SECTION TM
TRANSAXLE & TRANSMISSION

CONTENTS

PRECAUTION

PRECAUTIONS

Precaution for Technicians Using Medical Electric

INFOID:0000000007072231

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:0000000007079400

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:0000000007080036

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

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

WARNING:

Always observe the following items for preventing accidental activation.

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

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

WARNING:

Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the 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.**

High Voltage Precautions

INFOID:0000000007014522

WARNING:

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

CAUTION:

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

HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

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

HANDLING OF HIGH VOLTAGE HARNESS AND TERMINALS

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

REGULATIONS ON WORKERS WITH MEDICAL ELECTRONICS

WARNING:

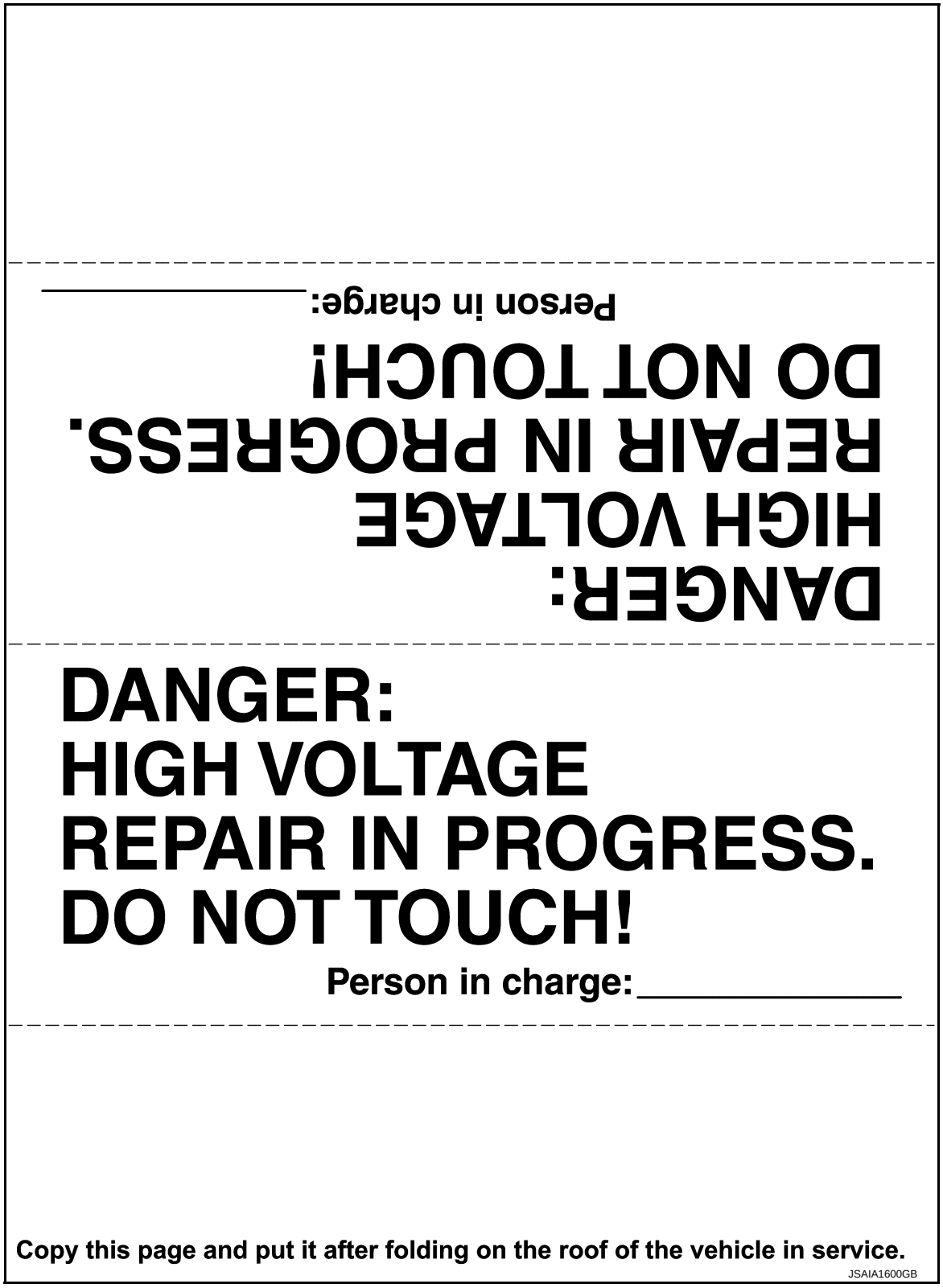
The vehicle contains parts that contain powerful magnets. If a person who is wearing a pacemaker or other medical device is close to these parts, the medical device may be affected by the magnets. Such persons must not perform work on the vehicle.

PROHIBITED ITEMS TO CARRY DURING THE WORK

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

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

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



Precaution for Removing 12V Battery

INFOID:0000000007014523

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

NOTE:

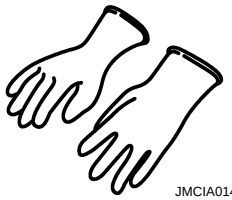
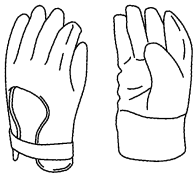
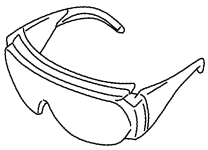
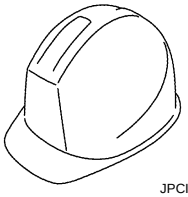
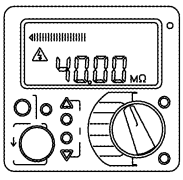
- The automatic 12V battery charge control may start even when the power switch is in OFF state.
- The automatic 12V battery charge control does not start within approximately one hour when the power switch is turned ON/OFF.

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000007005922

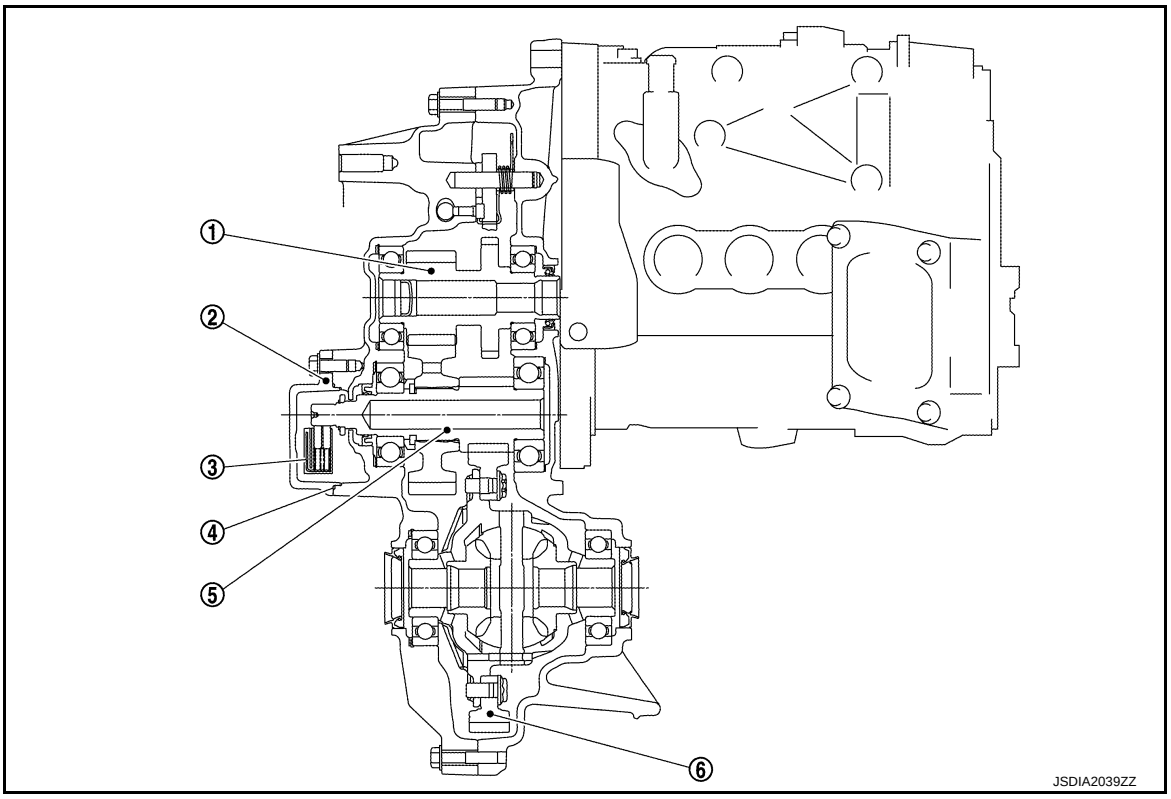
Tool name (Specific)		Description
Insulated gloves [Guaranteed insulation performance for 1000V/300A]	 JMCIA0149ZZ	Removing and installing high voltage components
Leather gloves [Use leather gloves that can fasten the wrist tight]	 JPCIA0066ZZ	• Removing and installing high voltage components • Protect insulated gloves
Insulated safety shoes	 JPCIA0011ZZ	Removing and installing high voltage components
Safety glasses [ANSI Z87.1]	 JPCIA0012ZZ	• Removing and installing high voltage components • To protect eye from the spatter on the work to electric line
Insulated helmet	 JPCIA0013ZZ	Removing and installing high voltage components
Insulation resistance tester (Multi tester)	 JPCIA0014ZZ	Measuring voltage and insulation resistance

SYSTEM DESCRIPTION

STRUCTURE AND OPERATION

Sectional View

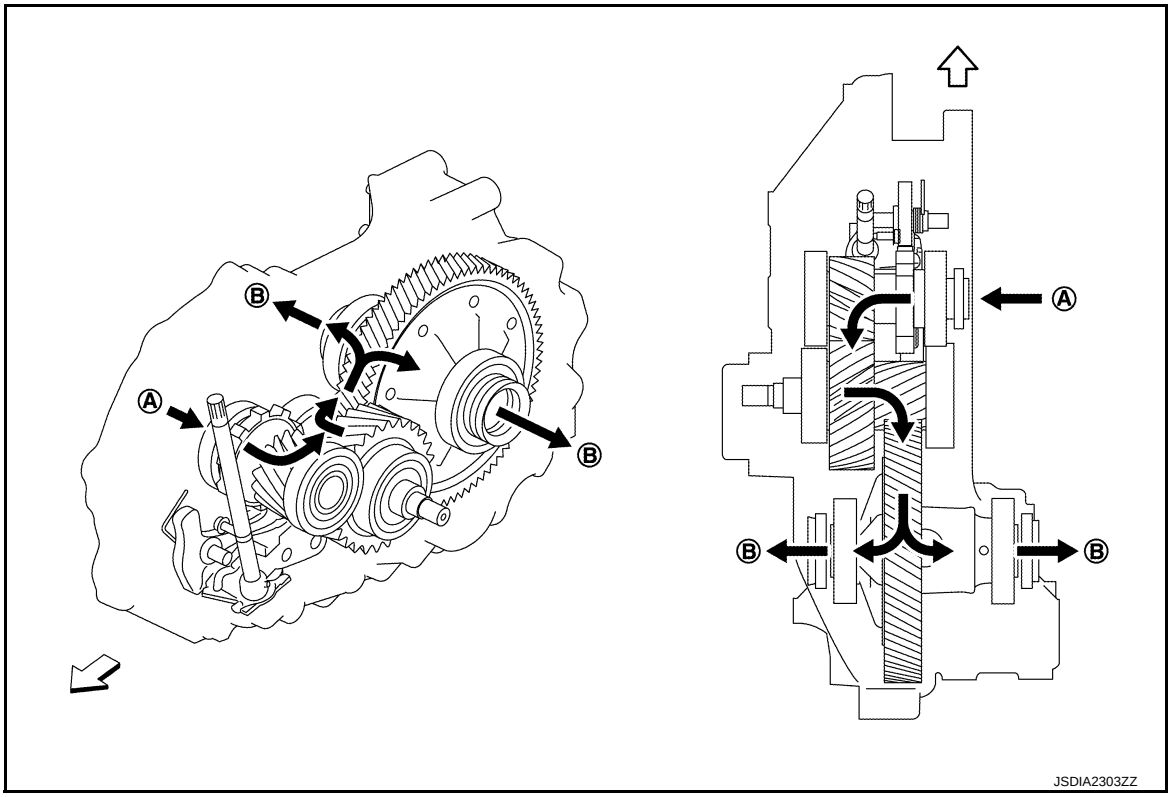
INFOID:0000000007005923



1. Input gear
2. Brush cover
3. Earth brush
4. O-ring
5. Main gear
6. Final gear

Power Transfer Diagram

INFOID:0000000007005924



PERIODIC MAINTENANCE

REDUCTION GEAR OIL

Inspection

INFOID:0000000007005925

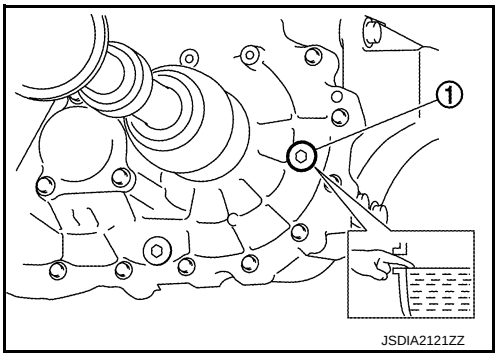
FLUID LEAKAGE

Check reduction gear surrounding area (oil seal, drain plug, and filler plug etc.) for fluid leakage.

FLUID LEVEL

- Remove filler plug (1) and gasket. Then check that fluid is filledup from mounting hole for the filler plug.
- Set a new gasket onto filler plug, and install it on reduction gear and tighten to the specified torque.

CAUTION:
- **Never reuse gasket.**
- **If foreign matter, such as gear abrasion powder, is on the magnet of the filler plug, wash it free of adherents before installation.**



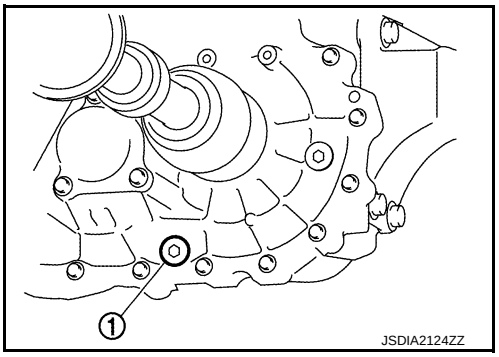
Draining and Refilling

INFOID:0000000007005926

DRAINING

1. Remove filler plug.
2. Remove drain plug (1) and drain gear oil.
3. Set a gasket on drain plug (1) and install it to reduction gear and tighten to the specified torque. Refer to TM-17, "Exploded View".

CAUTION:
- **Never reuse gasket.**
- **If foreign matter, such as gear abrasion powder, is on the magnet of the drain plug, wash it free of adherents before installation.**



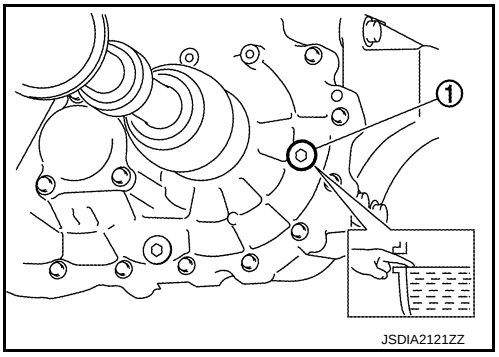
REFILLING

1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified level near filler plug mounting hole.

Oil grade	**: Refer to MA-9, "Fluids and Lubricants"**
Oil capacity	**: Refer to TM-21, "General Specifications"**

2. After refilling oil, check oil level. Set a gasket to filler plug (1),then install it to reduction gear. Refer to TM-17, "Exploded View".

CAUTION:
- **Never reuse gasket.**
- **If foreign matter, such as gear abrasion powder, is on the magnet of the filler plug, wash it free of adherents before installation.**

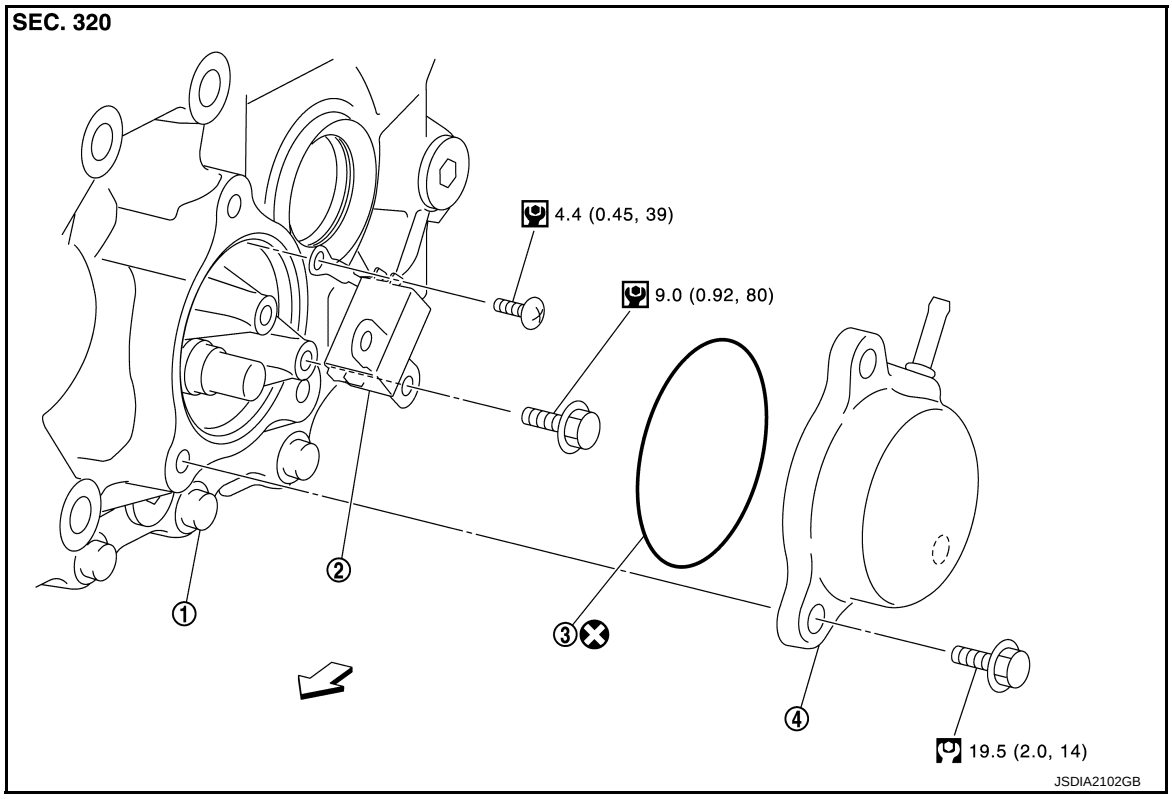


REMOVAL AND INSTALLATION

EARTH BRUSH

Exploded View

INFOID:0000000007005927



1. Reduction gear
2. Earth brush
3. O-ring
4. Brush cover

⇦ : Vehicle front

⊗ : Always replace after every disassembly.

: N·m (kg-m, in-lb)

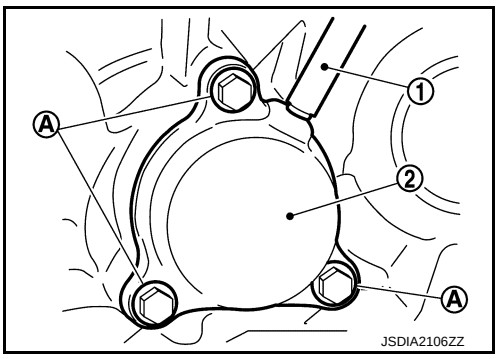
: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000007005928

REMOVAL

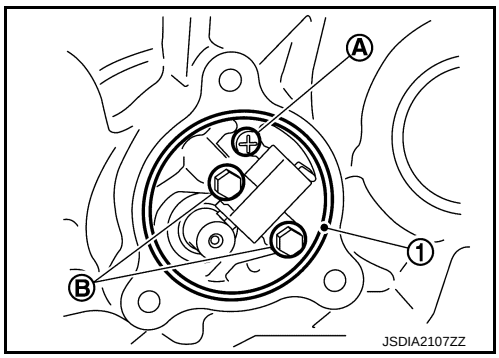
1. Disconnect breather hose (1) from brush cover (2), then remove 3 brush cover bolts (A) and remove brush cover.



2. Remove O-ring (1). Remove ground terminal fixing screw (A) and brush fixing bolts (B), then remove brush.

CAUTION:

- **Carefully remove brush, because the spring in the brush pushes out the brush.**
- **Take care that your hands and fingers do not contact head part of brush.**

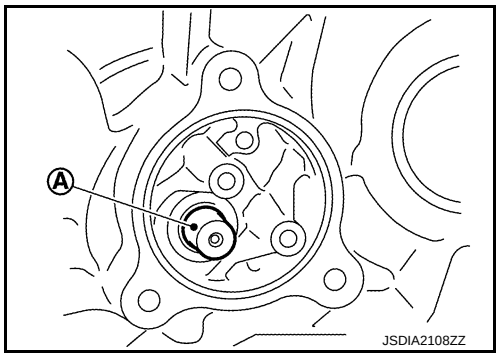


INSTALLATION

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

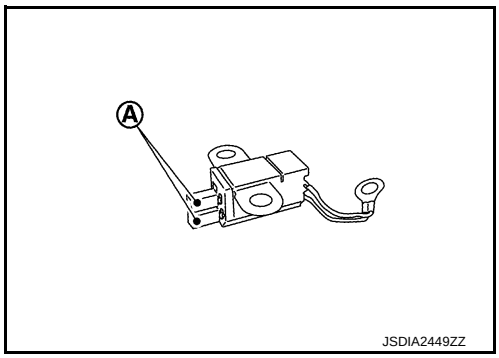
CAUTION:

- **Degrease shaft surface (A) (brush contact surface), and verify that there is no dust or other substance on it, then install the brush.**
- **Degrease brush contact surface, and verify that there is no dust or other substance on it, then install the brush.**
- **Never reuse O-ring.**
- **Do not apply oil to O-ring. Verify that there is no oil on it, then install O-ring.**
- **Take care that your hands and fingers do not contact brush when installing it.**

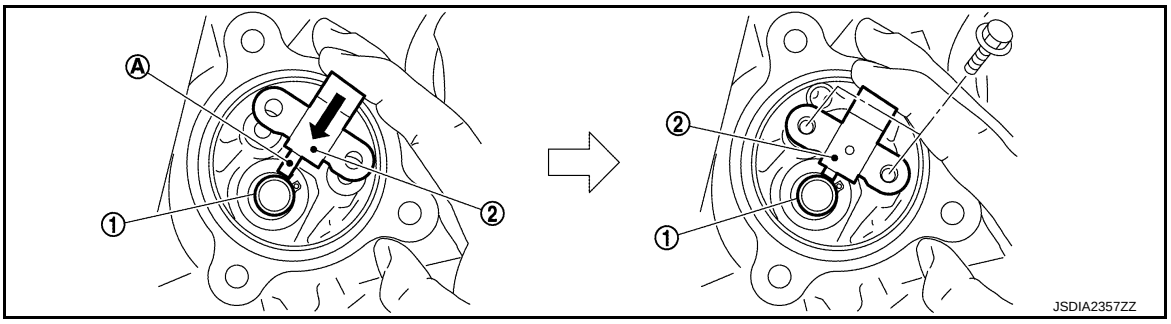


Assembly of brush

1. Install ground terminal, taking care that your hands do not contact brush (A).



2. Be sure that hands do not contact brush (A), press brush (2) onto shaft (1) and fasten with brush fixing bolt.



When Replacing With New Part

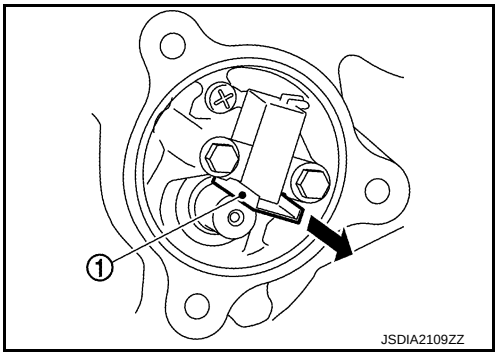
NOTE:

A new brush includes a stopper for preventing brush pop-out. Install with stopper attached.

When installing a new brush, pull out stopper after installation, allowing brush to contact shaft.

CAUTION:

Before installation, degrease the stopper surface (shaft side) and check that the surface is free of foreign matter.



Inspection

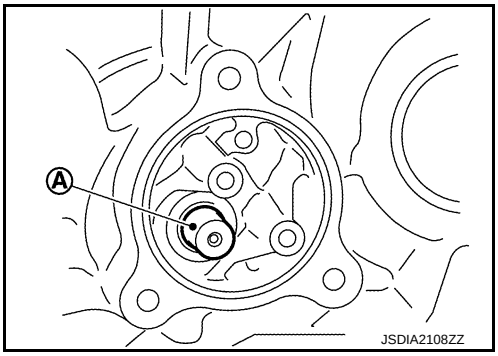
INFOID:0000000007005929

INSPECTION OF REDUCTION GEAR MAIN SHAFT

Check that there is no oil, dust, or other substance on main shaft surface (A), and that no corrosion has occurred.

CAUTION:

- **If oil, dust, or other substance is adhering, degrease shaft surface (brush contact surface) and remove dust or other adhering substance before installing.**
- **If there is corrosion on shaft surface, remove corrosion before installing.**



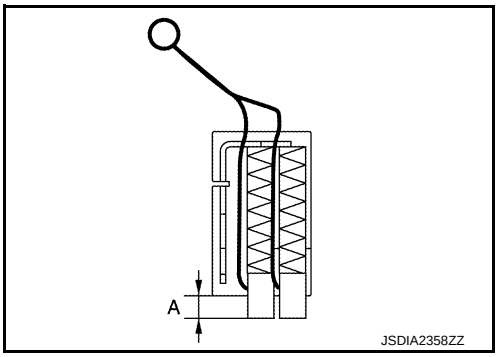
INSPECTION FOR BRUSH WEAR

Remove brush and measure amount of protrusion (A). If it is at or below limit value, replace brush.

Limit : TM-21, "Earth Brush"

CAUTION:

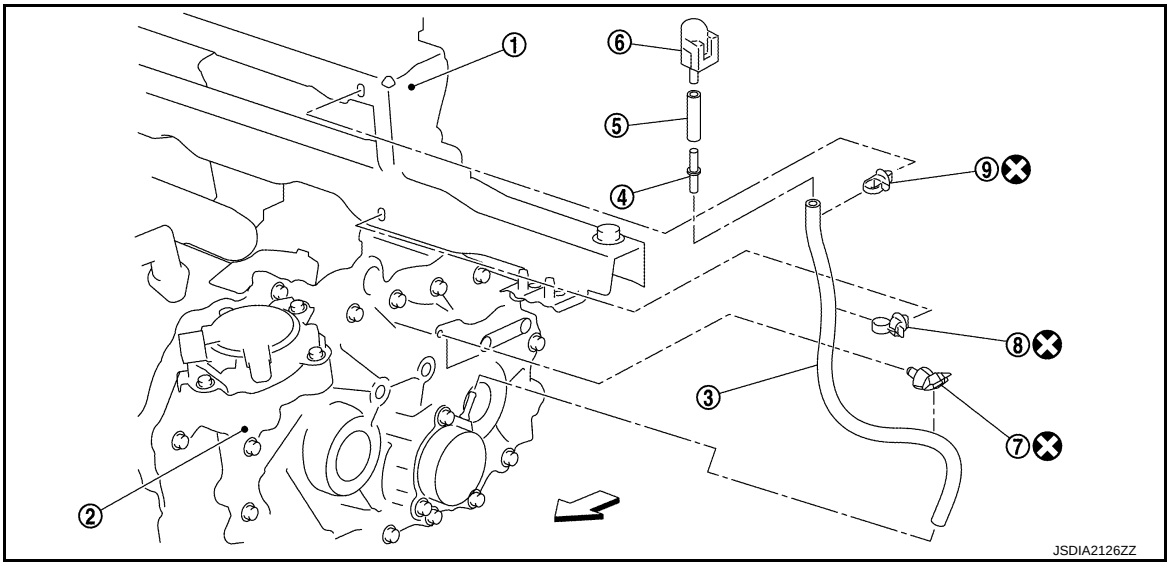
When reassembling with original parts, take care that oil does not contact brush. Refer to TM-14, "Inspection".



BREATHER HOSE

Exploded View

INFOID:0000000007005930



1. Inverter member
2. Reduction gear
3. Breather hose
4. Connector
5. Breather hose
6. Breather
7. Clip
8. Clip
9. Clip

⇦ : Vehicle front

⊗ : Always replace after every disassembly.

Removal and Installation

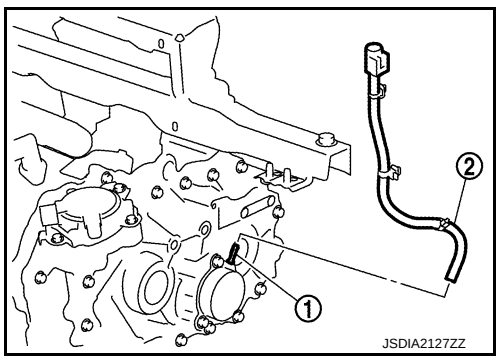
INFOID:0000000007005931

REMOVAL

1. Use a suitable tool and remove clip, then pull breather hose off of reduction gear tube.

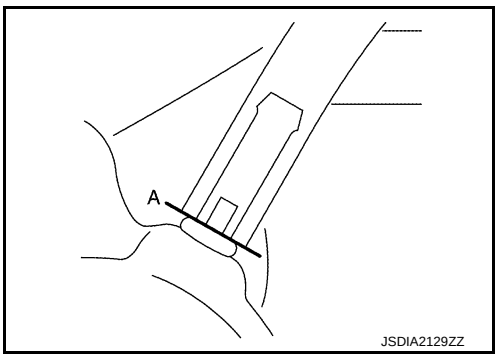
INSTALLATION

1. Face white paint on breather hose toward left side of vehicle, then fit breather hose (2) over reduction gear tube (1).

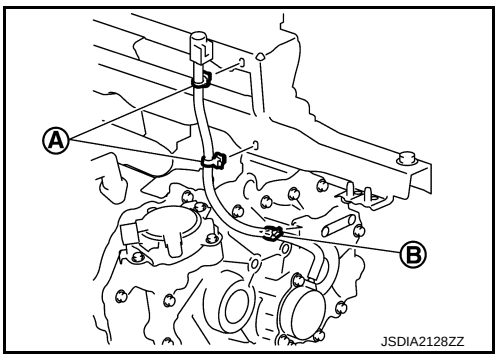


NOTE:

As shown in figure, fit breather hose onto reduction gear tube all the way to its base.

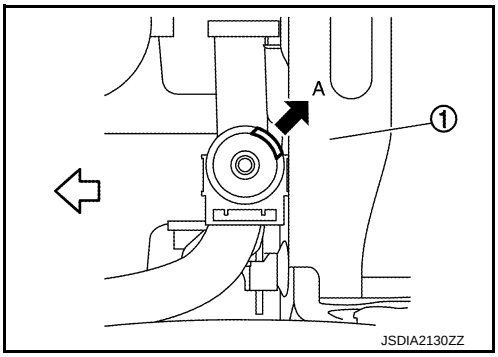


2. Install clips (1) into inverter member holes and clip (2) into reduction gear bolt hole.
CAUTION:
Since resin clip (hose clip) of breather hose is not reusable, never reuse it.



3. Face breather opening in direction (A) shown in figure.

⇦ : Vehicle front
(1) : Inverter member

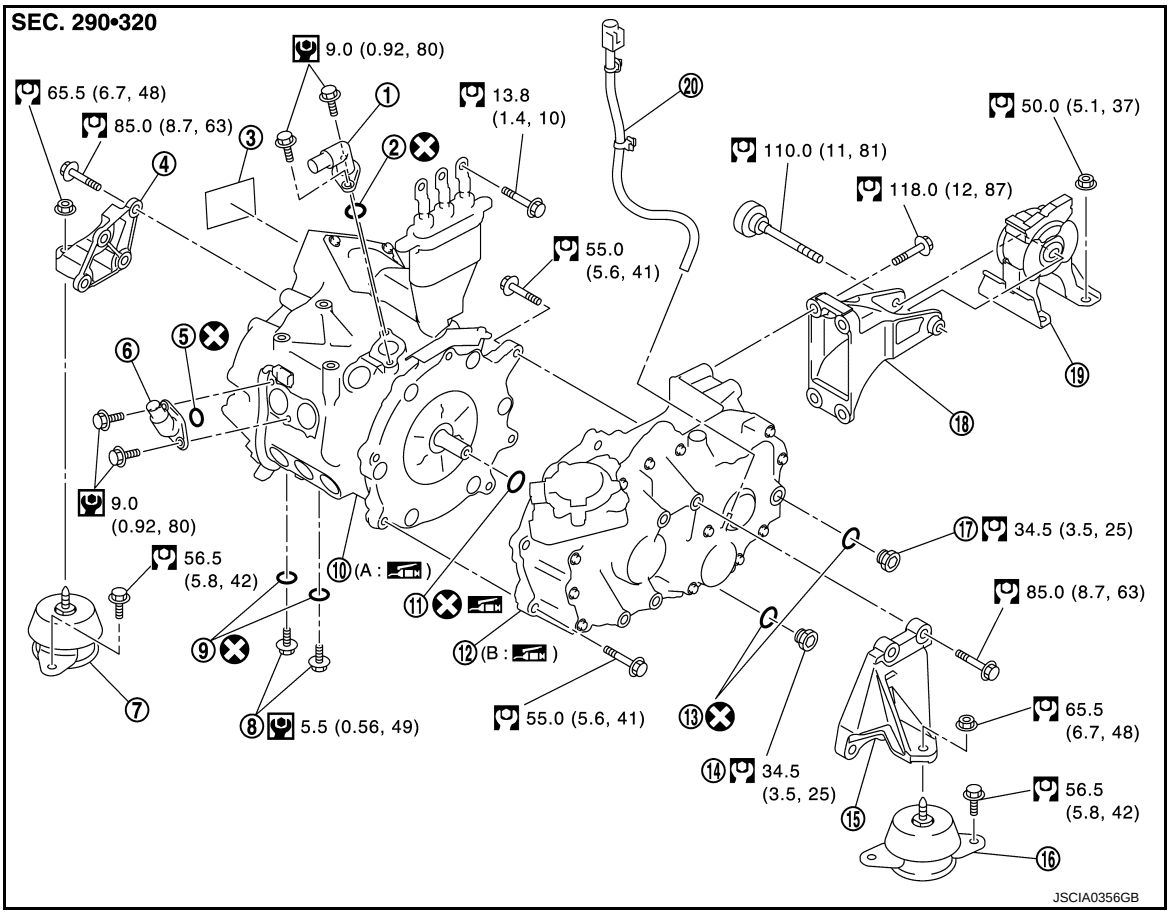


UNIT REMOVAL AND INSTALLATION

REDUCTION GEAR

Exploded View

INFOID:0000000007005932



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		
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:0000000007005933

WARNING:

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

- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to TM-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:
Shut off high voltage circuit. Refer to GI-31, "How to Cut Off High Voltage".

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

a. Remove Li-ion battery under cover.

WARNING:

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

b. Disconnect high voltage connector from front side of Li-ion battery.

DANGER:

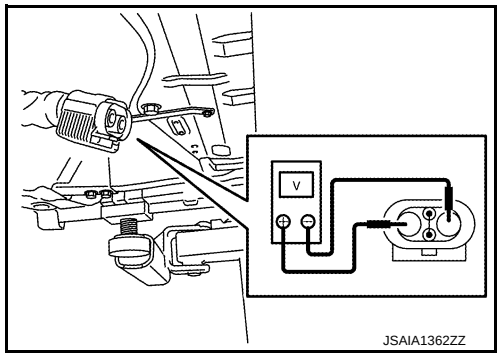
Touching high voltage components without using the appropriate protective equipment will cause electrocution.

c. Measure voltage between high voltage harness terminals.

DANGER:

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

Standard : 5 V or less

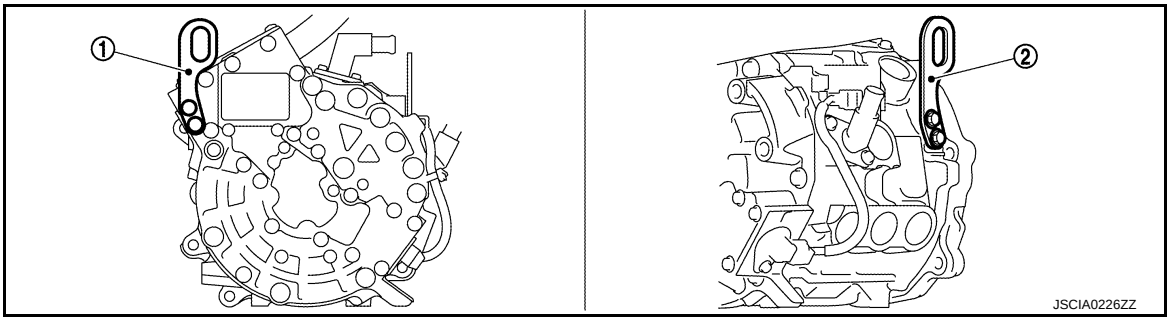


CAUTION:
For voltage measurements, use a tester which can measure to 500V or higher.

2. Drain coolant from radiator. Refer to HCO-9, "Draining and Refilling".
3. Remove traction motor inverter. Refer to TMS-115, "Removal and Installation".
4. Drain reduction gear oil from reduction gear. Refer to TM-11, "Draining and Refilling".
5. Remove traction motor and reduction gear from vehicle together as suspension member assembly. Refer to FSU-21, "Removal and Installation".
6. Remove left and right front drive shafts. Refer to FAX-19, "LEFT SIDE : Removal and Installation" (LH) and FAX-20, "RIGHT SIDE : Removal and Installation" (RH).
7. Install motor slinger onto traction motor, then lift traction motor with hoist so that traction motor does not become displaced when motor mounting and mounting bracket are removed.

WARNING:

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



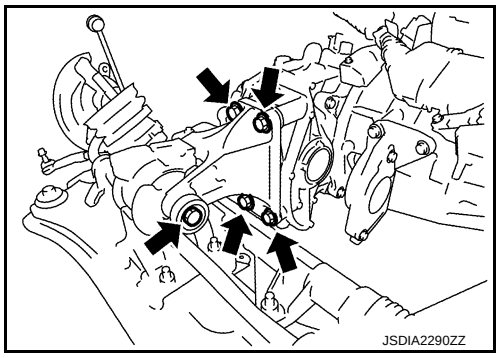
1 : Motor slinger (rear)
2 : Motor slinger (front)

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

8. Remove motor mounting rear bracket.

WARNING:

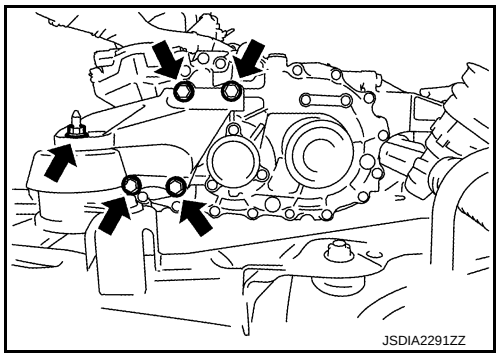
To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



9. Remove motor mounting LH bracket.

WARNING:

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



10. Remove mounting bolts of traction motor and reduction gear, then remove reduction gear.

WARNING:

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

INSTALLATION

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

WARNING:

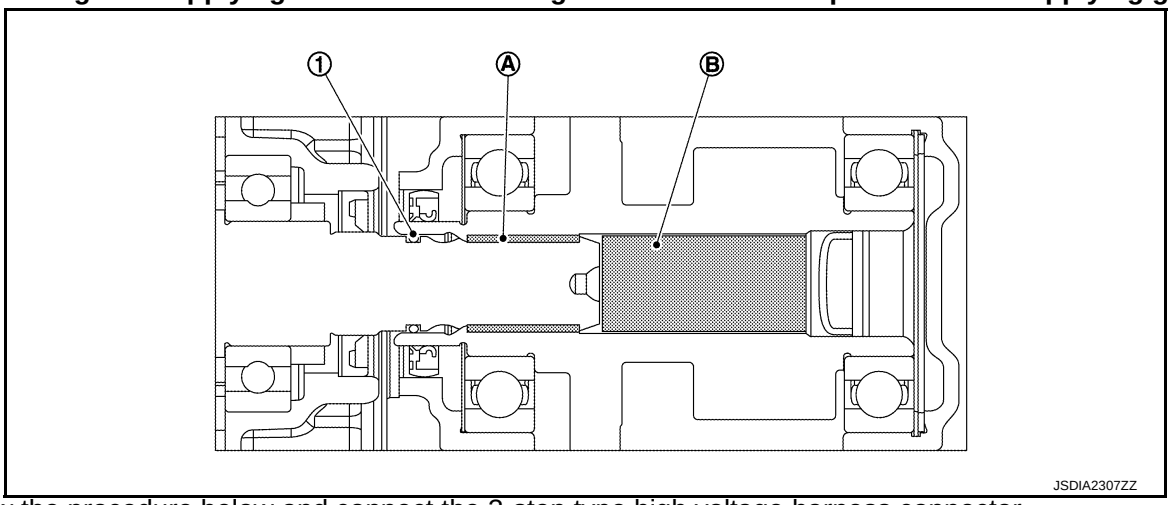
To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.

CAUTION:

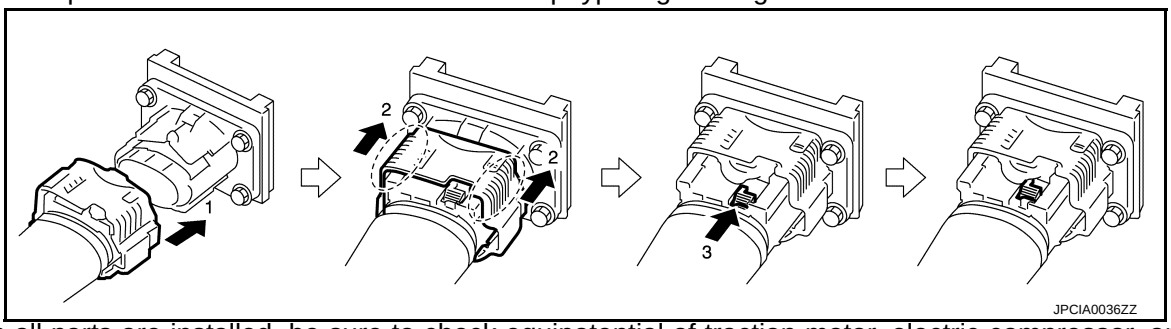
- **Be sure to reinstall high voltage harness clips in their original positions. If a clip is damaged, replace it with a new clip before installing.**
- **Be sure to perform correct air bleeding after adding coolant. Refer to HCO-9, "Draining and Refilling".**
- Before installing reduction gear and traction motor, apply grease to full periphery of shaft spline (A), and also inject grease [minimum 8.5 g (0.3 oz), maximum less than 20 g (0.7 oz)] into reduction gear input shaft (inside spline) (B). Take care to prevent damage to O-ring (1) when installing.

  CAUTION:

  Clean the grease applying area to remove old grease and abrasion powder before applying grease.



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



- When all parts are installed, be sure to check equipotential of traction motor, electric compressor, and traction motor inverter.

- Refer to TMS-127, "Inspection". (Traction motor)
- Refer to HA-49, "Inspection". (Electric compressor)
- Refer to TMS-121, "Inspection". (Traction motor inverter)

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000007005934

Reduction gear model		RE1F61A
Gear ratio		7.937
Number of teeth	Input gear	17
	Main gear (IN / OUT)	31 / 17
	Final gear	74
Oil capacity (Approx.)	ℓ (US pt, lmp pt)	1.1 (2-3/8, 1-7/8)

Earth Brush

INFOID:0000000007005935

Unit: mm (in)

Item		Limit
Earth brush	Protrusion length	4.0 (0.157)

PRECAUTION

PRECAUTIONS

Precaution for Technicians Using Medical Electric

INFOID:0000000007071849

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:0000000007079412

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:0000000007080037

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

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

WARNING:

Always observe the following items for preventing accidental activation.

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

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

WARNING:

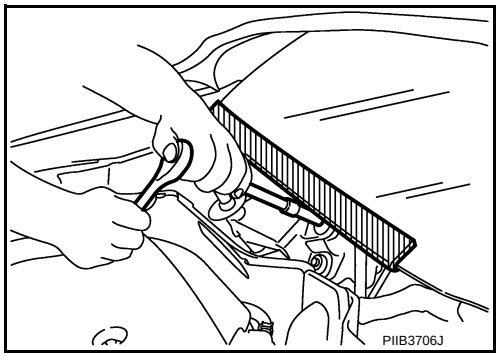
Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the 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:0000000007005938

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



Precaution for Removing 12V Battery

INFOID:0000000007005939

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

NOTE:

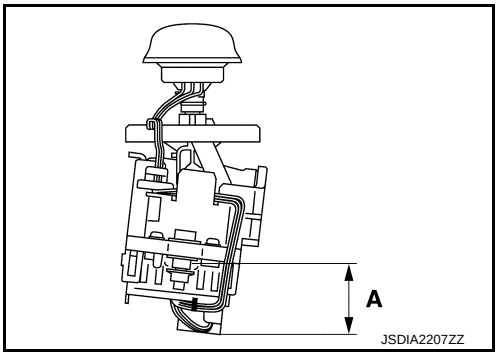
- The automatic 12V battery charge control may start even when the power switch is in OFF state.
- The automatic 12V battery charge control does not start within approximately one hour when the power switch is turned ON/OFF.

General Precautions

INFOID:0000000007005940

- Never turn the power switch ON while the selector lever is in the D or R position. Otherwise, the vehicle may start abruptly resulting in an accident.
- Never shift the selector lever to the R position while the vehicle is moving forward, or to the D position while moving backward, or press the P position switch while the vehicle is in motion. Otherwise, excessive force may be applied to the drive system causing damage.
- Never allow the vehicle to coast backward while the selector lever is in the D position or forward while the selector lever is in the R position.

- Part A shown in the figure contains a strong magnet. Persons with an electro-medical apparatus should keep away from this area. Otherwise, the magnet may cause the electro-medical apparatus to malfunction.
- Keep magnetic objects, such as magnetic cards, and metal products (e.g. watches) away from the area surrounding the magnet.



SYSTEM DESCRIPTION

DESCRIPTION

Description

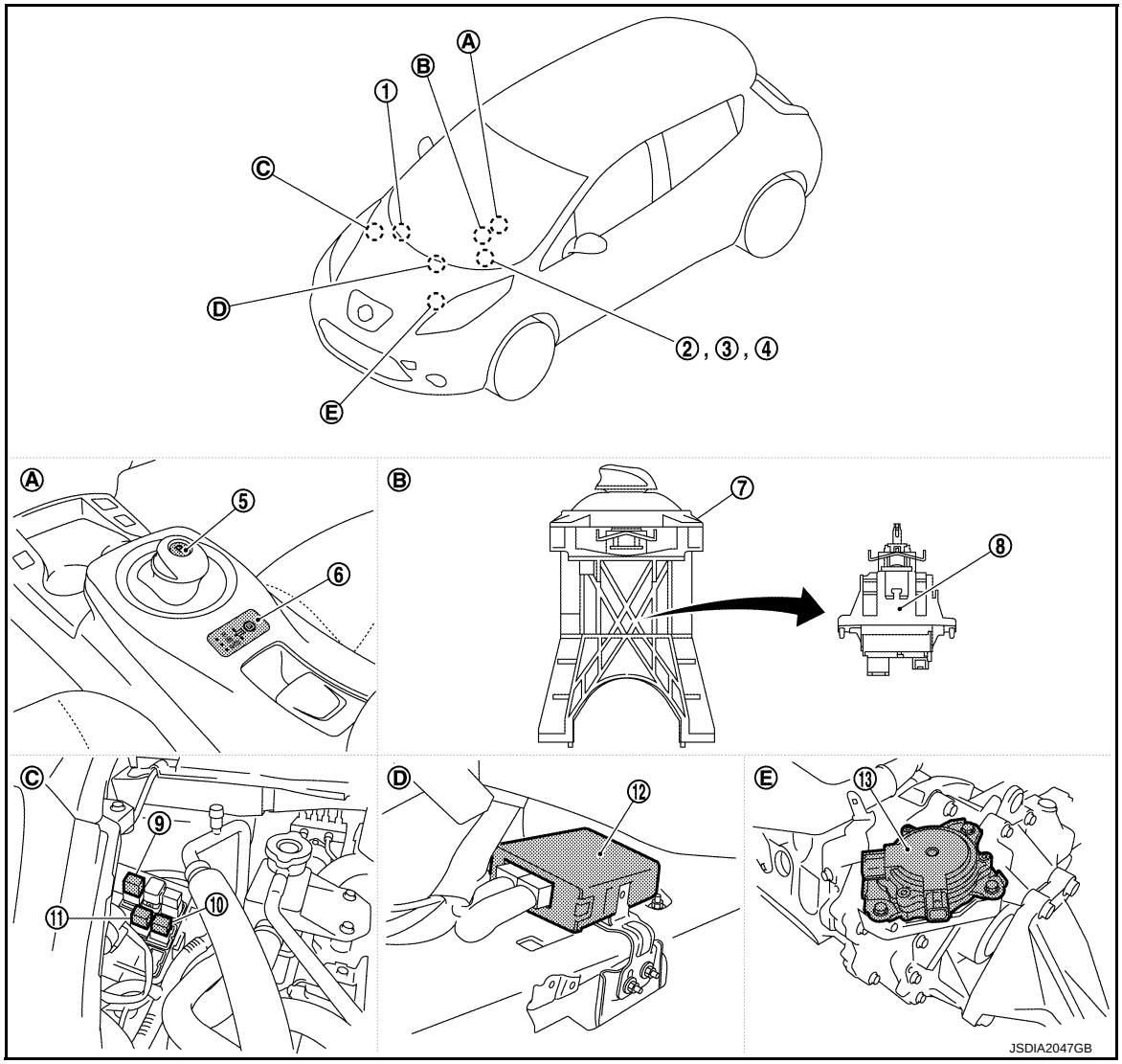
INFOID:0000000007005941

- Instead of the conventional mechanical shift mechanism, the electric shift system is adopted which electrically detects shifting operation and locks/unlocks the parking mechanism by operating the parking actuator.
- The momentary-type selector lever is adopted for mouse-like fine shift operability.
- The automatic P position function, which automatically shifts the gear to the P position if the power switch is turned OFF in the R, N, or D position, is adopted.
- For improved functionality and operability, the P position switch, which allows direct switching to the P position at the touch of the switch, is provided on the top of the selector lever.

COMPONENT PARTS

Component Parts Location

INFOID:0000000007005942



A. Finisher
B. Electric shift selector
C. Motor room
D. Center console, under
E. Reduction gear, upper

COMPONENT DESCRIPTION

No.	Name	Function
1	VCM	Switches the driving condition, according to a shift position signal received from the electric shift control module.
2	Combination meter	Sounds a buzzer, according to a command sent from the electric shift control module when the shift reject function is activated.
3	Shift position indicator	TM-29, "Shift Position Indicator"
4	Electric shift warning lamp	TM-28, "Electric Shift Warning Lamp"
5	P position switch	TM-28, "P Position Switch"
6	Selector indicator	TM-29, "Selector Indicator"
7	Electric shift selector	TM-28, "Electric Shift Selector"
8	Electric shift sensor	TM-28, "Electric Shift Sensor"

No.	Name	Function
9	Electric shift power supply relay	TM-27, "Electric Shift Power Supply Relay"
10	Parking actuator relay A	TM-27, "Parking Actuator Relay A"
11	Parking actuator relay B	TM-28, "Parking Actuator Relay B"
12	Electric shift control module	TM-27, "Electric Shift Control Module"
13	Parking actuator	TM-27, "Parking Actuator"

Electric Shift Control Module

INFOID:0000000007005943

- The electric shift control module is started by the power switch signal and wake-up signal transmitted from BCM.
- The electric shift control module determines the shift position based on the shift position data (ON/OFF signal) from the electric shift sensor, and transmits the shift position data to VCM via EV system CAN.
- The electric shift control module operates the parking actuator based on the signal from the P position switch.

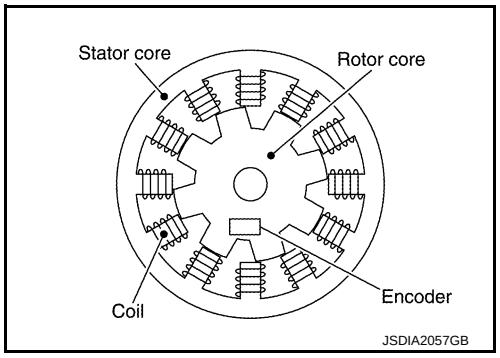
Parking Actuator

INFOID:0000000007005944

- The parking actuator is installed above the reduction gear.
- The parking actuator is operated by the signal from the electric shift control module and locks/unlocks the parking mechanism in the reducer.
- The parking actuator consists of the motor, encoder, angle sensor, and actuator reduction gear.

MOTOR

- A dual 3-phase SR motor is used.
- Two different types of coils are placed on the stator core around the motor and the current that passes through the coils in sequence generates the rotating force for the inner rotor core.



ENCODER

- The Hall IC type rotation angle sensor is used for higher accuracy in the detection of the rotor rotation angle.
- It detects the rotor rotation angle and outputs pulse signals to the electric shift control module.
- The electric shift control module controls the timing of the current feed to the coils optimally based on the signal from the encoder.

ANGLE SENSOR

The Hall IC type angle sensor is used for higher accuracy in the detection of the manual plate angle.

ACTUATOR REDUCTION GEAR

The actuator reduction gear consists of a cycloidal gear and includes a motor with its torque amplified for secure operation under high torque-requiring conditions.

Electric Shift Power Supply Relay

INFOID:0000000007005945

The electric shift power supply relay is turned ON by the electric shift control module when the power switch is turned ON and supplies a system voltage to the electric shift control module.

Parking Actuator Relay A

INFOID:0000000007005946

The parking actuator relay A is turned ON by the electric shift control module when the power switch is turned ON and supplies power to the motor coil A located in the parking actuator.

Parking Actuator Relay B

INFOID:0000000007005947

The parking actuator relay B is turned ON by the electric shift control module when the power switch is turned ON and supplies power to the motor coil B located in the parking actuator.

Electric Shift Warning Lamp

INFOID:0000000007005948

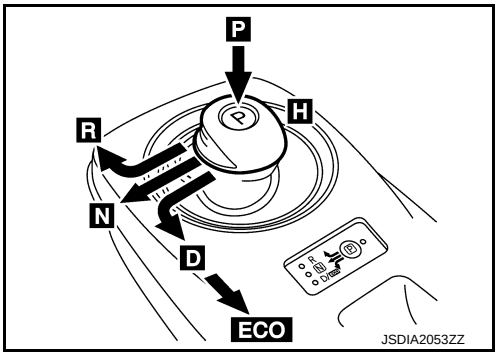
- The electric shift warning lamp illuminates if a malfunction occurs in the electric shift system.
- When the power switch is turned ON, the electric shift warning lamp illuminates for approximately 2 seconds for a bulb check and then turns OFF.

Electric Shift Selector

INFOID:0000000007005949

The electric shift selector consists of the selector lever, electric shift sensor, P position switch and others.

Shift position	Operation/Function
H (Home position)	The selector lever automatically moves back to the home position after it is operated.
P (P position switch)	Completely stop the vehicle and push the P position switch on the top of the selector lever while depressing the brake pedal.
R	While depressing the brake pedal, slide the selector lever forward along the gate.
N	While depressing the brake pedal, slide the selector lever to the left and hold it for approx. 1 second.
D/ECO	• While depressing the brake pedal, slide the selector lever backward along the gate. • If the selector lever is slid backward again while driving in the D position, the vehicle switches to ECO mode. • To switch from ECO mode to the D position driving, slide the selector lever backward again.



NOTE:
- Shifting is not possible when the power switch is OFF or ACC.
- Buzzer sounds and shifting is not possible when the selector lever is shifted from the P position to another position without depressing the brake pedal while the power switch is ON.
- The gear always shifts to the N position when selector lever is shifted from the P position to another position while depressing the brake pedal while the power switch is ON.
- Direct shifting to the ECO mode from the P position is not possible.

Electric Shift Sensor

INFOID:0000000007005950

- The electric shift sensor integrates 6 non-contact sensors (Hall IC) and transmits ON/OFF signals to the electric shift control module.
- The electric shift control module determines the shift position from the combination of the ON/OFF signals.

Electric shift control module recognition position	Selector lever position	P position SW	Electric shift sensor						P position SW	
			No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
H	H	No push	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
P	H	Push	OFF	OFF	ON	OFF	OFF	ON	ON	OFF
R	R	No push	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
N	N	No push	OFF	ON	ON	ON	OFF	OFF	OFF	ON
D	D	No push	OFF	OFF	OFF	ON	ON	OFF	OFF	ON

P Position Switch

INFOID:0000000007005951

- The P position switch allows direct one-touch switching to the P position from any position while the vehicle is stopped.

- The P position switch does not have a function to cancel the P position.
- The P position switch transmits the ON/OFF signals of 2 contact switches to the electric shift control module.

Electric shift control module recognition position	Selector lever position	P position SW	Electric shift sensor						P position SW	
			No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
H	H	No push	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
P	H	Push	OFF	OFF	ON	OFF	OFF	ON	ON	OFF
R	R	No push	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
N	N	No push	OFF	ON	ON	ON	OFF	OFF	OFF	ON
D	D	No push	OFF	OFF	OFF	ON	ON	OFF	OFF	ON

Selector Indicator

INFOID:0000000007005952

The selector indicator is located in the finisher area and the lamp for the currently selected shift position illuminates.

Shift Position Indicator

INFOID:0000000007005953

- The shift position indicator is located in the combination meter.
- The shift position indicator indicates the currently selected shift position.
- The shift position indicator turns OFF if a malfunction occurs in the electric shift system.

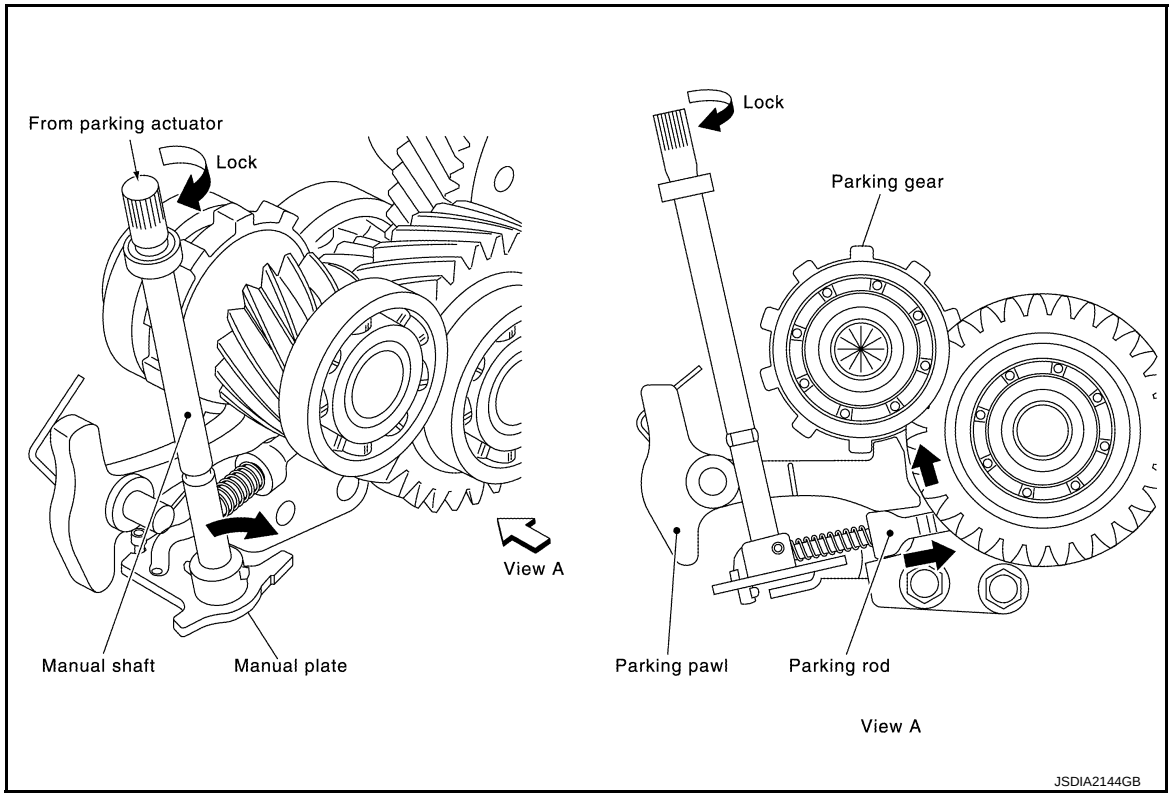
STRUCTURE AND OPERATION

Operating Principle

INFOID:0000000007005954

PARKING MECHANISM

- The parking mechanism consists of the manual shaft, manual plate, detent spring, parking rod, parking pawl and parking gear, and it is locked/unlocked by the operation of the parking actuator.
- If the parking actuator is operated by the signal from the electric shift control module, the manual shaft and manual plate that is mechanically connected to the parking actuator rotates sliding the parking rod. The sliding parking rod pushes up the parking pawl, which engages with the parking gear locking the parking mechanism.



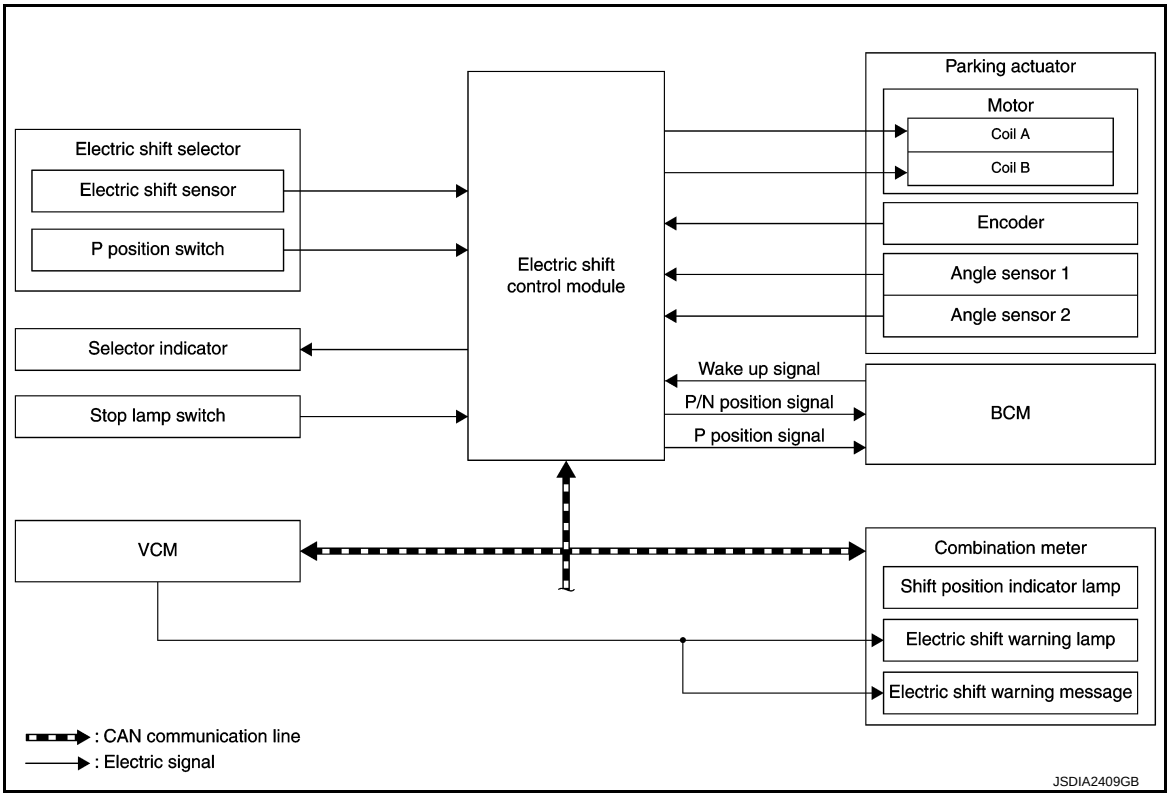
SYSTEM

System Description

INFOID:0000000007005955

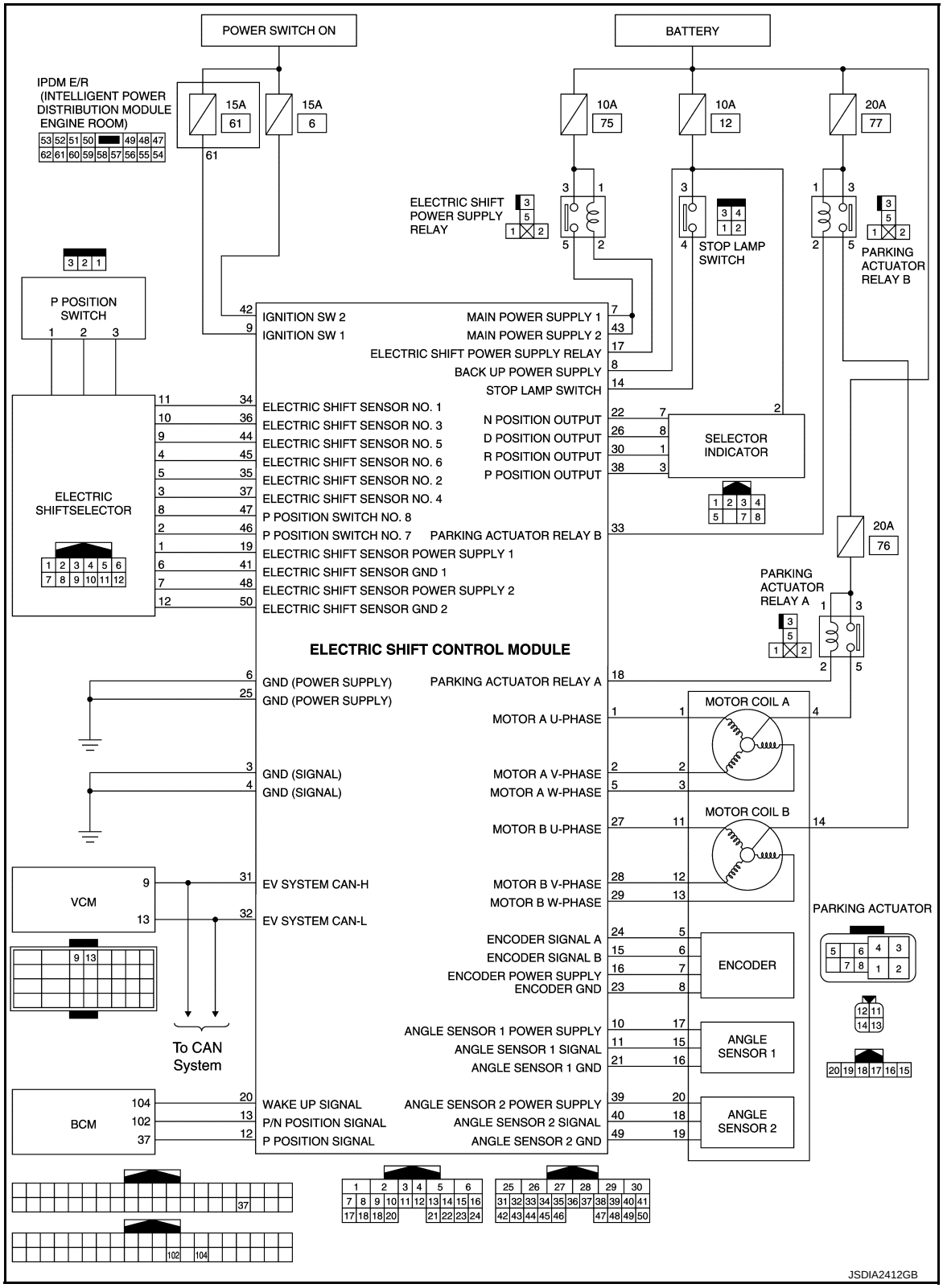
- The electric shift system detects each shift position electrically. In addition, in P position, the electric shift system activates the parking actuator, according to electrical signals received from the P position switch and brings the vehicle into the parking state.
- In the event of a malfunction in the electric shift system, the shift position indicator (in the combination meter) turns OFF and only the selector indicator (in the electric shift selector area) indicates the shift position.
- In the event of a malfunction in the electric shift system, the system enters fail-safe mode. Refer to TM-42, "Fail-Safe".

SYSTEM DIAGRAM



Schematic

INFOID:0000000007005956



Fail-Safe

INFOID:0000000007005957

DTC	Vehicle behavior	
P0571	—	
P0705	When shifting to the R position and the D position, the reaction becomes slower and it takes approximately 1 second to complete shifting	
P0706	Shifting to the R position, N position and D position is prohibited	
P0780	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P1722	—	
P1802	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P1803	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P1804	—	
P1811	Automatic P position system is disabled	
P1895	—	
P1896	When shifting to the R position and the D position, the reaction becomes slower and it takes approximately 1 second to complete shifting	
P1897	—	
P1899	—	
P189A	—	
P189B	—	
P189C	—	
P189D	—	
P189E	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P189F	—	
P18A0	—	
P18A1	—	
P18A2	—	
P18A3	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P18A4	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P18A6	—	
P18A7	Shifting operation is prohibited	
P18A8	Pushing the P position switch does not switch the to the P position	
P18A9	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P18AA	Shifting from the P position to another position is prohibited	
P18AB	Automatic P position system may be disabled	
P18AC	—	
P18AD	—	
P18AE	—	

DTC	Vehicle behavior	
U1000	EV system CAN with VCM blocked	Shifting to the R position and the D position is prohibited
	Other than the above	—
U1010	Shifting to the R position and the D position is prohibited	
U1086	—	

Protection Control

INFOID:0000000007005958

If shifting from the P position to another position and shifting from another position to the P position are repeated within a short period of time, it may become impossible to shift from the P position to another position and from another position to the P position for system protection. In this case, the system automatically returns to the normal state allowing shifting after approximately 10 seconds.

DIAGNOSIS SYSTEM (ELECTRIC SHIFT)

DIAGNOSIS DESCRIPTION

DIAGNOSIS DESCRIPTION : System Description

INFOID:0000000007005959

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

INFOID:0000000007005960

- DTC (P0571, P0705, P0780, etc.) is specified by SAE J2012/ISO 15031-6.
- Electric shift control module memorizes DTC when malfunction is detected. It can memorize plural DTCs.

DIAGNOSIS DESCRIPTION : Counter System

INFOID:0000000007005961

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:0000000007005962

APPLICABLE ITEMS

Mode	Function description
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 name	Description
P POSITION LEARNING VALUE CLEAR	Erase the P position stored in the electric shift control module. Refer to TM-57, "Work Procedure".

SELF DIAGNOSTIC RESULTS

Display Item List

Refer to TM-44, "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”.

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 “SHIFT” of CONSULT.
2. Touch “Self Diagnostic Result”.
3. Touch “Erase”. (DTC memorized in electric shift control module 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.
- If the number of operation exceeds 39, the displayed number will be fixed at “39” until the self diagnosis result is erased.

DATA MONITOR

Monitored item (Unit)	Remarks
SHIFT SENSOR 1	Displays the signal value of electric shift sensor No. 1
SHIFT SENSOR 2	Displays the signal value of electric shift sensor No. 2
SHIFT SENSOR 3	Displays the signal value of electric shift sensor No. 3
SHIFT SENSOR 4	Displays the signal value of electric shift sensor No. 4
SHIFT SENSOR 5	Displays the signal value of electric shift sensor No. 5
SHIFT SENSOR 6	Displays the signal value of electric shift sensor No. 6
P POSITION SWITCH 1	Displays the signal value of P position switch No. 7
P POSITION SWITCH 2	Displays the signal value of P position switch No. 8
BRAKE SWITCH	Displays the signal value of the stop lamp switch.
PARKING ACTUATOR RELAY A	Displays the command value from the electric shift control module to parking actuator relay A
PARKING ACTUATOR RELAY B	Displays the command value from the electric shift control module to parking actuator relay B
P/N POSITION CONDITION	Displays the P position and N position status recognized by the electric shift control module
NOT P POSITION CONDITION	Displays a status other than the P position recognized by the electric shift control module
IGNITION SWITCH	Displays the input status of the power switch
BRAKE SWITCH (CAN)	Displays the signal value of the stop lamp switch received from VCM
P POSI LEARNING STATUS	Displays the P position learning status
BACK UP POWER VOLTAGE (V)	Monitors the voltage value of the memory backup power supply and displays the monitored value
MAIN POWER VOLTAGE (V)	Monitors the voltage value of the main power supply for the electric shift control module and displays the monitored value
MOTOR A U VOLTAGE (V)	Displays the motor A U-phase terminal voltage A/D converted value
MOTOR A V VOLTAGE (V)	Displays the motor A V-phase terminal voltage A/D converted value
MOTOR A W VOLTAGE (V)	Displays the motor A W-phase terminal voltage A/D converted value
MOTOR B U VOLTAGE (V)	Displays the motor B U-phase terminal voltage A/D converted value
MOTOR B V VOLTAGE (V)	Displays the motor B V-phase terminal voltage A/D converted value
MOTOR B W VOLTAGE (V)	Displays the motor B W-phase terminal voltage A/D converted value
ANGLE SENSOR 1 VOLTAGE (V)	Displays the input voltage value of angle sensor 1
ANGLE SENSOR 2 VOLTAGE (V)	Displays the input voltage value of angle sensor 2
RANGE POSITION	Displays the position recognized by the electric shift control module
SHIFT POSITION JUDGMENT	Displays the shift input position recognized by the electric shift control module
TARGET SHIFT POSITION	Displays the target shift position recognized by the electric shift control module
ECO MODE REQUEST	Displays the ECO mode status recognized by the electric shift control module
ACTUAL P POSITION	Displays the P position status recognized by the electric shift control module
VEHICLE SPEED (VDC) (km/h or mph)	Displays the signal value of the vehicle speed received from ABS actuator control unit
VEHICLE SPEED (VCM) (km/h or mph)	Displays the vehicle speed signal value received from VCM

Monitored item (Unit)	Remarks
E-SHIFT WARNING LAMP	Displays the electric shift warning lamp signal status transmitted from the electric shift control module
E-SHIFT WARNING MSG	Displays the master warning message status transmitted from the electric shift control module

ECU DIAGNOSIS INFORMATION

ELECTRIC SHIFT CONTROL MODULE

Reference Value

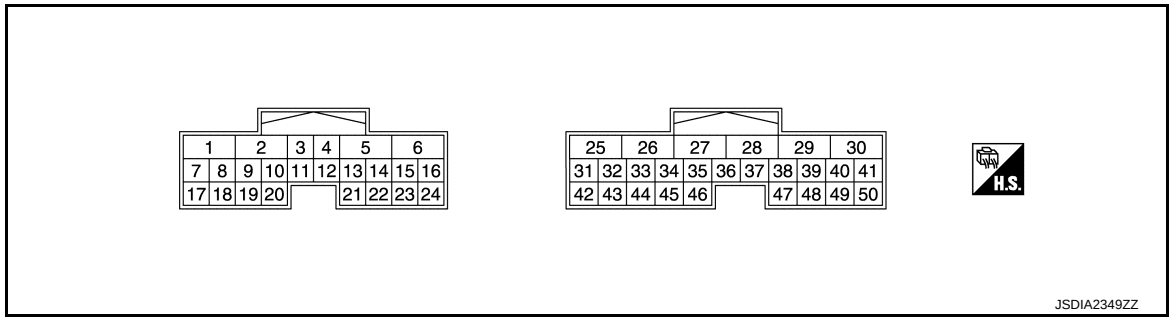
INFOID:0000000007005963

CONSULT DATA MONITOR STANDARD VALUE

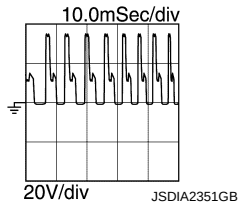
Monitor item	Condition	Value / Status (Approx.)
SHIFT SENSOR 1	Selector lever is held in R position	ON
	Other than the above	OFF
SHIFT SENSOR 2	Selector lever is held in R and N positions	ON
	Other than the above	OFF
SHIFT SENSOR 3	Selector lever is held in H (Home) and N positions	ON
	Other than the above	OFF
SHIFT SENSOR 4	Selector lever is held in N and D positions	ON
	Other than the above	OFF
SHIFT SENSOR 5	Selector lever is held in D position	ON
	Other than the above	OFF
SHIFT SENSOR 6	Selector lever in H (Home) position	ON
	Other than the above	OFF
P POSITION SWITCH 1	P position switch is pushed	ON
	Other than the above	OFF
P POSITION SWITCH 2	P position switch is pushed	OFF
	Other than the above	ON
BRAKE SWITCH	Brake pedal is depressed	ON
	Brake pedal is released	OFF
PARKING ACTUATOR RELAY A	Power switch is ON	ON
PARKING ACTUATOR RELAY B	Power switch is ON	ON
P/N POSITION CONDITION	Selector lever in P and N positions	ON
	Other than the above	OFF
NOT P POSITION CONDITION	Selector lever in P position	OFF
	Other than the above	ON
IGNITION SWITCH	Power switch is ON	ON
BRAKE SWITCH (CAN)	Brake pedal is depressed	ON
	Brake pedal is released	OFF
P POSI LEARNING STATUS	P position learning is completed	COMP
	P position learning is not completed	INCOMP
BACK UP POWER VOLTAGE	Power switch is ON	9 – 16 V
MAIN POWER VOLTAGE	Power switch is ON	9 – 16 V
MOTOR A U VOLTAGE	No shifting	9 – 16 V
MOTOR A V VOLTAGE	No shifting	9 – 16 V
MOTOR A W VOLTAGE	No shifting	9 – 16 V
MOTOR B U VOLTAGE	No shifting	9 – 16 V
MOTOR B V VOLTAGE	No shifting	9 – 16 V
MOTOR B W VOLTAGE	No shifting	9 – 16 V

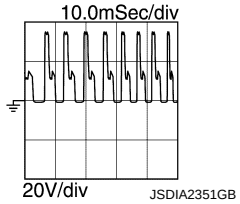
Monitor item	Condition	Value / Status (Approx.)
ANGLE SENSOR 1 VOLTAGE	Selector lever in P position (Manual plate: P position)	1.42 – 2.20 V
	Other than the above (Manual plate: Not P position)	2.85 – 3.56 V
ANGLE SENSOR 2 VOLTAGE	Selector lever in P position (Manual plate: P position)	1.42 – 2.20 V
	Other than the above (Manual plate: Not P position)	2.85 – 3.56 V
RANGE POSITION	Selector lever in P position	P
	Selector lever in R position	R
	Selector lever in N position	N
	Selector lever in D position	D
SHIFT POSITION JUDGMENT	Selector lever in P position	P
	Selector lever in R position	R
	Selector lever in N position	N
	Selector lever in D position	D
TARGET SHIFT POSITION	Selector lever in P position	P
	Selector lever in R position	R
	Selector lever in N position	N
	Selector lever in D position	D
ECO MODE REQUEST	During ECO mode driving	ECO
	Other than the above	NORML
ACTUAL P POSITION	Selector lever in P position	P
	Other than the above	NOT P
VEHICLE SPEED (VDC)	During driving	Almost same as the speedometer display
VEHICLE SPEED (VCM)	During driving	Almost same as the speedometer display
E-SHIFT WARNING LAMP	Electric shift warning lamp: ON	ON
	Electric shift warning lamp: OFF	OFF
E-SHIFT WARNING MSG	Warning message is not displayed	—
	Warning message: “When Parked Apply Parking Brake”	MSG1
	Warning message: “T/M system malfunction visit dealer”	MSG2
	Warning message: “Check position of shift lever”	MSG3

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal (Wire color)		Item		Condition		Value (Approx.)
+	—	Signal name	Input/ Output			
1 (L)	Ground	MOTOR COIL A U-PHASE	Output	Power switch ON		9 – 16 V
				Power switch OFF		0 V
2 (W)	Ground	MOTOR COIL A V-PHASE	Output	Power switch ON		9 – 16 V
				Power switch OFF		0 V
3 (B)	Ground	GND	—	Always		0 V
4 (B)	Ground	GND	—	Always		0 V
5 (V)	Ground	MOTOR COIL A W-PHASE	Output	Power switch ON		9 – 16 V
				Power switch OFF		0 V
6 (B)	Ground	GND (MOTOR)	—	Always		0 V
7 (W)	Ground	MAIN POWER SUPPLY 1	Input	Power switch ON		9 – 16 V
				Power switch OFF		0 V
8 (R)	Ground	BACK UP POWER SUPPLY	Input	Always		9 – 16 V
9 (BR)	Ground	POWER SW 1	Input	Power switch ON		9 – 16 V
				Power switch OFF		0 V
10 (Y)	Ground	ANGLE SENSOR 1 POWER SUPPLY	—	Power switch ON		5 V
11 (L)	Ground	ANGLE SENSOR 1 SIGNAL	Input	READY	Selector lever is P position (Manual plate: P position)	1.42 – 2.20 V
					Other than the above (Manual plate: Not P position)	2.85 – 3.56 V
12 (W)	Ground	P POSITION SIGNAL	Output	READY	Selector lever is P position	0 V
					Other than the above	9 – 16 V
13 (R)	Ground	P/N POSITION SIGNAL	Output	READY	Selector lever is P and N positions	9 – 16 V
					Other than the above	0 V
14 (P)	Ground	STOP LAMP SWITCH	Input	Power switch ON	Brake pedal is depressed	9 – 16 V
					Brake pedal is released	0 V
15 (LG)	Ground	ENCODER SIGNAL B	Input	Parking actuator is operated		
16 (R)	Ground	ENCODER POWER SUPPLY	—	Power switch ON		5 V
17 (V)	Ground	ELECTRIC SHIFT POWER SUPPLY RELAY	Output	Power switch ON		0 V
				Power switch OFF		9 – 16 V
18 (SB)	Ground	PARKING ACTUATOR RELAY A	—	Power switch ON		0 V
				Power switch OFF		9 – 16 V

Terminal (Wire color)		Item		Condition		Value (Approx.)
+	—	Signal name	Input/ Output			
19 (P)	Ground	ELECTRIC SHIFT SENSOR POWER SUPPLY 1	—	Power switch ON		5 V
20 (LG)	Ground	WAKE UP SIGNAL	Input	Power switch ON		9 – 16 V
21 (GR)	Ground	ANGLE SENSOR 1 GND	—	Always		0 V
22 (L)	Ground	N POSITION OUTPUT (SELECTOR INDICATOR)	Output	READY	Selector lever is N position	1 V or less
					Other than the above	9 – 16 V
23 (G)	Ground	ENCODER GND	—	Always		0 V
24 (W)	Ground	ENCODER SIGNAL A	Input	Parking actuator is operated		
25 (B)	Ground	GND (MOTOR)	—	Always		0 V
26 (R)	Ground	D POSITION OUTPUT (SELECTOR INDICATOR)	Output	READY	Selector lever is D position	1 V or less
					Other than the above	9 – 16 V
27 (BR)	Ground	MOTOR COIL B U-PHASE	Output	Power switch ON		9 – 16 V
				Power switch OFF		0 V
28 (GR)	Ground	MOTOR COIL B V-PHASE	Output	Power switch ON		9 – 16 V
				Power switch OFF		0 V
29 (R)	Ground	MOTOR COIL B W-PHASE	Output	Power switch ON		9 – 16 V
				Power switch OFF		0 V
30 (Y)	Ground	R POSITION OUTPUT (SELECTOR INDICATOR)	Output	READY	Selector lever is R position	1 V or less
					Other than the above	9 – 16 V
31 (L)	Ground	EV SYSTEM CAN-H	Input/ Output	—		—
32 (G)	Ground	EV SYSTEM CAN-L	Input/ Output	—		—
33 (GR)	Ground	PARKING ACTUATOR RELAY B	—	Power switch ON		0 V
				Power switch OFF		9 – 16 V
34 (B)	Ground	ELECTRIC SHIFT SENSOR NO. 1	Input	READY	Selector lever is held in R position	0 V
					Other than the above	5 V
35 (L)	Ground	ELECTRIC SHIFT SENSOR NO. 2	Input	READY	Selector lever is held in R and N positions	0 V
					Other than the above	5 V
36 (R)	Ground	ELECTRIC SHIFT SENSOR NO. 3	Input	READY	Selector lever is held in H (Home) and N positions	0 V
					Other than the above	5 V

Terminal (Wire color)		Item		Condition		Value (Approx.)
+	—	Signal name	Input/ Output			
37 (Y)	Ground	ELECTRIC SHIFT SENSOR NO. 4	Input	READY	Selector lever is held in N and D position	0 V
					Other than the above	5 V
38 (B)	Ground	P POSITION OUTPUT (SELECTOR INDICATOR)	Output	READY	Selector lever is P position	1 V or less
					Other than the above	9 – 16 V
39 (LG)	Ground	ANGLE SENSOR 2 POWER SUPPLY	—	Power switch ON		5 V
40 (P)	Ground	ANGLE SENSOR 2 SIGNAL	Input	READY	Selector lever is P position (Manual plate: P position)	1.42 – 2.20 V
					Other than the above (Manual plate: Not P position)	2.85 – 3.56 V
41 (BR)	Ground	ELECTRIC SHIFT SENSOR GND 1	—	Always		0 V
42 (G)	Ground	POWER SW 2	Input	Power switch ON		9 – 16 V
				Power switch OFF		0 V
43 (W)	Ground	MAIN POWER SUPPLY 2	Input	Power switch ON		9 – 16 V
				Power switch OFF		0 V
44 (W)	Ground	ELECTRIC SHIFT SENSOR NO. 5	Input	READY	Selector lever is held in D position	0 V
					Other than the above	5 V
45 (G)	Ground	ELECTRIC SHIFT SENSOR NO. 6	Input	READY	Selector lever in H (Home) position	0 V
					Other than the above	5 V
46 (R)	Ground	P POSITION SWITCH NO. 7	Input	READY	P position switch is pushed	5 V
					Other than the above	0 V
47 (B)	Ground	P POSITION SWITCH NO. 8	Input	READY	P position switch is pushed	0 V
					Other than the above	5 V
48 (SB)	Ground	ELECTRIC SHIFT SENSOR POWER SUPPLY 2	—	Power switch ON		5 V
49 (G)	Ground	ANGLE SENSOR 2 GND	—	Always		0 V
50 (LG)	Ground	ELECTRIC SHIFT SENSOR GND 2	—	Always		0 V

Fail-Safe

INFOID:0000000007005964

DTC	Vehicle behavior	
P0571	—	
P0705	When shifting to the R position and the D position, the reaction becomes slower and it takes approximately 1 second to complete shifting	
P0706	Shifting to the R position, N position and D position is prohibited	
P0780	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P1722	—	

DTC	Vehicle behavior	
P1802	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P1803	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P1804	—	
P1811	Automatic P position system is disabled	
P1895	—	
P1896	When shifting to the R position and the D position, the reaction becomes slower and it takes approximately 1 second to complete shifting	
P1897	—	
P1899	—	
P189A	—	
P189B	—	
P189C	—	
P189D	—	
P189E	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P189F	—	
P18A0	—	
P18A1	—	
P18A2	—	
P18A3	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P18A4	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P18A6	—	
P18A7	Shifting operation is prohibited	
P18A8	Pushing the P position switch does not switch the to the P position	
P18A9	Malfunction in P position	Shifting from the P position to another position is prohibited
	Malfunction in position other than P	Shifting to the P position is prohibited
P18AA	Shifting from the P position to another position is prohibited	
P18AB	Automatic P position system may be disabled	
P18AC	—	
P18AD	—	
P18AE	—	
U1000	EV system CAN with VCM blocked	Shifting to the R position and the D position is prohibited
	Other than the above	—
U1010	Shifting to the R position and the D position is prohibited	
U1086	—	

Protection Control

INFOID:0000000007005965

If shifting from the P position to another position and shifting from another position to the P position are repeated within a short period of time, it may become impossible to shift from the P position to another position and from another position to the P position for system protection. In this case, the system automatically returns to the normal state allowing shifting after approximately 10 seconds.

DTC Inspection Priority Chart

INFOID:0000000007005966

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

Priority	Detected items (DTC)	Reference
1	P0706 TRANSMISSION RANGE SENSOR A	TM-63
	P0780 SHIFT ERROR	TM-66
	P1802 CONTROL MODULE	TM-68
	P1803 CONTROL MODULE	TM-69
	P1897 ENCODER ERROR	TM-79
	P189E ACTUATOR LOCK	TM-95
	P18A3 CONTROL MODULE	TM-104
	P18A4 CONTROL MODULE	TM-105
	P18A7 SHIFT SIGNAL OFF	TM-108
	P18A8 P POSITION SWITCH	TM-112
	P18A9 PARKING ACTUATOR FUNCTION	TM-114
	P18AA P POSITION LEARNING ERROR	TM-115
	P18AB IGNITION SWITCH	TM-116
2	P0571 BRAKE SWITCH A	TM-58
	P0705 TRANSMISSION RANGE SENSOR A	TM-60
	P1722 VEHICLE SPEED	TM-67
	P1804 CONTROL MODULE	TM-70
	P1811 ELECTRIC SHIFT POWER SUPPLY RELAY	TM-71
	P1895 MOTOR SPEED	TM-74
	P1896 SHIFT POWER SUPPLY	TM-75
	P1899 MOTOR A	TM-81
	P189A MOTOR A	TM-83
	P189B MOTOR B	TM-87
	P189C MOTOR B	TM-89
	P189D BACK UP VOLTAGE	TM-93
	P189F ANGLE SENSOR 1	TM-96
	P18A0 ANGLE SENSOR 2	TM-98
	P18A1 ANGLE SENSOR 1	TM-100
	P18A2 ANGLE SENSOR 2	TM-102
	P18A6 WAKE UP SIGNAL	TM-106
	P18AC PARKING ACTUATOR RELAY A	TM-118
	P18AD PARKING ACTUATOR RELAY B	TM-120
	P18AE STUCK IN SHIFT	TM-122
	U1000 CAN COMM CIRC	TM-123
	U1010 CONTROL UNIT (CAN)	TM-124
	U1086 CAN ERROR	TM-125

DTC Index

INFOID:0000000007005967

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 TM-44, "DTC Inspection Priority Chart".

○: ON

DTC*	Item name (CONSULT screen terms)	Electric shift warning lamp	Master warning		Reference
CONSULT			Yellow	Red	
P0571	BRAKE SWITCH A	—	○	—	TM-58
P0705	TRANSMISSION RANGE SENSOR A	—	○	—	TM-60
P0706	TRANSMISSION RANGE SENSOR A	○ (Vehicle stopped)	○ (During driving)	○ (After stop)	TM-63
P0780	SHIFT ERROR	○	—	○	TM-66
P1722	VEHICLE SPEED	—	○	—	TM-67
P1802	CONTROL MODULE	○	—	○	TM-68
P1803	CONTROL MODULE	○	—	○	TM-69
P1804	CONTROL MODULE	—	—	—	TM-70
P1811	ELECTRIC SHIFT POWER SUPPLY RELAY	○ (After power switch OFF)	○ (During driving)	○ (After power switch OFF)	TM-71
P1895	MOTOR SPEED	—	○	—	TM-74
P1896	SHIFT POWER SUPPLY	—	○	—	TM-75
P1897	ENCODER ERROR	○ (After power switch OFF)	○ (During driving)	○ (After power switch OFF)	TM-79
P1899	MOTOR A	—	○	—	TM-81
P189A	MOTOR A	—	○	—	TM-83
P189B	MOTOR B	—	○	—	TM-87
P189C	MOTOR B	—	○	—	TM-89
P189D	BACK UP VOLTAGE	—	○	—	TM-93
P189E	ACTUATOR LOCK	○	—	○	TM-95
P189F	ANGLE SENSOR 1	—	○	—	TM-96
P18A0	ANGLE SENSOR 2	—	○	—	TM-98
P18A1	ANGLE SENSOR 1	—	○	—	TM-100
P18A2	ANGLE SENSOR 2	—	○	—	TM-102
P18A3	CONTROL MODULE	○	—	○	TM-104
P18A4	CONTROL MODULE	○	—	○	TM-105
P18A6	WAKE UP SIGNAL	—	—	—	TM-106
P18A7	SHIFT SIGNAL OFF	○ (Vehicle stopped)	○ (During driving)	○ (After stop)	TM-108
P18A8	P POSITION SWITCH	○ (Vehicle stopped)	○ (During driving)	○ (After stop)	TM-112
P18A9	PARKING ACTUATOR FUNCTION	○	—	○	TM-114
P18AA	P POSITION LEARNING ERROR	○	—	○	TM-115

DTC*	Item name (CONSULT screen terms)	Electric shift warning lamp	Master warning		Reference
CONSULT			Yellow	Red	
P18AB	IGNITION SWITCH	○ (Vehicle stopped)	○ (During driving)	○ (After stop)	TM-116
P18AC	PARKING ACTUATOR RELAY A	—	○	—	TM-118
P18AD	PARKING ACTUATOR RELAY B	—	○	—	TM-120
P18AE	STUCK IN SHIFT	—	○	—	TM-122
U1000	CAN COMM CIRC	—	○	—	TM-123
U1010	CONTROL UNIT (CAN)	—	○	—	TM-124
U1086	CAN ERROR	—	○	—	TM-125

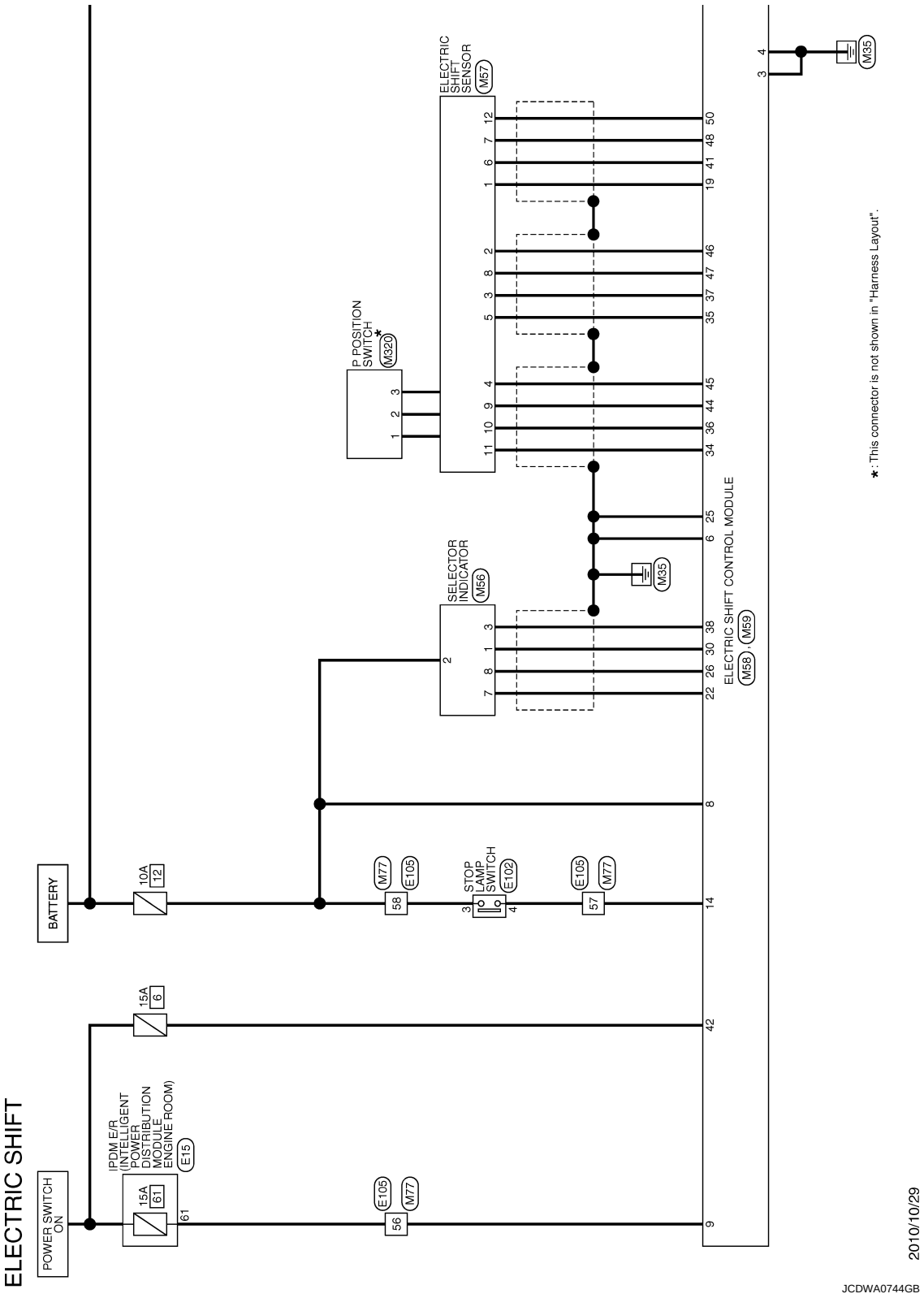
*: These numbers are prescribed by SAE J2012/ISO 15031-6.

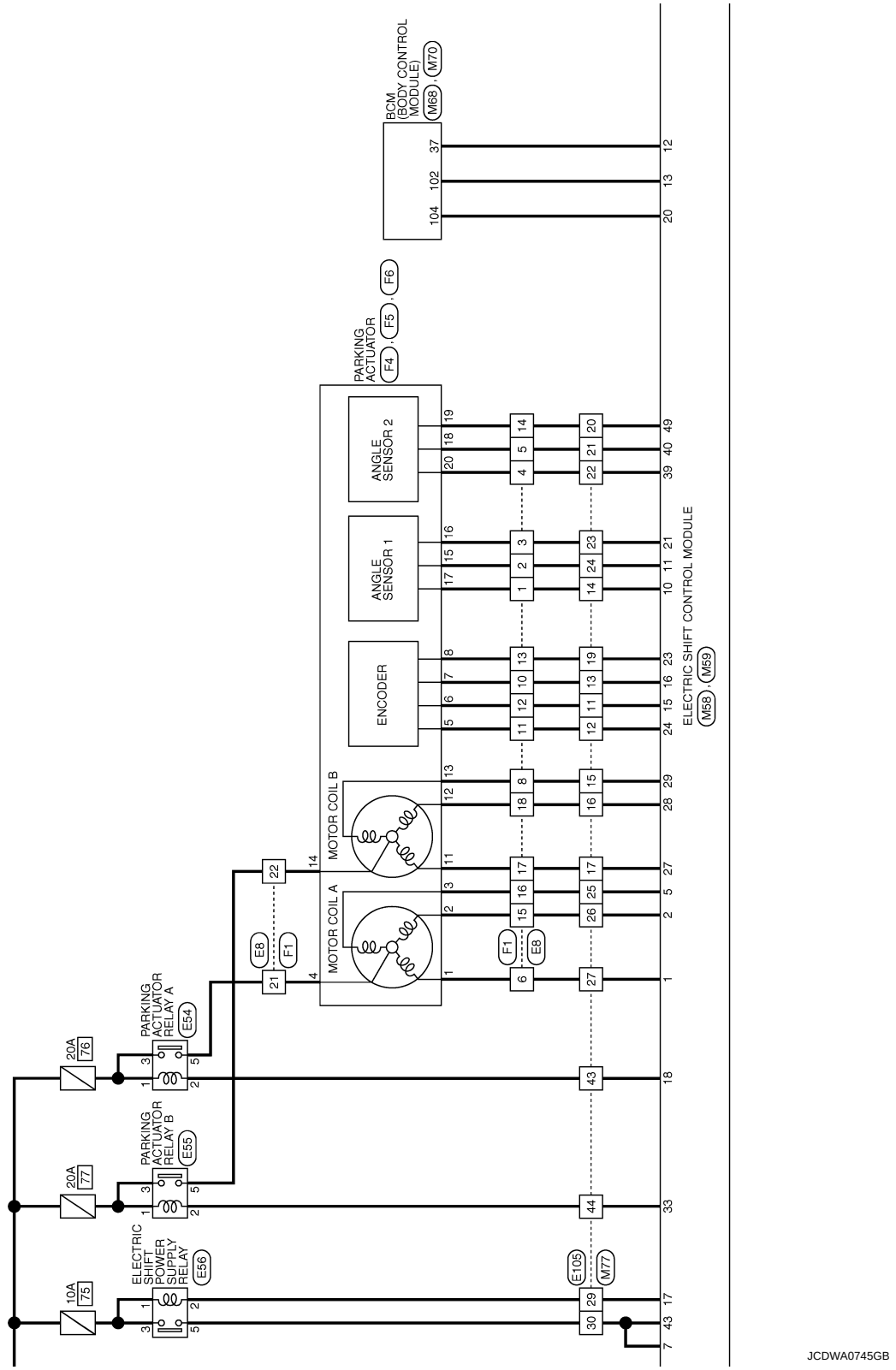
WIRING DIAGRAM

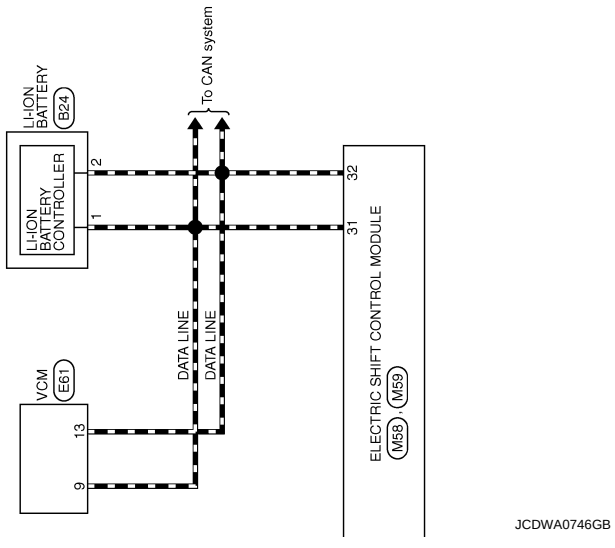
ELECTRIC SHIFT SYSTEM

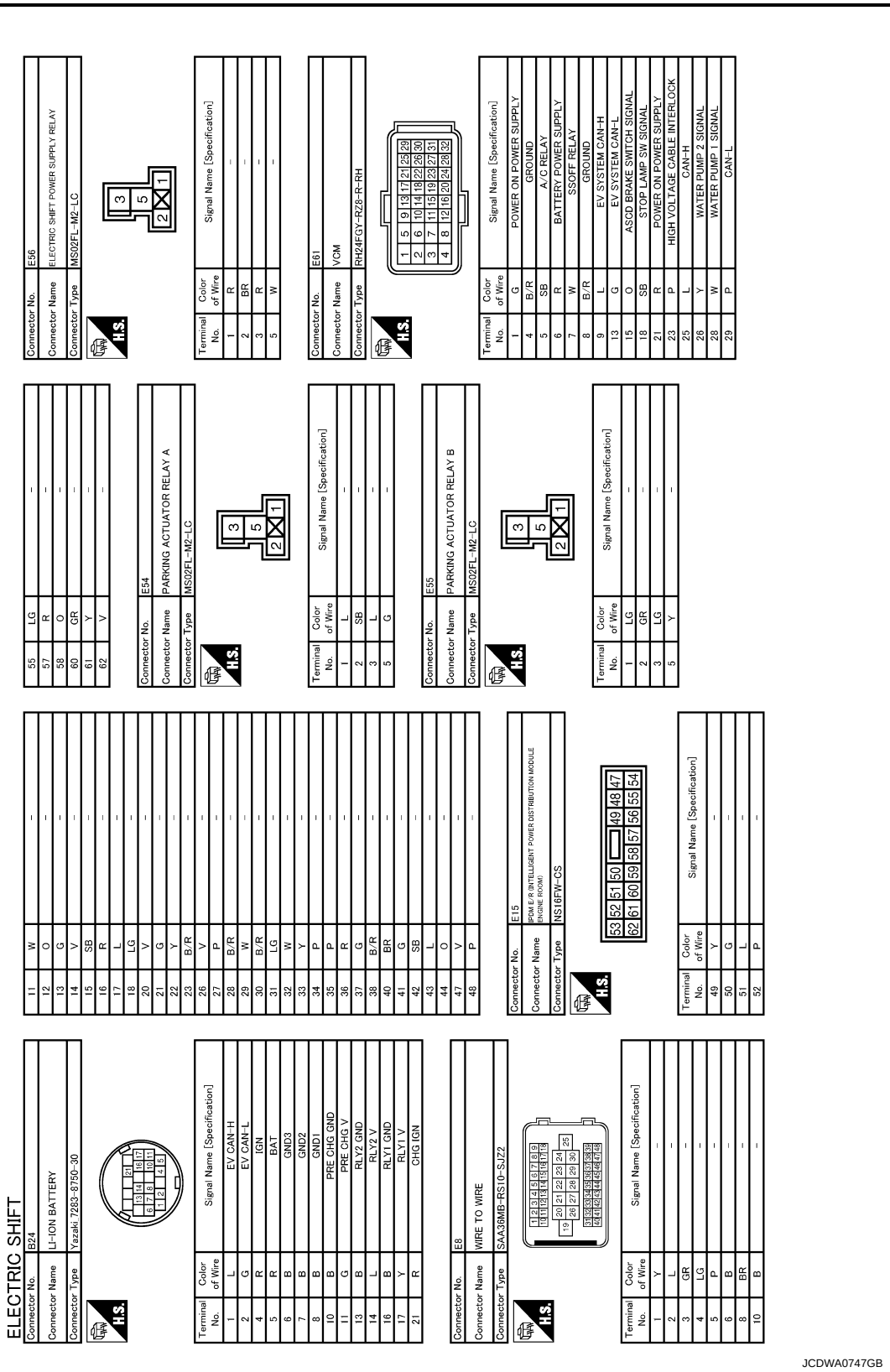
Wiring Diagram

INFOID:0000000007005968




BCM (BODY CONTROL MODULE) M68, M70
PARKING ACTUATOR F4, F5, F6
ANGLE SENSOR 2
ANGLE SENSOR 1
ENCODER
MOTOR COIL B
MOTOR COIL A
ELECTRIC SHIFT CONTROL MODULE M58, M59
20A 76
20A 77
10A 75
PARKING ACTUATOR RELAY A E54
PARKING ACTUATOR RELAY B E55
ELECTRIC SHIFT POWER SUPPLY RELAY E56
E8
F1
E105
M77
JCDWA0745GB


To CAN system
LI-ION BATTERY
B24
LI-ION BATTERY CONTROLLER
2
1
32
31
DATA LINE
DATA LINE
VCM
E61
13
9
ELECTRIC SHIFT CONTROL MODULE
M58, M59
JCDWA0746GB



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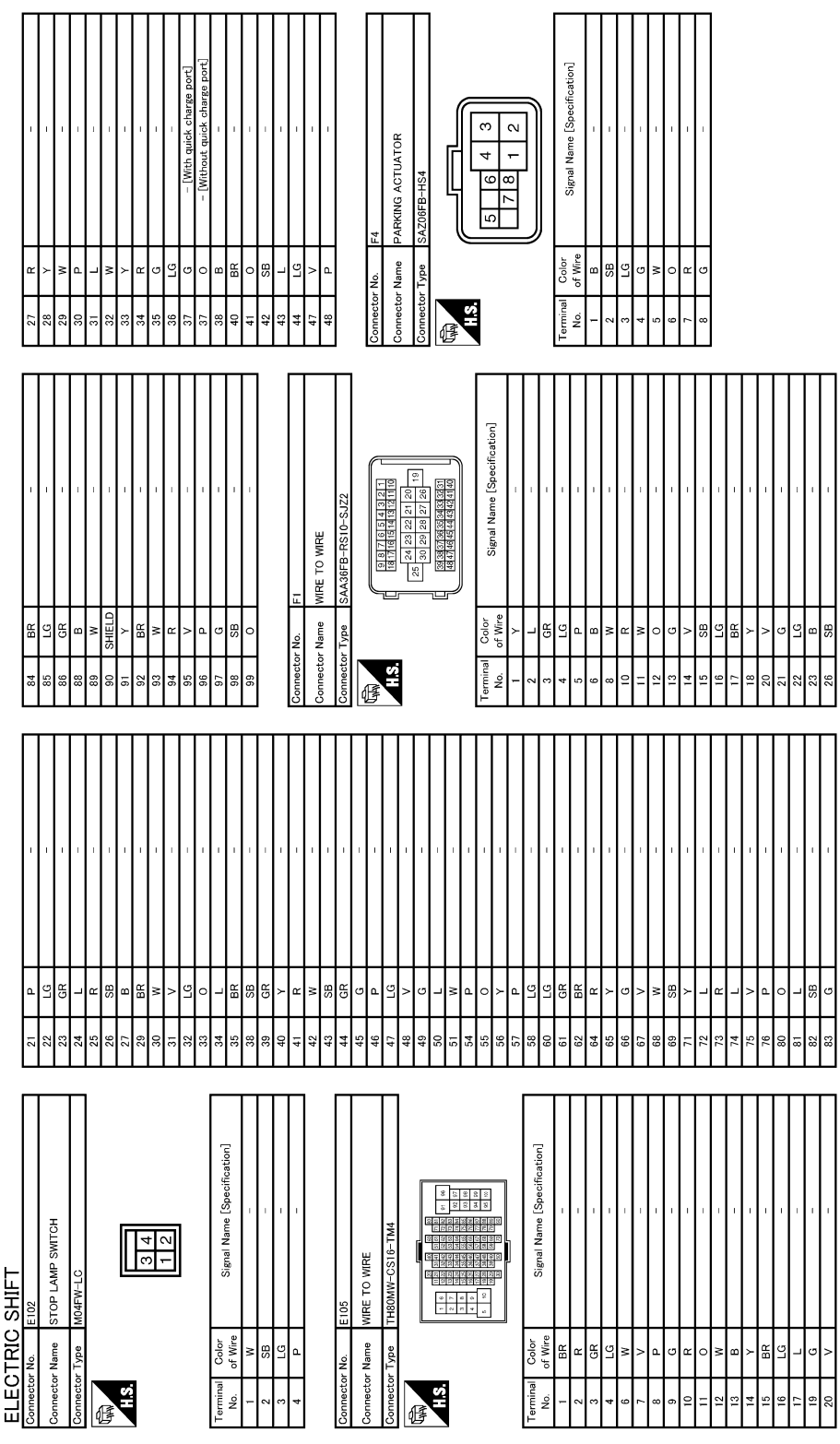


JCDWA0748GB

ELECTRIC SHIFT

Connector No.	F5
Connector Name	PARKING ACTUATOR
Connector Type	RS04FG

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
I1	BR	–
I2	Y	–
I3	W	–
I4	LG	–

Connector No.	F6
Connector Name	PARKING ACTUATOR
Connector Type	RH06FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
I5	L	–
I6	GR	–
I7	Y	–
I8	P	–
I9	V	–
I20	LG	–

Connector No.	M56
Connector Name	SELECTOR INDICATOR
Connector Type	TH08FW-NH

H.S.

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

Connector No.	M57
Connector Name	ELECTRIC SHIFT SENSOR
Connector Type	TH12FW-NH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	R	–
3	Y	–
4	G	–
5	L	–
6	BR	–
7	SB	–
8	B	–
9	W	–
10	R	–
11	B	–
12	LG	–

Connector No.	M58
Connector Name	ELECTRIC SHIFT CONTROL MODULE
Connector Type	TH20FW-TB4-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	MOTOR COIL A U-PHASE
2	W	MOTOR COIL A V-PHASE
3	B	GND
4	B	GND
5	V	MOTOR COIL A W-PHASE
6	B	GND (MOTOR)
7	W	MAIN POWER SUPPLY 1
8	R	BACK UP POWER SUPPLY
9	BR	POWER SW 1
10	Y	ANGLE SENSOR 1 POWER SUPPLY
11	L	ANGLE SENSOR 1 SIGNAL
12	W	P POSITION SIGNAL
13	R	P/N POSITION SIGNAL
14	P	STOP LAMP SWITCH
15	LG	ENCODER SIGNAL B
16	R	ENCODER POWER SUPPLY
17	V	ELECTRIC SHIFT POWER SUPPLY RELAY
18	SB	PARKING ACTUATOR RELAY A
19	P	ELECTRIC SHIFT SENSOR POWER SUPPLY 1
20	LG	WAKE UP SIGNAL
21	GR	ANGLE SENSOR 1 GND
22	L	N POSITION OUTPUT
23	G	ENCODER GND
24	W	ENCODER SIGNAL A

Terminal No.	Color of Wire	Signal Name [Specification]
25	B	GND (MOTOR)
26	R	D POSITION OUTPUT
27	BR	MOTOR COIL B U-PHASE
28	GR	MOTOR COIL B V-PHASE
29	R	MOTOR COIL B W-PHASE
30	Y	R POSITION OUTPUT
31	L	EV SYSTEM CAN-H
32	G	EV SYSTEM CAN-L
33	GR	PARKING ACTUATOR RELAY B
34	B	ELECTRIC SHIFT SENSOR NO. 1
35	L	ELECTRIC SHIFT SENSOR NO. 2
36	R	ELECTRIC SHIFT SENSOR NO. 3
37	Y	ELECTRIC SHIFT SENSOR NO. 4
38	B	P POSITION OUTPUT
39	LG	ANGLE SENSOR 2 POWER SUPPLY
40	P	ANGLE SENSOR 2 SIGNAL
41	BR	ELECTRIC SHIFT SENSOR GND 1
42	G	POWER SW 2
43	W	MAIN POWER SUPPLY 2
44	W	ELECTRIC SHIFT SENSOR NO. 5
45	G	ELECTRIC SHIFT SENSOR NO. 6
46	R	P POSITION SWITCH NO. 7
47	B	P POSITION SWITCH NO. 8
48	SB	ELECTRIC SHIFT SENSOR POWER SUPPLY 2
49	G	ANGLE SENSOR 2 GND
50	LG	ELECTRIC SHIFT SENSOR GND 2

Connector No.	M59
Connector Name	ELECTRIC SHIFT CONTROL MODULE
Connector Type	TH20FW-TB6-1V

H.S.

JCDWA0749GB

ELECTRIC SHIFT

Connector No.	M68
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	COMBI SW INPUT 5
3	GR	COMBI SW INPUT 4
4	BR	COMBI SW INPUT 3
5	G	COMBI SW INPUT 2
6	V	COMBI SW INPUT 1
7	GR	KEY CYL UNLK SW
8	R	KEY CYL LOCK SW
9	BR	STOP LAMP SW 1
12	Y	DOOR LK & UNLK SW LOCK
13	BR	DOOR LK & UNLK SW UNLOCK
14	G	OPTICAL SENS
15	W	REAR WINDOW DEF SW
16	R	DIMMER
17	Y	OPTICAL SENS PWR SPLY
18	V	SENS RECEIV GND
21	P	NATS ANTENNA AMP.
23	R	SECURITY IND LAMP CONT
25	LG	NATS ANTENNA AMP.
29	P	HAZARD SW
30	L	BK DOOR OPENER SW
31	W	DR DOOR UNLK SENS
32	LG	COMBI SW OUTPUT 5
33	Y	COMBI SW OUTPUT 4
34	W	COMBI SW OUTPUT 3
35	R	COMBI SW OUTPUT 2
36	P	COMBI SW OUTPUT 1
37	W	P POSITION
38	SB	RECEIVER COMM
39	L	CAN-H
40	P	CAN-L

Connector No.	M70
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FW-NH

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

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4

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

JCDWA0750GB

ELECTRIC SHIFT

Connector No.	M320
Connector Name	P POSITION SWITCH
Connector Type	-

H.S.

3 2 1

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

JCDWA0751GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Diagnosis Flow

INFOID:0000000007005969

1.OBTAIN INFORMATION ABOUT SYMPTOM

Refer to TM-56, "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

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 3.
Malfunction information exists, but no DTC. >>GO TO 4.
No malfunction information, but DTC exists. >>GO TO 5.

3.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 TM-42, "Fail-Safe".
When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-56, "Question sheet".
Verify the relationship between the symptom and the conditions in which the malfunction described by the customer occurs.

>> GO TO 5.

4.REPRODUCE MALFUNCTION SYMPTOM

Check the malfunction described by the customer on the vehicle.
Also investigate whether the symptom is a fail-safe or normal operation. Refer to TM-42, "Fail-Safe".
When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-56, "Question sheet".
Verify the relationship between the symptom and the conditions in which the malfunction described by the customer occurs.

>> GO TO 7.

5.PERFORM “DTC CONFIRMATION PROCEDURE”

Perform “DTC CONFIRMATION PROCEDURE” of the appropriate DTC to check if DTC is detected again.
Refer to TM-44, "DTC Inspection Priority Chart" when multiple DTCs are detected, and then determine the order for performing the diagnosis.

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

Is any DTC detected?

YES >> GO TO 6.
NO >> Check according to GI-51, "Intermittent Incident".

6.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 7.

7. 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 3 or 4.

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:0000000007005970

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.		Manuf. Date		
		Incident Date		VIN		
		Model & Year		In Service Date		
		Mileage	km / Mile			
Symptoms		☐ Vehicle does not move (☐ Any position ☐ Particular position)				
		☐ Does not shift P position				
		☐ Does not shift R, N and D positions				
		☐ Others				
Frequency		☐ All the time	☐ Under certain conditions	☐ Sometimes (times a day)		
Weather conditions		☐ Not affected				
	Weather	☐ Fine	☐ Clouding	☐ Raining	☐ Snowing	☐ Other ( )
	Temp.	☐ Hot	☐ Warm	☐ Cool	☐ Cold	☐ Temp. [Approx. °C (°F)]
	Humidity	☐ High	☐ Middle	☐ Low		
Road conditions		☐ Not affected				
		☐ In town	☐ In suburbs	☐ Freeway	☐ Off road (Up / Down)	
Driving conditions		☐ Not affected				
		☐ At starting	☐ While idling	☐ While engine racing	☐ At racing	☐ While cruising
		☐ While accelerating		☐ While decelerating	☐ While turning (Right / Left)	
		☐ Vehicle speed [	km/h (	MPH)]		
Other conditions						

P POSITION LEARNING VALUE CLEAR

Description

INFOID:0000000007005971

The electric shift control module memorizes the P position. Therefore, it is necessary to clear the P position learning value and perform the relearning of the P position after the electric shift control module and the parking actuator (reduction gear) are removed and installed or replaced.

Work Procedure

INFOID:0000000007005972

1.P POSITION LEARNING VALUE CLEAR

With CONSULT
1. Power switch ON.
2. Select “Work Support” in “SHIFT”.
3. Select “P POSITION LEARNING VALUE CLEAR”.
4. Touch “CLEAR”.

>> GO TO 2.

2.P POSITION LEARNING

1. Power switch OFF.
2. Power switch ON. (Selector lever in P position.)
3. Wait 5 seconds or more.
   CAUTION:
   Never shift change.
4. Check that the master warning is OFF and no warning message is displayed.

>> END

DTC/CIRCUIT DIAGNOSIS

P0571 BRAKE SWITCH A

DTC Logic

INFOID:0000000007005973

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P0571	Brake Switch “A” Circuit	It is detected that the stop lamp switch cannot be switched to ON/OFF.	• Stop lamp switch (ON stuck or OFF stuck) • Electric shift control module • Harness or connectors (Each circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

1. PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Accelerate the vehicle up to 50 km/h (31 MPH) and then depress the brake pedal to decelerate and stop the vehicle.
3. Repeat step 2 five more times.
4. Check DTC.

Is “P0571” detected?

YES >> Go to TM-58, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005974

1. CHECK STOP LAMP SWITCH SIGNAL

With CONSULT
1. Set the vehicle to READY.
2. Select “Data Monitor” in “SHIFT”.
3. Select “BRAKE SWITCH” and “BRAKE SWITCH (CAN)”.
4. Identify an abnormal signal value.

Condition	Item	
	BRAKE SWITCH	BRAKE SWITCH (CAN)
Brake pedal is depressed	ON	ON
Brake pedal is released	OFF	OFF

Which signal value is abnormal?

BRAKE SWITCH>>GO TO 2.
BRAKE SWITCH (CAN)>>GO TO 5.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the stop lamp switch connector.
3. Check the voltage between stop lamp switch vehicle side harness connector terminal and ground.

Stop lamp switch vehicle side harness connector		Ground	Voltage
Connector	Terminal		
E102	3	Ground	9 – 16 V

Is the inspection result normal?

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

3. DETECTION OF MALFUNCTION ITEMS

Check the following items:
- Harness open circuit or short circuit between the stop lamp switch vehicle side harness connector and 12V battery.
- 12V battery
- 10A fuse (# 12)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Repair or replace the malfunctioning parts.

4. CHECK STOP LAMP SWITCH SIGNAL INPUT CIRCUIT

1. Disconnect the electric shift control module connector.
2. Check the continuity between electric shift control module vehicle side harness connector terminal and stop lamp switch vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		Stop lamp switch vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	14	E102	4	Existed

3. Check the continuity between electric shift control module vehicle side harness connector terminal and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	14	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace the malfunctioning parts.

5. CHECK STOP LAMP SWITCH

Check the stop lamp switch. Refer to BRC-94, "Component Inspection".

Is the inspection result normal?

YES >> Replace the electric shift control module. Refer to TM-130, "Removal and Installation".
NO >> Replace the stop lamp switch. Refer to BRC-9, "Component Parts Location".

P0705 TRANSMISSION RANGE SENSOR A

DTC Logic

INFOID:0000000007005975

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P0705	Transmission Range Sensor “A” Circuit (PRNDL Input)	One of the electric shift sensors No. 1 to No. 6 is stuck at ON or OFF.	• Electric shift sensor • Harness or connectors (Each circuit is open or shorted.)

Position Pattern Table

Electric shift control module recognition position	Selector lever position	Electric shift sensor					
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
H	H	OFF	OFF	ON	OFF	OFF	ON
P	H	OFF	OFF	ON	OFF	OFF	ON
R	R	ON	ON	OFF	OFF	OFF	OFF
N	N	OFF	ON	ON	ON	OFF	OFF
D	D	OFF	OFF	OFF	ON	ON	OFF

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Select “Data Monitor” in “SHIFT”.
3. Select “RANGE POSITION”.
4. Shift the selector lever as follows. (Hold the selector lever at each position for 2 seconds or more.)
- H → N → R → N → D → N → H
5. Repeat step 4 five more times.
6. Check DTC.

Is “P0705” detected?

YES >> Go to TM-60, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005976

1.CHECK ELECTRIC SHIFT SENSOR INPUT SIGNAL

With CONSULT
1. Set the vehicle to READY.
2. Select “Data Monitor” in “SHIFT”.
3. Select “SHIFT SENSOR 1”, “SHIFT SENSOR 2”, “SHIFT SENSOR 3”, “SHIFT SENSOR 4”, “SHIFT SENSOR 5”, and “SHIFT SENSOR 6”.
4. Operate the selector lever to identify a electric shift sensor of which value does not change.

Monitor item	Condition	Value / Status
SHIFT SENSOR 1	Selector lever is held in R position	ON
	Other than the above	OFF

Monitor item	Condition	Value / Status
SHIFT SENSOR 2	Selector lever is held in R and N positions	ON
	Other than the above	OFF
SHIFT SENSOR 3	Selector lever is held in H (Home) and N positions	ON
	Other than the above	OFF
SHIFT SENSOR 4	Selector lever is held in N and D positions	ON
	Other than the above	OFF
SHIFT SENSOR 5	Selector lever is held in D position	ON
	Other than the above	OFF
SHIFT SENSOR 6	Selector lever in H (Home) position	ON
	Other than the above	OFF

Without CONSULT
1. Set the vehicle to READY.
2. Operate the selector lever.
3. Check the voltage between electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Condition	Voltage (Approx.)
	Connector	terminal			
1	M59	34	Ground	Selector lever is held in R position	0 V
				Other than the above	5 V
2		35		Selector lever is held in R and N positions	0 V
				Other than the above	5 V
3		36		Selector lever is held in H (Home) and N positions	0 V
				Other than the above	5 V
4		37		Selector lever is held in N and D position	0 V
				Other than the above	5 V
5		44		Selector lever is held in D position	0 V
				Other than the above	5 V
6		45		Selector lever in H (Home) position	0 V
				Other than the above	5 V

>> GO TO 2.

2. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ELECTRIC SHIFT SENSOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Disconnect the electric shift sensor connector.
4. Check the continuity between the malfunctioning electric shift sensor identified at Step 1 and the harness connector terminal located on the vehicle side of the electric shift control module.

Electric shift sensor	Electric shift control module vehicle side harness connector		Electric shift sensor vehicle side harness connector		Continuity
	Connector	terminal	Connector	terminal	
1	M59	34	M57	11	Existed
2		35		5	
3		36		10	
4		37		3	
5		44		9	
6		45		4	

5. Check the continuity electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Continuity
	Connector	terminal		
1	M59	34	Ground	Not existed
2		35		
3		36		
4		37		
5		44		
6		45		

Is the inspection result normal?

YES >> Replace the electric shift sensor. Refer to TM-131, "Exploded View".
NO >> Repair or replace damaged parts.

P0706 TRANSMISSION RANGE SENSOR A

DTC Logic

INFOID:0000000007005977

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P0706	Transmission range sensor “A” Circuit Range/Performance	Two or more sensors out of electric shift sensors No. 1 to No. 6 are stuck at ON or OFF.	• Electric shift sensor • Harness or connectors (Each circuit is open or shorted.)

Position Pattern Table

Electric shift control module recognition position	Selector lever position	Electric shift sensor					
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
H	H	OFF	OFF	ON	OFF	OFF	ON
P	H	OFF	OFF	ON	OFF	OFF	ON
R	R	ON	ON	OFF	OFF	OFF	OFF
N	N	OFF	ON	ON	ON	OFF	OFF
D	D	OFF	OFF	OFF	ON	ON	OFF

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Select “Data Monitor” in “SHIFT”.
3. Select “RANGE POSITION”.
4. Shift the selector lever as follows. (Hold the selector lever at each position for 2 seconds or more.)

- H → N → R → N → D → N → H

5. Repeat step 4 five more times.
6. Check DTC.

Is “P0706” detected?

YES >> Go to TM-63, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005978

1.CHECK ELECTRIC SHIFT SENSOR INPUT SIGNAL

With CONSULT
1. Set the vehicle to READY.
2. Select “Data Monitor” in “SHIFT”.
3. Select “SHIFT SENSOR 1”, “SHIFT SENSOR 2”, “SHIFT SENSOR 3”, “SHIFT SENSOR 4”, “SHIFT SENSOR 5”, and “SHIFT SENSOR 6”.
4. Operate the selector lever to identify a electric shift sensor of which value does not change.

Monitor item	Condition	Value / Status
SHIFT SENSOR 1	Selector lever is held in R position	ON
	Other than the above	OFF

Monitor item	Condition	Value / Status
SHIFT SENSOR 2	Selector lever is held in R and N positions	ON
	Other than the above	OFF
SHIFT SENSOR 3	Selector lever is held in H (Home) and N positions	ON
	Other than the above	OFF
SHIFT SENSOR 4	Selector lever is held in N and D positions	ON
	Other than the above	OFF
SHIFT SENSOR 5	Selector lever is held in D position	ON
	Other than the above	OFF
SHIFT SENSOR 6	Selector lever in H (Home) position	ON
	Other than the above	OFF

⊗Without CONSULT
1. Set the vehicle to READY.
2. Operate the selector lever.
3. Check the voltage between electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Condition	Voltage (Approx.)
	Connector	terminal			
1	M59	34	Ground	Selector lever is held in R position	0 V
				Other than the above	5 V
2		35		Selector lever is held in R and N positions	0 V
				Other than the above	5 V
3		36		Selector lever is held in H (Home) and N positions	0 V
				Other than the above	5 V
4		37		Selector lever is held in N and D position	0 V
				Other than the above	5 V
5		44		Selector lever is held in D position	0 V
				Other than the above	5 V
6		45		Selector lever in H (Home) position	0 V
				Other than the above	5 V

>> GO TO 2.

2.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ELECTRIC SHIFT SENSOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Disconnect the electric shift sensor connector.
4. Check the continuity between the malfunctioning electric shift sensor identified at Step 1 and the harness connector terminal located on the vehicle side of the electric shift control module.

Electric shift sensor	Electric shift control module vehicle side harness connector		Electric shift sensor vehicle side harness connector		Continuity
	Connector	terminal	Connector	terminal	
1	M59	34	M57	11	Existed
2		35		5	
3		36		10	
4		37		3	
5		44		9	
6		45		4	

5. Check the continuity electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Continuity
	Connector	terminal		
1	M59	34	Ground	Not existed
2		35		
3		36		
4		37		
5		44		
6		45		

Is the inspection result normal?

YES >> Replace the electric shift sensor. Refer to TM-131, "Exploded View".
NO >> Repair or replace damaged parts.

P0780 SHIFT ERROR

DTC Logic

INFOID:0000000007005979

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P0780	Shift Error	In spite of the command from the electric shift control module, the parking actuator does not complete the switching to the designated position (P position or another position).	Parking actuator

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Shift the selector lever to N position and wait for 10 seconds or more.
3. Press the P position switch to shift to P position and wait for 10 seconds or more.
4. Check DTC.

Is “P0780” detected?

YES >> Go to TM-66, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005980

1.REPLACE REDUCTION GEAR

Replace the reduction gear due to malfunction in the parking actuator. Refer to TM-17, "Removal and Installation".

>> END

P1722 VEHICLE SPEED

DTC Logic

INFOID:0000000007005981

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P1722	Vehicle Speed Signal Circuit	• The electric shift control module detects a malfunction in the CAN communication signal with the ABS actuator and electric unit (control unit). • The ABS actuator and electric unit (control unit) detects a malfunction with the wheel sensor.	• ABS actuator and electric unit (control unit) • VCM • Electric shift control module • Harness or connectors (Each circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Drive the vehicle at 30 km/h (19 MPH) or more for 60 seconds.
3. Stop the vehicle.
4. Check DTC.

Is “P1722” detected?

YES >> Go to TM-67, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005982

1. CHECK DTC OF ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT
1. Power switch ON.
2. Perform “Self Diagnostic Results” in “ABS”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to BRC-48, "DTC Index".
NO >> GO TO 2.

2. CHECK DTC OF VCM

With CONSULT
1. Power switch ON.
2. Perform “Self Diagnostic Results” in “EV/HEV”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to EVC-78, "DTC Index".
NO >> GO TO 3.

3. CHECK INTERMITTENT INCIDENT

Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace the electric shift control module. Refer to TM-130, "Removal and Installation".
NO >> Repair or replace damaged parts.

P1802 CONTROL MODULE

DTC Logic

INFOID:0000000007005983

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P1802	Control Module (RAM)	A malfunction is detected in the electric shift control module.	Electric shift control module

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Power switch OFF to ON and wait for 2 seconds or more.
2. Check DTC.

Is “P1802” detected?

YES >> Go to TM-68, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005984

1.REPLACE ELECTRIC SHIFT CONTROL MODULE

Replace the electric shift control module. Refer to TM-130, "Removal and Installation".

>> END

P1803 CONTROL MODULE

DTC Logic

INFOID:0000000007005985

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P1803	Control Module (ROM)	A malfunction is detected in the electric shift control module.	Electric shift control module

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Power switch OFF to ON and wait for 2 seconds or more.
2. Check DTC.

Is “P1803” detected?

YES >> Go to TM-69, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005986

1.REPLACE ELECTRIC SHIFT CONTROL MODULE

Replace the electric shift control module. Refer to TM-130, "Removal and Installation".

>> END

P1804 CONTROL MODULE

DTC Logic

INFOID:0000000007005987

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P1804	Control Module (EEPROM)	A malfunction is detected in the electric shift control module.	Electric shift control module

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Power switch OFF to ON and wait for 2 seconds or more.
2. Check DTC.

Is “P1804” detected?

YES >> Go to TM-70, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005988

1.REPLACE ELECTRIC SHIFT CONTROL MODULE

Replace the electric shift control module. Refer to TM-130, "Removal and Installation".

>> END

P1811 ELECTRIC SHIFT POWER SUPPLY RELAY

DTC Logic

INFOID:0000000007005989

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P1811	Electric Shift Power Supply Relay Circuit	Battery voltage from the electric shift power supply relay is less than the specified value.	• Electric shift power supply relay (OFF stuck) • Harness or fuse (Open)
		It is detected that the voltage from the electric shift power supply relay does not lower even though the electric shift power supply relay is OFF.	• Electric shift power supply relay (ON stuck) • Harness - 12V battery short (Switch side) - Ground short (Coil side)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P1811” detected?

YES >> Go to TM-71, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005990

1.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ELECTRIC SHIFT POWER SUPPLY RELAY

1. Disconnect the electric shift control module connector.
2. Disconnect the electric shift power supply relay.
3. Check the continuity between electric shift power supply relay vehicle side harness connector terminal and ground.

Electric shift power supply relay vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E56	2	Ground	Not existed

4. Check the continuity between electric shift power supply relay vehicle side harness connector terminals and electric shift control module vehicle side harness connector terminals.

Electric shift power supply relay vehicle side harness connector		Electric shift control module vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E56	2	M58	17	Existed
	5		7	
		M59	43	

5. Check the voltage between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
M58	7	Ground	0 V
M59	43		

Is the inspection result normal?

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

2.CHECK GROUND CIRCUIT

Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	3	Ground	Existed
	4		

Is the inspection result normal?

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

3.CHECK ELECTRIC SHIFT POWER SUPPLY RELAY

Check the electric shift power supply relay. Refer to TM-72, "Component Inspection (Electric Shift Power Supply Relay)".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the electric shift power supply relay. Refer to TM-26, "Component Parts Location".

4.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between 12V battery and electric shift power supply relay vehicle side harness connector terminal 1 and 3.
- 12V battery
- 10A fuse (# 75)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Repair or replace damaged parts.

Component Inspection (Electric Shift Power Supply Relay)

INFOID:0000000007005991

1.CHECK ELECTRIC SHIFT POWER SUPPLY RELAY

1. Disconnect the electric shift power supply relay. Refer to TM-26, "Component Parts Location".
2. Apply 12 V direct current between electric shift power supply relay terminals 1 and 2.
   CAUTION:
   - **Never make the terminals short.**
   - **Connect the fuse between the terminals when applying the voltage.**
3. Check the continuity between electric shift power supply relay terminals 3 and 5.

Electric shift power supply relay		Condition	Continuity
Terminal			
3	5	Apply 12 V direct current between terminals 1 and 2.	Existed
		Does not apply 12 V direct current between terminals 1 and 2.	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the electric shift power supply relay.

P1895 MOTOR SPEED

DTC Logic

INFOID:0000000007005992

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P1895	Motor Speed Signal	The motor speed signal from the traction motor inverter is not normal.	• Traction motor • Traction motor inverter • Electric shift control module • Harness or connectors (CAN communication line is open or shorted.)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, turn the power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Drive the vehicle at 30 km/h (19 MPH) or more for 60 seconds.
3. Stop the vehicle.
4. Check DTC.

Is “P1895” detected?

YES >> Go to TM-74, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005993

1. CHECK DTC OF TRACTION MOTOR INVERTER

With CONSULT
1. Power switch ON.
2. Perform “Self Diagnostic Results” in “MOTOR CONTROL”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to TMS-35, "DTC Index".
NO >> GO TO 2.

2. CHECK INTERMITTENT INCIDENT

Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace the electric shift control module. Refer to TM-130, "Removal and Installation".
NO >> Repair or replace damaged parts.

P1896 SHIFT POWER SUPPLY

DTC Logic

INFOID:0000000007005994

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P1896	Electric Shift Sensor Power Supply	It is detected that electric shift sensors No. 1, 3, and 5 are stuck at OFF.	• Electric shift sensor • Electric shift control module • Harness or connectors (Each circuit is open or shorted.)
		It is detected that electric shift sensors No. 2, 4, and 6 are stuck at OFF.	

Position Pattern Table

Electric shift control module recognition position	Selector lever position	Electric shift sensor					
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
H	H	OFF	OFF	ON	OFF	OFF	ON
P	H	OFF	OFF	ON	OFF	OFF	ON
R	R	ON	ON	OFF	OFF	OFF	OFF
N	N	OFF	ON	ON	ON	OFF	OFF
D	D	OFF	OFF	OFF	ON	ON	OFF

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Select “Data Monitor” in “SHIFT”.
3. Select “RANGE POSITION”.
4. Shift the selector lever as follows. (Hold the selector lever at each position for 2 seconds or more.)

- H → N → R → N → D → N → H

5. Repeat step 4 five times.
6. Check DTC.

Is “P1896” detected?

YES >> Go to TM-75, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005995

1.CHECK ELECTRIC SHIFT SENSOR INPUT SIGNAL

With CONSULT
1. Set the vehicle to READY.
2. Select “Data Monitor” in “SHIFT”.
3. Select “SHIFT SENSOR 1”, “SHIFT SENSOR 2”, “SHIFT SENSOR 3”, “SHIFT SENSOR 4”, “SHIFT SENSOR 5”, and “SHIFT SENSOR 6”.
4. Operate the selector lever to identify a electric shift sensor of which value does not change.

Monitor item	Condition	Value / Status
SHIFT SENSOR 1	Selector lever is held in R position	ON
	Other than the above	OFF

Monitor item	Condition	Value / Status
SHIFT SENSOR 2	Selector lever is held in R and N positions	ON
	Other than the above	OFF
SHIFT SENSOR 3	Selector lever is held in H (Home) and N positions	ON
	Other than the above	OFF
SHIFT SENSOR 4	Selector lever is held in N and D positions	ON
	Other than the above	OFF
SHIFT SENSOR 5	Selector lever is held in D position	ON
	Other than the above	OFF
SHIFT SENSOR 6	Selector lever in H (Home) position	ON
	Other than the above	OFF

⊗Without CONSULT
1. Set the vehicle to READY.
2. Operate the selector lever.
3. Check the voltage between electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Condition	Voltage (Approx.)
	Connector	terminal			
1	M59	34	Ground	Selector lever is held in R position	0 V
				Other than the above	5 V
2		35		Selector lever is held in R and N positions	0 V
				Other than the above	5 V
3		36		Selector lever is held in H (Home) and N positions	0 V
				Other than the above	5 V
4		37		Selector lever is held in N and D position	0 V
				Other than the above	5 V
5		44		Selector lever is held in D position	0 V
				Other than the above	5 V
6		45		Selector lever in H (Home) position	0 V
				Other than the above	5 V

>> GO TO 2.

2.CHECK ELECTRIC SHIFT SENSOR POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the electric shift sensor connector.
3. Power switch ON.
4. Check the power circuit of the malfunctioning electric shift sensor identified at Step 1.
5. Check the voltage between electric shift sensor vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift sensor vehicle side harness connector		Ground	Voltage (Approx.)
	Connector	Terminal		
1, 3, 5	M57	1	Ground	5 V
2, 4, 6		7		

Is the inspection result normal?

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

3. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ELECTRIC SHIFT SENSOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminal and electric shift sensor vehicle side harness connector terminal.

Electric shift sensor	Electric shift control module vehicle side harness connector		Electric shift sensor vehicle side harness connector		Continuity
	Connector	Terminal	Connector	Terminal	
1, 3, 5	M58	19	M57	1	Existed
2, 4, 6	M59	48		7	

4. Check the continuity between electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Continuity
	Connector	Terminal		
1, 3, 5	M58	19	Ground	Not existed
2, 4, 6	M59	48		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> Repair or replace damaged parts.

4. CHECK ELECTRIC SHIFT SENSOR GROUND CIRCUIT

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminal and electric shift sensor vehicle side harness connector terminal.

Electric shift sensor	Electric shift control module vehicle side harness connector		Electric shift sensor vehicle side harness connector		Continuity
	Connector	Terminal	Connector	Terminal	
1, 3, 5	M59	41	M57	6	Existed
2, 4, 6		50		12	

4. Check the continuity between electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Continuity
	Connector	Terminal		
1, 3, 5	M59	41	Ground	Not existed
2, 4, 6		50		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ELECTRIC SHIFT SENSOR

1. Check the continuity between electric shift control module vehicle side harness connector terminal and electric shift sensor vehicle side harness connector terminal.

Electric shift sensor	Electric shift control module vehicle side harness connector		Electric shift sensor vehicle side harness connector		Continuity
	Connector	Terminal	Connector	Terminal	
1	M59	34	M57	11	Existed
2		35		5	
3		36		10	
4		37		3	
5		44		9	
6		45		4	

2. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Continuity
	Connector	Terminal		
1	M59	34	Ground	Not existed
2		35		
3		36		
4		37		
5		44		
6		45		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift sensor. Refer to TM-131, "Exploded View".

NO >> Repair or replace damaged parts.

P1897 ENCODER ERROR

DTC Logic

INFOID:0000000007005996

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P1897	Encoder Error	Encoder signals are not transmitted despite the actuation of parking actuator by the electric shift control module.	• Encoder (Parking actuator) • Harness or connectors (Each circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Set the vehicle to READY.
2. Shift the selector lever to N position and wait for 10 seconds or more.
3. Press the P position switch to shift to P position and wait for 10 seconds or more.
4. Check DTC.

Is “P1897” detected?

YES >> Go to TM-79, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005997

1. CHECK ENCODER POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the parking actuator connector.
3. Check the voltage between parking actuator vehicle side harness connector terminal and ground.

Parking actuator vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F4	7	Ground	Power switch ON	5 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ENCODER

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminals and parking actuator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	15	F4	6	Existed
	23		8	
	24		5	

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	15	Ground	Not existed
	23		
	24		

Is the inspection result normal?

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

3. CHECK INTERMITTENT INCIDENT

Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace the reduction gear due to malfunction in the encoder (parking actuator). Refer to TM-17, "Removal and Installation".
NO >> Repair or replace damaged parts.

4. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ENCODER

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminal and parking actuator vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	16	F4	7	Existed

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	16	Ground	Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Repair or replace damaged parts.

P1899 MOTOR A

DTC Logic

INFOID:0000000007005998

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P1899	Motor “A” Circuit High	When the power switch is ON, either of two energized phases is in the non-energized state. **NOTE:** Energized: Approx. 0 V, Non-energized: 9 – 16 V	• Electric shift control module • Motor coil A (Parking actuator) • Harness (12V battery short)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P1899” detected?

YES >> Go to TM-81, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007005999

1.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND MOTOR COIL A

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Disconnect the parking actuator connector.
4. Check the voltage electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
M58	1	Ground	0 V
	2		
	5		

5. Check the continuity electric shift control module vehicle side harness connector terminals and parking actuator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	1	F4	1	Existed
	2		2	
	5		3	

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repaire or replace damaged parts.

2.CHECK MOTOR COIL A

Check the motor coil A. Refer to TM-82, "Component Inspection (Motor Coil A)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Replace the reduction gear due to malfunction in the motor coil A (parking actuator). Refer to TM-17, "Removal and Installation".

Component Inspection (Motor Coil A)

INFOID:0000000007006000

1. CHECK MOTOR COIL A

1. Disconnect the parking actuator connector.
2. Check the resistance between parking actuator connector terminals.

Parking actuator connector		Resistance
Terminal		
4	1	2.3 – 2.8 Ω
	2	
	3	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the reduction gear due to malfunction in the motor coil A (parking actuator). Refer to TM-17, "Removal and Installation".

P189A MOTOR A

DTC Logic

INFOID:0000000007006001

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P189A	Motor “A” Circuit Low	When the power switch is ON, one of the phases is in the energized state even though motor coil A all phases are not energized. **NOTE:** Energized: Approx. 0 V, Non-energized: 9 – 16 V	• Parking actuator relay A (OFF stuck) • Motor coil A (Parking actuator) • Electric shift control module • Harness or connectors (Each circuit is open or ground short-ed.)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, key switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P189A” detected?

YES >> Go to TM-83, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006002

1.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND MOTOR COIL A

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Disconnect the parking actuator connector.
4. Check the continuity electric shift control module vehicle side harness connector terminals and parking actuator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	1	F4	1	Existed
	2		2	
	5		3	

5. Check the continuity electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	1	Ground	Not existed
	2		
	5		

Is the inspection result normal?

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

2.CHECK GROUND CIRCUIT

Check the continuity electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	6	Ground	Existed
	25		

Is the inspection result normal?

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

3.CHECK PARKING ACTUATOR RELAY A

Check the parking actuator relay A. Refer to TM-85, "Component Inspection (Parking Actuator Relay A)".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the parking actuator relay A. Refer to TM-26, "Component Parts Location".

4.CHECK HARNESS BETWEEN PARKING ACTUATOR RELAY A AND 12V BATTERY

Check the voltage parking actuator relay A vehicle side harness connector terminal and ground.

Parking actuator relay A vehicle side harness connector		Ground	Voltage
Connector	Terminal		
E54	1	Ground	9 – 16 V
	3		

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between parking actuator relay A and 12V battery
- 12V battery
- 20A fuse (# 76)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Repair or replace damaged parts.

6.CHECK HARNESS BETWEEN PARKING ACTUATOR AND PARKING ACTUATOR RELAY A

Check the continuity parking actuator vehicle side harness connector terminal and parking actuator relay A vehicle side harness connector terminal.

Parking actuator vehicle side harness connector		Parking actuator relay A vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F4	4	E54	5	Existed

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace damaged parts.

7.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR RELAY A

1. Check the continuity electric shift control module vehicle side harness connector terminal and parking actuator relay A vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		Parking actuator relay A vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	18	E54	2	Existed

2. Check the continuity electric shift control module vehicle side harness connector terminal and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	18	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace damaged parts.

8. CHECK MOTOR COIL A

Check the motor coil A (parking actuator). Refer to TM-85, "Component Inspection (Motor Coil A)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Replace the reduction gear due to malfunction in the motor coil A (parking actuator). Refer to TM-17, "Removal and Installation".

Component Inspection (Parking Actuator Relay A)

INFOID:0000000007006003

1. CHECK PARKING ACTUATOR RELAY A

1. Disconnect the parking actuator relay A. Refer to TM-26, "Component Parts Location".
2. Apply 12 V direct current between parking actuator relay A terminals 1 and 2.
   CAUTION:
   - **Never make the terminals short.**
   - **Connect the fuse between the terminals when applying the voltage.**
3. Check the continuity between parking actuator relay A terminals 3 and 5.

Parking actuator relay A		Condition	Continuity
Terminal			
3	5	Apply 12 V direct current between terminals 1 and 2.	Existed
		Does not apply 12 V direct current between terminals 1 and 2.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the parking actuator relay A.

Component Inspection (Motor Coil A)

INFOID:0000000007006004

1. CHECK MOTOR COIL A

1. Disconnect the parking actuator connector.
2. Check the resistance between parking actuator connector terminals.

Parking actuator connector		Resistance
Terminal		
4	1	2.3 – 2.8 Ω
	2	
	3	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the reduction gear due to malfunction in the motor coil A (parking actuator). Refer to TM-17, "Removal and Installation".

P189B MOTOR B

DTC Logic

INFOID:0000000007006005

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P189B	Motor “B” Circuit High	When the power switch is ON, either of two energized phases is in the non-energized state. **NOTE:** Energized: Approx. 0 V, Non-energized: 9 – 16 V	• Electric shift control module • Motor coil B (Parking actuator) • Harness (12V battery short)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P189B” detected?

YES >> Go to TM-87, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006006

1.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND MOTOR COIL B

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Disconnect the parking actuator connector.
4. Check the voltage electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
M59	27	Ground	0 V
	28		
	29		

5. Check the continuity electric shift control module vehicle side harness connector terminals and parking actuator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M59	27	F5	11	Existed
	28		12	
	29		13	

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repaire or replace damaged parts.

2.CHECK MOTOR COIL B

Check the motor coil B. Refer to TM-88, "Component Inspection (Motor Coil B)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Replace the reduction gear due to malfunction in the motor coil B (parking actuator). Refer to TM-17, "Removal and Installation".

Component Inspection (Motor Coil B)

INFOID:0000000007006007

1. CHECK MOTOR COIL B

1. Disconnect the parking actuator connector.
2. Check the resistance between parking actuator connector terminals.

Parking actuator connector		Resistance
Terminal		
14	11	2.3 – 2.8 Ω
	12	
	13	

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the reduction gear due to malfunction in the motor coil B (parking actuator). Refer to TM-17, "Removal and Installation".

P189C MOTOR B

DTC Logic

INFOID:0000000007006008

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P189C	Motor “B” Circuit Low	When the power switch is ON, one of the phases is in the energized state even though motor coil B all phases are not energized. **NOTE:** Energized: Approx. 0 V, Non-energized: 9 – 16 V	• Parking actuator relay B (OFF stuck) • Motor coil B (Parking actuator) • Electric shift control module • Harness or connectors (Each circuit is open or ground short-ed.)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P189C” detected?

YES >> Go to TM-89, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006009

1.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND MOTOR COIL B

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Disconnect the parking actuator connector.
4. Check the continuity electric shift control module vehicle side harness connector terminals and parking actuator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M59	27	F5	11	Existed
	28		12	
	29		13	

5. Check the continuity electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M59	27	Ground	Not existed
	28		
	29		

Is the inspection result normal?

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

2.CHECK GROUND CIRCUIT

Check the continuity electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	6	Ground	Existed
	25		

Is the inspection result normal?

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

3.CHECK PARKING ACTUATOR RELAY B

Check the parking actuator relay B. Refer to TM-91, "Component Inspection (Parking Actuator Relay B)".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the parking actuator relay B. Refer to TM-26, "Component Parts Location".

4.CHECK HARNESS BETWEEN PARKING ACTUATOR RELAY B AND 12V BATTERY

Check the voltage parking actuator relay B vehicle side harness connector terminal and ground.

Parking actuator relay B vehicle side harness connector		Ground	Voltage
Connector	Terminal		
E55	1	Ground	9 – 16 V
	3		

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between parking actuator relay B and 12V battery
- 12V battery
- 20A fuse (# 77)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Repair or replace damaged parts.

6.CHECK HARNESS BETWEEN PARKING ACTUATOR AND PARKING ACTUATOR RELAY B

Check the continuity parking actuator vehicle side harness connector terminal and parking actuator relay A vehicle side harness connector terminal.

Parking actuator vehicle side harness connector		Parking actuator relay B vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F5	14	E55	5	Existed

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace damaged parts.

7.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR RELAY B

1. Check the continuity electric shift control module vehicle side harness connector terminal and parking actuator relay B vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		Parking actuator relay A vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M59	33	E55	2	Existed

2. Check the continuity electric shift control module vehicle side harness connector terminal and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M59	33	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace damaged parts.

8. CHECK MOTOR COIL B

Check the motor coil B (parking actuator). Refer to TM-91, "Component Inspection (Motor Coil B)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident"
NO >> Replace the reduction gear due to malfunction in the motor coil B (parking actuator). Refer to TM-17, "Removal and Installation".

Component Inspection (Parking Actuator Relay B)

INFOID:0000000007006010

1. CHECK PARKING ACTUATOR RELAY B

1. Disconnect the parking actuator relay B. Refer to TM-26, "Component Parts Location".
2. Apply 12 V direct current between parking actuator relay B terminals 1 and 2.
   CAUTION:
   - **Never make the terminals short.**
   - **Connect the fuse between the terminals when applying the voltage.**
3. Check the continuity between parking actuator relay B terminals 3 and 5.

Parking actuator relay B		Condition	Continuity
Terminal			
3	5	Apply 12 V direct current between terminals 1 and 2.	Existed
		Does not apply 12 V direct current between terminals 1 and 2.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the parking actuator relay B.

Component Inspection (Motor Coil B)

INFOID:0000000007006011

1. CHECK MOTOR COIL B

1. Disconnect the parking actuator connector.
2. Check the resistance between parking actuator connector terminals.

Parking actuator connector		Resistance
Terminal		
14	11	2.3 – 2.8 Ω
	12	
	13	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the reduction gear due to malfunction in the motor coil B (parking actuator). Refer to TM-17, "Removal and Installation".

P189D BACK UP VOLTAGE

DTC Logic

INFOID:0000000007006012

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P189D	Memory Back Up Power Supply	It is detected that the memory backup power supply voltage is specified value or less.	• Electric shift control module • Harness, fuse, or connectors (Each circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P189D” detected?

YES >> Go to TM-93, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006013

1.CHECK MEMORY BACK UP POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the voltage between electric shift control module vehicle side harness connector terminal and ground.

Electric shift control module vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
M58	8	Ground	9 – 16 V

Is the inspection result normal?

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

2.CHECK GROUND CIRCUIT

Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	3	Ground	Existed
	4		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between electric shift control module vehicle side harness connector and 12V battery.
- 12V battery
- 10A fuse (# 12)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Repair or replace damaged parts.

P189E ACTUATOR LOCK

DTC Logic

INFOID:0000000007006014

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P189E	Parking Actuator Lock	The parking actuator has a mechanical malfunction.	Parking Actuator (Parking mechanism)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Press the P position switch to shift to P position and wait for 5 seconds or more.
3. Shift the selector lever to N position and wait for 5 seconds or more.
4. Check DTC.

Is “P189E” detected?

YES >> Go to TM-95, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006015

1.REPLACE REDUCTION GEAR

Replace the reduction gear due to malfunction in the parking actuator. Refer to TM-17, "Removal and Installation".

>> END

P189F ANGLE SENSOR 1

DTC Logic

INFOID:0000000007006016

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P189F	Angle Sensor 1	Output value of angle sensor 1 is out of the specified value.	• Angle sensor 1 (Parking actuator) • Electric shift control module • Harness (Open or short)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P189F” detected?

YES >> Go to TM-96, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006017

1.CHECK ANGLE SENSOR 1 SIGNAL

1. Check the voltage between electric shift control module vehicle side harness connector terminal and ground.
2. Set the vehicle to READY.

Electric shift control module vehicle side harness connector		Ground	Condition	Voltage
Connector	Terminal			
M58	11	Ground	Selector lever in P position (Manual plate: P position)	1.42 – 2.20 V
			Other than the above (Manual plate: Not P position)	2.85 – 3.56 V

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> GO TO 2.

2.CHECK ANGLE SENSOR 1 POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the parking actuator connector.
3. Check the voltage between parking actuator vehicle side harness connector terminal and ground.

Parking actuator vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F6	17	Ground	Power switch ON	5 V

Is the inspection result normal?

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

3. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminals and parking actuator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	11	F6	15	Existed
	21		16	

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	11	Ground	Not existed
	21		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the reduction gear due to malfunction in the angle sensor 1 (parking actuator). Refer to TM-17, "Removal and Installation".

NO >> Repair or replace damaged parts.

4. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminal and parking actuator vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	10	F6	17	Existed

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	10	Ground	Not existed

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> Repair or replace damaged parts.

P18A0 ANGLE SENSOR 2

DTC Logic

INFOID:0000000007006018

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18A0	Angle Sensor 2	Output value of angle sensor 2 is out of the specified value	• Angle sensor 2 (Parking actuator) • Electric shift control module • Harness (Open or short)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P18A0” detected?

YES >> Go to TM-98, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006019

1.CHECK ANGLE SENSOR 2 SIGNAL

1. Check the voltage between electric shift control module vehicle side harness connector terminal and ground.
2. Set the vehicle to READY.

Electric shift control module vehicle side harness connector		Ground	Condition	Voltage
Connector	Terminal			
M59	40	Ground	Selector lever in P position (Manual plate: P position)	1.42 – 2.20 V
			Other than the above (Manual plate: Not P position)	2.85 – 3.56 V

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> GO TO 2.

2.CHECK ANGLE SENSOR 2 POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the parking actuator connector.
3. Check the voltage between parking actuator vehicle side harness connector terminal and ground.

Parking actuator vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F6	20	Ground	Power switch ON	5 V

Is the inspection result normal?

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

3. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminals and parking actuator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M59	40	F6	18	Existed
	49		19	

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M59	40	Ground	Not existed
	49		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the reduction gear due to malfunction in the angle sensor 2 (parking actuator). Refer to TM-17, "Removal and Installation".

NO >> Repair or replace damaged parts.

4. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminal and parking actuator vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M59	39	F6	20	Existed

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M59	39	Ground	Not existed

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> Repair or replace damaged parts.

P18A1 ANGLE SENSOR 1

DTC Logic

INFOID:0000000007006020

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18A1	Angle Sensor 1 Performance Error	A malfunction is detected in the performance of angle sensor 1.	• Angle sensor 1 (Parking actuator) • Electric shift control module • Harness (Open or short)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P18A1” detected?

YES >> Go to TM-100, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006021

1.CHECK ANGLE SENSOR 1 POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the parking actuator connector.
3. Check the voltage between parking actuator vehicle side harness connector terminal and ground.

Parking actuator vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F6	17	Ground	Power switch ON	5 V

Is the inspection result normal?

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

2.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminals and parking actuator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	11	F6	15	Existed
	21		16	

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	11	Ground	Not existed
	21		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the reduction gear due to malfunction in the angle sensor 1 (parking actuator). Refer to TM-17, "Removal and Installation".

NO >> Repair or replace damaged parts.

3. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminal and parking actuator vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	10	F6	17	Existed

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	10	Ground	Not existed

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> Repair or replace damaged parts.

P18A2 ANGLE SENSOR 2

DTC Logic

INFOID:0000000007006022

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18A2	Angle Sensor 2 Performance Error	A malfunction is detected in the performance of angle sensor 2.	Angle sensor 2 (Parking actuator)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Power switch ON and wait 2 seconds or more.
2. Perform “Self Diagnostic Results” in “SHIFT”.

Is “P18A2” detected?

YES >> Go to TM-102, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006023

1.CHECK ANGLE SENSOR 2 POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the parking actuator connector.
3. Check the voltage between parking actuator vehicle side harness connector terminal and ground.

Parking actuator vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F6	20	Ground	Power switch ON	5 V

Is the inspection result normal?

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

2.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminals and parking actuator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M59	40	F6	18	Existed
	49		19	

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M59	40	Ground	Not existed
	49		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the reduction gear due to malfunction in the angle sensor 2 (parking actuator). Refer to TM-17, "Removal and Installation".

NO >> Repair or replace damaged parts.

3. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminal and parking actuator vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		Parking actuator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M59	39	F6	20	Existed

4. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M59	39	Ground	Not existed

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> Repair or replace damaged parts.

P18A3 CONTROL MODULE

DTC Logic

INFOID:0000000007006024

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18A3	Control Module (Program Manipulation) Error	A malfunction is detected in the electric shift control module.	Electric shift control module

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Power switch OFF to ON and wait for 2 seconds or more.
2. Check DTC.

Is “P18A3” detected?

YES >> Go to TM-104, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006025

1.REPLACE ELECTRIC SHIFT CONTROL MODULE

Replace the electric shift control module. Refer to TM-130, "Removal and Installation".

>> END

P18A4 CONTROL MODULE

DTC Logic

INFOID:0000000007006026

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18A4	Control Module (CPU) Error	A malfunction is detected in the electric shift control module.	Electric shift control module

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Power switch OFF to ON and wait for 2 seconds or more.
2. Check DTC.

Is “P18A4” detected?

YES >> Go to TM-105, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006027

1.REPLACE ELECTRIC SHIFT CONTROL MODULE

Replace the electric shift control module. Refer to TM-130, "Removal and Installation".

>> END

P18A6 WAKE UP SIGNAL

DTC Logic

INFOID:0000000007006028

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18A6	Wake Up Signal Circuit	No wake-up signal is transmitted from BCM when the power switch is ON.	• BCM • Harness or connectors (Each circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Power switch ON and wait for 4 minutes or more.
2. Check DTC.

Is “P18A6” detected?

YES >> Go to TM-106, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006029

1.CHECK WAKE UP SIGNAL

Check the voltage between electric shift control module vehicle side harness connector terminal and ground.

Electric shift control module vehicle side harness connector		Ground	Condition	Voltage
Connector	Terminal			
M58	20	Ground	Power switch ON	9 – 16 V

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> GO TO 2.

2.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND BCM

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Disconnect the BCM connector.
4. Check the continuity between electric shift control module vehicle side harness connector terminal and BCM vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		BCM vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	20	M70	104	Existed

5. Check the continuity between electric shift control module vehicle side harness connector terminal and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	20	Ground	Not existed

Is the inspection result normal?

YES >> Check the BCM. Refer to BCS-32, "Reference Value".
NO >> Repair or replace damaged parts.

P18A7 SHIFT SIGNAL OFF

DTC Logic

INFOID:0000000007006030

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18A7	Electric Shift Sensor Circuit	It is detected that the states of all electric shift sensors No. 1 to No. 6 are OFF.	• Electric shift sensor • Electric shift control module • Harness or connectors (Each circuit is open or shorted.)

Position Pattern Table

Electric shift control module recognition position	Selector lever position	Electric shift sensor					
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
H	H	OFF	OFF	ON	OFF	OFF	ON
P	H	OFF	OFF	ON	OFF	OFF	ON
R	R	ON	ON	OFF	OFF	OFF	OFF
N	N	OFF	ON	ON	ON	OFF	OFF
D	D	OFF	OFF	OFF	ON	ON	OFF

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY and wait for 5 seconds or more.
2. Check DTC.

Is “P18A7” detected?

YES >> Go to TM-108, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006031

1.CHECK ELECTRIC SHIFT SENSOR INPUT SIGNAL

With CONSULT
1. Set the vehicle to READY.
2. Select “Data Monitor” in “SHIFT”.
3. Select “SHIFT SENSOR 1”, “SHIFT SENSOR 2”, “SHIFT SENSOR 3”, “SHIFT SENSOR 4”, “SHIFT SENSOR 5”, and “SHIFT SENSOR 6”.
4. Operate the selector lever to identify a electric shift sensor of which value does not change.

Monitor item	Condition	Value / Status
SHIFT SENSOR 1	Selector lever is held in R position	ON
	Other than the above	OFF
SHIFT SENSOR 2	Selector lever is held in R and N positions	ON
	Other than the above	OFF
SHIFT SENSOR 3	Selector lever is held in H (Home) and N positions	ON
	Other than the above	OFF

Monitor item	Condition	Value / Status
SHIFT SENSOR 4	Selector lever is held in N and D positions	ON
	Other than the above	OFF
SHIFT SENSOR 5	Selector lever is held in D position	ON
	Other than the above	OFF
SHIFT SENSOR 6	Selector lever in H (Home) position	ON
	Other than the above	OFF

Without CONSULT
1. Set the vehicle to READY.
2. Operate the selector lever.
3. Check the voltage between electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Condition	Voltage (Approx.)
	Connector	terminal			
1	M59	34	Ground	Selector lever is held in R position	0 V
				Other than the above	5 V
2		35		Selector lever is held in R and N positions	0 V
				Other than the above	5 V
3		36		Selector lever is held in H (Home) and N positions	0 V
				Other than the above	5 V
4		37		Selector lever is held in N and D position	0 V
				Other than the above	5 V
5		44		Selector lever is held in D position	0 V
				Other than the above	5 V
6		45		Selector lever in H (Home) position	0 V
				Other than the above	5 V

>> GO TO 2.

2. CHECK ELECTRIC SHIFT SENSOR POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the electric shift sensor connector.
3. Power switch ON.
4. Check the power circuit of the malfunctioning electric shift sensor identified at Step 1.
5. Check the voltage between electric shift sensor vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift sensor vehicle side harness connector		Ground	Voltage (Approx.)
	Connector	Terminal		
1, 3, 5	M57	1	Ground	5 V
2, 4, 6		7		

Is the inspection result normal?

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

3. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ELECTRIC SHIFT SENSOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.

3. Check the continuity between electric shift control module vehicle side harness connector terminal and electric shift sensor vehicle side harness connector terminal.

Electric shift sensor	Electric shift control module vehicle side harness connector		Electric shift sensor vehicle side harness connector		Continuity
	Connector	Terminal	Connector	Terminal	
1, 3, 5	M58	19	M57	1	Existed
2, 4, 6	M59	48		7	

4. Check the continuity between electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Continuity
	Connector	Terminal		
1, 3, 5	M58	19	Ground	Not existed
2, 4, 6	M59	48		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift control module. Refer to TM-130, "Removal and Installation".

NO >> Repair or replace damaged parts.

4. CHECK ELECTRIC SHIFT SENSOR GROUND CIRCUIT

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the continuity between electric shift control module vehicle side harness connector terminal and electric shift sensor vehicle side harness connector terminal.

Electric shift sensor	Electric shift control module vehicle side harness connector		Electric shift sensor vehicle side harness connector		Continuity
	Connector	Terminal	Connector	Terminal	
1, 3, 5	M59	41	M57	6	Existed
2, 4, 6		50		12	

4. Check the continuity between electric shift control module vehicle side harness connector terminal and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Continuity
	Connector	Terminal		
1, 3, 5	M59	41	Ground	Not existed
2, 4, 6		50		

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ELECTRIC SHIFT SENSOR

1. Check the continuity between electric shift control module vehicle side harness connector terminal and electric shift sensor vehicle side harness connector terminal.

Electric shift sensor	Electric shift control module vehicle side harness connector		Electric shift sensor vehicle side harness connector		Continuity
	Connector	Terminal	Connector	Terminal	
1	M59	34	M57	11	Existed
2		35		5	
3		36		10	
4		37		3	
5		44		9	
6		45		4	

2. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift sensor	Electric shift control module vehicle side harness connector		Ground	Continuity
	Connector	Terminal		
1	M59	34	Ground	Not existed
2		35		
3		36		
4		37		
5		44		
6		45		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the electric shift sensor. Refer to TM-131, "Exploded View".

NO >> Repair or replace damaged parts.

P18A8 P POSITION SWITCH

DTC Logic

INFOID:0000000007006032

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18A8	P Position Switch Error	P position switches No. 7 and No. 8 are stuck at OFF.	• P position switch • Harness (Each circuit is open or shorted.)
		P position switch No. 7 is stuck at ON and P position switch No. 8 is stuck at OFF.	

P Position Switch Pattern Table

Electric shift control module recognition position	Selector lever position	P position SW	Electric shift sensor						P position SW	
			No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
H	H	No push	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
P	H	Push	OFF	OFF	ON	OFF	OFF	ON	ON	OFF
R	R	No push	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
N	N	No push	OFF	ON	ON	ON	OFF	OFF	OFF	ON
D	D	No push	OFF	OFF	OFF	ON	ON	OFF	OFF	ON

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Press the P position switch to shift to P position and wait for 5 seconds or more. (Be sure to press the P position switch for 1 second or more.)
3. Shift the selector lever to N position and wait for 5 minutes or more.
4. Check DTC.

Is “P18A8” detected?

YES >> Go to TM-112, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006033

1.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND ELECTRIC SHIFT SENSOR

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Disconnect the electric shift sensor connector.
4. Check the continuity between electric shift control module vehicle side harness connector terminals and electric shift sensor vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Electric shift sensor vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M59	46	M57	2	Existed
	47		8	

5. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M59	46	Ground	Not existed
	47		

Is the inspection result normal?

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

2.CHECK P POSITION SWITCH

Check the P position switch. Refer to TM-113, "Component Inspection (P Position Switch)".

Is the inspection result normal?

YES >> Replace the electric shift sensor. Refer to TM-131, "Exploded View".
NO >> Replace the selector lever knob due to malfunction in the P position switch. Refer to TM-131, "Removal and Installation".

Component Inspection (P Position Switch)

INFOID:0000000007006034

1.CHECK P POSITION SWITCH

1. Disconnect the P position switch connector.
2. Check the continuity between P position swiitch connector terminal.

P position switch connector		Condition	Continuity
Terminal			
1	2	When P position switch is depressed	Existed
		When P position switch is released	Not existed
1	3	When P position switch is depressed	Not existed
		When P position switch is released	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the selector lever knob due to malfunction in the P position switch. Refer to TM-131, "Removal and Installation".

P18A9 PARKING ACTUATOR FUNCTION

DTC Logic

INFOID:0000000007006035

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18A9	Parking Actuator Function	It is detected that the output of the parking actuator does not stop.	Parking actuator

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Shift the selector lever to N position and wait for 10 seconds or more.
3. Press the P position switch to shift to P position and wait for 10 seconds or more.
4. Check DTC.

Is “P18A9” detected?

YES >> Go to TM-114, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006036

1.P POSITION LEARNING

Perform P position learning. Refer to TM-57, "Work Procedure".

>> GO TO 2.

2.SELF DIADNOSTIC

Perform “DTC CONFIRMATION PROCEDURE”. Refer to TM-114, "DTC Logic".

Is “P18A9” detected?

YES >> Replace the reduction gear due to malfunction in the parking actuator. Refer to TM-17, "Removal and Installation".
NO >> INSPECTION END

P18AA P POSITION LEARNING ERROR

DTC Logic

INFOID:0000000007006037

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18AA	P Position Learning Error	Voltage of angle sensor is out of the specified value while learning P position.	Parking actuator

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Perform P position learning. Refer to TM-57, "Work Procedure".
2. Check DTC.

Is “P18AA” detected?

YES >> Go to TM-115, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006038

1.REPLACE REDUCTION GEAR

Replace the reduction gear due to malfunction in the parking actuator. Refer to TM-17, "Removal and Installation".

>> END

P18AB IGNITION SWITCH

DTC Logic

INFOID:0000000007006039

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18AB	IGN switch Circuit	It is detected that the power switch input terminal values from the 2 lines do not match each other.	• Power switch • Harness, fuse, or connectors (Each circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P18AB” detected?

YES >> Go to TM-116, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006040

1.CHECK ELECTRIC SHIFT CONTROL MODULE POWER SUPPLY CIRCUIT

1. Power switch OFF.
2. Disconnect the electric shift control module connector.
3. Check the voltage between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
M58	9	Ground	Power switch ON	9 – 16 V
			Power switch OFF	0 V
M59	42		Power switch ON	9 – 16 V
			Power switch OFF	0 V

Which terminal value is abnormal?

Terminal 9>>GO TO 2.
Terminal 42>>GO TO 4.

2.CHECK HARNESS BETWEEN IPDM E/R AND ELECTRIC SHIFT CONTROL MODULE

1. Disconnect the IPDM E/R connector.
2. Check the continuity between IPDM E/R vehicle side harness connector terminal and electric shift control module vehicle side harness connector terminal.

Electric shift control module vehicle side harness connector		IPDM E/R vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	9	E15	61	Existed

3. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	9	Ground	Not existed

Is the inspection result normal?

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

3. DETECT MALFUNCTION ITEMS

Check the following items.
- Harness for short or open between power switch and IPDM E/R.
- Power switch
- Ignition relay
- 15A fuse (# 61, IPDM E/R)
- IPDM E/R

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Repair or replace damaged parts.

4. DETECT MALFUNCTION ITEMS

Check the following items.
- Harness for short or open between power switch and electric shift control module vehicle side harness connector terminal 42.
- Power switch
- Ignition relay
- 15A fuse (# 6)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Repair or replace damaged parts.

P18AC PARKING ACTUATOR RELAY A

DTC Logic

INFOID:0000000007006041

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18AC	Parking Actuator Relay A Circuit	In spite of the parking actuator relay A OFF, voltage is detected from the U phase, V phase and W phase of motor coil A.	• Parking actuator relay A (ON stuck) • Electric shift control module • Harness (Ground short)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P18AC” detected?

YES >> Go to TM-118, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006042

1.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR RELAY A

1. Disconnect the electric shift control module connector.
2. Disconnect the parking actuator relay A.
3. Check the continuity between parking actuator relay A vehicle side harness connector terminal and ground.

Parking actuator relay A vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E54	2	Ground	Not existed

Is the inspection result normal?

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

2.CHECK HARNESS BETWEEN PARKING ACTUATOR AND PARKING ACTUATOR RELAY A

1. Disconnect the parking actuator connector.
2. Check the voltage between parking actuator vehicle side harness connector terminal and ground.

Parking actuator vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
F4	4	Ground	0 V

Is the inspection result normal?

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

3.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

Check the voltage between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
M58	1	Ground	0 V
	2		
	5		

Is the inspection result normal?

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

4. CHECK PARKING ACTUATOR RELAY A

Check the parking actuator relay A. Refer to TM-119, "Component Inspection (Parking Actuator Relay A)".

Is the inspection result normal?

YES >> Replace the electric shift control module. Refer to TM-130, "Removal and Installation".
NO >> Replace the parking actuator relay A. Refer to TM-26, "Component Parts Location".

Component Inspection (Parking Actuator Relay A)

INFOID:0000000007006043

1. CHECK PARKING ACTUATOR RELAY A

1. Disconnect the parking actuator relay A. Refer to TM-26, "Component Parts Location".
2. Apply 12 V direct current between parking actuator relay A terminals 1 and 2.
   CAUTION:
   - **Never make the terminals short.**
   - **Connect the fuse between the terminals when applying the voltage.**
3. Check the continuity between parking actuator relay A terminals 3 and 5.

Parking actuator relay A		Condition	Continuity
Terminal			
3	5	Apply 12 V direct current between terminals 1 and 2.	Existed
		Does not apply 12 V direct current between terminals 1 and 2.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the parking actuator relay A.

P18AD PARKING ACTUATOR RELAY B

DTC Logic

INFOID:0000000007006044

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18AD	Parking Actuator Relay B Circuit	In spite of the parking actuator relay B OFF, voltage is detected from the U phase, V phase and W phase of motor coil B.	• Parking actuator relay B (ON stuck) • Electric shift control module • Harness (Ground short)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “P18AD” detected?

YES >> Go to TM-120, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006045

1.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR RELAY B

1. Disconnect the electric shift control module connector.
2. Disconnect the parking actuator relay B.
3. Check the continuity between parking actuator relay B vehicle side harness connector terminal and ground.

Parking actuator relay B vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E55	2	Ground	Not existed

Is the inspection result normal?

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

2.CHECK HARNESS BETWEEN PARKING ACTUATOR AND PARKING ACTUATOR RELAY B

1. Disconnect the parking actuator connector.
2. Check the voltage between parking actuator vehicle side harness connector terminal and ground.

Parking actuator vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
F5	14	Ground	0 V

Is the inspection result normal?

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

3.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND PARKING ACTUATOR

Check the voltage between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
M59	27	Ground	0 V
	28		
	29		

Is the inspection result normal?

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

4. CHECK PARKING ACTUATOR RELAY B

Check the parking actuator relay B. Refer to TM-121, "Component Inspection (Parking Actuator Relay B)".

Is the inspection result normal?

YES >> Replace the electric shift control module. Refer to TM-130, "Removal and Installation".
NO >> Replace the parking actuator relay B. Refer to TM-26, "Component Parts Location".

Component Inspection (Parking Actuator Relay B)

INFOID:0000000007006046

1. CHECK PARKING ACTUATOR RELAY B

1. Disconnect the parking actuator relay B. Refer to TM-26, "Component Parts Location".
2. Apply 12 V direct current between parking actuator relay B terminals 1 and 2.
   CAUTION:
   - **Never make the terminals short.**
   - **Connect the fuse between the terminals when applying the voltage.**
3. Check the continuity between parking actuator relay B terminals 3 and 5.

Parking actuator relay B		Condition	Continuity
Terminal			
3	5	Apply 12 V direct current between terminals 1 and 2.	Existed
		Does not apply 12 V direct current between terminals 1 and 2.	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace the parking actuator relay B.

P18AE STUCK IN SHIFT

DTC Logic

INFOID:0000000007006047

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
P18AE	Medium Stuck In Shift	It is detected that the parking actuator does not move at the midpoint of the manual plate after the parking actuator stops the operation.	Parking actuator (Parking mechanism)

DTC CONFIRMATION PROCEDURE

CAUTION:

"TM-122, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCEDURE" .

1. PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Set the vehicle to READY.
2. Select "Data Monitor" in "SHIFT".
3. Select "RANGE POSITION".
4. Shift the selector lever as follows.

- P → N → P

5. Repeat step 4 five more times.
6. Check DTC.

Is "P18AE" detected?

YES >> Go to TM-122, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006048

1. REPLACE REDUCTION GEAR

Replace the reduction gear due to malfunction in the parking actuator. Refer to TM-17, "Removal and Installation".

>> END

U1000 CAN COMM CIRCUIT

DTC Logic

INFOID:0000000007006049

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
U1000	CAN communication line	Electric shift control module cannot transmit or receive CAN communication signals when the power switch is ON.	Harness or connectors (CAN communication line is open or shorted.)

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is “U1000” detected?

YES >> Go to TM-123, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006050

Go to LAN-15, "Trouble Diagnosis Flow Chart".

U1010 CONTROL UNIT (CAN)

DTC Logic

INFOID:0000000007006051

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
U1010	Control Module Malfunction	Malfunction is detected in the CAN communication initial diagnosis (control module malfunction).	Electric shift control module

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Power switch OFF to ON and wait for 5 seconds or more.
2. Check DTC.

Is “U1010” detected?

YES >> Go to TM-124, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006052

1.REPLACE ELECTRIC SHIFT CONTROL MODULE

Replace the electric shift control module. Refer to TM-130, "Removal and Installation".

>> END

U1086 CAN ERROR

DTC Logic

INFOID:0000000007006053

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detection condition	Possible cause
U1086	Control Module Malfunction	The inability to transmit or receive data is detected after the power switch is turned OFF.	Electric shift control module

DTC DETECTION LOGIC

1.PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, power switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Power switch OFF to ON and wait for 5 seconds or more.
2. Check DTC.

Is “U1086” detected?

YES >> Go to TM-125, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007006054

Go to LAN-15, "Trouble Diagnosis Flow Chart".

SELECTOR INDICATOR CIRCUIT

Component Function Check

INFOID:0000000007006055

1.CHECK SELECTOR INDICATOR

1. Set the vehicle to READY.
2. Shift the selector lever.
3. Check that the illuminated position of the selector indicator in the finisher area corresponds to the selected shift position.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to TM-126, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007006056

1.CHECK SELECTOR INDICATOR POWER SUPPLY CIRCUIT

1. Disconnect the selector indicator connector.
2. Check the voltage between selector indicator vehicle side harness connector terminal and ground.

Selector indicator vehicle side harness connector		Ground	Voltage
Connector	Terminal		
M56	2	Ground	9 – 16 V

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between selector indicator vehicle side harness connector and 12V battery.
- 12V battery
- 10A fuse (# 12)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".
NO >> Repair or replace damaged parts.

3.CHECK HARNESS BETWEEN ELECTRIC SHIFT CONTROL MODULE AND SELECTOR INDICATOR

1. Disconnect the electric shift control module connector.
2. Check the continuity between electric shift control module vehicle side harness connector terminals and selector indicator vehicle side harness connector terminals.

Electric shift control module vehicle side harness connector		Selector indicator vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M58	22	M56	7	Existed
M59	26		8	
	30		1	
	38		3	

3. Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	22	Ground	Not existed
M59	26		
	30		
	38		

Is the inspection result normal?

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

4. CHECK GROUND CIRCUIT

Check the continuity between electric shift control module vehicle side harness connector terminals and ground.

Electric shift control module vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M58	3	Ground	Existed
	4		

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the selector indicator. Refer to TM-134, "Removal and Installation".
NO >> Repair or replace damaged parts.

SHIFT POSITION INDICATOR CIRCUIT

Component Function Check

INFOID:0000000007006057

1.CHECK SHIFT POSITION INDICATOR

1. Set the vehicle to READY.
2. Shift the selector lever.
3. Check that the indication of the shift position indicator in the combination meter corresponds to the selected shift position.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to TM-128, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007006058

1.CHECK DTC OF ELECTRIC SHIFT CONTROL MODULE

With CONSULT
1. Power switch ON.
2. Perform “Self Diagnostic Results” in “SHIFT”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to TM-44, "DTC Index".
NO >> GO TO 2.

2.CHECK DTC OF VCM

With CONSULT
1. Power switch ON.
2. Perform “Self Diagnostic Results” in “EV/HEV”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to EVC-78, "DTC Index".
NO >> GO TO 3.

3.CHECK DTC OF COMBINATION METER

With CONSULT
1. Power switch ON.
2. Perform “Self Diagnostic Results” in “METER”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to MWI-61, "DTC Index".
NO >> 1. Check intermittent incident. Refer to GI-51, "Intermittent Incident".
2. If inspection result is OK, replace the combination meter. Refer to MWI-89, "Removal and Installation".

ELECTRIC SHIFT WARNING LAMP

Component Function Check

INFOID:0000000007006059

1.CHECK ELECTRIC SHIFT WARNING LAMP

Check that electric shift warning lamp turns ON for approx. 2 seconds after power switch is ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to TM-129, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007006060

1.CHECK DTC OF ELECTRIC SHIFT CONTROL MODULE

With CONSULT
1. Power switch ON.
2. Perform “Self Diagnostic Results” in “SHIFT”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to TM-44, "DTC Index".
NO >> GO TO 2.

2.CHECK DTC OF VCM

With CONSULT
1. Power switch ON.
2. Perform “Self Diagnostic Results” in “EV/HEV”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to EVC-78, "DTC Index".
NO >> 1. Check input/output signals of VCM. Refer to EVC-60, "Reference Value".
2. If inspection result is OK, go to 3.

3.CHECK DTC OF COMBINATION METER

With CONSULT
1. Power switch ON.
2. Perform “Self Diagnostic Results” in “METER”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to MWI-61, "DTC Index".
NO >> 1. Check input/output signals of combination meter. Refer to MWI-52, "Reference Value".
2. If inspection result is OK, go to 4.

4.CHECK HARNESS BETWEEN VCM AND COMBINATION METER

1. Disconnect the combination meter connector.
2. Disconnect the VCM connector.
3. Check the continuity between combination meter vehicle side harness connector terminal and VCM vehicle side harness connector terminal.

Combination meter vehicle side harness connector		VCM vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M34	7	E63	91	Existed

4. Check the continuity between combination meter vehicle side harness connector terminal and ground.

Combination meter vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M34	7	Ground	Not existed

Is the inspection result normal?

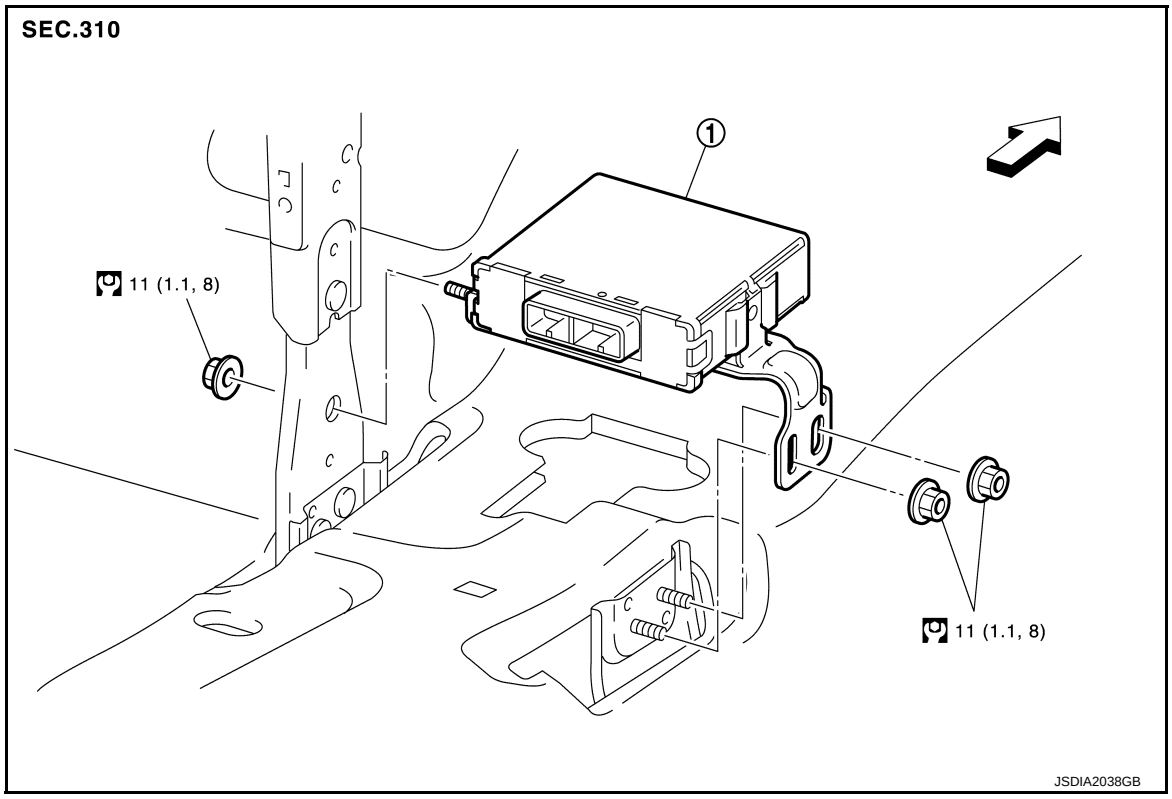
YES >> INSPECTION END
NO >> Repair or replace damaged parts.

REMOVAL AND INSTALLATION

ELECTRIC SHIFT CONTROL MODULE

Exploded View

INFOID:0000000007006061



1. Electric shift control module

⇦ : Vehicle front

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000007006062

CAUTION:
Never subject the electric shift control module to impact or load.

REMOVAL

1. Disconnect the negative cable from 12V battery.
2. Remove the console body assembly. Refer to IP-23, "Exploded View".
3. Disconnect the electric shift control module connector.
4. Remove the electric shift control module with bracket from the vehicle.

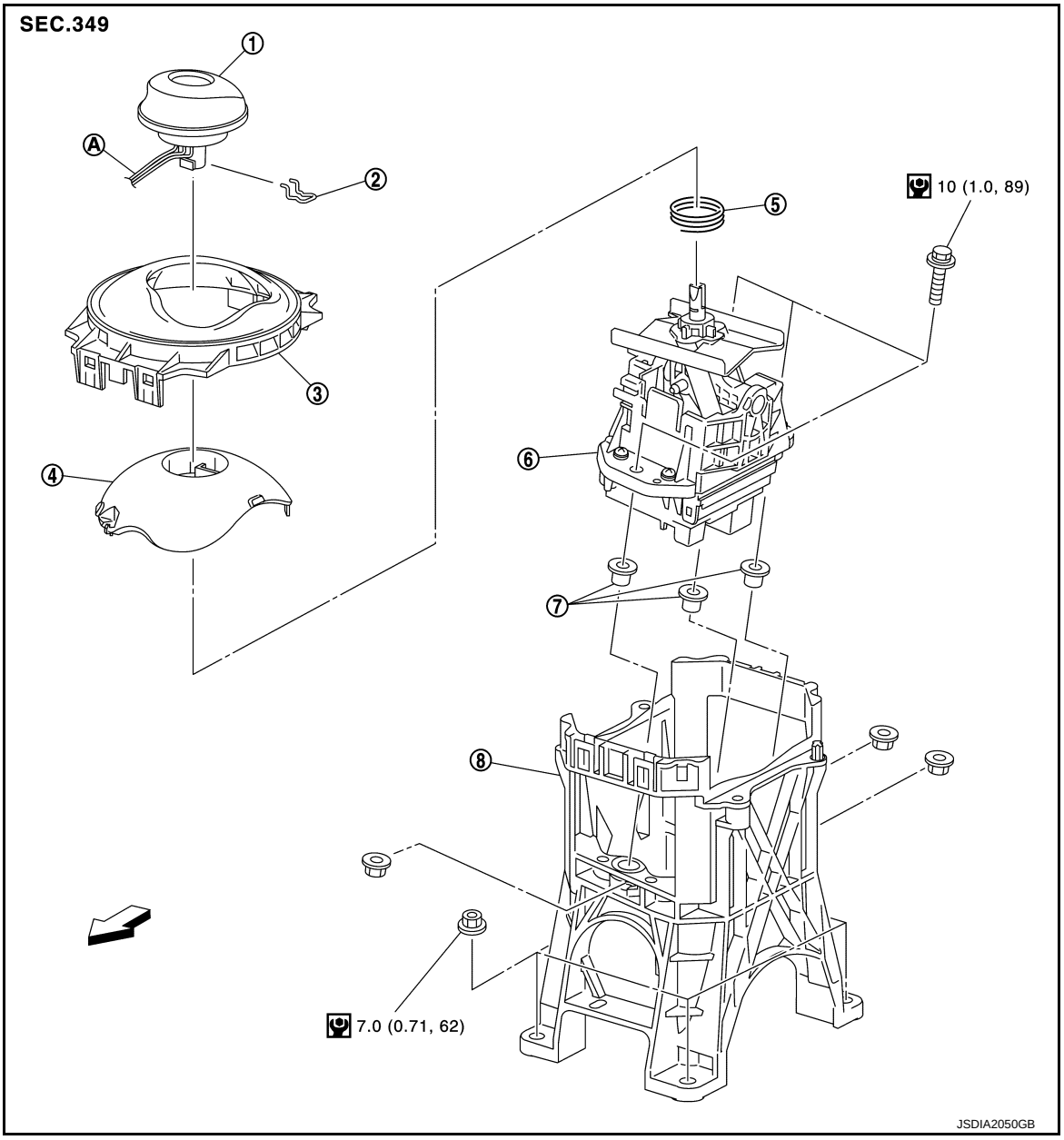
INSTALLATION

Installation is the reverse order of removal.

ELECTRIC SHIFT SELECTOR

Exploded View

INFOID:0000000007006063



1.	Selector lever knob	2.	Lock pin	3.	Shift gate
4.	Slider plate	5.	Spring	6.	Electric shift sensor
7.	Collar	8.	Body bracket		
A.	P position switch harness				

⇦ : Vehicle front

: N·m (kg-m, in-lb)

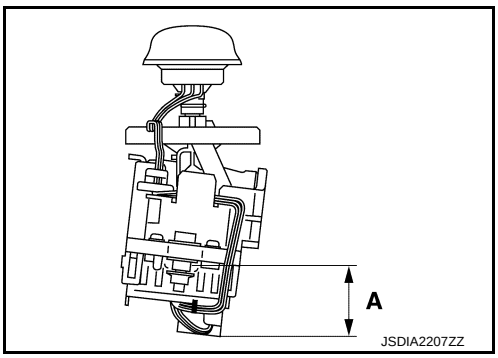
: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000007006064

CAUTION:

- **As part A in the figure contains a strong magnet, persons with an electro-medical apparatus should keep it away from his/her body. Otherwise it may cause the electro-medical apparatus to malfunction.**
- **Keep it away from magnetic objects such as magnetic cards and metal products (e.g. watches).**
- **Never subject the electric shift selector to impact by dropping or hitting, water splash or high humidity.**



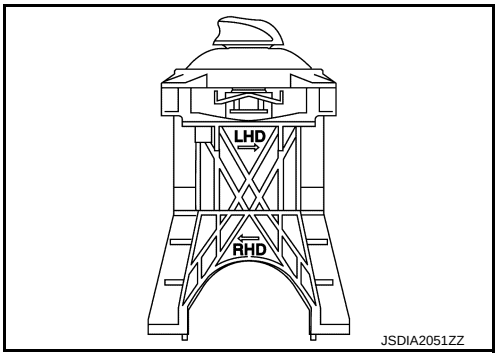
REMOVAL

1. Disconnect the negative cable from 12V battery.
2. Remove the console finisher assembly. Refer to IP-23, "Exploded View".
3. Disconnect the selector indicator connector.
4. Disconnect the electric parking brake connector.
5. Remove the console body assembly. Refer to IP-23, "Exploded View".
6. Remove body harness clip from electric shift selector.
7. Remove electric shift selector fix bolts.
8. Disconnect the electric shift sensor connector.
   CAUTION:
   Never disconnect the P position switch connector.
9. Remove the electric shift selector from the vehicle.

INSTALLATION

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

- Check the orientation instruction on the side of the body bracket and install the part so that the direction of the arrow points toward the vehicle front.

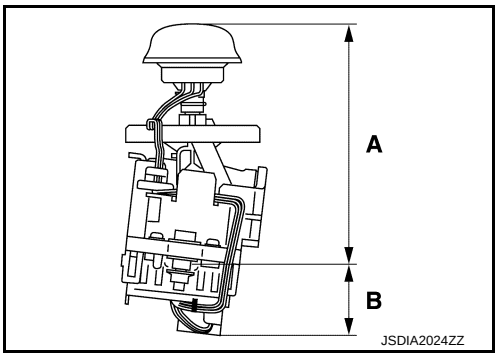


Disassembly and Assembly

INFOID:0000000007006065

CAUTION:

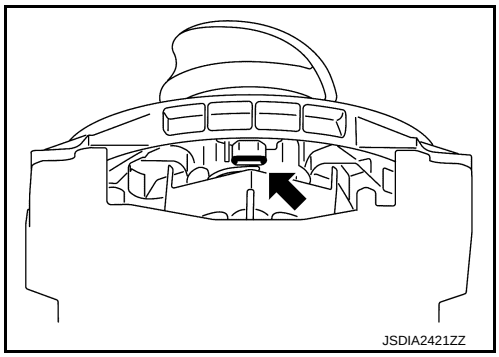
- **As part B in the figure contains a strong magnet, persons with an electro-medical apparatus should keep it away from his/her body. Otherwise it may cause the electro-medical apparatus to malfunction.**
- **Keep it away from magnetic objects such as magnetic cards and metal products (e.g. watches).**
- **When holding the electric shift sensor, hold part A in the figure.**
- **Never disassemble parts A or B shown in the figure.**
- **Never subject the electric shift sensor to impact by dropping or hitting, water splash or high humidity.**



DISASSEMBLY

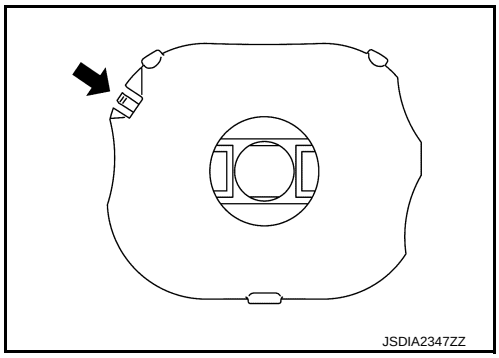
1. Put a mark at the hook position of the P position switch harness.
   CAUTION:
   Memorize how the P position switch harness is routed.

2. Disconnect the P position switch connector.
3. Pull the lock pin out of the selector lever using long-nose pliers.
   NOTE:
   Tilting of the selector lever knob in the N position direction allows easier work.
4. Remove P position switch harness from hook.
5. Pull the selector lever knob upward out of the vehicle.
6. Remove the shift gate from body bracket.
   CAUTION:
   Be careful not to damage the joint (pawl).
7. Remove the slider plate.
8. Remove the spring.
9. Remove electric shift sensor fix bolts.
10. Remove the electric shift sensor from body bracket.

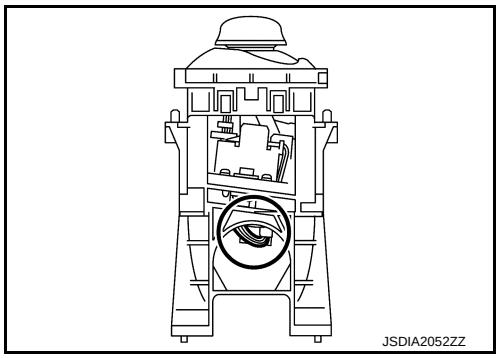

JSDIA2421ZZ

ASSEMBLY

Note the following, and install in the reverse order of removal.
- Install the lock pin to the selector knob before assembly.
- Check that lock pin is securely installed.
- To install slide plate, face the arrow (harness hook) shown in the figure toward the front of the vehicle.
- Hook the P position switch harness at the marked position.


JSDIA2347ZZ

- Adjust the redundant part of the P position switch harness in the position shown in the figure.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Inspection

INFOID:0000000007006066

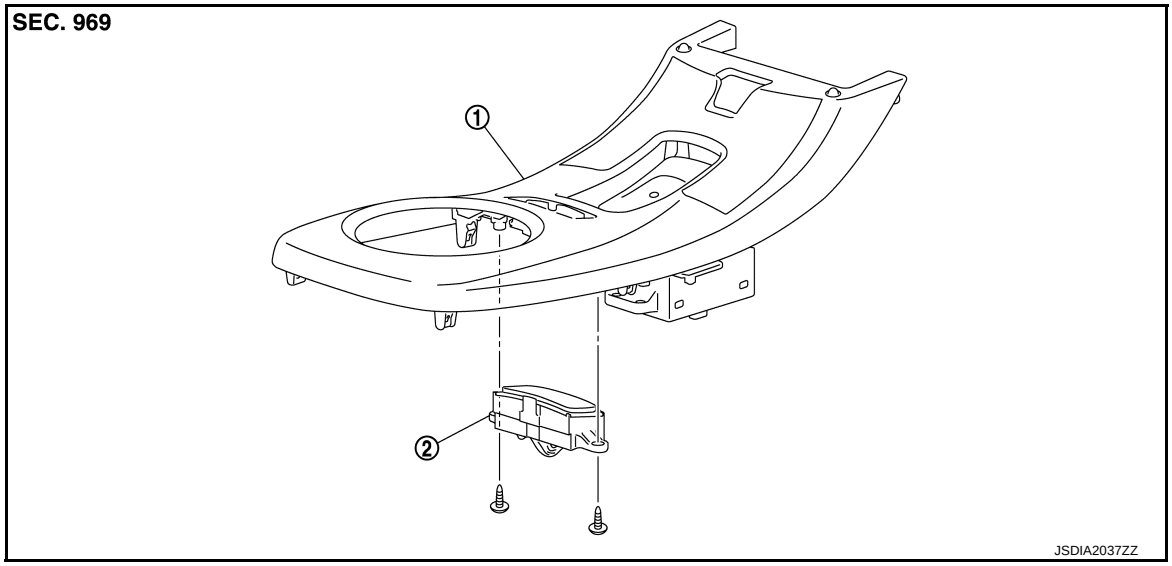
INSPECTION AFTER INSTALLATION

- Pull the selector lever knob upward to check that it does not come off.
- Shift the selector lever and check that the indication of the selector indicator (in the finisher area) and the shift position indicator (in the combination meter) correspond to the actual shift position.
- Check that a buzzer sounds and shifting is not possible when an attempt is made to shift the selector lever from the P position to another position with the pwer switch ON and the brake pedal not depressed.
  NOTE:
  If the brake pedal is depressed, the gear shifts to the N position irrespective of the position to which the lever is shifted.
- Check that a buzzer sounds and that shifting is not possible when an attempt is made to shift the selector lever from the P position to another position in the READY status, and with the brake pedal not depressed.
  NOTE:
  Shifting is possible if the brake pedal is depressed.

SELECTOR INDICATOR

Exploded View

INFOID:0000000007006067



1. Console finisher assembly
2. Selector indicator

Removal and Installation

INFOID:0000000007006068

REMOVAL

1. Remove the console finisher assembly. Refer to IP-23, "Exploded View".
2. Disconnect the selector indicator connector.
3. Disconnect the electric parking brake connector.
4. Remove the selector indicator from the console finisher assembly.

INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:0000000007006069

INSPECTION AFTER INSTALLATION

Shift the selector lever and check that the light position of the selector indicator corresponds to the actual shift position.