SECTION TM

TRANSAXLE & TRANSMISSION

CONTENTS

7AT: RE7R01H

HOW TO USE THIS MANUAL

HOW TO USE THIS SECTION

Information

INFOID:0000000008143050

In this manual, “Hybrid transmission” adopted to this vehicle is described as “automatic transmission (A/T)”.

PRECAUTION

PRECAUTIONS

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

INFOID:0000000008143051

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

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

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

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

Precaution Necessary for Steering Wheel Rotation after 12V Battery Disconnect

INFOID:0000000008143052

For vehicle with steering lock unit, if the 12V battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the 12V battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

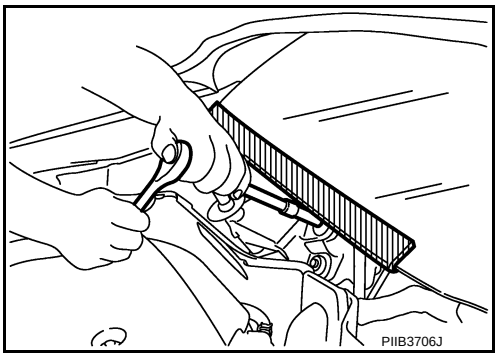
OPERATION PROCEDURE

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

Precaution for Procedure without Cowl Top Cover

INFOID:0000000008143053

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



High Voltage Precautions

INFOID:0000000008143054

DANGER:

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

WARNING:

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

CAUTION:

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

HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

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

HANDLING OF HIGH VOLTAGE HARNESS AND TERMINALS

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

REGULATIONS ON WORKERS WITH MEDICAL ELECTRONICS

WARNING:

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

PROHIBITED ITEMS TO CARRY DURING THE WORK

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

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

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

Person in charge:_____

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

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

Person in charge:_____

Copy this page and put it after folding on the roof of the vehicle in service.

JSAIA1600GB

Precaution for Removing 12V Battery

INFOID:0000000008143055

1. Check that EVSE is not connected.
   NOTE:
   If EVSE is connected, the air conditioning system may be automatically activated by the timer A/C function.
2. Turn the power switch OFF → ON → OFF. Get out of the vehicle. Close all doors (including back door).

3. Check that the charge status indicator lamp does not blink and wait for 5 minutes or more.
NOTE:
If the battery is removed within 5 minutes after the power switch is turned OFF, plural DTCs may be detected.
4. Remove 12V battery within 1 hour after turning the power switch OFF → ON → OFF.
NOTE:
- The 12V battery automatic charge control may start automatically even when the power switch is in OFF state.
- Once the power switch is turned ON → OFF, the 12V battery automatic charge control does not start for approximately 1 hour.

CAUTION:

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

Precautions Concerning On-board Servicing of Hybrid Systems

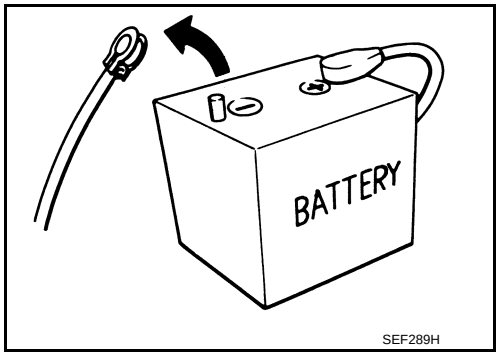
INFOID:0000000008143056

CAUTION:
Be sure to turn the ignition switch OFF before performing inspection and servicing inside the engine compartment or underneath the vehicle. If the ignition switch is ON (vehicle READY state), even if the engine is stopped, the conditions of the vehicle may cause the engine to start automatically.
If it is necessary to continually operate the engine during inspection or servicing, use the designated inspection mode. HBC-89, "Description".

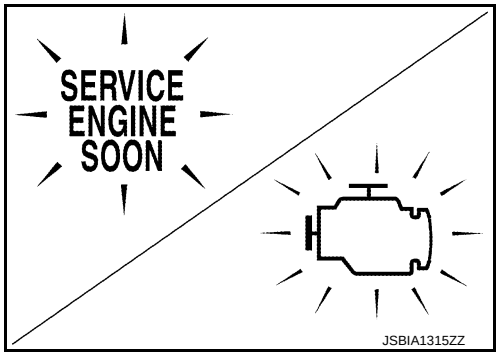
General Precautions

INFOID:0000000008143057

- **Turn ignition switch OFF and disconnect the battery cable from the negative terminal before connecting or disconnecting the A/T assembly connector. Because battery voltage is applied to TCM even if ignition switch is turned OFF.**



- **Perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE" after performing each TROUBLE DIAGNOSIS. If the repair is completed DTC should not be displayed in the "DTC CONFIRMATION PROCEDURE".**
- Always use the specified brand of ATF. Refer to MA-10, "Fluids and Lubricants".
- Use lint-free paper not cloth rags during work.
- Dispose of the waste oil using the methods prescribed by law, ordinance, etc. after replacing the ATF.
- Before proceeding with disassembly, thoroughly clean the outside of the transmission. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.



- Disassembly should be done in a clean work area.
- Use lint-free paper or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transmission.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the A/T is disassembled.
- It is very important to perform functional tests whenever they are indicated.

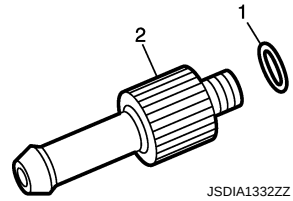
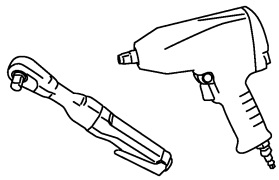
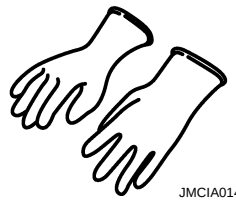
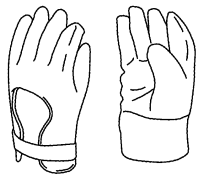
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Never use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- When the A/T drain plug is removed, only some of the ATF is drained. Old ATF will remain in torque converter and ATF cooling system.
  Always follow the procedures under “Changing” when changing ATF. Refer to TM-92, "Changing".
- Occasionally, the parking gear may be locked with the torque insufficiently released, when stopping the vehicle by shifting the selector lever from “D” or “R” to “P” position with the brake pedal depressed.
  In this case, the shock with a thud caused by the abrupt release of torque may occur when shifting the selector lever from “P” position to other positions.
  However, this symptom is not a malfunction which results in the damage of parts.
- Never remove sub electric oil pump from A/T assembly.
- Never disassembly sub electric oil pump inverter.

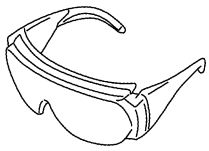
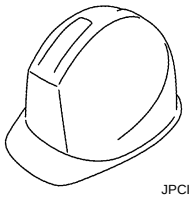
PREPARATION

PREPARATION

Commercial Service Tool

INFOID:0000000008143058

Tool number Tool name		Description
1. 315268E000* O-ring 2. 310811EA5A* Charging pipe	 JSDIA1332ZZ	A/T fluid changing and adjustment
Power tool	 PBIC0190E	Loosening bolts and nuts
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

Tool number Tool name		Description
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

*: Always check with the Parts Department for the latest parts information.

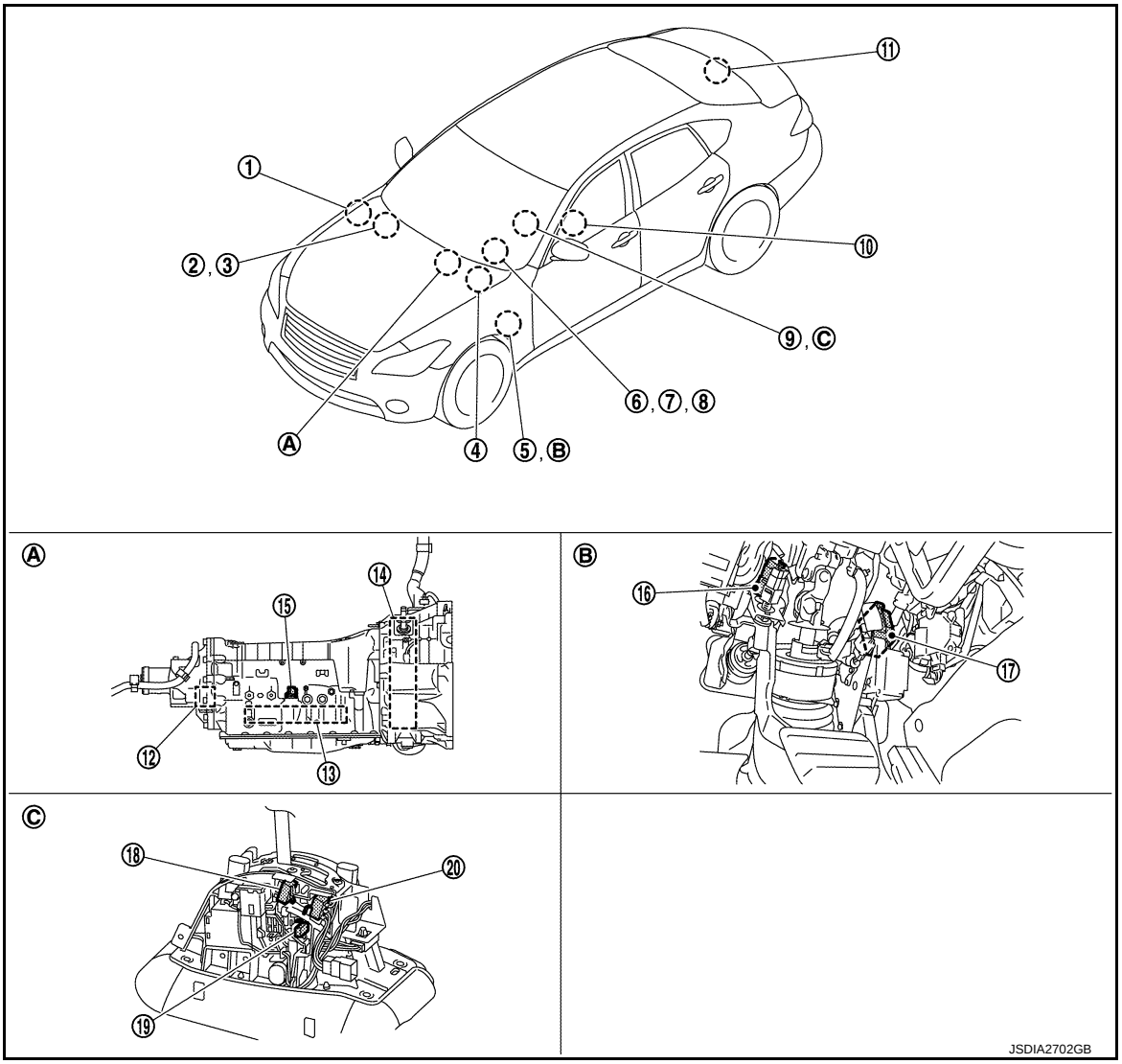
SYSTEM DESCRIPTION

COMPONENT PARTS

A/T CONTROL SYSTEM

A/T CONTROL SYSTEM : Component Parts Location

INFOID:0000000008143059



1. IPDM E/R
   Refer to PCS-5, "IPDM E/R : Component Parts Location".
2. ECM
   Refer to EC-15, "ENGINE CONTROL SYSTEM : Component Parts Location".
3. A/C auto amp.
   Refer to HAC-8, "AUTOMATIC AIR CONDITIONING SYSTEM : Component Parts Location".
4. ABS actuator and electric unit (control unit)
   Refer to BRC-11, "Component Parts Location".
5. BCM
   Refer to BCS-4, "BODY CONTROL SYSTEM : Component Parts Location".
6. Combination meter
   Refer to MWI-6, "METER SYSTEM : Component Parts Location".
7. A/T CHECK indicator lamp
   (On the combination meter)
8. Shift position indicator
   (In the information display LCD in the combination meter)
9. Drive mode select switch
   Refer to DMS-3, "Component Parts Location".
10. Yaw rate/side/decel G sensor
    Refer to BRC-11, "Component Parts Location".
11. HPCM
    Refer to BRC-11, "Component Parts Location".
12. Output speed sensor
13. Control valve & TCM*
14. Traction motor
15. Joint connector

16. Stop lamp switch
17. Accelerator pedal position sensor
18. Manual mode position select switch (shift-up)
19. Manual mode select switch
20. Manual mode position select switch (shift-down)

A. A/T assembly
B. Around the pedal
C. A/T shift selector assembly

*: Control valve & TCM is included in A/T assembly.

NOTE:

The following components are included in control valve & TCM (13).

- TCM
- Input speed sensor 1, 2
- A/T fluid temperature sensor
- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Clutch 1 solenoid valve

A/T CONTROL SYSTEM : Component Description

INFOID:0000000008143060

Name	Function
TCM	TM-15, "A/T CONTROL SYSTEM : TCM"
Transmission range switch	TM-15, "A/T CONTROL SYSTEM : Transmission Range Switch"
Output speed sensor	TM-15, "A/T CONTROL SYSTEM : Output Speed Sensor"
Input speed sensor 1	TM-15, "A/T CONTROL SYSTEM : Input Speed Sensor"
Input speed sensor 2	
A/T fluid temperature sensor	TM-15, "A/T CONTROL SYSTEM : A/T Fluid Temperature Sensor"
Input clutch solenoid valve	TM-15, "A/T CONTROL SYSTEM : Input Clutch Solenoid Valve"
Front brake solenoid valve	TM-15, "A/T CONTROL SYSTEM : Front Brake Solenoid Valve"
Direct clutch solenoid valve	TM-16, "A/T CONTROL SYSTEM : Direct Clutch Solenoid Valve"
High and low reverse clutch solenoid valve	TM-16, "A/T CONTROL SYSTEM : High and Low Reverse Clutch Solenoid Valve"
Low brake solenoid valve	TM-16, "A/T CONTROL SYSTEM : Low Brake Solenoid Valve"
Anti-interlock solenoid valve	TM-16, "A/T CONTROL SYSTEM : Anti-interlock Solenoid Valve"
2346 brake solenoid valve	TM-16, "A/T CONTROL SYSTEM : 2346 Brake Solenoid Valve"
Clutch 1 solenoid valve	TM-16, "A/T CONTROL SYSTEM : Clutch 1 Solenoid Valve"
Line pressure solenoid valve	TM-16, "A/T CONTROL SYSTEM : Line Pressure Solenoid Valve"
Accelerator pedal position sensor	TM-16, "A/T CONTROL SYSTEM : Accelerator Pedal Position Sensor"
Manual mode switch	TM-16, "A/T CONTROL SYSTEM : Manual Mode Switch"
Yaw rate/side/decel G sensor	BRC-14, "Yaw Rate/Side/Decel G Sensor"
Drive mode select switch	DMS-4, "Drive Mode Select Switch"
A/T CHECK indicator lamp	When the ignition switch is pushed to the ON position, the light comes on for 2 seconds.
Stop lamp switch	BRC-14, "Stop Lamp Switch"
ECM	EC-30, "ENGINE CONTROL SYSTEM : System Description"
BCM	BCS-6, "BODY CONTROL SYSTEM : System Description"
Combination meter	MWI-9, "METER SYSTEM : System Description"

Name	Function
ABS actuator and electric unit (control unit)	BRC-16, "System Description"
A/C auto amp.	HAC-16, "AUTOMATIC AIR CONDITIONING SYSTEM : System Description"
HPCM	HBC-20, "HYBRID CONTROL SYSTEM : System Description"

A/T CONTROL SYSTEM : TCM

INFOID:0000000008143061

- The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T.
- The TCM is integral with the control valve assembly and built into the A/T assembly.
- TCM transmits sub electric oil pump oil pressure command signal to sub electric oil pump inverter and secures necessary hydraulic pressure from sub electric oil pump, when necessary hydraulic pressure for transmission cannot be obtained during idling stop operation.

A/T CONTROL SYSTEM : Transmission Range Switch

INFOID:0000000008143062

- The transmission range switch incorporates four contact switches. Each contact switch transmits an ON/OFF signal to the TCM.
- The TCM judges a select lever position from a combination of ON/OFF signals transmitted from each contact switch.

Select lever position	Transmission range switch			
	SW1	SW2	SW3	SW4
P	OFF	OFF	OFF	OFF
R	ON	OFF	OFF	ON
N	ON	ON	OFF	OFF
D and M	ON	ON	ON	ON

A/T CONTROL SYSTEM : Output Speed Sensor

INFOID:0000000008143063

The output speed sensor detects the revolution of the parking gear and emits a pulse signal. The pulse signal is transmitted to the TCM which converts it into vehicle speed.

A/T CONTROL SYSTEM : Input Speed Sensor

INFOID:0000000008143064

The input speed sensor detects input shaft rpm (revolutions per minute). It is located on the input side of the A/T. Monitors revolution of sensor 1 and sensor 2 for non-standard conditions.

A/T CONTROL SYSTEM : A/T Fluid Temperature Sensor

INFOID:0000000008143065

The A/T fluid temperature sensor detects the A/T fluid temperature and transmits a signal to the TCM.

A/T CONTROL SYSTEM : Input Clutch Solenoid Valve

INFOID:0000000008143066

- The Input clutch solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The Input clutch solenoid valve controls the input clutch control valve in response to a signal transmitted from the TCM.

A/T CONTROL SYSTEM : Front Brake Solenoid Valve

INFOID:0000000008143067

- The front brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The front brake solenoid valve controls the front brake control valve in response to a signal transmitted from the TCM.

A/T CONTROL SYSTEM : Direct Clutch Solenoid Valve

INFOID:0000000008143068

- The direct clutch solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The direct clutch solenoid valve controls the direct clutch control valve in response to a signal transmitted from the TCM.

A/T CONTROL SYSTEM : High and Low Reverse Clutch Solenoid Valve

INFOID:0000000008143069

- The high and low reverse clutch solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The high and low reverse clutch solenoid valve controls the high and low reverse clutch control valve in response to a signal transmitted from the TCM.

A/T CONTROL SYSTEM : Low Brake Solenoid Valve

INFOID:0000000008143070

- The low brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The low brake solenoid valve controls the low brake control valve in response to a signal transmitted from the TCM.

A/T CONTROL SYSTEM : Anti-interlock Solenoid Valve

INFOID:0000000008143071

- Anti-interlock solenoid valve prevents the simultaneous activation of the input clutch and the low brake.
- The anti-interlock solenoid valve is an ON/OFF type solenoid valve.

A/T CONTROL SYSTEM : 2346 Brake Solenoid Valve

INFOID:0000000008143072

- The 2346 brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The 2346 brake solenoid valve controls the 2346 brake control valve in response to a signal transmitted from the TCM.

A/T CONTROL SYSTEM : Clutch 1 Solenoid Valve

INFOID:0000000008143073

Clutch 1 solenoid valve operates CSC (concentric slave cylinder) and engages or releases clutch 1.

A/T CONTROL SYSTEM : Line Pressure Solenoid Valve

INFOID:0000000008143074

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal transmitted from the TCM.

A/T CONTROL SYSTEM : Accelerator Pedal Position Sensor

INFOID:0000000008143075

- The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly.
- The accelerator pedal position sensor detects the accelerator position.

A/T CONTROL SYSTEM : Manual Mode Switch

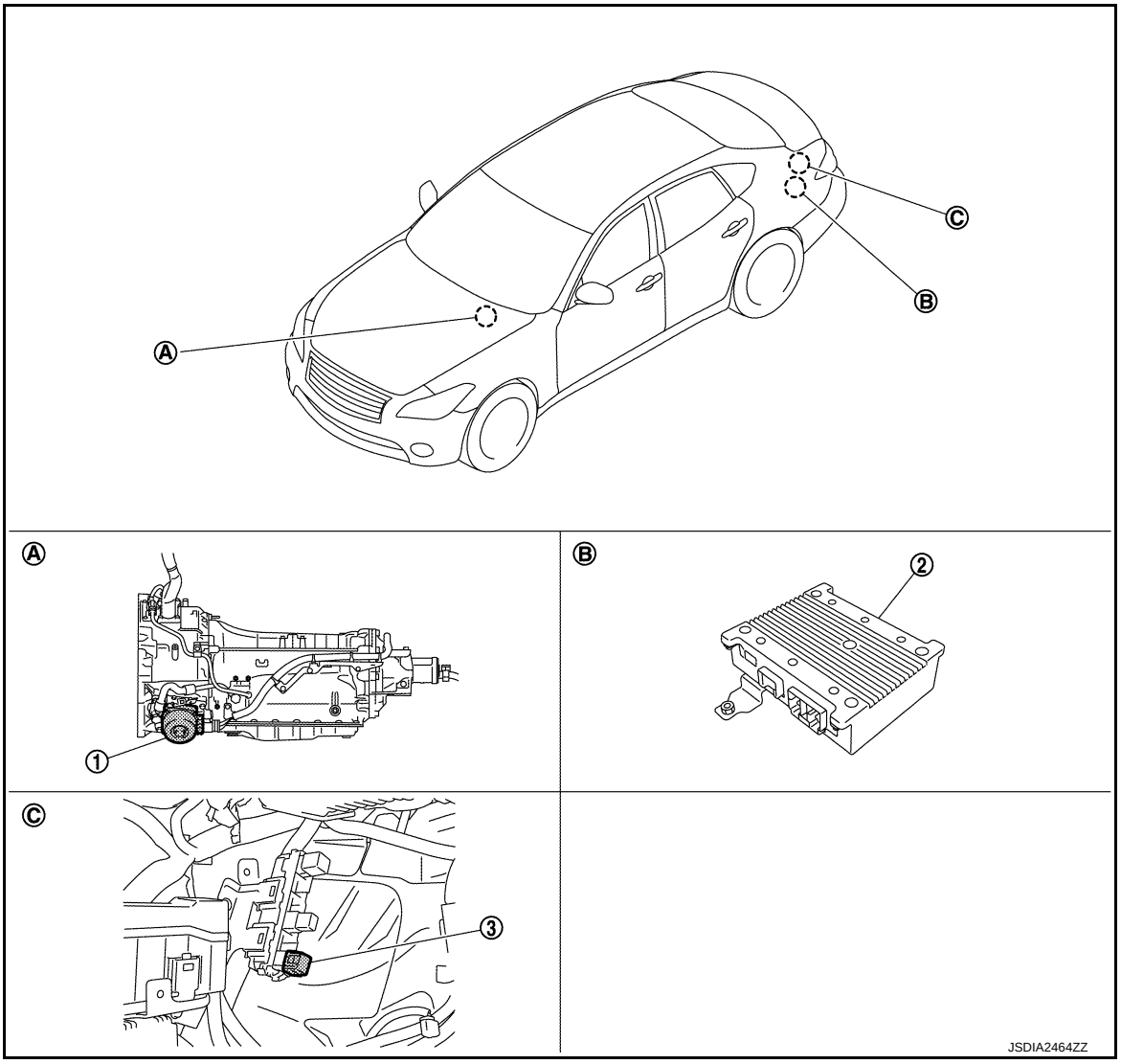
INFOID:0000000008143076

- The manual mode switch [mode select switch and position select switch (shift-up/shift-down)] is installed in the A/T shift selector assembly.
- The mode select switch detects the position (the main shift gate side or manual shift gate side) of the selector lever and transmits a manual mode signal or a not manual mode signal to the combination meter. Then, the TCM receives a manual mode signal or non-manual mode signal from the combination meter.
- The position select switch (shift-up) detects that the selector lever is shifted to the shift-up side of the manual shift gate and transmits a manual mode shift up signal to the combination meter. Then, the TCM receives a manual mode shift up signal from the combination meter.
- The position select switch (shift-down) detects that the selector lever is shifted to the shift-down side of the manual shift gate and transmits a manual mode shift down signal to the combination meter. Then, the TCM receives a manual mode shift down signal from the combination meter.

SUB ELECTRIC OIL PUMP SYSTEM

SUB ELECTRIC OIL PUMP SYSTEM : Component Parts Location

INFOID:0000000008143077



1. Sub electric oil pump
2. Sub electric oil pump inverter
3. Sub electric oil pump relay
A. A/T assembly
B. Rear fender, LH
C. Trunk room, LH

SUB ELECTRIC OIL PUMP SYSTEM : Component Description

INFOID:0000000008143078

Item	Function
Sub electric oil pump inverter	TM-17, "SUB ELECTRIC OIL PUMP SYSTEM : Sub Electric Oil Pump Inverter"
Sub electric oil pump	TM-18, "SUB ELECTRIC OIL PUMP SYSTEM : Sub Electric Oil Pump"
Sub electric oil pump relay	TM-18, "SUB ELECTRIC OIL PUMP SYSTEM : Sub Electric Oil Pump Relay"

SUB ELECTRIC OIL PUMP SYSTEM : Sub Electric Oil Pump Inverter

INFOID:0000000008143079

- The sub electric oil pump inverter is composed of the controller, driver, power module, current sensors, and electronic substrate temperature sensor.
- Sub electric oil pump inverter controls sub electric oil pump according to sub electric oil pump oil pressure command signal transmitted from TCM via HEV system CAN.
- A malfunction signal is sent to TCM when sub electric oil pump system malfunctions.

POWER MODULE

- The power module is composed of 6 power semiconductor FET (Field Effect Transistor).
- A FET is a semiconductor switch that is capable of switching ON/OFF at high speed.
- FET converts DC electric power of 12V battery to AC electric power by switching. It supplies AC electric power to sub electric oil pump.

CURRENT SENSOR

Current sensor is located in the internal circuit of sub electric oil pump inverter. It detects current circuit supplied to sub electric oil pump.

ELECTRONIC SUBSTRATE TEMPERATURE SENSOR

Electronic substrate temperature sensor is located in sub electric oil pump inverter. It detects temperature of electronic substrate.

SUB ELECTRIC OIL PUMP SYSTEM : Sub Electric Oil Pump

INFOID:0000000008143080

- The sub electric oil pump contains a “Three-phase brushless synchronous motors”.
- Sub electric oil pump is controlled by sub electric oil pump inverter. It secures necessary hydraulic pressure for transmission on behalf of mechanical oil pump.

- Supply of release hydraulic pressure for clutch 1
  When the input speed of transmission is low, the speed of mechanical oil pump in transmission is low. Hydraulic pressure for CSC (concentric slave cylinder) to release clutch 1 cannot be secured. Therefore, hydraulic pressure for CSC (concentric slave cylinder) is secured by sub electric oil pump on behalf of mechanical oil pump.
- Supply of engagement hydraulic pressure for clutch 2
  Mechanical oil pump in transmission does not operate during idling stop operation and hydraulic pressure is not generated. Thus engagement of clutch/brake component in transmission becomes impossible. Therefore, hydraulic pressure is secured for control valve by sub electric oil pump on behalf of mechanical oil pump.

SUB ELECTRIC OIL PUMP SYSTEM : Sub Electric Oil Pump Relay

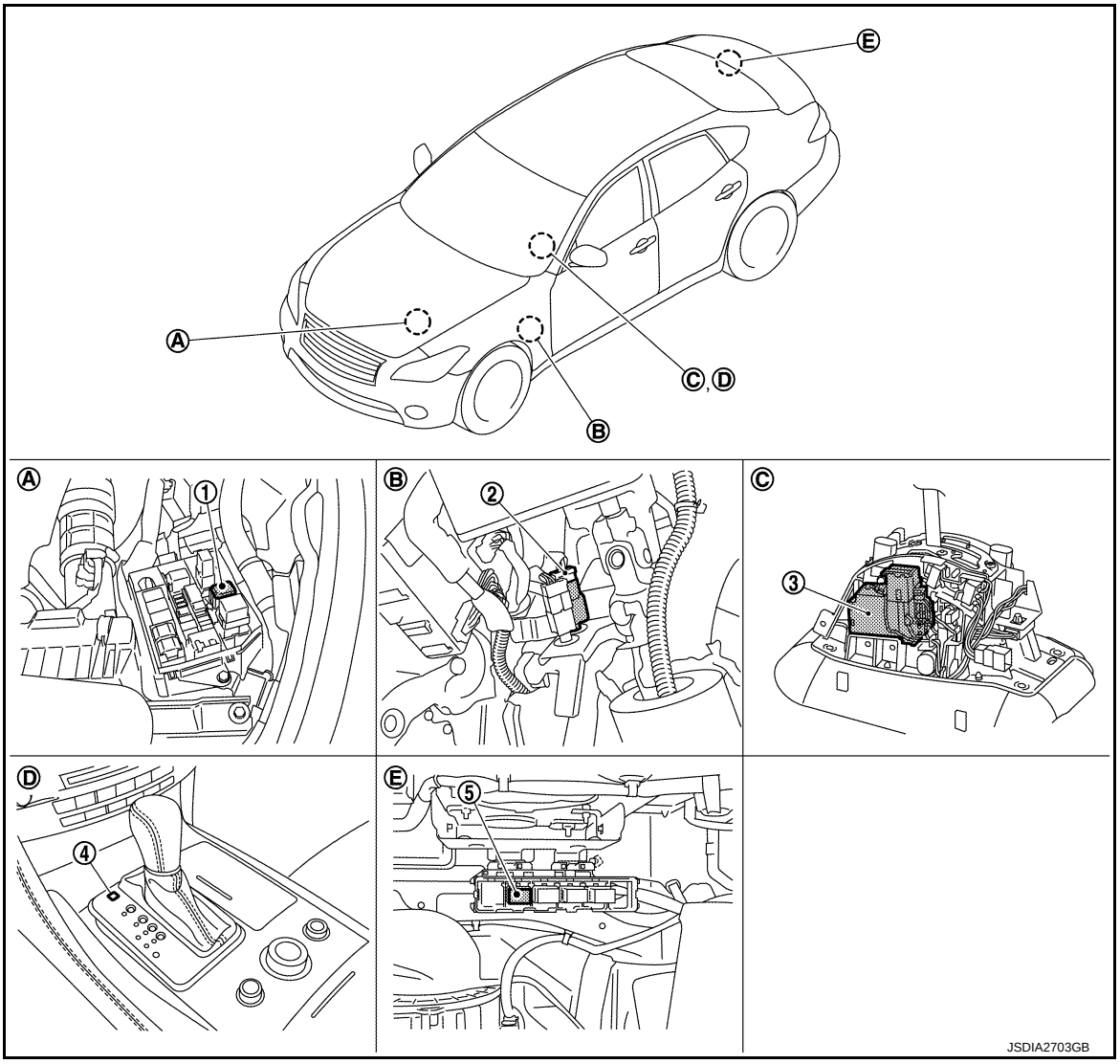
INFOID:0000000008143081

Sub electric oil pump relay is turned ON by sub electric oil pump inverter when power switch is turned to ON. Sub electric oil pump relay supplies system voltage to sub electric oil pump inverter.

A/T SHIFT LOCK SYSTEM

A/T SHIFT LOCK SYSTEM : Component Parts Location

INFOID:0000000008143082



1. Shift lock relay
2. Stop lamp switch
3. Shift lock unit
4. Shift lock cover *
5. Stop lamp OFF relay 1
A. Brake pedal, upper
B. Engine room, LH
C. A/T shift selector
D. Center console
E. Trunk room, center

*: Shift lock release button becomes operative by removing shift lock cover.

A/T SHIFT LOCK SYSTEM : Component Description

INFOID:0000000008143083

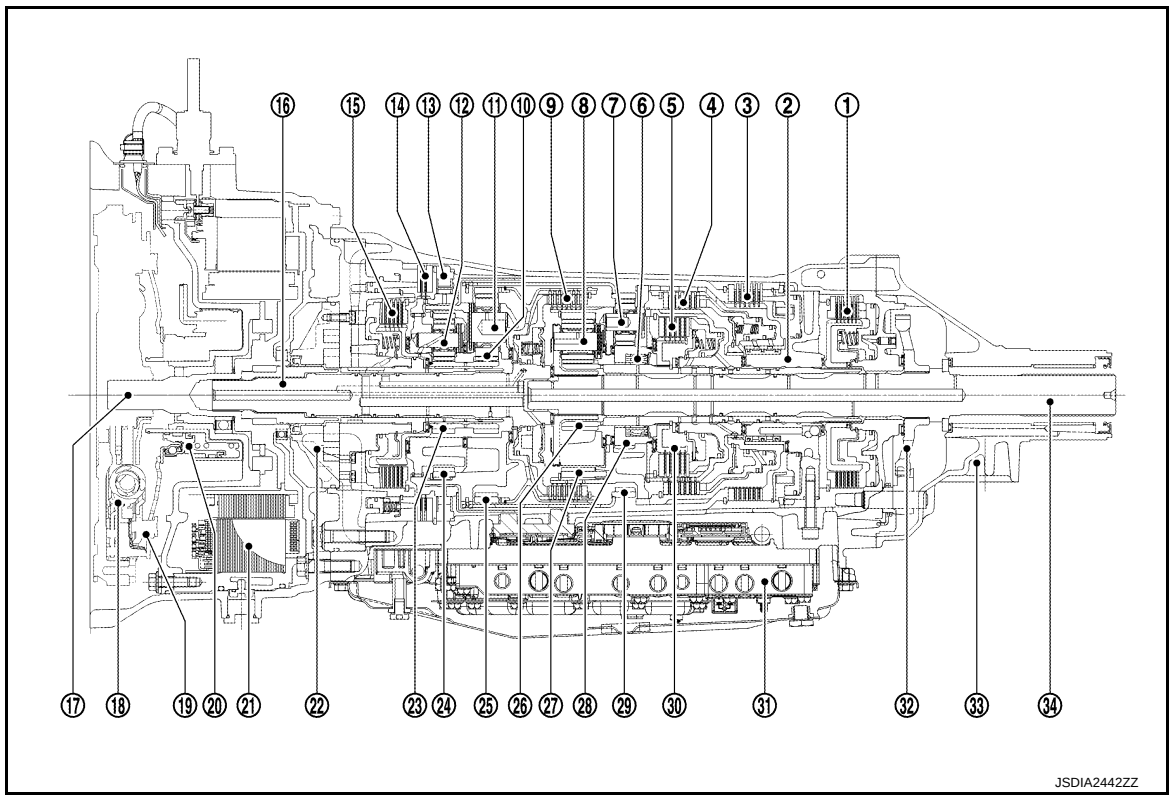
Component	Function
Slider	• Electromagnet is built into slider. • When electromagnet of slider is magnetized, stopper is unified with slider.
Stopper	• Iron plate is built into stopper. • Restricts plate moving.
Detent pin	Links with selector knob button and restricts selector lever shift operation.
Plate	Restricts detent pin moving.
Shift lock release button	When shift lock release button is pressed, shift lock is forcibly released.

Component	Function
Stop lamp switch	• When brake pedal is depressed, stop lamp switch turns ON. • When stop lamp switch turns ON, power is supplied to shift lock relay.
Shift lock relay	Current flow to stop lamp switch allows shift lock relay contact ON, and then power is applied to shift lock unit.
Stop lamp OFF relay 1	When the solenoid coil of stop lamp OFF relay 1 is not energized, the battery voltage is applied to the stop lamp switch. For stop lamp OFF relay 1, refer to BR-13, "Stop Lamp OFF Relay 1".

STRUCTURE AND OPERATION
TRANSMISSION

TRANSMISSION : Cross-Sectional View

INFOID:0000000008143084

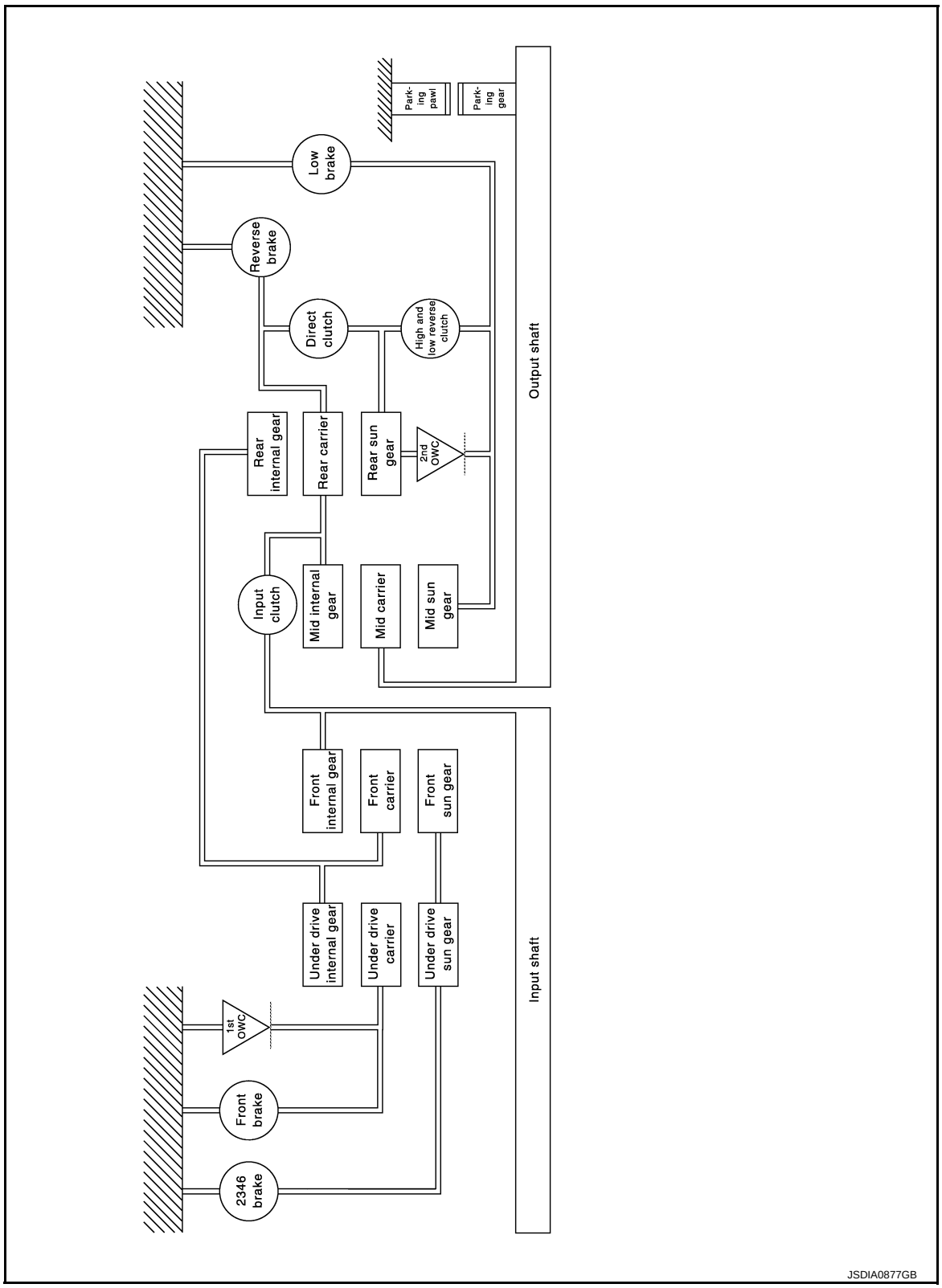


1.*6	Low brake	2.	Drum support	3.*6	Reverse brake
4.	Direct clutch	5.	High and low reverse clutch	6.	2nd one-way clutch
7.*1	Rear carrier	8.	Mid carrier	9.	Input clutch
10.*2	Front sun gear	11.*3	Front carrier	12.	Under drive carrier
13.	1st one-way clutch	14.	Front brake	15.	2346 brake
16.*4	Input shaft	17.	Main shaft	18.*5	Clutch disk
19.*5	Clutch cover	20.	CSC (Concentric slave cylinder)	21.	Traction motor
22.	Mechanical oil pump	23.*2	Under drive sun gear	24.*3	Under drive internal gear
25.*4	Front internal gear	26.	Mid sun gear	27.*1	Mid internal gear
28.	Rear sun gear	29.	Rear internal gear	30.	High and low reverse clutch hub
31.	Control valve & TCM	32.	Parking gear	33.	Rear extension
34.	Output shaft				

*1: 7 and 27 are one unit.
*2: 10 and 23 are one unit.
*3: 11 and 24 are one unit.
*4: 16 and 25 are one unit.
*5: 18 and 19 are clutch 1.
*6: 1 and 3 are clutch 2.

TRANSMISSION : System Diagram

INFOID:0000000008143085



TRANSMISSION : System Description

INFOID:0000000008143086

DESCRIPTION

With the use of 4 sets of planetary gears, A/T enables 7-speed transmission for forward and 1-speed transmission for backward, depending on the combination of 3 sets of multiple-disc clutches, 4 sets of multiple-disc brakes and 2 sets of one-way clutches.

CLUTCH AND BAND CHART

Shift position \ Name of the part		I/C	D/C		H&LR/C	F/B	L/B		2346/B	REV/B	1st OWC	2nd OWC	Remarks
			FRONT	REAR			INNER	OUTER					
P					△	△							Park position
R					◇	◇				○	◎	◎	Reverse position
N					△	△							Neutral position
D	1st				☆	☆	○	○			◎	◎	Automatic shift 1⇔2⇔3⇔4⇔5⇔6⇔7
	2nd						○	○	○			◎	
	3rd		○	○			○		○				
	4th		○	○	○				○				
	5th	○		○	○								
	6th	○			○				○				
	7th	○			○	○							
7M	7th	○			○	○							Locks* (held stationary) in 7GR
6M	6th	○			○				○				Locks* (held stationary) in 6GR
5M	5th	○		○	○								Locks* (held stationary) in 5GR
4M	4th		○	○	○				○				Locks* (held stationary) in 4GR
3M	3rd		○	○			○		○				Locks* (held stationary) in 3GR
2M	2nd				◇		○	○	○			◎	Locks* (held stationary) in 2GR
1M	1st				◇	◇	○	○			◎	◎	Locks (held stationary) in 1GR

*: Down shift automatically according to the vehicle speed.

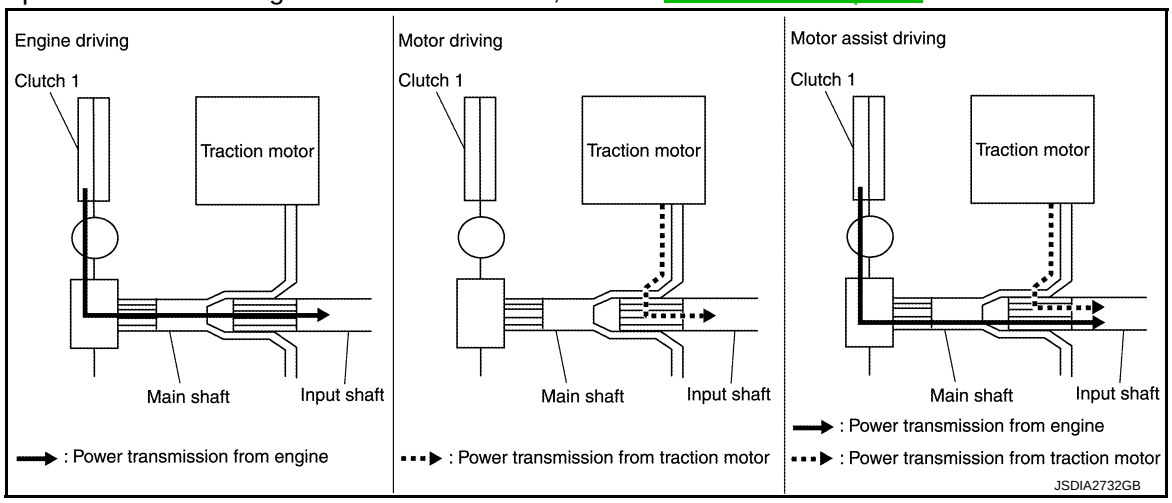
○ – Operates
◎ – Operates during “progressive” acceleration.
◇ – Operates and affects power transmission while coasting.
△ – Line pressure is applied but does not affect power transmission.
☆ – Operates at the fixed speed or less.

JSDIA1455GB

POWER TRANSMISSION FROM THE ENGINE AND TRACTION MOTOR

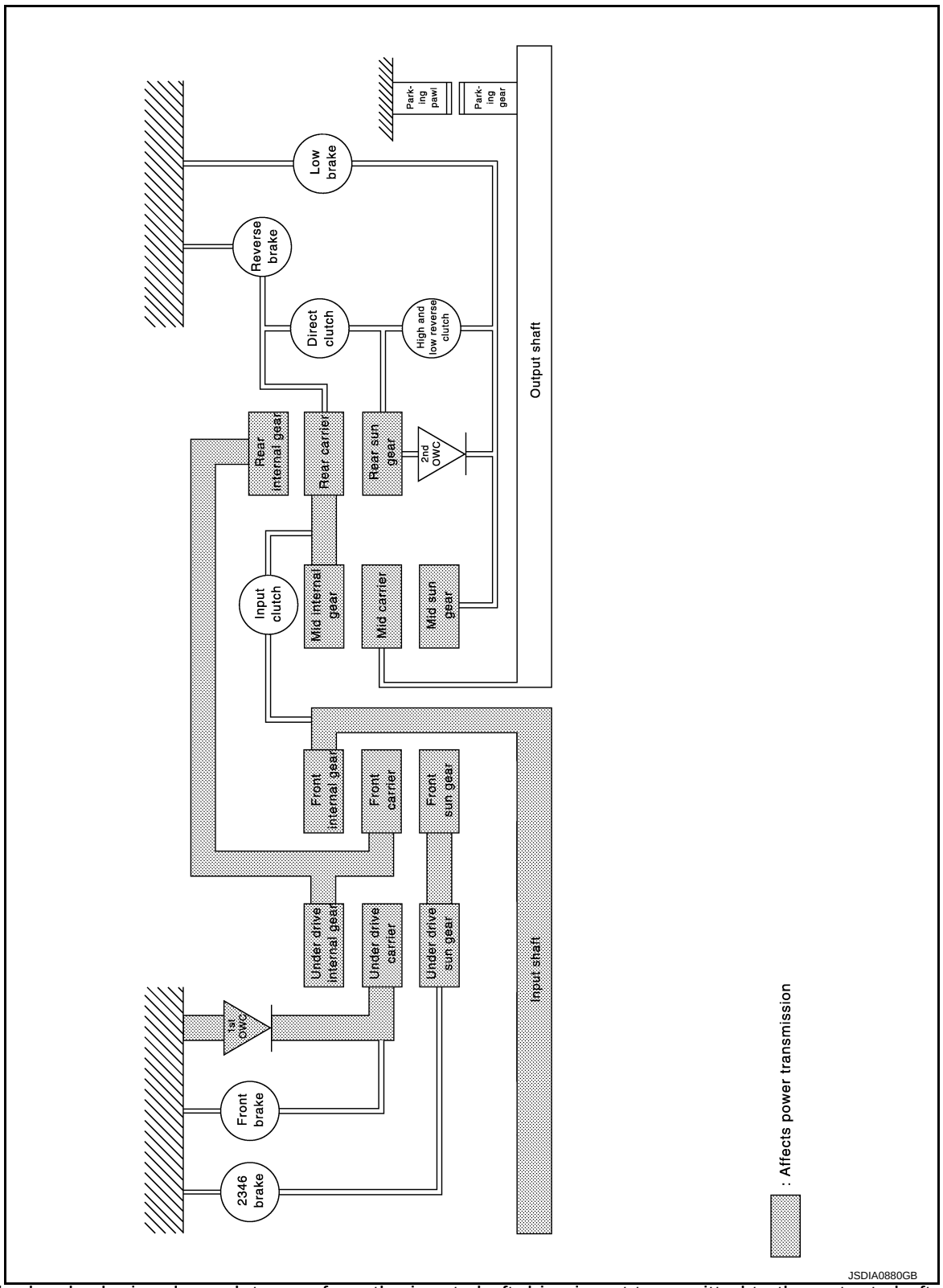
- Power transmission from the engine is transmitted to the input shaft via clutch 1 and the main shaft.
- Power transmission from the traction motor is transmitted to the input shaft via the main shaft.

- For output control of the engine and traction motor, refer to TMS-9, "Description".



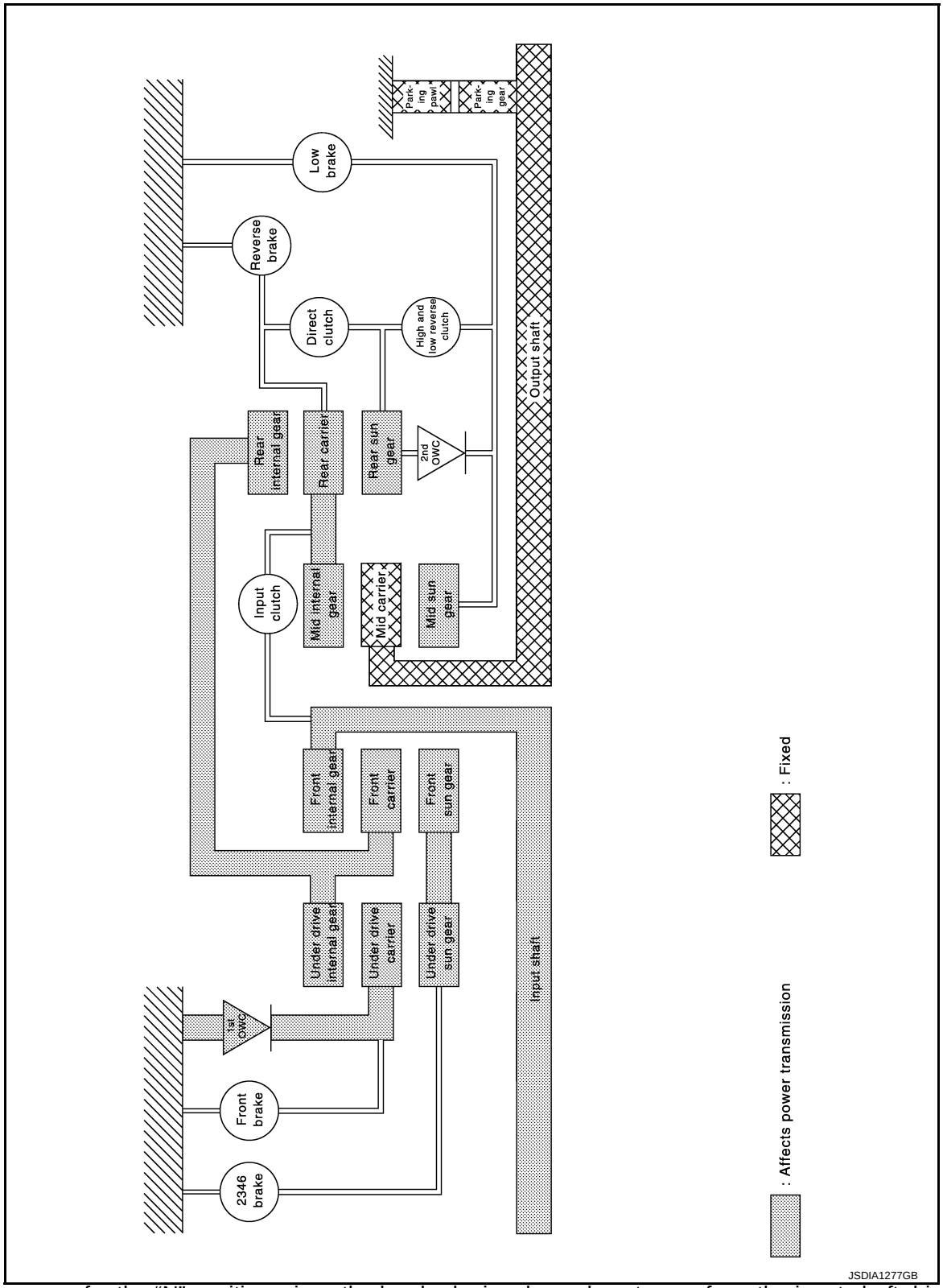
POWER TRANSMISSION

“N” Position



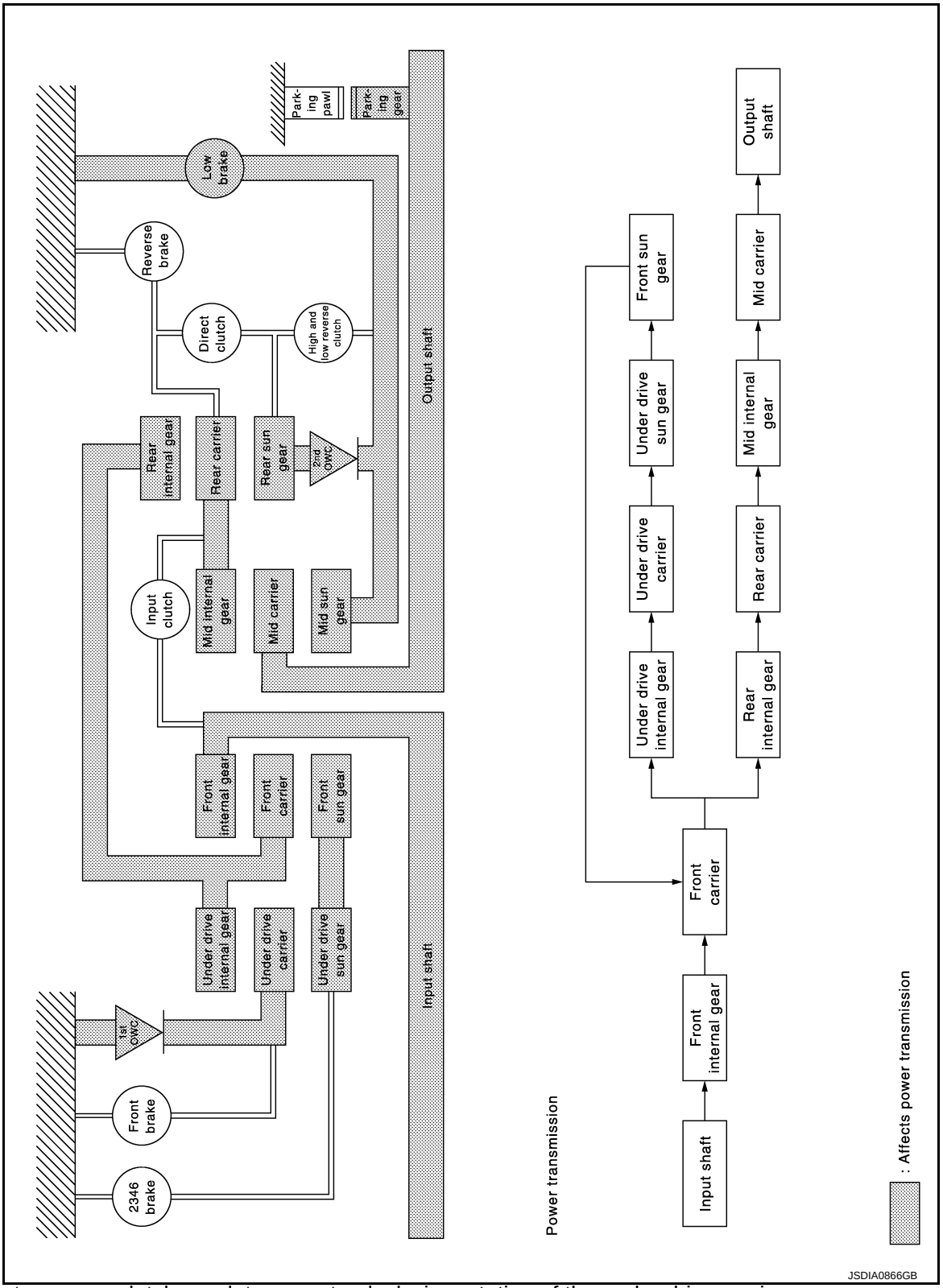
Since the low brake is released, torque from the input shaft drive is not transmitted to the output shaft.

"P" Position



- The same as for the “N” position, since the low brake is released, so torque from the input shaft drive is not transmitted to the output shaft.
- The parking pawl linked with the selector lever meshes with the parking gear and fastens the output shaft mechanically.

“D1” and “DS1” Positions



- The 1st one-way clutch regulates counterclockwise rotation of the under drive carrier.
- The 2nd one-way clutch regulates counterclockwise rotation of the rear sun gear.
- The mid sun gear is fixed by the low brake.
- Each planetary gear enters the state described below.

Front planetary gear

Name	Front sun gear	Front carrier	Front internal gear
Condition	—	Output	Input
Direction of rotation	Counterclockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Deceleration from front internal gear	Deceleration from front internal gear	Same number of revolution as the input shaft

Under drive planetary gear

Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	—	Fixed	Input/Output
Direction of rotation	Counterclockwise revolution	—	Clockwise revolution
Number of revolutions	Acceleration from under drive internal gear	—	Same number of revolution as the front carrier

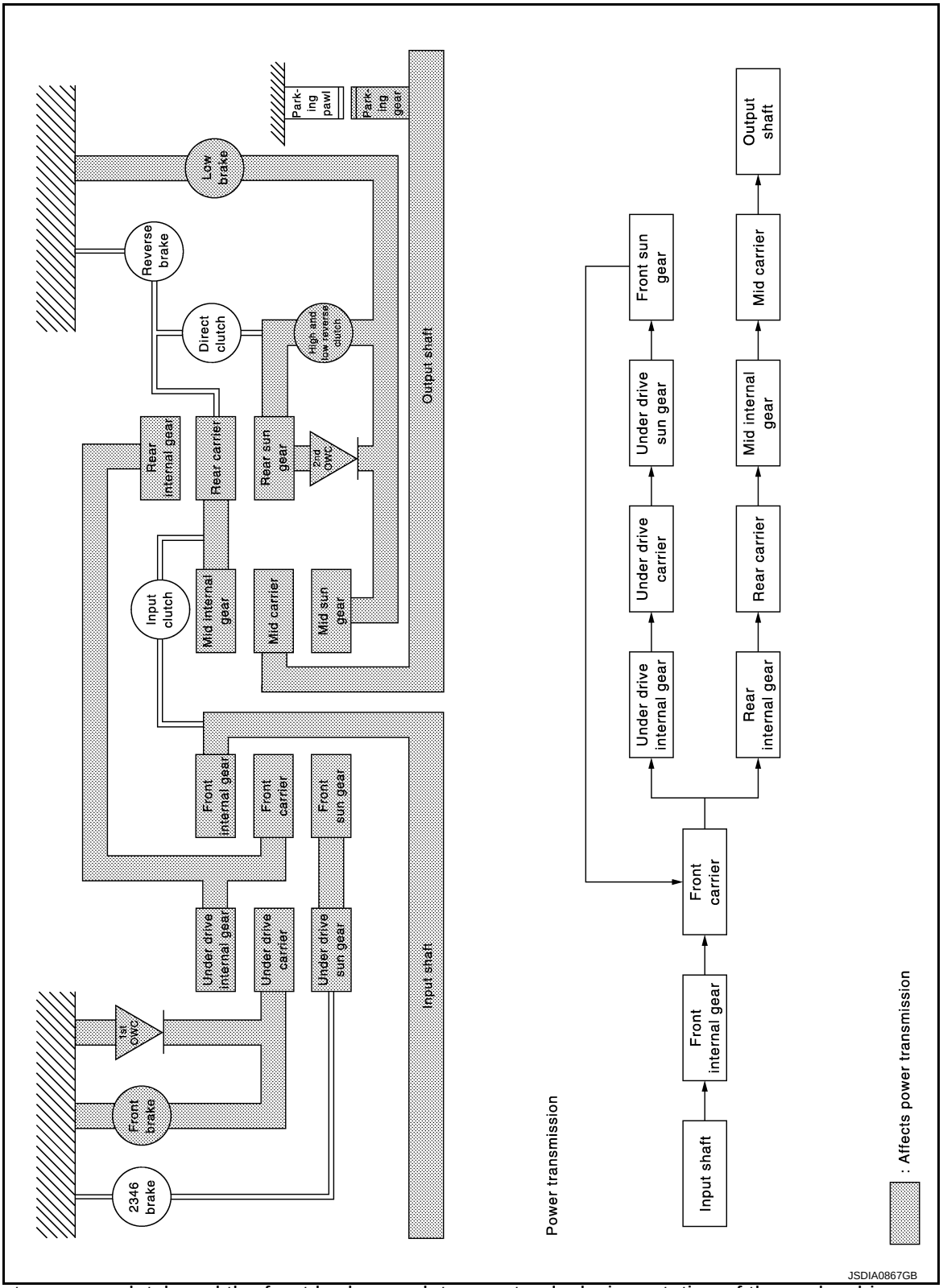
Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from rear internal gear	Same number of revolution as the under drive internal gear

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from mid internal gear	Same number of revolution as the rear carrier

“M1” Position



- The 1st one-way clutch and the front brake regulate counterclockwise rotation of the under drive carrier.
  NOTE:
  The front brake operates only while coasting.
- The 2nd one-way clutch and the high and low reverse clutch regulate counterclockwise rotation of the rear sun gear.
  NOTE:
  The high and low reverse clutch operates only while coasting.
- The mid sun gear is fixed by the low brake.

• Each planetary gear enters the state described below.

Front planetary gear

Name	Front sun gear	Front carrier	Front internal gear
Condition	—	Output	Input
Direction of rotation	Counterclockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Deceleration from front internal gear	Deceleration from front internal gear	Same number of revolution as the input shaft

Under drive planetary gear

Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	—	Fixed	Input/Output
Direction of rotation	Counterclockwise revolution	—	Clockwise revolution
Number of revolutions	Acceleration from under drive internal gear	—	Same number of revolution as the front carrier

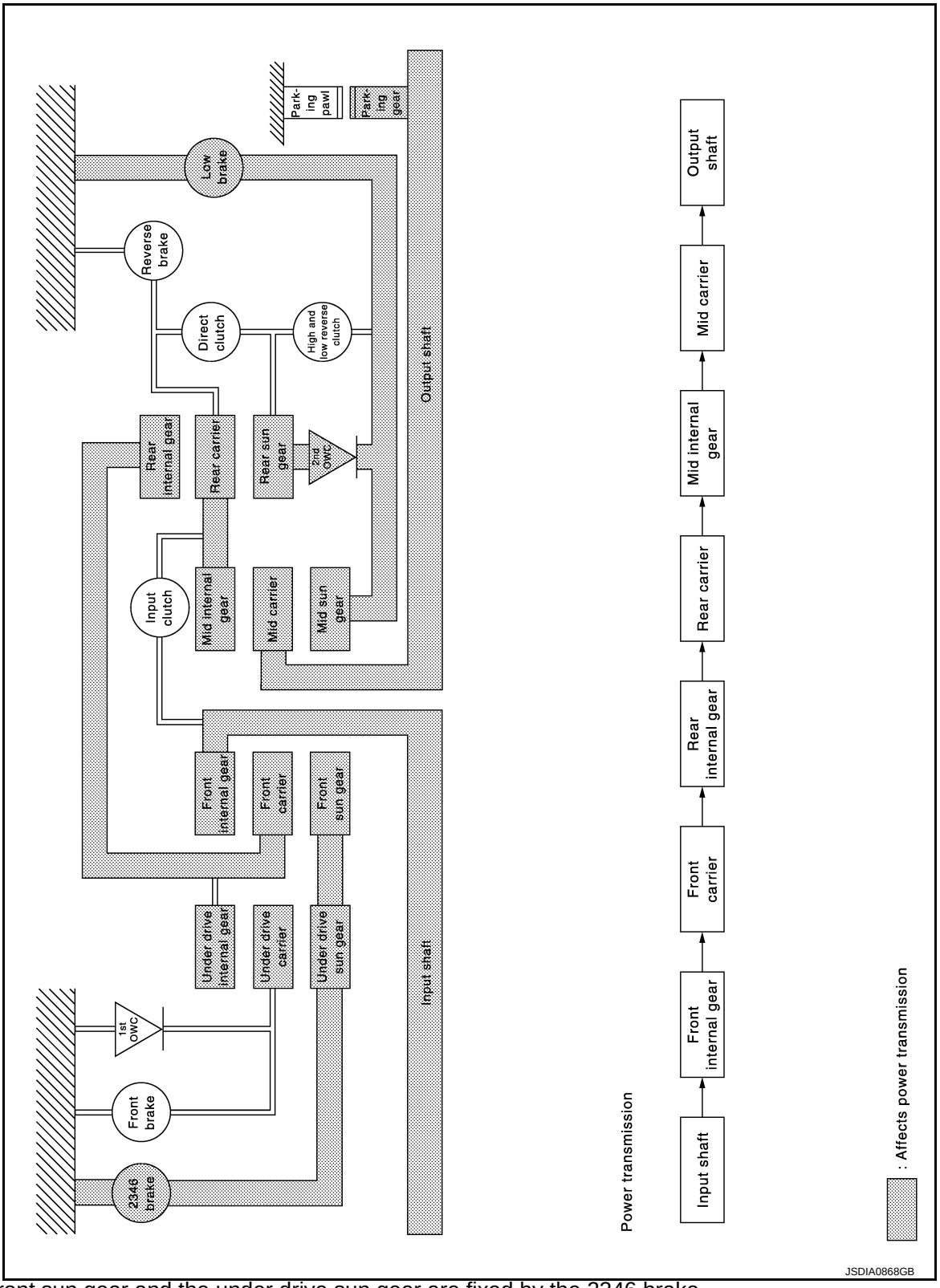
Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from rear internal gear	Same number of revolution as the under drive internal gear

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from mid internal gear	Same number of revolution as the rear carrier

“D2” and “DS2” Positions



- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The 2nd one-way clutch regulates counterclockwise rotation of the rear sun gear.
- The mid sun gear is fixed by the low brake.
- Each planetary gear enters the state described below.

Front planetary gear

Name	Front sun gear	Front carrier	Front internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from front internal gear	Same number of revolution as the input shaft

Under drive planetary gear

Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	Fixed	—	Input/Output
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from under drive internal gear	Same number of revolution as the front carrier

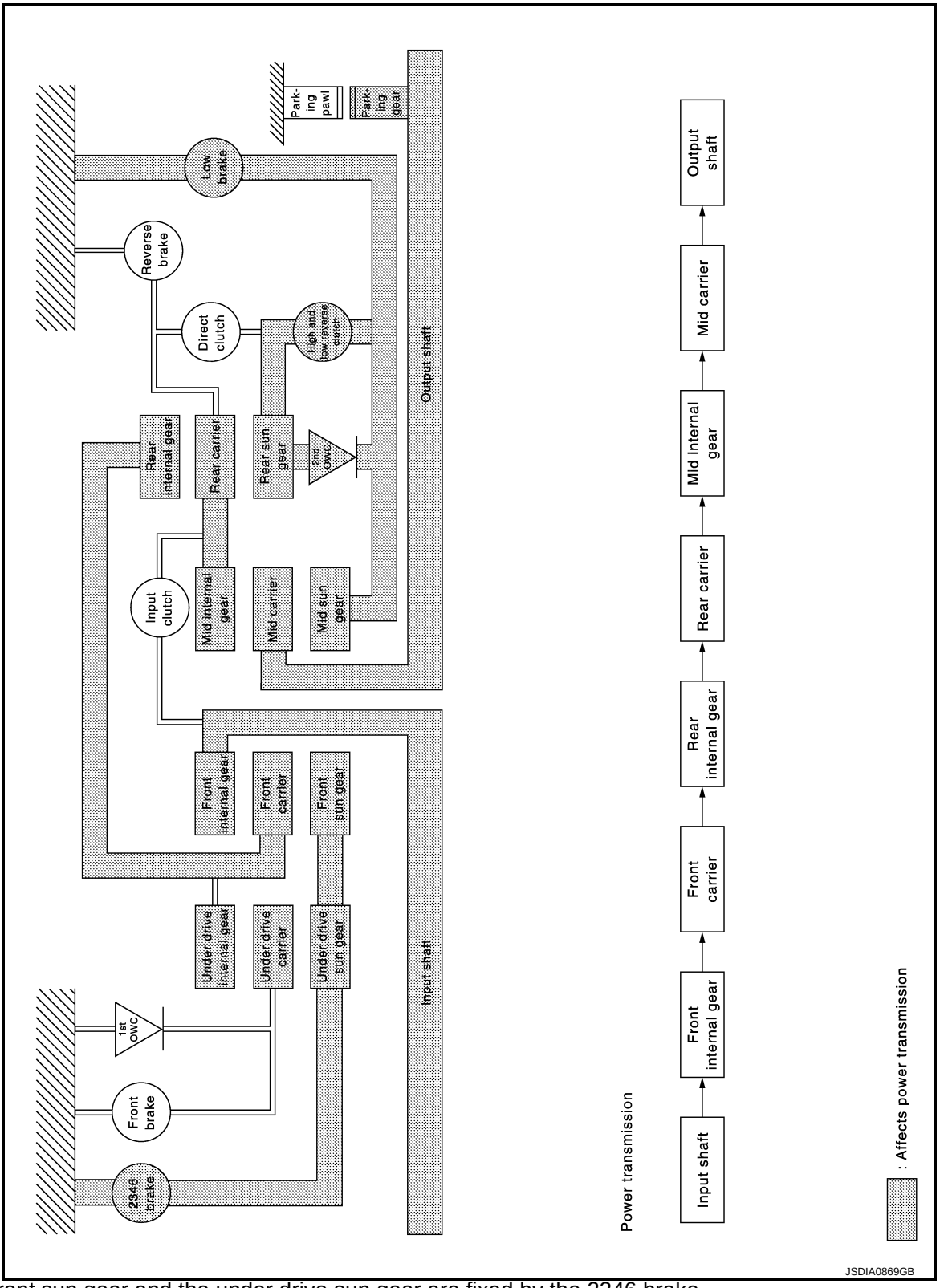
Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from rear internal gear	Same number of revolution as the under drive internal gear

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from mid internal gear	Same number of revolution as the rear carrier

“M2” Position



- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The 2nd one-way clutch and the high and low reverse clutch regulate counterclockwise rotation of the rear sun gear.

  NOTE:

  The high and low reverse clutch operates only while coasting.
- The mid sun gear is fixed by the low brake.
- Each planetary gear enters the state described below.

Front planetary gear

Name	Front sun gear	Front carrier	Front internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from front internal gear	Same number of revolution as the input shaft

Under drive planetary gear

Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	Fixed	—	Input/Output
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from under drive internal gear	Same number of revolution as the front carrier

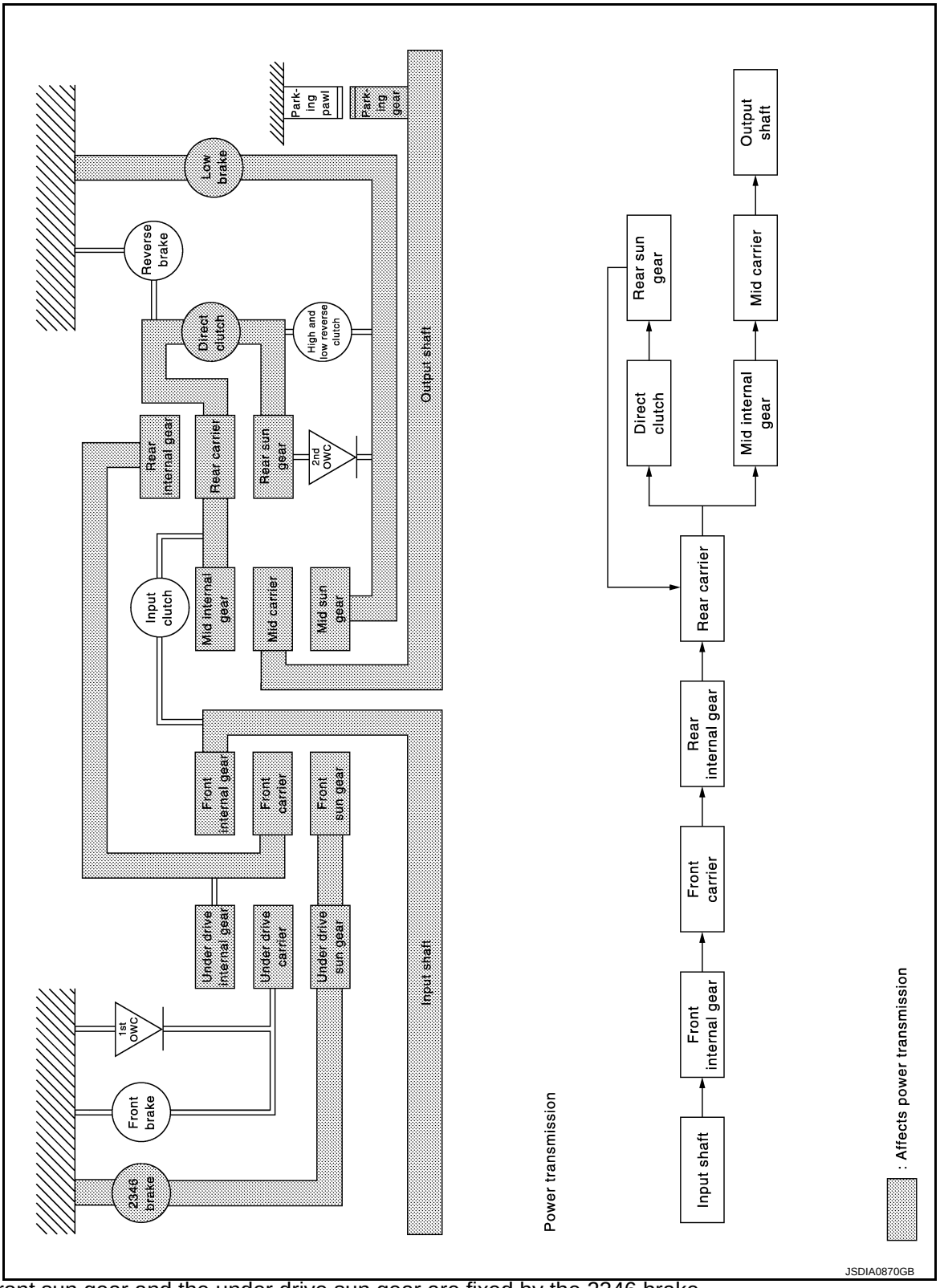
Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from rear internal gear	Same number of revolution as the under drive internal gear

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from mid internal gear	Same number of revolution as the rear carrier

“D3”, “DS3” and “M3” Positions



- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The direct clutch gets engaged and connects the rear sun gear with the rear carrier.
- The mid sun gear is fixed by the low brake.
- Each planetary gear enters the state described below.

Front planetary gear

Name	Front sun gear	Front carrier	Front internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from front internal gear	Same number of revolution as the input shaft

Under drive planetary gear

Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	Fixed	—	Input/Output
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from under drive internal gear	Same number of revolution as the front carrier

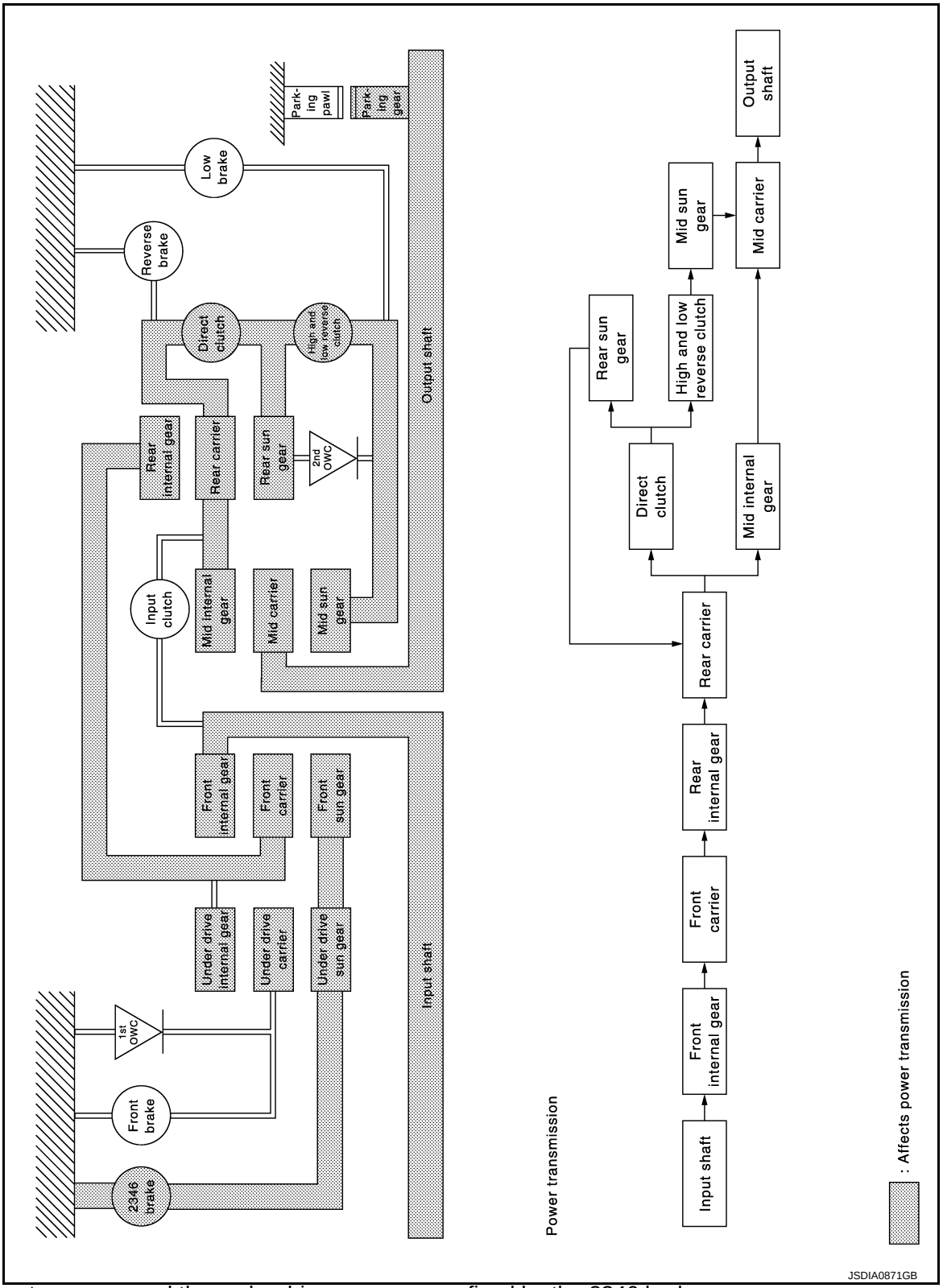
Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	—	Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Same number of revolution as the rear internal gear	Same number of revolution as the rear internal gear	Same number of revolution as the under drive internal gear

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from mid internal gear	Same number of revolution as the rear carrier

“D4”, “DS4” and “M4” Positions



- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The direct clutch gets engaged and connects the rear sun gear with the rear carrier.
- The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.
- Each planetary gear enters the state described below.

Front planetary gear

Name	Front sun gear	Front carrier	Front internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from front internal gear	Same number of revolution as the input shaft

Under drive planetary gear

Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	Fixed	—	Input/Output
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from under drive internal gear	Same number of revolution as the front carrier

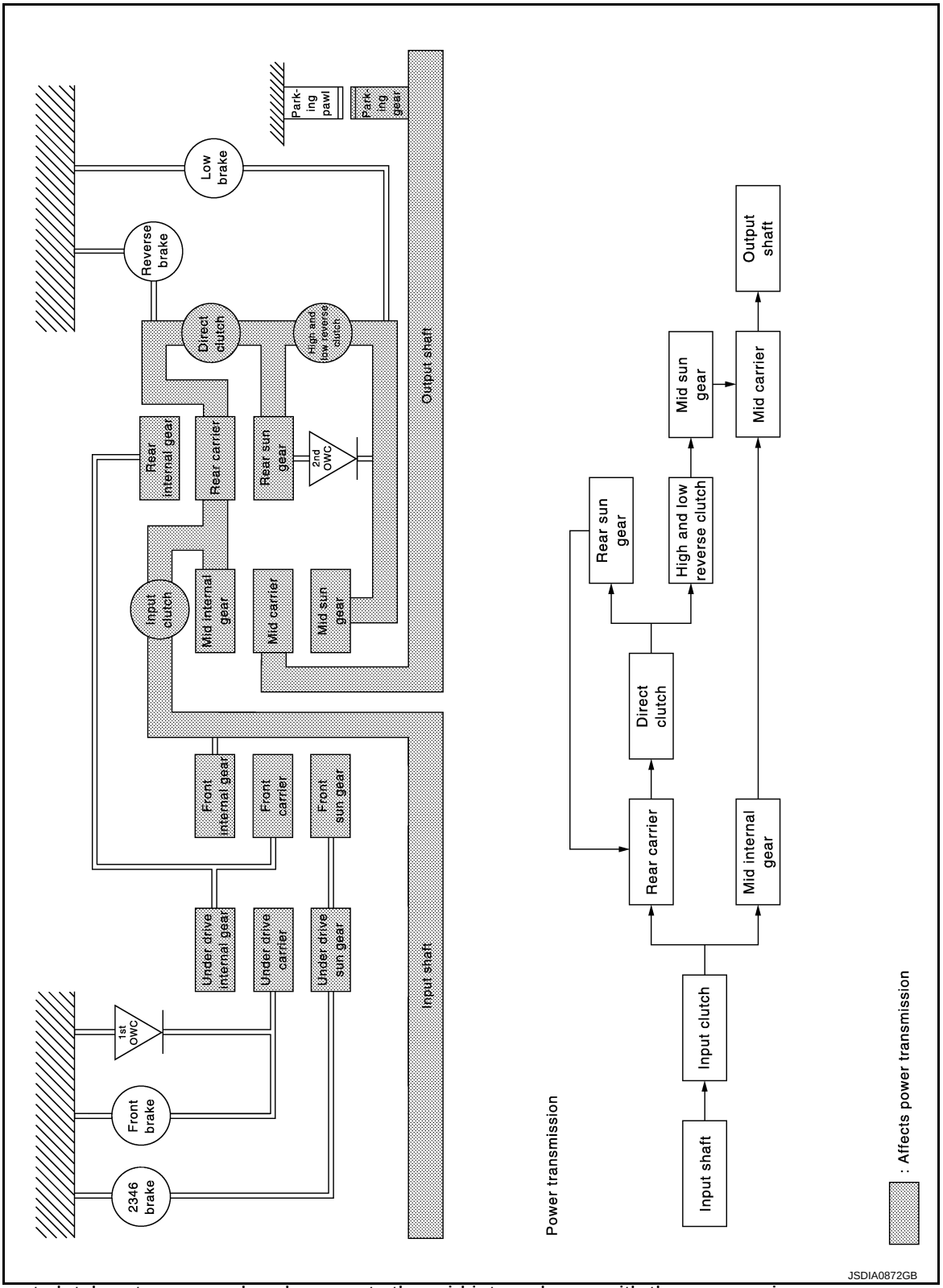
Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	—	Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Same number of revolution as the rear internal gear	Same number of revolution as the rear internal gear	Same number of revolution as the under drive internal gear

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	—	Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Same number of revolution as the mid internal gear	Same number of revolution as the mid internal gear	Same number of revolution as the rear carrier

“D5”, “DS5” and “M5” Positions



- The input clutch gets engaged and connects the mid internal gear with the rear carrier.
- The direct clutch gets engaged and connects the rear sun gear with the rear carrier.
- The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.
- Each planetary gear enters the state described below.

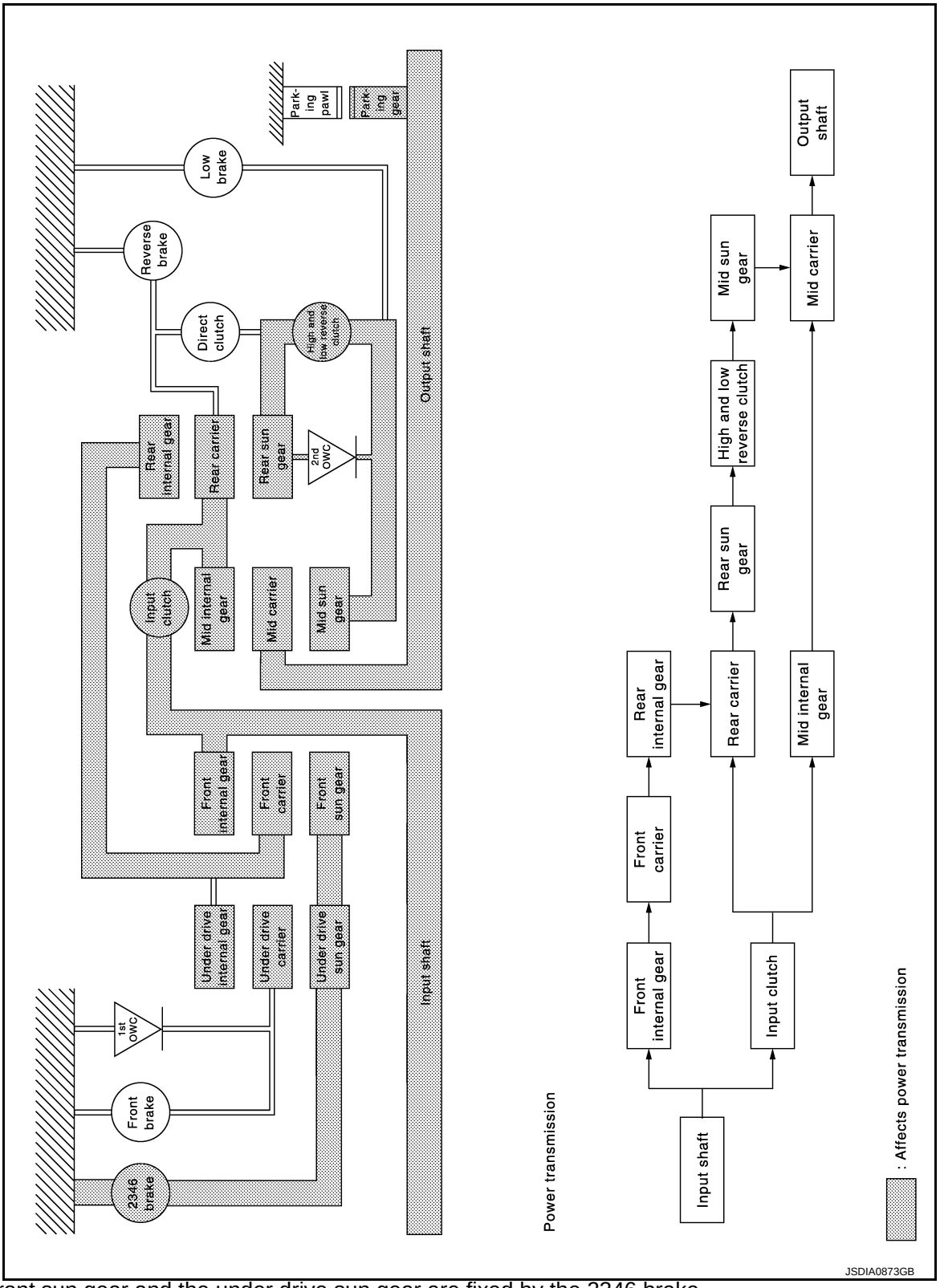
Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	—	input/Output	—
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Same number of revolution as the rear carrier	Same number of revolution as the input shaft	Same number of revolution as the rear carrier

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	—	Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Same number of revolution as the mid internal gear	Same number of revolution as the mid internal gear	Same number of revolution as the input shaft

“D6”, “DS6” and “M6” Positions



- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The input clutch gets engaged and connects the mid internal gear with the rear carrier.
- The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.
- Each planetary gear enters the state described below.

Front planetary gear

Name	Front sun gear	Front carrier	Front internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from front internal gear	Same number of revolution as the input shaft

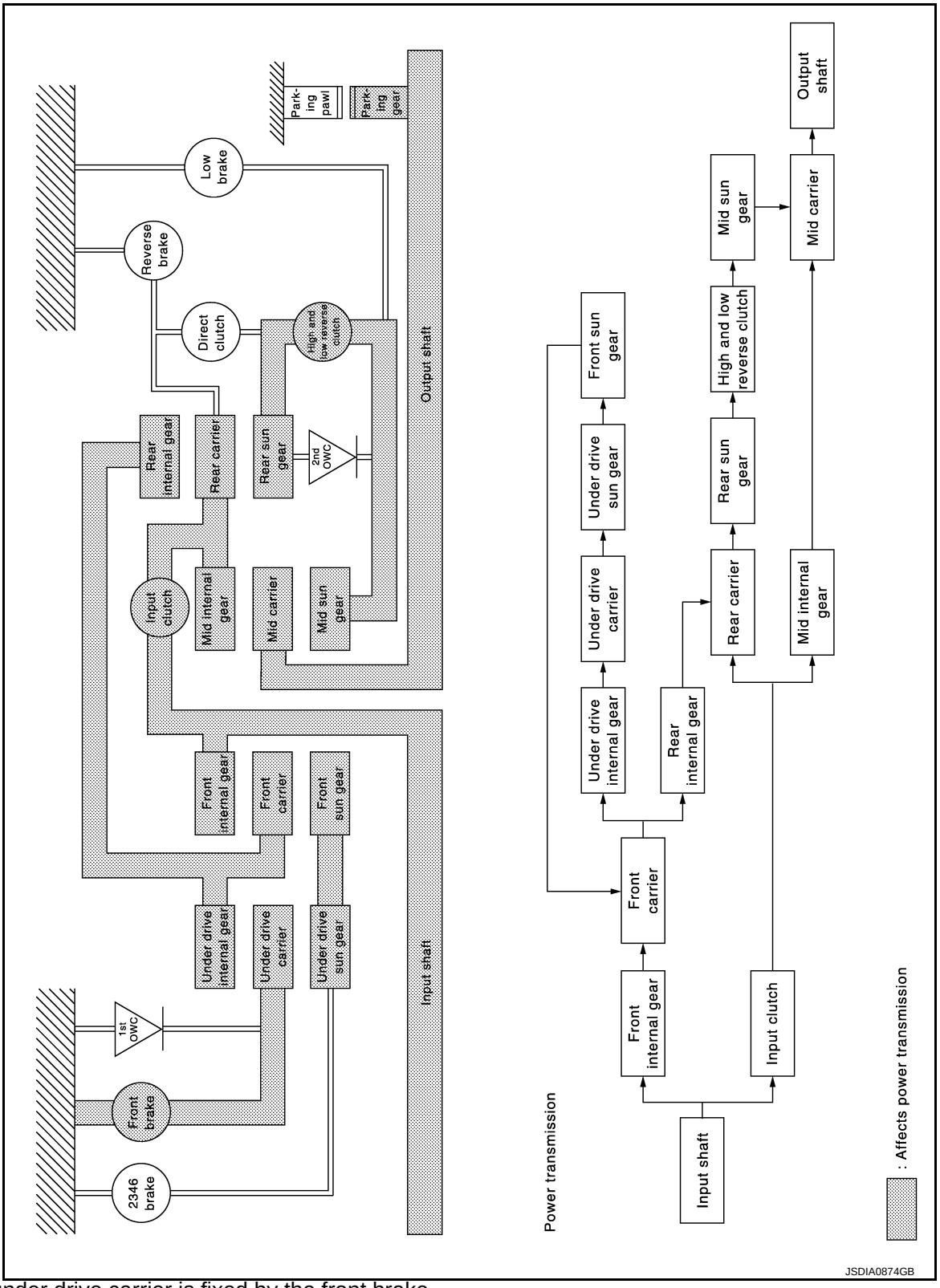
Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	—	Input/Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Acceleration from rear carrier	Same number of revolution as the input shaft	Same number of revolution as the front carrier

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	—	Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Acceleration from mid internal gear	Acceleration from mid internal gear	Same number of revolution as the input shaft

“D7”, “DS7” and “M7” Positions



- The under drive carrier is fixed by the front brake.
- The input clutch gets engaged and connects the mid internal gear with the rear carrier.
- The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.
- Each planetary gear enters state described below.

Front planetary gear

Name	Front sun gear	Front carrier	Front internal gear
Condition	—	Output	Input
Direction of rotation	Counterclockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Deceleration from front internal gear	Deceleration from front internal gear	Same number of revolution as the input shaft

Under drive planetary gear

Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	—	Fixed	Input/Output
Direction of rotation	Counterclockwise revolution	—	Clockwise revolution
Number of revolutions	Acceleration from under drive internal gear	—	Same number of revolution as the front carrier

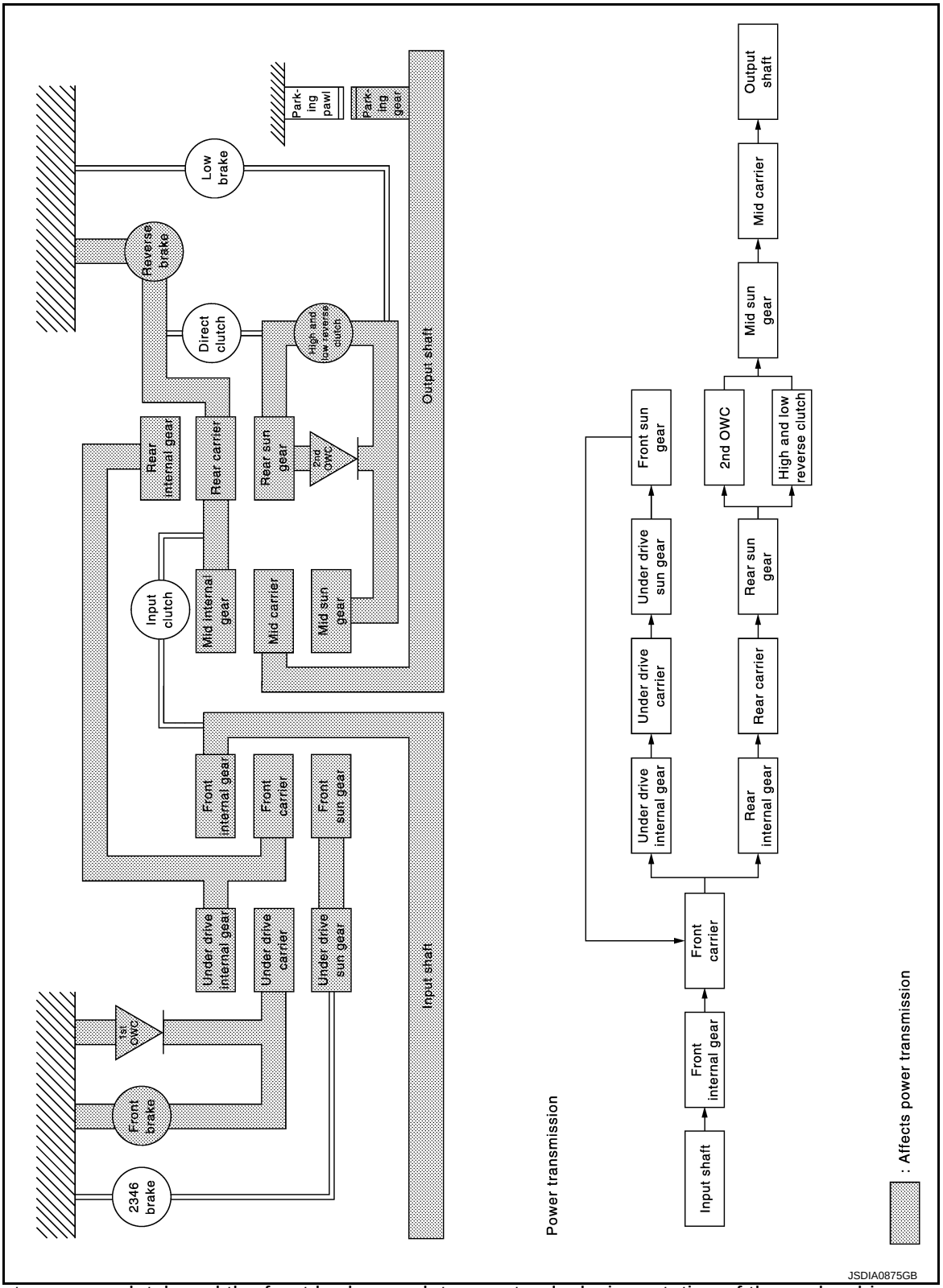
Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	—	Input/Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Acceleration from rear carrier	Same number of revolution as the input shaft	Same number of revolution as the under drive internal gear

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	—	Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Acceleration from mid internal gear	Acceleration from mid internal gear	Same number of revolution as the input shaft

“R” Position



- The 1st one-way clutch and the front brake regulate counterclockwise rotation of the under drive carrier.
  NOTE:
  The front brake operates at the fixed speed or less.
- The rear carrier and the mid internal gear are fixed by the reverse brake.
- The mid sun gear rotates at the same speed as the rear sun gear by operation of the 2nd one-way clutch and the high and low reverse clutch.
  NOTE:
  The high and low reverse clutch operates at the fixed speed or less.

• Each planetary gear enters the state described below.

Front planetary gear

Name	Front sun gear	Front carrier	Front internal gear
Condition	—	Output	Input
Direction of rotation	Counterclockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Deceleration from front internal gear	Deceleration from front internal gear	Same number of revolution as the input shaft

Under drive planetary gear

Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	—	Fixed	Input/Output
Direction of rotation	Counterclockwise revolution	—	Clockwise revolution
Number of revolutions	Acceleration from under drive internal gear	—	Same number of revolution as the front carrier

Rear planetary gear

Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	Output	Fixed	Input
Direction of rotation	Counterclockwise revolution	—	Clockwise revolution
Number of revolutions	Acceleration from rear internal gear	—	Same number of revolution as the under drive internal gear

Mid planetary gear

Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	Input	Output	Fixed
Direction of rotation	Counterclockwise revolution	Counterclockwise revolution	—
Number of revolutions	Same number of revolution as the rear sun gear	Deceleration from mid sun gear	—

TRANSMISSION : Component Description

INFOID:0000000008143087

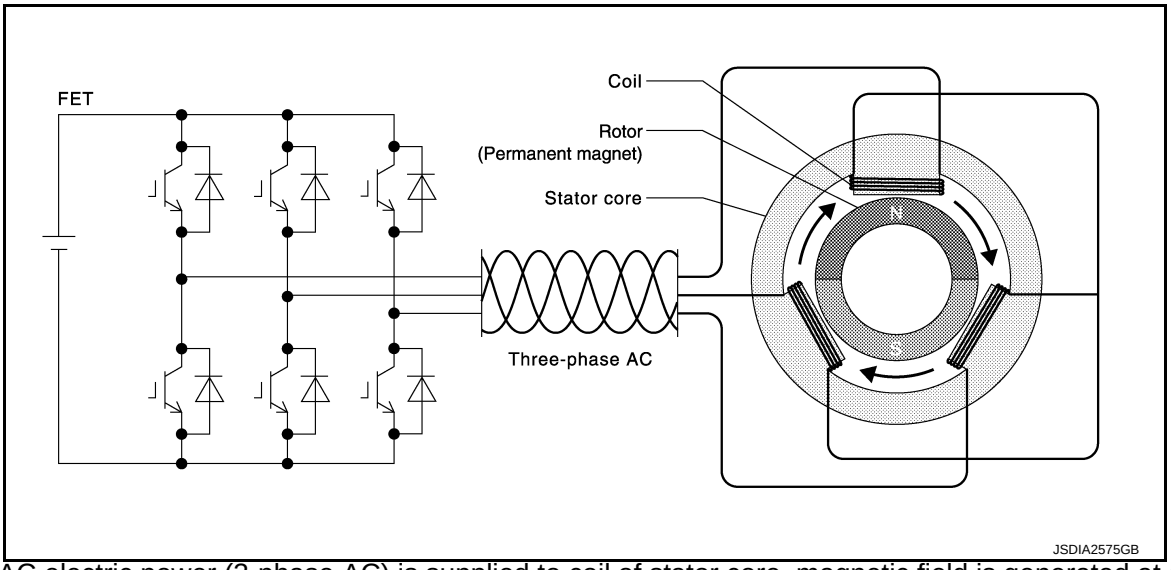
Name of the Part (Abbreviation)	Function
Front brake (FR/B)	Fastens the under drive carrier.
Input clutch (I/C)	Connects the input shaft, the mid internal gear and the rear carrier.
Direct clutch (D/C)	Connects the rear carrier and the rear sun gear.
High and low reverse clutch (HLR/C)	Connects the rear sun gear and the mid sun gear.
Reverse brake (R/B)	Fastens the rear carrier.
Low brake (L/B)	Fastens the mid sun gear.
2346 brake (2346/B)	Fastens the under drive sun gear.
1st one-way clutch (1st OWC)	Allows the under drive carrier to turn freely in the forward direction but fastens it for reverse rotation.
2nd one-way clutch (2nd OWC)	Allows the rear sun gear to turn freely in the forward direction but fastens it for reverse rotation.
Torque converter	Amplifies driving force the engine, and transmits it to transmission input shaft.
Oil pump	Driven by the engine, oil pump supplies oil to torque converter, control valve assembly, and each lubricating system.

SUB ELECTRIC OIL PUMP SYSTEM

SUB ELECTRIC OIL PUMP SYSTEM : Operation Description

INFOID:0000000008143088

OPERATION PRINCIPLE



When AC electric power (3-phase AC) is supplied to coil of stator core, magnetic field is generated at each of U-phase, V-phase, and W-phase. The direction of current (north pole and south pole) changes when FET performs switching of magnetic field, and then magnetic field rotates. This is called rotating magnetic field. At this moment, permanent magnet in rotor core, by being pulled or repelled by rotating magnetic field, synchronizes with rotating magnetic field, rotates, and generates torque force. Generated torque force is approximately proportional to current, and rotating speed depends on frequency of 3-phase AC current.

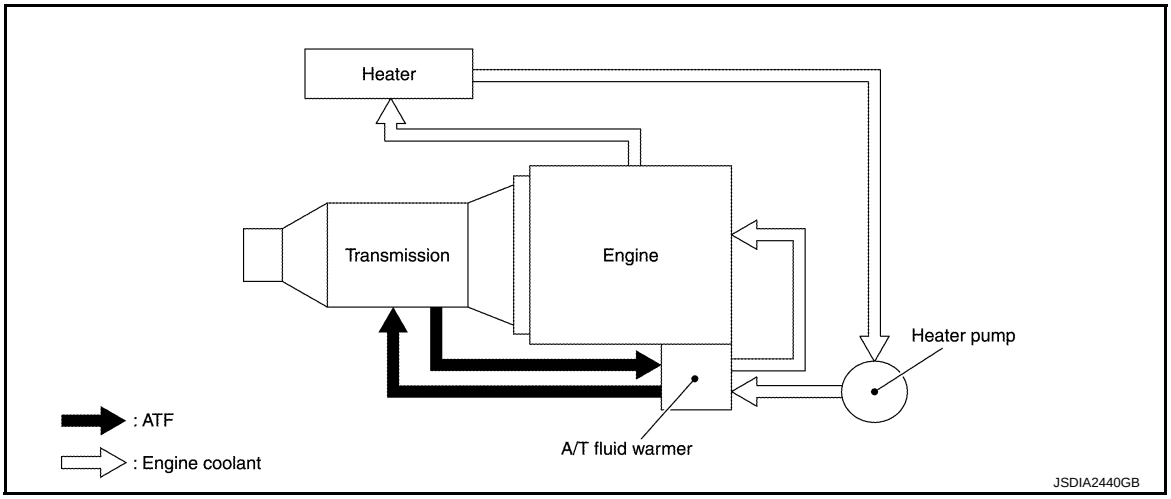
FLUID WARMER SYSTEM

FLUID WARMER SYSTEM : System Description

INFOID:0000000008143089

The A/T fluid temperature is controlled to an appropriate level by the A/T fluid warmer.

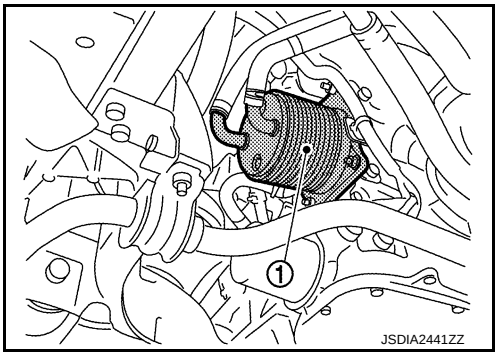
A/T FLUID WARMER SCHEMATIC



COMPONENT DESCRIPTION

A/T fluid warmer

- A/T fluid warmer (1) is mounted at the front part right side of cylinder block of engine.
- When engine is started while engine and A/T are cold, engine coolant temperature rises more quickly than A/T fluid temperature. A/T fluid warmer is provided with two circuits for ATF and engine coolant respectively so that warmed engine coolant warms ATF quickly. This helps shorten A/T warming up time, improving fuel economy.
- This unit has a cooling effect, as a water-cooled cooler, on the ATF when A/T fluid temperature is high.

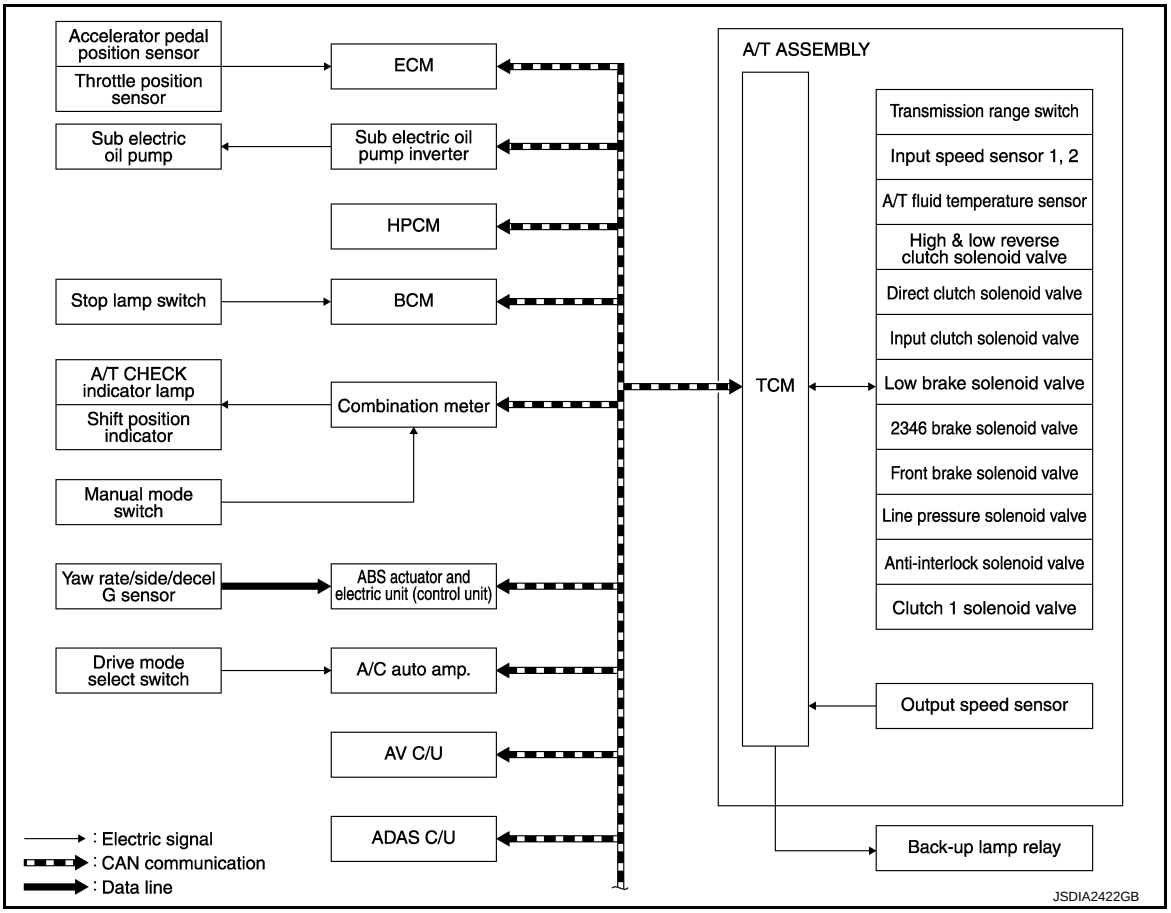


SYSTEM

A/T CONTROL SYSTEM

A/T CONTROL SYSTEM : System Diagram

INFOID:0000000008143090



A/T CONTROL SYSTEM : System Description

INFOID:0000000008143091

INPUT/OUTPUT SIGNAL CHART

Sensor (or signal)		TCM function		Actuator
• Transmission range switch • Accelerator pedal position signal • Closed throttle position signal • Wide open throttle position signal • Motor speed signal • A/T fluid temperature sensor • Output speed sensor • Vehicle speed signal • Manual mode switch signal • Stop lamp switch signal • Input speed sensor 1, 2 • Yaw rate/side/decel G sensor • Drive mode selector switch	⇒	• Line pressure control (TM-54) • Shift change control (TM-55) • Shift pattern control (TM-57) • Infiniti drive mode selector (TM-57) • Fail-safe (TM-75) • Self-diagnosis (TM-64) • CONSULT communication line (TM-64) • CAN communication line (TM-100)	⇒	• Input clutch solenoid valve • Direct clutch solenoid valve • Front brake solenoid valve • High and low reverse clutch solenoid valve • Low brake solenoid valve • Clutch 1 solenoid valve • Line pressure solenoid valve • Anti-interlock solenoid valve • 2346 brake solenoid valve • A/T CHECK indicator lamp • Back-up lamp relay

SYSTEM DESCRIPTION

- The A/T senses vehicle operating conditions through various sensors or signals. It always controls the optimum shift position and reduces shifting.
- Receive input signals transmitted from various switches and sensors.

- Determine required line pressure, shifting point, etc.
- Transmit required output signals to the respective solenoids.

A/T CONTROL SYSTEM : Fail-Safe

INFOID:0000000008143092

TCM has the electrical fail-safe mode. The mode is divided into a maximum of 3 phases (1st fail-safe, 2nd fail-safe and final fail-safe) and functions so that the operation can be continued even if the signal circuit of the main electronically controlled input/output parts is damaged.
Even if the electronic circuit is normal, the fail-safe mode may start under special conditions (such as when the brake pedal is depressed suddenly from a hard wheel spin status to stop the rotation of wheels). In this case, turn the ignition switch OFF and back to ON after 5 seconds to resume the normal shift pattern.
Consequently, the customer's vehicle may already return to the normal condition. Refer to TM-89, "Diagnosis Flow".

1st fail-safe	The mode that the vehicle can stop safely, to prompt the driver to stop if the malfunction occurs and to shift to 2nd fail-safe early. It shifts to 2nd fail-safe or final fail-safe after the vehicle stopped.
2nd fail-safe	The mode that the vehicle shifts to final fail-safe without changing the behavior, by identifying the malfunctioning parts in the condition that the driving force required for the driving is secured.
Final fail-safe	• Selects the shifting pattern that the malfunctioning parts identified at 1st fail-safe and 2nd fail-safe are not used, and then secure the driving force that is required for the driving. • The mode that the shifting performance does not decrease by normal shift control.

FAIL-SAFE FUNCTION

DTC	Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P0705	—	• Fixed in the “D” position (The shifting can be performed) • The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed • Manual mode is prohibited • Shift position indicator is switched OFF • Starter relay is switched OFF (starter is disabled) • Back-up lamp is OFF • Large shift shock	—	• Fixed in the “D” position (The shifting can be performed) • The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed • Manual mode is prohibited • Shift position indicator is switched OFF • Starter relay is switched OFF (starter is disabled) • Back-up lamp is OFF • Large shift shock
P0710	Between the gears of 1 - 2 - 3	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear while driving • Manual mode is prohibited	—	
P0717	Between the gears of 1 - 2 - 3	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear while driving • Manual mode is prohibited	—	

DTC	Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P0720	Between the gears of 1 - 2 - 3		• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • A vehicle speed signal from the combination meter is regarded as an effective signal	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited
	Between the gears of 4 - 5 - 6 - 7		• Fix the gear at driving • Manual mode is prohibited • A vehicle speed signal from the combination meter is regarded as an effective signal	—	
P0729 P0731 P0732 P0733 P0734 P0735 P1734	Gear ratio gap being small		Engine torque restriction to 150 Nm	—	Engine torque restriction to 150 Nm
	Gear ratio gap being large	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR • Locks in 3GR • Locks in 4GR • Manual mode is prohibited • Engine torque restriction to 150 Nm	—	• Locks in 1GR • The shifting between the gears of 1 - 2 can be performed • The shifting between the gears of 1 - 2 - 3 can be performed • The shifting between the gears of 4 - 5 - 6 can be performed • Manual mode is prohibited
		Other than the above	• Locks in 1GR • Locks in 2GR • Locks in 3GR • Locks in 4GR • Locks in 5GR • Locks in 6GR • Fix the gear while driving • Manual mode is prohibited • Engine torque restriction to 150 Nm	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • Engine torque restriction to 150 Nm	• Locks in 1GR • The shifting between the gears of 1 - 2 can be performed • The shifting between the gears of 1 - 2 - 3 can be performed • The shifting between the gears of 2 - 3 - 4 can be performed • The shifting between the gears of 3 - 4 can be performed • The shifting between the gears of 4 - 5 - 6 can be performed • Manual mode is prohibited
P0730	—		• Locks in 5GR • Locks in 6GR • Locks in 7GR • Manual mode is prohibited • Engine torque restriction to 150 Nm	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • Engine torque restriction to 150 Nm	• Locks in 1GR • The shifting between the gears of 1 - 2 can be performed • The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited
P0745	—		Line pressure is set to the maximum hydraulic pressure	—	Line pressure is set to the maximum hydraulic pressure

DTC	Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P0750 P0775 P0795 P2713 P2722 P2731 P2807	—	• Locks in 2GR • Locks in 3GR • Locks in 4GR • Locks in 5GR • Locks in 6GR • Locks in 7GR • Manual mode is prohibited	—	• Locks in 1GR • The shifting between the gears of 1 - 2 - 3 can be performed • The shifting between the gears of 3 - 4 - 5 can be performed • The shifting between the gears of 4 - 5 - 6 can be performed • The shifting between the gears of 1 - 2 - 3 - 4 - 5 - 6 can be performed • Manual mode is prohibited
P0780	—	• Locks in 3GR • Manual mode is prohibited • Engine torque restriction to 150 Nm	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited
P1705	—	• Downshift when accelerator pedal is depressed is prohibited • Upshift when accelerator pedal is released is prohibited • Manual mode is prohibited	—	• Downshift when accelerator pedal is depressed is prohibited • Upshift when accelerator pedal is released is prohibited • Manual mode is prohibited
P1730	—	• Locks in 1GR • Locks in 2GR • Locks in 3GR • Locks in 4GR • Locks in 5GR • Locks in 6GR • Locks in 7GR • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • Engine torque restriction to 150 Nm	• Locks in 1GR • The shifting between the gears of 2 - 3 - 4 can be performed • The shifting between the gears of 3 - 4 can be performed • The shifting between the gears of 4 - 5 - 6 can be performed • Manual mode is prohibited
P1815	Malfunction of both switches	Manual mode is prohibited	—	Manual mode is prohibited
P0720 and P1721	Between the gears of 1 - 2 - 3	Locks in 3GR	—	Locks in 3GR
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited	—	• Fix the gear at driving • Manual mode is prohibited
P175A	—	Clutch 1 solenoid valve OFF command (permanent connection of clutch 1)	—	Clutch 1 solenoid valve OFF command (permanent connection of clutch 1)
P1881 P1882 P1884 P1885 P1887 P1888 P188A P188C P188D U0101	—	Sub electric oil pump stop (idle stop not allowed)	—	Sub electric oil pump stop (idle stop not allowed)
P1116	—	Sub electric oil pump stop	—	Sub electric oil pump stop

DTC	Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
U0100 U0300 U1000	Between the gears of 1 - 2 - 3	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • Slip of clutch 2 is prohibited • Clutch 1 solenoid valve OFF command (permanent connection of clutch 1) • Sub electric oil pump stop • Large shift shock	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Line pressure is set to the maximum hydraulic pressure • Manual mode is prohibited • Clutch 1 solenoid valve OFF command (permanent connection of clutch 1) • Sub electric oil pump stop • Large shift shock
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited • Slip of clutch 2 is prohibited • Clutch 1 solenoid valve OFF command (permanent connection of clutch 1) • Sub electric oil pump stop • Large shift shock	—	
U1115	—	Sub electric oil pump stop (idle stop not allowed)	—	Sub electric oil pump stop (idle stop not allowed)

A/T CONTROL SYSTEM : Protection Control

INFOID:0000000008143093

The TCM becomes the protection control status temporarily to protect the safety when the safety of TCM and transmission is lost. It automatically returns to the normal status if the safety is secured.
The TCM has the following protection control.

REVERSE INHIBIT CONTROL

Intercepts the torque transmission and shift to the neutral status if the selector lever is shifted to “R” position while the vehicle moves forward at the vehicle speed 10 km/h (7 MPH) or more.

Malfunction detection condition	Vehicle speed: 10 km/h (7 MPH) or more
Control at malfunction	Neutral
Normal return condition	• Vehicle speed: 8 km/h (5 MPH) or less and • Engine speed: 2,200 rpm or less
Vehicle behavior	• The torque transmission cannot be performed • There is a shock just before a vehicle stop

1ST ENGINE BRAKE PROTECTION CONTROL

Controls the engine brake so as not to make effective by turning the front brake solenoid output to OFF when each solenoid becomes the electricity pattern of 1st engine brake during driving at the vehicle speed 25 km/h or more in any positions other than “R” position and 1GR.

Malfunction detection condition	• Select lever and gear: Any position other than “R” position and 1GR and • Vehicle speed: More than 25 km/h (16 MPH)
Control at malfunction	Front brake solenoid output signal; OFF
Normal return condition	Other than detection condition of malfunction
Vehicle behavior	Does not exist

TCM HIGH TEMPERATURE PROTECTION CONTROL

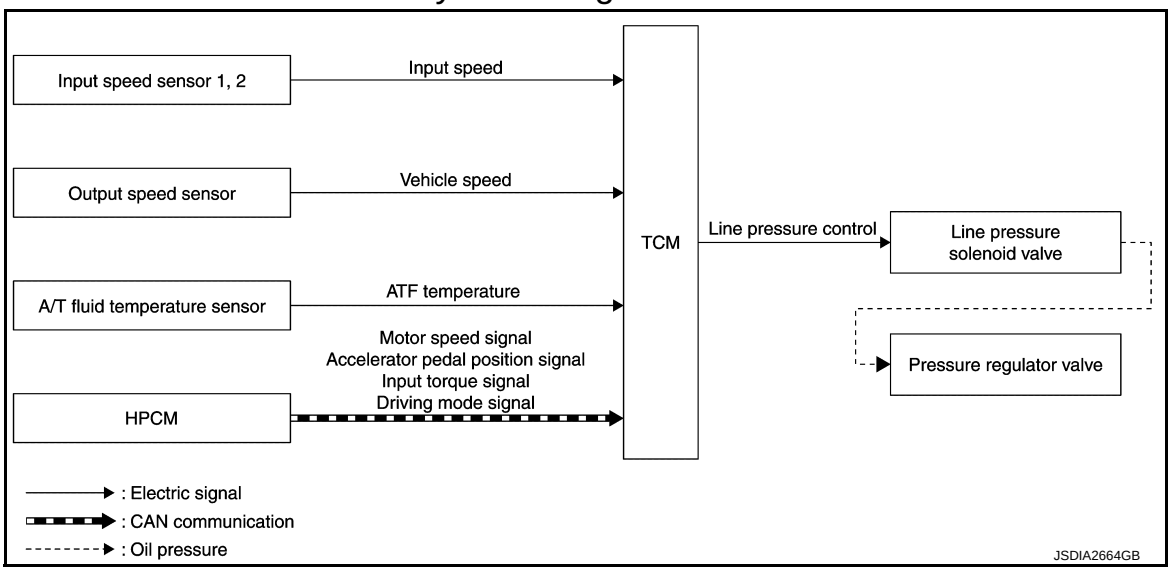
Limit the accelerator opening and forcibly control the vehicle to the low torque driving when the electronic substrate in TCM reaches the high temperature.

Malfunction detection condition	TCM electronic substrate temperature • 145°C (293°F) and 120 seconds or • 150°C (302°F)
Control at malfunction	Accelerator opening: 0.5/8 or less
Normal return condition	• TCM electronic substrate temperature: Less than 140°C (284°F) and • Vehicle speed: 5 km/h (3 MPH) or less
Vehicle behavior	Accelerator opening: output torque of approximately 0.5/8

LINE PRESSURE CONTROL

LINE PRESSURE CONTROL : System Diagram

INFOID:0000000008143094



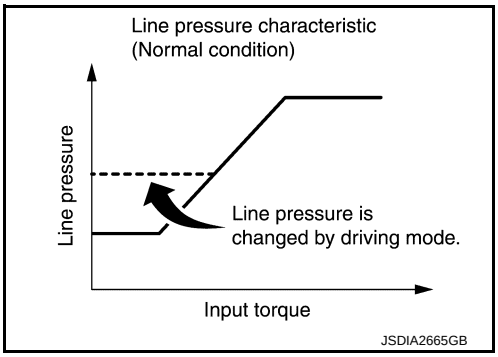
LINE PRESSURE CONTROL : System Description

INFOID:0000000008143095

- When input torque signal corresponding to engine and motor driving force is transmitted from HPCM to TCM, TCM controls line pressure solenoid valve.
  This line pressure solenoid controls the pressure regulator valve as the signal pressure and adjusts the pressure of the operating oil discharged from the mechanical oil pump to the line pressure most appropriate to the driving state.
- The TCM has stored in memory a number of patterns for the optimum line pressure characteristic for the driving state.
- In order to obtain the most appropriate line pressure characteristic to meet the current driving state, the TCM controls the line pressure solenoid current value and thus controls the line pressure.

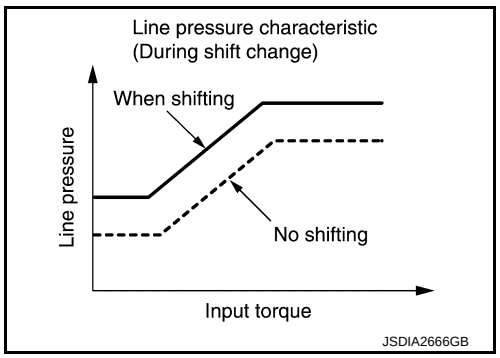
Normal Control

Each clutch is adjusted to the necessary pressure to match the engine and motor drive force.
It judges the vehicle drive mode based on the driving mode signal transmitted by HPCM and adjusts the line pressure to give the most appropriate value.



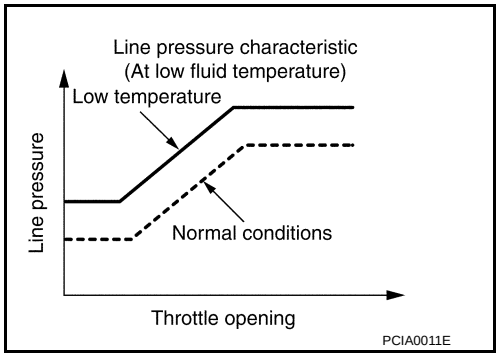
During Shift Change

The necessary and adequate line pressure for shift change is set. For this reason, line pressure pattern setting corresponds to engine torque and gearshift selection.



At Low Fluid Temperature

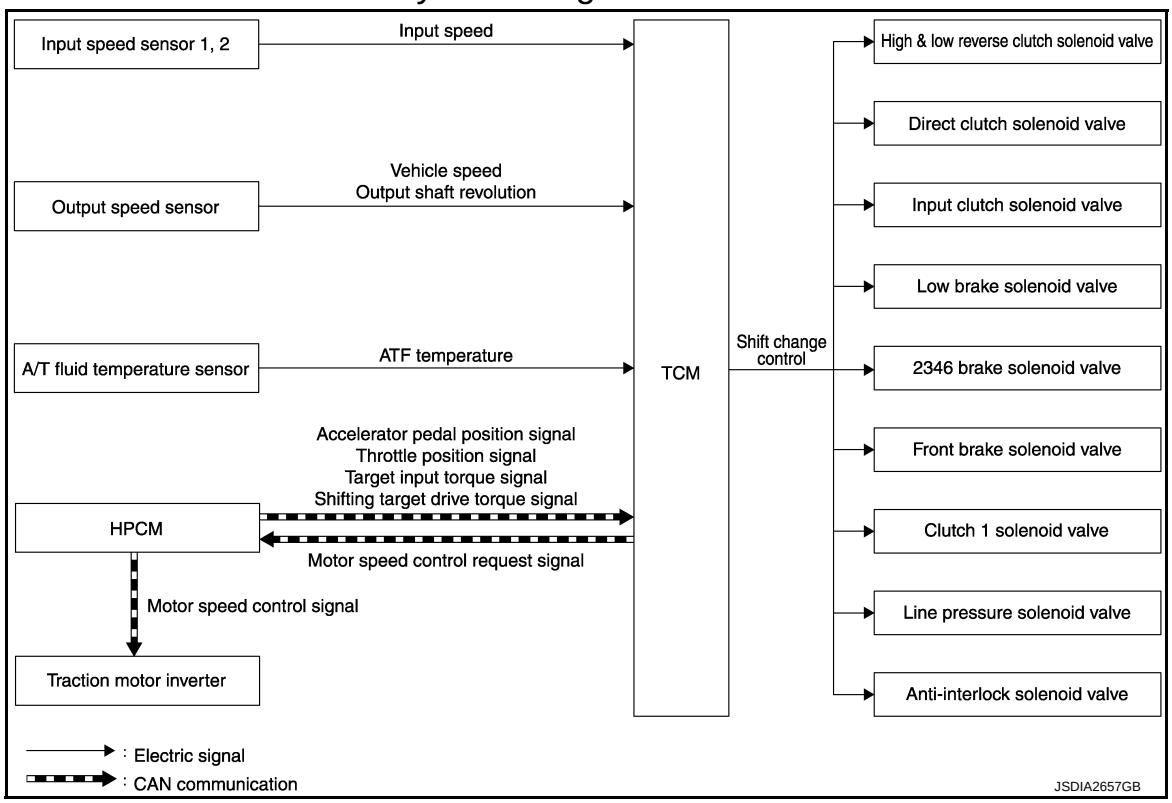
When the A/T fluid temperature drops below the prescribed temperature, in order to speed up the action of each friction element, the line pressure is set higher than the normal line pressure characteristic.



SHIFT CHANGE CONTROL

SHIFT CHANGE CONTROL : System Diagram

INFOID:0000000008143096

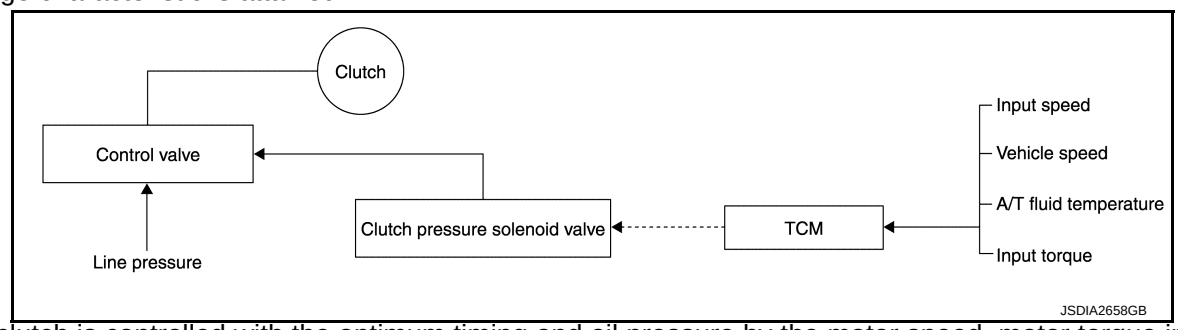


SHIFT CHANGE CONTROL : System Description

INFOID:0000000008143097

- The clutch pressure control solenoid is controlled by the signals from the switches and sensors. Thus, the clutch pressure is adjusted to be appropriate to the engine and motor load state and vehicle driving state. It

becomes possible to finely control the clutch hydraulic pressure with high precision and a smoother shift change characteristic is attained.

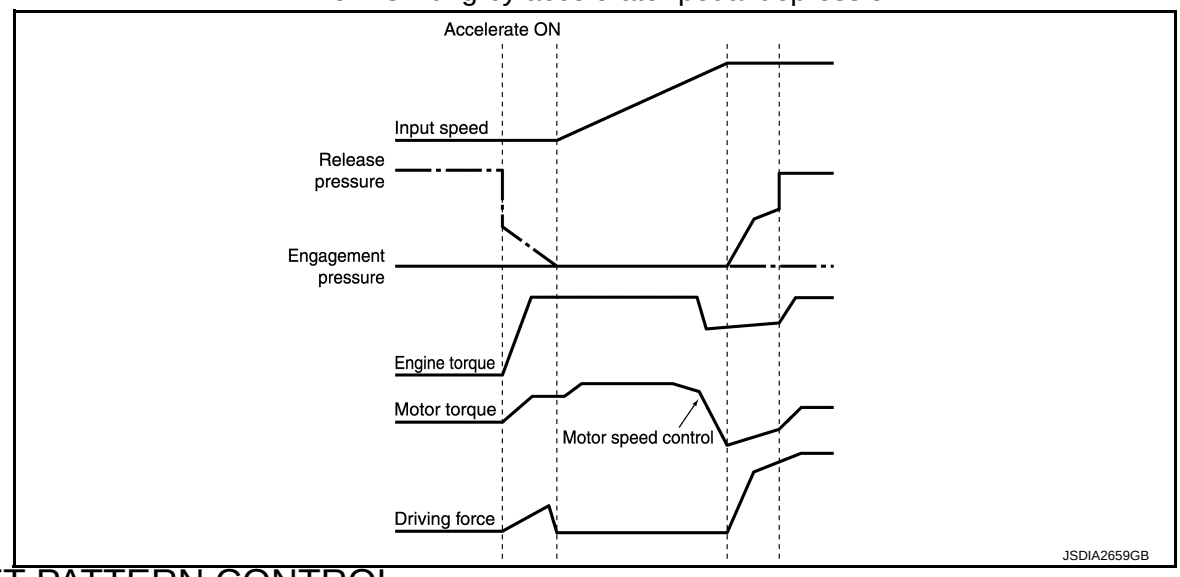


- The clutch is controlled with the optimum timing and oil pressure by the motor speed, motor torque information, etc.
- When motor regeneration is active, higher tightening and release pressures are applied taking account of portion for motor regeneration to prevent insufficient speed control.

MOTOR SPEED CONTROL

- TCM transmits motor speed control request signal to HPCM to get an aimed motor speed. HPCM transmits motor speed control request signal to traction motor inverter, based on which traction motor inverter controls traction motor.
- Motor speed control enables to synchronize input speed, which reduces shift shock and gives smooth shifting.

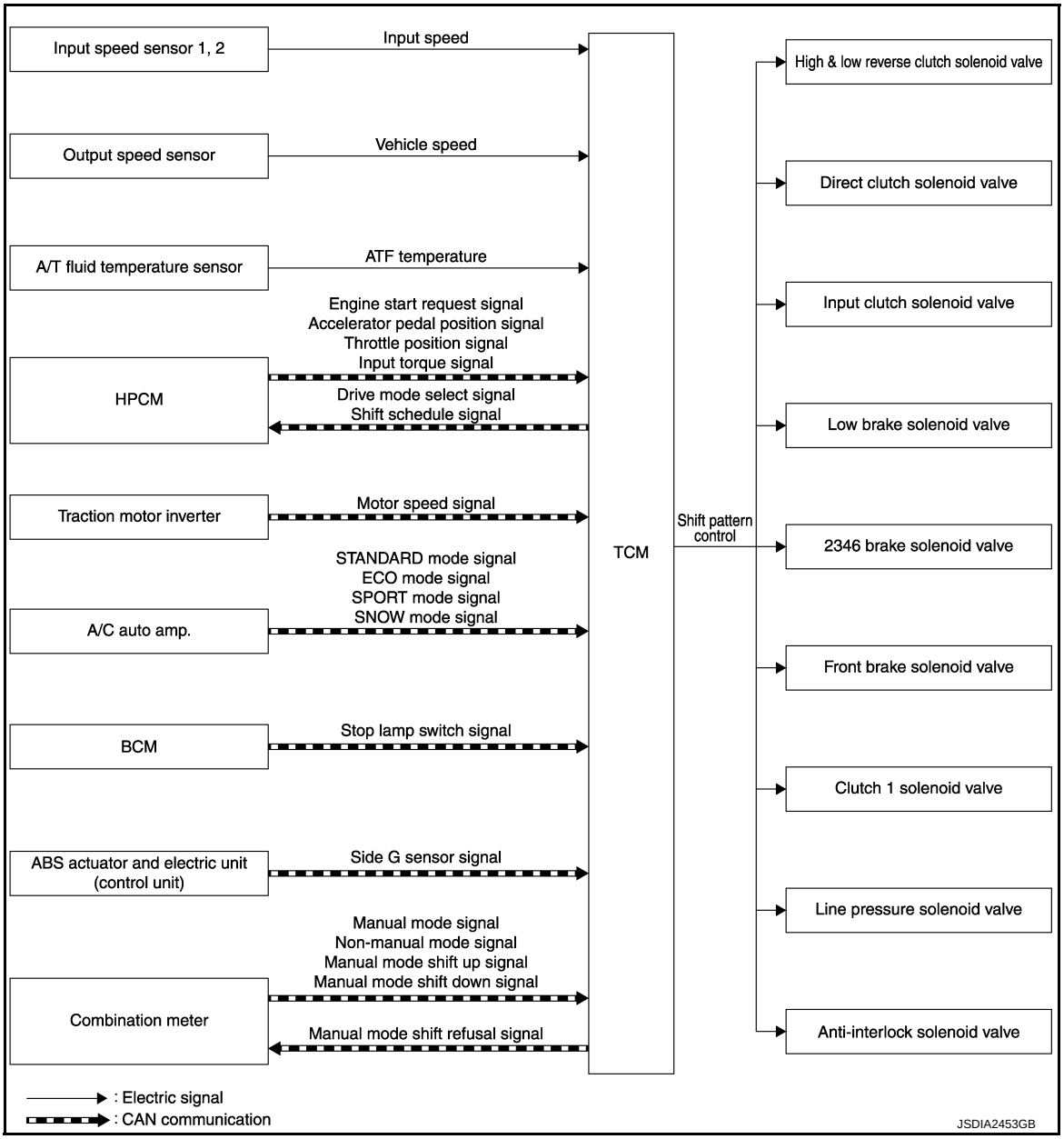
Downshifting by accelerator pedal depression



SHIFT PATTERN CONTROL

SHIFT PATTERN CONTROL : System Diagram

INFOID:0000000008143098



SHIFT PATTERN CONTROL : System Description

INFOID:0000000008143099

INFINITI DRIVE MODE SELECTOR

Input/Output Signal Chart

Item	Signal	TCM function	Actuator
Input speed sensor 1, 2	Input speed	Infiniti drive mode selector	• High and low reverse clutch solenoid valve • Direct clutch solenoid valve • Input clutch solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Front brake solenoid valve • Clutch 1 solenoid valve • Line pressure solenoid valve • Anti-interlock solenoid valve
Output speed sensor	Vehicle speed		
A/T fluid temperature sensor	ATF temperature		
Traction motor inverter	Motor speed signal*		
HPCM	Engine start request signal*		
	Accelerator pedal position signal*		
	Closed throttle position signal*		
	Input torque signal*		
	Drive mode select signal*		
	Shift schedule signal*		
ABS actuator and electric unit (control unit)	Side G sensor signal*		
BCM	Stop lamp switch signal*		
A/C auto amp.	STANDARD mode signal*		
	ECO mode signal*		
	SPORT mode signal*		
	SNOW mode signal*		

*: This signal is transmitted via CAN communication line.

- TCM receives STANDARD mode signal, ECO mode signal, SPORT mode signal, or SNOW mode signal from A/C auto amp. via CAN communication.
- TCM transmits recognized mode and gear shift line select result to HPCM via CAN communication (by drive mode select signal and shift schedule signal).
- Drive mode may not actually be shifted because of CAN communication malfunction or other causes, although display on combination meter may indicate that shifting of drive mode is complete by operation of drive mode select switch.
- Priority is given to manual mode, when manual mode is selected by operation of selector lever while driving in any other drive mode status.

ECO mode

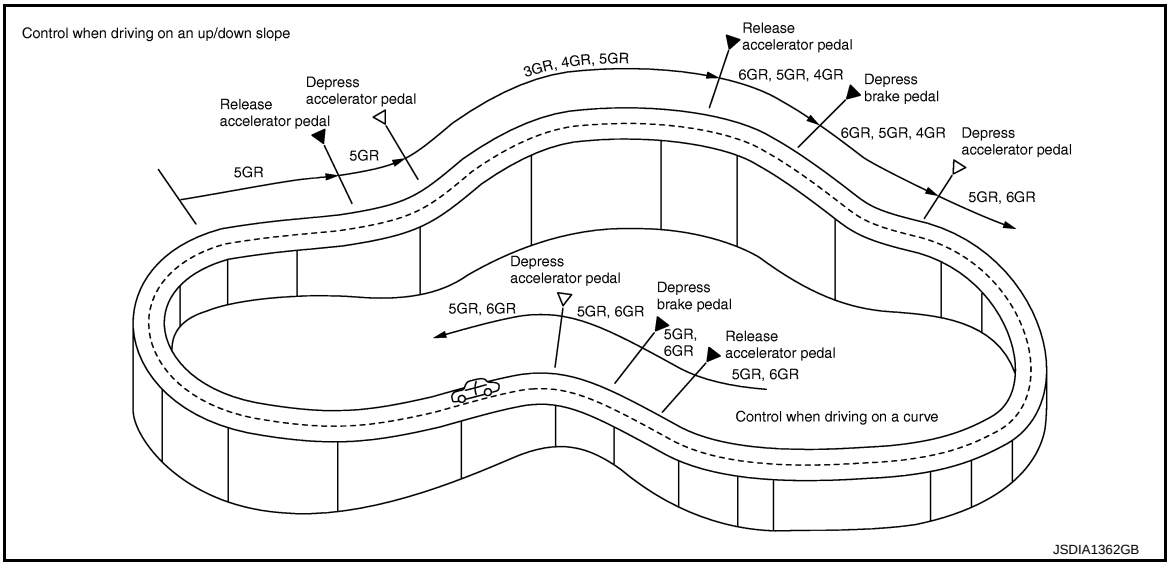
- Driving characteristic is controlled (for decreasing needless acceleration and deceleration and reducing energy consumption), so that driving that improves operational fuel efficiency is assisted.
- For gear shift vehicle speed, refer to TM-193, "Vehicle Speed at Which Gear Shifting Occurs".

SPORT mode

- This mode uses a shift schedule (gear shift line) that mainly utilizes the high engine speed zone and improves the driving control characteristic and response. This assists driving that is similar to driving a sports car.

ASC (Adaptive Shift Control)

- When driving on an up/down slope
  ASC judges up/down slope according to engine torque data transmitted from the HPCM and vehicle speed. Fixing at 4GR, 5GR or 6GR on an up-slope prevents shift hunting and controls the vehicle to gain optimum driving force.
- When driving on a curve
  TCM receives the side G sensor signal from the ABS actuator and electric unit (control unit). It locks to 4GR, 5GR or 6GR position in moderate cornering or to 3GR position in sharp cornering based on this signal. This prevents any upshift and kickdown during cornering, maintaining smooth vehicle travel.



Fail-Safe

If a malfunction occurs in CAN communication between TCM and A/C auto amp., driving mode is maintained for approximately 30 seconds to the mode that is applied when the malfunction occurs. The mode then returns to STANDARD mode when accelerator pedal is released.

MANUAL MODE

Input/Output Signal Chart

Item	Signal	TCM function	Actuator
Output speed sensor	Vehicle speed	Manual mode	• High and low reverse clutch solenoid valve • Direct clutch solenoid valve • Input clutch solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Front brake solenoid valve • Clutch 1 solenoid valve • Line pressure solenoid valve • Anti-interlock solenoid valve
A/T fluid temperature sensor	ATF temperature		
Traction motor inverter	Motor speed signal*		
HPCM	Accelerator pedal position signal*		
Combination meter	Manual mode signal*		
	Non-manual mode signal*		
	Manual mode shift up signal*		
	Manual mode shift down signal*		

*1: This signal is transmitted via CAN communication line.

- The TCM receives the manual mode signal, non-manual mode signal, manual mode shift up signal, and manual mode shift down signal from combination meter via CAN communication line. The TCM shifts shift pattern control to the manual mode based on these signals, and then shifts the A/T by operating each solenoid valve according to the shift operation of the driver.
- The TCM prohibits the manual mode while being in fail-safe mode due to an A/T malfunction, etc. Refer to TM-75, "Fail-Safe".

Manual Mode Information

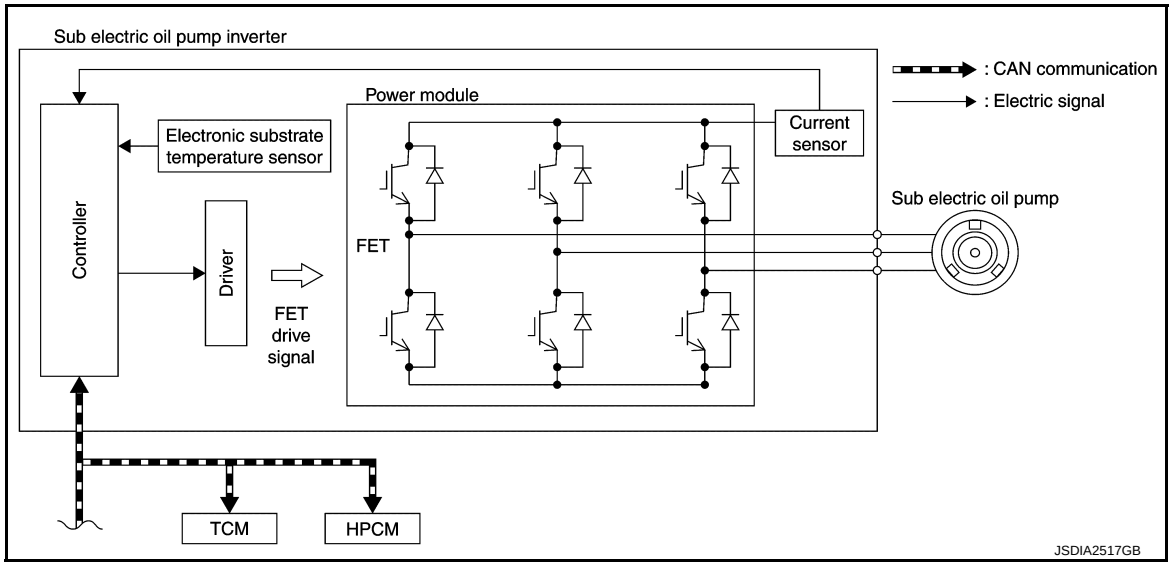
The TCM transmits the manual mode shift refusal signal to the combination meter if the TCM refuses the transmission from the driving status of vehicle when the selector lever shifts to “UP (+ side)” or “DOWN (– side)” side. The combination meter blinks shift indicator on the combination meter and sounds the buzzer to indicate the driver that the shifting is not performed when receiving this signal. However, the TCM does not transmit the manual mode shift refusal signal in the conditions as per the following.

- When the selector lever shifts to “DOWN (– side)” side while driving in 1GR.
- When the selector lever shifts to “UP (+ side)” side while driving in 7GR.

SUB ELECTRIC OIL PUMP SYSTEM

SUB ELECTRIC OIL PUMP SYSTEM : System Diagram

INFOID:0000000008143100



SUB ELECTRIC OIL PUMP SYSTEM : System Description

INFOID:0000000008143101

- Sub electric oil pump inverter controls sub electric oil pump according to signal transmitted from TCM via HEV system CAN.
- Sub electric oil pump inverter does not directly communicate with CONSULT. Instead, TCM displays the information of sub electric oil pump on CONSULT.

SUB ELECTRIC OIL PUMP TRACTION CONTROL

Role of TCM

- TCM transmits sub electric oil pump oil pressure command signal (drive) to sub electric oil pump inverter via HEV system CAN, when transmission input speed is low and mechanical oil pump cannot supply necessary hydraulic pressure.
- TCM transmits sub electric oil pump oil pressure command signal (stop) to sub electric oil pump inverter via HEV system CAN, when transmission input speed is high and necessary hydraulic pressure can be supplied by mechanical pump only.

Role of sub electric oil pump inverter

- Sub electric oil pump inverter applies AC power to sub electric oil pump and generates traction force according to sub electric oil pump oil pressure command signal transmitted from TCM via HEV system CAN.
- A malfunction signal is sent to TCM when sub electric oil pump system malfunctions.

A/T SHIFT LOCK SYSTEM

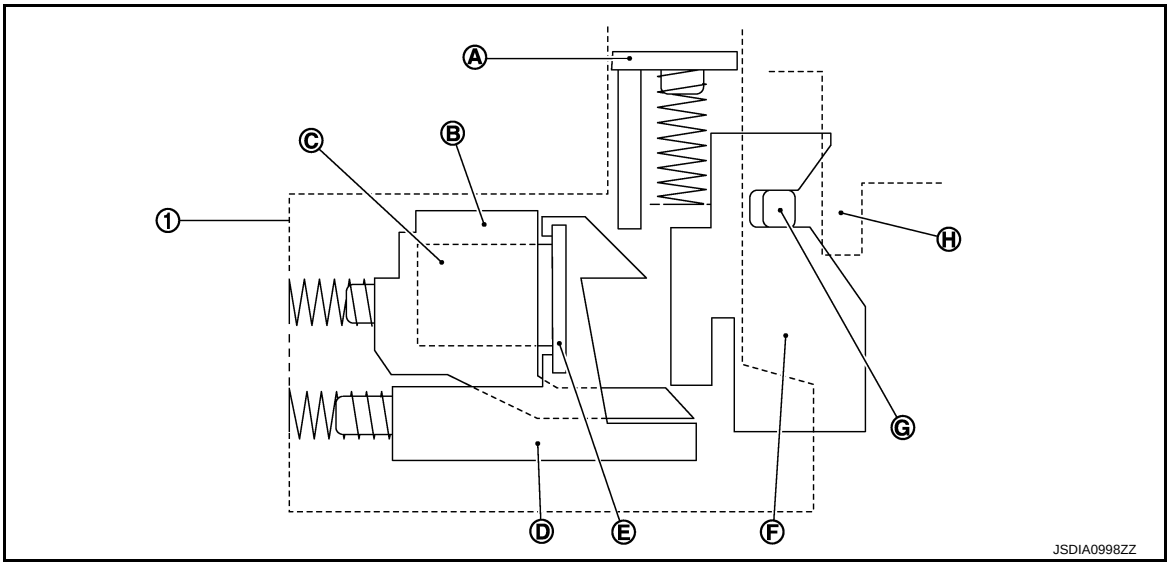
A/T SHIFT LOCK SYSTEM : System Description

INFOID:0000000008143102

- Shift lock prevents an unintentional start of the vehicle that may be caused by an incorrect operation while selector lever is in the “P” position.
- Selector lever can be shifted from the “P” position to another position when the following conditions are satisfied.

- Ignition switch ON
- Stop lamp switch is ON (brake pedal is depressed)
- Selector lever knob button is pressed

SHIFT LOCK MECHANISM

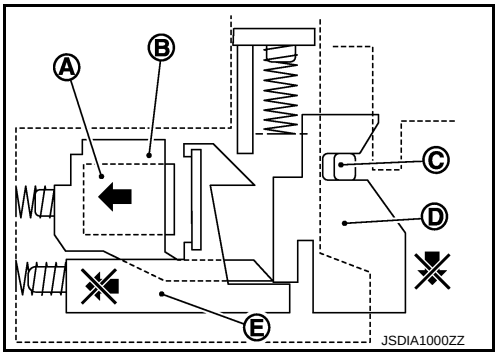


1. Shift lock unit
A. Shift lock release button
B. Slider
C. Electromagnet
D. Stopper
E. Iron plate
F. Plate
G. Detent pin
H. Detent gate

SHIFT LOCK OPERATION

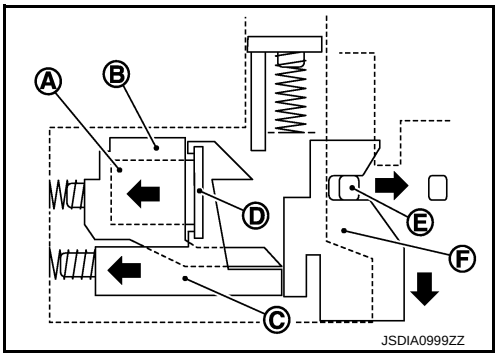
When brake pedal is not depressed and selector lever is in “P” position. (Unable to shift selector lever.)

Without brake pedal depressed and with ignition switch ON, electromagnet (A) of slider (B) is not magnetized because of non electrical current. When selector lever knob button is pressed in this situation, detent pin (C) lowers. According to the movement of detent pin, plate (D) also lowers while pressing slider into shift lock unit. However, stopper (E) pressed by spring comes underneath plate. Plate cannot lower further when it contacts stopper, and detent pin cannot lower to the point that releases selector lever. Thus selector lever stays in the “P” position and selector lever is unable to shift.



When brake pedal is depressed and selector lever is in “P” position. (Able to shift selector lever.)

With brake pedal depressed and with ignition switch ON, electromagnet (A) of slider (B) becomes magnetized because of live electricity. stopper (C) has an iron plate (D) to unify stopper with slider when electromagnet becomes magnetized. When selector lever knob button is pressed in this situation, detent pin (E) lowers. According to the movement of detent pin, plate (F) also lowers while pressing slider into shift lock unit. Because stopper is unified with slider, the slider unit moves into shift lock unit. Detent pin lowers to the point that releases selector lever from the “P” position and selector lever becomes able to shift.

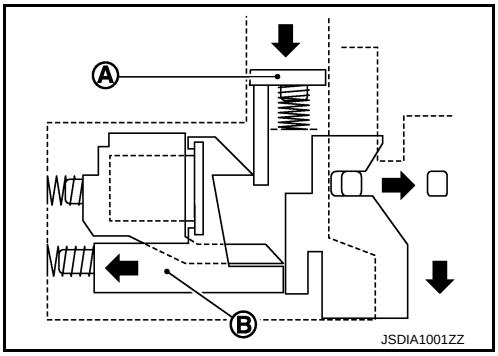


FORCIBLE RELEASE OF SHIFT LOCK

When an electrical or mechanical malfunction occurs in shift lock system, selector lever shift operation from the “P” position becomes impossible. When shift lock release button (A) is pressed in this state, stopper (B) is forcibly pressed into shift lock unit, and then it becomes possible to release shift lock. By this operation, shift operation becomes possible when a malfunction occurs in shift lock system.

CAUTION:

Never use shift lock release button except when select lever is inoperative when depressing brake pedal while ignition switch is ON.



ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000008143103

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

GST (Generic Scan Tool)

INFOID:0000000008143104

When GST is connected with a data link connector equipped on the vehicle side, it will communicate with the control module equipped in the vehicle and then enable various kinds of diagnostic tests. Refer to GI-57, "Description".

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

DIAGNOSIS SYSTEM (TCM)

CONSULT Function

INFOID:0000000008143105

CONSULT APPLICATION ITEMS

Diagnostic test mode	Function
All DTC Reading	Display all DTCs or diagnostic items that all ECUs are recording and judging.
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 a diagram.
CAN Diagnostic Support Monitor	It monitors the starts of CAN communication.
DTC work support	DTC reproduction procedure can be performed speedily and precisely.
ECU Identification	Display the ECU identification number (part number etc.) of the selected system.
CALIB DATA	The calibration data status of TCM can be checked.

SELF DIAGNOSTIC RESULTS

Refer to TM-80, "DTC Index".

IGN Counter

The IGN counter is indicated in Freeze frame data (FFD) and indicates the number of times that the ignition switch is turned ON after returning to the normal state from DTC.

- CAN malfunction (U1000)
  - The number is 0 when a malfunction is detected now.
  - The number increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition switch OFF → ON.
  - The number is fixed to 39 until the self-diagnosis results are erased if it is over 39.
- Other than CAN malfunction (Other than U1000)
  - The number is 0 when a malfunction is detected now.
  - The number increases like 1 → 2 → 3...254 → 255 after returning to the normal condition whenever ignition switch OFF → ON.
  - The number is fixed to 255 until the self-diagnosis results are erased if it is over 255.

DATA MONITOR

NOTE:

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

Monitored item (Unit)		Remarks
VHCL/S SE-A/T	(km/h or mph)	Displays the vehicle speed calculated by the TCM from the output shaft revolution.
ESTM VSP SIG	(km/h or mph)	Displays the vehicle speed signal received via HEV system CAN.
OUTPUT REV	(rpm)	Displays the output speed calculated from the pulse signal of output speed sensor.
INPUT SPEED	(rpm)	Displays the input speed calculated from front sun gear revolution and front carrier revolution.
F SUN GR REV	(rpm)	Displays the front sun gear revolution calculated from the pulse signal of input speed sensor 1.
F CARR GR REV	(rpm)	Displays the front carrier gear revolution calculated from the pulse signal of input speed sensor 2.
ACCELE POSI	(0.0/8)	Displays the accelerator position estimated value received via HEV system CAN.
THROTTLE POSI	(0.0/8)	Displays the throttle position received via HEV system CAN.
ATF TEMP 1	(°C or °F)	Displays the ATF temperature of oil pan calculated from the signal voltage of A/T fluid temperature sensor.

Monitored item (Unit)		Remarks
ATF TEMP SE 1	(V)	Displays the signal voltage of A/T fluid temperature sensor.
BATTERY VOLT	(V)	Displays the power supply voltage of TCM.
LINE PRES SOL	(A)	Displays the command current from TCM to the line pressure solenoid.
L/B SOLENOID	(A)	Displays the command current from TCM to the low brake solenoid.
FR/B SOLENOID	(A)	Displays the command current from TCM to the front brake solenoid.
HLR/C SOL	(A)	Displays the command current from TCM to the high and low reverse clutch solenoid.
I/C SOLENOID	(A)	Displays the command current from TCM to the input clutch solenoid.
D/C SOLENOID	(A)	Displays the command current from TCM to the direct clutch solenoid.
2346/B SOL	(A)	Displays the command current from TCM to the 2346 brake solenoid.
L/P SOL MON	(A)	Monitors the command current from TCM to the line pressure solenoid, and displays the monitor value.
L/B SOL MON	(A)	Monitors the command current from TCM to the low brake solenoid, and displays the monitor value.
FR/B SOL MON	(A)	Monitors the command current from TCM to the front brake solenoid, and displays the monitor value.
HLR/C SOL MON	(A)	Monitors the command current from TCM to the high and low reverse clutch solenoid, and displays the monitor value.
I/C SOL MON	(A)	Monitors the command current from TCM to the input clutch solenoid, and displays the monitor value.
D/C SOL MON	(A)	Monitors the command current from TCM to the direct clutch solenoid, and displays the monitor value.
2346/B SOL MON	(A)	Monitors the command current from TCM to the 2346 brake solenoid, and displays the monitor value.
GEAR RATIO		Displays the gear ratio calculated from input speed and output speed.
INPUT TRQ S	(Nm)	Displays the input torque using for the oil pressure calculation process of shift change control.
INPUT TRQ L/P	(Nm)	Displays the input torque using for the oil pressure calculation process of line pressure control.
TRGT PRES L/B	(kPa, kg/cm^2 or psi)	Displays the target oil pressure value of low brake solenoid valve calculated by the oil pressure calculation process of shift change control.
TRGT PRE FR/B	(kPa, kg/cm^2 or psi)	Displays the target oil pressure value of front brake solenoid valve calculated by the oil pressure calculation process of shift change control.
TRG PRE HLR/C	(kPa, kg/cm^2 or psi)	Displays the target oil pressure value of high and low reverse clutch solenoid valve calculated by the oil pressure calculation process of shift change control.
TRGT PRES I/C	(kPa, kg/cm^2 or psi)	Displays the target oil pressure value of input clutch solenoid valve calculated by the oil pressure calculation process of shift change control.
TRGT PRES D/C	(kPa, kg/cm^2 or psi)	Displays the target oil pressure value of direct clutch solenoid valve calculated by the oil pressure calculation process of shift change control.
TRG PRE 2346/B	(kPa, kg/cm^2 or psi)	Displays the target oil pressure value of 2346 brake solenoid valve calculated by the oil pressure calculation process of shift change control.
SHIFT PATTERN		Displays the gear change data using the shift pattern control.
VEHICLE SPEED	(km/h or mph)	Displays the vehicle speed for control using the control of TCM.
G SEN SLOPE	(%)	Displays the inclination angle calculated by the G sensor signal received via HEV system CAN.
RANGE SW 4	(ON/OFF)	Displays the operation status of transmission range switch 4.
RANGE SW 3	(ON/OFF)	Displays the operation status of transmission range switch 3.
RANGE SW 2	(ON/OFF)	Displays the operation status of transmission range switch 2.
RANGE SW 1	(ON/OFF)	Displays the operation status of transmission range switch 1.
SFT DWN ST SW	(ON/OFF)	Displays the operation status of paddle shifter (down switch).

Monitored item (Unit)		Remarks
SFT UP ST SW	(ON/OFF)	Displays the operation status of paddle shifter (up switch).
DOWN SW LEVER	(ON/OFF)	Displays the operation status of selector lever (down switch).
UP SW LEVER	(ON/OFF)	Displays the operation status of selector lever (up switch).
NON M-MODE SW	(ON/OFF)	Displays whether the selector lever is in any position other than manual shift gate position.
MANU MODE SW	(ON/OFF)	Displays whether the selector lever is in the manual shift gate position.
TOW MODE SW	(ON/OFF)	• Displays the reception status of tow mode switch signal received via HEV system CAN. • Not mounted but displayed.
DS RANGE	(ON/OFF)	• Displays whether it is the DS mode. • Not mounted but displayed.
1 POSITION SW	(ON/OFF)	• Displays the reception status of 1 position switch signal received via HEV system CAN. • Not mounted but displayed.
OD CONT SW	(ON/OFF)	• Displays the reception status of overdrive control switch signal received via HEV system CAN. • Not mounted but displayed.
BRAKESW	(ON/OFF)	Displays the reception status of stop lamp switch signal received via HEV system CAN.
POWERSHIFT SW	(ON/OFF)	• Displays the reception status of POWER mode signal received via HEV system CAN. • Not mounted but displayed.
ASCD-OD CUT	(ON/OFF)	Displays the reception status of ASCD OD cancel request signal received via HEV system CAN.
ASCD-CRUISE	(ON/OFF)	Displays the reception status of ASCD operation signal received via HEV system CAN.
ABS SIGNAL	(ON/OFF)	Displays the reception status of ABS operation signal received via HEV system CAN.
TCS GR/P KEEP	(ON/OFF)	Displays the reception status of TCS gear keep request signal received via HEV system CAN.
TCS SIGNAL 2	(ON/OFF)	Displays whether the reception value of A/T shift schedule change demand signal received via HEV system CAN is “cold”.
TCS SIGNAL 1	(ON/OFF)	Displays whether the reception value of A/T shift schedule change demand signal received via HEV system CAN is “warm”.
LOW/B PARTS	(FAIL/NOTFAIL)	Displays whether the identified malfunction point judged by TCM is the related parts of low brake.
HC/IC/FRB PARTS	(FAIL/NOTFAIL)	Displays whether the identified malfunction point judged by TCM is the related parts of high and low reversed clutch, input clutch or front brake.
IC/FRB PARTS	(FAIL/NOTFAIL)	Displays whether the identified malfunction point judged by TCM is the related parts of input clutch or front brake.
HLR/C PARTS	(FAIL/NOTFAIL)	Displays whether the identified malfunction point judged by TCM is the related parts of high and low reversed clutch.
W/O THL POS	(ON/OFF)	Displays the kickdown condition signal status received via HEV system CAN.
CLSD THL POS	(ON/OFF)	Displays the idling status signal status received via HEV system CAN.
DRV CST JUDGE	(DRIVE/COAST)	Displays the judgment results of “driving” or “coasting” judged by TCM.
SHIFT IND SIGNAL		Displays the transmission value of shift position signal transmitted via HEV system CAN.
F-SAFE IND/L	(ON/OFF)	Displays the transmission status of A/T CHECK indicator lamp signal transmitted via HEV system CAN.
ATF WARN LAMP	(ON/OFF)	• Displays the transmission status of ATF temperature signal transmitted via HEV system CAN. • Not mounted but displayed.

Monitored item (Unit)		Remarks
MANU MODE IND	(ON/OFF)	Displays the transmission status of manual mode signal transmitted via HEV system CAN.
ON OFF SOL MON	(ON/OFF)	Monitors the command value from TCM to the anti-interlock solenoid, and displays the monitor status.
ON OFF SOL	(ON/OFF)	Displays the command status from TCM to anti-interlock solenoid.
SLCT LVR POSI		Displays the shift positions recognized by TCM.
GEAR		Displays the current transmission gear position recognized by TCM.
NEXT GR POSI		Displays the target gear position of gear change that is calculated based on the vehicle speed information and throttle information.
SHIFT MODE		Displays the transmission driving mode recognized by TCM.
D/C PARTS	(FAIL/NOTFAIL)	Displays whether the identified malfunction point judged by TCM is the related parts of direct clutch.
FR/B PARTS	(FAIL/NOTFAIL)	Displays whether the identified malfunction point judged by TCM is the related parts of front brake.
2346/B PARTS	(FAIL/NOTFAIL)	Displays whether the identified malfunction point judged by TCM is the related parts of 2346 brake.
2346B/DC PARTS	(FAIL/NOTFAIL)	Displays whether the identified malfunction point judged by TCM is the related parts of 2346 brake or direct clutch.
SHIFT SCHEDULE		Displays the shift schedule selected by TCM.
DRIVE MODE STATS		Displays the drive mode status recognized by TCM.
SPORT MODE		Displays the status of drive mode select switch signal received via HEV system CAN.
STANDARD MODE		
ECO MODE		
SNOW MODE		
DRIVE MOTOR REV	(rpm)	Displays the traction motor speed received via HEV system CAN.
CL1 SOLENOID	(A)	Displays the command current from TCM to the clutch 1 solenoid.
CL1 SOLENOID MONITOR	(A)	Monitors the command current from TCM to the clutch 1 solenoid, and displays the monitor value.
INPUT TORQUE	(Nm)	Displays the input torque received via HEV system CAN.
CL1 PRESSURE	(kPa, kg/cm^2 or psi)	Displays the clutch 1 oil pressure command value received via HEV system CAN.
SUB E-OP PRESSURE	(kPa, kg/cm^2 or psi)	Displays the oil pressure command value to sub electric oil pump transmitted via HEV system CAN.
SUB E-OP TORQUE	(Nm)	Displays the torque of sub electric oil pump received via HEV system CAN.
SUB E-OP REVOLUTION	(rpm)	Displays the revolution of sub electric oil pump received via HEV system CAN.
SUB E-OP STEP OUT	(OK/NG)	Displays the step out status of sub electric oil pump received via HEV system CAN.
SUB E-OP READY	(READY/COMP)	Displays the ready status of sub electric oil pump received via HEV system CAN.
SUB E-OP CAN DIAGNOSIS	(OK/NG)	Displays the CAN diagnosis permit status to sub electric oil pump transmitted via HEV system CAN.
SUB E-OP POWER SAVE	(ON/OFF)	Displays the output limit status of sub electric oil pump received via HEV system CAN.
SUB E-OP OPERATION REQ	(ON/OFF)	Displays the drive permit status of sub electric oil pump received via HEV system CAN.
SUB E-OP START REQUEST	(ON/OFF)	Displays the coercion drive request status of sub electric oil pump received via HEV system CAN.
SUB E-OP STOP REQUEST	(ON/OFF)	Displays the stop request status of sub electric oil pump transmitted via HEV system CAN.

Monitored item (Unit)		Remarks
TARGET DRIVE TORQUE	(Nm)	Displays the target drive torque of during change gear received via HEV system CAN.
CL2 TARGET TORQUE	(Nm)	Displays the target torque of clutch/brake of transmission received via HEV system CAN.
ENGINE CRANK	(NOTCNK/CRANK)	Displays the starting status of engine received via HEV system CAN.
ENGINE STATUS	(STOP/RUN)	Displays the engine status received via HEV system CAN.

DTC WORK SUPPORT

Item name	Description	Check item
1ST GR FNCTN P0731	Following items for “1GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Input clutch solenoid valve • Front brake solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Anti-interlock solenoid valve • Each clutch and brake • Output speed sensor • Input speed sensor 1, 2 • Hydraulic control circuit
2ND GR FNCTN P0732	Following items for “2GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	
3RD GR FNCTN P0733	Following items for “3GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	
4TH GR FNCTN P0734	Following items for “4GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	
5TH GR FNCTN P0735	Following items for “5GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	
6TH GR FNCTN P0729	Following items for “6GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	
7TH GR FNCTN P1734	Following items for “7GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	
TCC SOL FUNCTN CHECK	Following items for “TCC solenoid function” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	—

ECU DIAGNOSIS INFORMATION

TCM

Reference Value

INFOID:0000000008143106

VALUES ON THE DIAGNOSIS TOOL

- The CONSULT electrically displays shift timing (that is, operation timing of each solenoid).
  Check for time difference between actual shift timing and the CONSULT display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts in accordance with the specified diagnostic procedures.
- Shift schedule (that implies gear position) on CONSULT may slightly differ from that is described in Service Manual. This occurs because of the reasons as per the following:

- Actual shift schedule has more or less tolerance or allowance
- Shift schedule in Service Manual refers to the point where shifting starts
- Gear position on CONSULT indicates the point where shifting completes

- Display of solenoid valves on CONSULT changes at the start of shifting, while gear position is displayed upon completion of shifting (which is computed by TCM).

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

Item name	Condition	Value / Status (Approx.)
VHCL/S SE-A/T	During driving	Approximately equals the speedometer reading.
ESTM VSP SIG	During driving	Approximately equals the speedometer reading.
OUTPUT REV	During driving	VHCL/S SE-A/T / 0.0488
INPUT SPEED	During driving	Approximately equals the motor speed.
F SUN GR REV	During driving	Revolution of front sun gear is indicated.
F CARR GR REV	During driving	Revolution of front carrier is indicated.
ACCELE POSI	Accelerator pedal is released	0.0/8
	Accelerator pedal is fully depressed	8.0/8
THROTTLE POSI	Accelerator pedal is released	0.0/8
	Accelerator pedal is fully depressed	8.0/8
ATF TEMP 1	Ignition switch ON	Temperature of ATF in the oil pan is indicated.
ATF TEMP SE 1	0°C (32° F) – 20°C (68°F) – 80°C (176°F)	3.3 – 2.7 – 0.9 V
BATTERY VOLT	Ignition switch ON	Battery voltage (11 V – 14 V)
LINE PRES SOL	During driving	0.2 – 0.6 A
L/B SOLENOID	Driving with 3GR	0.6 – 0.8 A
	Driving with 4GR to 7GR	0 – 0.05 A
FR/B SOLENOID	Driving with 7GR	0.6 – 0.8 A
	Driving with 2GR to 6GR	0 – 0.05 A
HLR/C SOL	Driving with 3GR	0.6 – 0.8 A
	Driving with 2GR, 6GR, and 7GR	0 – 0.05 A
I/C SOLENOID	Driving with 1GR to 4GR	0.6 – 0.8 A
	Driving with 5GR	0 – 0.05 A

Item name	Condition	Value / Status (Approx.)
D/C SOLENOID	Driving with 1GR, 2GR, 6GR, and 7GR	0.6 – 0.8 A
	Driving with 4GR and 5GR	0 – 0.05 A
2346/B SOL	Driving with 2GR, 3GR, 4GR, and 6GR	0.6 – 0.8 A
	Driving with 1GR, 5GR and 7GR	0 – 0.05 A
L/P SOL MON	During driving	0.2 – 0.6 A
L/B SOL MON	Driving with 3GR	0.6 – 0.8 A
	Driving with 4GR to 7GR	0 – 0.05 A
FR/B SOL MON	Driving with 7GR	0.6 – 0.8 A
	Driving with 2GR to 6GR	0 – 0.05 A
HLR/C SOL MON	Driving with 3GR	0.6 – 0.8 A
	Driving with 2GR, 6GR, and 7GR	0 – 0.05 A
I/C SOL MON	Driving with 1GR to 4GR	0.6 – 0.8 A
	Driving with 5GR	0 – 0.05 A
D/C SOL MON	Driving with 1GR, 2GR, 6GR, and 7GR	0.6 – 0.8 A
	Driving with 4GR and 5GR	0 – 0.05 A
2346/B SOL MON	Driving with 2GR, 3GR, 4GR, and 6GR	0.6 – 0.8 A
	Driving with 1GR, 5GR and 7GR	0 – 0.05 A
GEAR RATIO	Driving with 1GR	4.783
	Driving with 2GR	3.103
	Driving with 3GR	1.984
	Driving with 4GR	1.371
	Driving with 5GR	1.000
	Driving with 6GR	0.871
	Driving with 7GR	0.776
INPUT TRQ S	During driving	Changes the value according to the acceleration or deceleration.
INPUT TRQ L/P	During driving	Changes the value according to the acceleration or deceleration.
TRGT PRES L/P	During driving	490 – 1370 kPa
TRGT PRES L/B	Driving with 3GR	1370 kPa
	Driving with 4GR to 7GR	0 kPa
TRGT PRES FR/B	Driving with 7GR	1370 kPa
	Driving with 2GR to 6GR	0 kPa
TRG PRE HLR/C	Driving with 2GR, 6GR, and 7GR	1370 kPa
	Driving with 3GR	0 kPa
TRGT PRES I/C	Driving with 5GR	1370 kPa
	Driving with 1GR to 4GR	0 kPa
TRGT PRES D/C	Driving with 4GR and 5GR	1370 kPa
	Driving with 1GR, 2GR, 6GR, and 7GR	0 kPa
TRG PRE 2346/B	Driving with 2GR, 3GR, 4GR, and 6GR	1370 kPa
	Driving with 1GR, 5GR and 7GR	0 kPa
SHIFT PATTERN	During normal driving (without shift changes)	FF
VEHICLE SPEED	During driving	Approximately equals the speed-ometer reading.

Item name	Condition	Value / Status (Approx.)
RANGE SW 4	Selector lever in “P” and “N” positions	ON
	Other than the above	OFF
RANGE SW 3	Selector lever in “P”, “R” and “N” positions	ON
	Other than the above	OFF
RANGE SW 2	Selector lever in “P” and “R” positions	ON
	Other than the above	OFF
RANGE SW 1	Selector lever in “P” position	ON
	Other than the above	OFF
SFT DWN ST SW*	Paddle shifter (shift-down) is pulled	ON
	Other than the above	OFF
SFT UP ST SW*	Paddle shifter (shift-up) is pulled	ON
	Other than the above	OFF
DOWN SW LEVER	Selector lever is shifted to – side	ON
	Other than the above	OFF
UP SW LEVER	Selector lever is shifted to + side	ON
	Other than the above	OFF
NON M-MODE SW	Selector lever is shifted to manual shift gate side	OFF
	Other than the above	ON
MANU MODE SW	Selector lever is shifted to manual shift gate side	ON
	Other than the above	OFF
TOW MODE SW*	Tow mode	ON
	Other than the above	OFF
DS RANGE*	Driving with DS mode	ON
	Other than the above	OFF
1 POSITION SW*	Selector lever in “1” position	ON
	Other than the above	OFF
OD CONT SW*	When overdrive control switch is depressed	ON
	When overdrive control switch is released	OFF
BRAKESW	Brake pedal is depressed	ON
	Brake pedal is released	OFF
POWERSHIFT SW*	Power mode	ON
	Other than the above	OFF
ASCD-OD CUT	When TCM receives ASCD OD cancel request signal	ON
	Other than the above	OFF
ASCD-CRUISE	ASCD operate	ON
	Other than the above	OFF
ABS SIGNAL	ABS operate	ON
	Other than the above	OFF
TCS GR/P KEEP	When TCM receives TCS gear keep request signal	ON
	Other than the above	OFF
TCS SIGNAL 2	When the reception value of A/T shift schedule change demand signal is “cold”	ON
	Other than the above	OFF

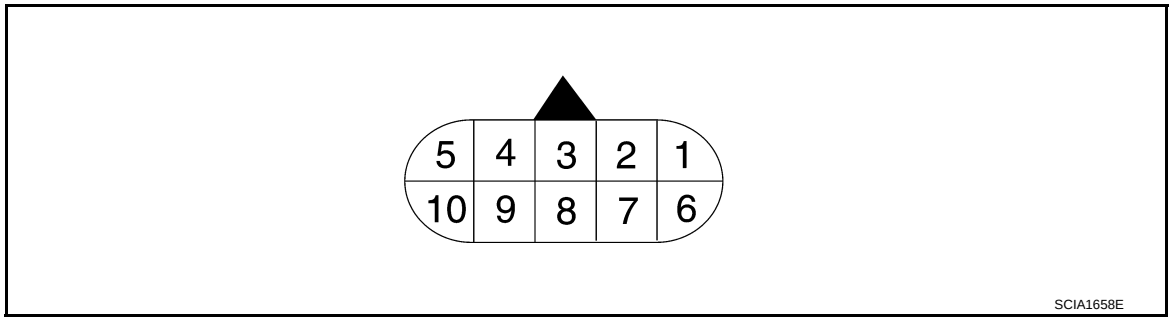
Item name	Condition	Value / Status (Approx.)
TCS SIGNAL 1	When the reception value of A/T shift schedule change demand signal is “warm”	ON
	Other than the above	OFF
LOW/B PARTS	At 4GR - 5GR - 6GR shift control	FAIL
	Other than the above	NOTFAIL
HC/IC/FRB PARTS	At 1GR - 2GR - 3GR shift control	FAIL
	Other than the above	NOTFAIL
IC/FRB PARTS	At 4GR - 5GR - 6GR shift control	FAIL
	Other than the above	NOTFAIL
HLR/C PARTS	At 4GR - 5GR - 6GR shift control	FAIL
	Other than the above	NOTFAIL
W/O THL POS	Accelerator pedal is fully depressed	ON
	Accelerator pedal is released	OFF
CLSD THL POS	Accelerator pedal is released	ON
	Accelerator pedal is fully depressed	OFF
DRV CST JUDGE	Accelerator pedal is depressed	DRIVE
	Accelerator pedal is released	COAST
SHIFT IND SIGNAL	When the selector lever is positioned in between each position.	OFF
	Selector lever in “P” position	P
	Selector lever in “R” position	R
	Selector lever in “N” position	N
	Selector lever in “D” position	D
	Selector lever in “D” position: 7GR	
	Selector lever in “D” position: 6GR	6
	Selector lever in “D” position: 5GR	5
	Selector lever in “D” position: 4GR	4
	Selector lever in “D” position: 3GR	3
	Selector lever in “D” position: 2GR	2
	Selector lever in “D” position: 1GR	1
	Selector lever in “M” position: 1GR	M1
	Selector lever in “M” position: 2GR	M2
	Selector lever in “M” position: 3GR	M3
	Selector lever in “M” position: 4GR	M4
	Selector lever in “M” position: 5GR	M5
	Selector lever in “M” position: 6GR	M6
	Selector lever in “M” position: 7GR	M7
	Driving with DS mode	DS
F-SAFE IND/L	For 2 seconds after the ignition switch is turned ON	ON
	Other than the above	OFF
ATF WARN LAMP*	When TCM transmits the A/T fluid warning lamp signal	ON
	Other than the above	OFF
MANU MODE IND	Driving with manual mode	ON
	Other than the above	OFF

Item name	Condition	Value / Status (Approx.)
ON OFF SOL MON	Selector lever in “P” and “N” positions	ON
	Driving with 1GR to 3GR	
	Other than the above	OFF
ON OFF SOL	Selector lever in “P” and “N” positions	ON
	Driving with 1GR to 3GR	
	Other than the above	OFF
SLCT LVR POSI	Selector lever in “N” and “P” positions	N/P
	Selector lever in “R” position	R
	Selector lever in “D” and “DS” positions	D
	Selector lever in “M” position: 7GR	
	Selector lever in “M” position: 6GR	6
	Selector lever in “M” position: 5GR	5
	Selector lever in “M” position: 4GR	4
	Selector lever in “M” position: 3GR	3
	Selector lever in “M” position: 2GR	2
	Selector lever in “M” position: 1GR	1
GEAR	During driving	1, 2, 3, 4, 5, 6, 7
NEXT GR POSI	During driving	1, 2, 3, 4, 5, 6, 7
SHIFT MODE	Driving with the D position	0 or 3
	Driving with the manual mode	4 or 8
D/C PARTS	At 1GR - 2GR shift control	FAIL
	Other than the above	NOTFAIL
FR/B PARTS	At control fixed to 1GR	FAIL
	Other than the above	NOTFAIL
2346/B PARTS	At control fixed to 1GR	FAIL
	Other than the above	NOTFAIL
2346B/DC PARTS	At 2GR - 3GR - 4GR shift control	FAIL
	Other than the above	NOTFAIL
N IDLE STATUS	Idle neutral is active	ON
	Other than the above	OFF
SHIFT SCHEDULE	During normal driving	NORMAL
	Drive mode select switch: SPORT mode	SPORT
	Drive mode select switch: ECO mode	ECO
DRIVE MODE STATS	Drive mode select switch: SPORT mode	SPORT
	Drive mode select switch: ECO mode	ECO
SPORT MODE	Drive mode select switch: SPORT mode	ON
	Other than the above	OFF
STANDARD MODE	Drive mode select switch: STANDARD mode	ON
	Other than the above	OFF
ECO MODE	Drive mode select switch: ECO mode	ON
	Other than the above	OFF
SNOW MODE	Drive mode select switch: SNOW mode	ON
	Other than the above	OFF
DRIVE MOTOR REV	During driving	Approximately equals the input speed.

Item name	Condition	Value / Status (Approx.)
CL1 SOLENOID	During driving (engine: stop)	0.5 – 0.7 A
	During driving (engine: run)	0 – 0.05 A
CL1 SOLENOID MONITOR	During driving (engine: stop)	0.5 – 0.7 A
	During driving (engine: run)	0 – 0.05 A
INPUT TORQUE	During driving	Changes the value according to the acceleration.
CL1 PRESSURE	During driving (engine: stop)	300 – 600 kPa
	During driving (engine: run)	0 kPa
SUB E-OP PRESSURE	During idling stop	490 – 746 kPa
SUB E-OP TORQUE	During idling stop	0.3 – 0.9 Nm
SUB E-OP REVOLUTION	During idling stop	500 – 3,000 rpm
SUB E-OP STEP OUT	During idling stop	OK
SUB E-OP READY	Ignition switch ON	COMP
SUB E-OP CAN DIAGNOSIS	Ignition switch ON	OK
SUB E-OP POWER SAVE	Ignition switch ON	OFF
SUB E-OP OPERATION REQ	READY	ON
SUB E-OP START REQUEST	READY	OFF
SUB E-OP STOP REQUEST	READY	OFF
TARGET DRIVE TORQUE	During driving	Changes the value according to the acceleration.
CL2 TARGET TORQUE	During driving	Changes the value according to the acceleration.
ENGINE CRANK	Engine cracking	CRANK
	Other than the above	NOTCNK
ENGINE STATUS	Engine run	RUN
	Other than the above	STOP

*: Not mounted but always display as OFF.

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
1 (Y)	Ground	Power supply (Back-up)	Input	Always	Battery voltage
2 (P)	Ground	Power supply (Back-up)	Input	Always	Battery voltage

Terminal (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
3 (L)	—	HEV system CAN-H	Input/ Output	—		—
4 (V)	—	K-line	Input/ Output	—		—
5 (B)	Ground	Ground	Output	Always		0 V
6 (G)	Ground	Power supply (IGN)	Input	Ignition switch ON		Battery voltage
				Ignition switch OFF		0 V
7 (SB)	Ground	Back-up lamp relay	Input	Ignition switch ON	Selector lever in “R” position.	0 V
					Selector lever in other than above.	Battery voltage
8 (G)	—	HEV system CAN-L	Input/ Output	—		—
9 (BR)	Ground	P/N signal	Output	Ignition switch ON	Selector lever in “P” and “N” positions.	Battery voltage
					Selector lever in other than above.	0 V
10 (B)	Ground	Ground	Output	Always		0 V

Fail-Safe

INFOID:0000000008143107

TCM has the electrical fail-safe mode. The mode is divided into a maximum of 3 phases (1st fail-safe, 2nd fail-safe and final fail-safe) and functions so that the operation can be continued even if the signal circuit of the main electronically controlled input/output parts is damaged.
Even if the electronic circuit is normal, the fail-safe mode may start under special conditions (such as when the brake pedal is depressed suddenly from a hard wheel spin status to stop the rotation of wheels). In this case, turn the ignition switch OFF and back to ON after 5 seconds to resume the normal shift pattern.
Consequently, the customer's vehicle may already return to the normal condition. Refer to TM-89, "Diagnosis Flow".

1st fail-safe	The mode that the vehicle can stop safely, to prompt the driver to stop if the malfunction occurs and to shift to 2nd fail-safe early. It shifts to 2nd fail-safe or final fail-safe after the vehicle stopped.
2nd fail-safe	The mode that the vehicle shifts to final fail-safe without changing the behavior, by identifying the malfunctioning parts in the condition that the driving force required for the driving is secured.
Final fail-safe	• Selects the shifting pattern that the malfunctioning parts identified at 1st fail-safe and 2nd fail-safe are not used, and then secure the driving force that is required for the driving. • The mode that the shifting performance does not decrease by normal shift control.

FAIL-SAFE FUNCTION

DTC	Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P0705	—	• Fixed in the “D” position (The shifting can be performed) • The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed • Manual mode is prohibited • Shift position indicator is switched OFF • Starter relay is switched OFF (starter is disabled) • Back-up lamp is OFF • Large shift shock	—	• Fixed in the “D” position (The shifting can be performed) • The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed • Manual mode is prohibited • Shift position indicator is switched OFF • Starter relay is switched OFF (starter is disabled) • Back-up lamp is OFF • Large shift shock
P0710	Between the gears of 1 - 2 - 3	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear while driving • Manual mode is prohibited	—	
P0717	Between the gears of 1 - 2 - 3	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear while driving • Manual mode is prohibited	—	
P0720	Between the gears of 1 - 2 - 3	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • A vehicle speed signal from the combination meter is regarded as an effective signal	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited • A vehicle speed signal from the combination meter is regarded as an effective signal	—	

DTC	Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P0729 P0731 P0732 P0733 P0734 P0735 P1734	Gear ratio gap being small		Engine torque restriction to 150 Nm	—	Engine torque restriction to 150 Nm
	Gear ratio gap being large	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR • Locks in 3GR • Locks in 4GR • Manual mode is prohibited • Engine torque restriction to 150 Nm	—	• Locks in 1GR • The shifting between the gears of 1 - 2 can be performed • The shifting between the gears of 1 - 2 - 3 can be performed • The shifting between the gears of 4 - 5 - 6 can be performed • Manual mode is prohibited
		Other than the above	• Locks in 1GR • Locks in 2GR • Locks in 3GR • Locks in 4GR • Locks in 5GR • Locks in 6GR • Fix the gear while driving • Manual mode is prohibited • Engine torque restriction to 150 Nm	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • Engine torque restriction to 150 Nm	• Locks in 1GR • The shifting between the gears of 1 - 2 can be performed • The shifting between the gears of 1 - 2 - 3 can be performed • The shifting between the gears of 2 - 3 - 4 can be performed • The shifting between the gears of 3 - 4 can be performed • The shifting between the gears of 4 - 5 - 6 can be performed • Manual mode is prohibited
P0730	—		• Locks in 5GR • Locks in 6GR • Locks in 7GR • Manual mode is prohibited • Engine torque restriction to 150 Nm	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • Engine torque restriction to 150 Nm	• Locks in 1GR • The shifting between the gears of 1 - 2 can be performed • The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited
P0745	—		Line pressure is set to the maximum hydraulic pressure	—	Line pressure is set to the maximum hydraulic pressure
P0750 P0775 P0795 P2713 P2722 P2731 P2807	—		• Locks in 2GR • Locks in 3GR • Locks in 4GR • Locks in 5GR • Locks in 6GR • Locks in 7GR • Manual mode is prohibited	—	• Locks in 1GR • The shifting between the gears of 1 - 2 - 3 can be performed • The shifting between the gears of 3 - 4 - 5 can be performed • The shifting between the gears of 4 - 5 - 6 can be performed • The shifting between the gears of 1 - 2 - 3 - 4 - 5 - 6 can be performed • Manual mode is prohibited
P0780	—		• Locks in 3GR • Manual mode is prohibited • Engine torque restriction to 150 Nm	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited

DTC	Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P1705	—	• Downshift when accelerator pedal is depressed is prohibited • Upshift when accelerator pedal is released is prohibited • Manual mode is prohibited	—	• Downshift when accelerator pedal is depressed is prohibited • Upshift when accelerator pedal is released is prohibited • Manual mode is prohibited
P1730	—	• Locks in 1GR • Locks in 2GR • Locks in 3GR • Locks in 4GR • Locks in 5GR • Locks in 6GR • Locks in 7GR • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • Engine torque restriction to 150 Nm	• Locks in 1GR • The shifting between the gears of 2 - 3 - 4 can be performed • The shifting between the gears of 3 - 4 can be performed • The shifting between the gears of 4 - 5 - 6 can be performed • Manual mode is prohibited
P1815	Malfunction of both switches	Manual mode is prohibited	—	Manual mode is prohibited
P0720 and P1721	Between the gears of 1 - 2 - 3	Locks in 3GR	—	Locks in 3GR
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited	—	• Fix the gear at driving • Manual mode is prohibited
P175A	—	Clutch 1 solenoid valve OFF command (permanent connection of clutch 1)	—	Clutch 1 solenoid valve OFF command (permanent connection of clutch 1)
P1881 P1882 P1884 P1885 P1887 P1888 P188A P188C P188D U0101	—	Sub electric oil pump stop (idle stop not allowed)	—	Sub electric oil pump stop (idle stop not allowed)
P1116	—	Sub electric oil pump stop	—	Sub electric oil pump stop
U0100 U0300 U1000	Between the gears of 1 - 2 - 3	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited • Slip of clutch 2 is prohibited • Clutch 1 solenoid valve OFF command (permanent connection of clutch 1) • Sub electric oil pump stop • Large shift shock	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Line pressure is set to the maximum hydraulic pressure • Manual mode is prohibited • Clutch 1 solenoid valve OFF command (permanent connection of clutch 1) • Sub electric oil pump stop • Large shift shock
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited • Slip of clutch 2 is prohibited • Clutch 1 solenoid valve OFF command (permanent connection of clutch 1) • Sub electric oil pump stop • Large shift shock	—	
U1115	—	Sub electric oil pump stop (idle stop not allowed)	—	Sub electric oil pump stop (idle stop not allowed)

Protection Control

INFOID:0000000008143108

The TCM becomes the protection control status temporarily to protect the safety when the safety of TCM and transmission is lost. It automatically returns to the normal status if the safety is secured.
The TCM has the following protection control.

REVERSE INHIBIT CONTROL

Intercepts the torque transmission and shift to the neutral status if the selector lever is shifted to “R” position while the vehicle moves forward at the vehicle speed 10 km/h (7 MPH) or more.

Malfunction detection condition	Vehicle speed: 10 km/h (7 MPH) or more
Control at malfunction	Neutral
Normal return condition	• Vehicle speed: 8 km/h (5 MPH) or less and • Engine speed: 2,200 rpm or less
Vehicle behavior	• The torque transmission cannot be performed • There is a shock just before a vehicle stop

1ST ENGINE BRAKE PROTECTION CONTROL

Controls the engine brake so as not to make effective by turning the front brake solenoid output to OFF when each solenoid becomes the electricity pattern of 1st engine brake during driving at the vehicle speed 25 km/h or more in any positions other than “R” position and 1GR.

Malfunction detection condition	• Select lever and gear: Any position other than “R” position and 1GR and • Vehicle speed: More than 25 km/h (16 MPH)
Control at malfunction	Front brake solenoid output signal; OFF
Normal return condition	Other than detection condition of malfunction
Vehicle behavior	Does not exist

TCM HIGH TEMPERATURE PROTECTION CONTROL

Limit the accelerator opening and forcibly control the vehicle to the low torque driving when the electronic substrate in TCM reaches the high temperature.

Malfunction detection condition	TCM electronic substrate temperature • 145°C (293°F) and 120 seconds or • 150°C (302°F)
Control at malfunction	Accelerator opening: 0.5/8 or less
Normal return condition	• TCM electronic substrate temperature: Less than 140°C (284°F) and • Vehicle speed: 5 km/h (3 MPH) or less
Vehicle behavior	Accelerator opening: output torque of approximately 0.5/8

DTC Inspection Priority Chart

INFOID:0000000008143109

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	U0100 LOST COMM (ECM A)	TM-97
	U0101 LOST COMM (TCM)	TM-98
	U0300 CAN COMM DATA	TM-99
	U1000 CAN COMM CIRCUIT	TM-100
	U1115 CAN ERROR	TM-101
	P1116 CAN ERROR	TM-125

Priority	Detected items (DTC)	Reference
2	P1705 TP SENSOR	TM-126
	P1721 VEHICLE SPEED SIGNAL	TM-127
	P1815 M-MODE SWITCH	TM-134
	P1889 MOTOR SPEED	TM-149
3	P0705 T/M RANGE SWITCH A	TM-102
	P0710 FLUID TEMP SENSOR A	TM-103
	P0720 OUTPUT SPEED SENSOR	TM-106
	P0745 PC SOLENOID A	TM-120
	P0750 SHIFT SOLENOID A	TM-121
	P0775 PC SOLENOID B	TM-122
	P0795 PC SOLENOID C	TM-124
	P175A CL1 SOLENOID	TM-133
	P2713 PC SOLENOID D	TM-154
	P2722 PC SOLENOID E	TM-155
	P2731 PC SOLENOID F	TM-156
	P2807 PC SOLENOID G	TM-157
	P1881 TEMPERATURE SENSOR	TM-137
	P1882 TEMPERATURE SENSOR	TM-138
	P1884 SUB ELECTRIC OIL PUMP	TM-139
	P1885 SUB ELECTRIC OIL PUMP	TM-142
	P1887 SUB E-OIL PUMP RELAY	TM-144
	P1888 SUB E-OIL PUMP RELAY	TM-147
	P188A SUB E-OIL PUMP CURRENT CIRC	TM-151
	P188C SUB E-OIL PUMP TEMPERATURE	TM-152
	P188D SUB E-OIL PUMP FUNCTION	TM-153
4	P0729 6GR INCORRECT RATIO	TM-107
	P0730 INCORRECT GR RATIO	TM-109
	P0731 1GR INCORRECT RATIO	TM-110
	P0732 2GR INCORRECT RATIO	TM-112
	P0733 3GR INCORRECT RATIO	TM-114
	P0734 4GR INCORRECT RATIO	TM-116
	P0735 5GR INCORRECT RATIO	TM-118
	P0780 SHIFT	TM-123
	P1730 INTERLOCK	TM-129
	P1734 7GR INCORRECT RATIO	TM-131

DTC Index

INFOID:0000000008143110

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-79, "DTC Inspection Priority Chart".
- The IGN counter is indicated in Freeze frame data (FFD). Refer to TM-64, "CONSULT Function".

Items (CONSULT screen terms)	DTC*1		Reference
	MIL*2, "ENGINE" with CONSULT or GST	CONSULT only "TRANSMISSION"	
T/M RANGE SWITCH A	P0705	P0705	TM-102
FLUID TEMP SENSOR A	P0710	P0710	TM-103
INPUT SPEED SENSOR A	P0717	P0717	TM-105
OUTPUT SPEED SENSOR	P0720	P0720	TM-106
6GR INCORRECT RATIO	P0729	P0729	TM-107
INCORRECT GR RATIO	P0730	P0730	TM-109
1GR INCORRECT RATIO	P0731	P0731	TM-110
2GR INCORRECT RATIO	P0732	P0732	TM-112
3GR INCORRECT RATIO	P0733	P0733	TM-114
4GR INCORRECT RATIO	P0734	P0734	TM-116
5GR INCORRECT RATIO	P0735	P0735	TM-118
PC SOLENOID A	P0745	P0745	TM-120
SHIFT SOLENOID A	P0750	P0750	TM-121
PC SOLENOID B	P0775	P0775	TM-122
SHIFT	P0780	P0780	TM-123
PC SOLENOID C	P0795	P0795	TM-124
CAN ERROR	—	P1116	TM-125
TP SENSOR	—	P1705	TM-126
VEHICLE SPEED SIGNAL	—	P1721	TM-127
INTERLOCK	P1730	P1730	TM-129
7GR INCORRECT RATIO	P1734	P1734	TM-131
CL1 SOLENOID	—	P175A	TM-133
M-MODE SWITCH	—	P1815	TM-134
TEMPERATURE SENSOR	—	P1881	TM-137
TEMPERATURE SENSOR	—	P1882	TM-138
SUB ELECTRIC OIL PUMP	—	P1884	TM-139
SUB ELECTRIC OIL PUMP	—	P1885	TM-142
SUB E-OIL PUMP RELAY	—	P1887	TM-144
SUB E-OIL PUMP RELAY	—	P1888	TM-147
MOTOR SPEED	—	P1889	TM-149
SUB E-OIL PUMP CURRENT CIRC	—	P188A	TM-151
SUB E-OIL PUMP TEMPERATURE	—	P188C	TM-152
SUB E-OIL PUMP FUNCTION	—	P188D	TM-153
PC SOLENOID D	P2713	P2713	TM-154
PC SOLENOID E	P2722	P2722	TM-155
PC SOLENOID F	P2731	P2731	TM-156
PC SOLENOID G	P2807	P2807	TM-157
LOST COMM (ECM A)	U0100	U0100	TM-97
LOST COMM (TCM)	—	U0101	TM-98
CAN COMM DATA	—	U0300	TM-99
CAN COMM CIRCUIT	U1000	U1000	TM-100
CAN ERROR	—	U1115	TM-101

*1: These numbers are prescribed by SAE J2012.
*2: Refer to EC-52, "DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)".

Index of HPCM-detected DTC

INFOID:0000000008143111

When a DTC in the following table is detected by TCM, HPCM also detects a DTC.

DTC	DTC of HPCM
P0705, P0710, P0717, P0720, P0729, P0730, P0731, P0732, P0733, P0734, P0735, P0745, P0750, P0775, P0780, P0795, P1705, P1721, P1730, P1734, P175A, P1815, P1881, P1882, P1884, P1885, P1887, P1888, P1889, P188A, P188C, P188D, P2713, P2722, P2731, P2807, U0101, U1000, U1115	P3185
P1881, P1882, P1884, P1885, P1887, P1888, P188A, P188C, P188D, U0101, U1115	P3149
P175A	P175A

SUB ELECTRIC OIL PUMP INVERTER

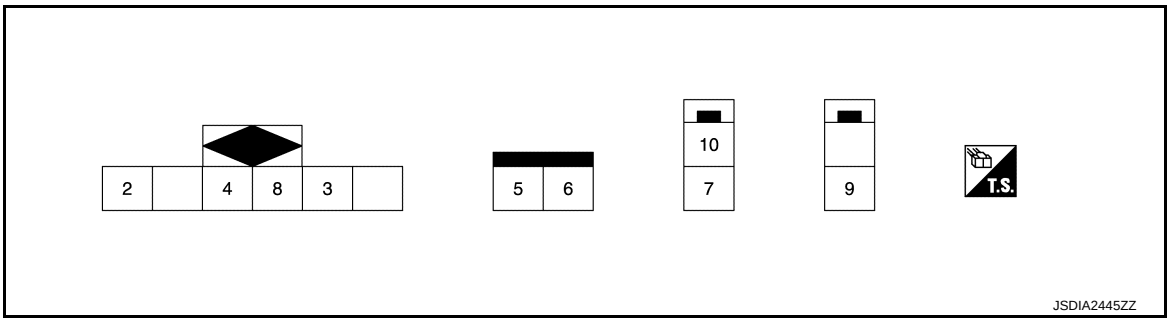
Reference Value

INFOID:0000000008143112

VALUES ON THE DIAGNOSIS TOOL

Sub electric oil pump inverter does not directly communicate with CONSULT. Therefore, data monitor items related to sub electric oil pump system are displayed on “TRANSMISSION”. Refer to TM-69, "Reference Value".

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
2 (R)	Ground	Power supply (IGN)	Input	Ignition switch ON	9 – 16 V
				Ignition switch OFF	0 V
3 (O)	Ground	Sub electric oil pump relay	Input	Ignition switch ON	1 V or less
				Ignition switch OFF	0 V
4 (L)	—	HEV system CAN-H	Input/ Output	—	—
5 (B/Y)	Ground	Ground	Output	Always	0 V
6 (R)	Ground	Power supply (BAT)	Input	Ignition switch ON	9 – 16 V
				Ignition switch OFF	0 V
7 (W)	Ground	V-phase	—	—	—
8 (P)	—	HEV system CAN-L	Input/ Output	—	—
9 (B)	Ground	W-phase	—	—	—
10 (R)	Ground	U-phase	—	—	—

Fail-safe

INFOID:0000000008143113

A malfunction signal is sent to TCM when sub electric oil pump system malfunctions. For fail-safe relating to sub-electric oil pump system, refer to TM-75, "Fail-Safe".

DTC Inspection Priority Chart

INFOID:0000000008143114

Sub electric oil pump inverter does not directly communicate with CONSULT. Therefore, DTC items related to sub electric oil pump system are displayed on “TRANSMISSION”. Refer to TM-79, "DTC Inspection Priority Chart".

DTC Index

INFOID:0000000008143115

Sub electric oil pump inverter does not directly communicate with CONSULT. Therefore, DTC items related to sub electric oil pump system are displayed on “TRANSMISSION”. Refer to TM-80, "DTC Index".

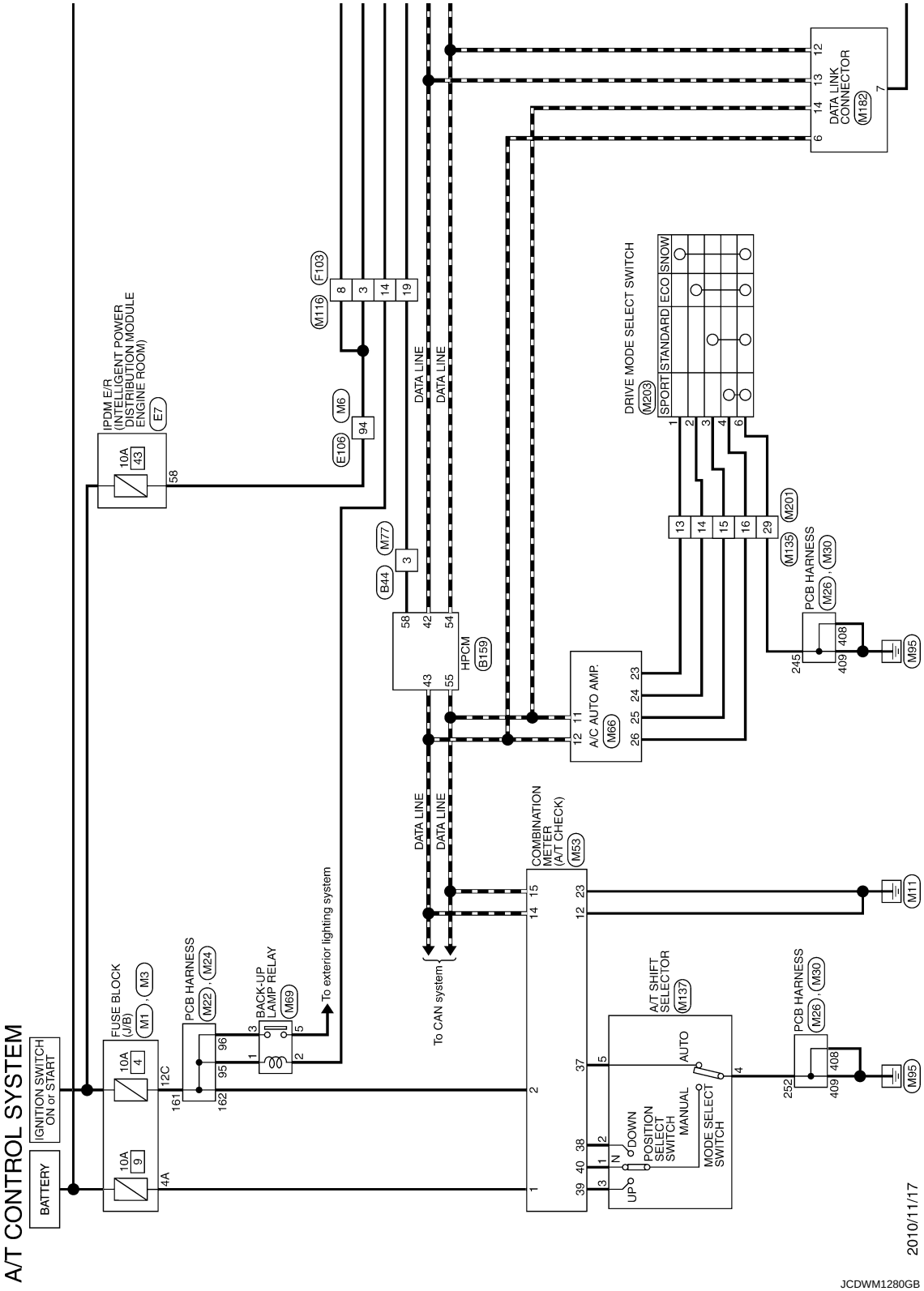
WIRING DIAGRAM

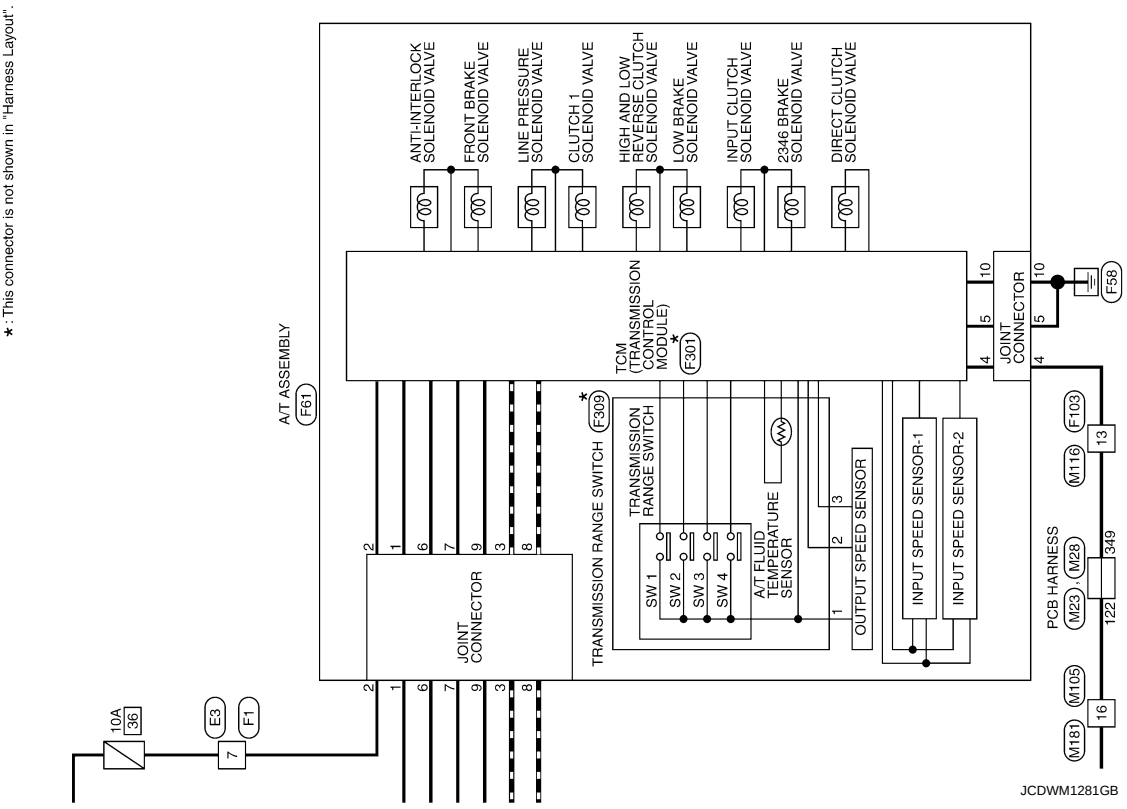
A/T CONTROL SYSTEM

Wiring Diagram

INFOID:0000000008143116

For connector terminal arrangements, harness layouts, and alphabets in a ⬡ (option abbreviation; if not described in wiring diagram), refer to GI-13, "Connector Information".



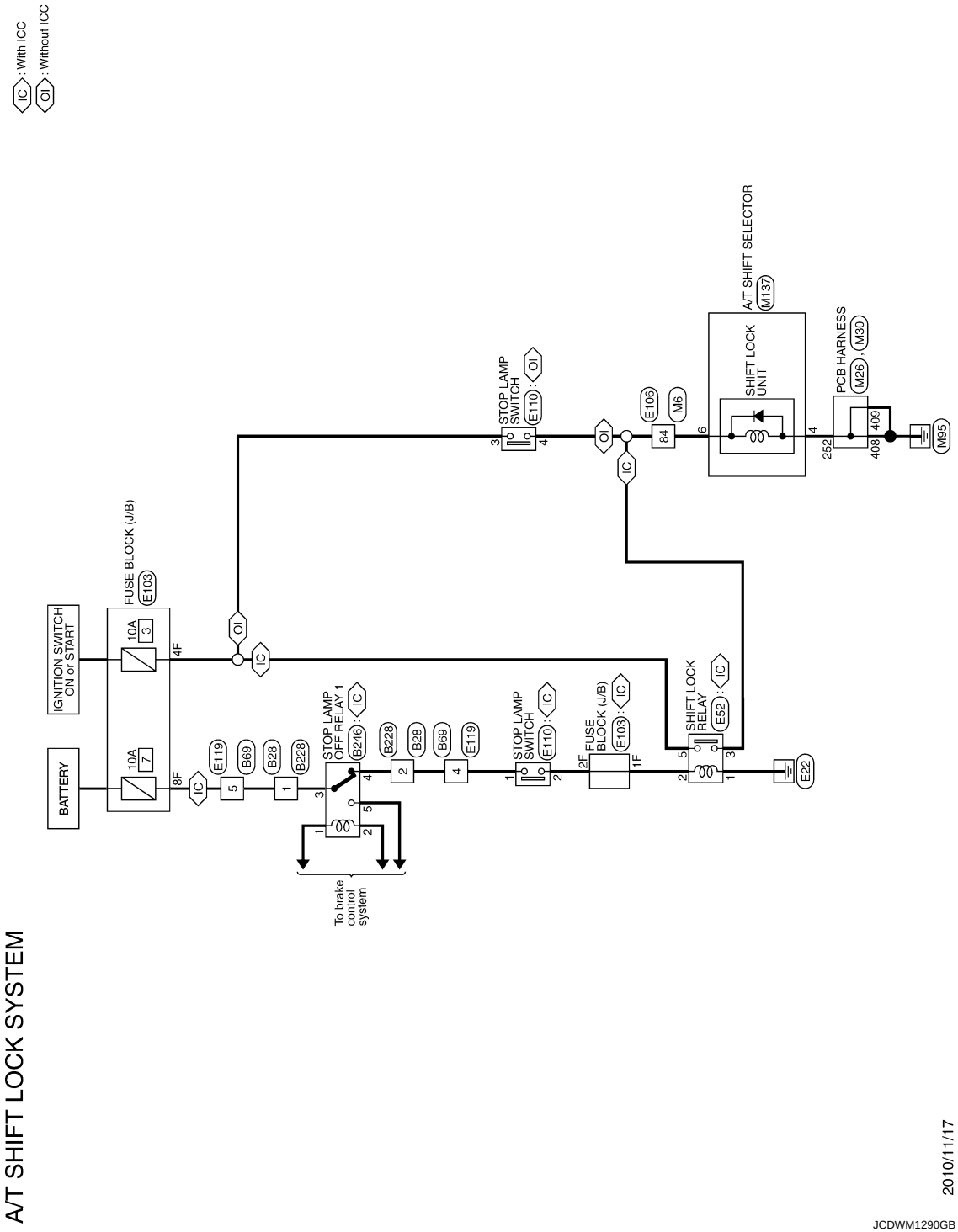

*: This connector is not shown in "Harness Layout".
A/T ASSEMBLY
F61
TCM (TRANSMISSION CONTROL MODULE)
F301
ANTI-INTERLOCK SOLENOID VALVE
FRONT BRAKE SOLENOID VALVE
LINE PRESSURE SOLENOID VALVE
CLUTCH 1 SOLENOID VALVE
HIGH AND LOW REVERSE CLUTCH SOLENOID VALVE
LOW BRAKE SOLENOID VALVE
INPUT CLUTCH SOLENOID VALVE
2346 BRAKE SOLENOID VALVE
DIRECT CLUTCH SOLENOID VALVE
JOINT CONNECTOR
JOINT CONNECTOR
TRANSMISSION RANGE SWITCH
F309
TRANSMISSION RANGE SWITCH
SW 1
SW 2
SW 3
SW 4
A/T FLUID TEMPERATURE SENSOR
OUTPUT SPEED SENSOR
INPUT SPEED SENSOR-1
INPUT SPEED SENSOR-2
F58
F103
M116
13
PCB HARNESS
M23
M28
349
122
M105
16
M181
10A
36
E3
7
F1
JCDWM1281GB

A/T SHIFT LOCK SYSTEM

Wiring Diagram

INFOID:0000000008143117

For connector terminal arrangements, harness layouts, and alphabets in a ⬡ (option abbreviation; if not described in wiring diagram), refer to GI-13, "Connector Information".

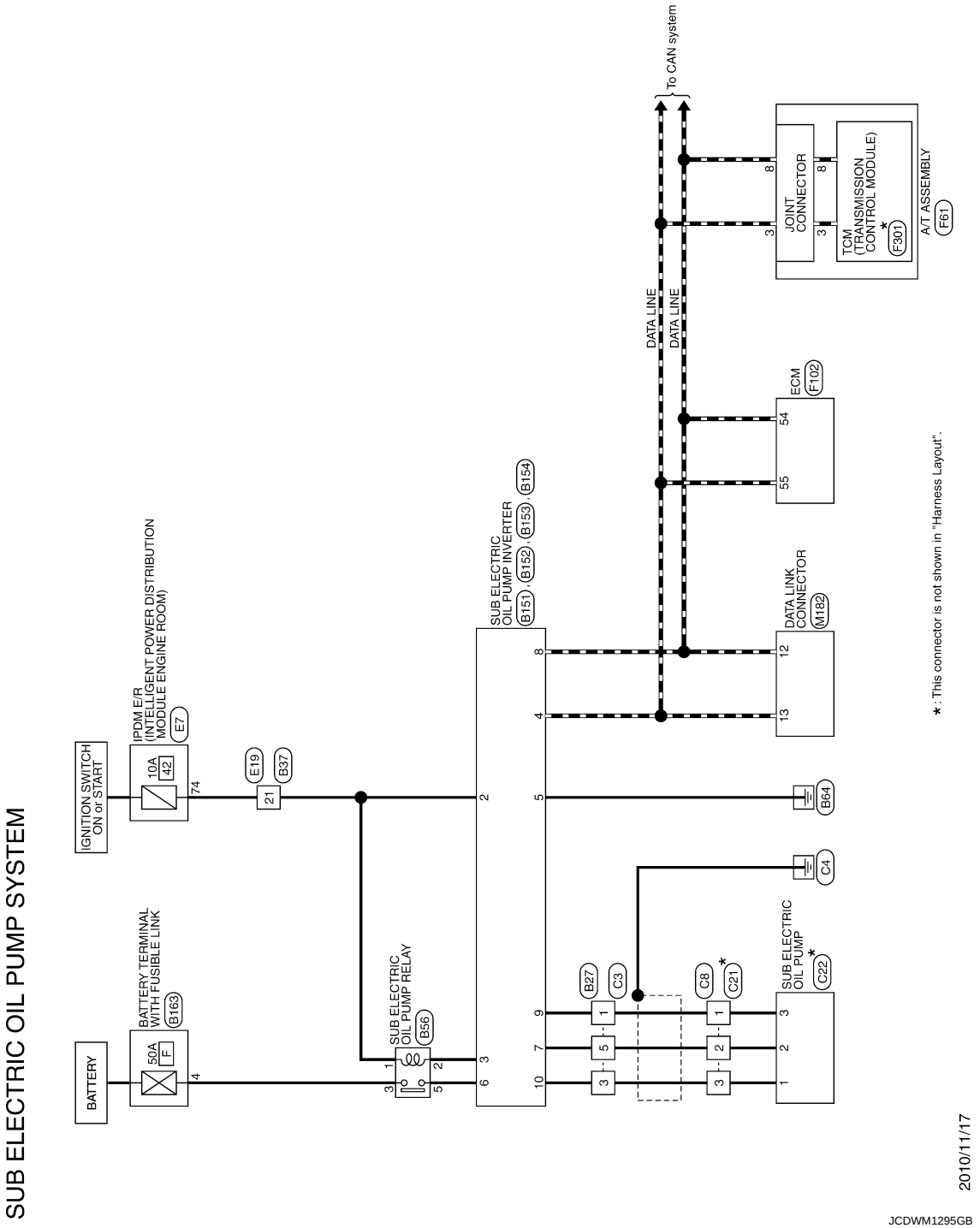


SUB ELECTRIC OIL PUMP SYSTEM

Wiring Diagram

INFOID:0000000008143118

For connector terminal arrangements, harness layouts, and alphabets in a ⬡ (option abbreviation; if not described in wiring diagram), refer to GI-13, "Connector Information".



BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Diagnosis Flow

INFOID:0000000008143119

1.OBTAIN INFORMATION ABOUT SYMPTOM

Refer to TM-90, "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. TM-173, "Symptom Table" is effective.

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-75, "Fail-Safe".
When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-90, "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-75, "Fail-Safe".
When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-90, "Question sheet".
Verify the relationship between the symptom and the conditions in which the malfunction described by the customer occurs.

>> GO TO 6.

5.PERFORM “DTC CONFIRMATION PROCEDURE”

Perform “DTC CONFIRMATION PROCEDURE” of the appropriate DTC to check if DTC is detected again.
Refer to TM-79, "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 7.
NO >> Check according to GI-49, "Intermittent Incident".

6.IDENTIFY MALFUNCTIONING SYSTEM WITH “DIAGNOSIS CHART BY SYMPTOM”

Use TM-173, "Symptom Table" from the symptom inspection result in step 4. Then identify where to start performing the diagnosis based on possible causes and symptoms.

>> GO TO 8.

7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the detected malfunctioning parts.
Reconnect parts or connector after repairing or replacing, and then erase DTC if necessary.

>> GO TO 8.

8. FINAL CHECK

Perform “DTC CONFIRMATION PROCEDURE” again to make sure that the repair is correctly performed.
Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 3 or 4.

Is DTC or malfunction symptom reproduced?

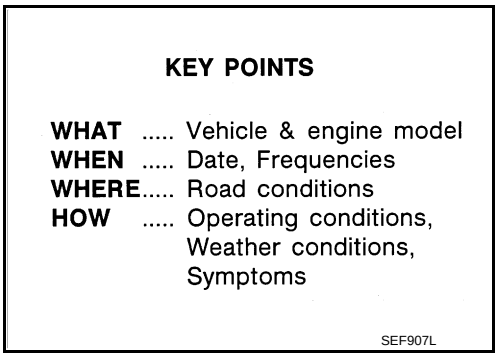
YES-1 >> DTC is reproduced: GO TO 5.
YES-2 >> Malfunction symptom is reproduced: GO TO 6.
NO >> Before delivering the vehicle to the customer, make sure that DTC is erased.

Question sheet

INFOID:0000000008143120

DESCRIPTION

There are many operating conditions that may cause a malfunction of the transmission parts. By understanding those conditions properly, a quick and exact diagnosis can be achieved.
In general, customers have their own criteria for a problem. Therefore, it is important to understand the symptom and status well enough by asking the customer about the concerns carefully. In order to systemize all the information for the diagnosis, prepare the question sheet referring to the question points.



WORKSHEET SAMPLE

Question Sheet					
Customer name MR/MS	Engine #		Manuf. Date		
	Incident Date		VIN		
	Model & Year		In Service Date		
	Trans.		Mileage		km / Mile
Symptoms	☐ Vehicle does not move (☐ Any position ☐ Particular position)				
	☐ No upshift (☐ 1GR → 2GR ☐ 2GR → 3GR ☐ 3GR → 4GR ☐ 4GR → 5GR ☐ 5GR → 6GR ☐ 6GR → 7GR)				
	☐ No downshift (☐ 7GR → 6GR ☐ 6GR → 5GR ☐ 5GR → 4GR ☐ 4GR → 3GR ☐ 3GR → 2GR ☐ 2GR → 1GR)				
	☐ Lock-up malfunction				
	☐ Shift point too high or too low				
	☐ Shift shock or slip				
	☐ Noise or vibration				
	☐ No kick down				
	☐ No pattern select				
	☐ Others				
Frequency	☐ All the time ☐ Under certain conditions ☐ Sometimes (times a day)				

Question Sheet						
Weather conditions		☐ Not affected				
	Weather	☐ Fine	☐ Clouding	☐ Raining	☐ Snowing	☐ Other ( )
	Temp.	☐ Hot	☐ Warm	☐ Cool	☐ Cold	☐ Temp. [Approx. °C (°F)]
	Humidity	☐ High	☐ Middle	☐ Low		
Transmission conditions		☐ Not affected				
		☐ Cold	☐ During warm-up		☐ After warm-up	
		☐ Engine speed (rpm)				
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						

A/T FLUID

Changing

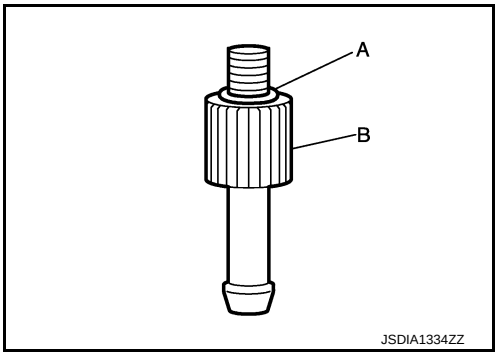
INFOID:0000000008143121

Recommended fluid and fluid capacity : Refer to TM-193, "General Specification".

CAUTION:
- **Use only Genuine NISSAN Matic S ATF. Never mix with other ATF.**
- **Using ATF other than Genuine NISSAN Matic S ATF will cause deterioration in driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.**
- **Be sure that ambient temperature is 0°C (32°F) or more when performing work.**
- **Always use shop paper. Never use shop cloth.**
- **When filling ATF, be careful not to scatter heat generating parts such as exhaust.**

1. Step 1

a. Install the O-ring (315268E000) (A) to the charging pipe (310811EA5A) (B).



2. Step 2

a. Park vehicle on level surface and set parking brake.

b. Shift the selector lever to “P” position.

c. Use CONSULT to check that the ATF temperature is 40°C (104°F) or less.

d. Lift up the vehicle.

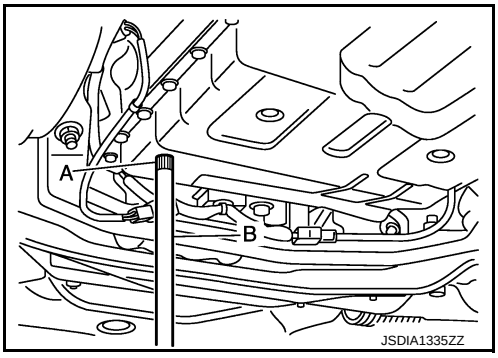
e. Remove engine under cover rear. Refer to EXT-28, "Exploded View".

f. Remove the drain plug from the oil pan, then drain the ATF.

g. When the ATF starts to drip, temporarily tighten the drain plug to the oil pan.
NOTE:
Never replace drain plug and drain plug gasket with new ones yet.

h. Remove overflow plug from oil pan. Refer to TM-182, "Exploded View".

i. Install the charging pipe (A) to the overflow plug hole.
CAUTION:
Tighten the charging pipe by hand.



j. Install the bucket pump hose (B) to the charging pipe.
CAUTION:
Insert the bucket pump hose all the way to the end of the charging pipe.

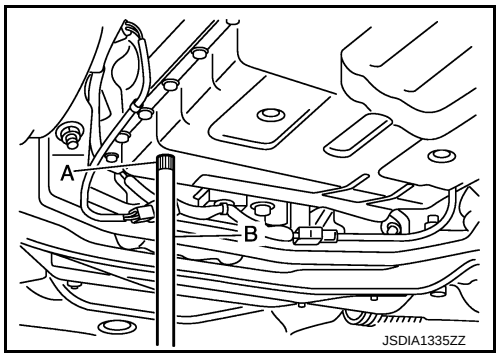
k. Fill approximately 3 liters (3-1/8 US qt, 2-5/8 lmp qt) of the ATF.

l. Remove the bucket pump hose and the charging pipe, then temporarily tighten the overflow plug to the oil pan.
CAUTION:
Quickly perform the procedure to avoid ATF leakage from the oil pan.
NOTE:
Never replace overflow plug with new ones yet.

m. Lift down the vehicle.

n. Set the vehicle to READY in inspection mode 5 state. Refer to TM-9, "Precautions Concerning On-board Servicing of Hybrid Systems".

o. Start the engine and wait for approximately 3 minutes.
p. Stop the engine.
3. Step 3
a. Repeat “Step 2”.
4. Final Step
a. Use CONSULT to check that the ATF temperature is 40°C (104°F) or less.
b. Lift up the vehicle.
c. Remove the drain plug from the oil pan, then drain the ATF.
d. When the ATF starts to drip, tighten the drain plug to the oil pan to the specified torque. Refer to TM-182, "Exploded View".
CAUTION:
Never reuse drain plug and drain plug gasket. Failure to do this may cause the leakage of ATF.
e. Remove overflow plug from oil pan.
f. Install the charging pipe (A) to the overflow plug hole.
CAUTION:
Tighten the charging pipe by hand.
g. Install the bucket pump hose (B) to the charging pipe.
CAUTION:
To prevent leakage of ATF, insert the bucket pump hose all the way to the end of the charging pipe.



h. Fill approximately 3 liters (3-1/8 US qt, 2-5/8 lmp qt) of the ATF.
i. Remove the bucket pump hose and the charging pipe, then temporarily tighten the overflow plug to the oil pan.
CAUTION:
Quickly perform the procedure to avoid ATF leakage from the oil pan.
NOTE:
Never replace overflow plug with new ones yet.
j. Lift down the vehicle.
k. For bleeding air from the sub electric oil pump, run the motor continuously for approximately 30 seconds. For motor running state, refer to HBC-20, "HYBRID CONTROL SYSTEM : System Description".
l. Turn ignition switch OFF.
m. Turn ignition switch ON.
n. Set the vehicle to inspection mode 5 state. Refer to TM-9, "Precautions Concerning On-board Servicing of Hybrid Systems".
o. Select “Data Monitor” in “TRANSMISSION” with CONSULT.
p. Select “ATF TEMP 1” and “SUB E-OP REVOLUTION”.
q. Check that the “ATF TEMP 1” value is 35°C (95°F) or less.
r. Set the vehicle to READY.
s. Shift the selector lever through each gear position. Leave selector lever in “P” position.
NOTE:
Hold the lever at each position for 5 seconds.
t. Lift up the vehicle when the ATF temperature reaches 35°C (95°F), and remove the overflow plug from the oil pan.
CAUTION:
- **Perform this work the vehicle idling.**
- **Check that the “Data Monitor” “SUB E-OP REVOLUTION” is 0 rpm.**

u. When the ATF starts to drip, tighten the overflow plug to the oil pan to the specified torque. Refer to TM-182, "Exploded View".
CAUTION:
Never reuse overflow plug. Failure to do this may cause the leakage of ATF.
v. Install engine under cover rear. Refer to EXT-28, "Exploded View".
w. Lift up the vehicle.
x. Turn ignition switch OFF.

Adjustment

INFOID:0000000008143122

Recommended fluid and fluid capacity : Refer to TM-193, "General Specification".

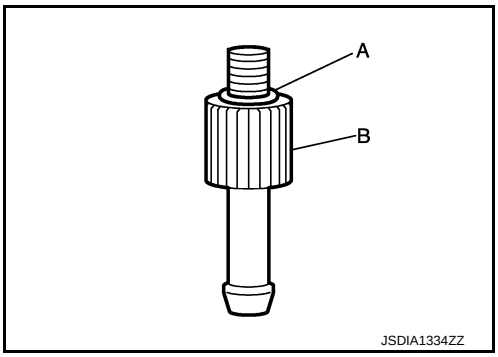
CAUTION:
- **Use only Genuine NISSAN Matic S ATF. Never mix with other ATF.**
- **Using ATF other than Genuine NISSAN Matic S ATF will cause deterioration in driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.**
- **Be sure that ambient temperature is 0°C (32°F) or more when performing work.**
- **Always use shop paper. Never use shop cloth.**
- **When filling ATF, be careful not to scatter heat generating parts such as exhaust.**
- **Always maintain the ATF temperature within between 30°C (86°F) and 40°C (104°F) while checking with CONSULT when the ATF level adjustment is performed.**

1. Park vehicle on level surface and set parking brake.
2. Shift the selector lever to “P” position.
3. When ATF is drained from the oil pan, fill the oil pan with ATF according to the following procedure before proceeding to Step 4.

a. Lift up the vehicle.

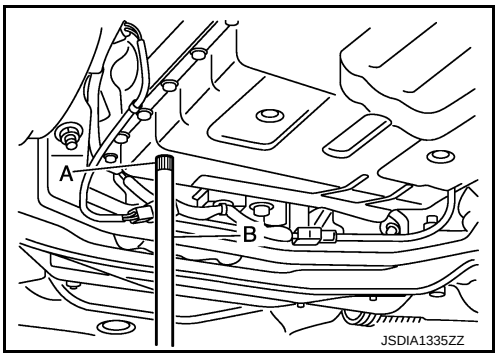
b. Install the O-ring (315268E000) (A) to the charging pipe (310811EA5A) (B).

c. Remove overflow plug from oil pan. Refer to TM-182, "Exploded View".



d. Install the charging pipe (A) to the overflow plug hole.
CAUTION:
Tighten the charging pipe by hand.

e. Install the bucket pump hose (B) to the charging pipe.
CAUTION:
To prevent leakage of ATF, insert the bucket pump hose all the way to the end of the charging pipe.



f. Fill approximately 3 liters (3-1/8 US qt, 2-5/8 lmp qt) of the ATF.

g. Remove the bucket pump hose and the charging pipe, then temporarily tighten the overflow plug to the oil pan.
CAUTION:
Quickly perform the procedure to avoid ATF leakage from the oil pan.
NOTE:
Never replace overflow plug with new ones yet.

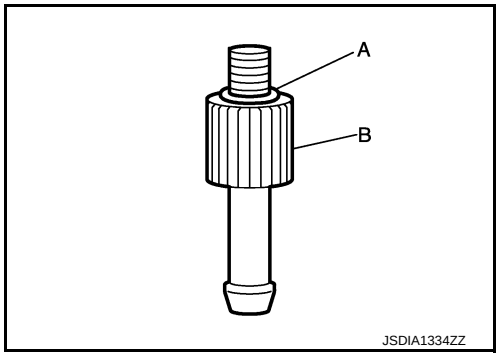
h. Lift down the vehicle.

i. For bleeding air from the sub electric oil pump, run the motor continuously for approximately 30 seconds. For motor running state, refer to HBC-20, "HYBRID CONTROL SYSTEM : System Description".

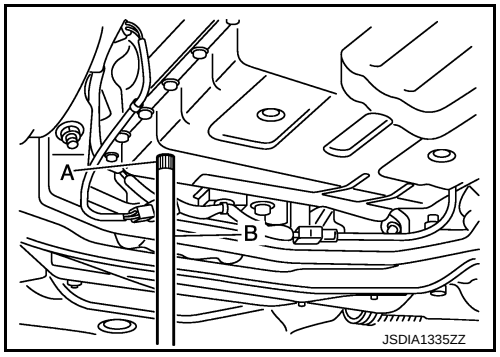
j. Turn ignition switch OFF.

4. Turn ignition switch ON.
5. Set the vehicle to inspection mode 5 state. Refer to TM-9, "Precautions Concerning On-board Servicing of Hybrid Systems".
6. Select “Data Monitor” in “TRANSMISSION” with CONSULT.
7. Select “ATF TEMP 1” and “SUB E-OP REVOLUTION”.
8. Check that the “ATF TEMP 1” value is 35°C (95°F) or less.

9. Set the vehicle to READY.
10. Shift the selector lever through each gear position. Leave selector lever in “P” position.
11. Lift up the vehicle.
12. Remove engine under cover rear.
13. Check the ATF leakage from transmission.
14. Install the O-ring (315268E000) (A) to the charging pipe (310811EA5A) (B).
15. Remove overflow plug from oil pan. Refer to TM-182, "Exploded View".



16. Install the charging pipe (A) to the overflow plug hole.
CAUTION:
Tighten the charging pipe by hand.
17. Install the bucket pump hose (B) to the charging pipe.
CAUTION:
To prevent leakage of ATF, insert the bucket pump hose all the way to the end of the charging pipe.
18. Fill approximately 0.5 liters (1/2 US qt, 1/2 lmp qt) of the ATF.
19. Check that the ATF leaks when removing the bucket pump hose. If the ATF does not leak, refill the ATF.
CAUTION:
- **Perform this work the vehicle idling.**
- **Check that the “Data Monitor” “SUB E-OP REVOLUTION” is 0 rpm.**



20. When the ATF starts to drip, remove the charging pipe.
21. Tighten the overflow plug to the oil pan to the specified torque. Refer to TM-182, "Exploded View".
CAUTION:
Never reuse drain plug and drain plug gasket. Failure to do this may cause the leakage of ATF.
22. Install engine under cover rear.
23. Lift down the vehicle.
24. Turn ignition switch OFF.

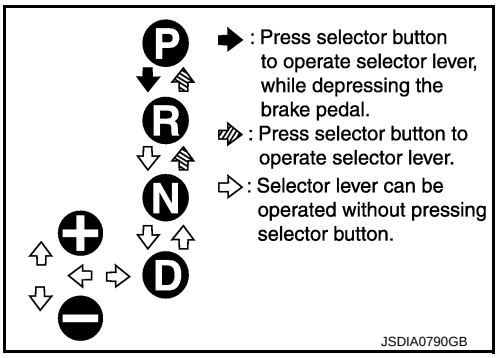
A/T POSITION

Inspection and Adjustment

INFOID:0000000008143123

INSPECTION

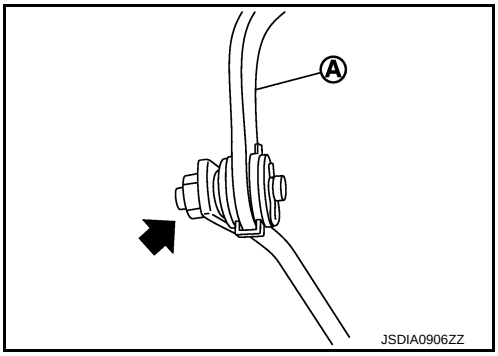
1. Place selector lever in “P” position, and turn ignition switch ON (engine stop).
2. Check that selector lever can be shifted to other than “P” position when brake pedal is depressed. Also check that selector lever can be shifted from “P” position only when brake pedal is depressed.
3. Shift the selector lever and check for excessive effort, sticking, noise or rattle.
4. Confirm that the selector lever stops at each position by feeling the engagement when it is moved through all the positions. Check whether or not the actual position the selector lever matches the position shown by the shift position indicator and the A/T body.
5. The method of operating the lever to individual positions correctly is shown in the figure.
6. When selector button is pressed in “P”, “R”, or “N” position without applying forward/backward force to selector lever, check button operation for sticking.
7. Confirm that the back-up lamps illuminate only when lever is placed in the “R” position. Confirm that the back-up lamps do not illuminate when selector lever is pushed against “R” position in the “P” or “N” position.
8. Confirm that the engine can only be started with the selector lever in the “P” and “N” positions. (With selector lever in the “P” position, engine can be started even when selector lever is moved forward and backward.)



9. Make sure that A/T is locked completely in “P” position.
10. DS mode must be indicated on the combination meter when the selector lever is shifted to the manual shift gate. When the selector lever is shifted to the “+” or “–” side in the DS mode, manual mode should be indicated on the combination meter.
    In addition, a set shift position must be changed when the selector lever is shifted to the “+” or “–” side in the manual mode. (Only while driving.)

ADJUSTMENT

1. Loosen nut (⬅).
2. Place manual lever and selector lever in “P” position.
3. While pressing lower lever (A) toward rear of vehicle (in “P” position direction), tighten nut to specified torque. Refer to TM-179, "Exploded View".
   CAUTION:
   Be careful not to touch the control rod while pressing lower lever of A/T shift selector assembly.
   NOTE:
   Press lower lever of A/T shift selector assembly with a force of 9.8 N (approximately 1 kg, 2.2 lb).



DTC/CIRCUIT DIAGNOSIS

U0100 LOST COMMUNICATION (ECM A)

DTC Logic

INFOID:0000000008478913

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible causes
U0100	Lost Communication With ECM/PCM A	When the ignition switch is ON, TCM is unable to receive the CAN communications signal from ECM continuously for 2 seconds or more.	• ECM • Harness or connector (CAN communication line is open or shorted)

DTC CONFIRMATION PROCEDURE

1. PREPARATION BEFORE WORK

If another “DTC CONFIRMATION PROCEDURE” occurs just before, turn ignition 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. Start the engine and wait for at least 5 seconds.
2. Check DTC.

With GST
Follow the procedure “With CONSULT”.

Is “U0100” detected?

YES >> Go to TM-97, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008478914

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

U0101 LOST COMM (TCM)

DTC Logic

INFOID:0000000008143124

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
U0101	Sub Electric Oil Pump Inverter Error	When sub electric oil pump inverter cannot receive signal from TCM via HEV system CAN.	• TCM • Sub electric oil pump inverter
		When TCM cannot transmit signal to sub electric oil pump inverter via HEV system CAN.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

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

Is “U0101” detected?

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

Diagnosis Procedure

INFOID:0000000008143125

1.CHECK DTC OF HPCM

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

Is “U0101” detected?

YES >> Replace the A/T assembly due to malfunction in the TCM. Refer to TM-190, "Removal and Installation".
NO >> Replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".

U0300 CAN COMMUNICATION DATA

Description

INFOID:0000000008143126

The amount of data transmitted from each control unit is read.

DTC Logic

INFOID:0000000008143127

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
U0300	Internal Control Module Software Incompatibility	When the amount of data transmitted from each control unit is smaller than the specified amount.	Control units other than TCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Turn ignition switch ON and wait 2 seconds or more.
2. Check DTC.

Is “U0300” detected?

YES >> Go to TM-99, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143128

1.CHECK CONTROL UNIT

Check the number of control units replaced before detecting “U0300”.

Is the number of replaced control units one?

YES >> Since the replaced control unit may be out of specifications, check the part number and specifications.
NO >> GO TO 2.

2.INSPECTION CONTROL UNIT

With CONSULT
1. Remove one of the replaced control units.
2. Install the previous control unit mounted before replacement.
3. Turn ignition switch ON and wait 2 seconds or more.
4. Check DTC.

Is “U0300” detected?

YES >> Turn OFF the ignition switch to check the other control units in the same method.
NO >> Since the removed control unit may be out of specifications, check the part number and specifications.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000008143129

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

DTC Logic

INFOID:0000000008143130

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
U1000	CAN Communication Line	TCM cannot transmit or receive CAN communication signals continuously for 2 seconds or more when the ignition switch is ON.	• Harness or connectors (CAN communication line is open or shorted.) • TCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Start the engine.
2. Run engine for at least 2 consecutive seconds at idle speed.
3. Check DTC.

With GST
Follow the procedure “With CONSULT”

Is “U1000” detected?

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

Diagnosis Procedure

INFOID:0000000008143131

Go to LAN-19, "Trouble Diagnosis Flow Chart".

U1115 CAN ERROR

DTC Logic

INFOID:0000000008143132

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
U1115	TCM Error	When TCM cannot receive signal from sub electric oil pump inverter via HEV system CAN.	• TCM • Sub electric oil pump inverter
		When sub electric oil pump inverter cannot transmit signal to sub electric oil pump inverter via HEV system CAN.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

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

Is “U1115” detected?

YES >> Go to TM-101, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143133

1.CHECK DTC OF TCM

With CONSULT
1. Turn ignition switch ON.
2. Check DTC.

Are “U1000” and “U1115” detected?

YES >> Replace the A/T assembly due to malfunction in the TCM. Refer to TM-190, "Removal and Installation".
NO >> Replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".

P0705 TRANSMISSION RANGE SWITCH A

DTC Logic

INFOID:0000000008143134

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0705	Transmission Range Switch A Circuit (PRNDL Input)	The TCM detects an ON/OFF combination pattern other than that of the transmission range switches 1, 2, 3 and 4.	• Harness or connectors (Transmission range switches 1, 2, 3, 4 and TCM circuit is open or shorted.) • Transmission range switches 1, 2, 3 and 4

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “ACCELE POSI” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Shift the selector lever throughout the entire shift position from “P” to “D”. (Hold the selector lever at each position for 2 seconds or more)
4. Drive vehicle and maintain the following conditions for 2 seconds or more.

ACCELE POSI	: More than 1.0/8
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

5. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0705” detected?

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

Diagnosis Procedure

INFOID:0000000008143135

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

DTC Logic

INFOID:0000000008143136

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0710	Transmission Fluid Temperature Sensor A Circuit	TCM judges that the A/T fluid temperature is -40 °C (-40 °F) or less continuously for 5 seconds while driving at 10 km/h (7 MPH) or more.	• Harness or connectors (Sensor circuit is open.) • A/T fluid temperature sensor
		TCM judges that the A/T fluid temperature is 180 °C (356 °F) or more continuously for 5 seconds.	• Harness or connectors (Sensor circuit is short.) • A/T fluid temperature sensor
		TCM judges the following conditions while driving the vehicle at 10 km/h (7 MPH) or more: • The time required for A/T fluid temperature to rise by 1 °C (1.8 °F) exceeds 14 minutes when A/T fluid temperature is -20 °C (-4 °F) or less. • The time required for A/T fluid temperature to rise by 1 °C (1.8 °F) exceeds 7 minutes when A/T fluid temperature is between -19 °C (-2 °F) and 0 °C (32 °F). • The time required for A/T fluid temperature to rise by 1 °C (1.8 °F) exceeds 4 minutes when A/T fluid temperature is between 1 °C (34 °F) and 20 °C (68 °F).	• Harness or connectors (Sensor circuit is stuck.) • A/T fluid temperature sensor

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “SLCT LVR POSI” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 14 minutes or more.

SLCT LVR POSI	: D
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0710” detected?

YES >> Go to TM-103, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143137

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".

NO >> Repair or replace damaged parts.

P0717 INPUT SPEED SENSOR A

DTC Logic

INFOID:0000000008143138

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0717	Input/Turbine Speed Sensor A Circuit No Signal	The revolution of input speed sensor 1 and/or 2 is 270 rpm or less.	• Harness or connectors (Sensor circuit is open.) • Input speed sensor 1 and/or 2

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “SLCT LVR POSI”, “GEAR”, “VHCL/S SE-A/T”, “CLSD THL POS” and “ENGINE SPEED” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.
   CAUTION:
   Keep the same gear position.
   NOTE:
   Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

SLCT LVR POSI	: D
GEAR	: 2nd, 3rd, 4th, 5th or 6th
VHCL/S SE-A/T	: More than 40 km/h (25 MPH)
CLSD THL POS	: OFF
ENGINE SPEED	: More than 1,500 rpm

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0717” detected?

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

Diagnosis Procedure

INFOID:0000000008143139

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0720 OUTPUT SPEED SENSOR

DTC Logic

INFOID:0000000008143140

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0720	Output Speed Sensor Circuit	• The vehicle speed detected by the output speed sensor is 5 km/h (3 MPH) or less when the vehicle speed transmitted from the combination meter to TCM is 20 km/h (13 MPH) or more. (Only when starts after the ignition switch is turned ON.) • The vehicle speed transmitted from the combination meter to TCM does not decrease despite the 36 km/h (23 MPH) or more of deceleration in vehicle speed detected by the output speed sensor. when the vehicle speed detected by the output speed sensor is 36 km/h (23 MPH) or more and the vehicle speed transmitted from the combination meter to TCM is 24 km/h (15 MPH) or more.	• Harness or connectors (Sensor circuit is open.) • Output speed sensor

DTC CONFIRMATION PROCEDURE

CAUTION:

- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “ESTM VSP SIG” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.

RANGE	: D
ACCECLE POSI	: More than 1.0/8
ESTM VSP SIG	: 40 km/h (25 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0720” detected?

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

Diagnosis Procedure

INFOID:0000000008143141

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0729 6GR INCORRECT RATIO

Description

INFOID:0000000008143142

This malfunction is detected when the A/T does not shift into 6GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000008143143

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0729	Gear 6 Incorrect Ratio	The gear ratio is: • 0.923 or more • 0.819 or less	• Input clutch solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Front brake solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Anti-interlock solenoid valve • Each clutch and brake • Output speed sensor • Input speed sensor 1, 2 • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-108, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCEDURE".**
- **Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK ATF TEMPERATURE

With CONSULT
1. Start the engine.
2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
3. Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST
1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.
NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3. CHECK SYMPTOM (PART 1)

With CONSULT
1. Select "6TH GR FNCTN P0729" in "DTC Work Support" in "TRANSMISSION".
2. Drive vehicle with manual mode and maintain the following conditions.

GEAR	: 6th
ACCELE POSI	: 0.7/8 or more
VEHICLE SPEED	: 10 km/h (7 MPH) or more

3. Keep the current driving status for 2 seconds or more if CONSULT screen changes from “OUT OF CONDITION” to “TESTING”.
CAUTION:
When “TESTING” is not indicated on CONSULT for a long time, check “Self Diagnostic Results” in “TRANSMISSION”. When a DTC other than “P0729” is detected, check the DTC. Refer to TM-80, "DTC Index".

With GST
1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever	: “M” position
Gear position	: 6th
Accelerator pedal opening	: 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more

2. Check DTC.

Is “OUT OF CONDITION”, “STOP VEHICLE” or “COMPLETED RESULT NG” displayed? / Is “P0729” detected?

YES-1 (OUT OF CONDITION)>>Perform “Step 3” again.
YES-2 (STOP VEHICLE)>>GO TO 4.
YES-3 (COMPLETED RESULT NG)>>Go to TM-108, "Diagnosis Procedure".
YES-4 (“P0729” is detected)>>Go to TM-108, "Diagnosis Procedure".
NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.
2. Drive vehicle in “D” position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143144

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0730 INCORRECT GEAR RATIO

Description

INFOID:0000000008143145

- TCM detects a high-rpm state of the under drive sun gear.
- The number of revolutions of the under drive sun gear is calculated with the input speed sensor 1 and 2.

DTC Logic

INFOID:0000000008143146

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0730	Incorrect Gear Ratio	The revolution of under drive sun gear is 8,000 rpm or more. **NOTE:** Not detected when in “P” or “N” position and during a shift to “P” or “N” position.	• 2346 brake solenoid valve • Front brake solenoid valve • Input speed sensor 2

DTC CONFIRMATION PROCEDURE

CAUTION:

- **“TM-109, "Diagnosis Procedure"” must be performed before starting “DTC CONFIRMATION PROCEDURE”.**
- **Never perform “DTC CONFIRMATION PROCEDURE” before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “Self Diagnostic Results” in “ENGINE”.
3. Drive vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
   Hold the accelerator pedal as steady as possible.

ENGINE SPEED	Same value as the Freeze Frame Data.
VEHICLE SPEED	Same value as the Freeze Frame Data.
B/FUEL SCHDL	Same value as the Freeze Frame Data.

With GST

Follow the procedure “With CONSULT”.

Is “P0730” detected?

YES >> Go to TM-109, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143147

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0731 1GR INCORRECT RATIO

Description

INFOID:0000000008143148

This malfunction is detected when the A/T does not shift into 1GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000008143149

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0731	Gear 1 Incorrect Ratio	The gear ratio is: • 5.069 or more • 4.496 or less	• Input clutch solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Front brake solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Anti-interlock solenoid valve • Each clutch and brake • Output speed sensor • Input speed sensor 1, 2 • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-111, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCEDURE".**
- **Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK ATF TEMPERATURE

With CONSULT

1. Start the engine.
2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
3. Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.
NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3. CHECK SYMPTOM (PART 1)

With CONSULT

1. Select "1ST GR FNCTN P0731" in "DTC Work Support" in "TRANSMISSION".
2. Drive vehicle with manual mode and maintain the following conditions.

GEAR	: 1st
ACCELE POSI	: 0.7/8 or more
VEHICLE SPEED	: 10 km/h (7 MPH) or more

3. Keep the current driving status for 2 seconds or more if CONSULT screen changes from “OUT OF CONDITION” to “TESTING”.

CAUTION:
When “TESTING” is not indicated on CONSULT for a long time, check “Self Diagnostic Results” in “TRANSMISSION”. When a DTC other than “P0731” is detected, check the DTC. Refer to TM-80, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever	: “M” position
Gear position	: 1st
Accelerator pedal opening	: 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more

2. Check DTC.

Is “OUT OF CONDITION”, “STOP VEHICLE” or “COMPLETED RESULT NG” displayed? / Is “P0731” detected?

YES-1 (OUT OF CONDITION)>>Perform “Step 3” again.
YES-2 (STOP VEHICLE)>>GO TO 4.
YES-3 (COMPLETED RESULT NG)>>Go to TM-111, "Diagnosis Procedure".
YES-4 (“P0731” is detected)>>Go to TM-111, "Diagnosis Procedure".
NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.
2. Drive vehicle in “D” position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143150

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0732 2GR INCORRECT RATIO

Description

INFOID:0000000008143151

This malfunction is detected when the A/T does not shift into 2GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000008143152

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0732	Gear 2 Incorrect Ratio	The gear ratio is: • 3.289 or more • 2.917 or less	• Input clutch solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Front brake solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Anti-interlock solenoid valve • Each clutch and brake • Output speed sensor • Input speed sensor 1, 2 • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-113, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCEDURE".**
- **Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK ATF TEMPERATURE

With CONSULT

1. Start the engine.
2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
3. Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.
NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3. CHECK SYMPTOM (PART 1)

With CONSULT

1. Select "2ND GR FNCTN P0732" in "DTC Work Support" in "TRANSMISSION".
2. Drive vehicle with manual mode and maintain the following conditions.

GEAR	: 2nd
ACCELE POSI	: 0.7/8 or more
VEHICLE SPEED	: 10 km/h (7 MPH) or more

3. Keep the current driving status for 2 seconds or more if CONSULT screen changes from “OUT OF CONDITION” to “TESTING”.

CAUTION:

When “TESTING” is not indicated on CONSULT for a long time, check “Self Diagnostic Results” in “TRANSMISSION”. When a DTC other than “P0732” is detected, check the DTC. Refer to TM-80, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever	: “M” position
Gear position	: 2nd
Accelerator pedal opening	: 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more

2. Check DTC.

Is “OUT OF CONDITION”, “STOP VEHICLE” or “COMPLETED RESULT NG” displayed? / Is “P0732” detected?

YES-1 (OUT OF CONDITION)>>Perform “Step 3” again.
YES-2 (STOP VEHICLE)>>GO TO 4.
YES-3 (COMPLETED RESULT NG)>>Go to TM-113, "Diagnosis Procedure".
YES-4 (“P0732” is detected)>>Go to TM-113, "Diagnosis Procedure".
NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.
2. Drive vehicle in “D” position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143153

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0733 3GR INCORRECT RATIO

Description

INFOID:0000000008143154

This malfunction is detected when the A/T does not shift into 3GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000008143155

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0733	Gear 3 Incorrect Ratio	The gear ratio is: • 2.103 or more • 1.865 or less	• Input clutch solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Front brake solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Anti-interlock solenoid valve • Each clutch and brake • Output speed sensor • Input speed sensor 1, 2 • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-115, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCEDURE".**
- **Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK ATF TEMPERATURE

With CONSULT

1. Start the engine.
2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
3. Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.
NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3. CHECK SYMPTOM (PART 1)

With CONSULT

1. Select "3RD GR FNCTN P0733" in "DTC Work Support" in "TRANSMISSION".
2. Drive vehicle with manual mode and maintain the following conditions.

GEAR	: 3rd
ACCELE POSI	: 0.7/8 or more
VEHICLE SPEED	: 10 km/h (7 MPH) or more

3. Keep the current driving status for 2 seconds or more if CONSULT screen changes from “OUT OF CONDITION” to “TESTING”.

CAUTION:
When “TESTING” is not indicated on CONSULT for a long time, check “Self Diagnostic Results” in “TRANSMISSION”. When a DTC other than “P0733” is detected, check the DTC. Refer to TM-80, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever	: “M” position
Gear position	: 3rd
Accelerator pedal opening	: 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more

2. Check DTC.

Is “OUT OF CONDITION”, “STOP VEHICLE” or “COMPLETED RESULT NG” displayed? / Is “P0733” detected?

YES-1 (OUT OF CONDITION)>>Perform “Step 3” again.
YES-2 (STOP VEHICLE)>>GO TO 4.
YES-3 (COMPLETED RESULT NG)>>Go to TM-115, "Diagnosis Procedure".
YES-4 (“P0733” is detected)>>Go to TM-115, "Diagnosis Procedure".
NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.
2. Drive vehicle in “D” position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143156

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0734 4GR INCORRECT RATIO

Description

INFOID:0000000008143157

This malfunction is detected when the A/T does not shift into 4GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000008143158

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0734	Gear 4 Incorrect Ratio	The gear ratio is: • 1.453 or more • 1.289 or less	• Input clutch solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Front brake solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Anti-interlock solenoid valve • Each clutch and brake • Output speed sensor • Input speed sensor 1, 2 • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-117, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCEDURE".**
- **Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK ATF TEMPERATURE

With CONSULT

1. Start the engine.
2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
3. Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.
NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3. CHECK SYMPTOM (PART 1)

With CONSULT

1. Select "4TH GR FNCTN P0734" in "DTC Work Support" in "TRANSMISSION".
2. Drive vehicle with manual mode and maintain the following conditions.

GEAR	: 4th
ACCELE POSI	: 0.7/8 or more
VEHICLE SPEED	: 10 km/h (7 MPH) or more

3. Keep the current driving status for 2 seconds or more if CONSULT screen changes from “OUT OF CONDITION” to “TESTING”.

CAUTION:
When “TESTING” is not indicated on CONSULT for a long time, check “Self Diagnostic Results” in “TRANSMISSION”. When a DTC other than “P0734” is detected, check the DTC. Refer to TM-80, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever	: “M” position
Gear position	: 4th
Accelerator pedal opening	: 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more

2. Check DTC.

Is “OUT OF CONDITION”, “STOP VEHICLE” or “COMPLETED RESULT NG” displayed? / Is “P0734” detected?

YES-1 (OUT OF CONDITION)>>Perform “Step 3” again.
YES-2 (STOP VEHICLE)>>GO TO 4.
YES-3 (COMPLETED RESULT NG)>>Go to TM-117, "Diagnosis Procedure".
YES-4 (“P0734” is detected)>>Go to TM-117, "Diagnosis Procedure".
NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.
2. Drive vehicle in “D” position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143159

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0735 5GR INCORRECT RATIO

Description

INFOID:0000000008143160

This malfunction is detected when the A/T does not shift into 5GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000008143161

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0735	Gear 5 Incorrect Circuit	The gear ratio is: • 1.060 or more • 0.940 or less	• Input clutch solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Front brake solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Anti-interlock solenoid valve • Each clutch and brake • Output speed sensor • Input speed sensor 1, 2 • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-119, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCEDURE".**
- **Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK ATF TEMPERATURE

With CONSULT

1. Start the engine.
2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
3. Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.
NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3. CHECK SYMPTOM (PART 1)

With CONSULT

1. Select "5TH GR FNCTN P0735" in "DTC Work Support" in "TRANSMISSION".
2. Drive vehicle with manual mode and maintain the following conditions.

GEAR	: 5th
ACCELE POSI	: 0.7/8 or more
VEHICLE SPEED	: 10 km/h (7 MPH) or more

3. Keep the current driving status for 2 seconds or more if CONSULT screen changes from “OUT OF CONDITION” to “TESTING”.

CAUTION:

When “TESTING” is not indicated on CONSULT for a long time, check “Self Diagnostic Results” in “TRANSMISSION”. When a DTC other than “P0735” is detected, check the DTC. Refer to TM-80, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever	: “M” position
Gear position	: 5th
Accelerator pedal opening	: 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more

2. Check DTC.

Is “OUT OF CONDITION”, “STOP VEHICLE” or “COMPLETED RESULT NG” displayed? / Is “P0735” detected?

YES-1 (OUT OF CONDITION)>>Perform “Step 3” again.
YES-2 (STOP VEHICLE)>>GO TO 4.
YES-3 (COMPLETED RESULT NG)>>Go to TM-119, "Diagnosis Procedure".
YES-4 (“P0735” is detected)>>Go to TM-119, "Diagnosis Procedure".
NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.
2. Drive vehicle in “D” position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143162

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0745 PRESSURE CONTROL SOLENOID A

DTC Logic

INFOID:0000000008143163

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0745	Pressure Control Solenoid A	The line pressure solenoid valve monitor value is 0.2 A or less when the line pressure solenoid valve command value is more than 0.75 A.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • Line pressure solenoid valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Start the engine.
2. Select “BATTERY VOLT” and “SLCT LVR POSI” in “Data Monitor” in “TRANSMISSION”.
3. Shift the selector lever to “N” position.
4. Maintain the following conditions for 5 seconds or more.

BATTERY VOLT	: 9 V or more
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

5. Check DTC.

With GST
Follow the procedure “With CONSULT”.

Is “P0745” detected?

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

Diagnosis Procedure

INFOID:0000000008143164

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0750 SHIFT SOLENOID A

DTC Logic

INFOID:0000000008143165

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0750	Shift Solenoid A	• The anti-interlock solenoid valve monitor value is ON when the anti-interlock solenoid valve command value is OFF. • The anti-interlock solenoid valve monitor value is OFF when the anti-interlock solenoid valve command value is ON.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • Anti-interlock solenoid valve

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “BATTERY VOLT”, “MANU MODE SW”, “GEAR” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT	: 9 V or more
MANU MODE SW	: ON
GEAR	: 1st
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0750” detected?

YES >> Go to TM-121, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143166

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0775 PRESSURE CONTROL SOLENOID B

DTC Logic

INFOID:0000000008143167

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0775	Pressure Control Solenoid B	The input clutch solenoid valve monitor value is 0.2 A or less when the input clutch solenoid valve command value is more than 0.75 A.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • Input clutch solenoid valve

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “BATTERY VOLT”, “MANU MODE SW”, “GEAR” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT	: 9 V or more
MANU MODE SW	: ON
GEAR	: 1st
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0775” detected?

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

Diagnosis Procedure

INFOID:0000000008143168

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0780 SHIFT

Description

INFOID:0000000008143169

The TCM detects the malfunction of low brake solenoid valve. This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000008143170

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0780	Shift Error	• When shifting from 3GR to 4GR with the selector lever in “D” position, the gear ratio does not shift to 1.371 (gear ratio of 4th). • When shifting from 6GR to 7GR, the engine speed exceeds the prescribed speed.	• Anti-interlock solenoid valve • Low brake solenoid valve • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

CAUTION:

- **“TM-123, "Diagnosis Procedure"” must be performed before starting “DTC CONFIRMATION PROCEDURE”.**
- **Never perform “DTC CONFIRMATION PROCEDURE” before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “SLCT LVR POSI”, “ACCELE POSI” and “GEAR” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions.

SLCT LVR POSI	: D
ACCELE POSI	: More than 1.0/8
GEAR	: 3rd → 4th or 6th → 7th

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0780” detected?

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

Diagnosis Procedure

INFOID:0000000008143171

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P0795 PRESSURE CONTROL SOLENOID C

DTC Logic

INFOID:0000000008143172

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P0795	Pressure Control Solenoid C	The front brake solenoid valve monitor value is 0.2 A or less when the front brake solenoid valve command value is more than 0.75 A.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • Front brake solenoid valve

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “BATTERY VOLT”, “MANU MODE SW”, “GEAR” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT	: 9 V or more
MANU MODE SW	: ON
GEAR	: 7th
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0795” detected?

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

Diagnosis Procedure

INFOID:0000000008143173

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P1116 CAN ERROR

DTC Logic

INFOID:0000000008143174

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P1116	CAN Initial Diagnosis Error	When detected CAN initial diagnosis error of sub electric oil pump inverter	Sub electric oil pump inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

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

Is “P1116” detected?

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

Diagnosis Procedure

INFOID:0000000008143175

1.REPLACE SUB ELECTRIC OIL PUMP INVERTER

Replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".

>> END

P1705 TP SENSOR

DTC Logic

INFOID:0000000008143176

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1705	Accelerator Pedal Position Sensor Signal Circuit	TCM detects the difference between two accelerator pedal position signals received from ECM via CAN communication.	Harness or connectors (Sensor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Start the engine.
2. Select “SLCT LVR POSI” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.

SLCT LVR POSI	: D
VHCL/S SE-A/T	: 5 km/h (3 MPH) or more

4. Check DTC.

Is “P1705” detected?

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

Diagnosis Procedure

INFOID:0000000008143177

1.CHECK DTC OF ECM

With CONSULT
1. Turn ignition switch ON.
2. Perform “Self Diagnostic Results” in “ENGINE”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to EC-81, "DTC Index".
NO >> GO TO 2.

2.CHECK DTC OF TCM

With CONSULT
Perform “Self Diagnostic Results” in “TRANSMISSION”.

Is any DTC other than “P1705” detected?

YES >> Check DTC detected item. Refer to TM-80, "DTC Index".
NO >> GO TO 3.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P1721 VEHICLE SPEED SIGNAL

Description

INFOID:0000000008143178

The vehicle speed signal is transmitted from combination meter to TCM via CAN communication line. The signal functions as an auxiliary device to the output speed sensor when it is malfunctioning. The TCM will then use the vehicle speed signal.

DTC Logic

INFOID:0000000008143179

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1721	Vehicle Speed Signal Circuit	• The vehicle speed transmitted from the combination meter to TCM is 5 km/h (3 MPH) or less when the vehicle speed detected by the output speed sensor is 20 km/h (13 MPH) or more. (Only when starts after the ignition switch is turned ON.) • The vehicle speed detected by the output speed sensor does not decrease despite the 36 km/h (23 MPH) or more of deceleration in vehicle speed received from the combination meter when the vehicle speed transmitted from the combination meter to TCM is 36 km/h (23 MPH) or more and the vehicle speed detected by the output speed sensor is 24 km/h (15 MPH) or more.	Harness or connectors (Sensor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

CAUTION:

- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “VHCL/S SE-AT” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 60 seconds or more.

VHCL/S SE-AT : 40 km/h (25 MPH) or more

4. Check DTC.

Is “P1721” detected?

YES >> Go to TM-127, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143180

1.CHECK DTC OF COMBINATION METER

With CONSULT

Perform “Self Diagnostic Results” in “METER/M&A”.

Is any DTC detected?

YES >> Check DTC detected item. Refer to MWI-51, "DTC Index".
NO >> GO TO 2.

2.CHECK DTC OF TCM

With CONSULT
Perform “Self Diagnostic Results” in “TRANSMISSION”.

Is any DTC other than “P1721” detected?

YES >> Check DTC detected item. Refer to TM-80, "DTC Index".
NO >> GO TO 3.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P1730 INTERLOCK

Description

INFOID:0000000008143181

Fail-safe function to detect interlock conditions.

DTC Logic

INFOID:0000000008143182

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1730	Interlock	The output speed sensor detects the deceleration of 12 km/h (7 MPH) or more for 1 second.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • Input clutch solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Front brake solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Anti-interlock solenoid valve • Each clutch • Hydraulic control circuit

NOTE:
When the vehicle is driven fixed in 2GR, an input speed sensor malfunction is displayed, but this is not an input speed sensor malfunction.

DTC CONFIRMATION PROCEDURE

CAUTION:
- **"TM-130, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCEDURE".**
- **Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT
1. Start the engine.
2. Select "SLCT LVR POSI" and "GEAR" in "Data Monitor" in "TRANSMISSION".
3. Drive vehicle the following condition.

SLCT LVR POSI	: D
GEAR	: 1st through 7th
VHCL/S SE-A/T	: 25 km/h (16 MPH) or more

4. Check DTC.

With GST
Follow the procedure "With CONSULT".

Is "P1730" detected?

YES >> Go to TM-130, "Diagnosis Procedure".
NO >> INSPECTION END

Judgment of Interlock

INFOID:0000000008143183

Refer to TM-75, "Fail-Safe".

Diagnosis Procedure

INFOID:0000000008143184

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P1734 7GR INCORRECT RATIO

Description

INFOID:0000000008143185

This malfunction is detected when the A/T does not shift into 7GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000008143186

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1734	Gear 7 Incorrect Ratio	The gear ratio is: • 0.822 or more • 0.730 or less	• Input clutch solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Front brake solenoid valve • Low brake solenoid valve • 2346 brake solenoid valve • Anti-interlock solenoid valve • Each clutch and brake • Output speed sensor • Input speed sensor 1, 2 • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-132, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCEDURE".**
- **Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK ATF TEMPERATURE

With CONSULT

1. Start the engine.
2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
3. Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.
NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3. CHECK SYMPTOM (PART 1)

With CONSULT

1. Select "7TH GR FNCTN P1734" in "DTC Work Support" in "TRANSMISSION".
2. Drive vehicle with manual mode and maintain the following conditions.

GEAR	: 7th
ACCELE POSI	: 0.7/8 or more
VEHICLE SPEED	: 10 km/h (7 MPH) or more

3. Keep the current driving status for 2 seconds or more if CONSULT screen changes from “OUT OF CONDITION” to “TESTING”.
CAUTION:
When “TESTING” is not indicated on CONSULT for a long time, check “Self Diagnostic Results” in “TRANSMISSION”. When a DTC other than “P1734” is detected, check the DTC. Refer to TM-80, "DTC Index".

With GST
1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever	: “M” position
Gear position	: 7th
Accelerator pedal opening	: 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more

2. Check DTC.

Is “OUT OF CONDITION”, “STOP VEHICLE” or “COMPLETED RESULT NG” displayed? / Is “P1734” detected?

YES-1 (OUT OF CONDITION)>>Perform “Step 3” again.
YES-2 (STOP VEHICLE)>>GO TO 4.
YES-3 (COMPLETED RESULT NG)>>Go to TM-132, "Diagnosis Procedure".
YES-4 (“P1734” is detected)>>Go to TM-132, "Diagnosis Procedure".
NO >> GO TO 4.

4.CHECK SYMPTOM (PART 2)

With CONSULT
1. Stop vehicle.
2. Drive vehicle in “D” position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143187

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P175A CL1 SOLENOID

DTC Logic

INFOID:0000000008143188

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P175A	Clutch 1 Solenoid	The clutch 1 solenoid valve monitor value is 0.2 A or less when the clutch 1 solenoid valve command value is more than 0.75 A.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • Clutch 1 solenoid valve

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Set the vehicle to READY.
2. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT	: 9 V or more
SLCT LVR POSI	: D or R

3. Stop the vehicle.
4. Check DTC.

With GST
Follow the procedure “With CONSULT”.

Is “P175A” detected?

YES >> Go to TM-133, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143189

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P1815 M-MODE SWITCH

DTC Logic

INFOID:0000000008143190

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1815	Manual Mode Switch Circuit	TCM monitors manual mode, non manual mode, up or down switch signal, and detects as irregular when impossible input pattern occurs 2 second or more.	• Harness or connectors (These switches circuit is open or shorted.) • Mode select switch (Into A/T shift selector) • Position select switch (Into A/T shift selector)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Turn ignition switch ON.
2. Select “SLCT LVR POSI” and “MANU MODE SW” in “Data Monitor” in “TRANSMISSION”.
3. Maintain the following each conditions more than 60 seconds.

SLCT LVR POSI : D
MANU MODE SW : ON

4. Check DTC.

Is “P1815” detected?

YES >> Go to TM-134, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143191

1.CHECK MANUAL MODE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect A/T shift selector connector.
3. Turn ignition switch ON.
4. Check voltage between A/T shift selector vehicle side harness connector terminals.

A/T shift selector vehicle side harness connector			Voltage (Approx.)
Connector	Terminal		
	+	–	
M137	1	4	Battery voltage
	2		
	3		
	5		

Is the inspection result normal?

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

2.CHECK MANUAL MODE SWITCH

1. Turn ignition switch OFF.
2. Check manual mode switch. Refer to TM-136, "Component Inspection (Manual Mode Switch)".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace damaged parts.

3. CHECK GROUND CIRCUIT (MANUAL MODE SWITCH CIRCUIT)

1. Turn ignition switch OFF.
2. Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

A/T shift selector vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M137	4		Existed

Is the inspection result normal?

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

4. CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND COMBINATION METER (PART 1)

1. Disconnect combination meter connector.
2. Check continuity between A/T shift selector vehicle side harness connector terminals and combination meter vehicle side harness connector terminals.

A/T shift selector vehicle side harness connector		Combination meter vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M137	1	M53	40	Existed
	2		38	
	3		39	
	5		37	

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5. CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND COMBINATION METER (PART 2)

Check continuity between A/T shift selector vehicle side harness connector terminals and ground.

A/T shift selector vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M137	1		Not existed
	2		
	3		
	5		

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace damaged parts.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

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

7. CHECK COMBINATION METER

1. Reconnect all the connectors.
2. Turn ignition switch ON.

3. Select “M RANGE SW”, “NM RANGE SW”, “AT SFT UP SW”, and “AT SFT DWN SW” in “Data Monitor” in “METER/M&A”.
4. Check the ON/OFF operations of each monitor item. Refer to MWI-41, "Reference Value".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Replace combination meter. Refer to MWI-81, "Exploded View".

Component Inspection (Manual Mode Switch)

INFOID:0000000008143192

1. CHECK MANUAL MODE SWITCH

Check continuity between A/T shift selector connector terminals.

A/T shift selector connector		Condition	Continuity
Terminal			
1	4	Selector lever is shifted to manual shift gate side	Existed
		Other than the above	Not existed
2		Selector lever is shifted to – side	Existed
		Other than the above	Not existed
3		Selector lever is shifted to + side	Existed
		Other than the above	Not existed
5		Selector lever is shifted to manual shift gate side	Not existed
		Other than the above	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace damaged parts. Refer to TM-179, "Exploded View".

P1881 TEMPERATURE SENSOR

DTC Logic

INFOID:0000000008143193

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1881	Electronic Substrate Temperature Sensor Error	When detected temperature by electronic substrate temperature sensor is the specified value or more	Electronic substrate temperature sensor circuit is shorted

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Turn ignition switch ON and wait for 15 seconds or more.
2. Check DTC.

Is “P1881” detected?

YES >> Go to TM-137, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143194

1.REPLACE SUB ELECTRIC OIL PUMP INVERTER

Replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".

>> END

P1882 TEMPERATURE SENSOR

DTC Logic

INFOID:0000000008143195

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1882	Electronic Substrate Temperature Sensor Error	When detected temperature by electronic substrate temperature sensor is the specified value or less	Electronic substrate temperature sensor circuit is shorted

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Turn ignition switch ON and wait for 15 seconds or more.
2. Check DTC.

Is “P1882” detected?

YES >> Go to TM-138, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143196

1.REPLACE SUB ELECTRIC OIL PUMP INVERTER

Replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".

>> END

P1884 SUB ELECTRIC OIL PUMP

DTC Logic

INFOID:0000000008143197

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1884	Sub Electric Oil Pump Error	When detected value by current sensor is the specified value or more	• Harness or connectors (Each circuit is shorted.) • Sub electric oil pump inverter • Sub electric oil pump

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Set the vehicle to READY.
2. Set the vehicle to idling stop state and wait for 2 seconds or more.
3. Check DTC.

Is “P1884” detected?

YES >> Go to TM-139, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143198

1.CHECK SUB ELECTRIC OIL PUMP INPUT SIGNAL

1. Turn ignition switch OFF and wait for 10 minutes or more.
2. Disconnect the negative terminal from 12V battery.
3. Disconnect the sub electric oil pump connector.
4. Check the continuity between sub electric oil pump vehicle side harness connector terminals.

Sub electric oil pump vehicle side harness connector			Continuity
Connector	Terminal		
C22	1	2	Not existed
	1	3	
	2	3	

5. Check the continuity between sub electric oil pump vehicle side harness connector terminals and ground.

Sub electric oil pump vehicle side harness connector		Ground	Continuity
Connector	Terminal		
C22	1	Ground	Not existed
	2		
	3		

Is the inspection result normal?

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

2.CHECK SUB ELECTRIC OIL PUMP INVERTER

1. Remove the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".

2. Check the continuity between sub electric oil pump inverter connector terminals.

Sub electric oil pump inverter connector		Continuity
Terminal		
+	–	
6	7	Not existed
	9	
	10	

Sub electric oil pump inverter connector		Continuity
Terminal		
+	–	
7	5	Not existed
9		
10		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".

3. CHECK HARNESS BETWEEN SUB ELECTRIC OIL PUMP INVERTER AND SUB ELECTRIC OIL PUMP

1. Check the continuity between sub electric oil pump inverter vehicle side harness connector terminals and sub electric oil pump vehicle side harness connector terminals.

Sub electric oil pump inverter vehicle side harness connector		Sub electric oil pump vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
B153	7	C22	1	Not existed
			3	
	10		2	
			3	
B154	9		1	
			2	

2. Check the continuity between sub electric oil pump inverter vehicle side harness connector terminals and ground.

Sub electric oil pump inverter vehicle side harness connector		Ground	Continuity
Connector	Terminal		
B153	7	Ground	Not existed
	10		
B154	9		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

4. CHECK SUB ELECTRIC OIL PUMP INSULATION RESISTANCE

Use an insulation resistance tester to measure insulation resistance.

Sub electric oil pump Terminal	Ground	Resistance
1	Housing case	1 MΩ or more
2		
3		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Replace the A/T assembly due to malfunction in the sub electric oil pump. Refer to TM-190, "Removal and Installation".

P1885 SUB ELECTRIC OIL PUMP

DTC Logic

INFOID:0000000008143199

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1885	Sub Electric Oil Pump Error	When 3-phase current value of sub-electric oil pump is less than indicated value from TCM	• Harness or connectors (Each circuit is open.) • Sub electric oil pump inverter • Sub electric oil pump

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Set the vehicle to READY.
2. Set the vehicle to idling stop state and wait for 2 seconds or more.
3. Check DTC.

Is “P1885” detected?

YES >> Go to TM-142, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143200

1.CHECK SUB ELECTRIC OIL PUMP STATOR COIL

1. Turn ignition switch OFF and wait for 10 minutes or more.
2. Disconnect the negative terminal from 12V battery.
3. Disconnect the sub electric oil pump connector.
4. Check the continuity between sub electric oil pump connector terminals.

Sub electric oil pump connector		Continuity
Terminal		
1	2	Existed
1	3	
2	3	

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the A/T assembly due to malfunction in the sub electric oil pump. Refer to TM-190, "Removal and Installation".

2.CHECK HARNESS BETWEEN SUB ELECTRIC OIL PUMP INVERTER AND SUB ELECTRIC OIL PUMP

1. Disconnect the sub electric oil pump inverter connector.
2. Check the continuity between sub electric oil pump inverter vehicle side harness connector terminals and sub electric oil pump vehicle side harness connector terminals.

Sub electric oil pump inverter vehicle side harness connector		Sub electric oil pump vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
B153	7	C22	2	Existed
	10		1	
B154	9		3	

Is the inspection result normal?

YES >> Replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".
NO >> Repair or replace damaged parts.

P1887 SUB E-OIL PUMP RELAY

DTC Logic

INFOID:0000000008143201

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1887	Sub Electric Oil Pump Relay Error	When power switch is in the ON position, status is detected that voltage from sub electric oil pump relay is the specified value or less	• Harness or connectors (Each circuit is open.) • Sub electric oil pump relay (OFF stuck) • Sub electric oil pump inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

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

Is “P1887” detected?

YES >> Go to TM-144, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143202

1.CHECK SUB ELECTRIC OIL PUMP RELAY

1. Turn ignition switch OFF and wait for 10 minutes or more.
2. Check the sub electric oil pump relay. Refer to TM-145, "Component Inspection (Sub Electric Oil Pump Relay)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the sub electric oil pump relay.

2.CHECK HARNESS BETWEEN SUB ELECTRIC OIL PUMP INVERTER AND SUB ELECTRIC OIL PUMP RELAY

1. Disconnect the sub electric oil pump inverter.
2. Check the continuity between sub electric oil pump inverter vehicle side harness connector terminals and sub electric oil pump relay vehicle side harness connector terminals.

Sub electric oil pump inverter vehicle side harness connector		Sub electric oil pump relay vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
B151	3	B56	2	Existed
B152	6		5	

Is the inspection result normal?

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

3.CHECK SUB ELECTRIC OIL PUMP RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.

2. Check the voltage between sub electric oil pump relay vehicle side harness connector terminals and ground.

Sub electric oil pump relay vehicle side harness connector		Ground	Condition	Voltage
Connector	Terminal			
B56	1	Ground	Turn ignition switch ON	9 – 16 V

Is the inspection result normal?

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

4. CHECK HARNESS BETWEEN SUB ELECTRIC OIL PUMP RELAY AND BATTERY TERMINAL WITH FUSIBLE LINK

1. Turn ignition switch OFF and wait for 10 minutes or more.
2. Disconnect the negative terminal from 12V battery.
3. Disconnect the battery terminal with fusible link connector.
4. Check the continuity between sub electric oil pump relay vehicle side harness connector terminal and battery terminal with fusible link vehicle side harness connector terminal.

Sub electric oil pump relay vehicle side harness connector		Battery terminal with fusible link vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
B56	3	B163	4	Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5. DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between 12V battery and battery terminal with fusible link
- 12V battery
- 50A fuse (#F, Battery terminal with fusible link)
- Battery terminal with fusible link

Is the inspection result normal?

YES >> 1. Check intermittent incident. Refer to GI-49, "Intermittent Incident".
2. If inspection result is OK, replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".
NO >> Repair or replace damaged parts.

Component Inspection (Sub Electric Oil Pump Relay)

INFOID:0000000008143203

1. CHECK SUB ELECTRIC OIL PUMP RELAY

1. Disconnect the sub electric oil pump relay. Refer to TM-17, "SUB ELECTRIC OIL PUMP SYSTEM : Component Parts Location".
2. Apply 12V direct current between sub electric oil pump 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 sub electric oil pump relay terminals 3 and 5.

Sub electric oil pump 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 sub electric oil pump relay.

P1888 SUB E-OIL PUMP RELAY

DTC Logic

INFOID:0000000008143204

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1888	Sub Electric Oil Pump Relay Error	When sub electric oil pump relay is in the OFF position, voltage is detected from sub-electric oil pump relay	• Harness or connectors (Each circuit is shorted.) • Sub electric oil pump relay (ON stuck) • Sub electric oil pump inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT
1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait for 2 seconds or more.
3. Turn ignition switch ON and wait for 2 seconds or more.
4. Check DTC.

Is “P1888” detected?

YES >> Go to TM-147, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143205

1.CHECK SUB ELECTRIC OIL PUMP RELAY

1. Turn ignition switch OFF and wait for 10 minutes or more.
2. Disconnect the negative terminal from 12V battery and wait for 5 minutes or more.
3. Check the sub electric oil pump relay. Refer to TM-148, "Component Inspection (Sub Electric Oil Pump Relay)".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the sub electric oil pump relay.

2.CHECK SUB ELECTRIC OIL PUMP RELAY POWER SUPPLY CIRCUIT

1. Disconnect the sub electric oil pump inverter connector.
2. Disconnect the sub electric oil pump relay.
3. Check the voltage between sub electric oil pump inverter vehicle side harness connector terminals and ground.

Sub electric oil pump inverter vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
B152	6	Ground	Turn ignition switch OFF	0 V

Is the inspection result normal?

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

3.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".
NO >> Repair or replace damaged parts.

Component Inspection (Sub Electric Oil Pump Relay)

INFOID:0000000008143206

1. CHECK SUB ELECTRIC OIL PUMP RELAY

1. Disconnect the sub electric oil pump relay. Refer to TM-17, "SUB ELECTRIC OIL PUMP SYSTEM : Component Parts Location".
2. Apply 12V direct current between sub electric oil pump 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 sub electric oil pump relay terminals 3 and 5.

Sub electric oil pump 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 sub electric oil pump relay.

P1889 MOTOR SPEED

Description

INFOID:0000000008143207

TCM receive an traction motor speed signal from drive motor inverter via CAN communication.

DTC Logic

INFOID:0000000008143208

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P1889	MOTOR SPEED	• When TCM cannot receive signal from traction motor speed signal • When TCM received an invalid value from traction motor inverter	Harness or connectors (Traction motor inverter and TCM circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “SLCT LVR POSI” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.

SLCT LVR POSI	: D
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

4. Check DTC.

Is “P1889” detected?

YES >> Go to TM-149, "Diagnosis Procedure".
NO >> INSPCTION END

Diagnosis Procedure

INFOID:0000000008143209

1. CHECK DTC TRACTION MOTOR INVERTER

With CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” in “MOTOR CONTROL”.

Is DTC detected?

YES >> Check DTC detected item. Refer to TMS-31, "DTC Index".
NO >> GO TO 2.

2. CHECK DTC TCM

With CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” in “TRANSMISSION”.

Is DTC detected?

YES >> Check DTC detected item. Refer to TM-80, "DTC Index".
NO >> GO TO 3.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P188A SUB E-OIL PUMP CURRENT CIRC

DTC Logic

INFOID:0000000008143210

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P188A	Current Detected Circuit Error	When detected current is the specified value or more while sub electric oil pump is stop	Sub electric oil pump inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

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

Is “P188A” detected?

YES >> Go to TM-151, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143211

1.REPLACE SUB ELECTRIC OIL PUMP INVERTER

Replace the sub electric oil pump inverter. Refer to TM-188, "Removal and Installation".

>> END

P188C SUB E-OIL PUMP TEMPERATURE

DTC Logic

INFOID:0000000008143212

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P188C	Over temperature Error	When detected temperature by electronic substrate temperature sensor is the specified value or more	Sub electric oil pump

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.PERFORM COMPONENT FUNCTION CHECK

Refer to TM-152, "Component Function Check".

NOTE:

If it is caused by a temporary incorporation of foreign matter, normal status might be recovered.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to TM-152, "Diagnosis Procedure".

Component Function Check

INFOID:0000000008143213

1.COMPONENT FUNCTION CHECK

With CONSULT

1. Start the engine.
2. Shift the selector lever to “P” position.
3. Select “Data Monitor” in “AT/CVT”.
4. Select “ATF TEMP 1”.
5. Warm up until the below condition is satisfied.

ATF TEMP 1 : 45 – 55°C (113 – 131°F)

6. Select “Data Monitor” in “MOTOR CONTROL”.
7. Select “SUB E-OP PRESSURE” and “SUB E-OP TORQUE”.
8. Set the vehicle to idling stop state.
9. Check value.

SUB E-OP PRESSURE : Approx. 550 kPa
SUB E-OP TORQUE : 0.52 – 0.62 Nm

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to TM-152, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008143214

1.REPLACE SUB ELECTRIC OIL PUMP

Replace the A/T assembly due to malfunction in the sub electric oil pump. Refer to TM-190, "Removal and Installation".

>> END

P188D SUB E-OIL PUMP FUNCTION

DTC Logic

INFOID:0000000008143215

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P188D	Sub Electric Oil Pump Function Error	When status is detected that output frequency of sub electric oil pump inverter is the specified value or less	Sub electric oil pump

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.PERFORM COMPONENT INSPECTION

Refer to TM-153, "Component Function Check".

NOTE:

If it is caused by a temporary incorporation of foreign matter, normal status might be recovered.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to TM-153, "Diagnosis Procedure".

Component Function Check

INFOID:0000000008143216

1.COMPONENT FUNCTION CHECK

With CONSULT

1. Start the engine.
2. Shift the selector lever to “P” position.
3. Select “Data Monitor” in “AT/CVT”.
4. Select “ATF TEMP 1”.
5. Warm up until the below condition is satisfied.

ATF TEMP 1 : 45 – 55°C (113 – 131°F)

6. Select “Data Monitor” in “MOTOR CONTROL”.
7. Select “SUB E-OP PRESSURE” and “SUB E-OP TORQUE”.
8. Set the vehicle to idling stop state.
9. Check value.

SUB E-OP PRESSURE	: Approx. 550 kPa
SUB E-OP TORQUE	: 0.52 – 0.62 Nm

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to TM-153, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008143217

1.REPLACE SUB ELECTRIC OIL PUMP

Replace the A/T assembly due to malfunction in the sub electric oil pump. Refer to TM-190, "Removal and Installation".

>> END

P2713 PRESSURE CONTROL SOLENOID D

DTC Logic

INFOID:0000000008143218

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P2713	Pressure Control Solenoid D	The high and low reverse clutch solenoid valve monitor value is 0.2 A or less when the high and low reverse clutch solenoid valve command value is more than 0.75 A.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • High and low reverse clutch solenoid valve

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “BATTERY VOLT”, “MANU MODE SW”, “GEAR” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive the vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT	: 9 V or more
MANU MODE SW	: ON
GEAR	: 3rd
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P2713” detected?

YES >> Go to TM-154, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143219

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P2722 PRESSURE CONTROL SOLENOID E

DTC Logic

INFOID:0000000008143220

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P2722	Pressure Control Solenoid E	The low brake solenoid valve monitor value is 0.2 A or less when the low brake solenoid valve command value is more than 0.75 A.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • Low brake solenoid valve

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “BATTERY VOLT”, “MANU MODE SW”, “GEAR” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT	: 9 V or more
MANU MODE SW	: ON
GEAR	: 1st
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P2722” detected?

YES >> Go to TM-155, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143221

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P2731 PRESSURE CONTROL SOLENOID F

DTC Logic

INFOID:0000000008143222

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P2731	Pressure Control Solenoid F	The 2346 brake solenoid valve monitor value is 0.2 A or less when the 2346 brake solenoid valve command value is more than 0.75 A.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • 2346 brake solenoid valve

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “BATTERY VOLT”, “MANU MODE SW”, “GEAR” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT	: 9 V or more
MANU MODE SW	: ON
GEAR	: 2nd
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P2731” detected?

YES >> Go to TM-156, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143223

1.CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

P2807 PRESSURE CONTROL SOLENOID G

DTC Logic

INFOID:0000000008143224

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible cause
P2807	Pressure Control Solenoid G	The direct clutch solenoid valve monitor value is 0.2 A or less when the direct clutch solenoid valve command value is more than 0.75 A.	• Harness or connectors (Solenoid valve circuit is open or shorted.) • Direct clutch solenoid valve

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Start the engine.
2. Select “BATTERY VOLT”, “MANU MODE SW”, “GEAR” and “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT	: 9 V or more
MANU MODE SW	: ON
GEAR	: 1st
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P2807” detected?

YES >> Go to TM-157, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008143225

1. CHECK INTERMITTENT INCIDENT

Refer to GI-49, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-190, "Exploded View".
NO >> Repair or replace damaged parts.

MAIN POWER SUPPLY AND GROUND CIRCUIT (TCM)

Diagnosis Procedure

INFOID:0000000008143226

1.CHECK TCM POWER SOURCE (PART 1)

1. Turn ignition switch OFF.
2. Disconnect A/T assembly connector.
3. Check voltage between A/T assembly vehicle side harness connector terminal and ground.

A/T assembly vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F61	2		Always	Battery voltage

Is the inspection result normal?

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

2.CHECK TCM POWER SOURCE (PART 2)

Check voltage between A/T assembly vehicle side harness connector terminals and ground.

A/T assembly vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F61	1		Turn ignition switch ON	Battery voltage
			Turn ignition switch OFF	0 V
	6		Turn ignition switch ON	Battery voltage
			Turn ignition switch OFF	0 V

Is the inspection result normal?

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

3.CHECK TCM GROUND CIRCUIT

Check continuity between A/T assembly vehicle side harness connector terminals and ground.

A/T assembly vehicle side harness connector		Ground	Continuity
Connector	Terminal		
F61	5		Existed
	10		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

4.DETECT MALFUNCTIONING ITEM (PART 1)

Check the following.

- Harness for short or open between battery positive terminal and A/T assembly vehicle side harness connector terminal 2. Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
- Battery
- 10A fuse (No.36, located in the fuse, fusible link and relay box). Refer to PG-43, "Fuse and Fusible Link Arrangement".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

5.CHECK HARNESS BETWEEN IPDM E/R AND A/T ASSEMBLY (PART 1)

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.

3. Check continuity between IPDM E/R vehicle side harness connector terminal and A/T assembly vehicle side harness connector terminals.

IPDM E/R vehicle side harness connector		A/T assembly vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E7	58	F61	1	Existed
			6	

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace damaged parts.

6. CHECK HARNESS BETWEEN IPDM E/R AND A/T ASSEMBLY (PART 2)

Check continuity between A/T assembly vehicle side harness connector terminal and ground.

A/T assembly vehicle side harness connector		Ground	Continuity
Connector	Terminal		
F61	1		Not existed
	6		

Is the inspection result normal?

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

7. DETECT MALFUNCTIONING ITEM (PART 2)

Check the following.
- Harness for short or open between ignition switch and IPDM E/R. Refer to PG-30, "Wiring Diagram - IGNITION POWER SUPPLY -".
- Ignition switch
- 10A fuse (No.43, located in the IPDM E/R). Refer to PG-44, "Fuse, Connector and Terminal Arrangement".
- IPDM E/R

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

MAIN POWER SUPPLY AND GROUND CIRCUIT (SUB ELECTRIC OIL PUMP INVERTER)

Diagnosis Procedure

INFOID:0000000008143227

1.CHECK POWER SUPPLY CIRCUIT

Check the voltage between sub electric oil pump inverter vehicle side harness connector terminal and ground.

Sub electric oil pump inverter vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
B151	2	Ground	Turn ignition switch ON	9 – 16 V
			Turn ignition switch OFF	0 V

Is the inspection result normal?

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

2.CHECK HARNESS BETWEEN SUB ELECTRIC OIL PUMP INVERTER AND IPDM E/R

1. Turn ignition switch OFF and wait for 10 minutes or more.
2. Disconnect the sub electric oil pump inverter connector.
3. Disconnect the IPDM E/R connector.
4. Check the continuity between sub electric oil pump inverter vehicle side harness connector terminal and IPDM E/R vehicle side harness connector terminal.

Sub electric oil pump inverter vehicle side harness connector		IPDM E/R vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
B151	2	E7	74	Existed

5. Check the continuity between sub electric oil pump inverter vehicle side harness connector terminal and ground.

Sub electric oil pump inverter vehicle side harness connector		Ground	Continuity
Connector	Terminal		
B151	2	Ground	Not existed

Is the inspection result normal?

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

3.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between ignition switch and IPDM E/R
- Ignition switch
- 10A fuse (#42, IPDM E/R)
- IPDM E/R

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

4.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF and wait for 10 minutes or more.
2. Disconnect the sub electric oil pump inverter connector.
3. Check the continuity between sub electric oil pump inverter vehicle side harness connector terminal and ground.

Sub electric oil pump inverter vehicle side harness connector		Ground	Continuity
Connector	Terminal		
B152	5	Ground	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

SHIFT POSITION INDICATOR CIRCUIT

Description

INFOID:0000000008143228

TCM transmits a shift position signal and a manual mode indicator signal to the combination meter via CAN communication line. While the vehicle is running, the combination meter displays a shift position on the combination meter, according to these signals.

Component Function Check

INFOID:0000000008143229

1.CHECK A/T INDICATOR

CAUTION:
Always drive vehicle at a safe speed.

1. Start the engine.
2. Check the actual selector lever position (“P”, “R”, “N” and “D”) and the indication of the shift position indicator mutually coincide.
3. Drive vehicle in the manual mode, and then check that the actual gear position and the indication of the shift position indicator mutually coincide when the selector lever is shifted to “UP (+ side)” or “DOWN (– side)” side (1GR ⇔ 7GR).

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to TM-162, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008143230

1.CHECK INPUT SIGNALS

With CONSULT

1. Start the engine.
2. Select “SLCT LVR POSI” in “Data Monitor” in “TRANSMISSION”.
3. Check the actual selector lever position (“P”, “R”, “N” and “D”) and the indication of the “SLCT LVR POSI” mutually coincide. Refer to TM-69, "Reference Value".
4. Drive vehicle in the manual mode, and then check that the actual gear position and the indication of the “SLCT LVR POSI” mutually coincide when the selector lever is shifted to the “UP (+ side)” or “DOWN (– side)” side (1GR ⇔ 7GR). Refer to TM-69, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END
NO-1 [The actual gear position does not change, or shifting into the manual mode is not possible (no gear shifting in the manual mode possible). Or the shift position indicator is not indicated.]>>•Check manual mode switch. Refer to TM-136, "Component Inspection (Manual Mode Switch)".
- Check A/T main system (Fail-safe function actuated).
  - Perform “Self Diagnostic Results” in “TRANSMISSION”. Refer to TM-80, "DTC Index".

NO-2 (The actual gear position changes, but the shift position indicator is not indicated.)>>Perform “Self Diagnostic Results” in “TRANSMISSION”. Refer to TM-80, "DTC Index".
NO-3 (The actual gear position and the indication on the shift position indicator do not coincide.)>>Perform “Self Diagnostic Results” in “TRANSMISSION”. Refer to TM-80, "DTC Index".
NO-4 (Only a specific position or positions is/are not indicated on the shift position indicator.)>>Check the combination meter. Refer to MWI-41, "Reference Value".

SHIFT LOCK SYSTEM
WITH ICC

WITH ICC : Component Function Check

INFOID:0000000008143231

1.CHECK A/T SHIFT LOCK OPERATION (STEP 1)

1. Turn ignition switch ON.
2. Shift the selector lever to the “P” position.
3. Attempt to shift the selector lever to any other position with the brake pedal released.

Can the selector lever be shifted to any other position?

YES >> Go to TM-163, "WITH ICC : Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK A/T SHIFT LOCK OPERATION (STEP 2)

Attempt to shift the selector lever to any other position with the brake pedal depressed.

Can the selector lever be shifted to any other position?

YES >> INSPECTION END
NO >> Go to TM-163, "WITH ICC : Diagnosis Procedure".

WITH ICC : Diagnosis Procedure

INFOID:0000000008143232

1.CHECK POWER SOURCE (PART 1)

1. Turn ignition switch OFF.
2. Disconnect shift lock relay.
3. Check voltage between shift lock relay vehicle side harness connector terminal and ground.

Shift lock relay vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E52	2		Depressed brake pedal.	Battery voltage
			Released brake pedal.	0 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 9.

2.CHECK GROUND CIRCUIT (PART 1)

Check continuity between shift lock relay vehicle side harness connector terminal and ground.

Shift lock relay vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E52	1		Existed

Is the inspection result normal?

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

3.CHECK SHIFT LOCK RELAY

Check shift lock relay. Refer to TM-168, "WITH ICC : Component Inspection (Shift Lock Relay)".

Is the inspection result normal?

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

4.CHECK POWER SOURCE (PART 2)

1. Turn ignition switch ON.
2. Check voltage between shift lock relay vehicle side harness connector terminal and ground.

Shift lock relay vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
E52	5		Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 20.

5. CHECK HARNESS BETWEEN SHIFT LOCK RELAY AND A/T SHIFT SELECTOR (PART 1)

1. Turn ignition switch OFF.
2. Disconnect A/T shift selector connector.
3. Check continuity between shift lock relay vehicle side harness connector terminal and A/T shift selector vehicle side harness connector terminal

Shift lock relay vehicle side harness connector		A/T shift selector vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E52	3	M137	6	Existed

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace damaged parts.

6. CHECK HARNESS BETWEEN SHIFT LOCK RELAY AND A/T SHIFT SELECTOR (PART 2)

Check continuity between shift lock relay vehicle side harness connector terminal and ground.

Shift lock relay vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E52	3		Not existed

Is the inspection result normal?

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

7. CHECK GROUND CIRCUIT (PART 2)

Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

A/T shift selector vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M137	4		Existed

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 23.

8. CHECK SHIFT LOCK UNIT

Check shift lock unit. Refer to TM-168, "WITH ICC : Component Inspection (Shift Lock Unit)"

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

9. CHECK POWER SOURCE (PART 3)

1. Disconnect stop lamp OFF relay 1.
2. Check voltage between stop lamp OFF relay 1 vehicle side harness connector terminal and ground.

Stop lamp OFF relay 1 vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
B246	3		Battery voltage

Is the inspection result normal?

YES >> GO TO 13.
NO >> GO TO 10.

10. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP OFF RELAY 1 (PART 1)

1. Disconnect fuse block (J/B) connector.
2. Check continuity between fuse block (J/B) vehicle side harness connector terminal and stop lamp OFF relay 1 vehicle side harness connector terminal.

Fuse block (J/B) vehicle side harness connector		Stop lamp OFF relay 1 vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E103	8F	B246	3	Existed

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace damaged parts.

11. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP OFF RELAY 1 (PART 2)

Check continuity between fuse block (J/B) vehicle side harness connector terminal and ground.

Fuse block (J/B) vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E103	8F		Not existed

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair or replace damaged parts.

12. DETECT MALFUNCTIONING ITEM (PART 1)

Check the following.
- Harness for short or open between battery and fuse block (J/B). Refer to PG-14, "Wiring Diagram - BATTERY POWER SUPPLY -".
- Battery
- 10A fuse [No.7, located in the fuse block (J/B)]. Refer to PG-42, "Fuse, Connector and Terminal Arrangement".
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

13. CHECK STOP LAMP SWITCH MOUNTING POSITION

Check stop lamp switch mounting position. Refer to BR-270, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 14.
NO >> Adjust stop lamp switch mounting position.

14. CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to TM-168, "WITH ICC : Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 15.
NO >> Repair or replace damaged parts.

15. CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT LOCK RELAY (PART 1)

Check continuity between stop lamp switch vehicle side harness connector terminal and shift lock relay vehicle side harness connector terminal.

Stop lamp switch vehicle side harness connector		Shift lock relay vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E110	2	E52	2	Existed

Is the inspection result normal?

YES >> GO TO 16.
NO >> Repair or replace damaged parts.

16. CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT LOCK RELAY (PART 2)

Check continuity between stop lamp switch vehicle side harness connector terminal and ground.

Stop lamp switch vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E110	2		Not existed

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair or replace damaged parts.

17. CHECK HARNESS BETWEEN STOP LAMP OFF RELAY 1 AND STOP LAMP SWITCH (PART 1)

Check continuity between stop lamp OFF relay 1 vehicle side harness connector terminal and stop lamp switch vehicle side harness connector terminal.

Stop lamp OFF relay 1 vehicle side harness connector		Stop lamp switch vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
B246	4	E110	1	Existed

Is the inspection result normal?

YES >> GO TO 18.
NO >> Repair or replace damaged parts.

18. CHECK HARNESS BETWEEN STOP LAMP OFF RELAY 1 AND STOP LAMP SWITCH (PART 2)

Check continuity between stop lamp OFF relay 1 vehicle side harness connector terminal and ground.

Stop lamp OFF relay 1 vehicle side harness connector		Ground	Continuity
Connector	Terminal		
B246	4		Not existed

Is the inspection result normal?

YES >> GO TO 19.
NO >> Repair or replace damaged parts.

19. CHECK STOP LAMP OFF RELAY 1 CIRCUIT

Check stop lamp OFF relay 1 circuit. Refer to BR-132, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

20. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND SHIFT LOCK RELAY (PART 1)

1. Turn ignition switch OFF.
2. Disconnect fuse block (J/B) connector.
3. Check continuity between fuse block (J/B) vehicle side harness connector terminal and shift lock relay vehicle side harness connector terminal.

Fuse block (J/B) vehicle side harness connector		Shift lock relay vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E103	4F	E52	5	Existed

Is the inspection result normal?

YES >> GO TO 21.
NO >> Repair or replace damaged parts.

21. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND SHIFT LOCK RELAY (PART 2)

Check continuity between fuse block (J/B) vehicle side harness connector terminal and ground.

Fuse block (J/B) vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E103	4F		Not existed

Is the inspection result normal?

YES >> GO TO 22.
NO >> Repair or replace damaged parts.

22. DETECT MALFUNCTIONING ITEM (PART 2)

Check the following.
- Harness for short or open between ignition switch and fuse block (J/B). Refer to PG-30, "Wiring Diagram - IGNITION POWER SUPPLY -".
- Ignition switch
- 10A fuse [No.3, located in the fuse block (J/B)]. Refer to PG-42, "Fuse, Connector and Terminal Arrangement".
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

23. CHECK GROUND CIRCUIT (PART 3)

1. Disconnect PCB harness connector.
2. Check continuity between PCB harness vehicle side harness connector terminal and ground.

PCB harness vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M30	408		Existed
	409		

Is the inspection result normal?

YES >> GO TO 24.
NO >> Repair or replace damaged parts.

24. CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND PCB HARNESS

Check continuity between A/T shift selector vehicle side harness connector terminal and PCB harness vehicle side harness connector terminal.

A/T shift selector vehicle side harness connector		PCB harness vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M137	4	M26	252	Existed

Is the inspection result normal?

YES >> GO TO 25.
NO >> Repair or replace damaged parts.

25. CHECK PCB HARNESS

Check continuity between PCB harness connector terminals.

PCB harness vehicle side harness connector				Continuity
Connector	Terminal	Connector	Terminal	
M26	252	M30	408	Existed
			409	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

WITH ICC : Component Inspection (Shift Lock Unit)

INFOID:0000000008143233

1.CHECK SHIFT LOCK SOLENOID

Apply voltage to terminals 6 and 4 of A/T shift selector connector, and check that shift lock unit is activated.

CAUTION:

- **Connect the fuse between the terminals when applying the voltage.**
- **Never cause shorting between terminals.**

Shift lock unit connector		Condition	Status
Terminal			
+ (fuse)	–		
6	4	Apply 12 V direct current between terminals 6 and 4.	Shift lock unit operates

Can the lock plate be moved up and down?

YES >> INSPECTION END
NO >> Replace A/T shift selector assembly. Refer to TM-179, "Exploded View".

WITH ICC : Component Inspection (Shift Lock Relay)

INFOID:0000000008143234

1.CHECK SHIFT LOCK RELAY

Check continuity between shift lock relay terminals.

CAUTION:

- **Connect the fuse between the terminals when applying the voltage.**
- **Never cause shorting between terminals.**

Shift lock relay connector		Condition	Continuity
Terminal			
3	5	Apply 12 V direct current between terminals 1 and 2.	Existed
		OFF	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace shift lock relay.

WITH ICC : Component Inspection (Stop Lamp Switch)

INFOID:0000000008143235

1.CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp switch connector		Condition	Continuity
Terminal			
1	2	Brake pedal depressed	Existed
		Brake pedal released	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to BR-280, "Exploded View".

WITHOUT ICC

WITHOUT ICC : Component Function Check

INFOID:0000000008143236

1.CHECK A/T SHIFT LOCK OPERATION (STEP 1)

1. Turn ignition switch ON.
2. Shift the selector lever to the “P” position.
3. Attempt to shift the selector lever to any other position with the brake pedal released.

Can the selector lever be shifted to any other position?

YES >> Go to TM-169, "WITHOUT ICC : Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK A/T SHIFT LOCK OPERATION (STEP 2)

Attempt to shift the selector lever to any other position with the brake pedal depressed.

Can the selector lever be shifted to any other position?

YES >> INSPECTION END
NO >> Go to TM-169, "WITHOUT ICC : Diagnosis Procedure".

WITHOUT ICC : Diagnosis Procedure

INFOID:0000000008143237

1.CHECK POWER SOURCE (PART 1)

1. Turn ignition switch OFF.
2. Disconnect A/T shift selector connector.
3. Turn ignition switch ON.
4. Check voltage between A/T shift selector vehicle side harness connector terminal and ground.

A/T shift selector vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
M137	6		Depressed brake pedal.	Battery voltage
			Released brake pedal.	0 V

Is the inspection result normal?

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

2.CHECK GROUND CIRCUIT (PART 1)

Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

A/T shift selector vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M137	4		Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 12.

3.CHECK SHIFT LOCK UNIT

Check shift lock unit. Refer to TM-172, "WITHOUT ICC : Component Inspection (Shift Lock Unit)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

4.CHECK POWER SOURCE (PART 2)

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.

3. Turn ignition switch ON.
4. Check voltage between stop lamp switch vehicle side harness connector terminal and ground.

Stop lamp switch vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
E110	3		Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 9.

5. CHECK STOP LAMP SWITCH MOUNTING POSITION

Check stop lamp switch mounting position. Refer to BR-270, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Adjust stop lamp switch mounting position.

6. CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to TM-172, "WITHOUT ICC : Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

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

7. CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT SELECTOR (PART 1)

Check continuity between stop lamp switch vehicle side harness connector terminal and A/T shift selector vehicle side harness connector terminal.

Stop lamp switch vehicle side harness connector		A/T shift selector vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E110	4	M137	6	Existed

Is the inspection result normal?

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

8. CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT SELECTOR (PART 2)

Check continuity between stop lamp switch vehicle side harness connector terminal and ground.

Stop lamp switch vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E110	4		Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

9. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP SWITCH (PART 1)

1. Turn ignition switch OFF.
2. Disconnect fuse block (J/B) connector.
3. Check continuity between fuse block (J/B) vehicle side harness connector terminal and stop lamp switch vehicle side harness connector terminal.

Fuse block (J/B) vehicle side harness connector		Stop lamp switch vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E103	4F	E110	3	Existed

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace damaged parts.

10. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP SWITCH (PART 2)

Check continuity between fuse block (J/B) vehicle side harness connector terminal and ground.

Fuse block (J/B) vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E103	4F		Not existed

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair or replace damaged parts.

11. DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between ignition switch and fuse block (J/B). Refer to PG-30, "Wiring Diagram - IGNITION POWER SUPPLY -".
- Ignition switch
- 10A fuse [No.3, located in the fuse block (J/B)]. Refer to PG-42, "Fuse, Connector and Terminal Arrangement".
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

12. CHECK GROUND CIRCUIT (PART 2)

1. Disconnect PCB harness connector.
2. Check continuity between PCB harness vehicle side harness connector terminal and ground.

PCB harness vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M30	408		Existed
	409		

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair or replace damaged parts.

13. CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND PCB HARNESS

Check continuity between A/T shift selector vehicle side harness connector terminal and PCB harness vehicle side harness connector terminal.

A/T shift selector vehicle side harness connector		PCB harness vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M137	4	M26	252	Existed

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair or replace damaged parts.

14. CHECK PCB HARNESS

Check continuity between PCB harness connector terminals.

PCB harness vehicle side harness connector				Continuity
Connector	Terminal	Connector	Terminal	
M26	252	M30	408	Existed
			409	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-49, "Intermittent Incident".
NO >> Repair or replace damaged parts.

WITHOUT ICC : Component Inspection (Shift Lock Unit)

INFOID:0000000008143238

1.CHECK SHIFT LOCK SOLENOID

Apply voltage to terminals 6 and 4 of A/T shift selector connector, and check that shift lock unit is activated.

CAUTION:

- **Connect the fuse between the terminals when applying the voltage.**
- **Never cause shorting between terminals.**

Shift lock unit connector		Condition	Status
Terminal			
+ (fuse)	–		
6	4	• Selector lever in “P” position. • Apply 12 V direct current between terminals 6 and 4.	Shift lock unit operates

Can the lock plate be moved up and down?

YES >> INSPECTION END
NO >> Replace A/T shift selector assembly. Refer to TM-179, "Exploded View".

WITHOUT ICC : Component Inspection (Stop Lamp Switch)

INFOID:0000000008143239

1.CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp switch connector		Condition	Continuity
Terminal			
3	4	Brake pedal depressed	Existed
		Brake pedal released	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to BR-280, "Exploded View".

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Table

INFOID:0000000008143240

The diagnostics item numbers show the sequence for inspection. Inspect in order from item 1.

CAUTION:

If any malfunction occurs in the RE7R01H transmission, replace the A/T assembly.

Symptom				Diagnostic item																		
				Control linkage (TM-96)	Output speed sensor (TM-106)	Vehicle speed signal (TM-127)	Accelerator pedal position sensor (TM-126)	Motor speed signal (TM-149)	Input speed sensor (TM-105)	A/T fluid temperature sensor (TM-103)	Transmission range switch (TM-102)	Line pressure solenoid valve (TM-120)	Clutch 1 solenoid valve (TM-133)	Low brake solenoid valve (TM-155)	Front brake solenoid valve (TM-124)	High and low reverse clutch solenoid valve (TM-154)	Input clutch solenoid valve (TM-122)	Direct clutch solenoid valve (TM-157)	2346 brake solenoid valve (TM-156)	Anti-interlock solenoid valve (TM-121)	CAN communication (TM-100)
Poor performance	Driving performance	Shift point is high in “D” position.			1		2			3											
		Shift point is low in “D” position.			1		2														
		Large shock	When shifting gears	→ “D” position			6	5		5	4	2		1						2	5
				→ “R” position			6	5		5	4	2						1			5
				1GR ⇔ 2GR	3		1	5	3	3									2		4
				2GR ⇔ 3GR	3		1	5	3	3								2			4
				3GR ⇔ 4GR	3		1	5	3	3				2		2					4
				4GR ⇔ 5GR	3		1	5	3	3							2		2		4
				5GR ⇔ 6GR	3		1	5	3	3								2	2		4
				6GR ⇔ 7GR	3		1	5	3	3					2				2		4
				Downshift when accelerator pedal is depressed	2		1	4	2	2											3
				Upshift when accelerator pedal is released	2		1	4	2	2											3
	Strange noise			In “R” position	2			1													
				In “N” position	2			1													
				In “D” position	2			1													
				Engine at idle	2			1													

Symptom				Diagnostic item																	
				Output speed sensor TM-106	Motor speed signal TM-149	Input speed sensor TM-105	A/T fluid temperature sensor TM-103	Battery voltage TM-158	Transmission range switch TM-102	Manual mode switch TM-134	Stop lamp switch BRC-129	Line pressure solenoid valve TM-120	Clutch 1 solenoid valve TM-133	Low brake solenoid valve TM-155	Front brake solenoid valve TM-124	High and low reverse clutch solenoid valve TM-154	Input clutch solenoid valve TM-122	Direct clutch solenoid valve TM-157	2346 brake solenoid valve TM-156	Anti-interlock solenoid valve TM-121	CAN communication TM-100
Function trouble	Gear does no change	"D" position	Locks in 1GR	1											1		1		1		
			Locks in 5GR					1													
			1GR → 2GR	1											1		1		1		
			2GR → 3GR															1			
			3GR → 4GR	1		1	1							1	1	1	1				1
			4GR → 5GR															1	1		
			5GR → 6GR															1			
			6GR → 7GR											1	1	1	1			1	
			5GR → 4GR														1				
			4GR → 3GR											1		1				1	
			3GR → 2GR						1									1			
			2GR → 1GR						1									1	1		
		"M" position	1GR ⇔ 2GR	2		2	2		2	1		2	2	2	2	2	2	2	2	2	2
			2GR ⇔ 3GR	2		2	2		2	1		2	2	2	2	2	2	2	2	2	2
			3GR ⇔ 4GR	2		2	2		2	1		2	2	2	2	2	2	2	2	2	2
			4GR ⇔ 5GR	2		2	2		2	1		2	2	2	2	2	2	2	2	2	2
			5GR ⇔ 6GR	2		2	2		2	1		2	2	2	2	2	2	2	2	2	2
			6GR ⇔ 7GR	2		2	2		2	1		2	2	2	2	2	2	2	2	2	2

Symptom					Diagnostic item																	
					Control linkage (TM-96)	Output speed sensor (TM-106)	Motor speed signal (TM-149)	Input speed sensor (TM-105)	A/T fluid temperature sensor (TM-103)	Transmission range switch (TM-102)	Manual mode switch (TM-134)	Line pressure solenoid valve (TM-120)	Clutch 1 solenoid valve (TM-133)	Low brake solenoid valve (TM-155)	Front brake solenoid valve (TM-124)	High and low reverse clutch solenoid valve (TM-154)	Input clutch solenoid valve (TM-122)	Direct clutch solenoid valve (TM-157)	2346 brake solenoid valve (TM-156)	Anti-interlock solenoid valve (TM-121)	CAN communication (TM-100)
Function trouble	Poor shifting	Slip	When shifting gears	1GR ⇔ 2GR		3	3	3	4			1							1		2
				2GR ⇔ 3GR		3	3	3	4			1						1			2
				3GR ⇔ 4GR		3	3	3	4			1		1		1				1	2
				4GR ⇔ 5GR		3	3	3	4			1					1		1		2
				5GR ⇔ 6GR		3	3	3	4			1						1	1		2
				6GR ⇔ 7GR		3	3	3	4			1			1				1		2
		Engine brake does not work	“D” position → “M” position			4	4	4	5	3	1	2									3
			“M” position	7GR → 6GR		4	4	4	5	3	1	2			2				2		3
				6GR → 5GR		4	4	4	5	3	1	2						2	2		3
				5GR → 4GR		4	4	4	5	3	1	2					2		2		3
				4GR → 3GR		4	4	4	5	3	1	2		2		2				2	3
				3GR → 2GR		4	4	4	5	3	1	2						2			3
				2GR → 1GR		4	4	4	5	3	1	2							2		3

Symptom				Diagnostic item																	
				TM-96 Control linkage	TM-106 Output speed sensor	TM-149 Motor speed signal	TM-105 Input speed sensor	TM-103 A/T fluid temperature sensor	TM-102 Transmission range switch	TM-134 Manual mode switch	TM-120 Line pressure solenoid valve	TM-133 Clutch 1 solenoid valve	TM-155 Low brake solenoid valve	TM-124 Front brake solenoid valve	TM-154 High and low reverse clutch solenoid valve	TM-122 Input clutch solenoid valve	TM-157 Direct clutch solenoid valve	TM-156 2346 brake solenoid valve	TM-121 Anti-interlock solenoid valve	TM-100 CAN communication
Function trouble	Poor power transmission	Slip	With selector lever in “D” position, acceleration is extremely poor.	5	3	3	3	4			1		1						1	2
			With selector lever in “R” position, acceleration is extremely poor.	5	3	3	3	4			1						1		1	2
			While starting off by accelerating in 1GR, engine races.		3	3	3	4			1		1						1	2
			While accelerating in 2GR, engine races.		3	3	3	4			1		1					1	1	2
			While accelerating in 3GR, engine races.		3	3	3	4			1		1				1	1		2
			While accelerating in 4GR, engine races.		3	3	3	4			1				1		1	1		2
			While accelerating in 5GR, engine races.		3	3	3	4			1				1	1	1		1	2
			While accelerating in 6GR, engine races.		3	3	3	4			1				1	1		1	1	2
			While accelerating in 7GR, engine races.		3	3	3	4			1			1	1	1			1	2
			No creep at all.								1	1	1	1	1	1	1	1	1	
			Extremely large creep.			1														

Symptom			Diagnostic item																
			Control linkage (TM-96)	Output speed sensor (TM-106)	Accelerator pedal position sensor (TM-126)	Motor speed signal (TM-149)	Battery voltage (TM-158)	Transmission range switch (TM-102)	Stop lamp switch (BRC-129)	Line pressure solenoid valve (TM-120)	Clutch 1 solenoid valve (TM-133)	Low brake solenoid valve (TM-155)	Front brake solenoid valve (TM-124)	High and low reverse clutch solenoid valve (TM-154)	Input clutch solenoid valve (TM-122)	Direct clutch solenoid valve (TM-157)	2346 brake solenoid valve (TM-156)	Anti-interlock solenoid valve (TM-121)	CAN communication (TM-100)
Function trouble	Power transmission cannot be performed	Vehicle cannot run in all position.	3					2		1	1	1	1	1	1	1	1	1	
		Driving is not possible in “D” position.	3					2		1	1	1	1	1	1	1	1	1	
		Driving is not possible in “R” position.	3					2		1						1		1	
		Engine stall		3	4	4	5		2		1								
		Engine stalls when selector lever shifted “N” → “D” or “R”.		3	4	4		2			1								
		System does not start in “N” or “P” position.	3				1	2											4
		System starts in position other than “N” or “P”.	2					1											3
	Poor operation	Vehicle does not enter parking condition.	1					2											
		Parking condition is not cancelled.	1					2											
		Vehicle runs with A/T in “P” position.	1					2											
		Vehicle moves forward with the “R” position.	1					2											
		Vehicle runs with A/T in “P” position.	1					2											
		Vehicle moves backward with the “D” position.	1					2											

PERIODIC MAINTENANCE

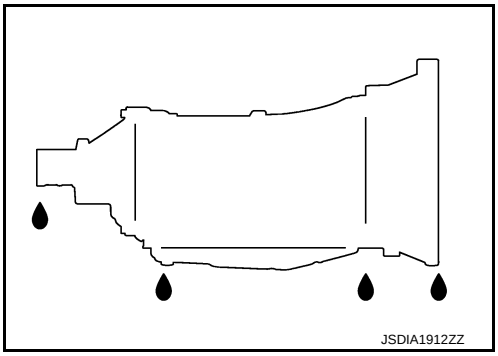
A/T FLUID

Inspection

INFOID:0000000008143241

FLUID LEAKAGE

- Check transaxle surrounding area (oil seal and plug etc.) for fluid leakage.
- If anything is found, repair or replace damaged parts and adjust A/T fluid level. Refer to TM-94, "Adjustment".

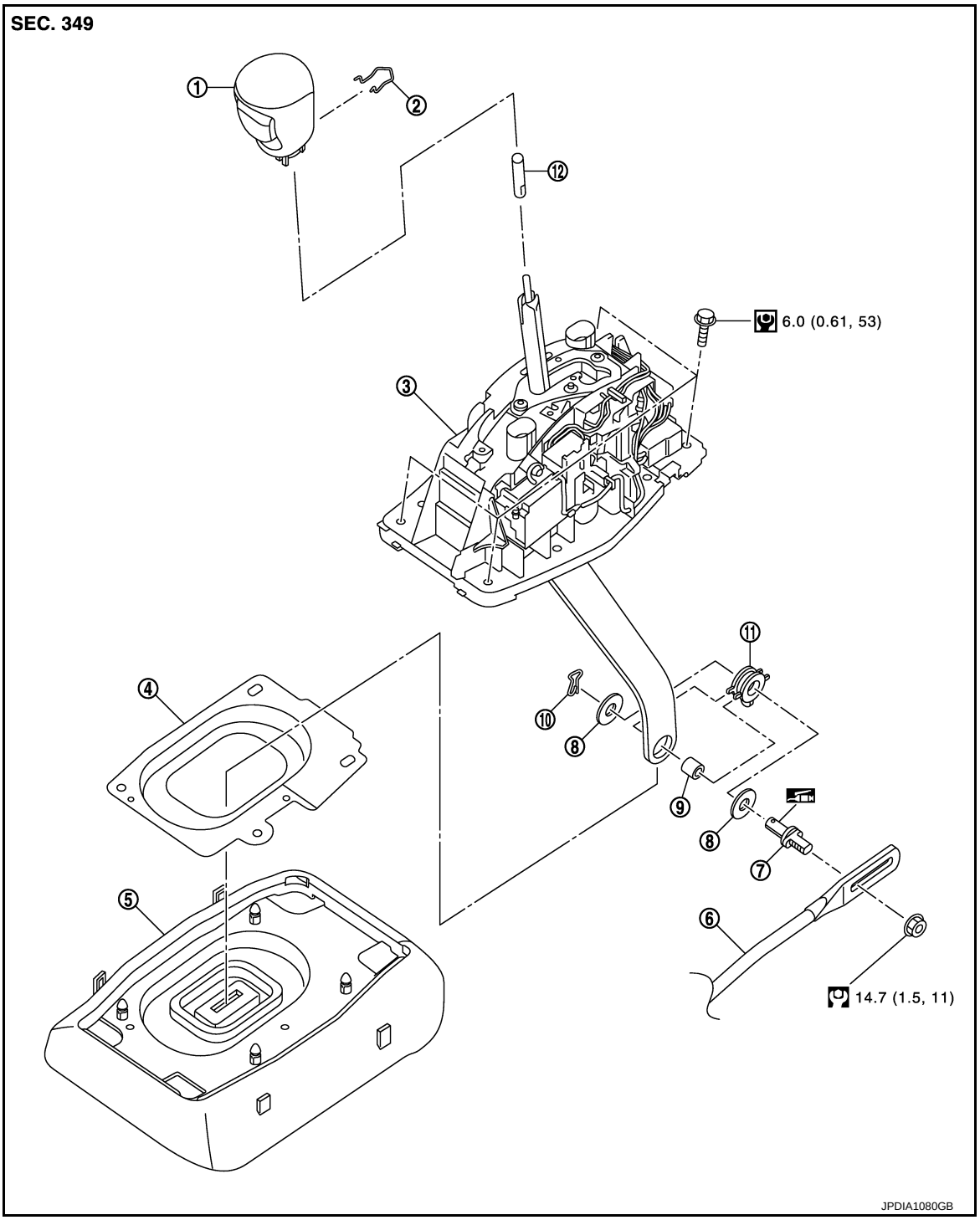


REMOVAL AND INSTALLATION

A/T SHIFT SELECTOR

Exploded View

INFOID:0000000008143242



1. Selector lever knob
2. Lock pin
3. A/T shift selector assembly
4. Dust cover plate
5. Dust cover
6. Control rod
7. Pivot pin
8. Washer
9. Collar
10. Snap pin
11. Insulator
12. Adapter

: Apply multi-purpose grease.

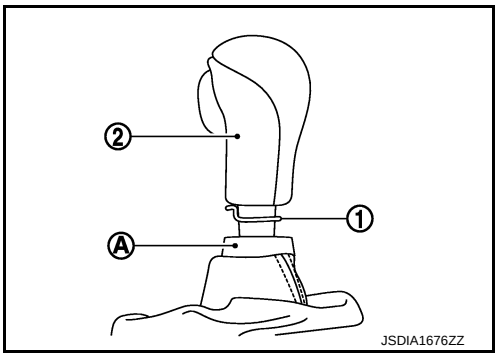
: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000008143243

REMOVAL

1. Shift the selector lever to “P” position.
2. Remove control rod from A/T shift selector assembly.
3. Shift the selector lever to “M” position.
4. Remove knob cover (A) below selector lever downward.
5. Pull lock pin (1) out of selector lever knob (2).
6. Remove selector lever knob.
7. Remove center console assembly. Refer to IP-23, "Exploded View".
8. Shift the selector lever to “P” position.
9. Disconnect A/T shift selector connector.
10. Remove A/T shift selector assembly mounting bolts.
11. Remove harness from A/T shift selector assembly.
12. Remove A/T shift selector assembly from the vehicle.
13. Remove snap pin, washers, insulator, collar and pivot pin from A/T shift selector assembly.
14. Remove dust cover and dust cover plate from A/T shift selector assembly.
15. Remove adapter from A/T shift selector assembly.



INSTALLATION

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

CAUTION:

- **Apply multi-purpose grease on the pin surface (that slides after installing a collar) of the pivot pin.**
- **Apply multi-purpose grease on the surface that the shift lock unit plate slides vertically.**
- Refer to the followings when installing the selector lever knob to the A/T shift selector assembly.

1. Install the lock pin to the selector lever knob.
2. Insert the shift lever knob into the shift lever until it clicks.

   CAUTION:

   - **Install it straight, and never tap or apply any shock to install it.**
   - **Never press selector button.**

Inspection and Adjustment

INFOID:0000000008143244

INSPECTION AFTER INSTALLATION

Check A/T positions after adjusting A/T positions. Refer to TM-96, "Inspection and Adjustment".

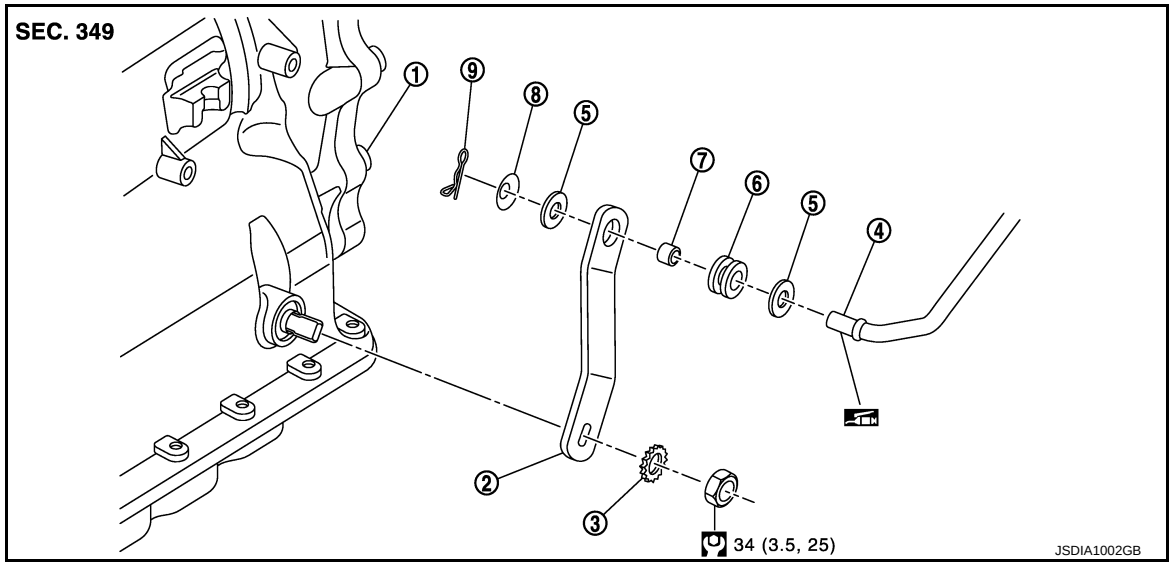
ADJUSTMENT AFTER INSTALLATION

Adjust A/T positions. Refer to TM-96, "Inspection and Adjustment".

CONTROL ROD

Exploded View

INFOID:0000000008143245



1. A/T assembly
2. Manual lever
3. Lock washer
4. Control rod
5. Washer
6. Insulator
7. Collar
8. Conical washer
9. Snap pin

: Apply multi-purpose grease.

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000008143246

REMOVAL

1. Shift the selector lever to “P” position.
2. Remove control rod from A/T shift selector assembly. Refer to TM-179, "Exploded View".
3. Remove manual lever from A/T assembly.
4. Remove control rod from manual lever.
5. Remove insulator and collar from manual lever.

INSTALLATION

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

CAUTION:

Apply multi-purpose grease on the pin surface (that slides after installing collar) of the tip of the control rod.

Inspection

INFOID:0000000008143247

INSPECTION AFTER INSTALLATION

Check A/T positions after adjusting A/T positions. Refer to TM-96, "Inspection and Adjustment".

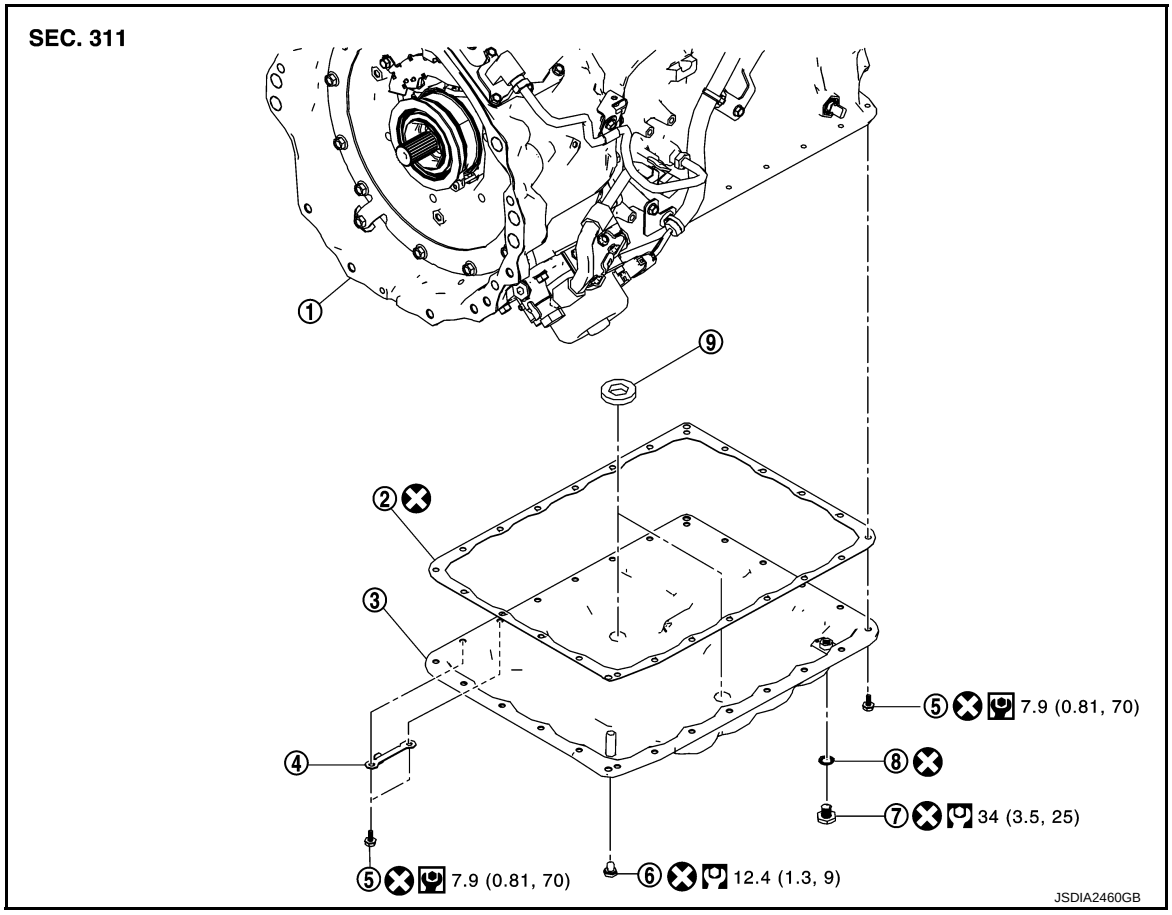
ADJUSTMENT AFTER INSTALLATION

Adjust A/T positions. Refer to TM-96, "Inspection and Adjustment".

OIL PAN

Exploded View

INFOID:0000000008143248



1. Transmission assembly
2. Oil pan gasket
3. Oil pan
4. Clip
5. Oil pan mounting bolt
6. Overflow plug
7. Drain plug
8. Drain plug gasket
9. Magnet

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000008143249

REMOVAL

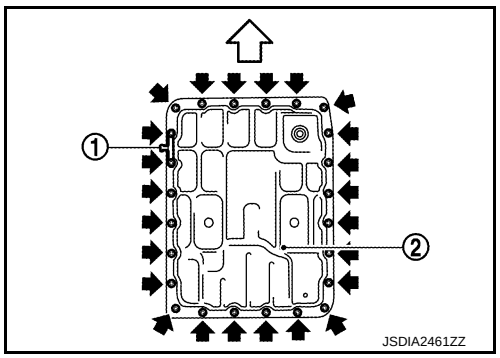
1. Remove the engine under cover rear. Refer to EXT-28, "Exploded View".
2. Drain ATF through drain plug.
3. Remove exhaust mounting bracket with power tool. Refer to EX-5, "Exploded View".
4. Remove heated oxygen sensor 2 harness from clip.

5. Remove clip (1).

⇦ : Vehicle front

⬅ : Oil pan mounting bolt

6. Remove oil pan (2) and oil pan gasket.
7. Remove magnets from oil pan.



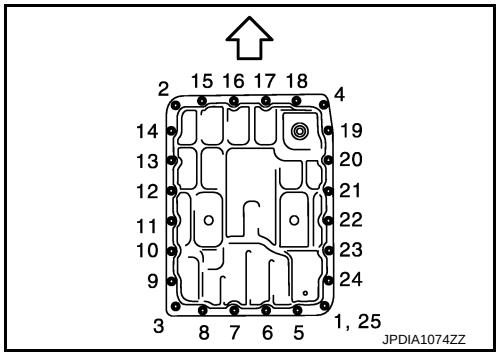
INSTALLATION

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

CAUTION:

- **Clean foreign materials (gear wear particles) that adhere on the inside of the oil pan and on the magnet, and then assembly.**
- **Completely remove all moisture, oil and old gasket, etc. from oil pan gasket mounting surface of transmission case and oil pan.**
- **Never reuse oil pan gasket and oil pan mounting bolts. Failure to do this may cause the leakage of ATF.**
- **Install oil pan gasket in the direction to align hole position.**
- **Never reuse drain plug and drain plug gasket. Failure to do this may cause the leakage of ATF. In addition, install new drain plug and drain plug gasket after adjustment of A/T fluid filling.**
- Tighten the oil pan mounting bolts to the specified torque in the numerical order as shown in the figure after temporarily tightening them.

⇦ : Vehicle front

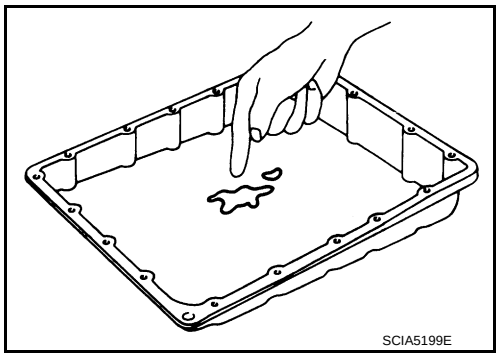


Inspection and Adjustment

INFOID:0000000008143250

INSPECTION AFTER REMOVAL

Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.



INSPECTION AFTER INSTALLATION

Check A/T fluid leakage.TM-178, "Inspection".

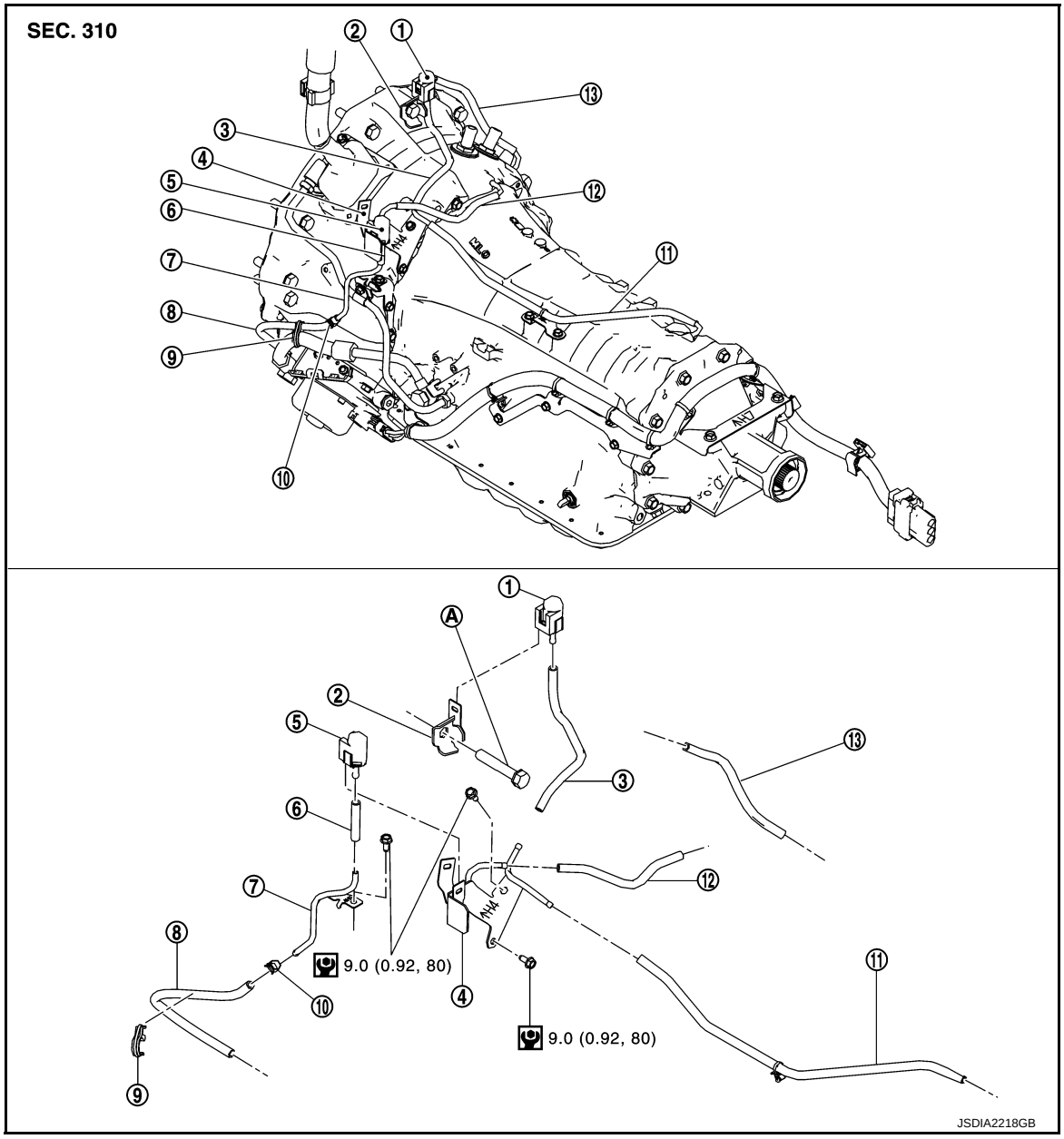
ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to TM-94, "Adjustment".

AIR BREATHER

Exploded View

INFOID:0000000008143251



1. Air breather box A
2. Bracket
3. Air breather hose A
4. Air breather tube A
5. Air breather box B
6. Air breather hose C
7. Air breather tube B
8. Air breather hose D
9. Clip
10 Hose clamp
11. Air breather hose B
12. Air breather hose E
13 Air breather hose F

A. Tightening must be done following the installation procedure. Refer to TM-190, "Removal and Installation".

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000008143252

REMOVAL

NOTE:

The removal and installation of parts other than those listed as per the following require that the transmission assembly be removed from the vehicle.

Air Breather Hose F

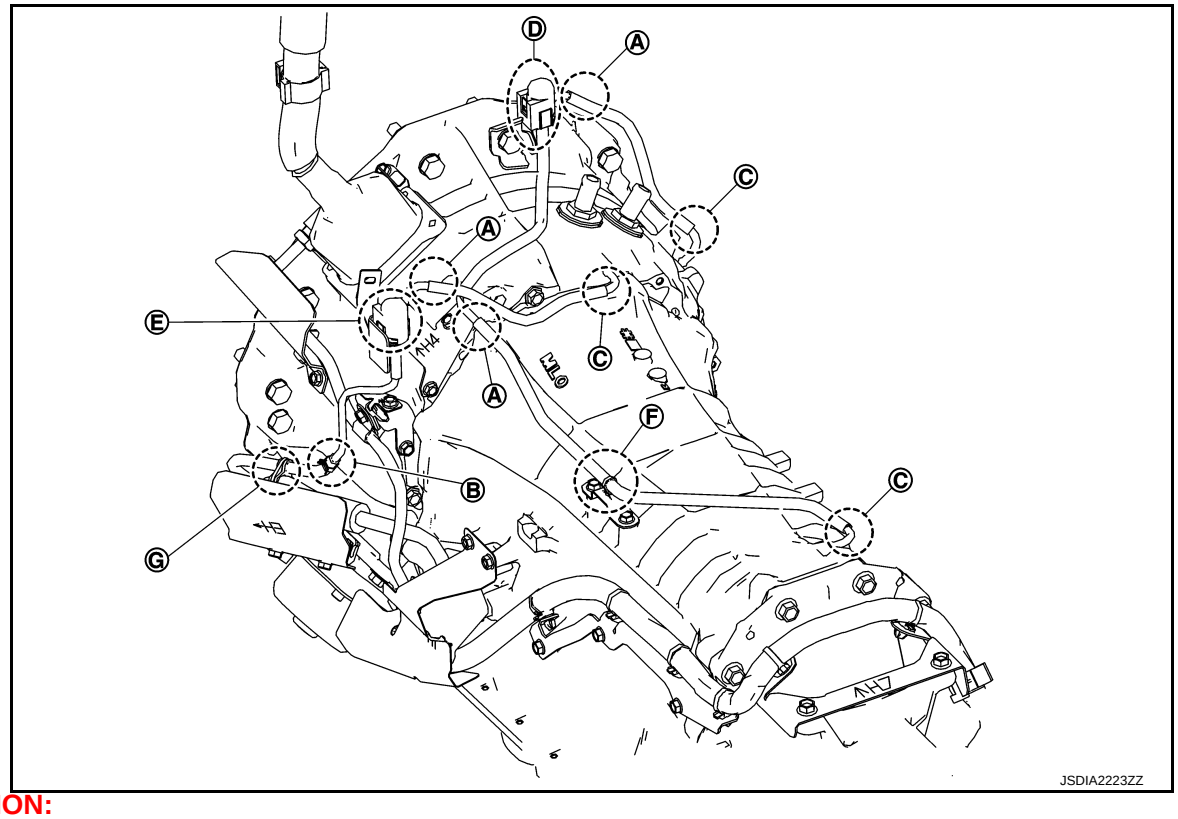
1. Remove the three way catalyst (bank 1). Refer to EX-5, "Exploded View".
2. Remove the air breather hose F.

Air Breather Hose D And Air Breather Tube B

1. Remove the three way catalyst (bank 2). Refer to EX-5, "Exploded View".
2. Remove the heat insulator (sub electric oil pump tube). Refer to TM-190, "Exploded View".
3. Remove the air breather hose D and air breather tube B.

INSTALLATION

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



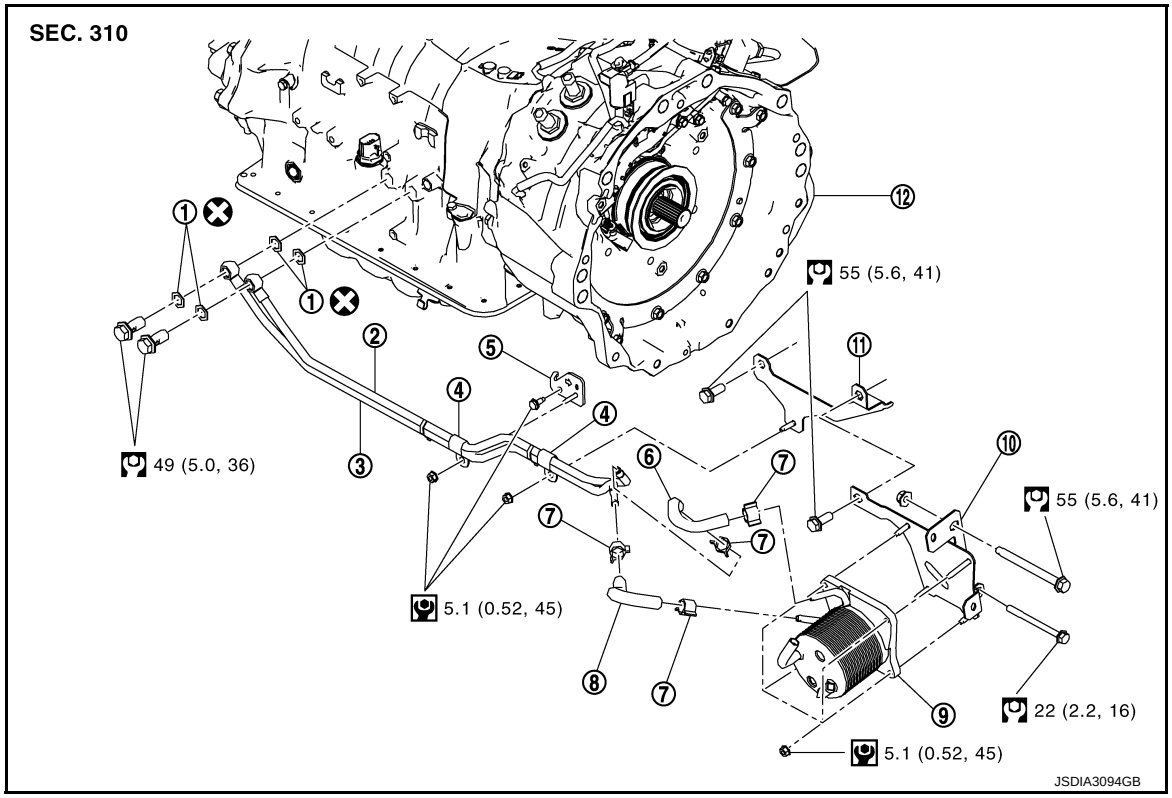
CAUTION:

- **Never bend the air breather hose to prevent damage to the hose.**
- **Figure A**
- **Insert air breather hose to air breather tube so that the paint mark is facing upward.**
- **Insert air breather hose to air breather tube all the way to the curve of the tube.**
- **Figure B**
- **Insert air breather hose to air breather tube so that the paint mark is facing leftward.**
- **Insert air breather hose to air breather tube all the way to the curve of the tube.**
- **Install hose clamp so that its tab is facing leftward.**
- **Figure C**
- **Insert air breather hose to air breather tube all the way to the curve of the tube.**
- **Figure D**
- **Insert air breather hose to air breather box so that the paint mark is facing backward.**
- **Be sure to insert air breather hose to air breather box until hose end reaches the stop.**
- **Insert the air breather box into the bracket until it fully locks in place.**
- **Figure E**
- **Insert the air breather box into the bracket until it fully locks in place.**
- **Figure F**
- **Securely install clip to bracket.**
- **Figure G**
- **Securely install clip to air breather hose and sub electric oil pump tube.**

FLUID WARMER SYSTEM

Exploded View

INFOID:0000000008143253



1. Copper washer
2. Fluid warmer tube A
3. Fluid warmer tube B
4. Clip
5. Bracket
6. Fluid warmer hose A
7. Hose clamp
8. Fluid warmer hose B
9. Fluid warmer
10. Bracket
11. Bracket
12. Transmission assembly

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000008143254

REMOVAL

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.

CAUTION:

To prevent a burns, perform these steps after the coolant temperature has cooled sufficiently.

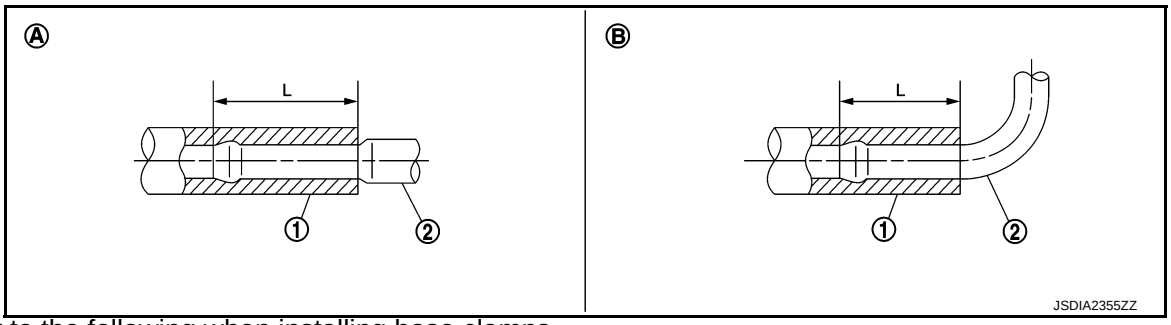
1. Remove the engine under cover and engine under cover rear. Refer to EXT-28, "Exploded View".
2. Remove fluid warmer hose A and fluid warmer hose B from fluid cooler tubes.
3. Remove water hose from fluid warmer.
   NOTE:
   Cap or plug openings to prevent engine coolant from spilling.
4. Remove harness mounting clip from bracket.
5. Remove fluid warmer mounting nuts.
6. Remove fluid warmer from bracket.

7. Remove fluid warmer tube mounting bolts.
NOTE:
Cap or plug openings to prevent fluid from spilling.
8. Remove fluid warmer tubes from the vehicle.
CAUTION:
Be careful not to bend fluid warmer tubes.

INSTALLATION

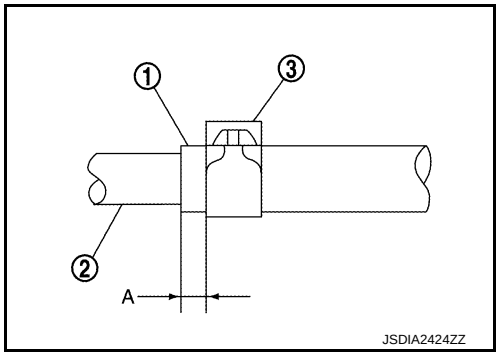
Note the following and install in the reverse order of removal.
CAUTION:
Never reuse copper washers. Failure to do this may cause the leakage of ATF.
- Refer to the following when installing fluid warmer hoses.

Fluid warmer hose (1)	Installation side tube (2)	Direction of paint mark	Dimension “L”
Fluid warmer hose A	Fluid warmer tube A	Upward	A: 33 mm (1.30) (End reaches the 2-stage bulge)
	Fluid warmer	Upward	B: 30 mm (1.18) (End reaches the tube bend R position)
Fluid warmer hose B	Fluid warmer	Backward	B: 30 mm (1.18) (End reaches the tube bend R position)
	Fluid warmer tube B	Upward	A: 33 mm (1.30) (End reaches the 2-stage bulge)



- Refer to the following when installing hose clamps.
CAUTION:
To prevent leakage of ATF, hose clamp should not interfere with the bulge of tube.

Fluid warmer hose (1)	Installation side tube (2)	Hose clamp (3)	
		Direction of tab	Clamping position
Fluid warmer hose A	Fluid warmer tube A	Rightward	5 – 7 mm (0.20 – 0.28 in) (A) from hose end
	Fluid warmer	Rightward and 45° upward	
Fluid warmer hose B	Fluid warmer	Rightward	
	Fluid warmer tube B	Leftward and 60° downward	



Inspection and Adjustment

INFOID:0000000008143255

INSPECTION AFTER INSTALLATION

Check A/T fluid leakage.TM-178, "Inspection".

ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to TM-94, "Adjustment".

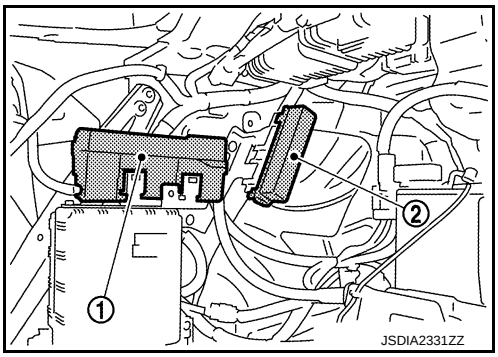
SUB ELECTRIC OIL PUMP INVERTER

Removal and Installation

INFOID:0000000008143256

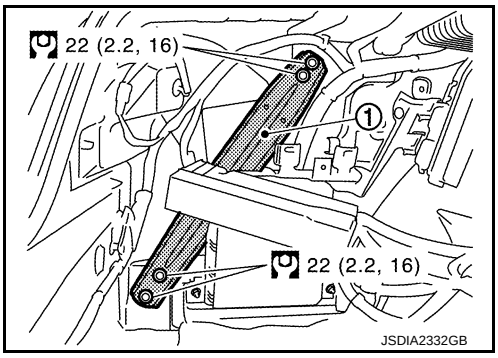
REMOVAL

1. Disconnect 12V battery cable from negative terminal. Refer to PG-141, "Exploded View".
2. Remove trunk side finisher LH. Refer to INT-52, "TRUNK SIDE FINISHER : Removal and Installation".
3. Remove fuse and relay box (1) and relay box (2) from bracket.

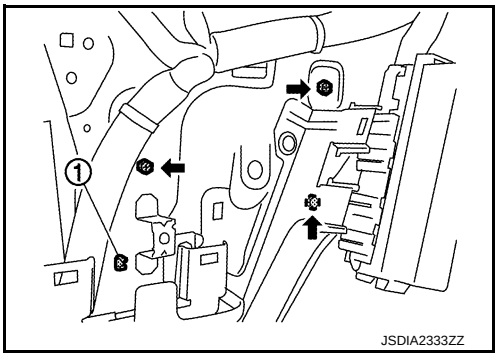


4. Remove rear floor gusset LH (1).

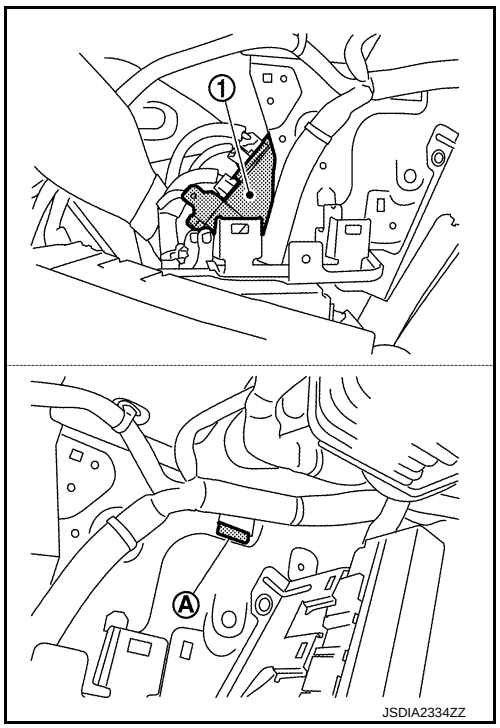
: N·m (kg-m, ft-lb)



5. Remove sub electric oil pump inverter mounting screws (⬅).
6. Remove harness mounting clip (1) from trunk room panel.



7. Lift up the sub electric oil pump inverter (1) and disconnect the temporary fastening hook (A) from the trunk room panel, then pull the sub electric oil pump inverter forward to pull it out.
CAUTION:
Never drop the sub electric oil pump inverter.
8. Disconnect each connector from sub electric oil pump inverter.



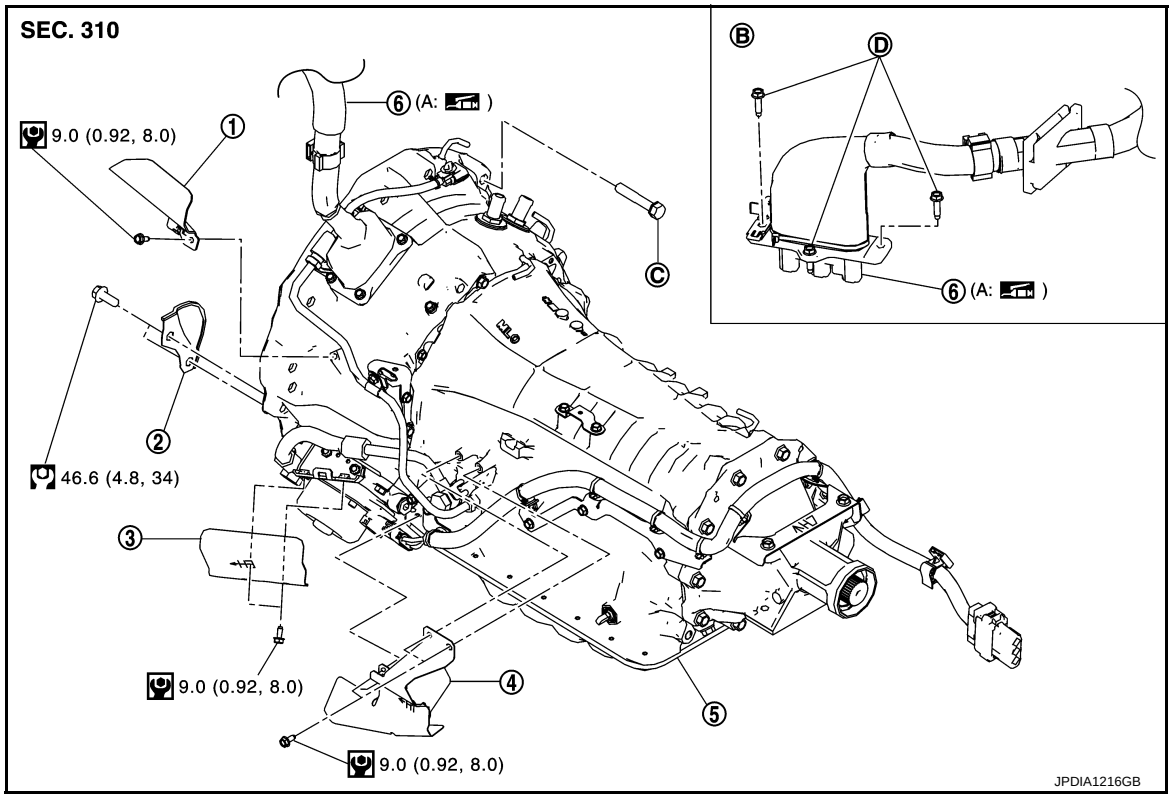
INSTALLATION
Install in the reverse order of removal.

UNIT REMOVAL AND INSTALLATION

TRANSMISSION ASSEMBLY

Exploded View

INFOID:0000000008143257



1. Heat insulator (CSC tube)
2. Rear plate cover
3. Heat insulator (sub electric oil pump tube)
4. Heat insulator (sub electric oil pump harness)
5. Transmission assembly
6. 3-phase harness

A. O-ring of 3-phase harness

B. Traction motor inverter side

C. Tightening must be done following the installation procedure. Refer to TM-190, "Removal and Installation".

D. For installation of the 3-phase harness, refer to TMS-121, "Removal and Installation".

: N·m (kg-m, in-lb)

: Waterproof grease

Removal and Installation

INFOID:0000000008143258

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 HBB-6, "High Voltage Precautions".**

CAUTION:

- **Be sure to remove the A/T assembly from the vehicle together with the engine. Removing the A/T assembly alone may apply an excessive load to the 3-phase harness resulting in damage.**
- **Replace A/T assembly when separate engine and A/T assembly. Because CSC (Concentric Slave Cylinder) slides back to the original position every time when removing A/T assembly. At this timing, dust on the sliding parts may damage a seal of CSC and may cause A/T fluid leakage.**

REMOVAL

1. Remove A/T assembly with engine from the vehicle. Refer to EM-78, "Removal and Installation".
2. Remove following parts from A/T assembly.
   - Manual lever and control rod. Refer to TM-181, "Exploded View"
   - Air breather hose and air breather tube. Refer to TM-184, "Exploded View".
   - Fluid warmer tube. Refer to TM-186, "Exploded View".
   - Heat insulators
3. Remove bolts fixing A/T assembly and engine with a power tool.

   WARNING:

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

4. Separate A/T assembly from engine.

   WARNING:

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

INSTALLATION

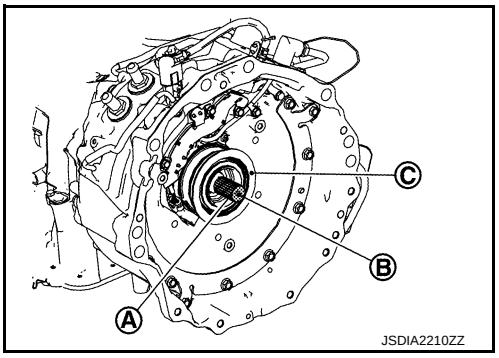
Note the following and Install in the reverse order of removal.

WARNING:

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

- Apply the recommended grease* to the full periphery of the A/T assembly shaft spline (A).
  *: Lithium-based grease including molybdenum disulphide.

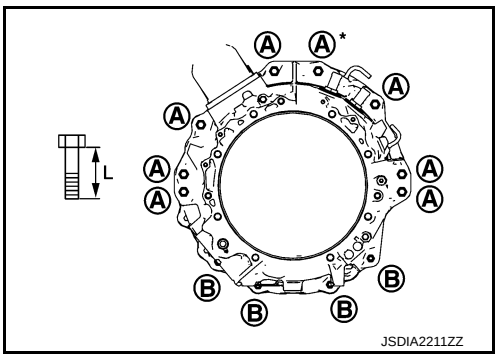
  CAUTION:
  - **Remove any grease that contacts the A/T assembly shaft end (B).**
  - **Never apply grease to the A/T assembly CSC end (C). Fully remove any grease that contacts the CSC end.**



- When installing A/T assembly to the engine, attach the fixing bolts in accordance with the following standard.

Bolt symbol	A	B
Insertion direction	A/T assembly to engine	Engine to A/T assembly
Number of bolts	8	4
Bolt length “L“ mm (in)	65 (2.56)	35 (1.38)
Tightening torque N·m (kg-m, ft-lb)	75 (7.7, 55)	46.6 (4.8, 34)

*: Tightening the bolt with bracket. Refer to TM-184, "Exploded View".



Inspection and Adjustment

INFOID:0000000008143259

INSPECTION AFTER INSTALLATION

Check A/T Fluid Leakage
Check A/T position after adjusting A/T positions. Refer to TM-96, "Inspection and Adjustment".

Equipotential Test
After installing transmission assembly, measure resistance below.
- Between transmission (aluminum part) and body (ground bolt)
- Between transmission (aluminum part) and electric compressor (aluminum part).

WARNING:

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

Standard : Less than 0.1 Ω

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

ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to TM-94, "Adjustment".
- Adjust A/T position. Refer to TM-96, "Inspection and Adjustment".
- Perform “CLUTCH 1 POSITION LEARNING”. Refer to HBC-88, "Description".

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000008143260

Engine		VQ35HR
Motor type		HM34
Axle		2WD
Transmission model code number		X960A, X961A, X963A, X964A, X966A
Transmission gear ratio	1st	4.783
	2nd	3.103
	3rd	1.984
	4th	1.371
	5th	1.000
	6th	0.871
	7th	0.776
	Reverse	3.859
Recommended fluid		Genuine NISSAN Matic S ATF*1
Fluid capacity		7.0 liter (7-3/8 US qt, 6-1/8 Imp qt)*2

CAUTION:

- **Use only Genuine NISSAN Matic S ATF. Never mix with other ATF.**
- **Using ATF other than Genuine NISSAN Matic S ATF will cause deterioration driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.**

*1: Refer to MA-10, "Fluids and Lubricants".

*2: The fluid capacity is the reference value.

Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000008143261

STANDARD MODE

Unit: km/h (MPH)

Gear position	Throttle position	
	Full throttle	Half throttle
D1 → D2	68 – 72 (43 – 44)	21 – 25 (13 – 15)
D2 → D3	103 – 111 (64 – 68)	49 – 57 (31 – 35)
D3 → D4	162 – 172 (101 – 106)	77 – 87 (48 – 54)
D4 → D5	237 – 247 (147 – 153)	105 – 115 (66 – 71)
D5 → D6	250 – 260 (155 – 162)	213 – 223 (133 – 138)
D6 → D7	250 – 260 (155 – 162)	250 – 260 (155 – 162)
D7 → D6	245 – 255 (152 – 158)	78 – 88 (49 – 54)
D6 → D5	235 – 245 (146 – 152)	78 – 88 (49 – 54)
D5 → D4	202 – 212 (125 – 131)	57 – 67 (36 – 41)
D4 → D3	127 – 137 (78 – 85)	39 – 49 (25 – 30)
D3 → D2	57 – 65 (35 – 40)	18 – 26 (12 – 16)
D2 → D1	16 –20 (10 – 12)	11 – 15 (7 – 9)

- At half throttle, the accelerator opening is 4/8 of the full opening.

ECO MODE

Unit: km/h (MPH)

Gear position	Throttle position	
	Full throttle	Half throttle
$D_1 \rightarrow D_2$	68 – 72 (43 – 44)	18 – 22 (12 – 13)
$D_2 \rightarrow D_3$	103 – 111 (64 – 68)	44 – 52 (28 – 32)
$D_3 \rightarrow D_4$	162 – 172 (101 – 106)	68 – 88 (43 – 54)
$D_4 \rightarrow D_5$	237 – 247 (147 – 153)	95 – 105 (59 – 65)
$D_5 \rightarrow D_6$	250 – 260 (155 – 162)	149 – 159 (93 – 98)
$D_6 \rightarrow D_7$	250 – 260 (155 – 162)	173 – 183 (108 – 113)
$D_7 \rightarrow D_6$	245 – 255 (152 – 158)	67 – 77 (42 – 47)
$D_6 \rightarrow D_5$	235 – 245 (146 – 152)	67 – 77 (42 – 47)
$D_5 \rightarrow D_4$	202 – 212 (125 – 131)	46 – 56 (29 – 34)
$D_4 \rightarrow D_3$	127 – 137 (78 – 85)	31 – 41 (20 – 25)
$D_3 \rightarrow D_2$	57 – 65 (35 – 40)	18 – 26 (12 – 16)
$D_2 \rightarrow D_1$	16 –20 (10 – 12)	11 – 15 (7 – 9)

- At half throttle, the accelerator opening is 4/8 of the full opening.

SPORT MODE

Unit: km/h (MPH)

Gear position	Throttle position	
	Full throttle	Half throttle
$D_1 \rightarrow D_2$	68 – 72 (43 – 44)	31 – 35 (20 – 21)
$D_2 \rightarrow D_3$	103 – 111 (64 – 68)	63 – 71 (40 – 44)
$D_3 \rightarrow D_4$	162 – 172 (101 – 106)	97 – 107 (61 – 66)
$D_4 \rightarrow D_5$	237 – 247 (147 – 153)	137 – 147 (86 – 91)
$D_5 \rightarrow D_6$	250 – 260 (155 – 162)	225 – 235 (140 – 146)
$D_6 \rightarrow D_7$	250 – 260 (155 – 162)	250 – 260 (155 – 162)
$D_7 \rightarrow D_6$	245 – 255 (152 – 158)	145 – 155 (91 – 96)
$D_6 \rightarrow D_5$	235 – 245 (146 – 152)	109 – 119 (68 – 73)
$D_5 \rightarrow D_4$	202 – 212 (125 – 131)	75 – 85 (41 – 52)
$D_4 \rightarrow D_3$	127 – 137 (78 – 85)	55 – 65 (35 – 40)
$D_3 \rightarrow D_2$	57 – 65 (35 – 40)	22 – 30 (14 – 18)
$D_2 \rightarrow D_1$	16 –20 (10 – 12)	11 – 15 (7 – 9)

- At half throttle, the accelerator opening is 4/8 of the full opening.