SECTION TM
TRANSAXLE & TRANSMISSION

CONTENTS

7AT: RE7R01A

PRECAUTION

PRECAUTIONS

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

INFOID:0000000009354645

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:

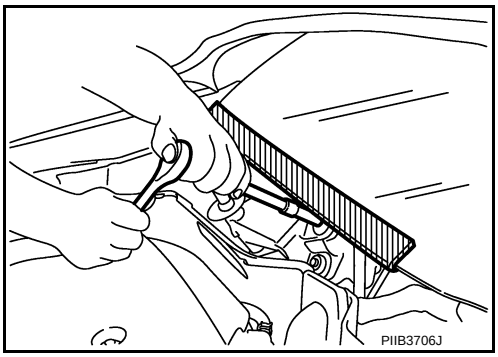
Always observe the following items for preventing accidental activation.

- **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 battery, and wait at least 3 minutes before performing any service.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000009354646

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



On Board Diagnostic (OBD) System of Engine and A/T

INFOID:0000000009235921

The ECM has an on board diagnostic system. It will illuminate the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

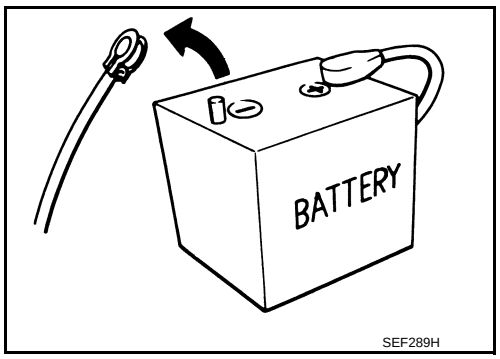
- **Always turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to illuminate.**
- **Always connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to illuminate due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**

- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-6, "Harness Connector".**
- **Always route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to illuminate due to the short circuit.**
- **Always connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to illuminate due to the malfunction of the EVAP system or fuel injection system, etc.**
- **Always erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.**

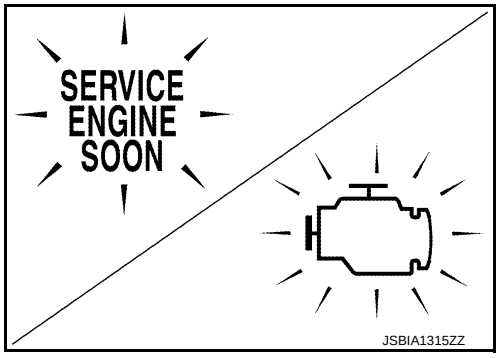
General Precautions

INFOID:0000000009235922

- **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-14, "FOR NORTH AMERICA : Fluids and Lubricants" (For North America) or MA-15, "FOR MEXICO : Fluids and Lubricants" (For Mexico).
- 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 transmission 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-205, "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.

Service Notice or Precaution

INFOID:0000000009235923

ATF COOLER SERVICE

If ATF contains frictional material (clutches, bands, etc.), or if a transmission is repaired, overhauled, or replaced, inspect and clean the A/T fluid cooler mounted in the radiator or replace the radiator. Flush cooler lines using cleaning solvent and compressed air after repair. For A/T fluid cooler cleaning procedure, refer to TM-101, "Cleaning". For radiator replacement, refer to CO-13, "Exploded View".

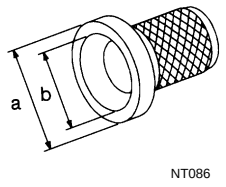
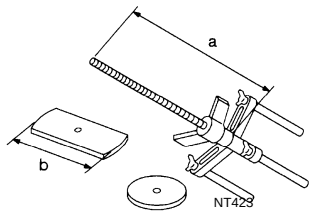
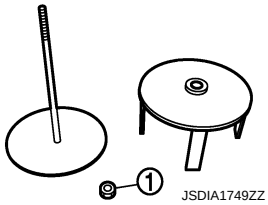
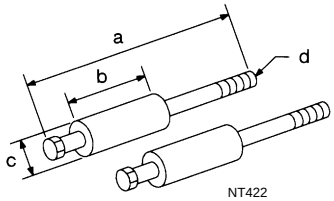
PREPARATION

PREPARATION

Special Service Tool

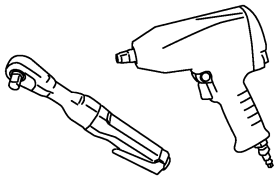
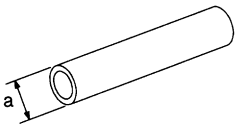
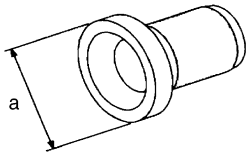
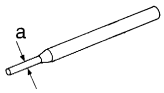
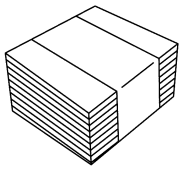
INFOID:0000000009235924

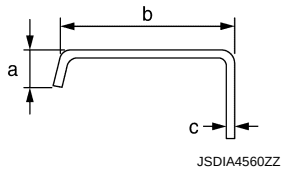
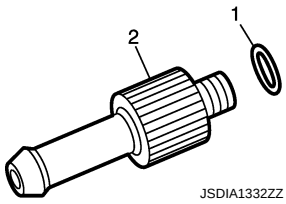
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST33400001 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  NT086	• Installing rear oil seal (2WD) • Installing oil pump housing oil seal
KV31102400 (J-34285 and J-34285-87) Clutch spring compressor a: 320 mm (12.60 in) b: 174 mm (6.85 in)  NT423	• Installing reverse brake return spring retainer • Removing and installing 2346 brake spring retainer
KV31103800 Clutch spring compressor 1. M12×1.75P  JSDIA1749ZZ	Removing and installing front brake spring retainer
ST25850000 (J-25721-A) Sliding hammer a: 179 mm (7.05 in) b: 70 mm (2.76 in) c: 40 mm (1.57 in) d: M12X1.75P  NT422	Removing oil pump assembly

Commercial Service Tool

INFOID:0000000009235925

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Drift a: 22 mm (0.87 in) dia.  NT083	Installing manual shaft oil seals
Drift a: 64 mm (2.52 in) dia.  SCIA5338E	Installing rear oil seal (AWD)
Pin punch a: 4 mm (0.16 in) dia.  NT410	Removing retaining pin
Lint-free paper  JSDIA4746ZZ	Cleaning transmission

Tool name	Description
Wire a: Approx. 15 mm (0.59 in) b: Approx. 100 mm (3.94 in) c: Approx. 3 mm (0.118 in) [Bend a 1.5 (0.059) dia. wire in half.]  JSDIA4560ZZ	Checking torque converter one-way clutch
1. 315268E000* O-ring 2. 310811EA5A* Charging pipe  JSDIA1332ZZ	Changing and adjustment A/T fluid

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

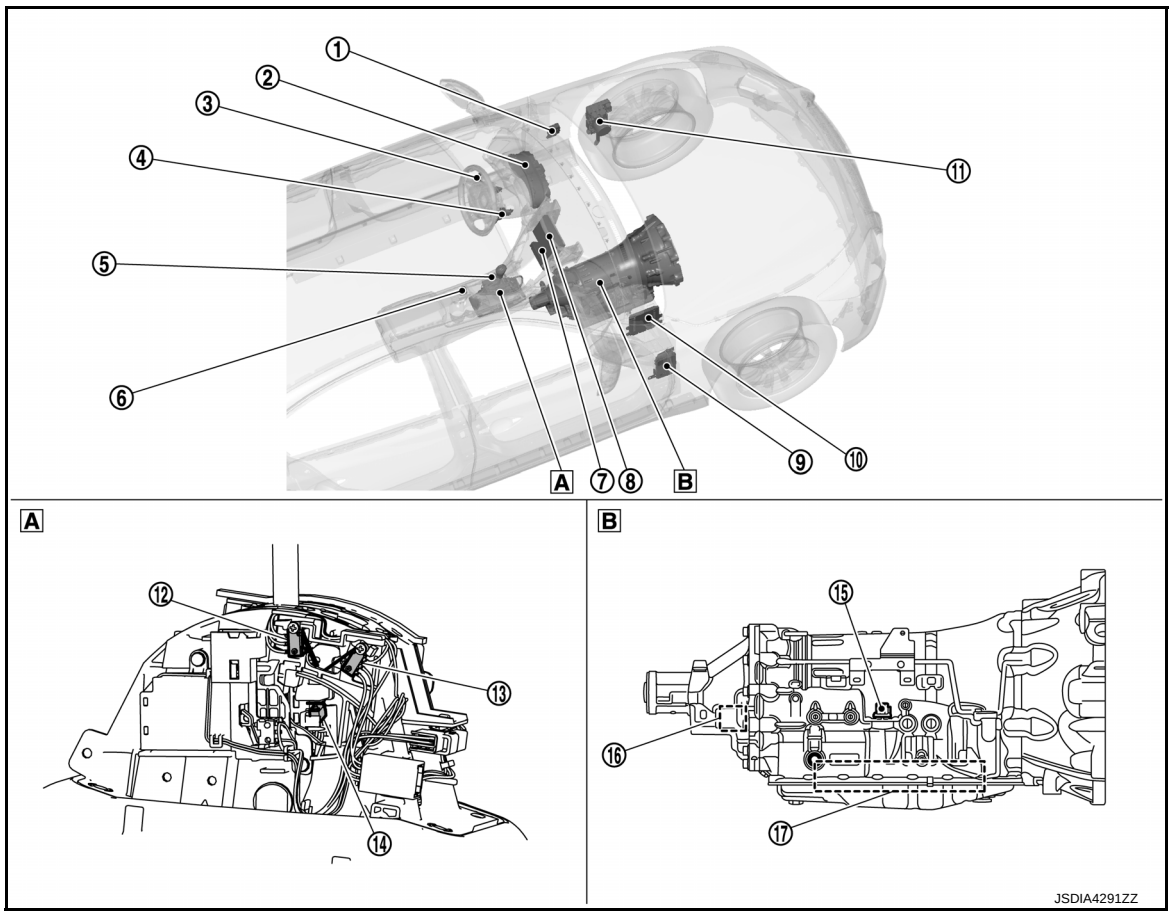
SYSTEM DESCRIPTION

COMPONENT PARTS

A/T CONTROL SYSTEM

A/T CONTROL SYSTEM : Component Parts Location

INFOID:0000000009235926



A A/T shift selector assembly B Transmission assembly

No.	Component	Function
①	Chassis control module	Mainly transmits the following signal to TCM via CAN communication. • Drive mode signal Refer to DAS-393, "Component Parts Location" for detailed installation location.
②	Combination meter	Mainly transmits the following signal to TCM via CAN communication. • Vehicle speed signal • Manual mode signal • Non-manual mode signal • Manual mode upshift signal • Manual mode downshift signal • Paddle shifter upshift signal*1 • Paddle shifter downshift signal*1 Mainly receives the following signals from TCM via CAN communication. • Shift position signal • Manual mode shift refusal signal Refer to MWI-7, "METER SYSTEM : Component Parts Location" for detailed installation location.
③	Paddle shifter (down)*1	TM-20, "A/T CONTROL SYSTEM : Paddle Shifter"

No.	Component		Function
④	Paddle shifter (up)*1		TM-20, "A/T CONTROL SYSTEM : Paddle Shifter"
⑤	Selector lever position indicator		TM-20, "A/T CONTROL SYSTEM : Selector Lever Position Indicator"
⑥	Drive mode select switch		DMS-6, "Drive Mode Select Switch"
⑦	NAVI control unit		AV-19, "NAVI Control Unit"
⑧	Display control unit		Mainly transmits the following signal to TCM via CAN communication.*3 • Curve signal • Road data signal • Vehicle speed signal • NAVI shift control switch signal Mainly receives the following signals from TCM via CAN communication.*3 • NAVI shift control status signal Refer to AV-14, "Component Parts Location" for detailed installation location.
⑨	BCM		Mainly transmits the following signal to TCM via CAN communication. • Stop lamp switch signal Refer to BCS-4, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.
⑩	ECM		Mainly transmits the following signal to TCM via CAN communication. • Engine and A/T integrated control signal **NOTE:** General term for the communication (torque-down permission, torque-down request, etc.) exchanged between the ECM and TCM. • Engine speed signal • Engine coolant temperature signal • Accelerator pedal position signal • Closed throttle position signal • Wide open throttle position signal • ASCD OD cancel request signal • NAVI shift control indication request signal*3 Refer to EC-16, "ENGINE CONTROL SYSTEM : Component Parts Location" for detailed installation location.
⑪	ABS actuator and electric unit (control unit)		Mainly transmits the following signal to TCM via CAN communication. • ABS operation signal • TCS gear keep request signal • A/T shift schedule change demand signal • Side G sensor signal Refer to BRC-9, "Component Parts Location" for detailed installation location.
⑫	Manual mode switch	Position select switch (up)	TM-20, "A/T CONTROL SYSTEM : Manual Mode Switch"
⑬		Position select switch (down)	
⑭		Mode select switch	
⑮	A/T assembly connector		—
⑯	Output speed sensor		TM-15, "A/T CONTROL SYSTEM : Output Speed Sensor"

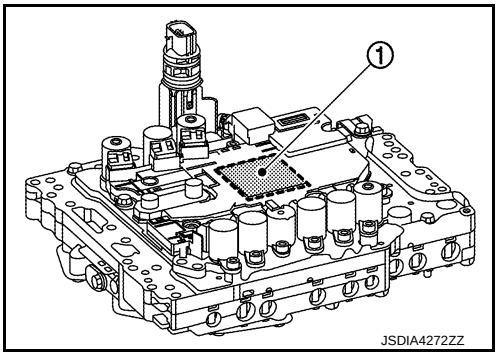
No.	Component		Function
⑰	Control valve & TCM	TCM*2	TM-14, "A/T CONTROL SYSTEM : TCM"
		Transmission range switch*2	TM-14, "A/T CONTROL SYSTEM : Transmission Range Switch"
		Input speed sensor 1, 2*2	TM-15, "A/T CONTROL SYSTEM : Input Speed Sensor"
		A/T fluid temperature sensor*2	TM-15, "A/T CONTROL SYSTEM : A/T Fluid Temperature Sensor"
		Input clutch solenoid valve*2	TM-15, "A/T CONTROL SYSTEM : Input Clutch Solenoid Valve"
		Direct clutch solenoid valve*2	TM-16, "A/T CONTROL SYSTEM : Direct Clutch Solenoid Valve"
		High and low reverse clutch solenoid valve*2	TM-17, "A/T CONTROL SYSTEM : High and Low Reverse Clutch Solenoid Valve"
		Front brake solenoid valve*2	TM-16, "A/T CONTROL SYSTEM : Front Brake Solenoid Valve"
		Low brake solenoid valve*2	TM-17, "A/T CONTROL SYSTEM : Low Brake Solenoid Valve"
		2346 brake solenoid valve*2	TM-18, "A/T CONTROL SYSTEM : 2346 Brake Solenoid Valve"
		Anti-interlock solenoid valve*2	TM-18, "A/T CONTROL SYSTEM : Anti-interlock Solenoid Valve"
		Line pressure solenoid valve*2	TM-19, "A/T CONTROL SYSTEM : Line Pressure Solenoid Valve"
		Torque converter clutch solenoid valve*2	TM-19, "A/T CONTROL SYSTEM : Torque Converter Clutch Solenoid Valve"

*1: With paddle shifter
*2: These components are included in control valve & TCM.
*3: For North America

A/T CONTROL SYSTEM : TCM

INFOID:0000000009235928

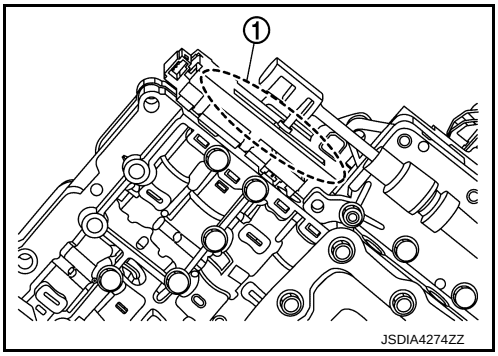
- The TCM ① is integral with the control valve assembly and built into the transmission assembly.
- The TCM consists of a microcomputer and connectors for signal input and output and for power supply.
- The vehicle driving status is judged based on the signals from the sensors, switches, and other control units, and the optimal transmission control is performed.
- For TCM control items, refer to TM-51, "A/T CONTROL SYSTEM : System Description".



A/T CONTROL SYSTEM : Transmission Range Switch

INFOID:0000000009235929

- The transmission range switch ① is installed to control valve assembly.
- 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.

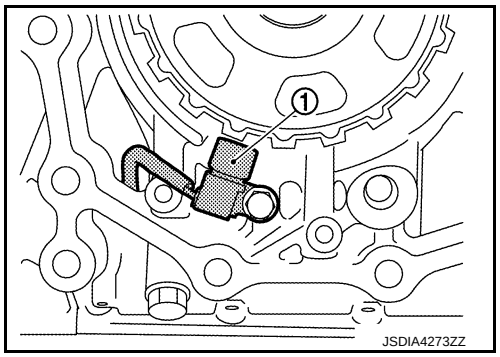


Select lever position	Transmission range switch			
	SW1	SW2	SW3	SW4
P	OFF	OFF	OFF	OFF
R	ON	OFF	OFF	ON
N	ON	ON	OFF	OFF
D and M	ON	ON	ON	ON

A/T CONTROL SYSTEM : Output Speed Sensor

INFOID:0000000009235930

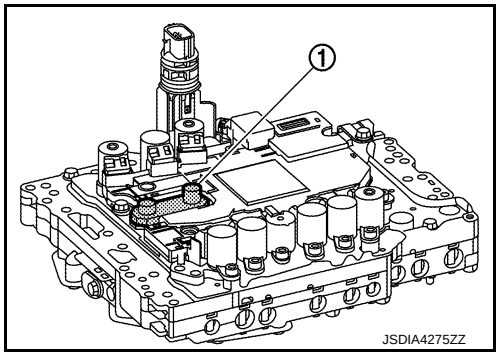
- The output speed sensor ① is installed to rear side of transmission case.
- The output speed sensor detects the revolution of the parking gear and emits a pulse signal. The pulse signal is transmitted to the TCM which converts it into vehicle speed.



A/T CONTROL SYSTEM : Input Speed Sensor

INFOID:0000000009235931

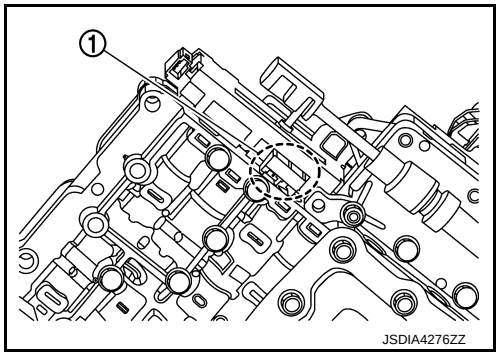
- The input speed sensor ① is installed to control valve assembly.
- The input speed sensor detects input shaft rpm (revolutions per minute). It is located on the input side of the A/T. Monitors revolution of sensor 1 and sensor 2 for non-standard conditions.



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

INFOID:0000000009235932

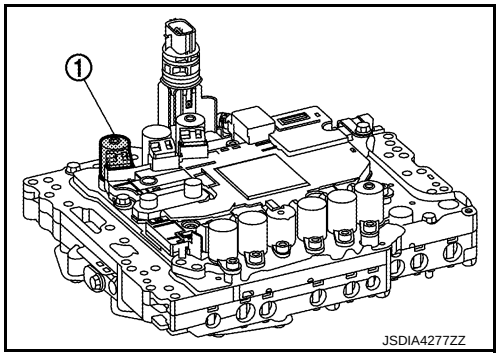
- The A/T fluid temperature sensor ① is installed to control valve assembly.
- The A/T fluid temperature sensor detects the A/T fluid temperature and transmits a signal to the TCM.



A/T CONTROL SYSTEM : Input Clutch Solenoid Valve

INFOID:0000000009235933

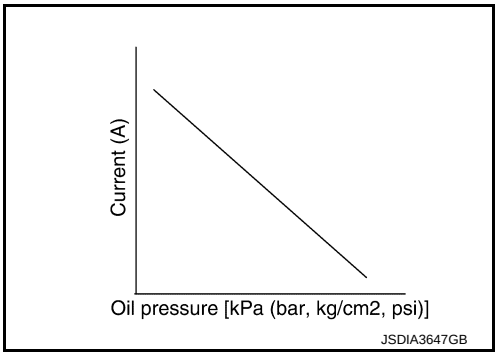
- The input clutch solenoid valve ① is installed to control valve assembly.
- The input clutch solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The input clutch solenoid valve controls the input clutch control valve in response to a signal transmitted from the TCM.



- The input clutch solenoid valve utilizes the linear solenoid valve [N/H (normal high) type].

NOTE:

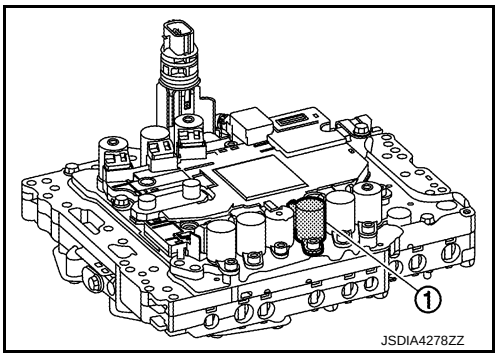
- The principle of the linear solenoid valve utilizes the fact that the force pressing on the valve spool installed inside the coil increases nearly in proportion to the current. This allows it to produce a fluid pressure that is proportional to this pressing force.
- The N/H (normal high) produces hydraulic control when the coil is not energized.



A/T CONTROL SYSTEM : Front Brake Solenoid Valve

INFOID:0000000009235934

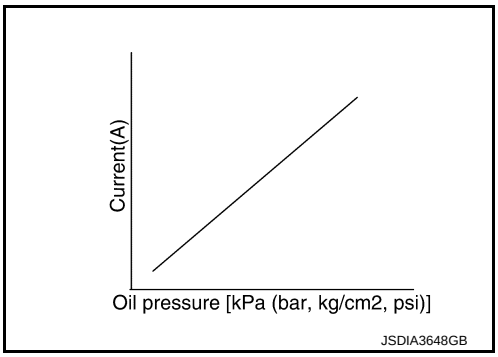
- The front brake solenoid valve ① is installed to control valve assembly.
- The front brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The front brake solenoid valve controls the front brake control valve in response to a signal transmitted from the TCM.



- The front brake solenoid valve utilizes a linear solenoid valve [N/L (normal low) type].

NOTE:

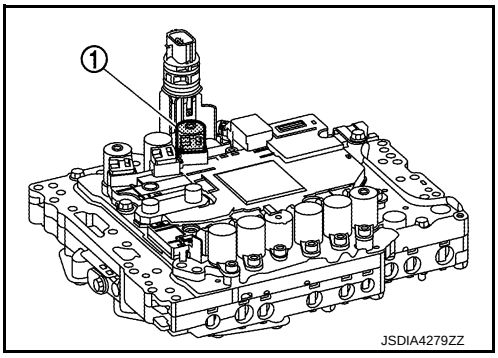
- The principle of the linear solenoid valve utilizes the fact that the force pressing on the valve spool installed inside the coil increases nearly in proportion to the current. This allows it to produce a fluid pressure that is proportional to this pressing force.
- The N/L (normal low) type does not produce hydraulic control when the coil is not energized.



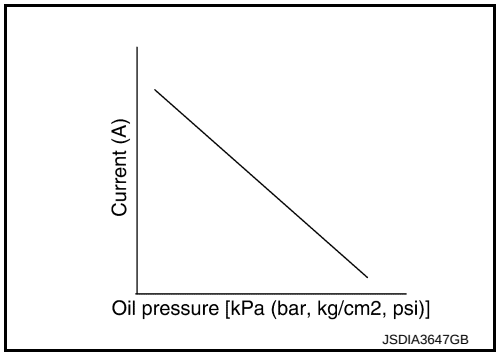
A/T CONTROL SYSTEM : Direct Clutch Solenoid Valve

INFOID:0000000009235935

- The direct clutch solenoid valve ① is installed to control valve assembly.
- 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.



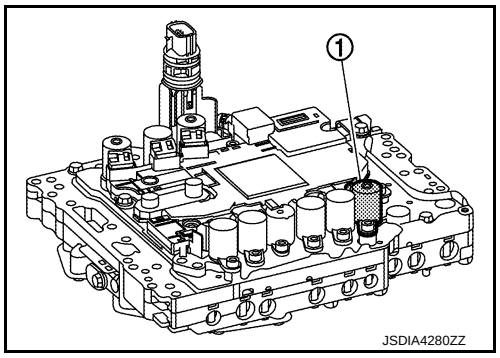
- The direct clutch solenoid valve utilizes the linear solenoid valve [N/H (normal high) type].
  NOTE:
  - The principle of the linear solenoid valve utilizes the fact that the force pressing on the valve spool installed inside the coil increases nearly in proportion to the current. This allows it to produce a fluid pressure that is proportional to this pressing force.
  - The N/H (normal high) produces hydraulic control when the coil is not energized.



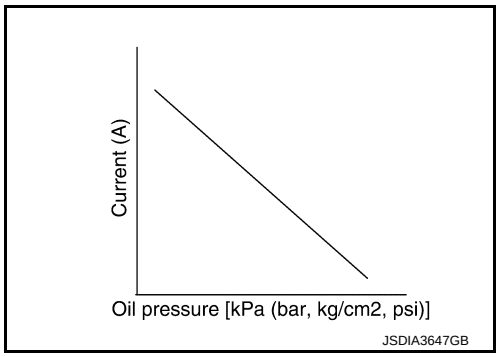
A/T CONTROL SYSTEM : High and Low Reverse Clutch Solenoid Valve

INFOID:0000000009235936

- The high and low reverse clutch solenoid valve ① is installed to control valve assembly.
- 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.



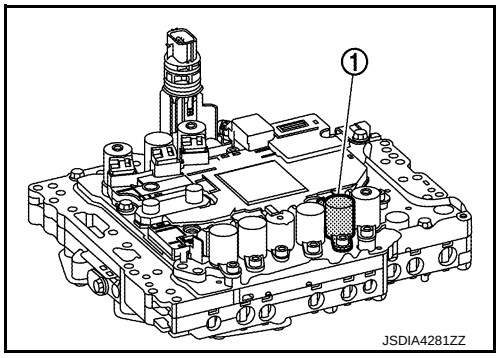
- The high and low reverse clutch solenoid valve utilizes the linear solenoid valve [N/H (normal high) type].
  NOTE:
  - The principle of the linear solenoid valve utilizes the fact that the force pressing on the valve spool installed inside the coil increases nearly in proportion to the current. This allows it to produce a fluid pressure that is proportional to this pressing force.
  - The N/H (normal high) produces hydraulic control when the coil is not energized.



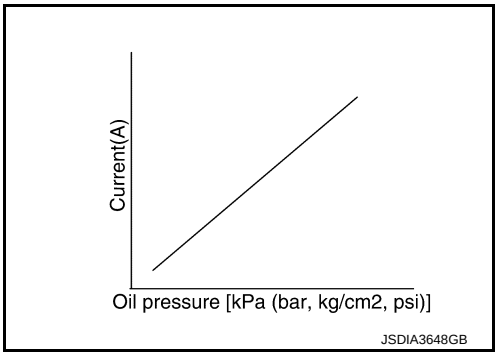
A/T CONTROL SYSTEM : Low Brake Solenoid Valve

INFOID:0000000009235937

- The low brake solenoid valve ① is installed to control valve assembly.
- 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.



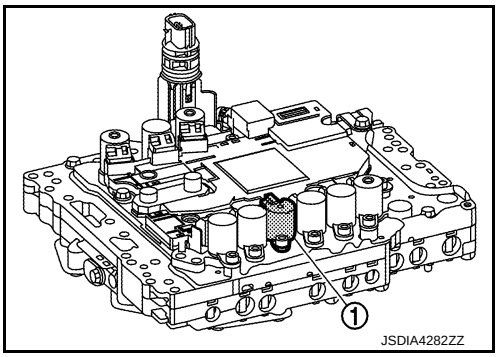
- The low brake solenoid valve utilizes a linear solenoid valve [N/L (normal low) type].
  NOTE:
  - The principle of the linear solenoid valve utilizes the fact that the force pressing on the valve spool installed inside the coil increases nearly in proportion to the current. This allows it to produce a fluid pressure that is proportional to this pressing force.
  - The N/L (normal low) type does not produce hydraulic control when the coil is not energized.



A/T CONTROL SYSTEM : Anti-interlock Solenoid Valve

INFOID:0000000009235938

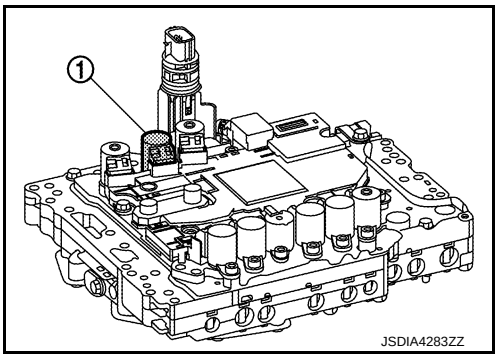
- The anti-interlock solenoid valve ① is installed to control valve assembly.
- The anti-interlock solenoid valve prevents the simultaneous activation of the input clutch and the low brake.
- The anti-interlock solenoid valve is an ON/OFF type solenoid valve.



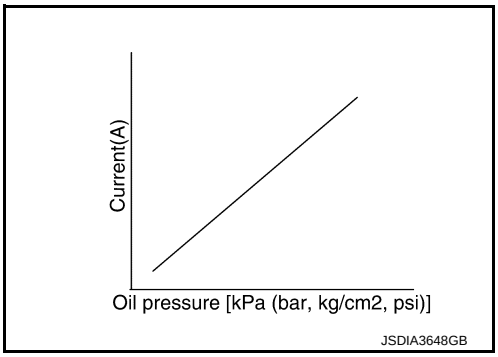
A/T CONTROL SYSTEM : 2346 Brake Solenoid Valve

INFOID:0000000009235939

- The 2346 brake solenoid valve ① is installed to control valve assembly.
- 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.



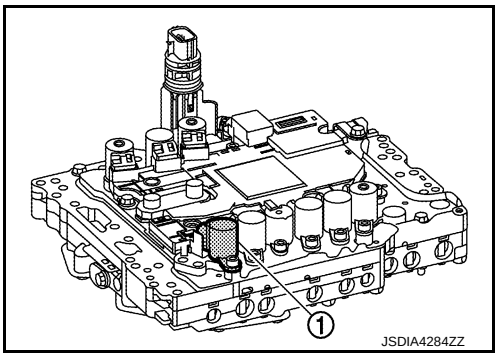
- The 2346 brake solenoid valve utilizes a linear solenoid valve [N/L (normal low) type].
  NOTE:
  - The principle of the linear solenoid valve utilizes the fact that the force pressing on the valve spool installed inside the coil increases nearly in proportion to the current. This allows it to produce a fluid pressure that is proportional to this pressing force.
  - The N/L (normal low) type does not produce hydraulic control when the coil is not energized.



A/T CONTROL SYSTEM : Torque Converter Clutch Solenoid Valve

INFOID:0000000009235940

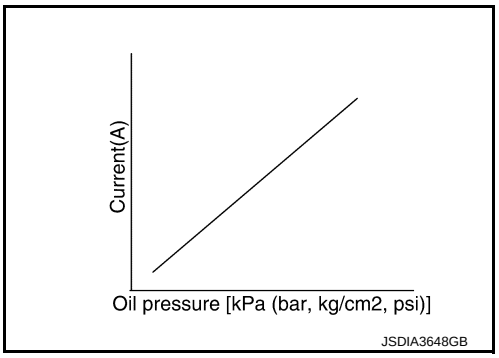
- The torque converter clutch solenoid valve ① is installed to control valve assembly.
- The torque converter clutch solenoid valve is activated, with the gear in D_2, D_3, D_4, D_5, D_6, D_7, M2, M3, M4, M5, M6 and M7 by the TCM in response to signals transmitted from the output speed sensor and accelerator pedal position sensor. Torque converter clutch piston operation will then be controlled.



- The torque converter clutch solenoid valve utilizes a linear solenoid valve [N/L (normal low) type].

NOTE:

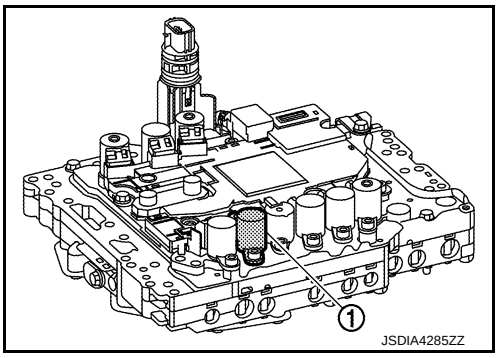
- The principle of the linear solenoid valve utilizes the fact that the force pressing on the valve spool installed inside the coil increases nearly in proportion to the current. This allows it to produce a fluid pressure that is proportional to this pressing force.
- The N/L (normal low) type does not produce hydraulic control when the coil is not energized.



A/T CONTROL SYSTEM : Line Pressure Solenoid Valve

INFOID:0000000009235941

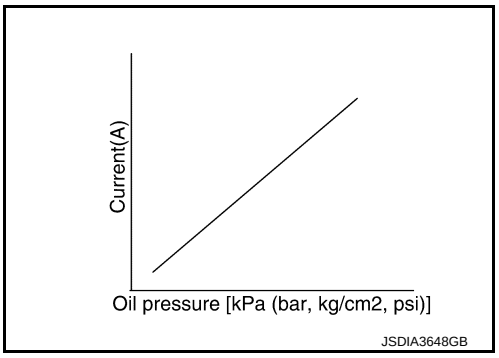
- The line pressure solenoid valve ① is installed to control valve assembly.
- The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal transmitted from the TCM.



- The line pressure solenoid valve utilizes a linear solenoid valve [N/L (normal low) type].

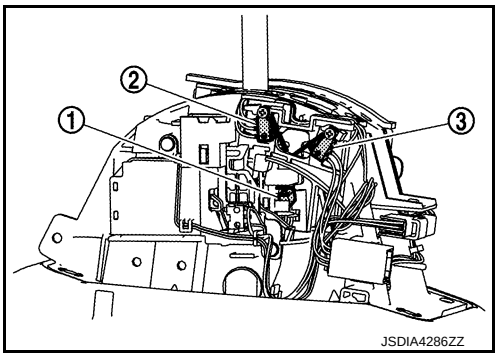
NOTE:

- The principle of the linear solenoid valve utilizes the fact that the force pressing on the valve spool installed inside the coil increases nearly in proportion to the current. This allows it to produce a fluid pressure that is proportional to this pressing force.
- The N/L (normal low) type does not produce hydraulic control when the coil is not energized.



A/T CONTROL SYSTEM : Manual Mode Switch

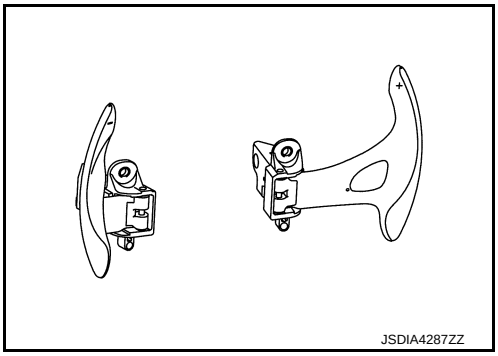
INFOID:0000000009235943



- The manual mode switch [mode select switch ①, position select switch (up) ②, and position select switch (down) ③] is installed to 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 (up) detects that the selector lever is shifted to the upshift side of the manual shift gate and transmits a manual mode upshift signal to the combination meter. Then, the TCM receives a manual mode upshift signal from the combination meter.
- The position select switch (down) detects that the selector lever is shifted to the downshift side of the manual shift gate and transmits a manual mode downshift signal to the combination meter. Then, the TCM receives a manual mode downshift signal from the combination meter.

A/T CONTROL SYSTEM : Paddle Shifter

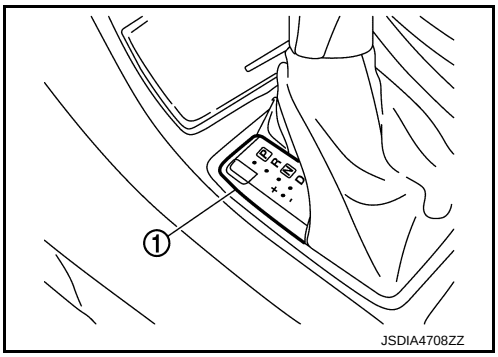
INFOID:0000000009235944



- The paddle shifter is installed to steering column.
- When operating the paddle shifter (up/down), a paddle shifter upshift signal or paddle shifter downshift signal is transmitted to the combination meter. Then, the TCM receives a paddle shifter upshift signal or a paddle shifter downshift signal from the combination meter.

A/T CONTROL SYSTEM : Selector Lever Position Indicator

INFOID:0000000009729295

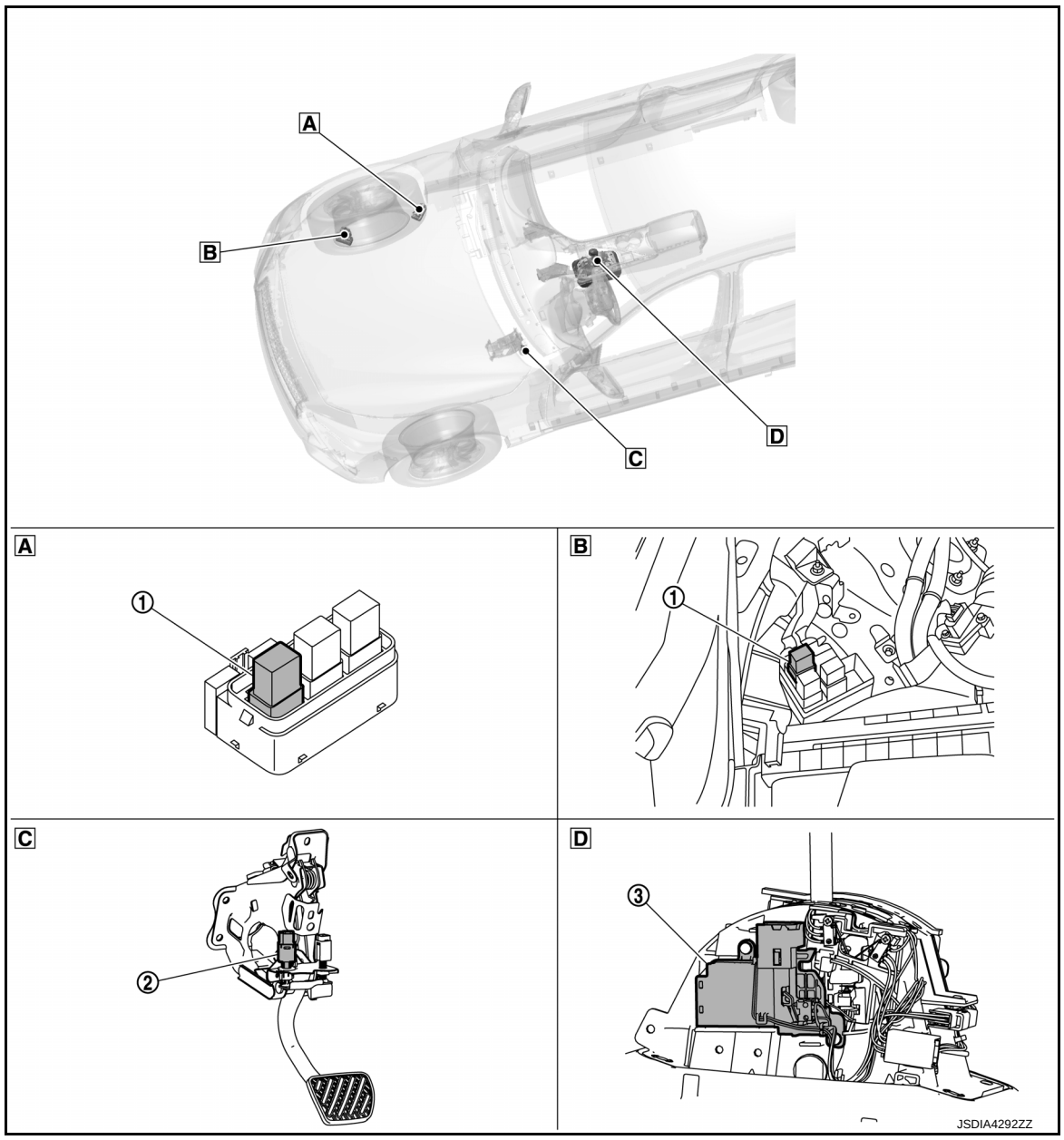


- Selector lever position indicator ① is installed to console finisher.
- Selector lever position indicator indicates selector lever position.

A/T SHIFT LOCK SYSTEM

A/T SHIFT LOCK SYSTEM : Component Parts Location

INFOID:0000000009235945



A Engine room, RH (Vehicle speed sensitive P/S models)
B Engine room, RH (Direct adaptive steering models)
C Brake pedal
D A/T shift selector assembly

No.	Component	Function
①	Shift lock relay*	TM-21, "A/T SHIFT LOCK SYSTEM : Shift Lock Relay"
②	Stop lamp switch	TM-22, "A/T SHIFT LOCK SYSTEM : Stop Lamp Switch"
③	Shift lock unit	TM-22, "A/T SHIFT LOCK SYSTEM : Shift Lock Unit"

*: With ICC

A/T SHIFT LOCK SYSTEM : Shift Lock Relay

INFOID:0000000009760979

- Shift lock relay is controlled by stop lamp switch.
- When shift lock relay turns ON, power is applied to shift lock unit.

A/T SHIFT LOCK SYSTEM : Stop Lamp Switch

INFOID:0000000009760980

WITH ICC

- When brake pedal is depressed, stop lamp switch turns ON.
- When stop lamp switch turns ON, power is supplied to shift lock relay.

WITHOUT ICC

- When brake pedal is depressed, stop lamp switch turns ON.
- When stop lamp switch turns ON, power is supplied to shift lock unit.

A/T SHIFT LOCK SYSTEM : Shift Lock Unit

INFOID:0000000009760981

WITH ICC

The shift lock unit operates according to the signal from shift lock relay. Refer to TM-48, "A/T SHIFT LOCK SYSTEM : System Description" for detailed operation of shift lock unit.

WITHOUT ICC

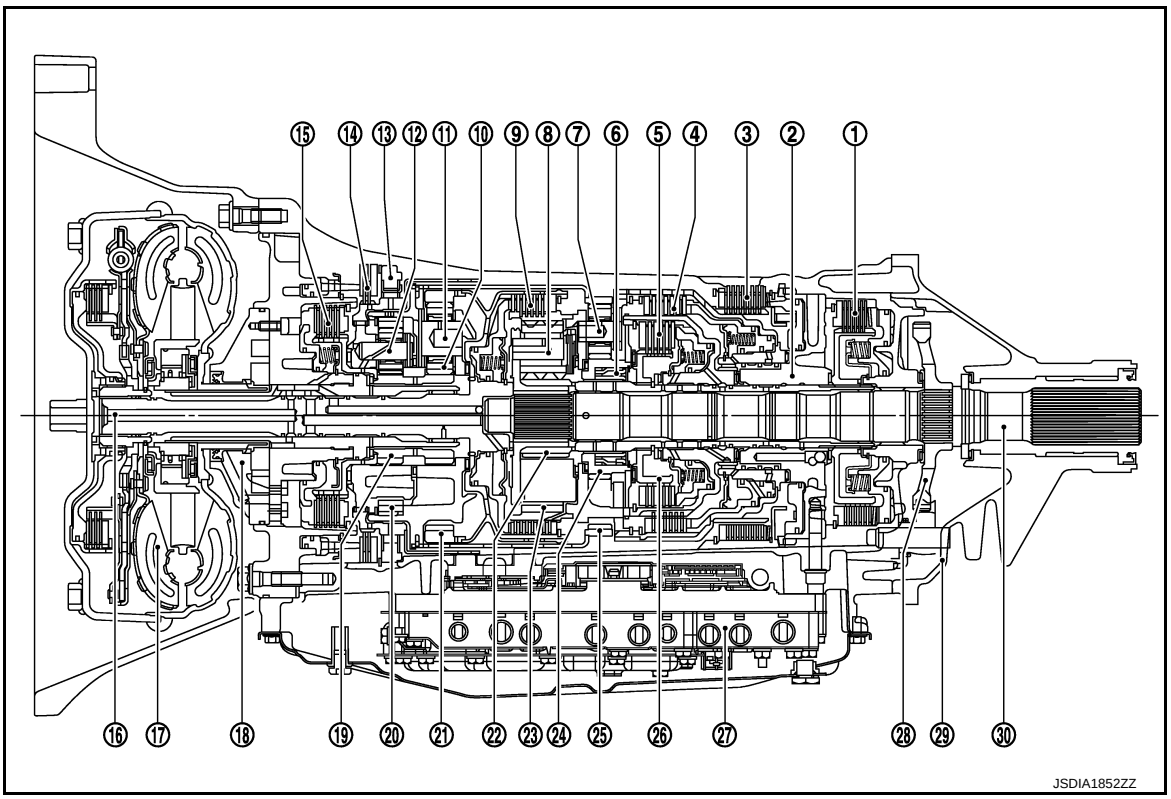
The shift lock unit operates according to the signal from stop lamp switch. Refer to TM-48, "A/T SHIFT LOCK SYSTEM : System Description" for detailed operation of shift lock unit.

STRUCTURE AND OPERATION
TRANSMISSION

TRANSMISSION : Cross-Sectional View

INFOID:0000000009235947

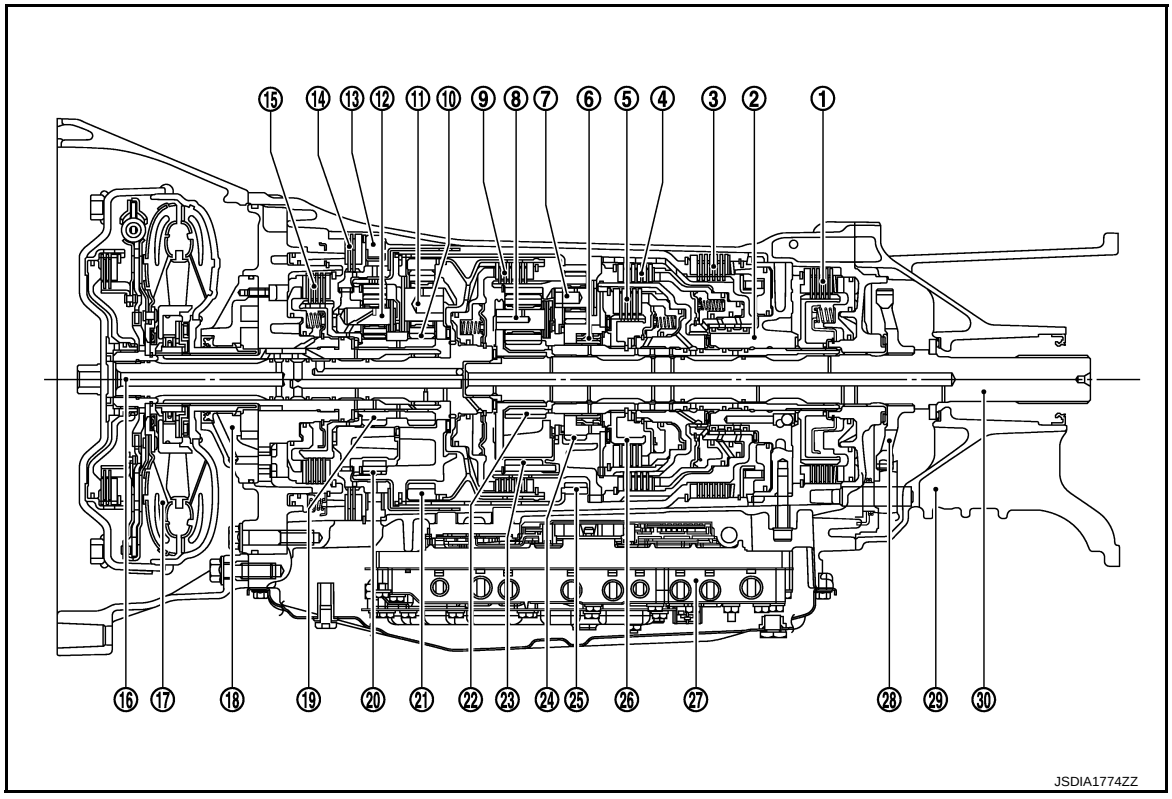
2WD MODELS



① Low brake
② Drum support
③ Reverse brake
④ Direct clutch
⑤ High and low reverse clutch
⑥ 2nd one-way clutch
⑦ Rear carrier*1
⑧ Mid carrier
⑨ Input clutch
⑩ Front sun gear*2
⑪ Front carrier*3
⑫ Under drive carrier
⑬ 1st one-way clutch
⑭ Front brake
⑮ 2346 brake
⑯ Input shaft*4
⑰ Torque converter
⑱ Oil pump
⑲ Under drive sun gear*2
⑳ Under drive internal gear*3
㉑ Front internal gear*4
㉒ Mid sun gear
㉓ Mid internal gear*1
㉔ Rear sun gear
㉕ Rear internal gear
㉖ High and low reverse clutch hub
㉗ Control valve & TCM
㉘ Parking gear
㉙ Rear extension
㉚ Output shaft

*1: 7 and 23 are one unit.
*2: 10 and 19 are one unit.
*3: 11 and 20 are one unit.
*4: 16 and 21 are one unit.

AWD MODELS

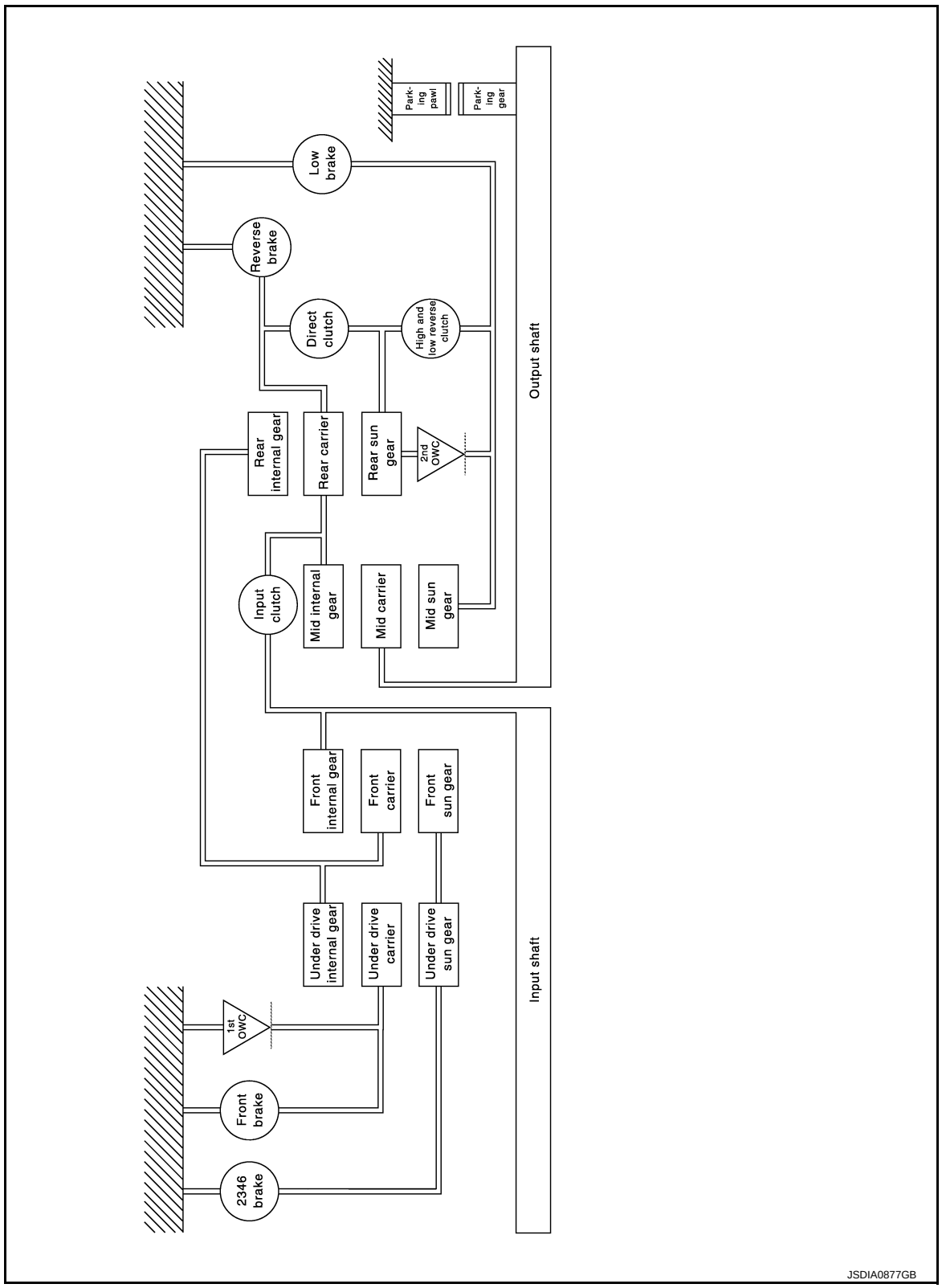


① Low brake
② Drum support
③ Reverse brake
④ Direct clutch
⑤ High and low reverse clutch
⑥ 2nd one-way clutch
⑦ Rear carrier*1
⑧ Mid carrier
⑨ Input clutch
⑩ Front sun gear*2
⑪ Front carrier*3
⑫ Under drive carrier
⑬ 1st one-way clutch
⑭ Front brake
⑮ 2346 brake
⑯ Input shaft*4
⑰ Torque converter
⑱ Oil pump
⑲ Under drive sun gear*2
⑳ Under drive internal gear*3
㉑ Front internal gear*4
㉒ Mid sun gear
㉓ Mid internal gear*1
㉔ Rear sun gear
㉕ Rear internal gear
㉖ High and low reverse clutch hub
㉗ Control valve & TCM
㉘ Parking gear
㉙ Adapter case
㉚ Output shaft

*1: 7 and 23 are one unit.
*2: 10 and 19 are one unit.
*3: 11 and 20 are one unit.
*4: 16 and 21 are one unit.

TRANSMISSION : System Diagram

INFOID:0000000009235948



TRANSMISSION : System Description

INFOID:0000000009235949

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 BRAKE 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

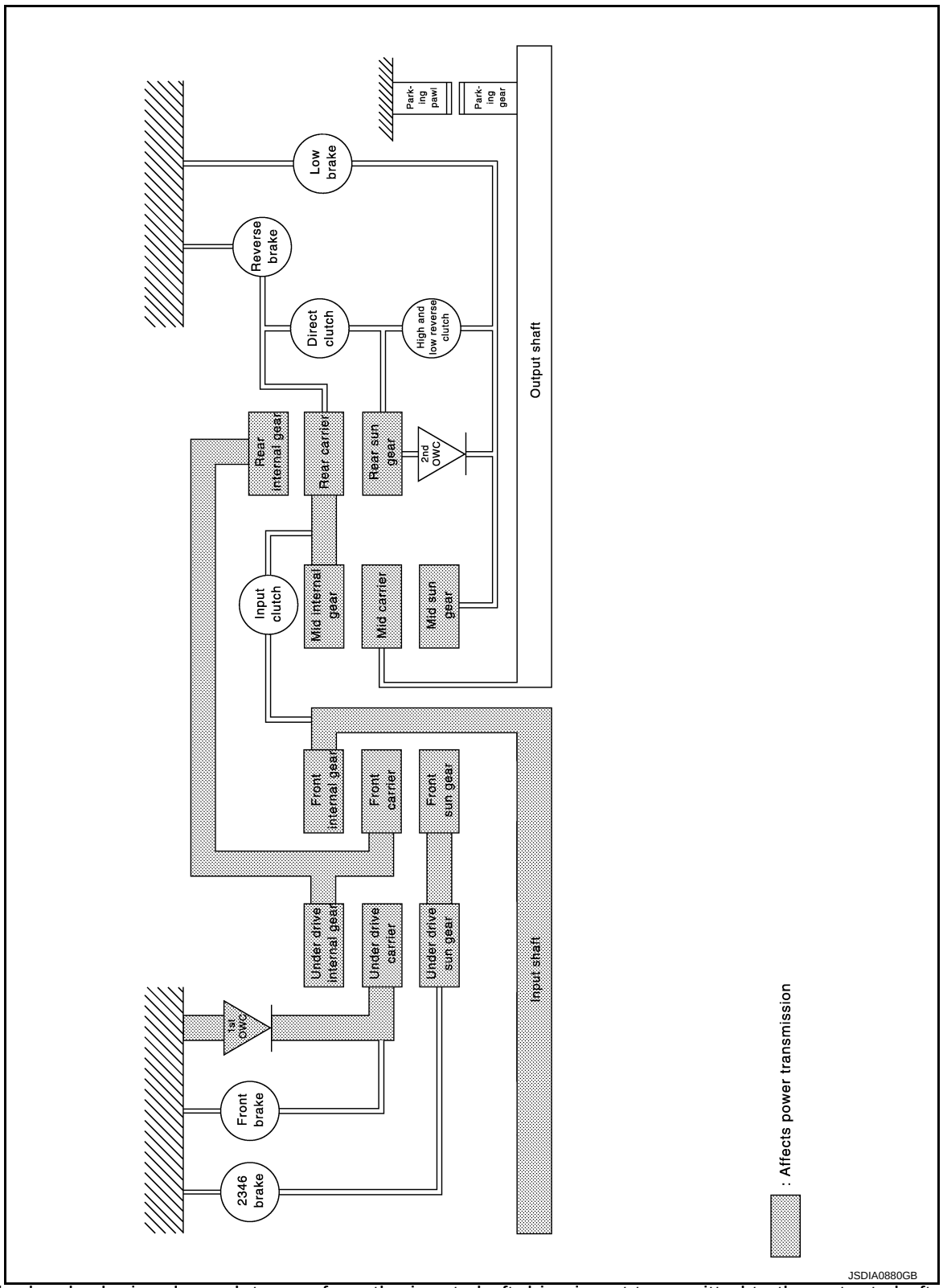
*: Down shift automatically according to the vehicle speed.

○ – 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

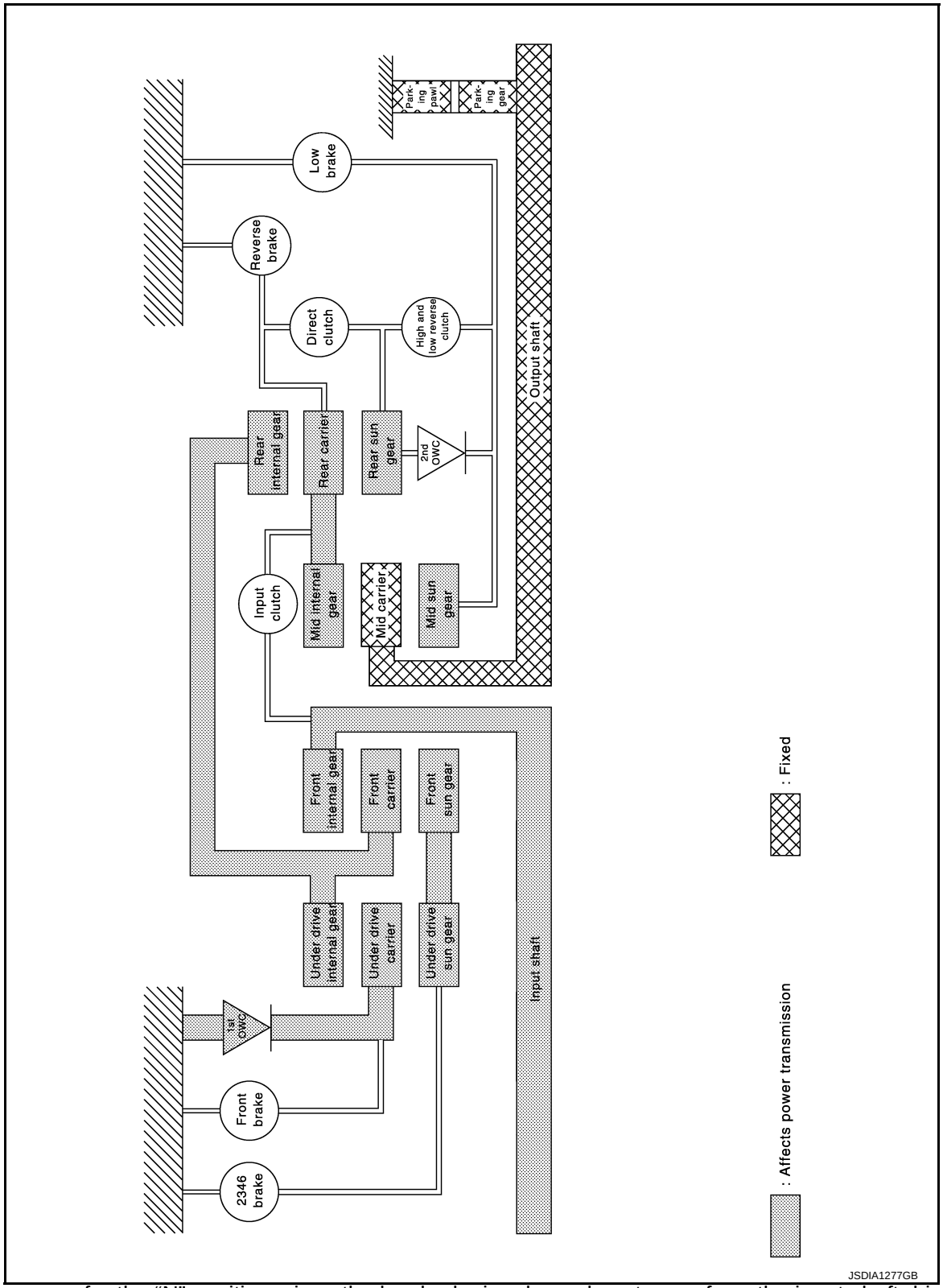
POWER TRANSMISSION

“N” Position



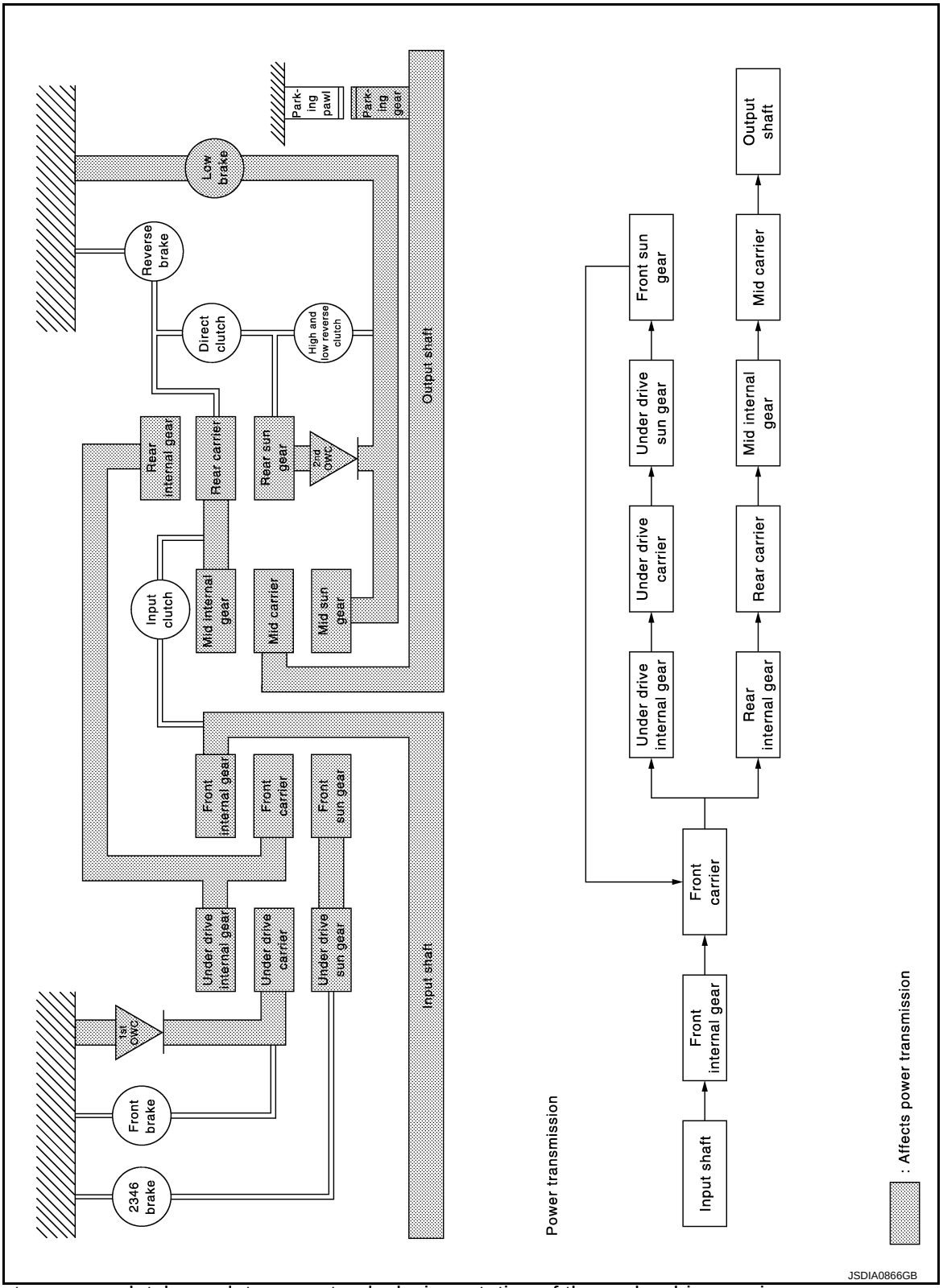
Since the low brake is released, torque from the input shaft drive is not transmitted to the output shaft.

"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” Position



- 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

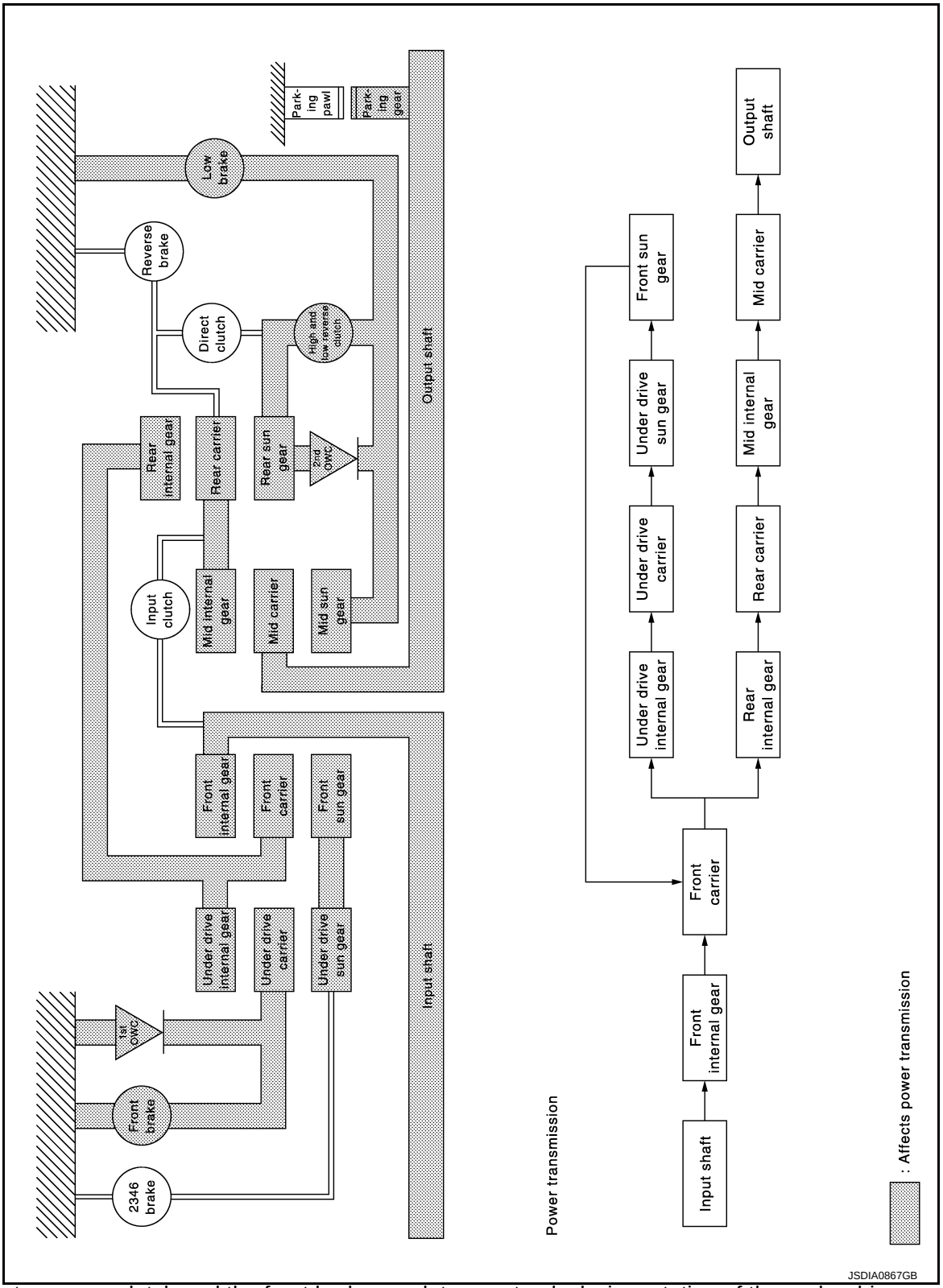
Rear planetary gear

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

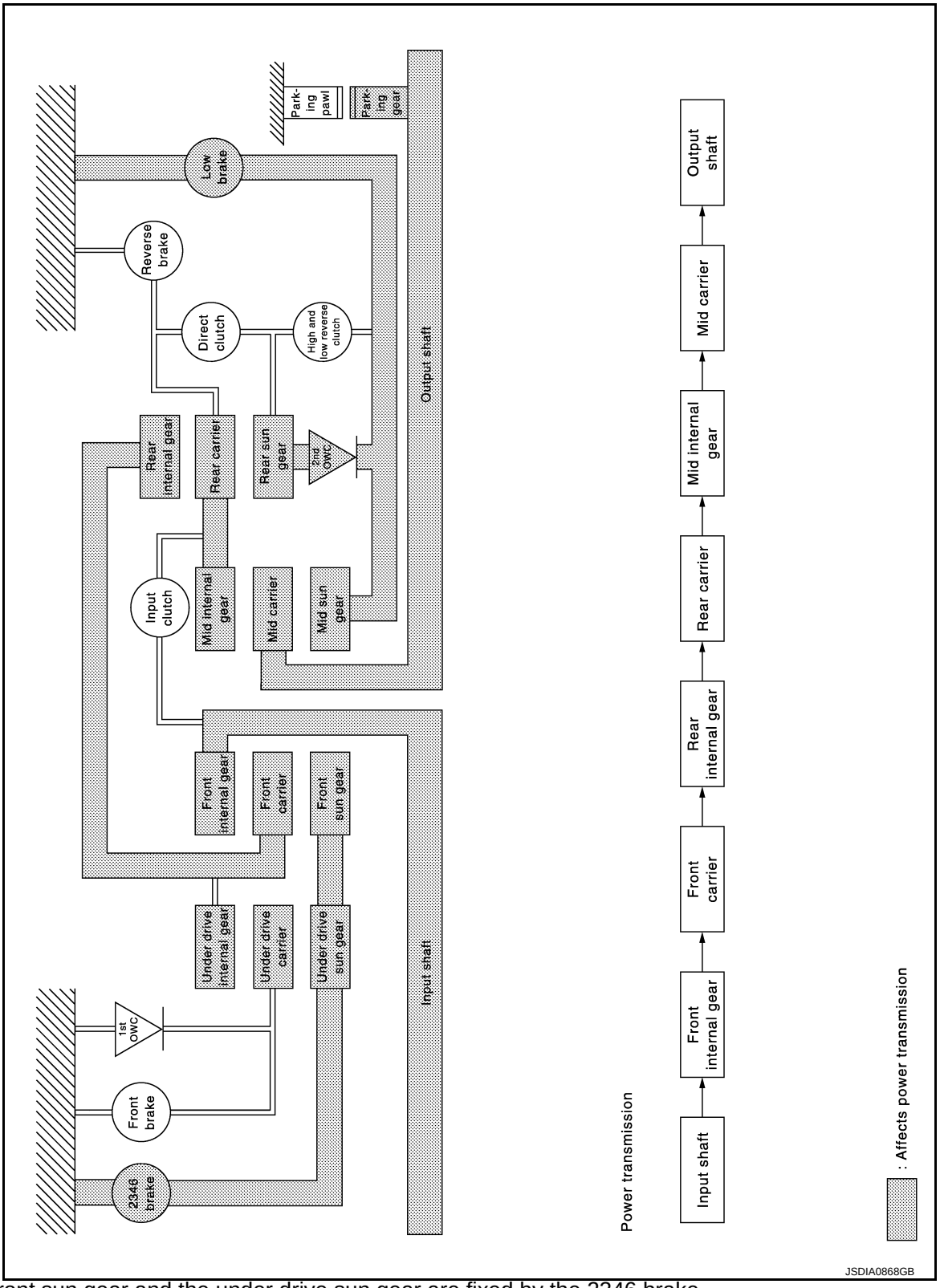
Rear planetary gear

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

"D_2" Position



- 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

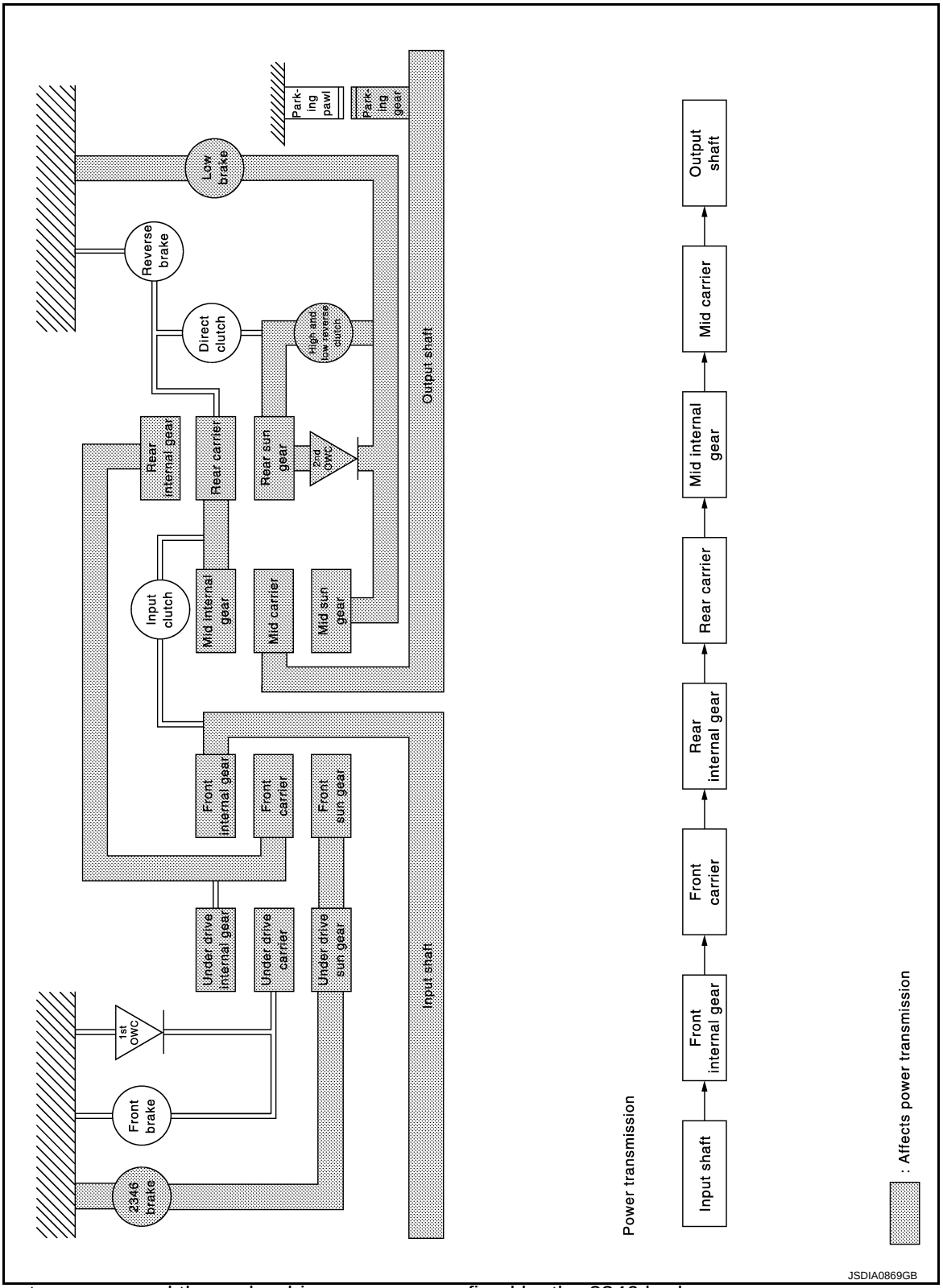
Rear planetary gear

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

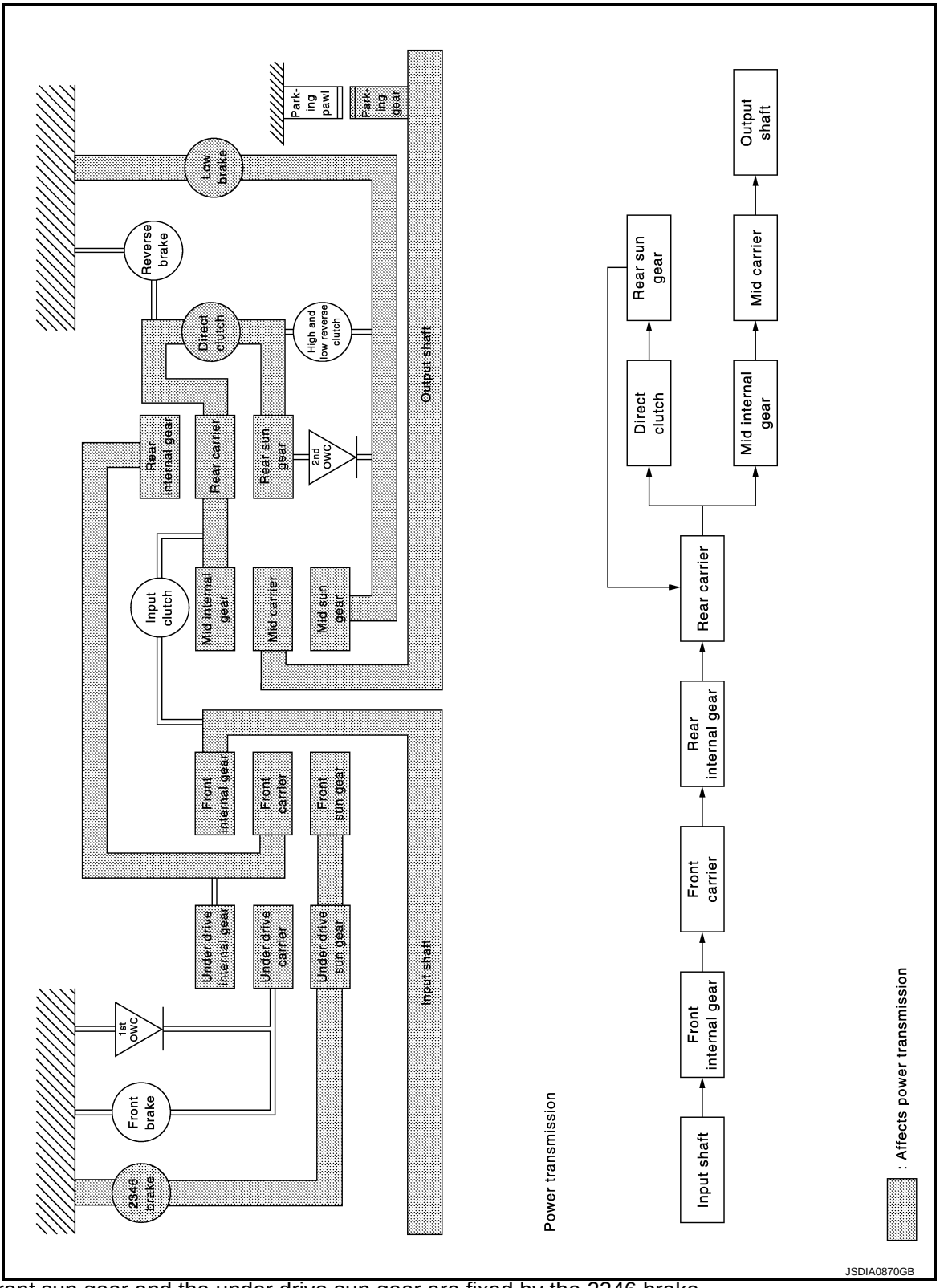
Rear planetary gear

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” 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

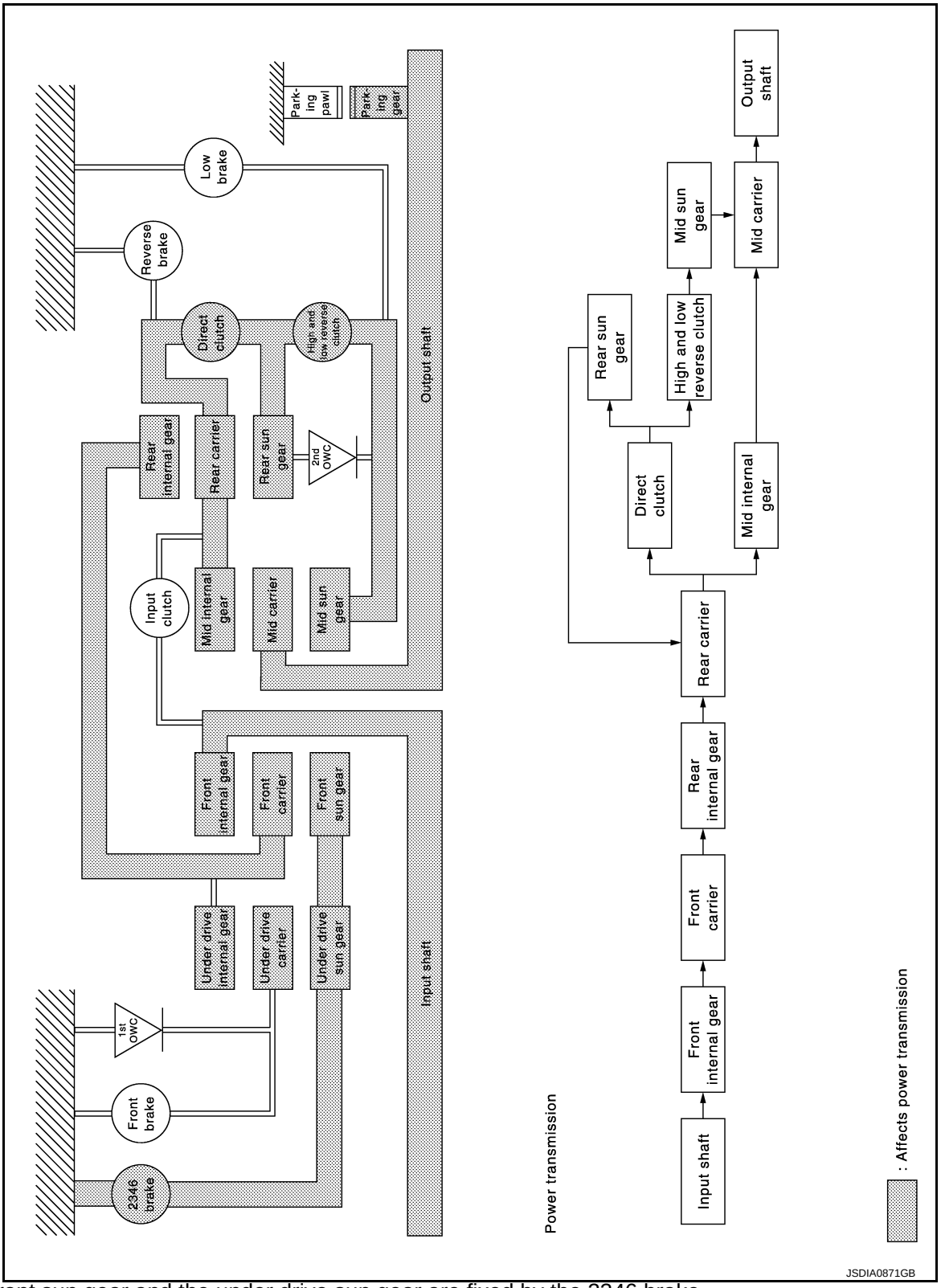
Rear planetary gear

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” 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

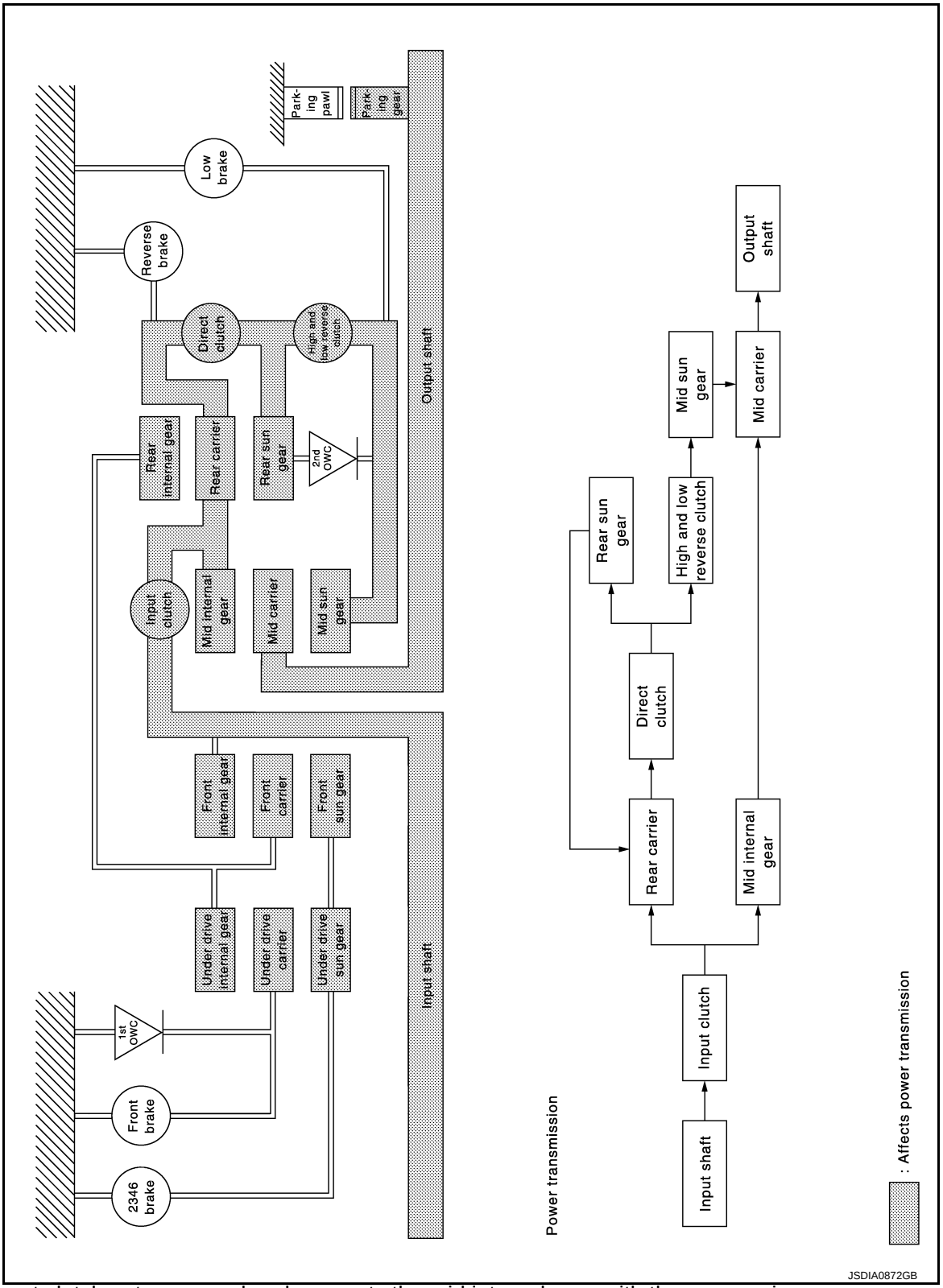
Rear planetary gear

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” 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.

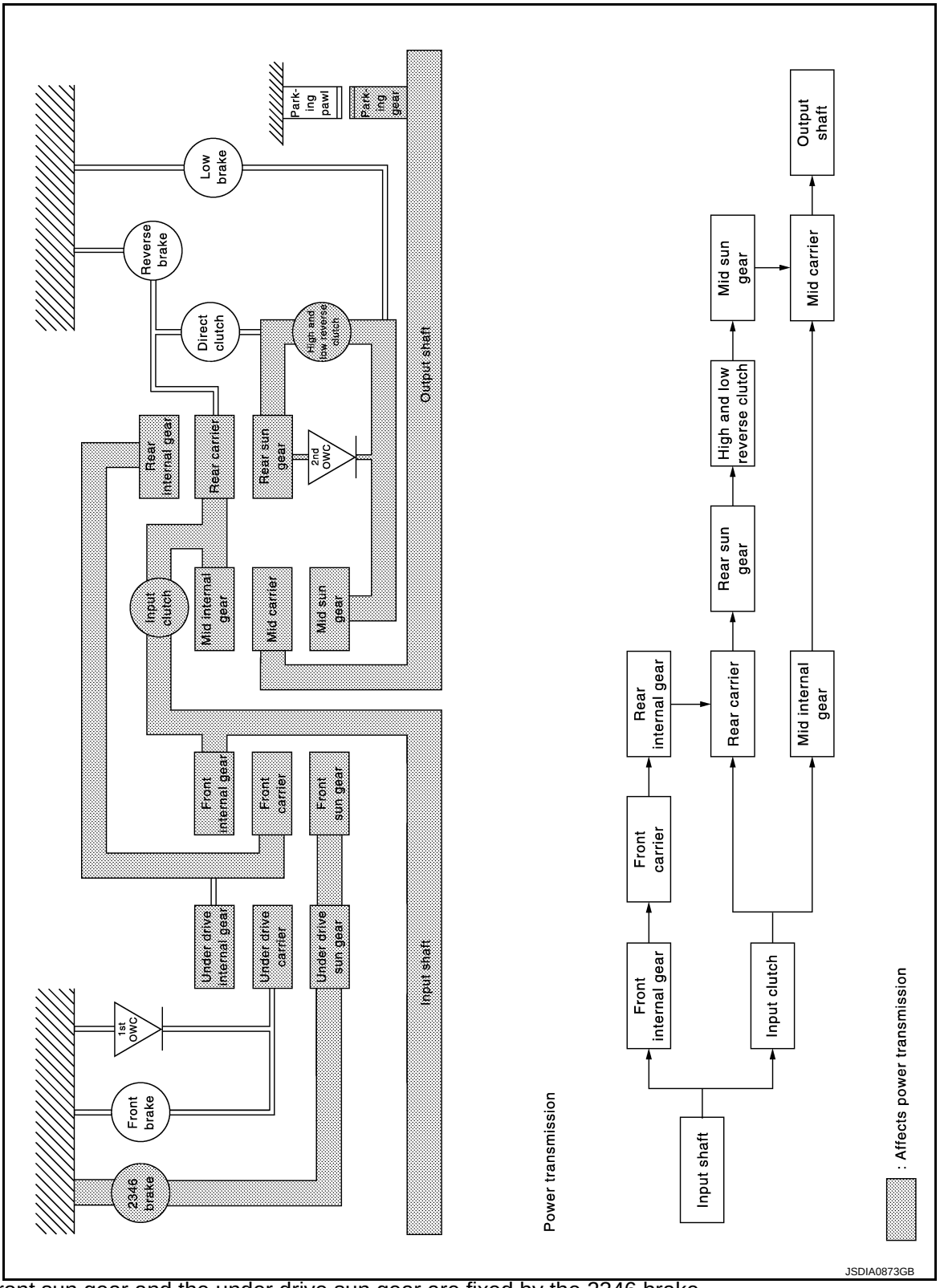
Rear planetary gear

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” 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

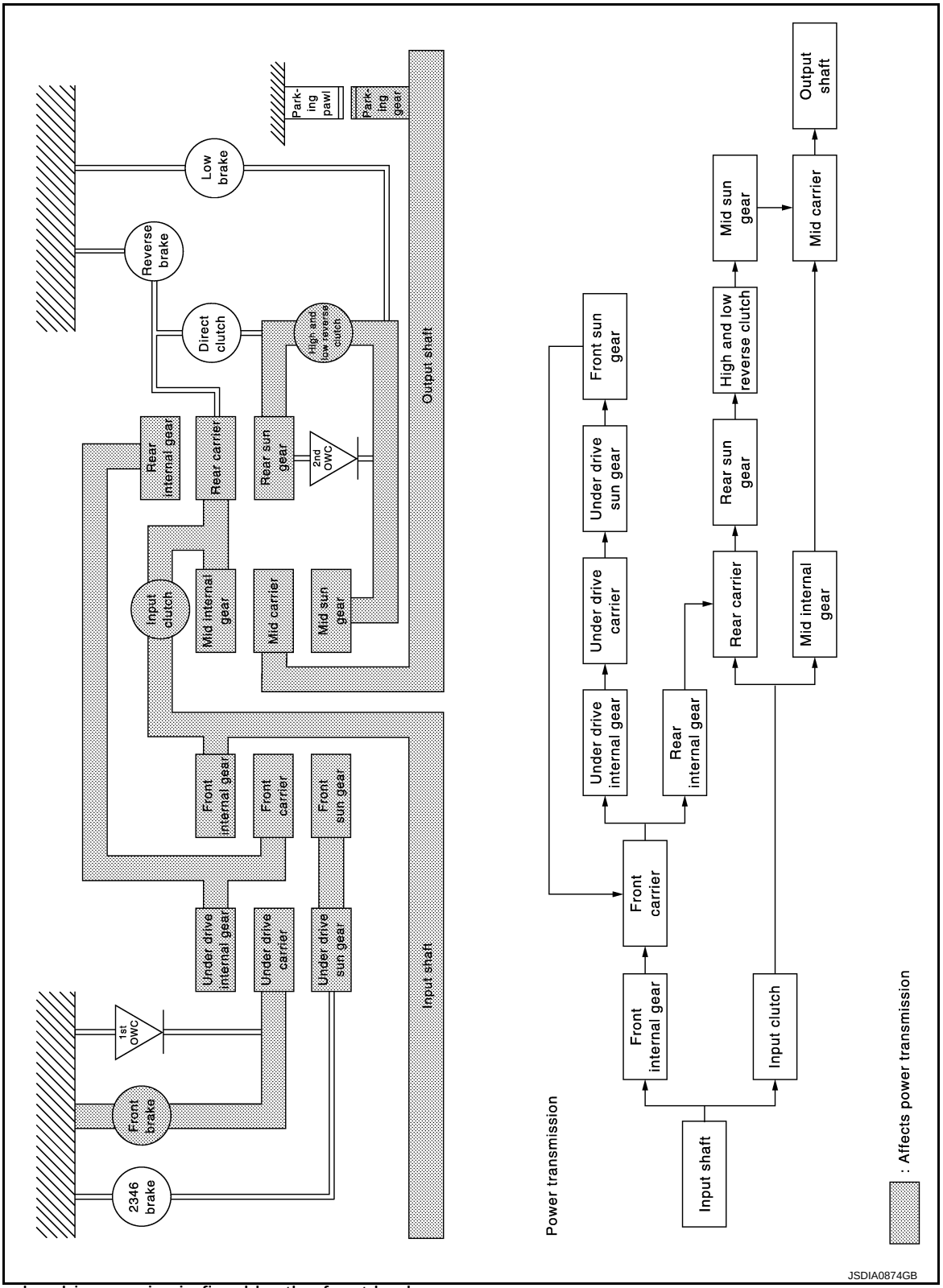
Rear planetary gear

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” 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

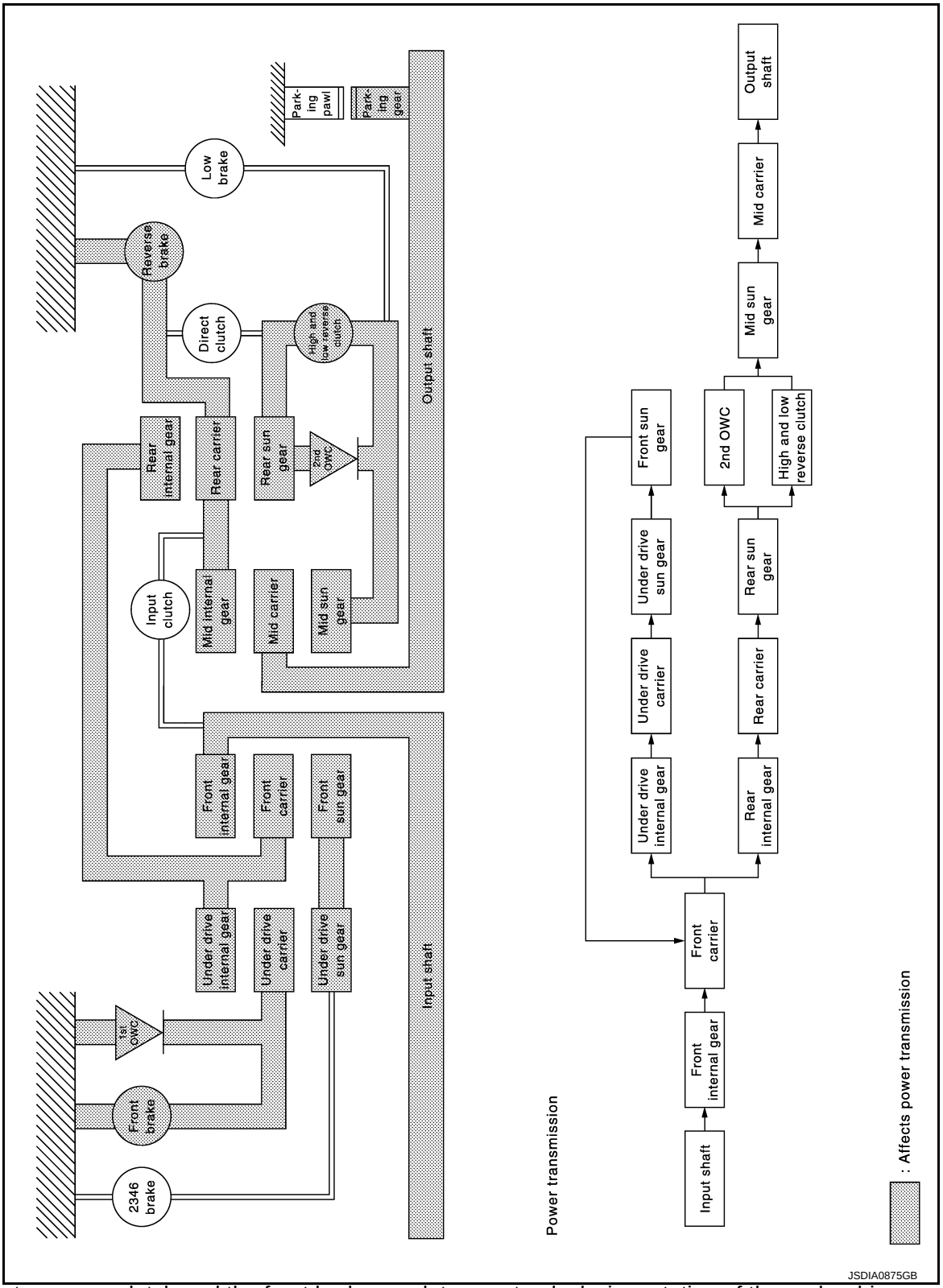
Rear planetary gear

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:0000000009235950

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.

A/T SHIFT LOCK SYSTEM

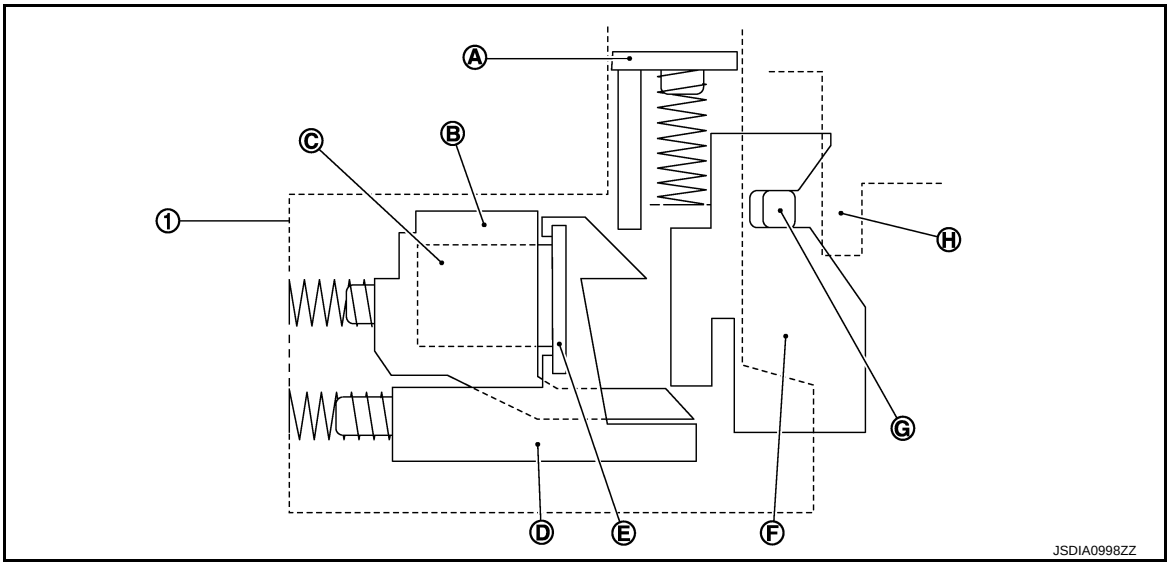
A/T SHIFT LOCK SYSTEM : System Description

INFOID:0000000009235963

• 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

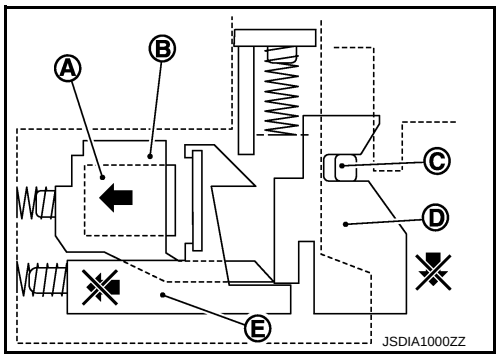


① Shift lock unit		
Ⓐ Shift lock release button	Ⓑ Slider	Ⓒ Electromagnet
Ⓓ Stopper	Ⓔ Iron plate	Ⓕ Plate
Ⓖ Detent pin	Ⓗ Detent gate	

SHIFT LOCK OPERATION AT P POSITION

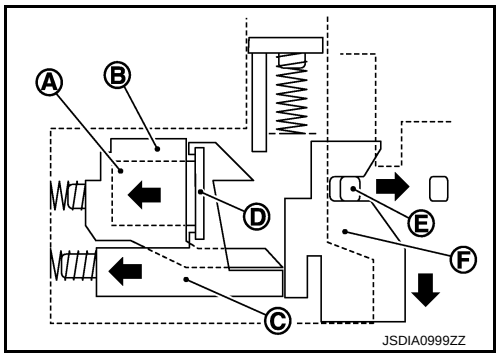
When brake pedal is not depressed (Unable to shift selector lever)

Without brake pedal depressed and with ignition switch ON, electromagnet Ⓐ of slider Ⓑ is not magnetized because of non electrical current. When selector lever knob button is pressed in this situation, detent pin Ⓒ lowers. According to the movement of detent pin, plate Ⓓ also lowers while pressing slider into shift lock unit. However, stopper Ⓔ 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.



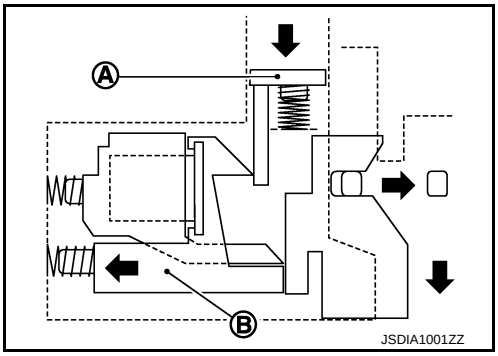
When brake pedal is depressed (Able to shift selector lever)

With brake pedal depressed and with ignition switch ON, electromagnet Ⓐ of slider Ⓑ becomes magnetized because of live electricity. stopper Ⓒ has an iron plate Ⓓ to unify stopper with slider when electromagnet becomes magnetized. When selector lever knob button is pressed in this situation, detent pin Ⓔ lowers. According to the movement of detent pin, plate Ⓕ 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.



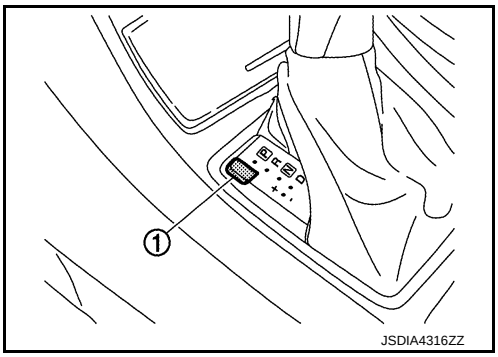
FORCIBLE RELEASE OF SHIFT LOCK

- 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 Ⓐ is pressed in this state, stopper Ⓑ is forcibly pressed into shift lock unit, and then it becomes possible to release shift lock.



- To release the shift lock forcibly and shift the selector lever from “P” position to other positions, follow the steps below.

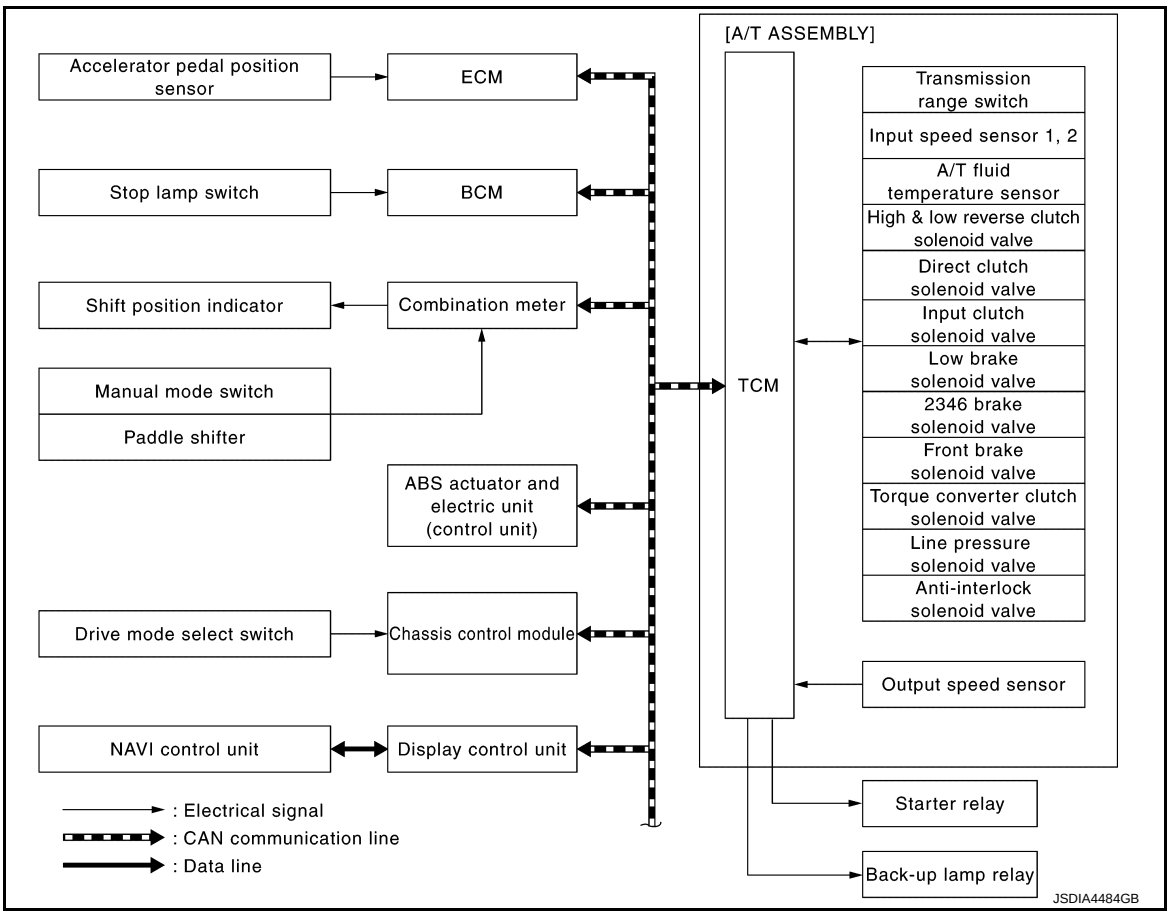
1. Turn ignition switch OFF.
2. Apply parking brake.
3. Remove shift lock cover ① and press the shift lock release button using suitable tool.
4. Press and hold the selector lever knob button and move the selector lever from “P” position to other positions while press the shift lock release button.



SYSTEM
A/T CONTROL SYSTEM
A/T CONTROL SYSTEM : System Description

INFOID:0000000009235952

SYSTEM DIAGRM



NOTE:
Paddle shifter is applied to vehicle with paddle shifter.

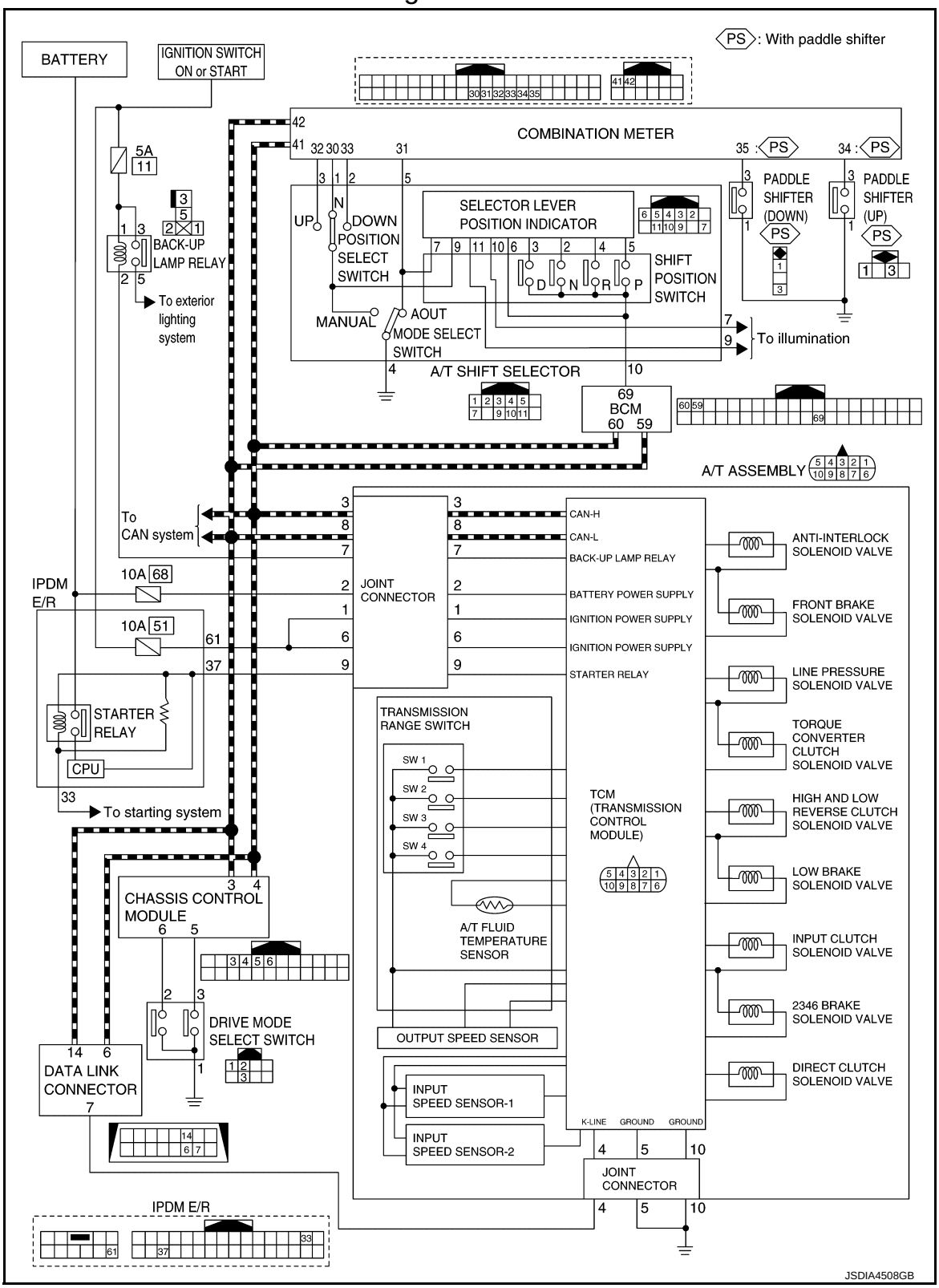
MAIN CONTROL OF TCM

Controls	Reference
Line pressure control	TM-56, "LINE PRESSURE CONTROL : System Description"
Shift change control	TM-58, "SHIFT CHANGE CONTROL : System Description"
Shift pattern control	TM-61, "SHIFT PATTERN CONTROL : System Description"
Lock-up control	TM-62, "LOCK-UP CONTROL : System Description"
NAVI shift control*	TM-63, "NAVI SHIFT CONTROL : System Description"
Infiniti drive mode selector	TM-65, "Infiniti Drive Mode Selector : System Description"
Fail-safe	TM-80, "Fail-Safe"
Self-diagnosis	TM-69, "CONSULT Function"
CONSULT communication	TM-69, "CONSULT Function"

*: For North America

A/T CONTROL SYSTEM : Circuit Diagram

INFOID:0000000009693848



A/T CONTROL SYSTEM : Fail-Safe

INFOID:0000000009767468

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-97, "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
P0615	—	Starter is disabled	—	Starter is disabled
P0705	—	• Fixed in the “D” position (The shifting can be performed) • Lock-up is prohibited when 30 km/h (19 MPH) or less • 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) • Lock-up is prohibited when 30 km/h (19 MPH) or less • 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	• Only downshift can be performed • Manual mode is prohibited • A vehicle speed signal from the unified meter and A/C amp. 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 unified meter and A/C amp. is regarded as an effective signal	—	
P0725	—	—	—	—

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	Small gear ratio difference		Engine torque limit: Max 150 Nm	—	Engine torque limit: Max 150 Nm
	Great gear ratio difference	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR, 3GR or 4GR • Manual mode is prohibited	—	• 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, 2GR, 3GR, 4GR, 5GR or 6GR • Fix the gear while driving • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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, 6GR or 7GR • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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
P0740	—		• Lock-up is prohibited • Slip lock-up is prohibited	—	• Lock-up is prohibited • Slip lock-up is prohibited
P0744	—		• Lock-up is prohibited • Slip lock-up is prohibited	—	• Lock-up is prohibited • Slip lock-up is prohibited
P0745	—		—	—	—
P0750 P0775 P0795 P2713 P2722 P2731 P2807	—		• Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 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

DTC	Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P0780	—	• Locks in 3GR • Manual mode is prohibited	—	• 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	• Downshift when accelerator pedal is depressed is prohibited • Upshift when accelerator pedal is released is prohibited • Manual mode is prohibited
P1721	—	—	—	—
P1730	—	• Locks in 1GR, 2GR, 3GR, 4GR, 5GR, 6GR or 7GR • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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	Gate switch malfunction	Only the gate switch is prohibited	—	Only the gate switch is prohibited
	Paddle switch malfunction	Only the paddle switch is prohibited	—	Only the paddle switch is prohibited
	Malfunction of both switches	Manual mode is prohibited	—	Manual mode is prohibited
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	—	• 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
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited	—	
P0720 and P1721	—	Locks in 5GR	—	Locks in 5GR

A/T CONTROL SYSTEM : Protection Control

INFOID:0000000009767469

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 (16 MPH) 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.

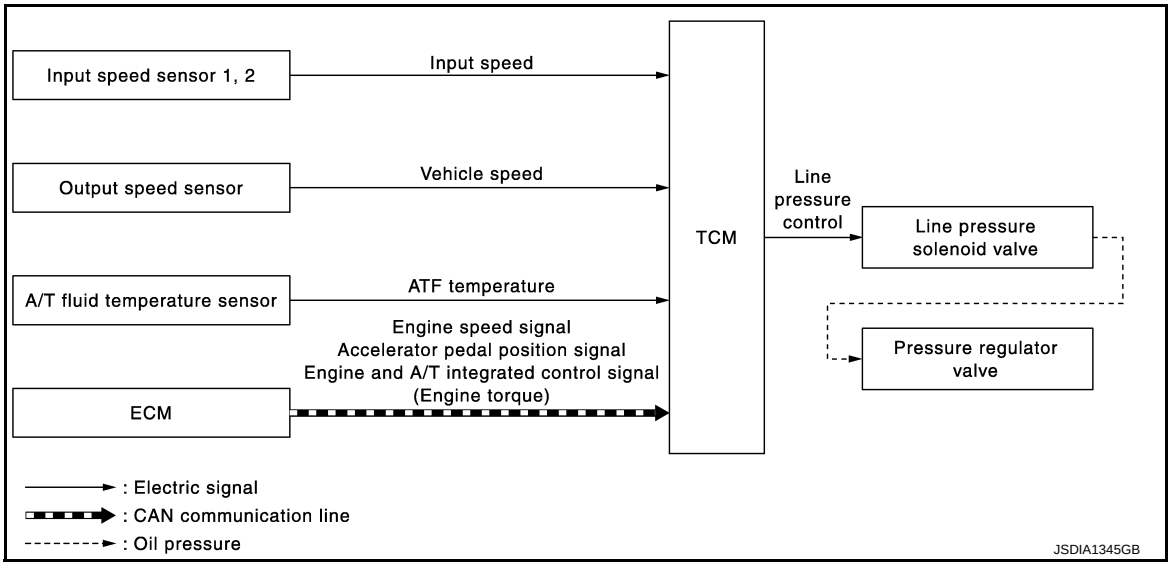
Malfunction detection condition	TCM electronic substrate temperature • 145°C (293°F) and 120 seconds or • 150°C (302°F)
Control at malfunction	Accelerator opening: 0.5/8 or less
Normal return condition	• TCM electronic substrate temperature: Less than 140°C (284°F) and • Vehicle speed: 5 km/h (3 MPH)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

LINE PRESSURE CONTROL

LINE PRESSURE CONTROL : System Description

INFOID:0000000009235956

SYSTEM DIAGRAM

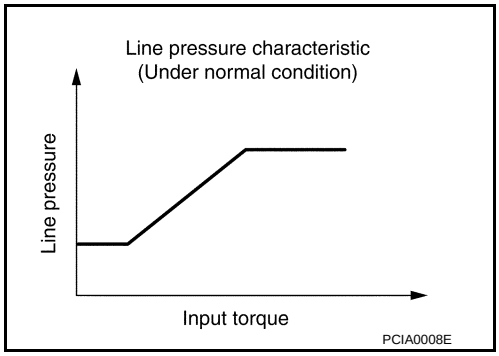


DESCRIPTION

- When an engine and A/T integrated control signal (engine torque) equivalent to the engine drive force is transmitted from the ECM to the TCM, the TCM controls the 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 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.

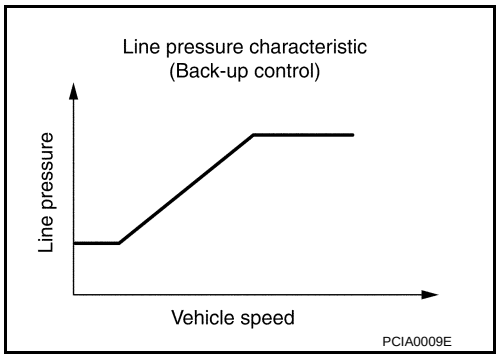
Normal Control

Each clutch is adjusted to the necessary pressure to match the engine drive force.



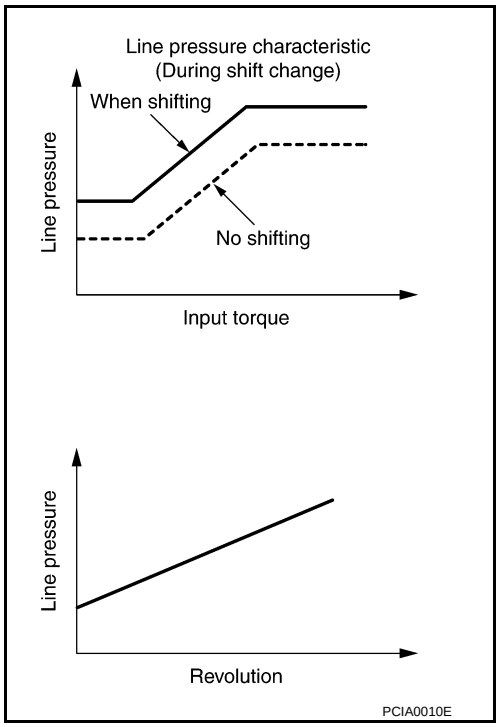
Back-up Control (Engine Brake)

When the select operation is performed during driving and the A/T is shifted down, the line pressure is set according to the vehicle speed.



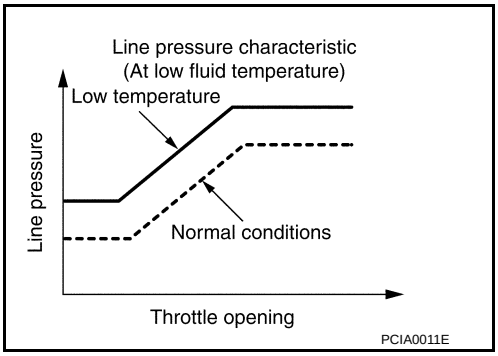
During Shift Change

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. Also, line pressure characteristic corresponds to engine speed, during engine brake operation.



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.

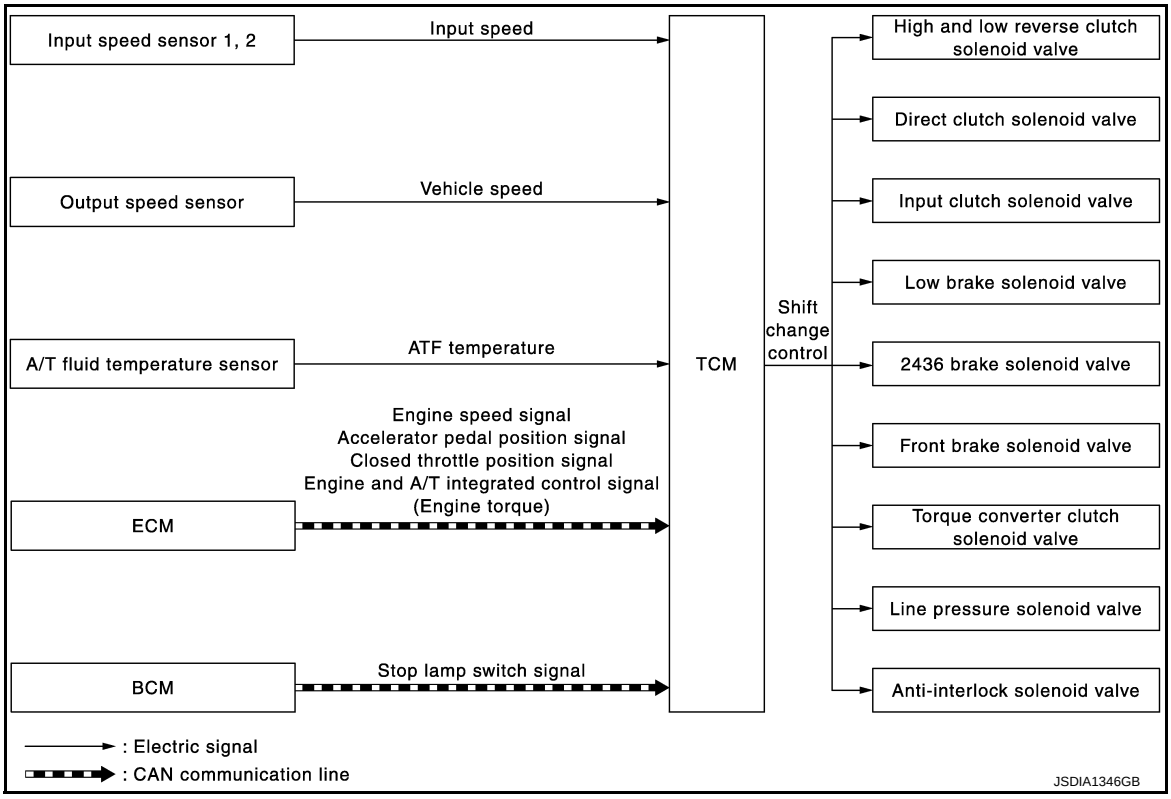


SHIFT CHANGE CONTROL

SHIFT CHANGE CONTROL : System Description

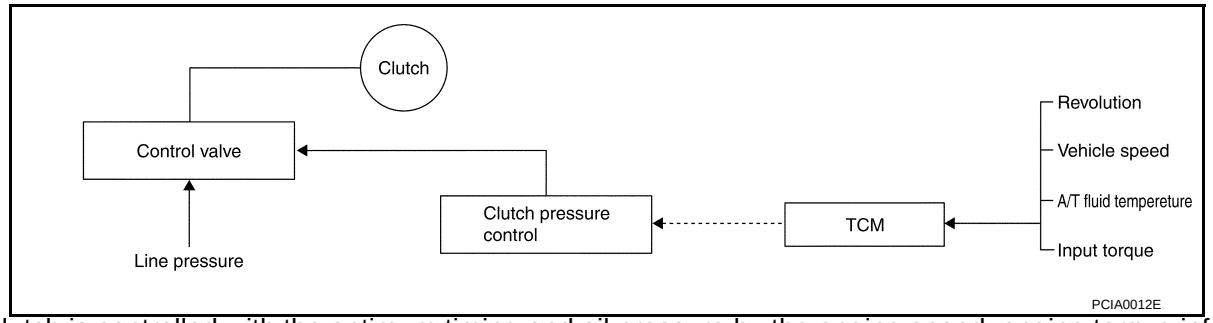
INFOID:0000000009235958

SYSTEM DIAGRAM



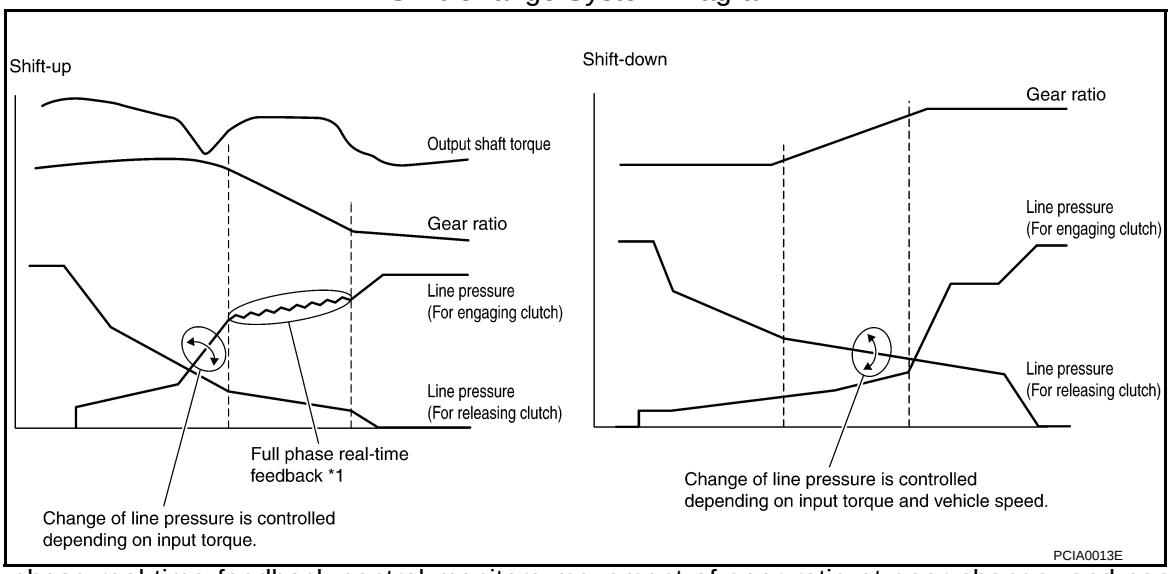
DESCRIPTION

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 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 engine speed, engine torque information, etc.

Shift Change System Diagram

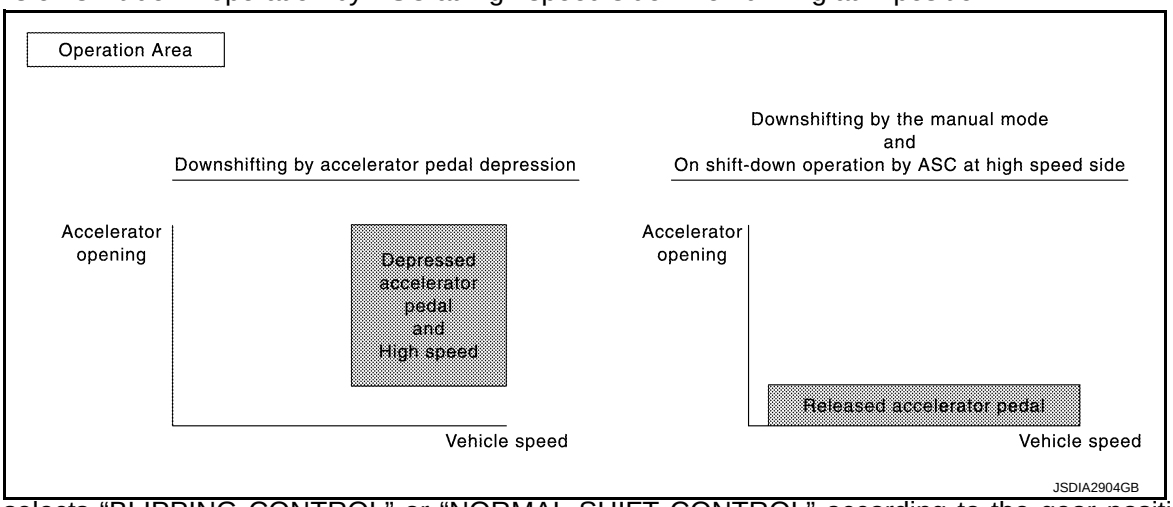


*1: Full phase real-time feedback control monitors movement of gear ratio at gear change, and controls oil pressure in real-time to achieve the best gear ratio.

BLIPPING CONTROL

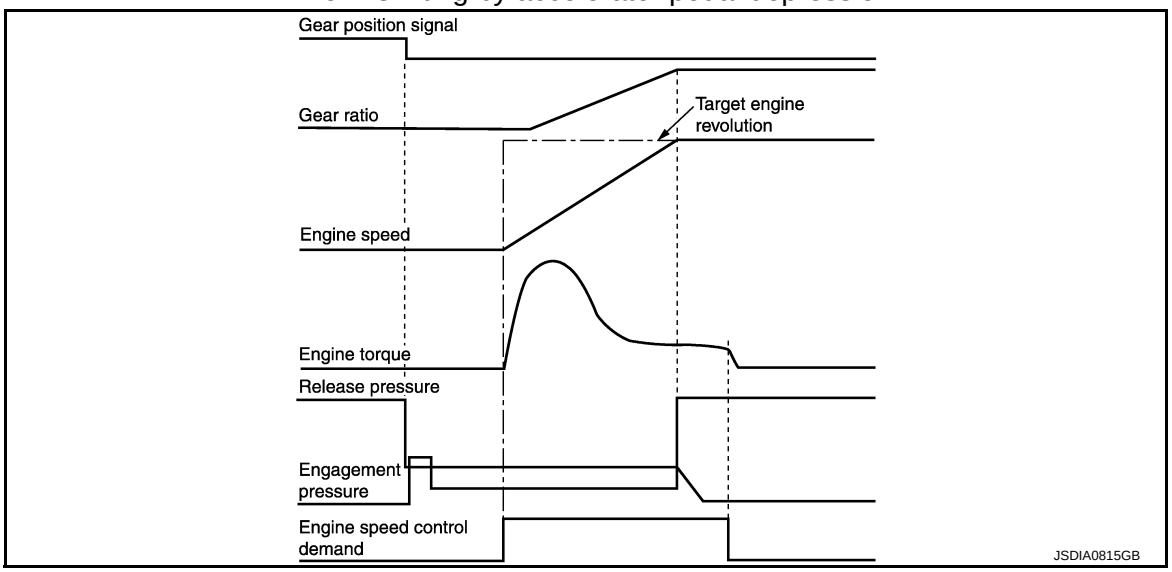
It controls (synchronizes) engine speed to have a quick shift clutch coupling, by calculating engine speed after downshifting and by cooperating with ASC (Adaptive Shift Control).

- "BLIPPING CONTROL" functions.
- When downshifting by accelerator pedal depression.
- When downshifting by the manual mode.
- It works on shift-down operation by ASC at high speed side when driving at D position.

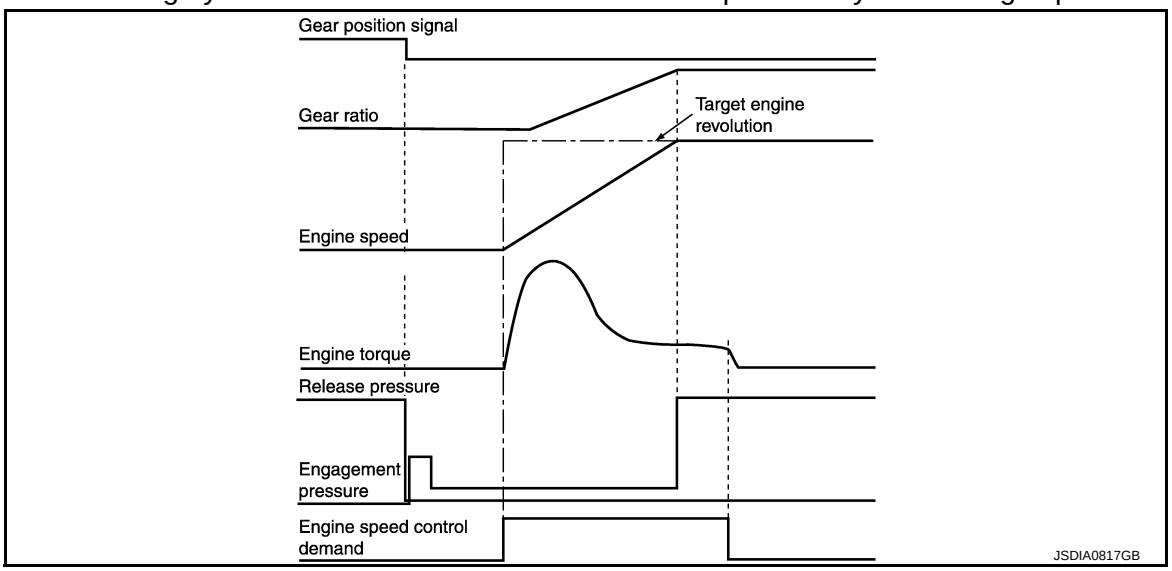


- TCM selects "BLIPPING CONTROL" or "NORMAL SHIFT CONTROL" according to the gear position, the selector lever position, the engine torque and the speed when accelerating by pedal depression.
- Engine speed control demand signal is transmitted from TCM to ECM under "BLIPPING CONTROL".
- ECM synchronizes the engine speed according to the engine speed control demand signal.

Downshifting by accelerator pedal depression



Downshifting by the manual mode and On shift-down operation by ASC at high speed side

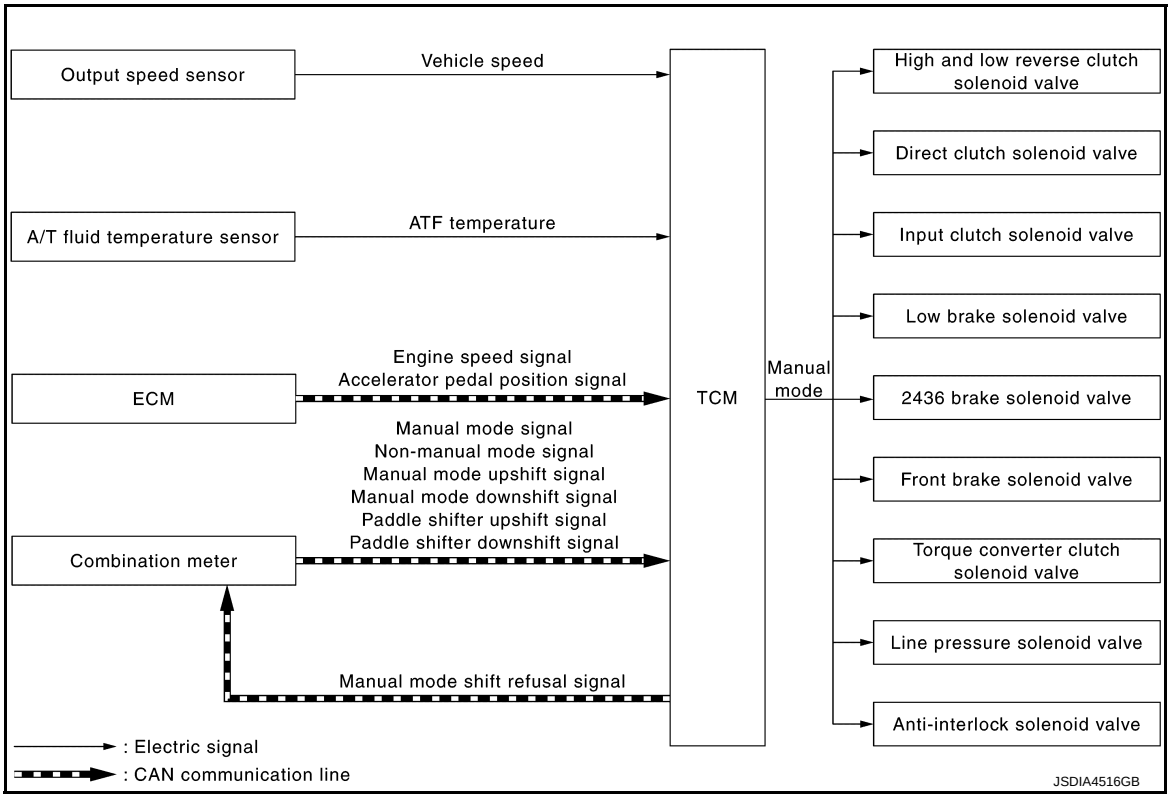


SHIFT PATTERN CONTROL

SHIFT PATTERN CONTROL : System Description

INFOID:0000000009235960

SYSTEM DIAGRAM



NOTE:
Paddle shifter upshift signal and paddle shifter downshift signal are applied to vehicle with paddle shifter.

DESCRIPTION

- The TCM receives the manual mode signal, non-manual mode signal, manual mode upshift signal, manual mode downshift signal, paddle shifter upshift signal and paddle shifter downshift 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.
  NOTE:
  When paddle shifter is pulled and held for approximately 60 seconds, gear shift using paddle shifter becomes inoperative. “P1815” is displayed in “Self Diagnostic Results” of CONSULT. In this case, paddle shifter returns to normal status when ignition switch is turned OFF once and then ON again. Gear shift using paddle shifter becomes operative.
- The TCM prohibits the manual mode while being in fail-safe mode due to an A/T malfunction, etc. Refer to TM-80, "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 or paddle shifter 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.

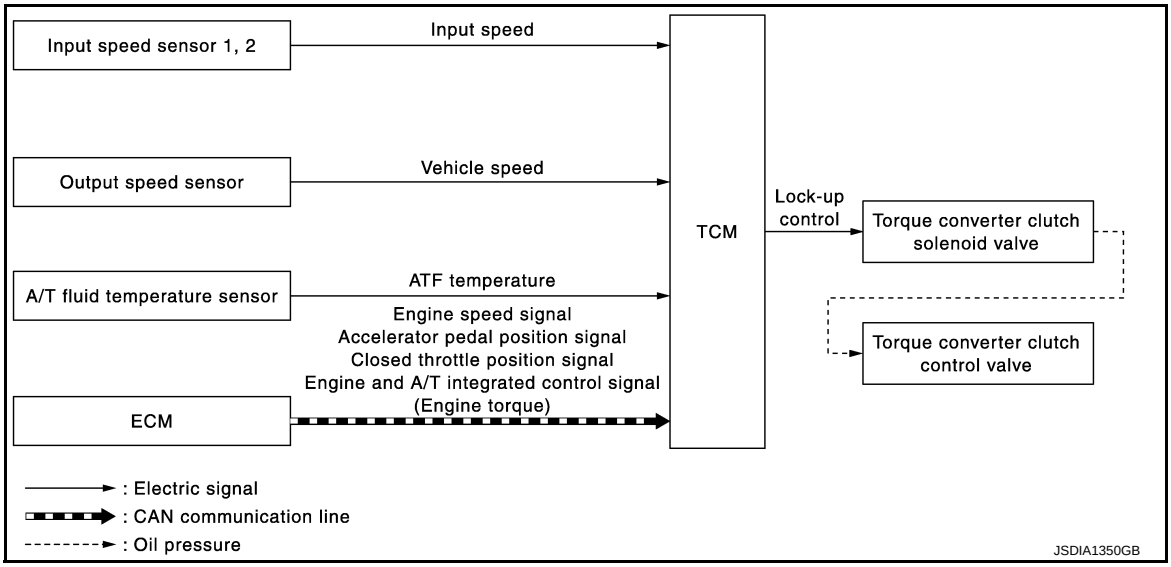
- When the selector lever or the paddle shifter shifts to “DOWN (– side)” side while driving in 1GR.
- When the selector lever or the paddle shifter shifts to “UP (+ side)” side while driving in 7GR.

LOCK-UP CONTROL

LOCK-UP CONTROL : System Description

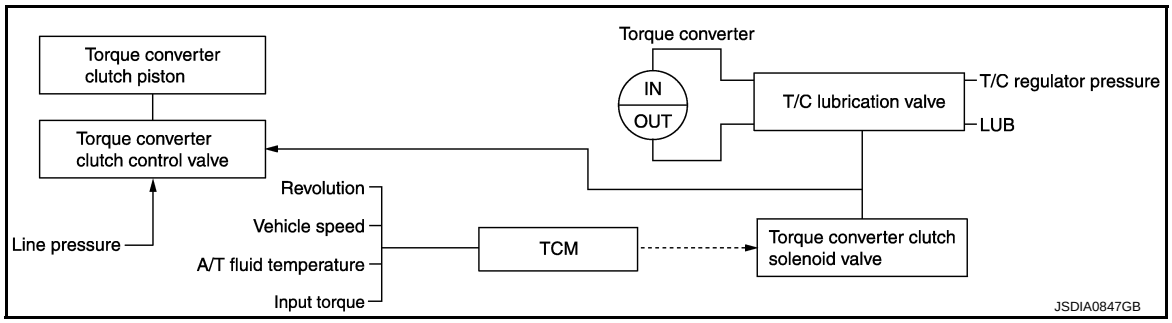
INFOID:0000000009235962

SYSTEM DIAGRAM



DESCRIPTION

- The torque converter clutch piston in the torque converter is engaged to eliminate torque converter slip to increase power transmission efficiency.
- Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
- The torque converter clutch control valve operation is controlled by the torque converter clutch solenoid valve, which is controlled by a signal from TCM, and the torque converter clutch control valve engages or releases the torque converter clutch piston.



Lock-up Operation Condition Table

Selector lever	"D" position						"M" position					
Gear position	7	6	5	4	3	2	7	6	5	4	3	2
Lock-up	×	–	–	–	–	–	×	×	×	×	×	×
Slip lock-up	×	×	×	×	×	×	×	×	×	×	×	×

Lock-up released

- In the lock-up released state, the torque converter clutch control valve is set into the unlocked state by the torque converter clutch solenoid and the lock-up apply pressure is drained.
  in this way, the torque converter clutch piston is not coupled.

Lock-up Applied

- In the lock-up applied state, the torque converter clutch control valve is set into the locked state by the torque converter clutch solenoid and lock-up apply pressure is generated.
  In this way, the torque converter clutch piston is pressed and coupled.

Smooth Lock-up Control

When shifting from the lock-up released state to the lock-up applied state, the current output to the torque converter clutch solenoid is controlled with the TCM. In this way, when shifting to the lock-up applied state, the torque converter clutch is temporarily set to the half-clutched state to reduce the shock.

Half-clutched State
- The current output from the TCM to the torque converter clutch solenoid is varied to steadily increase the torque converter clutch solenoid pressure.
  In this way, the lock-up apply pressure gradually rises and while the torque converter clutch piston is put into half-clutched states, the torque converter clutch piston operating pressure is increased and the coupling is completed smoothly.

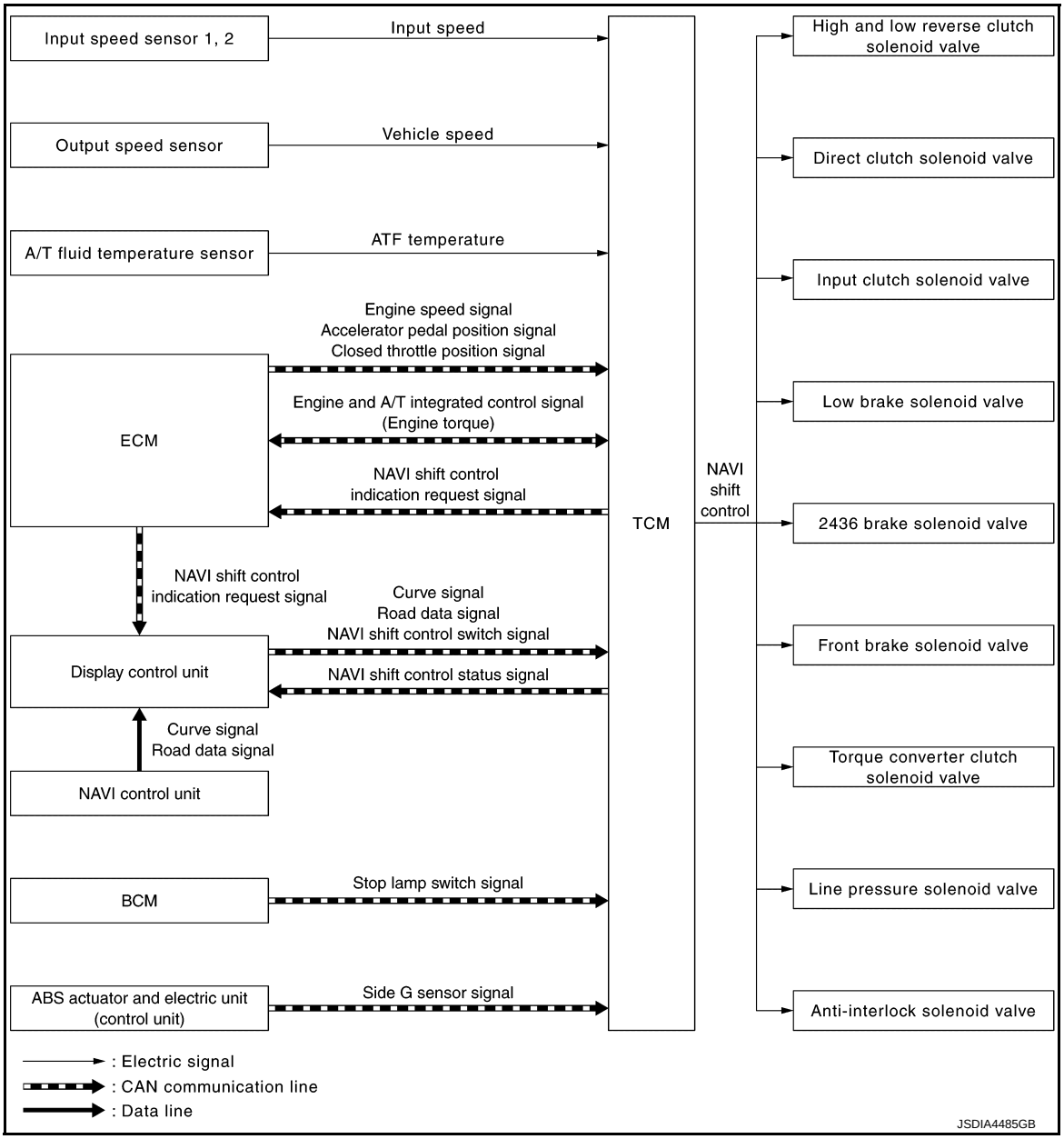
Slip Lock-up Control
- In the slip region, the torque converter clutch solenoid current is controlled with the TCM to put it into the half-clutched state. This absorbs the engine torque fluctuation and lock-up operates from low speed.
  This raises the fuel efficiency for 2GR, 3GR, 4GR, 5GR, 6GR and 7GR.

NAVI SHIFT CONTROL

NAVI SHIFT CONTROL : System Description

INFOID:0000000009640467

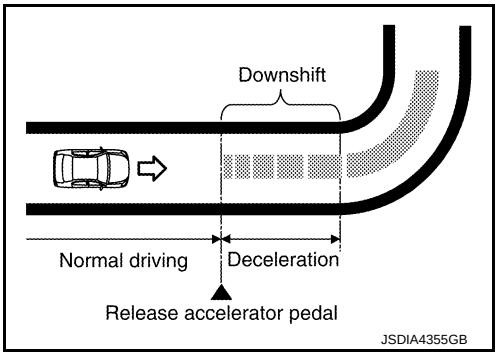
SYSTEM DIRGRAM



DESCRIPTION
- NAVI shift control is applied to vehicle for North America.
- NAVI shift control enables optimum engine brake by shifting the transmission gear to a lower position short of curve when the NAVI shift control switch displayed on the navigation screen is ON.

Short of Curve

- TCM judges the size of curve by using NAVI information and TCM selects an optimum transmission gear position.
  NOTE:
  When downshifting is unnecessary, current gear position may be maintained.



- TCM receives NAVI information (e.g. road data signal and curve signal) from the NAVI control unit via the display control unit. When receiving these signals, TCM transmits a NAVI shift control indication request signal to the display control unit via ECM to display the NAVI shift control switch on the navigation screen.
- TCM receives a NAVI shift control switch signal (ON/OFF) from the display control unit. TCM transmits a NAVI shift control status signal to the display control unit according to the signal received from the display control unit to switch NAVI shift control between ON and OFF.

NOTE:
The ON/OFF setting of NAVI shift control is maintained until the setting is changed even when the engine is stopped.

NAVI Shift Control Operating Condition

NAVI shift control operate when all of the following conditions are satisfied. However, the control ends when any one of the following conditions becomes insufficient during NAVI shift control.

NAVI shift control switch	: ON
Shift position	: D position
Infiniti Drive Mode Selector	: STANDARD or SPORT

If any of the following conditions are satisfied when NAVI shift control is ON, the control may not start or function properly:

- Road shape in Map data differs from that of actual road (e.g. roads not in map, under construction, lane closure, etc.).
- Own vehicle location cannot be identified accurately (e.g. wrong recognition of road, own vehicle location longitudinal deviation).
- A malfunction exists in a sensor equipped in the vehicle.
- Own vehicle location is hard to be identified. (e.g. existence of a road running parallel).
- Traveling at a low speed or high speed: slower/faster than a certain speed.
- GPS waves cannot be received.
- Communication error among TCM, ECM, and display control unit (CAN communication).
- Communication error between display control unit and NAVI control unit.

Fail-safe

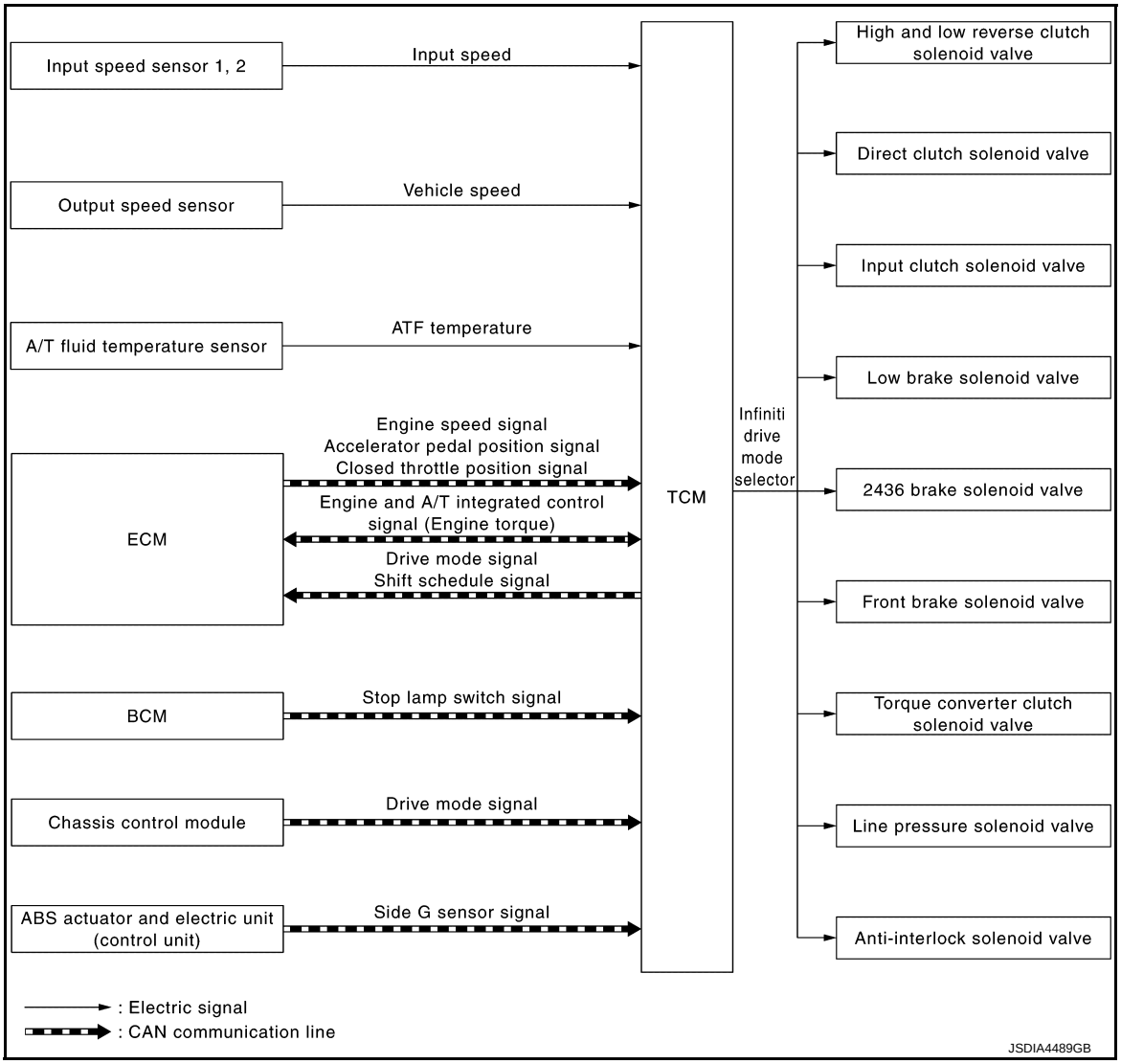
When an error occurs in the system while NAVI shift control is ON, the NAVI shift control switch on the navigation screen cannot be selected and NAVI shift control is turned OFF.

Infiniti Drive Mode Selector

Infiniti Drive Mode Selector : System Description

INFOID:0000000009640469

SYSTEM DIAGRAM



DESCRIPTION

- TCM receives drive mode signal from chassis control module via CAN communication.
- TCM transmits recognized mode and gear shift line select result to ECM 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.
- Refer to DMS-7, "Infiniti Drive Mode Selector : System Description" for detailed control of infinity drive mode selector.

ECO mode

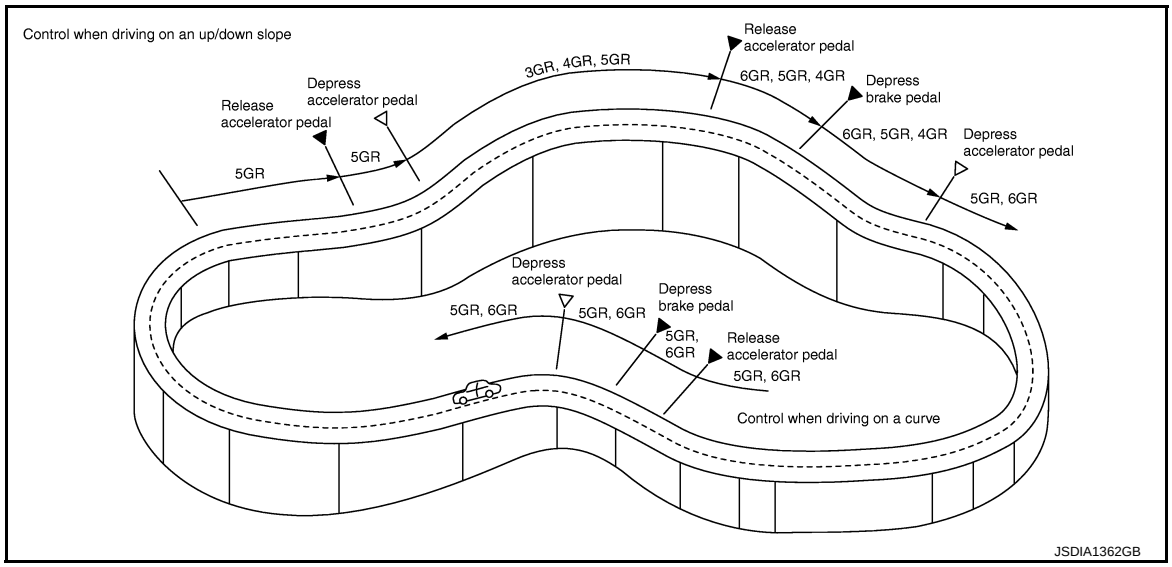
- Driving characteristic is controlled (for decreasing needless acceleration and deceleration and reducing energy consumption), so that driving that improves operational fuel efficiency is assisted.
- For gear shift vehicle speed, refer to TM-335, "Vehicle Speed at Which Gear Shifting Occurs".

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 ECM 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 chassis control module, 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.

INFORMATION DISPLAY (COMBINATION METER)

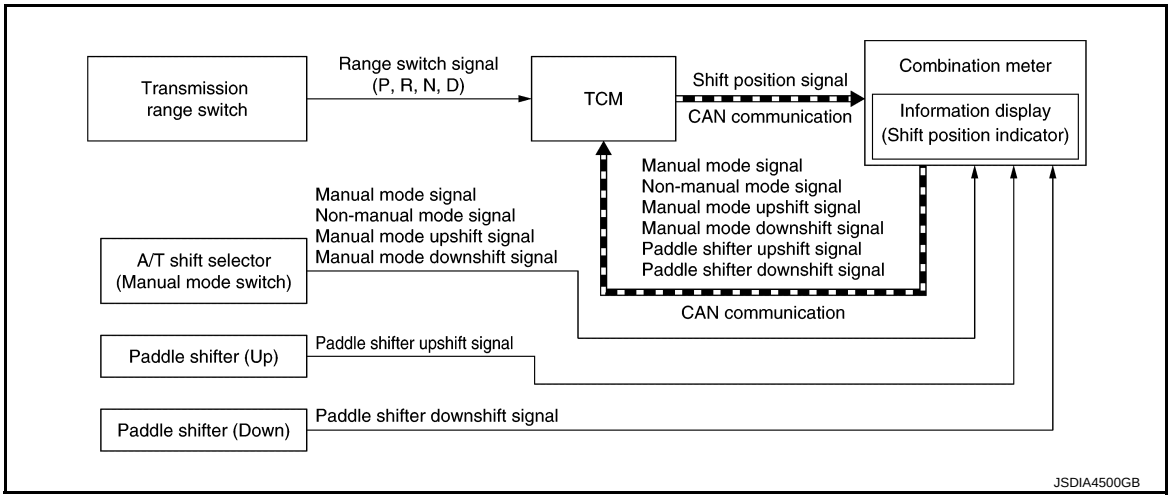
INFORMATION DISPLAY (COMBINATION METER) : Shift Position Indicator

INFOID:0000000009724743

PURPOSE

The shift position indicator displays the shift position of transmission.

SYSTEM DIAGRAM



NOTE:

Paddle shifter is applied to vehicle with paddle shifter.

SIGNAL PATH

- The TCM judges the shift position by the transmission range switch signal, manual mode switch signal, non-manual mode switch signal, manual mode upshift signal, manual mode downshift signal, paddle shifter upshift signal, and paddle shifter downshift signal.
- The TCM transmits the shift position signal to the combination meter via CAN communication. The combination meter shows the shift position indicator on the information display, according to the signal.

LIGHTING CONDITION
Ignition switch: ON

SHUTOFF CONDITION
Ignition switch: Other than ON

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning/Indicator (On Information Display)

INFOID:0000000009724744

Item	Reference
Shift position indicator	Refer to TM-66, "INFORMATION DISPLAY (COMBINATION METER) : Shift Position Indicator".

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000009235964

The A/T system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (OBD) performed by the TCM in combination with the ECM. A malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory and in the TCM memory.
The second is the TCM original self-diagnosis indicated by the TCM. A malfunction history is stored in the TCM memory. The detected items are overlapped with OBD self-diagnostic items. For details, refer to TM-85, "DTC Index".

OBD FUNCTION

The ECM provides emission-related on board diagnostic (OBD) functions for the A/T system.
One function is to receive a signal from the TCM used with OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part.
The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.
The MIL automatically illuminates in “One or Two Trip Detection Logic” when a malfunction is sensed in relation to A/T system parts. For details, refer to EC-64, "DIAGNOSIS DESCRIPTION : 1st Trip Detection Logic and Two Trip Detection Logic".

DIAGNOSIS SYSTEM (TCM)

CONSULT Function

INFOID:0000000009235965

APPLICATION ITEMS

Diagnostic test mode	Function
Work Support	This mode enables a technician to adjust some devices faster and more accurately.
Self Diagnostic Results	Retrieve DTC from ECU and display diagnostic items.
Data Monitor	Monitor the input/output signal of the control unit in real time.
CAN Diagnosis	This mode displays a network diagnosis result about CAN by a diagram.
CAN Diagnostic Support Monitor	It monitors the status 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.
Configuration	Function to READ/WRITE vehicle configuration.
CALIB DATA*	The calibration data status of TCM can be checked.

*: Although “CALIB DATA” is selectable, do not use its.

SELF DIAGNOSTIC RESULTS

Refer to TM-85, "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
  - 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
  - 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 CAN communication.
ACCELE POSI	(0.0/8)	Displays the accelerator position estimated value received via CAN communication.
THROTTLE POSI	(0.0/8)	Displays the throttle position received via CAN communication.
CLSD THL POS	(ON/OFF)	Displays the idling status signal status received via CAN communication.
W/O THL POS	(ON/OFF)	Displays the kickdown condition signal status received via CAN communication.
BRAKESW	(ON/OFF)	Displays the reception status of stop lamp switch signal received via CAN communication.
GEAR		Displays the current transmission gear position recognized by TCM.
ENGINE SPEED	(rpm)	Displays the engine speed received via CAN communication.
INPUT SPEED	(rpm)	Displays the input speed calculated from front sun gear revolution and front carrier revolution.
OUTPUT REV	(rpm)	Displays the output speed calculated from the pulse signal of output speed sensor.

Monitored item (Unit)		Remarks
GEAR RATIO		Displays the gear ratio calculated from input speed and output speed.
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.
ATF TEMP SE 1	(V)	Displays the signal voltage of A/T fluid temperature sensor.
ATF TEMP 1	(°C or °F)	Displays the ATF temperature of oil pan calculated from the signal voltage of A/T fluid temperature sensor.
BATTERY VOLT	(V)	Displays the power supply voltage of TCM.
RANGE SW 1	(ON/OFF)	Displays the operation status of transmission range switch 1.
RANGE SW 2	(ON/OFF)	Displays the operation status of transmission range switch 2.
RANGE SW 3	(ON/OFF)	Displays the operation status of transmission range switch 3.
RANGE SW 4	(ON/OFF)	Displays the operation status of transmission range switch 4.
1 POSITION SW	(ON/OFF)	• Displays the reception status of 1 position switch signal received via CAN communication. • Not mounted but displayed.
SLCT LVR POSI		Displays the shift positions recognized by TCM.
OD CONT SW	(ON/OFF)	• Displays the reception status of overdrive control switch signal received via CAN communication. • Not mounted but displayed.
POWERSHIFT SW	(ON/OFF)	• Displays the reception status of POWER mode signal received via CAN communication. • Not mounted but displayed.
DS RANGE	(ON/OFF)	• Displays whether it is the DS mode. • Not mounted but displayed.
MANU MODE SW	(ON/OFF)	Displays whether the selector lever is in the manual shift gate position.
NON M-MODE SW	(ON/OFF)	Displays whether the selector lever is in any position other than manual shift gate position.
UP SW LEVER	(ON/OFF)	Displays the operation status of selector lever (up switch).
DOWN SW LEVER	(ON/OFF)	Displays the operation status of selector lever (down switch).
SFT UP ST SW	(ON/OFF)	Displays the operation status of paddle shifter (up switch).
SFT DWN ST SW	(ON/OFF)	Displays the operation status of paddle shifter (down switch).
ASCD-OD CUT	(ON/OFF)	Displays the reception status of ASCD OD cancel request signal received via CAN communication.
ASCD-CRUISE	(ON/OFF)	Displays the reception status of ASCD operation signal received via CAN communication.
ABS SIGNAL	(ON/OFF)	Displays the reception status of ABS operation signal received via CAN communication.
TCS GR/P KEEP	(ON/OFF)	Displays the reception status of TCS gear keep request signal received via CAN communication.
TCS SIGNAL 2	(ON/OFF)	Displays whether the reception value of A/T shift schedule change demand signal received via CAN communication is “cold”.
TCS SIGNAL 1	(ON/OFF)	Displays whether the reception value of A/T shift schedule change demand signal received via CAN communication is “warm”.
TCC SOLENOID	(A)	Displays the command current from TCM to the torque converter clutch solenoid.
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.

Monitored item (Unit)		Remarks
ON OFF SOL	(ON/OFF)	Displays the command status from TCM to anti-interlock solenoid.
TCC SOL MON	(A)	Monitors the command current from TCM to the torque converter clutch solenoid, and displays the monitor value.
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.
ON OFF SOL MON	(ON/OFF)	Monitors the command value from TCM to the anti-interlock solenoid, and displays the monitor status.
SHIFT IND SIGNAL		Displays the transmission value of shift position signal transmitted via CAN communication.
MANU MODE IND	(ON/OFF)	Displays the transmission status of manual mode signal transmitted via CAN communication.
ATF WARN LAMP	(ON/OFF)	• Displays the transmission status of ATF temperature signal transmitted via CAN communication. • Not mounted but displayed.
TRGT PRES TCC	(kPa, kg/cm^2 or psi)	Displays the target oil pressure value of torque converter clutch solenoid valve calculated by the oil pressure calculation process of shift change control.
TRGT PRES L/P	(kPa, kg/cm^2 or psi)	Displays the target oil pressure value of torque converter clutch solenoid valve calculated by the oil pressure calculation process of lock-up 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.
DRV CST JUDGE	(DRIVE/COAST)	Displays the judgment results of “driving” or “coasting” judged 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.
ENGINE TORQUE	(Nm)	Displays the engine torque estimated value received via CAN communication.
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.

Monitored item (Unit)		Remarks
VEHICLE SPEED	(km/h or mph)	Displays the vehicle speed for control using the control of TCM.
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.
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.
SPORT MODE		Displays the status of drive mode select switch signal received via CAN communication.
STANDARD MODE		
ECO MODE		
SNOW MODE		
DRIVE MODE STATS		Displays the drive mode status recognized by TCM.
TOW MODE SW	(ON/OFF)	• Displays the reception status of tow mode switch signal received via CAN communication. • Not mounted but displayed.
SHIFT SCHEDULE		Displays the shift schedule selected by TCM.
TC SLIP SPEED	(rpm)	Displays the revolution difference between input speed and engine speed.
ATF TEMP 2	(°C or °F)	Displays the ATF temperature estimated value of torque converter outlet calculated from the signal voltage of A/T fluid temperature sensor.
ENG TORQUE D	(Nm)	Displays the engine torque estimated value reflected the requested torque of each control unit received via CAN communication.
STARTER RELAY	(ON/OFF)	Displays the command status from TCM to starter relay.
F-SAFE IND/L	(ON/OFF)	Displays the transmission status of A/T CHECK indicator lamp signal transmitted via CAN communication.
START RLY MON	(ON/OFF)	Monitors the command value from TCM to the starter relay, and displays the monitor status.
N IDLE STATUS	(ON/OFF)	Displays the control status of idle neutral control.
G SEN SLOPE	(%)	Displays the inclination angle calculated by the decel G sensor signal received via CAN communication.

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)	• Harness or connectors • Torque converter clutch solenoid valve • Torque converter • Input speed sensor 1, 2 • Hydraulic control circuit

ECU DIAGNOSIS INFORMATION

TCM

Reference Value

INFOID:0000000009235966

VALUES ON THE DIAGNOSIS TOOL

- The CONSULT electrically displays shift timing and lock-up 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.
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
CLSD THL POS	Accelerator pedal is released	ON
	Accelerator pedal is fully depressed	OFF
W/O THL POS	Accelerator pedal is fully depressed	ON
	Accelerator pedal is released	OFF
BRAKESW	Brake pedal is depressed	ON
	Brake pedal is released	OFF
GEAR	During driving	1, 2, 3, 4, 5, 6, 7
ENGINE SPEED	Engine running	Closely equals the tachometer reading.
INPUT SPEED	During driving (lock-up ON)	Approximately equals the engine speed.
OUTPUT REV	During driving (lock-up ON)	Tachometer / Gear ratio
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

Item name	Condition	Value / Status (Approx.)
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.
ATF TEMP SE 1	0°C (32° F) – 20°C (68°F) – 80°C (176°F)	3.3 – 2.7 – 0.9 V
ATF TEMP 1	Ignition switch ON	Temperature of ATF in the oil pan is indicated.
BATTERY VOLT	Ignition switch ON	Battery voltage (11 V – 14 V)
RANGE SW 1	Selector lever in “P” position	ON
	Other than the above	OFF
RANGE SW 2	Selector lever in “P” and “R” 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 4	Selector lever in “P” and “N” positions	ON
	Other than the above	OFF
1 POSITION SW*	Selector lever in “1” position	ON
	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” position	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
OD CONT SW*	When overdrive control switch is depressed	ON
	When overdrive control switch is released	OFF
POWERSHIFT SW*	Power mode	ON
	Other than the above	OFF
DS RANGE*	Driving with DS mode	ON
	Other than the above	OFF
MANU MODE SW	Selector lever is shifted to manual shift gate 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
UP SW LEVER	Selector lever is shifted to + side	ON
	Other than the above	OFF
DOWN SW LEVER	Selector lever is shifted to – side	ON
	Other than the above	OFF
SFT UP ST SW	Paddle shifter (shift-up) is pulled	ON
	Other than the above	OFF

Item name	Condition	Value / Status (Approx.)
SFT DWN ST SW	Paddle shifter (shift-down) is pulled	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
TCS SIGNAL 1	When the reception value of A/T shift schedule change demand signal is “warm”	ON
	Other than the above	OFF
TCC SOLENOID	Slip lock-up is active	0.2 – 0.8 A
	Lock-up is active	0.8 A
	Other than the above	0 A
LINE PRES SOL	During driving	0.2 – 0.6 A
L/B SOLENOID	Low brake is engaged	0.6 – 0.8 A
	Low brake is disengaged	0 – 0.05 A
FR/B SOLENOID	Front brake is engaged	0.6 – 0.8 A
	Front brake is disengaged	0 – 0.05 A
HLR/C SOL	High and low reverse clutch is disengaged	0.6 – 0.8 A
	High and low reverse clutch is engaged	0 – 0.05 A
I/C SOLENOID	Input clutch is disengaged	0.6 – 0.8 A
	Input clutch is engaged	0 – 0.05 A
D/C SOLENOID	Direct clutch is disengaged	0.6 – 0.8 A
	Direct clutch is engaged	0 – 0.05 A
2346/B SOL	2346 brake is engaged	0.6 – 0.8 A
	2346 brake is disengaged	0 – 0.05 A
ON OFF SOL	Selector lever in “P” and “N” positions	ON
	Driving with 1GR to 3GR	
	Other than the above	OFF
TCC SOL MON	Slip lock-up is active	0.2 – 0.8 A
	Lock-up is active	0.8 A
	Other than the above	0 A
L/P SOL MON	During driving	0.2 – 0.6 A
L/B SOL MON	Low brake is engaged	0.6 – 0.8 A
	Low brake is disengaged	0 – 0.05 A
FR/B SOL MON	Front brake is engaged	0.6 – 0.8 A
	Front brake is disengaged	0 – 0.05 A
HLR/C SOL MON	High and low reverse clutch is disengaged	0.6 – 0.8 A
	High and low reverse clutch is engaged	0 – 0.05 A

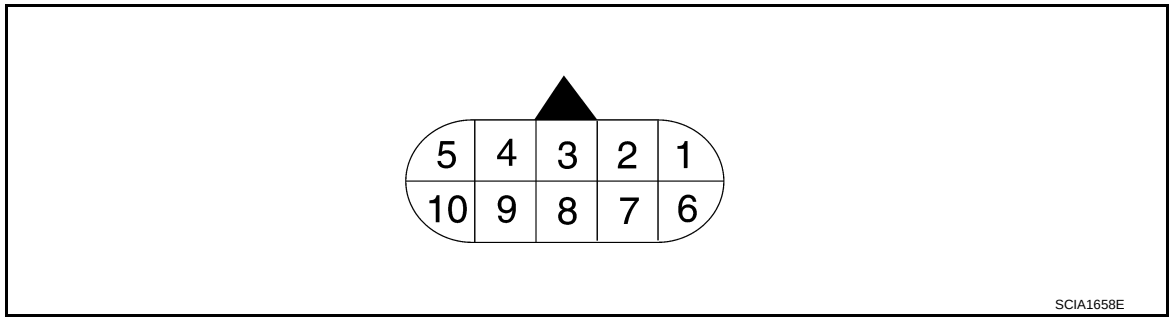
Item name	Condition	Value / Status (Approx.)
I/C SOL MON	Input clutch is disengaged	0.6 – 0.8 A
	Input clutch is engaged	0 – 0.05 A
D/C SOL MON	Direct clutch is disengaged	0.6 – 0.8 A
	Direct clutch is engaged	0 – 0.05 A
2346/B SOL MON	2346 brake is engaged	0.6 – 0.8 A
	2346 brake is disengaged	0 – 0.05 A
ON OFF SOL MON	Selector lever in “P” and “N” positions	ON
	Driving with 1GR to 3GR	
	Other than the above	OFF
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
MANU MODE IND	Driving with manual mode	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
TRGT PRES TCC	Slip lock-up is active	0 – 600 kPa
	Lock-up is active	600 kPa
	Other than the above	0 kPa
TRGT PRES L/P	Selector lever in “P” and “N” positions	490 kPa
	Other than the above	490 – 1370 kPa
TRGT PRES L/B	Low brake is engaged	1370 kPa
	Low brake is disengaged	0 kPa
TRGT PRES FR/B	Front brake is engaged	1370 kPa
	Front brake is disengaged	0 kPa
TRG PRE HLR/C	High and low reverse clutch is engaged	1370 kPa
	High and low reverse clutch is disengaged	0 kPa

Item name	Condition	Value / Status (Approx.)
TRGT PRES I/C	Input clutch is engaged	1370 kPa
	Input clutch is disengaged	0 kPa
TRGT PRES D/C	Direct clutch is engaged	1370 kPa
	Direct clutch is disengaged	0 kPa
TRG PRE 2346/B	2346 brake is engaged	1370 kPa
	2346 brake is disengaged	0 kPa
SHIFT PATTERN	During normal driving (without shift changes)	FF
DRV CST JUDGE	Accelerator pedal is depressed	DRIVE
	Accelerator pedal is released	COAST
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
ENGINE TORQUE	During driving	Changes the value according to the acceleration or deceleration.
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.
VEHICLE SPEED	During driving	Approximately equals the speed-ometer reading.
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
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
SPORT MODE	Drive mode: SPORT mode	ON
	Other than the above	OFF
STANDARD MODE	Drive mode: STANDARD mode	ON
	Other than the above	OFF
ECO MODE	Drive mode: ECO mode	ON
	Other than the above	OFF
SNOW MODE	Drive mode: SNOW mode	ON
	Other than the above	OFF

Item name	Condition	Value / Status (Approx.)
DRIVE MODE STATS	Drive mode: SPORT mode	SPORT
	Drive mode: STANDARD mode	STD
	Drive mode: ECO mode	ECO
	Drive mode: SNOW mode	SNOW
TOW MODE SW*	Tow mode	ON
	Other than the above	OFF
SHIFT SCHEDULE	During normal driving	NORMAL
	Drive mode: SPORT mode	SPORT
	Drive mode: ECO mode	ECO
TC SLIP SPEED	During driving	Engine speed – Input speed
ATF TEMP 2	Ignition switch ON	Temperature of ATF at the exit of torque converter.
ENG TORQUE D	During driving	Changes the value according to the acceleration or deceleration.
STARTER RELAY	Selector lever in “P” and “N” positions	ON
	Other than the above	OFF
F-SAFE IND/L	For 2 seconds after the ignition switch is turned ON	ON
	Other than the above	OFF
START RLY MON	Selector lever in “P” and “N” positions	ON
	Other than the above	OFF
N IDLE STATUS	Idle neutral is active	ON
	Other than the above	OFF
G SEN SLOPE	Level road	0%
	Uphill slope	Positive value (maximum 40.45%)
	Downhill slope	Negative value (minimum – 40.45%)

*: Not mounted but always display as OFF.

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
1 (GR)	Ground	Ignition power supply	Input	Ignition switch ON	Battery voltage
				Ignition switch OFF	0 V

Terminal (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
2 (P)	Ground	Battery power supply (Memory back-up)	Input	Always		Battery voltage
3 (L)	—	CAN-H	Input/ Output	—		—
4 (LG)	—	K-line	Input/ Output	—		—
5 (B)	Ground	Ground	—	Always		0 V
6 (GR)	Ground	Ignition power supply	Input	Ignition switch ON		Battery voltage
				Ignition switch OFF		0 V
7 (BG)	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 (P)	—	CAN-L	Input/ Output	—		—
9 (GR)	Ground	Starter relay	Output	Ignition switch ON	Selector lever in “N” and “P” positions.	Battery voltage
					Selector lever in other than above.	0 V
10 (B)	Ground	Ground	—	Always		0 V

Fail-Safe

INFOID:0000000009235967

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-97, "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
P0615	—	Starter is disabled	—	Starter is disabled
P0705	—	• Fixed in the “D” position (The shifting can be performed) • Lock-up is prohibited when 30 km/h (19 MPH) or less • 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) • Lock-up is prohibited when 30 km/h (19 MPH) or less • 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	• Only downshift can be performed • Manual mode is prohibited • A vehicle speed signal from the unified meter and A/C amp. 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 unified meter and A/C amp. is regarded as an effective signal	—	
P0725	—	—	—	—

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	Small gear ratio difference		Engine torque limit: Max 150 Nm	—	Engine torque limit: Max 150 Nm
	Great gear ratio difference	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR, 3GR or 4GR • Manual mode is prohibited	—	• 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, 2GR, 3GR, 4GR, 5GR or 6GR • Fix the gear while driving • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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, 6GR or 7GR • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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
P0740	—		• Lock-up is prohibited • Slip lock-up is prohibited	—	• Lock-up is prohibited • Slip lock-up is prohibited
P0744	—		• Lock-up is prohibited • Slip lock-up is prohibited	—	• Lock-up is prohibited • Slip lock-up is prohibited
P0745	—		—	—	—
P0750 P0775 P0795 P2713 P2722 P2731 P2807	—		• Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 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

DTC	Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P0780	—	• Locks in 3GR • Manual mode is prohibited	—	• 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	• Downshift when accelerator pedal is depressed is prohibited • Upshift when accelerator pedal is released is prohibited • Manual mode is prohibited
P1721	—	—	—	—
P1730	—	• Locks in 1GR, 2GR, 3GR, 4GR, 5GR, 6GR or 7GR • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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	Gate switch malfunction	Only the gate switch is prohibited	—	Only the gate switch is prohibited
	Paddle switch malfunction	Only the paddle switch is prohibited	—	Only the paddle switch is prohibited
	Malfunction of both switches	Manual mode is prohibited	—	Manual mode is prohibited
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	—	• 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
	Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited	—	
P0720 and P1721	—	Locks in 5GR	—	Locks in 5GR

Protection Control

INFOID:0000000009235968

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 (16 MPH) 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:0000000009235969

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-106, "DTC Description"
	U1000 CAN COMM CIRCUIT	TM-109, "DTC Description"
2	P0615 STARTER RELAY	TM-111, "DTC Description"
	P0705 T/M RANGE SENSOR A	TM-113, "DTC Description"
	P0710 FLUID TEMP SENSOR A	TM-115, "EXCEPT FOR MEXICO : DTC Description" (Excpt for Mexico), TM-117, "FOR MEXICO : DTC Description" (For Mexico)
	P0717 INPUT SPEED SENSOR A	TM-119, "DTC Description"
	P0720 OUTPUT SPEED SENSOR	TM-121, "DTC Description"
	P0740 TORQUE CONVERTER	TM-145, "DTC Description"
	P0745 PC SOLENOID A	TM-149, "DTC Description"
	P0750 SHIFT SOLENOID A	TM-150, "DTC Description"
	P0775 PC SOLENOID B	TM-152, "DTC Description"
	P0795 PC SOLENOID C	TM-156, "DTC Description"
	P2713 PC SOLENOID D	TM-173, "DTC Description"
	P2722 PC SOLENOID E	TM-175, "DTC Description"
	P2731 PC SOLENOID F	TM-177, "DTC Description"
	P2807 PC SOLENOID G	TM-179, "DTC Description"

Priority	Detected items (DTC)	Reference
3	P0729 6GR INCORRECT RATIO	TM-125, "DTC Description"
	P0730 INCORRECT GR RATIO	TM-128, "DTC Description"
	P0731 1GR INCORRECT RATIO	TM-130, "DTC Description"
	P0732 2GR INCORRECT RATIO	TM-133, "DTC Description"
	P0733 3GR INCORRECT RATIO	TM-136, "DTC Description"
	P0734 4GR INCORRECT RATIO	TM-139, "DTC Description"
	P0735 5GR INCORRECT RATIO	TM-142, "DTC Description"
	P0744 TORQUE CONVERTER	TM-147, "DTC Description"
	P0780 SHIFT	TM-154, "DTC Description"
	P1730 INTERLOCK	TM-162, "DTC Description"
	P1734 7GR INCORRECT RATIO	TM-164, "DTC Description"
4	U0300 CAN COMM DATA	TM-107, "DTC Description"
	P0725 ENGINE SPEED	TM-123, "DTC Description"
	P1705 TP SENSOR	TM-158, "DTC Description"
	P1721 VEHICLE SPEED SIGNAL	TM-160, "DTC Description"
	P1815 M-MODE SWITCH	TM-167, "DTC Description"

DTC Index

INFOID:0000000009235970

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-84, "DTC Inspection Priority Chart".
- The IGN counter is indicated in Freeze frame data (FFD). Refer to TM-69, "CONSULT Function".

Items (CONSULT screen terms)	DTC*1		Reference
	MIL*2, "ENGINE" with CONSULT or GST	CONSULT only "TRANSMISSION"	
STARTER RELAY	—	P0615	TM-111, "DTC Description"
T/M RANGE SENSOR A	P0705	P0705	TM-113, "DTC Description"
FLUID TEMP SENSOR A	P0710	P0710	TM-115, "EXCEPT FOR MEXICO : DTC Description" (Except for Mexico), TM-117, "FOR MEXICO : DTC Description" (For Mexico)
INPUT SPEED SENSOR A	P0717	P0717	TM-119, "DTC Description"
OUTPUT SPEED SENSOR	P0720	P0720	TM-121, "DTC Description"
ENGINE SPEED	—	P0725	TM-123, "DTC Description"
6GR INCORRECT RATIO	P0729	P0729	TM-125, "DTC Description"
INCORRECT GR RATIO	P0730	P0730	TM-128, "DTC Description"
1GR INCORRECT RATIO	P0731	P0731	TM-130, "DTC Description"
2GR INCORRECT RATIO	P0732	P0732	TM-133, "DTC Description"
3GR INCORRECT RATIO	P0733	P0733	TM-136, "DTC Description"
4GR INCORRECT RATIO	P0734	P0734	TM-139, "DTC Description"
5GR INCORRECT RATIO	P0735	P0735	TM-142, "DTC Description"
TORQUE CONVERTER	P0740	P0740	TM-145, "DTC Description"
TORQUE CONVERTER	P0744	P0744	TM-147, "DTC Description"
PC SOLENOID A	P0745	P0745	TM-149, "DTC Description"

Items (CONSULT screen terms)	DTC*1		Reference
	MIL*2, “ENGINE” with CONSULT or GST	CONSULT only “TRANS-MISSION”	
SHIFT SOLENOID A	P0750	P0750	TM-150, "DTC Description"
PC SOLENOID B	P0775	P0775	TM-152, "DTC Description"
SHIFT	P0780	P0780	TM-154, "DTC Description"
PC SOLENOID C	P0795	P0795	TM-156, "DTC Description"
TP SENSOR	—	P1705	TM-158, "DTC Description"
VEHICLE SPEED SIGNAL	—	P1721	TM-160, "DTC Description"
INTERLOCK	P1730	P1730	TM-162, "DTC Description"
7GR INCORRECT RATIO	P1734	P1734	TM-164, "DTC Description"
M-MODE SWITCH	—	P1815	TM-167, "DTC Description"
PC SOLENOID D	P2713	P2713	TM-173, "DTC Description"
PC SOLENOID E	P2722	P2722	TM-175, "DTC Description"
PC SOLENOID F	P2731	P2731	TM-177, "DTC Description"
PC SOLENOID G	P2807	P2807	TM-179, "DTC Description"
LOST COMM (ECM A)	U0100	U0100	TM-106, "DTC Description"
CAN COMM DATA	—	U0300	TM-107, "DTC Description"
CAN COMM CIRCUIT	U1000	U1000	TM-109, "DTC Description"

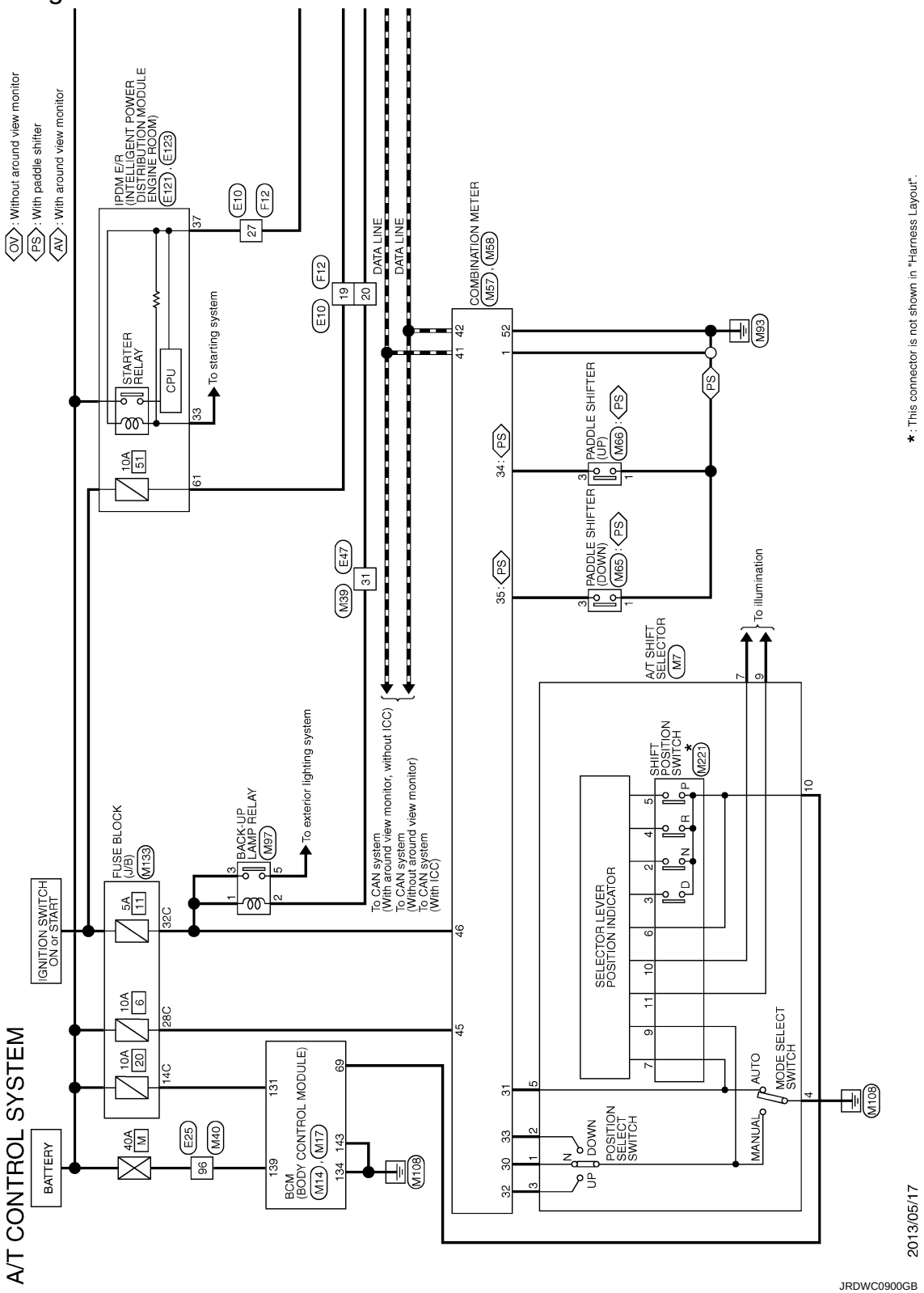
*1: These numbers are prescribed by SAE J2012.
*2: Refer to EC-63, "Diagnosis Description".

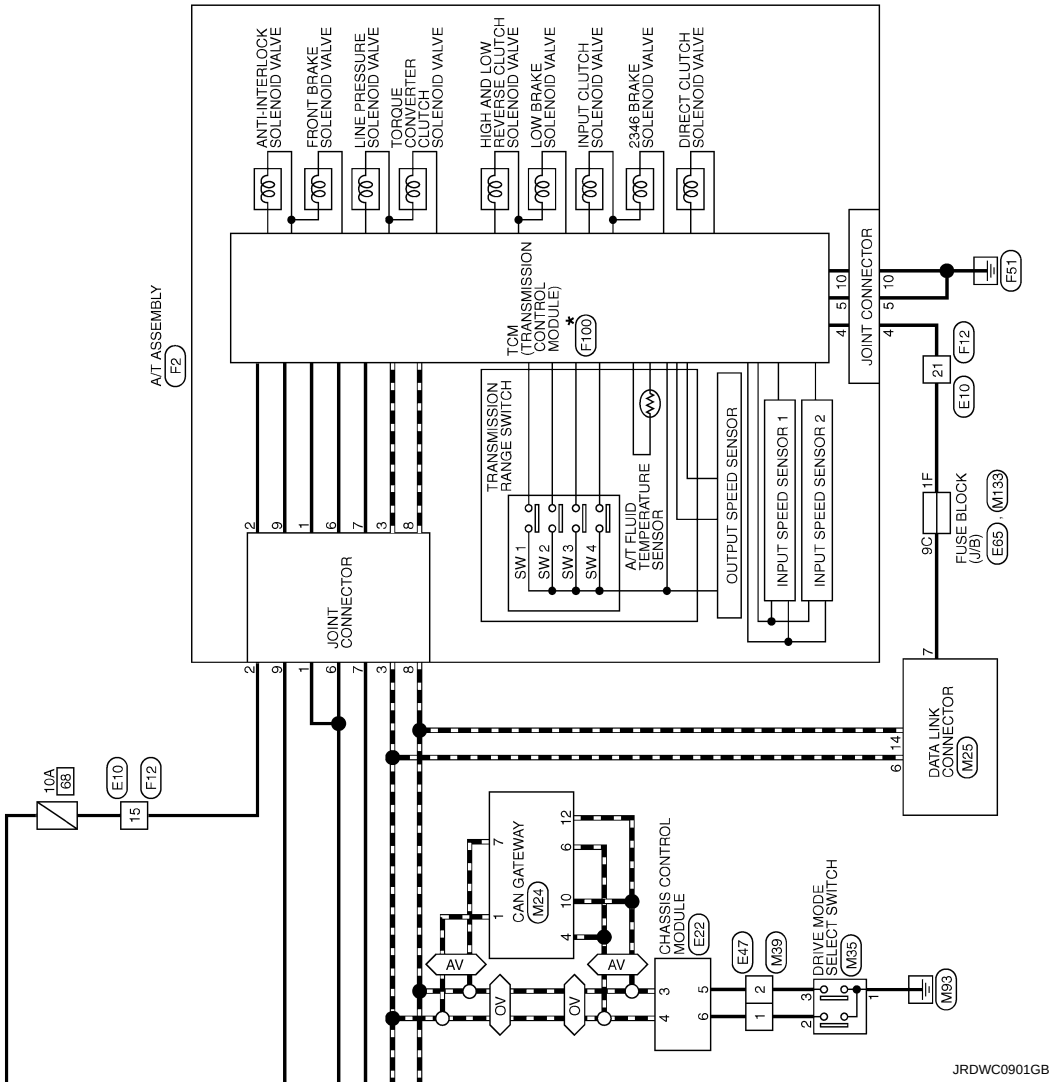
WIRING DIAGRAM

A/T CONTROL SYSTEM

Wiring Diagram

INFOID:0000000009235971

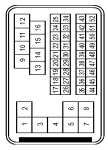



A/T ASSEMBLY
F2
ANTI-INTERLOCK SOLENOID VALVE
FRONT BRAKE SOLENOID VALVE
LINE PRESSURE SOLENOID VALVE
TORQUE CONVERTER CLUTCH SOLENOID VALVE
HIGH AND LOW REVERSE CLUTCH SOLENOID VALVE
LOW BRAKE SOLENOID VALVE
INPUT CLUTCH SOLENOID VALVE
2346 BRAKE SOLENOID VALVE
DIRECT CLUTCH SOLENOID VALVE
TCM (TRANSMISSION CONTROL MODULE)
F100
JOINT CONNECTOR
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
JOINT CONNECTOR
F51
F12
E10
21
1F
9C
FUSE BLOCK (J/B)
E65
M133
DATA LINK CONNECTOR
M25
10A
68
E10
F12
15
CAN GATEWAY
M24
CHASSIS CONTROL MODULE
E22
AV
OV
E47
M39
DRIVE MODE SELECT SWITCH
M35
M93
JRDWC0901GB

A/T CONTROL SYSTEM

Connector No.	E10
Connector Name	WIRE TO WIRE
Connector Type	SAA36MB-RS8-SMZ8

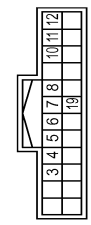
H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L*4	–
2	SHIELD	–
3	L*8	–
4	SHIELD	–
5	BR	–
6	SB	–
7	G	–
8	W	–
9	W	–
10	Y	–
11	P	–
12	SB	–
13	L	–
14	G	–
15	LG	–
16	BR	–
17	L	–
18	P	–
19	GR	–
20	G	–
21	V	–
22	Y	–
23	L	–
24	GR	–
25	V	–
26	BR	–
27	W	–
28	V	–
29	BR	–
30	R	–
31	P	–
32	G	–
33	B	–
34	BG	–
35	LG	–
36	W	–
37	SHIELD	–
38	L	–
39	P	–
40	R	–
41	W	–
42	LG	–
43	G	–
44	V	–
45	Y	–
46	SHIELD	–
47	W	–
48	BR	–
49	G	–
50	B	–
51	SB	–
52	R	–

Connector No.	E22
Connector Name	CHASSIS CONTROL MODULE
Connector Type	TH24FW-NH

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
3	P	CAN-L [Without Gateway]
3	R	CAN-L [With Gateway]
4	L	CAN-H
5	V	DRIVE MODE SELECT SW (UP)
6	G	DRIVE MODE SELECT SW (DOWN)
7	W	CHASSIS COMM-L
8	W	CHASSIS COMM-L
10	G	IGN
11	L	CHASSIS COMM-H
12	B	GROUND
19	L	CHASSIS COMM-H

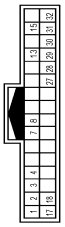
Connector No.	E25
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
2	W	–
3	LG	–
4	BR	–
6	V	–
7	L	–
10	BR	–
11	L	–
12	GR	–
13	W	–
14	B	–
15	SB	–
16	Y	–
17	BR	–
18	P	–
31	Y	–
32	GR	–
35	GR	–
36	R	–
37	V	–
38	L	–
39	Y	–
40	SB	–
41	LG	–
44	Y	–
45	W	–
46	B	–
47	G	–
48	SHIELD	–
49	R	–
50	BR	–
51	L	–
52	W	–
53	V	–
54	P	–
55	W	–
56	SB	–
57	BG	–
58	B	–
59	W	–
61	R	–
64	Y	–
65	SB	–
66	GR	–
67	LG	–
68	BG	–
71	LG	–
72	V	–
73	G	–
74	BR	–
75	V	–
78	P	–
79	SB	–
83	R	–
86	BG	–
91	G	–
92	Y	–
94	GR	–
95	BG	–
96	W	–
97	LG	–
98	L	–
99	P	–
100	SHIELD	–

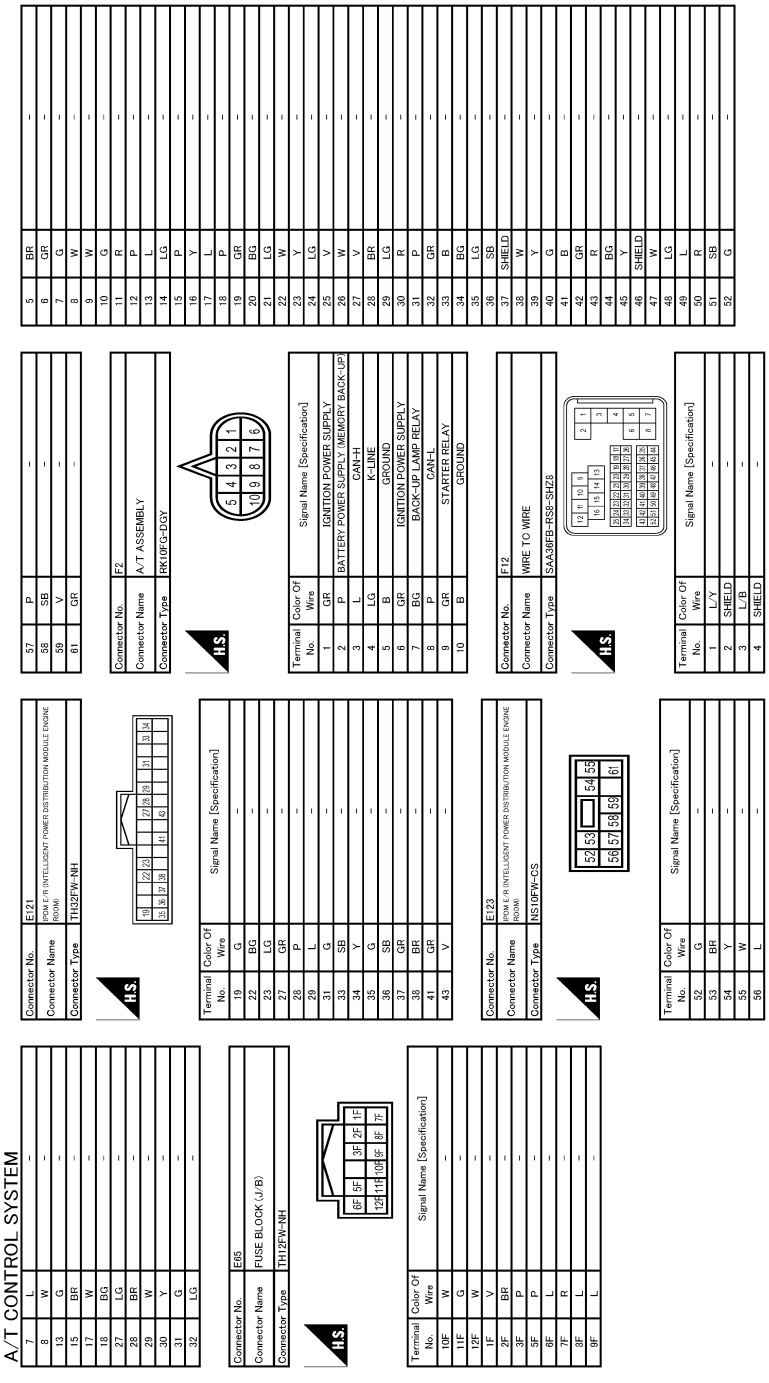
Connector No.	E47
Connector Name	WIRE TO WIRE
Connector Type	TH32MW-NH

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	–
2	V	–
3	L	–
4	P	–[Without Gateway]
4	R	–[With Gateway]

JRDWC0902GB



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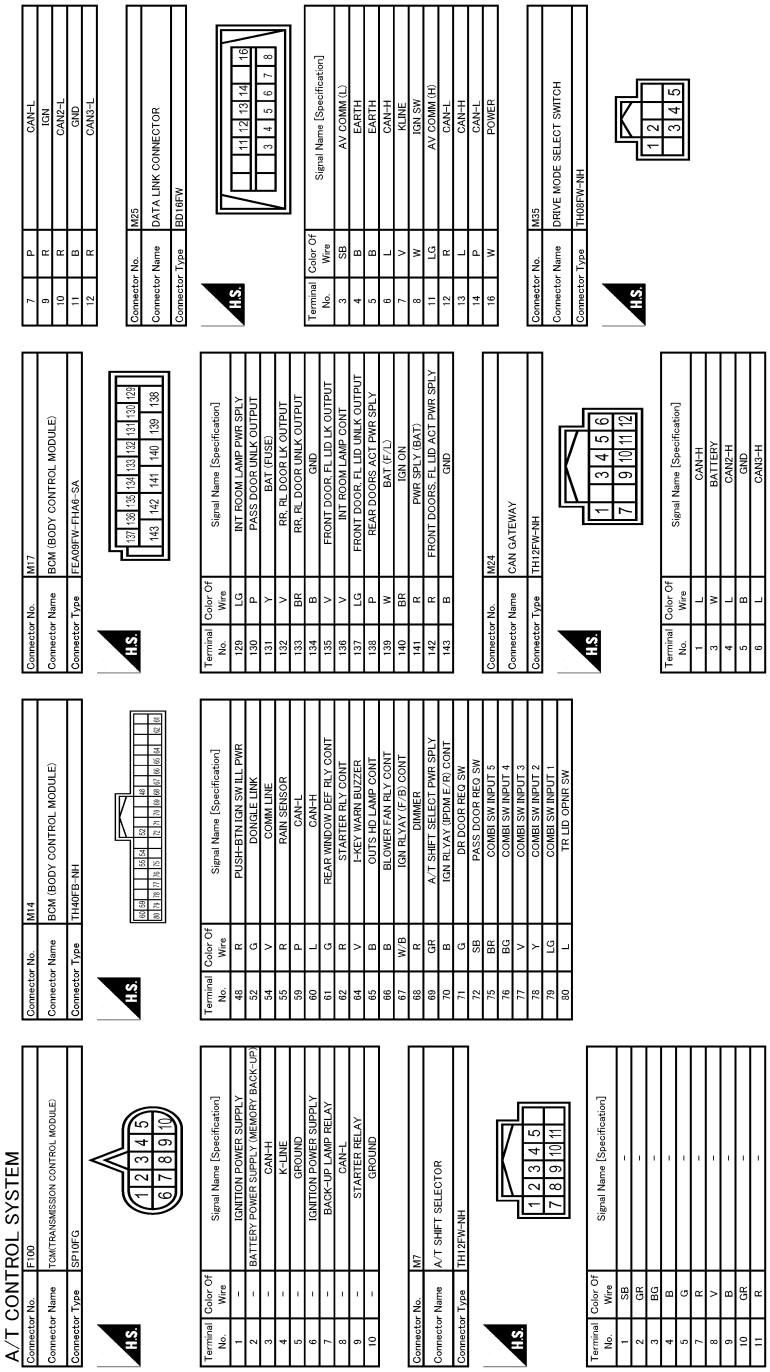

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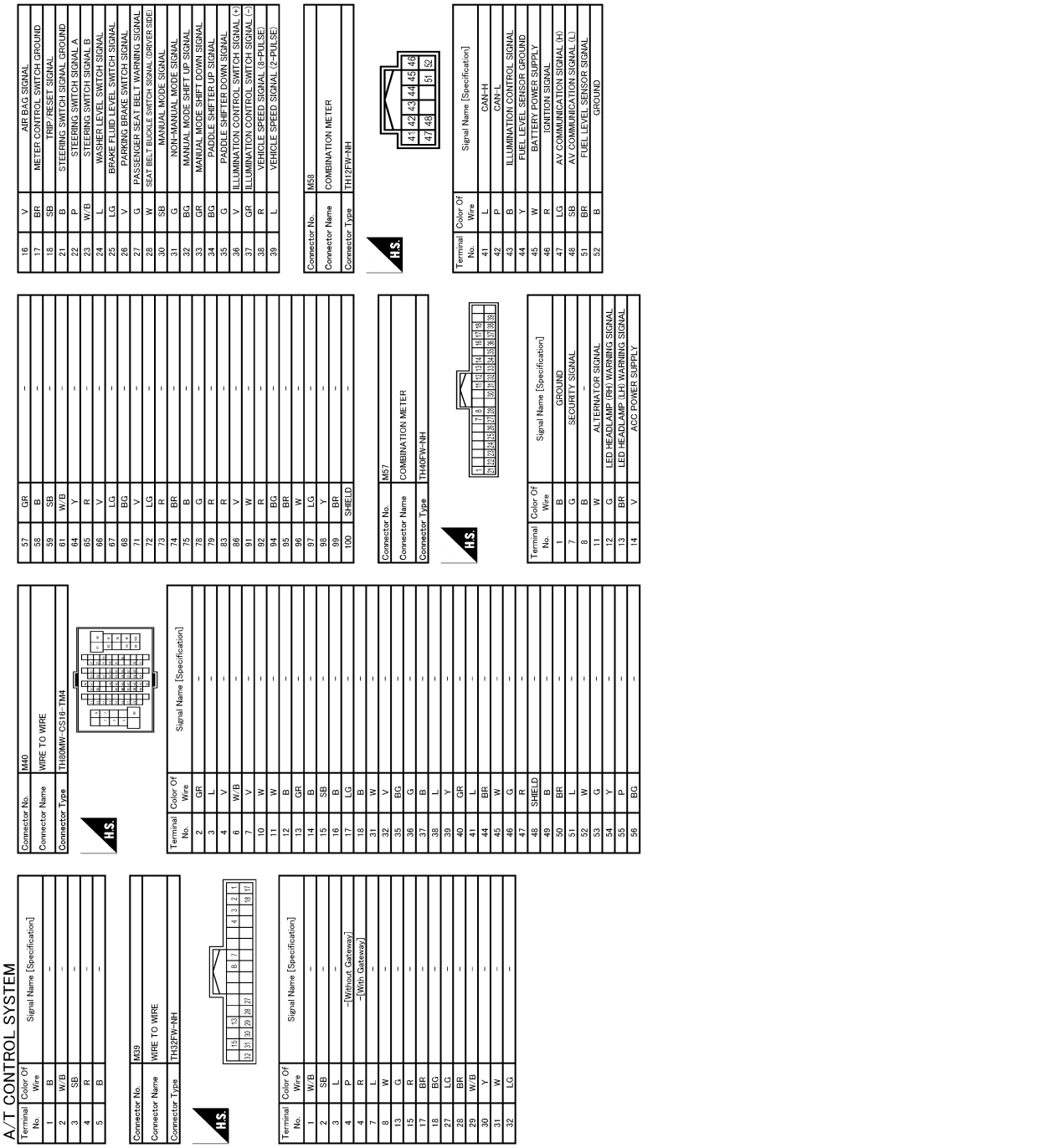

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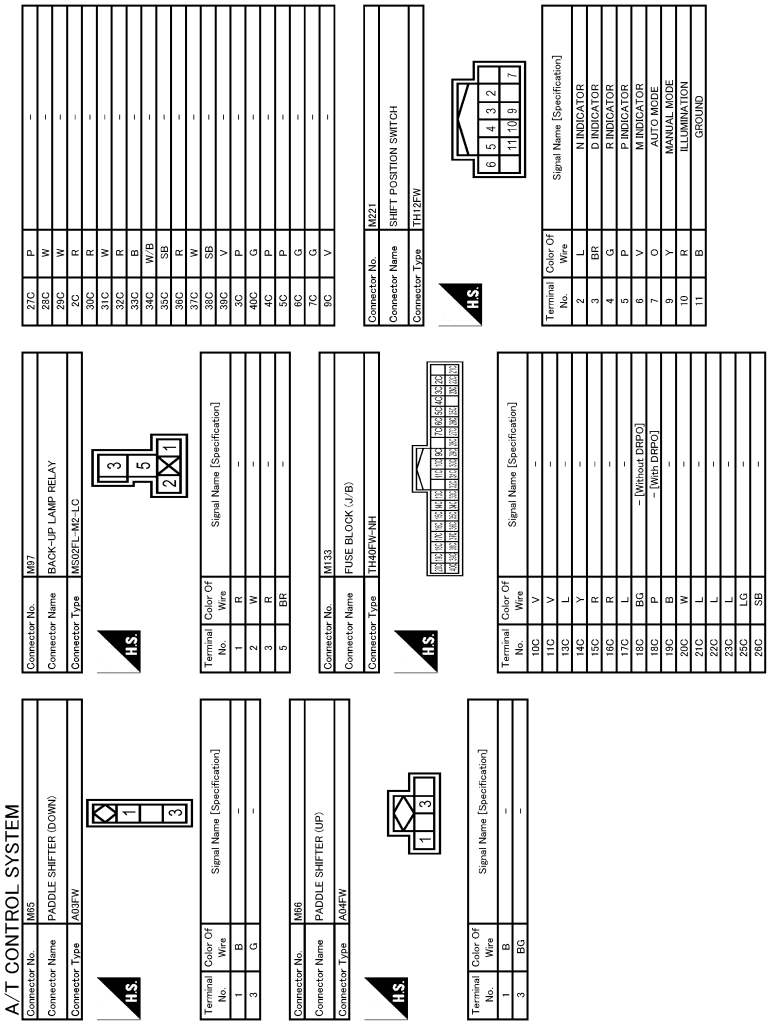
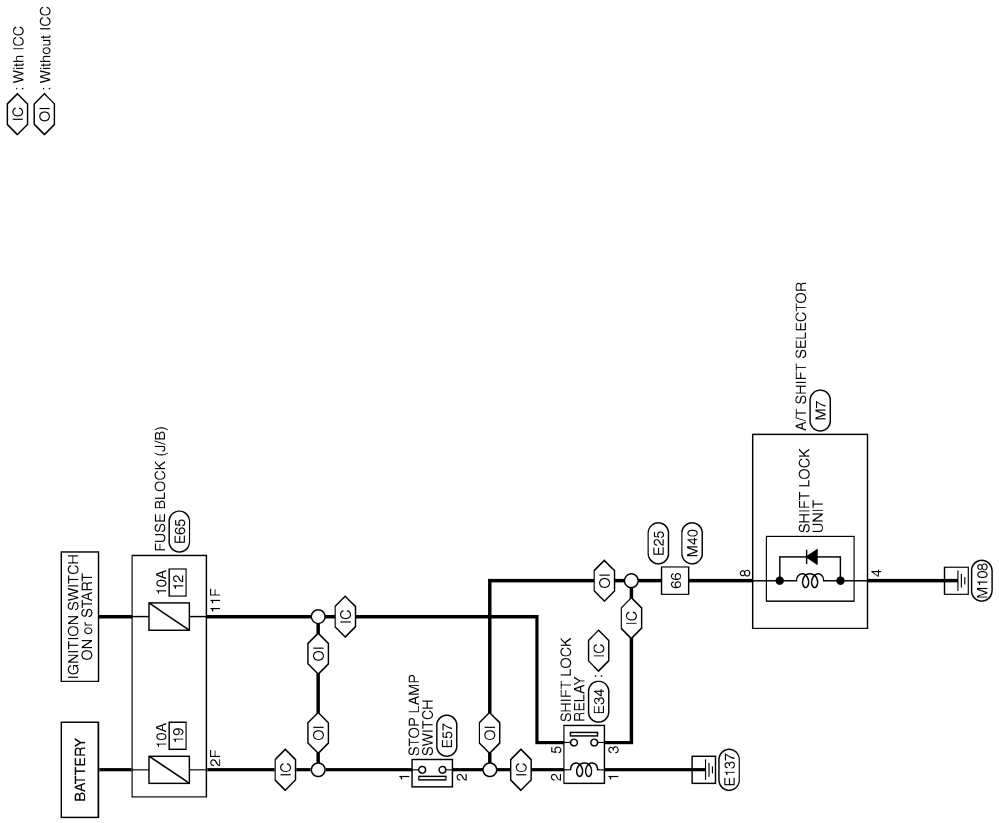


JRDWC0906GB

A/T SHIFT LOCK SYSTEM

Wiring Diagram

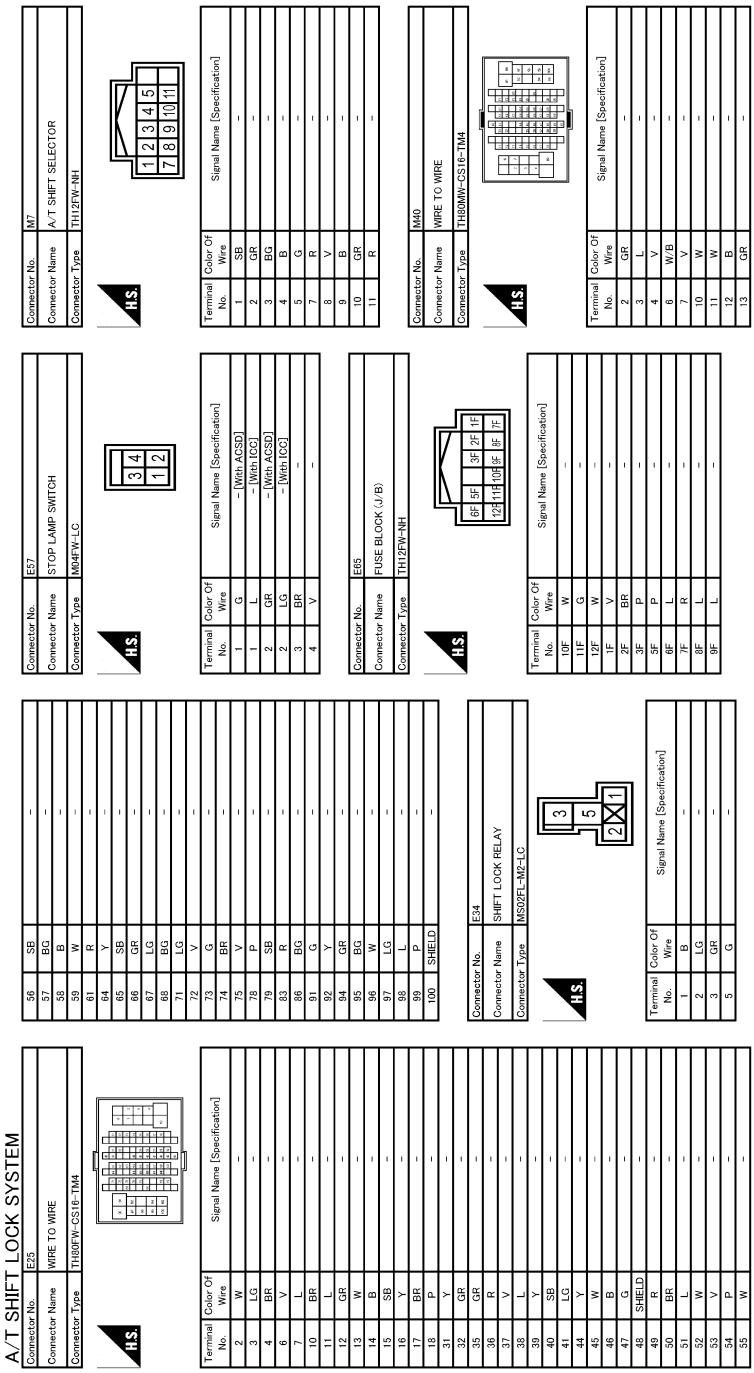
INFOID:0000000009235972



A/T SHIFT LOCK SYSTEM

2013/05/17

JRDWC0907GB



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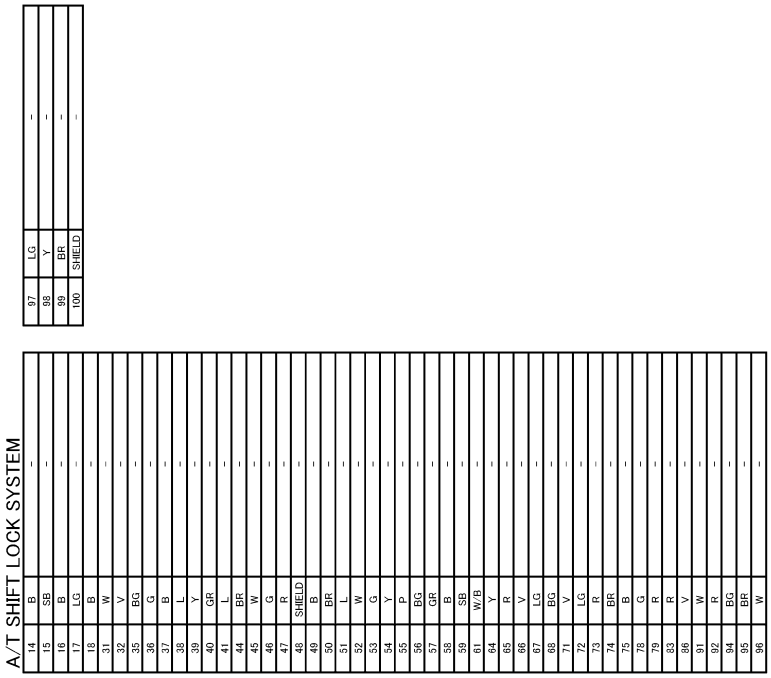


JRDWC0909GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Diagnosis Flow

INFOID:0000000009235973

1.OBTAIN INFORMATION ABOUT SYMPTOM

Refer to TM-98, "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-195, "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-80, "Fail-Safe".
When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-98, "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-80, "Fail-Safe".
When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-98, "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-84, "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-43, "Intermittent Incident".

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

Use TM-195, "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:0000000009235974

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.

KEY POINTS

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

SEF907L

WORKSHEET SAMPLE

Question Sheet					
Customer name MR/MS	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						

ADDITIONAL SERVICE WHEN REPLACING TRANSMISSION ASSEMBLY

Description

INFOID:0000000009235975

When replacing transmission assembly, save current TCM data using CONSULT before replacement.

Work Procedure

INFOID:0000000009235976

1.SAVING TCM DATA

With CONSULT
Save the TCM data according to the CONSULT display.
NOTE:
Even when TCM data is not saved in CONSULT, GO TO 2.

>> GO TO 2.

2.REPLACE TRANSMISSION ASSEMBLY

Replace the transmission assembly. Refer to TM-242, "2WD : Removal and Installation" (2WD), TM-246, "AWD : Removal and Installation" (AWD).

>> GO TO 3.

3.PERFORM TCM PROGRAMMING

With CONSULT
1. During programming, maintain the following conditions:

Ignition switch	: ON
Selector lever	: P
Engine speed	: 0 rpm

2. Perform programming according to the CONSULT display.

>> WORK END

A/T FLUID COOLER

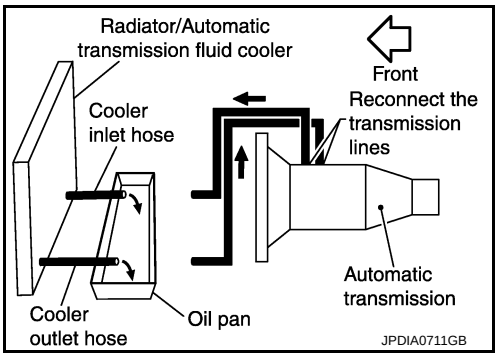
Cleaning

INFOID:0000000009235983

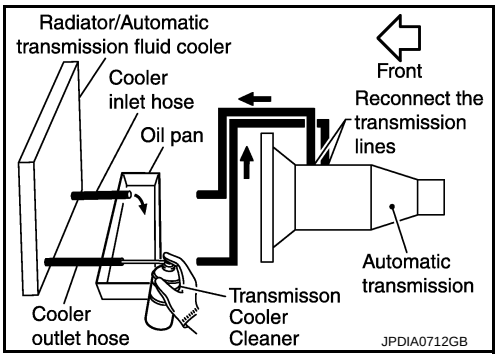
Whenever a transmission is replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced transmission or, in severe cases, can block or restrict the flow of ATF. In either case, malfunction of the newly serviced transmission may result.
Debris, if present, may build up as ATF enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

CLEANING PROCEDURE

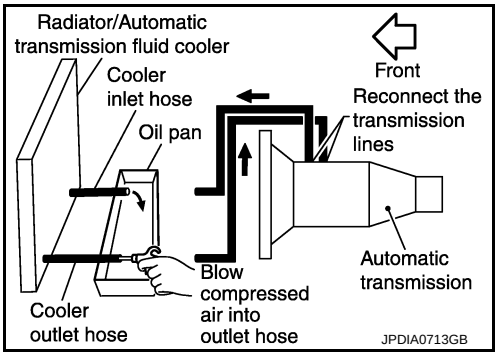
1. Position an oil pan under the transmission inlet and outlet cooler hoses.
2. Identify the inlet and outlet fluid cooler hoses.
3. Disconnect the A/T fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or by-pass valve.
   NOTE:
   Replace the cooler hoses if rubber material from the hose remains on the tube fitting.
4. Allow any ATF that remains in the cooler hoses to drain into the oil pan.



5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.
   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray Transmission Cooler Cleaner only with adequate ventilation.**
   - **Avoid contact with eyes and skin.**
   - **Never breath vapors or spray mist.**
6. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until ATF flows out of the cooler inlet hose for 5 seconds.



7. Insert the tip of an air gun into the end of the cooler outlet hose.
8. Wrap a shop rag around the air gun tip and of the cooler outlet hose.
9. Blow compressed air regulated to 5 to 9 kg/cm^2 (71 to 128 psi) through the cooler outlet hose for 10 seconds to force out any remaining ATF.
10. Repeat steps 5 through 9 three additional times.
11. Position an oil pan under the banjo bolts that connect the A/T fluid cooler steel lines to the transmission.
12. Remove the banjo bolts.



13. Flush each steel line from the cooler side back toward the transmission by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
14. Blow compressed air regulated to 5 to 9 kg/cm^2 (71 to 128 psi) through each steel line from the cooler side back toward the transmission for 10 seconds to force out any remaining ATF.
15. Ensure all debris is removed from the steel cooler lines.
16. Ensure all debris is removed from the banjo bolts and fittings.

17. Perform “DIAGNOSIS PROCEDURE”.

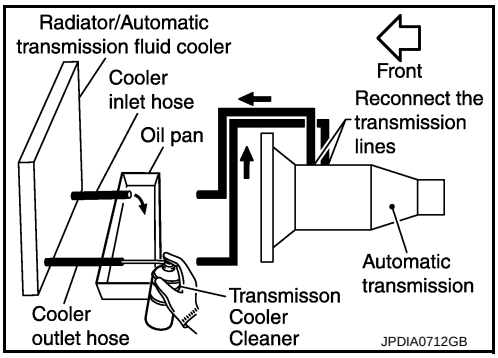
DIAGNOSIS PROCEDURE

NOTE:

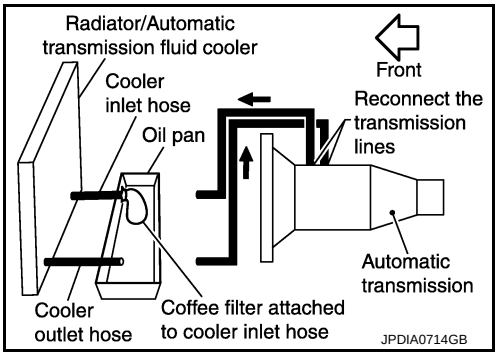
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

1. Position an oil pan under the transmission inlet and outlet cooler hoses.
2. Clean the exterior and tip of the cooler inlet hose.
3. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

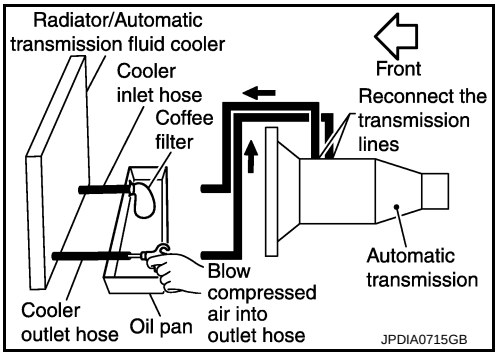
   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray Transmission Cooler Cleaner only with adequate ventilation.**
   - **Avoid contact with eyes and skin.**
   - **Never breath vapors or spray mist.**
4. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until ATF flows out of the cooler inlet hose for 5 seconds.



5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.



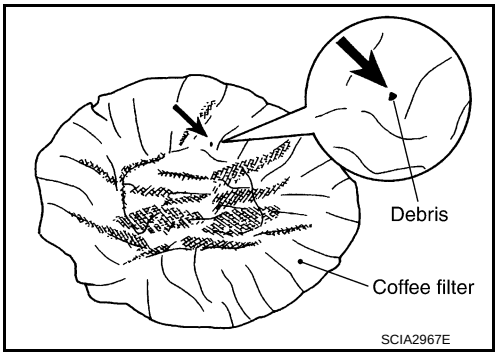
6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 to 9 kg/cm^2 (71 to 128 psi) through the cooler outlet hose to force any remaining ATF into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform “INSPECTION PROCEDURE”.



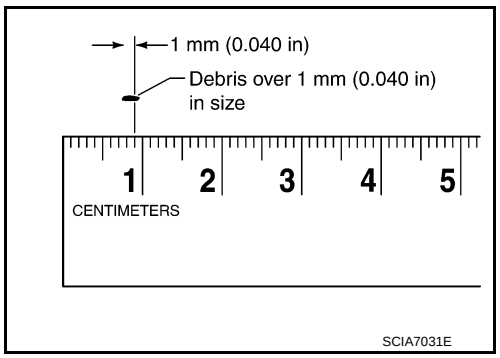
INSPECTION PROCEDURE

1. Inspect the coffee filter for debris.

a. If small metal debris less than 1 mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the A/T fluid cooler/radiator can be re-used and the procedure is ended.



b. If one or more pieces of debris are found that are over 1 mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the A/T fluid cooler is not serviceable. The A/T fluid cooler/radiator must be replaced and the inspection procedure is ended. Refer to CO-13, "Exploded View".



Inspection

INFOID:0000000009235984

After performing all procedures, ensure that all remaining oil is cleaned from all components.

STALL TEST

Inspection and Judgment

INFOID:0000000009235985

INSPECTION

1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
2. Drive for about 10 minutes to warm up the vehicle so that the A/T fluid temperature is 50 to 80°C (122 to 176°F). Inspect the amount of ATF. Replenish if necessary.
3. Securely engage the parking brake so that the tires do not turn.
4. Start the engine, apply foot brake, and place selector lever in “D” position.
5. Gradually press down the accelerator pedal while holding down the foot brake.
6. Quickly read off the stall speed, and quickly release the accelerator pedal.
   CAUTION:
   Never hold down the accelerator pedal for more than 5 seconds during this test.

   Stall speed : Refer to TM-336, "Stall Speed".
7. Shift the selector lever to “N” position.
8. Cool down the ATF.
   CAUTION:
   Run the engine at idle for at least 1 minute.
9. Repeat steps 5 through 8 with selector lever in “R” position.

JUDGMENT OF STALL TEST

	Selector lever position		Possible location of malfunction
	“D” and “M”	“R”	
Stall speed	H	O	• Low brake • 1st one-way clutch • 2nd one-way clutch
	O	H	• Reverse brake • 1st one-way clutch • 2nd one-way clutch
	L	L	• Engine and torque converter one-way clutch
	H	H	• Line pressure low

O: Stall speed within standard value position

H: Stall speed higher than standard value

L: Stall speed lower than standard value

Stall test standard value position

Does not shift-up “D” or “M” position 1 → 2	Slipping in 2GR, 3GR, 4GR or 6GR	2346 brake slippage
Does not shift-up “D” or “M” position 2 → 3	Slipping in 3GR, 4GR or 5GR	Direct clutch slippage
Does not shift-up “D” or “M” position 3 → 4	Slipping in 4GR, 5GR, 6GR or 7GR	High and low reverse clutch slippage
Does not shift-up “D” or “M” position 4 → 5	Slipping in 5GR, 6GR or 7GR	Input clutch slippage
Does not shift-up “D” or “M” position 5 → 6	Slipping in 2GR, 3GR, 4GR or 6GR	2346 brake slippage
Does not shift-up “D” or “M” position 6 → 7	Slipping in 7GR	Front brake slippage

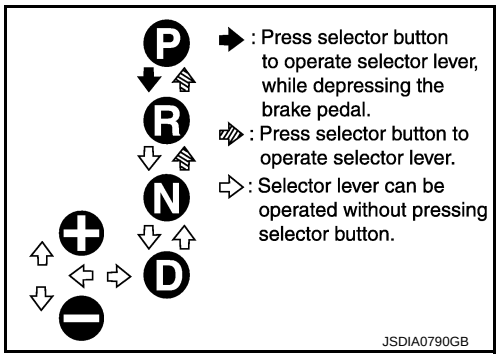
A/T POSITION

Inspection and Adjustment

INFOID:0000000009235986

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.

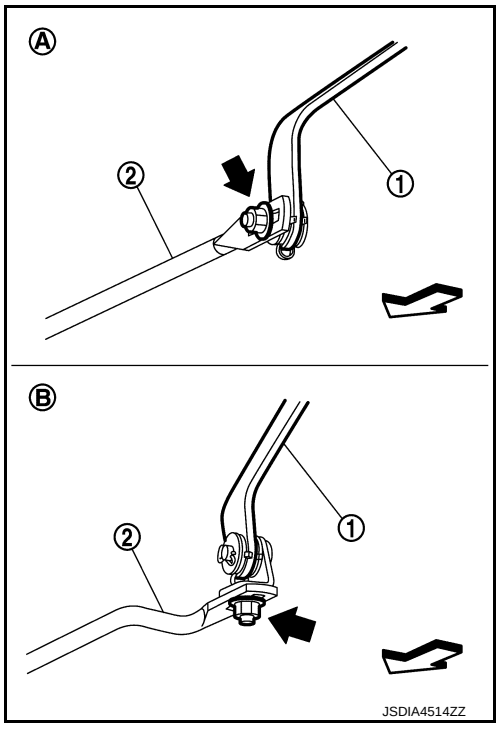


6. When selector button is pressed in “P”, “R”, or “N” position without applying forward/backward force to selector lever, check button operation for sticking.
7. Confirm that the back-up lamps illuminate only when lever is placed in the “R” position. Confirm that the back-up lamps do not illuminate 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. When the selector lever is shifted to the manual shift gate, 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. Place manual lever and selector lever in “P” position.
2. Loosen nut (⬅).

    Ⓐ : 2WD models
    Ⓑ : AWD models
    ⇦ : Vehicle front



3. While pressing lower lever ① toward rear of vehicle (in “P” position direction), tighten nut to specified torque. Refer to TM-208, "Exploded View".

    CAUTION:
    Be careful not to touch the control rod ② 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 Description

INFOID:0000000009235987

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
U0100	LOST COMM (ECM A) (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.

POSSIBLE CAUSE

- ECM
- Harness or connector
  (CAN communication line is open or shorted)

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
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 • Line pressure is set to the maximum hydraulic pressure • Manual mode is prohibited
Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited	—	

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-106, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009235988

For the diagnosis procedure, refer to LAN-26, "Trouble Diagnosis Flow Chart".

U0300 CAN COMMUNICATION DATA

DTC Description

INFOID:0000000009235990

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

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
U0300	CAN COMM DATA (Internal Control Module Software Incompatibility)	When the amount of data transmitted from each control unit is smaller than the specified amount.

POSSIBLE CAUSE

Control units other than TCM

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
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 • Line pressure is set to the maximum hydraulic pressure • Manual mode is prohibited
Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited	—	

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. Start the engine and wait for 2 seconds or more.
2. Check DTC.

Is “U0300” detected?

YES >> Go to TM-107, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009235991

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

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

DTC Description

INFOID:0000000009235993

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
U1000	CAN COMM CIRCUIT (CAN Communication Line)	TCM cannot transmit or receive CAN communication signals continuously for 2 seconds or more when the ignition switch is ON.

POSSIBLE CAUSE

- TCM
- Harness or connector
  (CAN communication line is open or shorted)

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
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 • Line pressure is set to the maximum hydraulic pressure • Manual mode is prohibited
Between the gears of 4 - 5 - 6 - 7	• Fix the gear at driving • Manual mode is prohibited	—	

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

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

Is “U1000” detected?

YES >> Go to TM-110, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009235994

Go to LAN-26, "Trouble Diagnosis Flow Chart".

P0615 STARTER RELAY

DTC Description

INFOID:0000000009235996

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0615	STARTER RELAY (Starter Relay Circuit)	The starter monitor value is OFF when the ignition switch is ON at the “P” and “N” positions.

POSSIBLE CAUSE

- Harness or connector
  (Starter relay and TCM circuit is open or shorted)
- Starter relay circuit

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Starter is disabled	—	Starter is disabled

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. Shift the selector lever to “P” and “N” positions.
2. Turn ignition switch ON and wait 2 seconds or more.
3. Check DTC.

Is “P0615” detected?

YES >> Go to TM-111, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009235997

1.CHECK STARTER RELAY SIGNAL

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Turn ignition switch ON.
4. Check voltage between IPDM E/R harness connector terminal and ground.

+		–	Condition	Voltage (Approx.)
IPDM E/R				
Connector	Terminal			
E121	37	Ground	Selector lever in “P” and “N” positions.	Battery voltage
			Selector lever in other positions.	0 V

Is the inspection result normal?

YES >> Check starter relay circuit. Refer to STR-6, "Wiring Diagram".
NO >> GO TO 2.

2. CHECK HARNESS BETWEEN A/T ASSEMBLY AND IPDM E/R

1. Turn ignition switch OFF.
2. Disconnect A/T assembly connector.
3. Check the continuity between A/T assembly harness connector terminal and IPDM E/R harness connector terminal.

A/T assembly		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F2	9	E121	37	Existed

4. Also check short circuit in harness.

Is the inspection result normal?

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

3. CHECK JOINT CONNECTOR

1. Remove joint connector. Refer to TM-218, "Exploded View".
2. Check the continuity between joint connector terminals.

A/T assembly harness connector side	TCM harness connector side	Continuity
Terminal	Terminal	
9	9	Existed

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0705 TRANSMISSION RANGE SENSOR A

DTC Description

INFOID:0000000009235998

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0705	T/M RANGE SENSOR A [Transmission Range Sensor 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.

POSSIBLE CAUSE

- Harness or connector
  (Transmission range switches 1, 2, 3, 4 and TCM circuit is open or shorted)
- Transmission range switches 1, 2, 3 and 4

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Fixed in the “D” position (The shifting can be performed) • Lock-up is prohibited when 30 km/h (19 MPH) or less • 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) • Lock-up is prohibited when 30 km/h (19 MPH) or less • 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

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 “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-114, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009235999

1. REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A EXCEPT FOR MEXICO

EXCEPT FOR MEXICO : DTC Description

INFOID:0000000009236000

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0710	FLUID TEMP SENSOR A (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.
		TCM judges that the A/T fluid temperature is 180°C (356°F) or more continuously for 5 seconds while driving at 10 km/h (7 MPH) or more.
		The following conditions are maintained for 5 minutes after the completion of engine diagnosis P0111, P0116, and P0196: • A/T fluid temperature – Engine coolant temperature > 33°C (91.4°F) • A/T fluid temperature – Engine coolant temperature < –19°C (–2.2°F)
		A/T fluid temperature does not rise to 20°C (68°F) after driving for a certain period of time with the TCM-received fluid temperature sensor value between –40°C (–40°F) and 20°C (68°F).

POSSIBLE CAUSE

- Harness or connector
  (Sensor circuit is open or short.)
- A/T fluid temperature sensor

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
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 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 (PART 1)

With CONSULT

1. Turn ignition switch ON.

2. Select “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Start the engine and maintain the following condition for 10 seconds or more.

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

With GST

Follow the procedure “With CONSULT”.

Is “P0710” detected?

YES >> Go to TM-117, "EXCEPT FOR MEXICO : Diagnosis Procedure".
NO >> GO TO 3.

3. CHECK A/T FLUID TEMPERATURE SENSOR FUNCTION

With CONSULT

1. Turn ignition switch OFF and cool the engine.
2. Turn ignition switch ON.
   CAUTION:
   Never start the engine.
3. Select “ATF TEMP 1” in “Data Monitor” in “TRANSMISSION”.
4. Select “COOLANT TEMP/S” in “Data Monitor” in “ENGINE”.
5. Check temperature difference between A/T fluid and engine coolant.

With GST

1. Complete engine diagnoses P0111, P0116, and P0196.
2. After starting the engine start, run the engine at idle for 5 minutes.
3. Check the DTC.

Is the temperature calculated by subtracting engine coolant temperature from A/T fluid temperature more than 33°C (91.4°F) or is it less than –19°C (–2.2°F)? (With CONSULT)/Is “P0710” detected? (With GST)

YES >> Go to TM-117, "EXCEPT FOR MEXICO : Diagnosis Procedure".
NO-1 [With CONSULT: “ATF TEMP 1” is 20°C (68°F) or more]>>To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 [With CONSULT: “ATF TEMP 1” is 20°C (68°F) or more]>>Confirmation after repair: INSPECTION END
NO-2 [With CONSULT: “ATF TEMP 1” is 19°C (66°F) or less]>>GO TO 4.
NO-3 (With GST)>>GO TO 4.

4. CHECK DTC DETECTION (PART 2)

With CONSULT

1. Select “SLCT LVR POSI”, “VHCL/S SE-A/T”, “ACCELE POSI”, “ATF TEMP 1” in “Data Monitor” in “TRANSMISSION”.
2. Record A/T fluid temperature.
3. Start the engine and wait for at least 3 minutes.
4. Drive the vehicle for the total minuets specified in the Driving time column below with the following conditions satisfied.

SLCT LVR POSI	: D
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more
ACCELE POSI	: 0.5/8 or more

A/T fluid temperature before engine start	Driving time
–40°C (–40°F) – –31°C (–23.8°F)	21 minutes or more
–30°C (–22°F) – –21°C (–5.8°F)	18 minutes or more
–20°C (–4°F) – –11°C (12.2°F)	15 minutes or more
–10°C (14°F) – –1°C (30.2°F)	12 minutes or more
0°C (32°F) – 9°C (48.2°F)	9 minutes or more
10°C (50°F) – 19°C (66.2°F)	6 minutes or more

5. Perform “Self Diagnostic Results” in “TRANSMISSION”.

With GST

1. Turn ignition switch OFF and cool the engine.
2. Start the engine and wait for at least 3 minutes.
3. Drive the vehicle and maintain the following conditions for 21 minutes or more.

Selector lever	: D position
Vehicle speed	: 10 km/h (7 MPH) or more
Accelerator pedal opening	: 0.5/8 or more

4. Check the DTC.

Is “P0710” detected?

YES >> Go to TM-117, "EXCEPT FOR MEXICO : Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

EXCEPT FOR MEXICO : Diagnosis Procedure

INFOID:0000000009236001

1.REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

FOR MEXICO

FOR MEXICO : DTC Description

INFOID:0000000009747998

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0710	FLUID TEMP SENSOR A (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.
		TCM judges that the A/T fluid temperature is 180°C (356°F) or more continuously for 5 seconds while driving at 10 km/h (7 MPH) or more.

POSSIBLE CAUSE

- Harness or connector
  (Sensor circuit is open or short.)
- A/T fluid temperature sensor

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
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 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. Turn ignition switch ON.
2. Select “VHCL/S SE-A/T” in “Data Monitor” in “TRANSMISSION”.
3. Start the engine and maintain the following condition for 10 seconds or more.

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

With GST
Follow the procedure “With CONSULT”.

Is “P0710” detected?

YES >> Go to TM-118, "FOR MEXICO : Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

FOR MEXICO : Diagnosis Procedure

INFOID:0000000009747999

1.REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

P0717 INPUT SPEED SENSOR A

DTC Description

INFOID:0000000009236002

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0717	INPUT SPEED SENSOR A (Input/Turbine Speed Sensor A Circuit No Signal)	The revolution of input speed sensor 1 and/or 2 is 270 rpm or less.

POSSIBLE CAUSE

- Harness or connector
  (Sensor circuit is open or shorted)
- Input speed sensor 1 and/or 2

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
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 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-120, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236003

1. REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

P0720 OUTPUT SPEED SENSOR

DTC Description

INFOID:0000000009236004

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0720	OUTPUT SPEED SENSOR (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 (12 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.

POSSIBLE CAUSE

- Harness or connector
  (Sensor circuit is open or shorted)
- Output speed sensor

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Between the gears of 1 - 2 - 3	• Only downshift can be performed • Manual mode is prohibited • A vehicle speed signal from the unified meter and A/C amp. 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 unified meter and A/C amp. is regarded as an effective signal	—	

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 “ESTM VSP SIG” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 60 seconds or more.

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-122, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236005

1. REPLACE OUTPUT SPEED SENSOR AND CHECK DTC

1. Replace output speed sensor. Refer to TM-231, "2WD : Exploded View" (2WD) or TM-249, "Exploded View" (AWD).
2. Perform “DTC CONFIRMATION PROCEDURE”. Refer to TM-121, "DTC Description".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

P0725 ENGINE SPEED

DTC Description

INFOID:0000000009236007

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0725	ENGINE SPEED (Engine Speed Input Circuit)	• TCM does not receive the CAN communication signal from the ECM. • The engine speed is more less 150 rpm even if the vehicle speed is more than 10 km/h (7 MPH).

POSSIBLE CAUSE

Harness or connector
(CAN communication line is open or shorted)

FAIL-SAFE

Not changed from normal driving

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	: More than 10 km/h (7 MPH)

4. Check DTC.

With GST
Follow the procedure “With CONSULT”.

Is “P0725” detected?

YES >> Go to TM-123, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236008

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-106, "DTC Index".
NO >> GO TO 2.

2.CHECK DTC OF TCM

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

Is any DTC other than “P0725” detected?

YES >> Check DTC detected item. Refer to TM-85, "DTC Index".
NO >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

P0729 6GR INCORRECT RATIO

DTC Description

INFOID:0000000009236010

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0729	6GR INCORRECT RATIO (Gear 6 Incorrect Ratio)	The gear ratio is: • 0.923 or more • 0.819 or less

POSSIBLE CAUSE

- 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

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Small gear ratio difference	Engine torque limit: Max 150 Nm	—	Engine torque limit: Max 150 Nm

Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Great gear ratio difference	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR, 3GR or 4GR • Manual mode is prohibited	—	• 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, 2GR, 3GR, 4GR, 5GR or 6GR • Fix the gear while driving • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-127, "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-85, "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-127, "Diagnosis Procedure".
YES-4 (“P0729” is detected)>>Go to TM-127, "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:0000000009236011

1.CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".

NOTE:
Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-125, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0730 INCORRECT GEAR RATIO

DTC Description

INFOID:0000000009236013

- 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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0730	INCORRECT GR RATIO (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.

POSSIBLE CAUSE

- 2346 brake solenoid valve
- Front brake solenoid valve
- Input speed sensor 2

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 5GR, 6GR or 7GR • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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

DTC CONFIRMATION PROCEDURE

CAUTION:

- **“TM-129, "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.

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0730” detected?

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

Diagnosis Procedure

INFOID:0000000009236014

1. CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2. DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".

NOTE:

Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-128, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0731 1GR INCORRECT RATIO

DTC Description

INFOID:0000000009236016

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0731	1GR INCORRECT RATIO (Gear 1 Incorrect Ratio)	The gear ratio is: • 5.069 or more • 4.496 or less

POSSIBLE CAUSE

- 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

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Small gear ratio difference	Engine torque limit: Max 150 Nm	—	Engine torque limit: Max 150 Nm

Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Great gear ratio difference	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR, 3GR or 4GR • Manual mode is prohibited	—	• 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, 2GR, 3GR, 4GR, 5GR or 6GR • Fix the gear while driving • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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

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 “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-85, "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-132, "Diagnosis Procedure".
YES-4 (“P0731” is detected)>>Go to TM-132, "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:0000000009236017

1.CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".

NOTE:

Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-130, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0732 2GR INCORRECT RATIO

DTC Description

INFOID:0000000009236019

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0732	2GR INCORRECT RATIO (Gear 2 Incorrect Ratio)	The gear ratio is: • 3.289 or more • 2.917 or less

POSSIBLE CAUSE

- 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

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Small gear ratio difference	Engine torque limit: Max 150 Nm	—	Engine torque limit: Max 150 Nm

Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Great gear ratio difference	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR, 3GR or 4GR • Manual mode is prohibited	—	• 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, 2GR, 3GR, 4GR, 5GR or 6GR • Fix the gear while driving • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-135, "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-85, "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-135, "Diagnosis Procedure".
YES-4 (“P0732” is detected)>>Go to TM-135, "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:0000000009236020

1.CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".
NOTE:
Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-133, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0733 3GR INCORRECT RATIO

DTC Description

INFOID:0000000009236022

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0733	3GR INCORRECT RATIO (Gear 3 Incorrect Ratio)	The gear ratio is: • 2.103 or more • 1.865 or less

POSSIBLE CAUSE

- 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

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Small gear ratio difference	Engine torque limit: Max 150 Nm	—	Engine torque limit: Max 150 Nm

Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Great gear ratio difference	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR, 3GR or 4GR • Manual mode is prohibited	—	• 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, 2GR, 3GR, 4GR, 5GR or 6GR • Fix the gear while driving • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-138, "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-85, "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-138, "Diagnosis Procedure".
YES-4 (“P0733” is detected)>>Go to TM-138, "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:0000000009236023

1.CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".

NOTE:

Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-136, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0734 4GR INCORRECT RATIO

DTC Description

INFOID:0000000009236025

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0734	4GR INCORRECT RATIO (Gear 4 Incorrect Ratio)	The gear ratio is: • 1.453 or more • 1.289 or less

POSSIBLE CAUSE

- 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

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Small gear ratio difference	Engine torque limit: Max 150 Nm	—	Engine torque limit: Max 150 Nm

Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Great gear ratio difference	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR, 3GR or 4GR • Manual mode is prohibited	—	• 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, 2GR, 3GR, 4GR, 5GR or 6GR • Fix the gear while driving • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-141, "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-85, "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-141, "Diagnosis Procedure".
YES-4 (“P0734” is detected)>>Go to TM-141, "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:0000000009236026

1.CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".
NOTE:
Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-139, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0735 5GR INCORRECT RATIO

DTC Description

INFOID:0000000009236028

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0735	5GR INCORRECT RATIO (Gear 5 Incorrect Circuit)	The gear ratio is: • 1.060 or more • 0.940 or less

POSSIBLE CAUSE

- 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

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Small gear ratio difference	Engine torque limit: Max 150 Nm	—	Engine torque limit: Max 150 Nm

Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Great gear ratio difference	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR, 3GR or 4GR • Manual mode is prohibited	—	• 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, 2GR, 3GR, 4GR, 5GR or 6GR • Fix the gear while driving • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-144, "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-85, "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-144, "Diagnosis Procedure".
YES-4 (“P0735” is detected)>>Go to TM-144, "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:0000000009236029

1.CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".

NOTE:

Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-142, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0740 TORQUE CONVERTER

DTC Description

INFOID:0000000009236030

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0740	TORQUE CONVERTER (Torque Converter Clutch Circuit/Open)	The torque converter clutch solenoid valve monitor value is 0.2 A or less when the torque converter clutch solenoid valve command value is more than 0.75 A.

POSSIBLE CAUSE

- Harness or connector
  (Solenoid valve circuit is open or shorted)
- Torque converter clutch solenoid valve

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Lock-up is prohibited • Slip lock-up is prohibited	—	• Lock-up is prohibited • Slip lock-up is prohibited

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 “VEHICLE SPEED” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 10 seconds or more.
   NOTE:
   Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

BATTERY VOLT	: 9 V or more
MANU MODE SW	: ON
GEAR	: 2nd
VEHICLE SPEED	: 40 km/h (25 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0740” detected?

YES >> Go to TM-146, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236031

1. REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> END

P0744 TORQUE CONVERTER

DTC Description

INFOID:0000000009236033

This malfunction is detected when the A/T does not lock-up. 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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0744	TORQUE CONVERTER (Torque Converter Clutch Circuit Intermittent)	The lock-up is not performed in spite of within the lock-up area.

POSSIBLE CAUSE

- Harness or connector
- Torque converter clutch solenoid valve
- Torque converter
- Input speed sensor 1, 2
- Hydraulic control circuit

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Lock-up is prohibited • Slip lock-up is prohibited	—	• Lock-up is prohibited • Slip lock-up is prohibited

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 “MANU MODE SW”, “GEAR” and “VEHICLE SPEED” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 10 seconds or more.
   NOTE:
   Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

MANU MODE SW	: ON
GEAR	: 2nd
VEHICLE SPEED	: 40 km/h (25 MPH) or more

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0744” detected?

YES >> Go to TM-148, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236034

1. DETECT MALFUNCTIONING ITEM

Disassemble the transmission to check component parts. Refer to TM-266, "Disassembly".

NOTE:

Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-147, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0745 PRESSURE CONTROL SOLENOID A

DTC Description

INFOID:0000000009236035

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0745	PC SOLENOID A (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.

POSSIBLE CAUSE

- Harness or connector
  (Solenoid valve circuit is open or shorted)
- Line pressure solenoid valve

FAIL-SAFE

Not changed from normal driving

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
SLCT LVR POSI	: N/P

5. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0745” detected?

YES >> Go to TM-149, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236036

1.REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

P0750 SHIFT SOLENOID A

DTC Description

INFOID:0000000009236037

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0750	SHIFT SOLENOID A (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.

POSSIBLE CAUSE

- Harness or connector
  (Solenoid valve circuit is open or shorted)
- Anti-interlock solenoid valve

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 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

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-151, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236038

1. REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

P0775 PRESSURE CONTROL SOLENOID B

DTC Description

INFOID:0000000009236039

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0775	PC SOLENOID B (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.

POSSIBLE CAUSE

- Harness or connector
  (Solenoid valve circuit is open or shorted)
- Input clutch solenoid valve

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 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

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-153, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236040

1.REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

P0780 SHIFT

DTC Description

INFOID:0000000009236042

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0780	SHIFT (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 5GR to 6GR or 6GR to 7GR, the engine speed exceeds the prescribed speed.

POSSIBLE CAUSE

- Anti-interlock solenoid valve
- Low brake solenoid valve
- Hydraulic control circuit

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 3GR • Manual mode is prohibited	—	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited

DTC CONFIRMATION PROCEDURE

CAUTION:

- **“TM-155, "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

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P0780” detected?

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

Diagnosis Procedure

INFOID:0000000009236043

1. CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2. DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".

NOTE:

Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-154, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0795 PRESSURE CONTROL SOLENOID C

DTC Description

INFOID:0000000009236044

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P0795	PC SOLENOID C (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.

POSSIBLE CAUSE

- Harness or connector
  (Solenoid valve circuit is open or shorted)
- Front brake solenoid valve

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 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

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-157, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236045

1. REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> END

P1705 TP SENSOR

DTC Description

INFOID:0000000009236046

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P1705	TP SENSOR (Accelerator Pedal Position Sensor Signal Circuit)	TCM detects the difference between two accelerator pedal position signals received from ECM via CAN communication.

POSSIBLE CAUSE

Harness or connector
(CAN communication line is open or shorted)

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• 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	• Downshift when accelerator pedal is depressed is prohibited • Upshift when accelerator pedal is released is prohibited • Manual mode is prohibited

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-158, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236047

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-106, "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-85, "DTC Index".
NO >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

P1721 VEHICLE SPEED SIGNAL

DTC Description

INFOID:0000000009236049

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P1721	VEHICLE SPEED SIGNA (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 (12 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.

POSSIBLE CAUSE

Harness or connector
(CAN communication line is open or shorted)

FAIL-SAFE

No changed from normal driving

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 “ESTM VSP SIG” in “Data Monitor” in “TRANSMISSION”.
3. Drive vehicle and maintain the following conditions for 60 seconds or more.

ESTM VSP SIG	: 40 km/h (25 MPH) or more

4. Check DTC.

Is “P1721” detected?

YES >> Go to TM-160, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236050

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-80, "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-85, "DTC Index".
NO >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

P1730 INTERLOCK

DTC Description

INFOID:0000000009236052

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P1730	INTERLOCK (Interlock)	The output speed sensor detects the deceleration of 12 km/h (7 MPH) or more for 1 second.

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.

POSSIBLE CAUSE

- 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

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 1GR, 2GR, 3GR, 4GR, 5GR, 6GR or 7GR • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-163, "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

4. Check DTC.

With GST

Follow the procedure “With CONSULT”.

Is “P1730” detected?

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

Judgment of Interlock

INFOID:0000000009236053

Refer to TM-80, "Fail-Safe".

Diagnosis Procedure

INFOID:0000000009236054

1.CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".

NOTE:

Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-162, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P1734 7GR INCORRECT RATIO

DTC Description

INFOID:0000000009236056

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 DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P1734	7GR INCORRECT RATIO (Gear 7 Incorrect Ratio)	The gear ratio is: • 0.822 or more • 0.730 or less

POSSIBLE CAUSE

- 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

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Small gear ratio difference	Engine torque limit: Max 150 Nm	—	Engine torque limit: Max 150 Nm

Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Great gear ratio difference	Neutral malfunction between the gears of 1 - 2 - 3 and 7	• Locks in 2GR, 3GR or 4GR • Manual mode is prohibited	—	• 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, 2GR, 3GR, 4GR, 5GR or 6GR • Fix the gear while driving • Manual mode is prohibited	• The shifting between the gears of 1 - 2 - 3 can be performed • Manual mode is prohibited	• 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

DTC CONFIRMATION PROCEDURE

CAUTION:

- **"TM-166, "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-85, "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-166, "Diagnosis Procedure".
YES-4 (“P1734” is detected)>>Go to TM-166, "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:0000000009236057

1.CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

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

2.DETECT MALFUNCTIONING ITEM

Disassemble the transmission assembly to check component parts. Refer to TM-266, "Disassembly".

NOTE:

Check the component parts, referring to “Possible cause” in “DTC DETECTION LOGIC”. Refer to TM-164, "DTC Description".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Repair or replace damaged parts.

P1815 M-MODE SWITCH

DTC Description

INFOID:0000000009236058

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P1815	M-MODE SWITCH (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. • Shift up/down signal of paddle shifter continuously remains ON for 60 seconds.*

*: With paddle shifter

POSSIBLE CAUSE

- Harness or connector (These switches circuit is open or shorted)
- Mode select switch (Into A/T shift selector)
- Position select switch (Into A/T shift selector)
- Paddle shifter (With paddle shifter)

FAIL-SAFE

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.

Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
Gate switch malfunction	Only the gate switch is prohibited	—	Only the gate switch is prohibited
Paddle switch malfunction	Only the paddle switch is prohibited	—	Only the paddle switch is prohibited
Malfunction of both switches	Manual mode is prohibited	—	Manual mode is prohibited

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 (PART 1)

With CONSULT

1. Turn ignition switch ON.
2. Maintain the following condition more than 60 seconds.

Selector lever : “P” position

3. Check DTC.

Is “P1815” detected?

YES >> Go to TM-168, "Diagnosis Procedure".
NO >> GO TO 3.

3.CHECK DTC DETECTION (PART 2)

With CONSULT

1. Maintain the following condition more than 5 seconds.

Selector lever : Manual shift gate (Neutral)

2. Check DTC.

Is “P1815” detected?

YES >> Go to TM-168, "Diagnosis Procedure".
NO >> GO TO 4.

4.CHECK DTC DETECTION (PART 3)

With CONSULT

1. Maintain the following condition more than 5 seconds.

Selector lever : Manual shift gate [UP side (+ side)]

2. Check DTC.

Is “P1815” detected?

YES >> Go to TM-168, "Diagnosis Procedure".
NO >> GO TO 5.

5.CHECK DTC DETECTION (PART 4)

With CONSULT

1. Maintain the following condition more than 5 seconds.

Selector lever : Manual shift gate [DOWN side (– side)]

2. Check DTC.

Is “P1815” detected?

YES >> Go to TM-168, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236059

1.CHECK INPUT SIGNAL

With CONSULT

1. Turn ignition switch ON.
2. Select “MANU MODE SW”, “NON M MODE SW”, “UP SW LEVER”, “DOWN SW LEVER”, “SFT UP ST SW”* and “SFT DWN ST SW”* in “Data Monitor” in “TRANSMISSION”.
   *: With paddle shifter
3. Check the ON/OFF operations of each monitor item.

Item	Monitor Item	Condition	Status
Manual mode switch	MANU MODE SW	Selector lever is shifted to manual shift gate 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
	UP SW LEVER	Selector lever is shifted to + side	ON
		Other than the above	OFF
	DOWN SW LEVER	Selector lever is shifted to – side	ON
		Other than the above	OFF

Item	Monitor Item	Condition	Status
Paddle shifter*	SFT UP ST SW	Paddle shifter (up) is pulled	ON
		Other than the above	OFF
	SFT DWN ST SW	Paddle shifter (down) is pulled	ON
		Other than the above	OFF

*: With paddle shifter

Without CONSULT

Drive the vehicle in the manual mode, and then check that the indication of the shift position indicator matches with the actual gear position.

1. Shift the selector lever to UP side, and then accelerate from 1GR to 7GR.
2. Shift the selector lever to DOWN side, and then decelerate from 7GR to 1GR.
3. *Shift the paddle shifter to UP side, and then accelerate from 1GR to 7GR.
4. *Shift the paddle shifter to DOWN side, and then decelerate from 7GR to 1GR.

*: With paddle shifter

Which item is abnormal?

Manual mode switch>>GO TO 2.
Paddle shifter>>GO TO 7.

2.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 harness connector terminals.

A/T shift selector			Voltage (Approx.)
Connector	+	–	
	Terminal		
M7	1	4	Battery voltage
	2		
	3		
	5		

Is the inspection result normal?

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

3.CHECK MANUAL MODE SWITCH

1. Turn ignition switch OFF.
2. Check manual mode switch. Refer to TM-172, "Component Inspection (Manual Mode Switch)".

Is the inspection result normal?

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

4.CHECK GROUND CIRCUIT (MANUAL MODE SWITCH CIRCUIT)

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

A/T shift selector		—	Continuity
Connector	Terminal		
M7	4	Ground	Existed

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 1)

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

A/T shift selector		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
M7	1	M57	30	Existed
	2		33	
	3		32	
	5		31	

Is the inspection result normal?

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

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

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

A/T shift selector		—	Continuity
Connector	Terminal		
M7	1	Ground	Not existed
	2		
	3		
	5		

Is the inspection result normal?

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

7.CHECK PADDLE SHIFTER CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect paddle shifter connectors.
3. Turn ignition switch ON.
4. Check voltage between paddle shifter harness connector terminals.

Paddle shifter			Voltage (Approx.)
Connector	+	–	
	Terminal		
M65	3	1	Battery voltage
M66			

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 9.

8.CHECK PADDLE SHIFTER

1. Turn ignition switch OFF.
2. Check paddle shifter. Refer to TM-172, "Component Inspection [Paddle Shifter (Up)]", TM-172, "Component Inspection [Paddle Shifter (Down)]".

Is the inspection result normal?

YES >> GO TO 12.
NO >> Replace damaged parts.

9. CHECK GROUND CIRCUIT (PADDLE SHIFTER CIRCUIT)

1. Turn ignition switch OFF.
2. Check continuity between paddle shifter harness connector terminals and ground.

Paddle shifter		—	Continuity
Connector	Terminal		
M65	1	Ground	Not existed
M66			

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace damaged parts.

10. CHECK HARNESS BETWEEN PADDLE SHIFTER AND COMBINATION METER (PART 1)

1. Disconnect combination meter connector.
2. Check continuity between paddle shifter harness connector terminals and combination meter harness connector terminals.

Paddle shifter		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
M65	3	M57	35	Existed
M66			34	

Is the inspection result normal?

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

11. CHECK HARNESS BETWEEN PADDLE SHIFTER AND COMBINATION METER (PART 2)

Check continuity between paddle shifter harness connector terminals and ground.

Paddle shifter		—	Continuity
Connector	Terminal		
M65	3	Ground	Not existed
M66			

Is the inspection result normal?

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

12. CHECK INTERMITTENT INCIDENT

Refer to GI-43, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Repair or replace damaged parts.

13. 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,” “AT SFT DWN SW,” “ST SFT UP SW*” and “ST SFT DWN SW*” in “Data Monitor” in “METER/M&A.”
   *: With paddle shifter
4. Check the ON/OFF operations of each monitor item. Refer to MWI-70, "Reference Value".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-219, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-126, "Removal and Installation".

Component Inspection (Manual Mode Switch)

INFOID:0000000009236060

1.CHECK MANUAL MODE SWITCH

Check continuity between A/T shift selector connector terminals.

A/T shift selector Terminal	Condition	Continuity
1 – 4	Selector lever is shifted to manual shift gate side	Existed
	Other than the above	Not existed
2 – 4	Selector lever is shifted to – side	Existed
	Other than the above	Not existed
3 – 4	Selector lever is shifted to + side	Existed
	Other than the above	Not existed
4 – 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-210, "Removal and Installation".

Component Inspection [Paddle Shifter (Up)]

INFOID:0000000009236061

1.CHECK PADDLE SHIFTER (UP)

Check continuity between paddle shifter (up) connector terminals.

Paddle shifter (up) Terminal	Condition	Continuity
1 – 3	Paddle shifter (up) is pulled.	Existed
	Other than the above	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace paddle shifter (up). Refer to TM-217, "Removal and Installation".

Component Inspection [Paddle Shifter (Down)]

INFOID:0000000009236062

1.CHECK PADDLE SHIFTER (DOWN)

Check continuity between paddle shifter (down) connector terminals.

Paddle shifter (down) Terminal	Condition	Continuity
1 – 3	Paddle shifter (down) is pulled.	Existed
	Other than the above	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace paddle shifter (down). Refer to TM-217, "Removal and Installation".

P2713 PRESSURE CONTROL SOLENOID D

DTC Description

INFOID:0000000009236063

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P2713	PC SOLENOID D (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.

POSSIBLE CAUSE

- Harness or connector
  (Solenoid valve circuit is open or shorted)
- High and low reverse clutch solenoid valve

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 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

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-174, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236064

1. REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

P2722 PRESSURE CONTROL SOLENOID E

DTC Description

INFOID:0000000009236065

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P2722	PC SOLENOID E (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.

POSSIBLE CAUSE

- Harness or connector
  (Solenoid valve circuit is open or shorted)
- Low brake solenoid valve

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 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

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-176, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236066

1. REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

P2731 PRESSURE CONTROL SOLENOID F

DTC Description

INFOID:0000000009236067

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P2731	PC SOLENOID F (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.

POSSIBLE CAUSE

- Harness or connector
  (Solenoid valve circuit is open or shorted)
- 2346 brake solenoid valve

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 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

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-178, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236068

1. REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

P2807 PRESSURE CONTROL SOLENOID G

DTC Description

INFOID:0000000009236069

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition
P2807	PC SOLENOID G (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.

POSSIBLE CAUSE

- Harness or connector
  (Solenoid valve circuit is open or shorted)
- Direct clutch solenoid valve

FAIL-SAFE

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.

Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
• Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 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

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-180, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-43, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000009236070

1. REPLACE CONTROL VALVE & TCM

Replace control valve & TCM. Refer to TM-219, "Removal and Installation".

>> WORK END

MAIN POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000009236071

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 harness connector terminal and ground.

+		–	Condition	Voltage (Approx.)
A/T assembly				
Connector	Terminal			
F2	2	Ground	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 harness connector terminals and ground.

+		–	Condition	Voltage (Approx.)
A/T assembly				
Connector	Terminal			
F2	1	Ground	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 harness connector terminals and ground.

A/T assembly		—	Continuity
Connector	Terminal		
F2	5	Ground	Existed
	10		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

4.DETECT MALFUNCTIONING ITEM (PART 1)

Check the following items:

- Open circuit or short circuit in harness between battery positive terminal and A/T assembly harness connector terminal 2. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".
- Battery
- 10A fuse (No.68, fuse and fusible link block). Refer to PG-82, "Fuse and Fusible Link Arrangement".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

5. CHECK HARNESS BETWEEN IPDM E/R AND A/T ASSEMBLY

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector terminal and A/T assembly harness connector terminals.

IPDM E/R		A/T assembly		Continuity
Connector	Terminal	Connector	Terminal	
E123	61	F2	1	Existed
			6	

4. Also check short circuit in harness.

Is the inspection result normal?

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

6. DETECT MALFUNCTIONING ITEM (PART 2)

Check the following items:

- Open circuit or short circuit in harness between ignition switch and IPDM E/R. Refer to PG-54, "Wiring Diagram - IGNITION POWER SUPPLY -".
- 10A fuse (No.51, IPDM E/R). Refer to PG-83, "Fuse, Connector and Terminal Arrangement".
- IPDM E/R

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

SHIFT POSITION INDICATOR CIRCUIT

Description

INFOID:0000000009236072

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:0000000009236073

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-183, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009236074

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-74, "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-74, "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-172, "Component Inspection (Manual Mode Switch)".
- Check A/T main system (Fail-safe function actuated).
  - Perform “Self Diagnostic Results” in “TRANSMISSION”. Refer to TM-85, "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-85, "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-85, "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-70, "Reference Value".

SHIFT LOCK SYSTEM
WITH ICC

WITH ICC : Component Function Check

INFOID:0000000009236075

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-184, "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-184, "WITH ICC : Diagnosis Procedure".

WITH ICC : Diagnosis Procedure

INFOID:0000000009236076

1.CHECK POWER SOURCE (PART 1)

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

+		–	Condition	Voltage (Approx.)
Shift lock relay				
Connector	Terminal			
E34	2	Ground	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 harness connector terminal and ground.

Shift lock relay		—	Continuity
Connector	Terminal		
E34	1	Ground	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-187, "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 harness connector terminal and ground.

+		−	Voltage (Approx.)
Shift lock relay			
Connector	Terminal		
E34	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 15.

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 harness connector terminal and A/T shift selector harness connector terminal

Shift lock relay		A/T shift selector		Continuity
Connector	Terminal	Connector	Terminal	
E34	3	M7	8	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 harness connector terminal and ground.

Shift lock relay		—	Continuity
Connector	Terminal		
E34	3	Ground	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 harness connector terminal and ground.

A/T shift selector		—	Continuity
Connector	Terminal		
M7	4	Ground	Existed

Is the inspection result normal?

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

8. CHECK SHIFT LOCK UNIT

Check shift lock unit. Refer to TM-187, "WITH ICC : Component Inspection (Shift Lock Unit)"

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

9. CHECK POWER SOURCE (PART 3)

1. Disconnect stop lamp switch.
2. Check voltage between stop lamp switch harness connector terminal and ground.

+		–	Voltage (Approx.)
Stop lamp switch			
Connector	Terminal		
E57	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 10.

10. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP SWITCH

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

Fuse block (J/B)		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E65	2F	E57	1	Existed

Is the inspection result normal?

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

11. DETECT MALFUNCTIONING ITEM (PART 1)

Check the following items:
- Open circuit or short circuit in harness between battery and fuse block (J/B). Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".
- Short circuit in harness between fuse block (J/B) harness connector terminal and stop lamp switch harness connector terminal 1.
- Battery
- 10A fuse [No.19, fuse block (J/B)]. Refer to PG-81, "Fuse, Connector and Terminal Arrangement".
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

12. CHECK STOP LAMP SWITCH MOUNTING POSITION

Check stop lamp switch mounting position. Refer to BR-9, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Adjust stop lamp switch mounting position.

13. CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to TM-188, "WITH ICC : Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair or replace damaged parts.

14. CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT LOCK RELAY

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

Stop lamp switch		Shift lock relay		Continuity
Connector	Terminal	Connector	Terminal	
E57	2	E34	2	Existed

2. Also check short circuit in harness.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

15. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND SHIFT LOCK RELAY (PART 1)

1. Turn ignition switch OFF and wait for 10 minutes or more.
2. Disconnect the sub electric oil pump inverter connector.
3. Disconnect fuse block (J/B) connector.
4. Check continuity between fuse block (J/B) harness connector terminal and shift lock relay harness connector terminal.

Fuse block (J/B)		Shift lock relay		Continuity
Connector	Terminal	Connector	Terminal	
E65	11F	E34	5	Existed

5. Also check short circuit in harness.

Is the inspection result normal?

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

16. DETECT MALFUNCTIONING ITEM (PART 2)

Check the following items:
- Open circuit or short circuit in harness between ignition switch and fuse block (J/B). Refer to PG-54, "Wiring Diagram - IGNITION POWER SUPPLY -".
- 10A fuse [No.12, fuse block (J/B)]. Refer to PG-81, "Fuse, Connector and Terminal Arrangement".
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

WITH ICC : Component Inspection (Shift Lock Unit)

INFOID:0000000009236077

1. CHECK SHIFT LOCK SOLENOID

Apply voltage to terminals 8 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.

A/T shift selector		Condition	Status
+ (fuse)	–		
Terminal			
8	4	• Selector lever in “P” position. • Apply 12 V direct current between terminals 8 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-210, "Removal and Installation".

WITH ICC : Component Inspection (Shift Lock Relay)

INFOID:0000000009236078

1. CHECK SHIFT LOCK RELAY

Check continuity between shift lock relay terminals.

CAUTION:
Connect the fuse between the terminals when applying the voltage.

Shift lock relay Terminal	Condition	Continuity
3 – 4	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:0000000009236079

1.CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp switch Terminal	Condition	Continuity
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-21, "Exploded View".

WITHOUT ICC

WITHOUT ICC : Component Function Check

INFOID:0000000009236080

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-188, "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-188, "WITHOUT ICC : Diagnosis Procedure".

WITHOUT ICC : Diagnosis Procedure

INFOID:0000000009236081

1.CHECK POWER SOURCE (PART 1)

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Turn ignition switch ON.
4. Check voltage between stop lamp switch harness connector terminal and ground.

+		–	Voltage (Approx.)
Stop lamp switch			
Connector	Terminal		
E57	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 8.

2.CHECK STOP LAMP SWITCH MOUNTING POSITION

Check stop lamp switch mounting position. Refer to BR-9, "Inspection and Adjustment".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Adjust stop lamp switch mounting position.

3.CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to TM-190, "WITHOUT ICC : Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

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

4.CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT SELECTOR (PART 1)

1. Disconnect A/T shift selector connector.
2. Check continuity between stop lamp switch harness connector terminal and A/T shift selector harness connector terminal.

Stop lamp switch		A/T shift selector		Continuity
Connector	Terminal	Connector	Terminal	
E57	2	M7	8	Existed

Is the inspection result normal?

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

5.CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT SELECTOR (PART 2)

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

Stop lamp switch		—	Continuity
Connector	Terminal		
E57	2	Ground	Not existed

Is the inspection result normal?

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

6.CHECK GROUND CIRCUIT

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

A/T shift selector		—	Continuity
Connector	Terminal		
M7	4	Ground	Existed

Is the inspection result normal?

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

7.CHECK SHIFT LOCK UNIT

Check shift lock unit. Refer to TM-190, "WITHOUT ICC : Component Inspection (Shift Lock Unit)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

8.CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP SWITCH

1. Turn ignition switch OFF and wait for 10 minutes or more.
2. Disconnect the sub electric oil pump inverter connector.
3. Disconnect fuse block (J/B) connector.
4. Check continuity between fuse block (J/B) harness connector terminal and stop lamp switch harness connector terminal.

Fuse block (J/B)		Stop lamp switch		Continuity
Connector	Terminal	Connector	Terminal	
E65	11F	E57	1	Existed

5. Short circuit in harness between fuse block (J/B) harness connector terminal 94 and stop lamp switch harness connector terminal 1.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace damaged parts.

9. DETECT MALFUNCTIONING ITEM

Check the following items:
- Open circuit or short circuit in harness between ignition switch and fuse block (J/B). Refer to PG-54, "Wiring Diagram - IGNITION POWER SUPPLY -".
- 10A fuse [No.12, fuse block (J/B)]. Refer to PG-81, "Fuse, Connector and Terminal Arrangement".
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

WITHOUT ICC : Component Inspection (Shift Lock Unit)

INFOID:0000000009236082

1. CHECK SHIFT LOCK SOLENOID

Apply voltage to terminals 8 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.

A/T shift selector		Condition	Status
+ (fuse)	–		
Terminal			
8	4	• Selector lever in “P” position. • Apply 12 V direct current between terminals 8 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-208, "Exploded View".

WITHOUT ICC : Component Inspection (Stop Lamp Switch)

INFOID:0000000009236083

1. CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp switch	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-21, "Exploded View".

SELECTOR LEVER POSITION INDICATOR

Description

INFOID:0000000009670874

Indicates selector lever position.

Component Function Check

INFOID:0000000009670875

1.CHECK SELECTOR LEVER POSITION INDICATOR (PART 1)

1. Turn ignition switch ON.
2. Check that each position indicator lamp of the selector lever position indicator turns on when shifting the selector lever from “P” to “M” position.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Go to TM-191, "Diagnosis Procedure".

2.CHECK SELECTOR LEVER POSITION INDICATOR (PART 2)

Check that the night illumination of the selector lever position indicator turns on when setting the lighting switch in 1st position.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to TM-191, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009670876

1.CHECK MALFUNCTIONING ITEM

Which item is abnormal?

Position indicator lamp>> GO TO 2.
Illumination lamp>> GO TO 9.

2.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 harness connector terminal and ground.

+		–	Voltage (Approx.)
A/T shift selector			
Connector	Terminal		
M7	10	Ground	Battery voltage

Is the inspection result normal?

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

3.CHECK GROUND CIRCUIT

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

A/T shift selector		—	Continuity
Connector	Terminal		
M7	4	Ground	Existed

Is the inspection result normal?

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

4.CHECK SHIFT POSITION SWITCH

1. Disconnect selector lever position indicator side connector of shift position switch.
2. Check continuity between A/T shift selector connector terminals and selector lever position indicator side connector terminals of shift position switch.

A/T shift selector connector		Selector lever position indicator side connector of shift position switch		Condition	Continuity
Connector	Terminal	Connector	Terminal		
M7	4	M221	7	Selector lever in “D” position.	Existed
			2, 3, 4, 5, 6, 9, 10, 11		Not existed
			9	Selector lever in “M” position.	Existed
			2, 3, 4, 5, 6, 7, 10, 11		Not existed
	10		2, 6	Selector lever in “N” and “M” position.	Existed
			3, 4, 5, 7, 9, 10, 11		Not existed
			3, 6	Selector lever in “D” position.	Existed
			2, 4, 5, 7, 9, 10, 11		Not existed
			4, 6	Selector lever in “R” position.	Existed
			2, 3, 5, 7, 9, 10, 11		Not existed
			5, 6	Selector lever in “P” position.	Existed
			2, 3, 4, 7, 9, 10, 11		Not existed

Is the inspection result normal?

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

5.CHECK SELECTOR LEVER POSITION INDICATOR

Check selector lever position indicator. Refer to TM-193, "Component Inspection (Selector Lever Position Indicator)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Replace damaged parts.

6.CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND BCM (PART 1)

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

A/T shift selector		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M7	10	M14	69	Existed

Is the inspection result normal?

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

7.CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND BCM (PART 2)

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

A/T shift selector		—	Continuity
Connector	Terminal		
M7	10	Ground	Not existed

Is the inspection result normal?

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

8. CHECK BCM INPUT/OUTPUT SIGNAL

Check BCM input/output signal. Refer to BCS-35, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-43, "Intermittent Incident".
NO >> Repair or replace damaged parts.

9. CHECK POWER SOURCE (PART 2)

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			Condition	Voltage (Approx.)
Connector	+	–		
	Terminal			
M7	7	9	Lighting switch 1ST	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> Check illumination circuit. Refer to INL-38, "Wiring Diagram".

10. CHECK SHIFT POSITION SWITCH

1. Disconnect selector lever position indicator side connector of shift position switch.
2. Check continuity between A/T shift selector connector terminals and selector lever position indicator side connector terminals of shift position switch.

A/T shift selector		Selector lever position indicator side connector of shift position switch		Continuity
Connector	Terminal	Connector	Terminal	
M7	7	M221	10	Existed
			2, 3, 4, 5, 6, 7, 9, 11	Not existed
	9		11	Existed
			2, 3, 4, 5, 6, 7, 9, 10	Not existed

Is the inspection result normal?

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

Component Inspection (Selector Lever Position Indicator)

INFOID:0000000009670877

1. CHECK SELECTOR LEVER POSITION INDICATOR

Check that selector lever position indicator lamps turn on.

CAUTION:
Connect the fuse between the terminals when applying the voltage.

Selector lever position indicator		Condition	Status
+ (fuse)	–		
Terminal			
2	7	Apply 12 V direct current between terminals 2 and 7.	“N” position indicator lamp turns on.
3		Apply 12 V direct current between terminals 3 and 7.	“D” position indicator lamp turns on.
4		Apply 12 V direct current between terminals 4 and 7.	“R” position indicator lamp turns on.
5		Apply 12 V direct current between terminals 5 and 7.	“P” position indicator lamp turns on.
6	9	Apply 12 V direct current between terminals 6 and 9.	“M” mode indicator lamp turns on.
10	11	Apply 12 V direct current between terminals 10 and 11.	Illumination lamp turns on.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace selector lever position indicator. Refer to TM-213, "Removal and Installation".

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Table

INFOID:0000000009236084

- The diagnostics item numbers show the sequence for inspection. Inspect in order from item 1.
- Perform diagnoses of symptom table 1 before symptom table 2.

SYMPTOM TABLE 1

Symptom					Diagnostic item																								
					Control linkage TM-105	Output speed sensor TM-121	Vehicle speed signal TM-160	Accelerator pedal position sensor TM-158	Engine speed signal TM-123	Input speed sensor TM-119	A/T fluid temperature sensor TM-115	Battery voltage TM-181	Transmission range switch TM-113	Manual mode switch TM-167	Stop lamp switch BR-9	Line pressure solenoid valve TM-149	Torque converter solenoid valve TM-145	Low brake solenoid valve TM-175	Front brake solenoid valve TM-156	High and low reverse clutch solenoid valve TM-173	Input clutch solenoid valve TM-152	Direct clutch solenoid valve TM-179	2346 brake solenoid valve TM-177	Anti-interlock solenoid valve TM-150	Starter relay TM-111	CAN communication TM-109
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	4			7	6		6		5			3		2						3		1
				→ “R” position	4			7	6		6		5			3						2				1
				1GR ⇔ 2GR		4		2	5	4	4													3		1
				2GR ⇔ 3GR		4		2	5	4	4												3			1
				3GR ⇔ 4GR		4		2	5	4	4							3		3						1
				4GR ⇔ 5GR		4		2	5	4	4										3		3			1
				5GR ⇔ 6GR		4		2	5	4	4											3	3			1
				6GR ⇔ 7GR		4		2	5	4	4								3				3			1
				Downshift when accelerator pedal is depressed		3		2	4	3	3															1
				Upshift when accelerator pedal is released		3		2	4	3	3															1
				Lock-up		4		2	4	4	4						3									1
		Judder		Lock-up				2	1	1	4						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																						
				Control linkage	Output speed sensor	Vehicle speed signal	Accelerator pedal position sensor	Engine speed signal	Input speed sensor	A/T fluid temperature sensor	Battery voltage	Transmission range switch	Manual mode switch	Stop lamp switch	Line pressure solenoid valve	Torque converter solenoid valve	Low brake solenoid valve	Front brake solenoid valve	High and low reverse clutch solenoid valve	Input clutch solenoid valve	Direct clutch solenoid valve	2346 brake solenoid valve	Anti-interlock solenoid valve	Starter relay	CAN communication
				TM-105	TM-121	TM-160	TM-158	TM-123	TM-119	TM-115	TM-181	TM-113	TM-167	BR-9	TM-149	TM-145	TM-175	TM-156	TM-173	TM-152	TM-179	TM-177	TM-150	TM-111	TM-109
Function trouble	Gear does no change	“D” position	Locks in 1GR		1													1		1		1			
			Locks in 2GR																						
			Locks in 3GR																						
			Locks in 4GR																						
			Locks in 5GR								1														
			Locks in 6GR																						
			Locks in 7GR																						
			1GR → 2GR		1													1		1		1			
			2GR → 3GR																	1					
			3GR → 4GR		2				2	2							2	2	2	2					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			
			Does not lock-up		2			2	2	2	4	5		3	2	2	2	2	2	2	2	2	2		1
		“M” position	1GR ⇔ 2GR		3				3	3		3	2		3	3	3	3	3	3	3	3	3		1
			2GR ⇔ 3GR		3				3	3		3	2		3	3	3	3	3	3	3	3	3		1
			3GR ⇔ 4GR		3				3	3		3	2		3	3	3	3	3	3	3	3	3		1
			4GR ⇔ 5GR		3				3	3		3	2		3	3	3	3	3	3	3	3	3		1
			5GR ⇔ 6GR		3				3	3		3	2		3	3	3	3	3	3	3	3	3		1
			6GR ⇔ 7GR		3				3	3		3	2		3	3	3	3	3	3	3	3	3		1

Symptom					Diagnostic item																							
					Control linkage TM-105	Output speed sensor TM-121	Vehicle speed signal TM-160	Accelerator pedal position sensor TM-158	Engine speed signal TM-123	Input speed sensor TM-119	A/T fluid temperature sensor TM-115	Battery voltage TM-181	Transmission range switch TM-113	Manual mode switch TM-167	Stop lamp switch BR-9	Line pressure solenoid valve TM-149	Torque converter clutch solenoid valve TM-145	Low brake solenoid valve TM-175	Front brake solenoid valve TM-156	High and low reverse clutch solenoid valve TM-173	Input clutch solenoid valve TM-152	Direct clutch solenoid valve TM-179	2346 brake solenoid valve TM-177	Anti-interlock solenoid valve TM-150	Starter relay TM-111	CAN communication TM-109
Function trouble	Poor shifting	Slip	When shifting gears	1GR ⇔ 2GR		3			3	3	4					2							2			1
				2GR ⇔ 3GR		3			3	3	4					2						2					1
				3GR ⇔ 4GR		3			3	3	4					2		2		2				2			1
				4GR ⇔ 5GR		3			3	3	4					2					2		2				1
				5GR ⇔ 6GR		3			3	3	4					2						2	2				1
				6GR ⇔ 7GR		3			3	3	4					2			2				2				1
		Engine brake does not work	“D” position → “M” position			5			5	5	6		4	2		3			3	3							1
			“M” position	7GR → 6GR		5			5	5	6		4	2		3			3				3				1
				6GR → 5GR		5			5	5	6		4	2		3						3	3				1
				5GR → 4GR		5			5	5	6		4	2		3					3		3				1
				4GR → 3GR		5			5	5	6		4	2		3		3		3				3			1
				3GR → 2GR		5			5	5	6		4	2		3				3		3					1
				2GR → 1GR		5			5	5	6		4	2		3			3				3				1

Symptom				Diagnostic item																							
				Control linkage TM-105	Output speed sensor TM-121	Vehicle speed signal TM-160	Accelerator pedal position sensor TM-158	Engine speed signal TM-123	Input speed sensor TM-119	A/T fluid temperature sensor TM-115	Battery voltage TM-181	Transmission range switch TM-113	Manual mode switch TM-167	Stop lamp switch BR-9	Line pressure solenoid valve TM-149	Torque converter clutch solenoid valve TM-145	Low brake solenoid valve TM-175	Front brake solenoid valve TM-156	High and low reverse clutch solenoid valve TM-173	Input clutch solenoid valve TM-152	Direct clutch solenoid valve TM-179	2346 brake solenoid valve TM-177	Anti-interlock solenoid valve TM-150	Starter relay TM-111	CAN communication TM-109
Function trouble	Poor power transmission	Slip	With selector lever in “D” position, acceleration is extremely poor.	5	3			3	3	4					2		2							2		1
			With selector lever in “R” position, acceleration is extremely poor.	5	3			3	3	4					2						2		2			1
			While starting off by accelerating in 1GR, engine races.		3			3	3	4					2		2						2			1
			While accelerating in 2GR, engine races.		3			3	3	4					2		2					2	2			1
			While accelerating in 3GR, engine races.		3			3	3	4					2		2				2	2				1
			While accelerating in 4GR, engine races.		3			3	3	4					2				2		2	2				1
			While accelerating in 5GR, engine races.		3			3	3	4					2				2	2	2		2			1
			While accelerating in 6GR, engine races.		3			3	3	4					2				2	2		2	2			1
			While accelerating in 7GR, engine races.		3			3	3	4					2			2	2	2			2			1
			Lock-up		3			3	3	4					2	2										1
			No creep at all.												1	1	1	1	1	1	1	1	1			
			Extremely large creep.					1																		

Symptom			Diagnostic item																						
			Control linkage TM-105	Output speed sensor TM-121	Vehicle speed signal TM-160	Accelerator pedal position sensor TM-158	Engine speed signal TM-123	Input speed sensor TM-119	A/T fluid temperature sensor TM-115	Battery voltage TM-181	Transmission range switch TM-113	Manual mode switch TM-167	Stop lamp switch BR-9	Line pressure solenoid valve TM-149	Torque converter clutch solenoid valve TM-145	Low brake solenoid valve TM-175	Front brake solenoid valve TM-156	High and low reverse clutch solenoid valve TM-173	Input clutch solenoid valve TM-152	Direct clutch solenoid valve TM-179	2346 brake solenoid valve TM-177	Anti-interlock solenoid valve TM-150	Starter relay TM-111	CAN communication TM-109
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		4		5	5			6			3		2								1	
		Engine stalls when selector lever shifted “N” → “D” or “R”.		4		5	5				3				2								1	
		Engine does not start in “N” or “P” position.	3							1	2												1	
		Engine starts in position other than “N” or “P”.	3								2												1	
	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 “N” position.	1								2													
		Vehicle moves backward with the “D” position.	1								2													

SYMPTOM TABLE 2

Symptom				Diagnostic item													
				Oil pump TM-309	Torque converter TM-249	Low brake* TM-249	Front brake TM-249	High and low reverse clutch TM-331	Input clutch TM-321	Direct clutch TM-333	2346 brake TM-309	Reverse brake TM-249	1st one-way clutch TM-249	2nd one-way clutch TM-326	gear TM-249	control valve TM-218	Parking component TM-223 (2WD) TM-249 (AWD)
Poor performance	Driving performance	Shift point is high in “D” position.															
		Shift point is low in “D” position.															
		Large shock	When shifting gears	→ “D” position	1		2										2	
				→ “R” position	1								1				2	
				1GR ⇔ 2GR								1					2	
				2GR ⇔ 3GR							1						2	
				3GR ⇔ 4GR			2		1								2	
				4GR ⇔ 5GR						1		1					2	
				5GR ⇔ 6GR							1	1					2	
				6GR ⇔ 7GR				1				1					2	
				Downshift when accelerator pedal is depressed			2	1	1	1	1	1		1	1		2	
				Upshift when accelerator pedal is released			2	1	1	1	1	1		1	1		2	
				Lock-up		1											2	
		Judder		Lock-up		1											2	
	Strange noise			In “R” position	1	1							1			1	2	
				In “N” position	1	1										1	2	
				In “D” position	1	1	1									1	2	
				Engine at idle	1	1										1	2	

*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-23, "TRANSMISSION : Cross-Sectional View".

Symptom				Diagnostic item														
				Oil pump TM-309	Torque converter TM-249	Low brake* TM-249	Front brake TM-249	High and low reverse clutch TM-331	Input clutch TM-321	Direct clutch TM-333	2346 brake TM-309	Reverse brake TM-249	1st one-way clutch TM-249	2nd one-way clutch TM-326	gear TM-249	control valve TM-218	Parking component TM-223 (2WD) TM-249 (AWD)
Function trouble	Gear does no change	“D” position	Locks in 1GR				1		1		1					2	
			Locks in 2GR													1	
			Locks in 3GR													1	
			Locks in 4GR													1	
			Locks in 5GR													1	
			Locks in 6GR													1	
			Locks in 7GR													1	
			1GR → 2GR				1		1		1					2	
			2GR → 3GR							1						2	
			3GR → 4GR			2	1	1	1							2	
			4GR → 5GR							1	1					2	
			5GR → 6GR							1						2	
			6GR → 7GR			2	1	1	1							2	
			5GR → 4GR						1							2	
			4GR → 3GR			2		1								2	
			3GR → 2GR							1				1		2	
			2GR → 1GR							1	1		1			2	
			Does not lock-up		1	2	1	1	1	1	1		1	1		2	
		“M” position	1GR ⇔ 2GR			2	1	1	1	1	1		1	1		2	
			2GR ⇔ 3GR			2	1	1	1	1	1		1	1		2	
			3GR ⇔ 4GR			2	1	1	1	1	1		1	1		2	
			4GR ⇔ 5GR			2	1	1	1	1	1		1	1		2	
			5GR ⇔ 6GR			2	1	1	1	1	1		1	1		2	
			6GR ⇔ 7GR			2	1	1	1	1	1		1	1		2	

*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-23, "TRANSMISSION : Cross-Sectional View".

Symptom					Diagnostic item														
					Oil pump TM-309	Torque converter TM-249	Low brake* TM-249	Front brake TM-249	High and low reverse clutch TM-331	Input clutch TM-321	Direct clutch TM-333	2346 brake TM-309	Reverse brake TM-249	1st one-way clutch TM-249	2nd one-way clutch TM-326	gear TM-249	control valve TM-218	Parking component TM-223 (2WD) TM-249 (AWD)
Function trouble	Poor shifting	Slip	When shifting gears	1GR ⇔ 2GR	1							1		1			2	
				2GR ⇔ 3GR	1						1						2	
				3GR ⇔ 4GR	1		2		1								2	
				4GR ⇔ 5GR	1					1		1					2	
				5GR ⇔ 6GR	1						1	1					2	
				6GR ⇔ 7GR	1			1				1					2	
		Engine brake does not work	“D” position → “M” position		1			1	1					1	1		2	
			“M” position	7GR → 6GR	1			1				1					2	
				6GR → 5GR	1						1	1					2	
				5GR → 4GR	1					1		1					2	
				4GR → 3GR	1		2		1								2	
				3GR → 2GR	1				1		1			1	1		2	
				2GR → 1GR	1			1				1		1			2	

Symptom				Diagnostic item														
				Oil pump TM-309	Torque converter TM-249	Low brake* TM-249	Front brake TM-249	High and low reverse clutch TM-331	Input clutch TM-321	Direct clutch TM-333	2346 brake TM-309	Reverse brake TM-249	1st one-way clutch TM-249	2nd one-way clutch TM-326	gear TM-249	control valve TM-218	Parking component TM-223 (2WD) TM-249 (AWD)
Function trouble	Poor power transmission	Slip	With selector lever in “D” position, acceleration is extremely poor.	1	1	2							1		1	2	
			With selector lever in “R” position, acceleration is extremely poor.	1	1							1	1	1	1	2	
			While starting off by accelerating in 1GR, engine races.	1	1	2							1	1	1	2	
			While accelerating in 2GR, engine races.	1		2					1			1	1	2	
			While accelerating in 3GR, engine races.	1		2				1	1				1	2	
			While accelerating in 4GR, engine races.	1				1		1	1				1	2	
			While accelerating in 5GR, engine races.	1				1	1	1					1	2	
			While accelerating in 6GR, engine races.	1				1	1		1				1	2	
			While accelerating in 7GR, engine races.	1			1	1	1							2	
			Lock-up	1	1										1	2	
			No creep at all.	1	1	2	1	1	1	1	1		1	1	1	2	1
			Extremely large creep.		1												

*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-23, "TRANSMISSION : Cross-Sectional View".

Symptom			Diagnostic item													
			Oil pump TM-309	Torque converter TM-249	Low brake* TM-249	Front brake TM-249	High and low reverse clutch TM-331	Input clutch TM-321	Direct clutch TM-333	2346 brake TM-309	Reverse brake TM-249	gear TM-249	1st one-way clutch TM-326	2nd one-way clutch TM-249	control valve TM-218	Parking component TM-223 (2WD) TM-249 (AWD)
Function trouble	Power transmission cannot be performed	Vehicle cannot run in all position.	1	1	2	1	1	1	1	1				1	2	1
		Driving is not possible in “D” position.	1	1	2	1	1	1	1	1		1	1	1	2	1
		Driving is not possible in “R” position.	1								1	1	1	1	2	1
		Engine stall		1												
		Engine stalls when selector lever shifted “N” → “D” or “R”.		1												
		Engine does not start in “N” or “P” position.		1												
		Engine starts in position other than “N” or “P”.														
	Poor operation	Vehicle does not enter parking condition.														1
		Parking condition is not cancelled.														1
		Vehicle runs with A/T in “P” position.			2	1	1	1	1	1	1				2	1
		Vehicle moves forward with the “R” position.			2	1	1	1	1	1					2	
		Vehicle runs with A/T in “N” position.			2	1	1	1	1	1	1				2	
		Vehicle moves backward with the “D” position.									1				2	

*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-23, "TRANSMISSION : Cross-Sectional View".

PERIODIC MAINTENANCE

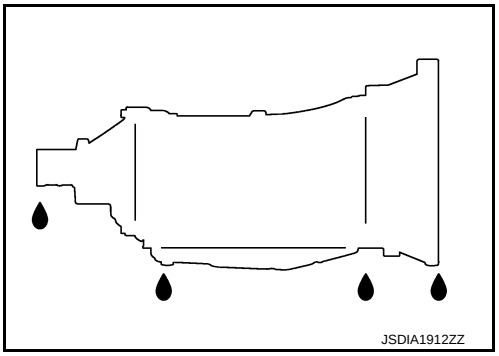
A/T FLUID

Inspection

INFOID:0000000009236085

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-207, "Adjustment".



Changing

INFOID:0000000009235981

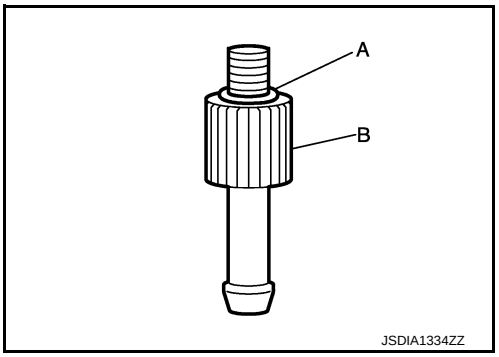
Recommended fluid and fluid capacity	: Refer to MA-14, "FOR NORTH AMERICA : Fluids and Lubricants" (For North America), MA-15, "FOR MEXICO : Fluids and Lubricants" (For Mexico).

CAUTION:

- **Use only recommended ATF. Never mix with other ATF.**
- **Using ATF other than recommended 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.**
- **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. Use CONSULT to check that the ATF temperature is 40°C (104°F) or less.

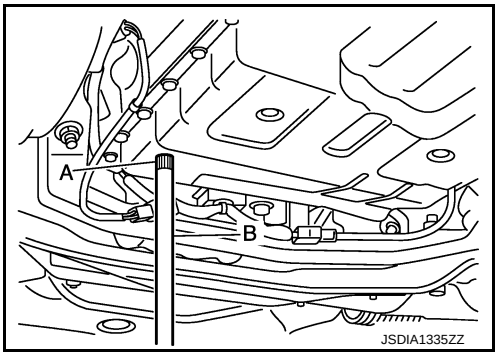
b. Lift up the vehicle.

c. Remove the drain plug from the oil pan, and then drain the ATF.

d. 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.

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:
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 to remove the charging pipe, and then temporarily tighten the overflow plug to the oil pan.
CAUTION:
Quickly perform the procedure to avoid ATF leakage from the oil pan.

j. Lift down the vehicle.

k. Start the engine and wait for approximately 3 minutes.

l. 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.

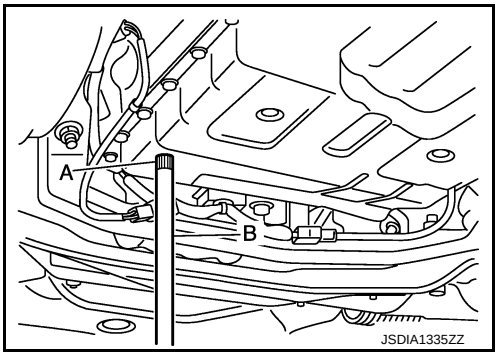
b. Lift up the vehicle.

c. Remove the drain plug from the oil pan, and 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-218, "Exploded View".
CAUTION:
Never reuse drain plug and drain plug gasket.

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:
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 to remove the charging pipe, and then temporarily tighten the overflow plug to the oil pan.
CAUTION:
Quickly perform the procedure to avoid ATF leakage from the oil pan.

j. Lift down the vehicle.

k. Start the engine.

l. Make the ATF temperature approximately 40°C (104°F).
NOTE:
The ATF level is greatly affected by the temperature. Always check the ATF temperature on “ATF TEMP 1” of “Data Monitor” using CONSULT.

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

n. Shift the selector lever through each gear position. Leave selector lever in “P” position.

o. Lift up the vehicle when the ATF temperature reaches 40°C (104°F), and remove the overflow plug from the oil pan.

p. When the ATF starts to drip, tighten the overflow plug to the oil pan to the specified torque. Refer to TM-218, "Exploded View".
CAUTION:
Never reuse overflow plug.

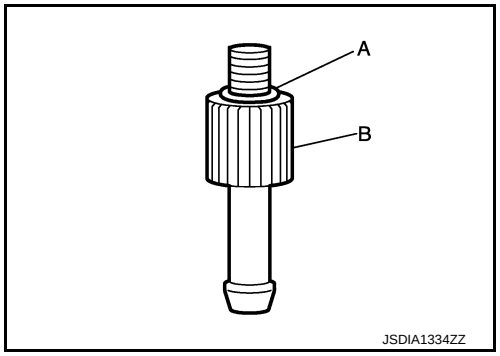
Adjustment

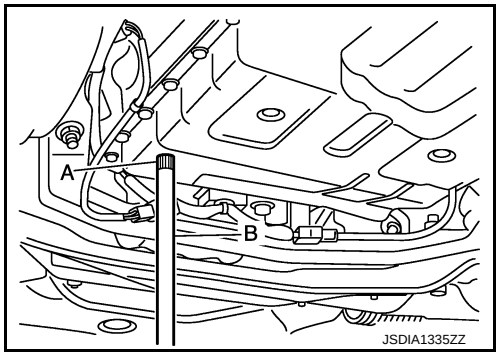
INFOID:0000000009235982

Recommended fluid and fluid capacity : Refer to MA-14, "FOR NORTH AMERICA : Fluids and Lubricants" (For North America), MA-15, "FOR MEXICO : Fluids and Lubricants" (For Mexico).

CAUTION:
- **Use only recommended ATF. Never mix with other ATF.**
- **Using ATF other than recommended 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.**
- **When filling ATF, be careful not to scatter heat generating parts such as exhaust.**
- **Always maintain the ATF temperature within between 35°C (95°F) and 45°C (113°F) while checking with CONSULT when the ATF level adjustment is performed.**

1. Install the O-ring (315268E000) (A) to the charging pipe (310811EA5A) (B).
2. Start the engine.
3. Make the ATF temperature approximately 40°C (104°F).
   NOTE:
   The ATF level is greatly affected by the temperature. Always check the ATF temperature on “ATF TEMP 1” of “Data Monitor” using CONSULT.
4. Park vehicle on level surface and set parking brake.
5. Shift the selector lever through each gear position. Leave selector lever in “P” position.
6. Lift up the vehicle.
7. Check the ATF leakage from transmission.
8. Remove overflow plug from oil pan.
9. Install the charging pipe (A) to the overflow plug hole.
   CAUTION:
   Tighten the charging pipe by hand.
10. 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.
11. Fill approximately 0.5 liters (1/2 US qt, 1/2 lmp qt) of the ATF.
12. Check that the ATF leaks when removing the charging pipe and the bucket pump hose. If the ATF does not leak, refill the ATF.
13. When the ATF starts to drip, tighten the overflow plug to the oil pan to the specified torque. Refer to TM-218, "Exploded View".
    CAUTION:
    Never reuse overflow plug.





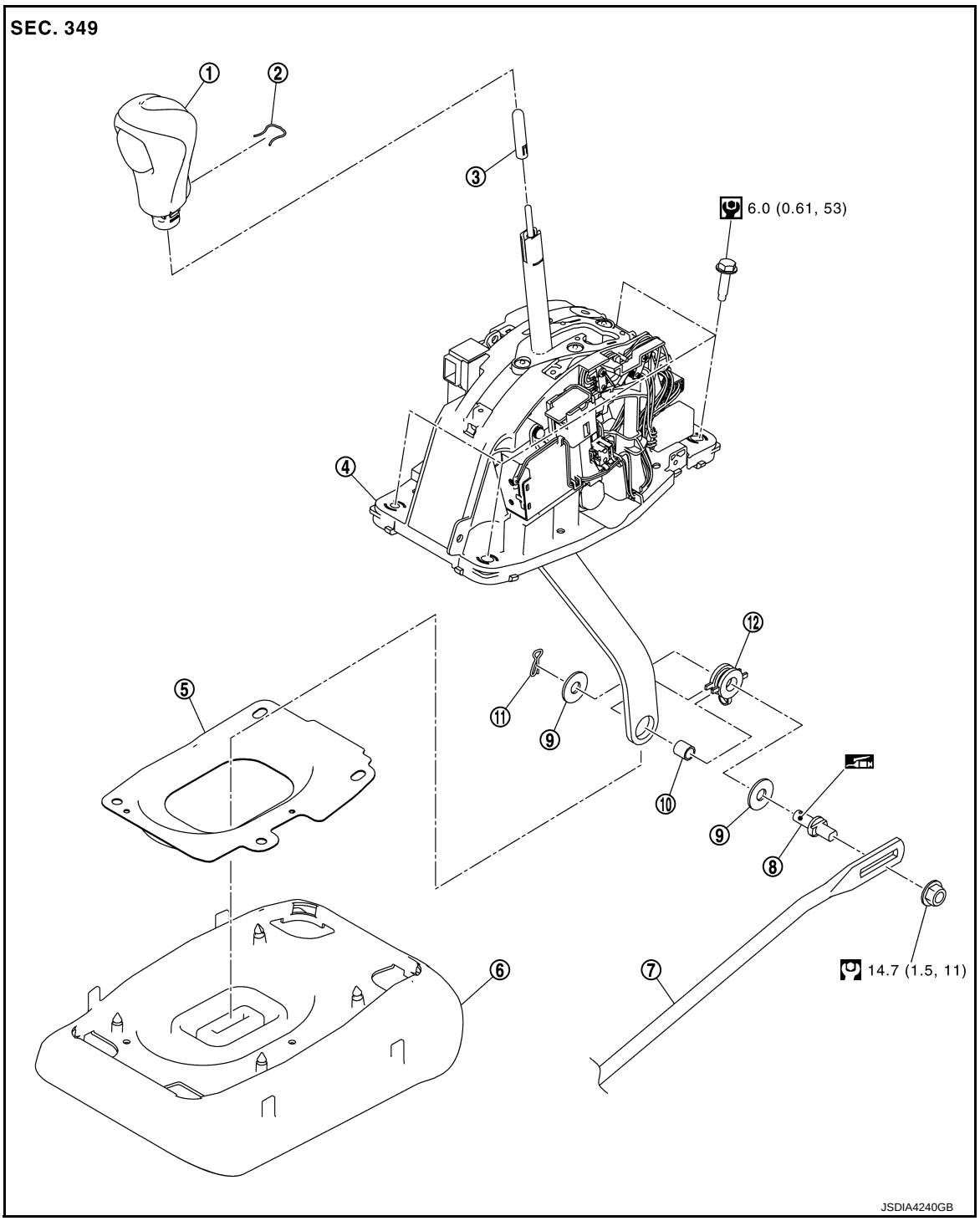
REMOVAL AND INSTALLATION

A/T SHIFT SELECTOR

Exploded View

INFOID:0000000009236086

2WD Models



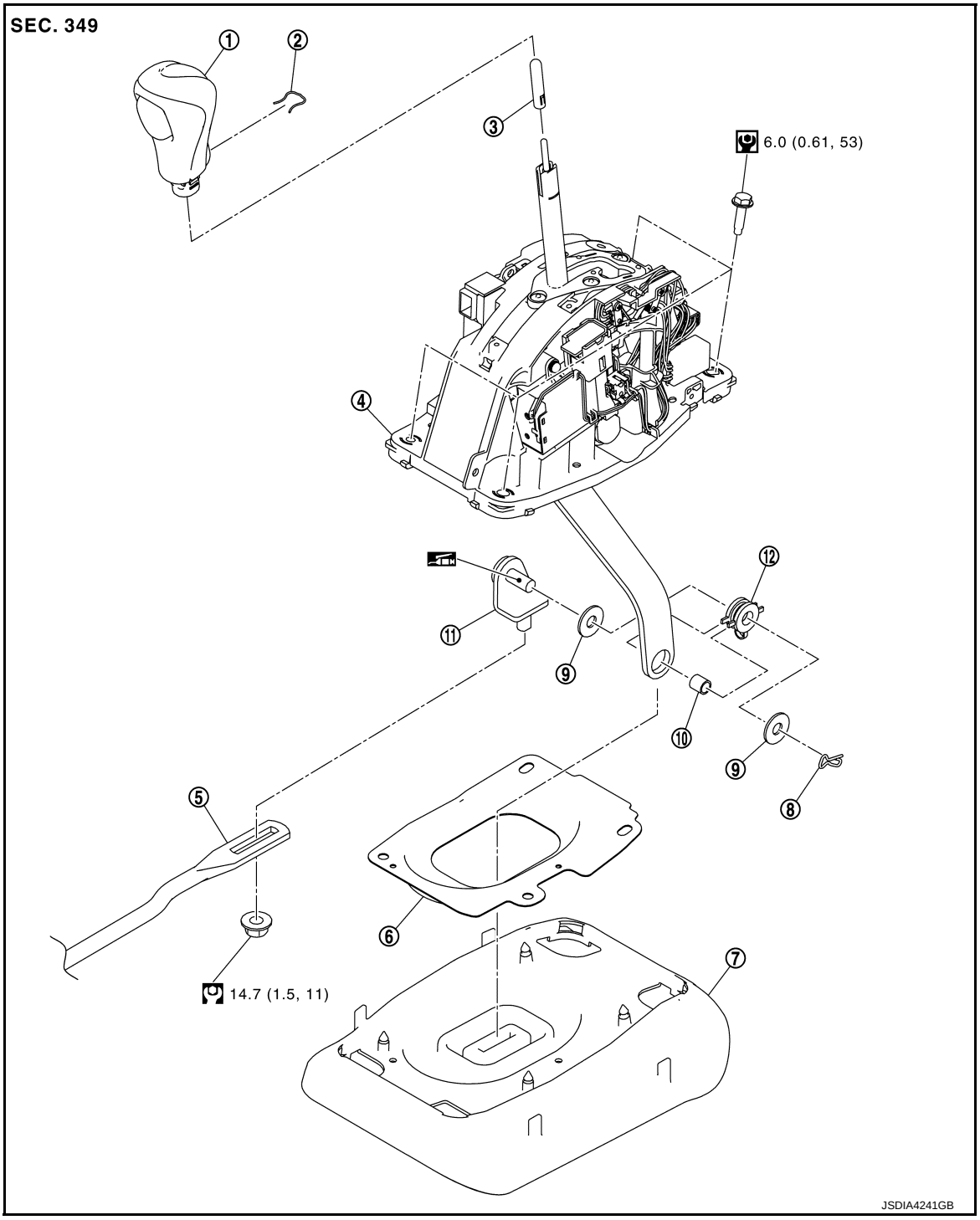
①	Selector lever knob	②	Lock pin	③	Adapter
④	A/T shift selector assembly	⑤	Dust cover plate	⑥	Dust cover
⑦	Control rod	⑧	Pivot pin	⑨	Washer
⑩	Collar	⑪	Snap pin	⑫	Insulator

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

: Apply multi-purpose grease

AWD Models



① Selector lever knob	② Lock pin	③ Adapter
④ A/T shift selector assembly	⑤ Dust cover plate	⑥ Dust cover
⑦ Control rod	⑧ Pivot pin	⑨ Washer
⑩ Collar	⑪ Snap pin	⑫ Insulator

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

: Apply multi-purpose grease

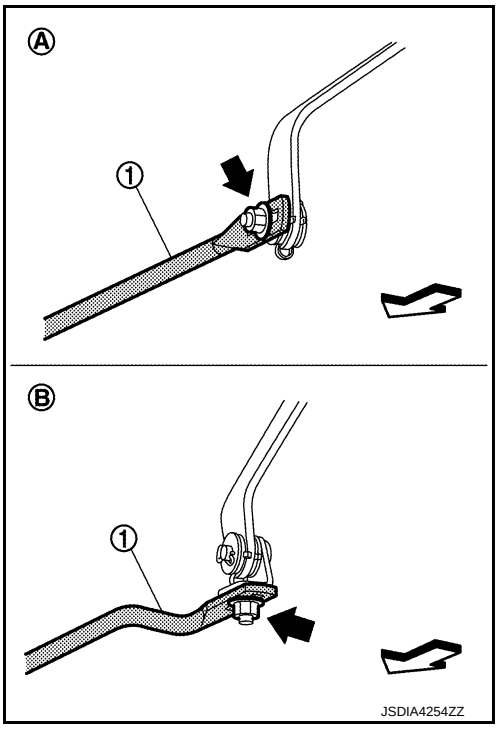
Removal and Installation

INFOID:0000000009236087

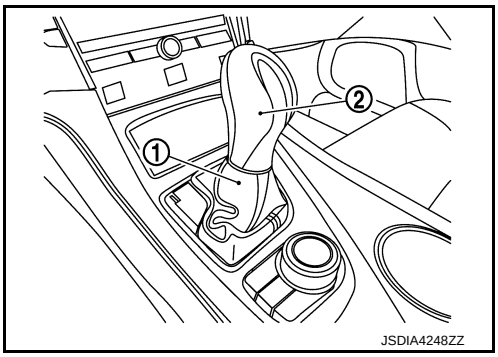
REMOVAL

1. Shift the selector lever to “P” position.
2. Remove nut (⬅) and remove the control rod ① from the lower lever of A/T shift selector assembly.

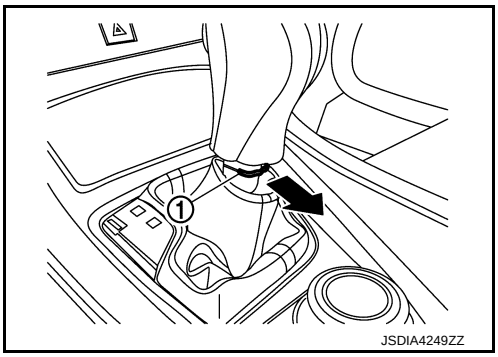
Ⓐ : 2WD models
Ⓑ : AWD models
⇦ : Vehicle front



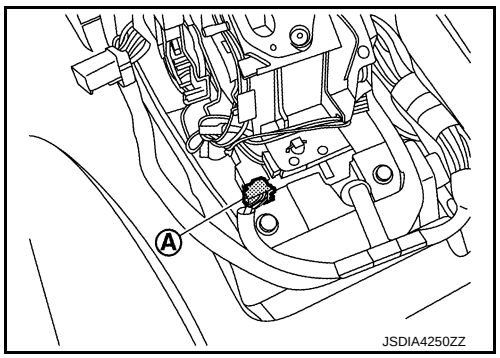
3. Shift the selector lever to “N” position.
4. Remove the top of shift boot ① from the selector lever knob ② and slide the shift boot down.



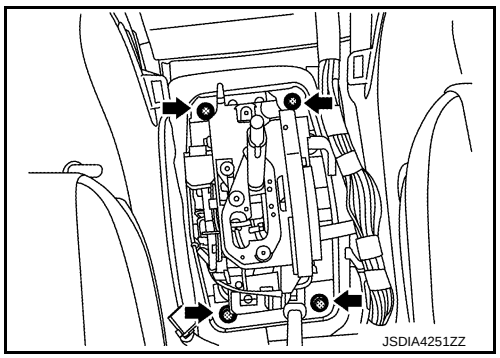
5. Pull out the lock pin ① and remove shift selector knob from the selector lever.
6. Remove center console assembly. Refer to IP-23, "Removal and Installation".
7. Remove rear floor duct 2. Refer to VTL-12, "REAR FLOOR DUCT 2 : Removal and Installation". (With rear ventilator grille)
8. Shift the selector lever to “P” position.
CAUTION:
Be sure to move selector lever with the selector lever knob installed.



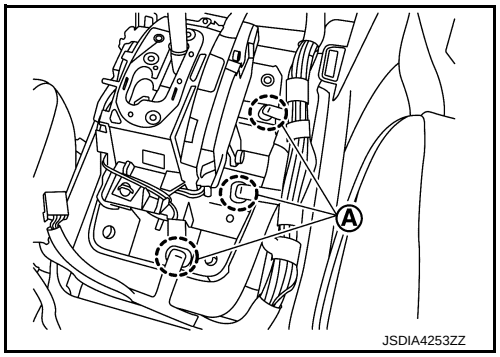
9. Disconnect A/T shift selector connector Ⓐ.



10. Remove A/T shift selector assembly mounting bolts (⬅).



11. Remove harness clips Ⓐ 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.

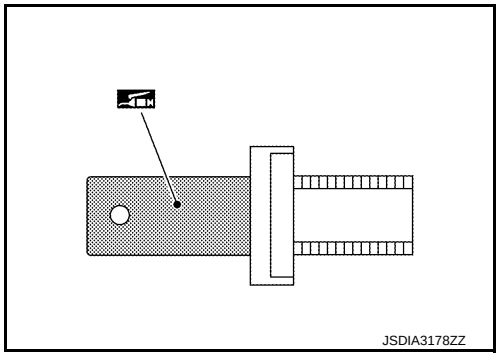


INSTALLATION

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.

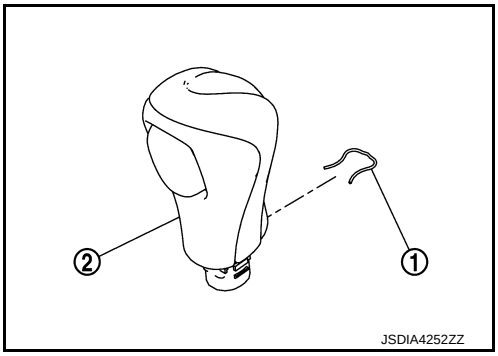


- Refer to the followings when installing the selector lever knob to the A/T shift selector assembly.

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:0000000009236088

INSPECTION AFTER INSTALLATION

Check A/T position after adjusting A/T position. Refer to TM-105, "Inspection and Adjustment".

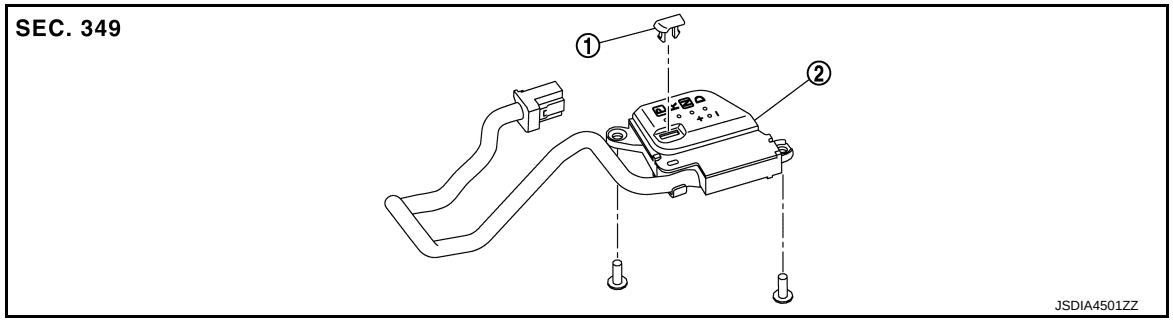
ADJUSTMENT AFTER INSTALLATION

Adjust A/T position. Refer to TM-105, "Inspection and Adjustment".

SELECTOR LEVER POSITION INDICATOR

Exploded View

INFOID:0000000009670872



① Shift lock cover ② Selector lever position indicator

Removal and Installation

INFOID:0000000009346623

REMOVAL

1. Remove console finisher assembly. Refer to IP-23, "Removal and Installation".
2. Remove console pocket assembly from console finisher assembly. Refer to IP-22, "Exploded View".
3. Remove selector lever position indicator from console finisher assembly.

INSTALLATION

Install in the reverse order of removal.

Inspection

INFOID:0000000009670873

INSPECTION AFTER INSTALLATION

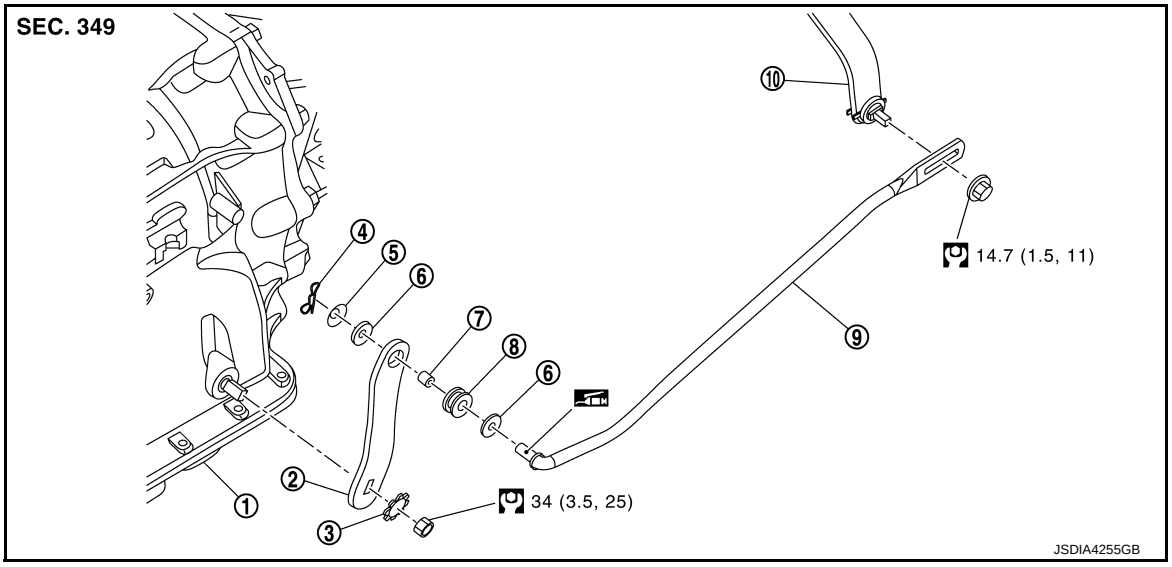
Check selector lever position indicator function. Refer to TM-191, "Component Function Check".

CONTROL ROD

Exploded View

INFOID:0000000009236092

2WD Models

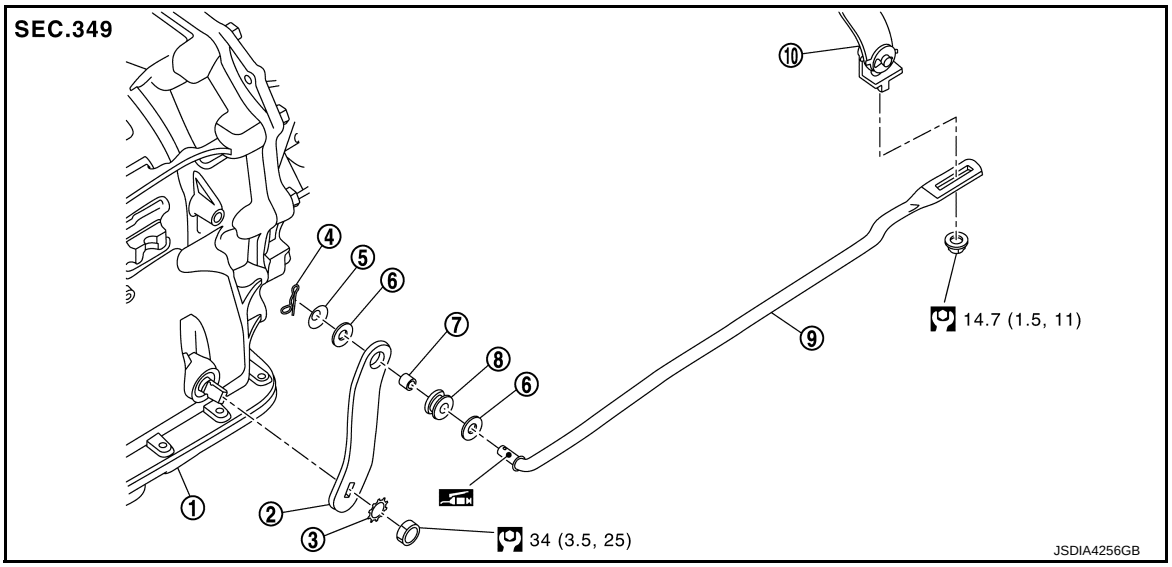


① Transmission assembly ② Manual lever ③ Lock washer
④ Snap pin ⑤ Conical washer ⑥ Plain washer
⑦ Collar ⑧ Insulator ⑨ Control rod
⑩ A/T shift selector assembly

: N·m (kg-m, ft-lb)

: Apply multi-purpose grease

AWD Models



① Transmission assembly ② Manual lever ③ Lock washer
④ Snap pin ⑤ Conical washer ⑥ Plain washer
⑦ Collar ⑧ Insulator ⑨ Control rod
⑩ A/T shift selector assembly

: N·m (kg-m, ft-lb)

: Apply multi-purpose grease

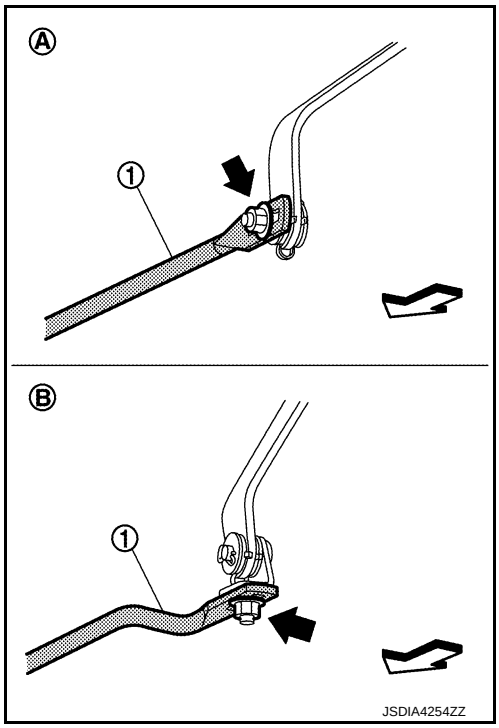
Removal and Installation

INFOID:0000000009236093

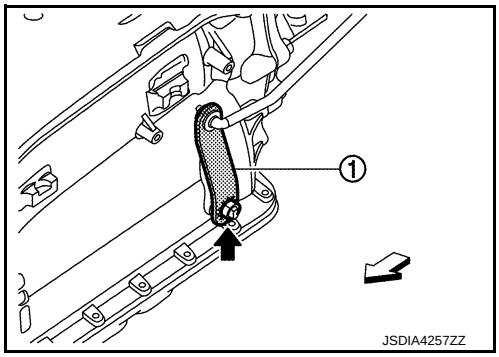
REMOVAL

1. Shift the selector lever to “P” position.
2. Remove nut (⬅) and remove the control rod ① from the lower lever of A/T shift selector assembly.

Ⓐ : 2WD models
Ⓑ : AWD models
⇦ : Vehicle front

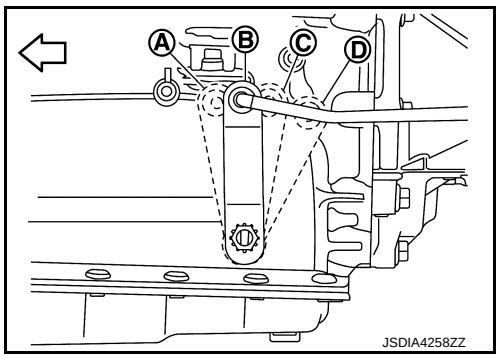


3. Remove nut (⬅) and remove the manual lever ① (with control rod) from transmission assembly.



CAUTION:
When loosening manual lever mounting nut, set manual lever in “N” position and fix manual lever to prevent it from moving.

Ⓐ : D position
Ⓑ : N position
Ⓒ : R position
Ⓓ : P position
⇦ : Vehicle front



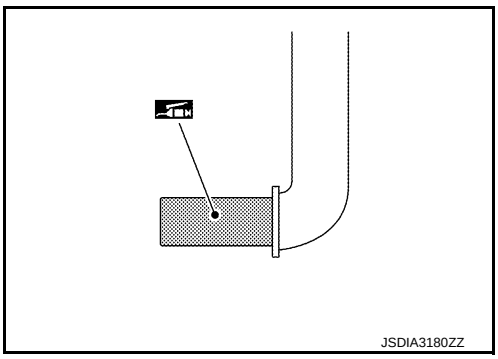
4. Remove snap pin, control rod, conical washer, plain washers, collar, and insulator from manual lever.

INSTALLATION

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

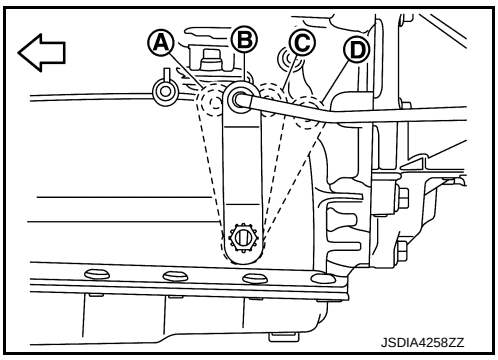
CAUTION:

- **Apply multi-purpose grease on the pin surface (that slides after installing collar) of the tip of the control rod.**



- **When tightening manual lever mounting nut, set manual lever in “N” position and fix manual lever to prevent it from moving.**

Ⓐ : D position
Ⓑ : N position
Ⓒ : R position
Ⓓ : P position
⇦ : Vehicle front



Inspection and Adjustment

INFOID:0000000009236094

INSPECTION AFTER INSTALLATION

Check A/T position after adjustment A/T position. Refer to TM-105, "Inspection and Adjustment".

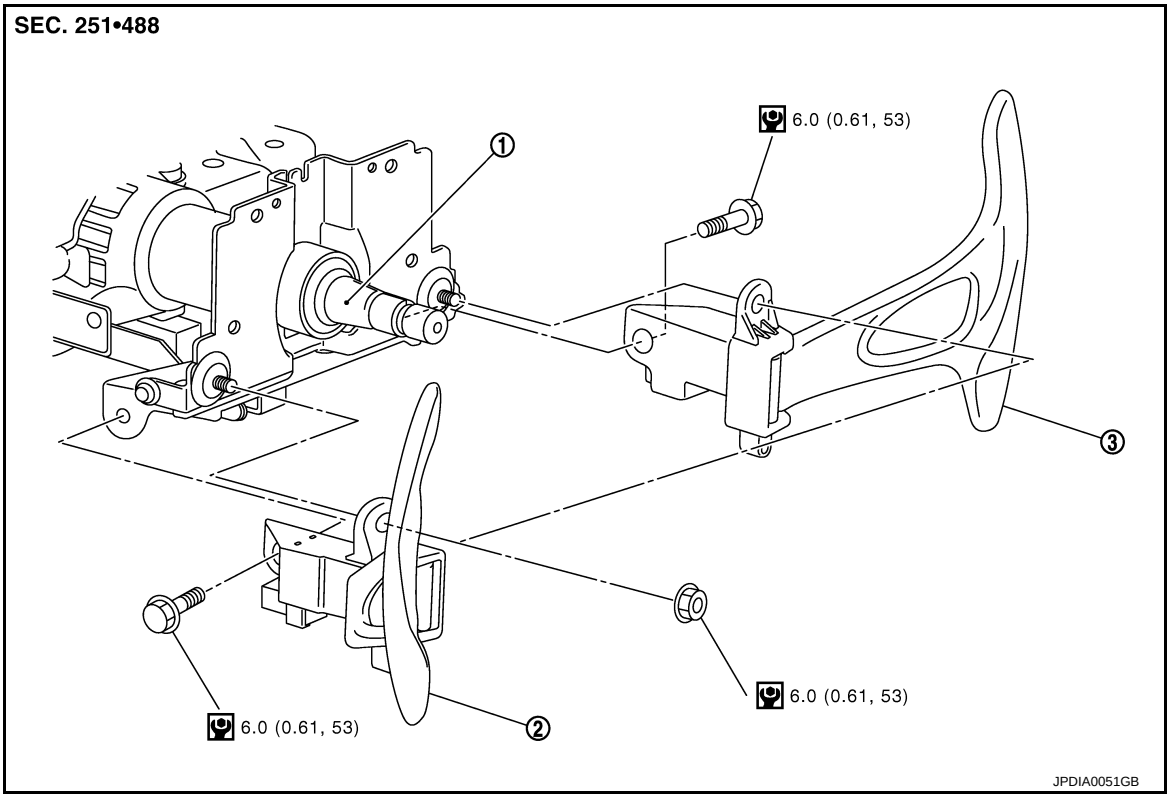
ADJUSTMENT AFTER INSTALLATION

Adjust A/T position. Refer to TM-105, "Inspection and Adjustment".

PADDLE SHIFTER

Exploded View

INFOID:0000000009236095



① Steering column assembly ② Paddle shifter (down) ③ Paddle shifter (up)

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000009236096

REMOVAL

1. Remove steering wheel. Refer to ST-30, "Removal and Installation".
2. Remove steering column cover. Refer to IP-12, "Removal and Installation".
3. Disconnect paddle shifter connectors.
4. Remove paddle shifter mounting bolts and nuts.
5. Remove each paddle shifter from steering column assembly.

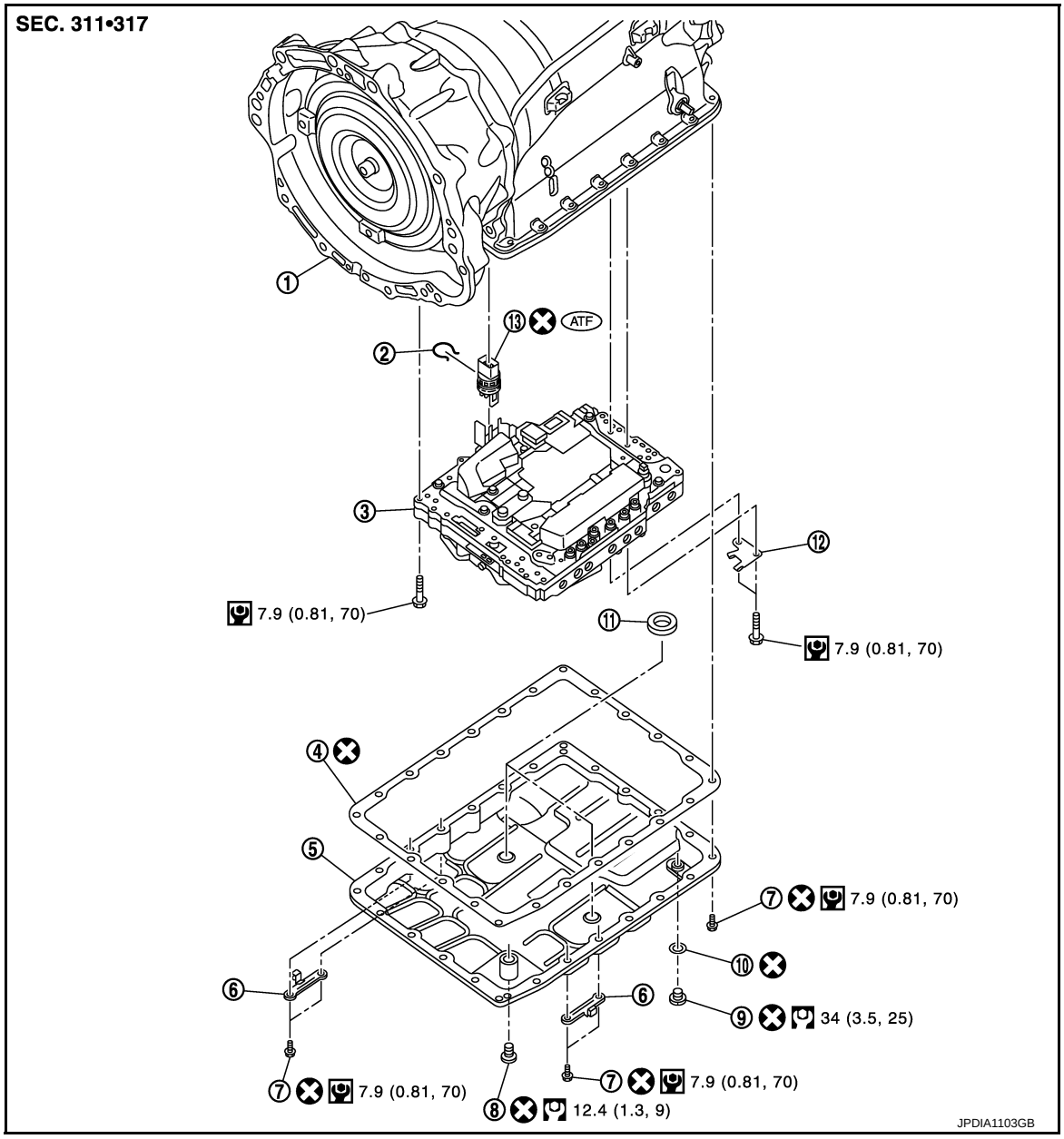
INSTALLATION

Install in the reverse order of removal.

CONTROL VALVE & TCM

Exploded View

INFOID:0000000009236097



① Transmission assembly
② Snap ring
③ Control valve & TCM
④ Oil pan gasket
⑤ Oil pan
⑥ Clip
⑦ Oil pan mounting bolt
⑧ Overflow plug
⑨ Drain plug
⑩ Drain plug gasket
⑪ Magnet
⑫ Clip
⑬ Joint connector

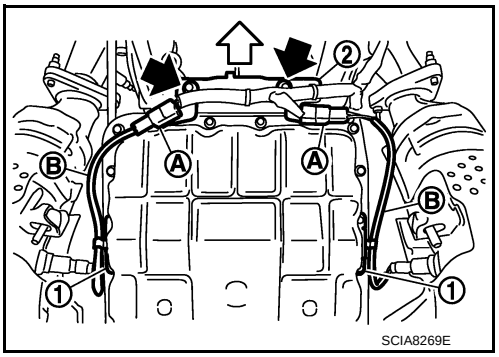
: Always replace after every disassembly.
: N·m (kg-m, ft-lb)
: N·m (kg-m, in-lb)
ATF : Apply ATF

Removal and Installation

INFOID:0000000009236098

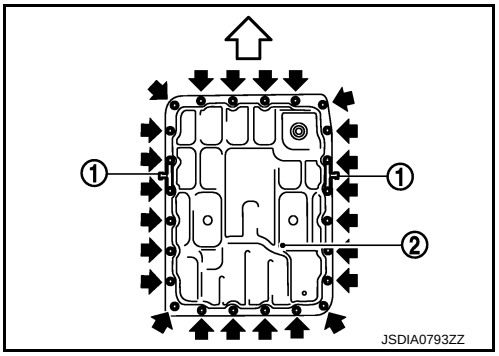
REMOVAL

1. Remove rear engine cover. Refer to EXT-35, "FLOOR UNDER COVER : Removal and Installation".
2. Drain ATF through drain plug.
3. Remove exhaust mounting bracket with power tool. Refer to EX-5, "Exploded View".
4. Disconnect heated oxygen sensor 2 connectors Ⓐ.



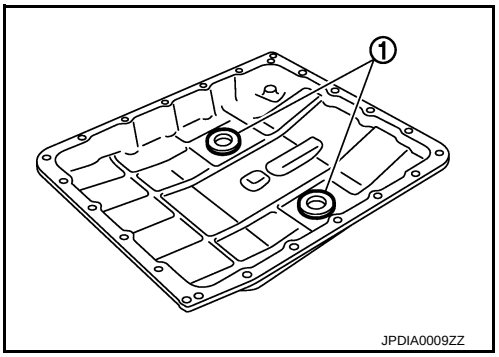
⇦ : Vehicle front
⬅ : Bolt

5. Remove heated oxygen sensor 2 harness Ⓑ from clips ①.
6. Remove bracket ② from transmission assembly. Refer to TM-242, "2WD : Exploded View" (2WD), TM-245, "AWD : Exploded View" (AWD).
7. Remove clips ①.

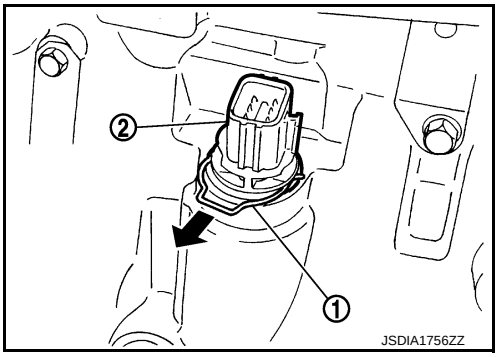


⇦ : Vehicle front
⬅ : Oil pan mounting bolt

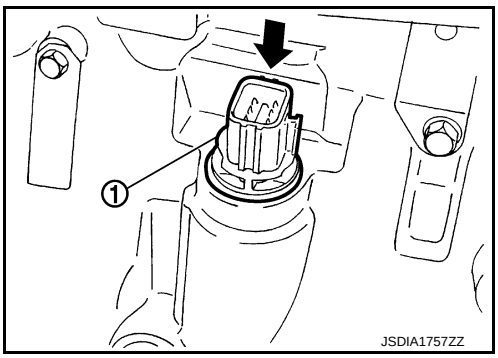
8. Remove oil pan ② and oil pan gasket.
9. Remove magnets ① from oil pan.



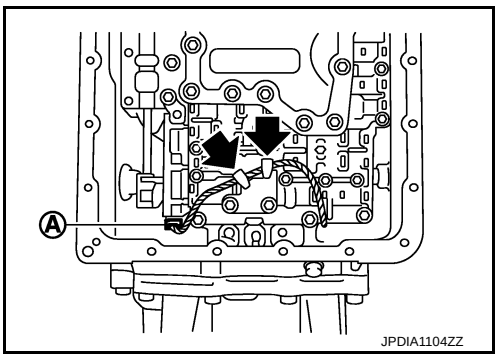
10. Remove snap ring ① from joint connector ②.



11. Push joint connector ①.



12. Disconnect output speed sensor connector Ⓐ.
CAUTION:
Be careful not to damage connector.
13. Disengage terminal clip (⬅).

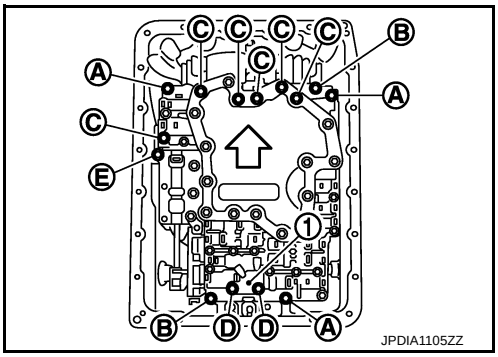


14. Remove bolts and clip ① from the control valve & TCM.

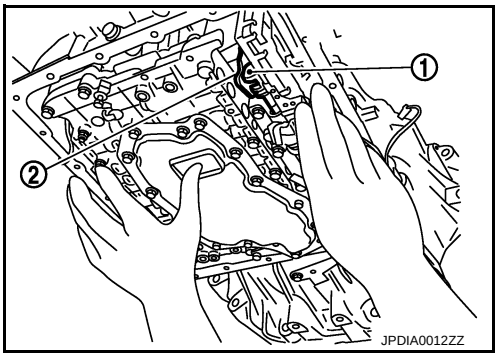
⇦ : Vehicle front

Bolt symbol	Length mm (in)	Number of bolts
Ⓐ	43 (1.69)	3
Ⓑ	40 (1.57)	2
Ⓒ	54 (2.13)	6
Ⓓ	50 (1.97)	2
Ⓔ*	50 (1.97)	1

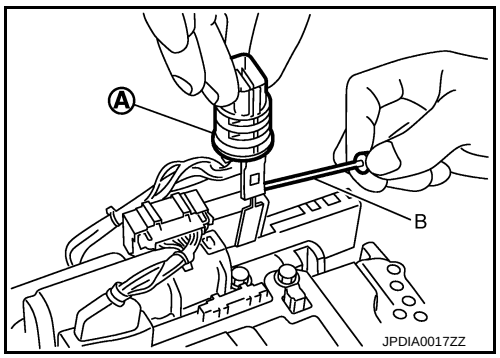
*: Reamer bolt



15. Remove the control valve & TCM from transmission case.
CAUTION:
When removing, be careful with the manual valve ① notch and manual plate ② height. Remove it vertically.



16. Remove joint connector Ⓐ from the control valve & TCM using a flat-bladed screwdriver Ⓑ.
17. Disconnect TCM harness connector.
    CAUTION:
    Be careful not to damage connector.



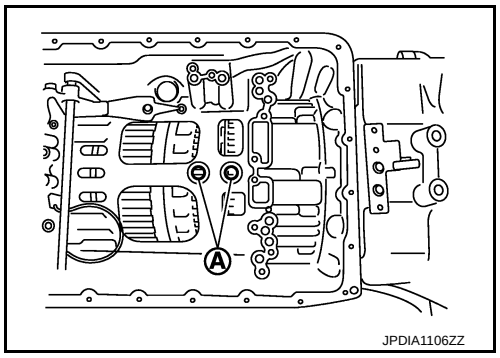
INSTALLATION

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

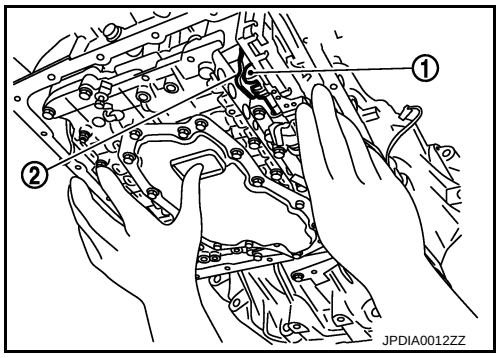
CAUTION:

- **Be careful not to damage connector when installing any connector.**
- **Never reuse joint connector.**
- **Apply ATF to O-ring of joint connector.**
- **Never reuse drain plug and drain plug gasket. In addition, install new drain plug and drain plug gasket after adjustment of A/T fluid filling.**
- Refer to the following when installing the control valve & TCM to transmission case.

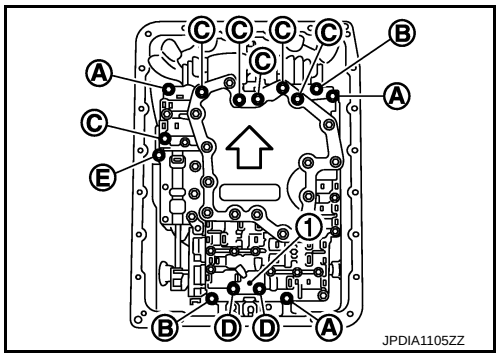
  CAUTION:
  - **Make sure that input speed sensor securely installs input speed sensor holes Ⓐ.**
  - **Hang down output speed sensor harness toward outside so as not to disturb installation of the control valve & TCM.**
  - **Adjust joint connector of the control valve & TCM to terminal hole of transmission case.**



  - **Assemble it so that manual valve ① cutout is engaged with manual plate ② projection.**



- Install bolts and clip ① to the control valve & TCM. Tighten bolt Ⓔ to the specified torque before tightening the other than bolts.



⇦ : Vehicle front

Bolt symbol	Length mm (in)	Number of bolts
Ⓐ	43 (1.69)	3
Ⓑ	40 (1.57)	2
Ⓒ	54 (2.13)	6

Bolt symbol	Length mm (in)	Number of bolts
Ⓓ	50 (1.97)	2
Ⓔ*	50 (1.97)	1

*: Reamer bolt

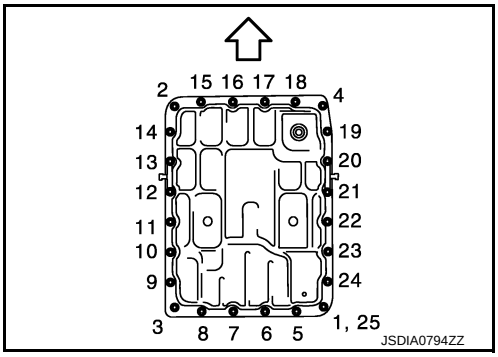
- Refer to the following when installing oil pan to transmission case.

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.**
- **Install oil pan gasket in the direction to align hole position.**

- 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



- Fill with ATF after installation. Refer to TM-205, "Changing".

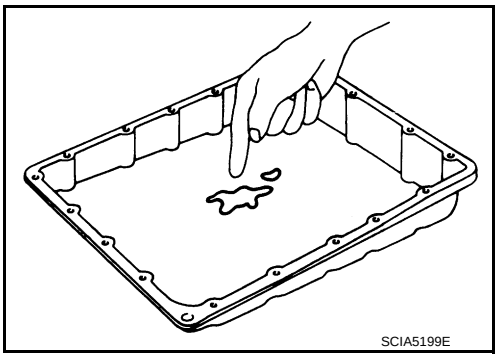
Inspection and Adjustment

INFOID:0000000009236099

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.

- **If frictional material is detected, perform A/T fluid cooler cleaning. Refer to TM-101, "Cleaning".**



INSPECTION AFTER INSTALLATION

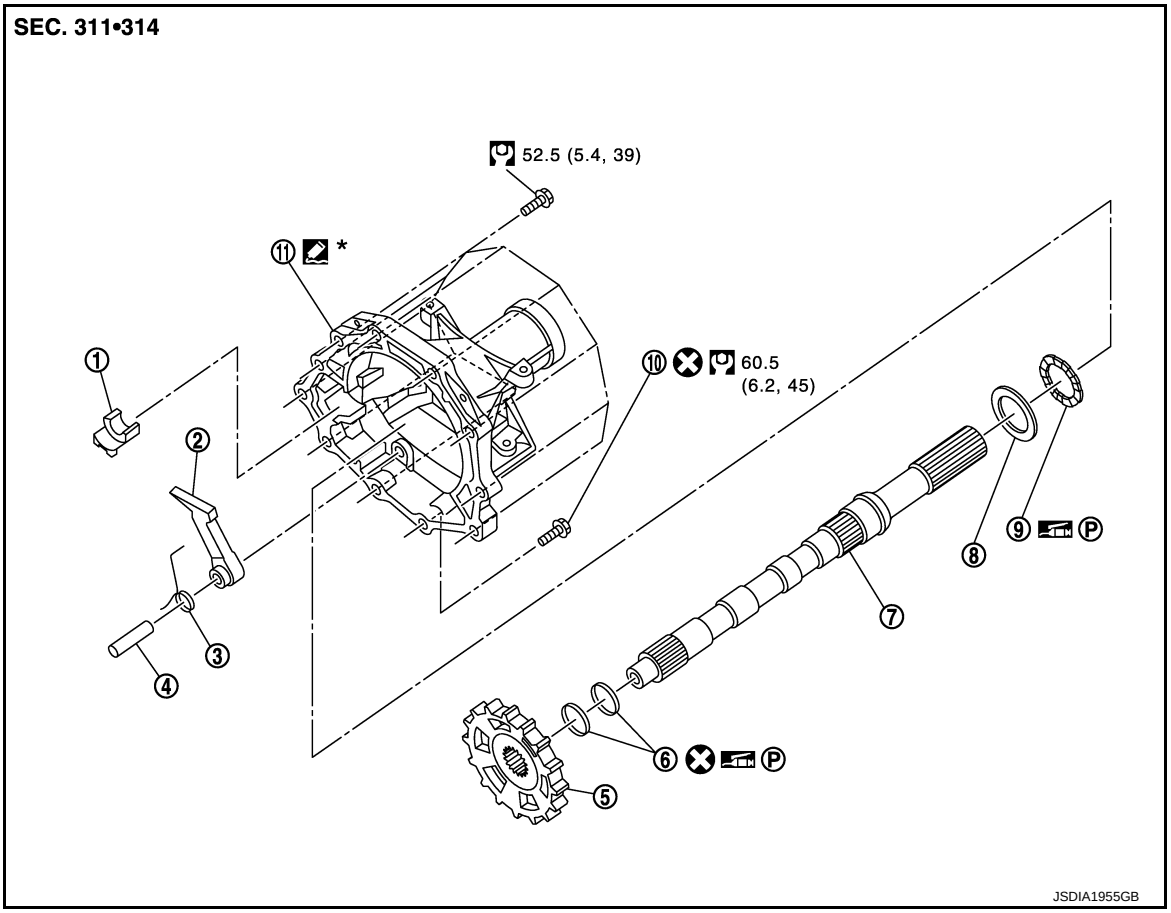
Start the engine and check visually that there is no leakage of ATF.

PARKING COMPONENTS

2WD

2WD : Exploded View

INFOID:0000000009236100



① Parking actuator support	② Parking pawl	③ Return spring
④ Pawl shaft	⑤ Parking gear	⑥ Seal ring
⑦ Output shaft	⑧ Bearing race	⑨ Needle bearing
⑩ Self-sealing bolt	⑪ Rear extension	

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

Ⓟ: Apply petroleum jelly

*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".

2WD : Removal and Installation

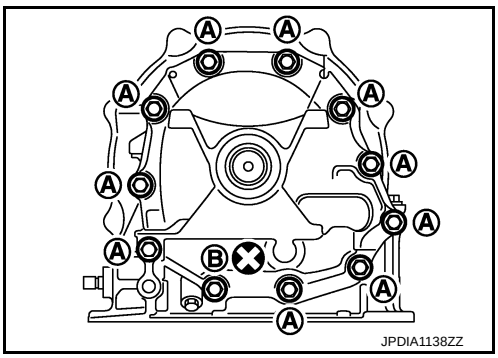
INFOID:0000000009236101

REMOVAL

1. Remove rear engine cover. Refer to EXT-35, "FLOOR UNDER COVER : Removal and Installation".
2. Drain ATF through drain plug.
3. Remove exhaust front tube and center muffler with power tool. Refer to EX-5, "Exploded View".
4. Separate propeller shaft assembly. Refer to DLN-98, "Removal and Installation".
5. Remove control rod. Refer to TM-215, "Removal and Installation".
6. Support transmission assembly with a transmission jack.
   CAUTION:

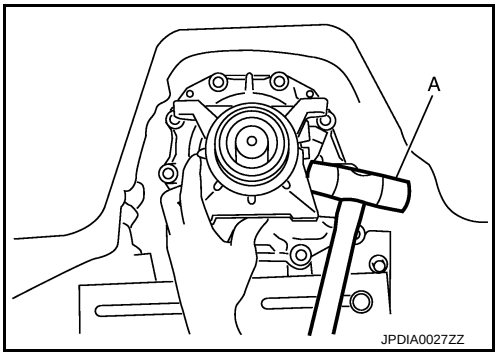
When setting transmission jack, be careful not to allow it to collide against the drain plug.

7. Remove rear engine mounting member with power tool. Refer to EM-76, "2WD : Exploded View".
8. Remove engine mounting insulator (rear). Refer to EM-76, "2WD : Exploded View".
9. Remove tightening bolts for rear extension assembly and transmission case.

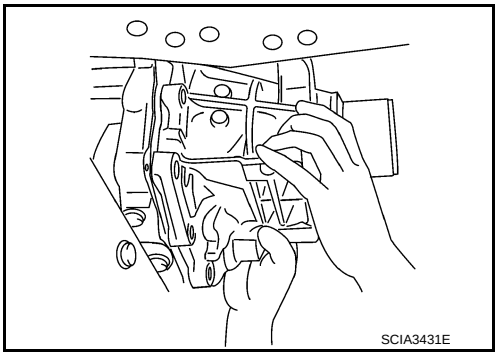


Ⓐ : Bolt
Ⓑ : Self-sealing bolt

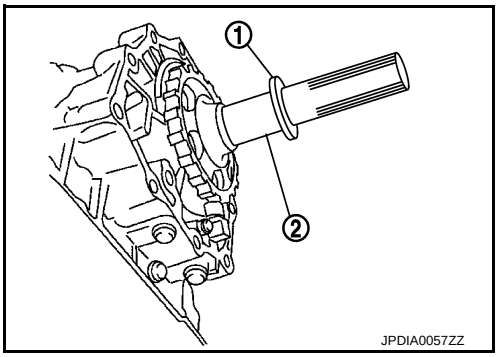
10. Tap rear extension assembly with a soft hammer (A).
CAUTION:
Be careful not to damage adapter case.



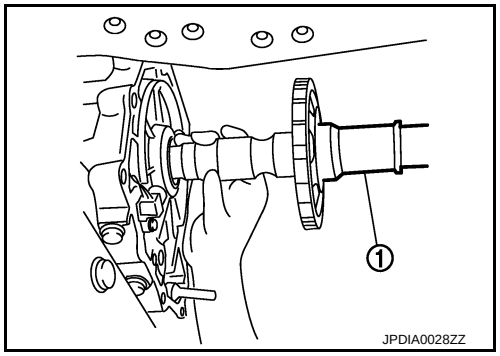
11. Remove rear extension assembly (with needle bearing) from transmission case.



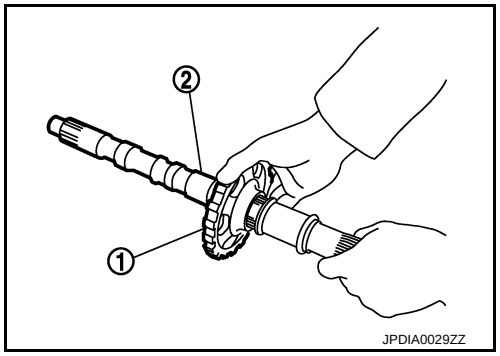
12. Remove bearing race ① from output shaft ②.



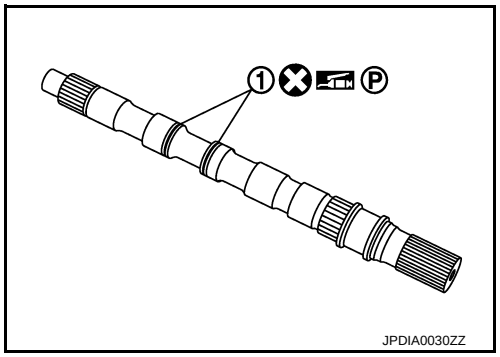
13. Remove output shaft ① from transmission case by rotating left/ right.



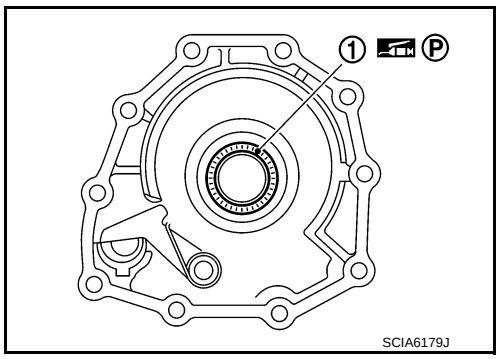
14. Remove parking gear ① from output shaft ②.



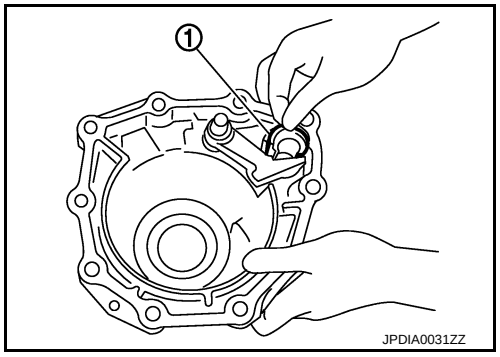
15. Remove seal rings ① from output shaft.



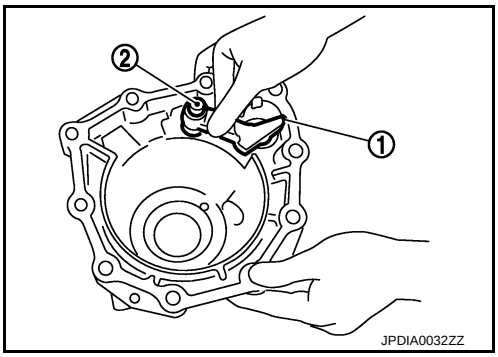
16. Remove needle bearing ① from rear extension.



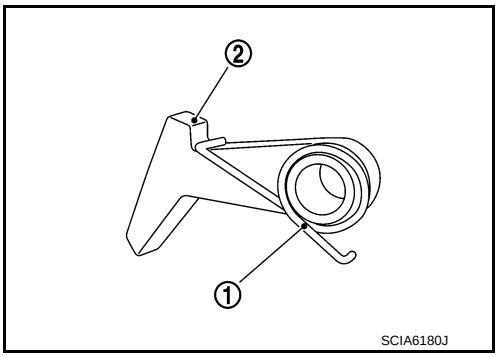
17. Remove parking actuator support ① from rear extension.



18. Remove parking pawl (with return spring) ① and pawl shaft ② from rear extension.



19. Remove return spring ① from parking pawl ②.



INSTALLATION

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

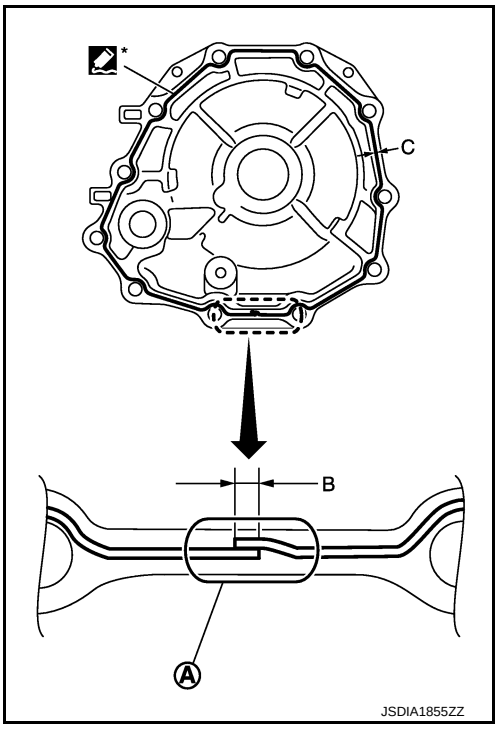
CAUTION:

- **Never reuse seal rings and drain plug gasket.**
- **Apply petroleum jelly to needle bearing and seal rings.**
- **Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the rear extension assembly.**
- Refer to the followings installing rear extension assembly.

- Apply recommended sealant to rear extension assembly as shown in the figure.

: Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".

Sealant starting point and end-point Ⓐ	**: Start and finish point shall be in the center of two bolts.**
Overlap width of sealant starting point and end-point (B)	**: 3 – 5 mm (0.12 – 0.20 in)**
Sealant width (C)	**: 1.0 – 2.0 mm (0.04 – 0.08 in)**
Sealant height (C)	**: 0.4 – 1.0 mm (0.016 – 0.04 in)**

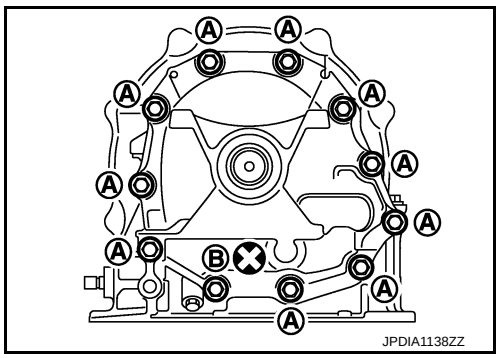


CAUTION:

Completely remove all moisture, oil and old sealant, etc. from transmission case and rear extension assembly mounting surfaces.

- Tighten rear extension assembly bolts to the specified torque.

Ⓐ : Bolt
Ⓑ : Self-sealing bolt



JPDIA1138ZZ

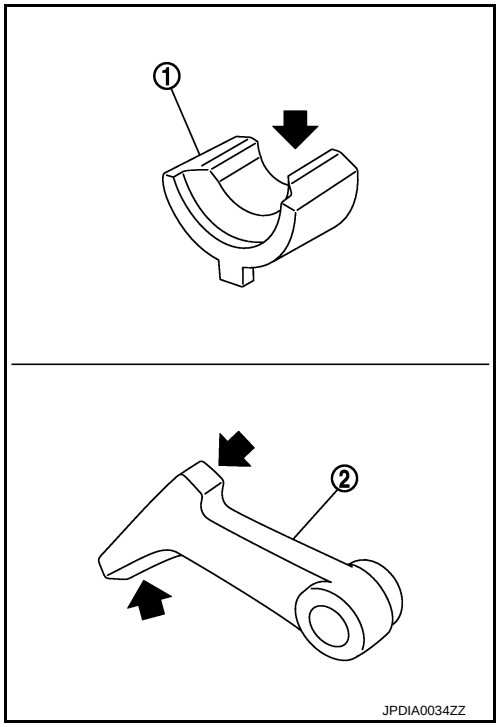
- Fill with ATF after installation. Refer to TM-205, "Changing".

2WD : Inspection and Adjustment

INFOID:0000000009236102

INSPECTION AFTER REMOVAL

If the contact surface on parking actuator support ①, parking pawl ② and etc. has excessive wear, abrasion, bend, or any other damage, replace the components.



JPDIA0034ZZ

INSPECTION AFTER INSTALLATION

- Start the engine and check visually that there is no leakage of ATF.
- Check A/T position after adjusting A/T position. Refer to TM-105, "Inspection and Adjustment".

ADJUSTMENT AFTER INSTALLATION

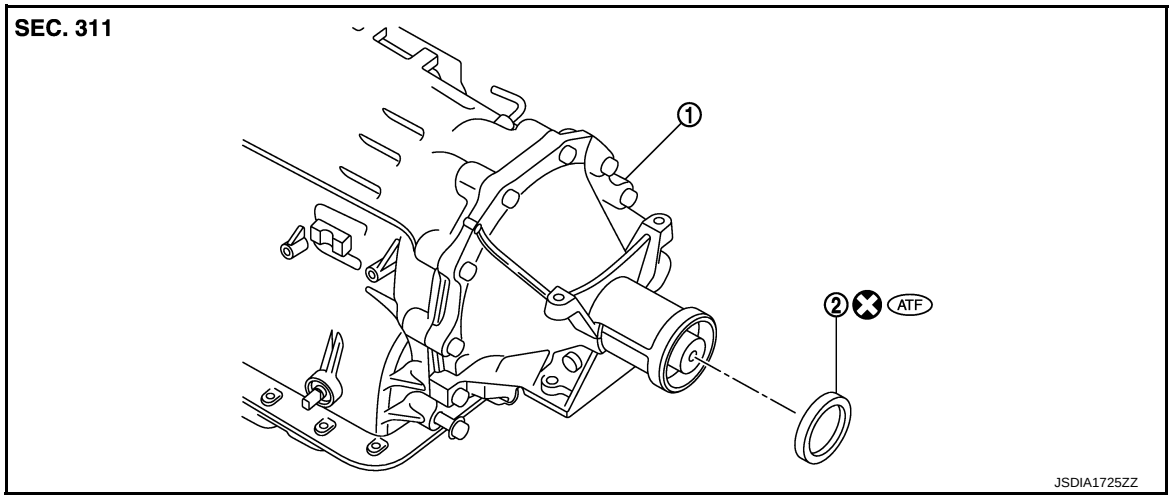
Adjust A/T position. Refer to TM-105, "Inspection and Adjustment".

REAR OIL SEAL

2WD

2WD : Exploded View

INFOID:0000000009236103



① Transmission assembly ② Rear oil seal

⊗ : Always replace after every disassembly.

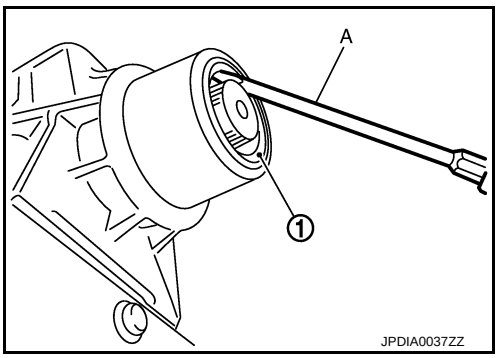
ATF : Apply ATF

2WD : Removal and Installation

INFOID:0000000009236104

REMOVAL

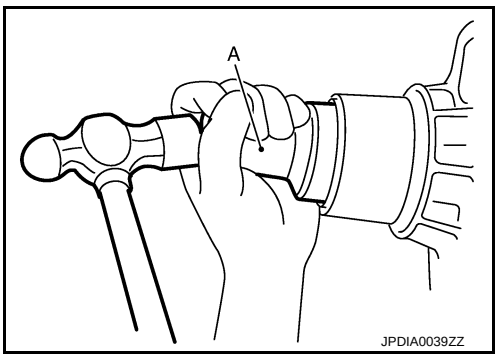
1. Separate propeller shaft assembly. Refer to DLN-98, "Removal and Installation".
2. Remove rear oil seal ① using a flat-bladed screwdriver (A).
   CAUTION:
   Be careful not to scratch rear extension assembly.



INSTALLATION

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

- As shown in the figure, use the drift [SST: ST33400001 (J-26082)] (A) to drive rear oil seal into rear extension assembly until it is flush.
  CAUTION:
  - **Never reuse rear oil seal.**
  - **Apply ATF to rear oil seal.**



2WD : Inspection

INFOID:0000000009236105

INSPECTION AFTER INSTALLATION

Drive the vehicle and check visually that there is no leakage of ATF.

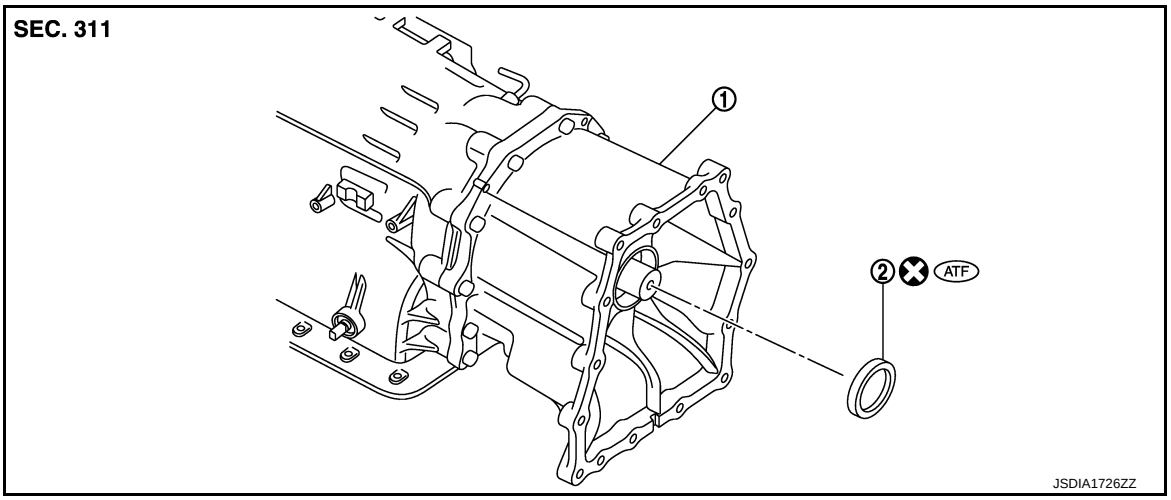
ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to TM-207, "Adjustment".

AWD

AWD : Exploded View

INFOID:0000000009236106



① Transmission assembly ② Rear oil seal

⊗ : Always replace after every disassembly.

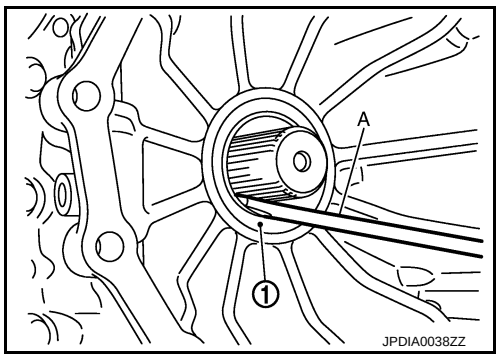
ATF : Apply ATF

AWD : Removal and Installation

INFOID:0000000009236107

REMOVAL

1. Remove transfer assembly from transmission assembly. Refer to DLN-62, "Removal and Installation".
2. Remove rear oil seal ① using a flat-bladed screwdriver (A).
   CAUTION:
   Be careful not to scratch adapter case assembly.



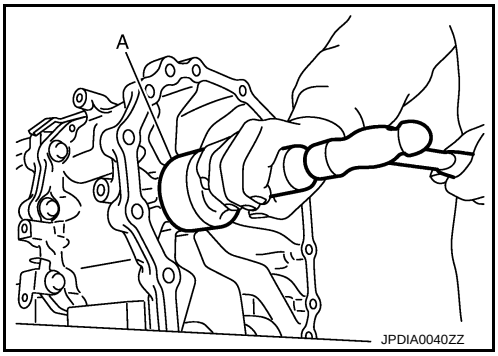
INSTALLATION

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

- As shown in the figure, use the drift [64 mm (2.52 in) dia. commercial service tool] (A) to drive rear oil seal into adapter case assembly until it is flush.

CAUTION:

- **Never reuse rear oil seal.**
- **Apply ATF to rear oil seal.**



AWD : Inspection

INFOID:0000000009236108

INSPECTION AFTER INSTALLATION

Drive the vehicle and check visually that there is no leakage of ATF.

ADJUSTMENT AFTER INSTALLATION

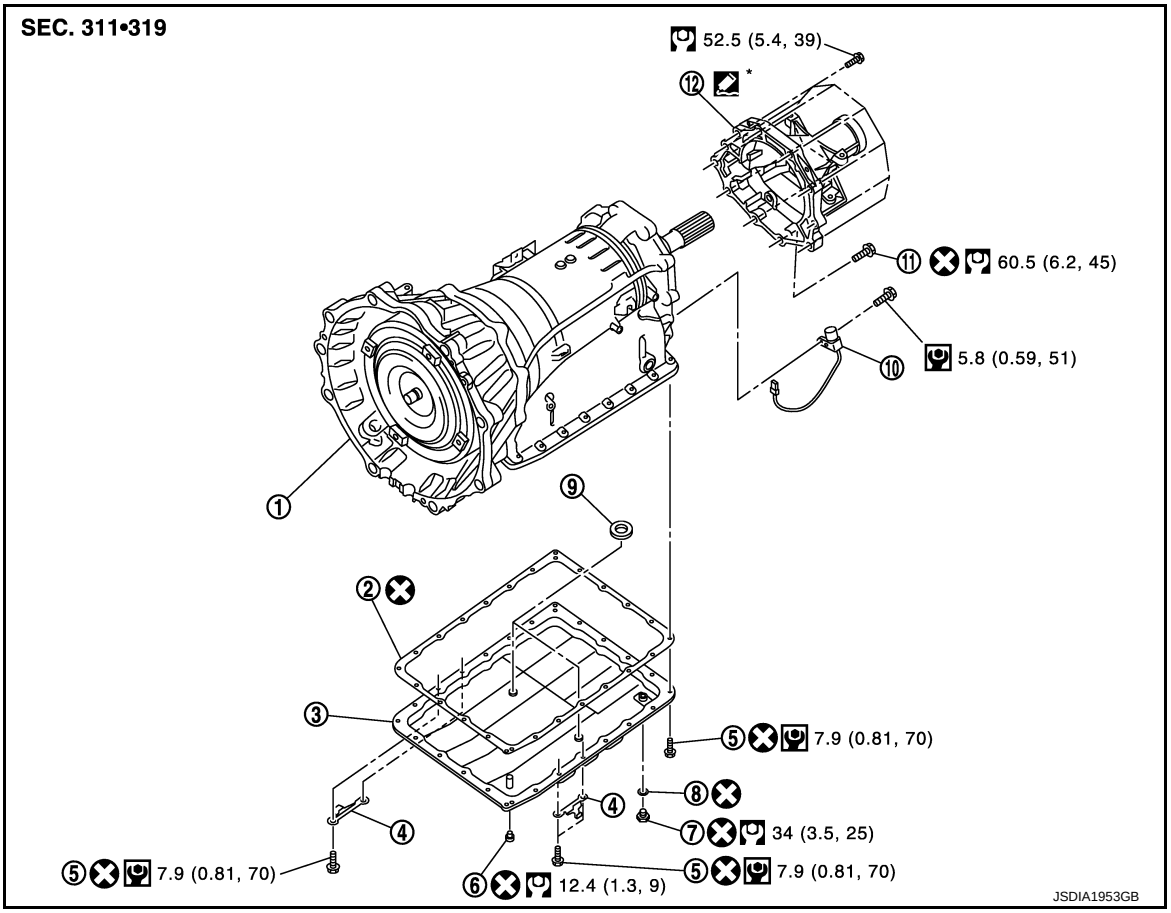
Adjust A/T fluid level. Refer to TM-207, "Adjustment".

OUTPUT SPEED SENSOR

2WD

2WD : Exploded View

INFOID:0000000009236109



① Transmission assembly	② Oil pan gasket	③ Oil pan
④ Overflow plug	⑤ Drain plug	⑥ Drain plug gasket
⑦ Oil pan mounting bolt	⑧ Magnet	⑨ Output speed sensor
⑩ Rear extension	⑪ Self-sealing bolt	

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

Ⓟ: Apply petroleum jelly

*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".

2WD : Removal and Installation

INFOID:0000000009236110

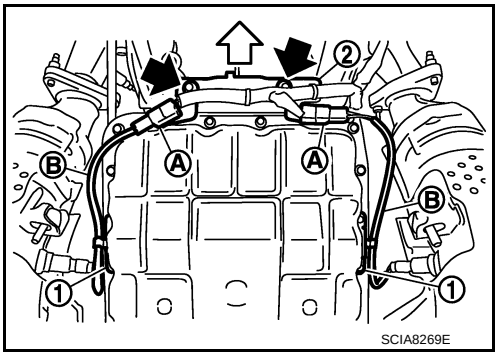
REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove rear engine cover. Refer to EXT-35, "FLOOR UNDER COVER : Removal and Installation".
3. Drain ATF through drain plug.
4. Remove exhaust front tube and center muffler with power tool. Refer to EX-5, "Exploded View".
5. Separate propeller shaft assembly. Refer to DLN-98, "Removal and Installation".
6. Remove control rod. Refer to TM-215, "Removal and Installation".
7. Remove exhaust mounting bracket. Refer to EX-5, "Exploded View".

8. Disconnect heated oxygen sensor 2 connectors Ⓐ.

⇦ : Vehicle front

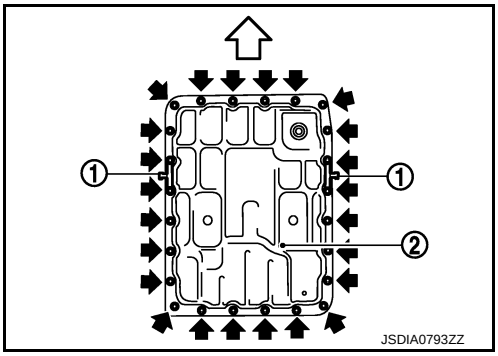
⬅ : Bolt



9. Remove heated oxygen sensor 2 harness Ⓑ from clips ①.
10. Remove bracket ② from transmission assembly. Refer to TM-242, "2WD : Exploded View".
11. Remove clips ①.

⇦ : Vehicle front

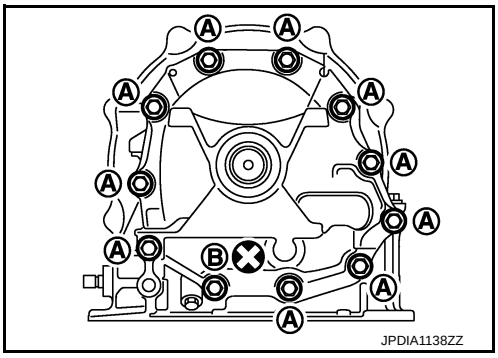
⬅ : Oil pan mounting bolt



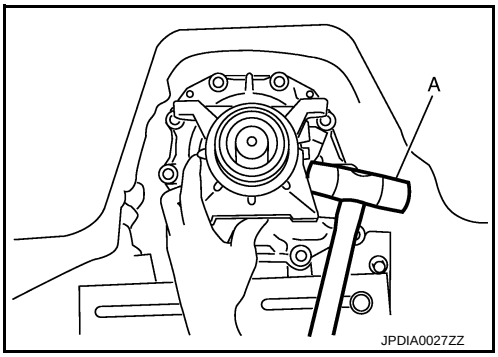
12. Remove oil pan ② and oil pan gasket.
13. Support transmission assembly with a transmission jack.
CAUTION:
When setting transmission jack, place wooden blocks to prevent from damaging control valve & TCM and transmission case.
14. Remove rear engine mounting member with power tool. Refer to EM-76, "2WD : Exploded View".
15. Remove engine mounting insulator (rear). Refer to EM-76, "2WD : Exploded View".
16. Remove tightening bolts for rear extension assembly and transmission case.

Ⓐ : Bolt

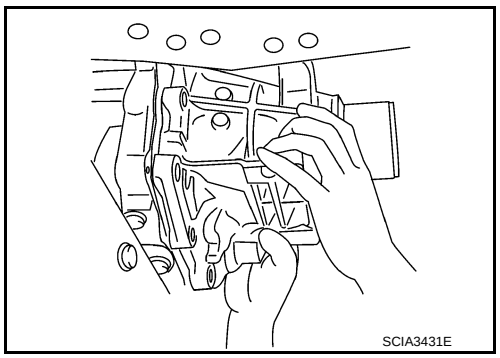
Ⓑ : Self-sealing bolt



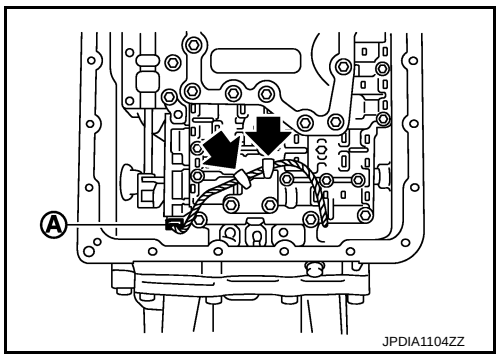
17. Tap rear extension assembly with a soft hammer (A).
CAUTION:
Be careful not to damage adapter case.



18. Remove rear extension assembly (with needle bearing) from transmission case.



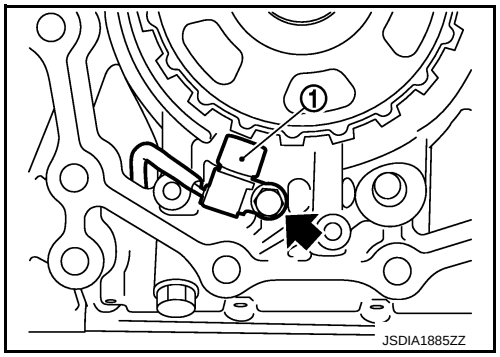
19. Disconnect output speed sensor connector Ⓐ.
CAUTION:
Be careful not to damage connector
20. Disengage terminal clips (⬅).



21. Remove output speed sensor ① from transmission case.

⬅ : Bolt

CAUTION:
- **Never subject it to impact by dropping or hitting it.**
- **Never disassemble.**
- **Never allow metal filings, etc. to get on the sensor's front edge magnetic area.**
- **Never place in an area affected by magnetism.**



INSTALLATION

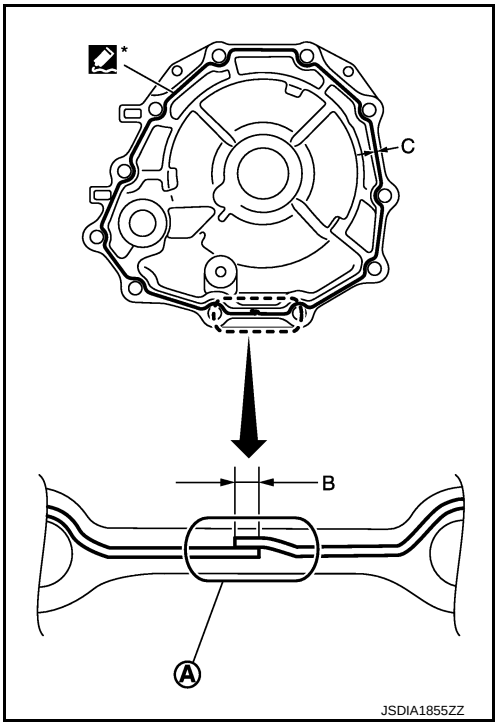
Note the following, and install in the reverse order removal.

CAUTION:
- **Insert the tip of parking rod between the parking pole and the parking actuator support when assembling the rear extension assembly.**
- **Never reuse drain plug gasket.**
- Refer to the followings when installing output speed sensor.
  CAUTION:
  - **Never subject it to impact by dropping or hitting it.**
  - **Never disassemble.**
  - **Never allow metal filings, etc. to get on the sensor's front edge magnetic area.**
  - **Never place in an area affected by magnetism.**
- Refer to the followings when installing rear extension assembly.

- Apply recommended sealant to rear extension assembly as shown in the figure.

: Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".

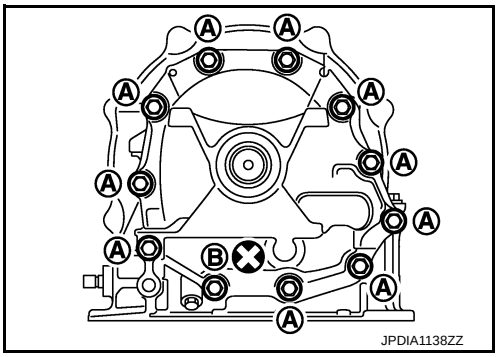
Sealant starting point and end-point Ⓐ	**: Start and finish point shall be in the center of two bolts.**
Overlap width of sealant starting point and end-point (B)	**: 3 – 5 mm (0.12 – 0.20 in)**
Sealant width (C)	**: 1.0 – 2.0 mm (0.04 – 0.08 in)**
Sealant height (C)	**: 0.4 – 1.0 mm (0.016 – 0.04 in)**



CAUTION:
Completely remove all moisture, oil and old sealant, etc. from transmission case and rear extension assembly mounting surfaces.

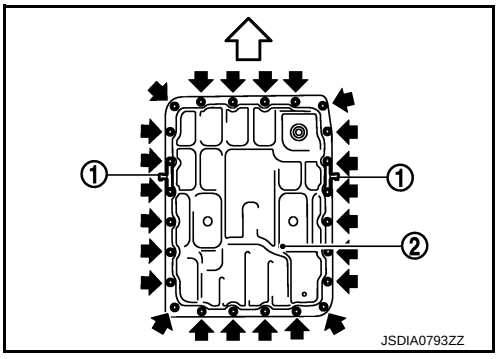
- Tighten rear extension assembly bolts to the specified torque.

Ⓐ : Bolt
Ⓑ : Self-sealing bolt



- Refer to the followings when installing oil pan ② (with oil pan gasket) and clips ① to transmission case.

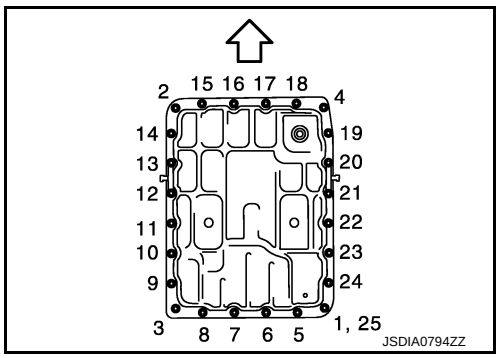
⇦ : Vehicle front
⬅ : Oil pan mounting bolt



CAUTION:
- **Never reuse oil pan gasket and oil pan mounting bolts.**
- **Install oil pan gasket in the direction to align hole position.**
- **Install it so that drain plug comes to the position as shown in the figure.**
- **Be careful not to pinch harnesses.**
- **Completely remove all moisture, oil and old gasket, etc. from oil pan mounting surface.**

- Tighten oil pan mounting bolts to the specified torque in numerical order shown in the figure after temporarily tightening them. Tighten necessary oil pan mounting bolts with specified torque.

⇦ : Vehicle front



- Fill with ATF after installation. Refer to TM-205, "Changing".

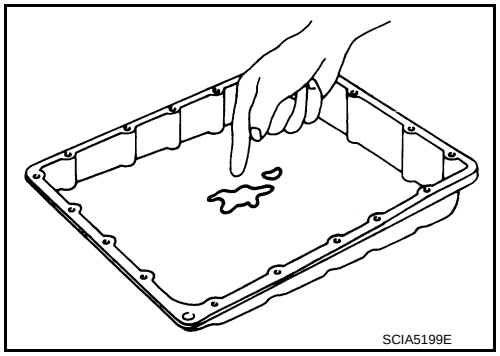
2WD : Inspection

INFOID:0000000009236111

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.

- **If frictional material is detected, perform A/T fluid cooler cleaning. Refer to TM-101, "Cleaning".**



INSPECTION AFTER INSTALLATION

- Start the engine and check visually that there is no leakage of ATF.
- Check A/T position after adjusting A/T position. Refer to TM-105, "Inspection and Adjustment".

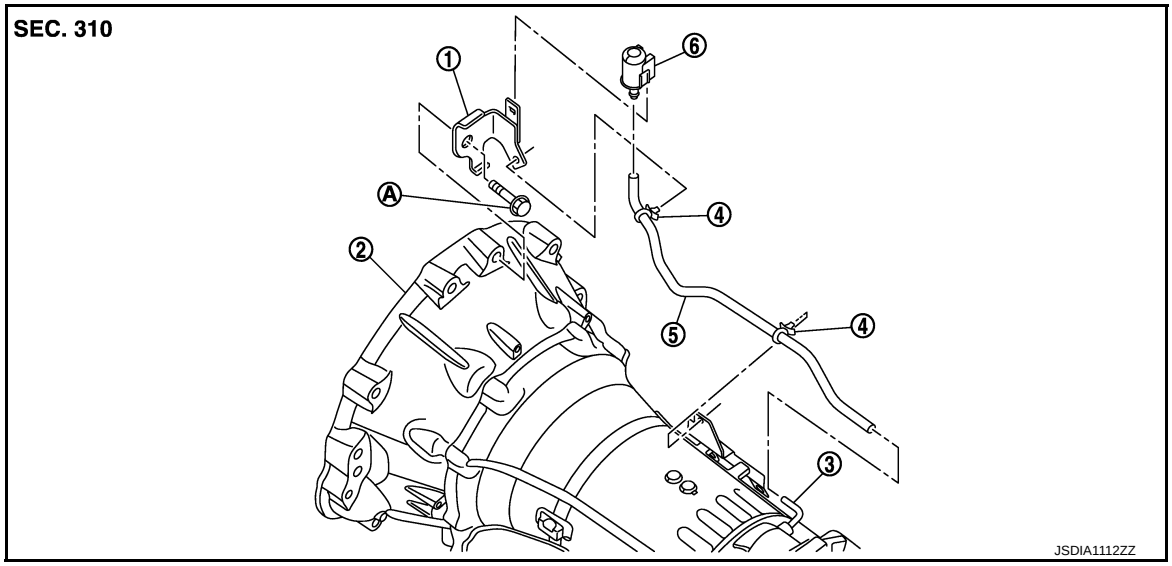
ADJUSTMENT AFTER INSTALLATION

- Adjust A/T position. Refer to TM-105, "Inspection and Adjustment".
- Adjust A/T fluid level. Refer to TM-207, "Adjustment".

AIR BREATHER

Exploded View

INFOID:0000000009236112



① Bracket	② Transmission assembly	③ Air breather tube
④ Clip	⑤ Air breather hose	⑥ Air breather box

Ⓐ Tightening must be done following the installation procedure. Refer to TM-242, "2WD : Removal and Installation" (2WD), TM-246, "AWD : Removal and Installation" (AWD).

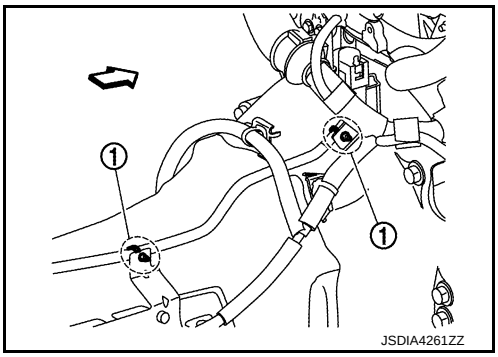
Removal and Installation

INFOID:0000000009236113

REMOVAL

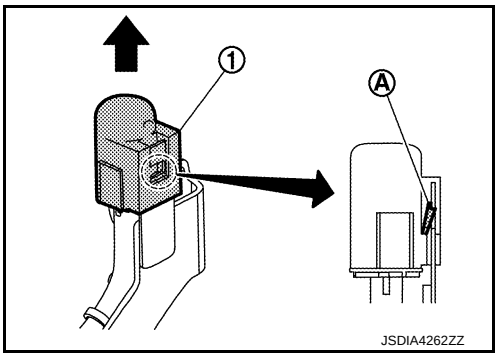
1. Remove exhaust mounting bracket and three way catalyst (bank 1). Refer to EX-5, "Exploded View".
2. Remove propeller shaft assembly (front). Refer to DLN-88, "Removal and Installation". (AWD models)
3. Remove clips ① from brackets.

⇦ : Vehicle front



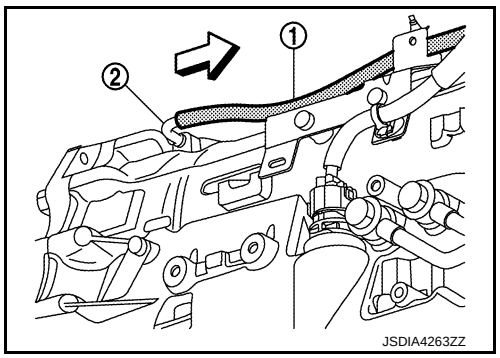
4. Remove air breather box ① from bracket with suitable tool.

Ⓐ : Pawl



5. Remove air breather hose ① from air breather tube ②.

⇦ : Vehicle front

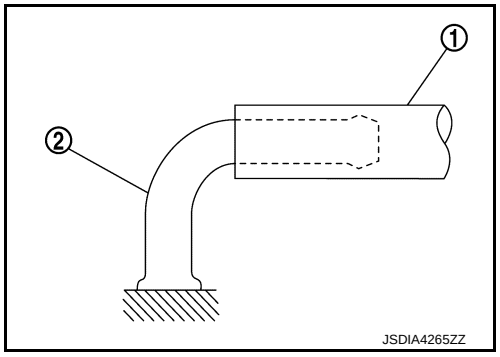


INSTALLATION

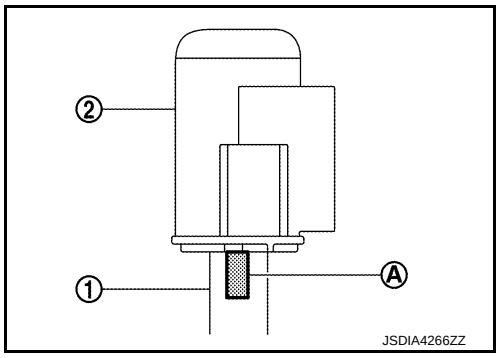
Note the followings and install in the reverse order of removal.

CAUTION:

- **Never bend the air breather hose to prevent damage to the hose.**
- Insert air breather hose ① to air breather tube ② all the way to the curve of the tube.

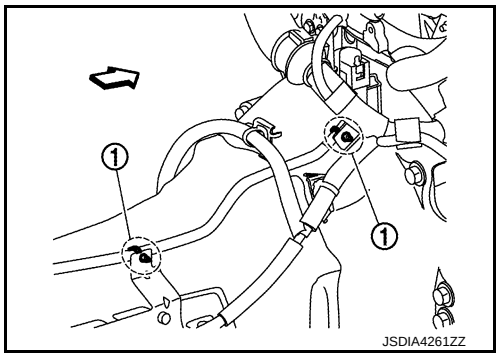


- Install air breather hose ① to air breather box ② so that the paint mark Ⓐ is facing backward.



- Securely install the clips ① to the brackets.

⇦ : Vehicle front



Inspection

INFOID:0000000009354541

INSPECTION AFTER REMOVAL

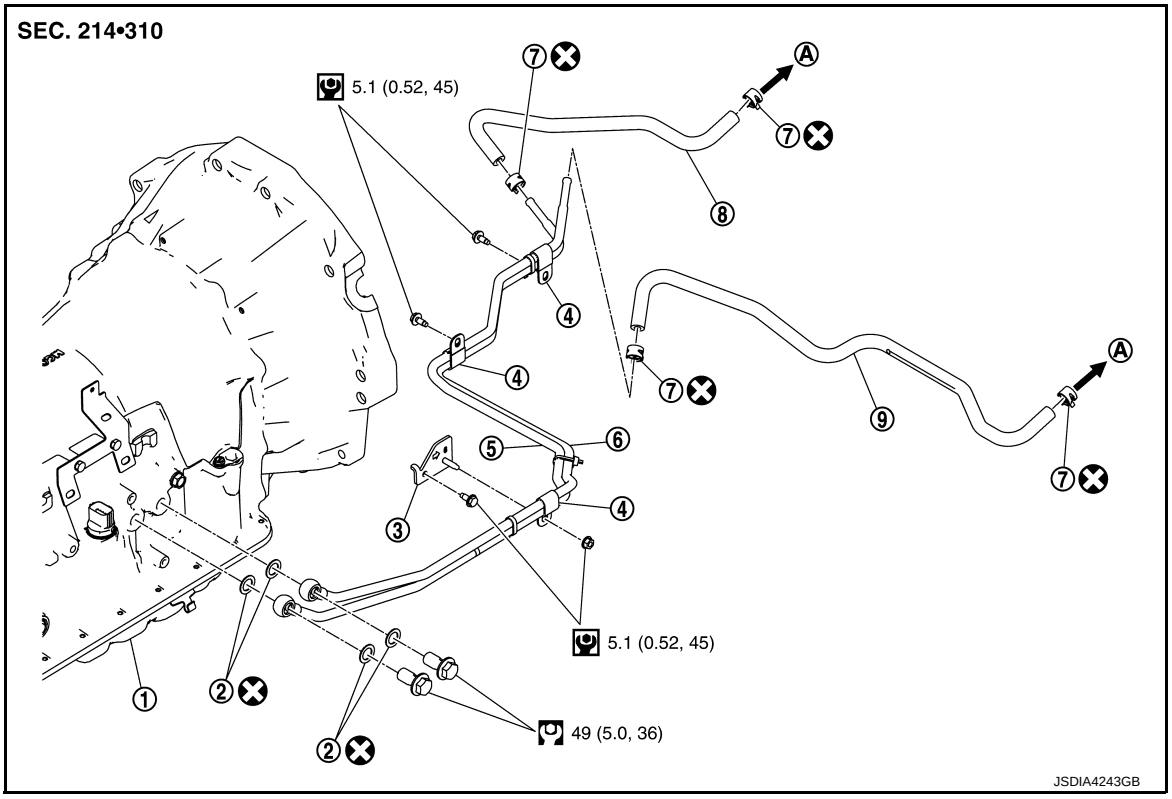
Check for damage of breather hose and breather box.

FLUID COOLER SYSTEM

Exploded View

INFOID:0000000009236120

2WD Models (Vehicle Speed Sensitive P/S)



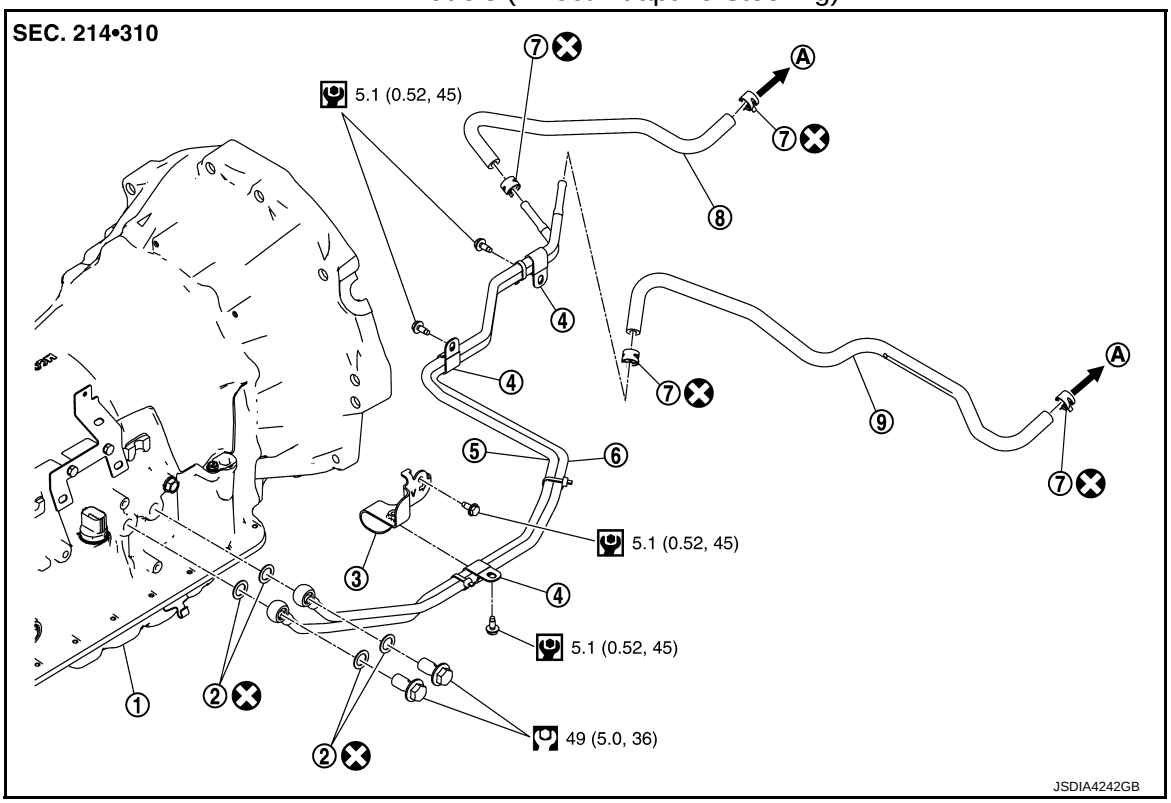
① Transmission assembly	② Copper washer	③ Bracket
④ Clip	⑤ Fluid cooler tube	⑥ Fluid cooler tube
⑦ Hose clamp	⑧ A/T fluid cooler hose B	⑨ A/T fluid cooler hose A
Ⓐ To radiator		

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

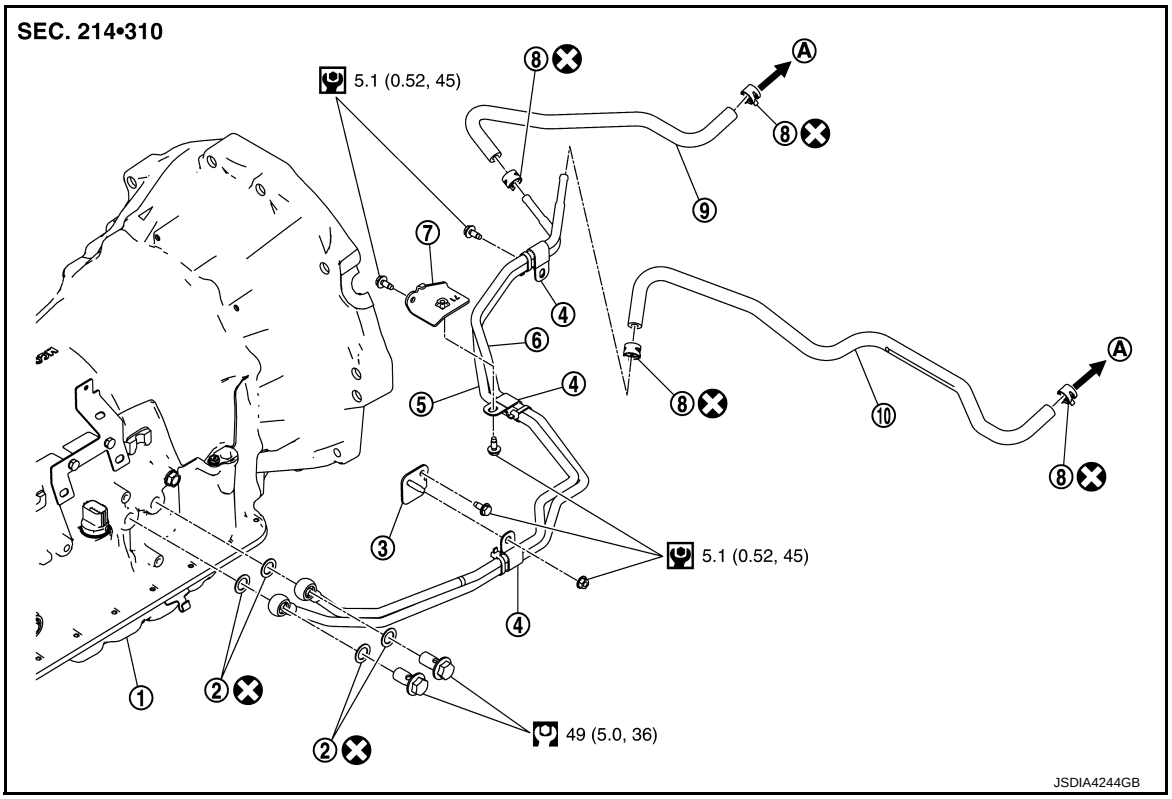
2WD Models (Direct Adaptive Steering)



① Transmission assembly
② Copper washer
③ Bracket
④ Clip
⑤ Fluid cooler tube
⑥ Fluid cooler tube
⑦ Hose clamp
⑧ Fluid cooler hose B
⑨ Fluid cooler hose A
Ⓐ To radiator

: Always replace after every disassembly.
: N·m (kg-m, ft-lb)
: N·m (kg-m, in-lb)

AWD Models



① Transmission assembly	② Copper washer	③ Bracket
④ Clip	⑤ Fluid cooler tube	⑥ Fluid cooler tube
⑦ Bracket	⑧ Hose clamp	⑨ Fluid cooler hose B
⑩ Fluid cooler hose A		
Ⓐ To radiator		

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000009236121

REMOVAL

CAUTION:

Be careful not to bend A/T fluid cooler tubes.

NOTE:

When removing the fluid cooler tube or the fluid cooler hose, cap or plug openings to prevent fluid from spilling.

INSTALLATION

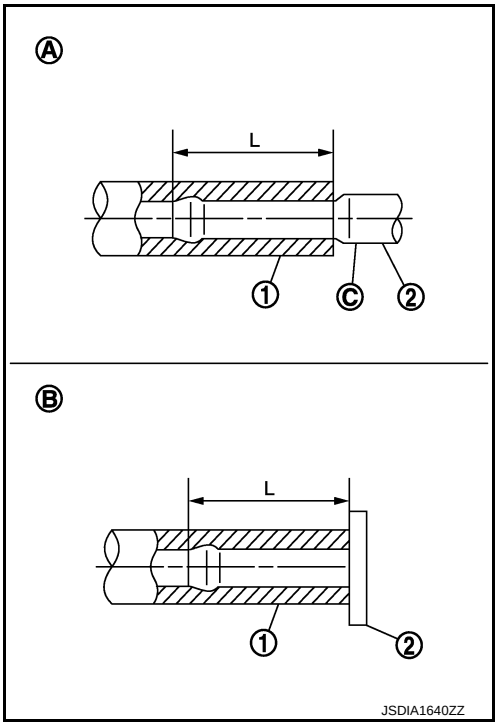
Note the followings and install in the reverse order of removal.

CAUTION:

Never reuse copper washers.

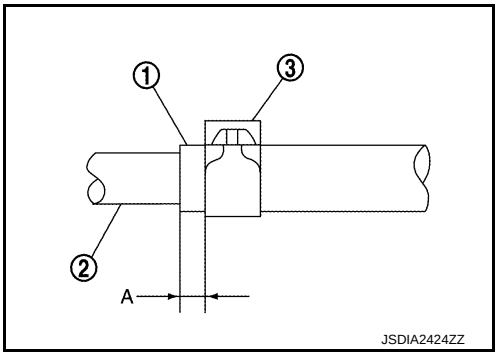
- Refer to the following when installing fluid cooler hoses.

Fluid cooler hose ①	Installation side tube ②	Direction of paint mark	Hose insertion depth (L)
Fluid cooler hose A	Fluid cooler tube	Downward	Ⓐ: Hose end reaches the 2 stage bulge Ⓒ
	Radiator assembly		Ⓑ: Insert the hose until the hose touches the radiator
Fluid cooler hose B	Fluid cooler tube		Ⓐ: Hose end reaches the 2 stage bulge Ⓒ
	Radiator assembly		Ⓑ: Insert the hose until the hose touches the radiator



- Refer to the following when installing hose clamps.
  CAUTION:
  Hose clamp should not interfere with the bulge of tube.

Fluid cooler hose ①	Installation side tube ②	Hose clamp	
		Direction of tab	Clamping position (A)
Fluid cooler hose A	Fluid cooler tube	Downward	5 – 9 mm (0.20 – 0.35 in) from hose end
	Radiator assembly		
Fluid cooler hose B	Fluid cooler tube		
	Radiator assembly		



Inspection and Adjustment

INFOID:0000000009236122

INSPECTION AFTER REMOVAL

Check for damage of fluid cooler hoses and fluid cooler tubes.

ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to TM-207, "Adjustment".

INSPECTION AFTER INSTALLATION

Start the engine and check visually that there is no leakage of ATF.

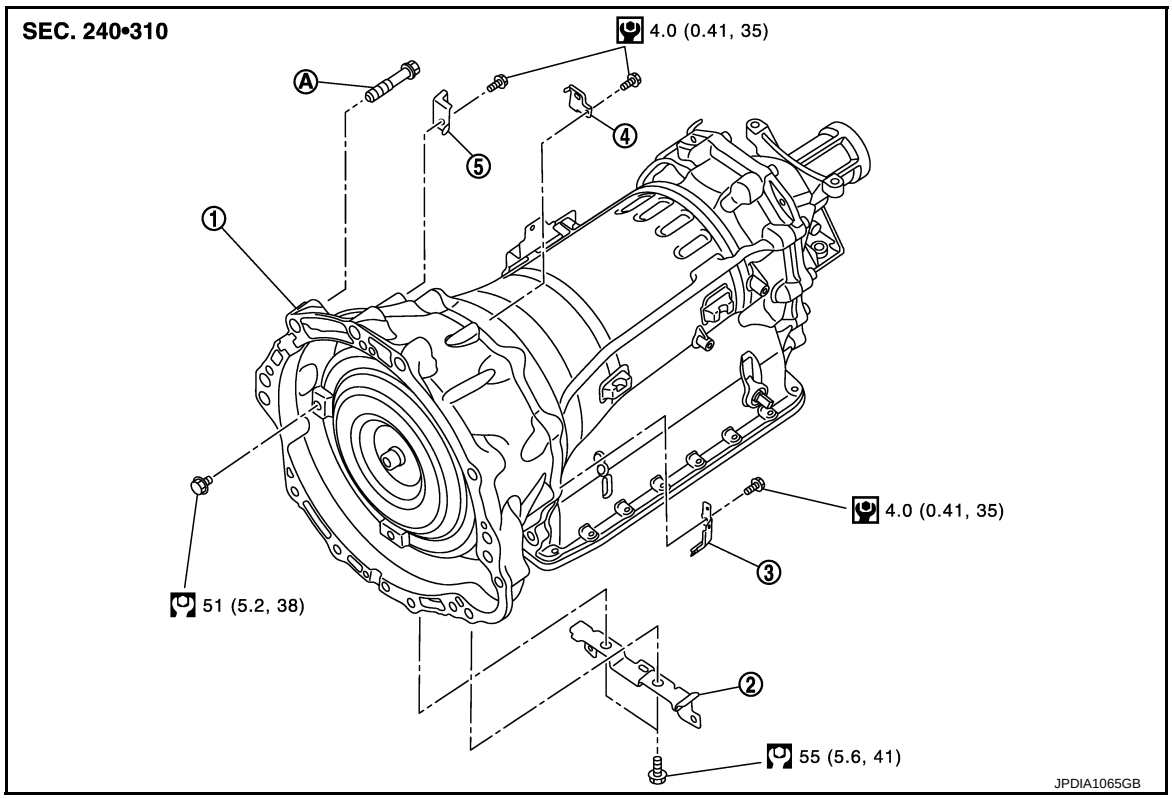
UNIT REMOVAL AND INSTALLATION

TRANSMISSION ASSEMBLY

2WD

2WD : Exploded View

INFOID:0000000009236132



①	Transmission assembly	②	Bracket	③	Bracket
④	Bracket	⑤	Bracket		

Ⓐ Tightening must be done following the installation procedure. Refer to TM-242, "2WD : Removal and Installation".

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

2WD : Removal and Installation

INFOID:0000000009236133

CAUTION:
Before replacing transmission assembly, perform "ADDITIONAL SERVICE WHEN TRANSMISSION ASSEMBLY". Refer to TM-100, "Work Procedure".

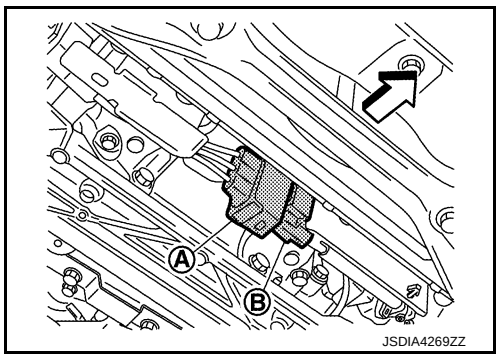
REMOVAL

CAUTION:
- **When removing the transmission assembly from engine, first remove the crankshaft position sensor (POS) from the transmission assembly.**
- **Be careful not to damage sensor edge.**

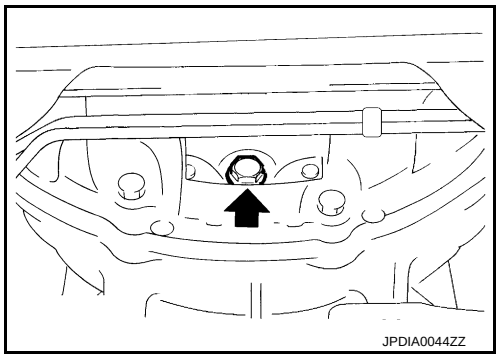
1. Shift the selector lever to "P" position and release the parking brake.
2. Disconnect the battery cable from the negative terminal.
3. Remove front under cover and front under cover rear with a power tool. Refer to EXT-32, "FRONT UNDER COVER : Exploded View".
4. Remove rear engine cover with a power tool. Refer to EXT-34, "FLOOR UNDER COVER : Exploded View".

5. Remove control rod from lower lever of A/T shift selector assembly. Refer to TM-214, "Exploded View".
6. Separate propeller shaft assembly. Refer to DLN-98, "Removal and Installation".
   NOTE:
   Cap or plug opening to prevent fluid from spilling.
7. Remove suspension member stay. Refer to FSU-21, "Exploded View".
8. Remove exhaust mounting bracket with power tool. Refer to EX-5, "Exploded View".
9. Remove three way catalyst (bank 1). Refer to EX-5, "Exploded View".
10. Remove crankshaft position sensor form cylinder block. Refer to EM-71, "Exploded View".
    CAUTION:
    - **Never subject it to impact by dropping or hitting it.**
    - **Never disassemble.**
    - **Never allow metal filings, etc. to get on the sensor's front edge magnetic area.**
    - **Never place in an area affected by magnetism.**
11. Remove starter motor from transmission housing. Refer to STR-19, "VQ37VHR : Removal and Installation (Vehicle speed sensitive P/S models)", STR-21, "VQ37VHR : Removal and Installation (Direct adaptive steering models)".
12. Disconnect steering angle main motor harness connector Ⓐ and remove steering angle main motor harness connector Ⓑ from bracket. (Direct adaptive steering models)

    ⇦ : Vehicle front



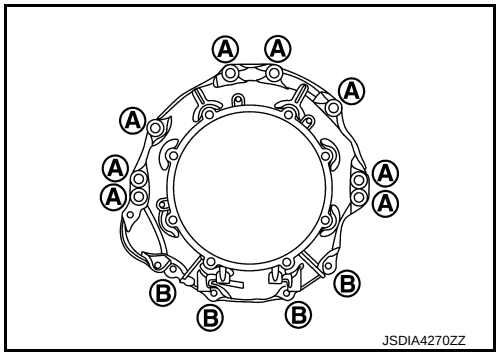
13. Remove rear plate cover. Refer to EM-46, "2WD : Exploded View".
14. Turn crankshaft, and remove the four tightening bolts (⬅) for drive plate and torque converter.
    CAUTION:
    Rotate crankshaft clockwise (as viewed from the crankshaft pulley side).



15. Remove fluid cooler tubes mounting bolts from transmission assembly and engine. Refer to TM-238, "Exploded View".
    NOTE:
    Cap or plug openings to prevent fluid from spilling.
16. Support transmission assembly with a transmission jack.
    CAUTION:
    Be careful not to allow it to collide against the drain plug and overflow plug when setting the transmission jack.
17. Remove rear engine mounting member and engine mounting insulator (rear) with a power tool. Refer to EM-76, "2WD : Exploded View".
18. Disconnect A/T assembly connector.
19. Remove harness brackets from transmission assembly.
20. Remove bolts fixing transmission assembly to engine with a power tool.

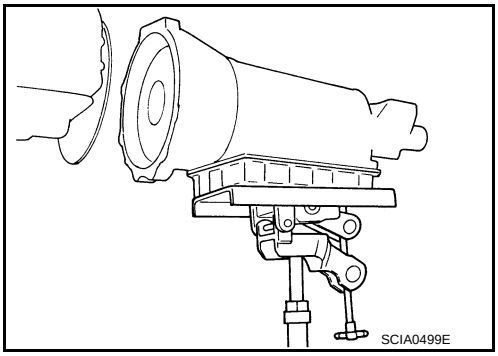
    Ⓐ : Transmission to engine

    Ⓑ : Engine to transmission



21. Remove transmission assembly from the vehicle.
CAUTION:
- **Secure torque converter to prevent it from dropping.**
- **Secure transmission assembly to a transmission jack.**
- **Never damage heated oxygen sensor 2.**

NOTE:
By placing wooden block between oil pan (upper) and front suspension member, the removal of transmission assembly from engine becomes easier.

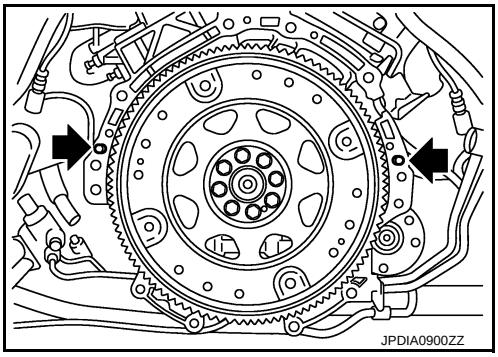


22. Remove manual lever and control rod from transmission assembly. Refer to TM-214, "Exploded View".
23. Remove air breather hose, air breather box and bracket from transmission assembly. Refer to TM-236, "Exploded View".

INSTALLATION

Note the followings and Install in the reverse order of removal.

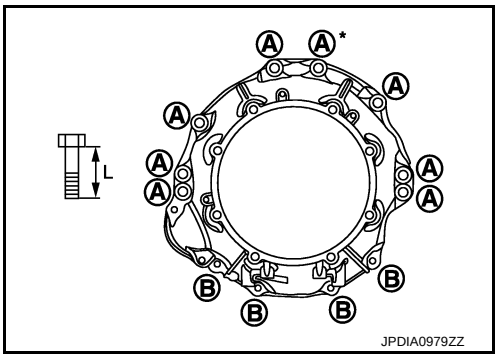
- Check fitting of dowel pin (⬅).



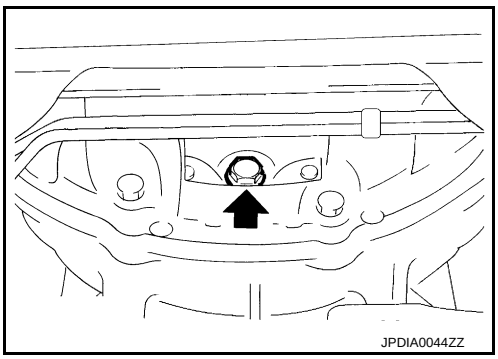
- Install the fixing bolts of A/T assembly and engine according to the following standards.

Bolt symbol	Ⓐ	Ⓑ
Insertion direction	Transmission to engine	Engine to transmission
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-236, "Exploded View".



- Align the positions of tightening bolts for drive plate with those of the torque converter, and temporarily tighten the bolts (⬅). Then, tighten the bolts with the specified torque.
CAUTION:
- **Rotate crankshaft clockwise (as viewed from the crankshaft pulley side).**
- **When tightening the tightening bolts for the torque converter after fixing the crankshaft pulley bolts, be sure to confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-54, "Removal and Installation".**
- **Rotate crankshaft several turns and check to be sure that transmission rotates freely without binding after converter is installed to drive plate.**



2WD : Inspection and Adjustment

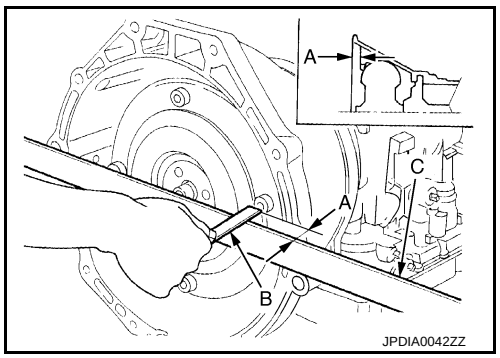
INFOID:0000000009236134

INSPECTION BEFORE INSTALLATION

Be sure to check dimension (A) to ensure it is within the reference value limit.

B : Scale
C : Straightedge

Dimension (A) : Refer to TM-336, "Torque Converter".



INSPECTION AFTER INSTALLATION

- Start the engine and check visually that there is no leakage of ATF.
- Check A/T position after adjusting A/T position. Refer to TM-105, "Inspection and Adjustment".

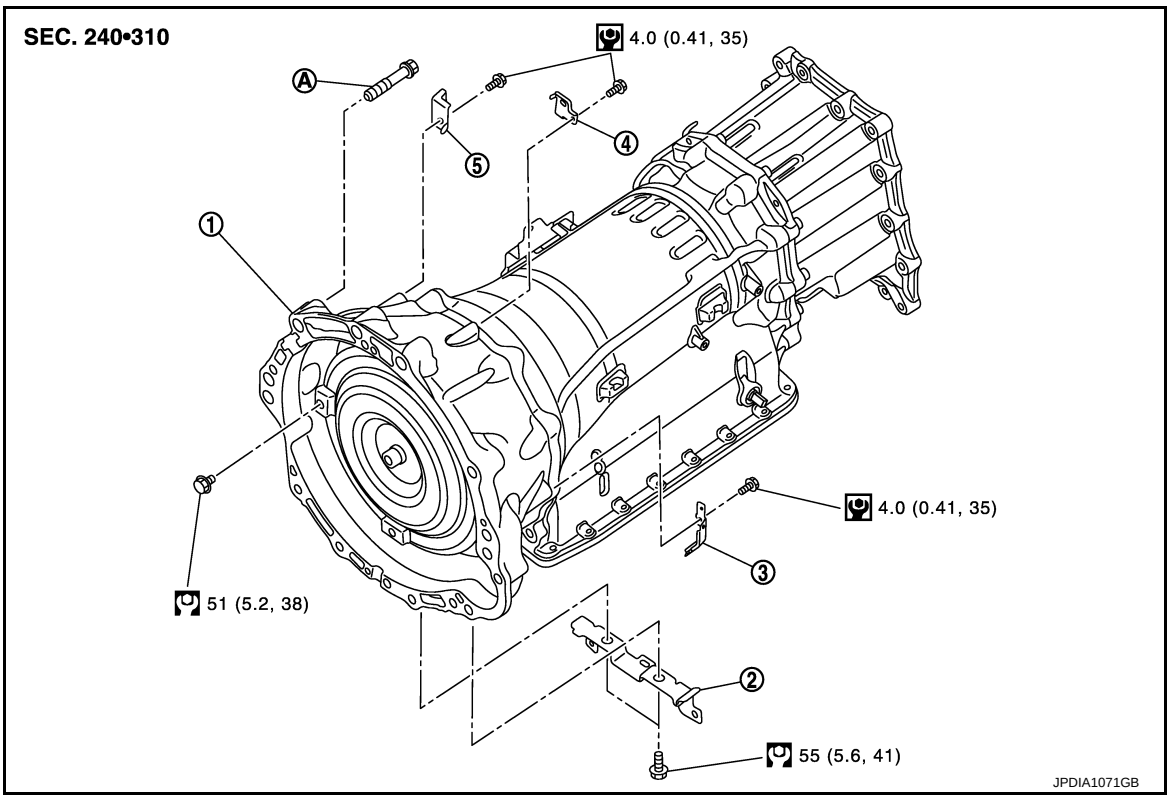
ADJUSTMENT AFTER INSTALLATION

- When replaced transmission assembly, perform “ADDITIONAL SERVICE WHEN REPLACING TRANSMISSION ASSEMBLY”. Refer to TM-100, "Work Procedure".
- Adjust A/T fluid level. Refer to TM-207, "Adjustment".
- Adjust A/T position. Refer to TM-105, "Inspection and Adjustment".

AWD

AWD : Exploded View

INFOID:0000000009236135



①	Transmission assembly	②	Bracket	③	Bracket
④	Bracket	⑤	Bracket		

Ⓐ Tightening must be done following the installation procedure. Refer to TM-246, "AWD : Removal and Installation".

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

AWD : Removal and Installation

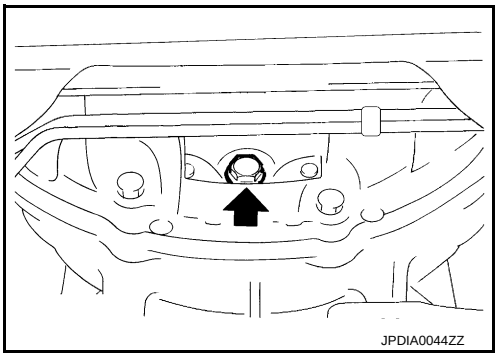
INFOID:0000000009236136

CAUTION:
Before replacing transmission assembly, perform "ADDITIONAL SERVICE WHEN TRANSMISSION ASSEMBLY". Refer to TM-100, "Work Procedure".

REMOVAL

CAUTION:
- **When removing the transmission assembly from engine, first remove the crankshaft position sensor (POS) from the transmission assembly.**
- **Be careful not to damage sensor edge.**

1. Shift the selector lever to "P" position, and release the parking brake.
2. Disconnect the battery cable from the negative terminal.
3. Remove front under cover with a power tool. Refer to EXT-32, "FRONT UNDER COVER : Exploded View".
4. Remove rear engine cover with a power tool. Refer to EXT-34, "FLOOR UNDER COVER : Exploded View".
5. Remove control rod from lower lever of A/T shift selector assembly. Refer to TM-214, "Exploded View".
6. Separate propeller shaft assembly (rear). Refer to DLN-108, "Removal and Installation".
7. Separate propeller shaft assembly (front). Refer to DLN-88, "Removal and Installation".
8. Remove crankshaft position sensor form cylinder block. Refer to EM-71, "Exploded View".
   CAUTION:
   - **Never subject it to impact by dropping or hitting it.**
   - **Never disassemble.**
   - **Never allow metal filings, etc. to get on the sensor's front edge magnetic area.**
   - **Never place in an area affected by magnetism.**
9. Remove starter motor from transmission housing. Refer to STR-19, "VQ37VHR : Removal and Installation (Vehicle speed sensitive P/S models)", STR-21, "VQ37VHR : Removal and Installation (Direct adaptive steering models)".
10. Disconnect steering angle main motor harness connector and steering angle sub motor harness connector, and remove harness clip from bracket. Refer to ST-97, "Harness Layout". (Direct adaptive steering models)
11. Remove rear plate cover. Refer to EM-47, "AWD : Exploded View".
12. Turn crankshaft, and remove the four tightening bolts (⬅) for drive plate and torque converter.
    CAUTION:
    Rotate crankshaft clockwise (as viewed from the crankshaft pulley side).

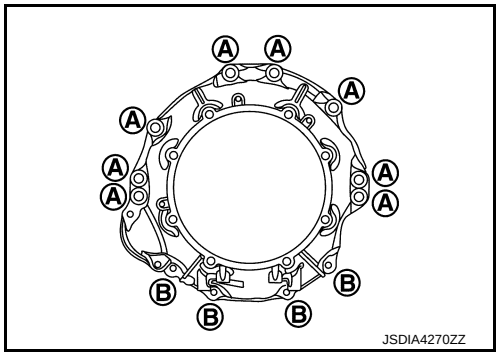


13. Remove fluid cooler tubes mounting bolts from transmission assembly and engine. Refer to TM-238, "Exploded View".
    NOTE:
    Cap or plug openings to prevent fluid from spilling.
14. Support transmission assembly with a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to allow it to collide against the drain plug and overflow plug.
15. Remove rear engine mounting member and engine mounting insulator (rear) with a power tool. Refer to EM-81, "AWD : Exploded View".
16. Disconnect A/T assembly connector and AWD solenoid connector.
17. Remove harness brackets from transmission assembly and transfer assembly.

18. Remove bolts fixing transmission assembly to engine with a power tool.

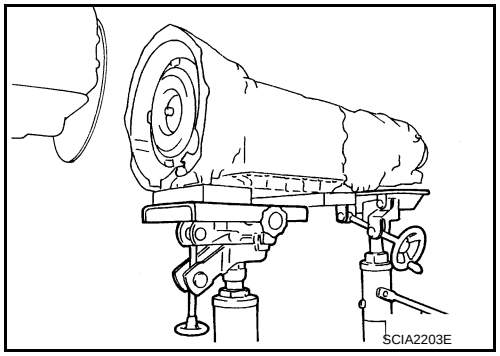
Ⓐ : Transmission to engine

Ⓑ : Engine to transmission



19. Remove transmission assembly with transfer assembly from the vehicle.
CAUTION:
- **Secure torque converter to prevent it from dropping.**
- **Secure transmission assembly to a transmission jack.**
- **Never damage heated oxygen sensor 2.**

NOTE:
By placing wooden block between oil pan (upper) and front suspension member, the removal of transmission assembly from engine becomes easier.

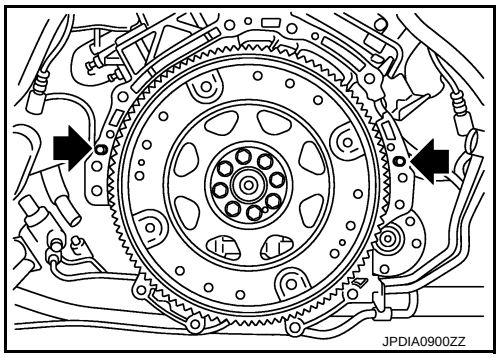


20. Remove manual lever and control rod from transmission assembly. Refer to TM-214, "Exploded View".
21. Remove air breather hoses, air breather box, and bracket. Refer to TM-236, "Exploded View" (Transmission), DLN-60, "Exploded View" (Transfer).
22. Remove transfer assembly from transmission assembly with a power tool. Refer to DLN-62, "Removal and Installation".
NOTE:
Cap or plug opening to prevent fluid from spilling.

INSTALLATION

Note the followings and install in the reverse order of removal.

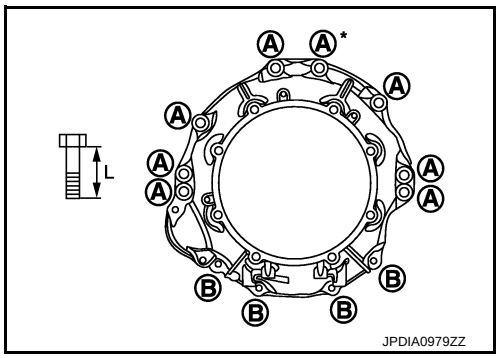
- Check fitting of dowel pin (⬅).



- Install the fixing bolts of transmission and engine according to the following standards.

Bolt symbol	Ⓐ	Ⓑ
Insertion direction	Transmission to engine	Engine to transmission
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)

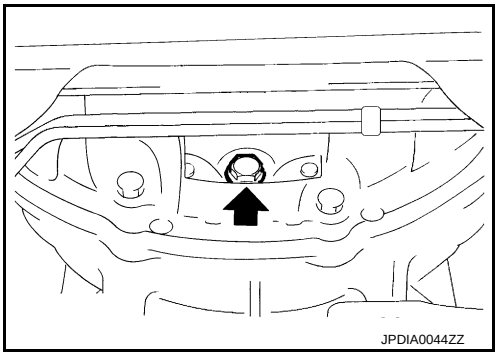
*: Tightening the bolt with bracket of air breather tube. Refer to TM-236, "Exploded View".



- Align the positions of tightening bolts for drive plate with those of the torque converter, and temporarily tighten the bolts (⬅). Then, tighten the bolts with the specified torque.

CAUTION:

- **Rotate crankshaft clockwise (as viewed from the crankshaft pulley side).**
- **When tightening the tightening bolts for the torque converter after fixing the crankshaft pulley bolts, be sure to confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-54, "Removal and Installation".**
- **Rotate crankshaft several turns and check to be sure that transmission rotates freely without binding after converter is installed to drive plate.**



AWD : Inspection and Adjustment

INFOID:0000000009236137

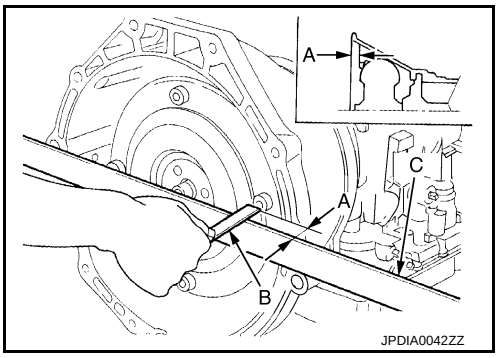
INSPECTION BEFORE INSTALLATION

Be sure to check dimension (A) to ensure it is within the reference value limit.

B : Scale

C : Straightedge

Dimension (A) : Refer to TM-336, "Torque Converter".



INSPECTION AFTER INSTALLATION

- Start the engine and check visually that there is no leakage of ATF.
- Check A/T position after adjusting A/T position. Refer to TM-105, "Inspection and Adjustment".

ADJUSTMENT AFTER INSTALLATION

- When replaced transmission assembly, perform “ADDITIONAL SERVICE WHEN REPLACING TRANSMISSION ASSEMBLY”. Refer to TM-100, "Work Procedure".
- Adjust A/T fluid level. Refer to TM-207, "Adjustment".
- Adjust A/T position. Refer to TM-105, "Inspection and Adjustment".

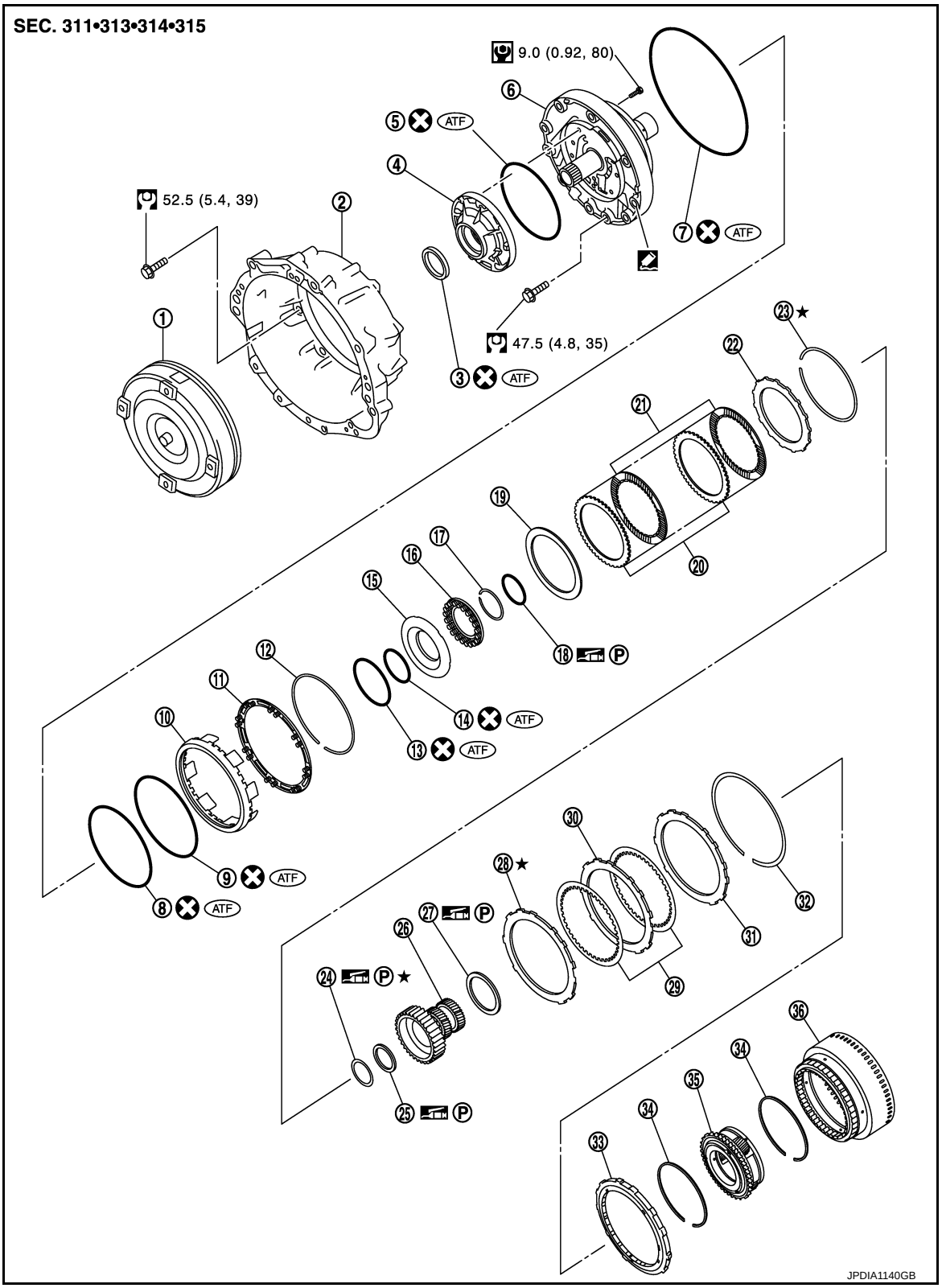
UNIT DISASSEMBLY AND ASSEMBLY

TRANSMISSION ASSEMBLY

Exploded View

INFOID:0000000009236144

2WD MODELS



① Torque converter	② Converter housing	③ Oil pump housing oil seal
④ Oil pump housing	⑤ O-ring	⑥ Oil pump cover
⑦ O-ring	⑧ D-ring	⑨ D-ring
⑩ Front brake piston	⑪ Front brake spring retainer	⑫ Snap ring
⑬ D-ring	⑭ D-ring	⑮ 2346 brake piston
⑯ 2346 brake spring retainer	⑰ Snap ring	⑱ Seal ring
⑲ 2346 brake dish plate	⑳ 2346 brake driven plate	㉑ 2346 brake drive plate
㉒ 2346 brake retaining plate	㉓ Snap ring	㉔ Bearing race
㉕ Needle bearing	㉖ Under drive sun gear	㉗ Needle bearing
㉘ Front brake retaining plate	㉙ Front brake drive plate	㉚ Front brake driven plate
㉛ Front brake retaining plate	㉜ Snap ring	㉝ 1st one-way clutch
㉞ Snap ring	㉟ Under drive carrier assembly	㊱ Front brake hub assembly

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

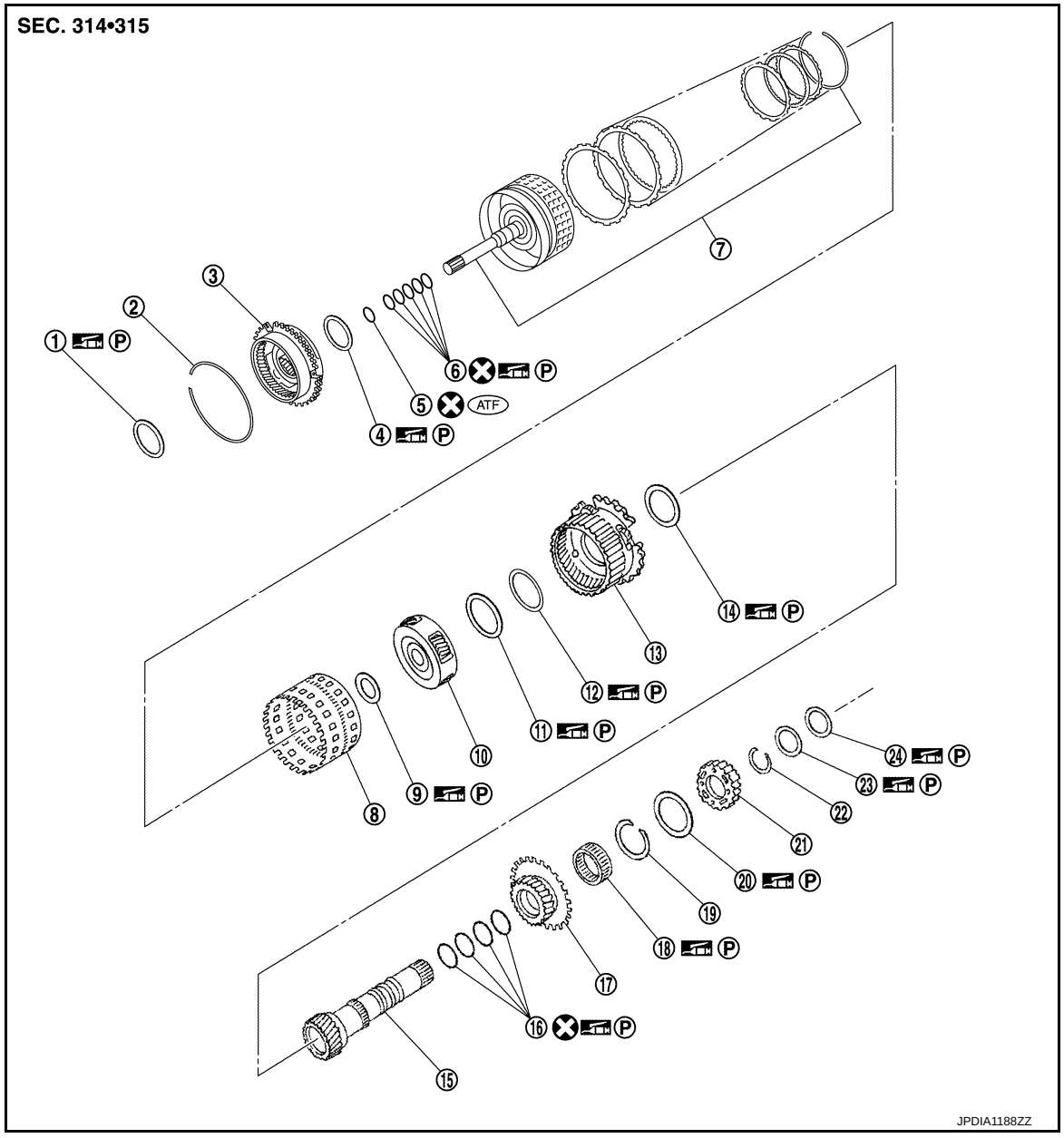
: N·m (kg-m, in-lb)

★ : Select with proper thickness.

ATF : Apply ATF.

Ⓟ : Apply petroleum jelly.

: Apply Genuine RTV silicone sealant or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".

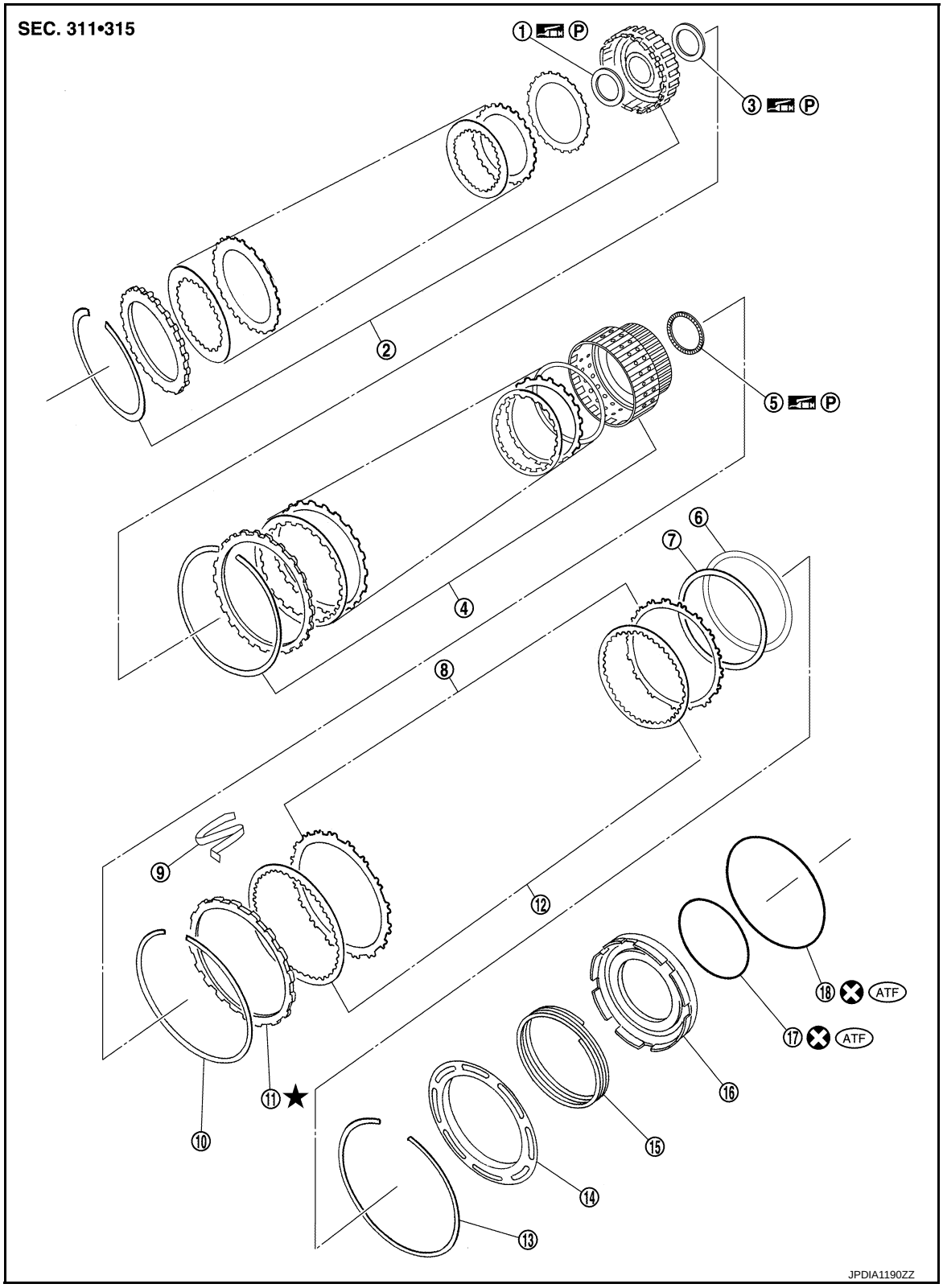


① Needle bearing	② Snap ring	③ Front carrier assembly
④ Needle bearing	⑤ O-ring	⑥ Seal ring
⑦ Input clutch assembly	⑧ Rear internal gear	⑨ Needle bearing
⑩ Mid carrier assembly	⑪ Needle bearing	⑫ Bearing race
⑬ Rear carrier assembly	⑭ Needle bearing	⑮ Mid sun gear
⑯ Seal ring	⑰ Rear sun gear	⑱ 2nd one-way clutch
⑲ Snap ring	⑳ Needle bearing	㉑ High and low reverse clutch hub
㉒ Snap ring	㉓ Bearing race	㉔ Needle bearing

⊗ : Always replace after every disassembly.

ATF : Apply ATF.

Ⓟ : Apply petroleum jelly.



① Bearing race	② High and low reverse clutch assembly	③ Needle bearing
④ Direct clutch assembly	⑤ Needle bearing	⑥ Reverse brake dish plate
⑦ Reverse brake dish plate	⑧ Reverse brake driven plate	⑨ N-spring
⑩ Snap ring	⑪ Reverse brake retaining plate	⑫ Reverse brake drive plate
⑬ Snap ring	⑭ Reverse brake spring retainer	⑮ Reverse brake return spring

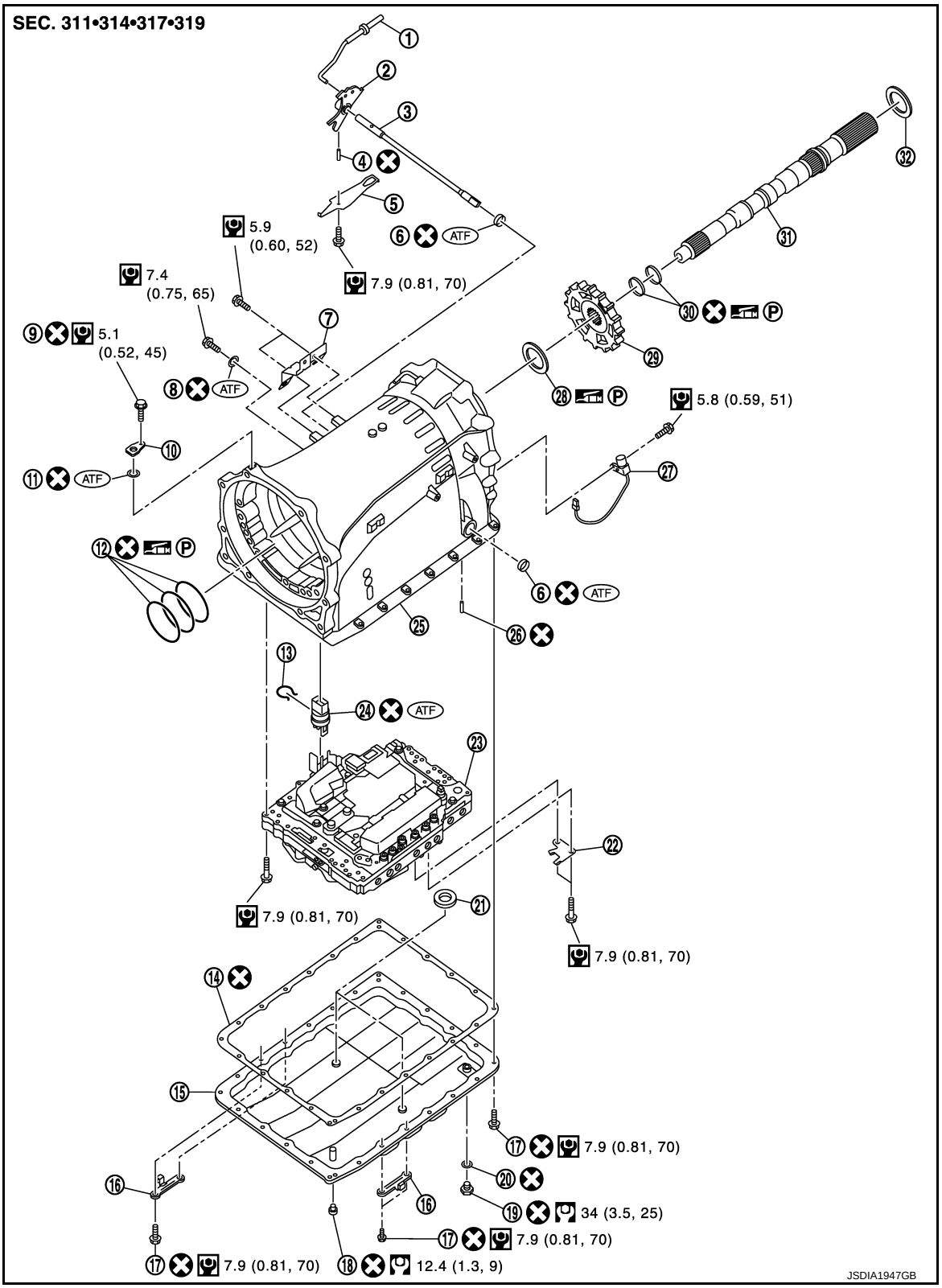
⑯ Reverse brake piston ⑰ D-ring ⑱ D-ring

⊗ : Always replace after every disassembly.

★ : Select with proper thickness.

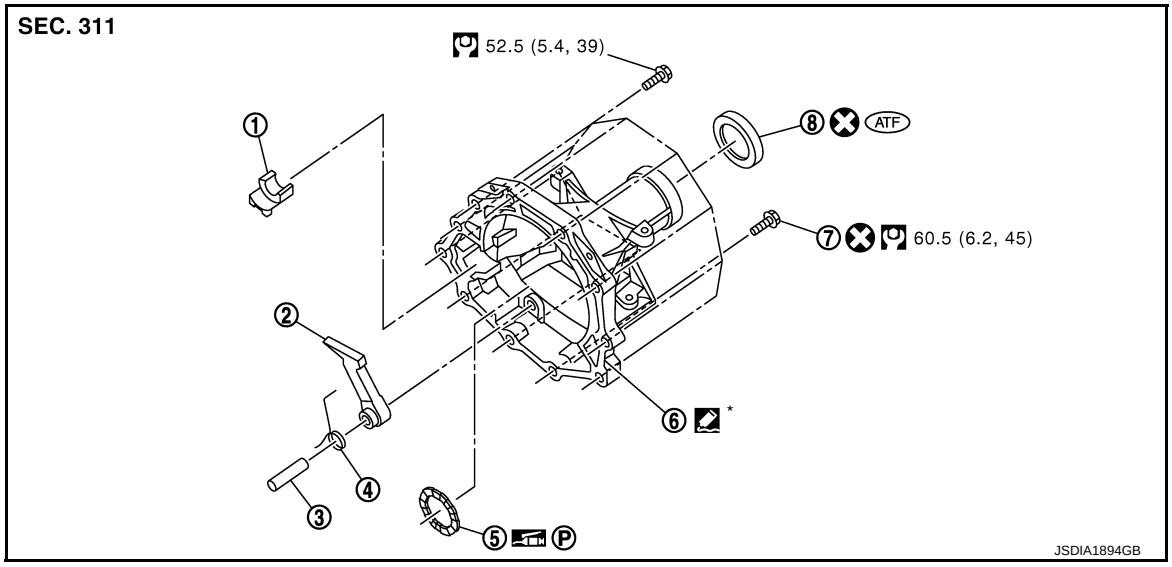
ATF : Apply ATF.

Ⓟ : Apply petroleum jelly.



① Parking rod
② Manual plate
③ Manual shaft
④ Retaining pin
⑤ Detent spring
⑥ Oil seal
⑦ Bracket
⑧ O-ring
⑨ Self-sealing bolt
⑩ Baffle plate
⑪ O-ring
⑫ Seal ring
⑬ Snap ring
⑭ Oil pan gasket
⑮ Oil pan
⑯ Clip
⑰ Oil pan mounting bolt
⑱ Overflow plug
⑲ Drain plug
⑳ Drain plug gasket
㉑ Magnet
㉒ Clip
㉓ Control valve & TCM
㉔ Joint connector
㉕ Transmission case
㉖ Retaining pin
㉗ Output speed sensor
㉘ Needle bearing
㉙ Parking gear
㉚ Seal ring
㉛ Output shaft
㉜ Bearing race

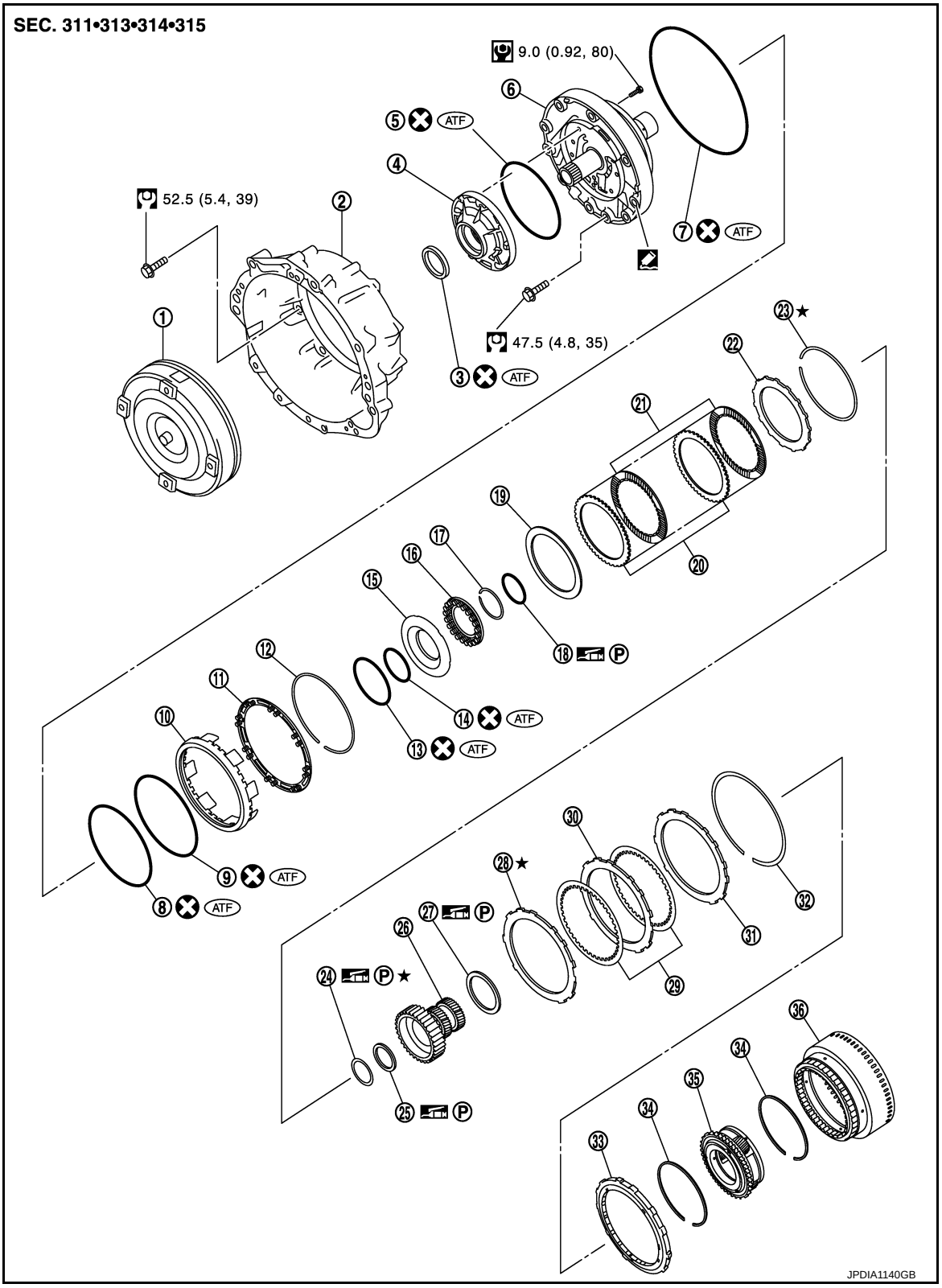
: Always replace after every disassembly.
: N·m (kg-m, ft-lb)
: N·m (kg-m, in-lb)
★ : Select with proper thickness.
ATF : Apply ATF.
Ⓟ : Apply petroleum jelly.



① Parking actuator support
② Parking pawl
③ Pawl shaft
④ Return spring
⑤ Needle bearing
⑥ Rear extension
⑦ Self-sealing bolt
⑧ Rear oil seal

: Always replace after every disassembly.
: N·m (kg-m, ft-lb)
ATF : Apply ATF.
Ⓟ : Apply petroleum jelly.
: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".
*

AWD MODELS



① Torque converter
② Converter housing
③ Oil pump housing oil seal
④ Oil pump housing
⑤ O-ring
⑥ Oil pump cover
⑦ O-ring
⑧ D-ring
⑨ D-ring
⑩ Front brake piston
⑪ Front brake spring retainer
⑫ Snap ring
⑬ D-ring
⑭ D-ring
⑮ 2346 brake piston

⑯ 2346 brake spring retainer	⑰ Snap ring	⑱ Seal ring
⑲ 2346 brake dish plate	⑳ 2346 brake driven plate	㉑ 2346 brake drive plate
㉒ 2346 brake retaining plate	㉓ Snap ring	㉔ Bearing race
㉕ Needle bearing	㉖ Under drive sun gear	㉗ Needle bearing
㉘ Front brake retaining plate	㉙ Front brake drive plate	㉚ Front brake driven plate
㉛ Front brake retaining plate	㉜ Snap ring	㉝ 1st one-way clutch
㉞ Snap ring	㉟ Under drive carrier assembly	㊱ Front brake hub assembly

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

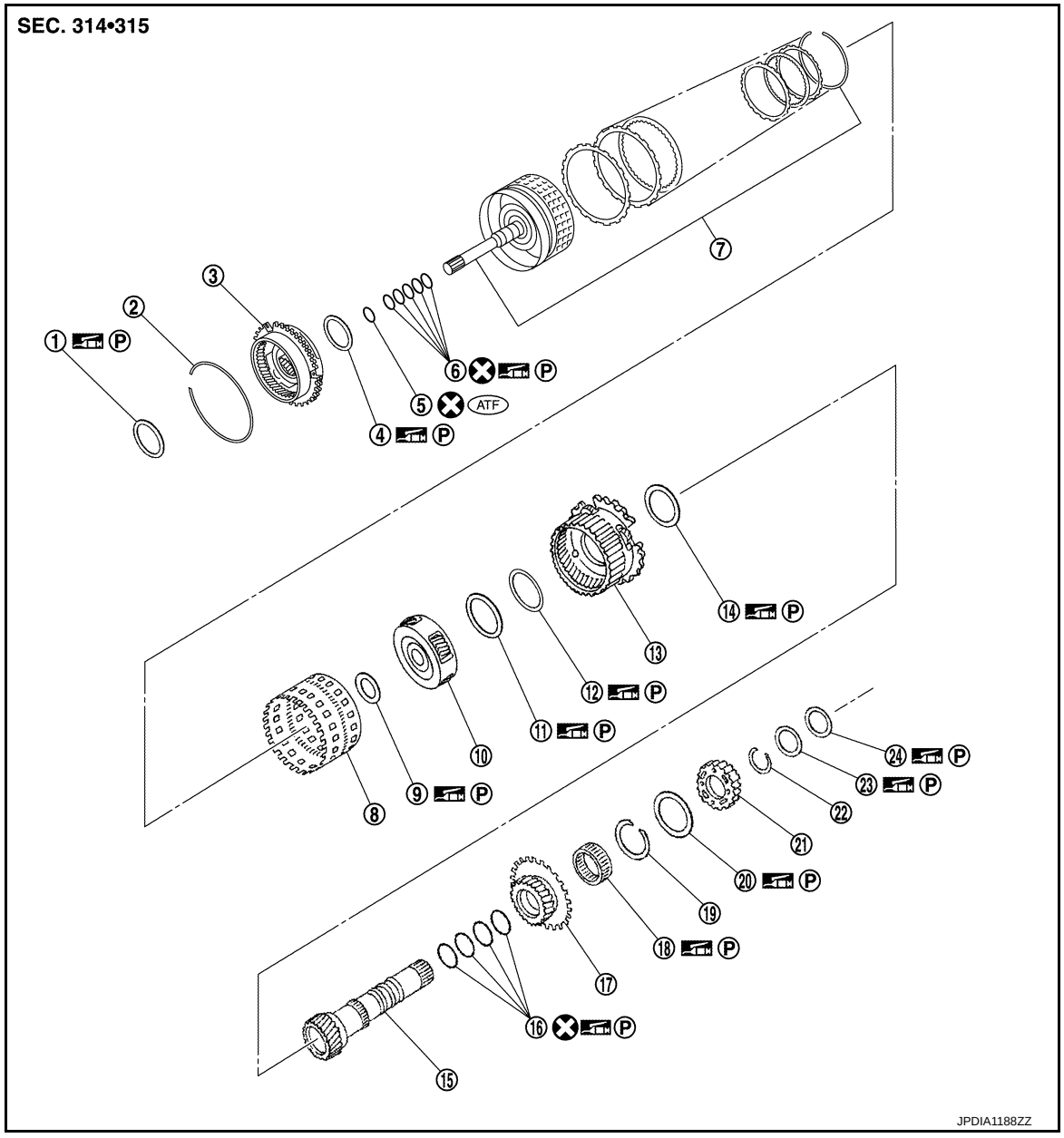
: N·m (kg-m, in-lb)

★ : Select with proper thickness.

ATF : Apply ATF.

: Apply petroleum jelly.

: Apply Genuine RTV silicone sealant or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".

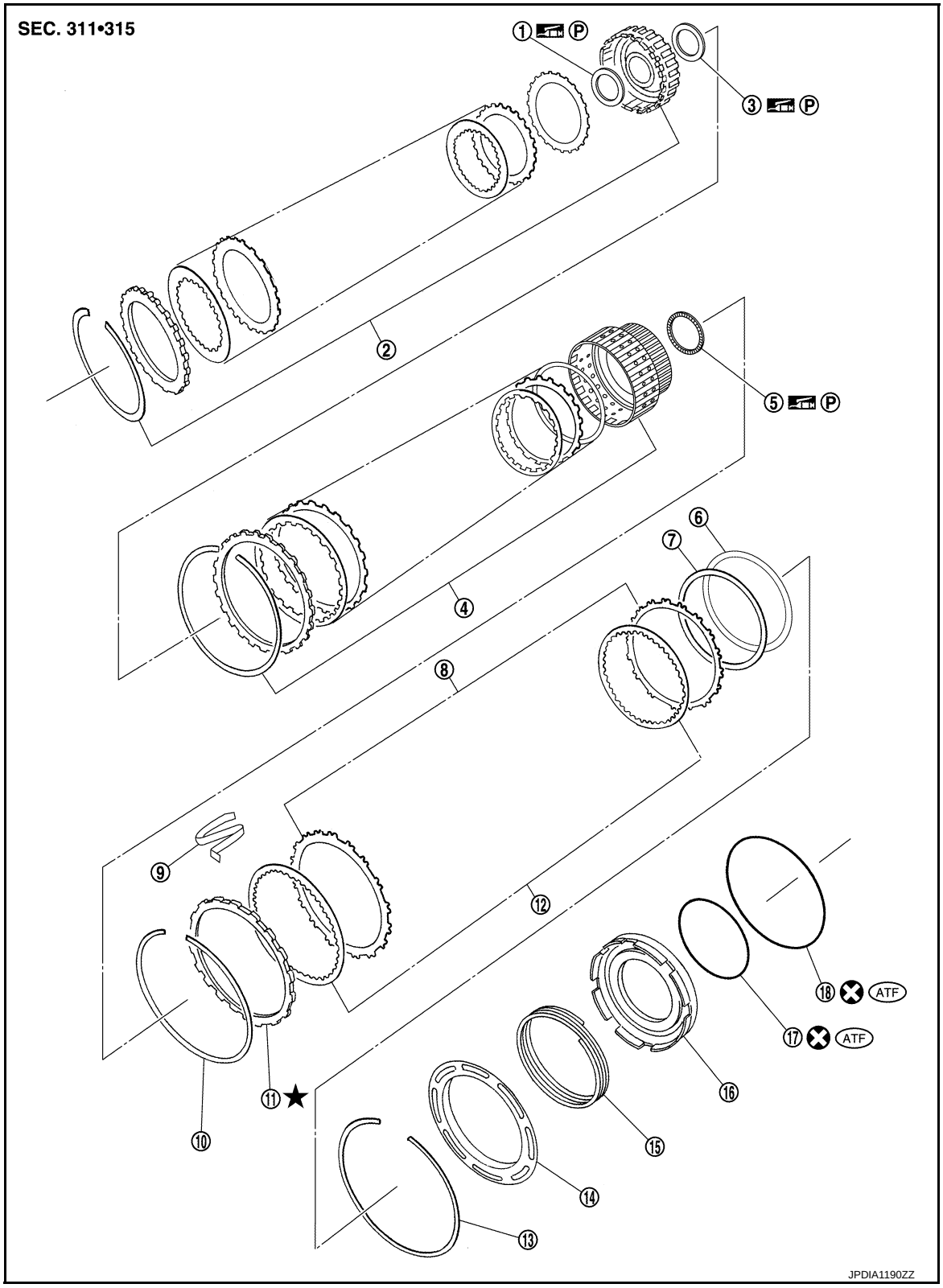


① Needle bearing	② Snap ring	③ Front carrier assembly
④ Needle bearing	⑤ O-ring	⑥ Seal ring
⑦ Input clutch assembly	⑧ Rear internal gear	⑨ Needle bearing
⑩ Mid carrier assembly	⑪ Needle bearing	⑫ Bearing race
⑬ Rear carrier assembly	⑭ Needle bearing	⑮ Mid sun gear
⑯ Seal ring	⑰ Rear sun gear	⑱ 2nd one-way clutch
⑲ Snap ring	⑳ Needle bearing	㉑ High and low reverse clutch hub
㉒ Snap ring	㉓ Bearing race	㉔ Needle bearing

⊗ : Always replace after every disassembly.

ATF : Apply ATF.

Ⓟ : Apply petroleum jelly.



① Bearing race	② High and low reverse clutch assembly	③ Needle bearing
④ Direct clutch assembly	⑤ Needle bearing	⑥ Reverse brake dish plate
⑦ Reverse brake dish plate	⑧ Reverse brake driven plate	⑨ N-spring
⑩ Snap ring	⑪ Reverse brake retaining plate	⑫ Reverse brake drive plate
⑬ Snap ring	⑭ Reverse brake spring retainer	⑮ Reverse brake return spring

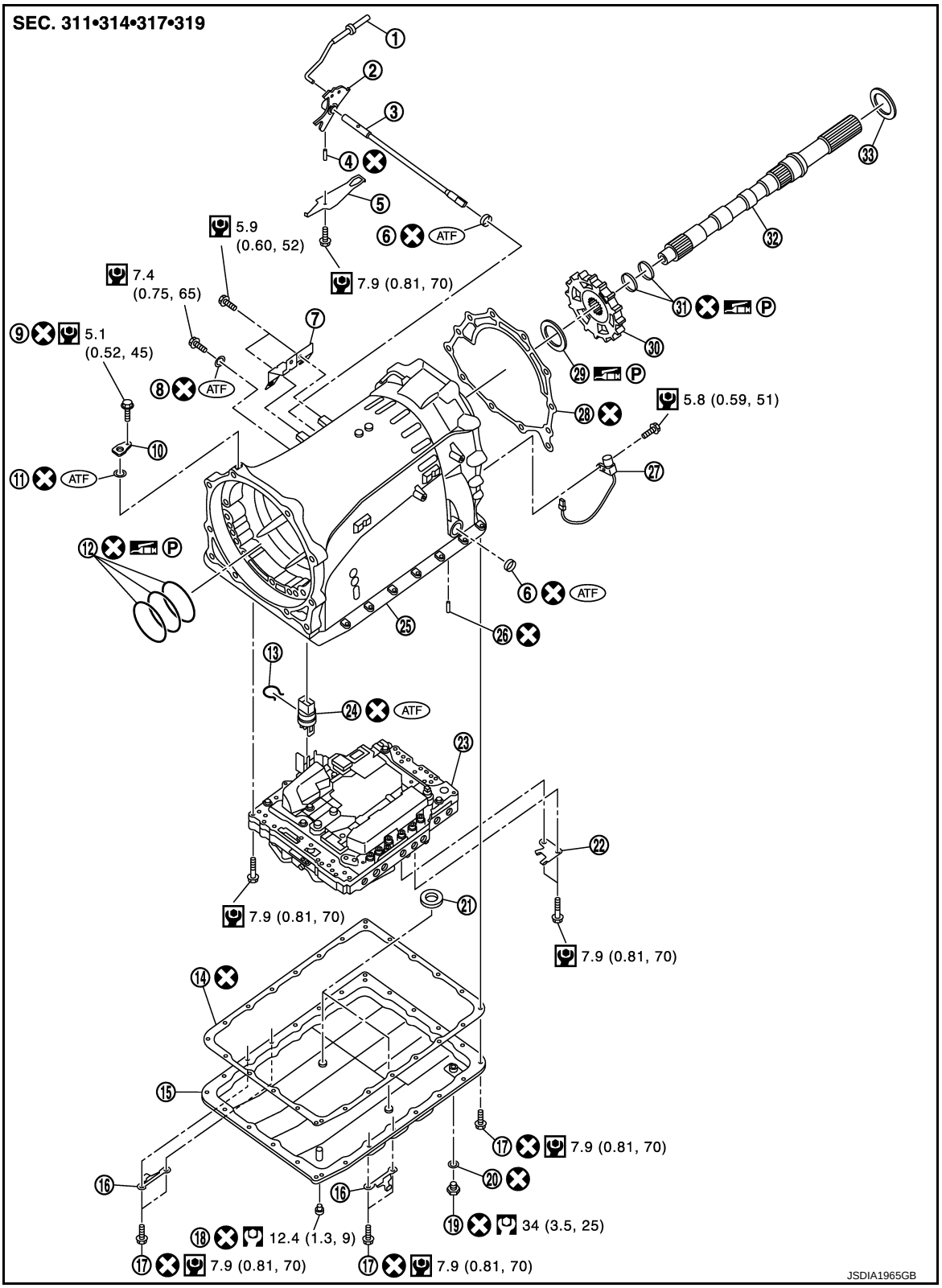
⑯ Reverse brake piston ⑰ D-ring ⑱ D-ring

⊗ : Always replace after every disassembly.

★ : Select with proper thickness.

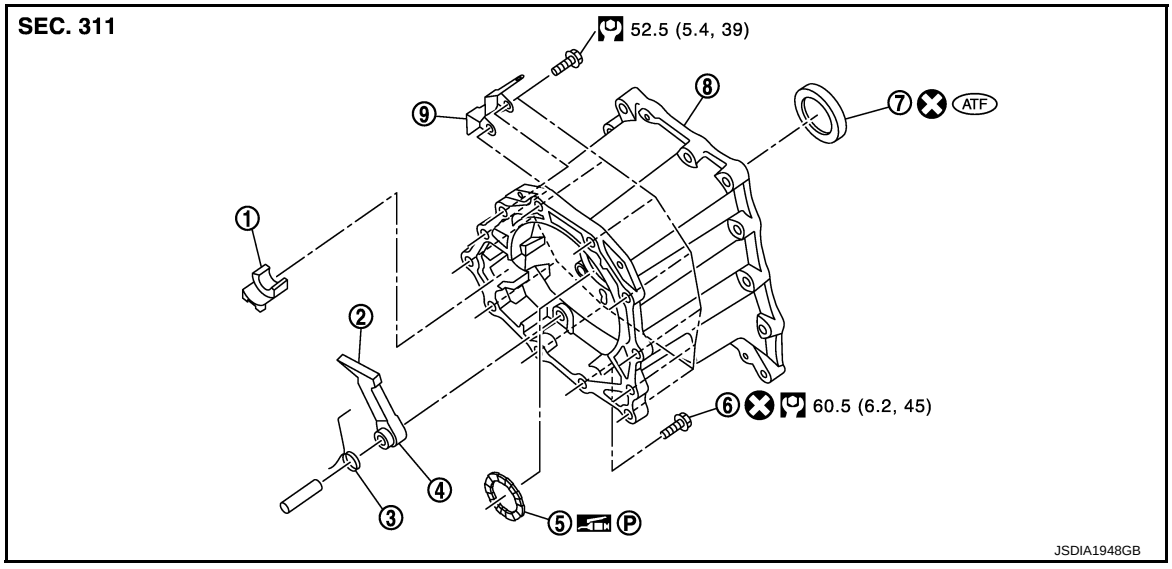
ATF : Apply ATF.

Ⓟ : Apply petroleum jelly.



① Parking rod
② Manual plate
③ Manual shaft
④ Retaining pin
⑤ Detent spring
⑥ Oil seal
⑦ Bracket
⑧ O-ring
⑨ Self-sealing bolt
⑩ Baffle plate
⑪ O-ring
⑫ Seal ring
⑬ Snap ring
⑭ Oil pan gasket
⑮ Oil pan
⑯ Clip
⑰ Oil pan mounting bolt
⑱ Overflow plug
⑲ Drain plug
⑳ Drain plug gasket
㉑ Magnet
㉒ Clip
㉓ Control valve & TCM
㉔ Joint connector
㉕ Transmission case
㉖ Retaining pin
㉗ Output speed sensor
㉘ Gasket
㉙ Needle bearing
㉚ Parking gear
㉛ Seal ring
㉜ Output shaft
㉝ Bearing race

: Always replace after every disassembly.
: N·m (kg-m, ft-lb)
: N·m (kg-m, in-lb)
ATF : Apply ATF.
Ⓟ : Apply petroleum jelly.

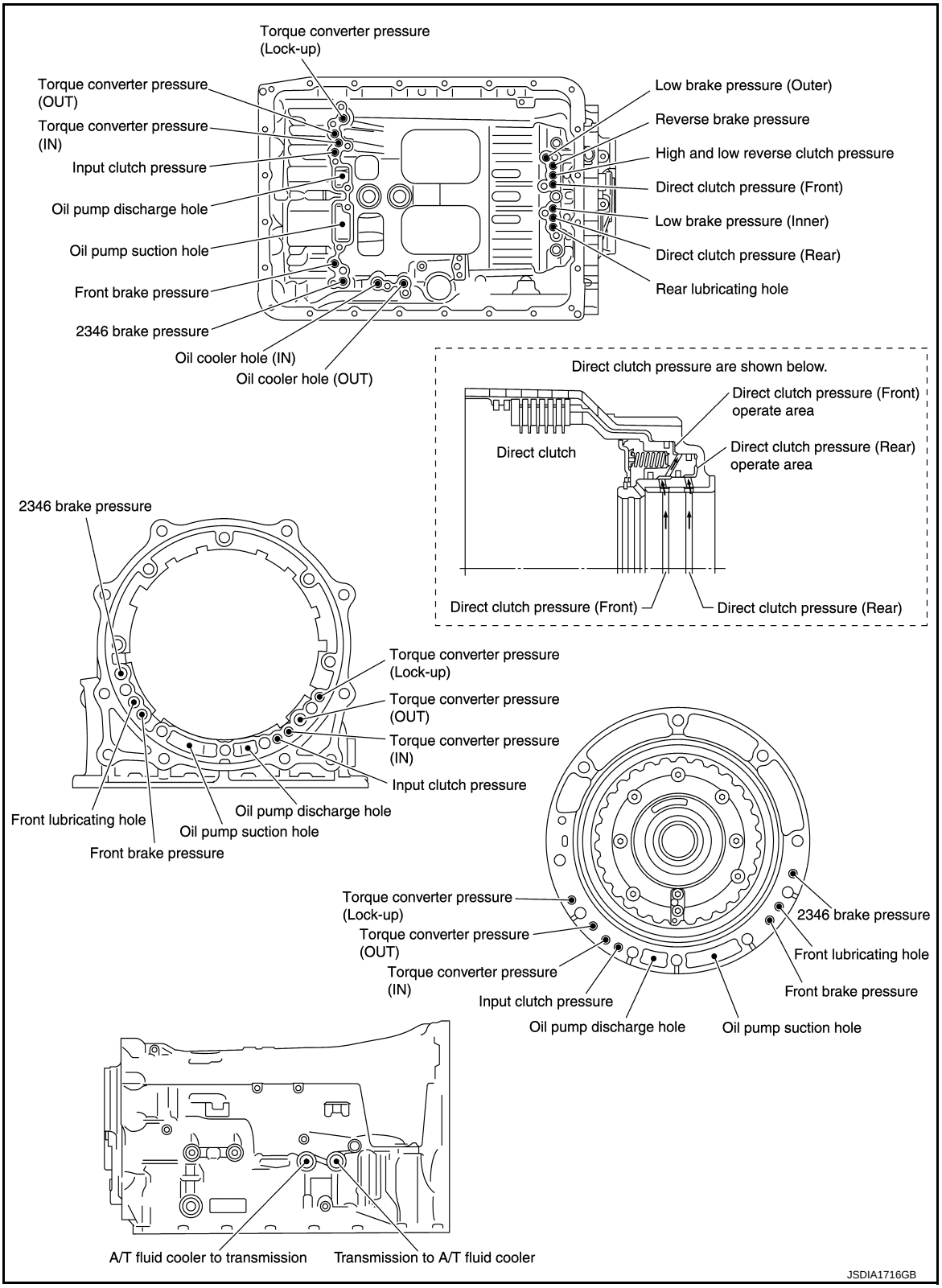


① Parking actuator support
② Parking pawl
③ Pawl shaft
④ Return spring
⑤ Needle bearing
⑥ Self-sealing bolt
⑦ Rear oil seal
⑧ Adapter case
⑨ Bracket

: Always replace after every disassembly.
: N·m (kg-m, ft-lb)
ATF : Apply ATF.
Ⓟ : Apply petroleum jelly.

Oil Channel

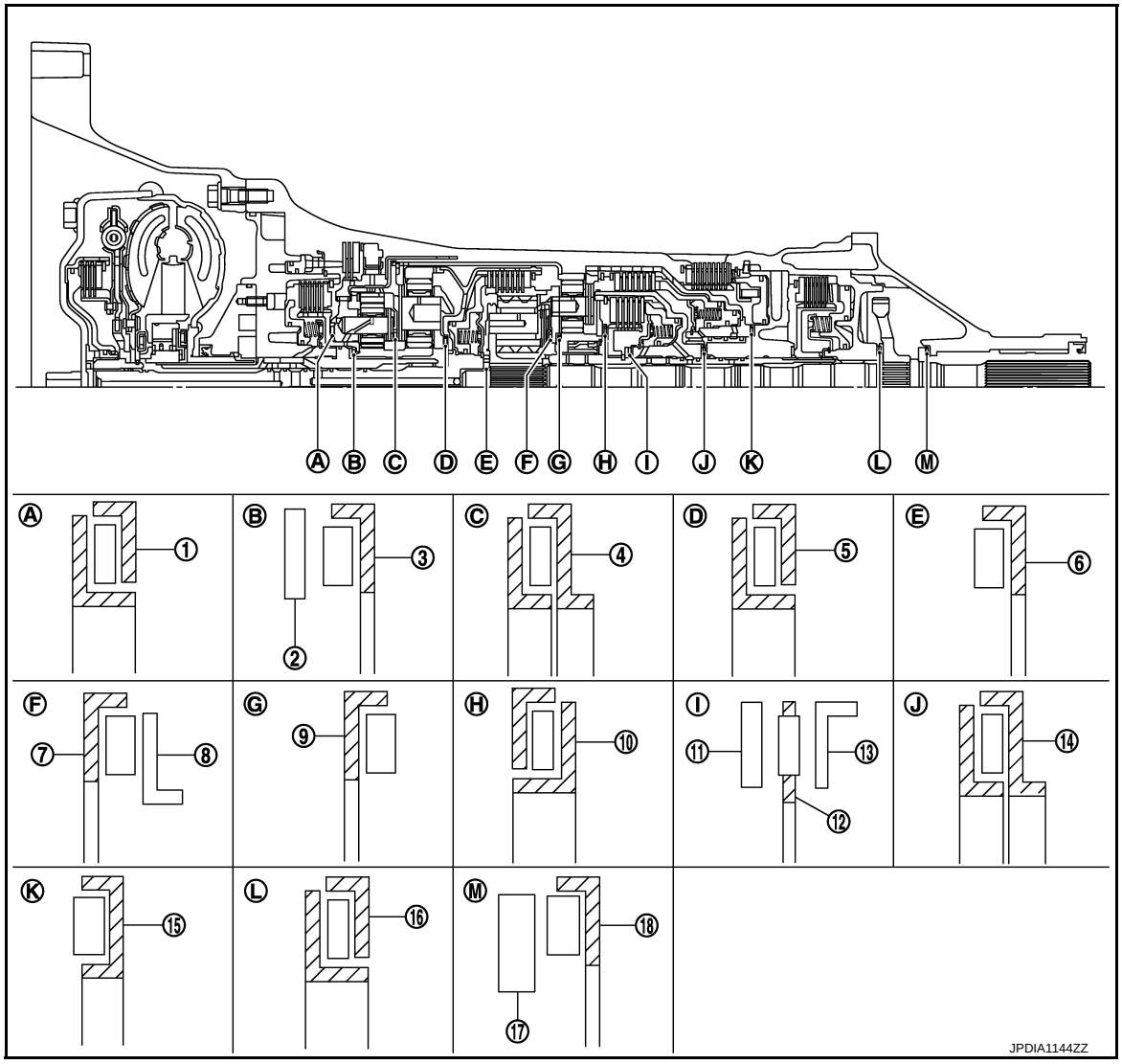
INFOID:0000000009236145



Location of Needle Bearings and Bearing Races

INFOID:0000000009236146

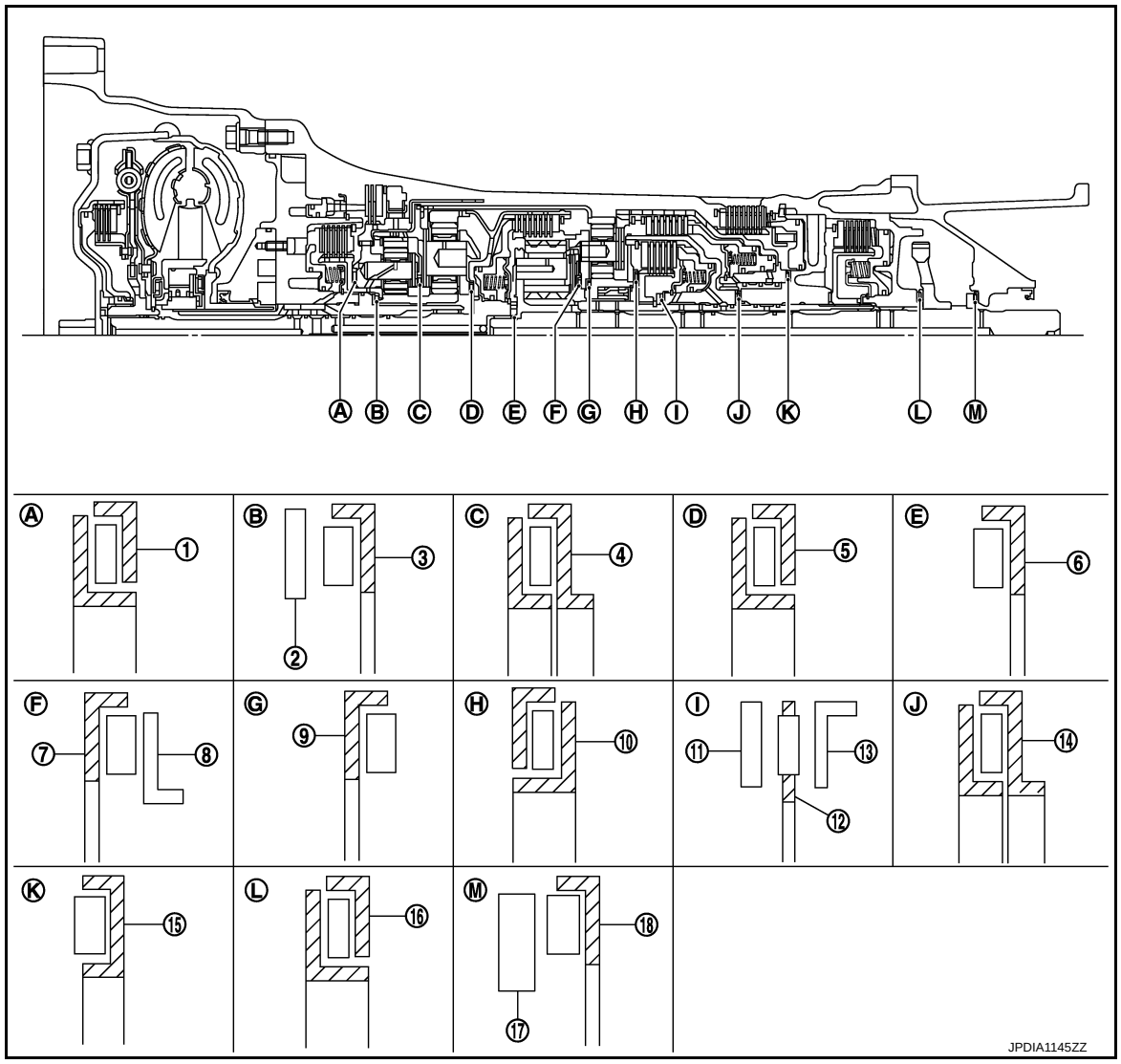
2WD MODELS



Location	Item	Outer diameter mm (in)
Ⓐ	① Needle bearing	94 (3.701)
Ⓑ	② Bearing race	58.6 (2.307)
	③ Needle bearing	60 (2.362)
Ⓒ	④ Needle bearing	84.6 (3.331)
Ⓓ	⑤ Needle bearing	77 (3.031)
Ⓔ	⑥ Needle bearing	47 (1.850)
Ⓕ	⑦ Needle bearing	84 (3.307)
	⑧ Bearing race	82 (3.228)
Ⓖ	⑨ Needle bearing	80 (3.150)
Ⓗ	⑩ Needle bearing	92 (3.622)
Ⓘ	⑪ Bearing race	61.1 (2.406)
	⑫ Needle bearing	60 (2.362)
	⑬ Bearing race	61.9 (2.437)
Ⓙ	⑭ Needle bearing	62.8 (2.472)

Location	Item	Outer diameter mm (in)
Ⓚ	⑮ Needle bearing	92 (3.622)
Ⓛ	⑯ Needle bearing	65 (2.559)
Ⓜ	⑰ Bearing race	58 (2.283)
	⑱ Needle bearing	60 (2.362)

AWD MODELS



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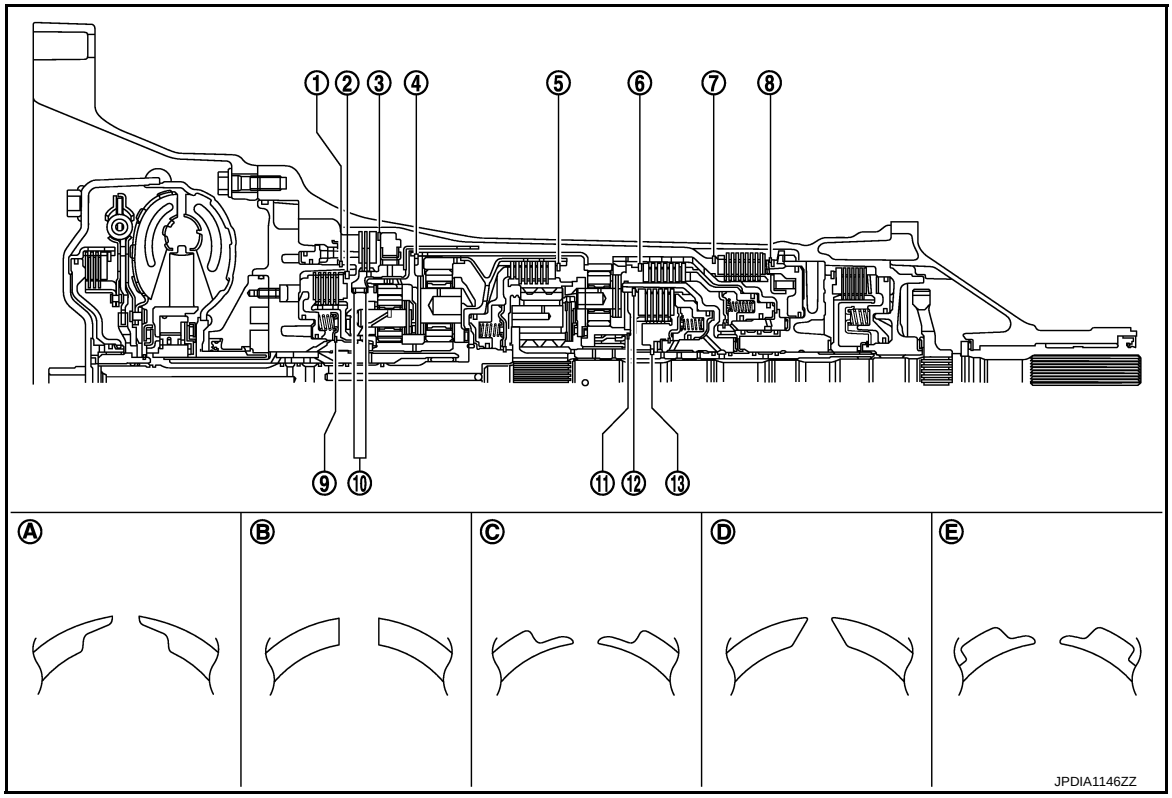
Ⓛ	⑯ Needle bearing	65 (2.559)
Ⓜ	⑰ Bearing race	58 (2.283)
	⑱ Needle bearing	60 (2.362)

Location of Snap Rings

INFOID:0000000009236147

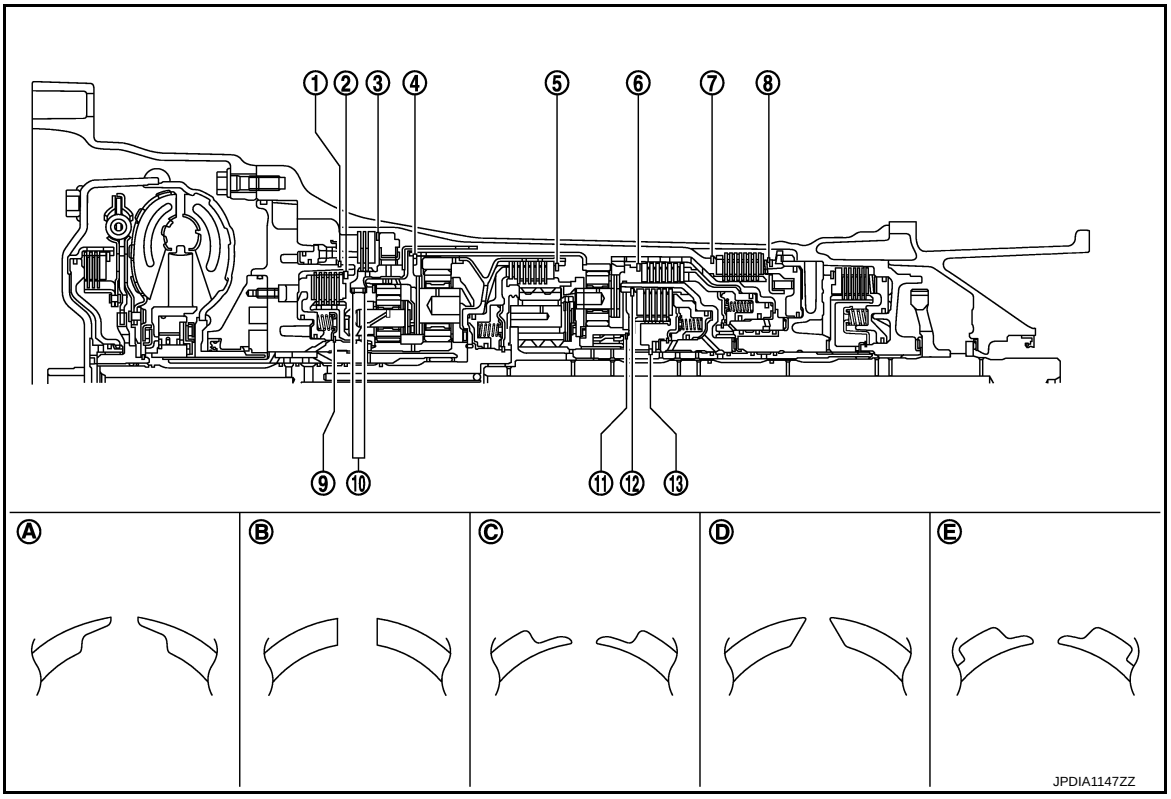
2WD MODELS



Location	Shape of snap ring	Outer diameter mm (in)
①	Ⓐ	159.9 (6.295)
②	Ⓑ	159 (6.260)
③	Ⓑ	216 (8.504)
④	Ⓑ	180.4 (7.102)
⑤	Ⓒ	171.5 (6.752)
⑥	Ⓑ	169 (6.654)
⑦	Ⓑ	180.5 (7.106)

Location	Shape of snap ring	Outer diameter mm (in)
⑧	Ⓑ	181.0 (7.126)
⑨	Ⓓ	64.6 (2.543)
⑩	Ⓑ	136 (5.354)
⑪	Ⓔ	70.5 (2.776)
⑫	Ⓑ	135 (5.315)
⑬	Ⓐ	48.4 (1.906)

AWD MODELS



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⑪	Ⓔ	70.5 (2.776)

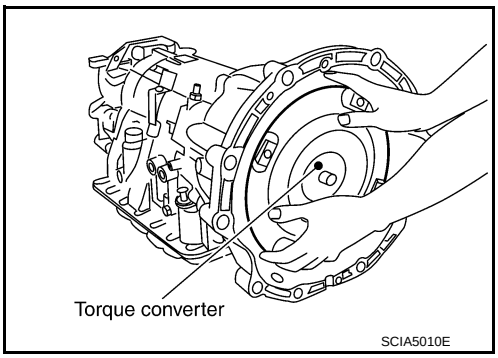
Location	Shape of snap ring	Outer diameter mm (in)
⑫	Ⓑ	135 (5.315)
⑬	Ⓐ	48.4 (1.906)

Disassembly

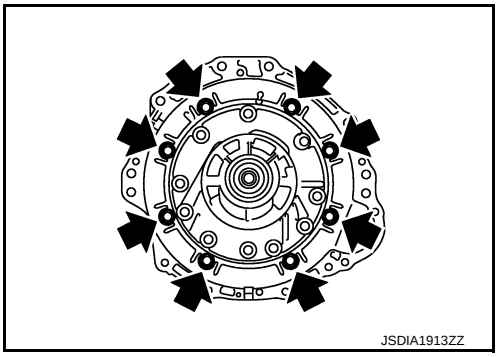
INFOID:0000000009236148

CAUTION:
Never disassemble parts behind drum support. Refer to TM-23, "TRANSMISSION : Cross-Sectional View".

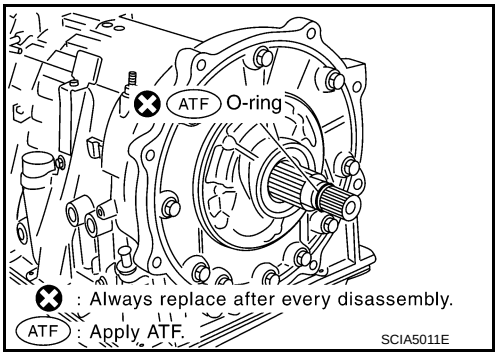
1. Drain ATF through drain plug.
2. Remove torque converter by holding it firmly and turning while pulling straight out.



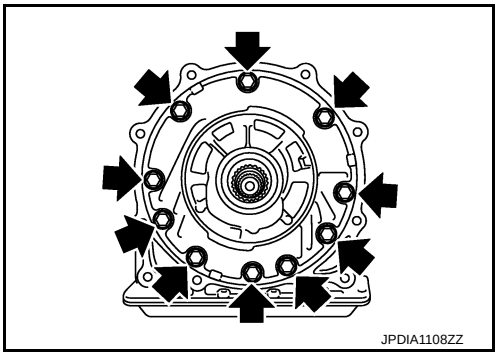
3. Remove tightening bolts (⬅) for converter housing and transmission case.
4. Remove converter housing from transmission case.
   CAUTION:
   Be careful not to scratch converter housing.



5. Remove O-ring from input clutch assembly.



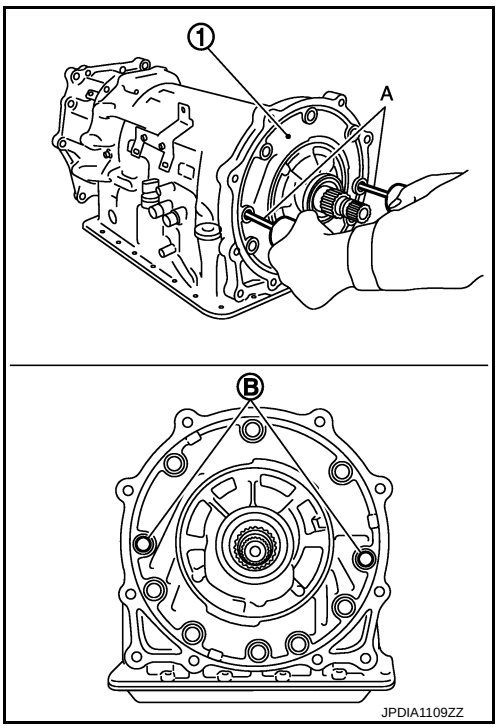
6. Remove tightening bolts (⬅) for oil pump assembly and transmission case.



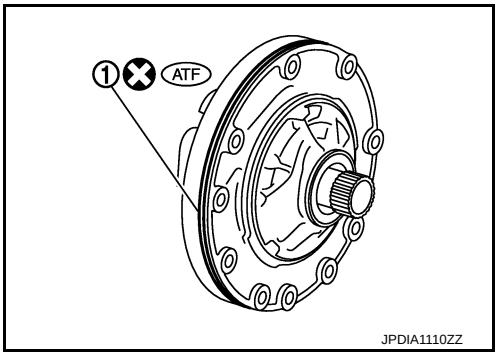
7. Attach the sliding hammers [SST: ST25850000 (J-25721-A)] (A) to oil pump assembly ① and extract it evenly from transmission case.

Ⓑ : Sliding hammer attachment position

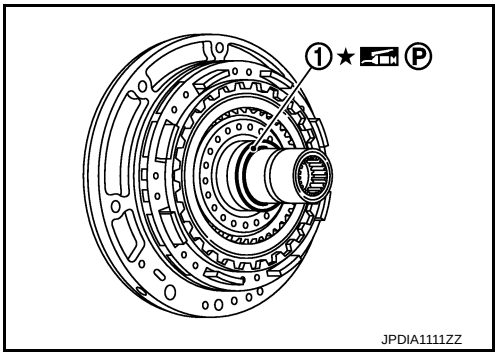
CAUTION:
- **Fully tighten the sliding hammer screws.**
- **Make sure that bearing race is installed to the oil pump assembly edge surface.**



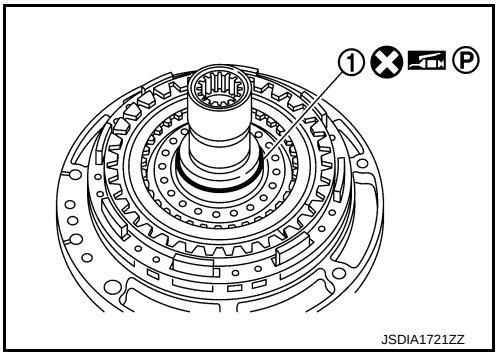
8. Remove O-ring ① from oil pump assembly.



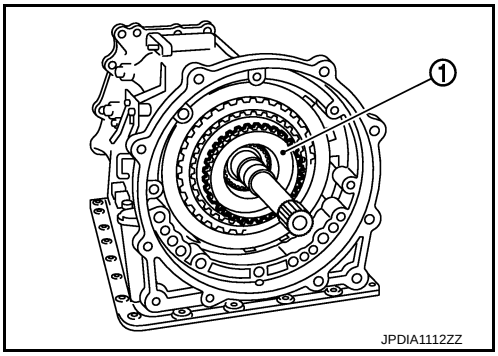
9. Remove bearing race ① from oil pump assembly.



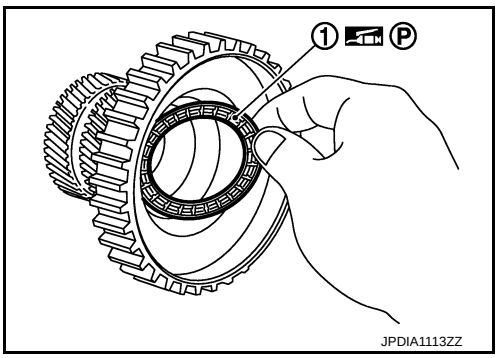
10. Remove seal ring ① from oil pump assembly.



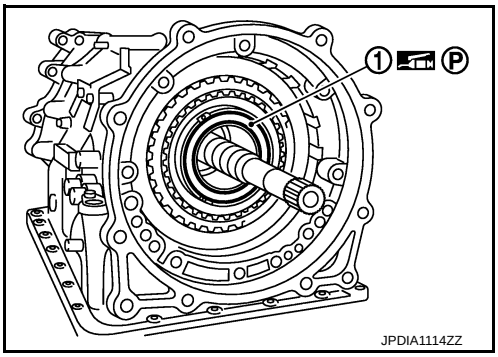
11. Remove under drive sun gear ① from under drive carrier assembly.



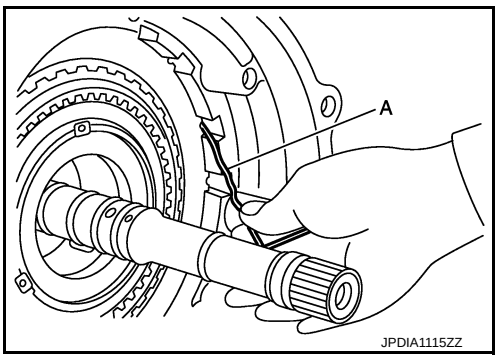
12. Remove needle bearing ① from under drive sun gear.



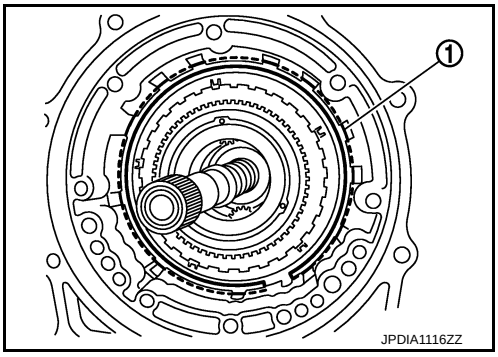
13. Remove needle bearing ① from under drive carrier assembly.



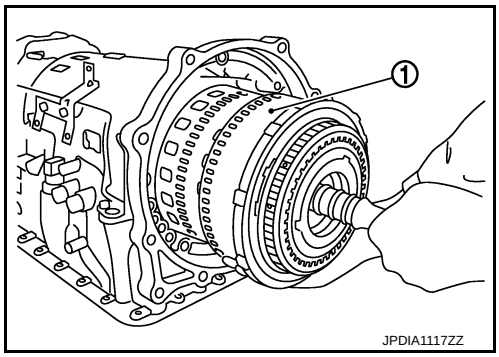
14. Remove front brake component part (retaining plates, drive plates and driven plate) from transmission case by using a wire (A) with its tip bent like a hook.



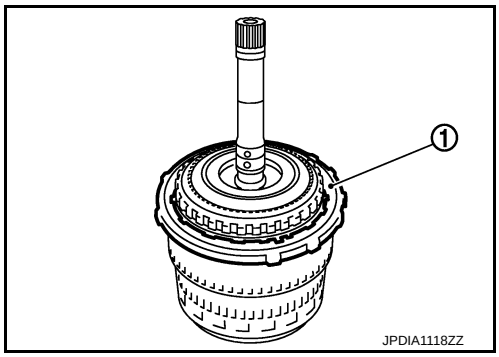
15. Remove snap ring ① from transmission case using a flat-bladed screwdriver.
CAUTION:
- **Be careful not to scratch transmission case and 1st one-way clutch.**
- **Be careful not to damage snap ring.**



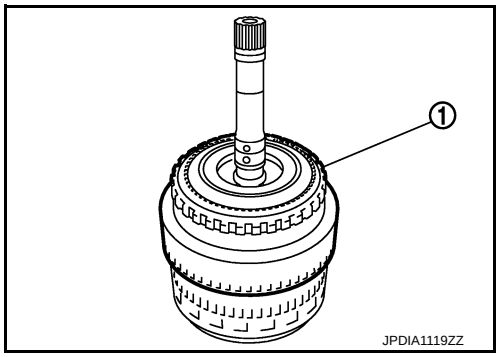
16. Remove input clutch assembly (with 1st one-way clutch, under drive carrier assembly, front brake hub, front carrier assembly, and rear internal gear) ① from transmission case.



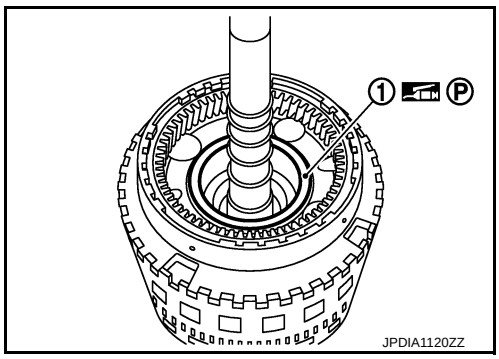
17. Remove 1st one-way clutch ① from front brake hub.



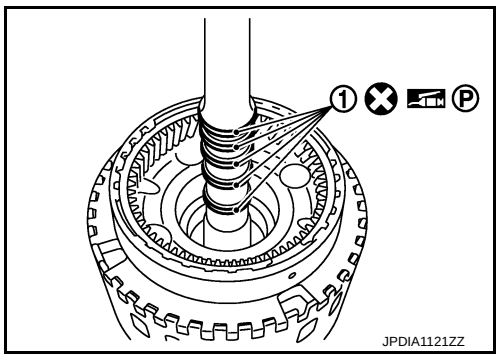
18. Remove under drive carrier assembly (with front brake hub) ① from front carrier assembly.



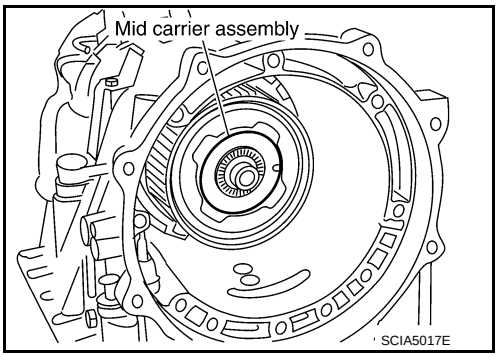
19. Remove needle bearing ① from front carrier assembly.



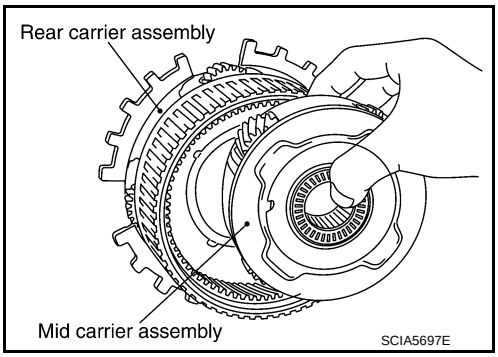
20. Remove seal rings ① from input clutch assembly.



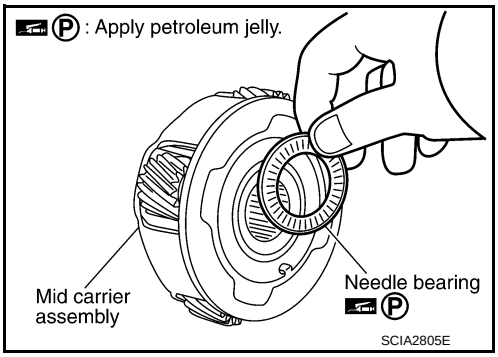
21. Remove mid carrier assembly and rear carrier assembly as a unit.



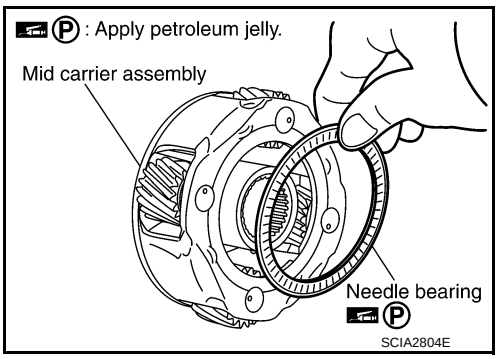
22. Remove mid carrier assembly from rear carrier assembly.



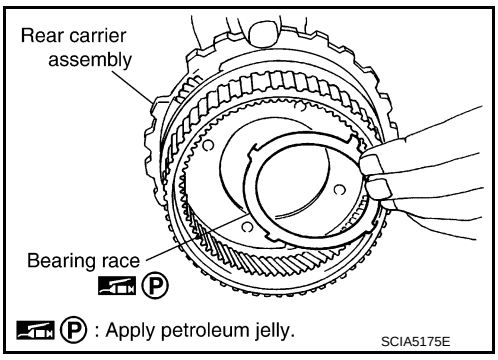
23. Remove needle bearing (front side) from mid carrier assembly.



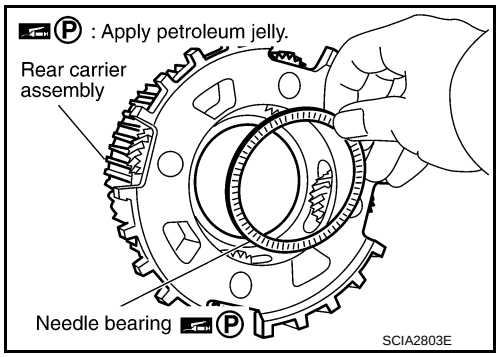
24. Remove needle bearing (rear side) from mid carrier assembly.



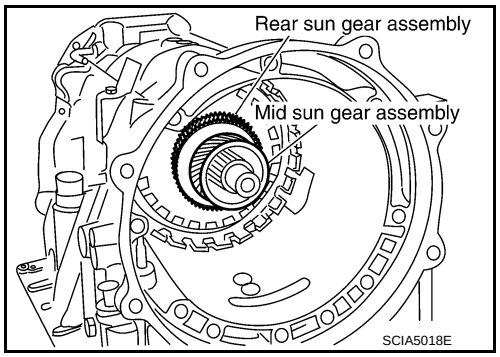
25. Remove bearing race from rear carrier assembly.



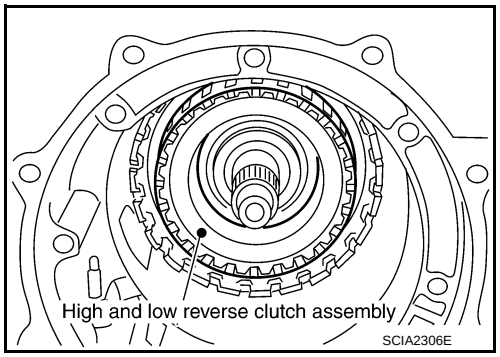
26. Remove needle bearing from rear carrier assembly.



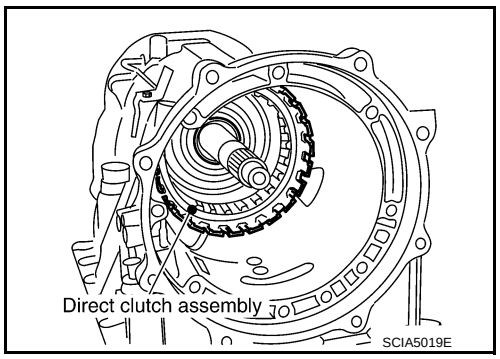
27. Remove mid sun gear assembly, rear sun gear assembly, and high and low reverse clutch hub as a unit.
CAUTION:
Be careful to remove then with bearing race and needle bearing.



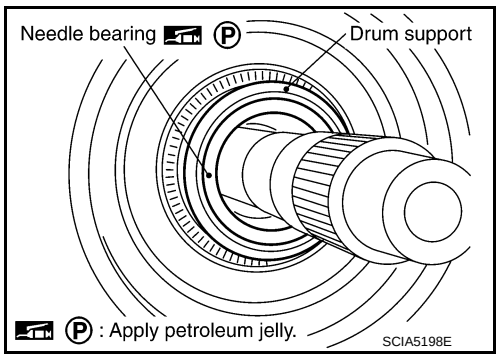
28. Remove high and low reverse clutch assembly from direct clutch assembly.
CAUTION:
Make sure that needle bearing is installed to the high and low reverse clutch assembly edge surface.



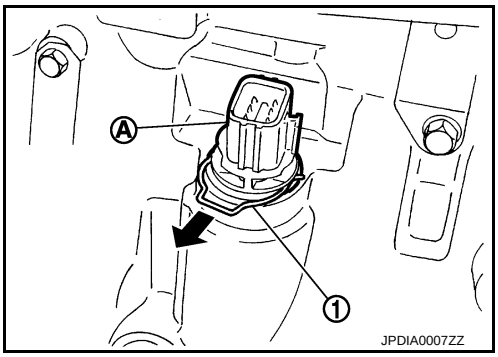
29. Remove direct clutch assembly from reverse brake.



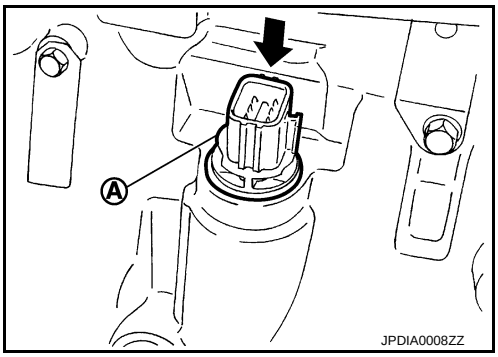
30. Remove needle bearing from drum support.



31. Remove snap ring ① from joint connector Ⓐ.



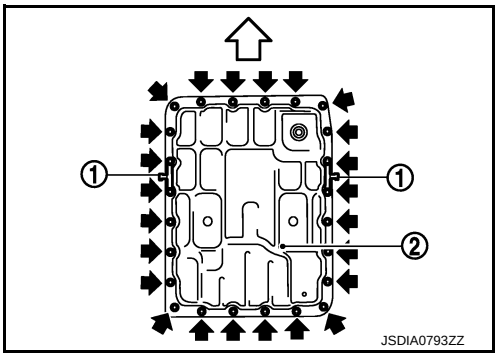
32. Push joint connector Ⓐ.
CAUTION:
Be careful not to damage connector.



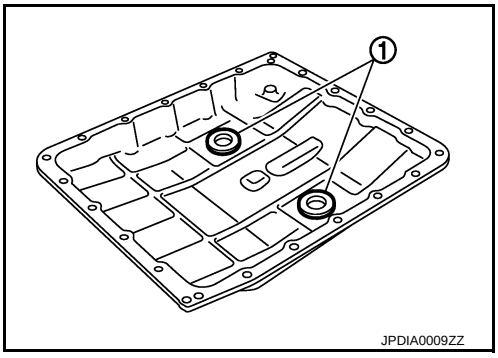
33. Remove oil pan mounting bolts (⬅).

① : Clip
⇦ : Front

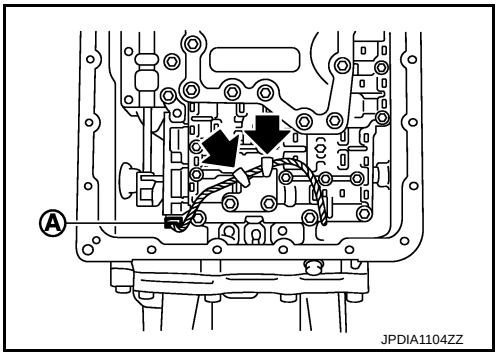
34. Remove oil pan ② and oil pan gasket.



35. Remove magnets ① from oil pan.

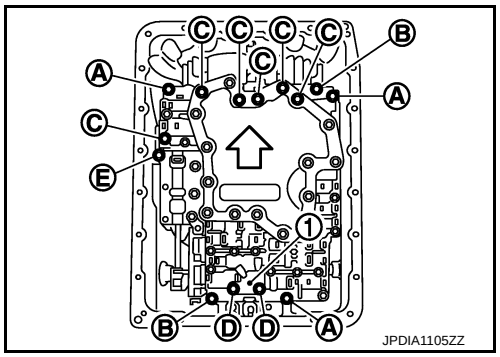


36. Disconnect output speed sensor connector Ⓐ.
CAUTION:
Be careful not to damage connector.
37. Disengage terminal clips (⬅).



38. Remove control valve & TCM mounting bolts and clip ① from the control valve & TCM.

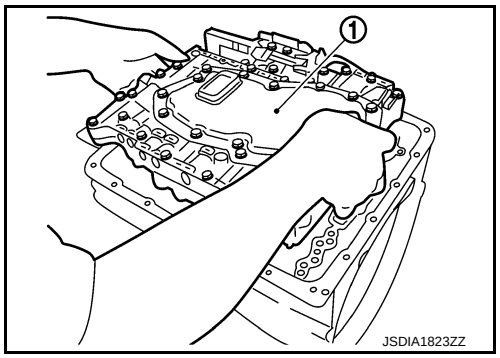
⇦ : Front



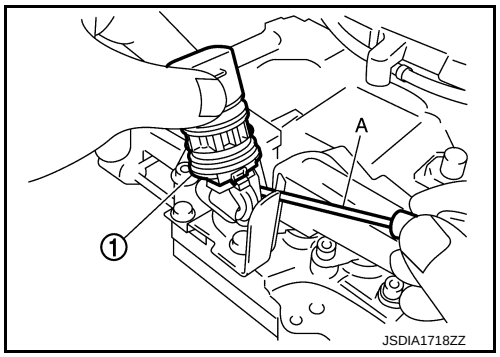
Bolt symbol	Length mm (in)	Number of bolts
Ⓐ	43 (1.69)	3
Ⓑ	40 (1.57)	2
Ⓒ	54 (2.13)	6
Ⓓ	50 (1.97)	2
Ⓔ*	50 (1.97)	1

*: Reamer bolt

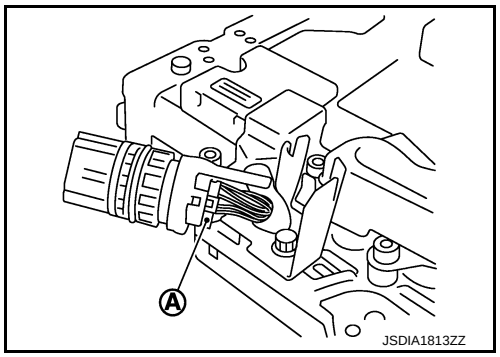
39. Remove the control valve & TCM ① from transmission case.
CAUTION:
When removing, never with the manual valve notch and manual plate height. Remove it vertically.



40. Remove joint connector ① from the control valve & TCM using a flat-bladed screwdriver Ⓐ.



41. Disconnect TCM connector Ⓐ.
CAUTION:
Be careful not to damage connector.



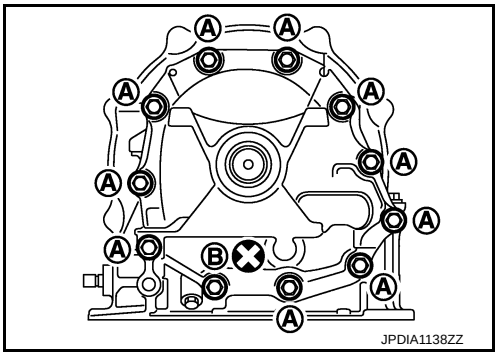
42. Remove rear extension assembly (2WD) or adapter case assembly (AWD) according to the following procedures.

a. **2WD**

i. Remove tightening bolts for rear extension assembly and transmission case.

Ⓐ : Bolt

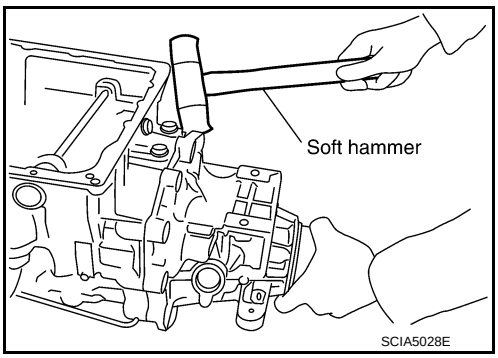
Ⓑ : Self-sealing bolt



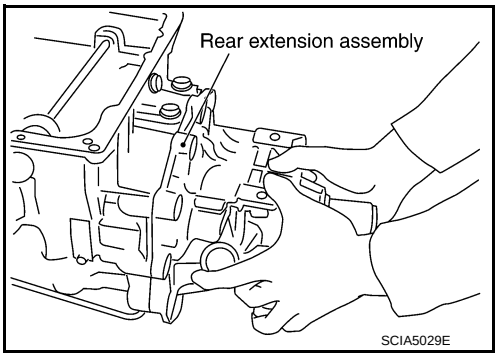
ii. Tap rear extension assembly using a soft hammer.

CAUTION:

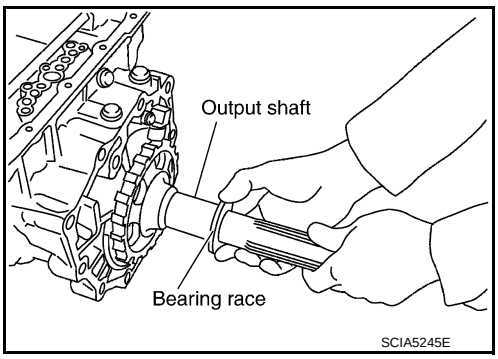
Be careful not to damage rear extension.



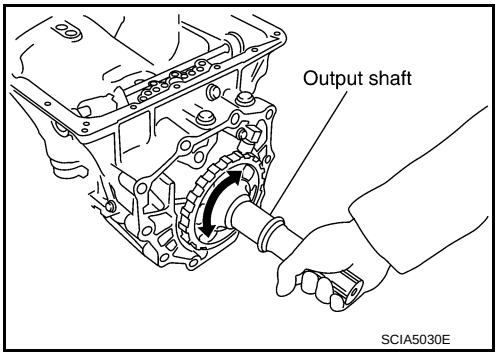
iii. Remove rear extension assembly from transmission case. (With needle bearing.)



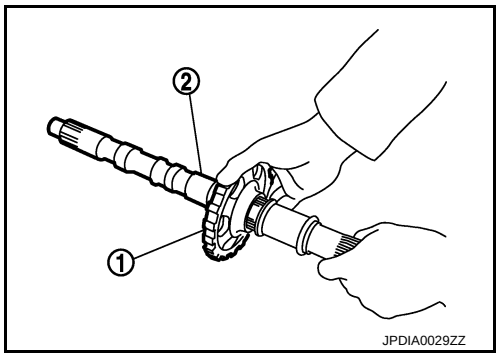
iv. Remove bearing race from output shaft.



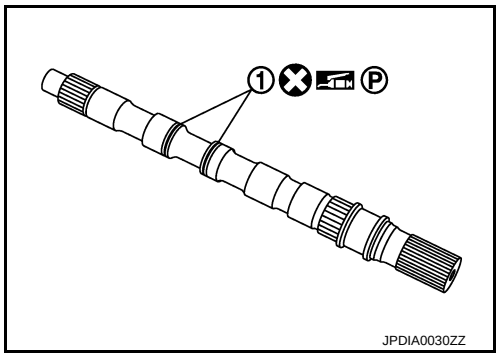
v. Remove output shaft from transmission case by rotating left/right.



vi. Remove parking gear ① from output shaft ②.



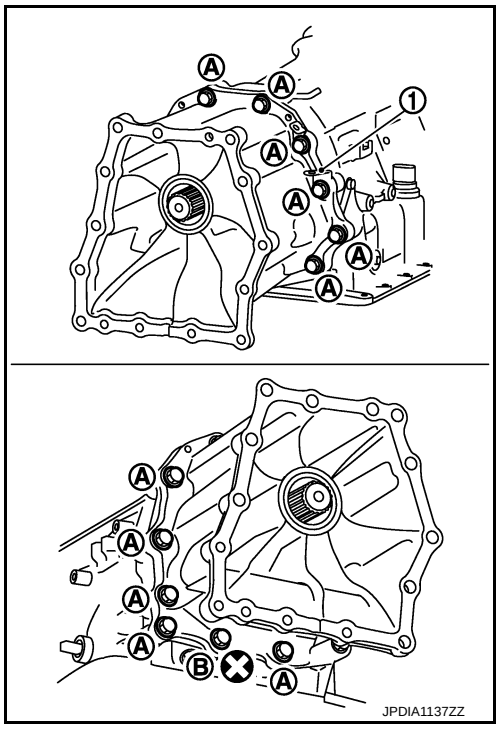
vii. Remove seal rings ① from output shaft.



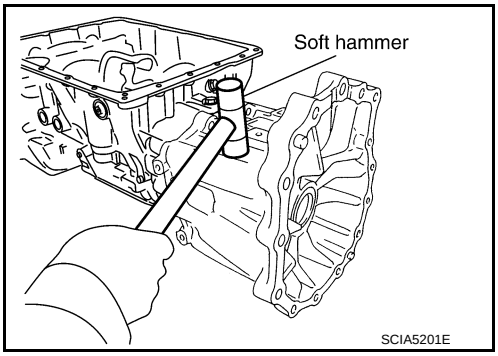
b. **AWD**

i. Remove tightening bolts for adapter case assembly and transmission case.

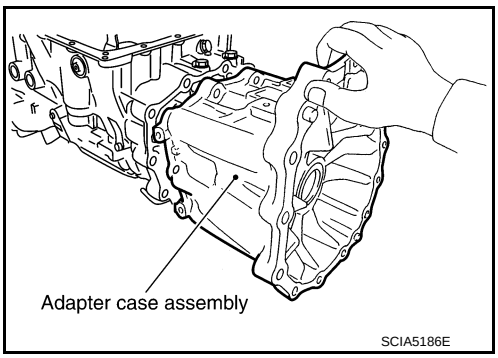
① : Bracket
Ⓐ : Bolt
Ⓑ : Self-sealing bolt



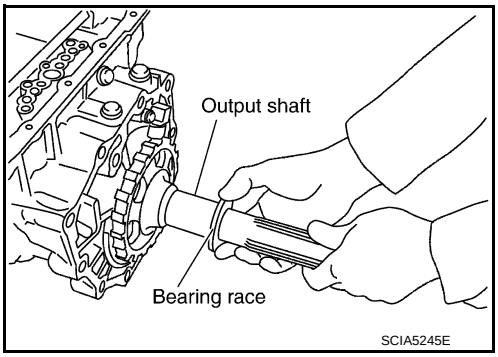
ii. Tap adapter case assembly using a soft hammer.
CAUTION:
Be careful not to damage adapter case.



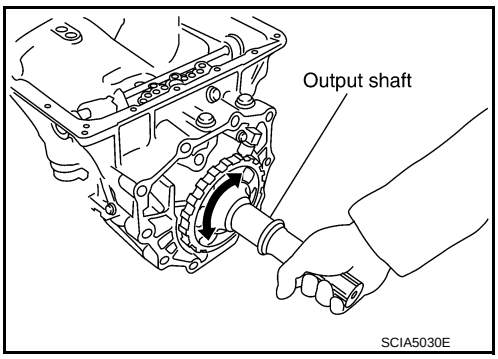
iii. Remove adapter case assembly from transmission case. (With needle bearing)



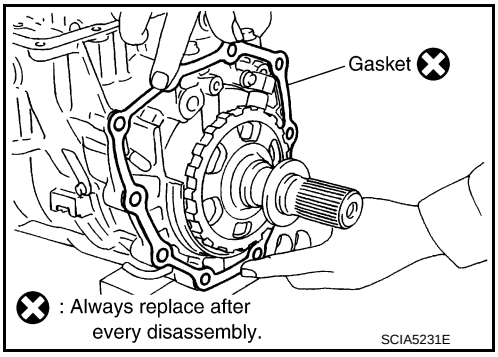
iv. Remove bearing race from output shaft.



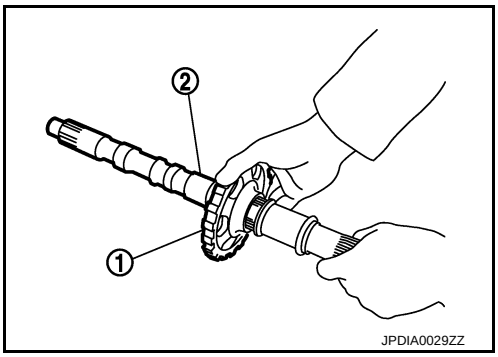
v. Remove output shaft from transmission case by rotating left/ right.



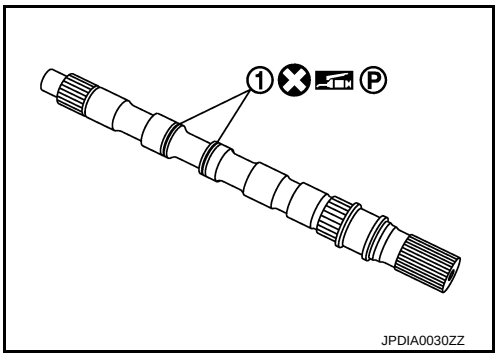
vi. Remove gasket from transmission case.



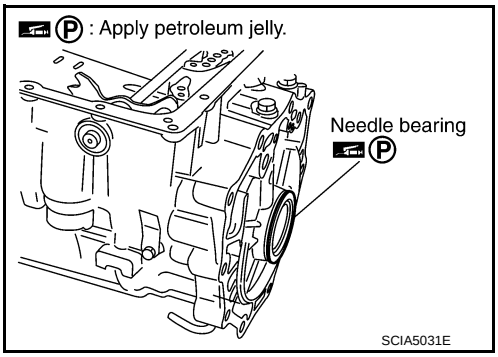
vii. Remove parking gear ① from output shaft ②.



viii. Remove seal rings ① from output shaft.



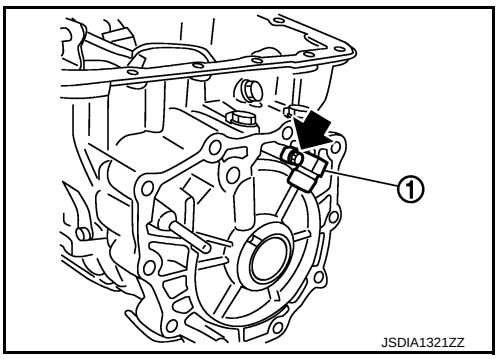
43. Remove needle bearing from transmission case.



44. Remove output speed sensor ① from transmission case.

⬅ : Bolt

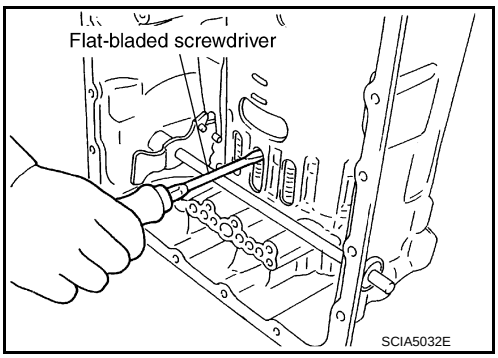
CAUTION:
- **Never subject it to impact by dropping or hitting it.**
- **Never disassemble.**
- **Never allow metal filings, etc. to get on the sensor's front edge magnetic area.**
- **Never place in an area affected by magnetism.**



45. Remove reverse brake snap ring (fixing plate) with 2 flat-bladed screwdrivers.

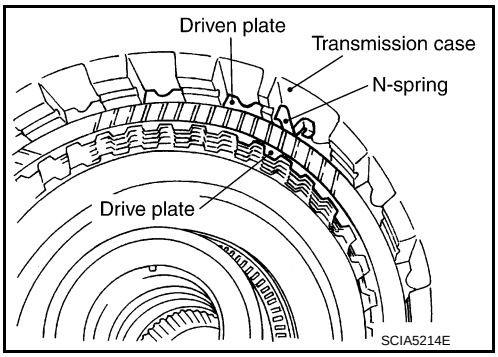
CAUTION:
- **Be careful not to scratch transmission case and reverse brake retaining plate.**
- **Be careful not to damage snap ring.**

NOTE:
Press out snap ring from the transmission case oil pan side gap with a flat-bladed screwdriver, and remove it using a another screwdriver.

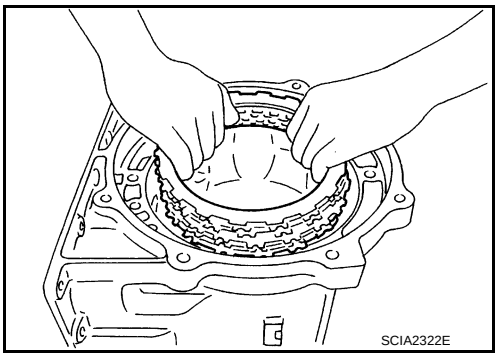


46. Remove reverse brake retaining plate from transmission case.

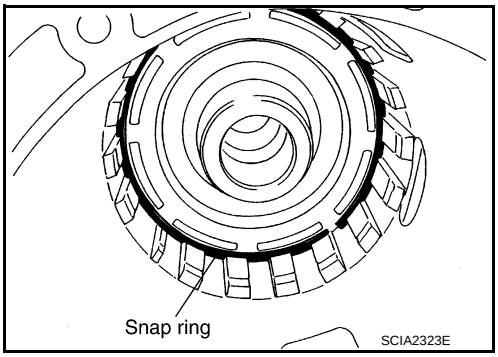
47. Remove N-spring from transmission case.



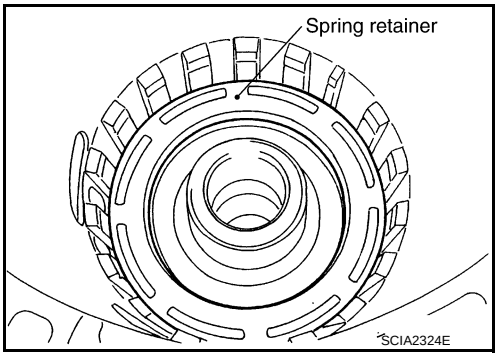
48. Remove reverse brake component part (drive plates, driven plates, and dish plates) from transmission case.



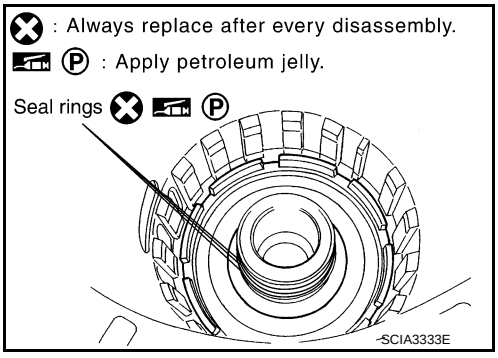
49. Remove snap ring (fixing spring retainer) using a flat-bladed screwdriver.
CAUTION:
- **Be careful not to scratch transmission case and spring retainer.**
- **Be careful not to damage snap ring.**



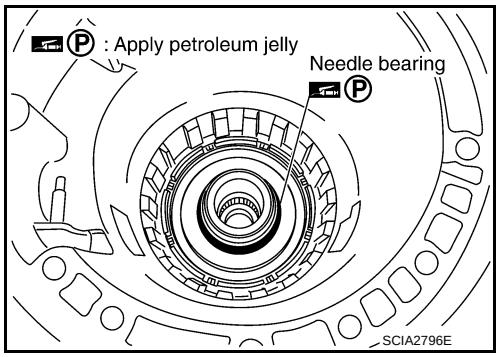
50. Remove reverse brake spring retainer and reverse brake return spring from transmission case.



51. Remove seal rings from drum support.



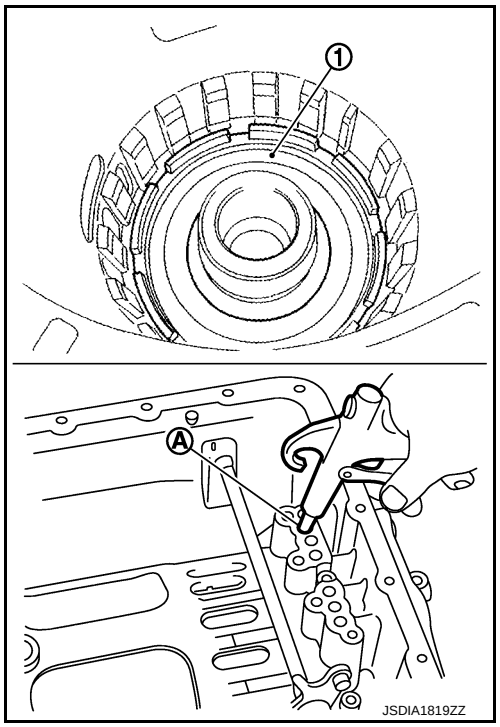
52. Remove needle bearing from drum support edge surface.



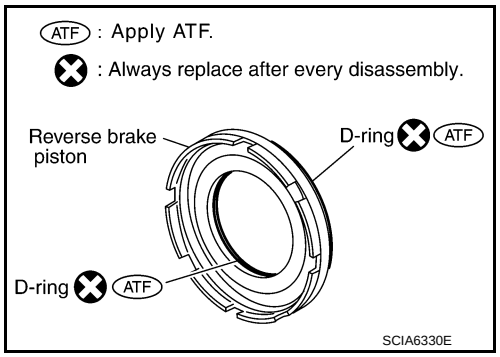
53. Remove reverse brake piston ① from transmission case with compressed air. Refer to TM-261, "Oil Channel".

Ⓐ : Reverse brake pressure hole

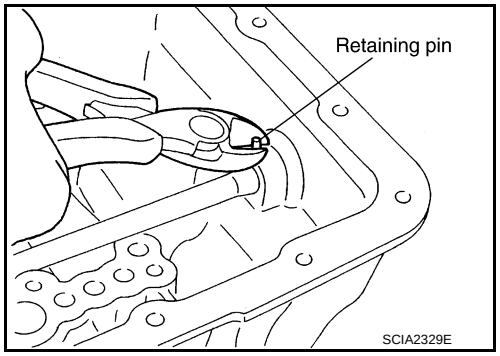
CAUTION:
Care should be taken not to abruptly blow air. It makes pistons incline, as the result, it becomes hard to disassemble the pistons.



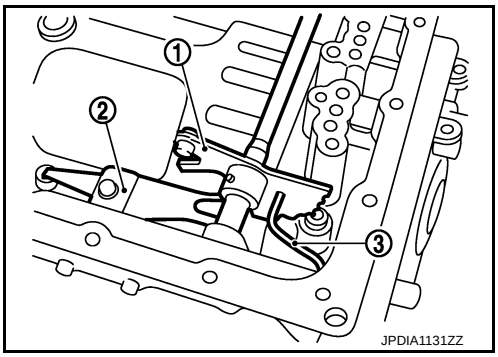
54. Remove D-rings from reverse brake piston.



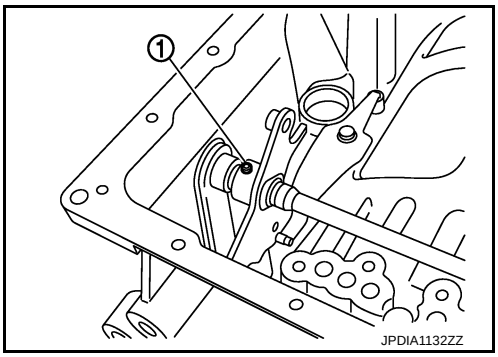
55. Remove manual shaft retaining pin with pair of nippers.
CAUTION:
Be careful not to cut retaining pin.



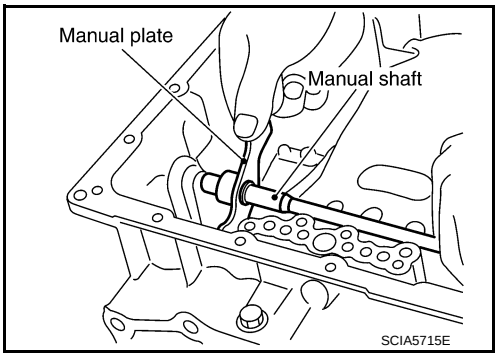
56. Remove manual plate ① from detent spring ②.
57. Remove parking rod ③ from manual plate.
58. Install manual plate to detent spring.



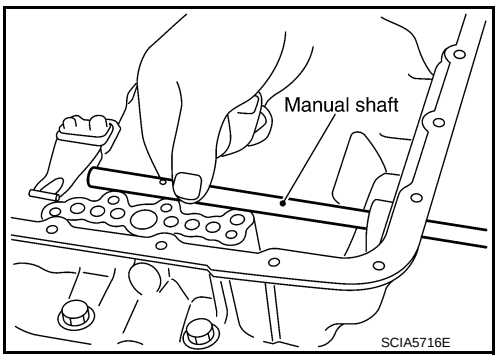
59. Use a pin punch [4 mm (0.16 in) dia. commercial service tool] to knock out retaining pin ①.



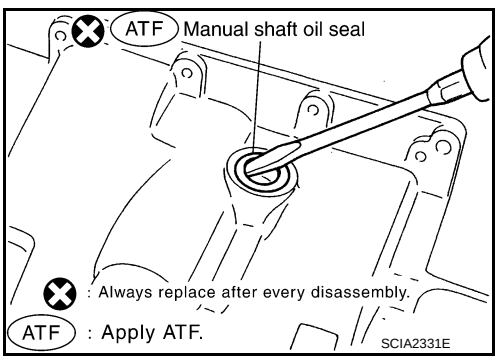
60. Remove manual plate from manual shaft.



61. Remove manual shaft from transmission case.

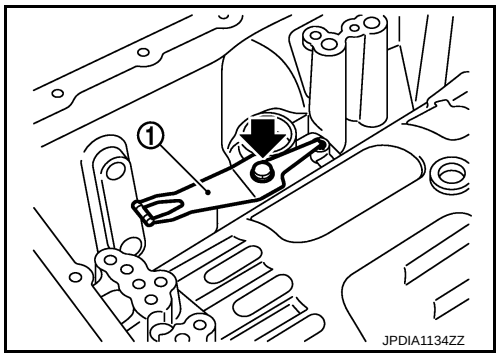


62. Remove manual shaft oil seals using a flat-bladed screwdriver.
CAUTION:
Be careful not to scratch transmission case.

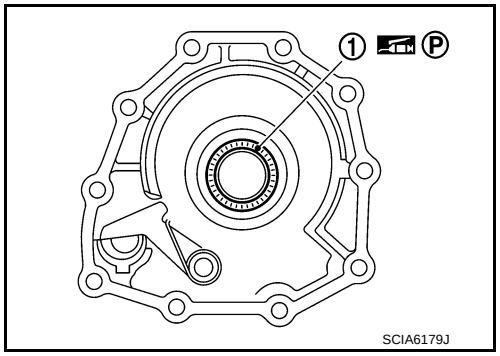


63. Remove detent spring ① from transmission case.

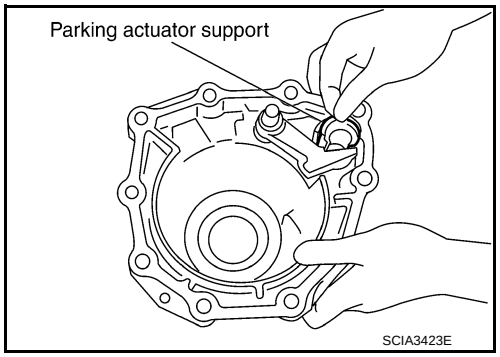
⬅ : Bolt



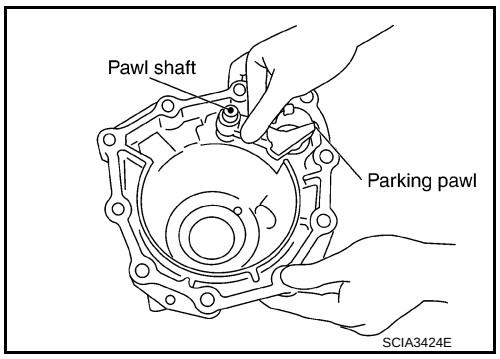
64. Remove needle bearing ① from rear extension (2WD) or adapter case (AWD).



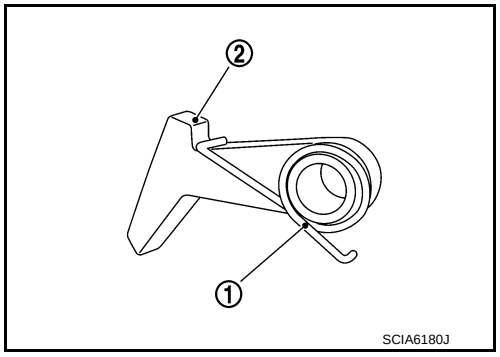
65. Remove parking actuator support from rear extension (2WD) or adapter case (AWD).



66. Remove parking pawl (with return spring) and pawl shaft from rear extension (2WD) or adapter case (AWD).



67. Remove return spring ① from parking pawl ②.

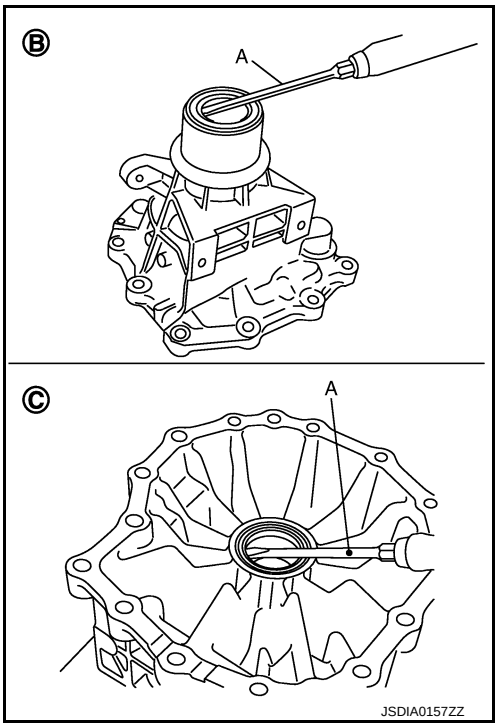


68. Remove rear oil seal from rear extension Ⓑ or adapter case Ⓒ using a flat-bladed screwdriver (A).

Ⓑ : 2WD

Ⓒ : AWD

CAUTION:
Be careful not to scratch rear extension or adapter case.

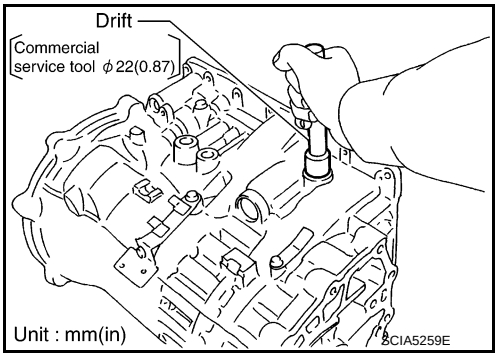


Assembly

INFOID:0000000009236149

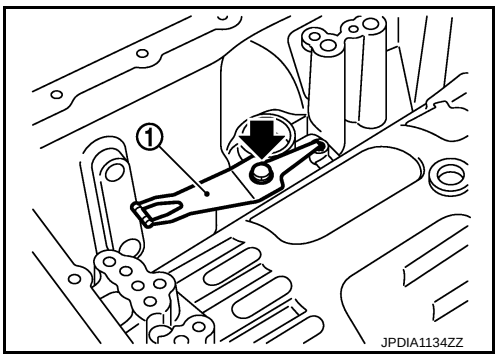
1. As shown in the figure, use a drift [22 mm (0.87 in) dia. commercial service tool] to drive manual shaft oil seals into the transmission case until it is flush.

CAUTION:
- **Never reuse manual shaft oil seals.**
- **Apply ATF to manual shaft oil seals.**

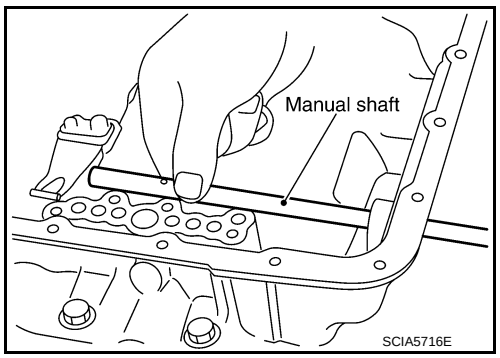


2. Install detent spring to transmission case. Tighten detent spring bolt to the specified torque.

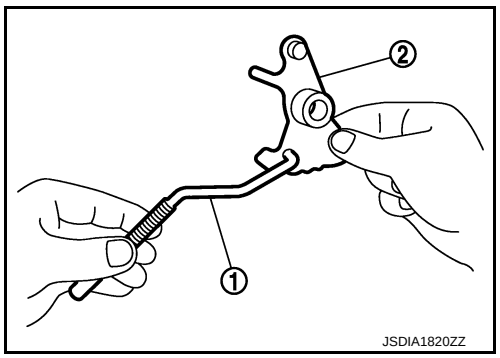
⬅ : Bolt



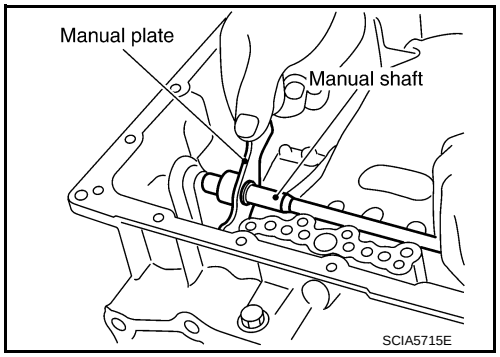
3. Install manual shaft to transmission case.



4. Install parking rod ① to manual plate ②.



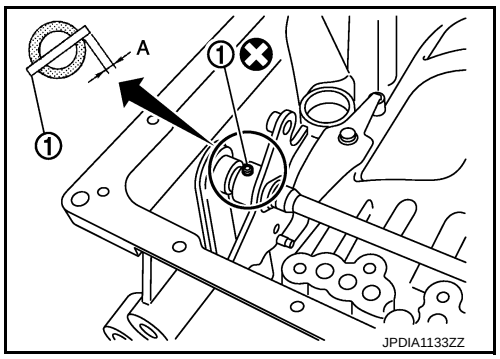
5. Install manual plate (with parking rod) to manual shaft.



6. Install retaining pin ① into the manual plate and manual shaft.
a. Fit pinhole of the manual plate to pinhole of the manual shaft with a pin punch.
b. Use a hammer to tap the retaining pin into the manual plate.

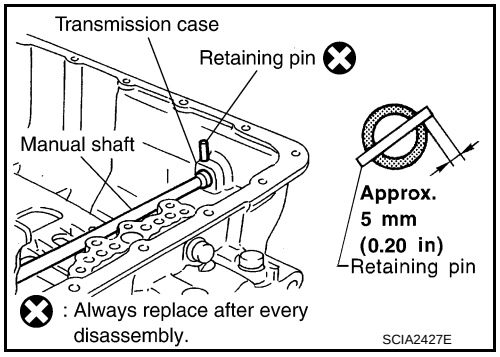
(A) : Approx. 2 mm (0.08in)

CAUTION:
Drive retaining pin to 2±0.5 mm (0.08±0.020 in) over the manual plate.

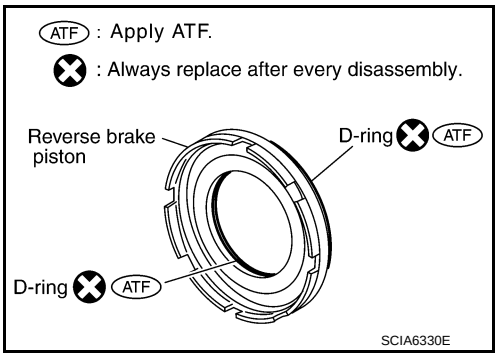


7. Install retaining pin into the transmission case and manual shaft.
a. Fit pinhole of the transmission case to pinhole of the manual shaft with a pin punch.
b. Use a hammer to tap the retaining pin into the transmission case.

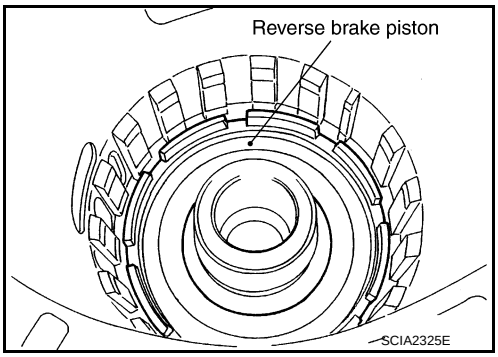
CAUTION:
Drive retaining pin to 5±1 mm (0.20±0.04 in) over the transmission case.



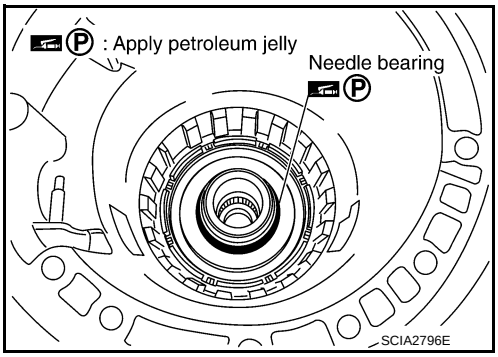
8. Install D-rings to reverse brake piston.



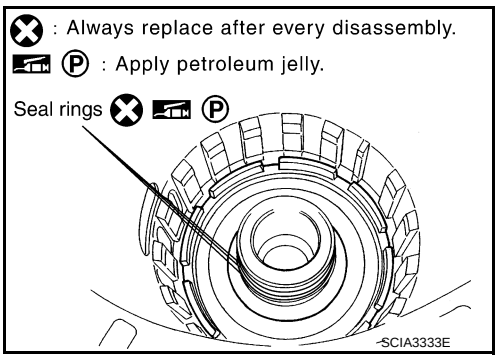
9. Install reverse brake piston to transmission case.



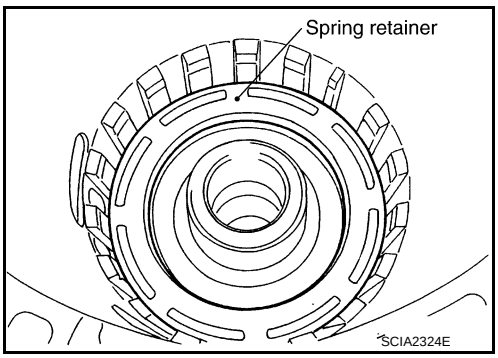
10. Install needle bearing to drum support edge surface.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



11. Install seal rings to drum support.



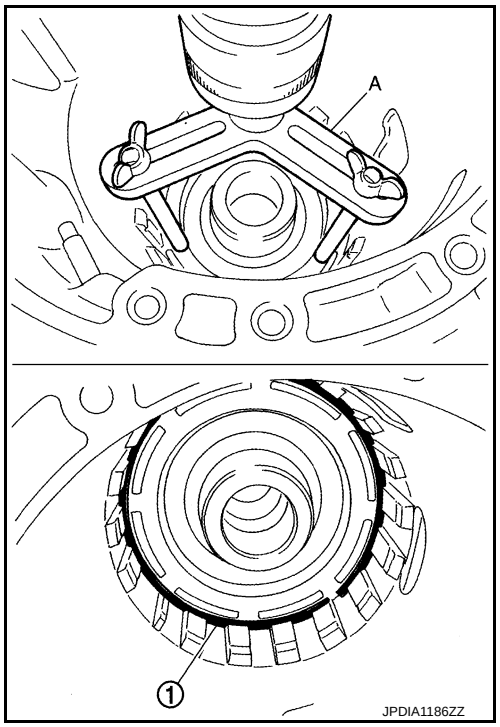
12. Install reverse brake spring retainer and reverse brake return spring to transmission case.



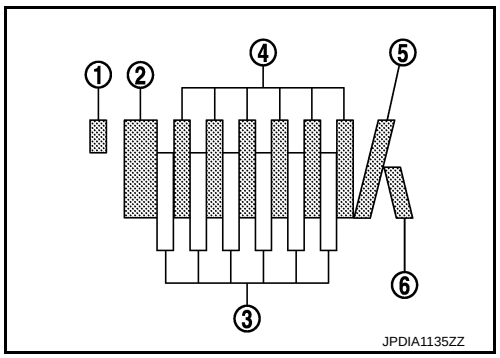
13. Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)] (A) on reverse brake spring retainer and install snap ring (fixing spring retainer) ① to transmission case while compressing return spring.

CAUTION:

- **Securely assemble them using a flat-bladed screwdriver so that snap ring tension is slightly weak.**
- **Be careful not to damage snap ring.**



14. Install reverse brake component part (drive plates, driven plates, and dish plates) to transmission case.

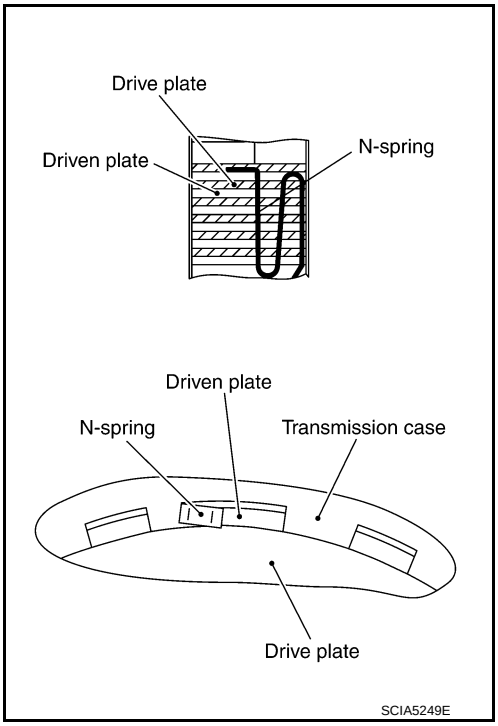


① : Snap ring
② : Retaining plate
③ : Drive plate (six pieces)
④ : Driven plate (six pieces)
⑤ : Dish plate
⑥ : Dish plate

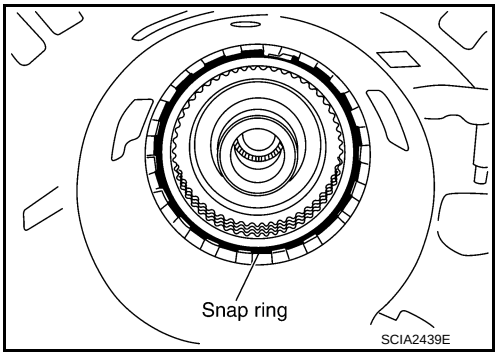
CAUTION:

Check order of plates.

15. Assemble N-spring.
16. Install reverse brake retaining plate to transmission case.



17. Install snap ring to transmission case.
CAUTION:
Be careful not to damage snap ring.

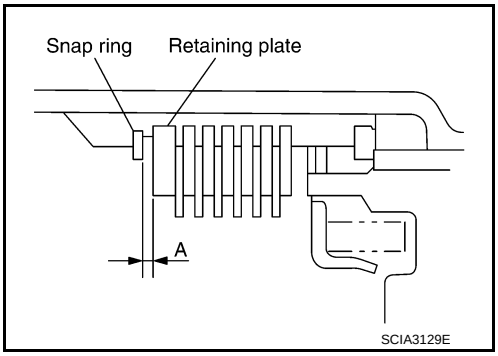


18. Measure clearance between retaining plate and snap ring. If not within specified clearance, select proper retaining plate.

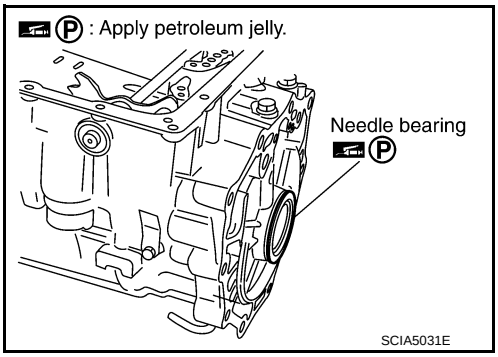
Specified clearance (A)

Standard: Refer to TM-337, "Reverse Brake Clearance".

Retaining plate: Refer to TM-337, "Reverse Brake Clearance"



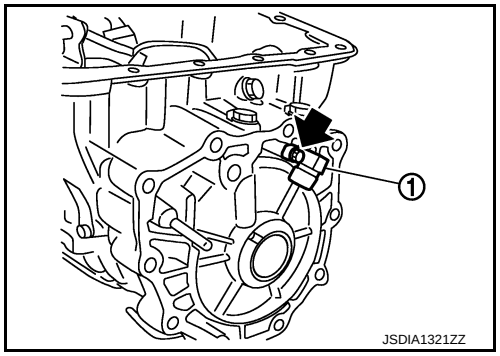
19. Install needle bearing to transmission case.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



20. Install output speed sensor ① to transmission case. Tighten output speed sensor bolt to the specified torque.

⬅ : Bolt

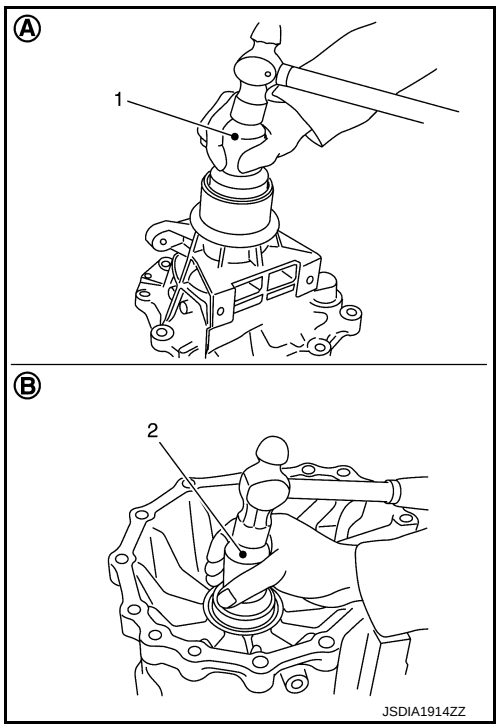
CAUTION:
- **Never subject it to impact by dropping or hitting it.**
- **Never disassemble.**
- **Never allow metal filings, etc. to get on the sensor's front edge magnetic area.**
- **Never place in an area affected by magnetism.**



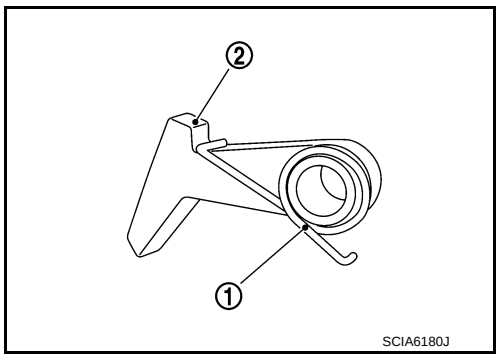
21. As shown in the figure, use the drift to drive rear oil seal into the rear extension (2WD) Ⓐ or adapter case (AWD) Ⓑ until it is flush.

(1) : Drift [SST: 33400001 (J-26082)]
(2) : Drift [Commercial service tool Ø64 mm (2.52 in)]

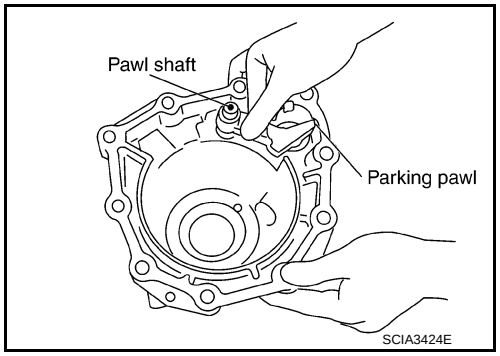
CAUTION:
- **Never reuse rear oil seal.**
- **Apply ATF to rear oil seal.**



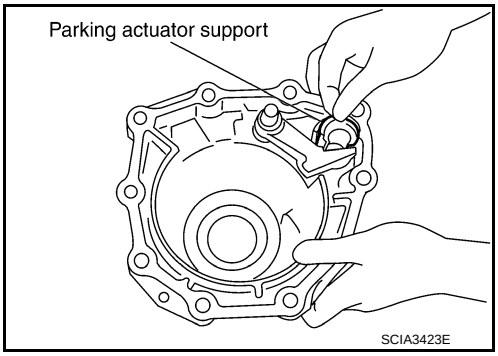
22. Install return spring ① to parking pawl ②.



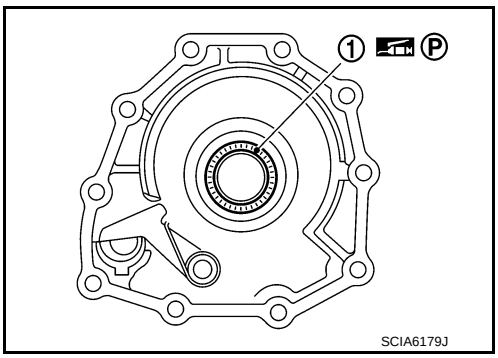
23. Install parking pawl (with return spring) and pawl shaft to rear extension (2WD) or adapter case (AWD).



24. Install parking actuator support to rear extension (2WD) or adapter case (AWD).



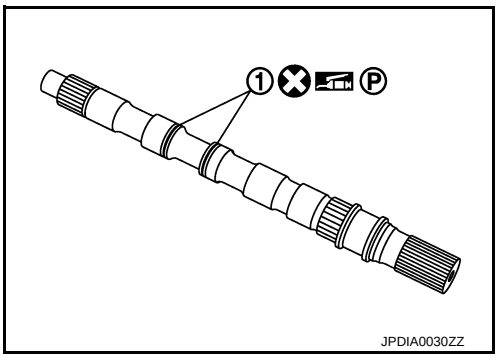
25. Install needle bearing ① to rear extension (2WD) or adapter case (AWD).
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



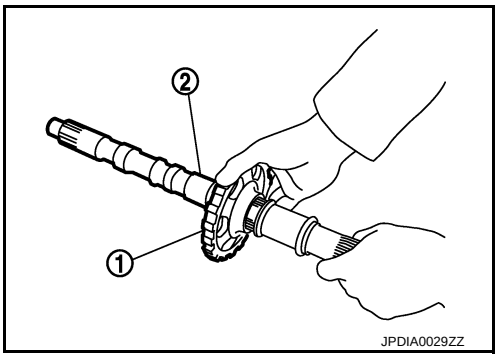
26. Install rear extension assembly (2WD) or adapter case assembly (AWD) according to the following procedures.

a. **2WD**

i. Install seal rings ① to output shaft.



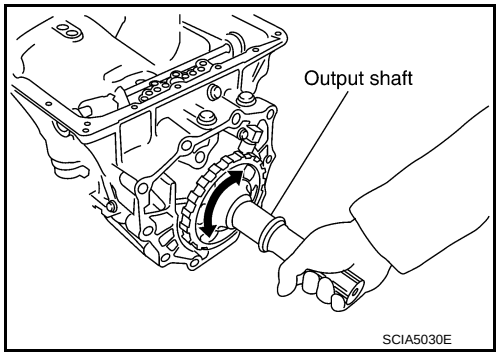
ii. Install parking gear ① to output shaft ②.



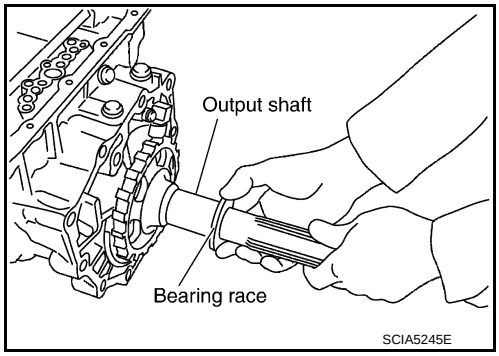
iii. Install output shaft to transmission case.

CAUTION:

Be careful not to mistake front for rear because both sides looks similar. (Thinner end is front side.)



iv. Install bearing race to output shaft.



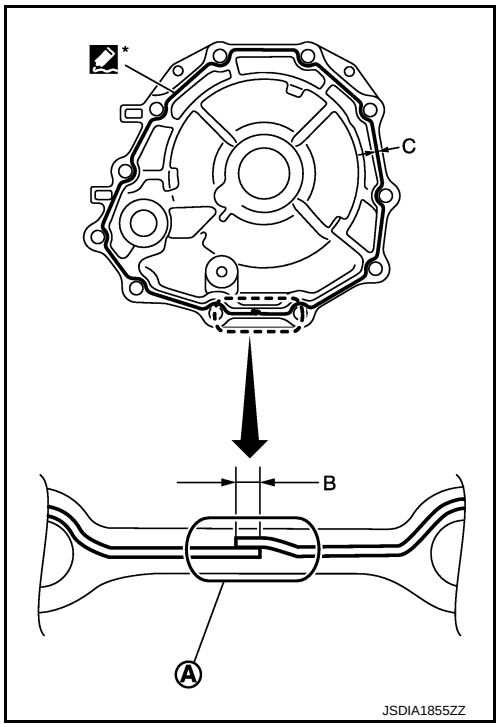
v. Apply recommended sealant to rear extension assembly as shown in the figure.

: Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".

Sealant starting point and end-point Ⓐ	**: Start and finish point shall be in the center of two bolts.**
Overlap width of sealant starting point and end-point (B)	**: 3 – 5 mm (0.12 – 0.20 in)**
Sealant width (C)	**: 1.0 – 2.0 mm (0.04 – 0.08 in)**
Sealant height (C)	**: 0.4 – 1.0 mm (0.016 – 0.04 in)**

CAUTION:

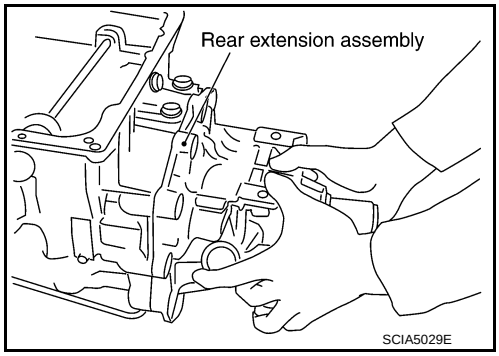
Completely remove all moisture, oil and old sealant, etc. from the transmission case and rear extension assembly mounting surfaces.



vi. Install rear extension assembly to transmission case.

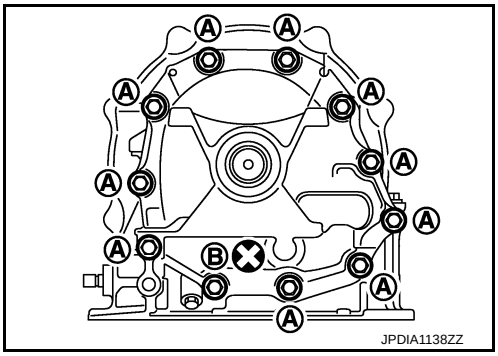
CAUTION:

Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the rear extension assembly.



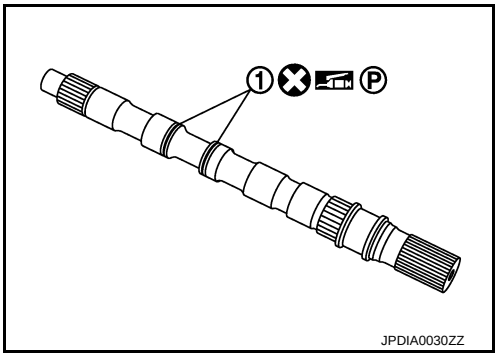
vii. Tighten rear extension assembly bolts to the specified torque.

Ⓐ : Bolt
Ⓑ : Self-sealing bolt

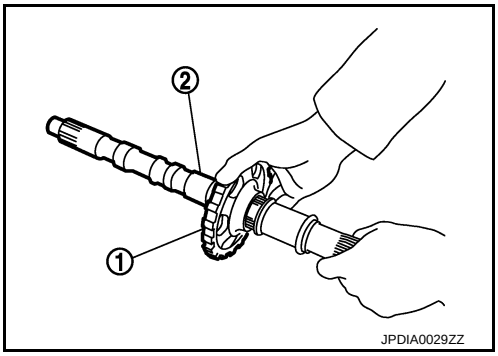


b. **AWD**

i. Install seal rings ① to output shaft.



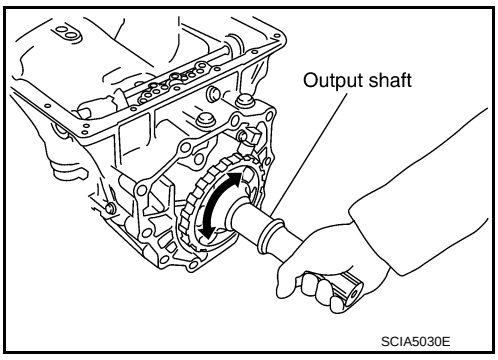
ii. Install parking gear ① to output shaft ②.



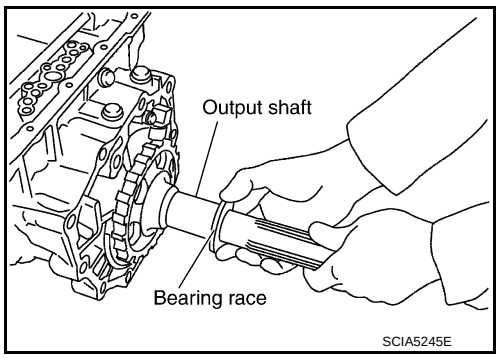
iii. Install output shaft to transmission case.

CAUTION:

Be careful not to mistake front for rear because both sides looks similar. (Thinner end is front side.)



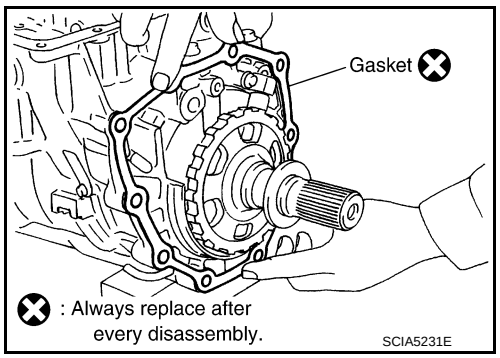
iv. Install bearing race to output shaft.



v. Install gasket onto transmission case.

CAUTION:

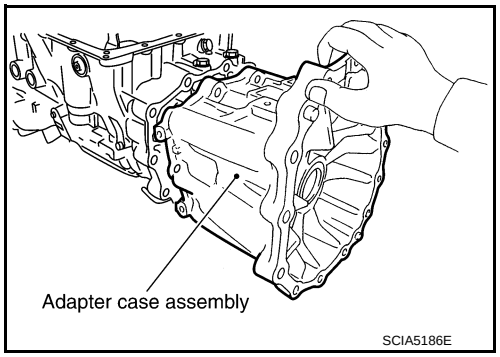
- **Completely remove all moisture, oil and old gasket, etc. from the transmission case and adapter case assembly mounting surfaces.**
- **Never reuse gasket.**



vi. Install adapter case assembly to transmission case.

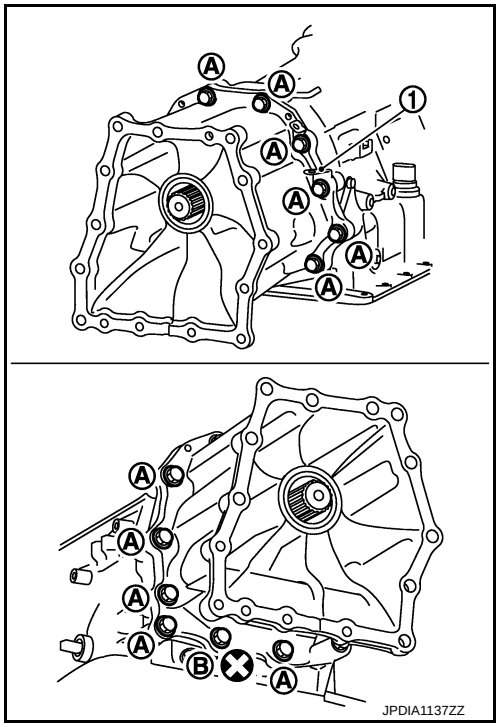
CAUTION:

Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the adapter case assembly.

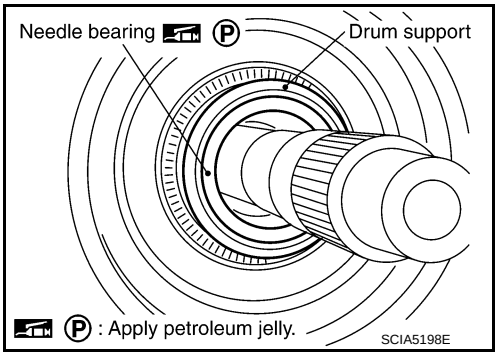


vii. Tighten adapter case assembly bolts to the specified torque.

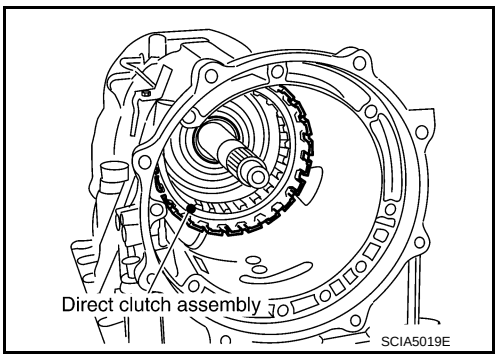
① : Bracket
Ⓐ : Bolt
Ⓑ : Self-sealing bolt



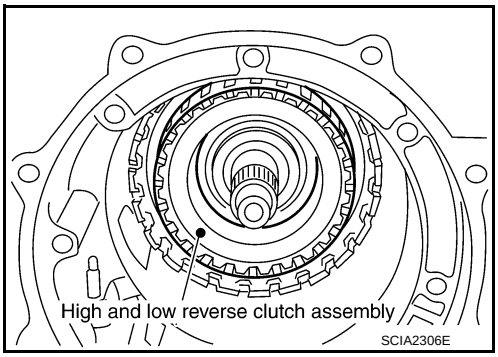
27. Install needle bearing to drum support.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



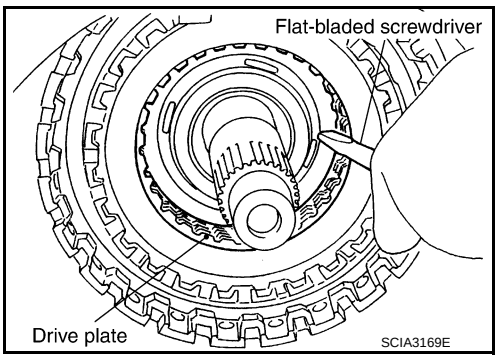
28. Install direct clutch assembly to reverse brake.
CAUTION:
Make sure that drum support edge surface and direct clutch inner boss edge surface come to almost same place.



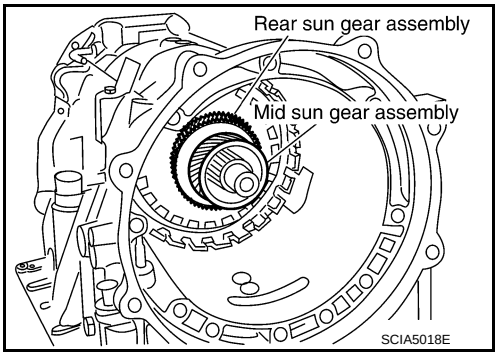
29. Install high and low reverse clutch assembly to direct clutch.



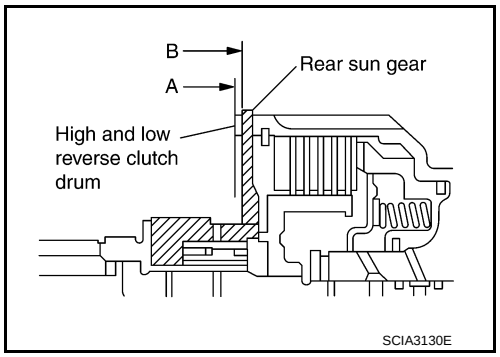
30. Align the drive plate using a flat-bladed screwdriver.



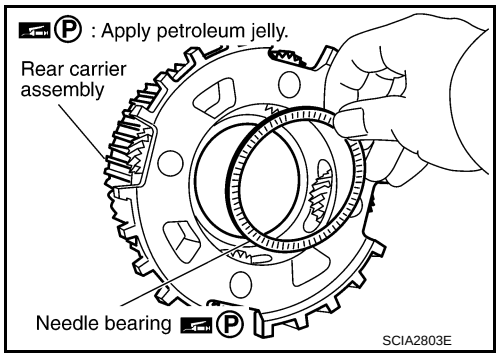
31. Install high and low reverse clutch hub, mid sun gear assembly, and rear sun gear assembly as a unit.



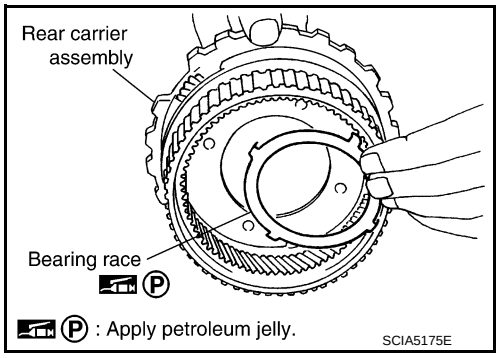
CAUTION:
Make sure that portion (A) of high and low reverse clutch drum protrudes approximately 2 mm (0.08 in) beyond portion (B) of rear sun gear.



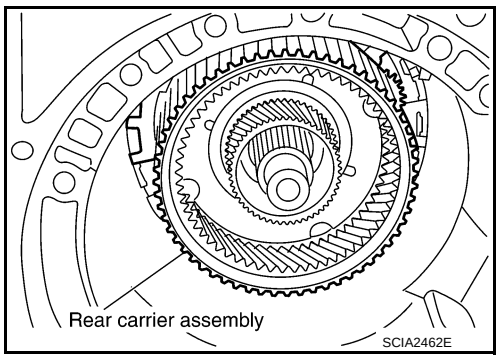
32. Install needle bearing to rear carrier assembly.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



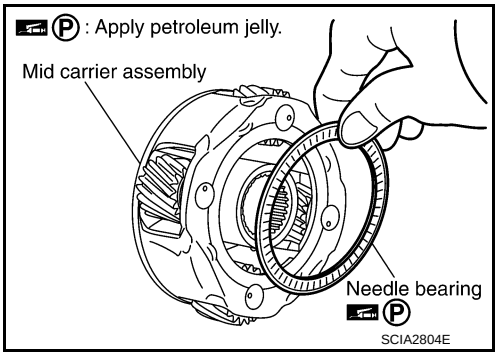
33. Install bearing race to rear carrier assembly.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



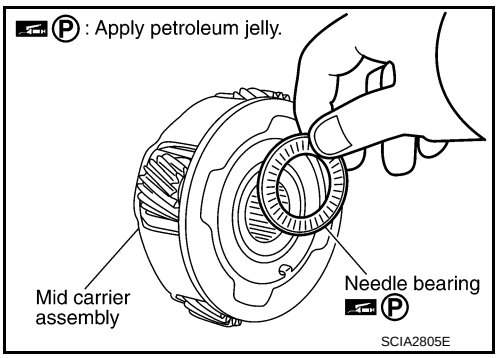
34. Install rear carrier assembly to direct clutch drum.



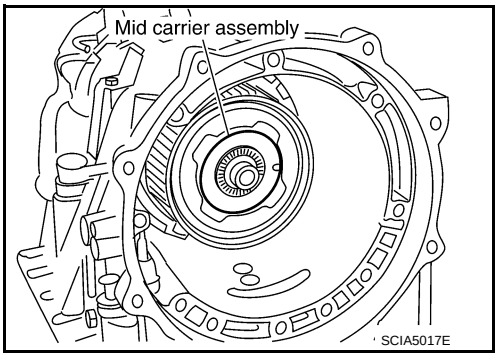
35. Install needle bearing (rear side) to mid carrier assembly.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



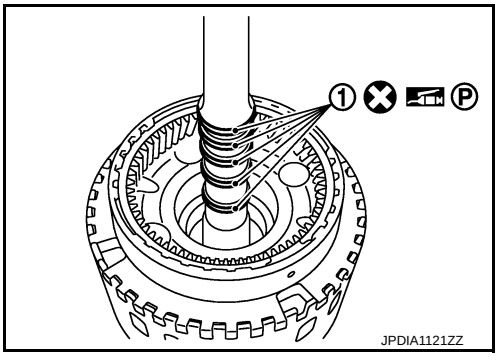
36. Install needle bearing (front side) to mid carrier assembly.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



37. Install mid carrier assembly to rear carrier assembly.



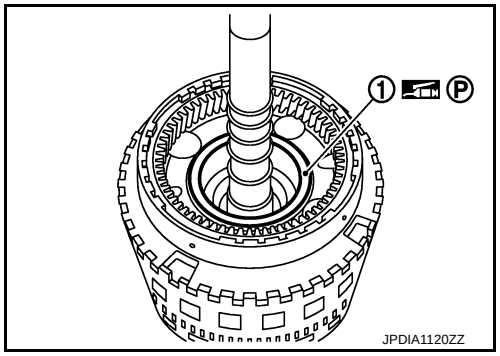
38. Install seal rings ① to input clutch assembly.



39. Install needle bearing ① to front carrier assembly.

CAUTION:

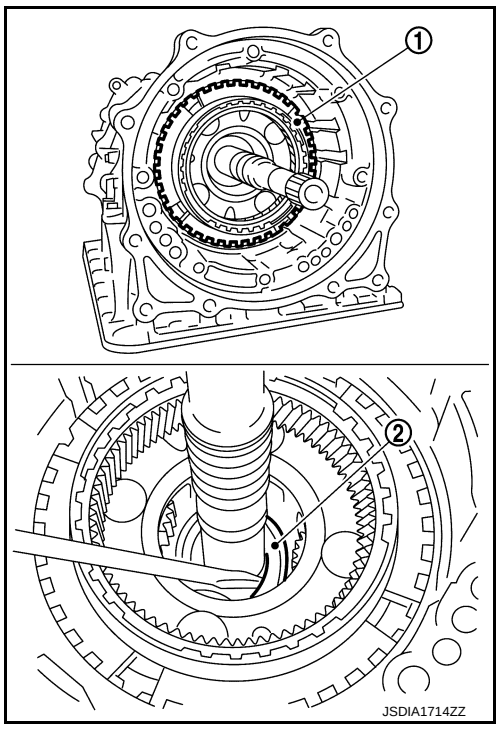
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



40. Install input clutch assembly (with front carrier assembly and rear internal gear) ① to transmission case.

CAUTION:

Check that the needle bearing ② is securely positioned. If the needle bearing position is misaligned, adjust it to the specified position.



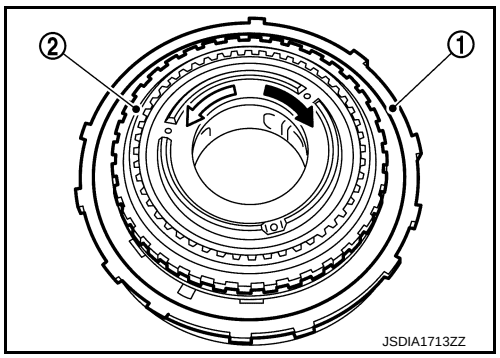
41. Install 1st one-way clutch ① to front brake hub (with under drive carrier) ②.
42. Check operation of 1st one-way clutch.

a. Hold 1st one-way clutch.

b. Check front brake hub for correct locking and unlocking directions.

⇦ : Unlocked

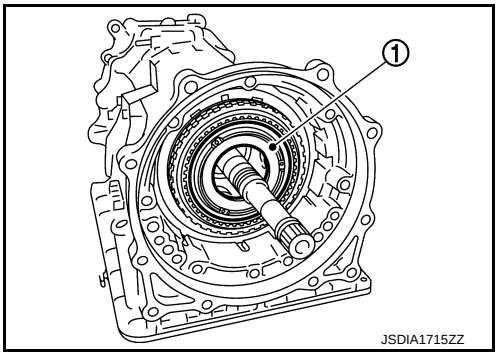
⇨ : Locked



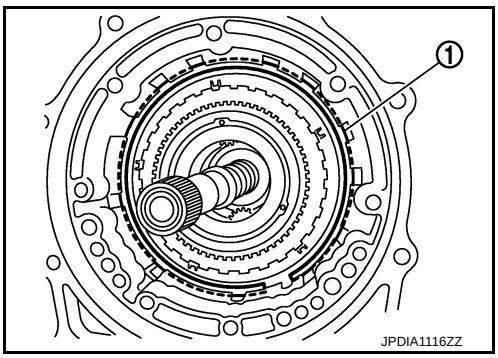
CAUTION:

If not shown in figure, check installation direction of 1st one-way clutch.

43. Install under drive carrier (with 1st one-way clutch) ① to transmission case.



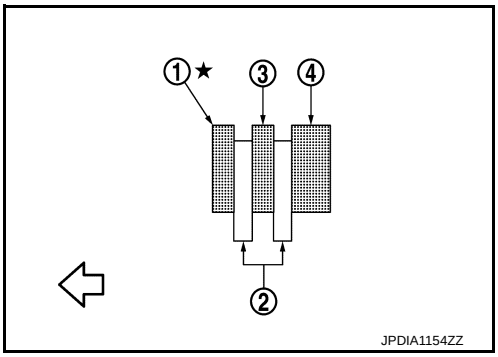
44. Install snap ring ① to transmission case.
CAUTION:
Be careful not to damage snap ring.



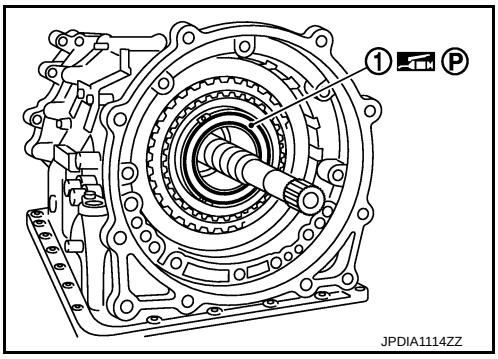
45. Install front brake component part (retaining plates, drive plates, and driven plate) to transmission case.

① : Retaining plate (thin)
② : Drive plate
③ : Driven plate
④ : Retaining plate (thick)
⇦ : Front

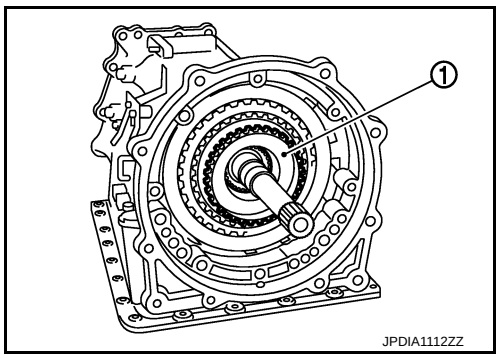
CAUTION:
Check order of plates.



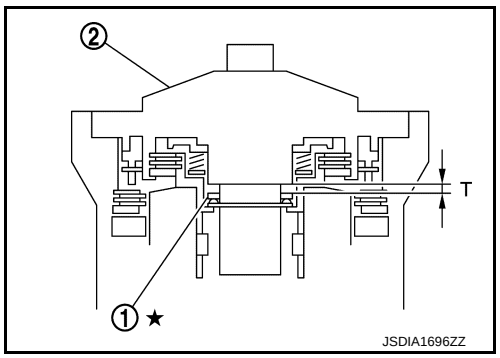
46. Install needle bearing ① to under drive carrier assembly.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



47. Install under drive sun gear ① to under drive carrier assembly.



48. Adjustment of total end play “T”.
    - Measure clearance between bearing race ① and oil pump cover ②.
    - Select proper thickness of bearing race so that end play is within specifications.

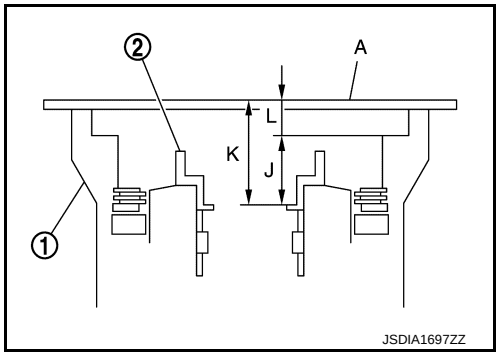


a. Measure dimensions “K” and “L”, and calculate dimension “J”.

① : Transmission case
② : Under drive sun gear
(A) : Straightedge

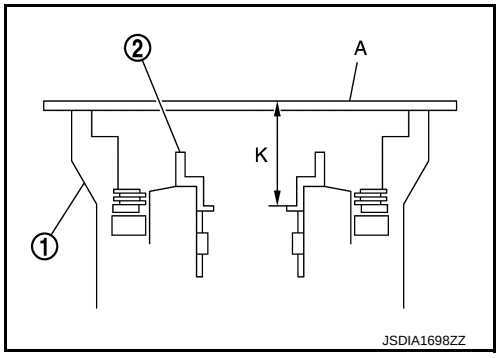
“J” : Distance between the oil pump fitting surface of transmission case and the needle bearing mating surface of under drive sun gear.

J = K – L



i. Measure dimension “K” between the converter housing fitting surface of transmission case and the needle bearing mating surface of under drive sun gear.

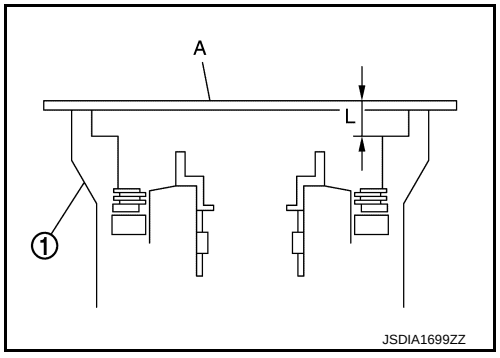
CAUTION:
- **Never change the straightedge (A) installation position before the completion of “L” measurement.**
- **Measure dimension “K” in at least three places, and take the average.**



ii. Measure dimension “L” between the converter housing fitting surface of transmission case and the oil pump fitting surface of transmission case.

① : Transmission case
(A) : Straightedge

CAUTION:
Measure dimension “L” in at least three places, and take the average.

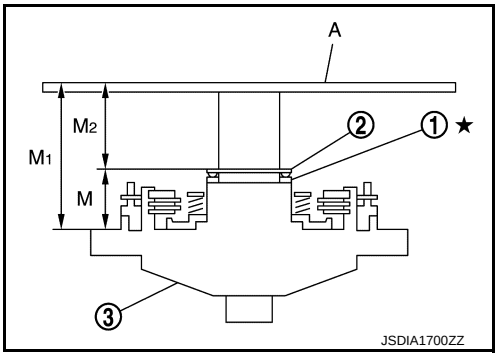


iii. Measure dimension “K” and “L” in at least three places, and take the average.

iv. Calculate dimension “J”.

J = K – L

b. Measure dimensions “M_1” and “M_2”, and calculate dimension “M”.

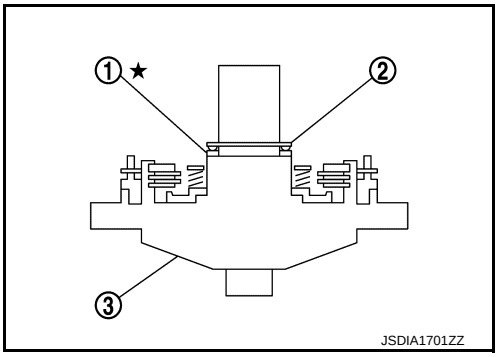


① : Bearing race
② : Needle bearing
③ : Oil pump assembly
(A) : Straightedge

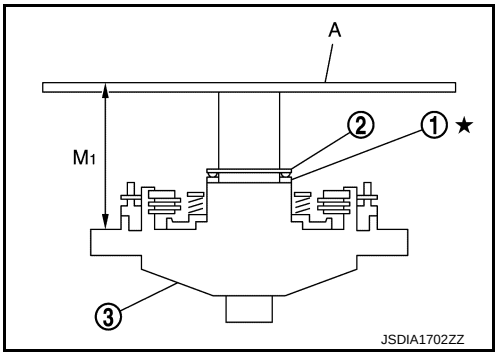
“M” : Distance between the transmission case fitting surface of oil pump and the needle bearing on oil pump.

M = M_1– M_2

i. Place bearing race ① and needle bearing ② on oil pump assembly ③.



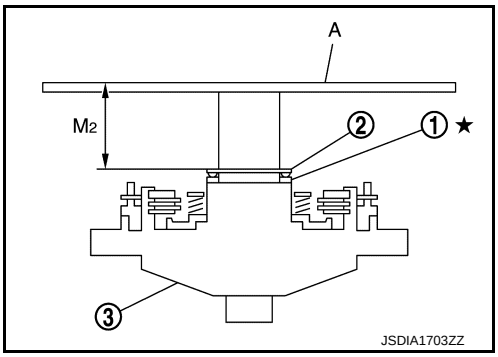
ii. Measure dimension “M_1” between the transmission case fitting surface of oil pump and the end of oil pump.



① : Bearing race
② : Needle bearing
③ : Oil pump assembly
(A) : Straightedge

CAUTION:
Measure dimension “M_1” in at least three places, and take the average.

iii. Measure dimension “M_2” between the needle bearing on oil pump and the end of oil pump.



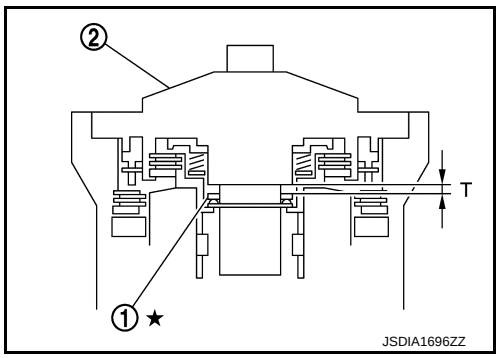
① : Bearing race
② : Needle bearing
③ : Oil pump assembly
(A) : Straightedge

CAUTION:
Measure dimension “M_2” in at least three places, and take the average.

iv. Calculate dimension “M”.

M = M_1– M_2

c. Adjust total end play “T”.



① : Bearing race
② : Oil pump assembly

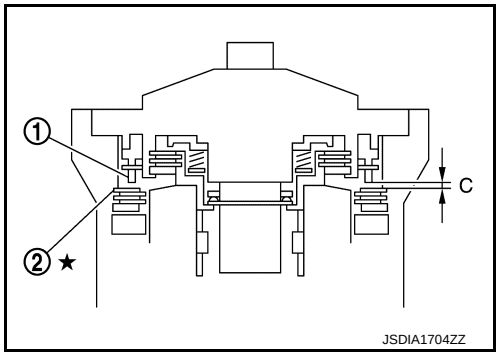
T = J – M

Total end play “T” : Refer to TM-337, "Total End Play".

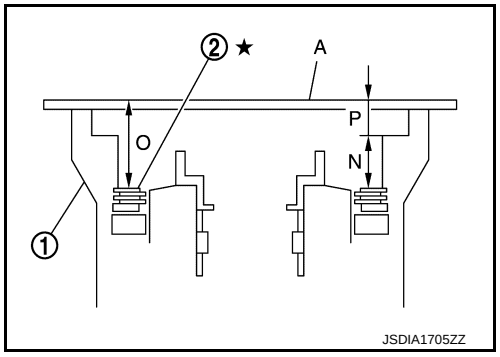
- Select proper thickness of bearing race so that total end play is within specifications.

Bearing races : Refer to TM-337, "Total End Play".

49. Adjustment of front brake clearance “C”.
- Measure clearance between front brake piston ① and front brake retaining plate ②.
- Select proper thickness of front brake retaining plat so that clearance is within specifications.



a. Measure dimensions “O” and “P”, and calculate dimension “N”.

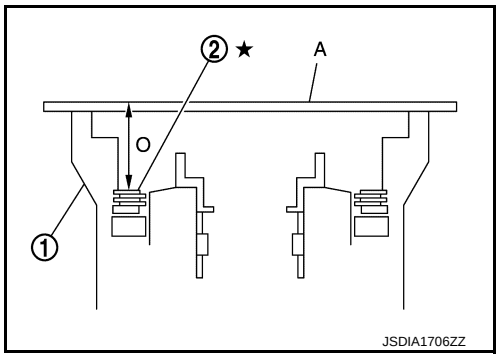


① : Transmission case
② : Front brake retaining plate
(A) : Straightedge

“N” : Distance between the oil pump fitting surface of transmission case and the front brake retaining plate.

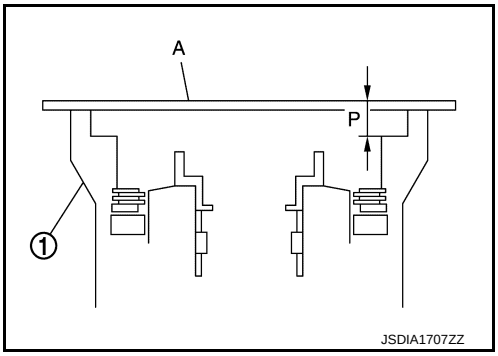
N = O – P

i. Measure dimension “O” between the converter housing fitting surface of transmission case ① and the front brake retaining plate ②.



CAUTION:
- **Never change the straightedge (A) installation position before the completion of “P” measurement.**
- **Measure dimension “O” in at least three places, and take the average.**

ii. Measure dimension “P” between the converter housing fitting surface of transmission case and the oil pump fitting surface of transmission case.



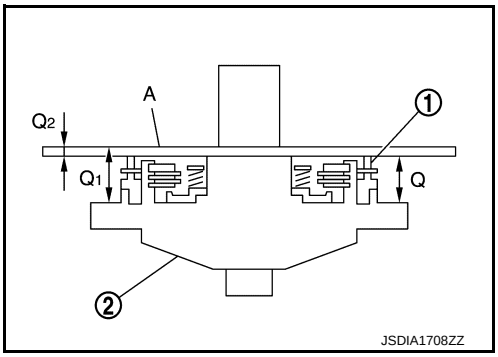
① : Transmission case
(A) : Straightedge

CAUTION:
Measure dimension “P” in at least three places, and take the average.

iii. Calculate dimension “N”.

N = O – P

b. Measure dimensions “Q_1” and “Q_2”, and calculate dimension “Q”.

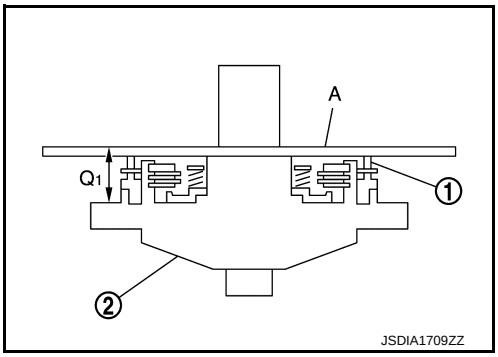


① : Front brake piston
② : Oil pump assembly
(A) : Straightedge

“Q” : Distance between the transmission case fitting surface of oil pump and the front brake piston.

$Q = Q_1 – Q_2$

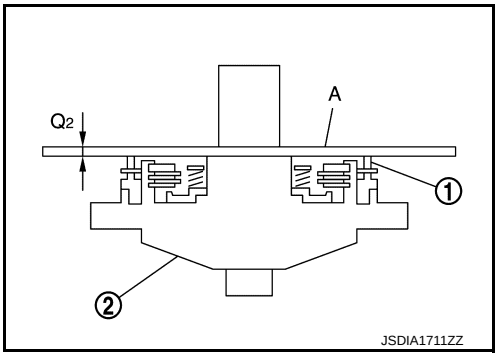
i. Measure dimension “Q_1” between the transmission case fitting surface of oil pump and the straightedge on front brake piston.



① : Front brake piston
② : Oil pump assembly
(A) : Straightedge

CAUTION:
Measure dimension “Q_1” in at least three places, and take the average.

ii. Measure dimension “Q_2” of the straightedge.



① : Front brake piston
② : Oil pump assembly
(A) : Straightedge

iii. Calculate dimension “Q”.

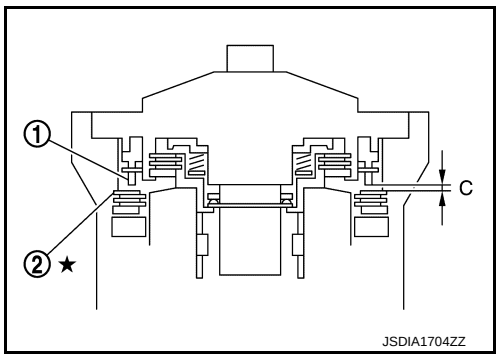
$Q = Q_1 – Q_2$

c. Adjust front brake clearance “C”.

① : Front brake piston
② : Front brake retaining plate

C = N – Q

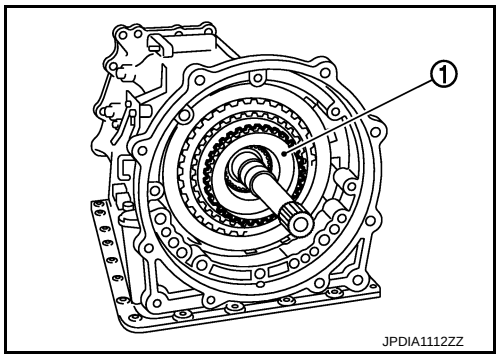
Front brake clearance “C” : Refer to TM-337, "Front Brake Clearance".



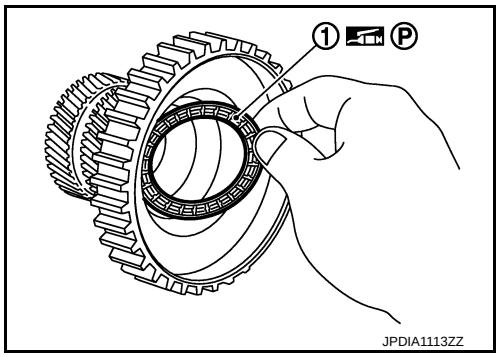
- Select proper thickness of retaining plate so that front brake clearance is within specifications.

Retaining plate : Refer to TM-337, "Front Brake Clearance".

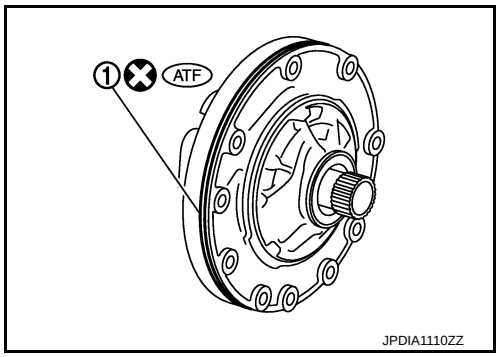
50. Remove under drive sun gear ① from under drive carrier assembly.



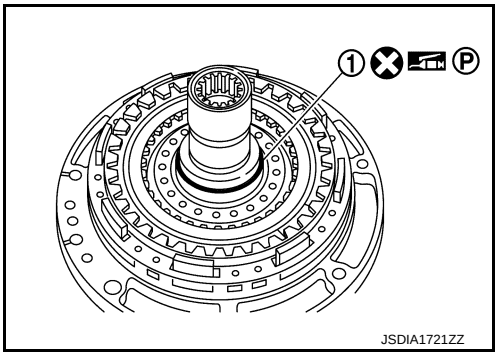
51. Install needle bearing ① to under drive sun gear.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



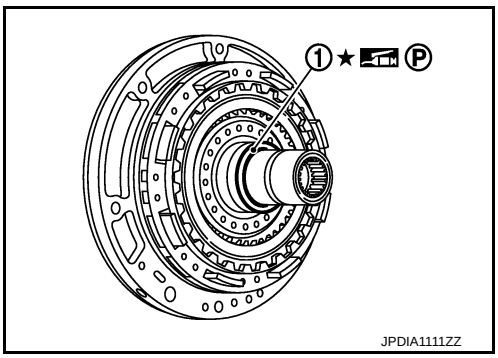
52. Install O-ring ① to oil pump assembly.



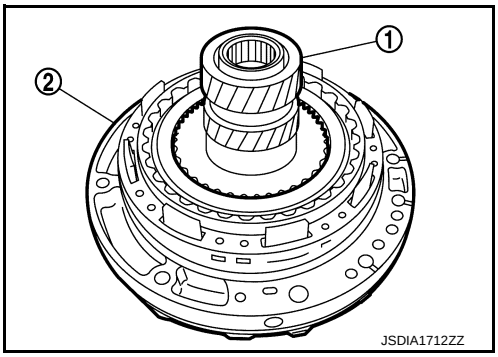
53. Install seal ring ① to oil pump assembly.



54. Install bearing race ① to oil pump assembly.



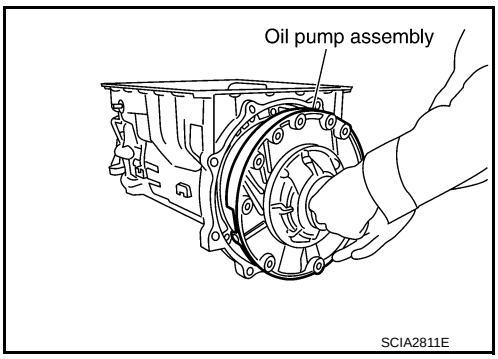
55. Install under drive sun gear (with needle bearing) ① to oil pump assembly ②.



56. Install oil pump assembly (with under drive sun gear) to transmission case.

CAUTION:

Apply ATF to oil pump bearing.

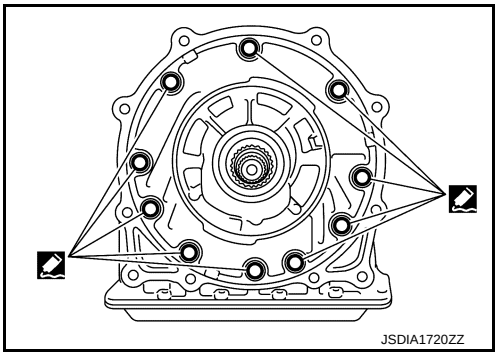


57. Apply recommended sealant to oil pump assembly as shown in the figure.

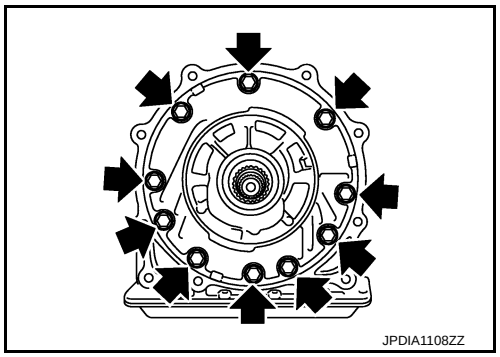
: Genuine RTV silicone sealant or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".

CAUTION:

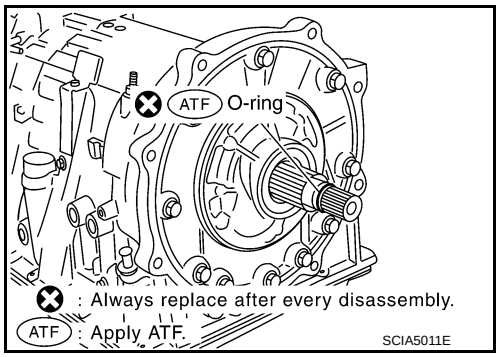
Completely remove all moisture, oil and old sealant, etc. from the oil pump mounting bolts and oil pump mounting bolt mounting surfaces.



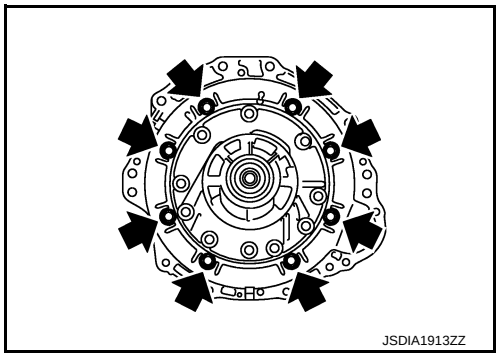
58. Tighten oil pump bolts (⬅) to the specified torque.



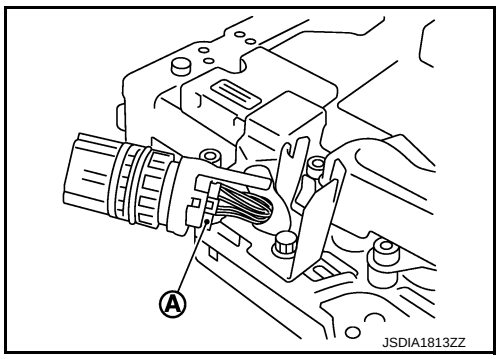
59. Install O-ring to input clutch assembly.



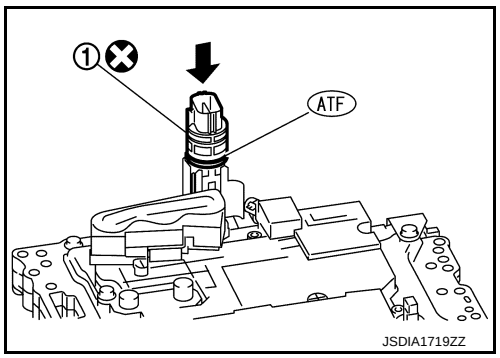
60. Install converter housing to transmission case, and tighten converter housing bolts (⬅) to the specified torque.



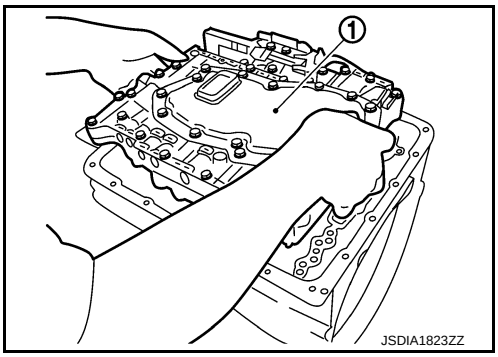
61. Connect TCM connector Ⓐ to joint connector.



62. Install joint connector ① to the control valve & TCM.
CAUTION:
Apply ATF to O-ring of joint connector.

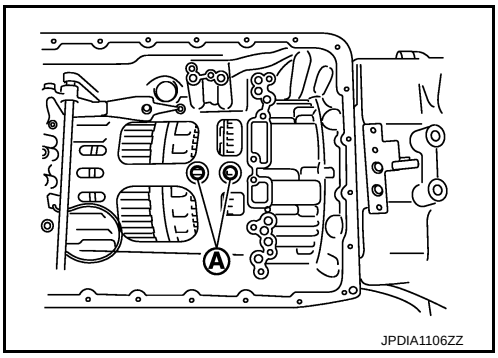


63. Install the control valve & TCM ① to transmission case.

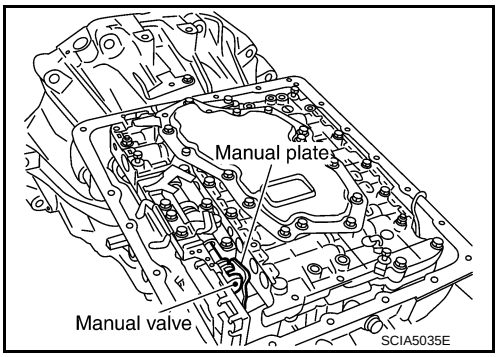


CAUTION:

- **Make sure that input speed sensor securely installs input speed sensor holes Ⓐ.**
- **Hang down output speed sensor harness toward outside so as not to disturb installation of the control valve & TCM.**
- **Adjust joint connector of the control valve & TCM to terminal hole of transmission case.**

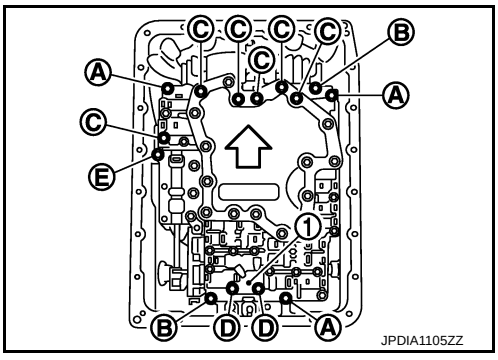


- **Assemble it so that manual valve cutout is engaged with manual plate projection.**



64. Install bolts and clip ① to the control valve & TCM. Tighten bolt Ⓔ to the specified torque before tightening the other than bolts.

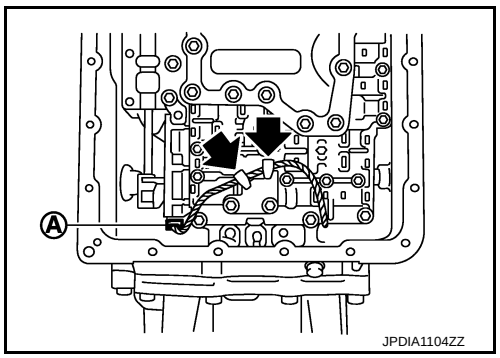
⇦ : Front



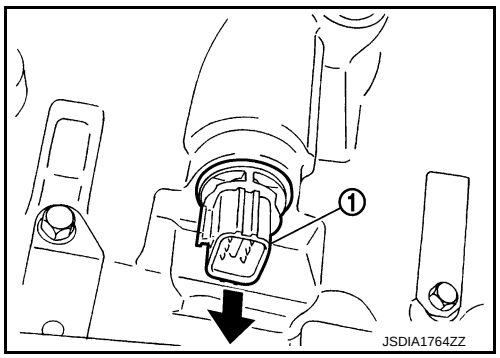
Bolt symbol	Length mm (in)	Number of bolts
Ⓐ	43 (1.69)	3
Ⓑ	40 (1.57)	2
Ⓒ	54 (2.13)	6
Ⓓ	50 (1.97)	2
Ⓔ*	50 (1.97)	1

*: Reamer bolt

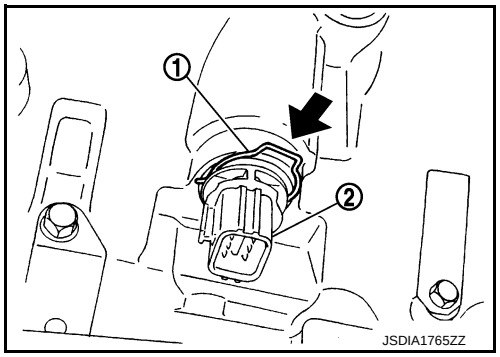
65. Connect output speed sensor connector (A).
66. Engage output speed sensor harness with terminal clips (⬅).



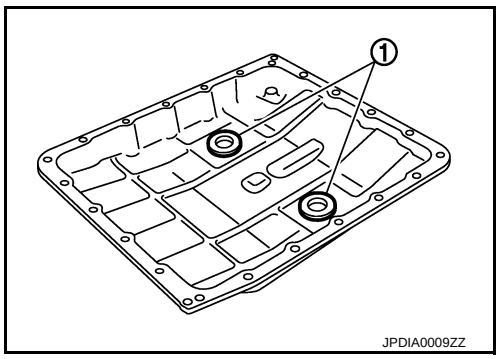
67. Pull down joint connector ①.
CAUTION:
Be careful not to damage connector.



68. Install snap ring ① to joint connector ②.



69. Install magnets ① to oil pan.
70. Install oil pan gasket to transmission case.
CAUTION:
- **Never reuse oil pan gasket.**
- **Install it in the direction to align hole positions.**
- **Completely remove all moisture, oil and old gasket, etc. from oil pan gasket mounting surface.**

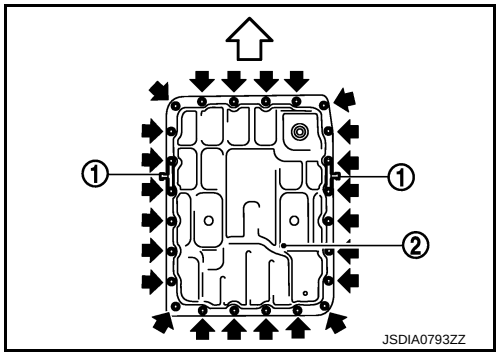


71. Install oil pan ② and clips ① to transmission case.

⇦ : Front

⬅ : Oil pan mounting bolt

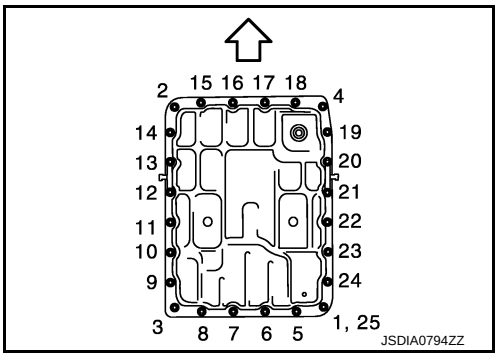
CAUTION:
- **Be careful not to pinch harnesses.**
- **Completely remove all moisture, oil and old gasket, etc. from oil pan mounting surface.**



72. Tighten oil pan mounting bolts to the specified torque in numerical order shown in the figure after temporarily tightening them. Tighten oil pan mounting bolts to the specified torque.

⇦ : Front

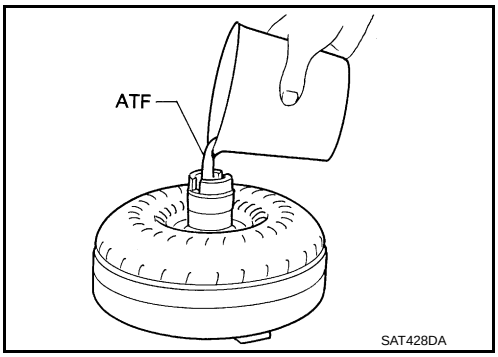
CAUTION:
Never reuse oil pan mounting bolts.



73. Install drain plug to oil pan. Tighten drain plug to the specified torque.

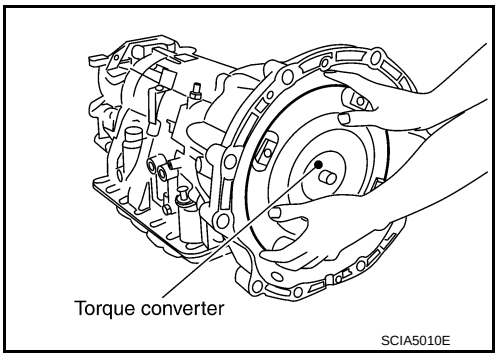
CAUTION:
Never reuse drain plug gasket.

74. Pour ATF into torque converter.
- **Approximately 2 liter (2-1/8 US qt, 1-3/4 Imp qt) of ATF is required for a new torque converter.**
- **When reusing old torque converter, add the same amount of ATF as was drained.**



75. Install torque converter while aligning notches of torque converter with notches of oil pump.

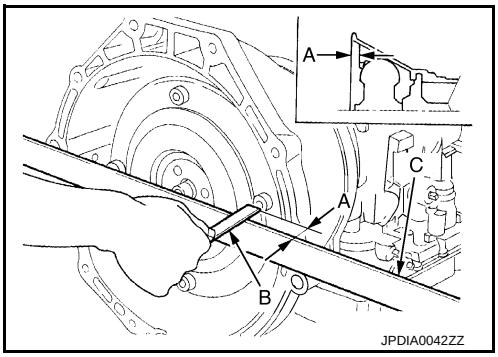
CAUTION:
Install torque converter while rotating it.



76. Measure dimension “A” to make sure that torque converter is in proper position.

(B) : Scale
(C) : Straightedge

Dimension (A) : Refer to TM-336, "Torque Converter".



Inspection

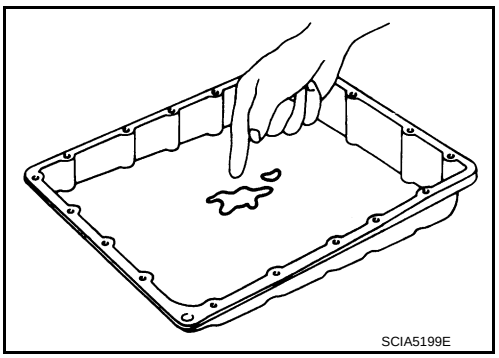
INFOID:0000000009236150

INSPECTION AFTER DISASSEMBLY

Oil Pan

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.

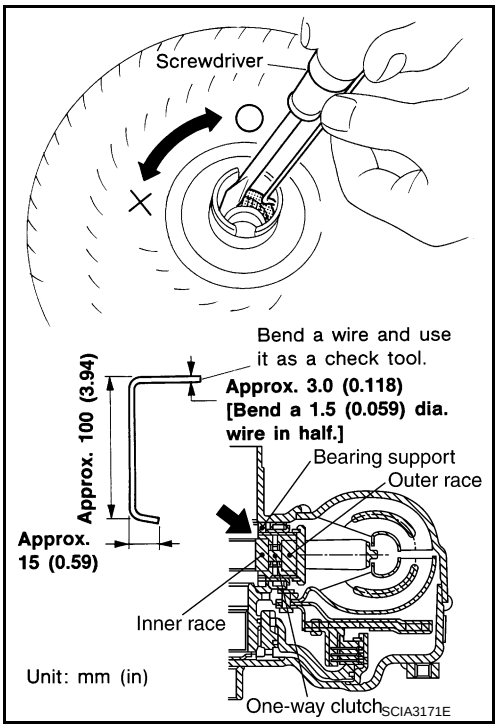
- **If frictional material is detected, perform A/T fluid cooler cleaning. Refer to TM-101, "Cleaning".**


SCIA5199E

Torque Converter

Check torque converter one-way clutch using a check tool as shown at figure.

1. Insert a check tool into the groove of bearing support built into one-way clutch outer race.
2. When fixing bearing support with a check tool, rotate one-way clutch spline using a screwdriver.
3. Make sure that inner race rotates clockwise only. If not, replace torque converter assembly.



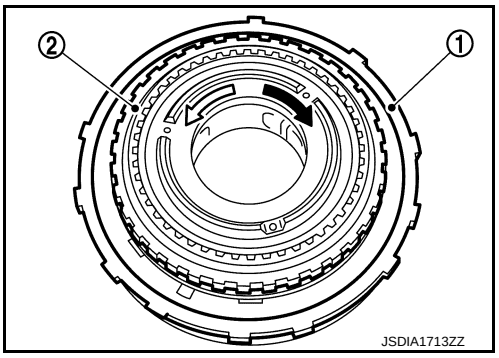
1st One-way Clutch

Check operation of 1st one-way clutch.

1. Install 1st one-way clutch ① to front brake hub (with under drive carrier).
2. Hold 1st one-way clutch.
3. Check front brake hub for correct locking and unlocking directions. If necessary, replace 1st one-way clutch.

⬅ : Unlocked

⇦ : Locked



Under Drive Sun Gear

Check for deformation, fatigue or damage. If necessary, replace the under drive sun gear.

Mid Carrier Assembly

Check for deformation, fatigue or damage. If necessary, replace the mid carrier assembly.

Rear Carrier Assembly

Check for deformation, fatigue or damage. If necessary, replace the rear carrier assembly.

Reverse Brake Retaining Plate/Drive Plates/Driven Plates/Dish Plates

Check facing for burns, cracks or damage. If necessary, replace the damaged plate.

Front Brake Retaining Plates/Drive Plates/Driven Plate

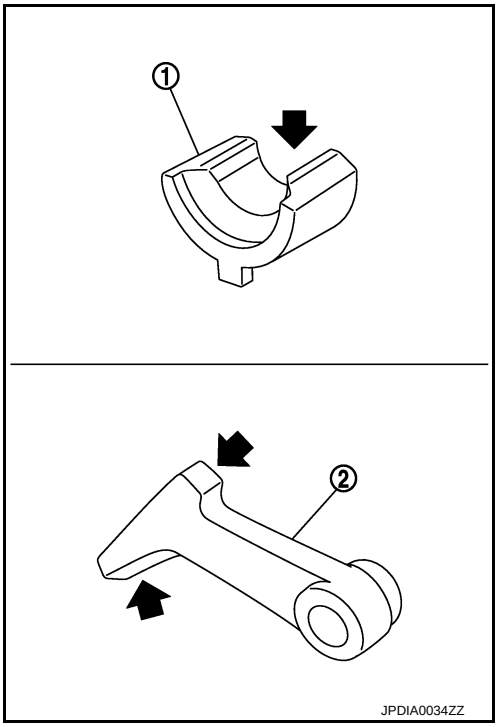
Check facing for burns, cracks or damage. If necessary, replace the damaged plate.

Each Snap Ring

Check for deformation, fatigue or damage. If necessary, replace the snap ring.

Parking Actuator Support and Parking Pawl

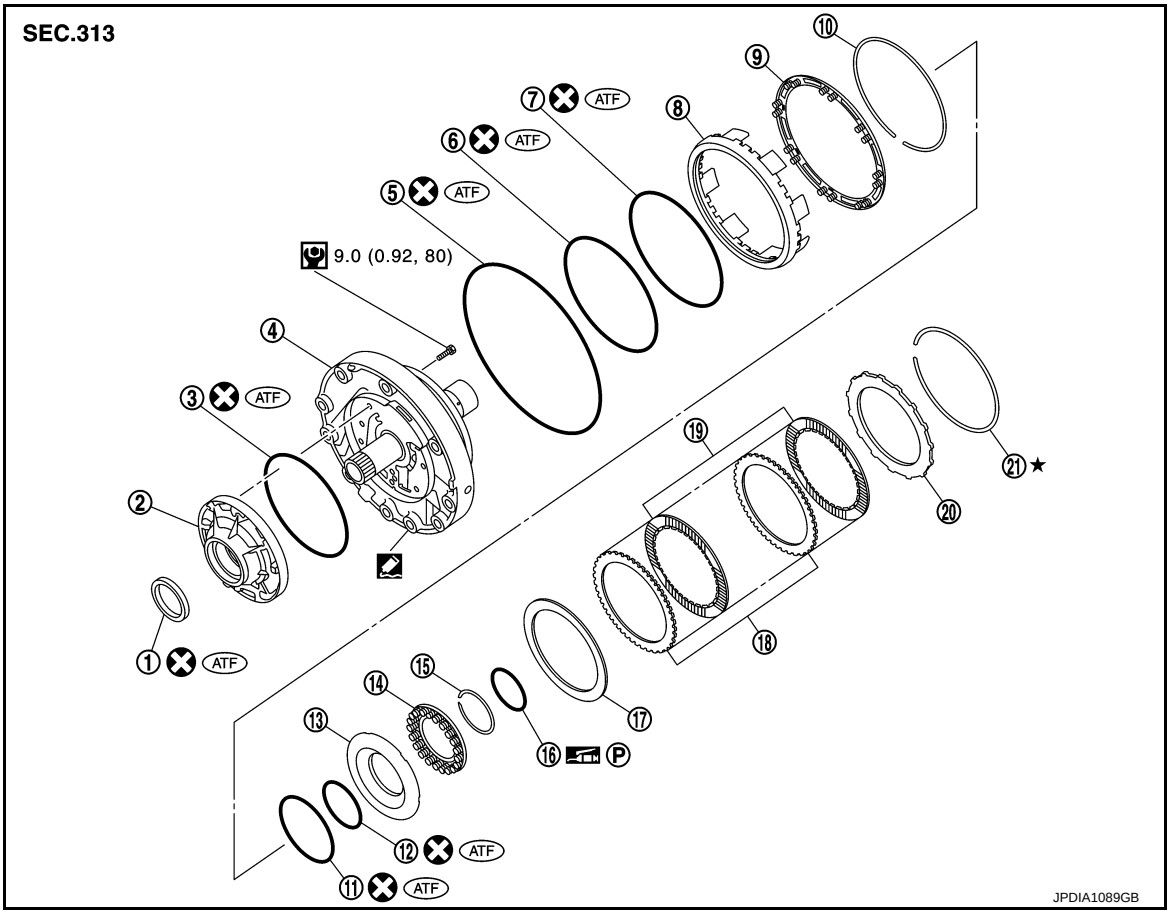
If the contact surface on parking actuator support ① and parking pawl ② has excessive wear, abrasion, bend or any other damage, replace the components.



OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

Exploded View

INFOID:0000000009236151



① Oil pump housing oil seal	② Oil pump housing	③ O-ring
④ Oil pump cover	⑤ O-ring	⑥ D-ring
⑦ D-ring	⑧ Front brake piston	⑨ Front brake spring retainer
⑩ Snap ring	⑪ D-ring	⑫ D-ring
⑬ 2346 brake piston	⑭ 2346 brake spring retainer	⑮ Snap ring
⑯ Seal ring	⑰ 2346 brake dish plate	⑱ 2346 brake driven plate
⑲ 2346 brake drive plate	⑳ 2346 brake retaining plate	㉑ Snap ring

: Always replace after every disassembly.

: N·m (kg-m, in-lb)

★ : Select with proper thickness.

ATF : Apply ATF.

Ⓟ : Apply petroleum jelly.

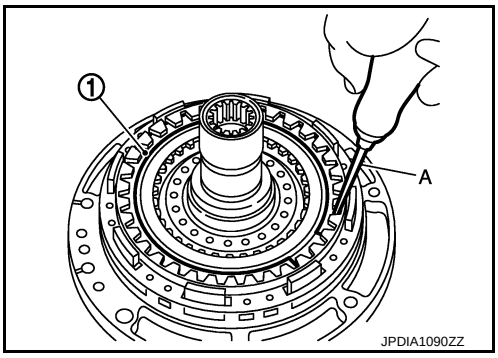
: Apply Genuine RTV silicone sealant or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".

Disassembly

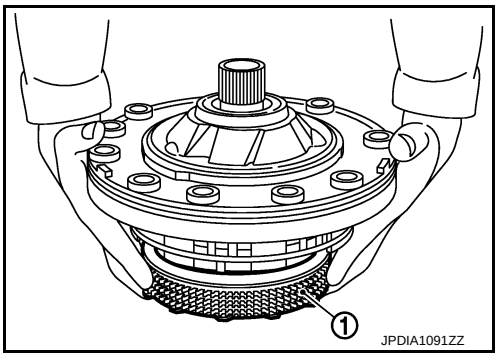
INFOID:0000000009236152

1. Remove snap ring ① from oil pump assembly using a flat-bladed screwdriver (A).

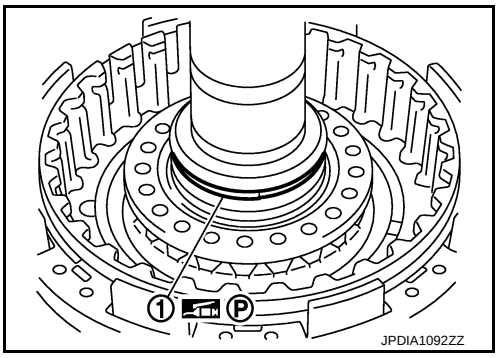
CAUTION:
- **Be careful not to scratch oil pump cover and 2346 brake retaining plate.**
- **Be careful not to damage snap ring.**



2. Remove 2346 brake component part (retaining plate, drive plates, driven plates and dish plate) ① from oil pump assembly.

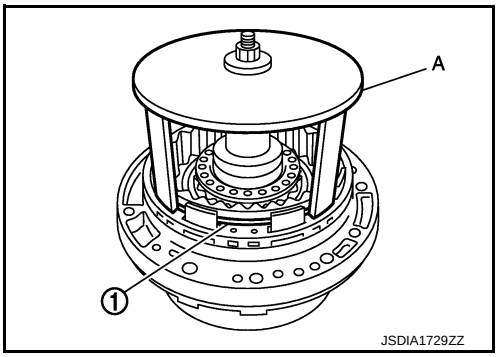


3. Remove seal ring ① from oil pump assembly.

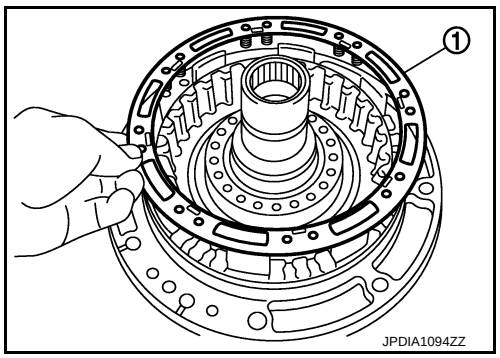


4. Set the clutch spring compressor (SST: KV31103800) (A) on front brake spring retainer and remove snap ring (fixing front brake spring retainer) ① from oil pump assembly while compressing return spring.

CAUTION:
Be careful not to expand snap ring excessively.



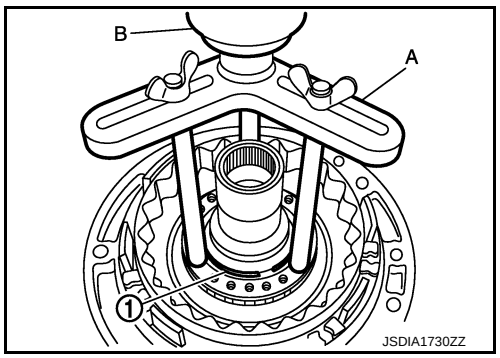
5. Remove front brake spring retainer ① from oil pump assembly.



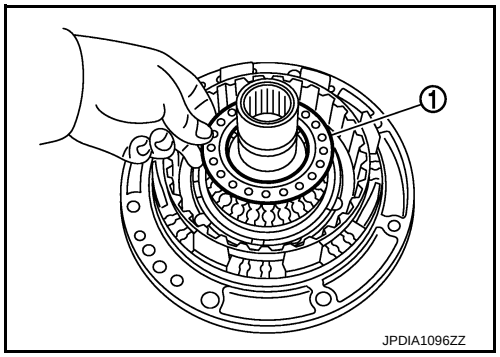
6. Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)] (A) on 2346 brake spring retainer and remove snap ring (fixing 2346 brake spring retainer) ① from oil pump assembly while compressing return spring.

B : Press

CAUTION:
Be careful not to expand snap ring excessively.



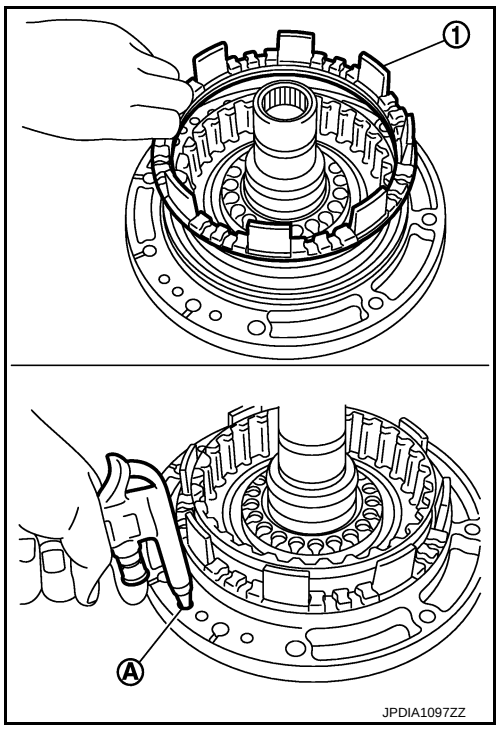
7. Remove 2346 brake spring retainer ① from oil pump assembly.



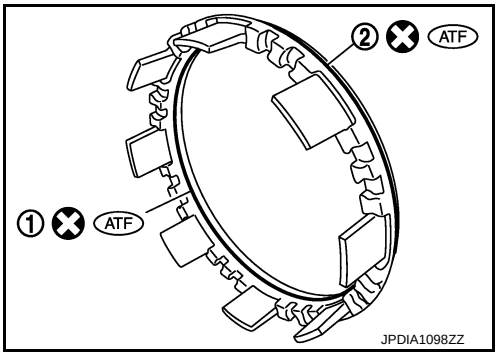
8. Remove front brake piston ① from oil pump assembly with compressed air. Refer to TM-261, "Oil Channel".

Ⓐ : Front brake pressure hole

CAUTION:
Care should be taken not to abruptly blow air. It makes piston incline, as the result, it becomes hard to disassemble the piston.



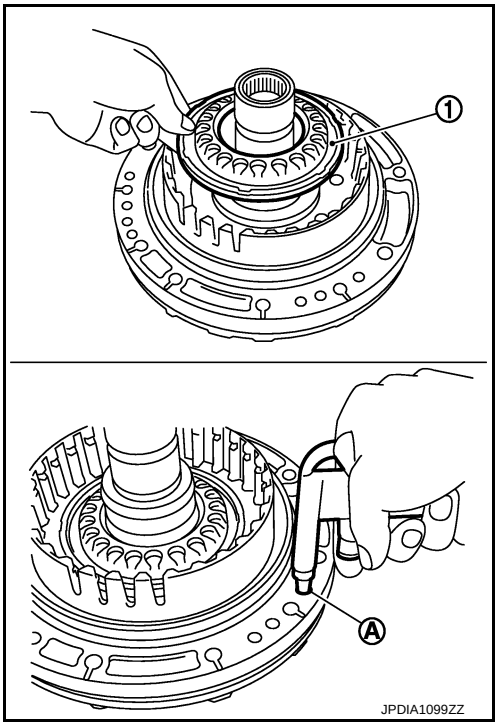
9. Remove D-ring (inner) ① and D-ring (outer) ② from front brake piston.



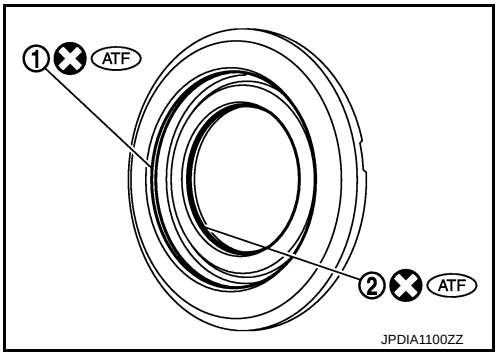
10. Remove 2346 brake piston ① from oil pump assembly with compressed air. Refer to TM-261, "Oil Channel".

Ⓐ : 2346 brake pressure hole

CAUTION:
Care should be taken not to abruptly blow air. It makes piston incline, as the result, it becomes hard to disassemble the piston.

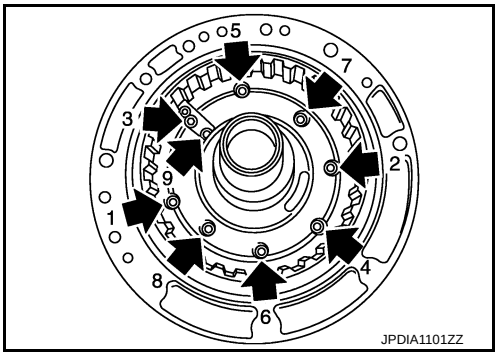


11. Remove D-ring (large) ① and D-ring (small) ② from 2346 brake piston.

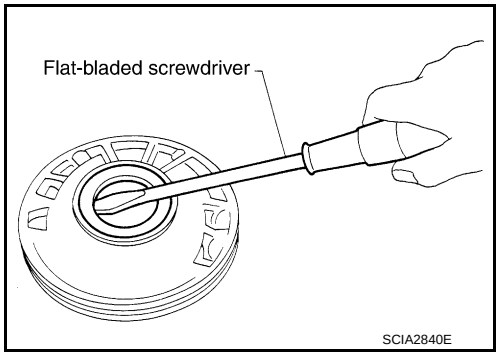


12. loosen bolts in numerical order shown in the figure and remove oil pump housing from oil pump cover.

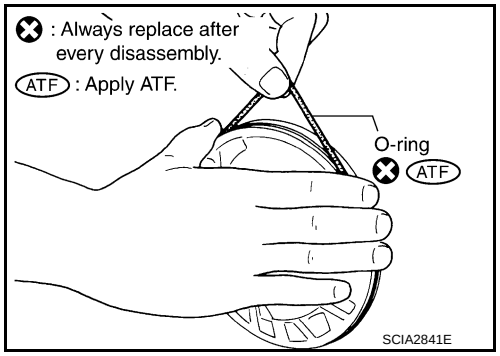
⬅ : Bolt



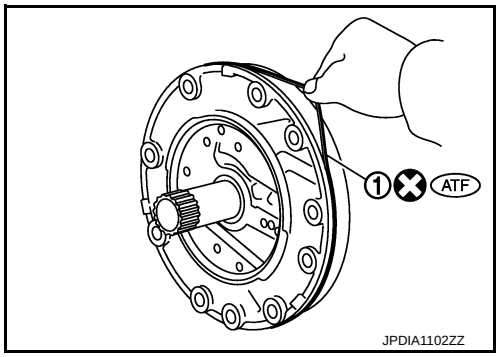
13. Remove oil pump housing oil seal using a flat-bladed screwdriver.
CAUTION:
Be careful not to scratch oil pump housing.



14. Remove O-ring from oil pump housing.



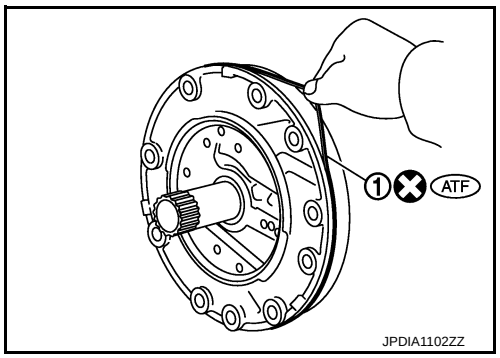
15. Remove O-ring ① from oil pump cover.



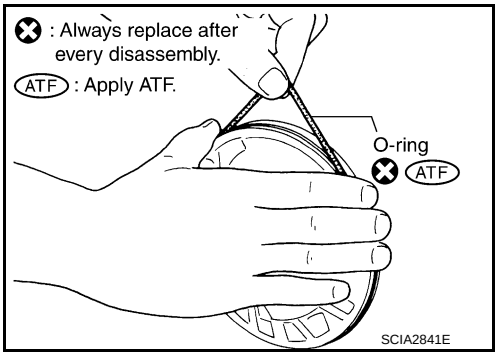
Assembly

INFOID:0000000009236153

1. Install O-ring ① to oil pump cover.



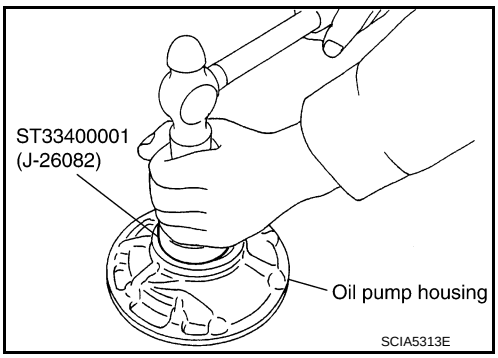
2. Install O-ring to oil pump housing.



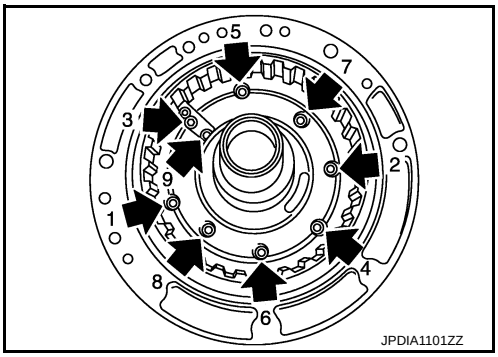
3. Using the drift, install oil pump housing oil seal to the oil pump housing until it is flush.

CAUTION:

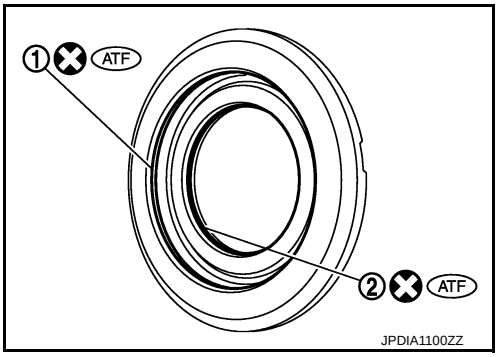
- **Never reuse oil seal.**
- **Apply ATF to oil seal.**



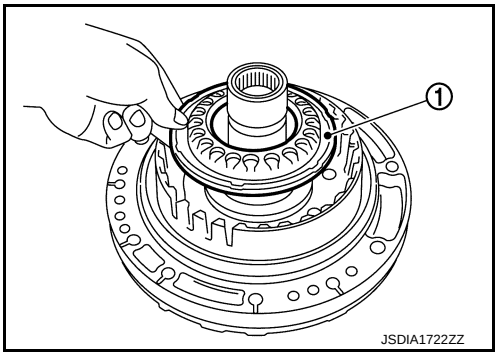
4. Install oil pump housing to oil pump cover and tighten bolts (⬅) to the specified torque in numerical order shown in the figure after temporarily tightening them.



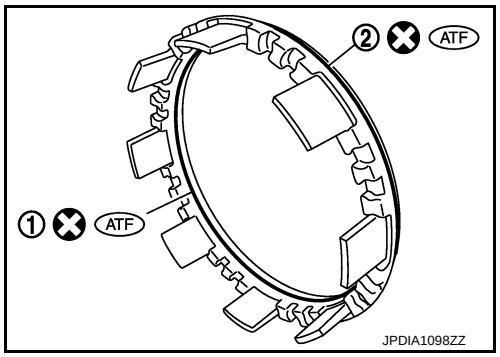
5. Install D-ring (large) ① and D-ring (small) ② to 2346 brake piston.



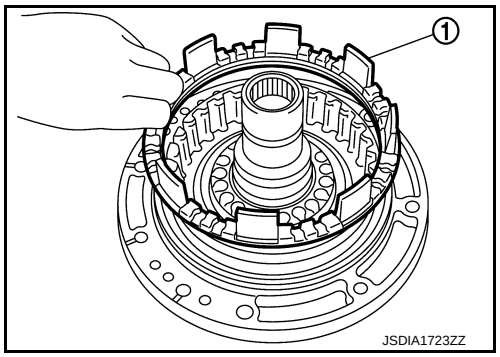
6. Install 2346 brake piston ① to oil pump assembly.



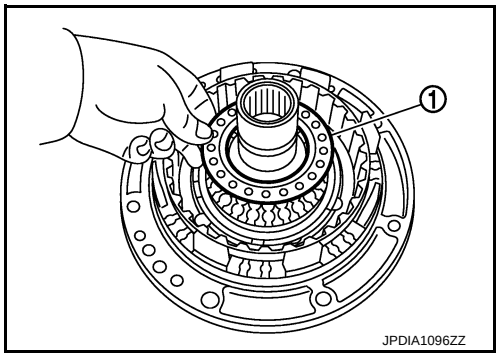
7. Install D-ring (inner) ① and D-ring (outer) ② to front brake piston.



8. Install front brake piston ① to oil pump assembly.



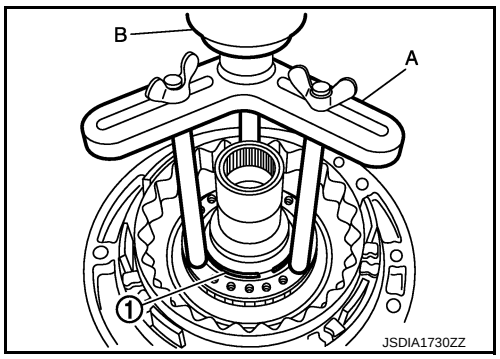
9. Install 2346 brake spring retainer ① to oil pump assembly.



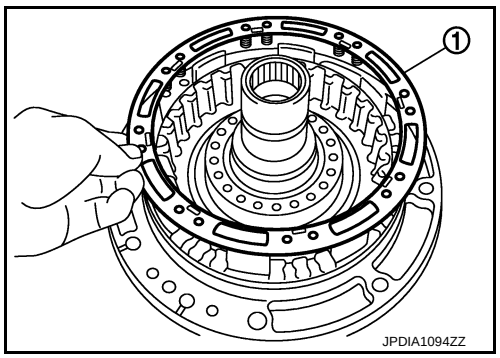
10. Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)] (A) on 2346 brake spring retainer and install snap ring (fixing 2346 brake spring retainer) ① to oil pump assembly while compressing return spring.

(B) : Press

CAUTION:
Be careful not to expand snap ring excessively.



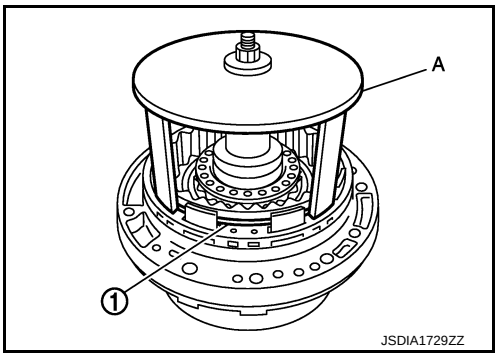
11. Install front brake spring retainer ① to oil pump assembly.



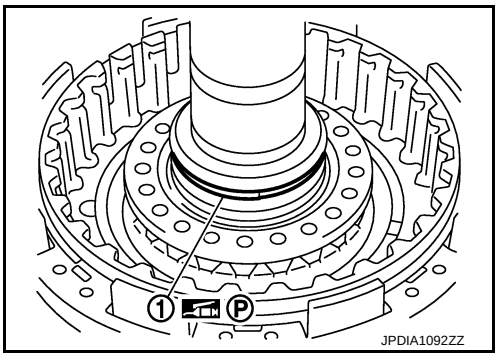
12. Set the clutch spring compressor (SST: KV31103800) (A) on front brake spring retainer and install snap ring (fixing front brake spring retainer) ① to oil pump assembly while compressing return spring.

CAUTION:

Be careful not to expand snap ring excessively.

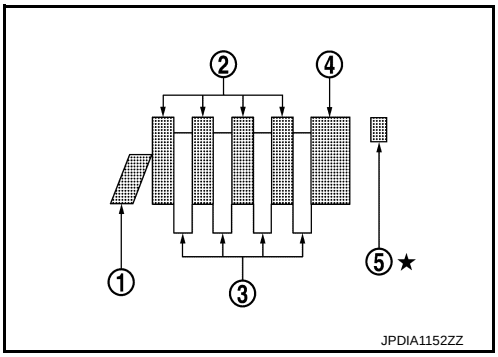


13. Install seal ring ① to oil pump assembly.



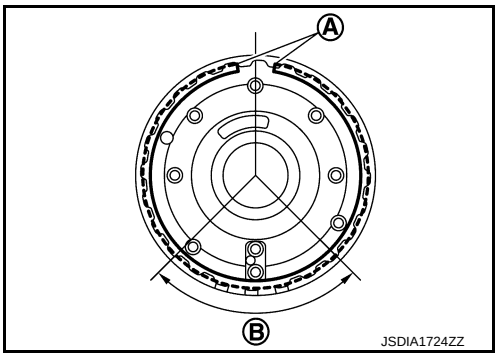
14. Install 2346 brake component part (retaining plate, drive plates, driven plates, dish plate and snap ring) to oil pump assembly.

① : Dish plate
② : Driven plate (four pieces)
③ : Drive plate (four pieces)
④ : Retaining plate
⑤ : Snap ring



CAUTION:

- **Check the order of plates.**
- **Never install snap ring mating part (A) to the clearance groove [(B) shown in the figure] of oil pump cover.**



Inspection and Adjustment

INFOID:0000000009236154

INSPECTION AFTER DISASSEMBLY

Each Snap Ring
Check for deformation, fatigue or damage. If necessary, replace snap ring.

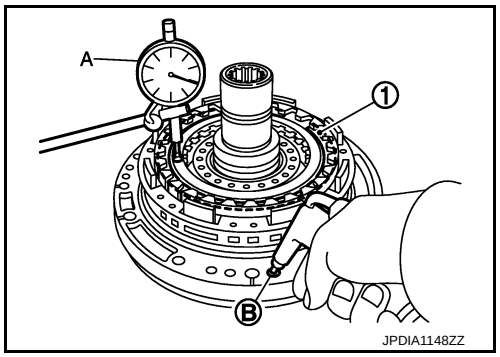
Each Spring Retainer
Check for deformation, fatigue or damage. If necessary, replace spring retainer.

2346 Brake Retaining Plate/Drive Plates/Driven Plates/Dish Plate
Check facing for burns, cracks or damage. If necessary, replace the damaged plate.

INSPECTION AFTER ASSEMBLY

2346 Brake Clearance

Set a dial indicator (A) as shown in the figure. Blow air into 2346 brake oil pressure hole Ⓑ, and measure 2346 brake clearance. If clearance is outside the specified value, adjust clearance by selecting an appropriate snap ring ①. Refer to TM-261, "Oil Channel".



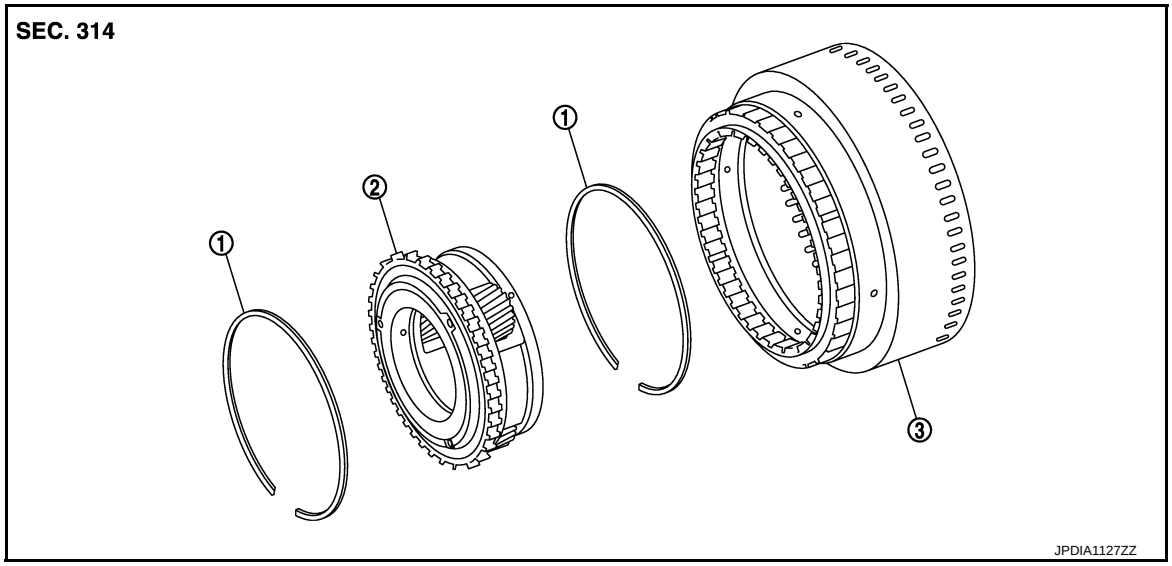
Air pressure	**: 300 kPa (3.06 kg/cm^2, 43.5 psi)**
2346 brake clearance	**: Refer to TM-337, "2346 Brake Clearance".**

CAUTION:
Never exceed the specified air pressure value.

UNDER DRIVE CARRIER, FRONT BRAKE HUB

Exploded View

INFOID:0000000009236155

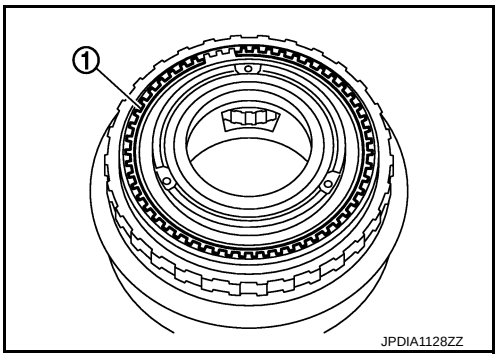


① Snap ring ② Under drive carrier assembly ③ Front brake hub

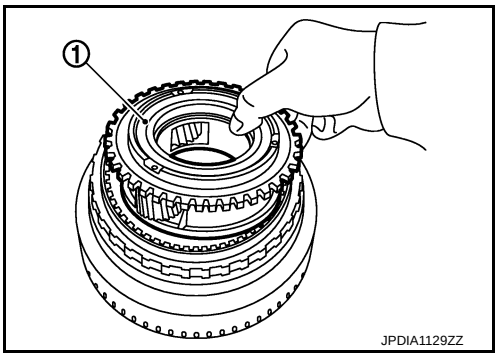
Disassembly

INFOID:0000000009236156

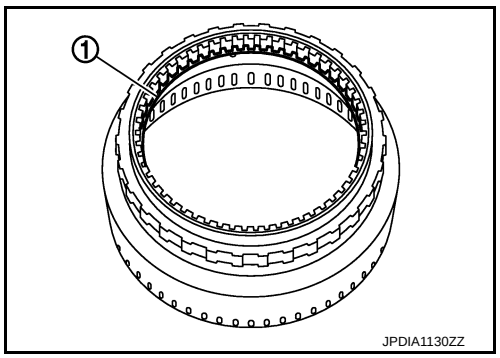
1. Remove snap ring ① from front brake hub using a flat-bladed screwdriver.
   CAUTION:
   - **Be careful not to scratch front brake hub and under drive carrier assembly.**
   - **Be careful not to damage snap ring.**



2. Remove under drive carrier assembly ① from front brake hub.



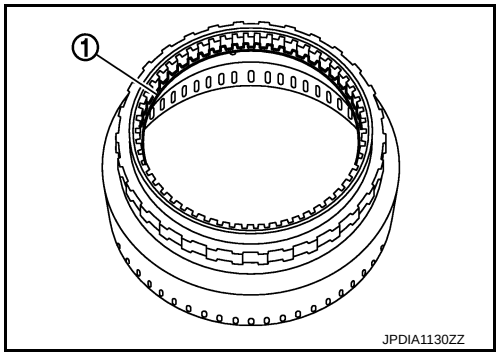
3. Remove snap ring ① from front brake hub using a flat-bladed screwdriver.
CAUTION:
- **Be careful not to scratch front brake hub.**
- **Be careful not to damage snap ring.**



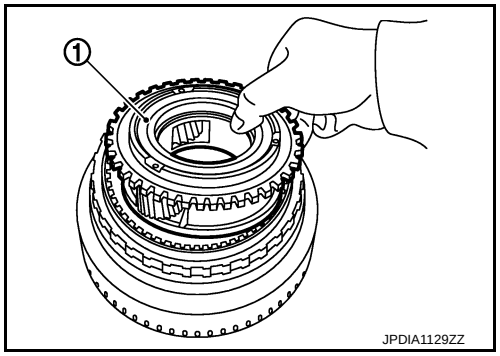
Assembly

INFOID:0000000009236157

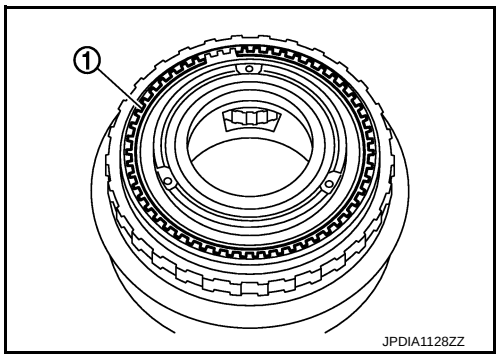
1. Install snap ring ① to front brake hub.
CAUTION:
Be careful not to damage snap ring.



2. Install under drive carrier assembly ① to front brake hub.



3. Install snap ring ① to front brake hub using a flat-bladed screwdriver.
CAUTION:
- **Be careful not to scratch front brake hub.**
- **Be careful not to damage snap ring.**



Inspection

INFOID:0000000009236158

INSPECTION AFTER DISASSEMBLY

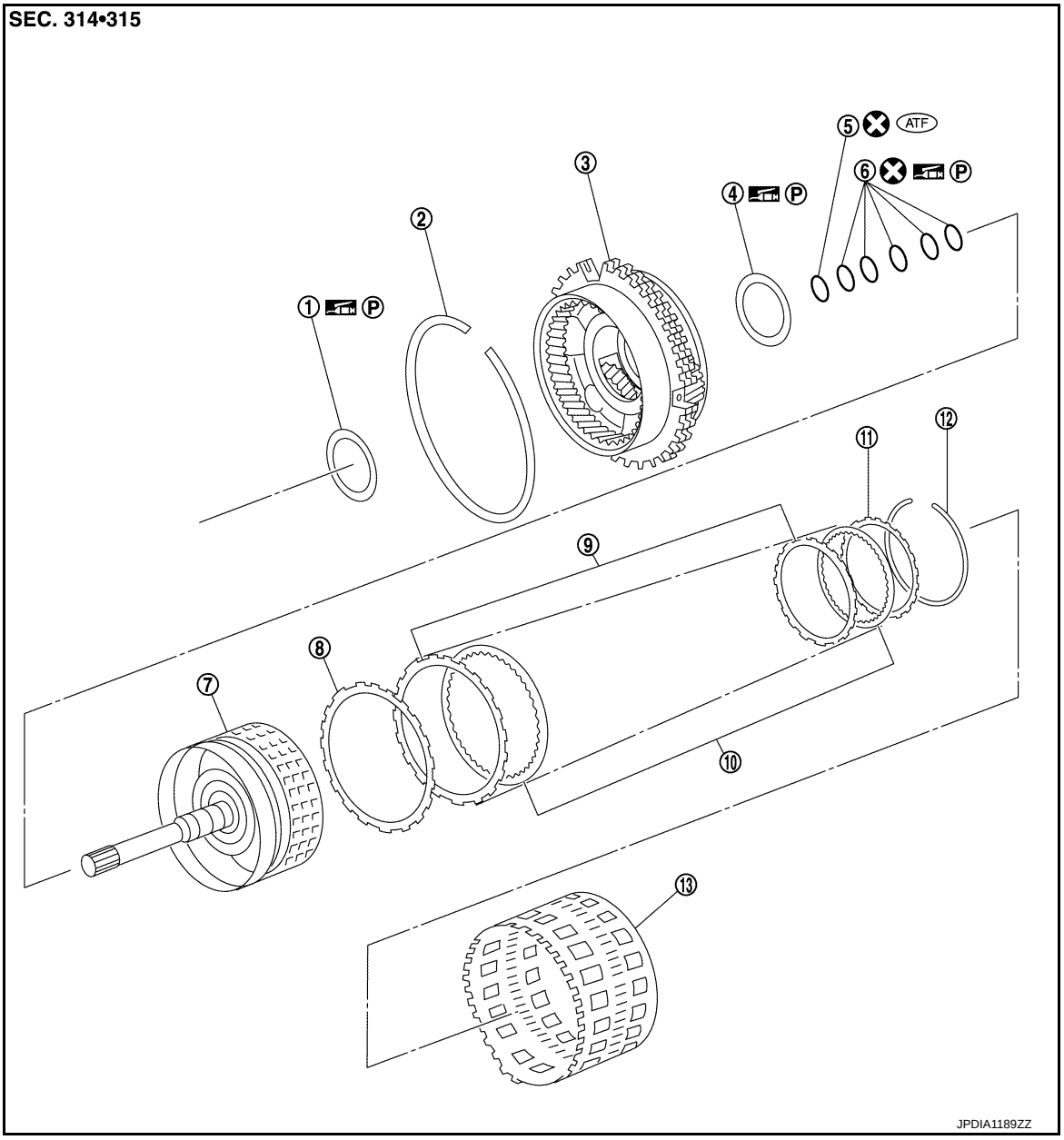
- Each Snap Ring
  Check for deformation, fatigue or damage. If necessary, replace snap ring.
- Under Drive Carrier Assembly
  Check for deformation, fatigue or damage. If necessary, replace under drive carrier assembly.
- Front Brake Hub

Check for deformation, fatigue or damage. If necessary, replace front brake hub.

FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

Exploded View

INFOID:0000000009236159



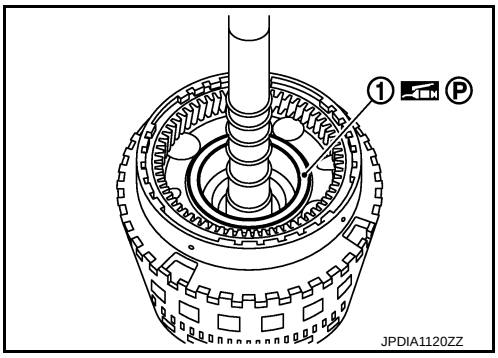
① Needle bearing
② Snap ring
③ Front carrier assembly
④ Needle bearing
⑤ O-ring
⑥ Seal ring
⑦ Input clutch drum
⑧ Input clutch dish plate
⑨ Input clutch driven plate
⑩ Input clutch drive plate
⑪ Input clutch retaining plate
⑫ Snap ring
⑬ Rear internal gear

: Always replace after every disassembly.
ATF : Apply ATF.
P : Apply petroleum jelly.

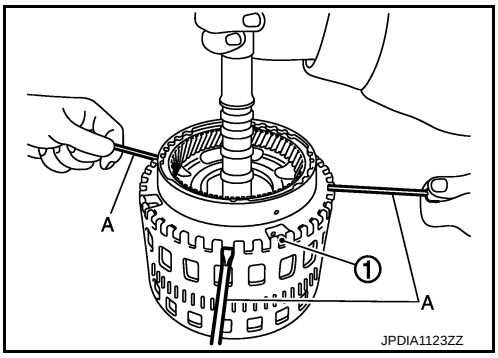
Disassembly

INFOID:0000000009236160

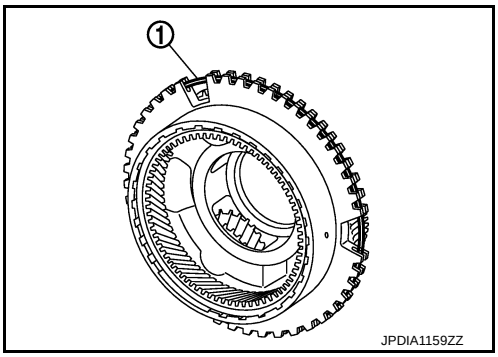
1. Remove needle bearing ① from front carrier assembly.



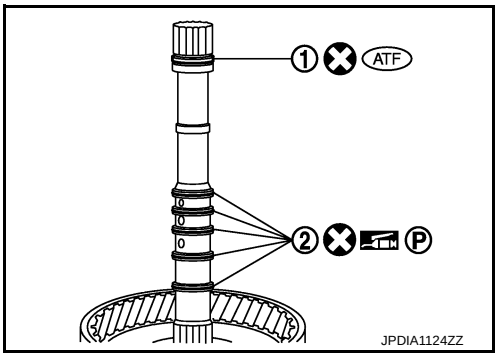
2. Compress snap ring ① using flat-bladed screwdrivers (A).
   CAUTION:
   - **Be careful not to scratch rear internal gear.**
   - **Be careful not to damage snap ring.**
3. Remove front carrier assembly and input clutch assembly from rear internal gear.
4. Remove front carrier assembly from input clutch assembly.



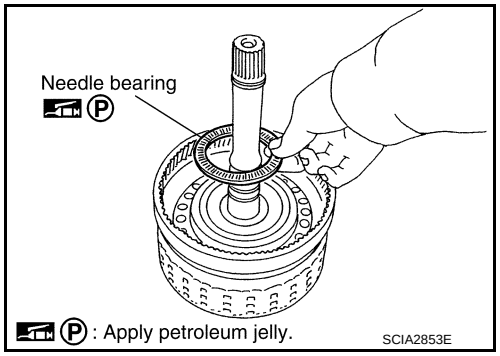
5. Remove snap ring ① from front carrier assembly.
   CAUTION:
   Be careful not to expand snap ring excessively.



6. Remove O-ring ① and seal rings ② from input clutch assembly.

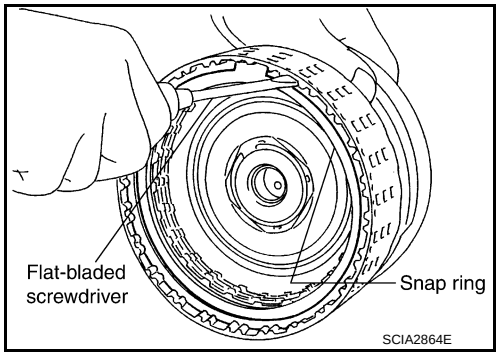


7. Remove needle bearing from input clutch assembly.



8. Remove snap ring from input clutch drum using a flat-bladed screwdriver.
CAUTION:
- **Be careful not to scratch rear input clutch drum and input clutch retaining plate.**
- **Be careful not to damage snap ring.**

9. Remove input clutch component part (drive plates, driven plates, retaining plate and dish plate) from input clutch drum.

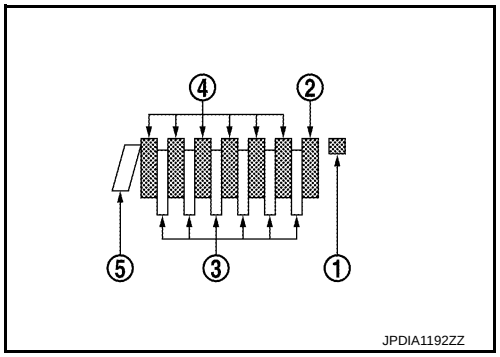


Assembly

INFOID:0000000009236161

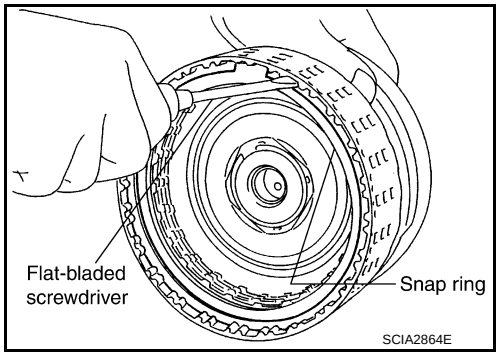
1. Install input clutch component part (dish plate, drive plates, driven plates and retaining plate) to input clutch drum.

① : Snap ring
② : Retaining plate
③ : Drive plate (six pieces)
④ : Driven plate (six pieces)
⑤ : Dish plate

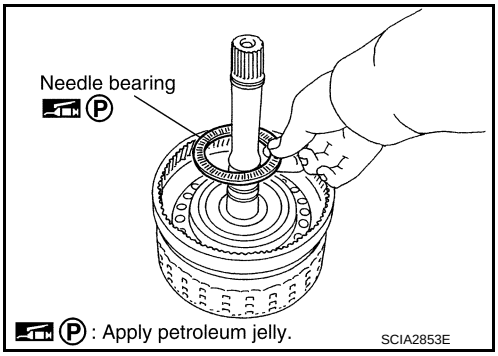


CAUTION:
Check order of plates.

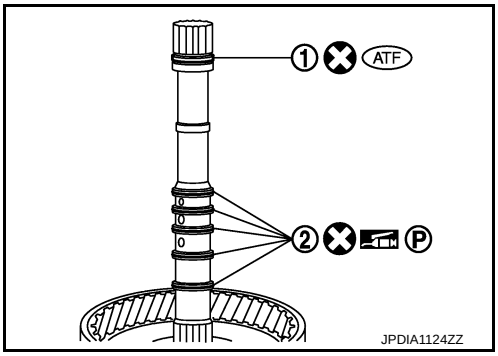
2. Install snap ring to input clutch drum using a flat-bladed screwdriver.
CAUTION:
- **Be careful not to scratch input clutch drum and input clutch retaining plate.**
- **Be careful not to damage snap ring.**



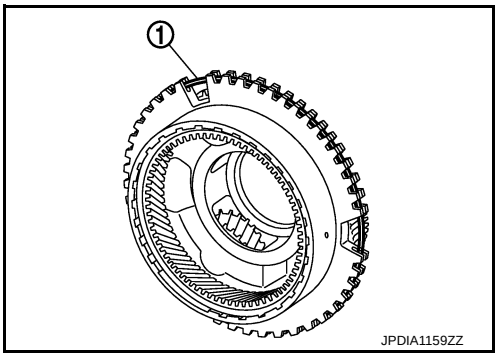
3. Install needle bearing to input clutch assembly.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



4. Install O-ring ① and seal rings ② to input clutch assembly.

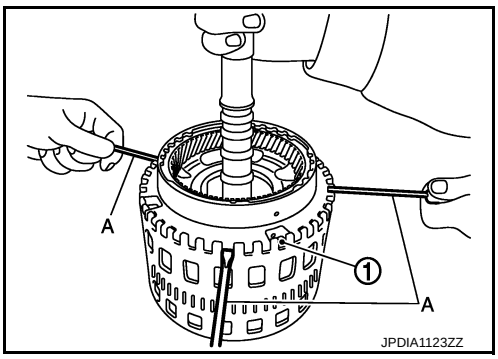


5. Install snap ring ① to front carrier assembly.
CAUTION:
Be careful not to expand snap ring excessively.

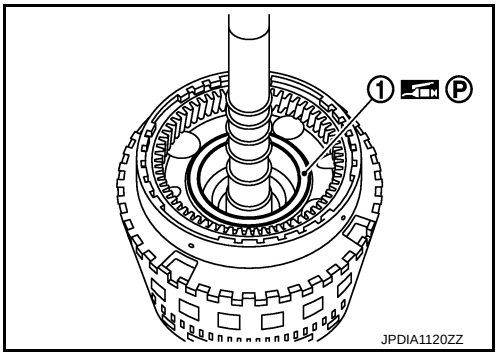


6. Compress snap ring ① using flat-bladed screwdrivers (A).
CAUTION:
- **Be careful not to scratch rear internal gear.**
- **Be careful not to damage snap ring.**

7. Install front carrier assembly and input clutch assembly to rear internal gear.



8. Install needle bearing ① to front carrier assembly.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



Inspection

INFOID:0000000009236162

INSPECTION AFTER DISASSEMBLY

Front Carrier Snap Ring
Check for deformation, fatigue or damage. If necessary, replace the snap ring.

Input Clutch Snap Ring
Check for deformation, fatigue or damage. If necessary, replace input clutch assembly.

Input Clutch Drum
Check for deformation, fatigue or damage or burns. If necessary, replace input clutch assembly.

Input Clutch Retaining Plate/Drive Plates/Driven Plates/Dish Plate
Check facing for burns, cracks or damage. If necessary, replace input clutch assembly.

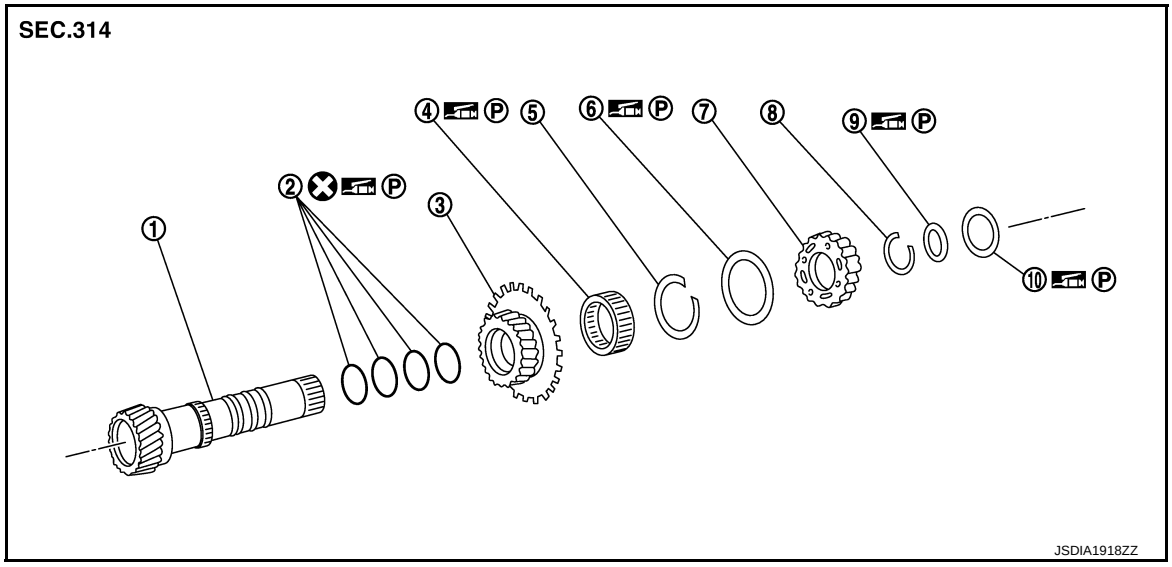
Front Carrier
Check for deformation, fatigue or damage. If necessary, replace front carrier assembly.

Rear Internal Gear
Check for deformation, fatigue or damage. If necessary, replace rear internal gear.

MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

Exploded View

INFOID:0000000009236163

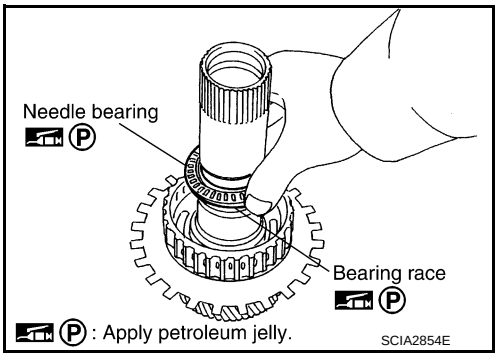


① Mid sun gear
② Seal ring
③ Rear sun gear
④ 2nd one-way clutch
⑤ Snap ring
⑥ Needle bearing
⑦ High and low reverse clutch hub
⑧ Snap ring
⑨ Bearing race
⑩ Needle bearing
⊗ : Always replace after every disassembly.
Ⓟ : Apply petroleum jelly.

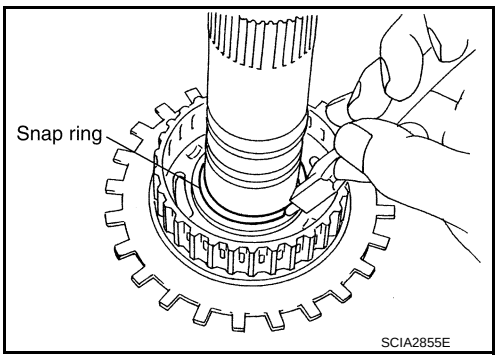
Disassembly

INFOID:0000000009236164

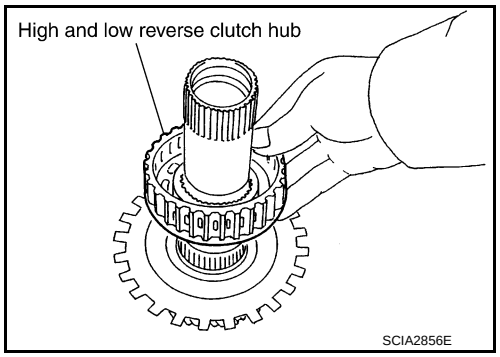
1. Remove needle bearing and bearing race from high and low reverse clutch hub.



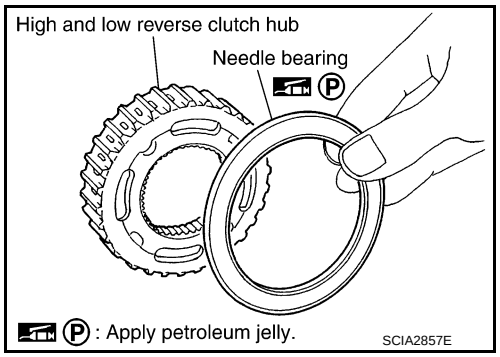
2. Remove snap ring from mid sun gear assembly using pair of snap ring pliers.
CAUTION:
Be careful not to expand snap ring excessively.



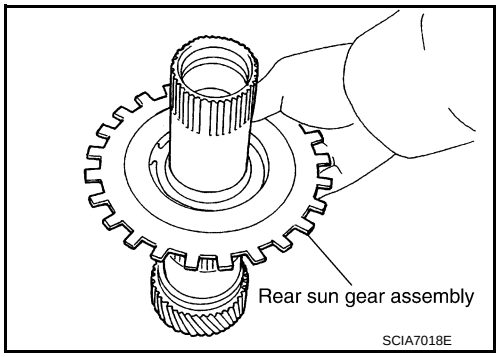
3. Remove high and low reverse clutch hub from mid sun gear assembly.



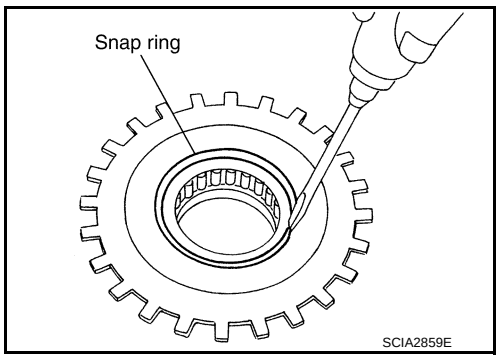
4. Remove needle bearing from high and low reverse clutch hub.



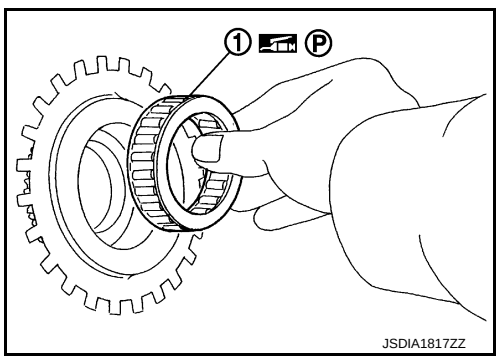
5. Remove rear sun gear assembly from mid sun gear assembly.



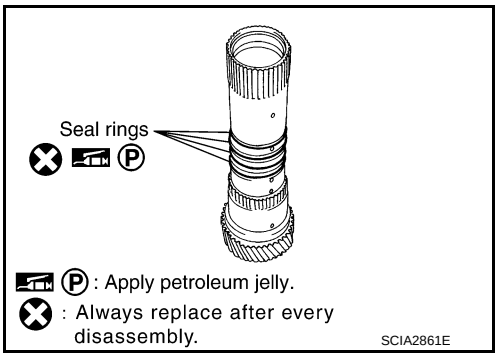
6. Remove snap ring from rear sun gear using a flat-bladed screwdriver.
CAUTION:
- **Be careful not to scratch rear sun gear and 2nd one-way clutch.**
- **Be careful not to damage snap ring.**



7. Remove 2nd one-way clutch from rear sun gear.



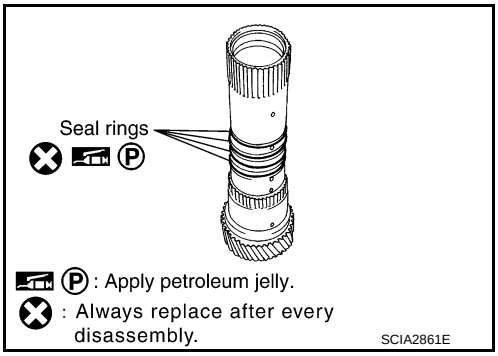
8. Remove seal rings from mid sun gear.



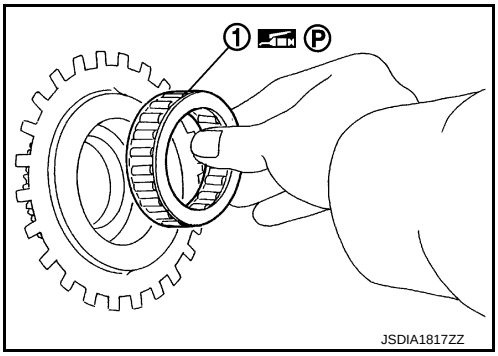
Assembly

INFOID:0000000009236165

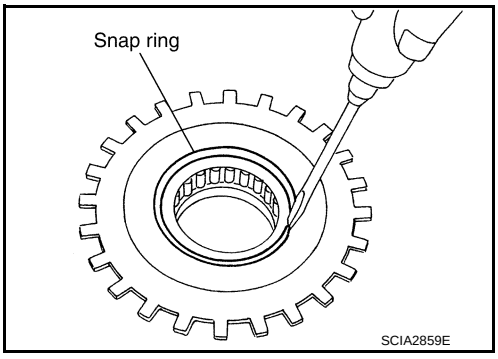
1. Install seal rings to mid sun gear.



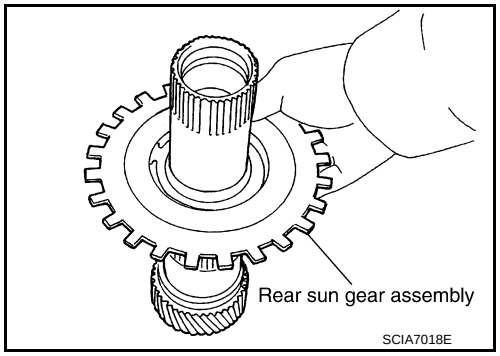
2. Install 2nd one-way clutch to rear sun gear.



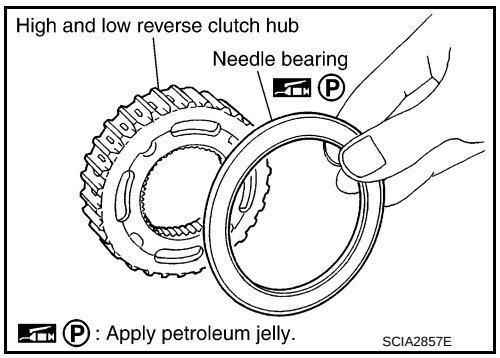
3. Install snap ring to rear sun gear using a flat-bladed screwdriver.
CAUTION:
- **Be careful not to scratch rear sun gear and 2nd one-way clutch.**
- **Be careful not to damage snap ring.**



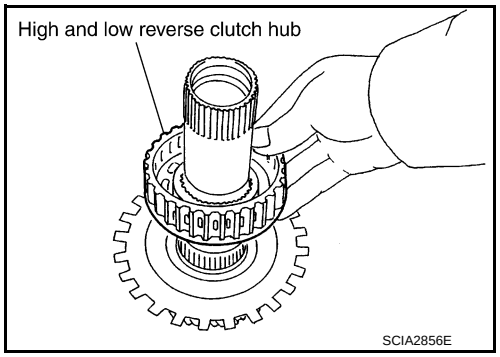
4. Install rear sun gear assembly to mid sun gear assembly.



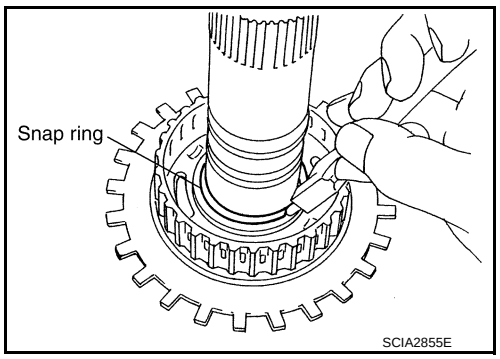
5. Install needle bearing to high and low reverse clutch hub.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



6. Install high and low reverse clutch hub to mid sun gear assembly.

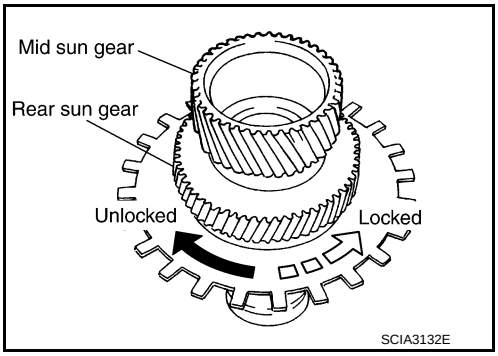


7. Install snap ring to mid sun gear assembly using pair of snap ring pliers.
CAUTION:
Be careful not to expand snap ring excessively.

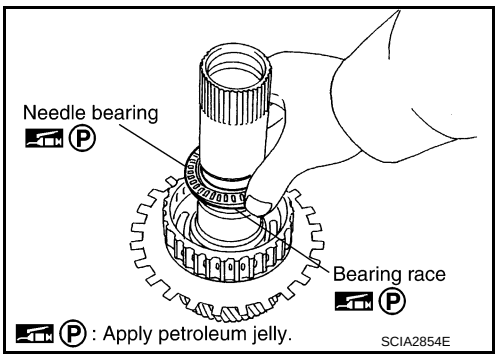


8. Check operation of 2nd one-way clutch.

a. Hold mid sun gear and turn rear sun gear.
b. Check 2nd one-way clutch for correct locking and unlocking directions.
CAUTION:
If not as shown in the figure, check installation direction of 2nd one-way clutch.



9. Install needle bearing and bearing race to high and low reverse clutch hub.
CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".



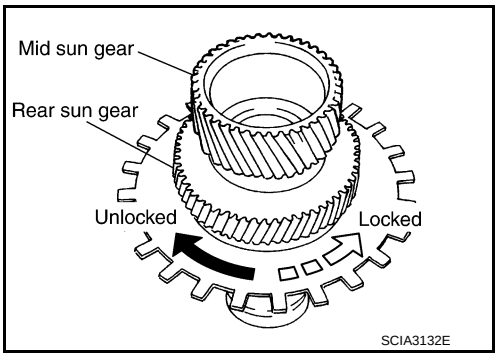
Inspection

INFOID:0000000009236166

INSPECTION AFTER DISASSEMBLY

2nd One-way Clutch

1. Hold mid sun gear and turn rear sun gear.
2. Check 2nd one-way clutch for correct locking and unlocking directions. If necessary, replace 2nd one-way clutch.



High and Low Reverse Clutch Hub Snap Ring, Rear Sun Gear Snap Ring
Check for deformation, fatigue or damage. If necessary, replace the snap ring.

2nd One-way Clutch
Check frictional surface for wear or damage. If necessary, replace the 2nd one-way clutch.

Mid Sun Gear
Check for deformation, fatigue or damage. If necessary, replace the mid sun gear.

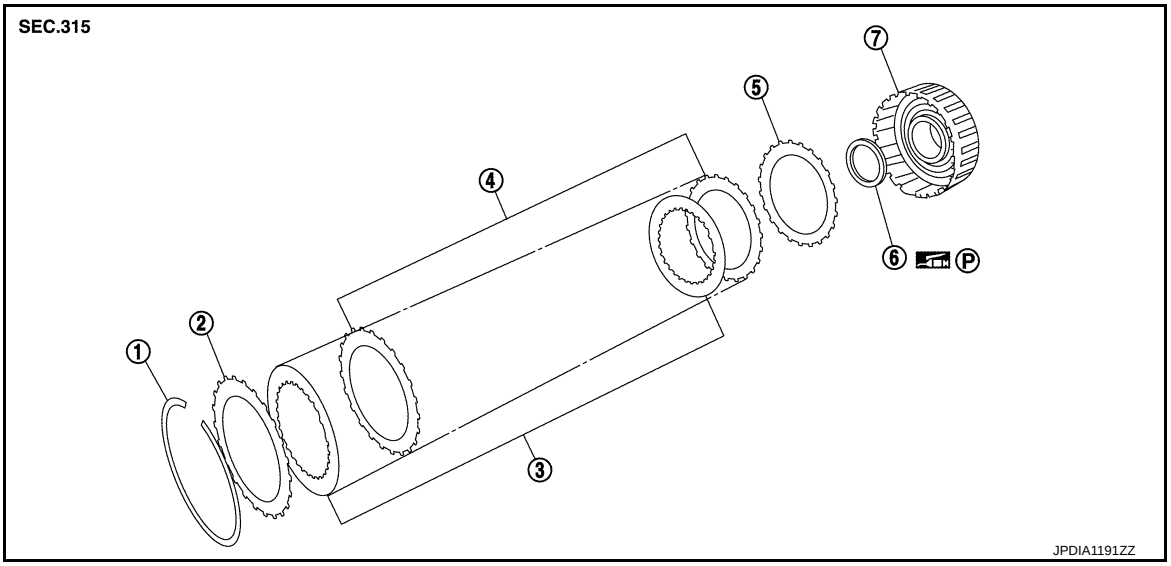
Rear Sun Gear
Check for deformation, fatigue or damage. If necessary, replace the rear sun gear.

High and Low Reverse Clutch Hub
Check for deformation, fatigue or damage. If necessary, replace the high and low reverse clutch hub.

HIGH AND LOW REVERSE CLUTCH

Exploded View

INFOID:0000000009236167



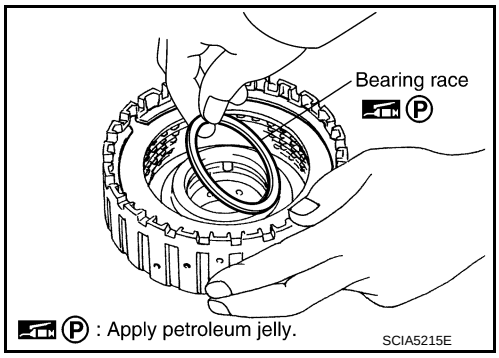
① Snap ring	② High and low reverse clutch retaining plate	③ High and low reverse clutch drive plate
④ High and low reverse clutch driven plate	⑤ High and low reverse clutch dish plate	⑥ Bearing race
⑦ High and low reverse clutch drum		

Ⓟ : Apply petroleum jelly.

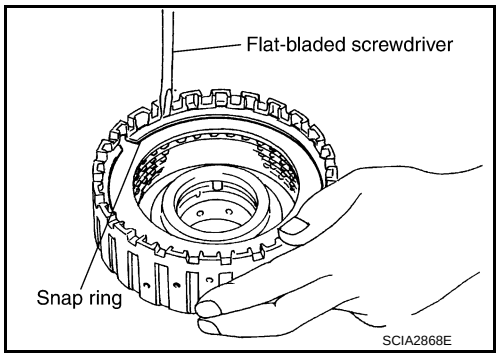
Disassembly

INFOID:0000000009236168

1. Remove bearing race from high and low reverse clutch drum.



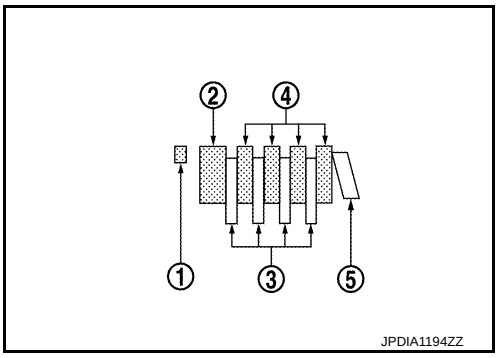
2. Remove snap ring from high and low reverse clutch drum using a flat-bladed screwdriver.
   CAUTION:
   - **Be careful not to scratch high and low reverse clutch drum.**
   - **Be careful not to damage snap ring.**
3. Remove high and low reverse clutch component (drive plates, driven plates, retaining plate and dish plate) from high and low reverse clutch drum.



Assembly

INFOID:0000000009236169

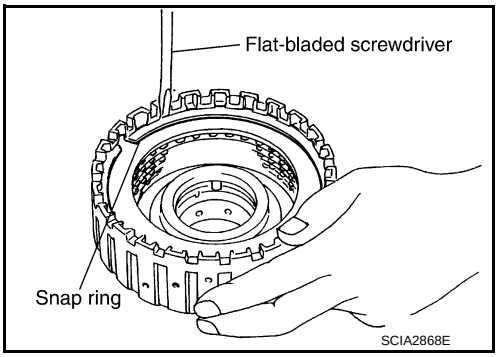
1. Install high and low reverse clutch component part (dish plate, drive plates, driven plates and retaining plate) to high and low reverse clutch drum.



① : Snap ring
② : Retaining plate
③ : Drive plate (four pieces)
④ : Driven plate (four pieces)
⑤ : Dish plate

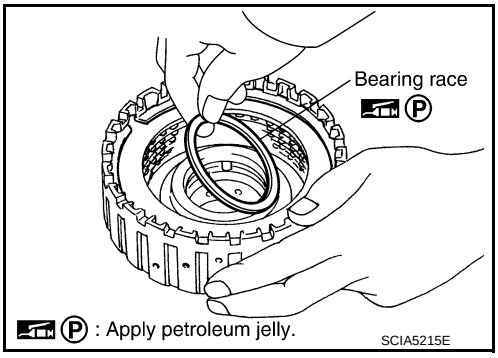
CAUTION:
Check the order of plates.

2. Install snap ring to high and low reverse clutch drum using a flat-bladed screwdriver.



CAUTION:
- **Be careful not to scratch high and low reverse clutch drum.**
- **Be careful not to damage snap ring.**

3. Install bearing race to high and low reverse clutch drum.



CAUTION:
Check the direction of needle bearing. Refer to TM-261, "Location of Needle Bearings and Bearing Races".

Inspection

INFOID:0000000009236170

INSPECTION AFTER DISASSEMBLY

Check the following items. If necessary, replace high and low reverse clutch assembly.

Snap Ring
Check for deformation, fatigue or damage.

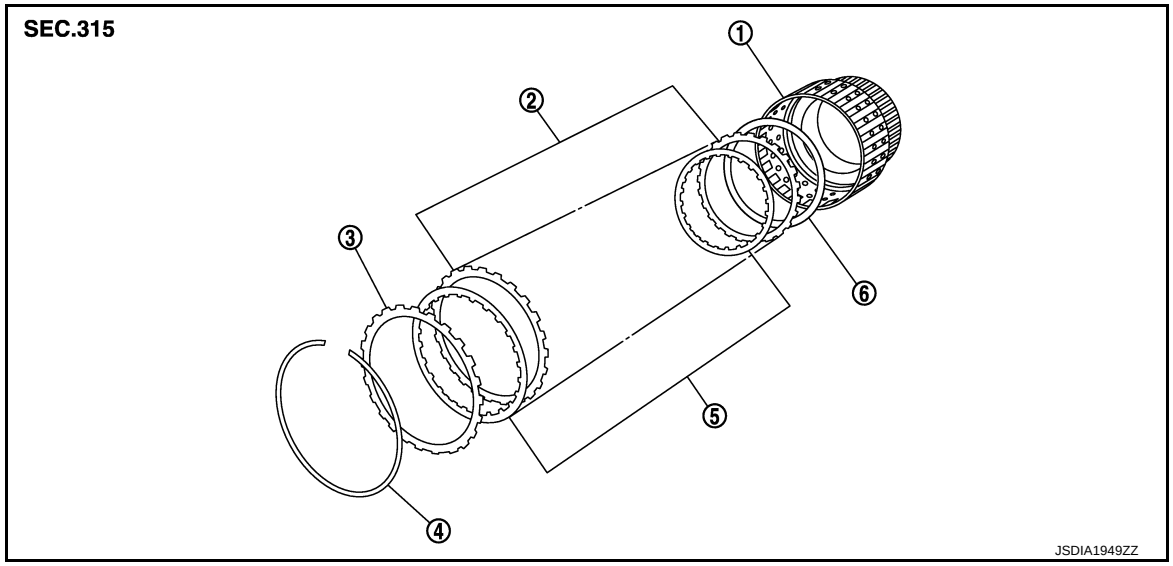
High and Low Reverse Clutch Retaining Plate/ Drive Plates/Driven Plates/Dish Plate
Check facing for burns, cracks or damage.

High and Low Reverse Clutch Drum
Check for deformation, fatigue or damage or burns.

DIRECT CLUTCH

Exploded View

INFOID:0000000009236171

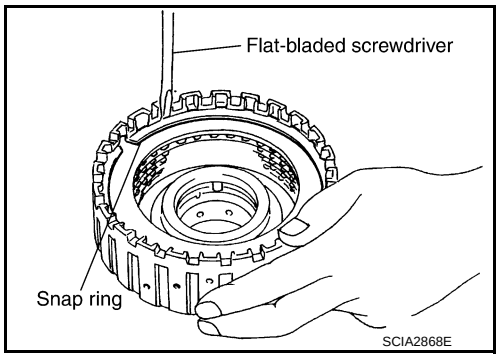


①	Direct clutch drum	②	Direct clutch driven plate	③	Direct clutch retaining plate
④	Snap ring	⑤	Direct clutch drive plate	⑥	Direct clutch dish plate

Disassembly

INFOID:0000000009236172

1. Remove snap rings from direct clutch drum using a flat-bladed screwdriver.
   CAUTION:
   - **Be careful not to scratch direct clutch drum and direct clutch retaining plate.**
   - **Be careful not to damage snap ring.**
2. Remove direct clutch component part (drive plates, driven plates, retaining plate and dish plate) from direct clutch drum.



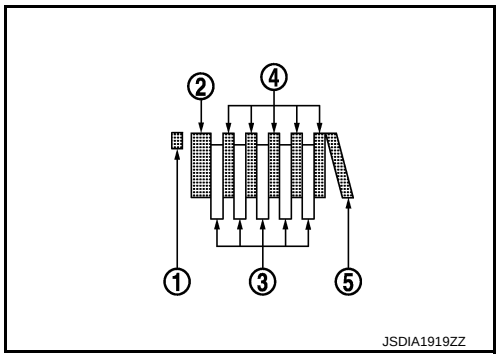
Assembly

INFOID:0000000009236173

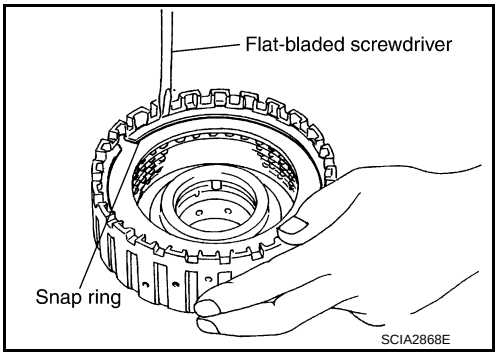
1. Install direct clutch component part (drive plates, driven plates, retaining plate and dish plate) to direct clutch drum.

   ① : Snap ring
   ② : Retaining plate
   ③ : Drive plate (five pieces)
   ④ : Driven plate (five pieces)
   ⑤ : Dish plate

   CAUTION:
   Check the order of plates.



2. Install snap rings to direct clutch drum using a flat-bladed screwdriver.
   CAUTION:
   - **Be careful not to scratch direct clutch drum and direct clutch retaining plate.**
   - **Be careful not to damage snap ring.**



Inspection

INFOID:0000000009236174

INSPECTION AFTER DISASSEMBLY

Check the following items. If necessary, replace direct clutch assembly.

Snap Ring
Check for deformation, fatigue or damage.

Direct Clutch Retaining Plate/Drive Plates/Driven Plates/Dish Plate
Check facing for burns, cracks or damage.

Direct Clutch Drum
Check for deformation, fatigue or damage or burns.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000009236175

Applied models	Engine	VQ37VHR
	Axle	2WD/AWD
Transmission model		RE7R01A
Stall torque ratio		1.92 : 1
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 and fluid capacity		Refer to MA-14, "FOR NORTH AMERICA : Fluids and Lubricants" (For North America), MA-15, "FOR MEXICO : Fluids and Lubricants" (For Mexico).

Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000009236176

STANDARD MODE

Unit: km/h (MPH)

Gear position	Throttle position	
	Full throttle	Half throttle
$D_1 \rightarrow D_2$	56 – 60 (35 – 37)	41 – 45 (26 – 28)
$D_2 \rightarrow D_3$	88 – 96 (55 – 59)	68 – 76 (43 – 47)
$D_3 \rightarrow D_4$	134 – 144 (84 – 89)	103 – 113 (64 – 70)
$D_4 \rightarrow D_5$	200 – 210 (125 – 130)	149 – 159 (93 – 98)
$D_5 \rightarrow D_6$	251 – 261 (156 – 162)	185 – 195 (115 – 121)
$D_6 \rightarrow D_7$	251 – 261 (156 – 162)	213 – 223 (133 – 138)
$D_7 \rightarrow D_6$	240 – 250 (150 – 155)	138 – 148 (86 – 92)
$D_6 \rightarrow D_5$	240 – 250 (150 – 155)	138 – 148 (86 – 92)
$D_5 \rightarrow D_4$	172 – 182 (107 – 113)	99 – 109 (62 – 67)
$D_4 \rightarrow D_3$	119 – 129 (74 – 80)	56 – 66 (35 – 41)
$D_3 \rightarrow D_2$	60 – 68 (38 – 42)	31 – 39 (20 – 24)
$D_2 \rightarrow D_1$	13 – 17 (8 – 10)	7 – 11 (5 – 6)

- 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
$D_1 \rightarrow D_2$	56 – 60 (35 – 37)	25 – 29 (16 – 18)
$D_2 \rightarrow D_3$	88 – 96 (55 – 59)	45 – 54 (28 – 33)
$D_3 \rightarrow D_4$	134 – 144 (84 – 89)	74 – 84 (46 – 52)

Gear position	Throttle position	
	Full throttle	Half throttle
$D_4 \rightarrow D_5$	200 – 210 (125 – 130)	116 – 126 (47 – 72)
$D_5 \rightarrow D_6$	251 – 261 (156 – 162)	175 – 185 (109 – 114)
$D_6 \rightarrow D_7$	251 – 261 (156 – 162)	195 – 205 (122 – 127)
$D_7 \rightarrow D_6$	240 – 250 (150 – 155)	139 – 149 (87 – 92)
$D_6 \rightarrow D_5$	195 – 205 (122 – 127)	139 – 149 (87 – 92)
$D_5 \rightarrow D_4$	135 – 145 (84 – 90)	80 – 90 (50 – 55)
$D_4 \rightarrow D_3$	100 – 110 (63 – 68)	49 – 59 (31 – 36)
$D_3 \rightarrow D_2$	43 – 51 (27 – 31)	23 – 31 (15 – 19)
$D_2 \rightarrow D_1$	3 – 7 (2 – 4)	3 – 7 (2 – 4)

- At half throttle, the accelerator opening is 4/8 of the full opening.

Vehicle Speed at Which Lock-up Occurs/Releases

INFOID:0000000009236177

STANDARD MODE

Throttle position	Vehicle speed km/h (MPH)	
	Lock-up ON	Lock-up OFF
Closed throttle	36 – 44 (23 – 27)	36 – 44 (23 – 27)
Half throttle	36 – 44 (23 – 27)	36 – 44 (23 – 27)

- Vehicle speed with D_5 position.
- At closed throttle, the accelerator opening is less than 1/8 condition. (Closed throttle position signal OFF)
- At half throttle, the accelerator opening is 4/8 of the full opening.

ECO MODE

Throttle position	Vehicle speed km/h (MPH)	
	Lock-up ON	Lock-up OFF
Closed throttle	49 – 57 (31 – 35)	49 – 57 (31 – 35)
Half throttle	61 – 69 (38 – 42)	61 – 69 (38 – 42)

- Vehicle speed with D_5 position.
- At closed throttle, the accelerator opening is less than 1/8 condition. (Closed throttle position signal OFF)
- At half throttle, the accelerator opening is 4/8 of the full opening.

Stall Speed

INFOID:0000000009236178

Unit: rpm

Stall speed	2,050 – 2,350

Torque Converter

INFOID:0000000009236179

Unit: mm (in)

Dimension between end of converter housing and torque converter	25.0 (0.98)

Total End Play

INFOID:0000000009236180

Unit: mm (in)

Total end play	Standard	0.25 – 0.55 (0.0098 – 0.0217)
Thickness of bearing race for adjusting total end play		1.0 (0.039) 1.2 (0.047) 1.4 (0.055) 1.6 (0.063) 1.8 (0.071) 2.0 (0.079) 2.2 (0.087)

Reverse Brake Clearance

INFOID:0000000009236181

Unit: mm (in)

Reverse brake clearance	Standard	0.8 – 1.2 (0.031 – 0.047)
Thickness of retaining plate for adjusting reverse brake clearance		4.8 (0.189) 5.0 (0.197) 5.2 (0.205) 5.4 (0.213) 5.6 (0.220) 5.8 (0.228) 6.0 (0.236)

Front Brake Clearance

INFOID:0000000009236182

Unit: mm (in)

Front brake clearance	Standard	0.7 – 1.1 (0.028 – 0.043)
Thickness of retaining plate for adjusting front brake clearance		2.0 (0.079) 2.2 (0.087) 2.4 (0.094) 2.6 (0.102) 2.8 (0.110)

2346 Brake Clearance

INFOID:0000000009236183

Unit: mm (in)

2346 brake clearance	Standard	1.5 – 1.9 (0.059 – 0.075)
Thickness of snap ring for adjusting 2346 brake clearance		2.0 (0.079) 2.2 (0.087) 2.4 (0.094) 2.6 (0.102) 2.8 (0.110) 3.0 (0.118)