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# TM

## SECTION

# TRANSAXLE & TRANSMISSION

TM

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

INFOID:000000006883957

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.

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

INFOID:000000007229632

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-5, "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.

# PRECAUTIONS

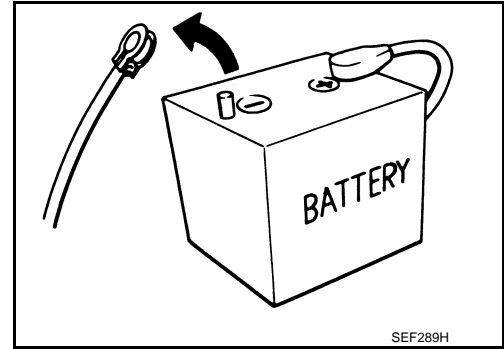
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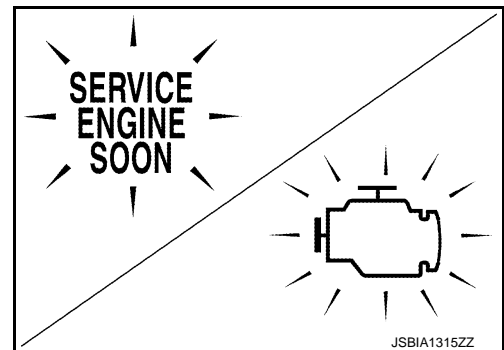
## General Precautions

INFOID:000000006883958

- 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-16, "FOR NORTH AMERICA : Fluids and Lubricants"](#) (For North America) or [MA-18, "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 A/T is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Never use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- When the A/T drain plug is removed, only some of the ATF is drained. Old ATF will remain in torque converter and ATF cooling system. Always follow the procedures under “Changing” when changing ATF. Refer to [TM-89, "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:000000007204512

### ATF COOLER SERVICE

If ATF contains frictional material (clutches, bands, etc.), or if an A/T 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-92, "Cleaning"](#). For radiator replacement, refer to [CO-14, "Exploded View"](#) (VQ37VHR) or [CO-40, "Exploded View"](#) (VK56VD).

# PREPARATION

< PREPARATION >

[7AT: RE7R01A]

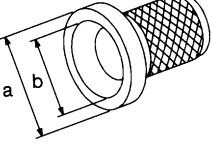
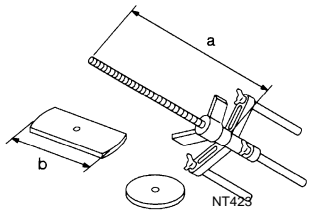
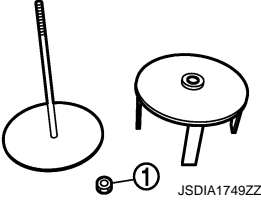
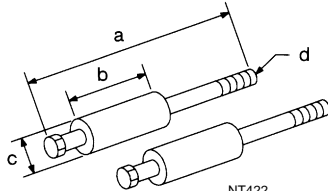
## PREPARATION

### PREPARATION

#### Special Service Tool

INFOID:000000007134322

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.  <p style="text-align: center;">NT086</p>	<ul style="list-style-type: none"> <li>• Installing rear oil seal (2WD)</li> <li>• Installing oil pump housing oil seal</li> </ul>
KV31102400 (J-34285 and J-34285-87) Clutch spring compressor a: 320 mm (12.60 in) b: 174 mm (6.85 in)  <p style="text-align: center;">NT423</p>	<ul style="list-style-type: none"> <li>• Installing reverse brake return spring retainer</li> <li>• Removing and installing 2346 brake spring retainer</li> </ul>
KV31103800 Clutch spring compressor 1. M12×1.75P  <p style="text-align: center;">JSDIA1749ZZ</p>	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  <p style="text-align: center;">NT422</p>	Remove oil pump assembly

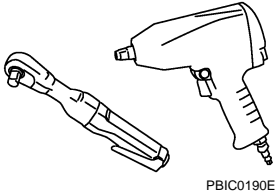
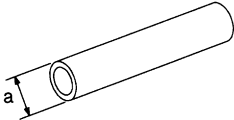
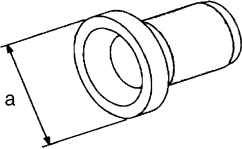
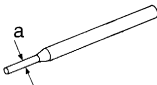
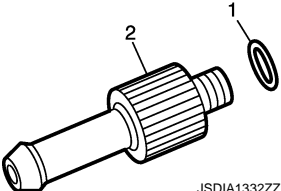
# PREPARATION

< PREPARATION >

[7AT: RE7R01A]

## Commercial Service Tool

INFOID:000000007134323

Tool name	Description
<p>Power tool</p>  <p>PBI0190E</p>	<p>Loosening bolts and nuts</p>
<p>Drift a: 22 mm (0.87 in) dia.</p>  <p>NT083</p>	<p>Installing manual shaft oil seals</p>
<p>Drift a: 64 mm (2.52 in) dia.</p>  <p>SCIA5338E</p>	<p>Installing rear oil seal (AWD)</p>
<p>Pin punch a: 4 mm (0.16 in) dia.</p>  <p>NT410</p>	<p>Remove retaining pin</p>
<p>1. 315268E000* O-ring 2. 310811EA5A* Charging pipe</p>  <p>JSDIA1332ZZ</p>	<p>A/T fluid changing and adjustment</p>

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

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# COMPONENT PARTS

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

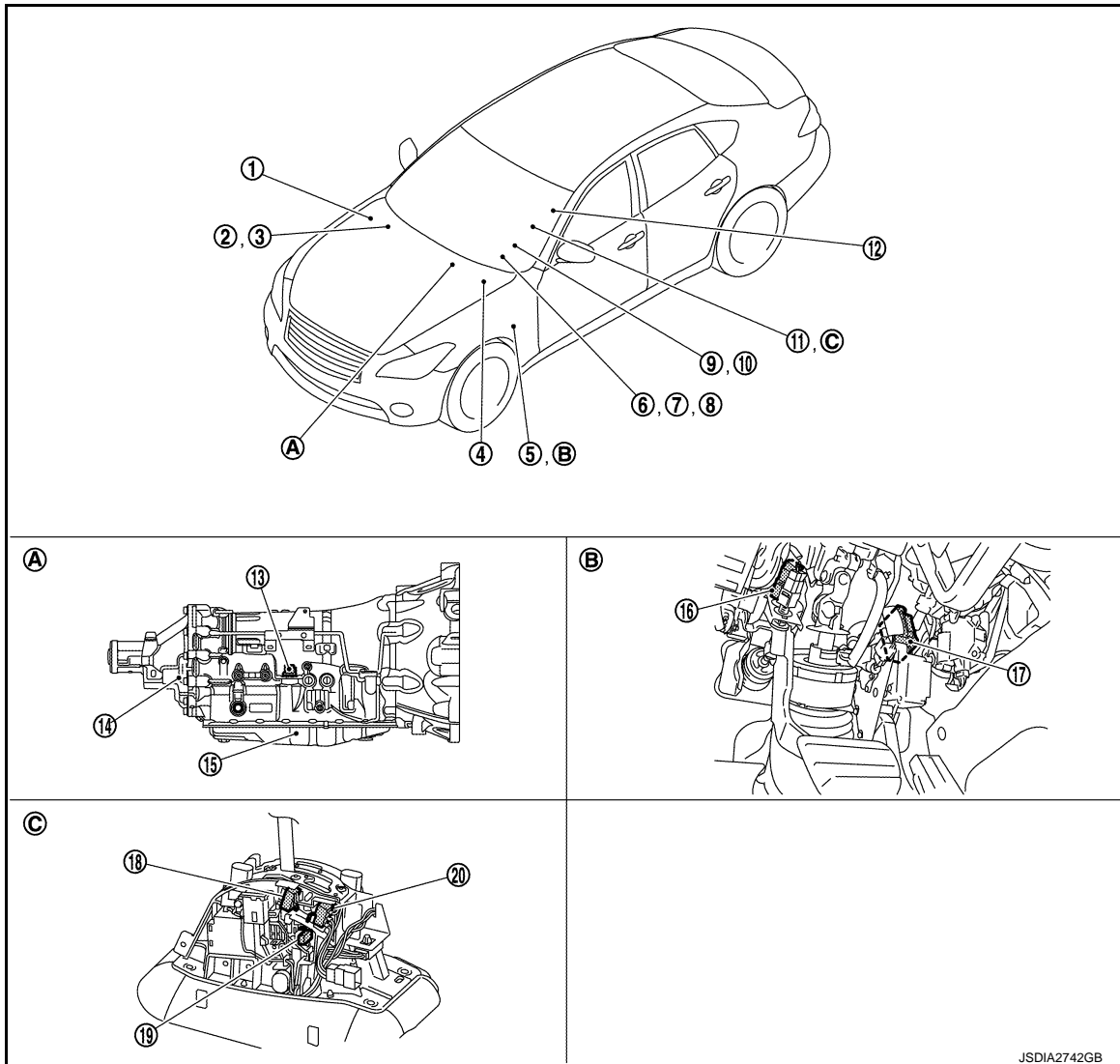
## SYSTEM DESCRIPTION

### COMPONENT PARTS

#### A/T CONTROL SYSTEM

#### A/T CONTROL SYSTEM : Component Parts Location

INFOID:000000006883960



1. IPDM E/R  
Refer to [PCS-5, "IPDM E/R : Component Parts Location"](#).
2. ECM  
Refer to [EC-38, "ENGINE CONTROL SYSTEM : Component Parts Location"](#) (VQ37VHR), [EC-990, "ENGINE CONTROL SYSTEM : Component Parts Location"](#) (VK56VD).
3. A/C auto amp.  
Refer to [HAC-7, "AUTOMATIC AIR CONDITIONING SYSTEM \(WITH FOREST AIR\) : Component Parts Location"](#).
4. ABS actuator and electric unit (control unit)  
Refer to [BRC-9, "Component Parts Location"](#).
5. BCM  
Refer to [BCS-4, "BODY CONTROL SYSTEM : Component Parts Location"](#).
6. Combination meter  
Refer to [MWI-6, "METER SYSTEM : Component Parts Location"](#).
7. A/T CHECK indicator lamp  
(On the combination meter)
8. Shift position indicator  
(In the information display LCD in the combination meter)
9. Paddle shifter (shift-down)<sup>\*1</sup>

JSDIA2742GB

# COMPONENT PARTS

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

- |                                 |  |  |
|---------------------------------|--|--|
| 10. Paddle shifter (shift-up)*1 | 11. Drive mode select switch<br>Refer to <a href="#">DMS-3, "Component Parts Location"</a> . | 12. Yaw rate/side/decel G sensor<br>Refer to <a href="#">BRC-9, "Component Parts Location"</a> . |
| 13. A/T assembly connector      | 14. Output speed sensor  | 15. Control valve & TCM*2  |
| 16. Stop lamp switch            | 17. Accelerator pedal position sensor  | 18. Manual mode position select switch (shift-up)  |
| 19. Manual mode select switch   | 20. Manual mode position select switch (shift-down)  |  |
| A. A/T assembly                 | B. Steering wheel  | C. A/T shift selector assembly   |

\*1: With paddle shifter

\*2: Control valve & TCM is included in A/T assembly.

**NOTE:**

The following components are included in control valve & TCM (15).

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

## A/T CONTROL SYSTEM : Component Description

INFOID:000000006883961

Name	Function
TCM	<a href="#">TM-12, "A/T CONTROL SYSTEM : TCM"</a>
Transmission range switch	<a href="#">TM-12, "A/T CONTROL SYSTEM : Transmission Range Switch"</a>
Output speed sensor	<a href="#">TM-12, "A/T CONTROL SYSTEM : Output Speed Sensor"</a>
Input speed sensor 1	<a href="#">TM-12, "A/T CONTROL SYSTEM : Input Speed Sensor"</a>
Input speed sensor 2	
A/T fluid temperature sensor	<a href="#">TM-12, "A/T CONTROL SYSTEM : A/T Fluid Temperature Sensor"</a>
Input clutch solenoid valve	<a href="#">TM-12, "A/T CONTROL SYSTEM : Input Clutch Solenoid Valve"</a>
Front brake solenoid valve	<a href="#">TM-13, "A/T CONTROL SYSTEM : Front Brake Solenoid Valve"</a>
Direct clutch solenoid valve	<a href="#">TM-13, "A/T CONTROL SYSTEM : Direct Clutch Solenoid Valve"</a>
High and low reverse clutch solenoid valve	<a href="#">TM-13, "A/T CONTROL SYSTEM : High and Low Reverse Clutch Solenoid Valve"</a>
Low brake solenoid valve	<a href="#">TM-13, "A/T CONTROL SYSTEM : Low Brake Solenoid Valve"</a>
Anti-interlock solenoid valve	<a href="#">TM-13, "A/T CONTROL SYSTEM : Anti-interlock Solenoid Valve"</a>
2346 brake solenoid valve	<a href="#">TM-13, "A/T CONTROL SYSTEM : 2346 Brake Solenoid Valve"</a>
Torque converter clutch solenoid valve	<a href="#">TM-13, "A/T CONTROL SYSTEM : Torque Converter Clutch Solenoid Valve"</a>
Line pressure solenoid valve	<a href="#">TM-13, "A/T CONTROL SYSTEM : Line Pressure Solenoid Valve"</a>
Accelerator pedal position sensor	<a href="#">TM-13, "A/T CONTROL SYSTEM : Accelerator Pedal Position Sensor"</a>
Manual mode switch	<a href="#">TM-14, "A/T CONTROL SYSTEM : Manual Mode Switch"</a>
Paddle shifter*	<a href="#">TM-14, "A/T CONTROL SYSTEM : Paddle Shifter"</a>
Yaw rate/side/decel G sensor	<a href="#">BRC-12, "Yaw Rate/Side/Decel G Sensor"</a>
Drive mode select switch	<a href="#">DMS-4, "Drive Mode Select Switch"</a>

# COMPONENT PARTS

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Name	Function
A/T CHECK indicator lamp	When the ignition switch is pushed to the ON position, the light comes on for 2 seconds.
Stop lamp switch	<a href="#">BRC-12. "Stop Lamp Switch"</a>
Starter relay	<a href="#">STR-7. "System Description"</a>
ECM	<a href="#">EC-58. "ENGINE CONTROL SYSTEM : System Description"</a> (VQ37VHR), <a href="#">EC-1011. "ENGINE CONTROL SYSTEM : System Description"</a> (VK56VD)
BCM	<a href="#">BCS-5. "BODY CONTROL SYSTEM : System Description"</a>
Combination meter	<a href="#">MWI-9. "METER SYSTEM : System Description"</a>
ABS actuator and electric unit (control unit)	<a href="#">BRC-14. "System Description"</a>
A/C auto amp.	<a href="#">HAC-19. "AUTOMATIC AIR CONDITIONING SYSTEM (WITH FOREST AIR) : System Description"</a>

\*: With paddle shifter

## A/T CONTROL SYSTEM : TCM

INFOID:000000006883962

- The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T.
- The TCM is integral with the control valve assembly and built into the A/T assembly.

## A/T CONTROL SYSTEM : Transmission Range Switch

INFOID:000000006883963

- 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:000000006883964

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:000000006883965

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:000000006883966

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:000000006883967

- 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.



# COMPONENT PARTS

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

## A/T CONTROL SYSTEM : Front Brake Solenoid Valve

INFOID:000000006883968

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

## A/T CONTROL SYSTEM : Direct Clutch Solenoid Valve

INFOID:000000006883969

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

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

INFOID:000000006883970

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

## A/T CONTROL SYSTEM : Low Brake Solenoid Valve

INFOID:000000006883971

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

## A/T CONTROL SYSTEM : Anti-interlock Solenoid Valve

INFOID:000000006883972

- 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:000000006883973

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

## A/T CONTROL SYSTEM : Torque Converter Clutch Solenoid Valve

INFOID:000000006883974

The torque converter clutch solenoid valve is activated, with the gear in D2, D3, D4, D5, D6, D7, 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.

## A/T CONTROL SYSTEM : Line Pressure Solenoid Valve

INFOID:000000006883975

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

## A/T CONTROL SYSTEM : Accelerator Pedal Position Sensor

INFOID:000000006883976

- The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly.
- The accelerator pedal position sensor detects the accelerator position.
- The accelerator pedal position sensor transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. Then, the TCM receives accelerator pedal position signal from the ECM via CAN communication.

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# COMPONENT PARTS

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

## A/T CONTROL SYSTEM : Manual Mode Switch

INFOID:000000006883977

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

## A/T CONTROL SYSTEM : Paddle Shifter

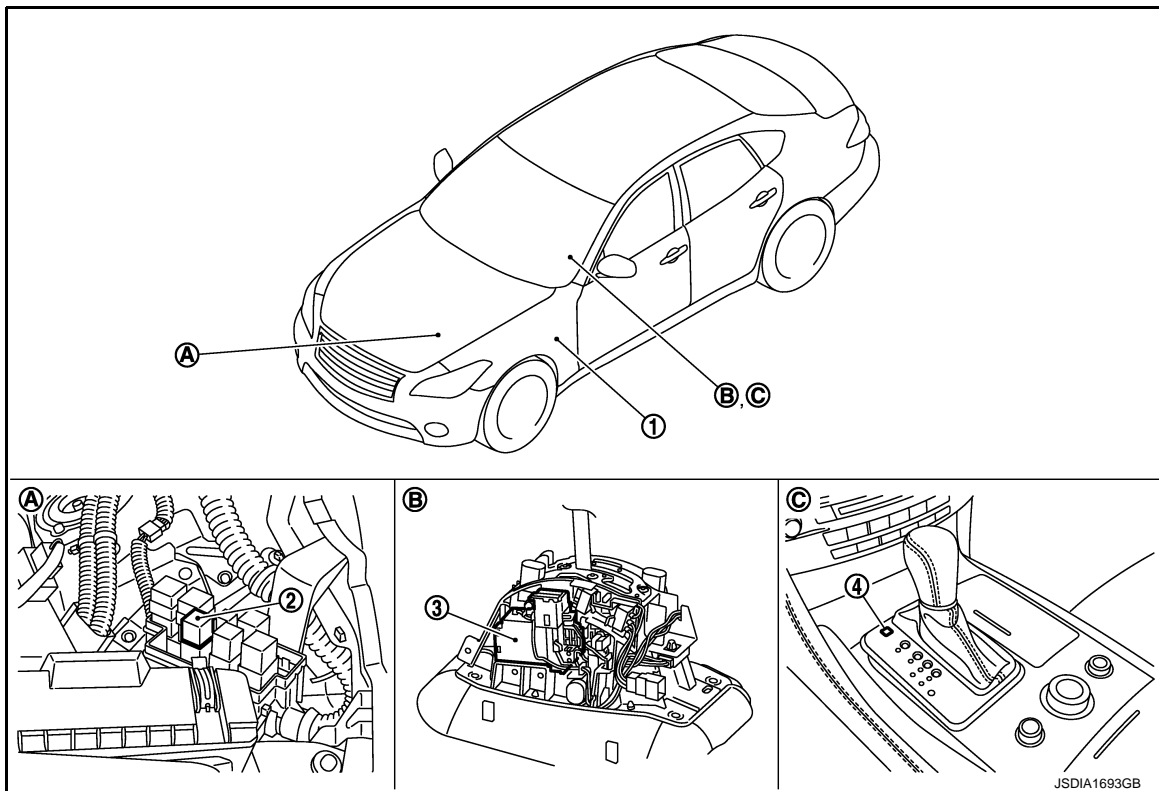
INFOID:000000006883978

When operating the paddle shifter (shift-up/shift-down), a paddle shifter shift up signal or paddle shifter shift down signal is transmitted to the combination meter. Then, the TCM receives a paddle shifter shift-up signal or a paddle shifter shift-down signal from the combination meter.

## A/T SHIFT LOCK SYSTEM

### A/T SHIFT LOCK SYSTEM : Component Parts Location

INFOID:000000006883979



- |   |                       |                    |
|---|-----------------------|--------------------|
| 1. Stop lamp switch<br>Refer to <a href="#">BRC-9. "Component Parts Location"</a> . | 2. Shift lock relay*  | 3. Shift lock unit |
| 4. Shift lock cover   |                       |                    |
| A. Engine room, LH  | B. A/T shift selector | C. Center console  |
- \*: With ICC

# COMPONENT PARTS

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

## A/T SHIFT LOCK SYSTEM : Component Description

INFOID:000000006883980

Component	Function	
Slider	<ul style="list-style-type: none"> <li>Electromagnet is built into slider.</li> <li>When electromagnet of slider is magnetized, stopper is unified with slider.</li> </ul>	B
Stopper	<ul style="list-style-type: none"> <li>Iron plate is built into stopper.</li> <li>Restricts plate moving.</li> </ul>	C
Detent pin	Links with selector knob button and restricts selector lever shift operation.	
Plate	Restricts detent pin moving.	
Shift lock release button	When shift lock release button is pressed, shift lock is forcibly released.	<b>TM</b>
Stop lamp switch	<p style="margin-left: 20px;">With ICC</p> <ul style="list-style-type: none"> <li>When brake pedal is depressed, stop lamp switch turns ON.</li> <li>When stop lamp switch turns ON, power is supplied to shift lock relay.</li> </ul> <p style="margin-left: 20px;">Without ICC</p> <ul style="list-style-type: none"> <li>When brake pedal is depressed, stop lamp switch turns ON.</li> <li>When stop lamp switch turns ON, power is supplied to shift lock unit.</li> </ul>	E
Shift lock relay*	Current flow to stop lamp switch allows shift lock relay contact ON, and then power is applied to shift lock unit.	F

\*: With ICC

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# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

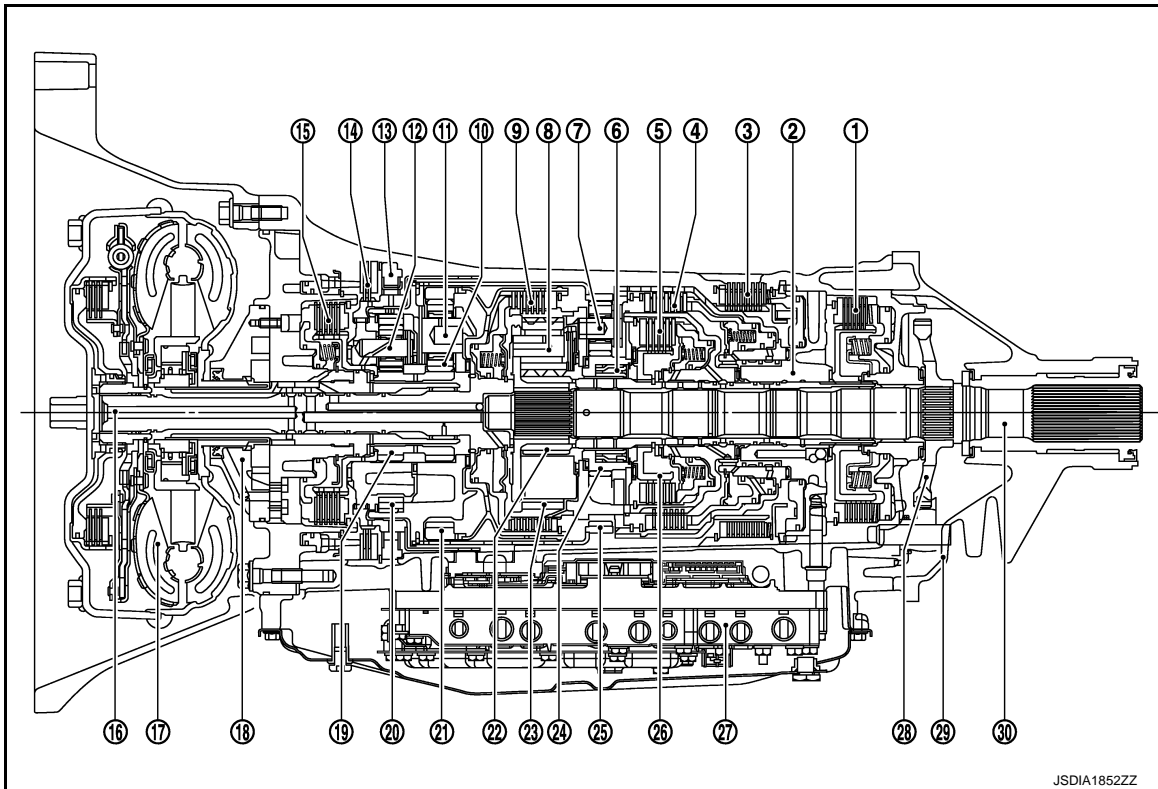
[7AT: RE7R01A]

## STRUCTURE AND OPERATION

### Cross-Sectional View

INFOID:000000006883981

### 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.* <sup>1</sup> Rear carrier          | 8. Mid carrier                              | 9. Input clutch                       |
| 10.* <sup>2</sup> Front sun gear       | 11.* <sup>3</sup> Front carrier             | 12. Under drive carrier               |
| 13. 1st one-way clutch                 | 14. Front brake                             | 15. 2346 brake                        |
| 16.* <sup>4</sup> Input shaft          | 17. Torque converter                        | 18. Oil pump                          |
| 19.* <sup>2</sup> Under drive sun gear | 20.* <sup>3</sup> Under drive internal gear | 21.* <sup>4</sup> Front internal gear |
| 22. Mid sun gear                       | 23.* <sup>1</sup> Mid internal gear         | 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.

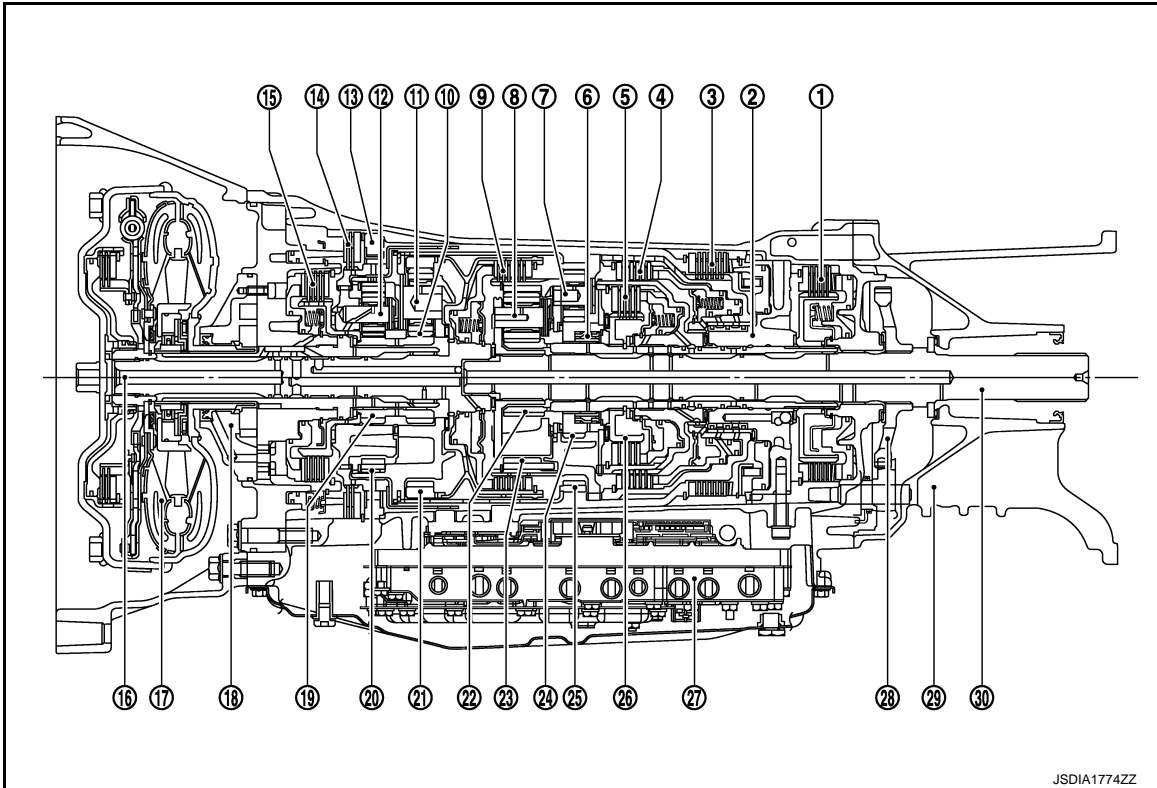
\*4: 16 and 21 are one unit.

### AWD MODELS

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- |  |   |                                       |
|--|---|---------------------------------------|
| 1. Low brake                           | 2. Drum support                             | 3. Reverse brake                      |
| 4. Direct clutch                       | 5. High and low reverse clutch              | 6. 2nd one-way clutch                 |
| 7.* <sup>1</sup> Rear carrier          | 8. Mid carrier                              | 9. Input clutch                       |
| 10.* <sup>2</sup> Front sun gear       | 11.* <sup>3</sup> Front carrier             | 12. Under drive carrier               |
| 13. 1st one-way clutch                 | 14. Front brake                             | 15. 2346 brake                        |
| 16.* <sup>4</sup> Input shaft          | 17. Torque converter                        | 18. Oil pump                          |
| 19.* <sup>2</sup> Under drive sun gear | 20.* <sup>3</sup> Under drive internal gear | 21.* <sup>4</sup> Front internal gear |
| 22. Mid sun gear                       | 23.* <sup>1</sup> Mid internal gear         | 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.

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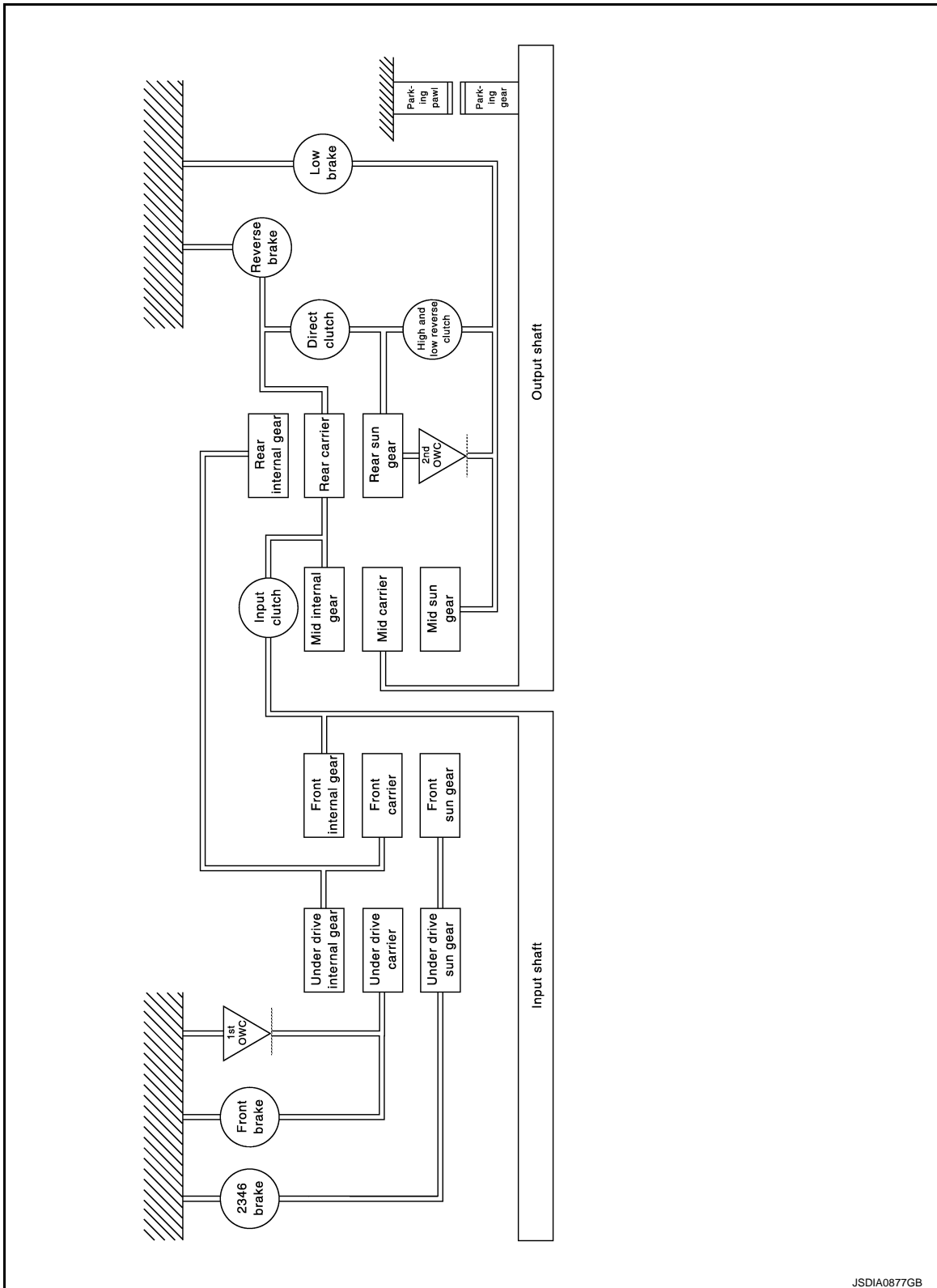
# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

## System Diagram

INFOID:000000006883982



JSDIA0877GB

## System Description

INFOID:000000006883983

## DESCRIPTION

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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

Name of the part Shift position	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

- - 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.

\*: Down shift automatically according to the vehicle speed.

JSDIA1455GB

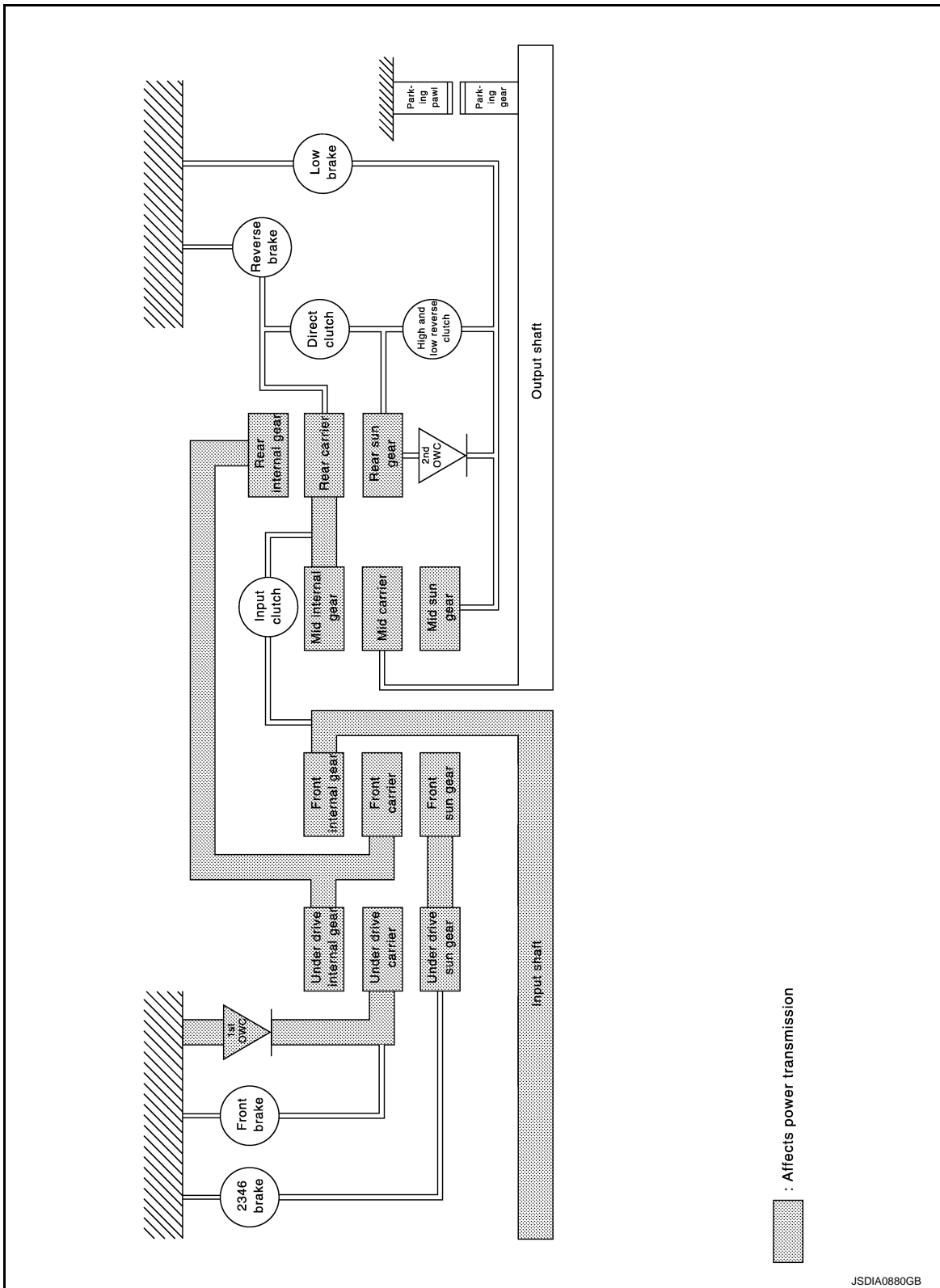
## POWER TRANSMISSION

"N" Position

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



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

"P" Position

JSDIA0880GB

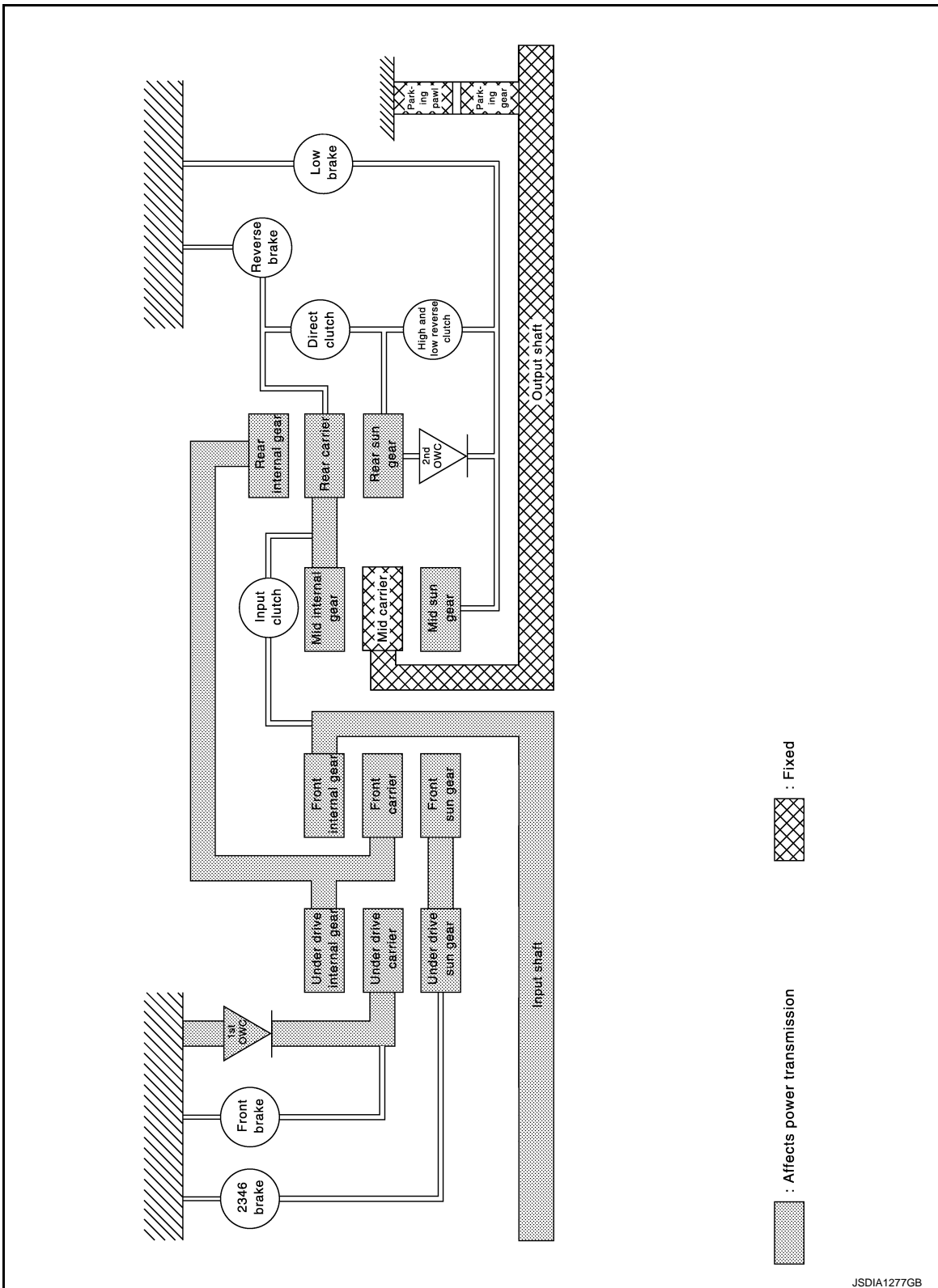
▨ : Affects power transmission



# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



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

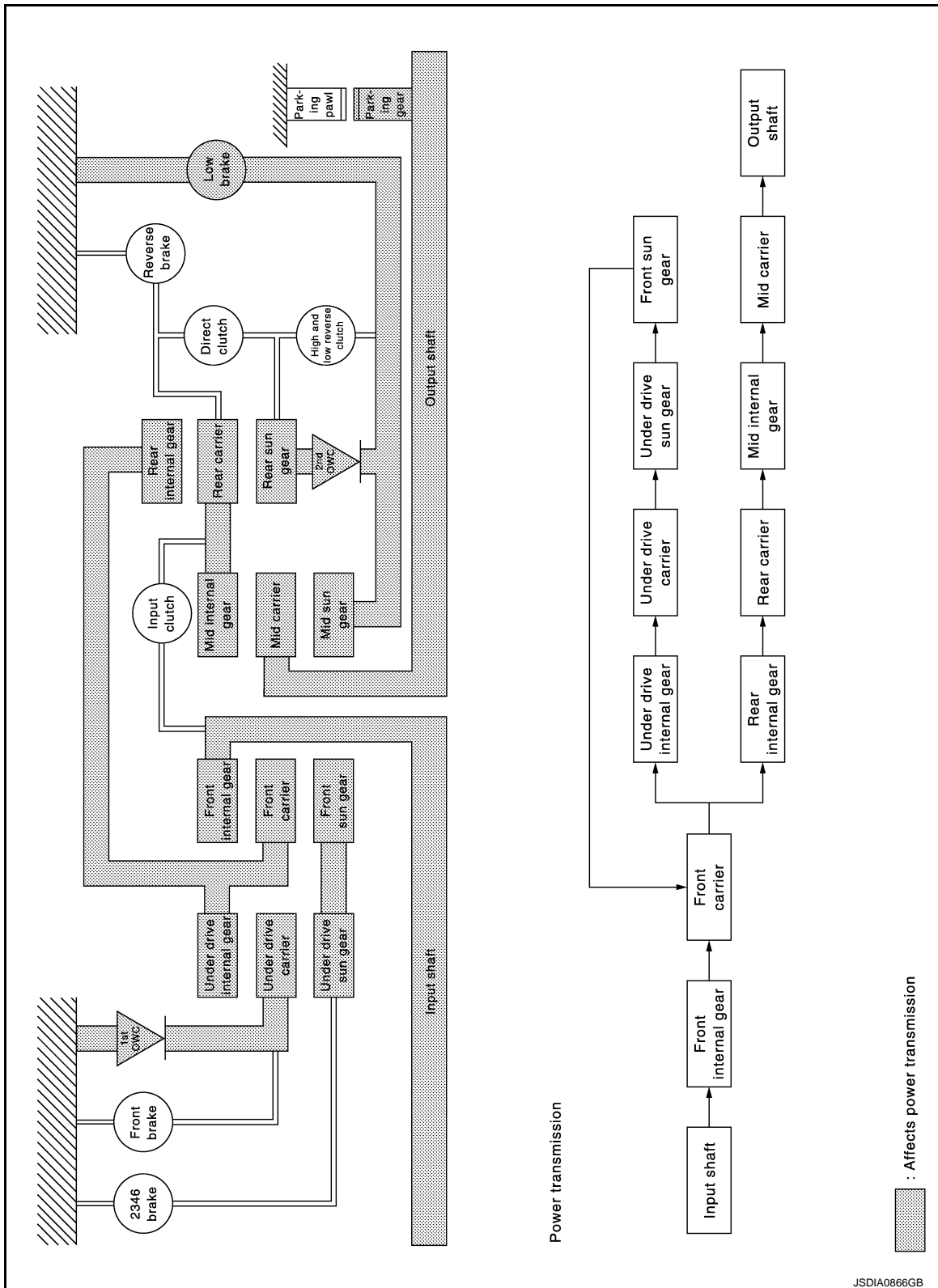
“D1” and “DS1” Positions

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- 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.

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P



# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

- Each planetary gear enters the state described below.

Front planetary gear			
Name	Front sun gear	Front carrier	Front internal gear
Condition	—	Output	Input
Direction of rotation	Counterclockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Deceleration from front internal gear	Deceleration from front internal gear	Same number of revolution as the input shaft
Under drive planetary gear			
Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	—	Fixed	Input/Output
Direction of rotation	Counterclockwise revolution	—	Clockwise revolution
Number of revolutions	Acceleration from under drive internal gear	—	Same number of revolution as the front carrier
Rear planetary gear			
Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from rear internal gear	Same number of revolution as the under drive internal gear
Mid planetary gear			
Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from mid internal gear	Same number of revolution as the rear carrier

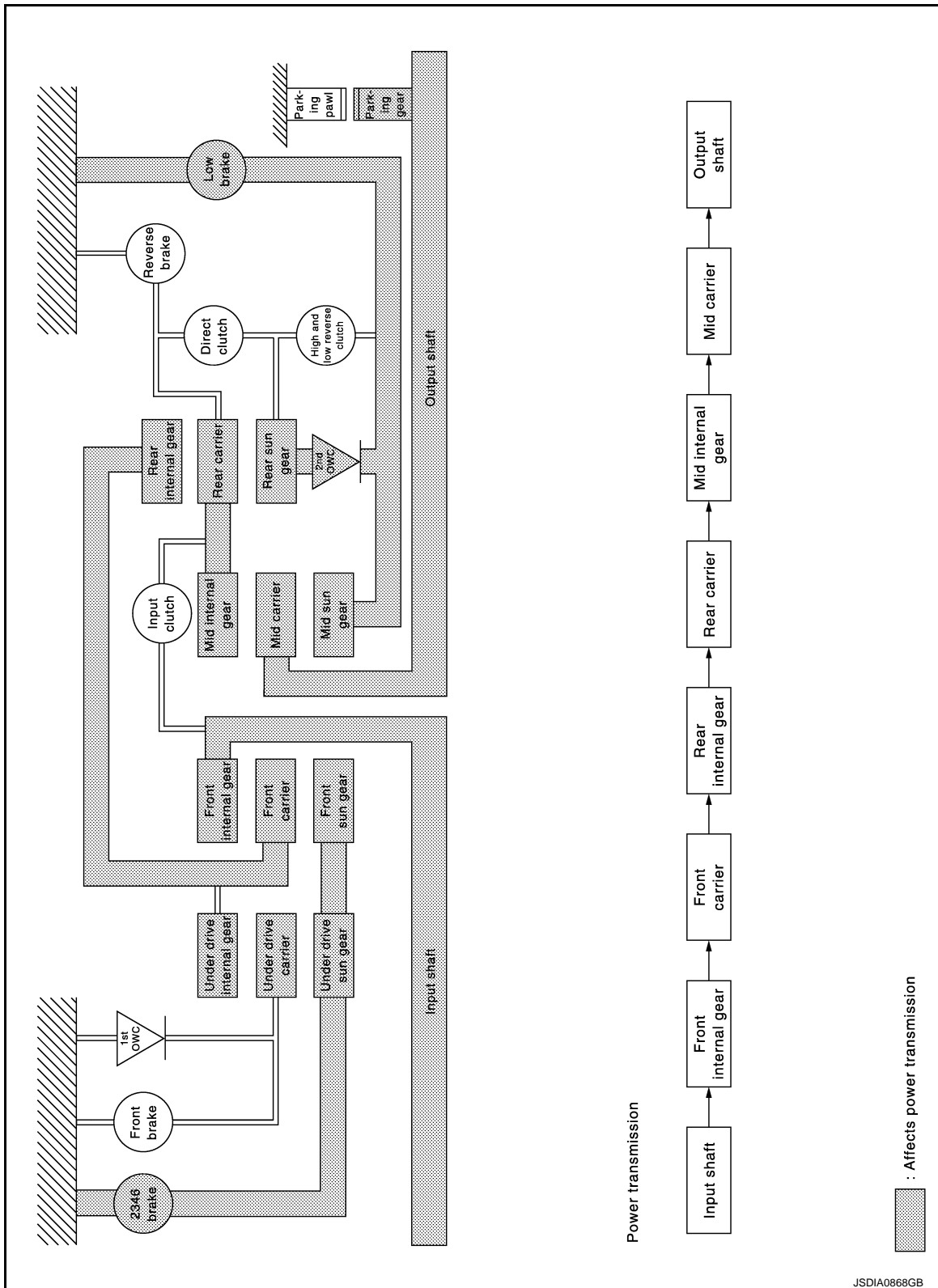
“D2” and “DS2” Positions

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- 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.

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# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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

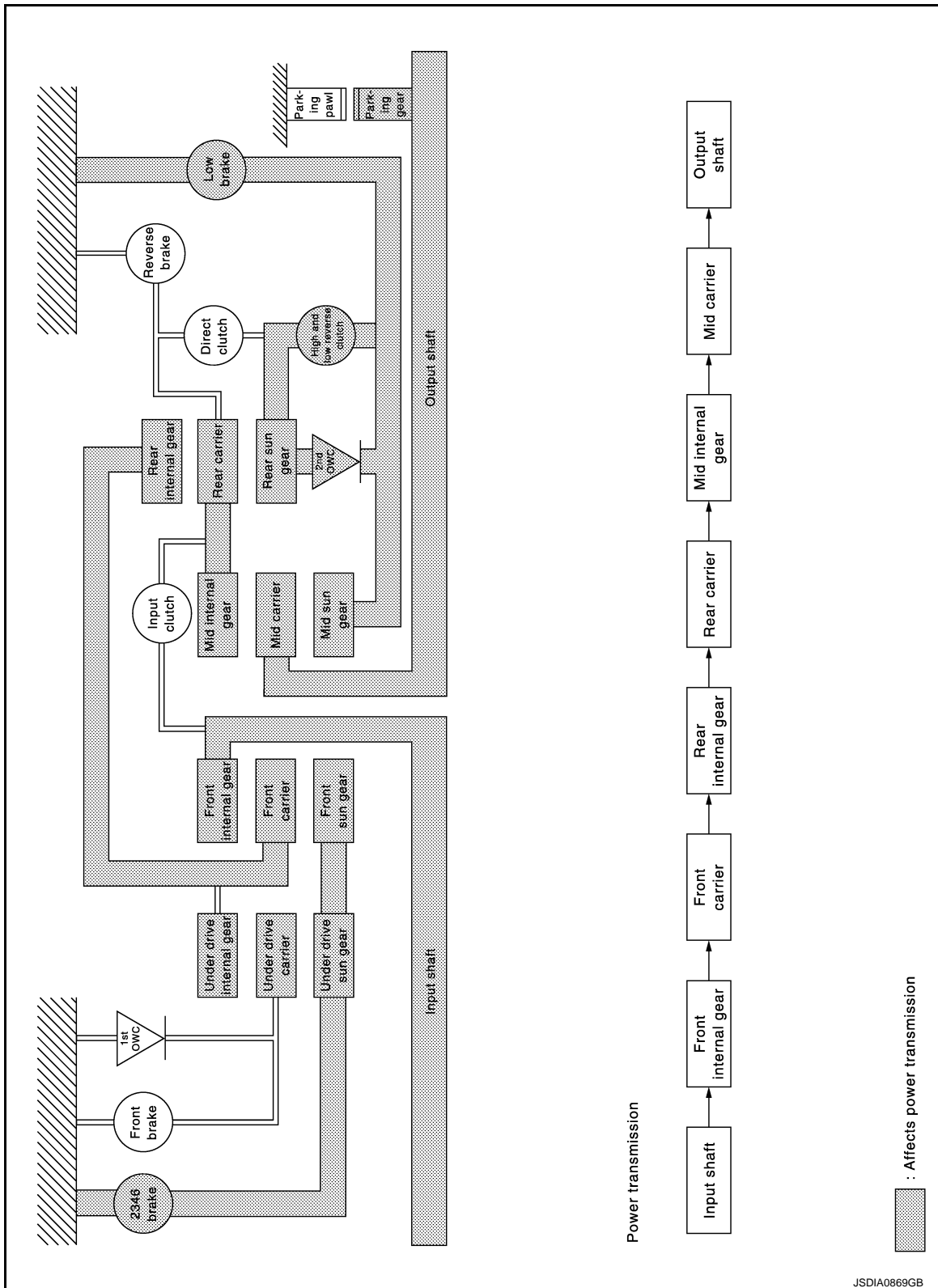
"M2" Position

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- 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.



# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Front planetary gear			
Name	Front sun gear	Front carrier	Front internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from front internal gear	Same number of revolution as the input shaft
Under drive planetary gear			
Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	Fixed	—	Input/Output
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from under drive internal gear	Same number of revolution as the front carrier
Rear planetary gear			
Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from rear internal gear	Same number of revolution as the under drive internal gear
Mid planetary gear			
Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from mid internal gear	Same number of revolution as the rear carrier

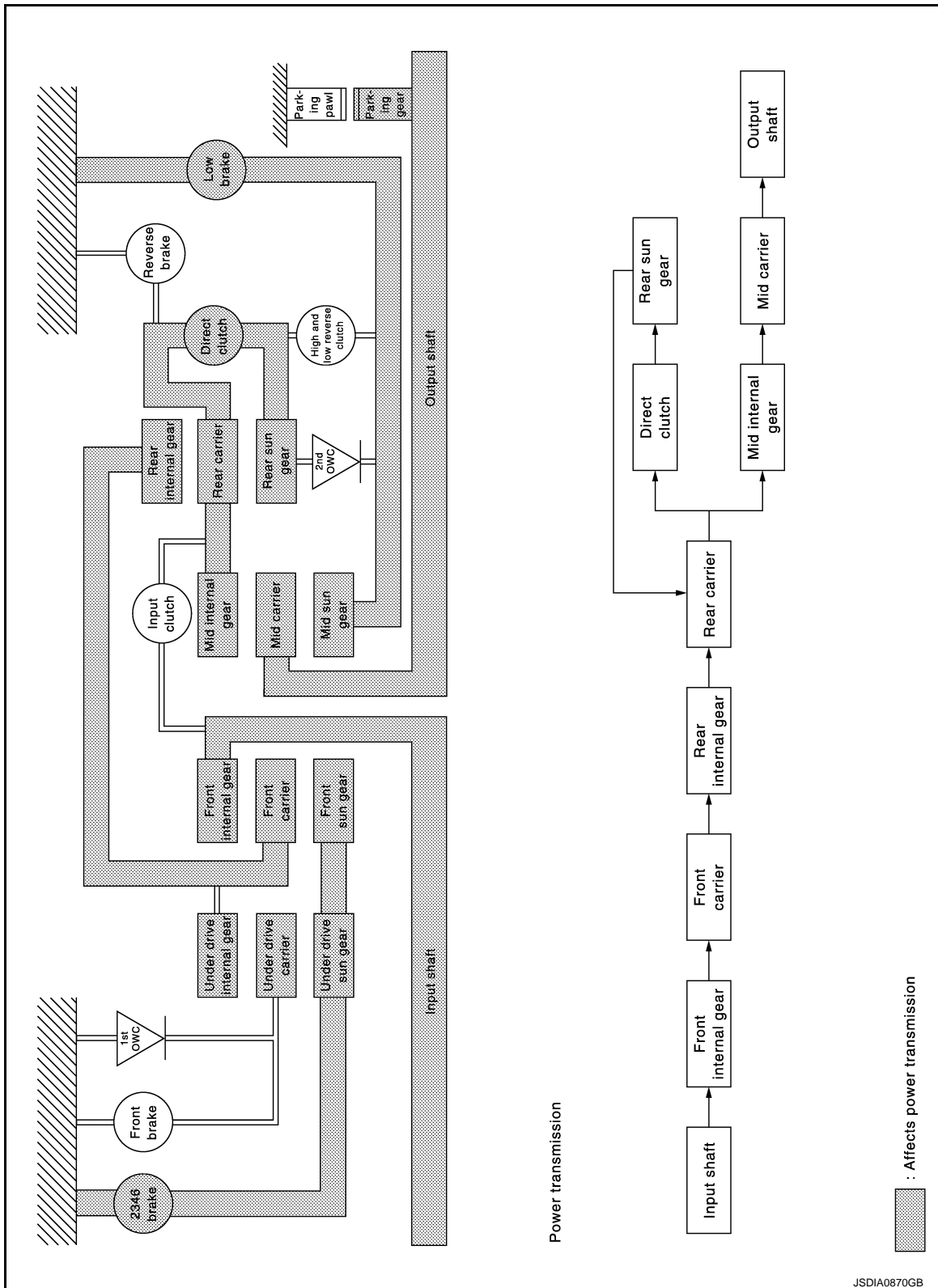
“D3”, “DS3” and “M3” Positions

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- 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.

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Front planetary gear			
Name	Front sun gear	Front carrier	Front internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from front internal gear	Same number of revolution as the input shaft
Under drive planetary gear			
Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	Fixed	—	Input/Output
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from under drive internal gear	Same number of revolution as the front carrier
Rear planetary gear			
Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	—	Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Same number of revolution as the rear internal gear	Same number of revolution as the rear internal gear	Same number of revolution as the under drive internal gear
Mid planetary gear			
Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from mid internal gear	Same number of revolution as the rear carrier

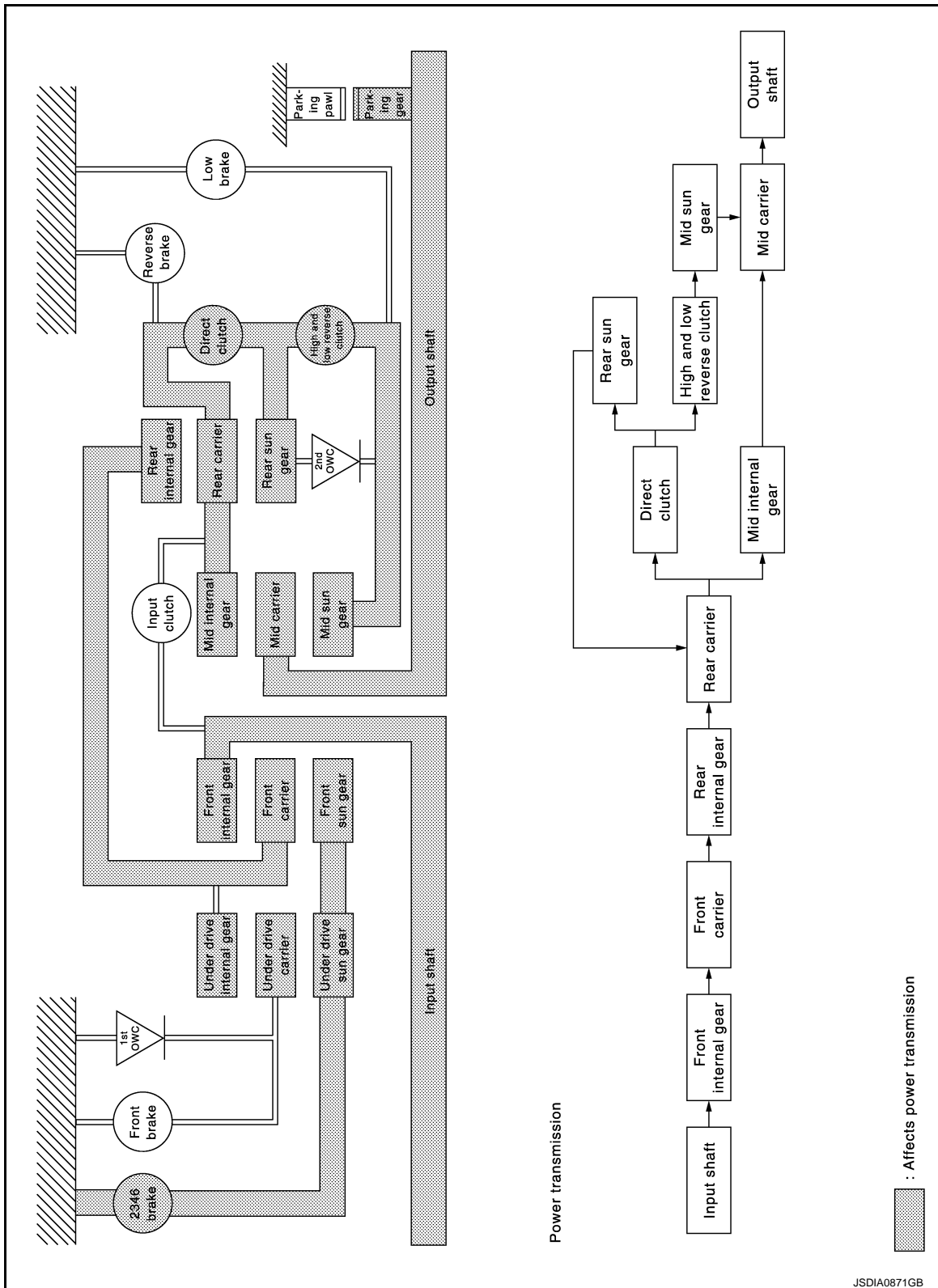
“D4”, “DS4” and “M4” Positions

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- 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.

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Front planetary gear			
Name	Front sun gear	Front carrier	Front internal gear
Condition	Fixed	Output	Input
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from front internal gear	Same number of revolution as the input shaft
Under drive planetary gear			
Name	Under drive sun gear	Under drive carrier	Under drive internal gear
Condition	Fixed	—	Input/Output
Direction of rotation	—	Clockwise revolution	Clockwise revolution
Number of revolutions	—	Deceleration from under drive internal gear	Same number of revolution as the front carrier
Rear planetary gear			
Name	Rear sun gear	Rear carrier	Rear internal gear
Condition	—	Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Same number of revolution as the rear internal gear	Same number of revolution as the rear internal gear	Same number of revolution as the under drive internal gear
Mid planetary gear			
Name	Mid sun gear	Mid carrier	Mid internal gear
Condition	—	Output	Input
Direction of rotation	Clockwise revolution	Clockwise revolution	Clockwise revolution
Number of revolutions	Same number of revolution as the mid internal gear	Same number of revolution as the mid internal gear	Same number of revolution as the rear carrier

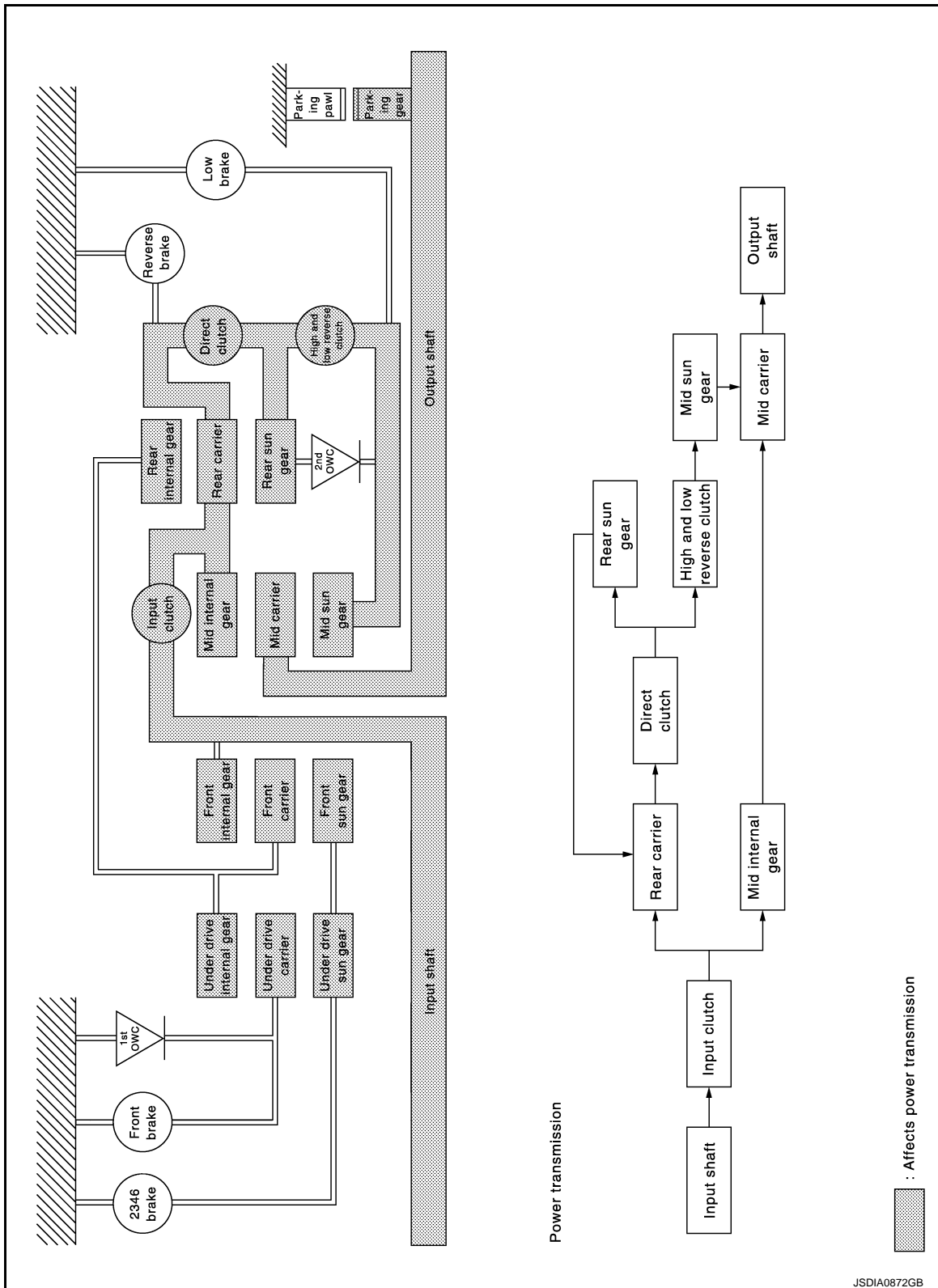
“D5”, “DS5” and “M5” Positions

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- 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.

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# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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

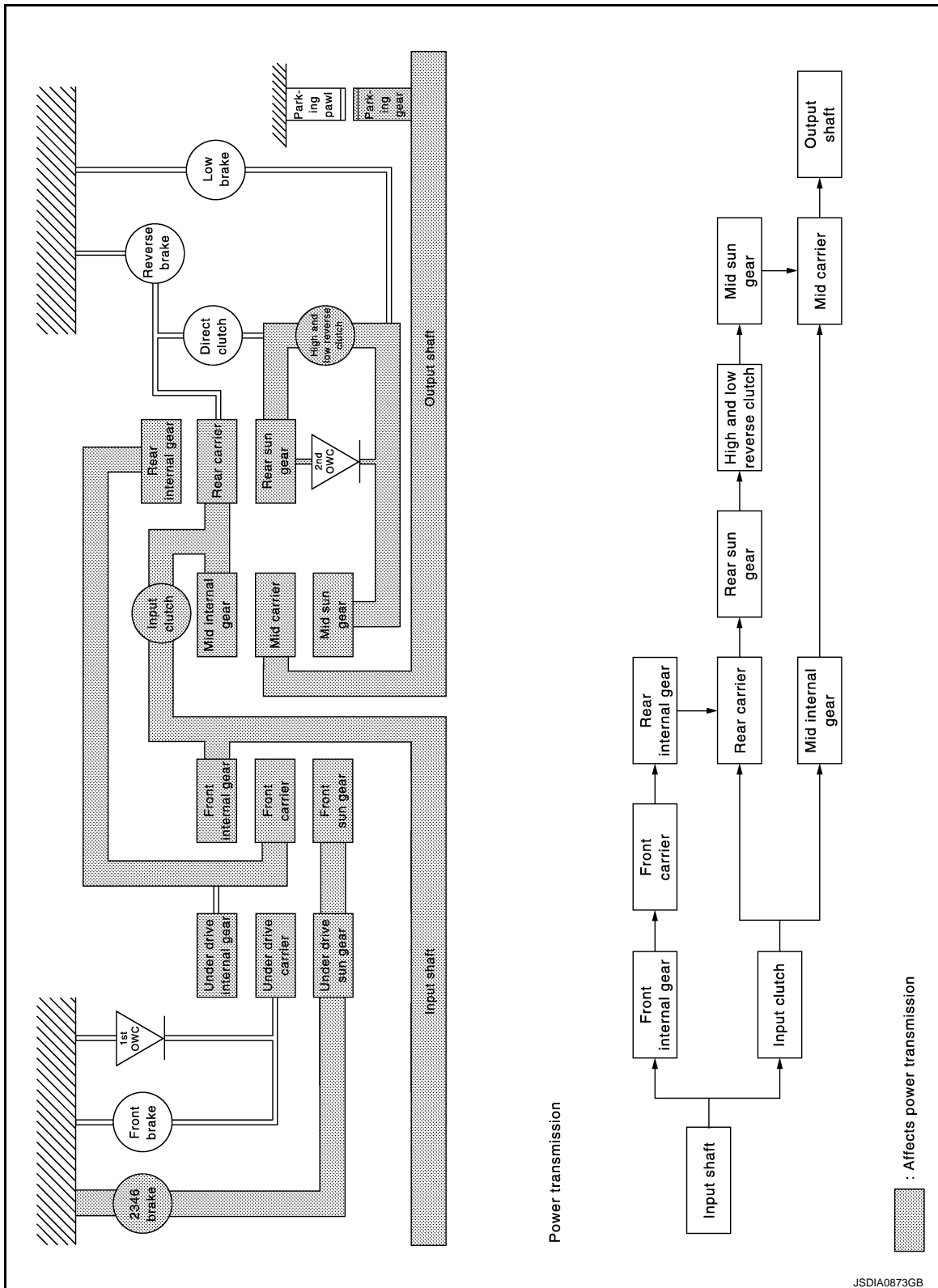
"D6", "DS6" and "M6" Positions

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- 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.



# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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

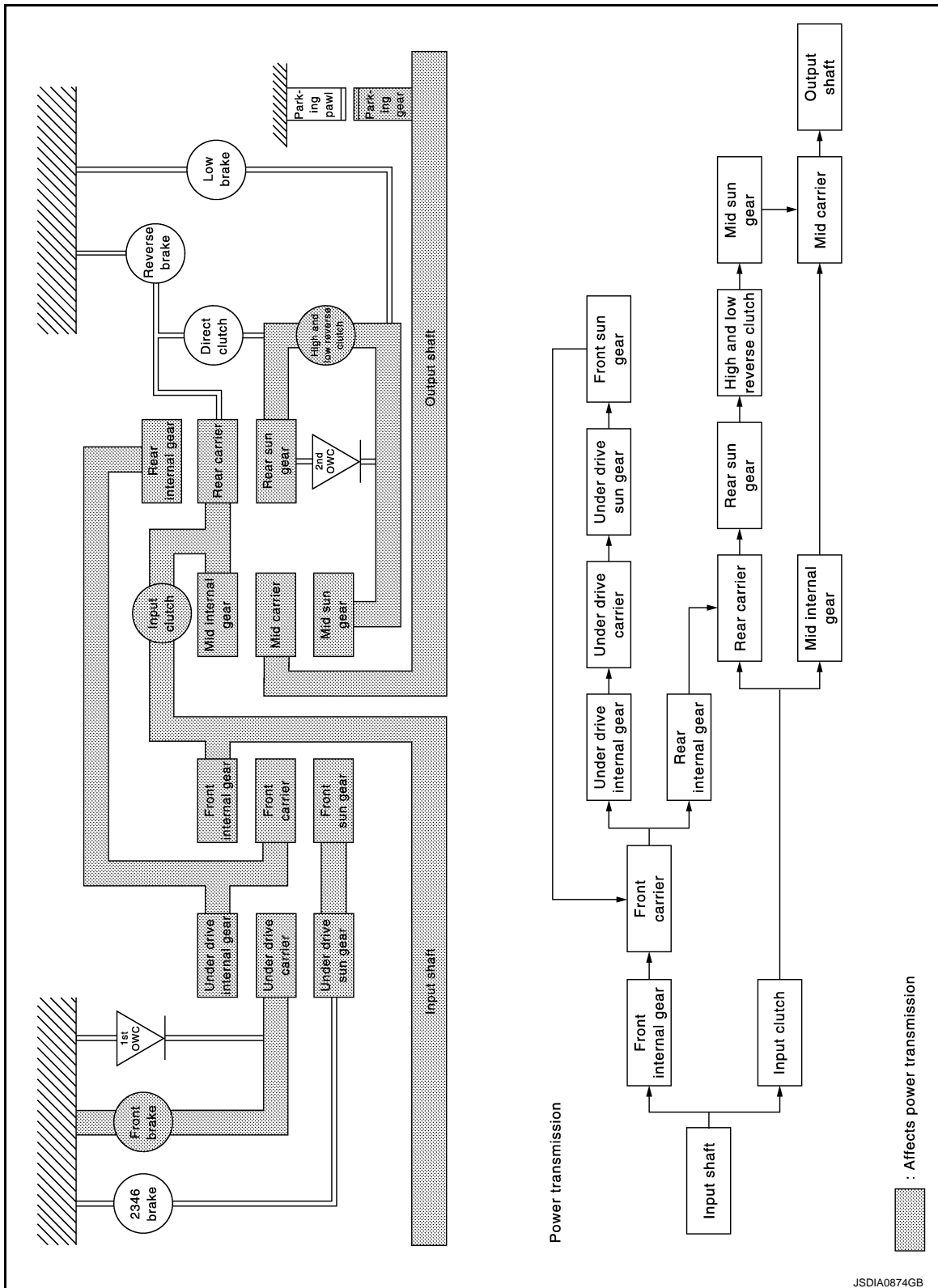
“D7”, “DS7” and “M7” Positions

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- 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.

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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

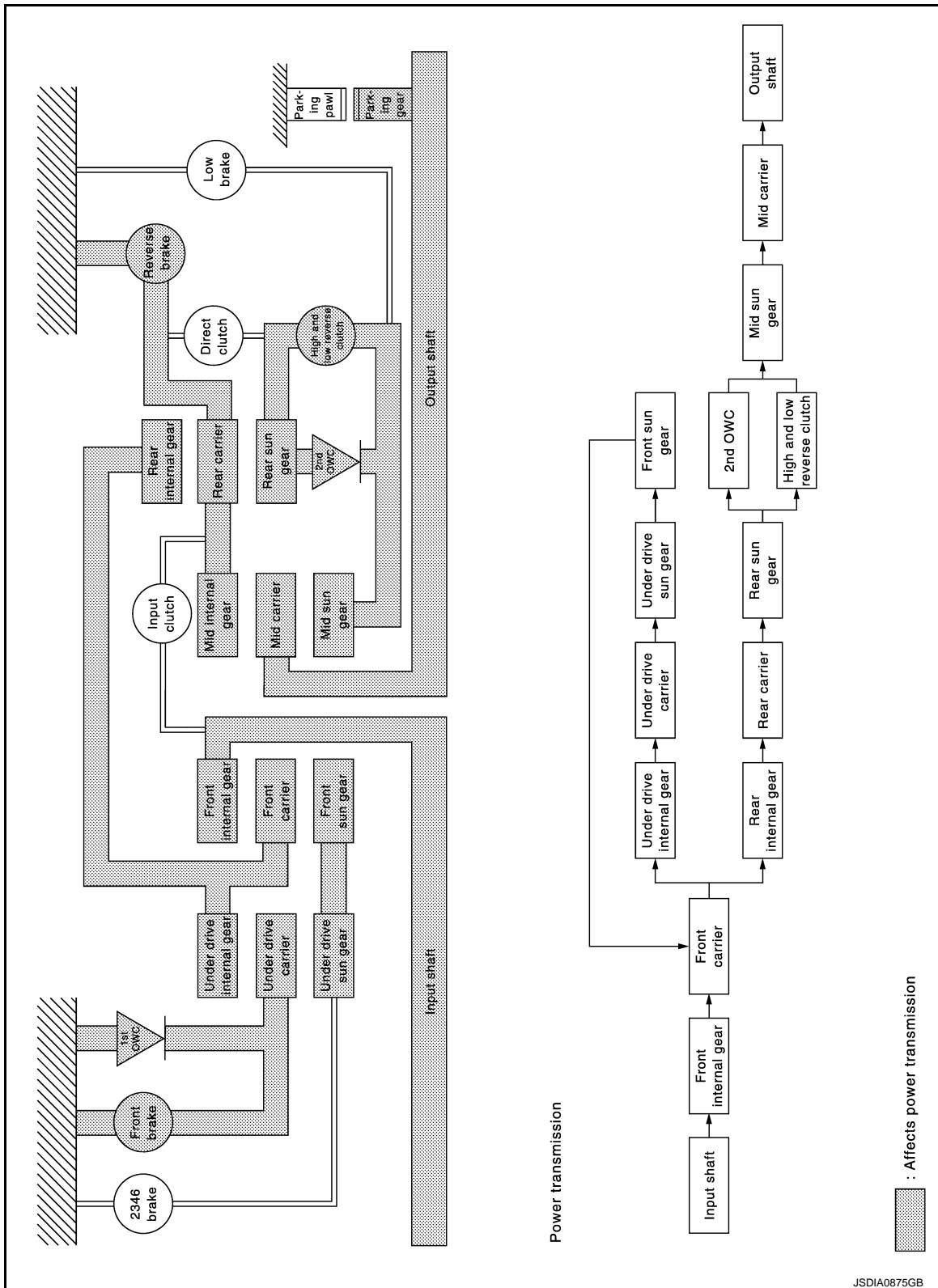
“R” Position

A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]



- 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.

# STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

- 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	—

## Component Description

INFOID:000000006883984

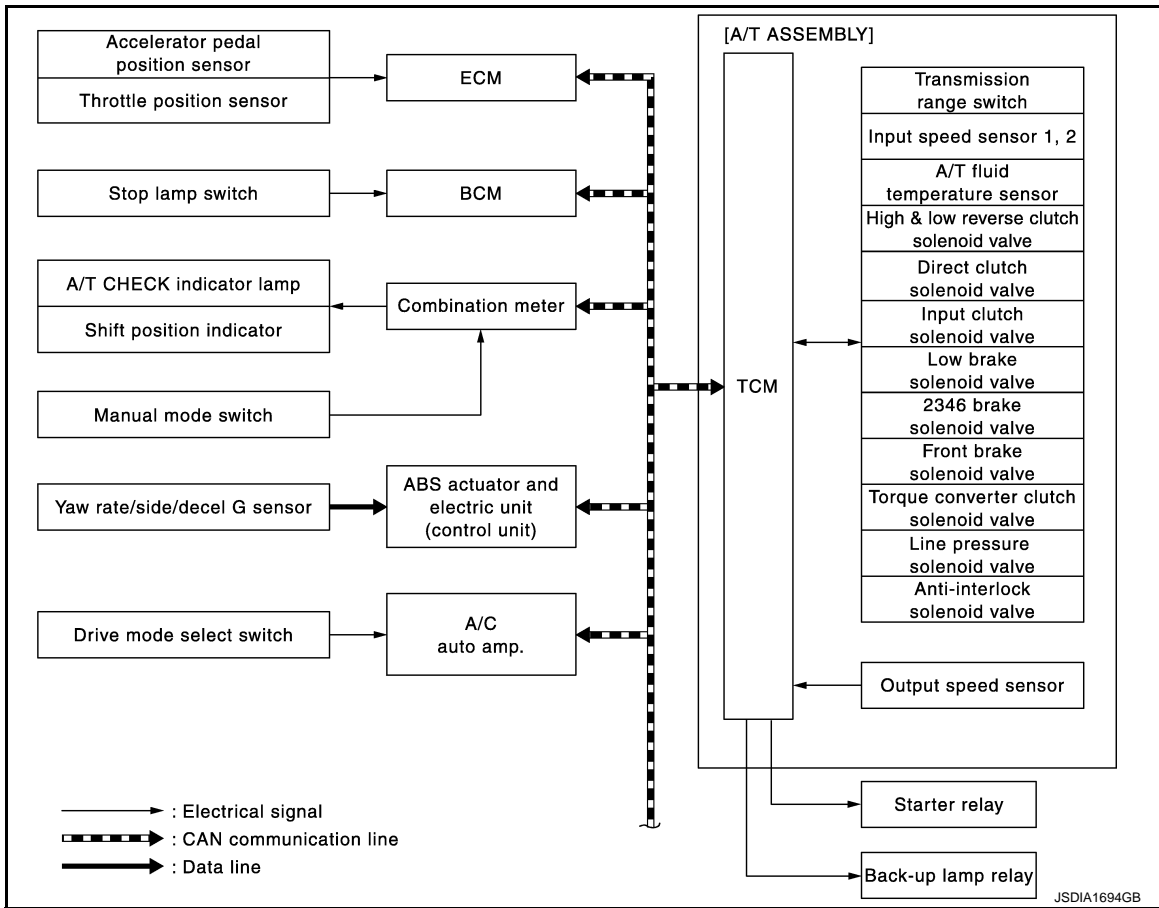
Name of the Part (Abbreviation)	Function
Front brake (FR/B)	Fastens the under drive carrier.
Input clutch (I/C)	Connects the input shaft, the mid internal gear and the rear carrier.
Direct clutch (D/C)	Connects the rear carrier and the rear sun gear.
High and low reverse clutch (HLR/C)	Connects the rear 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.

SYSTEM

A/T CONTROL SYSTEM

A/T CONTROL SYSTEM : System Diagram

INFOID:000000006883985



A/T CONTROL SYSTEM : System Description

INFOID:000000006883986

INPUT/OUTPUT SIGNAL CHART

Sensor (or signal)	TCM function	Actuator
<ul style="list-style-type: none"> <li>Transmission range switch</li> <li>Accelerator pedal position signal</li> <li>Closed throttle position signal</li> <li>Wide open throttle position signal</li> <li>Engine speed signal</li> <li>A/T fluid temperature sensor</li> <li>Output speed sensor</li> <li>Vehicle speed signal</li> <li>Manual mode switch signal</li> <li>Stop lamp switch signal</li> <li>Input speed sensor 1, 2</li> <li>Yaw rate/side/decel G sensor</li> <li>Drive mode selector switch</li> </ul>	<ul style="list-style-type: none"> <li>Line pressure control (TM-46)</li> <li>Shift change control (TM-49)</li> <li>Shift pattern control (TM-53)</li> <li>Lock-up control (TM-56)</li> <li>Drive mode selector (TM-53)</li> <li>Fail-safe control (TM-43)</li> <li>Self-diagnosis (TM-60)</li> <li>CONSULT communication line (TM-60)</li> <li>CAN communication line (TM-99)</li> </ul>	<ul style="list-style-type: none"> <li>Input clutch solenoid valve</li> <li>Direct clutch solenoid valve</li> <li>Front brake solenoid valve</li> <li>High and low reverse clutch solenoid valve</li> <li>Low brake solenoid valve</li> <li>Torque converter clutch solenoid valve</li> <li>Line pressure solenoid valve</li> <li>Anti-interlock solenoid valve</li> <li>2346 brake solenoid valve</li> <li>A/T CHECK indicator lamp</li> <li>Back-up lamp relay</li> <li>Starter relay</li> </ul>

SYSTEM DESCRIPTION

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

# SYSTEM

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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

## A/T CONTROL SYSTEM : Fail-Safe

INFOID:000000007134422

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-83, "Work 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	<ul style="list-style-type: none"> <li>• 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.</li> <li>• The mode that the shifting performance does not decrease by normal shift control.</li> </ul>

## 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	—	<ul style="list-style-type: none"> <li>• Fixed in the "D" position (The shifting can be performed)</li> <li>• Lock-up is prohibited when 30 km/h (19 MPH) or less</li> <li>• The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed</li> <li>• Manual mode is prohibited</li> <li>• Shift position indicator is switched OFF</li> <li>• Starter relay is switched OFF (starter is disabled)</li> <li>• Back-up lamp is OFF</li> <li>• Large shift shock</li> </ul>	—	<ul style="list-style-type: none"> <li>• Fixed in the "D" position (The shifting can be performed)</li> <li>• Lock-up is prohibited when 30 km/h (19 MPH) or less</li> <li>• The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed</li> <li>• Manual mode is prohibited</li> <li>• Shift position indicator is switched OFF</li> <li>• Starter relay is switched OFF (starter is disabled)</li> <li>• Back-up lamp is OFF</li> <li>• Large shift shock</li> </ul>
P0710	Between the gears of 1 - 2 - 3	<ul style="list-style-type: none"> <li>• The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>• Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>• The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>• Manual mode is prohibited</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul style="list-style-type: none"> <li>• Fix the gear while driving</li> <li>• Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>• Manual mode is prohibited</li> </ul>
P0717	Between the gears of 1 - 2 - 3	<ul style="list-style-type: none"> <li>• The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>• Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>• The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>• Manual mode is prohibited</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul style="list-style-type: none"> <li>• Fix the gear while driving</li> <li>• Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>• Manual mode is prohibited</li> </ul>

# SYSTEM

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

DTC	Vehicle condition		Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P0720	Between the gears of 1 - 2 - 3		<ul style="list-style-type: none"> <li>Only downshift can be performed</li> <li>Manual mode is prohibited</li> <li>A vehicle speed signal from the unified meter and A/C amp. is regarded as an effective signal</li> </ul>	—	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>
	Between the gears of 4 - 5 - 6 - 7		<ul style="list-style-type: none"> <li>Fix the gear at driving</li> <li>Manual mode is prohibited</li> <li>A vehicle speed signal from the unified meter and A/C amp. is regarded as an effective signal</li> </ul>	—	
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	<ul style="list-style-type: none"> <li>Locks in 2GR, 3GR or 4GR</li> <li>Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 1 - 2 can be performed</li> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>The shifting between the gears of 4 - 5 - 6 can be performed</li> <li>Manual mode is prohibited</li> </ul>
		Other than the above	<ul style="list-style-type: none"> <li>Locks in 1GR, 2GR, 3GR, 4GR, 5GR or 6GR</li> <li>Fix the gear while driving</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 1 - 2 can be performed</li> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>The shifting between the gears of 2 - 3 - 4 can be performed</li> <li>The shifting between the gears of 3 - 4 can be performed</li> <li>The shifting between the gears of 4 - 5 - 6 can be performed</li> <li>Manual mode is prohibited</li> </ul>
P0730	—		<ul style="list-style-type: none"> <li>Locks in 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 1 - 2 can be performed</li> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>
P0740	—		<ul style="list-style-type: none"> <li>Lock-up is prohibited</li> <li>Slip lock-up is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>Lock-up is prohibited</li> <li>Slip lock-up is prohibited</li> </ul>
P0744	—		<ul style="list-style-type: none"> <li>Lock-up is prohibited</li> <li>Slip lock-up is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>Lock-up is prohibited</li> <li>Slip lock-up is prohibited</li> </ul>



# SYSTEM

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

DTC	Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P0750 P0775 P0795 P2713 P2722 P2731 P2807	—	<ul style="list-style-type: none"> <li>Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>The shifting between the gears of 3 - 4 - 5 can be performed</li> <li>The shifting between the gears of 4 - 5 - 6 can be performed</li> <li>The shifting between the gears of 1 - 2 - 3 - 4 - 5 - 6 can be performed</li> <li>Manual mode is prohibited</li> </ul>
P0780	—	<ul style="list-style-type: none"> <li>Locks in 3GR</li> <li>Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>
P1705	—	<ul style="list-style-type: none"> <li>Downshift when accelerator pedal is depressed is prohibited</li> <li>Upshift when accelerator pedal is released is prohibited</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Downshift when accelerator pedal is depressed is prohibited</li> <li>Upshift when accelerator pedal is released is prohibited</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Downshift when accelerator pedal is depressed is prohibited</li> <li>Upshift when accelerator pedal is released is prohibited</li> <li>Manual mode is prohibited</li> </ul>
P1730	—	<ul style="list-style-type: none"> <li>Locks in 1GR, 2GR, 3GR, 4GR, 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 2 - 3 - 4 can be performed</li> <li>The shifting between the gears of 3 - 4 can be performed</li> <li>The shifting between the gears of 4 - 5 - 6 can be performed</li> <li>Manual mode is prohibited</li> </ul>
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
U0300 U1000	Between the gears of 1 - 2 - 3	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Line pressure is set to the maximum hydraulic pressure</li> <li>Manual mode is prohibited</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul style="list-style-type: none"> <li>Fix the gear at driving</li> <li>Manual mode is prohibited</li> </ul>	—	
P0720 and P1721	—	Locks in 5GR	—	Locks in 5GR

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## A/T CONTROL SYSTEM : Protection Control

INFOID:000000006883988

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

# SYSTEM

## < SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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	<ul style="list-style-type: none"> <li>• Vehicle speed: 8 km/h (5 MPH) or less</li> <li>and</li> <li>• Engine speed: 2,200 rpm or less</li> </ul>
Vehicle behavior	<ul style="list-style-type: none"> <li>• The torque transmission cannot be performed</li> <li>• There is a shock just before a vehicle stop</li> </ul>

### 1ST ENGINE BRAKE PROTECTION CONTROL

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

Malfunction detection condition	<ul style="list-style-type: none"> <li>• Select lever and gear: Any position other than "R" position and 1GR</li> <li>and</li> <li>• Vehicle speed: More than 25 km/h (16 MPH)</li> </ul>
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

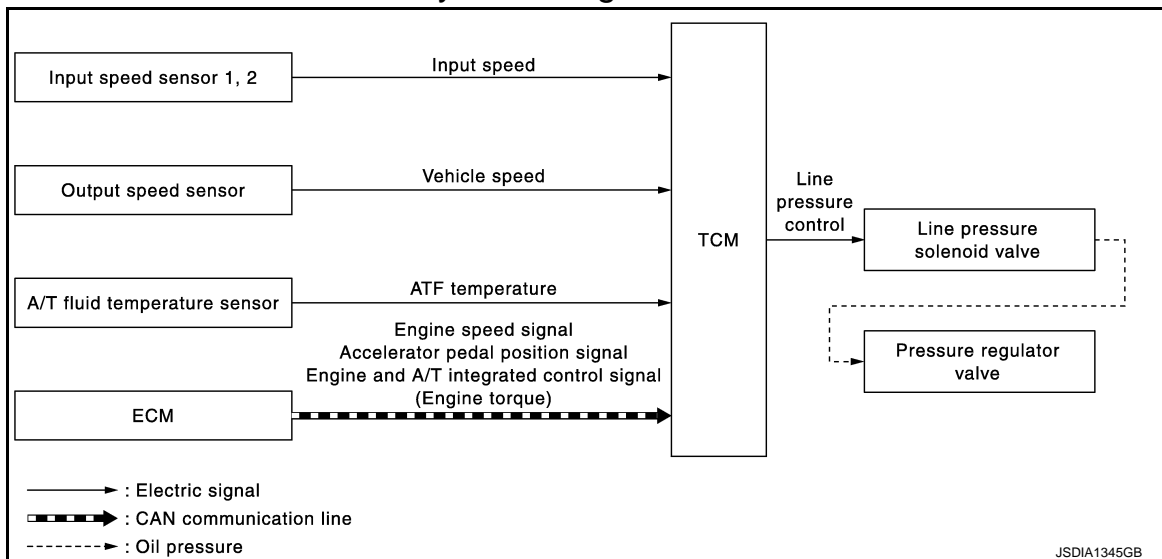
Limit the accelerator opening and forcibly control the vehicle to the low torque driving when the electronic substrate in TCM reaches the high temperature.

Malfunction detection condition	TCM electronic substrate temperature <ul style="list-style-type: none"> <li>• 145°C (293°F) and 120 seconds</li> <li>or</li> <li>• 150°C (302°F)</li> </ul>
Control at malfunction	Accelerator opening: 0.5/8 or less
Normal return condition	<ul style="list-style-type: none"> <li>• TCM electronic substrate temperature: Less than 140°C (284°F)</li> <li>and</li> <li>• Vehicle speed: 5 km/h (3 MPH) or less</li> </ul>
Vehicle behavior	Accelerator opening: output torque of approximately 0.5/8

## LINE PRESSURE CONTROL

### LINE PRESSURE CONTROL : System Diagram

INFOID:000000006883989



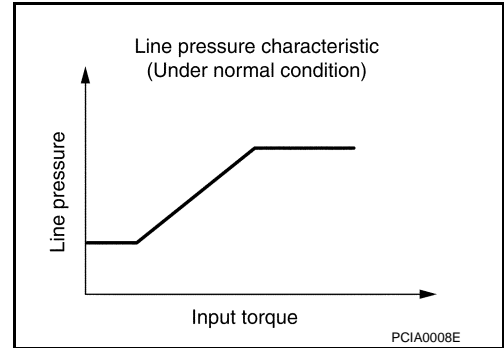
LINE PRESSURE CONTROL : System Description

INFOID:000000006883990

- 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.

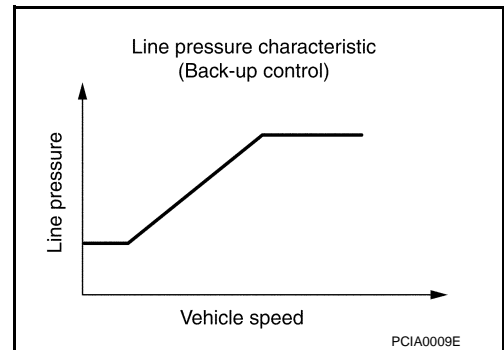
Normal Control

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

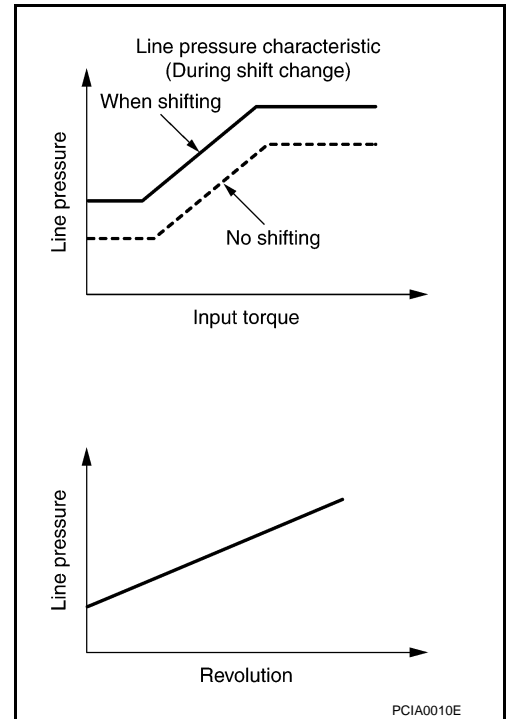
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# SYSTEM

## < SYSTEM DESCRIPTION >

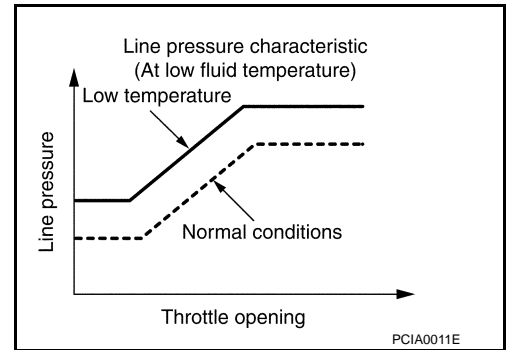
[7AT: RE7R01A]

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

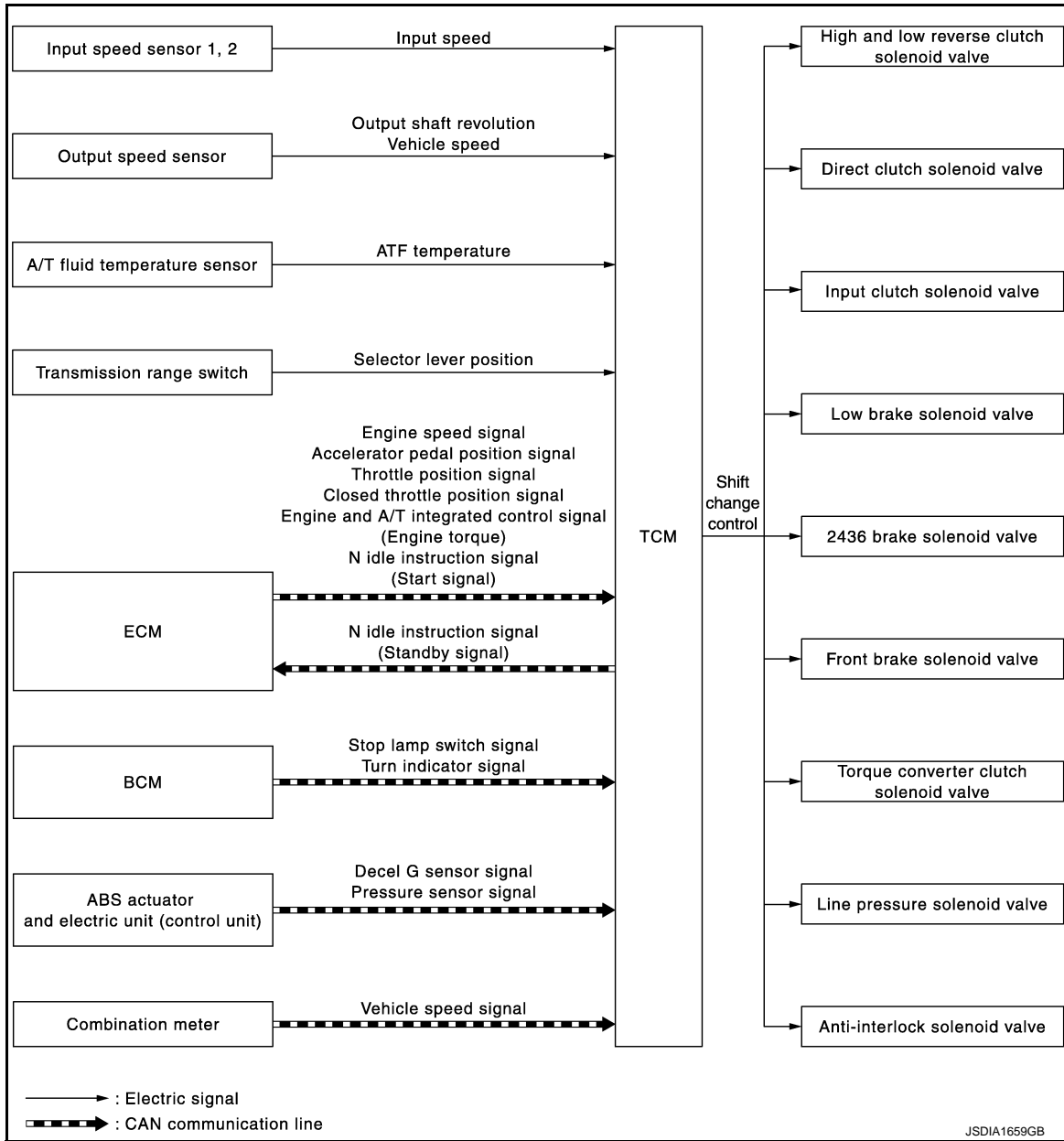
When the A/T fluid temperature drops below the prescribed temperature, in order to speed up the action of each friction element, the line pressure is set higher than the normal line pressure characteristic.



## SHIFT CHANGE CONTROL

SHIFT CHANGE CONTROL : System Diagram

INFOID:000000006883991



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SHIFT CHANGE CONTROL : System Description

INFOID:000000006883992

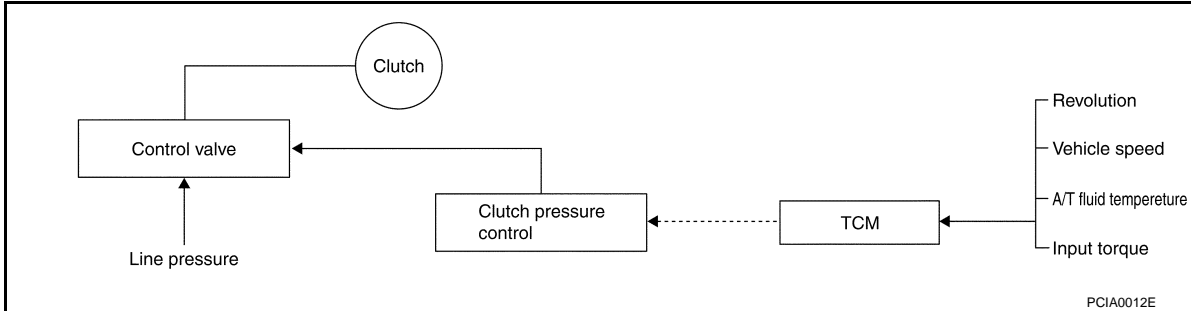
Input/Output Signal Chart

Item	Signal	TCM function	Actuator
Input speed sensor 1, 2	Input speed	Shift change control	<ul style="list-style-type: none"> <li>High and low reverse clutch solenoid valve</li> <li>Direct clutch solenoid valve</li> <li>Input clutch solenoid valve</li> <li>Low brake solenoid valve</li> <li>2436 brake solenoid valve</li> <li>Front brake solenoid valve</li> <li>Torque converter clutch solenoid valve</li> <li>Line pressure solenoid valve</li> <li>Anti-interlock solenoid valve</li> </ul>
Output speed sensor	Vehicle speed		
A/T fluid temperature sensor	ATF temperature		
ECM	Engine speed signal*		
	Accelerator pedal position signal*		
	Closed throttle position signal*		
	Engine and A/T integrated control signal (Engine torque)*		
BCM	Stop lamp switch signal*		

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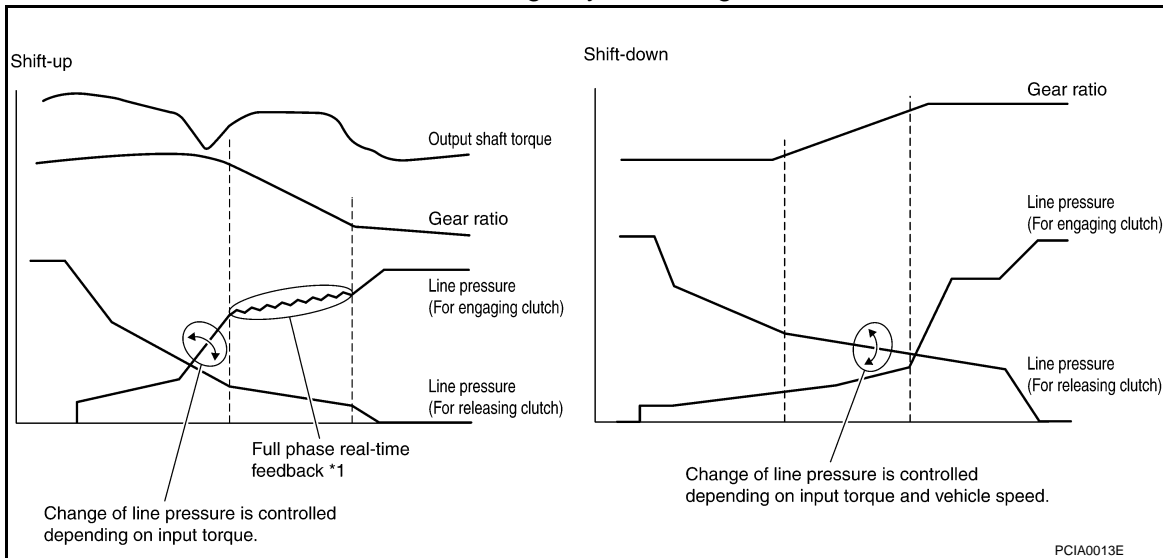
\*: This signal is transmitted via communication line.

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).

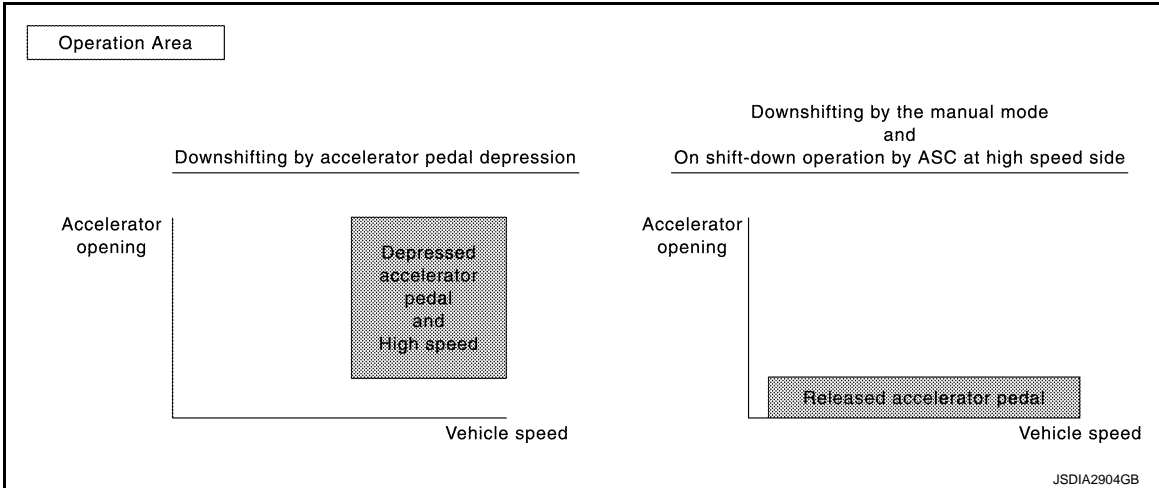
- “BLIPPING CONTROL” functions.
- When downshifting by accelerator pedal depression.
- When downshifting by the manual mode.

# SYSTEM

## < SYSTEM DESCRIPTION >

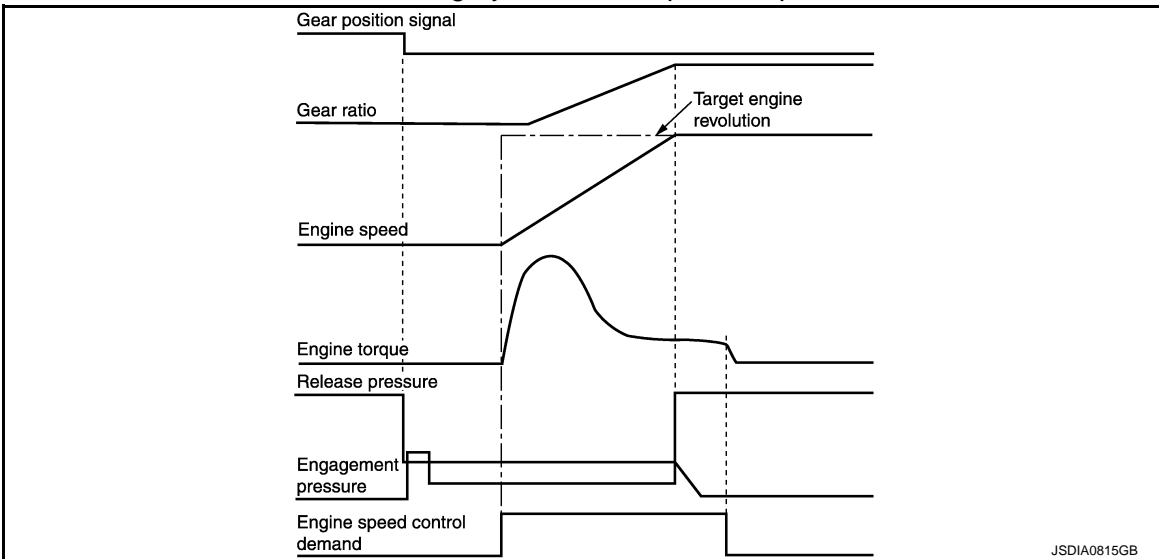
[7AT: RE7R01A]

- It works on shift-down operation by ASC at high speed side when driving at D position or in DS mode.

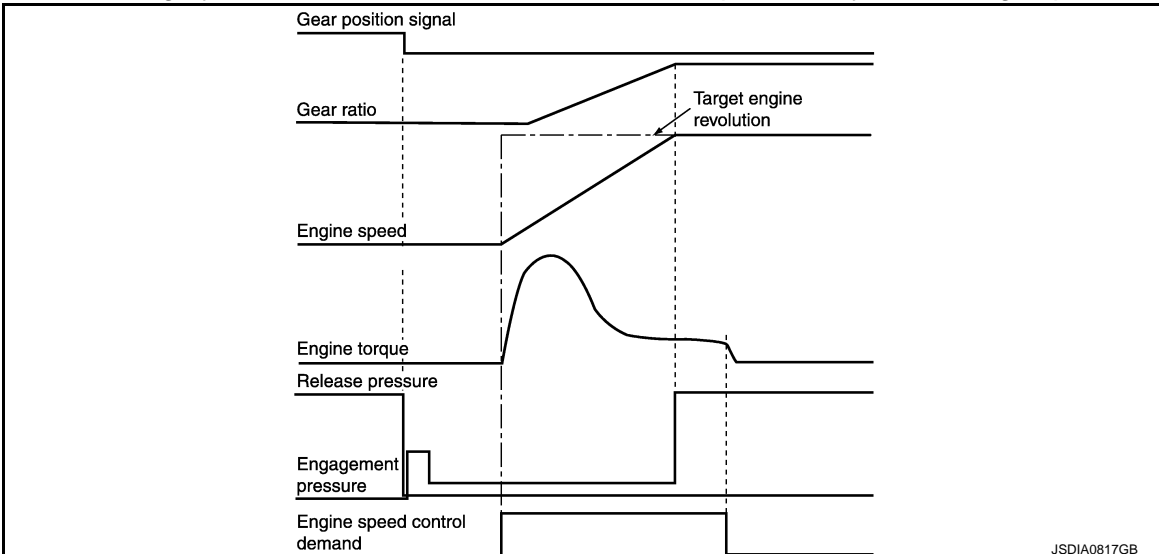


- TCM selects "BLIPPING CONTROL" or "NORMAL SHIFT CONTROL" according to the gear position, the selector lever position, the engine torque and the speed when accelerating by pedal depression.
- Engine speed control demand signal is transmitted from TCM to ECM under "BLIPPING CONTROL".
- ECM synchronizes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



## IDLE NEUTRAL CONTROL

Input/Output Signal Chart

Item	Signal			TCM function	Actuator
	Each sensor, switch and control unit ⇒ TCM	TCM ⇒ ECM	ECM ⇒ TCM		
Input speed sensor 1, 2	Input speed	N idle instruction signal (Standby signal)*	N idle instruction signal (Start signal)*	Idle neutral control	Low brake solenoid valve
Output speed sensor	Output shaft revolution				
A/T fluid temperature sensor	ATF temperature				
Transmission range switch	Selector lever position				
ECM	Engine speed signal*				
	Accelerator pedal position signal*				
	Throttle position signal*				
BCM	Stop lamp switch signal*				
	Turn indicator signal*				
ABS actuator electric unit (control unit)	Pressure sensor signal*				
	Decel G sensor signal*				
Combination meter	Vehicle speed signal*				

\*: This signal is transmitted via communication line.

The TCM activates low brake solenoid valve and controls the low brake oil pressure to the low pressure level if the driver does not intend to start the vehicle while the vehicle is being stopped in the “D” position. Therefore, the low brake is in the release (slip) status and the power transmission route of A/T is the same status as the “N” position. This can decrease the engine load and improves the fuel economy because the drive force of engine is not transmitted to the output shaft of A/T.

### Idle Neutral Control Start Condition

Idle neutral control starts when all of the following conditions are satisfied. However, the control ends when any one of the following conditions becomes insufficient during idle neutral control.

- Driving location : Level road and gentle slope
- Selector lever position : “D” position
- Vehicle speed : 0 km/h (0 MPH)
- Accelerator pedal opening : 0.0 / 8
- Brake pedal : Depress
- Engine speed : Idle speed
- Drive mode selector : Other than SNOW mode
- Turn signal lamp and hazard warning lamp : OFF

### NOTE:

The idle neutral control is terminated or prohibited when the TCM and ECM detect that the vehicle is in any of the conditions as per the following.

- Engine cooling water temperature and A/T fluid temperature are below or above a prescribed temperature.
- A/T malfunction occurs.
- DTC is detected.
- Fail-safe mode activates.
- Idle neutral control is performed continuously for a certain period of time.

### Idle Neutral Control Resume Condition

Idle neutral control can be resumed when its start condition is fulfilled after any of the following operations is performed (unless a malfunction occurs in the vehicle).

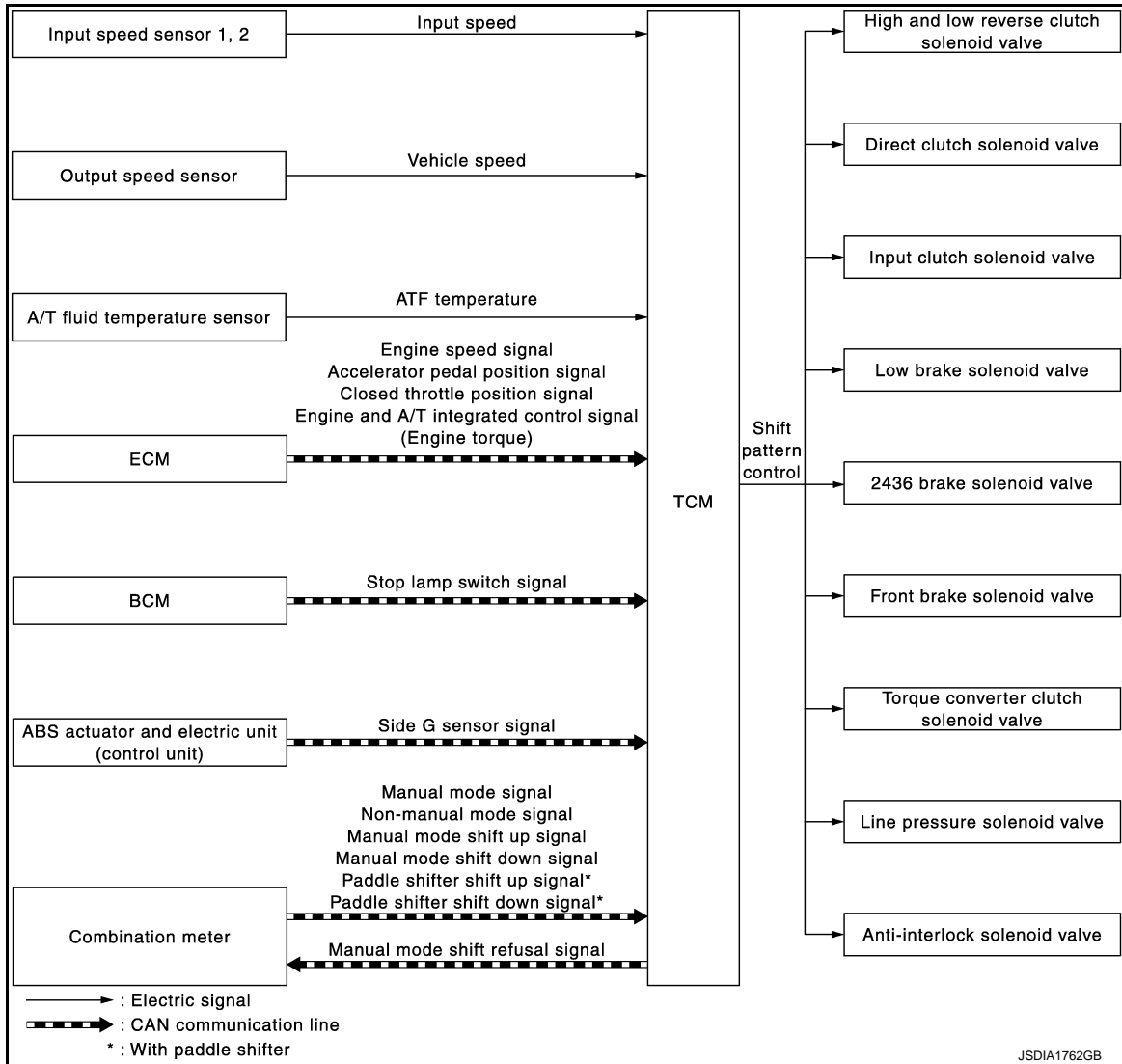
- After driving at more than a prescribed speed.
- When idle neutral control start conditions are fulfilled for a certain period of time.

## SHIFT PATTERN CONTROL



SHIFT PATTERN CONTROL : System Diagram

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SHIFT PATTERN CONTROL : System Description

INFOID:000000006883994

DRIVE MODE SELECTOR

# SYSTEM

## < SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Input/Output Signal Chart

Item	Signal	TCM function	Actuator
Input speed sensor 1, 2	Input speed	Drive mode selector	<ul style="list-style-type: none"> <li>• High and low reverse clutch solenoid valve</li> <li>• Direct clutch solenoid valve</li> <li>• Input clutch solenoid valve</li> <li>• Low brake solenoid valve</li> <li>• 2346 brake solenoid valve</li> <li>• Front brake solenoid valve</li> <li>• Torque converter clutch solenoid valve</li> <li>• Line pressure solenoid valve</li> <li>• Anti-interlock solenoid valve</li> </ul>
Output speed sensor	Vehicle speed		
A/T fluid temperature sensor	ATF temperature		
ECM	Engine speed signal*		
	Accelerator pedal position signal*		
	Closed throttle position signal*		
	Engine and A/T integrated control signal (engine torque)*		
	Drive mode select signal*		
	Shift schedule signal*		
ABS actuator and electric unit (control unit)	Side G sensor signal*		
BCM	Stop lamp switch signal*		
A/C auto amp.	STANDARD mode signal*		
	ECO mode signal*		
	SPORT mode signal*		
	SNOW mode signal*		

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

- TCM receives STANDARD mode signal, ECO mode signal, SPORT mode signal, or SNOW mode signal from A/C auto amp. via CAN communication.
- TCM transmits recognized mode and gear shift line select result to 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 or paddle shifter while driving in any other drive mode status.

### ECO mode

- Driving characteristic is controlled (for decreasing needless acceleration and deceleration, reducing energy consumption, and fixing to ECO gear shift line), so that driving that improves operational fuel efficiency is assisted.
- For gear shift vehicle speed, refer to [TM-312. "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)

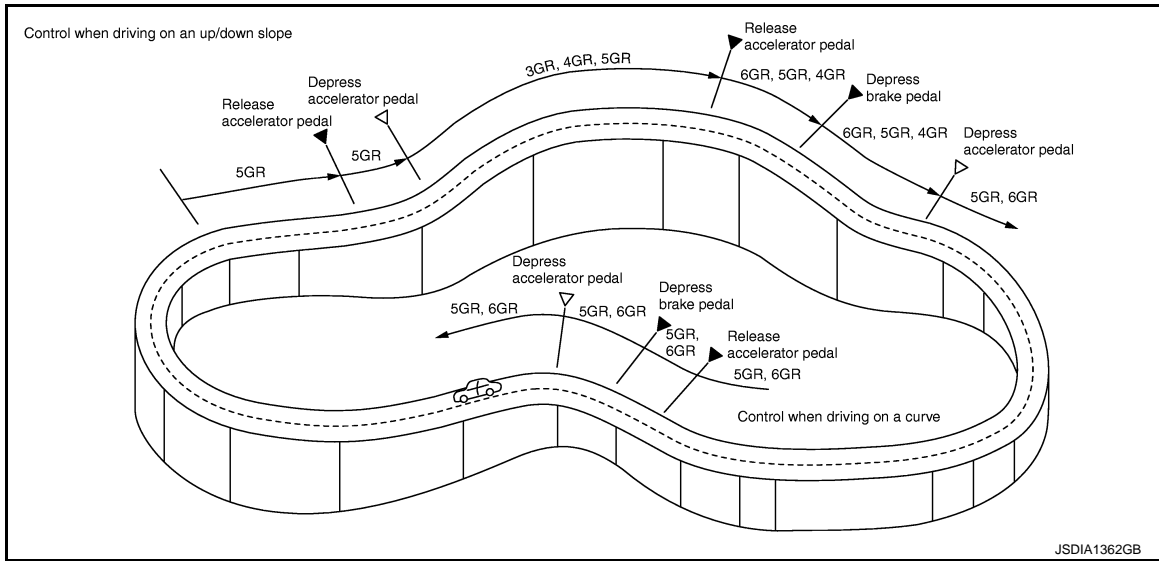
- When driving on an up/down slope  
ASC judges up/down slope according to engine torque data transmitted from the ECM and vehicle speed. Fixing at 4GR, 5GR or 6GR on an up-slope prevents shift hunting and controls the vehicle to gain optimum driving force. On a down-slope, automatic shift-down to 4GR, 5GR or 6GR controls to gain optimum engine brake.
- When driving on a curve  
- In driving condition where acceleration, deceleration, or lateral acceleration continues, it corrects gear selection in order to keep a smooth vehicle speed during the curve and to give an adequate driving force at the curve end.
- When acceleration pedal is quickly released at curve entrance etc, it prevents an unnecessary shift-up.
- On braking operation at curve entrance, it gives an early shift-down according to the deceleration.
- In a sporty driving condition, it selects lower gear early even on a light braking operation, giving greater importance on driving force.

# SYSTEM

## < SYSTEM DESCRIPTION >

[7AT: RE7R01A]

- TCM receives the side G sensor signal from the ABS actuator and electric unit (control unit). It locks to 4GR, 5GR or 6GR position in moderate cornering or to 3GR position in sharp cornering based on this signal. This prevents any upshift and kickdown during cornering, maintaining smooth vehicle travel.



### Fail-Safe

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

### MANUAL MODE

#### Input/Output Signal Chart

Item	Signal	TCM function	Actuator
Output speed sensor	Vehicle speed	Manual mode	<ul style="list-style-type: none"> <li>• High and low reverse clutch solenoid valve</li> <li>• Direct clutch solenoid valve</li> <li>• Input clutch solenoid valve</li> <li>• Low brake solenoid valve</li> <li>• 2346 brake solenoid valve</li> <li>• Front brake solenoid valve</li> <li>• Torque converter clutch solenoid valve</li> <li>• Line pressure solenoid valve</li> <li>• Anti-interlock solenoid valve</li> </ul>
A/T fluid temperature sensor	ATF temperature		
ECM	Engine speed signal*1		
	Accelerator pedal position signal*1		
Combination meter	Manual mode signal*1		
	Non-manual mode signal*1		
	Manual mode shift up signal*1		
	Manual mode shift down signal*1		
	Paddle shifter shift up signal*1, *2		
	Paddle shifter shift down signal*1, *2		

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

\*2: With paddle shifter

- The TCM receives the manual mode signal, non-manual mode signal, manual mode shift up signal, manual mode shift down signal, paddle shifter shift up signal\* and paddle shifter shift down signal\* from combination meter via CAN communication line. The TCM shifts shift pattern control to the manual mode based on these signals, and then shifts the A/T by operating each solenoid valve according to the shift operation of the driver.

\*: With paddle shifter

#### 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

# SYSTEM

## < SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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-73. "Fail-Safe"](#).

### Manual Mode Information

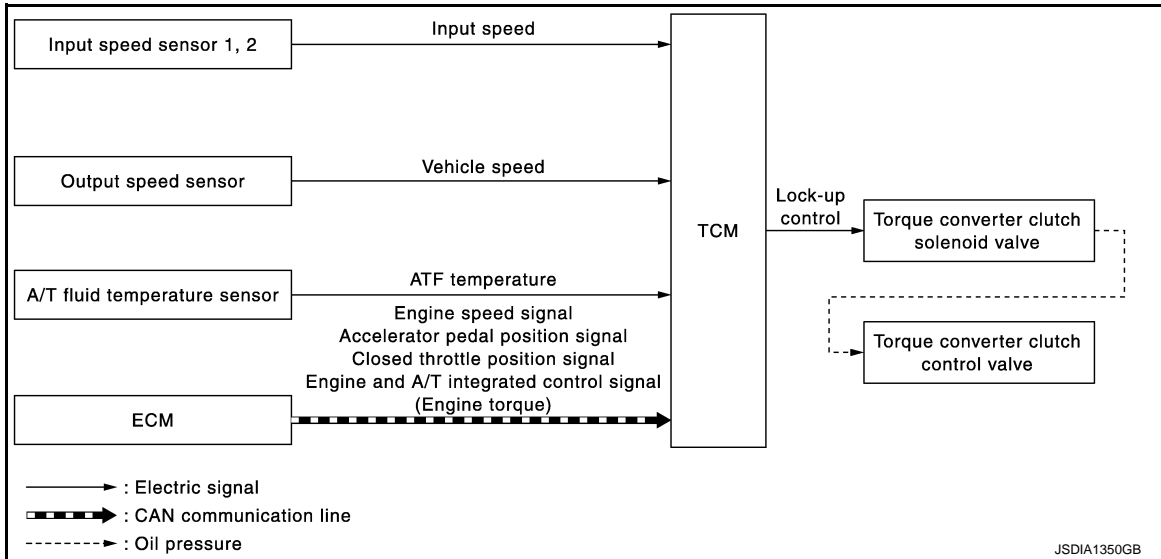
The TCM transmits the manual mode shift refusal signal to the combination meter if the TCM refuses the transmission from the driving status of vehicle when the selector lever or paddle shifter shifts to "UP (+ side)" or "DOWN (- side)" side. The combination meter blinks shift indicator on the combination 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 Diagram

INFOID:000000006883995

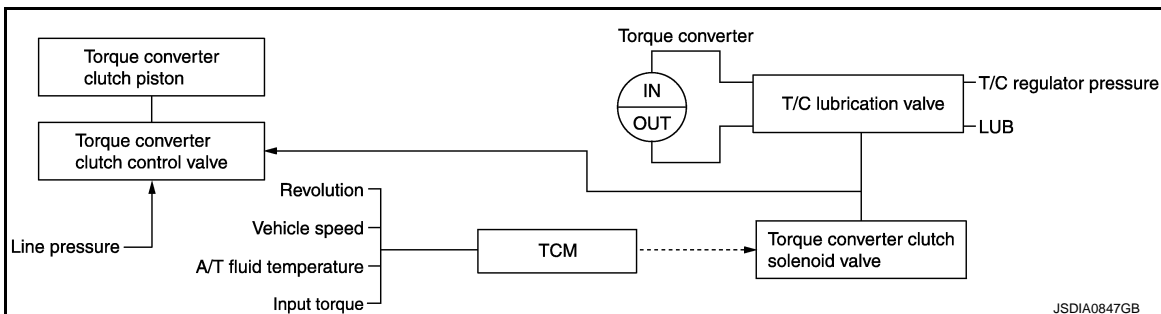


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### LOCK-UP CONTROL : System Description

INFOID:000000006883996

- 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 is controlled by the torque converter clutch solenoid valve, which is controlled by a signal from TCM, and the torque converter clutch engages or releases the torque converter clutch piston.



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Lock-up Operation Condition Table

Selector lever	"D" position						"M" 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.

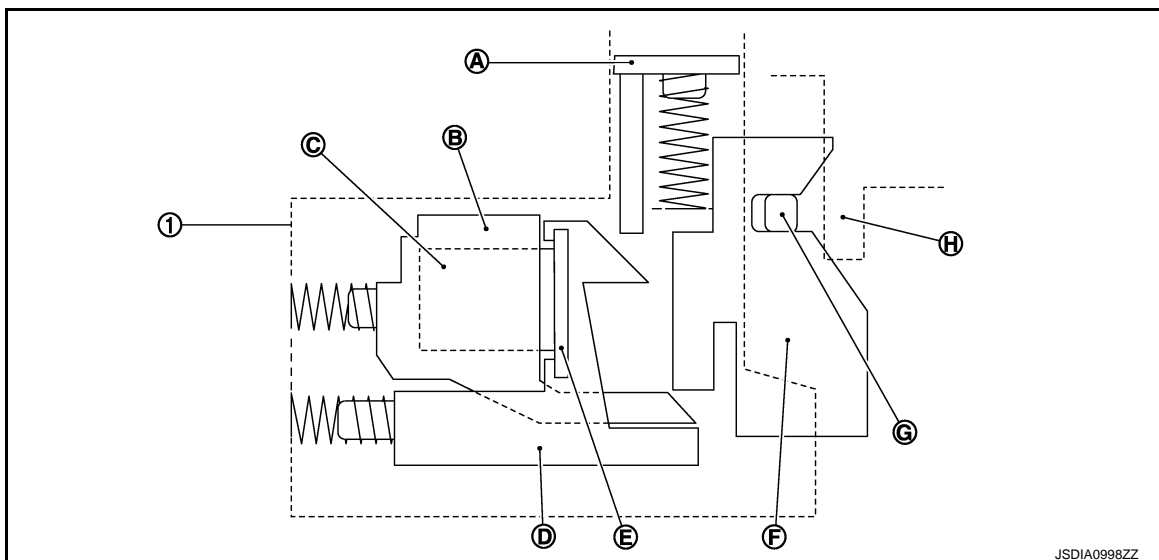
## A/T SHIFT LOCK SYSTEM

### A/T SHIFT LOCK SYSTEM : System Description

INFOID:000000006883997

- 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



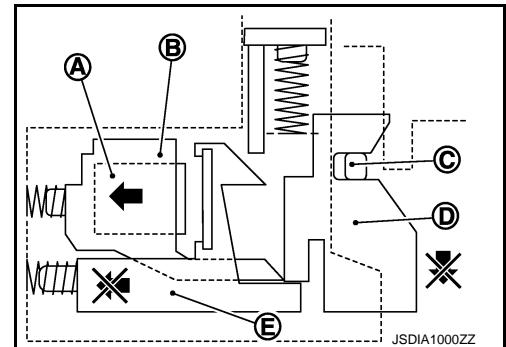
- |                              |           |                  |
|------------------------------|-----------|------------------|
| 1. Shift lock unit           | B. Slider | C. Electromagnet |
| A. Shift lock release button |           |                  |

- |               |                |          |
|---------------|----------------|----------|
| D. Stopper    | E. Iron plate  | F. Plate |
| G. Detent pin | H. Detent gate |          |

## SHIFT LOCK OPERATION

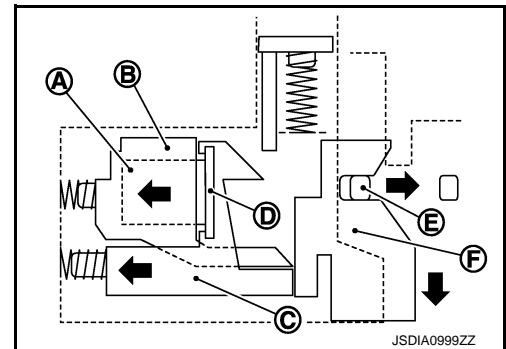
When brake pedal is not depressed and selector lever is in "P" position. (Unable to shift selector lever.)

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



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

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

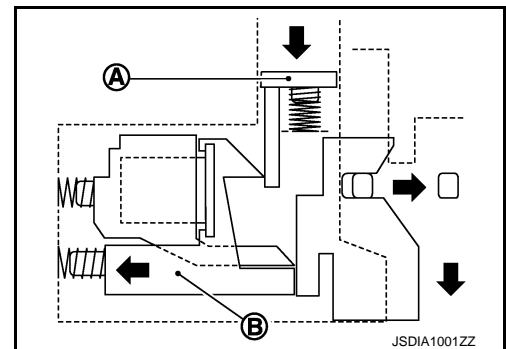


## FORCIBLE RELEASE OF SHIFT LOCK

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

**CAUTION:**

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



## ON BOARD DIAGNOSTIC (OBD) SYSTEM

### Diagnosis Description

INFOID:000000006883998

The A/T system has two self-diagnostic systems.

The first is the emission-related on board diagnostic system (OBD-II) 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-II self-diagnostic items. For details, refer to [TM-78. "DTC Index"](#).

### OBD FUNCTION

The ECM provides emission-related on board diagnostic (OBD-II) 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-77. "Diagnosis Description"](#) (VQ37VHR) or [EC-1033. "Diagnosis Description"](#) (VK56VD).

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# DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

## DIAGNOSIS SYSTEM (TCM)

### CONSULT Function

INFOID:000000006883999

### CONSULT 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 & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
ECU Identification	Display the ECU identification number (part number etc.) of the selected system.
Function Test*	This mode can show results of self-diagnosis of ECU with either "OK" or "NG". For engine, more practical tests regarding sensors/switches and/or actuators are available.
CALIB DATA*	The calibration data status of TCM can be checked.

\*: Although "Function Test" and "CALIB DATA" are selectable, do not use its.

### WORK SUPPORT

Item name	Description
G SENSOR CALIBRATION	Calibrates G sensor.

### SELF DIAGNOSTIC RESULTS

Refer to [TM-78, "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

X: Standard, —: Not applicable, ▼: Option

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU IN-PUT SIG-NALS	MAIN SIG-NALS	SELEC-TION FROM ITEM	
VHCL/S SE-A/T (km/h or mph)	X	X	▼	Displays the vehicle speed calculated by the TCM from the output shaft revolution.
ESTM VSP SIG (km/h or mph)	X	—	▼	Displays the vehicle speed signal received via CAN communication.
OUTPUT REV (rpm)	X	X	▼	Displays the output speed calculated from the pulse signal of output speed sensor.



# DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM ITEM	
INPUT SPEED (rpm)	X	X	▼	Displays the input speed calculated from front sun gear revolution and front carrier revolution.
F SUN GR REV (rpm)	—	—	▼	Displays the front sun gear revolution calculated from the pulse signal of input speed sensor 1.
F CARR GR REV (rpm)	—	—	▼	Displays the front carrier gear revolution calculated from the pulse signal of input speed sensor 2.
ENGINE SPEED (rpm)	X	X	▼	Displays the engine speed received via CAN communication.
TC SLIP SPEED (rpm)	—	X	▼	Displays the revolution difference between input speed and engine speed.
ACCELE POSI (0.0/8)	X	—	▼	Displays the accelerator position estimated value received via CAN communication.
THROTTLE POSI (0.0/8)	X	X	▼	Displays the throttle position received via CAN communication.
ATF TEMP 1 (°C or °F)	X	X	▼	Displays the ATF temperature of oil pan calculated from the signal voltage of A/T fluid temperature sensor.
ATF TEMP 2 (°C or °F)	X	X	▼	Displays the ATF temperature estimated value of torque converter outlet calculated from the signal voltage of A/T fluid temperature sensor.
ATF TEMP SE 1 (V)	—	—	▼	Displays the signal voltage of A/T fluid temperature sensor.
BATTERY VOLT (V)	X	—	▼	Displays the power supply voltage of TCM.
LINE PRES SOL (A)	—	X	▼	Displays the command current from TCM to the line pressure solenoid.
TCC SOLENOID (A)	—	X	▼	Displays the command current from TCM to the torque converter clutch solenoid.
L/B SOLENOID (A)	—	X	▼	Displays the command current from TCM to the low brake solenoid.
FR/B SOLENOID (A)	—	X	▼	Displays the command current from TCM to the front brake solenoid.
HLR/C SOL (A)	—	X	▼	Displays the command current from TCM to the high and low reverse clutch solenoid.
I/C SOLENOID (A)	—	X	▼	Displays the command current from TCM to the input clutch solenoid.
D/C SOLENOID (A)	—	X	▼	Displays the command current from TCM to the direct clutch solenoid.
2346/B SOL (A)	—	X	▼	Displays the command current from TCM to the 2346 brake solenoid.
L/P SOL MON (A)	—	—	▼	Monitors the command current from TCM to the line pressure solenoid, and displays the monitor value.
TCC SOL MON (A)	—	—	▼	Monitors the command current from TCM to the torque converter clutch 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.

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# DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM ITEM	
FR/B SOL MON (A)	—	—	▼	Monitors the command current from TCM to the front brake solenoid, and displays the monitor value.
HLR/C SOL MON (A)	—	—	▼	Monitors the command current from TCM to the high and low reverse clutch solenoid, and displays the monitor value.
I/C SOL MON (A)	—	—	▼	Monitors the command current from TCM to the input clutch solenoid, and displays the monitor value.
D/C SOL MON (A)	—	—	▼	Monitors the command current from TCM to the direct clutch solenoid, and displays the monitor value.
2346/B SOL MON (A)	—	—	▼	Monitors the command current from TCM to the 2346 brake solenoid, and displays the monitor value.
GEAR RATIO	—	X	▼	Displays the gear ratio calculated from input speed and output speed.
ENGINE TORQUE (Nm)	—	—	▼	Displays the engine torque estimated value received via CAN communication.
ENG TORQUE D (Nm)	—	—	▼	Displays the engine torque estimated value reflected the requested torque of each control unit 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.
TRGT PRES L/P (kPa, kg/cm <sup>2</sup> 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 TCC (kPa, kg/cm <sup>2</sup> 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/B (kPa, kg/cm <sup>2</sup> 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 <sup>2</sup> 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 <sup>2</sup> 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 <sup>2</sup> 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 <sup>2</sup> or psi)	—	—	▼	Displays the target oil pressure value of direct clutch solenoid valve calculated by the oil pressure calculation process of shift change control.

# DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM ITEM	
TRG PRE 2346/B (kPa, kg/cm <sup>2</sup> or psi)	—	—	▼	Displays the target oil pressure value of 2346 brake solenoid valve calculated by the oil pressure calculation process of shift change control.
SHIFT PATTERN	—	—	▼	Displays the gear change data using the shift pattern control.
VEHICLE SPEED (km/h or mph)	—	—	▼	Displays the vehicle speed for control using the control of TCM.
G SEN SLOPE (%)	X	—	▼	Displays the inclination angle calculated by the decel G sensor signal received via CAN communication.
RANGE SW 4 (ON/OFF)	X	—	▼	Displays the operation status of transmission range switch 4.
RANGE SW 3 (ON/OFF)	X	—	▼	Displays the operation status of transmission range switch 3.
RANGE SW 2 (ON/OFF)	X	—	▼	Displays the operation status of transmission range switch 2.
RANGE SW 1 (ON/OFF)	X	—	▼	Displays the operation status of transmission range switch 1.
SFT DWN ST SW (ON/OFF)	X	—	▼	Displays the operation status of paddle shifter (down switch).
SFT UP ST SW (ON/OFF)	X	—	▼	Displays the operation status of paddle shifter (up switch).
DOWN SW LEVER (ON/OFF)	X	—	▼	Displays the operation status of selector lever (down switch).
UP SW LEVER (ON/OFF)	X	—	▼	Displays the operation status of selector lever (up switch).
NON M-MODE SW (ON/OFF)	X	—	▼	Displays whether the selector lever is in any position other than manual shift gate position.
MANU MODE SW (ON/OFF)	X	—	▼	Displays whether the selector lever is in the manual shift gate position.
TOW MODE SW (ON/OFF)	—	—	▼	<ul style="list-style-type: none"> <li>• Displays the reception status of tow mode switch signal received via CAN communication.</li> <li>• Not mounted but displayed.</li> </ul>
DS RANGE (ON/OFF)	—	—	▼	<ul style="list-style-type: none"> <li>• Displays whether it is the DS mode.</li> <li>• Not mounted but displayed.</li> </ul>
1 POSITION SW (ON/OFF)	X	—	▼	<ul style="list-style-type: none"> <li>• Displays the reception status of 1 position switch signal received via CAN communication.</li> <li>• Not mounted but displayed.</li> </ul>
OD CONT SW (ON/OFF)	X	—	▼	<ul style="list-style-type: none"> <li>• Displays the reception status of overdrive control switch signal received via CAN communication.</li> <li>• Not mounted but displayed.</li> </ul>
BRAKESW (ON/OFF)	X	—	▼	Displays the reception status of stop lamp switch signal received via CAN communication.
POWERSHIFT SW (ON/OFF)	X	—	▼	<ul style="list-style-type: none"> <li>• Displays the reception status of POWER mode signal received via CAN communication.</li> <li>• Not mounted but displayed.</li> </ul>

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# DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM ITEM	
ASCD-OD CUT (ON/OFF)	X	—	▼	Displays the reception status of ASCD OD cancel request signal received via CAN communication.
ASCD-CRUISE (ON/OFF)	X	—	▼	Displays the reception status of ASCD operation signal received via CAN communication.
ABS SIGNAL (ON/OFF)	X	—	▼	Displays the reception status of ABS operation signal received via CAN communication.
TCS GR/P KEEP (ON/OFF)	X	—	▼	Displays the reception status of TCS gear keep request signal received via CAN communication.
TCS SIGNAL 2 (ON/OFF)	X	—	▼	Displays whether the reception value of A/T shift schedule change demand signal received via CAN communication is "cold".
TCS SIGNAL 1 (ON/OFF)	X	—	▼	Displays whether the reception value of A/T shift schedule change demand signal received via CAN communication is "warm".
LOW/B PARTS (FAIL/NOTFAIL)	—	—	▼	Displays whether the identified malfunction point judged by TCM is the related parts of low brake.
HC/IC/FRB PARTS (FAIL/NOTFAIL)	—	—	▼	Displays whether the identified malfunction point judged by TCM is the related parts of high and low reversed clutch, input clutch or front brake.
IC/FRB PARTS (FAIL/NOTFAIL)	—	—	▼	Displays whether the identified malfunction point judged by TCM is the related parts of input clutch or front brake.
HLR/C PARTS (FAIL/NOTFAIL)	—	—	▼	Displays whether the identified malfunction point judged by TCM is the related parts of high and low reversed clutch.
W/O THL POS (ON/OFF)	X	—	▼	Displays the kickdown condition signal status received via CAN communication.
CLSD THL POS (ON/OFF)	X	—	▼	Displays the idling status signal status received via CAN communication.
DRV CST JUDGE (DRIVE/COAST)	—	—	▼	Displays the judgment results of "driving" or "coasting" judged by TCM.
SHIFT IND SIGNAL	—	—	▼	Displays the transmission value of shift position signal transmitted via 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.
ATF WARN LAMP (ON/OFF)	—	—	▼	<ul style="list-style-type: none"> <li>• Displays the transmission status of ATF temperature signal transmitted via CAN communication.</li> <li>• Not mounted but displayed.</li> </ul>
MANU MODE IND (ON/OFF)	—	—	▼	Displays the transmission status of manual mode signal transmitted via CAN communication.
ON OFF SOL MON (ON/OFF)	—	—	▼	Monitors the command value from TCM to the anti-interlock solenoid, and displays the monitor status.

# DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU IN-PUT SIG-NALS	MAIN SIG-NALS	SELEC-TION FROM ITEM	
START RLY MON (ON/OFF)	—	—	▼	Monitors the command value from TCM to the starter relay, and displays the monitor status.
ON OFF SOL (ON/OFF)	—	—	▼	Displays the command status from TCM to anti-interlock solenoid.
SLCT LVR POSI	—	X	▼	Displays the shift positions recognized by TCM.
GEAR	—	X	▼	Displays the current transmission gear position recognized by TCM.
NEXT GR POSI	—	—	▼	Displays the target gear position of gear change that is calculated based on the vehicle speed information and throttle information.
SHIFT MODE	—	—	▼	Displays the transmission driving mode recognized by TCM.
D/C PARTS (FAIL/NOTFAIL)	—	—	▼	Displays whether the identified malfunction point judged by TCM is the related parts of direct clutch.
FR/B PARTS (FAIL/NOTFAIL)	—	—	▼	Displays whether the identified malfunction point judged by TCM is the related parts of front brake.
2346/B PARTS (FAIL/NOTFAIL)	—	—	▼	Displays whether the identified malfunction point judged by TCM is the related parts of 2346 brake.
2346B/DC PARTS (FAIL/NOTFAIL)	—	—	▼	Displays whether the identified malfunction point judged by TCM is the related parts of 2346 brake or direct clutch.
N IDLE STATUS (ON/OFF)	—	—	▼	Displays the control status of idle neutral control.
SHIFT SCHEDULE	—	—	▼	Displays the shift schedule selected by TCM.
DRIVE MODE STATS	—	—	▼	Displays the drive mode status recognized by TCM.
SPORT MODE	—	—	▼	Displays the status of drive mode select switch signal received via CAN communication.
STANDARD MODE	—	—	▼	
ECO MODE	—	—	▼	
SNOW MODE	—	—	▼	

## DTC & SRT CONFIRMATION

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## DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

[7AT: RE7R01A]

Item name	Description	Check item
1ST GR FNCTN P0731	Following items for "1GR incorrect ratio" can be confirmed. <ul style="list-style-type: none"> <li>• Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>• Self-diagnostic results (OK or NG)</li> </ul>	<ul style="list-style-type: none"> <li>• Input clutch solenoid valve</li> <li>• Front brake solenoid valve</li> <li>• Direct clutch solenoid valve</li> <li>• High and low reverse clutch solenoid valve</li> <li>• Low brake solenoid valve</li> <li>• 2346 brake solenoid valve</li> <li>• Anti-interlock solenoid valve</li> <li>• Each clutch and brake</li> <li>• Output speed sensor</li> <li>• Input speed sensor 1, 2</li> <li>• Hydraulic control circuit</li> </ul>
2ND GR FNCTN P0732	Following items for "2GR incorrect ratio" can be confirmed. <ul style="list-style-type: none"> <li>• Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>• Self-diagnostic results (OK or NG)</li> </ul>	
3RD GR FNCTN P0733	Following items for "3GR incorrect ratio" can be confirmed. <ul style="list-style-type: none"> <li>• Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>• Self-diagnostic results (OK or NG)</li> </ul>	
4TH GR FNCTN P0734	Following items for "4GR incorrect ratio" can be confirmed. <ul style="list-style-type: none"> <li>• Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>• Self-diagnostic results (OK or NG)</li> </ul>	
5TH GR FNCTN P0735	Following items for "5GR incorrect ratio" can be confirmed. <ul style="list-style-type: none"> <li>• Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>• Self-diagnostic results (OK or NG)</li> </ul>	
6TH GR FNCTN P0729	Following items for "6GR incorrect ratio" can be confirmed. <ul style="list-style-type: none"> <li>• Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>• Self-diagnostic results (OK or NG)</li> </ul>	
7TH GR FNCTN P1734	Following items for "7GR incorrect ratio" can be confirmed. <ul style="list-style-type: none"> <li>• Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>• Self-diagnostic results (OK or NG)</li> </ul>	
TCC SOL FUNCTN CHECK	Following items for "TCC solenoid function" can be confirmed. <ul style="list-style-type: none"> <li>• Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>• Self-diagnostic results (OK or NG)</li> </ul>	<ul style="list-style-type: none"> <li>• Harness or connectors</li> <li>• Torque converter clutch solenoid valve</li> <li>• Torque converter</li> <li>• Input speed sensor 1, 2</li> <li>• Hydraulic control circuit</li> </ul>

# ECU DIAGNOSIS INFORMATION

## TCM

### Reference Value

INFOID:000000006884000

### VALUES ON THE DIAGNOSIS TOOL

#### NOTE:

- 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).

#### CONSULT MONITOR ITEM

Item name	Condition	Value / Status (Approx.)
VHCL/S SE-A/T	During driving	Approximately equals the speedometer reading.
ESTM VSP SIG	During driving	Approximately equals the speedometer reading.
OUTPUT REV	During driving (lock-up ON)	Tachometer / Gear ratio
INPUT SPEED	During driving (lock-up ON)	Approximately equals the engine speed.
F SUN GR REV	During driving	Revolution of front sun gear is indicated.
F CARR GR REV	During driving	Revolution of front carrier is indicated.
ENGINE SPEED	Engine running	Closely equals the tachometer reading.
TC SLIP SPEED	During driving	Engine speed – Input speed
ACCELE POSI	Accelerator pedal is released	0.0/8
	Accelerator pedal is fully depressed	8.0/8
THROTTLE POSI	Accelerator pedal is released	0.0/8
	Accelerator pedal is fully depressed	8.0/8
ATF TEMP 1	Ignition switch ON	Temperature of ATF in the oil pan is indicated.
ATF TEMP 2	Ignition switch ON	Temperature of ATF at the exit of torque converter.
ATF TEMP SE 1	0°C (32° F) – 20°C (68°F) – 80°C (176°F)	3.3 – 2.7 – 0.9 V
BATTERY VOLT	Ignition switch ON	Battery voltage (11 V – 14 V)
LINE PRES SOL	During driving	0.2 – 0.6 A
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
L/B SOLENOID	Low brake is engaged	0.6 – 0.8 A
	Low brake is disengaged	0 – 0.05 A

# TCM

< ECU DIAGNOSIS INFORMATION >

[7AT: RE7R01A]

Item name	Condition	Value / Status (Approx.)
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
L/P SOL MON	During driving	0.2 – 0.6 A
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/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
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
GEAR RATIO	Driving with 1GR	4.924
	Driving with 2GR	3.194
	Driving with 3GR	2.043
	Driving with 4GR	1.412
	Driving with 5GR	1.000
	Driving with 6GR	0.862
	Driving with 7GR	0.772
ENGINE TORQUE	During driving	Changes the value according to the acceleration or deceleration.
ENG TORQUE D	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.
TRGT PRES L/P	Selector lever in "P" and "N" positions	490 kPa
	Other than the above	490 – 1370 kPa
TRGT PRES TCC	Slip lock-up is active	0 – 600 kPa
	Lock-up is active	600 kPa
	Other than the above	0 kPa



# TCM

< ECU DIAGNOSIS INFORMATION >

[7AT: RE7R01A]

Item name	Condition	Value / Status (Approx.)	
TRGT PRES L/B	Low brake is engaged	1370 kPa	A
	Low brake is disengaged	0 kPa	
TRGT PRES FR/B	Front brake is engaged	1370 kPa	B
	Front brake is disengaged	0 kPa	
TRG PRE HLR/C	High and low reverse clutch is disengaged	1370 kPa	C
	High and low reverse clutch is engaged	0 kPa	
TRGT PRES I/C	Input clutch is disengaged	1370 kPa	
	Input clutch is engaged	0 kPa	TM
TRGT PRES D/C	Direct clutch is disengaged	1370 kPa	
	Direct clutch is engaged	0 kPa	
TRG PRE 2346/B	2346 brake is engaged	1370 kPa	E
	2346 brake is disengaged	0 kPa	
SHIFT PATTERN	During normal driving (without shift changes)	FF	F
VEHICLE SPEED	During driving	Approximately equals the speedometer reading.	
G SEN SLOPE	Level road	0%	G
	Uphill slope	Positive value (maximum 40.45%)	
	Downhill slope	Negative value (minimum - 40.45%)	H
RANGE SW 4	Selector lever in "P" and "N" positions	ON	
	Other than the above	OFF	
RANGE SW 3	Selector lever in "P", "R" and "N" positions	ON	I
	Other than the above	OFF	
RANGE SW 2	Selector lever in "P" and "R" positions	ON	J
	Other than the above	OFF	
RANGE SW 1	Selector lever in "P" position	ON	
	Other than the above	OFF	K
SFT DWN ST SW	Paddle shifter (shift-down) is pulled	ON	
	Other than the above	OFF	L
SFT UP ST SW	Paddle shifter (shift-up) is pulled	ON	
	Other than the above	OFF	
DOWN SW LEVER	Selector lever is shifted to - side	ON	M
	Other than the above	OFF	
UP SW LEVER	Selector lever is shifted to + side	ON	
	Other than the above	OFF	N
NON M-MODE SW	Selector lever is shifted to manual shift gate side	OFF	
	Other than the above	ON	O
MANU MODE SW	Selector lever is shifted to manual shift gate side	ON	
	Other than the above	OFF	
TOW MODE SW*	Tow mode	ON	P
	Other than the above	OFF	
DS RANGE*	Driving with DS mode	ON	
	Other than the above	OFF	
1 POSITION SW*	Selector lever in "1" position	ON	
	Other than the above	OFF	

# TCM

< ECU DIAGNOSIS INFORMATION >

[7AT: RE7R01A]

Item name	Condition	Value / Status (Approx.)
OD CONT SW*	When overdrive control switch is depressed	ON
	When overdrive control switch is released	OFF
BRAKESW	Brake pedal is depressed	ON
	Brake pedal is released	OFF
POWERSHIFT SW*	Power mode	ON
	Other than the above	OFF
ASCD-OD CUT	When TCM receives ASCD OD cancel request signal	ON
	Other than the above	OFF
ASCD-CRUISE	ASCD operate	ON
	Other than the above	OFF
ABS SIGNAL	ABS operate	ON
	Other than the above	OFF
TCS GR/P KEEP	When TCM receives TCS gear keep request signal	ON
	Other than the above	OFF
TCS SIGNAL 2	When the reception value of A/T shift schedule change demand signal is "cold"	ON
	Other than the above	OFF
TCS SIGNAL 1	When the reception value of A/T shift schedule change demand signal is "warm"	ON
	Other than the above	OFF
LOW/B PARTS	At 4GR - 5GR - 6GR shift control	FAIL
	Other than the above	NOTFAIL
HC/IC/FRB PARTS	At 1GR - 2GR - 3GR shift control	FAIL
	Other than the above	NOTFAIL
IC/FRB PARTS	At 4GR - 5GR - 6GR shift control	FAIL
	Other than the above	NOTFAIL
HLR/C PARTS	At 4GR - 5GR - 6GR shift control	FAIL
	Other than the above	NOTFAIL
W/O THL POS	Accelerator pedal is fully depressed	ON
	Accelerator pedal is released	OFF
CLSD THL POS	Accelerator pedal is released	ON
	Accelerator pedal is fully depressed	OFF
DRV CST JUDGE	Accelerator pedal is depressed	DRIVE
	Accelerator pedal is released	COAST

# TCM

< ECU DIAGNOSIS INFORMATION >

[7AT: RE7R01A]

Item name	Condition	Value / Status (Approx.)	
SHIFT IND SIGNAL	When the selector lever is positioned in between each position.	OFF	A
	Selector lever in "P" position	P	B
	Selector lever in "R" position	R	C
	Selector lever in "N" position	N	
	Selector lever in "D" position	D	TM
	Selector lever in "D" position: 7GR	6	
	Selector lever in "D" position: 6GR	5	
	Selector lever in "D" position: 5GR	4	
	Selector lever in "D" position: 4GR	3	E
	Selector lever in "D" position: 3GR	2	
	Selector lever in "D" position: 2GR	1	
	Selector lever in "D" position: 1GR	M1	F
	Selector lever in "M" position: 2GR	M2	
	Selector lever in "M" position: 3GR	M3	G
	Selector lever in "M" position: 4GR	M4	
	Selector lever in "M" position: 5GR	M5	H
	Selector lever in "M" position: 6GR	M6	
	Selector lever in "M" position: 7GR	M7	I
	Driving with DS mode	DS	
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	J
	Other than the above	OFF	
ATF WARN LAMP*	When TCM transmits the A/T fluid warning lamp signal	ON	K
	Other than the above	OFF	
MANU MODE IND	Driving with manual mode	ON	
	Other than the above	OFF	L
ON OFF SOL MON	Selector lever in "P" and "N" positions	ON	
	Driving with 1GR to 3GR	OFF	M
	Other than the above	OFF	
START RLY MON	Selector lever in "P" and "N" positions	ON	
	Other than the above	OFF	N
ON OFF SOL	Selector lever in "P" and "N" positions	ON	
	Driving with 1GR to 3GR	OFF	O
	Other than the above	OFF	P

# TCM

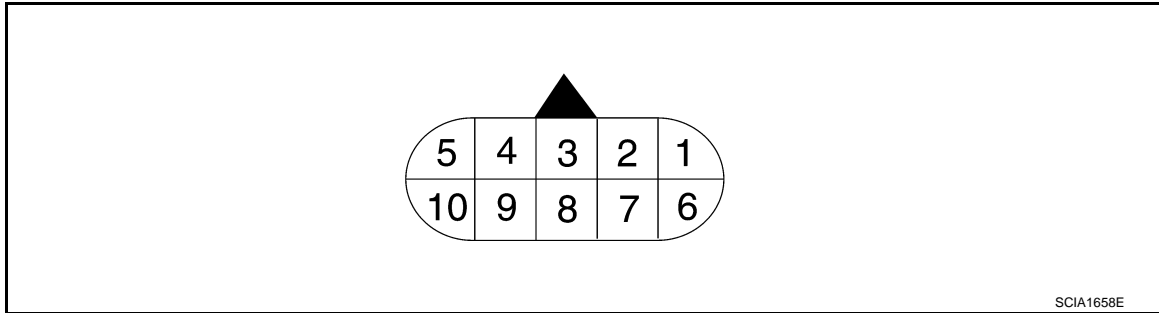
< ECU DIAGNOSIS INFORMATION >

[7AT: RE7R01A]

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

\*: Not mounted but always display as OFF.

## TERMINAL LAYOUT



## PHYSICAL VALUES

Terminal (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
1 (Y)	Ground	Power supply	Input	Ignition switch ON	Battery voltage
				Ignition switch OFF	0 V
2 (R)	Ground	Power supply (Memory back-up)	Input	Always	Battery voltage
3 (L)	—	CAN-H	Input/ Output	—	—
4 (V)	—	K-line	Input/ Output	—	—
5 (B)	Ground	Ground	Output	Always	0 V
6 (G)	Ground	Power supply	Input	Ignition switch ON	Battery voltage
				Ignition switch OFF	0 V
7 (SB)	Ground	Back-up lamp relay	Input	Ignition switch ON	Selector lever in "R" position. 0 V
					Selector lever in other than above. Battery voltage
8 (P)	—	CAN-L	Input/ Output	—	—
9 (LG) <sup>*1</sup> (BR) <sup>*2</sup>	Ground	Starter relay	Output	Ignition switch ON	Selector lever in "N" and "P" po- sitions. Battery voltage
					Selector lever in other than above. 0 V
10 (B)	Ground	Ground	Output	Always	0 V

\*: With paddle shifter

\*: Without paddle shifter

## Fail-Safe

INFOID:000000007699615

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-83. "Work 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	<ul style="list-style-type: none"> <li>• 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.</li> <li>• The mode that the shifting performance does not decrease by normal shift control.</li> </ul>

## 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	—	<ul style="list-style-type: none"> <li>• Fixed in the "D" position (The shifting can be performed)</li> <li>• Lock-up is prohibited when 30 km/h (19 MPH) or less</li> <li>• The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed</li> <li>• Manual mode is prohibited</li> <li>• Shift position indicator is switched OFF</li> <li>• Starter relay is switched OFF (starter is disabled)</li> <li>• Back-up lamp is OFF</li> <li>• Large shift shock</li> </ul>	—	<ul style="list-style-type: none"> <li>• Fixed in the "D" position (The shifting can be performed)</li> <li>• Lock-up is prohibited when 30 km/h (19 MPH) or less</li> <li>• The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed</li> <li>• Manual mode is prohibited</li> <li>• Shift position indicator is switched OFF</li> <li>• Starter relay is switched OFF (starter is disabled)</li> <li>• Back-up lamp is OFF</li> <li>• Large shift shock</li> </ul>
P0710	Between the gears of 1 - 2 - 3	<ul style="list-style-type: none"> <li>• The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>• Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>• The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>• Manual mode is prohibited</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul style="list-style-type: none"> <li>• Fix the gear while driving</li> <li>• Manual mode is prohibited</li> </ul>	—	
P0717	Between the gears of 1 - 2 - 3	<ul style="list-style-type: none"> <li>• The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>• Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>• The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>• Manual mode is prohibited</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul style="list-style-type: none"> <li>• Fix the gear while driving</li> <li>• Manual mode is prohibited</li> </ul>	—	
P0720	Between the gears of 1 - 2 - 3	<ul style="list-style-type: none"> <li>• Only downshift can be performed</li> <li>• Manual mode is prohibited</li> <li>• A vehicle speed signal from the unified meter and A/C amp. is regarded as an effective signal</li> </ul>	—	<ul style="list-style-type: none"> <li>• The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>• Manual mode is prohibited</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul style="list-style-type: none"> <li>• Fix the gear at driving</li> <li>• Manual mode is prohibited</li> <li>• A vehicle speed signal from the unified meter and A/C amp. is regarded as an effective signal</li> </ul>	—	

# TCM

< ECU DIAGNOSIS INFORMATION >

[7AT: RE7R01A]

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	<ul style="list-style-type: none"> <li>Locks in 2GR, 3GR or 4GR</li> <li>Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 1 - 2 can be performed</li> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>The shifting between the gears of 4 - 5 - 6 can be performed</li> <li>Manual mode is prohibited</li> </ul>
		Other than the above	<ul style="list-style-type: none"> <li>Locks in 1GR, 2GR, 3GR, 4GR, 5GR or 6GR</li> <li>Fix the gear while driving</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 1 - 2 can be performed</li> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>The shifting between the gears of 2 - 3 - 4 can be performed</li> <li>The shifting between the gears of 3 - 4 can be performed</li> <li>The shifting between the gears of 4 - 5 - 6 can be performed</li> <li>Manual mode is prohibited</li> </ul>
P0730	—		<ul style="list-style-type: none"> <li>Locks in 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 1 - 2 can be performed</li> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>
P0740	—		<ul style="list-style-type: none"> <li>Lock-up is prohibited</li> <li>Slip lock-up is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>Lock-up is prohibited</li> <li>Slip lock-up is prohibited</li> </ul>
P0744	—		<ul style="list-style-type: none"> <li>Lock-up is prohibited</li> <li>Slip lock-up is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>Lock-up is prohibited</li> <li>Slip lock-up is prohibited</li> </ul>
P0750 P0775 P0795 P2713 P2722 P2731 P2807	—		<ul style="list-style-type: none"> <li>Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>The shifting between the gears of 3 - 4 - 5 can be performed</li> <li>The shifting between the gears of 4 - 5 - 6 can be performed</li> <li>The shifting between the gears of 1 - 2 - 3 - 4 - 5 - 6 can be performed</li> <li>Manual mode is prohibited</li> </ul>
P0780	—		<ul style="list-style-type: none"> <li>Locks in 3GR</li> <li>Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>

A

B

C

TM

E

F

G

H

I

J

K

L

M

N

O

P

DTC	Vehicle condition	Vehicle behavior for 1st fail-safe	Vehicle behavior for 2nd fail-safe	Vehicle behavior for final fail-safe
P1705	—	<ul style="list-style-type: none"> <li>Downshift when accelerator pedal is depressed is prohibited</li> <li>Upshift when accelerator pedal is released is prohibited</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Downshift when accelerator pedal is depressed is prohibited</li> <li>Upshift when accelerator pedal is released is prohibited</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Downshift when accelerator pedal is depressed is prohibited</li> <li>Upshift when accelerator pedal is released is prohibited</li> <li>Manual mode is prohibited</li> </ul>
P1730	—	<ul style="list-style-type: none"> <li>Locks in 1GR, 2GR, 3GR, 4GR, 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul style="list-style-type: none"> <li>Locks in 1GR</li> <li>The shifting between the gears of 2 - 3 - 4 can be performed</li> <li>The shifting between the gears of 3 - 4 can be performed</li> <li>The shifting between the gears of 4 - 5 - 6 can be performed</li> <li>Manual mode is prohibited</li> </ul>
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
U0300 U1000	Between the gears of 1 - 2 - 3	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Line pressure is set to the maximum hydraulic pressure</li> <li>Manual mode is prohibited</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul style="list-style-type: none"> <li>Fix the gear at driving</li> <li>Manual mode is prohibited</li> </ul>	—	<ul style="list-style-type: none"> <li>Manual mode is prohibited</li> </ul>
P0720 and P1721	—	Locks in 5GR	—	Locks in 5GR

Protection Control

INFOID:000000006884002

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	<ul style="list-style-type: none"> <li>Vehicle speed: 8 km/h (5 MPH) or less and</li> <li>Engine speed: 2,200 rpm or less</li> </ul>
Vehicle behavior	<ul style="list-style-type: none"> <li>The torque transmission cannot be performed</li> <li>There is a shock just before a vehicle stop</li> </ul>

1ST ENGINE BRAKE PROTECTION CONTROL

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



# TCM

< ECU DIAGNOSIS INFORMATION >

[7AT: RE7R01A]

Malfunction detection condition	<ul style="list-style-type: none"> <li>• Select lever and gear: Any position other than "R" position and 1GR and</li> <li>• Vehicle speed: More than 25 km/h (16 MPH)</li> </ul>
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 <ul style="list-style-type: none"> <li>• 145°C (293°F) and 120 seconds</li> <li>or</li> <li>• 150°C (302°F)</li> </ul>
Control at malfunction	Accelerator opening: 0.5/8 or less
Normal return condition	<ul style="list-style-type: none"> <li>• TCM electronic substrate temperature: Less than 140°C (284°F) and</li> <li>• Vehicle speed: 5 km/h (3 MPH) or less</li> </ul>
Vehicle behavior	Accelerator opening: output torque of approximately 0.5/8

## DTC Inspection Priority Chart

INFOID:000000006884003

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	U1000 CAN COMM CIRCUIT	<a href="#">TM-99, "DTC Logic"</a>
2	P0615 STARTER RELAY	<a href="#">TM-100, "DTC Logic"</a>
	P0705 T/M RANGE SENSOR A	<a href="#">TM-102, "DTC Logic"</a>
	P0710 FLUID TEMP SENSOR A	<a href="#">TM-103, "DTC Logic"</a>
	P0717 INPUT SPEED SENSOR A	<a href="#">TM-105, "DTC Logic"</a>
	P0720 OUTPUT SPEED SENSOR	<a href="#">TM-106, "DTC Logic"</a>
	P0740 TORQUE CONVERTER	<a href="#">TM-124, "DTC Logic"</a>
	P0745 PC SOLENOID A	<a href="#">TM-127, "DTC Logic"</a>
	P0750 SHIFT SOLENOID A	<a href="#">TM-128, "DTC Logic"</a>
	P0775 PC SOLENOID B	<a href="#">TM-129, "DTC Logic"</a>
	P0795 PC SOLENOID C	<a href="#">TM-132, "DTC Logic"</a>
	P2713 PC SOLENOID D	<a href="#">TM-146, "DTC Logic"</a>
	P2722 PC SOLENOID E	<a href="#">TM-147, "DTC Logic"</a>
	P2731 PC SOLENOID F	<a href="#">TM-148, "DTC Logic"</a>
	P2807 PC SOLENOID G	<a href="#">TM-149, "DTC Logic"</a>

# TCM

< ECU DIAGNOSIS INFORMATION >

[7AT: RE7R01A]

Priority	Detected items (DTC)	Reference
3	P0729 6GR INCORRECT RATIO	<a href="#">TM-110, "DTC Logic"</a>
	P0730 INCORRECT GR RATIO	<a href="#">TM-112, "DTC Logic"</a>
	P0731 1GR INCORRECT RATIO	<a href="#">TM-114, "DTC Logic"</a>
	P0732 2GR INCORRECT RATIO	<a href="#">TM-116, "DTC Logic"</a>
	P0733 3GR INCORRECT RATIO	<a href="#">TM-118, "DTC Logic"</a>
	P0734 4GR INCORRECT RATIO	<a href="#">TM-120, "DTC Logic"</a>
	P0735 5GR INCORRECT RATIO	<a href="#">TM-122, "DTC Logic"</a>
	P0744 TORQUE CONVERTER	<a href="#">TM-125, "DTC Logic"</a>
	P0780 SHIFT	<a href="#">TM-130, "DTC Logic"</a>
	P1730 INTERLOCK	<a href="#">TM-136, "DTC Logic"</a>
	P1734 7GR INCORRECT RATIO	<a href="#">TM-138, "DTC Logic"</a>
4	U0300 CAN COMM DATA	<a href="#">TM-98, "DTC Logic"</a>
	P0725 ENGINE SPEED	<a href="#">TM-108, "DTC Logic"</a>
	P1705 TP SENSOR	<a href="#">TM-133, "DTC Logic"</a>
	P1721 VEHICLE SPEED SIGNAL	<a href="#">TM-134, "DTC Logic"</a>
	P1815 M-MODE SWITCH	<a href="#">TM-140, "DTC Logic"</a>

## DTC Index

INFOID:000000006884004

### 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-77, "DTC Inspection Priority Chart"](#).
- The IGN counter is indicated in Freeze frame data (FFD). Refer to [TM-60, "CONSULT Function"](#).

Items (CONSULT screen terms)	DTC*1		Reference
	MIL*2, "ENGINE" with CONSULT or GST	CONSULT only "TRANS- MISSION"	
STARTER RELAY	—	P0615	<a href="#">TM-100, "DTC Logic"</a>
T/M RANGE SENSOR A	P0705	P0705	<a href="#">TM-102, "DTC Logic"</a>
FLUID TEMP SENSOR A	P0710	P0710	<a href="#">TM-103, "DTC Logic"</a>
INPUT SPEED SENSOR A	P0717	P0717	<a href="#">TM-105, "DTC Logic"</a>
OUTPUT SPEED SENSOR	P0720	P0720	<a href="#">TM-106, "DTC Logic"</a>
ENGINE SPEED	—	P0725	<a href="#">TM-108, "DTC Logic"</a>
6GR INCORRECT RATIO	P0729	P0729	<a href="#">TM-110, "DTC Logic"</a>
INCORRECT GR RATIO	P0730	P0730	<a href="#">TM-112, "DTC Logic"</a>
1GR INCORRECT RATIO	P0731	P0731	<a href="#">TM-114, "DTC Logic"</a>
2GR INCORRECT RATIO	P0732	P0732	<a href="#">TM-116, "DTC Logic"</a>
3GR INCORRECT RATIO	P0733	P0733	<a href="#">TM-118, "DTC Logic"</a>
4GR INCORRECT RATIO	P0734	P0734	<a href="#">TM-120, "DTC Logic"</a>
5GR INCORRECT RATIO	P0735	P0735	<a href="#">TM-122, "DTC Logic"</a>
TORQUE CONVERTER	P0740	P0740	<a href="#">TM-124, "DTC Logic"</a>
TORQUE CONVERTER	P0744	P0744	<a href="#">TM-125, "DTC Logic"</a>
PC SOLENOID A	P0745	P0745	<a href="#">TM-127, "DTC Logic"</a>
SHIFT SOLENOID A	P0750	P0750	<a href="#">TM-128, "DTC Logic"</a>
PC SOLENOID B	P0775	P0775	<a href="#">TM-129, "DTC Logic"</a>
SHIFT	P0780	P0780	<a href="#">TM-130, "DTC Logic"</a>
PC SOLENOID C	P0795	P0795	<a href="#">TM-132, "DTC Logic"</a>

# TCM

< ECU DIAGNOSIS INFORMATION >

[7AT: RE7R01A]

Items (CONSULT screen terms)	DTC*1		Reference
	MIL *2, "ENGINE" with CONSULT or GST	CONSULT only "TRANS- MISSION"	
TP SENSOR	—	P1705	<a href="#">TM-133, "DTC Logic"</a>
VEHICLE SPEED SIGNAL	—	P1721	<a href="#">TM-134, "DTC Logic"</a>
INTERLOCK	P1730	P1730	<a href="#">TM-136, "DTC Logic"</a>
7GR INCORRECT RATIO	P1734	P1734	<a href="#">TM-138, "DTC Logic"</a>
M-MODE SWITCH	—	P1815	<a href="#">TM-140, "DTC Logic"</a>
PC SOLENOID D	P2713	P2713	<a href="#">TM-146, "DTC Logic"</a>
PC SOLENOID E	P2722	P2722	<a href="#">TM-147, "DTC Logic"</a>
PC SOLENOID F	P2731	P2731	<a href="#">TM-148, "DTC Logic"</a>
PC SOLENOID G	P2807	P2807	<a href="#">TM-149, "DTC Logic"</a>
CAN COMM DATA	—	U0300	<a href="#">TM-98, "DTC Logic"</a>
CAN COMM CIRCUIT	U1000	U1000	<a href="#">TM-99, "DTC Logic"</a>

\*1: These numbers are prescribed by SAE J2012.

\*2: Refer to [EC-77, "Diagnosis Description"](#) (VQ37VHR) or [EC-1033, "Diagnosis Description"](#) (VK56VD).

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
< WIRING DIAGRAM >

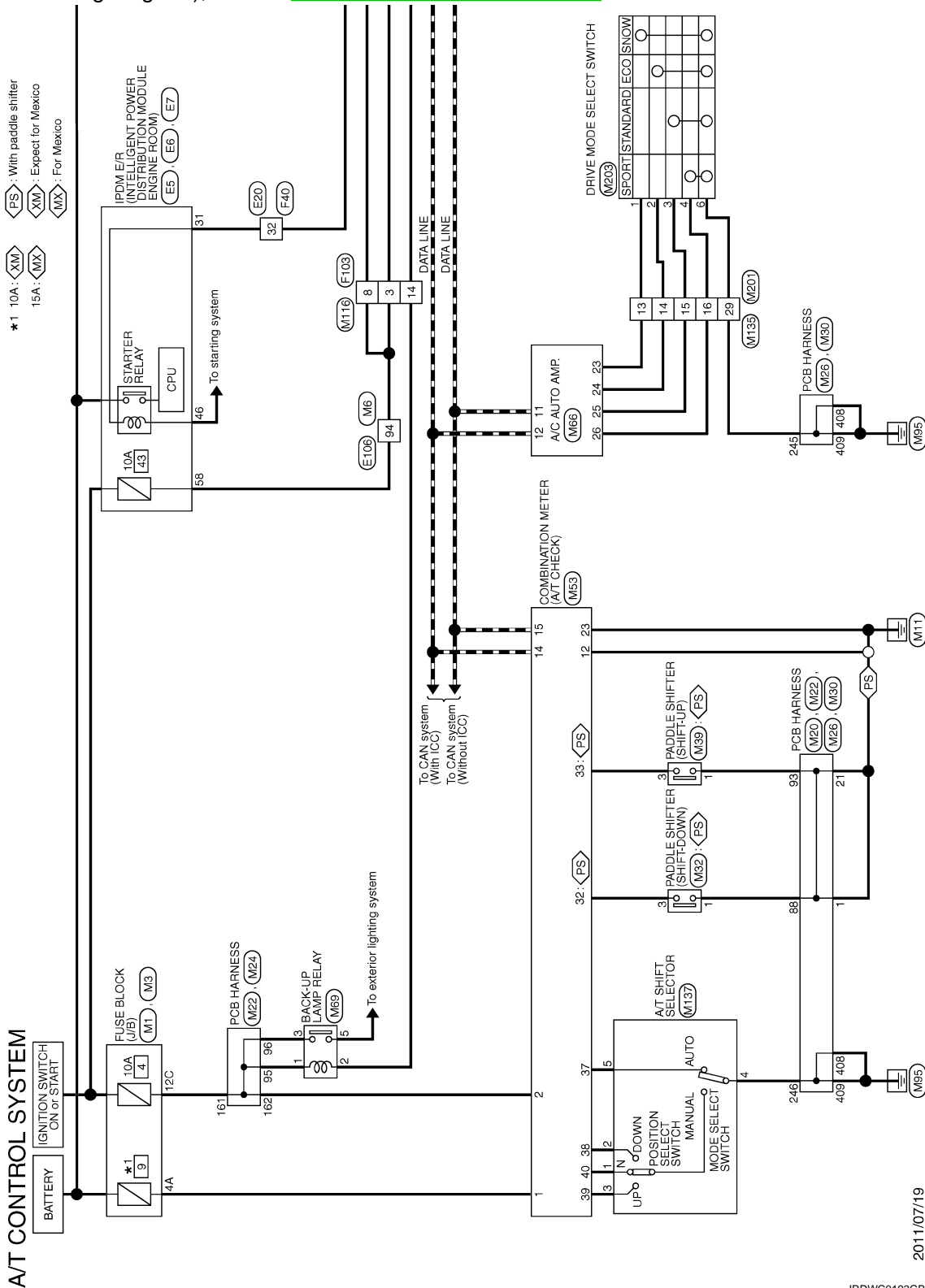
# WIRING DIAGRAM

## A/T CONTROL SYSTEM

### Wiring Diagram

INFOID:000000006884005

For connector terminal arrangements, harness layouts, and alphabets in a  (option abbreviation; if not described in wiring diagram), refer to [GI-12, "Connector Information"](#).



2011/07/19

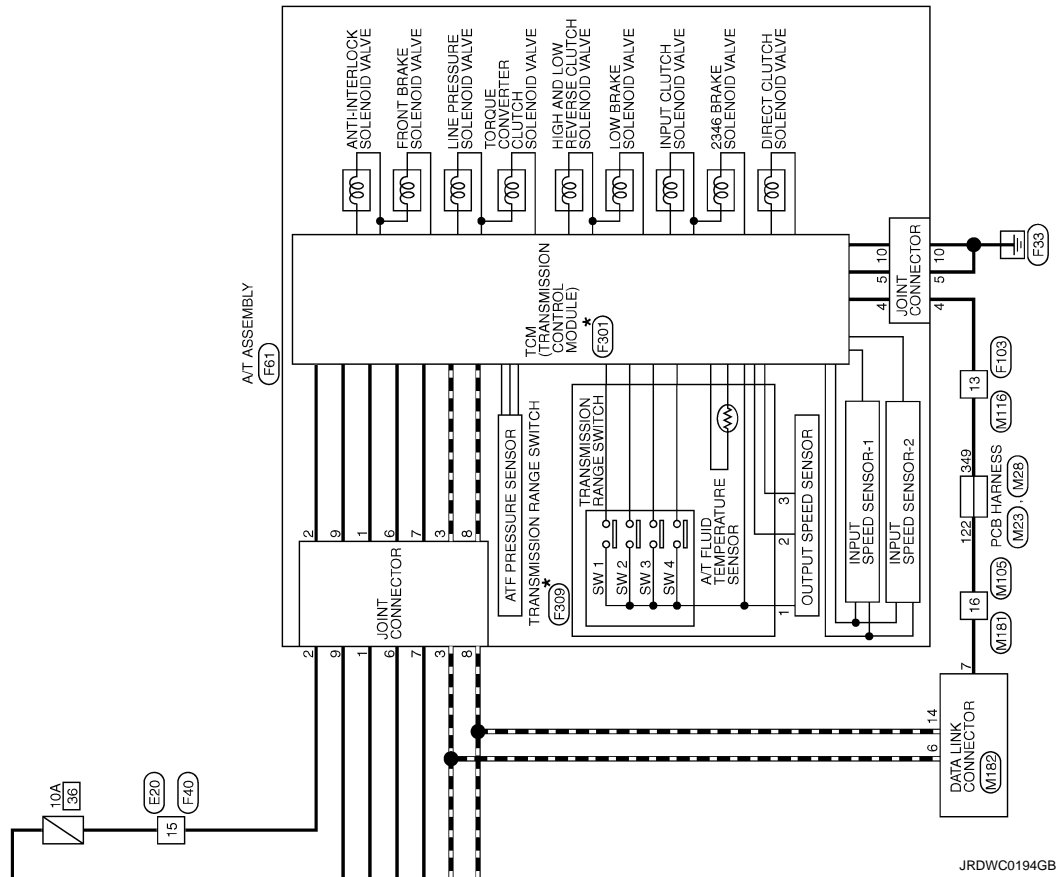
JRDWC0193GB

# A/T CONTROL SYSTEM

< WIRING DIAGRAM >

[7AT: RE7R01A]

\*: This connector is not shown in "Harness Layout".



JRDWC0194GB

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# A/T SHIFT LOCK SYSTEM


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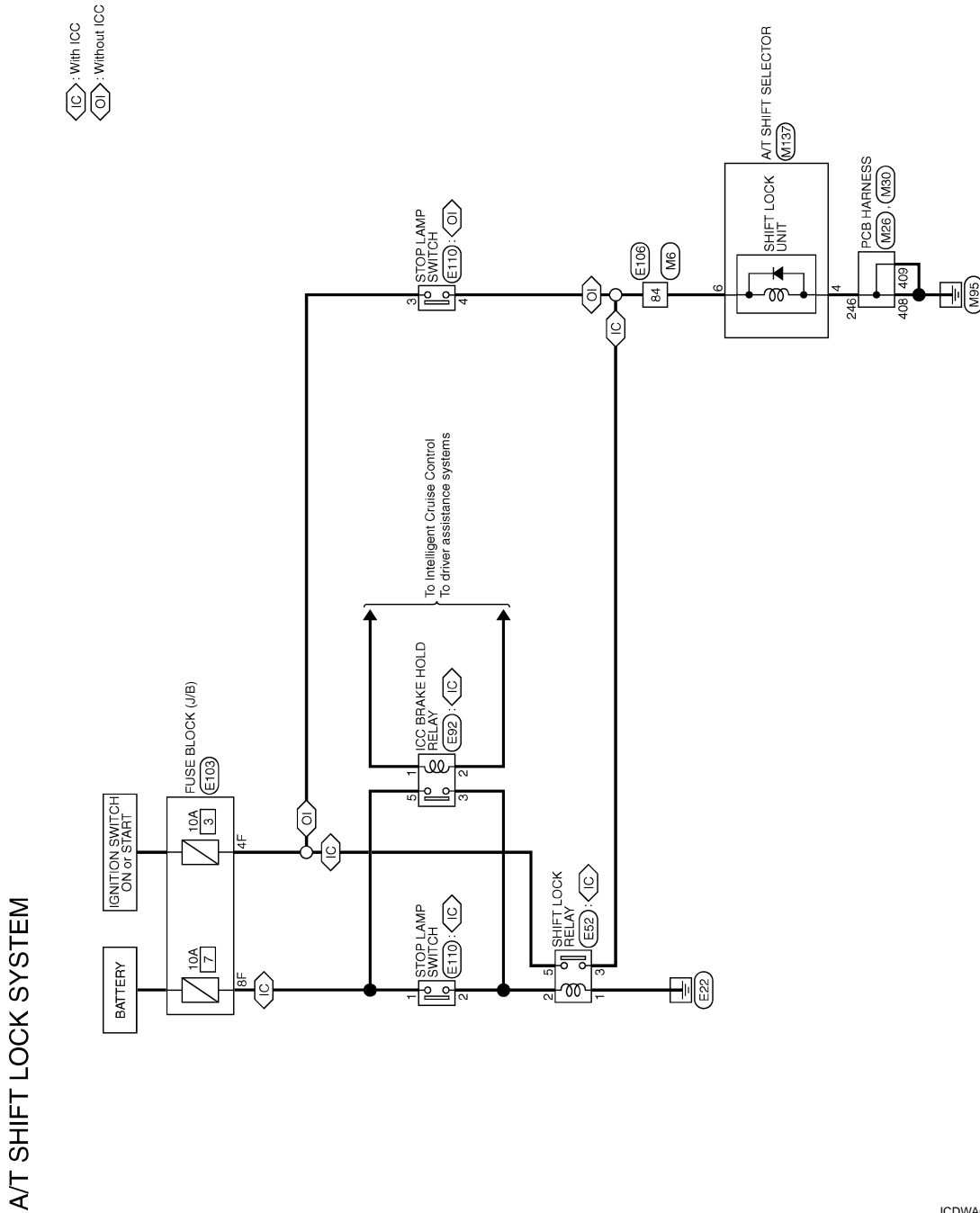
[7AT: RE7R01A]

## A/T SHIFT LOCK SYSTEM

### Wiring Diagram

INFOID:000000006884006

For connector terminal arrangements, harness layouts, and alphabets in a  (option abbreviation; if not described in wiring diagram), refer to [GI-12, "Connector Information"](#).



2010/02/03

JCDWA0613GB

# BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORK FLOW

### Work Flow

INFOID:000000006884007

#### 1. OBTAIN INFORMATION ABOUT SYMPTOM

Refer to [TM-84, "Diagnostic Work Sheet"](#) and interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings in the vehicle.

>> GO TO 2.

#### 2. CHECK DTC

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-163, "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-73, "Fail-Safe"](#). When a malfunction symptom is reproduced, the question sheet is effective. Refer to [TM-84, "Diagnostic Work 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-73, "Fail-Safe"](#). When a malfunction symptom is reproduced, the question sheet is effective. Refer to [TM-84, "Diagnostic Work 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-77, "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-44, "Intermittent Incident"](#).

#### 6. IDENTIFY MALFUNCTIONING SYSTEM WITH "DIAGNOSIS CHART BY SYMPTOM"

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[7AT: RE7R01A]

Use [TM-163. "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.

## Diagnostic Work Sheet

INFOID:000000006884008

### 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



# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[7AT: RE7R01A]

Question Sheet																			
Symptoms	<input type="checkbox"/> Vehicle does not move ( <input type="checkbox"/> Any position <input type="checkbox"/> Particular position ) <input type="checkbox"/> No upshift ( <input type="checkbox"/> 1GR → 2GR <input type="checkbox"/> 2GR → 3GR <input type="checkbox"/> 3GR → 4GR <input type="checkbox"/> 4GR → 5GR <input type="checkbox"/> 5GR → 6GR <input type="checkbox"/> 6GR → 7GR ) <input type="checkbox"/> No downshift ( <input type="checkbox"/> 7GR → 6GR <input type="checkbox"/> 6GR → 5GR <input type="checkbox"/> 5GR → 4GR <input type="checkbox"/> 4GR → 3GR <input type="checkbox"/> 3GR → 2GR <input type="checkbox"/> 2GR → 1GR ) <input type="checkbox"/> Lock-up malfunction <input type="checkbox"/> Shift point too high or too low <input type="checkbox"/> Shift shock or slip <input type="checkbox"/> Noise or vibration <input type="checkbox"/> No kick down <input type="checkbox"/> No pattern select <input type="checkbox"/> Others																		
Frequency	<input type="checkbox"/> All the time <input type="checkbox"/> Under certain conditions <input type="checkbox"/> Sometimes (      times a day )																		
Weather conditions	<input type="checkbox"/> Not affected <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Weather</td> <td><input type="checkbox"/> Fine</td> <td><input type="checkbox"/> Clouding</td> <td><input type="checkbox"/> Raining</td> <td><input type="checkbox"/> Snowing</td> <td><input type="checkbox"/> Other (      )</td> </tr> <tr> <td>Temp.</td> <td><input type="checkbox"/> Hot</td> <td><input type="checkbox"/> Warm</td> <td><input type="checkbox"/> Cool</td> <td><input type="checkbox"/> Cold</td> <td><input type="checkbox"/> Temp. [Approx. °C ( °F)]</td> </tr> <tr> <td>Humidity</td> <td><input type="checkbox"/> High</td> <td><input type="checkbox"/> Middle</td> <td><input type="checkbox"/> Low</td> <td colspan="2"></td> </tr> </table>	Weather	<input type="checkbox"/> Fine	<input type="checkbox"/> Clouding	<input type="checkbox"/> Raining	<input type="checkbox"/> Snowing	<input type="checkbox"/> Other (      )	Temp.	<input type="checkbox"/> Hot	<input type="checkbox"/> Warm	<input type="checkbox"/> Cool	<input type="checkbox"/> Cold	<input type="checkbox"/> Temp. [Approx. °C ( °F)]	Humidity	<input type="checkbox"/> High	<input type="checkbox"/> Middle	<input type="checkbox"/> Low		
Weather	<input type="checkbox"/> Fine	<input type="checkbox"/> Clouding	<input type="checkbox"/> Raining	<input type="checkbox"/> Snowing	<input type="checkbox"/> Other (      )														
Temp.	<input type="checkbox"/> Hot	<input type="checkbox"/> Warm	<input type="checkbox"/> Cool	<input type="checkbox"/> Cold	<input type="checkbox"/> Temp. [Approx. °C ( °F)]														
Humidity	<input type="checkbox"/> High	<input type="checkbox"/> Middle	<input type="checkbox"/> Low																
Transmission conditions	<input type="checkbox"/> Not affected <input type="checkbox"/> Cold <input type="checkbox"/> During warm-up <input type="checkbox"/> After warm-up <input type="checkbox"/> Engine speed (      rpm )																		
Road conditions	<input type="checkbox"/> Not affected <input type="checkbox"/> In town <input type="checkbox"/> In suburbs <input type="checkbox"/> Freeway <input type="checkbox"/> Off road (Up / Down)																		
Driving conditions	<input type="checkbox"/> Not affected <input type="checkbox"/> At starting <input type="checkbox"/> While idling <input type="checkbox"/> While engine racing <input type="checkbox"/> At racing <input type="checkbox"/> While cruising <input type="checkbox"/> While accelerating <input type="checkbox"/> While decelerating <input type="checkbox"/> While turning (Right / Left) <input type="checkbox"/> Vehicle speed [      km/h (      MPH)]																		
Other conditions																			

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# ADDITIONAL SERVICE WHEN REPLACING TRANSMISSION ASSEMBLY

< BASIC INSPECTION >

[7AT: RE7R01A]

## ADDITIONAL SERVICE WHEN REPLACING TRANSMISSION ASSEMBLY

### Description

INFOID:000000006884009

Decel G sensor calibration must be performed when replacing A/T assembly.

### Special Repair Requirement

INFOID:000000006884010

### 1. PREPARATION BEFORE CALIBRATION PROCEDURE

---

1. Park the vehicle on a flat road.
2. Adjust pressure in all tires to the specified value. Refer to [WT-62. "Tire Air Pressure"](#).

>> GO TO 2.

### 2. PERFORM CALIBRATION

---

#### Ⓟ With CONSULT

1. Turn ignition switch ON.  
**CAUTION:**  
**Never start the engine.**
2. Select "G SENSOR CALIBRATION" in "Work Support" in "TRANSMISSION".
3. Touch "START".

**CAUTION:**

**Never give any motion to the vehicle during the calibration.**

Is "completed" displayed?

YES >> GO TO 3.

NO >> Perform the calibration again.

### 3. CHECK DTC

---

#### Ⓟ With CONSULT

1. Turn ignition switch OFF and wait 10 seconds or more.
2. Turn ignition switch ON.
3. Select "Self Diagnostic Results" in "ABS".

Is "C1145" or "C1146" detected?

YES >> Refer to [BRC-51. "DTC Index"](#).

NO >> Calibration end.

# ADDITIONAL SERVICE WHEN REPLACING CONTROL VALVE & TCM

< BASIC INSPECTION >

[7AT: RE7R01A]

## ADDITIONAL SERVICE WHEN REPLACING CONTROL VALVE & TCM

### Description

INFOID:000000007699617

Decel G sensor calibration must be performed when replacing A/T assembly.

### Special Repair Requirement

INFOID:000000007699618

### 1. PREPARATION BEFORE CALIBRATION PROCEDURE

1. Park the vehicle on a flat road.
2. Adjust pressure in all tires to the specified value. Refer to [WT-62, "Tire Air Pressure"](#).

>> GO TO 2.

### 2. PERFORM CALIBRATION

#### With CONSULT

1. Turn ignition switch ON.  
**CAUTION:**  
**Never start the engine.**
2. Select "G SENSOR CALIBRATION" in "Work Support" in "TRANSMISSION".
3. Touch "START".

**CAUTION:**

**Never give any motion to the vehicle during the calibration.**

Is "completed" displayed?

YES >> GO TO 3.

NO >> Perform the calibration again.

### 3. CHECK DTC

#### With CONSULT

1. Turn ignition switch OFF and wait 10 seconds or more.
2. Turn ignition switch ON.
3. Select "Self Diagnostic Results" in "ABS".

Is "C1145" or "C1146" detected?

YES >> Refer to [BRC-51, "DTC Index"](#).

NO >> Calibration end.

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## CALIBRATION OF DECEL G SENSOR

### Description

INFOID:000000006884011

Decel G sensor calibration must be performed when the following operation is performed.

- Removal and installation or replacement of yaw rate/side/decel G sensor
- Replacement of A/T assembly
- Replacement of control valve & TCM
- Replacement of ABS actuator and electric unit (control unit)

**CAUTION:**

**After removing/replacing the yaw rate/side/decal G sensor or replacing the ABS actuator and electric unit (control unit), the decel G sensor of the ABS actuator and electric unit (control unit) must be calibrated first. Refer to [BRC-61, "Description"](#).**

### Special Repair Requirement

INFOID:000000006884012

**CAUTION:**

**After removing/replacing the yaw rate/side/decal G sensor or replacing the ABS actuator and electric unit (control unit), the decel G sensor of the ABS actuator and electric unit (control unit) must be calibrated first. Refer to [BRC-61, "Description"](#).**

### 1. PREPARATION BEFORE CALIBRATION PROCEDURE

1. Park the vehicle on a flat road.
2. Adjust pressure in all tires to the specified value. Refer to [WT-62, "Tire Air Pressure"](#).

>> GO TO 2.

### 2. PERFORM CALIBRATION

 **With CONSULT**

1. Turn ignition switch ON.  
**CAUTION:**  
**Never start the engine.**
2. Select "G SENSOR CALIBRATION" in "Work Support" in "TRANSMISSION".
3. Touch "START".

**CAUTION:**

**Never give any motion to the vehicle during the calibration.**

Is "completed" displayed?

YES >> GO TO 3.

NO >> Perform the calibration again.

### 3. CHECK DTC

 **With CONSULT**

1. Turn ignition switch OFF and wait 10 seconds or more.
2. Turn ignition switch ON.
3. Select "Self Diagnostic Results" in "ABS".

Is "C1145" or "C1146" detected?

YES >> Refer to [BRC-51, "DTC Index"](#).

NO >> Calibration end.

## A/T FLUID

## Changing

INFOID:000000006884013

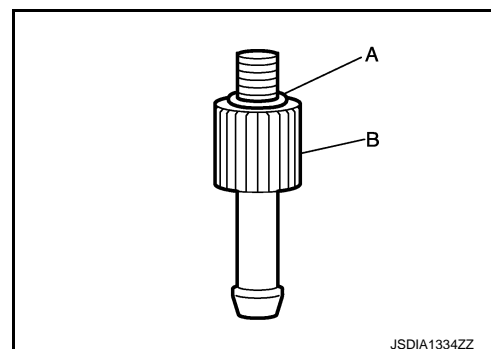
Recommended fluid and fluid capacity : Refer to [TM-312, "General Specification"](#).

**CAUTION:**

- Use only Genuine NISSAN Matic S ATF. Never mix with other ATF.
- Using ATF other than Genuine NISSAN Matic S ATF will cause deterioration in driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.
- 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 Imp 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.**

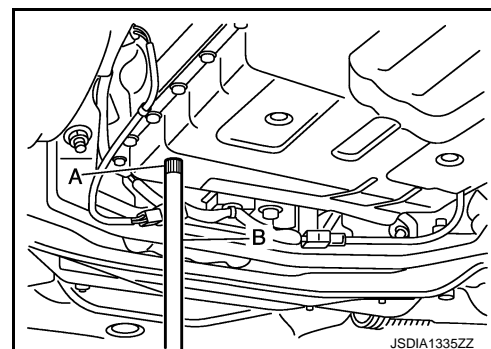
- j. Lift down the vehicle.  
 k. Start the engine and wait for approximately 3 minutes.  
 l. Stop the engine.

## 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.

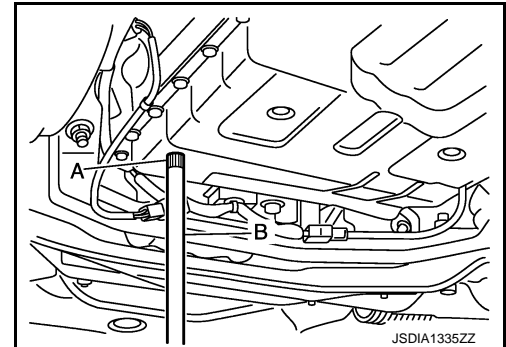


## A/T FLUID

< BASIC INSPECTION >

[7AT: RE7R01A]

- d. When the ATF starts to drip, tighten the drain plug to the oil pan to the specified torque. Refer to [TM-181, "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 Imp 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-181, "Exploded View"](#).  
**CAUTION:**  
**Never reuse overflow plug.**



### Adjustment

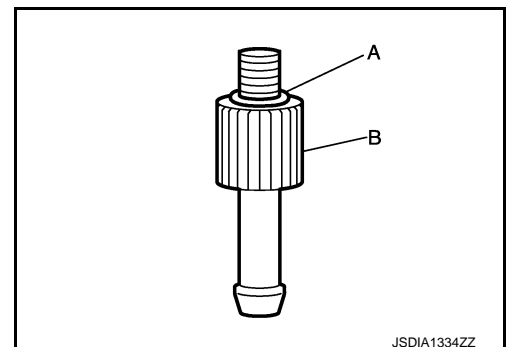
INFOID:000000006884014

Recommended fluid and fluid capacity : Refer to [TM-312, "General Specification"](#).

#### **CAUTION:**

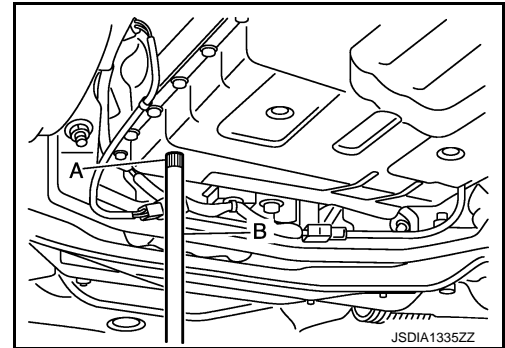
- Use only Genuine NISSAN Matic S ATF. Never mix with other ATF.
- Using ATF other than Genuine NISSAN Matic S ATF will cause deterioration in driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.
- When filling ATF, be careful not 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.



## &lt; BASIC INSPECTION &gt;

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 Imp 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-181, "Exploded View"](#).  
**CAUTION:**  
**Never reuse overflow plug.**



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## A/T FLUID COOLER

### Cleaning

INFOID:000000006884015

Whenever an A/T 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 A/T or, in severe cases, can block or restrict the flow of ATF. In either case, malfunction of the newly serviced A/T 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.

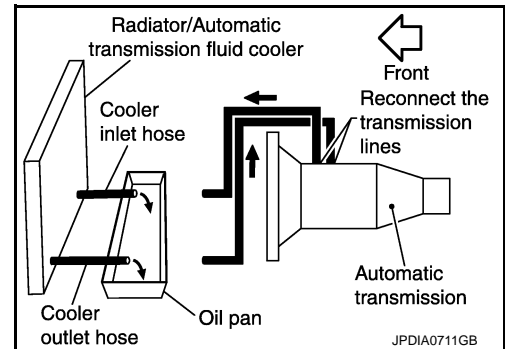
### CLEANING PROCEDURE

1. Position an oil pan under the A/T 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.

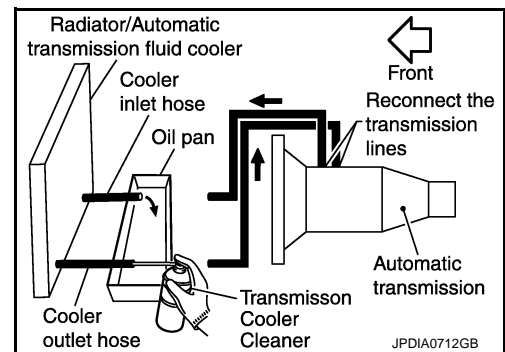


5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

**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<sup>2</sup> (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 A/T.

12. Remove the banjo bolts.

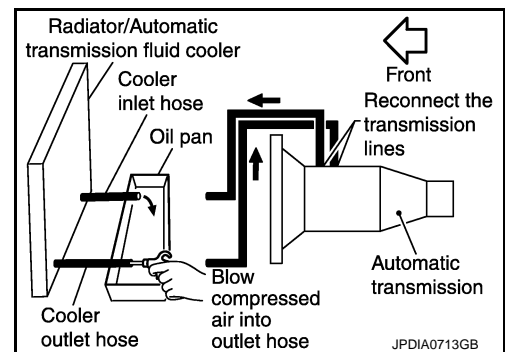
13. Flush each steel line from the cooler side back toward the A/T by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.

14. Blow compressed air regulated to 5 to 9 kg/cm<sup>2</sup> (71 to 128 psi) through each steel line from the cooler side back toward the A/T 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".





# A/T FLUID COOLER

< BASIC INSPECTION >

[7AT: RE7R01A]

## DIAGNOSIS PROCEDURE

### NOTE:

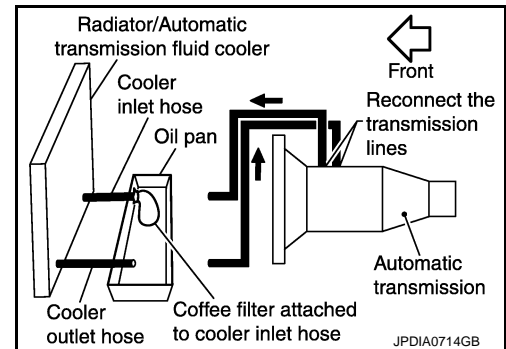
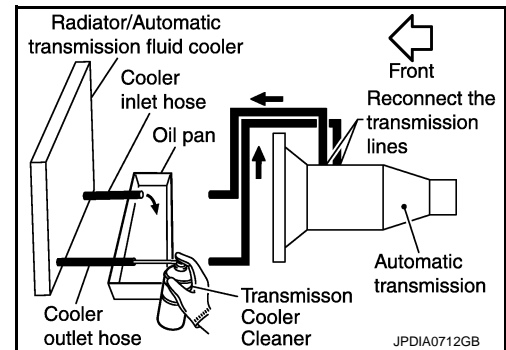
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

1. Position an oil pan under the A/T 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.

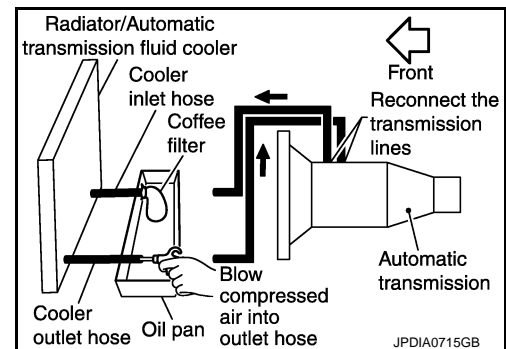
### CAUTION:

- 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.

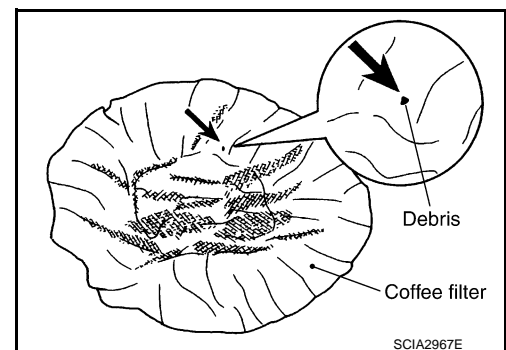


6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 to 9 kg/cm<sup>2</sup> (71 to 128 psi) through the cooler outlet hose to force any remaining ATF into the coffee filter.
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.

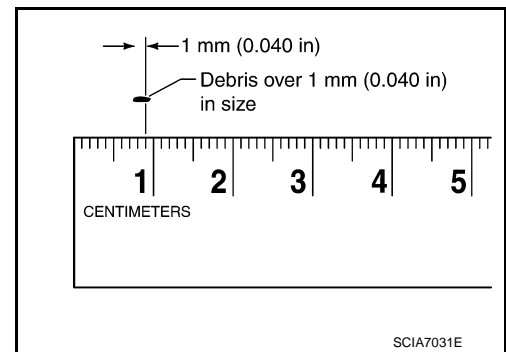


## A/T FLUID COOLER

< BASIC INSPECTION >

[7AT: RE7R01A]

- 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-14, "Exploded View"](#) (VQ37VHR) or [CO-40, "Exploded View"](#) (VK56VD).



### Inspection

INFOID:000000006884016

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

# STALL TEST

< BASIC INSPECTION >

[7AT: RE7R01A]

## STALL TEST

### Inspection and Judgment

INFOID:000000006884017

#### 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-314, "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	<ul style="list-style-type: none"> <li>• Low brake</li> <li>• 1st one-way clutch</li> <li>• 2nd one-way clutch</li> </ul>
	O	H	<ul style="list-style-type: none"> <li>• Reverse brake</li> <li>• 1st one-way clutch</li> <li>• 2nd one-way clutch</li> </ul>
	L	L	<ul style="list-style-type: none"> <li>• Engine and torque converter one-way clutch</li> </ul>
	H	H	<ul style="list-style-type: none"> <li>• Line pressure low</li> </ul>

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

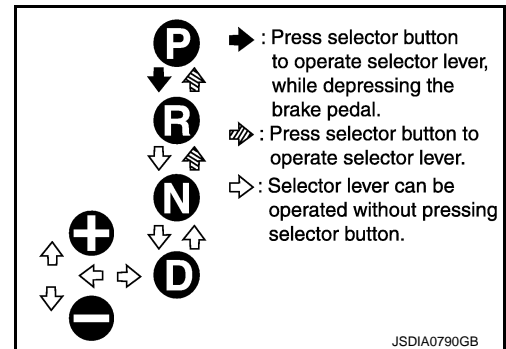
## A/T POSITION

### Inspection and Adjustment

INFOID:000000006884018

#### INSPECTION

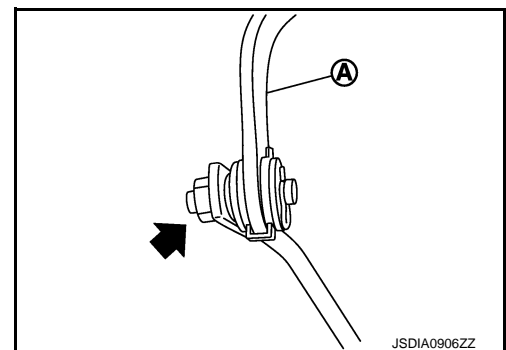
- Place selector lever in "P" position, and turn ignition switch ON (engine stop).
- Check that selector lever can be shifted to other than "P" position when brake pedal is depressed. Also check that selector lever can be shifted from "P" position only when brake pedal is depressed.
- Shift the selector lever and check for excessive effort, sticking, noise or rattle.
- 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.
- The method of operating the lever to individual positions correctly is shown in the figure.
- When selector button is pressed in "P", "R", or "N" position without applying forward/backward force to selector lever, check button operation for sticking.
- 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.
- 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.)
- Make sure that A/T is locked completely in "P" position.
- DS mode must be indicated on the combination meter when the selector lever is shifted to the manual shift gate. When the selector lever is shifted to the "+" or "-" side in the DS mode, manual mode should be indicated on the combination meter.  
In addition, a set shift position must be changed when the selector lever is shifted to the "+" or "-" side in the manual mode. (Only while driving.)



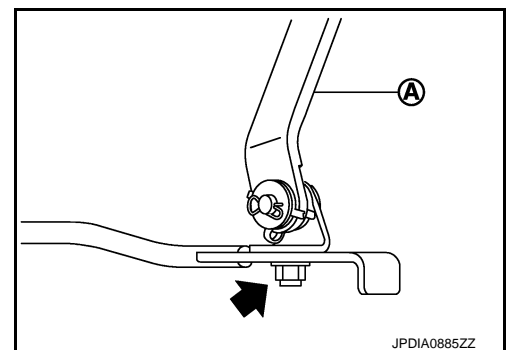
#### ADJUSTMENT

- Loosen nut (←).

- 2WD



- AWD (VQ37VHR models)

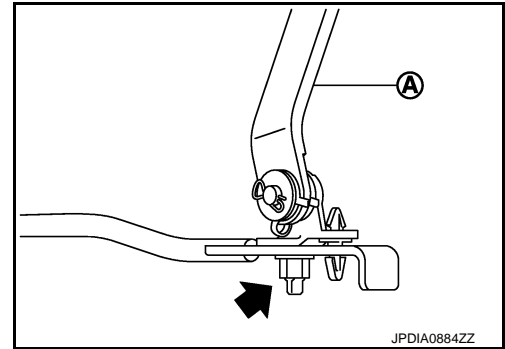


## A/T POSITION

< BASIC INSPECTION >

[7AT: RE7R01A]

- AWD (VK56VD models)



2. Place manual lever and selector lever in "P" position.
3. While pressing lower lever (A) toward rear of vehicle (in "P" position direction), tighten nut to specified torque. Refer to [TM-174, "2WD : Exploded View"](#) (2WD) or [TM-176, "AWD : Exploded View"](#) (AWD).

**CAUTION:**

**Be careful not to touch the control rod while pressing lower lever of A/T shift selector assembly.**

**NOTE:**

Press lower lever of A/T shift selector assembly with a force of 9.8 N (approximately 1 kg, 2.2 lb).

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# U0300 CAN COMMUNICATION DATA

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## DTC/CIRCUIT DIAGNOSIS

### U0300 CAN COMMUNICATION DATA

#### Description

INFOID:000000006884019

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

#### DTC Logic

INFOID:000000006884020

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

##### 1. PRECONDITIONING

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

>> GO TO 2.

##### 2. CHECK DTC DETECTION

###### With CONSULT

1. Turn ignition switch ON and wait 2 seconds or more.
2. Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "U0300" detected?

YES >> Go to [TM-98, "Diagnosis Procedure"](#).

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000006884021

##### 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

### Description

INFOID:000000006884022

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

### DTC Logic

INFOID:000000006884023

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
U1000	CAN Communication Line	TCM cannot transmit or receive CAN communication signals continuously for 2 seconds or more when the ignition switch is ON.	<ul style="list-style-type: none"> <li>• Harness or connectors (CAN communication line is open or shorted.)</li> <li>• TCM</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK DTC DETECTION

##### With CONSULT

1. Start the engine.
2. Run engine for at least 2 consecutive seconds at idle speed.
3. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT"

Is "U1000" detected?

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

### Diagnosis Procedure

INFOID:000000006884024

Go to [LAN-25, "Trouble Diagnosis Flow Chart"](#).

# P0615 STARTER RELAY

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0615 STARTER RELAY

### Description

INFOID:000000006884025

TCM prohibits cranking other than at "P" or "N" position.

### DTC Logic

INFOID:000000006884026

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0615	Starter Relay Circuit	The starter monitor value is OFF when the ignition switch is ON at the "P" and "N" positions.	<ul style="list-style-type: none"> <li>• Harness or connectors (Starter relay and TCM circuit is open or shorted.)</li> <li>• Starter relay circuit</li> </ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P0615" detected?

- YES >> Go to [TM-100, "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884027

#### 1. CHECK STARTER RELAY SIGNAL

1. Turn ignition switch ON.
2. Check voltage between IPDM E/R connector terminal and ground.

IPDM E/R connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
E5	31	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-8, "Wiring Diagram"](#).  
 NO >> GO TO 2.

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

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



# P0615 STARTER RELAY

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

A/T assembly vehicle side harness connector		IPDM E/R vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F61	9	E5	31	Existed

Is the inspection result normal?

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

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

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

A/T assembly vehicle side harness connector		Ground	Continuity
Connector	Terminal		
F61	9		Not existed

Is the inspection result normal?

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

### 4.CHECK JOINT CONNECTOR

1. Remove joint connector. Refer to [TM-181, "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 >> GO TO 5.
- NO >> Repair or replace damaged parts.

### 5.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).
- NO >> Repair or replace damaged parts.

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# P0705 TRANSMISSION RANGE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0705 TRANSMISSION RANGE SENSOR A

### DTC Logic

INFOID:000000006884028

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0705	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.	<ul style="list-style-type: none"><li>• Harness or connectors (Transmission range switches 1, 2, 3, 4 and TCM circuit is open or shorted.)</li><li>• Transmission range switches 1, 2, 3 and 4</li></ul>

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK DTC DETECTION

##### With CONSULT

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

ACCELE POSI : More than 1.0/8

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

5. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P0705" detected?

YES >> Go to [TM-102, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884029

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

# P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

### DTC Logic

INFOID:000000006884030

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0710	Transmission Fluid Temperature Sensor A Circuit	TCM judges that the A/T fluid temperature is -40 °C (-40 °F) or less continuously for 5 seconds while driving at 10 km/h (7 MPH) or more.	<ul style="list-style-type: none"> <li>• Harness or connectors (Sensor circuit is open.)</li> <li>• A/T fluid temperature sensor</li> </ul>
		TCM judges that the A/T fluid temperature is 180 °C (356 °F) or more continuously for 5 seconds.	<ul style="list-style-type: none"> <li>• Harness or connectors (Sensor circuit is short.)</li> <li>• A/T fluid temperature sensor</li> </ul>
		TCM judges the following conditions while driving the vehicle at 10 km/h (7 MPH) or more: <ul style="list-style-type: none"> <li>• The time required for A/T fluid temperature to rise by 1 °C (1.8 °F) exceeds 14 minutes when A/T fluid temperature is -20 °C (-4 °F) or less.</li> <li>• The time required for A/T fluid temperature to rise by 1 °C (1.8 °F) exceeds 7 minutes when A/T fluid temperature is between -19 °C (-2 °F) and 0 °C (32 °F).</li> <li>• The time required for A/T fluid temperature to rise by 1 °C (1.8 °F) exceeds 4 minutes when A/T fluid temperature is between 1 °C (34 °F) and 20 °C (68 °F).</li> </ul>	<ul style="list-style-type: none"> <li>• Harness or connectors (Sensor circuit is stuck.)</li> <li>• A/T fluid temperature sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

Always drive vehicle at a safe speed.

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK DTC DETECTION

##### With CONSULT

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

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

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P0710" detected?

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

### Diagnosis Procedure

INFOID:000000006884031

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

# P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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NO >> Repair or replace damaged parts.

# P0717 INPUT SPEED SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0717 INPUT SPEED SENSOR A

### DTC Logic

INFOID:000000006884032

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0717	Input/Turbine Speed Sensor A Circuit No Signal	The revolution of input speed sensor 1 and/or 2 is 270 rpm or less.	<ul style="list-style-type: none"><li>• Harness or connectors (Sensor circuit is open.)</li><li>• Input speed sensor 1 and/or 2</li></ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### **With GST**

Follow the procedure "With CONSULT".

Is "P0717" detected?

- YES >> Go to [TM-105, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884033

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.

# P0720 OUTPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0720 OUTPUT SPEED SENSOR

### DTC Logic

INFOID:000000006884034

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0720	Output Speed Sensor Circuit	<ul style="list-style-type: none"><li>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.)</li><li>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.</li></ul>	<ul style="list-style-type: none"><li>Harness or connectors (Sensor circuit is open.)</li><li>Output speed sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

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

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK DTC DETECTION

##### With CONSULT

- Start the engine.
- Select "ESTM VSP SIG" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 60 seconds or more.

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

- Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P0720" detected?

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

### Diagnosis Procedure

INFOID:000000006884035

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

# P0720 OUTPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

## 2. REPLACE OUTPUT SPEED SENSOR AND CHECK DTC

1. Replace output speed sensor. Refer to [TM-194. "2WD : Exploded View"](#) (2WD) or [TM-225. "Exploded View"](#) (AWD).

2. Perform "DTC CONFIRMATION PROCEDURE". Refer to [TM-106. "DTC Logic"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace control valve & TCM. Refer to [TM-181. "Exploded View"](#).

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# P0725 ENGINE SPEED

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0725 ENGINE SPEED

### Description

INFOID:000000006884036

The engine speed signal is transmitted from the ECM to the TCM via CAN communication line.

### DTC Logic

INFOID:000000006884037

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0725	Engine Speed Input Circuit	<ul style="list-style-type: none"><li>• TCM does not receive the CAN communication signal from the ECM.</li><li>• The engine speed is more less 150 rpm even if the vehicle speed is more than 10 km/h (7 MPH).</li></ul>	Harness or connectors (ECM to TCM circuit is open or shorted.)

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

Always drive vehicle at a safe speed.

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK DTC DETECTION

##### With CONSULT

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

SLCT LVR POSI : D

VHCL/S SE-A/T : More than 10 km/h (7 MPH)

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### Is "P0725" detected?

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

### Diagnosis Procedure

INFOID:000000006884038

#### 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-117, "DTC Index"](#) (VQ37VHR) or [EC-1083, "DTC Index"](#) (VK56VD).  
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-78, "DTC Index"](#).



# P0725 ENGINE SPEED

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

NO >> GO TO 3.

## 3.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

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# P0729 6GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0729 6GR INCORRECT RATIO

### Description

INFOID:000000006884039

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

### DTC Logic

INFOID:000000006884040

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0729	Gear 6 Incorrect Ratio	The gear ratio is: <ul style="list-style-type: none"><li>• 0.923 or more</li><li>• 0.819 or less</li></ul>	<ul style="list-style-type: none"><li>• Input clutch solenoid valve</li><li>• Direct clutch solenoid valve</li><li>• High and low reverse clutch solenoid valve</li><li>• Front brake solenoid valve</li><li>• Low brake solenoid valve</li><li>• 2346 brake solenoid valve</li><li>• Anti-interlock solenoid valve</li><li>• Each clutch and brake</li><li>• Output speed sensor</li><li>• Input speed sensor 1, 2</li><li>• Hydraulic control circuit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

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

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK ATF TEMPERATURE

##### With CONSULT

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

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

##### With GST

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

Is ATF temperature within specified range?

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

#### 3. CHECK SYMPTOM (PART 1)

##### With CONSULT

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

# P0729 6GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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-78, "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-111, "Diagnosis Procedure"](#).

YES-4 ("P0729" is detected)>>Go to [TM-111, "Diagnosis Procedure"](#).

NO >> GO TO 4.

## 4.CHECK SYMPTOM (PART 2)

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

>> INSPECTION END

## Diagnosis Procedure

INFOID:000000006884041

### 1.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

### 2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

**NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-110, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

# P0730 INCORRECT GEAR RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0730 INCORRECT GEAR RATIO

### Description

INFOID:000000006884042

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

### DTC Logic

INFOID:000000006884043

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0730	Incorrect Gear Ratio	The revolution of under drive sun gear is 8,000 rpm or more. <b>NOTE:</b> Not detected when in "P" or "N" position and during a shift to "P" or "N" position.	<ul style="list-style-type: none"> <li>• 2346 brake solenoid valve</li> <li>• Front brake solenoid valve</li> <li>• Input speed sensor 2</li> </ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

- **"[TM-112, "Diagnosis Procedure"](#)" must be performed before starting "DTC CONFIRMATION PROCEDURE"**.
- **Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.**
- **Always drive vehicle at a safe speed.**

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK DTC DETECTION

##### With CONSULT

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

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

##### With GST

Follow the procedure "With CONSULT".

#### Is "P0730" detected?

- YES >> Go to [TM-112, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884044

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

#### Is the inspection result normal?

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

# P0730 INCORRECT GEAR RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## 2. DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

**NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-112, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

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# P0731 1GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0731 1GR INCORRECT RATIO

### Description

INFOID:000000006884045

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

### DTC Logic

INFOID:000000006884046

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0731	Gear 1 Incorrect Ratio	The gear ratio is: <ul style="list-style-type: none"><li>• 5.069 or more</li><li>• 4.496 or less</li></ul>	<ul style="list-style-type: none"><li>• Input clutch solenoid valve</li><li>• Direct clutch solenoid valve</li><li>• High and low reverse clutch solenoid valve</li><li>• Front brake solenoid valve</li><li>• Low brake solenoid valve</li><li>• 2346 brake solenoid valve</li><li>• Anti-interlock solenoid valve</li><li>• Each clutch and brake</li><li>• Output speed sensor</li><li>• Input speed sensor 1, 2</li><li>• Hydraulic control circuit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

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

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK ATF TEMPERATURE

##### With CONSULT

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

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

##### With GST

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

Is ATF temperature within specified range?

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

#### 3. CHECK SYMPTOM (PART 1)

##### With CONSULT

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

# P0731 1GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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-78, "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-115, "Diagnosis Procedure"](#).

YES-4 ("P0731" is detected)>>Go to [TM-115, "Diagnosis Procedure"](#).

NO >> GO TO 4.

## 4.CHECK SYMPTOM (PART 2)

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

>> INSPECTION END

## Diagnosis Procedure

INFOID:000000006884047

### 1.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

### 2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

**NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-114, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

# P0732 2GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0732 2GR INCORRECT RATIO

### Description

INFOID:000000006884048

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

### DTC Logic

INFOID:000000006884049

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0732	Gear 2 Incorrect Ratio	The gear ratio is: <ul style="list-style-type: none"><li>• 3.289 or more</li><li>• 2.917 or less</li></ul>	<ul style="list-style-type: none"><li>• Input clutch solenoid valve</li><li>• Direct clutch solenoid valve</li><li>• High and low reverse clutch solenoid valve</li><li>• Front brake solenoid valve</li><li>• Low brake solenoid valve</li><li>• 2346 brake solenoid valve</li><li>• Anti-interlock solenoid valve</li><li>• Each clutch and brake</li><li>• Output speed sensor</li><li>• Input speed sensor 1, 2</li><li>• Hydraulic control circuit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

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

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK ATF TEMPERATURE

##### With CONSULT

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

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

##### With GST

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

Is ATF temperature within specified range?

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

#### 3. CHECK SYMPTOM (PART 1)

##### With CONSULT

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



# P0732 2GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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-78, "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-117, "Diagnosis Procedure"](#).  
YES-4 ("P0732" is detected)>>Go to [TM-117, "Diagnosis Procedure"](#).  
NO >> GO TO 4.

## 4.CHECK SYMPTOM (PART 2)

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

>> INSPECTION END

## Diagnosis Procedure

INFOID:000000006884050

### 1.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

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

### 2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

**NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-116, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.

# P0733 3GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0733 3GR INCORRECT RATIO

### Description

INFOID:000000006884051

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

### DTC Logic

INFOID:000000006884052

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0733	Gear 3 Incorrect Ratio	The gear ratio is: <ul style="list-style-type: none"><li>• 2.103 or more</li><li>• 1.865 or less</li></ul>	<ul style="list-style-type: none"><li>• Input clutch solenoid valve</li><li>• Direct clutch solenoid valve</li><li>• High and low reverse clutch solenoid valve</li><li>• Front brake solenoid valve</li><li>• Low brake solenoid valve</li><li>• 2346 brake solenoid valve</li><li>• Anti-interlock solenoid valve</li><li>• Each clutch and brake</li><li>• Output speed sensor</li><li>• Input speed sensor 1, 2</li><li>• Hydraulic control circuit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

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

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK ATF TEMPERATURE

##### With CONSULT

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

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

##### With GST

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

Is ATF temperature within specified range?

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

#### 3. CHECK SYMPTOM (PART 1)

##### With CONSULT

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

# P0733 3GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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-78, "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-119, "Diagnosis Procedure"](#).

YES-4 ("P0733" is detected)>>Go to [TM-119, "Diagnosis Procedure"](#).

NO >> GO TO 4.

## 4.CHECK SYMPTOM (PART 2)

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

>> INSPECTION END

## Diagnosis Procedure

INFOID:000000006884053

### 1.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

### 2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

**NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-118, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

# P0734 4GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0734 4GR INCORRECT RATIO

### Description

INFOID:000000006884054

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

### DTC Logic

INFOID:000000006884055

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0734	Gear 4 Incorrect Ratio	The gear ratio is: <ul style="list-style-type: none"><li>• 1.453 or more</li><li>• 1.289 or less</li></ul>	<ul style="list-style-type: none"><li>• Input clutch solenoid valve</li><li>• Direct clutch solenoid valve</li><li>• High and low reverse clutch solenoid valve</li><li>• Front brake solenoid valve</li><li>• Low brake solenoid valve</li><li>• 2346 brake solenoid valve</li><li>• Anti-interlock solenoid valve</li><li>• Each clutch and brake</li><li>• Output speed sensor</li><li>• Input speed sensor 1, 2</li><li>• Hydraulic control circuit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

- **“TM-121, "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.

# P0734 4GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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-78, "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-121, "Diagnosis Procedure"](#).  
YES-4 ("P0734" is detected)>>Go to [TM-121, "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:000000006884056

### 1.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

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

### 2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

**NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-120, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.

# P0735 5GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0735 5GR INCORRECT RATIO

### Description

INFOID:000000006884057

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

### DTC Logic

INFOID:000000006884058

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0735	Gear 5 Incorrect Circuit	The gear ratio is: <ul style="list-style-type: none"><li>• 1.060 or more</li><li>• 0.940 or less</li></ul>	<ul style="list-style-type: none"><li>• Input clutch solenoid valve</li><li>• Direct clutch solenoid valve</li><li>• High and low reverse clutch solenoid valve</li><li>• Front brake solenoid valve</li><li>• Low brake solenoid valve</li><li>• 2346 brake solenoid valve</li><li>• Anti-interlock solenoid valve</li><li>• Each clutch and brake</li><li>• Output speed sensor</li><li>• Input speed sensor 1, 2</li><li>• Hydraulic control circuit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

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

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK 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.

# P0735 5GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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-78, "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-123, "Diagnosis Procedure"](#).

YES-4 ("P0735" is detected)>>Go to [TM-123, "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:000000006884059

### 1.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

### 2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

**NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-122, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

# P0740 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0740 TORQUE CONVERTER

### DTC Logic

INFOID:000000006884060

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0740	Torque Converter Clutch Circuit/Open	The torque converter clutch solenoid valve monitor value is 0.4 A or less when the torque converter clutch solenoid valve command value is more than 0.75 A.	<ul style="list-style-type: none"><li>• Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>• Torque converter clutch solenoid valve</li></ul>

### 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 30 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P0740" detected?

- YES >> Go to [TM-124, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884061

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.



# P0744 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0744 TORQUE CONVERTER

### Description

INFOID:000000006884062

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 Logic

INFOID:000000006884063

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0744	Torque Converter Clutch Circuit Intermittent	The lock-up is not performed in spite of within the lock-up area.	<ul style="list-style-type: none"> <li>• Harness or connectors</li> <li>• Torque converter clutch solenoid valve</li> <li>• Torque converter</li> <li>• Input speed sensor 1, 2</li> <li>• Hydraulic control circuit</li> </ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P0744" detected?

YES >> Go to [TM-125, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884064

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

#### 2. DETECT MALFUNCTIONING ITEM

## P0744 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

---

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

**NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-125, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

# P0745 PRESSURE CONTROL SOLENOID A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0745 PRESSURE CONTROL SOLENOID A

### DTC Logic

INFOID:000000006884065

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0745	Pressure Control Solenoid A	The line pressure solenoid valve monitor value is 0.4 A or less when the line pressure solenoid valve command value is more than 0.75 A.	<ul style="list-style-type: none"><li>• Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>• Line pressure solenoid valve</li></ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P0745" detected?

YES >> Go to [TM-127. "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884066

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44. "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181. "Exploded View"](#).

NO >> Repair or replace damaged parts.

# P0750 SHIFT SOLENOID A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0750 SHIFT SOLENOID A

### DTC Logic

INFOID:000000006884067

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0750	Shift Solenoid A	<ul style="list-style-type: none"><li>The anti-interlock solenoid valve monitor value is ON when the anti-interlock solenoid valve command value is OFF.</li><li>The anti-interlock solenoid valve monitor value is OFF when the anti-interlock solenoid valve command value is ON.</li></ul>	<ul style="list-style-type: none"><li>Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>Anti-interlock solenoid valve</li></ul>

### 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

- Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 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

- Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P0750" detected?

- YES >> Go to [TM-128, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884068

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.

# P0775 PRESSURE CONTROL SOLENOID B

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0775 PRESSURE CONTROL SOLENOID B

### DTC Logic

INFOID:000000006884069

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0775	Pressure Control Solenoid B	The input clutch solenoid valve monitor value is 0.4 A or less when the input clutch solenoid valve command value is more than 0.75 A.	<ul style="list-style-type: none"><li>• Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>• Input clutch solenoid valve</li></ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

##### Is "P0775" detected?

YES >> Go to [TM-129, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884070

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

##### Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

P0780 SHIFT

Description

INFOID:000000006884071

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

DTC Logic

INFOID:000000006884072

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0780	Shift Error	<ul style="list-style-type: none"> <li>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).</li> <li>When shifting from 5GR to 6GR or 6GR to 7GR, the engine speed exceeds the prescribed speed.</li> </ul>	<ul style="list-style-type: none"> <li>Anti-interlock solenoid valve</li> <li>Low brake solenoid valve</li> <li>Hydraulic control circuit</li> </ul>

DTC CONFIRMATION PROCEDURE

**CAUTION:**

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

**1. PRECONDITIONING**

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

>> GO TO 2.

**2. CHECK DTC DETECTION**

 **With CONSULT**

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

SLCT LVR POSI : D  
 ACCELE POSI : More than 1.0/8  
 GEAR : 3rd → 4th or 5th → 6th → 7th

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

 **With GST**

Follow the procedure "With CONSULT".

Is "P0780" detected?

- YES >> Go to [TM-130. "Diagnosis Procedure"](#).  
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006884073

**1. CHECK INTERMITTENT INCIDENT**

Refer to [GI-44. "Intermittent Incident"](#).

Is the inspection result normal?

# P0780 SHIFT

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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

A

## 2. DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

B

### NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-130, "DTC Logic"](#).

C

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).
- NO >> Repair or replace damaged parts.

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# P0795 PRESSURE CONTROL SOLENOID C

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P0795 PRESSURE CONTROL SOLENOID C

### DTC Logic

INFOID:000000006884074

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P0795	Pressure Control Solenoid C	The front brake solenoid valve monitor value is 0.4 A or less when the front brake solenoid valve command value is more than 0.75 A.	<ul style="list-style-type: none"><li>• Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>• Front brake solenoid valve</li></ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

##### Is "P0795" detected?

YES >> Go to [TM-132, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884075

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

##### Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.



# P1705 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P1705 TP SENSOR

### DTC Logic

INFOID:000000006884076

### DTC DETECTION LOGIC

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

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK DTC DETECTION

##### With CONSULT

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

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

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### Is "P1705" detected?

YES >> Go to [TM-133, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884077

#### 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-117, "DTC Index"](#) (VQ37VHR) or [EC-1083, "DTC Index"](#) (VK56VD).  
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-78, "DTC Index"](#).  
NO >> GO TO 3.

#### 3. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

##### Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.

# P1721 VEHICLE SPEED SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P1721 VEHICLE SPEED SIGNAL

### Description

INFOID:000000006884078

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

### DTC Logic

INFOID:000000006884079

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P1721	Vehicle Speed Signal Circuit	<ul style="list-style-type: none"><li>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.)</li><li>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.</li></ul>	Harness or connectors (Sensor circuit is open or shorted.)

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

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

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK DTC DETECTION

##### With CONSULT

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

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

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P1721" detected?

- YES >> Go to [TM-135. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

# P1721 VEHICLE SPEED SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## Diagnosis Procedure

INFOID:000000006884080

### 1. CHECK DTC OF COMBINATION METER

#### ④ With CONSULT

Perform "Self Diagnostic Results" in "METER/M&A".

Is any DTC detected?

YES >> Check DTC detected item. Refer to [MWI-44, "DTC Index"](#).

NO >> GO TO 2.

### 2. CHECK DTC OF TCM

#### ④ With CONSULT

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is any DTC other than "P1721" detected?

YES >> Check DTC detected item. Refer to [TM-78, "DTC Index"](#).

NO >> GO TO 3.

### 3. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

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# P1730 INTERLOCK

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P1730 INTERLOCK

### Description

INFOID:000000006884081

Fail-safe function to detect interlock conditions.

### DTC Logic

INFOID:000000006884082

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P1730	Interlock	The output speed sensor detects the deceleration of 12 km/h (7 MPH) or more for 1 second.	<ul style="list-style-type: none"><li>• Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>• Input clutch solenoid valve</li><li>• Direct clutch solenoid valve</li><li>• High and low reverse clutch solenoid valve</li><li>• Front brake solenoid valve</li><li>• Low brake solenoid valve</li><li>• 2346 brake solenoid valve</li><li>• Anti-interlock solenoid valve</li><li>• Each clutch</li><li>• Hydraulic control circuit</li></ul>

#### NOTE:

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

#### DTC CONFIRMATION PROCEDURE

##### CAUTION:

- **“[TM-137, "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. Perform “Self Diagnostic Results” in “TRANSMISSION”.

##### With GST

Follow the procedure “With CONSULT”.

Is “P1730” detected?

- YES >> Go to [TM-137, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

### Judgment of Interlock

INFOID:000000006884083

Refer to [TM-73, "Fail-Safe"](#).

# P1730 INTERLOCK

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## Diagnosis Procedure

INFOID:000000006884084

### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

### 2. DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

#### NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-136, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

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# P1734 7GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P1734 7GR INCORRECT RATIO

### Description

INFOID:000000006884085

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

### DTC Logic

INFOID:000000006884086

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P1734	Gear 7 Incorrect Ratio	The gear ratio is: <ul style="list-style-type: none"><li>• 0.822 or more</li><li>• 0.730 or less</li></ul>	<ul style="list-style-type: none"><li>• Input clutch solenoid valve</li><li>• Direct clutch solenoid valve</li><li>• High and low reverse clutch solenoid valve</li><li>• Front brake solenoid valve</li><li>• Low brake solenoid valve</li><li>• 2346 brake solenoid valve</li><li>• Anti-interlock solenoid valve</li><li>• Each clutch and brake</li><li>• Output speed sensor</li><li>• Input speed sensor 1, 2</li><li>• Hydraulic control circuit</li></ul>

### DTC CONFIRMATION PROCEDURE

#### CAUTION:

- **“[TM-139, "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.

# P1734 7GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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-78, "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-139, "Diagnosis Procedure"](#).

YES-4 ("P1734" is detected)>>Go to [TM-139, "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:000000006884087

### 1.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

### 2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to [TM-240, "Disassembly"](#).

**NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to [TM-138, "DTC Logic"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

# P1815 M-MODE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P1815 M-MODE SWITCH

### DTC Logic

INFOID:000000006884088

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P1815	Manual Mode Switch Circuit	<ul style="list-style-type: none"><li>• 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.</li><li>• Shift up/down signal of paddle shifter continuously remains ON for 60 seconds.*</li></ul>	<ul style="list-style-type: none"><li>• Harness or connectors (These switches circuit is open or shorted.)</li><li>• Mode select switch (Into A/T shift selector)</li><li>• Position select switch (Into A/T shift selector)</li><li>• Paddle shifter*</li></ul>

\*: With paddle shifter

### DTC CONFIRMATION PROCEDURE

#### 1. PRECONDITIONING

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

>> GO TO 2.

#### 2. CHECK DTC DETECTION

##### With CONSULT

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

SLCT LVR POSI : D

MANU MODE SW : ON

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### Is "P1815" detected?

- YES >> Go to [TM-140. "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884089

#### 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.



# P1815 M-MODE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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	
Paddle shifter*	SFT UP ST SW	Paddle shifter (shift-up) is pulled	ON
		Other than the above	OFF
	SFT DWN ST SW	Paddle shifter (shift-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.

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

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

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

### Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

## 3.CHECK MANUAL MODE SWITCH

- Turn ignition switch OFF.
- Check manual mode switch. Refer to [TM-144, "Component Inspection \(Manual Mode Switch\)"](#).

### Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace damaged parts.

# P1815 M-MODE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## 4. CHECK GROUND CIRCUIT (MANUAL MODE SWITCH CIRCUIT)

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

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

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 vehicle side harness connector terminals and combination meter vehicle side harness connector terminals.

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

Is the inspection result normal?

- YES >> GO TO 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 vehicle side harness connector terminals and ground.

A/T shift selector vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M137	1		
	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 vehicle side harness connector terminals.

Paddle shifter vehicle side harness connector			Voltage (Approx.)
Connector	Terminal		
M32	+	-	Battery voltage
	M39	3	

Is the inspection result normal?

# P1815 M-MODE SWITCH

[7AT: RE7R01A]

## < DTC/CIRCUIT DIAGNOSIS >

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

### 8.CHECK PADDLE SHIFTER

1. Turn ignition switch OFF.
2. Check paddle shifter. Refer to [TM-144, "Component Inspection \[Paddle Shifter \(Shift-up\)\]"](#), [TM-144, "Component Inspection \[Paddle Shifter \(Shift-down\)\]"](#).

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 vehicle side harness connector terminals and ground.

Paddle shifter vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M32	1		Existed
M39			

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 vehicle side harness connector terminals and combination meter vehicle side harness connector terminals.

Paddle shifter vehicle side harness connector		Combination meter vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M32	3	M53	32	Existed
M39			33	

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 vehicle side harness connector terminals and ground.

Paddle shifter vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M32	3		Not existed
M39			

Is the inspection result normal?

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

### 12.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "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.

# P1815 M-MODE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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-36, "Reference Value"](#).

Is the inspection result normal?

- YES >> Replace A/T assembly. Refer to [TM-213, "VQ37VHR \(2WD\) : Exploded View"](#) [VQ37VHR (2WD)], [TM-216, "VQ37VHR \(AWD\) : Exploded View"](#) [VQ37VHR (AWD)], [TM-219, "VK56VD \(2WD\) : Exploded View"](#) [VK56VD (2WD)] or [TM-222, "VK56VD \(AWD\) : Exploded View"](#) [VK56VD (AWD)].
- NO >> Replace combination meter. Refer to [MWI-79, "Exploded View"](#).

## Component Inspection (Manual Mode Switch)

INFOID:000000006884090

### 1.CHECK MANUAL MODE SWITCH

Check continuity between A/T shift selector connector terminals.

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

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Repair or replace damaged parts. Refer to [TM-174, "2WD : Exploded View"](#).

## Component Inspection [Paddle Shifter (Shift-up)]

INFOID:000000006884091

### 1.CHECK PADDLE SHIFTER (SHIFT-UP)

Check continuity between paddle shifter (shift-up) connector terminals.

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

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace paddle shifter (shift-up). Refer to [TM-180, "Exploded View"](#).

## Component Inspection [Paddle Shifter (Shift-down)]

INFOID:000000006884092

### 1.CHECK PADDLE SHIFTER (SHIFT-DOWN)

Check continuity between paddle shifter (shift-down) connector terminals.

# P1815 M-MODE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace paddle shifter (shift-down). Refer to [TM-180, "Exploded View"](#).

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TM

# P2713 PRESSURE CONTROL SOLENOID D

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P2713 PRESSURE CONTROL SOLENOID D

### DTC Logic

INFOID:000000006884093

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P2713	Pressure Control Solenoid D	The high and low reverse clutch solenoid valve monitor value is 0.4 A or less when the high and low reverse clutch solenoid valve command value is more than 0.75 A.	<ul style="list-style-type: none"><li>• Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>• High and low reverse clutch solenoid valve</li></ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P2713" detected?

- YES >> Go to [TM-146, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884094

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.

# P2722 PRESSURE CONTROL SOLENOID E

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P2722 PRESSURE CONTROL SOLENOID E

### DTC Logic

INFOID:000000006884095

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P2722	Pressure Control Solenoid E	The low brake solenoid valve monitor value is 0.4 A or less when the low brake solenoid valve command value is more than 0.75 A.	<ul style="list-style-type: none"><li>• Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>• Low brake solenoid valve</li></ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P2722" detected?

YES >> Go to [TM-147, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884096

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.

# P2731 PRESSURE CONTROL SOLENOID F

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P2731 PRESSURE CONTROL SOLENOID F

### DTC Logic

INFOID:000000006884097

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if...	Possible cause
P2731	Pressure Control Solenoid F	The 2346 brake solenoid valve monitor value is 0.4 A or less when the 2346 brake solenoid valve command value is more than 0.75 A.	<ul style="list-style-type: none"><li>• Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>• 2346 brake solenoid valve</li></ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P2731" detected?

- YES >> Go to [TM-148, "Diagnosis Procedure"](#).  
NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884098

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.



# P2807 PRESSURE CONTROL SOLENOID G

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## P2807 PRESSURE CONTROL SOLENOID G

### DTC Logic

INFOID:000000006884099

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected is...	Possible cause
P2807	Pressure Control Solenoid G	The direct clutch solenoid valve monitor value is 0.4 A or less when the direct clutch solenoid valve command value is more than 0.75 A.	<ul style="list-style-type: none"><li>• Harness or connectors (Solenoid valve circuit is open or shorted.)</li><li>• Direct clutch solenoid valve</li></ul>

### 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. Perform "Self Diagnostic Results" in "TRANSMISSION".

##### With GST

Follow the procedure "With CONSULT".

Is "P2807" detected?

YES >> Go to [TM-149, "Diagnosis Procedure"](#).

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000006884100

#### 1. CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to [TM-181, "Exploded View"](#).

NO >> Repair or replace damaged parts.

# MAIN POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## MAIN POWER SUPPLY AND GROUND CIRCUIT

### Diagnosis Procedure

INFOID:000000006884101

#### 1. CHECK TCM POWER SOURCE (PART 1)

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

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

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 6.

#### 2. CHECK TCM POWER SOURCE (PART 2)

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

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 7.

#### 3. CHECK TCM GROUND CIRCUIT

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

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

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

#### 4. CHECK JOINT CONNECTOR

1. Remove joint connector. Refer to [TM-181, "Exploded View"](#).
2. Check the continuity between joint connector terminals.

A/T assembly harness connector side	TCM harness connector side	Continuity
Terminal	Terminal	
1	1	Existed
2	2	
5	5	
6	6	
10	10	

Is the inspection result normal?

# MAIN POWER SUPPLY AND GROUND CIRCUIT

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

## 5.CHECK INTERMITTENT INCIDENT

Refer to [GI-44, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> Replace the control valve & TCM. Refer to [TM-181, "Exploded View"](#).  
NO >> Repair or replace damaged parts.

## 6.DETECT MALFUNCTIONING ITEM (PART 1)

Check the following.

- Harness for short or open between battery positive terminal and A/T assembly vehicle side harness connector terminal 2. Refer to [PG-11, "Wiring Diagram - BATTERY POWER SUPPLY -"](#).
- Battery
- 10A fuse (No.36, located in the fuse, fusible link and relay box). Refer to [PG-39, "Fuse and Fusible Link Arrangement"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).  
NO >> Repair or replace damaged parts.

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

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

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

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

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

## 9.DETECT MALFUNCTIONING ITEM (PART 2)

Check the following.

- Harness for short or open between ignition switch and IPDM E/R. Refer to [PG-28, "Wiring Diagram - IGNITION POWER SUPPLY -"](#).
- Ignition switch
- 10A fuse (No.43, located in the IPDM E/R). Refer to [PG-40, "Fuse, Connector and Terminal Arrangement"](#).
- IPDM E/R

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).  
NO >> Repair or replace damaged parts.

# SHIFT POSITION INDICATOR CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## SHIFT POSITION INDICATOR CIRCUIT

### Description

INFOID:000000006884102

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:000000006884103

#### 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-152, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000006884104

#### 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-67, "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-67, "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-144, "Component Inspection \(Manual Mode Switch\)"](#).  
• Check A/T main system (Fail-safe function actuated).  
- Perform "Self Diagnostic Results" in "TRANSMISSION". Refer to [TM-78, "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-78, "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-78, "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-36, "Reference Value"](#).

# SHIFT LOCK SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

## SHIFT LOCK SYSTEM WITH ICC

### WITH ICC : Component Function Check

INFOID:000000006884105

#### 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-153, "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-153, "WITH ICC : Diagnosis Procedure"](#).

### WITH ICC : Diagnosis Procedure

INFOID:000000006884106

#### 1. CHECK POWER SOURCE (PART 1)

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

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

Is the inspection result normal?

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

#### 2. CHECK GROUND CIRCUIT (PART 1)

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

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

Is the inspection result normal?

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

#### 3. CHECK SHIFT LOCK RELAY

Check shift lock relay. Refer to [TM-158, "WITH ICC : Component Inspection \(Shift Lock Relay\)"](#).

Is the inspection result normal?

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

#### 4. CHECK POWER SOURCE (PART 2)

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

# SHIFT LOCK SYSTEM

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

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> GO TO 19.

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

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

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

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

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

## 7. CHECK GROUND CIRCUIT (PART 2)

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

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

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> GO TO 22.

## 8. CHECK SHIFT LOCK UNIT

Check shift lock unit. Refer to [TM-157, "WITH ICC : Component Inspection \(Shift Lock Unit\)"](#)

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).
- NO >> Repair or replace damaged parts.

## 9. CHECK POWER SOURCE (PART 3)

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

Stop lamp switch vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
E110	1		Battery voltage

# SHIFT LOCK SYSTEM

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Is the inspection result normal?

YES >> GO TO 14.

NO >> GO TO 10.

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

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

Fuse block (J/B) vehicle side harness connector		Stop lamp switch vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E103	8F	E110	1	Existed

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace damaged parts.

## 11. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP SWITCH (PART 2)

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

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

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace damaged parts.

## 12. DETECT MALFUNCTIONING ITEM (PART 1)

Check the following.

- Harness for short or open between battery and fuse block (J/B). Refer to [PG-11, "Wiring Diagram - BATTERY POWER SUPPLY -"](#).
- Battery
- 10A fuse [No.7, located in the fuse block (J/B)]. Refer to [PG-38, "Fuse, Connector and Terminal Arrangement"](#).
- Fuse block (J/B)

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace damaged parts.

## 13. CHECK DTC OF ICC

Ⓜ With CONSULT

Perform "Self Diagnostic Results" in "ICC".

Is any malfunction detected?

YES >> Check the DTC detected item. Refer to [CCS-51, "DTC Index"](#).

NO >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).

## 14. CHECK STOP LAMP SWITCH (PART 1)

Check stop lamp switch. Refer to [TM-158, "WITH ICC : Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

YES >> GO TO 17.

NO >> GO TO 15.

## 15. CHECK INSTALLATION POSITION OF STOP LAMP SWITCH

Adjust stop lamp switch position. Refer to [BR-7, "Inspection and Adjustment"](#).

>> GO TO 16.

# SHIFT LOCK SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

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## 16. CHECK STOP LAMP SWITCH (PART 2)

Check stop lamp switch. Refer to [TM-158, "WITH ICC : Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

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

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

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

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

Is the inspection result normal?

- YES >> GO TO 18.  
NO >> Repair or replace damaged parts.

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

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

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

Is the inspection result normal?

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

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

1. Turn ignition switch OFF.
2. Disconnect fuse block (J/B) connector.
3. Check continuity between fuse block (J/B) vehicle side harness connector terminal and shift lock relay vehicle side harness connector terminal.

Fuse block (J/B) vehicle side harness connector		Shift lock relay vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E103	4F	E52	5	Existed

Is the inspection result normal?

- YES >> GO TO 20.  
NO >> Repair or replace damaged parts.

## 20. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND SHIFT LOCK RELAY (PART 2)

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

Fuse block (J/B) vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E103	4F		Not existed

Is the inspection result normal?

- YES >> GO TO 21.  
NO >> Repair or replace damaged parts.

## 21. DETECT MALFUNCTIONING ITEM (PART 2)

Check the following.

- Harness for short or open between ignition switch and fuse block (J/B). Refer to [PG-28, "Wiring Diagram - IGNITION POWER SUPPLY -"](#).



# SHIFT LOCK SYSTEM

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- Ignition switch
- 10A fuse [No.3, located in the fuse block (J/B)]. Refer to [PG-38, "Fuse, Connector and Terminal Arrangement"](#).
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).

NO >> Repair or replace damaged parts.

## 22.CHECK GROUND CIRCUIT (PART 3)

1. Disconnect PCB harness connector.
2. Check continuity between PCB harness vehicle side harness connector terminal and ground.

PCB harness vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M30	408		Existed
	409		

Is the inspection result normal?

YES >> GO TO 23.

NO >> Repair or replace damaged parts.

## 23.CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND PCB HARNESS

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

A/T shift selector vehicle side harness connector		PCB harness vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M137	4	M26	246	Existed

Is the inspection result normal?

YES >> GO TO 24.

NO >> Repair or replace damaged parts.

## 24.CHECK PCB HARNESS

Check continuity between PCB harness connector terminals.

PCB harness vehicle side harness connector				Continuity
Connector	Terminal	Connector	Terminal	
M26	246	M30	408	Existed
			409	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).

NO >> Repair or replace damaged parts.

## WITH ICC : Component Inspection (Shift Lock Unit)

INFOID:000000006884107

### 1.CHECK SHIFT LOCK SOLENOID

Apply voltage to terminals 6 and 4 of A/T shift selector connector, and check that shift lock unit is activated.

#### **CAUTION:**

**Connect the fuse between the terminals when applying the voltage.**

# SHIFT LOCK SYSTEM

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Shift lock unit connector		Condition	Status
Terminal			
+ (fuse)	-		
6	4	<ul style="list-style-type: none"> <li>Selector lever in "P" position.</li> <li>Apply 12 V direct current between terminals 6 and 4.</li> </ul>	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-174, "2WD : Exploded View"](#) (2WD) or [TM-176, "AWD : Exploded View"](#) (AWD).

## WITH ICC : Component Inspection (Shift Lock Relay)

INFOID:000000006884108

### 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 connector		Condition	Continuity
Terminal			
3	5	Apply 12 V direct current between terminals 1 and 2.	Existed
		OFF	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace shift lock relay.

## WITH ICC : Component Inspection (Stop Lamp Switch)

INFOID:000000006884109

### 1.CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp switch connector		Condition	Continuity
Terminal			
1	2	Brake pedal depressed	Existed
		Brake pedal released	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to [BR-18, "Exploded View"](#).

## WITHOUT ICC

## WITHOUT ICC : Component Function Check

INFOID:000000006884110

### 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-159, "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.

# SHIFT LOCK SYSTEM

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Can the selector lever be shifted to any other position?

- YES >> INSPECTION END  
NO >> Go to [TM-159, "WITHOUT ICC : Diagnosis Procedure"](#).

## WITHOUT ICC : Diagnosis Procedure

INFOID:000000006884111

### 1.CHECK POWER SOURCE (PART 1)

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

A/T shift selector vehicle side harness connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal		Depressed brake pedal.	Battery voltage
M137	6		Released brake pedal.	0 V

Is the inspection result normal?

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

### 2.CHECK GROUND CIRCUIT

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

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

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> GO TO 13.

### 3.CHECK SHIFT LOCK UNIT

Check shift lock unit. Refer to [TM-161, "WITHOUT ICC : Component Inspection \(Shift Lock Unit\)"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).  
NO >> Repair or replace damaged parts.

### 4.CHECK POWER SOURCE (PART 2)

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

Stop lamp switch vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		Battery voltage
E110	3		Battery voltage

Is the inspection result normal?

- YES >> GO TO 5.  
NO >> GO TO 8.

### 5.CHECK STOP LAMP SWITCH (PART 1)

Check stop lamp switch. Refer to [TM-162, "WITHOUT ICC : Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> GO TO 11.

# SHIFT LOCK SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

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

Check continuity between stop lamp switch vehicle side harness connector terminal and A/T shift selector vehicle side harness connector terminal.

Stop lamp switch vehicle side harness connector		A/T shift selector vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E110	4	M137	6	Existed

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace damaged parts.

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

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

Stop lamp switch vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E110	4		Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).

NO >> Repair or replace damaged parts.

## 8. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP SWITCH (PART 1)

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

Fuse block (J/B) vehicle side harness connector		Stop lamp switch vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E103	4F	E110	3	Existed

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace damaged parts.

## 9. CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP SWITCH (PART 2)

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

Fuse block (J/B) vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E103	4F		Not existed

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace damaged parts.

## 10. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and fuse block (J/B). Refer to [PG-28, "Wiring Diagram - IGNITION POWER SUPPLY -"](#).
- Ignition switch
- 10A fuse [No.3, located in the fuse block (J/B)]. Refer to [PG-38, "Fuse, Connector and Terminal Arrangement"](#).
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).

# SHIFT LOCK SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

NO >> Repair or replace damaged parts.

## 11.CHECK INSTALLATION POSITION OF STOP LAMP SWITCH

Adjust stop lamp switch position. Refer to [BR-7, "Inspection and Adjustment"](#).

>> GO TO 12.

## 12.CHECK STOP LAMP SWITCH (PART 2)

Check stop lamp switch. Refer to [TM-162, "WITHOUT ICC : Component Inspection \(Stop Lamp Switch\)"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace damaged parts.

## 13.CHECK GROUND CIRCUIT (PART 2)

1. Disconnect PCB harness connector.
2. Check continuity between PCB harness vehicle side harness connector terminal and ground.

PCB harness vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M30	408		Existed
	409		

Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair or replace damaged parts.

## 14.CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND PCB HARNESS

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

A/T shift selector vehicle side harness connector		PCB harness vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M137	4	M26	246	Existed

Is the inspection result normal?

YES >> GO TO 15.

NO >> Repair or replace damaged parts.

## 15.CHECK PCB HARNESS

Check continuity between PCB harness connector terminals.

PCB harness vehicle side harness connector				Continuity
Connector	Terminal	Connector	Terminal	
M26	246	M30	408	Existed
			409	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-44, "Intermittent Incident"](#).

NO >> Repair or replace damaged parts.

## WITHOUT ICC : Component Inspection (Shift Lock Unit)

INFOID:000000006884112

### 1.CHECK SHIFT LOCK SOLENOID

Apply voltage to terminals 6 and 4 of A/T shift selector connector, and check that shift lock unit is activated.

**CAUTION:**

**Connect the fuse between the terminals when applying the voltage.**

# SHIFT LOCK SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

Shift lock unit connector		Condition	Status
Terminal			
+ (fuse)	-		
6	4	<ul style="list-style-type: none"> <li>Selector lever in "P" position.</li> <li>Apply 12 V direct current between terminals 6 and 4.</li> </ul>	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-174, "2WD : Exploded View"](#) (2WD) or [TM-176, "AWD : Exploded View"](#) (AWD).

## WITHOUT ICC : Component Inspection (Stop Lamp Switch)

INFOID:000000006884113

### 1. CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp switch connector		Condition	Continuity
Terminal			
3	4	Brake pedal depressed	Existed
		Brake pedal released	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to [BR-18, "Exploded View"](#).

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Table

INFOID:000000006884114

- 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																									
			IM-96	IM-106	IM-134	IM-133	IM-108	IM-105	IM-103	IM-150	IM-102	IM-140	SEC-61	IM-127	IM-124	IM-147	IM-132	IM-146	IM-129	IM-149	IM-148	IM-128	IM-100	IM-99				
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																							

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# SYSTEM SYMPTOM

< SYMPTOM DIAGNOSIS >

[7AT: RE7R01A]

			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					
Symptom			TM-96	TM-106	TM-134	TM-133	TM-108	TM-105	TM-103	TM-150	TM-102	TM-140	SEC-61	TM-127	TM-124	TM-147	TM-132	TM-146	TM-129	TM-149	TM-148	TM-128	TM-100	TM-99					
Func-tion 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	2	2		1		
		"M" position	1GR ⇔ 2GR		3			3	3		3	2		3	3	3	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	3	3	3		1		
	3GR ⇔ 4GR			3			3	3		3	2		3	3	3	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	3	3	3		1			
	5GR ⇔ 6GR			3			3	3		3	2		3	3	3	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	3	3	3		1			



# SYSTEM SYMPTOM

< SYMPTOM DIAGNOSIS >

[7AT: RE7R01A]

Symptom				Diagnostic item																								
				IM-96	IM-106	IM-134	IM-133	IM-108	IM-105	IM-103	IM-150	IM-102	IM-140	SEC-61	IM-127	IM-124	IM-147	IM-132	IM-146	IM-129	IM-149	IM-148	IM-128	IM-100	IM-99			
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			1	
			6GR ⇔ 7GR	3			3	3	4					2		2								2			1	
		Engine brake does not work	“M” position	“D” position → “M” position				5			5	5	6		4	2		3		3	3						1	
				7GR → 6GR		5			5	5	6		4	2		3		3							3		1	
				6GR → 5GR		5			5	5	6		4	2		3									3		1	
				5GR → 4GR		5			5	5	6		4	2		3									3		1	
				4GR → 3GR		5			5	5	6		4	2		3	3									3		1
				3GR → 2GR		5			5	5	6		4	2		3										3		1
			2GR → 1GR		5			5	5	6		4	2		3								3		1			

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# SYSTEM SYMPTOM

< SYMPTOM DIAGNOSIS >

[7AT: RE7R01A]

Symptom			Diagnostic item																							
			<a href="#">TM-96</a>	<a href="#">TM-106</a>	<a href="#">TM-134</a>	<a href="#">TM-133</a>	<a href="#">TM-108</a>	<a href="#">TM-105</a>	<a href="#">TM-103</a>	<a href="#">TM-150</a>	<a href="#">TM-102</a>	<a href="#">TM-140</a>	<a href="#">SEC-61</a>	<a href="#">TM-127</a>	<a href="#">TM-124</a>	<a href="#">TM-147</a>	<a href="#">TM-132</a>	<a href="#">TM-146</a>	<a href="#">TM-129</a>	<a href="#">TM-149</a>	<a href="#">TM-148</a>	<a href="#">TM-128</a>	<a href="#">TM-100</a>	<a href="#">TM-99</a>		
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	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	1		
		Extremely large creep.					1																			

# SYSTEM SYMPTOM

< SYMPTOM DIAGNOSIS >

[7AT: RE7R01A]

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 clutch 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-96	TM-106	TM-134	TM-133	TM-108	TM-105	TM-103	TM-150	TM-102	TM-140	SEC-61	TM-127	TM-124	TM-147	TM-132	TM-146	TM-129	TM-149	TM-148	TM-128	TM-100	TM-99			
Function trouble	Power transmission cannot be performed	Vehicle cannot run in all position.	3							2			1	1	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	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	
			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

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# SYSTEM SYMPTOM

< SYMPTOM DIAGNOSIS >

[7AT: RE7R01A]

Symptom			Diagnostic item															
			Oil pump	Torque converter	Low brake*	Front brake	High and low reverse clutch	Input clutch	Direct clutch	2346 brake	Reverse brake	1st one-way clutch	2nd one-way clutch	gear	control valve	Parking component		
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-16, "Cross-Sectional View"](#).

# SYSTEM SYMPTOM

< SYMPTOM DIAGNOSIS >

[7AT: RE7R01A]

Symptom			Diagnostic item											Parking component						
			Oil pump	Torque converter	Low brake*	Front brake	High and low reverse clutch	Input clutch	Direct clutch	2346 brake	Reverse brake	1st one-way clutch	2nd one-way clutch		gear	control valve				
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	1			2		
		"M" position	1GR ⇔ 2GR			2	1	1	1	1	1	1		1	1			2		
			2GR ⇔ 3GR			2	1	1	1	1	1	1		1	1			2		
			3GR ⇔ 4GR			2	1	1	1	1	1	1		1	1			2		
			4GR ⇔ 5GR			2	1	1	1	1	1	1		1	1			2		
			5GR ⇔ 6GR			2	1	1	1	1	1	1		1	1			2		
			6GR ⇔ 7GR			2	1	1	1	1	1	1		1	1			2		

\*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to [TM-16. "Cross-Sectional View"](#).

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# SYSTEM SYMPTOM

< SYMPTOM DIAGNOSIS >

[7AT: RE7R01A]

Symptom				Diagnostic item															
				Oil pump	Torque converter	Low brake*	Front brake	High and low reverse clutch	Input clutch	Direct clutch	2346 brake	Reverse brake	1st one-way clutch	2nd one-way clutch	gear	control valve	Parking component		
				TM-285	TM-225	TM-225	TM-225	TM-30Z	TM-297	TM-310	TM-285	TM-225	TM-225	TM-302	TM-225	TM-181	TM-186 (2WD) TM-225 (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		
				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

# SYSTEM SYMPTOM

< SYMPTOM DIAGNOSIS >

[7AT: RE7R01A]

Symptom			Diagnostic item														
			Oil pump	Torque converter	Low brake*	Front brake	High and low reverse clutch	Input clutch	Direct clutch	2346 brake	Reverse brake	1st one-way clutch	2nd one-way clutch	gear	control valve	Parking component	
			<a href="#">TM-285</a>	<a href="#">TM-225</a>	<a href="#">TM-225</a>	<a href="#">TM-225</a>	<a href="#">TM-307</a>	<a href="#">TM-297</a>	<a href="#">TM-310</a>	<a href="#">TM-285</a>	<a href="#">TM-225</a>	<a href="#">TM-225</a>	<a href="#">TM-302</a>	<a href="#">TM-225</a>	<a href="#">TM-181</a>	<a href="#">TM-186 (2WD)</a> <a href="#">TM-225 (AWD)</a>	
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	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	1	2	1
		Extremely large creep.		1													

\*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to [TM-16, "Cross-Sectional View"](#).

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# SYSTEM SYMPTOM

< SYMPTOM DIAGNOSIS >

[7AT: RE7R01A]

Symptom			Diagnostic item													
			Oil pump <a href="#">TM-285</a>	Torque converter <a href="#">TM-225</a>	Low brake* <a href="#">TM-225</a>	Front brake <a href="#">TM-225</a>	High and low reverse clutch <a href="#">TM-307</a>	Input clutch <a href="#">TM-297</a>	Direct clutch <a href="#">TM-310</a>	2346 brake <a href="#">TM-285</a>	Reverse brake <a href="#">TM-225</a>	gear <a href="#">TM-225</a>	1st one-way clutch <a href="#">TM-302</a>	2nd one-way clutch <a href="#">TM-225</a>	control valve <a href="#">TM-181</a>	Parking component <a href="#">TM-186 (2WD)</a> <a href="#">TM-225 (AWD)</a>
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												
	Poor operation	Engine starts in position other than "N" or "P".														
		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	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-16. "Cross-Sectional View"](#).



# PERIODIC MAINTENANCE

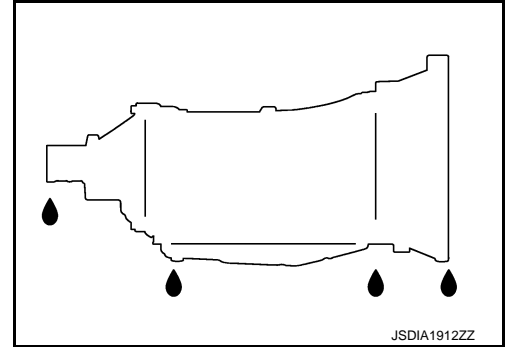
## A/T FLUID

### Inspection

INFOID:000000007134321

#### 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-90. "Adjustment"](#).



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# A/T SHIFT SELECTOR

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

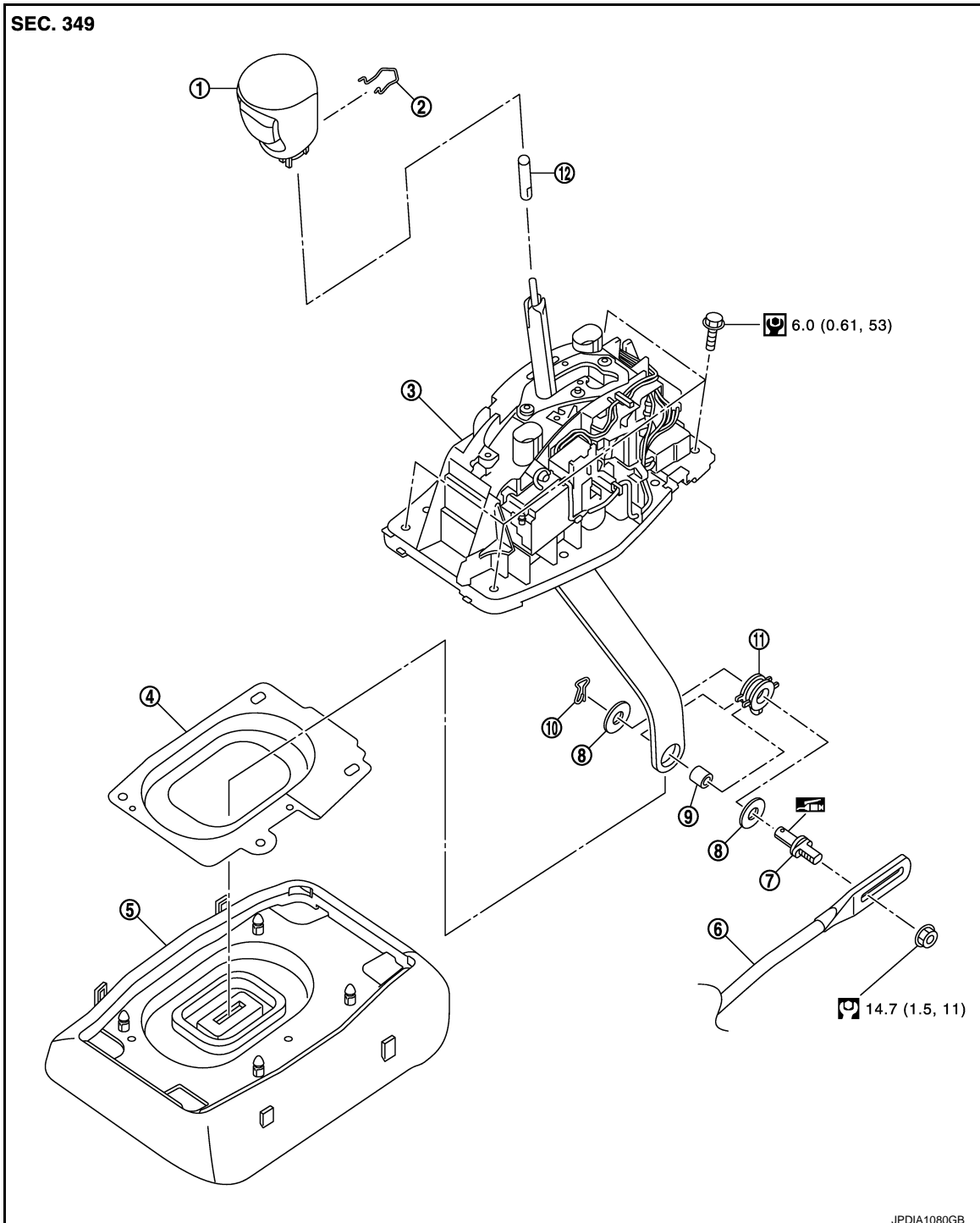
## REMOVAL AND INSTALLATION

### A/T SHIFT SELECTOR

2WD

2WD : Exploded View

INFOID:000000006884115




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

# A/T SHIFT SELECTOR

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

 : Apply multi-purpose grease.

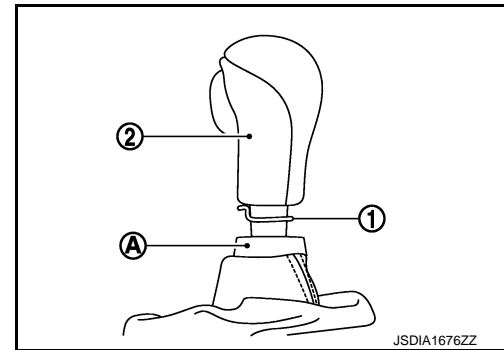
Refer to [GI-4, "Components"](#) for symbols in the figure.

## 2WD : Removal and Installation

INFOID:000000006884116

### REMOVAL

1. Shift the selector lever to "P" position.
2. Remove control rod from A/T shift selector assembly.
3. Shift the selector lever to "M" position.
4. Remove knob cover (A) below selector lever downward.
5. Pull lock pin (1) out of selector lever knob (2).
6. Remove selector lever knob.
7. Remove center console assembly. Refer to [IP-23, "Exploded View"](#).
8. Shift the selector lever to "P" position.
9. Disconnect A/T shift selector connector.
10. Remove A/T shift selector assembly mounting bolts.
11. Remove harness from A/T shift selector assembly.
12. Remove A/T shift selector assembly from the vehicle.
13. Remove snap pin, washers, insulator, collar and pivot pin from A/T shift selector assembly.
14. Remove dust cover and dust cover plate from A/T shift selector assembly.
15. Remove adapter from A/T shift selector assembly.



### INSTALLATION

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

#### CAUTION:

- Apply multi-purpose grease on the pin surface (that slides after installing a collar) of the pivot pin.
- Apply multi-purpose grease on the surface that the shift lock unit plate slides vertically.
- Refer to the followings when installing the selector lever knob to the A/T shift selector assembly.
  1. Install the lock pin to the selector lever knob.
  2. Insert the shift lever knob into the shift lever until it clicks.

#### CAUTION:

- Install it straight, and never tap or apply any shock to install it.
- Never press selector button.

## 2WD : Inspection and Adjustment

INFOID:000000006884117

### INSPECTION AFTER INSTALLATION

Check A/T positions after adjusting A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).

### ADJUSTMENT AFTER INSTALLATION

Adjust A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).

### AWD

# A/T SHIFT SELECTOR

< REMOVAL AND INSTALLATION >

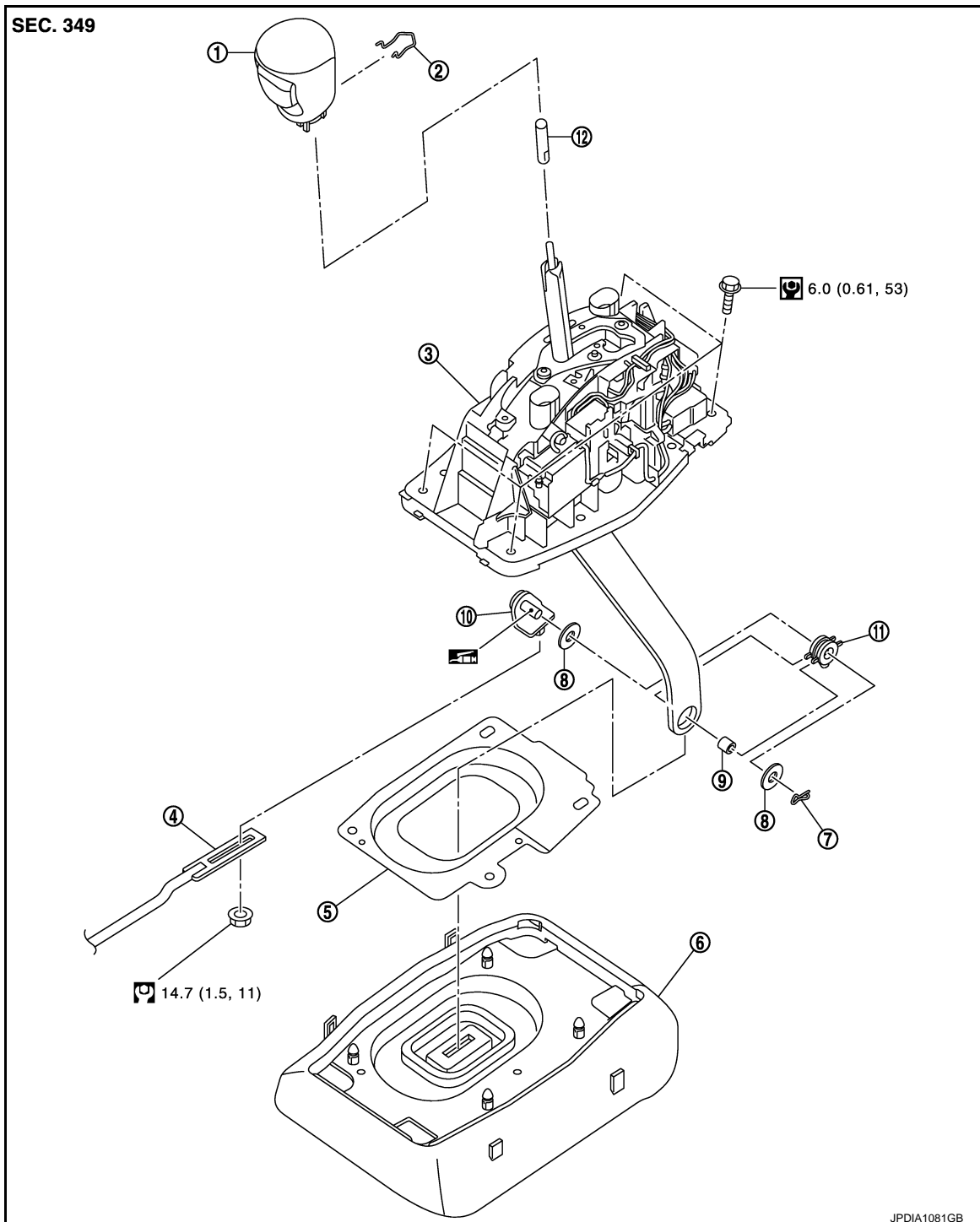
[7AT: RE7R01A]

AWD : Exploded View


INFOID:000000006884118

VQ37VHR models

SEC. 349



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

 : Apply multi-purpose grease.

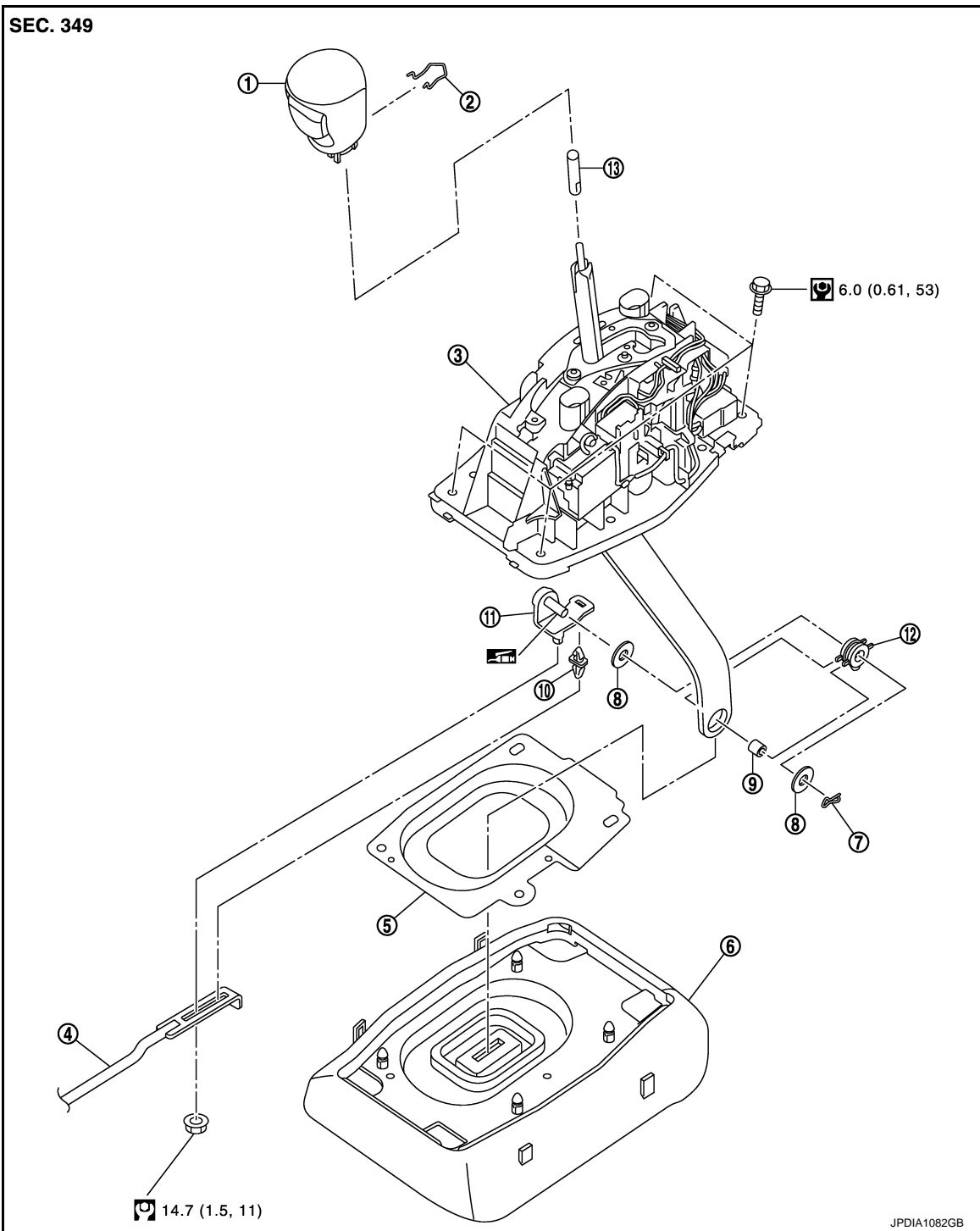
Refer to [GI-4, "Components"](#) for symbols in the figure.

# A/T SHIFT SELECTOR

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

VK56VD models



- |                        |                     |                                |
|------------------------|---------------------|--------------------------------|
| 1. Selector lever knob | 2. Lock pin         | 3. A/T shift selector assembly |
| 4. Control rod         | 5. Dust cover plate | 6. Dust cover                  |
| 7. Snap pin            | 8. Washer           | 9. Collar                      |
| 10. Clip               | 11. Pivot pin       | 12. Insulator                  |
| 13. Adapter            |                     |                                |

: Apply multi-purpose grease.

Refer to [GI-4, "Components"](#) for symbols in the figure.

## AWD : Removal and Installation

INFOID:000000006884119

### REMOVAL

Revision: 2013 September

TM-177

2012 M

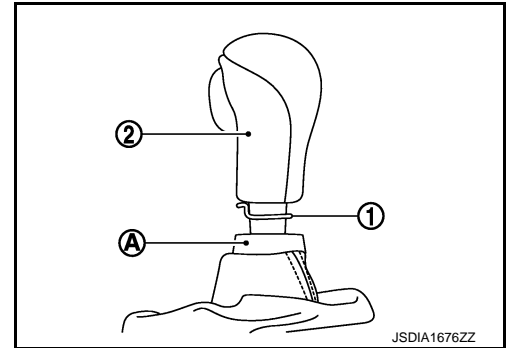
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# A/T SHIFT SELECTOR

[7AT: RE7R01A]

## < REMOVAL AND INSTALLATION >

1. Shift the selector lever to "P" position.
2. Remove control rod from A/T shift selector assembly.
3. Shift the selector lever to "M" position.
4. Remove knob cover (A) below selector lever downward.
5. Pull lock pin (1) out of selector lever knob (2).
6. Remove selector lever knob.
7. Remove center console assembly. Refer to [IP-23. "Exploded View"](#).
8. Shift the selector lever to "P" position.
9. Disconnect A/T shift selector connector.
10. Remove A/T shift selector assembly mounting bolts.
11. Remove harness from A/T shift selector assembly.
12. Remove A/T shift selector assembly from the vehicle.
13. Remove snap pin, washers, insulator, collar and pivot pin from A/T shift selector assembly.
14. Remove dust cover and dust cover plate from A/T shift selector assembly.
15. Remove adapter from A/T shift selector assembly.



## INSTALLATION

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

### CAUTION:

- Apply multi-purpose grease on the pin surface (that slides after installing a collar) of the pivot pin.
  - Apply multi-purpose grease on the surface that the shift lock unit plate slides vertically.
- Refer to the followings when installing the selector lever knob to the A/T shift selector assembly.
1. Install the lock pin to the selector lever knob.
  2. Insert the shift lever knob into the shift lever until it clicks.

### CAUTION:

- Install it straight, and never tap or apply any shock to install it.
- Never press selector button.

## AWD : Inspection and Adjustment

INFOID:000000006884120

## INSPECTION AFTER INSTALLATION

Check A/T positions after adjusting A/T positions. Refer to [TM-96. "Inspection and Adjustment"](#).

## ADJUSTMENT AFTER INSTALLATION

Adjust A/T positions. Refer to [TM-96. "Inspection and Adjustment"](#).

# CONTROL ROD

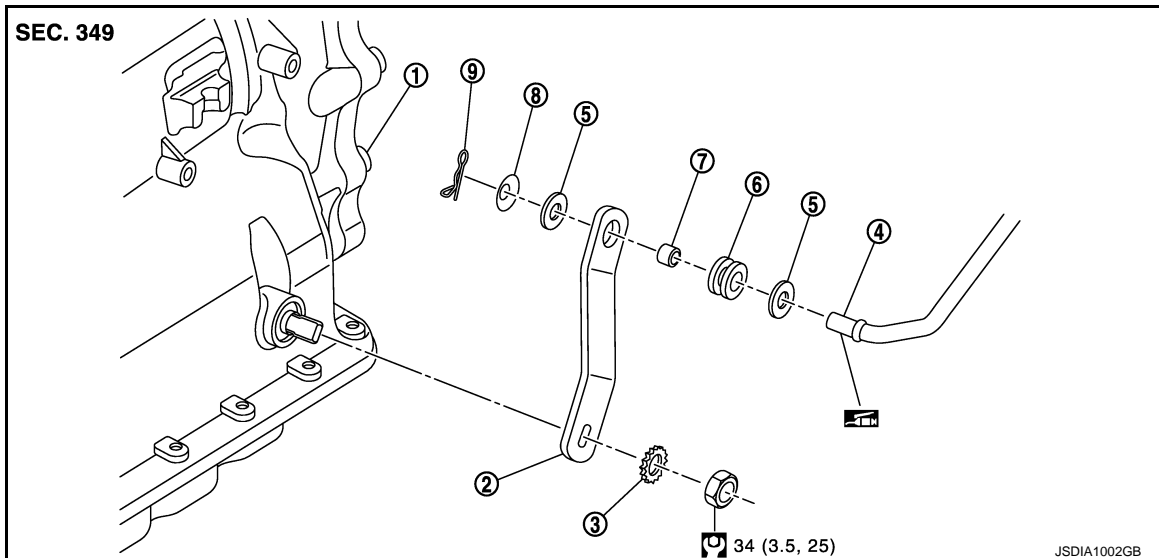
< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]


## CONTROL ROD

### Exploded View

INFOID:000000006884121



- |                 |                   |                |
|-----------------|-------------------|----------------|
| 1. A/T assembly | 2. Manual lever   | 3. Lock washer |
| 4. Control rod  | 5. Washer         | 6. Insulator   |
| 7. Collar       | 8. Conical washer | 9. Snap pin    |

 : Apply multi-purpose grease.

Refer to [GI-4, "Components"](#) for symbols in the figure.

## Removal and Installation

INFOID:000000006884122

### REMOVAL

1. Shift the selector lever to "P" position.
2. Remove control rod from A/T shift selector assembly. Refer to [TM-174, "2WD : Exploded View"](#) (2WD) or [TM-176, "AWD : Exploded View"](#) (AWD).
3. Remove manual lever from A/T assembly.
4. Remove control rod from manual lever.
5. Remove insulator and collar from manual lever.

### INSTALLATION

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

#### **CAUTION:**

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

### Inspection

INFOID:000000006884123

### INSPECTION AFTER INSTALLATION

Check A/T positions after adjusting A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).

### ADJUSTMENT AFTER INSTALLATION

Adjust A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).

# PADDLE SHIFTER

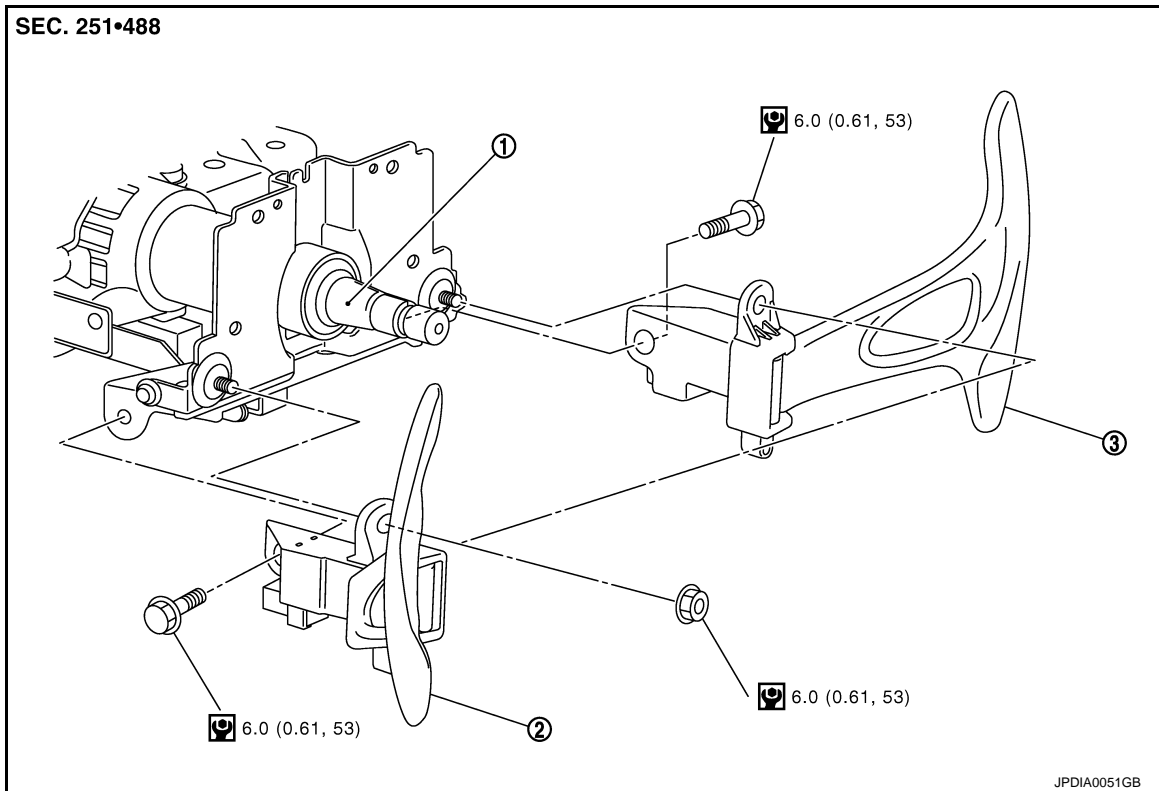
< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

## PADDLE SHIFTER

Exploded View

INFOID:000000006884124



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

Refer to [GI-4, "Components"](#) for symbols in the figure.

## Removal and Installation

INFOID:000000006884125

### REMOVAL

1. Remove steering column cover. Refer to [IP-12, "Exploded View"](#).
2. Disconnect paddle shifter connectors from each paddle shifter.
3. Remove paddle shifter mounting bolts and nuts.
4. Remove each paddle shifter from steering column assembly.

### INSTALLATION

Install in the reverse order of removal.



# CONTROL VALVE & TCM

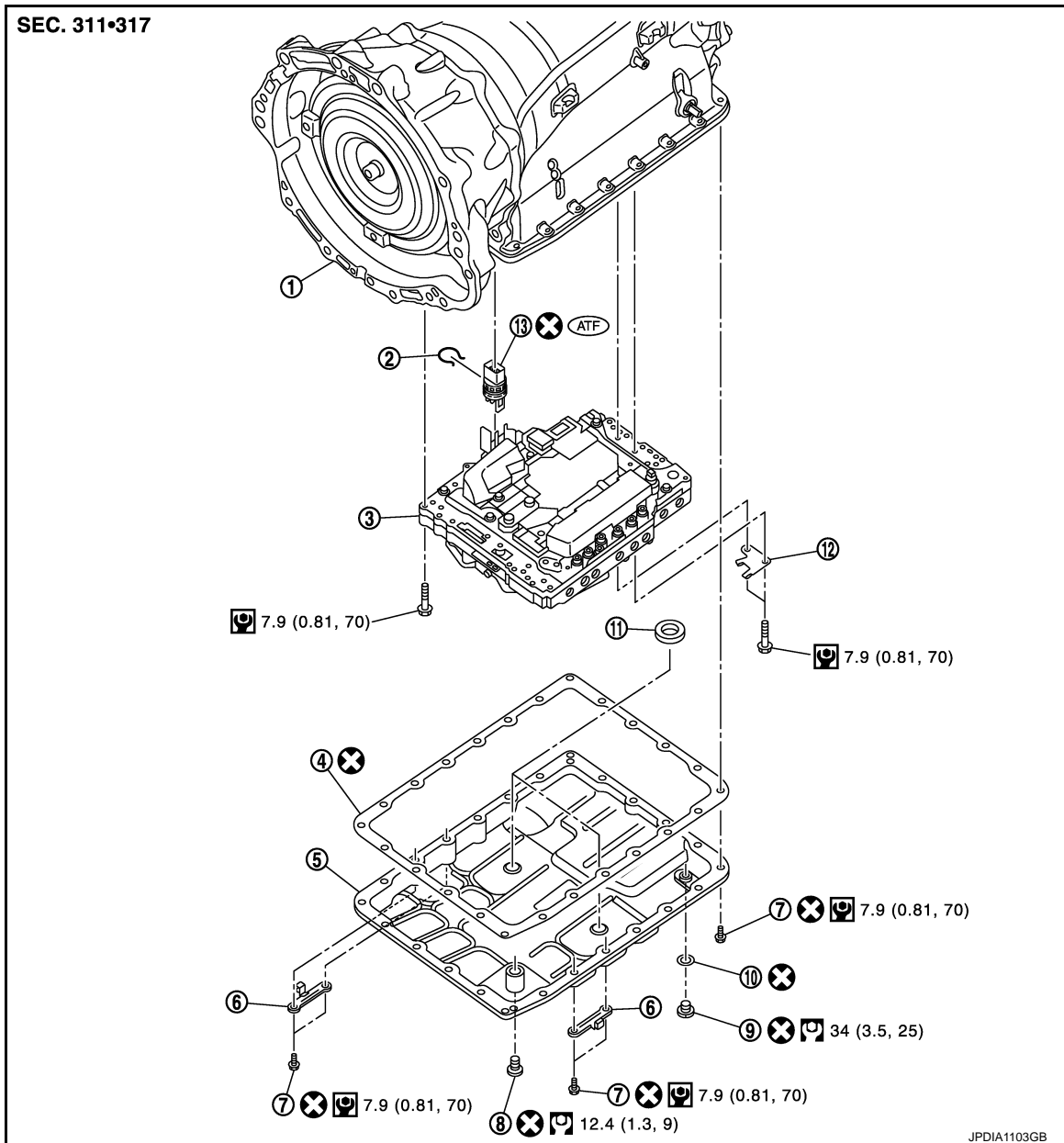
< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

## CONTROL VALVE & TCM

### Exploded View

INFOID:000000007134302



- |                          |                  |                        |
|--------------------------|------------------|------------------------|
| 1. A/T                   | 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      |                  |                        |

Refer to [GI-4, "Components"](#) for symbols in the figure.

### Removal and Installation

INFOID:000000007134303

#### REMOVAL

1. Drain ATF through drain plug.
2. Remove exhaust mounting bracket with power tool. Refer to [EX-5, "VQ37VHR : Exploded View"](#) (VQ37VHR) or [EX-7, "VK56VD : Exploded View"](#) (VK56VD).

# CONTROL VALVE & TCM

## < REMOVAL AND INSTALLATION >

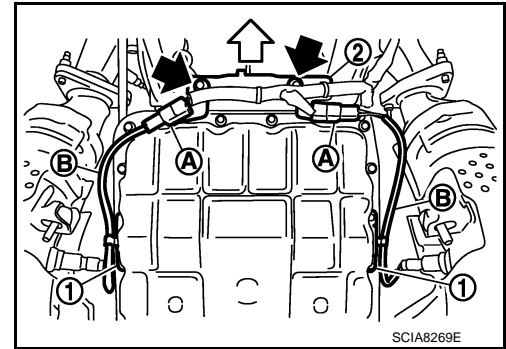
[7AT: RE7R01A]

3. Disconnect heated oxygen sensor 2 connectors (A).

⇐ : Vehicle front

← : Bolt

4. Remove heated oxygen sensor 2 harness (B) from clips (1).  
5. Remove bracket (2) from A/T assembly. Refer to [TM-213](#), "[VQ37VHR \(2WD\) : Exploded View](#)" (VQ37VHR) or [TM-219](#), "[VK56VD \(2WD\) : Exploded View](#)" (VK56VD).

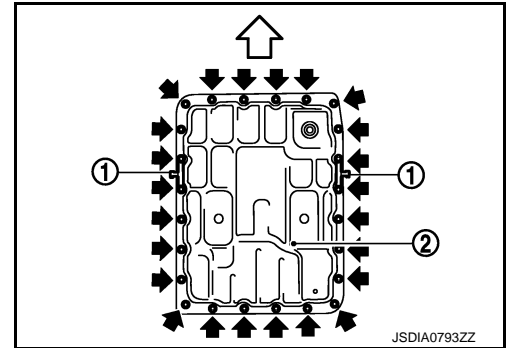


6. Remove clips (1).

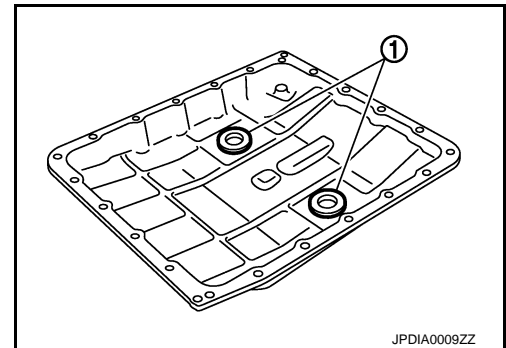
⇐ : Vehicle front

← : Oil pan mounting bolt

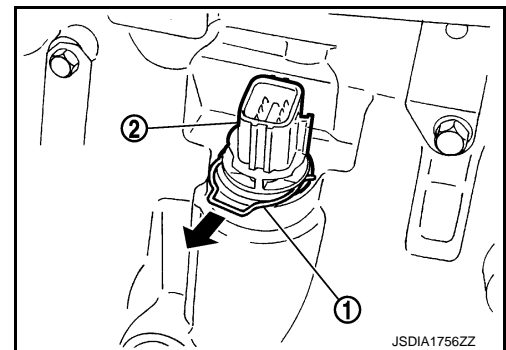
7. Remove oil pan (2) and oil pan gasket.



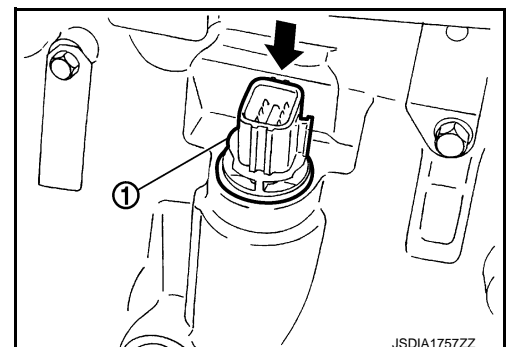
8. Remove magnets (1) from oil pan.



9. Remove snap ring (1) from joint connector (2).



10. Push joint connector (1).



# CONTROL VALVE & TCM

[7AT: RE7R01A]

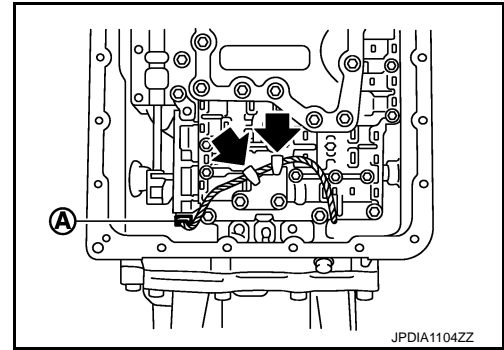
## < REMOVAL AND INSTALLATION >

11. Disconnect output speed sensor connector (A).

**CAUTION:**

**Be careful not to damage connector.**

12. Disengage terminal clip (◄).

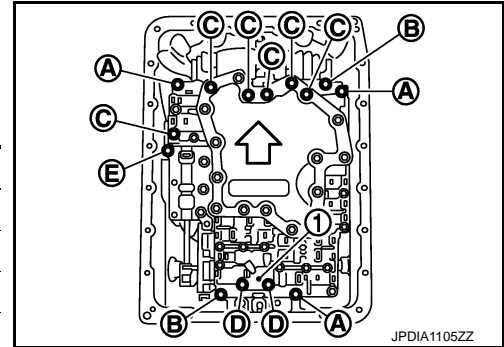


13. Remove bolts and clip (1) from the control valve & TCM.

◄ : Vehicle front

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

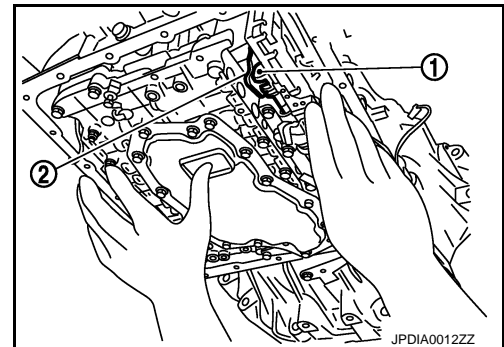
\*: Reamer bolt



14. 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.**

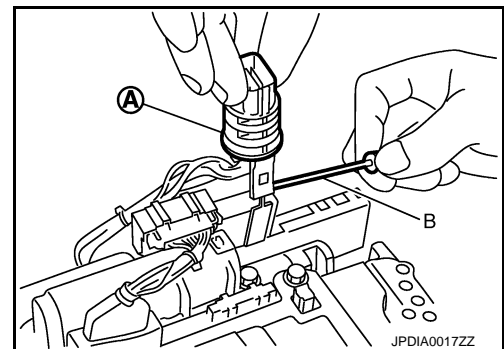


15. Remove joint connector (A) from the control valve & TCM using a flat-bladed screwdriver (B).

16. 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.

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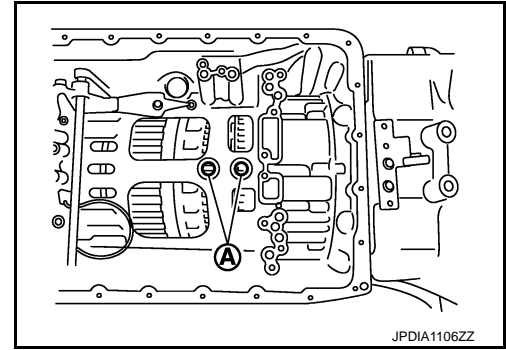
# CONTROL VALVE & TCM

< REMOVAL AND INSTALLATION >

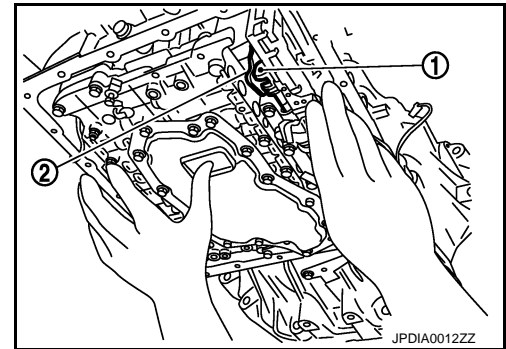
[7AT: RE7R01A]

**CAUTION:**

- Make sure that input speed sensor securely installs input speed sensor holes (A).
- 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 (E) to the specified torque before tightening the other than bolts.

← : Vehicle front

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

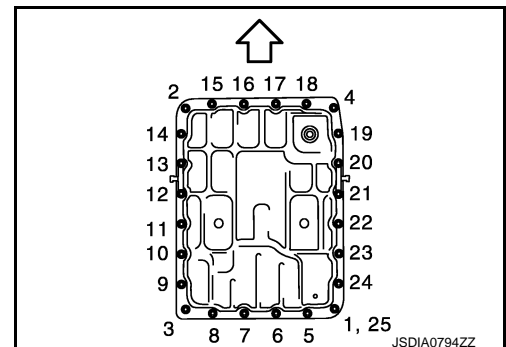
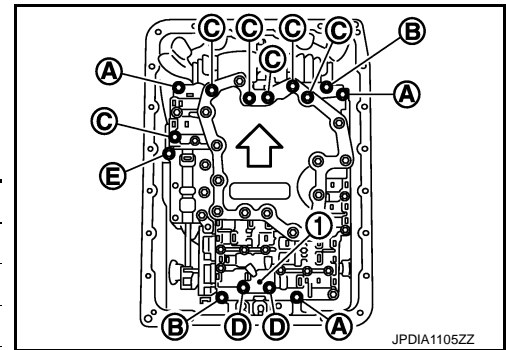
\*: Reamer bolt

- 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



# CONTROL VALVE & TCM

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

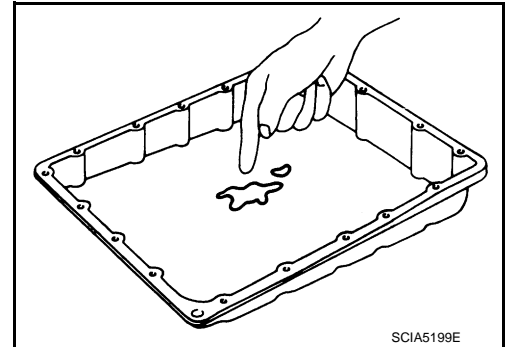
INFOID:000000007134304

## Inspection and Adjustment

### 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-92. "Cleaning"](#).



### INSPECTION AFTER INSTALLATION

Check A/T fluid leakage. Refer to [TM-173. "Inspection"](#).

### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to [TM-90. "Adjustment"](#).
- Perform G sensor calibration when replacing control valve & TCM. Refer to [TM-87. "Special Repair Requirement"](#).

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# PARKING COMPONENTS

< REMOVAL AND INSTALLATION >

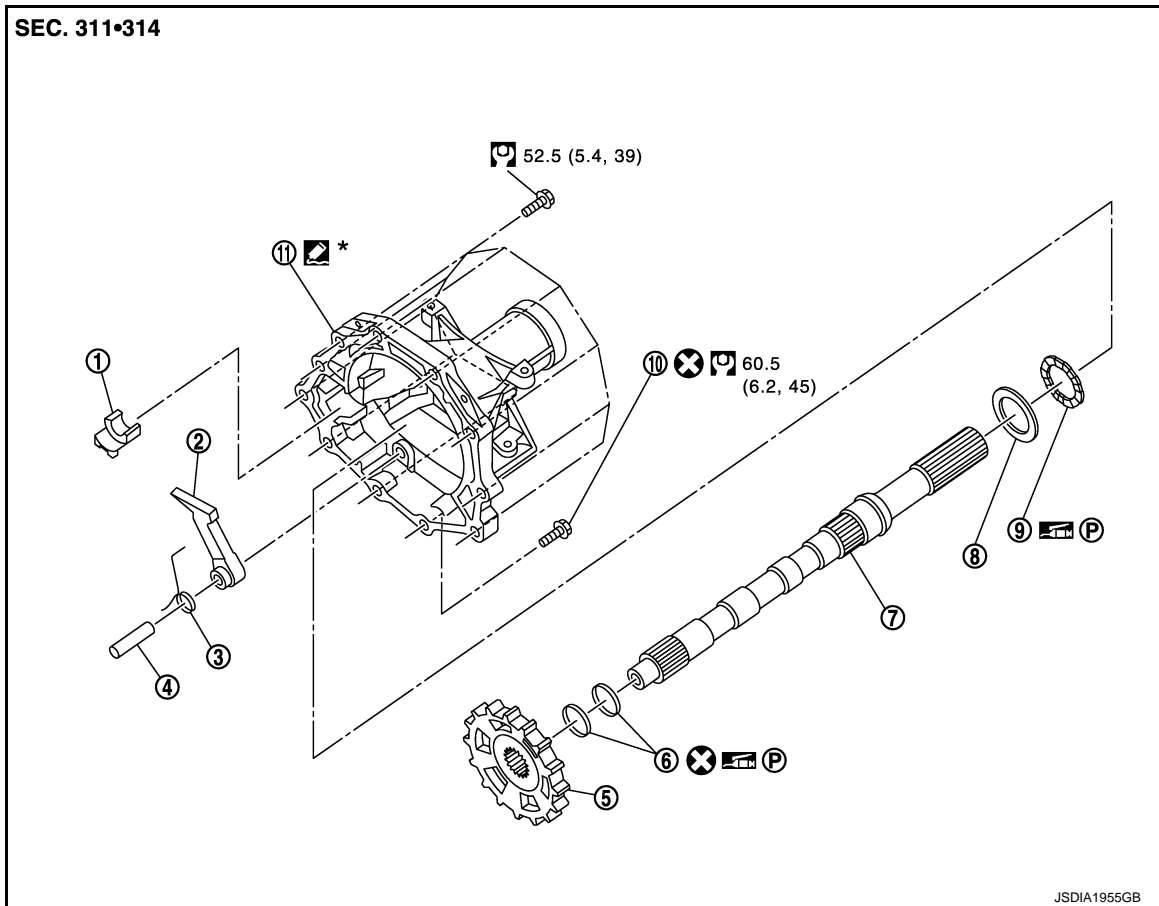
[7AT: RE7R01A]

## PARKING COMPONENTS

2WD

2WD : Exploded View

INFOID:000000007134305



- |                             |                    |                   |
|-----------------------------|--------------------|-------------------|
| 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 |                   |

\*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).  
Refer to [GI-4, "Components"](#) for symbols not described on the above.

## 2WD : Removal and Installation

INFOID:000000007134306

### REMOVAL

1. Drain ATF through drain plug.
2. Remove exhaust front tube and center muffler with power tool. Refer to [EX-5, "VQ37VHR : Exploded View"](#) (VQ37VHR) or [EX-7, "VK56VD : Exploded View"](#) (VK56VD).
3. Separate propeller shaft assembly. Refer to [DLN-97, "Exploded View"](#).
4. Remove control rod. Refer to [TM-179, "Exploded View"](#).
5. Support A/T assembly with a transmission jack.  
**CAUTION:**  
**When setting transmission jack, be careful not to allow it to collide against the drain plug.**
6. Remove rear engine mounting member with power tool. Refer to [EM-71, "2WD : Exploded View"](#) (VQ37VHR) or [EM-212, "2WD : Exploded View"](#) (VK56VD).

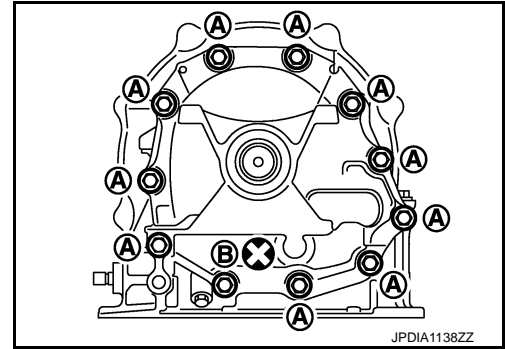
# PARKING COMPONENTS

## < REMOVAL AND INSTALLATION >

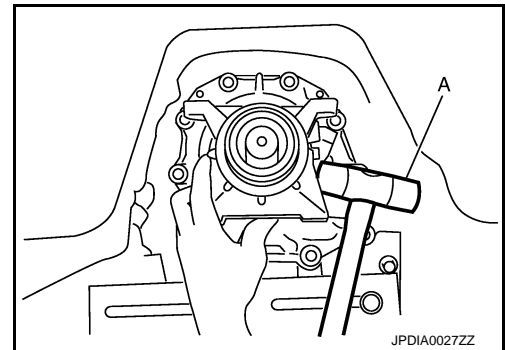
[7AT: RE7R01A]

- Remove engine mounting insulator (rear). Refer to [EM-71, "2WD : Exploded View"](#) (VQ37VHR) or [EM-212, "2WD : Exploded View"](#) (VK56VD).
- Remove tightening bolts for rear extension assembly and transmission case.

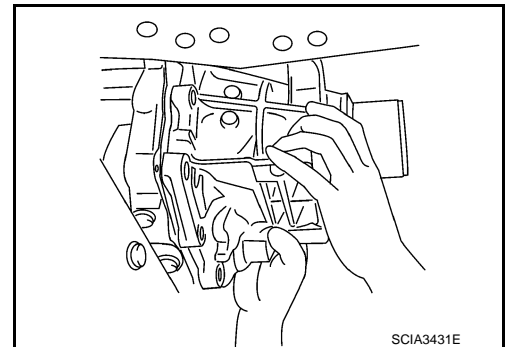
- A : Bolt
- B : Self-sealing bolt



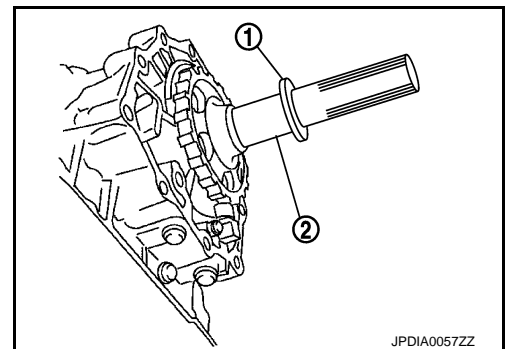
- Tap rear extension assembly with a soft hammer (A).  
**CAUTION:**  
Be careful not to damage adapter case.



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



- Remove bearing race (1) from output shaft (2).



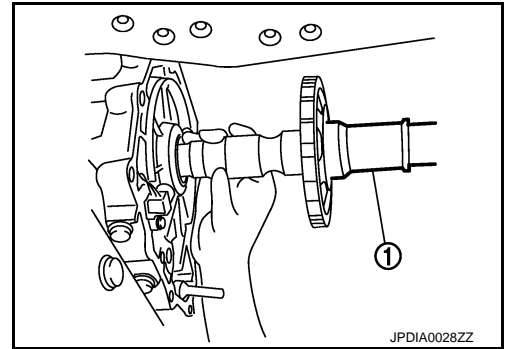
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# PARKING COMPONENTS

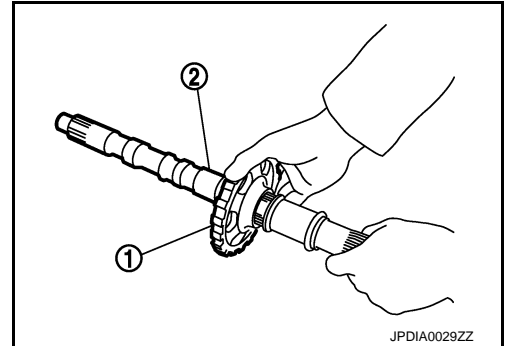
## < REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

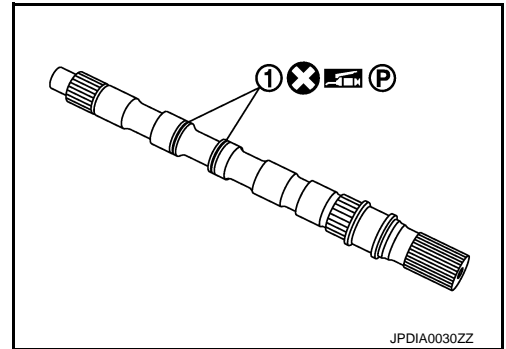
12. Remove output shaft (1) from transmission case by rotating left/right.



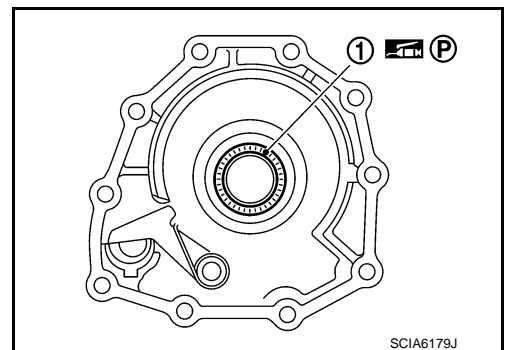
13. Remove parking gear (1) from output shaft (2).



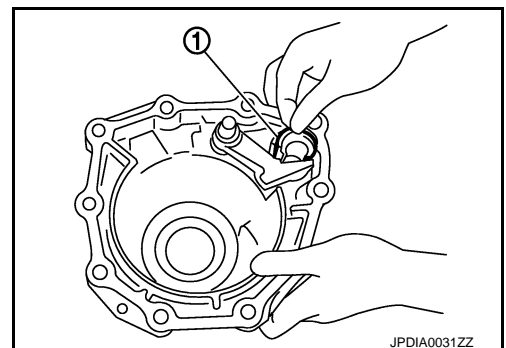
14. Remove seal rings (1) from output shaft.



15. Remove needle bearing (1) from rear extension.



16. Remove parking actuator support (1) from rear extension.



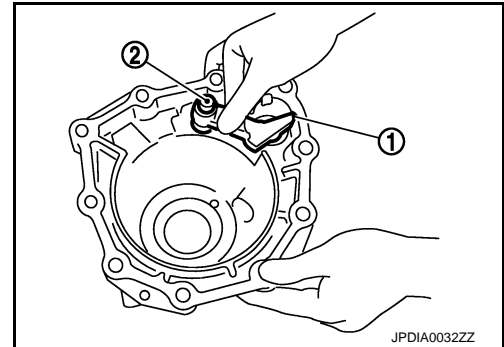


# PARKING COMPONENTS

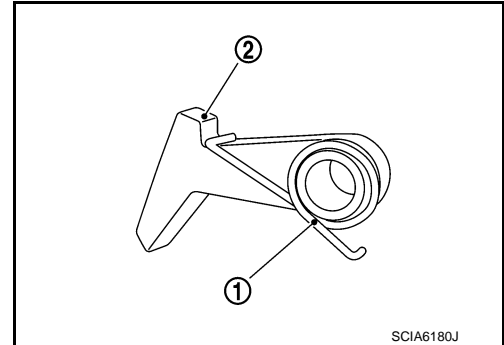
## < REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

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



18. 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 [GL-22](#), "Recommended Chemical Products and Sealants".

**Sealant starting point and end-point (A)** : Start and finish point shall be in the center of two bolts.

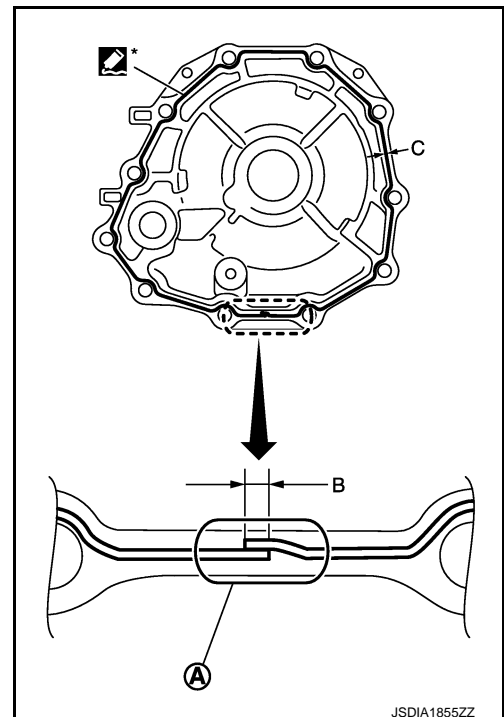
**Overlap width of sealant starting point and end-point (B)** : 3 – 5 mm (0.12 – 0.20 in)

**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.



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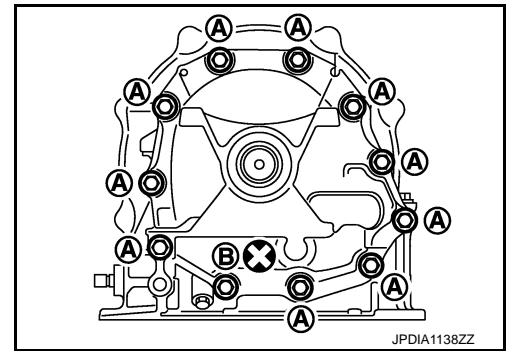
# PARKING COMPONENTS

## < REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

- Tighten rear extension assembly bolts to the specified torque.

- A : Bolt
- B : Self-sealing bolt

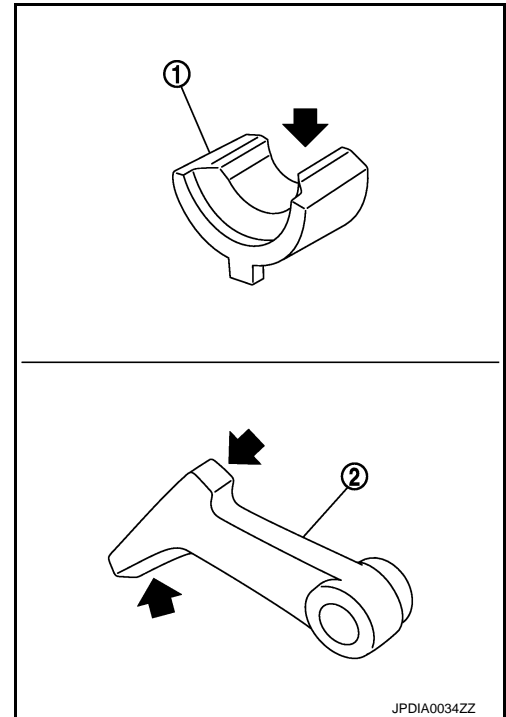


## 2WD : Inspection and Adjustment

INFOID:000000007134307

### 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.



### INSPECTION AFTER INSTALLATION

- Check A/T fluid leakage. Refer to [TM-173, "Inspection"](#).
- Check A/T positions after adjusting A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).

### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).
- Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).

# REAR OIL SEAL

< REMOVAL AND INSTALLATION >

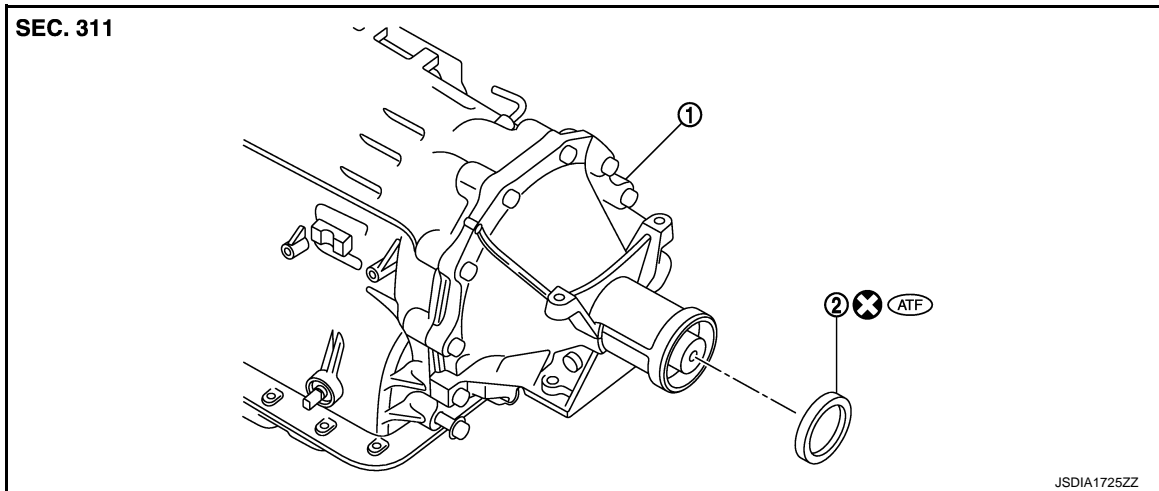
[7AT: RE7R01A]

## REAR OIL SEAL

2WD

2WD : Exploded View

INFOID:000000007134308



1. A/T
2. Rear oil seal

Refer to [GI-4, "Components"](#) for symbols in the figure.

## 2WD : Removal and Installation

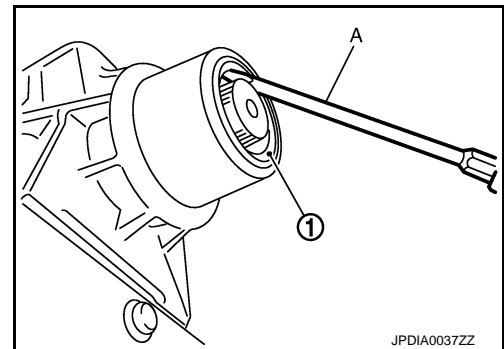
INFOID:000000007134309

### REMOVAL

1. Separate propeller shaft assembly. Refer to [DLN-97, "Exploded View"](#).
2. Remove rear oil seal (1) using a flat-bladed screwdriver (A).

**CAUTION:**

**Be careful not to scratch rear extension assembly.**



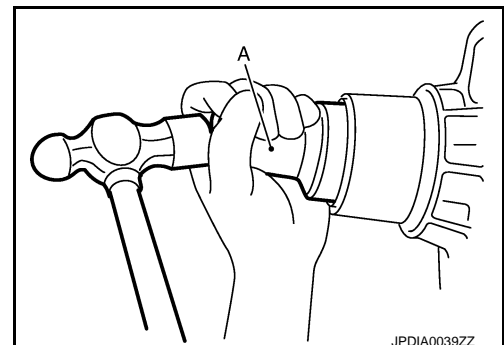
### INSTALLATION

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.



# REAR OIL SEAL

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

2WD : Inspection

INFOID:000000007134310

## INSPECTION AFTER INSTALLATION

Check A/T fluid leakage. Refer to [TM-173, "Inspection"](#).

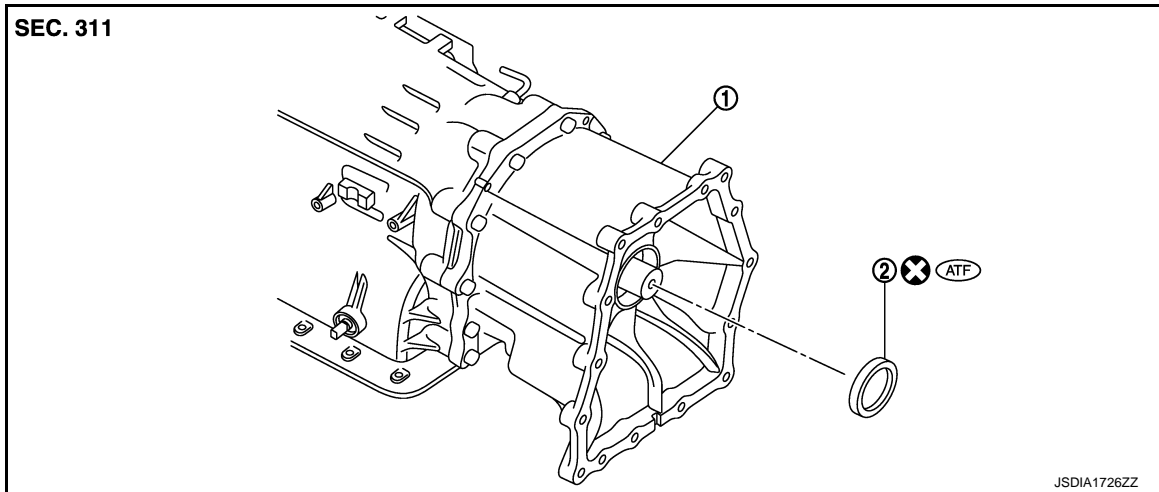
## ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).

AWD

AWD : Exploded View

INFOID:000000007134311



1. A/T
2. Rear oil seal

Refer to [GI-4, "Components"](#) for symbols in the figure.

AWD : Removal and Installation

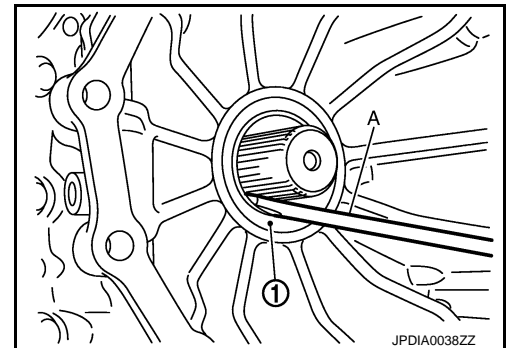
INFOID:000000007134312

## REMOVAL

1. Remove transfer assembly from A/T assembly. Refer to [DLN-59, "VQ37VHR : Exploded View"](#) (VQ37VHR) or [DLN-61, "VK56VD : Exploded View"](#) (VK56VD).
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.

## REAR OIL SEAL

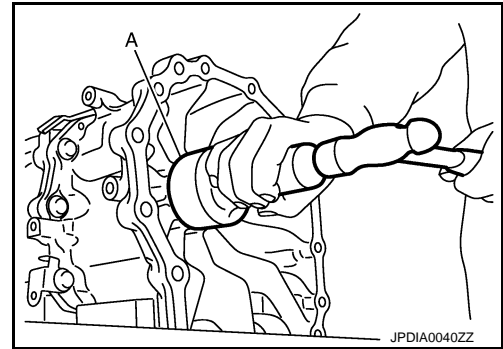
### < REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

- 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

#### INSPECTION AFTER INSTALLATION

Check A/T fluid leakage. Refer to [TM-173, "Inspection"](#).

#### ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).

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# OUTPUT SPEED SENSOR

< REMOVAL AND INSTALLATION >

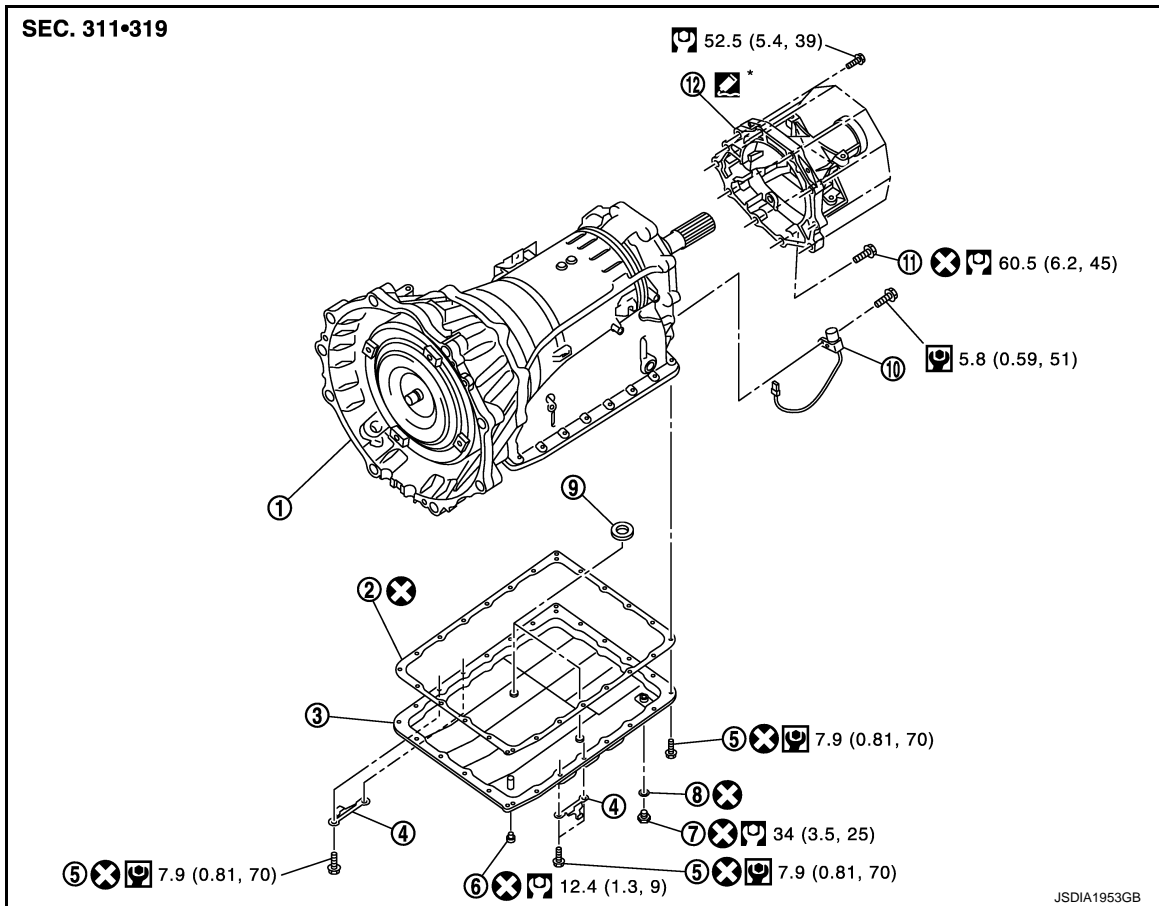
[7AT: RE7R01A]

## OUTPUT SPEED SENSOR

2WD

2WD : Exploded View

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- |                          |                       |                        |
|--------------------------|-----------------------|------------------------|
| 1. A/T                   | 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 |                        |

\*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

Refer to [GI-4, "Components"](#) for symbols not described on the above.

## 2WD : Removal and Installation

INFOID:000000007134315

### REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Drain ATF through drain plug.
3. Remove exhaust front tube and center muffler with power tool. Refer to [EX-5, "VQ37VHR : Exploded View"](#) (VQ37VHR) or [EX-7, "VK56VD : Exploded View"](#) (VK56VD).
4. Separate propeller shaft assembly. Refer to [DLN-97, "Exploded View"](#).
5. Remove control rod. Refer to [TM-179, "Exploded View"](#).
6. Remove exhaust mounting bracket. Refer to [EX-5, "VQ37VHR : Exploded View"](#) (VQ37VHR) or [EX-7, "VK56VD : Exploded View"](#) (VK56VD).

# OUTPUT SPEED SENSOR

## < REMOVAL AND INSTALLATION >

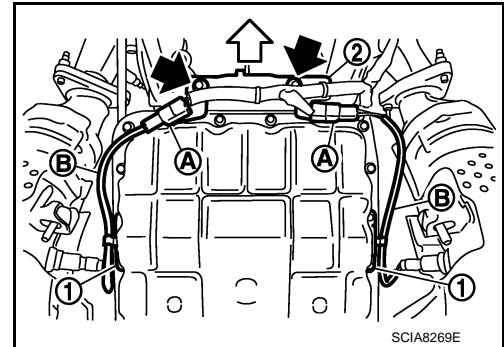
[7AT: RE7R01A]

7. Disconnect heated oxygen sensor 2 harness connectors (A).

↔ : Vehicle front

← : Bolt

8. Remove heated oxygen sensor 2 harness (B) from clips (1).  
 9. Remove bracket (2) from transmission assembly. Refer to [TM-213. "VQ37VHR \(2WD\) : Exploded View"](#) (VQ37VHR) or [TM-219. "VK56VD \(2WD\) : Exploded View"](#) (VK56VD).



10. Remove clips (1).

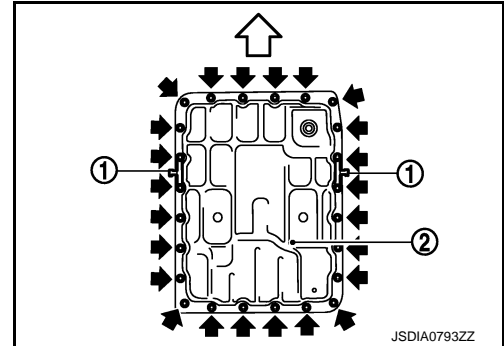
↔ : Vehicle front

← : Oil pan mounting bolt

11. Remove oil pan (2) and oil pan gasket.  
 12. Support A/T assembly with a transmission jack.

**CAUTION:**

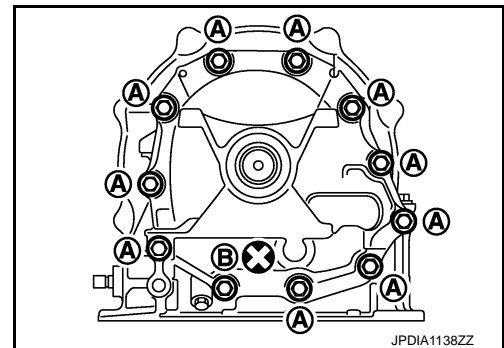
**When setting transmission jack, place wooden blocks to prevent from damaging control valve & TCM and transmission case.**



13. Remove rear engine mounting member with power tool. Refer to [EM-71. "2WD : Exploded View"](#) (VQ37VHR) or [EM-212. "2WD : Exploded View"](#) (VK56VD).  
 14. Remove engine mounting insulator (rear). Refer to [EM-71. "2WD : Exploded View"](#) (VQ37VHR) or [EM-212. "2WD : Exploded View"](#) (VK56VD).  
 15. Remove tightening bolts for rear extension assembly and transmission case.

A : Bolt

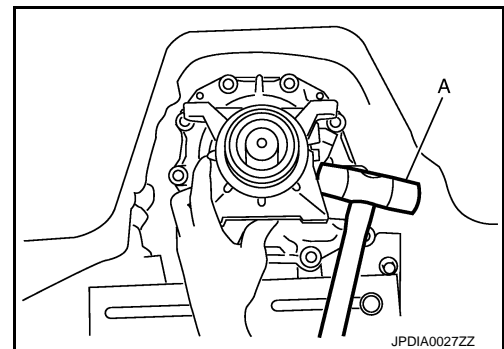
B : Self-sealing bolt



16. Tap rear extension assembly with a soft hammer (A).

**CAUTION:**

**Be careful not to damage adapter case.**

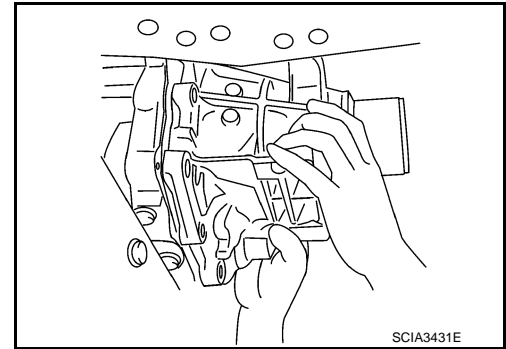


# OUTPUT SPEED SENSOR

## < REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

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

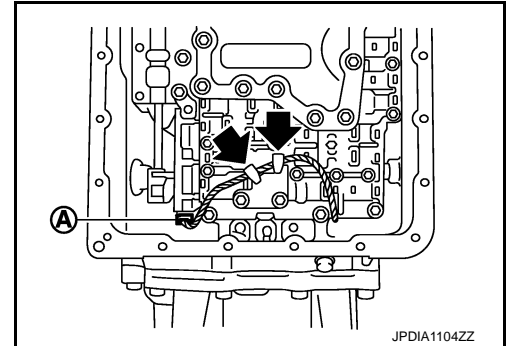


18. Disconnect output speed sensor connector (A).

**CAUTION:**

**Be careful not to damage connector**

19. Disengage terminal clips (←).

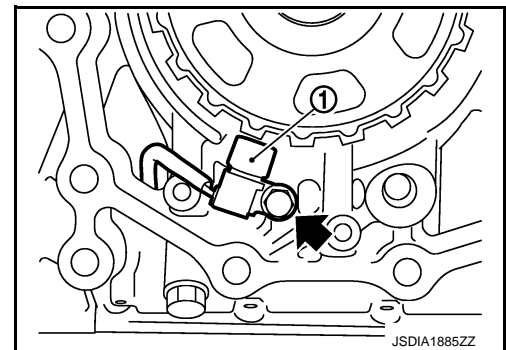


20. Remove output speed sensor (1) from transmission case.

← : 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.



# OUTPUT SPEED SENSOR

[7AT: RE7R01A]

## < REMOVAL AND INSTALLATION >

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



: Genuine Anaerobic Liquid Gasket or equivalent. Refer to [GL-22, "Recommended Chemical Products and Sealants"](#).

**Sealant starting point and end-point (A) :** Start and finish point shall be in the center of two bolts.

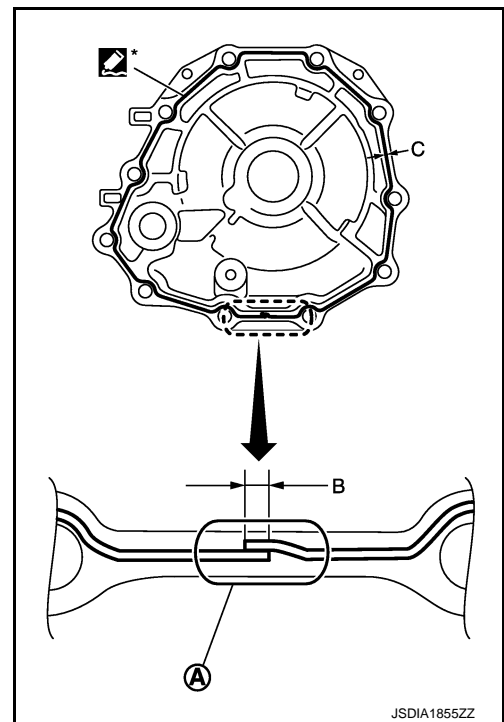
**Overlap width of sealant starting point and end-point (B) :** 3 – 5 mm (0.12 – 0.20 in)

**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:**

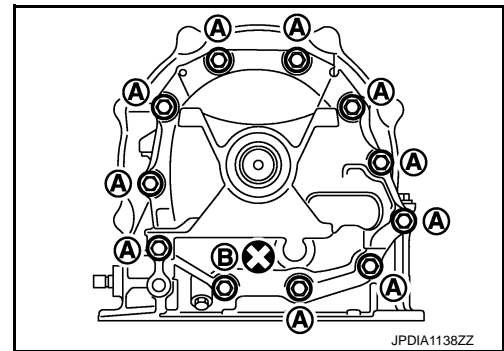
Completely remove all moisture, oil and old sealant, etc. from transmission case and rear extension assembly mounting surfaces.



JSDIA185ZZ

- Tighten rear extension assembly bolts to the specified torque.

- A : Bolt
- B : Self-sealing bolt



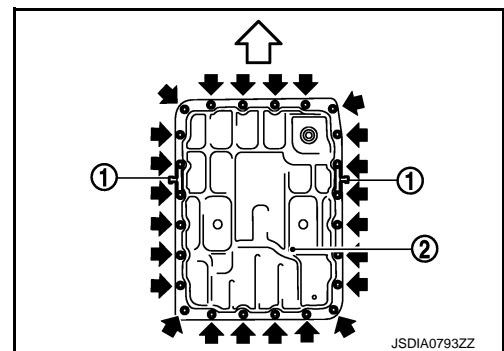
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- Refer to the followings when installing oil pan (2) (with oil pan gasket) and clips (1) to transmission case.

- ⇐ : 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.



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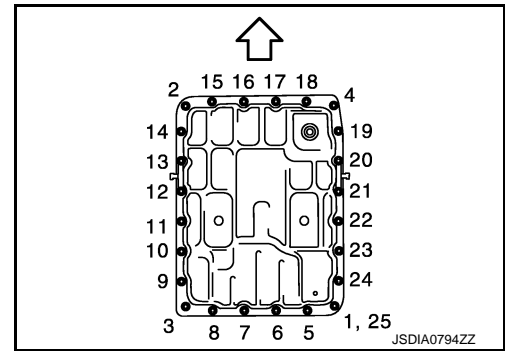
# OUTPUT SPEED SENSOR

## < REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

- 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



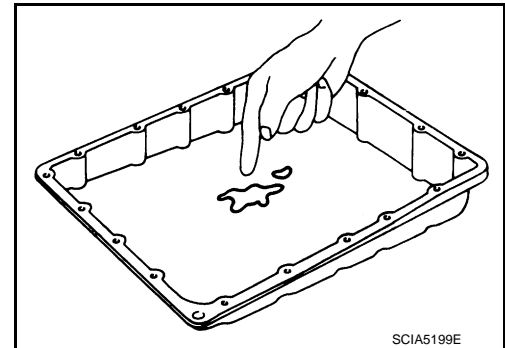
## 2WD : Inspection

INFOID:000000007134316

### 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-92, "Cleaning"](#).



### INSPECTION AFTER INSTALLATION

- Check A/T fluid leakage. Refer to [TM-173, "Inspection"](#).
- Check A/T positions after adjusting A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).

### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).
- Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).

# AIR BREATHER HOSE

< REMOVAL AND INSTALLATION >

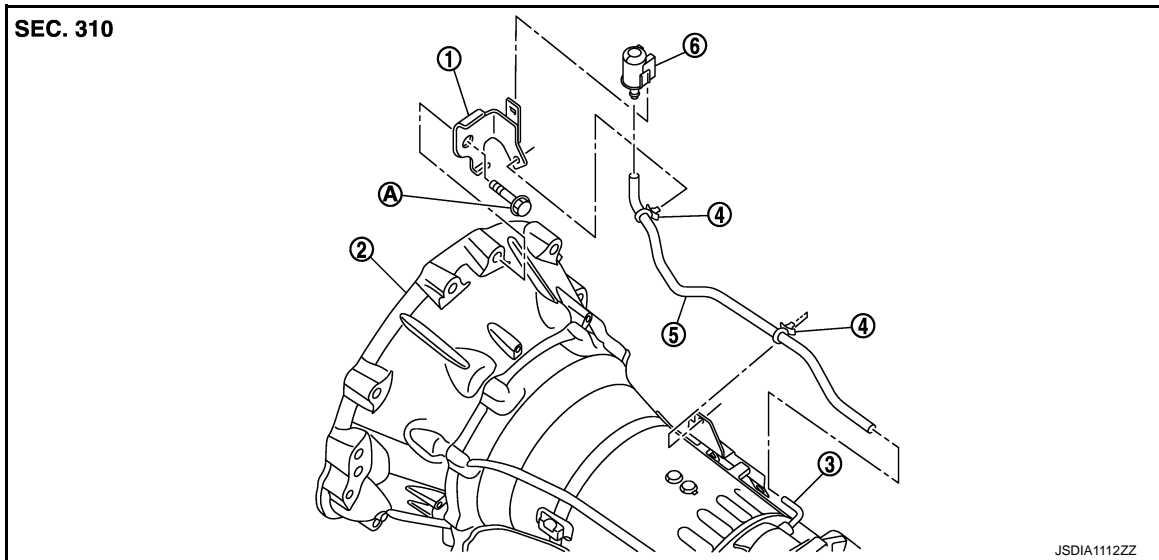
[7AT: RE7R01A]

## AIR BREATHER HOSE

VQ37VHR (2WD)

VQ37VHR (2WD) : Exploded View

INFOID:000000006884129



- |  |                      |                     |
|--|----------------------|---------------------|
| 1. Bracket   | 2. A/T assembly      | 3. Breather tube    |
| 4. Clip  | 5. Air breather hose | 6. Air breather box |
| A. Tightening must be done following the installation procedure. Refer to <a href="#">TM-213, "VQ37VHR (2WD) : Removal and Installation"</a> . |                      |                     |

## VQ37VHR (2WD) : Removal and Installation

INFOID:000000006884130

### REMOVAL

1. Remove clips of air breather hose from brackets.
2. Remove air breather box from bracket.
3. Remove air breather box from air breather hose.
4. Remove air breather hose from breather tube.
5. Remove bolt fixing A/T assembly to engine assembly with a power tool.
6. Remove bracket.

### INSTALLATION

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

#### CAUTION:

- Never bend the air breather hose to prevent damage to the hose.
- Insert air breather hose to breather tube all the way to the curve of the tube.
- Be sure to insert it fully until its end reaches the stop when inserting air breather hose to air breather box.
- Install air breather hose to air breather box so that the paint mark is facing backward.
- Securely install the clips to the brackets when installing air breather hose to the brackets.

VQ37VHR (AWD)

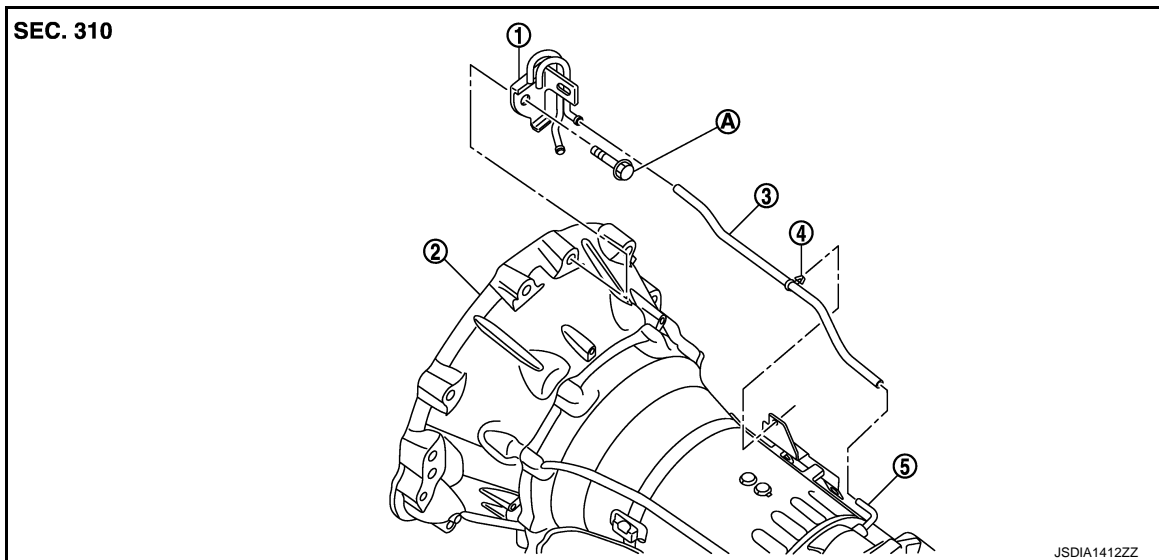
# AIR BREATHER HOSE

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

VQ37VHR (AWD) : Exploded View

INFOID:000000006884131



- |   |                  |                      |
|---|------------------|----------------------|
| 1. Air breather tube  | 2. A/T assembly  | 3. Air breather hose |
| 4. Clip   | 5. Breather tube |                      |
| A. Tightening must be done following the installation procedure. Refer to <a href="#">TM-216, "VQ37VHR (AWD) : Exploded View"</a> . |                  |                      |

## VQ37VHR (AWD) : Removal and Installation

INFOID:000000006884132

### REMOVAL

1. Remove propeller shaft assembly (front). Refer to [DLN-87, "VQ37VHR : Exploded View"](#).
2. Remove air breather hose.
3. Remove propeller shaft assembly (rear). Refer to [DLN-106, "Exploded View"](#).
4. Remove control rod from A/T shift selector assembly. Refer to [TM-176, "AWD : Exploded View"](#).
5. Support A/T 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.**
6. Remove rear engine mounting member with a power tool. Refer to [EM-71, "2WD : Exploded View"](#).
7. Remove bolt fixing A/T assembly to engine assembly with power tool.
8. Remove air breather tube from transfer air breather hose. Refer to [DLN-59, "VQ37VHR : Removal and Installation"](#).

### INSTALLATION

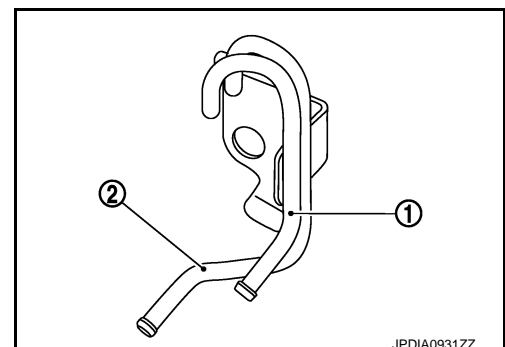
Note the following, and install in the reverse order of removal.

#### **CAUTION:**

- Never bend the air breather hose to prevent damage to the hose.
- Insert air breather hose to breather tube all the way to the curve of the tube.
- Be sure to insert it fully until its end reaches the radius curve end when inserting air breather hose to air breather tube (for A/T) (1).

2 : For transfer

- Install air breather hose to air breather tube (for A/T) so that the paint mark is facing upward.
- Securely install the clip to the brackets when installing air breather hose to the bracket.



# AIR BREATHER HOSE

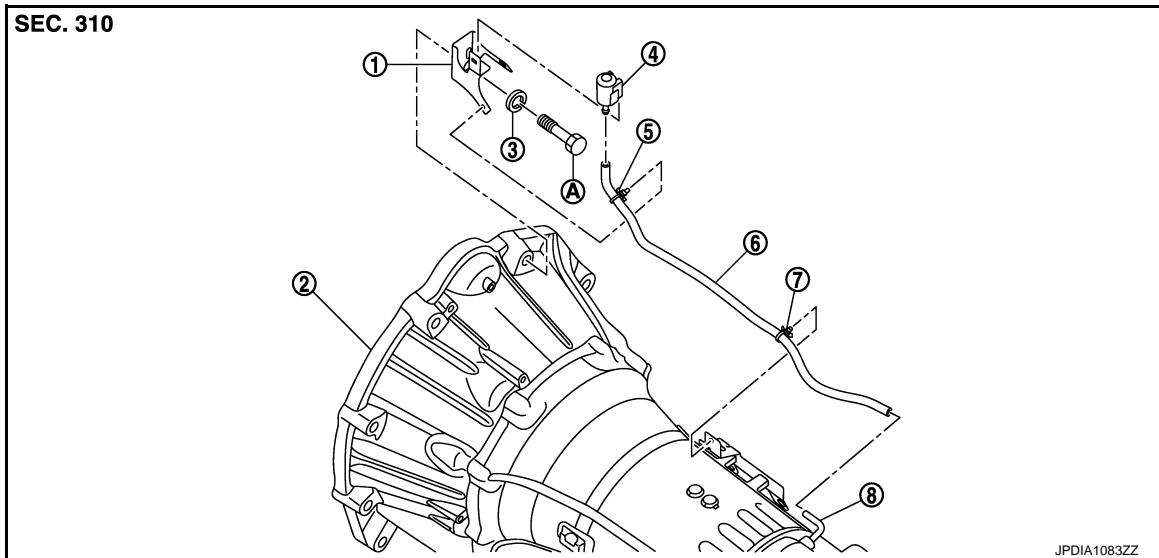
< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

VK56VD (2WD)

VK56VD (2WD) : Exploded View

INFOID:000000006884133



- |                     |                  |                      |
|---------------------|------------------|----------------------|
| 1. Bracket          | 2. A/T assembly  | 3. Spring washer     |
| 4. Air breather box | 5. Clip          | 6. Air breather hose |
| 7. Clip             | 8. Breather tube |                      |
- A. Tightening must be done following the installation procedure. Refer to [TM-213. "VQ37VHR \(2WD\) : Removal and Installation"](#).

VK56VD (2WD) : Removal and Installation

INFOID:000000006884134

## REMOVAL

1. Remove exhaust front tube. Refer to [EX-7. "VK56VD : Exploded View"](#).
2. Remove clips of air breather hose from brackets.
3. Remove air breather box from bracket.
4. Remove air breather box from air breather hose.
5. Remove air breather hose from breather tube.
6. Remove bolt fixing A/T assembly to engine assembly with a power tool.
7. Remove bracket.

## INSTALLATION

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

### CAUTION:

- Never bend the air breather hose to prevent damage to the hose.
- Insert A/T air breather hose to breather tube all the way to the curve of the tube.
- Be sure to insert it fully until its end reaches the stop when inserting air breather hose to air breather box.
- Install air breather hose to air breather box so that the paint mark is facing backward.
- Securely install the clips to the brackets when installing air breather hose to the brackets.

VK56VD (AWD)

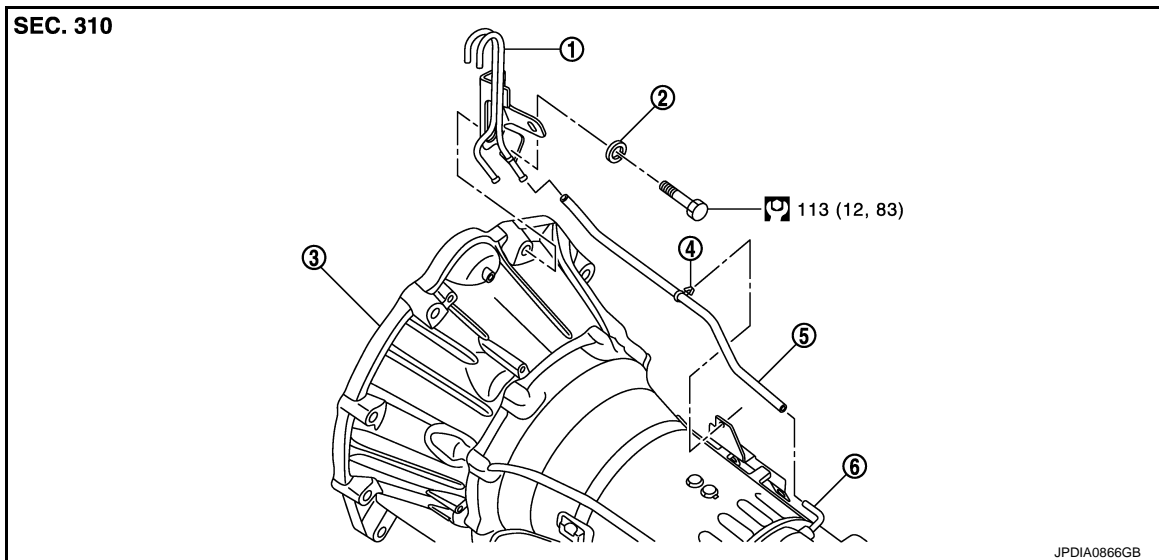
# AIR BREATHER HOSE

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

VK56VD (AWD) : Exploded View

INFOID:000000006884135



- |                      |                          |                          |
|----------------------|--------------------------|--------------------------|
| 1. Air breather tube | 2. Spring washer         | 3. A/T assembly          |
| 4. Clip              | 5. A/T air breather hose | 6. A/T air breather tube |

Refer to [GI-4, "Components"](#) for symbols in the figure.

## VK56VD (AWD) : Removal and Installation

INFOID:000000006884135

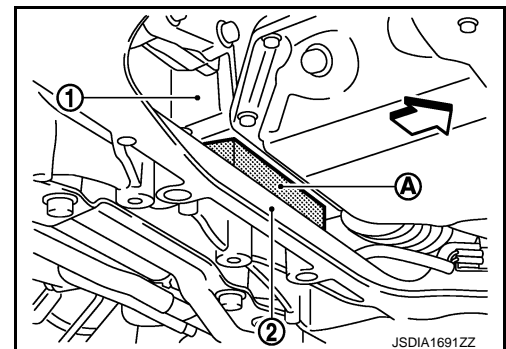
### REMOVAL

1. Remove propeller shaft assembly (front). Refer to [DLN-89, "VK56VD : Exploded View"](#).
2. Remove exhaust mounting bracket and three way catalyst (right bank). Refer to [EX-7, "VK56VD : Exploded View"](#).
3. Remove A/T air breather hose.
4. Remove propeller shaft assembly (rear). Refer to [DLN-106, "Exploded View"](#).
5. Remove control rod from A/T shift selector. Refer to [TM-176, "AWD : Exploded View"](#).
6. Support A/T assembly with a transmission jack.
7. Insert a wooden block (A) between oil pan (upper) (1) of engine and front suspension member (2).

← : Vehicle front

### CAUTION:

- Always insert a wooden block between oil pan (upper) of engine and front suspension member when removing air breather tube. (Because VVEL control shaft position sensor may be damaged by the interference between VVEL control shaft position sensor and dash panel if the operation is performed without the wooden block inserted.)
- After inserting wooden block, check it does not fall out easily.



8. Remove rear engine mounting member with a power tool. Refer to [EM-212, "2WD : Exploded View"](#).
9. Remove bolt fixing A/T assembly to engine with power tool.
10. Remove air breather tube from transfer air breather hose. Refer to [DLN-61, "VK56VD : Removal and Installation"](#).

### INSTALLATION

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

### CAUTION:

# AIR BREATHER HOSE

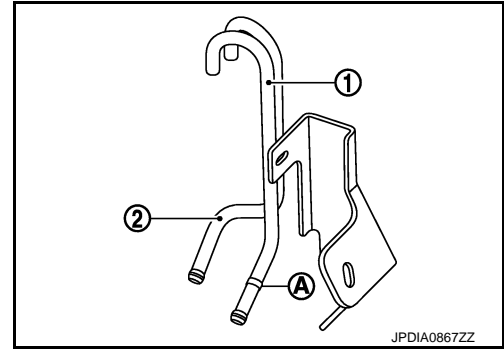
< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

- Never bend the A/T air breather hose to prevent damage to the hose.
- Insert A/T air breather hose to A/T air breather tube all the way to the curve of the tube.
- Be sure to insert it fully until its end reaches the spool (A) portion when inserting A/T air breather hose to the air breather tube (for A/T) (1).

2 : For transfer

- Install A/T air breather hose to air breather tube (for A/T) so that the paint mark is facing upward.
- Securely install the clip to the brackets when installing A/T air breather hose to the bracket.



A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# FLUID COOLER SYSTEM

< REMOVAL AND INSTALLATION >

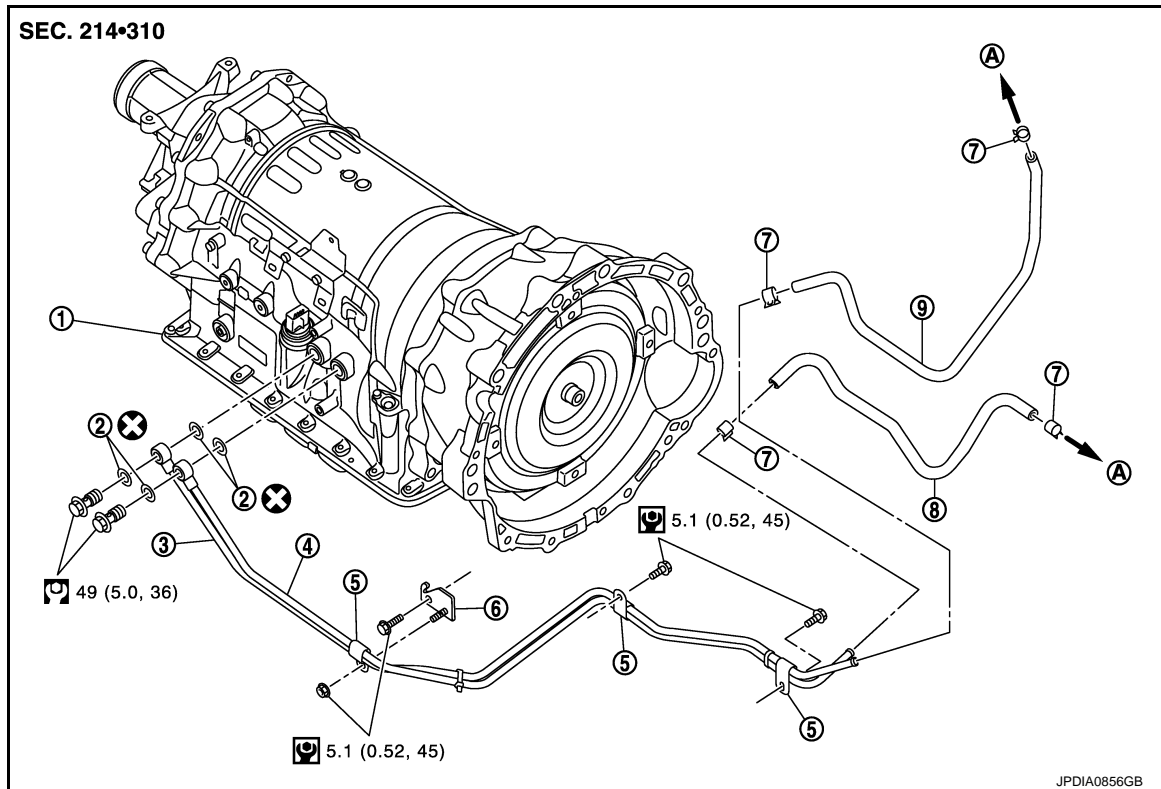
[7AT: RE7R01A]

## FLUID COOLER SYSTEM

VQ37VHR (2WD)

VQ37VHR (2WD) : Exploded View

INFOID:000000006884137



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

Refer to [GI-4. "Components"](#) for symbols in the figure.

## VQ37VHR (2WD) : Removal and Installation

INFOID:000000006884138

### REMOVAL

1. Remove air cleaner case (LH). Refer to [EM-29. "Exploded View"](#).
2. Remove engine under cover and engine under cover rear with a power tool. Refer to [EXT-28. "Exploded View"](#).
3. Remove A/T fluid cooler hose A and A/T fluid cooler hose B.
4. Remove exhaust mounting bracket with power tool. Refer to [EX-5. "VQ37VHR : Exploded View"](#).
5. Remove A/T fluid cooler tube mounting bolts and bracket.
6. Remove suspension member stay. Refer to [FSU-18. "Exploded View"](#).
7. Remove the clips and bands fixing two A/T fluid cooler tubes.
8. Remove the A/T fluid cooler tubes one at a time from the vehicle.

### CAUTION:

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

### NOTE:

Cap or plug openings to prevent fluid from spilling.

### INSTALLATION

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



# FLUID COOLER SYSTEM

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

**CAUTION:**

**Never reuse copper washers.**

- Refer to the following when installing A/T fluid cooler hoses.

Hose name	Hose end	Paint mark	Position of hose clamp*
A/T fluid cooler hose A	Radiator assembly side	Facing backward	A
	A/T fluid cooler tube side	Facing downward	B
A/T fluid cooler hose B	Radiator assembly side	Facing downward	C
	A/T fluid cooler tube side	Facing downward	B

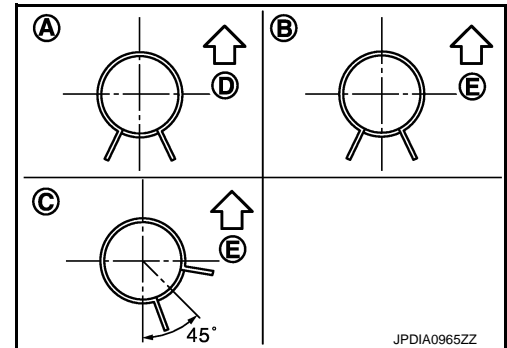
\*: Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

↔ D : Vehicle front

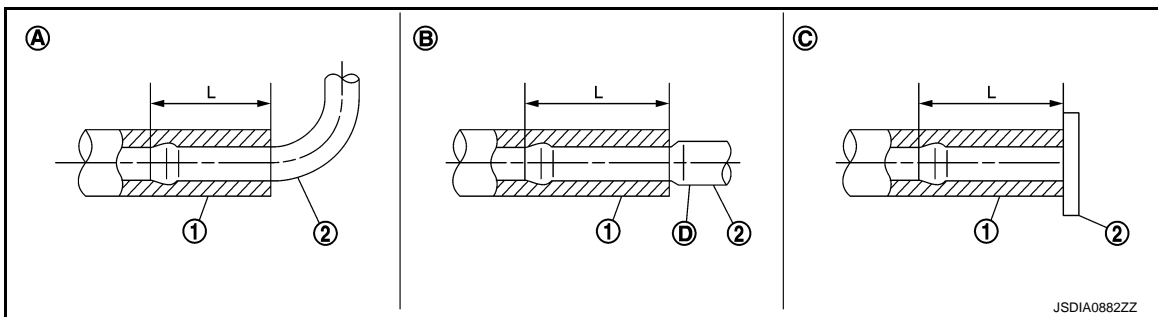
↔ E : Vehicle upper

- When installing hose clamps center line of each hose clamp tab should be positioned as shown in the figure.



- Insert A/T fluid cooler hoses according to dimension "L" described below.

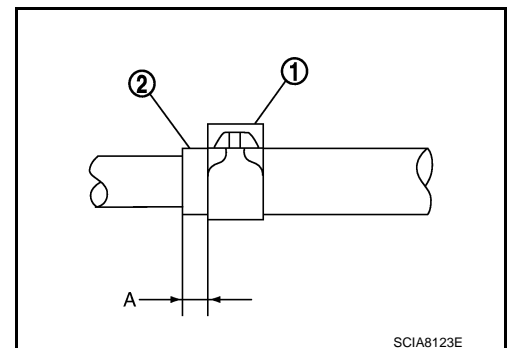
A/T fluid cooler hose (1)	Insertion side tube (2)	Tube type	Dimension "L"
A/T fluid cooler hose A	Radiator assembly tube	A	End reaches the radius curve end.
	A/T fluid cooler tube	B	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]
A/T fluid cooler hose B	Radiator assembly tube	C	Insert the hose until the hose touches the radiator.
	A/T fluid cooler tube	B	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]



- Set hose clamps (1) at the both ends of A/T fluid cooler hoses (2) with dimension "A" from the hose edge.

**Dimension "A" : 5 – 9 mm (0.20 – 0.35 in)**

- Hose clamp should not interfere with the bulge of fluid cooler tube.



# FLUID COOLER SYSTEM

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

## VQ37VHR (2WD) : Inspection and Adjustment

INFOID:000000006884139

### INSPECTION AFTER INSTALLATION

Check A/T fluid leakage.

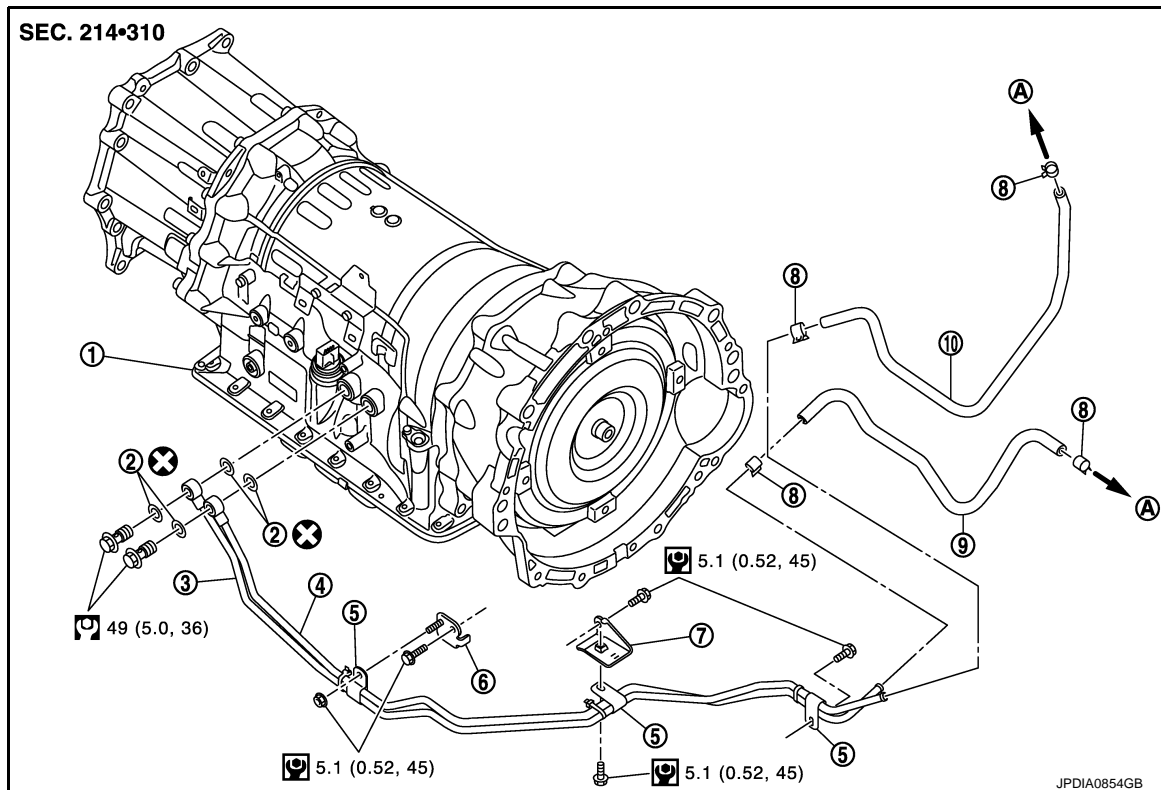
### ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).

## VQ37VHR (AWD)

### VQ37VHR (AWD) : Exploded View

INFOID:000000006884140



- |                             |                  |                            |
|-----------------------------|------------------|----------------------------|
| 1. A/T assembly             | 2. Copper washer | 3. A/T fluid cooler tube   |
| 4. A/T fluid cooler tube    | 5. Clip          | 6. Bracket                 |
| 7. Bracket                  | 8. Hose clamp    | 9. A/T fluid cooler hose B |
| 10. A/T fluid cooler hose A |                  |                            |
| A. To radiator              |                  |                            |

Refer to [GI-4, "Components"](#) for symbols in the figure.

## VQ37VHR (AWD) : Removal and Installation

INFOID:000000006884141

### REMOVAL

1. Remove air cleaner case (LH). Refer to [EM-29, "Exploded View"](#).
2. Remove engine under cover with a power tool. Refer to [EXT-28, "Exploded View"](#).
3. Remove A/T fluid cooler hose A and A/T fluid cooler hose B.
4. Remove propeller shaft assembly (front). Refer to [DLN-87, "VQ37VHR : Exploded View"](#).
5. Remove the A/T fluid cooler tube mounting bolts and brackets.
6. Remove the clips and bands fixing two A/T fluid cooler tubes.
7. Remove the A/T fluid cooler tubes one at a time from the vehicle.

### CAUTION:

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

# FLUID COOLER SYSTEM

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

**NOTE:**

Cap or plug openings to prevent fluid from spilling.

**INSTALLATION**

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

**CAUTION:**

**Never reuse copper washer.**

- Refer to the following when installing A/T fluid cooler hoses.

Hose name	Hose end	Paint mark	Position of hose clamp*
A/T fluid cooler hose A	Radiator assembly side	Facing backward	A
	A/T fluid cooler tube side	Facing downward	B
A/T fluid cooler hose B	Radiator assembly side	Facing downward	C
	A/T fluid cooler tube side	Facing downward	B

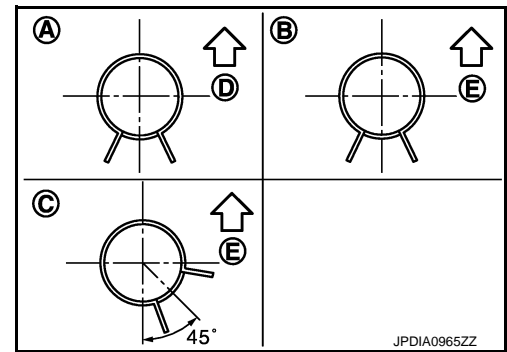
\*: Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

↔ D : Vehicle front

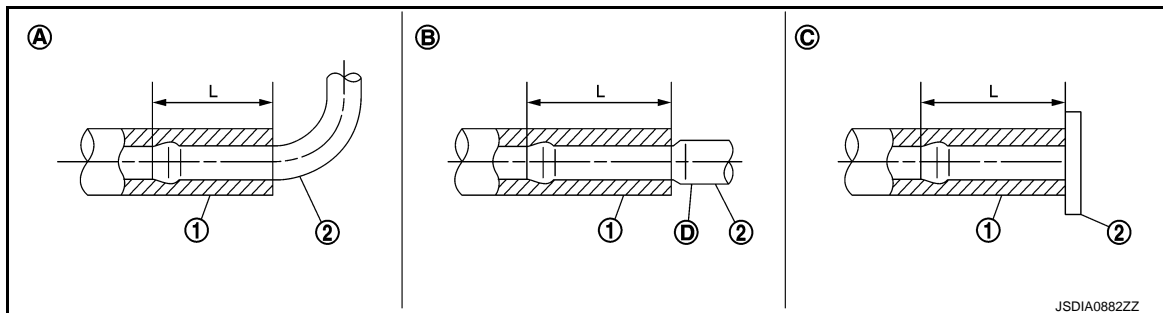
↔ E : Vehicle upper

- When installing hose clamps center line of each hose clamp tab should be positioned as shown in the figure.



- Insert A/T fluid cooler hose according to dimension "L" described below.

A/T fluid cooler tube (1)	Insertion side tube (2)	Tube type	Dimension "L"
A/T fluid cooler hose A	Radiator assembly tube	A	End reaches the radius curve end.
	A/T fluid cooler tube	B	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]
A/T fluid cooler hose B	Radiator assembly tube	C	Insert the hose until the hose touches the radiator.
	A/T fluid cooler tube	B	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]



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# FLUID COOLER SYSTEM

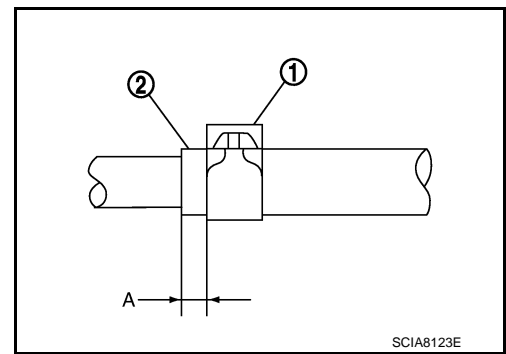
## < REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

- Set hose clamps (1) at the both ends of A/T fluid cooler hoses (2) with dimension "A" from the hose edge.

**Dimension "A" : 5 – 9 mm (0.20 – 0.35 in)**

- Hose clamp should not interfere with the bulge of fluid cooler tube.



## VQ37VHR (AWD) : Inspection and Adjustment

INFOID:000000006884142

### INSPECTION AFTER INSTALLATION

Check A/T fluid leakage.

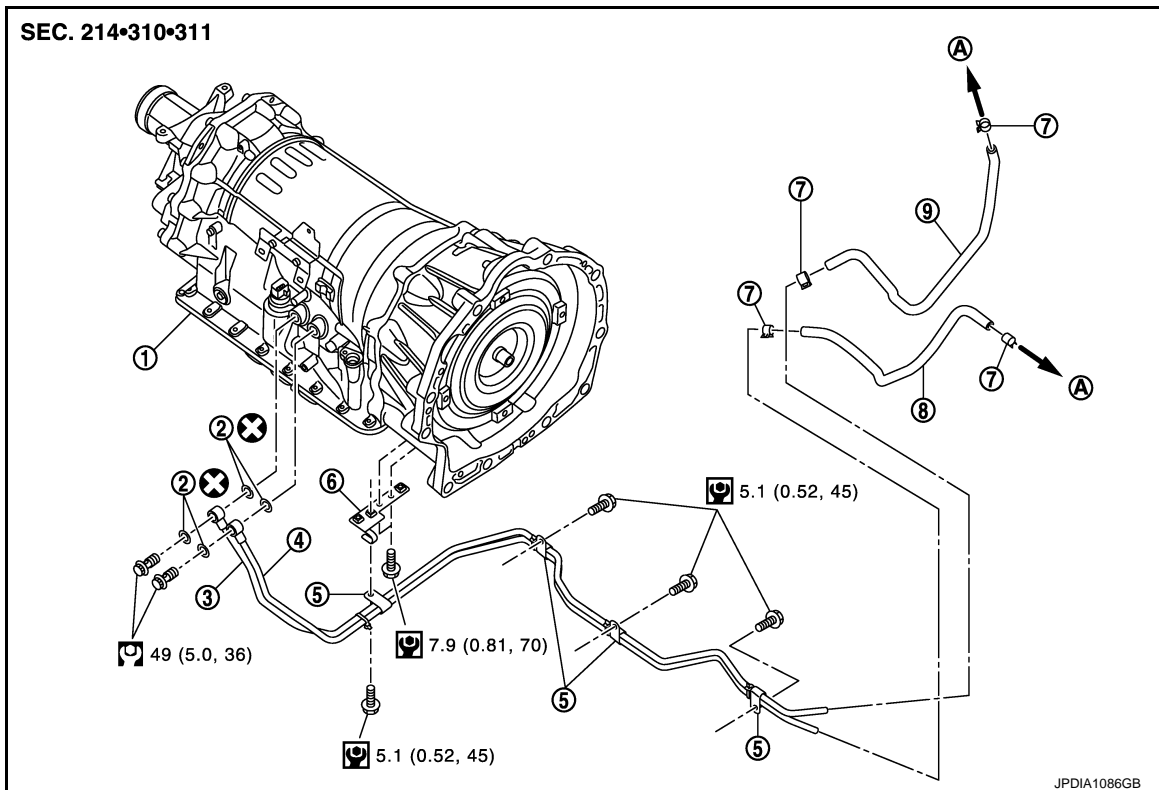
### ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).

## VK56VD (2WD)

## VK56VD (2WD) : Exploded View

INFOID:000000006884143



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

Refer to [GI-4, "Components"](#) for symbols in the figure.

## VK56VD (2WD) : Removal and Installation

INFOID:000000006884144

### REMOVAL

# FLUID COOLER SYSTEM

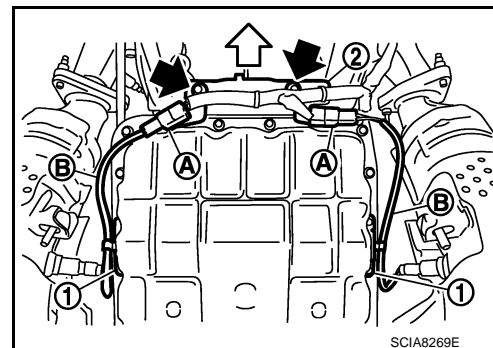
## < REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

1. Remove air duct (inlet). Refer to [EM-184, "Exploded View"](#).
2. Remove engine under cover and engine under cover rear with a power tool. Refer to [EXT-28, "Exploded View"](#).
3. Remove A/T fluid cooler hose A and A/T fluid cooler hose B.
4. Remove exhaust mounting bracket with power tool. Refer to [EX-7, "VK56VD : Exploded View"](#).
5. Disconnect heated oxygen sensor 2 connectors (A).

↔ : Vehicle front

← : Bolt



6. Remove heated oxygen sensor 2 harness (B) from clips (1).
  7. Remove bracket (2) from A/T assembly. Refer to [TM-219, "VK56VD \(2WD\) : Exploded View"](#).
  8. Remove the A/T fluid cooler tube mounting bolts.
- NOTE:**  
Cap or plug openings to prevent fluid from spilling.
9. Remove the clips and bands fixing two A/T fluid cooler tubes.
  10. Remove the A/T fluid cooler tubes one at a time from the vehicle.

**CAUTION:**

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

### INSTALLATION

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

**CAUTION:**

**Never reuse copper washers.**

- Refer to the following when installing A/T fluid cooler hoses.

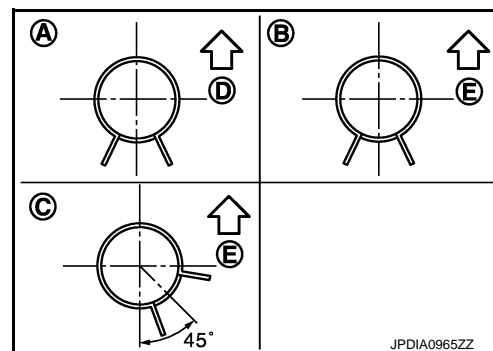
Hose name	Hose end	Paint mark	Position of hose clamp*
A/T fluid cooler hose A	Radiator assembly side	Facing backward	A
	A/T fluid cooler tube side	Facing downward	B
A/T fluid cooler hose B	Radiator assembly side	Facing downward	C
	A/T fluid cooler tube side	Facing downward	B

\*: Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

↔ D : Vehicle front

↔ E : Vehicle upper



- When installing hose clamps center line of each hose clamp tab should be positioned as shown in the figure.

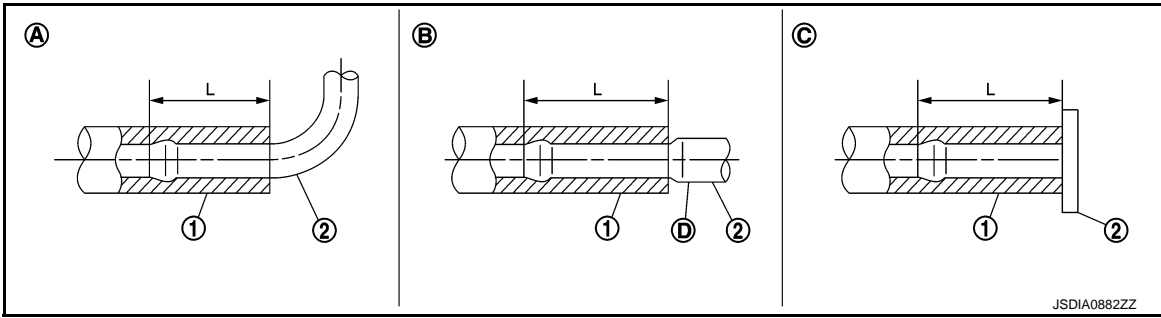
- Insert A/T fluid cooler hoses according to dimension "L" described below.

A/T fluid cooler tube (1)	Insertion side tube (2)	Tube type	Dimension "L"
A/T fluid cooler hose A	Radiator assembly tube	A	End reaches the radius curve end.
	A/T fluid cooler tube	B	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]
A/T fluid cooler hose B	Radiator assembly tube	C	Insert the hose until the hose touches the radiator.
	A/T fluid cooler tube	B	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]

# FLUID COOLER SYSTEM

< REMOVAL AND INSTALLATION >

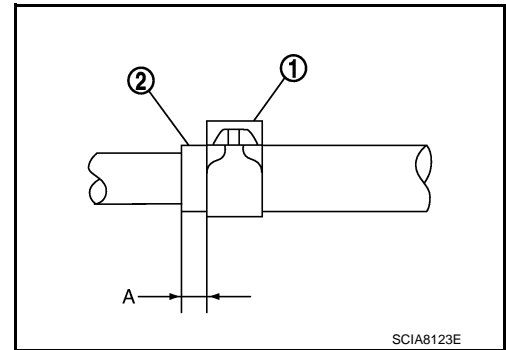
[7AT: RE7R01A]



- Set hose clamps (1) at the both ends of A/T fluid cooler hoses (2) with dimension "A" from the hose edge.

**Dimension "A" : 5 – 9 mm (0.20 – 0.35 in)**

- Hose clamp should not interfere with the bulge of fluid cooler tube.



## VK56VD (2WD) : Inspection and Adjustment

INFOID:000000006884145

### INSPECTION AFTER INSTALLATION

Check A/T fluid leakage.

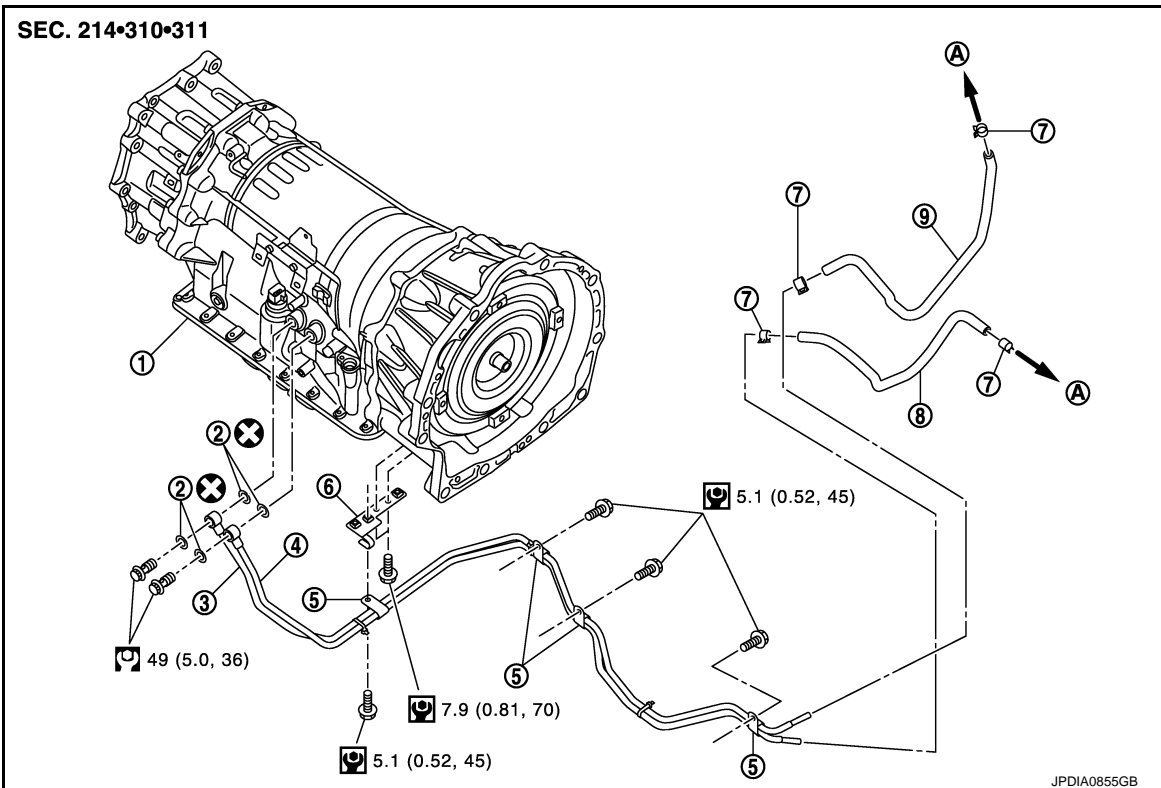
### ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).

### VK56VD (AWD)

## VK56VD (AWD) : Exploded View

INFOID:000000006884146



# FLUID COOLER SYSTEM

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

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

Refer to [GI-4, "Components"](#) for symbols in the figure.

## VK56VD (AWD) : Removal and Installation

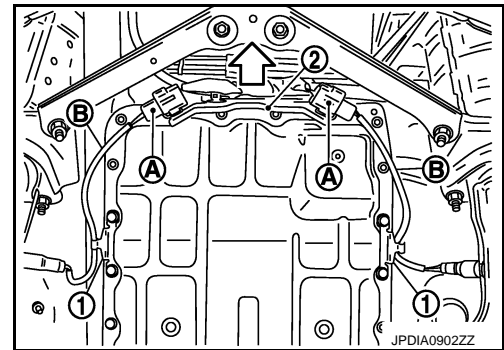
INFOID:000000006884147

### REMOVAL

- Shift the selector lever to "N" position, and release the parking brake.
- Remove air duct (inlet). Refer to [EM-29, "Exploded View"](#).
- Remove engine under cover with a power tool. Refer to [EXT-28, "Exploded View"](#).
- Remove A/T fluid cooler hose A and A/T fluid cooler hose B.
- Disconnect heated oxygen sensor 2 connectors (A).

← : Vehicle front

- Remove heated oxygen sensor 2 harness (B) from clips (1).
- Remove bracket (2) from A/T assembly. Refer to [TM-222, "VK56VD \(AWD\) : Exploded View"](#).
- Remove propeller shaft assembly (front). Refer to [DLN-89, "VK56VD : Exploded View"](#).
- Remove front drive shaft (left side). Refer to [FAX-24, "Exploded View"](#).
- Remove A/T fluid cooler tube mounting bolts.
- Remove the clips and bands fixing two A/T fluid cooler tubes.
- Remove the A/T fluid cooler tubes one at a time from the vehicle.



**NOTE:**

Cap or plug openings to prevent fluid from spilling.

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

### INSTALLATION

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

**CAUTION:**

**Never reuse copper washer.**

- Refer to the following when installing A/T fluid cooler hoses.

Hose name	Hose end	Paint mark	Position of hose clamp*
A/T fluid cooler hose A	Radiator assembly side	Facing backward	A
	A/T fluid cooler tube side	Facing downward	B
A/T fluid cooler hose B	Radiator assembly side	Facing downward	C
	A/T fluid cooler tube side	Facing downward	B

\*: Refer to the illustrations for the specific position each hose clamp tab.

# FLUID COOLER SYSTEM

## < REMOVAL AND INSTALLATION >

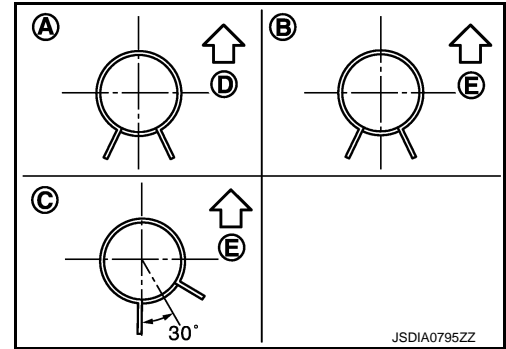
[7AT: RE7R01A]

- The illustrations indicate the view from the hose ends.

↔ D : Vehicle front

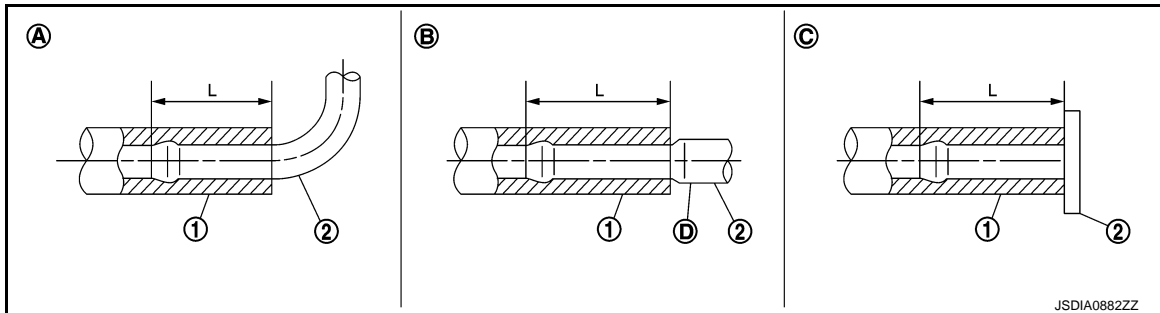
↔ E : Vehicle upper

- When installing hose clamps center line of each hose clamp tab should be positioned as shown in the figure.



- Insert fluid cooler hose according to dimension "L" described below.

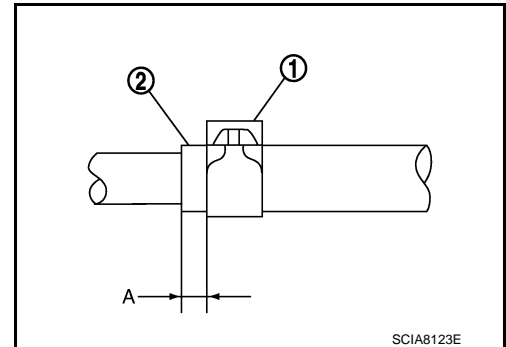
A/T fluid cooler hose (1)	Insertion side tube (2)	Tube type	Dimension "L"
A/T fluid cooler hose A	Radiator assembly tube	A	End reaches the radius curve end.
	A/T fluid cooler tube	B	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]
A/T fluid cooler hose B	Radiator assembly tube	C	Insert the hose until the hose touches the radiator.
	A/T fluid cooler tube	B	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]



- Set hose clamps (1) at the both ends of A/T fluid cooler hoses (2) with dimension "A" from the hose edge.

**Dimension "A" : 5 – 9 mm (0.20 – 0.35 in)**

- Hose clamp should not interfere with the bulge of fluid cooler tube.



## VK56VD (AWD) : Inspection and Adjustment

INFOID:000000006884148

### INSPECTION AFTER INSTALLATION

Check for A/T fluid leakage.

### ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to [TM-90. "Adjustment"](#).



# TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

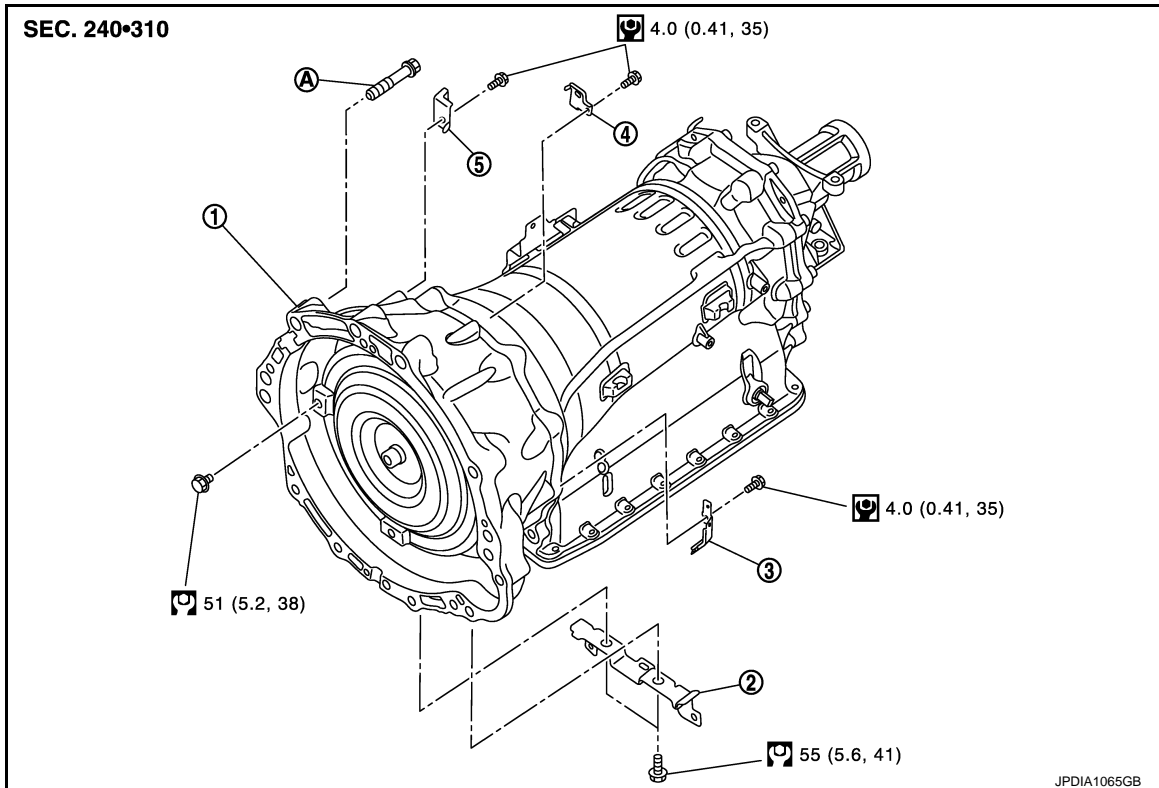
## UNIT REMOVAL AND INSTALLATION

### TRANSMISSION ASSEMBLY

VQ37VHR (2WD)

VQ37VHR (2WD) : Exploded View

INFOID:000000006884149



1. A/T assembly

2. Bracket

3. Bracket

4. Bracket

5. Bracket

A. Tightening must be done following the installation procedure. Refer to [TM-213, "VQ37VHR \(2WD\) : Removal and Installation"](#).

Refer to [GI-4, "Components"](#) for symbols in the figure.

### VQ37VHR (2WD) : Removal and Installation

INFOID:000000006884150

#### REMOVAL

##### CAUTION:

- When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T 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 engine under cover and front under cover with a power tool. Refer to [EXT-28, "Exploded View"](#).
4. Remove control rod from A/T shift selector assembly. Refer to [TM-174, "2WD : Exploded View"](#).
5. Separate propeller shaft assembly. Refer to [DLN-97, "Exploded View"](#).

##### NOTE:

Cap or plug opening to prevent fluid from spilling.

6. Remove suspension member stay. Refer to [FSU-18, "Exploded View"](#).
7. Remove exhaust mounting bracket with power tool. Refer to [EX-5, "VQ37VHR : Exploded View"](#).
8. Remove crankshaft position sensor (POS) from A/T assembly. Refer to [EM-123, "Exploded View"](#).

# TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

## 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. Refer to [STR-15, "VQ37VHR : Exploded View"](#).

10. Remove rear plate cover. Refer to [EM-45, "Exploded View"](#).

11. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter.

## CAUTION:

**When turning the crankshaft, turn it clockwise as viewed from the front of the engine.**

12. Remove A/T fluid cooler tubes mounting bolts from A/T assembly and engine. Refer to [TM-204, "VQ37VHR \(2WD\) : Exploded View"](#).

## NOTE:

Cap or plug openings to prevent fluid from spilling.

13. Plug up openings such as the A/T fluid cooler tube holes.

14. Support A/T 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.**

## NOTE:

Be placing wooden block between oil pan (upper) and front suspension member, the removal of A/T assembly from engine becomes easier.

15. Remove rear engine mounting member and engine mounting insulator (rear) with a power tool. Refer to [EM-71, "2WD : Exploded View"](#).

16. Disconnect A/T assembly connector.

17. Remove harness and brackets from A/T assembly.

18. Remove bolts fixing A/T assembly to engine with a power tool.

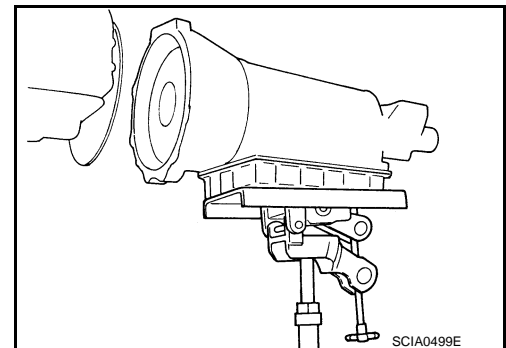
19. Remove air breather hose, air breather box and bracket. Refer to [TM-199, "VQ37VHR \(2WD\) : Exploded View"](#).

20. Remove A/T assembly from the vehicle.

## CAUTION:

- Secure torque converter to prevent it from dropping.
- Secure A/T assembly to a transmission jack.

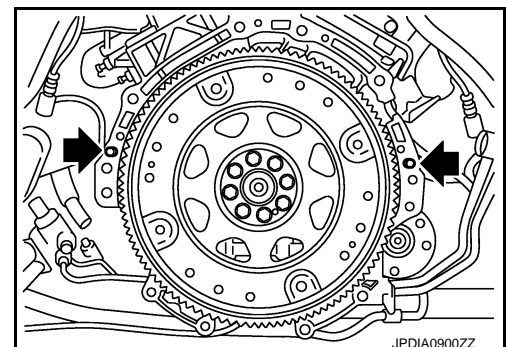
21. Remove manual lever from A/T assembly. Refer to [TM-179, "Exploded View"](#).



## INSTALLATION

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

- Check fitting of dowel pin (←).



# TRANSMISSION ASSEMBLY

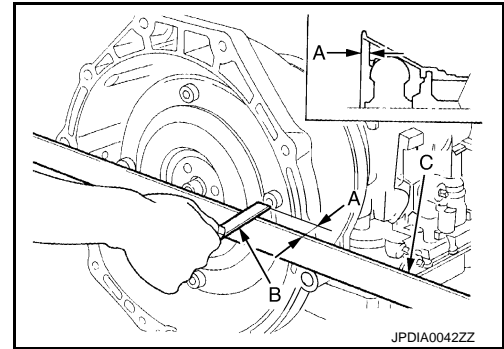
## < UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

- When installing A/T assembly to the engine, be sure to check dimension "A" to ensure it is within the reference value limit.

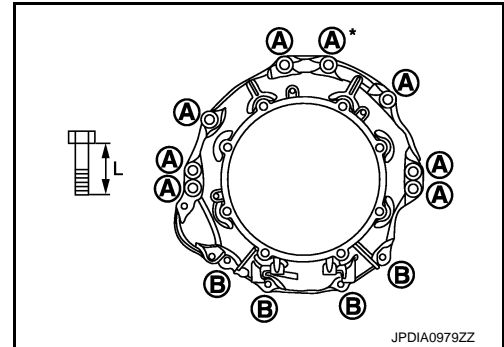
B : Scale  
C : Straightedge

**Dimension "A"** : Refer to [TM-315, "Torque Converter"](#).



- When installing A/T assembly to the engine, attach the fixing bolts in accordance with the following standard.

Bolt symbol	A	B
Insertion direction	A/T assembly to engine	Engine to A/T assembly
Number of bolts	8	4
Bolt length "L" mm (in)	65 (2.56)	35 (1.38)
Tightening torque N·m (kg·m, ft·lb)	75 (7.7, 55)	46.6 (4.8, 34)



\*: Tightening the bolt with bracket. Refer to [TM-199, "VQ37VHR \(2WD\) : 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:

- When turning crankshaft, turn it clockwise as viewed from the front of the engine.
- 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-53, "Removal and Installation"](#).
- Rotate crankshaft several turns and check to be sure that A/T rotates freely without binding after converter is installed to drive plate.

## VQ37VHR (2WD) : Inspection and Adjustment

INFOID:000000006884151

### INSPECTION AFTER INSTALLATION

- Check A/T fluid leakage.
- Check A/T position after adjusting A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).

### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).
- Adjust A/T position. Refer to [TM-96, "Inspection and Adjustment"](#).
- Perform G sensor calibration when replacing A/T assembly. Refer to [TM-86, "Special Repair Requirement"](#).

## VQ37VHR (AWD)

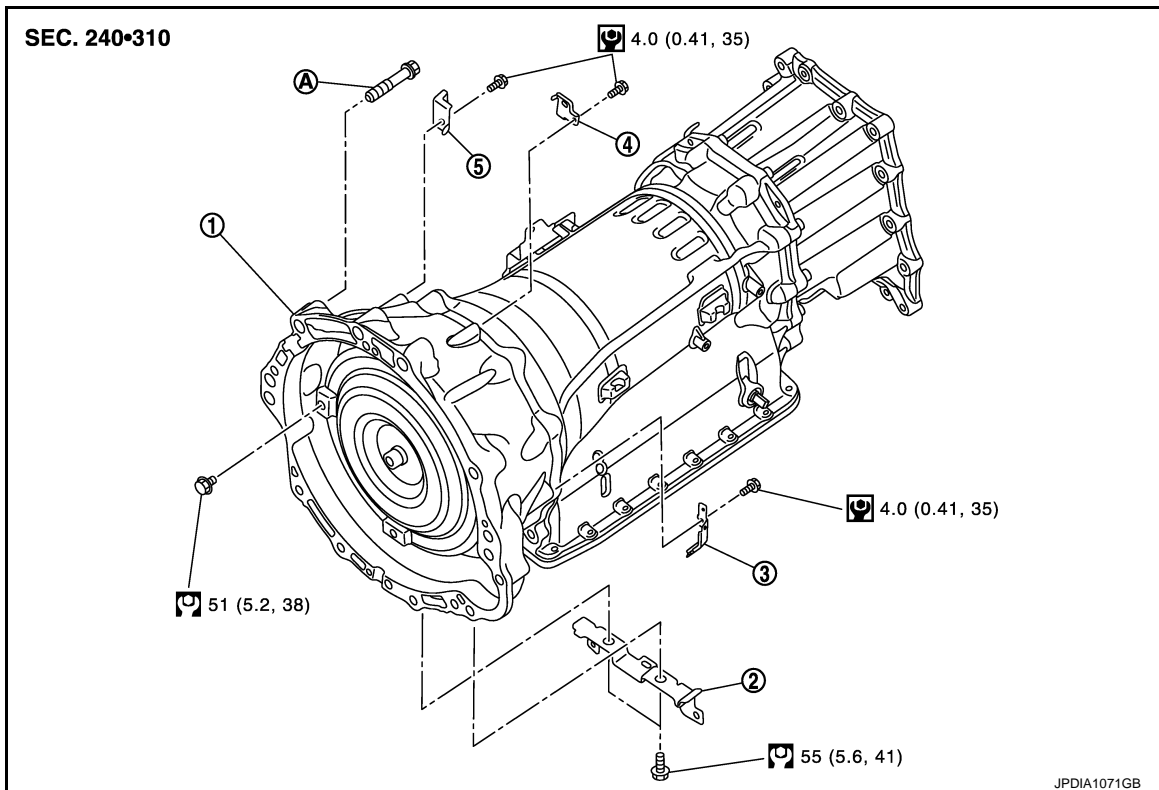
# TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

VQ37VHR (AWD) : Exploded View

INFOID:000000006884152



1. A/T assembly
2. Bracket
3. Bracket
4. Bracket
5. Bracket
- A. Tightening must be done following the installation procedure. Refer to [TM-216. "VQ37VHR \(AWD\) : Removal and Installation"](#).

Refer to [GI-4. "Components"](#) for symbols in the figure.

## VQ37VHR (AWD) : Removal and Installation

INFOID:000000006884153

### REMOVAL

#### CAUTION:

- When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T 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 control rod from A/T shift selector assembly. Refer to [TM-176. "AWD : Exploded View"](#).
4. Separate propeller shaft assembly (rear). Refer to [DLN-106. "Exploded View"](#).
5. Separate propeller shaft assembly (front). Refer to [DLN-87. "VQ37VHR : Exploded View"](#).
6. Remove crankshaft position sensor (POS) from A/T assembly. Refer to [EM-123. "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.

7. Remove starter motor. Refer to [STR-15. "VQ37VHR : Exploded View"](#).
8. Remove rear plate cover. Refer to [EM-45. "Exploded View"](#).
9. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter.

#### CAUTION:

# TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

**When turning the crankshaft, turn it clockwise as viewed from the front of the engine.**

10. Remove A/T fluid cooler tubes mounting bolts from A/T assembly and engine. Refer to [TM-206, "VQ37VHR \(AWD\) : Exploded View"](#).

**NOTE:**

Cap or plug openings to prevent fluid from spilling.

11. Support A/T 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.**

**NOTE:**

Be placing wooden block between oil pan (upper) and front suspension member, the removal of A/T assembly from engine becomes easier.

12. Remove rear engine mounting member and engine mounting insulator (rear) with a power tool. Refer to [EM-76, "AWD : Exploded View"](#).

13. Disconnect A/T assembly connector and AWD solenoid connector.

14. Remove harness and brackets from A/T assembly and transfer assembly.

15. Remove bolts fixing A/T assembly to engine with a power tool.

16. Remove A/T air breather hose, transfer air breather hose and air breather tube. Refer to [TM-200, "VQ37VHR \(AWD\) : Exploded View"](#) (for A/T), [DLN-59, "VQ37VHR : Removal and Installation"](#) (for transfer).

17. Remove A/T assembly with transfer assembly from the vehicle.

**CAUTION:**

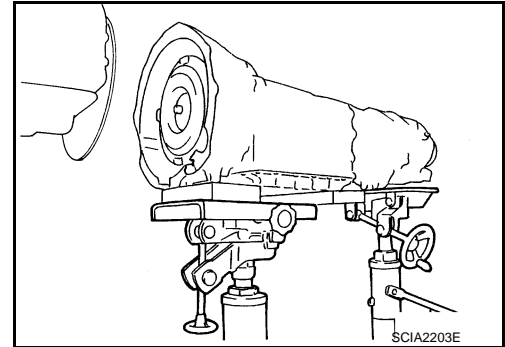
- Secure torque converter to prevent it from dropping.
- Secure A/T assembly to a transmission jack.

18. Remove manual lever. Refer to [TM-179, "Exploded View"](#).

19. Remove transfer assembly from A/T assembly with a power tool. Refer to [DLN-59, "VQ37VHR : Exploded View"](#).

**NOTE:**

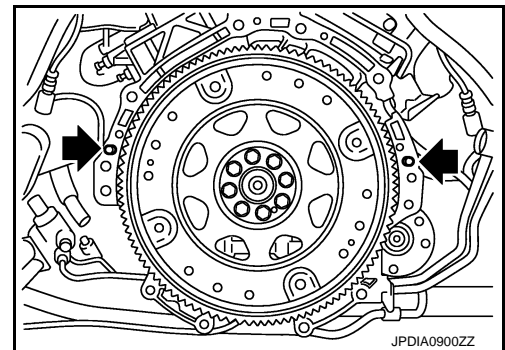
Cap or plug opening to prevent fluid from spilling.



## INSTALLATION

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

- Check fitting of dowel pin (←).

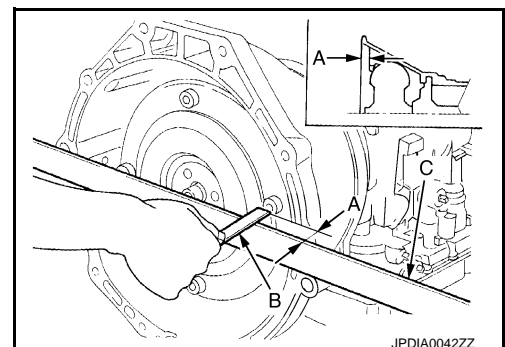


- When installing A/T assembly to the engine, be sure to check dimension "A" to ensure it is within the reference value limit.

B : Scale

C : Straightedge

**Dimension "A" : Refer to [TM-315, "Torque Converter"](#).**



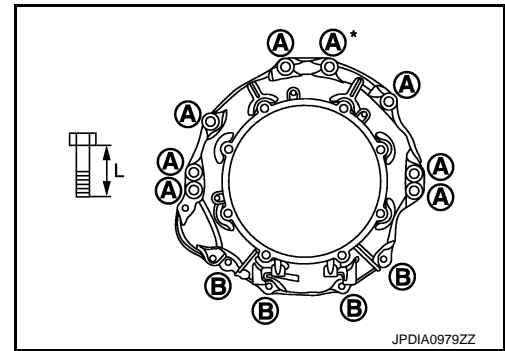
# TRANSMISSION ASSEMBLY

[7AT: RE7R01A]

## < UNIT REMOVAL AND INSTALLATION >

- When installing A/T assembly to the engine, attach the fixing bolts in accordance with the following standard.

Bolt symbol	A	B
Insertion direction	A/T assembly to engine	Engine to A/T assembly
Number of bolts	8	4
Bolt length "L" mm (in)	65 (2.56)	35 (1.38)
Tightening torque N·m (kg·m, ft·lb)	75 (7.7, 55)	46.6 (4.8, 34)



\*: Tightening the bolt with bracket of air breather tube. Refer to [TM-200. "VQ37VHR \(AWD\) : 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:

- When turning crankshaft, turn it clockwise as viewed from the front of the engine.
- 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-53. "Removal and Installation"](#).
- Rotate crankshaft several turns and check to be sure that A/T rotates freely without binding after converter is installed to drive plate.

## VQ37VHR (AWD) : Inspection and Adjustment

INFOID:000000006884154

### INSPECTION AFTER INSTALLATION

- Check A/T fluid leakage.
- Check A/T position after adjusting A/T positions. Refer to [TM-96. "Inspection and Adjustment"](#).

### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to [TM-90. "Adjustment"](#).
- Adjust A/T position. Refer to [TM-96. "Inspection and Adjustment"](#).
- Perform G sensor calibration when replacing A/T assembly. Refer to [TM-86. "Special Repair Requirement"](#).

## VK56VD (2WD)



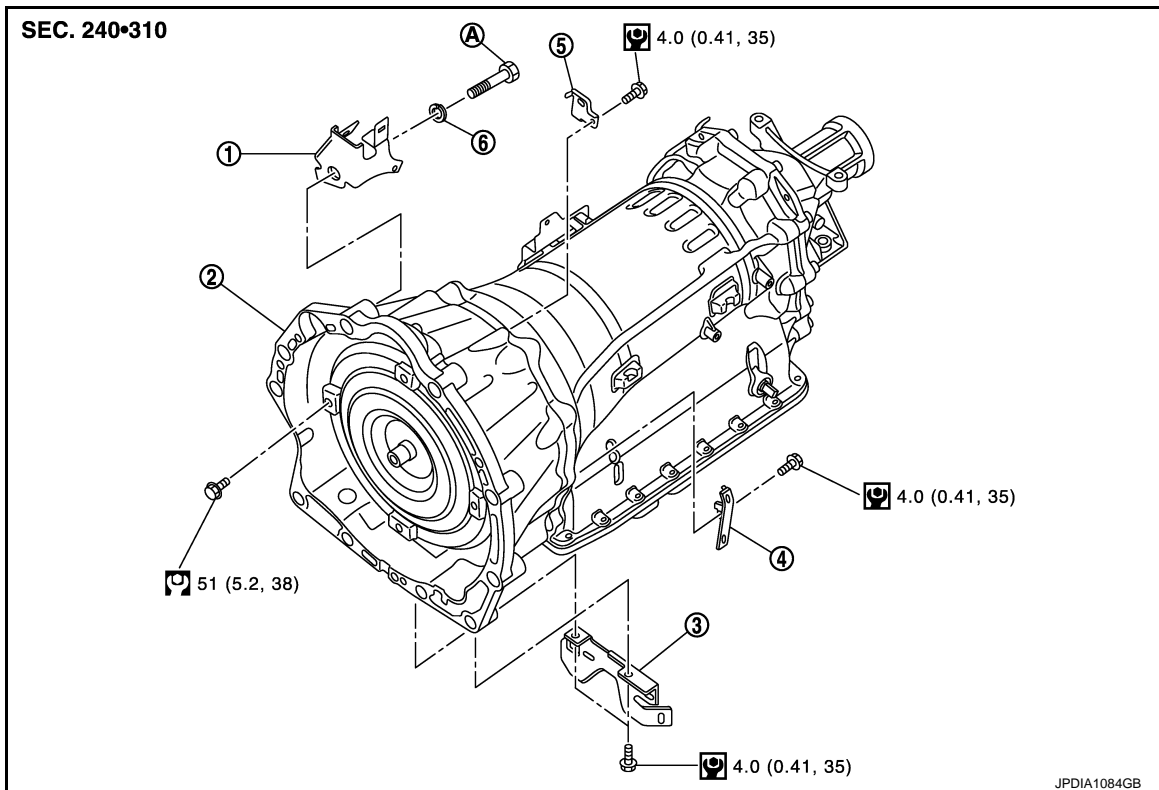
# TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

VK56VD (2WD) : Exploded View

INFOID:000000006884155



- |            |                 |                  |
|------------|-----------------|------------------|
| 1. Bracket | 2. A/T assembly | 3. Bracket       |
| 4. Bracket | 5. Bracket      | 6. Spring washer |

A. Tightening must be done following the installation procedure. Refer to [TM-219, "VK56VD \(2WD\) : Removal and Installation"](#).

Refer to [GI-4, "Components"](#) for symbols in the figure.

## VK56VD (2WD) : Removal and Installation

INFOID:000000006884156

### REMOVAL

#### CAUTION:

- When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.
- Be careful not to damage sensor edge.
- Always insert a wooden block between oil pan (upper) of engine and front suspension member when removing A/T assembly from the engine. (Because VVEL control shaft position sensor may be damaged by the interference between VVEL control shaft position sensor and dash panel if the operation is performed without the wooden block inserted.)

1. Shift the selector lever to "P" position, and release the parking brake.
2. Disconnect the battery cable from the negative terminal.
3. Remove engine under cover and front under cover with power tool. Refer to [EXT-28, "Exploded View"](#).
4. Remove control rod from A/T shift selector. Refer to [TM-174, "2WD : Exploded View"](#).
5. Separate propeller shaft assembly. Refer to [DLN-97, "Exploded View"](#).

#### NOTE:

Cap or plug opening to prevent fluid from spilling.

6. Remove suspension member stay. Refer to [FSU-18, "Exploded View"](#).
7. Remove crankshaft position sensor (POS) from A/T assembly. Refer to [EM-226, "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.

# TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

- **Never place in an area affected by magnetism.**

8. Remove rear plate cover. Refer to [EM-204, "2WD : Exploded View"](#).
9. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter.

**CAUTION:**

**When turning the crankshaft, turn it clockwise as viewed from the front of the engine.**

10. Remove A/T fluid cooler tubes mounting bolts from the A/T assembly and engine. Refer to [TM-208, "VK56VD \(2WD\) : Exploded View"](#).

**NOTE:**

Cap or plug openings to prevent fluid from spilling.

11. Support A/T assembly with a transmission jack.

**CAUTION:**

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

12. Insert a wooden block (A) between oil pan (upper) (1) of engine and front suspension member (2).

← : Vehicle front

**CAUTION:**

- **Always insert a wooden block between oil pan (upper) of engine and front suspension member when removing A/T assembly from the engine. (Because VVEL control shaft position sensor may be damaged by the interference between VVEL control shaft position sensor and dash panel if the operation is performed without the wooden block inserted.)**

- **After inserting wooden block, check it does not fall out easily.**

13. Remove rear engine mounting member with power tool. Refer to [EM-212, "2WD : Exploded View"](#).

14. Disconnect A/T assembly connector.

15. Remove harness and brackets from A/T assembly.

16. Remove bolts fixing A/T assembly to engine with power tool.

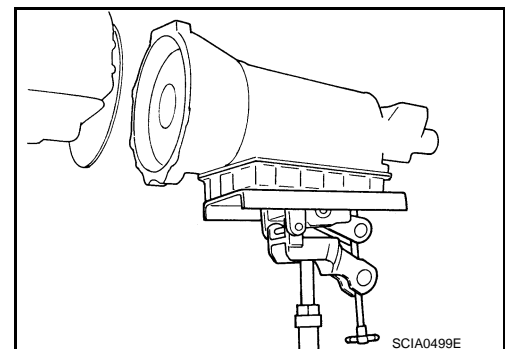
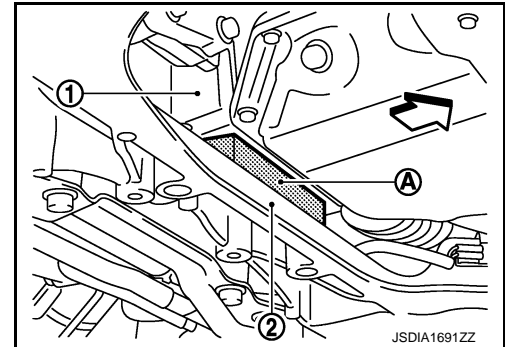
17. Remove air breather hose, air breather box and air breather tube. Refer to [TM-201, "VK56VD \(2WD\) : Exploded View"](#).

18. Remove A/T assembly from the vehicle.

**CAUTION:**

- **Secure torque converter to prevent it from dropping.**
- **Secure A/T assembly to a transmission jack.**

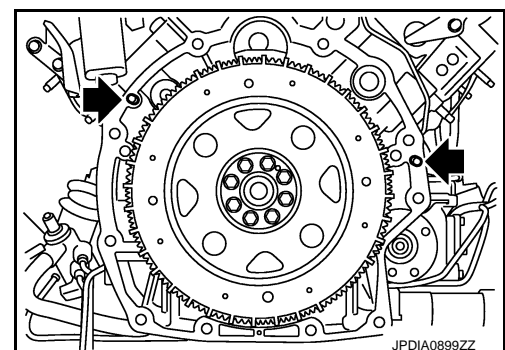
19. Remove manual lever. Refer to [TM-179, "Exploded View"](#).



## INSTALLATION

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

- Check fitting of dowel pin (←).





# TRANSMISSION ASSEMBLY

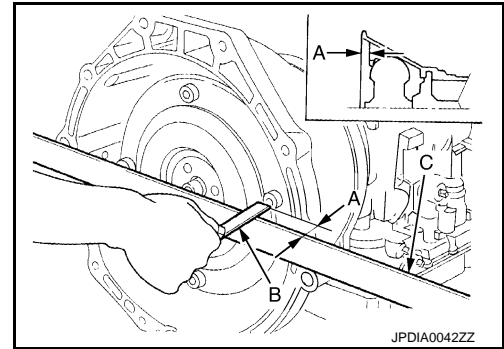
## < UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

- When installing A/T assembly to the engine, be sure to check dimension "A" to ensure it is within the reference value limit.

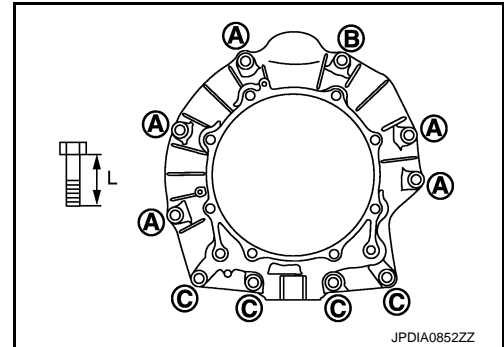
B : Scale  
C : Straightedge

**Dimension "A"** : Refer to [TM-315, "Torque Converter"](#).



- When installing A/T assembly to the engine, attach the fixing bolts in accordance with the following standard.

Bolt symbol	A	B*	C
Insertion direction	A/T assembly to engine		
Number of bolts	5	1	4
Bolt length "L" mm (in)	70 (2.76)		65 (2.56)
Tightening torque N·m (kg·m, ft·lb)	113 (12, 83)		74 (7.5, 55)



\*: Tightening the bolt with bracket and spring washer. Refer to [TM-201, "VK56VD \(2WD\) : 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:

- When turning crankshaft, turn it clockwise as viewed from the front of the engine.
- 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-232, "Disassembly and Assembly"](#).
- Rotate crankshaft several turns and check to be sure that A/T rotates freely without binding after converter is installed to drive plate.

## VK56VD (2WD) : Inspection and Adjustment

INFOID:0000000006884157

### INSPECTION AFTER INSTALLATION

- Check A/T fluid leakage.
- Check A/T position after adjusting A/T positions. Refer to [TM-96, "Inspection and Adjustment"](#).

### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).
- Adjust A/T position. Refer to [TM-96, "Inspection and Adjustment"](#).
- Perform G sensor calibration when replacing A/T assembly. Refer to [TM-86, "Special Repair Requirement"](#).

## VK56VD (AWD)

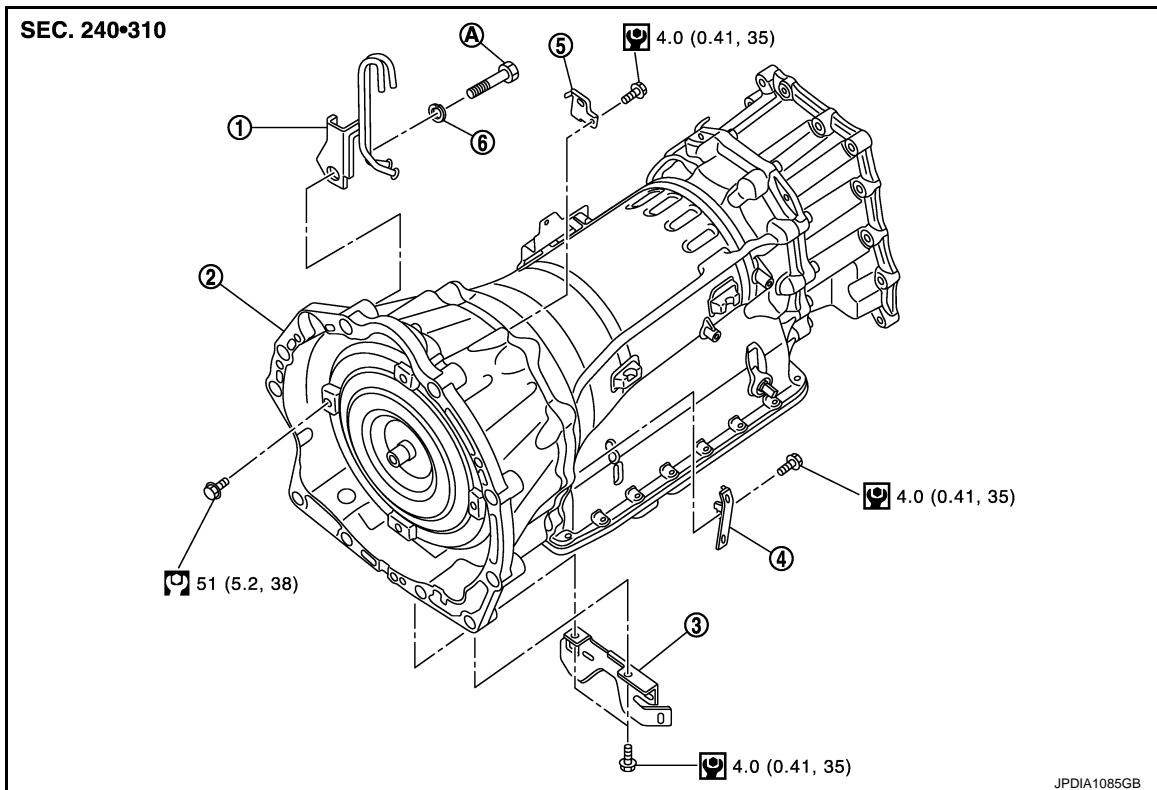
# TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

VK56VD (AWD) : Exploded View

INFOID:000000006884158



- |                      |                 |                  |
|----------------------|-----------------|------------------|
| 1. Air breather tube | 2. A/T assembly | 3. Bracket       |
| 4. Bracket           | 5. Bracket      | 6. Spring washer |

A. Tightening must be done following the installation procedure. Refer to [TM-219, "VK56VD \(2WD\) : Removal and Installation"](#).

Refer to [GI-4, "Components"](#) for symbols in the figure.

## VK56VD (AWD) : Removal and Installation

INFOID:000000006884159

### REMOVAL

#### CAUTION:

- When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.
- Be careful not to damage sensor edge.
- Always insert a wooden block between oil pan (upper) of engine and front suspension member when removing A/T assembly from the engine. (Because VVEL control shaft position sensor may be damaged by the interference between VVEL control shaft position sensor and dash panel if the operation is performed without the wooden block inserted.)

1. Shift the selector lever to "P" position, and release the parking brake.
2. Disconnect the battery cable from the negative terminal.
3. Remove control rod from A/T shift selector. Refer to [TM-176, "AWD : Exploded View"](#).
4. Separate propeller shaft assembly (rear). Refer to [DLN-106, "Exploded View"](#).
5. Separate propeller shaft assembly (front). Refer to [DLN-89, "VK56VD : Exploded View"](#).
6. Remove crankshaft position sensor (POS) from A/T assembly. Refer to [EM-207, "AWD : 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.
7. Remove rear plate cover. Refer to [EM-207, "AWD : Exploded View"](#).

# TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

8. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter.  
**CAUTION:**  
**When turning the crankshaft, turn it clockwise as viewed from the front of the engine.**
9. Remove A/T fluid cooler tubes mounting bolts from the A/T assembly and engine. Refer to [TM-210, "VK56VD \(AWD\) : Exploded View"](#).  
**NOTE:**  
Cap or plug openings to prevent fluid from spilling.
10. Support A/T assembly with a transmission jack.  
**CAUTION:**  
**When setting the transmission jack, be careful not to allow it to collide against the drain plug.**
11. Insert a wooden block (A) between oil pan (upper) of engine (1) and front suspension member (2).

← : Vehicle front

**CAUTION:**

- Always insert a wooden block between oil pan (upper) of engine and front suspension member when removing A/T assembly from the engine. (Because VVEL control shaft position sensor may be damaged by the interference between VVEL control shaft position sensor and dash panel if the operation is performed without the wooden block inserted.)

- After inserting wooden block, check it does not fall out easily.

12. Remove rear engine mounting member with power tool. Refer to [EM-212, "2WD : Exploded View"](#).
13. Disconnect A/T assembly connector and AWD solenoid connector.
14. Remove harness and brackets from A/T assembly and transfer assembly.
15. Remove bolts fixing A/T assembly to engine with power tool.
16. Remove A/T air breather hose, transfer air breather hose and air breather tube. Refer to [TM-202, "VK56VD \(AWD\) : Exploded View"](#) (for A/T), [DLN-61, "VK56VD : Removal and Installation"](#) (for transfer).

17. Remove A/T assembly with transfer assembly from vehicle.

**CAUTION:**

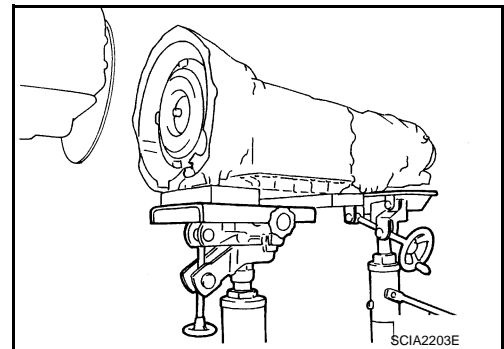
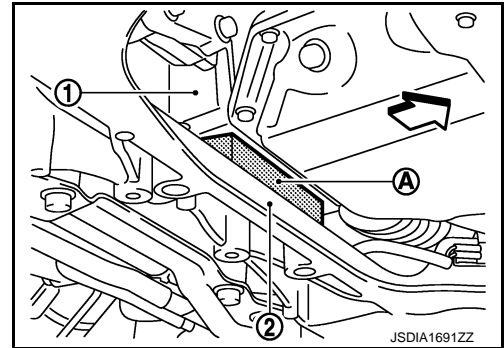
- Secure torque converter to prevent it from dropping.
- Secure A/T assembly to a transmission jack.

18. Remove transfer assembly from A/T assembly with power tool. Refer to [DLN-61, "VK56VD : Exploded View"](#).

**NOTE:**

Cap or plug opening to prevent fluid from spilling.

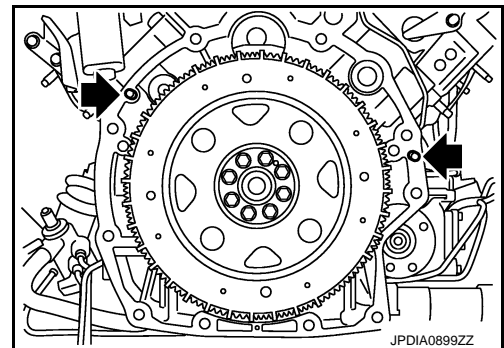
19. Remove manual lever. Refer to [TM-179, "Exploded View"](#).



## INSTALLATION

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

- Check fitting of dowel pin (←).



A  
B  
C  
TM  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

# TRANSMISSION ASSEMBLY

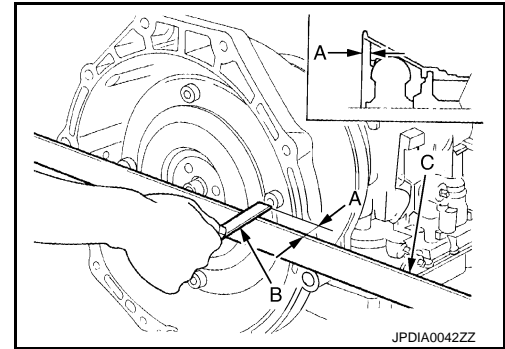
## < UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

- When installing A/T assembly to the engine, be sure to check dimension "A" to ensure it is within the reference value limit.

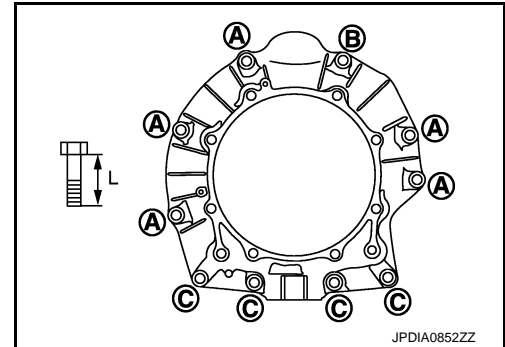
B : Scale  
C : Straightedge

**Dimension "A"** : Refer to [TM-315, "Torque Converter"](#).



- When installing A/T assembly to the engine, attach the fixing bolts in accordance with the following standard.

Bolt symbol	A	B*	C
Insertion direction	A/T assembly to engine		
Number of bolts	5	1	4
Bolt length "L" mm (in)	70 (2.76)		65 (2.56)
Tightening torque N·m (kg·m, ft·lb)	113 (12, 83)		74 (7.5, 55)



\*: Tightening the bolt with bracket of air breather tube and spring washer. Refer to [TM-202, "VK56VD \(AWD\) : 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:

- When turning crankshaft, turn it clockwise as viewed from the front of the engine.
- 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-232, "Disassembly and Assembly" EM](#).
- Rotate crankshaft several turns and check to be sure that A/T rotates freely without binding after converter is installed to drive plate.

## VK56VD (AWD) : Inspection and Adjustment

INFOID:000000006884160

### INSPECTION AFTER INSTALLATION

- Check A/T fluid leakage.
- Check A/T position after adjusting A/T position. Refer to [TM-96, "Inspection and Adjustment"](#).

### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to [TM-90, "Adjustment"](#).
- Adjust A/T position. Refer to [TM-96, "Inspection and Adjustment"](#).
- Perform G sensor calibration when replacing A/T assembly. Refer to [TM-86, "Special Repair Requirement"](#).

# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

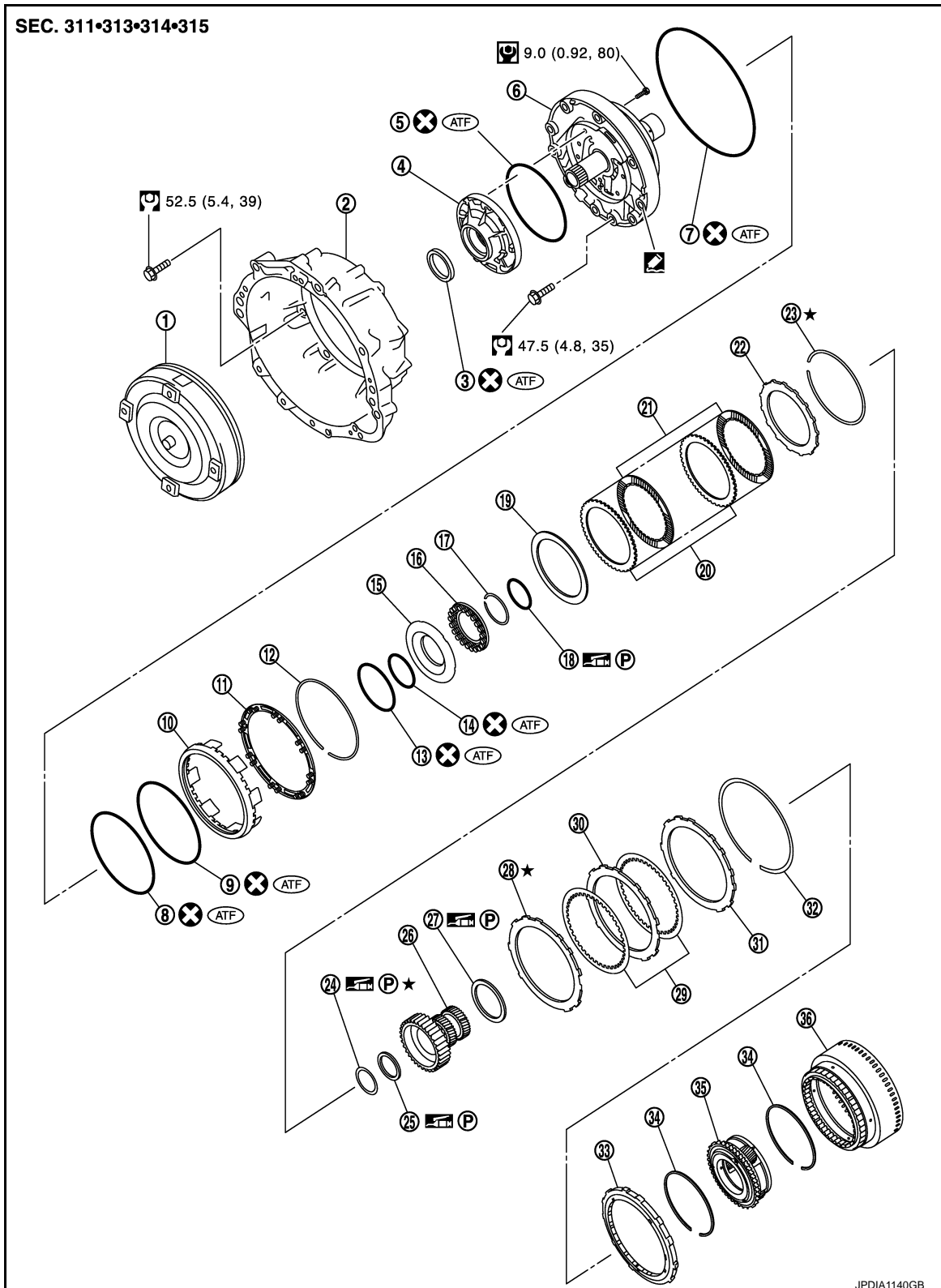
## UNIT DISASSEMBLY AND ASSEMBLY

### TRANSMISSION ASSEMBLY

Exploded View

INFOID:000000007134271

2WD MODELS



A

B

C

TM

E

F

G

H

I

J

K

L

M

N

O


P

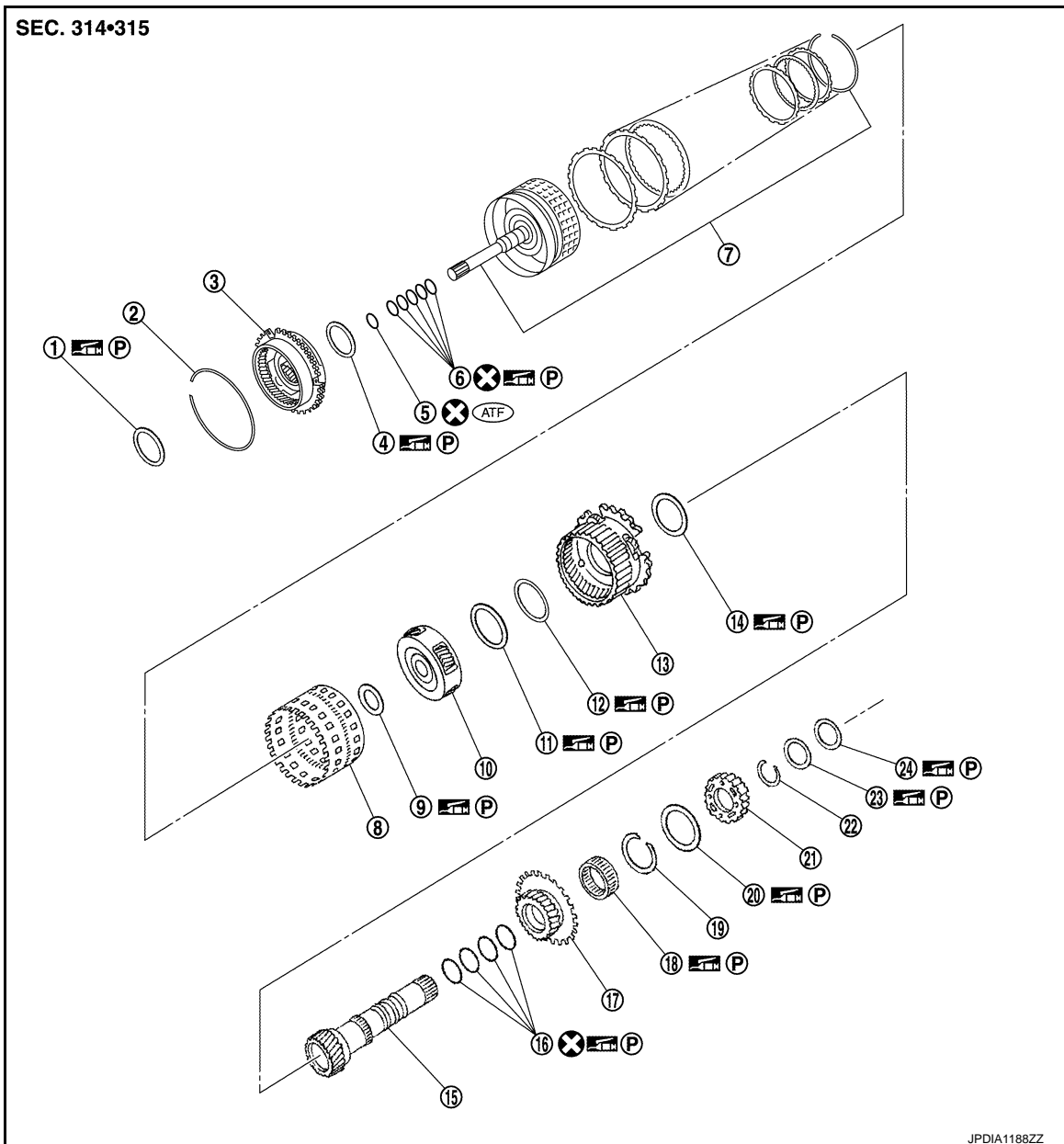
# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- |                                 |                                  |                              |
|---------------------------------|----------------------------------|------------------------------|
| 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 |

: Apply Genuine RTV silicone sealant or equivalent. Refer to [GI-22. "Recommended Chemical Products and Sealants"](#).  
Refer to [GI-4. "Components"](#) for symbols not described on the above.



# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- |                           |                       |                                     |   |
|---------------------------|-----------------------|-------------------------------------|---|
| 1. Needle bearing         | 2. Snap ring          | 3. Front carrier assembly           | A |
| 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                    | B |
| 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 | C |
| 22. Snap ring             | 23. Bearing race      | 24. Needle bearing                  |   |

Refer to [GI-4, "Components"](#) for symbols not described on the above.

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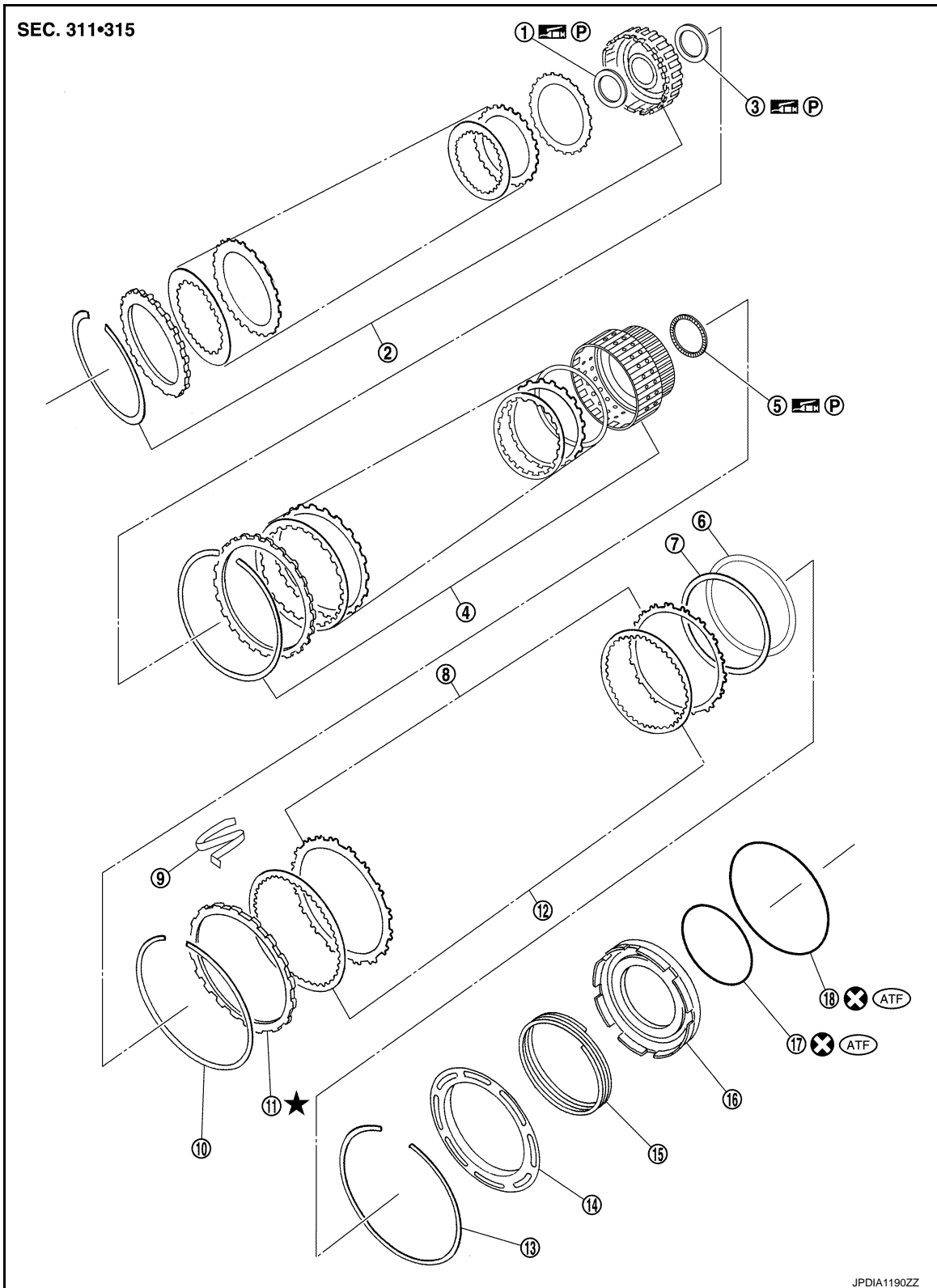
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# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]



- |                             |   |                                 |
|-----------------------------|---|---------------------------------|
| 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 |



# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

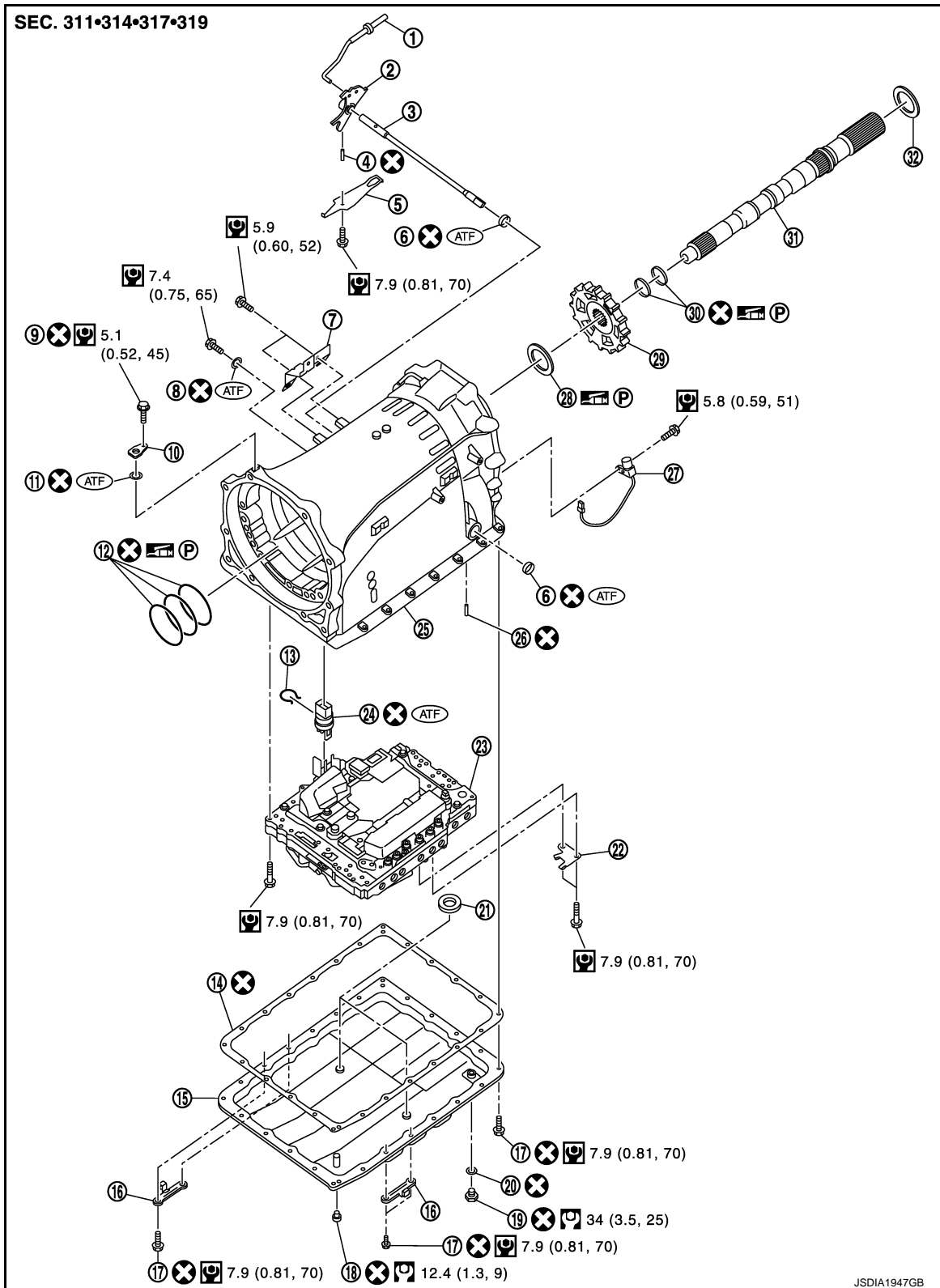
[7AT: RE7R01A]

16. Reverse brake piston

17. D-ring

18. D-ring

Refer to [GI-4, "Components"](#) for symbols in the figure.



- 1. Parking rod
- 4. Retaining pin
- 7. Bracket
- 10. Baffle plate

- 2. Manual plate
- 5. Detent spring
- 8. O-ring
- 11. O-ring
- 13. O-ring
- 14. O-ring
- 15. O-ring
- 16. Reverse brake piston
- 17. D-ring
- 18. D-ring
- 19. O-ring
- 20. O-ring
- 21. O-ring
- 22. O-ring
- 23. O-ring
- 24. O-ring
- 25. O-ring
- 26. O-ring
- 27. O-ring
- 28. O-ring
- 29. Gear
- 30. O-ring
- 31. Manual shaft
- 32. O-ring

- 3. Manual shaft
- 6. Oil seal
- 9. Self-sealing bolt
- 12. Seal ring

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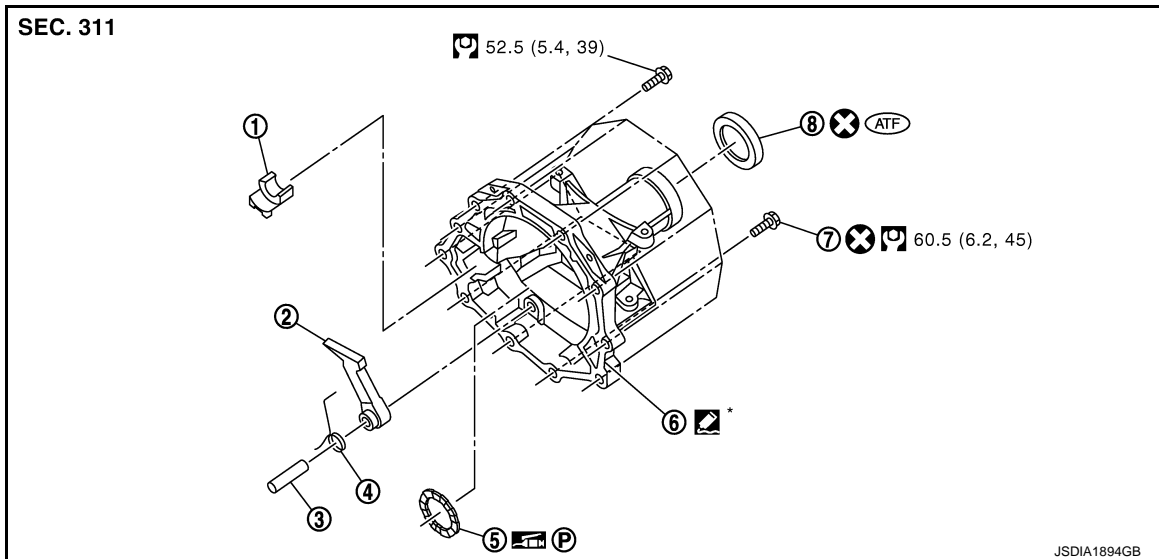
# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- |                       |                           |                         |
|-----------------------|---------------------------|-------------------------|
| 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          |                         |

Refer to [GI-4. "Components"](#) for symbols in the figure.



- |                             |                   |                   |
|-----------------------------|-------------------|-------------------|
| 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  |                   |

\*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to [GI-22. "Recommended Chemical Products and Sealants"](#).

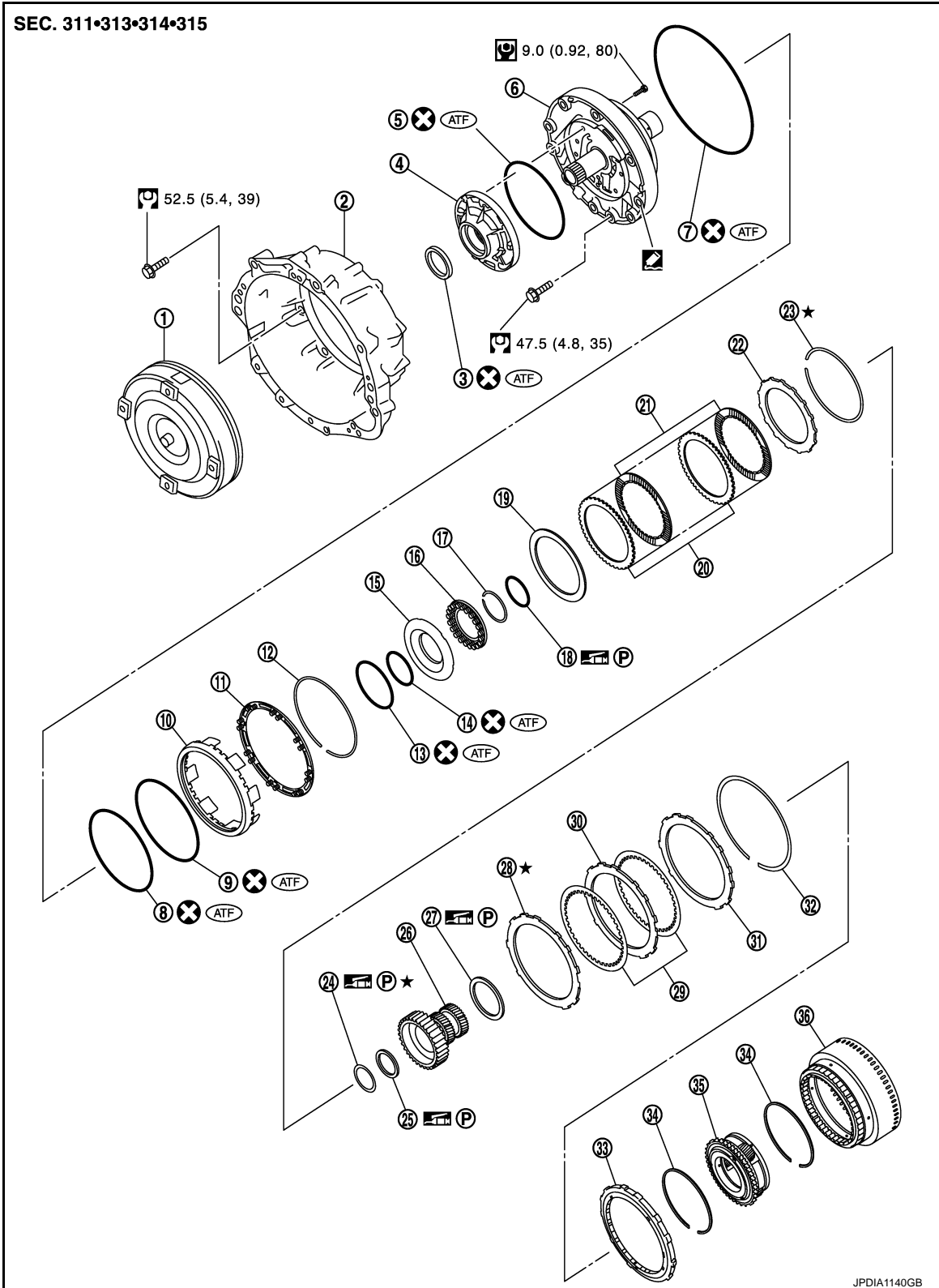
Refer to [GI-4. "Components"](#) for symbols in the figure.

AWD MODELS

# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]



- |                                |                                 |                              |
|--------------------------------|---------------------------------|------------------------------|
| 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                |


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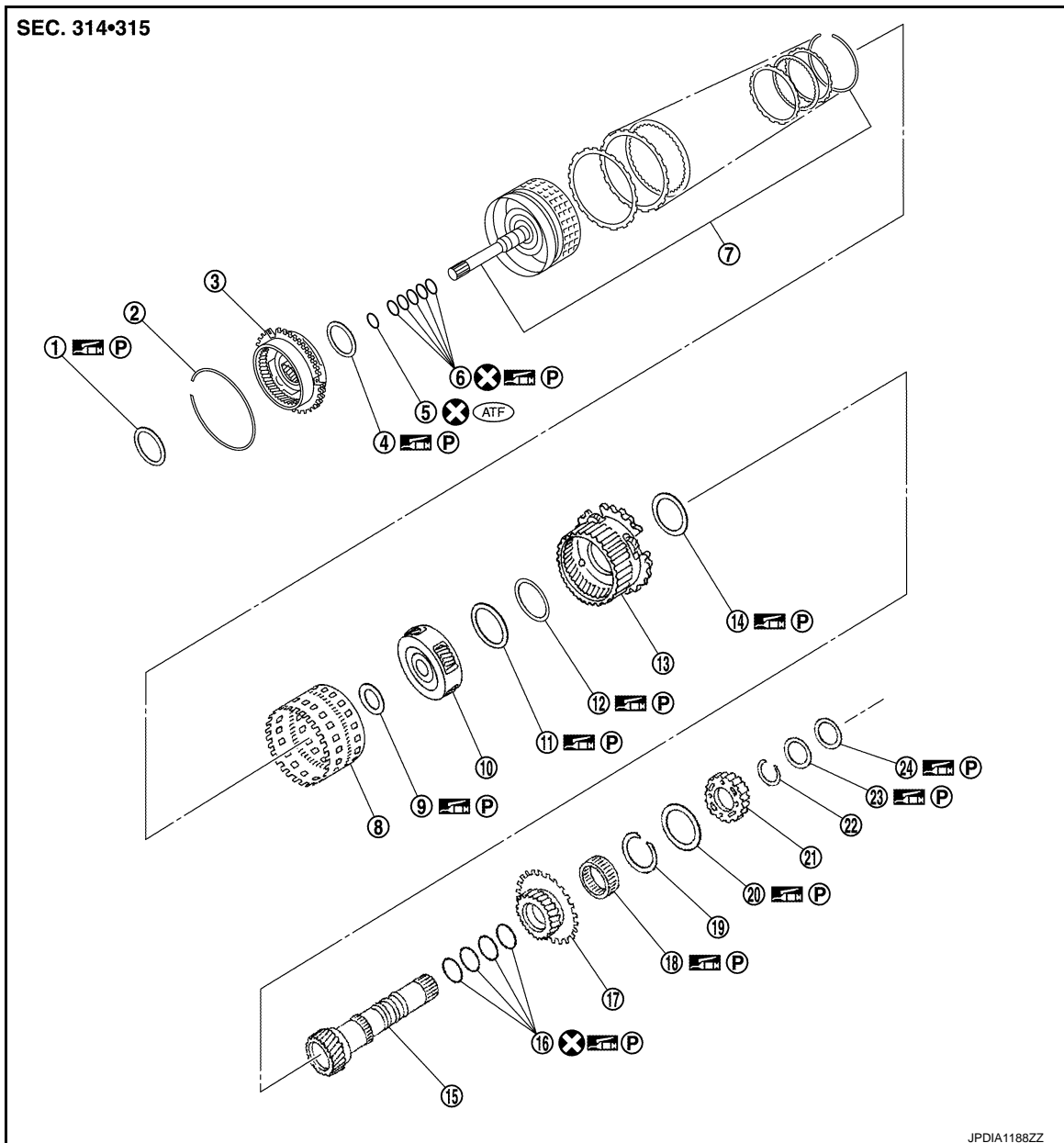
# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- |                                 |                                  |                              |
|---------------------------------|----------------------------------|------------------------------|
| 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 |

 Apply Genuine RTV silicone sealant or equivalent. Refer to [GI-22. "Recommended Chemical Products and Sealants"](#). Refer to [GI-4. "Components"](#) for symbols not described on the above.



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- |                           |                       |                                     |
|---------------------------|-----------------------|-------------------------------------|
| 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 |

# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

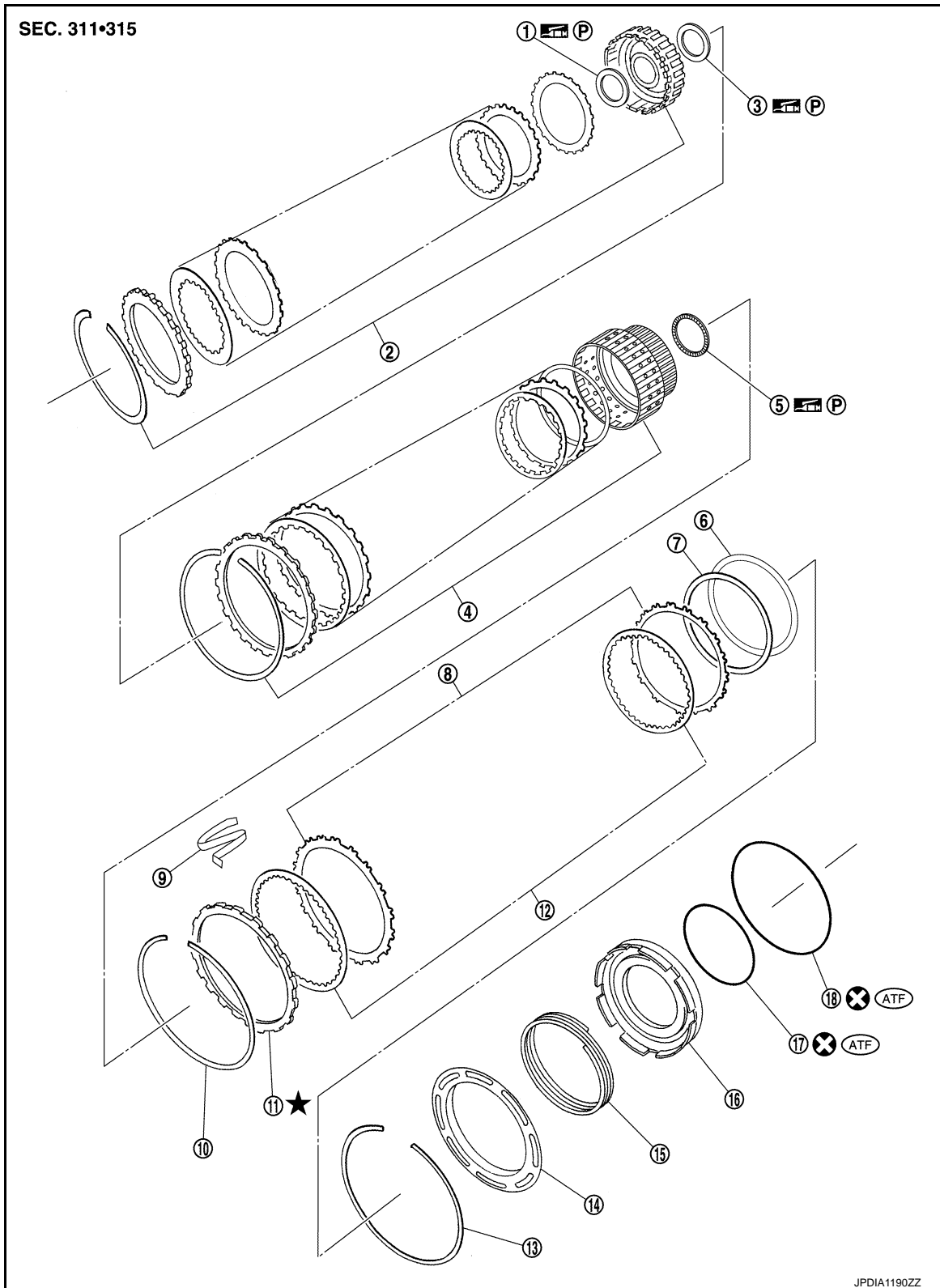
[7AT: RE7R01A]

22. Snap ring

23. Bearing race

24. Needle bearing

Refer to [GI-4, "Components"](#) for symbols not described on the above.



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

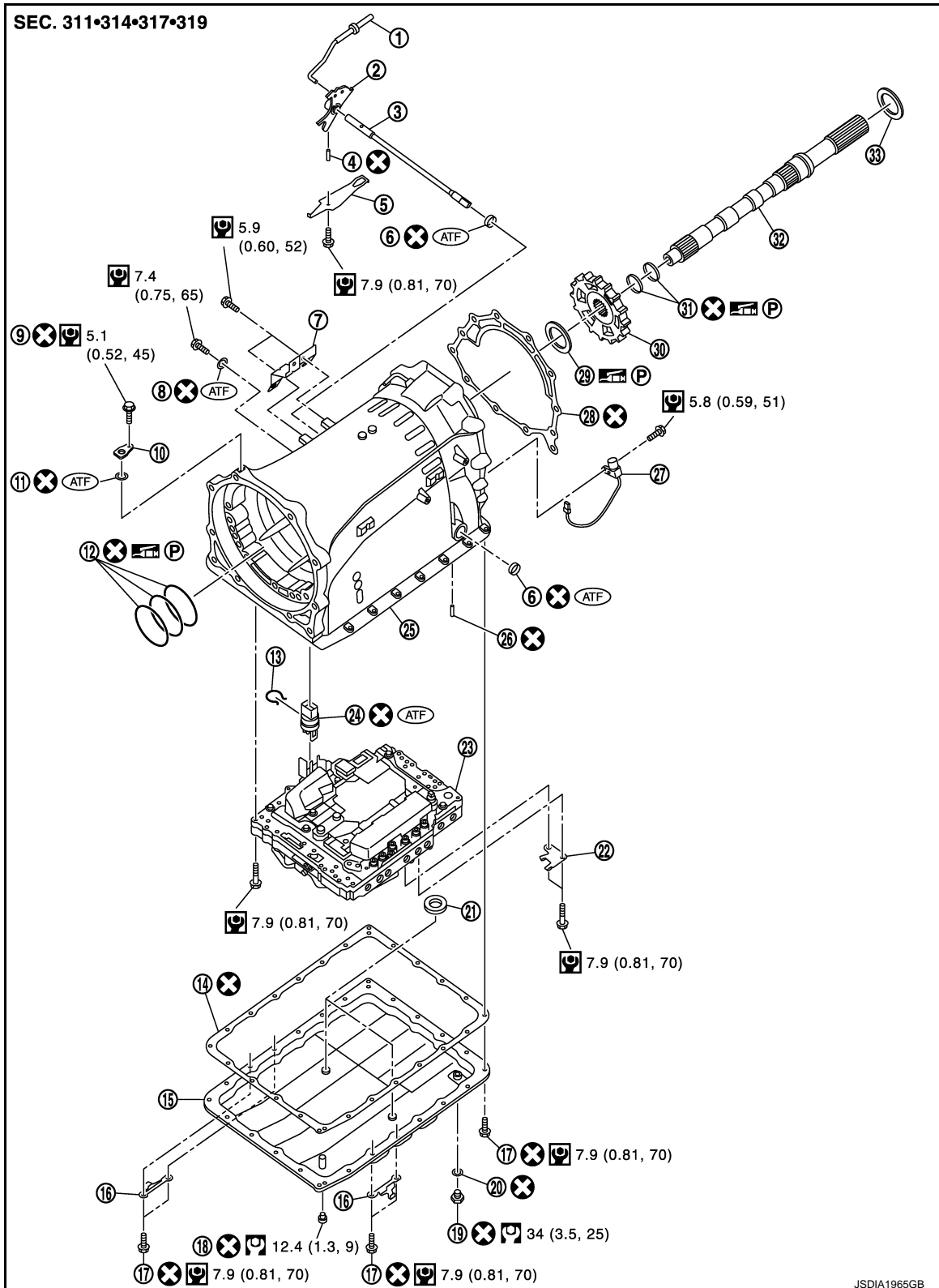
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# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- |                          |                                   |                                 |
|--------------------------|-----------------------------------|---------------------------------|
| 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                      |
- Refer to [GI-4. "Components"](#) for symbols in the figure.



- |                  |                  |                 |
|------------------|------------------|-----------------|
| 1. Parking rod   | 2. Manual plate  | 3. Manual shaft |
| 4. Retaining pin | 5. Detent spring | 6. Oil seal     |

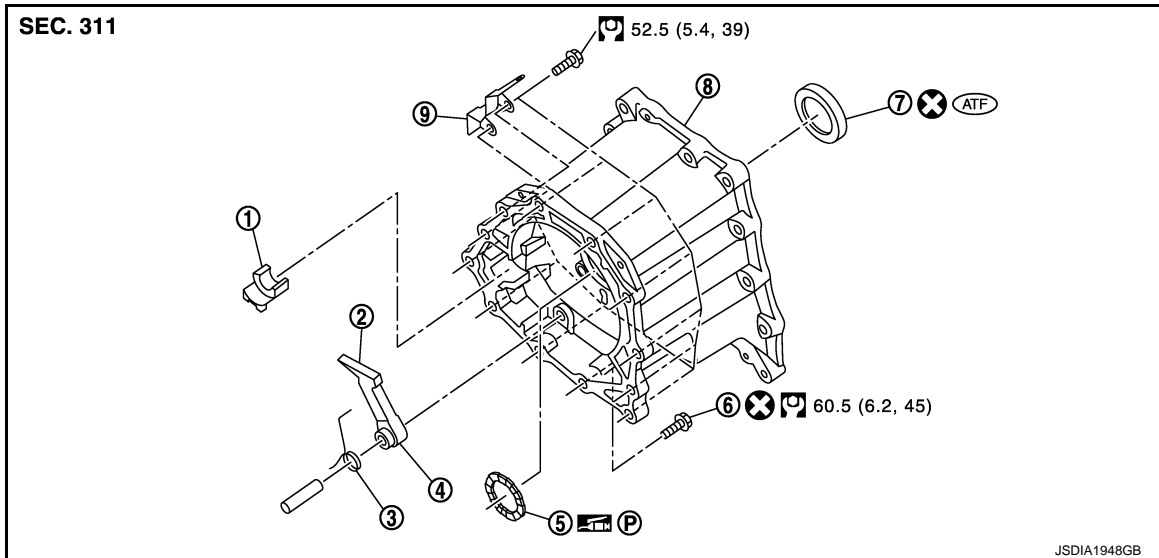
# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- |                       |                           |                         |
|-----------------------|---------------------------|-------------------------|
| 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        |

Refer to [GI-4, "Components"](#) for symbols in the figure.



- |                             |                   |                      |
|-----------------------------|-------------------|----------------------|
| 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           |

Refer to [GI-4, "Components"](#) for symbols in the figure.

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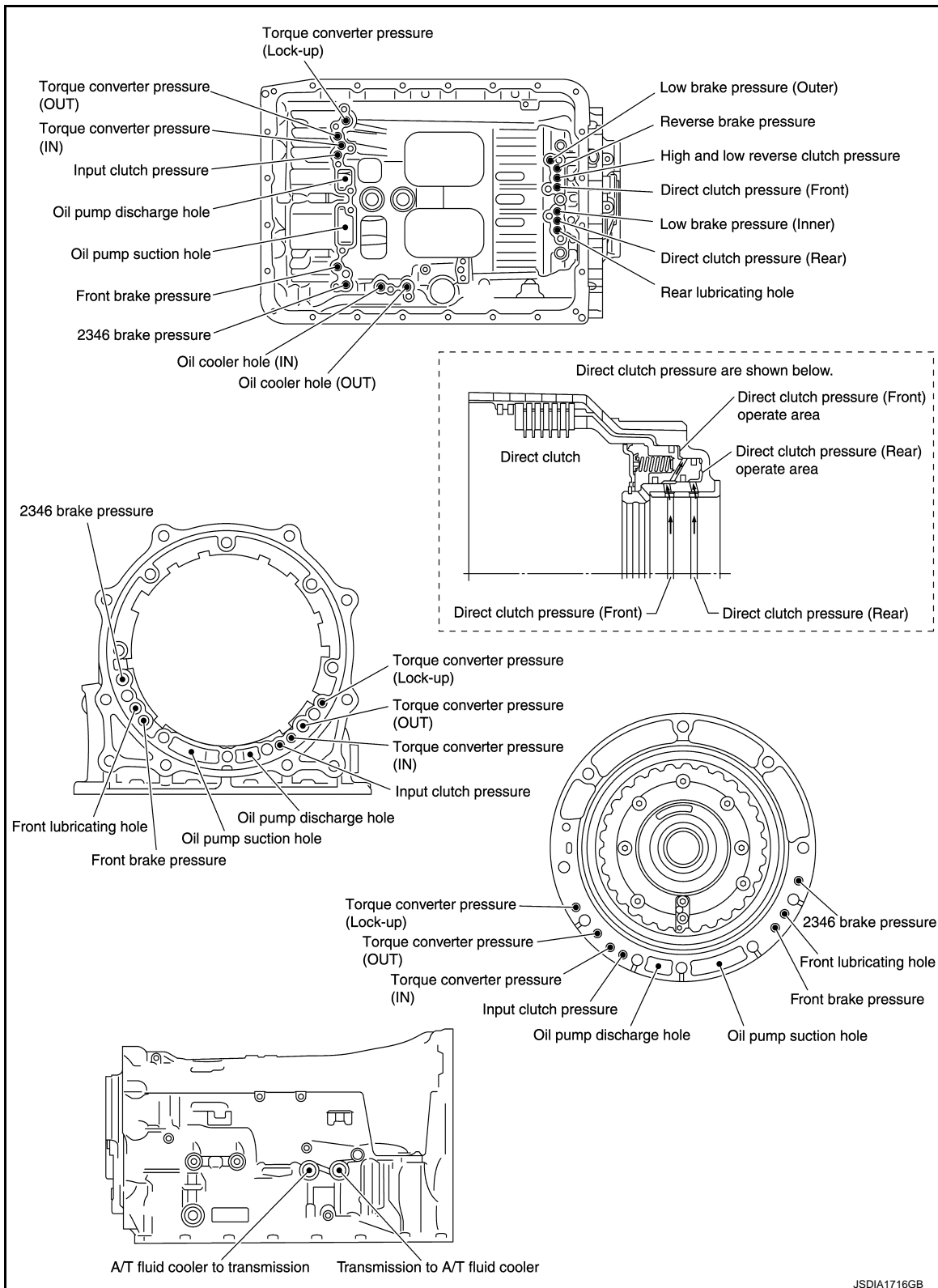
# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

## Oil Channel

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## Location of Needle Bearings and Bearing Races

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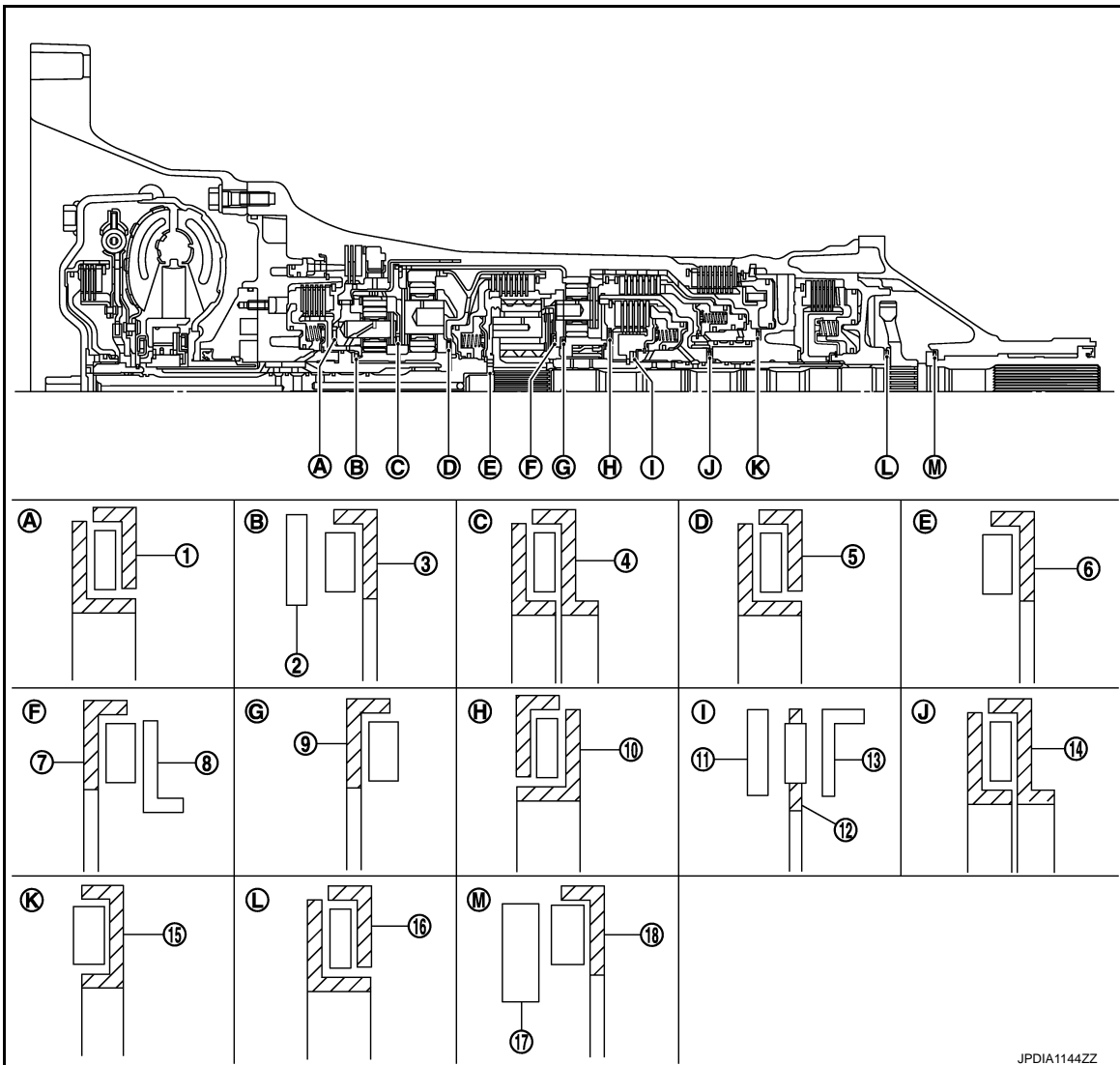
### 2WD MODELS



# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]



Location	Item	Outer diameter mm (in)
A	(1) Needle bearing	94 (3.701)
B	(2) Bearing race	58.6 (2.307)
	(3) Needle bearing	60 (2.362)
C	(4) Needle bearing	84.6 (3.331)
D	(5) Needle bearing	77 (3.031)
E	(6) Needle bearing	47 (1.850)
F	(7) Needle bearing	84 (3.307)
	(8) Bearing race	82 (3.228)
G	(9) Needle bearing	80 (3.150)
H	(10) Needle bearing	92 (3.622)
I	(11) Bearing race	61.1 (2.406)
	(12) Needle bearing	60 (2.362)
	(13) Bearing race	61.9 (2.437)
J	(14) Needle bearing	62.8 (2.472)
K	(15) Needle bearing	92 (3.622)
L	(16) Needle bearing	65 (2.559)

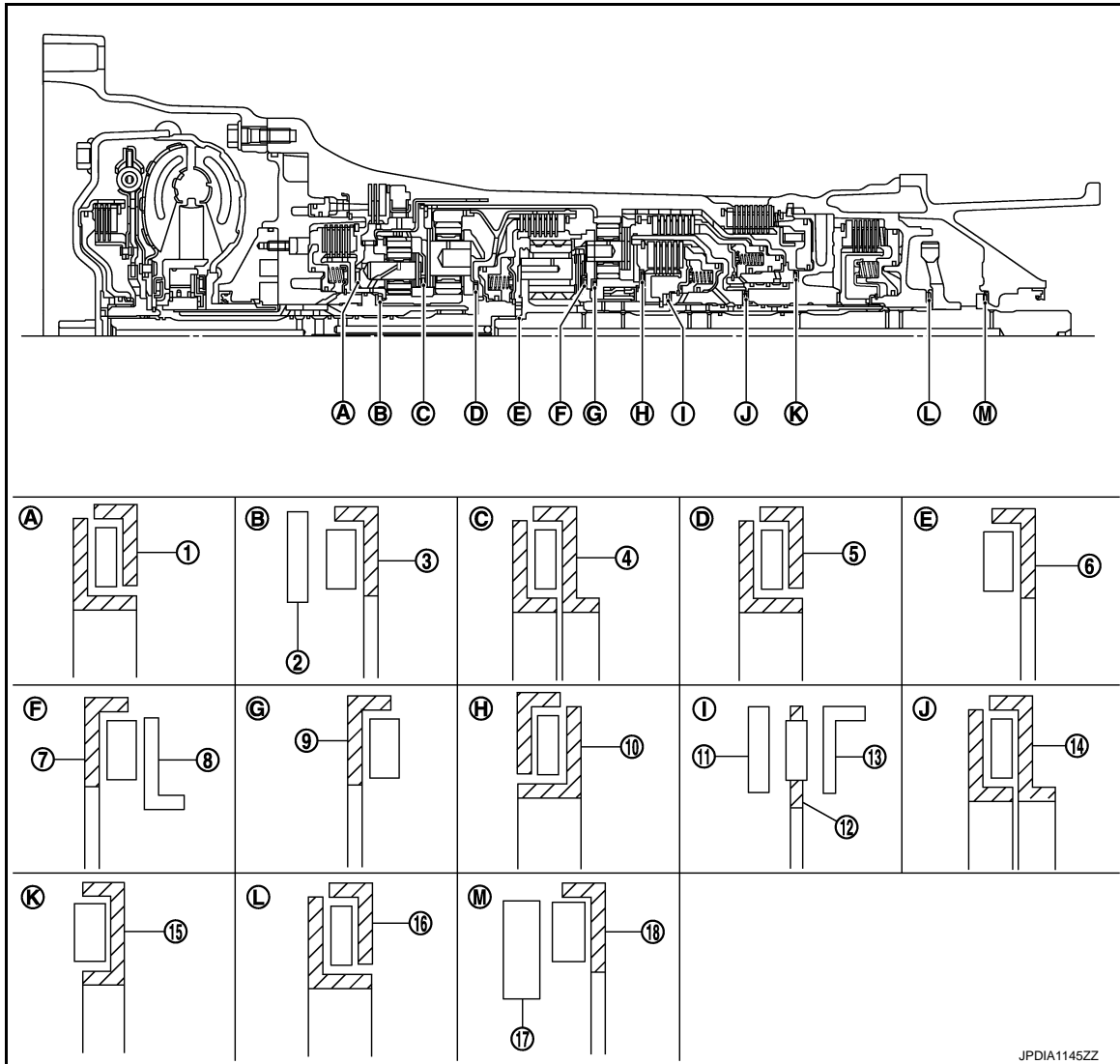
# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

Location	Item	Outer diameter mm (in)
M	(17) Bearing race	58 (2.283)
	(18) Needle bearing	60 (2.362)

**AWD MODELS**



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

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# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

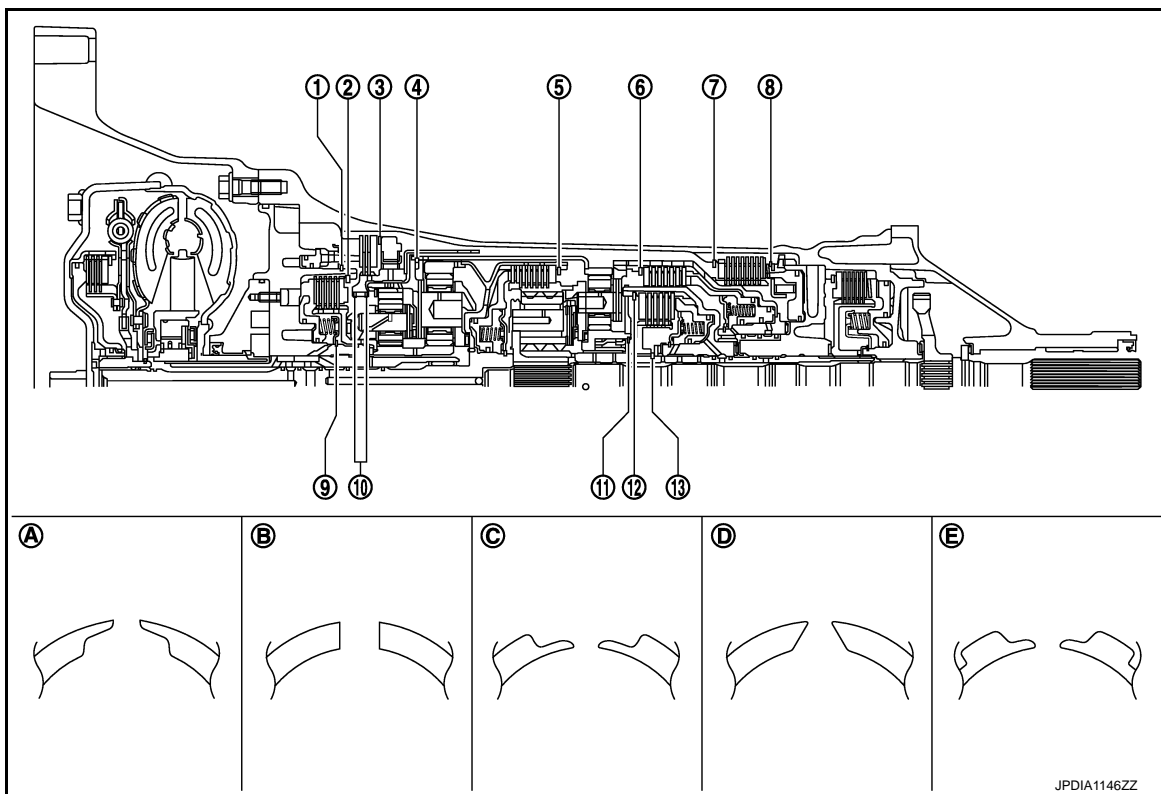
[7AT: RE7R01A]

Location	Item	Outer diameter mm (in)
I	(11) Bearing race	61.1 (2.406)
	(12) Needle bearing	60 (2.362)
	(13) Bearing race	61.9 (2.437)
J	(14) Needle bearing	62.8 (2.472)
K	(15) Needle bearing	92 (3.622)
L	(16) Needle bearing	65 (2.559)
M	(17) Bearing race	58 (2.283)
	(18) Needle bearing	60 (2.362)

## Location of Snap Rings

INFOID:000000007134274

### 2WD MODELS



Location	Shape of snap ring	Outer diameter mm (in)
1	A	159.9 (6.295)
2	B	159 (6.260)
3	B	216 (8.504)
4	B	180.4 (7.102)
5	C	171.5 (6.752)
6	B	169 (6.654)
7	B	180.5 (7.106)
8	B	181.0 (7.126)
9	D	64.6 (2.543)
10	B	136 (5.354)
11	E	70.5 (2.776)

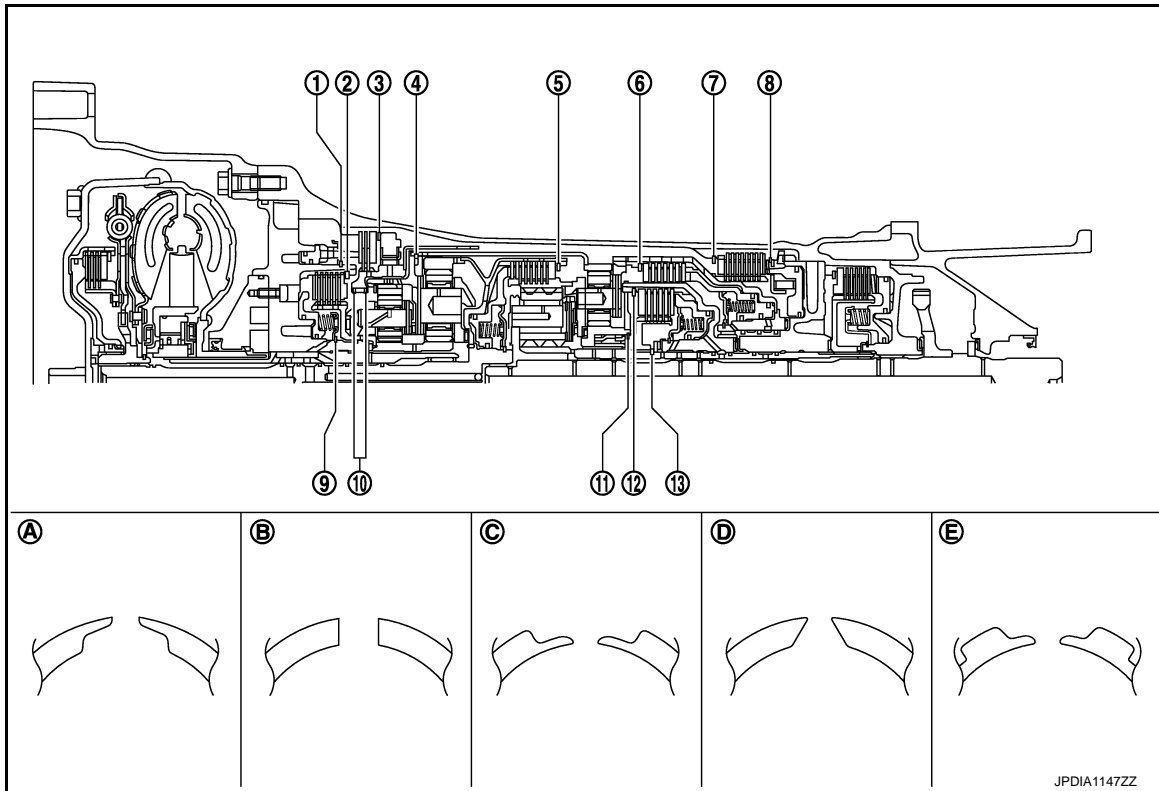
# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

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

## AWD MODELS



Location	Shape of snap ring	Outer diameter mm (in)
1	A	159.9 (6.295)
2	B	159 (6.260)
3	B	216 (8.504)
4	B	180.4 (7.102)
5	C	171.5 (6.752)
6	B	169 (6.654)
7	B	180.5 (7.106)
8	B	181.0 (7.126)
9	D	64.6 (2.543)
10	B	136 (5.354)
11	E	70.5 (2.776)
12	B	135 (5.315)
13	A	48.4 (1.906)

## Disassembly

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### CAUTION:

Never disassemble parts behind drum support. Refer to [TM-16, "Cross-Sectional View"](#).

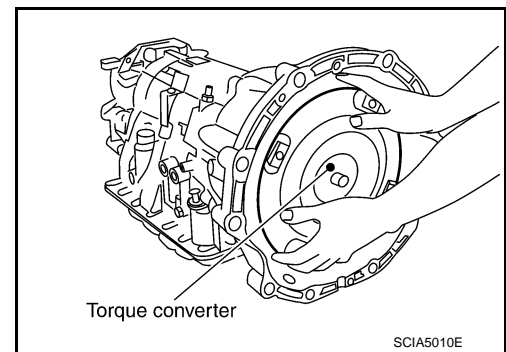
1. Drain ATF through drain plug.

# TRANSMISSION ASSEMBLY

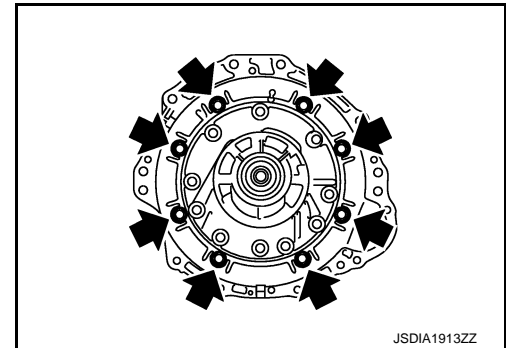
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

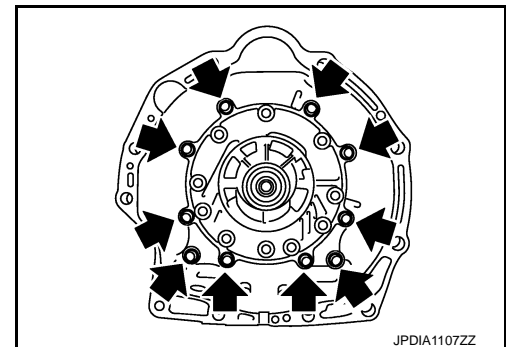
2. Remove torque converter by holding it firmly and turning while pulling straight out.



3. Remove tightening bolts (←) for converter housing and transmission case.
  - VQ37VHR models

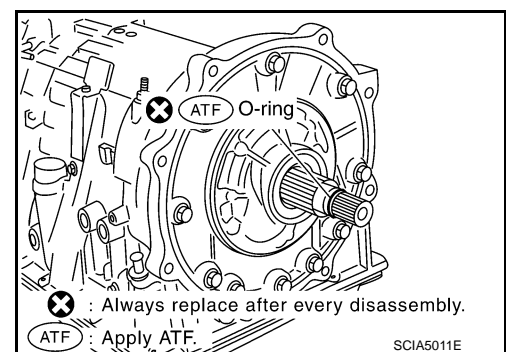


- VK56VD models



4. Remove converter housing from transmission case.  
**CAUTION:**  
**Be careful not to scratch converter housing.**

5. Remove O-ring from input clutch assembly.

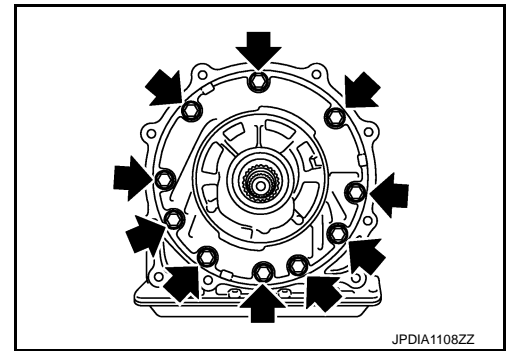


# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

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

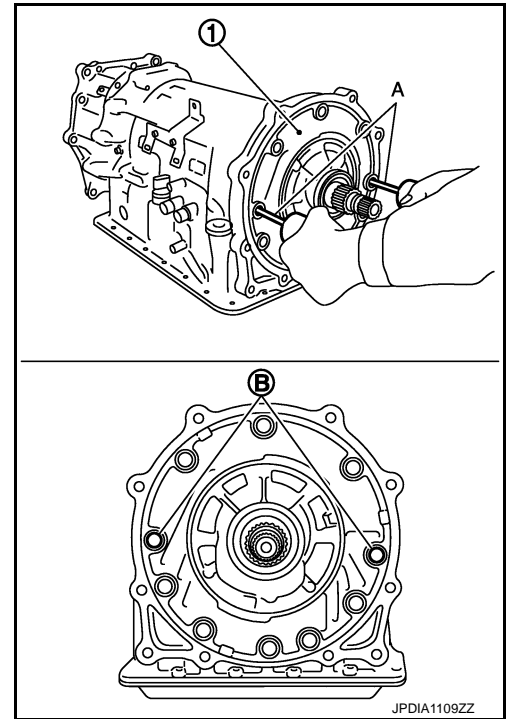


7. Attach the sliding hammers [SST: ST25850000 (J-25721-A)] (A) to oil pump assembly (1) and extract it evenly from transmission case.

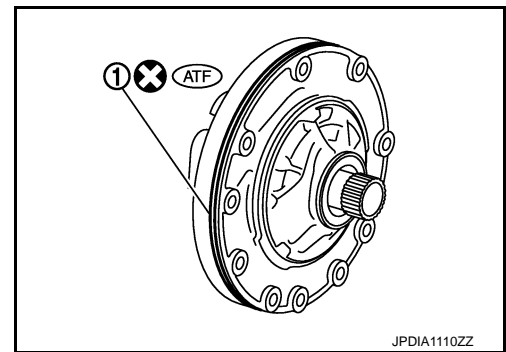
B : Sliding hammer attachment position

**CAUTION:**

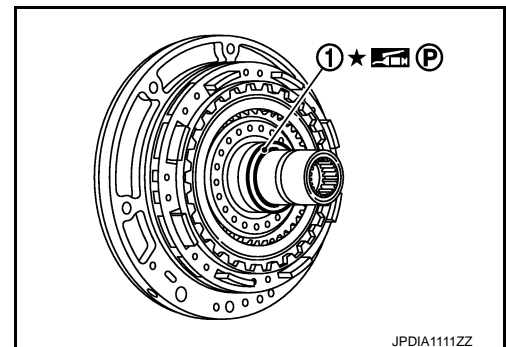
- Fully tighten the sliding hammer screws.
- Make sure that bearing race is installed to the oil pump assembly edge surface.



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



9. Remove bearing race (1) from oil pump assembly.

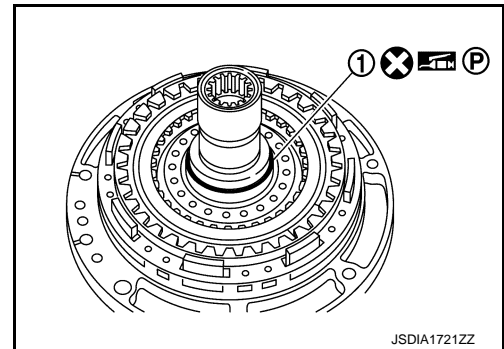


# TRANSMISSION ASSEMBLY

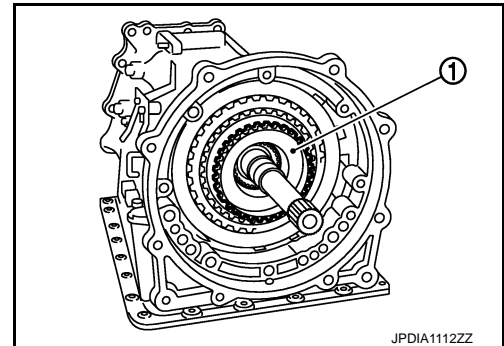
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

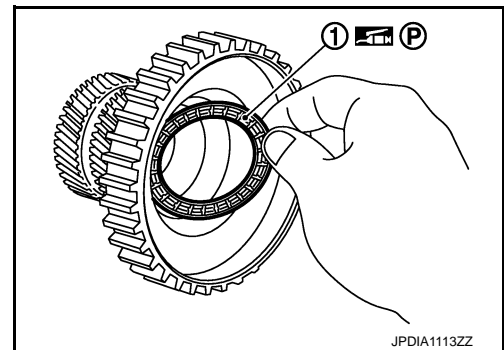
10. Remove seal ring (1) from oil pump assembly.



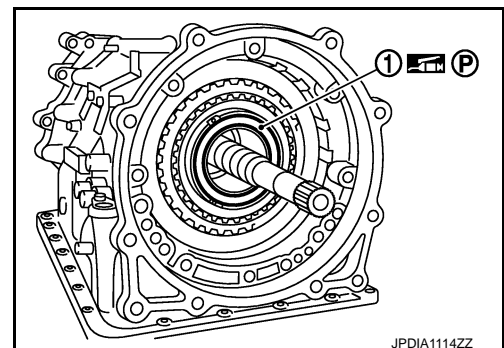
11. Remove under drive sun gear (1) from under drive carrier assembly.



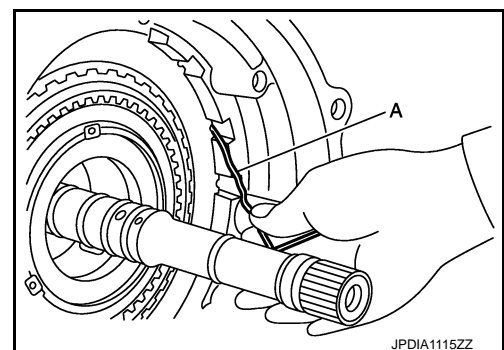
12. Remove needle bearing (1) from under drive sun gear.



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.



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# TRANSMISSION ASSEMBLY

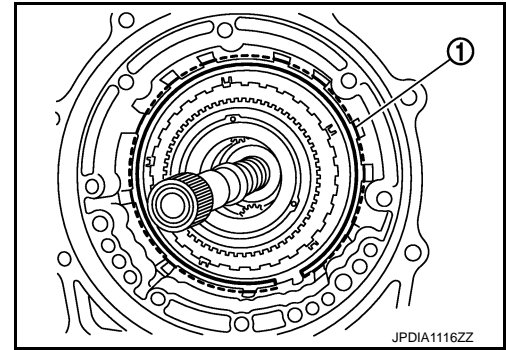
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

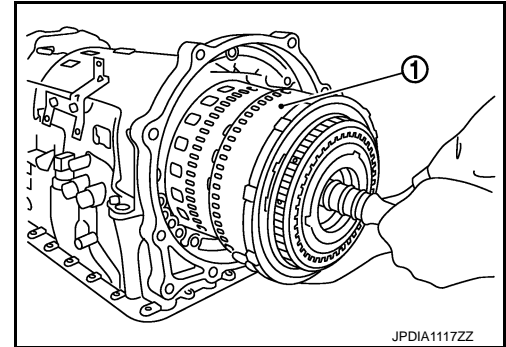
15. Remove snap ring (1) from transmission case using a flat-bladed screwdriver.

**CAUTION:**

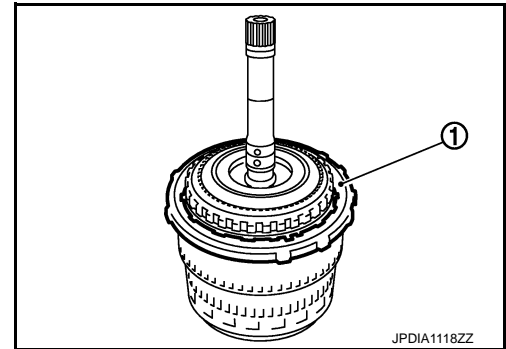
- Be careful not to scratch transmission case and 1st one-way clutch.
- Be careful not to damage snap ring.



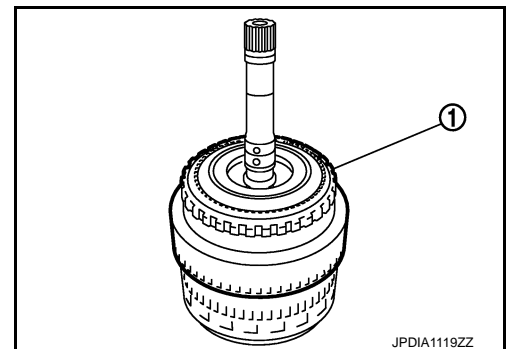
16. Remove input clutch assembly (with 1st one-way clutch, under drive carrier assembly, front brake hub, front carrier assembly, and rear internal gear) (1) from transmission case.



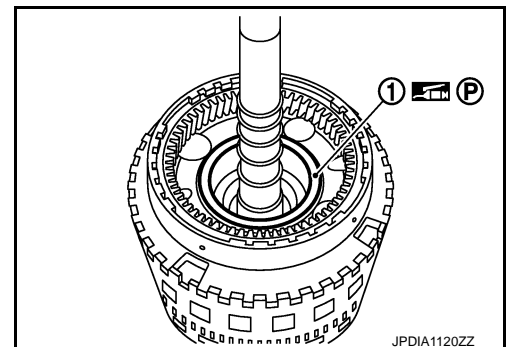
17. Remove 1st one-way clutch (1) from front brake hub.



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



19. Remove needle bearing (1) from front carrier assembly.



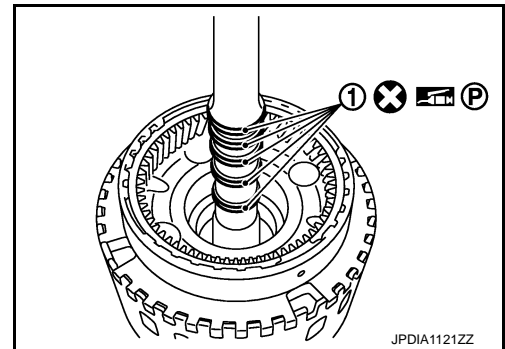


# TRANSMISSION ASSEMBLY

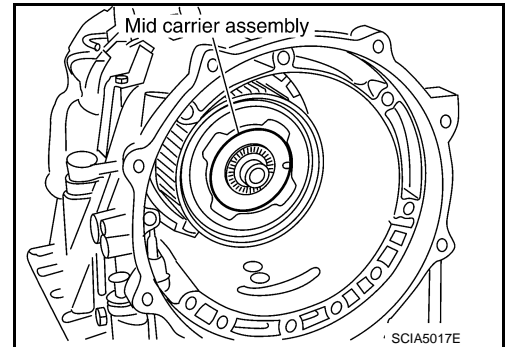
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

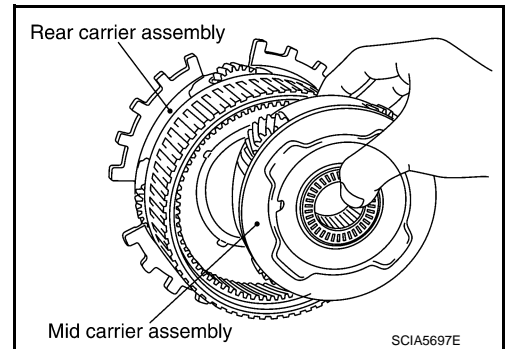
20. Remove seal rings (1) from input clutch assembly.



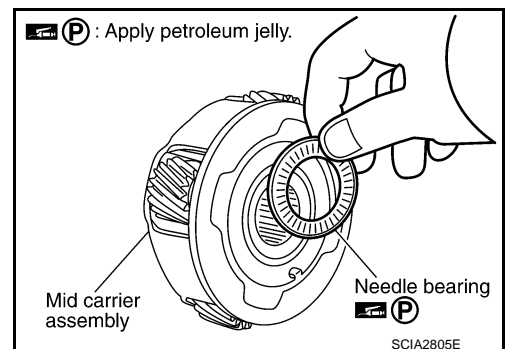
21. Remove mid carrier assembly and rear carrier assembly as a unit.



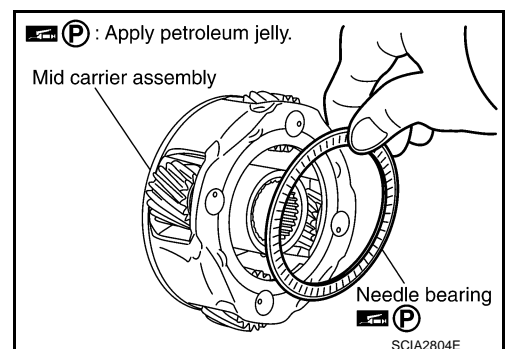
22. Remove mid carrier assembly from rear carrier assembly.



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



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



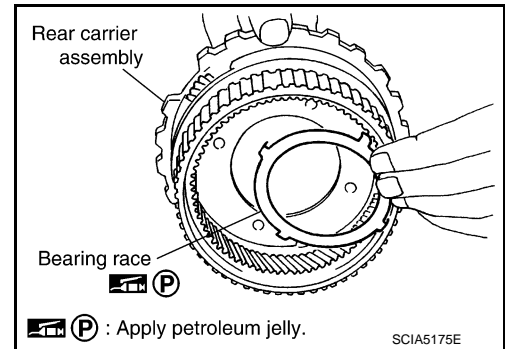
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# TRANSMISSION ASSEMBLY

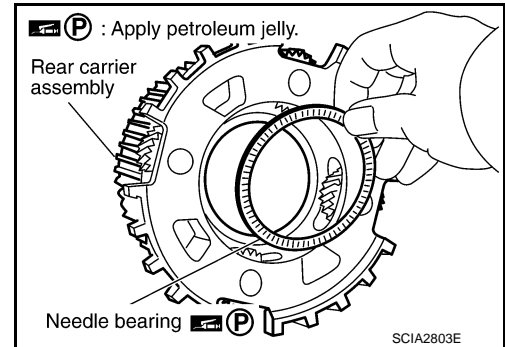
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

25. Remove bearing race from rear carrier assembly.



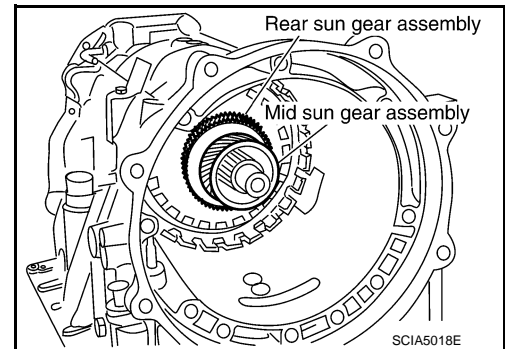
26. Remove needle bearing from rear carrier assembly.



27. Remove mid sun gear assembly, rear sun gear assembly, and high and low reverse clutch hub as a unit.

**CAUTION:**

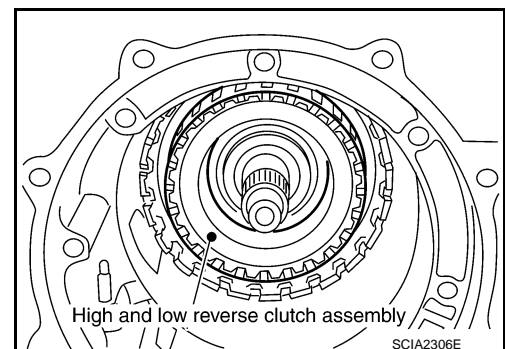
**Be careful to remove them with bearing race and needle bearing.**



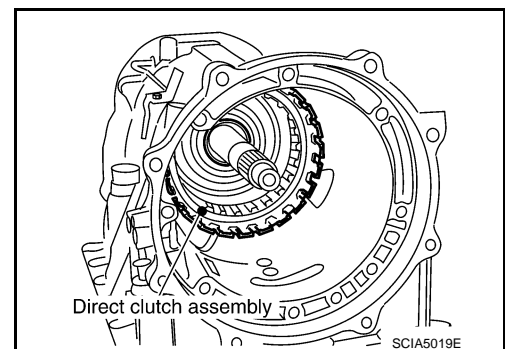
28. Remove high and low reverse clutch assembly from direct clutch assembly.

**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.

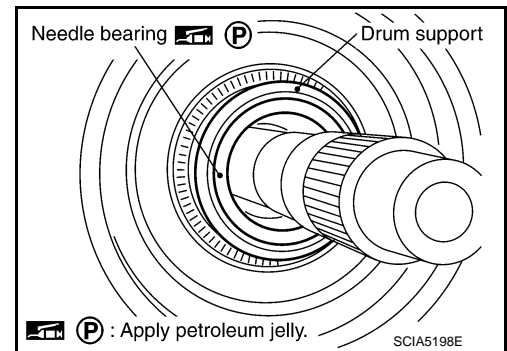


# TRANSMISSION ASSEMBLY

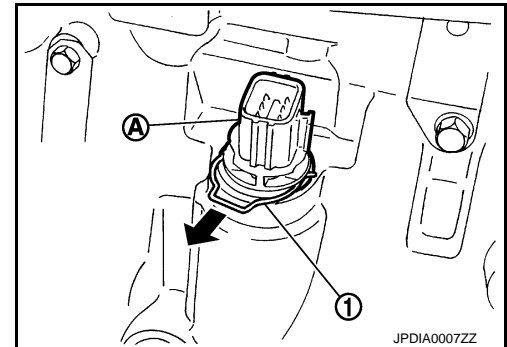
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

30. Remove needle bearing from drum support.

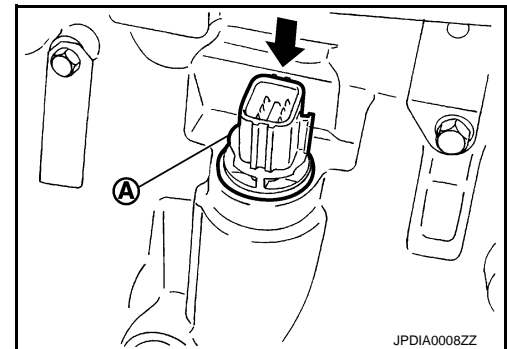


31. Remove snap ring (1) from joint connector (A).



32. Push joint connector (A).

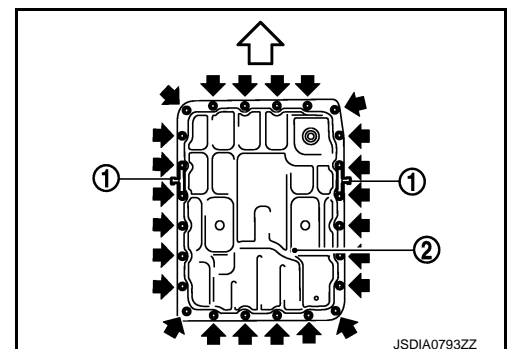
**CAUTION:**  
Be careful not to damage connector.



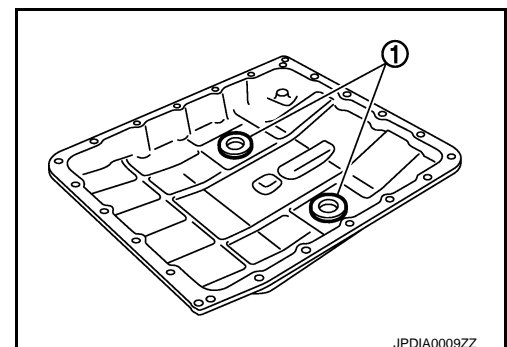
33. Remove oil pan mounting bolts (←).

1 : Clip  
← : Front

34. Remove oil pan (2) and oil pan gasket.



35. Remove magnets (1) from oil pan.



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# TRANSMISSION ASSEMBLY

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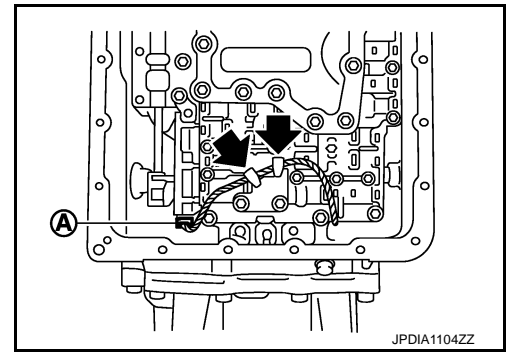
[7AT: RE7R01A]

36. Disconnect output speed sensor connector (A).

**CAUTION:**

**Be careful not to damage connector.**

37. Disengage terminal clips (←).

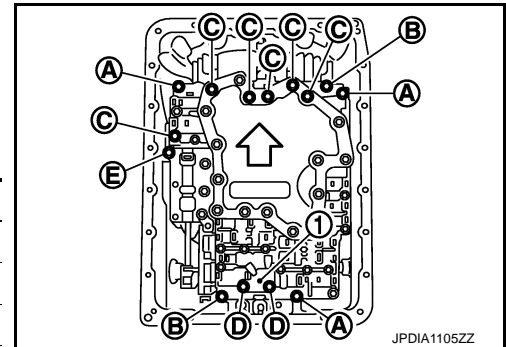


38. Remove control valve & TCM mounting bolts and clip (1) from the control valve & TCM.

← : Front

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

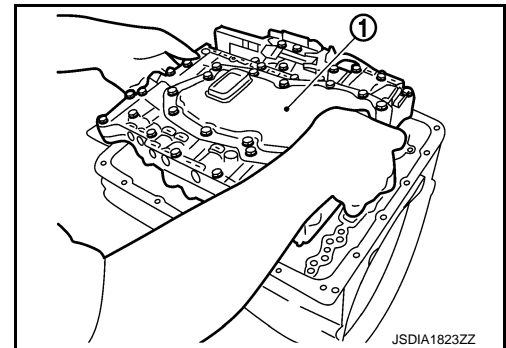
\*: Reamer bolt



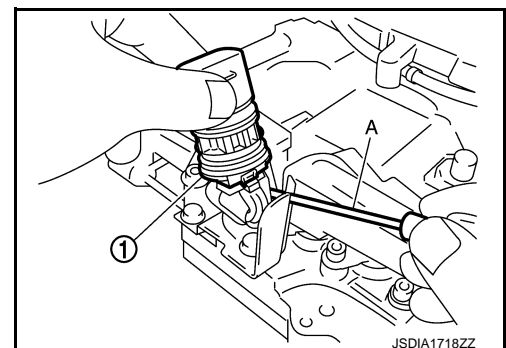
39. Remove the control valve & TCM (1) from transmission case.

**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 (A).



# TRANSMISSION ASSEMBLY

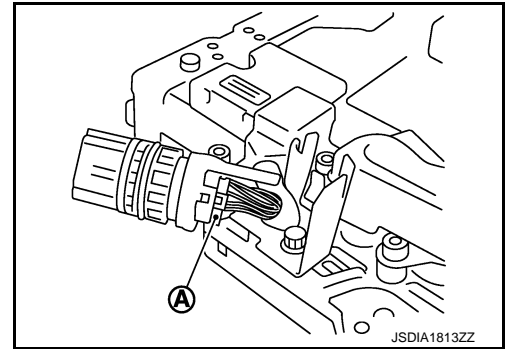
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

41. Disconnect TCM connector (A).

**CAUTION:**

**Be careful not to damage connector.**



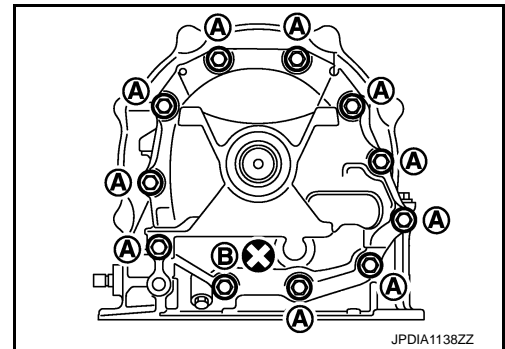
42. Remove rear extension assembly (2WD) or adapter case assembly (AWD) according to the following procedures.

a. **2WD**

- i. Remove tightening bolts for rear extension assembly and transmission case.

A : Bolt

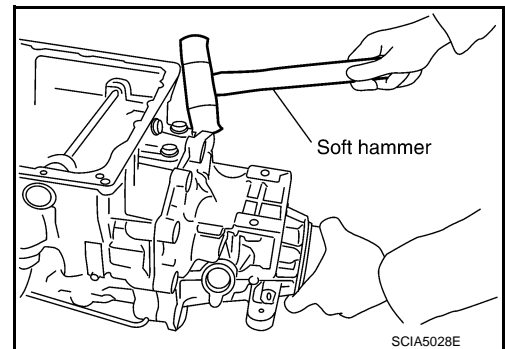
B : Self-sealing bolt



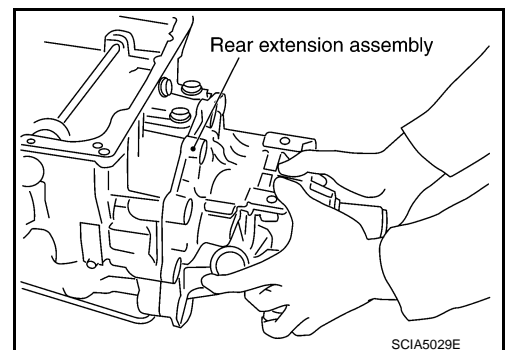
- ii. Tap rear extension assembly using a soft hammer.

**CAUTION:**

**Be careful not to damage rear extension.**



- iii. Remove rear extension assembly from transmission case. (With needle bearing.)



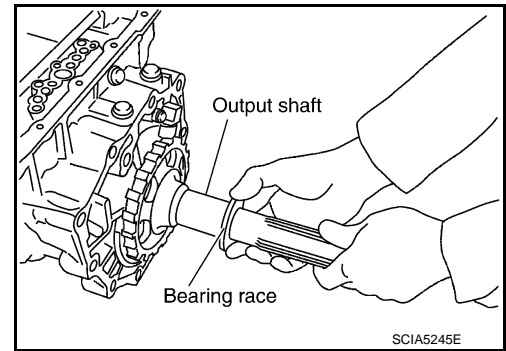
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# TRANSMISSION ASSEMBLY

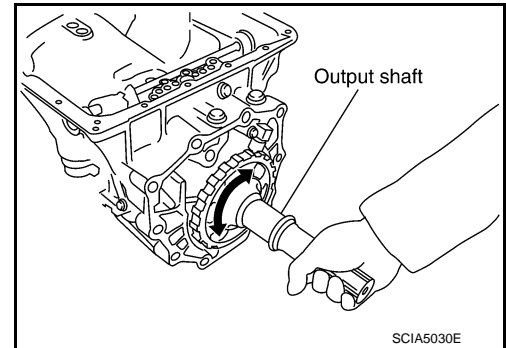
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[7AT: RE7R01A]

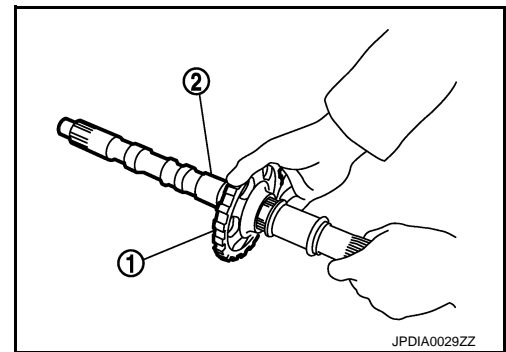
iv. Remove bearing race from output shaft.



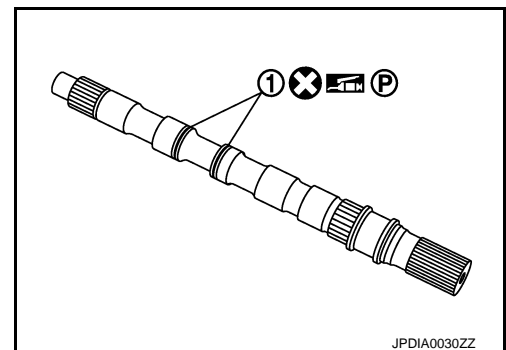
v. Remove output shaft from transmission case by rotating left/right.



vi. Remove parking gear (1) from output shaft (2).



vii. Remove seal rings (1) from output shaft.



b. **AWD**

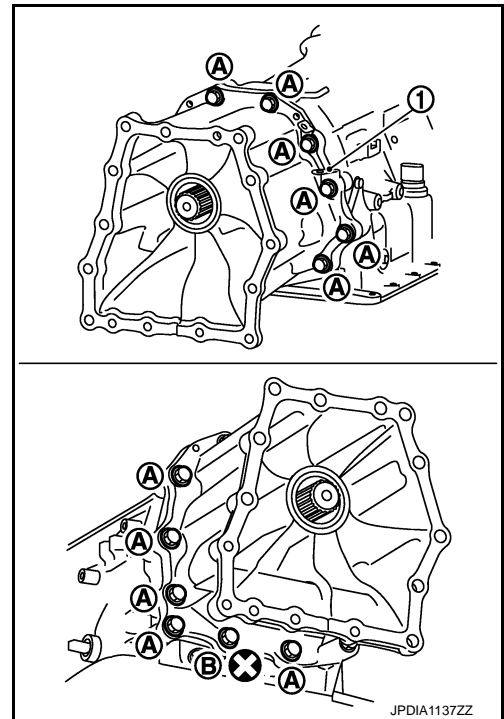
# TRANSMISSION ASSEMBLY

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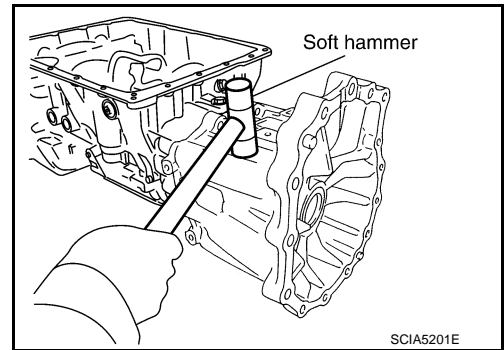
- i. Remove tightening bolts for adapter case assembly and transmission case.

- 1 : Bracket
- A : Bolt
- B : Self-sealing bolt

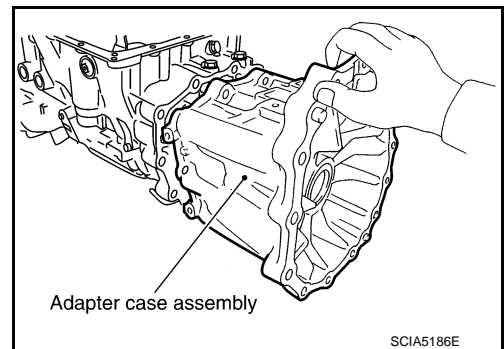


- ii. Tap adapter case assembly using a soft hammer.

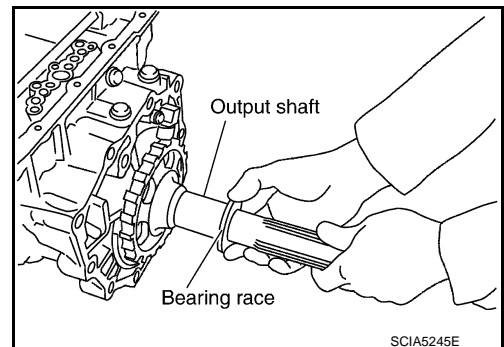
**CAUTION:**  
Be careful not to damage adapter case.



- iii. Remove adapter case assembly from transmission case. (With needle bearing)



- iv. Remove bearing race from output shaft.



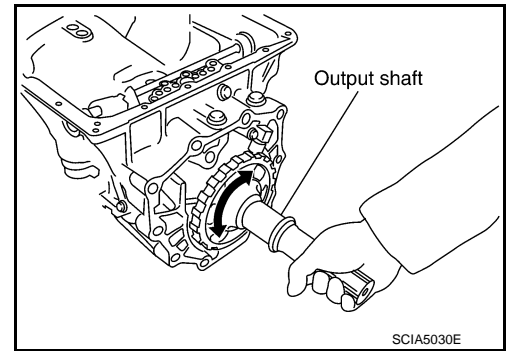
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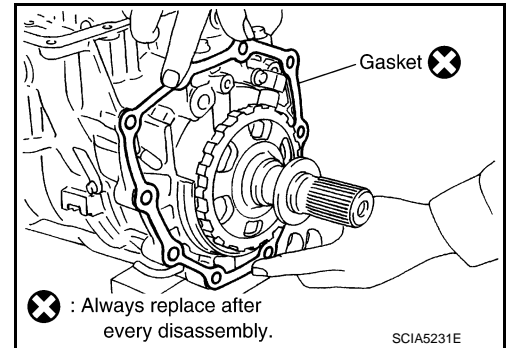
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[7AT: RE7R01A]

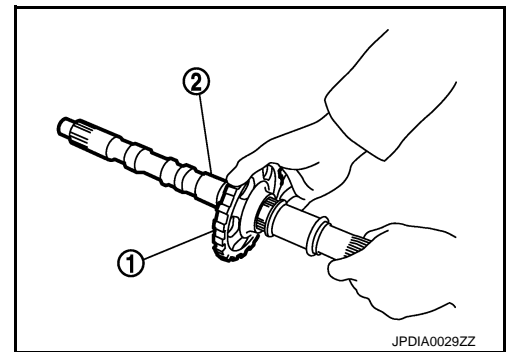
- v. Remove output shaft from transmission case by rotating left/right.



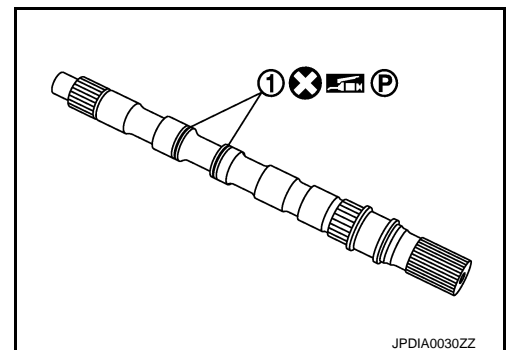
- vi. Remove gasket from transmission case.



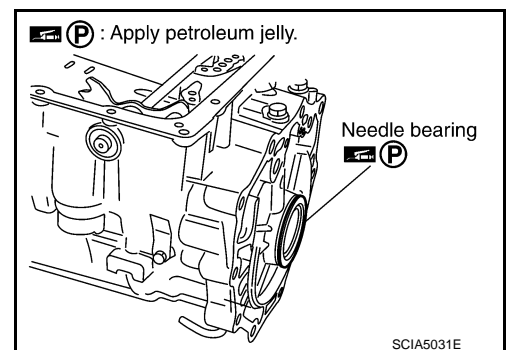
- vii. Remove parking gear (1) from output shaft (2).



- viii. Remove seal rings (1) from output shaft.



- 43. Remove needle bearing from transmission case.





# TRANSMISSION ASSEMBLY

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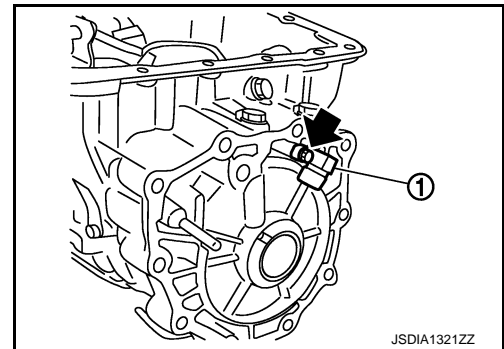
[7AT: RE7R01A]

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.



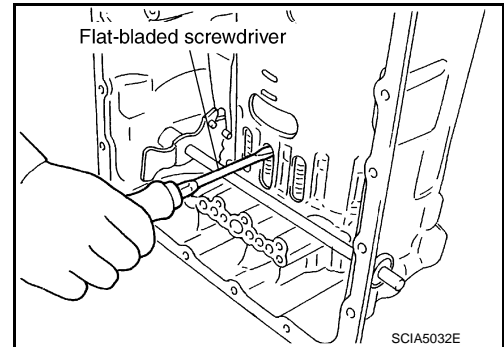
45. Remove reverse brake snap ring (fixing plate) with 2 flat-bladed screwdrivers.

**CAUTION:**

- Be careful not to scratch transmission case and reverse brake retaining plate.
- Be careful not to damage snap ring.

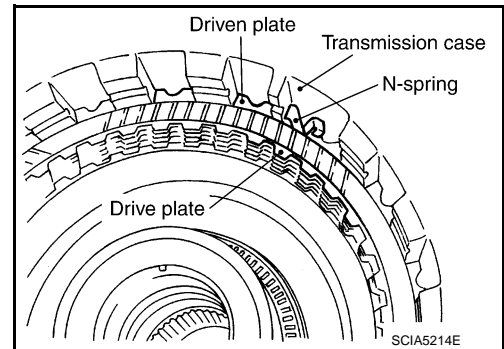
**NOTE:**

Press out snap ring from the transmission case oil pan side gap with a flat-bladed screwdriver, and remove it using a another screwdriver.

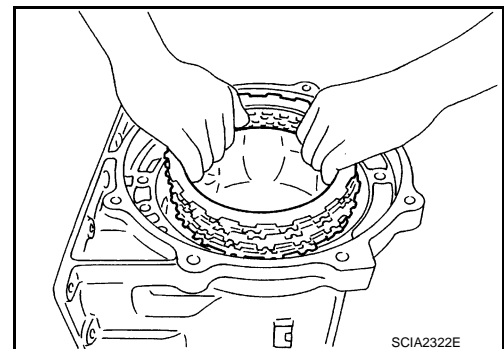


46. Remove reverse brake retaining plate from transmission case.

47. Remove N-spring from transmission case.



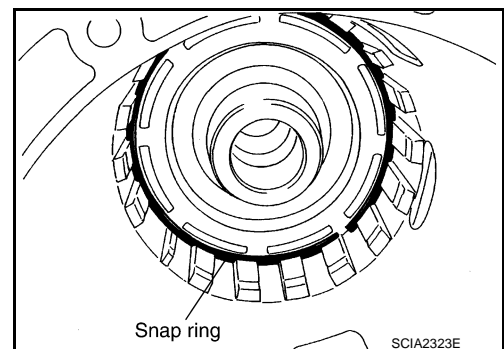
48. Remove reverse brake component part (drive plates, driven plates, and dish plates) from transmission case.



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.



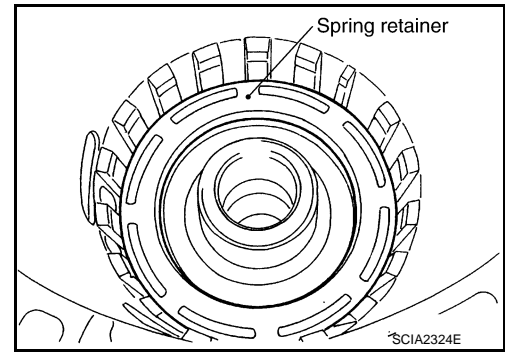
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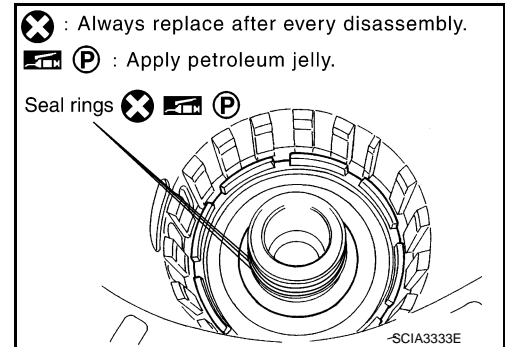
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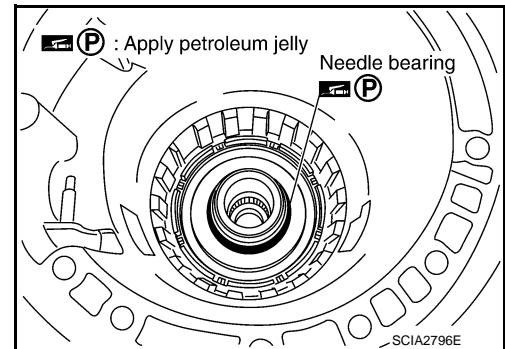
50. Remove reverse brake spring retainer and reverse brake return spring from transmission case.



51. Remove seal rings from drum support.



52. Remove needle bearing from drum support edge surface.

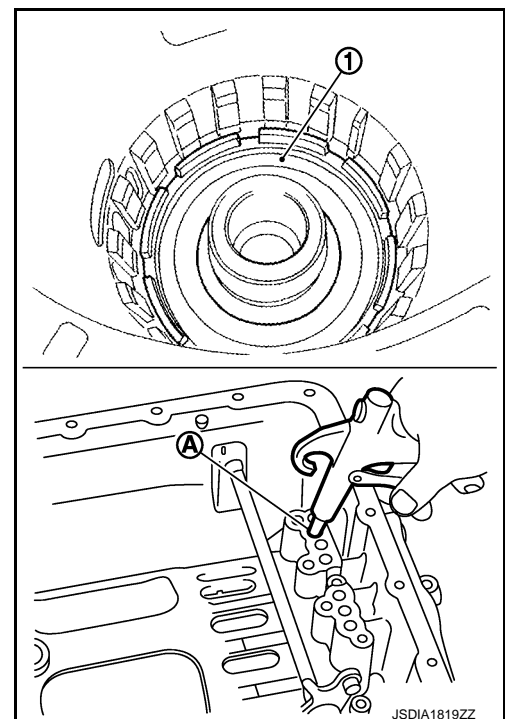


53. Remove reverse brake piston (1) from transmission case with compressed air. Refer to [TM-236](#). "Oil Channel".

A : 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.

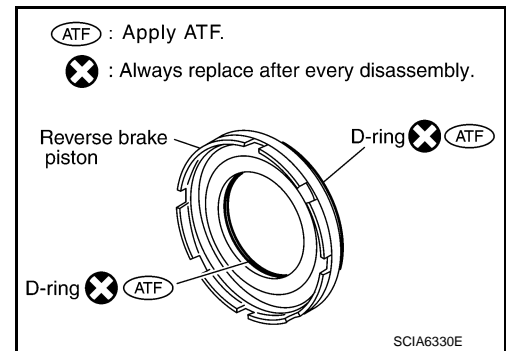


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[7AT: RE7R01A]

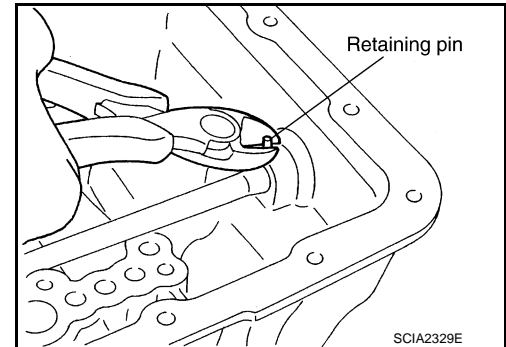
54. Remove D-rings from reverse brake piston.



55. Remove manual shaft retaining pin with pair of nippers.

**CAUTION:**

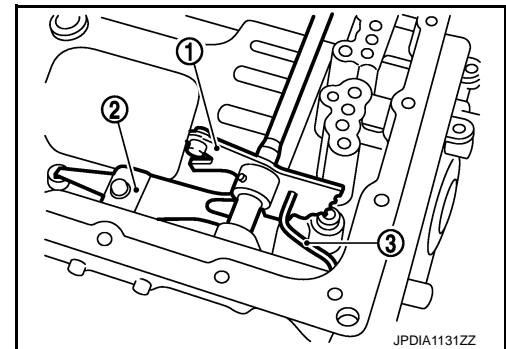
**Be careful not to cut retaining pin.**



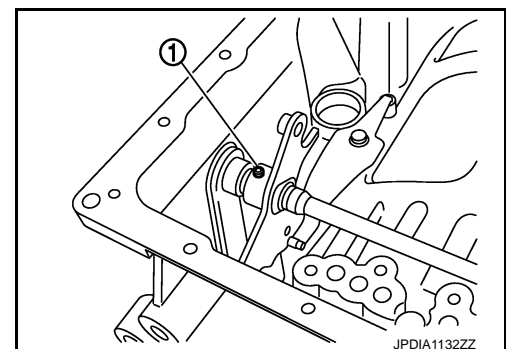
56. Remove manual plate (1) from detent spring (2).

57. Remove parking rod (3) from manual plate.

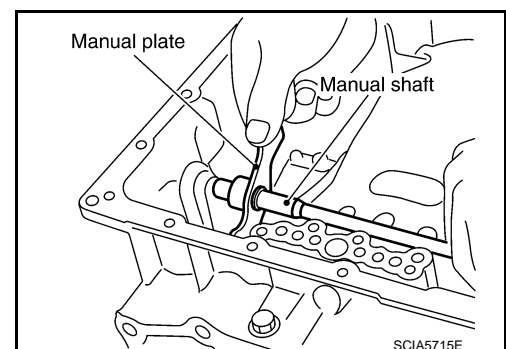
58. Install manual plate to detent spring.



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.



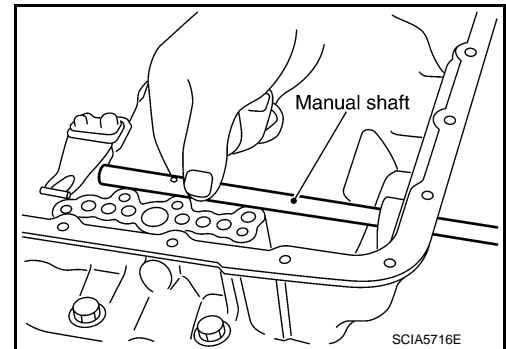
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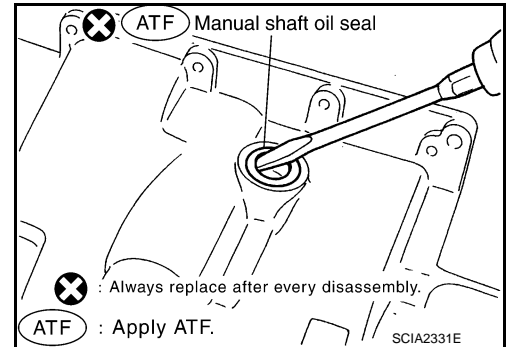
61. Remove manual shaft from transmission case.



62. Remove manual shaft oil seals using a flat-bladed screwdriver.

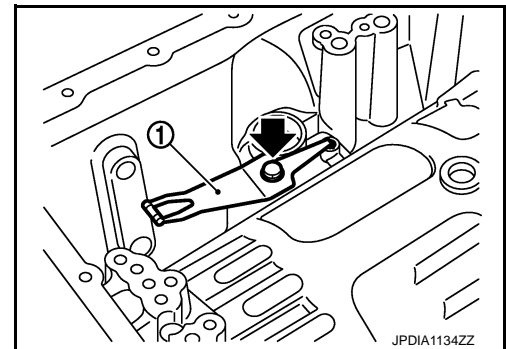
**CAUTION:**

**Be careful not to scratch transmission case.**

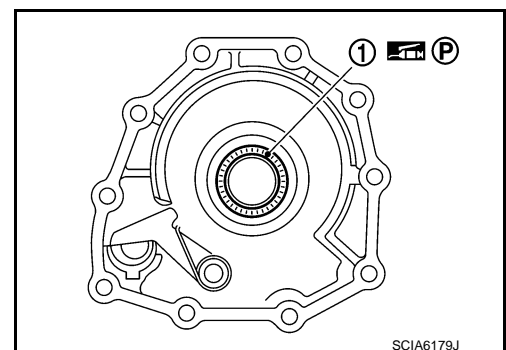


63. Remove detent spring (1) from transmission case.

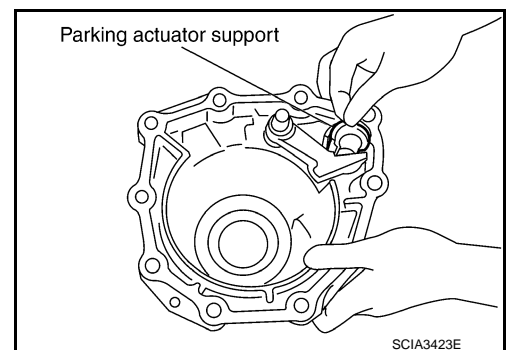
← : Bolt



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).

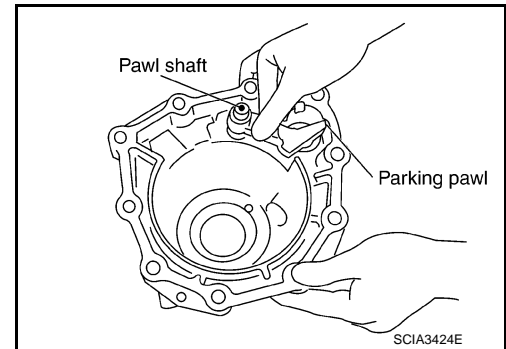


# TRANSMISSION ASSEMBLY

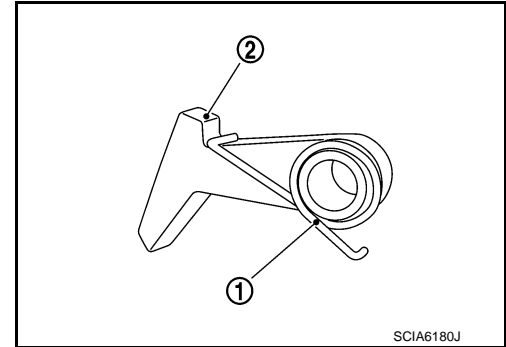
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[7AT: RE7R01A]

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).



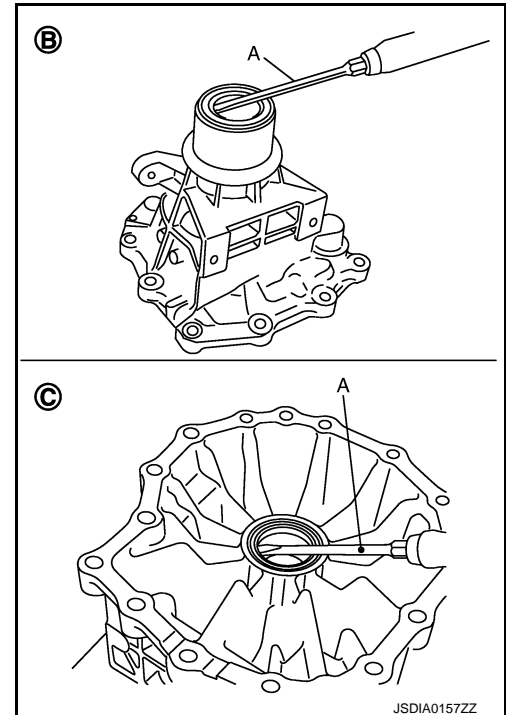
68. Remove rear oil seal from rear extension (B) or adapter case (C) using a flat-bladed screwdriver (A).

B : 2WD

C : AWD

**CAUTION:**

**Be careful not to scratch rear extension or adapter case.**



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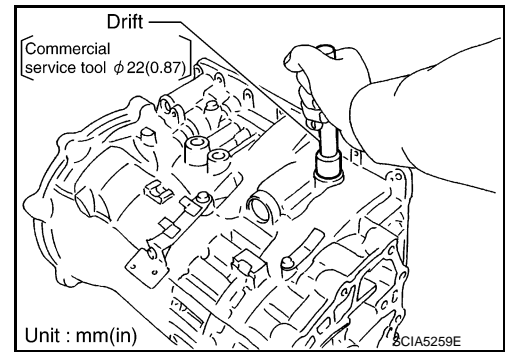
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## Assembly

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.

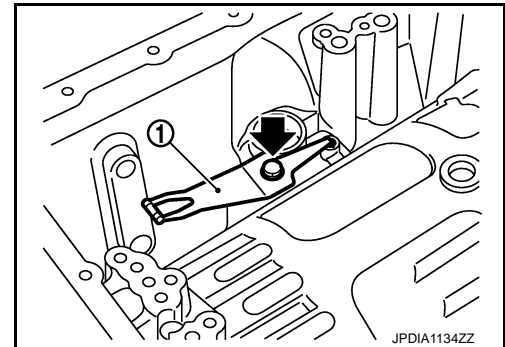
**CAUTION:**

- Never reuse manual shaft oil seals.
- Apply ATF to manual shaft oil seals.

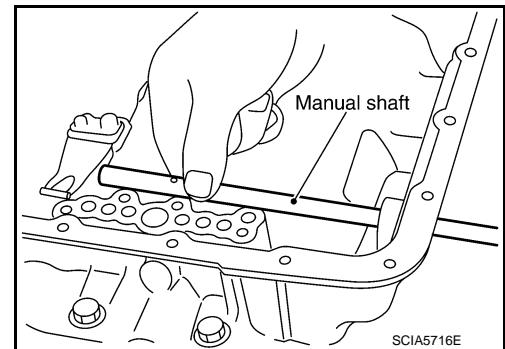


2. Install detent spring to transmission case. Tighten detent spring bolt to the specified torque.

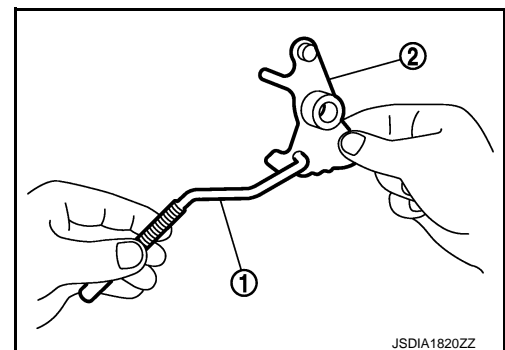
← : Bolt



3. Install manual shaft to transmission case.



4. Install parking rod (1) to manual plate (2).

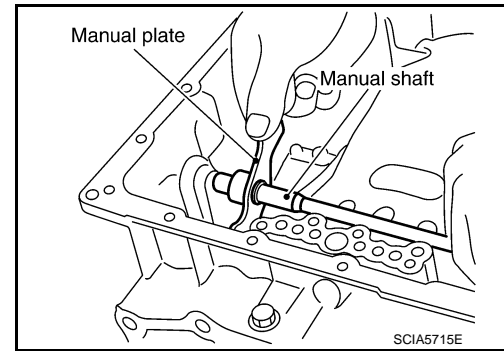


# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

5. Install manual plate (with parking rod) to manual shaft.

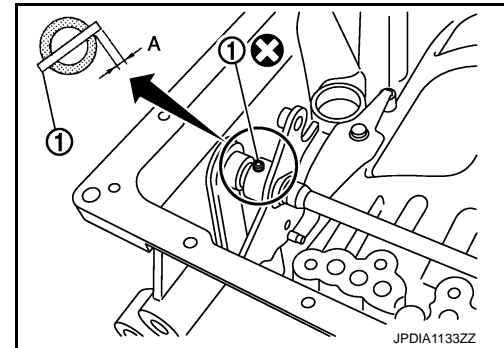


6. Install retaining pin (1) into the manual plate and manual shaft.
- Fit pinhole of the manual plate to pinhole of the manual shaft with a pin punch.
  - Use a hammer to tap the retaining pin into the manual plate.

**A** : Approx. 2 mm (0.08in)

**CAUTION:**

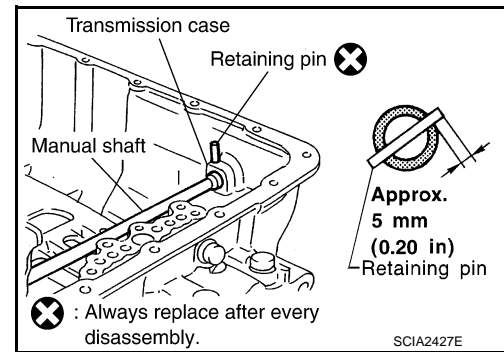
Drive retaining pin to  $2 \pm 0.5$  mm ( $0.08 \pm 0.020$  in) over the manual plate.



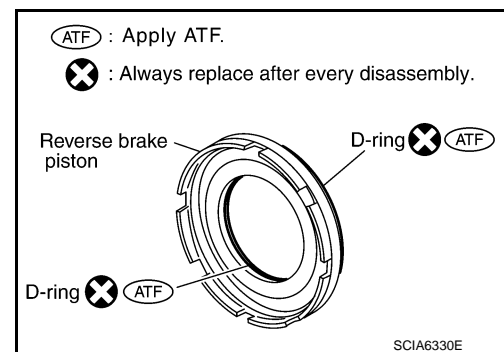
7. Install retaining pin into the transmission case and manual shaft.
- Fit pinhole of the transmission case to pinhole of the manual shaft with a pin punch.
  - Use a hammer to tap the retaining pin into the transmission case.

**CAUTION:**

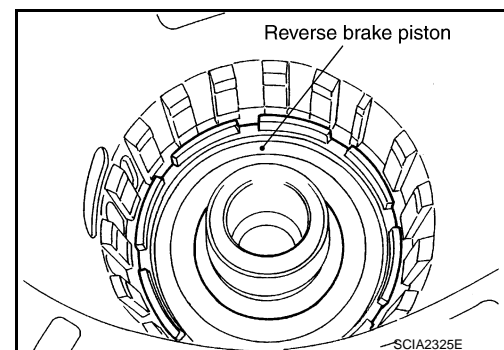
Drive retaining pin to  $5 \pm 1$  mm ( $0.20 \pm 0.04$  in) over the transmission case.



8. Install D-rings to reverse brake piston.



9. Install reverse brake piston to transmission case.



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# TRANSMISSION ASSEMBLY

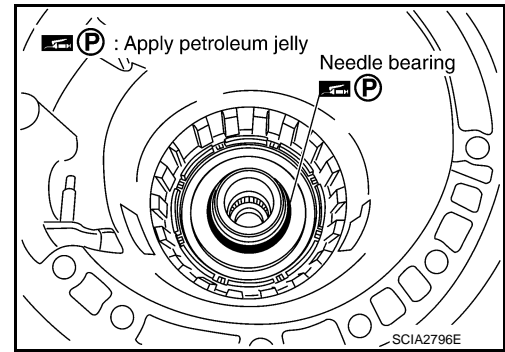
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

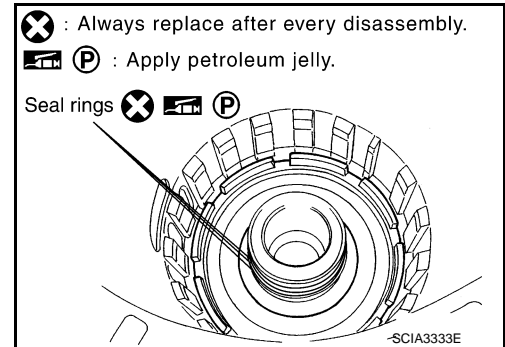
10. Install needle bearing to drum support edge surface.

**CAUTION:**

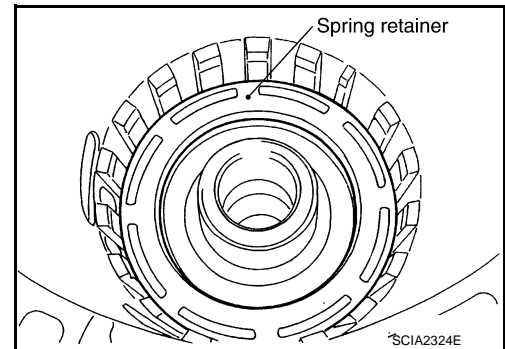
Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



11. Install seal rings to drum support.



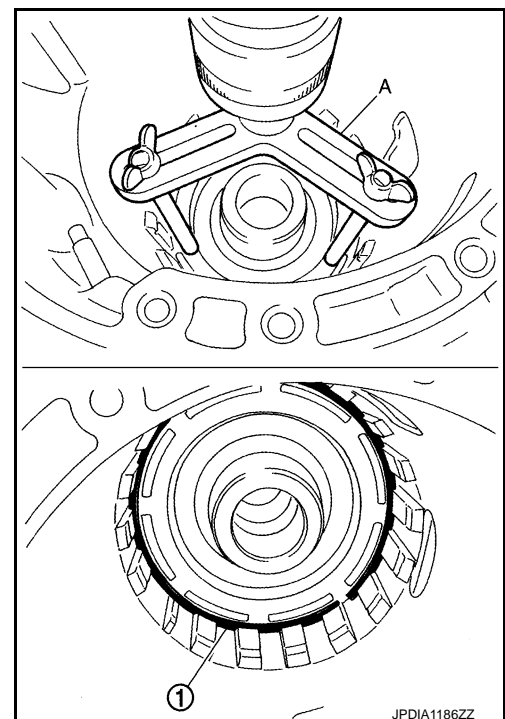
12. Install reverse brake spring retainer and reverse brake return spring to transmission case.



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.





# TRANSMISSION ASSEMBLY

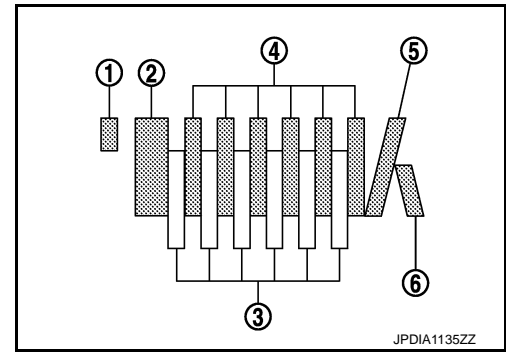
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

14. Install reverse brake component part (drive plates, driven plates, and dish plates) to transmission case.

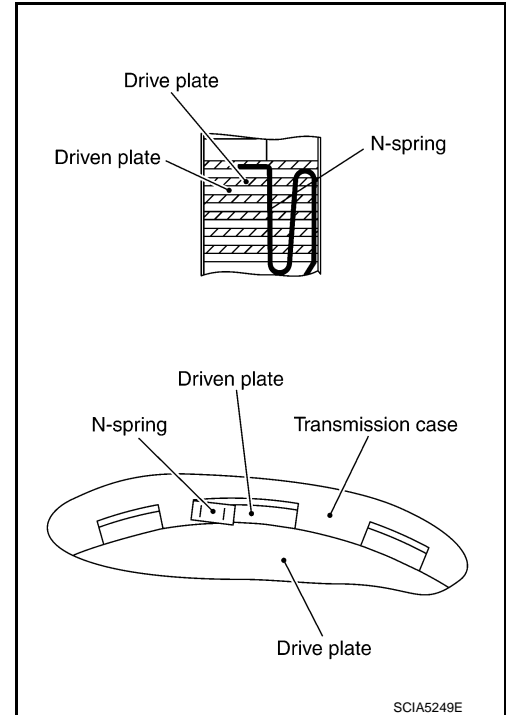
- 1 : Snap ring
- 2 : Retaining plate
- 3 : Drive plate (six pieces)
- 4 : Driven plate (six pieces)
- 5 : Dish plate
- 6 : Dish plate

**CAUTION:**  
Check order of plates.



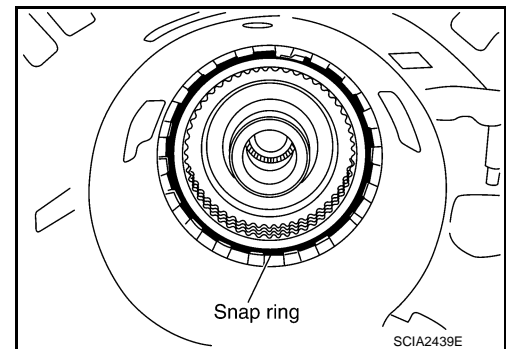
15. Assemble N-spring.

16. Install reverse brake retaining plate to transmission case.



17. Install snap ring to transmission case.

**CAUTION:**  
Be careful not to damage snap ring.



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# TRANSMISSION ASSEMBLY

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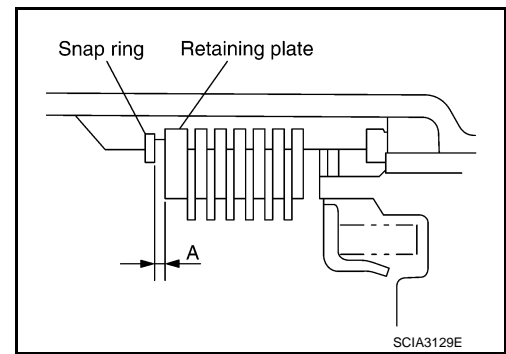
[7AT: RE7R01A]

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-315, "Reverse Brake Clearance"](#).

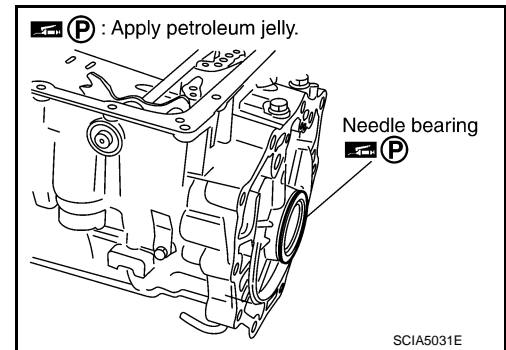
**Retaining plate:** Refer to [TM-315, "Reverse Brake Clearance"](#).



19. Install needle bearing to transmission case.

**CAUTION:**

**Check the direction of needle bearing. Refer to [TM-236, "Location of Needle Bearings and Bearing Races"](#).**

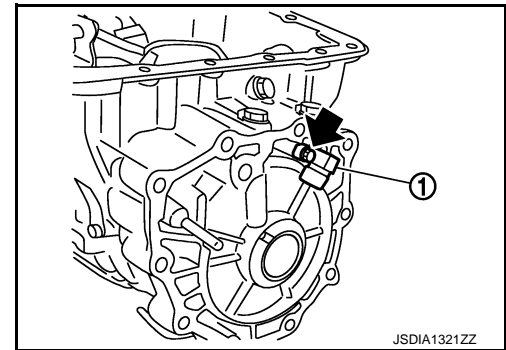


20. Install output speed sensor (1) to transmission case. Tighten output speed sensor bolt to the specified torque.

 : 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.



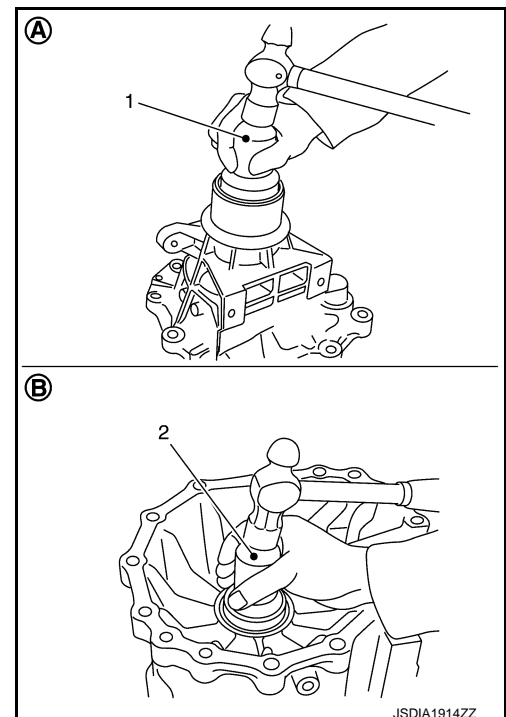
21. As shown in the figure, use the drift to drive rear oil seal into the rear extension (2WD) (A) or adapter case (AWD) (B) until it is flush.

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.

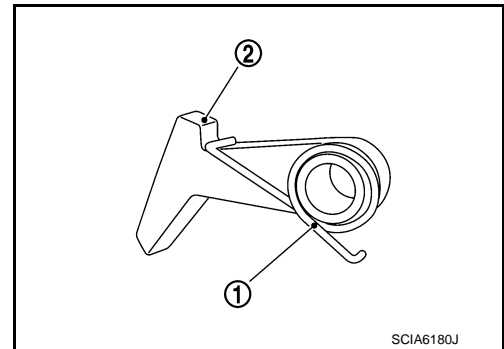


# TRANSMISSION ASSEMBLY

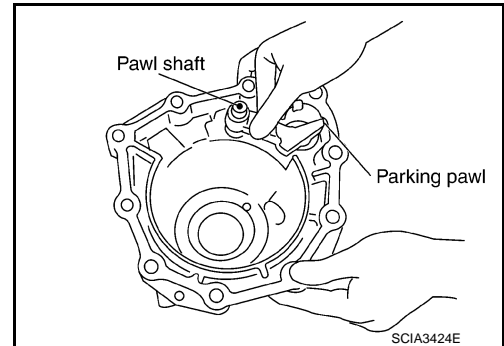
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[7AT: RE7R01A]

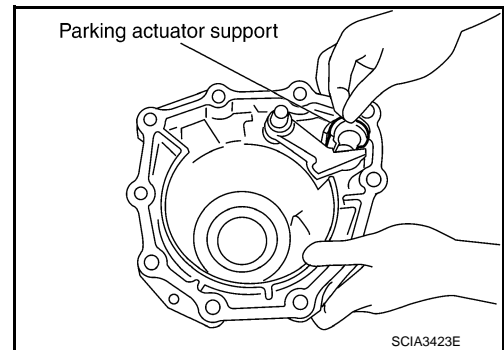
22. Install return spring (1) to parking pawl (2).



23. Install parking pawl (with return spring) and pawl shaft to rear extension (2WD) or adapter case (AWD).



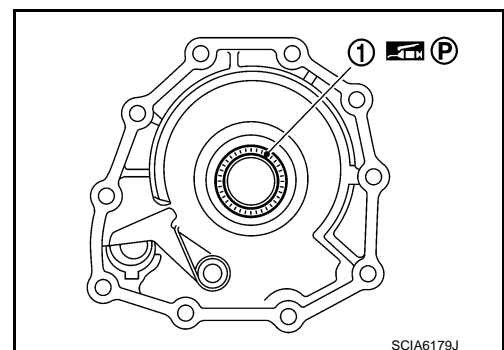
24. Install parking actuator support to rear extension (2WD) or adapter case (AWD).



25. Install needle bearing (1) to rear extension (2WD) or adapter case (AWD).

**CAUTION:**

**Check the direction of needle bearing. Refer to [TM-236](#), "[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**

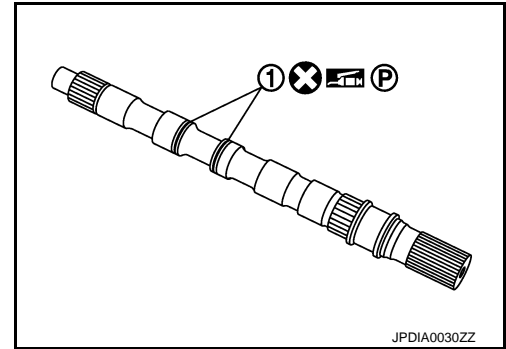
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# TRANSMISSION ASSEMBLY

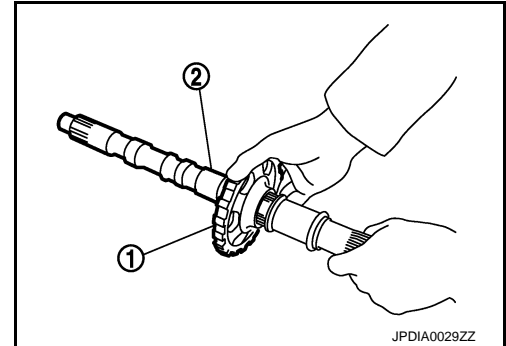
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- i. Install seal rings (1) to output shaft.



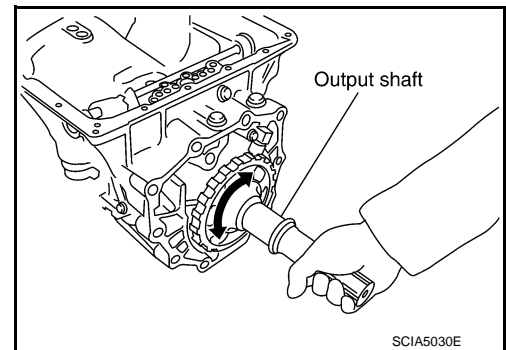
- ii. Install parking gear (1) to output shaft (2).



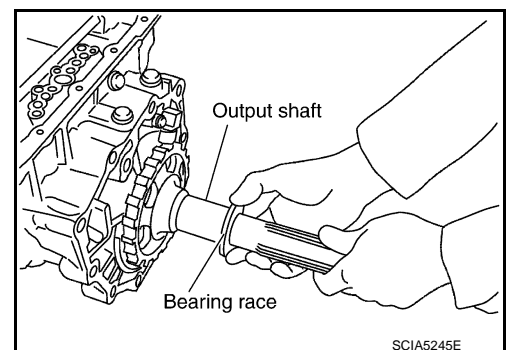
- iii. Install output shaft to transmission case.

**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.




# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

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

 : Genuine Anaerobic Liquid Gasket or equivalent. Refer to [GL-22, "Recommended Chemical Products and Sealants"](#).

**Sealant starting point and end-point (A)** : Start and finish point shall be in the center of two bolts.

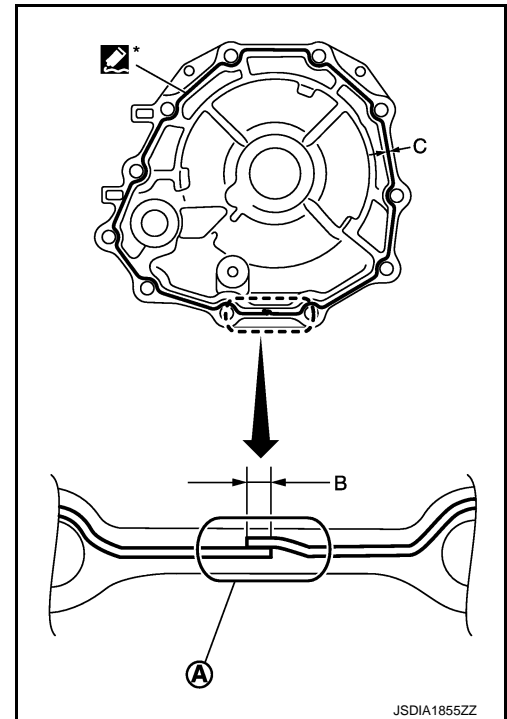
**Overlap width of sealant starting point and end-point (B)** : 3 – 5 mm (0.12 – 0.20 in)

**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.

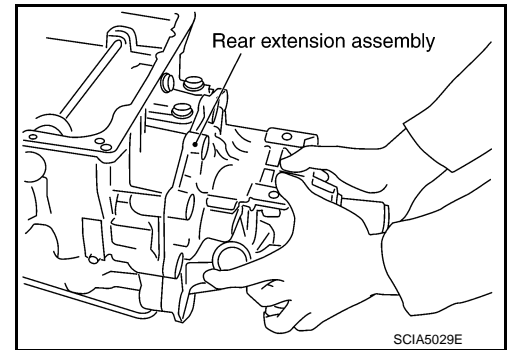


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- vi. Install rear extension assembly to transmission case.

**CAUTION:**

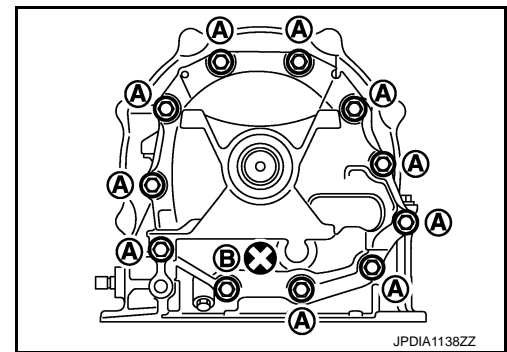
Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the rear extension assembly.



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- vii. Tighten rear extension assembly bolts to the specified torque.

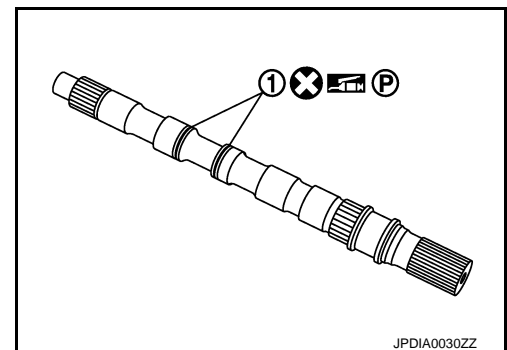
- A : Bolt
- B : Self-sealing bolt



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- b. **AWD**

- i. Install seal rings (1) to output shaft.



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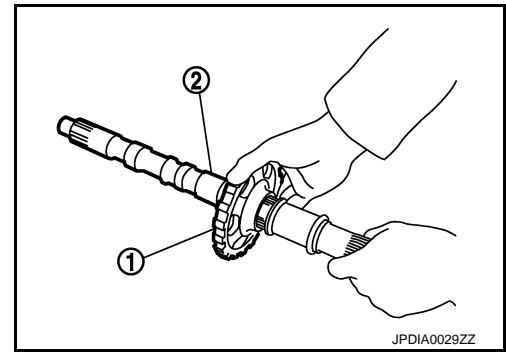
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# TRANSMISSION ASSEMBLY

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[7AT: RE7R01A]

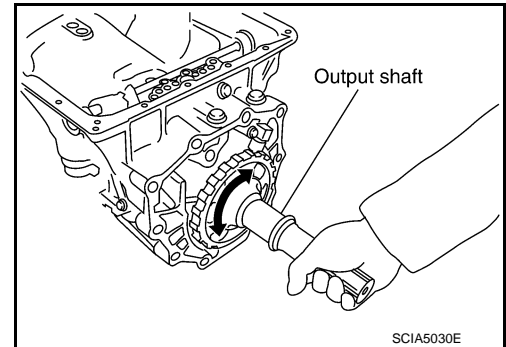
ii. Install parking gear (1) to output shaft (2).



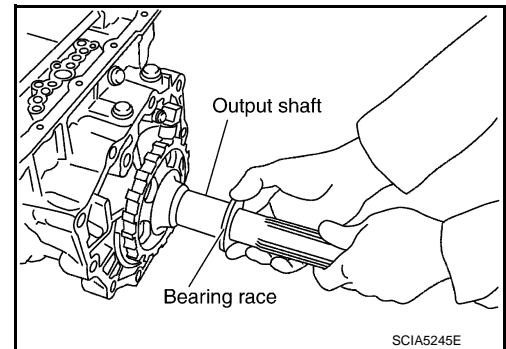
iii. Install output shaft to transmission case.

**CAUTION:**

Be careful not to mistake front for rear because both sides looks similar. (Thinner end is front side.)



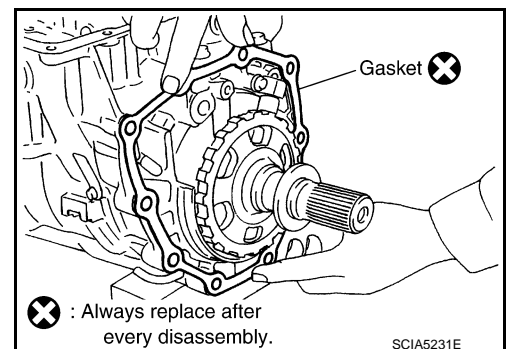
iv. Install bearing race to output shaft.



v. Install gasket onto transmission case.

**CAUTION:**

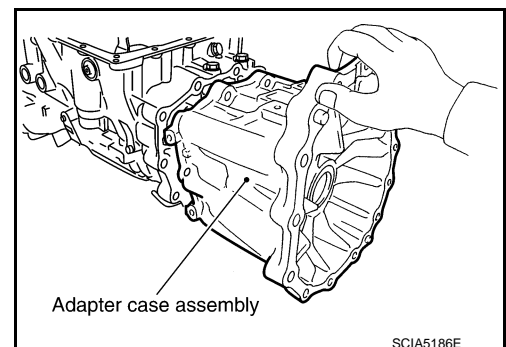
- Completely remove all moisture, oil and old gasket, etc. from the transmission case and adapter case assembly mounting surfaces.
- Never reuse gasket.



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.



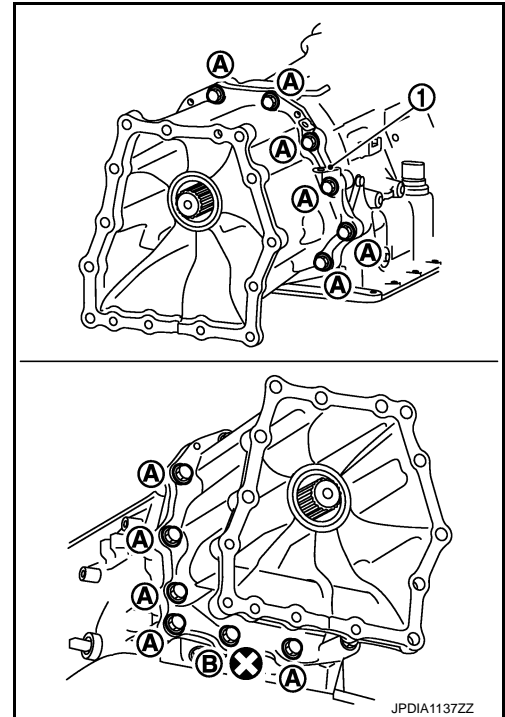
# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

vii. Tighten adapter case assembly bolts to the specified torque.

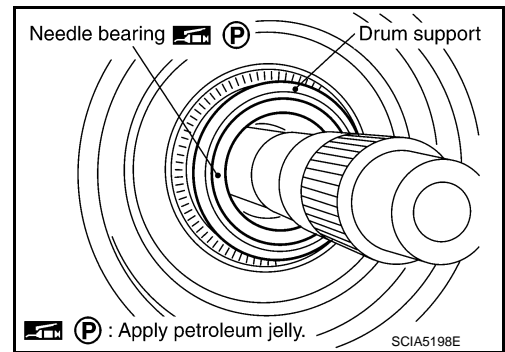
- 1 : Bracket
- A : Bolt
- B : Self-sealing bolt



27. Install needle bearing to drum support.

**CAUTION:**

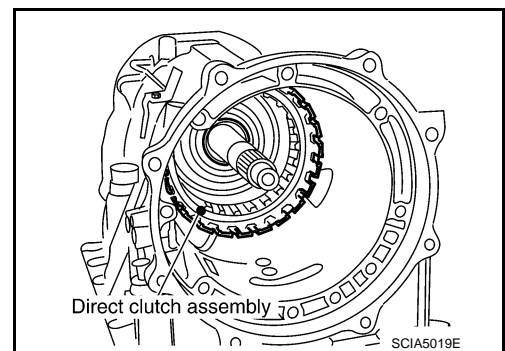
Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



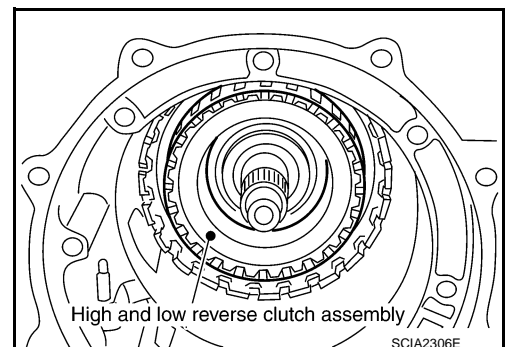
28. Install direct clutch assembly to reverse brake.

**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.



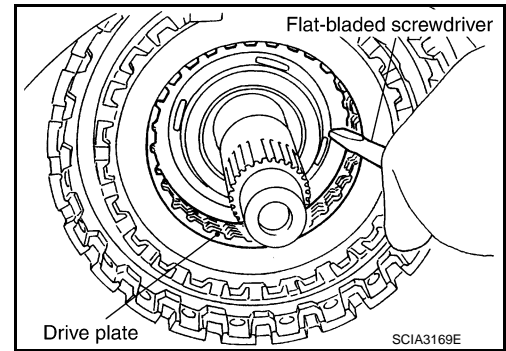
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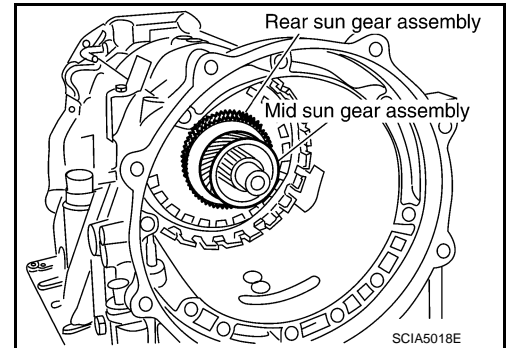
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

30. Align the drive plate using a flat-bladed screwdriver.

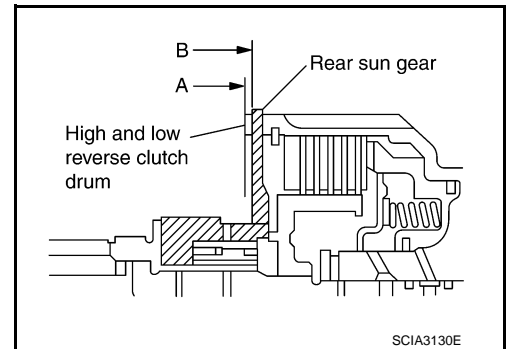


31. Install high and low reverse clutch hub, mid sun gear assembly, and rear sun gear assembly as a unit.



**CAUTION:**

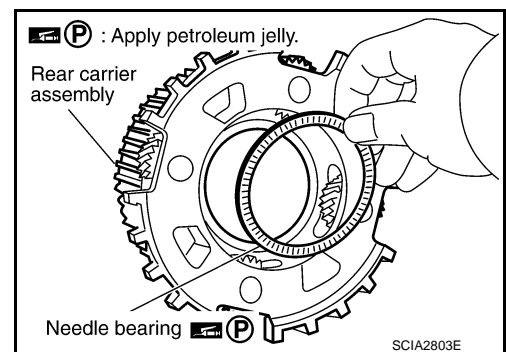
Make sure that portion "A" of high and low reverse clutch drum protrudes approximately 2 mm (0.08 in) beyond portion "B" of rear sun gear.



32. Install needle bearing to rear carrier assembly.

**CAUTION:**

Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".





# TRANSMISSION ASSEMBLY

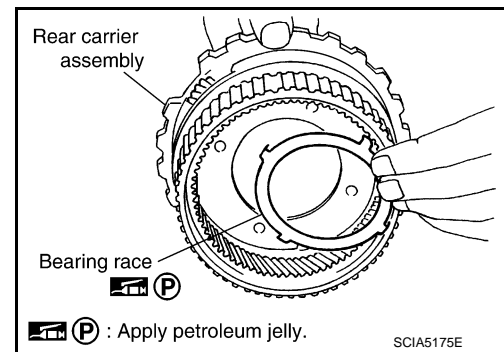
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[7AT: RE7R01A]

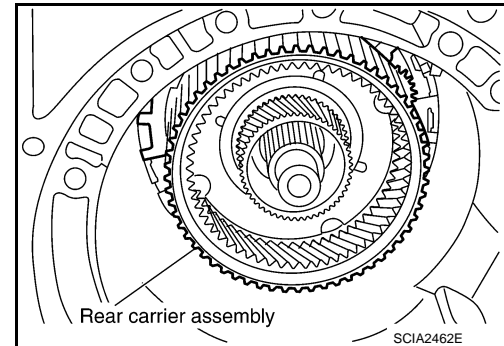
33. Install bearing race to rear carrier assembly.

**CAUTION:**

Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



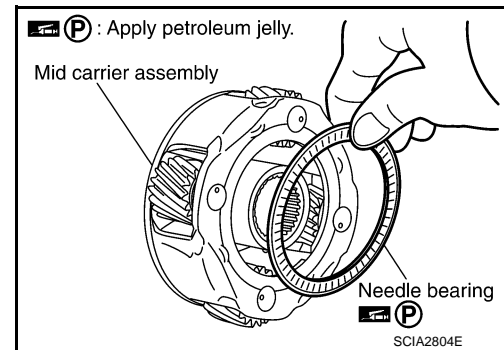
34. Install rear carrier assembly to direct clutch drum.



35. Install needle bearing (rear side) to mid carrier assembly.

**CAUTION:**

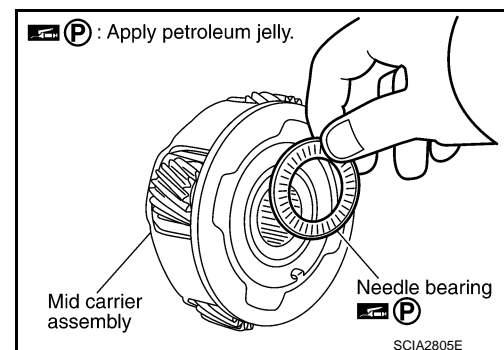
Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



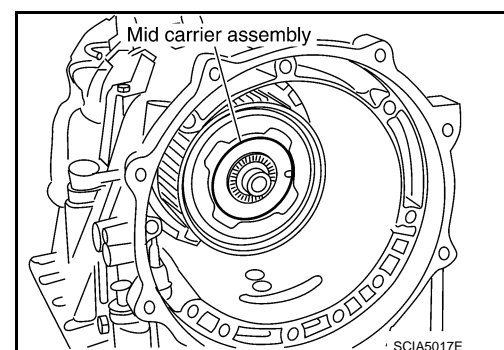
36. Install needle bearing (front side) to mid carrier assembly.

**CAUTION:**

Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



37. Install mid carrier assembly to rear carrier assembly.



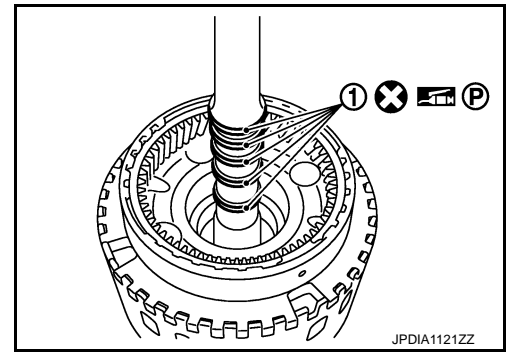
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# TRANSMISSION ASSEMBLY

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[7AT: RE7R01A]

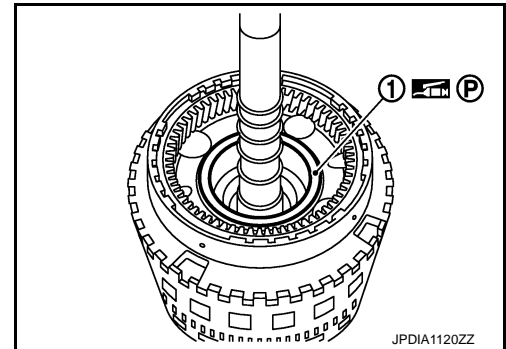
38. Install seal rings (1) to input clutch assembly.



39. Install needle bearing (1) to front carrier assembly.

**CAUTION:**

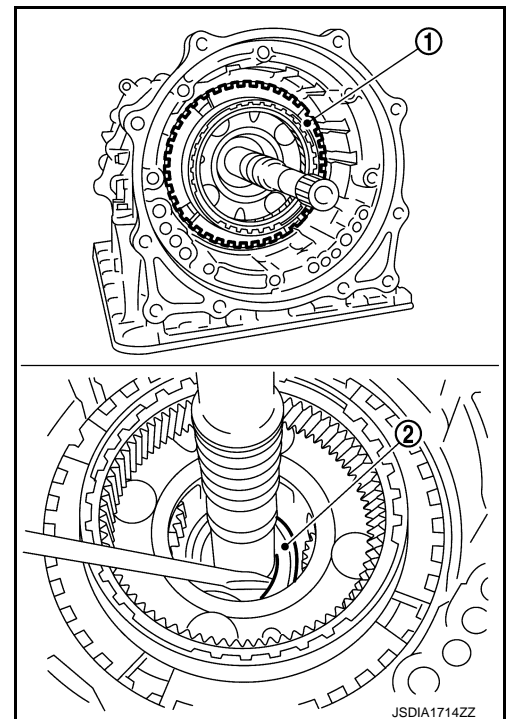
Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



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.





# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

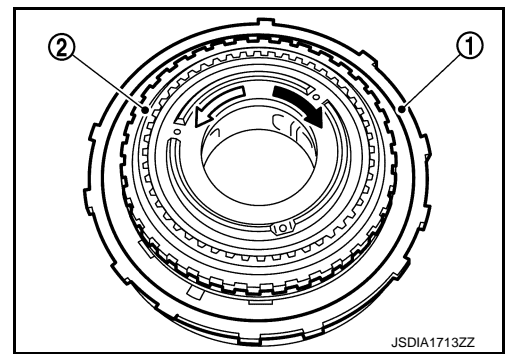
[7AT: RE7R01A]

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.

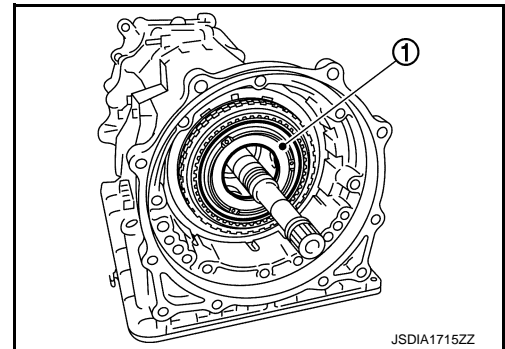
 : Unlocked  
 : Locked

**CAUTION:**

**If not shown in figure, check installation direction of 1st one-way clutch.**



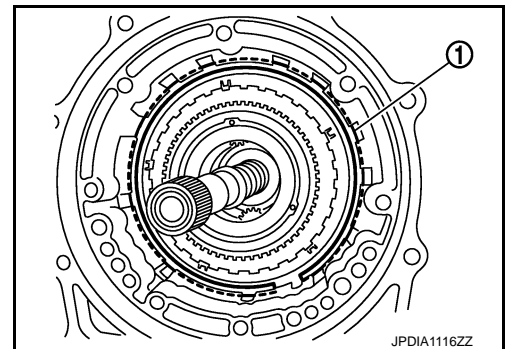
43. Install under drive carrier (with 1st one-way clutch) (1) to transmission case.




44. Install snap ring (1) to transmission case.

**CAUTION:**

**Be careful not to damage snap ring.**

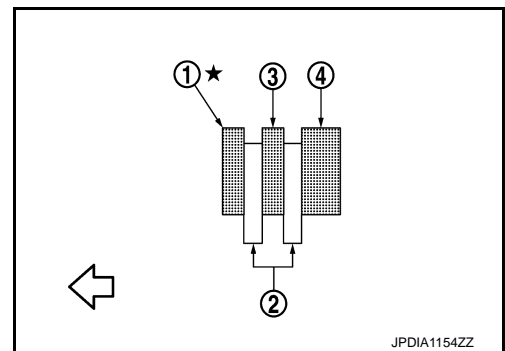


45. Install front brake component part (retaining plates, drive plates, and driven plate) to transmission case.

1 : Retaining plate (thin)  
 2 : Drive plate  
 3 : Driven plate  
 4 : Retaining plate (thick)  
 : Front

**CAUTION:**

**Check order of plates.**



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# TRANSMISSION ASSEMBLY

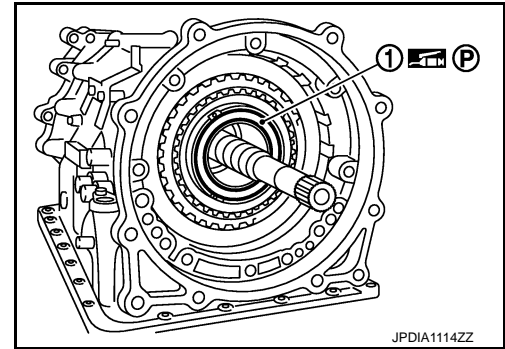
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[7AT: RE7R01A]

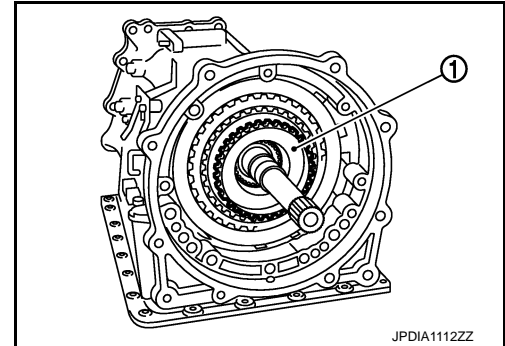
46. Install needle bearing (1) to under drive carrier assembly.

**CAUTION:**

Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".

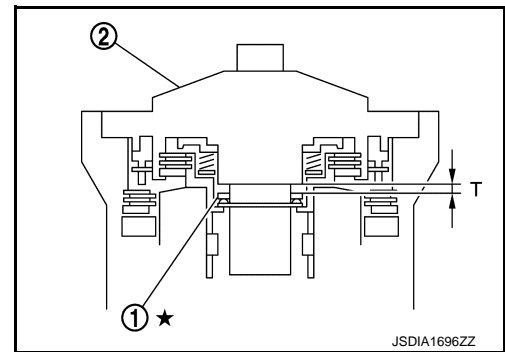


47. Install under drive sun gear (1) to under drive carrier assembly.



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.

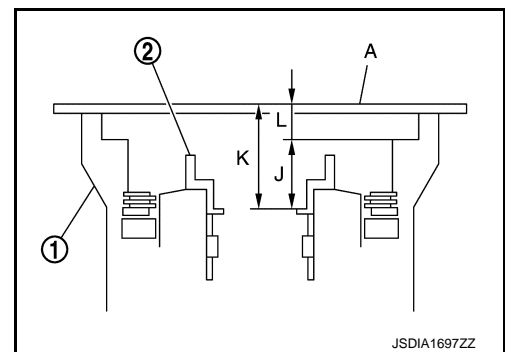


a. Measure dimensions "K" and "L", and calculate dimension "J".

- 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.

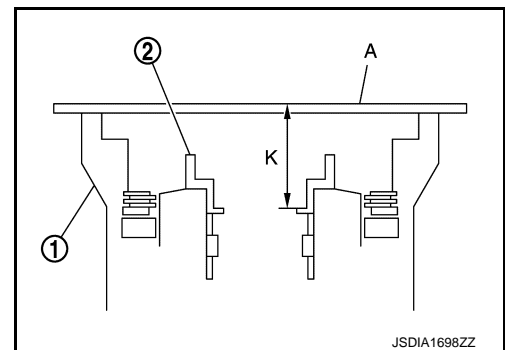
$$J = K - L$$



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.



# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- ii. Measure dimension “L” between the converter housing fitting surface of transmission case and the oil pump fitting surface of transmission case.

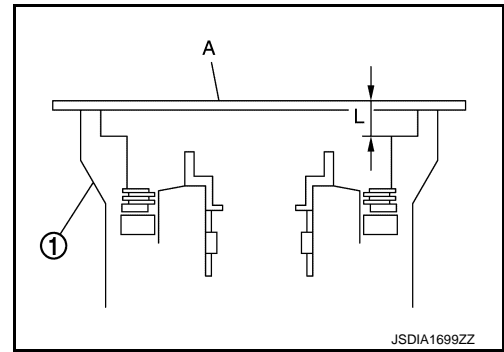
- 1 : Transmission case
- A : Straightedge

**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”.

$$J = K - L$$

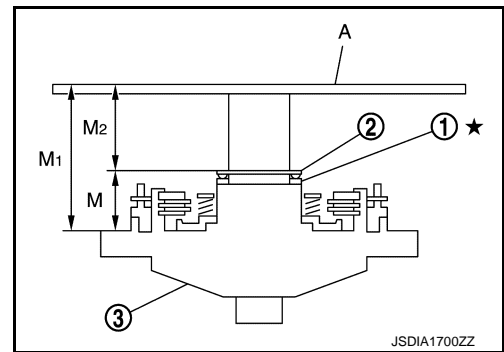


- b. Measure dimensions “M1” and “M2”, and calculate dimension “M”.

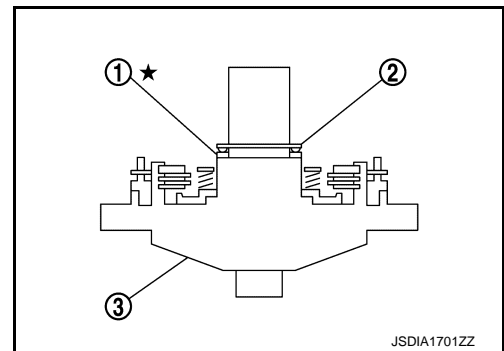
- 1 : Bearing race
- 2 : Needle bearing
- 3 : Oil pump assembly
- A : Straightedge

**“M”** : Distance between the transmission case fitting surface of oil pump and the needle bearing on oil pump.

$$M = M1 - M2$$



- i. Place bearing race (1) and needle bearing (2) on oil pump assembly (3).

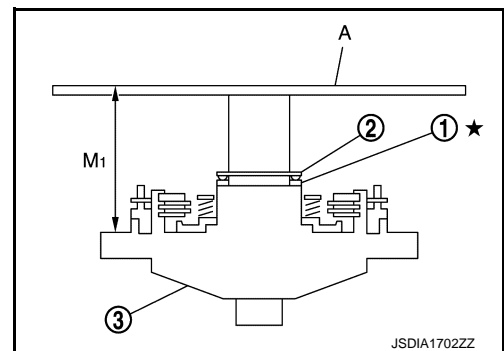


- ii. Measure dimension “M1” between the transmission case fitting surface of oil pump and the end of oil pump.

- 1 : Bearing race
- 2 : Needle bearing
- 3 : Oil pump assembly
- A : Straightedge

**CAUTION:**

Measure dimension “M1” in at least three places, and take the average.



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# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

iii. Measure dimension "M2" 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 "M2" in at least three places, and take the average.

iv. Calculate dimension "M".

$$M = M1 - M2$$

c. Adjust total end play "T".

- 1 : Bearing race
- 2 : Oil pump assembly

$$T = J - M$$

Total end play "T" : Refer to [TM-315, "Total End Play"](#).

- Select proper thickness of bearing race so that total end play is within specifications.

Bearing races : Refer to [TM-315, "Total End Play"](#).

49. Adjustment of front brake clearance "C".

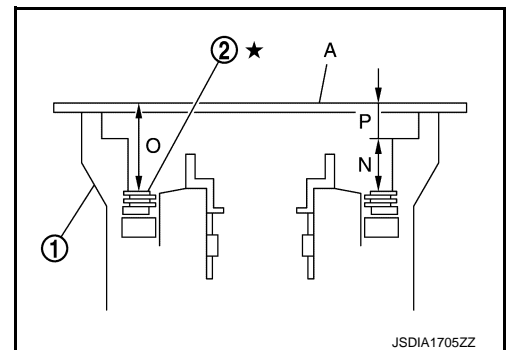
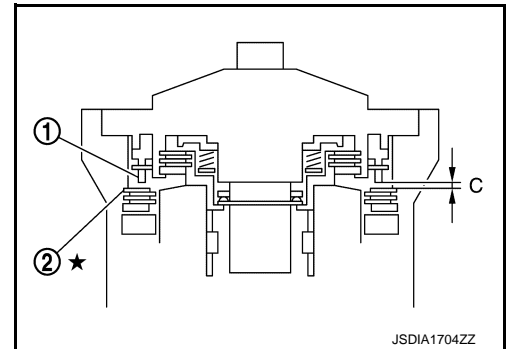
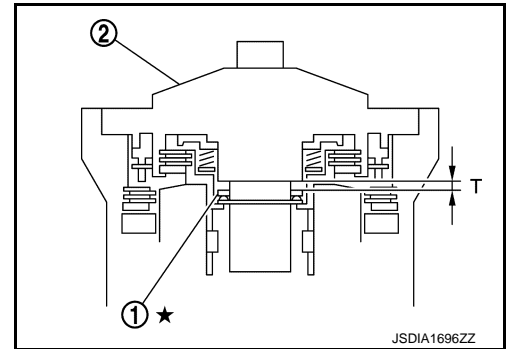
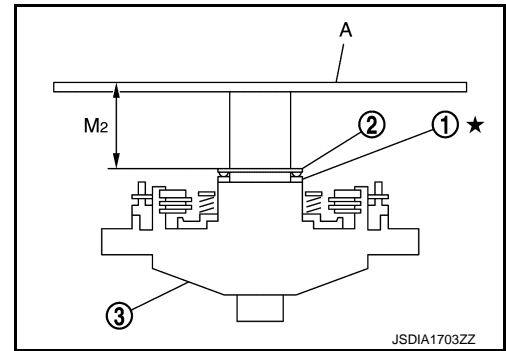
- Measure clearance between front brake piston (1) and front brake retaining plate (2).
- Select proper thickness of front brake retaining plate so that clearance is within specifications.

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.

$$N = O - P$$



# TRANSMISSION ASSEMBLY

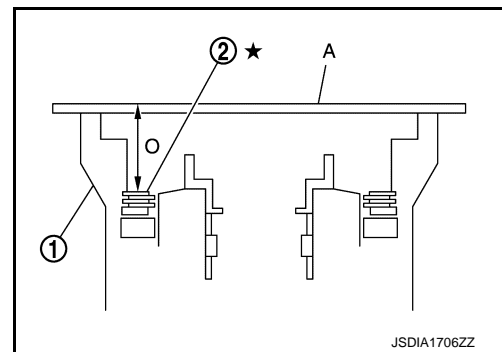
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- 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".

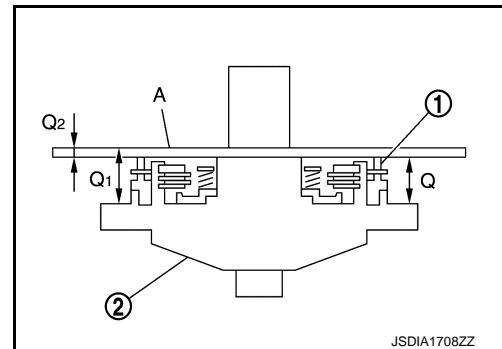
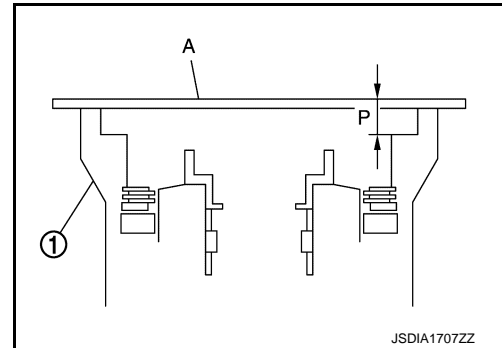
$$N = O - P$$

- b. Measure dimensions "Q1" and "Q2", 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.

$$Q = Q1 - Q2$$

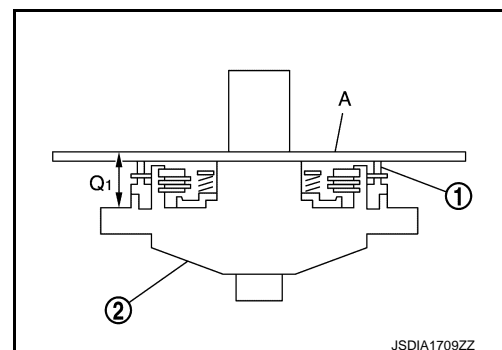


- i. Measure dimension "Q1" between the transmission case fitting surface of oil pump and the straightedge on front brake piston.

- 1 : Front brake piston  
2 : Oil pump assembly  
A : Straightedge

**CAUTION:**

Measure dimension "Q1" in at least three places, and take the average.



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# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

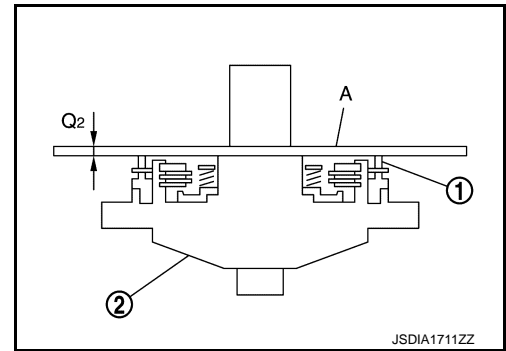
[7AT: RE7R01A]

ii. Measure dimension "Q2" of the straightedge.

- 1 : Front brake piston
- 2 : Oil pump assembly
- A : Straightedge

iii. Calculate dimension "Q".

$$Q = Q_1 - Q_2$$



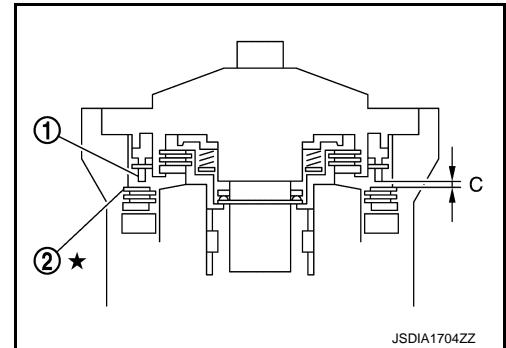
c. Adjust front brake clearance "C".

- 1 : Front brake piston
- 2 : Front brake retaining plate

$$C = N - Q$$

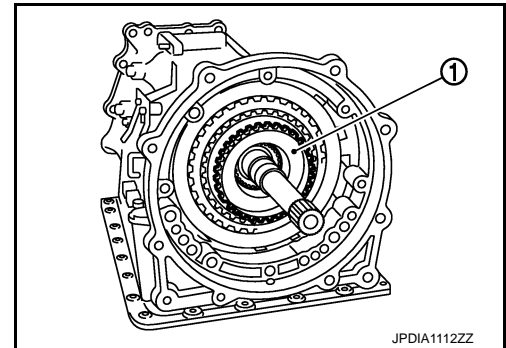
Front brake clearance "C" : Refer to [TM-315, "Front Brake Clearance"](#).

- Select proper thickness of retaining plate so that front brake clearance is within specifications.



Retaining plate : Refer to [TM-315, "Front Brake Clearance"](#).

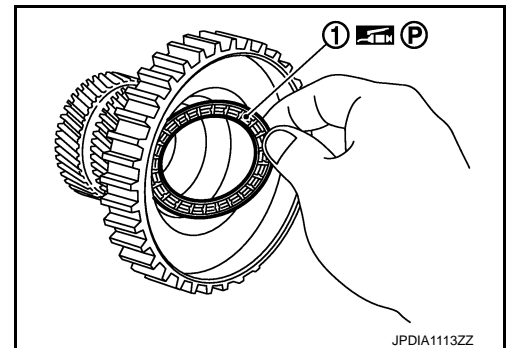
50. Remove under drive sun gear (1) from under drive carrier assembly.



51. Install needle bearing (1) to under drive sun gear.

**CAUTION:**

Check the direction of needle bearing. Refer to [TM-236, "Location of Needle Bearings and Bearing Races"](#).



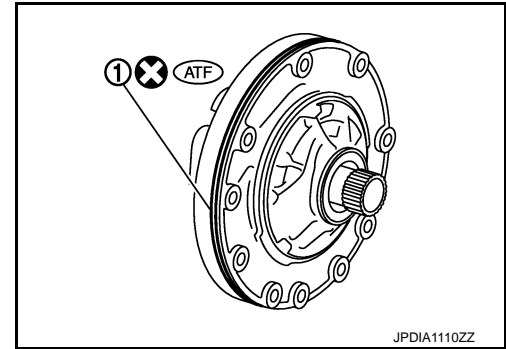


# TRANSMISSION ASSEMBLY

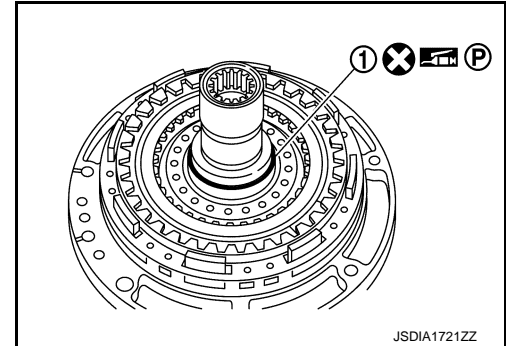
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

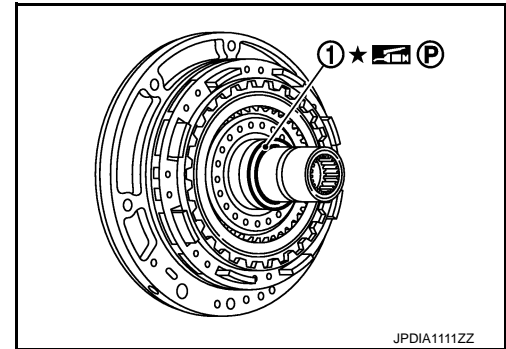
52. Install O-ring (1) to oil pump assembly.



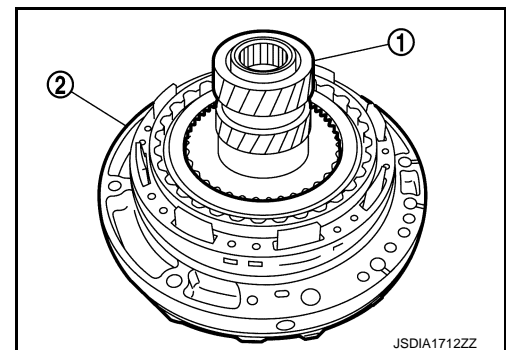
53. Install seal ring (1) to oil pump assembly.



54. Install bearing race (1) to oil pump assembly.



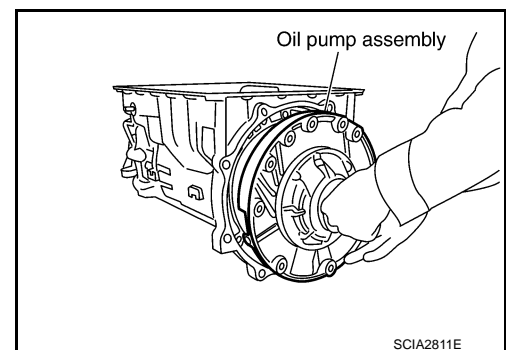
55. Install under drive sun gear (with needle bearing) (1) to oil pump assembly (2).



56. Install oil pump assembly (with under drive sun gear) to transmission case.

**CAUTION:**

**Apply ATF to oil pump bearing.**




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# TRANSMISSION ASSEMBLY

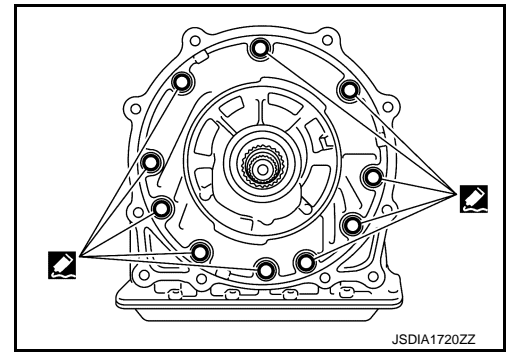
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

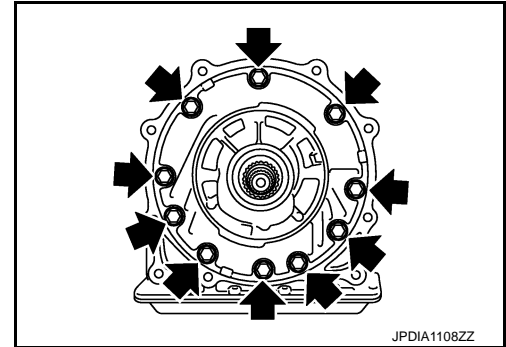
57. Apply recommended sealant to oil pump assembly as shown in the figure.

 : Genuine RTV silicone sealant or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

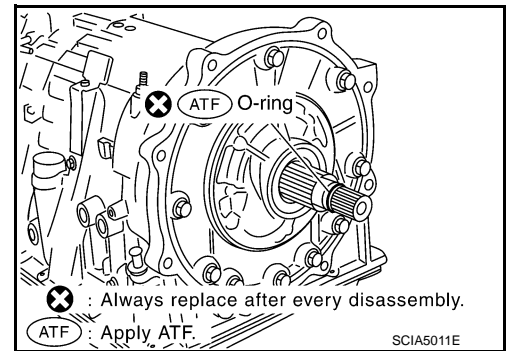
**CAUTION:**  
Completely remove all moisture, oil and old sealant, etc. from the oil pump mounting bolts and oil pump mounting bolt mounting surfaces.



58. Tighten oil pump bolts (←) to the specified torque.

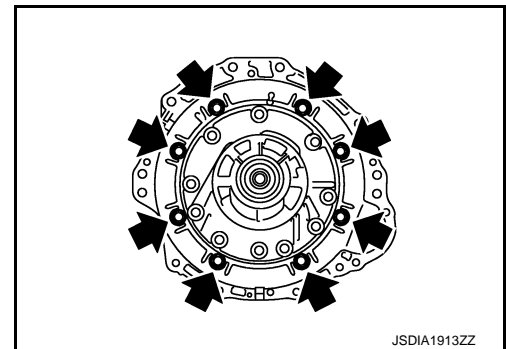


59. Install O-ring to input clutch assembly.



60. Install converter housing to transmission case, and tighten converter housing bolts (←) to the specified torque.

- VQ37VHR models

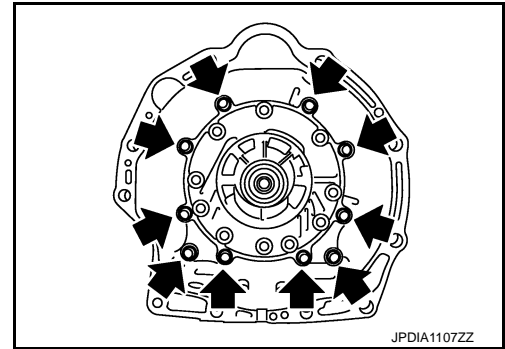


# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

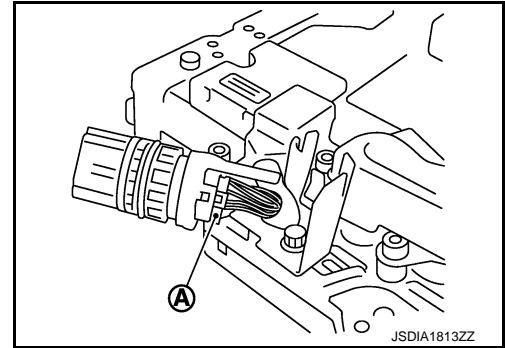
[7AT: RE7R01A]

- VK56VD models



A  
B  
C

61. Connect TCM connector (A) to joint connector.

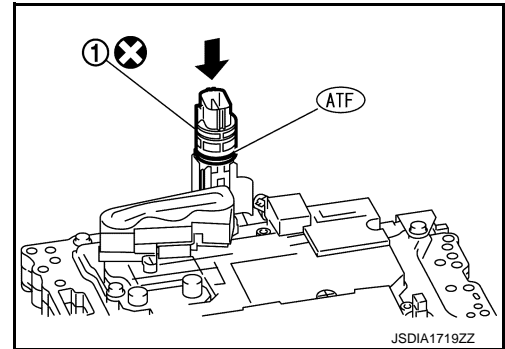


TM

E  
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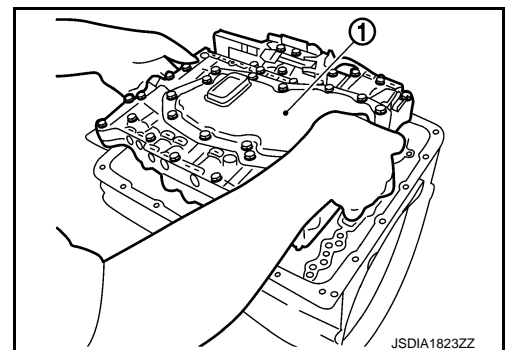
62. Install joint connector (1) to the control valve & TCM.

**CAUTION:**  
Apply ATF to O-ring of joint connector.



H  
I  
J

63. Install the control valve & TCM (1) to transmission case.



K  
L  
M

**CAUTION:**

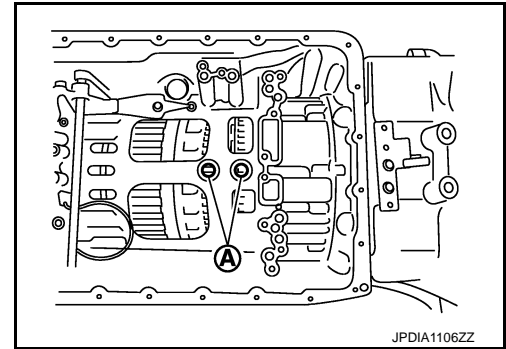
N  
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# TRANSMISSION ASSEMBLY

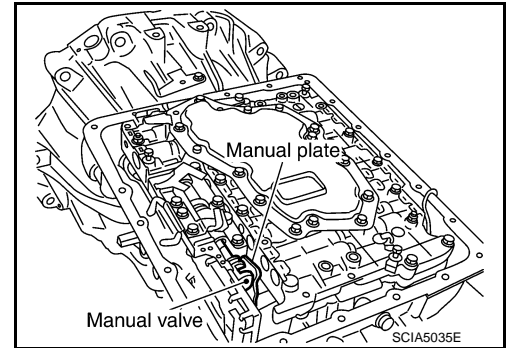
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- Make sure that input speed sensor securely installs input speed sensor holes (A).
- 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.

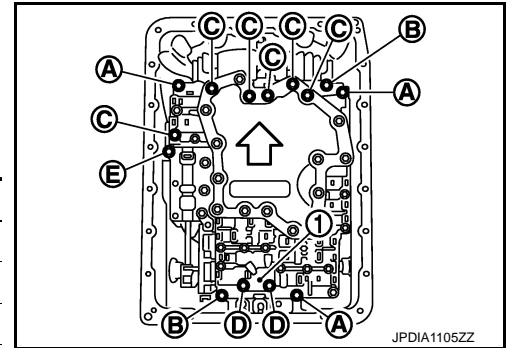


64. Install bolts and clip (1) to the control valve & TCM. Tighten bolt (E) to the specified torque before tightening the other than bolts.

↔ : Front

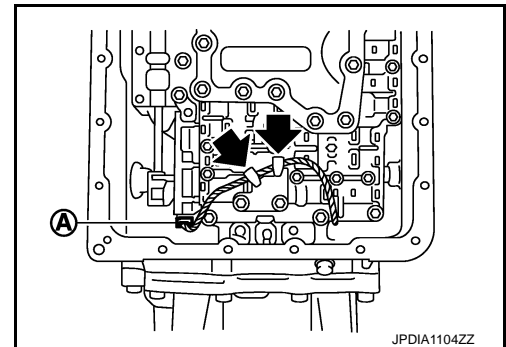
Bolt symbol	Length mm (in)	Number of bolts
A	43 (1.69)	3
B	40 (1.57)	2
C	54 (2.13)	6
D	50 (1.97)	2
E*	50 (1.97)	1

\*: Reamer bolt



65. Connect output speed sensor connector (A).

66. Engage output speed sensor harness with terminal clips (↔).



# TRANSMISSION ASSEMBLY

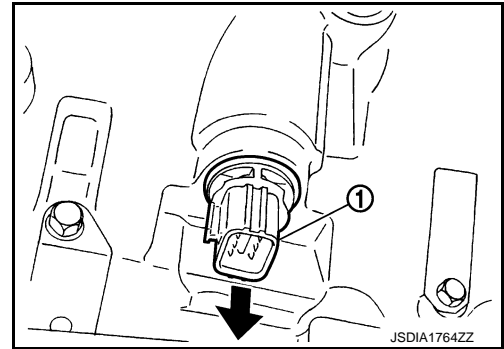
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

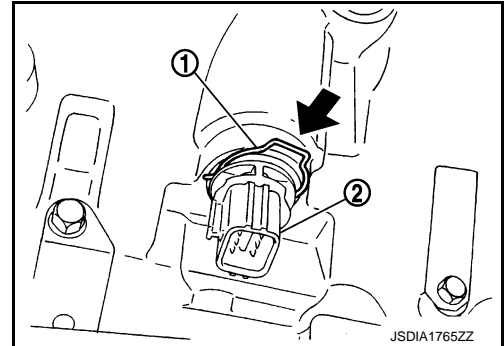
67. Pull down joint connector (1).

**CAUTION:**

Be careful not to damage connector.



68. Install snap ring (1) to joint connector (2).

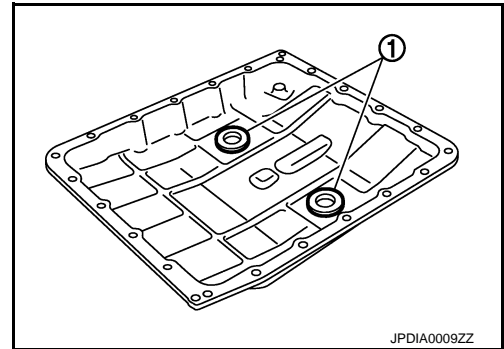


69. Install magnets (1) to oil pan.

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.



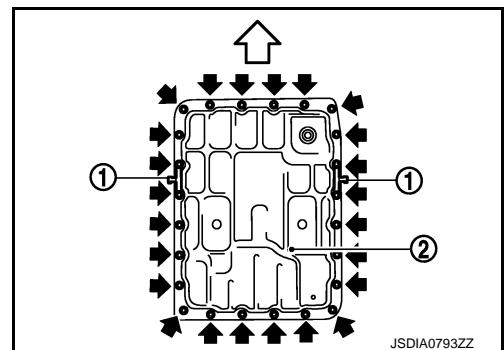
71. Install oil pan (2) and clips (1) to transmission case.

⇐ : 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

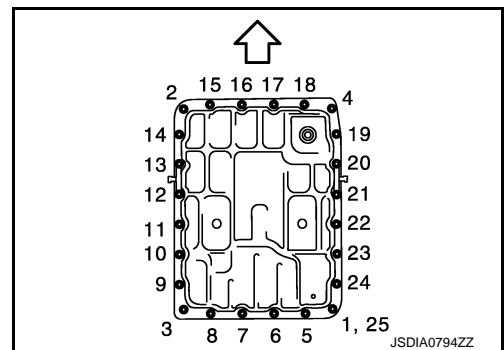
**CAUTION:**

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.



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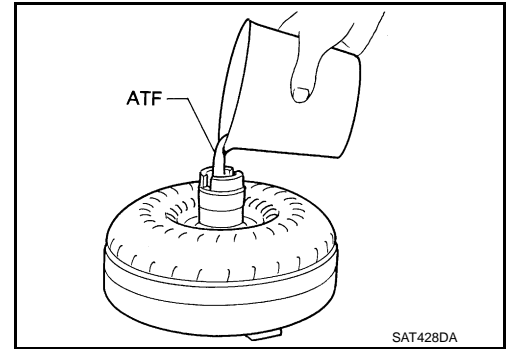
# TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

74. Pour ATF into torque converter.

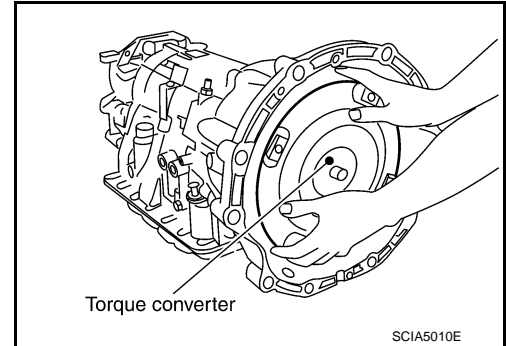
- Approximately 2 liter (2-1/8 US qt, 1-3/4 Imp qt) of ATF is required for a new torque converter.
- When reusing old torque converter, add the same amount of ATF as was drained.



75. Install torque converter while aligning notches of torque converter with notches of oil pump.

**CAUTION:**

**Install torque converter while rotating it.**

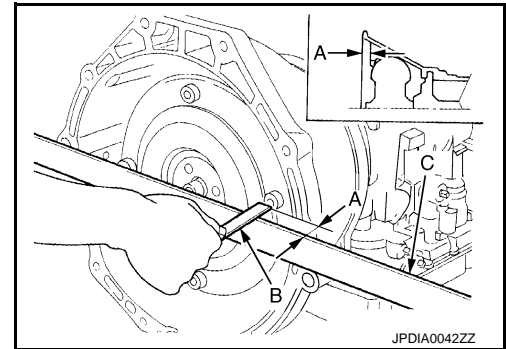


76. Measure dimension "A" to make sure that torque converter is in proper position.

B : Scale

C : Straightedge

**Dimension "A" : Refer to [TM-315, "Torque Converter"](#).**



## Inspection

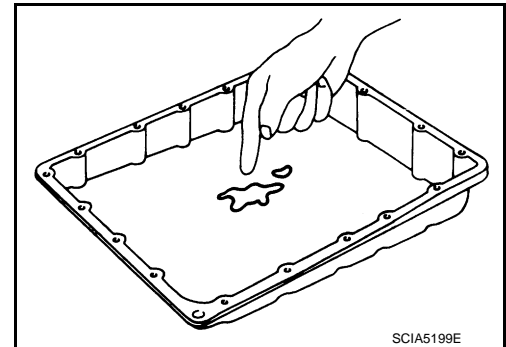
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### INSPECTION AFTER DISASSEMBLY

#### 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-92, "Cleaning"](#).



#### Torque Converter

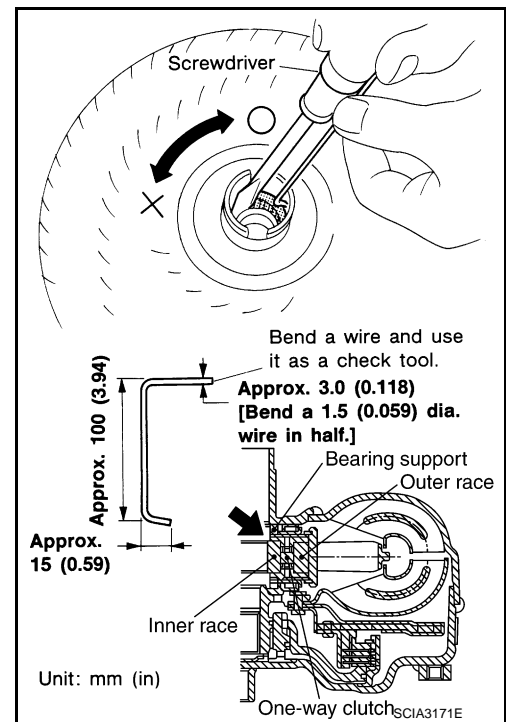
# TRANSMISSION ASSEMBLY

## < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

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.



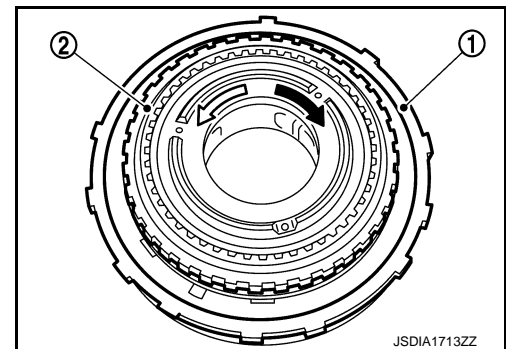
### 1st One-way Clutch

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.

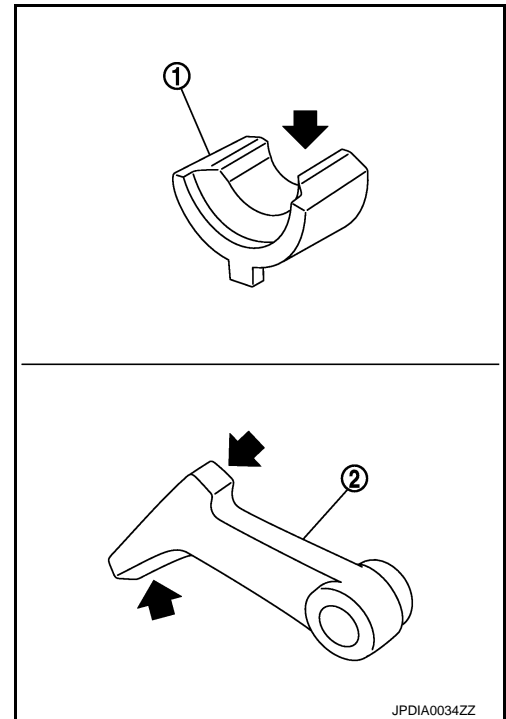
### Parking Actuator Support and Parking Pawl

# TRANSMISSION ASSEMBLY

## < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

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

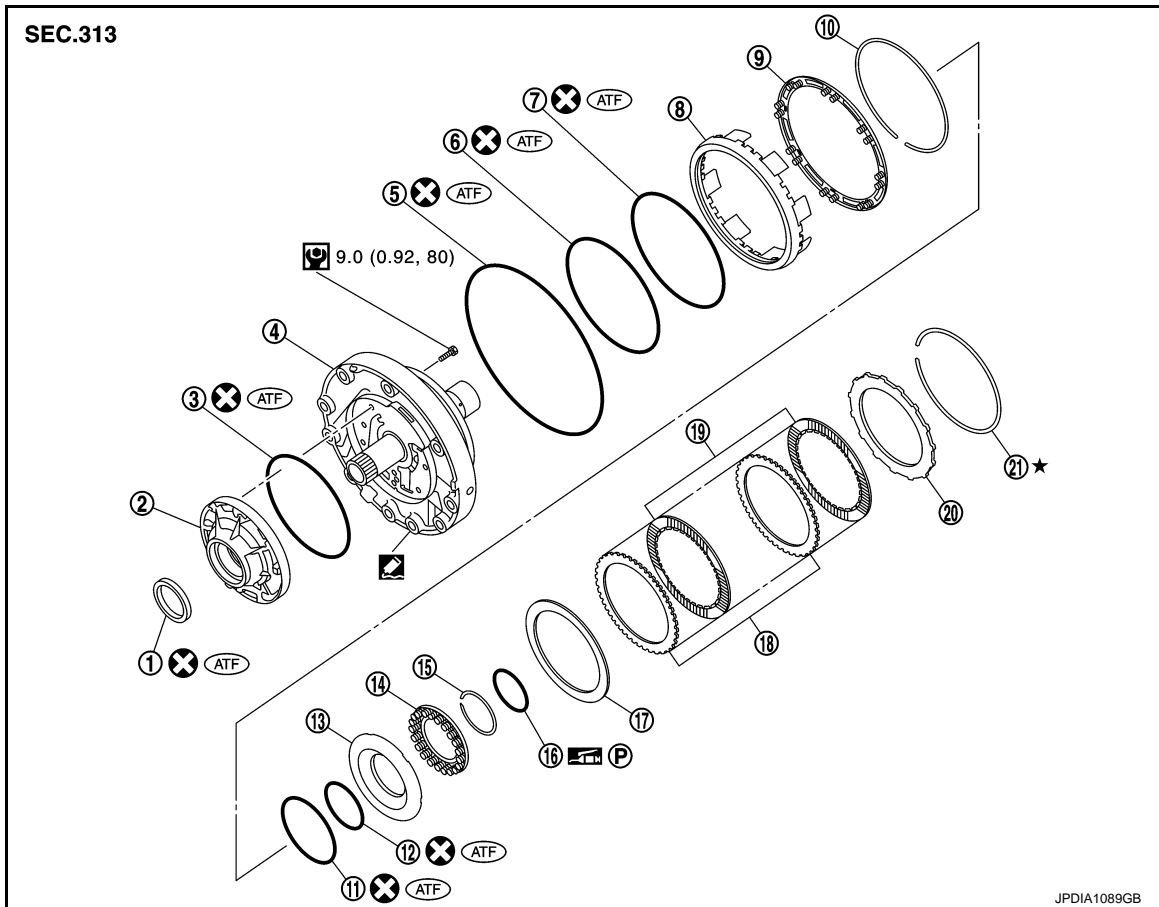
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]


## OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

Exploded View

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- |                              |                                |                                |
|------------------------------|--------------------------------|--------------------------------|
| 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                  |

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

Refer to [GI-4, "Components"](#) for symbols not described on the above.

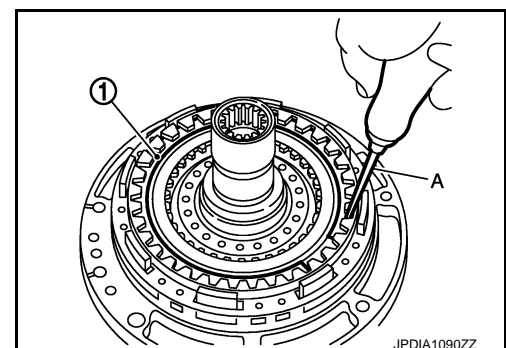
### Disassembly

INFOID:000000007134279

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.

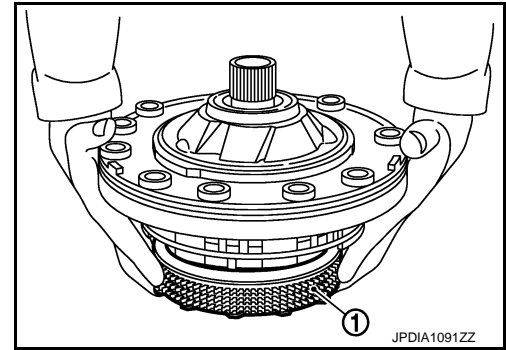


# OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

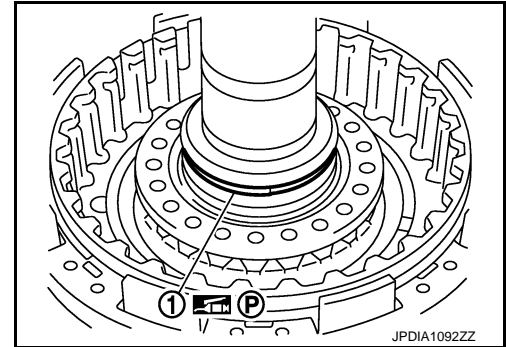
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

2. Remove 2346 brake component part (retaining plate, drive plates, driven plates, and dish plate) (1) from oil pump assembly.



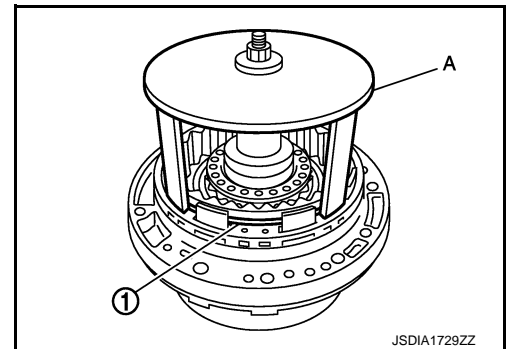
3. Remove seal ring (1) from oil pump assembly.



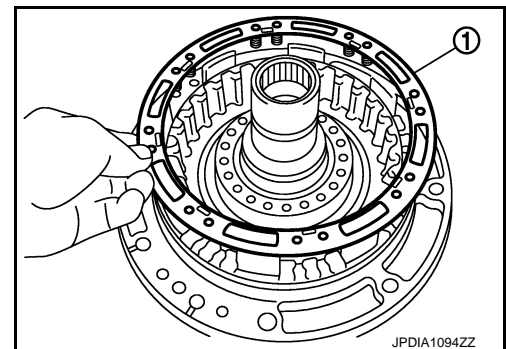
4. Set the clutch spring compressor (SST: KV31103800) (A) on front brake spring retainer and remove snap ring (fixing front brake spring retainer) (1) from oil pump assembly while compressing return spring.

**CAUTION:**

**Be careful not to expand snap ring excessively.**



5. Remove front brake spring retainer (1) from oil pump assembly.

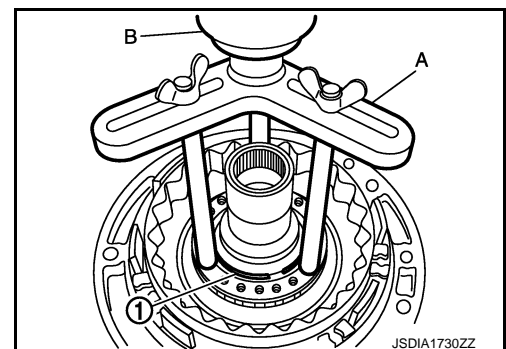


6. Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)] (A) on 2346 brake spring retainer and remove snap ring (fixing 2346 brake spring retainer) (1) from oil pump assembly while compressing return spring.

B : Press

**CAUTION:**

**Be careful not to expand snap ring excessively.**

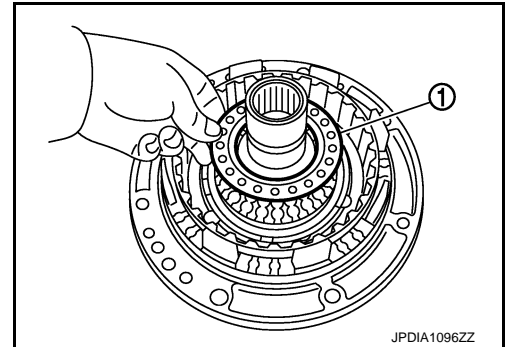


# OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

7. Remove 2346 brake spring retainer (1) from oil pump assembly.

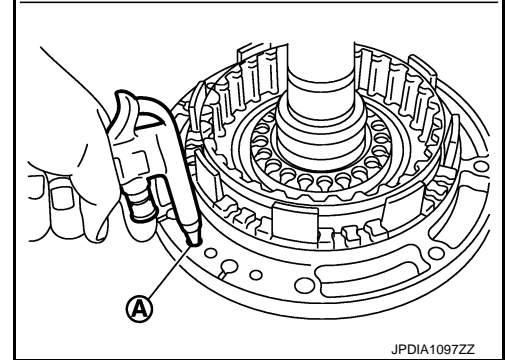
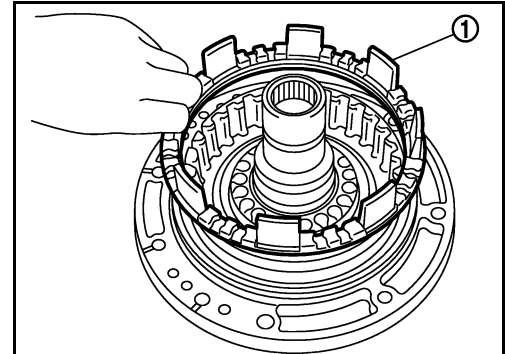


8. Remove front brake piston (1) from oil pump assembly with compressed air. Refer to [TM-236, "Oil Channel"](#).

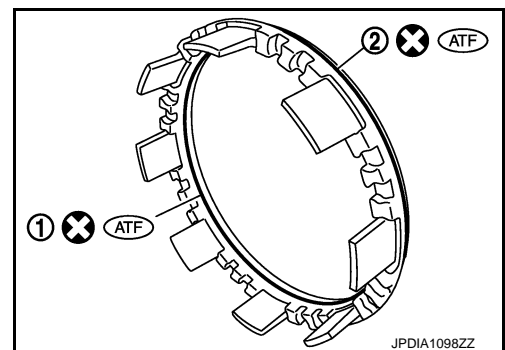
A : Front brake pressure hole

**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.



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# OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

< UNIT DISASSEMBLY AND ASSEMBLY >

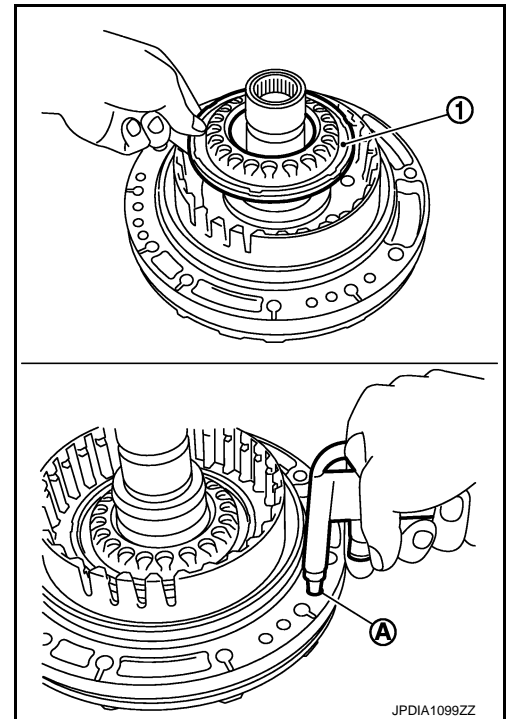
[7AT: RE7R01A]

10. Remove 2346 brake piston (1) from oil pump assembly with compressed air. Refer to [TM-236, "Oil Channel"](#).

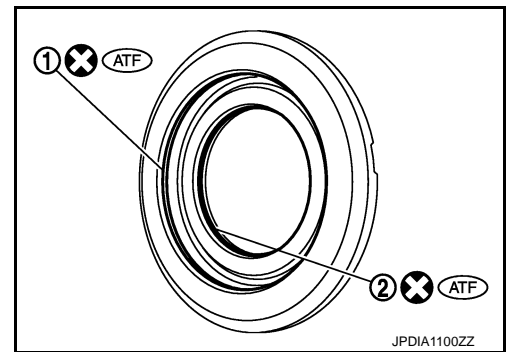
A : 2346 brake pressure hole

**CAUTION:**

Care should be taken not to abruptly blow air. It makes piston incline, as the result, it becomes hard to disassemble the piston.

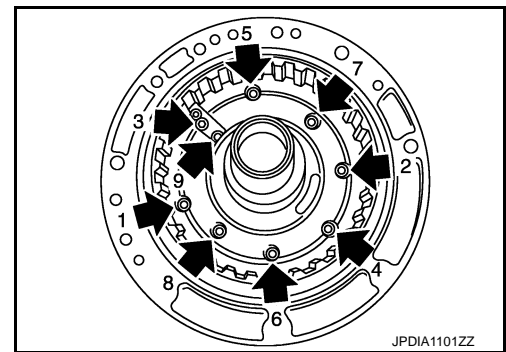


11. Remove D-ring (large) (1) and D-ring (small) (2) from 2346 brake piston.



12. Loosen bolts in numerical order shown in the figure and remove oil pump housing from oil pump cover.

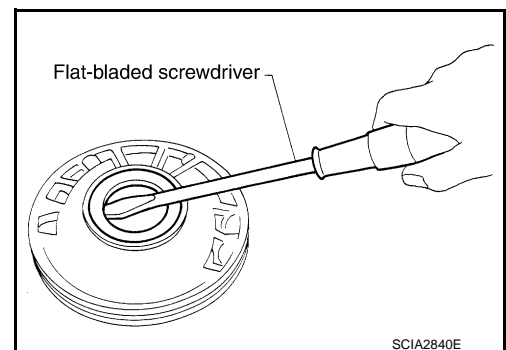
← : Bolt



13. Remove oil pump housing oil seal using a flat-bladed screwdriver.

**CAUTION:**

Be careful not to scratch oil pump housing.

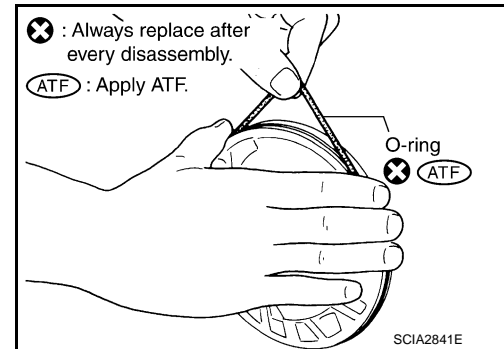


# OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

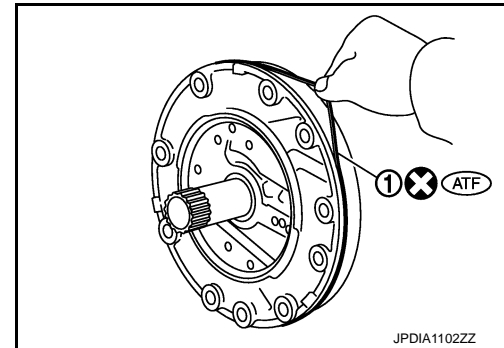
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

14. Remove O-ring from oil pump housing.



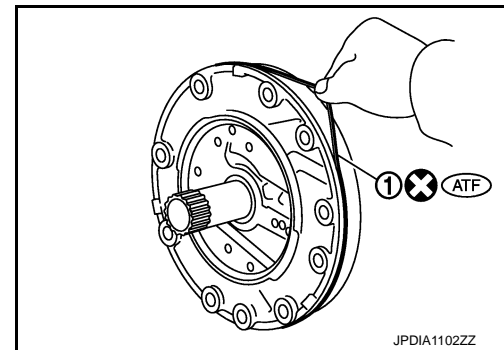
15. Remove O-ring (1) from oil pump cover.



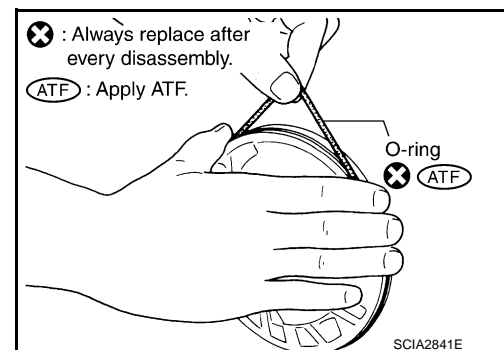
## Assembly

INFOID:000000007134280

1. Install O-ring (1) to oil pump cover.



2. Install O-ring to oil pump housing.



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# OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

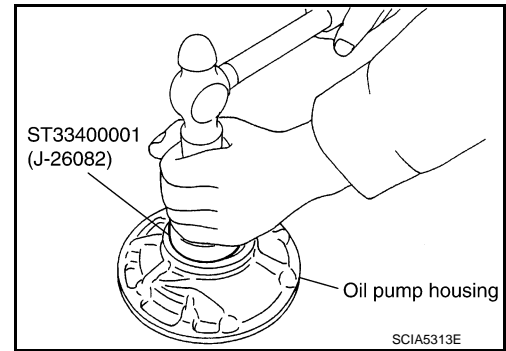
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

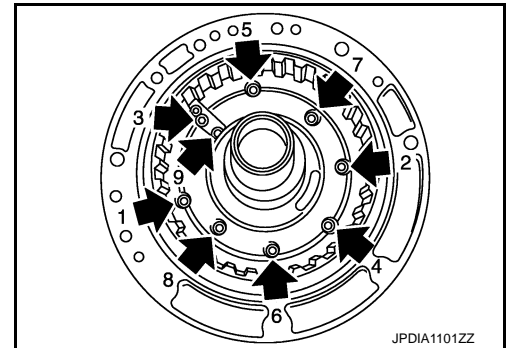
3. Using the drift, install oil pump housing oil seal to the oil pump housing until it is flush.

**CAUTION:**

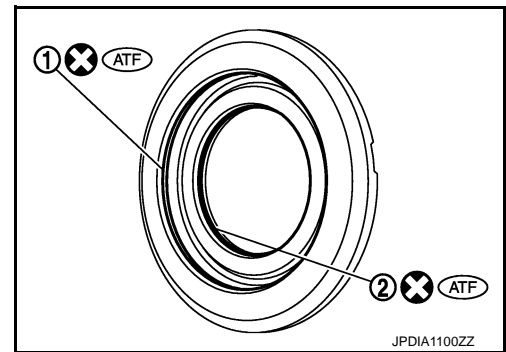
- Never reuse oil seal.
- Apply ATF to oil seal.



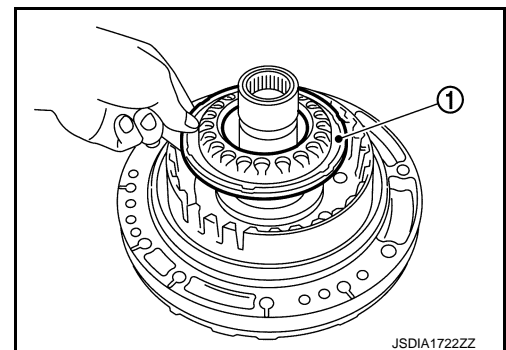
4. Install oil pump housing to oil pump cover and tighten bolts (←) to the specified torque in numerical order shown in the figure after temporarily tightening them.



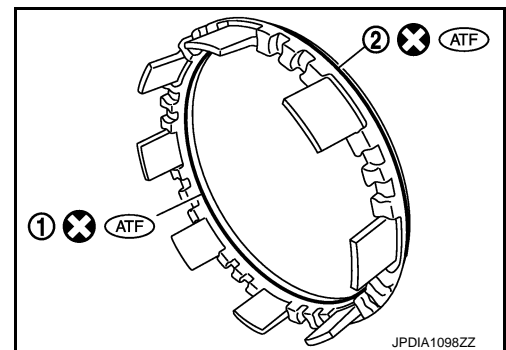
5. Install D-ring (large) (1) and D-ring (small) (2) to 2346 brake piston.



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.

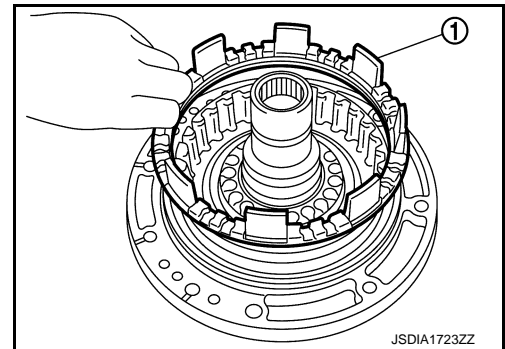


# OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

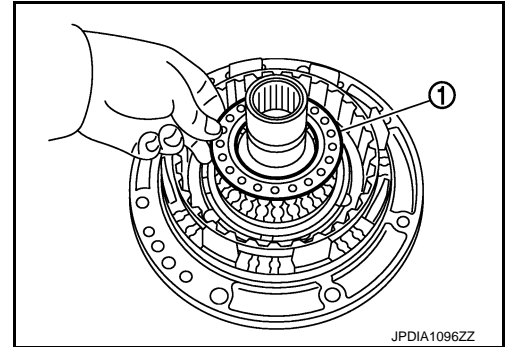
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

8. Install front brake piston (1) to oil pump assembly.



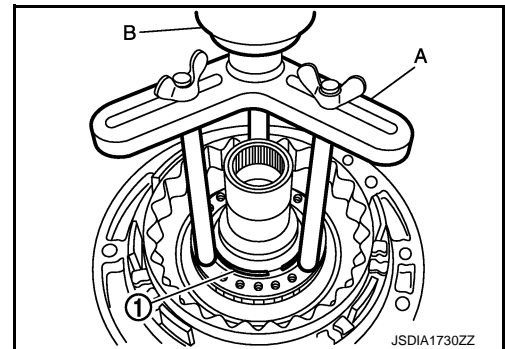
9. Install 2346 brake spring retainer (1) to oil pump assembly.



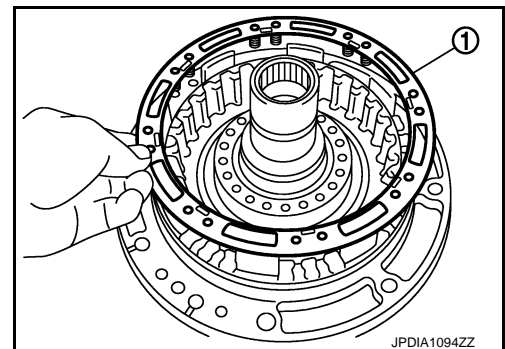
10. Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)] (A) on 2346 brake spring retainer and install snap ring (fixing 2346 brake spring retainer) (1) to oil pump assembly while compressing return spring.

B : Press

**CAUTION:**  
Be careful not to expand snap ring excessively.

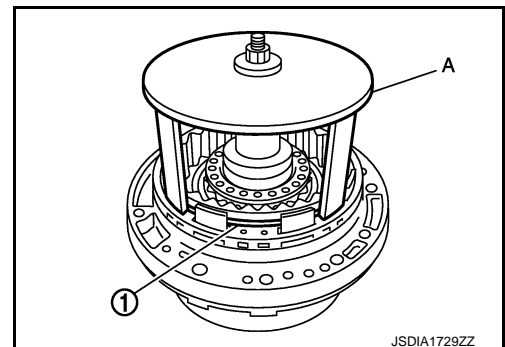


11. Install front brake spring retainer (1) to oil pump assembly.



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.



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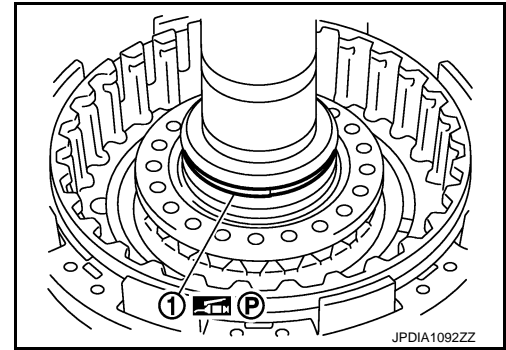


# OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

13. Install seal ring (1) to oil pump assembly.

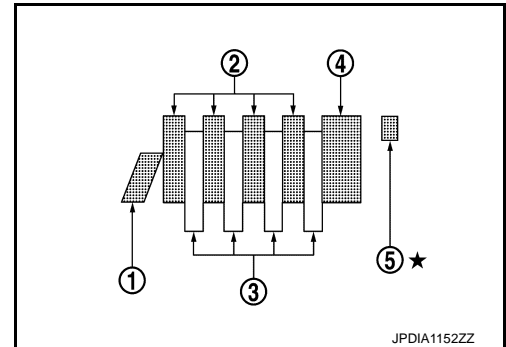


14. Install 2346 brake component part (retaining plate, drive plates, driven plates, and dish plate) to oil pump assembly.

• VQ37VHR models

- 1 : Dish plate
- 2 : Driven plate (four pieces)
- 3 : Drive plate (four pieces)
- 4 : Retaining plate
- 5 : Snap ring

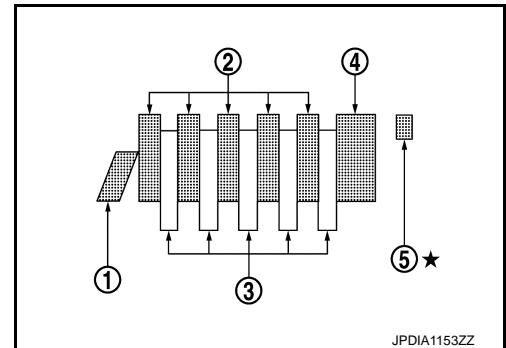
**CAUTION:**  
Check the order of plates.



• VK56VD models

- 1 : Dish plate
- 2 : Driven plate (five pieces)
- 3 : Drive plate (five pieces)
- 4 : Retaining plate
- 5 : Snap ring

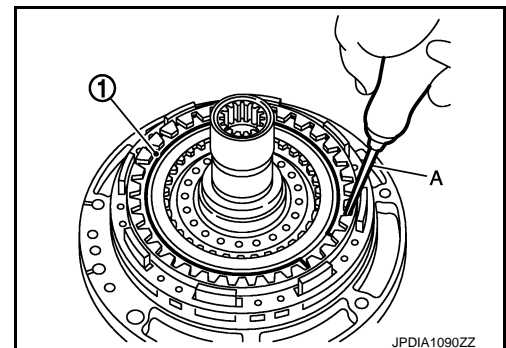
**CAUTION:**  
Check the order of plates.



15. Install 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.



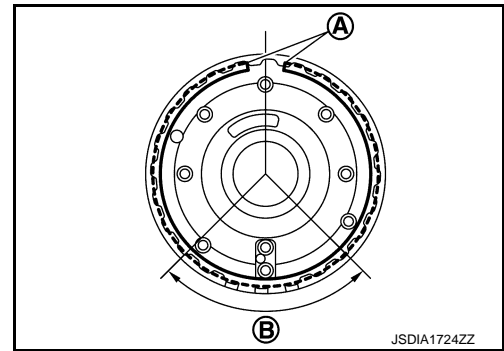


# OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- Never install snap ring mating part (A) to the clearance groove [(B) shown in the figure] of oil pump cover.



## Inspection and Adjustment

INFOID:000000007134281

### 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

Check facing for burns, cracks or damage. If necessary, replace drive plates and driven plates.

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

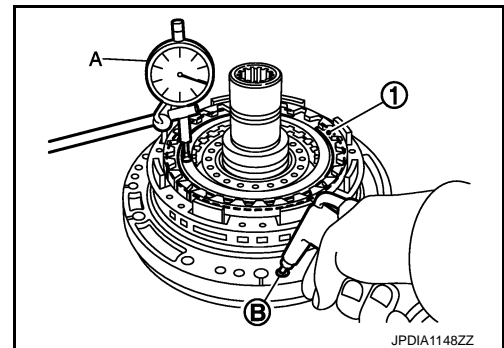
Set a dial indicator (A) as shown in the figure. Blow air into 2346 brake oil pressure hole (B), and measure 2346 brake clearance. If clearance is outside the specified value, adjust clearance by selecting an appropriate snap ring (1). Refer to [TM-236. "Oil Channel"](#).

**Air pressure** : 300 kPa (3.06 kg/cm<sup>2</sup>, 43.5 psi)

**2346 brake clearance** : Refer to [TM-315. "2346 Brake Clearance"](#).

### CAUTION:

Never exceed the specified air pressure value.



# UNDER DRIVE CARRIER, FRONT BRAKE HUB

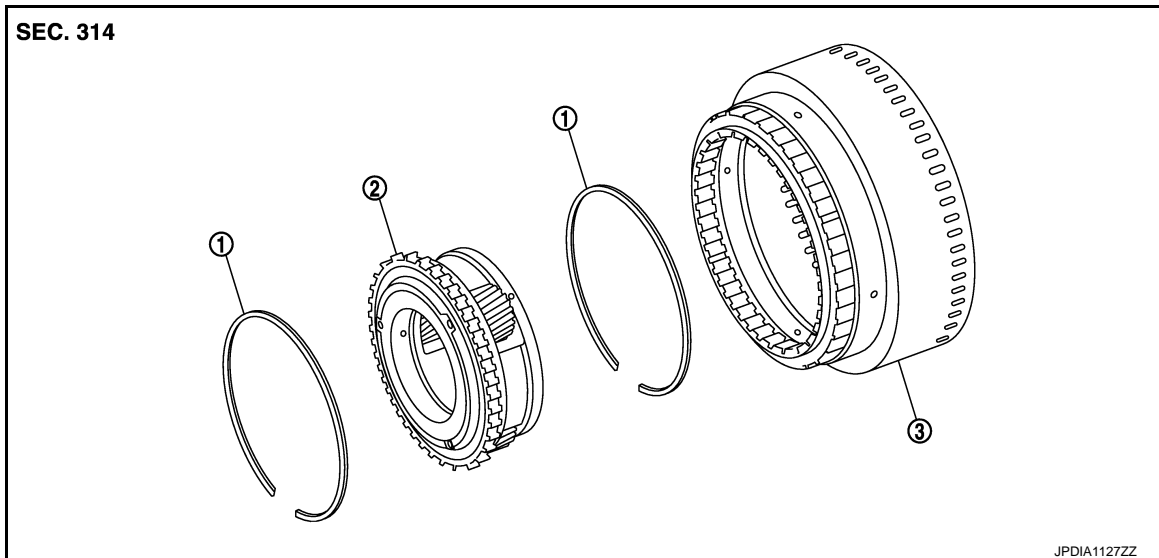
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

## UNDER DRIVE CARRIER, FRONT BRAKE HUB

Exploded View

INFOID:000000007134282



1. Snap ring

2. Under drive carrier assembly

3. Front brake hub

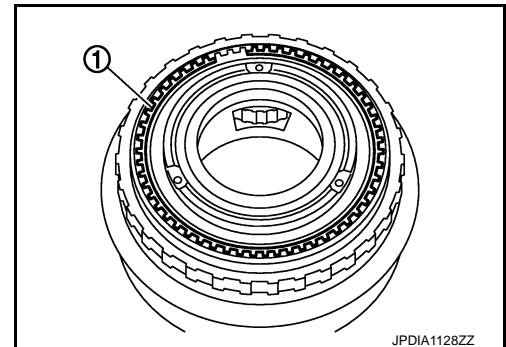
### Disassembly

INFOID:000000007134283

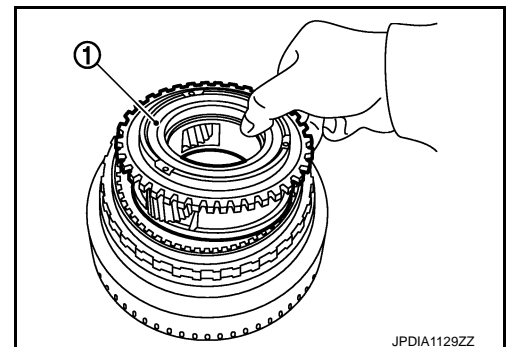
1. Remove snap ring (1) from front brake hub using a flat-bladed screwdriver.

**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.



# UNDER DRIVE CARRIER, FRONT BRAKE HUB

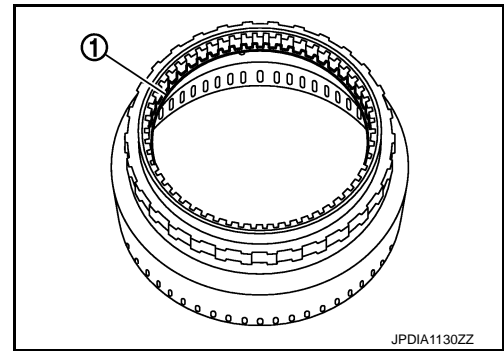
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

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.



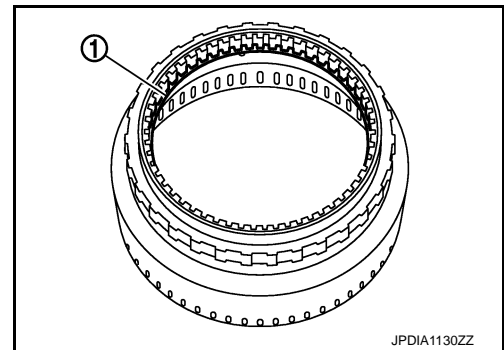
## Assembly

INFOID:000000007134284

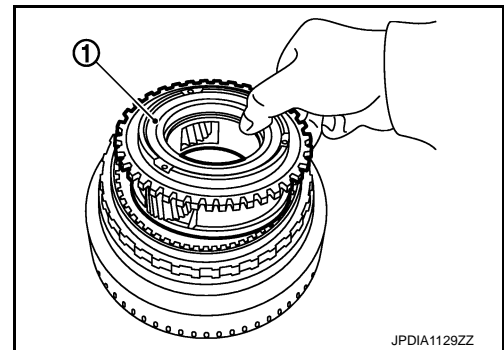
1. Install snap ring (1) to front brake hub.

**CAUTION:**

- Be careful not to damage snap ring.



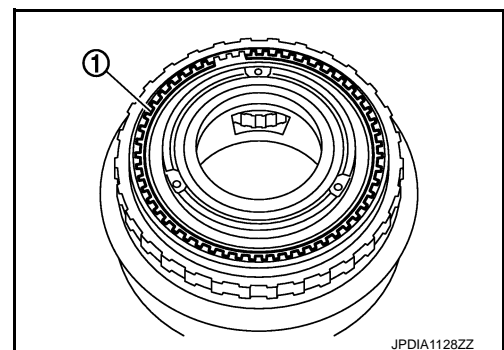
2. Install under drive carrier assembly (1) to front brake hub.



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:000000007134285

### 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

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## **UNDER DRIVE CARRIER, FRONT BRAKE HUB**

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

---

Check for deformation, fatigue or damage. If necessary, replace front brake hub.

# FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

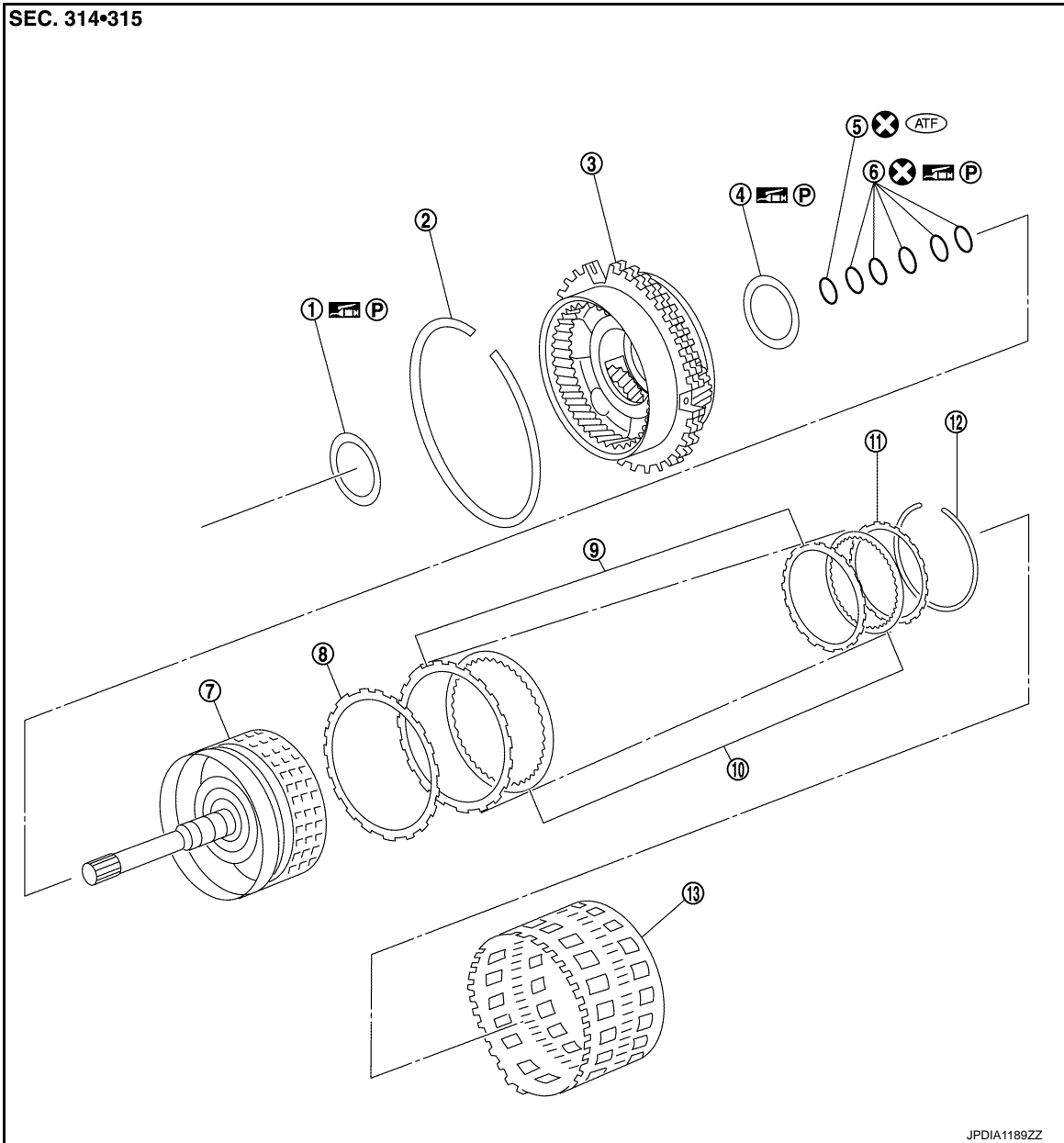
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

## FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

Exploded View

INFOID:000000007134286



- |                              |                                  |                              |
|------------------------------|----------------------------------|------------------------------|
| 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       |                                  |                              |

Refer to [GI-4, "Components"](#) for symbols in the figure.

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# FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

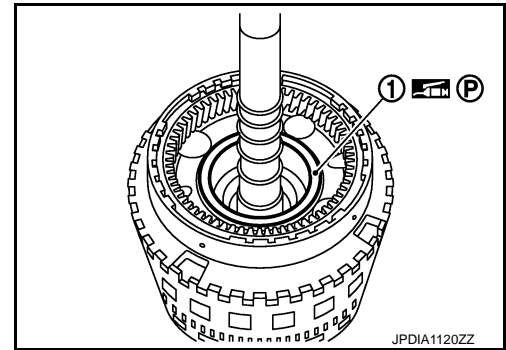
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

INFOID:000000007134287

## Disassembly

1. Remove needle bearing (1) from front carrier assembly.

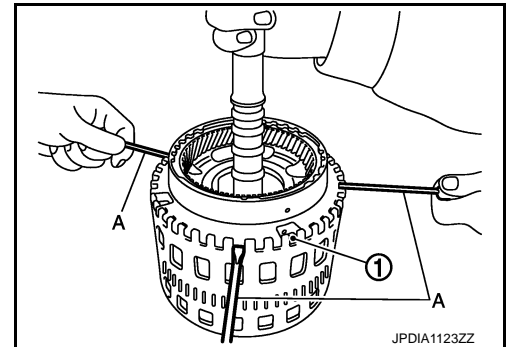


2. Compress snap ring (1) using flat-bladed screwdrivers (A).

**CAUTION:**

- Be careful not to scratch rear internal gear.
- Be careful not to damage snap ring.

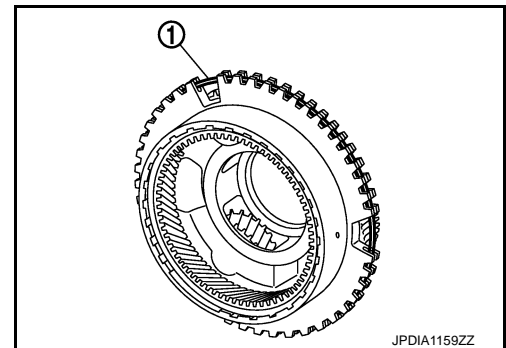
3. Remove front carrier assembly and input clutch assembly from rear internal gear.
4. Remove front carrier assembly from input clutch assembly.



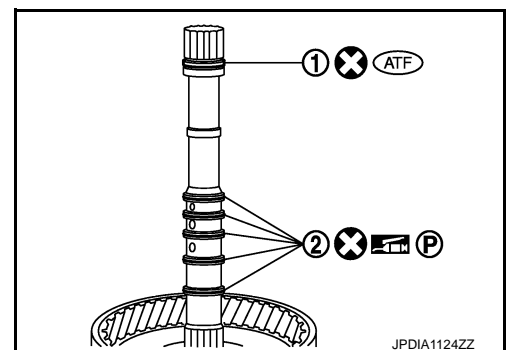
6. Remove snap ring (1) from front carrier assembly.

**CAUTION:**

- Be careful not to expand snap ring excessively.



7. Remove O-ring (1) and seal rings (2) from input clutch assembly.

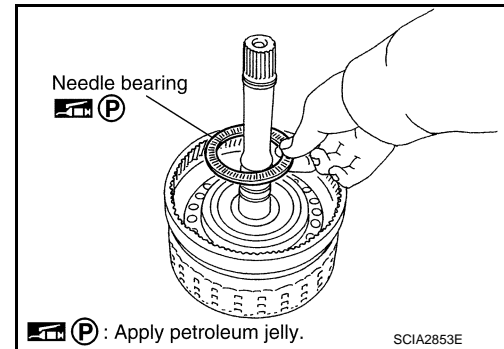


# FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

8. Remove needle bearing from input clutch assembly.

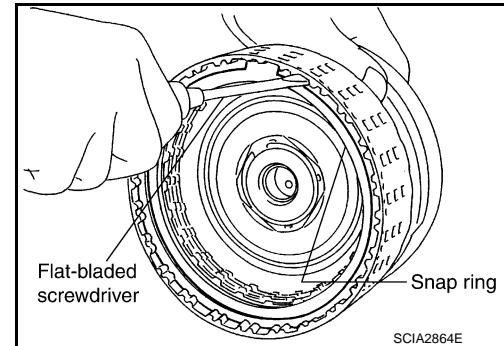


9. Remove snap ring from input clutch drum using a flat-bladed screwdriver.

**CAUTION:**

- Be careful not to scratch rear input clutch drum and input clutch retaining plate.
- Be careful not to damage snap ring.

10. Remove input clutch component part (drive plates, driven plates, retaining plate, and dish plate) from input clutch drum.



## Assembly

INFOID:000000007134288

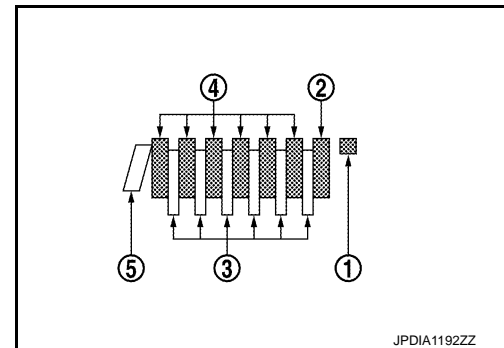
1. Install input clutch component part (dish plate, drive plates, driven plates, and retaining plate) to input clutch drum.

- VQ37VHR models

- 1 : Snap ring
- 2 : Retaining plate
- 3 : Drive plate (six pieces)
- 4 : Driven plate (six pieces)
- 5 : Dish plate

**CAUTION:**

**Check order of plates.**

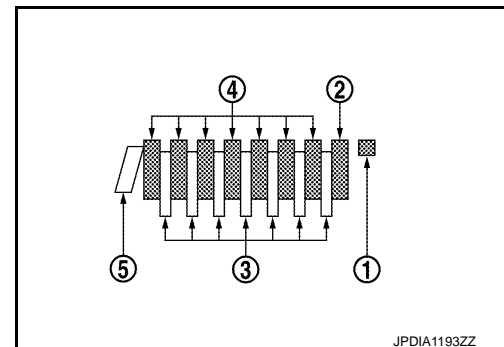


- VK56VD models

- 1 : Snap ring
- 2 : Retaining plate
- 3 : Drive plate (seven pieces)
- 4 : Driven plate (seven pieces)
- 5 : Dish plate

**CAUTION:**

**Check order of plates.**



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P

# FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

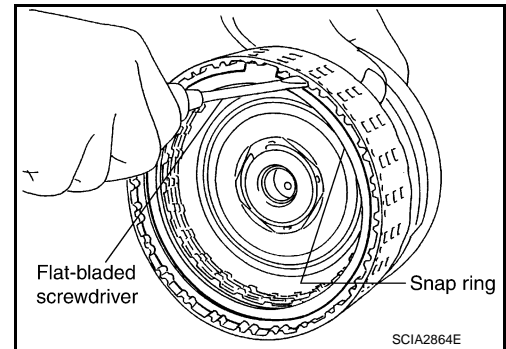
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

2. Install snap ring to input clutch drum using a flat-bladed screwdriver.

**CAUTION:**

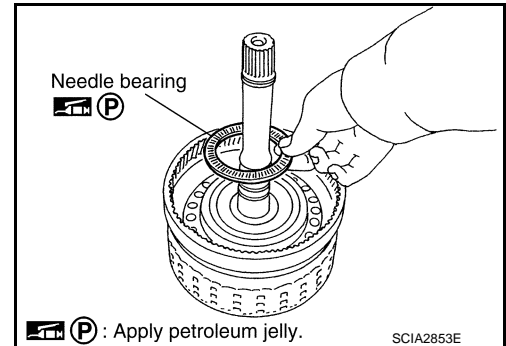
- Be careful not to scratch input clutch drum and input clutch retaining plate.
- Be careful not to damage snap ring.



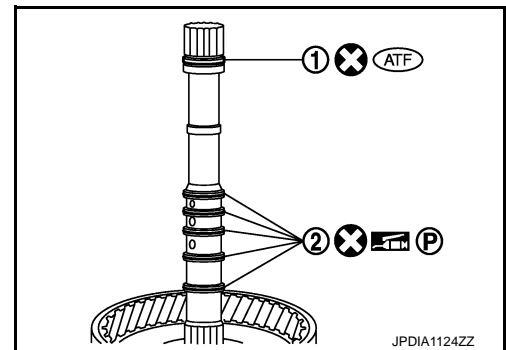
3. Install needle bearing to input clutch assembly.

**CAUTION:**

Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



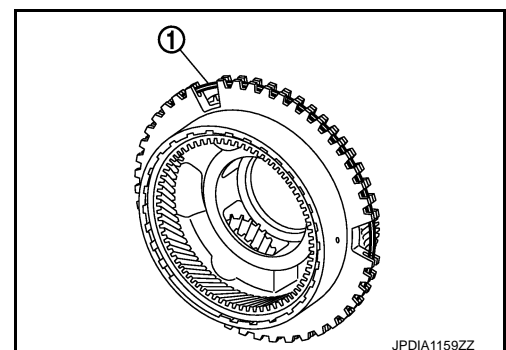
4. Install O-ring (1) and seal rings (2) to input clutch assembly.



5. Install snap ring (1) to front carrier assembly.

**CAUTION:**

Be careful not to expand snap ring excessively.

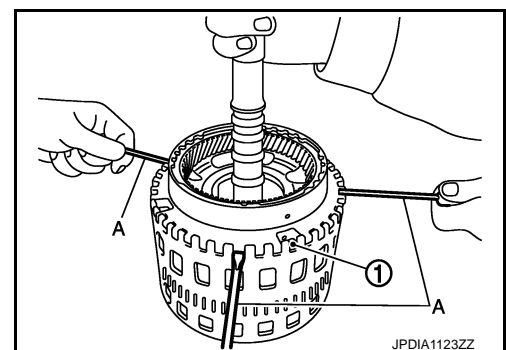


6. Compress snap ring (1) using flat-bladed screwdrivers (A).

**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.





# FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

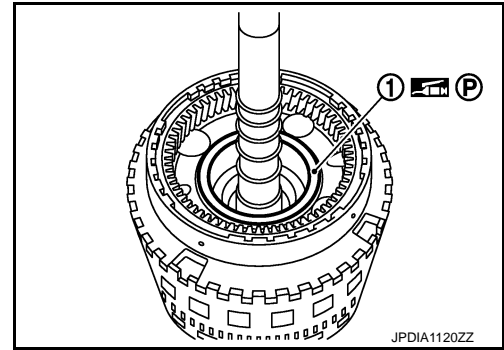
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

8. Install needle bearing (1) to front carrier assembly.

**CAUTION:**

Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



INFOID:000000007134289

## Inspection

### 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.

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# MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

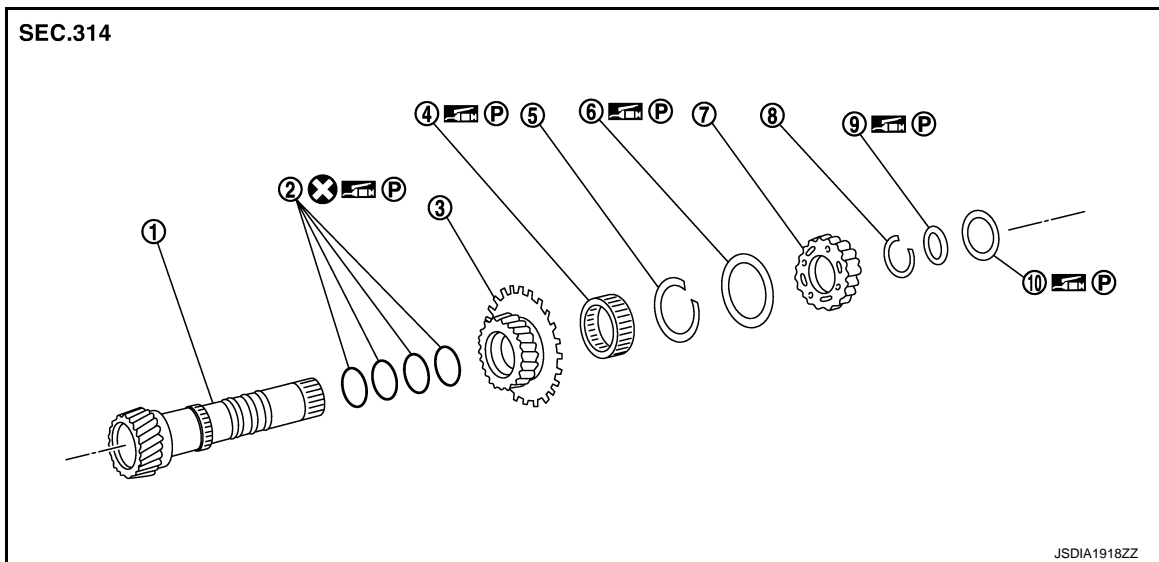
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

## MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

Exploded View

INFOID:000000007134290



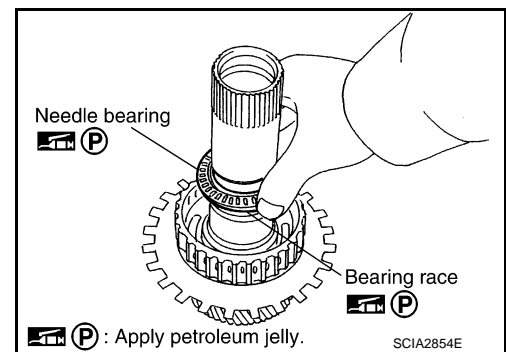
- |                                    |              |                   |
|------------------------------------|--------------|-------------------|
| 1. Mid sun gear                    | 2. Seal ring | 3. Rear sun gear  |
| 4. 2nd one-way clutch              | 5. Snap ring | 6. Needle bearing |
| 7. High and low reverse clutch hub | 8. Snap ring | 9. Bearing race   |
| 10. Needle bearing                 |              |                   |

Refer to [GI-4, "Components"](#) for symbols in the figure.

### Disassembly

INFOID:000000007134291

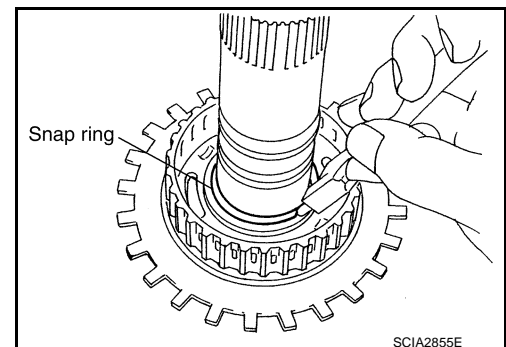
1. Remove needle bearing and bearing race from high and low reverse clutch hub.



2. Remove snap ring from mid sun gear assembly using pair of snap ring pliers.

**CAUTION:**

**Be careful not to expand snap ring excessively.**

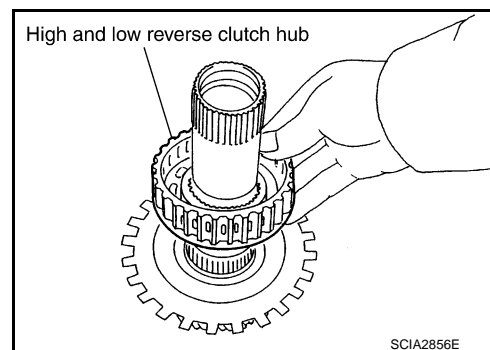


# MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

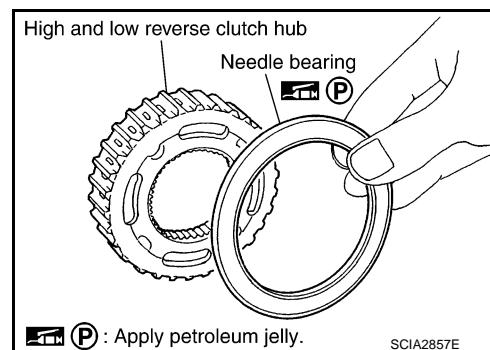
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

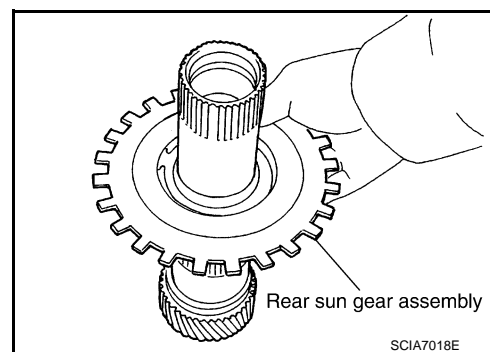
3. Remove high and low reverse clutch hub from mid sun gear assembly.



4. Remove needle bearing from high and low reverse clutch hub.



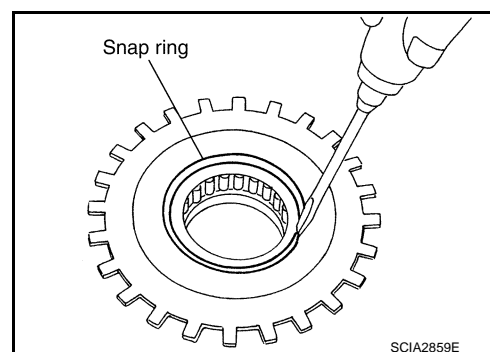
5. Remove rear sun gear assembly from mid sun gear assembly.



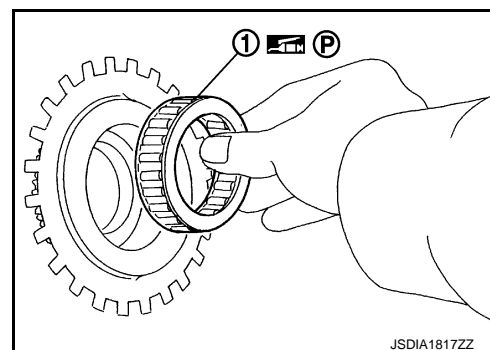
6. Remove snap ring from rear sun gear using a flat-bladed screwdriver.

**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.



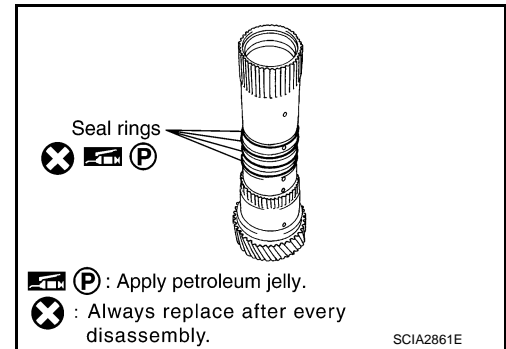
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# MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

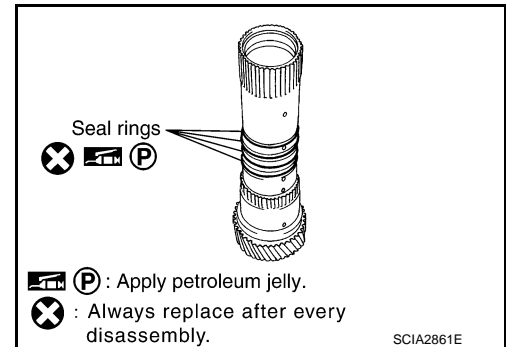
8. Remove seal rings from mid sun gear.



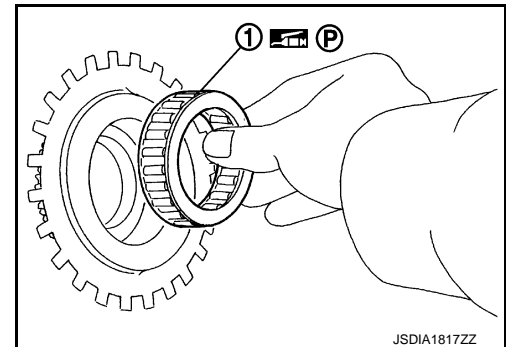
## Assembly

INFOID:000000007134292

1. Install seal rings to mid sun gear.



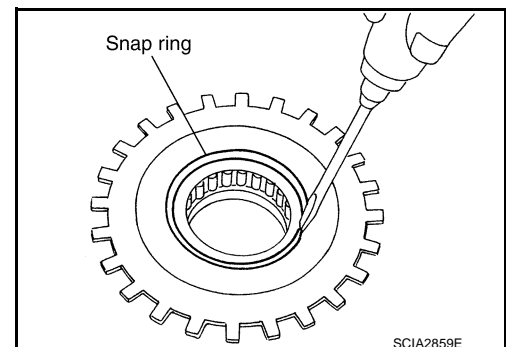
2. Install 2nd one-way clutch to rear sun gear.



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.

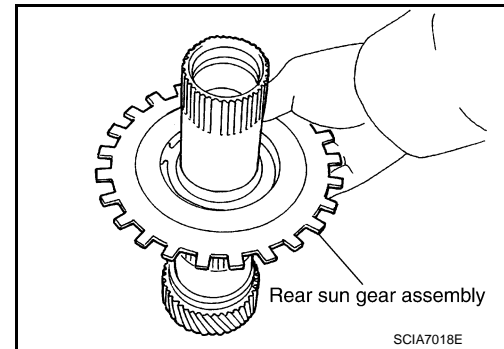


# MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

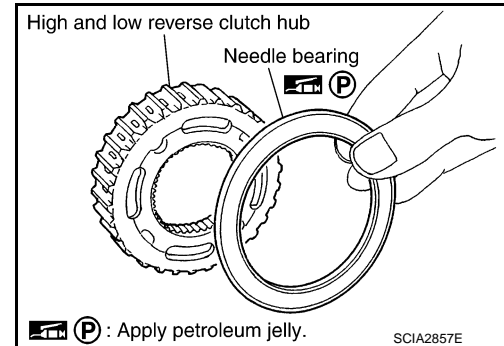
4. Install rear sun gear assembly to mid sun gear assembly.



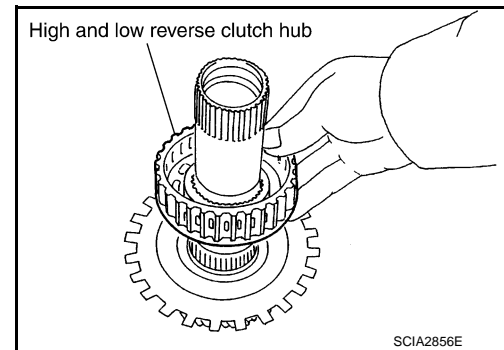
5. Install needle bearing to high and low reverse clutch hub.

**CAUTION:**

**Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".**



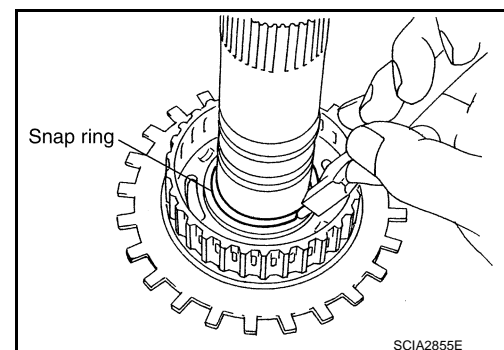
6. Install high and low reverse clutch hub to mid sun gear assembly.



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.

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# MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

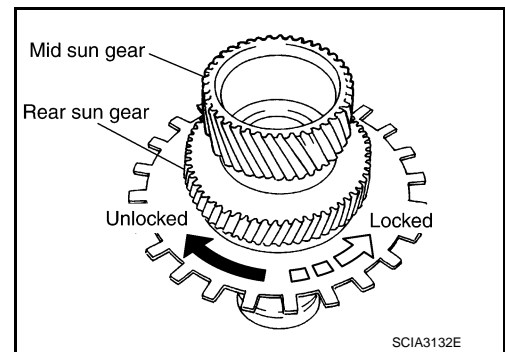
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- Hold mid sun gear and turn rear sun gear.
- Check 2nd one-way clutch for correct locking and unlocking directions.

**CAUTION:**

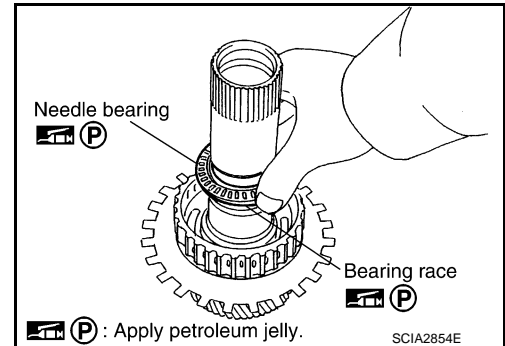
If not as shown in the figure, check installation direction of 2nd one-way clutch.



- Install needle bearing and bearing race to high and low reverse clutch hub.

**CAUTION:**

Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



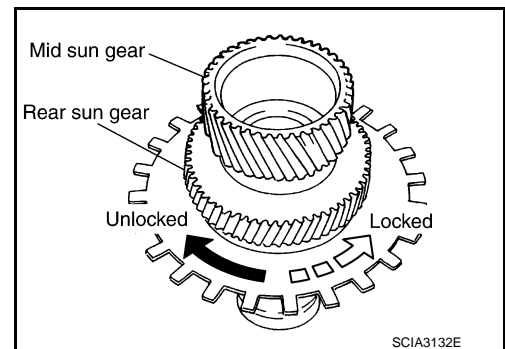
## Inspection

INFOID:000000007134293

### INSPECTION AFTER DISASSEMBLY

#### 2nd One-way Clutch

- Hold mid sun gear and turn rear sun gear.
- 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

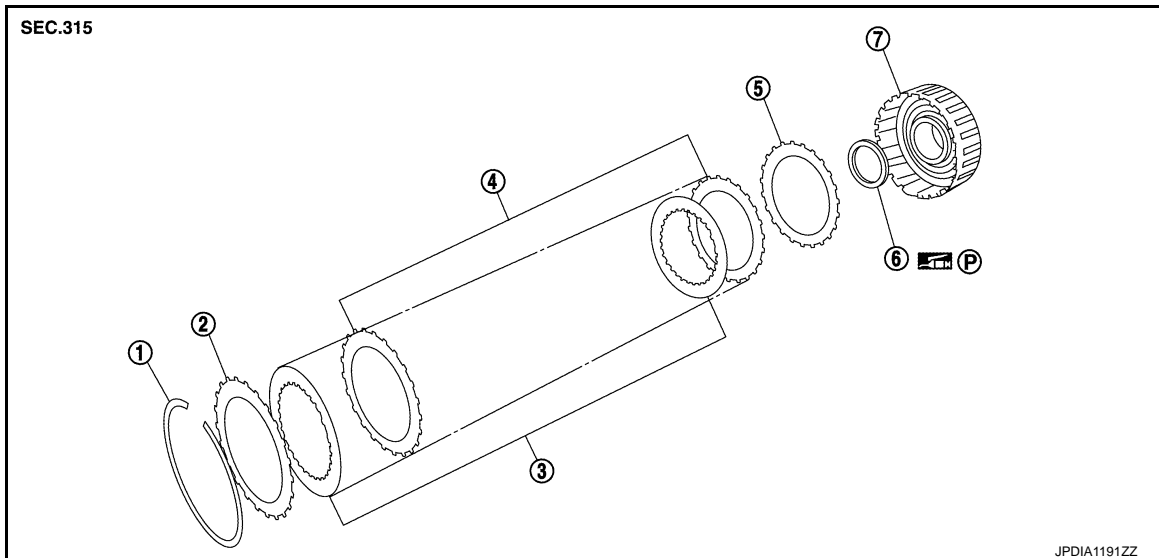
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

## HIGH AND LOW REVERSE CLUTCH

### Exploded View

INFOID:000000007134294



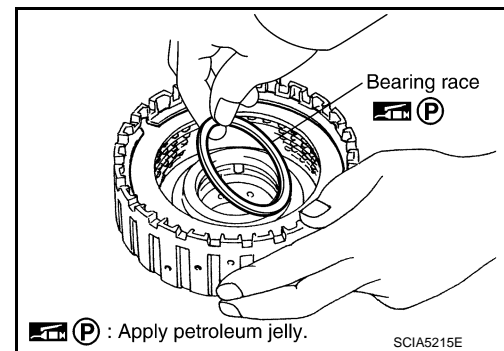
- |   |  |  |
|---|--|--|
| 1. Snap ring                                | 2. High and low reverse clutch retaining plate | 3. High and low reverse clutch drive plate |
| 4. High and low reverse clutch driven plate | 5. High and low reverse clutch dish plate      | 6. Bearing race                            |
| 7. High and low reverse clutch drum         |  |  |

Refer to [GI-4, "Components"](#) for symbols in the figure.

### Disassembly

INFOID:000000007134295

1. Remove bearing race from high and low reverse clutch drum.

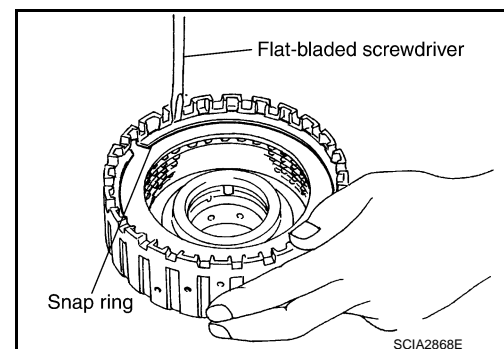


2. Remove snap ring from high and low reverse clutch drum using a flat-bladed screwdriver.

#### 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.



# HIGH AND LOW REVERSE CLUTCH

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

## Assembly

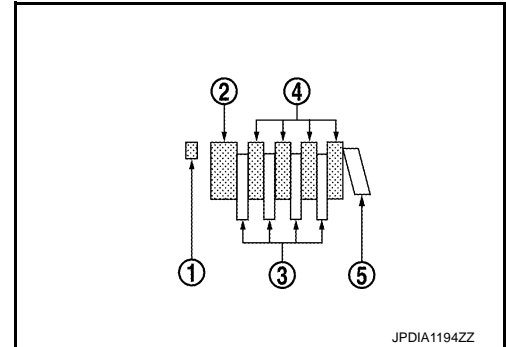
INFOID:000000007134296

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.

- VQ37VHR models

- 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.

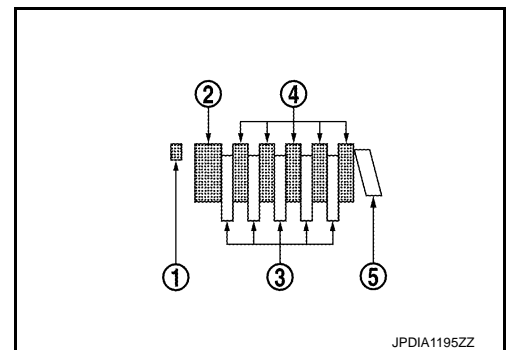


JPDIA1194ZZ

- VK56VD models

- 1 : Snap ring
- 2 : Retaining plate
- 3 : Drive plate (five pieces)
- 4 : Driven plate (five pieces)
- 5 : Dish plate

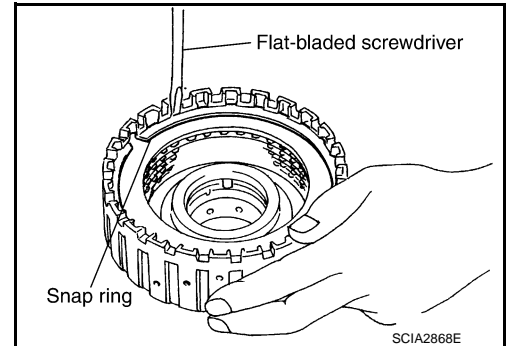
**CAUTION:**  
Check the order of plates.



JPDIA1195ZZ

2. Install snap ring to high and low reverse clutch drum using a flat-bladed screwdriver.

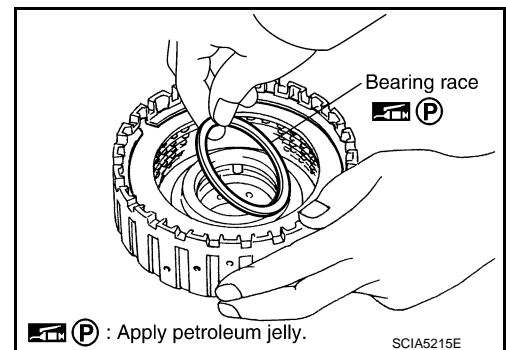
- CAUTION:**
- Be careful not to scratch high and low reverse clutch drum.
  - Be careful not to damage snap ring.



SCIA2868E

3. Install bearing race to high and low reverse clutch drum.

- CAUTION:**  
Check the direction of needle bearing. Refer to [TM-236](#), "[Location of Needle Bearings and Bearing Races](#)".



SCIA5215E

## Inspection

INFOID:000000007134297

### INSPECTION AFTER DISASSEMBLY

Check the following items. If necessary, replace high and low reverse clutch assembly.

Snap Ring



# HIGH AND LOW REVERSE CLUTCH

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

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.

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# DIRECT CLUTCH

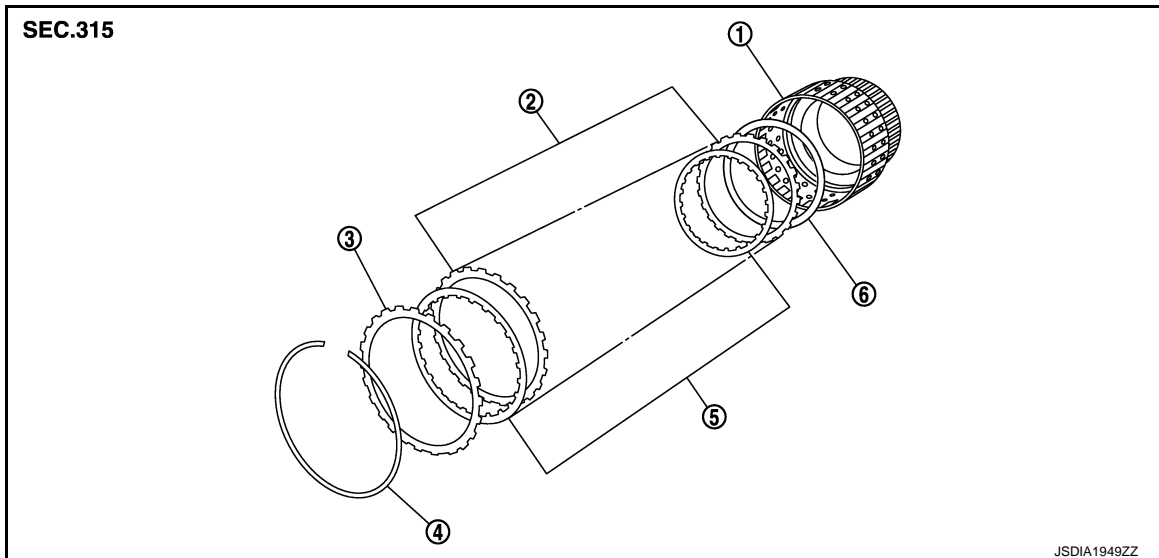
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

## DIRECT CLUTCH

### Exploded View

INFOID:000000007134298

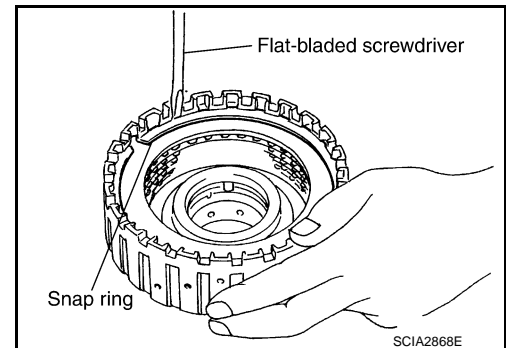


- |                       |                               |                                  |
|-----------------------|-------------------------------|----------------------------------|
| 1. Direct clutch drum | 2. Direct clutch driven plate | 3. Direct clutch retaining plate |
| 4. Snap ring          | 5. Direct clutch drive plate  | 6. Direct clutch dish plate      |

### Disassembly

INFOID:000000007134299

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.



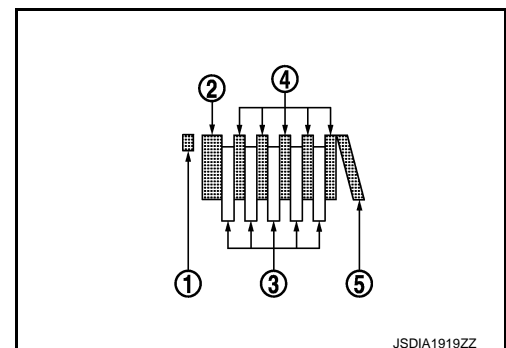
### Assembly

INFOID:000000007134300

1. Install direct clutch component part (drive plates, driven plates, retaining plate, and dish plate) to direct clutch drum.
  - VQ37VHR models

- |   |                              |
|---|------------------------------|
| 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.



# DIRECT CLUTCH

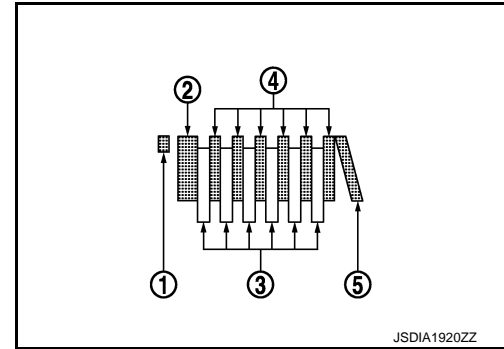
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

- VK56VD models

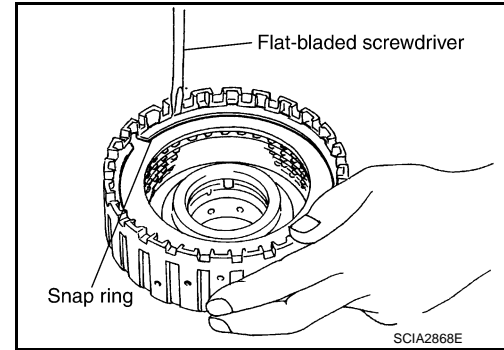
- 1 : Snap ring
- 2 : Retaining plate
- 3 : Drive plate (six pieces)
- 4 : Driven plate (six pieces)
- 5 : Dish plate

**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

### 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.

INFOID:000000007134301

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: RE7R01A]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### General Specification

INFOID:000000006884161

Applied model	VQ37VHR		VK56VD	
	2WD	AWD	2WD	AWD
Transmission model code number	X216E, X452C, X458A	X217A, X452D, X458B	X430B, X451B	X430C, X451C
Stall torque ratio	1.92 : 1		1.93 : 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	Genuine NISSAN Matic S ATF <sup>*1</sup>			
Fluid capacity	9.2 liter (9-3/4 US qt, 8-1/8 Imp qt) <sup>*2</sup>		10.0 liter (10-5/8 US qt, 8-3/4 Imp qt) <sup>*2</sup>	

**CAUTION:**

- Use only Genuine NISSAN Matic S ATF. Never mix with other ATF.
- Using ATF other than Genuine NISSAN Matic S ATF will cause deterioration driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.

\*1: Refer to [MA-16, "FOR NORTH AMERICA : Fluids and Lubricants"](#) (For North America) or [MA-18, "FOR MEXICO : Fluids and Lubricants"](#) (For Mexico).

\*2: The fluid capacity is the reference value.

#### Vehicle Speed at Which Gear Shifting Occurs

INFOID:000000006884162

##### VQ37VHR

##### STANDARD MODE

Unit: km/h (MPH)

Gear position	Throttle position	
	Full throttle	Half throttle
D1 → D2	54 – 58 (34 – 36)	36 – 40 (22 – 25)
D2 → D3	84 – 92 (52 – 57)	57 – 65 (35 – 40)
D3 → D4	132 – 142 (82 – 88)	93 – 103 (58 – 64)
D4 → D5	194 – 204 (121 – 127)	136 – 146 (85 – 91)
D5 → D6	250 – 260 (155 – 162)	180 – 190 (112 – 118)
D6 → D7	250 – 260 (155 – 162)	207 – 217 (129 – 135)
D7 → D6	240 – 250 (149 – 155)	113 – 123 (70 – 76)
D6 → D5	240 – 250 (149 – 155)	113 – 123 (70 – 76)
D5 → D4	167 – 177 (104 – 110)	69 – 79 (43 – 49)
D4 → D3	126 – 136 (78 – 85)	35 – 45 (22 – 28)
D3 → D2	59 – 67 (37 – 42)	12 – 20 (7 – 12)
D2 → D1	13 – 17 (8 – 11)	6 – 10 (4 – 6)

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: RE7R01A]

- 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
D1 → D2	42 – 46 (26 – 29)	21 – 25 (13 – 16)
D2 → D3	65 – 73 (40 – 45)	35 – 43 (22 – 27)
D3 → D4	110 – 120 (68 – 75)	56 – 66 (35 – 41)
D4 → D5	162 – 172 (101 – 107)	75 – 85 (47 – 53)
D5 → D6	250 – 260 (155 – 162)	116 – 126 (72 – 78)
D6 → D7	250 – 260 (155 – 162)	134 – 144 (83 – 89)
D7 → D6	240 – 250 (149 – 155)	99 – 109 (62 – 68)
D6 → D5	126 – 136 (78 – 85)	99 – 109 (62 – 68)
D5 → D4	108 – 118 (67 – 73)	50 – 60 (31 – 37)
D4 → D3	56 – 66 (35 – 41)	21 – 31 (13 – 19)
D3 → D2	21 – 29 (13 – 18)	9 – 17 (6 – 11)
D2 → D1	3 – 7 (2 – 4)	3 – 7 (2 – 4)

- At half throttle, the accelerator opening is 4/8 of the full opening.

## VK56VD

### STANDARD MODE

Unit: km/h (MPH)

Gear position	Throttle position	
	Full throttle	Half throttle
D1 → D2	60 – 64 (37 – 40)	36 – 40 (22 – 25)
D2 → D3	95 – 103 (59 – 64)	64 – 72 (40 – 45)
D3 → D4	149 – 159 (93 – 99)	110 – 120 (68 – 75)
D4 → D5	219 – 229 (136 – 142)	154 – 164 (96 – 102)
D5 → D6	250 – 260 (155 – 162)	217 – 227 (135 – 141)
D6 → D7	250 – 260 (155 – 162)	250 – 260 (155 – 162)
D7 → D6	240 – 250 (149 – 155)	199 – 209 (124 – 130)
D6 → D5	240 – 250 (149 – 155)	138 – 148 (86 – 92)
D5 → D4	209 – 219 (130 – 136)	78 – 88 (48 – 55)
D4 → D3	137 – 147 (85 – 91)	38 – 48 (24 – 30)
D3 → D2	68 – 76 (42 – 47)	24 – 32 (15 – 20)
D2 → D1	14 – 18 (9 – 11)	10 – 14 (6 – 9)

- At half throttle, the accelerator opening is 4/8 of the full opening.

## ECO MODE

Unit: km/h (MPH)

Gear position	Throttle position	
	Full throttle	Half throttle
D1 → D2	49 – 53 (30 – 33)	23 – 27 (14 – 17)
D2 → D3	77 – 85 (48 – 53)	40 – 48 (25 – 30)
D3 → D4	122 – 132 (76 – 82)	64 – 74 (40 – 46)
D4 → D5	180 – 190 (112 – 118)	95 – 105 (59 – 65)
D5 → D6	250 – 260 (155 – 162)	132 – 142 (82 – 88)

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: RE7R01A]

Gear position	Throttle position	
	Full throttle	Half throttle
D6 → D7	250 – 260 (155 – 162)	152 – 162 (94 – 101)
D7 → D6	240 – 250 (149 – 155)	147 – 157 (91 – 98)
D6 → D5	144 – 154 (89 – 96)	127 – 137 (79 – 85)
D5 → D4	124 – 134 (77 – 83)	71 – 81 (44 – 50)
D4 → D3	64 – 74 (40 – 46)	47 – 57 (29 – 35)
D3 → D2	33 – 41 (20 – 25)	17 – 25 (11 – 16)
D2 → D1	5 – 9 (3 – 6)	5 – 9 (3 – 6)

- At half throttle, the accelerator opening is 4/8 of the full opening.

## Vehicle Speed at Which Lock-up Occurs/Releases

INFOID:000000006884163

### VQ37VHR

#### STANDARD MODE

Throttle position	Vehicle speed km/h (MPH)	
	Lock-up ON	Lock-up OFF
Closed throttle	40 – 48 (25 – 30)	37 – 45 (23 – 28)
Half throttle	137 – 145 (85 – 90)	70 – 78 (43 – 48)

- Vehicle speed with D5 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	34 – 42 (19 – 26)	31 – 39 (19 – 24)
Half throttle	76 – 84 (47 – 52)	51 – 59 (32 – 37)

- Vehicle speed with D5 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.

### VK56VD

#### STANDARD / ECO MODE

Throttle position	Vehicle speed km/h (MPH)	
	Lock-up ON	Lock-up OFF
Closed throttle	58 – 66 (36 – 41)	58 – 66 (36 – 41)
Half throttle	175 – 183 (109 – 114)	175 – 183 (109 – 114)

- Vehicle speed with D5 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:000000006884164

### VQ37VHR

Stall speed	2,050 – 2,350 rpm
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### VK56VD

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: RE7R01A]

Stall speed	1,650 – 1,950 rpm
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## Torque Converter

INFOID:000000006884165

### VQ37VHR

Dimension between end of converter housing and torque converter	25.0 mm (0.98 in)
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### VK56VD

Dimension between end of converter housing and torque converter	24.0 mm (0.94 in)
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## Total End Play

INFOID:000000007134317

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:000000007134318

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:000000007134319

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:000000007134320

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)