# SECTION TRANSAXLE & TRANSMISSION

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С

# CONTENTS

#### 7AT: RE7R01A

PRECAUTION6
<b>PRECAUTIONS</b> 6         Precaution for Supplemental Restraint System       (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-SIONER"         SIONER"       6         Precaution for Procedure without Cowl Top Cover6         Precautions for Removing of Battery Terminal       7         On Board Diagnostic (OBD) System of Engine         and A/T       7         General Precautions       7         Service Notice or Precaution       8
PREPARATION9
PREPARATION
SYSTEM DESCRIPTION11
COMPONENT PARTS11
A/T CONTROL SYSTEM
A/T CONTROL SYSTEM : Front Brake Solenoid Valve

A/T CONTROL SYSTEM : Direct Clutch Solenoid	F
Valve	G
A/T CONTROL SYSTEM : Anti-interlock Solenoid Valve14 A/T CONTROL SYSTEM : 2346 Brake Solenoid	Н
Valve	I
Valve	J
A/T CONTROL SYSTEM : Manual Mode Switch15 A/T CONTROL SYSTEM : Paddle Shifter	K
A/T SHIFT LOCK SYSTEM15 A/T SHIFT LOCK SYSTEM : Component Parts Location	L
STRUCTURE AND OPERATION17Cross-Sectional View17System Diagram19System Description19Component Description42	N
SYSTEM43	0
A/T CONTROL SYSTEM43 A/T CONTROL SYSTEM : System Diagram43 A/T CONTROL SYSTEM : System Description43 A/T CONTROL SYSTEM : Fail-Safe44 A/T CONTROL SYSTEM : Protection Control46	Ρ
LINE PRESSURE CONTROL47 LINE PRESSURE CONTROL : System Diagram47	

LINE PRESSURE CONTROL : System Descrip- tion	48
SHIFT CHANGE CONTROL SHIFT CHANGE CONTROL : System Diagram	
SHIFT CHANGE CONTROL : System Description	50
SHIFT PATTERN CONTROL	54
SHIFT PATTERN CONTROL : System Diagram SHIFT PATTERN CONTROL : System Descrip-	
tion	
LOCK-UP CONTROL LOCK-UP CONTROL : System Diagram	
LOCK-UP CONTROL : System Description	
A/T SHIFT LOCK SYSTEM A/T SHIFT LOCK SYSTEM : System Description	
ON BOARD DIAGNOSTIC (OBD) SYSTEM Diagnosis Description	
DIAGNOSIS SYSTEM (TCM) CONSULT Function	
ECU DIAGNOSIS INFORMATION	
тсм	68
Reference Value Fail-Safe	
Protection Control	
DTC Inspection Priority Chart DTC Index	
WIRING DIAGRAM	80
A/T CONTROL SYSTEM	
Wiring Diagram	80
A/T SHIFT LOCK SYSTEM	
Wiring Diagram	
BASIC INSPECTION	93
DIAGNOSIS AND REPAIR WORK FLOW	
Work Flow Diagnostic Work Sheet	
ADDITIONAL SERVICE WHEN REPLACING TRANSMISSION ASSEMBLY	96
Description Special Repair Requirement	96
ADDITIONAL SERVICE WHEN REPLACING	
CONTROL VALVE & TCM	
Description Special Repair Requirement	
CALIBRATION OF DECEL G SENSOR	
Description	98
Special Repair Requirement	98

A/T FLUID COOLER	9
STALL TEST	2
A/T POSITION	3
DTC/CIRCUIT DIAGNOSIS10	5
U0100 LOST COMMUNICATION (ECM A) 10	5
DTC Logic	5
U0300 CAN COMMUNICATION DATA10	
Description	
DTC Logic 10 Diagnosis Procedure	
U1000 CAN COMM CIRCUIT	
Description	
DTC Logic 10	7
Diagnosis Procedure 10	7
P0615 STARTER RELAY10	8
Description	
DTC Logic	8
-	
P0705 TRANSMISSION RANGE SENSOR A 11	
DTC Logic	
P0710 TRANSMISSION FLUID TEMPERA-	
TURE SENSOR A11	
DTC Logic	
P0717 INPUT SPEED SENSOR A11: DTC Logic	
Diagnosis Procedure	
P0720 OUTPUT SPEED SENSOR11	
DTC Logic 11	
Diagnosis Procedure	
P0725 ENGINE SPEED110	6
P0725 ENGINE SPEED11 Description	
Description	6 6
Description11	6 6
Description	6 6 6 <b>8</b>
Description         11           DTC Logic         11           Diagnosis Procedure         11 <b>P0729 6GR INCORRECT RATIO</b> 11           Description         11	6 6 8 8
Description         11           DTC Logic         11           Diagnosis Procedure         11 <b>P0729 6GR INCORRECT RATIO</b> 11           Description         11           DTC Logic         11	6 6 8 8 8
Description         11           DTC Logic         11           Diagnosis Procedure         11 <b>P0729 6GR INCORRECT RATIO</b> 11           Description         11           DTC Logic         11           Diagnosis Procedure         11           Diagnosis Procedure         11           Diagnosis Procedure         11	6 6 8 8 9
Description       11         DTC Logic       11         Diagnosis Procedure       11 <b>P0729 6GR INCORRECT RATIO</b> 11         Description       11         DTC Logic       11         Diagnosis Procedure       11         Diagnosis Procedure       11         Diagnosis Procedure       11         Diagnosis Procedure       11	6 6 8 8 8 9 0
Description         11           DTC Logic         11           Diagnosis Procedure         11 <b>P0729 6GR INCORRECT RATIO</b> 11           Description         11           DTC Logic         11           Diagnosis Procedure         11           Diagnosis Procedure         11           Diagnosis Procedure         11	6 6 8 8 8 9 0

P0731 1GR INCORRECT RATIO	100
Description	
DTC Logic	
Diagnosis Procedure	. 123
P0732 2GR INCORRECT RATIO	.124
Description	. 124
DTC Logic	
Diagnosis Procedure	
	120
P0733 3GR INCORRECT RATIO	. 126
Description	-
DTC Logic	
0	
Diagnosis Procedure	. 127
P0734 4GR INCORRECT RATIO	400
Description	
DTC Logic	
Diagnosis Procedure	. 129
-	
P0735 5GR INCORRECT RATIO	. 130
Description	. 130
DTC Logic	
Diagnosis Procedure	
	. 101
P0740 TORQUE CONVERTER	132
DTC Logic	
Diagnosis Procedure	. 132
P0744 TORQUE CONVERTER	400
Description	
DTC Logic	. 133
Diagnosis Procedure	. 133
-	
<b>P0745 PRESSURE CONTROL SOLENOID A</b>	. 135
DTC Logic	. 135
Diagnosis Procedure	
P0750 SHIFT SOLENOID A	. 136
DTC Logic	
Diagnosis Procedure	136
P0775 PRESSURE CONTROL SOLENOID B	407
DTC Logic	. 137
Diagnosis Procedure	. 137
P0780 SHIFT	
Description	. 138
DTC Logic	. 138
Diagnosis Procedure	
<b>P0795 PRESSURE CONTROL SOLENOID C</b>	. 140
DTC Logic	
Diagnosis Procedure	. 140
P1705 TP SENSOR	111
DTC Logic	
Diagnosis Procedure	. 141
P1721 VEHICLE SPEED SIGNAL	
Description	. 142
DTC Logic	

Diagnosis Procedure143	
P1730 INTERLOCK	A
DTC Logic	В
P1734 7GR INCORRECT RATIO         146           Description         146           DTC Logic         146	С
Diagnosis Procedure147	ТΜ
P1815 M-MODE SWITCH	
Diagnosis Procedure	E F
P2713 PRESSURE CONTROL SOLENOID D. 154 DTC Logic	G
P2722 PRESSURE CONTROL SOLENOID E. 155 DTC Logic	Η
P2731 PRESSURE CONTROL SOLENOID F. 156 DTC Logic	I
P2807 PRESSURE CONTROL SOLENOID G. 157 DTC Logic	J
MAIN POWER SUPPLY AND GROUND CIR- CUIT	K
C C	L
SHIFT POSITION INDICATOR CIRCUIT 160 Description	Μ
SHIFT LOCK SYSTEM161	Ν
WITH ICC	0
Unit)	Ρ
WITHOUT ICC	

WITHOUT ICC : Component Inspection (Shift	
Lock Unit)	169
WITHOUT ICC : Component Inspection (Stop	
Lamp Switch)	170
	. 170
SYMPTOM DIAGNOSIS	.171
EVETEM EVMPTOM	474
SYSTEM SYMPTOM	
Symptom Table	.171
PERIODIC MAINTENANCE	. 181
A/T FLUID	181
Inspection	
Changing Adjustment	
REMOVAL AND INSTALLATION	.184
A/T SHIFT SELECTOR	184
2WD	.184
2WD : Exploded View	
2WD : Removal and Installation	105
2WD : Inspection and Adjustment	
AWD	.185
AWD : Exploded View	
AWD : Removal and Installation	
AWD : Inspection and Adjustment	
CONTROL ROD	
Exploded View	.189
Removal and Installation	.189
Inspection	.189
	400
PADDLE SHIFTER	
Exploded View	
Removal and Installation	.190
CONTROL VALVE & TCM	191
Exploded View	
Removal and Installation	
Inspection and Adjustment	
PARKING COMPONENTS	196
2WD	.196
2WD : Exploded View	
2WD : Removal and Installation	
2WD : Inspection and Adjustment	
REAR OIL SEAL	201
2WD	.201
2WD : Exploded View	
2WD : Removal and Installation	
2WD : Inspection	
AWD	
AWD : Exploded View	.202
AWD : Removal and Installation	
AWD : Inspection	

OUTPUT SPEED SENSOR204
2WD         204           2WD : Exploded View         204           2WD : Removal and Installation         204           2WD : Inspection         208
AIR BREATHER HOSE209
VQ37VHR (2WD)
VQ37VHR (AWD)
VK56VD (2WD)
VK56VD (AWD)
FLUID COOLER SYSTEM214
VQ37VHR (2WD)
VQ37VHR (AWD)
VK56VD (2WD)         218           VK56VD (2WD) : Exploded View         218           VK56VD (2WD) : Removal and Installation         218           VK56VD (2WD) : Removal and Installation         218           VK56VD (2WD) : Inspection and Adjustment         220
VK56VD (AWD)
UNIT REMOVAL AND INSTALLATION 223
TRANSMISSION ASSEMBLY223
VQ37VHR (2WD)
VQ37VHR (AWD)
VK56VD (2WD)

#### 

#### UNIT DISASSEMBLY AND ASSEMBLY . 235

#### TRANSMISSION ASSEMBLY ......235

Exploded View	.235
Oil Channel	246
Location of Needle Bearings and Bearing Races.	246
Location of Snap Rings	.249
Disassembly	250
Assembly	
Inspection	. 292

#### OIL PUMP, 2346 BRAKE, FRONT BRAKE

PISTON	295
Exploded View	
Disassembly	
Assembly	
Inspection and Adjustment	

#### UNDER DRIVE CARRIER, FRONT BRAKE

HUB	
Exploded View	
Disassembly	
Assembly	
Inspection	

#### FRONT CARRIER, INPUT CLUTCH, REAR

INTERNAL GEAR	
Exploded View	
Disassembly	
Assembly	309

Inspection	
MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB	А
Exploded View	B
HIGH AND LOW REVERSE CLUTCH	С
Exploded View	
Disassembly	
Assembly	ΤN
Inspection	
DIRECT CLUTCH 320	E
Exploded View	
Disassembly320	
Assembly	F
Inspection	
SERVICE DATA AND SPECIFICATIONS	
(SDS)	G
SERVICE DATA AND SPECIFICATIONS	
(SDS)	F
General Specification	
Vehicle Speed at Which Gear Shifting Occurs322	
Vehicle Speed at Which Lock-up Occurs/Releas-	1
es	
Stall Speed324	
Torque Converter	J
Total End Play	J
Reverse Brake Clearance	
Front Brake Clearance	
2346 Brake Clearance	K

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# < PRECAUTION > PRECAUTION PRECAUTIONS

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

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

#### WARNING:

Always observe the following items for preventing accidental activation.

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

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

#### WARNING:

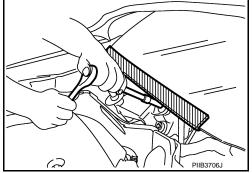
Always observe the following items for preventing accidental activation.

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

#### Precaution for Procedure without Cowl Top Cover

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



# PRECAUTIONS

# Precautions for Removing of Battery Terminal

• When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

#### NOTE:

< PRECAUTION >

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

• For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch. **NOTE:** 

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

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

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

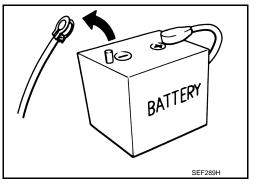
On Board Diagnostic (OBD) System of Engine and A/T

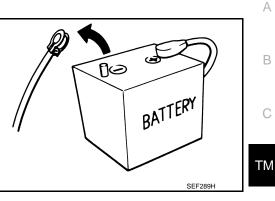
The ECM has an on board diagnostic system. It will illuminate the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

- 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 <u>PG-6</u>, "<u>Harness Connec-</u> <u>tor</u>".
- Always route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to illuminate due to the short circuit.
- Always connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to illuminate due to the malfunction of the EVAP system or fuel injection system, etc.
- Always erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

#### **General Precautions**

• 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.





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# PRECAUTIONS

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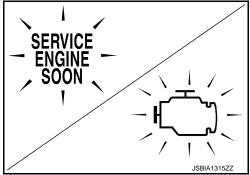
- Perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE" after performing each TROUBLE DIAGNOSIS. If the repair is completed DTC should not be displayed in the "DTC CONFIRMATION PROCEDURE".
- Always use the specified brand of ATF. Refer to <u>MA-16</u>, "FOR <u>NORTH AMERICA : Fluids and Lubricants</u>" (For North America) or <u>MA-18</u>, "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-181, "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

#### 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 <u>TM-99</u>. "<u>Cleaning</u>". For radiator replacement, refer to <u>CO-15</u>. "Exploded View" (VQ37VHR) or <u>CO-43</u>. "Exploded View" (VK56VD).



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#### [7AT: RE7R01A]

# PREPARATION

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# PREPARATION PREPARATION

# **Special Service Tool**

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[7AT: RE7R01A]

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#### The actual shapes of TechMate tools may differ from those of special service tools illustrated here. Tool number С Description (TechMate No.) Tool name ST33400001 • Installing rear oil seal (2WD) (J-26082) ТΜ · Installing oil pump housing oil seal Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia. Ε NT086 F KV31102400 · Installing reverse brake return spring retainer (J-34285 and J-34285-87) · Removing and installing 2346 brake spring retain-Clutch spring compressor er a: 320 mm (12.60 in) b: 174 mm (6.85 in) Н KV31103800 Removing and installing front brake spring retainer Clutch spring compressor 1. M12×1.75P **o**-1 JSDIA1749ZZ ST25850000 Remove oil pump assembly Κ (J-25721-A) Sliding hammer а a: 179 mm (7.05 in) d h b: 70 mm (2.76 in) L c: 40 mm (1.57 in) d: M12X1.75P T NT422 Μ

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# PREPARATION

#### < PREPARATION >

# **Commercial Service Tool**

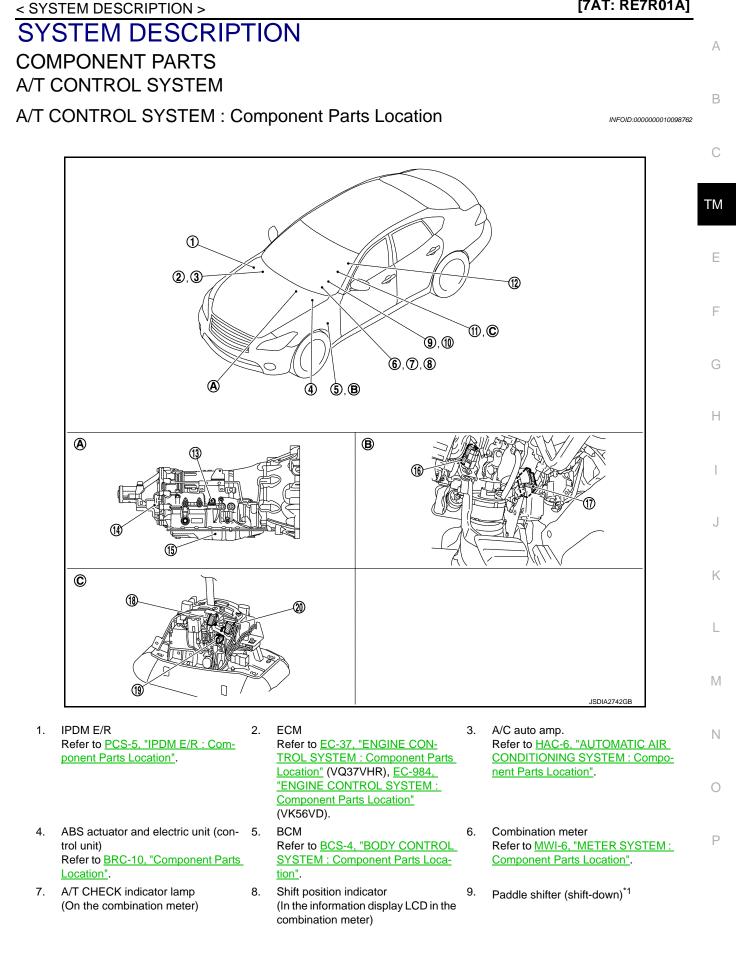
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Tool name		Description
Power tool		Loosening bolts and nuts
Drift a: 22 mm (0.87 in) dia.	PBIC0190E	Installing manual shaft oil seals
Drift a: 64 mm (2.52 in) dia.	лтовз	Installing rear oil seal (AWD)
Pin punch a: 4 mm (0.16 in) dia.	SCIA5338E	Remove retaining pin
<ol> <li>315268E000* O-ring</li> <li>310811EA5A* Charging pipe</li> </ol>	NT410	A/T fluid changing and adjustment

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

#### [7AT: RE7R01A]



#### < SYSTEM DESCRIPTION >

10.	Paddle shifter (shift-up) <sup>*1</sup>	11.	Drive mode select switch Refer to <u>DMS-3</u> , "Component Parts Location".	12.	Yaw rate/side/decel G sensor Refer to <u>BRC-10, "Component Parts</u> <u>Location"</u> .
13.	A/T assembly connector	14.	Output speed sensor	15.	Control valve & TCM <sup>*2</sup>
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)		
Α.	A/T assembly	В.	Steering wheel	C.	A/T shift selector assembly
*1: \	Nith paddle shifter				
*2: (	Control valve & TCM is included in A/T	asse	embly.		
NOTE:					
The foll	owing components are included in con	trol v	alve & 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

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Name	Function
ТСМ	TM-13, "A/T CONTROL SYSTEM : TCM"
Transmission range switch	TM-13, "A/T CONTROL SYSTEM : Transmission Range Switch"
Output speed sensor	TM-13, "A/T CONTROL SYSTEM : Output Speed Sensor"
Input speed sensor 1	TM-13, "A/T CONTROL SYSTEM : Input Speed Sensor"
Input speed sensor 2	
A/T fluid temperature sensor	TM-13, "A/T CONTROL SYSTEM : A/T Fluid Temperature Sensor"
Input clutch solenoid valve	TM-13, "A/T CONTROL SYSTEM : Input Clutch Solenoid Valve"
Front brake solenoid valve	TM-14, "A/T CONTROL SYSTEM : Front Brake Solenoid Valve"
Direct clutch solenoid valve	TM-14, "A/T CONTROL SYSTEM : Direct Clutch Solenoid Valve"
High and low reverse clutch solenoid valve	TM-14, "A/T CONTROL SYSTEM : High and Low Reverse Clutch Solenoid Valve"
Low brake solenoid valve	TM-14, "A/T CONTROL SYSTEM : Low Brake Solenoid Valve"
Anti-interlock solenoid valve	TM-14, "A/T CONTROL SYSTEM : Anti-interlock Solenoid Valve"
2346 brake solenoid valve	TM-14, "A/T CONTROL SYSTEM : 2346 Brake Solenoid Valve"
Torque converter clutch solenoid valve	TM-14, "A/T CONTROL SYSTEM : Torque Converter Clutch Solenoid Valve"
Line pressure solenoid valve	TM-14, "A/T CONTROL SYSTEM : Line Pressure Solenoid Valve"
Accelerator pedal position sensor	TM-14, "A/T CONTROL SYSTEM : Accelerator Pedal Position Sensor"
Manual mode switch	TM-15, "A/T CONTROL SYSTEM : Manual Mode Switch"
Paddle shifter*	TM-15, "A/T CONTROL SYSTEM : Paddle Shifter"
Yaw rate/side/decel G sensor	BRC-13, "Yaw Rate/Side/Decel G Sensor"
Drive mode select switch	DMS-4, "Drive Mode Select Switch"

Revision: 2013 November

#### < SYSTEM DESCRIPTION >

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Function	
When the ignition switch is pushed to the ON position, the light comes on for 2 seconds.	-
BRC-13, "Stop Lamp Switch"	
STR-7, "System Description"	-
EC-57, "ENGINE CONTROL SYSTEM : System Description" (VQ37VHR), EC-1005, "ENGINE CONTROL SYSTEM : System Description" (VK56VD)	-
BCS-5, "BODY CONTROL SYSTEM : System Description"	-
MWI-9, "METER SYSTEM : System Description"	-
BRC-15. "System Description"	
HAC-15. "AUTOMATIC AIR CONDITIONING SYSTEM : System Description"	-
	When the ignition switch is pushed to the ON position, the light comes on for 2 seconds.         BRC-13, "Stop Lamp Switch"         STR-7, "System Description"         EC-57, "ENGINE CONTROL SYSTEM : System Description" (VQ37VHR), EC-1005, "ENGINE CONTROL SYSTEM : System Description" (VK56VD)         BCS-5, "BODY CONTROL SYSTEM : System Description"         MWI-9, "METER SYSTEM : System Description"         BRC-15, "System Description"

\*: With paddle shifter

# A/T CONTROL SYSTEM : TCM

- 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

- 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 lover position	Transmission range switch							
Select lever position	SW1	SW2	SW3	SW4	_			
Р	OFF	OFF	OFF	OFF				
R	ON	OFF	OFF	ON				
Ν	ON	ON	OFF	OFF				
D and M	ON	ON	ON	ON				
			1		-			

# A/T CONTROL SYSTEM : Output Speed Sensor

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

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

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

- 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.

#### < SYSTEM DESCRIPTION >

# A/T CONTROL SYSTEM : Front Brake Solenoid Valve

- 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

- 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 INFOLD.000000010098772

- 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

- 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

- 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

- The 2346 brake solenoid value 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

The torque converter clutch solenoid valve is activated, with the gear in D<sub>2</sub>, D<sub>3</sub>, D<sub>4</sub>, D<sub>5</sub>, D<sub>6</sub>, D<sub>7</sub>, M<sub>2</sub>, M<sub>3</sub>, M<sub>4</sub>, M<sub>5</sub>, M<sub>6</sub> and M<sub>7</sub> 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

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

- 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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INFOID:000000010098778

INFOID:000000010098774

INFOID:000000010098773

#### < SYSTEM DESCRIPTION >

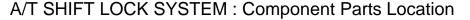
# A/T CONTROL SYSTEM : Manual Mode Switch

- 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 selec-В tor 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

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



Н B.C  ${f D}$ B C M Ν JSDIA1693GB Shift lock relay\* Stop lamp switch 2. 3. Shift lock unit Refer to BRC-10, "Component Parts Location". Ρ Shift lock cover Engine room, LH B A/T shift selector Center console С

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< SYSTEM DESCRIPTION >

# [7AT: RE7R01A]

# A/T SHIFT LOCK SYSTEM : Component Description

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Component	Function
Slider	<ul> <li>Electromagnet is built into slider.</li> <li>When electromagnet of slider is magnetized, stopper is unified with slider.</li> </ul>
Stopper	<ul><li>Iron plate is built into stopper.</li><li>Restricts plate moving.</li></ul>
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.
Stop lamp switch	<ul> <li>With ICC</li> <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. Without ICC</li> <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>
Shift lock relay*	Current flow to stop lamp switch allows shift lock relay contact ON, and then power is applied to shift lock unit.

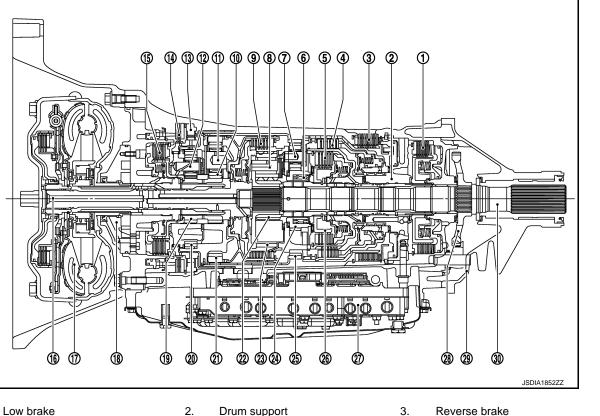
\*: With ICC

#### < SYSTEM DESCRIPTION >

# STRUCTURE AND OPERATION

# **Cross-Sectional View**

# **2WD MODELS**



- 1. Low brake
- 4. Direct clutch
- 7.\*1 Rear carrier
- 10.<sup>\*2</sup> Front sun gear
- 1st one-way clutch 13.
- 16.<sup>\*4</sup> Input shaft
- 19.<sup>\*2</sup> Under drive sun gear
- 22. Mid sun gear
- 25. Rear internal gear
- 28. Parking gear
- \*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

2.	Drum	sup	port

- 5. High and low reverse clutch
- 8. Mid carrier
- 11.\*3 Front carrier
- Front brake 14.
- 17. Torque converter
- 20.<sup>\*3</sup> Under drive internal gear
- 23.\*1 Mid internal gear
- 26. High and low reverse clutch hub
- 29. Rear extension

- Reverse brake
- 6. 2nd one-way clutch
- 9. Input clutch
- 12. Under drive carrier
- 15. 2346 brake
- 18. Oil pump
- Front internal gear 21.\*4
- 24. Rear sun gear
- 27. Control valve & TCM
- 30. Output shaft

**TM-17** 

# [7AT: RE7R01A]

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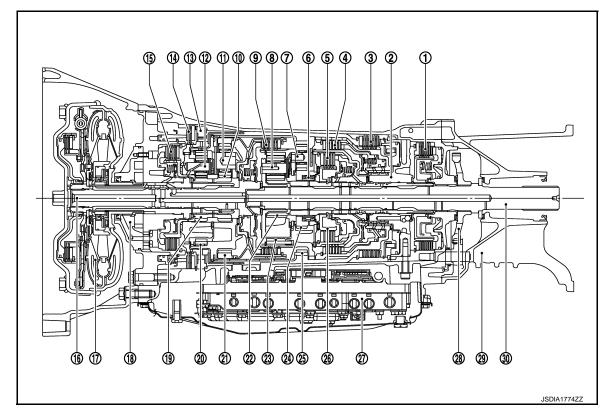
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#### < SYSTEM DESCRIPTION >



- 1. Low brake
- 4. Direct clutch
- 7.<sup>\*1</sup> Rear carrier
- 10.\*2 Front sun gear
- 13. 1st one-way clutch
- 16.<sup>\*4</sup> Input shaft
- 19.\*2 Under drive sun gear
- 22. Mid sun gear
- 25. Rear internal gear
- 28. Parking gear
- \*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.

- 2. Drum support
- 5. High and low reverse clutch
- 8. Mid carrier
- 11.<sup>\*3</sup> Front carrier
- 14. Front brake
- 17. Torque converter
- 20.\*3 Under drive internal gear
- 23.\*1 Mid internal gear
- 26. High and low reverse clutch hub
- 29. Adapter case

- 3. Reverse brake
- 6. 2nd one-way clutch
- 9. Input clutch
- 12. Under drive carrier
- 15. 2346 brake
- 18. Oil pump
- 21.\*4 Front internal gear
- 24. Rear sun gear
- 27. Control valve & TCM
- 30. Output shaft

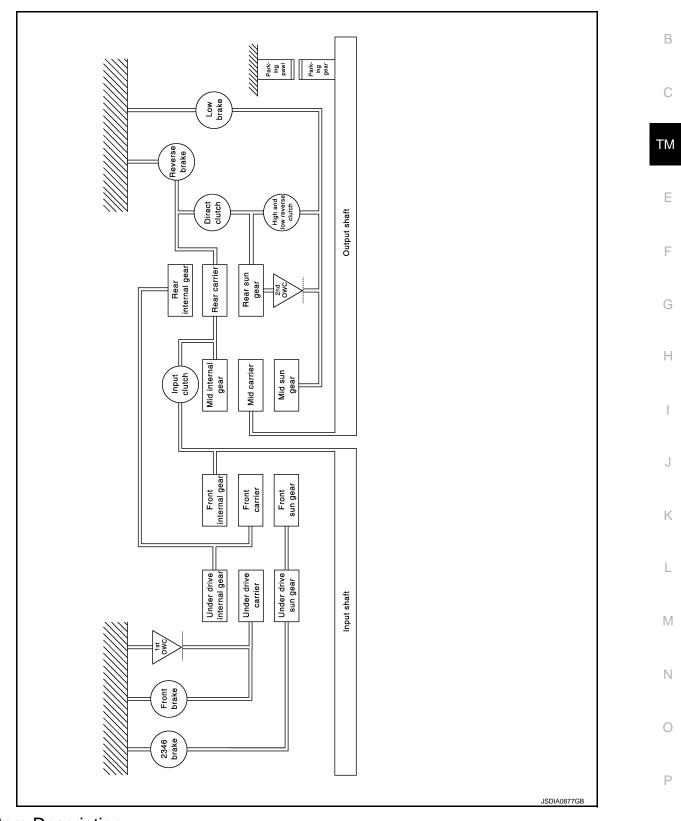
# < SYSTEM DESCRIPTION >

# System Diagram

# [7AT: RE7R01A]

#### INFOID:0000000010098784

А



System Description

DESCRIPTION

INFOID:000000010098785

#### < SYSTEM DESCRIPTION >

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

#### CLUTCH AND BRAKE CHART

	ame of ne part		D	/C			L	/B							
Shift positio	$\overline{\ }$	I/C	FRONT	REAR	H&LR/C	F/B	INNER	OUTER	2346/B	REV/B	1st OWC	2nd OWC			Remarks
I	P				$\triangle$	$\triangle$							Park position		
F	R				$\diamond$	$\diamond$				0	Ø	Ø	Reverse position		
1	N				$\triangle$	$\triangle$							Neutral position		
	1st				☆	☆	0	0			Ø	O			
	2nd						0	0	0			Ø			
	3rd		0	0			0		0				Automatic shift		
D	4th		0	0	0				0				1⇔2⇔3⇔4⇔5⇔6⇔7		
	5th	0		0	0										
	6th	0			0				0						
	7th	0			0	0									
7M	7th	0			0	0							Locks* (held stationary) in 7GR		
6M	6th	0			0				0				Locks* (held stationary) in 6GR		
5M	5th	0		0	0								Locks* (held stationary) in 5GR		
4M	4th		0	0	0				0				Locks* (held stationary) in 4GR		
ЗМ	3rd		0	0			0		0				Locks* (held stationary) in 3GR		
2M	2nd				$\diamond$		0	0	0			O	Locks* (held stationary) in 2GR		
1M	1st				$\diamond$	$\diamond$	0	0			Ø	O	Locks (held stationary) in 1GR		

○ – Operates

O - Operates during "progressive" acceleration.

 $\bigcirc$  – Operates and affects power transmission while coasting.

 $\triangle$  – Line pressure is applied but does not affect power transmission.

 $\stackrel{\scriptscriptstyle A}{\rightarrowtail}$  – Operates at the fixed speed or less.

JSDIA1455GB

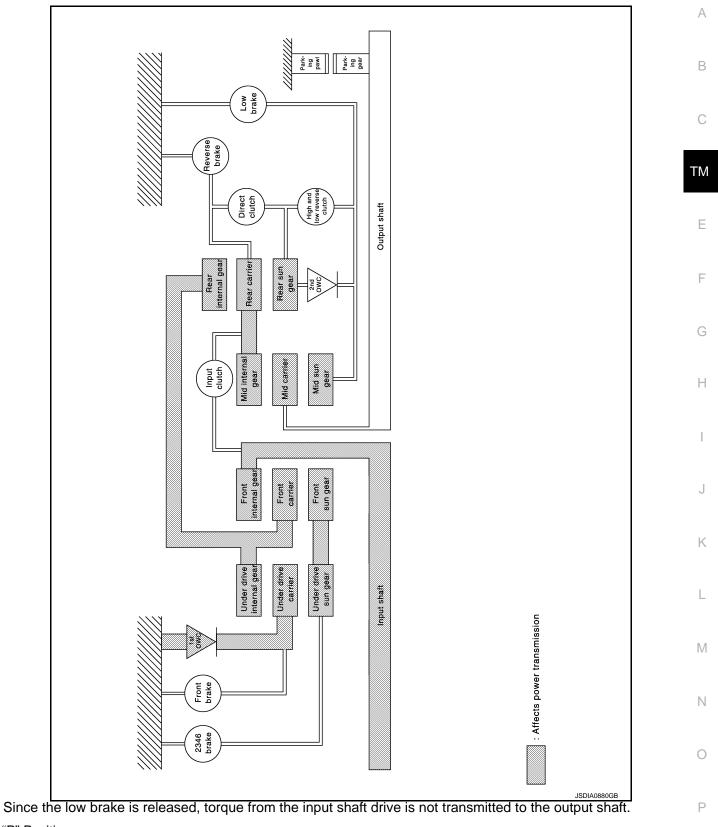
\*: Down shift automatically according to the vehicle speed.

#### POWER TRANSMISSION

"N" Position

#### < SYSTEM DESCRIPTION >

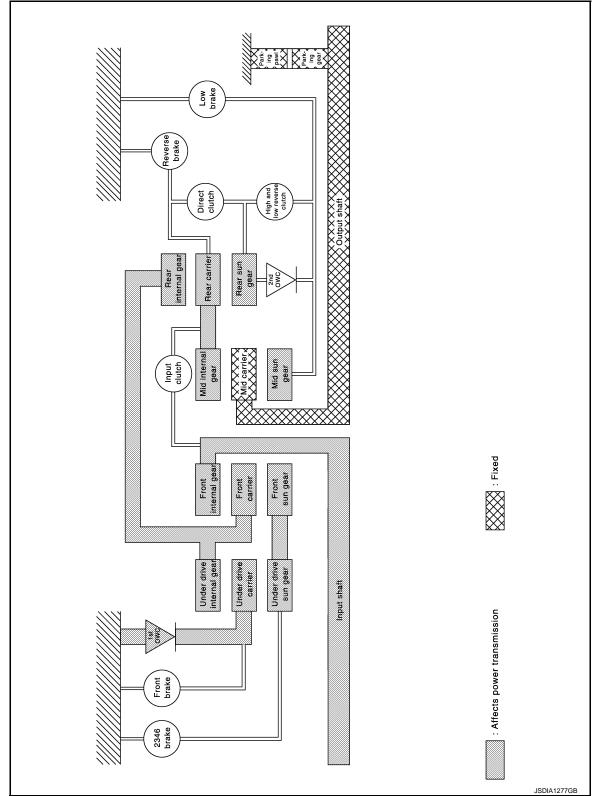
[7AT: RE7R01A]



"P" Position

#### < SYSTEM DESCRIPTION >

[7AT: RE7R01A]

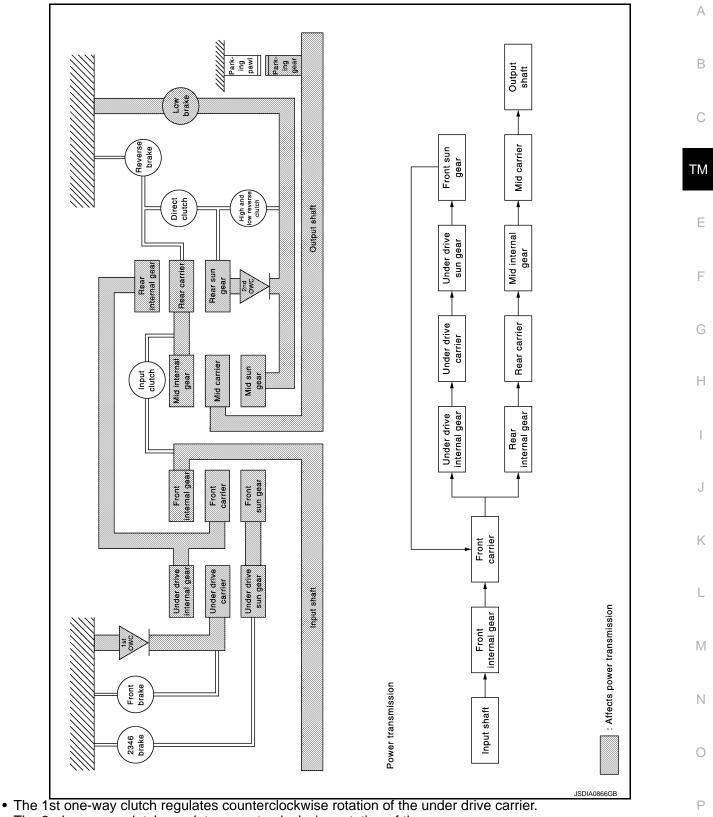


- The same as for the "N" position, since the low brake is released, so torque from the input shaft drive is not transmitted to the output shaft.
- The parking pawl linked with the selector lever meshes with the parking gear and fastens the output shaft mechanically.

"D1" and "DS1" Positions

#### < SYSTEM DESCRIPTION >

#### [7AT: RE7R01A]



- 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.

#### < SYSTEM DESCRIPTION >

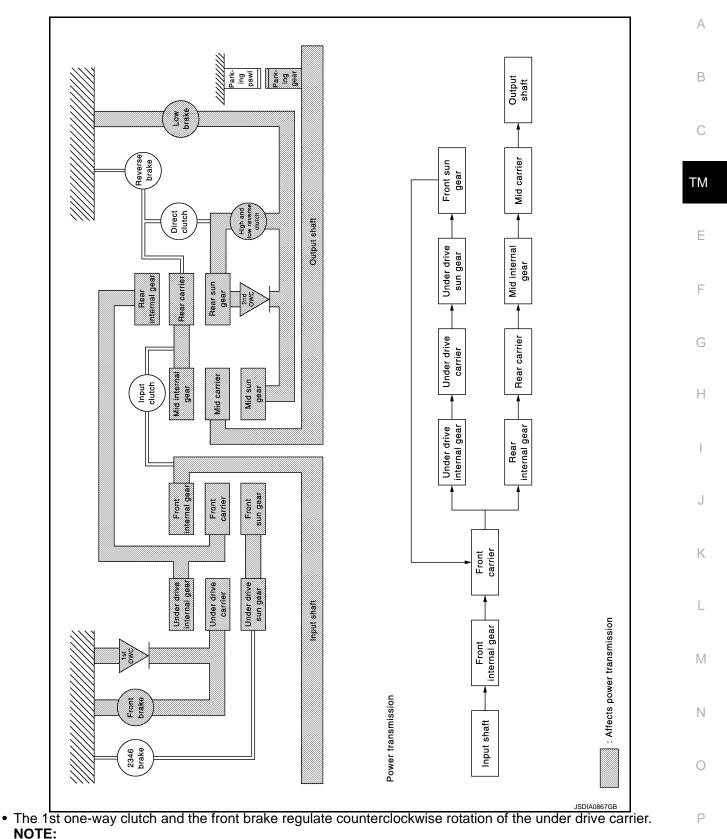
# [7AT: RE7R01A]

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 ge	ear		
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 in- ternal 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

#### < SYSTEM DESCRIPTION >

#### [7AT: RE7R01A]



- The front brake operates only while coasting.
- The 2nd one-way clutch and the high and low reverse clutch regulate counterclockwise rotation of the rear sun gear.

#### NOTE:

- The high and low reverse clutch operates only while coasting.
- The mid sun gear is fixed by the low brake.

#### < SYSTEM DESCRIPTION >

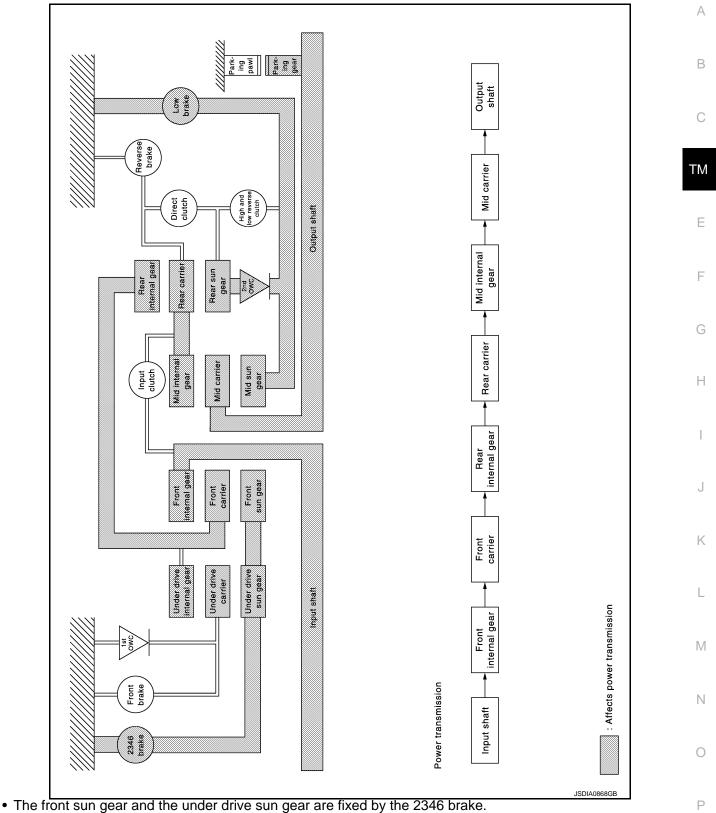
# • Each planetary gear enters the state described below.

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 ge	ear		
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 in- ternal 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

#### < SYSTEM DESCRIPTION >

#### [7AT: RE7R01A]



• 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.

#### < SYSTEM DESCRIPTION >

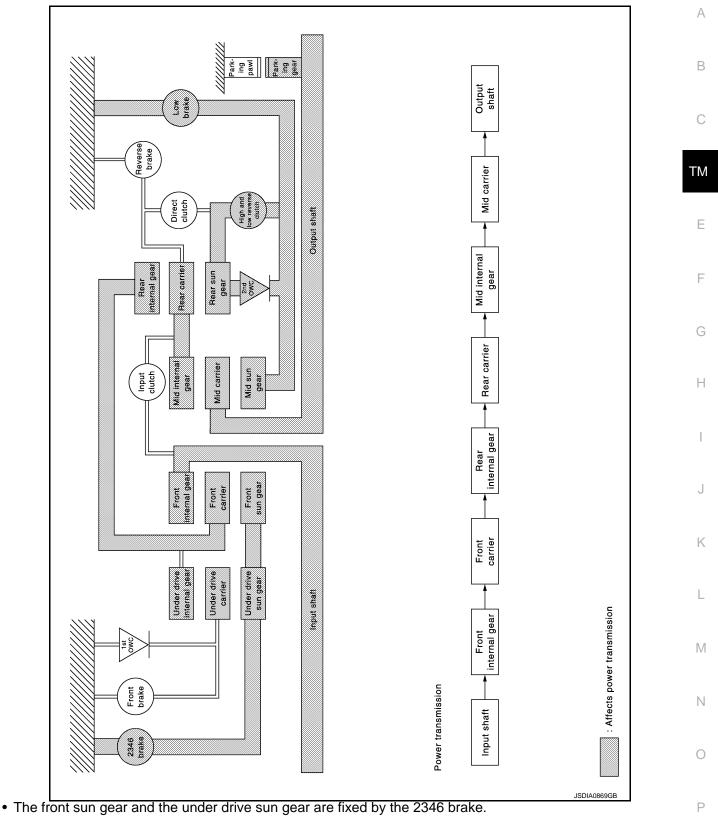
# [7AT: RE7R01A]

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 gea	r		
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 in- ternal 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

#### < SYSTEM DESCRIPTION >

#### [7AT: RE7R01A]



• 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.

#### < SYSTEM DESCRIPTION >

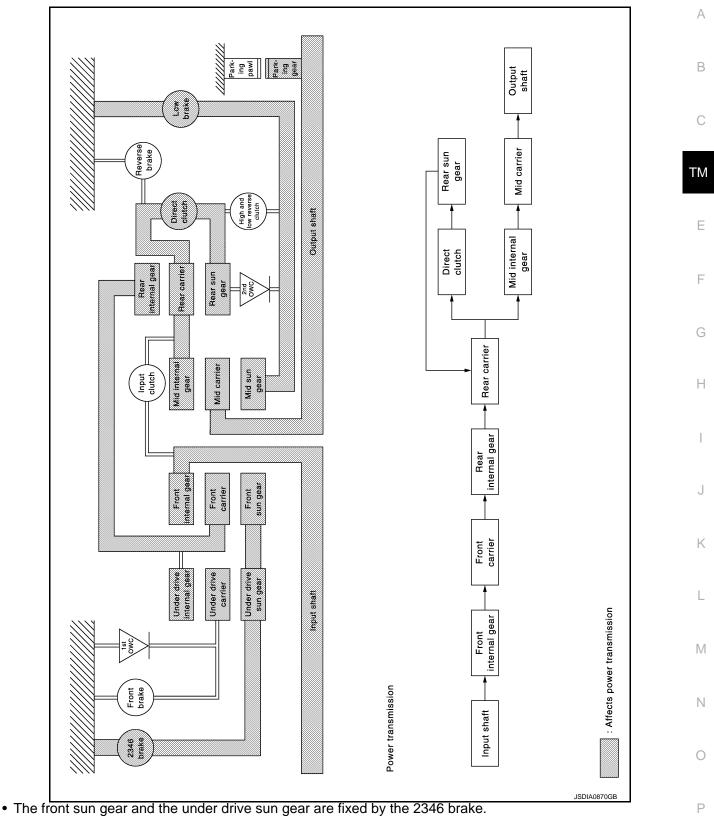
# [7AT: RE7R01A]

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 ge	ear		
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 in- ternal 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

#### < SYSTEM DESCRIPTION >

#### [7AT: RE7R01A]



- 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.

#### < SYSTEM DESCRIPTION >

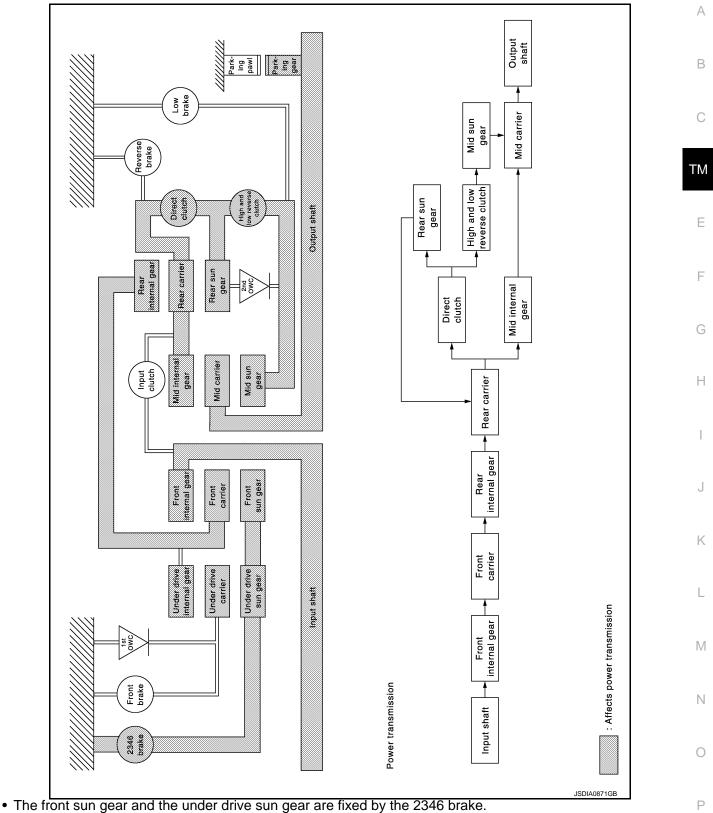
# [7AT: RE7R01A]

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 g	ear		
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 in- ternal 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

#### < 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.

#### < SYSTEM DESCRIPTION >

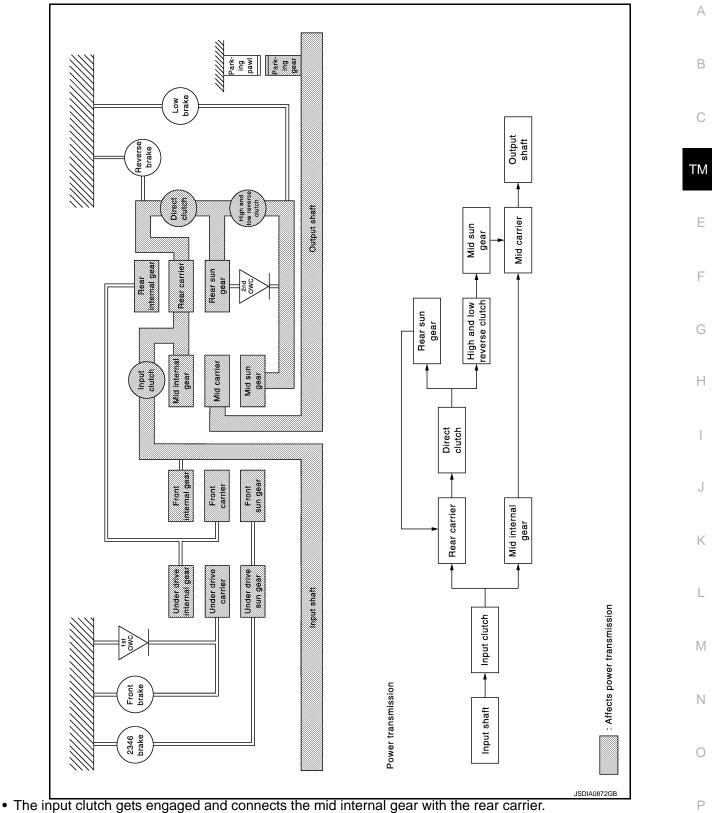
# [7AT: RE7R01A]

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 g	ear		
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 in- ternal 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

#### < SYSTEM DESCRIPTION >

#### [7AT: RE7R01A]



- 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.

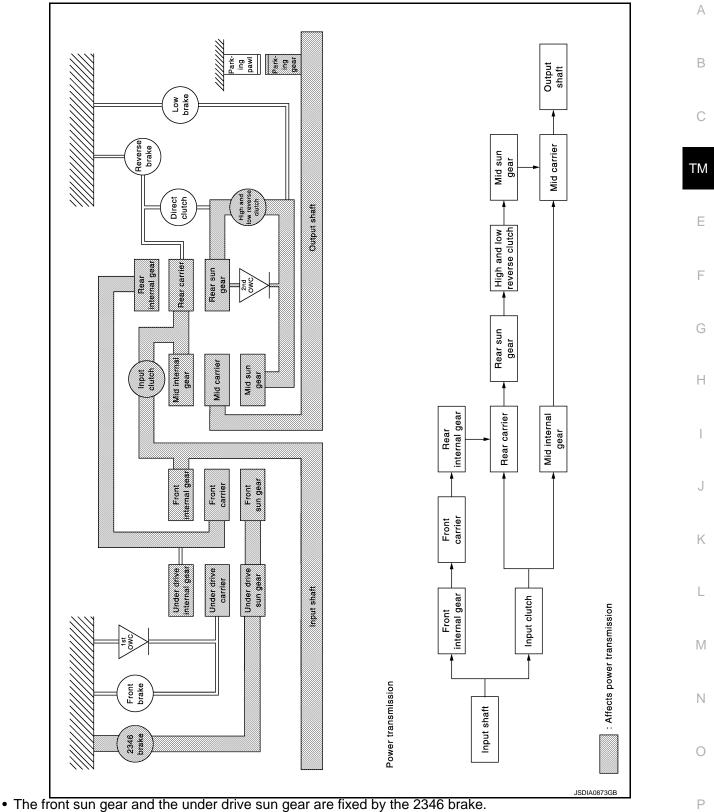
#### < SYSTEM DESCRIPTION >

# [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

### < SYSTEM DESCRIPTION >



- 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.

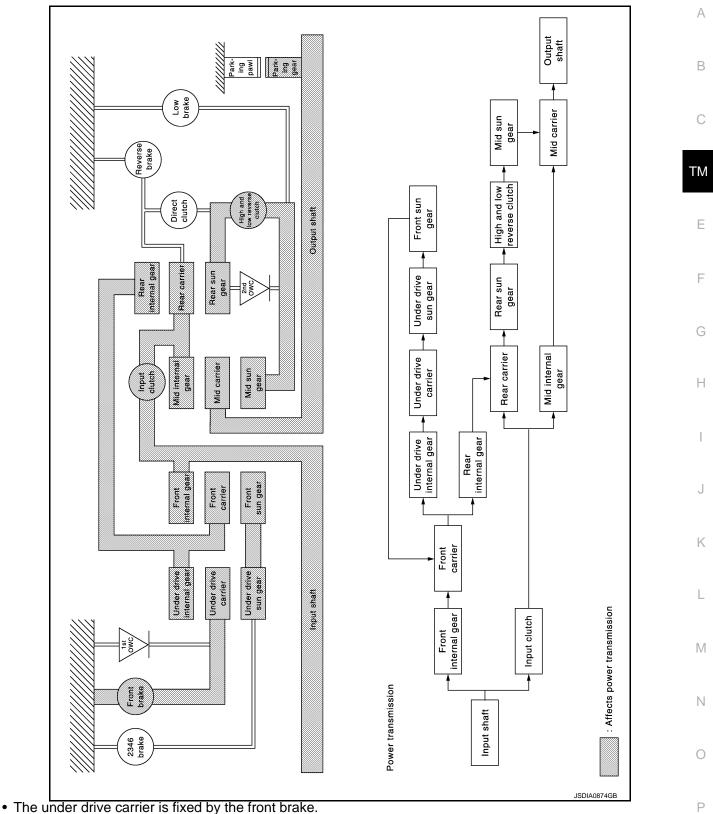
#### < SYSTEM DESCRIPTION >

# [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

### < SYSTEM DESCRIPTION >



- 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.

### < SYSTEM DESCRIPTION >

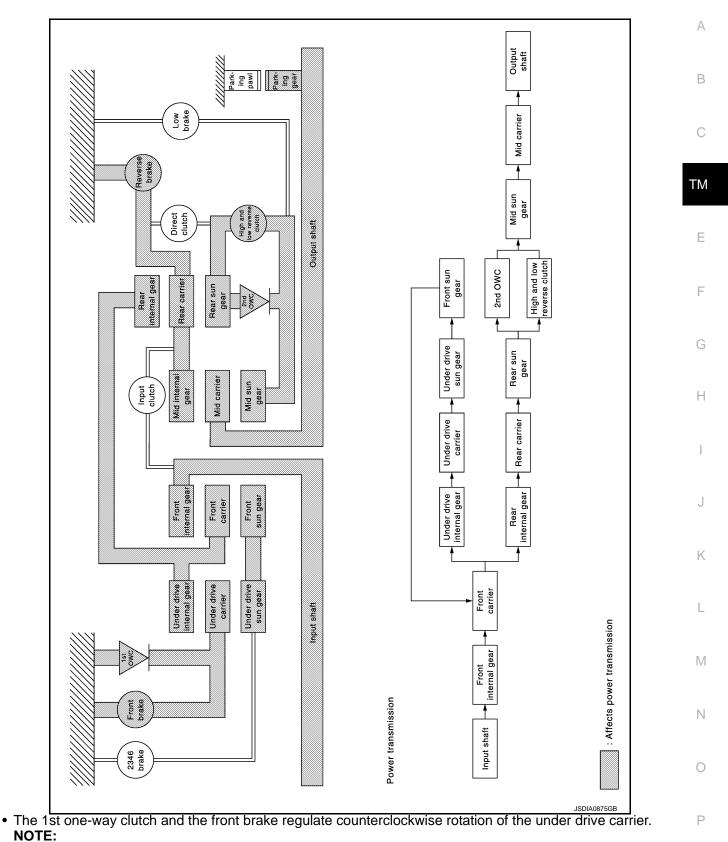
# [7AT: RE7R01A]

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 g	ear		
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 inter- nal 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

#### < SYSTEM DESCRIPTION >

### [7AT: RE7R01A]



- 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.

### TM-41

### < SYSTEM DESCRIPTION >

### • 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 g	ear		
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 inter- nal 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

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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 ro- tation.
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.

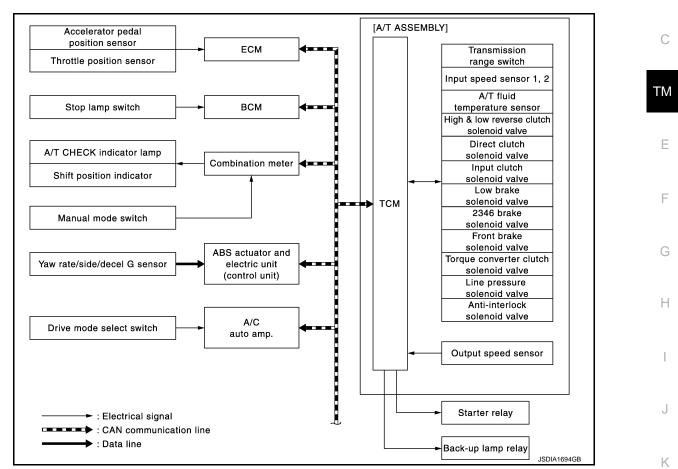
# SYSTEM A/T CONTROL SYSTEM

# A/T CONTROL SYSTEM : System Diagram

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# A/T CONTROL SYSTEM : System Description

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# INPUT/OUTPUT SIGNAL CHART

Sensor (or signal)	TCM function	Actuator
<ul> <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> <li>Line pressure control (<u>TM-47</u>)</li> <li>Shift change control (<u>TM-50</u>)</li> <li>Shift pattern control (<u>TM-54</u>)</li> <li>Lock-up control (<u>TM-57</u>)</li> <li>Infiniti drive mode selector (<u>TM-54</u>)</li> <li>Fail-safe control (<u>TM-74</u>)</li> <li>Self-diagnosis (<u>TM-61</u>)</li> <li>CONSULT communication line (<u>TM-61</u>)</li> <li>CAN communication line (<u>TM-107</u>)</li> </ul>	<ul> <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.

# TM-43

### < SYSTEM DESCRIPTION >

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

# A/T CONTROL SYSTEM : Fail-Safe

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[7AT: RE7R01A]

TCM has the electrical fail-safe mode. The mode is divided into a maximum of 3 phases (1st fail-safe, 2nd failsafe 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-93, "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 malfunction- ing parts in the condition that the driving force required for the driving is secured.
Final fail-safe	<ul> <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> <li>Fixed in the "D" position (The shifting can be per- formed)</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> <li>Fixed in the "D" position (The shifting can be per- formed)</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> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	_	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul><li>Fix the gear while driving</li><li>Manual mode is prohibited</li></ul>	_	Manual mode is prohibited
P0717	Between the gears of 1 - 2 - 3	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	_	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul><li>Fix the gear while driving</li><li>Manual mode is prohibited</li></ul>	_	Manual mode is prohibited

### < SYSTEM DESCRIPTION >

DTC	Vehicle	condition	Vehicle behavior for 1st fail- safe	Vehicle behavior for 2nd fail- safe	Vehicle behavior for final fail- safe
P0720	Between the g	gears of 1 - 2 - 3	<ul> <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> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> </ul>
	Between the gears of 4 - 5 - 6 - 7		<ul> <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>	_	Manual mode is prohibited
	Small gear ra	tio difference	Engine torque limit: Max 150 Nm	_	Engine torque limit: Max 150 Nm
P0734	1 2 3 Great gear 4 ratio differ- 5 ence	<ul> <li>Locks in 2GR, 3GR or 4GR</li> <li>Manual mode is prohibited</li> </ul>		<ul> <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>	
			<ul> <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> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul> <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> <li>Locks in 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul> <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><li>Lock-up is prohibited</li><li>Slip lock-up is prohibited</li></ul>		<ul><li>Lock-up is prohibited</li><li>Slip lock-up is prohibited</li></ul>
P0744			<ul><li>Lock-up is prohibited</li><li>Slip lock-up is prohibited</li></ul>		<ul><li>Lock-up is prohibited</li><li>Slip lock-up is prohibited</li></ul>

### < 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> <li>Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>		<ul> <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><li>Locks in 3GR</li><li>Manual mode is prohibited</li></ul>	_	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>
P1705	_	<ul> <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> <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> <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> <li>Locks in 1GR, 2GR, 3GR, 4GR, 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul> <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>
	Gate switch malfunction	Only the gate switch is pro- hibited	_	Only the gate switch is pro- hibited
P1815	Paddle switch malfunction	Only the paddle switch is prohibited	_	Only the paddle switch is pro- hibited
	Malfunction of both switches	Manual mode is prohibited	—	Manual mode is prohibited
U0100 U0300	Between the gears of 1 - 2 - 3	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	_	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Line pressure is set to the maximum budgaulic press</li> </ul>
U1000	Between the gears of 4 - 5 - 6 - 7	<ul><li>Fix the gear at driving</li><li>Manual mode is prohibited</li></ul>	_	<ul><li>maximum hydraulic pressure</li><li>Manual mode is prohibited</li></ul>
P0720 and P1721	_	Locks in 5GR	_	Locks in 5GR

# A/T CONTROL SYSTEM : Protection Control

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** 

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### < SYSTEM DESCRIPTION >

[7AT: RE7R01A]

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	ssion and shift to the neutral status if the selector lever is shifted to "R" position ard at the vehicle speed 10 km/h (7 MPH) or more.	А
Malfunction detection condition	Vehicle speed: 10 km/h (7 MPH) or more	
Control at malfunction	Neutral	В
Normal return condition	<ul> <li>Vehicle speed: 8 km/h (5 MPH) or less and</li> <li>Engine speed: 2,200 rpm or less</li> </ul>	С
Vehicle behavior	<ul> <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> <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>	F
Control at malfunction	Front brake solenoid output signal; OFF	
Normal return condition	Other than detection condition of malfunction	G
Vehicle behavior	Does not exist	

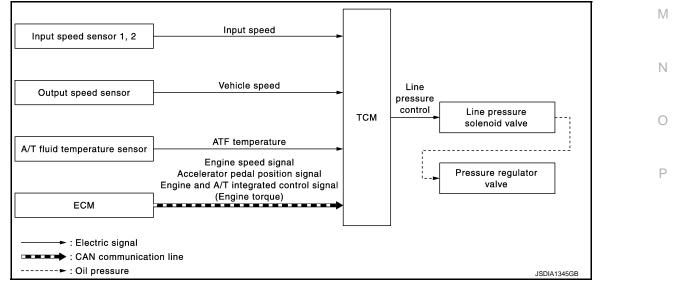
### TCM HIGH TEMPERATURE PROTECTION CONTROL

Limit the accelerator opening and forcibly control the vehicle to the low torque driving when the electronic sub-

Malfunction detection condition	<ul> <li>TCM electronic substrate temperature</li> <li>145°C (293°F) and 120 seconds or</li> <li>150°C (302°F)</li> </ul>	I
Control at malfunction	Accelerator opening: 0.5/8 or less	0
Normal return condition	<ul> <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>	K
Vehicle behavior	Accelerator opening: output torque of approximately 0.5/8	_

# LINE PRESSURE CONTROL

# LINE PRESSURE CONTROL : System Diagram



### < SYSTEM DESCRIPTION >

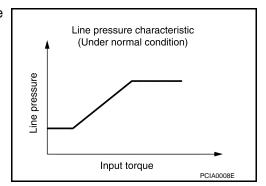
### LINE PRESSURE CONTROL : System Description

[7AT: RE7R01A]

- 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.

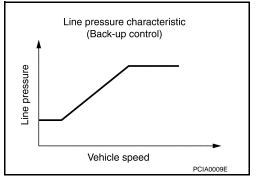
#### Normal Control

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.

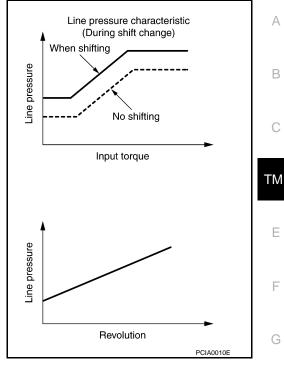


**During Shift Change** 

### < SYSTEM DESCRIPTION >

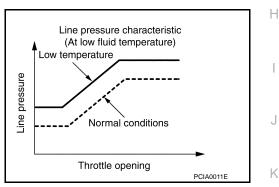
The necessary and adequate line pressure for shift change is set. For this reason, line pressure pattern setting corresponds to engine torque and gearshift selection. Also, line pressure characteristic corresponds to engine speed, during engine brake operation.

### [7AT: RE7R01A]



### 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

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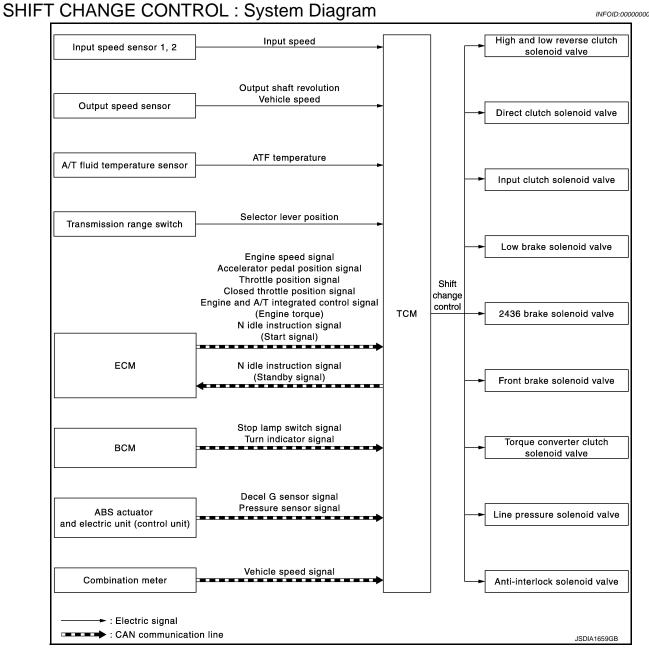
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# [7AT: RE7R01A]

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# SHIFT CHANGE CONTROL : System Description

nput/Output Signal Chart Item	Signal	TCM function	Actuator		
Input speed sensor 1, 2	Input speed		High and low reverse		
Output speed sensor	Vehicle speed		clutch solenoid valve		
A/T fluid temperature sensor	ATF temperature		Direct clutch solenoid valve		
	Engine speed signal*		<ul> <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 so-</li> </ul>		
	Accelerator pedal position signal*	Shift change control			
ECM	Closed throttle position signal*	Chine change control			
	Engine and A/T integrated control signal (Engine torque)*		<ul> <li>Iorque converter clutch sol lenoid valve</li> <li>Line pressure solenoid valve</li> <li>Anti-interlock solenoid valve</li> </ul>		
BCM	Stop lamp switch signal*				

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< SYSTEM DESCRIPTION >

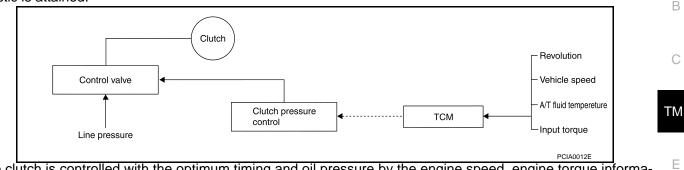
#### Revision: 2013 November

# [7AT: RE7R01A]

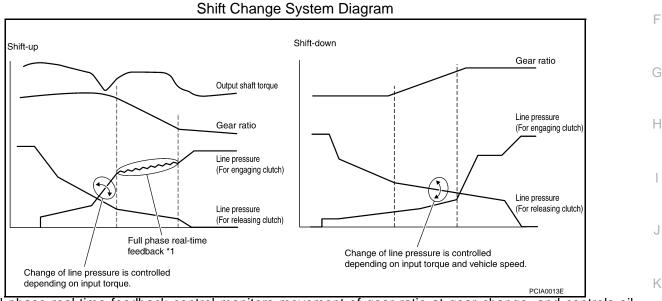
### < SYSTEM DESCRIPTION >

#### \*: 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.



\*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.

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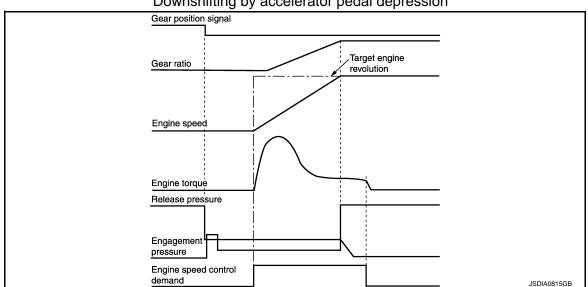
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### < SYSTEM DESCRIPTION >

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

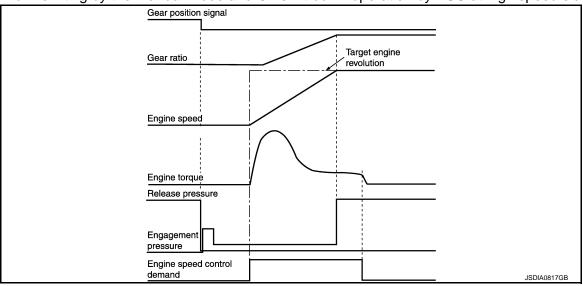
	Downshifting by accelerator pedal depression	Downshifting by the manual mode and On shift-down operation by ASC at high speed sid
Accelerato opening		Accelerator opening Released accelerator pedal

- 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



### < SYSTEM DESCRIPTION >

### **IDLE NEUTRAL CONTROL**

		Signal					
ltem	Each sensor, switch and control unit $\Rightarrow$ TCM	$TCM \Rightarrow ECM$	$ECM \Rightarrow TCM$	TCM function	Actuator	В	
Input speed sensor 1, 2	Input speed						
Output speed sensor	Output shaft revolution					С	
A/T fluid temperature sensor	ATF temperature					0	
Transmission range switch	Selector lever position						ТМ
	Engine speed signal*	N idlo instruction					
ECM	Accelerator pedal posi- tion signal*	<ul> <li>N idle instruction signal (Standby sig- nal)*</li> </ul>	N idle instruction signal (Start signal)*		Low brake sole- noid valve	Ε	
	Throttle position signal*						
DOM	Stop lamp switch signal*					F	
BCM	Turn indicator signal*						
ABS actuator electric	Pressure sensor signal*					0	
unit (control unit)	Decel G sensor signal*					G	

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	Κ
Selector lever position	: "D" position	
Vehicle speed	: 0 km/h (0 MPH)	
Accelerator pedal opening	: 0.0 / 8	L
Brake pedal	: Depress	
Engine speed	: Idle speed	
Infiniti drive mode selector	: Other than SNOW mode	M
Turn signal lamp and hazard warning lamp	: OFF	

#### NOTE:

Ν 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.
- When idle speed increases due to heavy electric load\*.
- \*: When any one of rear window defogger switch, A/C switch, headlamp, fog lamp is turned ON. In addition, when the steering wheel is operated.

### 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).

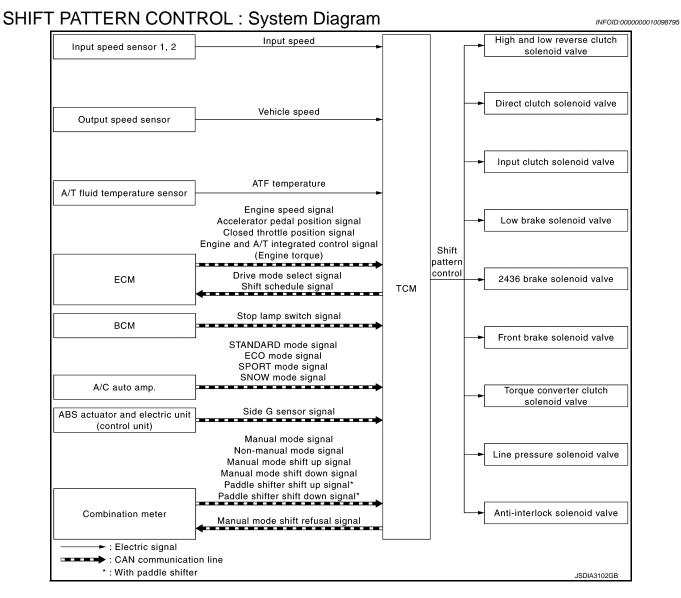
After driving at more than a prescribed speed.

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### < SYSTEM DESCRIPTION >

#### • When idle neutral control start conditions are fulfilled for a certain period of time.

### SHIFT PATTERN CONTROL



SHIFT PATTERN CONTROL : System Description

INFOID:000000010098796

INFINITI DRIVE MODE SELECTOR

### < SYSTEM DESCRIPTION >

Input/Output Signal Chart

Item	Signal	TCM function	Actuator		
Input speed sensor 1, 2	Input speed				
Output speed sensor	Vehicle speed				
A/T fluid temperature sensor	ATF temperature				
	Engine speed signal*		<ul> <li>High and low reverse</li> </ul>		
	Accelerator pedal position signal*		clutch solenoid valve		
	Closed throttle position signal*		<ul> <li>Direct clutch solenoid valve</li> </ul>		
ECM	Engine and A/T integrated control signal (engine torque)*		<ul> <li>Input clutch solenoid valve</li> <li>Low brake solenoid valve</li> <li>2346 brake solenoid valve</li> <li>Front brake solenoid valve</li> </ul>		
	Drive mode select signal*	Infiniti drive mode se- lector			
	Shift schedule signal*		Torque converter clutch so-		
ABS actuator and electric unit (control unit)	Side G sensor signal*	de G sensor signal* lenoi valve			
BCM	Stop lamp switch signal*		<ul> <li>Anti-interlock solenoid valve</li> </ul>		
A/C auto amp.	STANDARD mode signal*				
	ECO mode signal*	1			
	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-322, "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

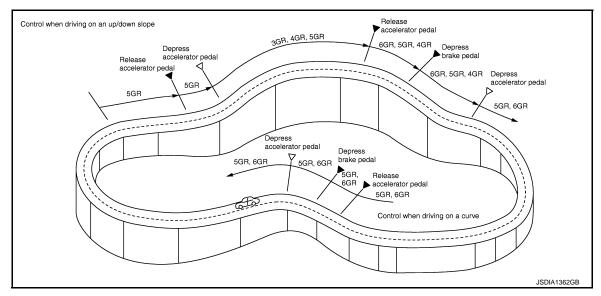
- In driving condition where acceleration, deceleration, or lateral acceleration continues, it corrects gear selection in order to keep a smooth vehicle speed during the curve and to give an adequate driving force at the curve end.
- When acceleration pedal is quickly released at curve entrance etc, 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.

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### < SYSTEM DESCRIPTION >

 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			
A/T fluid temperature sensor	ATF temperature			
ECM	Engine speed signal <sup>*1</sup>		High and low reverse clutch	
	Accelerator pedal position sig- nal*1		<ul> <li>High and low reverse clutch solenoid valve</li> <li>Direct clutch solenoid valve</li> </ul>	
	Manual mode signal*1		<ul> <li>Input clutch solenoid valve</li> <li>Low brake solenoid valve</li> </ul>	
	Non-manual mode signal*1	Manual mode	<ul> <li>2346 brake solenoid valve</li> </ul>	
	Manual mode shift up signal*1		<ul> <li>Front brake solenoid valve</li> <li>Torque converter clutch sole-</li> </ul>	
Combination meter	Manual mode shift down sig- nal*1		<ul> <li>noid valve</li> <li>Line pressure solenoid valv</li> </ul>	
	Paddle shifter shift up signal*1, *2		Anti-interlock solenoid valve	
	Paddle shifter shift down sig- nal*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 DESCRIPTION >

shifter returns to normal status when ignition switch is turned OFF once and then ON again. Gear shift using paddle shifter becomes operative.

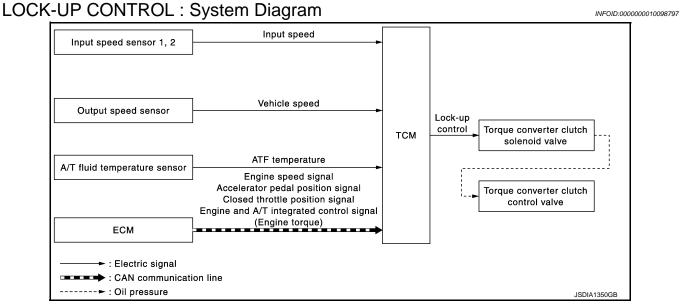
• The TCM prohibits the manual mode while being in fail-safe mode due to an A/T malfunction, etc. Refer to <u>TM-74, "Fail-Safe"</u>.

### Manual Mode Information

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

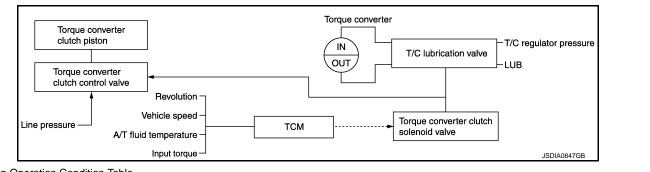
- When the selector lever or the paddle shifter shifts to "DOWN (- side)" side while driving in 1GR.
- When the selector lever or the paddle shifter shifts to "UP (+ side)" side while driving in 7GR.

# LOCK-UP CONTROL



# LOCK-UP CONTROL : System Description

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



Lock-up Operation C	Condition I	able										
Selector lever		"D" position					"M" position					
Gear position	7	6	5	4	3	2	7	6	5	4	3	2
Lock-up	×	_	_	-	_	_	×	×	×	×	×	×
Slip lock-up	×	×	×	×	×	×	×	×	×	×	×	×

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#### 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.

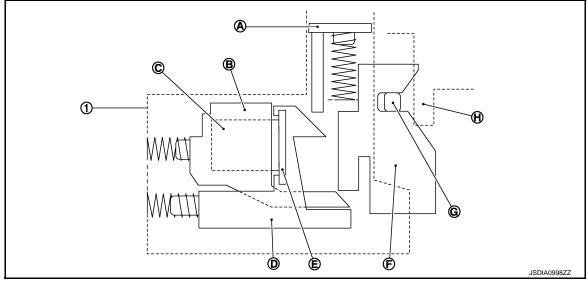
### A/T SHIFT LOCK SYSTEM

# A/T SHIFT LOCK SYSTEM : System Description

 Shift lock prevents an unintentional start of the vehicle that may be caused by an incorrect operation while selector lever is in the "P" position.

- Selector lever can be shifted from the "P" position to another position when the following conditions are satisfied.
- Ignition switch ON
- Stop lamp switch is ON (brake pedal is depressed)
- Selector lever knob button is pressed

SHIFT LOCK MECHANISM



- 1. Shift lock unit
- A. Shift lock release button

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Slider

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### < SYSTEM DESCRIPTION >

D. Stopper

Detent pin

G.

E. Iron plateH. Detent gate

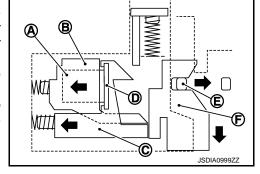
### SHIFT LOCK OPERATION

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.



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### 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.



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F. Plate

# **ON BOARD DIAGNOSTIC (OBD) SYSTEM**

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# ON BOARD DIAGNOSTIC (OBD) SYSTEM

### Diagnosis Description

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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  $\underline{TM}$ -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 <u>EC-75</u>, "<u>Diagnosis Description</u>" (VQ37VHR) or <u>EC-1027</u>, "<u>Diagnosis Description</u>" (VK56VD).

### < SYSTEM DESCRIPTION >

# DIAGNOSIS SYSTEM (TCM)

# **CONSULT** Function

### APPLICATION ITEMS

Diagnostic test mode	Function	
Work Support	This mode enables a technician to adjust some devices faster and more accurately.	С
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.	F
DTC Work Support	DTC reproduction procedure can be performed speedily and precisely.	
ECU Identification	Display the ECU identification number (part number etc.) of the selected system.	
CALIB DATA*	The calibration data status of TCM can be checked.	F

\*: Although "CALIB DATA" is selectable, do not use it.

### WORK SUPPORT

Item name	Description	
G SENSOR CALIBRATION	Calibrates G sensor.	Н

#### 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  $\rightarrow$  2  $\rightarrow$  3...38  $\rightarrow$  39 after returning to the normal condition whenever ignition switch OFF  $\rightarrow$  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  $1 \rightarrow 2 \rightarrow 3...254 \rightarrow 255$  after returning to the normal condition whenever ignition switch OFF  $\rightarrow$  ON.
- The number is fixed to 255 until the self-diagnosis results are erased if it is over 255.

#### DATA MONITOR

#### NOTE:

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

X: Standard, —: Not applicable, 🔻	<b>'</b> :	Option
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		Мо	nitor Item Sele	ction		
Monitore	Monitored item (Unit)		MAIN SIG- NALS	SELEC- TION FROM ITEM	Remarks	
VHCL/S SE-A/T	(km/h or mph)	Х	х	▼	Displays the vehicle speed calculated by the TCM from the output shaft revolution.	
ESTM VSP SIG	(km/h or mph)	Х	_	▼	Displays the vehicle speed signal received via CAN communication.	
OUTPUT REV	(rpm)	Х	х	▼	Displays the output speed calculated from the pulse signal of output speed sensor.	

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### < SYSTEM DESCRIPTION >

	Мо	nitor Item Sele				
Monitored	d item (Unit)	ECU IN- PUT SIG- NALS	MAIN SIG- NALS	SELEC- TION FROM ITEM	Remarks	
INPUT SPEED	(rpm)	Х	Х	▼	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 calculat- ed from the pulse signal of input speed sensor 1.	
F CARR GR REV	(rpm)	_	_	▼	Displays the front carrier gear revolution calcu- lated from the pulse signal of input speed sen- sor 2.	
ENGINE SPEED	(rpm)	Х	Х	▼	Displays the engine speed received via CAN communication.	
TC SLIP SPEED	(rpm)	_	Х	▼	Displays the revolution difference between in- put speed and engine speed.	
ACCELE POSI	(0.0/8)	Х	_	▼	Displays the accelerator position estimated value received via CAN communication.	
THROTTLE POSI	(0.0/8)	Х	Х	▼	Displays the throttle position received via CAN communication.	
ATF TEMP 1	(°C or °F)	x	х	▼	Displays the ATF temperature of oil pan calcu- lated from the signal voltage of A/T fluid tem- perature sensor.	
ATF TEMP 2	(°C or °F)	x	х	▼	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 temper- ature sensor.	
BATTERY VOLT	(V)	Х	_	▼	Displays the power supply voltage of TCM.	
LINE PRES SOL	(A)	_	Х	▼	Displays the command current from TCM to the line pressure solenoid.	
TCC SOLENOID	(A)	_	Х	▼	Displays the command current from TCM to the torque converter clutch solenoid.	
L/B SOLENOID	(A)	_	х	▼	Displays the command current from TCM to the low brake solenoid.	
FR/B SOLENOID	(A)	_	Х	▼	Displays the command current from TCM to the front brake solenoid.	
HLR/C SOL	(A)	_	Х	▼	Displays the command current from TCM to the high and low reverse clutch solenoid.	
I/C SOLENOID	(A)	_	Х	▼	Displays the command current from TCM to the input clutch solenoid.	
D/C SOLENOID	(A)	_	х	▼	Displays the command current from TCM to the direct clutch solenoid.	
2346/B SOL	(A)	_	х	▼	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.	

### < SYSTEM DESCRIPTION >

		Monitor Item Selection		ction		
Monitored	item (Unit)	ECU IN- PUT SIG- NALS	MAIN SIG- NALS	SELEC- TION FROM ITEM	Remarks	
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			х	▼	Displays the gear ratio calculated from input geed and output speed.	
ENGINE TORQUE	(Nm)		_	▼	Displays the engine torque estimated value re- ceived via CAN communication.	
ENG TORQUE D	(Nm)	_	_	▼	Displays the engine torque estimated value re- flected the requested torque of each control unit received via CAN communication.	
INPUT TRQ S	(Nm)	_	_	▼	Displays the input torque using for the oil pres- sure calculation process of shift change control.	
INPUT TRQ L/P	(Nm)	_	_	▼	Displays the input torque using for the oil pres- sure calculation process of line pressure con- trol.	
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 pres- sure 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 calculat- ed 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 pres- sure 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 pres- sure calculation process of shift change control.	

### < SYSTEM DESCRIPTION >

		Monitor Item Selection		ction		
Monitored	item (Unit)	ECU IN- PUT SIG- NALS	MAIN SIG- NALS	SELEC- TION FROM ITEM	Remarks	
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 pres- sure 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	(%)	х	_	▼	Displays the inclination angle calculated by the decel G sensor signal received via CAN communication.	
RANGE SW 4	(ON/OFF)	х		▼	Displays the operation status of transmission range switch 4.	
RANGE SW 3	(ON/OFF)	х		▼	Displays the operation status of transmission range switch 3.	
RANGE SW 2	(ON/OFF)	х	_	▼	Displays the operation status of transmission range switch 2.	
RANGE SW 1	(ON/OFF)	х	_	▼	Displays the operation status of transmission range switch 1.	
SFT DWN ST SW	(ON/OFF)	х	_	▼	Displays the operation status of paddle shifter (down switch).	
SFT UP ST SW	(ON/OFF)	Х	_	▼	Displays the operation status of paddle shifter (up switch).	
DOWN SW LEVER	(ON/OFF)	Х	_	▼	Displays the operation status of selector lever (down switch).	
UP SW LEVER	(ON/OFF)	Х	_	▼	Displays the operation status of selector lever (up switch).	
NON M-MODE SW	(ON/OFF)	Х	_	▼	Displays whether the selector lever is in any po- sition other than manual shift gate position.	
MANU MODE SW	(ON/OFF)	Х	_	▼	Displays whether the selector lever is in the manual shift gate position.	
TOW MODE SW	(ON/OFF)	_	_	▼	<ul> <li>Displays the reception status of tow mode switch signal received via CAN communica- tion.</li> <li>Not mounted but displayed.</li> </ul>	
DS RANGE	(ON/OFF)	_	_	▼	<ul><li>Displays whether it is the DS mode.</li><li>Not mounted but displayed.</li></ul>	
1 POSITION SW	(ON/OFF)	х	_	▼	<ul> <li>Displays the reception status of 1 position switch signal received via CAN communica- tion.</li> <li>Not mounted but displayed.</li> </ul>	
OD CONT SW	(ON/OFF)	х	_	▼	<ul> <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)	Х	_	▼	Displays the reception status of stop lamp switch signal received via CAN communication.	
POWERSHIFT SW	(ON/OFF)	х		▼	<ul> <li>Displays the reception status of POWER mode signal received via CAN communica- tion.</li> <li>Not mounted but displayed.</li> </ul>	

### < SYSTEM DESCRIPTION >

	Monitor Item Selection				
Monitored	item (Unit)	ECU IN- PUT SIG- NALS	MAIN SIG- NALS	SELEC- TION FROM ITEM	Remarks
ASCD-OD CUT	(ON/OFF)	x	_	▼	Displays the reception status of ASCD OD can- cel request signal received via CAN communi- cation.
ASCD-CRUISE	(ON/OFF)	Х	_	▼	Displays the reception status of ASCD opera- tion signal received via CAN communication.
ABS SIGNAL	(ON/OFF)	х	_	▼	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 communica- tion.
TCS SIGNAL 2	(ON/OFF)	х	_	▼	Displays whether the reception value of A/T shift schedule change demand signal received via CAN communication is "cold".
TCS SIGNAL 1	(ON/OFF)	х	_	▼	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)	х	—	▼	Displays the kickdown condition signal status received via CAN communication.
CLSD THL POS	(ON/OFF)	х	_	▼	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> <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 communica- tion.
ON OFF SOL MON	(ON/OFF)	_	_	▼	Monitors the command value from TCM to the anti-interlock solenoid, and displays the monitor status.

### < SYSTEM DESCRIPTION >

### [7AT: RE7R01A]

		Monitor Item Selection		ction		
Monitored	item (Unit)	ECU IN- PUT SIG- NALS	MAIN SIG- NALS	SELEC- TION FROM ITEM	Remarks	
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		_	Х	▼	Displays the shift positions recognized by TCM.	
GEAR		_	Х	▼	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 recog- nized by TCM.	
D/C PARTS	(FAIL/NOTFAIL)	_	_	▼	Displays whether the identified malfunction point judged by TCM is the related parts of di- rect 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 con- trol.	
SHIFT SCHEDULE		—	_	▼	Displays the shift schedule selected by TCM.	
DRIVE MODE STATS		_	—	▼	Displays the drive mode status recognized by TCM.	
SPORT MODE		—	_	▼		
STANDARD MODE		—	—	▼	Displays the status of drive mode select switch	
ECO MODE		_	_	▼	signal received via CAN communication.	
SNOW MODE		_		▼		

**DTC Work Support** 

### < SYSTEM DESCRIPTION >

# [7AT: RE7R01A]

Item name	Description	Check item	
1ST GR FNCTN P0731	<ul> <li>Following items for "1GR incorrect ratio" can be confirmed.</li> <li>Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>Self-diagnostic results (OK or NG)</li> </ul>	<ul> <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>	ŀ
2ND GR FNCTN P0732	<ul> <li>Following items for "2GR incorrect ratio" can be confirmed.</li> <li>Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>Self-diagnostic results (OK or NG)</li> </ul>		E
3RD GR FNCTN P0733	<ul> <li>Following items for "3GR incorrect ratio" can be confirmed.</li> <li>Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>Self-diagnostic results (OK or NG)</li> </ul>		C
4TH GR FNCTN P0734	<ul> <li>Following items for "4GR incorrect ratio" can be confirmed.</li> <li>Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>Self-diagnostic results (OK or NG)</li> </ul>		TN
5TH GR FNCTN P0735	<ul> <li>Following items for "5GR incorrect ratio" can be confirmed.</li> <li>Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>Self-diagnostic results (OK or NG)</li> </ul>		E
6TH GR FNCTN P0729	<ul> <li>Following items for "6GR incorrect ratio" can be confirmed.</li> <li>Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>Self-diagnostic results (OK or NG)</li> </ul>		F
7TH GR FNCTN P1734	<ul> <li>Following items for "7GR incorrect ratio" can be confirmed.</li> <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	<ul> <li>Following items for "TCC solenoid function" can be confirmed.</li> <li>Self-diagnosis status (whether the diagnosis is being performed or not)</li> <li>Self-diagnostic results (OK or NG)</li> </ul>	<ul> <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>	H

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# ECU DIAGNOSIS INFORMATION

# TCM

### **Reference Value**

INFOID:0000000010098802

[7AT: RE7R01A]

### VALUES ON THE DIAGNOSIS TOOL

• The CONSULT electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).

Check for time difference between actual shift timing and the CONSULT display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts in accordance with the specified diagnostic procedures.

- Shift schedule (that implies gear position) on CONSULT may slightly differ from that is described in Service Manual. This occurs because of the reasons as per the following:
- Actual shift schedule has more or less tolerance or allowance
- Shift schedule in Service Manual refers to the point where shifting starts
- Gear position on CONSULT indicates the point where shifting completes
- Display of solenoid valves on CONSULT changes at the start of shifting, while gear position is displayed upon completion of shifting (which is computed by TCM).

#### NOTE:

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

CONSULT	MONITOR	ITEM
CONCOL		

Item name	Condition	Value / Status (Approx.)
VHCL/S SE-A/T	During driving	Approximately equals the speed- ometer reading.
ESTM VSP SIG	During driving	Approximately equals the speed- ometer 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 indi- cated.
F CARR GR REV	During driving	Revolution of front carrier is indi- cated.
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
AUGELE POSI	Accelerator pedal is fully depressed	8.0/8
THROTTLE POSI	Accelerator pedal is released	0.0/8
THROTTLE POSI	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	-	_
TCC SOLENOID	_	_
L/B SOLENOID	_	_
FR/B SOLENOID	_	_
HLR/C SOL	_	_

Revision: 2013 November

# ТСМ

< ECU DIAGNOSIS INFORMATION >

# [7AT: RE7R01A]

Item name	Condition	Value / Status (Approx.)
I/C SOLENOID	-	—
D/C SOLENOID	_	_
2346/B SOL	-	_
L/P SOL MON	-	_
TCC SOL MON	-	_
L/B SOL MON	_	_
FR/B SOL MON	_	_
HLR/C SOL MON	-	_
I/C SOL MON	_	_
D/C SOL MON	-	_
2346/B SOL MON	-	_
	Driving with 1GR	4.924
	Driving with 2GR	3.194
	Driving with 3GR	2.043
GEAR RATIO	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.
	Selector lever in "P" and "N" positions	490 kPa
TRGT PRES L/P	Other than the above	490 – 1370 kPa
	Slip lock-up is active	0 – 600 kPa
TRGT PRES TCC	Lock-up is active	600 kPa
	Other than the above	0 kPa
	Low brake is engaged	1370 kPa
TRGT PRES L/B	Low brake is disengaged	0 kPa
	Front brake is engaged	1370 kPa
TRGT PRES FR/B	Front brake is disengaged	0 kPa
	High and low reverse clutch is engaged	1370 kPa
TRG PRE HLR/C	High and low reverse clutch is disengaged	0 kPa
	Input clutch is engaged	1370 kPa
TRGT PRES I/C	Input clutch is disengaged	0 kPa
	Direct clutch is engaged	1370 kPa
TRGT PRES D/C	Direct clutch is disengaged	0 kPa
	2346 brake is engaged	1370 kPa
TRG PRE 2346/B	2346 brake is disengaged	0 kPa
SHIFT PATTERN	During normal driving (without shift changes)	FF
VEHICLE SPEED	During driving	Approximately equals the speed- ometer reading.

Revision: 2013 November

# ТСМ

### < ECU DIAGNOSIS INFORMATION >

Item name	Condition	Value / Status (Approx.)
	Level road	0%
G SEN SLOPE	Uphill slope	Positive value (maximum 40.45%)
	Downhill slope	Negative value (minimum – 40.45%)
RANGE SW 4	Selector lever in "P" and "N" positions	ON
RANGE SW 4	Other than the above	OFF
RANGE SW 3	Selector lever in "P", "R" and "N" positions	ON
RANGE SW 5	Other than the above	OFF
RANGE SW 2	Selector lever in "P" and "R" positions	ON
RANGE SW 2	Other than the above	OFF
	Selector lever in "P" position	ON
RANGE SW 1	Other than the above	OFF
	Paddle shifter (shift-down) is pulled	ON
SFT DWN ST SW	Other than the above	OFF
	Paddle shifter (shift-up) is pulled	ON
SFT UP ST SW	Other than the above	OFF
	Selector lever is shifted to – side	ON
DOWN SW LEVER	Other than the above	OFF
	Selector lever is shifted to + side	ON
UP SW LEVER	Other than the above	OFF
	Selector lever is shifted to manual shift gate side	OFF
NON M-MODE SW	Other than the above	ON
	Selector lever is shifted to manual shift gate side	ON
MANU MODE SW	Other than the above	OFF
	Tow mode	ON
TOW MODE SW*	Other than the above	OFF
	Driving with DS mode	ON
DS RANGE*	Other than the above	OFF
	Selector lever in "1" position	ON
1 POSITION SW*	Other than the above	OFF
	When overdrive control switch is depressed	ON
OD CONT SW*	When overdrive control switch is released	OFF
	Brake pedal is depressed	ON
BRAKESW	Brake pedal is released	OFF
	Power mode	ON
POWERSHIFT SW*	Other than the above	OFF
	When TCM receives ASCD OD cancel request signal	ON
ASCD-OD CUT	Other than the above	OFF
	ASCD operate	ON
ASCD-CRUISE	Other than the above	OFF
	ABS operate	ON
ABS SIGNAL	Other than the above	OFF
	When TCM receives TCS gear keep request signal	ON
TCS GR/P KEEP	Other than the above	OFF

# TCM

### < ECU DIAGNOSIS INFORMATION >

Item name	Condition	Value / Status (Approx.)	
TCS SIGNAL 2	When the reception value of A/T shift schedule change demand signal is "cold"	ON	A
	Other than the above	OFF	R
TCS SIGNAL 1	When the reception value of A/T shift schedule change demand signal is "warm"	ON	D
	Other than the above	OFF	C
LOW/B PARTS	At 4GR - 5GR - 6GR shift control	FAIL	_ 0
LOW/B FARTS	Other than the above	NOTFAIL	
HC/IC/FRB PARTS	At 1GR - 2GR - 3GR shift control	FAIL	ΤM
10/10/FRD FARTS	Other than the above	NOTFAIL	
C/FRB PARTS	At 4GR - 5GR - 6GR shift control	FAIL	
U/FRD PARIS	Other than the above	NOTFAIL	
	At 4GR - 5GR - 6GR shift control	FAIL	
HLR/C PARTS	Other than the above	NOTFAIL	F
	Accelerator pedal is fully depressed	ON	
N/O THL POS	Accelerator pedal is released	OFF	
	Accelerator pedal is released	ON	G
CLSD THL POS	Accelerator pedal is fully depressed	OFF	
	Accelerator pedal is depressed	DRIVE	— н
DRV CST JUDGE	Accelerator pedal is released	COAST	
	When the selector lever is positioned in between each po- sition.	OFF	I
	Selector lever in "P" position	Р	_
	Selector lever in "R" position	R	_
	Selector lever in "N" position	Ν	J
	Selector lever in "D" position	P	
	Selector lever in "D" position: 7GR	D	K
	Selector lever in "D" position: 6GR	6	
	Selector lever in "D" position: 5GR	5	
	Selector lever in "D" position: 4GR	4	L
SHIFT IND SIGNAL	Selector lever in "D" position: 3GR	3	
	Selector lever in "D" position: 2GR	2	N
	Selector lever in "D" position: 1GR	1	IV
	Selector lever in "M" position: 1GR	M1	
	Selector lever in "M" position: 2GR	M2	N
	Selector lever in "M" position: 3GR	M3	
	Selector lever in "M" position: 4GR	M4	_
	Selector lever in "M" position: 5GR	M5	_ 0
	Selector lever in "M" position: 6GR	M6	
	Selector lever in "M" position: 7GR	M7	P
	Driving with DS mode	DS	
	Selector lever in "P" and "N" positions	ON	
STARTER RELAY	Other than the above	OFF	
	For 2 seconds after the ignition switch is turned ON	ON	
-SAFE IND/L	Other than the above	OFF	

# ТСМ

### < ECU DIAGNOSIS INFORMATION >

Item name	Condition	Value / Status (Approx.)
ATF WARN LAMP*	When TCM transmits the A/T fluid warning lamp signal	ON
	Other than the above	OFF
	Driving with manual mode	ON
MANU MODE IND	Other than the above	OFF
	Selector lever in "P" and "N" positions	ON
ON OFF SOL MON	Driving with 1GR to 3GR	ON
	Other than the above	OFF
	Selector lever in "P" and "N" positions	ON
START RLY MON	Other than the above	OFF
	Selector lever in "P" and "N" positions	01
ON OFF SOL	Driving with 1GR to 3GR	ON
	Other than the above	OFF
	Selector lever in "N" and "P" positions	N/P
	Selector lever in "R" position	R
	Selector lever in "D" and "DS" positions	
	Selector lever in "M" position: 7GR	D
	Selector lever in "M" position: 6GR	6
SLCT LVR POSI	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
	Driving with the D position	0 or 3
SHIFT MODE	Driving with the manual mode	4 or 8
	At 1GR - 2GR shift control	FAIL
D/C PARTS	Other than the above	NOTFAIL
	At control fixed to 1GR	FAIL
FR/B PARTS	Other than the above	NOTFAIL
	At control fixed to 1GR	FAIL
2346/B PARTS	Other than the above	NOTFAIL
	At 2GR - 3GR - 4GR shift control	FAIL
2346B/DC PARTS	Other than the above	NOTFAIL
	Idle neutral is active	ON
N IDLE STATUS	Other than the above	OFF
	During normal driving	NORMAL
SHIFT SCHEDULE	Drive mode select switch: SPORT mode	SPORT
	Drive mode select switch: ECO mode	ECO
	Drive mode select switch: SPORT mode	SPORT
DRIVE MODE STATS	Drive mode select switch: ECO mode	ECO
	Drive mode select switch: SPORT mode	ON

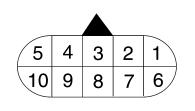
# TCM

#### < ECU DIAGNOSIS INFORMATION >

Item name	Condition	Value / Status (Approx.)	_
STANDARD MODE	Drive mode select switch: STANDARD mode	ON	A
STANDARD MODE	Other than the above	OFF	-
ECO MODE	Drive mode select switch: ECO mode	ON	В
ECOMODE	Other than the above	OFF	-
SNOW MODE	Drive mode select switch: SNOW mode	ON	-
	Other than the above	OFF	С

\*: Not mounted but always display as OFF.

#### TERMINAL LAYOUT



SCIA1658E

# PHYSICAL VALUES

	minal color)	Description		Condition		Value (Approx.)
+	_	Signal name	Input/ Output			value (Approx.)
1	Ground	Ignition power supply	Input	Ignition switch Of	N	Battery voltage
(Y)	Ground	ignition power supply	Input	Ignition switch Of	FF	0 V
2 (R)	Ground	Battery 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	Ground	Ignition power supply	Input	Ignition switch Of	Ignition switch ON	
(G)	Ground	Ignition power supply	mput	Ignition switch OFF		0 V
7				Ignition switch	Selector lever in "R" position.	0 V
(SB)	Ground	Back-up lamp relay	Input	ON	Selector lever in other than above.	Battery voltage
8 (P)	_	CAN-L	Input/ Output		_	_
9 _G) <sup>*1</sup>	Ground	Startar ralay	Quitouit	Ignition switch	Selector lever in "N" and "P" po- sitions.	Battery voltage
LG) * 3R) <sup>*2</sup>	Ground	Starter relay	Output	ŎN	Selector lever in other than above.	0 V
10 (B)	Ground	Ground	Output		Always	0 V

\*: With paddle shifter

\*: Without paddle shifter



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TCM has the electrical fail-safe mode. The mode is divided into a maximum of 3 phases (1st fail-safe, 2nd failsafe 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-93, "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 malfunction- ing parts in the condition that the driving force required for the driving is secured.
Final fail-safe	<ul> <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> <li>Fixed in the "D" position (The shifting can be per- formed)</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> <li>Fixed in the "D" position (The shifting can be per- formed)</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> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	_	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul><li>Fix the gear while driving</li><li>Manual mode is prohibited</li></ul>	_	Manual mode is prohibited
P0717	Between the gears of 1 - 2 - 3	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	_	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> </ul>
	Between the gears of 4 - 5 - 6 - 7	<ul><li>Fix the gear while driving</li><li>Manual mode is prohibited</li></ul>	_	<ul> <li>Manual mode is prohibited</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
P0720	Between the	gears of 1 - 2 - 3	<ul> <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> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> </ul>
	Between the gears of 4 - 5 - 6 - 7		<ul> <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>		Manual mode is prohibited
	Small gear ra	atio difference	Engine torque limit: Max 150 Nm	_	Engine torque limit: Max 150 Nm
		Neutral mal- function be- tween the gears of 1 - 2 - 3 and 7 Neutral mal- tween the GR tween the tween the tweenthe tween the tween the twe tween the tween tweent twe twe tween tween th	<ul> <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</li> </ul>		
P0729 P0731 P0732 P0733 P0734 P0735 P1734	Great gear ratio differ- ence	Other than the above	<ul> <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> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul> <li>performed</li> <li>Manual mode is prohibited</li> <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> <li>Locks in 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul> <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><li>Lock-up is prohibited</li><li>Slip lock-up is prohibited</li></ul>		<ul><li>Lock-up is prohibited</li><li>Slip lock-up is prohibited</li></ul>
P0744		_	<ul><li>Lock-up is prohibited</li><li>Slip lock-up is prohibited</li></ul>		<ul><li>Lock-up is prohibited</li><li>Slip lock-up is prohibited</li></ul>

# TCM

Vehicle behavior

safe

Vehicle behavior for 1st fail-

safe

### < ECU DIAGNOSIS INFORMATION >

Vehicle condition

DTC

	Malfunction of both switches	Manual mode is prohibited	—	Manual mode is prohibited	
U0100 U0300	Between the gears of 1 - 2 - 3	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	_	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Line pressure is set to the</li> </ul>	
U1000	Between the gears of 4 - 5 - 6 - 7	<ul><li>Fix the gear at driving</li><li>Manual mode is prohibited</li></ul>	_	<ul><li>maximum hydraulic pres- sure</li><li>Manual mode is prohibited</li></ul>	
P0720 and P1721	_	Locks in 5GR	_	Locks in 5GR	
Protec	ction Control			INFOID:000000010098804	
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					

TM-76

[7AT: RE7R01A]		
for 2nd fail-	Vehicle behavior for final fail- safe	
	<ul> <li>Locks in 1GR</li> <li>The shifting between the gears of 1 - 2 - 3 can be</li> </ul>	

P0750 P0775 P0795 P2713 P2722 P2731 P2807		<ul> <li>Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>		<ul> <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><li>Locks in 3GR</li><li>Manual mode is prohibited</li></ul>	_	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>
P1705		<ul> <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> <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> <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> <li>Locks in 1GR, 2GR, 3GR, 4GR, 5GR, 6GR or 7GR</li> <li>Manual mode is prohibited</li> </ul>	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	<ul> <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>
	Gate switch malfunction	Only the gate switch is pro- hibited	_	Only the gate switch is pro- hibited
P1815	Paddle switch malfunction	Only the paddle switch is prohibited	_	Only the paddle switch is pro- hibited
	Malfunction of both switches	Manual mode is prohibited		Manual mode is prohibited
U0100 U0300 U1000	Between the gears of 1 - 2 - 3	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Manual mode is prohibited</li> </ul>	_	<ul> <li>The shifting between the gears of 1 - 2 - 3 can be performed</li> <li>Line pressure is set to the maximum hydraulic pres-</li> </ul>
01000	Between the gears of 4 - 5 - 6 - 7	<ul><li>Fix the gear at driving</li><li>Manual mode is prohibited</li></ul>	_	<ul> <li>Maximum hydraulic pres- sure</li> <li>Manual mode is prohibited</li> </ul>
P0720 and P1721	_	Locks in 5GR	_	Locks in 5GR

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	В
Normal return condition	<ul> <li>Vehicle speed: 8 km/h (5 MPH) or less and</li> <li>Engine speed: 2,200 rpm or less</li> </ul>	С
Vehicle behavior	<ul><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> <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>	F
Control at malfunction	Front brake solenoid output signal; OFF	-
Normal return condition	Other than detection condition of malfunction	G
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 sub-

Malfunction detection condition	<ul> <li>TCM electronic substrate temperature</li> <li>145°C (293°F) and 120 seconds or</li> <li>150°C (302°F)</li> </ul>	
Control at malfunction	Accelerator opening: 0.5/8 or less	
Normal return condition	<ul> <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**

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

Priority	Detected items (DTC)	Reference	
1	U0100 LOST COMM (ECM A)	TM-105, "DTC Logic"	Ν
1	U1000 CAN COMM CIRCUIT	TM-107, "DTC Logic"	

**TM-77** 



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#### [7AT: RE7R01A]

Priority	Detected items (DTC)	Reference
	P0615 STARTER RELAY	TM-108, "DTC Logic"
	P0705 T/M RANGE SENSOR A	TM-110, "DTC Logic"
	P0710 FLUID TEMP SENSOR A	TM-111, "DTC Logic"
	P0717 INPUT SPEED SENSOR A	TM-113, "DTC Logic"
	P0720 OUTPUT SPEED SENSOR	TM-114, "DTC Logic"
	P0740 TORQUE CONVERTER	TM-132, "DTC Logic"
2	P0745 PC SOLENOID A	TM-135, "DTC Logic"
2	P0750 SHIFT SOLENOID A	TM-136, "DTC Logic"
	P0775 PC SOLENOID B	TM-137, "DTC Logic"
	P0795 PC SOLENOID C	TM-140, "DTC Logic"
	P2713 PC SOLENOID D	TM-154, "DTC Logic"
	P2722 PC SOLENOID E	TM-155, "DTC Logic"
	P2731 PC SOLENOID F	TM-156, "DTC Logic"
	P2807 PC SOLENOID G	TM-157, "DTC Logic"
	P0729 6GR INCORRECT RATIO	TM-118, "DTC Logic"
	P0730 INCORRECT GR RATIO	TM-120, "DTC Logic"
	P0731 1GR INCORRECT RATIO	TM-122, "DTC Logic"
	P0732 2GR INCORRECT RATIO	TM-124, "DTC Logic"
	P0733 3GR INCORRECT RATIO	TM-126, "DTC Logic"
3	P0734 4GR INCORRECT RATIO	TM-128, "DTC Logic"
	P0735 5GR INCORRECT RATIO	TM-130, "DTC Logic"
	P0744 TORQUE CONVERTER	TM-133, "DTC Logic"
	P0780 SHIFT	TM-138, "DTC Logic"
	P1730 INTERLOCK	TM-144, "DTC Logic"
	P1734 7GR INCORRECT RATIO	TM-146, "DTC Logic"
	U0300 CAN COMM DATA	TM-106, "DTC Logic"
	P0725 ENGINE SPEED	TM-116, "DTC Logic"
4	P1705 TP SENSOR	TM-141, "DTC Logic"
	P1721 VEHICLE SPEED SIGNAL	TM-142, "DTC Logic"
	P1815 M-MODE SWITCH	TM-148, "DTC Logic"

# **DTC** Index

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#### 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 <u>TM-77</u>, "<u>DTC Inspection Priority Chart</u>".

• The IGN counter is indicated in Freeze frame data (FFD). Refer to TM-61, "CONSULT Function".

Items	DT	<sup>-</sup> C <sup>*1</sup>	
(CONSULT screen terms)	MIL <sup>*2</sup> , "ENGINE" with CONSULT or GST	CONSULT only "TRANS- MISSION"	Reference
STARTER RELAY	—	P0615	TM-108, "DTC Logic"
T/M RANGE SENSOR A	P0705	P0705	TM-110, "DTC Logic"
FLUID TEMP SENSOR A	P0710	P0710	TM-111, "DTC Logic"
INPUT SPEED SENSOR A	P0717	P0717	TM-113, "DTC Logic"
OUTPUT SPEED SENSOR	P0720	P0720	TM-114, "DTC Logic"
ENGINE SPEED	—	P0725	TM-116, "DTC Logic"

ltomo	D.	TC <sup>*1</sup>	
Items (CONSULT screen terms)	MIL <sup>*2</sup> , "ENGINE" with CONSULT or GST	CONSULT only "TRANS- MISSION"	Reference
6GR INCORRECT RATIO	P0729	P0729	TM-118, "DTC Logic"
INCORRECT GR RATIO	P0730	P0730	TM-120, "DTC Logic"
1GR INCORRECT RATIO	P0731	P0731	TM-122, "DTC Logic"
2GR INCORRECT RATIO	P0732	P0732	TM-124, "DTC Logic"
3GR INCORRECT RATIO	P0733	P0733	TM-126, "DTC Logic"
4GR INCORRECT RATIO	P0734	P0734	TM-128, "DTC Logic"
5GR INCORRECT RATIO	P0735	P0735	TM-130, "DTC Logic"
TORQUE CONVERTER	P0740	P0740	TM-132, "DTC Logic"
TORQUE CONVERTER	P0744	P0744	TM-133, "DTC Logic"
PC SOLENOID A	P0745	P0745	TM-135, "DTC Logic"
SHIFT SOLENOID A	P0750	P0750	TM-136, "DTC Logic"
PC SOLENOID B	P0775	P0775	TM-137, "DTC Logic"
SHIFT	P0780	P0780	TM-138, "DTC Logic"
PC SOLENOID C	P0795	P0795	TM-140, "DTC Logic"
TP SENSOR	_	P1705	TM-141, "DTC Logic"
VEHICLE SPEED SIGNAL	_	P1721	TM-142, "DTC Logic"
INTERLOCK	P1730	P1730	TM-144, "DTC Logic"
7GR INCORRECT RATIO	P1734	P1734	TM-146, "DTC Logic"
M-MODE SWITCH	_	P1815	TM-148, "DTC Logic"
PC SOLENOID D	P2713	P2713	TM-154, "DTC Logic"
PC SOLENOID E	P2722	P2722	TM-155, "DTC Logic"
PC SOLENOID F	P2731	P2731	TM-156, "DTC Logic"
PC SOLENOID G	P2807	P2807	TM-157, "DTC Logic"
LOST COMM (ECM A)	U0100 <sup>*3</sup>	U0100	TM-105, "DTC Logic"
CAN COMM DATA	-	U0300	TM-106, "DTC Logic"
CAN COMM CIRCUIT		U1000	TM-107, "DTC Logic"

TCM

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

\*2: Refer to EC-75. "Diagnosis Description" (VQ37VHR) or EC-1027. "Diagnosis Description" (VK56VD).

\*3: Except for Mexico

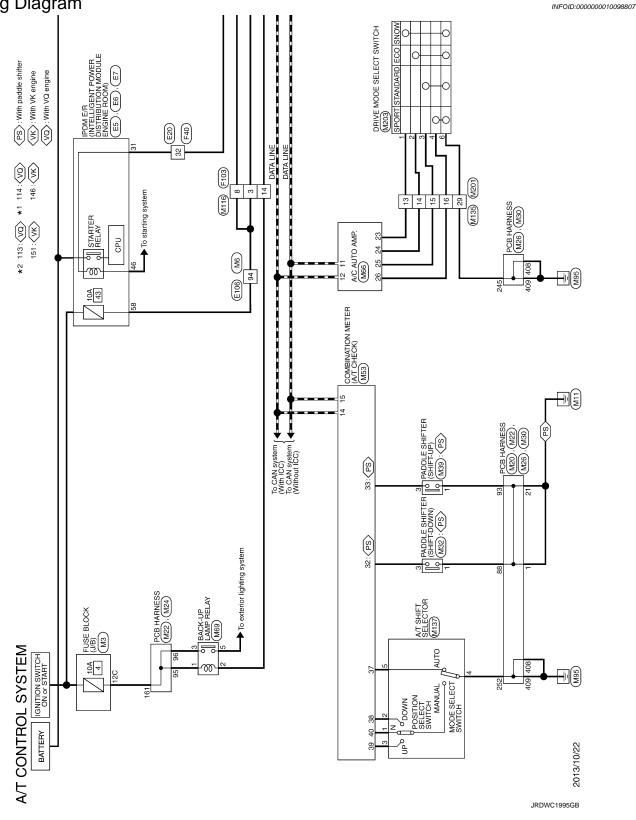
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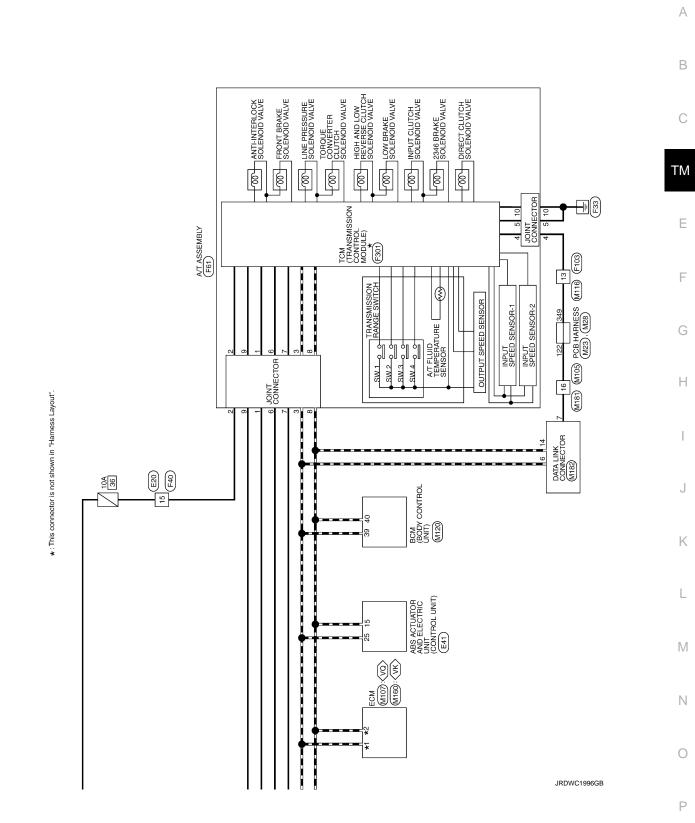
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# WIRING DIAGRAM A/T CONTROL SYSTEM

Wiring Diagram





Revision: 2013 November

< WIRING DIAGRAM >

A/T CC	CONT	A/T CONTROL SYSTEM	Connector No		E6	02	e -	SSOFF	[	8		
		TEOM F/B (NITE)   ICENT POWER DISTRIBUTION MODULE FROME		г	IDOM F/P (NATE)   ICENT POWER DISTRIBUTION MODULE FARCINE	1	c	MOTRIY		╞	1	
Connect	Connector Name	ROOM	Connecto	Connector Name	ROOM	73	0	START JG-E/R	32	┝		
Connector Type	or Type	TH20FW-CS12-M4-1V	Connector Type	Г	TH08FW-NH	74	œ	START_JG-EGI	~ ~	33 BR	1	
						75	>	OIL_PRESSURE_SW	34	•		
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ĨŦ			i f		Ļ	80	w	STARTER_MOTOR	38	e G	-	
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		4 5 6 7 8 76 8 36			42 41 40 38				4	40 R	-	
					46 45 44 43	Connector No.	tor No.	E20	41	M	-	
						Conner	Connector Name	WIRE TO WIRE	42	с Г	-	
									4			
Terminal	Terminal Color Of	6 Signal Name [Snecification]	Terminal	0	Signal Name [Snecification]	Connec:	Connector Type	SAA36MB-RS8-SHZ8	4	46 SHIELD	-	
° N	Wire		o N	Wire		C			47	~	T	
4	>	ENG_SOL	39	٩	CAN-L	ľ		1 2 9 10 11 12	48		T	
5	٩		40	٦	CAN-H			13 14 15 16	4	49 G	-	
9	æ	ECM_VB [With VQ engine]	41	в	S-GND		ń		5	50 B	-	
9	SB	ECM_VB [With VK engine]	42	^	MOTOR_FAN_RLY_CONT [With VK engine]	ļ	1		51	Y		
7	Я	ETC [With VK engine]	42	Y	MOTOR_FAN_RLY_CONT [With VQ engine]			5 6 101 101 101 101 101 101 101 101 101 1	52	M	-	
7	7	ETC [With VQ engine]	43	SB	DETENT_SW			46 47 48 49 51 52				
8	Γ/	A/C_COMP [With VK engine]	44	GR	HORN_RLY [With VK engine]							
8	ď	A/C_COMP [With VQ engine]	44	ΡΠ	HORN RLY [With VQ engine]	Termina	Terminal Color Of	Cincel Manue [Canadification]	Conr	Connector No.	E41	
10	>	ECM_BAT	45	σ	HORN SW	No.	Wire	oignai Name [opecification]			ATTAC A CONTRACTOR AND IN CONTRACT A CONTRACTOR OF A	
11	в	PGND	46	BR	START_CONT	-	L/W	-	5			
12	9	ABS_ECU				2	SHIELD		Conr	Connector Type	SAZ30FB-SJZ4-U	
13	GR	FUEL_PUMP [With VQ engine]				3	L/B	-	[			
13	W	FUEL_PUMP [With VK engine]	Connector No.		E7	4	SHIELD	-	l			
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18	×	IGN_SIGNAL	COLLECT		ROOM	9	w	1		<i>\$</i>	5 15 15 15 18 19 20 5	
22	BR	ALT-C	Connector Type		TH20FW-CS12-M4	7	E/B	1				
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23	ß	DTRL_RLY [With VK engine]	£			10	9	1				
24	0	MS_DODH	in the			=	M	- [With VK engine]			]]	
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31	ВR	NP_SW [With VK engine]				5		'		B/W	ECU(GND)	
31	×	NP_SW [With VQ engine]				4	P	- [With VK engine]		8	MOTOR(GND)	
36	GR	F/LIGN_SW				14	>	<ul> <li>[With VQ engine]</li> </ul>		~	SOLENOID(POWER)	
			Terminal	Color Of	C [C	15	SB	-	7	9	MOTOR(POWER)	
			No.	Wire	oligual reame concernori	16	GR	-		5 SB	STOP LAMP SW	
			48	W	DTRL_DEICER	19	w	-	-	6 Y	CANM2(-)	
			51	0	WASH_MTR	20	BR	-		M	Rr-LH SEN(SIGNAL)	
			52	9	INJECTOR_#1	21	σ	-		8		
			53	-	FR_WIPER_HI	22	0	-	6	BR		
			54	Р	FR_WIPER_LO	23	-		10	8	Fr-RH SEN(POWER)	



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O.1.         O.1.         O.1.           L/Y         - (Web. VO engine)           P         - (Web. VO engine)           M/L         - (Web. VO engine)           M/L         - (Web. VO engine)           M/L         - (Web. VO engine)           D         - (Web. VO engine)           M/L         - (Web. VO engine)           D-1         - (Web. VO engine)           LG         - (Web. VO engine)           LG         - (Web. VO engine)           O         - (Web. VO engine)           O         - (Web. VO engine)	9	Dr.L         Dr.M. Composition           W.I.         - (Writh Vie engine)           M.I.         - (Writh Vie engine)           D.A.         - (Writh Vie engine)           M.I.         - (Writh Vie engine)           M.I.         - (Writh Vie engine)           SB         - (Writh Vie engine)           O         - (Writh Vie engine)           M         - (Writh Vie engine)           W         - (Writh Vie engine)           W         - (Writh Vie engine)           W         - (Writh Vie engine)		
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# **A/T CONTROL SYSTEM**

#### < WIRING DIAGRAM >

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A/T CO Connector No.	SONTF	A/T CONTROL SYSTEM	Connector No.		F301	Connector No.	tor No.	W6	09	В	,
Connector Name		WIRE TO WIRE	Connector Name		TCM (TRANSMISSION CONTROL MODULE)	Connec	Connector Name	WIRE TO WIRE	61	m	-
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									80	9	
	ľ								81	٦	T
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4		- [With VK engine]		'	CAN-H	~	8		98		
4	œ	- [With VQ enzine]	4	,	K LINE	4	51		87	>	
ß	œ	- [With VQ engine]	2	,	GND	ŝ	w	,	88	>	,
ß	GR	- [With VK engine]	9	'	VIGN	2	BG	'	88	ΓC	1
2	ГG	1	~	'	REV LAMP RLY	~	G	'	90	BG	1
8	7	1	8	'	CAN-L	6	~	-	91	W	1
6	SB	- [With VQ engine]	6	-	START RLY	10	w	-	92	BG	1
6	W	- [With VK engine]	10	1	GND	11	R	-	93	G	
10	BR	<ul> <li>[With VK engine]</li> </ul>				12	>	-	94	Y	-
10	>	- [With VQ engine]				13	LG	Т	95	W	1
Ξ	_	-	Connector No.	r No.	M3	14		-	97	SB	-
12	٩	1	Connector Name		FIISE RI OCK (,I/B)	15	>	-	98	ч	1
13	>	T	200			16	8	-	66	w	T
14	B		Connector Type		NS12FW-CS	1	GR	1	100	-1	1
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17	ß	T				21	ВR	T	Connec	Connector No.	M20
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# A/T CONTROL SYSTEM

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	+	104	æ	г	147	m	T	185	٩	<ul> <li>[With BOSE system]</li> </ul>
	-	105	œ	1	148	_		185	>	<ul> <li>[Without BOSE system]</li> </ul>
	_	107	~		149	æ		186	æ	
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	٩	117	۵	<ul> <li>[With VK engine]</li> </ul>	158	œ	,	194	BR	,
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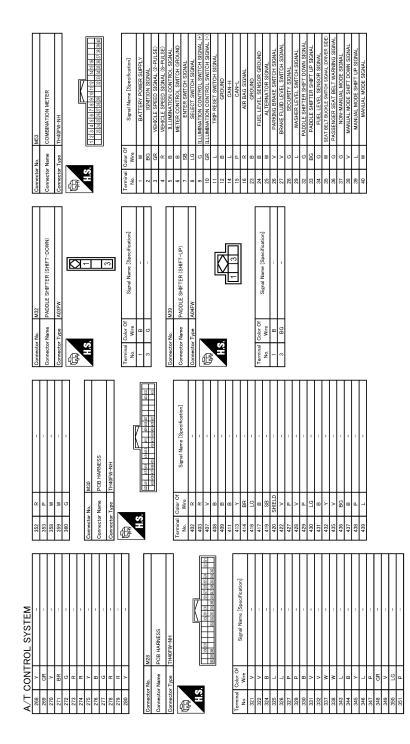
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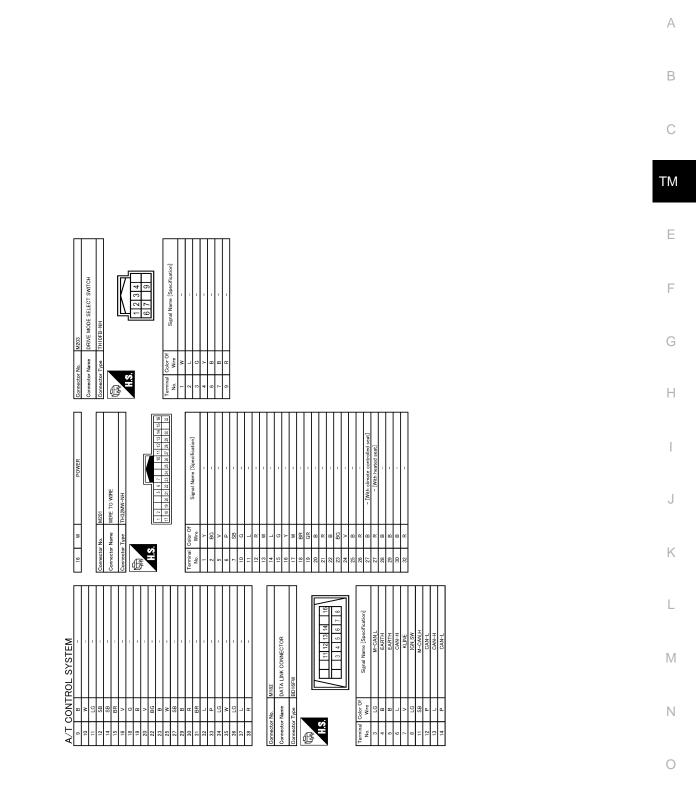
# A/T CONTROL SYSTEM

# [7AT: RE7R01A]

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	BCM (BODY CONTROL MODULE)	TH40FB-NH				1 2 3 4 5 6 8 9 11 14 18 19 20 14 61 62 54 56 8 9 11 14 18 19 20				Signal Name [Specification]	DD WINDOW DEFC DI V DONT	HK WINDOW DEFG RLY CONT	COMBLEW INFUL 5	COMBLOW INFLICE	COMBI SW INPUT 2	COMBI SW INPUT 1	POWER WINDOW SW COMM	STOP LAMP SW 1	RAIN SENSOR SERIAL LINK	OPTICAL SENSOR	DIMMER SIGNAL	SENSOR PWR SPLY RECEIVER / SENSOR GND	RECEIVER PWR SPLY	KYLS ENT RECEIVER COMM	NATS ANT AMP.	KYLS ENT RECEIVER RSSI	DONGLE LINK	NATS ANT AMP.	I-KEY IDENTIFICATION	HAZARD SW	TR LID OPNR SW	DR DOOR UNLK SENSOR	COMBI SW OUTPUT 5	COMBI SW OUTPUL 4	COMBLSW UUTPUL 3	COMBLSW OUTPUT 1	P POSITION	CAN-H	CAN-L			
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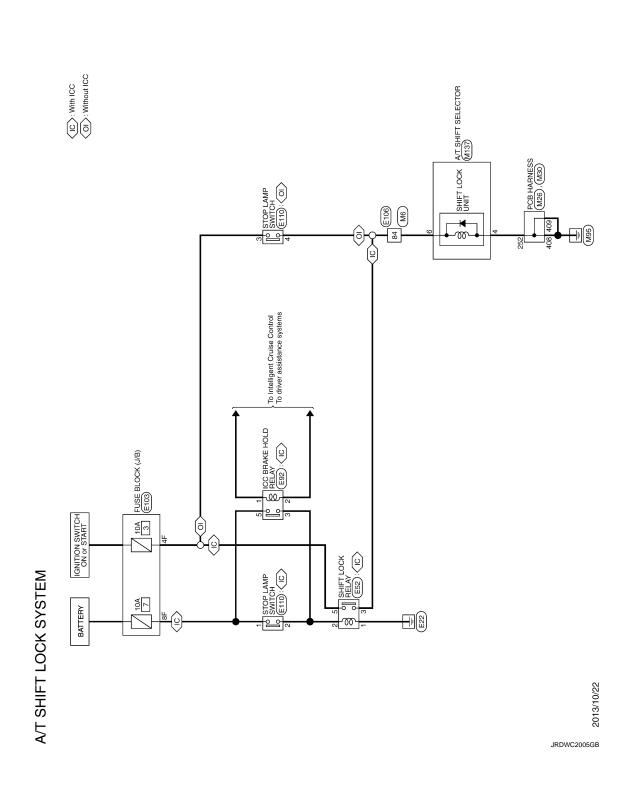
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# A/T SHIFT LOCK SYSTEM

Wiring Diagram

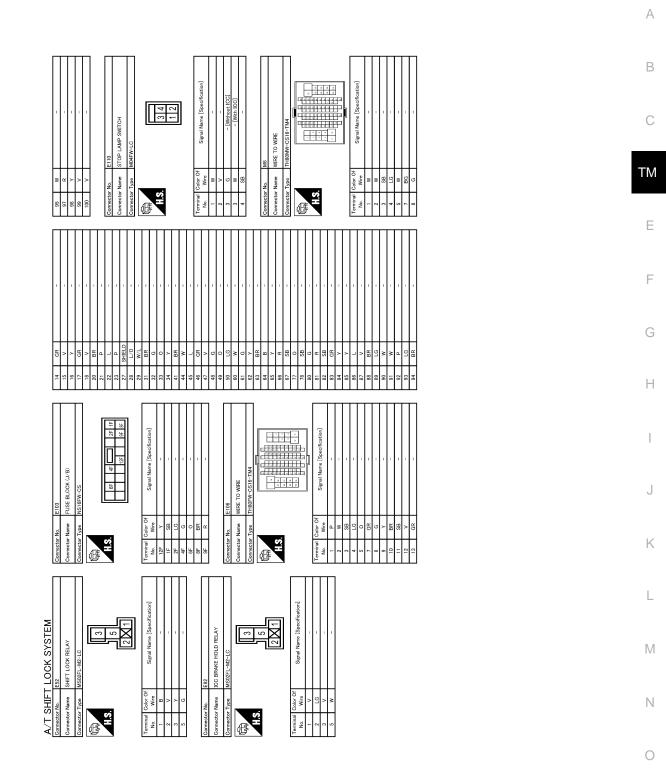
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[7AT: RE7R01A]



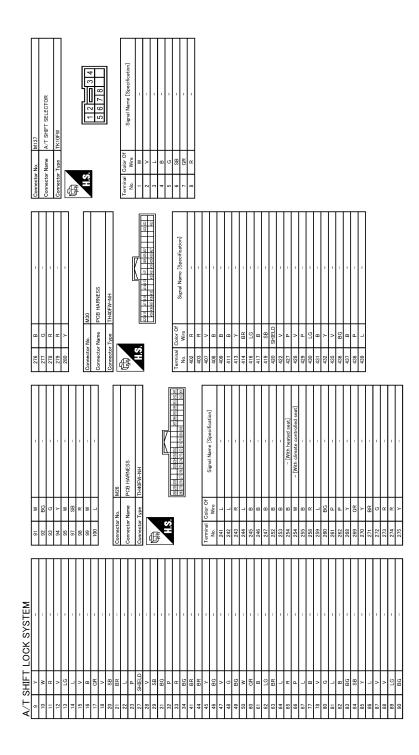
# A/T SHIFT LOCK SYSTEM

# [7AT: RE7R01A]



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Work Flow	INFOID:000000010098809
1.OBTAIN INFORMATION ABOUT SYMPTOM	
Refer to <u>TM-94</u> , " <u>Diagnostic Work Sheet</u> " and interview the customer to o (conditions and environment when the malfunction occurred) as much as poin the vehicle.	
>> GO TO 2.	
2. СНЕСК DTC	
<ol> <li>Before checking the malfunction, check whether any DTC exists.</li> <li>If DTC exists, perform the following operations.</li> <li>Record the DTC and freeze frame data. (Print out the data using CON Order Sheet.)</li> <li>Erase DTCs.</li> </ol>	SULT and affix them to the Work
<ul> <li>Check the relationship between the cause that is clarified with DTC described by the customer. <u>TM-171</u>, "Symptom Table" is effective.</li> <li>Check the information of related service bulletins and others also.</li> </ul>	and the malfunction information
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.	
<b>3.</b> REPRODUCE MALFUNCTION SYMPTOM	
Also investigate whether the symptom is a fail-safe or normal operation. Refe When a malfunction symptom is reproduced, the question sheet is effective. <u>Sheet"</u> . Verify the relationship between the symptom and the conditions in which the tomer occurs.	Refer to TM-94, "Diagnostic Work
>> 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. Refe When a malfunction symptom is reproduced, the question sheet is effective. Sheet".	
Verify the relationship between the symptom and the conditions in which the tomer occurs.	malfunction described by the cus-
>> GO TO 6.	
5. PERFORM "DTC CONFIRMATION PROCEDURE"	
Perform "DTC CONFIRMATION PROCEDURE" of the appropriate DTC to cl Refer to <u>TM-77</u> , " <u>DTC Inspection Priority Chart</u> " when multiple DTCs are co order for performing the diagnosis. <b>NOTE:</b>	
If no DTC is detected, refer to the freeze frame data.	
<u>Is any DTC detected?</u> YES >> GO TO 7. NO >> Check according to <u>GI-47, "Intermittent Incident"</u> .	

# DIAGNOSIS AND REPAIR WORK FLOW

# Work Flow

< BASIC INSPECTION >

**BASIC INSPECTION** 

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# DIAGNOSIS AND REPAIR WORK FLOW

#### < BASIC INSPECTION >

[7AT: RE7R01A]

Use <u>TM-171, "Symptom Table"</u> 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**

#### 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.

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#### **KEY POINTS**

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

#### 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]

			Questi	ion Sheet				
Symptoms		□ Vehicle does	not move (D)	Any position	Particular position	l	)	
		□ No upshift 6GR □ 6GR -		$\Box$ 2GR $\rightarrow$ 3GF	$R  \Box \ 3GR \rightarrow 4GR$	$R \square 4GR \rightarrow 50$	GR □ 5GR –	÷
		□ No downshift 2GR □ 2GR -		$\mathbf{\widehat{GR}}  \Box \ \mathbf{6GR} \rightarrow 50$	$GR  \Box  5GR \to 4C$	$GR  \Box  4GR \rightarrow$	3GR □3GR	$\rightarrow$
		Lock-up mal	function					
		□ Shift point to	o high or too low					
		□ Shift shock c	or slip					
		□ Noise or vibr	ation					
		No kick dowr	า					
		□ No pattern se	elect					
		□ Others						
Frequency		□ All the time	□ Under certair	n conditions	□ Sometimes (	times a d	ay)	
Weather conditions		□ Not affected						
	Weather	□ Fine	□ Clouding	□ Raining	□ Snowing	D Other (		)
	Temp.	□ Hot	□ Warm	Cool	□ Cold	□ Temp. [App °F)]	rox. °C (	
	Humidity	🗆 High	□ Middle	□ Low				
Transmission cond	tions	□ Not affected						
		Cold	During warm	-up	□ After warm-u	р		
		□ Engine spee	d (	rpm)				
Road conditions		□ Not affected						
		□ In town	□ In suburbs	□ Freeway	□ Off road (Up /	/ Down)		
Driving conditions		□ Not affected						
		□ At starting	□ While idling	□ While engine	e racing	□ At racing	☐ While cru ing	is-
		□ While accele	rating	□ While decele	erating	While turnir	ng (Right / Left	t)
		□ Vehicle spee	d [	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

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

#### Special Repair Requirement

INFOID:000000010098812

INFOID:000000010098811

# **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-71, "Tire Air Pressure".

>> GO TO 2.

# 2.PERFORM CALIBRATION

#### (I) 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

- 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 <u>BRC-52, "DTC Index"</u>.
- NO >> Calibration end.

#### ADDITIONAL SERVICE WHEN REPLACING CONTROL VALVE & TCM [7AT: RE7R01A] < BASIC INSPECTION > ADDITIONAL SERVICE WHEN REPLACING CONTROL VALVE & TCM А Description INFOID:000000010098813 Decel G sensor calibration must be performed when replacing A/T assembly. В Special Repair Requirement INFOID:0000000010098814 1.PREPARATION BEFORE CALIBRATION PROCEDURE С 1. Park the vehicle on a flat road. Adjust pressure in all tires to the specified value. Refer to WT-71, "Tire Air Pressure". 2. ТΜ >> GO TO 2. 2.PERFORM CALIBRATION Ε (P) With CONSULT 1. Turn ignition switch ON. **CAUTION:** F Never start the engine. Select "G SENSOR CALIBRATION" in "Work Support" in "TRANSMISSION". 2. Touch "START". 3. CAUTION: Never give any motion to the vehicle during the calibration. Is "completed" displayed? Н YES >> GO TO 3. NO >> Perform the calibration again. 3. СНЕСК DTC (P) With CONSULT Turn ignition switch OFF and wait 10 seconds or more. 1. 2. Turn ignition switch ON. 3. Select "Self Diagnostic Results" in "ABS". Is "C1145" or "C1146" detected? YES >> Refer to BRC-52, "DTC Index". Κ NO >> Calibration end. L

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# **CALIBRATION OF DECEL G SENSOR**

< BASIC INSPECTION >

# CALIBRATION OF DECEL G SENSOR

# Description

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 <u>BRC-71, "Description"</u>.

Special Repair Requirement

INFOID:000000010098816

#### 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 <u>BRC-71, "Description"</u>.

**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-71. "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

#### (I) 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 <u>BRC-52, "DTC Index"</u>.
- NO >> Calibration end.

INFOID:000000010098815

# A/T FLUID COOLER

#### < BASIC INSPECTION >

# A/T FLUID COOLER

# Cleaning

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.

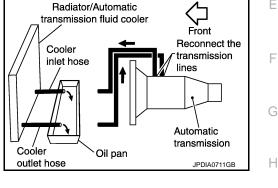
Debris, if present, may build up as ATF enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

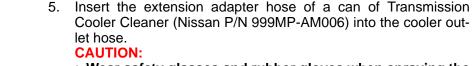
# CLEANING PROCEDURE

- 1. Position an oil pan under the A/T inlet and outlet cooler hoses.
- 2. Identify the inlet and outlet fluid cooler hoses.
- Disconnect the A/T fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or by-pass valve. NOTE:

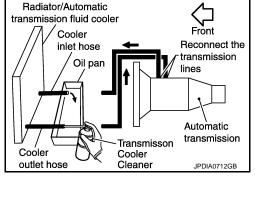
Replace the cooler hoses if rubber material from the hose remains on the tube fitting.

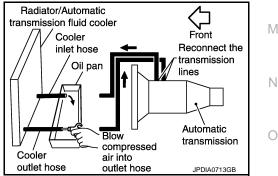
4. Allow any ATF that remains in the cooler hoses to drain into the oil pan.





- 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.
- 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.
- 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".







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#### **DIAGNOSIS PROCEDURE**

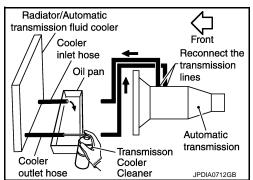
#### NOTE:

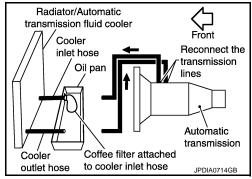
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

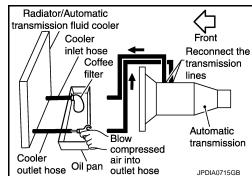
- 1. Position an oil pan under the A/T inlet and outlet cooler hoses.
- 2. Clean the exterior and tip of the cooler inlet hose.
- Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

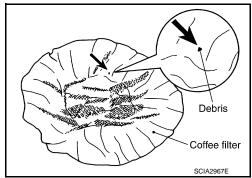
#### CAUTION:

- 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".

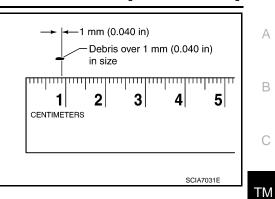
#### INSPECTION PROCEDURE

- 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 >

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-15, "Exploded View" (VQ37VHR) or CO-43, "Exploded View" (VK56VD).



### Inspection

INFOID:0000000010098820

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

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[7AT: RE7R01A]

# STALL TEST

#### < BASIC INSPECTION >

# STALL TEST

### Inspection and Judgment

#### INSPECTION

- 1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
- 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-324, "Stall Speed".

- 7. Shift the selector lever to "N" position.
- Cool down the ATF.
   CAUTION:
   Run the engine at idle for at least 1 minute.
- 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"		
	Н	0	<ul><li>Low brake</li><li>1st one-way clutch</li><li>2nd one-way clutch</li></ul>	
Stall speed	0	Н	<ul><li>Reverse brake</li><li>1st one-way clutch</li><li>2nd one-way clutch</li></ul>	
	L	L	Engine and torque converter one-way clutch	
	Н	Н	Line pressure low	

O: Stall speed within standard value position

H: Stall speed higher than standard value

L: Stall speed lower than standard value

Stall test standard value position

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

INFOID:000000010098821

[7AT: RE7R01A]

# < BASIC INSPECTION >

# **A/T POSITION**

# Inspection and Adjustment

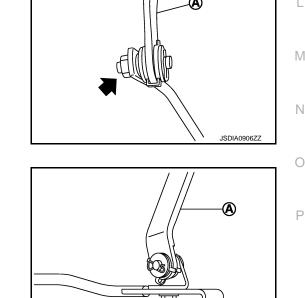
#### INSPECTION

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

In addition, a set shift position must be changed when the selector lever is shifted to the "+" or "-" side in J the manual mode. (Only while driving.)

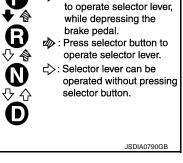
#### ADJUSTMENT

1. Loosen nut ( • 2WD



AWD (VQ37VHR models)

TM-103



: Press selector button



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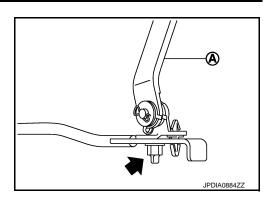
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JPDIA0885ZZ

INFOID:000000010098822

#### < BASIC INSPECTION >

• AWD (VK56VD models)



- 2. Place manual lever and selector lever in "P" position.
- While pressing lower lever (A) toward rear of vehicle (in "P" position direction), tighten nut to specified torque. Refer to <u>TM-184, "2WD : Exploded View"</u> (2WD) or <u>TM-186, "AWD : Exploded View"</u> (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).

# DTC/CIRCUIT DIAGNOSIS U0100 LOST COMMUNICATION (ECM A)

DTC Logic

# DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible causes	С		
U0100	Lost Communication With ECM/PCM A	When the ignition switch is ON, TCM is un- able to receive the CAN communications signal from ECM continuously for 2 sec- onds or more.	ECM     Harness or connector     (CAN communication line is open or     shorted)	ТМ		
DTC COI	DTC CONFIRMATION PROCEDURE					
1.PREP/	ARATION BEFORE WORK	<				
	"DTC CONFIRMATION F econds, then perform the		n ignition switch OFF and wait for at	F		
>> GO TO 2. 2.PERFORM DTC CONFIRMATION PROCEDURE						
<ul> <li>With CONSULT</li> <li>Start the engine and wait for at least 5 seconds.</li> <li>Check DTC.</li> </ul>						
With GST Follow the procedure "With CONSULT". <u>Is "U0100" detected?</u>						
YES >> Go to <u>TM-105, "Diagnosis Procedure"</u> . NO >> INSPECTION END						
Diagnosis Procedure						
For the diagnosis procedure, refer to LAN-24, "Trouble Diagnosis Flow Chart".						
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#### < DTC/CIRCUIT DIAGNOSIS >

# U0300 CAN COMMUNICATION DATA

# Description

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

### DTC Logic

INFOID:000000010098826

INFOID-000000010098827

INFOID:000000010098825

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
U0300	Internal Control Module Soft- ware Incompatibility	When the amount of data trans- mitted 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

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

#### Is "U0300" detected?

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

#### Diagnosis Procedure

**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

#### (I) With CONSULT

- T. 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.

#### < DTC/CIRCUIT DIAGNOSIS >

# **U1000 CAN COMM CIRCUIT**

# Description

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 con-С nected 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

#### 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> <li>Harness or connectors (CAN communication line is open or shorted.)</li> <li>TCM</li> </ul>
OTC CONFIRMATION F	ROCEDURE		
1.PRECONDITIONING			
		conducted, always turn igni	tion switch OFF and wait at
least 10 seconds before pe	erforming the next test.		
>> GO TO 2.			
2. СНЕСК DTC DETECTI	ON		
With CONSULT			
<ol> <li>Start the engine.</li> <li>Run engine for at leas</li> </ol>	t 2 consecutive seconds at	idle speed.	
3. Perform "Self Diagnostic Results" in "TRANSMISSION".			
Is "U1000" detected? YES >> Go to TM-107	, "Diagnosis Procedure".		
NO >> INSPECTION			
Diagnosis Procedure	)		INFOID:000000010098830
Go to LAN-24, "Trouble Diagnosis Flow Chart".			

INFOID:000000010098829

[7AT: RE7R01A]

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# P0615 STARTER RELAY

# Description

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

# DTC Logic

INFOID:000000010098832

INFOID:000000010098833

INFOID:000000010098831

#### 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> <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

- T. 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-108, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

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			Condition	Voltage (Approx)
Connector	Terminal	-	Condition	Voltage (Approx.)
E5	31	Ground	Selector lever in "P" and "N" positions.	Battery voltage
Eb			Selector lever in other positions.	0 V

#### Is the inspection result normal?

YES >> Check starter relay circuit. Refer to <u>STR-8, "Wiring Diagram"</u>.

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]

F61       9       E5       31       Existed         he inspection result normal?       ES       > GO TO 3.       > > Repair or replace damaged parts.          CHECK HARNESS BETWEEN A/T ASSEMBLY AND IPDM E/R (PART 2)       ack the continuity between A/T assembly vehicle side harness connector terminal and ground.         A/T assembly vehicle side harness connector       Continuity         Connector       Terminal       Ground         F61       9       Not existed         he inspection result normal?       ES       > GO TO 4.         D       >> Repair or replace damaged parts.       Centinuity         CHECK JOINT CONNECTOR       Remove joint connector.       Continuity         Remove joint connector side       TCM harness connector side       Continuity         Y assembly harness connector side       TCM harness connector side       Continuity         9       9       Existed       Pe inspection result normal?         ES       >> GO TO 5.       >> Repair or replace damaged parts.       Check INTERMITTENT INCIDENT         er to Gi-47. "Intermittent Incident".       he inspection result normal?       Existed         S       >> Replace control valve & TCM. Refer to TM-191. "Exploded View".       Existed		de harness connect	Conne	ctor Te	rminal	nnector Continuity	
he inspection result normal?         ES       >> GO TO 3.         O       >> Repair or replace damaged parts.         CHECK HARNESS BETWEEN A/T ASSEMBLY AND IPDM E/R (PART 2)         eck the continuity between A/T assembly vehicle side harness connector terminal and ground.         A/T assembly vehicle side harness connector         Continuity         Contector         Terminal         Ground         Continuity         F61         9         he inspection result normal?         ES         S> >> GO TO 4.         O         O         Remove joint connector.         Reform result normal?         ES         SO TO 4.         O         O         Remove joint connector.         Refer to <u>TM-191. "Exploded View"</u> .         Check the continuity between joint connector terminals.         A/T assembly harness connector side         Terminal         Terminal         Yes         9       9         9       9         S       > Go TO 5.         O       >> Repair or replace damaged parts.         CHECK INTERMITTENT INCIDENT <t< th=""><th></th><th></th><th></th><th></th><th></th><th>Existed</th></t<>						Existed	
ES       >> GO TO 3.         O       >> Repair or replace damaged parts.         CHECK HARNESS BETWEEN A/T ASSEMBLY AND IPDM E/R (PART 2)         eck the continuity between A/T assembly vehicle side harness connector terminal and ground.         A/T assembly vehicle side harness connector         Gonnector       Terminal         Ground       Continuity         F61       9         Not existed         he inspection result normal?         ES       >> GO TO 4.         O       >> Repair or replace damaged parts.         CHECK JOINT CONNECTOR         Remove joint connector. Refer to <u>TM-191, "Exploded View"</u> .         Check the continuity between joint connector terminals.         A/T assembly harness connector side       TCM harness connector side         Continuity       Terminal       Continuity         et minal       Terminal       Continuity         A/T assembly harness connector side       TCM harness connector side       Continuity         ES       > GO TO 5.       O       > Repair or replace damaged parts.         CHECK INTERMITTENT INCIDENT       Fer to GI-47, "Intermittent Incident".       Effect or TM-191, "Exploded View".         ES       >> Replace control valve & TCM. Refer to TM-191, "Exploded View".       Existed	-	-				Exictor	
A/T assembly vehicle side harness connector       Continuity         Connector       Terminal       Ground       Continuity         F61       9       Not existed         he inspection result normal?       ES       >> GO TO 4.       Not existed         O       >> Repair or replace damaged parts.       CHECK JOINT CONNECTOR       Check the continuity between joint connector terminals.         A/T assembly harness connector side       TCM harness connector side       Continuity         Y       9       9       Existed         he inspection result normal?       ES       >> GO TO 5.       Continuity         S       >> GO TO 5.       So To 7.       Check INTERMITTENT INCIDENT         fer to GI-47, "Intermittent Incident".       Line inspection result normal?       ES         S       >> Replace control valve & TCM. Refer to TM-191, "Exploded View".       Exploded View".	ES >> GO TO 3. O >> Repair or re CHECK HARNESS	eplace damageo BETWEEN A/T	ASSEMBLY AND			around	
Connector         Terminal         Ground         Continuity           F61         9         Not existed         Not existed           the inspection result normal?         ES         >> GO TO 4.         Not existed           O         >> Repair or replace damaged parts.         CHECK JOINT CONNECTOR         Check thouse in the continuity between joint connector terminals.           A/T assembly harness connector side         TCM harness connector side         Continuity           9         9         Existed           the inspection result normal?         ES         >> GO TO 5.           O         >> Repair or replace damaged parts.         Continuity           1         Terminal         Continuity           9         9         Existed           the inspection result normal?         ES         >> GO TO 5.           O         >> Repair or replace damaged parts.         CHECK INTERMITTENT INCIDENT           fer to GI-47. "Intermittent Incident".         the inspection result normal?         ES           ES         >> Replace control valve & TCM. Refer to TM-191, "Exploded View".         EXploded View".			-			ground	
F61       9       Not existed         the inspection result normal?       (ES >> GO TO 4.       (O >> Repair or replace damaged parts.       (ES = Continuity)         IO >> Repair or replace damaged parts.       (CHECK JOINT CONNECTOR       (CHECK JOINT CONNECTOR       (Continuity)         Remove joint connector. Refer to TM-191, "Exploded View".       (Continuity)       (Continuity)         A/T assembly harness connector side       TCM harness connector side       Continuity)         9       9       (Continuity)       (Continuity)         9       9       (Continuity)       (Continuity)         10       >> Repair or replace damaged parts.       (Continuity)       (Continuity)         (ES >> GO TO 5.       (Conto >> Repair or replace damaged parts.       (CHECK INTERMITTENT INCIDENT)       (CHECK INTERMITTENT INCIDENT)         (Fer to GI-47. "Intermittent Incident".       (Check inspection result normal?)       (Check inspection result normal?)       (Check inspection result normal?)         (ES >> Replace control valve & TCM. Refer to TM-191, "Exploded View".       (Check inspection result normal?)       (Check inspection result normal?)				Ground		Continuity	
the inspection result normal?         (ES >> GO TO 4.         IO >> Repair or replace damaged parts.         .CHECK JOINT CONNECTOR         Remove joint connector. Refer to TM-191, "Exploded View". Check the continuity between joint connector terminals.         A/T assembly harness connector side       Continuity         Yerminal       Terminal         9       9         9       9         Existed         the inspection result normal?         'ES >> GO TO 5.         IO       >> Repair or replace damaged parts.         .CHECK INTERMITTENT INCIDENT         Offer to GI-47. "Intermittent Incident".         the inspection result normal?         'ES >> Replace control valve & TCM. Refer to TM-191, "Exploded View".				Ground		Not existed	
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Terminal       Terminal       Continuity         9       9       Existed         10       >> Repair or replace damaged parts.       Image: CHECK INTERMITTENT INCIDENT         effer to GI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT         effer to GI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT         effer to GI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT         effer to GI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT         effer to SI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT         effer to SI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT         effer to SI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT         effer to SI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT         effer to SI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT         effer to SI-47. "Intermittent Incident".       Image: CHECK INTERMITTENT INCIDENT	CHECK JOINT CON Remove joint conne	NECTOR ector. Refer to	TM-191, "Explode				
Terminal       Terminal         9       9         the inspection result normal?         'ES       >> GO TO 5.         IO       >> Repair or replace damaged parts.         .CHECK INTERMITTENT INCIDENT         effer to GI-47. "Intermittent Incident".         the inspection result normal?         'ES       >> Replace control valve & TCM. Refer to TM-191, "Exploded View".	A/T assembly harness cc	onnector side	TCM harness co	onnector side	0	optipuitu	
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<ul> <li>YES &gt;&gt; GO TO 5.</li> <li>NO &gt;&gt; Repair or replace damaged parts.</li> <li>CHECK INTERMITTENT INCIDENT</li> <li>Peter to GI-47. "Intermittent Incident".</li> <li>the inspection result normal?</li> <li>YES &gt;&gt; Replace control valve &amp; TCM. Refer to TM-191, "Exploded View".</li> </ul>	9		9			Existed	
	O >> Repair or re CHECK INTERMITT fer to <u>GI-47, "Intermi</u> he inspection result ES >> Replace co	TENT INCIDENT ittent Incident" normal? ontrol valve & TC	CM. Refer to <u>TM-1</u>	91, "Exploded Vie	<u>v"</u> .		

## **P0705 TRANSMISSION RANGE SENSOR A**

#### < DTC/CIRCUIT DIAGNOSIS >

## P0705 TRANSMISSION RANGE SENSOR A

## **DTC Logic**

INFOID:000000010098834

#### 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> <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-110, "Diagnosis Procedure".

NO >> INSPECTION END

### **Diagnosis** Procedure

INFOID:000000010098835

### **1.**CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u>.

NO >> Repair or replace damaged parts.

## P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

## P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

## DTC Logic

INFOID:000000010098836

[7AT: RE7R01A]

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
		TCM judges that the A/T fluid temperature is $-40^{\circ}$ C (- $40^{\circ}$ F) or less continuously for 5 seconds while driving at 10 km/h (7 MPH) or more.	<ul> <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 while driving at 10 km/h (7 MPH) or more.	<ul> <li>Harness or connectors (Sensor circuit is short.)</li> <li>A/T fluid temperature sensor</li> </ul>
P0710	Transmission Fluid Tempera- ture Sensor A Circuit	<ul> <li>The following conditions are maintained for 5 minutes after the completion of engine diagnosis P0111, P0116, and P0196:</li> <li>A/T fluid temperature – Engine coolant temperature &gt; 33°C (91.4°F)</li> <li>A/T fluid temperature – Engine coolant temperature &lt; -19°C (-2.2°F)</li> </ul>	<ul> <li>Harness or connectors (Sensor circuit is stuck.)</li> <li>A/T fluid temperature sensor</li> </ul>
		A/T fluid temperature does not rise to $20^{\circ}$ C ( $68^{\circ}$ F) after driving for a certain period of time with the TCM-received fluid temperature sensor value between $-40^{\circ}$ C ( $-40^{\circ}$ F) and $20^{\circ}$ C ( $68^{\circ}$ F).	A/T fluid temperature sen- sor

#### 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.	K
2.CHECK DTC DETECTION (PART 1)	
<ul> <li>With CONSULT</li> <li>Turn ignition switch ON.</li> </ul>	L
<ol> <li>Select "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".</li> <li>Start the engine and maintain the following condition for 10 seconds or more.</li> </ol>	Μ
VHCL/S SE-A/T : 10 km/h (7 MPH) or more	
With GST Follow the procedure "With CONSULT".	Ν
Is "P0710" detected?	
YES >> Go to <u>TM-112, "Diagnosis Procedure"</u> . NO >> GO TO 3.	0
<b>3.</b> CHECK A/T FLUID TEMPERATURE SENSOR FUNCTION	_
<ul> <li>With CONSULT</li> <li>Turn ignition switch OFF and cool the engine.</li> <li>Turn ignition switch ON.</li> <li>CAUTION:</li> <li>Never start the engine.</li> </ul>	P
<ol> <li>Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".</li> <li>Select "COOL ANT TEMP/S" in "Data Monitor" in "ENGINE".</li> </ol>	

- Select "COOLANT TEMP/S" in "Data Monitor" in "ENGINE".
   Check temporature difference between A/T fluid and engine coolant
- 5. Check temperature difference between A/T fluid and engine coolant.

## TM-111

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## P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

#### With GST

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

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

YES >> Go to TM-112, "Diagnosis Procedure". NO-1 [With CONSULT: "ATF TEMP 1" is 20°C (68°F) or more]>>INSPECTION END NO-2 [With CONSULT: "ATF TEMP 1" is 19°C (66°F) or less]>>GO TO 4. NO-3 (With GST)>>GO TO 4.

### **4.**CHECK DTC DETECTION (PART 2)

#### With CONSULT

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

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

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

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

#### With GST

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

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

#### 4. Check the DTC.

#### Is "P0710" detected?

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

## **Diagnosis Procedure**

## **1.**CHECK INTERMITTENT INCIDENT

#### Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u>.
- NO >> Repair or replace damaged parts.

INFOID:000000010098837

## **P0717 INPUT SPEED SENSOR A**

#### < DTC/CIRCUIT DIAGNOSIS >

DTC DETECTION LOGIC

## P0717 INPUT SPEED SENSOR A

## DTC Logic

[7AT: RE7R01A]

INFOID:000000010098838

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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> <li>Harness or connectors (Sensor circuit is open.)</li> <li>Input speed sensor 1 and/or 2</li> </ul>
TC CONFIRMATION	PROCEDURE		
CAUTION: Always drive vehicle at	a safe sneed		
1.PRECONDITIONING			
	I PROCEDURE" is previously	conducted always turn igni	tion switch OFF and wait at
	performing the next test.	conducted, always tarrigin	
>> GO TO 2.			
2.CHECK DTC DETEC	TION		
With CONSULT  Start the engine.			
	POSI", "GEAR", "VHCL/S SE-A	VT", "CLSD THL POS" and	"ENGINE SPEED" in "Data
Monitor" in "TRANS		for E accordo or more	
CAUTION:	aintain the following conditions		
Keep the same gea	r position.		
NOTE: Driving the vehicle u	phill (increased engine load) v	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 ENGINE SPEED	: OFF : More than 1,500 rpm		
	ostic Results" in "TRANSMISS	NON"	
With GST		JON .	
Follow the procedure "W	ith CONSULT".		
Is "P0717" detected?			
YES >> Go to <u>TM-11</u> NO >> INSPECTIO	<u>3, "Diagnosis Procedure"</u> . N END		
Diagnosis Procedu	le		INFOID:000000010098839
<b>1.</b> CHECK INTERMITTE	INT INCIDENT		
Refer to <u>GI-47, "Intermitt</u>	ent Incident".		
Is the inspection result ne	ormal?		
	trol valve & TCM. Refer to TN	1-191, "Exploded View".	
NO >> Repair or rep	place damaged parts.		

NO >> Repair or replace damaged parts.

## P0720 OUTPUT SPEED SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

## P0720 OUTPUT SPEED SENSOR

## **DTC Logic**

INFOID:000000010098840

[7AT: RE7R01A]

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0720	Output Speed Sensor Circuit	<ul> <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 af- ter the ignition switch is turned ON.)</li> <li>The vehicle speed transmit- ted from the combination meter to TCM does not de- crease despite the 36 km/h (23 MPH) or more of deceler- ation in vehicle speed detect- ed 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> <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

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

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

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

#### With GST

Follow the procedure "With CONSULT".

Is "P0720" detected?

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

## **Diagnosis Procedure**

**1.**CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

INFOID:0000000010098841

P0720 OUTPUT SPEED SENSOR		
< DTC/CIRCUIT DIAGNOSIS >	[7AT: RE7R01A]	
Is the inspection result normal? YES >> GO TO 2. NO >> Repair or replace damaged parts. <b>2.</b> REPLACE OUTPUT SPEED SENSOR AND CHECK DTC		A
1. Replace output speed sensor. Refer to <u>TM-204</u> , " <u>2WD</u> : <u>Exploded View</u> " (2WD) or	TM-235 "Exploded	В
<ul> <li><u>View</u>" (AWD).</li> <li>Perform "DTC CONFIRMATION PROCEDURE". Refer to <u>TM-114</u>, "<u>DTC Logic</u>".</li> <li><u>Is the inspection result normal?</u></li> <li>YES &gt;&gt; INSPECTION END</li> </ul>	<u> באקופעטע</u>	С
NO >> Replace control valve & TCM. Refer to $\underline{\text{TM-191, "Exploded View"}}$ .		ТМ
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## P0725 ENGINE SPEED

## Description

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

DTC Logic

INFOID:000000010098843

INFOID:000000010098842

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0725	Engine Speed Input Circuit	<ul> <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 vehi- cle 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 <u>TM-116. "Diagnosis Procedure"</u>. NO >> INSPECTION END

#### Diagnosis Procedure

### **1.**CHECK DTC OF ECM

#### (I) With CONSULT

- Turn ignition switch ON.
- 2. Perform "Self Diagnostic Results" in "ENGINE".

#### Is any DTC detected?

- YES >> Check DTC detected item. Refer to <u>EC-116, "DTC Index"</u> (VQ37VHR) or <u>EC-1077, "DTC Index"</u> (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 <u>TM-78. "DTC Index"</u>.

#### TM-116

INFOID:000000010098844

P0725 ENGINE SPEED		
< DTC/CIRCUIT DIAGNOSIS >	[7AT: RE7R01A]	
NO >> GO TO 3.		
3. CHECK INTERMITTENT INCIDENT		А
Refer to GI-47, "Intermittent Incident".		
Is the inspection result normal?		В
<ul> <li>YES &gt;&gt; Replace control valve &amp; TCM. Refer to <u>TM-191, "Exploded View"</u>.</li> <li>NO &gt;&gt; Repair or replace damaged parts.</li> </ul>		
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## P0729 6GR INCORRECT RATIO

## Description

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:000000010098846

INFOID:000000010098845

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0729	Gear 6 Incorrect Ratio	The gear ratio is: • 0.923 or more • 0.819 or less	<ul> <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

- "<u>TM-119, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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)

#### (B) 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 ACCELE POSI	: 6th : 0.7/8 or more
VEHICLE SPEED	: 10 km/h (7 MPH) or more
<ol> <li>Keep the current din DITION" to "TESTII CAUTION:</li> </ol>	riving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON- NG".
When "TESTING"	is not indicated on CONSULT for a long time, check "Self Diagnostic Results" in '. When a DTC other than "P0729" is detected, check the DTC. Refer to $\underline{TM-78}$ ,
With GST <ol> <li>Drive vehicle and n</li> </ol>	naintain the following conditions for 2 seconds or more.
Selector lever	: "M" position
Gear position	: 6th
Accelerator pedal o	pening : 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more
2. Check DTC.	
	ON", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0729"
letected?	
YES-1 (OUT OF CON	DITION)>>Perform "Step 3" again.
YES-2 (STOP VEHICL	_E)>>GO TO 4. RESULT NG)>>Go to <u>TM-119, "Diagnosis Procedure"</u> .
YES-4 ("P0729" is det	ected)>>Go to <u>TM-119, "Diagnosis Procedure"</u> .
NO >> GO TO 4.	
<b>1.</b> CHECK SYMPTOM	(PART 2)
I. Stop vehicle.	
	position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.
>> INSPECTIO	ON END
Diagnosis Procedu	Jre INFOID:000000010098847
.CHECK INTERMITT	ENT INCIDENT
Refer to <u>GI-47, "Intermi</u>	ttent Incident".
s the inspection result	normal?
YES >> GO TO 2.	
-	eplace damaged parts.
2. DETECT MALFUNC	TIONING ITEM
Disassemble the A/T as	ssembly to check component parts. Refer to <u>TM-250, "Disassembly"</u> .
	parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-118,
Is the inspection result	normal?
	ntrol valve & TCM. Refer to <u>TM-191, "Exploded View"</u> .
	eplace damaged parts.

## P0730 INCORRECT GEAR RATIO

## Description

- 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:0000000010098849

INFOID:000000010098848

### 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> <li>2346 brake solenoid valve</li> <li>Front brake solenoid valve</li> <li>Input speed sensor 2</li> </ul>

## DTC CONFIRMATION PROCEDURE

#### **CAUTION:**

- "<u>TM-120, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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-120, "Diagnosis Procedure".
- NO >> INSPECTION END

### Diagnosis Procedure

### **1.**CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

INFOID:000000010098850

## **P0730 INCORRECT GEAR RATIO**

< DTC/CIRCUIT DIAGNOSIS >

2.DETECT MALFUNCTIONING ITEM	Δ
Disassemble the A/T assembly to check component parts. Refer to <u>TM-250, "Disassembly"</u> . <b>NOTE:</b>	1
Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to <u>TM-120</u> , <u>"DTC Logic"</u> .	В
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; Replace control valve &amp; TCM. Refer to <u>TM-191, "Exploded View"</u>.</li> <li>NO &gt;&gt; Repair or replace damaged parts.</li> </ul>	С
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## P0731 1GR INCORRECT RATIO

## Description

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:000000010098852

INFOID:000000010098851

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0731	Gear 1 Incorrect Ratio	The gear ratio is: • 5.069 or more • 4.496 or less	<ul> <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

- "<u>TM-123, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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

#### (I) 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)

#### (B) 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.

## TM-122

## 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	
<ol> <li>Keep the current d DITION" to "TESTI CAUTION:</li> </ol>	Iriving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON- NG".	
When "TESTING" "TRANSMISSION <u>"DTC Index"</u> .	is not indicated on CONSULT for a long time, check "Self Diagnostic Results" in ". When a DTC other than "P0731" is detected, check the DTC. Refer to $\underline{TM-78}$ .	(
With GST <ol> <li>Drive vehicle and r</li> </ol>	maintain the following conditions for 2 seconds or more.	T
Selector lever	: "M" position	
Gear position	: 1st	
Accelerator pedal o	opening : 0.7/8 or more	
Vehicle speed	: 10 km/h (7 MPH) or more	
2. Check DTC.		
	ION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0731"	
detected?		
YES-1 (OUT OF CON	IDITION)>>Perform "Step 3" again.	
YES-2 (STOP VEHIC)	DRESULT NG)>>Go to <u>TM-123, "Diagnosis Procedure"</u> .	
	tected)>>Go to TM-123, "Diagnosis Procedure".	
NO >> GO TO 4.	,	
<ol> <li>CHECK SYMPTOM</li> </ol>	(PART 2)	
1. Stop vehicle.		
	" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.	
>> INSPECTI	ON END	
Diagnosis Procedu	UIC 10000000010098853	
<b>1.</b> CHECK INTERMITT	FENT INCIDENT	
Refer to <u>GI-47, "Interm</u> i	ittent Incident".	
s the inspection result		
YES >> GO TO 2.		
NO >> Repair or r	eplace damaged parts.	
2. DETECT MALFUNC	CTIONING ITEM	
Disassemble the A/T as	ssembly to check component parts. Refer to <u>TM-250, "Disassembly"</u> .	
	parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to $\underline{\text{TM-122}}$ ,	
s the inspection result	normal?	
	ontrol valve & TCM. Refer to <u>TM-191, "Exploded View"</u> .	
· · · · · ·	eplace damaged parts.	

## P0732 2GR INCORRECT RATIO

### Description

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:000000010098855

INFOID:000000010098854

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0732	Gear 2 Incorrect Ratio	The gear ratio is: • 3.289 or more • 2.917 or less	<ul> <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

- "<u>TM-125, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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

#### (I) 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.

## TM-124

## P0732 2GR INCORRECT RATIO

#### < DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

GEAR :	2nd
	0.7/8 or more
VEHICLE SPEED :	10 km/h (7 MPH) or more
DITION" to "TESTING	
"TRANSMISSION". <u>"DTC Index"</u> .	s not indicated on CONSULT for a long time, check "Self Diagnostic Results" in When a DTC other than "P0732" is detected, check the DTC. Refer to <u>TM-78.</u>
With GST <ol> <li>Drive vehicle and ma</li> </ol>	intain the following conditions for 2 seconds or more.
Selector lever	: "M" position
Gear position	: 2nd
Accelerator pedal ope	-
Vehicle speed	: 10 km/h (7 MPH) or more
2. Check DTC.	
	N", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0732"
<u>detected?</u>	ITIONIN - Derform "Stop 2" oggin
YES-2 (STOP VEHICLE	ITION)>>Perform "Step 3" again. :)>>GO TO 4.
YES-3 (COMPLETED R	ESULT NG)>>Go to TM-125, "Diagnosis Procedure".
YES-4 ("P0732" is detect	ted)>>Go to TM-125, "Diagnosis Procedure".
NO >> GO TO 4.	
<b>4.</b> CHECK SYMPTOM (F	PART 2)
1. Stop vehicle.	
2. Drive vehicle in "D" p	osition allowing it to shift from 1GR to 7GR and check shift timing and shift shock.
>> INSPECTION	I END
Diagnosis Procedur	e INFOID:000000010098856
.CHECK INTERMITTE	NT INCIDENT
Refer to <u>GI-47, "Intermitte</u>	ent Incident".
s the inspection result no	
YES >> GO TO 2.	
	lace damaged parts.
2. DETECT MALFUNCT	IONING ITEM
	embly to check component parts. Refer to TM-250, "Disassembly".
NOTE: Check the component pa ' <u>DTC Logic"</u> .	arts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-124,
s the inspection result no	ormal?
YES >> Replace cont	rol valve & TCM. Refer to <u>TM-191, "Exploded View"</u> .
	lace damaged parts.

## P0733 3GR INCORRECT RATIO

## Description

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:000000010098858

INFOID:000000010098857

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0733	Gear 3 Incorrect Ratio	The gear ratio is: • 2.103 or more • 1.865 or less	<ul> <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

- "<u>TM-127, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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)

#### (B) 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.

## TM-126

## P0733 3GR INCORRECT RATIO

#### < DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

	: 3rd
	: 0.7/8 or more
	: 10 km/h (7 MPH) or more
<ol> <li>Keep the current dri DITION" to "TESTIN CAUTION:</li> </ol>	iving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON- IG".
	is not indicated on CONSULT for a long time, check "Self Diagnostic Results" in . When a DTC other than "P0733" is detected, check the DTC. Refer to $\underline{\text{TM-78}}$ .
With GST	
1. Drive vehicle and m	aintain the following conditions for 2 seconds or more.
Selector lever	: "M" position
Gear position	: 3rd
Accelerator pedal op	ening : 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more
2. Check DTC.	
	ON", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0733"
detected?	
YES-1 (OUT OF CONL YES-2 (STOP VEHICL	DITION)>>Perform "Step 3" again. E)>>GO TO 4
YES-3 (COMPLETED	RESULT NG)>>Go to <u>TM-127, "Diagnosis Procedure"</u> .
YES-4 ("P0733" is dete	ected)>>Go to TM-127, "Diagnosis Procedure".
NO >> GO TO 4.	
<b>4.</b> 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.
>> INSPECTIC	
Diagnosis Procedu	INFOID:000000010098859
CHECK INTERMITTI	ENT INCIDENT
Refer to <u>GI-47, "Intermit</u>	tent Incident".
s the inspection result r	iormal?
YES >> GO TO 2.	
	place damaged parts.
2. DETECT MALFUNC	TIONING ITEM
	sembly to check component parts. Refer to TM-250, "Disassembly".
NOTE: Check the component p 'DTC Logic".	parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to $\underline{TM-126}$ ,
ls the inspection result n	ormal?
	ntrol valve & TCM. Refer to <u>TM-191, "Exploded View"</u> .
	place damaged parts.

## P0734 4GR INCORRECT RATIO

## Description

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:000000010098861

INFOID:000000010098860

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0734	Gear 4 Incorrect Ratio	The gear ratio is: • 1.453 or more • 1.289 or less	<ul> <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

- "<u>TM-129, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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)

#### (I) With CONSULT

- i. 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]

ACCELE POSI	: 4th : 0.7/8 or more : 10 km/h (7 MPH) or more
<ol> <li>Keep the current dri DITION" to "TESTIN CAUTION: When "TESTING"</li> </ol>	iving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON- NG". is not indicated on CONSULT for a long time, check "Self Diagnostic Results" in
"TRANSMISSION" <u>"DTC Index"</u> .	. When a DTC other than "P0734" is detected, check the DTC. Refer to $TM-78$ .
With GST	
I. Drive vehicle and m	aintain the following conditions for 2 seconds or more.
Selector lever	: "M" position
Gear position	: 4th
Accelerator pedal op	
Vehicle speed	: 10 km/h (7 MPH) or more
. Check DTC.	
<u>"OUT_OF_CONDITI</u> etected?	ON", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0734"
	DITION)>>Perform "Step 3" again.
YES-2 (STOP VEHICL	
YES-3 (COMPLETED	RESULT NG)>>Go to TM-129, "Diagnosis Procedure".
YES-4 ("P0734" is dete NO >> GO TO 4.	ected)>>Go to TM-129. "Diagnosis Procedure".
4	
LCHECK SYMPTOM	PART 2)
<ol> <li>Stop vehicle.</li> <li>Drive vehicle in "D"</li> </ol>	position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.
>> INSPECTIC	N END
Diagnosis Procedu	ro
	INFOID:000000010098862
.CHECK INTERMITTI	ENT INCIDENT
efer to <u>GI-47, "Intermit</u>	tent Incident".
s the inspection result r	
YES >> GO TO 2.	
NO >> Repair or re	place damaged parts.
2.detect malfunc <sup>-</sup>	TIONING ITEM
isassemble the A/T as	sembly to check component parts. Refer to <u>TM-250, "Disassembly"</u> .
<b>IOTE:</b> Check the component p DTC Logic".	parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-128,
s the inspection result r	iormal?
	ntrol valve & TCM. Refer to <u>TM-191, "Exploded View"</u> .
· · · · · ·	place damaged parts.

## P0735 5GR INCORRECT RATIO

## Description

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:000000010098864

INFOID:000000010098863

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0735	Gear 5 Incorrect Circuit	The gear ratio is: • 1.060 or more • 0.940 or less	<ul> <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

- "<u>TM-131, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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)

#### (I) 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.

## TM-130

## **P0735 5GR INCORRECT RATIO**

#### < DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A]

	5th
	0.7/8 or more
	10 km/h (7 MPH) or more
<ol> <li>Keep the current driv DITION" to "TESTINC CAUTION:</li> </ol>	ing status for 2 seconds or more if CONSULT screen changes from "OUT OF CON- G".
	a not indicated on CONSULT for a long time, check "Self Diagnostic Results" in When a DTC other than "P0735" is detected, check the DTC. Refer to $\underline{TM-78}$ ,
With GST	
1. Drive vehicle and ma	intain the following conditions for 2 seconds or more.
Selector lever	: "M" position
Gear position	: 5th
Accelerator pedal oper	ning : 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more
2. Check DTC.	
	N", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0735"
letected?	
YES-1 (OUT OF CONDI	TION)>>Perform "Step 3" again.
YES-2 (STOP VEHICLE YES-3 (COMPLETED R	)>>GO TO 4. ESULT NG)>>Go to <u>TM-131, "Diagnosis Procedure"</u> .
	ted)>>Go to <u>TM-131, "Diagnosis Procedure"</u> .
NO >> GO TO 4.	······································
<b>1.</b> CHECK SYMPTOM (P	YART 2)
1. Stop vehicle.	
	osition allowing it to shift from 1GR to 7GR and check shift timing and shift shock.
>> INSPECTION	1 END
Diagnosis Procedure	e
.CHECK INTERMITTEI	NT INCIDENT
Refer to <u>GI-47, "Intermitte</u>	ent Incident".
s the inspection result no	<u>rmal?</u>
YES >> GO TO 2.	
- ' '	lace damaged parts.
2.DETECT MALFUNCTI	ONING ITEM
	embly to check component parts. Refer to <u>TM-250. "Disassembly"</u> .
<b>IOTE:</b> Check the component pa DTC Logic".	arts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-130,
s the inspection result no	urmal?
•	rol valve & TCM. Refer to <u>TM-191, "Exploded View"</u> .
	lace damaged parts.
- I - · · - F	

## P0740 TORQUE CONVERTER

## DTC Logic

[7AT: RE7R01A]

INFOID:000000010098866

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0740	Torque Converter Clutch Cir- cuit/Open	The torque converter clutch so- lenoid valve monitor value is 0.4 A or less when the torque con- verter clutch solenoid valve command value is more than 0.75 A.	<ul> <li>Harness or connectors (Solenoid valve circuit is open or shorted.)</li> <li>Torque converter clutch sole- noid 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 moreMANU MODE SW: ONGEAR: 2ndVEHICLE 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 <u>TM-132</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000010098867

### **1.**CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u>.
- NO >> Repair or replace damaged parts.

## P0744 TORQUE CONVERTER

## Description

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:000000010098869

## 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> <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 F CAUTION: Always drive vehicle at a			
1.PRECONDITIONING			
If "DTC CONFIRMATION least 10 seconds before p		v conducted, always turn ig	nition switch OFF and wait at
>> GO TO 2.			
2. CHECK DTC DETECT	ION		
3. Drive vehicle and mai <b>NOTE:</b>	SW", "GEAR" and "VEHICL ntain the following conditions hill (increased engine load)	s for 10 seconds or more.	in TRANSMISSION .
	ON		
-	2nd 40 km/h (25 MPH) or more		
4. Perform "Self Diagnos	stic Results" in "TRANSMISS	SION".	
With GST Follow the procedure "With			
Is "P0744" detected?			
	8, "Diagnosis Procedure".		
Diagnosis Procedure			INFOID:000000010098870
<b>1.</b> CHECK INTERMITTEN	IT INCIDENT		
Refer to GI-47, "Intermitte	nt Incident".		
Is the inspection result nor	<u>rmal?</u>		
YES >> GO TO 2. NO >> Repair or repl	ace damaged parts.		
	and a second second		

2. DETECT MALFUNCTIONING ITEM

INFOID:000000010098868

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TN/

Disassemble the A/T assembly to check component parts. Refer to <u>TM-250</u>, "Disassembly". **NOTE:** 

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to <u>TM-133</u>, <u>"DTC Logic"</u>.

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u>.

NO >> Repair or replace damaged parts.

## **P0745 PRESSURE CONTROL SOLENOID A**

#### < DTC/CIRCUIT DIAGNOSIS >

## P0745 PRESSURE CONTROL SOLENOID A

## DTC Logic

[7AT: RE7R01A]

INFOID:0000000010098871

## DTC DETECTION LOGIC

<ul> <li>Harness or connectors (Solenoid valve circuit is open or shorted.)</li> <li>Line pressure solenoid valve</li> </ul>
n ignition switch OFF and wait at
n ignition switch OFF and wait at
n ignition switch OFF and wait at
ANSMISSION".
INFOID:000000010098872

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## P0750 SHIFT SOLENOID A

#### < DTC/CIRCUIT DIAGNOSIS >

## P0750 SHIFT SOLENOID A

## DTC Logic

INFOID:000000010098873

[7AT: RE7R01A]

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0750	Shift Solenoid A	<ul> <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> <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

- 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 "P0750" detected?

YES >> Go to <u>TM-136</u>, "Diagnosis Procedure". NO >> INSPECTION END

### **Diagnosis** Procedure

### **1.**CHECK INTERMITTENT INCIDENT

#### Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to TM-191, "Exploded View".
- NO >> Repair or replace damaged parts.

INFOID:000000010098874

## P0775 PRESSURE CONTROL SOLENOID B

#### < DTC/CIRCUIT DIAGNOSIS >

## P0775 PRESSURE CONTROL SOLENOID B

## DTC Logic

[7AT: RE7R01A]

INFOID:0000000010098875

А

В

## DTC DETECTION LOGIC

P0775       Pressure Control Solenoid B       The input clutch solenoid value in 0.4 A or less or connectors (solenoid value circuit is one or shorted.) always drive vehicle at a safe speed.       • Harness or connectors (solenoid value circuit is open or shorted.)       • Input clutch solenoid value is more intend.)       • Input clutch solenoid value is 0.4 A or less is intend.)       • Input clutch solenoid value is intend.)       • Input clutch solenoid value is more intend.)       • Input clutch solenoid value is more intend.)       • Input clutch solenoid value is intend.)       • Input clutch solenoid value is more intendend.)       • Input clutch solenoid value is intend.)         • Solen CS DE	DTC	Trouble diagnosis name	DTC is detected if	Possible cause	
CAUTION:       E         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.       F         >> GO TO 2.       G         2.CHECK DTC DETECTION       G         If "With CONSULT       H         1. Start the engine.       H         2. Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".       H         3. Drive vehicle and maintain the following conditions for 5 seconds or more.       I         BATTERY VOLT : 9 V or more       J         MANU MODE SW : ON       J         GEAR       : 1st         VHCL/S SE-A/T       : 10 km/h (7 MPH) or more         4. Perform "Self Diagnostic Results" in "TRANSMISSION".       K         With CONSULT".       Ist         select 2       YES       > Go to TM-137. "Diagnosis Procedure".         NO       >> INSPECTION END       M         Diagnosis Procedure       M       M         Refer to GI-47. "Intermittent Incident".       Is the inspection result normal?       N         NO       >> Repair or replace damaged parts.       O	P0775	Pressure Control Solenoid B	monitor value is 0.4 A or less when the input clutch solenoid valve command value is more	(Solenoid valve circuit is open or shorted.)	
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.         Select The engine.       G         2. CHECK DTC DETECTION       H         3. Drive vehicle and maintain the following conditions for 5 seconds or more.       H         BATTERY VOLT : 9 V or more       J         MANU MODE SW : ON       GEAR         GEAR       : 1st         VHCL/S SE-A/T : 10 km/h (7 MPH) or more       J         4. Perform "Self Diagnostic Results" in "TRANSMISSION".       K         B''''''''''''''''''''''''''''''''''''	DTC CONFIRMATION	N 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.       F         >> GO TO 2.       G         2.CHECK DTC DETECTION       G         With CONSULT       H         1. Start the engine.       Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".       H         3. Drive vehicle and maintain the following conditions for 5 seconds or more.       J         BATTERY VOLT :: 9 V or more       J         MANU MODE SW :: ON       GEAR :: 1st         VHCL/S SE-A/T :: 10 km/h (7 MPH) or more       K         4. Perform "Self Diagnostic Results" in "TRANSMISSION".       K         With GST       Follow the procedure "With CONSULT".       L         Is "PO775" detected?       YES       > Ro to TM-137. "Diagnosis Procedure".       M         Diagnosis Procedure       ####################################					E
If "DTC CONFIRMATION PROCEDURE" is previously conducted, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.       G         >> GO TO 2.       G         2.CHECK DTC DETECTION       H         1. Start the engine.       H         2. Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".       I         3. Drive vehicle and maintain the following conditions for 5 seconds or more.       J         BATTERY VOLT :: 9 V or more       J         MANU MODE SW : ON       GEAR :: 1st         VHCL/S SE-A/T :: 10 km/h (7 MPH) or more       K         With GST       Follow the procedure" With CONSULT".         Is "PO775" detected?       L         YES >> Go to <u>TM-137. "Diagnosis Procedure"</u> .       M         NO >> INSPECTION END       M         Diagnosis Procedure       M         Refer to <u>G1-47. "Intermittent Incident"</u> .       N         Is the inspection result normal?       O         YES >> Replace control valve & TCM. Refer to <u>TM-191. "Exploded View"</u> .       O	4	•			
least 10 seconds before performing the next test.       >> GO TO 2.         2.CHECK DTC DETECTION       H         I Start the engine.       H         2. Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".       H         3. Drive vehicle and maintain the following conditions for 5 seconds or more.       J         BATTERY VOLT : 9 V or more       MANU MODE SW : ON         GEAR : 1st       VHCL/S SE-AT : 10 km/h (7 MPH) or more         4. Perform "Self Diagnostic Results" in "TRANSMISSION".       K         With GST       Follow the procedure "With CONSULT".         Is "PO775" detected??       L         YES >> Go to <u>TM-137. "Diagnosis Procedure"</u> .       M         Diagnosis Procedure       M         Refer to <u>GI-47. "Intermittent Incident".       N         Is the inspection result normal?       O         YES &gt;&gt; Replace control valve &amp; TCM. Refer to <u>TM-191, "Exploded View"</u>.       O   </u>					F
>> GO TO 2.       C.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".       IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII			y conducted, always turn igni	ition switch OFF and wait at	Γ
2. CHECK DTC DETECTION <b>With CONSULT H Start the engine. Start the the endot maintain the following conditions for 5 seconds or more. Start the the engine. Start the the procedure "With CONSULT".</b>		performing the next teet.			
B With CONSULT       H         1. Start the engine.       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".       K            With GST        Follow the procedure "With CONSULT".             Is "P0775" detected?        YES >> Go to TM-137. "Diagnosis Procedure".          NO       >> INSPECTION END         Diagnosis Procedure       M         Refer to GI-47. "Intermittent Incident".         Is the inspection result normal?       N         YES       >> Replace control valve & TCM. Refer to TM-191, "Exploded View".         NO       >> Repair or replace damaged parts.	>> GO TO 2.				G
<ul> <li>1. Start the engine.</li> <li>2. Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".</li> <li>3. Drive vehicle and maintain the following conditions for 5 seconds or more.</li> <li>BATTERY VOLT : 9 V or more MANU MODE SW : ON GEAR : 1st VHCL/S SE-A/T : 10 km/h (7 MPH) or more</li> <li>4. Perform "Self Diagnostic Results" in "TRANSMISSION".</li> <li>With GST Follow the procedure "With CONSULT". <ul> <li>Is "P0775" detected?</li> <li>YES &gt;&gt; Go to <u>TM-137</u>, "Diagnosis Procedure".</li> <li>NO &gt;&gt; INSPECTION END</li> </ul> </li> <li>Diagnosis Procedure <ul> <li>A.CHECK INTERMITTENT INCIDENT</li> <li>Refer to GI-47, "Intermittent Incident".</li> <li>Is the inspection result normal?</li> <li>YES &gt;&gt; Replace control valve &amp; TCM. Refer to <u>TM-191</u>, "Exploded View".</li> </ul> </li> </ul>	2.CHECK DTC DETEC	CTION			
<ul> <li>2. Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".</li> <li>3. Drive vehicle and maintain the following conditions for 5 seconds or more.</li> <li>BATTERY VOLT : 9 V or more MANU MODE SW : ON GEAR : 1st VHCL/S SE-A/T : 10 km/h (7 MPH) or more</li> <li>4. Perform "Self Diagnostic Results" in "TRANSMISSION".</li> <li>With GST Follow the procedure "With CONSULT". Is "PO775" detected? YES &gt;&gt; Go to TM-137, "Diagnosis Procedure". NO &gt;&gt; INSPECTION END Diagnosis Procedure A.CHECK INTERMITTENT INCIDENT Refer to GI-47, "Intermittent Incident". Is the inspection result normal? YES &gt;&gt; Replace control valve &amp; TCM. Refer to TM-191, "Exploded View". NO &gt;&gt; Repair or replace damaged parts.</li> </ul>	(P) With CONSULT				Н
"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".         Image: With GST         Follow the procedure "With CONSULT".         Is "P0775" detected?         YES >> Go to TM-137. "Diagnosis Procedure".         NO >> INSPECTION END         Diagnosis Procedure         MRefer to GI-47. "Intermittent Incident".         Is the inspection result normal?         YES >> Replace control valve & TCM. Refer to TM-191. "Exploded View".         NO		VOLT" "MAANUL MODE OM"		A/T" in "Data Manitar" in	
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-ATT :: 10 km/h (7 MPH) or more       K         Image: Second Structure       M         Image: Second Structure <t< td=""><td></td><td></td><td>, "GEAR" and "VHCL/S SE</td><td>-A/1" in "Data Monitor" in</td><td></td></t<>			, "GEAR" and "VHCL/S SE	-A/1" in "Data Monitor" in	
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 <u>TM-137</u> , "Diagnosis Procedure". NO >> INSPECTION END Diagnosis Procedure 1. CHECK INTERMITTENT INCIDENT Refer to <u>GI-47</u> , "Intermittent Incident". Is the inspection result normal? YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u> . NO >> Repair or replace damaged parts.			s for 5 seconds or more.		I
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 <u>TM-137</u> , "Diagnosis Procedure". NO >> INSPECTION END Diagnosis Procedure 1. CHECK INTERMITTENT INCIDENT Refer to <u>GI-47</u> , "Intermittent Incident". Is the inspection result normal? YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u> . NO >> Repair or replace damaged parts.	BATTERY VOLT	:9 V or more			
VHCL/S SE-A/T       : 10 km/h (7 MPH) or more       K         4. Perform "Self Diagnostic Results" in "TRANSMISSION".       K         With GST       Follow the procedure "With CONSULT".       L         Is "P0775" detected?       YES       >> Go to TM-137, "Diagnosis Procedure".       M         NO       >> INSPECTION END       M         Diagnosis Procedure       MFOID:000000010098876       M         1.CHECK INTERMITTENT INCIDENT       N         Refer to GI-47, "Intermittent Incident".       Is the inspection result normal?       O         YES       >> Replace control valve & TCM. Refer to TM-191, "Exploded View".       O         NO       >> Repair or replace damaged parts.       O					J
4. Perform "Self Diagnostic Results" in "TRANSMISSION".       K	-				
With GST         Follow the procedure "With CONSULT".         Is "P0775" detected?         YES       >> Go to TM-137, "Diagnosis Procedure".         NO       >> INSPECTION END         Diagnosis Procedure       INFOLD 000000000000000000000000000000000000					Κ
Follow the procedure "With CONSULT".       L         Is "P0775" detected?       YES >> Go to TM-137. "Diagnosis Procedure".         NO >> INSPECTION END       M         Diagnosis Procedure       INFOLCOMMENT         Diagnosis Procedure       N         Refer to GI-47. "Intermittent Incident".       N         Is the inspection result normal?       YES >> Replace control valve & TCM. Refer to TM-191, "Exploded View".         NO >> Repair or replace damaged parts.       O		nostic Results" in "TRANSMIS	SION".		
YES       >> Go to TM-137, "Diagnosis Procedure".       M         NO       >> INSPECTION END       INFOID:00000010098876         Diagnosis Procedure       INFOID:00000010098876       N         1.CHECK INTERMITTENT INCIDENT       N         Refer to GI-47, "Intermittent Incident".       Is the inspection result normal?       O         YES       >> Replace control valve & TCM. Refer to TM-191, "Exploded View".       O         NO       >> Repair or replace damaged parts.       O		Vith CONSULT".			
NO       >> INSPECTION END       M         Diagnosis Procedure       INFOLD:00000010098876       N         1.CHECK INTERMITTENT INCIDENT       N         Refer to GI-47, "Intermittent Incident".       N         Is the inspection result normal?       YES         YES       >> Replace control valve & TCM. Refer to TM-191, "Exploded View".         NO       >> Repair or replace damaged parts.	Is "P0775" detected?				L
Diagnosis Procedure INFOLD:00000010098876 1.CHECK INTERMITTENT INCIDENT N Refer to GI-47, "Intermittent Incident". Is the inspection result normal? YES >> Replace control valve & TCM. Refer to TM-191, "Exploded View". NO >> Repair or replace damaged parts.					
1.CHECK INTERMITTENT INCIDENT       N         Refer to GI-47, "Intermittent Incident".       Is the inspection result normal?         YES       >> Replace control valve & TCM. Refer to TM-191, "Exploded View".         NO       >> Repair or replace damaged parts.					M
Refer to <u>GI-47, "Intermittent Incident"</u> . <u>Is the inspection result normal?</u> YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u> . NO >> Repair or replace damaged parts.	Diagnosis Procedu	lre		INFOID:000000010098876	
Refer to <u>GI-47, "Intermittent Incident"</u> . <u>Is the inspection result normal?</u> YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u> . NO >> Repair or replace damaged parts.	1.CHECK INTERMITT	ENT INCIDENT			Ν
<u>Is the inspection result normal?</u> YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u> . NO >> Repair or replace damaged parts.					
YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u> . NO >> Repair or replace damaged parts.					
	YES >> Replace co	ntrol valve & TCM. Refer to T	M-191, "Exploded View".		0
P	NO >> Repair or re	eplace damaged parts.			
					Ρ

# P0780 SHIFT

## Description

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:0000000010098878

INFOID:000000010098877

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P0780	Shift Error	<ul> <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 en- gine speed exceeds the pre- scribed speed.</li> </ul>	<ul> <li>Anti-interlock solenoid valv</li> <li>Low brake solenoid valve</li> <li>Hydraulic control circuit</li> </ul>

# DTC CONFIRMATION PROCEDURE

- "<u>TM-138, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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 $\rightarrow$ 4th or 5th $\rightarrow$ 6th $\rightarrow$ 7th

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

#### With GST

Follow the procedure "With CONSULT".

Is "P0780" detected?

YES >> Go to TM-138. "Diagnosis Procedure".

NO >> INSPECTION END

### Diagnosis Procedure

**1.**CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

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YES >> GO TO 2. NO >> Repair or replace damaged parts.	А
2. DETECT MALFUNCTIONING ITEM	
Disassemble the A/T assembly to check component parts. Refer to <u>TM-250, "Disassembly"</u> . <b>NOTE:</b>	В
Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to <u>TM-138</u> , <u>"DTC Logic"</u> .	
<u>Is the inspection result normal?</u> YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u> .	С
NO >> Repair or replace damaged parts.	ТМ

< DTC/CIRCUIT DIAGNOSIS >

## P0795 PRESSURE CONTROL SOLENOID C

## DTC Logic

INFOID:000000010098880

[7AT: RE7R01A]

#### 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> <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 <u>TM-140, "Diagnosis Procedure"</u>. NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000010098881

#### **1.**CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to TM-191, "Exploded View".
- NO >> Repair or replace damaged parts.

## P1705 TP SENSOR

## < DTC/CIRCUIT DIAGNOSIS >

## P1705 TP SENSOR

DTC DETECTION LOGIC

## DTC Logic

[7AT: RE7R01A]

INFOID:000000010098882

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P1705	Accelerator Pedal Position Sensor Signal Circuit	TCM detects the difference be- tween two accelerator pedal po- sition signals received from ECM via CAN communication.	Harness or connectors (Sensor circuit is open or short- ed.)
DTC CONFIRMATION P	ROCEDURE		
.PRECONDITIONING			
f "DTC CONFIRMATION F east 10 seconds before pe	PROCEDURE" is previously erforming the next test.	conducted, always turn igni	tion switch OFF and wait at
>> GO TO 2.			
2. CHECK DTC DETECTI	ON		
	SI" and "VHCL/S SE-A/T" in ntain the following conditions		IISSION".
SLCT LVR POSI	: D		
	: 5 km/h (3 MPH) or more		
•	tic Results" in "TRANSMISS	SION".	
s "P1705" detected?	"Diagnasia Drasadura"		
YES >> Go to <u>TM-141</u> NO >> INSPECTION	<u>, "Diagnosis Procedure"</u> . END		
Diagnosis Procedure	)		INFOID:000000010098883
<b>1.</b> CHECK DTC OF ECM			
<ol> <li>Turn ignition switch Of</li> <li>Perform "Self Diagnos</li> </ol>	N. tic Results" in "ENGINE".		
s any DTC detected?			
	etected item. Refer to EC-11	6, "DTC Index" (VQ37VHR	) or <u>EC-1077, "DTC_Index"</u>
(VK56VD). NO >> GO TO 2.			
2. CHECK DTC OF TCM			
With CONSULT     Perform "Self Diagnostic R	esults" in "TRANSMISSION	».	
s any DTC other than "P1"			
YES >> Check DTC de NO >> GO TO 3.	etected item. Refer to TM-78	<u>, "DTC Index"</u> .	
3. CHECK INTERMITTEN	IT INCIDENT		
Refer to GI-47. "Intermitter	nt Incident"		

Refer to <u>GI-47, "Intermittent Incident"</u>.

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u>.

NO >> Repair or replace damaged parts.

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## P1721 VEHICLE SPEED SIGNAL

### Description

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:000000010098885

INFOID:000000010098884

### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P1721	Vehicle Speed Signal Circuit	<ul> <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 transmitted 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 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 short- ed.)

# DTC CONFIRMATION PROCEDURE

#### • 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-143, "Diagnosis Procedure".

NO >> INSPECTION END

## **P1721 VEHICLE SPEED SIGNAL**

< DTC/CIRCUIT DIAGNOSIS >	[7AT: RE7R01A]
Diagnosis Procedure	INFOID:000000010098886
1. CHECK DTC OF COMBINATION METER	
With CONSULT     Perform "Self Diagnostic Results" in "METER/M&A".     Is any DTC detected?	
YES >> Check DTC detected item. Refer to <u>MWI-44, "DTC Index"</u> . NO >> GO TO 2.	
2.CHECK DTC OF TCM	
With CONSULT     Perform "Self Diagnostic Results" in "TRANSMISSION".	
<u>Is any DTC other than "P1721" detected?</u> YES >> Check DTC detected item. Refer to <u>TM-78, "DTC Index"</u> . NO >> GO TO 3.	
3. CHECK INTERMITTENT INCIDENT	
Refer to <u>GI-47, "Intermittent Incident"</u> .	
<u>Is the inspection result normal?</u> YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u> . NO >> Repair or replace damaged parts.	

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## P1730 INTERLOCK

## Description

Fail-safe function to detect interlock conditions.

## DTC Logic

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P1730	Interlock	The output speed sensor de- tects the deceleration of 12 km/ h (7 MPH) or more for 1 sec- ond.	<ul> <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:**

- "<u>TM-145, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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 <u>TM-145</u>, "Diagnosis Procedure". NO >> INSPECTION END

Judgment of Interlock

Refer to TM-74, "Fail-Safe".

Revision: 2013 November

INFOID:000000010098887

INFOID:000000010098888

INFOID:000000010098889

# P1730 INTERLOCK

DTC/CIRCUIT DIAGNOSIS >	[7AT: RE7R01A]
Diagnosis Procedure	INFOID:000000010098890
CHECK INTERMITTENT INCIDENT	
fer to GI-47, "Intermittent Incident".	
the inspection result normal?	
<ul> <li>/ES &gt;&gt; GO TO 2.</li> <li>NO &gt;&gt; Repair or replace damaged parts.</li> </ul>	
.DETECT MALFUNCTIONING ITEM	
sassemble the A/T assembly to check component parts. Refer to <u>TM-250, "Disas</u> <b>DTE:</b>	<u>ssembly"</u> .
heck the component parts, referring to "Possible cause" in "DTC DETECTION DTC Logic".	LOGIC". Refer to TM-144,
the inspection result normal?	
YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u> .	
NO >> Repair or replace damaged parts.	

#### < DTC/CIRCUIT DIAGNOSIS >

# P1734 7GR INCORRECT RATIO

## Description

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:000000010098892

INFOID:000000010098891

## DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P1734	Gear 7 Incorrect Ratio	The gear ratio is: • 0.822 or more • 0.730 or less	<ul> <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

- "<u>TM-147, "Diagnosis Procedure"</u>" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- 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
<ol> <li>Keep the current driv DITION" to "TESTIN CAUTION:</li> </ol>	ving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-G".
When "TESTING" is	s not indicated on CONSULT for a long time, check "Self Diagnostic Results" in When a DTC other than "P1734" is detected, check the DTC. Refer to $\underline{TM-78}$ .
With GST	
. Drive vehicle and ma	aintain the following conditions for 2 seconds or more.
Selector lever	: "M" position
Gear position	: 7th
Accelerator pedal ope	ening : 0.7/8 or more
Vehicle speed	: 10 km/h (7 MPH) or more
Check DTC.	
OUT OF CONDITIC	N", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P1734"
etected?	
	ITION)>>Perform "Step 3" again.
(ES-2 (STOP VEHICLE	-)>>GO TO 4. RESULT NG)>>Go to <u>TM-147, "Diagnosis Procedure"</u> .
	cted)>>Go to <u>TM-147, "Diagnosis Procedure"</u> .
NO >> GO TO 4.	
CHECK SYMPTOM (I	PART 2)
•	,
With CONSULT Stop vehicle.	
	position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.
>> INSPECTIO	N END
iagnosis Procedu	PC INFOID:0000000010098893
CHECK INTERMITTE	INT INCIDENT
efer to <u>GI-47, "Intermitt</u>	ent Incident".
the inspection result ne	ormal?
YES >> GO TO 2.	
NO >> Repair or rep	place damaged parts.
.DETECT MALFUNCT	IONING ITEM
	embly to check component parts. Refer to TM-250, "Disassembly".
OTE:	
heck the component p DTC Logic".	arts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-146.
the inspection result ne	ormal?
	trol valve & TCM. Refer to <u>TM-191. "Exploded View"</u> .
NO >> Repair or rep	place damaged parts.
; -1	

#### < DTC/CIRCUIT DIAGNOSIS >

# P1815 M-MODE SWITCH

# DTC Logic

INFOID:000000010098894

[7AT: RE7R01A]

#### DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC is detected if	Possible cause
P1815	Manual Mode Switch Circuit	<ul> <li>TCM monitors manual mode, non manual mode, up or down switch signal, and de- tects as irregular when im- possible input pattern occurs 2 second or more.</li> <li>Shift up/down signal of pad- dle shifter continuously re- mains ON for 60 seconds.*</li> </ul>	<ul> <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-148, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

# 1.CHECK INPUT SIGNAL

#### () With CONSULT

- 1. Turn ignition switch ON.
- 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.

INFOID:000000010098895

#### < DTC/CIRCUIT DIAGNOSIS >

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Item	Monitor Item	Condition	Status	A
	Selector lever is shifted to manual shift gate sid	Selector lever is shifted to manual shift gate side	ON	
	MANU MODE SW	Other than the above	OFF	F
	NON M-MODE SW	Selector lever is shifted to manual shift gate side	OFF	
Manual made awitch		Other than the above	ON	
Manual mode switch UP SW LEVER DOWN SW LEV	UP SW LEVER	Selector lever is shifted to + side	ON	C
		Other than the above	OFF	
		Selector lever is shifted to – side	ON	τı
	DOWN SW LEVER	Other than the above	OFF	TN
		Paddle shifter (shift-up) is pulled	ON	
	SFT UP ST SW	Other than the above	OFF	E
Paddle shifter*		Paddle shifter (shift-down) is pulled	ON	
	SFT DWN ST SW	Other than the above	OFF	

\*: With paddle shifter

#### **Without CONSULT**

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

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

#### Which item is abnormal?

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

#### 2.CHECK MANUAL MODE SWITCH CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect A/T shift selector connector.
- 3. Turn ignition switch ON.

4. Check voltage between A/T shift selector vehicle side harness connector terminals.

Connector	Ter	minal	Voltage (Approx.)
Connector	+	-	
	1	4 Battery voltage	
M137	2		Potton (voltage
	3		Dallery Vollage
	5		

NO >> GO TO 4.

**3.**CHECK MANUAL MODE SWITCH

1. Turn ignition switch OFF.

2. Check manual mode switch. Refer to TM-152, "Component Inspection (Manual Mode Switch)".

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace damaged parts.

#### < DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

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

1. Disconnect combination meter connector.

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

A/T shift selector vehicle	e side harness connector	Combination meter vehicle side harness connector		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
	1	- M53	40		
M137	2		38	Existed	
WIS7	WITS7	3		39	Existed
	5		37		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace damaged parts.

#### $\mathbf{6}$ . 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 vehic	A/T shift selector vehicle side harness connector		Continuity
Connector	Terminal	_	Continuity
	1	Ground	
M137	2		Not existed
	3		NOT EXISTED
	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.

Pado				
Connector	Terminal		Voltage (Approx.)	
Connector	+	-		
M32	2		1	Battony voltago
M39	- 3	I	Battery voltage	

Is the inspection result normal?

[7AT: RE7R01A] < DTC/CIRCUIT DIAGNOSIS > YES >> GO TO 8. NO >> GO TO 9. А 8. CHECK PADDLE SHIFTER 1. Turn ignition switch OFF. В Check paddle shifter. Refer to TM-152, "Component Inspection [Paddle Shifter (Shift-up)]", TM-152, 2. "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) ТΜ Turn ignition switch OFF. 1. Check continuity between paddle shifter vehicle side harness connector terminals and ground. 2. Paddle shifter vehicle side harness connector Continuity Connector Terminal Ground 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) Н 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 32 3 M53 Existed M39 33 Is the inspection result normal? YES >> GO TO 11. >> Repair or replace damaged parts. NO 11. CHECK HARNESS BETWEEN PADDLE SHIFTER AND COMBINATION METER (PART 2) Check continuity between paddle shifter vehicle side harness connector terminals and ground. M Paddle shifter vehicle side harness connector Continuity Connector Terminal Ground M32 Ν 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-47, "Intermittent Incident". Is the inspection result normal? >> GO TO 13. YES NO >> Repair or replace damaged parts. 13. CHECK COMBINATION METER

1. Reconnect all the connectors.

#### < DTC/CIRCUIT DIAGNOSIS >

- 2. Turn ignition switch ON.
- 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 <u>TM-223</u>, "VQ37VHR (2WD) : Exploded View" [VQ37VHR (2WD)], <u>TM-226</u>, "VQ37VHR (AWD) : Exploded View" [VQ37VHR (AWD)], <u>TM-229</u>, "VK56VD (2WD) : <u>Exploded View"</u> [VK56VD (2WD)] or <u>TM-232</u>, "VK56VD (AWD) : Exploded View" [VK56VD (AWD)].
- NO >> Replace combination meter. Refer to <u>MWI-92, "Exploded View"</u>.

#### Component Inspection (Manual Mode Switch)

INFOID:000000010098896

# **1.**CHECK MANUAL MODE SWITCH

Check continuity between A/T shift selector connector terminals.

A/T shift sele	ctor connector	Condition	Continuity	
Terr	minal	Condition	Continuity	
1		Selector lever is shifted to manual shift gate side	Existed	
		Other than the above	Not existed	
2	Selector lever is shifted to – side           Other than the above	Selector lever is shifted to – side	Existed	
2		Other than the above	Not existed	
2	3 5	Selector lever is shifted to + side	Existed	
3		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 <u>TM-184, "2WD : Exploded View"</u>.

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

INFOID:000000010098897

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

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

Paddle shifter (shift-up) connector Terminal		Condition	Continuity
Other than the above	Not existed		

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace paddle shifter (shift-up). Refer to <u>TM-190, "Exploded View"</u>.

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

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

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

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#### < DTC/CIRCUIT DIAGNOSIS >

# [7AT: RE7R01A]

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

YES >> INSPECTION END

NO >> Replace paddle shifter (shift-down). Refer to TM-190, "Exploded View".

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# P2713 PRESSURE CONTROL SOLENOID D

#### < DTC/CIRCUIT DIAGNOSIS >

# P2713 PRESSURE CONTROL SOLENOID D

## **DTC Logic**

INFOID:000000010098899

#### 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> <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

#### 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 <u>TM-154. "Diagnosis Procedure"</u>. NO >> INSPECTION END
- NO >> INSPECTION END

## Diagnosis Procedure

1.CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u>.
- NO >> Repair or replace damaged parts.

INFOID:000000010098900

# P2722 PRESSURE CONTROL SOLENOID E

#### < DTC/CIRCUIT DIAGNOSIS >

# P2722 PRESSURE CONTROL SOLENOID E

# DTC Logic

[7AT: RE7R01A]

INFOID:000000010098901

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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> <li>Harness or connectors (Solenoid valve circuit is open or shorted.)</li> <li>Low brake solenoid valve</li> </ul>
DTC CONFIRMATIO	N PROCEDURE		
CAUTION: Always drive vehicle a	at a safe sneed		
1.PRECONDITIONING	-		
	N PROCEDURE" is previously	conducted. always turn ion	ition switch OFF and wait at
	e performing the next test.	,	
>> GO TO 2. 2.CHECK DTC DETE	CTION		
	CHON		
<ul> <li>With CONSULT</li> <li>Start the engine.</li> </ul>			
		, "GEAR" and "VHCL/S SE	E-A/T" in "Data Monitor" in
"TRANSMISSION"			E-A/T" in "Data Monitor" in
"TRANSMISSION" 3. Drive vehicle and n	naintain the following condition		E-A/T" in "Data Monitor" in
"TRANSMISSION" 3. Drive vehicle and n BATTERY VOLT	•		E-A/T" in "Data Monitor" in
"TRANSMISSION" 3. Drive vehicle and n BATTERY VOLT	naintain the following condition :9 V or more		E-A/T" in "Data Monitor" in
"TRANSMISSION" 3. Drive vehicle and n BATTERY VOLT MANU MODE SW	naintain the following condition : 9 V or more : ON		E-A/T" in "Data Monitor" in
"TRANSMISSION" 3. Drive vehicle and n BATTERY VOLT MANU MODE SW GEAR VHCL/S SE-A/T 4. Perform "Self Diage	naintain the following condition : 9 V or more : ON : 1st	s for 5 seconds or more.	E-A/T" in "Data Monitor" in
"TRANSMISSION" 3. Drive vehicle and n BATTERY VOLT MANU MODE SW GEAR VHCL/S SE-A/T	naintain the following condition : 9 V or more : ON : 1st : 10 km/h (7 MPH) or more nostic Results" in "TRANSMIS	s for 5 seconds or more.	E-A/T" in "Data Monitor" in
<ul> <li>"TRANSMISSION"</li> <li>3. Drive vehicle and n</li> <li>BATTERY VOLT</li> <li>MANU MODE SW</li> <li>GEAR</li> <li>VHCL/S SE-A/T</li> <li>4. Perform "Self Diagon"</li> <li>With GST</li> </ul>	naintain the following condition : 9 V or more : ON : 1st : 10 km/h (7 MPH) or more nostic Results" in "TRANSMIS	s for 5 seconds or more.	E-A/T" in "Data Monitor" in
<ul> <li>"TRANSMISSION"</li> <li>3. Drive vehicle and n</li> <li>BATTERY VOLT</li> <li>MANU MODE SW</li> <li>GEAR</li> <li>VHCL/S SE-A/T</li> <li>4. Perform "Self Diage</li> <li>With GST</li> <li>Follow the procedure "\</li> <li>Is "P2722" detected?</li> <li>YES &gt;&gt; Go to TM-1</li> </ul>	naintain the following condition : 9 V or more : ON : 1st : 10 km/h (7 MPH) or more nostic Results" in "TRANSMIS With CONSULT". 155. "Diagnosis Procedure".	s for 5 seconds or more.	E-A/T" in "Data Monitor" in
<ul> <li>"TRANSMISSION"</li> <li>3. Drive vehicle and mean means that is a second mean of the second mean mean of the second mean mean mean mean mean mean mean mean</li></ul>	naintain the following condition 9 V or more ON 1st 10 km/h (7 MPH) or more nostic Results" in "TRANSMISS With CONSULT". 155, "Diagnosis Procedure". ON END	s for 5 seconds or more.	E-A/T" in "Data Monitor" in
<ul> <li>"TRANSMISSION"</li> <li>3. Drive vehicle and n</li> <li>BATTERY VOLT</li> <li>MANU MODE SW</li> <li>GEAR</li> <li>VHCL/S SE-A/T</li> <li>4. Perform "Self Diage</li> <li>With GST</li> <li>Follow the procedure "\</li> <li>Is "P2722" detected?</li> <li>YES &gt;&gt; Go to TM-1</li> </ul>	naintain the following condition 9 V or more ON 1st 10 km/h (7 MPH) or more nostic Results" in "TRANSMISS With CONSULT". 155, "Diagnosis Procedure". ON END	s for 5 seconds or more.	E-A/T" in "Data Monitor" in
<ul> <li>"TRANSMISSION"</li> <li>3. Drive vehicle and mean means that is a second mean of the second mean mean of the second mean mean mean mean mean mean mean mean</li></ul>	naintain the following condition 9 V or more ON 1st 10 km/h (7 MPH) or more nostic Results" in "TRANSMIS With CONSULT". 155, "Diagnosis Procedure". ON END URE	s for 5 seconds or more.	
<ul> <li>"TRANSMISSION"</li> <li>3. Drive vehicle and mean means of the second mean of th</li></ul>	naintain the following condition : 9 V or more : ON : 1st : 10 km/h (7 MPH) or more nostic Results" in "TRANSMIS With CONSULT". Mith CONSULT". <u>155, "Diagnosis Procedure"</u> . ON END URE	s for 5 seconds or more.	
<ul> <li>"TRANSMISSION"</li> <li>3. Drive vehicle and n</li> <li>BATTERY VOLT MANU MODE SW GEAR VHCL/S SE-A/T</li> <li>4. Perform "Self Diagn</li> <li>With GST Follow the procedure "V Is "P2722" detected? YES &gt;&gt; Go to TM-1 NO &gt;&gt; INSPECTION</li> <li>Diagnosis Procedure</li> <li>1.CHECK INTERMITT</li> <li>Refer to GI-47, "Intermition Intermition Intermitian Intermitian Intermitian Intermitian Intermitian Intermit</li></ul>	naintain the following condition : 9 V or more : ON : 1st : 10 km/h (7 MPH) or more nostic Results" in "TRANSMIS With CONSULT". Mith CONSULT". 155, "Diagnosis Procedure". ON END URE FENT INCIDENT ittent Incident". normal?	s for 5 seconds or more. SION".	
<ul> <li>"TRANSMISSION"</li> <li>3. Drive vehicle and n</li> <li>BATTERY VOLT MANU MODE SW GEAR VHCL/S SE-A/T</li> <li>4. Perform "Self Diagn</li> <li>With GST Follow the procedure "\ Is "P2722" detected? YES &gt;&gt; Go to TM-1 NO &gt;&gt; INSPECTION</li> <li>Diagnosis Procedu</li> <li>Diagnosis Procedu</li> <li>1.CHECK INTERMITT</li> <li>Refer to GI-47, "Intermitis the inspection result YES &gt;&gt; Replace compared</li> </ul>	maintain the following condition : 9 V or more : ON : 1st : 10 km/h (7 MPH) or more nostic Results" in "TRANSMISS With CONSULT". 155. "Diagnosis Procedure". ON END URE FENT INCIDENT ittent Incident". normal? pontrol valve & TCM. Refer to TM	s for 5 seconds or more. SION".	
<ul> <li>"TRANSMISSION"</li> <li>3. Drive vehicle and n</li> <li>BATTERY VOLT MANU MODE SW GEAR VHCL/S SE-A/T</li> <li>4. Perform "Self Diagn</li> <li>With GST Follow the procedure "\ Is "P2722" detected? YES &gt;&gt; Go to TM-1 NO &gt;&gt; INSPECTION</li> <li>Diagnosis Procedu</li> <li>Diagnosis Procedu</li> <li>1.CHECK INTERMITT</li> <li>Refer to GI-47, "Intermitis the inspection result YES &gt;&gt; Replace compared</li> </ul>	naintain the following condition : 9 V or more : ON : 1st : 10 km/h (7 MPH) or more nostic Results" in "TRANSMIS With CONSULT". Mith CONSULT". 155, "Diagnosis Procedure". ON END URE FENT INCIDENT ittent Incident". normal?	s for 5 seconds or more. SION".	

# P2731 PRESSURE CONTROL SOLENOID F

# DTC Logic

INFOID:000000010098903

[7AT: RE7R01A]

#### 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> <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 <u>TM-156, "Diagnosis Procedure"</u>. NO >> INSPECTION END

#### Diagnosis Procedure

#### INFOID:000000010098904

#### **1.**CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to <u>TM-191, "Exploded View"</u>.
- NO >> Repair or replace damaged parts.

# **P2807 PRESSURE CONTROL SOLENOID G**

#### < DTC/CIRCUIT DIAGNOSIS >

DTC DETECTION LOGIC

# P2807 PRESSURE CONTROL SOLENOID G

# DTC Logic

[7AT: RE7R01A]

#### INFOID:000000010098905

А

В

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> <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 least 10 seconds before	I PROCEDURE" is previously performing the next test.	/ conducted, always turn igni	tion switch OFF and wait at
>> GO TO 2.			
2. CHECK DTC DETEC	TION		
1. Start the engine.			
<ol> <li>Select "BATTERY \ "TRANSMISSION".</li> </ol>	/OLT", "MANU MODE SW",	"GEAR" and "VHCL/S SE	-A/T" in "Data Monitor" in
	aintain the following condition	s for 5 seconds or more.	
BATTERY VOLT	: 9 V or more		
	: ON		
GEAR	: 1st		
VHCL/S SE-A/T	: 10 km/h (7 MPH) or more		
	ostic Results" in "TRANSMISS	SION".	
With GST Follow the procedure "W	ith CONSULT"		
Is "P2807" detected?			
YES >> Go to TM-15	7, "Diagnosis Procedure".		
NO >> INSPECTIO	N END		
Diagnosis Procedui	re		INFOID:000000010098906
1. CHECK INTERMITTE			
Refer to <u>GI-47, "Intermitte</u>			
Is the inspection result no			
	trol valve & TCM. Refer to T	/I-191, "Exploded View".	
	place damaged parts.		

# MAIN POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

# MAIN POWER SUPPLY AND GROUND CIRCUIT

#### **Diagnosis** Procedure

INFOID:000000010098907

[7AT: RE7R01A]

# 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	A/T assembly vehicle side harness connector		Condition	Voltage (Approx.)
Connector	Terminal	Ground	Condition	vollage (Applox.)
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			Condition	Voltage (Approv.)
Connector	Terminal		Condition	Voltage (Approx.)
F61	1	Ground	Turn ignition switch ON	Battery voltage
	Ι		Turn ignition switch OFF	0 V
	2		Turn ignition switch ON	Battery voltage
	6		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		Continuity
Connector	Terminal	Ground	Continuity
F61	5	Ground	Existed
FOI	10		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 <u>TM-191, "Exploded View"</u>.

2. Check the continuity between joint connector terminals.

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

Is the inspection result normal?

# MAIN POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIA		UPPLT	AND GR	OUND CIRCUIT	[7AT: RE7R01A]
YES >> GO TO 5.					
NO >> Repair or 5.CHECK INTERMIT	replace damaged par	ts.			
Refer to <u>GI-47, "Interr</u>					
Is the inspection resul					
	he control valve & TC		<u>TM-191, "I</u>	Exploded View".	
NO >> Repair or 6.DETECT MALFUN	replace damaged par				
Check the following.		XI I)			
<ul> <li>Harness for short or tor terminal 2. Refer</li> <li>Battery</li> <li>10A fuse (No.36, lo</li> </ul>	to PG-12, "Wiring Dia	igram - BA	<u>TTERY PO</u>	<u>WER SUPPLY -"</u> .	side harness connec-
<u>Arrangement</u> .	t normal?				
Is the inspection resul YES >> Check int	ermittent incident. Ref	er to GI-47	. "Intermitte	ent Incident".	
NO >> Repair or	replace damaged par	ts.			
<b>1</b> .CHECK HARNESS	BETWEEN IPDM E/	R AND A/T	ASSEMBL	Y (PART 1)	
<ol> <li>Turn ignition swite</li> <li>Disconnect IPDM</li> <li>Check continuity side harness continuity</li> </ol>	E/R connector. between IPDM E/R ve	ehicle side	harness co	onnector terminal and	A/T assembly vehicle
IPDM E/R vehicle sid	le harness connector	A/T asse	mbly vehicle	side harness connector	Continuity
Connector	Terminal	Conr	nector	Terminal	
E7	58	F	61	<u> </u>	Existed
8. CHECK HARNESS	replace damaged par BETWEEN IPDM E/	R AND A/T		. ,	
Check continuity betw	een A/T assembly ver	nicie side n	arness con	nector terminal and gi	ound.
	ehicle side harness connec		-		Continuity
Connector	Termina	al	-	Ground	· · · · · · · · · · · · · · · · · · ·
F61	1		-		Not existed
9. DETECT MALFUN Check the following. • Harness for short or <u>TION POWER SUP</u> • Ignition switch • 10A fuse (No.43, loc • IPDM E/R Is the inspection result	replace damaged par CTIONING ITEM (PAI open between ignitio <u>PLY -"</u> . cated in the IPDM E/R <u>t normal?</u> ermittent incident. Ref	RT 2) n switch ar ). Refer to j	PG-102, "F	use, Connector and To	Viring Diagram - IGNI- erminal Arrangement".

# TM-159

# SHIFT POSITION INDICATOR CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

# SHIFT POSITION INDICATOR CIRCUIT

## Description

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**

**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 <u>TM-160, "Diagnosis Procedure"</u>.

# Diagnosis Procedure

# **1.**CHECK INPUT SIGNALS

#### With CONSULT

- 1. Start the engine.
- 2. Select "SLCT LVR POSI" in "Data Monitor" in "TRANSMISSION".
- Check the actual selector lever position ("P", "R", "N" and "D") and the indication of the "SLCT LVR POSI" mutually coincide. Refer to <u>TM-68</u>, "<u>Reference Value</u>".
- 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 <u>TM-68</u>, "<u>Reference Value</u>".

#### 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-152, "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 <u>TM-78</u>, "<u>DTC Index</u>".
- 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 <u>TM-78</u>, "<u>DTC Index</u>".
- NO-4 (Only a specific position or positions is/are not indicated on the shift position indicator.)>>Check the combination meter. Refer to <u>MWI-36, "Reference Value"</u>.

INFOID:000000010098909

INFOID:000000010098910

INFOID:000000010098908

# < DTC/CIRCUIT DIAGNOSIS > SHIFT LOCK SYSTEM WITH ICC WITH ICC : Component Function Check

1.CHECK A/T SHIFT LOCK OPERATION (STEP 1) Turn ignition switch ON. Shift the selector lever to the "P" position. 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-161, "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-161, "WITH ICC : Diagnosis Procedure".

WITH ICC : Diagnosis Procedure

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

1. Turn ignition switch OFF.

1.

2.

3.

- Disconnect shift lock relay. 2.
- 3. Check voltage between shift lock relay vehicle side harness connector terminal and ground.

Shift lock relay vehicle side harness connector			Condition	Voltage (Approx.)	
Connector	Terminal	Ground	Condition	vollage (Approx.)	
E52	<b>F</b> 52 0	Giouna	Depressed brake pedal.	Battery voltage	J
ESZ	2		Released brake pedal.	0 V	

Is the inspection result normal?

>> GO TO 2. YES

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		N	
Connector	Terminal				
E52	1	_	Existed		
Is the inspection result nor	mal?			N	
YES >> GO TO 3.					
NO >> Repair or repla	ace damaged parts.				
3. CHECK SHIFT LOCK RELAY					
Check shift lock relay. Refe	er to <u>TM-166, "WITH ICC :</u> (	Component Inspection (Shift	Lock Relay)".		
Is the inspection result nor	mal?			P	
YES >> GO TO 4.				1	
NO >> Repair or repla	ace damaged parts.				
1					

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

1. Turn ignition switch ON.

Check voltage between shift lock relay vehicle side harness connector terminal and ground. 2.

# TM-161

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#### < DTC/CIRCUIT DIAGNOSIS >

Shift lock relay vehicle side harness connector			Voltage (Approx.)
Connector Terminal		Ground	vollage (Approx.)
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		Continuity	
E52	3	M137	6	Existed	

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace damaged parts.

#### $\mathbf{6}$ . 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			Continuity
Connector	Terminal	Ground	Continuity
E52	3		Not existed

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace damaged parts.

**I**.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			Continuity
Connector	Terminal	Ground	Continuity
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-165, "WITH ICC : Component Inspection (Shift Lock Unit)"

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "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	e side harness connector		Voltage (Approx.)
Connector	Connector Terminal		volidge (Approx.)
E110	E110 1		Battery voltage

s the inspection resu	GNOSIS >				[7AT: RE7R01A]
s the inspection resu	It normal?				
YES >> GO TO 1					
NO >> GO TO 1 10 OUTOK LADNE					
	SS BETWEEN FUSE	BLUCK (J/I	B) AND ST		PART 1)
. Check continuity	block (J/B) connector. between fuse block (J ess connector termina		side harne	ss connector termina	and stop lamp switch
Fuse block (J/B) vehicle	e side harness connector	Stop lamp	switch vehicle	e side harness connector	<b>0</b>
Connector	Terminal	Conn	ector	Terminal	Continuity
E103	8F	E1	10	1	Existed
the inspection resu	It normal?	I			
YES >> GO TO 1					
	replace damaged par				
	SS BETWEEN FUSE				
heck continuity betw	veen fuse block (J/B) v	ehicle side	harness co	onnector terminal and	ground.
Fuse block (J/B)	vehicle side harness conne	ector			Continuity
Connector	Termina	al	Ground		Continuity
E103	8F				Not existed
		PART 1)			
Harness for short o <u>TERY POWER SUF</u> Battery 10A fuse [No.7, loca <u>ment"</u> . Fuse block (J/B) <u>the inspection resu</u> (ES >> GO TO 1)	ated in the fuse block It normal? 3.	ry and fuse (J/B)]. Refe			
Harness for short o <u>TERY POWER SUF</u> Battery 10A fuse [No.7, loca <u>ment"</u> . Fuse block (J/B) the inspection resul YES >> GO TO 1 NO >> Repair or	<u>PPLY -"</u> . ated in the fuse block <u>It normal?</u> 3. <sup>.</sup> replace damaged par	ry and fuse (J/B)]. Refe			
TERY POWER SUF         Battery       10A fuse [No.7, loca         10A fuse [No.7, loca       ment".         Fuse block (J/B)       s         s the inspection resu       YES >> GO TO 1.         YES >> GO TO 1.       NO >> Repair or         OK       S.CHECK DTC OF         With CONSULT       Perform "Self Diagnos         s any malfunction der       YES >> Check the         NO >> Check int       YES >> Check int	PLY -". ated in the fuse block It normal? 3. replace damaged par FICC stic Results" in "ICC". tected? e DTC detected item. I termittent incident. Ref	ry and fuse (J/B)]. Refe ts. Refer to <u>CC</u> fer to <u>GI-47</u> ,	er to <u>PG-10</u>	0, "Fuse, Connector :	
Harness for short o <u>TERY POWER SUF</u> Battery 10A fuse [No.7, loca <u>ment"</u> . Fuse block (J/B) the inspection resule YES >> GO TO 1 NO >> Repair or <b>3.</b> CHECK DTC OF With CONSULT erform "Self Diagnos any malfunction der YES >> Check the NO >> Check int <b>4.</b> CHECK STOP L	PLY -". ated in the fuse block It normal? 3. replace damaged par F ICC stic Results" in "ICC". tected? e DTC detected item. I	ry and fuse (J/B)]. Refe ts. Refer to <u>CC</u> fer to <u>GI-47</u> , 1)	er to <u>PG-10</u> S-52, "DT( "Intermitte	<u>0, "Fuse, Connector :</u> <u>C Index"</u> . <u>ent Incident"</u> .	and Terminal Arrange-
Harness for short o <u>TERY POWER SUF</u> Battery 10A fuse [No.7, loca <u>ment"</u> . Fuse block (J/B) the inspection resu YES >> GO TO 1 NO >> Repair or <b>3.</b> CHECK DTC OF With CONSULT erform "Self Diagnos any malfunction der YES >> Check the NO >> Check int <b>4.</b> CHECK STOP L heck stop lamp switt	PPLY -". ated in the fuse block <u>It normal?</u> 3. replace damaged par FICC stic Results" in "ICC". <u>tected?</u> e DTC detected item. I termittent incident. Ref AMP SWITCH (PART ch. Refer to <u>TM-166.</u> "	ry and fuse (J/B)]. Refe ts. Refer to <u>CC</u> fer to <u>GI-47</u> , 1)	er to <u>PG-10</u> S-52, "DT( "Intermitte	<u>0, "Fuse, Connector :</u> <u>C Index"</u> . <u>ent Incident"</u> .	and Terminal Arrange-
Harness for short of TERY POWER SUF Battery 10A fuse [No.7, location ment". Fuse block (J/B) the inspection result YES >> GO TO 1 NO >> Repair or <b>3.</b> CHECK DTC OF With CONSULT reform "Self Diagnost any malfunction der YES >> Check the NO >> Check the NO >> Check into <b>4.</b> CHECK STOP L check stop lamp switt the inspection result YES >> GO TO 1	PPLY -". ated in the fuse block It normal? 3. replace damaged par FICC stic Results" in "ICC". tected? e DTC detected item. I termittent incident. Ref AMP SWITCH (PART ch. Refer to <u>TM-166. "</u> It normal? 7.	ry and fuse (J/B)]. Refe ts. Refer to <u>CC</u> fer to <u>GI-47</u> , 1)	er to <u>PG-10</u> S-52, "DT( "Intermitte	<u>0, "Fuse, Connector :</u> <u>C Index"</u> . <u>ent Incident"</u> .	and Terminal Arrange-
Harness for short o <u>TERY POWER SUF</u> Battery 10A fuse [No.7, loca <u>ment"</u> . Fuse block (J/B) the inspection resul YES >> GO TO 1 NO >> Repair or <b>3.</b> CHECK DTC OF With CONSULT erform "Self Diagnos any malfunction der YES >> Check the NO >> Check the CHECK STOP L	PPLY -". ated in the fuse block It normal? 3. replace damaged par FICC stic Results" in "ICC". tected? e DTC detected item. I termittent incident. Ref AMP SWITCH (PART ch. Refer to <u>TM-166. "</u> It normal? 7.	ry and fuse (J/B)]. Refe ts. Refer to <u>CC</u> fer to <u>GI-47</u> , 1) <u>WITH ICC :</u>	er to <u>PG-10</u> S-52, "DT( , "Intermitte Compone	0, "Fuse, Connector : <u>C Index"</u> . Int Incident". nt Inspection (Stop La	and Terminal Arrange-

>> GO TO 16.

< DTC/CIRCUIT DIAGNOSIS >

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

Check stop lamp switch. Refer to TM-166, "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	Continuity
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			Continuity
Connector	Connector Terminal		Continuity
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	Continuity
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			Continuity
Connector	Connector Terminal		Continuity
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 <u>PG-57, "Wiring Diagram -</u> <u>IGNITION POWER SUPPLY -"</u>.

#### Ignition switch

 10A fuse [No.3, located in the fuse block (J/B)]. Refer to <u>PG-100, "Fuse, Connector and Terminal Arrange-</u> <u>ment".</u>

• Fuse block (J/B)

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Check intermittent incident. Refer to <u>GI-47, "Intermittent Incident"</u>.
- 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		Continuity	
Connector	Terminal	Ground	Continuity	_
M30	408	Ground	Existed	E
IVISO	409		Existed	

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	e side harness connector	PCB harness vehicle	side harness connector	Continuity
Connector	Terminal	Connector	Terminal	Continuity
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.

tiouity	Contin		side harness connector	PCB harness vehicle	
	Contir	Terminal	Connector	Terminal	Connector
stod	Exist	408	M30	246	M26
M	EXIST	409	W30	240	MZO

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-47, "Intermittent Incident"</u>.

NO >> Repair or replace damaged parts.

# WITH ICC : Component Inspection (Shift Lock Unit)

#### **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.

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#### < DTC/CIRCUIT DIAGNOSIS >

Shift lock ur	nit connector		
Terr	ninal	Condition	Status
+ (fuse)	-		
6	4	<ul> <li>Selector lever in "P" position.</li> <li>Apply 12 V direct current be- tween 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 <u>TM-184</u>, "<u>2WD</u> : <u>Exploded View</u>" (2WD) or <u>TM-186</u>, <u>"AWD : Exploded View</u>" (AWD).

# WITH ICC : Component Inspection (Shift Lock Relay)

INFOID:000000010098914

# **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 rel	ay connector	Condition	Continuity
Terr	ninal	Condition	Continuity
3	5	Apply 12 V direct current be- tween 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)

## **1.**CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp sv	vitch connector	Condition	Continuity
Ter	minal	Condition	Continuity
1	2	Brake pedal depressed	Existed
1	2	Brake pedal released	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-18, "Exploded View"</u>. WITHOUT ICC

# WITHOUT ICC : Component Function Check

INFOID:000000010098916

INFOID:000000010098915

**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-167, "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.

## TM-166

# >> GO TO 8. Check stop lamp switch. Refer to TM-170, "WITHOUT ICC : Component Inspection (Stop Lamp Switch)". >> GO TO 6. >> GO TO 11.

# SHIFT LOCK SYSTEM

# Can the selector lever be shifted to any other position?

YES >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

NO >> Go to TM-167, "WITHOUT ICC : Diagnosis Procedure".

Terminal

6

# WITHOUT ICC : Diagnosis Procedure

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

- 1. Turn ignition switch OFF.
- 2. Disconnect A/T shift selector connector.

A/T shift selector vehicle side harness connector

3. Turn ignition switch ON.

Connector

M137

Check voltage between A/T shift selector vehicle side harness connector terminal and ground. 4.

Ground

Condition

Depressed brake pedal.

		Data and the state of the	
M137	6	Released brake ped	lal. 0 V
s the inspection result norm	nal?		
YES >> GO TO 2.			
NO >> GO TO 4.			
2.CHECK GROUND CIRC	UIT		
Check continuity between A	/T shift selector vehicle s	ide harness connector termina	I and ground.
A/T shift selector vehicle	side harness connector		<b>6</b>
Connector	Terminal	Ground	Continuity
M137	4		Existed
s the inspection result norm	nal?		
YES >> GO TO 3.			
NO >> GO TO 13.			
<b>3.</b> CHECK SHIFT LOCK UN	NIT		
3. CHECK SHIFT LOCK UN		CC : Component Inspection (St	nift Lock Unit)".
<b>3.</b> CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm	to <u>TM-169, "WITHOUT IC</u> nal?		nift Lock Unit)".
<b>3.</b> CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm YES >> Check intermitted	to <u>TM-169, "WITHOUT IC</u> nal? ent incident. Refer to <u>GI-</u> /	CC : Component Inspection (St	<u>nift Lock Unit)"</u> .
<b>3.</b> CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm YES >> Check intermitte NO >> Repair or replace	to <u>TM-169, "WITHOUT IC</u> <u>nal?</u> ent incident. Refer to <u>GI-4</u> ce damaged parts.		nift Lock Unit)".
3.CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm YES >> Check intermitte NO >> Repair or replace 4.CHECK POWER SOURC	to <u>TM-169, "WITHOUT IC</u> <u>nal?</u> ent incident. Refer to <u>GI-4</u> ce damaged parts. CE (PART 2)		<u>nift Lock Unit)"</u> .
3.CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm YES >> Check intermitte NO >> Repair or replace 4.CHECK POWER SOURC	to <u>TM-169, "WITHOUT IC</u> nal? ent incident. Refer to <u>GI-</u> ce damaged parts. CE (PART 2) F.		nift Lock Unit)".
3.CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm YES >> Check intermitte NO >> Repair or replace 4.CHECK POWER SOURC 1. Turn ignition switch OFF 2. Disconnect stop lamp so	to <u>TM-169, "WITHOUT IC</u> nal? ent incident. Refer to <u>GI-4</u> ce damaged parts. CE (PART 2) F. witch connector.		<u>nift Lock Unit)"</u> .
3.CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm YES >> Check intermitte NO >> Repair or replace 4.CHECK POWER SOURC 1. Turn ignition switch OFF 2. Disconnect stop lamp so 3. Turn ignition switch ON	to <u>TM-169, "WITHOUT IC</u> nal? ent incident. Refer to <u>GI-4</u> ce damaged parts. CE (PART 2) F. witch connector.		
3.CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm YES >> Check intermitte NO >> Repair or replace 4.CHECK POWER SOURC 1. Turn ignition switch OFF 2. Disconnect stop lamp so 3. Turn ignition switch ON 4. Check voltage between	to <u>TM-169, "WITHOUT IC</u> nal? ent incident. Refer to <u>GI-4</u> ce damaged parts. CE (PART 2) F. witch connector. stop lamp switch vehicle	47, "Intermittent Incident".	
3.CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm YES >> Check intermitte NO >> Repair or replace 4.CHECK POWER SOURC 1. Turn ignition switch OFF 2. Disconnect stop lamp so 3. Turn ignition switch ON 4. Check voltage between Stop lamp switch vehicle	to <u>TM-169</u> , <u>"WITHOUT IC</u> nal? ent incident. Refer to <u>GI-4</u> ce damaged parts. CE (PART 2) F. witch connector. stop lamp switch vehicle	47, "Intermittent Incident".	
3.CHECK SHIFT LOCK UN Check shift lock unit. Refer to s the inspection result norm YES >> Check intermitte NO >> Repair or replace 4.CHECK POWER SOURC 1. Turn ignition switch OFF 2. Disconnect stop lamp so 3. Turn ignition switch ON 4. Check voltage between	to <u>TM-169, "WITHOUT IC</u> nal? ent incident. Refer to <u>GI-4</u> ce damaged parts. CE (PART 2) F. witch connector. stop lamp switch vehicle	47, "Intermittent Incident".	nal and ground.

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

Is the inspection result normal?

YES NO

Voltage (Approx.)

Battery voltage

INFOID:000000010098917

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#### < DTC/CIRCUIT DIAGNOSIS >

#### ${f 6.}$ 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	e side harness connector	A/T shift selector vehicle	e side harness connector	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E110	4	M137	6	Existed

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace damaged parts.

**1.**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	e side harness connector		Continuity
Connector	Terminal	Ground	Continuity
E110	4		Not existed

#### Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-47, "Intermittent Incident"</u>.

NO >> Repair or replace damaged parts.

 $\mathbf{8}$ . 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	e side harness connector	Stop lamp switch vehicle	e side harness connector	Continuity
Connector	Terminal	Connector	Terminal	Continuity
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	e side harness connector		Continuity
Connector	Terminal	Ground	Continuity
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 <u>PG-57, "Wiring Diagram -</u> <u>IGNITION POWER SUPPLY -"</u>.
- Ignition switch
- 10A fuse [No.3, located in the fuse block (J/B)]. Refer to <u>PG-100, "Fuse, Connector and Terminal Arrangement"</u>.
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

#### TM-168

	<b>9</b> 11				
< DTC/CIRCUIT DIA					[7AT: RE7R01A]
'	replace damaged part		_		
<b>11.</b> CHECK INSTALL					
Adjust stop lamp switc	h position. Refer to <u>B</u>	<u>R-7, "Inspe</u>	ection and Adju	<u>ustment"</u> .	
>> GO TO 12	)				
12.снеск stop L/		2)			
	•			ont Incraction	(Stop Lamp Switch)".
Is the inspection result		WITHOUT			
YES >> INSPECT	ION END				
	replace damaged part	s.			
13.CHECK GROUN					
<ol> <li>Disconnect PCB h</li> <li>Check continuity b</li> </ol>	arness connector. Detween PCB harness	vohielo cir	do barnoss co	nnactor tormin	al and ground
	elween FCD hamess				ai anu giounu.
PCB harness ve	hicle side harness connecte	or			Continuity
Connector	Termina	l	Gro	und	
M30	408				Existed
	409				
ls the inspection result YES >> GO TO 14					
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES	l. replace damaged part SS BETWEEN A/T SH	IIFT SELE			
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connecto	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector v or terminal.	IIFT SELE	e harness con	nector termina	I and PCB harness vehicle
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector or terminal. side harness connector	IIFT SELE( vehicle side PCB har	e harness con	nector termina	I and PCB harness vehicle
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connecto	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector v or terminal.	IIFT SELE vehicle side PCB har Conr	e harness con	nector termina	Il and PCB harness vehicle
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector A/T shift selector vehicle Connector	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector or terminal. side harness connector Terminal 4	IIFT SELE vehicle side PCB har Conr	e harness con	nector termina harness connecto Terminal	or Continuity
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector A/T shift selector vehicle Connector M137 Is the inspection result YES >> GO TO 15	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector or terminal. side harness connector Terminal 4 <u>a normal?</u> 5. replace damaged part	IIFT SELE vehicle side PCB har Conr M	e harness con	nector termina harness connecto Terminal	or Continuity
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector A/T shift selector vehicle Connector M137 Is the inspection result YES >> GO TO 15 NO >> Repair or	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector or terminal. side harness connector Terminal 4 <u>a normal?</u> 5. replace damaged part RNESS	IIFT SELE vehicle side PCB har Conr M	e harness con	nector termina harness connecto Terminal	or Continuity
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector A/T shift selector vehicle Connector M137 Is the inspection result YES >> GO TO 15 NO >> Repair or 15.CHECK PCB HA	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector or terminal. side harness connector Terminal 4 <u>a normal?</u> 5. replace damaged part RNESS	IIFT SELE( vehicle side PCB har Conr M ts.	e harness con mess vehicle side hector 126	nector termina harness connecto Terminal	Il and PCB harness vehicle
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector A/T shift selector vehicle Connector M137 Is the inspection result YES >> GO TO 15 NO >> Repair or 15.CHECK PCB HA	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector or terminal. side harness connector Terminal 4 t normal? 5. replace damaged part RNESS een PCB harness con	IIFT SELE( vehicle side PCB har Conr M ss.	e harness con mess vehicle side hector 126	nector termina harness connecto Terminal	or Continuity
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector A/T shift selector vehicle Connector M137 Is the inspection result YES >> GO TO 15 NO >> Repair or 15.CHECK PCB HA Check continuity betwo	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector of or terminal. side harness connector Terminal 4 t normal? 5. replace damaged part RNESS een PCB harness con PCB harness vehicle s Terminal	IIFT SELE( vehicle side PCB har Conr M ts.	e harness con mess vehicle side nector 126 ninals. connector	harness connecte Terminal 246	Il and PCB harness vehicle
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector A/T shift selector vehicle Connector M137 Is the inspection result YES >> GO TO 15 NO >> Repair or 15.CHECK PCB HA Check continuity betwo	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector or terminal. side harness connector Terminal 4 <u>a normal?</u> 5. replace damaged part RNESS een PCB harness con PCB harness vehicle s	IIFT SELE( vehicle side PCB har Conr M ts.	e harness con mess vehicle side nector 126	harness connector Terminal 246 Terminal	Il and PCB harness vehicle
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector A/T shift selector vehicle Connector M137 Is the inspection result YES >> GO TO 15 NO >> Repair or 15.CHECK PCB HA Check continuity betwo Connector M26 Is the inspection result YES >> Check inte	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector of or terminal. side harness connector Terminal 4 t normal? 5. replace damaged part RNESS een PCB harness con PCB harness vehicle s Terminal 246	IIFT SELE( vehicle side PCB har Conr M is. inector tern side harness of Conr M er to <u>GI-47</u>	e harness con mess vehicle side hector 126 26 ninals. connector hector	harness connector Terminal 246 Terminal 408 409	Il and PCB harness vehicle
YES >> GO TO 14 NO >> Repair or 14.CHECK HARNES Check continuity betwo side harness connector A/T shift selector vehicle Connector M137 Is the inspection result YES >> GO TO 15 NO >> Repair or 15.CHECK PCB HA Check continuity betwo Connector M26 Is the inspection result YES >> Check inte	I. replace damaged part SS BETWEEN A/T SH een A/T shift selector of or terminal. side harness connector Terminal 4 a normal? 5. replace damaged part RNESS een PCB harness con PCB harness vehicle s Terminal 246 a normal? ermittent incident. Reference damaged part	IIFT SELE( vehicle side PCB har Conr M ts. ide harness of Conr M er to <u>GI-47</u> ts.	e harness con mess vehicle side hector 126 ninals. connector hector 130	harness connector Terminal 246 Terminal 408 409 Incident".	Il and PCB harness vehicle
$\begin{array}{rrrr} YES & >> GO TO 14\\ NO & >> Repair or \\ 14.CHECK HARNES\\ Check continuity betwood ide harness connector \\ \hline A/T shift selector vehicle \\ \hline Connector \\ \hline M137\\ \hline Is the inspection result \\ YES & >> GO TO 15\\ NO & >> Repair or \\ \hline 15.CHECK PCB HA\\ \hline Check continuity betwood \\ \hline \hline Connector \\ \hline M26\\ \hline \hline S & >> Check integed \\ \hline YES & YES & YES \\ $	A.  replace damaged part SS BETWEEN A/T SH een A/T shift selector of rerminal.  side harness connector Terminal 4  anormal? 5 replace damaged part RNESS een PCB harness con PCB harness vehicle s Terminal 246 anormal? ermittent incident. Refereplace damaged part Component Inspective	IIFT SELE( vehicle side PCB har Conr M ts. ide harness of Conr M er to <u>GI-47</u> ts.	e harness con mess vehicle side hector 126 ninals. connector hector 130	harness connector Terminal 246 Terminal 408 409 Incident".	Il and PCB harness vehicle

Connect the fuse between the terminals when applying the voltage.

#### < DTC/CIRCUIT DIAGNOSIS >

Shift lock ur	nit connector		
Terr	ninal	Condition	Status
+ (fuse)	-		
6	4	<ul> <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

# WITHOUT ICC : Component Inspection (Stop Lamp Switch)

INFOID:000000010098919

# 1. CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp sv	vitch connector	Condition	Continuity
Ter	minal	Condition	Continuity
2	1	Brake pedal depressed	Existed
	4	Brake pedal released	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-18, "Exploded View"</u>.

NO >> Replace A/T shift selector assembly. Refer to <u>TM-184, "2WD : Exploded View"</u> (2WD) or <u>TM-186,</u> <u>"AWD : Exploded View"</u> (AWD).

# SYMPTOM DIAGNOSIS SYSTEM SYMPTOM

# Symptom Table

#### • 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

													[	Diag	nos	stic	iten	n								—	TNA
															,					/e							ТМ
								sensor			or					e	/alve			High and low reverse clutch solenoid valve				Ð			E
						or	ы	osition (	la		re senso		switch	Ļ		ioid valv	olenoid v	l valve	d valve	se clutch	d valve	id valve	d valve	oid valv		c	F
		Sym	ptom		age	ed sens	ed sign	r pedal p	ed signal	d sensor	mperatu	tage	on range	de swito	switch	ure soler	werter so	solenoic	e soleno	w rever	n soleno	th solend	solenoi	ck solen	Y	nunicatic	G
					Control linkage	Output speed sensor	Vehicle speed signal	Accelerator pedal position	Engine speed	Input speed sensor	A/T fluid temperature sensor	Battery voltage	Transmission range	Manual mode switch	Stop lamp switch	Line pressure solenoid valve	Torque converter solenoid valve	Low brake solenoid valve	Front brake solenoid valve	High and Ic	Input clutch solenoid valve	Direct clutch solenoid valve	2346 brake solenoid valve	Anti-interlock solenoid valve	Starter relay	CAN communication	Н
					TM-103	TM-114	TM-142	<u>TM-141</u>	<u>TM-116</u>	<u>TM-113</u>	<u>TM-111</u>	TM-158	TM-110	TM-148	<b>SEC-71</b>	TM-135	TM-132	<u>TM-155</u>	TM-140	TM-154	TM-137	TM-157	TM-156	<u>TM-136</u>	TM-108	<u>TM-107</u>	I
		Shift po	oint is high	in "D" position.		1		2			3																
		Shift po	pint is low i	n "D" position.		1		2																			J
				$\rightarrow$ "D" position	4			7	6		6		5			3		2						3		1	
				$\rightarrow$ "R" position	4			7	6		6		5			3						2		 		1	K
				1GR ⇔ 2GR		4		2	5	4	4												3	 		1	TX.
				2GR ⇔ 3GR		4		2	5	4	4											3		 		1	
				3GR ⇔ 4GR		4		2	5	4	4							3		3	_					1	L
	Driving perfor-		When	4GR ⇔ 5GR		4		2	5	4	4										3		3	 		1	
	mance	Large shock	shifting	5GR ⇔ 6GR		4		2	5	4	4								_			3	3			1	M
Poor perfor-			gears	6GR ⇔ 7GR		4		2	5	4	4								3				3	 		1	
mance				Downshift when accelerator ped- al is depressed		3		2	4	3	3															1	Ν
				Upshift when ac- celerator pedal is released		3		2	4	3	3															1	0
				Lock-up		4		2	4	4	4						3									1	
		Judder		Lock-up				2	1	1	4						3										
				In "R" position		2			1																		Ρ
	Strange	noise		In "N" position		2			1																		
	Strange	10130		In "D" position		2			1																		
				Engine at idle		2			1																		

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		Symptom		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
				<u>TM-103</u>	TM-114	<u>TM-142</u>	TM-141	<u>TM-116</u>	TM-113	TM-111	<u>TM-158</u>	TM-110	<u>TM-148</u>	<b>SEC-71</b>	<u>TM-135</u>	TM-132	<u>TM-155</u>	<u>TM-140</u>	<u>TM-154</u>	TM-137	<u>TM-157</u>	<u>TM-156</u>	<u>TM-136</u>	TM-108	<u>TM-107</u>
Func- tion trouble	Gear does no change	"D" position	Locks in 1GR Locks in 2GR Locks in 3GR Locks in 4GR Locks in 5GR Locks in 6GR Locks in 7GR 1GR $\rightarrow$ 2GR 2GR $\rightarrow$ 3GR 3GR $\rightarrow$ 4GR 4GR $\rightarrow$ 5GR 5GR $\rightarrow$ 6GR 6GR $\rightarrow$ 7GR 5GR $\rightarrow$ 4GR 4GR $\rightarrow$ 3GR 2GR $\rightarrow$ 1GR					2	2	2					2	2	2 1 2 2	1 1 1 1 1 1 1 1 2 1 1 2 2 2 2	2 1 2 2			1			
		"M" posi- tion	$1GR \Leftrightarrow 2GR$ $2GR \Leftrightarrow 3GR$ $3GR \Leftrightarrow 4GR$ $4GR \Leftrightarrow 5GR$		2 3 3 3 3			2	2 3 3 3 3	2 3 3 3 3	+	5 3 3 3 3	2 2 2 2		2 3 3 3 3	3 3 3	2 3 3 3 3	2 3 3 3 3	3 3 3	2 3 3 3 3	3 3 3	2 3 3 3 3	3 3 3 3		1 1 1 1
			$5GR \Leftrightarrow 6GR$ $6GR \Leftrightarrow 7GR$		3 3				3 3	3 3		3 3			3 3		3 3	3 3	3 3	3 3	-	3 3	3 3		1

#### < SYMPTOM DIAGNOSIS >

# [7AT: RE7R01A]

													[	Diag	gnos	stic	iten	n									A
		Sympt	tom		Control linkage	Output speed sensor	cle 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	E
					Cont	Outp	Vehicle	Acce	Engi	ndul	A/T f	Batte	Tran	Man	Stop	Line	Torq	Low	Fron	High	ndul	Dire	2346	Anti-	Start	CAN	E
					TM-103	<u>TM-114</u>	<u>TM-142</u>	<u>TM-141</u>	<u>TM-116</u>	<u>TM-113</u>	TM-111	<u>TM-158</u>	<u>TM-110</u>	<u>TM-148</u>	<b>SEC-71</b>	<u>TM-135</u>	<u>TM-132</u>	<u>TM-155</u>	<u>TM-140</u>	TM-154	<u>TM-137</u>	<u>TM-157</u>	<u>TM-156</u>	<u>TM-136</u>	<u>TM-108</u>	TM-107	F
				1GR ⇔ 2GR		3			3	3	4					2							2			1	
			When	2GR ⇔ 3GR		3			3	3	4					2						2				1	(
		Slip	shift-	3GR ⇔ 4GR		3			3	3	4					2		2		2				2		1	
		Silp	ing gears	$4GR \Leftrightarrow 5GR$		3			3	3	4					2					2		2			1	ŀ
			years	5GR ⇔ 6GR		3			3	3	4					2						2	2			1	
-				6GR ⇔ 7GR		3			3	3	4					2			2				2			1	
Func- tion trou- ble	Poor shifting		"D" pos tion	sition $\rightarrow$ "M" posi-		5			5	5	6		4	2		3			3	3						1	
		En-		$7\text{GR} \rightarrow 6\text{GR}$		5			5	5	6		4	2		3			3				3			1	
		gine		$6\text{GR} \rightarrow 5\text{GR}$		5			5	5	6		4	2		3						3	3			1	`
		brake does	"M" posi-	$5\text{GR} \rightarrow 4\text{GR}$		5			5	5	6		4	2		3					3		3			1	
		not	tion	$4GR \rightarrow 3GR$		5			5	5	6		4	2		3		3		3				3		1	ŀ
		work		$3\text{GR} \rightarrow 2\text{GR}$		5			5	5	6		4	2		3				3		3			_	1	
				$2\text{GR} \rightarrow 1\text{GR}$		5			5	5	6		4	2		3			3				3			1	

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#### < SYMPTOM DIAGNOSIS >

# [7AT: RE7R01A]

												[	Dia	gno	stic	iter	n								
		Symptom		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-103	<u>TM-114</u>	TM-142	TM-141	<u>TM-116</u>	<u>TM-113</u>	<u>TM-111</u>	<u>TM-158</u>	TM-110	TM-148	<u>SEC-71</u>	<u>TM-135</u>	TM-132	<u>TM-155</u>	<u>TM-140</u>	TM-154	TM-137	TM-157	<u>TM-156</u>	<u>TM-136</u>	<u>TM-108</u>	<u>TM-107</u>
			With selector le- ver in "D" posi- tion, acceleration is extremely poor.	5	3	-		3	3	4	-				2	-	2				-		2		1
			With selector le- ver in "R" posi- tion, 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 accelerat- ing in 2GR, en- gine races.		3			3	3	4					2		2					2	2		1
Func- tion trou- ble	Poor power trans- mission	Slip	While accelerat- ing in 3GR, en- gine races.		3			3	3	4					2		2				2	2			1
			While accelerat- ing in 4GR, en- gine races.		3			3	3	4					2				2		2	2			1
			While accelerat- ing in 5GR, en- gine races.		3			3	3	4					2				2	2	2		2		1
			While accelerat- ing in 6GR, en- gine races.		3			3	3	4					2				2	2		2	2		1
			While accelerat- ing in 7GR, en- gine races.		3			3	3	4					2			2	2	2			2		1
			Lock-up		3			3	3	4					2	2								$ \parallel$	1
			No creep at all. Extremely large creep.					1							1	1	1	1	1	1	1	1	1		

#### < SYMPTOM DIAGNOSIS >

# [7AT: RE7R01A]

											Di	agn	ost	ic ite	em										А
	Sympt	om	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	B C TM E
			TM-103	TM-114	TM-142	TM-141	<u>TM-116</u>	TM-113	TM-111	TM-158	TM-110	<u>TM-148</u>	SEC-71	<u>TM-135</u>	<u>TM-132</u>	<u>TM-155</u>	<u>TM-140</u>	TM-154	TM-137	TM-157	<u>TM-156</u>	<u>TM-136</u>	TM-108	TM-107	F
		Vehicle cannot run in all position.	3								2			1	1	1	1	1	1	1	1	1			G
		Driving is not possible in "D" position.	3								2			1	1	1	1	1	1	1	1	1			
		Driving is not possible in "R" position.	3								2			1						1		1			Н
	Power transmis- sion cannot be	Engine stall		4		5	5			6			3		2								1		
	performed	Engine stalls when selector lever shifted "N" $\rightarrow$ "D" or "R".		4		5	5				3				2								1		
		Engine does not start in "N" or "P" position.	3							1	2												1		J
Function trouble		Engine starts in position other than "N" or "P".	3								2												1		K
		Vehicle does not enter parking condition.	1								2														IX.
		Parking condition is not cancelled.	1								2														L
	Descention	Vehicle runs with A/T in "P" position.	1								2														в. Л
	Poor operation	Vehicle moves forward with the "R" position.	1								2														Μ
		Vehicle runs with A/T in "N" position.	1								2														Ν
		Vehicle moves backward with the "D" position.	1								2														0

SYMPTOM TABLE 2

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#### < SYMPTOM DIAGNOSIS >

										Diag	nosti	c iter	n					
		S	ymptom		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
					<u>TM-295</u>	<u>TM-235</u>	<u>TM-235</u>	<u>TM-235</u>	<u>TM-317</u>	<u>TM-307</u>	TM-320	<u>TM-295</u>	<u>TM-235</u>	<u>TM-235</u>	<u>TM-312</u>	<u>TM-235</u>	<u>TM-191</u>	<u>TM-196</u> (2WD) <u>TM-235</u> (AWD)
		-	-	in "D" position.														
		Shift po	oint is low	in "D" position.														
				$\rightarrow$ "D" position	1		2										2	
				$\rightarrow$ "R" position	1								1				2	
				1GR ⇔ 2GR								1					2	
				2GR ⇔ 3GR							1						2	
				3GR ⇔ 4GR			2		1								2	
	Driving		When	4GR ⇔ 5GR						1		1					2	
	perfor- mance	Large shock	shift- ing	5GR ⇔ 6GR							1	1					2	
Poor		onook	gears	6GR ⇔ 7GR				1				1					2	
perfor- mance				Downshift when accel- erator pedal is de- pressed			2	1	1	1	1	1		1	1		2	
				Upshift when accelera- tor pedal is released			2	1	1	1	1	1		1	1		2	
				Lock-up		1											2	
		Judder		Lock-up		1											2	
				In "R" position	1	1							1			1	2	
	Stronge	noice		In "N" position	1	1										1	2	
	Strange	noise		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-17, "Cross-Sectional View".

#### < SYMPTOM DIAGNOSIS >

## [7AT: RE7R01A]

									Diag	nosti	c iten	۱						А
		Sympto	m	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	B C
				<u>TM-295</u>	<u>TM-235</u>	<u>TM-235</u>	TM-235	<u>TM-317</u>	TM-307	TM-320	<u>TM-295</u>	TM-235	<u>TM-235</u>	<u>TM-312</u>	<u>TM-235</u>	TM-191	<u>TM-196</u> (2WD) <u>TM-235</u> (AWD)	E
			Locks in 1GR				1		1		1					2		F
			Locks in 2GR													1		
			Locks in 3GR													1		
			Locks in 4GR													1		G
			Locks in 5GR													1		
			Locks in 6GR													1		Н
			Locks in 7GR													1		
			$1GR \rightarrow 2GR$				1		1		1					2		
		"D" posi-	$2\text{GR} \rightarrow 3\text{GR}$							1						2		
		tion	$3\text{GR} \rightarrow 4\text{GR}$			2	1	1	1							2		
			$4\text{GR} \rightarrow 5\text{GR}$							1	1					2		J
Func- tion	Gear does no		$5 \text{GR} \rightarrow 6 \text{GR}$							1						2		J
trouble	change		$6\text{GR} \rightarrow 7\text{GR}$			2	1	1	1							2		
			$5\text{GR} \rightarrow 4\text{GR}$						1							2		K
			$4GR \rightarrow 3GR$			2		1								2		
			$3\text{GR} \rightarrow 2\text{GR}$							1				1		2		
			$2\text{GR} \rightarrow 1\text{GR}$							1	1		1			2		L
			Does not lock-up		1	2	1	1	1	1	1		1	1		2		
			1GR ⇔ 2GR			2	1	1	1	1	1		1	1		2		N
			2GR ⇔ 3GR			2	1	1	1	1	1		1	1		2		
		"M" posi-	3GR ⇔ 4GR			2	1	1	1	1	1		1	1		2		
		tion	4GR ⇔ 5GR			2	1	1	1	1	1		1	1		2		Ν
			5GR ⇔ 6GR			2	1	1	1	1	1		1	1		2		
			6GR ⇔ 7GR			2	1	1	1	1	1		1	1		2		0

\*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-17, "Cross-Sectional View".

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#### < SYMPTOM DIAGNOSIS >

										D	iagno	ostic i	tem					
			Symptom		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
					<u>TM-295</u>	TM-235	<u>TM-235</u>	TM-235	<u>TM-317</u>	TM-307	<u>TM-320</u>	<u>TM-295</u>	TM-235	<u>TM-235</u>	TM-312	<u>TM-235</u>	<u>TM-191</u>	<u>TM-196</u> (2WD) <u>TM-235</u> (AWD)
				1GR ⇔ 2GR	1							1		1			2	
				$2\text{GR} \Leftrightarrow 3\text{GR}$	1						1						2	
		Slip	When shifting	$3GR \Leftrightarrow 4GR$	1		2		1								2	-
		Silp	gears	4GR ⇔ 5GR	1					1		1					2	
				5GR ⇔ 6GR	1						1	1					2	
Func-	Poor			6GR ⇔ 7GR	1			1				1					2	
tion	shift-		"D" position	$h \rightarrow$ "M" position	1			1	1					1	1		2	
trouble	ing			$7\text{GR} \rightarrow 6\text{GR}$	1			1				1					2	
		En- gine		$6\text{GR} \rightarrow 5\text{GR}$	1						1	1					2	
		brake	"M" posi-	$5\text{GR} \rightarrow 4\text{GR}$	1					1		1					2	
		does not	tion	$4\text{GR} \rightarrow 3\text{GR}$	1		2		1								2	
		work		$3\text{GR} \rightarrow 2\text{GR}$	1				1		1			1	1		2	
				$2\text{GR} \rightarrow 1\text{GR}$	1			1				1		1			2	

#### < SYMPTOM DIAGNOSIS >

#### [7AT: RE7R01A]

									D	Diagno	ostic i	item						
		Symptom		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	-
				<u>TM-295</u>	<u>TM-235</u>	<u>TM-235</u>	<u>TM-235</u>	TM-317	<u>TM-307</u>	<u>TM-320</u>	<u>TM-295</u>	<u>TM-235</u>	<u>TM-235</u>	<u>TM-312</u>	<u>TM-235</u>	TM-191	<u>TM-196</u> (2WD) <u>TM-235</u> (AWD)	Т
			With selector lever in "D" position, ac- celeration is ex- tremely poor.	1	1	2							1		1	2		
			With selector lever in "R" position, ac- celeration is ex- tremely poor.	1	1							1	1	1	1	2		
			While starting off by accelerating in 1GR, engine rac- es.	1	1	2							1	1	1	2		
			While accelerating in 2GR, engine races.	1		2					1			1	1	2		
unc- on	Poor pow- er trans-	Slip	While accelerating in 3GR, engine races.	1		2				1	1				1	2		_
ouble	mis- sion		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. Extremely large creep.	1	1	2	1	1	1	1	1		1	1	1	2	1	

\*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-17, "Cross-Sectional View".

#### < SYMPTOM DIAGNOSIS >

								D	liagn	ostic	item	1				
	Sj	ymptom	Oil pump	Torque converter	Low brake*	Front brake	High and low reverse clutch	Input clutch	Direct clutch	2346 brake	Reverse brake	gear	1st one-way clutch	2nd one-way clutch	control valve	Parking component
			<u>TM-295</u>	<u>TM-235</u>	TM-235	<u>TM-235</u>	<u>TM-317</u>	TM-307	TM-320	<u>TM-295</u>	TM-235	<u>TM-235</u>	<u>TM-312</u>	<u>TM-235</u>	TM-191	<u>TM-196</u> (2WD) <u>TM-235</u> (AWD)
		Vehicle cannot run in all position.	1	1	2	1	1	1	1	1				1	2	1
		Driving is not possible in "D" posi- tion.	1	1	2	1	1	1	1	1		1	1	1	2	1
		Driving is not possible in "R" posi- tion.	1								1	1	1	1	2	1
	Power trans- mission cannot	Engine stall		1												
	be performed	Engine stalls when selector lever shifted "N" $\rightarrow$ "D" or "R".		1												
		Engine does not start in "N" or "P" position.		1												
Function		Engine starts in position other than "N" or "P".														
trouble		Vehicle does not enter parking condition.														1
		Parking condition is not can- celled.														1
	Deer energier	Vehicle runs with A/T in "P" posi- tion.			2	1	1	1	1	1	1				2	1
	Poor operation	Vehicle moves forward with the "R" position.			2	1	1	1	1	1					2	
		Vehicle runs with A/T in "N" posi- tion.			2	1	1	1	1	1	1				2	
		Vehicle moves backward with the "D" position.									1				2	

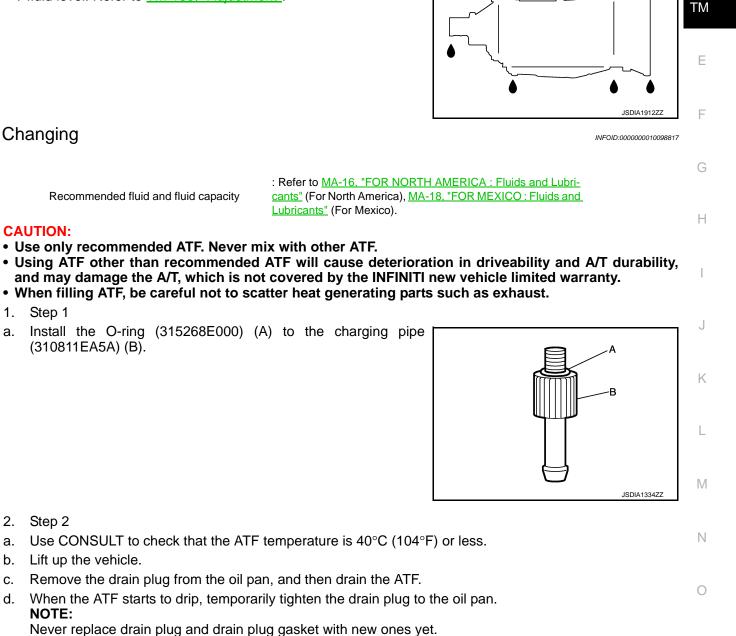
\*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-17, "Cross-Sectional View".

## PERIODIC MAINTENANCE A/T FLUID

### Inspection

### 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-183, "Adjustment".



Remove overflow plug from oil pan.

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### A/T FLUID

### < PERIODIC MAINTENANCE >

- f. Install the charging pipe (A) to the overflow plug hole.
   CAUTION:
   Tighten the charging pipe by hand.
- g. Install the bucket pump hose (B) to the charging pipe.
   CAUTION:

Insert the bucket pump hose all the way to the end of the charging pipe.

- h. Fill approximately 3 liters (3-1/8 US qt, 2-5/8 lmp qt) of the ATF.
- i. Remove the bucket pump hose to remove the charging pipe, and then temporarily tighten the overflow plug to the oil pan. CAUTION:

## Quickly perform the procedure to avoid ATF leakage from the oil pan.

- j. Lift down the vehicle.
- k. Start the engine and wait for approximately 3 minutes.
- I. Stop the engine.
- 3. Step 3
- a. Repeat "Step 2".
- 4. Final Step
- a. Use CONSULT to check that the ATF temperature is 40°C (104°F) or less.
- b. Lift up the vehicle.
- c. Remove the drain plug from the oil pan, and then drain the ATF.
- d. When the ATF starts to drip, tighten the drain plug to the oil pan to the specified torque. Refer to <u>TM-191</u>, <u>"Exploded View"</u>.

#### CAUTION: Never reuse drain plug and drain plug gasket.

- e. Remove overflow plug from oil pan.
- f. Install the charging pipe (A) to the overflow plug hole. **CAUTION:**

#### Tighten the charging pipe by hand.

- g. Install the bucket pump hose (B) to the charging pipe.
   CAUTION:
   Insert the bucket pump hose all the way to the end of the charging pipe.
- h. Fill approximately 3 liters (3-1/8 US qt, 2-5/8 lmp qt) of the ATF.
- i. Remove the bucket pump hose to remove the charging pipe, and then temporarily tighten the overflow plug to the oil pan. CAUTION:

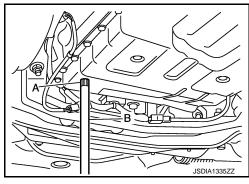
## Quickly perform the procedure to avoid ATF leakage from the oil pan.

- j. Lift down the vehicle.
- k. Start the engine.
- I. Make the ATF temperature approximately 40°C (104°F). NOTE:

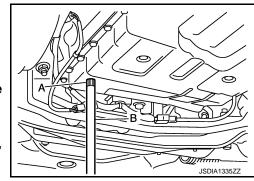
The ATF level is greatly affected by the temperature. Always check the ATF temperature on "ATF TEMP 1" of "Data Monitor" using CONSULT.

- 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 <u>TM-191, "Exploded View"</u>. CAUTION:

#### Never reuse overflow plug.



[7AT: RE7R01A]



TM-182

### A/T FLUID

#### < PERIODIC MAINTENANCE >

### Adjustment

### [7AT: RE7R01A]

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Recommended fluid and fluid capacity

: Refer to <u>MA-16, "FOR NORTH AMERICA : Fluids and Lubri-</u> <u>cants"</u> (For North America), <u>MA-18, "FOR MEXICO : Fluids and</u> <u>Lubricants"</u> (For Mexico).

#### **CAUTION:**

- Use only recommended ATF. Never mix with other ATF.
- Using ATF other than recommended ATF will cause deterioration in driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.
- When filling ATF, be careful not to scatter heat generating parts such as exhaust.
- Always maintain the ATF temperature within between 35°C (95°F) and 45°C (113°F) while checking TM with CONSULT when the ATF level adjustment is performed.
- 1. Install the O-ring (315268E000) (A) to the charging pipe (310811EA5A) (B).
- Start the engine.
- 3. Make the ATF temperature approximately 40°C (104°F). NOTE:

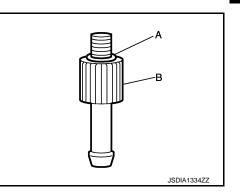
The ATF level is greatly affected by the temperature. Always check the ATF temperature on "ATF TEMP 1" of "Data Monitor" using CONSULT.

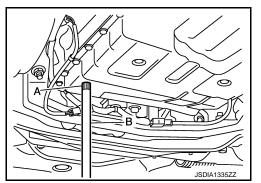
- 4. Park vehicle on level surface and set parking brake.
- 5. Shift the selector lever through each gear position. Leave selector lever in "P" position.
- 6. Lift up the vehicle.
- 7. Check the ATF leakage from transmission.
- 8. Remove overflow plug from oil pan.
- 9. Install the charging pipe (A) to the overflow plug hole. CAUTION:

#### Tighten the charging pipe by hand.

- 10. Install the bucket pump hose (B) to the charging pipe.
   CAUTION: Insert the bucket pump hose all the way to the end of the
- charging pipe.
- 11. Fill approximately 0.5 liters (1/2 US qt, 1/2 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.
- When the ATF starts to drip, tighten the overflow plug to the oil pan to the specified torque. Refer to <u>TM-191, "Exploded View"</u>. CAUTION:

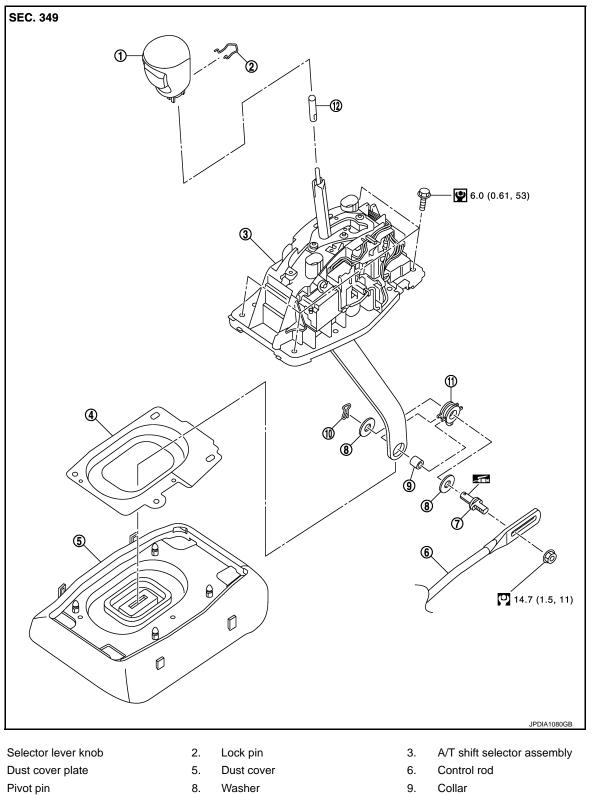
Never reuse overflow plug.





### < REMOVAL AND INSTALLATION > **REMOVAL AND INSTALLATION** A/T SHIFT SELECTOR 2WD

2WD : Exploded View



7.

1.

4.

10. Snap pin Insulator

11.

- Collar
- 12. Adapter

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[7AT: RE7R01A]

2014 Q70

Apply multi-purpose grease.
Refer to <u>GI-4, "Components"</u> for symbols in the figure.

### 2WD : Removal and Installation

### 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.
- Remove center console assembly. Refer to <u>IP-23</u>, "Exploded <u>View"</u>.
- 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.
- 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.

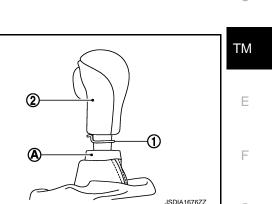
### 2WD : Inspection and Adjustment

**INSPECTION AFTER INSTALLATION** 

Check A/T positions after adjusting A/T positions. Refer to <u>TM-103. "Inspection and Adjustment"</u>.

#### ADJUSTMENT AFTER INSTALLATION

Adjust A/T positions. Refer to <u>TM-103. "Inspection and Adjustment"</u>. AWD



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В

: Apply multi-purpose grease.

Refer to GI-4, "Components" for symbols in the figure.

### < REMOVAL AND INSTALLATION >

1

### AWD : Exploded View

SEC. 349

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[7AT: RE7R01A]

### A/T SHIFT SELECTOR

VQ37VHR models

## 2 12 9 6.0 (0.61, 53) 3 10 ⓓ 8 $\circ$ 6 0 4 (7) ం) 5 6 14.7 (1.5, 11) 9 Ø 9 Ø JPDIA1081GB

- 1. Selector lever knob
- 4. Control rod
- Snap pin
   Pivot pin

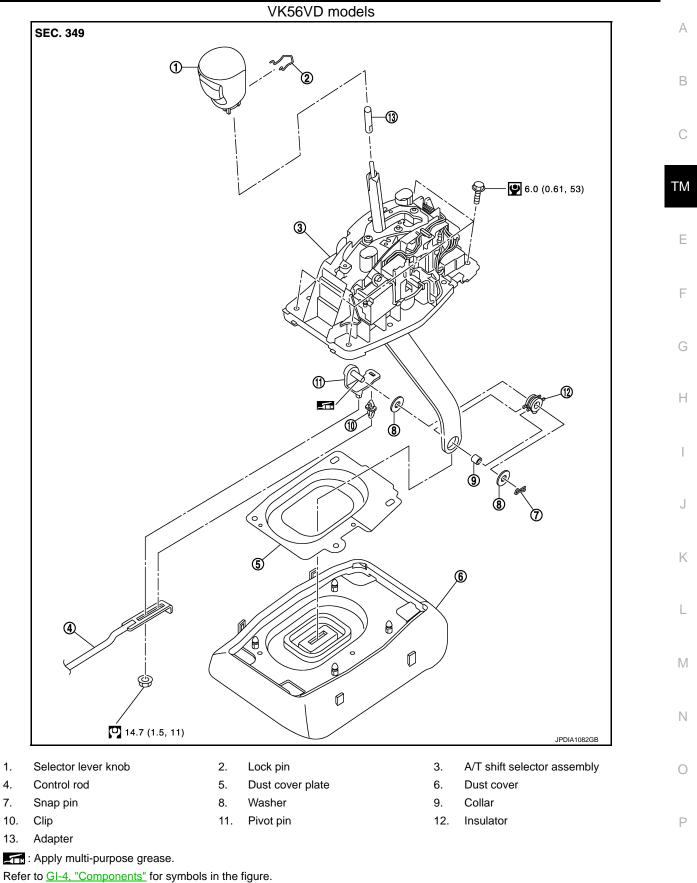
- Lock pin
   Dust cover plate
- 5. Du
  - 8. Washer
  - 11. Insulator

- 3. A/T shift selector assembly
- 6. Dust cover
- 9. Collar
- 12. Adapter

### A/T SHIFT SELECTOR

### < REMOVAL AND INSTALLATION >

[7AT: RE7R01A]



### AWD : Removal and Installation

INFOID:000000010098926

### A/T SHIFT SELECTOR

#### < 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 <u>IP-23. "Exploded</u> <u>View"</u>.
- 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.

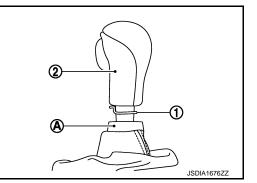
#### AWD : Inspection and Adjustment

#### INSPECTION AFTER INSTALLATION

Check A/T positions after adjusting A/T positions. Refer to TM-103, "Inspection and Adjustment".

#### ADJUSTMENT AFTER INSTALLATION

Adjust A/T positions. Refer to TM-103, "Inspection and Adjustment".

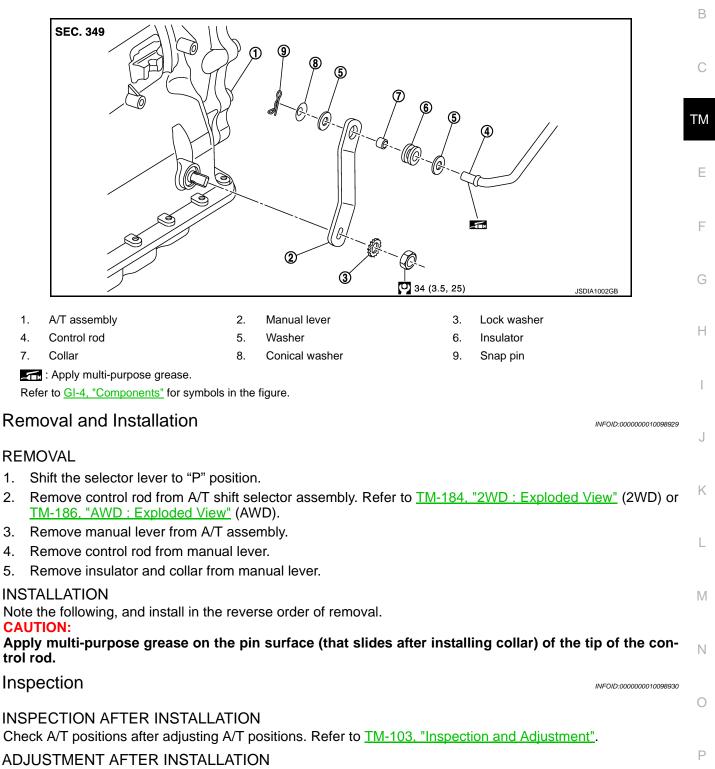


### CONTROL ROD

Exploded View

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[7AT: RE7R01A]



Adjust A/T positions. Refer to TM-103, "Inspection and Adjustment".

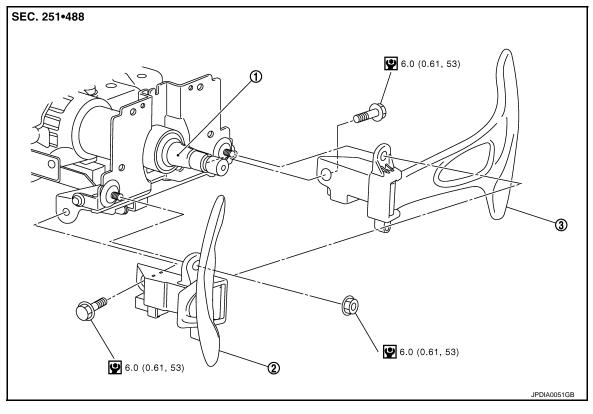
### PADDLE SHIFTER

# < REMOVAL AND INSTALLATION > PADDLE SHIFTER

## Exploded View

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[7AT: RE7R01A]



1. Steering column assembly2. Paddle shifter (shift-down)Refer to GI-4. "Components" for symbols in the figure.

### Removal and Installation

### REMOVAL

- 1. Remove steering column cover. Refer to <u>IP-12, "Exploded View"</u>.
- 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.

3. Paddle shifter (shift-up)

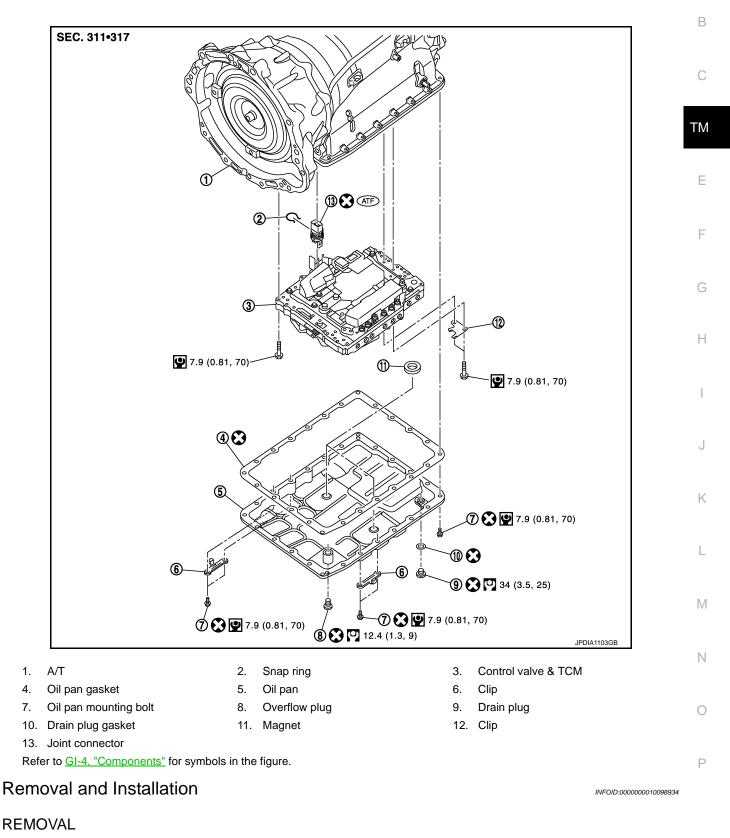
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CONTROL VALVE & TCM

### **Exploded View**

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

### TM-191

### **CONTROL VALVE & TCM**

### < REMOVAL AND INSTALLATION >

#### next heated avygan sensor 2 connectors (A)

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

- 🗭 : Bolt
- 4. Remove heated oxygen sensor 2 harness (B) from clips (1).
- 5. Remove bracket (2) from A/T assembly. Refer to <u>TM-223.</u> <u>"VQ37VHR (2WD) : Exploded View"</u> (VQ37VHR) or <u>TM-229.</u> <u>"VK56VD (2WD) : Exploded View"</u> (VK56VD).
- 6. Remove clips (1).

8.

- : Oil pan mounting bolt
- 7. Remove oil pan (2) and oil pan gasket.

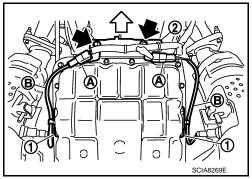
Remove magnets (1) from oil pan.

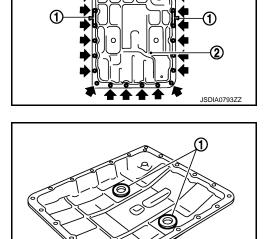
9. Remove snap ring (1) from joint connector (2).

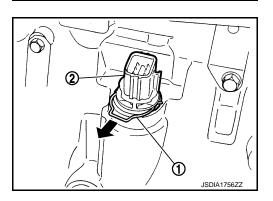
10. Push joint connector (1).

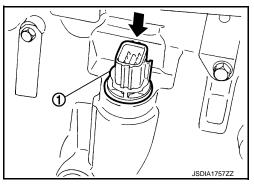


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### [7AT: RE7R01A]

### **CONTROL VALVE & TCM**

### < REMOVAL AND INSTALLATION >

- 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.

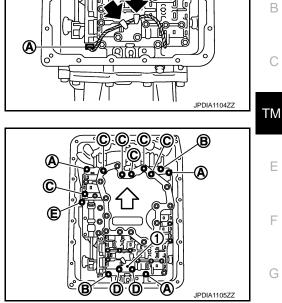
Bolt symbol	Length mm (in)	Number of bolts
А	43 (1.69)	3
В	40 (1.57)	2
С	54 (2.13)	6
D	50 (1.97)	2
E*	50 (1.97)	1

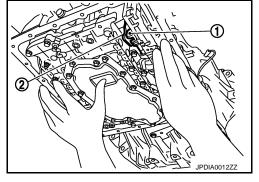
\*: Reamer bolt

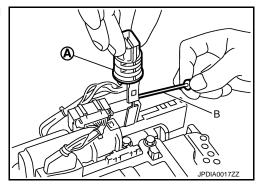
14. Remove the control valve & TCM from transmission case. CAUTION:

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.







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### 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.

### TM-193

### [7AT: RE7R01A]

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#### < REMOVAL AND INSTALLATION >

### [7AT: RE7R01A]

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#### **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.

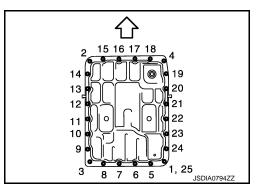
- Install bolts and clip (1) to the control valve & TCM. Tighten bolt (E) to the specified torque before tightening the other than bolts.

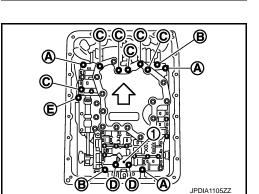
#### 

Bolt symbol	Length mm (in)	Number of bolts
A	43 (1.69)	3
В	40 (1.57)	2
С	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.



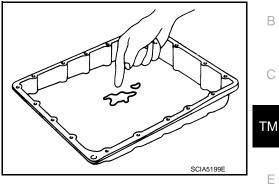


### Inspection and Adjustment

### 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 <u>TM-99, "Cleaning"</u>.



INSPECTION AFTER INSTALLATION Check A/T fluid leakage. Refer to <u>TM-181, "Inspection"</u>.

#### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to TM-183, "Adjustment".
- Perform G sensor calibration when replacing control valve & TCM. Refer to <u>TM-97</u>, "Special Repair Requirement".



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Revision: 2013 November

### [7AT: RE7R01A]

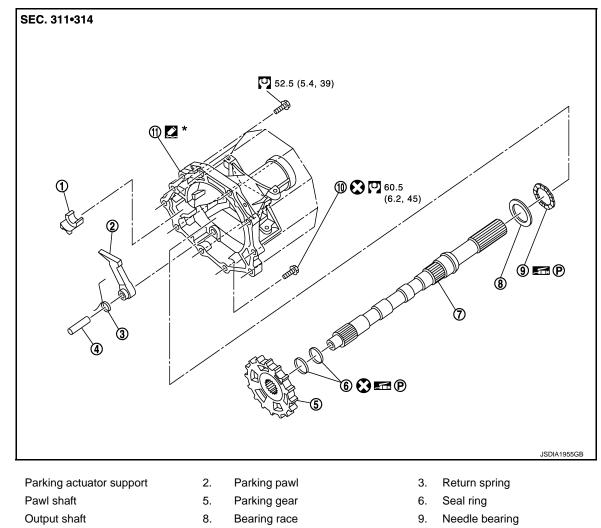
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### PARKING COMPONENTS 2WD

2WD : Exploded View

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10. Self-sealing bolt 11. Rear extension

\*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to <u>GI-24, "Recommended Chemical Products and Sealants"</u>.
Refer to <u>GI-4, "Components"</u> for symbols not described on the above.

### 2WD : Removal and Installation

### REMOVAL

1.

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7.

- 1. Drain ATF through drain plug.
- 2. Remove exhaust front tube and center muffler with power tool. Refer to <u>EX-5</u>, "VQ37VHR : <u>Exploded</u> <u>View</u>" (VQ37VHR) or <u>EX-7</u>, "VK56VD : <u>Exploded</u> <u>View</u>" (VK56VD).
- 3. Separate propeller shaft assembly. Refer to <u>DLN-104, "Exploded View"</u>.
- 4. Remove control rod. Refer to TM-189, "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 <u>EM-76, "2WD : Exploded View"</u> (VQ37VHR) or <u>EM-219, "2WD : Exploded View"</u> (VK56VD).

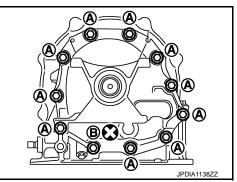
### TM-196

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### < REMOVAL AND INSTALLATION >

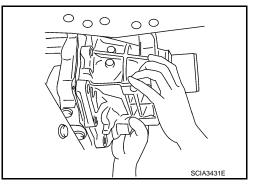
- 7. Remove engine mounting insulator (rear). Refer to <u>EM-76, "2WD : Exploded View"</u> (VQ37VHR) or <u>EM-219, "2WD : Exploded View"</u> (VK56VD).
- 8. Remove tightening bolts for rear extension assembly and transmission case.
  - A : Bolt
  - B : Self-sealing bolt

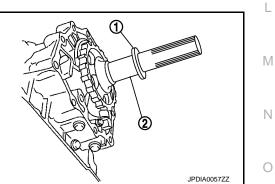


 Tap rear extension assembly with a soft hammer (A).
 CAUTION: Be careful not to damage adapter case.

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

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





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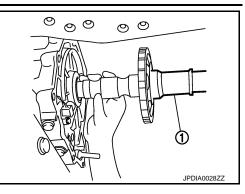
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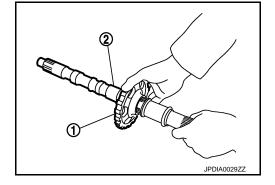
### < REMOVAL AND INSTALLATION >

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

### [7AT: RE7R01A]

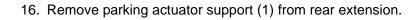


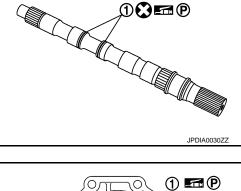
13. Remove parking gear (1) from output shaft (2).

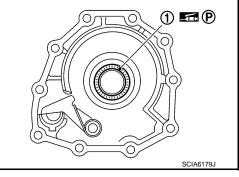


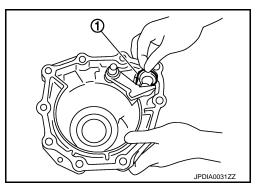
14. Remove seal rings (1) from output shaft.

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





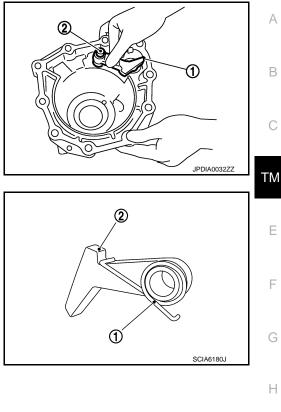




### < REMOVAL AND INSTALLATION >

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





#### INSTALLATION

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

• Never reuse seal rings and drain plug gasket.

18. Remove return spring (1) from parking pawl (2).

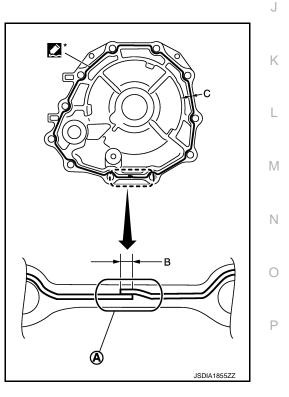
- Apply petroleum jelly to needle bearing and seal rings.
- Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the rear extension assembly.
- Refer to the followings installing rear extension assembly.
- Apply recommended sealant to rear extension assembly as shown in the figure.

: Genuine Anaerobic Liquid Gasket or equivalent. Refer to <u>GI-24, "Recommended Chemical Products and Sealants"</u>.

Sealant starting<br/>point and end-<br/>point (A): Start and finish point shall be in<br/>the center of two bolts.Overlap width of<br/>sealant starting<br/>point and end-<br/>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)

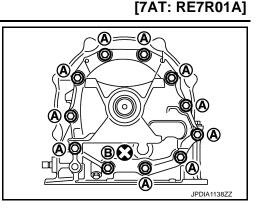
#### **CAUTION:**

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



### < REMOVAL AND INSTALLATION >

- Tighten rear extension assembly bolts to the specified torque.
  - A : Bolt
  - B : Self-sealing bolt

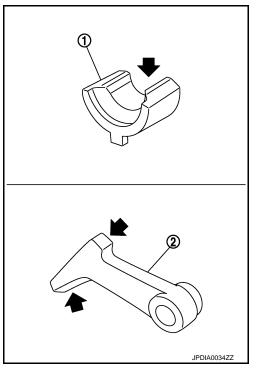


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2WD : Inspection and Adjustment

**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-181, "Inspection".
- Check A/T positions after adjusting A/T positions. Refer to TM-103, "Inspection and Adjustment".

### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T positions. Refer to TM-103, "Inspection and Adjustment".
- Adjust A/T fluid level. Refer to <u>TM-183</u>, "Adjustment".

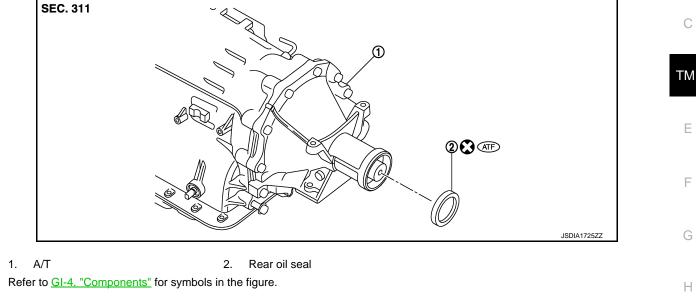
### REAR OIL SEAL 2WD

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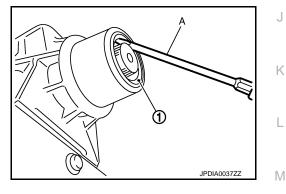


### 2WD : Removal and Installation

### REMOVAL

- 1. Separate propeller shaft assembly. Refer to <u>DLN-104, "Exploded View"</u>.
- 2. Remove rear oil seal (1) using a flat-bladed screwdriver (A). CAUTION:

Be careful not to scratch rear extension assembly.



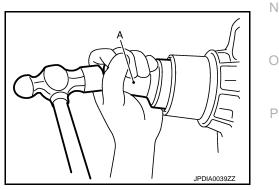
### INSTALLATION

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

• As shown in the figure, use the drift [SST: ST33400001 (J-26082)] (A) to drive rear oil seal into rear extension assembly until it is flush.

#### **CAUTION:**

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



### 2WD : Inspection

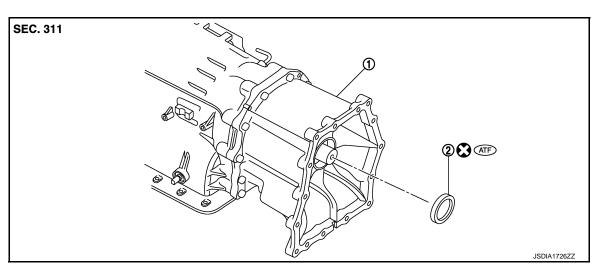
INSPECTION AFTER INSTALLATION Check A/T fluid leakage. Refer to <u>TM-181, "Inspection"</u>.

ADJUSTMENT AFTER INSTALLATION Adjust A/T fluid level. Refer to <u>TM-183, "Adjustment"</u>. AWD

### AWD : Exploded View

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 1. A/T
 2. Rear oil seal

 Refer to GI-4. "Components" for symbols in the figure.

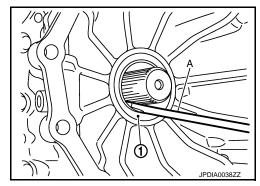
### AWD : Removal and Installation

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### REMOVAL

- Remove transfer assembly from A/T assembly. Refer to <u>DLN-66, "VQ37VHR : Exploded View"</u> (VQ37VHR) or <u>DLN-67, "VK56VD : Exploded View"</u> (VK56VD).
- 2. Remove rear oil seal (1) using a flat-bladed screwdriver (A).

Be careful not to scratch adapter case assembly.

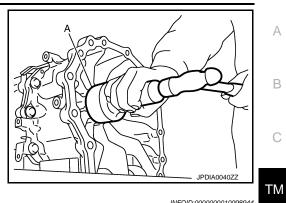


INSTALLATION Note the following, and install in the reverse order of removal.

### **REAR OIL SEAL**

### < REMOVAL AND INSTALLATION >

- 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

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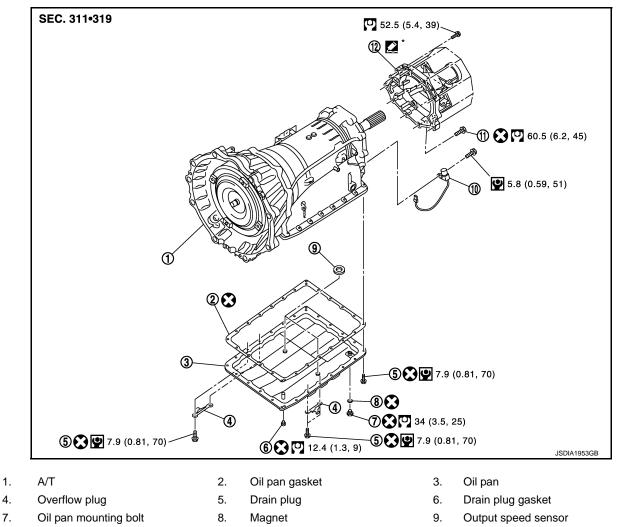
**INSPECTION AFTER INSTALLATION** Check A/T fluid leakage. Refer to TM-181, "Inspection".

ADJUSTMENT AFTER INSTALLATION Adjust A/T fluid level. Refer to TM-183, "Adjustment".

### OUTPUT SPEED SENSOR 2WD

2WD : Exploded View

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10. Rear extension 11. Self-sealing bolt

\*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to <u>GI-24, "Recommended Chemical Products and Sealants"</u>.
Refer to <u>GI-4, "Components"</u> for symbols not described on the above.

### 2WD : Removal and Installation

### REMOVAL

- 1. Disconnect the battery cable from the negative terminal.
- 2. Drain ATF through drain plug.
- Remove exhaust front tube and center muffler with power tool. Refer to <u>EX-5</u>, <u>"VQ37VHR : Exploded View"</u> (VQ37VHR) or <u>EX-7</u>, <u>"VK56VD : Exploded View"</u> (VK56VD).
- 4. Separate propeller shaft assembly. Refer to DLN-104, "Exploded View".
- 5. Remove control rod. Refer to TM-189, "Exploded View".
- 6. Remove exhaust mounting bracket. Refer to <u>EX-5. "VQ37VHR : Exploded View"</u> (VQ37VHR) or <u>EX-7.</u> <u>"VK56VD : Exploded View"</u> (VK56VD).

### TM-204

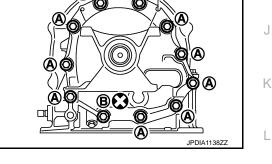
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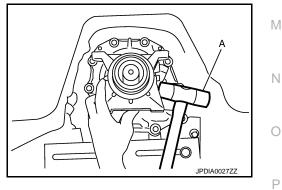
### < REMOVAL AND INSTALLATION >

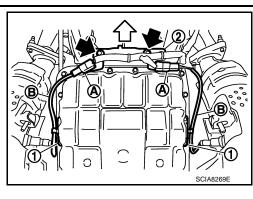
7. Disconnect heated oxygen sensor 2 harness connectors (A).

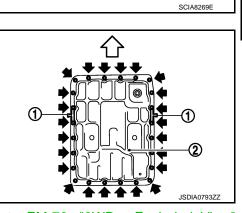
- 🗲 : Bolt
- 8. Remove heated oxygen sensor 2 harness (B) from clips (1).
- Remove bracket (2) from transmission assembly. Refer to <u>TM-223</u>, "VQ37VHR (2WD) : Exploded View" (VQ37VHR) or <u>TM-229</u>, "VK56VD (2WD) : Exploded View" (VK56VD).
- 10. Remove clips (1).

  - 🖛 : Oil pan mounting bolt
- 11. Remove oil pan (2) and oil pan gasket.
- 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 <u>EM-76. "2WD : Exploded View"</u> (VQ37VHR) or <u>EM-219. "2WD : Exploded View"</u> (VK56VD).
- 14. Remove engine mounting insulator (rear). Refer to <u>EM-76, "2WD : Exploded View"</u> (VQ37VHR) or <u>EM-219, "2WD : Exploded View"</u> (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.

### [7AT: RE7R01A]

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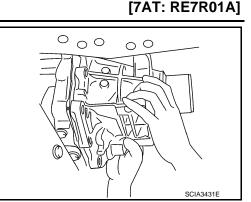
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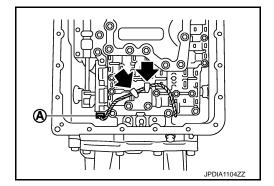
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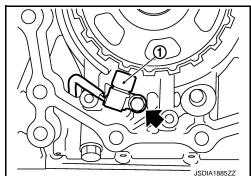
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### < REMOVAL AND INSTALLATION >

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.

#### < REMOVAL AND INSTALLATION >

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

: Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-24, "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.

- Tighten rear extension assembly bolts to the specified torque.
  - А : Bolt
  - в : Self-sealing bolt

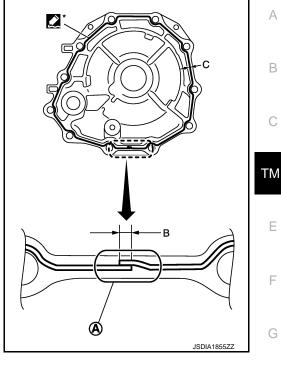
• Refer to the followings when installing oil pan (2) (with oil pan gasket) and clips (1) to transmission case.

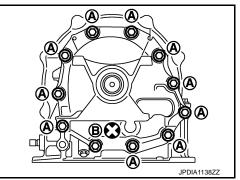
#### ⟨□ : Vehicle front

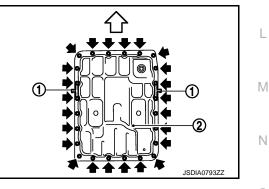
Cil pan mounting bolt

#### **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.









### [7AT: RE7R01A]

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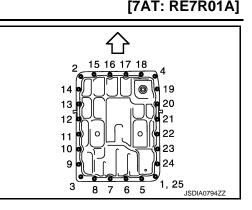
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#### < REMOVAL AND INSTALLATION >

 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.

 $\triangleleft$ : Vehicle front



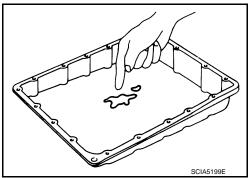
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### 2WD : Inspection

#### 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 <u>TM-99, "Cleaning"</u>.



### INSPECTION AFTER INSTALLATION

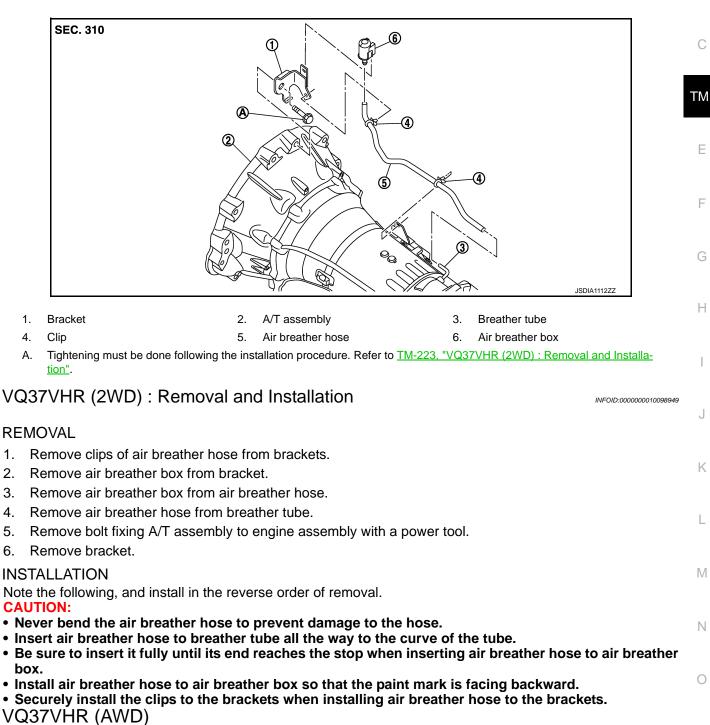
- Check A/T fluid leakage. Refer to <u>TM-181, "Inspection"</u>.
- Check A/T positions after adjusting A/T positions. Refer to <u>TM-103</u>, "Inspection and Adjustment".

#### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T positions. Refer to <u>TM-103</u>, "Inspection and Adjustment".
- Adjust A/T fluid level. Refer to <u>TM-183, "Adjustment"</u>.

### AIR BREATHER HOSE VQ37VHR (2WD)

VQ37VHR (2WD) : Exploded View



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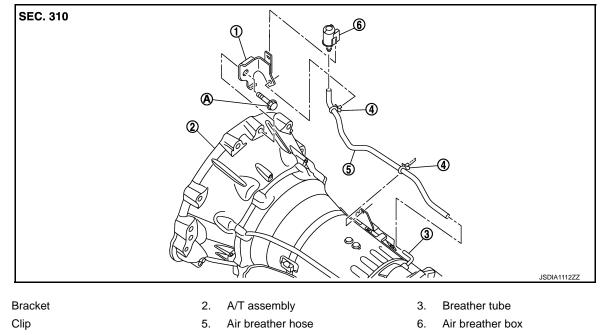
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### < REMOVAL AND INSTALLATION >

### VQ37VHR (AWD) : Exploded View

[7AT: RE7R01A]



A. Tightening must be done following the installation procedure. Refer to TM-226, "VQ37VHR (AWD) : Exploded View".

### VQ37VHR (AWD) : Removal and Installation

INFOID:000000010098951

### REMOVAL

1

4.

- 1. Remove propeller shaft assembly (front). Refer to <u>DLN-93, "VQ37VHR : Exploded View"</u>.
- 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 propeller shaft assembly (rear). Refer to <u>DLN-114, "Exploded View"</u>.
- 7. Remove control rod from A/T shift selector assembly. Refer to TM-186, "AWD : Exploded View".
- 8. 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.

- 9. Remove rear engine mounting member with a power tool. Refer to EM-76, "2WD : Exploded View".
- 10. Remove bolt fixing A/T assembly to engine assembly with power tool.
- 11. Remove air 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.

VK56VD (2WD)

### < REMOVAL AND INSTALLATION >

### VK56VD (2WD) : Exploded View

### [7AT: RE7R01A]

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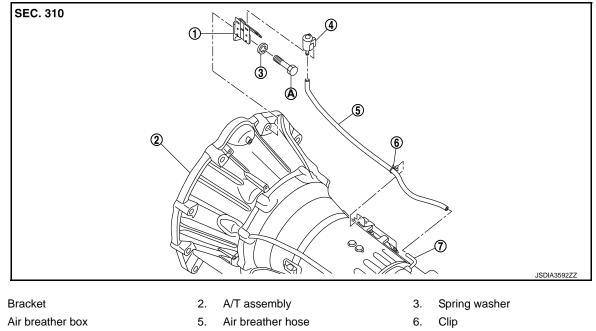
SEC. 310	В
	С
	ТМ
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Image: Second state of the se	G
<ul> <li>7. Clip</li> <li>8. Breather tube</li> <li>A. Tightening must be done following the installation procedure. Refer to <u>TM-223, "VQ37VHR (2WD) : Removal and Installa-tion"</u>.</li> </ul>	Н
VK56VD (2WD) : Removal and Installation	r
<ol> <li>REMOVAL</li> <li>Remove exhaust front tube. Refer to <u>EX-7, "VK56VD : Exploded View"</u>.</li> <li>Remove clips of air breather hose from brackets.</li> </ol>	J
<ol> <li>Remove air breather box from bracket.</li> <li>Remove air breather box from air breather hose.</li> <li>Remove air breather hose from breather tube.</li> </ol>	K
<ol> <li>Remove all breather hose from breather tube.</li> <li>Remove bolt fixing A/T assembly to engine assembly with a power tool.</li> <li>Remove bracket.</li> </ol>	L
INSTALLATION Note the following, and install in the reverse order of removal. CAUTION:	M
<ul> <li>Never bend the air breather hose to prevent damage to the hose.</li> <li>Insert A/T air breather hose to breather tube all the way to the curve of the tube.</li> <li>Be sure to insert it fully until its end reaches the stop when inserting air breather hose to air breather box.</li> </ul>	Ν
<ul> <li>Install air breather hose to air breather box so that the paint mark is facing backward.</li> <li>Securely install the clips to the brackets when installing air breather hose to the brackets.</li> <li>VK56VD (AWD)</li> </ul>	0
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### < REMOVAL AND INSTALLATION >

### VK56VD (AWD) : Exploded View

[7AT: RE7R01A]



7. Breather tube

A. Tightening must be done following the installation procedure. Refer to TM-232, "VK56VD (AWD) : Removal and Installation".

### VK56VD (AWD) : Removal and Installation

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#### REMOVAL

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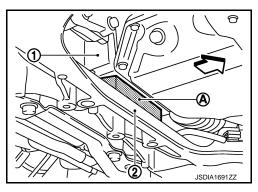
- 1. Remove propeller shaft assembly (front). Refer to <u>DLN-95, "VK56VD : Exploded View"</u>.
- 2. Remove clips of air breather hose from brackets.
- 3. Remove air breather box from bracket.
- 4. Remove air breather box from air breather hose.
- 5. Remove air breather hose from breather tube.
- 6. Remove propeller shaft assembly (rear). Refer to <u>DLN-114, "Exploded View"</u>.
- 7. Remove control rod from A/T shift selector. Refer to TM-186, "AWD : Exploded View".
- 8. Support A/T assembly with a transmission jack.
- 9. 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.
- 10. Remove rear engine mounting member with a power tool. Refer to EM-219, "2WD : Exploded View".
- 11. Remove bolt fixing A/T assembly to engine assembly with a power tool.
- 12. Remove bracket.

INSTALLATION



Revision: 2013 November

#### < REMOVAL AND 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.

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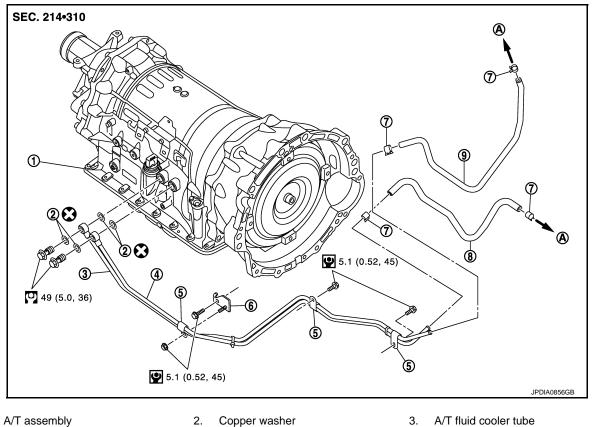
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### < REMOVAL AND INSTALLATION > FLUID COOLER SYSTEM

### VQ37VHR (2WD)

VQ37VHR (2WD) : Exploded View

INFOID-000000010098956



- 1. 4.
- 5. Clip

8.

- A/T fluid cooler tube
- 7. Hose clamp
- To radiator Α.

Refer to GI-4, "Components" for symbols in the figure.

### VQ37VHR (2WD) : Removal and Installation

INFOID:000000010098957

Bracket

A/T fluid cooler hose A

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REMOVAL

- Remove air cleaner case (LH). Refer to EM-29, "Exploded View". 1.
- 2. Remove engine under cover and engine under cover rear with a power tool. Refer to EXT-30, "Exploded View".
- Remove A/T fluid cooler hose A and A/T fluid cooler hose B.
- Remove exhaust mounting bracket with power tool. Refer to <u>EX-5. "VQ37VHR : Exploded View"</u>.

A/T fluid cooler hose B

- 5. Remove A/T fluid cooler tube mounting bolts and bracket.
- Remove suspension member stay. Refer to <u>FSU-19. "Exploded View"</u>.
- 7. 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. 8. **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.

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#### **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*	В
A/T fluid cooler hose A	Radiator assembly side	Facing backward	A	
	A/T fluid cooler tube side	Facing downward	В	
A/T fluid cooler hose B	Radiator assembly side	Facing downward	С	С
	A/T fluid cooler tube side	Facing downward	В	

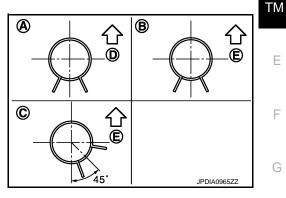
\*: Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

<⊐D : Vehicle front

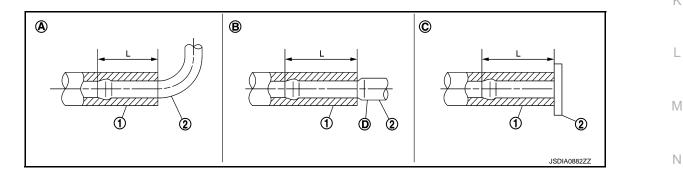
<⊐E : Vehicle upper

- 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.

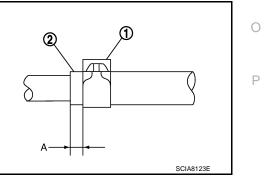
A/T fluid cooler hose (1)	Insertion side tube (2)	Tube type	Dimension "L"	
A/T fluid cooler hose A	Radiator assembly tube	A	End reaches the radius curve end.	
	A/T fluid cooler tube	В	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]	
A/T fluid cooler hose B	Radiator assembly tube	С	Insert the hose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



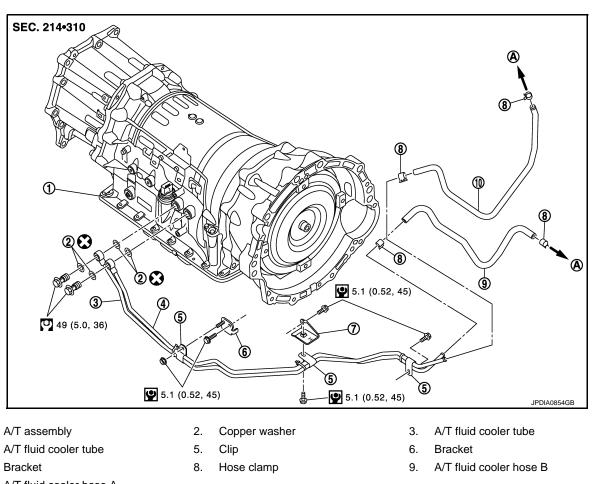
### VQ37VHR (2WD) : Inspection and Adjustment

INSPECTION AFTER INSTALLATION Check A/T fluid leakage.

ADJUSTMENT AFTER INSTALLATION Adjust A/T fluid level. Refer to <u>TM-183, "Adjustment"</u>. VQ37VHR (AWD)

VQ37VHR (AWD) : Exploded View

INFOID:000000010098959



- 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:000000010098960

#### REMOVAL

1.

4.

7.

- 1. Remove air cleaner case (LH). Refer to EM-29. "Exploded View".
- 2. Remove engine under cover with a power tool. Refer to EXT-30, "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-93, "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.
- 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.

#### Revision: 2013 November

### TM-216

#### 2014 Q70

#### < REMOVAL AND INSTALLATION >

#### 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.

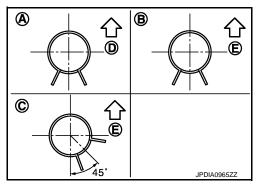
• Refer to the following when installing A/T fluid cooler hoses.

				_ ()	
Hose name	Hose end	Paint mark	Position of hose clamp <sup>*</sup>	-	
A/T fluid cooler hose A	Radiator assembly side	Facing backward	А	_	
	A/T fluid cooler tube side	Facing downward	В	ΤM	
A/T fluid cooler hose B	Radiator assembly side	Facing downward	С	-	
	A/T fluid cooler tube side	Facing downward	В	F	

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

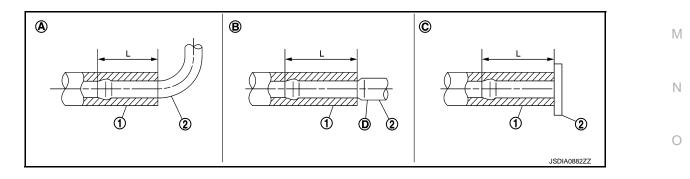
- The illustrations indicate the view from the hose ends.

- <>> 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"	J
A/T fluid cooler hose A	Radiator assembly tube	A	End reaches the radius curve end.	
	A/T fluid cooler tube	В	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]	K
	Radiator assembly tube	С	Insert the hose until the hose touches the radiator.	
A/T fluid cooler hose B	A/T fluid cooler tube	В	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]	L



Ρ

В

А

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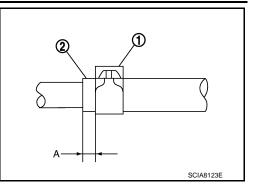
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#### < REMOVAL AND INSTALLATION >

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

INSPECTION AFTER INSTALLATION Check A/T fluid leakage.

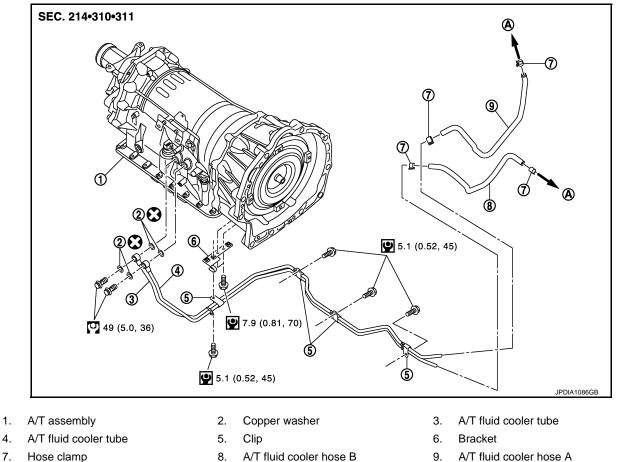
ADJUSTMENT AFTER INSTALLATION Adjust A/T fluid level. Refer to TM-183, "Adjustment". VK56VD (2WD)

VK56VD (2WD) : Exploded View

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[7AT: RE7R01A]





7. Α. To radiator

Refer to GI-4, "Components" for symbols in the figure.

# VK56VD (2WD) : Removal and Installation

#### REMOVAL

4.

INFOID:000000010098963

# < REMOVAL AND INSTALLATION >

- 1. Remove air duct (inlet). Refer to <u>EM-191, "Exploded View"</u>.
- Remove engine under cover and engine under cover rear with a power tool. Refer to <u>EXT-30, "Exploded</u> A <u>View"</u>.
- 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).
- Remove bracket (2) from A/T assembly. Refer to <u>TM-229</u>. <u>"VK56VD (2WD) : Exploded View"</u>.
- 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.

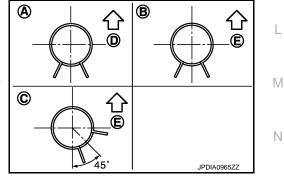
• Refer to the following when installing A/T fluid cooler hoses.

Hose name	Hose end	Paint mark	Position of hose clamp <sup>*</sup>
A/T fluid cooler boos A	Radiator assembly side	Facing backward	А
A/T fluid cooler hose A	A/T fluid cooler tube side	Facing downward	В
A/T fluid cooler hose B	Radiator assembly side	Facing downward	С
A/T fluid cooler hose B	A/T fluid cooler tube side	Facing downward	В

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

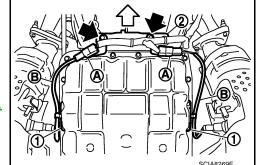
- The illustrations indicate the view from the hose ends.

- ⊲ 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	В	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]
	Radiator assembly tube	С	Insert the hose until the hose touches the radiator.
A/T fluid cooler hose B	A/T fluid cooler tube	В	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]



E

ТΜ

В



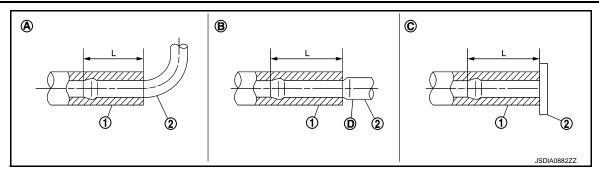
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Revision: 2013 November

# < REMOVAL AND INSTALLATION >

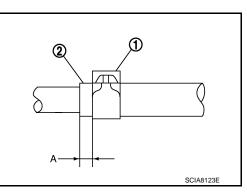
# [7AT: RE7R01A]



- 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.



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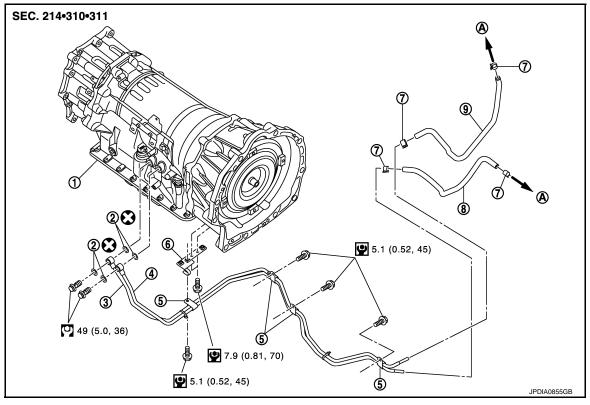
INSPECTION AFTER INSTALLATION Check A/T fluid leakage.

ADJUSTMENT AFTER INSTALLATION Adjust A/T fluid level. Refer to <u>TM-183, "Adjustment"</u>. VK56VD (AWD)

VK56VD (2WD) : Inspection and Adjustment

VK56VD (AWD) : Exploded View







# < REMOVAL AND INSTALLATION >

# 1. A/T assembly

- 4. A/T fluid cooler tube
- 2. Copper washer
- Clip
   A/T fluid cooler hose B

- 7. Hose clamp
- A. To radiator

Refer to <u>GI-4, "Components"</u> for symbols in the figure.

# VK56VD (AWD) : Removal and Installation

# REMOVAL

- 1. Shift the selector lever to "N" position, and release the parking brake.
- 2. Remove air duct (inlet). Refer to EM-29, "Exploded View".
- 3. Remove engine under cover with a power tool. Refer to EXT-30, "Exploded View".
- 4. Remove A/T fluid cooler hose A and A/T fluid cooler hose B.
- 5. Disconnect heated oxygen sensor 2 connectors (A).

#### 

- 6. Remove heated oxygen sensor 2 harness (B) from clips (1).
- 7. Remove bracket (2) from A/T assembly. Refer to <u>TM-232</u>, <u>"VK56VD (AWD) : Exploded View"</u>.
- Remove propeller shaft assembly (front). Refer to <u>DLN-95</u>, <u>"VK56VD : Exploded View"</u>.
- 9. Remove front drive shaft (left side). Refer to <u>FAX-25</u>, "Exploded <u>View"</u>.
- 10. Remove A/T fluid cooler tube mounting bolts.

Cap or plug openings to prevent fluid from spilling.

- 11. Remove the clips and bands fixing two A/T fluid cooler tubes.
- 12. Remove the A/T fluid cooler tubes one at a time from the vehicle.

# 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	В	-
A/T fluid cooler hose B	Radiator assembly side	Facing downward	С	
	A/T fluid cooler tube side	Facing downward	В	_

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

Revision: 2013 November



# [7AT: RE7R01A]

INFOID:000000010098966

- 3. A/T fluid cooler tube
- 6. Bracket
- 9. A/T fluid cooler hose A

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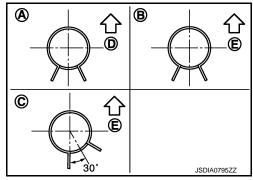
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В

# < REMOVAL AND INSTALLATION >

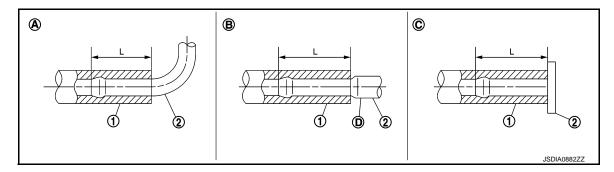
# [7AT: RE7R01A]

- The illustrations indicate the view from the hose ends.
  - <>⊐ D : Vehicle front
  - <br/>
    <br/>
- 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.

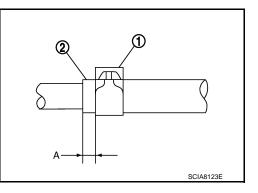
A/T fluid cooler hose (1)	Insertion side tube (2)	Tube type	Dimension "L"
A/T fluid cooler hose A	Radiator assembly tube	A	End reaches the radius curve end.
	A/T fluid cooler tube	В	30 mm (1.18 in) [End reaches the 2-stage bulge (D).]
	Radiator assembly tube	С	Insert the hose until the hose touches the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

INSPECTION AFTER INSTALLATION Check for A/T fluid leakage.

ADJUSTMENT AFTER INSTALLATION Adjust A/T fluid level. Refer to <u>TM-183, "Adjustment"</u>. INFOID:0000000010098967

Revision: 2013 November

# TRANSMISSION ASSEMBLY < UNIT REMOVAL AND INSTALLATION > UNIT REMOVAL AND INSTALLATION TRANSMISSION ASSEMBLY VQ37VHR (2WD)

VQ37VHR (2WD) : Exploded View

4.0 (0.41, 35) SEC. 240•310 ТΜ Ε 1 F 4.0 (0.41, 35) Н 3 51 (5.2, 38) 55 (5.6, 41) JPDIA1065GB A/T assembly 2. Bracket Bracket 3. Κ

- 4. Bracket 5. Bracket
- A. Tightening must be done following the installation procedure. Refer to <u>TM-223</u>, "VQ37VHR (2WD) : Removal and Installation".

Refer to <u>GI-4, "Components"</u> for symbols in the figure.

# VQ37VHR (2WD) : Removal and Installation

# REMOVAL

1.

**CAUTION:** 

- When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS)  $^{\rm N}$  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-30, "Exploded View".
- 4. Remove control rod from A/T shift selector assembly. Refer to TM-184, "2WD : Exploded View".
- 5. Separate propeller shaft assembly. Refer to <u>DLN-104, "Exploded View"</u>. **NOTE:**

Cap or plug opening to prevent fluid from spilling.

- Remove suspension member stay. Refer to <u>FSU-19, "Exploded View"</u>.
- 7. Remove exhaust mounting bracket with power tool. Refer to EX-5, "VQ37VHR : Exploded View".
- Remove crankshaft position sensor (POS) from A/T assembly. Refer to <u>EM-130, "Exploded View"</u>.

# TM-223

INFOID:000000010098968

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INFOID:000000010098969

#### < UNIT REMOVAL AND INSTALLATION >

#### **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-21, "VQ37VHR : Exploded View".
- 10. Remove rear plate cover. Refer to EM-48, "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 <u>TM-214</u>, <u>"VQ37VHR (2WD) : Exploded View"</u>.

#### NOTE:

Cap or plug openings to prevent fluid from spilling.

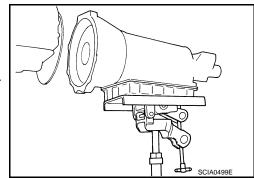
- 13. Plug up openings such as the A/T fluid cooler tube holes.
- 14. Support A/T assembly with a transmission jack.
  - **CAUTION:**

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.

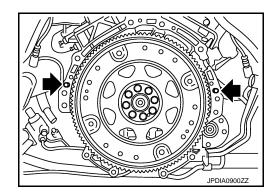
- 15. Remove rear engine mounting member and engine mounting insulator (rear) with a power tool. Refer to <u>EM-76, "2WD : Exploded View"</u>.
- 16. Disconnect A/T assembly connector.
- 17. Remove harness and brackets from A/T assembly.
- 18. Remove bolts fixing A/T assembly to engine with a power tool.
- 19. Remove air breather hose, air breather box and bracket. Refer to <u>TM-209</u>, <u>"VQ37VHR (2WD) : Exploded</u> <u>View"</u>.
- 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 <u>TM-189.</u> <u>"Exploded View"</u>.



#### INSTALLATION

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

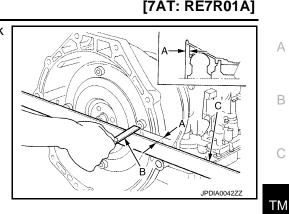
• Check fitting of dowel pin (



# < UNIT REMOVAL AND INSTALLATION >

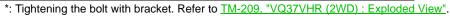
- When installing A/T assembly to the engine, be sure to check dimension "A" to ensure it is within the reference value limit.
  - B : Scale
  - C : Straightedge

Dimension "A" : Refer to <u>TM-324, "Torque Convert-</u> <u>er"</u>.



• When installing A/T assembly to the engine, attach the fixing bolts in accordance with the following standard.

Bolt symbol	А	В
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)



- 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 <u>EM-58</u>, "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)	) : Ins	pection	and Ad	justment
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#### INSPECTION AFTER INSTALLATION

- Check A/T fluid leakage.
- Check A/T position after adjusting A/T positions. Refer to <u>TM-103</u>, "Inspection and Adjustment".

#### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to <u>TM-183</u>, "Adjustment".
- Adjust A/T position. Refer to TM-103, "Inspection and Adjustment".

Perform G sensor calibration when replacing A/T assembly. Refer to <u>TM-96, "Special Repair Requirement"</u>.
 VQ37VHR (AWD)

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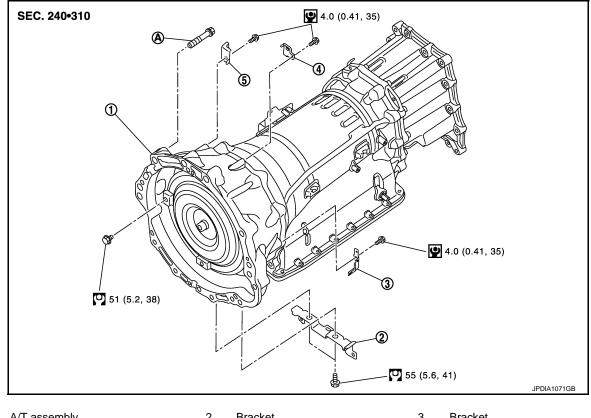
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# < UNIT REMOVAL AND INSTALLATION >

VQ37VHR (AWD) : Exploded View

INFOID:000000010098971

[7AT: RE7R01A]



- 1. A/T assembly 2. Bracket 3. Bracket Bracket
- 4. 5. Bracket

Tightening must be done following the installation procedure. Refer to TM-226, "VQ37VHR (AWD) : Removal and Installa-Α. tion".

Refer to GI-4, "Components" for symbols in the figure.

# VQ37VHR (AWD) : Removal and Installation

INFOID:000000010098972

# 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.
- Shift the selector lever to "P" position, and release the parking brake. 1.
- Disconnect the battery cable from the negative terminal.
- Remove control rod from A/T shift selector assembly. Refer to <u>TM-186</u>, "<u>AWD : Exploded View</u>".
- Separate propeller shaft assembly (rear). Refer to <u>DLN-114, "Exploded View"</u>.
- Separate propeller shaft assembly (front). Refer to <u>DLN-93, "VQ37VHR : Exploded View"</u>.
- 6. Remove crankshaft position sensor (POS) from A/T assembly. Refer to EM-130, "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-21, "VQ37VHR : Exploded View".
- 8. Remove rear plate cover. Refer to EM-48, "Exploded View".
- 9. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter. CAUTION:

# TM-226

#### Revision: 2013 November

# TRANSMISSION ASSEMBLY

#### < UNIT REMOVAL AND INSTALLATION >

#### 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 <u>TM-216</u>, <u>"VQ37VHR (AWD) : Exploded View"</u>.

#### NOTE:

Cap or plug openings to prevent fluid from spilling.

- 11. Support A/T assembly with a transmission jack.
  - CAUTION:

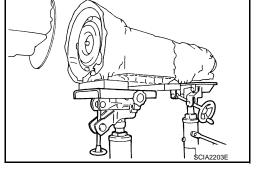
When setting the transmission jack, be careful not to allow it to collide against the drain plug and overflow plug.

#### 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 <u>EM-81, "AWD : Exploded View"</u>.
- 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.
- Remove A/T air breather hose, transfer air breather hose and air breather tube. Refer to <u>TM-210</u>, <u>"VQ37VHR (AWD) : Exploded View"</u> (for A/T), <u>DLN-66</u>. "VQ37VHR : <u>Removal and Installation</u>" (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-189. "Exploded View".
- Remove transfer assembly from A/T assembly with a power tool. Refer to <u>DLN-66, "VQ37VHR : Exploded View"</u>. NOTE:

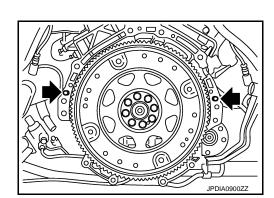
Cap or plug opening to prevent fluid from spilling.



#### INSTALLATION

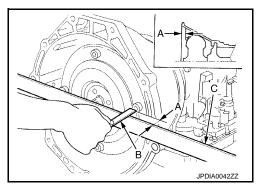
Note the following, and install in the reverse order of removal.

• 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 <u>TM-324, "Torque Convert-</u> <u>er"</u>.



[7AT: RE7R01A]

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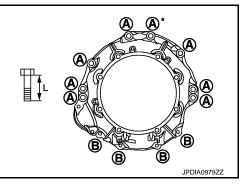
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#### < UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A]

• When installing A/T assembly to the engine, attach the fixing bolts in accordance with the following standard.

Bolt symbol	А	В
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-210, "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 <u>EM-58, "Removal and Installation"</u>.
  - 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:000000010098973

#### INSPECTION AFTER INSTALLATION

- Check A/T fluid leakage.
- Check A/T position after adjusting A/T positions. Refer to <u>TM-103, "Inspection and Adjustment"</u>.

#### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to TM-183, "Adjustment".
- Adjust A/T position. Refer to TM-103, "Inspection and Adjustment".
- Perform G sensor calibration when replacing A/T assembly. Refer to <u>TM-96, "Special Repair Requirement"</u>.
   VK56VD (2WD)

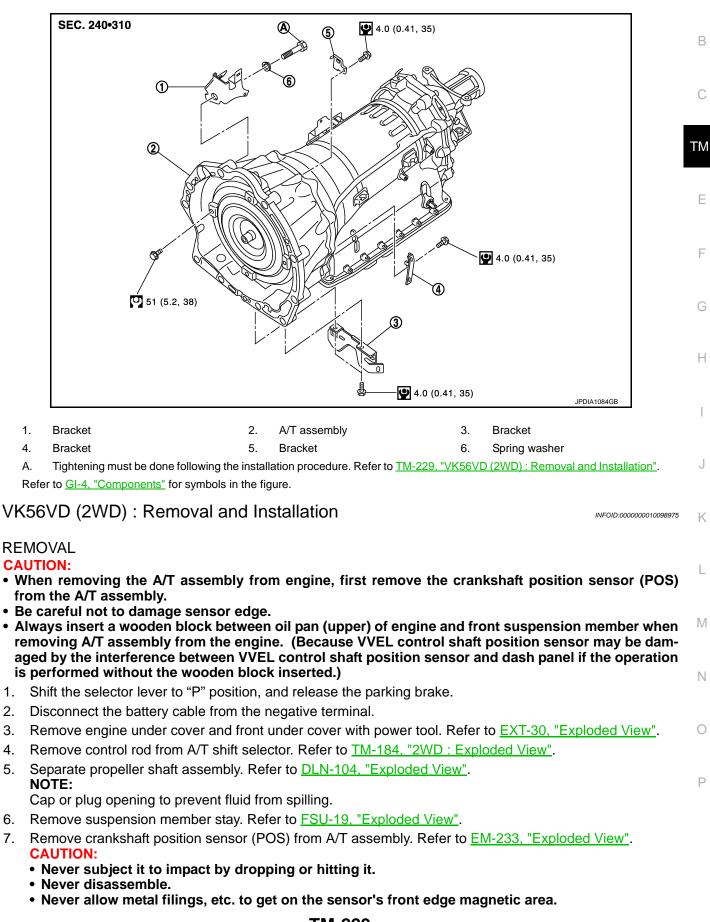
# < UNIT REMOVAL AND INSTALLATION >

# VK56VD (2WD) : Exploded View

[7AT: RE7R01A]

INFOID:000000010098974

А



#### TM-229

#### < UNIT REMOVAL AND INSTALLATION >

#### • Never place in an area affected by magnetism.

- 8. Remove rear plate cover. Refer to EM-211, "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.

 Remove A/T fluid cooler tubes mounting bolts from the A/T assembly and engine. Refer to <u>TM-218</u>, <u>"VK56VD (2WD) : Exploded View"</u>.

#### NOTE:

Cap or plug openings to prevent fluid from spilling.

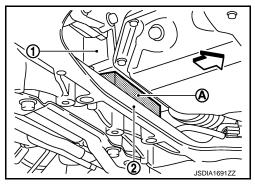
11. Support A/T assembly with a transmission jack.

#### 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).

#### **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.)



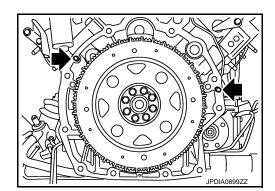
- After inserting wooden block, check it does not fall out easily.
- 13. Remove rear engine mounting member with power tool. Refer to EM-219, "2WD : Exploded View".
- 14. Disconnect A/T assembly connector.
- 15. Remove harness and brackets from A/T assembly.
- 16. Remove bolts fixing A/T assembly to engine with power tool.
- 17. Remove air breather hose, air breather box and air breather tube. Refer to <u>TM-211, "VK56VD (2WD) :</u> <u>Exploded View"</u>.
- 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 <u>TM-189, "Exploded View"</u>.

# SCIA0499E

#### INSTALLATION

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

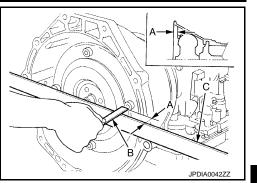
• Check fitting of dowel pin (



# < UNIT REMOVAL AND INSTALLATION >

- 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

: Refer to TM-324, "Torque Convert-**Dimension "A"** <u>er"</u>.



[7AT: RE7R01A]

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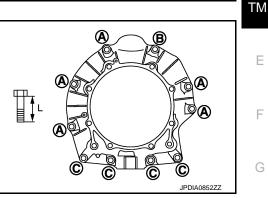
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INFOID:000000010098976

 When installing A/T assembly to the engine, attach the fixing bolts in accordance with the following standard.

Bolt symbol	А	B <sup>*</sup>	С	
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-211, "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 torgue of the crankshaft pulley mounting bolts. Refer to EM-240, "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

#### **INSPECTION AFTER INSTALLATION**

- Check A/T fluid leakage.
- Check A/T position after adjusting A/T positions. Refer to TM-103, "Inspection and Adjustment".

#### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to <u>TM-183</u>, "Adjustment".
- Adjust A/T position. Refer to TM-103, "Inspection and Adjustment".

 Perform G sensor calibration when replacing A/T assembly. Refer to TM-96, "Special Repair Requirement". VK56VD (AWD) Ν

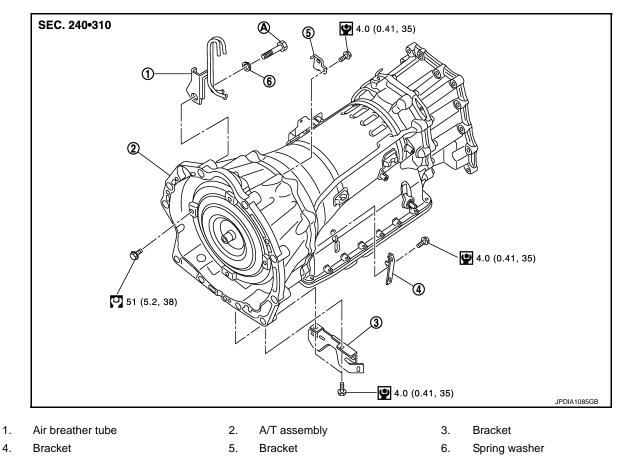
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# < UNIT REMOVAL AND INSTALLATION >

# VK56VD (AWD) : Exploded View

INFOID:0000000010098977

[7AT: RE7R01A]



A. Tightening must be done following the installation procedure. Refer to <u>TM-229</u>, "VK56VD (2WD) : Removal and Installation". Refer to <u>GI-4</u>, "<u>Components</u>" for symbols in the figure.

# VK56VD (AWD) : Removal and Installation

INFOID:000000010098978

# 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-186, "AWD : Exploded View".
- 4. Separate propeller shaft assembly (rear). Refer to <u>DLN-114, "Exploded View"</u>.
- 5. Separate propeller shaft assembly (front). Refer to <u>DLN-95. "VK56VD : Exploded View"</u>.
- Remove crankshaft position sensor (POS) from A/T assembly. Refer to <u>EM-214</u>, "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-214, "AWD : Exploded View".

# TM-232

#### Revision: 2013 November

# TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter. 8 **CAUTION:** 

# When turning the crankshaft, turn it clockwise as viewed from the front of the engine.

Remove A/T fluid cooler tubes mounting bolts from the A/T assembly and engine. Refer to TM-220, 9 "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).

#### 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-219, "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-212, "VK56VD (AWD) : Exploded View" (for A/T), DLN-67, "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-67, "VK56VD : Exploded View". NOTE:

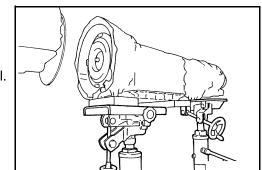
Cap or plug opening to prevent fluid from spilling.

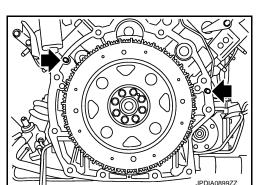
19. Remove manual lever. Refer to TM-189, "Exploded View".

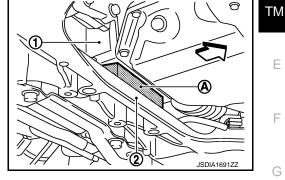
# **INSTALLATION**

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

Check fitting of dowel pin (







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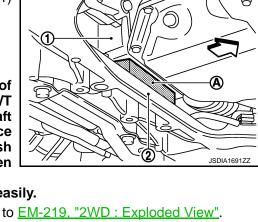
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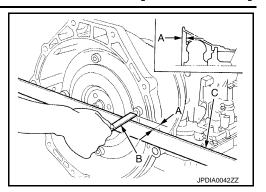
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#### < UNIT REMOVAL AND INSTALLATION >

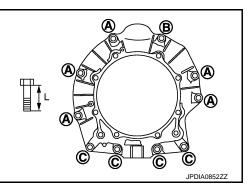
- When installing A/T assembly to the engine, be sure to check dimension "A" to ensure it is within the reference value limit.
  - B : Scale
  - C : Straightedge

Dimension "A" : Refer to <u>TM-324, "Torque Convert-</u> <u>er"</u>.



• When installing A/T assembly to the engine, attach the fixing bolts in accordance with the following standard.

Bolt symbol	А	B <sup>*</sup>	С	
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-212, "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 <u>EM-240, "Disassembly and Assembly"</u>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:000000010098979

#### **INSPECTION AFTER INSTALLATION**

- Check A/T fluid leakage.
- Check A/T position after adjusting A/T position. Refer to <u>TM-103</u>, "Inspection and Adjustment".

#### ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to TM-183, "Adjustment".
- Adjust A/T position. Refer to TM-103. "Inspection and Adjustment".
- Perform G sensor calibration when replacing A/T assembly. Refer to <u>TM-96, "Special Repair Requirement"</u>.

# UNIT DISASSEMBLY AND ASSEMBLY TRANSMISSION ASSEMBLY

**Exploded View** 

**2WD MODELS** 

[7AT: RE7R01A]

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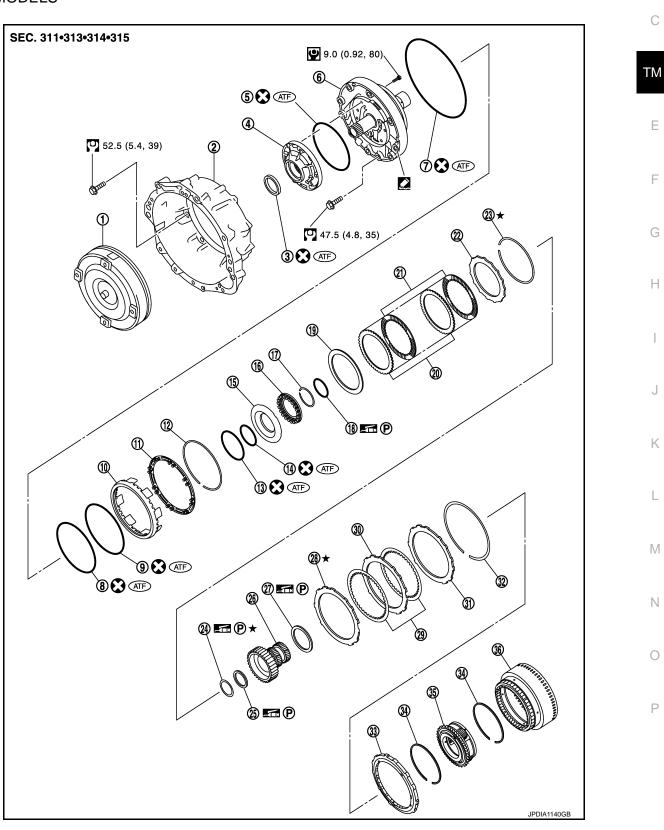
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INFOID:000000010098980 В



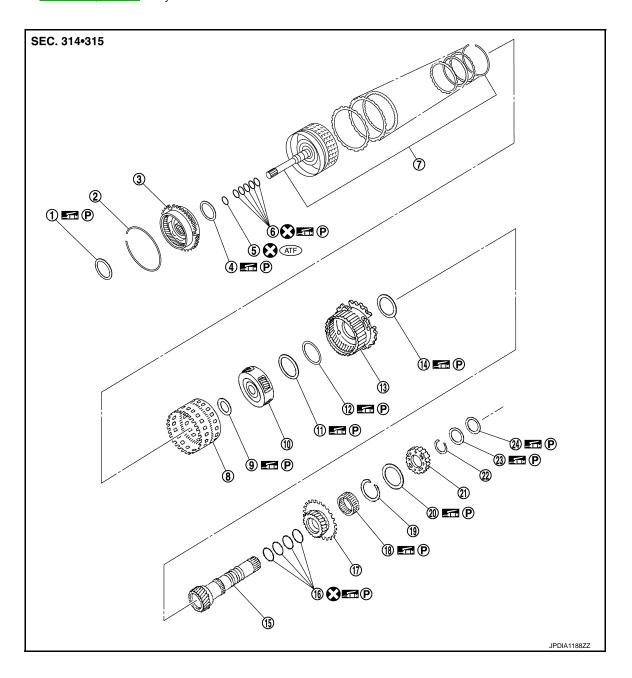
# < UNIT DISASSEMBLY AND ASSEMBLY >

- 1. Torque converter
- 4. Oil pump housing
- 7. O-ring
- 10. Front brake piston
- 13. D-ring
- 16. 2346 brake spring retainer
- 19. 2346 brake dish plate
- 22. 2346 brake retaining plate
- 25. Needle bearing
- 28. Front brake retaining plate
- 31. Front brake retaining plate
- 34. Snap ring

- 2. Converter housing
- 5. O-ring
- 8. D-ring
- 11. Front brake spring retainer
- 14. D-ring
- 17. Snap ring
- 20. 2346 brake driven plate
- 23. Snap ring
- 26. Under drive sun gear
- 29. Front brake drive plate
- 32. Snap ring
- 35. Under drive carrier assembly

- 3. Oil pump housing oil seal
- 6. Oil pump cover
- 9. D-ring
- 12. Snap ring
- 15. 2346 brake piston
- 18. Seal ring
- 21. 2346 brake drive plate
- 24. Bearing race
- 27. Needle bearing
- 30. Front brake driven plate
- 33. 1st one-way clutch
- 36. Front brake hub assembly

Apply Genuine RTV silicone sealant or equivalent. Refer to <u>GI-24, "Recommended Chemical Products and Sealants"</u>. Refer to <u>GI-4, "Components"</u> for symbols not described on the above.



# < UNIT DISASSEMBLY AND ASSEMBLY >

# [7AT: RE7R01A]

- 1. Needle bearing
- Needle bearing 4.
- 7. Input clutch assembly
- 10. Mid carrier assembly
- 13. Rear carrier assembly
- 16. Seal ring
- 19. Snap ring
- 22. Snap ring

- 2. Snap ring
- 5. O-ring
- 8. Rear internal gear
- 11. Needle bearing
- 14. Needle bearing
- 17. Rear sun gear
- 20. Needle bearing
- 23. Bearing race
- Refer to GI-4, "Components" for symbols not described on the above.
- 3. Front carrier assembly А 6. Seal ring 9. Needle bearing 12. Bearing race В 15. Mid sun gear 18. 2nd one-way clutch 21. High and low reverse clutch hub С
- 24. Needle bearing

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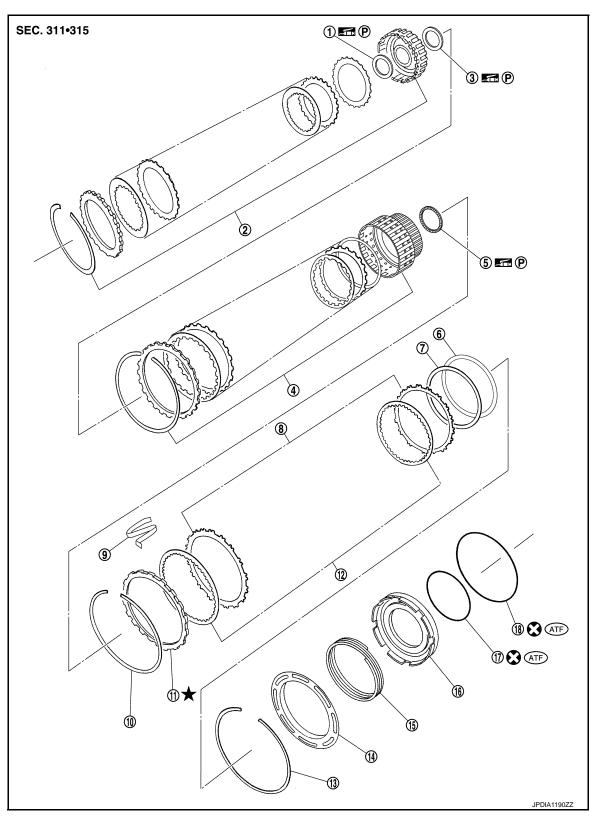
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#### < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]



- 1. Bearing race
- 4. Direct clutch assembly
- 7. Reverse brake dish plate
- 10. Snap ring
- 13. Snap ring

- 2. High and low reverse clutch assembly
- 5. Needle bearing
- 8. Reverse brake driven plate
- 11. Reverse brake retaining plate
- 14. Reverse brake spring retainer
- Needle bearing
- 6. Reverse brake dish plate
- 9. N-spring

3.

- 12. Reverse brake drive plate
- 15. Reverse brake return spring



#### < UNIT DISASSEMBLY AND ASSEMBLY >

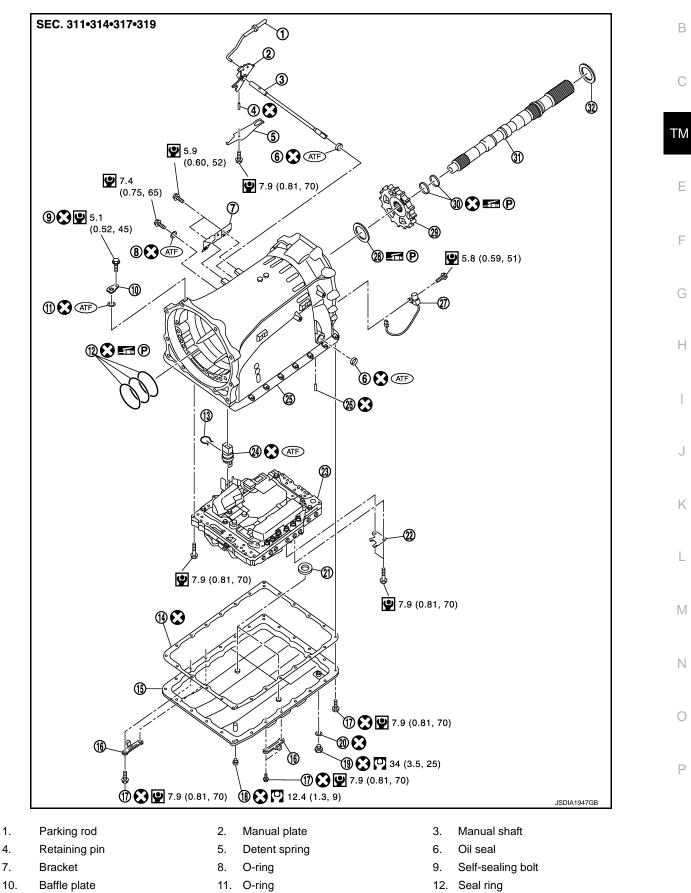
16. Reverse brake piston17. D-ringRefer to GI-4, "Components" for symbols in the figure.

[7AT: RE7R01A]

А

18. D-ring

SEC 311•314•317•319

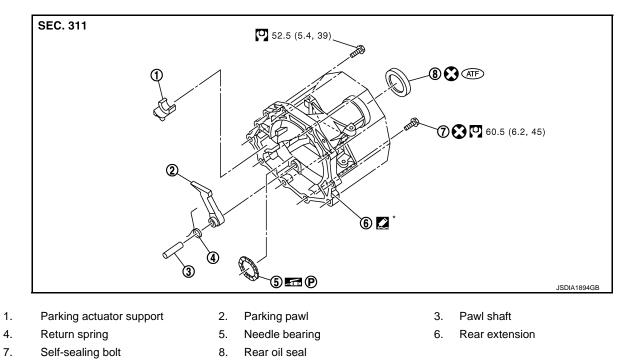




#### < UNIT DISASSEMBLY AND ASSEMBLY >

- 13. 14. Oil pan gasket Snap ring 16. Clip
- 19. Drain plug
- 22. Clip
- 25. Transmission case
- 28. Needle bearing
- 31. Output shaft
- Refer to GI-4, "Components" for symbols in the figure.
- 17. Oil pan mounting bolt
- 20. Drain plug gasket
- 23. Control valve & TCM
- 26. Retaining pin
- 29. Parking gear
- 32. Bearing race

- 15. Oil pan
- 18. Overflow plug
- 21. Magnet
- 24. Joint connector
- 27. Output speed sensor
- 30. Seal ring

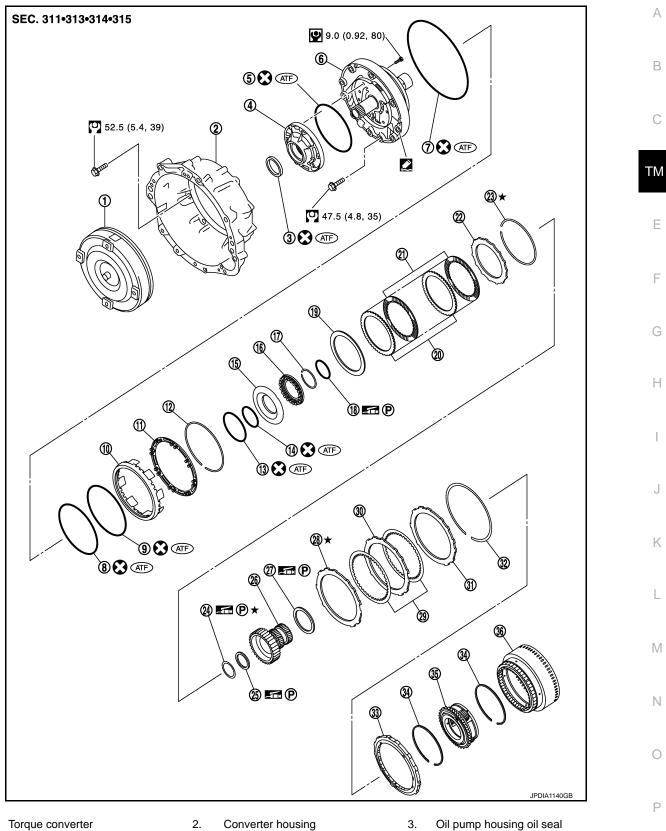


\*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants". Refer to GI-4, "Components" for symbols in the figure.

# AWD MODELS

# < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]



- 1.
- 4. Oil pump housing
- 7. O-ring
- 10. Front brake piston
- 13. D-ring
- 16. 2346 brake spring retainer
- 5. O-ring
- 8. D-ring
- 11. Front brake spring retainer
- 14. D-ring
- 17. Snap ring

- 6. Oil pump cover
- 9. D-ring
- 12. Snap ring
- 15. 2346 brake piston
- 18. Seal ring

#### < UNIT DISASSEMBLY AND ASSEMBLY >

19. 2346 brake dish plate

Snap ring

25.

28.

31.

34.

22. 2346 brake retaining plate Needle bearing

Front brake retaining plate

Front brake retaining plate

- 20. 2346 brake driven plate
- 23. Snap ring

26.

35.

- Under drive sun gear
- 29. Front brake drive plate
- 32.
- Snap ring Under drive carrier assembly
- 27. Front brake driven plate 30.

21.

24.

33. 1st one-way clutch

Bearing race

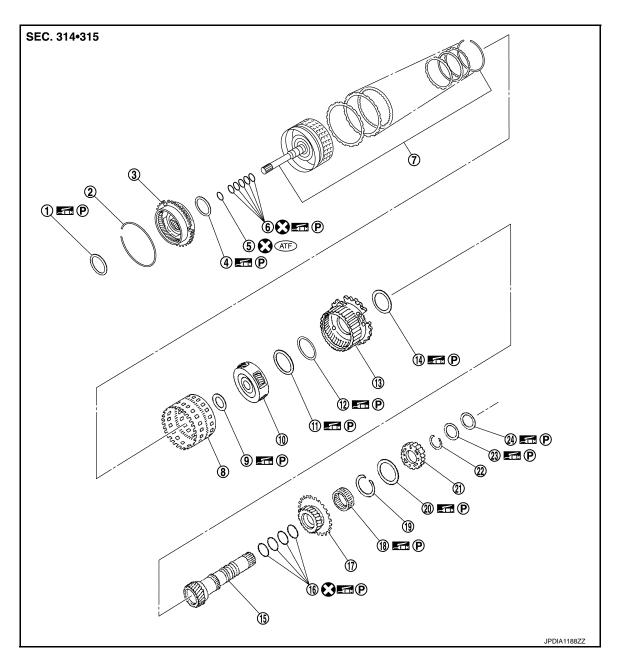
Needle bearing

36. Front brake hub assembly

2346 brake drive plate

2: Apply Genuine RTV silicone sealant or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants".

Refer to GI-4, "Components" for symbols not described on the above.



- 1. Needle bearing
- 4. Needle bearing
- 7. Input clutch assembly
- 10. Mid carrier assembly
- 13. Rear carrier assembly
- 16. Seal ring
- 19. Snap ring

- 2. Snap ring
- 5. O-ring
- Rear internal gear 8.
- 11. Needle bearing
- 14. Needle bearing
- 17. Rear sun gear
- 20. Needle bearing

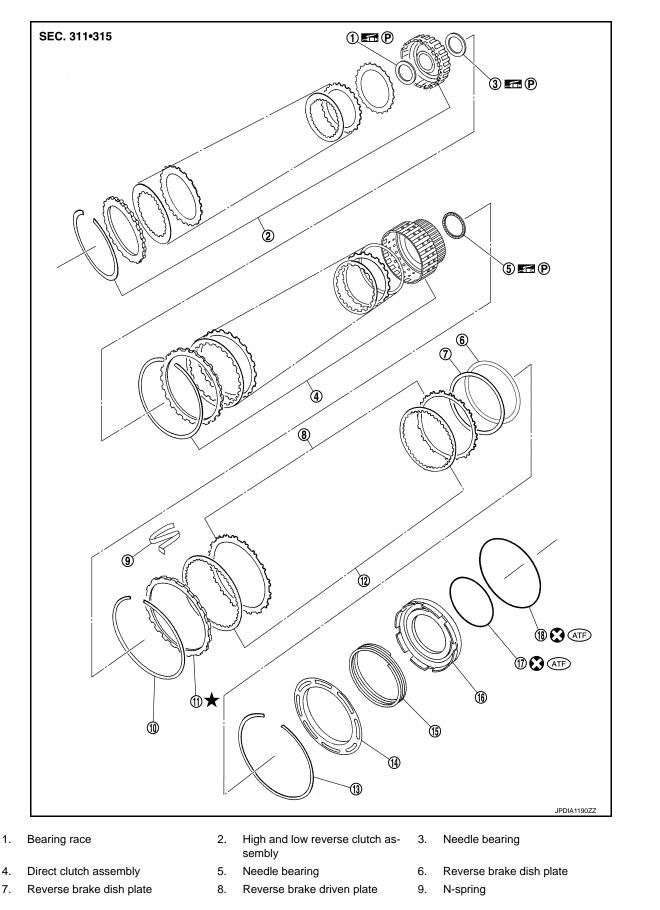
- 3. Front carrier assembly
- 6. Seal ring
- 9. Needle bearing
- Bearing race 12.
- 15. Mid sun gear
- 18. 2nd one-way clutch
- High and low reverse clutch hub 21.

TM-242

#### < UNIT DISASSEMBLY AND ASSEMBLY >

24. Needle bearing

22.Snap ring23.Bearing raceRefer to GI-4, "Components" for symbols not described on the above.



TM-243

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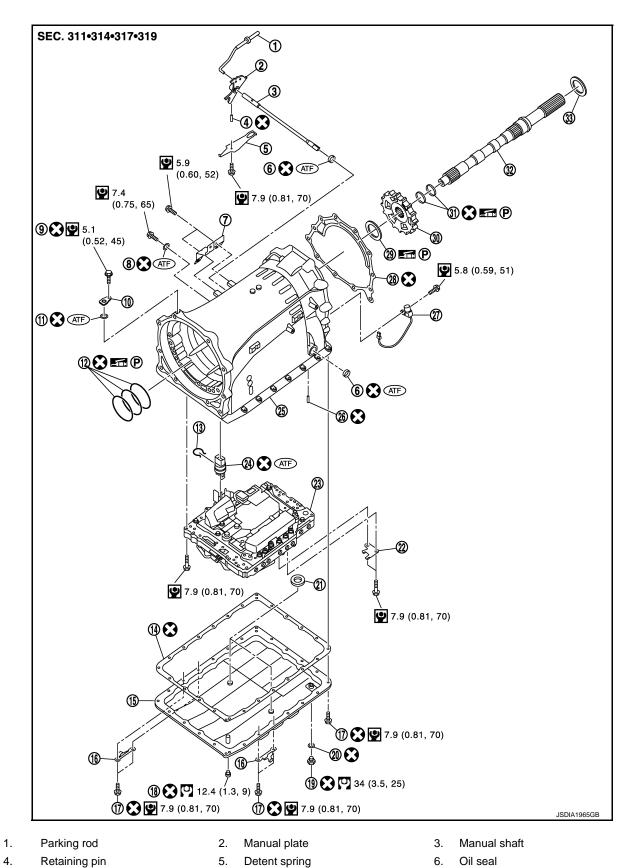
#### < UNIT DISASSEMBLY AND ASSEMBLY >

Snap ring
 Snap ring

- 11. Reverse brake retaining plate
- 12. Reverse brake drive plate
- 15. Reverse brake return spring

- 16. Reverse brake piston
- Reverse brake spring retainer
   D-ring
- 18. D-ring

Refer to GI-4, "Components" for symbols in the figure.





#### < UNIT DISASSEMBLY AND ASSEMBLY >

# [7AT: RE7R01A]

7.	Bracket	8.	O-ring	9.	Self-sealing bolt	
10.	Baffle plate	11.	O-ring	12.	Seal ring	A
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	В
22.	Clip	23.	Control valve & TCM	24.	Joint connector	
25.	Transmission case	26.	Retaining pin	27.	Output speed sensor	0
28.	Gasket	29.	Needle bearing	30.	Parking gear	С
31.	Seal ring	32.	Output shaft	33.	Bearing race	
Defe	Tto CL 4. "Components" for av	mahala in tha	figure			

Refer to <u>GI-4, "Components"</u> for symbols in the figure.

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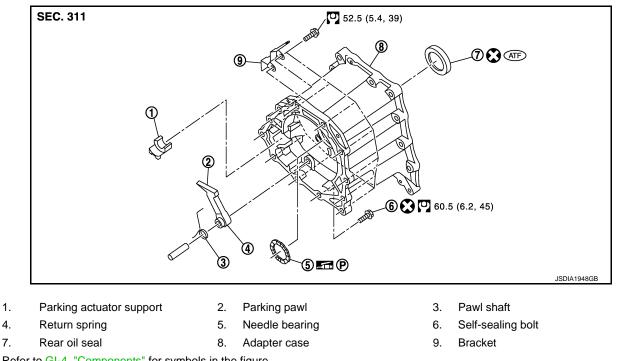
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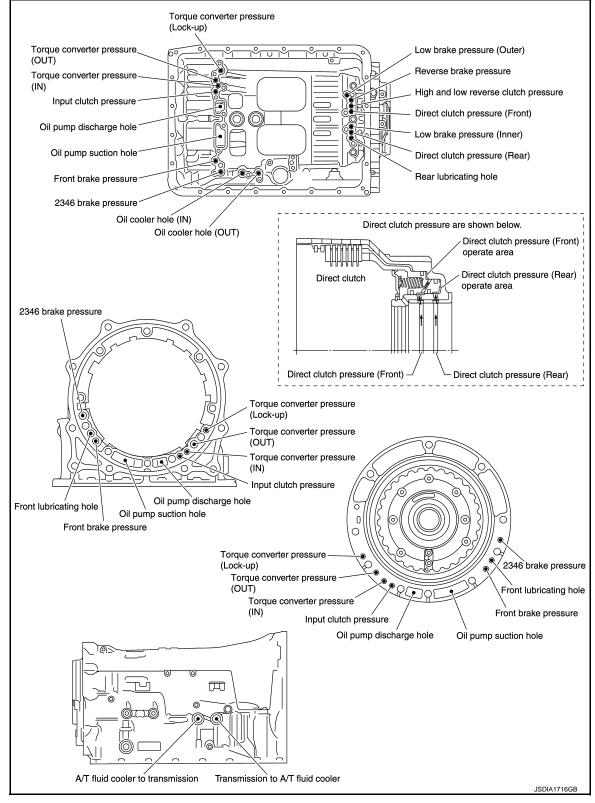
Refer to <u>GI-4, "Components"</u> for symbols in the figure.

# < UNIT DISASSEMBLY AND ASSEMBLY >

# Oil Channel

INFOID:000000010098981

[7AT: RE7R01A]



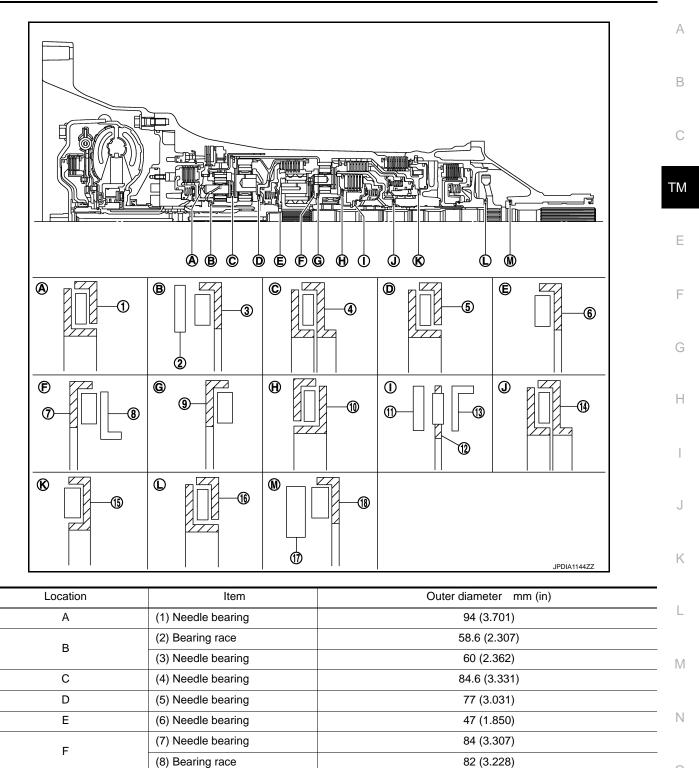
# Location of Needle Bearings and Bearing Races

2WD MODELS

INFOID:000000010098982

#### < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]



Revision: 2013 November

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(9) Needle bearing

(10) Needle bearing

(12) Needle bearing

(14) Needle bearing

(15) Needle bearing

(16) Needle bearing

(11) Bearing race

(13) Bearing race

Ρ

80 (3.150)

92 (3.622)

61.1 (2.406)

60 (2.362)

61.9 (2.437)

62.8 (2.472)

92 (3.622)

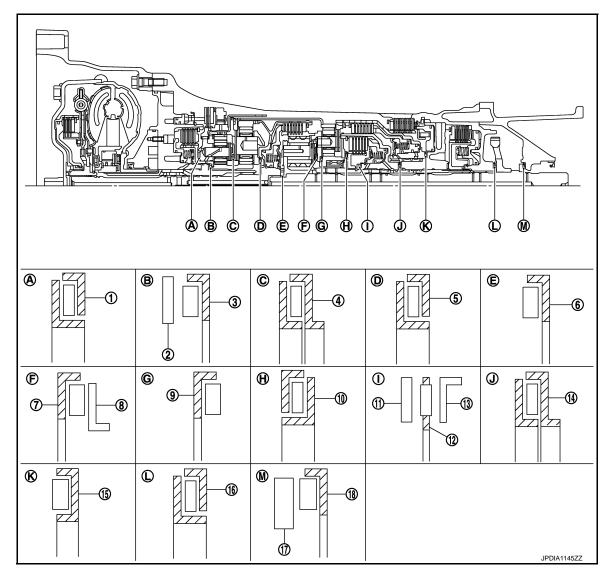
65 (2.559)

#### < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

Location	Item	Outer diameter mm (in)
М	(17) Bearing race	58 (2.283)
	(18) Needle bearing	60 (2.362)

# AWD MODELS



Location	Item	Outer diameter mm (in)
А	(1) Needle bearing	94 (3.701)
P	(2) Bearing race	58.6 (2.307)
В	(3) Needle bearing	60 (2.362)
С	(4) Needle bearing	84.6 (3.331)
D	(5) Needle bearing	77 (3.031)
E	(6) Needle bearing	47 (1.850)
_	(7) Needle bearing	84 (3.307)
F	(8) Bearing race	82 (3.228)
G	(9) Needle bearing	80 (3.150)
Н	(10) Needle bearing	92 (3.622)

#### < UNIT DISASSEMBLY AND ASSEMBLY >

Location	Item	Outer diameter mm (in)	
	(11) Bearing race	61.1 (2.406)	A
I	(12) Needle bearing	60 (2.362)	
	(13) Bearing race	61.9 (2.437)	В
J	(14) Needle bearing	62.8 (2.472)	
К	(15) Needle bearing	92 (3.622)	
L	(16) Needle bearing	65 (2.559)	С
N4	(17) Bearing race	58 (2.283)	
М	(18) Needle bearing	60 (2.362)	ТМ

# Location of Snap Rings

# 2WD MODELS

INFOID:000000010098983

[7AT: RE7R01A]

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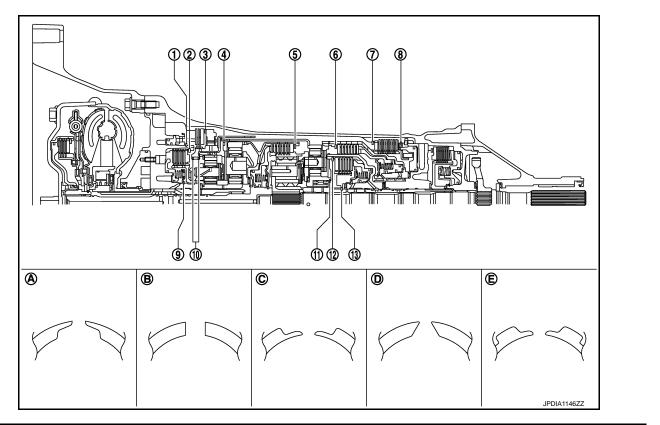
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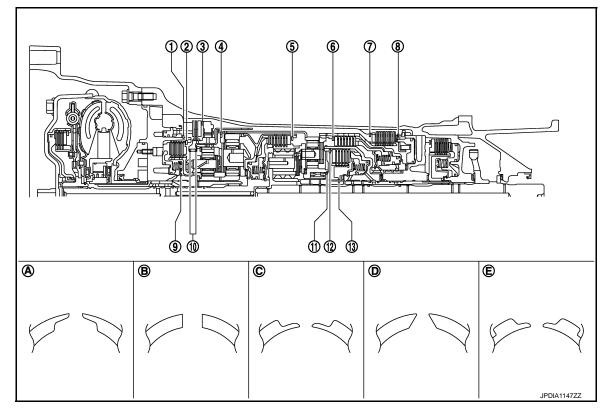
Location	Shape of snap ring	Outer diameter mm (in)	
1	A	159.9 (6.295)	N
2	В	159 (6.260)	- 11
3	В	216 (8.504)	
4	В	180.4 (7.102)	0
5	С	171.5 (6.752)	
6	В	169 (6.654)	
7	В	180.5 (7.106)	- P
8	В	181.0 (7.126)	
9	D	64.6 (2.543)	
10	В	136 (5.354)	
11	E	70.5 (2.776)	

### < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

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

# AWD MODELS



Location	Shape of snap ring	Outer diameter mm (in)
1	A	159.9 (6.295)
2	В	159 (6.260)
3	В	216 (8.504)
4	В	180.4 (7.102)
5	C	171.5 (6.752)
6	В	169 (6.654)
7	В	180.5 (7.106)
8	В	181.0 (7.126)
9	D	64.6 (2.543)
10	В	136 (5.354)
11	E	70.5 (2.776)
12	В	135 (5.315)
13	A	48.4 (1.906)

# Disassembly

#### INFOID:000000010098984

#### **CAUTION:**

# Never disassemble parts behind drum support. Refer to TM-17, "Cross-Sectional View".

1. Drain ATF through drain plug.

# < UNIT DISASSEMBLY AND ASSEMBLY >

2. Remove torque converter by holding it firmly and turning while pulling straight out.



Е

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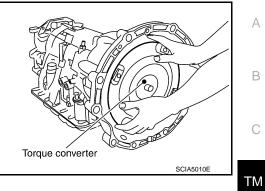
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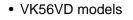
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JSDIA1913ZZ

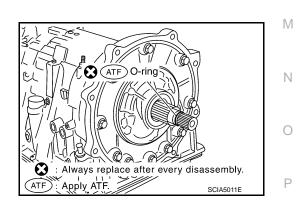
JPDIA1107ZZ



- 3. Remove tightening bolts (←) for converter housing and transmission case.
  - VQ37VHR models



- Remove converter housing from transmission case.
   CAUTION: Be careful not to scratch converter housing.
- 5. Remove O-ring from input clutch assembly.



# < UNIT DISASSEMBLY AND ASSEMBLY >

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

1

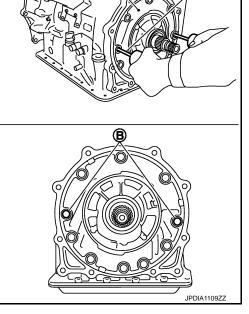
[7AT: RE7R01A]

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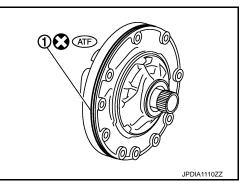
- Attach the sliding hammers [SST: ST25850000 (J-25721-A)] (A) to oil pump assembly (1) and extract it evenly from transmission case.
  - B : Sliding hammer attachment position

#### **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.

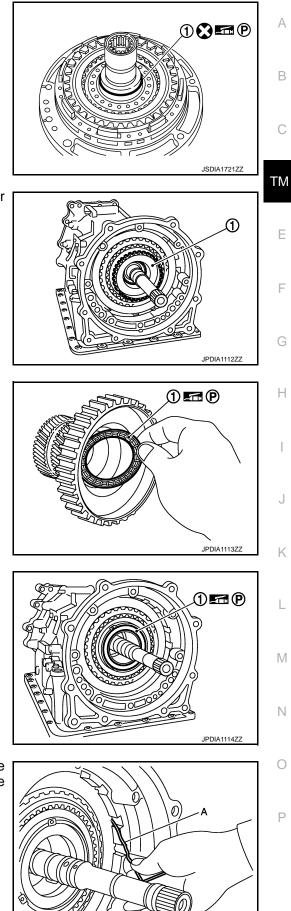


- UPDA11112Z
- 9. Remove bearing race (1) from oil pump assembly.

## < UNIT DISASSEMBLY AND ASSEMBLY >

10. Remove seal ring (1) from oil pump assembly.

## [7AT: RE7R01A]



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.

 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.

JPDIA1115ZZ

#### < UNIT DISASSEMBLY AND ASSEMBLY >

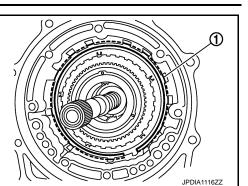
## Remove snap ring (1) from transmission case using a flatbladed screwdriver. CAUTION:

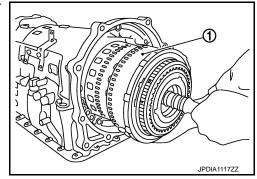
- Be careful not to scratch transmission case and 1st oneway clutch.
- Be careful not to damage snap ring.
- 16. Remove input clutch assembly (with 1st one-way clutch, under drive carrier assembly, front brake hub, front carrier assembly, and rear internal gear) (1) from transmission case.

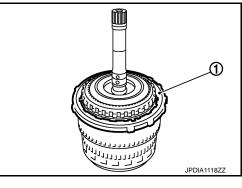
17. Remove 1st one-way clutch (1) from front brake hub.

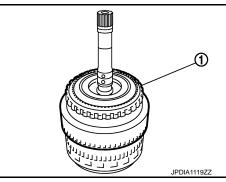
18. Remove under drive carrier assembly (with front brake hub) (1) from front carrier assembly.

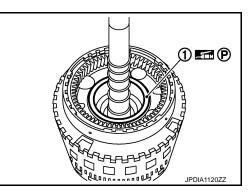
19. Remove needle bearing (1) from front carrier assembly.













#### < UNIT DISASSEMBLY AND ASSEMBLY >

20. Remove seal rings (1) from input clutch assembly.

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

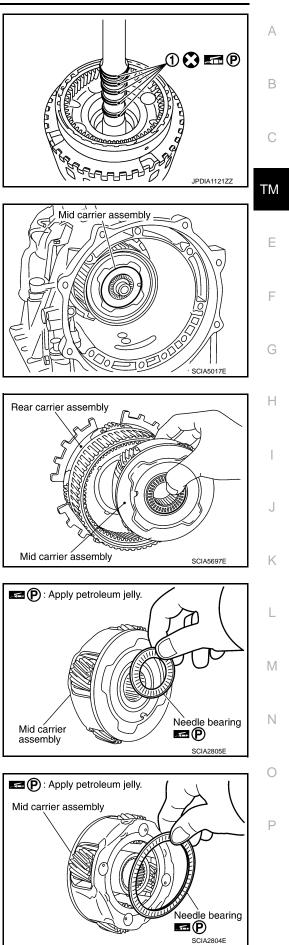
22. Remove mid carrier assembly from rear carrier assembly.

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

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

Revision: 2013 November

TM-255



## < UNIT DISASSEMBLY AND ASSEMBLY >

25. Remove bearing race from rear carrier assembly.

26. Remove needle bearing from rear carrier assembly.

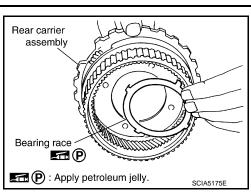
27. Remove mid sun gear assembly, rear sun gear assembly, and high and low reverse clutch hub as a unit. CAUTION:

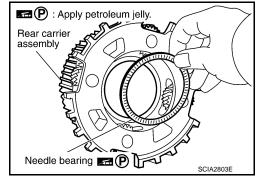
Be careful to remove then with bearing race and needle bearing.

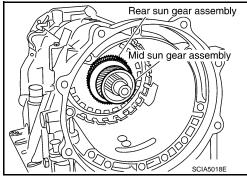
Remove high and low reverse clutch assembly from direct clutch assembly.
 CAUTION:

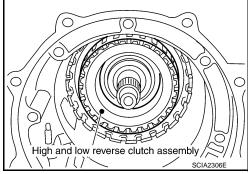
Make sure that needle bearing is installed to the high and low reverse clutch assembly edge surface.

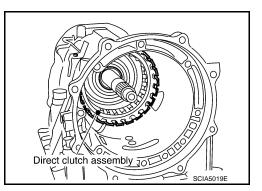
29. Remove direct clutch assembly from reverse brake.









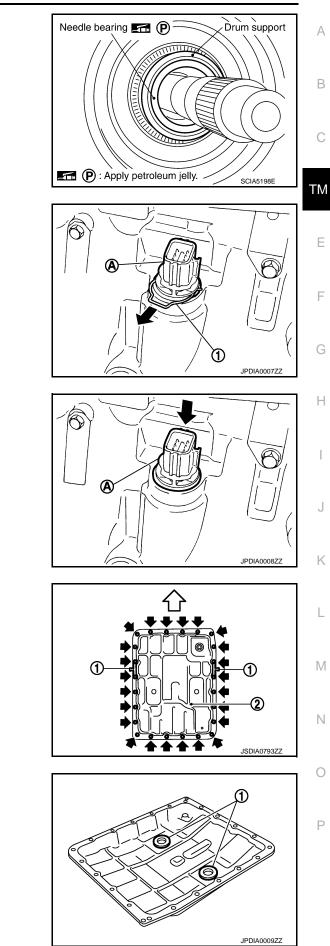




## < UNIT DISASSEMBLY AND ASSEMBLY >

30. Remove needle bearing from drum support.

## [7AT: RE7R01A]



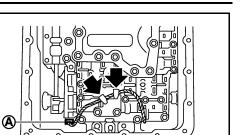
31. Remove snap ring (1) from joint connector (A).

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

- 33. Remove oil pan mounting bolts ( $\Leftarrow$ ).
  - 1 : Clip <⊐ : Front
- 34. Remove oil pan (2) and oil pan gasket.
- 35. Remove magnets (1) from oil pan.

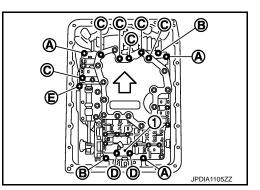
#### < UNIT DISASSEMBLY AND ASSEMBLY >

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



[7AT: RE7R01A]

JPDIA1104ZZ



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

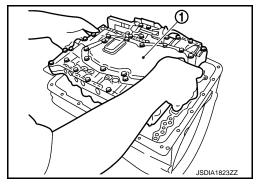
<□ : Front

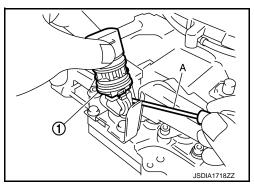
Bolt symbol	Length mm (in)	Number of bolts
А	43 (1.69)	3
В	40 (1.57)	2
С	54 (2.13)	6
D	50 (1.97)	2
E*	50 (1.97)	1

\*: 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.

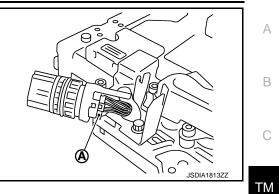




40. Remove joint connector (1) from the control valve & TCM using a flat-bladed screwdriver (A).

#### < UNIT DISASSEMBLY AND ASSEMBLY >

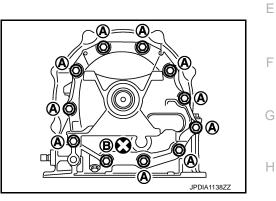
41. Disconnect TCM connector (A). **CAUTION:** Be careful not to damage connector. [7AT: RE7R01A]

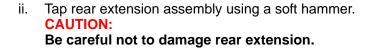


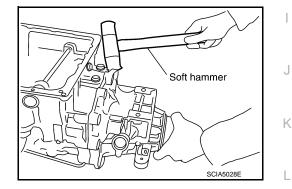
42. Remove rear extension assembly (2WD) or adapter case assembly (AWD) according to the following procedures.

#### 2WD a.

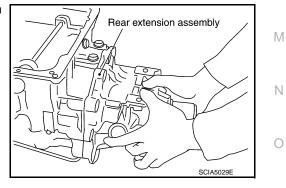
- Remove tightening bolts for rear extension assembly and transi. mission case.
  - А : Bolt
  - В : Self-sealing bolt







Remove rear extension assembly from transmission case. (With iii. needle bearing.)



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#### < UNIT DISASSEMBLY AND ASSEMBLY >

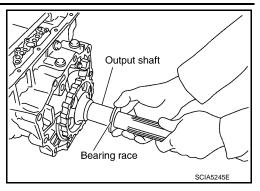
iv. Remove bearing race from output shaft.

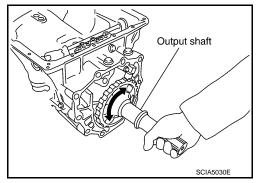
v. Remove output shaft from transmission case by rotating left/ right.

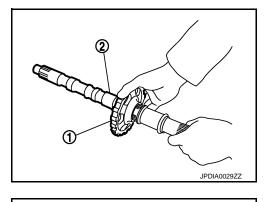
vi. Remove parking gear (1) from output shaft (2).

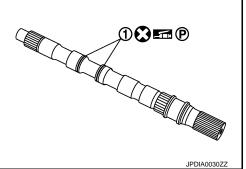
vii. Remove seal rings (1) from output shaft.

b. AWD











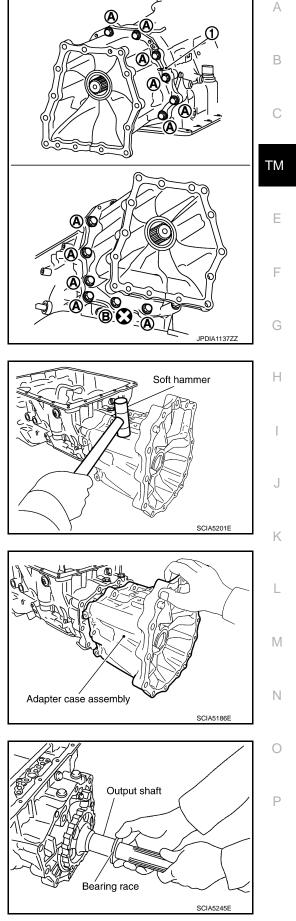
#### < UNIT DISASSEMBLY AND ASSEMBLY >

- i. Remove tightening bolts for adapter case assembly and transmission case.
  - 1 : Bracket
  - A : Bolt
  - B : Self-sealing bolt

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.



### [7AT: RE7R01A]

## < UNIT DISASSEMBLY AND ASSEMBLY >

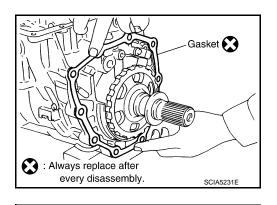
v. Remove output shaft from transmission case by rotating left/ right.

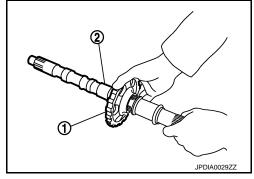
# [7AT: RE7R01A]

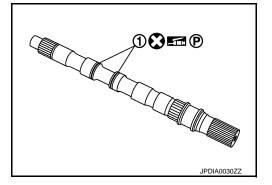
SCIA5030E

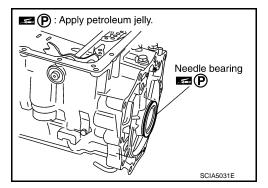
✨

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.

#### < UNIT DISASSEMBLY AND ASSEMBLY >

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:

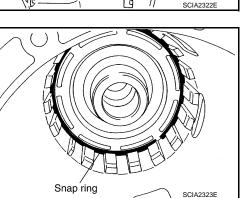
Press out snap ring from the transmission case oil pan side gap with a flat-bladed screwdriver, and remove it using a another screwdriver.

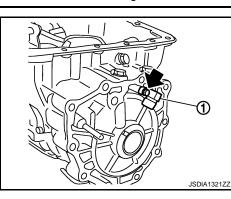
- 46. Remove reverse brake retaining plate from transmission case.
- 47. Remove N-spring from transmission case.

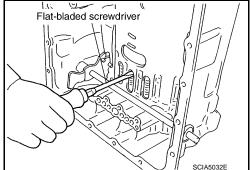
48. Remove reverse brake component part (drive plates, driven plates, and dish plates) from transmission case.

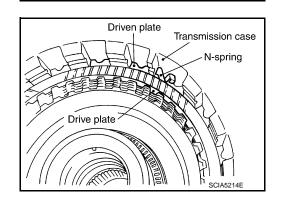
- 49. Remove snap ring (fixing spring retainer) using a flat-bladed screwdriver. CAUTION:
  - Be careful not to scratch transmission case and spring retainer.
  - Be careful not to damage snap ring.

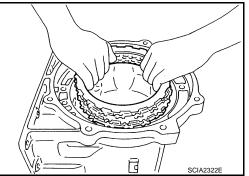
Revision: 2013 November











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## [7AT: RE7R01A]

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#### < UNIT DISASSEMBLY AND ASSEMBLY >

50. Remove reverse brake spring retainer and reverse brake return spring from transmission case.

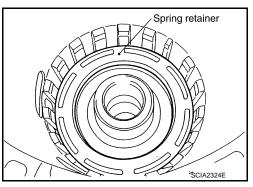
51. Remove seal rings from drum support.

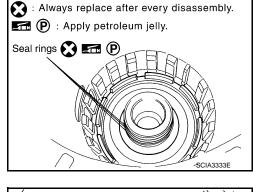
52. Remove needle bearing from drum support edge surface.

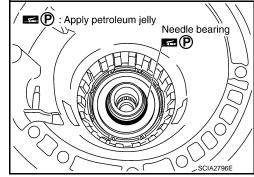
- 53. Remove reverse brake piston (1) from transmission case with compressed air. Refer to <u>TM-246</u>, "Oil Channel".
  - A : Reverse brake pressure hole

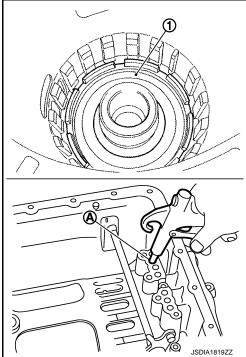
#### CAUTION:

Care should be taken not to abruptly blow air. It makes pistons incline, as the result, it becomes hard to disassemble the pistons.









## [7AT: RE7R01A]

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## < UNIT DISASSEMBLY AND ASSEMBLY >

54. Remove D-rings from reverse brake piston.

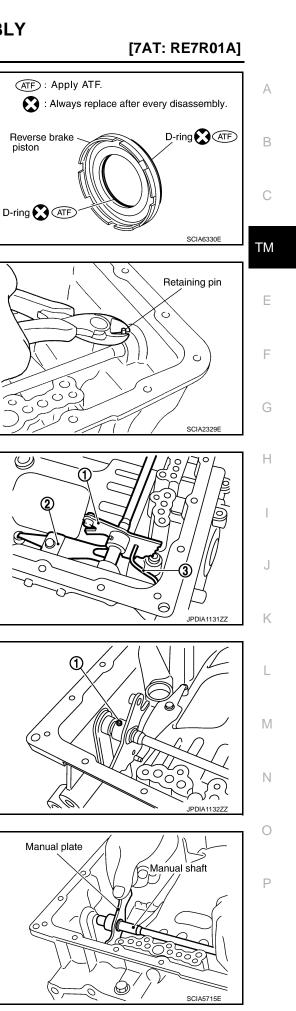
#### 55. Remove manual shaft retaining pin with pair of nippers. CAUTION: Be careful not to cut retaining pin.

- 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.





#### < UNIT DISASSEMBLY AND ASSEMBLY >

61. Remove manual shaft from transmission case.

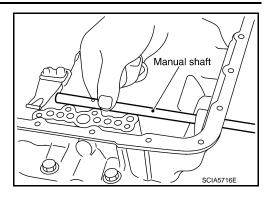
62. Remove manual shaft oil seals using a flat-bladed screwdriver. CAUTION: Be careful not to scratch transmission case.

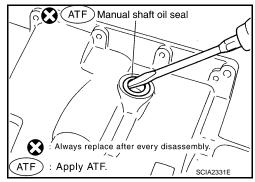
63. Remove detent spring (1) from transmission case.

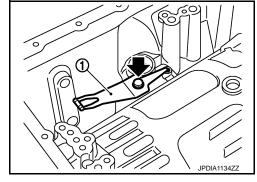
: Bolt

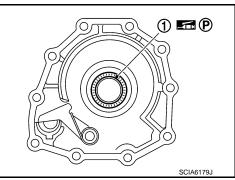
64. Remove needle bearing (1) from rear extension (2WD) or adapter case (AWD).

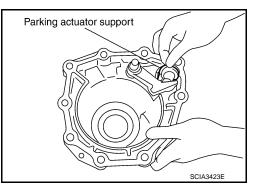
65. Remove parking actuator support from rear extension (2WD) or adapter case (AWD).













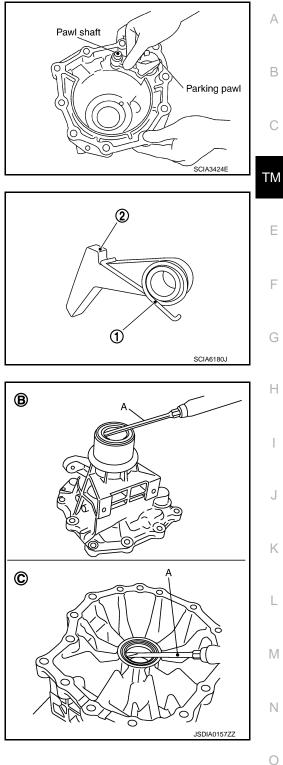
#### < UNIT DISASSEMBLY AND ASSEMBLY >

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.



[7AT: RE7R01A]

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## < UNIT DISASSEMBLY AND ASSEMBLY >

## 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.

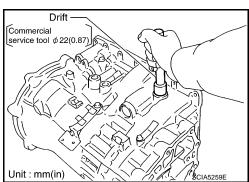
CAUTION:

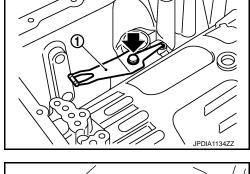
- Never reuse manual shaft oil seals.
- Apply ATF to manual shaft oil seals.
- 2. Install detent spring to transmission case. Tighten detent spring bolt to the specified torque.
  - 🖛 : Bolt

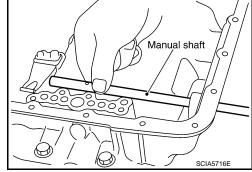
3. Install manual shaft to transmission case.

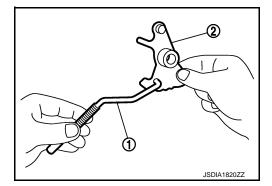
4. Install parking rod (1) to manual plate (2).









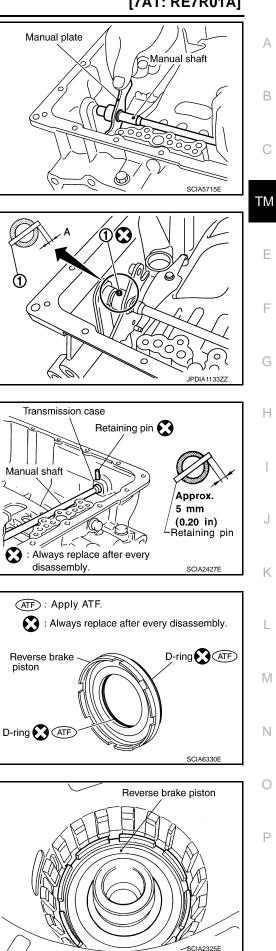




## < UNIT DISASSEMBLY AND ASSEMBLY >

5. Install manual plate (with parking rod) to manual shaft.

## [7AT: RE7R01A]



- Install retaining pin (1) into the manual plate and manual shaft. 6.
- a. Fit pinhole of the manual plate to pinhole of the manual shaft with a pin punch.
- b. Use a hammer to tap the retaining pin into the manual plate.

: Approx. 2 mm (0.08in) Α

#### **CAUTION:**

mission case.

Drive retaining pin to 2±0.5 mm (0.08±0.020 in) over the manual plate.

- 7. Install retaining pin into the transmission case and manual shaft.
- Fit pinhole of the transmission case to pinhole of the manual a. shaft with a pin punch.
- b. Use a hammer to tap the retaining pin into the transmission case.

**CAUTION:** Drive retaining pin to 5±1 mm (0.20±0.04 in) over the trans-

Install D-rings to reverse brake piston. 8.

Install reverse brake piston to transmission case. 9.

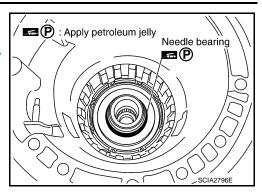
## < UNIT DISASSEMBLY AND ASSEMBLY >

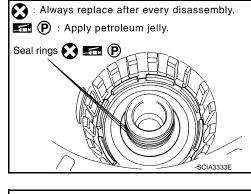
 Install needle bearing to drum support edge surface.
 CAUTION:
 Check the direction of needle bearing. Refer to <u>TM-246</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

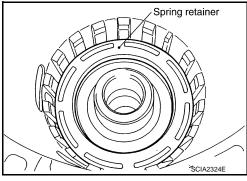
11. Install seal rings to drum support.

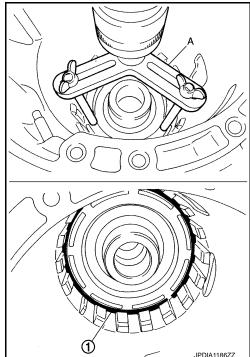
12. Install reverse brake spring retainer and reverse brake return spring to transmission case.

- 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.
  - Securely assemb
  - Securely assemble them using a flat-bladed screwdriver so that snap ring tension is slightly weak.
  - Be careful not to damage snap ring.









[7AT: RE7R01A]

#### < UNIT DISASSEMBLY AND ASSEMBLY >

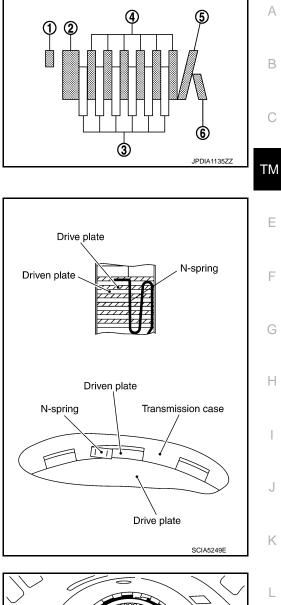
## [7AT: RE7R01A]

- 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

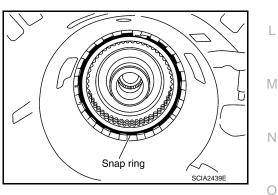
#### **CAUTION:**

#### 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.



#### < UNIT DISASSEMBLY AND ASSEMBLY >

18. Measure clearance between retaining plate and snap ring. If not within specified clearance, select proper retaining plate.

Specified clearance "A"

Standard: Refer to <u>TM-325, "Reverse Brake Clear-ance"</u>.

Retaining plate: Refer to <u>TM-325</u>, "Reverse Brake Clearance"

19. Install needle bearing to transmission case. CAUTION:

Check the direction of needle bearing. Refer to <u>TM-246</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

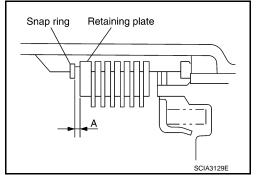
- 20. Install output speed sensor (1) to transmission case. Tighten output speed sensor bolt to the specified torque.
  - 🗰 : Bolt

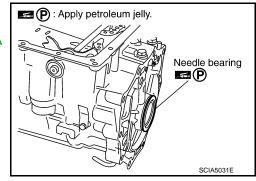
#### **CAUTION:**

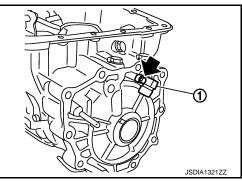
- Never subject it to impact by dropping or hitting it.
- Never disassemble.
- Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
- Never place in an area affected by magnetism.
- 21. As shown in the figure, use the drift to drive rear oil seal into the rear extension (2WD) (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)]

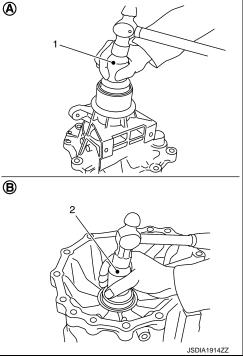
#### **CAUTION:**

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





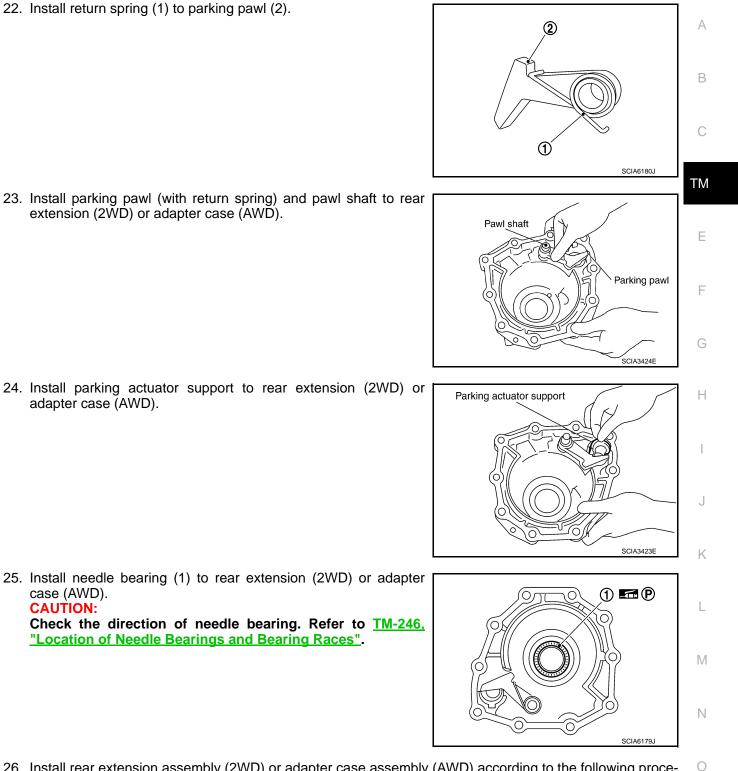




## [7AT: RE7R01A]

< UNIT DISASSEMBLY AND ASSEMBLY >

## [7AT: RE7R01A]



- 26. Install rear extension assembly (2WD) or adapter case assembly (AWD) according to the following procedures.
- 2WD a.

case (AWD).

**CAUTION:** 

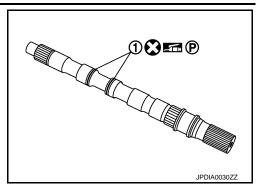
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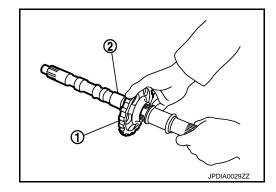
## < UNIT DISASSEMBLY AND ASSEMBLY >

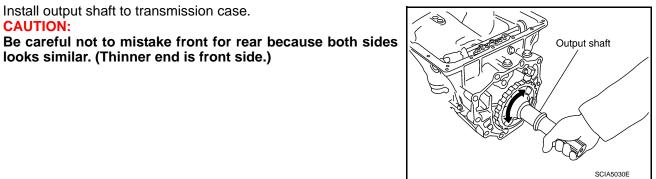
Install parking gear (1) to output shaft (2).

i. Install seal rings (1) to output shaft.

ii.





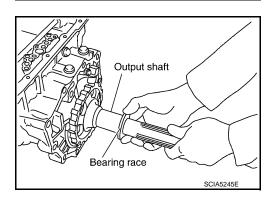


iv. Install bearing race to output shaft.

iii. Install output shaft to transmission case.

looks similar. (Thinner end is front side.)

**CAUTION:** 



#### < UNIT DISASSEMBLY AND ASSEMBLY >

\*

Sealant starting

Overlap width of sealant starting

point and end-

mounting surfaces.

extension assembly.

Sealant width (C)

point and end-

point (A)

point (B)

CAUTION:

CAUTION:

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

Sealant height (C) : 0.4 – 1.0 mm (0.016 – 0.04 in)

Completely remove all moisture, oil and old sealant, etc.

from the transmission case and rear extension assembly

Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the rear

vi. Install rear extension assembly to transmission case.

: Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-

the center of two bolts.

: 3 – 5 mm (0.12 – 0.20 in)

: 1.0 – 2.0 mm (0.04 – 0.08 in)

: Start and finish point shall be in

24, "Recommended Chemical Products and Sealants".

[7AT: RE7R01A]

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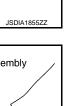
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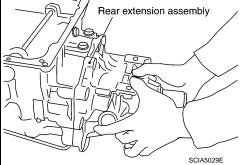
L

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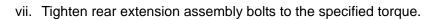
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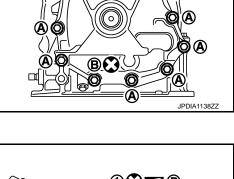
(A)



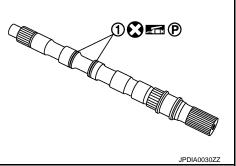
- A : Bolt
- B : Self-sealing bolt

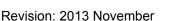
#### b. AWD

i. Install seal rings (1) to output shaft.



A





## < UNIT DISASSEMBLY AND ASSEMBLY >

ii. Install parking gear (1) to output shaft (2).

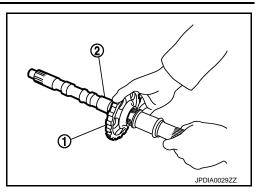
iii. Install output shaft to transmission case.

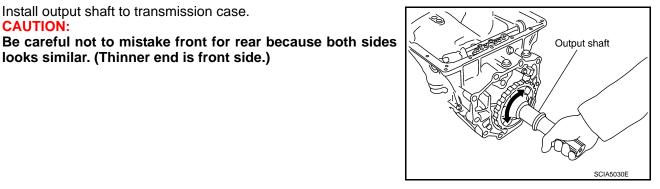
looks similar. (Thinner end is front side.)

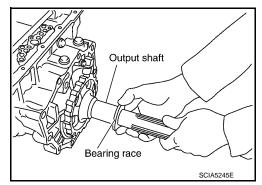
**CAUTION:** 

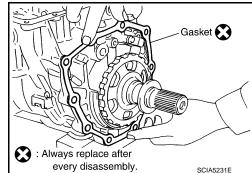
iv.

## [7AT: RE7R01A]



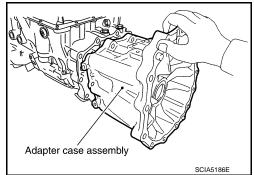






vi. Install adapter case assembly to transmission case. **CAUTION:** 

Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the adapter case assembly.



Install bearing race to output shaft.

- Install gasket onto transmission case. V. **CAUTION:** • Completely remove all moisture, oil and old gasket, etc.
  - from the transmission case and adapter case assembly mounting surfaces.
  - Never reuse gasket.

#### < UNIT DISASSEMBLY AND ASSEMBLY >

27. Install needle bearing to drum support.

CAUTION:

[7AT: RE7R01A]

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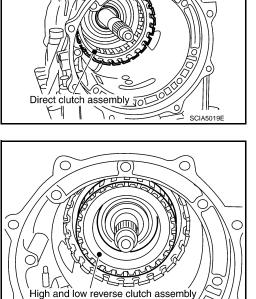
SCIA5198E

- vii. Tighten adapter case assembly bolts to the specified torque.
  - 1 : Bracket
  - А : Bolt
  - В : Self-sealing bolt

- JPDIA1137ZZ Drum support Needle bearing 🚮 (P) Check the direction of needle bearing. Refer to TM-246, "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.



P: Apply petroleum jelly.

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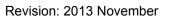
SCIA2306E

## < UNIT DISASSEMBLY AND ASSEMBLY >

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.

32. Install needle bearing to rear carrier assembly. **CAUTION:** Check the direction of needle bearing. Refer to TM-246, "Location of Needle Bearings and Bearing Races".



SCIA3169E Rear sun gear assembly 0 B Mid sun gear assembly

TOF

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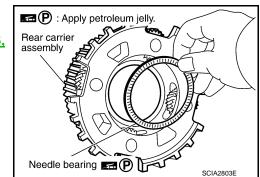
High and low reverse clutch drum

SCIA5018E

Rear sun gear

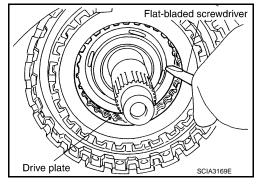
#### **CAUTION:**

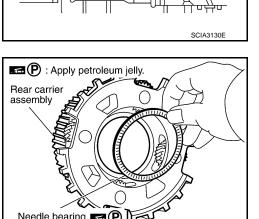
Make sure that portion "A" of high and low reverse clutch drum protrudes approximately 2 mm (0.08 in) beyond portion "B" of rear sun gear.





## [7AT: RE7R01A]

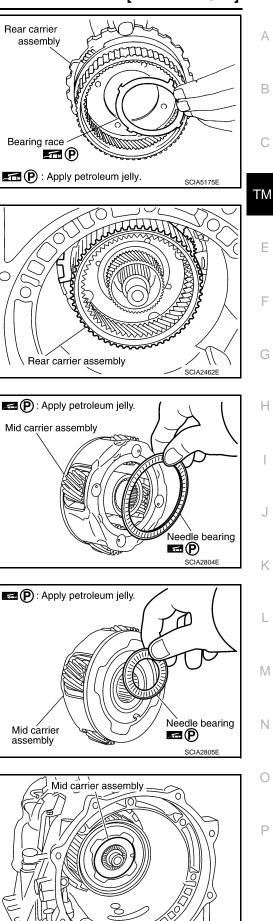




#### < UNIT DISASSEMBLY AND ASSEMBLY >

 Install bearing race to rear carrier assembly.
 CAUTION:
 Check the direction of needle bearing. Refer to <u>TM-246</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

## [7AT: RE7R01A]



34. Install rear carrier assembly to direct clutch drum.

 Install needle bearing (rear side) to mid carrier assembly.
 CAUTION:
 Check the direction of needle bearing. Refer to <u>TM-246</u>, "Location of Needle Bearings and Bearing Races".

 Install needle bearing (front side) to mid carrier assembly.
 CAUTION:
 Check the direction of needle bearing. Refer to <u>TM-246</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

37. Install mid carrier assembly to rear carrier assembly.

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#### < UNIT DISASSEMBLY AND ASSEMBLY >

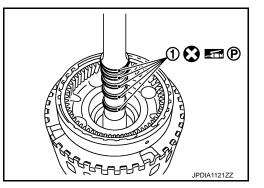
**CAUTION:** 

38. Install seal rings (1) to input clutch assembly.

[7AT: RE7R01A]

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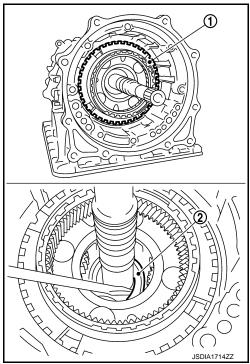
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39. Install needle bearing (1) to front carrier assembly. Check the direction of needle bearing. Refer to TM-246. "Location of Needle Bearings and Bearing Races".

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.



#### < UNIT DISASSEMBLY AND ASSEMBLY >

- 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.
- Check front brake hub for correct locking and unlocking direcb. tions.

: Unlocked

 $\triangleleft$ : Locked

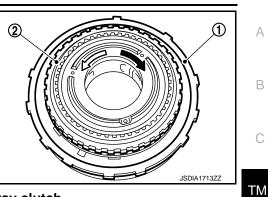
#### **CAUTION:**

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)
  - $\triangleleft$ : Front
  - **CAUTION:** Check order of plates.



[7AT: RE7R01A]

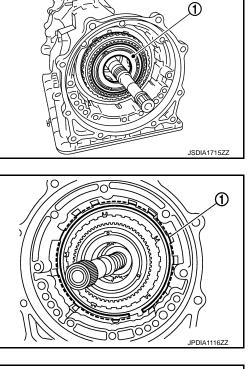
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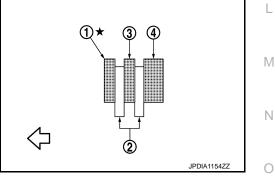
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#### < UNIT DISASSEMBLY AND ASSEMBLY >

 Install needle bearing (1) to under drive carrier assembly.
 CAUTION:
 Check the direction of needle bearing. Refer to <u>TM-246</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

47. Install under drive sun gear (1) to under drive carrier assembly.

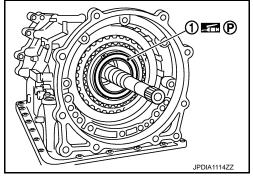
• Measure clearance between bearing race (1) and oil pump

• Select proper thickness of bearing race so that end play is

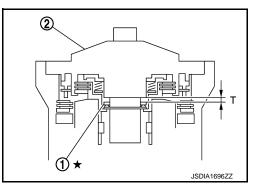
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TM-282

## [7AT: RE7R01A]



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- - 1 : Transmission case
    - 2 : Under drive sun gear

48. Adjustment of total end play "T".

within specifications.

cover (2).

a.

A : Straightedge

#### "J" : Distance between the oil pump fitting surface of transmission case and the needle bearing mating surface of under drive sun gear.

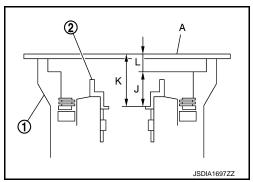
Measure dimensions "K" and "L", and calculate dimension "J".

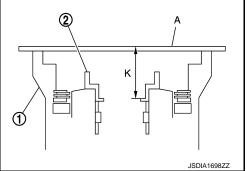
#### $\mathbf{J} = \mathbf{K} - \mathbf{L}$

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.





#### < UNIT DISASSEMBLY AND ASSEMBLY >

- 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.

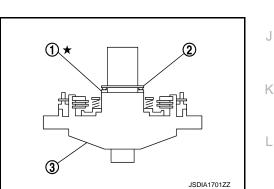
- iii. Measure dimension "K" and "L" in at least three places, and take the average.
- iv. Calculate dimension "J".

#### 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.

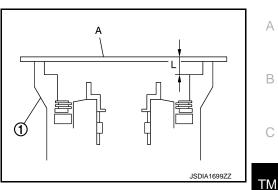
- $\mathbf{M} = \mathbf{M}\mathbf{1} \mathbf{M}\mathbf{2}$
- i. Place bearing race (1) and needle bearing (2) on oil pump assembly (3).

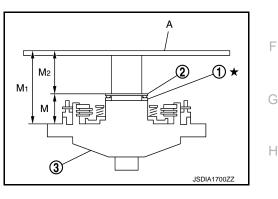


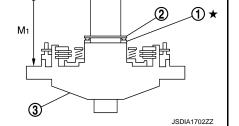
- ii. Measure dimension "M1" between the transmission case fitting surface of oil pump and the end of oil pump.
  - 1 : Bearing race
  - 2 : Needle bearing
  - 3 : Oil pump assembly
  - A : Straightedge

#### CAUTION:

Measure dimension "M1" in at least three places, and take the average.







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## [7AT: RE7R01A]

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#### < UNIT DISASSEMBLY AND ASSEMBLY >

- 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".

#### $\mathbf{M} = \mathbf{M}\mathbf{1} - \mathbf{M}\mathbf{2}$

- c. Adjust total end play "T".
  - 1 : Bearing race

2 : Oil pump assembly

#### T = J - M

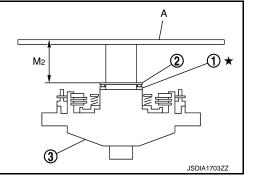
Total end play "T"

: Refer to <u>TM-325, "Total End</u> Play".

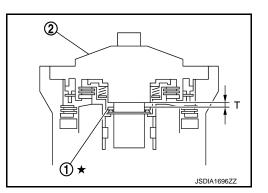
• Select proper thickness of bearing race so that total end play is within specifications.

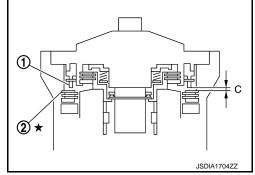
Bearing races : Refer to TM-325, "Total End Play".

- 49. Adjustment of front brake clearance "C".
  - Measure clearance between front brake piston (1) and front brake retaining plate (2).
  - Select proper thickness of front brake retaining plat so that clearance is within specifications.



[7AT: RE7R01A]





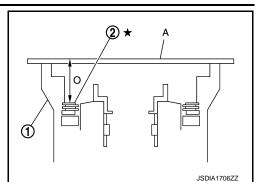
- a. Measure dimensions "O" and "P", and calculate dimension "N".
  - 1 : Transmission case
  - 2 : Front brake retaining plate
  - A : Straightedge

"N" : Distance between the oil pump fitting surface of transmission case and the front brake retaining plate.

N = O - P

#### < UNIT DISASSEMBLY AND ASSEMBLY >

- 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.



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[7AT: RE7R01A]

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- 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".

 $\mathbf{N} = \mathbf{O} - \mathbf{P}$ 

- b. Measure dimensions "Q1" and "Q2", and calculate dimension "Q".
  - 1 : Front brake piston
  - 2 : Oil pump assembly
  - A : Straightedge

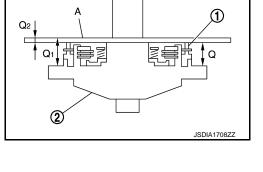
"Q" : Distance between the transmission case fitting surface of oil pump and the front brake piston.

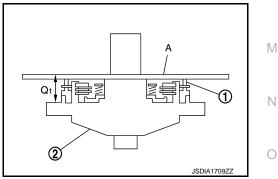


- i. Measure dimension "Q1" between the transmission case fitting surface of oil pump and the straightedge on front brake piston.
  - 1 : Front brake piston
  - 2 : Oil pump assembly
  - A : Straightedge

#### **CAUTION:**

Measure dimension "Q1" in at least three places, and take the average.







Q2

#### < UNIT DISASSEMBLY AND ASSEMBLY >

- ii. Measure dimension "Q2" of the straightedge.
  - 1 : Front brake piston
  - 2 : Oil pump assembly
  - А : Straightedge
- iii. Calculate dimension "Q".
  - $\mathbf{Q} = \mathbf{Q}_1 \mathbf{Q}_2$
- Adjust front brake clearance "C". C.
  - 1 : Front brake piston
  - 2 : Front brake retaining plate

C = N - Q

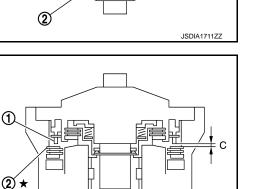
Front brake clearance "C" : Refer to TM-325, "Front Brake Clearance".

· Select proper thickness of retaining plate so that front brake clearance is within specifications.

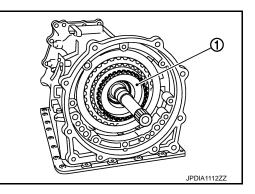
Retaining plate : Refer to TM-325, "Front Brake Clearance".

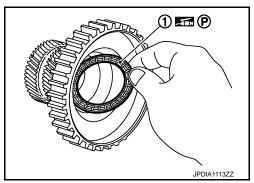
50. Remove under drive sun gear (1) from under drive carrier assembly.

51. Install needle bearing (1) to under drive sun gear. CAUTION: Check the direction of needle bearing. Refer to TM-246, "Location of Needle Bearings and Bearing Races".



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## [7AT: RE7R01A]

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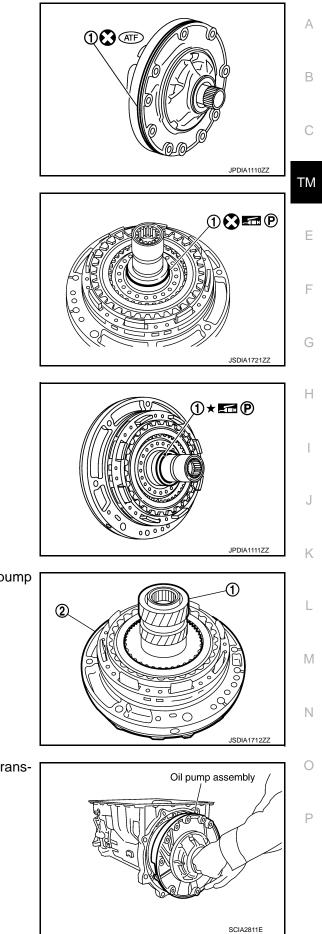
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## < UNIT DISASSEMBLY AND ASSEMBLY >

52. Install O-ring (1) to oil pump assembly.

## [7AT: RE7R01A]



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.

#### < UNIT DISASSEMBLY AND ASSEMBLY >

## [7AT: RE7R01A]

57. Apply recommended sealant to oil pump assembly as shown in the figure.

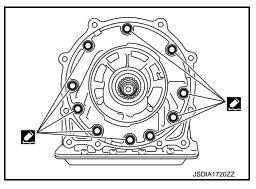


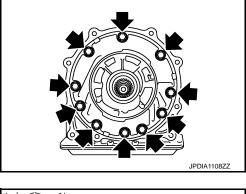
: Genuine RTV silicone sealant or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants".

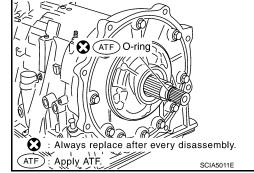
#### **CAUTION:**

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.

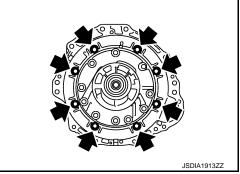






59. Install O-ring to input clutch assembly.

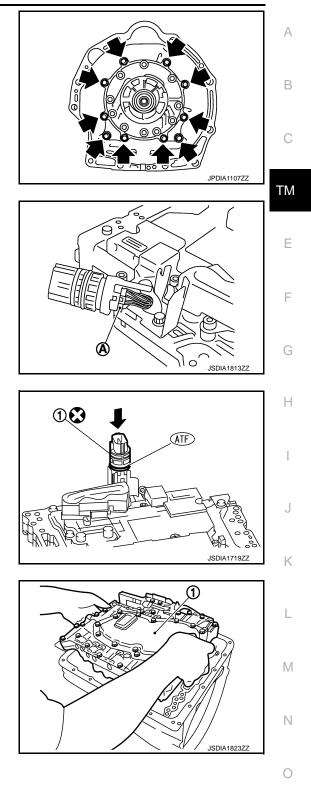
- 60. Install converter housing to transmission case, and tighten converter housing bolts (+) to the specified torque.
  - VQ37VHR models



### < UNIT DISASSEMBLY AND ASSEMBLY >

VK56VD models

### [7AT: RE7R01A]



61. Connect TCM connector (A) to joint connector.

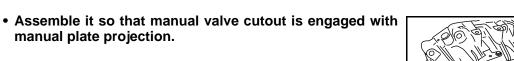
62. Install joint connector (1) to the control valve & TCM. **CAUTION: Apply ATF to O-ring of joint connector.** 

63. Install the control valve & TCM (1) to transmission case.

**CAUTION:** 

#### < UNIT DISASSEMBLY AND ASSEMBLY >

- 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.



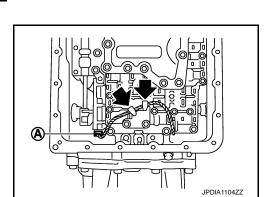
64. Install bolts and clip (1) to the control valve & TCM. Tighten bolt (E) to the specified torque before tightening the other than bolts.

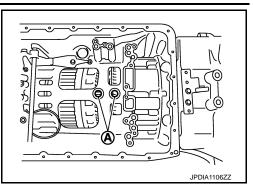
$\triangleleft$	: Front	
		•

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

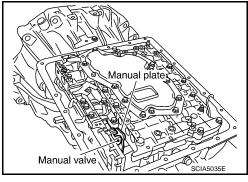


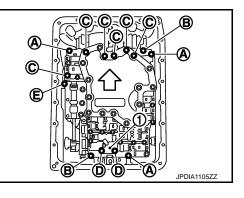
- 65. Connect output speed sensor connector (A).
- 66. Engage output speed sensor harness with terminal clips (





[7AT: RE7R01A]

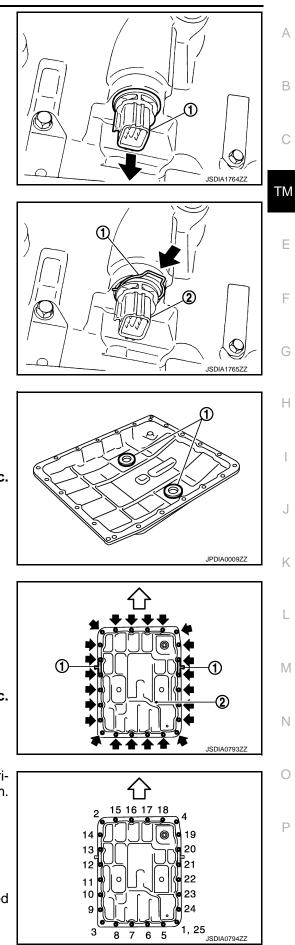






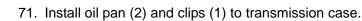
### < UNIT DISASSEMBLY AND ASSEMBLY >

67. Pull down joint connector (1). CAUTION: Be careful not to damage connector. [7AT: RE7R01A]



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.





Cil 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.

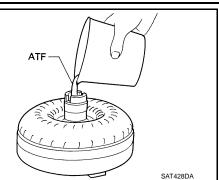
#### CAUTION:

Never reuse drain plug gasket.

#### < UNIT DISASSEMBLY AND ASSEMBLY >

### [7AT: RE7R01A]

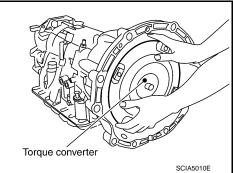
- 74. Pour ATF into torque converter.
  - Approximately 2 liter (2-1/8 US qt, 1-3/4 Imp qt) of ATF is required for a new torque converter.
  - When reusing old torque converter, add the same amount of ATF as was drained.

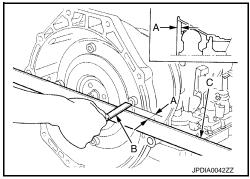


 75. Install torque converter while aligning notches of torque converter with notches of oil pump.
 CAUTION: Install torque converter while rotating it.

- 76. Measure dimension "A" to make sure that torque converter is in proper position.
  - B : Scale
  - C : Straightedge

Dimension "A" : Refer to <u>TM-324, "Torque Converter"</u>.





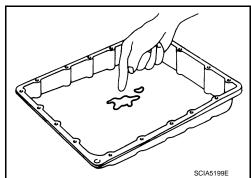
Inspection

#### 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 <u>TM-99, "Cleaning"</u>.



Torque Converter

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### < UNIT DISASSEMBLY AND ASSEMBLY >

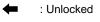
Check torque converter one-way clutch using a check tool as shown at figure.

- 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.
- Check front brake hub for correct locking and unlocking directions. If necessary, replace 1st one-way clutch.



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

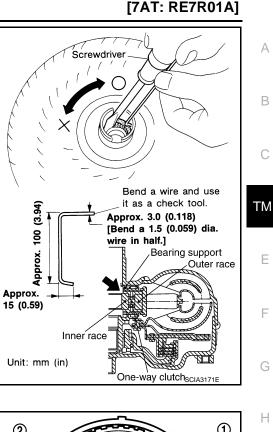
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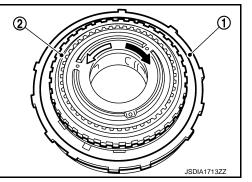
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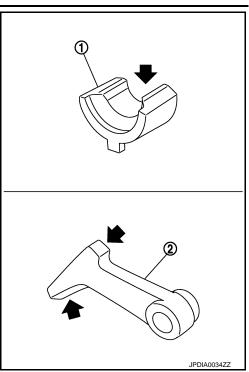
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### < UNIT DISASSEMBLY AND ASSEMBLY >

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.



### [7AT: RE7R01A]

### < UNIT DISASSEMBLY AND ASSEMBLY >

# OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

### **Exploded View**

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[7AT: RE7R01A]

### Disassembly

1.

4.

7.

D-ring

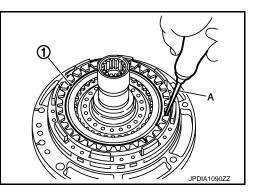
10. Snap ring

16. Seal ring

- Remove snap ring (1) from oil pump assembly using a flat-1. bladed screwdriver (A). CAUTION:
  - Be careful not to scratch oil pump cover and 2346 brake retaining plate.

TM-295

· Be careful not to damage snap ring.



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### < UNIT DISASSEMBLY AND ASSEMBLY >

Remove seal ring (1) from oil pump assembly.

3.

2. Remove 2346 brake component part (retaining plate, drive plates, driven plates, and dish plate) (1) from oil pump assembly.

Revision: 2013 November

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.

TM-296

#### B : Press

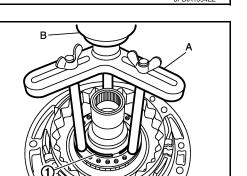
#### **CAUTION:**

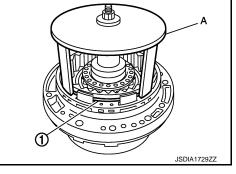
Be careful not to expand snap ring excessively.

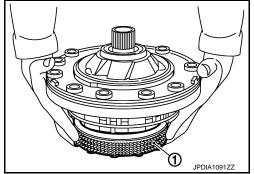
Set the clutch spring compressor (SST: KV31103800) (A) on 4. front brake spring retainer and remove snap ring (fixing front brake spring retainer) (1) from oil pump assembly while compressing return spring. CAUTION:

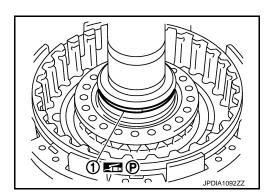
Be careful not to expand snap ring excessively.

- Remove front brake spring retainer (1) from oil pump assembly. 5.
- 00 Œ JSDIA1729ZZ

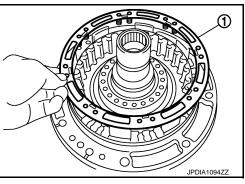








JSDIA1730ZZ

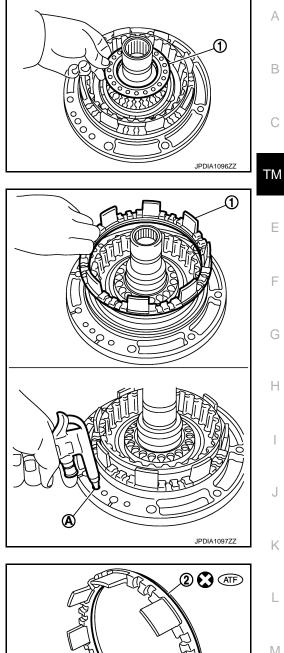


### [7AT: RE7R01A]

#### < UNIT DISASSEMBLY AND ASSEMBLY >

7. Remove 2346 brake spring retainer (1) from oil pump assembly.

### [7AT: RE7R01A]

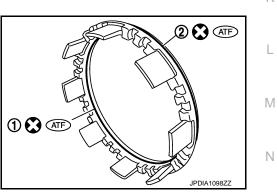


- 8. Remove front brake piston (1) from oil pump assembly with compressed air. Refer to TM-246, "Oil Channel".
  - А : Front brake pressure hole

#### **CAUTION:**

Care should be taken not to abruptly blow air. It makes piston incline, as the result, it becomes hard to disassemble the piston.

Remove D-ring (inner) (1) and D-ring (outer) (2) from front brake 9. piston.



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### < UNIT DISASSEMBLY AND ASSEMBLY >

- 10. Remove 2346 brake piston (1) from oil pump assembly with compressed air. Refer to <u>TM-246, "Oil Channel"</u>.
  - 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.

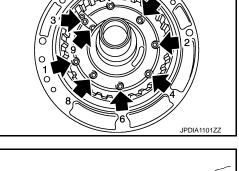
11. Remove D-ring (large) (1) and D-ring (small) (2) from 2346 brake piston.

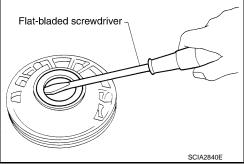
12. loosen bolts in numerical order shown in the figure and remove oil pump housing from oil pump cover.

13. Remove oil pump housing oil seal using a flat-bladed screw-

Be careful not to scratch oil pump housing.

Bolt





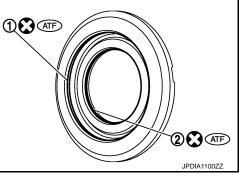
driver.

**CAUTION:** 



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### < UNIT DISASSEMBLY AND ASSEMBLY >

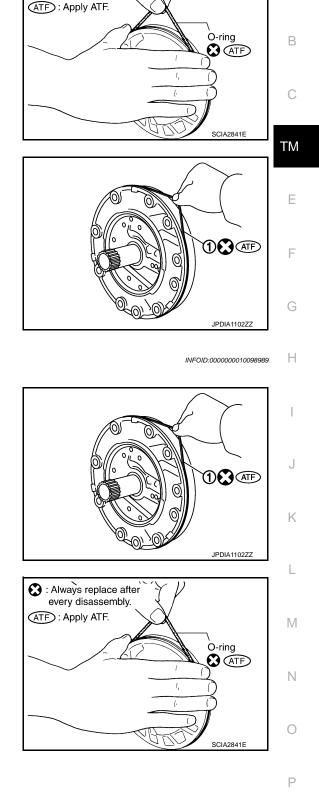
14. Remove O-ring from oil pump housing.

15. Remove O-ring (1) from oil pump cover.

2. Install O-ring to oil pump housing.

1. Install O-ring (1) to oil pump cover.

Assembly



### [7AT: RE7R01A]

А

S : Always replace after

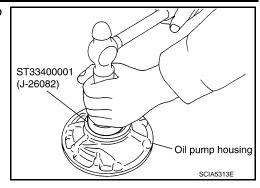
every disassembly.

#### < UNIT DISASSEMBLY AND ASSEMBLY >

- 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.

### [7AT: RE7R01A]

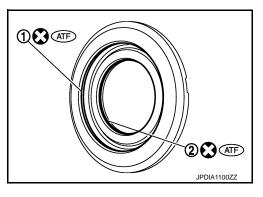
JPDIA1101ZZ



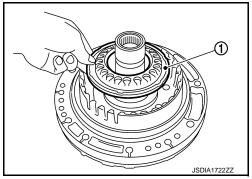
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Install oil pump housing to oil pump cover and tighten bolts (
 to the specified torque in numerical order shown in the figure after temporarily tightening them.

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.

### < UNIT DISASSEMBLY AND ASSEMBLY >

#### 8. Install front brake piston (1) to oil pump assembly.

9. Install 2346 brake spring retainer (1) to oil pump assembly.

 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:

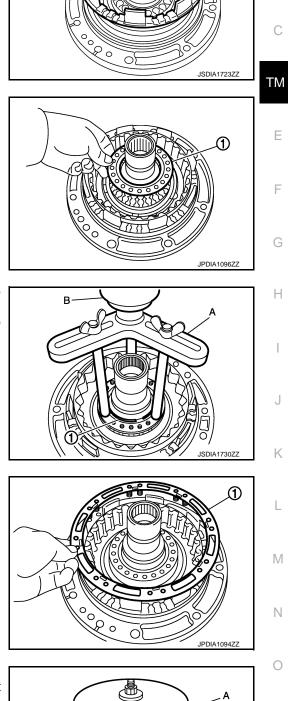
Be careful not to expand snap ring excessively.

11. Install front brake spring retainer (1) to oil pump assembly.

 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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# [7AT: RE7R01A]

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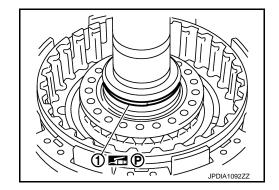
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В

### < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

13. Install seal ring (1) to oil pump assembly.

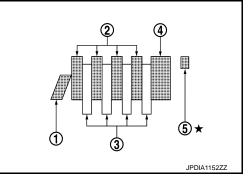


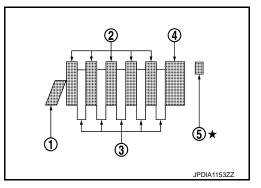
- 14. Install 2346 brake component part (retaining plate, drive plates, driven plates, and dish plate) to oil pump assembly.
  - VQ37VHR models
    - 1 : Dish plate
    - 2 : Driven plate (four pieces)
    - 3 : Drive plate (four pieces)
    - 4 : Retaining plate
    - 5 : Snap ring

#### **CAUTION:** Check the order of plates.

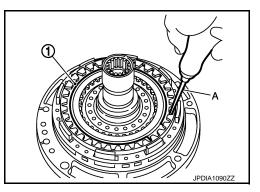
- VK56VD models
  - 1 : Dish plate
  - 2 : Driven plate (five pieces)
  - 3 : Drive plate (five pieces)
  - 4 : Retaining plate
  - 5 : Snap ring

#### **CAUTION:** Check the order of plates.



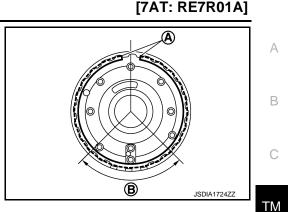


- Install snap ring (1) from oil pump assembly using a flat-bladed screwdriver (A).
   CAUTION:
  - Be careful not to scratch oil pump cover and 2346 brake retaining plate.
  - Be careful not to damage snap ring.



#### < UNIT DISASSEMBLY AND ASSEMBLY >

# • Never install snap ring mating part (A) to the clearance groove [(B) shown in the figure] of oil pump cover.



INFOID:000000010098990

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Inspection and Adjustment

#### 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

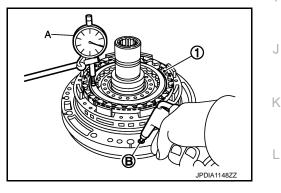
#### 2346 Brake Clearance

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 <u>TM-246</u>, "Oil Channel".

Air pressure	: 300 kPa (3.06 kg/cm <sup>2</sup> , 43.5 psi)		
2346 brake	: Refer to TM-325, "2346 Brake Clear-		
clearance	ance".		

#### **CAUTION:**

Never exceed the specified air pressure value.



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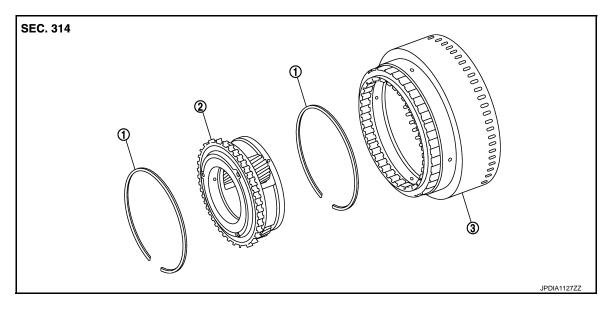
### UNDER DRIVE CARRIER, FRONT BRAKE HUB

#### < UNIT DISASSEMBLY AND ASSEMBLY >

# UNDER DRIVE CARRIER, FRONT BRAKE HUB

### Exploded View

INFOID:000000010098991



1. Snap ring

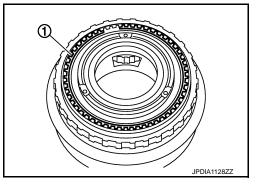
- 2. Under drive carrier assembly
- 3. Front brake hub

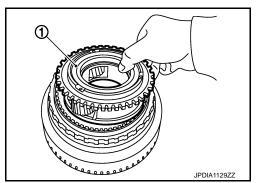
### Disassembly

 Remove snap ring (1) from front brake hub using a flat-bladed screwdriver.
 CAUTION:

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

- Be careful not to scratch front brake hub and under drive carrier assembly.
- Be careful not to damage snap ring.





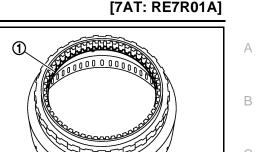
Revision: 2013 November

INFOID:0000000010098992

### **UNDER DRIVE CARRIER, FRONT BRAKE HUB**

### < UNIT DISASSEMBLY AND ASSEMBLY >

- 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.



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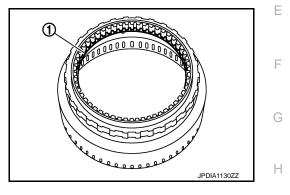
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Assembly

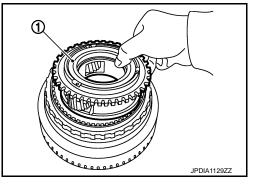
 Install snap ring (1) to front brake hub. CAUTION: Be careful not to damage snap ring.

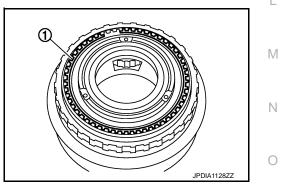
2. Install under drive carrier assembly (1) to front brake hub.

- 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.



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Inspection

INFOID:000000010098994

#### 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

### TM-305

# UNDER DRIVE CARRIER, FRONT BRAKE HUB

### < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

Check for deformation, fatigue or damage. If necessary, replace front brake hub.

### < UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A]

# FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

### **Exploded View**

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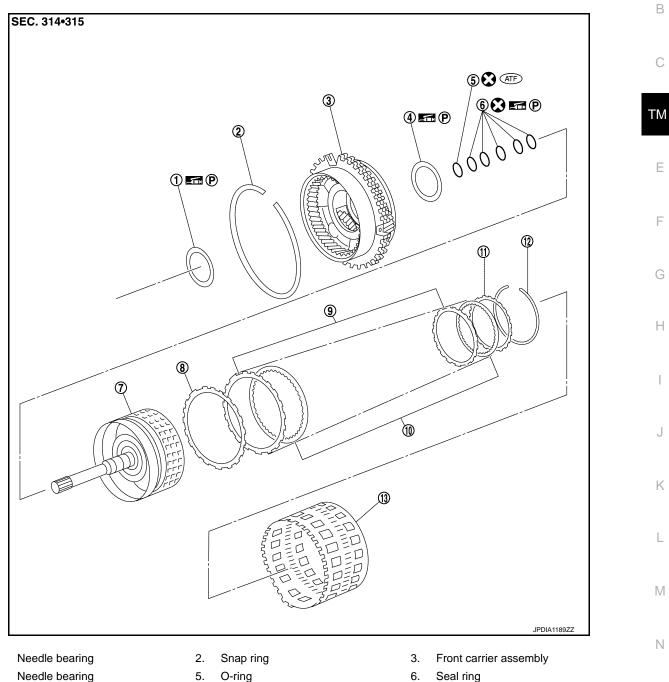
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7. Input clutch drum

1.

4.

- 10. Input clutch drive plate
- 13. Rear internal gear

Refer to GI-4, "Components" for symbols in the figure.

8.

- 9. Input clutch driven plate
- 12. Snap ring

Ρ

Input clutch dish plate

11. Input clutch retaining plate

### < UNIT DISASSEMBLY AND ASSEMBLY >

### Disassembly

**CAUTION:** 

**CAUTION:** 

bly.

6.

1. Remove needle bearing (1) from front carrier assembly.

Revision: 2013 November

Be careful not to scratch rear internal gear.
Be careful not to damage snap ring.

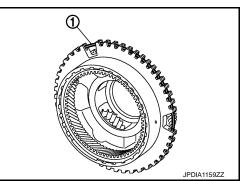
2. Compress snap ring (1) using flat-bladed screwdrivers (A).

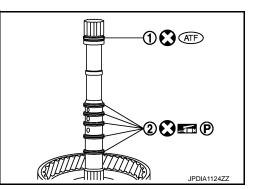
- 3. Remove front carrier assembly and input clutch assembly from rear internal gear.
- 4. Remove front carrier assembly from input clutch assembly.

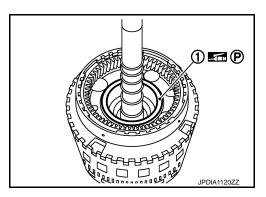
Remove snap ring (1) from front carrier assembly.

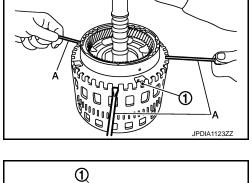
Be careful not to expand snap ring excessively.

7. Remove O-ring (1) and seal rings (2) from input clutch assem-







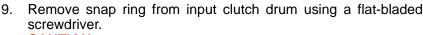


INFOID:000000010098996

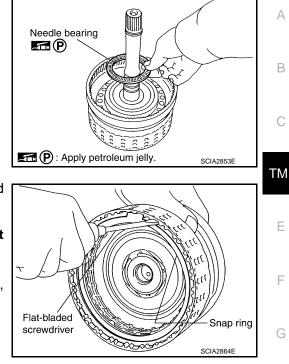
[7AT: RE7R01A]

#### < UNIT DISASSEMBLY AND ASSEMBLY >

8. Remove needle bearing from input clutch assembly.



- CAUTION: • Be careful not to scratch rear
- 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.



[7AT: RE7R01A]

### Assembly

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1. Install input clutch component part (dish plate, drive plates, driven plates, and retaining plate) to input clutch drum.

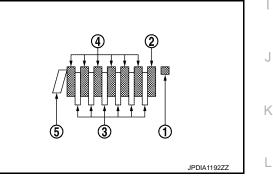
VQ37VHR models

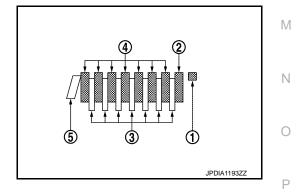
- 1 : Snap ring
- 2 : Retaining plate
- 3 : Drive plate (six pieces)
- 4 : Driven plate (six pieces)
- 5 : Dish plate

CAUTION: Check order of plates.

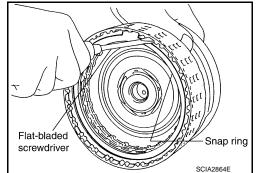
- VK56VD models
  - 1 : Snap ring
  - 2 : Retaining plate
  - 3 : Drive plate (seven pieces)
  - 4 : Driven plate (seven pieces)
  - 5 : Dish plate

CAUTION: Check order of plates.





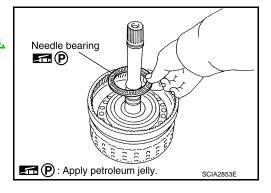
- < UNIT DISASSEMBLY AND ASSEMBLY >
- Install snap ring to input clutch drum using a flat-bladed screwdriver.
   CAUTION:
  - Be careful not to scratch input clutch drum and input clutch retaining plate.
  - Be careful not to damage snap ring.

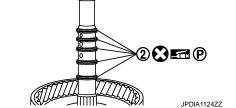


[7AT: RE7R01A]

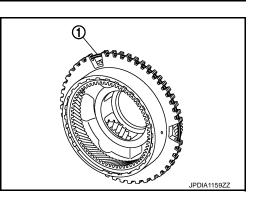
 Install needle bearing to input clutch assembly. CAUTION: Check the direction of needle bearing. Refer to <u>TM-246</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

Install O-ring (1) and seal rings (2) to input clutch assembly.

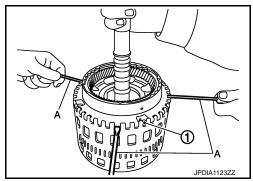




 Install snap ring (1) to front carrier assembly.
 CAUTION: Be careful not to expand snap ring excessively.



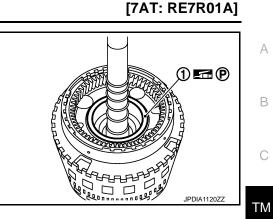
- 6. Compress snap ring (1) using flat-bladed screwdrivers (A). CAUTION:
  - Be careful not to scratch rear internal gear.
  - Be careful not to damage snap ring.
- 7. Install front carrier assembly and input clutch assembly to rear internal gear.



4.

### < UNIT DISASSEMBLY AND ASSEMBLY >

Install needle bearing (1) to front carrier assembly.
 CAUTION:
 Check the direction of needle bearing. Refer to <u>TM-246.</u>
 <u>"Location of Needle Bearings and Bearing Races"</u>.



Inspection

INFOID:000000010098998

INSPECTION AFTER DISASSEMBLY	Е
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.	F
Input Clutch Drum Check for deformation, fatigue or damage or burns. If necessary, replace input clutch assembly.	G
Input Clutch Retaining Plate/Drive Plates/Driven Plates/Dish Plate Check facing for burns, cracks or damage. If necessary, replace input clutch assembly.	Н
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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	M
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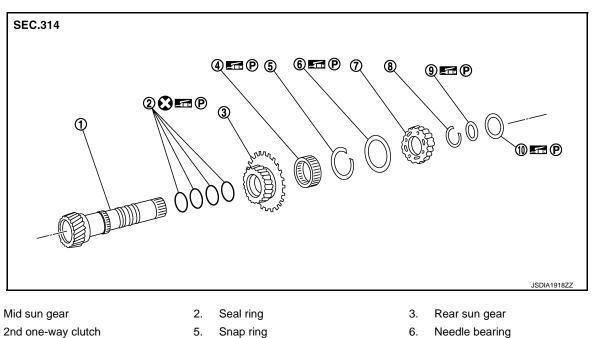
Ρ

#### MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB [7AT: RE7R01A] < UNIT DISASSEMBLY AND ASSEMBLY >

# MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

**Exploded View** 

INFOID:000000010098999



2nd one-way clutch 5. 4. Snap ring

- High and low reverse clutch hub 8. 7. Snap ring
- 10. Needle bearing

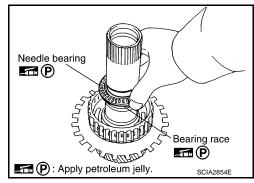
Refer to GI-4, "Components" for symbols in the figure.

# Disassembly

1.

INFOID:000000010099000

1. Remove needle bearing and bearing race from high and low reverse clutch hub.

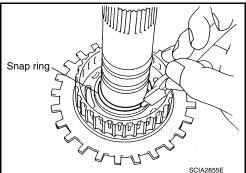


9.

Bearing race

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 [7AT: RE7R01A]

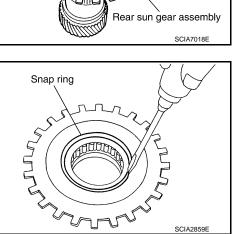
- < UNIT DISASSEMBLY AND ASSEMBLY >
- 3. Remove high and low reverse clutch hub from mid sun gear assembly.

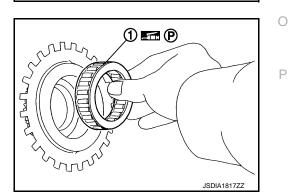
Remove needle bearing from high and low reverse clutch hub. 4.

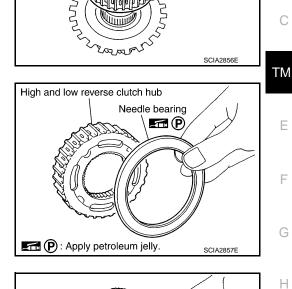
5. Remove rear sun gear assembly from mid sun gear assembly.

- 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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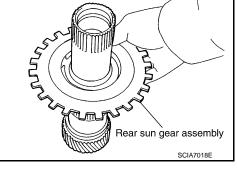
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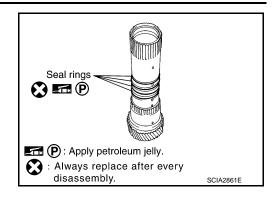
High and low reverse clutch hub



### MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB [7AT: RE7R01A]

### < UNIT DISASSEMBLY AND ASSEMBLY >

8. Remove seal rings from mid sun gear.

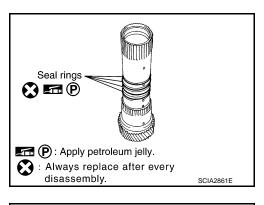


### Assembly

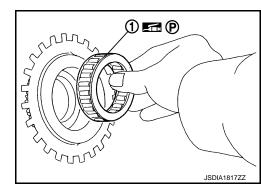
1. Install seal rings to mid sun gear.

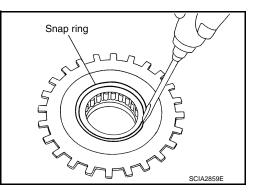
2. Install 2nd one-way clutch to rear sun gear.

- 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.



INFOID:000000010099001

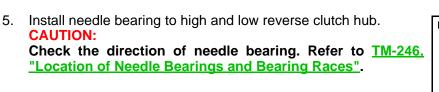




### MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB [7AT: RE7R01A]



4. Install rear sun gear assembly to mid sun gear assembly.



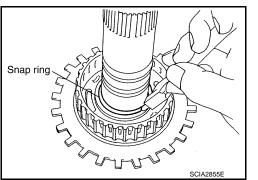
6. Install high and low reverse clutch hub to mid sun gear assembly.

Install snap ring to mid sun gear assembly using pair of snap 7. ring pliers. **CAUTION:** 

Be careful not to expand snap ring excessively.

Solutor, Rear sun gear assembly SCIA7018E High and low reverse clutch hub Needle bearing E P P: Apply petroleum jelly. SCIA2857E High and low reverse clutch hub Lapans SCIA2856E

S



Check operation of 2nd one-way clutch. 8.

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# MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

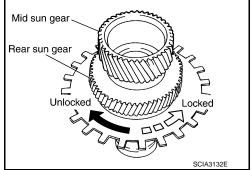
- < UNIT DISASSEMBLY AND ASSEMBLY >
- Hold mid sun gear and turn rear sun gear. a.
- b. Check 2nd one-way clutch for correct locking and unlocking directions.

"Location of Needle Bearings and Bearing Races".

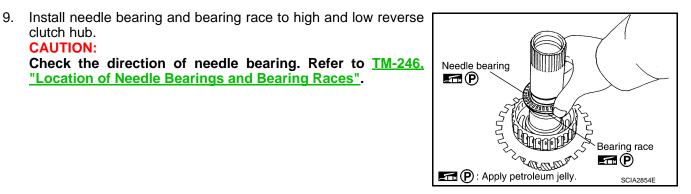
#### **CAUTION:**

clutch hub. **CAUTION:** 

If not as shown in the figure, check installation direction of 2nd one-way clutch.



[7AT: RE7R01A]

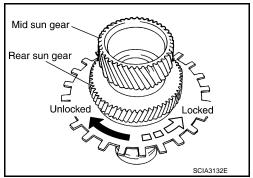


Inspection

### INSPECTION AFTER DISASSEMBLY

2nd One-way Clutch

- 1. Hold mid sun gear and turn rear sun gear.
- Check 2nd one-way clutch for correct locking and unlocking 2. 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.

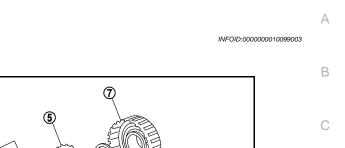
INFOID:000000010099002

# < UNIT DISASSEMBLY AND ASSEMBLY >

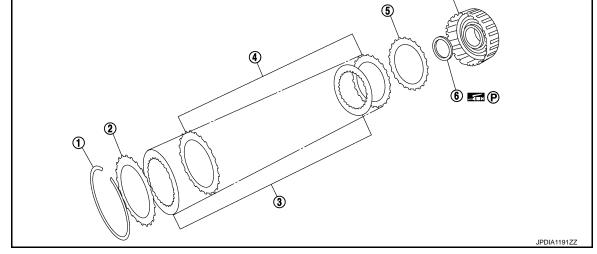
# HIGH AND LOW REVERSE CLUTCH

# Exploded View

SEC.315



[7AT: RE7R01A]



1. Snap ring

2. High and low reverse clutch retaining 3. plate

High and low reverse clutch dish

- 4. High and low reverse clutch driven plate
- 7. High and low reverse clutch drum

Refer to <u>GI-4, "Components"</u> for symbols in the figure.

### Disassembly

1. Remove bearing race from high and low reverse clutch drum.

5.

plate

High and low reverse clutch drive

plate

Bearing race

6.

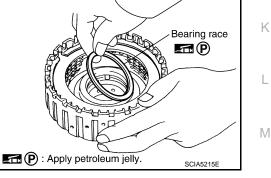
INFOID:0000000010099004

ТΜ

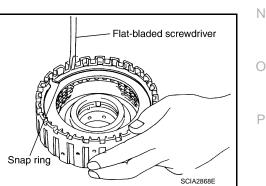
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- Remove snap ring from high and low reverse clutch drum using a flat-bladed screwdriver.
   CAUTION:
  - Be careful not to scratch high and low reverse clutch drum.
  - Be careful not to damage snap ring.
- 3. Remove high and low reverse clutch component (drive plates, driven plates, retaining plate, and dish plate) from high and low reverse clutch drum.



### < UNIT DISASSEMBLY AND ASSEMBLY >

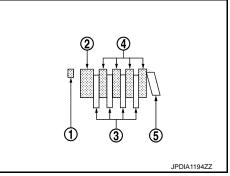
### Assembly

INFOID:000000010099005

[7AT: RE7R01A]

- Install high and low reverse clutch component part (dish plate, drive plates, driven plates, and retaining 1. 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.



- VK56VD models
  - : Snap ring 1
  - 2 : Retaining plate
  - 3 : Drive plate (five pieces)
  - 4 : Driven plate (five pieces)
  - : Dish plate 5

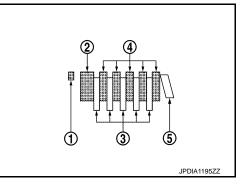
### CAUTION: Check the order of plates.

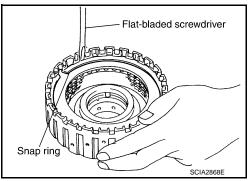
2. Install snap ring to high and low reverse clutch drum using a flatbladed screwdriver. **CAUTION:** 

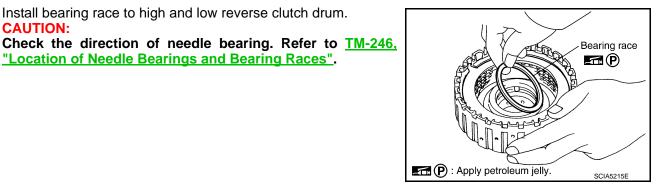
Install bearing race to high and low reverse clutch drum.

"Location of Needle Bearings and Bearing Races".

- Be careful not to scratch high and low reverse clutch drum.
- · Be careful not to damage snap ring.







Inspection

**CAUTION:** 

3.

INFOID:000000010099006

#### INSPECTION AFTER DISASSEMBLY

Check the following items. If necessary, replace high and low reverse clutch assembly.

Snap Ring

< 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.		A
High and Low Reverse Clutch Drum Check for deformation, fatigue or damage or burns.		В
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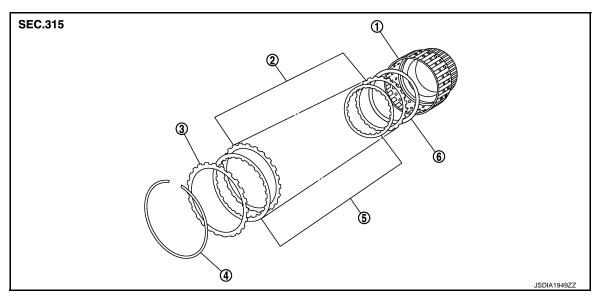
# **DIRECT CLUTCH**

### < UNIT DISASSEMBLY AND ASSEMBLY >

# DIRECT CLUTCH

### **Exploded View**

INFOID:000000010099007



Direct clutch drum 1.

Snap ring

- Direct clutch driven plate 2. Direct clutch drive plate
- Direct clutch retaining plate 3. 6. Direct clutch dish plate

### Disassembly

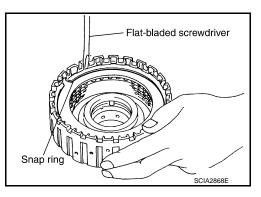
Assembly

4.

Remove snap rings from direct clutch drum using a flat-bladed 1. screwdriver. CAUTION:

5.

- 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.



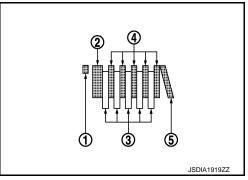
INFOID:000000010099009

INFOID:000000010099008

- Install direct clutch component part (drive plates, driven plates, retaining plate, and dish plate) to direct 1. clutch drum.
  - VQ37VHR models
    - 1 : Snap ring
    - 2 : Retaining plate
    - 3 : Drive plate (five pieces)
    - : Driven plate (five pieces) 4
    - 5 : Dish plate

#### **CAUTION:**

Check the order of plates.



### **DIRECT CLUTCH**

### < UNIT DISASSEMBLY AND ASSEMBLY >

### [7AT: RE7R01A]

 VK56VD models А 1 : Snap ring 2 : Retaining plate 3 : Drive plate (six pieces) В 4 : Driven plate (six pieces) 5 : Dish plate **CAUTION:** ſſ (5 Check the order of plates. JSDIA1920ZZ ТΜ 2. Install snap rings to direct clutch drum using a flat-bladed screwdriver. Flat-bladed screwdriver Ε **CAUTION:** RUDURA · Be careful not to scratch direct clutch drum and direct clutch retaining plate. F • Be careful not to damage snap ring. Snap ring SCIA28688 Н Inspection INFOID:0000000010099010 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 Κ Check for deformation, fatigue or damage or burns. L Μ Ν Ρ

#### < SERVICE DATA AND SPECIFICATIONS (SDS)

# SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

### **General Specification**

INFOID:000000010099011

[7AT: RE7R01A]

Applied model	Engine	VQ37VHR		VK56VD	
Applied model	Axle	2WD	AWD	2WD	AWD
Transmission model			RE7R	01A	
Stall torque ratio		1.92	2 : 1	1.93	5:1
Transmission gear ratio	1st		4.73	83	
	2nd	3.103			
	3rd	1.984			
	4th	1.371			
	5th	1.000			
	6th	0.871			
	7th	0.776			
	Reverse	3.859			
Recommended fluid and fluid capacity			OR NORTH AMERIC 3, "FOR MEXICO : F		

### Vehicle Speed at Which Gear Shifting Occurs

INFOID:000000010099012

Unit: km/h (MPH)

### VQ37VHR

#### STANDARD MODE

Gear position	Throttle position		
	Full throttle	Half throttle	
$D1 \rightarrow D2$	54 - 58 (34 - 36)	36 - 40 (22 - 25)	
$D_2 \rightarrow D_3$	84 - 92 (52 - 57)	57 - 65 (35 - 40)	
$D3 \rightarrow D4$	132 – 142 (82 – 88)	93 - 103 (58 - 64)	
$D4 \rightarrow D5$	194 – 204 (121 – 127)	136 – 146 (85 – 91)	
$D5 \rightarrow D6$	250 – 260 (155 – 162)	180 – 190 (112 – 118)	
$D6 \rightarrow D7$	250 - 260 (155 - 162)	207 – 217 (129 – 135)	
$D7 \rightarrow D6$	240 – 250 (149 – 155)	113 – 123 (70 – 76)	
$D6 \rightarrow D5$	240 – 250 (149 – 155)	113 – 123 (70 – 76)	
$D5 \rightarrow D4$	167 – 177 (104 – 110)	69 - 79 (43 - 49)	
$D4 \rightarrow D3$	126 – 136 (78 – 85)	35 - 45 (22 - 28)	
$D3 \rightarrow D2$	59 - 67 (37 - 42)	12 – 20 (7 – 12)	
$D_2 \rightarrow D_1$	13 – 17 (8 – 11)	6 - 10 (4 - 6)	

• At half throttle, the accelerator opening is 4/8 of the full opening.

#### ECO MODE

Unit: km/h (MPH)

	Throttle position	
Gear position	Full throttle	Half throttle
$D1 \rightarrow D2$	42 - 46 (26 - 29)	21 – 25 (13 – 16)
$D_2 \rightarrow D_3$	65 – 73 (40 – 45)	35 - 43 (22 - 27)

### < SERVICE DATA AND SPECIFICATIONS (SDS)

### [7AT: RE7R01A]

Gear position	Throttle position		
	Full throttle	Half throttle	A
$D_3 \rightarrow D_4$	110 – 120 (68 – 75)	56 - 66 (35 - 41)	
$D4 \rightarrow D5$	162 – 172 (101 – 107)	75 – 85 (47 – 53)	В
$D5 \rightarrow D6$	250 - 260 (155 - 162)	116 – 126 (72 – 78)	
$D6 \rightarrow D7$	250 - 260 (155 - 162)	134 – 144 (83 – 89)	
$D7 \rightarrow D6$	240 – 250 (149 – 155)	99 - 109 (62 - 68)	С
$D6 \rightarrow D5$	126 – 136 (78 – 85)	99 - 109 (62 - 68)	
$D5 \rightarrow D4$	108 – 118 (67 – 73)	50 - 60 (31 - 37)	ТМ
$D4 \rightarrow D3$	56 - 66 (35 - 41)	21 – 31 (13 – 19)	
$D3 \rightarrow D2$	21 – 29 (13 – 18)	9 – 17 (6 – 11)	
$D_2 \rightarrow D_1$	3 – 7 (2 – 4)	3 - 7 (2 - 4)	E

• At half throttle, the accelerator opening is 4/8 of the full opening.

#### VK56VD

#### STANDARD MODE

Coorposition	Throttle	position
Gear position	Full throttle	Half throttle
$D1 \rightarrow D2$	60 - 64 (37 - 40)	36 - 40 (22 - 25)
$D2 \rightarrow D3$	95 - 103 (59 - 64)	64 - 72 (40 - 45)
$D3 \rightarrow D4$	149 – 159 (93 – 99)	110 – 120 (68 – 75)
$D4 \rightarrow D5$	219 – 229 (136 – 142)	154 – 164 (96 – 102)
$D5 \rightarrow D6$	250 - 260 (155 - 162)	217 – 227 (135 – 141)
$D6 \rightarrow D7$	250 – 260 (155 – 162)	250 – 260 (155 – 162)
$D7 \rightarrow D6$	240 - 250 (149 - 155)	199 – 209 (124 – 130)
$D6 \rightarrow D5$	240 – 250 (149 – 155)	138 – 148 (86 – 92)
$D5 \rightarrow D4$	209 – 219 (130 – 136)	78 - 88 (48 - 55)
$D4 \rightarrow D3$	137 – 147 (85 – 91)	38 - 48 (24 - 30)
$D_3 \rightarrow D_2$	68 - 76 (42 - 47)	24 - 32 (15 - 20)
$D_2 \rightarrow D_1$	14 – 18 (9 – 11)	10 - 14 (6 - 9)

• At half throttle, the accelerator opening is 4/8 of the full opening.

#### ECO MODE

Throttle position		Coorposition
 Half throttle	Full throttle	Gear position
 23 – 27 (14 – 17)	49 – 53 (30 – 33)	$D1 \to D2$
 40 - 48 (25 - 30)	77 – 85 (48 – 53)	$D2 \rightarrow D3$
 64 - 74 (40 - 46)	122 – 132 (76 – 82)	$D3 \rightarrow D4$
 95 - 105 (59 - 65)	180 – 190 (112 – 118)	$D4 \rightarrow D5$
 132 – 142 (82 – 88)	250 – 260 (155 – 162)	$D5 \rightarrow D6$
 152 – 162 (94 – 101)	250 - 260 (155 - 162)	$D6 \rightarrow D7$
 147 – 157 (91 – 98)	240 – 250 (149 – 155)	$D7 \rightarrow D6$
 127 – 137 (79 – 85)	144 – 154 (89 – 96)	$D6 \rightarrow D5$
 71 – 81 (44 – 50)	124 – 134 (77 – 83)	$D5 \rightarrow D4$
 47-57 (29-35)	64 - 74 (40 - 46)	$D4 \rightarrow D3$

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#### < SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: RE7R01A]

INFOID:000000010099013

Gear position	Throttle position		
	Full throttle	Half throttle	
$D_3 \rightarrow D_2$	33 – 41 (20 – 25)	17 – 25 (11 – 16)	
$D2 \rightarrow D1$	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

#### VQ37VHR

#### STANDARD MODE

Throttle position	Vehicle speed	l 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	i 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	d 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

### VQ37VHR

Stall speed	2,050 – 2,350 rpm
VK56VD	
Stall speed	1,650 – 1,950 rpm
Torque Converter	INFCID:000000010099015

VQ37VHR

INFOID:000000010099014

### < SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: RE7R01A]

Dimension between end of conver	ter housing and torque converter	25.0 mm (0.98	25.0 mm (0.98 in)	
/K56VD				
Dimension between end of conver	ter housing and torque converter	24.0 mm (0.94in)		
Total End Play			INFOID:000000010099016	
			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 Cleara	nce		INFOID:000000010099017	
			Unit: mm (in)	
Reverse brake clearance	Standard	0.8 – 1.2 (0.031 – 0.047)		
Thickness of retaining plate for ad	iusting reverse brake clearance	4.8 (0.189) 5.0 (0.197) 5.2 (0.205) 5.4 (0.213)		
З г		5.6 (0.220) 5.8 (0.228) 6.0 (0.236)		
Front Brake Clearance	)		INFOID:000000010099018	
			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:000000010099019	
			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)		

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