SECTION TM
TRANSAXLE & TRANSMISSION

CONTENTS

BASIC INSPECTION

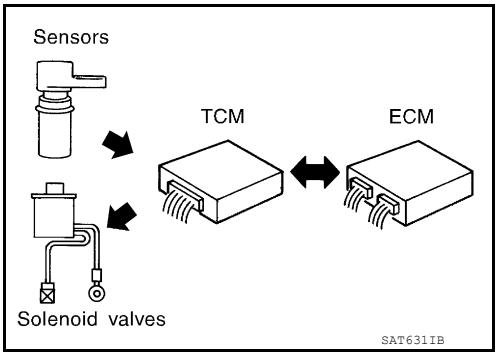
DIAGNOSIS AND REPAIR WORKFLOW

How to Perform Trouble Diagnosis For Quick and Accurate Repair

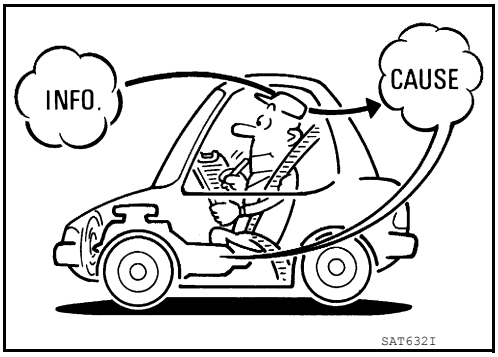
INFOID:0000000006244659

INTRODUCTION

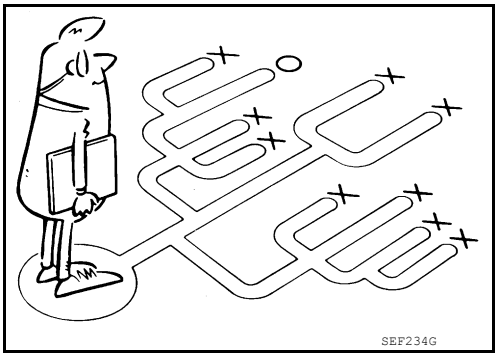
The TCM receives a signal from the output speed sensor, accelerator pedal position sensor (throttle position sensor) or transmission range switch. Then provides shift control or lock-up control via A/T solenoid valves.
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.
Input and output signals must always be correct and stable in the operation of the A/T system. The A/T system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.



It is much more difficult to diagnose an error that occurs intermittently rather than continuously. Most intermittent errors are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.
A visual check only may not find the cause of the errors. A road test with CONSULT-III (or GST) or a circuit tester connected should be performed. Follow the “DETAILED FLOW”.



Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such errors, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic work sheet” as shown on the example (Refer to TM-7) should be used.
Start your diagnosis by looking for “conventional” errors first. This will help troubleshoot driveability errors on an electronically controlled engine vehicle.
Also check related Service bulletins.



DETAILED FLOW

1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using diagnosis worksheet. Refer to TM-7, "Diagnostic Work Sheet".

>> GO TO 2.

2. CHECK SYMPTOM 1

Check the following items based on the information obtained from the customer.
- Fail-safe. Refer to TM-112, "Fail-Safe".
- A/T fluid inspection. Refer to TM-155, "Checking the A/T Fluid (ATF)".
- Stall test. Refer to TM-161, "Stall Test".
- Line pressure test. Refer to TM-162, "Line Pressure Test".

>> GO TO 3.

3.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is detected.

- Record DTC.
- Erase DTC. Refer to TM-34, "OBD-II Diagnostic Trouble Code (DTC)".

Is any DTC detected?

YES >> GO TO 4.
NO >> GO TO 6.

4.PERFORM DIAGNOSTIC PROCEDURE

Perform “Diagnosis Procedure” for the displayed DTC.

>> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform “DTC CONFIRMATION PROCEDURE”.

Is DTC detected?

YES >> GO TO 4.
NO >> GO TO 6.

6.CHECK SYMPTOM 2

Try to confirm the symptom described by the customer.

Is any malfunction present?

YES >> GO TO 7.
NO >> INSPECTION END

7.ROAD TEST

Perform “ROAD TEST”. Refer to TM-165, "Check Before Engine Is Started".

>> GO TO 8.

8.CHECK SYMPTOM 3

Try to confirm the symptom described by the customer.

Is any malfunction present?

YES >> GO TO 2.
NO >> INSPECTION END

Diagnostic Work Sheet

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INFORMATION FROM CUSTOMER

KEY POINTS

- **WHAT**..... Vehicle and A/T model
- **WHEN**..... Date, Frequencies
- **WHERE**..... Road conditions
- **HOW**..... Operating conditions, Symptoms

Customer name MR/MS	Model and Year	VIN
Trans. Model	Engine	Mileage
Malfunction Date	Manuf. Date	In Service Date
Frequency	☐ Continuous ☐ Intermittent (times a day)	

Symptoms	☐ Vehicle does not move. (☐ Any position ☐ Particular position)	
	☐ No up-shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → 4th ☐ 4th → 5th)	
	☐ No down-shift (☐ 5th → 4th ☐ 4th → 3rd ☐ 3rd → 2nd ☐ 2nd → 1st)	
	☐ Lock-up malfunction	
	☐ Shift point too high or too low.	
	☐ Shift shock or slip (☐ N → D ☐ N → R ☐ Lock-up ☐ Any drive position)	
	☐ Noise or vibration	
	☐ No kick down	
	☐ No pattern select	
	☐ Cannot be changed to manual mode	
	☐ Others ( )	
A/T CHECK indicator lamp (with manual mode)	☐ Continuously lit	☐ Not lit
O/D OFF indicator lamp (without manual mode)	☐ Continuously lit	☐ Not lit
Malfunction indicator lamp (MIL)	☐ Continuously lit	☐ Not lit

DIAGNOSTIC WORK SHEET

1	☐ Read the item on cautions concerning fail-safe and understand the customer's complaint.			TM-112
2	☐ A/T fluid inspection, stall test and line pressure test			
		☐ A/T fluid inspection		TM-155
		☐ Leak (Repair leak location.) ☐ State ☐ Amount		
		☐ Stall test		TM-161
		☐ Torque converter one-way clutch ☐ Front brake ☐ High and low reverse clutch ☐ Low coast brake ☐ Forward brake ☐ Reverse brake ☐ Forward one-way clutch	☐ 1st one-way clutch ☐ 3rd one-way clutch ☐ Engine ☐ Line pressure low ☐ Except for input clutch and direct clutch, clutches and brakes OK	
		☐ Line pressure test - Suspected part:		TM-162
3	☐ Perform self-diagnosis. — Check detected items to repair or replace malfunctioning part.			TM-36
4	☐ Perform road test.			
	5-1	☐ Check before engine is started		TM-165
	5-2	☐ Check at idle		TM-165
	5-3	Cruise test	☐ Part 1	TM-166
			☐ Part 2	TM-168
			☐ Part 3	TM-168
	☐ Check malfunction phenomena to repair or replace malfunctioning part after completing all road test. Refer to TM-126, "Symptom Chart".			
5	☐ Drive vehicle to check that the malfunction phenomenon has been resolved.			
6	☐ Erase the results of the self-diagnosis from the TCM and the ECM.			TM-34

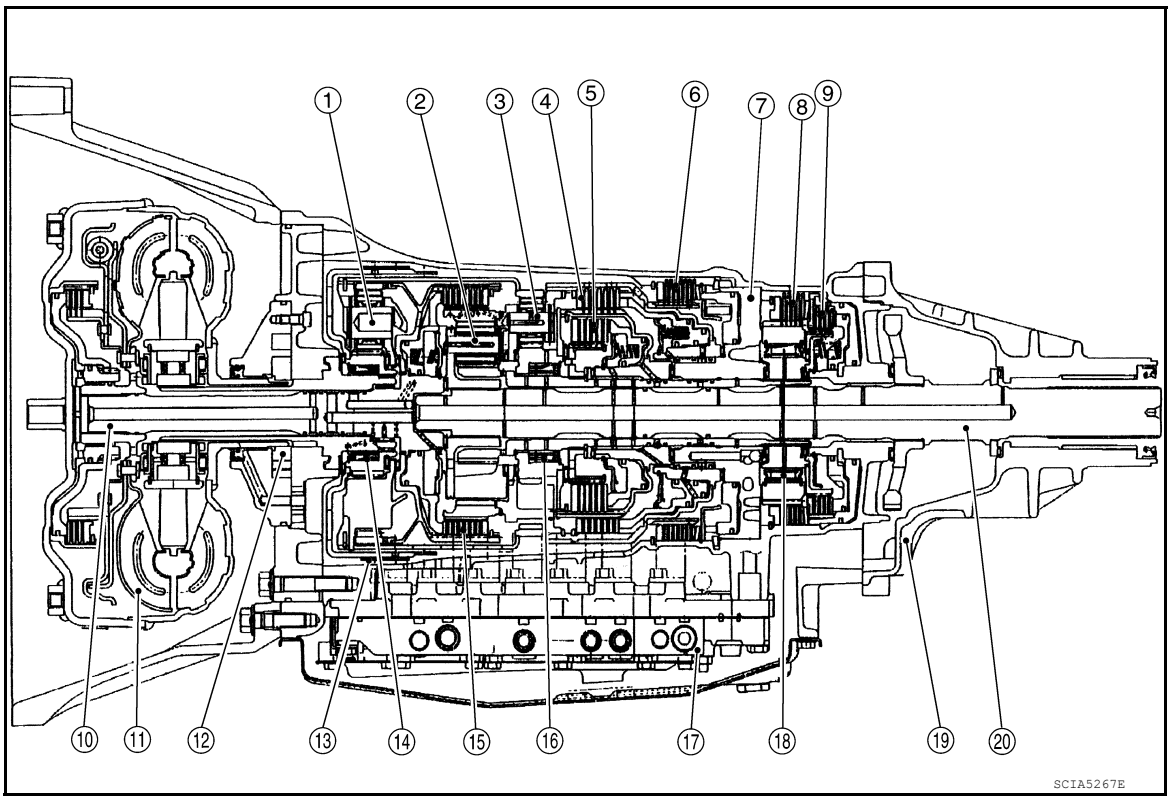
SYSTEM DESCRIPTION

A/T CONTROL SYSTEM

Cross-Sectional View

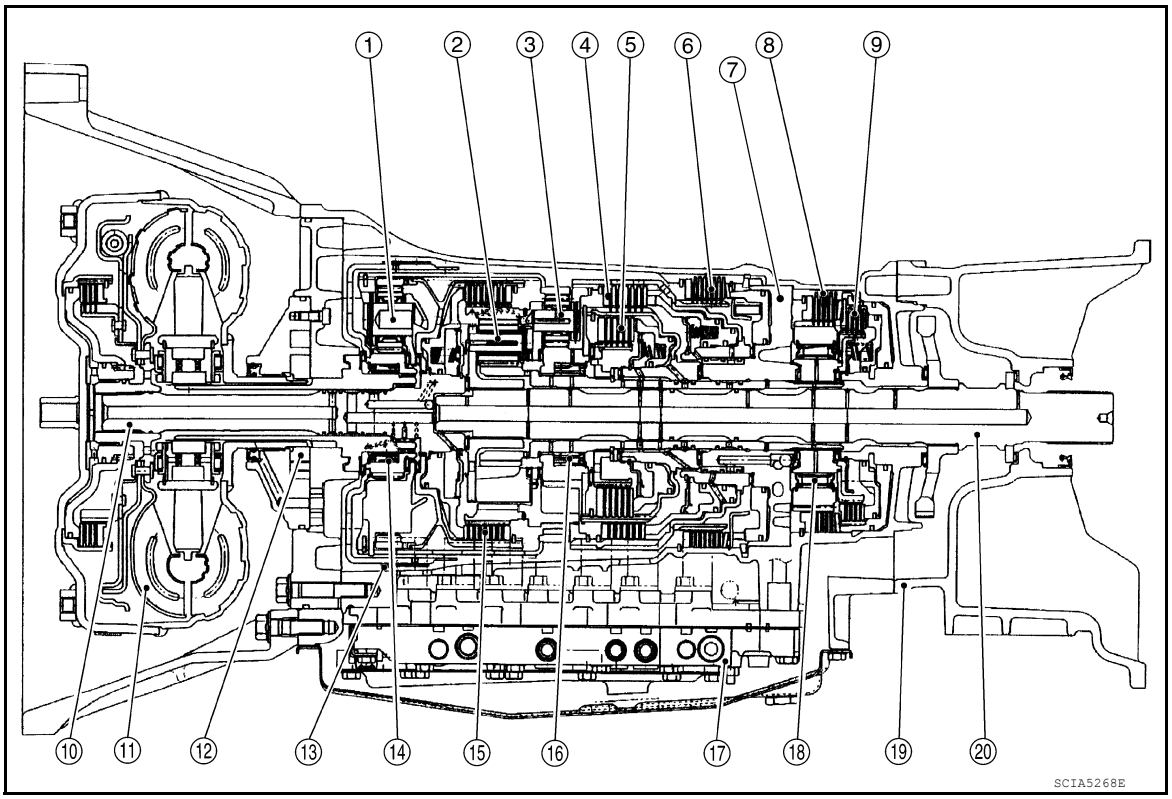
INFOID:0000000006244661

2WD models



1. Front planetary gear
2. Mid planetary gear
3. Rear planetary gear
4. Direct clutch
5. High and low reverse clutch
6. Reverse brake
7. Drum support
8. Forward brake
9. Low coast brake
10. Input shaft
11. Torque converter
12. Oil pump
13. Front brake
14. 3rd one-way clutch
15. Input clutch
16. 1st one-way clutch
17. Control valve with TCM
18. Forward one-way clutch
19. Rear extension
20. Output shaft

4WD models



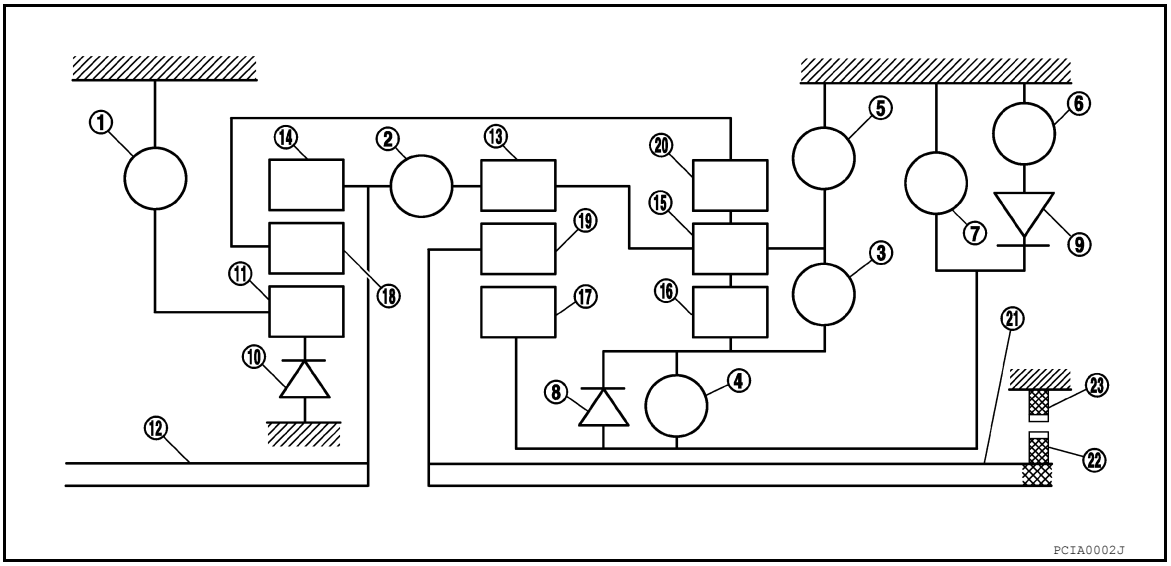
1. Front planetary gear
2. Mid planetary gear
3. Rear planetary gear
4. Direct clutch
5. High and low reverse clutch
6. Reverse brake
7. Drum support
8. Forward brake
9. Low coast brake
10. Input shaft
11. Torque converter
12. Oil pump
13. Front brake
14. 3rd one-way clutch
15. Input clutch
16. 1st one-way clutch
17. Control valve with TCM
18. Forward one-way clutch
19. Adapter case
20. Output shaft

Shift Mechanism

INFOID:0000000006244662

The automatic transmission uses compact triple planetary gear systems to improve power-transmission efficiency, simplify construction and reduce weight.
It also employs an optimum shift control and super wide gear ratios. They improve starting performance and acceleration during medium and high-speed operation.

CONSTRUCTION



1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

FUNCTION OF CLUTCH AND BRAKE

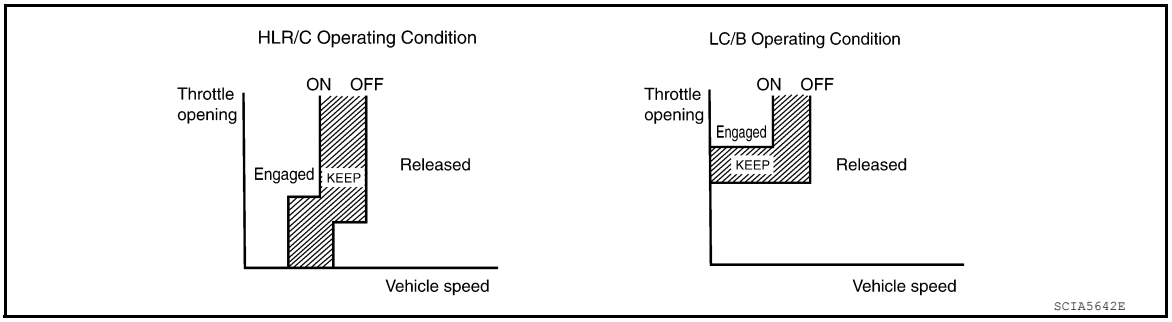
Name of the Part	Abbreviation	Function
Front brake (1)	FR/B	Fastens the front sun gear (11).
Input clutch (2)	I/C	Connects the input shaft (12), the front internal gear (14) and the mid internal gear (13).
Direct clutch (3)	D/C	Connects the rear carrier (15) and the rear sun gear (16).
High and low reverse clutch (4)	HLR/C	Connects the mid sun gear (17) and the rear sun gear (16).
Reverse brake (5)	R/B	Fastens the rear carrier (15).
Forward brake (6)	Fwd/B	Fastens the mid sun gear (17).
Low coast brake (7)	LC/B	Fastens the mid sun gear (17).
1st one-way clutch (8)	1st WOC	Allows the rear sun gear (16) to turn freely forward relative to the mid sun gear (17) but fastens it for reverse rotation.
Forward one-way clutch (9)	Fwd OWC	Allows the mid sun gear (17) to turn freely in the forward direction but fastens it for reverse rotation.
3rd one-way clutch (10)	3rd OWC	Allows the front sun gear (11) to turn freely in the forward direction but fastens it for reverse rotation.

CLUTCH AND BAND CHART (Without Manual Mode)

Shift position	I/C	HLR/C	D/C	R/B	FR/B	LC/B	Fwd/B	1st OWC	Fwd OWC	3rd OWC	Remarks
P		△			△						PARK POSITION
R		○		○	○			☆		☆	REVERSE POSITION

Shift position		I/C	HLR/C	D/C	R/B	FR/B	LC/B	Fwd/B	1st OWC	Fwd OWC	3rd OWC	Remarks
N			△			△						NEUTRAL POSITION
D*1	1st		△✻			△	△✻✻	○	☆	☆	☆	Automatic shift 1⇔2⇔3⇔4⇔5
	2nd			○		△		○		☆	☆	
	3rd		○	○		○		△	★		☆	
	4th	○	○	○				△	★			
	5th	○	○			○		△	★		★	
3	1st		△✻			△	△✻✻	○	☆	☆	☆	Automatic shift 1⇔2⇔3⇐4
	2nd			○		△		○		☆	☆	
	3rd		○	○		○		△	★		☆	
	4th	○	○	○				△	★			
2	1st		△✻			△	△✻✻	○	☆	☆	☆	Automatic shift 1⇔2⇐3⇐4
	2nd			○		○	○	○		☆	☆	
	3rd		○	○		○		△	★		☆	
	4th	○	○	○				△	★			
1	1st		○			○	○	○	☆	☆	☆	Locks (held stationary in 1st gear) 1⇐2⇐3⇐4
	2nd			○		○	○	○		☆	☆	
	3rd		○	○		○		△	★		☆	
	4th	○	○	○				△	★			

- ○—Operates
- ☆—Operates during “progressive” acceleration.
- ★—Operates and effects power transmission while coasting.
- △—Line pressure is applied but does not affect power transmission.
- △✻—Operates under conditions shown in HLR/C Operating Condition
- △✻✻—Operates under conditions shown in LC/B Operating Condition. Delay control is applied during D (4,3,2,1) ⇒N shift.
- *1: A/T will not shift to 5th when overdrive control switch is set in “OFF” position.

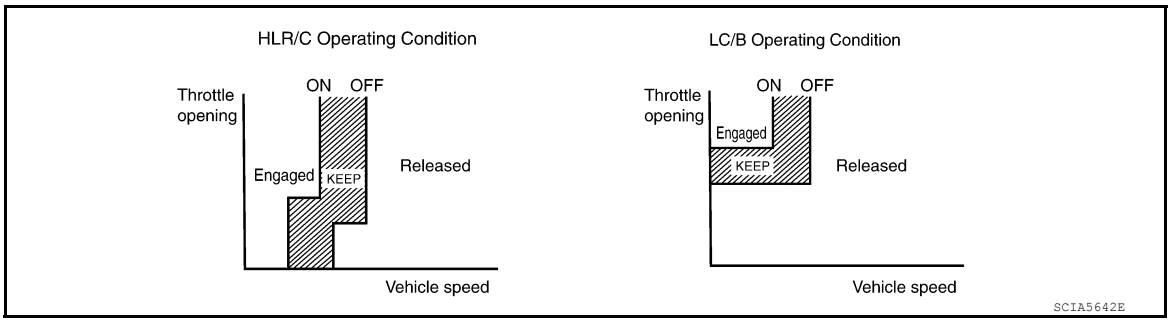


CLUTCH AND BAND CHART (With Manual Mode)

Shift position	I/C	HLR/C	D/C	R/B	FR/B	LC/B	Fwd/B	1st OWC	Fwd OWC	3rd OWC	Remarks
P		△			△						PARK POSITION
R		○		○	○			☆		☆	REVERSE POSITION

Shift position		I/C	HLR/C	D/C	R/B	FR/B	LC/B	Fwd/B	1st OWC	Fwd OWC	3rd OWC	Remarks
N			△			△						NEUTRAL POSITION
D	1st		△✳			△	△✳✳	○	☆	☆	☆	Automatic shift 1⇔2⇔3⇔4⇔5
	2nd			○		△		○		☆	☆	
	3rd		○	○		○		△	★		☆	
	4th	○	○	○				△	★			
	5th	○	○			○		△	★		★	
M5	1st		△✳			△	△✳✳	○	☆	☆	☆	Automatic shift 1⇔2⇔3⇔4⇔5
	2nd			○		△		○		☆	☆	
	3rd		○	○		○		△	★		☆	
	4th	○	○	○				△	★			
	5th	○	○			○		△	★		★	
M4	1st		△✳			△	△✳✳	○	☆	☆	☆	Automatic shift 1⇔2⇔3⇔4
	2nd			○		△		○		☆	☆	
	3rd		○	○		○		△	★		☆	
	4th	○	○	○				△	★			
M3	1st		△✳			△	△✳✳	○	☆	☆	☆	Automatic shift 1⇔2⇔3
	2nd			○		△		○		☆	☆	
	3rd		○	○		○		△	★		☆	
M2	1st		△✳			△	△✳✳	○	☆	☆	☆	Automatic shift 1⇔2
	2nd			○		○	○	○		☆	☆	
M1	1st		○			○	○	○	☆	☆	☆	Locks (held stationary in 1GR)
	2nd			○		○	○	○		☆	☆	

- ○—Operates
- ☆—Operates during “progressive” acceleration.
- ★—Operates and effects power transmission while coasting.
- △—Line pressure is applied but does not affect power transmission.
- △✳—Operates under conditions shown in HLR/C Operating Condition
- △✳✳—Operates under conditions shown in LC/B Operating Condition. Delay control is applied during D (4,3,2,1) ⇒N shift.



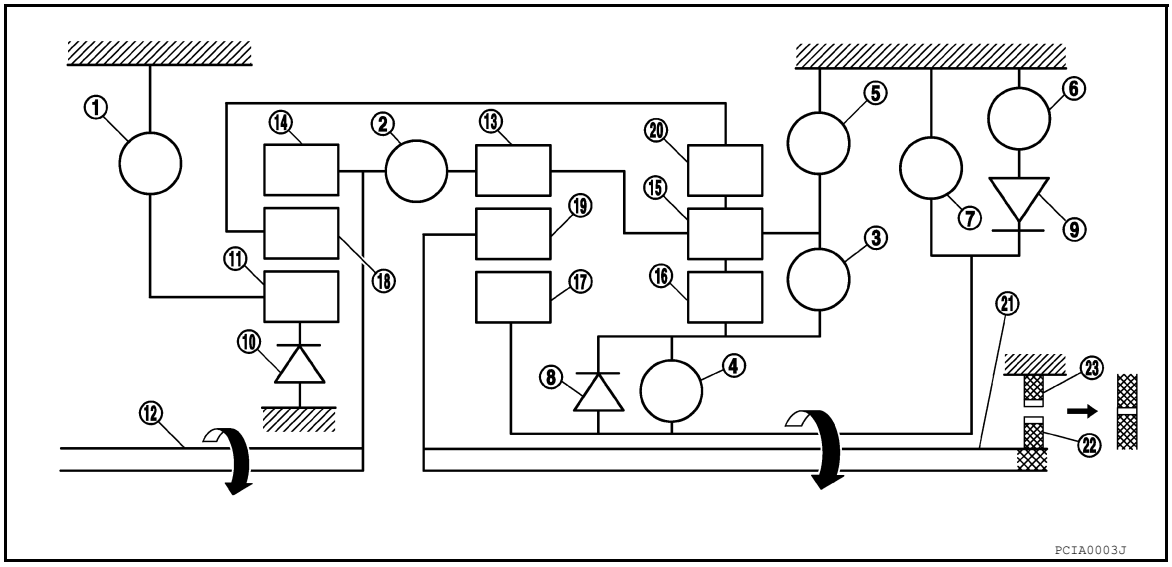
POWER TRANSMISSION

“N” Position

Since both the forward brake and the reverse brake are released, torque from the input shaft drive is not transmitted to the output shaft.

“P” Position

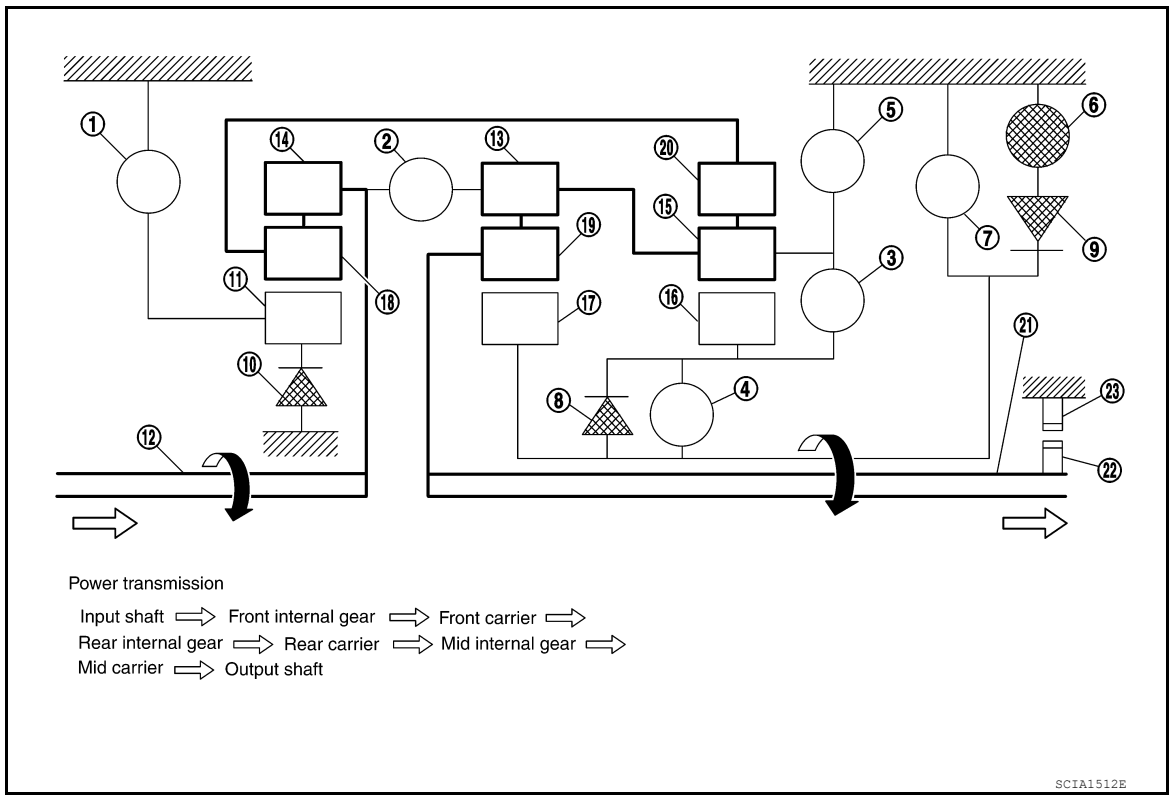
- The same as for the “N” position, both the forward brake and the reverse brake are released, so torque from the input shaft drive is not transmitted to the output shaft.
- The parking pawl linked with the select lever meshes with the parking gear and fastens the output shaft mechanically.



1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

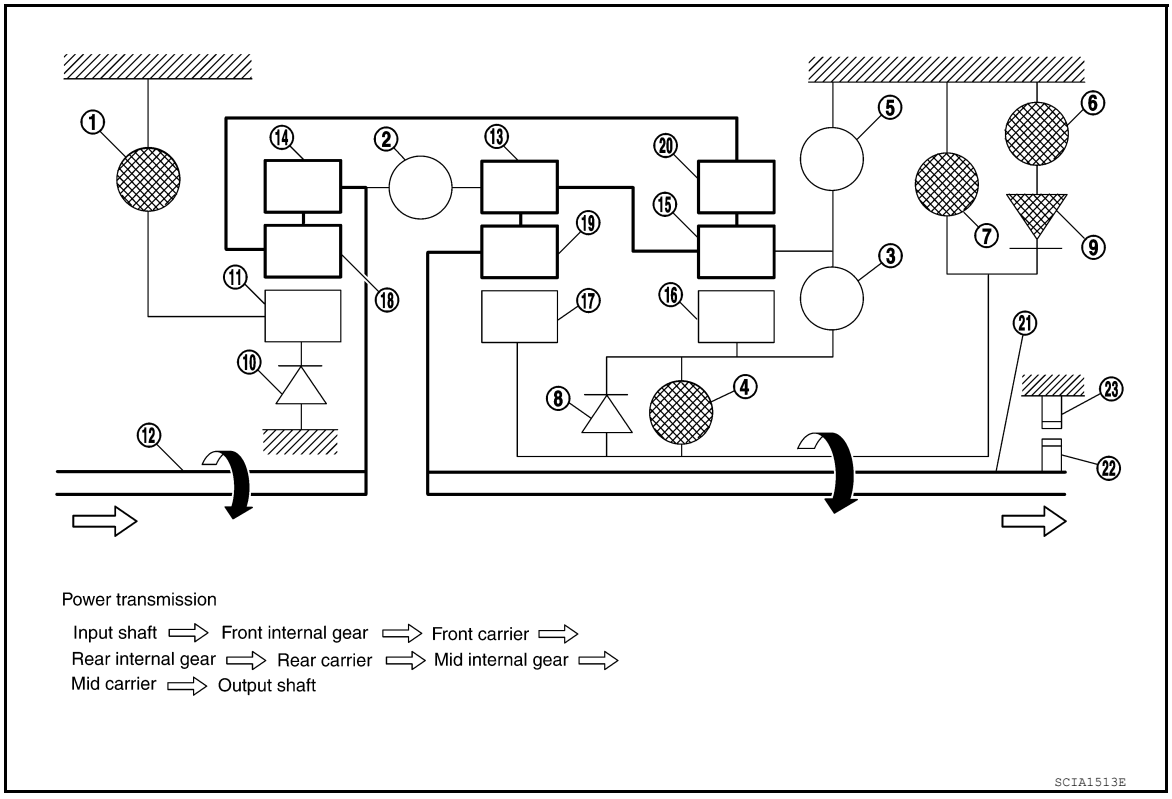
“D1”Position (With Manual Mode) / "D1", “31" and “21” Positions (Without Manual Mode)

- The forward brake and the forward one-way clutch regulate reverse rotation of the mid sun gear.
- The 1st one-way clutch regulates reverse rotation of the rear sun gear.
- The 3rd one-way clutch regulates reverse rotation of the front sun gear.
- During deceleration, the mid sun gear turns forward, so the forward one-way clutch idles and the engine brake is not activated.



1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

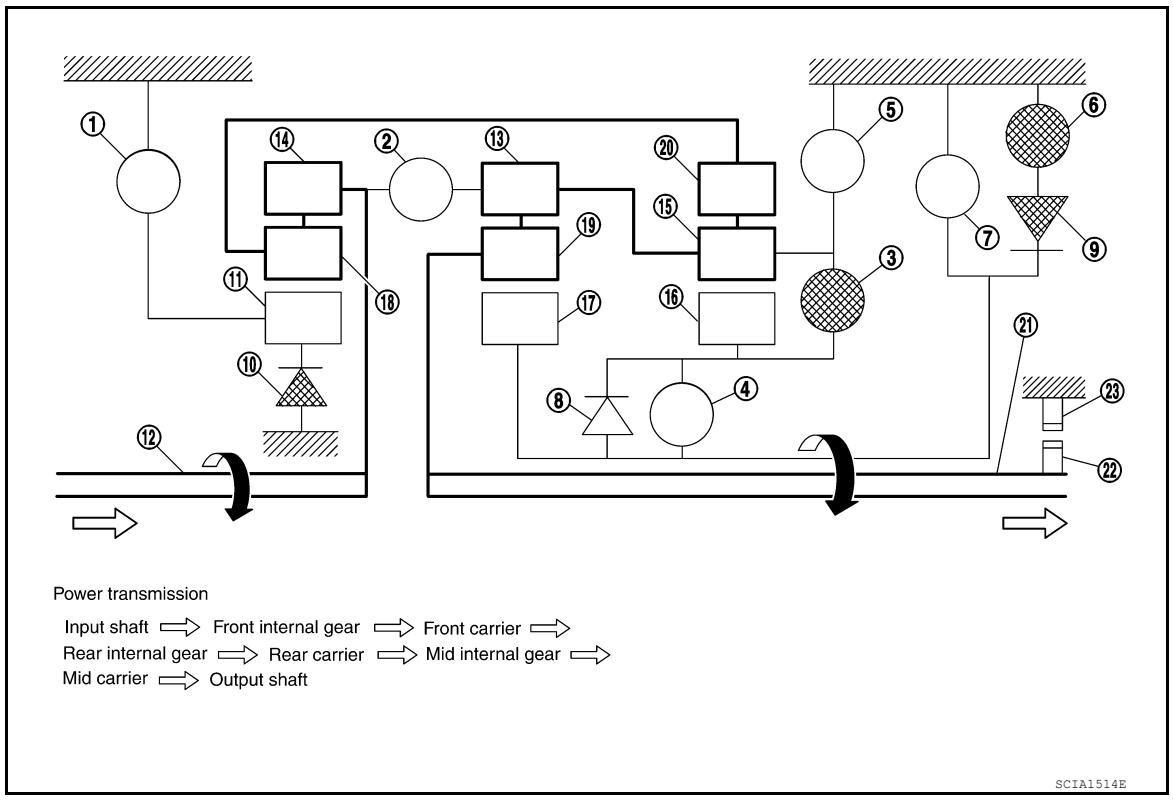
“M1” Position (With Manual Mode) / "1₁" Position (Without Manual Mode)
- The front brake fastens the front sun gear.
- The forward brake and the forward one-way clutch regulate reverse rotation of the mid sun gear.
- High and low reverse clutch connects the rear sun gear and the mid sun gear.
- The low coast brake fastens the mid sun gear.
- During deceleration, the low coast brake regulates forward rotation of the mid sun gear and the engine brake functions.



1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

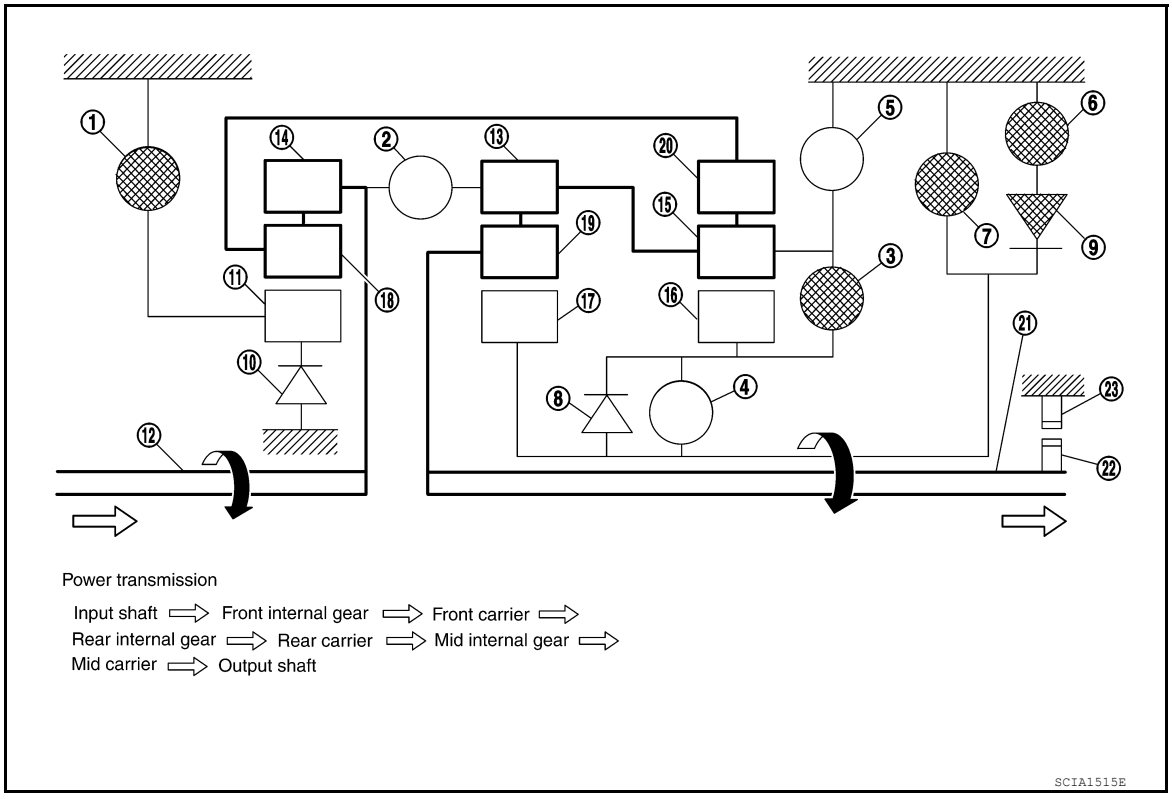
"D2" Position (with Manual Mode) / "D2" and "32" Positions (Without Manual Mode)

- The forward brake and the forward one-way clutch regulate reverse rotation of the mid sun gear.
- The 3rd one-way clutch regulates reverse rotation of the front sun gear.
- The direct clutch is coupled and the rear carrier and rear sun gear are connected.
- During deceleration, the mid sun gear turns forward, so the forward one-way clutch idles and engine brake is not activated.



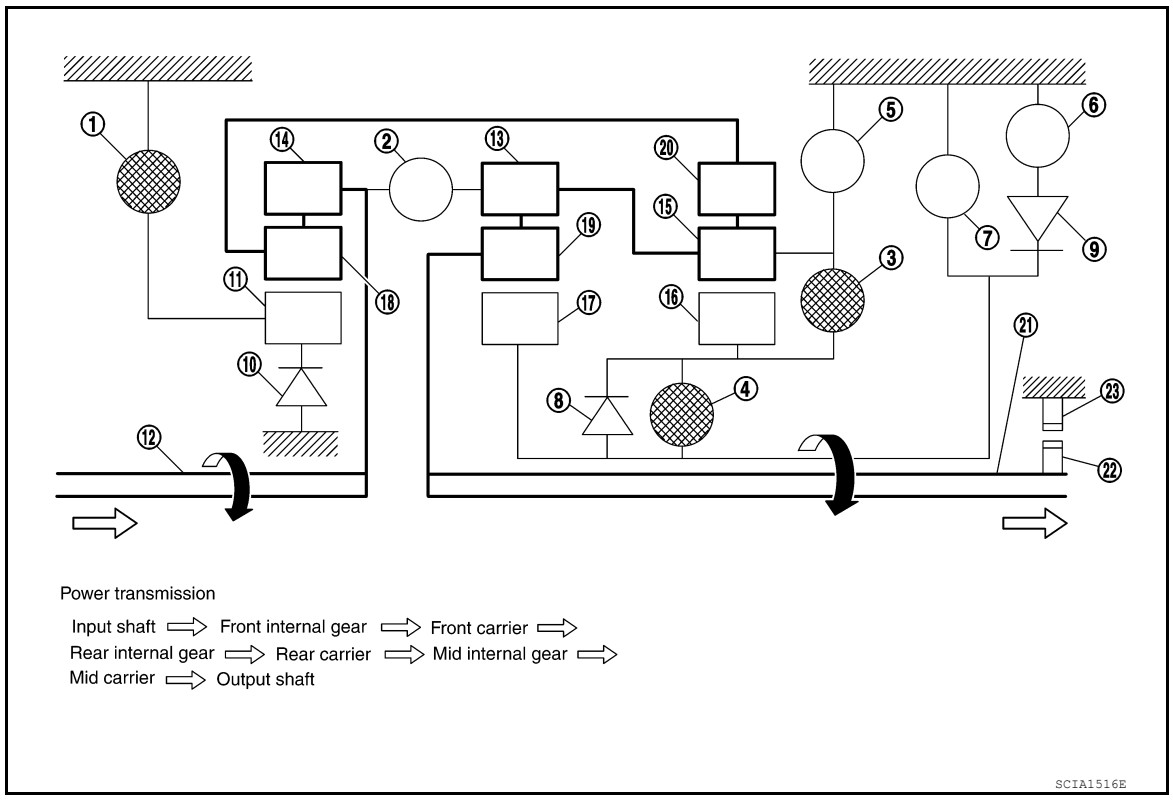
1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

“M2” Position (With Manual Mode) / "22" and “12” Positions (Without Manual Mode)
- The front brake fastens the front sun gear.
- The forward brake and the forward one-way clutch regulate reverse rotation of the mid sun gear.
- The direct clutch is coupled, and the rear carrier and rear sun gear are connected.
- The low coast brake fastens the mid sun gear.
- During deceleration, the low coast brake regulates forward rotation of the mid sun gear and the engine brake functions.



1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

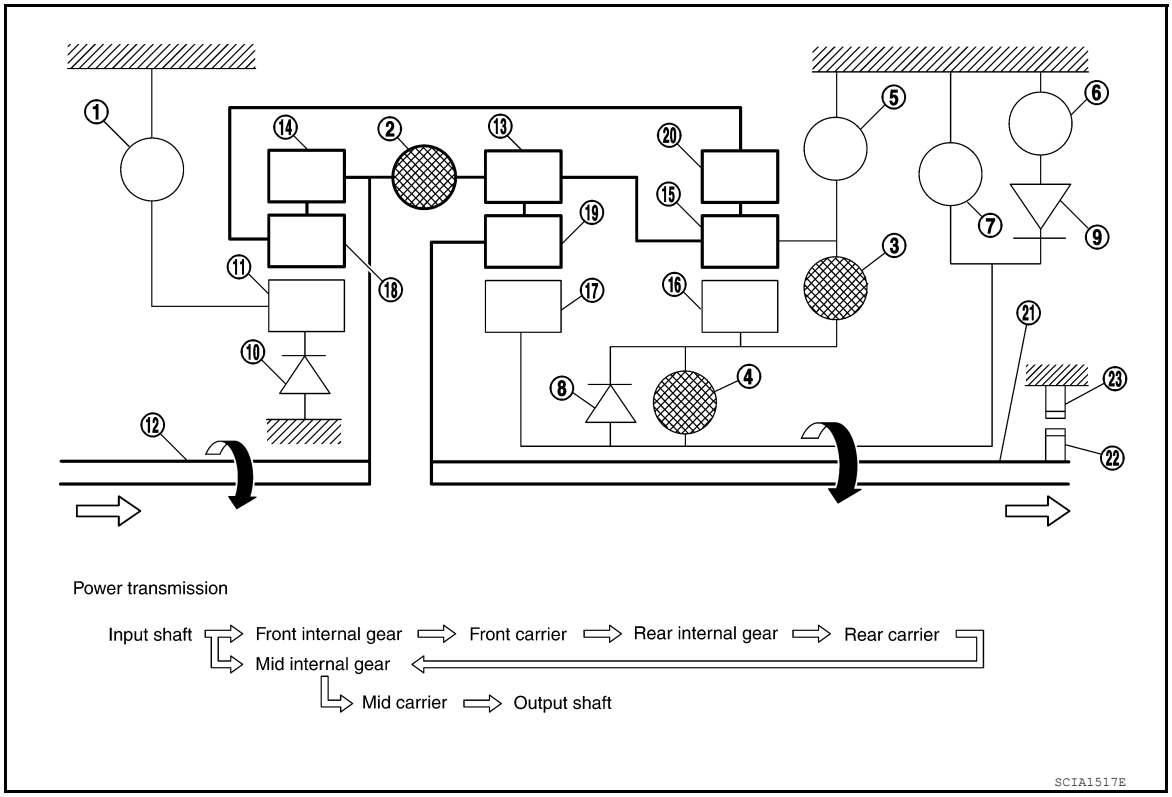
“D3” Position (With Manual Mode) / "D3" and “33” Positions (Without Manual Mode)
- The front brake fastens the front sun gear.
- The direct clutch is coupled, and the rear carrier and rear sun gear are connected.
- The high and low reverse clutch is coupled and the mid sun gear and rear sun gear are connected.



1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

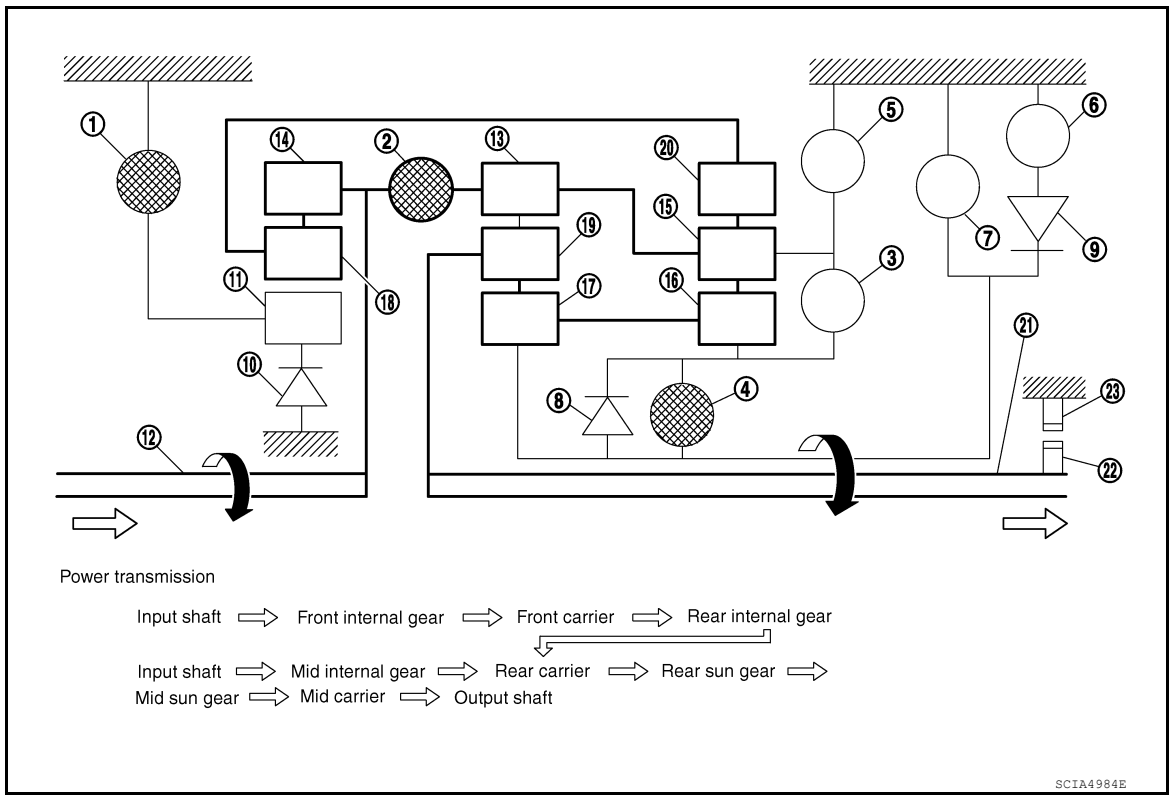
"D4" and "M4" Positions (With Manual Mode) / "D4" Position (Without Manual Mode)

- The direct clutch is coupled, and the rear carrier and rear sun gear are connected.
- The high and low reverse clutch is coupled and the mid sun gear and rear sun gear are connected.
- The input clutch is coupled and the front internal gear and mid internal gear are connected.
- The drive power is conveyed to the front internal gear, mid internal gear, and rear carrier and the three planetary gears rotate forward as one unit.



1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

“D5” and "M5" Positions (With Manual Mode) / "D5" Position (Without Manual Mode)
- The front brake fastens the front sun gear.
- The input clutch is coupled and the front internal gear and mid internal gear are connected.
- The high and low reverse clutch is coupled and the mid sun gear and rear sun gear are connected.



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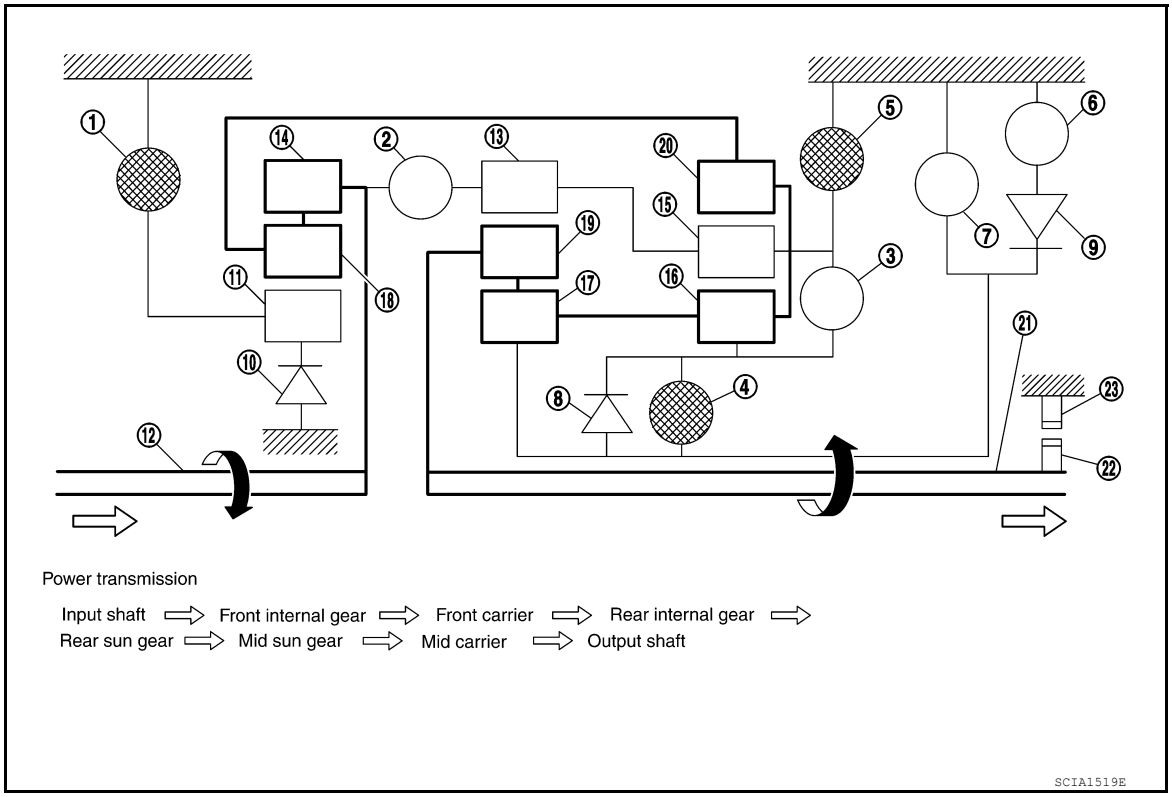
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

“R” Position
- The front brake fastens the front sun gear.
- The high and low reverse clutch is coupled, and the mid sun gear and rear sun gear are connected.
- The reverse brake fastens the rear carrier.



1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
16. Rear sun gear
17. Mid sun gear
18. Front carrier
19. Mid carrier
20. Rear internal gear
21. Output shaft
22. Parking gear
23. Parking pawl

TCM Function

INFOID:0000000006244663

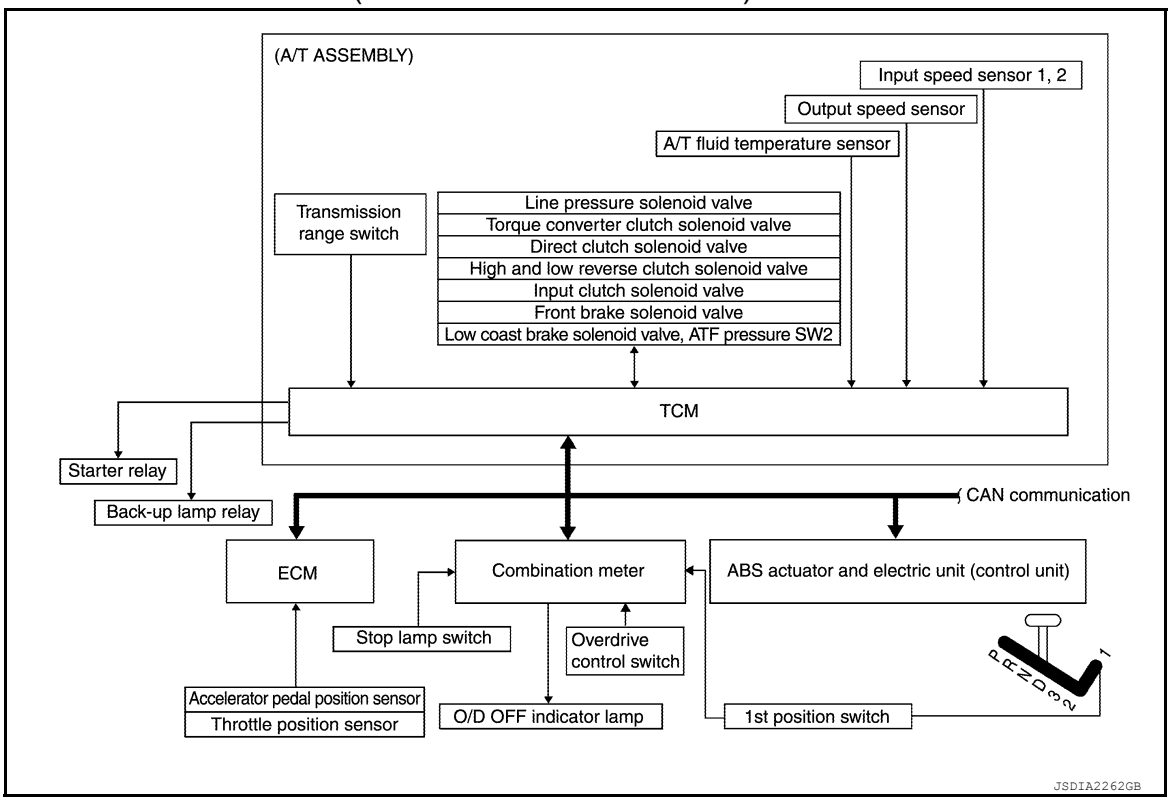
The function of the TCM is to:
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

CONTROL SYSTEM OUTLINE (WITHOUT MANUAL MODE)

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.

SENSORS (or SIGNALS)		TCM		ACTUATORS
Transmission range switch Accelerator pedal position sensor Closed throttle position signal Wide open throttle position signal Engine speed signal A/T fluid temperature sensor Output speed sensor Vehicle speed signal Stop lamp switch signal Input speed sensor 1st position switch signal Overdrive control switch signal ATF pressure switch signal	⇒	Shift control Line pressure control Lock-up control Engine brake control Timing control Fail-safe control Self-diagnosis CONSULT-III communication line Duet-EA control CAN system	⇒	Input clutch solenoid valve Direct clutch solenoid valve Front brake solenoid valve High and low reverse clutch solenoid valve Low coast brake solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve O/D OFF indicator lamp Starter relay Back-up lamp relay

CONTROL SYSTEM DIAGRAM (WITHOUT MANUAL MODE)



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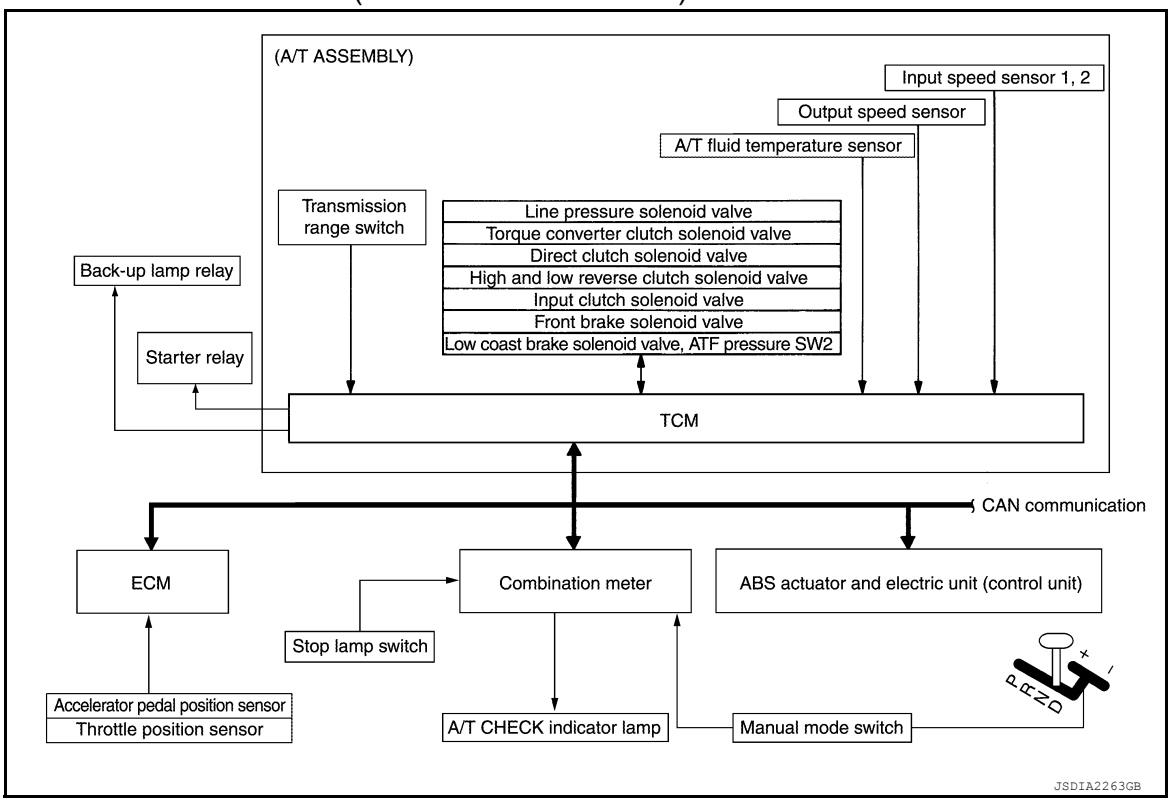
SENSORS (or SIGNALS)		TCM		ACTUATORS
Transmission range switch Accelerator pedal position sensor Closed throttle position signal Wide open throttle position signal Engine speed signal A/T fluid temperature sensor Output speed sensor Vehicle speed signal Manual mode switch signal Stop lamp switch signal Input speed sensor ATF pressure switch signal	⇒	Shift control Line pressure control Lock-up control Engine brake control Timing control Fail-safe control Self-diagnosis CONSULT-III communication line Duet-EA control CAN system	⇒	Input clutch solenoid valve Direct clutch solenoid valve Front brake solenoid valve High and low reverse clutch solenoid valve Low coast brake solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve A/T CHECK indicator lamp Starter relay Back-up lamp relay

CONTROL SYSTEM DIAGRAM (WITH MANUAL MODE)



CAN Communication

INFOID:0000000006244664

SYSTEM 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 error 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 independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. For details, refer to LAN-52, "CAN System Specification Chart".

Input/Output Signal of TCM

INFOID:0000000006244665

Control item			Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function (*3)	Self-diag-nostics function
Input	Accelerator pedal position signal (*5)		X	X	X	X	X	X	X
	Output speed sensor		X	X	X	X	X	X	X
	Vehicle speed signal(*1) (*5)							X	
	Closed throttle position signal(*5)			X(*2)	X	X		X	X(*4)
	Wide open throttle position signal(*5)							X	X(*4)
	Input speed sensor 1			X		X	X	X	X
	Input speed sensor 2 (for 4th speed only)			X		X	X	X	X
	Engine speed signals(*5)		X	X	X	X	X	X	X
	Stop lamp switch signal(*5)			X	X	X			X(*4)
	A/T fluid temperature sensor		X	X	X	X		X	X
	ASCD	Operation signal(*5)		X	X	X			
		Overdrive cancel signal(*5)		X					
Output	Direct clutch solenoid			X	X			X	X
	Input clutch solenoid			X	X			X	X
	High and low reverse clutch solenoid			X	X			X	X
	Front brake solenoid			X	X			X	X
	Low coast brake solenoid (ATF pressure switch 2)			X	X		X	X	X
	Line pressure solenoid		X	X	X	X	X	X	X
	TCC solenoid					X		X	X
	A/T CHECK indicator lamp (with manual mode)(*6)								X(*4)
	O/D OFF indicator lamp (without manual mode)(*6)								X(*4)
	Starter relay							X	X

*1: Spare foroutput speed sensor.

*2: Spare for accelerator pedal position signal.

*3: If these input and output signals are different, the TCM triggers the fail-safe function.

*4: Used as a condition for starting self-diagnosis; if self-diagnosis are not started, it is judged that there is some kind of error.

*5: Input by CAN communications.

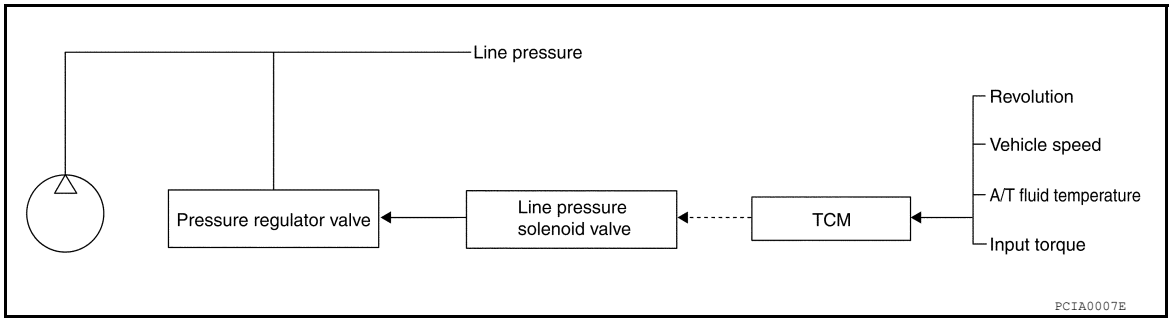
*6: Output by CAN communications.

Line Pressure Control

INFOID:0000000006244666

- When an input torque signal equivalent to the engine drive force is sent from the ECM to the TCM, the TCM controls the line pressure solenoid.

- 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.

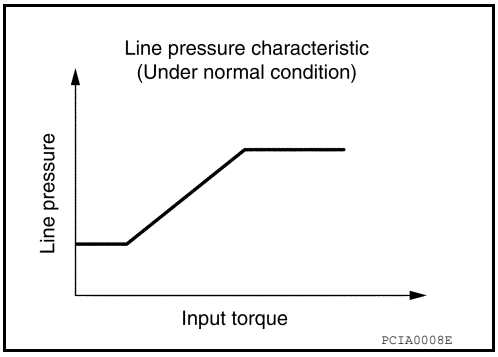


LINE PRESSURE CONTROL IS BASED ON THE TCM LINE PRESSURE CHARACTERISTIC PATTERN

- 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.

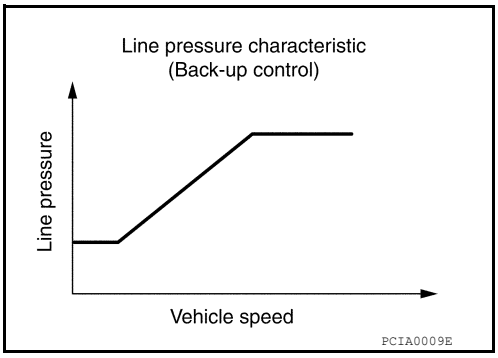
Normal Control

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



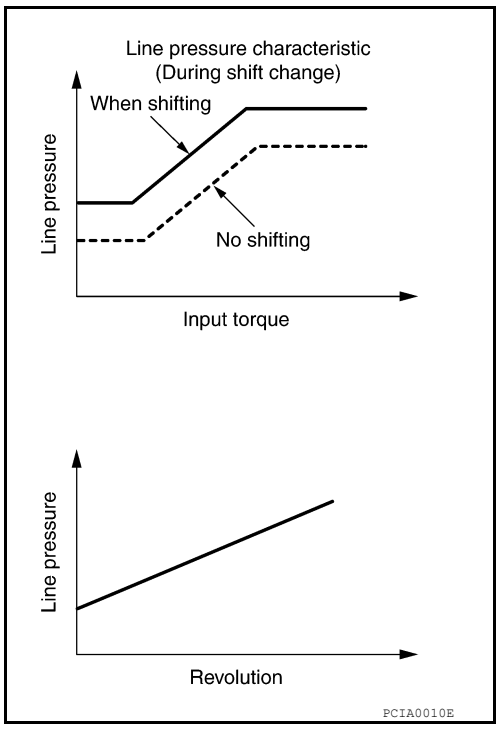
Back-up Control (Engine Brake)

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



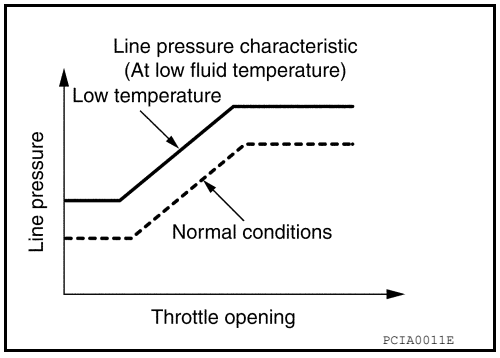
During Shift Change

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



At Low Fluid Temperature

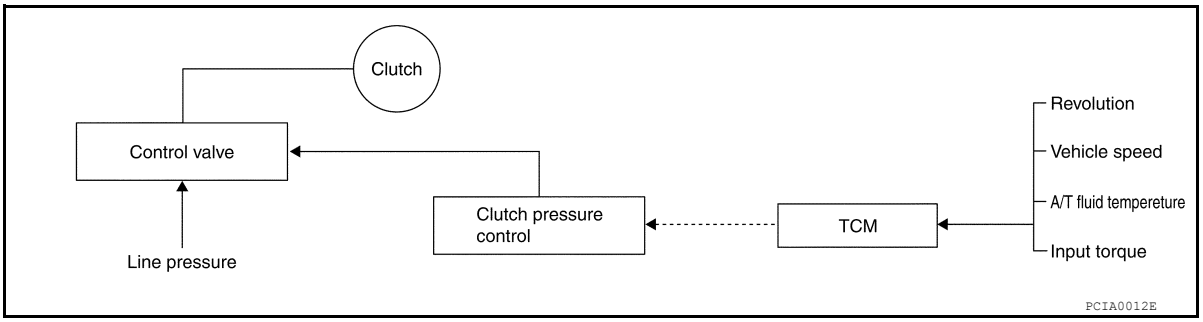
When the A/T fluid temperature drops below the prescribed temperature, in order to speed up the action of each friction element, the line pressure is set higher than the normal line pressure characteristic.



Shift Control

INFOID:0000000006244667

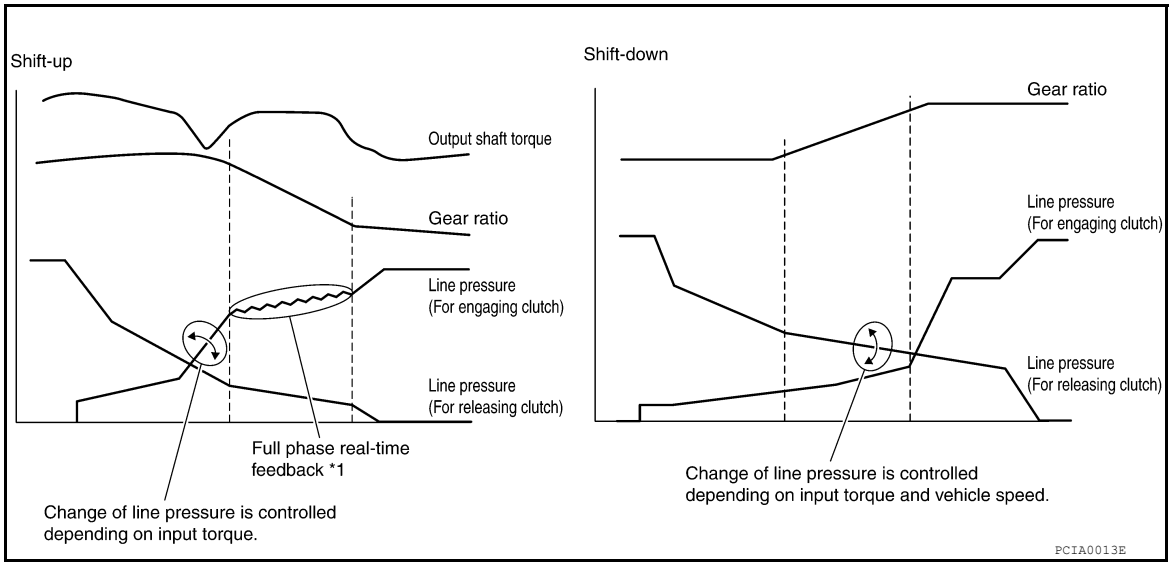
The clutch pressure control solenoid is controlled by the signals from the switches and sensors. Thus, the clutch pressure is adjusted to be appropriate to the engine load state and vehicle driving state. It becomes possible to finely control the clutch hydraulic pressure with high precision and a smoother shift change characteristic is attained.



SHIFT CHANGE

The clutch is controlled with the optimum timing and oil pressure by the engine speed, engine torque information, etc.

Shift Change System Diagram



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

Lock-up Control

INFOID:0000000006244668

The torque converter clutch piston in the torque converter is engaged to eliminate torque converter slip to increase power transmission efficiency.
The torque converter clutch control valve operation is controlled by the torque converter clutch solenoid valve, which is controlled by a signal from TCM, and the torque converter clutch control valve engages or releases the torque converter clutch piston.

Lock-up Operation Condition Table (Without Manual Mode)

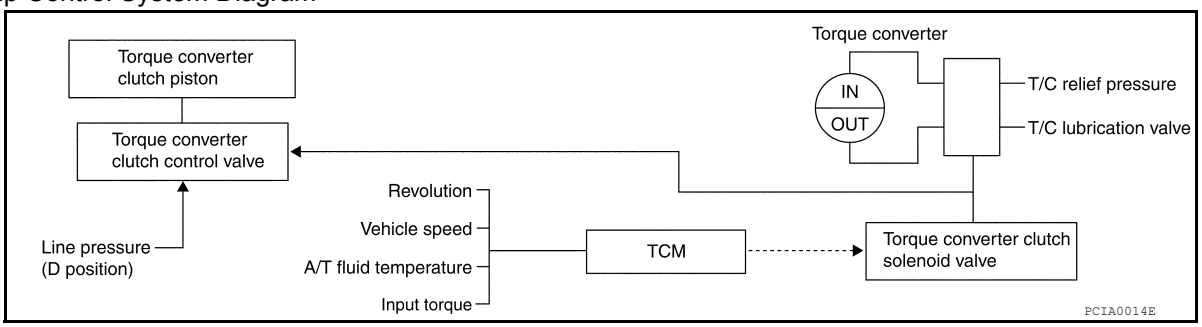
Select lever	D position			3 position	2 position
Gear position	5	4	3	3	2
Lock-up	×	×	–	–	–
Slip lock-up	–	–	×	–	–

Lock-up Operation Condition Table (With Manual Mode)

Select lever	D position			M position			
Gear position	5	4	3	5	4	3	2
Lock-up	×	×	–	×	×	–	–
Slip lock-up	–	–	×	–	–	×	–

TORQUE CONVERTER CLUTCH CONTROL VALVE CONTROL

Lock-up Control System Diagram



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 gradually 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 status, the torque converter clutch piston operating pressure is increased and the coupling is completed smoothly.

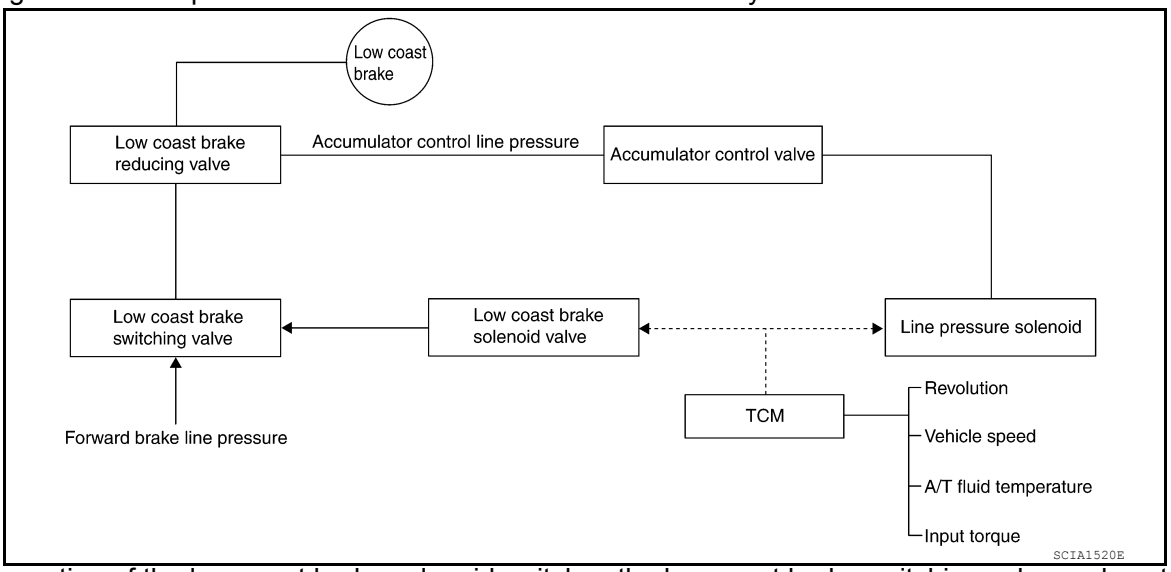
Slip Lock-up Control

- 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 4GR and 5GR at both low speed and when the accelerator has a low degree of opening.

Engine Brake Control

INFOID:0000000006244669

- The forward one-way clutch transmits the drive force from the engine to the rear wheels. But the reverse drive from the rear wheels is not transmitted to the engine because the one-way clutch is idling.
  Therefore, the low coast brake solenoid is operated to prevent the forward one-way clutch from idling and the engine brake is operated in the same manner as conventionally.



- The operation of the low coast brake solenoid switches the low coast brake switching valve and controls the coupling and releasing of the low coast brake.
  The low coast brake reducing valve controls the low coast brake coupling force.

Control Valve

INFOID:0000000006244670

FUNCTION OF CONTROL VALVE

Name	Function
Torque converter regulator valve	In order to prevent the pressure supplied to the torque converter from being excessive, the line pressure is adjusted to the optimum pressure (torque converter operating pressure).
Pressure regulator valve Pressure regulator plug Pressure regulator sleeve	Adjusts the oil discharged from the oil pump to the optimum pressure (line pressure) for the driving state.

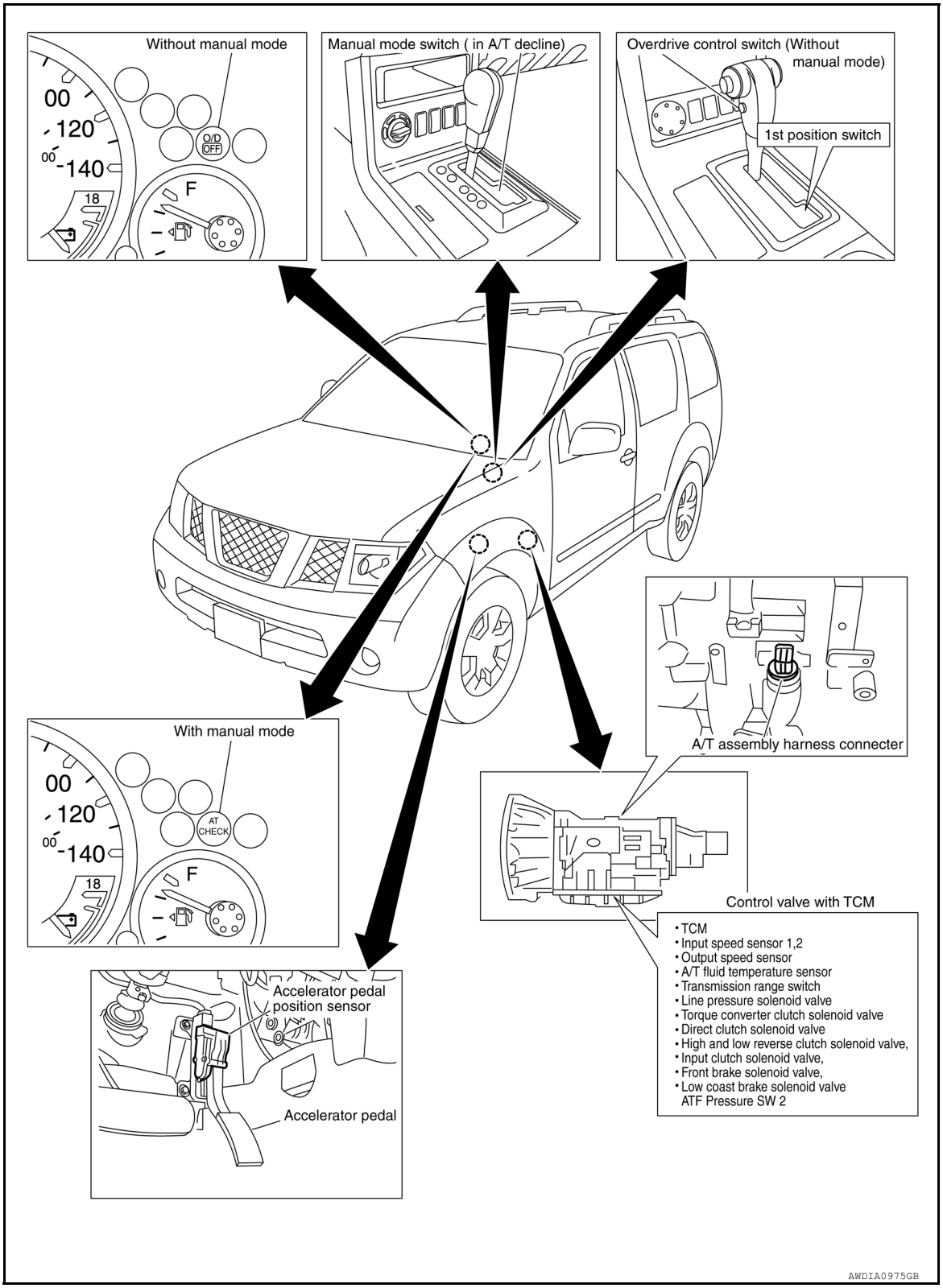
Name	Function
Front brake control valve	When the front brake is coupled, adjusts the line pressure to the optimum pressure (front brake pressure) and supplies it to the front brake. (In 1GR, 2GR, 3GR, and 5GR, adjusts the clutch pressure.)
Accumulator control valve	Adjusts the pressure (accumulator control pressure) acting on the accumulator piston and low coast reducing valve to the pressure appropriate to the driving state.
Pilot valve A	Adjusts the line pressure and produces the constant pressure (pilot pressure) required for line pressure control, shift change control, and lock-up control.
Pilot valve B	Adjusts the line pressure and produces the constant pressure (pilot pressure) required for shift change control.
Low coast brake switching valve	During engine braking, supplies the line pressure to the low coast brake reducing valve.
Low coast brake reducing valve	When the low coast brake is coupled, adjusts the line pressure to the optimum pressure (low coast brake pressure) and supplies it to the low coast brake.
N-R accumulator	Produces the stabilizing pressure for when N-R is selected.
Direct clutch piston switching valve	Operates in 4GR and switches the direct clutch coupling capacity.
High and low reverse clutch control valve	When the high and low reverse clutch is coupled, adjusts the line pressure to the optimum pressure (high and low reverse clutch pressure) and supplies it to the high and low reverse clutch. (In 1GR, 3GR, 4GR and 5GR, adjusts the clutch pressure.)
Input clutch control valve	When the input clutch is coupled, adjusts the line pressure to the optimum pressure (input clutch pressure) and supplies it to the input clutch. (In 4GR and 5GR, adjusts the clutch pressure.)
Direct clutch control valve	When the direct clutch is coupled, adjusts the line pressure to the optimum pressure (direct clutch pressure) and supplies it to the direct clutch. (In 2GR, 3GR, and 4GR, adjusts the clutch pressure.)
TCC control valve TCC control plug TCC control sleeve	Switches the lock-up to operating or released. Also, by performing the lock-up operation transiently, lock-up smoothly.
Torque converter lubrication valve	Operates during lock-up to switch the torque converter, cooling, and lubrication system oil path.
Cool bypass valve	Allows excess oil to bypass cooler circuit without being fed into it.
Line pressure relief valve	Discharges excess oil from line pressure circuit.
N-D accumulator	Produces the stabilizing pressure for when N-D is selected.
Manual valve	Sends line pressure to each circuit according to the select position. The circuits to which the line pressure is not sent drain.

FUNCTION OF PRESSURE SWITCH

Name	Function
Pressure switch 2 (LC/B)	Detects any malfunction in the low coast brake hydraulic pressure. When it detects any malfunction, it puts the system into fail-safe mode.

A/T Electrical Parts Location

INFOID:0000000006244671



A/T SHIFT LOCK SYSTEM

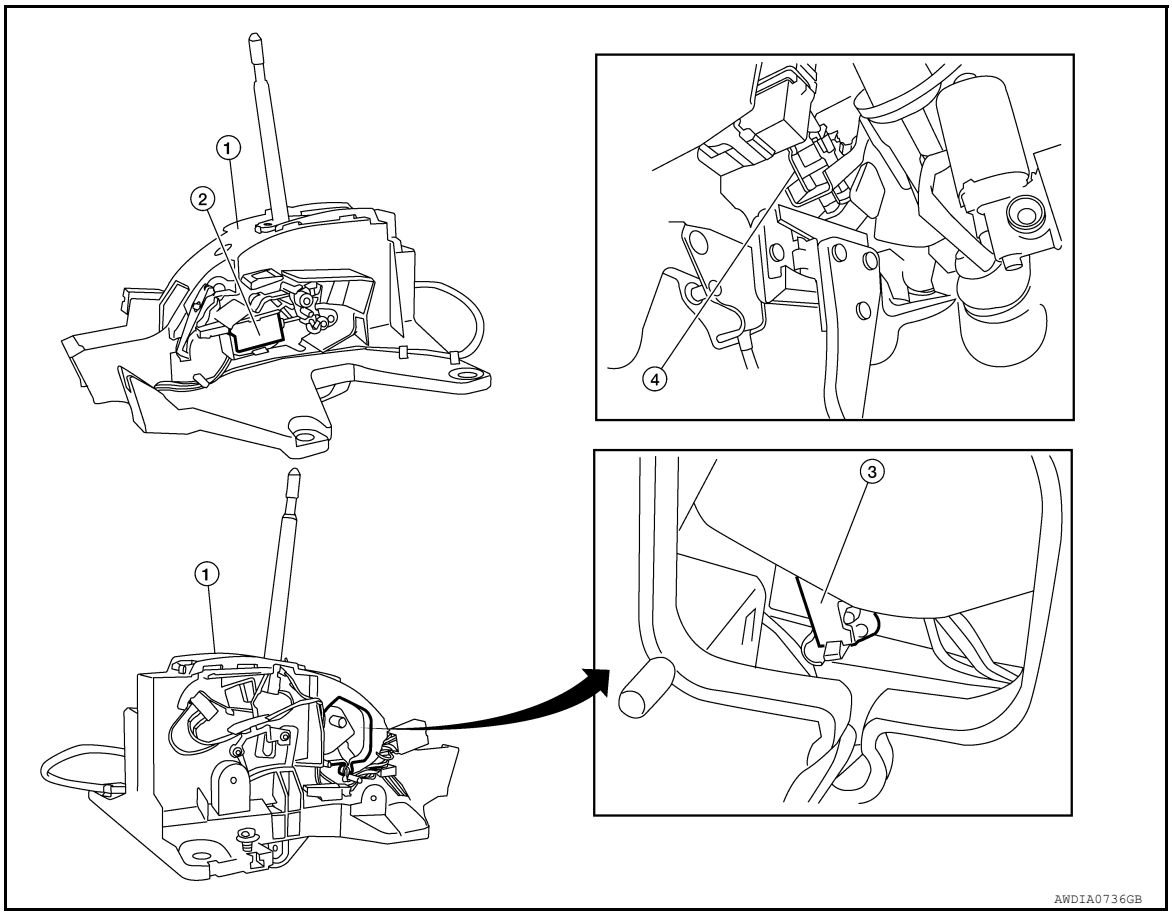
System Description

INFOID:0000000006244672

- The selector lever cannot be shifted from “P” (Park) unless the brake pedal is depressed and the ignition switch is in the “ON” position.
- Battery voltage is supplied to the shift lock solenoid by the stop lamp switch.
- Ground is supplied to the shift lock solenoid by the park position switch (shift selector).
- With the the ignition switch “ON”, brake pedal depressed and the A/T shift selector in “P” (Park), the shift lock solenoid is energized, allowing the selector lever to be shifted from Park.

Component Parts Location (With Manual Mode)

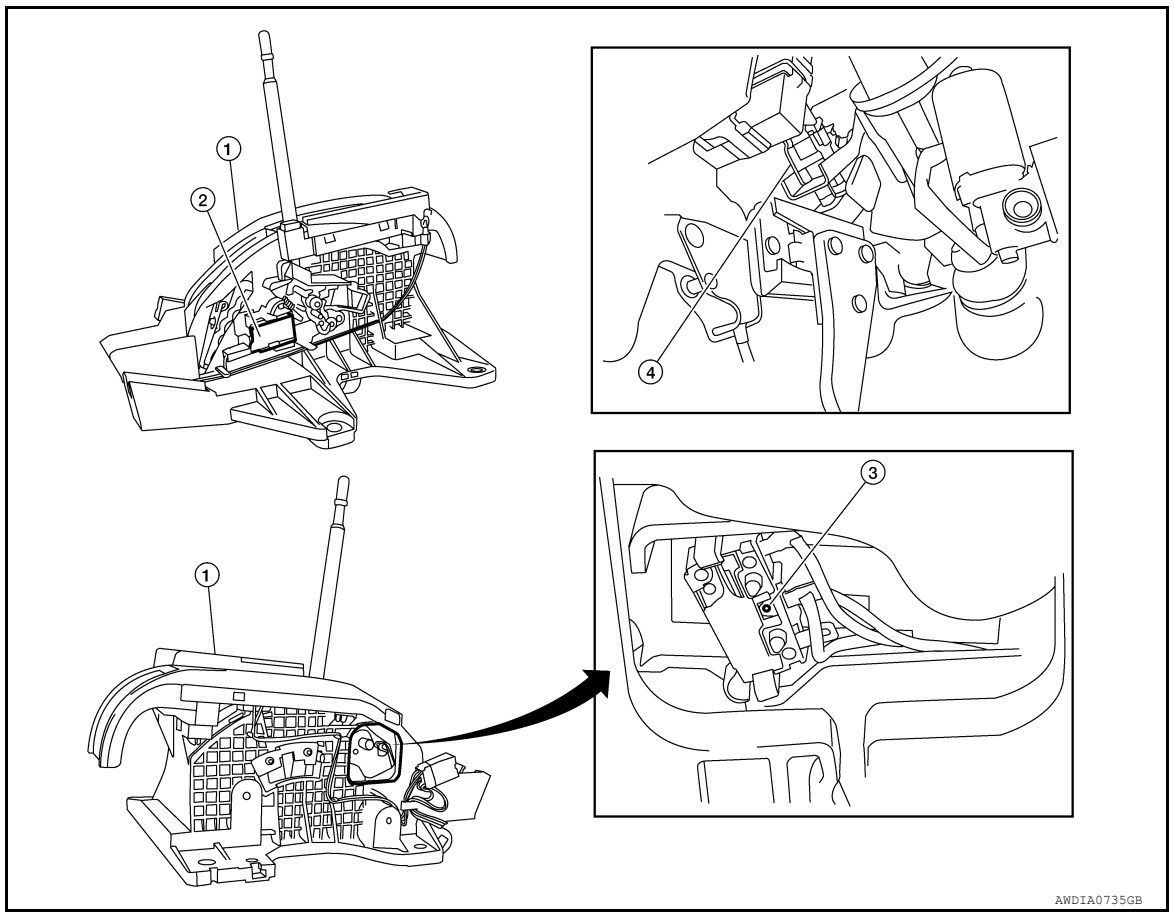
INFOID:0000000006244673



1. A/T shift selector
2. Shift lock solenoid
3. Park position switch (shift selector)
4. Stop lamp switch E38

Component Parts Location (Without Manual Mode)

INFOID:0000000006244674



1. A/T shift selector
2. Shift lock solenoid
3. Park position switch (shift selector)
4. Stop lamp switch E38

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Introduction

INFOID:0000000006244675

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. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory but not the TCM memory.
The second is the TCM original self-diagnosis indicated by the A/T CHECK indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

OBD-II Function for A/T System

INFOID:0000000006244676

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.

One or Two Trip Detection Logic of OBD-II

INFOID:0000000006244677

ONE TRIP DETECTION LOGIC

If a malfunction is sensed during the first test drive, the MIL will illuminate and the malfunction will be stored in the ECM memory as a DTC. The TCM is not provided with such a memory function.

TWO TRIP DETECTION LOGIC

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MIL will not illuminate. — 1st Trip
If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — 2nd Trip
The “Trip” in the “One or Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.

OBD-II Diagnostic Trouble Code (DTC)

INFOID:0000000006244678

HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.
(with CONSULT-III or GST) CONSULT-III or GST (Generic Scan Tool) Examples: P0705, P0720 etc.
These DTC are prescribed by SAE J2012.
(CONSULT-III also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST, they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.**
  CONSULT-III can identify them as shown below, therefore, CONSULT-III (if available) is recommended.

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.
Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST. For detail, refer to TM-34.
Only one set of freeze frame data (either 1st trip freeze frame data of freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no

longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

Both 1st trip freeze frame data and freeze frame data (along with the DTC) are cleared when the ECM memory is erased.

HOW TO ERASE DTC

The diagnostic trouble code can be erased by CONSULT-III, GST or ECM DIAGNOSTIC TEST MODE as described following.

- **If the battery cable is disconnected, the diagnostic trouble code will be lost within 24 hours.**
- **When you erase the DTC, using CONSULT-III or GST is easier and quicker than switching the mode selector on the ECM.**

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to EC-74, "On Board Diagnosis Function" (VQ40DE), EC-527, "On Board Diagnosis Function" (VK56DE).

- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**
- **Freeze frame data**
- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

HOW TO ERASE DTC (WITH CONSULT-III)

1. The emission related diagnostic information in the TCM and ECM can be erased by selecting “ALL Erase” in the “Description” of “FINAL CHECK” mode with CONSULT-III.

HOW TO ERASE DTC (WITH GST)

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 10 seconds and then turn it “ON” (engine stopped) again.
2. Select Mode 4 with the Generic Scan Tool (GST). For details refer to EC-66, "GST (Generic Scan Tool)" (VQ40DE), EC-518, "GST (Generic Scan Tool)" (VK56DE).

HOW TO ERASE DTC (NO TOOLS)

1. Disconnect battery for 24 hours.
2. Reconnect battery.

Malfunction Indicator Lamp (MIL)

INFOID:0000000006244679

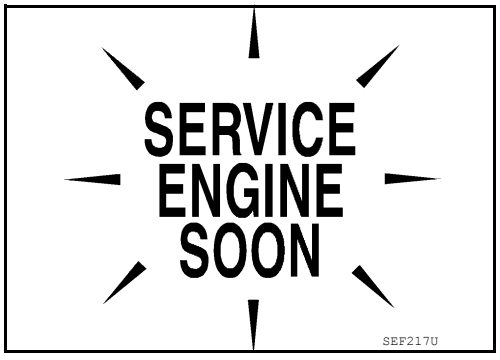
DESCRIPTION

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned “ON” without the engine running. This is a bulb check.

- If the MIL does not light up, refer to MWI-19, "WARNING LAMPS/ INDICATOR LAMPS : System Diagram".

2. When the engine is started, the MIL should go off.
   If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



DIAGNOSIS SYSTEM (TCM)

CONSULT-III Function (TRANSMISSION)

INFOID:0000000006244680

FUNCTION

TCM diagnostic mode	Description
Self Diagnostic Result	Retrieve DTC from ECU and display diagnostic items.
Data Monitor	Monitor the input/output signal of the control unit in real time.
CAN Diagnosis	The condition of CAN communication can be indicated by a topology.
CAN Diagnosis Support Monitor	It monitors the status of CAN communication.
DTC & SRT Confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
Function Test*	This mode can show results of self-diagnosis of ECU with either “OK” or “NG”. For engines, more practical tests regarding sensors/switches and/or actuators are available.
Ecu Identification	Display the ECU identification number (part number etc.) of the selected system.

*: Although “Function Test” is selectable, do not use it.

SELF-DIAGNOSTIC RESULT MODE

Display Items List

X: Applicable, —: Not applicable

Items (CONSULT-III screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD-II (DTC)	Reference page
		“TRANSMISSION” with CONSULT-III	MIL indicator lamp*1, “ENGINE” with CONSULT-III or GST	
CAN COMM CIRCUIT	• When TCM is not transmitting or receiving CAN communication signal for 2 seconds or more.	U1000	U1000	TM-46
STARTER RELAY	• If this signal is ON other than in “P” or “N” position, this is judged to be a malfunction. (And if it is OFF in “P” or “N” position, this too is judged to be a malfunction.)	P0615	—	TM-47
TRANSMISSION CONT	• TCM is malfunctioning.	P0700	P0700	TM-49
T/M RANGE SWITCH A	• Transmission range switch 1-4 signals input with impossible pattern • “P” position is detected from “N” position without any other position being detected in between.	P0705	P0705	TM-50
INPUT SPEED SENSOR A	• TCM does not receive the proper voltage signal from the sensor. • TCM detects an irregularity only at position of 4GR for input speed sensor 2.	P0717	P0717	TM-52
OUTPUT SPEED SENSOR	• Signal from output speed sensor not input due to cut line or the like • Unexpected signal input during running • After ignition switch is turned ON, unexpected signal input from vehicle speed sensor MTR before the vehicle starts moving	P0720	P0720	TM-54
ENGINE SPEED	• TCM does not receive the CAN communication signal from the ECM.	P0725	—	TM-57
1GR INCORRECT RATIO	• A/T cannot shift to 1GR	P0731	P0731	TM-60
2GR INCORRECT RATIO	• A/T cannot shift to 2GR	P0732	P0732	TM-62

Items (CONSULT-III screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD-II (DTC)	Reference page
		"TRANSMISSION" with CONSULT-III	MIL indicator lamp*1, "ENGINE" with CONSULT-III or GST	
3GR INCORRECT RATIO	• A/T cannot shift to 3GR	P0733	P0733	TM-64
4GR INCORRECT RATIO	• A/T cannot shift to 4GR	P0734	P0734	TM-66
5GR INCORRECT RATIO	• A/T cannot shift to 5GR	P0735	P0735	TM-68
TORQUE CONVERTER	• Normal voltage not applied to solenoid due to cut line, short, or the like	P0740	P0740	TM-69
TORQUE CONVERTER	• A/T cannot perform lock-up even if electrical circuit is good. • TCM detects as irregular by comparing difference value with slip rotation.	P0744	P0744*2	TM-71
PC SOLENOID A	• Normal voltage not applied to solenoid due to cut line, short, or the like • TCM detects as irregular by comparing target value with monitor value.	P0745	P0745	TM-73
TP SENSOR	• TCM does not receive the proper accelerator pedal position signals (input by CAN communication) from ECM.	P1705	—	TM-75
TRANS FLUID TEMP SEN	• During running, the ATF temperature sensor signal voltage is excessively high or low	P1710	P0710	TM-77
VEHICLE SPEED SIGNAL	• Signal (CAN communication) from vehicle speed sensor MTR not input due to cut line or the like • Unexpected signal input during running	P1721	—	TM-79
INTERLOCK	• Except during shift change, the gear position and ATF pressure switch states are monitored and comparative judgment made.	P1730	P1730	TM-81
1GR E/BRAKING	• Each ATF pressure switch and solenoid current is monitored and if a pattern is detected having engine braking 1st gear other than in the "1" position, a malfunction is detected.	P1731	—	TM-83
INPUT CLUTCH SOL	• Normal voltage not applied to solenoid due to functional malfunction, cut line, short, or the like • TCM detects as irregular by comparing target value with monitor value.	P1752	P1752	TM-85
FR BRAKE SOLENOID	• Normal voltage not applied to solenoid due to functional malfunction, cut line, short, or the like • TCM detects as irregular by comparing target value with monitor value.	P1757	P1757	TM-87
DRCT CLUTCH SOL	• Normal voltage not applied to solenoid due to cut line, short, or the like • TCM detects as irregular by comparing target value with monitor value.	P1762	P1762	TM-89
HLR CLUTCH SOLENOID	• Normal voltage not applied to solenoid due to functional malfunction, cut line, short, or the like • TCM detects as irregular by comparing target value with monitor value.	P1767	P1767	TM-91
L C BRAKE SOLENOID	• Normal voltage not applied to solenoid due to functional malfunction, cut line, short, or the like	P1772	P1772	TM-93

Items (CONSULT-III screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD-II (DTC)	Reference page
		"TRANSMISSION" with CONSULT-III	MIL indicator lamp*1, "ENGINE" with CONSULT-III or GST	
L C BRAKE SOLENOID	• TCM detects an improper voltage drop when it tries to operate the solenoid valve. • Condition of ATF pressure switch 2 is different from monitor value, and relation between gear position and actual gear ratio is irregular.	P1774	P1774*2	TM-95
M-MODE SWITCH *3	• When an impossible pattern of switch signals is detected, a malfunction is detected.	P1815	—	TM-97
NO DTC IS DETECTED FURTHER TESTING MAY BE REQUIRED	• No NG item has been detected.	X	X	—

*1: Refer to TM-35, "Malfunction Indicator Lamp (MIL)".

*2:These malfunctions cannot be displayed MIL if another malfunction is assigned to MIL.

*3:With manual mode.

DATA MONITOR MODE

Display Items List

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

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VHCL/S SE-A/T (km/h or mph)	X	X	▼	Output speed sensor
VHCL/S SE-MTR (km/h or mph)	X	—	▼	
ACCELE POSI (0.0/8)	X	—	▼	Accelerator pedal position signal
THROTTLE POSI (0.0/8)	X	X	▼	Degree of opening for accelerator recognized by the TCM For fail-safe operation, the specific value used for control is displayed.
CLSD THL POS (ON-OFF display)	X	—	▼	Signal input with CAN communications
W/O THL POS (ON-OFF display)	X	—	▼	
BRAKESW (ON-OFF display)	X	—	▼	Stop lamp switch
GEAR	—	X	▼	Gear position recognized by the TCM updated after gear-shifting
ENGINE SPEED (rpm)	X	X	▼	
INPUT SPEED (rpm)	X	X	▼	
OUTPUT REV (rpm)	X	X	▼	
GEAR RATIO	—	X	▼	
TC SLIP SPEED (rpm)	—	X	▼	Difference between engine speed and torque converter input shaft speed
F SUN GR REV (rpm)	—	—	▼	
F CARR GR REV (rpm)	—	—	▼	
ATF TEMP SE 1 (V)	X	—	▼	

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
ATF TEMP 1 (°C or °F)	—	X	▼	
ATF TEMP 2 (°C or °F)	—	X	▼	
BATTERY VOLT (V)	X	—	▼	
ATF PRES SW 1 (ON-OFF display)	X	X	▼	Not mounted but displayed.
ATF PRES SW 2 (ON-OFF display)	X	X	▼	(for LC/B solenoid)
ATF PRES SW 3 (ON-OFF display)	X	X	▼	Not mounted but displayed.
ATF PRES SW 5 (ON-OFF display)	X	X	▼	
ATF PRES SW 6 (ON-OFF display)	X	X	▼	
RANGE SW 1 (ON-OFF display)	X	—	▼	
RANGE SW 2 (ON-OFF display)	X	—	▼	
RANGE SW 3 (ON-OFF display)	X	—	▼	
RANGE SW 4 (ON-OFF display)	X	—	▼	
1 POSITION SW (ON-OFF display)	X	—	▼	1st position switch
SLCT LVR POSI	—	X	▼	Selector lever position is recognized by the TCM. For fail-safe operation, the specific value used for control is displayed.
OD CONT SW (ON-OFF display)	X	—	▼	
POWERSHIFT SW (ON-OFF display)	X	—	▼	Not mounted but displayed.
HOLD SW (ON-OFF display)	X	—	▼	
DS RANGE (ON-OFF display)	—	—	▼	
MANU MODE SW (ON-OFF display)	X	—	▼	
NON M-MODE SW (ON-OFF display)	X	—	▼	
UP SW LEVER (ON-OFF display)	X	—	▼	
DOWN SW LEVER (ON-OFF display)	X	—	▼	
SFT UP ST SW (ON-OFF display)	X	—	▼	Not mounted but displayed.
SFT DWN ST SW (ON-OFF display)	X	—	▼	
ASCD-OD CUT (ON-OFF display)	X	—	▼	
ASCD-CRUISE (ON-OFF display)	X	—	▼	
ABS SIGNAL (ON-OFF display)	X	—	▼	
ACC OD CUT (ON-OFF display)	X	—	▼	Not mounted but displayed.
ACC SIGNAL (ON-OFF display)	X	—	▼	
TCS GR/P KEEP (ON-OFF display)	X	—	▼	
TCS SIGNAL 2 (ON-OFF display)	X	—	▼	
TCS SIGNAL 1 (ON-OFF display)	X	—	▼	
TCC SOLENOID (A)	—	X	▼	
LINE PRES SOL (A)	—	X	▼	

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
I/C SOLENOID (A)	—	X	▼	
FR/B SOLENOID (A)	—	X	▼	
D/C SOLENOID (A)	—	X	▼	
HLR/C SOL (A)	—	X	▼	
ON OFF SOL (ON-OFF display)	—	—	▼	LC/B solenoid
TCC SOL MON (A)	—	—	▼	
L/P SOL MON (A)	—	—	▼	
I/C SOL MON (A)	—	—	▼	
FR/B SOL MON (A)	—	—	▼	
D/C SOL MON (A)	—	—	▼	
HLR/C SOL MON (A)	—	—	▼	
ON OFF SOL MON (ON-OFF display)	—	—	▼	LC/B solenoid
P POSI IND (ON-OFF display)	—	—	▼	
R POSI IND (ON-OFF display)	—	—	▼	
N POSI IND (ON-OFF display)	—	—	▼	
D POSI IND (ON-OFF display)	—	—	▼	
4TH POSI IND (ON-OFF display)	—	—	▼	
3RD POSI IND (ON-OFF display)	—	—	▼	
2ND POSI IND (ON-OFF display)	—	—	▼	
1ST POSI IND (ON-OFF display)	—	—	▼	
MANU MODE IND (ON-OFF display)	—	—	▼	
POWER M LAMP (ON-OFF display)	—	—	▼	
F-SAFE IND/L (ON-OFF display)	—	—	▼	
ATF WARN LAMP (ON-OFF display)	—	—	▼	
BACK-UP LAMP (ON-OFF display)	—	—	▼	
STARTER RELAY (ON-OFF display)	—	—	▼	
RANGE SW 3M (ON-OFF display)	—	—	▼	
C/V CLB ID1	—	—	▼	
C/V CLB ID2	—	—	▼	
C/V CLB ID3	—	—	▼	
UNIT CLB ID1	—	—	▼	
UNIT CLB ID2	—	—	▼	
UNIT CLB ID3	—	—	▼	
TRGT GR RATIO	—	—	▼	
TRGT PRES TCC (kPa, kg/cm^2 or psi)	—	—	▼	

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
TRGT PRES L/P (kPa, kg/cm^2 or psi)	—	—	▼	
TRGT PRES I/C (kPa, kg/cm^2 or psi)	—	—	▼	
TRGT PRE FR/B (kPa, kg/cm^2 or psi)	—	—	▼	
TRGT PRES D/C (kPa, kg/cm^2 or psi)	—	—	▼	
TRG PRE HLR/C (kPa, kg/cm^2 or psi)	—	—	▼	
SHIFT PATTERN	—	—	▼	
DRV CST JUDGE	—	—	▼	
START RLY MON (ON-OFF display)	—	—	▼	
NEXT GR POSI	—	—	▼	
SHIFT MODE	—	—	▼	
MANU GR POSI	—	—	▼	
VEHICLE SPEED (km/h or mph)	—	X	▼	Vehicle speed recognized by the TCM.

DTC & SRT CONFIRMATION

DTC Work Support Mode

DTC work support item	Description	Check item
1ST GR FNCTN P0731	Following items for “1GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Input clutch solenoid valve • Front brake solenoid valve • Direct clutch solenoid valve • High and low reverse clutch solenoid valve • Each clutch and brake • Hydraulic control circuit
2ND GR FNCTN P0732	Following items for “2GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	
3RD GR FNCTN P0733	Following items for “3GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	
4TH GR FNCTN P0734	Following items for “4GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	
5TH GR FNCTN P0735	Following items for “5GR incorrect ratio” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	

Diagnosis Procedure without CONSULT-III

INFOID:0000000006244681

OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Refer to EC-74, "On Board Diagnosis Function" (VQ40DE) or EC-527, "On Board Diagnosis Function" (VK56DE).

TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS) — WITH MANUAL MODE

Description

< SYSTEM DESCRIPTION >

When the ignition switch is switched “ON”, the A/T CHECK indicator lamp lights up for 2 seconds. As a method for locating the suspect circuit, when the self-diagnostics start signal is input, the memory for the malfunction location is output and the A/T CHECK indicator lamp flashes to display the corresponding DTC.

Diagnostic Procedure

1.CHECK A/T CHECK INDICATOR LAMP

1. Start the engine with selector lever in “P” position. Warm engine to normal operating temperature.
2. Turn ignition switch ON and OFF at least twice, then leave it in the OFF position.
3. Wait 10 seconds.
4. Turn ignition switch ON. (Do not start engine.)

Does A/T CHECK indicator lamp come on for about 2 seconds?

YES >> GO TO 2.
NO >> Go to TM-126, "Symptom Chart".

2.JUDGMENT PROCEDURE STEP 1

1. Turn ignition switch OFF.
2. Keep pressing shift lock release button.
3. Move selector lever from “P” to “D” position.
4. Release accelerator pedal. (Set the closed throttle position signal “ON”.)
5. Depress brake pedal. (Stop lamp switch signal “ON”.)
6. Turn ignition switch ON (Do not start engine.)
7. Wait 3 seconds.
8. Move the selector lever to the manual shift gate side. (Manual mode signal “ON”.)
9. Release brake pedal. (Stop lamp switch signal “OFF”.)
10. Move the selector lever to “D” position. (Manual mode signal ON.)
11. Depress brake pedal. (Stop lamp switch signal “ON”.)
12. Release brake pedal. (Stop lamp switch signal “OFF”.)
13. Depress accelerator pedal fully and release it.

>> GO TO 3.

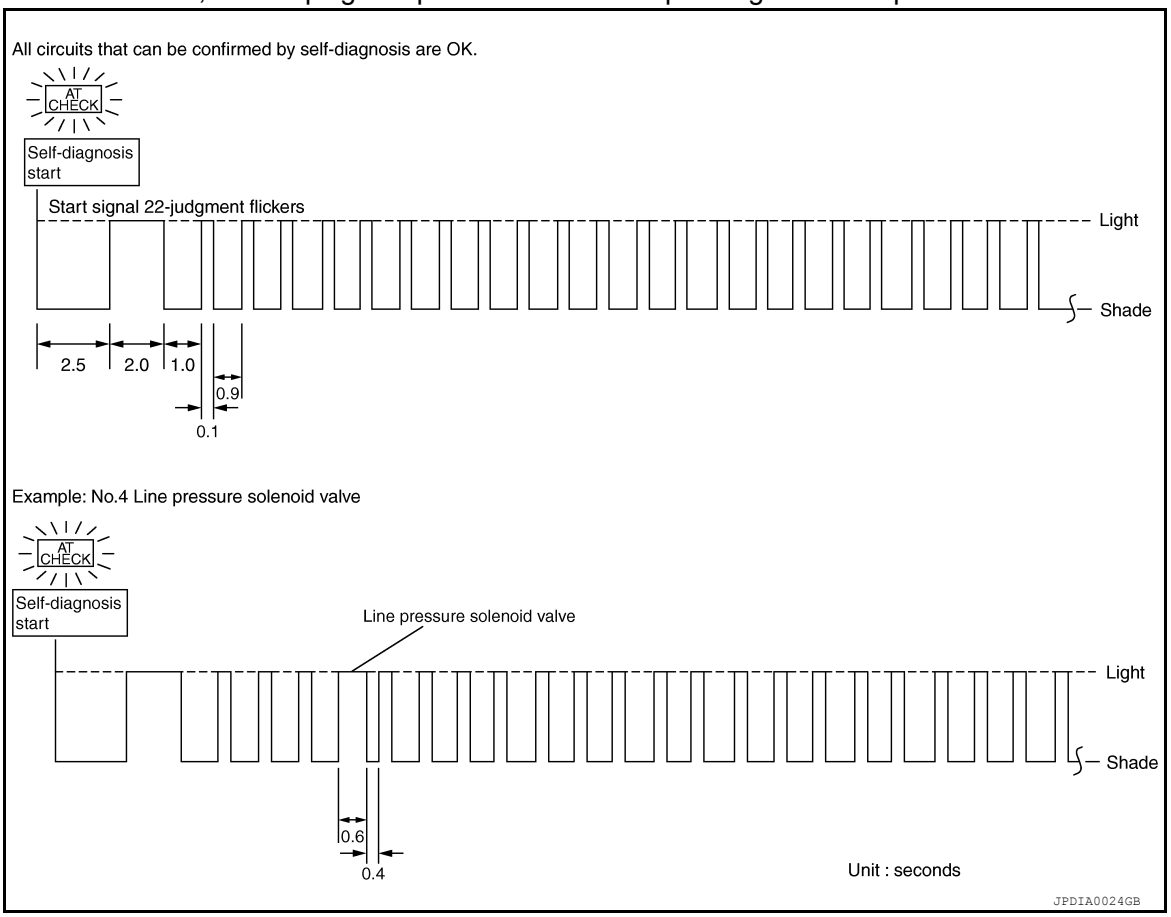
3.CHECK SELF-DIAGNOSIS CODE

Check A/T CHECK indicator lamp.
Refer to “Judgement Self-diagnosis Code”.
If the system does not go into self-diagnostics. Refer to TM-50, "Diagnosis Procedure", TM-102, "Diagnosis Procedure", TM-103, "Diagnosis Procedure", TM-97, "Diagnosis Procedure".

>> **DIAGNOSIS END**

Judgment Self-diagnosis Code

If there is a malfunction, the lamp lights up for the time corresponding to the suspect circuit.



No.	Malfunctioning item	No.	Malfunctioning item
1	Output speed sensor TM-54	12	Interlock TM-81
2	Direct clutch solenoid TM-89	13	1st engine braking TM-83
3	Torque converter TM-69, TM-71	14	Starter relay TM-47
4	Line pressure solenoid TM-73	15	TP sensor TM-75
5	Input clutch solenoid TM-85	16	Engine speed TM-57
6	Front brake solenoid TM-87	17	CAN communication line TM-46
7	Low coast brake solenoid TM-93, TM-95	18	1GR incorrect ratio TM-59
8	High and low reverse clutch solenoid TM-91	19	2GR incorrect ratio TM-61
9	Transmission range switch TM-50	20	3GR incorrect ratio TM-63
10	Transmission fluid temperature sensor TM-77	21	4GR incorrect ratio TM-65
11	Input speed sensor TM-52	22	5GR incorrect ratio TM-67

Erase Self-diagnosis

- In order to make it easier to find the cause of hard-to-duplicate malfunctions, malfunction information is stored into the control unit as necessary during use by the user. This memory is not erased no matter how many times the ignition switch is turned ON and OFF.
- However, this information is erased by turning ignition switch OFF after executing self-diagnostics or by erasing the memory using the CONSULT-III.

TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS) — WITHOUT MANUAL MODE

Description

When the ignition switch is switched “ON”, the O/D OFF indicator lamp lights up for 2 seconds. As a method for locating the suspect circuit, when the self-diagnostics start signal is input, the memory for the malfunction location is output and the O/D OFF indicator lamp flashes to display the corresponding DTC.

Diagnostic Procedure

1.CHECK O/D OFF INDICATOR LAMP

1. Start the engine with selector lever in “P” position. Warm engine to normal operating temperature.
2. Turn ignition switch ON and OFF at least twice, then leave it in the OFF position.
3. Wait 10 seconds.
4. Turn ignition switch ON. (Do not start engine.)

Does O/D OFF indicator lamp come on for about 2 seconds?

YES >> GO TO 2.
NO >> Go to TM-126, "Symptom Chart".

2.JUDGMENT PROCEDURE STEP 1

1. Turn ignition switch OFF.
2. Keep pressing shift lock release button.
3. Move selector lever from “P” to “D” position.
4. Release accelerator pedal. (Set the closed throttle position signal “ON”.)
5. Depress brake pedal. (Stop lamp switch signal “ON”.)
6. Turn ignition switch ON. (Do not start engine.)
7. Wait 3 seconds.
8. Move the selector lever from “D” to “3” position.
9. Release brake pedal. (Stop lamp switch signal “OFF”.)
10. Move the selector lever from “3” to “2” position.
11. Depress brake pedal. (Stop lamp switch signal “ON”.)
12. Depress accelerator pedal fully and release it.

>> GO TO 3.

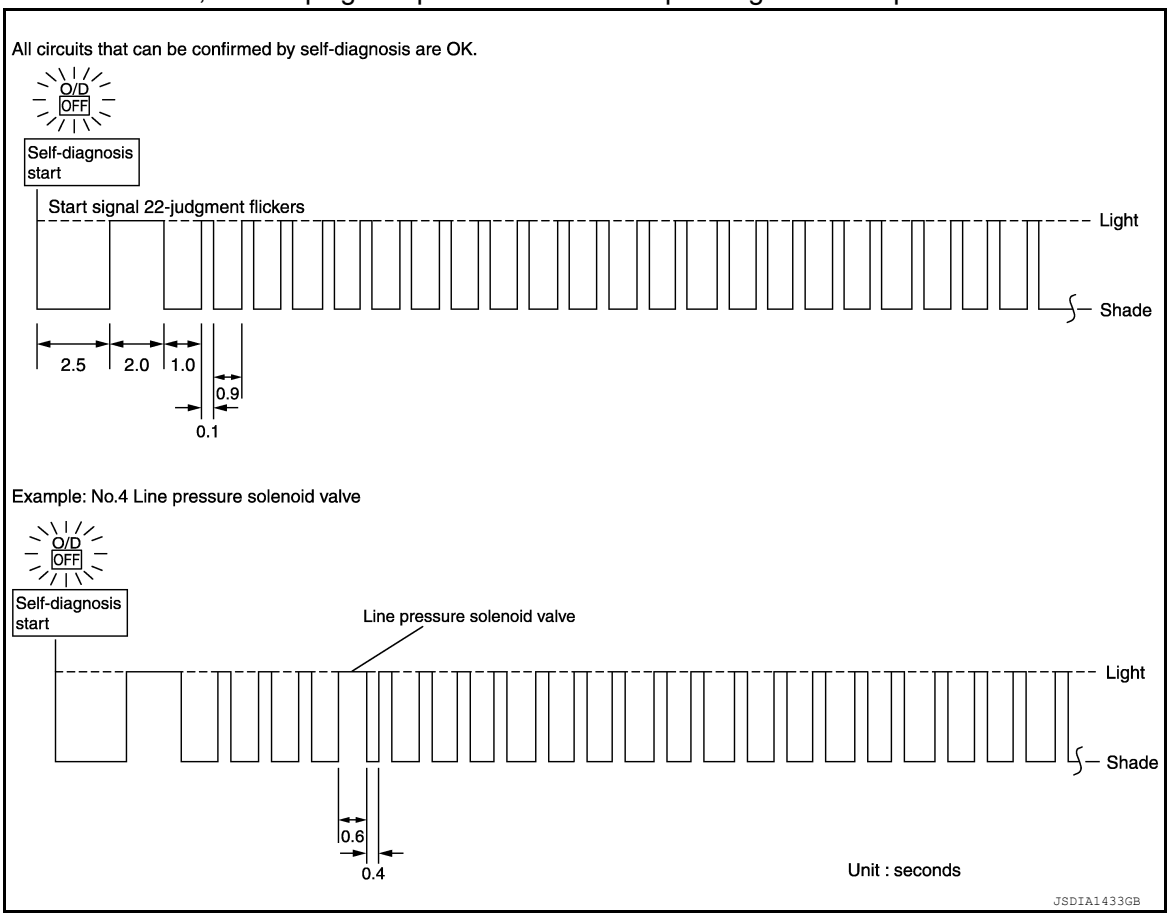
3.CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp.
Refer to “Judgement Self-diagnosis Code”.
If the system does not go into self-diagnostics. Refer to TM-50, "Diagnosis Procedure", TM-102, "Diagnosis Procedure", TM-103, "Diagnosis Procedure".

>> **DIAGNOSIS END**

Judgment Self-diagnosis Code

If there is a malfunction, the lamp lights up for the time corresponding to the suspect circuit.



No.	Malfunctioning item	No.	Malfunctioning item
1	Output speed sensor TM-54	12	Interlock TM-81
2	Direct clutch solenoid TM-89	13	1st engine braking TM-83
3	Torque converter TM-69, TM-71	14	Starter relay TM-47
4	Line pressure solenoid TM-73	15	TP sensor TM-75
5	Input clutch solenoid TM-85	16	Engine speed TM-57
6	Front brake solenoid TM-87	17	CAN communication line TM-46
7	Low coast brake solenoid TM-93, TM-95	18	1GR incorrect ratio TM-59
8	High and low reverse clutch solenoid TM-91	19	2GR incorrect ratio TM-61
9	Transmission range switch TM-50	20	3GR incorrect ratio TM-63
10	Transmission fluid temperature sensor TM-77	21	4GR incorrect ratio TM-65
11	Input speed sensor TM-52	22	5GR incorrect ratio TM-67

Erase Self-diagnosis

- In order to make it easier to find the cause of hard-to-duplicate malfunctions, malfunction information is stored into the control unit as necessary during use by the user. This memory is not erased no matter how many times the ignition switch is turned ON and OFF.
- However, this information is erased by turning ignition switch OFF after executing self-diagnostics or by erasing the memory using the CONSULT-III.

DTC/CIRCUIT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000006244682

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 independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

INFOID:0000000006244683

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “U1000” with CONSULT-III or 17th judgment flicker without CONSULT-III is detected when TCM cannot communicate to other control units.

Possible Cause

INFOID:0000000006244684

Harness or connectors
(CAN communication line is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000006244685

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine and wait for at least 6 seconds.
4. If DTC is detected, go to TM-46, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244686

1.CHECK CAN COMMUNICATION CIRCUIT

With CONSULT-III

1. Turn ignition switch “ON” and start engine.
2. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT-III.

Is any malfunction of the “U1000” indicated?

YES >> Go to LAN section. Refer to LAN-14, "Trouble Diagnosis Flow Chart".
NO >> **INSPECTION END**

P0615 STARTER RELAY

Description

INFOID:0000000006244687

- TCM prohibits cranking other than at “P” or “N” position.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244688

Item name	Condition	Display value
STARTER RELAY	Selector lever in “N”, “P” positions.	ON
	Selector lever in other position.	OFF

On Board Diagnosis Logic

INFOID:0000000006244689

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0615” with CONSULT-III or 14th judgment flicker without CONSULT-III is detected when starter relay is switched “ON” other than at “P” or “N” position. (Or when switched “OFF” at “P” or “N” position).

Possible Cause

INFOID:0000000006244690

- Harness or connectors
  (The starter relay and TCM circuit is open or shorted.)
- Starter relay

DTC Confirmation Procedure

INFOID:0000000006244691

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Shift selector lever to “P” or “N” position.
2. Turn ignition switch ON and wait for at least 2 seconds.
3. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT-III.
4. If DTC is detected, go to TM-47, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000006244692

1.CHECK STARTER RELAY

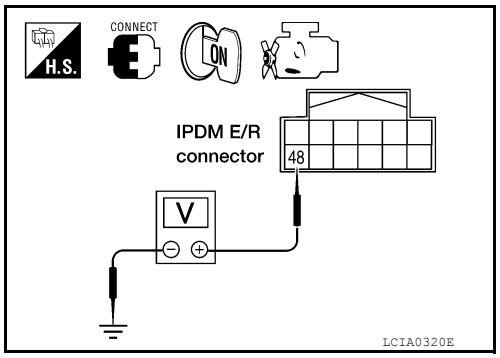
With CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for "TRANSMISSION" with CONSULT-III and check monitor “STARTER RELAY” ON/OFF.

Without CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between the IPDM E/R connector and ground.

Item	Connector	Terminal		Shift position	Voltage (Approx.)
Starter relay	E122	48	Ground	“N” and “P”	Battery voltage
				“R” and “D”	0V

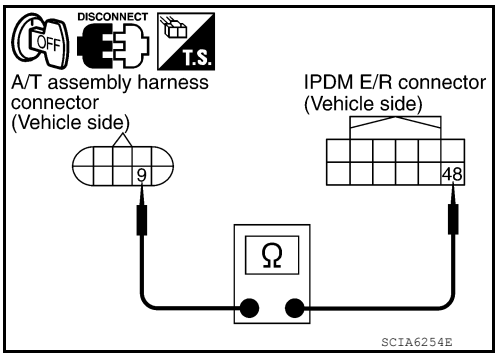


OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

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

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



Item	Connector	Terminal	Continuity
A/T assembly harness connector	F9	9	Yes
IPDM E/R connector	E122	48	

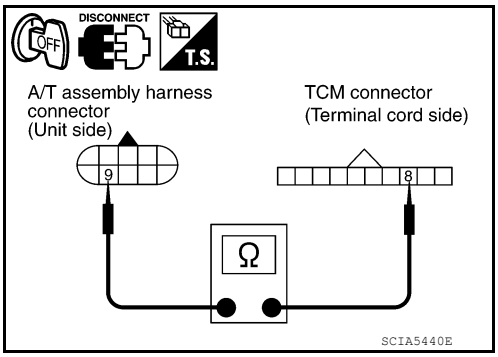
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK TERMINAL CORD ASSEMBLY

1. Remove control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Disconnect A/T assembly harness connector and TCM connector.
3. Check continuity between A/T assembly harness connector terminal and TCM connector terminal.



Item	Connector	Terminal	Continuity
A/T assembly harness connector	F9	9	Yes
TCM connector	F502	8	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Replace open circuit or short to ground and short to power in harness or connectors.

4. DETECT MALFUNCTIONING ITEM

Check the following.
- Starter relay, Refer to STR-5.
- IPDM E/R, Refer to PCS-3.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform TM-47, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P0700 TRANSMISSION CONTROL

Description

INFOID:0000000006244693

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T.

On Board Diagnosis Logic

INFOID:0000000006244694

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0700” with CONSULT-III is detected when the TCM is malfunctioning.

Possible Cause

INFOID:0000000006244695

TCM.

DTC Confirmation Procedure

INFOID:0000000006244696

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Run engine for at least 2 consecutive seconds at idle speed.
5. If DTC is detected, go to TM-49, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244697

1.CHECK DTC

With CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “SELF DIAG RESULTS” mode for “TRANSMISSION” with CONSULT-III.
3. Touch “ERASE”.
4. Turn ignition switch “OFF” and wait at least 10 seconds.
5. Perform TM-49, "DTC Confirmation Procedure".

Is the “P0700” displayed again?

YES >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NO >> **INSPECTION END**

P0705 TRANSMISSION RANGE SWITCH A

Description

INFOID:0000000006244698

The transmission range switch detects the selector lever position and sends a signal to the TCM.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244699

Item name	Condition	Display value
SLCTLVR POSI	Selector lever in “N”,“P” positions.	N/P
	Selector lever in “R” position.	R
	Selector lever in “D” position.	D
	Selector lever in “3” position.	3
	Selector lever in “2” position.	2
	Selector lever in “1” position.	1

On Board Diagnosis Logic

INFOID:0000000006244700

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0705” with CONSULT-III or 9th judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM does not receive the correct voltage signal from the transmission range switch 1, 2, 3, 4 based on the gear position.
- When no other position but “P” position is detected from “N” positions.

Possible Cause

INFOID:0000000006244701

- Harness or connectors
  (The transmission range switch 1, 2, 3, 4 and TCM circuit is open or shorted.)
- Transmission range switch 1, 2, 3, 4

DTC Confirmation Procedure

INFOID:0000000006244702

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 2 consecutive seconds.
   ACCELE POSI: More than 1.0/8
5. If DTC is detected, go to TM-50, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244703

1.CHECK TRANSMISSION RANGE SWITCH CIRCUIT

With CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Check if correct selector lever position (N/P, R, D, 3, 2 or 1) is displayed as selector lever is moved into each position.

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

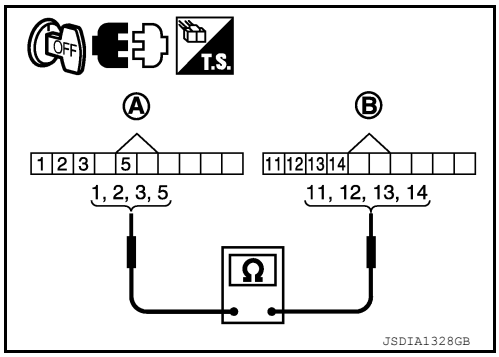
Check the following.
- A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SUB-HARNESS

1. Remove control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Disconnect transmission range switch connector and TCM connector.
3. Check continuity between transmission range switch connector (A) terminals and TCM connector (B) terminals.



Item	Connector	Terminal	Continuity
Transmission range switch connector	F505	1	Yes
TCM connector	F503	13	
Transmission range switch connector	F505	2	Yes
TCM connector	F503	11	
Transmission range switch connector	F505	3	Yes
TCM connector	F503	12	
Transmission range switch connector	F505	5	Yes
TCM connector	F503	14	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Replace open circuit or short to ground and short to power in harness or connectors.

5.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-50, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P0717 INPUT SPEED SENSOR A

Description

INFOID:0000000006244704

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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244705

Item name	Condition	Display value (rpm)
INPUT SPEED	During driving (lock-up ON)	Approximately matches the engine speed.

On Board Diagnosis Logic

INFOID:0000000006244706

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0717” with CONSULT-III or 11th judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM does not receive the proper voltage signal from the sensor.
- When TCM detects an irregularity only at position of 4GR for input speed sensor 2.

Possible Cause

INFOID:0000000006244707

- Harness or connectors
  (The sensor circuit is open or shorted.)
- Input speed sensor 1, 2

DTC Confirmation Procedure

INFOID:0000000006244708

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

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL/S SE-A/T: 40 km/h (25 MPH) or more
   ENGINE SPEED: 1,500 rpm or more
   ACCELE POSI: 0.5/8 or more
   SLCT LVR POSI: “D” position
   GEAR (Input speed sensor 1): 4th or 5th position
   GEAR (Input speed sensor 2): All position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
4. If DTC is detected, go to TM-52, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244709

1.CHECK INPUT SIGNAL

With CONSULT-III
1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Vehicle start and read out the value of “INPUT SPEED”.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-52, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P0720 OUTPUT SPEED SENSOR

Description

INFOID:0000000006244710

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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244711

Item name	Condition	Display value (km/h)
VHCL/S SE-A/T	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

INFOID:0000000006244712

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0720” with CONSULT-III or 1st judgment flicker without CONSULT-III is detected under the following conditions.
- When TCM does not receive the proper voltage signal from the sensor.
- After ignition switch is turned “ON”, irregular signal input from vehicle speed signal before the vehicle starts moving.

Possible Cause

INFOID:0000000006244713

- Harness or connectors
  (The sensor circuit is open or shorted.)
- Output speed sensor
- Vehicle speed signal

DTC Confirmation Procedure

INFOID:0000000006244714

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

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Drive vehicle and check for an increase of “VHCL/S SE-A/T” value in response to “VHCL/S SE-MTR” value.
   If the check result is NG, go to TM-55, "Diagnosis Procedure".
   If the check result is OK, go to following step.
4. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
5. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL/S SE-A/T: 30 km/h (19 MPH) or more
   ACCELE POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
   If the check result is NG, go to TM-55, "Diagnosis Procedure".
   If the check result is OK, go to following step.
6. Maintain the following conditions for at least 5 consecutive seconds.
   ENGINE SPEED: 3,500 rpm or more
   ACCELE POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
   If the check result is NG, go to TM-55, "Diagnosis Procedure".

WITH GST
Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244715

1.CHECK INPUT SIGNAL

With CONSULT-III
1. Turn ignition switch ON.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start the engine.
4. Read out the value of “VHCL/S SE-A/T” while driving.
   Check the value changes according to driving speed.

OK or NG

OK >> GO TO 6.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

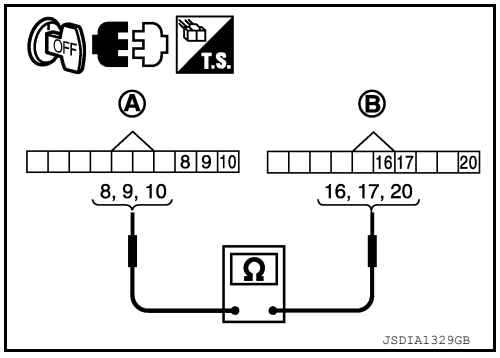
Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SUB-HARNESS

1. Remove control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Disconnect transmission range switch connector and TCM connector.
3. Check continuity between transmission range switch connector (A) terminals and TCM connector (B) terminals.



Item	Connector	Terminal	Continuity
Transmission range switch connector	F505	8	Yes
TCM connector	F503	20	
Transmission range switch connector	F505	9	Yes
TCM connector	F503	17	
Transmission range switch connector	F505	10	Yes
TCM connector	F503	16	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Replace open circuit or short to ground and short to power in harness or connectors.

5.REPLACE THE OUTPUT SPEED SENSOR AND CHECK DTC

1. Replace the output speed sensor. Refer to TM-219.
2. Perform “DTC Confirmation Procedure”. Refer to TM-54, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".

6.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-54, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P0725 ENGINE SPEED

Description

INFOID:0000000006244716

The engine speed signal is sent from the ECM to the TCM.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244717

Item name	Condition	Display value (rpm)
ENGINE SPEED	Engine running	Closely matches the tachometer reading.

On Board Diagnosis Logic

INFOID:0000000006244718

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0725” with CONSULT-III or 16th judgment flicker without CONSULT-III is detected when TCM does not receive the ignition signal from ECM during engine cranking or running.

Possible Cause

INFOID:0000000006244719

Harness or connectors
(The ECM to the TCM circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000006244720

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON” and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
2. Start engine and maintain the following conditions for at least 10 consecutive seconds.
   VHCL/S SE-A/T: 10 km/h (6 MPH) or more
   ACCELE POSI: More than 1/8
   SLCT LVR POSI: “D” position
3. If DTC is detected, go to TM-57, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000006244721

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46.
NO >> GO TO 2.

2.CHECK DTC WITH TCM

With CONSULT-III

1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. While monitoring engine speed, check for engine speed change corresponding to wide-open throttle position signal.

OK or NG

OK >> GO TO 3.
NG >> Check the ignition signal circuit.
- Refer to EC-407, "Diagnosis Procedure" (VQ40DE) or EC-917, "Diagnosis Procedure" (VK56DE).

3.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-57, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5.DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

P0731 1GR INCORRECT RATIO

Description

INFOID:0000000006244722

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 also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

On Board Diagnosis Logic

INFOID:0000000006244723

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0731” with CONSULT-III or 18th judgment flicker without CONSULT-III is detected when TCM detects any inconsistency in the actual gear ratio.

Possible Cause

INFOID:0000000006244724

- Harness or connectors
  (Solenoid circuits are open or shorted.)
- Input clutch solenoid valve
- Front brake solenoid valve
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000006244725

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 140°C
   If out of range, drive vehicle to warm ATF or stop engine to cool ATF.
3. Select “1ST GR FNCTN P0731” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT-III.
4. Drive vehicle and maintain the following conditions.
   With manual mode:
   MANU MODE SW: ON
   GEAR: “1” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more

   Without manual mode:
   SLCT LVR POSI: “1” position
   GEAR: “1” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more
5. Keep the current driving status for at least 5 consecutive seconds if CONSULT-III screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:

If "TESTING" does not appear on CONSULT-III for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC other than P0731 is shown, refer to TM-36, "CONSULT-III Function (TRANSMISSION)".
If "COMPLETED RESULT NG" is detected, go to TM-60, "Diagnosis Procedure".
If "STOP VEHICLE" is detected, go to the following step.

6. Stop vehicle.
7. Drive vehicle in "D" position allowing it to shift from 1GR to 5GR and check shift timing and shift shock.

- Touch "OK" to complete the inspection when normally shifted from the 1GR to 5GR.
- Touch "NG" when an unusual shift shock, etc. occurs in spite of shifting from the 1GR to 5GR. Go to TM-165, "Check Before Engine Is Started".
- Perform TM-36, "CONSULT-III Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither "OK" nor "NG" are indicated.)

Diagnosis Procedure

INFOID:0000000006244726

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)", TM-41, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTION ITEM

Check A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.REPLACE CONTROL VALVE WITH TCM

1. Replace control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Perform TM-59, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by "ROAD TEST" to repair malfunctioning part. Refer to TM-165, "Check Before Engine Is Started".

P0732 2GR INCORRECT RATIO

Description

INFOID:0000000006244727

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 also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

On Board Diagnosis Logic

INFOID:0000000006244728

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0732” with CONSULT-III or 19th judgment flicker without CONSULT-III is detected when TCM detects any inconsistency in the actual gear ratio.

Possible Cause

INFOID:0000000006244729

- Harness or connectors
  (Solenoid circuits are open or shorted.)
- Input clutch solenoid valve
- Front brake solenoid valve
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000006244730

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 140°C
   If out of range, drive vehicle to warm ATF or stop engine to cool ATF.
3. Select “2ND GR FNCTN P0732” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT-III.
4. Drive vehicle and maintain the following conditions.
   With manual mode:
   MANU MODE SW: ON
   GEAR: “2” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more

   Without manual mode:
   SLCT LVR POSI: “2” position
   GEAR: “2” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more
5. Keep the current driving status for at least 5 consecutive seconds if CONSULT-III screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:

If "TESTING" does not appear on CONSULT-III for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC other than P0732 is shown, refer to "TM-36, "CONSULT-III Function (TRANSMISSION)"".
If "COMPLETED RESULT NG" is detected, go to TM-62, "Diagnosis Procedure".
If "STOP VEHICLE" is detected, go to the following step.

6. Stop vehicle.
7. Drive vehicle in "D" position allowing it to shift from 1GR to 5GR and check shift timing and shift shock.

- Touch "OK" to complete the inspection when normally shifted from the 1GR to 5GR.
- Touch "NG" when an unusual shift shock, etc. occurs in spite of shifting from the 1GR to 5GR. Go to TM-165, "Check Before Engine Is Started".
- Perform TM-36, "CONSULT-III Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither "OK" nor "NG" are indicated.)

Diagnosis Procedure

INFOID:0000000006244731

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)", TM-41, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTION ITEM

Check A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.REPLACE CONTROL VALVE WITH TCM

1. Replace control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Perform TM-61, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by "ROAD TEST" to repair malfunctioning part. Refer to TM-165, "Check Before Engine Is Started".

P0733 3GR INCORRECT RATIO

Description

INFOID:0000000006244732

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 also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

On Board Diagnosis Logic

INFOID:0000000006244733

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0733” with CONSULT-III or 20th judgment flicker without CONSULT-III is detected when TCM detects any inconsistency in the actual gear ratio.

Possible Cause

INFOID:0000000006244734

- Harness or connectors
  (Solenoid circuits are open or shorted.)
- Input clutch solenoid valve
- Front brake solenoid valve
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000006244735

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 140°C
   If out of range, drive vehicle to warm ATF or stop engine to cool ATF.
3. Select “3RD GR FNCTN P0733” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT-III.
4. Drive vehicle and maintain the following conditions.
   With manual mode:
   MANU MODE SW: ON
   GEAR: “3” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more

   Without manual mode:
   SLCT LVR POSI: “3” position
   GEAR: “3” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more
5. Keep the current driving status for at least 5 consecutive seconds if CONSULT-III screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:

If "TESTING" does not appear on CONSULT-III for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC other than P0733 is shown, refer to "TM-36, "CONSULT-III Function (TRANSMISSION)"".
If "COMPLETED RESULT NG" is detected, go to TM-64, "Diagnosis Procedure".
If "STOP VEHICLE" is detected, go to the following step.

6. Stop vehicle.
7. Drive vehicle in "D" position allowing it to shift from 1GR to 5GR and check shift timing and shift shock.

- Touch "OK" to complete the inspection when normally shifted from the 1GR to 5GR.
- Touch "NG" when an unusual shift shock, etc. occurs in spite of shifting from the 1GR to 5GR. Go to TM-165, "Check Before Engine Is Started".
- Perform TM-36, "CONSULT-III Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither "OK" nor "NG" are indicated.)

Diagnosis Procedure

INFOID:0000000006244736

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)", TM-41, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTION ITEM

Check A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.REPLACE CONTROL VALVE WITH TCM

1. Replace control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Perform TM-63, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by "ROAD TEST" to repair malfunctioning part. Refer to TM-165, "Check Before Engine Is Started".

P0734 4GR INCORRECT RATIO

Description

INFOID:0000000006244737

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 also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

On Board Diagnosis Logic

INFOID:0000000006244738

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0734” with CONSULT-III or 21th judgment flicker without CONSULT-III is detected when TCM detects any inconsistency in the actual gear ratio.

Possible Cause

INFOID:0000000006244739

- Harness or connectors
  (Solenoid circuits are open or shorted.)
- Input clutch solenoid valve
- Front brake solenoid valve
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000006244740

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 140°C
   If out of range, drive vehicle to warm ATF or stop engine to cool ATF.
3. Select “4TH GR FNCTN P0734” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT-III.
4. Drive vehicle and maintain the following conditions.
   With manual mode:
   MANU MODE SW: ON
   GEAR: “4” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more

   Without manual mode:
   SLCT LVR POSI: “D” position
   GEAR: “4” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more
5. Keep the current driving status for at least 5 consecutive seconds if CONSULT-III screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:

If "TESTING" does not appear on CONSULT-III for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC other than P0734 is shown, refer to "TM-36, "CONSULT-III Function (TRANSMISSION)"".
If "COMPLETED RESULT NG" is detected, go toTM-66, "Diagnosis Procedure".
If "STOP VEHICLE" is detected, go to the following step.

6. Stop vehicle.
7. Drive vehicle in "D" position allowing it to shift from 1GR to 5GR and check shift timing and shift shock.

- Touch "OK" to complete the inspection when normally shifted from the 1GR to 5GR.
- Touch "NG" when an unusual shift shock, etc. occurs in spite of shifting from the 1GR to 5GR. Go to TM-165, "Check Before Engine Is Started".
- Perform TM-36, "CONSULT-III Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither "OK" nor "NG" are indicated.)

Diagnosis Procedure

INFOID:0000000006244741

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)", TM-41, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTION ITEM

Check A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.REPLACE CONTROL VALVE WITH TCM

1. Replace control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Perform TM-65, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by "ROAD TEST" to repair malfunctioning part. Refer to TM-165, "Check Before Engine Is Started".

P0735 5GR INCORRECT RATIO

Description

INFOID:0000000006244742

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 also by mechanical malfunction such as control valve sticking, improper solenoid valve operation.

On Board Diagnosis Logic

INFOID:0000000006244743

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0735” with CONSULT-III or 22th judgment flicker without CONSULT-III is detected when TCM detects any inconsistency in the actual gear ratio.

Possible Cause

INFOID:0000000006244744

- Harness or connectors
  (Solenoid circuits are open or shorted.)
- Input clutch solenoid valve
- Front brake solenoid valve
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000006244745

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 140°C
   If out of range, drive vehicle to warm ATF or stop engine to cool ATF.
3. Select “5TH GR FNCTN P0735” of “DTC & SRT CONFIRMATION” mode for “TRANSMISSION” with CONSULT-III.
4. Drive vehicle and maintain the following conditions.
   With manual mode:
   MANU MODE SW: ON
   GEAR: “5” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more

   Without manual mode:
   SLCT LVR POSI: “D” position
   GEAR: “5” position
   ACCELE POSI: 0.6/8 or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   ENGINE SPEED: INPUT SPEED – 50 rpm or more
   INPUT SPEED: 300 rpm or more
5. Keep the current driving status for at least 5 consecutive seconds if CONSULT-III screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:

If "TESTING" does not appear on CONSULT-III for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC other than P0735 is shown, refer to "TM-36, "CONSULT-III Function (TRANSMISSION)"".
If "COMPLETED RESULT NG" is detected, go to TM-68, "Diagnosis Procedure".
If "STOP VEHICLE" is detected, go to the following step.

6. Stop vehicle.
7. Drive vehicle in "D" position allowing it to shift from 1GR to 5GR and check shift timing and shift shock.

- Touch "OK" to complete the inspection when normally shifted from the 1GR to 5GR.
- Touch "NG" when an unusual shift shock, etc. occurs in spite of shifting from the 1GR to 5GR. Go to TM-165, "Check Before Engine Is Started".
- Perform TM-36, "CONSULT-III Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither "OK" nor "NG" are indicated.)

Diagnosis Procedure

INFOID:0000000006244746

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)", TM-41, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTION ITEM

Check A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.REPLACE CONTROL VALVE WITH TCM

1. Replace control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Perform TM-67, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by "ROAD TEST" to repair malfunctioning part. Refer to TM-165, "Check Before Engine Is Started".

P0740 TORQUE CONVERTER

Description

INFOID:0000000006244747

- The torque converter clutch solenoid valve is activated, with the gear in D_4, D_5 by the TCM in response to signals sent from the output speed sensor and accelerator pedal position sensor (throttle position sensor). Torque converter clutch piston operation will then be controlled.
- Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
- When the accelerator pedal is depressed (less than 1/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244748

Item name	Condition	Display value (Approx.)
TCC SOLENOID	When performing slip lock-up	0.2 - 0.4 A
	When performing lock-up	0.4 - 0.6 A

On Board Diagnosis Logic

INFOID:0000000006244749

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0740” with CONSULT-III or 3rd judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM detects an improper voltage drop when it tries to operate the solenoid valve.
- When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

INFOID:0000000006244750

- Torque converter clutch solenoid valve
- Harness or connectors
  (The solenoid circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000006244751

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL/S SE-A/T: 80 km/h (50 MPH) or more
   ACCELE POSI: 0.5/8 - 1.0/8
   SLCT LVR POSI: “D” position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
4. If DTC is detected go to TM-69, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244752

1.CHECK INPUT SIGNAL

With CONSULT-III
1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.

3. Start engine.
4. Read out the value of “TCC SOLENOID” while driving.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-69, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P0744 TORQUE CONVERTER

Description

INFOID:0000000006244753

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.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244754

Item name	Condition	Display value (Approx.)
TCC SOLENOID	When performing slip lock-up	0.2 - 0.4 A
	When performing lock-up	0.4 - 0.6 A

On Board Diagnosis Logic

INFOID:0000000006244755

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0744” with CONSULT-III or 3rd judgment flicker without CONSULT-III is detected under the following conditions.

- When A/T cannot perform lock-up even if electrical circuit is good.
- When TCM detects as irregular by comparing difference value with slip rotation.

Possible Cause

INFOID:0000000006244756

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Torque converter clutch solenoid valve
- Hydraulic control circuit

DTC Confirmation Procedure

INFOID:0000000006244757

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Start engine.
2. Select “DATA MONITOR" mode for "TRANSMISSION" with CONSULT-III.
3. Drive vehicle and maintain the following conditions for at least 30 consecutive seconds.
   ACCELE POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
   TCC SOLENOID: 0.4 - 0.6 A
   VEHICLE SPEED: 80 km/h (50 MPH) or more
   Driving locations: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
4. If DTC is detected, go to TM-71, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244758

1.CHECK INPUT SIGNAL

With CONSULT-III

1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start the engine.

4. Read out the value of “TCC SOLENOID” while driving.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.

- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.

- Refer to TM-71, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P0745 PRESSURE CONTROL SOLENOID A

Description

INFOID:0000000006244759

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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244760

Item name	Condition	Display value (Approx.)
LINE PRES SOL	During driving	0.2 - 0.6 A

On Board Diagnosis Logic

INFOID:0000000006244761

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0745” with CONSULT-III or 4th judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM detects an improper voltage drop when it tries to operate the solenoid valve.
- When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

INFOID:0000000006244762

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Line pressure solenoid valve

DTC Confirmation Procedure

INFOID:0000000006244763

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON” and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
2. Engine start and wait at least 5 second.
3. If DTC is detected, go to TM-73, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244764

1.CHECK INPUT SIGNAL

With CONSULT-III

1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start the engine.
4. Read out the value of “LINE PRES SOL” while driving.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.
• The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4. CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-73, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P1705 TP SENSOR

Description

INFOID:0000000006244765

Electric throttle control actuator consists of throttle control motor, accelerator pedal position sensor, throttle position sensor, etc. The actuator sends a signal to the ECM, and ECM sends signals to TCM with CAN communication.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244766

Item name	Condition	Display value (Approx.)
ACCELE POSI	Released accelerator pedal.	0.0/8
	Fully depressed accelerator pedal.	8/8

On Board Diagnosis Logic

INFOID:0000000006244767

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1705” with CONSULT-III or 15th judgment flicker without CONSULT-III is detected when TCM does not receive the proper accelerator pedal position signals (input by CAN communication) from ECM.

Possible Cause

INFOID:0000000006244768

Harness or connectors
(The sensor circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000006244769

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for "TRANSMISSION" with CONSULT-III.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to TM-75, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000006244770

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46.
NO >> GO TO 2.

2.CHECK DTC WITH TCM

With CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Depress accelerator pedal and read out the value of “ACCELE POSI”.
4. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT-III. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.CHECK DTC WITH ECM

With CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “ENGINE” with CONSULT-III. Refer to EC-77, "CONSULT-III Function" (VQ40DE) or EC-530, "CONSULT-III Function" (VK56DE).

OK or NG

OK >> GO TO 4.
NG >> Check the DTC detected item. Refer to EC-77, "CONSULT-III Function" (VQ40DE) or EC-530, "CONSULT-III Function" (VK56DE).
- If CAN communication line is detected, go to TM-46, "Diagnosis Procedure".

4. CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-75, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

P1710 TRANSMISSION FLUID TEMPERATURE SENSOR

Description

INFOID:0000000006244771

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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244772

Item name	Condition °C (°F)	Display value (Approx.)
ATF TEMP SE 1	0 (32) - 20 (68) - 80 (176)	3.3 - 2.7 - 0.9 V

On Board Diagnosis Logic

INFOID:0000000006244773

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1710 (A/T), P0710 (ENGINE)” with CONSULT-III or 10th judgment flicker without CONSULT-III is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

INFOID:0000000006244774

- Harness or connectors
  (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor

DTC Confirmation Procedure

INFOID:0000000006244775

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “ENGINE” with CONSULT-III.
3. Start engine and maintain the following conditions for at least 14 minutes (Total). (It is not necessary to maintain continuously.)
   VHCL/S SE-A/T: 10 km/h (6 MPH) or more
   ACCELE POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
4. If DTC is detected, go to TM-77, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244776

1.CHECK A/T FLUID TEMPERATURE SENSOR SIGNAL

With CONSULT-III
1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Read out the value of “ATF TEMP SE 1”.

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2.CHECK A/T FLUID TEMPERATURE SENSOR

Check A/T fluid temperature sensor 1. Refer to TM-78, "Component Inspection".

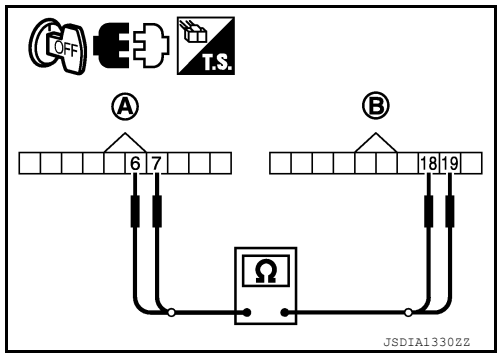
OK or NG

OK >> GO TO 3.

NG >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".

3.CHECK SUB-HARNESS

1. Disconnect transmission range switch connector and TCM connector.
2. Check continuity between transmission range switch connector (A) terminals and TCM connector (B) terminals.



Item	Connector	Terminal	Continuity
Transmission range switch connector	F505	6	Yes
TCM connector	F503	19	
Transmission range switch connector	F505	7	Yes
TCM connector	F503	18	

3. If OK, check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Replace open circuit or short to ground and short to power in harness or connectors.

4.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

1. Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".
2. Reinstall any part removed.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

5.CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-77, "DTC Confirmation Procedure".

OK or NG

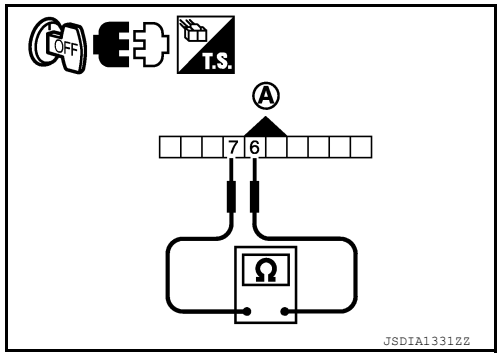
OK >> **INSPECTION END**
NG >> GO TO 1.

Component Inspection

INFOID:0000000006244777

A/T FLUID TEMPERATURE SENSOR

1. Remove control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Check resistance between transmission range switch connector (A) terminals.



Name	Terminal	Temperature °C (°F)	Resistance (Approx.)
A/T fluid temperature sensor	6 - 7	TM-282, "A/T Fluid Temperature Sensor"	

3. If NG, replace the control valve with TCM. Refer to TM-174, "Removal and Installation".

P1721 VEHICLE SPEED SIGNAL

Description

INFOID:0000000006244778

The vehicle speed signal is transmitted from combination meter to TCM by 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.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244779

Item name	Condition	Display value (km/h)
VHCL/S SE-MTR	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

INFOID:0000000006244780

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1721” with CONSULT-III is detected when TCM does not receive the proper vehicle speed signal (input by CAN communication) from combination meter.

Possible Cause

INFOID:0000000006244781

Harness or connectors
(The sensor circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000006244782

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   ACCELE POSI: 1/8 or less
   VHCL/S SE-A/T: 30 km/h (19 MPH) or more
4. If DTC is detected, go to TM-79, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000006244783

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

Is malfunction in the CAN communication indicated in the result?

YES >> Check CAN communication line. Refer to TM-46.
NO >> GO TO 2.

2.CHECK INPUT SIGNAL

With CONSULT-III

1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Drive vehicle and read out the value of “VHCL/S SE-MTR”.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.CHECK COMBINATION METERS

Check combination meters. Refer to MWI-7, "METER SYSTEM : Component Description".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-79, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. DETECT MALFUNCTIONING ITEM

Check the following.
• The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

P1730 INTERLOCK

Description

INFOID:0000000006244784

- Fail-safe function to detect interlock conditions.

On Board Diagnosis Logic

INFOID:0000000006244785

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1730” with CONSULT-III or 12th judgment flicker without CONSULT-III is detected when TCM does not receive the proper voltage signal from the sensor and switch.
- TCM monitors and compares gear position and conditions of each ATF pressure switch when gear is steady.

Possible Cause

INFOID:0000000006244786

- Harness or connectors
  (The solenoid and switch circuit is open or shorted.)
- Low coast brake solenoid valve
- ATF pressure switch 2

DTC Confirmation Procedure

INFOID:0000000006244787

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 2 consecutive seconds.
   SLCT LVR POSI: “D” position
5. If DTC is detected, go to TM-81, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Judgement of Interlock

INFOID:0000000006244788

When interlock is judged to be malfunctioning, the vehicle should be fixed in 2GR, and should be set in a condition in which it can travel.
When one of the following fastening patterns is detected, the fail-safe function in correspondence with the individual pattern should be performed.
NOTE:
When the vehicle is driven in 2GR, a input speed sensor malfunction is displayed, but this is not a tinput speed sensor malfunction.
When interlock is detected at the 3GR or more, it is locked at the 2GR.

Diagnosis Procedure

INFOID:0000000006244789

1.SELF-DIAGNOSIS

With CONSULT-III

1. Drive vehicle.
2. Stop vehicle and turn ignition switch OFF.
3. Turn ignition switch ON.
4. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT-III.

Without CONSULT-III

1. Drive vehicle.
2. Stop vehicle and turn ignition switch OFF.
3. Turn ignition switch ON.

4. Perform self-diagnosis. Refer to TM-41, "Diagnosis Procedure without CONSULT-III".

OK or NG

OK >> GO TO 2.
NG >> Check low coast brake solenoid valve circuit and function. Refer to TM-93, TM-95.

2.CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-81, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.DETECT MALFUNCTIONING ITEM

Check the following.
• The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

P1731 1ST ENGINE BRAKING

Description

INFOID:0000000006244790

Fail-safe function to prevent sudden decrease in speed by engine brake other than at “1” position.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244791

Item name	Condition	Display value
ON OFF SOL	Low coast brake engaged. Refer to TM-10.	ON
	Low coast brake disengaged. Refer to TM-10.	OFF
ATF PRES SW 2	Low coast brake engaged. Refer to TM-10.	ON
	Low coast brake disengaged. Refer to TM-10.	OFF

On Board Diagnosis Logic

INFOID:0000000006244792

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1731” with CONSULT-III or 13th judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM does not receive the proper voltage signal from the sensor.
- When TCM monitors each ATF pressure switch and solenoid monitor value, and detects as irregular when engine brake of 1st gear acts other than at “1” position.

Possible Cause

INFOID:0000000006244793

- Harness or connectors
  (The sensor circuit is open or shorted.)
- Low coast brake solenoid valve
- ATF pressure switch 2

DTC Confirmation Procedure

INFOID:0000000006244794

NOTE:
If “DTC Confirmation Procedure” has been previously preformed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 2 consecutive seconds.
   ENGINE SPEED: 1,200 rpm
   SLCT LVR POSI: “1” position
   GEAR: 1st
5. If DTC is detected, go to TM-83, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000006244795

1. CHECK INPUT SIGNALS

With CONSULT-III

1. Start the engine.
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Drive vehicle in the “1” position (1GR), and confirm the ON/OFF actuation of “ATF PRES SW 2” and “ON OFF SOL”.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-83, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P1752 INPUT CLUTCH SOLENOID

Description

INFOID:0000000006244796

Input clutch solenoid valve is controlled by the TCM in response to signals sent from the transmission range switch, output speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244797

Item name	Condition	Display value (Approx.)
I/C SOLENOID	Input clutch disengaged. Refer to TM-10.	0.6 - 0.8 A
	Input clutch engaged. Refer to TM-10.	0 - 0.05 A

On Board Diagnosis Logic

INFOID:0000000006244798

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1752” with CONSULT-III or 5th judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM detects an improper voltage drop when it tries to operate the solenoid valve.
- When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

INFOID:0000000006244799

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Input clutch solenoid valve

DTC Confirmation Procedure

INFOID:0000000006244800

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   ACCELE POSI: 1.5/8 - 2.0/8
   SLCT LVR POSI: “D” position
   GEAR: 3rd ⇒ 4th (I/C ON/OFF)
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
5. If DTC is detected go to TM-85, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244801

1.CHECK INPUT SIGNAL

With CONSULT-III
1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start the engine.
4. Read out the value of “I/C SOLENOID” while driving.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-85, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P1757 FRONT BRAKE SOLENOID

Description

INFOID:0000000006244802

Front brake solenoid valve is controlled by the TCM in response to signals sent from the transmission range switch, output speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244803

Item name	Condition	Display value (Approx.)
FR/B SOLENOID	Front brake engaged. Refer to TM-10.	0.6 - 0.8 A
	Front brake disengaged. Refer to TM-10.	0 - 0.05 A

On Board Diagnosis Logic

INFOID:0000000006244804

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1757” with CONSULT-III or 6th judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM detects an improper voltage drop when it tries to operate the solenoid valve.
- When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

INFOID:0000000006244805

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Front brake solenoid valve

DTC Confirmation Procedure

INFOID:0000000006244806

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   ACCELE POSI: 1.5/8 - 2.0/8
   SLCT LVR POSI: “D” position
   GEAR: 3rd ⇒ 4th (FR/B ON/OFF)
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
5. If DTC is detected go to TM-87, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244807

1.CHECK INPUT SIGNAL

With CONSULT-III
1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Read out the value of “FR/B SOLENOID” while driving.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-87, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P1762 DIRECT CLUTCH SOLENOID

Description

INFOID:0000000006244808

Direct clutch solenoid valve is controlled by the TCM in response to signals sent from the transmission range switch, output speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244809

Item name	Condition	Display value (Approx.)
D/C SOLENOID	Direct clutch disengaged. Refer to TM-10.	0.6 - 0.8 A
	Direct clutch engaged. Refer to TM-10.	0 - 0.05 A

On Board Diagnosis Logic

INFOID:0000000006244810

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1762” with CONSULT-III or 2nd judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM detects an improper voltage drop when it tries to operate the solenoid valve.
- When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

INFOID:0000000006244811

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Direct clutch solenoid valve

DTC Confirmation Procedure

INFOID:0000000006244812

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   ACCELE POSI: 1.5/8 - 2.0/8
   SLCT LVR POSI: “D” position
   GEAR: 1st ⇒ 2nd (D/C ON/OFF)
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
5. If DTC is detected, go to TM-89, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244813

1.CHECK INPUT SIGNAL

With CONSULT-III

1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start the engine.
4. Read out the value of “D/C SOLENOID” while driving.

OK or NG

OK >> GO TO 4.

NG >> GO TO 2.

2. CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4. CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-89, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P1767 HIGH AND LOW REVERSE CLUTCH SOLENOID

Description

INFOID:0000000006244814

High and low reverse clutch solenoid valve is controlled by the TCM in response to signals sent from the transmission range switch, output speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244815

Item name	Condition	Display value (Approx.)
HLR/C SOL	High and low reverse clutch disengaged. Refer to TM-10.	0.6 - 0.8 A
	High and low reverse clutch engaged. Refer to TM-10.	0 - 0.05 A

On Board Diagnosis Logic

INFOID:0000000006244816

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1767” with CONSULT-III or 8th judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM detects an improper voltage drop when it tries to operate the solenoid valve.
- When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

INFOID:0000000006244817

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- High and low reverse clutch solenoid valve

DTC Confirmation Procedure

INFOID:0000000006244818

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   ACCELE POSI: 1.5/8 - 2.0/8
   SLCT LVR POSI: “D” position
   GEAR: 2nd ⇒ 3rd (HLR/C ON/OFF)
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
5. If DTC is detected, go to TM-91, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244819

1.CHECK INPUT SIGNAL

With CONSULT-III
1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start the engine.
4. Read out the value of “HLR/C SOLENOID” while driving.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4. CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-91, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P1772 LOW COAST BRAKE SOLENOID

Description

INFOID:0000000006244820

Low coast brake solenoid valve is turned “ON” or “OFF” by the TCM in response to signals sent from the transmission range switch, output speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244821

Item name	Condition	Display value
ON OFF SOL	Low coast brake engaged. Refer to TM-10.	ON
	Low coast brake disengaged. Refer to TM-10.	OFF

On Board Diagnosis Logic

INFOID:0000000006244822

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1772” with CONSULT-III or 7th judgment flicker without CONSULT-III is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000006244823

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Low coast brake solenoid valve

DTC Confirmation Procedure

INFOID:0000000006244824

NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   With manual mode:
   MANUAL MODE SW: ON
   GEAR: “1st” or “2nd” (LC/B ON/OFF)

   Without manual mode:
   SLCT LVR POSI: “1” or “2”
   GEAR: “1st” or “2nd” (LC/B ON/OFF)
5. If DTC is detected, go to TM-93, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244825

1.CHECK INPUT SIGNAL

With CONSULT-III

1. Turn ignition switch ON.
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start the engine.
4. Read out the value of “ON OFF SOL” while driving.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-93, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P1774 LOW COAST BRAKE SOLENOID

Description

INFOID:0000000006244826

- Low coast brake solenoid valve is turned “ON” or “OFF” by the TCM in response to signals sent from the transmission range switch, output speed sensor and accelerator pedal position sensor (throttle position sensor). Gears will then be shifted to the optimum position.
- 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.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244827

Item name	Condition	Display value
ON OFF SOL	Low coast brake engaged. Refer to TM-10.	ON
	Low coast brake disengaged. Refer to TM-10.	OFF
ATF PRES SW 2	Low coast brake engaged. Refer to TM-10.	ON
	Low coast brake disengaged. Refer to TM-10.	OFF

On Board Diagnosis Logic

INFOID:0000000006244828

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1774” with CONSULT-III or 7th judgment flicker without CONSULT-III is detected under the following conditions.

- When TCM detects that actual gear ratio is irregular, and relation between gear position and condition of ATF pressure switch 2 is irregular during depressing accelerator pedal. (Other than during shift change)
- When TCM detects that relation between gear position and condition of ATF pressure switch 2 is irregular during releasing accelerator pedal. (Other than during shift change)

Possible Cause

INFOID:0000000006244829

- Harness or connectors
  (The solenoid and switch circuits are open or shorted.)
- Low coast brake solenoid valve
- ATF pressure switch 2

DTC Confirmation Procedure

INFOID:0000000006244830

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch “OFF” and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Start engine.
2. Accelerate vehicle to maintain the following conditions.
   With manual mode:
   MANUAL MODE SW: ON
   GEAR: “1st” or “2nd” (LC/B ON/OFF)

   Without manual mode:
   SLCT LVR POSI: “1” or “2” position
   GEAR: “1st” or “2nd” (LC/B ON/OFF)
3. Perform step “2” again.
4. Turn ignition switch “OFF”, then perform step “1” to “3” again.
5. Check “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT-III. If DTC (P1774) is detected, refer to TM-96, "Diagnosis Procedure".
   If DTC (P1772) is detected, go to TM-93, "Diagnosis Procedure".

WITH GST
Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000006244831

1.CHECK INPUT SIGNALS

With CONSULT-III
1. Start the engine.
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Drive vehicle in the “1” or “2” position (“1$_1$” or “2$_2$” gear), and confirm the ON/OFF actuation of the “ATF PRES SW 2” and “ON OFF SOL”.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3.DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-95, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

P1815 M-MODE SWITCH

Description

INFOID:0000000006244832

Manual mode switch is installed in A/T shift selector. It sends manual mode switch, shift up and shift down switch signals to TCM.
TCM sends the switch signals to combination meter and A/C amp. by CAN communication line. Then manual mode switch position is indicated on the A/T position indicator.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244833

Item name	Condition	Display Value
MANU MODE SW	Manual shift gate position (neutral)	ON
	Other than the above	OFF
NON M-MODE SW	Manual shift gate position	OFF
	Other than the above	ON
UP SW LEVER	Selector lever: + side	ON
	Other than the above	OFF
DOWN SW LEVER	Selector lever: - side	ON
	Other than the above	OFF

On Board Diagnosis Logic

INFOID:0000000006244834

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1815” with CONSULT-III is detected when TCM monitors Manual mode, Non manual mode, Up or Down switch signal, and detects as irregular when impossible input pattern occurs 1 second or more.

Possible Cause

INFOID:0000000006244835

- Harness or connectors
  (These switches circuit is open or shorted.)
- Manual mode select switch (Into A/T shift selector)
- Manual mode position select switch (Into A/T shift selector)

DTC Confirmation Procedure

INFOID:0000000006244836

CAUTION:
Always drive vehicle at a safe speed.
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-III

1. Turn ignition switch ON.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Start engine.
4. Move selector lever to “M” position.
5. Drive vehicle and maintain the following conditions for at least 2 consecutive seconds.
   MANU MODE SW: ON
6. If DTC is detected, go to TM-97, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000006244837

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".
Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46, "Diagnosis Procedure".
NO >> GO TO 2.

2. CHECK MANUAL MODE SWITCH CIRCUIT

With CONSULT-III

1. Turn ignition switch ON.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Read out ON/OFF switching action of “MANU MODE SW”, “NON M-MODE SW”, “UP SW LEVER”, “DOWN SW LEVER”.

Item name	Condition	Display Value
MANU MODE SW	Manual shift gate position (neutral)	ON
	Other than the above	OFF
NON M-MODE SW	Manual shift gate position	OFF
	Other than the above	ON
UP SW LEVER	selector lever: +side	ON
	Other than the above	OFF
DOWN SW LEVER	selector lever: -side	ON
	Other than the above	OFF

Without CONSULT-III

Drive vehicle in the manual mode, and confirm that the actual gear position and the meter's indication of the position mutually coincide when the selector lever is shifted to the “+ (up)” or “- (down)” side (1GR ⇔ 5GR).

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

Check the following.

- Manual mode switch. Refer to TM-99, "Component Inspection".
- Pin terminals for damage or loose connection with harness connector.
- Open circuit or short to ground or short to power in harness or connector for A/T shift selector (manual mode switch).
- Combination meter. Refer to MWI-5, "METER SYSTEM : System Description".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK DTC

Perform TM-97, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-100, "Diagnosis Procedure".

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. DETECT MALFUNCTIONING ITEM

Check A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> Replace control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Repair or replace damaged parts.

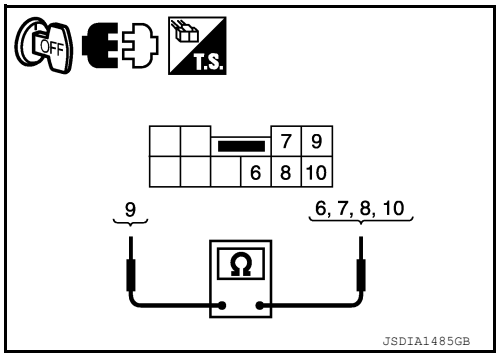
Component Inspection

INFOID:0000000006244838

MANUAL MODE SWITCH

Check continuity between A/T shift selector connector (A) terminals.

Item	Position	Terminal	Continuity
Manual mode select switch	Auto	9 – 10	Yes
	Manual	6 – 9	
Manual mode position select switch	UP	8 – 9	
	DOWN	7 – 9	



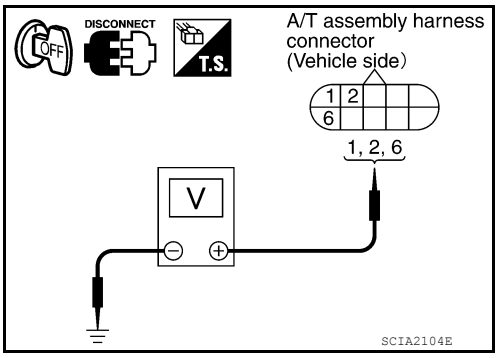
MAIN POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000006244839

1.CHECK TCM POWER SOURCE STEP 1

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



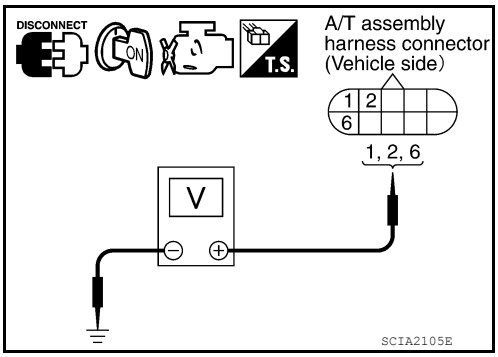
Item	Connector	Terminal	Voltage
TCM	F9	1 - Ground	Battery voltage
		2 - Ground	
		6 - Ground	0V

OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2.CHECK TCM POWER SOURCE STEP 2

1. Disconnect A/T assembly harness connector.
2. Turn ignition switch ON. (Do not start engine.)
3. Check voltage between A/T assembly harness connector terminals and ground.



Item	Connector	Terminal	Voltage
TCM	F9	1 - Ground	Battery voltage
		2 - Ground	
		6 - Ground	

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between battery and A/T assembly harness connector terminals 1, 2
- Harness for short or open between ignition switch and A/T assembly harness connector terminal 6
- 10A fuse (No. 22, located in the fuse and fusible link block) and 10A fuse (No. 49, located in the IPDM E/R)
- Ignition switch. Refer to PG-21, "Wiring Diagram — Ignition Power Supply —".

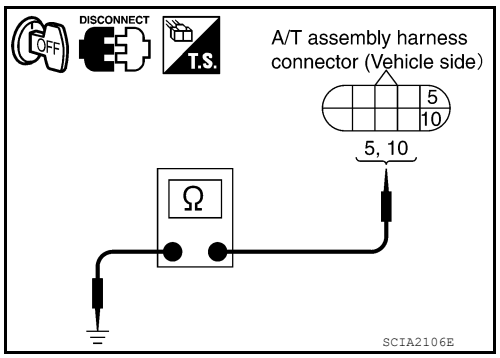
OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect A/T assembly harness connector.

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



Item	Connector	Terminal	Continuity
TCM	F9	5, 10 - Ground	Yes

If OK, check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. DETECT MALFUNCTIONING ITEM

Check the following.
- The A/T assembly harness connector terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. PERFORM SELF-DIAGNOSIS

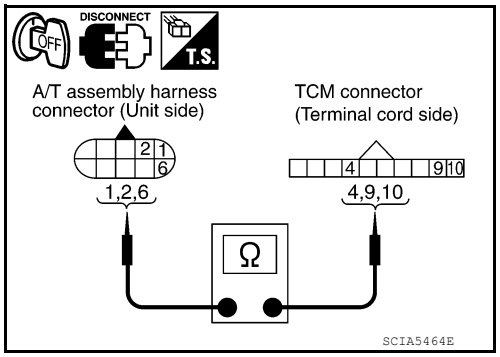
Perform self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

OK or NG

OK >> **INSPECTION END**
NG-1 >> Self-diagnosis does not activate: GO TO 7.
NG-2 >> DTC is displayed: Check the malfunctioning system. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

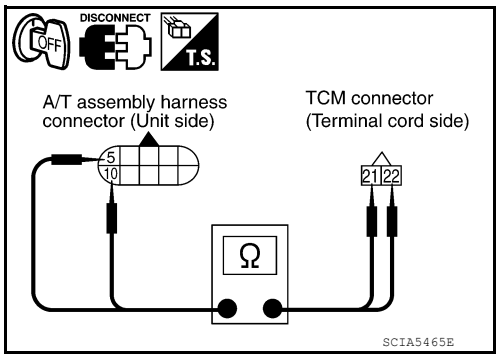
7. CHECK TERMINAL CORD ASSEMBLY

1. Remove control valve with TCM. Refer to TM-174, "Removal and Installation".
2. Disconnect A/T assembly harness connector and TCM connector.
3. Check continuity between A/T assembly harness connector terminals and TCM connector terminals.



Item	Connector	Terminal	Continuity
A/T assembly harness connector	F9	1	Yes
TCM connector	F502	9	
A/T assembly harness connector	F9	2	Yes
TCM connector	F502	10	
A/T assembly harness connector	F9	6	Yes
TCM connector	F502	4	

4. Check continuity between A/T assembly harness connector terminals and TCM connector terminals.



Item	Connector	Terminal	Continuity
A/T assembly harness connector	F9	5	Yes
TCM connector	F504	21	
A/T assembly harness connector	F9	10	Yes
TCM connector	F504	22	

5. If OK, check harness for short to ground and short to power.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-174, "Removal and Installation".
NG >> Replace open circuit or short to ground and short to power in harness or connectors.

CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION CIRCUIT

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244840

Item name	Condition	Display value
CLSD THL POS	Released accelerator pedal.	ON
	Fully depressed accelerator pedal.	OFF
W/O THL POS	Fully depressed accelerator pedal.	ON
	Released accelerator pedal.	OFF

Diagnosis Procedure

INFOID:0000000006244841

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46.
NO >> GO TO 2.

2.CHECK THROTTLE POSITION SIGNAL CIRCUIT

With CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Depress accelerator pedal and read out the value of “CLSD THL POS” and “W/O THL POS”.

OK or NG

OK >> **INSPECTION END**
NG >> Check the following. If NG, repair or replace damaged parts.
- Perform the self-diagnosis for “ENGINE” with CONSULT-III.
- Open circuit or short to ground or short to power in harness or connectors.
- Pin terminals for damage or loose connection with harness connector.

BRAKE SIGNAL CIRCUIT

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244842

Item name	Condition	Display value
BRAKE SW	Depressed brake pedal.	ON
	Released brake pedal.	OFF

Diagnosis Procedure

INFOID:0000000006244843

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46.
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH CIRCUIT

With CONSULT-III

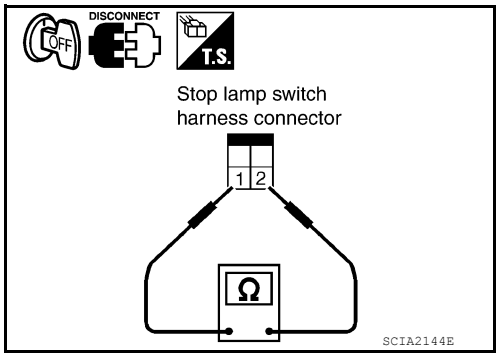
1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Read out ON/OFF switching action of the “BRAKE SW”.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3.CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch harness connector terminals 1 and 2.



Item	Condition	Terminal	Continuity
Stop lamp switch harness connector	When brake pedal is depressed	1 - 2	Yes
	When brake pedal is released		No

Check stop lamp switch after adjusting brake pedal — refer to BR-17, "Inspection and Adjustment - Standard Pedal" or BR-18, "Inspection and Adjustment - Adjustable Pedal".

OK or NG

OK >> Check the following. If NG, repair or replace damaged parts.
- Harness for short or open between battery and stop lamp switch.
- Harness for short or open between stop lamp switch and combination meter.

NG >> Repair or replace the stop lamp switch.

A/T SHIFT LOCK SYSTEM

Description

INFOID:0000000006244844

Refer to TM-32, "System Description".

Diagnosis Procedure

INFOID:0000000006244846

Regarding Wiring Diagram information, refer to TM-123, "Wiring Diagram".

1.CHECK KEY INTERLOCK CABLE

Check key interlock cable for damage.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair key interlock cable. Refer to TM-184, "Component".

2.CHECK SELECTOR LEVER

Check selector lever for damage. Refer to TM-171, "Inspection and Adjustment".

Is the inspection result normal?

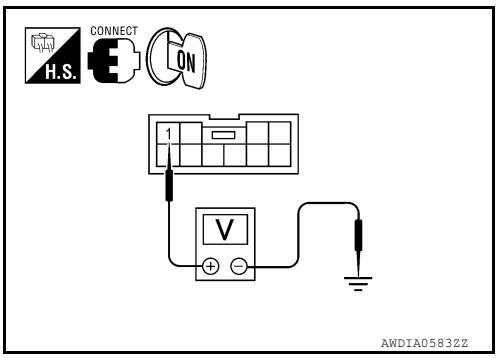
YES >> GO TO 3.
NO >> Repair selector lever. Refer to TM-170, "Exploded view".

3.CHECK INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between A/T shift selector connector terminal 1 and ground.

- M156 (without manual mode switch)
- M157 (with manual mode switch without Intelligent Key system)
- M158 (with manual mode switch and Intelligent Key system)

Brake pedal depressed : Battery voltage
Brake pedal released : 0V



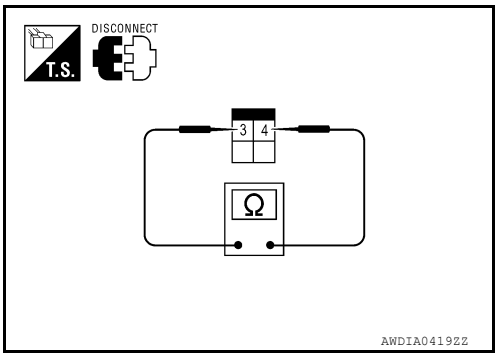
Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch terminals 3 and 4.

Brake pedal depressed : Continuity should exist.
Brake pedal released : Continuity should not exist.



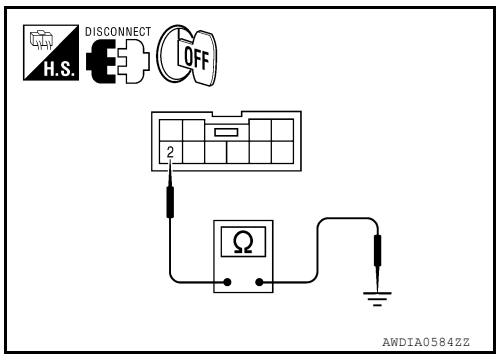
Is the inspection result normal?

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

5.CHECK GROUND CIRCUIT

1. Disconnect A/T shift selector connector.
2. Check continuity between A/T shift selector connector terminal 2 and ground.

- M156 (without manual mode switch)
- M157 (with manual mode switch without Intelligent Key system)
- M158 (with manual mode switch and Intelligent Key system)



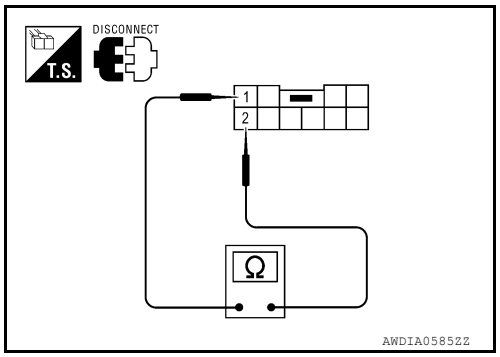
Continuity should exist.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connectors.

6. CHECK PARK POSITION SWITCH (SHIFT SELECTOR) AND SHIFT LOCK SOLENOID

Check continuity between A/T shift selector terminals 1 and 2.



Selector lever in “P” position : Continuity should exist.

Except above : Continuity should not exist.

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace A/T shift selector. Refer to TM-170, "Exploded view".

OVERDRIVE CONTROL SWITCH

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244847

Item name	Condition	Display value
OD CONT SW	Releasing overdrive control switch	OFF
	Holding overdrive control switch	ON

Diagnosis Procedure

INFOID:0000000006244848

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

Is any malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46.
NO >> GO TO 2.

2.CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

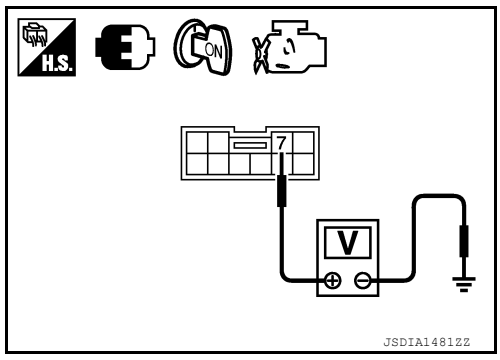
With CONSULT-III

1. Turn ignition switch “ON”.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Read out “OD CONT SW”.
   Check the signal of the overdrive control switch is indicated properly.

Monitor item	Condition	Display value
OD CONT SW	Releasing overdrive control switch	OFF
	Holding overdrive control switch	ON

Without CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine)
2. Check voltage between A/T control device connector terminal and ground.



Item	Connector	Terminal	Condition	Data (Approx.)
Overdrive control switch	M156	7 - Ground	Releasing overdrive control switch	Battery voltage
			Holding overdrive control switch	0V

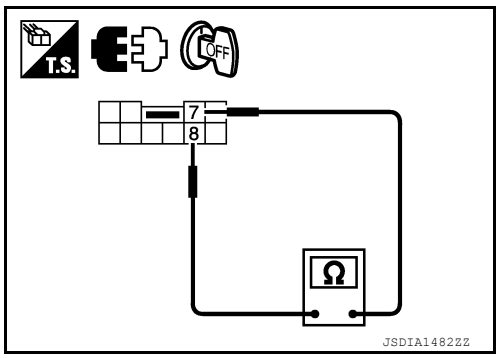
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3.CHECK OVERDRIVE CONTROL SWITCH

1. Turn ignition switch “OFF”.
2. Disconnect A/T control device connector.

3. Check continuity between A/T control device connector terminals.



Item	Connector	Terminal	Condition	Continuity
Overdrive control switch	M156	7 - 8	Releasing overdrive control switch	No
			Holding overdrive control switch	Yes

OK or NG

OK >> GO TO 4.
NG >> Repair or replace overdrive control switch.

4. DETECT MALFUNCTIONING ITEM

Check the following. If any items are damaged, repair or replace damaged parts.
- Harness for short or open between combination meter connector terminal 20 and A/T control device connector terminal 7.
- Harness for short or open between A/T control device connector terminal 8 and ground.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK COMBINATION METER

Check the combination meter. Refer to MWI-25, "Diagnosis Description".

OK or NG

OK >> **INSPECTION END**
NO >> Repair or replace damaged parts.

1ST POSITION SWITCH

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000006244849

Item name	Condition	Display value
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

Diagnosis Procedure

INFOID:0000000006244850

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

Is any malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-46.
NO >> GO TO 2.

2.CHECK 1ST POSITION SWITCH CIRCUIT

With CONSULT-III

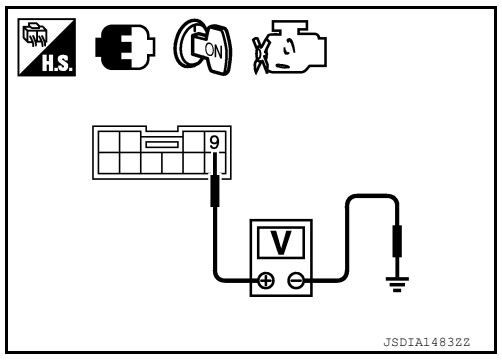
1. Turn ignition switch “ON”.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Read out “1 POSITION SW”.
   Check the signal of the 1st position switch is indicated properly.

Monitor item	Condition	Display value
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

Without CONSULT-III

1. Turn ignition switch “ON”. (Do not start engine)
2. Check voltage between A/T shift selector connector terminal and ground.

Item	Connector	Terminal	Condition	Data (Approx.)
1st position switch	M156	9 - Ground	When setting selector lever to “1” position.	0V
			When setting selector lever to other positions.	Battery voltage



OK or NG

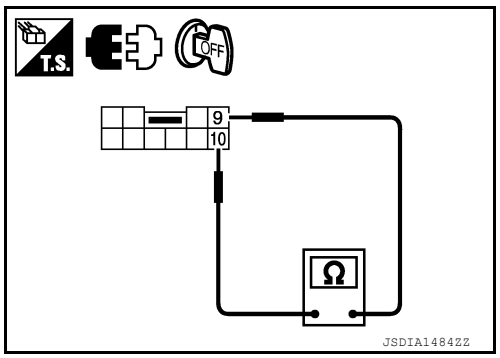
OK >> GO TO 5.
NG >> GO TO 3.

3.CHECK 1ST POSITION SWITCH

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

3. Check continuity between A/T shift selector connector terminals.

Item	Connector	Terminal	Condition	Continuity
1st position switch	M156	9 - 10	When setting selector lever to “1” position.	Yes
			When setting selector lever to other positions.	No



OK or NG

OK >> GO TO 4.
NG >> Repair or replace A/T shift selector assembly.

4. DETECT MALFUNCTIONING ITEM

Check the following. If any items are damaged, repair or replace damaged parts.
- Harness for short or open between combination meter connector terminal 18 and A/T shift selector connector terminal 9.
- Harness for short or open between A/T shift selector connector terminal 10 and ground.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK COMBINATION METER

Check the combination meter. Refer to MWI-25, "Diagnosis Description".

OK or NG

OK >> **INSPECTION END**
NO >> Repair or replace damaged parts.

ECU DIAGNOSIS INFORMATION

TCM

Reference Value

INFOID:0000000006244851

VALUES ON THE DIAGNOSIS TOOL

NOTICE:

1. The CONSULT-III 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-III display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2. Shift schedule (which implies gear position) displayed on CONSULT-III and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:

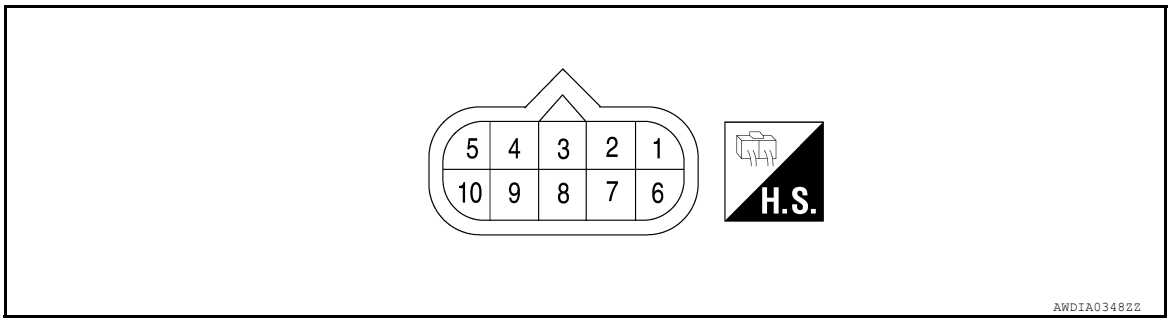
- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-III indicates the point where shifts are completed.

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

Item name	Condition	Display value (Approx.)
ATF TEMP SE 1	0°C (32° F) - 20°C (68°F) - 80°C (176°F)	3.3 - 2.7 - 0.9 V
TCC SOLENOID	When perform slip lock-up	0.2 - 0.4 A
	When perform lock-up	0.4 - 0.6 A
SLCT LVR POSI	Selector lever in “N”,“P” positions.	N/P
	Selector lever in “R” position.	R
	Selector lever in “D” position.	D
	Selector lever in “3” position.	3
	Selector lever in “2” position.	2
	Selector lever in “1” position.	1
VHCL/S SE-A/T	During driving	Approximately matches the speedometer reading.
ENGINE SPEED	Engine running	Closely matches the tachometer reading.
LINE PRES SOL	During driving	0.2 - 0.6 A
INPUT SPEED	During driving (lock-up ON)	Approximately matches the engine speed.
VHCL/S SE-MTR	During driving	Approximately matches the speedometer reading.
ATF PRES SW 2	Low coast brake engaged. Refer to TM-10	ON
	Low coast brake disengaged. Refer to TM-10	OFF
I/C SOLENOID	Input clutch disengaged. Refer to TM-10	0.6 - 0.8 A
	Input clutch engaged. Refer to TM-10	0 - 0.05 A
FR/B SOLENOID	Front brake engaged. Refer to TM-10	0.6 - 0.8 A
	Front brake disengaged. Refer to TM-10	0 - 0.05 A
D/C SOLENOID	Direct clutch disengaged. Refer to TM-10	0.6 - 0.8 A
	Direct clutch engaged. Refer to TM-10	0 - 0.05 A
HLR/C SOL	High and low reverse clutch disengaged. Refer to TM-10	0.6 - 0.8 A
	High and low reverse clutch engaged. Refer to TM-10	0 - 0.05 A
ON OFF SOL	Low coast brake engaged. Refer to TM-10	ON
	Low coast brake disengaged. Refer to TM-10	OFF

Item name	Condition	Display value (Approx.)
MANU MODE SW	Manual shift gate position (neutral)	ON
	Other than the above	OFF
NON M-MODE SW	Manual shift gate position	OFF
	Other than the above	ON
UP SW LEVER	Selector lever: + side	ON
	Other than the above	OFF
DOWN SW LEVER	Selector lever: - side	ON
	Other than the above	OFF
STARTER RELAY	Selector lever in “N”,“P” positions.	ON
	Selector lever in other position.	OFF
ACCELE POSI	Released accelerator pedal.	0.0/8
	Fully depressed accelerator pedal.	8/8
CLSD THL POS	Released accelerator pedal.	ON
	Fully depressed accelerator pedal.	OFF
W/O THL POS	Fully depressed accelerator pedal.	ON
	Released accelerator pedal.	OFF
OD CONT SW	Releasing overdrive control switch	OFF
	Holding overdrive control switch	ON
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF
BRAKESW	Depressed brake pedal.	ON
	Released brake pedal.	OFF

TERMINAL LAYOUT



PHYSICAL VALUES

Data are reference value and are measured between each terminal and ground.

Terminal No.	Wire color	Item	Condition	Data (Approx.)
1	R/B	Power supply (Memory back-up)	Always	Battery voltage
2	R/B	Power supply (Memory back-up)	Always	Battery voltage
3	L	CAN H	–	–
4	V	K-line (CONSULT-III signal)	The terminal is connected to the data link connector for CONSULT-III.	–
5	B	Ground	Always	0V

Terminal No.	Wire color	Item	Condition		Data (Approx.)
6	W/G	Power supply		–	Battery voltage
				–	0V
7	LG	Back-up lamp relay		Selector lever in “R” position.	0V
				Selector lever in other positions.	Battery voltage
8	P	CAN L	–		–
9	R	Starter relay		Selector lever in “N”, “P” positions.	Battery voltage
				Selector lever in other positions.	0V
10	B	Ground	Always		0V

Fail-Safe

INFOID:0000000006244853

The TCM has an electrical fail-safe mode. This mode makes it possible to operate even if there is an error in a main electronic control input/output signal circuit. In fail-safe mode the transmission is fixed in 2nd, 4th or 5th (depending on the breakdown position), so the customer should feel “slipping” or “poor acceleration”.
Even when the electronic circuits are normal, under special conditions (for example, when slamming on the brake with the wheels spinning drastically and stopping the tire rotation), the transmission can go into fail-safe mode. If this happens, switch “OFF” the ignition switch for 10 seconds, then switch it “ON” again to return to the normal shift pattern. Therefore, the customer's vehicle has returned to normal, so handle according to the “diagnostics flow” (Refer to TM-7, "Diagnostic Work Sheet").

FAIL-SAFE FUNCTION

If any malfunction occurs in a sensor or solenoid, this function controls the A/T to mark driving possible.

Output Speed Sensor

- Signals are input from two systems - from output speed sensor installed on the transmission and from combination meter so normal driving is possible even if there is a malfunction in one of the systems. And if output speed sensor has unusual cases, 5GR is prohibited.

Accelerator Pedal Position Sensor

- If there is a malfunction in one of the systems, the accelerator opening angle is controlled by ECM according to a pre-determined accelerator angle to make driving possible. And if there are malfunctions in tow systems, the engine speed is fixed by ECM to a pre-determined engine speed to make driving possible.

Throttle Position Sensor

- If there is a malfunction in one of the systems, the accelerator opening angle is controlled by ECM according to a pre-determined accelerator angle to make driving possible. And if there are malfunctions in tow systems, the accelerator opening angle is controlled by the idle signal sent from the ECM which is based on input indicating either idle condition or off-idle condition (pre-determined accelerator opening) in order to make driving possible.

Transmission Range Switch

- In the unlikely event that a malfunction signal enters the TCM, the position indicator is switched “OFF”, the starter relay is switched “OFF” (starter starting is disabled), the back-up lamp relay switched “OFF” (back-up lamp is OFF) and the position is fixed to the “D” range to make driving possible.

Starter Relay

- The starter relay is switched “OFF”. (Starter starting is disabled.)

Interlock

- If there is an interlock judgment malfunction, the transmission is fixed in 2GR to make driving possible.
  NOTE:
  When the vehicle is driven fixed in 2GR, a input speed sensor malfunction is displayed, but this is not a input speed sensor malfunction.
- When interlock is detected at the 3GR or more, it is locked at the 2GR.

1st Engine Braking
- When there is an 1st engine brake judgment malfunction, the low coast brake solenoid is switched “OFF” to avoid the engine brake operation.

Line Pressure Solenoid
- The solenoid is switched “OFF” and the line pressure is set to the maximum hydraulic pressure to make driving possible.

Torque Converter Clutch Solenoid
- The solenoid is switched “OFF” to release the lock-up.

Low Coast Brake Solenoid
- When a (electrical or functional) malfunction occurs, in order to make driving possible, the engine brake is not applied in 1GR and 2GR.

Input Clutch Solenoid
- If a (electrical or functional) malfunction occurs with the solenoid either “ON” or “OFF”, the transmission is held in 4GR to make driving possible.

Direct Clutch Solenoid
- If a (electrical or functional) malfunction occurs with the solenoid either “ON” or “OFF”, the transmission is held in 4GR to make driving possible.

Front Brake Solenoid
- If a (electrical or functional) malfunction occurs with the solenoid “ON”, in order to make driving possible, the A/T is held in 5GR; if the solenoid is OFF, 4GR.

High and Low Reverse Clutch Solenoid
- If a (electrical or functional) malfunction occurs with the solenoid either “ON” or “OFF”, the transmission is held in 4GR to make driving possible.

Input Speed Sensor 1 or 2
- The control is the same as if there were no turbine revolution sensors, 5GR is prohibited.

DTC Inspection Priority Chart

INFOID:0000000006244854

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

NOTE:
If DTC U1000 is displayed with other DTCs, first perform the trouble diagnosis for DTC U1000. Refer to TM-46.

Priority	Detected items (DTC)
1	U1000 CAN COMM CIRCUIT
2	Except above

DTC No. Index

INFOID:0000000006244855

NOTE:
If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to TM-46.

DTC		Items (CONSULT- III screen terms)	Reference page
OBD- II	Except OBD- II		
CONSULT- III GST (*1)	CONSULT- III only “TRANSMISSION”		
—	P0615	STARTER RELAY	TM-47
P0700	P0700	TRANSMISSION CONTROL	TM-49
P0705	P0705	T/M RANGE SWITCH A	TM-50
P0710	P1710	FLUID TEMP SENSOR A	TM-77
P0717	P0717	INPUT SPEED SENSOR A	TM-52

DTC		Items (CONSULT- III screen terms)	Reference page
OBD- II	Except OBD- II		
CONSULT- III GST (*1)	CONSULT- III only “TRANSMIS- SION”		
P0720	P0720	OUTPUT SPEED SENSOR	TM-54
—	P0725	ENGINE SPEED	TM-57
P0731	P0731	1GR INCORRECT RATIO	TM-69
P0732	P0732	2GR INCORRECT RATIO	TM-69
P0733	P0733	3GR INCORRECT RATIO	TM-69
P0734	P0734	4GR INCORRECT RATIO	TM-69
P0735	P0735	5GR INCORRECT RATIO	TM-69
P0740	P0740	TORQUE CONVERTER	TM-69
P0744 (*2)	P0744	TORQUE CONVERTER	TM-71
P0745	P0745	PC SOLENOID A	TM-73
—	P1705	TP SENSOR	TM-75
—	P1721	VEHICLE SPEED SIGNAL	TM-79
P1730	P1730	INTERLOCK	TM-81
—	P1731	1GR E/BRAKING	TM-83
P1752	P1752	INPUT CLUTCH SOL	TM-85
P1757	P1757	FR BRAKE SOLENOID	TM-87
P1762	P1762	DRCT CLUTCH SOL	TM-89
P1767	P1767	HLR CLUTCH SOLENOID	TM-91
P1772	P1772	LC BRAKE SOLENOID	TM-93
P1774 (*2)	P1774	LC BRAKE SOLENOID	TM-95
—	P1815	M-MODE SWITCH (*3)·	TM-79
U1000	U1000	CAN COMM CIRCUIT	TM-46

*1: These numbers are prescribed by SAE J2012.

*2: These malfunctions cannot be displayed MIL if another malfunction is assigned to MIL.

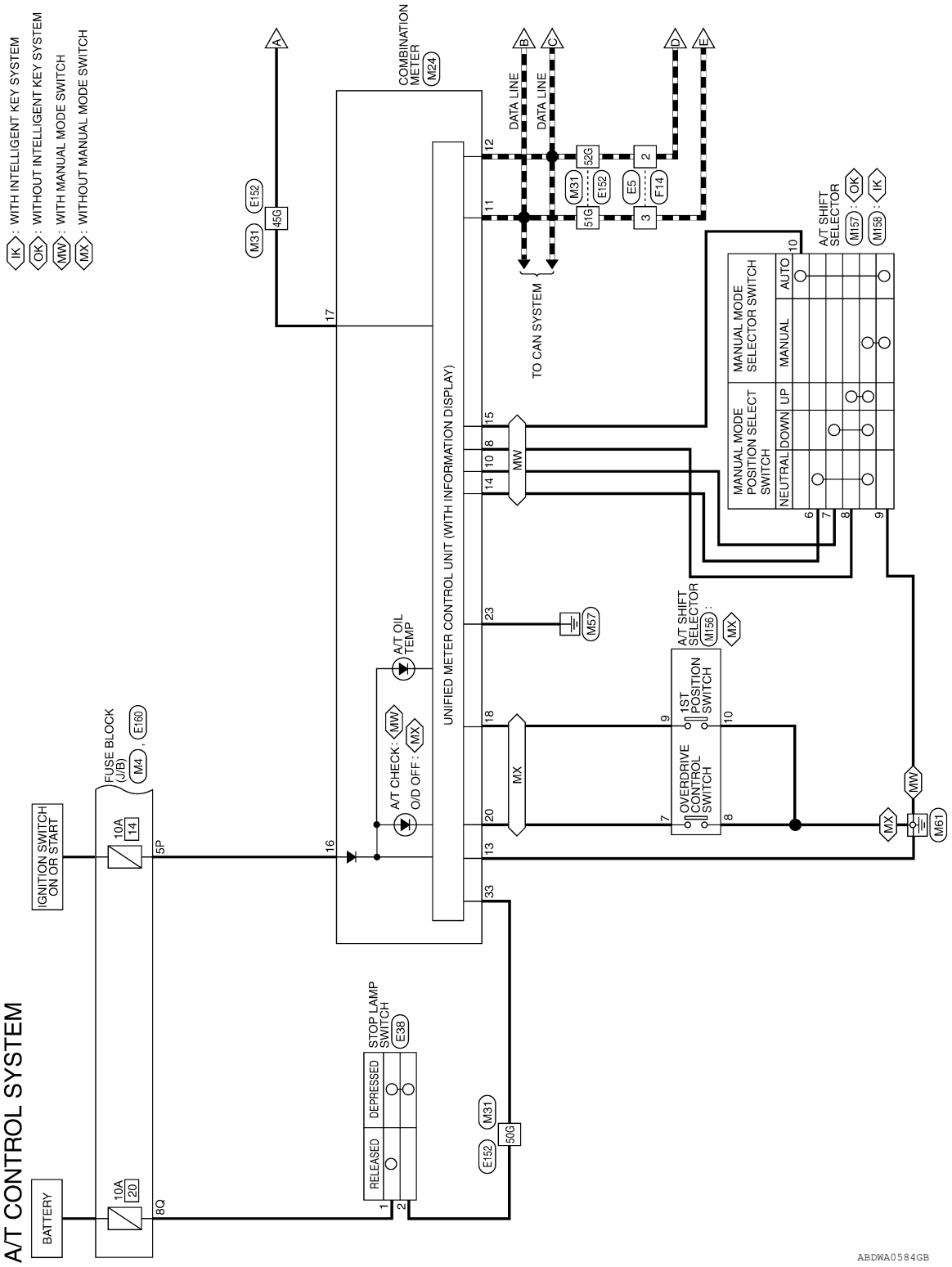
*3: With manual mode.

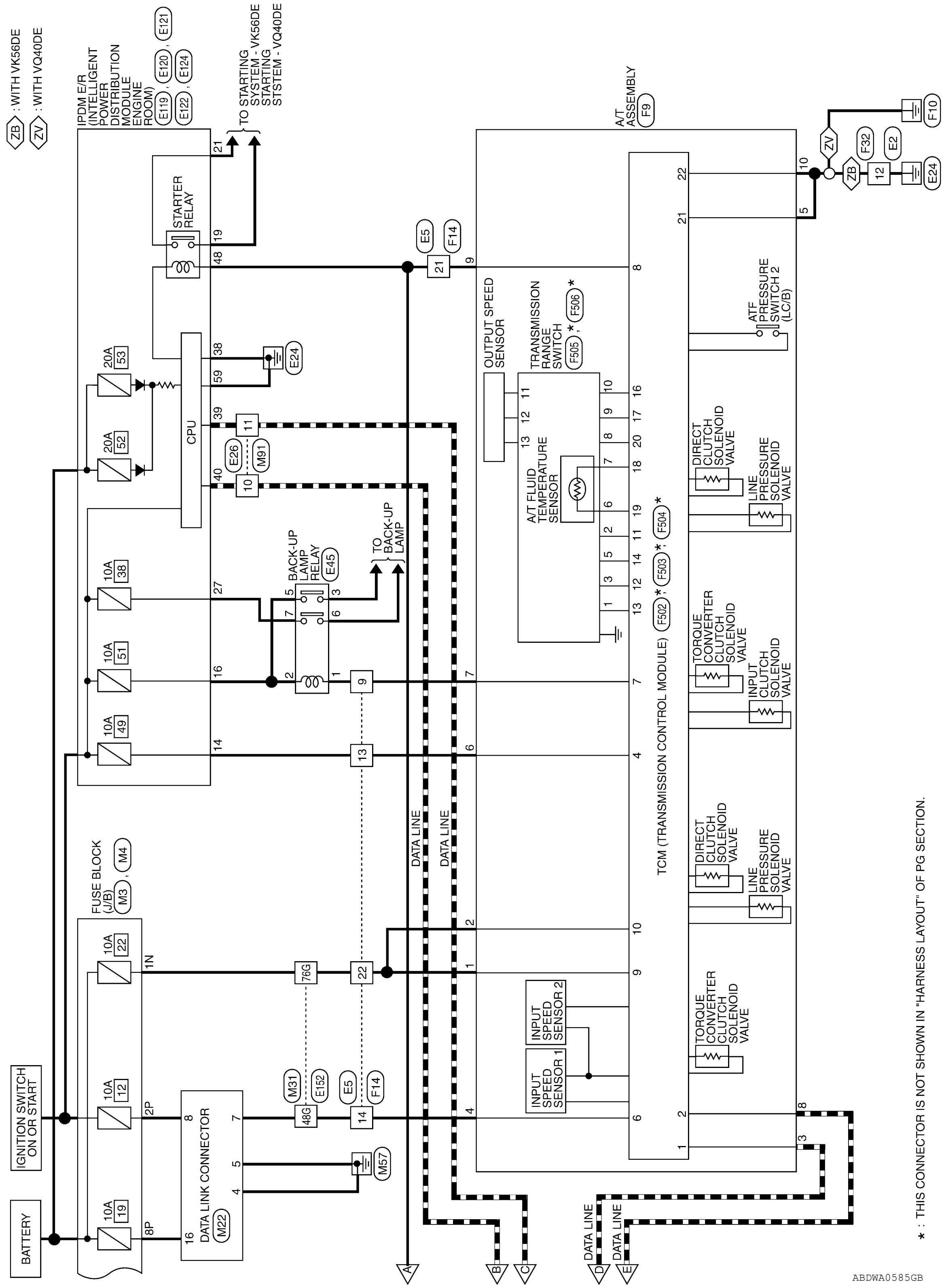
WIRING DIAGRAM

A/T CONTROL SYSTEM

Wiring Diagram

INFOID:0000000006244852





ZB : WITH VK56DE
ZV : WITH VQ40DE
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E119, E120, E121, E122, E124
TO STARTING SYSTEM - VK56DE
STARTING STSTEM - VQ40DE
STARTER RELAY
CPU
A/T ASSEMBLY
F9
OUTPUT SPEED SENSOR
TRANSMISSION RANGE SWITCH
F505 *, F506 *
A/T FLUID TEMPERATURE SENSOR
ATF PRESSURE SWITCH 2 (LC/B)
BACK-UP LAMP RELAY
E45
TO BACK-UP LAMP
E26
M91
DATA LINE
FUSE BLOCK (J/B)
M3, M4
TCM (TRANSMISSION CONTROL MODULE)
F502 *, F503 *, F504 *
DIRECT CLUTCH SOLENOID VALVE
LINE PRESSURE SOLENOID VALVE
TORQUE CONVERTER CLUTCH SOLENOID VALVE
INPUT CLUTCH SOLENOID VALVE
INPUT SPEED SENSOR 1
INPUT SPEED SENSOR 2
IGNITION SWITCH ON OR START
BATTERY
DATA LINK CONNECTOR
M22
M57
M31
E152
E5
F14
F32
E2
F10
E24
* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.
ABDWA0585GB

A/T CONTROL SYSTEM CONNECTORS

Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE

H.S.

3N	2N	1N
8N	7N	6N	5N	4N

Terminal No.	Color of Wire	Signal Name
1N	R/B	–

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE

H.S.

7P	6P	5P	4P	3P	2P	1P
16P	15P	14P	13P	12P	11P	10P	9P	8P

Terminal No.	Color of Wire	Signal Name
2P	W/G	–
5P	W/G	–
8P	R/Y	–

Connector No.	M22
Connector Name	DATA LINK CONNECTOR
Connector Color	WHITE

H.S.

9	10	11	12	13	14	15	16
1	2	3	4	5	6	7	8

Terminal No.	Color of Wire	Signal Name
4	B	–
5	B	–
7	W	–
8	W/G	–
16	R/Y	–

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
11	P	CAN-L
12	L	CAN-H
13	GR	GROUND
14	O	M RANGE
15	W	NOT M RANGE
16	W/G	RUN START
17	B	AT-PN SWITCH
18	L	AT 1 RANGE SWITCH
20	Y	O/D OFF SWITCH
23	B	POWER GND
33	LG	BRAKE PEDAL SW

Terminal No.	Color of Wire	Signal Name
8	SB	AT SHIFT UP
10	LG	AT SHIFT DN

ABDIA0398GB

Connector No.	M91
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

7	6	5	4		3	2	1
16	15	14	13	12	11	10	9	8

Terminal No.	Color of Wire	Signal Name
10	P	–
11	L	–

Connector No.	M158
Connector Name	A/T SHIFT SELECTOR (WITH MANUAL MODE SWITCH AND INTELLIGENT KEY SYSTEM)
Connector Color	WHITE

H.S.

1	3		7	9
2	4	5	6	8	10

Terminal No.	Color of Wire	Signal Name
6	O	MANUAL
7	LG	M-DOWN
8	SB	M-UP
9	B	GND
10	W	AUTO

Terminal No.	Color of Wire	Signal Name
45G	B	–
48G	W	–
50G	L	–
51G	P	–
52G	L	–
76G	R/B	–

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

		5G	4G	3G	2G	1G					
			9G	8G	7G	6G					
			10G								
21G	20G	19G	18G	17G	16G	15G	14G	13G	12G	11G	
	30G	29G	28G	27G	26G	25G	24G	23G	22G		
41G	40G	39G	38G	37G	36G	35G	34G	33G	32G	31G	
	50G	49G	48G	47G	46G	45G	44G	43G	42G		
61G	60G	59G	58G	57G	56G	55G	54G	53G	52G	51G	
	70G	69G	68G	67G	66G	65G	64G	63G	62G		
		75G	74G	73G	72G	71G					
			80G	79G	78G	77G	76G				

Connector No.	M157
Connector Name	A/T SHIFT SELECTOR (WITH MANUAL MODE SWITCH WITHOUT INTELLIGENT KEY SYSTEM)
Connector Color	WHITE

H.S.

1	3		7	9
2	4	5	6	8	10

Terminal No.	Color of Wire	Signal Name
6	O	MANUAL
7	LG	M-DOWN
8	SB	M-UP
9	B	GND
10	W	AUTO

Connector No.	M156
Connector Name	A/T SHIFT SELECTOR (WITHOUT MANUAL MODE SWITCH)
Connector Color	WHITE

H.S.

1	3		7	9
2	4	5	6	8	10

Terminal No.	Color of Wire	Signal Name
7	Y	–
8	B	–
9	L	–
10	B	–

ABDIA0399GB

Connector No.	E2
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name
12	BR	–

Connector No.	E5
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name
2	L	–
3	P	–
9	LG	–
13	W/G	–
14	V	–
21	R	–
22	R/B	–

Connector No.	E26
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name
10	P	–
11	L	–

Connector No.	E38
Connector Name	STOP LAMP SWITCH
Connector Color	WHITE

H.S.

3	4
1	2

Terminal No.	Color of Wire	Signal Name
1	R/B	–
2	Y	–

Connector No.	E45
Connector Name	BACK-UP LAMP RELAY
Connector Color	BROWN

H.S.

2		1
7	5	
6		3

Terminal No.	Color of Wire	Signal Name
1	LG	–
2	W/G	–
3	SB	–
5	W/G	–
6	Y	–
7	W/G	–

Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

9	8	7	6		5	4	3
18	17	16	15	14	13	12	11	10

Terminal No.	Color of Wire	Signal Name
14	W/G	A/T ECU IGN SUPPLY
16	W/G	REVERS LAMP

ABDIA0400GB

Connector No.	E120
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

21	20	19
24	23	22

Terminal No.	Color of Wire	Signal Name
19	W	STARTER MOTOR
21	GR	IGN SW (ST)

Connector No.	E121
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BROWN

H.S.

29	28	27	26	25
36	35	34	33	32	31	30

Terminal No.	Color of Wire	Signal Name
27	W/G	T TOW REV LAMP

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

42	41	40	39	38	37
48	47	46	45	44	43

Terminal No.	Color of Wire	Signal Name
38	B	GND (SIGNAL)
39	L	CAN-H
40	P	CAN-L
48	R	INHIBIT

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BLACK

H.S.

59	58	57
62	61	60

Terminal No.	Color of Wire	Signal Name
59	B	GND (POWER)

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1G	2G	3G	4G	5G
6G	7G	8G	9G	10G

11G	12G	13G	14G	15G	16G	17G	18G	19G	20G	21G
22G	23G	24G	25G	26G	27G	28G	29G	30G		

31G	32G	33G	34G	35G	36G	37G	38G	39G	40G	41G
42G	43G	44G	45G	46G	47G	48G	49G	50G		

51G	52G	53G	54G	55G	56G	57G	58G	59G	60G	61G
62G	63G	64G	65G	66G	67G	68G	69G	70G		

71G	72G	73G	74G	75G
76G	77G	78G	79G	80G

Terminal No.	Color of Wire	Signal Name
45G	B	–
48G	W	–
50G	L	–
51G	P	–
52G	L	–
76G	R/B	–

ABDIA0401GB

Terminal No.	Color of Wire	Signal Name
6	W/G	–
7	LG	–
8	P	–
9	R	–
10	B	–

Connector No.	F502
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Color	GRAY

H.S.

10	9	8	7	6	5	4	3	2	1

Terminal No.	Color of Wire	Signal Name
1	BR	CAN-H
2	L/Y	CAN-L
3	–	–
4	R	VIGN
5	–	–
6	L	K-LINE
7	O	REV LAMP RLY
8	G	START-RLY
9	W	STAND BY SUPPLY-1
10	GR	STAND BY SUPPLY-2

Connector No.	F9
Connector Name	A/T ASSEMBLY
Connector Color	GREEN

H.S.

5	4	3	2	1
10	9	8	7	6

Terminal No.	Color of Wire	Signal Name
1	R/B	–
2	R/B	–
3	L	–
4	V	–
5	B	–

Connector No.	F32
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

7	6	5	4		3	2	1
16	15	14	13	12	11	10	9	8

Terminal No.	Color of Wire	Signal Name
12	BR	–

Connector No.	E160
Connector Name	FUSE BLOCK(J/B)
Connector Color	WHITE

H.S.

3Q		2Q	1Q
8Q	7Q	6Q	5Q	4Q

Terminal No.	Color of Wire	Signal Name
8Q	R/B	–

Connector No.	F14
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

12	11	10	9	8	7	6	5	4	3	2	1
24	23	22	21	20	19	18	17	16	15	14	13

Terminal No.	Color of Wire	Signal Name
2	L	–
3	P	–
9	LG	–
13	W/G	–
14	V	–
21	R	–
22	R/B	–

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Connector No.	F503
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Color	GREEN

Terminal No.	Color of Wire	Signal Name
11	W	TR SW 4
12	GR	TR SW 2
13	BR	TR SW 1
14	L	TR SW 3
16	B	OUT SPD SEN GND
17	R	OUT SPD SEN
18	O	ATF SENS
19	G	ATF SENS
20	Y	OUT SPD SEN POWER

Connector No.	F504
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Color	WHITE

Terminal No.	Color of Wire	Signal Name
21	B	POWER GND-1
22	Y	POWER GND-2

Connector No.	F505
Connector Name	TRANSMISSION RANGE SWITCH
Connector Color	GRAY

Terminal No.	Color of Wire	Signal Name
1	BR	S1
2	W	S4
3	GR	S2
5	L	S3
6	G	–
7	O	–
8	Y	C1
9	R	C2
10	B	C3

Connector No.	F506
Connector Name	TRANSMISSION RANGE SWITCH
Connector Color	GREEN

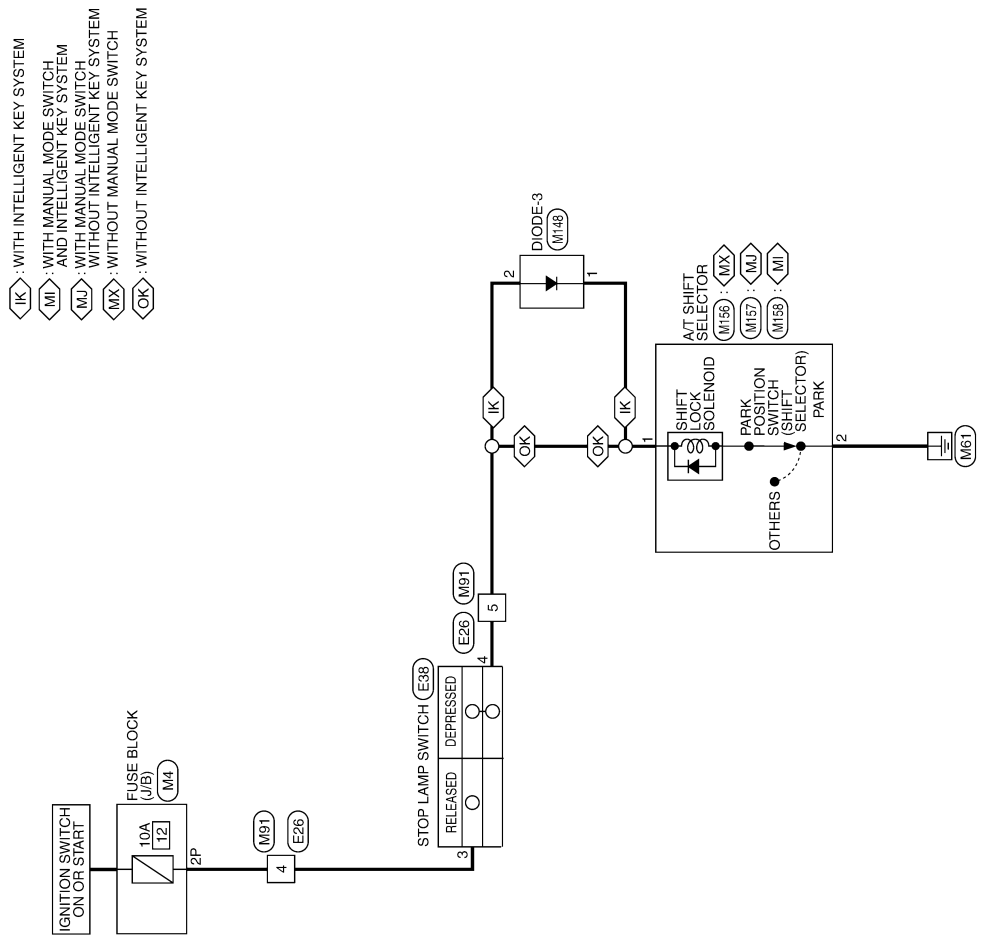
Terminal No.	Color of Wire	Signal Name
11	L	C3 (GND)
12	W	C2 (VOUT)
13	R	C1 (VIN)

AADIA0187GB

A/T SHIFT LOCK SYSTEM

Wiring Diagram

INFOID:0000000006244845



A/T SHIFT LOCK SYSTEM

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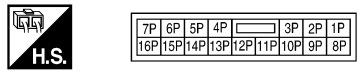
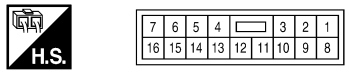
A/T SHIFT LOCK SYSTEM CONNECTORS

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
2P	W/G	–

Connector No.	M91
Connector Name	WIRE TO WIRE
Connector Color	WHITE

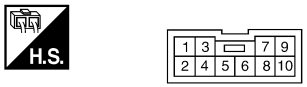


Terminal No.	Color of Wire	Signal Name
4	W/G	–
5	R	–

Connector No.	M148
Connector Name	DIODE-3
Connector Color	BLACK

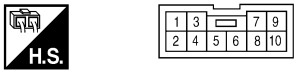
Terminal No.	Color of Wire	Signal Name
1	G	–
2	R	–

Connector No.	M156
Connector Name	A/T SHIFT SELECTOR (WITHOUT MANUAL MODE SWITCH)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	R	–
2	B	–

Connector No.	M157
Connector Name	A/T SHIFT SELECTOR (WITH MANUAL MODE SWITCH WITHOUT INTELLIGENT KEY SYSTEM)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	R	–
2	B	–

Connector No.	M158
Connector Name	A/T SHIFT SELECTOR (WITH MANUAL MODE SWITCH AND INTELLIGENT KEY SYSTEM)
Connector Color	WHITE

Terminal No.	Color of Wire	Signal Name
1	G	–
2	B	–

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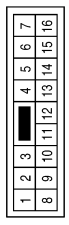
Connector No.	E38
Connector Name	STOP LAMP SWITCH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
3	W/G	–
4	R	–

Connector No.	E26
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
4	W/G	–
5	R	–

ABDIA0405GB

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Chart

INFOID:0000000006244856

- **The diagnostics item numbers show the sequence for inspection. Inspect in order from item 1.**
- **Overhaul and inspect inside the A/T only if A/T fluid condition is NG. Refer to** TM-155, "Checking the A/T Fluid (ATF)".

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
1	Shift Shock	Large shock. (“N”→“D” position)	ON vehicle	1. Engine idle speed	EC-24 (VQ40DE) EC-592 (VK56DE)
				2. Engine speed signal	TM-57
				3. Accelerator pedal position sensor	TM-75
				4. Control cable adjustment	TM-171
				5. ATF temperature sensor	TM-77
				6. Front brake solenoid valve	TM-87
				7. CAN communication line	TM-46
				8. Fluid level and state	TM-155
				9. Line pressure test	TM-162
				10. Control valve with TCM	TM-174
			OFF vehicle	11. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
2		Shock is too large when changing D_1→ D_2.	ON vehicle	1. Accelerator pedal position sensor	TM-75
				2. Control cable adjustment	TM-171
				3. Direct clutch solenoid valve	TM-89
				4. CAN communication line	TM-46
				5. Engine speed signal	TM-57
				6. Input speed sensor	TM-52
				7. Output speed sensor and vehicle speed signal	TM-54, TM-79
				8. Fluid level and state	TM-155
				9. Control valve with TCM	TM-174
			OFF vehicle	10. Direct clutch	TM-255
3		Shock is too large when changing D_2→ D_3.	ON vehicle	1. Accelerator pedal position sensor	TM-75
				2. Control cable adjustment	TM-171
				3. High and low reverse clutch solenoid valve	TM-91
				4. CAN communication line	TM-46
				5. Engine speed signal	TM-57
				6. Input speed sensor	TM-52
				7. Output speed sensor and vehicle speed signal	TM-54, TM-79
				8. Fluid level and state	TM-155
				9. Control valve with TCM	TM-174
			OFF vehicle	10. High and low reverse clutch	TM-253

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
4	Shift Shock	Shock is too large when changing D3→D4.	ON vehicle	1. Accelerator pedal position sensor	TM-75
				2. Control cable adjustment	TM-171
				3. Input clutch solenoid valve	TM-85
				4. CAN communication line	TM-46
				5. Engine speed signal	TM-57
				6. Input speed sensor	TM-52
				7. Output speed sensor and vehicle speed signal	TM-54, TM-79
				8. Fluid level and state	TM-155
				9. Control valve with TCM	TM-174
			OFF vehicle	10. Input clutch	TM-242
5		Shock is too large when changing D4→D5.	ON vehicle	1. Accelerator pedal position sensor	TM-75
				2. Control cable adjustment	TM-171
				3. Front brake solenoid valve	TM-87
				4. CAN communication line	TM-46
				5. Engine speed signal	TM-57
				6. Input speed sensor	TM-52
				7. Output speed sensor and vehicle speed signal	TM-54, TM-79
				8. Fluid level and state	TM-155
				9. Control valve with TCM	TM-174
			OFF vehicle	10. Front brake (brake band)	TM-201
				11. Input clutch	TM-242
6		Shock is too large for downshift when accelerator pedal is pressed.	ON vehicle	1. Accelerator pedal position sensor	TM-75
				2. Control cable adjustment	TM-171
				3. CAN communication line	TM-46
				4. Engine speed signal	TM-57
				5. Input speed sensor	TM-52
				6. Output speed sensor and vehicle speed signal	TM-54, TM-79
				7. Fluid level and state	TM-155
				8. Control valve with TCM	TM-174
			OFF vehicle	9. Front brake (brake band)	TM-201
				10. Input clutch	TM-242
				11. High and low reverse clutch	TM-253
				12. Direct clutch	TM-255

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
7	Shift Shock	Shock is too large for upshift when accelerator pedal is released.	ON vehicle	1. Accelerator pedal position sensor	TM-75
				2. Control cable adjustment	TM-171
				3. Engine speed signal	TM-57
				4. CAN communication line	TM-46
				5. Input speed sensor	TM-52
				6. Output speed sensor and vehicle speed signal	TM-54, TM-79
				7. Fluid level and state	TM-155
				8. Control valve with TCM	TM-174
			OFF vehicle	9. Front brake (brake band)	TM-201
				10. Input clutch	TM-242
				11. High and low reverse clutch	TM-253
				12. Direct clutch	TM-255
8		Shock is too large for lock-up.	ON vehicle	1. Accelerator pedal position sensor	TM-75
				2. Control cable adjustment	TM-171
				3. Engine speed signal	TM-57
				4. CAN communication line	TM-46
				5. Input speed sensor	TM-52
				6. Output speed sensor and vehicle speed signal	TM-54, TM-79
				7. Torque converter clutch solenoid valve	TM-69
				8. Fluid level and state	TM-155
				9. Control valve with TCM	TM-174
			OFF vehicle	10. Torque converter	TM-219
9		Shock is too large during engine brake.	ON vehicle	1. Accelerator pedal position sensor	TM-75
				2. Control cable adjustment	TM-171
				3. CAN communication line	TM-46
				4. Fluid level and state	TM-155
				5. Control valve with TCM	TM-174
			OFF vehicle	6. Front brake (brake band)	TM-201
				7. Input clutch	TM-242
				8. High and low reverse clutch	TM-253
				9. Direct clutch	TM-255

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
10	No Up Shift	Gear does not change from $D_1 \rightarrow D_2$.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Direct clutch solenoid valve	TM-89
				4. Line pressure test	TM-162
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Direct clutch	TM-255
11		Gear does not change from $D_2 \rightarrow D_3$.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. High and low reverse clutch solenoid valve	TM-91
				4. Line pressure test	TM-162
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. High and low reverse clutch	TM-253
12		Gear does not change from $D_3 \rightarrow D_4$.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Input clutch solenoid valve	TM-85
				4. Front brake solenoid valve	TM-87
				5. Line pressure test	TM-162
				6. CAN communication line	TM-46
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Input clutch	TM-242
13		Gear does not change from $D_4 \rightarrow D_5$.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Front brake solenoid valve	TM-87
				4. Direct clutch solenoid valve	TM-89
				5. Input speed sensor	TM-52
				6. Line pressure test	TM-162
				7. CAN communication line	TM-46
				8. Control valve with TCM	TM-174
			OFF vehicle	9. Front brake (brake band)	TM-219
				10. Input clutch	TM-242

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
14	No Down Shift	In “D” or "M" range, does not downshift to 4GR.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Front brake solenoid valve	TM-87
				4. Direct clutch solenoid valve	TM-89
				5. CAN communication line	TM-46
				6. Line pressure test	TM-162
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Front brake (brake band)	TM-219
				9. Input clutch	TM-242
15		In “D”, “3” or "M" range, does not downshift to 3GR.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Input clutch solenoid valve	TM-85
				4. Front brake solenoid valve	TM-87
				5. CAN communication line	TM-46
				6. Line pressure test	TM-162
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Input clutch	TM-242
16		In “D”, “2” or "M" range, does not downshift to 2GR.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. High and low reverse clutch solenoid valve	TM-91
				4. CAN communication line	TM-46
				5. Line pressure test	TM-162
				6. Control valve with TCM	TM-174
			OFF vehicle	7. High and low reverse clutch	TM-253
17		In “D”, “1” or "M" range, does not downshift to 1GR.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Direct clutch solenoid valve	TM-89
				4. CAN communication line	TM-46
				5. Line pressure test	TM-162
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Direct clutch	TM-255

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
18	Slips/Will Not engage	When “D” or "M" position, remains in 1GR.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Direct clutch solenoid valve	TM-89
				4. Line pressure test	TM-162
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. 3rd one-way clutch	TM-240
				8. 1st one-way clutch	TM-201
				9. Gear system	TM-201
				10. Reverse brake	TM-219
				11. Forward one-way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				12. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
19		When “D” or "M" position, remains in 2GR.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Low coast brake solenoid valve	TM-93
				4. Line pressure test	TM-162
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. 3rd one-way clutch	TM-240
				8. Gear system	TM-201
				9. Direct clutch	TM-255
				10. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
20	Slips/Will Not engage	When “D” or "M" position, remains in 3GR.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Line pressure test	TM-162
				4. CAN communication line	TM-46
				5. Control valve with TCM	TM-174
			OFF vehicle	6. 3rd one-way clutch	TM-240
				7. Gear system	TM-201
				8. High and low reverse clutch	TM-253
				9. Forward one-way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				10. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
21		When “D” or "M" position, remains in 4GR.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Input clutch solenoid valve	TM-85
				4. Direct clutch solenoid valve	TM-89
				5. High and low reverse clutch solenoid valve	TM-91
				6. Low coast brake solenoid valve	TM-93
				7. Front brake solenoid valve	TM-87
				8. Line pressure test	TM-162
				9. CAN communication line	TM-46
				10. Control valve with TCM	TM-174
			OFF vehicle	11. Input clutch	TM-242
				12. Gear system	TM-201
				13. High and low reverse clutch	TM-253
				14. Direct clutch	TM-255

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
22	Slips/Will Not Engage	When “D” or "M" position, remains in 5GR.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Front brake solenoid valve	TM-87
				4. Line pressure test	TM-162
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Front brake (brake band)	TM-219
				8. Input clutch	TM-242
				9. Gear system	TM-201
				10. High and low reverse clutch	TM-253
23		Vehicle cannot be started from D_1.	ON vehicle	1. Fluid level and state	TM-155
				2. Accelerator pedal position sensor	TM-75
				3. Line pressure test	TM-162
				4. CAN communication line	TM-46
				5. Control valve with TCM	TM-174
			OFF vehicle	6. Torque converter	TM-219
				7. Oil pump assembly	TM-237
				8. 3rd one-way clutch	TM-240
				9. 1st one-way clutch	TM-201
				10. Gear system	TM-201
				11. Reverse brake	TM-219
				12. Forward one-way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
24		Does not lock-up.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Engine speed signal	TM-57
				4. Input speed sensor	TM-52
				5. Torque converter clutch solenoid valve	TM-69
				6. CAN communication line	TM-46
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
25	Slips/Will Not engage	Does not hold lock-up condition.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Engine speed signal	TM-57
				4. Input speed sensor	TM-52
				5. Torque converter clutch solenoid valve	TM-69
				6. CAN communication line	TM-46
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237
26		Lock-up is not released.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Engine speed signal	TM-57
				4. Input speed sensor	TM-52
				5. Torque converter clutch solenoid valve	TM-69
				6. CAN communication line	TM-46
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237
27		No shock at all or the clutch slips when vehicle changes speed $D_1 \rightarrow D_2$, $1_1 \rightarrow 2_2$ or $M_1 \rightarrow M_2$	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Direct clutch solenoid valve	TM-89
				4. CAN communication line	TM-46
				5. Line pressure test	TM-162
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219
				8. Oil pump assembly	TM-237
				9. 3rd one-way clutch	TM-240
				10. Gear system	TM-201
				11. Direct clutch	TM-255
				12. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
28	Slips/Will Not engage	No shock at all or the clutch slips when vehicle changes speed $D_2 \rightarrow D_3$, $2_2 \rightarrow 3_3$ or M2 → M3.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. High and low reverse clutch solenoid valve	TM-91
				4. CAN communication line	TM-46
				5. Line pressure test	TM-162
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219
				8. Oil pump assembly	TM-237
				9. 3rd one-way clutch	TM-240
				10. Gear system	TM-201
				11. High and low reverse clutch	TM-253
				12. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
29		No shock at all or the clutch slips when vehicle changes speed $D_3 \rightarrow D_4$, $3_3 \rightarrow D_4$ or M3 → M4.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Input clutch solenoid valve	TM-85
				4. Front brake solenoid valve	TM-87
				5. CAN communication line	TM-46
				6. Line pressure test	TM-162
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237
				10. Input clutch	TM-242
				11. Gear system	TM-201
				12. High and low reverse clutch	TM-253
				13. Direct clutch	TM-255

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
30	Slips/Will Not engage	No shock at all or the clutch slips when vehicle changes speed D4 → D5, or M4 → M5.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Front brake solenoid valve	TM-87
				4. Direct clutch solenoid valve	TM-89
				5. CAN communication line	TM-46
				6. Line pressure test	TM-162
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237
				10. Front brake (brake band)	TM-219
				11. Input clutch	TM-242
				12. Gear system	TM-201
				13. High and low reverse clutch	TM-253
31		When you press the accelerator pedal and shift speed D5→ D4, or M5 → M4. the engine idles or the transmission slips.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Front brake solenoid valve	TM-87
				4. Direct clutch solenoid valve	TM-89
				5. CAN communication line	TM-46
				6. Line pressure test	TM-162
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237
				10. Input clutch	TM-242
				11. Gear system	TM-201
				12. High and low reverse clutch	TM-253
				13. Direct clutch	TM-255

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
32	Slips/Will Not engage	When you press the accelerator pedal and shift speed D4→ D3, D4→ 33 OR M4 → M3 the engine idles or the transmission slips.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Input clutch solenoid valve	TM-85
				4. Front brake solenoid valve	TM-87
				5. CAN communication line	TM-46
				6. Line pressure test	TM-162
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237
				10. 3rd one-way clutch	TM-240
				11. Gear system	TM-201
				12. High and low reverse clutch	TM-253
				13. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				14. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
33		When you press the accelerator pedal and shift speed D3→ D2, 33→ 22 OR M3 → M2 the engine idles or the transmission slips.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. High and low reverse clutch solenoid valve	TM-91
				4. Direct clutch solenoid valve	TM-89
				5. CAN communication line	TM-46
				6. Line pressure test	TM-162
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237
				10. 3rd one-way clutch	TM-240
				11. Gear system	TM-201
				12. Direct clutch	TM-255
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
34	Slips/Will Not Engage	When you press the accelerator pedal and shift speed D2→ D1, 22→ 11 OR M2 → M1 the engine idles or the transmission slips.	ON vehicle	1. Fluid level and state	TM-155
				2. Output speed sensor and vehicle speed signal	TM-54, TM-79
				3. Direct clutch solenoid valve	TM-89
				4. CAN communication line	TM-46
				5. Line pressure test	TM-162
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219
				8. Oil pump assembly	TM-237
				9. 3rd one-way clutch	TM-240
				10. 1st one-way clutch	TM-201
				11. Gear system	TM-201
				12. Reverse brake	TM-219
				13. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				14. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
35		With selector lever in “D” position, acceleration is extremely poor.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Accelerator pedal position sensor	TM-75
				4. CAN communication line	TM-46
				5. Transmission range switch	TM-50
				6. Control cable adjustment	TM-171
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237
				10. 1st one-way clutch	TM-201
				11. Gear system	TM-201
				12. Reverse brake	TM-219
				13. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				14. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
36	Slips/Will Not Engage	With selector lever in “R” position, acceleration is extremely poor.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Accelerator pedal position sensor	TM-75
				4. High and low reverse clutch solenoid valve	TM-91
				5. CAN communication line	TM-46
				6. Transmission range switch	TM-50
				7. Control cable adjustment	TM-171
				8. Control valve with TCM	TM-174
			OFF vehicle	9. Gear system	TM-201
				10. Output shaft	TM-219
				11. Reverse brake	TM-219
37		While starting off by accelerating in 1st, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Accelerator pedal position sensor	TM-75
				4. CAN communication line	TM-46
				5. Control valve with TCM	TM-174
			OFF vehicle	6. Torque converter	TM-219
				7. Oil pump assembly	TM-237
				8. 3rd one-way clutch	TM-240
				9. 1st one-way clutch	TM-201
				10. Gear system	TM-201
				11. Reverse brake	TM-219
				12. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
38		While accelerating in 2nd, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Accelerator pedal position sensor	TM-75
				4. CAN communication line	TM-46
				5. Direct clutch solenoid valve	TM-89
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219
				8. Oil pump assembly	TM-237
				9. 3rd one-way clutch	TM-240
				10. Gear system	TM-201
				11. Direct clutch	TM-255
				12. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
39	Slips/Will Not Engage	While accelerating in 3rd, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Accelerator pedal position sensor	TM-75
				4. CAN communication line	TM-46
				5. High and low reverse clutch solenoid valve	TM-91
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219
				8. Oil pump assembly	TM-237
				9. 3rd one-way clutch	TM-240
				10. Gear system	TM-201
				11. High and low reverse clutch	TM-253
				12. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
40		While accelerating in 4th, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Accelerator pedal position sensor	TM-75
				4. CAN communication line	TM-46
				5. Input clutch solenoid valve	TM-85
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219
				8. Oil pump assembly	TM-237
				9. Input clutch	TM-242
				10. Gear system	TM-201
				11. High and low reverse clutch	TM-253
				12. Direct clutch	TM-255

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
41	Slips/Will Not Engage	While accelerating in 5th, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Accelerator pedal position sensor	TM-75
				4. CAN communication line	TM-46
				5. Front brake solenoid valve	TM-87
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219
				8. Oil pump assembly	TM-237
				9. Front brake (brake band)	TM-219
				10. Input clutch	TM-242
				11. Gear system	TM-201
				12. High and low reverse clutch	TM-253
42		Slips at lock-up.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Engine speed signal	TM-57
				4. Input speed sensor	TM-52
				5. Torque converter clutch solenoid valve	TM-69
				6. CAN communication line	TM-46
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Torque converter	TM-219
				9. Oil pump assembly	TM-237
43		No creep at all.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Accelerator pedal position sensor	TM-75
				4. Direct clutch solenoid valve	TM-89
				5. Transmission range switch	TM-50
				6. CAN communication line	TM-46
				7. Control cable adjustment	TM-171
				8. Control valve with TCM	TM-174
			OFF vehicle	9. Torque converter	TM-219
				10. Oil pump assembly	TM-237
				11. 1st one-way clutch	TM-201
				12. Gear system	TM-201
				13. Reverse brake	TM-219
				14. Direct clutch	TM-255
				15. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				16. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
44	Slips/Will Not Engage	Vehicle cannot run in all positions.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Transmission range switch	TM-50
				4. Control cable adjustment	TM-171
				5. Control valve with TCM	TM-174
			OFF vehicle	6. Oil pump assembly	TM-237
				7. Gear system	TM-201
				8. Output shaft	TM-219
45		With selector lever in “D” position, driving is not possible.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Transmission range switch	TM-50
				4. Control cable adjustment	TM-171
				5. Control valve with TCM	TM-174
			OFF vehicle	6. Torque converter	TM-219
				7. Oil pump assembly	TM-237
				8. 1st one-way clutch	TM-201
				9. Gear system	TM-201
				10. Reverse brake	TM-219
				11. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				12. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
46		With selector lever in “R” position, driving is not possible.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Transmission range switch	TM-50
				4. Control cable adjustment	TM-171
				5. Control valve with TCM	TM-174
			OFF vehicle	6. Gear system	TM-201
				7. Output shaft	TM-219
				8. Reverse brake	TM-219
47	Does not change	Does not change $M_5 \rightarrow M_4$.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. A/T position	TM-171
				4. Manual mode switch	TM-97
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Front brake (brake band)	TM-219

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
48	Does not change	Does not change M_4 → M_3.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. Manual mode switch	TM-97
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Front brake (brake band)	TM-219
				8. Input clutch	TM-242
49		Does not change M_3 → M_2.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. Manual mode switch	TM-97
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Front brake (brake band)	TM-219
				8. Input clutch	TM-242
50		Does not change M_2 → M_1.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. Manual mode switch	TM-97
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Input clutch	TM-242
				8. High and low reverse clutch	TM-253
				9. Direct clutch	TM-255
51		Cannot be changed to manual mode.	ON vehicle	1. Manual mode switch	TM-97
				2. Input speed sensor	TM-52
				3. CAN communication line	TM-46
52	Others	Shift point is high in “D” position.	ON vehicle	1. Output speed sensor and vehicle speed signal	TM-54, TM-79
				2. Accelerator pedal position sensor	TM-75
				3. CAN communication line	TM-46
				4. ATF temperature sensor	TM-77
				5. Control valve with TCM	TM-174

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
53	Others	Shift point is low in “D” position.	ON vehicle	1. Output speed sensor and vehicle speed signal	TM-54, TM-79
				2. Accelerator pedal position sensor	TM-75
				3. CAN communication line	TM-46
				4. Control valve with TCM	TM-174
54		Judder occurs during lock-up.	ON vehicle	1. Fluid level and state	TM-155
				2. Engine speed signal	TM-57
				3. Input speed sensor	TM-52
				4. Output speed sensor and vehicle speed signal	TM-54, TM-79
				5. Accelerator pedal position sensor	TM-75
				6. CAN communication line	TM-46
				7. Torque converter clutch solenoid valve	TM-69
				8. Control valve with TCM	TM-174
			OFF vehicle	9. Torque converter	TM-219
55		Strange noise in “R” position.	ON vehicle	1. Fluid level and state	TM-155
				2. Engine speed signal	TM-57
				3. CAN communication line	TM-46
				4. Control valve with TCM	TM-174
			OFF vehicle	5. Torque converter	TM-219
				6. Oil pump assembly	TM-237
				7. Gear system	TM-201
				8. High and low reverse clutch	TM-253
				9. Reverse brake	TM-219
56		Strange noise in “N” position.	ON vehicle	1. Fluid level and state	TM-155
				2. Engine speed signal	TM-57
				3. CAN communication line	TM-46
				4. Control valve with TCM	TM-174
			OFF vehicle	5. Torque converter	TM-219
				6. Oil pump assembly	TM-237
				7. Gear system	TM-201
57		Strange noise in “D” position.	ON vehicle	1. Fluid level and state	TM-155
				2. Engine speed signal	TM-57
				3. CAN communication line	TM-46
				4. Control valve with TCM	TM-174
			OFF vehicle	5. Torque converter	TM-219
				6. Oil pump assembly	TM-237
				7. Gear system	TM-201
				8. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
58	Others	Vehicle does not decelerate by engine brake.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. 1st position switch (without manual mode), manual mode switch (with manual mode)	TM-108 (without manual mode), TM-97 (with manual mode)
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Input clutch	TM-242
				8. High and low reverse clutch	TM-253
				9. Direct clutch	TM-255
59		Engine brake does not operate in “2” position.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				7. CAN communication line	TM-46
				8. Control valve with TCM	TM-174
			OFF vehicle	9. Front brake (brake band)	TM-219
				10. Input clutch	TM-242
				11. High and low reverse clutch	TM-253
60		Engine brake does not operate in “1” position.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. 1st position switch	TM-108
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Input clutch	TM-242
				8. High and low reverse clutch	TM-253
				9. Direct clutch	TM-255
61		Engine brake does not work $M_5 \rightarrow M_4$.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. Manual mode switch	TM-97
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Front brake (brake band)	TM-219
				8. Input clutch	TM-242

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
62	Others	Engine brake does not work $M_4 \rightarrow M_3$.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. Manual mode switch	TM-97
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Front brake (brake band)	TM-219
				8. Input clutch	TM-242
63		Engine brake does not work $M_3 \rightarrow M_2$.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. Manual mode switch	TM-97
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Front brake (brake band)	TM-219
				8. Input clutch	TM-242
				9. High and low reverse clutch	TM-253
64		Engine brake does not work $M_2 \rightarrow M_1$.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. Manual mode switch	TM-97
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Input clutch	TM-242
				8. High and low reverse clutch	TM-253
				9. Direct clutch	TM-255

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
65	Others	Maximum speed low.	ON vehicle	1. Fluid level and state	TM-155
				2. Line pressure test	TM-162
				3. Accelerator pedal position sensor	TM-75
				4. CAN communication line	TM-46
				5. Direct clutch solenoid valve	TM-89
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219
				8. Oil pump assembly	TM-237
				9. Input clutch	TM-242
				10. Gear system	TM-201
				11. High and low reverse clutch	TM-253
				12. Direct clutch	TM-255
				13. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				14 Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
66		Extremely large creep.	ON vehicle	1. Engine idle speed	EC-24 (VQ40DE) EC-592 (VK56DE)
				2. CAN communication line	TM-46
			OFF vehicle	3. Torque converter	TM-219
67		With selector lever in “P” position, vehicle does not enter parking condition or, with selector lever in another position, parking condition is not cancelled.	ON vehicle	1. Transmission range switch	TM-50
				2. Control cable adjustment	TM-171
			OFF vehicle	3. Parking pawl components	TM-201
68		Vehicle runs with transmission in “P” position.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. Control valve with TCM	TM-174
				5. Parking pawl components	TM-201
			OFF vehicle	6. Gear system	TM-201

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
69	Others	Vehicle runs with transmission in “N” position.	ON vehicle	1. Transmission range switch	TM-50
				2. Fluid level and state	TM-155
				3. Control cable adjustment	TM-171
				4. Control valve with TCM	TM-174
			OFF vehicle	5. Input clutch	TM-242
				6. Gear system	TM-201
				7. Direct clutch	TM-255
				8. Reverse brake	TM-219
				9. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
				10. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-9.)	TM-219
70		Engine does not start in “N” or “P” position.	ON vehicle	1. Ignition switch and starter	PG-9, STR-8
				2. Control cable adjustment	TM-171
				3. Transmission range switch	TM-50
71		Engine starts in positions other than “N” or “P”.	ON vehicle	1. Ignition switch and starter	PG-9, STR-8
				2. Control cable adjustment	TM-171
				3. Transmission range switch	TM-50
72		Engine stall.	ON vehicle	1. Fluid level and state	TM-155
				2. Engine speed signal	TM-57
				3. Input speed sensor	TM-52
				4. Torque converter clutch solenoid valve	TM-69
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219
73		Engine stalls when select lever shifted “N”→ “D”, “R”.	ON vehicle	1. Fluid level and state	TM-155
				2. Engine speed signal	TM-57
				3. Input speed sensor	TM-52
				4. Torque converter clutch solenoid valve	TM-69
				5. CAN communication line	TM-46
				6. Control valve with TCM	TM-174
			OFF vehicle	7. Torque converter	TM-219

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
74	Others	Engine speed does not return to idle.	ON vehicle	1. Fluid level and state	TM-155
				2.Direct clutch solenoid valve	TM-89
				3. Front brake solenoid valve	TM-87
				4. Accelerator pedal position sensor	TM-75
				5. Output speed sensor and vehicle speed signal	TM-54, TM-79
				6. CAN communication line	TM-46
				7. Control valve with TCM	TM-174
			OFF vehicle	8. Front brake (brake band)	TM-219
				9. Direct clutch	TM-255
75		A/T CHECK indicator lamp does not come on. (without manual mode)	ON vehicle	1. CAN communication line	TM-46
				2. Combination meter	MWI-25
				3. TCM power supply	TM-100
76		O/D OFF indicator lamp does not come on. (without manual mode)	ON vehicle	1. CAN communication line	TM-46
				2. Combination meter	MWI-25
				3. TCM power supply	TM-100

PRECAUTION

PRECAUTIONS

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

INFOID:0000000006827735

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 SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which 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 the SR section.**
- **Do not 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:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT 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 Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000006827736

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.

5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for On Board Diagnosis (OBD) System of A/T and Engine

INFOID:0000000006244858

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

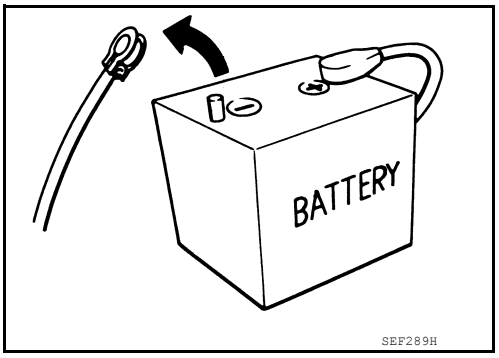
CAUTION:

- **Be sure to 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 light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to an open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Be sure to route and secure the harnesses properly after work. Interference of the harness with a bracket, etc. May cause the MIL to light up due to a short circuit.**
- **Be sure to connect rubber tubes properly after work. A mis-connected or disconnected rubber tube may cause the MIL to light up due to a malfunction of the EGR system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM and ECM before returning the vehicle to the customer.**

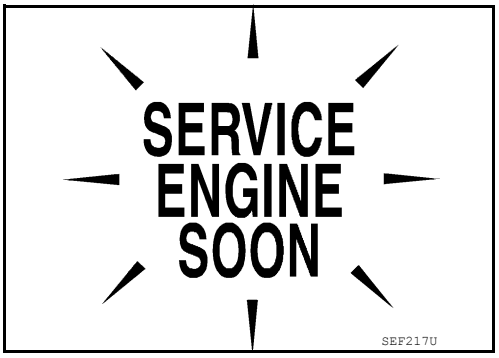
Precaution

INFOID:0000000006244859

- **Before connecting or disconnecting the A/T assembly harness connector, turn ignition switch “OFF” and disconnect negative battery cable. Because battery voltage is applied to TCM even if ignition switch is turned “OFF”.**



- **After performing each TROUBLE DIAGNOSIS, perform “DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE”. If the repair is completed the DTC should not be displayed in the “DTC CONFIRMATION PROCEDURE”.**



- Always use the specified brand of ATF. Refer to MA-18, "FOR USA AND CANADA : Fluids and Lubricants" (United States and Canada) and MA-20, "FOR MEXICO : Fluids and Lubricants" (Mexico).
- Use lint-free paper not cloth rags during work.
- After replacing the ATF, dispose of the waste oil using the methods prescribed by law, ordinance, etc.
- Before proceeding with disassembly, thoroughly clean the outside of the transmission. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free paper or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transmission.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.

- Gaskets, seals and O-rings should be replaced any time the transmission is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Clean or replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to TM-152, "Service Notice or Precaution".
- After overhaul, refill the transmission with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.
  Always follow the procedures under “Changing A/T Fluid” in the AT section when changing A/T fluid. Refer to TM-157, "Changing the A/T Fluid (ATF)", TM-155, "Checking the A/T Fluid (ATF)".

Service Notice or Precaution

INFOID:0000000006244860

ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.), or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T fluid cooler mounted in the radiator or replace the radiator. Flush cooler lines using cleaning solvent and compressed air after repair. For A/T fluid cooler cleaning procedure, refer to TM-158, "A/T Fluid Cooler Cleaning". For radiator replacement, refer to CO-18, "Removal and Installation" (VQ40DE), CO-49, "Removal and Installation" (VK56DE).

OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. Refer to the table on TM-36, "CONSULT-III Function (TRANSMISSION)" for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.
  Always perform the procedure on TM-34, "OBD-II Diagnostic Trouble Code (DTC)" to complete the repair and avoid unnecessary blinking of the MIL.
  For details of OBD-II, refer to TM-34, "Introduction".
- **Certain systems and components, especially those related to OBD, may use the new style slide-locking type harness connector. For description and how to disconnect, refer to PG-67, "Description".**

Precaution for Work

INFOID:0000000008188572

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components.

- Water soluble dirt: Dip a soft cloth into lukewarm water, and wring the water out of the cloth to wipe the dirty area.
  Then rub with a soft and dry cloth.
- Oily dirt: Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%), and wipe the dirty area.
  Then dip a cloth into fresh water, and wring the water out of the cloth to wipe the detergent off. Then rub with a soft and dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol, or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

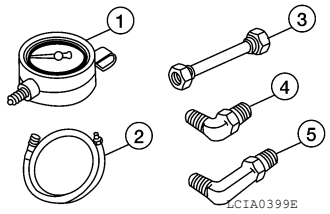
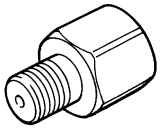
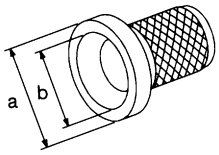
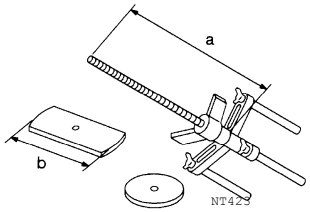
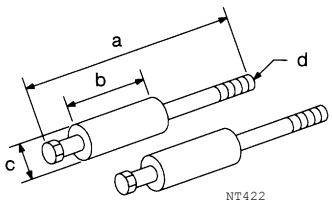
PREPARATION

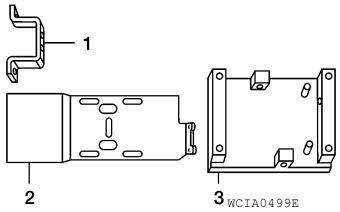
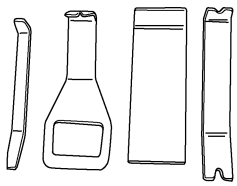
PREPARATION

Special Service Tool

INFOID:0000000006244861

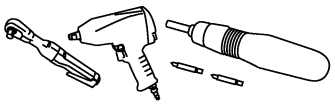
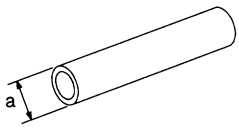
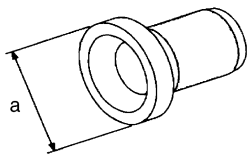
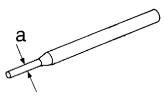
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST2505S001 (J-34301-C) Oil pressure gauge set 1 ST25051001 (—) Oil pressure gauge 2 ST25052000 (—) Hose 3 ST25053000 (—) Joint pipe 4 ST25054000 (—) Adapter 5 ST25055000 (—) Adapter  LCIA0399E	Measuring line pressure
KV31103600 (J-45674) Joint pipe adapter (With ST25054000)  ZZA1227D	Measuring line pressure
ST33400001 (J-26082) Drift  NT086	• Installing rear oil seal (2WD models) • Installing oil pump housing oil seal **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
KV31102400 (J-34285 and J-34285-87) Clutch spring compressor  NT423	Installing reverse brake return spring retainer **a: 320 mm (12.60 in)** **b: 174 mm (6.85 in)**
ST25850000 (J-25721-A) Sliding hammer  NT422	Remove oil pump assembly **a: 179 mm (7.05 in)** **b: 70 mm (2.76 in)** **c: 40 mm (1.57 in)** **d: M12X1.75P**

Tool number (Kent-Moore No.) Tool name	Description
— (J-47002) Transmission jack adapter kit 1. — (J-47002-1) Center bracket 2. — (J-47002-3) Adapter plate 3. — (J-47002-4) Adapter block 	Assist in removal of transmission and transfer case as one assembly using only one transmission jack.
— (J-46534) Trim tool set 	For removing trim

Commercial Service Tool

INFOID:0000000006244862

Tool name	Description
Power tool 	Loosening nuts, screws and bolts
Drift 	Installing manual shaft seals **a: 22 mm (0.87 in) dia.**
Drift 	Installing rear oil seal (4WD models) **a: 64 mm (2.52 in) dia.**
Pin punch 	• Removing retaining pin • Installing retaining pin **a: 4 mm (0.16 in) dia.**

PERIODIC MAINTENANCE

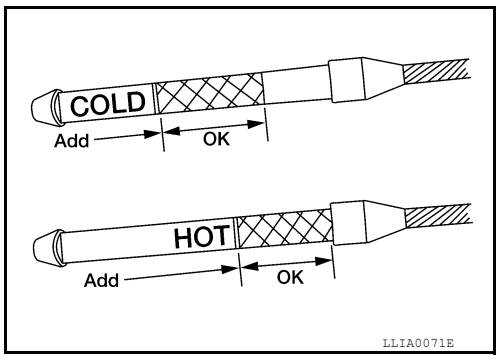
A/T FLUID

Checking the A/T Fluid (ATF)

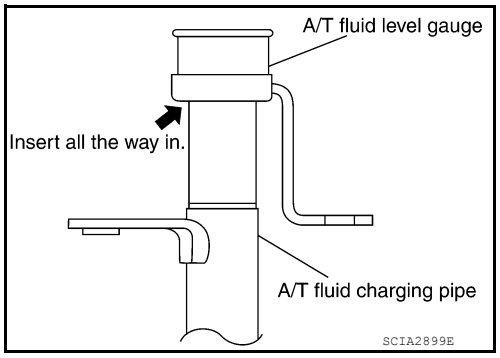
INFOID:0000000006244863

CAUTION:
If using the vehicle for towing, the A/T fluid must be replaced as specified. Refer to MA-11, "FOR USA AND CANADA : Introduction to Periodic Maintenance" (United States and Canada) and MA-15, "FOR MEXICO : Periodic Maintenance Schedule" (Mexico).

1. Before driving, the A/T fluid level can be checked at A/T fluid temperatures of 30° to 50° C (86° to 122° F) using the “COLD” range on the A/T fluid level gauge as follows:



a. Park the vehicle on a level surface and set the parking brake.
b. Start the engine and move the shift selector through each gear position. Shift the shift selector into the “P” position.
c. Check the A/T fluid level with the engine idling.
d. Remove the A/T fluid level gauge and wipe it clean with a lint-free paper.
CAUTION:
When wiping the A/T fluid from the A/T fluid level gauge, always use a lint-free paper, not a cloth.

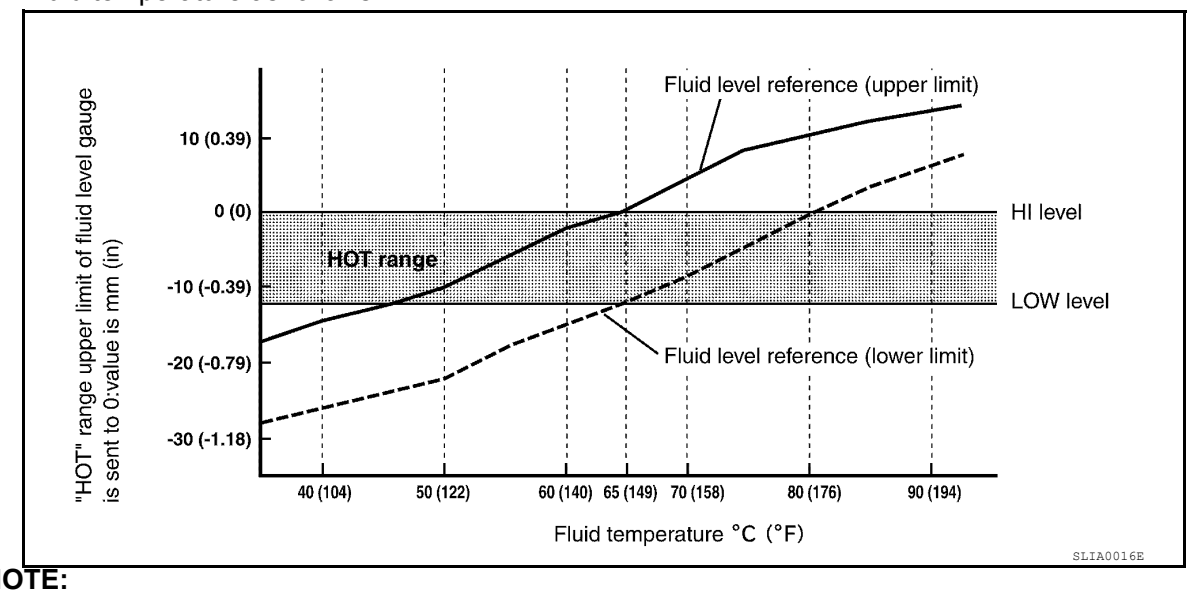


e. Re-insert the A/T fluid level gauge into the A/T fluid charging pipe until the cap contacts the top of the A/T fluid charging pipe as shown.
CAUTION:
To check A/T fluid level, insert the A/T fluid level gauge until the cap contacts the top of the A/T fluid charging pipe, with the gauge reversed from the normal inserted position.
f. Remove the A/T fluid level gauge and note the A/T fluid level. If the A/T fluid level is at low side of range, add A/T fluid to the transmission through the A/T fluid charging pipe.
CAUTION:
Do not overfill the transmission with A/T fluid.
g. Install the A/T fluid level gauge and the A/T fluid level gauge bolt.

A/T fluid level gauge bolt : Refer to TM-193, "2WD : Exploded View" (2WD) or TM-196, "4WD : Exploded View" (4WD).

2. Warm up the engine and transmission.
3. Check for any A/T fluid leaks.
4. Drive the vehicle to increase the A/T fluid temperature to 80° C (176° F).

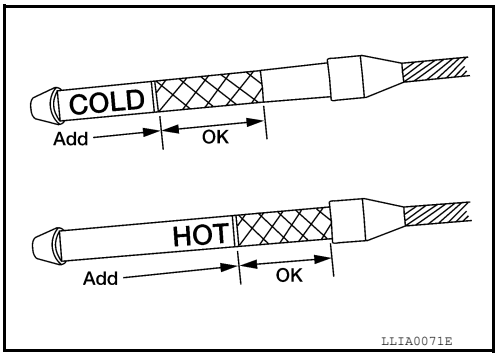
5. Allow the A/T fluid temperature to fall to approximately 65°C (149°F). Use the CONSULT-III to monitor the A/T fluid temperature as follows:



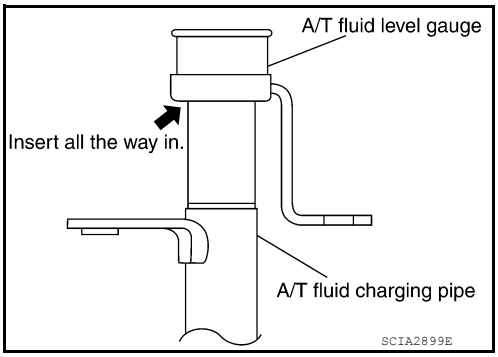
NOTE:
The A/T fluid level will be significantly affected by the A/T fluid temperature as shown. Therefore monitor the A/T fluid temperature data using the CONSULT-III.

a. Connect CONSULT-III to data link connector.
b. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
c. Read out the value of “ATF TEMP 1”.

6. Re-check the A/T fluid level at A/T fluid temperatures of approximately 65°C (149°F) using the “HOT” range on the A/T fluid level gauge as shown. The HOT range is between 50° - 80° C (122° - 176° F).



CAUTION:
- **When wiping the A/T fluid from the A/T fluid level gauge, always use lint-free paper, not a cloth.**
- **To check the A/T fluid level, insert the A/T fluid level gauge until the cap contacts the top of the A/T fluid charging pipe, with the gauge reversed from the normal inserted position as shown.**



7. Check the A/T fluid condition.
   - If the A/T fluid is very dark or has some burned smell, there may be an internal problem with the transmission. Refer to TM-115. Flush the transmission cooling system after repairing the transmission.
   - If the A/T fluid contains frictional material (clutches, bands, etc.), replace the radiator and flush the transmission cooler lines using cleaning solvent and compressed air after repairing the transmission.
8. Install the A/T fluid level gauge in the A/T fluid charging pipe.
9. Tighten the A/T fluid level gauge bolt to specification.

A/T fluid level gauge bolt : Refer to TM-193, "2WD : Exploded View" (2WD) or TM-196, "4WD : Exploded View" (4WD).

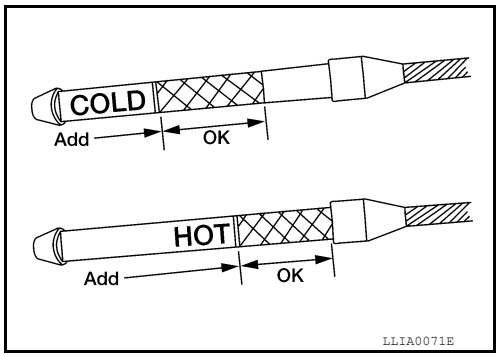
Changing the A/T Fluid (ATF)

INFOID:0000000006244864

CAUTION:

If using the vehicle for towing, the A/T fluid must be replaced as specified. Refer to MA-11, "FOR USA AND CANADA : Introduction to Periodic Maintenance" (United States and Canada) and MA-15, "FOR MEXICO : Periodic Maintenance Schedule" (Mexico).

1. Drive the vehicle to warm up the A/T fluid to approximately 80° C (176° F).
2. Stop the engine.
3. Remove the A/T fluid level gauge.
4. Drain the A/T fluid from the drain plug hole, then install the drain plug with a new gasket. Refill the transmission with new A/T fluid. Always refill with the same volume as the drained A/T fluid. Use the A/T fluid level gauge to check the A/T fluid level as shown. Add A/T fluid as necessary.



Drain plug : **Refer to TM-172, "Removal and Installation".**

- To flush out the old A/T fluid from the transmission oil coolers, pour new A/T fluid into the A/T fluid charging pipe with the engine idling and at the same time drain the old A/T fluid from the auxiliary transmission oil cooler hose return line.
- When the color of the A/T fluid coming out of the auxiliary transmission oil cooler hose return line is about the same as the color of the new A/T fluid, flushing out the old A/T fluid is complete. The amount of new A/T fluid used for flushing should be 30% to 50% increase of the specified capacity.

A/T fluid grade and capacity : **Refer to MA-11, "FOR USA AND CANADA : Introduction to Periodic Maintenance" (United States and Canada) and MA-15, "FOR MEXICO : Periodic Maintenance Schedule" (Mexico).**

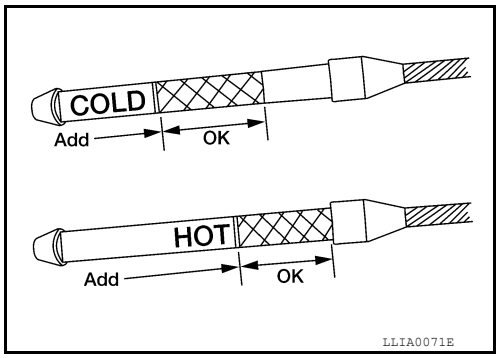
CAUTION:

- **If Genuine NISSAN Matic S ATF is not available, Genuine NISSAN Matic J ATF may also be used. Using automatic transmission fluid other than Genuine NISSAN Matic S or Matic J will cause deterioration in driveability. and may damage automatic transmission, which is not covered by the NISSAN new vehicle limited warranty.**
- **When filling the transmission with A/T fluid, do not spill the A/T fluid on any heat generating parts such as the exhaust manifold.**
- **Do not reuse the drain plug gasket.**

5. Install the A/T fluid level gauge and tighten the A/T fluid level gauge bolt to specification.

A/T fluid level gauge bolt : **Refer to TM-193, "2WD : Exploded View" (2WD) or TM-196, "4WD : Exploded View" (4WD).**

6. Drive the vehicle to warm up the A/T fluid to approximately 80° C (176° F).
7. Check the fluid level and condition. If the A/T fluid is still dirty, repeat steps 2 through 6.



8. Install the A/T fluid level gauge in the A/T fluid charging pipe and install the A/T fluid level gauge bolt.
9. Tighten the A/T fluid level gauge bolt to specification.

A/T fluid level gauge bolt : **Refer to TM-193, "2WD : Exploded View" (2WD) or TM-196, "4WD : Exploded View" (4WD).**

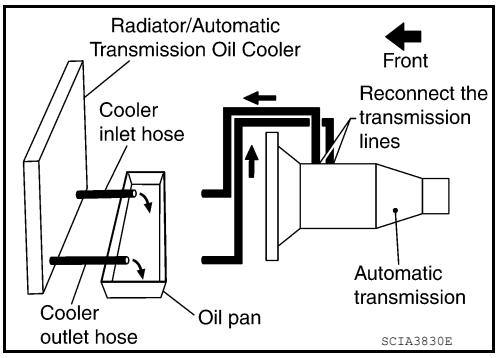
A/T Fluid Cooler Cleaning

INFOID:0000000006244865

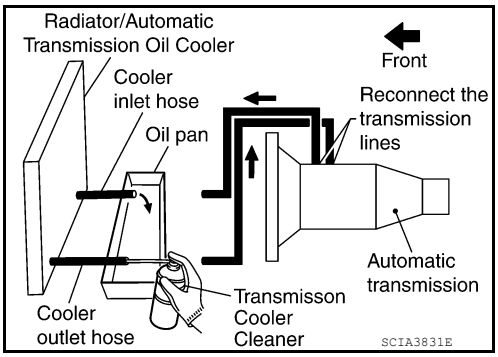
Whenever an A/T is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block or restrict the flow of A/T fluid. In either case, malfunction of the newly serviced A/T may result.
Debris, if present, may build up as A/T fluid 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.

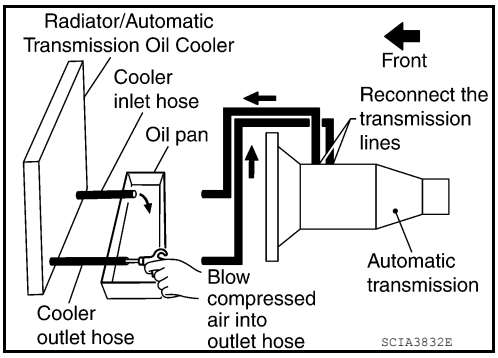
A/T FLUID COOLER CLEANING PROCEDURE

1. Position a drain pan under the A/T inlet and outlet fluid cooler tube to cooler hose connection.
2. Put a different color matching mark on each cooler tube to cooler hose connection to aid in assembly.
   CAUTION:
   Use paint to make the matching mark. Do not damage the tubes or hose.
3. Disconnect the fluid cooler inlet and outlet rubber hoses from the steel cooler tubes.
   NOTE:
   Replace the cooler hoses if rubber material from the hose remains on the tube fitting.
4. Drain any A/T fluid from the cooler hose.



5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.
   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray cooler cleaner only with adequate ventilation.**
   - **Avoid contact with eyes and skin.**
   - **Do not 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 fluid 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 tip of the air gun and the cooler outlet hose.



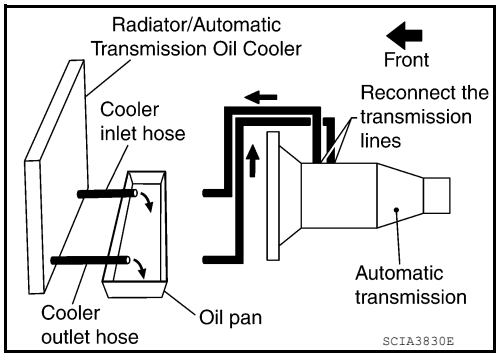


9. Blow compressed air regulated to 490 - 883 kPa (5 - 9 kg/cm^2, 71 - 128 psi) through the cooler outlet hose for 10 seconds to force out any remaining fluid.
10. Repeat steps 5 through 9 three additional times.
11. Position an oil pan under the banjo bolts that connect the fluid cooler tubes to the A/T.
12. Remove the banjo bolts.
13. Flush each steel line from the cooler side back toward the A/T by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
14. Blow compressed air regulated to 490 - 883 kPa (5 - 9 kg/cm^2, 71 - 128 psi) through each steel line from the cooler side back toward the A/T for 10 seconds to force out any remaining fluid.
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 "A/T FLUID COOLER DIAGNOSIS PROCEDURE".

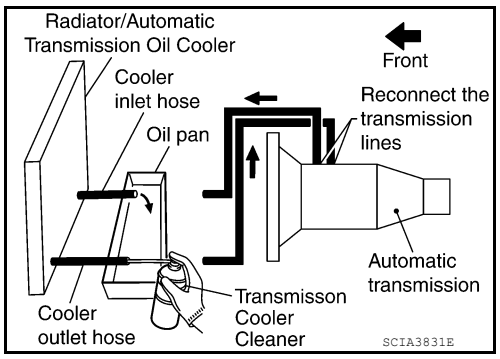
A/T FLUID COOLER DIAGNOSIS PROCEDURE

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

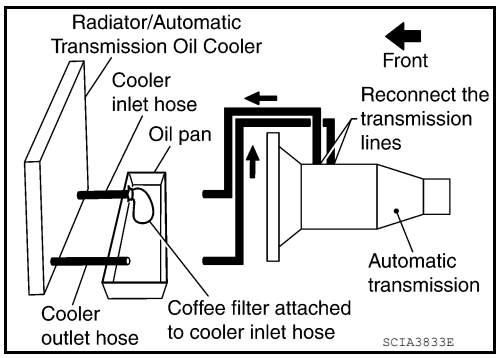
1. Position a drain pan under the A/T inlet and outlet fluid cooler tube to cooler hose connection.
2. Clean the exterior and tip of the cooler inlet hose.
3. Put a different color matching mark on each cooler tube to cooler hose connection to aid in assembly.
   CAUTION:
   Use paint to make the matching mark. Do not damage the tubes or hose.
4. Disconnect the fluid cooler inlet and outlet rubber hoses from the steel cooler tubes.
   NOTE:
   Replace the cooler hoses if rubber material from the hose remains on the tube fitting.



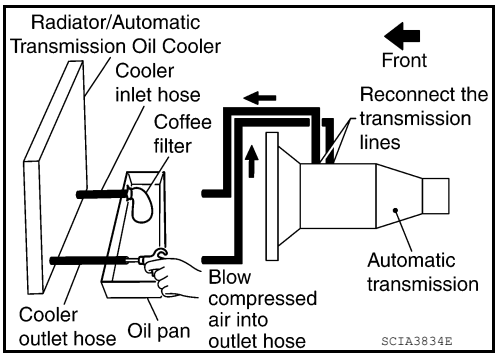
5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.
   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray cooler cleaner only with adequate ventilation.**
   - **Avoid contact with eyes and skin.**
   - **Do not 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 fluid flows out of the cooler inlet hose for 5 seconds.



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



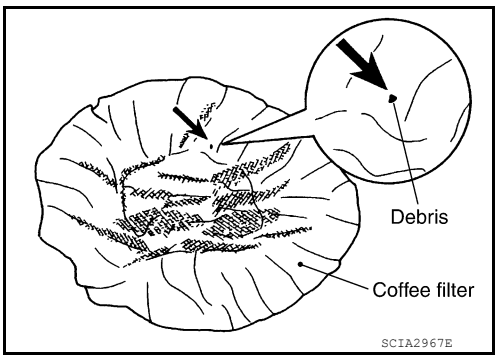
8. Insert the tip of an air gun into the end of the cooler outlet hose.
9. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
10. Blow compressed air regulated to 490 - 883 kPa (5 - 9 kg/cm^2, 71 - 128 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
11. Remove the coffee filter from the end of the cooler inlet hose.
12. Perform A/T fluid cooler inspection. Refer to TM-155, "Checking the A/T Fluid (ATF)".



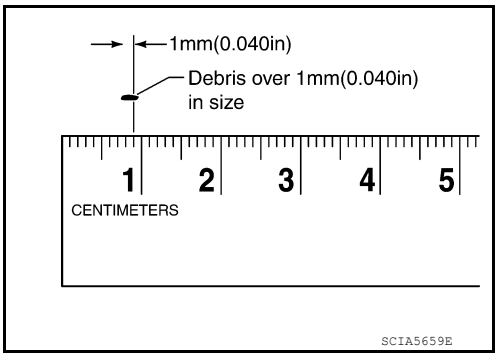
A/T FLUID COOLER INSPECTION PROCEDURE

1. Inspect the coffee filter for debris.

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



b. If one or more pieces of debris are found that are over 1mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the fluid cooler is not serviceable. The A/T fluid cooler/radiator must be replaced and the inspection procedure is ended. Refer to CO-18, "Removal and Installation" for (VQ40DE) CO-49, "Removal and Installation" for (VK56DE).



A/T FLUID COOLER FINAL INSPECTION

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

INSPECTIONS BEFORE TROUBLE DIAGNOSIS

Fluid Condition Check

INFOID:0000000006244866

A/T FLUID CHECK

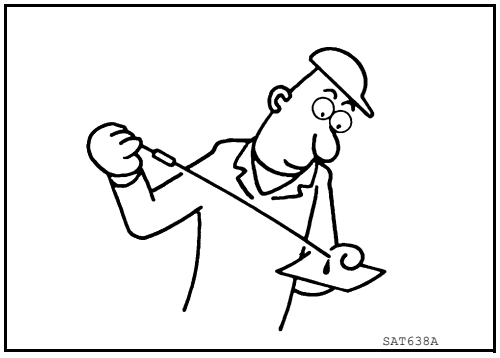
Fluid Leakage and Fluid Level Check

- Inspect for fluid leakage and check the fluid level. Refer to TM-157, "Changing the A/T Fluid (ATF)".

Fluid Condition Check

Inspect the fluid condition.

Fluid condition	Conceivable Cause	Required Operation
Varnished (viscous varnish state)	Clutch, brake scorched	Replace the ATF and check the A/T main unit and the vehicle for malfunctions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the ATF and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within A/T	Replace the ATF and check for improper operation of the A/T.



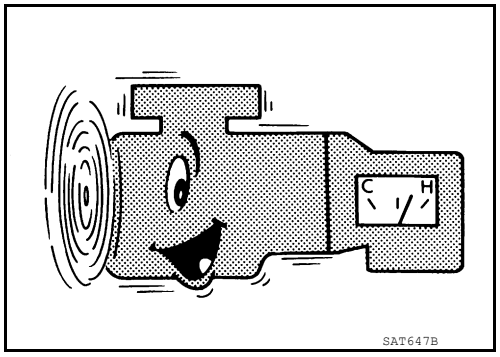
Stall Test

INFOID:0000000006244867

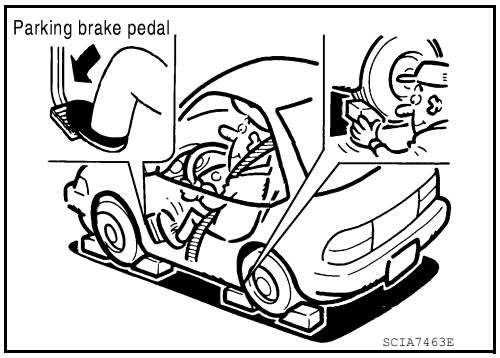
STALL TEST

Stall Test Procedure

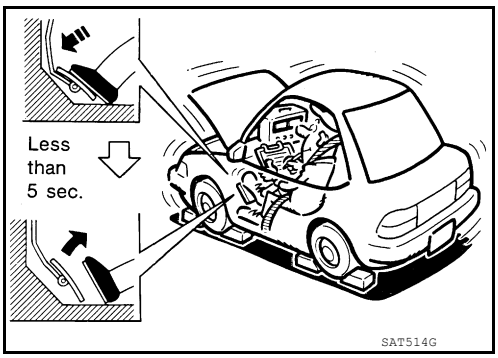
1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
2. Drive for about 10 minutes to warm up the vehicle so that the A/T fluid temperature is 50 to 80°C (122 to 176°F). Inspect the amount of ATF. Replenish if necessary.



3. Securely engage the parking brake so that the tires do not turn.



4. Engine start, apply foot brake, and place shift selector in “D” position.
5. While holding down the foot brake, gradually press down the accelerator pedal.
6. Quickly read off the stall speed, then quickly remove your foot from the accelerator pedal.
   CAUTION:
   Do not hold down the accelerator pedal for more than 5 seconds during this test.



Stall speed: TM-281, "Stall Speed"

7. Move the shift selector to the “N” position.
8. Cool down the ATF.
   CAUTION:
   Run the engine at idle for at least one minute.
9. Repeat steps 5 through 8 with shift selector in “R” position.

Judgment of Stall Test

	Shift selector position		Expected problem location
	D	R	
Stall rotation	H	O	• Forward brake • Forward one-way clutch • 1st one-way clutch • 3rd one-way clutch
	O	H	• Reverse brake
	L	L	• Engine and torque converter one-way clutch
	H	H	• Line pressure low

O: Stall speed within standard value position

H: Stall speed higher than standard value

L: Stall speed lower than standard value

Stall test standard value position

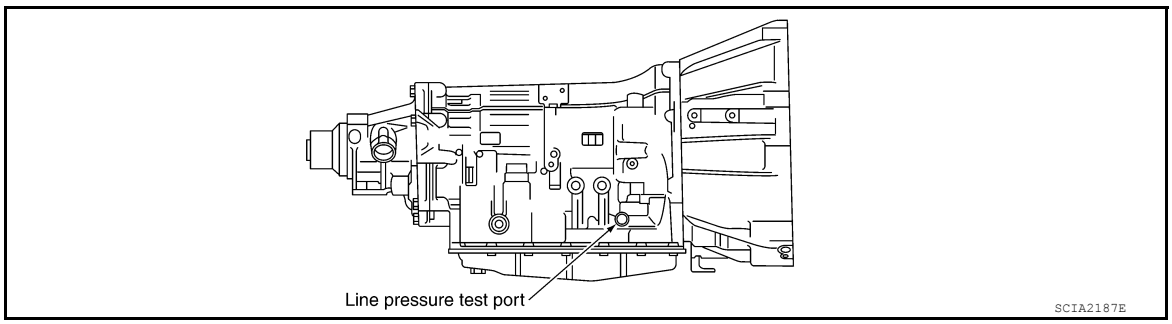
Does not shift-up D position 1 → 2	Slipping in 2GR, 3GR, 4GR	Direct clutch slippage
Does not shift-up D position 2 → 3	Slipping in 3GR, 4GR, 5GR	High and low reverse clutch slippage
Does not shift-up D position 3 → 4	Slipping in 4GR, 5GR	Input clutch slippage
Does not shift-up D position 4 → 5	Slipping in 5GR	Front brake slippage

Line Pressure Test

INFOID:0000000006244868

LINE PRESSURE TEST

Line Pressure Test Port

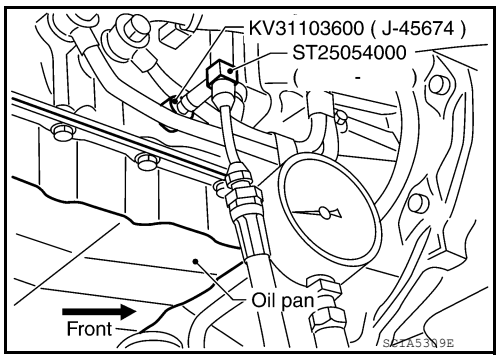


Line Pressure Test Procedure

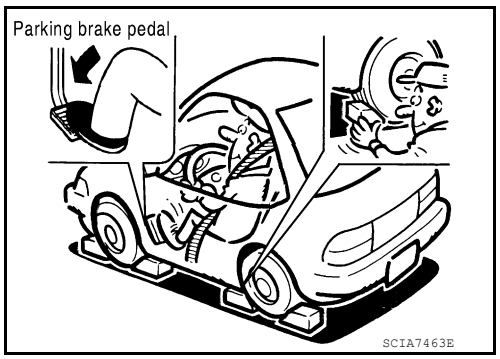
1. Inspect the amount of engine oil and replenish if necessary.

2. Drive the car for about 10 minutes to warm it up so that the ATF reaches in range of 50 to 80°C (122 to 176°F), then inspect the amount of ATF and replenish if necessary.
NOTE:
The automatic fluid temperature rises in range of 50 to 80°C (122 to 176°F) during 10 minutes of driving.

3. After warming up remove the oil pressure detection plug and install the oil pressure gauge [ST2505S001(J-34301-C)].
CAUTION:
When using the oil pressure gauge, be sure to use the O-ring attached to the oil pressure detection plug.

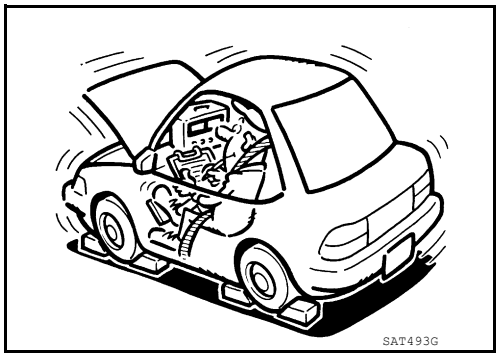


4. Securely engage the parking brake so that the tires do not turn.



5. Start the engine, then measure the line pressure at both idle and the stall speed.
CAUTION:
- **Keep the brake pedal pressed all the way down during measurement.**
- **When measuring the line pressure at the stall speed, refer to "STALL TEST".**

6. After the measurements are complete, install the oil pressure detection plug and tighten to the regulation torque below.



Oil pressure detection plug	**:7.3 N·m (0.74 kg-m, 65 in-lb)**

CAUTION:
- **Do not reuse the O-ring.**
- **Apply ATF to O-ring.**

Line Pressure

Engine speed	Line pressure [kPa (kg/cm^2, psi)]	
	"R" position	"D" position
At idle speed	TM-281, "Line Pressure"	
At stall speed		

Judgment of Line Pressure Test

Judgment		Possible cause
Idle speed	Low for all positions (P, R, N, D)	Possible causes include malfunctions in the pressure supply system and low oil pump output. For example • Oil pump wear • Pressure regulator valve or plug sticking or spring fatigue • Oil strainer ⇒ oil pump ⇒ pressure regulator valve passage oil leak • Engine idle speed too low
	Only low for a specific position	Possible causes include an oil pressure leak in a passage or device related to the position after the pressure is distributed by the manual valve.
	High	Possible causes include a sensor malfunction or malfunction in the line pressure adjustment function. For example • Accelerator pedal position signal malfunction • ATF temperature sensor malfunction • Line pressure solenoid malfunction (sticking in “OFF” state, filter clog, cut line) • Pressure regulator valve or plug sticking
Stall speed	Oil pressure does not rise higher than the oil pressure for idle.	Possible causes include a sensor malfunction or malfunction in the pressure adjustment function. For example • Accelerator pedal position signal malfunction • TCM breakdown • Line pressure solenoid malfunction (shorting, sticking in“ ON” state) • Pressure regulator valve or plug sticking • Pilot valve sticking or pilot filter clogged
	The pressure rises, but does not enter the standard position.	Possible causes include malfunctions in the pressure supply system and malfunction in the pressure adjustment function. For example • Accelerator pedal position signal malfunction • Line pressure solenoid malfunction (sticking, filter clog) • Pressure regulator valve or plug sticking • Pilot valve sticking or pilot filter clogged
	Only low for a specific position	Possible causes include an oil pressure leak in a passage or device related to the position after the pressure is distributed by the manual valve.

ROAD TEST

Check Before Engine Is Started

INFOID:0000000006244869

1.CHECK O/D OFF INDICATOR LAMP (WITHOUT MANUAL MODE) OR A/T CHECK INDICATOR LAMP (WITH MANUAL MODE)

1. Park vehicle on level surface.
2. Move shift selector to “P” position.
3. Turn ignition switch to “OFF” position and wait at least 10 seconds.
4. Turn ignition switch to “ON” position. (Do not start engine.)

Does O/D OFF indicator lamp or A/T CHECK indicator lamp light up for about 2 seconds?

YES >> 1. Turn ignition switch “OFF”.
2. Perform self-diagnostics and record all NG items on the TM-7, "Diagnostic Work Sheet". Refer to TM-36, "CONSULT-III Function (TRANSMISSION)", TM-41, "Diagnosis Procedure without CONSULT-III".
3. Go to TM-165, "Check at Idle".

NO >> Stop the test and go to TM-126, "Symptom Chart".

Check at Idle

INFOID:0000000006244870

1.CHECK STARTING THE ENGINE

1. Park vehicle on level surface.
2. Move shift selector to “P” or “N” position.
3. Turn ignition switch to “OFF” position.
4. Turn ignition switch to “START” position.

Does the engine start?

YES >> GO TO 2.
NO >> Stop the road test and go to TM-126, "Symptom Chart".

2.CHECK VEHICLE EQUIPMENT

Is vehicle equipped with manual mode shifter?

YES or NO?

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

3.CHECK STARTING THE ENGINE

1. Turn ignition switch to “ON” position.
2. Move shift selector in “D”, "M" and “R” position.
3. Turn ignition switch to “START” position.

Does the engine start in either position?

YES >> Stop the road test and go to TM-126, "Symptom Chart".
NO >> GO TO 5.

4.CHECK STARTING THE ENGINE

1. Turn ignition switch to “ON” position.
2. Move shift selector in “D”, “3”, “2”, “1” or “R” position.
3. Turn ignition switch to “START” position.

Does the engine start in either position?

YES >> Stop the road test and go to TM-126, "Symptom Chart".
NO >> GO TO 5.

5.CHECK “P” POSITION FUNCTIONS

Without manual mode

1. Move shift selector to “P” position.
2. Turn ignition switch to “OFF” position.
3. Release the parking brake.
4. Push the vehicle forward or backward.

5. Engage the parking brake.

When you push the vehicle with disengaging the parking brake, does it move?

YES >> Record the malfunction, GO TO 6.
NO >> GO TO 6.

6.CHECK “N” POSITION FUNCTIONS

1. Start the engine.
2. Move shift selector to “N” position.
3. Release the parking brake.

Does vehicle move forward or backward?

YES >> Record the malfunction, GO TO 7.
NO >> GO TO 7.

7.CHECK SHIFT SHOCK

1. Engage the brake.
2. Move shift selector to “D” position.

When the transmission is shifted from “N” to “D”, is there an excessive shock?

YES >> Record the malfunction, GO TO 8.
NO >> GO TO 8.

8.CHECK “R” POSITION FUNCTIONS

1. Engage the brake.
2. Move shift selector to “R” position.
3. Release the brake for 4 to 5 seconds.

Does the vehicle creep backward?

YES >> GO TO 9.
NO >> Record the malfunction, GO TO 9.

9.CHECK “D” POSITION FUNCTIONS

Inspect whether the vehicle creep forward when the transmission is put into the “D” position.

Does the vehicle creep forward in the “D” positions?

YES >> Go to TM-166, "Cruise Test - Part 1".
NO >> Record the malfunction and go to TM-166, "Cruise Test - Part 1".

Cruise Test - Part 1

INFOID:0000000006244871

1.CHECK STARTING OUT FROM D1

1. Drive the vehicle for about 10 minutes to warm up the engine oil and ATF.
   Appropriate temperature for the ATF: 50 - 80°C (122 - 176°F)
2. Park the vehicle on a level surface.
3. Move shift selector to “P” position.
4. Start the engine.
5. Set overdrive control switch to ON position (without manual mode).
6. Move shift selector to “D” position.
7. Press the accelerator pedal about half way down to accelerate the vehicle.

With CONSULT-III

Read off the gear positions.

Starts from D1?

YES >> GO TO 2.
NO >> Record the malfunction, GO TO 2.

2.CHECK SHIFT-UP D1 → D2

Press down the accelerator pedal about half way and inspect if the vehicle shifts up (D1 → D2) at the appropriate speed.

- Refer to TM-280, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT-III

Read the gear position, throttle degree of opening, and vehicle speed.

Does the A/T shift-up D1 → D2 at the correct speed?

YES >> GO TO 3.
NO >> Record the malfunction, GO TO 3.

3. CHECK SHIFT-UP D2 → D3

Press down the accelerator pedal about half way and inspect if the vehicle shifts up (D2 → D3) at the appropriate speed.
• Refer to TM-280, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT-III
Read the gear position, throttle degree of opening, and vehicle speed.

Does the A/T shift-up D2 → D3 at the correct speed?

YES >> GO TO 4.
NO >> Record the malfunction, GO TO 4.

4. CHECK SHIFT-UP D3 → D4

Press down the accelerator pedal about half way and inspect if the vehicle shifts up (D3 → D4) at the appropriate speed.
• Refer to TM-280, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT-III
Read the gear position, throttle degree of opening, and vehicle speed.

Does the A/T shift-up D3 → D4 at the correct speed?

YES >> GO TO 5.
NO >> Record the malfunction, GO TO 5.

5. CHECK SHIFT-UP D4 → D5

Press down the accelerator pedal about half way and inspect if the vehicle shifts up (D4 → D5) at the appropriate speed.
• Refer to TM-280, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT-III
Read the gear position, throttle degree of opening, and vehicle speed.

Does the A/T shift-up D4 → D5 at the correct speed?

YES >> GO TO 6.
NO >> Record the malfunction, GO TO 6.

6. CHECK LOCK-UP

When releasing accelerator pedal from D5 (closed throttle position signal: OFF), check lock-up from D5 to L/U.
• Refer to TM-281, "Vehicle Speed at Which Lock-up Occurs/Releases".

With CONSULT-III
Select “TCC SOLENOID” with the “MAIN SIGNAL” mode for “TRANSMISSION”.

Does it lock-up?

YES >> GO TO 7.
NO >> Record the malfunction, GO TO 7.

7. CHECK LOCK-UP HOLD

Check hold lock-up.

With CONSULT-III
Select “TCC SOLENOID” with the “MAIN SIGNAL” mode for “TRANSMISSION”.

Does it maintain lock-up status?

YES >> GO TO 8.
NO >> Record the malfunction, GO TO 8.

8. CHECK LOCK-UP RELEASE

Check lock-up cancellation by depressing brake pedal lightly to decelerate.

With CONSULT-III
Select “TCC SOLENOID” with the “MAIN SIGNAL” mode for “TRANSMISSION”.

Does lock-up cancel?

YES >> GO TO 9.
NO >> Record the malfunction, GO TO 9.

9. CHECK SHIFT-DOWN D5 → D4

Decelerate by pressing lightly on the brake pedal.

With CONSULT-III

Read the gear position and engine speed.

When the A/T shift-down D5 → D4, does the engine speed drop smoothly back to idle?

YES >> 1. Stop the vehicle.
2. Go to TM-168, "Cruise Test - Part 2".
NO >> Record the malfunction and go to TM-168, "Cruise Test - Part 2".

Cruise Test - Part 2

INFOID:0000000006244872

1. CHECK SHIFT-UP D1 → D2

Press the accelerator pedal down all the way and inspect whether or not the transmission shifts up (D1 → D2) at the correct speed.

- Refer to TM-280, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT-III

Read the gear position, throttle position and vehicle speed.

Does the A/T shift-up D1 → D2 at the correct speed?

YES >> GO TO 2.
NO >> Record the malfunction, GO TO 2.

2. CHECK SHIFT-UP D2 → D3

Press the accelerator pedal down all the way and inspect whether or not the transmission shifts up (D2 → D3) at the correct speed.

- Refer to TM-280, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT-III

Read the gear position, throttle position and vehicle speed.

Does the A/T shift-up D2 → D3 at the correct speed?

YES >> GO TO 3.
NO >> Record the malfunction, GO TO 3.

3. CHECK SHIFT-UP D3 → D4 AND ENGINE BRAKE

When the transmission changes speed D3 → D4, return the accelerator pedal.

With CONSULT-III

Read the gear position.

Does the A/T shift-up D3 → D4 and apply the engine brake?

YES >> 1. Stop the vehicle.
2. Go to TM-168, "Cruise Test - Part 3".
NO >> Record the malfunction and go to TM-168, "Cruise Test - Part 3".

Cruise Test - Part 3

INFOID:0000000006244873

1. CHECK VEHICLE EQUIPMENT

Is vehicle equipped with manual mode shifter?

YES or NO?

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

2. MANUAL MODE FUNCTION

Move to manual mode from “D” position.

Does it switch to manual mode?

YES >> GO TO 3.
NO >> Record the malfunction, GO TO 3.

3. CHECK SHIFT-DOWN

During manual mode driving, move shift selector from M5 → M4 → M3 → M2 → M1.

With CONSULT-III

Read the gear position.

Is downshifting correctly performed?

YES >> GO TO 6.
NO >> Record the malfunction, GO TO 6.

4. CHECK SHIFT-DOWN

1. Confirm overdrive control switch is ON position.
2. Confirm gear shift selector is in “D” position.
3. Accelerate vehicle using half-throttle to D_5.
4. Release accelerator pedal.
5. Set overdrive control switch to OFF position while driving in D_5.

With CONSULT-III

Read the gear position.

Does A/T shift from D_5 to D_4 (O/D OFF)?

YES >> GO TO 5.
NO >> Record the malfunction, GO TO 5.

5. CHECK SHIFT-DOWN

During D_4 driving, move shift selector from D → 3 → 2 → 1.

With CONSULT-III

Read the gear position.

Is downshifting correctly performed?

YES >> GO TO 6.
NO >> Record the malfunction, GO TO 6.

6. CHECK ENGINE BRAKE

Does engine braking effectively reduce speed in M_1 position (with manual mode) or 1_1 position (without manual mode)?

YES >> 1. Stop the vehicle.
2. Carry out the self-diagnostics. Refer to TM-36, "CONSULT-III Function (TRANSMISSION)".

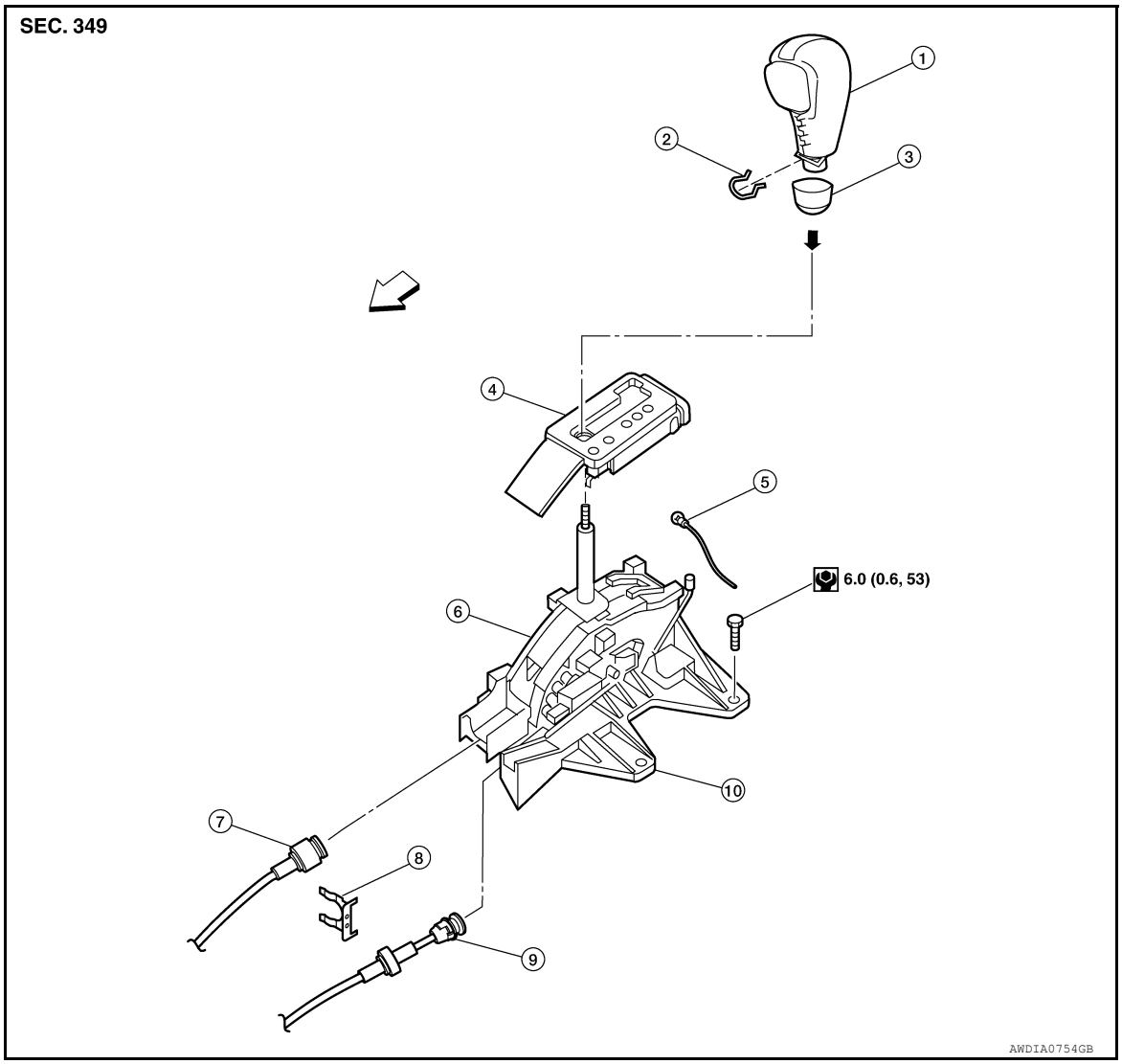
NO >> Record the malfunction, then continue the trouble diagnosis.

REMOVAL AND INSTALLATION

SHIFT CONTROL SYSTEM

Exploded view

INFOID:0000000006244874



1. Shift selector handle	2. Shift selector handle clip	3. Shift selector handle cover
4. A/T finisher	5. Position lamp	6. Position indicator
7. A/T shift selector control cable	8. Lock plate	9. A/T key interlock cable
10. Shift selector assembly	⇦ Front	

Removal and Installation

INFOID:0000000006244875

REMOVAL

1. Remove the center console. Refer to IP-21, "Removal and Installation".
2. Disconnect the following from the shift selector assembly.
   - A/T shift selector control cable
   - A/T key interlock cable
   - A/T shift selector connector
3. Remove the shift selector assembly.

INSTALLATION

Installation is in the reverse order of removal.
- Be sure to adjust shift selector cable. Refer to TM-171, "Inspection and Adjustment".

Inspection and Adjustment

INFOID:0000000006244876

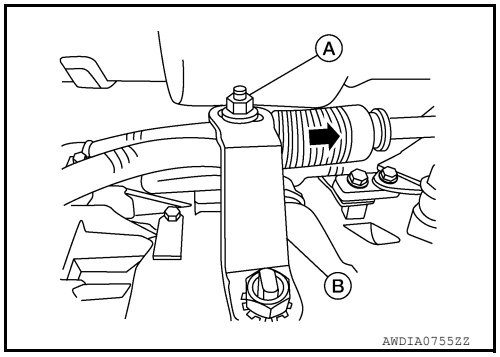
INSPECTION

With the shift selector in the “P” position, turn the ignition switch to the ON position with the engine OFF. Confirm that the following conditions apply.
- The shift selector can be shifted from the “P” position only when the brake pedal is depressed.
- The shift selector stops at each position with the feel of engagement when it is moved through all the positions.
- There is no excessive effort, sticking, noise or rattle.
- The actual position of the shift selector matches the position shown by the shift position indicator and the A/T body.
- The back-up lamps illuminate only when the shift selector is placed in the “R” position.
- The back-up lamps do not illuminate when the shift selector is pushed against the “R” position when in the “P” or “N” position.
- The engine can only be started with the shift selector in the “P” and “N” positions.
- The A/T is locked completely when in the “P” position.

ADJUSTMENT

1. Loosen nut (A) of A/T shift selector control cable.
2. Place the manual lever (B) and A/T shift selector in “P” position.
3. Push the shift selector control cable in the direction shown with a force of 9.8 N (1kg, 2.2 lb), and release it, this is in the natural state. Tighten A/T shift selector control cable nut (A) to specifications.

A/T shift selector control cable nut : 14.7 N·m (1.5 kg-m, 11 ft-lb)



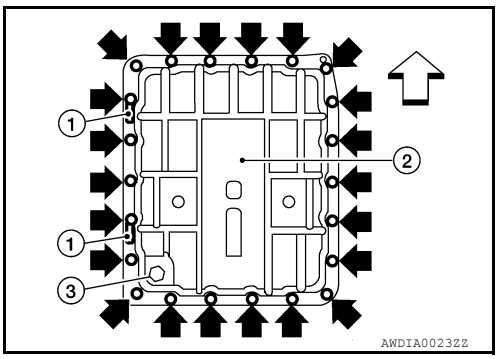
OIL PAN

Removal and Installation

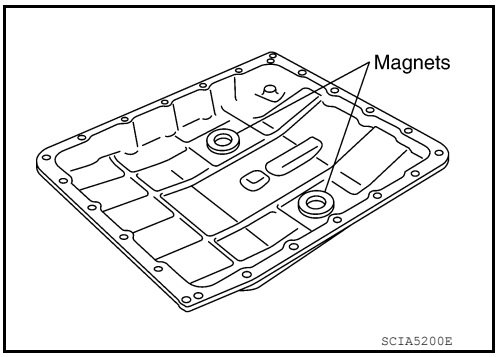
INFOID:0000000006244877

Removal

1. Drain A/T fluid. Refer to TM-157, "Changing the A/T Fluid (ATF)".
2. Remove clips (1) (VK56DE engine models) and oil pan bolts.
   - ⇨ Vehicle front
   - ➡ Oil pan bolts
   - Drain plug (3)
3. Remove oil pan (2) and oil pan gasket.

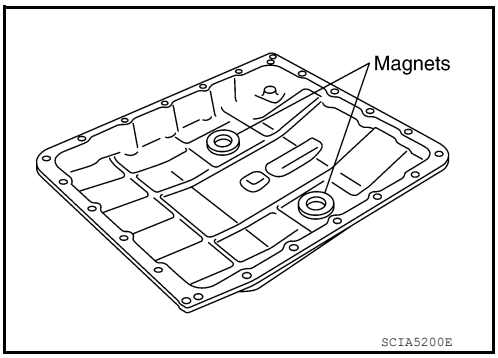


4. Check for foreign materials in oil pan to help determine cause of malfunction. If the A/T fluid is very dark, has some burned smell, or contains foreign particles then friction material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
   CAUTION:
   If friction material is detected, flush the transmission cooler after repair. Refer to TM-158, "A/T Fluid Cooler Cleaning".
5. Remove magnets from oil pan.

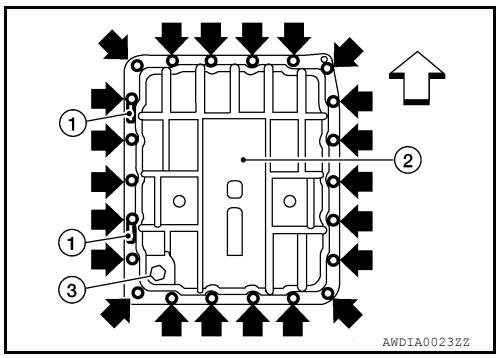


Installation

1. Install the oil pan magnets as shown.

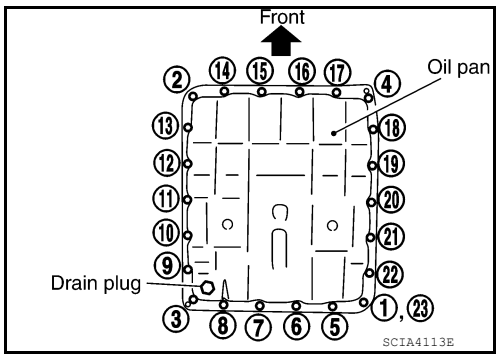


2. Install the oil pan (2) with new oil pan gasket and clips (1) (VK56DE engine models).
   - ⇨: Vehicle Front
   - ➡: Oil pan bolts
   - Drain plug (3)



CAUTION:
- **Be sure the oil drain plug is located to the rear of the transmission assembly.**
- **Before installing oil pan bolts, remove any traces of old sealant from the sealing surfaces and threaded holes.**
- **Do not reuse old gasket, replace with a new one.**
- **Always replace the oil pan bolts as they are self-sealing.**
- **Partially install the oil pan bolts in a criss-cross pattern to prevent dislocation of the gasket.**

3. Tighten oil pan bolts in numerical order as shown.



Oil pan bolts : 7.9 N·m (0.81 kg-m, 70 in-lb)

4. Install drain plug with new gasket to oil pan and tighten to specification.

Drain plug : 34 N·m (3.5 kg-m, 25 ft-lb)

CAUTION:
Do not reuse drain plug gasket.

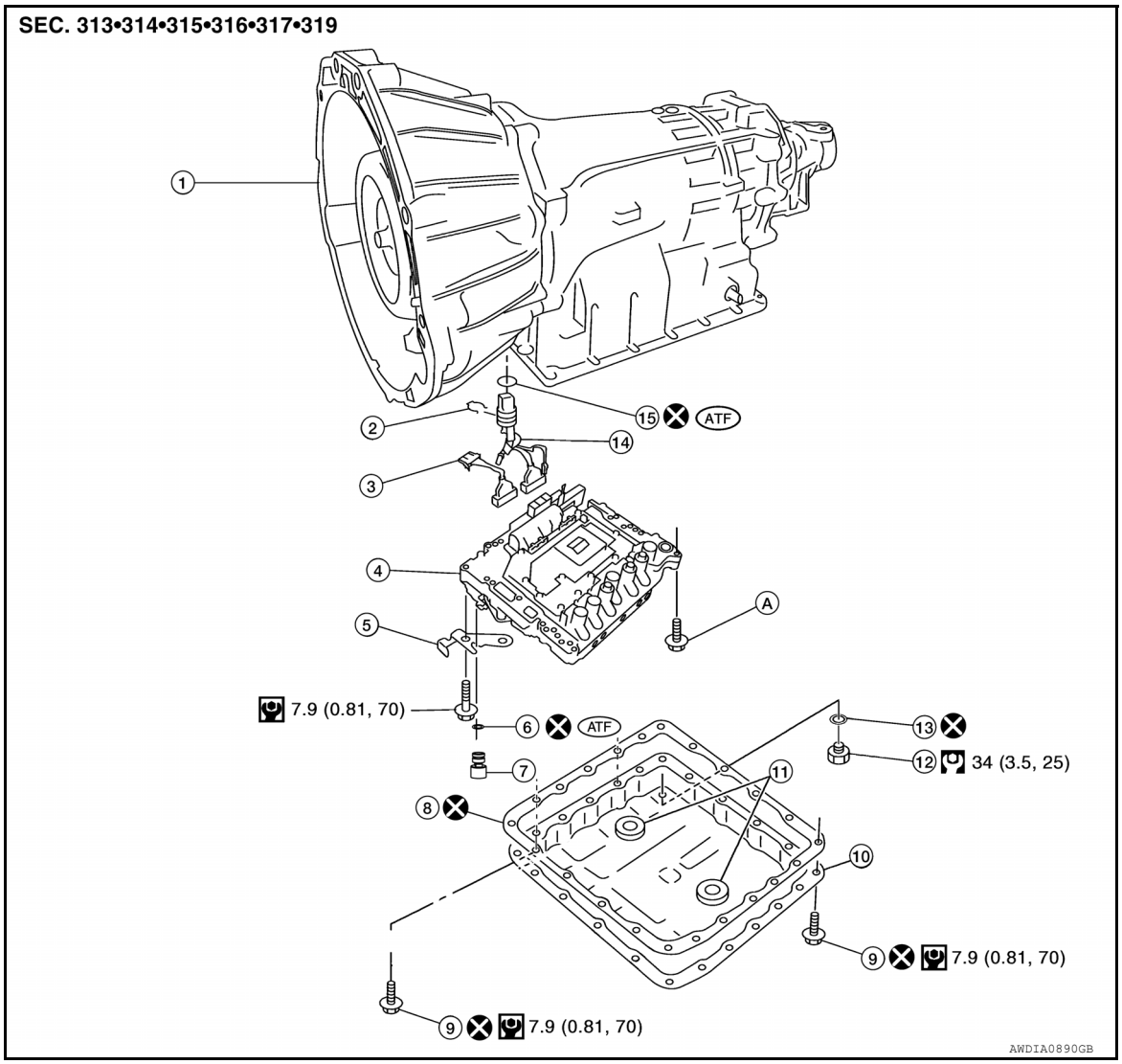
5. Refill the A/T with fluid and check for fluid leakage. Refer to TM-155, "Checking the A/T Fluid (ATF)".

CONTROL VALVE WITH TCM

Removal and Installation

INFOID:0000000006244878

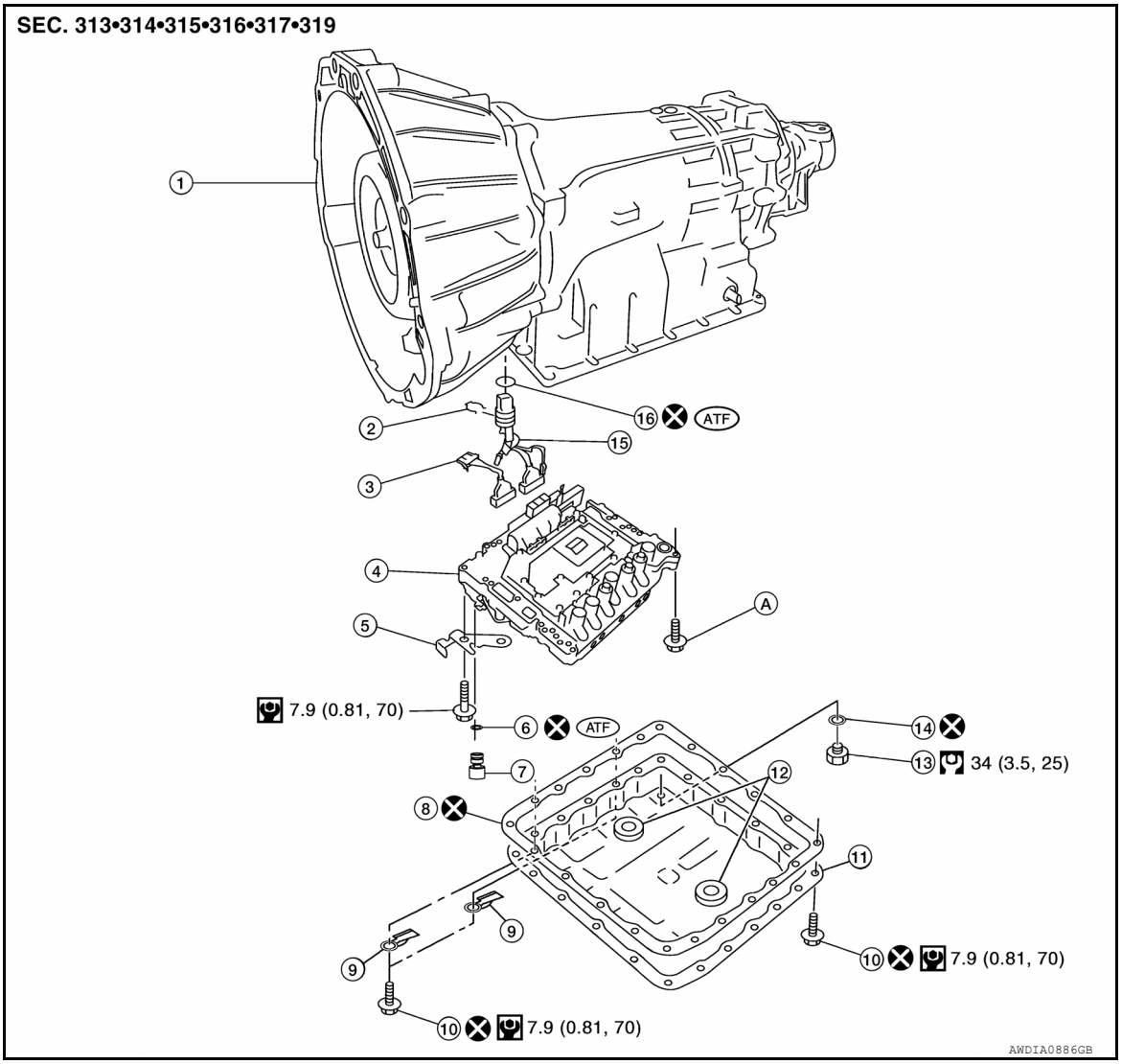
VQ40DE MODELS



1. Transmission
2. Snap ring
3. Sub-harness
4. Control valve with TCM
5. Bracket
6. O-ring
7. Plug
8. Oil pan gasket
9. Oil pan bolts
10. Oil pan
11. Magnet
12. Drain plug
13. Drain plug gasket
14. Terminal cord assembly
15. O-ring

A. For tightening torque, refer to "Installation"

VK56DE MODELS



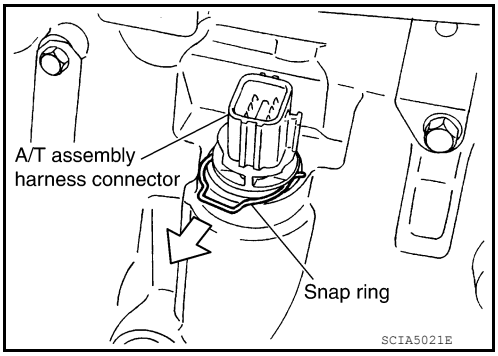
1. Transmission	2. Snap ring	3. Sub-harness
4. Control valve with TCM	5. Bracket	6. O-ring
7. Plug	8. Oil pan gasket	9. Brackets
10. Oil pan bolt	11. Oil pan	12. Magnet
13. Drain plug	14. Drain plug gasket	15. Terminal cord assembly
16. O-ring	A. For tightening torque, refer to "Installation"	

REMOVAL AND INSTALLATION OF CONTROL VALVE WITH TCM

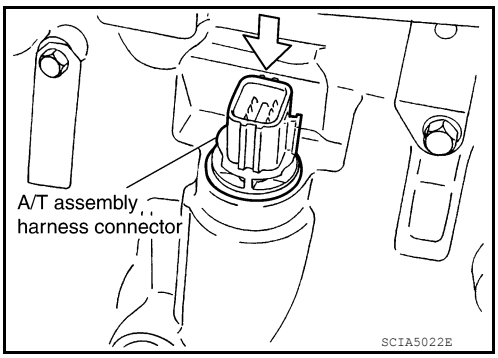
Removal

1. Disconnect negative battery terminal.
2. Drain A/T fluid. Refer to TM-157, "Changing the A/T Fluid (ATF)".
3. Disconnect A/T assembly harness connector.

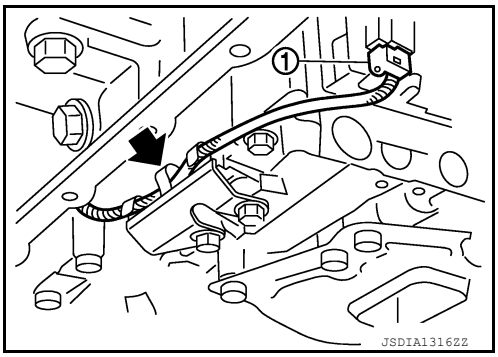
4. Remove snap ring from A/T assembly harness connector.



5. Push A/T assembly harness connector.
CAUTION:
Do not damage connector.

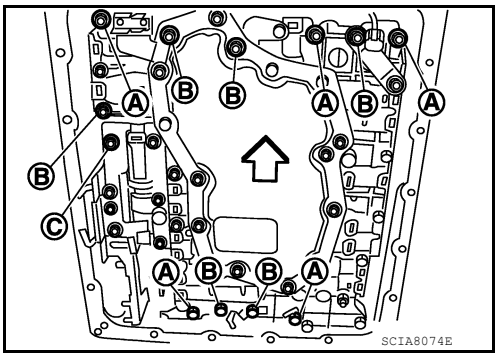


6. Remove oil pan and oil pan gasket. Refer to TM-172, "Removal and Installation".
7. Straighten terminal clip (⬅) to free the output speed sensor harness.
8. Disconnect output speed sensor connector (1).
CAUTION:
Do not damage connector.



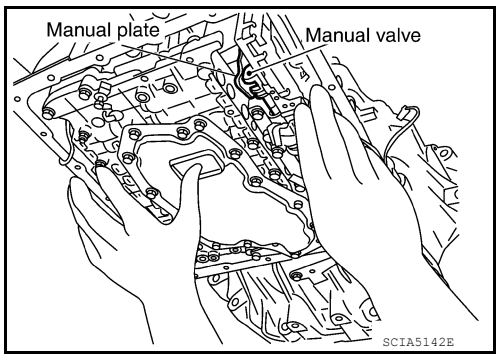
9. Remove bolts (A), (B) and (C) from control valve with TCM.

⇦ : Front

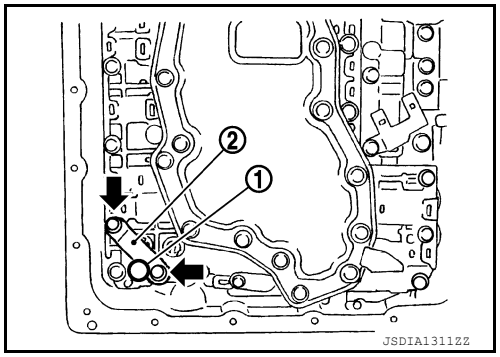


Bolt symbol	Length mm (in)	Number of bolts
A	42 (1.65)	5
B	55 (2.17)	6
C	40 (1.57)	1

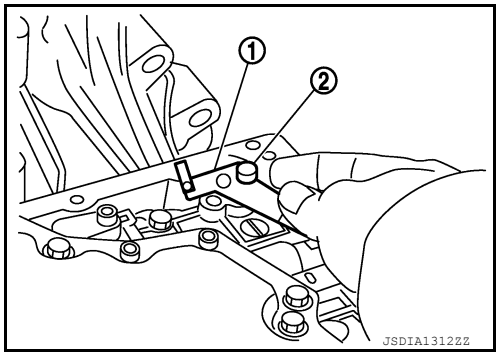
10. Remove control valve with TCM from transmission case.
CAUTION:
When removing, be careful with the manual valve notch and manual plate height. Remove it vertically.



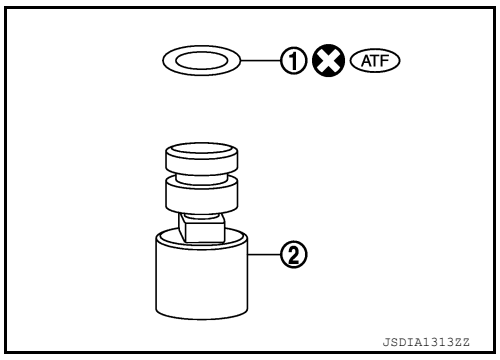
11. Remove plug (1) with bracket (2) from control valve with TCM.
• ⬅ :Bolt



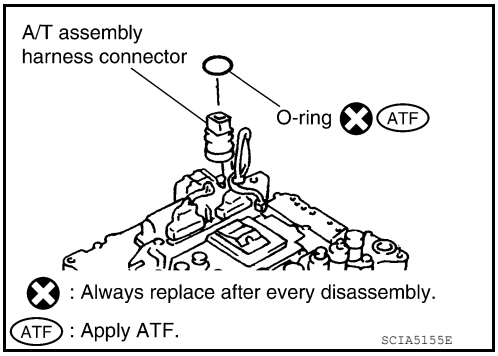
12. Remove the bracket (1) from plug (2).



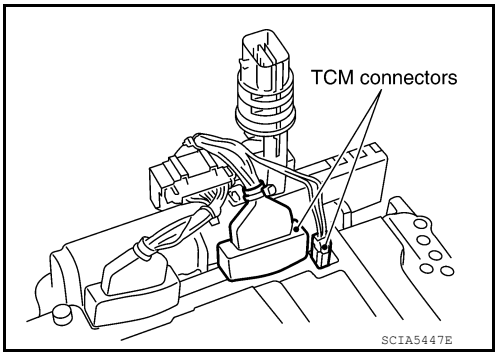
13. Remove O-ring (1) from plug (2).
CAUTION:
Do not reuse O-ring.



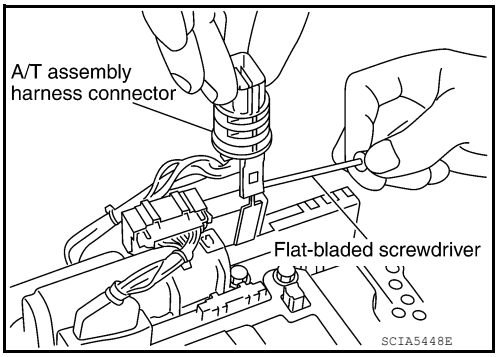
14. Remove O-ring from A/T assembly harness connector.
CAUTION:
Do not reuse O-ring.



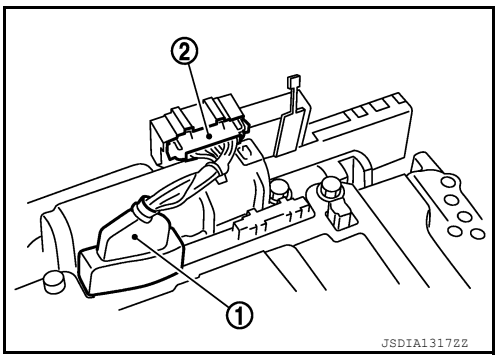
15. Disconnect TCM connectors.
CAUTION:
Do not damage connectors.



16. Remove A/T assembly harness connector from control valve with TCM using suitable tool.

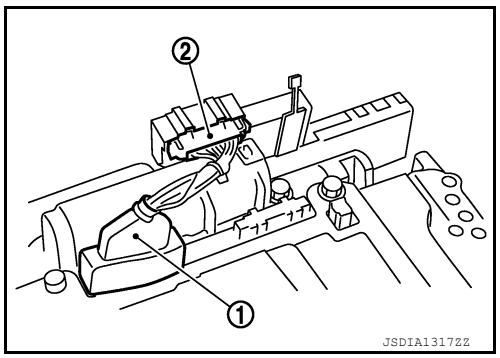


17. Disconnect TCM connector (1) and transmission range switch connector (2).
CAUTION:
Do not damage connectors.

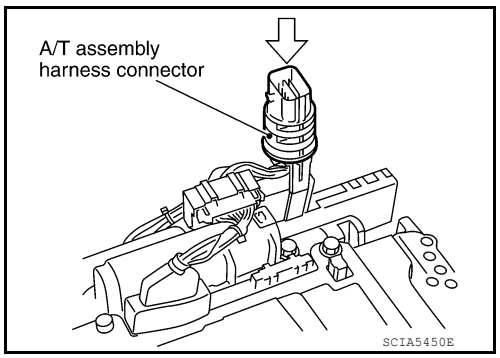


Installation
CAUTION:
After completing installation, check A/T fluid leakage and fluid level. Refer to TM-155, "Checking the A/T Fluid (ATF)".

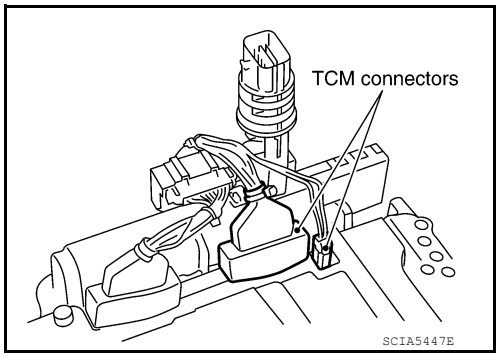
1. Connect TCM connector (1) and transmission range switch connector (2).



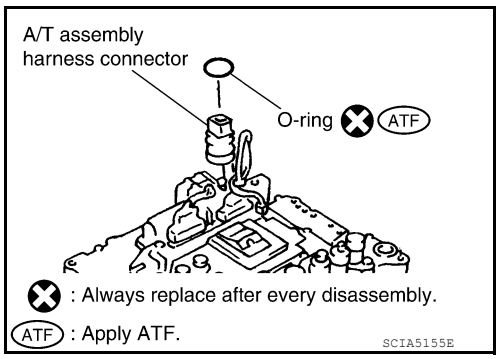
2. Install A/T assembly harness connector to control valve with TCM.



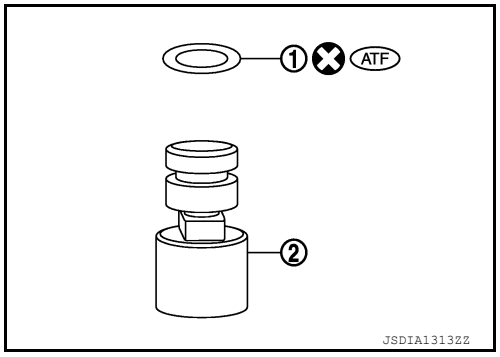
3. Connect TCM connector.



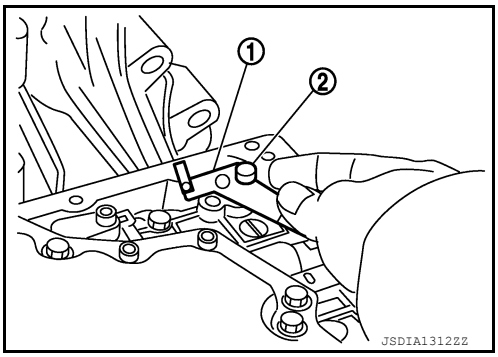
4. Install new O-ring in A/T assembly harness connector.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



5. Install new O-ring (1) in plug (2).
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**
- **O-ring should be free of contamination.**

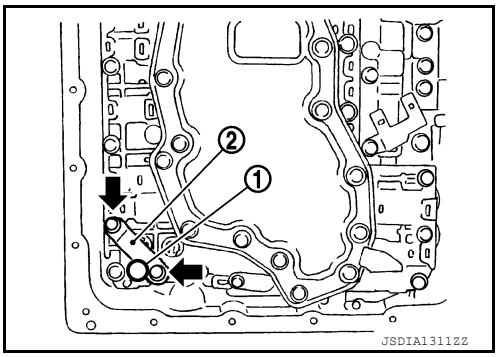


6. Install plug (2) to bracket(1).



7. Install plug (1) [with bracket (2)] to control valve with TCM.
   - ⬅ :Bolt

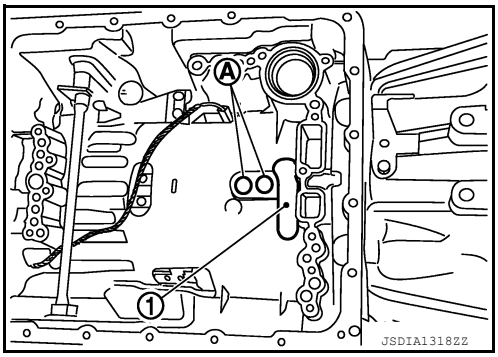
   CAUTION:
   Adjust bolt hole of bracket to bolt hole of control valve with TCM.



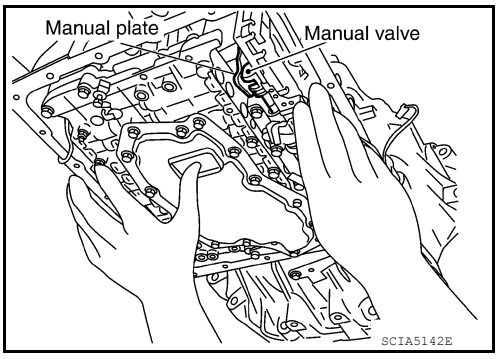
8. Install control valve with TCM in transmission case.

   1 : Brake band

   CAUTION:
   - **Make sure that input speed sensor is securely installed into input speed sensor hole (A).**
   - **Hang down output speed sensor harness toward outside so as not to disturb installation of control valve with TCM.**
   - **Adjust A/T assembly harness connector of control valve with TCM to terminal hole of transmission case.**



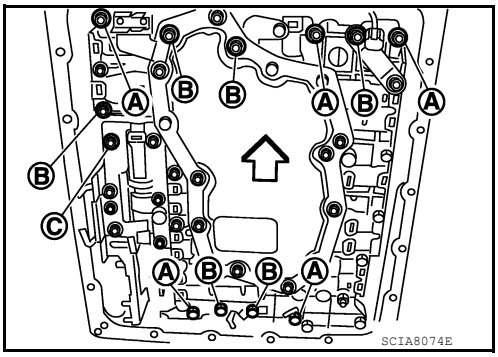
   - **Assemble it so that manual valve cutout is engaged with manual plate projection.**



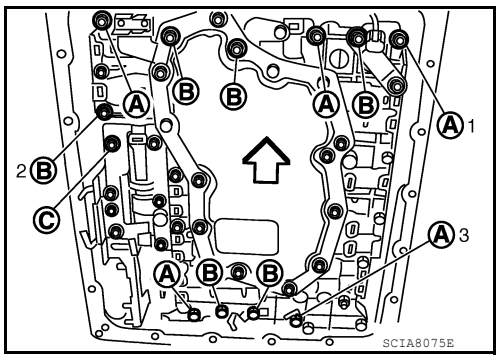
9. Install bolts (A), (B) and (C) in control valve with TCM.

   ⇦ : Front

Bolt symbol	Length mm (in)	Number of bolts
A	42 (1.65)	5
B	55 (2.17)	6
C	40 (1.57)	1



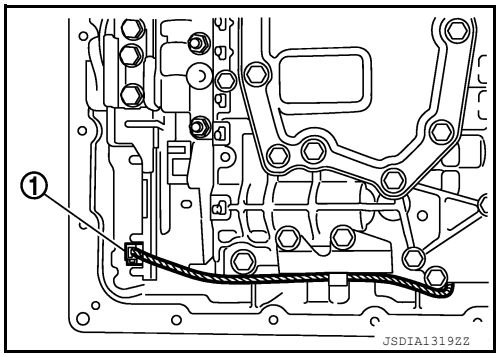
10. Tighten bolt (1A), (2B) and (3A) temporarily to prevent dislocation. After that tighten them in order (1 → 2 → 3). Then tighten other bolts.Tighten control valve with TCM bolts to the specified torque.



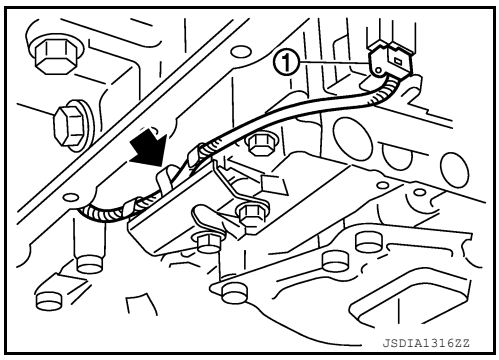
⇦ : Front

Bolt symbol	A	B	C
Number of bolts	5	6	1
Length mm (in)	42 (1.65)	55 (2.17)	40 (1.57)
Tightening torque N·m (kg-m, in-lb)	7.9 (0.81, 70)		With ATF applied
			7.9 (0.81, 70)

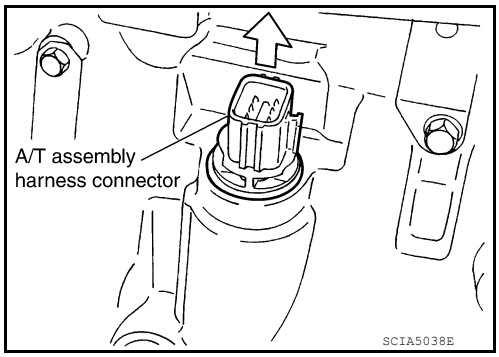
11. Connect output speed sensor connector (1).



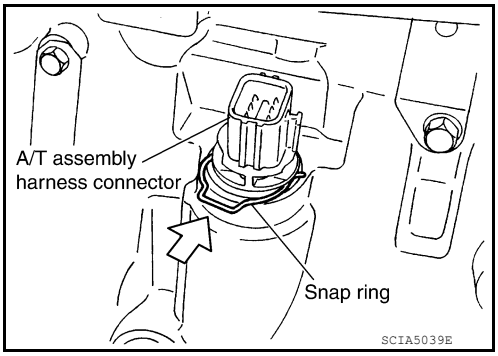
12. Securely fasten output speed sensor (1) harness with terminal clip (⬅).



13. Install oil pan to transmission case. Refer to TM-172, "Removal and Installation".
14. Pull up A/T assembly harness connector.
CAUTION:
Do not damage connector.



15. Install snap ring to A/T assembly harness connector.
16. Connect A/T assembly harness connector.
17. Connect the negative battery terminal.
18. Refill the A/T with fluid and check the fluid level and for fluid leakage. Refer to TM-155, "Checking the A/T Fluid (ATF)".



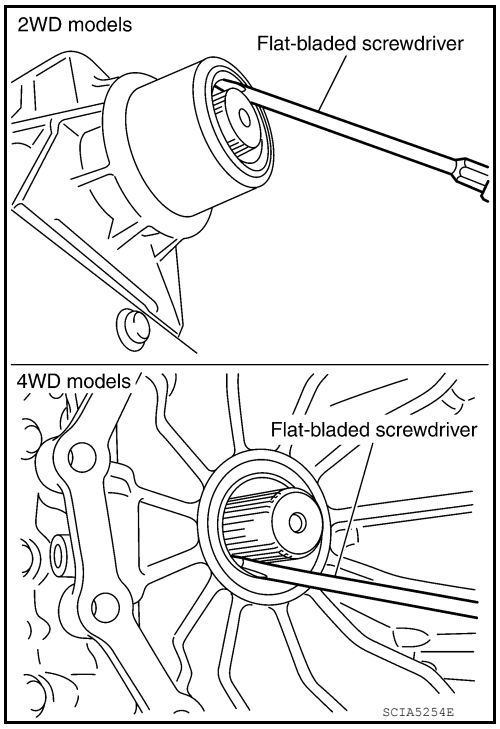
REAR OIL SEAL

Removal and Installation

INFOID:0000000006244879

REMOVAL

1. Remove rear propeller shaft. Refer to DLN-328, "Removal and Installation" (2S1330), DLN-339, "Removal and Installation" (2S1350).
2. Remove transfer from transmission (4WD models). Refer to DLN-153, "Removal and Installation" (ATX14B), DLN-286, "Removal and Installation" (TX15B).
3. Remove rear oil seal using flat bladed screwdriver.
   CAUTION:
   Do not scratch rear extension assembly (2WD models) or adapter case assembly (4WD models).

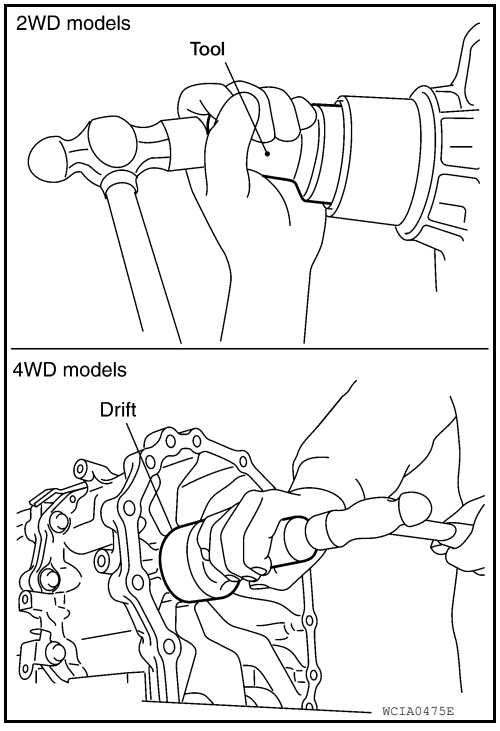


INSTALLATION

1. Install new rear oil seal until it is flush into the rear extension case (2WD models) using Tool or adapter case (4WD models) using suitable tool.

   Tool number : ST33400001 (J-26082)

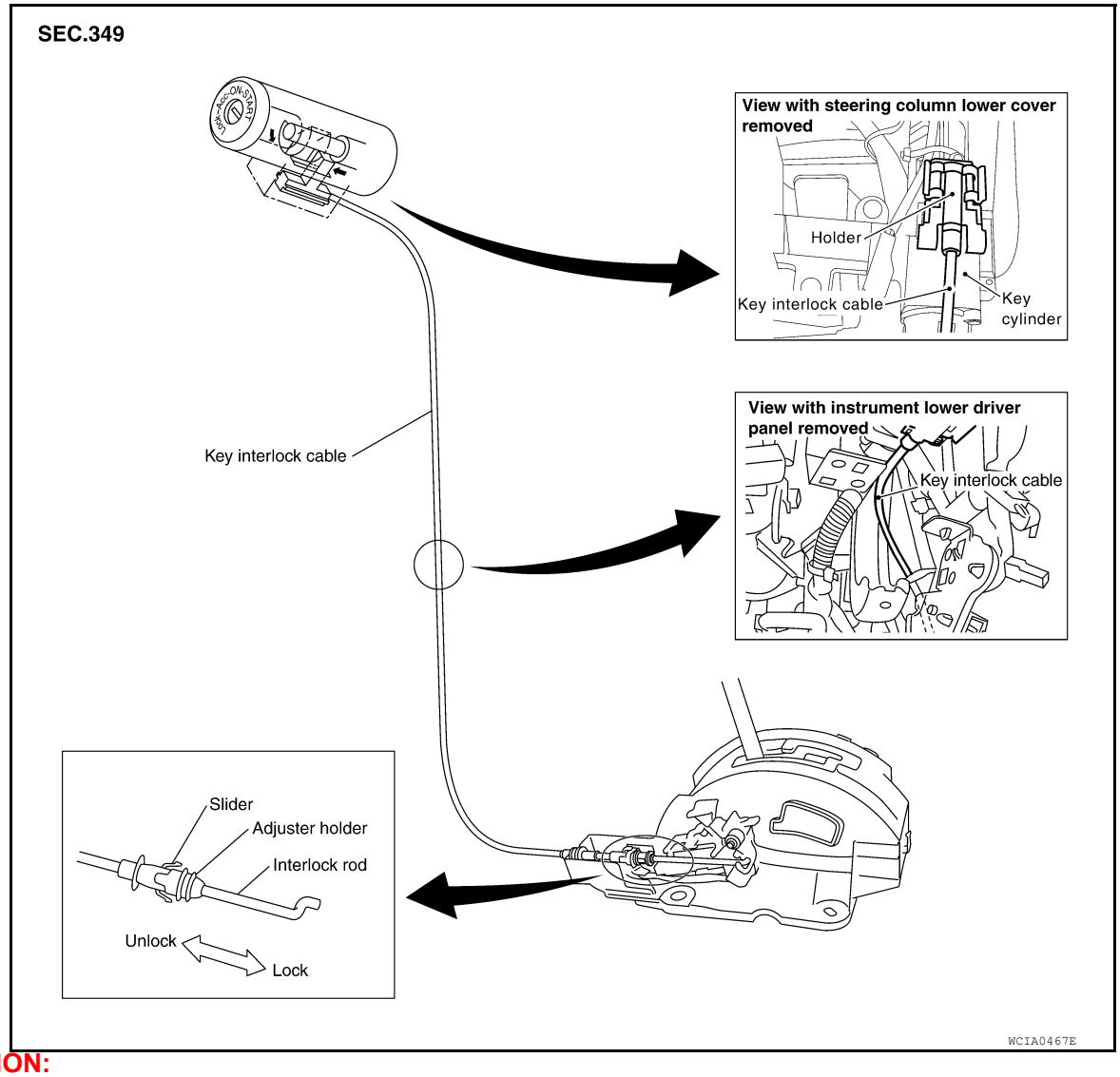
   CAUTION:
   - **Apply ATF to rear oil seal.**
   - **Do not reuse rear oil seal.**
2. Install transfer to transmission (4WD models). Refer to DLN-153, "Removal and Installation" (ATX14B), DLN-286, "Removal and Installation" (TX15B).
3. Install rear propeller shaft. Refer to DLN-328, "Removal and Installation" (2S1330) or DLN-339, "Removal and Installation" (2S1350).
4. Check the A/T fluid level and for fluid leakage. Refer to TM-155.



KEY INTERLOCK CABLE

Component

INFOID:0000000006244880



CAUTION:

- **Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.**
- **After installing key interlock cable to control device, make sure that casing cap and bracket are firmly secured in their positions. If casing cap can be removed with an external load of less than 39 N (4.0 kg, 8.8 lb), replace key interlock cable with new one.**

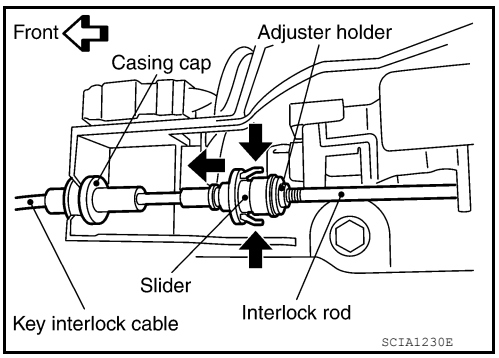
Removal and Installation

INFOID:0000000006244881

REMOVAL

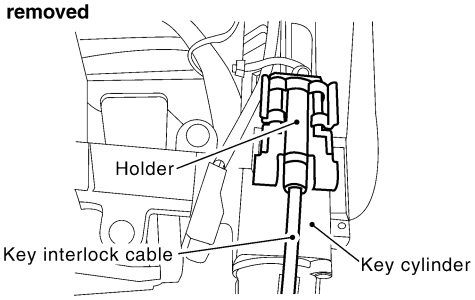
1. Remove the center console. Refer to IP-21, "Removal and Installation".
2. Remove lower instrument panel LH. Refer to IP-19, "Removal and Installation".

3. Unlock slider from adjuster holder by squeezing lock tabs.
4. Remove casing cap from bracket of control device assembly and remove interlock rod from adjuster holder.

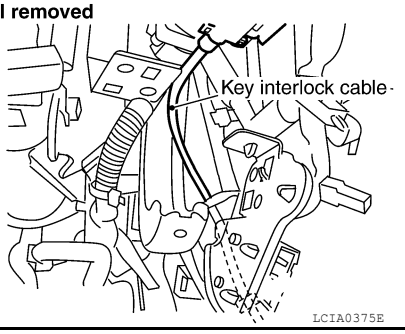


5. Remove holder from key cylinder and remove key interlock cable.

View with steering column lower cover removed



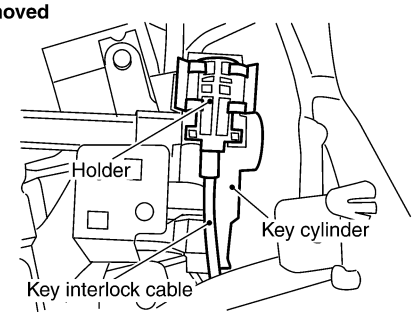
View with instrument lower driver panel removed



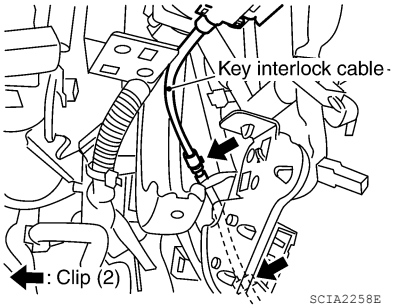
INSTALLATION

1. Set key interlock cable to key cylinder and install holder.
2. Turn ignition key to (LOCK) position.
3. Set shift selector to (P) position.

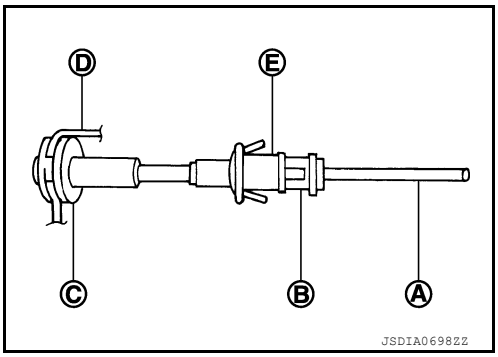
View with steering column lower cover removed



View with instrument lower driver panel removed



4. Insert key interlock rod (A) into adjuster holder (B).
5. Install casing cap (C) to bracket (D).
6. Move slider (E) toward key interlock rod (A) to secure adjuster holder (B) to key interlock rod (A).



7. Install instrument lower panel LH. Refer to IP-12, "Removal and Installation".
8. Install the center console. Refer to IP-21, "Removal and Installation".

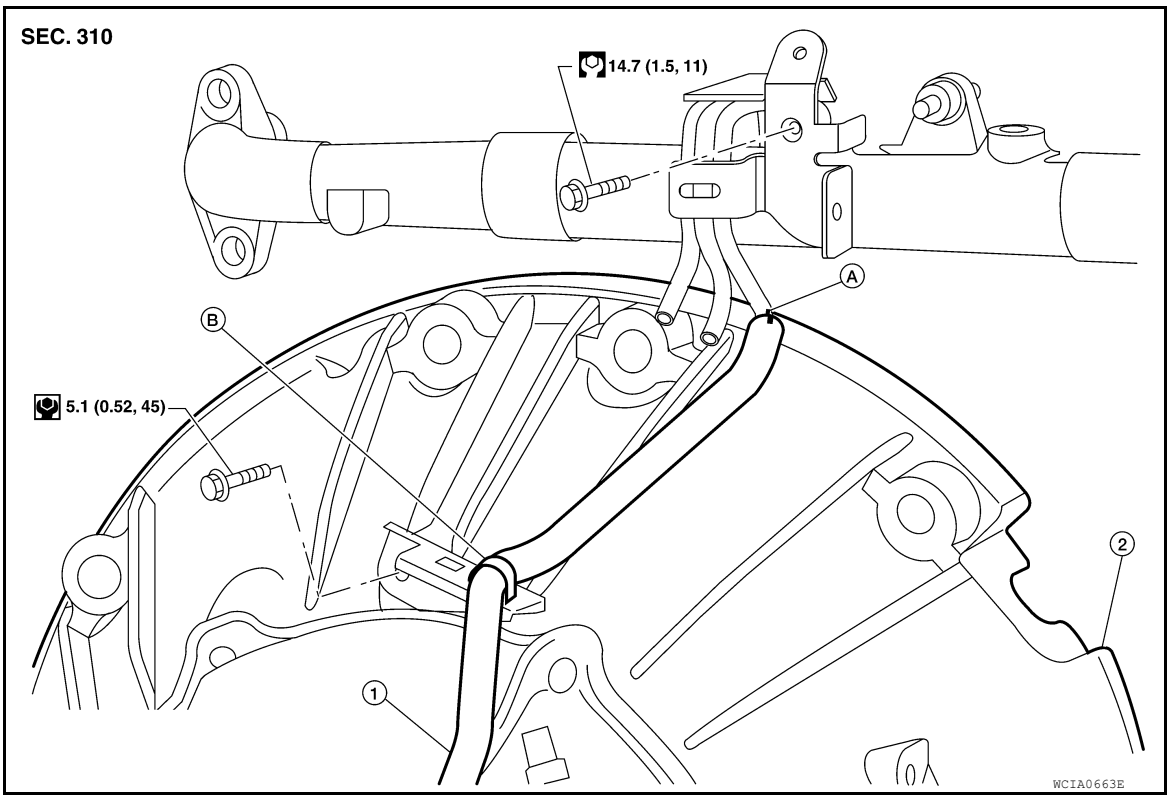
AIR BREATHER HOSE

2WD

2WD : Removal and Installation

INFOID:0000000006244882

VQ40DE Models



1. Air breather hose
2. Transmission assembly
A. Paint mark
B. Clip

REMOVAL

1. Release air breather hose from clip.
2. Disconnect air breather hose from transmission tube.
3. Disconnect air breather hose from air breather tube.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

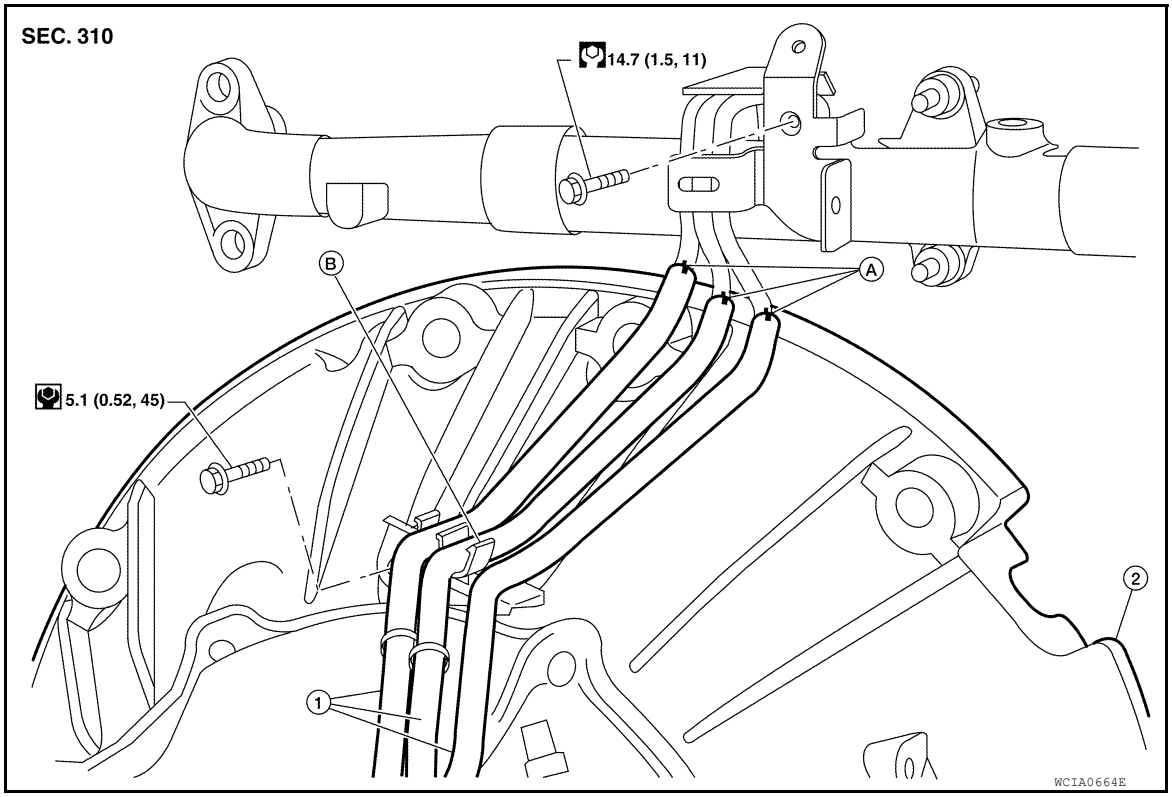
- **Install air breather hose with paint mark at upper side.**
- **When installing the air breather hose, do not crush or block by folding or bending the hose.**
- **When inserting the hose to the transmission tube, be sure to insert it fully until its end reaches the tube bend portion.**
- **Make sure clip is securely installed to bracket.**

4WD

4WD : Removal and Installation

INFOID:0000000006244883

VQ40DE Models



1. Air breather hose
2. Transmission assembly
A. Paint mark
B. Clip

REMOVAL

1. Release air breather hose from clip.
2. Disconnect air breather hose from transmission tube.
3. Disconnect air breather hose from air breather tube.

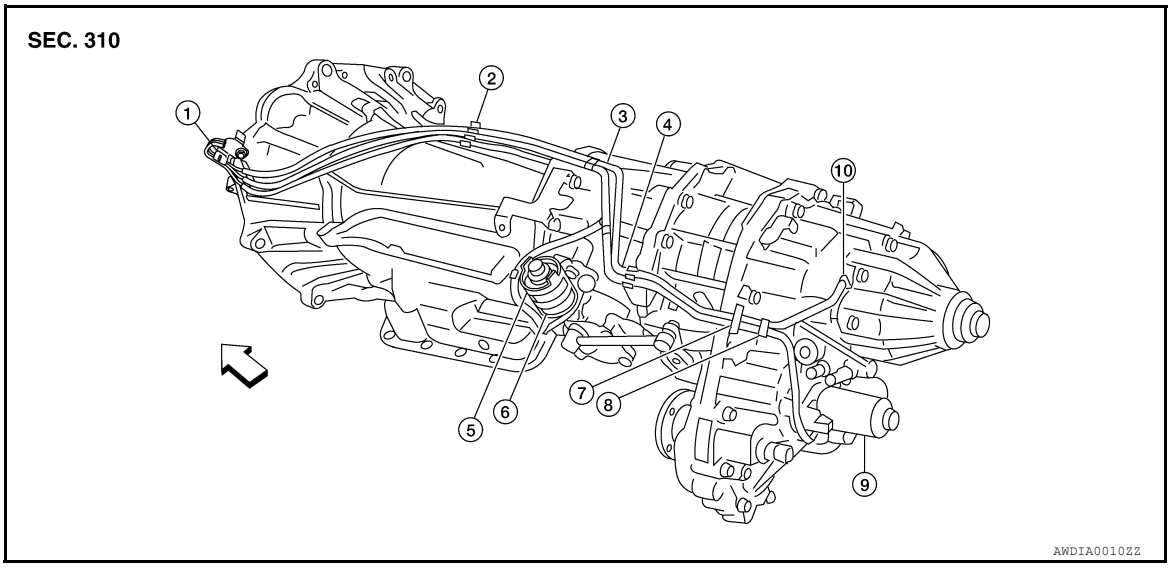
INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Install air breather hose with paint mark at upper side.**
- **When installing an air breather hose, do not crush or block by folding or bending the hose.**
- **When inserting a hose to the transmission tube, be sure to insert it fully until its end reaches the tube bend portion.**
- **Make sure clip is securely installed to bracket.**

VK56DE Models



1. Breather tube	2. Clip A	3. Clip B
4. Clip C	5. Clip D	6. Actuator
7. Air breather hose clamp	8. Clip E	9. Transfer motor
10. Breather tube (transfer)	⇨ Vehicle front	

REMOVAL

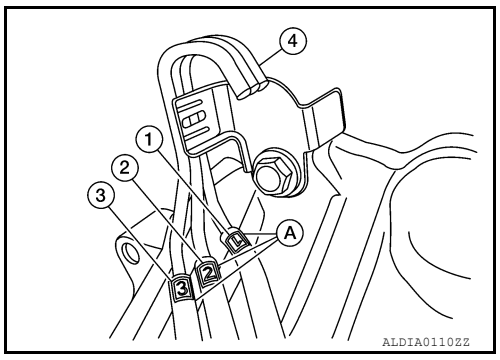
1. Release air breather hose from clip.
2. Disconnect air breather hose from transmission tube.
3. Disconnect air breather hose from air breather tube.

INSTALLATION

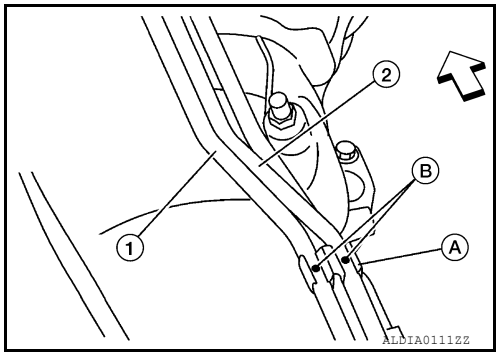
CAUTION:

Make sure there are no pinched or restricted areas on each air breather hose caused by folding or bending when installing it.

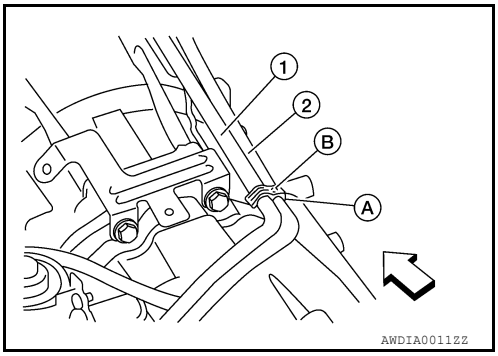
1. Install each air breather hose into the breather tube (4). Set each air breather hose with paint mark facing upward.
   - A/T breather hose (1)
   - Transfer breather hose (2)
   - Actuator/transfer motor breather hose (3)
   - Paint marks (A)



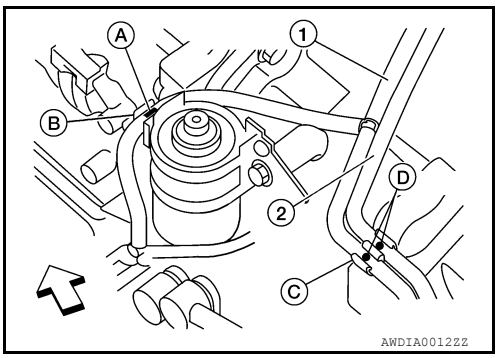
2. Install actuator/transfer motor air breather hose (1) and transfer air breather hose (2) on clip (A) with the paint mark (B) facing upward.
   - ⇦:Front



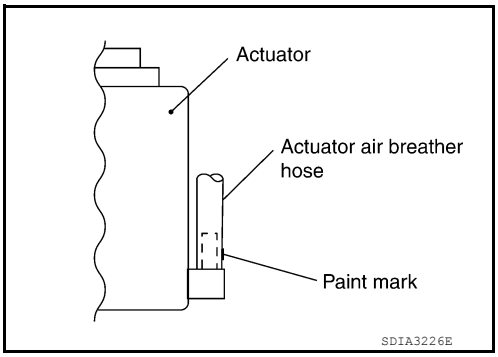
3. Install clip (B) on actuator/transfer motor air breather hose (1) and transfer air breather hose (2) with the paint mark (A) matched.
   • ⇦:Front



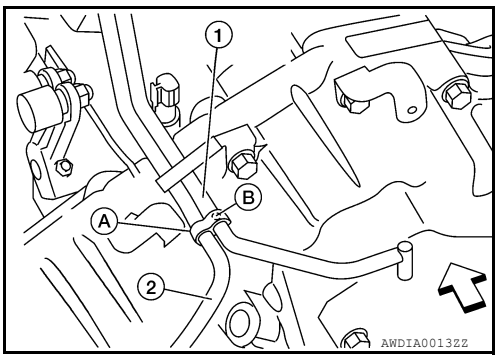
4. Install actuator/transfer motor air breather hose (1) and transfer air breather hose (2) on clip (B) and clip (C) with the paint mark (A) and (D) facing upward.
   • ⇦:Front



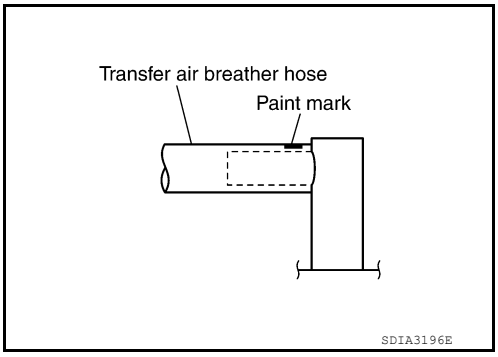
5. Install the actuator air breather hose into the actuator (case connector) until the hose end reaches the base of the tube. Set actuator air breather hose with paint mark facing leftward.



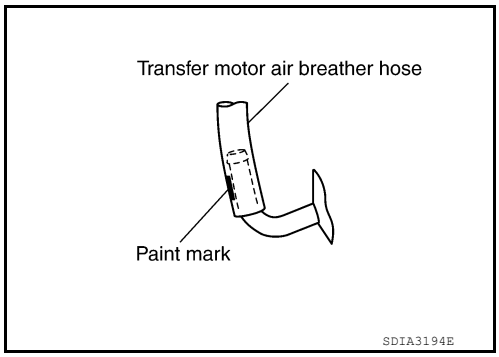
6. Install clip (B) on transfer motor air breather hose (2) and transfer air breather hose (1) with the paint mark (A) matched.
   • ⇦:Front



7. Install the transfer air breather hose into the breather tube (transfer, metal connector) until the hose end reaches the base of the tube. Set transfer air breather hose with paint mark facing upwards.



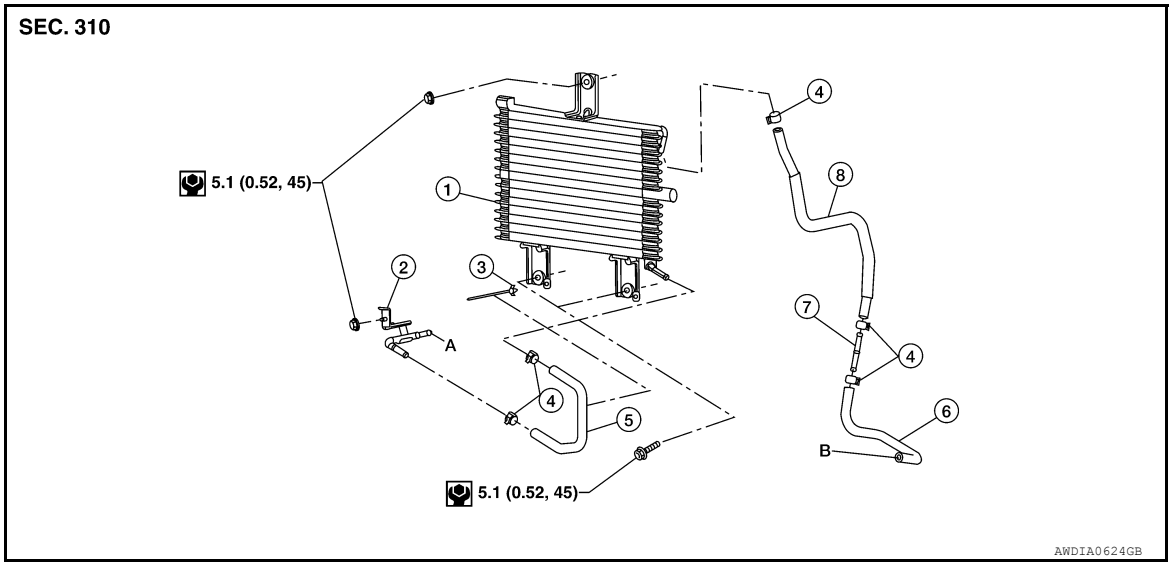
8. Install the transfer motor air breather hose into the transfer motor (case connector) until the hose end reaches the end of the curved section. Set transfer motor air breather hose with paint mark facing leftward.



A/T FLUID COOLER

Removal and Installation

INFOID:0000000006244884



1. A/T fluid cooler
2. Fluid cooler tube
3. Clip
4. Hose clamp
5. Cooler hose (lower)
6. Cooler hose
7. Tube joint
8. Cooler hose (upper)
A. To transmission
B. From radiator

REMOVAL

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

1. Remove front grill. Refer to EXT-20, "Removal and Installation".
2. Remove A/T fluid cooler hoses from fluid cooler.
3. Remove A/T fluid cooler.

INSTALLATION

Installation is in the reverse order of removal.

- After completing installation, check fluid level and check for fluid leakage. Refer to TM-155, "Checking the A/T Fluid (ATF)".

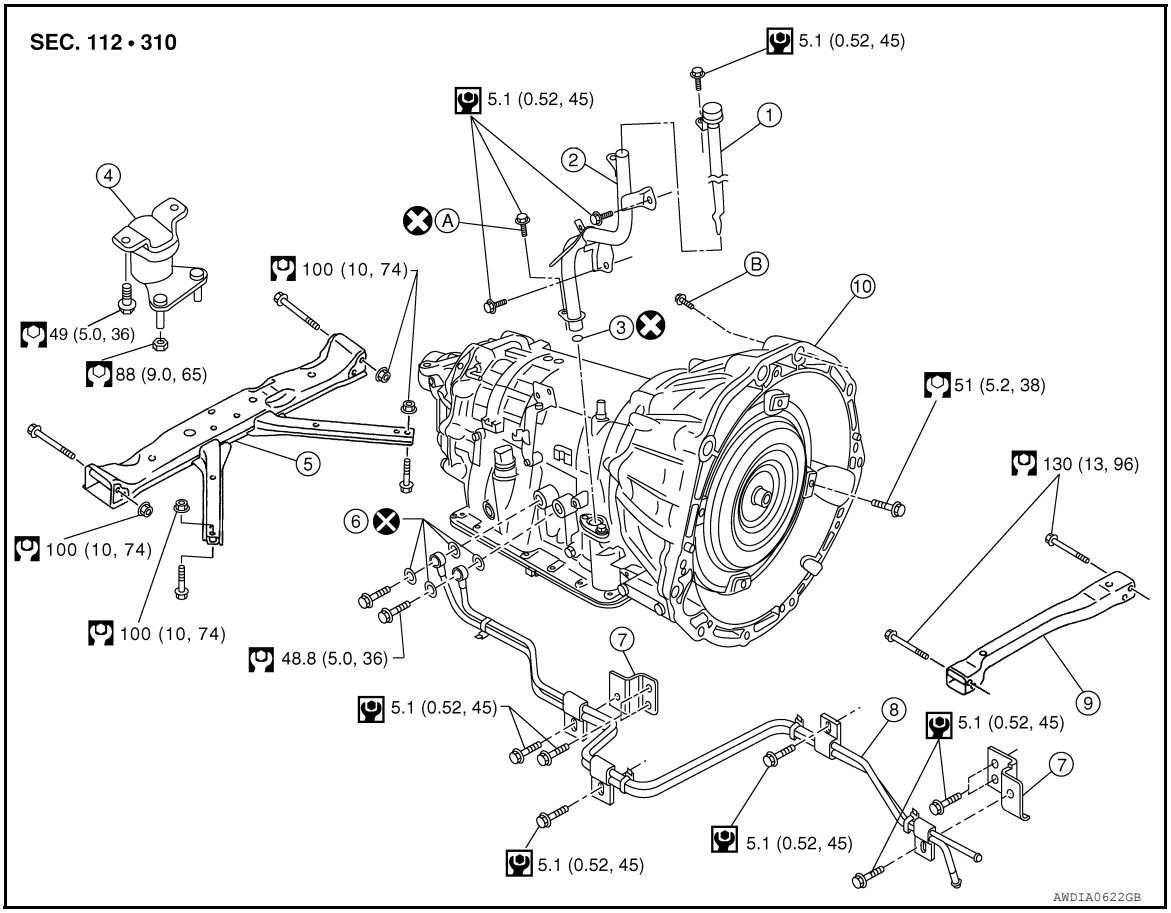
UNIT REMOVAL AND INSTALLATION

TRANSMISSION ASSEMBLY

2WD

2WD : Exploded View

INFOID:0000000006244885



1.	A/T fluid level gauge	2.	A/T fluid charging pipe	3.	O-ring
4.	Insulator	5.	A/T crossmember	6.	Copper sealing washer
7.	Bracket	8.	A/T fluid cooler tube	9.	Front crossmember
10.	Transmission assembly	A.	Self-sealing bolt	B.	Refer to installation.

2WD : Removal and Installation

INFOID:0000000006244886

REMOVAL

CAUTION:

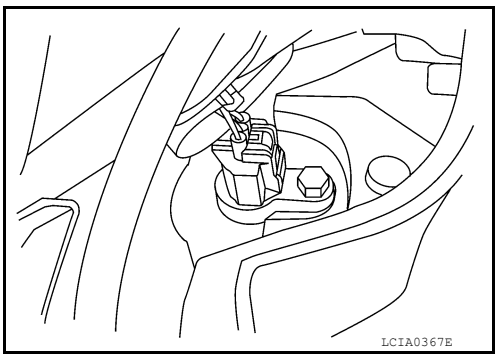
When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.

NOTE:

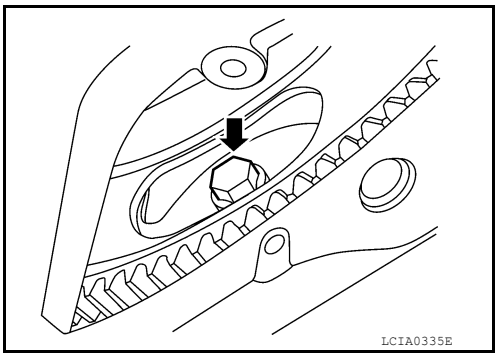
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

1. Disconnect the negative battery terminal.
2. Remove the A/T fluid level gauge.
3. Remove front LH wheel and tire assembly. Refer to WT-50, "Adjustment".
4. Remove the front LH mud flap. Refer to EXT-27, "Removal and Installation".
5. Remove the LH fender protector. Refer to EXT-25, "Removal and Installation of Front Fender Protector".

6. Remove the crankshaft position sensor (POS) from the A/T assembly.
   CAUTION:
   - **Do not subject it to impact by dropping or hitting it.**
   - **Do not disassemble.**
   - **Do not allow metal filings or foreign material to get on the sensor front edge magnetic area.**
   - **Do not place in an area affected by magnetism.**



7. Remove the under covers using power tool (if equipped).
8. Remove the front crossmember using power tool.
9. Remove the starter motor.
10. Remove the rear propeller shaft. Refer to DLN-328, "Removal and Installation".
11. Remove the left and right front exhaust tubes. Refer to EX-7, "Removal and Installation".
12. Remove the A/T shift selector control cable and bracket from the A/T.
13. Disconnect the A/T fluid cooler tubes from the A/T assembly.
14. Remove the dust cover from the converter housing.
15. Turn the crankshaft to access and remove the four bolts for the drive plate to torque converter.
    CAUTION:
    When turning the crankshaft, turn it clockwise as viewed from the front of the engine.

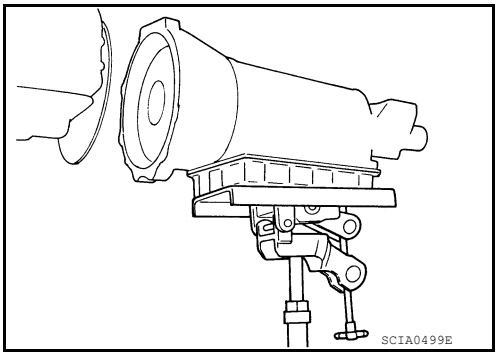


16. Support the A/T assembly using a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to allow it to collide against the drain plug.
17. Remove the nuts securing the insulator to the crossmember.
18. Remove the crossmember using power tool.
19. Tilt the transmission slightly to gain clearance between the body and the transmission, then disconnect the air breather hose.
20. Disconnect the A/T assembly harness connector.
21. Remove the wiring harness from the retainers.
22. Remove the A/T fluid charging pipe.
23. Remove the A/T assembly to engine bolts using power tool.
24. Remove A/T assembly from the vehicle using Tool.

    Tool number : — (J-47002)

    CAUTION:
    - **Secure the torque converter to prevent it from dropping.**
    - **Secure the A/T assembly the transmission jack.**

    NOTE:
    The actual special service Tool may differ from Tool shown.

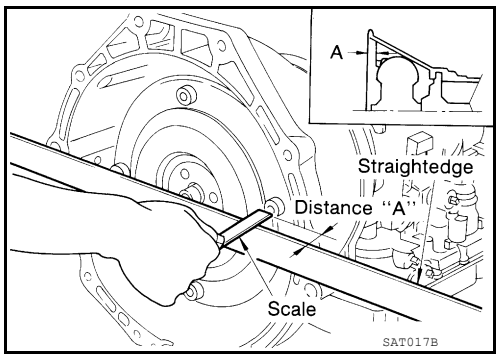


INSPECTION

Installation and Inspection of Torque Converter

- After inserting the torque converter to the transmission, check dimension (A) to ensure it is within the reference value limit.

Distance (A) : 25.0 mm (0.98 in) or more



INSTALLATION

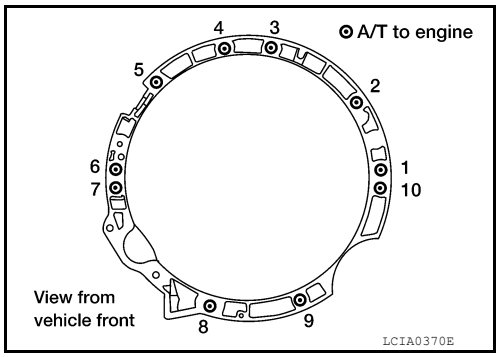
Installation is in the reverse order of removal.

CAUTION:

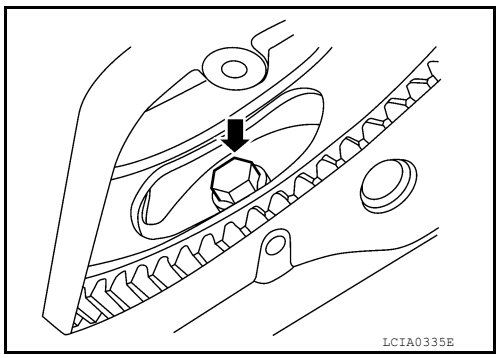
- **When replacing an engine or transmission you must make sure the dowels are installed correctly during re-assembly.**
- **Improper alignment caused by missing dowels may cause vibration, oil leaks or breakage of drivetrain components.**
- **Do not reuse O-rings or copper sealing washers. Refer to TM-193, "2WD : Exploded View".**
- **When turning crankshaft, turn it clockwise as viewed from the front of the engine.**
- **After converter is installed to drive plate, rotate crankshaft several turns and check to be sure that transmission rotates freely without binding.**
- **When tightening the bolts for the torque converter while securing the crankshaft pulley bolt, be sure to confirm the tightening torque of the crankshaft pulley bolt. Refer to EM-61, "Removal and Installation".**

When installing transmission to the engine, tighten the bolts to the specified torque as shown.

Transmission bolts : 75 N·m (7.6 kg-m, 55 ft-lb)



- When installing the drive plate to torque converter bolts, align the positions of bolts for drive plate with those of the torque converter and temporarily tighten the bolts. Then tighten the bolts with the specified torque.
- After completing installation, fill A/T with fluid and check fluid leakage, fluid level, and the positions of A/T. Refer to TM-155, "Checking the A/T Fluid (ATF)", TM-171, "Inspection and Adjustment".

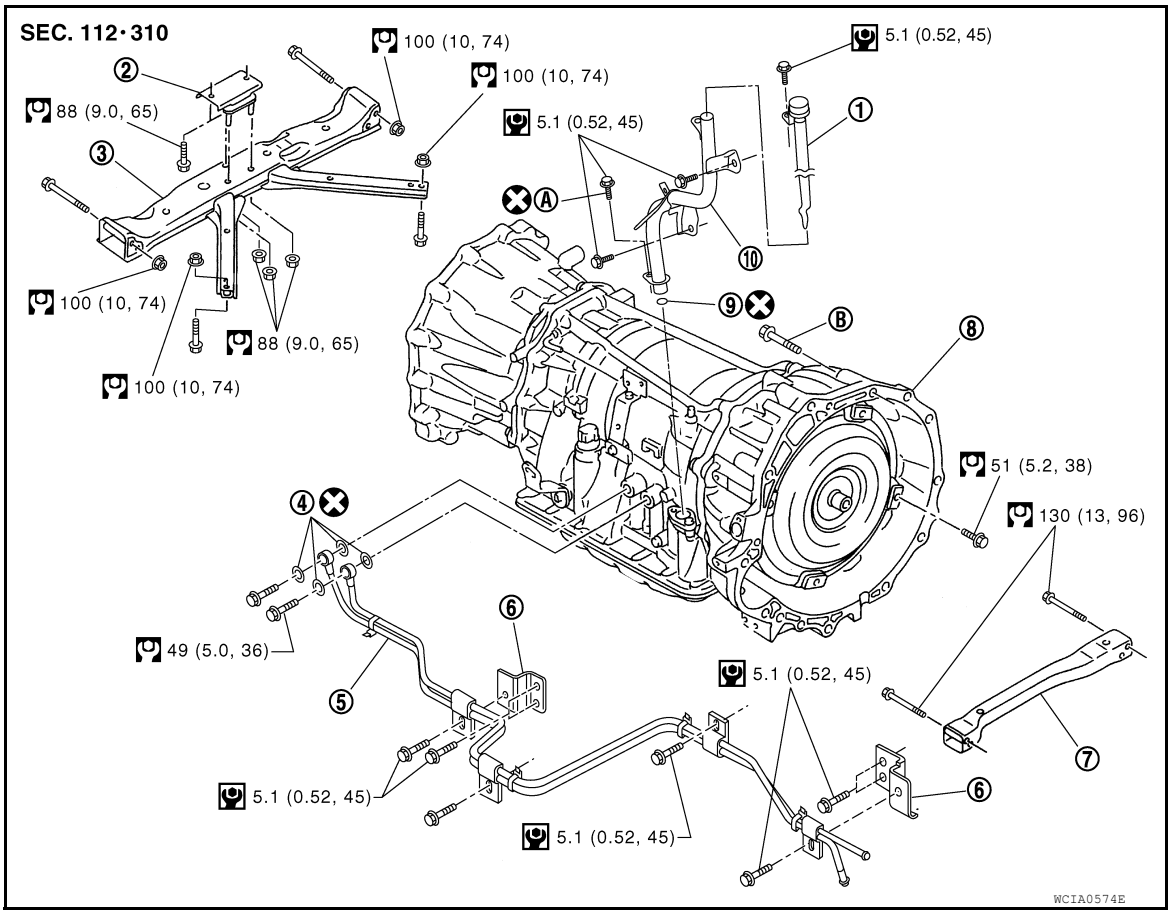


4WD

4WD : Exploded View

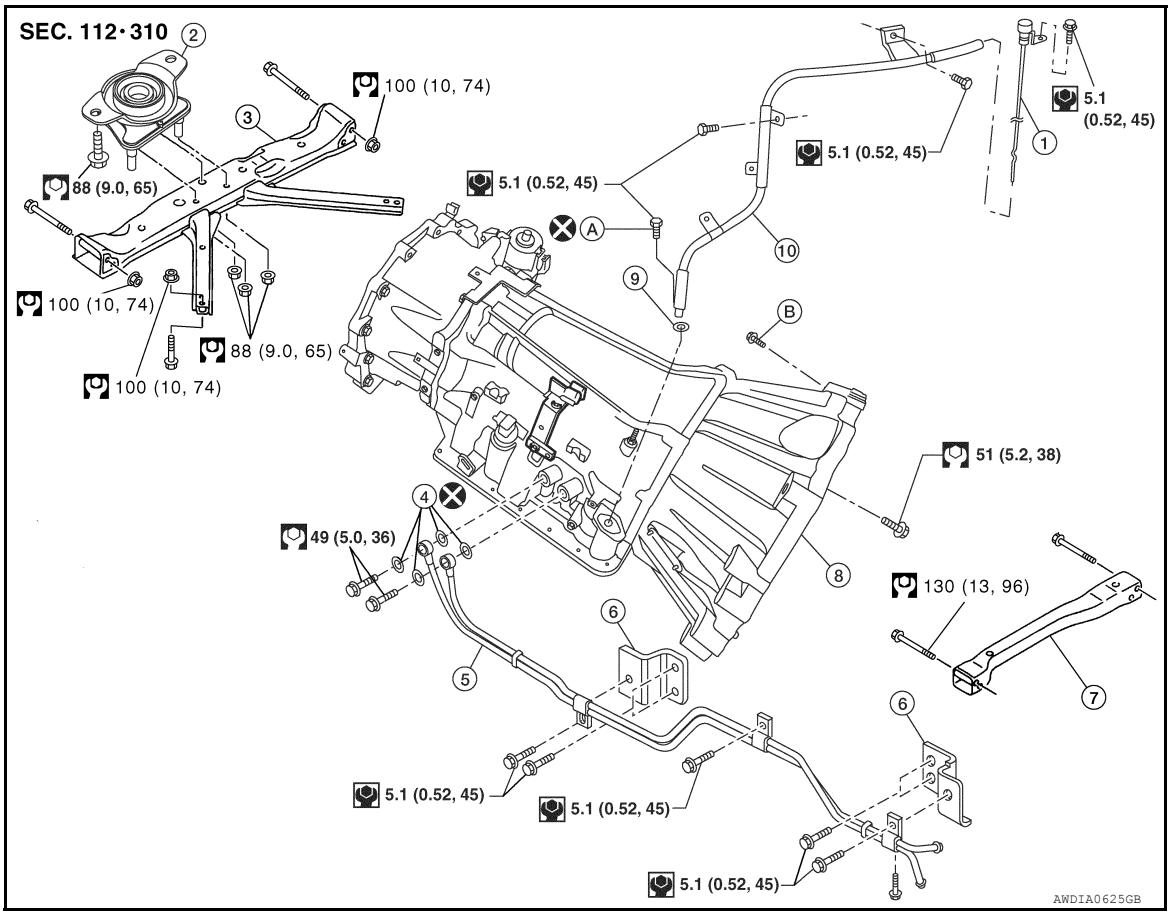
INFOID:0000000006244887

VQ40DE



1.	A/T fluid level gauge	2.	Insulator	3.	A/T crossmember
4.	Copper sealing washers	5.	A/T fluid cooler tube	6.	Bracket
7.	Front crossmember	8.	Transmission assembly	9.	O-ring
10.	A/T fluid charging pipe	A.	Self-sealing bolt	B.	Refer to installation

VK56DE



1.	A/T fluid level gauge	2.	Insulator	3.	A/T crossmember
4.	Copper sealing washers	5.	A/T fluid cooler tube	6.	Bracket
7.	Front crossmember	8.	Transmission assembly	9.	O-ring
10.	A/T fluid charging pipe	A.	Self-sealing bolt	B.	Refer to installation

4WD : Removal and Installation

INFOID:0000000006244888

REMOVAL

CAUTION:

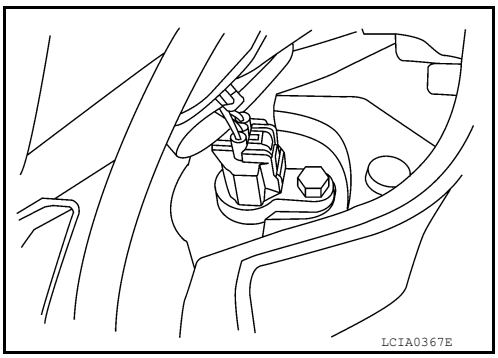
When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.

NOTE:

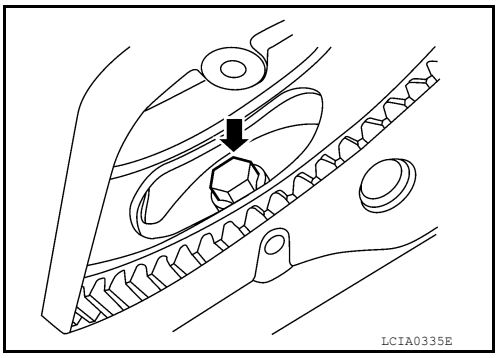
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

1. Disconnect the negative battery terminal.
2. Remove the A/T fluid level gauge.
3. Remove front LH wheel and tire assembly. Refer to WT-50, "Adjustment".
4. Remove the front LH mud flap. Refer to EXT-27, "Removal and Installation".
5. Remove the LH fender protector. Refer to EXT-25, "Removal and Installation of Front Fender Protector".

6. Remove the crankshaft position sensor (POS) from the A/T assembly.
   CAUTION:
   - **Do not subject it to impact by dropping or hitting it.**
   - **Do not disassemble.**
   - **Do not allow metal filings or foreign material to get on the sensor's front edge magnetic area.**
   - **Do not place in an area affected by magnetism.**



7. Remove the under covers using power tool.
8. Remove the front crossmember using power tool.
9. Remove the starter motor.
10. Remove the front and rear propeller shafts. Refer to DLN-318, "Removal and Installation" for front and DLN-328, "Removal and Installation" (VQ40DE) or DLN-339, "Removal and Installation" (VK56DE) for rear.
11. Remove the left and right front exhaust tubes. Refer to EX-7, "Removal and Installation".
12. Remove the A/T shift selector control cable and bracket from the A/T.
13. Disconnect the fluid cooler tubes from the A/T assembly.
14. Remove the dust cover from the converter housing.
15. Turn the crankshaft to access and remove the four bolts for the drive plate and torque converter.
    CAUTION:
    When turning the crankshaft, turn it clockwise as viewed from the front of the engine.

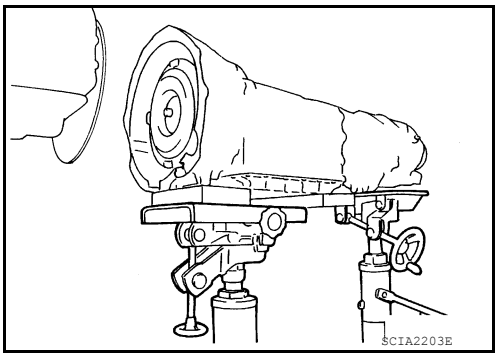


16. Support the A/T assembly using a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to allow it to collide against the drain plug.
17. Remove the nuts securing the insulator to the crossmember.
18. Remove the crossmember using power tool.
19. Tilt the transmission slightly to gain clearance between the body and the transmission, then disconnect the air breather hose.
20. Disconnect the following:
    - A/T assembly harness connector
    - Neutral-4LO switch connector (ATX14B only)
    - 4LO switch connector (TX15B only)
    - Wait detection switch connector
    - ATP switch connector
    - Transfer motor connector (ATX14B only)
    - Control valve assembly connector (ATX14B only)
    - Transfer control device connector
21. Remove the wiring harness from the retainers.
22. Remove the A/T fluid charging pipe.
23. Remove the A/T assembly to engine bolts using power tool.
24. Remove A/T assembly with transfer from the vehicle using Tool.

    Tool number : — (J-47002)

    CAUTION:
    - **Secure the torque converter to prevent it from dropping.**
    - **Secure the A/T assembly to the transmission jack.**

    NOTE:
    The actual special service Tool may differ from Tool shown.

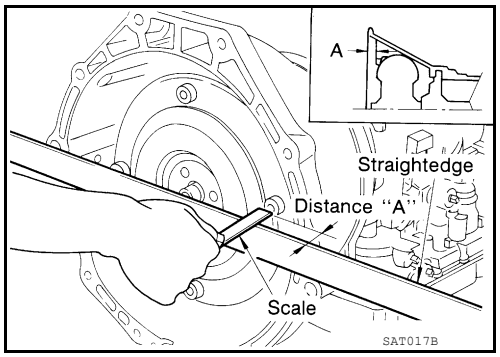


25. Remove the transfer from the A/T assembly. Refer to DLN-153, "Removal and Installation" (ATX14B) or DLN-286, "Removal and Installation" (TX15B).

INSPECTION

Installation and Inspection of Torque Converter

- After inserting the torque converter to the transmission, be sure to check dimension (A) to ensure it is within the reference value limit.



Dimension (A)

VQ40DE Models : 25.0 mm (0.98 in) or more

VK56DE Models : 24.0 mm (0.94 in) or more

INSTALLATION

Installation is in the reverse order of removal.

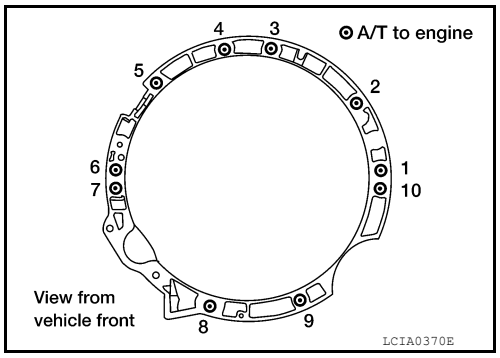
CAUTION:

- **When replacing an engine or transmission you must make sure the dowels are installed correctly during re-assembly.**
- **Improper alignment caused by missing dowels may cause vibration, oil leaks or breakage of drivetrain components.**
- **Do not reuse O-rings or copper sealing washers. Refer to TM-196, "4WD : Exploded View".**
- **When turning crankshaft, turn it clockwise as viewed from the front of the engine.**
- **After converter is installed to drive plate, rotate crankshaft several turns and check to be sure that transmission rotates freely without binding.**
- **When tightening the bolts for the torque converter while securing the crankshaft pulley bolt, be sure to confirm the tightening torque of the crankshaft pulley bolt. Refer to EM-61, "Removal and Installation" (VQ40DE) or EM-195, "Removal and Installation" (VK56DE).**

When installing transmission to the engine, tighten the bolts to the specified torque as shown.

- For VQ40DE

Transmission bolts : 75 N·m (7.6 kg-m, 55 ft-lb)

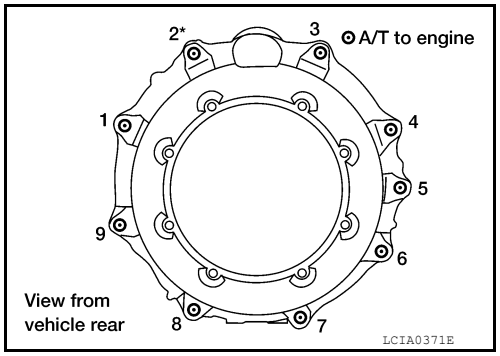


- For VK56DE

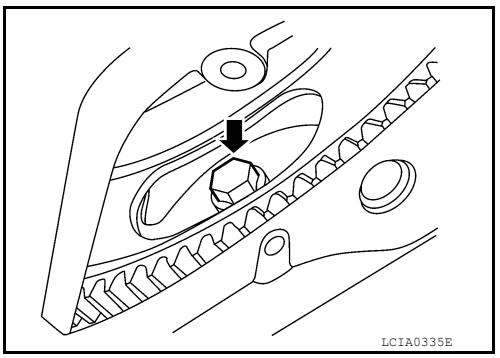
Transmission bolts : 113 N·m (12 kg-m, 83 ft-lb)

NOTE:

*: Bolt also secures air breather vent.



- When installing the drive plate to torque converter bolts, align the positions of bolts for drive plate with those of the torque converter and temporarily tighten the bolts. Then tighten the bolts with the specified torque.
- After completing installation, fill A/T with fluid and check fluid leakage, fluid level, and the positions of A/T. Refer to TM-155, "Checking the A/T Fluid (ATF)", TM-171, "Inspection and Adjustment".



UNIT DISASSEMBLY AND ASSEMBLY

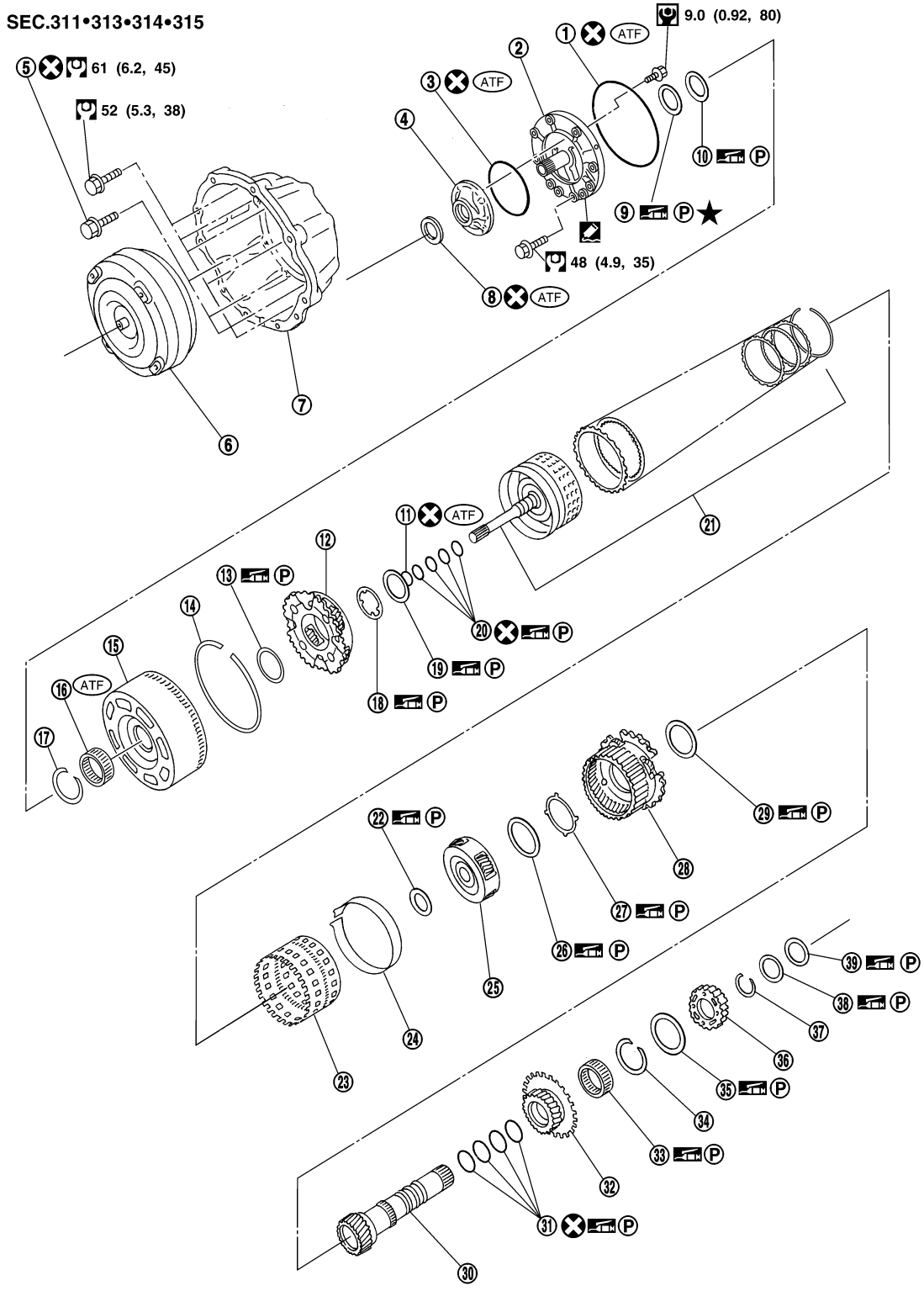
OVERHAUL

Exploded View

INFOID:0000000006244889

VQ40DE MODELS

Bell Housing Components

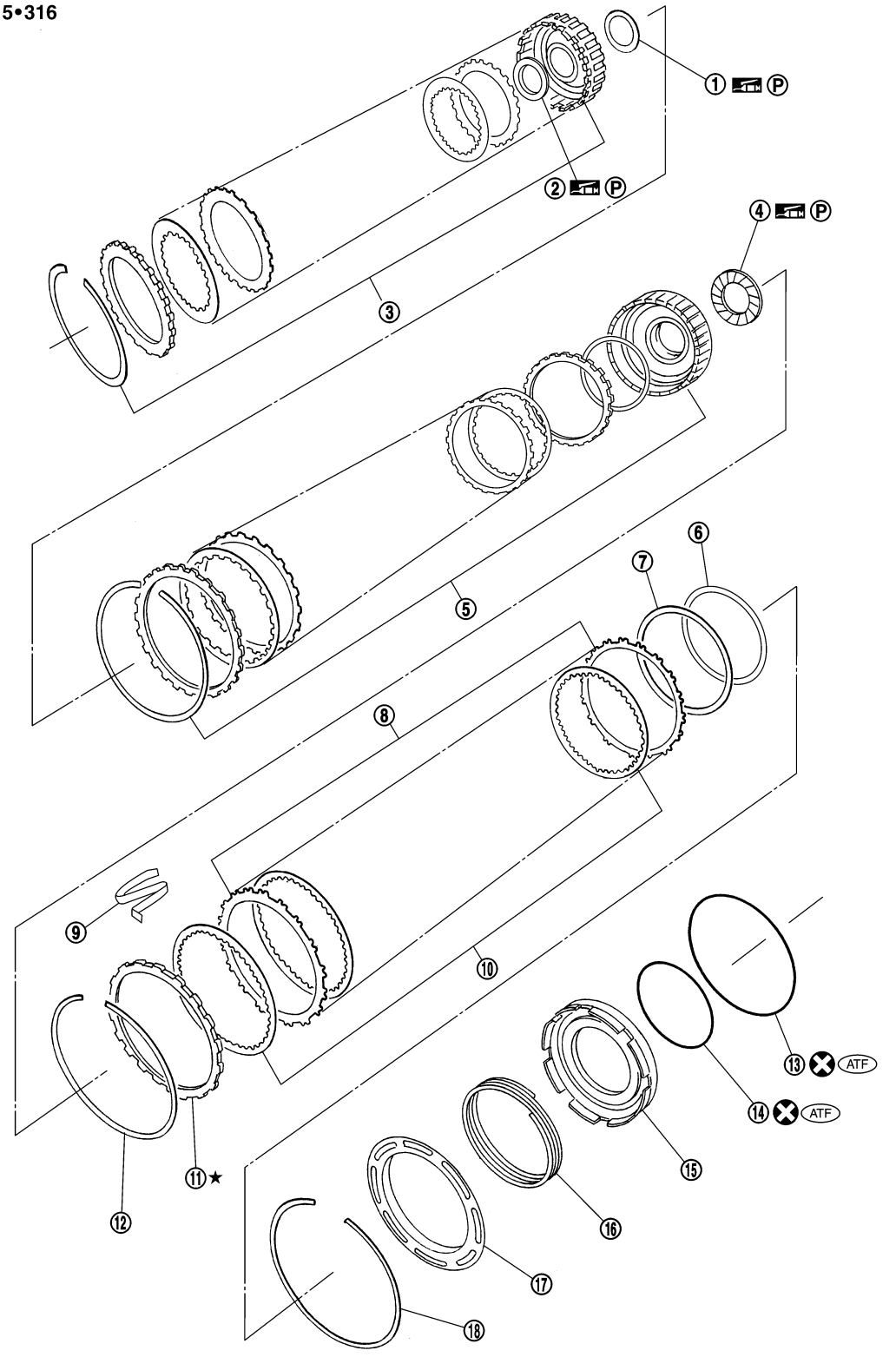


WCIA0661E

1. O-ring
2. Oil pump cover
3. O-ring
4. Oil pump housing
5. Self-sealing bolts
6. Torque converter
7. Converter housing
8. Oil pump housing oil seal
9. Bearing race
10. Needle bearing
11. O-ring
12. Front carrier assembly
13. Needle bearing
14. Snap ring
15. Front sun gear
16. 3rd one-way clutch
17. Snap ring
18. Bearing race
19. Needle bearing
20. Seal ring
21. Input clutch assembly
22. Needle bearing
23. Rear internal gear
24. Brake band
25. Mid carrier assembly
26. Needle bearing
27. Bearing race
28. Rear carrier assembly
29. Needle bearing
30. Mid sun gear
31. Seal ring
32. Rear sun gear
33. 1st one-way clutch
34. Snap ring
35. Needle bearing
36. High and low reverse clutch hub
37. Snap ring
38. Bearing race
39. Needle bearing

Clutch Pack Components

SEC.315•316

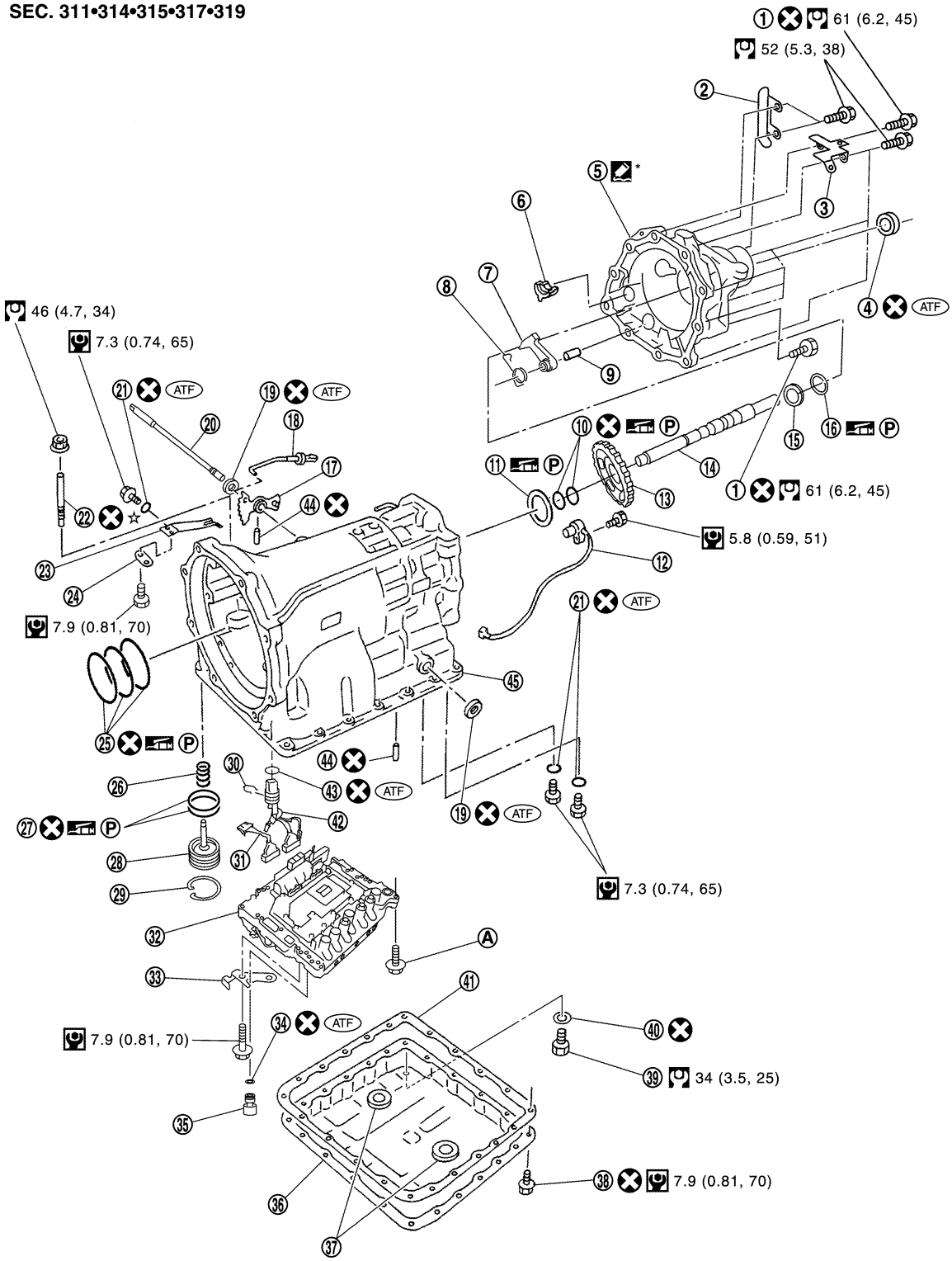


1. Needle bearing	2. Bearing race	3. High and low reverse clutch assembly
4. Needle bearing	5. Direct clutch assembly	6. Reverse brake dish plate
7. Reverse brake dish plate	8. Reverse brake driven plate	9. N-spring
10. Reverse brake drive plate	11. Reverse brake retaining plate	12. Snap ring

13. D-ring
14. D-ring
15. Reverse brake piston
16. Return spring
17. Spring retainer
18. Snap ring

Transmission Case Components for 2WD

SEC. 311•314•315•317•319



JSDIA2264GB

1. Self-sealing bolt
2. Bracket-
3. Bracket
4. Rear oil seal
5. Rear extension
6. Parking actuator support
7. Parking pawl
8. Return spring
9. Pawl shaft
10. Seal ring
11. Needle bearing
12. Output speed sensor

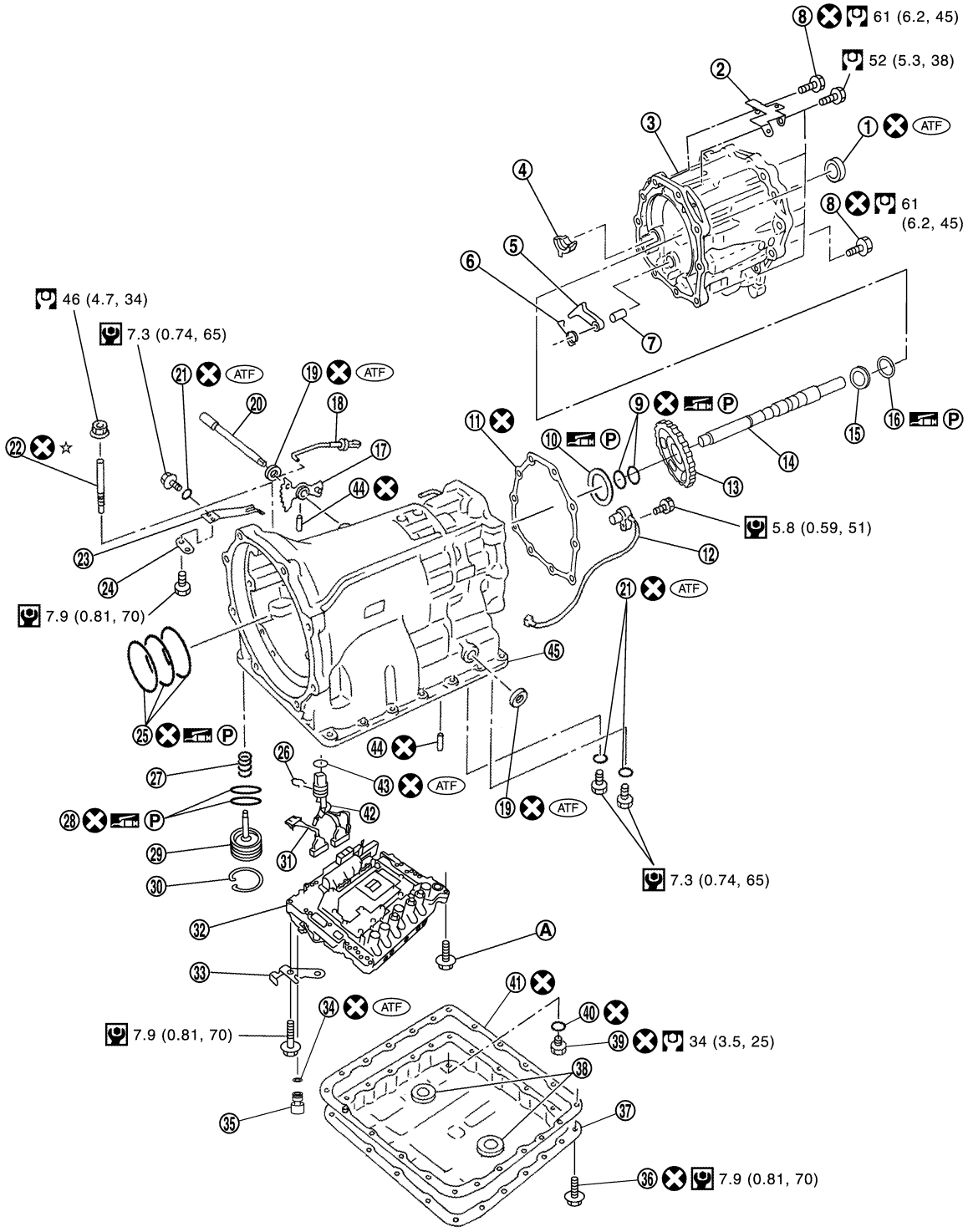
13. Parking gear	14. Output shaft	15. Bearing race
16. Needle bearing	17. Manual plate	18. Parking rod
19. Manual shaft oil seal	20. Manual shaft	21. O-ring
22. Band servo anchor end pin	23. Detent spring	24. Spacer
25. Seal ring	26. Return spring	27. O-ring
28. Servo assembly	29. Snap ring	30. Snap ring
31. Sub-harness	32. Control valve with TCM	33. Bracket
34. O-ring	35. Plug	36. Oil pan
37. Magnet	38. Oil pan bolt	39. Drain plug
40. Drain plug gasket	41. Oil pan gasket	42. Terminal cord assembly
43. O-ring	44. Retaining pin	45. Transmission case
46. Plug		

A. Tightening must be done following the assembly procedure. Refer to TM-273, "Assembly (2)".

*: Apply Genuine Anaerobic Liquid Gasket or equivalent.

Transmission Case Components for 4WD

SEC. 313•314•315•316•317•319



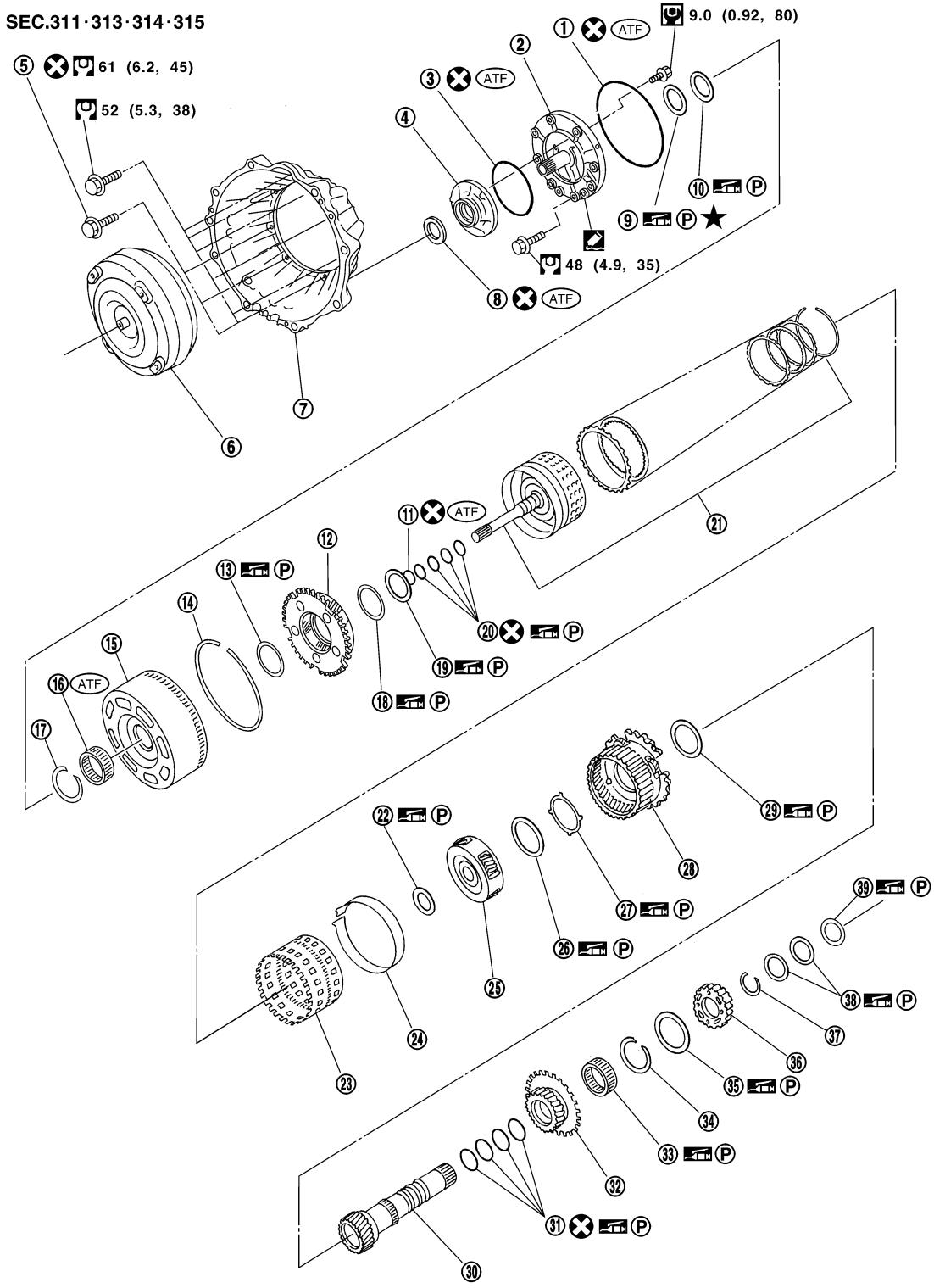
1. Rear oil seal
2. Bracket
3. Adapter case
4. Parking actuator support
5. Parking pawl
6. Return spring
7. Pawl shaft
8. Self-sealing bolt
9. Seal ring
10. Needle bearing
11. Gasket
12. Output speed sensor
13. Parking gear
14. Output shaft
15. Bearing race
16. Needle bearing
17. Manual plate
18. Parking rod

19. Manual shaft oil seal
20. Manual shaft
21. O-ring
22. Band servo anchor end pin
23. Detent spring
24. Spacer
25. Seal ring
26. Snap ring
27. Return spring
28. O-ring
29. Servo assembly
30. Snap ring
31. Sub-harness
32. Control valve with TCM
33. Bracket
34. O-ring
35. Plug
36. Oil pan
37. Magnet
38. Oil pan bolt
39. Drain plug
40. Drain plug gasket
41. Oil pan gasket
42. Terminal cord assembly
43. O-ring
44. Retaining pin
45. Transmission case
46. Plug

A. Tightening must be done following the assembly procedure. Refer to TM-273, "Assembly (2)".

VK56DE MODELS

Bell Housing Components

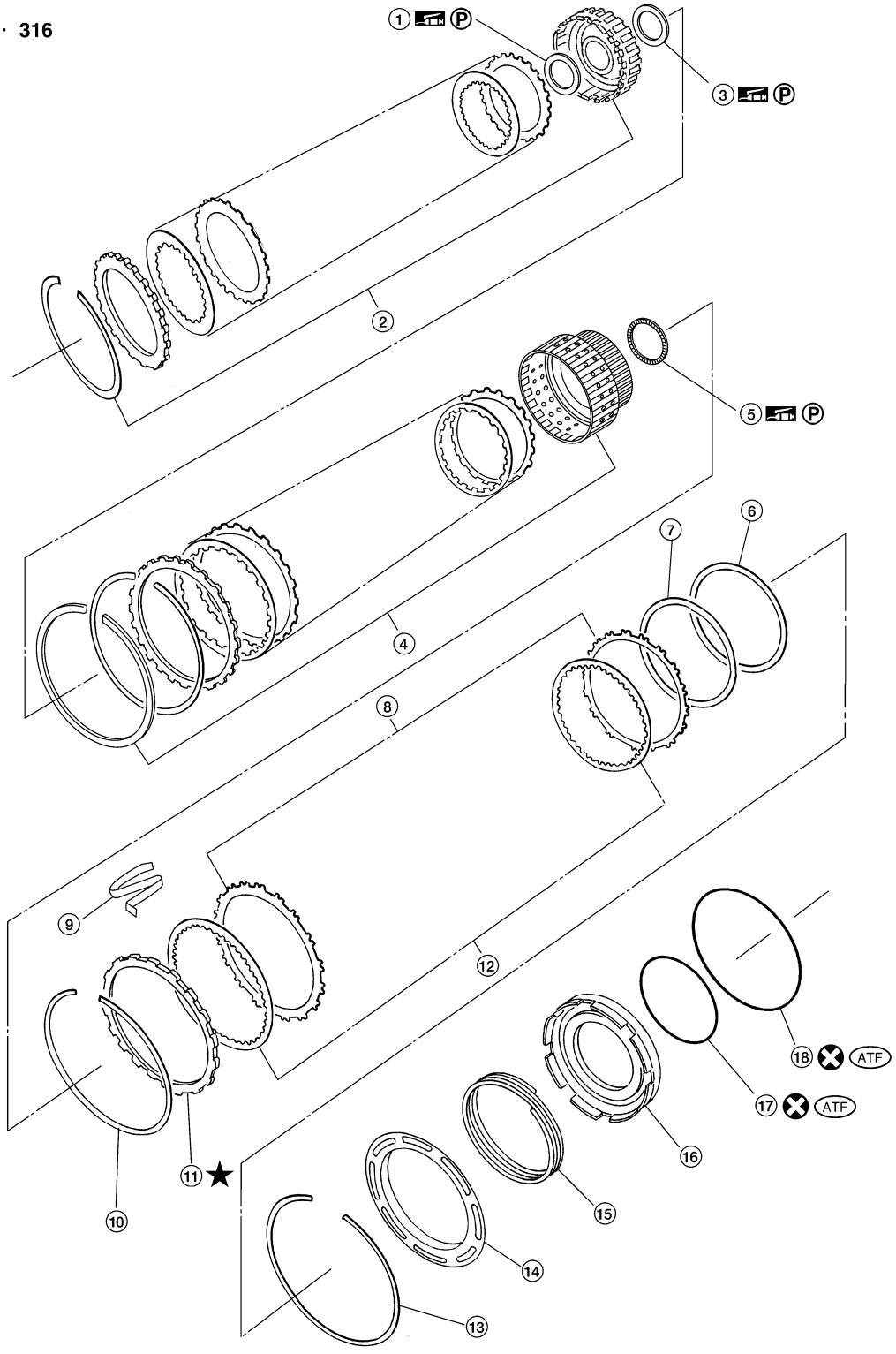


1. O-ring
2. Oil pump cover
3. O-ring
4. Oil pump housing
5. Self-sealing bolts
6. Torque converter
7. Converter housing
8. Oil pump housing oil seal
9. Bearing race
10. Needle bearing
11. O-ring
12. Front carrier assembly
13. Needle bearing
14. Snap ring
15. Front sun gear
16. 3rd one-way clutch
17. Snap ring
18. Bearing race

19. Needle bearing
20. Seal ring
21. Input clutch assembly
22. Needle bearing
23. Rear internal gear
24. Brake band
25. Mid carrier assembly
26. Needle bearing
27. Bearing race
28. Rear carrier assembly
29. Needle bearing
30. Mid sun gear
31. Seal ring
32. Rear sun gear
33. 1st one-way clutch
34. Snap ring
35. Needle bearing
36. High and low reverse clutch hub
37. Snap ring
38. Bearing race
39. Needle bearing

Clutch Pack Components

SEC.315· 316

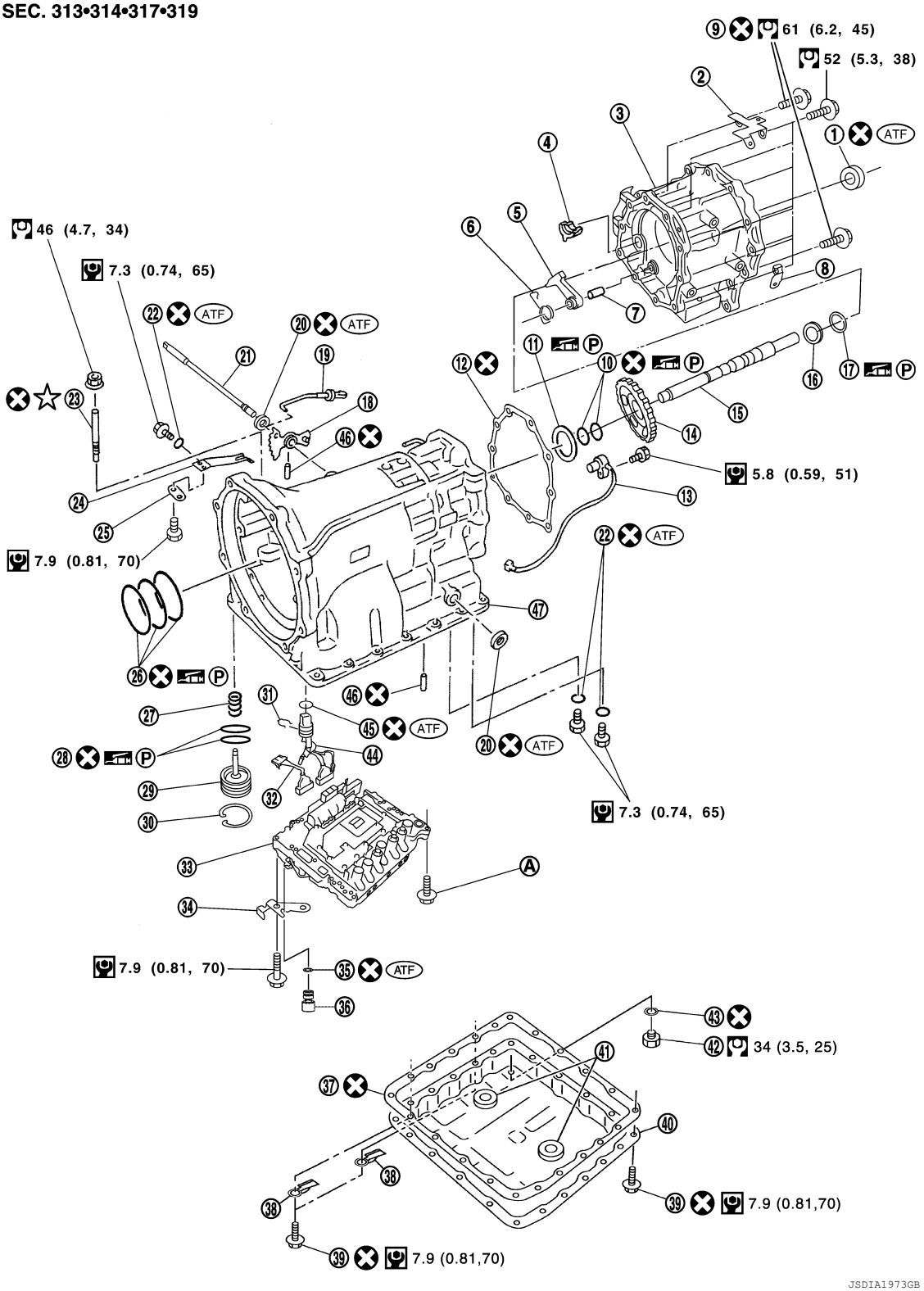


WCIA0623E

1. Bearing race
2. Needle bearing
3. Needle bearing
4. Direct clutch assembly
5. Needle bearing
6. Reverse brake dish plate
7. Reverse brake dish plate
8. Reverse brake driven plate
9. N-spring
10. Snap ring
11. Reverse brake retaining plate
12. Reverse brake drive plate
13. D-ring
14. D-ring
15. Reverse brake piston
16. Return spring
17. Spring retainer
18. Snap ring

Transmission Case Components for 4WD

SEC. 313•314•317•319



1. Rear oil seal
2. Bracket
3. Adapter case
4. Parking actuator support
5. Parking pawl
6. Return spring
7. Pawl shaft
8. Bracket
9. Self-sealing bolt
10. Seal ring
11. Needle bearing
12. Gasket
13. Output speed sensor
14. Parking gear
15. Output shaft
16. Bearing race
17. Needle bearing
18. Manual plate

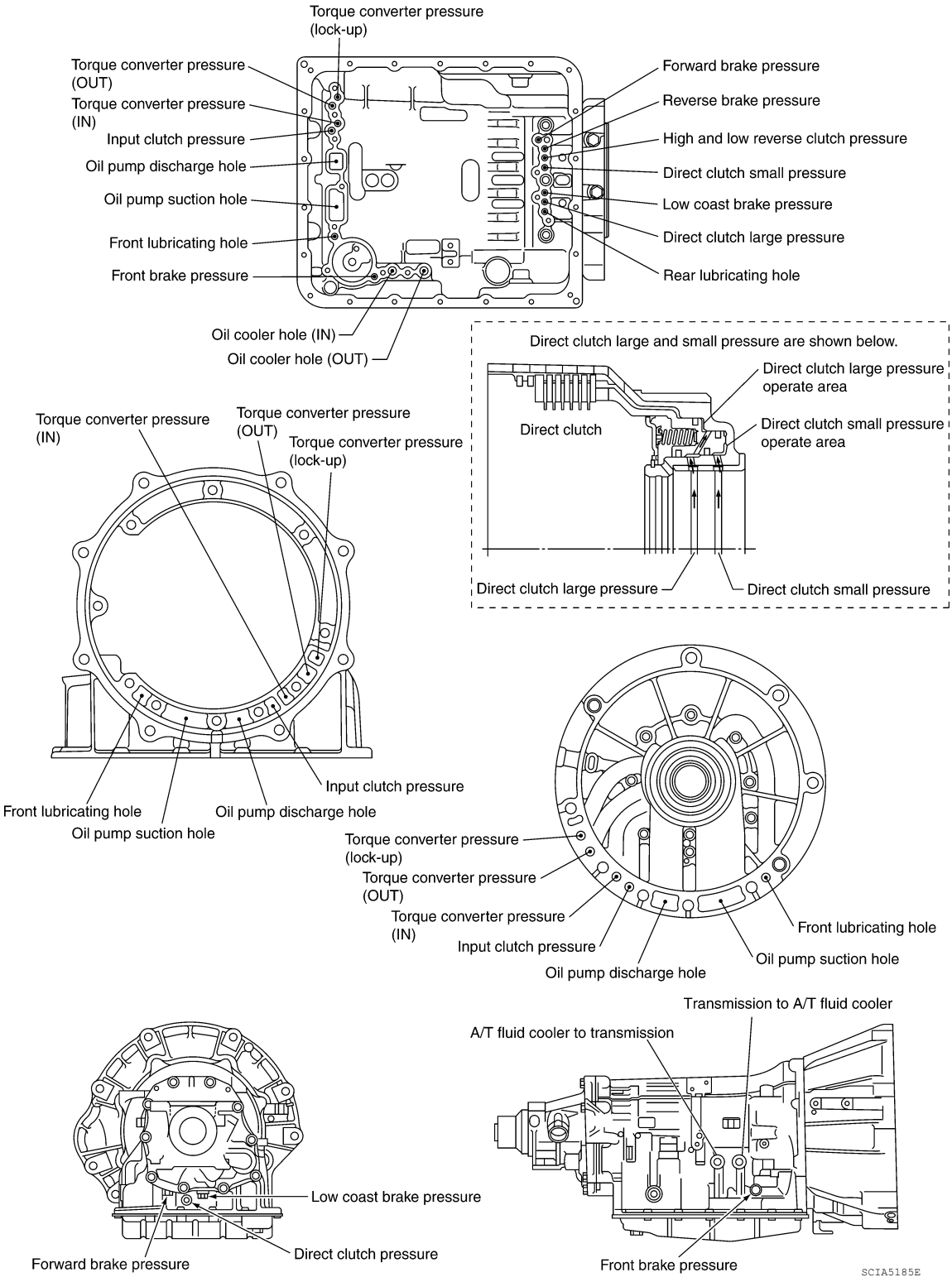
19. Parking rod	20. Manual shaft oil seal	21. Manual shaft
22. O-ring	23. Band servo anchor end pin	24. Detent spring
25. Spacer	26. Seal rings	27. Return spring
28. O-ring	29. Servo assembly	30. Snap ring
31. Snap ring	32. Sub-harness	33. Control valve with TCM
34. Bracket	35. O-ring	36. Plug
37. Oil pan gasket	38. Brackets	39. Oil pan bolt
40. Oil pan	41. Magnets	42. Drain plug
43. Drain plug gasket	44. A/T assembly harness connector	45. O-ring
46. Retaining pin	47. Transmission case	

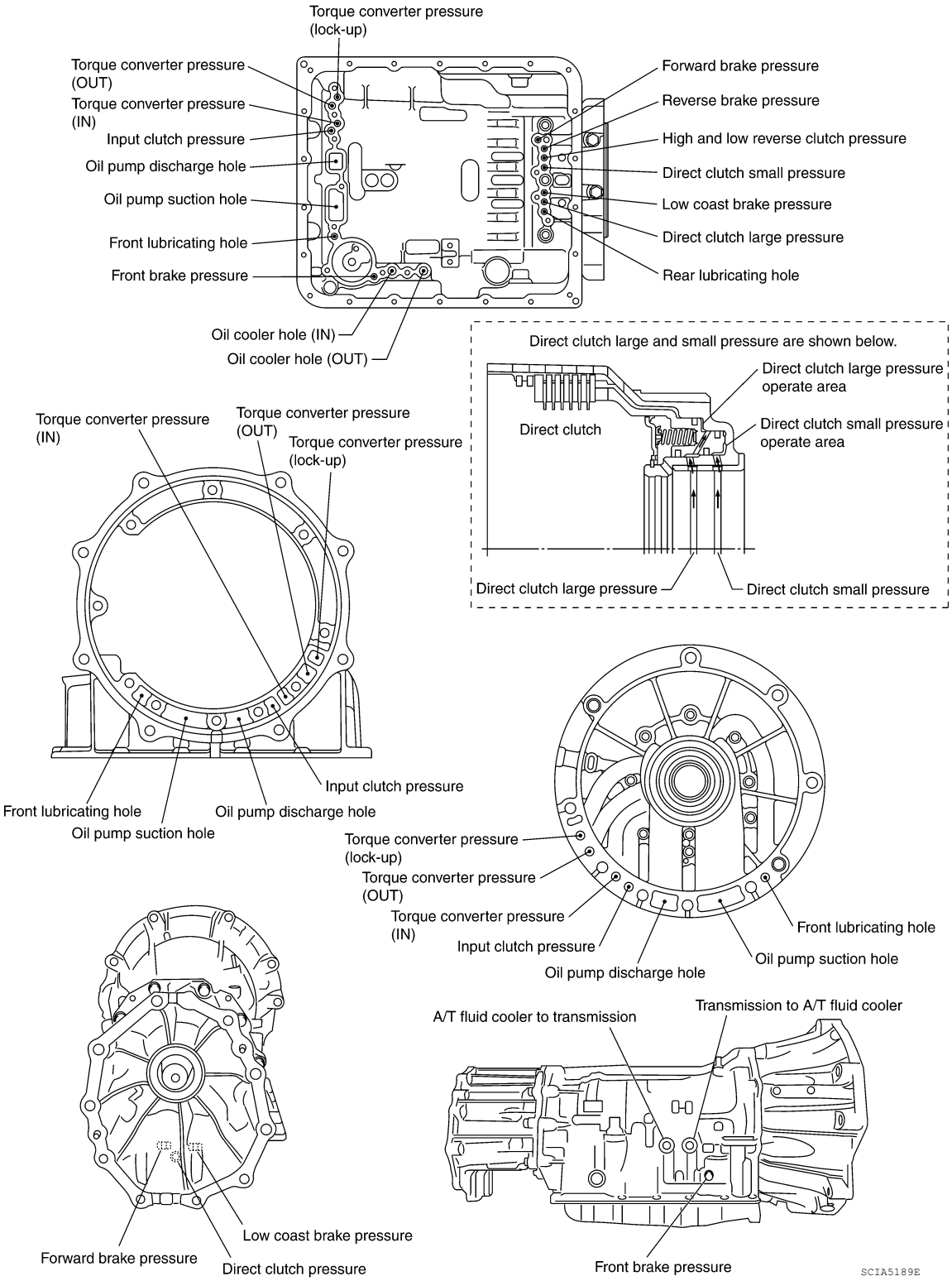
A. Tightening must be done following the assembly procedure. Refer to TM-273, "Assembly (2)".

Oil Channel

INFOID:0000000006244890

2WD models




Torque converter pressure (lock-up)
Torque converter pressure (OUT)
Torque converter pressure (IN)
Input clutch pressure
Oil pump discharge hole
Oil pump suction hole
Front lubricating hole
Front brake pressure
Oil cooler hole (IN)
Oil cooler hole (OUT)
Forward brake pressure
Reverse brake pressure
High and low reverse clutch pressure
Direct clutch small pressure
Low coast brake pressure
Direct clutch large pressure
Rear lubricating hole
Direct clutch large and small pressure are shown below.
Direct clutch
Direct clutch large pressure operate area
Direct clutch small pressure operate area
Direct clutch large pressure
Direct clutch small pressure
Torque converter pressure (IN)
Torque converter pressure (OUT)
Torque converter pressure (lock-up)
Input clutch pressure
Front lubricating hole
Oil pump discharge hole
Oil pump suction hole
Torque converter pressure (lock-up)
Torque converter pressure (OUT)
Torque converter pressure (IN)
Input clutch pressure
Oil pump discharge hole
Front lubricating hole
Oil pump suction hole
A/T fluid cooler to transmission
Transmission to A/T fluid cooler
Front brake pressure
Low coast brake pressure
Forward brake pressure
Direct clutch pressure
SCIA5189E

Location of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

INFOID:0000000006244891

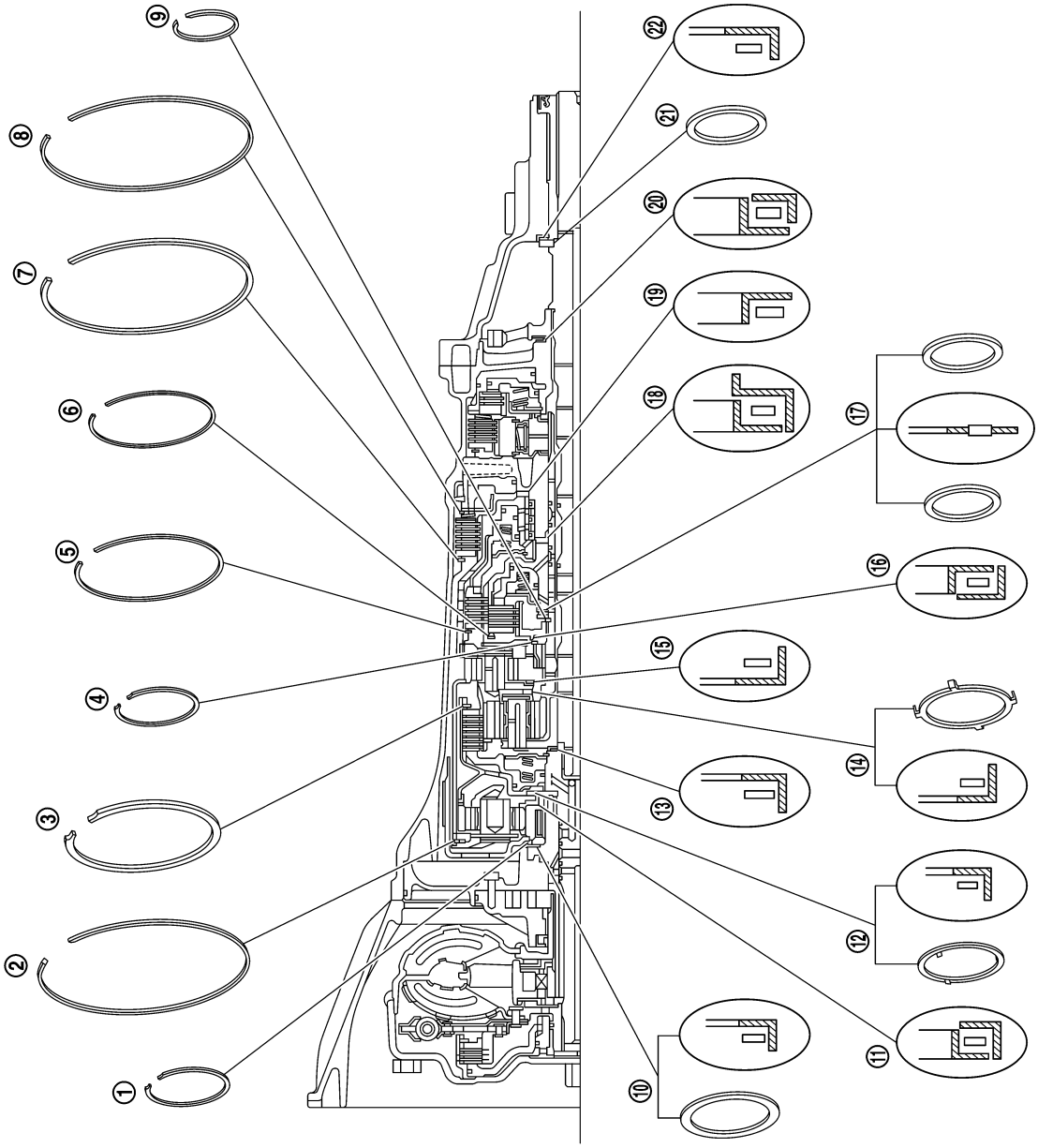
VQ40DE models 2WD

Outer diameter of snap rings

Item number	Outer diameter mm (in)
1	63 (2.48)
2	183 (7.20)
3	173 (6.81)
4	70 (2.76)
5	170 (6.69)
6	135 (5.31)
7	180 (7.09)
8	185 (7.28)
9	48 (1.89)

Outer diameter of needle bearings

Item number	Outer diameter mm (in)
10	80 (3.15)
11	77 (3.03)
12	77 (3.03)
13	47 (1.85)
14	84 (3.31)
15	80 (3.15)
16	92 (3.62)
17	60 (2.36)
18	63 (2.48)
19	92 (3.62)
20	65 (2.56)
22	60 (2.36)



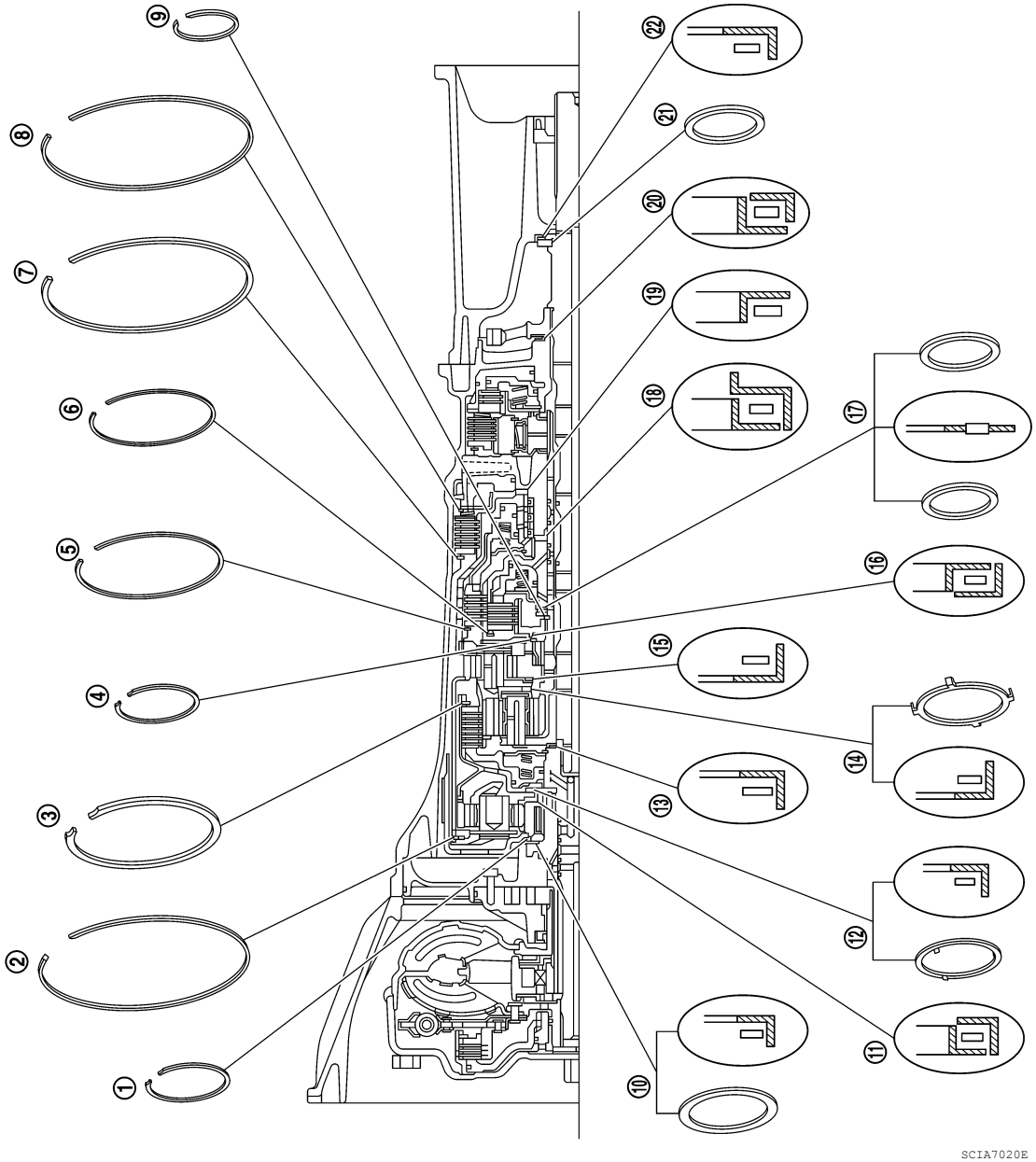
SCIA7019E

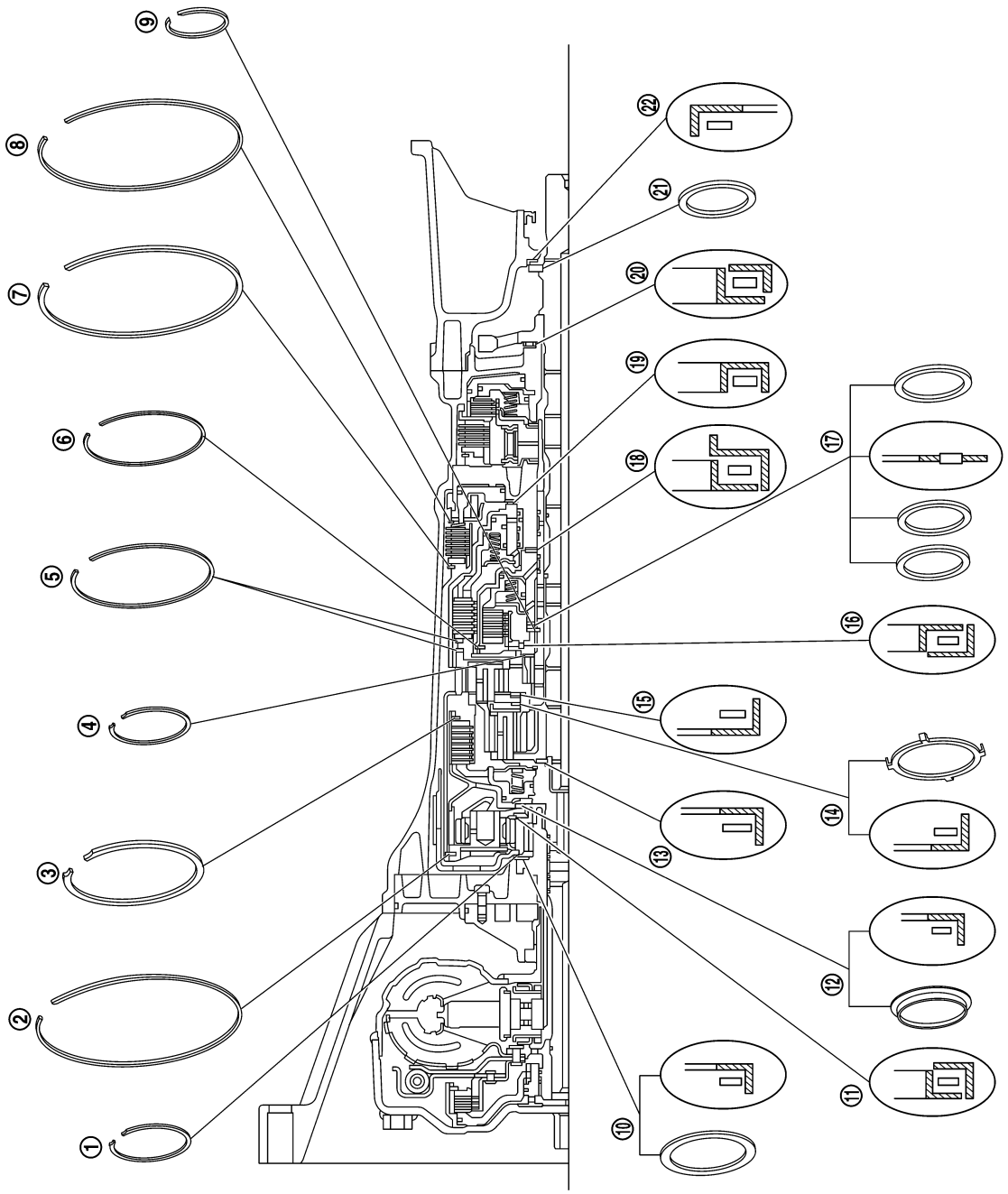
Outer diameter of snap rings

Item number	Outer diameter mm (in)
①	63 (2.48)
②	183 (7.20)
③	173 (6.81)
④	70 (2.76)
⑤	170 (6.69)
⑥	135 (5.31)
⑦	180 (7.09)
⑧	185 (7.28)
⑨	48 (1.89)

Outer diameter of needle bearings

Item number	Outer diameter mm (in)
⑩	80 (3.15)
⑪	77 (3.03)
⑫	77 (3.03)
⑬	47 (1.85)
⑭	84 (3.31)
⑮	80 (3.15)
⑯	92 (3.62)
⑰	60 (2.36)
⑱	63 (2.48)
⑲	92 (3.62)
⑳	65 (2.56)
㉒	60 (2.36)





WCIA0561E

1. Outer diameter 68 mm (2.68 in)
2. Outer diameter 182 mm (7.17 in)
3. Outer diameter 172 mm (6.77 in)
4. Outer diameter 71 mm (2.80 in)
5. Outer diameter 169 mm (6.65 in)
6. Outer diameter 134 mm (5.28 in)
7. Outer diameter 181 mm (7.13 in)
8. Outer diameter 181 mm (7.13 in)
9. Outer diameter 48 mm (1.89 in)
10. Outer diameter 80 mm (3.15 in)
11. Outer diameter 77 mm (3.03 in)
12. Outer diameter 77 mm (3.03 in)
13. Outer diameter 47 mm (1.85 in)
14. Outer diameter 84 mm (3.31 in)
15. Outer diameter 84 mm (3.31 in)
16. Outer diameter 92 mm (3.62 in)
17. Outer diameter 60 mm (2.36 in)
18. Outer diameter 63 mm (2.48 in)

19. Outer diameter 92 mm (3.62 in) 20. Outer diameter 65 mm (2.56 in) 21. Bearing race
22. Outer diameter 60 mm (2.36 in)

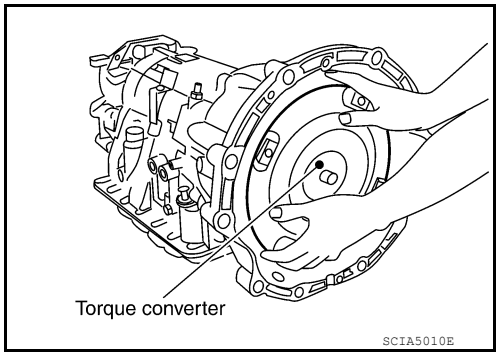
DISASSEMBLY

Disassembly

INFOID:0000000006244892

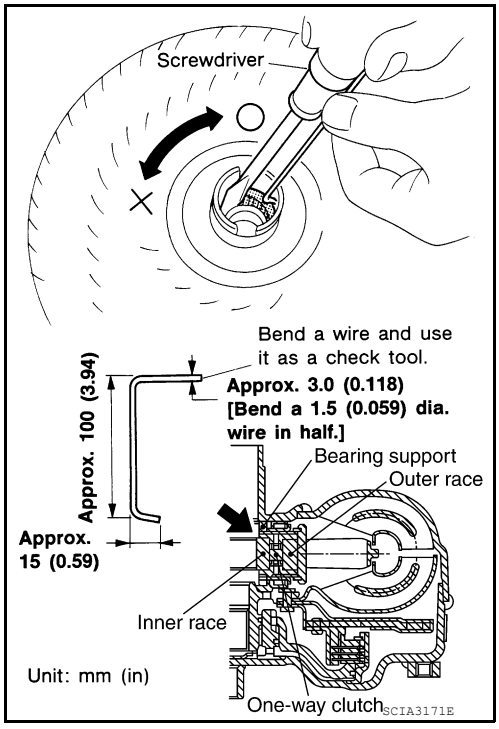
CAUTION:
Do not disassemble parts behind Drum Support. Refer to TM-9, "Cross-Sectional View".

1. Drain A/T fluid through drain plug.
2. Remove torque converter by holding it firmly and turing while pulling straight out.

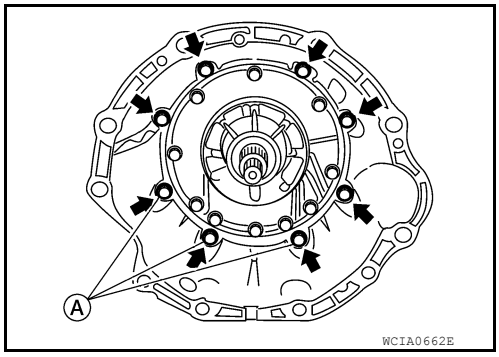


3. Check torque converter one-way clutch using a check tool as shown.

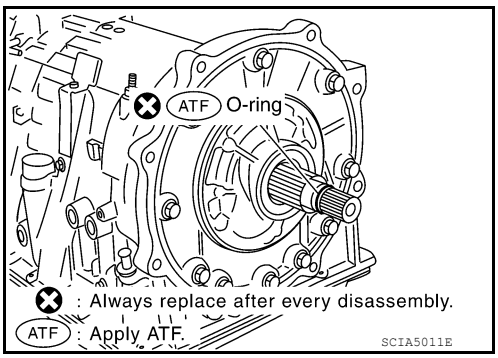
a. Insert a check tool into the groove of bearing support built into one-way clutch outer race.
b. While holding bearing support with a check tool, rotate one-way clutch spline using suitable tool.
c. Make sure that inner race rotates clockwise only. If not, replace torque converter assembly.



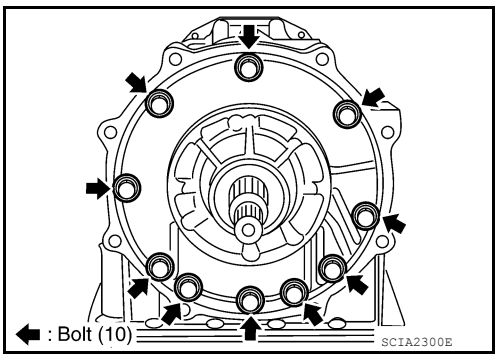
4. Remove bolts and converter housing from transmission case.
CAUTION:
Do not scratch converter housing.
- Self-sealing bolt (A)



5. Remove O-ring from input clutch assembly.



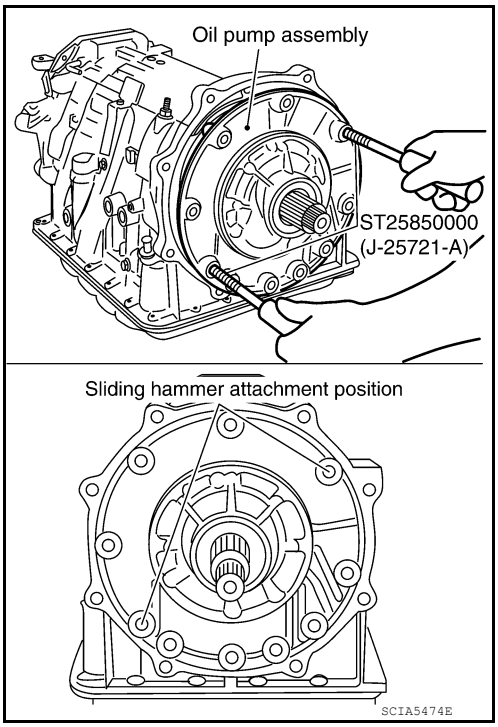
6. Remove oil pump assembly to transmission case bolts.



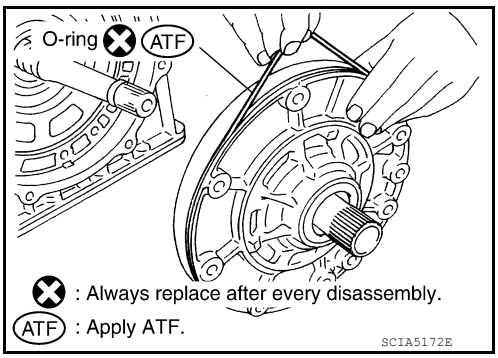
7. Remove the oil pump assembly evenly from the transmission case using Tools.

Tool number : ST25850000 (J-25721-A)

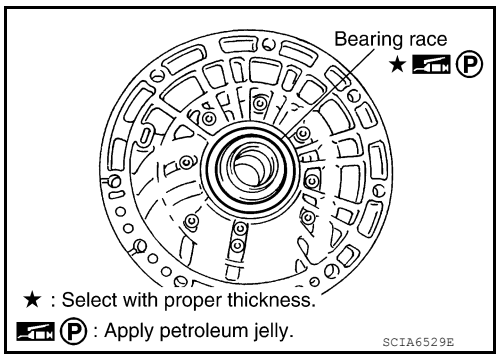
CAUTION:
- **Fully tighten the sliding hammer screws.**
- **Make sure that bearing race is installed to the oil pump assembly edge surface.**



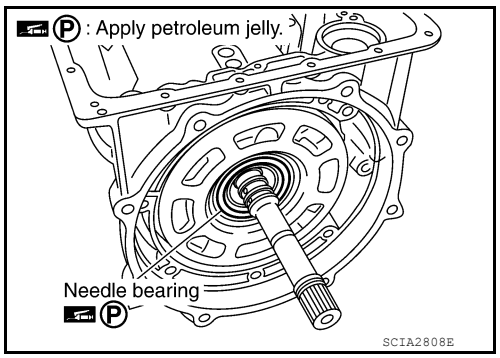
8. Remove O-ring from oil pump assembly.



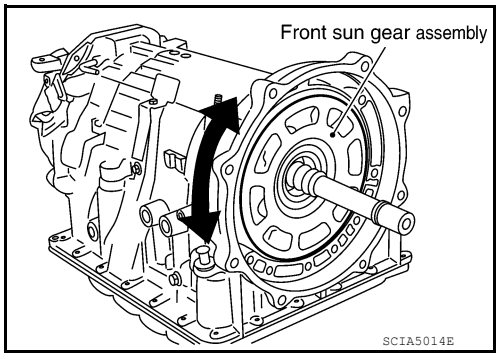
9. Remove bearing race from oil pump assembly.



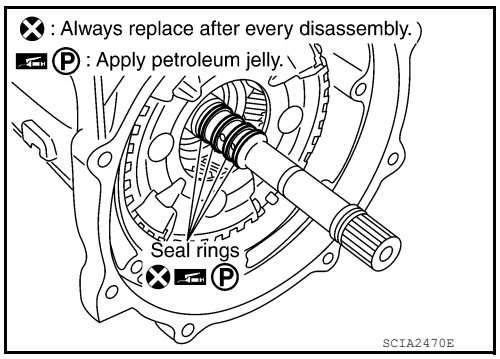
10. Remove needle bearing from front sun gear.



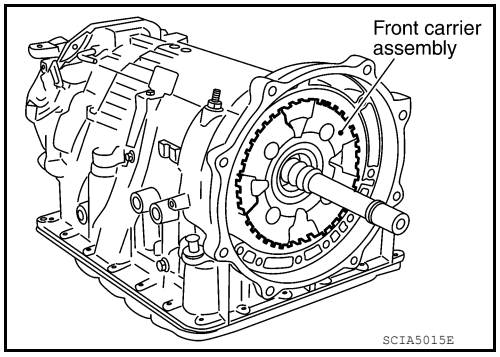
11. Remove front sun gear assembly from front carrier assembly.
NOTE:
Remove front sun gear by rotating it left and right.



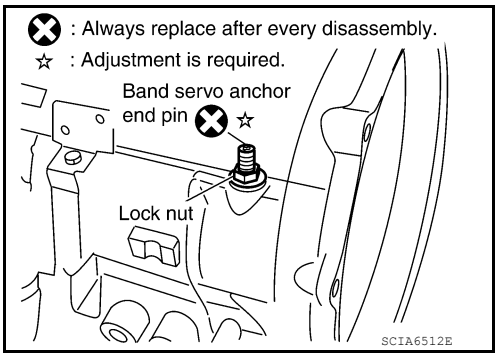
12. Remove seal rings from input clutch assembly.



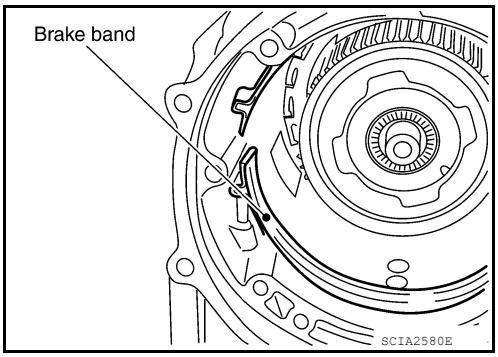
13. Remove front carrier assembly (with input clutch assembly and rear internal gear) from rear carrier assembly.
CAUTION:
Do not remove it with needle bearing.



14. Loosen lock nut and remove band servo anchor end pin from transmission case.

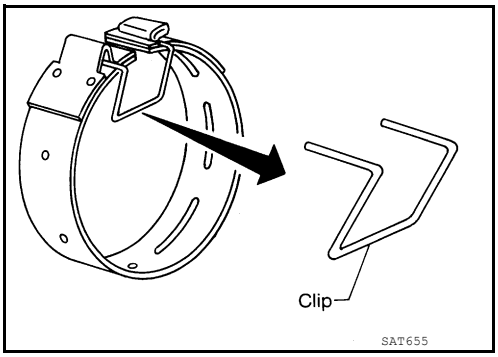


15. Remove brake band from transmission case.

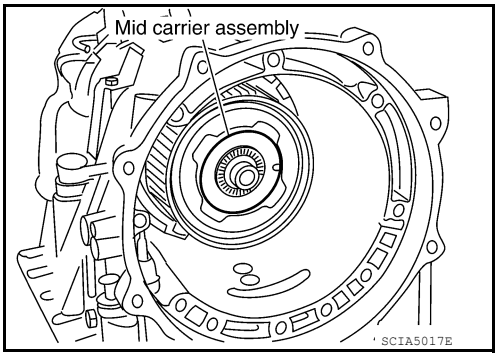


CAUTION:

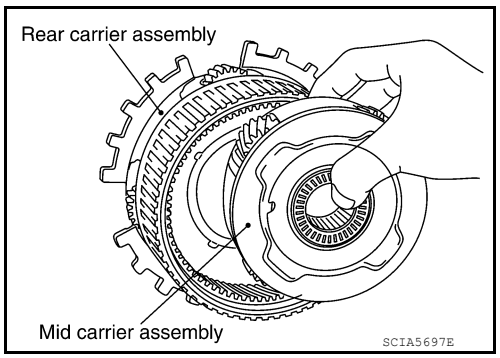
- **To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown.**
- **Check brake band facing for damage, cracks, wear or burns.**



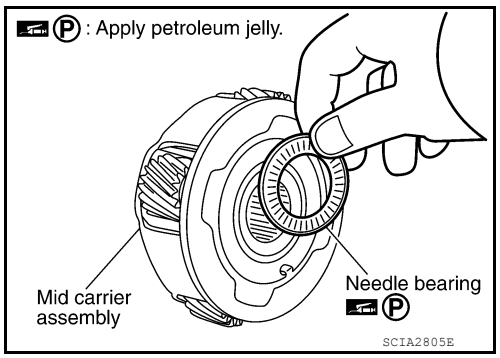
16. Remove mid carrier assembly and rear carrier assembly as a unit.



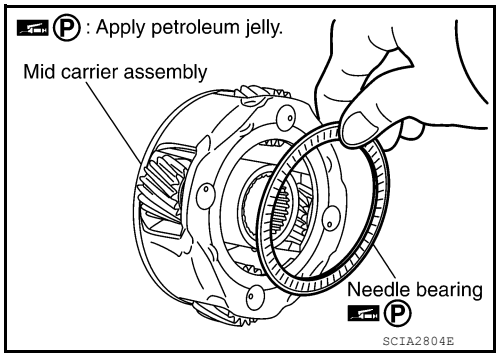
17. Remove mid carrier assembly from rear carrier assembly.



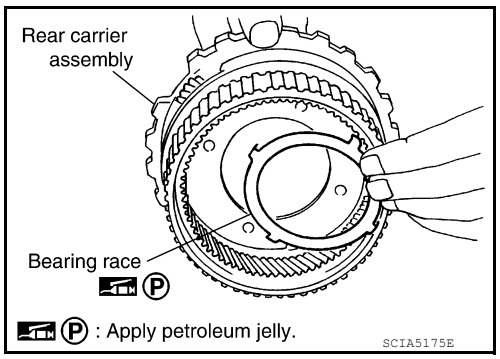
18. Remove needle bearing (front side) from mid carrier assembly.



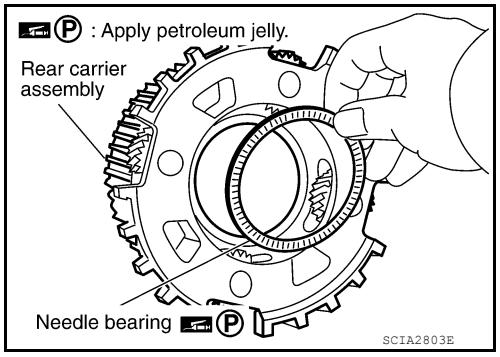
19. Remove needle bearing (rear side) from mid carrier assembly.



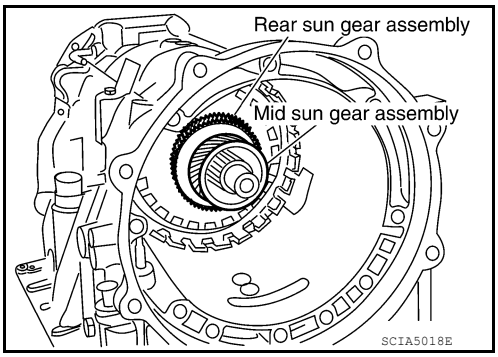
20. Remove bearing race from rear carrier assembly.



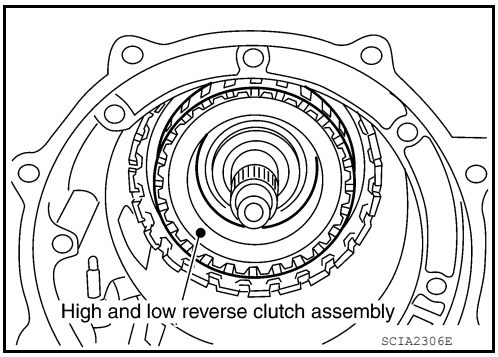
21. Remove needle bearing from rear carrier assembly.



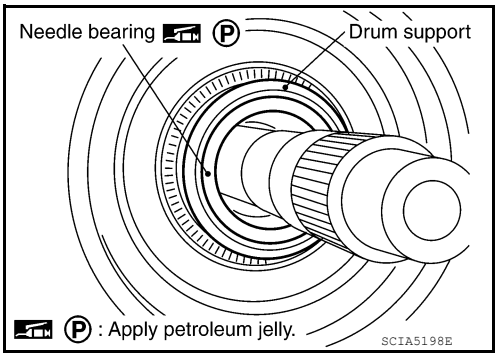
22. Remove mid sun gear assembly, rear sun gear assembly and high and low reverse clutch hub as a unit.
CAUTION:
Remove them with bearing race and needle bearing.



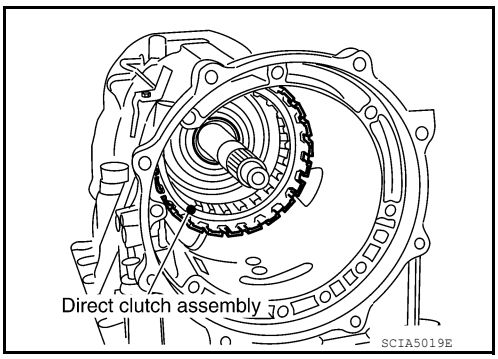
23. Remove high and low reverse clutch assembly from direct clutch assembly.
CAUTION:
Make sure that needle bearing is installed to the high and low reverse clutch assembly edge surface.



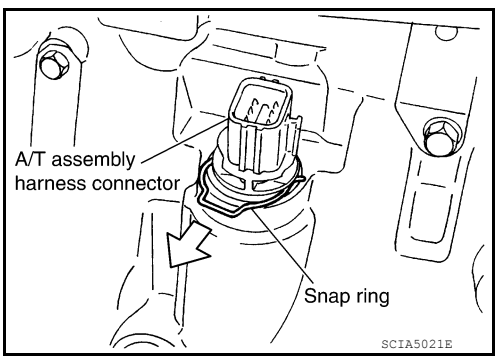
24. Remove needle bearing from drum support.



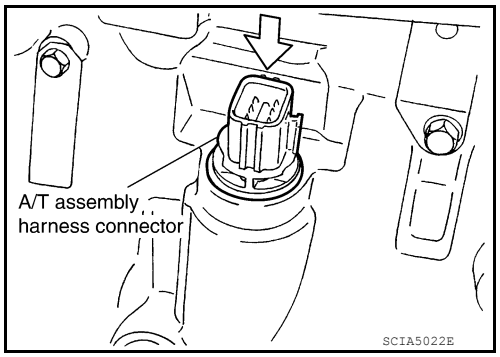
25. Remove direct clutch assembly from reverse brake.



26. Remove snap ring from A/T assembly harness connector.

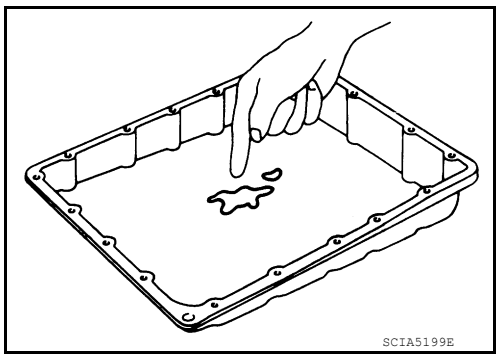


27. Push A/T assembly harness connector.
CAUTION:
Do not damage connector.

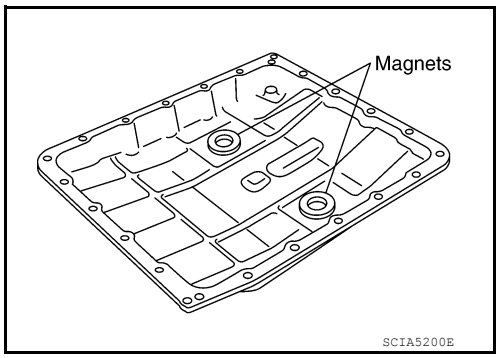


28. Remove oil pan and oil pan gasket. Refer to TM-172, "Removal and Installation".

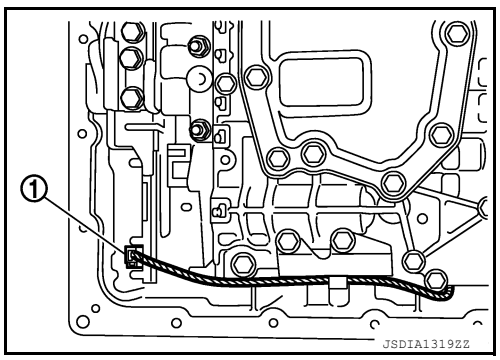
29. Check foreign materials in oil pan to help determine causes of malfunction. If the A/T fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
- **If frictional material is detected, perform A/T fluid cooler cleaning. Refer to TM-158, "A/T Fluid Cooler Cleaning".**



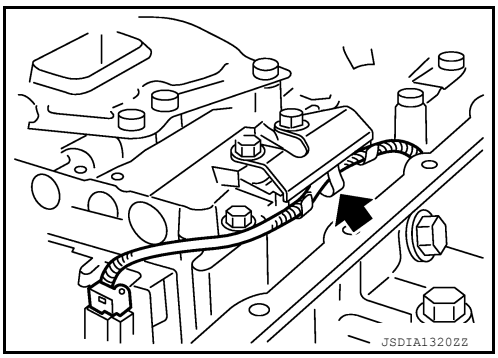
30. Remove magnets from oil pan.



31. Disconnect output speed sensor connector (1).
CAUTION:
Do not damage connector.

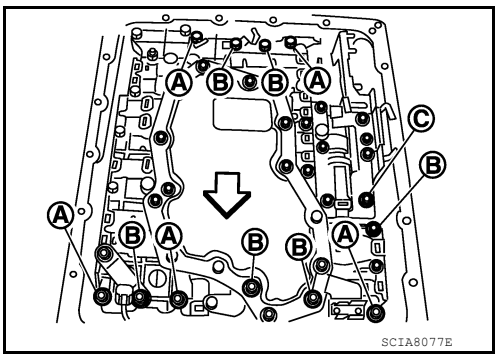


32. Straighten terminal clip (⬅) to free output speed sensor harness.

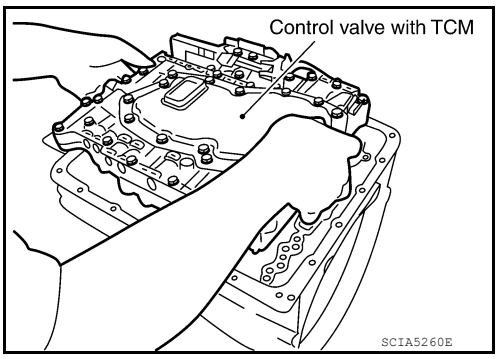


33. Remove bolts (A), (B) and (C) from control valve with TCM.
    - ⇦ : Front

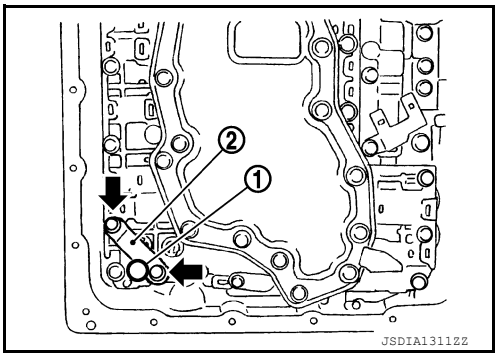
Bolt symbol	Length mm (in)	Number of bolts
A	42 (1.65)	5
B	55 (2.17)	6
C	40 (1.57)	1



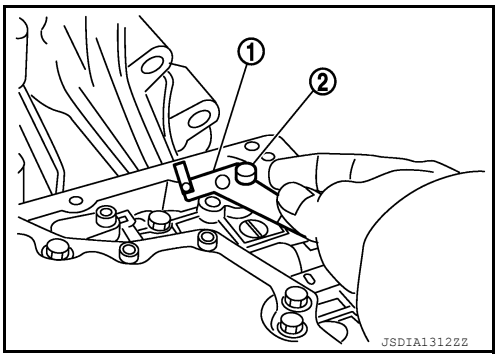
34. Remove control valve with TCM from transmission case.
    CAUTION:
    When removing, be careful with the manual valve notch and manual plate height. Remove it vertically.



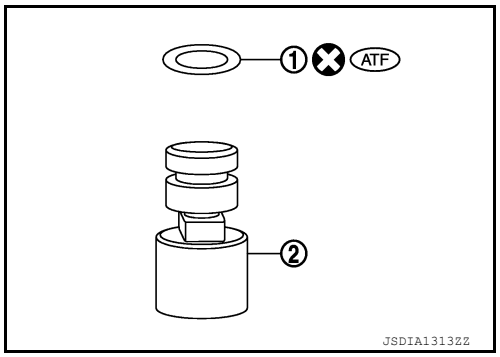
35. Remove plug (1) with bracket (2) from control valve with TCM.



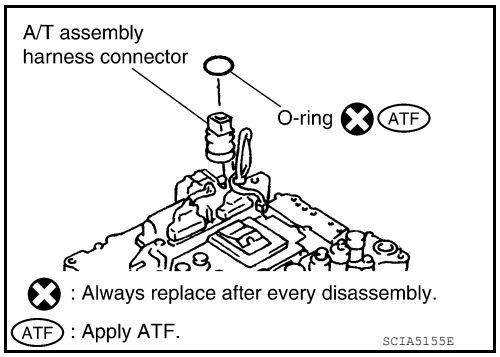
36. Remove bracket (1) from plug (2).



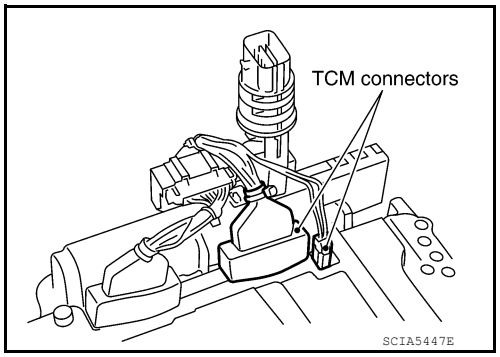
37. RemoveO-ring (1) from plug (2).



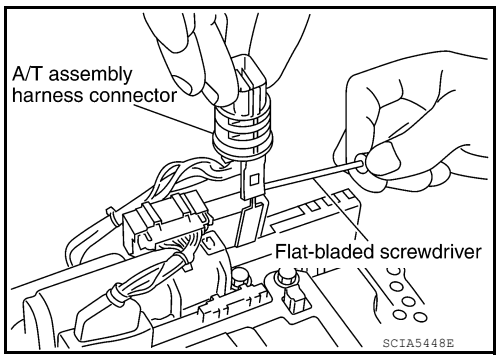
38. Remove O-ring from A/T assembly harness connector.



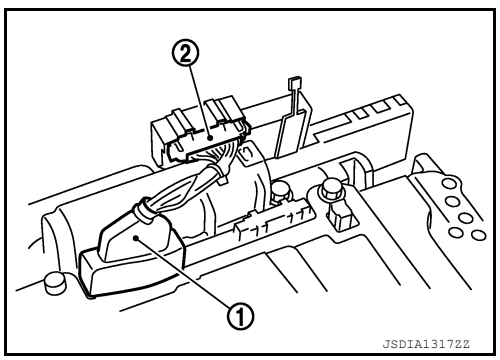
39. Disconnect TCM connectors.
CAUTION:
Do not damage connectors.



40. Remove A/T assembly harness connector from control valve with TCM using suitable tool.



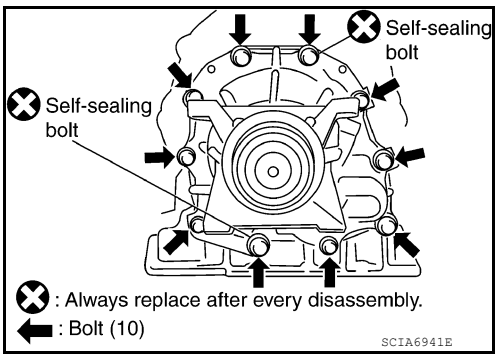
41. Disconnect TCM connector (1) and transmission range switch connector (2).
CAUTION:
Do not damage connectors.



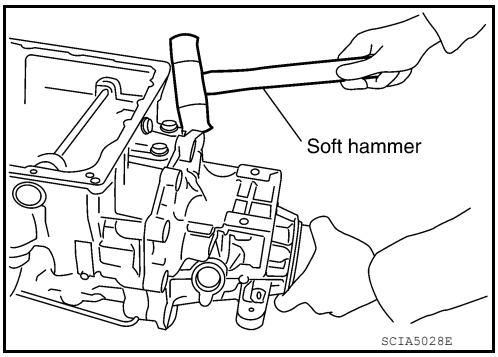
42. Remove rear extension assembly (2WD models) or adapter case assembly (4WD models) according to the following procedures.

a. **2WD models**

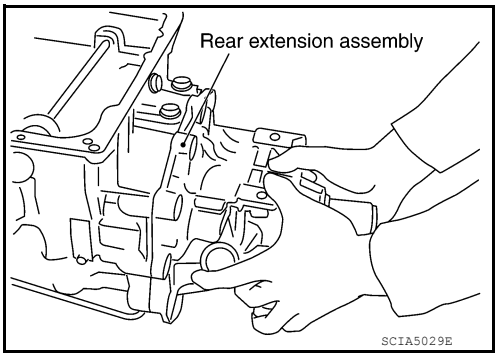
i. Remove bolts for rear extension assembly and transmission case.



ii. Tap rear extension assembly with soft hammer.



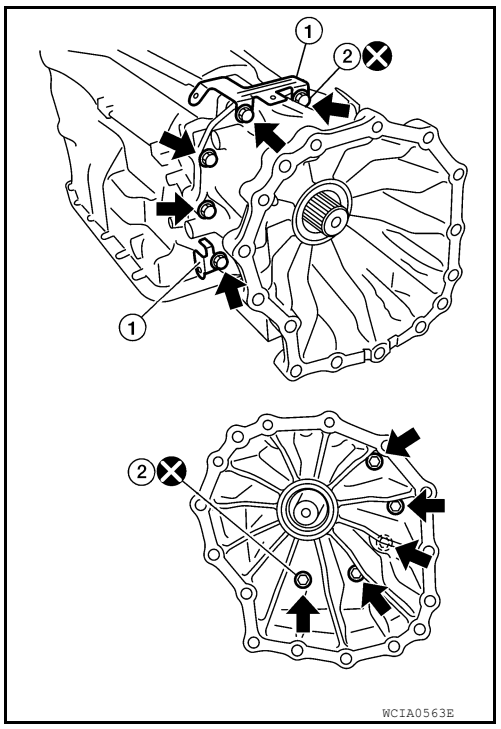
iii. Remove rear extension assembly (with needle bearing) from transmission case.



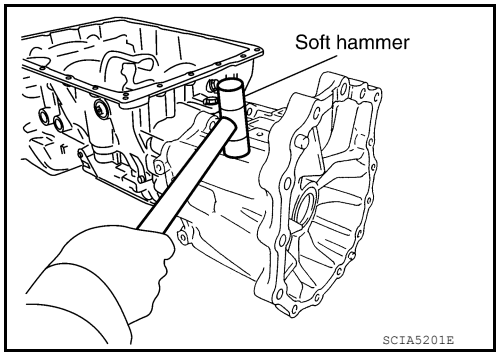
b. **4WD models**

i. Remove adapter case to transmission case bolts.
   • Self-sealing bolts (2)

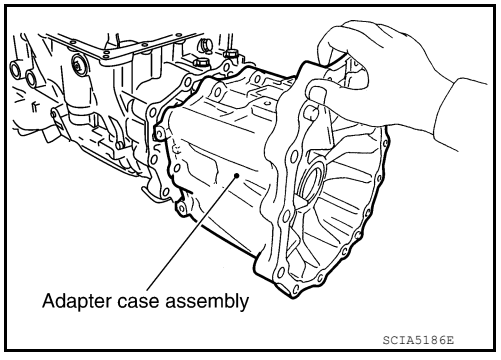
ii. Remove brackets (1) (if equipped).



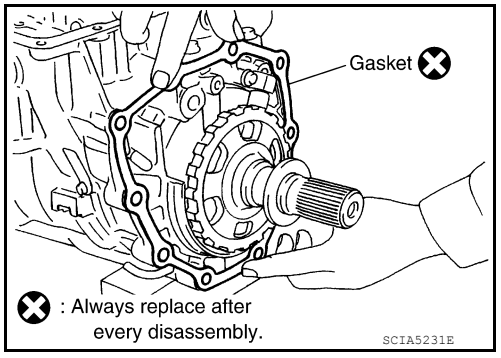
iii. Tap adapter case assembly using suitable tool.



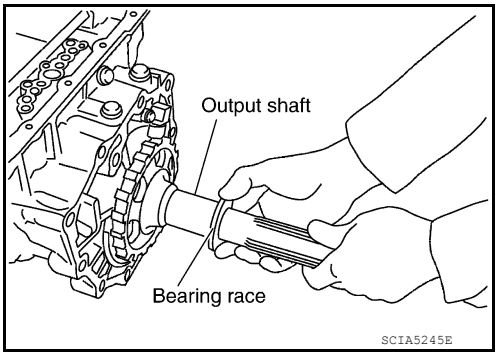
iv. Remove adapter case assembly (with needle bearing) from transmission case.



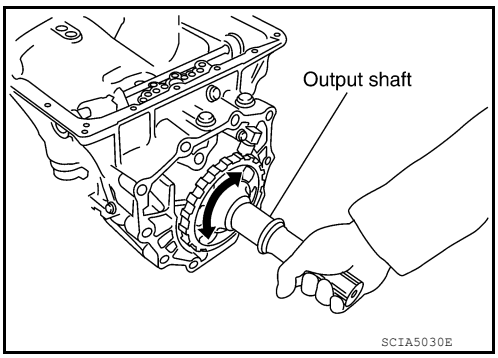
v. Remove gasket from transmission case.



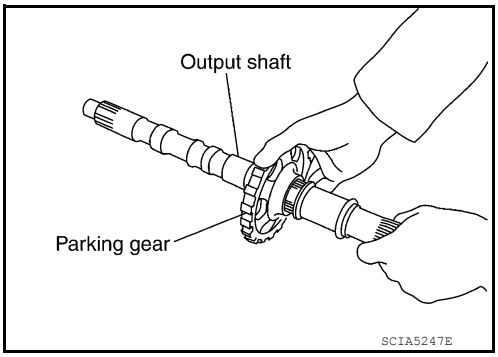
43. Remove bearing race from output shaft.



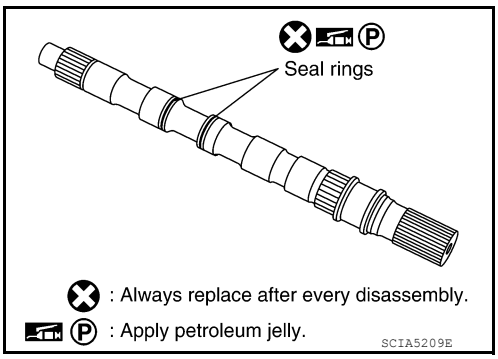
44. Remove output shaft from transmission case by rotating left and right.



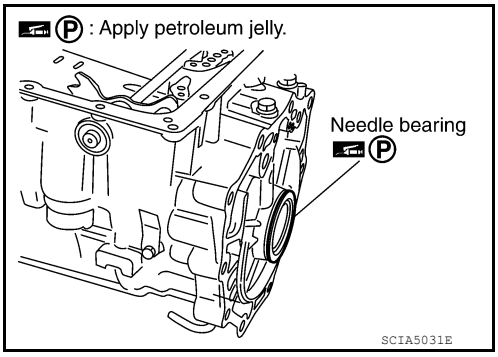
45. Remove parking gear from output shaft.



46. Remove seal rings from output shaft.



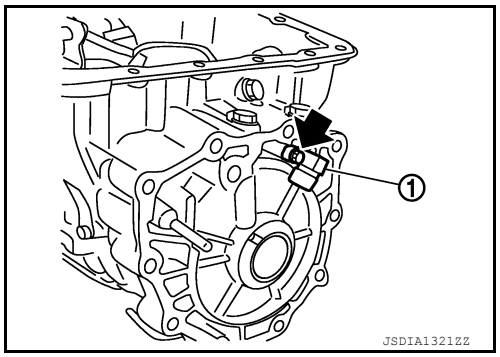
47. Remove needle bearing from transmission case.



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

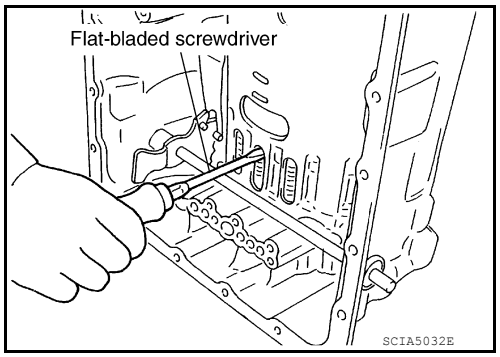
⬅ : Bolt

CAUTION:
- **Do not subject it to impact by dropping or hitting it.**
- **Do not disassemble.**
- **Do not allow metal filings or any foreign material to get on the sensor's front edge magnetic area.**
- **Do not place in an area affected by magnetism.**

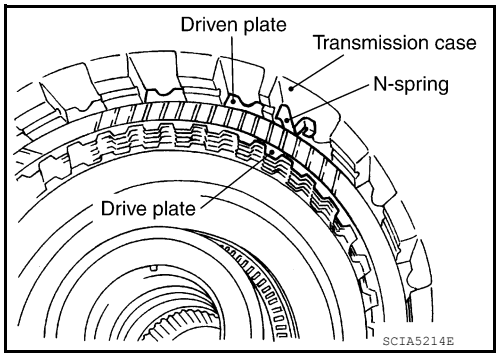


49. Remove reverse brake snap ring using two flat-bladed screwdrivers.
NOTE:
Press out snap ring from the transmission case oil pan side gap using a flat-bladed screwdriver, and remove it using a another screwdriver.

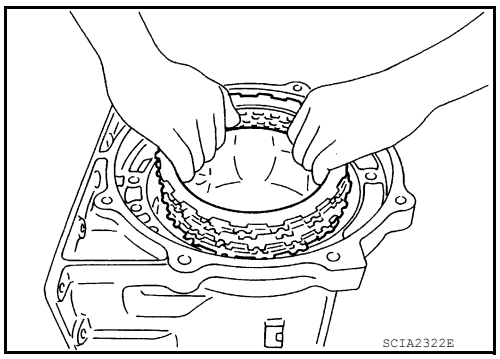
50. Remove reverse brake retaining plate from transmission case.
- Check facing for burns, cracks or damage. If necessary, replace the plate.



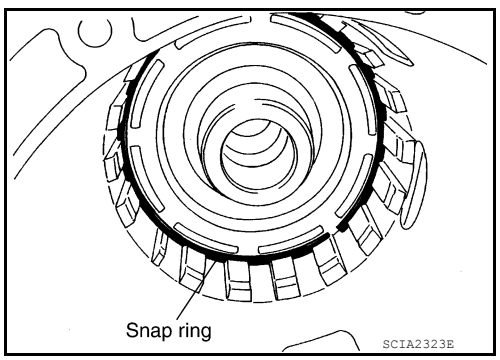
51. Remove N-spring from transmission case.



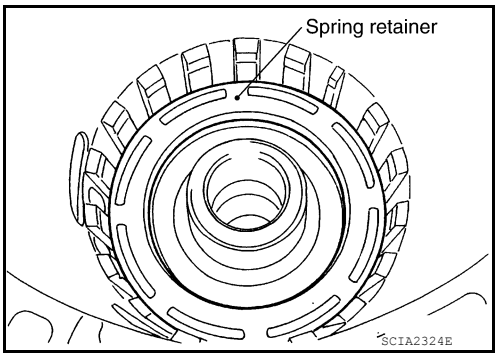
52. Remove reverse brake drive plates, driven plates and dish plate from transmission case.
- **Check facing for burns, cracks or damage. If necessary, replace the plate.**



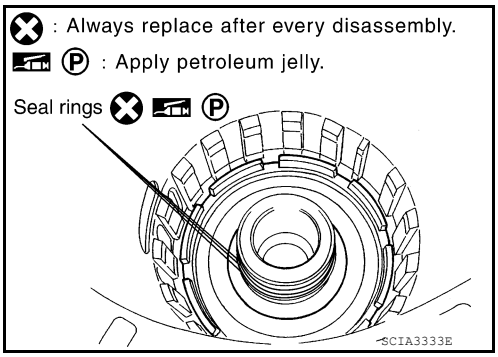
53. Remove snap ring using suitable tool.



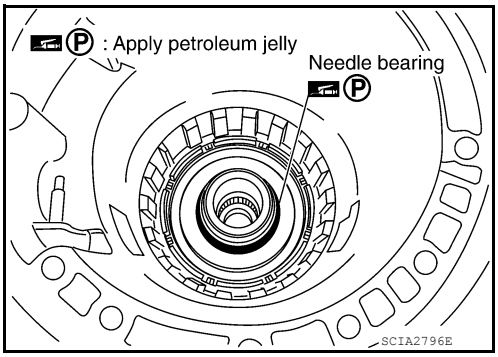
54. Remove spring retainer and return spring from transmission case.



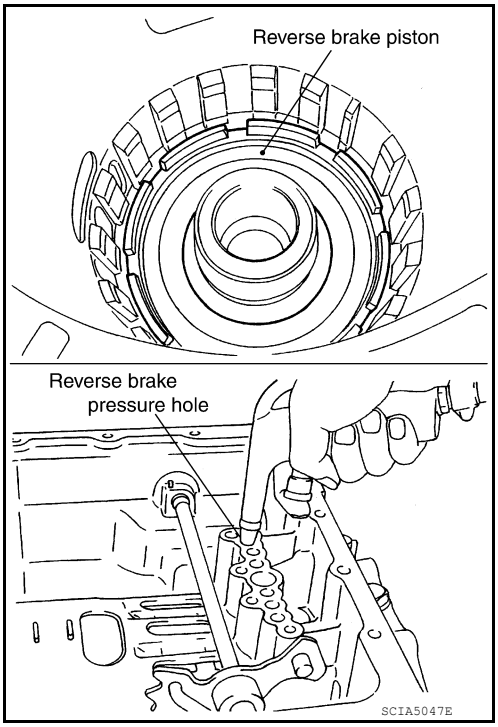
55. Remove seal rings from drum support.



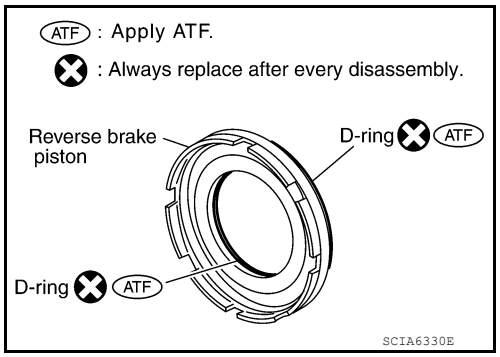
56. Remove needle bearing from drum support edge surface.



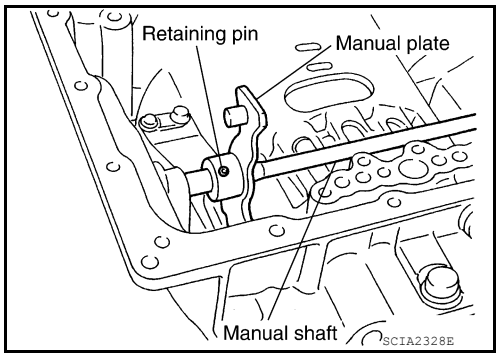
57. Remove reverse brake piston from transmission case using compressed air. Refer to TM-213, "Oil Channel".
CAUTION:
Care should be taken not to abruptly blow air. It makes the piston incline, and as a result, it becomes hard to disassemble the pistons.



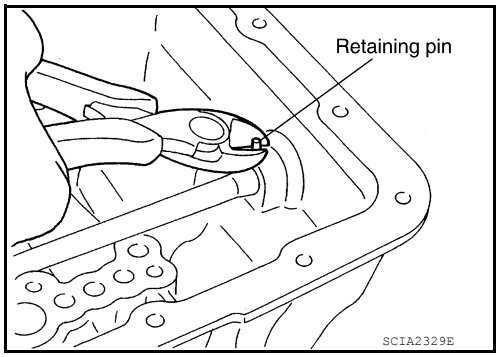
58. Remove D-rings from reverse brake piston.



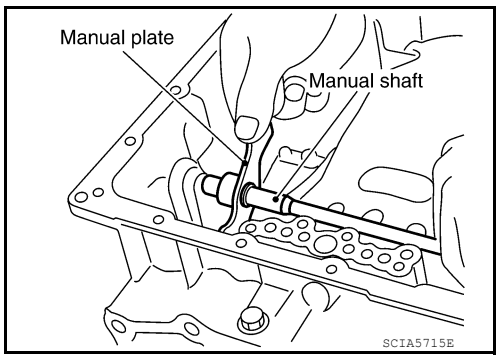
59. Knock out retaining pin using suitable tool.



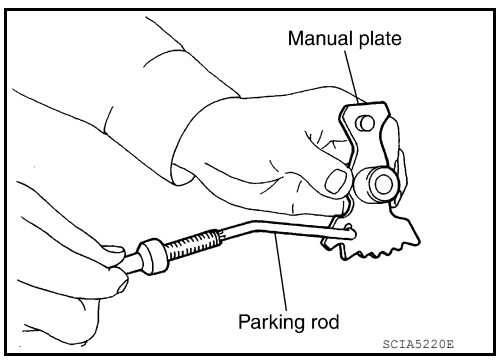
60. Remove manual shaft retaining pin using suitable tool.



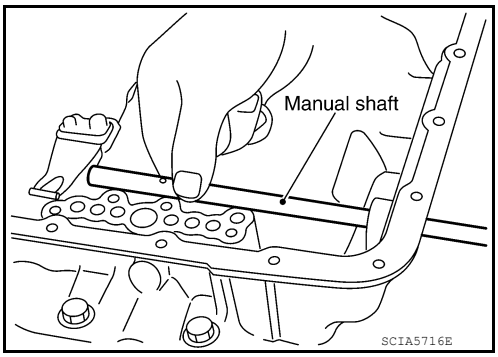
61. Remove manual plate (with parking rod) from manual shaft.



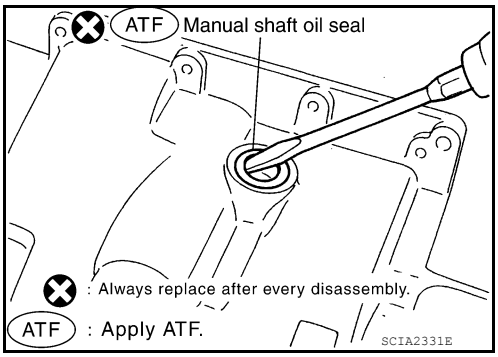
62. Remove parking rod from manual plate.



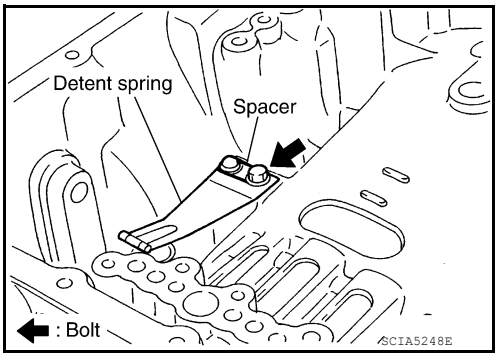
63. Remove manual shaft from transmission case.



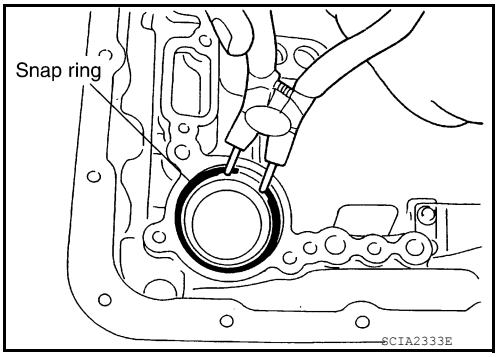
64. Remove manual shaft oil seals using suitable tool.
CAUTION:
Do not scratch transmission case.



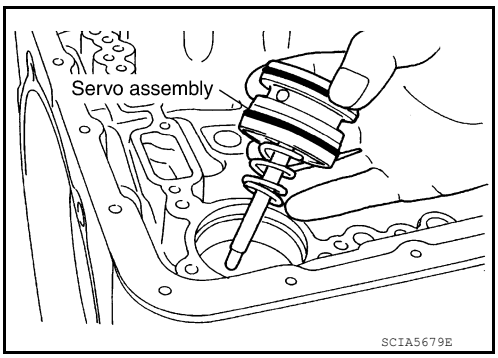
65. Remove detent spring and spacer from transmission case.



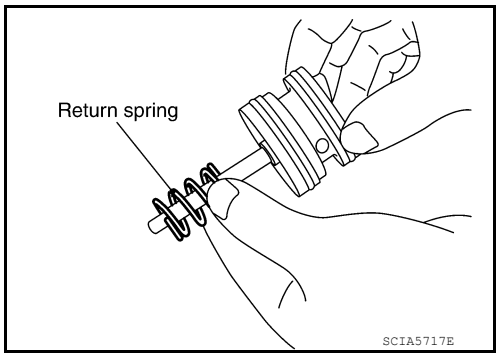
66. Remove snap ring from transmission case using suitable tool.



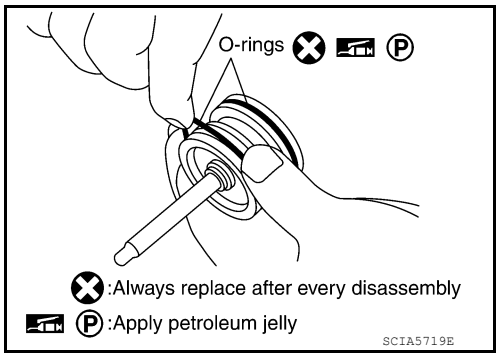
67. Remove servo assembly (with return spring) from transmission case.



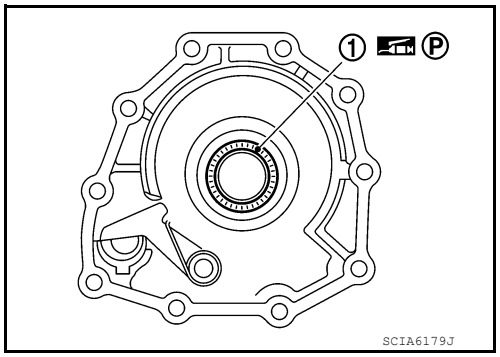
68. Remove return spring from servo assembly.



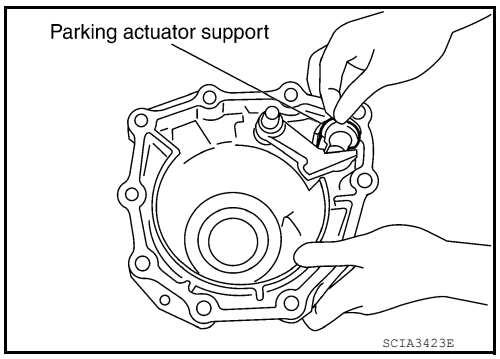
69. Remove O-rings from servo assembly.



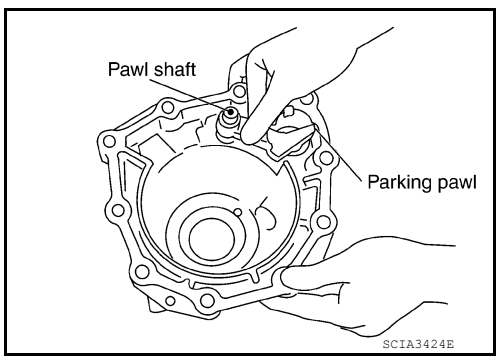
70. Remove needle bearing (1) from rear extension (2WD models) or adapter case (4WD models).



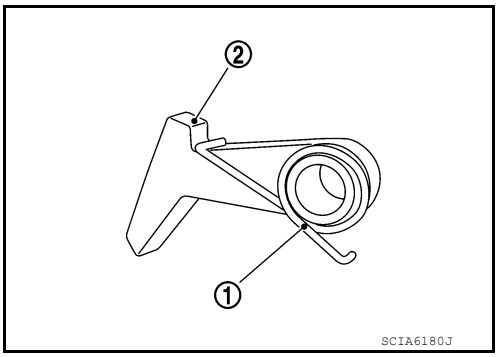
71. Remove parking actuator support from rear extension (2WD models) or adapter case (4WD models).



72. Remove parking pawl (with return spring) and pawl shaft from rear extension (2WD models) or adapter case (4WD models).



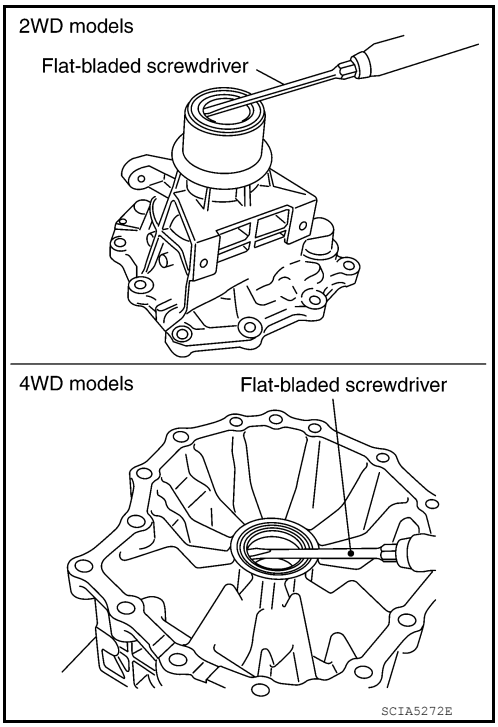
73. Remove return spring (1) from parking pawl (2).



74. Remove rear oil seal from rear extension (2WD models) or adapter case (4WD models) using suitable tool.

CAUTION:

Do not scratch rear extension (2WD models) or adapter case (4WD models).

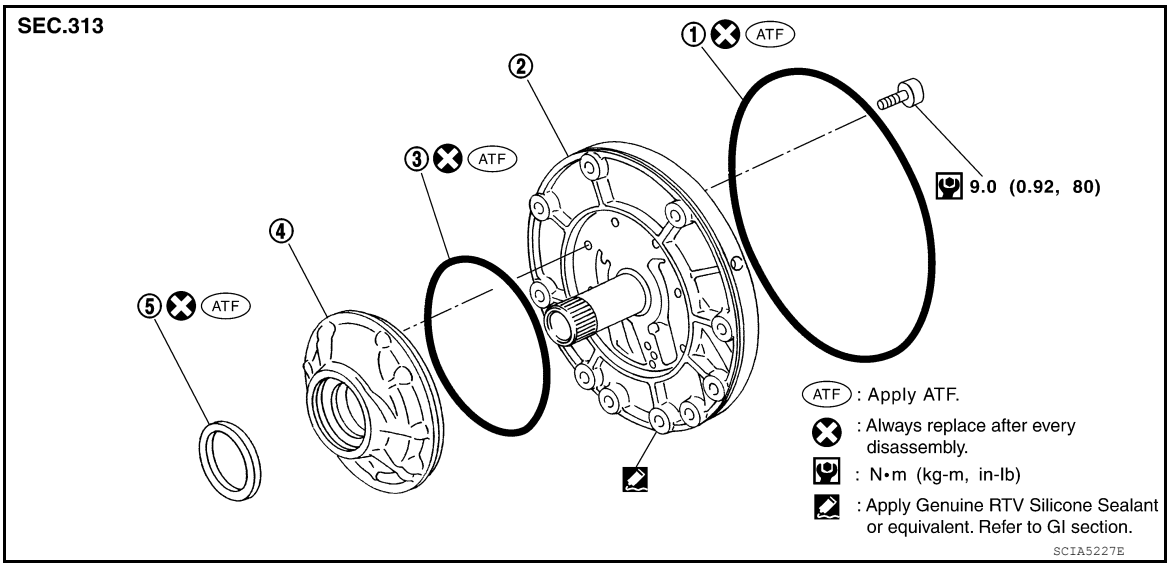


OIL PUMP

Exploded View

INFOID:0000000006244893

Oil Pump



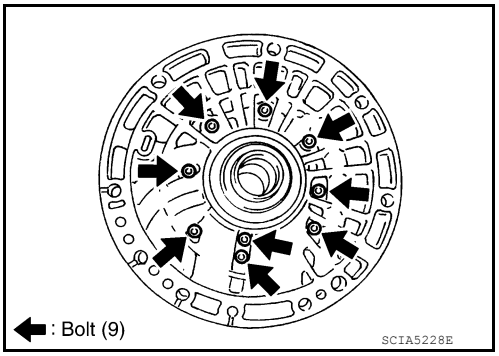
1. O-ring
2. Oil pump cover
3. O-ring
4. Oil pump housing
5. Oil pump housing oil seal

Disassembly and Assembly

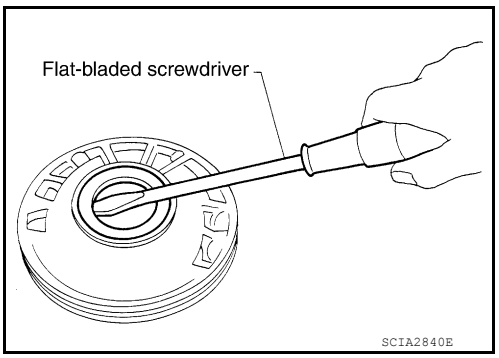
INFOID:0000000006244894

DISASSEMBLY

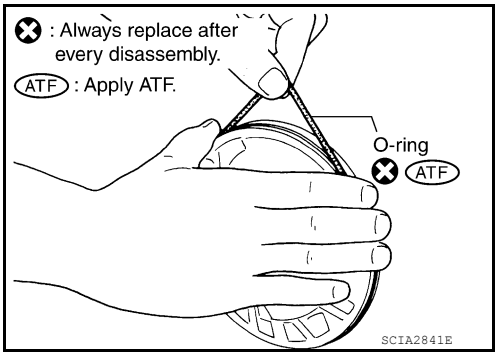
1. Remove oil pump housing from oil pump cover.



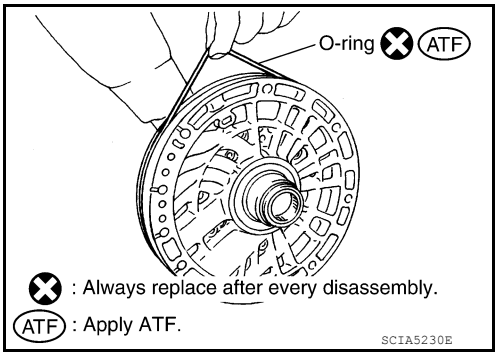
2. Remove oil pump housing oil seal using suitable tool.
   CAUTION:
   Do not scratch oil pump housing.



3. Remove O-ring from oil pump housing.

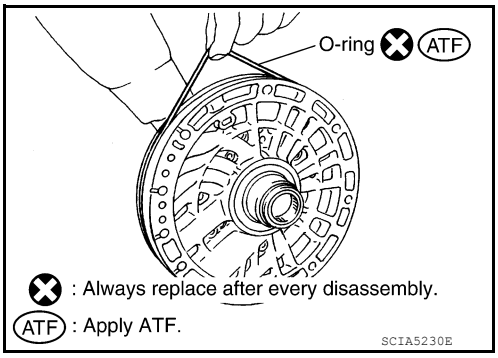


4. Remove O-ring from oil pump cover.

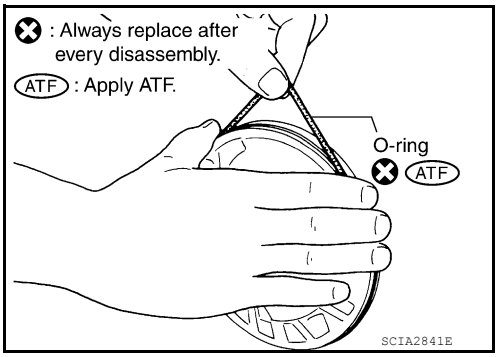


ASSEMBLY

1. Install O-ring to oil pump cover.
   CAUTION:
   - **Do not reuse O-ring.**
   - **Apply ATF to O-ring.**



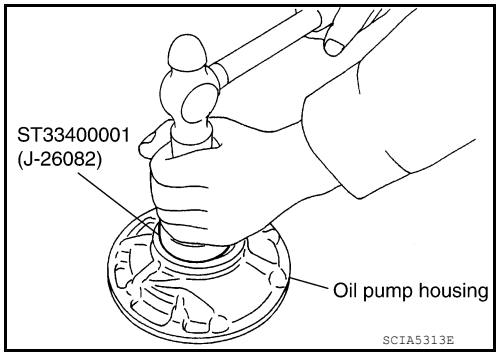
2. Install O-ring to oil pump housing.
   CAUTION:
   - **Do not reuse O-ring.**
   - **Apply ATF to O-ring.**



3. Install oil pump housing oil seal to the oil pump housing until it is flush using Tool.

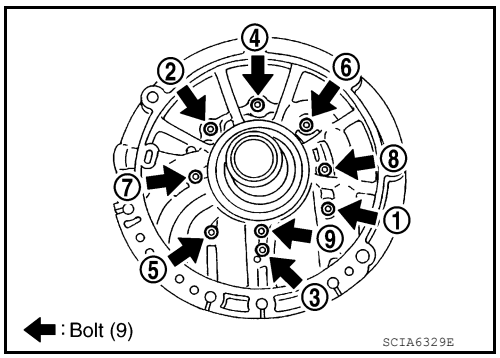
Tool number : ST33400001 (J-26082)

CAUTION:
- **Do not reuse oil seal.**
- **Apply ATF to oil seal.**



4. After temporarily tightening the bolts for the oil pump housing to the oil pump cover, tighten them to the specified torque in the sequence shown.

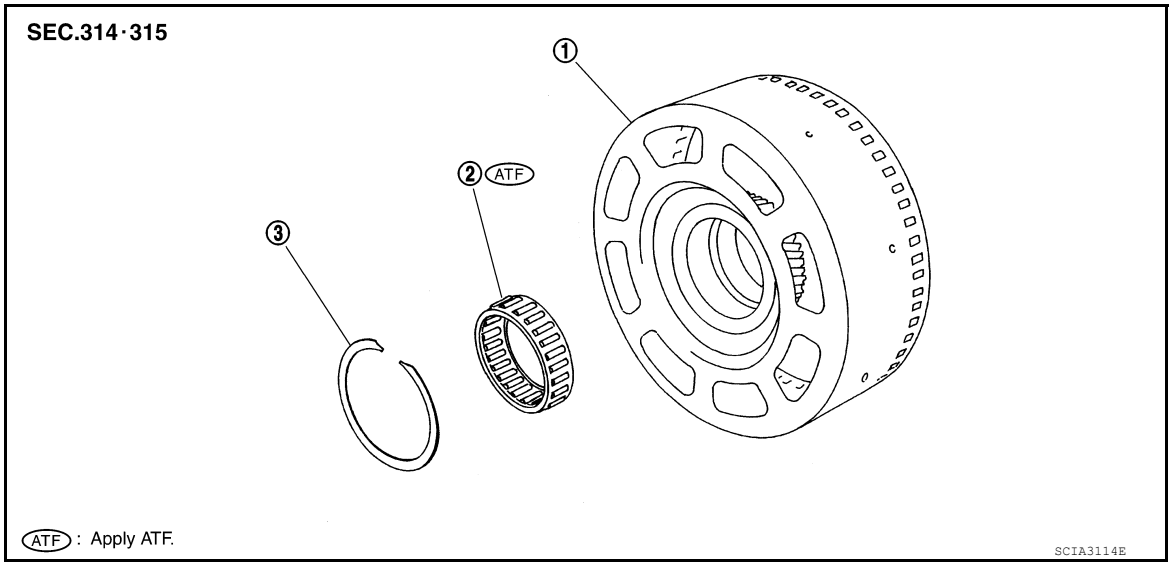
Oil pump housing bolts : 9.0 N·m (0.92 kg-m, 80 in-lb.)



FRONT SUN GEAR, 3RD ONE-WAY CLUTCH

Exploded View

INFOID:0000000006244895



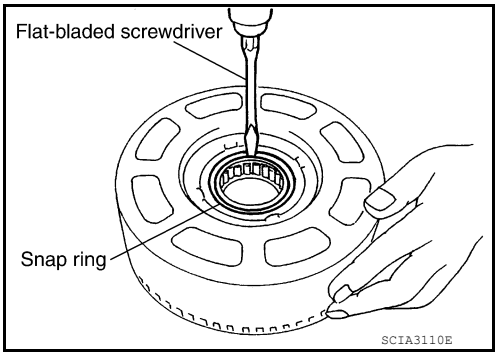
1. Front sun gear
2. 3rd one-way clutch
3. Snap ring

Disassembly and Assembly

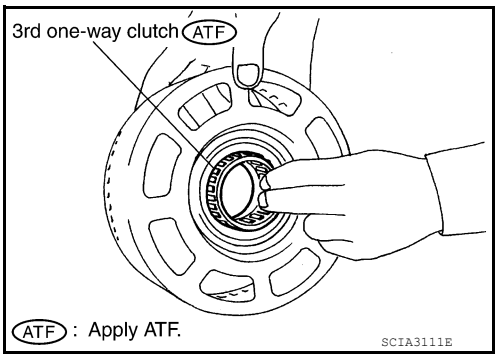
INFOID:0000000006244896

DISASSEMBLY

1. Remove snap ring from front sun gear using suitable tool.



2. Remove 3rd one-way clutch from front sun gear.



INSPECTION

3rd One-way Clutch

- Check frictional surface for wear or damage.

CAUTION:

If necessary, replace the 3rd one-way clutch.

Front Sun Gear Snap Ring

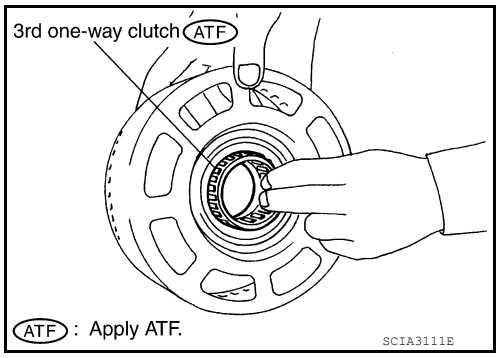
- Check for deformation, fatigue or damage.
  CAUTION:
  If necessary, replace the snap ring.

Front Sun Gear

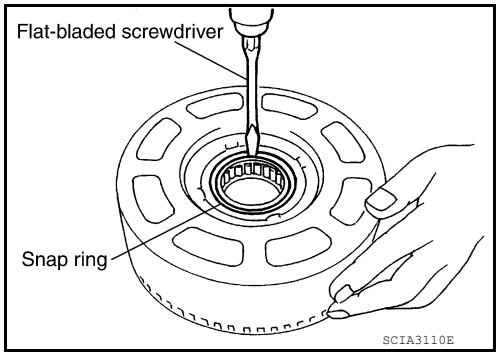
- Check for deformation, fatigue or damage.
  CAUTION:
  If necessary, replace the front sun gear.

ASSEMBLY

1. Install 3rd one-way clutch in front sun gear.
   CAUTION:
   Apply ATF to 3rd one-way clutch.



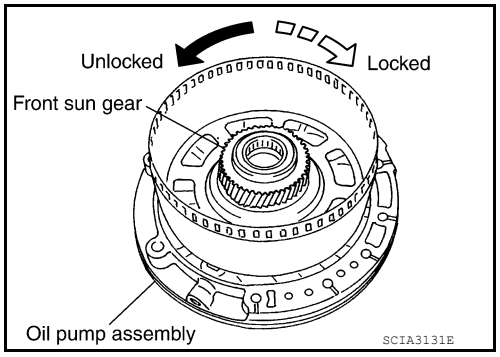
2. Install snap ring in front sun gear using suitable tool.



3. Check operation of 3rd one-way clutch.

a. Hold oil pump assembly and turn front sun gear.

b. Check 3rd one-way clutch for correct locking and unlocking directions.
   CAUTION:
   If not as shown, check installation direction of 3rd one-way clutch.

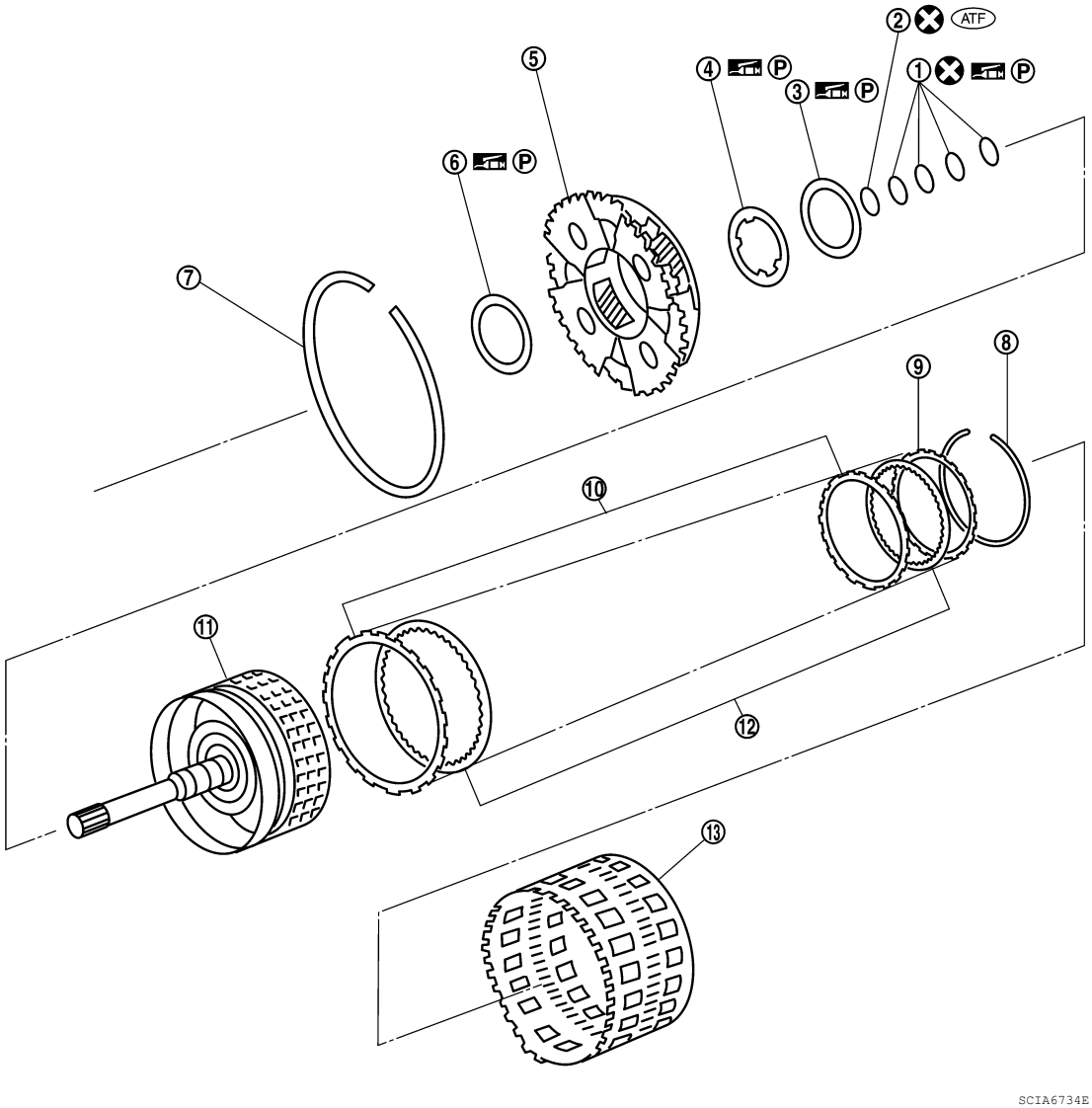


FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

Exploded View

INFOID:0000000006244897

SEC.314 • 315



SCIA6734E

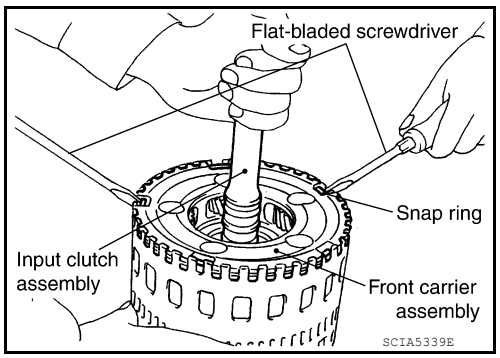
1. Seal ring
2. O-ring
3. Needle bearing
4. Bearing race
5. Front carrier assembly
6. Needle bearing
7. Snap ring
8. Snap ring
9. Retaining plate
10. Driven plate
11. Input clutch drum
12. Drive plate
13. Rear internal gear

Disassembly and Assembly

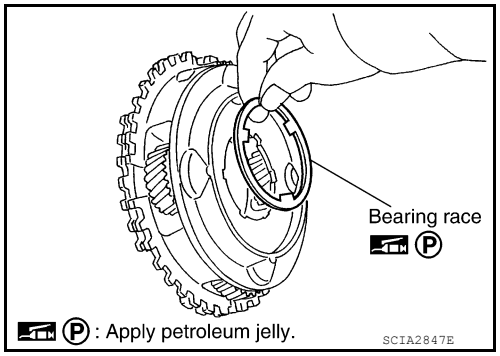
INFOID:0000000006244898

DISASSEMBLY

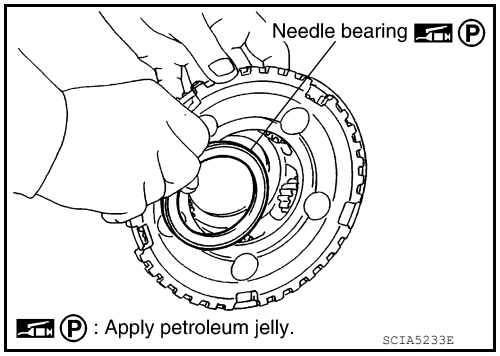
1. Compress snap ring using 2 flat-bladed screwdrivers.
2. Remove front carrier assembly and input clutch assembly from rear internal gear.
3. Remove front carrier assembly from input clutch assembly.



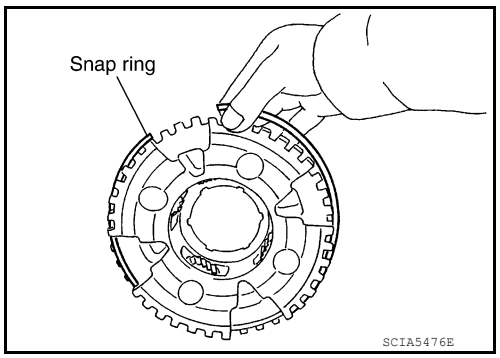
a. Remove bearing race from front carrier assembly.



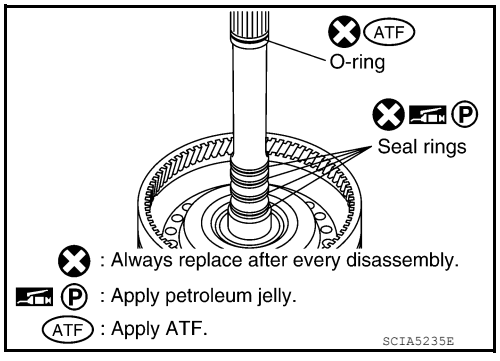
b. Remove needle bearing from front carrier assembly.



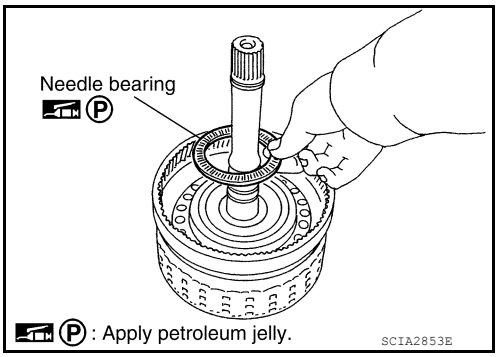
c. Remove snap ring from front carrier assembly.
CAUTION:
Do not excessively expand snap ring.



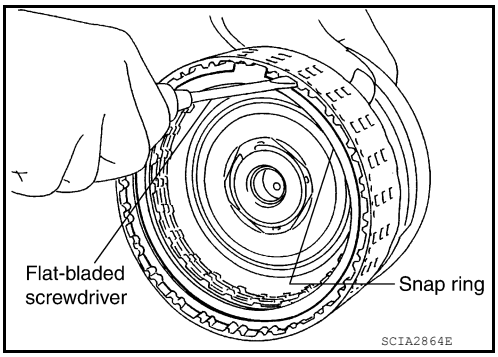
4. Disassemble input clutch assembly.
a. Remove O-ring and seal rings from input clutch assembly.



b. Remove needle bearing from input clutch assembly.



c. Remove snap ring from input clutch drum using suitable tool.
d. Remove drive plates, driven plates and retaining plate from input clutch drum.



INSPECTION

Front Carrier Snap Ring
- Check for deformation, fatigue or damage.

CAUTION:
If necessary, replace the snap ring.

Input Clutch Snap Ring
- Check for deformation, fatigue or damage.

CAUTION:
If necessary, replace the input clutch assembly.

Input Clutch Drum
- Check for deformation, fatigue or damage or burns.

CAUTION:
If necessary, replace the input clutch assembly.

Input Clutch Drive Plates
- Check facing for burns, cracks or damage.

CAUTION:
If necessary, replace the input clutch assembly.

Input Clutch Retaining Plate and Driven Plates
- Check facing for burns, cracks or damage.

CAUTION:
If necessary, replace the input clutch assembly.

Front Carrier
- Check for deformation, fatigue or damage.

CAUTION:
If necessary, replace the front carrier assembly.

Rear Internal Gear
- Check for deformation, fatigue or damage.

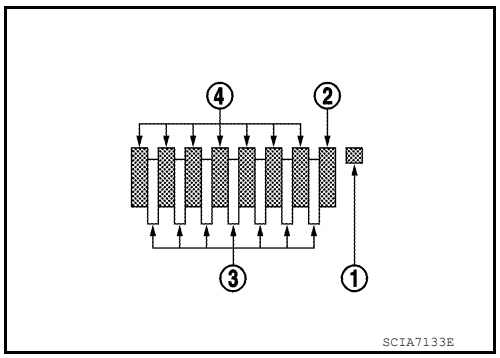
CAUTION:
If necessary, replace the rear internal gear assembly.

ASSEMBLY

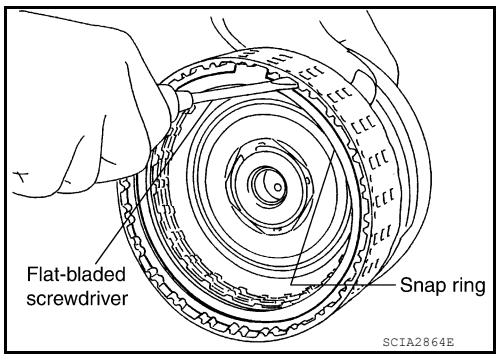
1. Install input clutch.

a. Install drive plates (3), driven plates (4) and retaining plate (2) in input clutch drum.
- Snap ring (1)

CAUTION:
Take care with order of plates.
NOTE:
There are 7 drive plates and 7 driven plates.

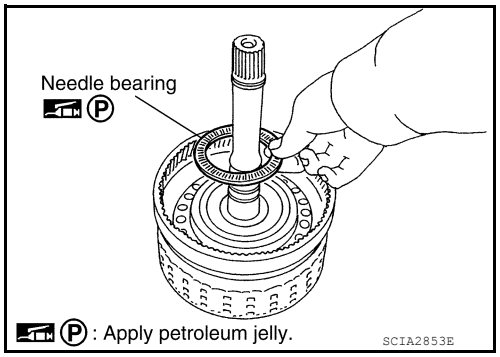


b. Install snap ring in input clutch drum using suitable tool.



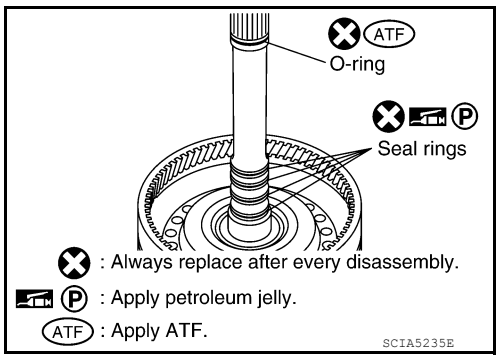
c. Install needle bearing in input clutch assembly.

CAUTION:
Apply petroleum jelly to needle bearing.



d. Install O-ring and seal rings in input clutch assembly.

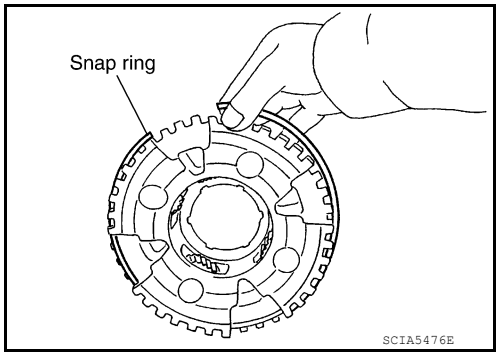
CAUTION:
- **Do not reuse O-ring and seal rings.**
- **Apply ATF to O-ring.**
- **Apply petroleum jelly to seal rings.**



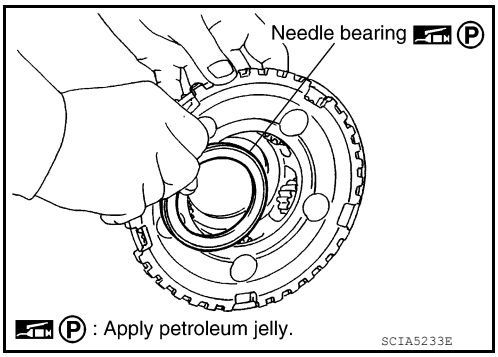
2. Install front carrier assembly.

a. Install snap ring to front carrier assembly.

CAUTION:
Do not excessively expand snap ring.

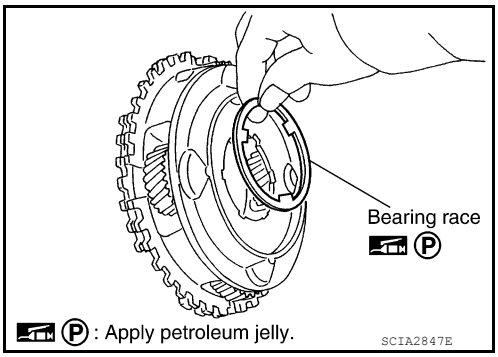


b. Install needle bearing in front carrier assembly.
CAUTION:
- **Take care with the direction of needle bearing. Refer to TM-215, "Location of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings".**
- **Apply petroleum jelly to bearing race.**

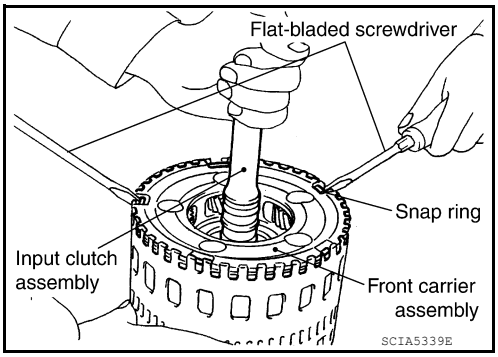


c. Install bearing race in front carrier assembly.
CAUTION:
Apply petroleum jelly to bearing race.

d. Install front carrier assembly to input clutch assembly.



3. Compress snap ring using 2 flat-bladed screwdrivers.
4. Install front carrier assembly and input clutch assembly to rear internal gear.

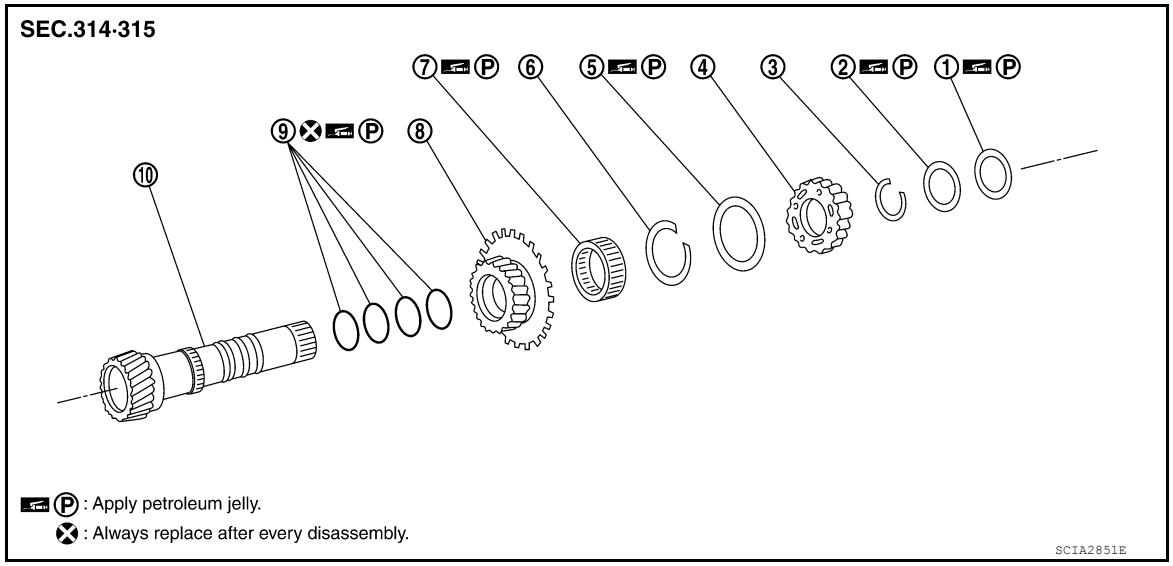


MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

Exploded View

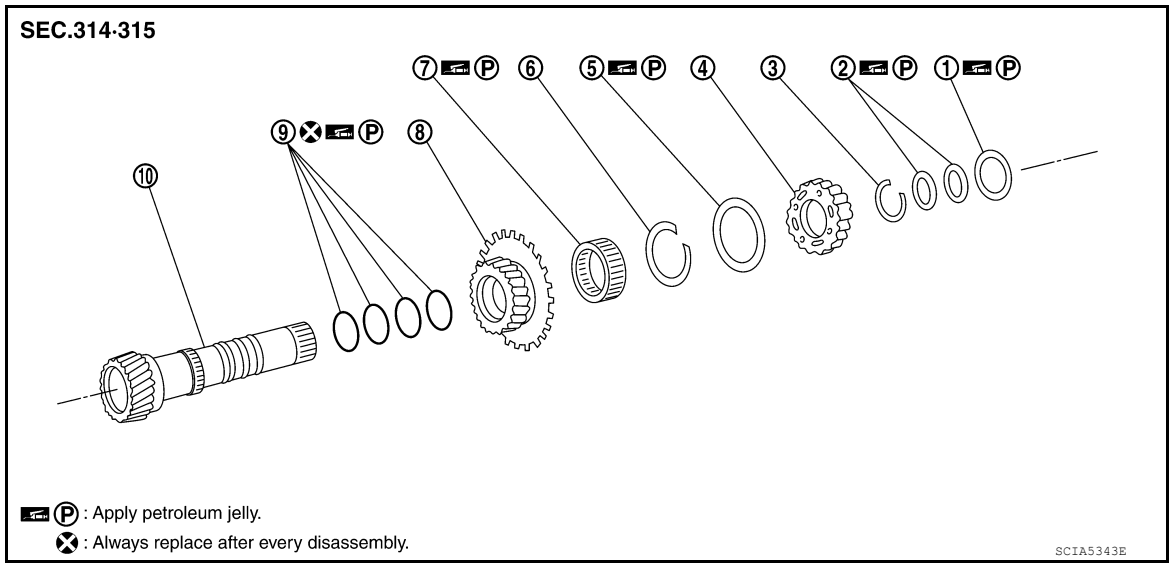
INFOID:0000000006244899

VQ40DE MODELS



1. Needle bearing
2. Bearing race
3. Snap ring
4. High and low reverse clutch hub
5. Needle bearing
6. Snap ring
7. 1st one-way clutch
8. Rear sun gear
9. Seal ring
10. Mid sun gear

VK56DE MODELS



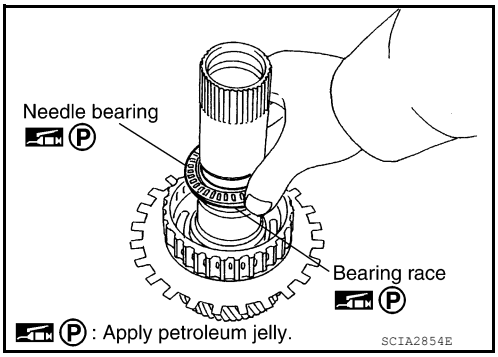
1. Needle bearing
2. Bearing race
3. Snap ring
4. High and low reverse clutch hub
5. Needle bearing
6. Snap ring
7. 1st one-way clutch
8. Rear sun gear
9. Seal ring
10. Mid sun gear

Disassembly and Assembly

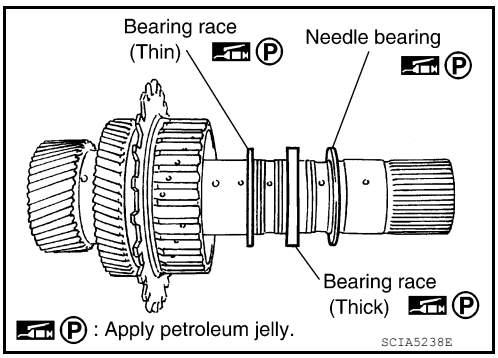
INFOID:0000000006244900

DISASSEMBLY

1. Remove needle bearing and bearing race from high and low reverse clutch hub.
   - VQ40DE models

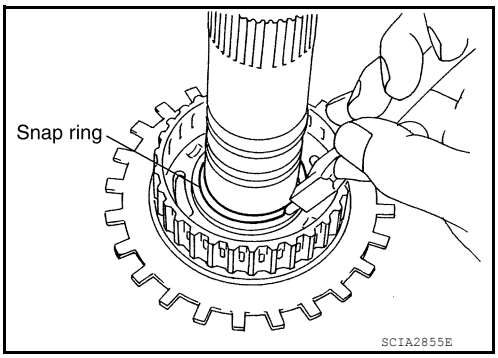


   - VK56DE models

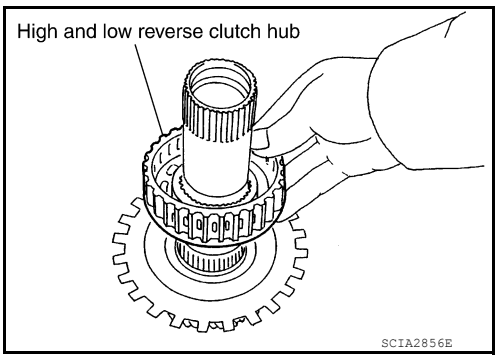


2. Remove snap ring from mid sun gear assembly using suitable tool.

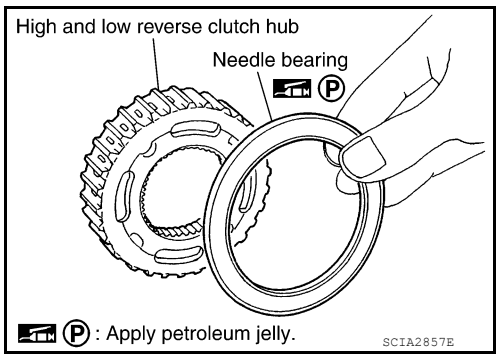
CAUTION:
Do not excessively expand snap ring.



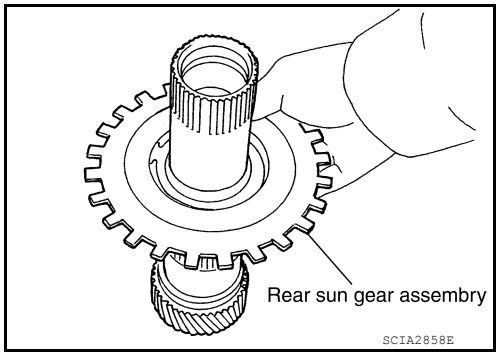
3. Remove high and low reverse clutch hub from mid sun gear assembly.



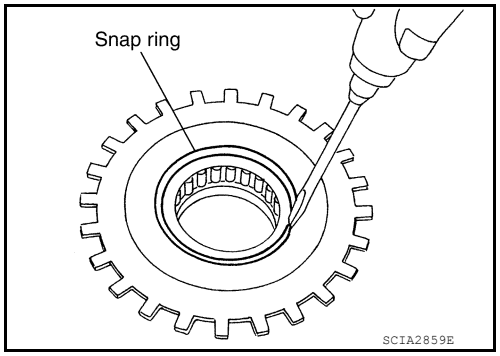
a. Remove needle bearing from high and low reverse clutch hub.



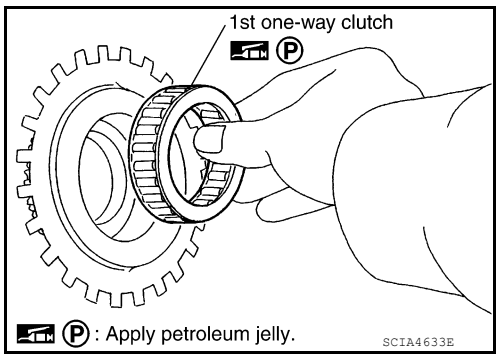
4. Remove rear sun gear assembly from mid sun gear assembly.



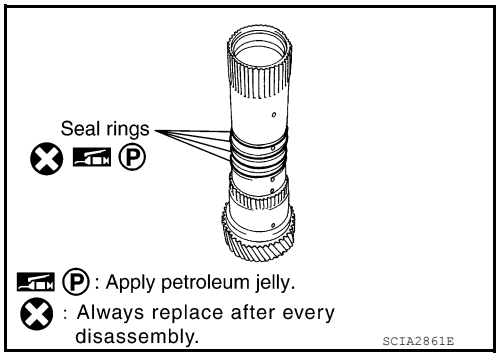
a. Remove snap ring from rear sun gear using suitable tool.



b. Remove 1st one-way clutch from rear sun gear.



5. Remove seal rings from mid sun gear.



INSPECTION

High and Low Reverse Clutch Hub Snap Ring, Rear Sun Gear Snap Ring
- Check for deformation, fatigue or damage.

CAUTION:
If necessary, replace the snap ring.

1st One-way Clutch
- Check frictional surface for wear or damage.

CAUTION:
If necessary, replace the 1st one-way clutch.

Mid Sun Gear
- Check for deformation, fatigue or damage.

CAUTION:
If necessary, replace the mid sun gear.

Rear Sun Gear
- Check for deformation, fatigue or damage.

CAUTION:
If necessary, replace the rear sun gear.

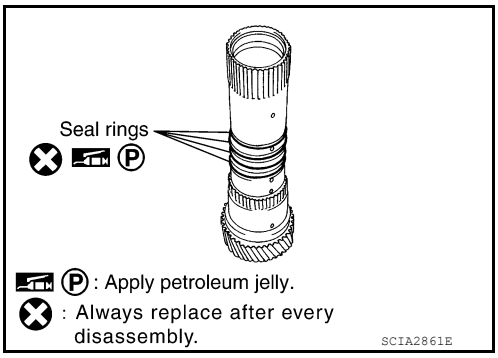
High and Low Reverse Clutch Hub
- Check for deformation, fatigue or damage.

CAUTION:
If necessary, replace the high and low reverse clutch hub.

ASSEMBLY

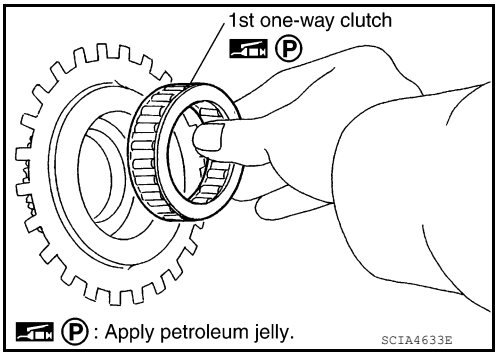
1. Install seal rings to mid sun gear.

CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**

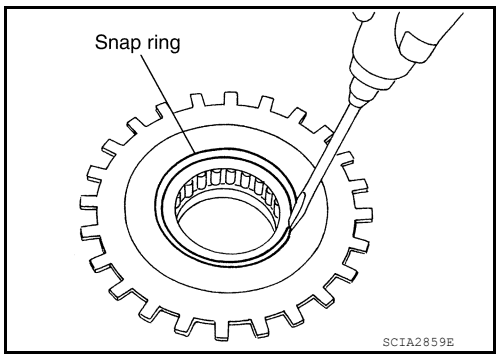


2. Install 1st one-way clutch to rear sun gear.

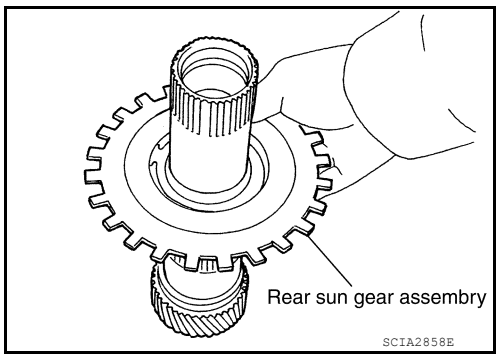
CAUTION:
Apply petroleum jelly to 1st one-way clutch.



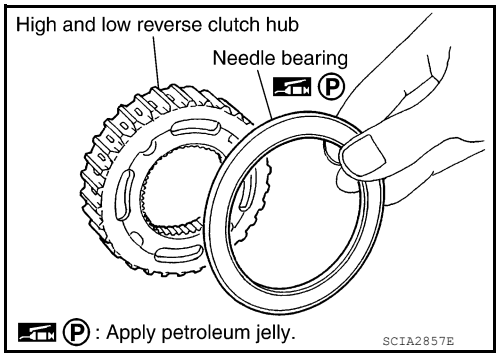
3. Install snap ring to rear sun gear using suitable tool.



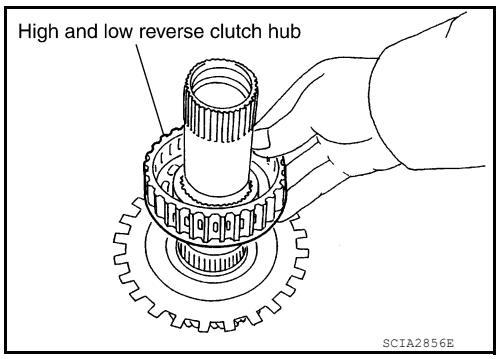
4. Install rear sun gear assembly to mid sun gear assembly.



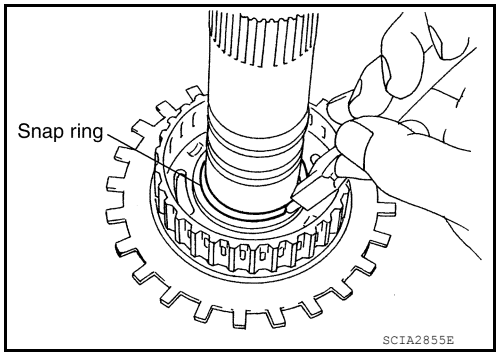
5. Install needle bearing to high and low reverse clutch hub.
CAUTION:
Apply petroleum jelly to needle bearing.



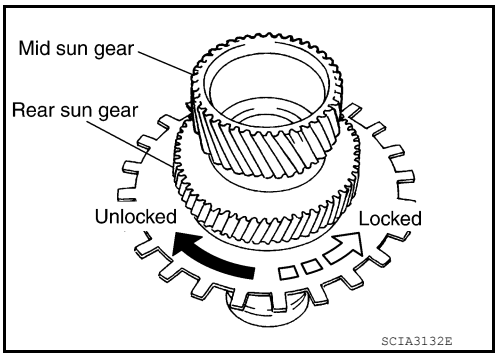
6. Install high and low reverse clutch hub to mid sun gear assembly.



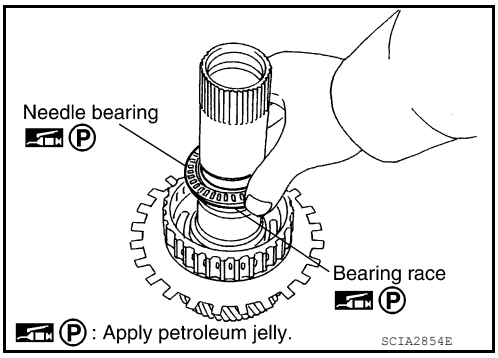
7. Install snap ring to mid sun gear assembly using suitable tool.
CAUTION:
Do not excessively expand snap ring.



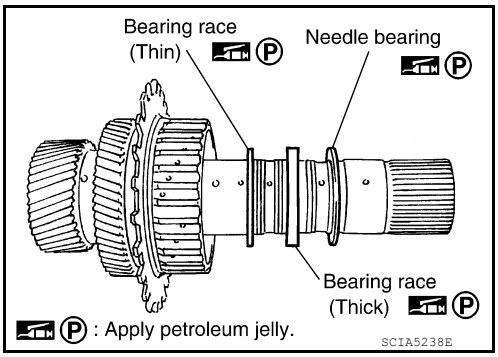
8. Check operation of 1st one-way clutch.
a. Hold mid sun gear and turn rear sun gear.
b. Check 1st one-way clutch for correct locking and unlocking directions.
CAUTION:
If not as shown, check installation direction of 1st one-way clutch.



9. Install needle bearing and bearing race to high and low reverse clutch hub.
CAUTION:
Apply petroleum jelly to needle bearing and bearing race.
• VQ40DE models



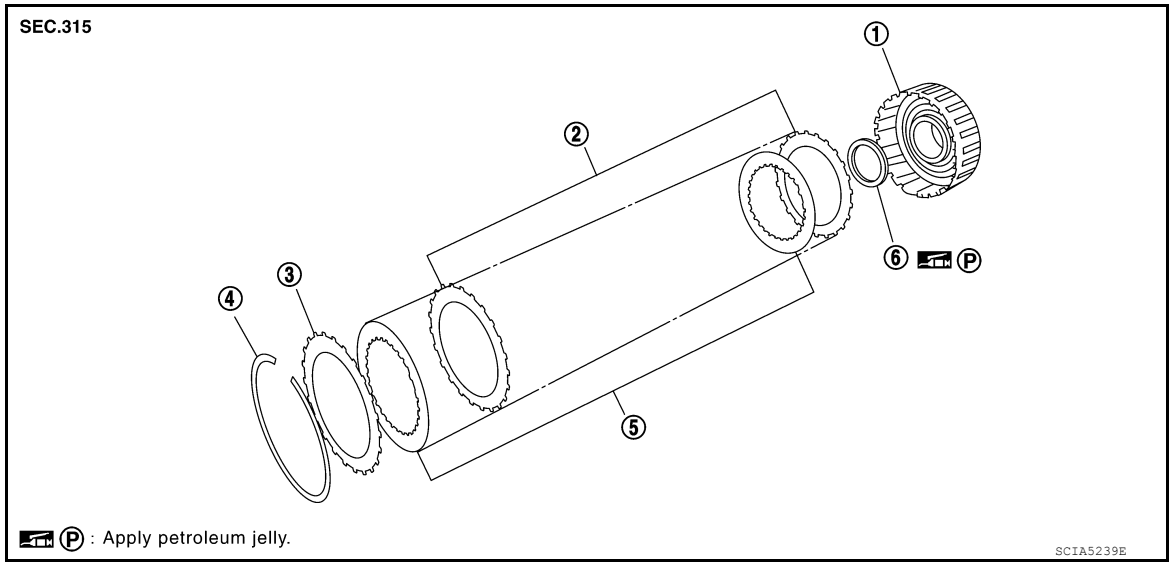
• VK56DE models



HIGH AND LOW REVERSE CLUTCH

Exploded View

INFOID:0000000006244901



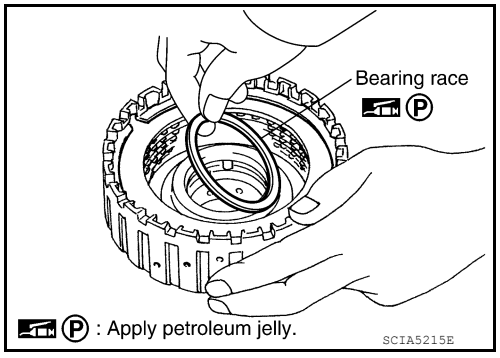
1. High and low reverse clutch drum
2. Driven plate
3. Retaining plate
4. Snap ring
5. Drive plate
6. Bearing race

Disassembly and Assembly

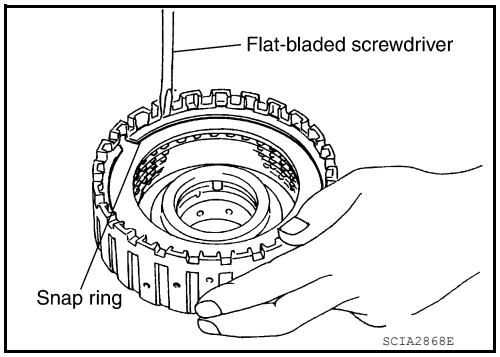
INFOID:0000000006244902

DISASSEMBLY

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



2. Remove snap ring from high and low reverse clutch drum using suitable tool.
3. Remove drive plates, driven plates and retaining plate from high and low reverse clutch drum.



INSPECTION

- **Check the following, and replace high and low reverse clutch assembly if necessary.**

High and Low Reverse Clutch Snap Ring

- Check for deformation, fatigue or damage.

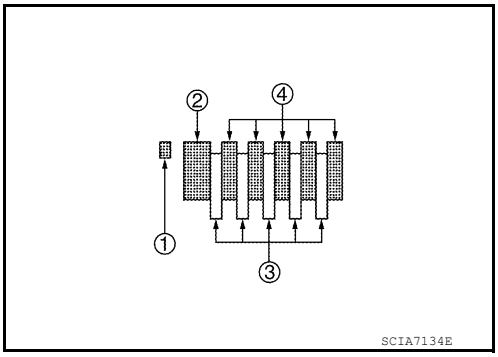
High and Low Reverse Clutch Drive Plates

• Check facing for burns, cracks or damage.

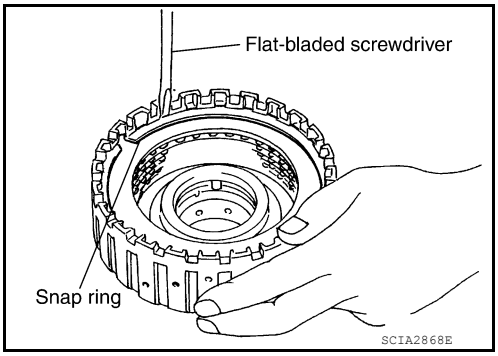
High and Low Reverse Clutch Retaining Plate and Driven Plates
• Check facing for burns, cracks or damage.

ASSEMBLY

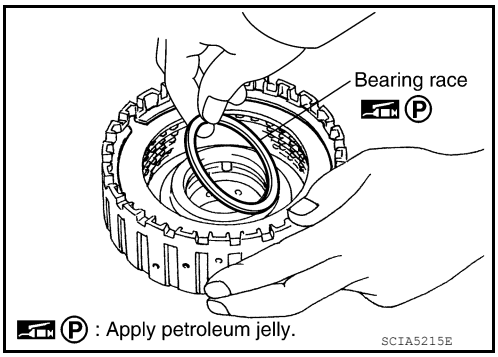
1. Install drive plates, driven plates and retaining plate in high and low reverse clutch drum.
   CAUTION:
   Take care with the order of plates.
   • Snap ring (1)
   • Retaining plate (2)
   • Drive plate (3)
   • Driven plate (4)
   • Drive plate/Driven plate: 5/5



2. Install snap ring in high and low reverse clutch drum using suitable tool.



3. Install bearing race to high and low reverse clutch drum.
   CAUTION:
   Apply petroleum jelly to bearing race.

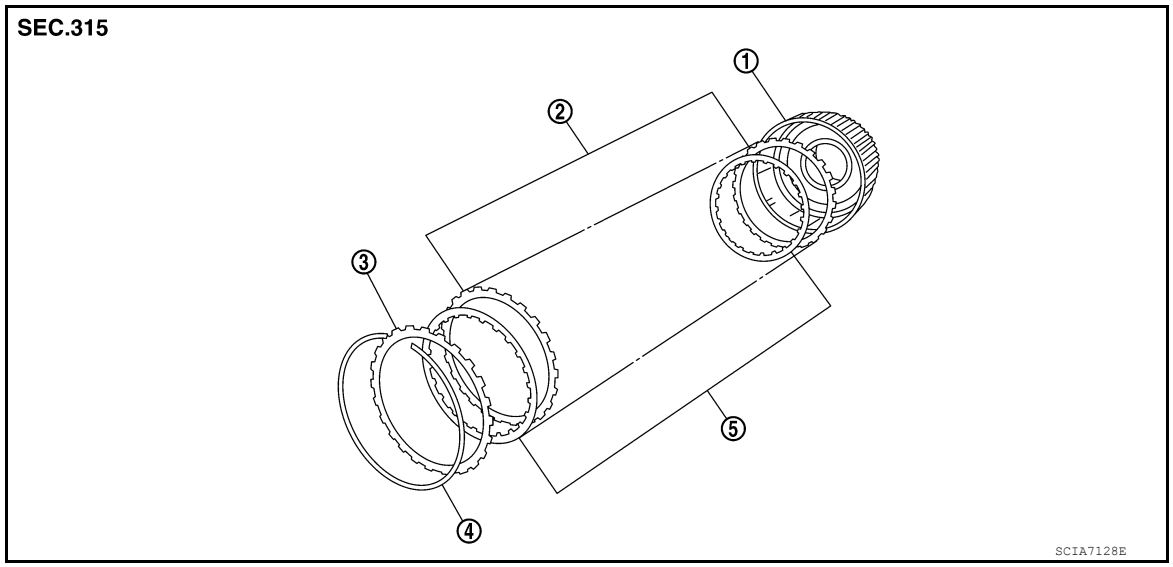


DIRECT CLUTCH

Exploded View

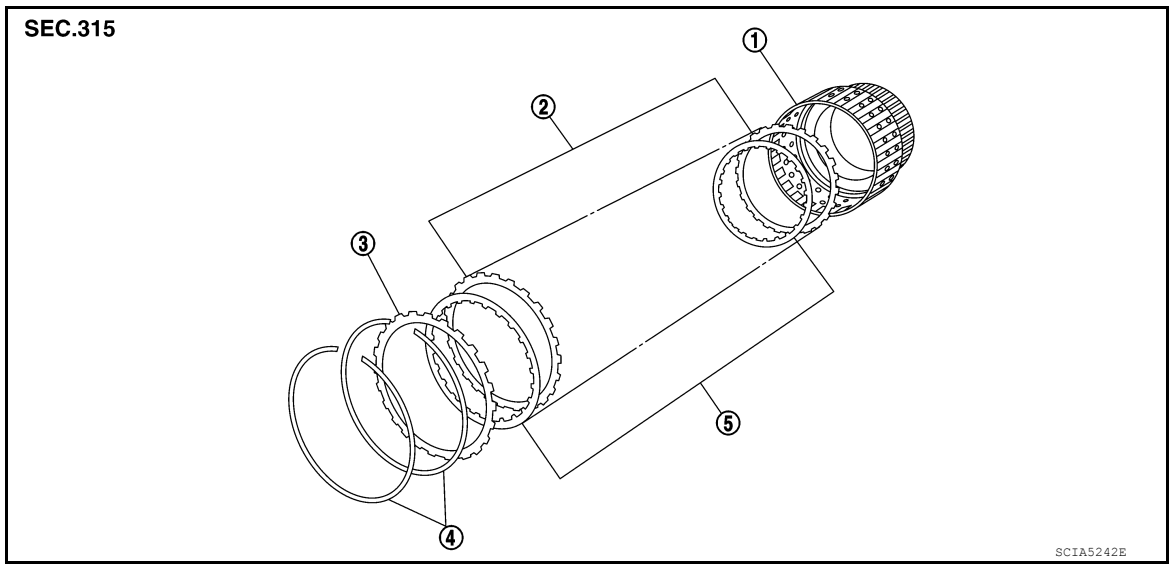
INFOID:0000000006244903

VQ40DE MODELS



1. Direct clutch drum
2. Driven plate
3. Retaining plate
4. Snap ring
5. Drive plate

VK56DE MODELS



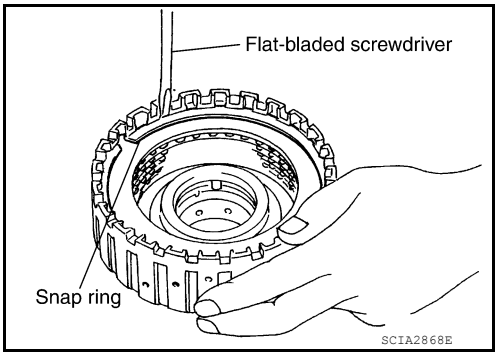
1. Direct clutch drum
2. Driven plate
3. Retaining plate
4. Snap ring
5. Drive plate

Disassembly and Assembly

INFOID:0000000006244904

DISASSEMBLY

1. Remove snap ring from direct clutch drum using suitable tool.
2. Remove retaining plates, drive plates, driven plates and dish plate from direct clutch drum.



INSPECTION

- **Check the following, and replace direct clutch assembly if necessary.**

Direct Clutch Snap Ring

- Check for deformation, fatigue or damage.

Direct Clutch Drive Plates

- Check facing for burns, cracks or damage.

Direct Clutch Retaining Plate and Driven Plates

- Check facing for burns, cracks or damage.

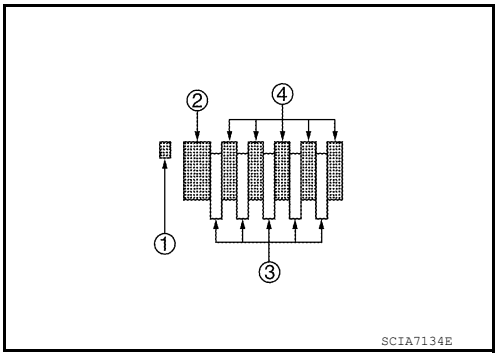
ASSEMBLY

1. Install dish plate, retaining plates, drive plates and driven plates in direct clutch drum.

CAUTION:

Take care with order of plates.

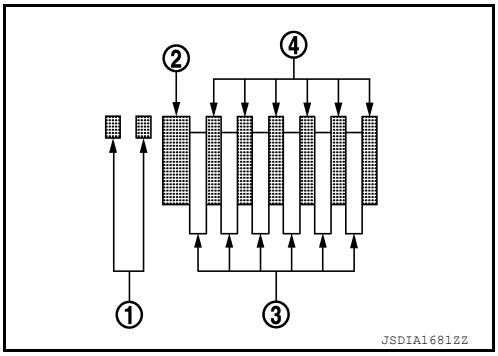
- VQ40DE models
  - Snap ring (1)
  - Retaining plate (2)
  - Drive plate (3)
  - Driven plate (4)
  - Driveplate/Driven plate: 5/5



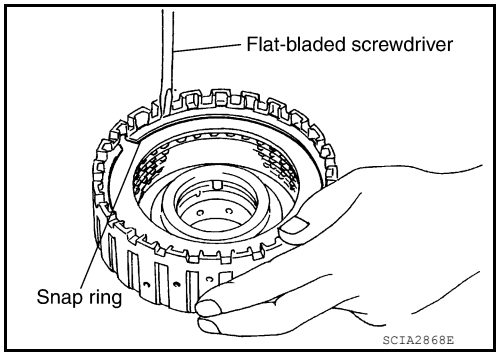
CAUTION:

Take care with order of plates.

- VK56DE models
  - Snap ring (1)
  - Retaining plate (2)
  - Drive plate (3)
  - Driven plate (4)
  - Driveplate/Driven plate: 6/6



2. Install snap ring in direct clutch drum using suitable tool.

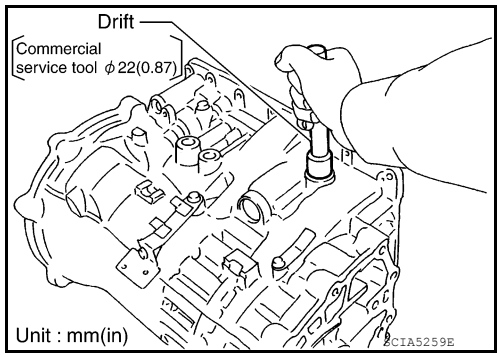


ASSEMBLY

Assembly (1)

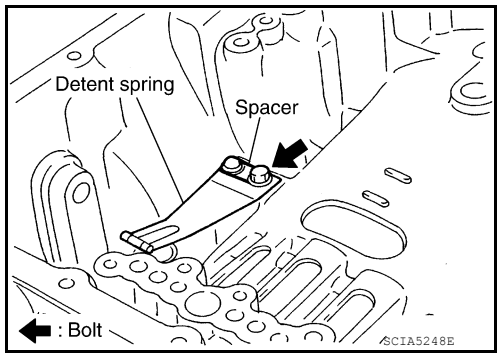
INFOID:0000000006244905

1. Drive manual shaft oil seals into the transmission case until they are flush using suitable tool.
   CAUTION:
   - **Apply ATF to manual shaft oil seals.**
   - **Do not reuse manual shaft oil seals.**

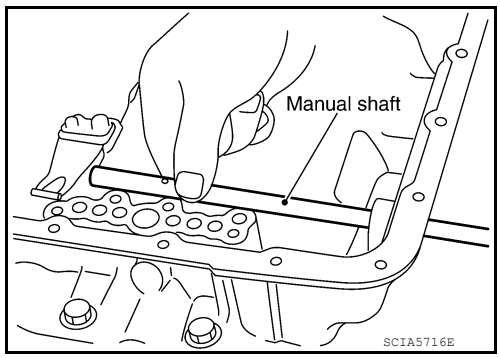


2. Install detent spring and spacer in transmission case and secure with the bolt.

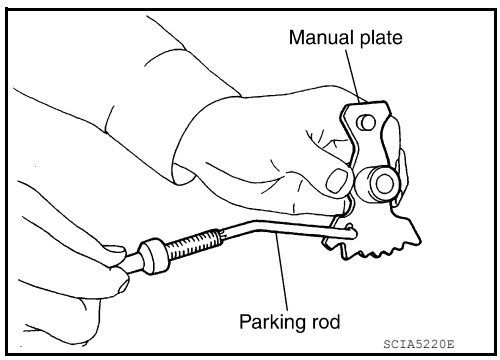
   Bolt : 7.9 N·m (0.81 kg-m, 70 in-lb)



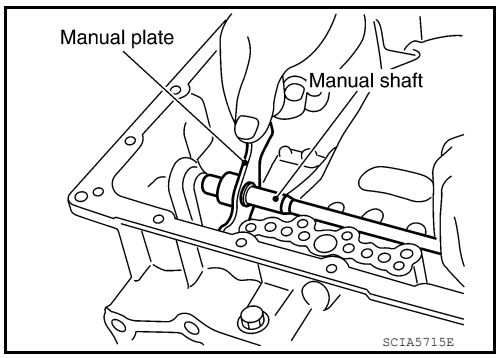
3. Install manual shaft to transmission case.



4. Install parking rod to manual plate.



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



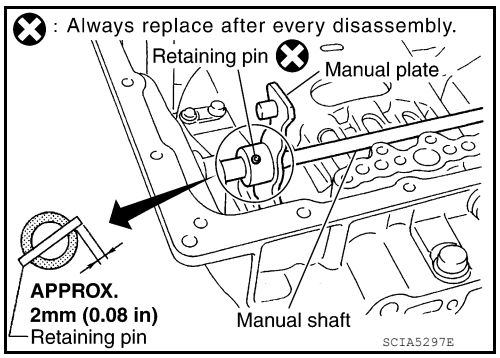
6. Install retaining pin into the manual plate and manual shaft.

a. Align pinhole of the manual plate to pinhole of the manual shaft using suitable tool.

b. Tap the retaining pin into the manual plate using suitable tool.

CAUTION:

- **Drive retaining pin to 2 ± 0.5 mm (0.08 ± 0.020 in) over the manual plate.**
- **Do not reuse retaining pin.**



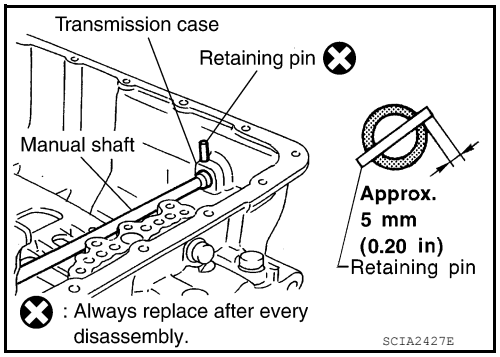
7. Install retaining pin into the transmission case and manual shaft.

a. Align pinhole of the transmission case to pinhole of the manual shaft using suitable tool.

b. Tap the retaining pin into the transmission case using suitable tool.

CAUTION:

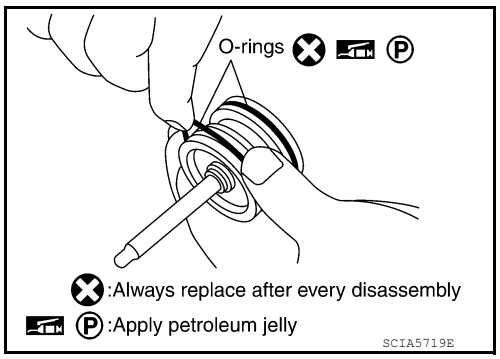
- **Drive retaining pin to 5 ± 1 mm (0.20 ± 0.04 in) over the transmission case.**
- **Do not reuse retaining pin.**



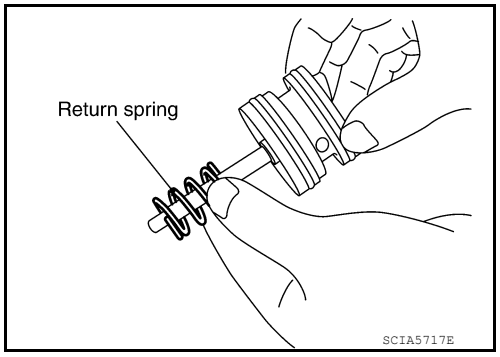
8. Install O-rings to servo assembly.

CAUTION:

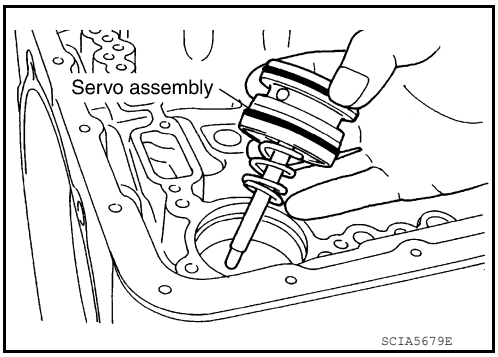
- **Do not reuse O-rings.**
- **Apply petroleum jelly to O-rings.**



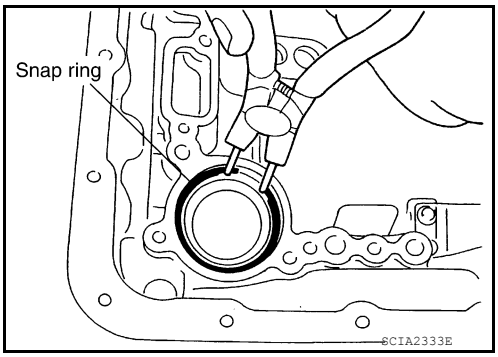
9. Install return spring to servo assembly.



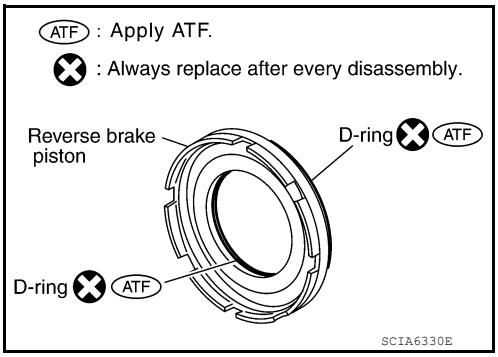
10. Install servo assembly in transmission case.



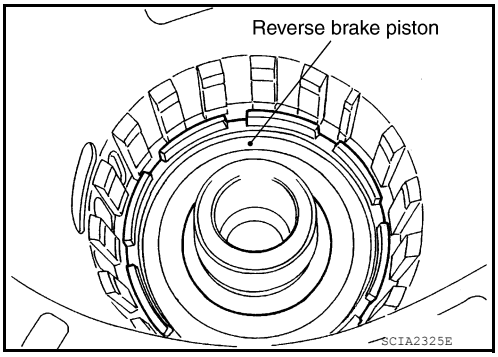
11. Install snap ring to transmission case using suitable tool.



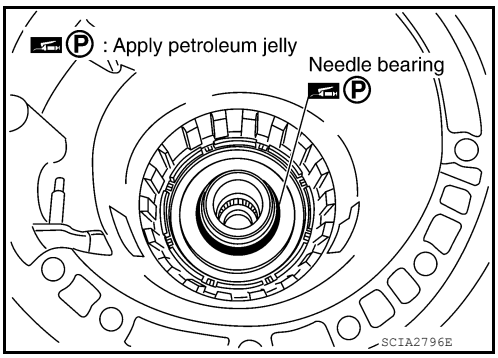
12. Install D-rings in reverse brake piston.
CAUTION:
- **Do not reuse D-rings.**
- **Apply ATF to D-rings.**



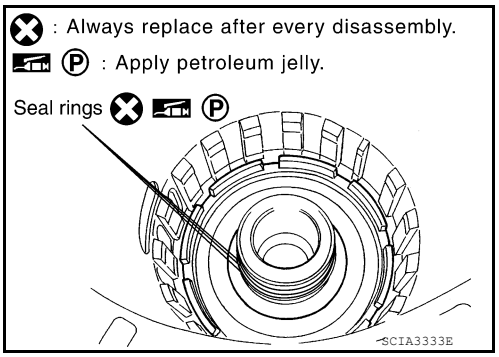
13. Install reverse brake piston in transmission case.



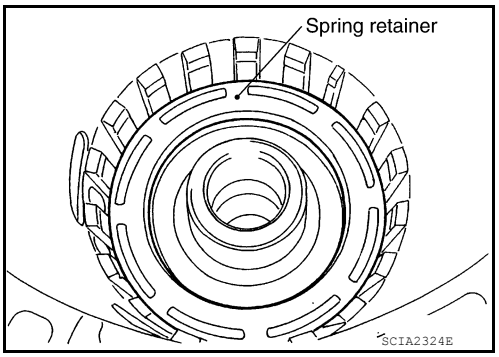
14. Install needle bearing to drum support edge surface.
CAUTION:
Apply petroleum jelly to needle bearing.



15. Install seal rings to drum support.
CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



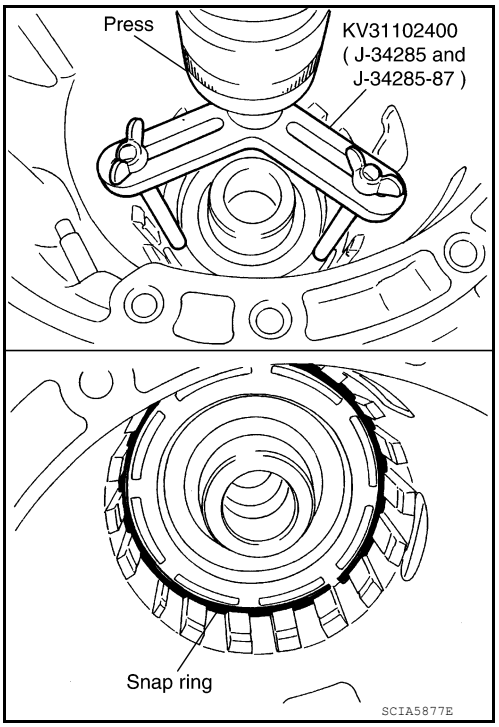
16. Install spring retainer and return spring in transmission case.



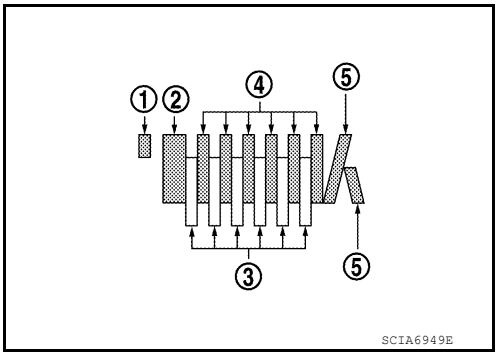
17. Install snap ring in transmission case while compressing return spring using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

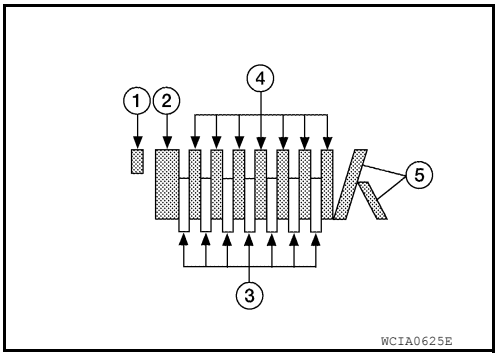
CAUTION:
Securely assemble them using a flat-bladed screwdriver so that snap ring tension is slightly weak.



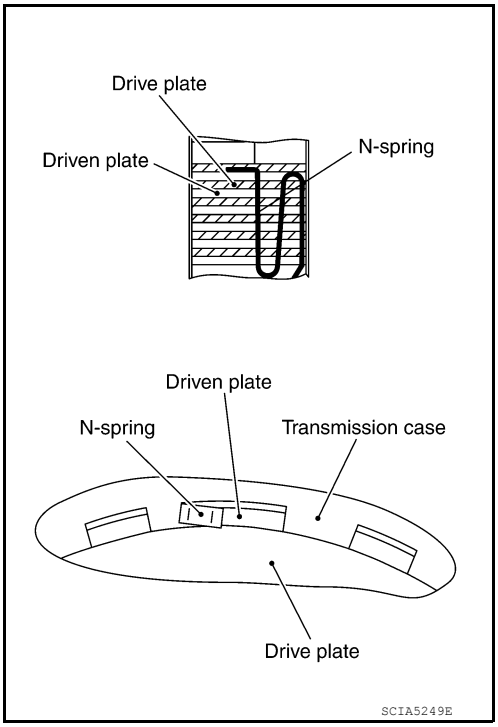
18. Install reverse brake drive plates, driven plates and dish plates in transmission case.
CAUTION:
Take care with order of plates.
- VQ40DE models
- Snap ring (1)
- Retaining plate (2)
- Drive plate (3)
- Driven plate (4)
- Dish plate (5)
- Driveplate/Driven plate:6/6



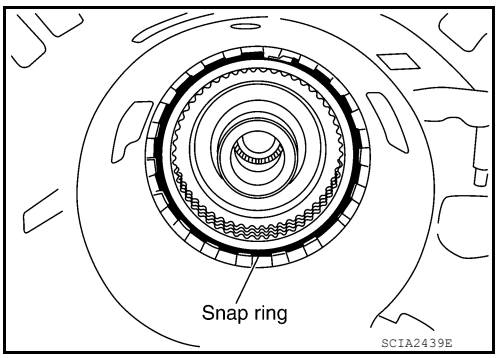
- VK56DE models
- Snap ring (1)
- Retaining plate (2)
- Drive plate (3)
- Driven plate (4)
- Dish plate (5)
- Driveplate/Driven plate: 7/7



19. Assemble N-spring.
20. Install reverse brake retaining plate in transmission case.

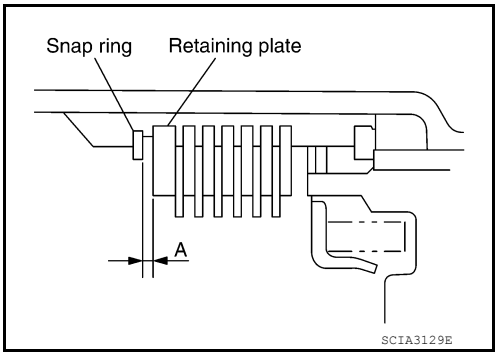


21. Install snap ring in transmission case.



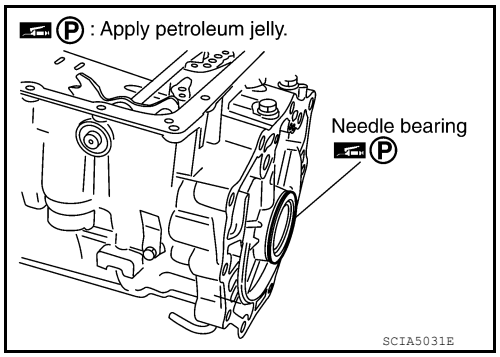
22. Measure clearance (A) between retaining plate and snap ring. If not within specified clearance, select proper retaining plate.

Clearance "A" : **0.7 - 1.1mm (0.028 - 0.043 in)**
Retaining plate : **Refer to TM-282, "Reverse brake".**



23. Install needle bearing to transmission case.

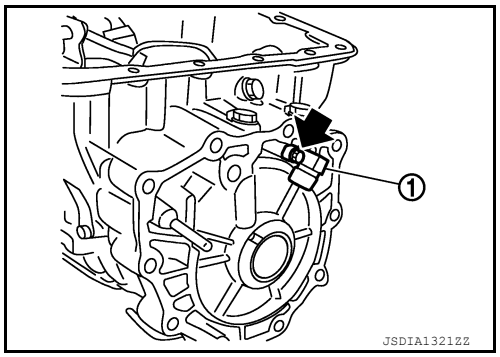
CAUTION:
- **Take care with the direction of needle bearing. Refer to TM-215, "Location of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings".**
- **Apply petroleum jelly to needle bearing.**



24. Install output speed sensor (1) to transmission case and tighten bolt (⬅) to specified torque.

Output speed sensor bolt : 5.8 N·m (0.59 kg-m, 51 in-lb)

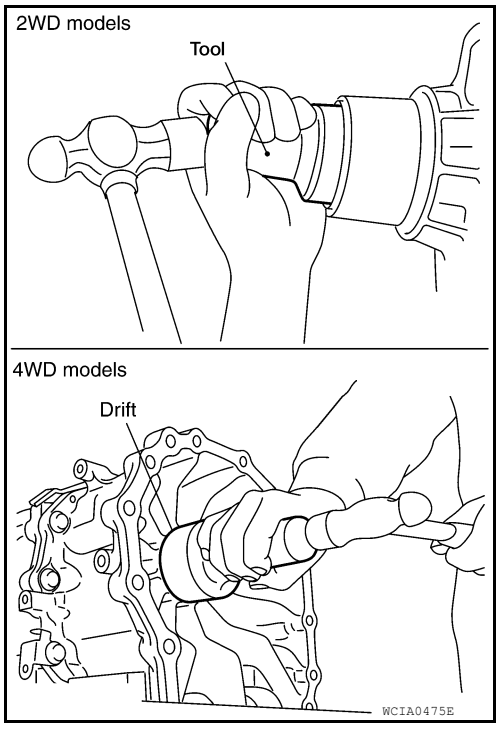
CAUTION:
- **Do not subject sensor to impact by dropping or hitting it.**
- **Do not disassemble sensor.**
- **Do not allow metal filings or any foreign material to get on the sensor's front edge magnetic area.**
- **Do not place sensor in an area affected by magnetism.**



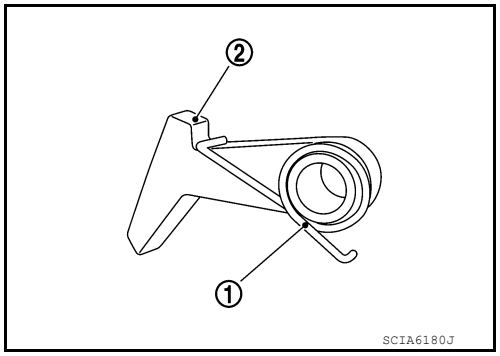
25. Install new rear oil seal until it is flush into the rear extension case (2WD models) using Tool or adapter case (4WD models) using suitable tool.

Tool number : ST33400001 (J-26082)

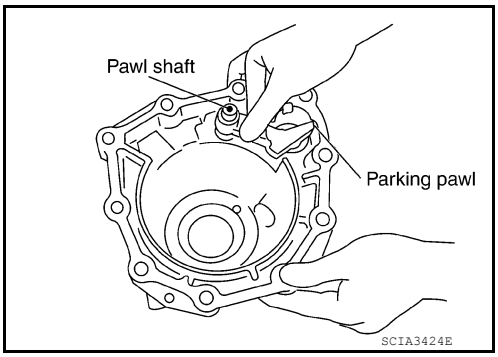
CAUTION:
- **Apply ATF to rear oil seal.**
- **Do not reuse rear oil seal.**



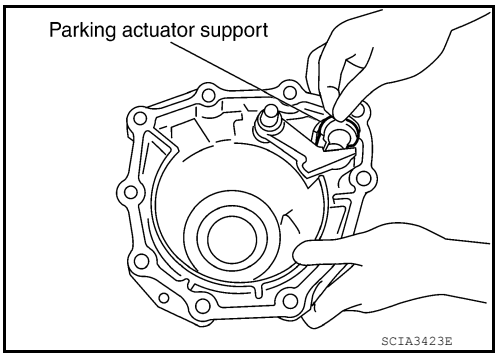
26. Install return spring (1) to parking pawl (2).



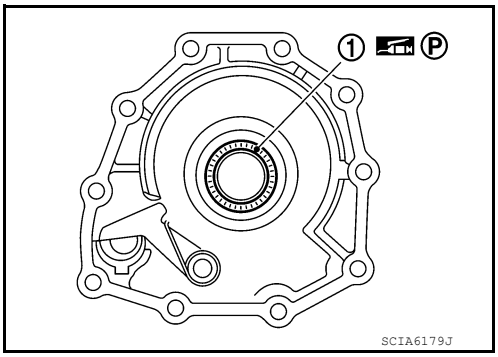
27. Install parking pawl (with return spring) and pawl shaft to rear extension (2WD models) or adapter case (4WD models).



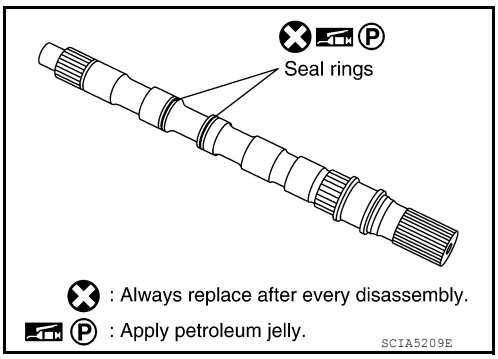
28. Install parking actuator support to rear extension (2WD models) or adapter case (4WD models).



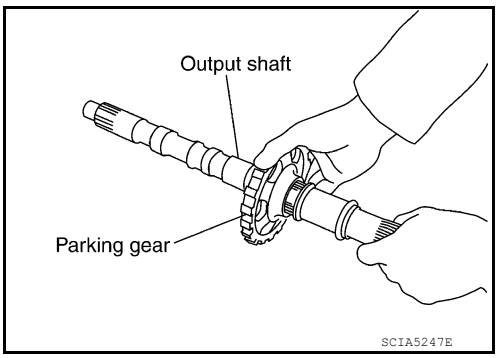
29. Install needle bearing (1) to rear extension (2WD models) or adapter case (4WD models).
CAUTION:
Apply petroleum jelly to needle bearing.



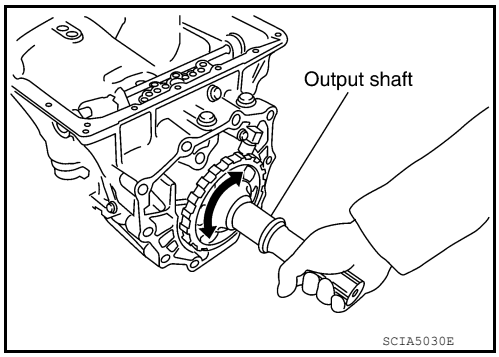
30. Install seal rings to output shaft.
CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



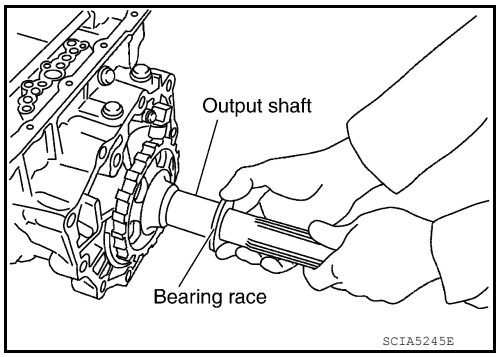
31. Install parking gear to output shaft.



32. Install output shaft in transmission case.
CAUTION:
Do not mistake front of shaft for rear because both sides look similar (thinner end is front side).



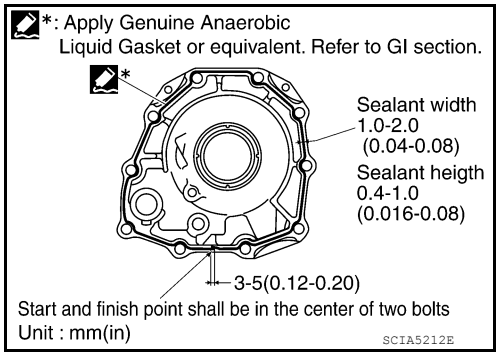
33. Install bearing race to output shaft.



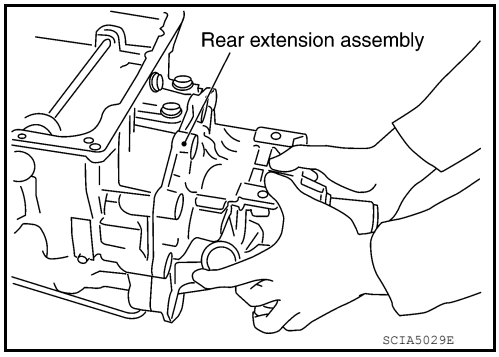
34. Install rear extension assembly (2WD models) or adapter case assembly (4WD models) according to the following procedures.

a. **2WD models**

i. Apply recommended sealant (Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-14, "Recommended Chemical Products and Sealants".) to rear extension assembly as shown.
CAUTION:
Completely remove all moisture, oil, old sealant and any foreign material from the transmission case and rear extension assembly mating surfaces.



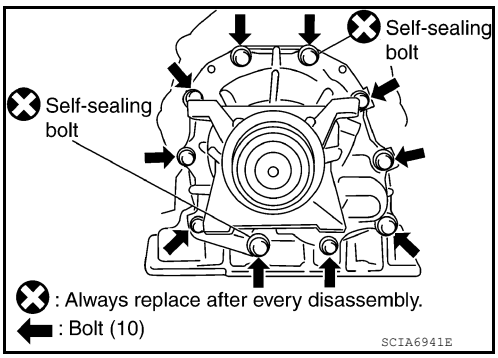
ii. Install rear extension assembly to transmission case.
CAUTION:
Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the rear extension assembly.



iii. Install rear extension assembly bolts and tighten to the specified torque.

Rear extension assembly bolt	**: 52 N·m (5.3 kg-m, 38 ft-lb)**
Self-sealing bolt	**: 61 N·m (6.2 kg-m, 45 ft-lb)**

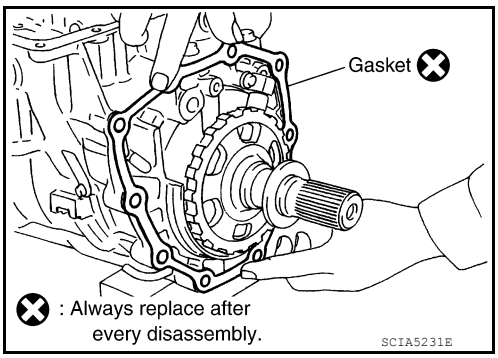
CAUTION:
Do not reuse self-sealing bolt.



b. **4WD models**

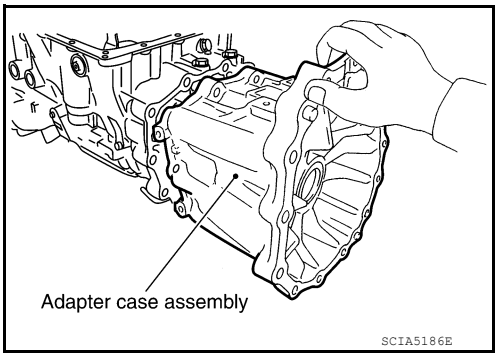
i. Install gasket onto transmission case.

CAUTION:
- **Completely remove all moisture, oil, old gasket and any foreign material from the transmission case and adapter case assembly mating surfaces.**
- **Do not reuse gasket.**



ii. 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 rear extension assembly.

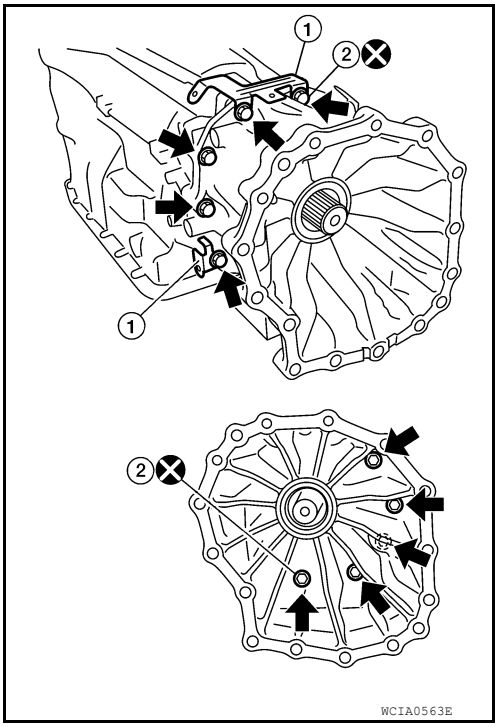


iii. Install brackets (1) (lower bracket VK56DE only).

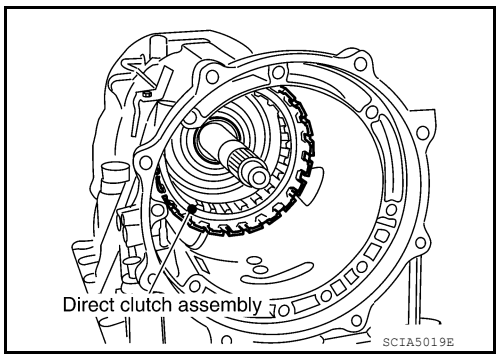
iv. Tighten adapter case assembly bolts to specified torque.

CAUTION:
Do not reuse self-sealing bolts (2).

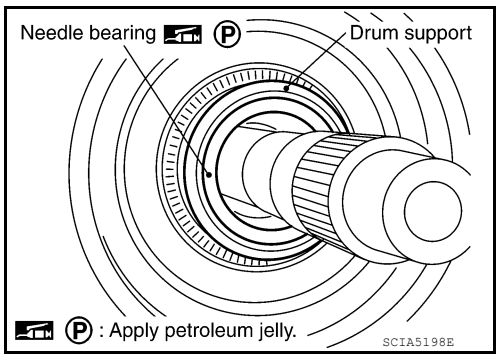
Adapter case assembly bolt	**: 52 N·m (5.3 kg-m, 38 ft-lb)**
Self-sealing bolt	**: 61 N·m (6.2 kg-m, 45 ft-lb)**



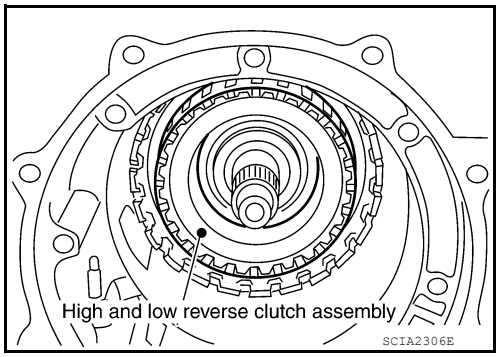
35. Install direct clutch assembly in reverse brake.
CAUTION:
Make sure that drum support edge surface and direct clutch inner boss edge surface come to almost same place.



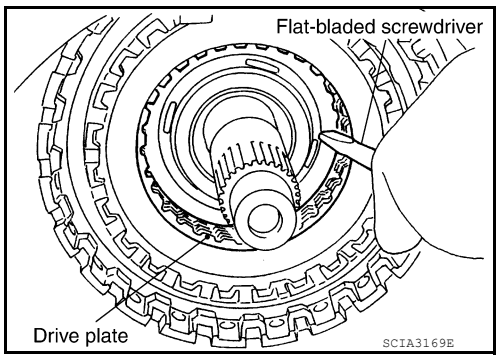
36. Install needle bearing in drum support.
CAUTION:
Apply petroleum jelly to needle bearing.



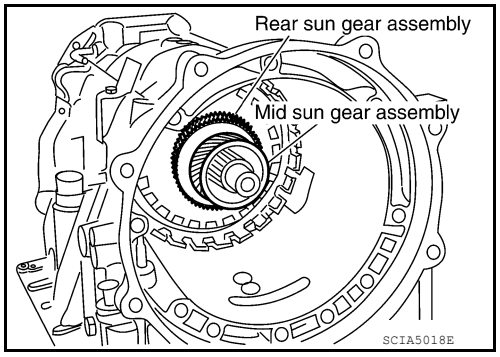
37. Install high and low reverse clutch assembly in direct clutch.



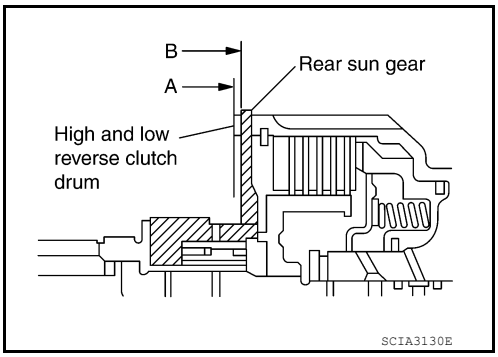
38. Align the drive plate using suitable tool.



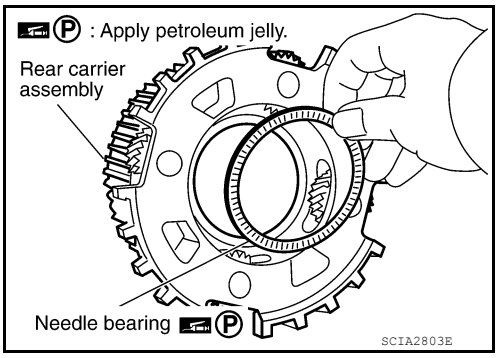
39. Install high and low reverse clutch hub, mid sun gear assembly and rear sun gear assembly as a unit.



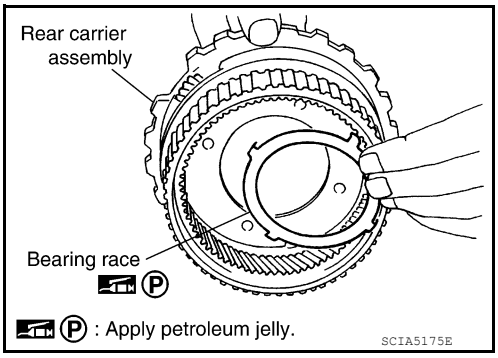
CAUTION:
Make sure that portion "A" of high and low reverse clutch drum protrudes approximately 2 mm (0.08 in) beyond portion "B" of rear sun gear.



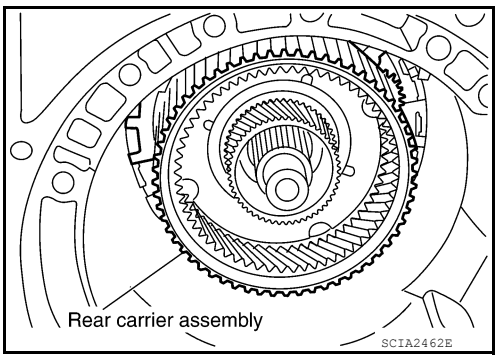
40. Install needle bearing in rear carrier assembly.
CAUTION:
Apply petroleum jelly to needle bearing.



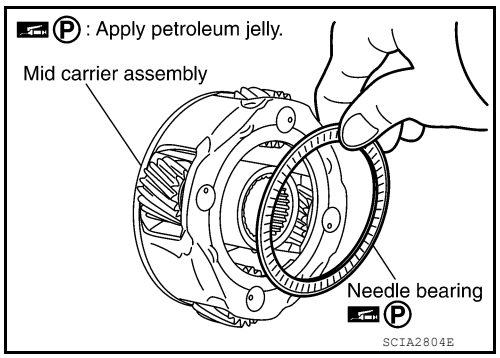
41. Install bearing race in rear carrier assembly.
CAUTION:
Apply petroleum jelly to bearing race.



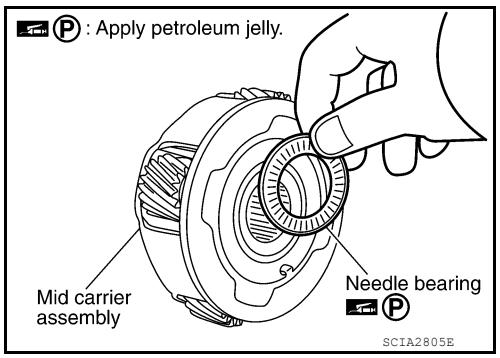
42. Install rear carrier assembly in direct clutch drum.



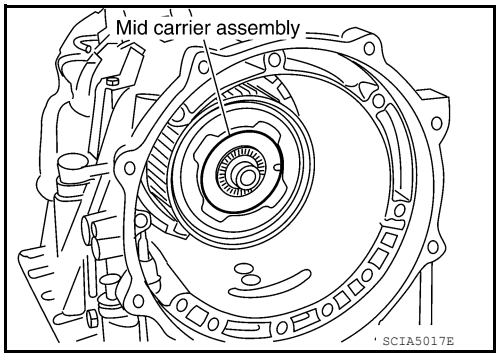
43. Install needle bearing (rear side) to mid carrier assembly.
CAUTION:
Apply petroleum jelly to needle bearing.



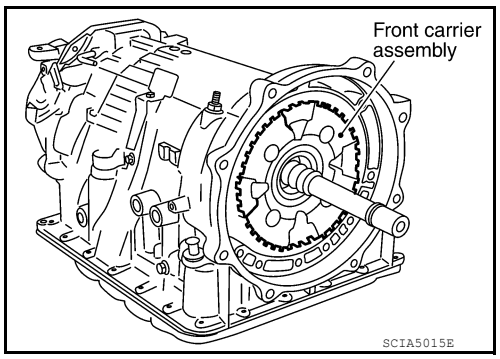
44. Install needle bearing (front side) to mid carrier assembly.
CAUTION:
Apply petroleum jelly to needle bearing.



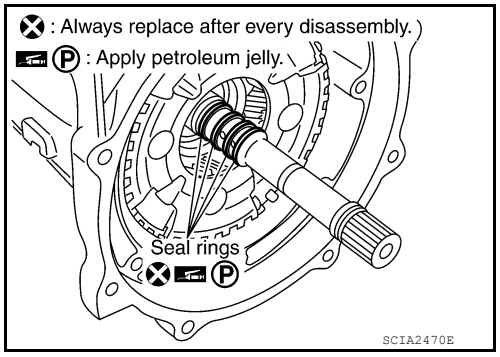
45. Install mid carrier assembly in rear carrier assembly.



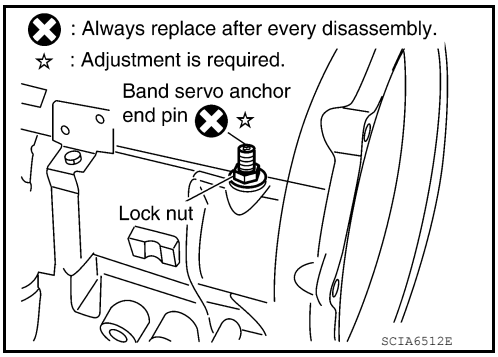
46. Install front carrier assembly, input clutch assembly and rear internal gear as a unit.



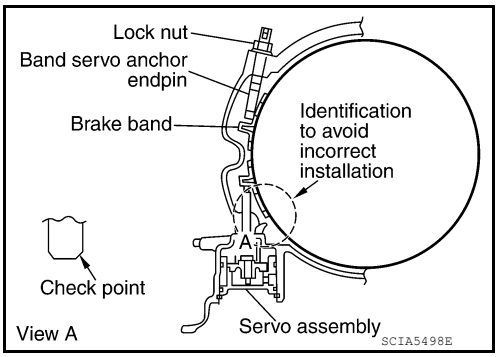
47. Install seal rings in input clutch assembly.
CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



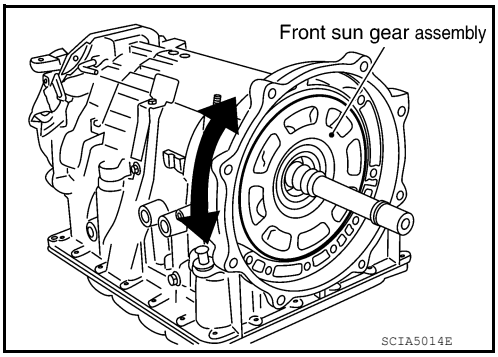
48. Install band servo anchor end pin and lock nut in transmission case.
CAUTION:
Do not reuse band servo anchor end pin.



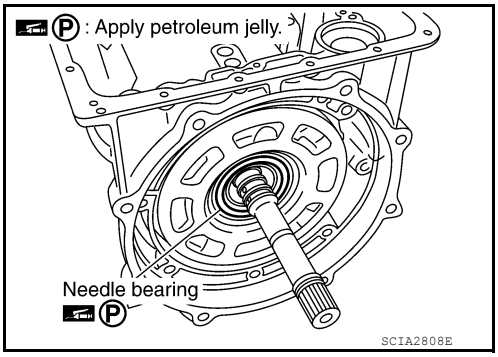
49. Install brake band in transmission case.
CAUTION:
Install it so that the identification to avoid incorrect installation faces the servo side.



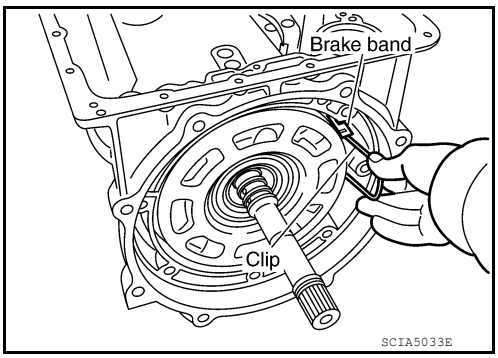
50. Install front sun gear to front carrier assembly.
CAUTION:
Apply ATF to front sun gear bearing and 3rd one-way clutch end bearing.



51. Install needle bearing to front sun gear.
CAUTION:
Apply petroleum jelly to needle bearing.



52. Adjust brake band tilting using a clip so that brake band contacts front sun gear drum evenly.

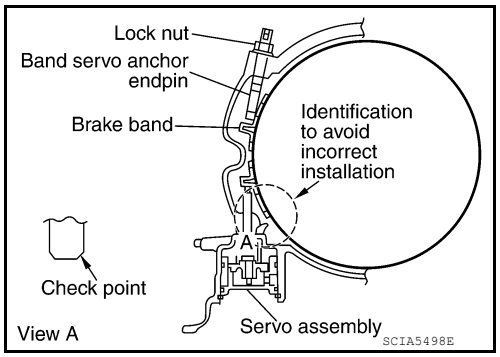


53. Adjust brake band.
a. Loosen lock nut.
b. Tighten band servo anchor end pin to specified torque.

Anchor end pin : 5.0 N·m (0.51 kg-m, 44 in-lb)

c. Back off band servo anchor end pin three turns.
d. Holding band servo anchor end pin, tighten lock nut to specified torque.

Lock nut : 46 N·m (4.7 kg-m, 34 ft-lb)

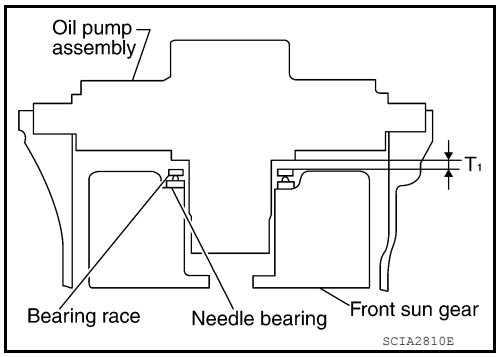


Adjustment

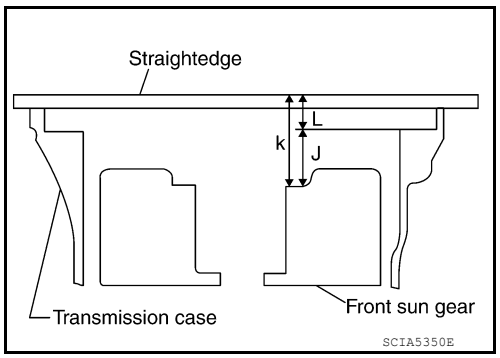
INFOID:0000000006244906

TOTAL END PLAY

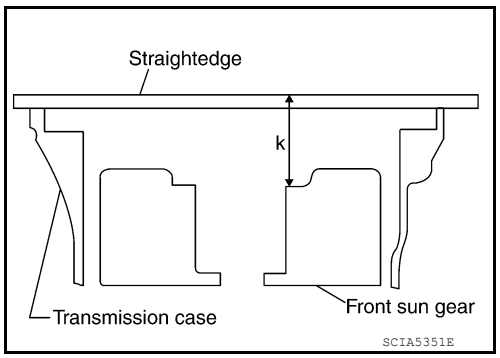
- Measure clearance between front sun gear and bearing race for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions (K) and (L) and then calculate dimension (J).



a. Measure dimension (K).

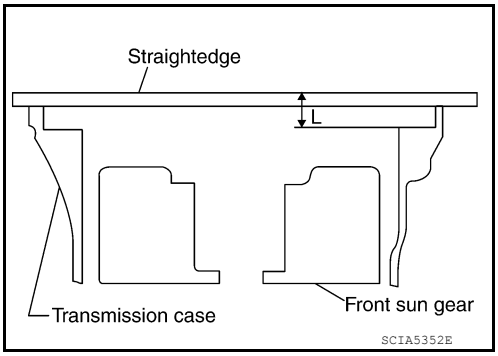


b. Measure dimension (L).

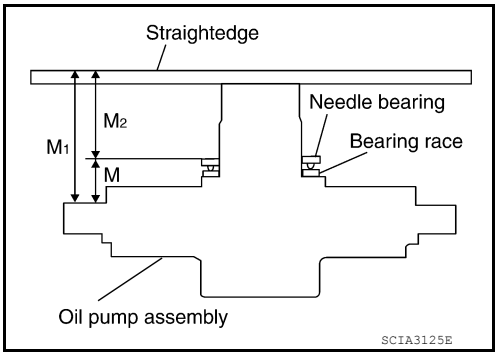
c. Calculate dimension (J).

(J): Distance between oil pump fitting surface of transmission case and needle bearing mating surface of front sun gear.

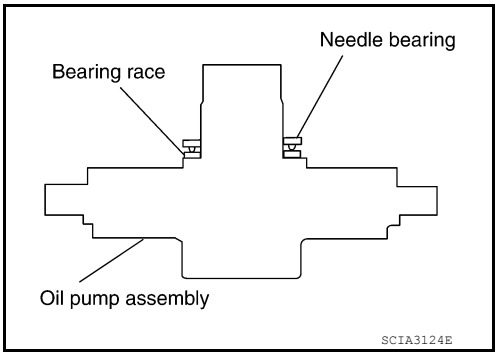
J = K – L



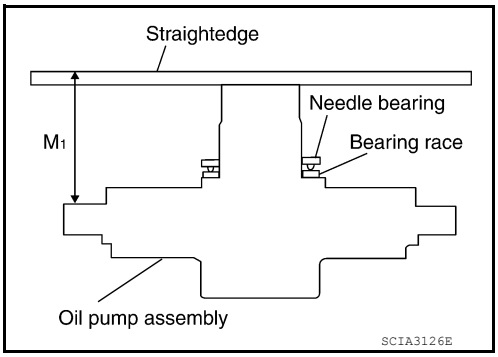
2. Measure dimensions (M_1) and (M_2) and then calculate dimension (M).



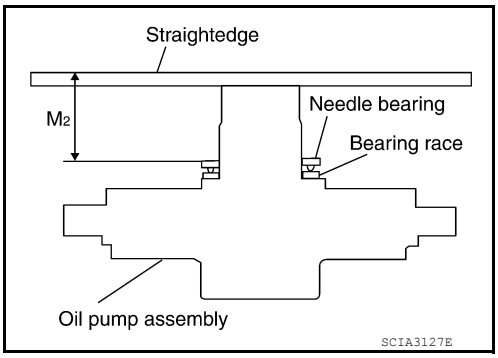
a. Place bearing race and needle bearing on oil pump assembly.



b. Measure dimension (M_1).



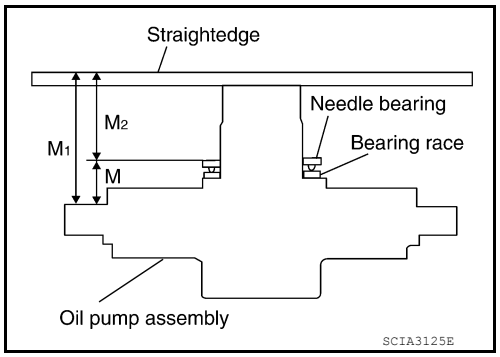
c. Measure dimension (M_2).



d. Calculate dimension (M).

(M): Distance between transmission case fitting surface of oil pump and needle bearing on oil pump.

$M = M_1 - M_2$



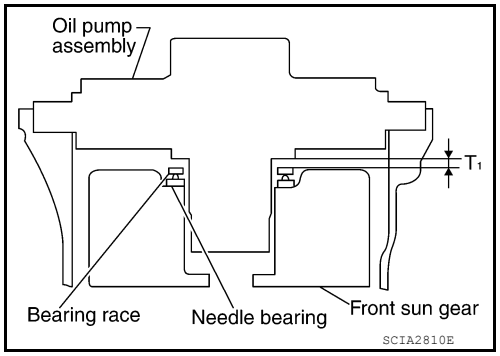
3. Adjust total end play (T_1).

$T_1 = J - M$

Total end play (T_1) : 0.25 - 0.55 mm (0.0098 - 0.0217 in)

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

Bearing races :Refer to TM-282, "Total End Play".

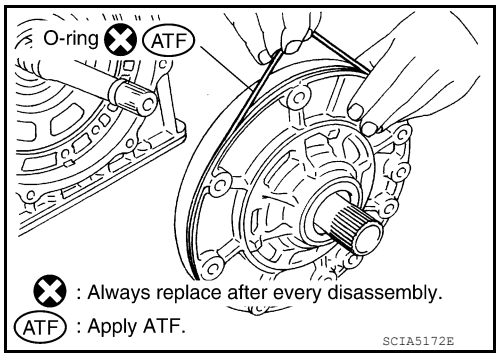


Assembly (2)

INFOID:0000000006244907

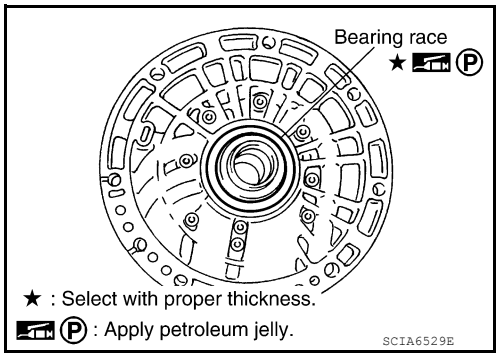
1. Install O-ring to oil pump assembly.

CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

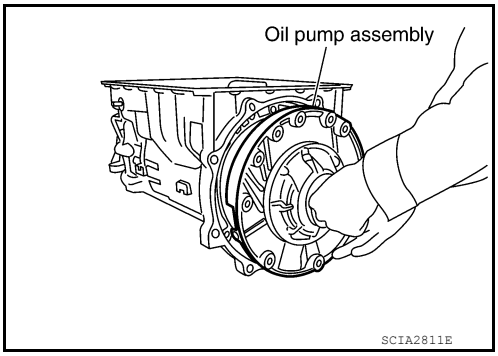


2. Install bearing race to oil pump assembly.

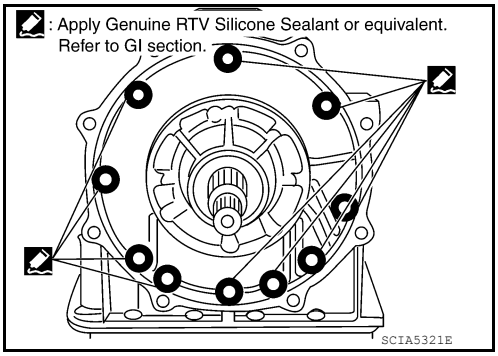
CAUTION:
Apply petroleum jelly to bearing race.



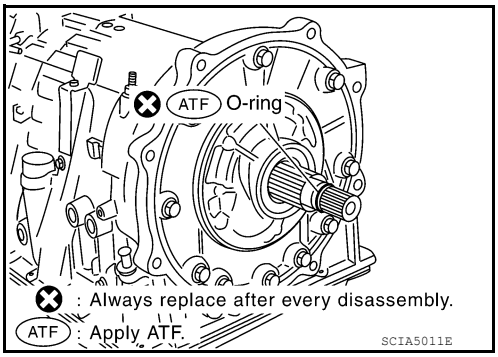
3. Install oil pump assembly in transmission case.
CAUTION:
Apply ATF to oil pump bearing.



4. Apply recommended sealant (Genuine RTV Silicone Sealant or equivalent. Refer to GI-14, "Recommended Chemical Products and Sealants".) to oil pump assembly as shown.
CAUTION:
Completely remove all moisture, oil, old sealant and any foreign material from the oil pump bolts and oil pump bolt mating surfaces.



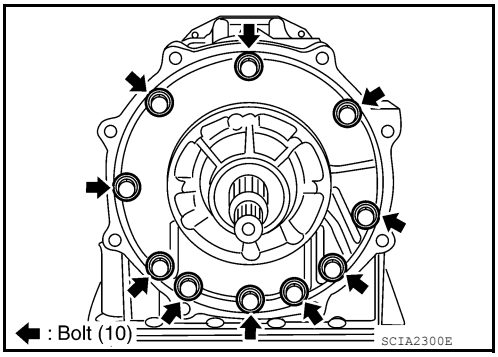
5. Install O-ring to input clutch assembly.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



6. Tighten oil pump bolts to specified torque.

Oil pump bolts : 48 N·m (4.9 kg-m, 35 ft-lb)

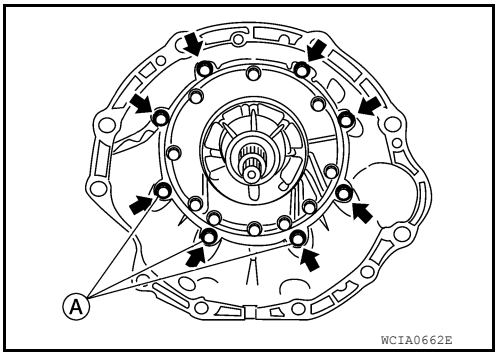
CAUTION:
Apply ATF to oil pump bushing.



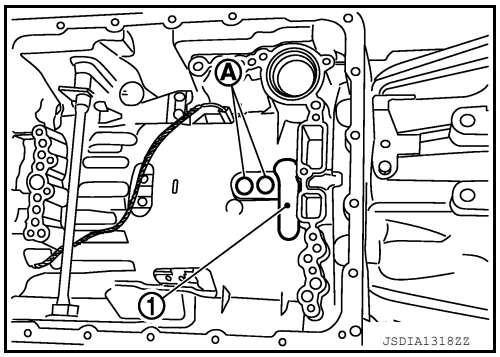
7. Install converter housing to transmission case and tighten bolts to specified torque.

Converter housing bolt : 52 N·m (5.3 kg-m, 38 ft-lb)
Self-sealing bolt (A) : 61 N·m (6.2 kg-m, 45 ft-lb)

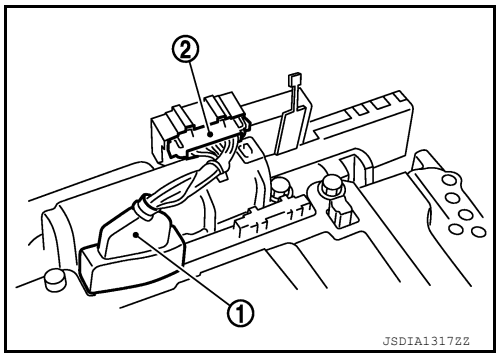
CAUTION:
Do not reuse self-sealing bolt (A).



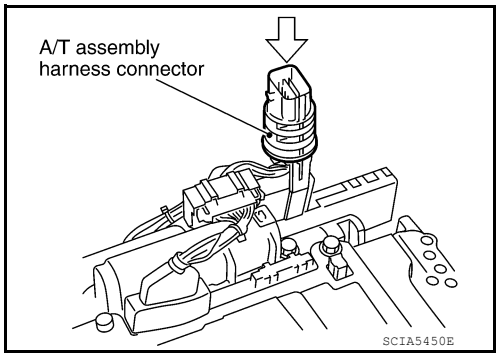
8. Make sure that brake band (1) does not close input speed sensor hole (A).



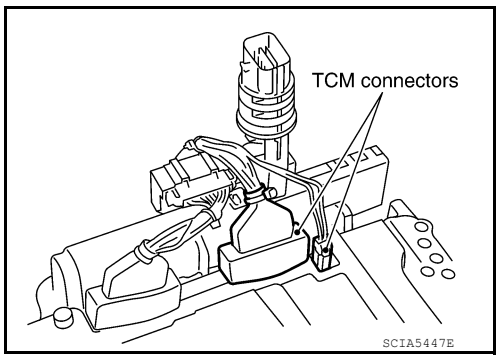
9. Connect TCM connector (1) and transmission range switch connector (2).



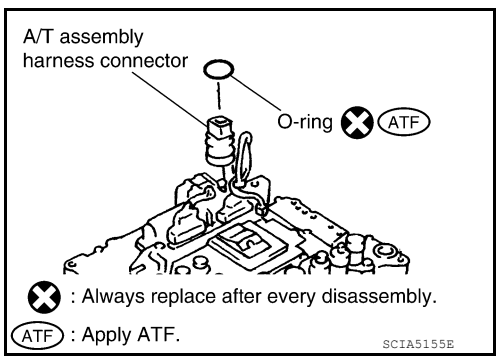
10. Install A/T assembly harness connector to control valve with TCM.



11. Connect TCM connectors.

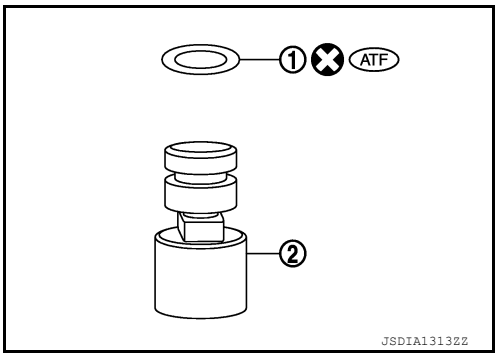


12. Install O-ring to A/T assembly harness connector.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

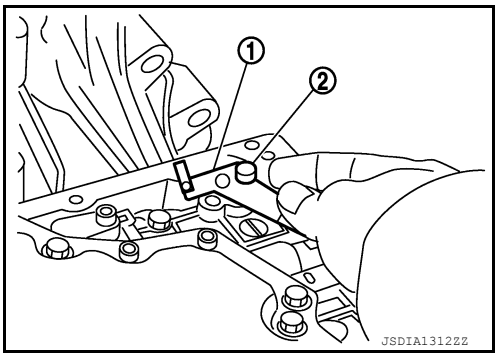


13. Install new O-ring (1) in plug (2).

CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**
- **O-ring should be free of contamination.**



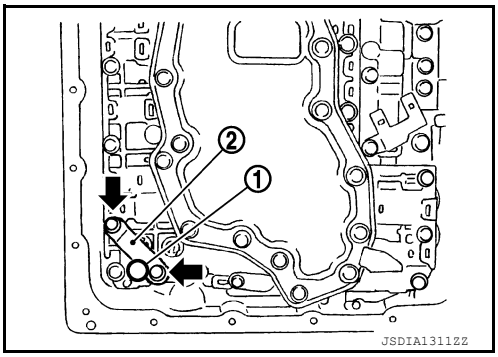
14. Install plug (2) to bracket (1).



15. Install plug (1) [with bracket (2)] to control valve with TCM and tighten bolt (⬅) to specified torque.

Bracket bolt : 7.9 N·m (0.81 kg-m, 70 in-lb)

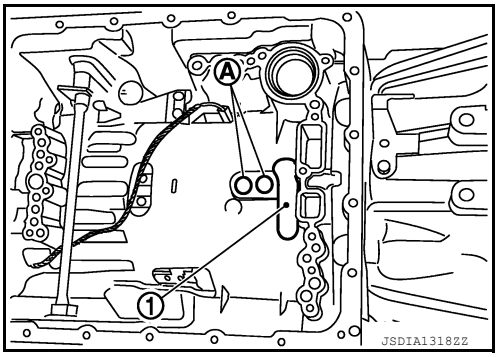
CAUTION:
Adjust bolt hole of bracket to bolt hole of control valve.



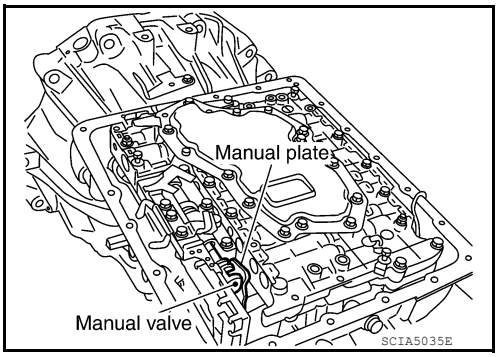
16. Install control valve with TCM in transmission case.

1 : Brake band

CAUTION:
- **Make sure that input speed sensor is securely installed into input speed sensor hole (A).**
- **Hang down output speed sensor harness toward outside so as not to disturb installation of control valve with TCM.**
- **Adjust A/T assembly harness connector of control valve with TCM to terminal hole of transmission case.**



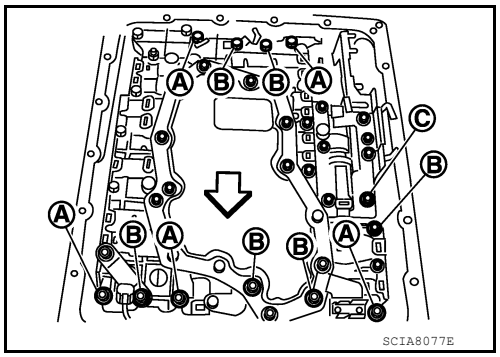
- **Assemble it so that manual valve cutout is engaged with manual plate projection.**



17. Install bolts (A), (B) and (C) to control valve with TCM.

⇦ : Front

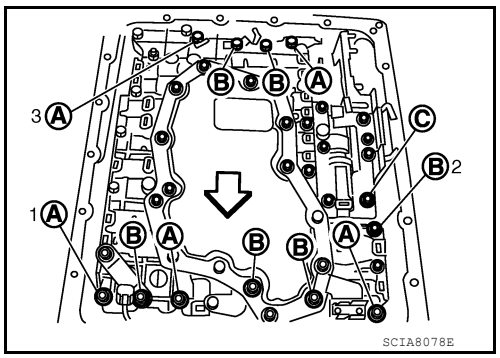
Bolt symbol	Length mm (in)	Number of bolts
A	42 (1.65)	5
B	55 (2.17)	6
C	40 (1.57)	1



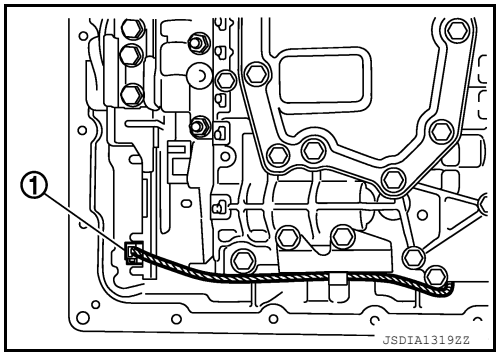
18. Tighten bolt (1A), (2B) and (3A) temporarily to prevent dislocation. After that tighten them in order (A → B → C), and then tighten other bolts.

⇦ : Front

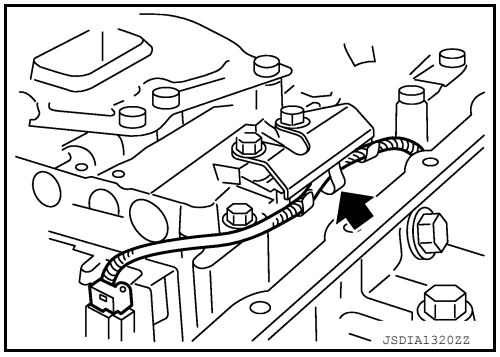
Bolt symbol	A	B	C
Number of bolts	5	6	1
Length mm (in)	42 (1.65)	55 (2.17)	40 (1.57)
Tightening torque N·m (kg-m, in-lb)	7.9 (0.81, 70)		With ATF applied
			7.9 (0.81, 70)



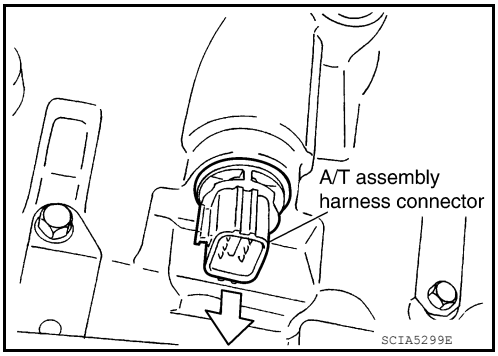
19. Connect output speed sensor connector (1).



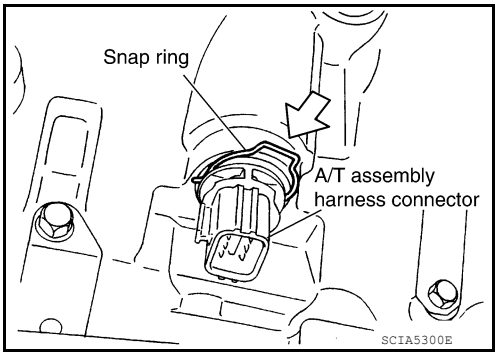
20. Securely fasten output speed sensor harness with terminal clip (⬅).



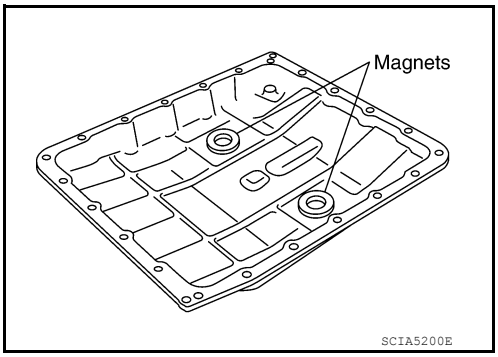
21. Pull down A/T assembly harness connector.
CAUTION:
Do not damage connector.



22. Install snap ring to A/T assembly harness connector.

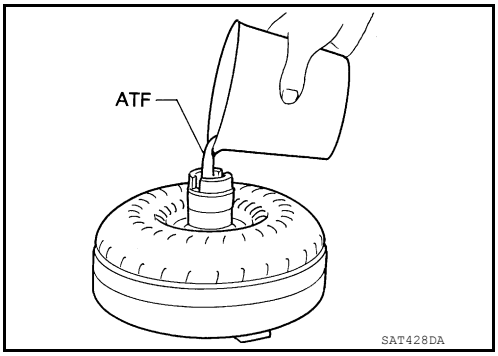


23. Install magnets in oil pan.



24. Install oil pan to transmission case. Refer to TM-172, "Removal and Installation".
25. Install torque converter.

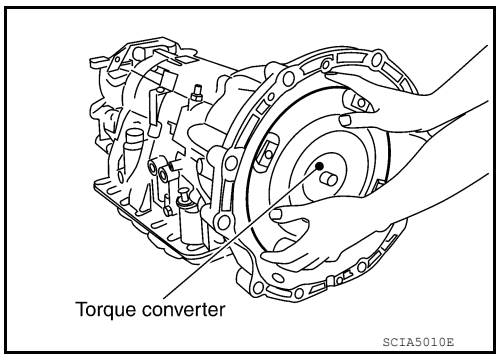
a. Pour ATF into torque converter.
NOTE:
- Approximately 2 liters (2-1/8 US qt. 1-3/4 Imp qt) of fluid is required for a new torque converter.
- When reusing old torque converter, add the same amount of fluid as was drained.



b. Install torque converter while aligning notches of torque converter with notches of oil pump.

CAUTION:

Install torque converter while rotating it.

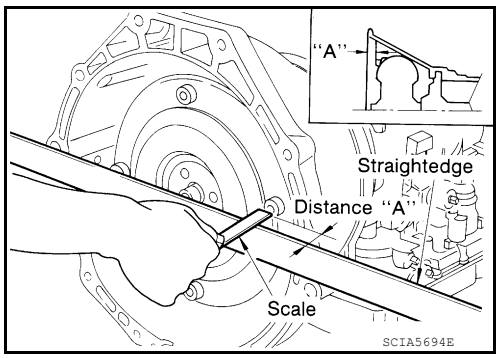


c. Measure distance (A) to make sure that torque converter is in proper position.

Distance (A)

VQ40DE models : 25.0 mm (0.98 in) or more

VK56DE models : 24.0 mm (0.94 in) or more



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000006244908

Applied model		VQ40DE engine		VK56DE engine
		2WD	4WD	4WD
Automatic transmission model		RE5R05A		
Transmission model code number		3FX7C	3FX7A	3DX3D
Stall torque ratio		1.76: 1		1.85: 1
Transmission gear ratio	1st	3.842		3.827
	2nd	2.353		2.368
	3rd	1.529		1.520
	4th	1.000		1.000
	5th	0.839		0.834
	Reverse	2.765		2.613
Recommended fluid		Genuine NISSAN Matic S ATF*1		
Fluid capacity		10.3 liter (10-7/8 US qt, 9-1/8 Imp qt)		10.6 liter (11-1/4 US qt, 9-3/8 Imp qt)

CAUTION:

If Genuine NISSAN Matic S ATF is not available, Genuine NISSAN Matic J ATF may also be used. Using automatic transmission fluid other than Genuine NISSAN Matic S ATF or Matic J ATF will cause deterioration in driveability and automatic transmission durability, and may damage the automatic transmission, which is not covered by the NISSAN new vehicle limited warranty.

*1: Refer to MA-18, "FOR USA AND CANADA : Fluids and Lubricants" (United States and Canada) and MA-20, "FOR MEXICO : Fluids and Lubricants" (Mexico).

Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000006244909

VQ40DE MODELS FOR 2WD

Throttle position	Vehicle speed km/h (MPH)							
	D1→D2	D2→D3	D3→D4	D4→D5	D5→D4	D4→D3	D3→D2	D2→D1
Full throttle	62 - 66 (39 - 41)	100 - 108 (63 - 67)	156 - 166 (97 - 103)	241 - 251 (150 - 155)	237 - 247 (148 - 153)	145 - 155 (91 - 96)	88 - 96 (55 - 59)	42 - 46 (27 - 28)
Half throttle	50 - 54 (32 - 33)	82 - 88 (51 - 54)	126 - 134 (79 - 83)	155 - 163 (97 - 101)	126 - 134 (79 - 83)	71 - 79 (45 - 49)	50 - 56 (32 - 34)	11 - 15 (7 - 9)

At half throttle the accelerator is 1/2 of the full opening.

VQ40DE MODELS FOR 4WD

Throttle position	Vehicle speed km/h (MPH)							
	D1→D2	D2→D3	D3→D4	D4→D5	D5→D4	D4→D3	D3→D2	D2→D1
Full throttle	59 - 63 (37 - 39)	95 - 103 (60 - 64)	147 - 157 (92 - 97)	228 - 238 (142 - 147)	224 - 234 (140 - 145)	137 - 147 (86 - 91)	83 - 91 (52 - 56)	40 - 44 (25 - 27)
Half throttle	47 - 51 (30 - 31)	77 - 83 (48 - 51)	119 - 127 (74 - 78)	147 - 155 (92 - 96)	119 - 127 (74 - 78)	67 - 75 (42 - 46)	48 - 54 (30 - 33)	11 - 15 (7 - 9)

At half throttle the accelerator is 1/2 of the full opening.

VK56DE MODELS

Throttle position	Vehicle speed km/h (MPH)							
	D1→D2	D2→D3	D3→D4	D4→D5	D5→D4	D4→D3	D3→D2	D2→D1
Full throttle	64 - 68 (40 - 42)	103 - 111 (64 - 68)	163 - 173 (102 - 107)	230 - 240 (143 - 149)	226 - 236 (141 - 146)	153 - 163 (96 - 101)	92 - 100 (58 - 62)	43 - 47 (27 - 29)
Half throttle	42 - 46 (27 - 28)	69 - 75 (43 - 46)	96 - 104 (60 - 64)	126 - 134 (79 - 83)	102 - 110 (64 - 68)	70 - 78 (44 - 48)	41 - 47 (26 - 29)	10 - 14 (7 - 8)

At half throttle the accelerator is 1/2 of the full opening.

Vehicle Speed at Which Lock-up Occurs/Releases

INFOID:0000000006244910

VQ40DE MODELS FOR 2WD

Throttle position	Vehicle speed km/h (MPH)	
	Lock-up “ON”	Lock-up “OFF”
Closed throttle	52 - 60 (33 - 37)	49 - 57 (31 - 35)
Half throttle	172 - 180 (107 - 111)	126 - 134 (79 - 83)

- At closed throttle, the accelerator opening is less than 1/8 condition. (Closed throttle position signal: OFF)
- At half throttle, the accelerator opening is 1/2 of the full opening.

VQ40DE MODELS FOR 4WD

Throttle position	Vehicle speed km/h (MPH)	
	Lock-up “ON”	Lock-up “OFF”
Closed throttle	49 - 57 (31 - 35)	46 - 54 (29 - 33)
Half throttle	163 - 171 (102 - 106)	119 - 127 (74 - 78)

- At closed throttle, the accelerator opening is less than 1/8 condition. (Closed throttle position signal: OFF)
- At half throttle, the accelerator opening is 1/2 of the full opening.

VK56DE MODELS

Throttle position	Vehicle speed km/h (MPH)	
	Lock-up “ON”	Lock-up “OFF”
Closed throttle	56 - 64 (35 - 39)	53 - 61 (33 - 37)
Half throttle	164 - 172 (102 - 106)	102 - 110 (64 - 68)

- At closed throttle, the accelerator opening is less than 1/8 condition. (Closed throttle position signal: OFF)
- At half throttle, the accelerator opening is 1/2 of the full opening.

Stall Speed

INFOID:0000000006244911

Engine Model	VQ40DE	VK56DE
Stall speed	2,600 - 2,900 rpm	2,550 - 2,850 rpm

Line Pressure

INFOID:0000000006244912

Engine speed	Line pressure [kPa (kg/cm^2, psi)]	
	“R” position	“D” position
At idle speed	425 - 465 (4.3 - 4.7, 62 - 67)	379 - 428 (3.9 - 4.4, 55 - 62)
At stall speed	1,605 - 1,950 (16.4 - 19.9, 233 - 283)	1,310 - 1,500 (13.4 - 15.3, 190 - 218)

A/T Fluid Temperature Sensor

INFOID:0000000006244913

Name	Condition	CONSULT-III “DATA MONITOR” (Approx.) (V)	Resistance (Approx.) (kΩ)
A/T fluid temperature sensor	0°C (32°F)	3.3	15
	20°C (68°F)	2.7	6.5
	80°C (176°F)	0.9	0.9

Input Speed Sensor

INFOID:0000000006244914

Name	Condition	Data (Approx.)
Input speed sensor 1	When running at 50 km/h (31 MPH) in 4th speed with the closed throttle position signal “OFF”.	1.3 (kHz)
Input speed sensor 2	When moving at 20 km/h (12 MPH) in 1st speed with the closed throttle position signal “OFF”.	

Output Speed Sensor

INFOID:0000000006244915

Name	Condition	Data (Approx.)
Output speed sensor	When moving at 20 km/h (12 MPH).	185 (Hz)

Reverse brake

INFOID:0000000006244916

Model code number		3FX7A, 3FX7C	3DX3D
Number of drive plates		6	7
Number of driven plates		6	7
Clearance [mm (in)]	Standard	0.7 - 1.1 (0.028 - 0.043)	
Thickness of retaining plates		Thickness mm (in)	
		4.2 (0.165) 4.4 (0.173) 4.6 (0.181) 4.8 (0.189) 5.0 (0.197) 5.2 (0.205)	

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

Total End Play

INFOID:0000000006244917

Total end play mm (in)	0.25 - 0.55 (0.0098 - 0.0217)

BEARING RACE FOR ADJUSTING TOTAL END PLAY

Thickness mm (in)
0.8 (0.031)
1.0 (0.039)
1.2 (0.047)
1.4 (0.055)
1.6 (0.063)
1.8 (0.071)

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