SECTION TM

TRANSAXLE & TRANSMISSION

CONTENTS

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000007360131

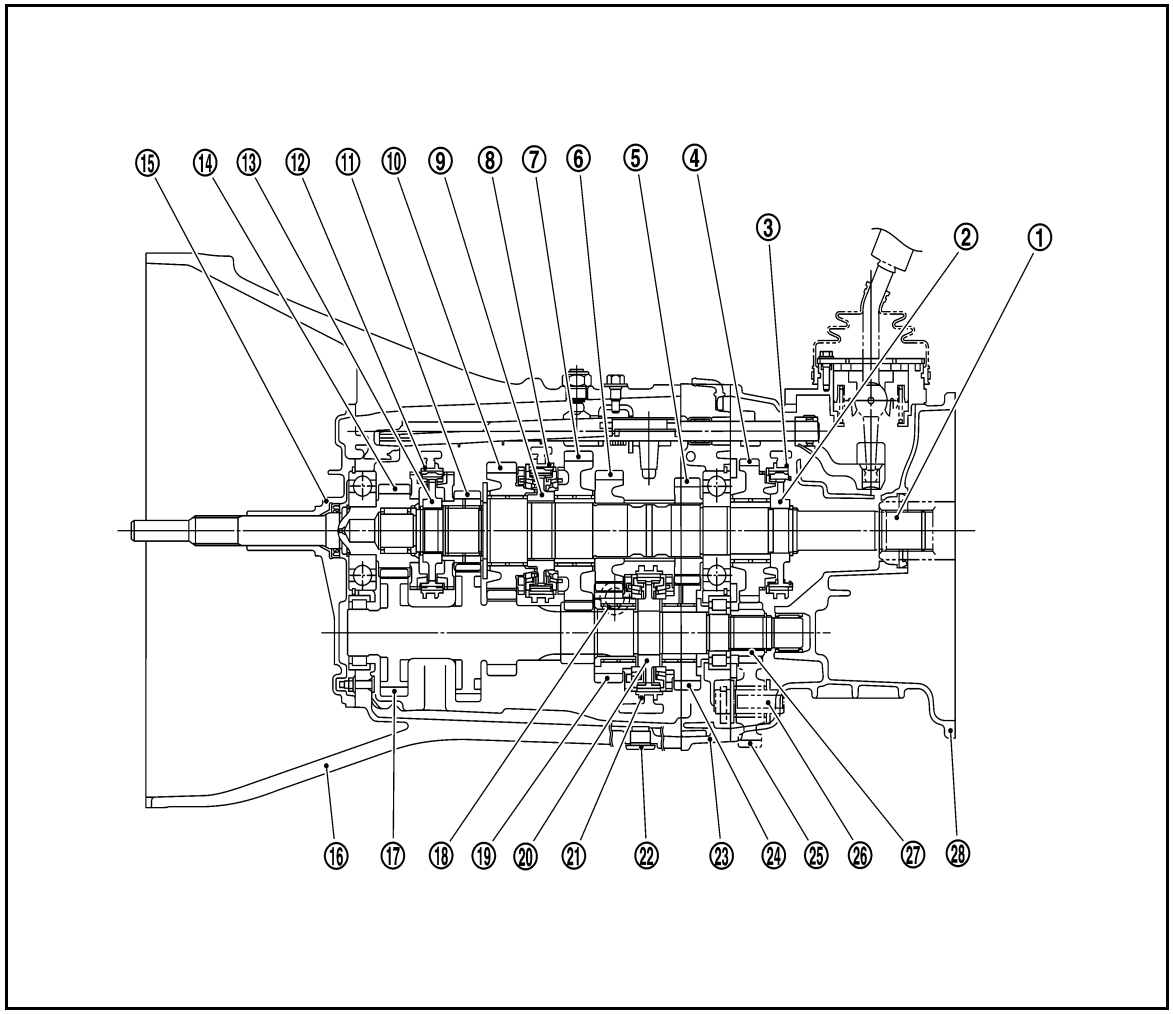
Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		TM-15			TM-15		TM-18	TM-43		TM-54			
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	CHECK PLUG RETURN SPRING AND CHECK BALL (Worn or damaged)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2							3	3		
	Oil leakage		3	1	2	2							
	Hard to shift or will not shift		1	1			2					2	2
	Jumps out of gear						1	1	2	2			

DESCRIPTION

Cross-Sectional View

INFOID:0000000007360132



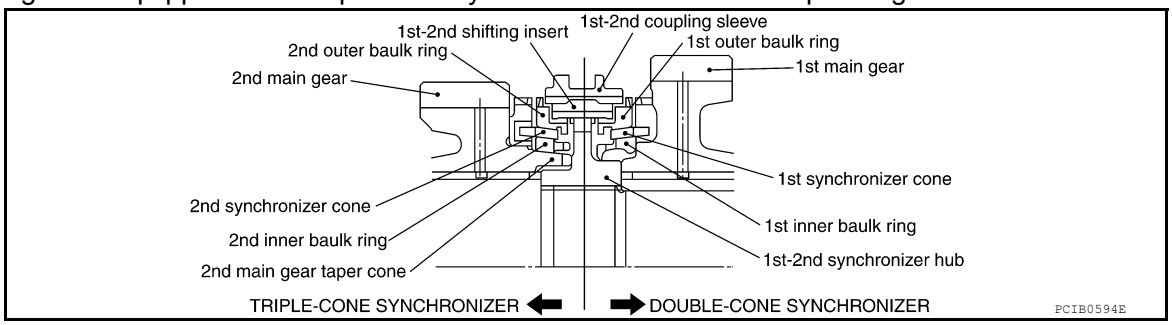
1. Mainshaft
2. Reverse synchronizer hub
3. Reverse coupling sleeve
4. Reverse main gear
5. 4th main gear
6. 3rd main gear
7. 1st main gear
8. 1st-2nd coupling sleeve
9. 1st-2nd synchronizer hub
10. 2nd main gear
11. 6th main gear
12. 5th-6th coupling sleeve
13. 5th-6th synchronizer hub
14. Main drive gear
15. Front cover
16. Transmission case
17. Counter gear
18. Filler plug
19. 3rd counter gear
20. 3rd-4th synchronizer hub
21. 3rd-4th coupling sleeve
22. Drain plug
23. Adapter plate
24. 4th counter gear
25. Reverse idler gear
26. Reverse idler shaft
27. Reverse counter gear
28. OD gear case

DOUBLE-CONE SYNCHRONIZER

The 1st, 3rd and 4th gears are equipped with a double-cone synchronizer to reduce the operating force of the shift selector.

TRIPLE-CONE SYNCHRONIZER

The 2nd gear is equipped with a triple-cone synchronizer to reduce the operating force of the shift selector.



PRECAUTION

PRECAUTIONS

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

INFOID:0000000007360133

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.**

Service Notice or Precaution

INFOID:0000000007360134

- Do not reuse transmission oil once it has been drained.
- Check oil level or replace oil with vehicle on level surface.
- During removal or installation, keep inside of transmission clear of dust or dirt.
- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied to.
- In principle, tighten nuts and bolts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.
- Be careful not to damage sliding surfaces and mating surfaces.

Precaution for Work

INFOID:0000000007360135

- 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.

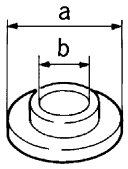
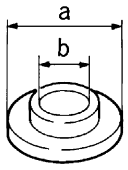
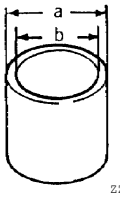
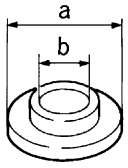
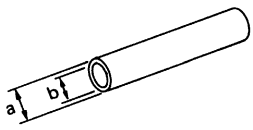
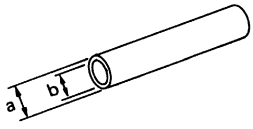
PREPARATION

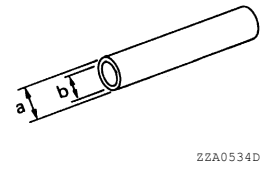
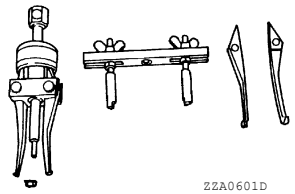
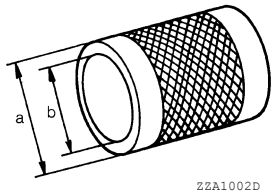
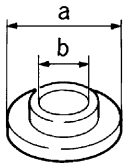
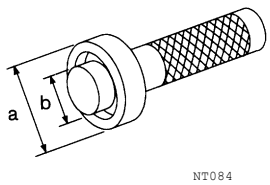
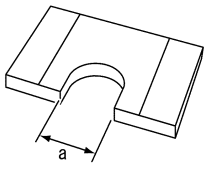
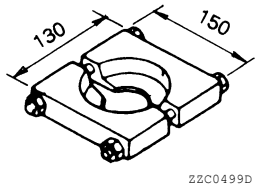
PREPARATION

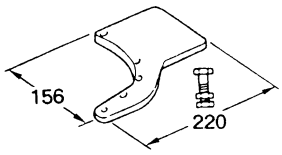
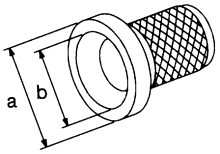
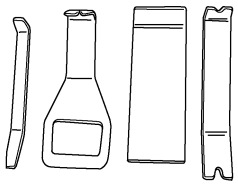
Special Service Tool

INFOID:0000000007360136

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

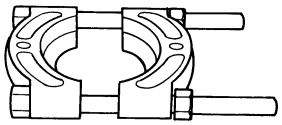
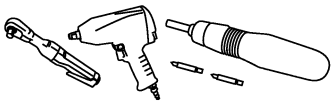
Tool number (Kent-Moore No.) Tool name	Description
ST30911000 (—) Inserter  ZZA0920D	• Installing mainshaft bearing • Installing 5th-6th synchronizer hub assembly • Installing reverse main gear bushing • Installing 3rd gear bushing • Installing 3rd-4th synchronizer hub assembly **a: 98 mm (3.86 in) dia.** **b: 40 mm (1.57 in) dia.**
ST30022000 (—) Inserter  ZZA0920D	• Installing 3rd main gear • Installing 4th main gear **a: 110 mm (4.33 in) dia.** **b: 46 mm (1.81 in) dia.**
ST27861000 (—) Support ring  ZZA0832D	• Installing 1st-2nd synchronizer hub assembly • Installing 1st gear bushing **a: 62 mm (2.44 in) dia.** **b: 52 mm (2.05 in) dia.**
ST30032000 (J-26010-01) Inserter  ZZA0920D	Installing counter rear bearing inner race **a: 80 mm (3.15 in) dia.** **b: 31 mm (1.22 in) dia.**
KV32102700 (—) Drift  ZZA0534D	Installing main drive gear bearing **a: 48 mm (1.89 in) dia.** **b: 41 mm (1.61 in) dia.**
ST23860000 (—) Drift  ZZA0534D	Installing reverse counter gear **a: 38 mm (1.50 in) dia.** **b: 33 mm (1.30 in) dia.**

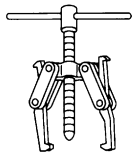
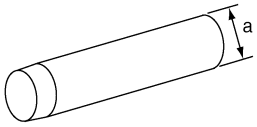
Tool number (Kent-Moore No.) Tool name	Description
ST01530000 (—) Drift 	Installing reverse synchronizer hub assembly **a: 50 mm (1.97 in) dia.** **b: 41 mm (1.61 in) dia.**
KV381054S0 (J-34286) Puller 	Removing rear oil seal
ST33200000 (J-26082) Drift 	• Installing counter rear bearing • Installing rear oil seal **a: 60 mm (2.36 in) dia.** **b: 44.5 mm (1.752 in) dia.**
KV40100630 (J-26092) Inserter 	Installing 4th counter gear thrust washer **a: 67 mm (2.64 in) dia.** **b: 38 mm (1.50 in) dia.**
KV38102100 (J-25803-01) Drift 	Installing front cover oil seal **a: 44 mm (1.73 in) dia.** **b: 28 mm (1.10 in) dia.**
KV32103300 (J-46529) Press plate 	Installing reverse synchronizer hub assembly **a: 73 mm (2.87 in)**
ST30031000 (J-22912-01) Puller 	Measuring wear of inner baulk ring

Tool number (Kent-Moore No.) Tool name	Description
ST22490000 (—) Adapter setting plate  ZZC0465D	Holding a adapter plate
ST33400001 (J-26082) Drift  NT086	Installing oil seal **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
— (J-46534) Trim tool set  AWJIA0483ZZ	Removing trim components

Commercial Service Tool

INFOID:0000000007360137

Tool name	Description
Puller  ZZB0823D	Removing each bearing, gear and bushing
Pin punch  ZZA0815D	Removing and installing each retaining pin Tip diameter: 6.0 mm (0.236 in) dia.
Power tool  PIIB1407E	Loosening bolts, nuts and screws

Tool name	Description
Puller  NT077	• Removing reverse synchronizer hub assembly • Removing reverse counter gear • Removing reverse main gear
Drift  LCIA0362E	Removing counter end bearing **a: 32 mm (1.26 in) dia.**

PERIODIC MAINTENANCE

M/T OIL

Changing

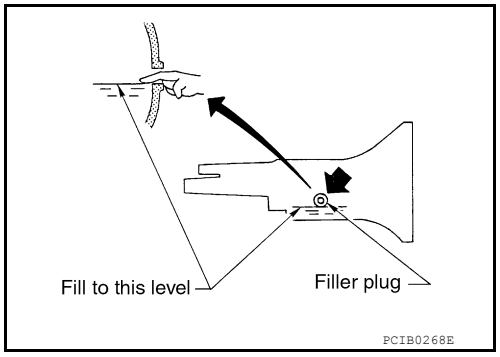
INFOID:0000000007360138

DRAINING

1. Start the engine and let it run to warm up the transmission.
2. Stop the engine. Remove the transmission drain plug and drain the oil.
3. Set a gasket on the drain plug and install it to the transmission. Tighten the drain plug to the specified torque. Refer to TM-30, "Disassembly".
   CAUTION:
   Do not reuse gasket.

FILLING

1. Remove the filler plug. Fill with new oil until oil level reaches the specified limit near the filler plug hole as shown.



Oil grade and viscosity	**: Refer to MA-13, "Fluids and Lubricants".**
Oil capacity	**: Refer to MA-13, "Fluids and Lubricants".**

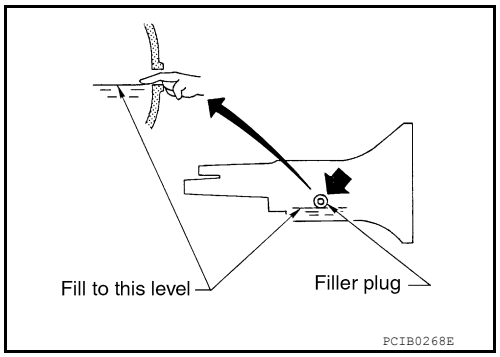
2. After refilling the oil, check oil level. Set a gasket to the filler plug, then install it to the transmission. Tighten the filler plug to the specified torque. Refer to TM-24, "Overhaul".
   CAUTION:
   Do not reuse gasket.

Checking

INFOID:0000000007360139

OIL LEAKAGE AND OIL LEVEL

1. Make sure that oil is not leaking from the transmission or around it.
2. Check oil level from the filler plug hole as shown.
   CAUTION:
   Do not start engine while checking oil level.
3. Set a gasket on the filler plug and install it to the transmission. Tighten the filler plug to the specified torque. Refer to TM-24, "Overhaul".
   CAUTION:
   Do not reuse gasket.



REMOVAL AND INSTALLATION

REAR OIL SEAL

Removal and Installation

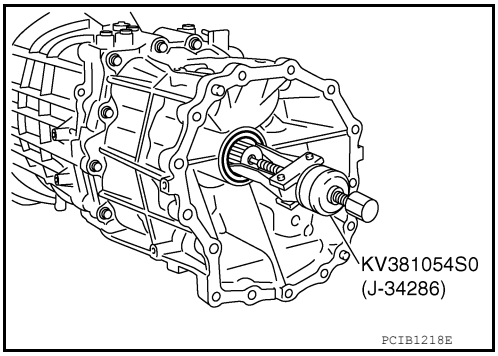
INFOID:0000000007360140

REMOVAL

1. Remove transfer assembly. Refer to DLN-102, "Removal and Installation".
2. Remove rear oil seal using Tool.

Tool number : KV381054S0 (J-34286)

CAUTION:
Do not damage OD gear case.



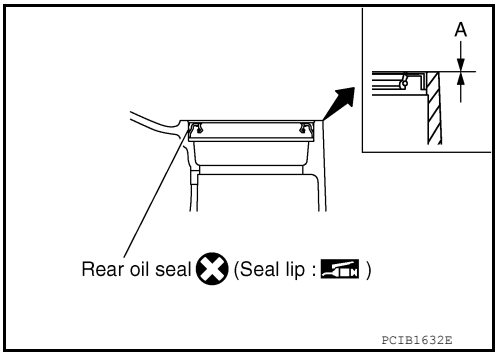
INSTALLATION
Installation is in the reverse order of removal.

- Drive the rear oil seal using Tool.

Tool number : ST33200000 (J-26082)

Dimension (A) : -0.5 - 0.5 mm (-0.020 - 0.020 in)

CAUTION:
Do not incline the rear oil seal during installation.



- Check the transmission oil level after installation. Refer to TM-15, "Checking".

POSITION SWITCH

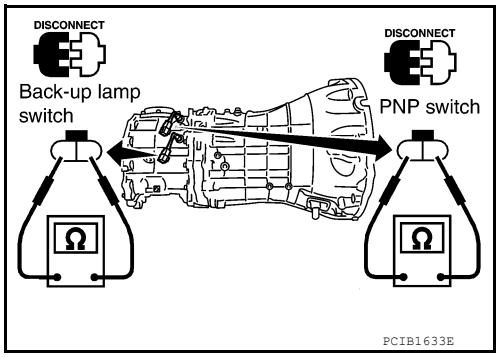
Checking

INFOID:0000000007360141

BACK-UP LAMP SWITCH

- Check continuity.

Gear position	Continuity
Reverse	Yes
Except reverse	No



PARK/NEUTRAL POSITION SWITCH

- Check continuity.

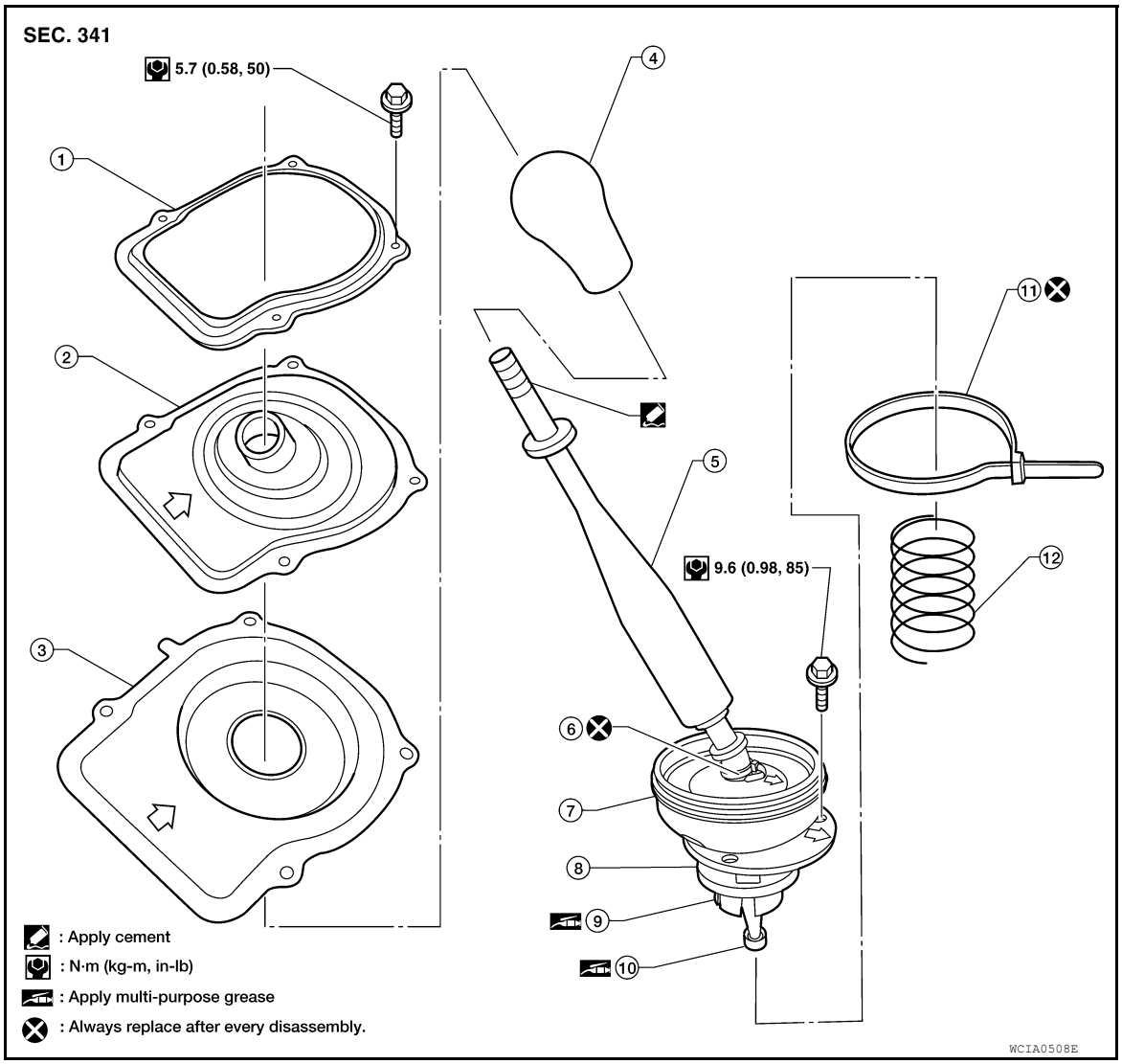
Gear position	Continuity
Neutral	Yes
Except neutral	No

SHIFT CONTROL

Removal and Installation

INFOID:0000000007360142

COMPONENTS



1. Retaining plate
2. Dust boot cover (upper)
3. Dust boot cover (lower)
4. Shift selector handle
5. Shift selector assembly
6. Clip A
7. Boot
8. Guide plate
9. Socket
10. Bushing
11. Clip B
12. Spring

REMOVAL

1. Remove the shift selector handle
2. Remove the M/T finisher. Refer to IP-26, "Exploded View".
3. Remove the retaining plate and dust boot covers.
4. Remove the clip B and then separate the boot from the control housing.
5. Remove the guide plate bolts and then separate the guide plate.
6. Remove the shift selector assembly and spring from the transmission.

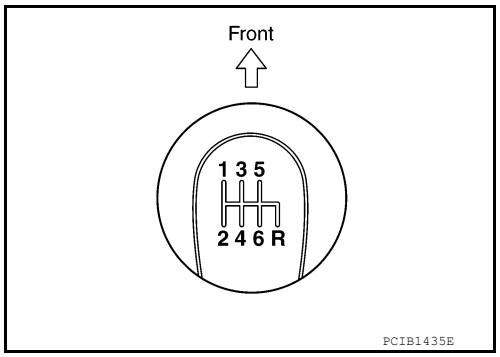
INSTALLATION

Installation is the reverse order of removal.

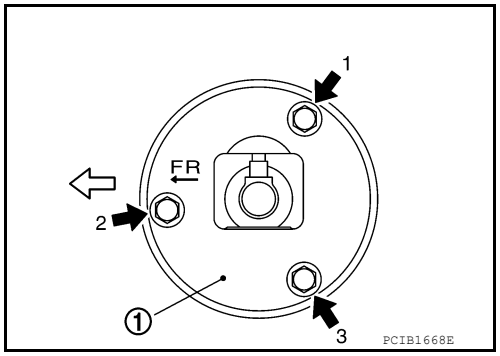
- Install shift selector handle according to the following.

- Apply cement to threads of shift selector assembly.
- Tighten shift selector handle until increased tension is felt. Then align shift selector handle to the position as shown within one turn.

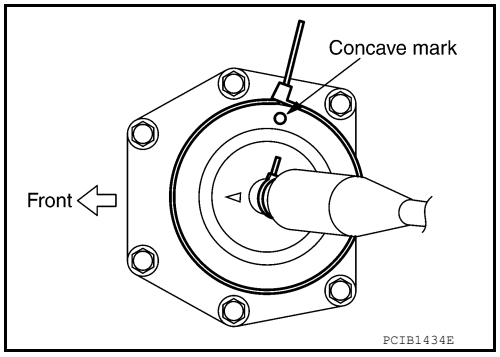
CAUTION:
Do not adjust shift selector handle by loosening it.



CAUTION:
- **Apply multi-purpose grease to socket and bushing.**
- **Insert bushing of shift selector assembly as far as it will go into the hole of striking arm.**
- **Tighten guide plate (1) bolts to the specified torque in order as shown.**
- **⇦: Front**



- **Do not reuse clip.**
- **Position clip as shown.**
- **Be careful with the orientation of shift selector boot and insulator.**



INSPECTION AFTER INSTALLATION

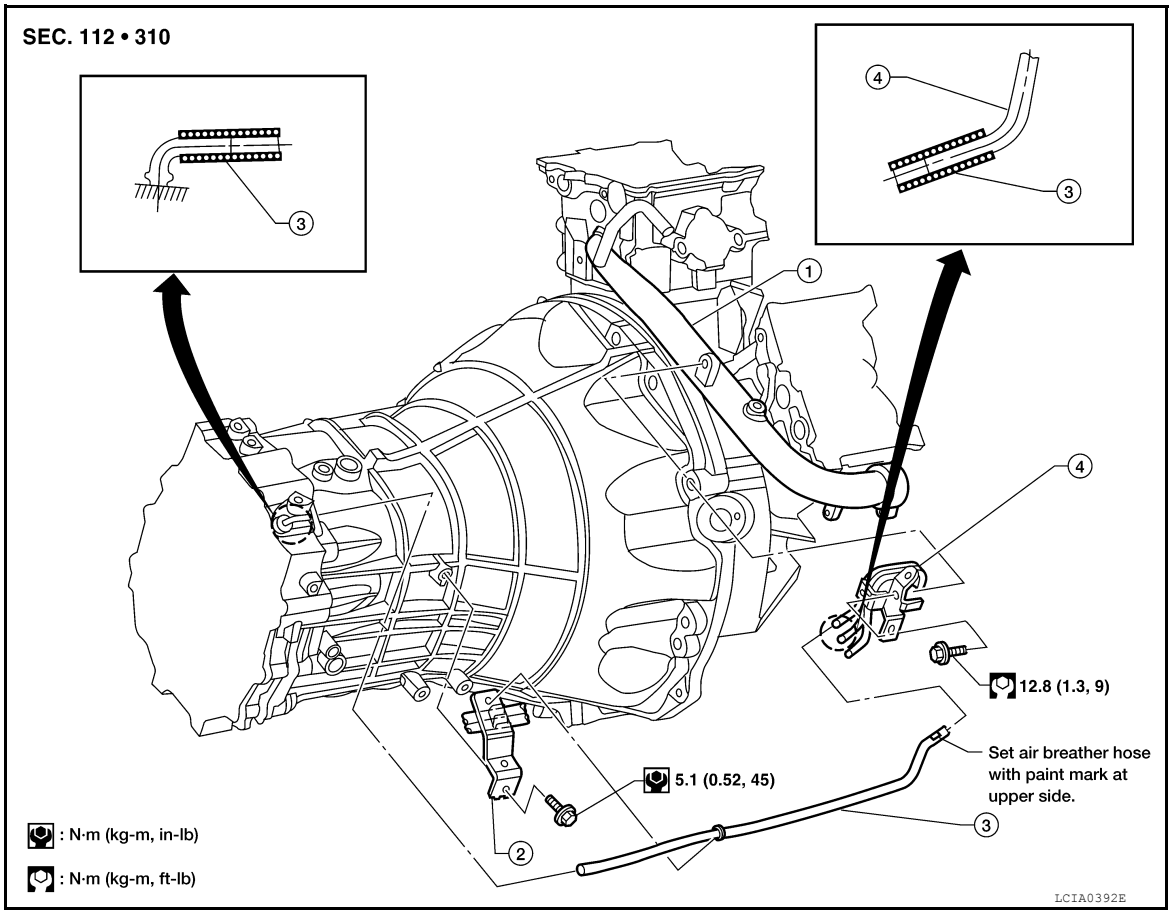
- Tighten guide plate bolts to the specified torque. Refer to TM-18, "Removal and Installation".
- When shift selector assembly is moved to each position, make sure there is no binding or disconnection in either boot.
- When moved to each position, make sure there is no noise, bending, and backlash. Especially when shift selector assembly is moved to 5th, 6th without pressing downward, check for bending.
- When shift selector assembly is moved to 1st, 2nd side and 5th, 6th side, confirm shift selector assembly returns to neutral position smoothly.
- In any position other than reverse, confirm that shift selector assembly can be pressed downward.
- With shift selector assembly pressed downward, confirm that it can be moved to reverse.
- When moved from reverse to neutral position, confirm shift selector assembly returns to neutral position smoothly with spring power.
- Without shift selector assembly pressed downward, confirm that it cannot be moved to reverse.

AIR BREATHER HOSE

Removal and Installation

INFOID:0000000007360143

COMPONENTS



1. Water outlet
2. Bracket
3. Air breather hose
4. Breather tube

REMOVAL

1. Disconnect air breather hose from breather tube and transmission connector.
2. Disconnect air breather hose from the bracket.
3. Remove the bracket bolt and remove the bracket from the transmission housing, if necessary.
4. Remove the breather tube bolt and the breather tube.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Make sure there are no pinched or blocked areas on the air breather hose after installation.**
- **When inserting the air breather hose, be sure to insert it fully until its end reaches the end of the tube radius.**
- **Install the air breather hose with the paint mark side up.**

UNIT REMOVAL AND INSTALLATION

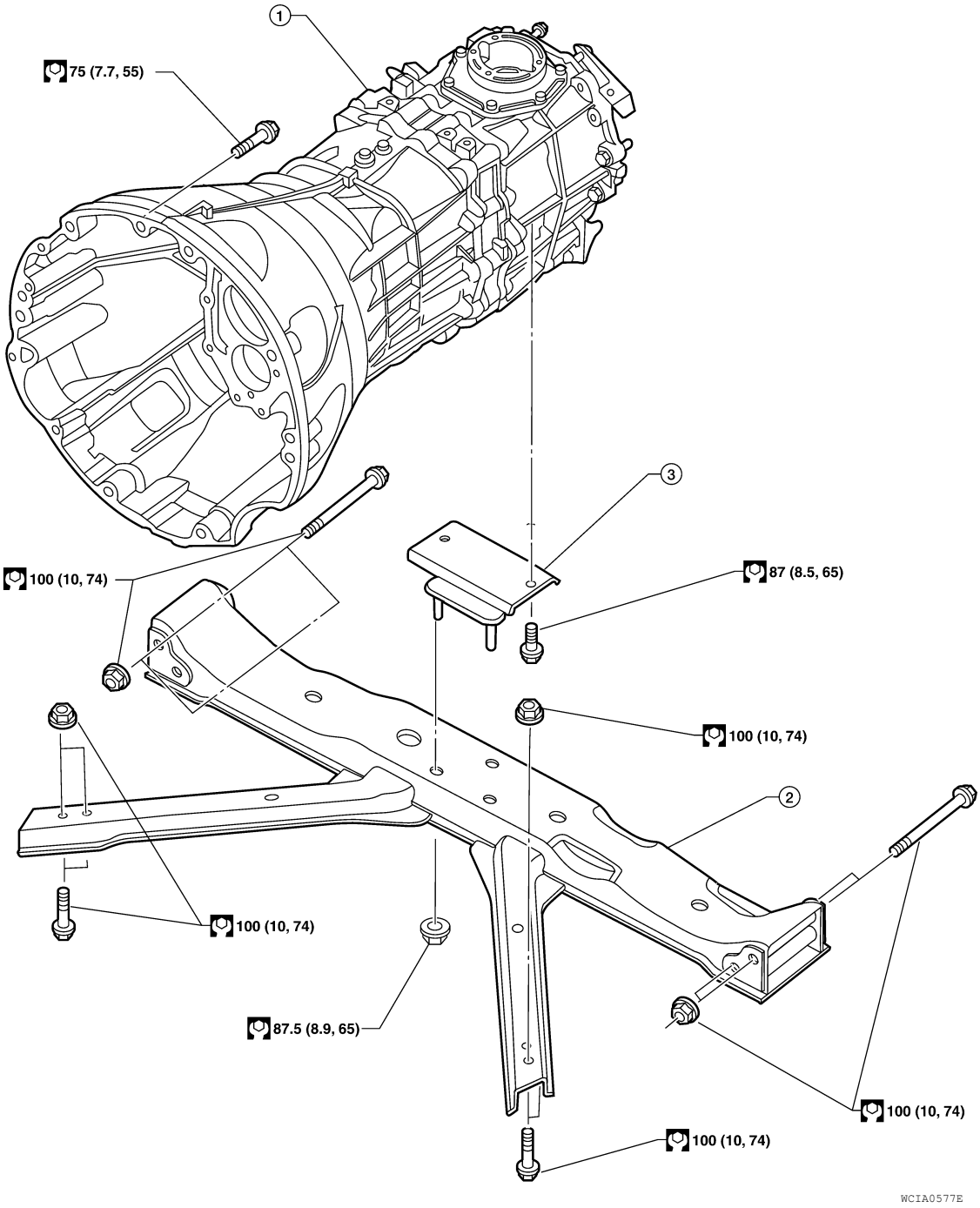
TRANSMISSION ASSEMBLY

Removal and Installation from Vehicle

INFOID:0000000007360144

COMPONENTS

SEC. 112 • 310

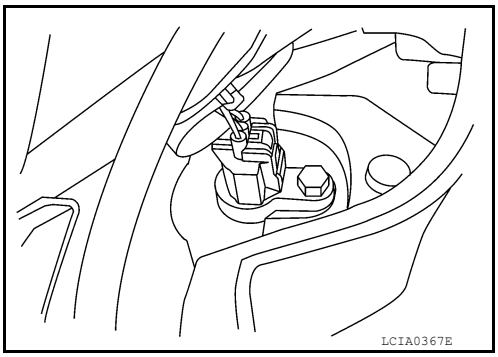


1. Transmission assembly
2. Crossmember
3. Insulator

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Disconnect the battery negative terminal. Refer to PG-72, "Removal and Installation".
2. Remove the shift selector assembly. Refer to TM-18, "Removal and Installation".
3. Remove the LH fender protector. Refer to EXT-22, "Removal and Installation".
4. Remove the crankshaft position sensor (POS) from the M/T assembly.
   CAUTION:
   Do not damage the sensor edge.

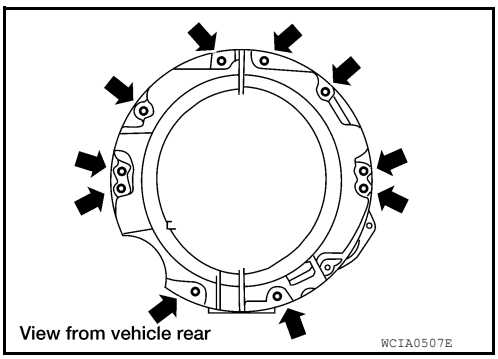


5. Remove the engine under cover using power tool.
6. Remove the front crossmember using power tool.
7. Remove the starter motor. Refer to STR-29, "Removal and Installation".
8. Remove the front and rear propeller shafts. Refer to DLN-134, "Removal and Installation" (front) and DLN-143, "Removal and Installation" (rear).
9. Remove the left and right front exhaust tubes. Refer to EX-5, "Removal and Installation".
10. Remove the clutch operating cylinder from the transmission. Refer to CL-10, "Removal and Installation".
11. Support the transmission using a suitable jack.
12. Remove the nuts securing the insulator to the crossmember.
13. Remove the crossmember using power tool.
    WARNING:
    Support the transmission using suitable jack.
14. Tilt the transmission slightly to gain clearance between the body and the transmission, then disconnect the air breather hoses. Refer to TM-20, "Removal and Installation".
15. Disconnect the following:
    - Back-up lamp switch connector
    - Park/neutral position (PNP) switch connector
    - ATP switch connector
    - Neutral 4LO switch connector
    - Wait detection switch connector
    - Transfer control device connector
16. Remove the wiring harness from the retainers.
17. Remove the transmission to engine bolts using power tool.
18. Separate the transmission from the engine and remove it from the vehicle.
    WARNING:
    Support manual transmission while removing it.
19. Separate transmission and transfer case.

INSTALLATION

Installation is in the reverse order of removal.

- When installing the transmission to the engine, tighten the bolts to the specified torque.



Quantity	10
Bolt length "ℓ" mm (in)	65 (2.56)
Tightening torque N·m (kg-m, ft-lb)	75 (7.7, 55)

- Check and refill transmission oil as necessary. Refer to MA-13, "Fluids and Lubricants".

CAUTION:

- **When installing be careful to avoid interference between transmission main drive gear and clutch cover.**
- **After installation, check for oil leakage and oil level. Refer to TM-15, "Checking".**

- **If flywheel is removed, align dowel pin with the smallest hole of flywheel.**
- **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.**

UNIT DISASSEMBLY AND ASSEMBLY

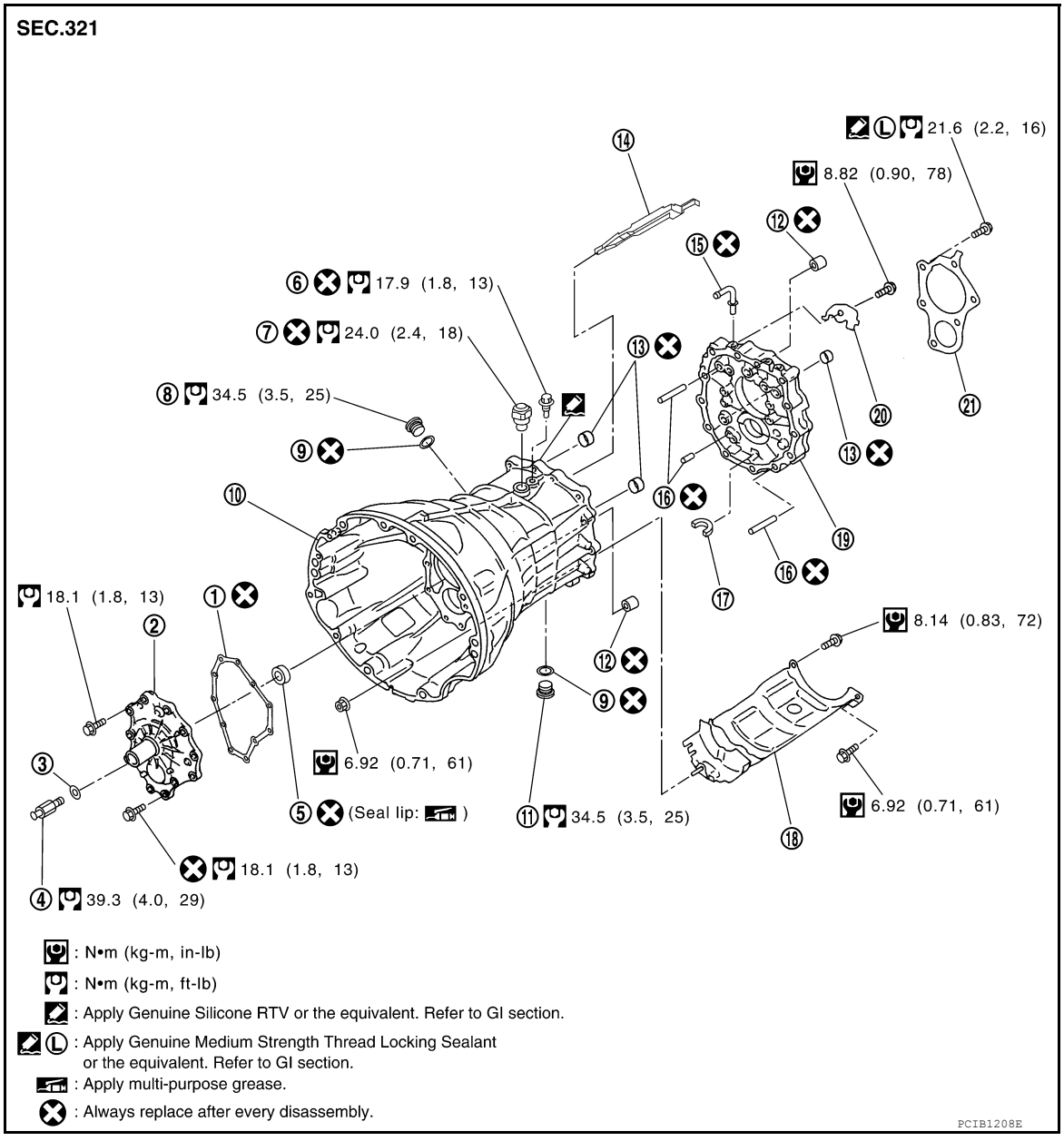
TRANSMISSION ASSEMBLY

Overhaul

INFOID:0000000007360145

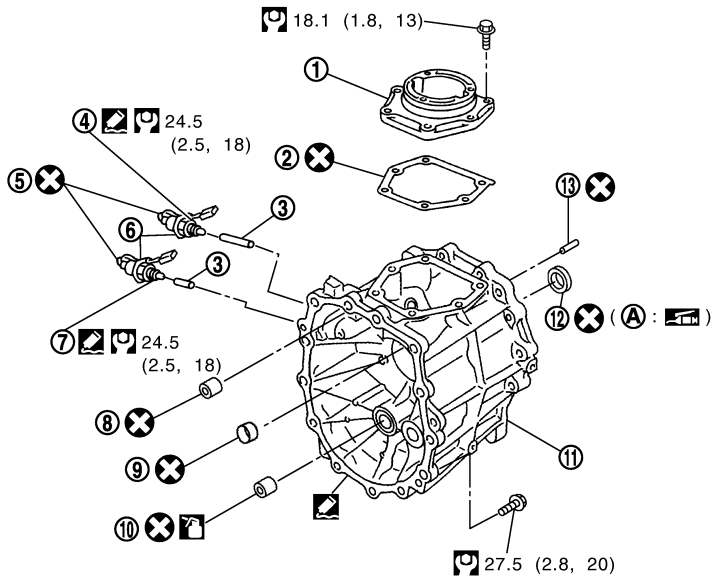
COMPONENTS

Case Components



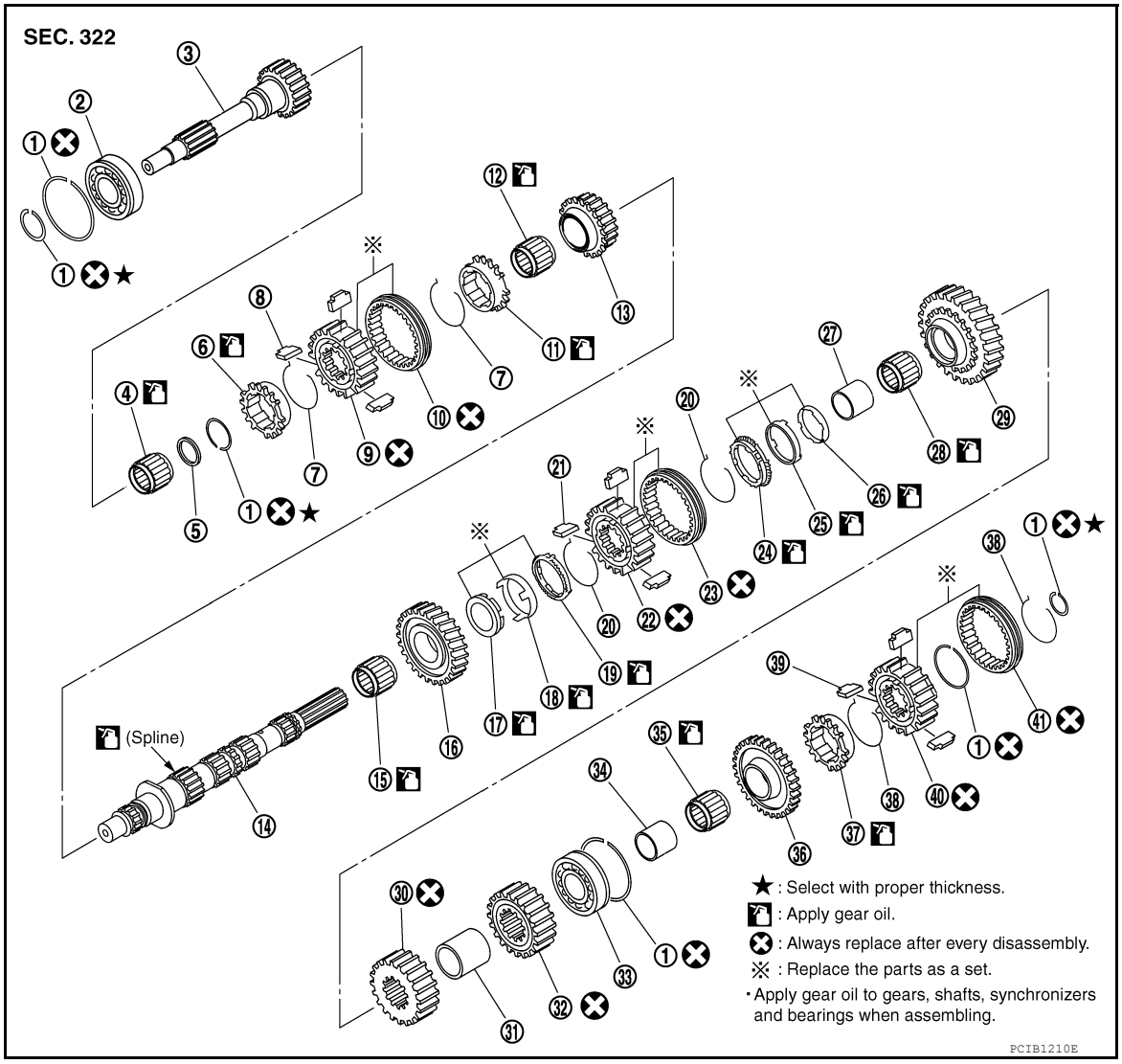
1. Front cover gasket	2. Front cover	3. Washer
4. Withdrawal lever ball pin	5. Front cover oil seal	6. Pivot bolt
7. Check shift pin	8. Filler plug	9. Gasket
10. Transmission case	11. Drain plug	12. Sliding ball bearing
13. Bushing	14. Oil gutter	15. Breather
16. Dowel pin	17. Magnet	18. Baffle plate
19. Adapter plate	20. Baffle plate	21. Bearing retainer

SEC. 321

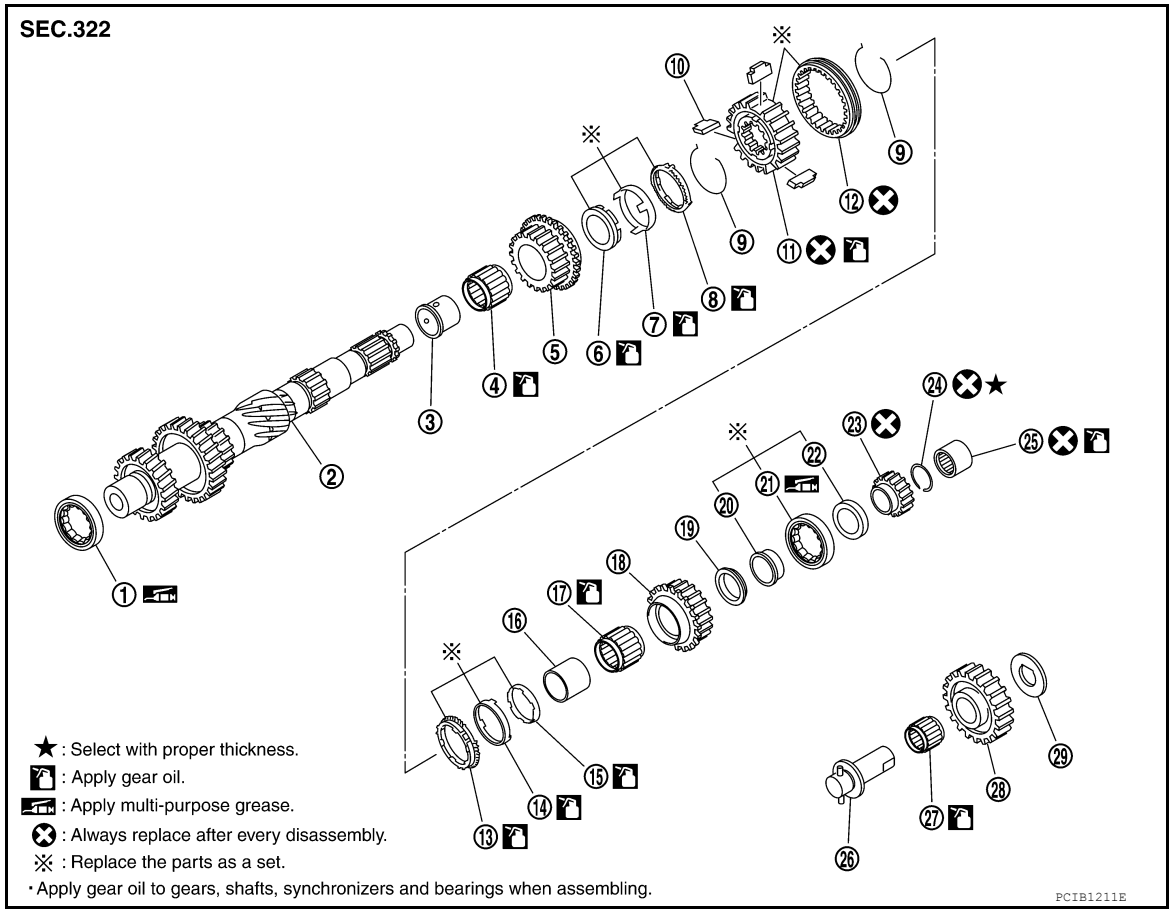


1. Control housing
2. Gasket
3. Plunger
4. Transmission range switch
5. Clip
6. Back-up lamp switch
7. Sliding ball bearing
8. Bushing
9. Rear extension oil gutter
10. Cap
11. Counter end bearing
12. Rear extension
13. Rear oil seal
14. Dust seal
15. Dowel pin
16. OD gear case

Gear Components

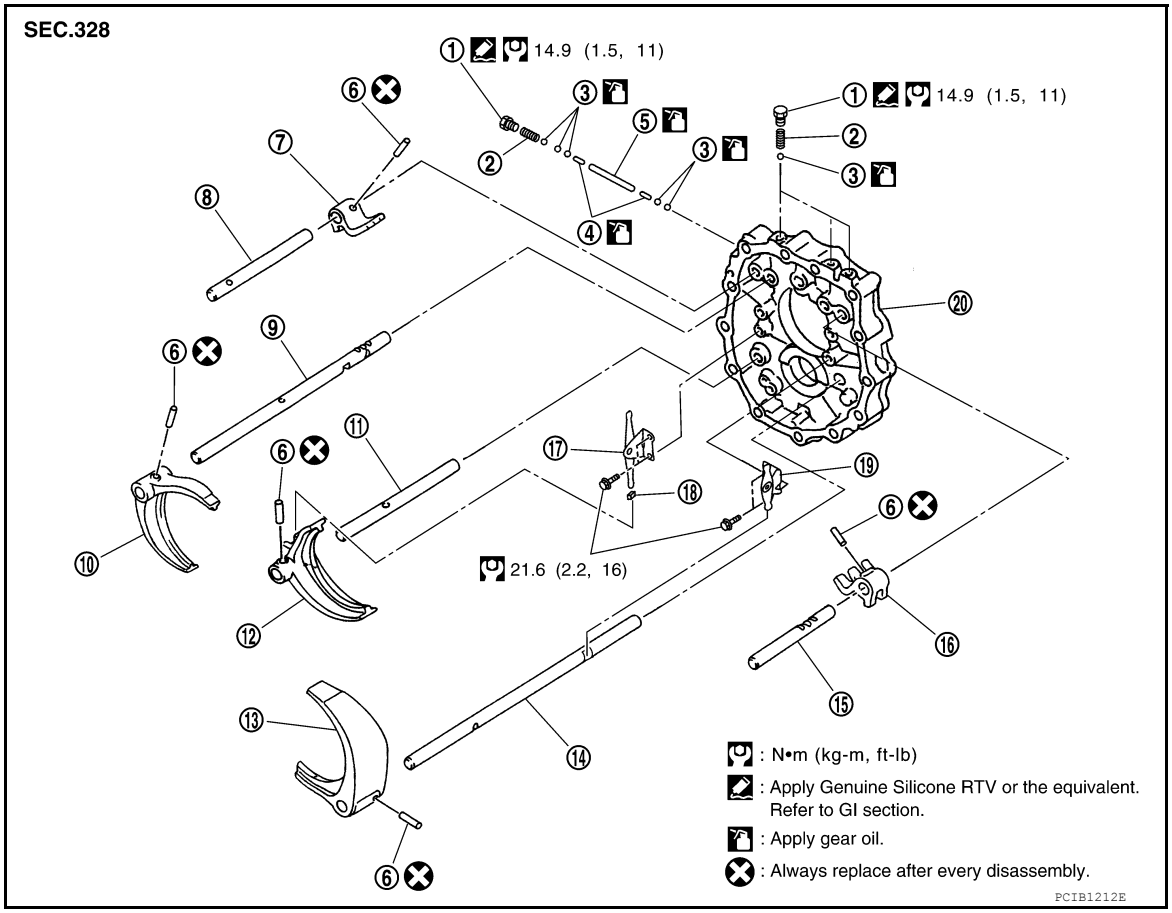


1. Snap ring
2. Main drive gear bearing
3. Main drive gear
4. Main pilot bearing
5. Pilot bearing spacer
6. 5th baulk ring
7. 5th-6th spread spring
8. 5th-6th shifting insert
9. 5th-6th synchronizer hub
10. 5th-6th coupling sleeve
11. 6th baulk ring
12. 6th needle bearing
13. 6th main gear
14. Mainshaft
15. 2nd needle bearing
16. 2nd main gear
17. 2nd inner baulk ring
18. 2nd synchronizer cone
19. 2nd outer baulk ring
20. 1st-2nd spread spring
21. 1st-2nd shifting insert
22. 1st-2nd synchronizer hub
23. 1st-2nd coupling sleeve
24. 1st outer baulk ring
25. 1st synchronizer cone
26. 1st inner baulk ring
27. 1st gear bushing
28. 1st needle bearing
29. 1st main gear
30. 3rd main gear
31. 3rd-4th main spacer
32. 4th main gear
33. Mainshaft bearing
34. Reverse main gear bushing
35. Reverse main needle bearing
36. Reverse main gear
37. Reverse baulk ring
38. Reverse spread spring
39. Reverse shifting insert
40. Reverse synchronizer hub
41. Reverse coupling sleeve



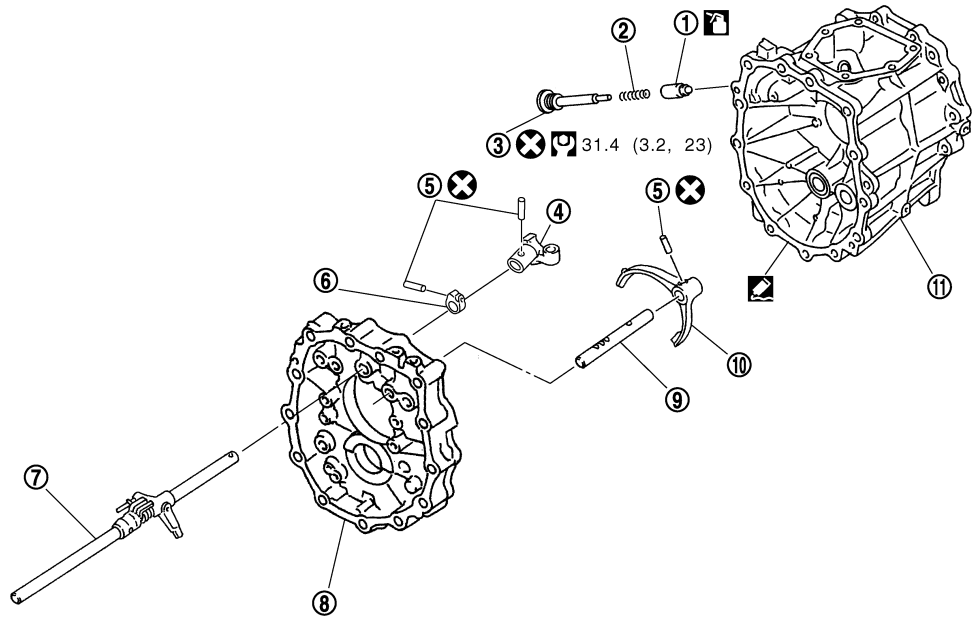
1. Counter front bearing	2. Counter gear	3. 3rd gear bushing
4. 3rd needle bearing	5. 3rd counter gear	6. 3rd inner baulk ring
7. 3rd synchronizer cone	8. 3rd outer baulk ring	9. 3rd-4th spread spring
10. 3rd-4th shifting insert	11. 3rd-4th synchronizer hub	12. 3rd-4th coupling sleeve
13. 4th outer baulk ring	14. 4th synchronizer cone	15. 4th inner baulk ring
16. 4th gear bushing	17. 4th needle bearing	18. 4th counter gear
19. 4th counter gear thrust washer	20. Counter rear bearing inner race	21. Counter rear bearing
22. Counter rear bearing spacer	23. Reverse counter gear	24. Snap ring
25. Counter end bearing	26. Reverse idler shaft	27. Reverse idler needle bearing
28. Reverse idler gear	29. Reverse idler thrust washer	

Shift Control Components



1. Check ball plug
2. Check ball spring
3. Check ball
4. Interlock pin
5. Interlock plunger
6. Retaining pin
7. 3rd-4th fork rod bracket
8. 3rd-4th fork rod
9. 1st-2nd fork rod
10. 1st-2nd shift fork
11. 3rd-4th fork rod (reversal side)
12. 3rd-4th shift fork
13. 5th-6th shift fork
14. 5th-6th fork rod (reversal side)
15. 5th-6th fork rod
16. 5th-6th fork rod bracket
17. 3rd-4th control lever
18. Shifter cap
19. 5th-6th control lever
20. Adapter plate

SEC. 328



: N•m (kg-m, ft-lb)
: Apply Genuine Liquid Gasket, Three Bond TB1215 or the equivalent.
: Apply gear oil.
: Always replace after every disassembly.

1. Return spring plunger	2. Return spring	3. Return spring plug
4. Striking arm	5. Retaining pin	6. Stopper ring
7. Striking rod assembly	8. Adapter plate	9. Reverse fork rod
10. Reverse shift fork	11. Rear extension	12. OD gear case

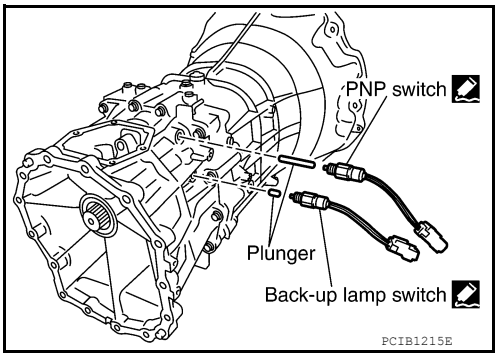
CASE COMPONENTS

Disassembly

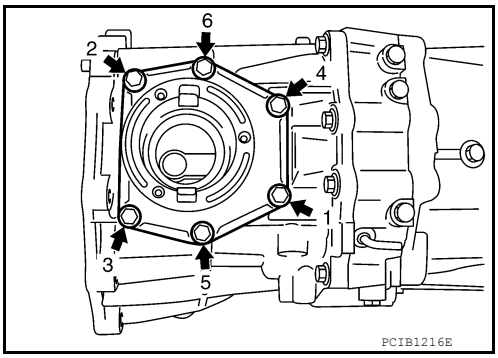
INFOID:0000000007360146

CASE COMPONENTS

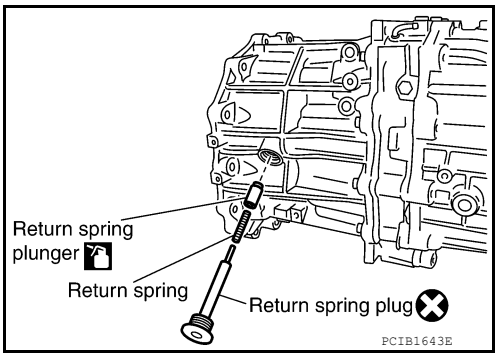
1. Remove clips from PNP switch and back-up lamp switch.
2. Remove PNP switch, back-up lamp switch and plungers from OD gear case.



3. Remove control housing bolts, and then remove control housing and gasket from OD gear case.



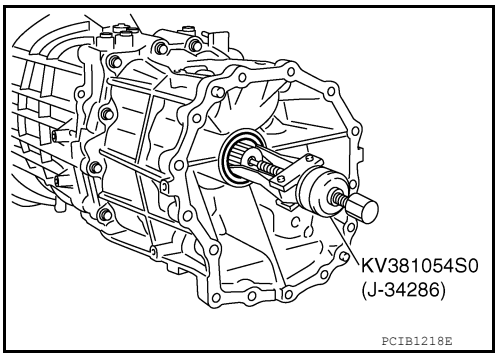
4. Remove return spring plug, return spring and return spring plunger from OD gear case.
   CAUTION:
   Do not reuse return spring plug.



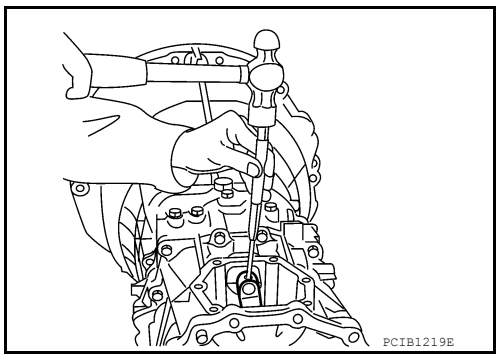
5. Remove rear oil seal from OD gear case using Tool.

   Tool number : KV381054S0 (J-34286)

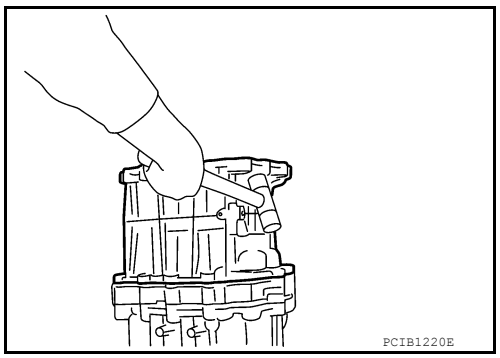
   CAUTION:
   Do not damage OD gear case.



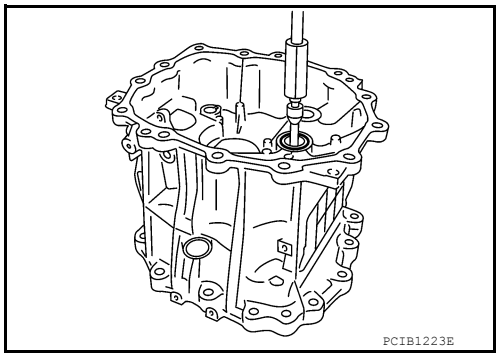
6. Remove retaining pin using suitable tool, and then remove striking arm from striking rod assembly.



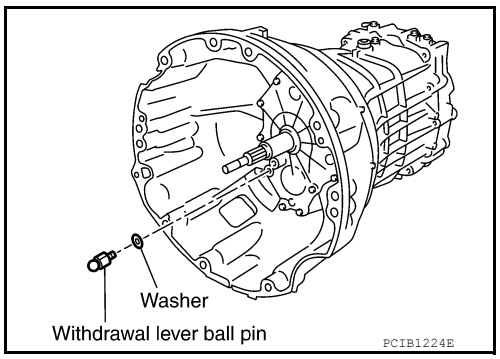
7. Remove OD gear case bolts, and then remove OD gear case from adapter plate using suitable tool.



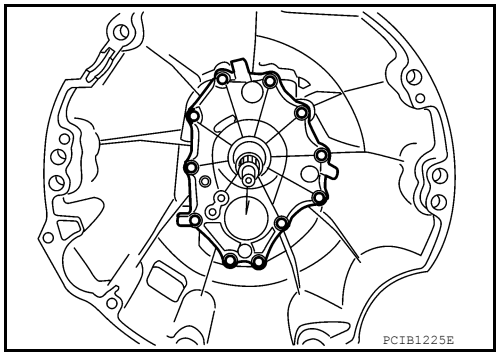
8. Remove counter end bearing from OD gear case using suitable tool.
CAUTION:
Be careful not to damage OD gear case.



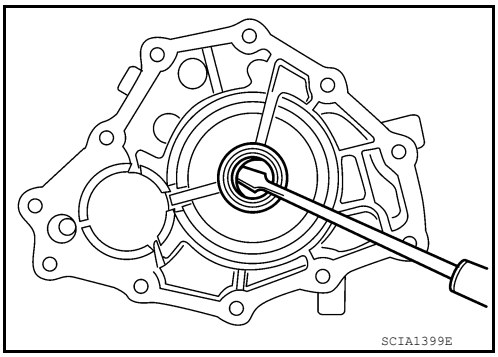
9. Remove withdrawal lever ball pin and washer from front cover.



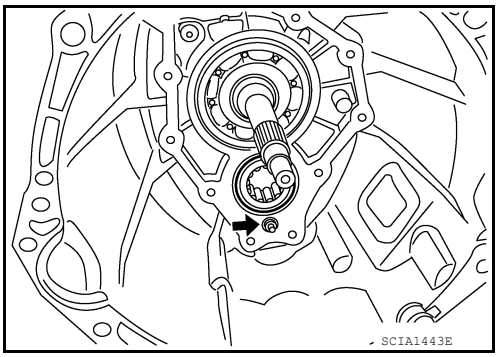
10. Remove front cover bolts, and then remove front cover and front cover gasket from transmission case.



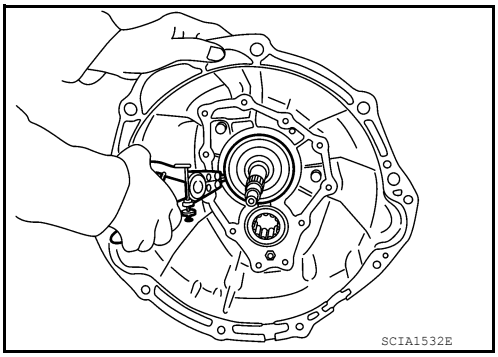
11. Remove front cover oil seal from front cover using suitable tool.
CAUTION:
Be careful not to damage front cover.



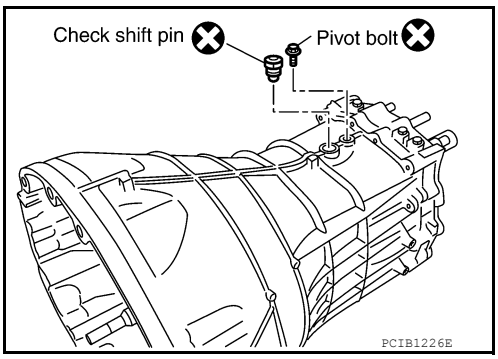
12. Remove baffle plate nut from transmission case.



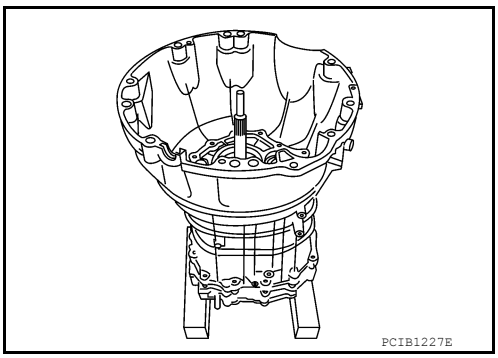
13. Remove snap ring from main drive gear bearing using suitable tool.



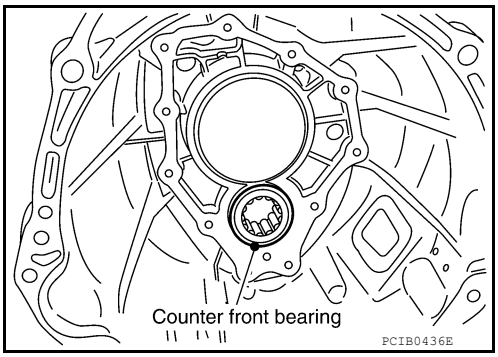
14. Remove pivot bolt and check shift pin from transmission case.
CAUTION:
Do not reuse pivot bolt and check shift pin.



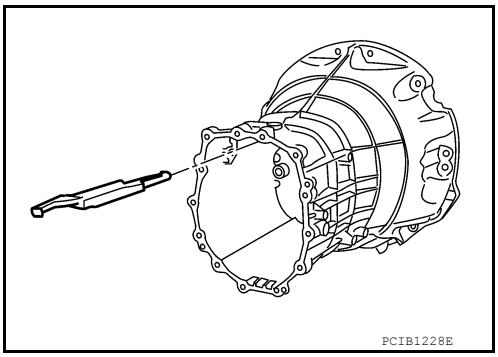
15. Remove transmission case from adapter plate.



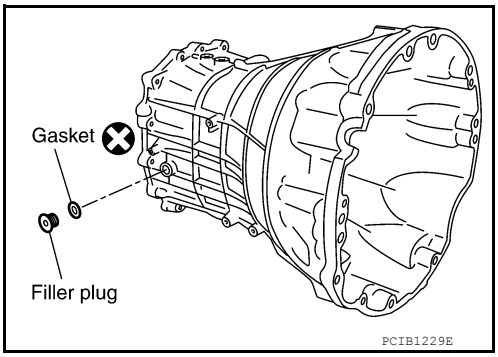
16. Remove counter front bearing from transmission case.



17. Remove oil gutter from transmission case.



18. Remove filler plug and gasket from transmission case.
CAUTION:
Do not reuse gasket.

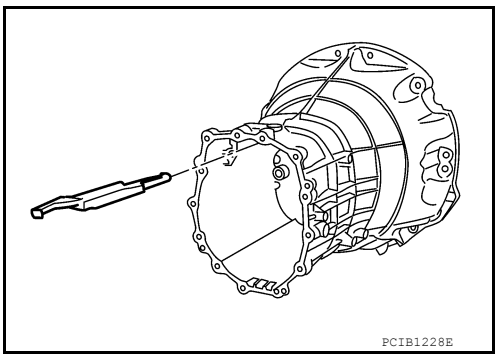


Assembly

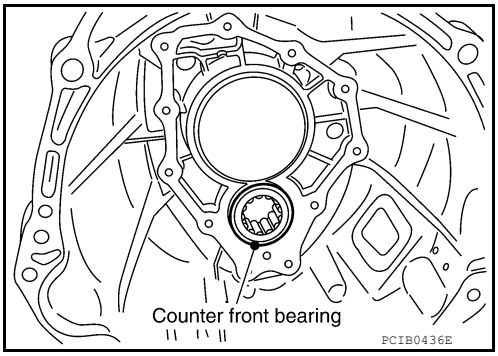
INFOID:0000000007360147

CASE COMPONENTS

1. Install main drive gear assembly, mainshaft assembly, counter gear assembly and reverse idler shaft assembly. Refer to "Gear Components" in assembly.
2. Install fork rods and shift forks. Refer to "Shift Control Components" in assembly.
3. Install oil gutter to transmission case.

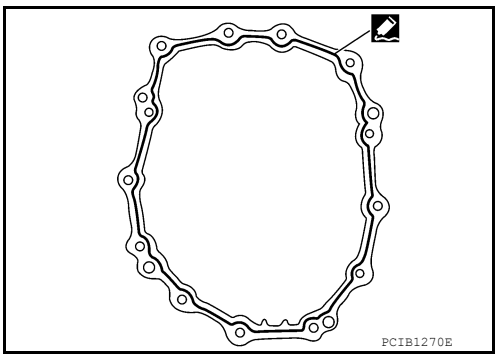


4. Install counter front bearing to transmission case.
CAUTION:
Apply multi-purpose grease to counter front bearing.

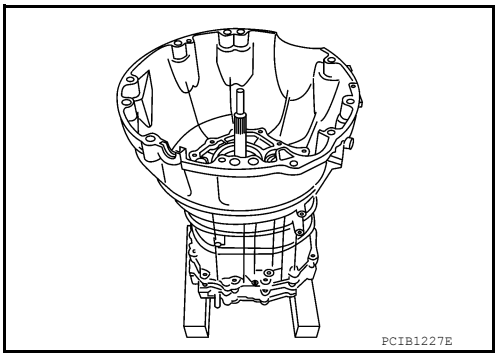


5. Apply recommended sealant to mating surface of transmission case as shown.
- **Use Genuine Silicone RTV or the equivalent. Refer to GI-15, "Recommended Chemical Products and Sealants".**

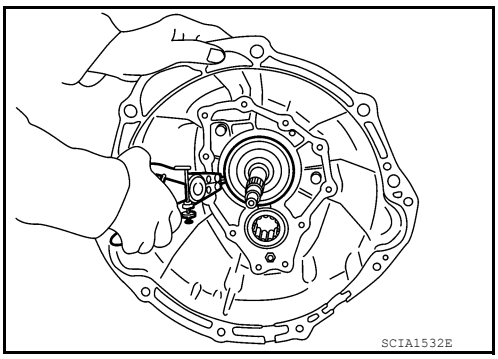
CAUTION:
Remove old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to both mating surfaces.



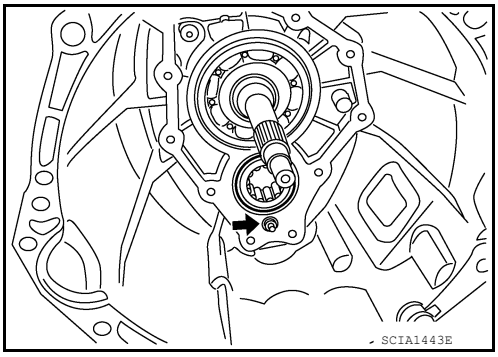
6. Install transmission case to adapter plate assembly.



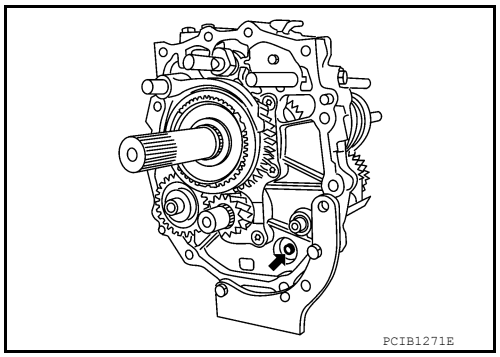
7. Install snap ring to main drive gear bearing using suitable tool.
CAUTION:
Do not reuse snap ring.



8. Tighten baffle plate nut to the specified torque. Refer to "Case Components" in assembly.



9. Tighten baffle plate bolt to the specified torque. Refer to "Case Components" in assembly.

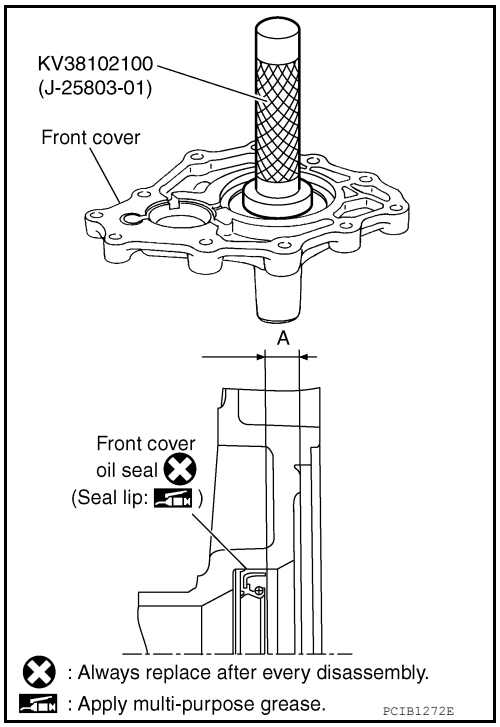


10. Install front cover oil seal to front cover using Tool.

Tool number : KV38102100 (J-25803-01)

Dimension (A) : 8.55 - 9.55 (0.336 - 0.376 in)

CAUTION:
- **Do not reuse front cover oil seal.**
- **Apply multi-purpose grease onto oil seal lip.**
- **When installing, do not incline front cover oil seal.**

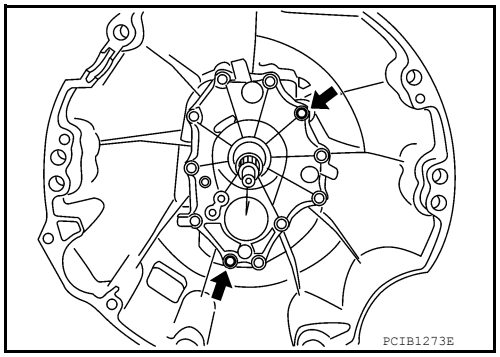


11. Install front cover according to the following.

a. Install front cover gasket and front cover to transmission case.
CAUTION:
Do not reuse front cover gasket.

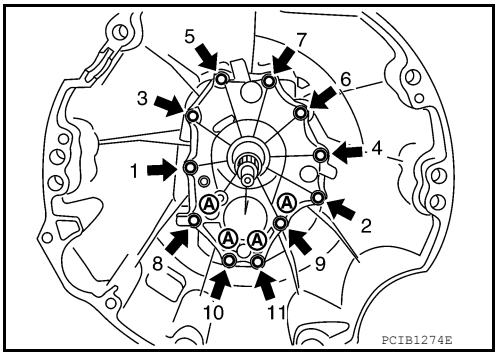
b. Temporarily tighten 2 bolts in the positions shown.

c. Temporarily tighten remaining 9 bolts.

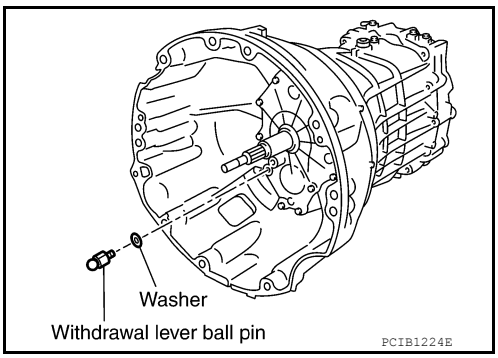


d. Tighten bolts to the specified torque in order as shown. Refer to TM-24, "Overhaul".

CAUTION:
Do not reuse bolts (A) shown.



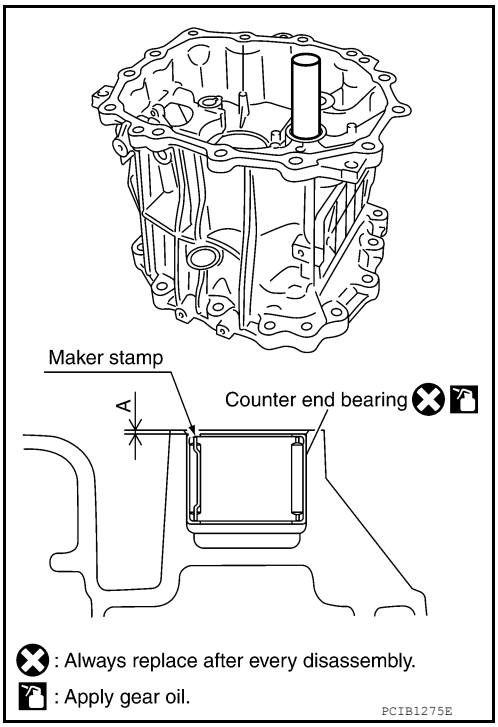
12. Install washer to withdrawal lever ball pin, and then install it to front cover. Tighten withdrawal lever ball pin to the specified torque. Refer to TM-24, "Overhaul"



13. Install counter end bearing to OD gear case using suitable tool [32 mm (1.26 in) dia.].

Dimension (A) : 0.5 - 1.5 (0.020 - 0.059 in)

CAUTION:
- **Do not reuse counter end bearing.**
- **Apply gear oil to counter end bearing.**
- **Install counter end bearing with maker stamp at upper side.**

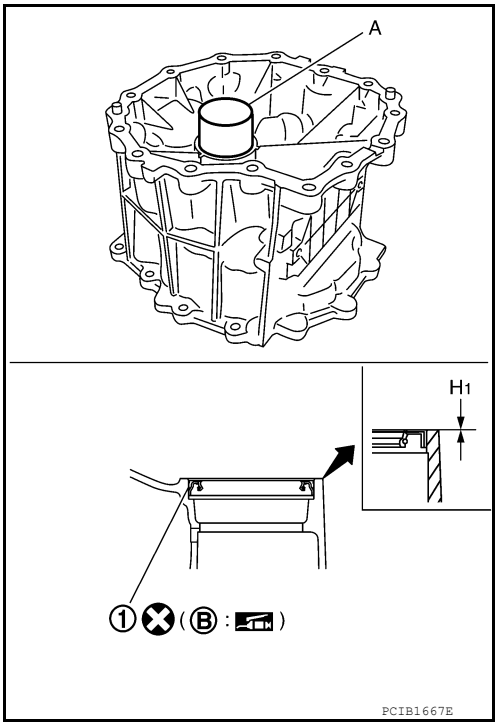


14. Install rear oil seal (1) to OD gear case using Tool (A).

Tool number : ST33200000 (J-26082)

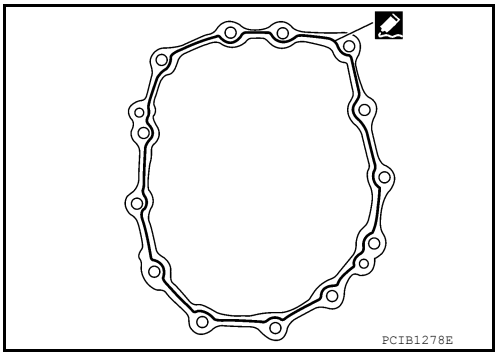
Dimension (H1) : -0.5 - 0.5 mm (-0.020 - 0.020 in)

CAUTION:
When installing, do not incline rear oil seal.
(B): Seal lip

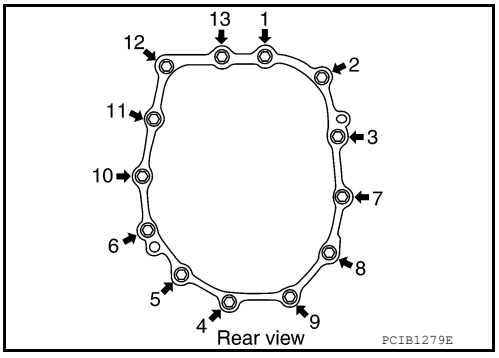


15. Apply recommended sealant to mating surface of rear extension as shown.
- **Use Genuine Silicone RTV or the equivalent. Refer to GI-15, "Recommended Chemical Products and Sealants".**

CAUTION:
Remove old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to both mating surfaces.

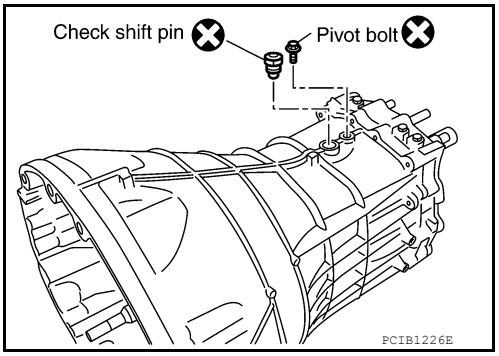


16. Install OD gear case to adapter plate, and then tighten bolts to the specified torque in order as shown. Refer to TM-24, "Overhaul".

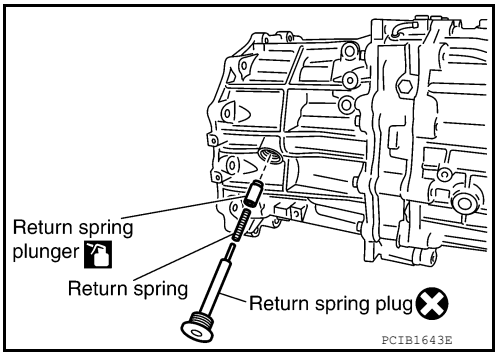


17. Install check shift pin and pivot bolt to transmission case, and then tighten them to the specified torque. Refer to TM-24, "Overhaul".

CAUTION:
Do not reuse check shift pin and pivot bolt.



18. Install return spring plunger, return spring and return spring plug to OD gear case, and then tighten return spring plug to the specified torque. Refer to TM-24, "Overhaul".
CAUTION:
- **Do not reuse return spring plug.**
- **Apply gear oil to return spring plunger.**

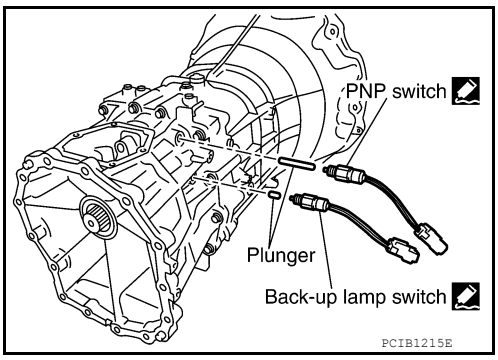


19. Install PNP switch and back-up lamp switch according to the following.

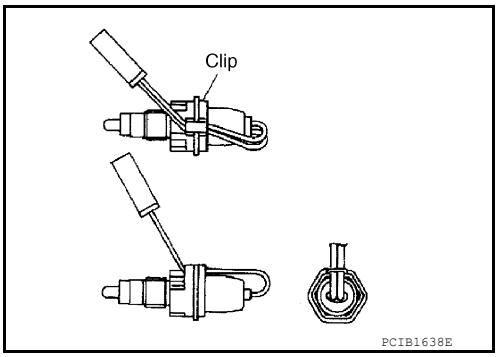
a. Install plunger to OD gear case.

b. Apply recommended sealant to threads of PNP switch and back-up lamp switch.
- **Use Genuine Silicone RTV or the equivalent. Refer to GI-15, "Recommended Chemical Products and Sealants".**

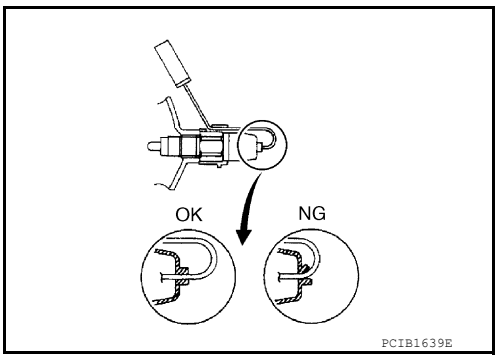
c. Install PNP switch and back-up lamp switch to OD gear case, and tighten them to the specified torque. Refer to TM-24, "Overhaul".



20. Install clips to PNP switch and back-up lamp switch.
CAUTION:
- **Thread harness through the notch of clip.**

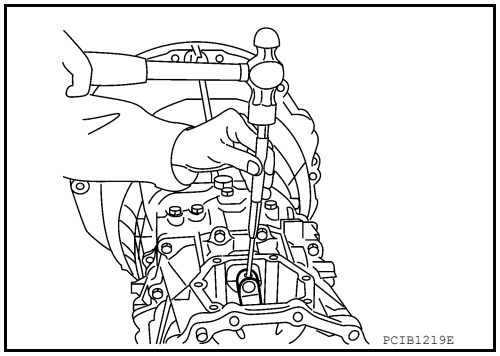


- **Thread the harness as shown.**

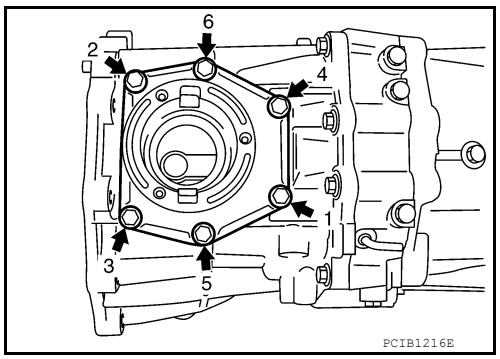


21. Install striking arm according to the following.

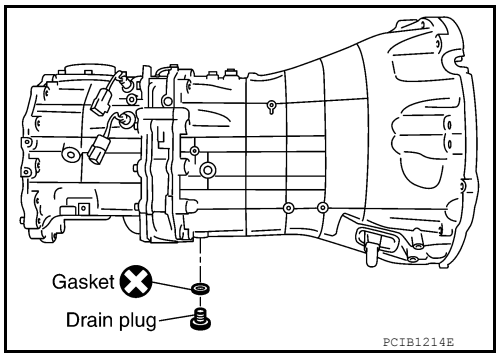
a. Install striking arm to striking rod assembly.
b. Install retaining pin to striking arm using suitable tool.
CAUTION:
Do not reuse retaining pin.



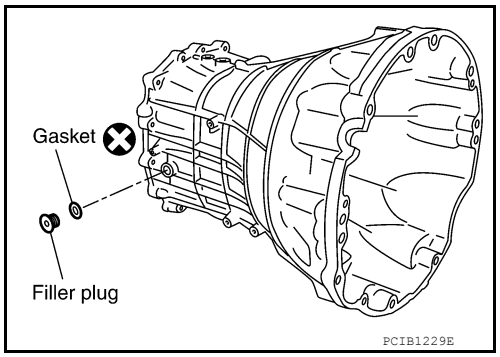
22. Install control housing according to the following.
a. Install gasket and control housing to OD gear case.
CAUTION:
Do not reuse gasket.
b. Tighten bolts to the specified torque in order as shown. Refer to TM-24, "Overhaul".



23. Install gasket to drain plug, and then install it to transmission case. Tighten drain plug to the specified torque. Refer to TM-24, "Overhaul".
CAUTION:
Do not reuse gasket.



24. Install gasket to filler plug, and then install it to transmission case. Tighten filler plug to the specified torque. Refer to TM-24, "Overhaul".
CAUTION:
- **Do not reuse gasket.**
- **After oil is filled, tighten filler plug to specified torque.**



SHIFT CONTROL COMPONENTS

Disassembly

INFOID:0000000007360148

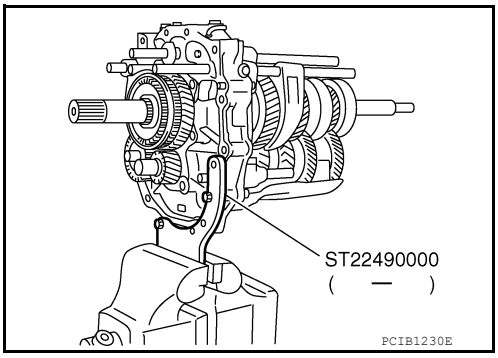
SHIFT CONTROL COMPONENTS

1. Remove OD gear case and transmission case. Refer to TM-30, "Disassembly".

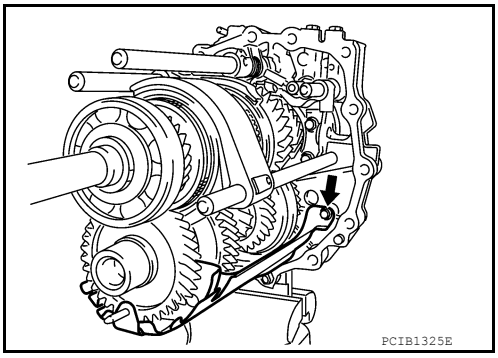
2. Install Tool to adapter plate, and then position in a vise.

   Tool number : ST22490000 (—)

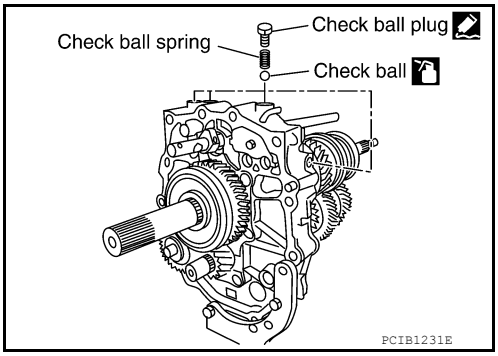
   CAUTION:
   Do not directly secure mating surface of adapter plate in a vise.



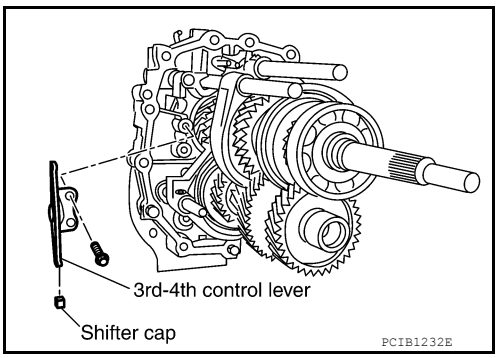
3. Remove baffle plate bolts, and then remove baffle plate from adapter plate.



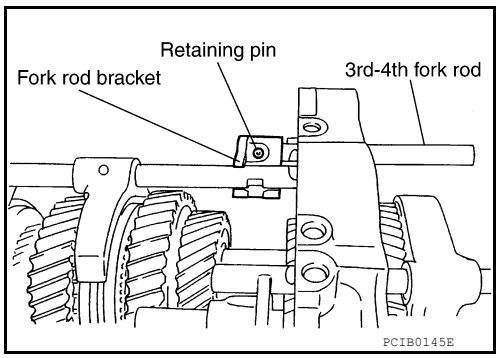
4. Remove check ball plugs, check ball springs and check balls from adapter plate.



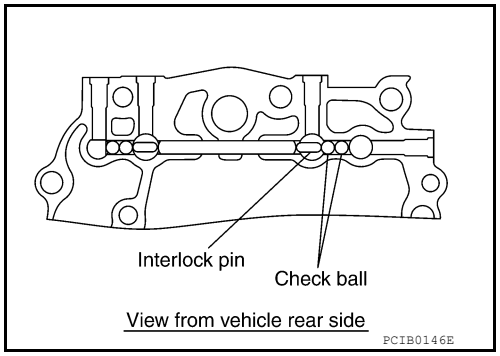
5. Remove 3rd-4th control lever bolts, and then remove 3rd-4th control lever and shifter cap from adapter plate.



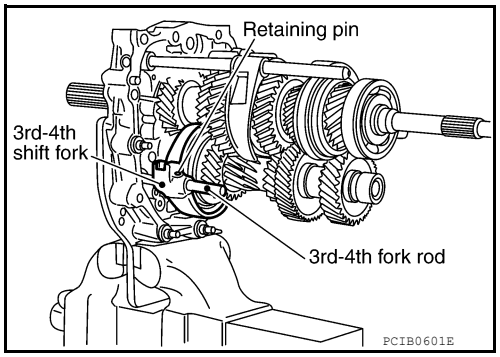
6. Remove retaining pin using suitable tool, and then remove 3rd - 4th fork rod bracket and 3rd-4th fork rod from adapter plate.



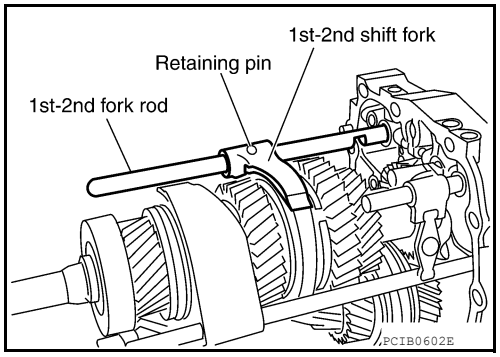
7. Remove check balls and interlock pin from adapter plate.



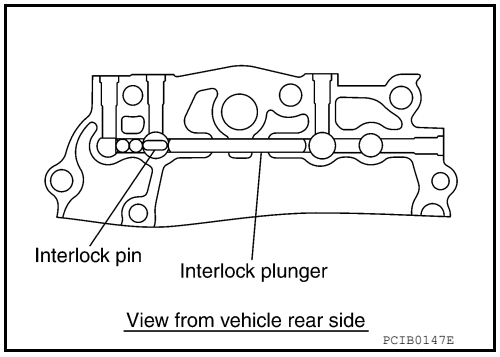
8. Remove retaining pin using a suitable tool, and then remove 3rd-4th shift fork and 3rd-4th fork rod (reversal side) from adapter plate.



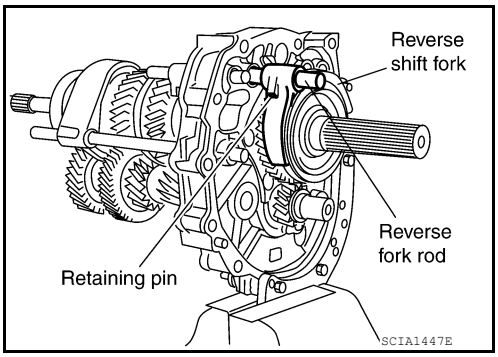
9. Remove retaining pin using a suitable tool, and then remove 1st-2nd shift fork and 1st-2nd fork rod from adapter plate.



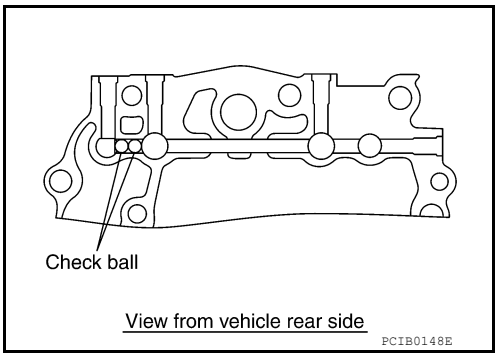
10. Remove interlock plunger and interlock pin from adapter plate.



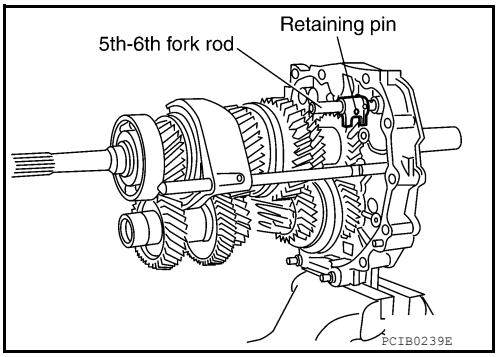
11. Remove retaining pin using suitable tool, and then remove reverse shift fork and reverse fork rod from adapter plate.



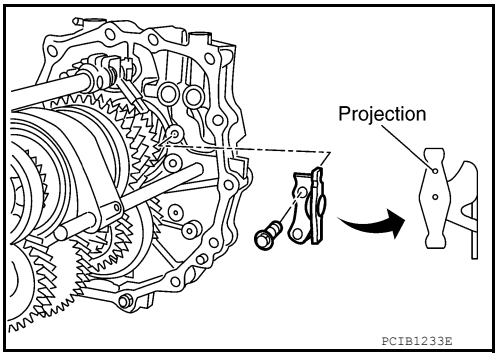
12. Remove check balls from adapter plate.



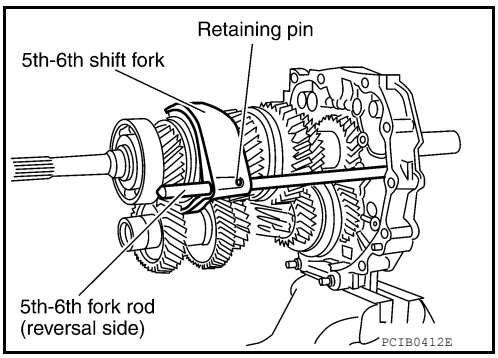
13. Remove retaining pin using suitable tool, and then remove 5th-6th fork rod bracket and 5th-6th fork rod from adapter plate.



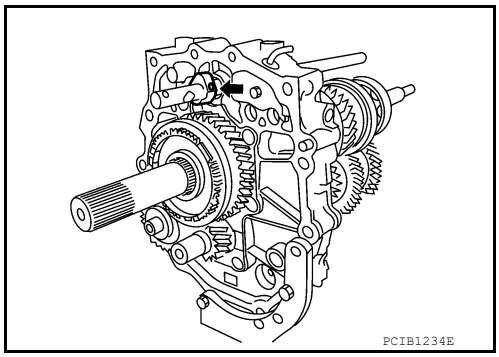
14. Remove 5th-6th control lever bolts, and then remove 5th-6th control lever from adapter plate.



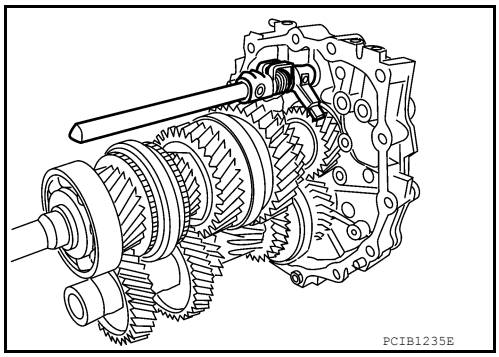
15. Remove retaining pin using suitable tool, and then remove 5th-6th shift fork and 5th-6th fork rod (reversal side) from adapter plate.



16. Remove retaining pin using suitable tool, and then remove stopper ring from striking rod assembly.



17. Remove striking rod assembly from adapter plate.

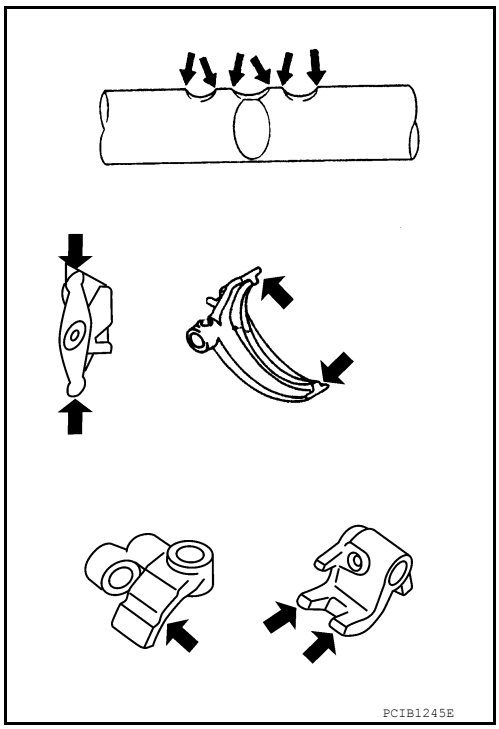


Inspection

INFOID:0000000007360149

SHIFT CONTROL COMPONENTS

If the contact surface on striking lever, fork rod, shift fork, etc., has excessive wear, abrasion, bend, or any other damage, replace the components.



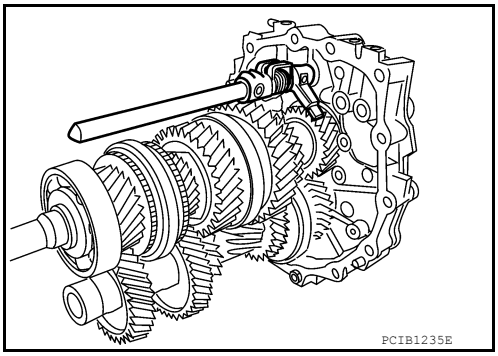
Assembly

INFOID:0000000007360150

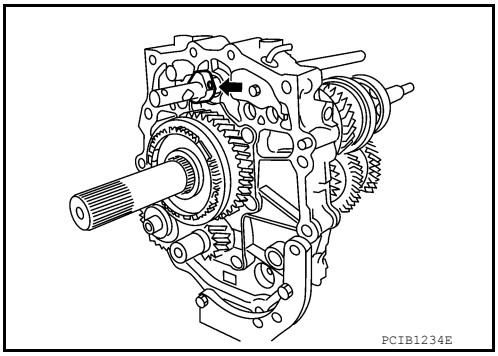
SHIFT CONTROL COMPONENTS

1. Install main drive gear assembly, mainshaft assembly, counter gear assembly and reverse idler shaft assembly. Refer to TM-57, "Assembly".
2. Install striking rod assembly according to the following.

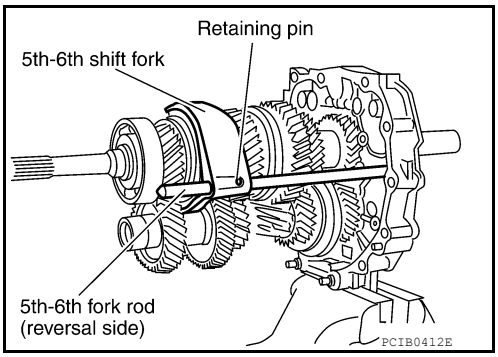
a. Install striking rod assembly to adapter plate.



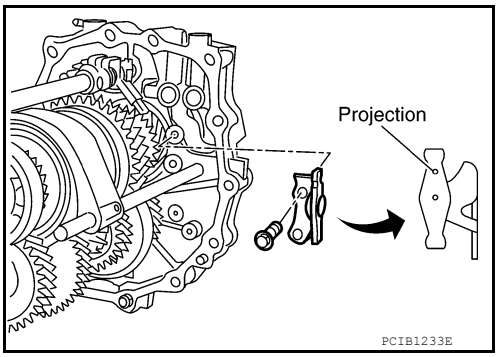
b. Install stopper ring to striking rod assembly.
c. Install retaining pin onto stopper ring using suitable tool.
CAUTION:
Do not reuse retaining pin.



3. Install 5th-6th fork rod (reversal side) according to the following.
a. Install 5th-6th shift fork to 5th-6th coupling sleeve.
b. Install 5th-6th fork rod (reversal side) to 5th-6th shift fork.
c. Install retaining pin onto 5th-6th shift fork using suitable tool.
CAUTION:
Do not reuse retaining pin.

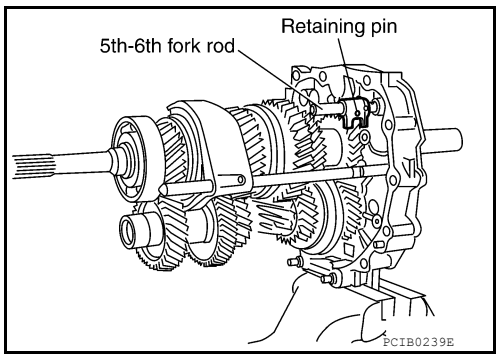


4. Install 5th-6th control lever to adapter plate, and then tighten bolts to the specified torque. Refer to "TM-57, "Assembly".
CAUTION:
Install 5th-6th control lever with projection side at upward.

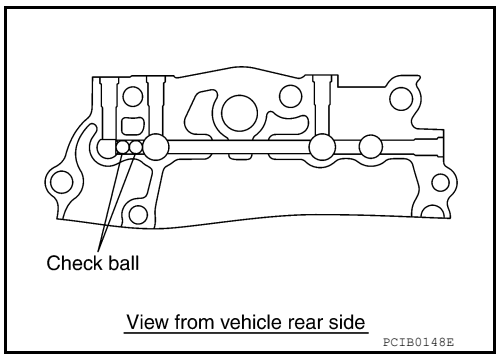


5. Install 5th-6th fork rod according to the following.

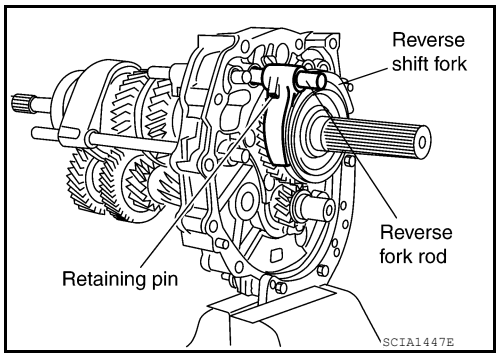
a. Install 5th-6th fork bracket and 5th-6th fork rod to adapter plate.
b. Install retaining pin onto 5th-6th fork bracket using suitable tool.
CAUTION:
Do not reuse retaining pin.



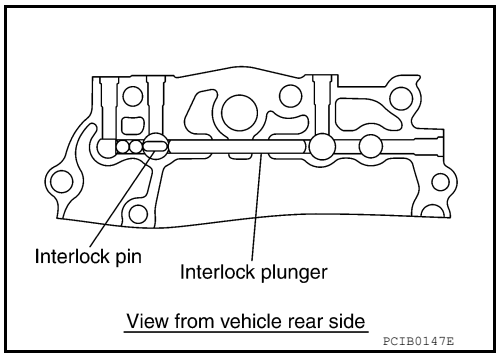
6. Install check balls to adapter plate.
CAUTION:
Apply gear oil to check balls.



7. Install reverse fork rod according to the following.
a. Install reverse shift fork to reverse coupling sleeve.
b. Install reverse fork rod to reverse shift fork.
c. Install retaining pin onto reverse shift fork using suitable tool.
CAUTION:
Do not reuse retaining pin.

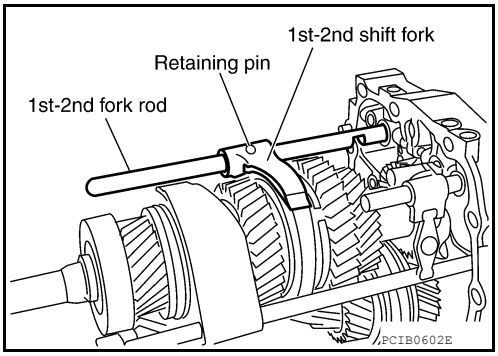


8. Install interlock pin and interlock plunger to adapter plate.
CAUTION:
Apply gear oil to interlock pin and interlock plunger.

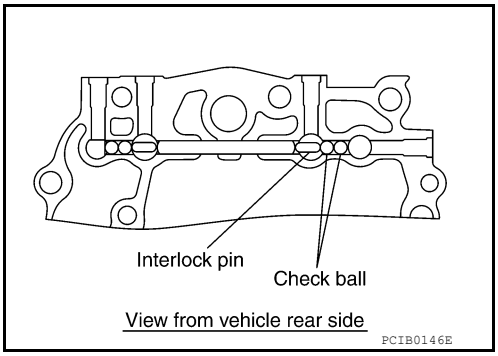


9. Install 1st-2nd fork rod according to the following.

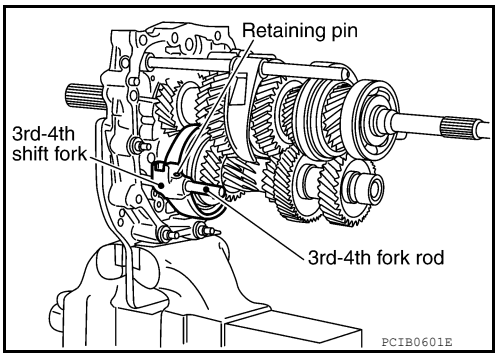
a. Install 1st-2nd shift fork to 1st-2nd coupling sleeve.
b. Install 1st-2nd fork rod to 1st-2nd shift fork.
c. Install retaining pin onto 1st-2nd shift fork using suitable tool.
CAUTION:
Do not reuse retaining pin.



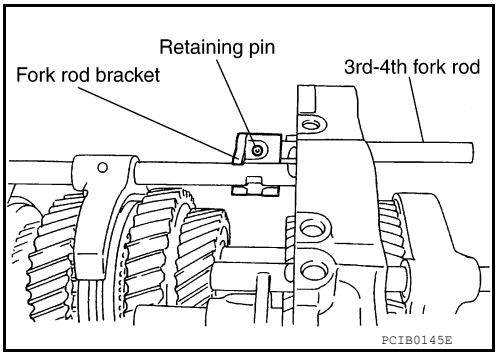
10. Install interlock pin and check balls to adapter plate.
CAUTION:
Apply gear oil to interlock pin and check balls.



11. Install 3rd-4th fork rod (reversal side) according to the following.
a. Install 3rd-4th shift fork to 3rd-4th coupling sleeve.
b. Install 3rd-4th fork rod (reversal side) to 3rd-4th shift fork.
c. Install retaining pin onto 3rd-4th shift fork using suitable tool.
CAUTION:
Do not reuse retaining pin.



12. Install 3rd-4th fork rod according to the following.
a. Install 3rd-4th fork rod to adapter plate.
b. Install 3rd-4th fork rod bracket to 3rd-4th fork rod.
c. Install retaining pin onto 3rd-4th fork rod bracket using suitable tool.
CAUTION:
Do not reuse retaining pin.



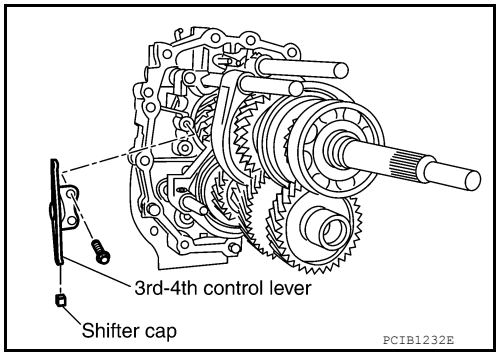
13. Install 3rd-4th control lever according to the following.

a. Install shifter cap to 3rd-4th control lever.

b. Install 3rd-4th control lever to adapter plate, and then tighten bolts to the specified torque. Refer to "Shift Control Components".

CAUTION:

Be careful with the orientation 3rd-4th control lever.



14. Install check ball plug according to the following.

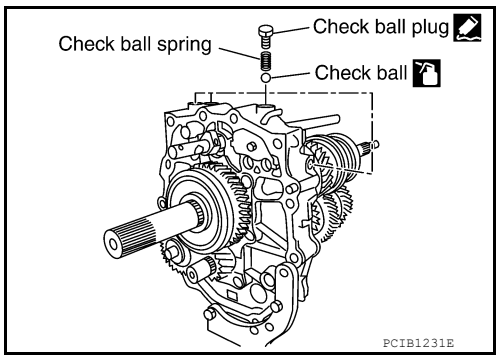
a. Install check balls, check ball springs to adapter plate.

CAUTION:

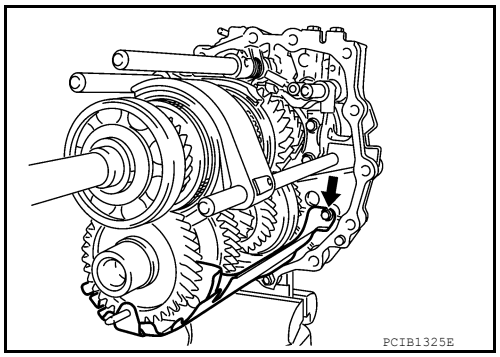
Apply gear oil to check ball.

b. Apply recommended sealant to threads of check ball plugs, and tighten check ball plugs to the specified torque. Refer to TM-57, "Assembly".

- **Use Genuine Silicone RTV or the equivalent. Refer to GI-15, "Recommended Chemical Products and Sealants".**



15. Install baffle plate to adapter plate, and then tighten bolt to the specified torque. Refer to TM-57, "Assembly".



GEAR COMPONENTS

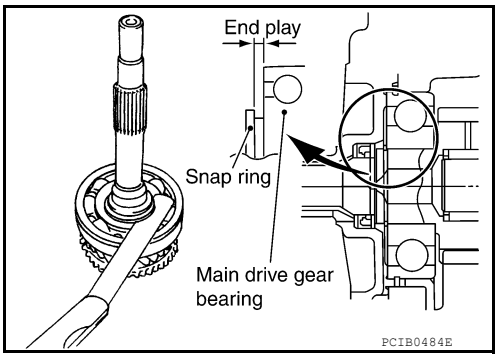
Disassembly

INFOID:0000000007360151

GEAR COMPONENTS

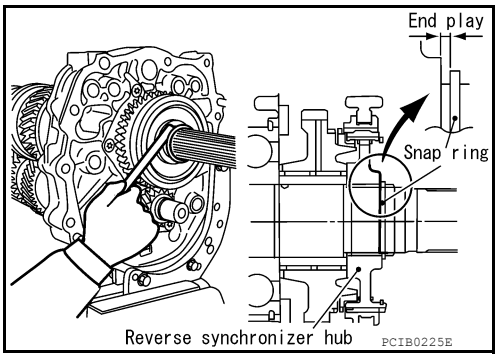
1. Remove OD gear case and transmission case. Refer to TM-30, "Disassembly".
2. Remove shift forks and fork rods. Refer to TM-40, "Disassembly".
3. Before disassembling, measure the end play for each position. If the end play is outside the standards, disassemble and inspect.
   - Main drive gear

End play — **Refer to TM-72, "Gear End Play"**



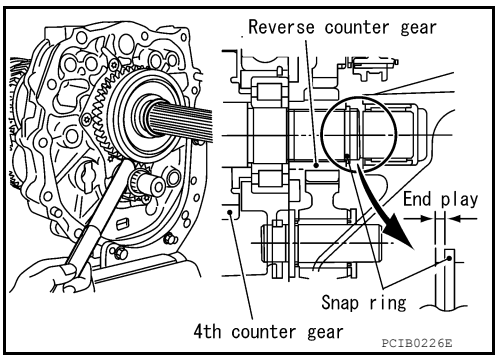
   - Mainshaft (Rear side)

End play — **Refer to TM-72, "Gear End Play"**



   - Counter gear

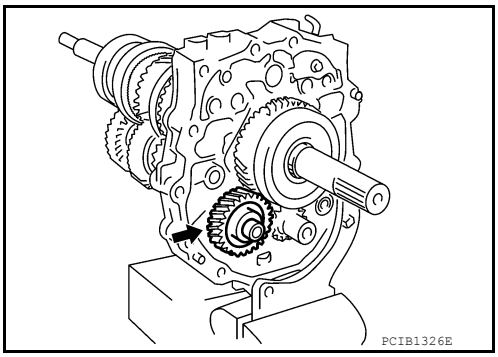
End play — **Refer to TM-72, "Gear End Play"**



4. Remove reverse idler gear according to the following.

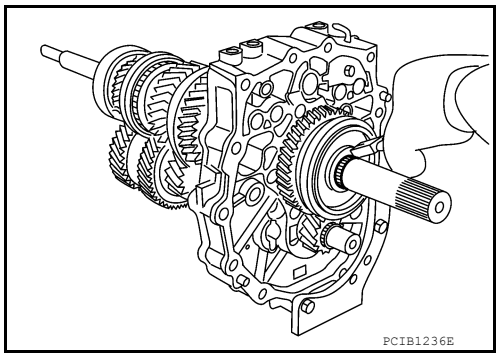
a. Remove reverse idler shaft assembly from adapter plate.

b. Remove reverse idler thrust washer, reverse idler gear and reverse idler needle bearing from reverse idler shaft.



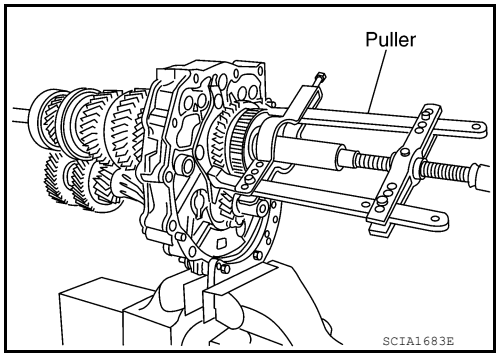
5. Remove reverse main gear and reverse synchronizer hub assembly according to the following.

a. Remove snap ring from mainshaft using suitable tool.



b. Remove reverse main gear and reverse synchronizer hub assembly using suitable tool.

c. Remove reverse main needle bearing from mainshaft.

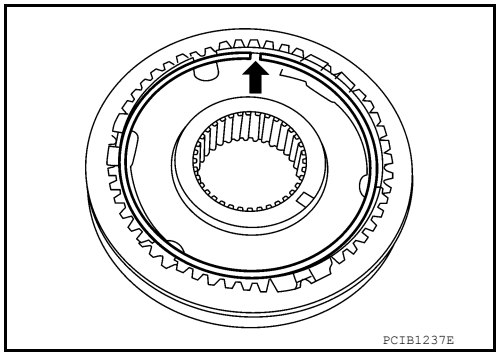


6. Remove reverse coupling sleeve according to the following.

a. Remove snap ring from reverse synchronizer hub.

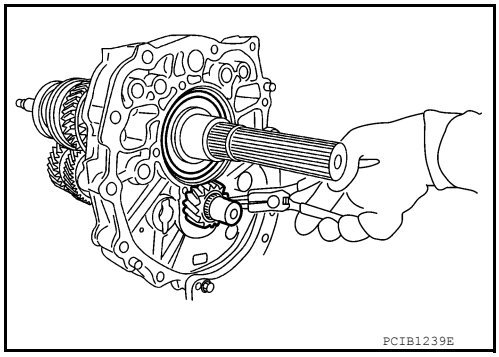
b. Remove spread springs and shifting inserts from reverse synchronizer hub.

c. Remove reverse coupling sleeve from reverse synchronizer hub.



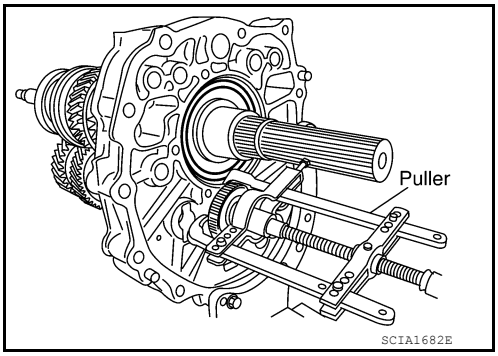
7. Remove reverse counter gear according to the following.

a. Remove snap ring from counter gear using suitable tool.

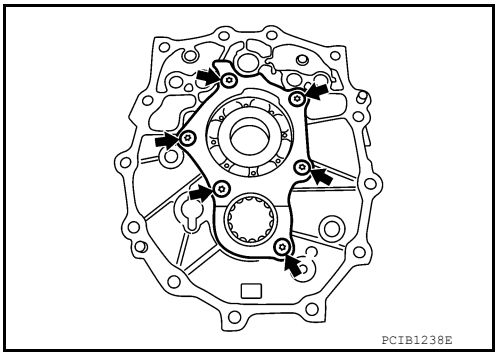


b. Remove reverse counter gear using suitable tool.

8. Remove counter rear bearing spacer from counter gear.

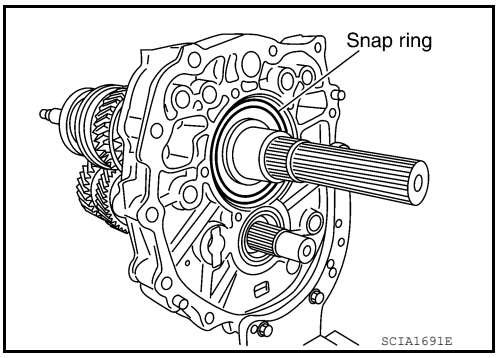


9. Remove bearing retainer bolts, and then remove bearing retainer.



10. Remove main drive gear assembly, mainshaft assembly and counter gear assembly according to the following.

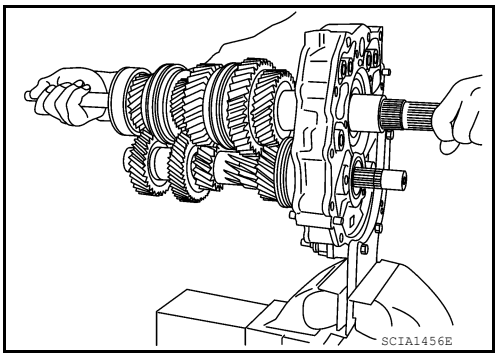
a. Remove snap ring from mainshaft bearing using suitable tool.



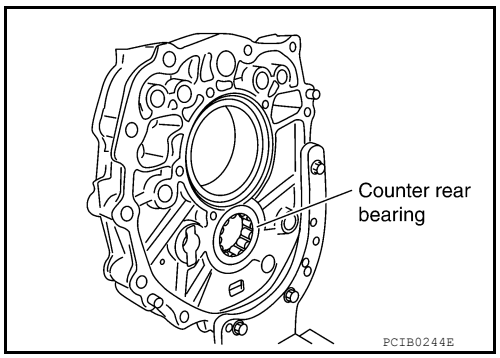
b. Carefully tap mainshaft using suitable tool, and then remove main drive gear assembly, mainshaft assembly and counter gear assembly from adapter plate.

c. Remove main pilot bearing, pilot bearing spacer from mainshaft.

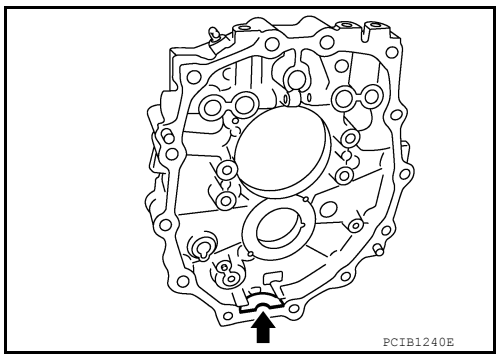
d. Remove 5th baulk ring from main drive gear.



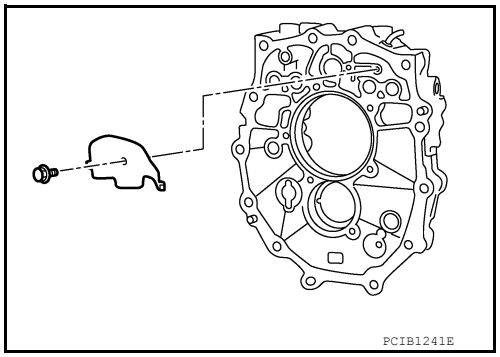
11. Remove counter rear bearing from adapter plate.



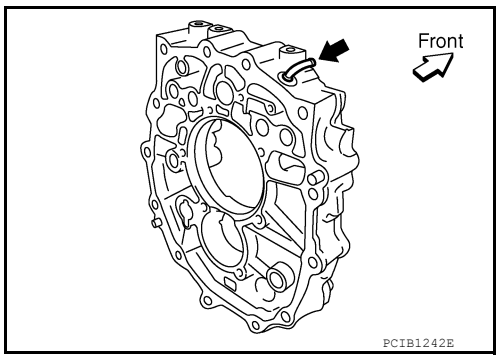
12. Remove magnet from adapter plate.



13. Remove baffle plate bolt, and then remove baffle plate from adapter plate.

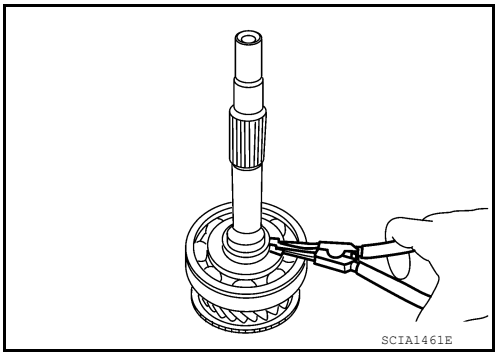


14. Remove breather from adapter plate.

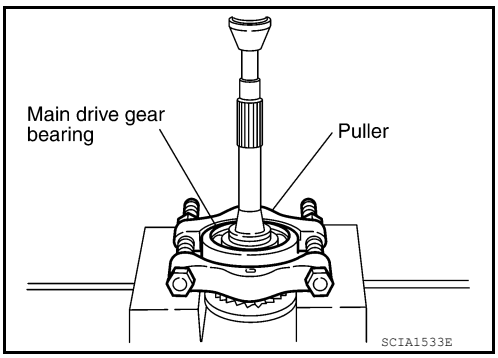


15. Remove main drive gear bearing according to the following.

a. Remove snap ring from main drive gear using suitable tool.

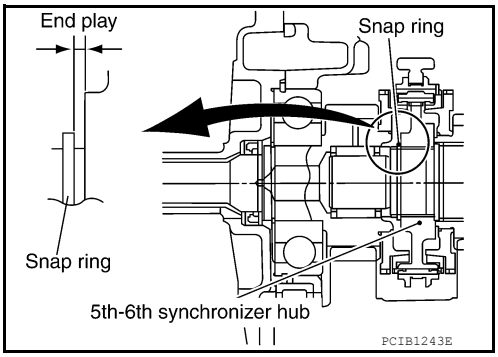


b. Press out main drive gear bearing using suitable tool.

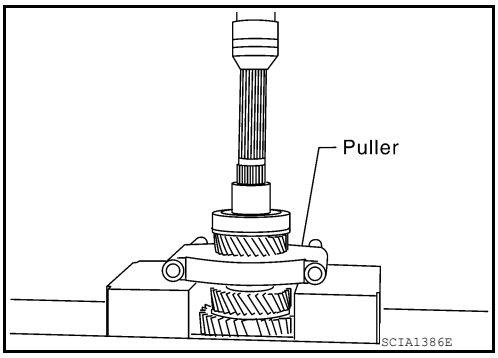


16. Before disassembling, measure the end play for mainshaft (Front side). If the end play is outside the standards, disassemble and inspect.

End play : 0 - 0.10 mm (0 - 0.004 in)

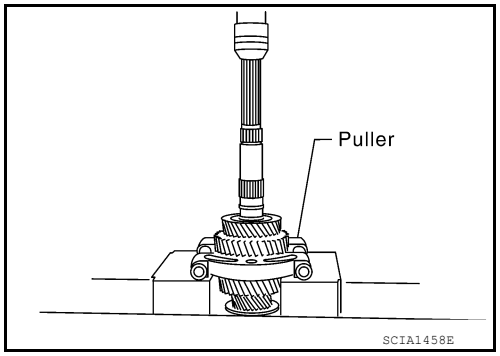


17. Press out reverse main gear bushing, mainshaft bearing and 4th main gear using suitable tool.
18. Remove 3rd-4th main spacer from mainshaft.

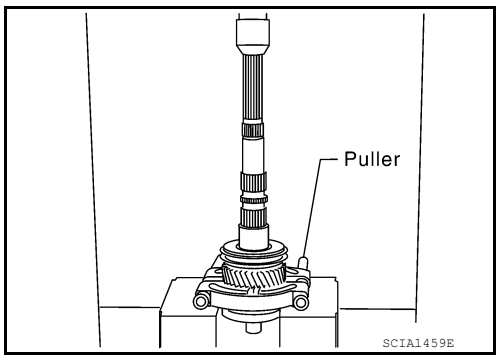


19. Remove 3rd main gear and 1st main gear according to the following.

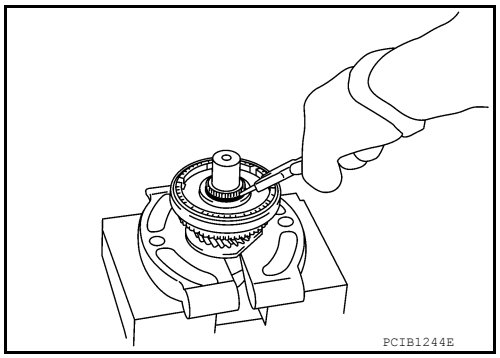
a. Press out 3rd main gear and 1st main gear using suitable tool.
CAUTION:
Be careful not to damage 1st outer baulk ring.
b. Remove 1st needle bearing from mainshaft.



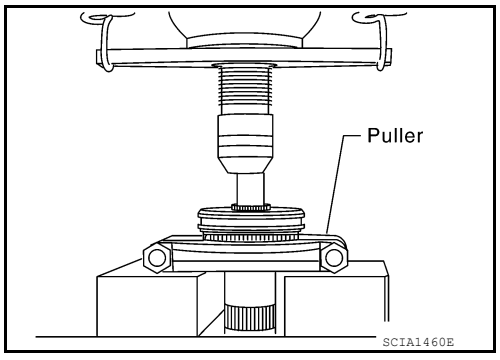
20. Remove 1st-2nd synchronizer hub assembly and 2nd main gear according to the following.
a. Press out 1st gear bushing, 1st-2nd synchronizer hub assembly and 2nd main gear using suitable tool.
CAUTION:
Be aware that when using the press, if mainshaft gear positioner catches on the V-block, etc., mainshaft could be damaged.
b. Remove 2nd needle bearing from mainshaft.
21. Remove 1st-2nd coupling sleeve according to the following.
a. Remove spread springs and shifting inserts from 1st-2nd synchronizer hub.
b. Remove 1st-2nd coupling sleeve from 1st-2nd synchronizer hub.



22. Remove 6th main gear and 5th-6th synchronizer hub assembly according to the following.
a. Remove snap ring from mainshaft using suitable tool.

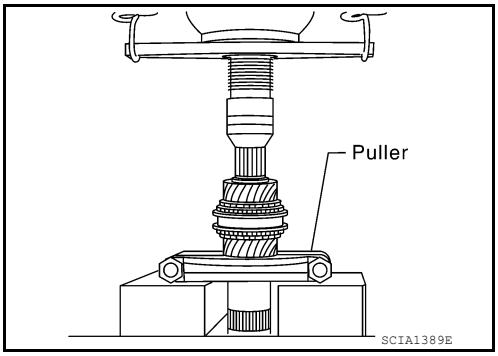


b. Press out 6th main gear and 5th-6th synchronizer hub assembly using suitable tool.
c. Remove 6th needle bearing from mainshaft.
23. Remove 5th-6th coupling sleeve according to the following.
a. Remove spread springs and shifting inserts from 5th-6th synchronizer hub.
b. Remove 5th-6th coupling sleeve from 5th-6th synchronizer hub.

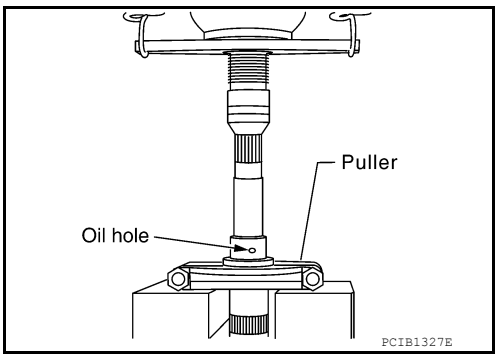


24. Remove 3rd counter gear, 3rd-4th synchronizer hub assembly, 4th counter gear according to the following.

a. Press out 3rd counter gear, 3rd-4th synchronizer hub assembly, 4th counter gear, 4th needle bearing, 4th gear bushing, 4th counter gear thrust washer, and counter rear bearing inner race using suitable tool.
b. Remove 3rd needle bearing from counter gear.
25. Remove 3rd-4th coupling sleeve according to the following.
a. Remove spread springs and shifting inserts from 3rd-4th synchronizer hub.
b. Remove 3rd-4th coupling sleeve from 3rd-4th synchronizer hub.



26. Press out 3rd gear bushing using suitable tool.
CAUTION:
Do not use oil hole of 3rd gear bushing when press out.

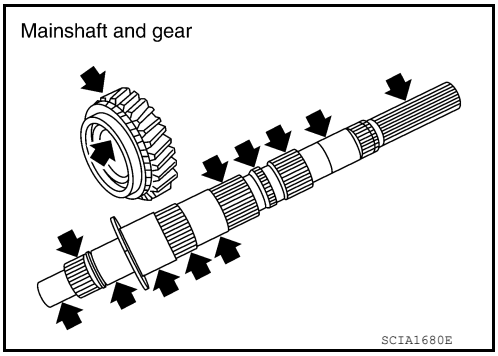


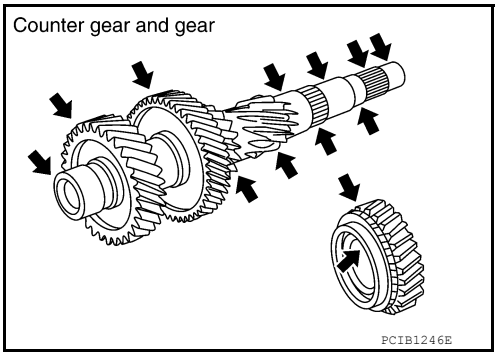
Inspection

INFOID:0000000007360152

GEAR AND SHAFT

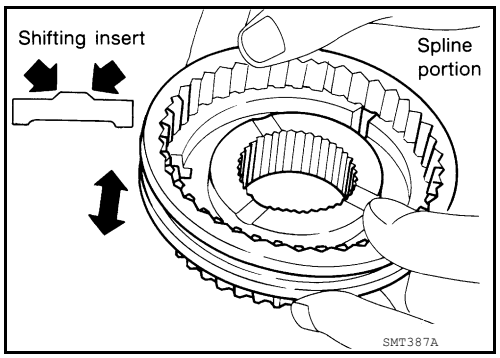
If the contact surface on each gear, mainshaft, main drive gear, and counter gear, etc., has damage, peeling, abrasion, dent, bent, or any other damage, replace the components.



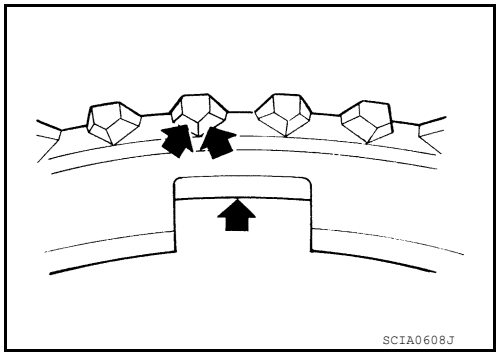


SYNCHRONIZERS

- If the contact surface on coupling sleeve, synchronizer hub, and shifting insert has damage or abrasion, replace the components.
- Coupling sleeve and synchronizer hub shall move smoothly.

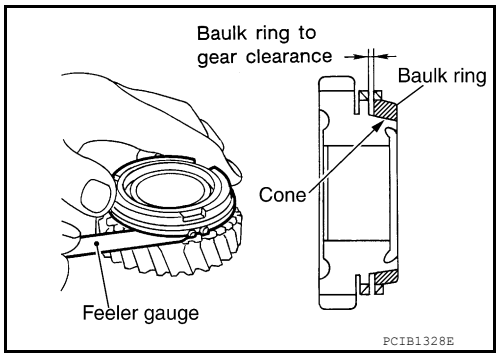


- If the cam surface on baulk ring or contact surface on insert has damage or excessive wear, replace with a new one.
- If spread spring damaged, replace with a new one.



- **Reverse Synchronizer**
  Push baulk ring on the cone, and measure the clearance between baulk ring and cone. If the measurement is below limit, replace it with a new one.

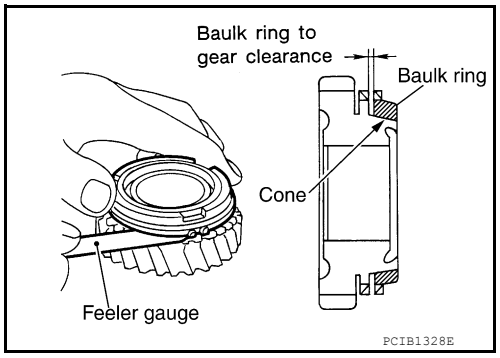
Clearance	
Standard value	Refer to TM-72, "Baulk Ring Clearance"
Limit value	Refer to TM-72, "Baulk Ring Clearance"



BAULK RING CLEARENCE

- **Single Cone Synchronizer (5th and 6th)**
  Push baulk ring on the cone, and measure the clearance between baulk ring and cone. If the measurement is below limit, replace it with a new one.

Clearance	
Standard value	Refer to TM-72, "Baulk Ring Clearance"
Limit value	Refer to TM-72, "Baulk Ring Clearance"

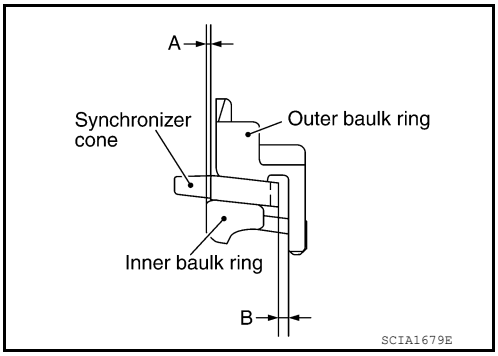


- **Double Cone Synchronizer (1st, 3rd and 4th)**

Check the clearance between outer baulk ring, synchronizer cone, and inner baulk ring as follows.

CAUTION:

The clearances (A) and (B) are controlled with outer baulk ring, synchronizer cone, and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.



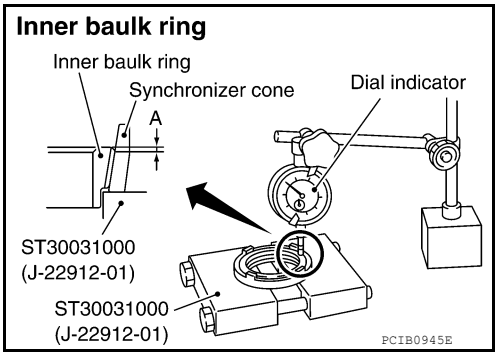
1. Measure the clearance (A) at 2 points or more diagonally opposite using a dial indicator and Tool. Then calculate the mean value.

Tool number : ST30031000 (J-22912-01)

Clearance (A)

Standard value Refer to TM-72, "Baulk Ring Clearance"

Limit value Refer to TM-72, "Baulk Ring Clearance"



2. Measure the clearance (B) at 2 points or more diagonally opposite using a feeler gauge. Then calculate the mean value.

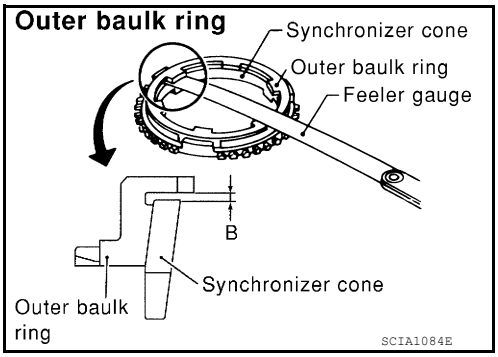
Clearance (B)

Standard value

1st Refer to TM-72, "Baulk Ring Clearance"

3rd,4th Refer to TM-72, "Baulk Ring Clearance"

Limit value Refer to TM-72, "Baulk Ring Clearance"

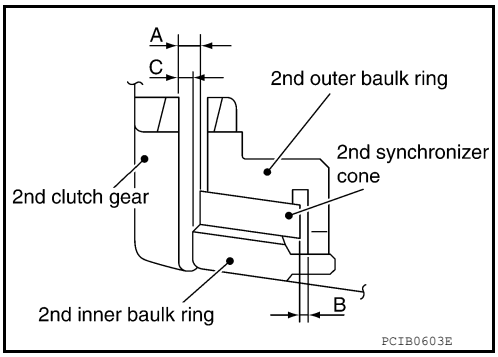


- **Triple Cone Synchronizer (2nd)**

Check the clearance between outer baulk ring, synchronizer cone, and inner baulk ring as follows.

CAUTION:

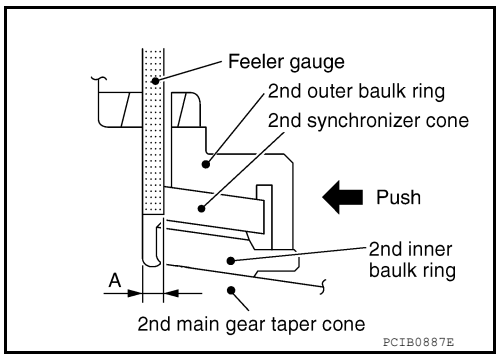
The clearances (A), (B) and (C) are controlled with outer baulk ring, synchronizer cone, and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.



1. Measure the clearance (A) at 2 points or more diagonally opposite using a feeler gauge when pressing baulk ring toward clutch gear taper cone. Then calculate the mean value.

Clearance (A)

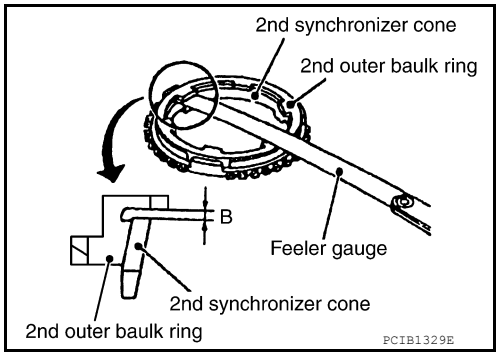
Standard value	**Refer to TM-72, "Baulk Ring Clearance"**
Limit value	**Refer to TM-72, "Baulk Ring Clearance"**



2. Measure the clearance (B) at 2 points or more diagonally opposite using a feeler gauge. Then calculate the mean value.

Clearance (B)

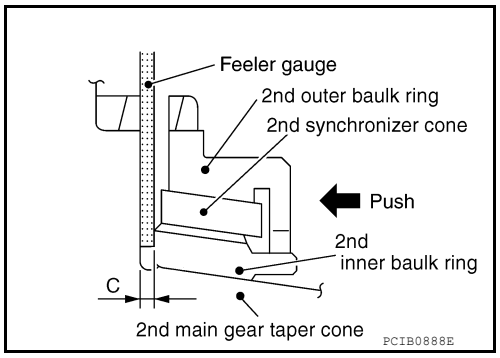
Standard value	**Refer to TM-72, "Baulk Ring Clearance"**
Limit value	**Refer to TM-72, "Baulk Ring Clearance"**



3. Measure the clearance (C) at 2 points or more diagonally opposite using a feeler gauge when pressing baulk ring toward clutch gear taper cone. Then calculate the mean value.

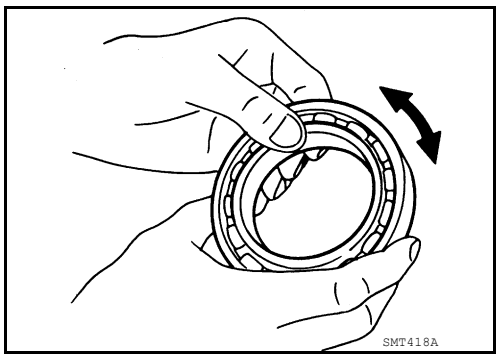
Clearance (C)

Standard value	**Refer to TM-72, "Baulk Ring Clearance"**
Limit value	**Refer to TM-72, "Baulk Ring Clearance"**



BEARINGS

If the bearing does not rotate smoothly or the contact surface on ball or race is damaged or peeled, replace with new ones.



Assembly

INFOID:0000000007360153

GEAR COMPONENTS

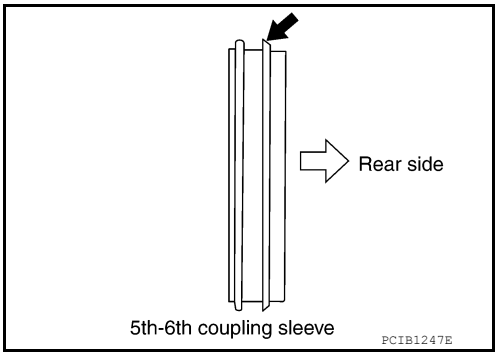
1. Install 5th-6th synchronizer hub assembly according to the following.

a. Install 5th-6th coupling sleeve to 5th-6th synchronizer hub.

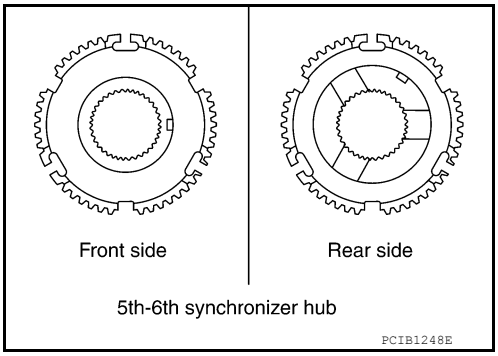
CAUTION:

- **Do not reuse 5th-6th synchronizer hub and 5th-6th coupling sleeve.**
- **Replace 5th-6th synchronizer hub and 5th-6th coupling sleeve as a set.**

- **Be careful with the orientation 5th-6th coupling sleeve.**



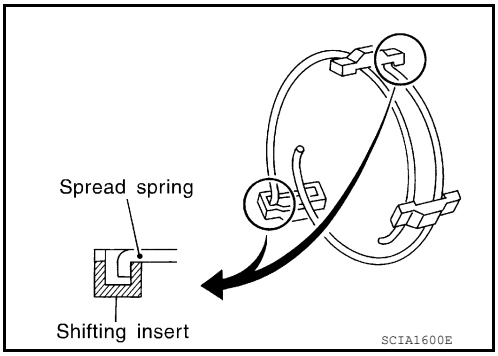
- **Be careful with the orientation 5th-6th synchronizer hub.**



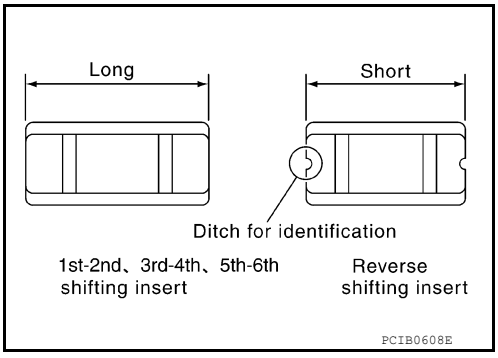
b. Install shifting inserts and spread springs to 5th-6th synchronizer hub.

CAUTION:

- **Do not install spread spring hook onto the same shifting insert.**



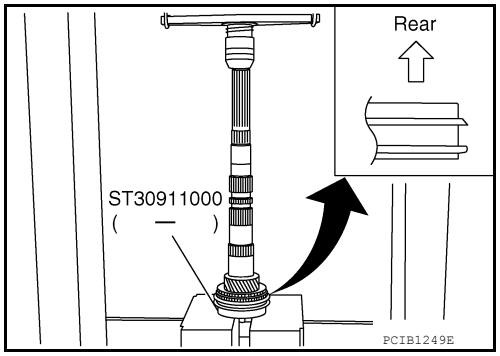
- **Be careful with the shape of reserve shifting insert to avoid misemploy.**



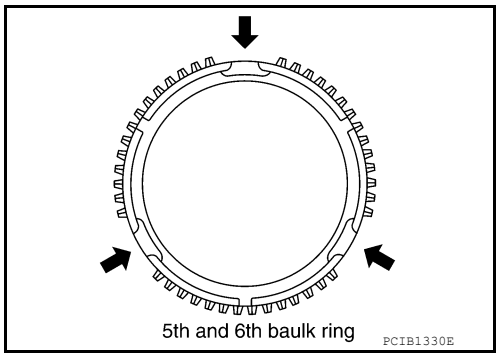
c. Press in 5th-6th synchronizer hub assembly, 6th baulk ring, 6th main gear and 6th needle bearing using Tool.

Tool number : ST30911000 (—)

CAUTION:
- **Apply gear oil to 6th baulk ring and 6th needle bearing.**
- **Be careful with the orientation 5th-6th coupling sleeve.**



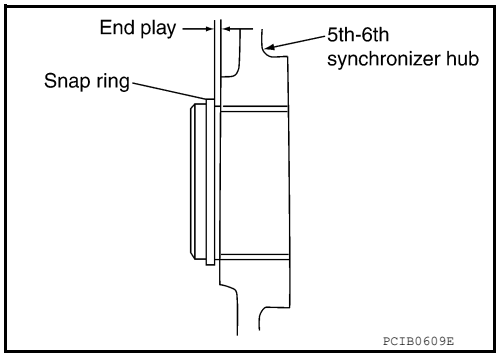
NOTE:
5th and 6th baulk rings have three spaces that four gear teeth are missing as shown.



2. Select and install a snap ring so that the end play comes within the standard value. Refer to TM-72, "Snap Rings".

End play : 0 - 0.10 mm (0 - 0.004 in)

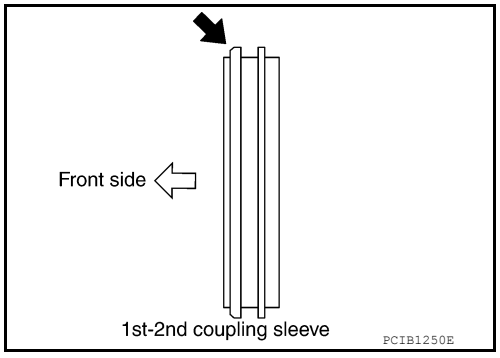
CAUTION:
Do not reuse snap ring.



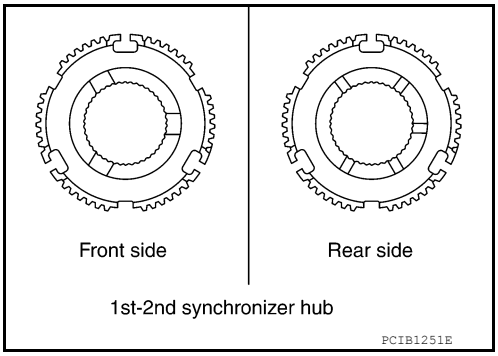
3. Install 1st-2nd synchronizer hub assembly according to the following.

a. Install 1st-2nd coupling sleeve to 1st-2nd synchronizer hub.

CAUTION:
- **Do not reuse 1st-2nd coupling sleeve and 1st-2nd synchronizer hub.**
- **Replace 1st-2nd synchronizer hub and 1st-2nd coupling sleeve as a set.**
- **Be careful with the orientation 1st-2nd coupling sleeve.**



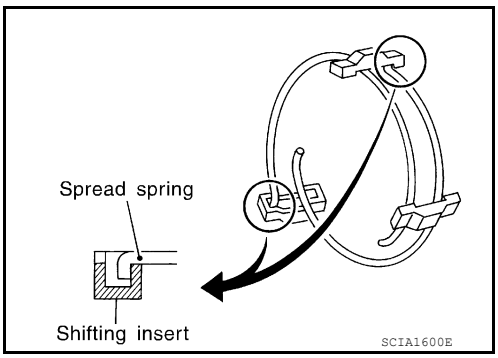
- **Be careful with the orientation 1st-2nd synchronizer hub.**



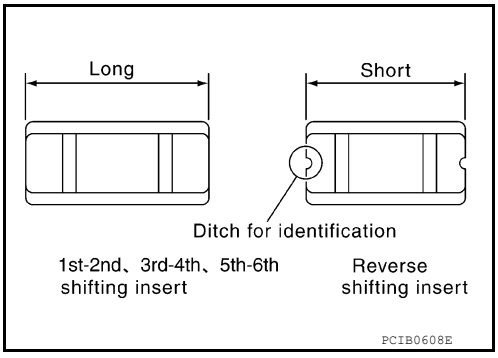
b. Install spread springs and shifting inserts to 1st-2nd synchronizer hub.

CAUTION:

- **Do not install spread spring hook onto the same shifting insert.**



- **Be careful with the shape of reverse shifting insert to avoid improper assembly.**

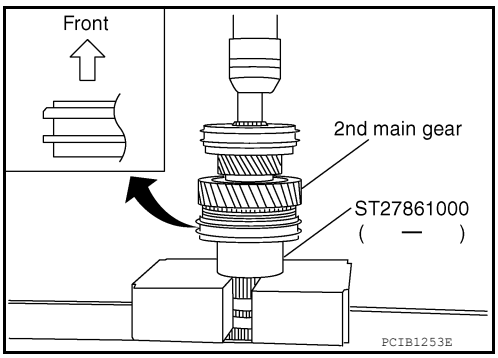


c. Press in 1st-2nd synchronizer hub assembly, 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring, 2nd main gear and 2nd needle bearing using Tool.

Tool number : ST27861000 (—)

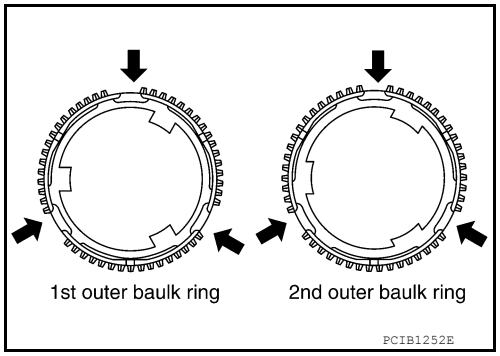
CAUTION:

- **Apply gear oil to 2nd needle bearing, 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring, 1st-2nd synchronizer hub spline of mainshaft.**
- **Replace 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring as a set.**
- **Be careful with the orientation 1st-2nd coupling sleeve.**



NOTE:

1st outer baulk ring has three spaces that three gear tooth is missing and 2nd outer baulk ring has three spaces that two gear teeth are missing.

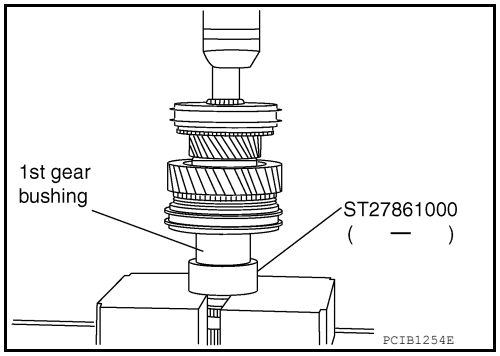


4. Press in 1st gear bushing using Tool.

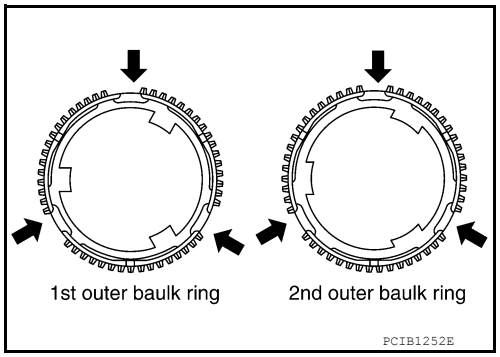
Tool number : ST27861000 (—)

5. Install 1st outer baulk ring, 1st synchronizer cone, 1st inner baulk ring, 1st needle bearing and 1st main gear to mainshaft.

CAUTION:
- **Apply gear oil to 1st outer baulk ring, 1st synchronizer cone, 1st inner baulk ring and 1st needle bearing.**
- **Replace 1st outer baulk ring, 1st synchronizer cone and 1st inner baulk ring as a set.**



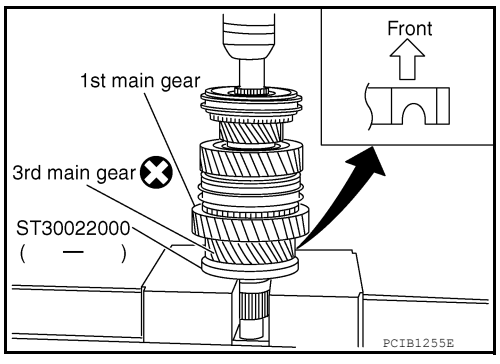
NOTE:
1st outer baulk ring has three spaces that three gear tooth is missing and 2nd outer baulk ring has three spaces that two gear teeth are missing.



6. Press in 3rd main gear using Tool.

Tool number : ST30022000 (—)

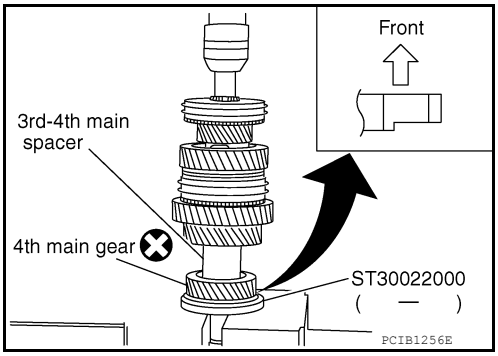
CAUTION:
- **Do not reuse 3rd main gear.**
- **Be careful with the orientation 3rd main gear.**



7. Install 3rd-4th main spacer to mainshaft.
8. Press in 4th main gear using Tool.

Tool number : ST30022000 (—)

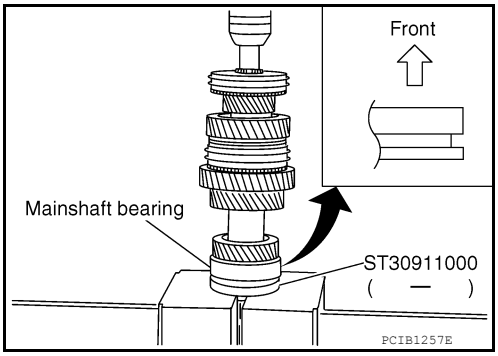
CAUTION:
- **Do not reuse 4th main gear.**
- **Be careful with the orientation 4th main gear.**



9. Press in mainshaft bearing using Tool.

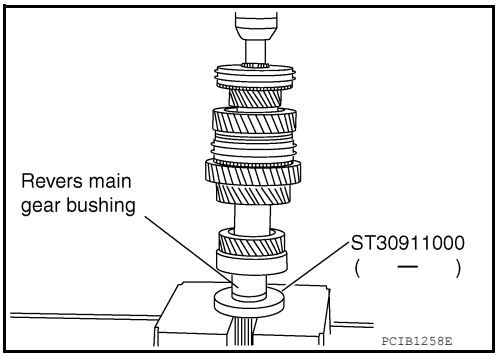
Tool number : ST30911000 (—)

CAUTION:
Be careful with the orientation mainshaft bearing.



10. Press in reverse main gear bushing using Tool.

Tool number : ST30911000 (—)



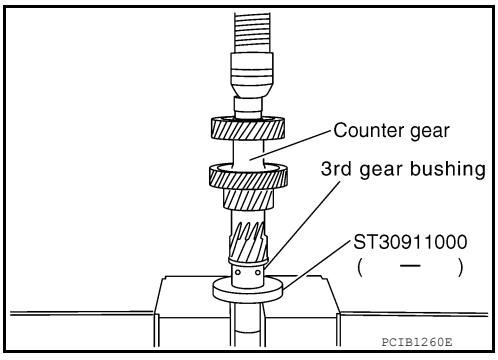
11. Press in 3rd gear bushing using Tool.

Tool number : ST30911000 (—)

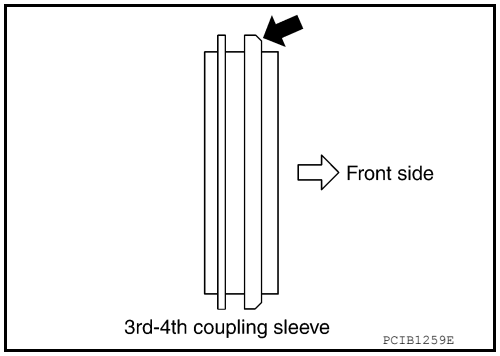
12. Install 3rd-4th synchronizer hub assembly according to the following.

a. Install 3rd-4th coupling sleeve to 3rd-4th synchronizer hub.

CAUTION:
- **Do not reuse 3rd-4th synchronizer hub and 3rd-4th coupling sleeve.**
- **Replace 3rd-4th synchronizer hub and 3rd-4th coupling sleeve as a set.**



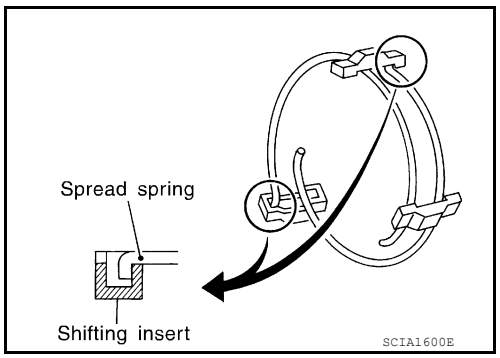
- **Be careful with the orientation 3rd-4th coupling sleeve.**



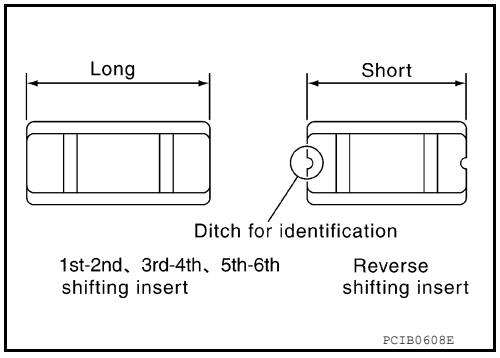
b. Install spread springs and shifting inserts to 3rd-4th synchronizer hub.

CAUTION:

- **Do not install spread spring hook onto the same shifting insert.**



- **Be careful with the shape of reverse shifting insert to avoid improper assembly.**



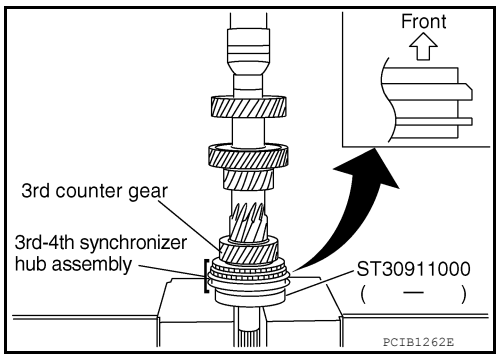
c. Press in 3rd-4th synchronizer hub assembly, 3rd inner baulk ring, 3rd synchronizer cone, 3rd outer baulk ring, 3rd counter gear and 3rd needle bearing using Tool.

Tool number : ST30911000 (—)

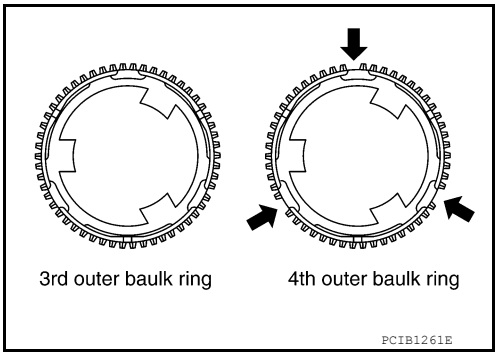
CAUTION:

- **Apply gear oil to 3rd inner baulk ring, 3rd synchronizer cone, 3rd outer baulk ring and 3rd needle bearing, hole spline of 3rd-4th synchronizer hub.**
- **Replace 3rd inner baulk ring, 3rd synchronizer cone and 3rd outer baulk ring as a set.**
- **Be careful with the orientation 3rd-4th coupling sleeve.**

NOTE:



4th baulk ring has three spaces that one gear tooth is missing but 3rd baulk ring doesn't.

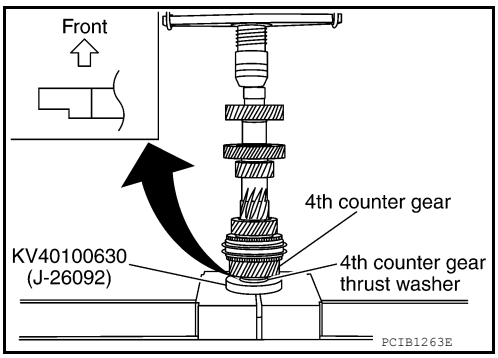


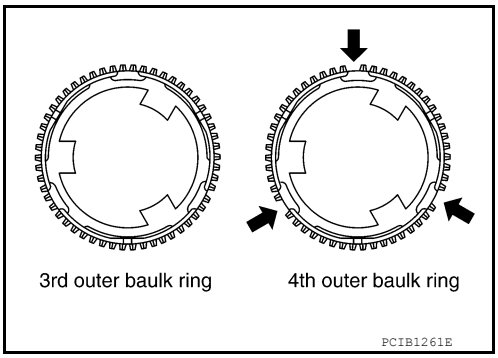
13. Press in 4th counter gear thrust washer, 4th gear bushing, 4th needle bearing, 4th counter gear, 4th outer baulk ring,4th synchronizer cone and 4th inner baulk ring using Tool.

Tool number : KV40100630 (J-26092)

CAUTION:
- **Apply gear oil to 4th needle bearing, 4th outer baulk ring, 4th synchronizer cone and 4th inner baulk ring.**
- **Replace 4th outer baulk ring, 4th synchronizer cone and 4th inner baulk ring as a set.**
- **Be careful with the orientation 4th counter gear thrust washer.**

NOTE:
4th baulk ring has three spaces that one gear tooth is missing but 3rd baulk ring doesn't.

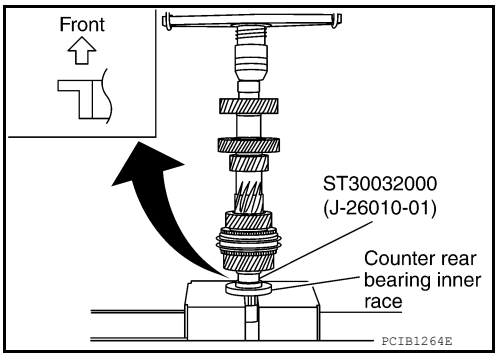




14. Press in counter rear bearing inner race using Tool.

Tool number : ST30032000 (J-26010-01)

CAUTION:
Be careful with the orientation counter rear bearing inner race.

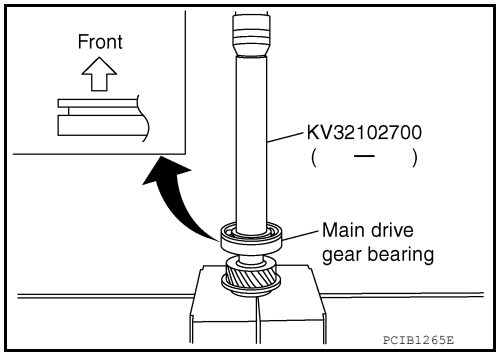


15. Install main drive gear bearing according to the following.

a. Press in main drive gear bearing using Tool.

Tool number : KV32102700 (—)

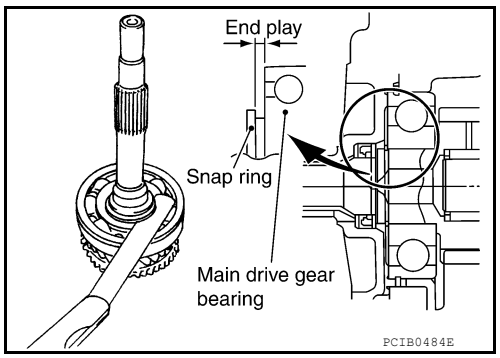
CAUTION:
Be careful with the orientation main drive gear bearing.



b. Select and install a snap ring to main drive gear bearing so that the end play comes within the standard value. Refer to TM-72, "Snap Rings".

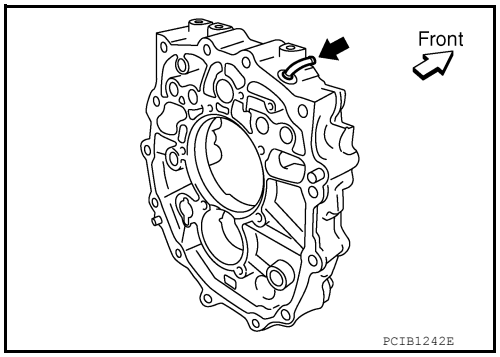
End play : 0 - 0.10 mm (0 - 0.004 in)

CAUTION:
Do not reuse snap ring.



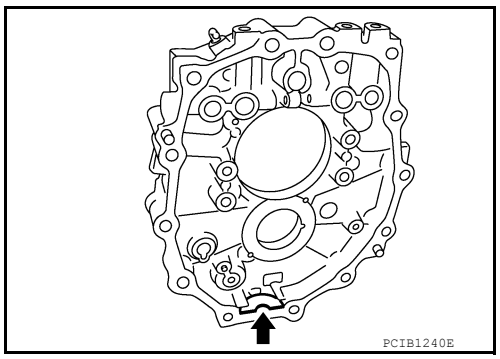
16. Install breather to adapter plate.

CAUTION:
- **Do not reuse breather.**
- **Be careful with the orientation breather.**

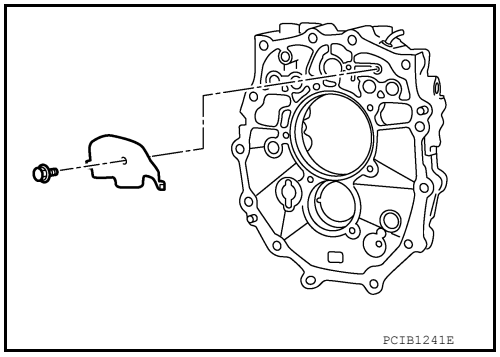


17. Install magnet to adapter plate.

CAUTION:
Be careful with the orientation magnet.



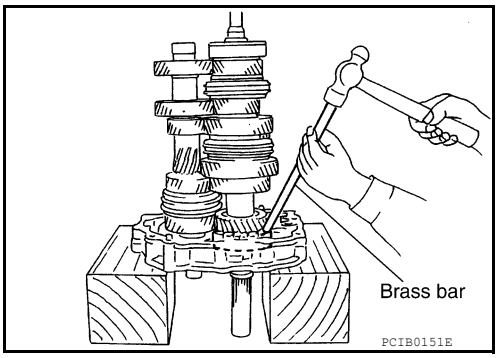
18. Install baffle plate to adapter plate, and then tighten bolt to the specified torque. Refer to TM-33, "Assembly".



19. Install main drive gear assembly, mainshaft assembly and counter gear assembly according to the following.

a. Install main pilot bearing, pilot bearing spacer and 5th baulk ring to main drive gear.

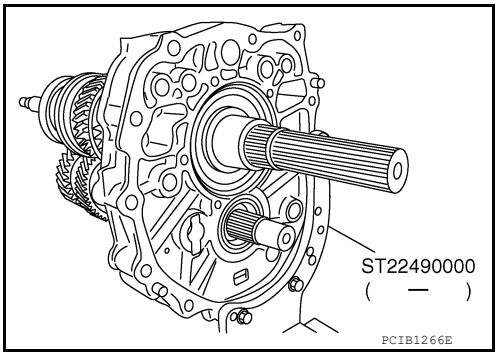
b. Install main drive gear assembly, mainshaft assembly and counter gear assembly combined in one unit to adapter plate using brass bar.



20. Install Tool to adapter plate, and then position in a vise.

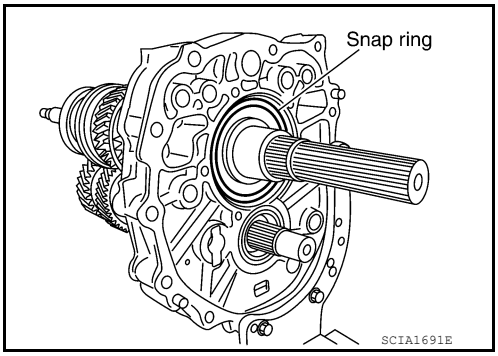
Tool number : ST22490000 (—)

CAUTION:
Do not directly secure mating surface of adapter plate in a vise.



21. Install snap ring to mainshaft bearing.

CAUTION:
Do not reuse snap ring.

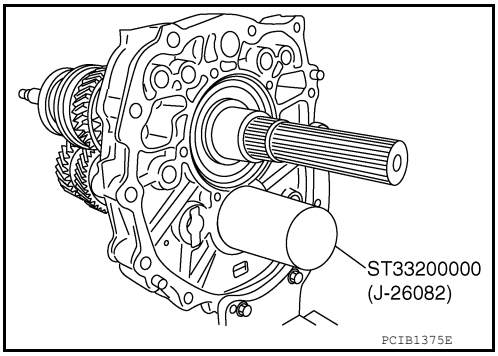


22. Install counter rear bearing to adapter plate using Tool.

Tool number : ST33200000 (J-26082)

23. Install counter rear bearing spacer to counter gear.

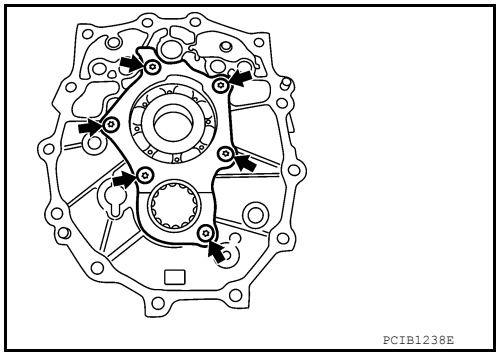
CAUTION:
When installing counter rear bearing spacer, groove should face to the rear side.



24. Install bearing retainer according to the following.

a. Install bearing retainer to adapter plate.

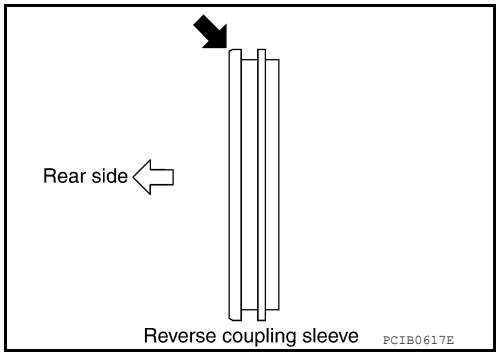
b. Apply recommended thread locking sealant to threads of bolts, and then tighten bolts to the specified torque. Refer to TM-33, "Assembly".
- **Use Genuine Medium Strength Thread Locking Sealant or the equivalent. Refer to GI-15, "Recommended Chemical Products and Sealants".**



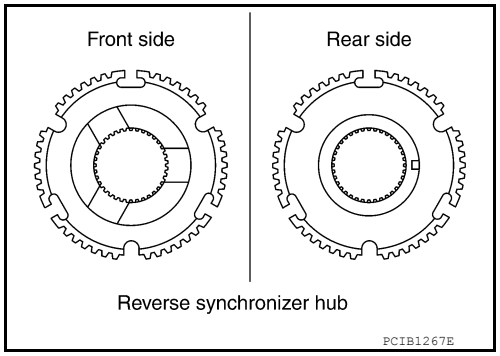
25. Install reverse synchronizer hub assembly according to the following.

a. Install reverse coupling sleeve to reverse synchronizer hub.

CAUTION:
- **Do not reuse reverse coupling sleeve and reverse synchronizer hub.**
- **Replace reuse reverse coupling sleeve and reverse synchronizer hub as a set.**
- **Be careful with the orientation reverse coupling sleeve.**

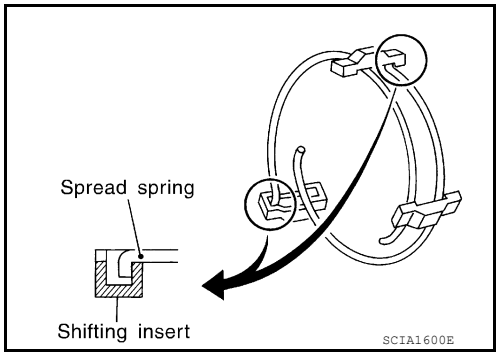


- **Be careful with the orientation reverse synchronizer hub.**

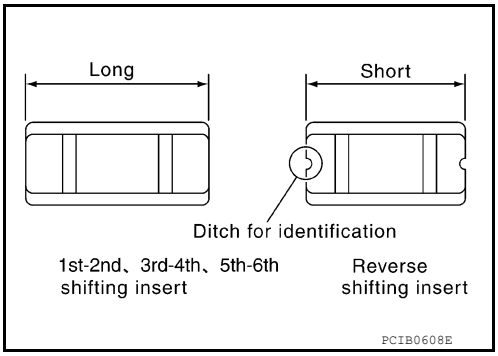


b. Install spread springs to shifting inserts to reverse synchronizer hub.

CAUTION:
- **Do not install spread spring hook onto the same shifting insert.**



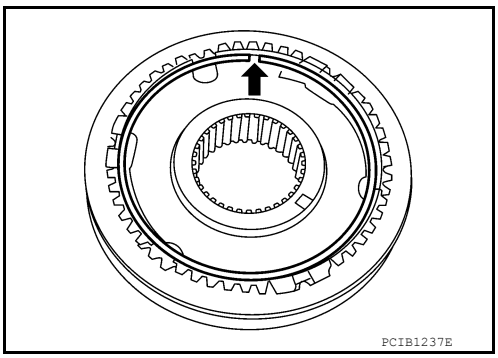
- **Be careful with the shape of 1st-2nd, 3rd-4th and 5th-6th shifting insert to avoid improper assembly.**



c. Install snap ring to reverse synchronizer hub.

CAUTION:

- **Do not reuse snap ring.**
- **Do not align the snap ring notch with synchronizer hub groove when assembling.**

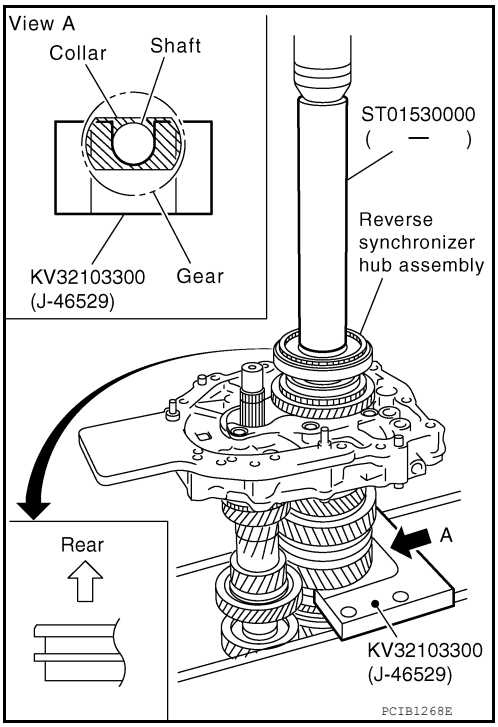


d. Press in reverse synchronizer hub assembly, reverse baulk ring, reverse main gear and reverse main needle bearing using Tools.

Tool number : ST01530000 (—)
: KV32103300 (J-46529)

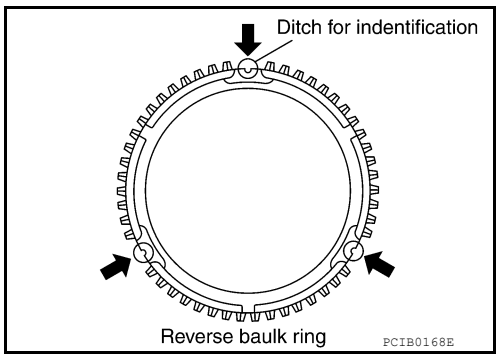
CAUTION:

Apply gear oil to reverse baulk ring and reverse main needle bearing.



NOTE:

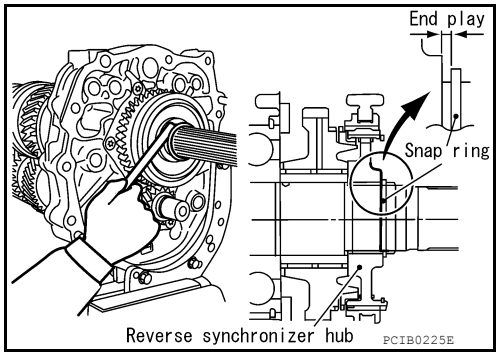
Reverse baulk ring has three spaces that two gear teeth are missing, and each space has small ditch for identification as shown.



26. Select and install a snap ring so that the end play comes within the standard value. Refer to TM-72, "Snap Rings".

End play : 0 - 0.10 mm (0 - 0.004 in)

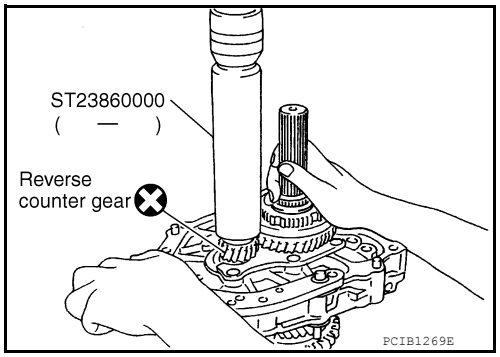
CAUTION:
Do not reuse snap ring.



27. Press in reverse counter gear using Tool.

Tool number : ST23860000 (—)

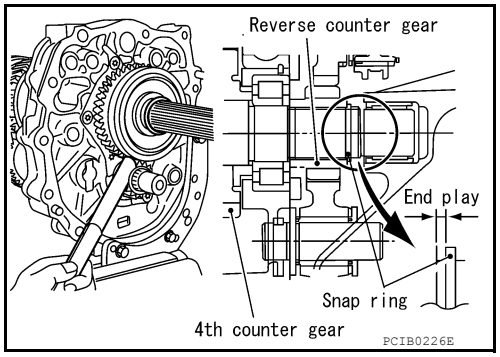
CAUTION:
- **Do not reverse counter gear.**
- **Be careful with the orientation counter gear.**



28. Select and install a snap ring so that the end play comes within the standard value. Refer to TM-72, "Snap Rings".

End play : 0 - 0.10 mm (0 - 0.004 in)

CAUTION:
Do not reuse snap ring.

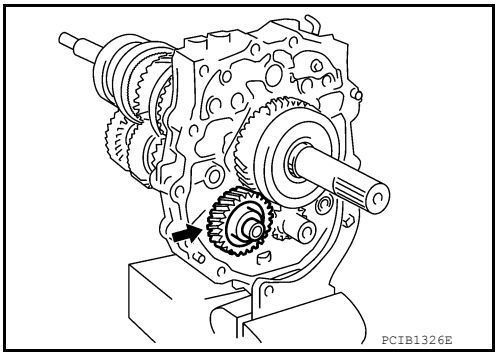


29. Install reverse idler shaft assembly according to the following.

a. Install reverse idler needle bearing, reverse idler gear and reverse idler thrust washer to reverse idler shaft.

CAUTION:
Apply gear oil to reverse idler needle bearing.

b. Install reverse idler shaft assembly to adapter plate.

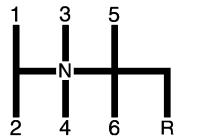


SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000007360154

Engine		VQ40DE
Transmission model		FS6R31A
Axle type		4WD
Number of speed		6
Synchromesh type		Warner
Shift pattern		 SCIA0955E
Gear ratio	1st	4.368
	2nd	2.518
	3rd	1.743
	4th	1.283
	5th	1.000
	6th	0.769
	Reverse	3.966
Main gear (Number of teeth)	Drive	24
	1st	37
	2nd	32
	3rd	32
	4th	29
	6th	25
	Reverse	42
Counter gear (Number of teeth)	Drive	34
	1st	12
	2nd	18
	3rd	26
	4th	32
	6th	46
	Reverse	15
Reverse idler gear (Number of teeth)		26
Oil capacity (Approx.)	ℓ (US pt, Imp pt)	4.18 (8-7/8, 7-3/8)
Remarks	Reverse synchronizer	Installed
	Double cone synchronizer	1st, 3rd and 4th
	Triple cone synchronizer	2nd

Gear End Play

INFOID:0000000007360155

Unit: mm (in)

Item	Standard value
Counter gear	0 - 0.10 (0 - 0.004)
Main drive gear	0 - 0.10 (0 - 0.004)
Mainshaft (Front side)	0 - 0.10 (0 - 0.004)
Mainshaft (Rear side)	0 - 0.10 (0 - 0.004)

Snap Rings

INFOID:0000000007360156

Unit: mm (in)

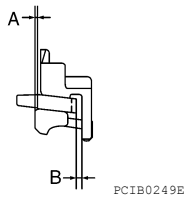
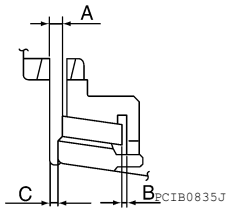
Selective parts		Thickness	Part number*
Main drive gear		1.89 (0.0744) 1.95 (0.0768) 1.99 (0.0783) 2.03 (0.0799) 2.07 (0.0815) 2.11 (0.0831)	32204 01G60 32204 01G61 32204 01G62 32204 01G63 32204 01G64 32204 01G65
Counter gear		1.96 (0.0772) 2.02 (0.0795) 2.08 (0.0819) 2.14 (0.0843) 2.20 (0.0866) 2.26 (0.0890) 2.32 (0.0913) 2.38 (0.0937) 2.44 (0.0961) 2.50 (0.0984) 2.56 (0.1008) 2.62 (0.1031)	32236 CD000 32236 CD001 32236 CD002 32236 CD003 32236 CD004 32236 CD005 32236 CD006 32236 CD007 32236 CD008 32236 CD009 32236 CD010 32236 CD011
Mainshaft	Front side	2.08 (0.0819) 2.14 (0.0843) 2.20 (0.0866) 2.26 (0.0890)	32204 CD000 32204 CD001 32204 CD002 32204 CD003
	Rear side	2.08 (0.0819) 2.14 (0.0843) 2.20 (0.0866) 2.26 (0.0890) 2.32 (0.0913) 2.38 (0.0937) 2.44 (0.0961) 2.50 (0.0984) 2.56 (0.1008) 2.62 (0.1031) 2.68 (0.1055) 2.74 (0.1079) 2.80 (0.1102) 2.86 (0.1126) 2.92 (0.1150) 2.98 (0.1173)	32204 CD000 32204 CD001 32204 CD002 32204 CD003 32204 CD004 32204 CD005 32204 CD006 32204 CD007 32204 CD008 32204 CD009 32204 CD010 32204 CD011 32204 CD012 32204 CD013 32204 CD014 32204 CD015

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

Baulk Ring Clearance

INFOID:0000000007360157

Unit: mm (in)

Measurement point		Standard value	Limit value
1st, 3rd and 4th (Double-cone synchronizer) 	Clearance between synchronizer cone and inner baulk ring end face (A)	0.5 - 0.7 (0.020 - 0.028)	0.3 (0.012)
	Clearance between outer baulk ring pawl and synchronizer cone (B)	1st: 1.0 - 1.5 (0.039 - 0.059) 3rd, 4th: 0.85 - 1.35 (0.0335 - 0.0531)	0.7 (0.028) 0.7 (0.028)
2nd (Triple-cone synchronizer) 	Clearance between synchronizer and clutch gear end face (A)	0.6 - 1.3 (0.024 - 0.051)	0.3 (0.012)
	Clearance between outer baulk ring pawl and synchronizer cone (B)	0.85 - 1.35 (0.0335 - 0.0531)	0.7 (0.028)
	Clearance between inner baulk ring and clutch gear end face (C)	0.7 - 1.25 (0.028 - 0.0492)	0.3 (0.012)
5th and 6th		0.7 - 1.35 (0.028 - 0.0531)	0.5 (0.020)
Reverse		0.75 - 1.2 (0.0295 - 0.047)	0.5 (0.020)

BASIC INSPECTION

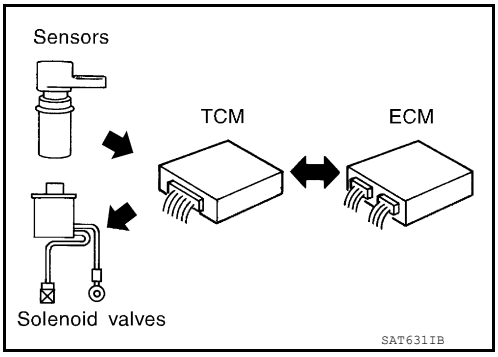
DIAGNOSIS AND REPAIR WORKFLOW

How to Perform Trouble Diagnosis for Quick and Accurate Repair

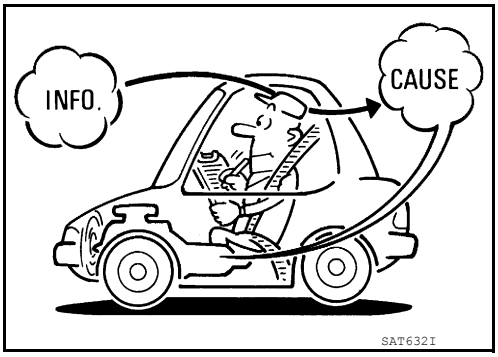
INFOID:0000000007360158

INTRODUCTION

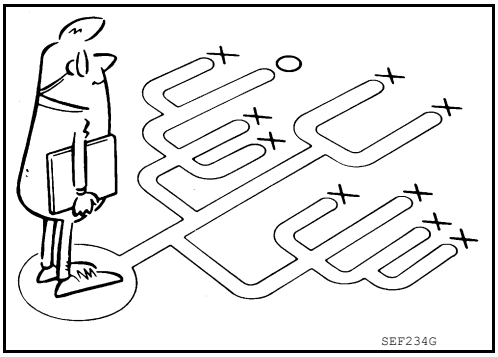
The TCM receives a signal from the output speed sensor, accelerator pedal position sensor (throttle position sensor) or transmission range switch. Then provides shift control or lock-up control via A/T solenoid valves.
The TCM also communicates with the ECM by means of a signal sent from sensing elements 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 (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-75) 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-75, "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-173, "Fail-Safe".
- A/T fluid inspection. Refer to TM-212, "Checking the A/T Fluid (ATF)".
- Stall test. Refer to TM-218, "Stall Test".
- Line pressure test. Refer to TM-219, "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-100, "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-222, "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

INFOID:0000000007360159

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 ( )	
O/D OFF indicator lamp	☐ 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-173
2	☐ A/T fluid inspection, stall test and line pressure test			
		☐ A/T fluid inspection		TM-212
		☐ Leak (Repair leak location.) ☐ State ☐ Amount		
		☐ Stall test		TM-218
		☐ 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-219
3	☐ Perform self-diagnosis. — Check detected items to repair or replace malfunctioning part.			TM-102
4	☐ Perform road test.			
	5-1	☐ Check before engine is started		TM-222
	5-2	☐ Check at idle		TM-222
	5-3	Cruise test	☐ Part 1	TM-223
			☐ Part 2	TM-225
			☐ Part 3	TM-225
	☐ Check malfunction phenomena to repair or replace malfunctioning part after completing all road test. Refer to TM-185, "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-100

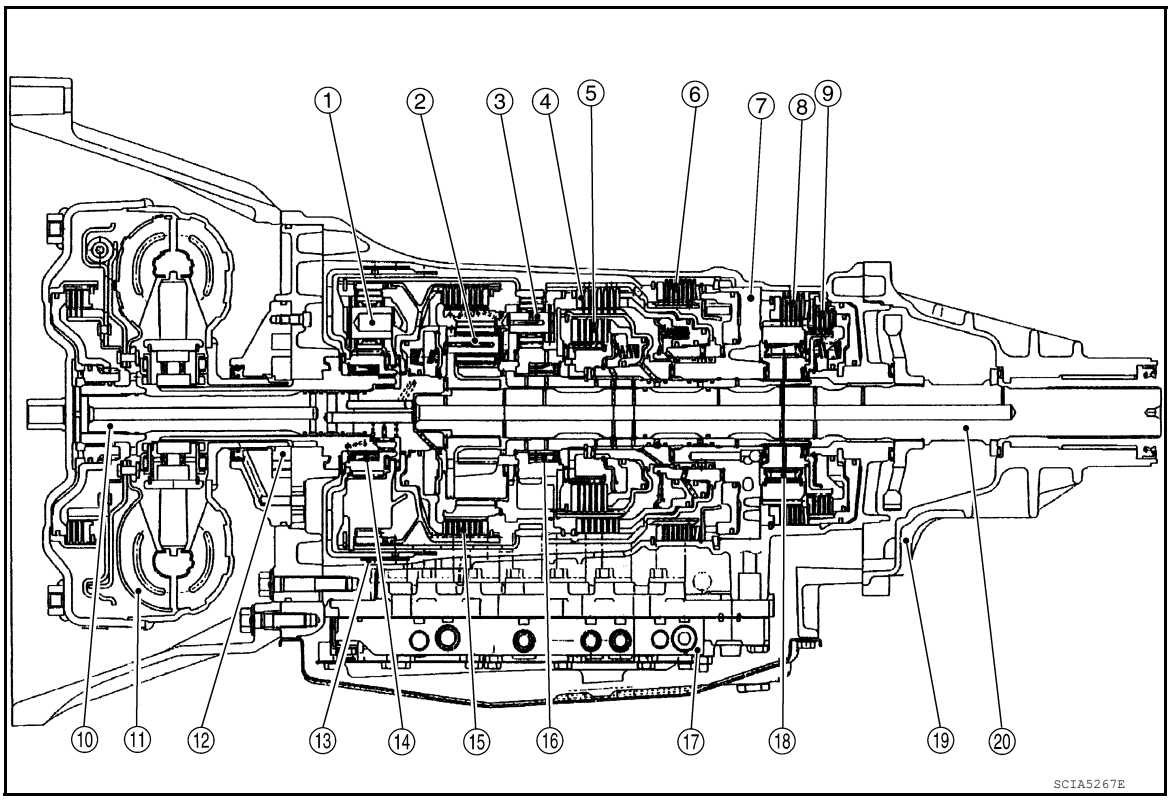
SYSTEM DESCRIPTION

A/T CONTROL SYSTEM

Cross-Sectional View

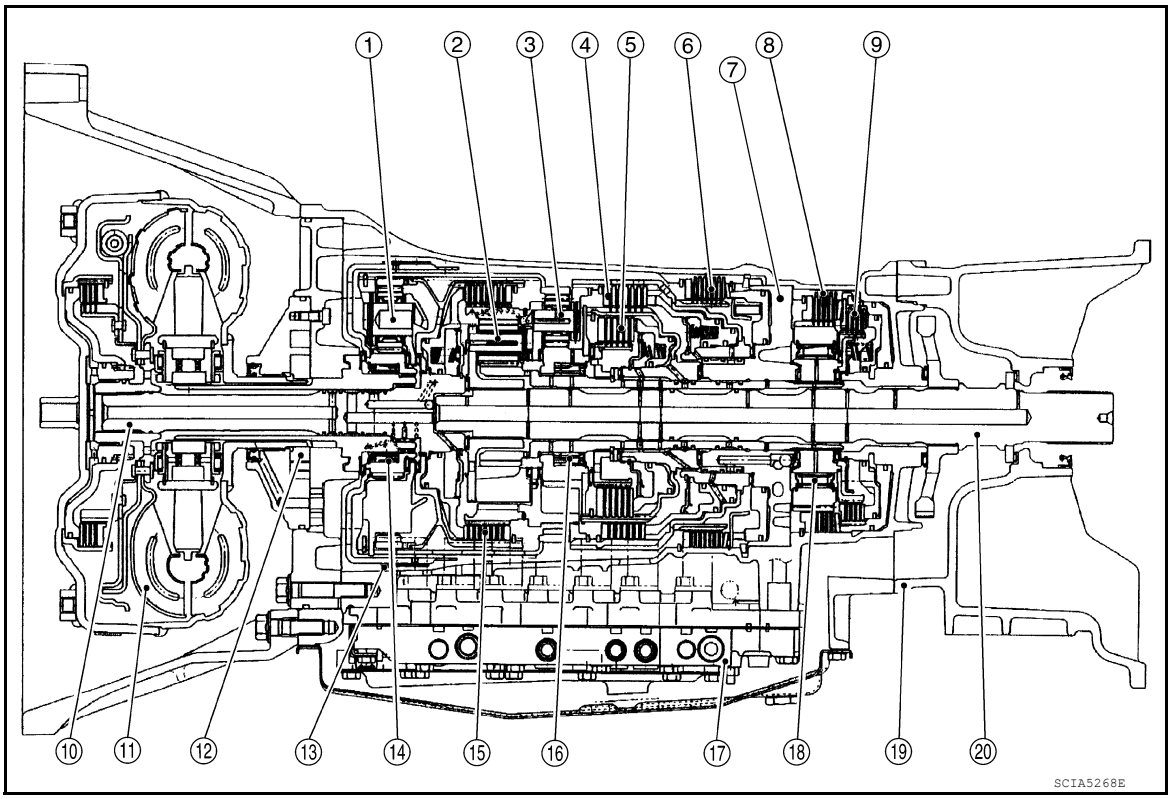
INFOID:0000000007360160

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



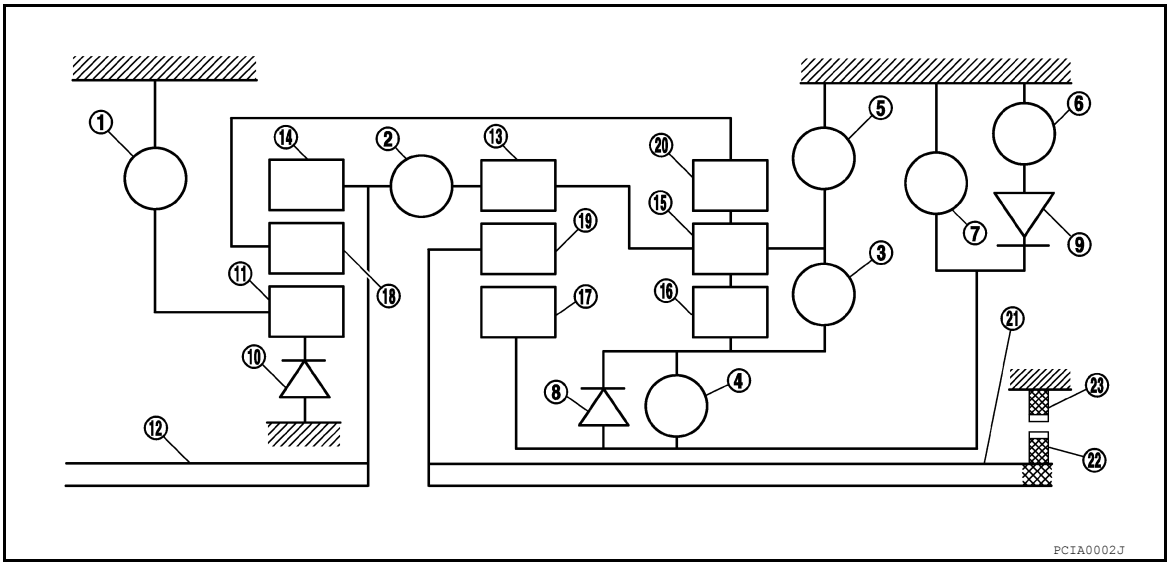
1. Front planetary gear
2. Mid planetary gear
3. Rear planetary gear
4. Direct clutch
5. High and low reverse clutch
6. Reverse brake
7. Drum support
8. Forward brake
9. Low coast brake
10. Input shaft
11. Torque converter
12. Oil pump
13. Front brake
14. 3rd one-way clutch
15. Input clutch
16. 1st one-way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

Shift Mechanism

INFOID:0000000007360161

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

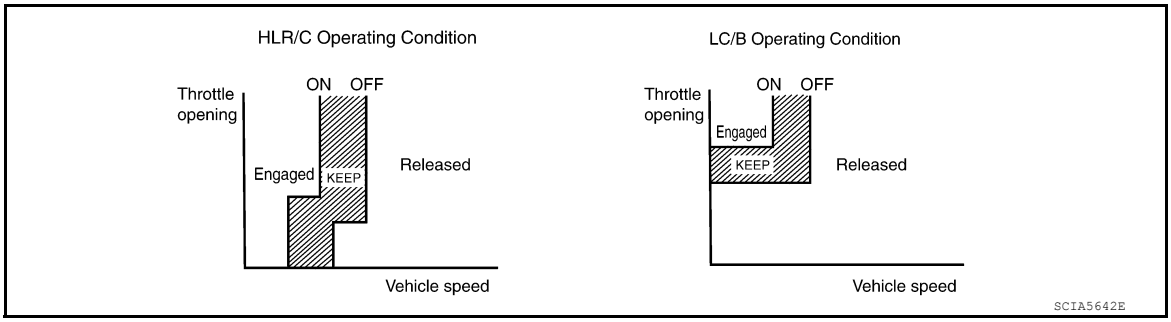
Name of the Part	Abbreviation	Function
Front brake (1)	FR/B	Fastens the front sun gear (11).
Input clutch (2)	I/C	Connects the input shaft (12), the front internal gear (14) and the mid internal gear (13).
Direct clutch (3)	D/C	Connects the rear carrier (15) and the rear sun gear (16).
High and low reverse 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

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.



POWER TRANSMISSION

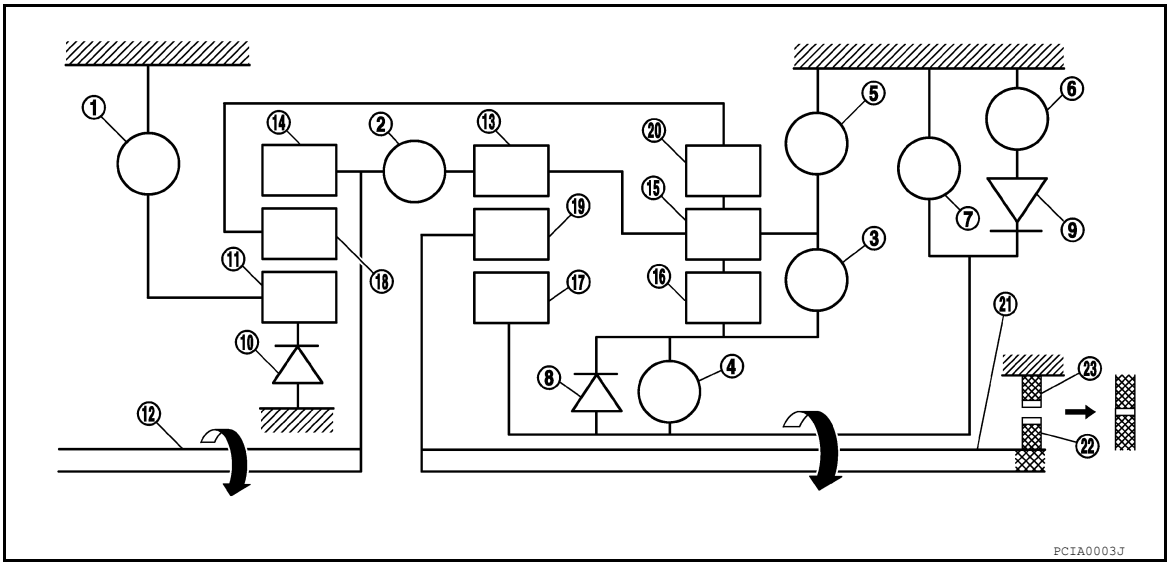
“N” Position

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

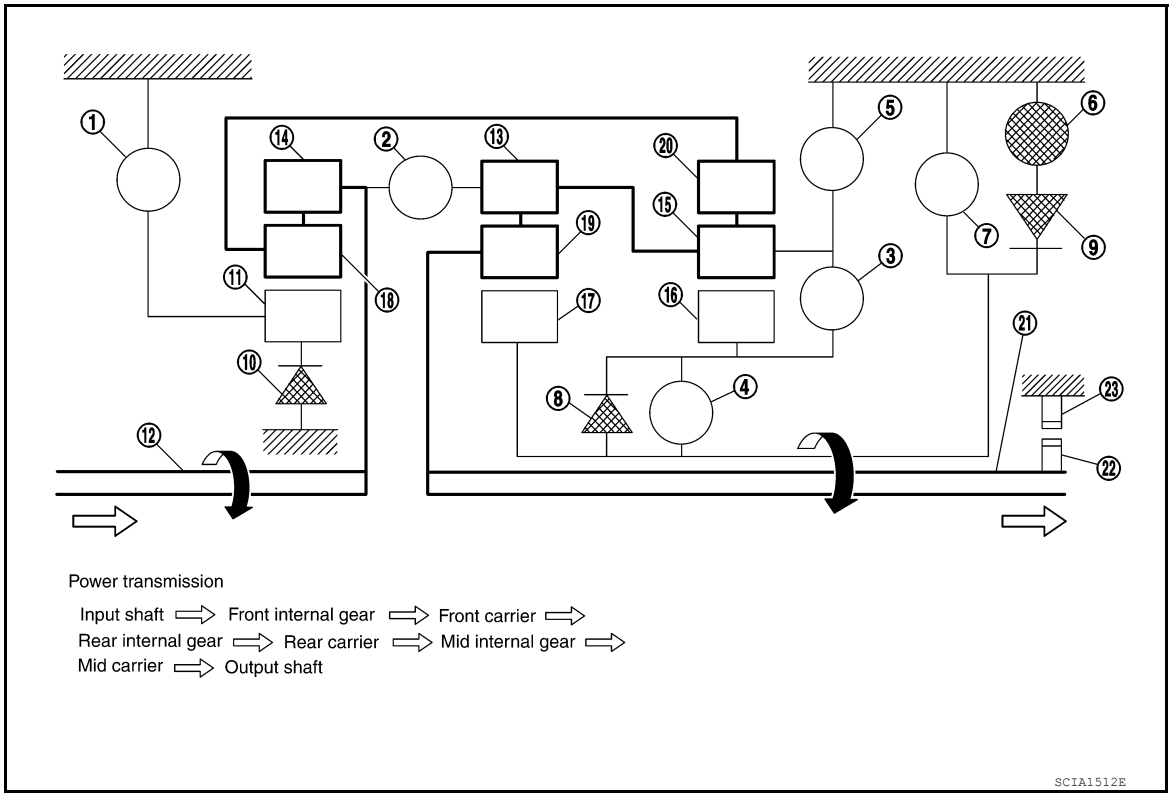
- The same as for the “N” position, both the forward brake and the reverse brake are released, so torque from the input shaft drive is not transmitted to the output shaft.

• The parking pawl linked with the select lever meshes with the parking gear and fastens the output shaft mechanically.



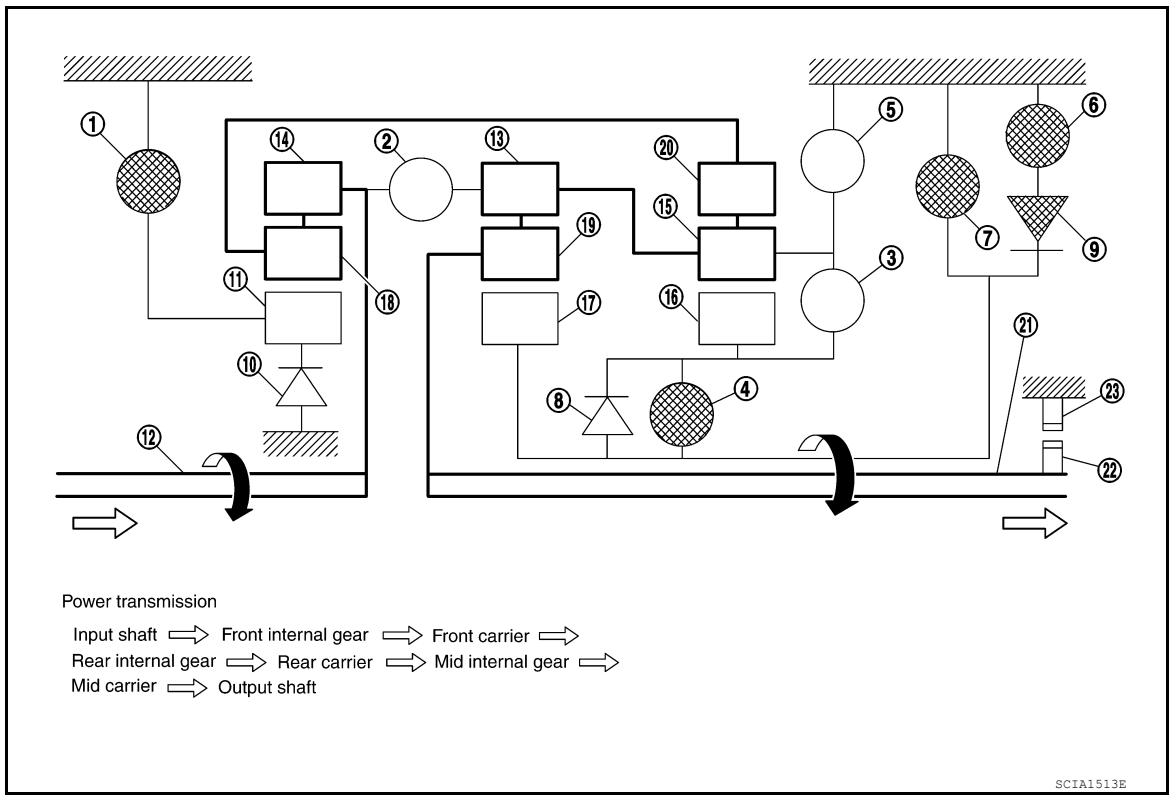
1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
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

"D_1", "3_1" and "2_1" Positions
• 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.



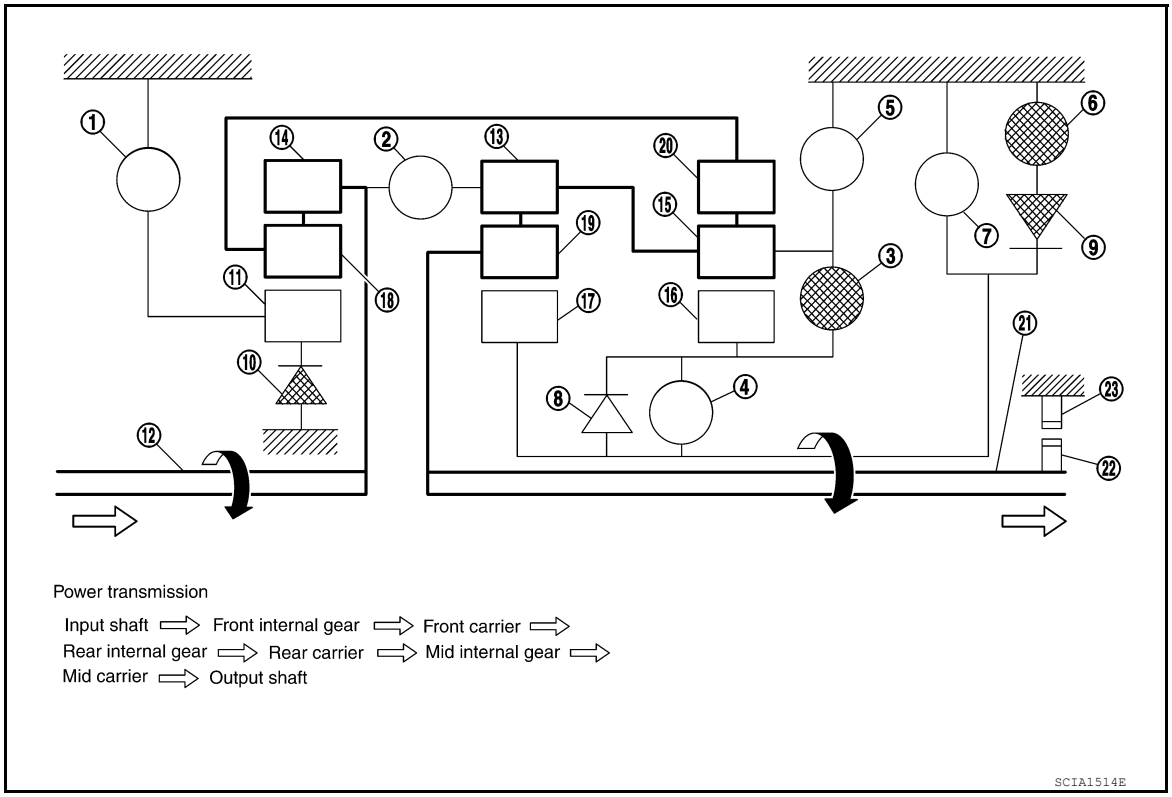
1. Front brake	2. Input clutch	3. Direct clutch
4. High and low reverse clutch	5. Reverse brake	6. Forward brake
7. Low coast brake	8. 1st one-way clutch	9. Forward one-way clutch
10. 3rd one-way clutch	11. Front sun gear	12. Input shaft
13. Mid internal gear	14. Front internal gear	15. Rear carrier
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	

"11" Position
- 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.



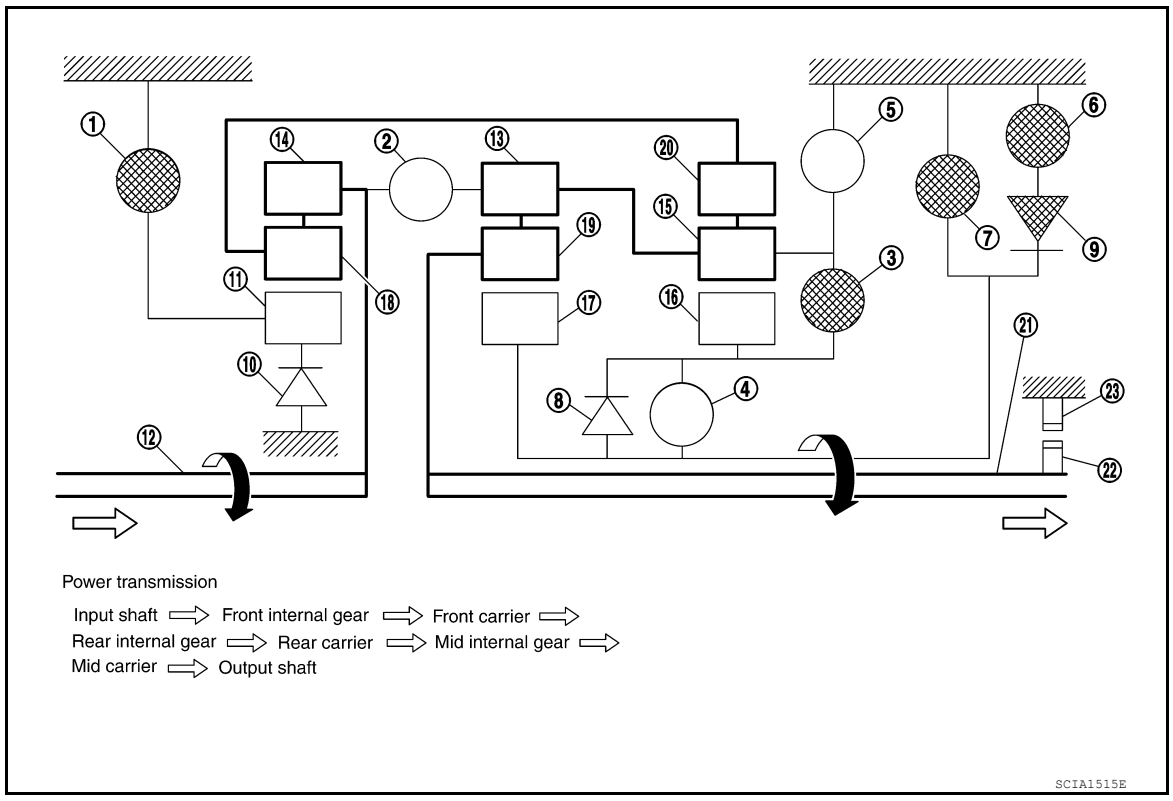
1. Front brake	2. Input clutch	3. Direct clutch
4. High and low reverse clutch	5. Reverse brake	6. Forward brake
7. Low coast brake	8. 1st one-way clutch	9. Forward one-way clutch
10. 3rd one-way clutch	11. Front sun gear	12. Input shaft
13. Mid internal gear	14. Front internal gear	15. Rear carrier
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" and “32” Positions
- 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.



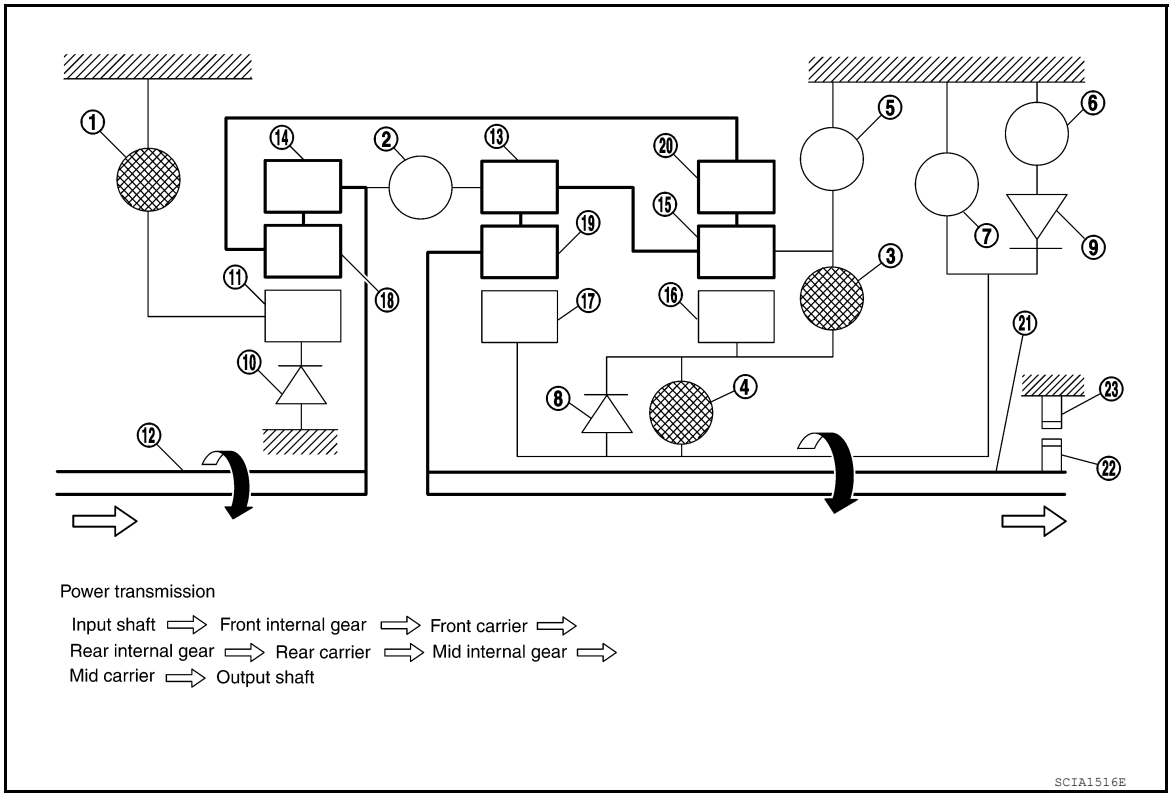
1. Front brake	2. Input clutch	3. Direct clutch
4. High and low reverse clutch	5. Reverse brake	6. Forward brake
7. Low coast brake	8. 1st one-way clutch	9. Forward one-way clutch
10. 3rd one-way clutch	11. Front sun gear	12. Input shaft
13. Mid internal gear	14. Front internal gear	15. Rear carrier
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	

"2₂" and “1₂” Positions
- 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.



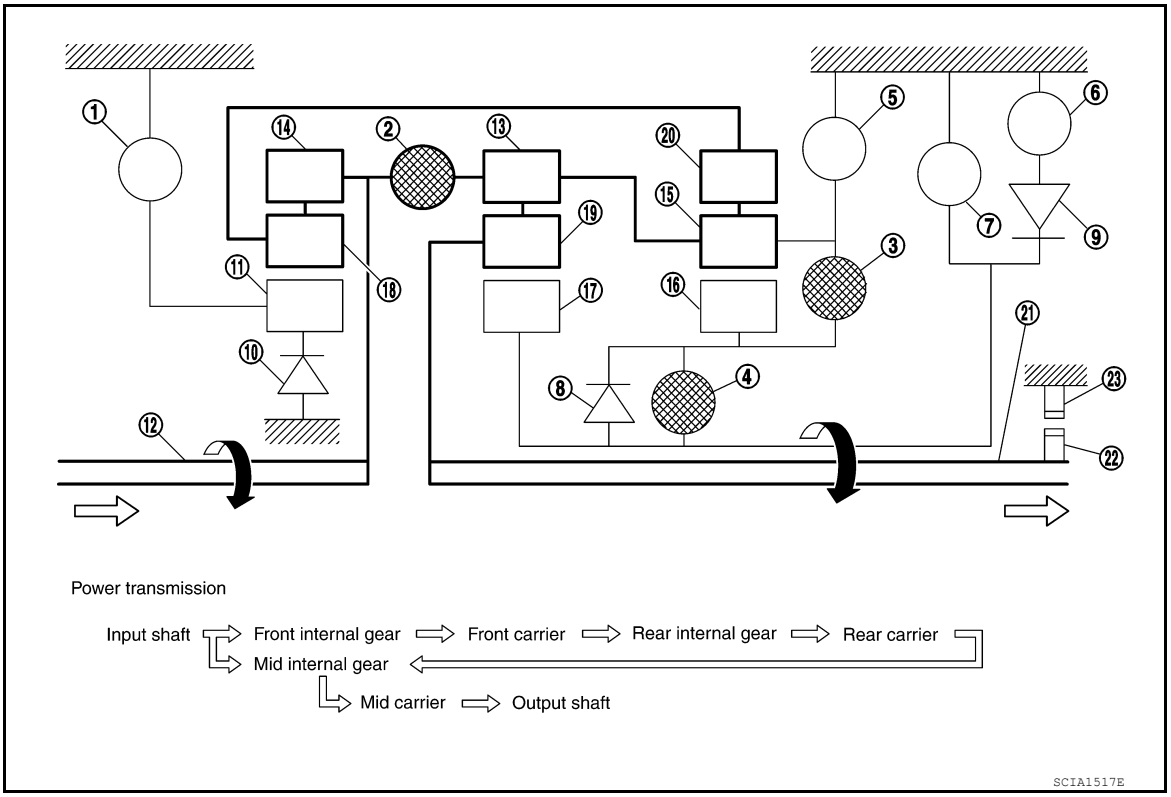
1. Front brake	2. Input clutch	3. Direct clutch
4. High and low reverse clutch	5. Reverse brake	6. Forward brake
7. Low coast brake	8. 1st one-way clutch	9. Forward one-way clutch
10. 3rd one-way clutch	11. Front sun gear	12. Input shaft
13. Mid internal gear	14. Front internal gear	15. Rear carrier
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" and “33” Positions
- 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.



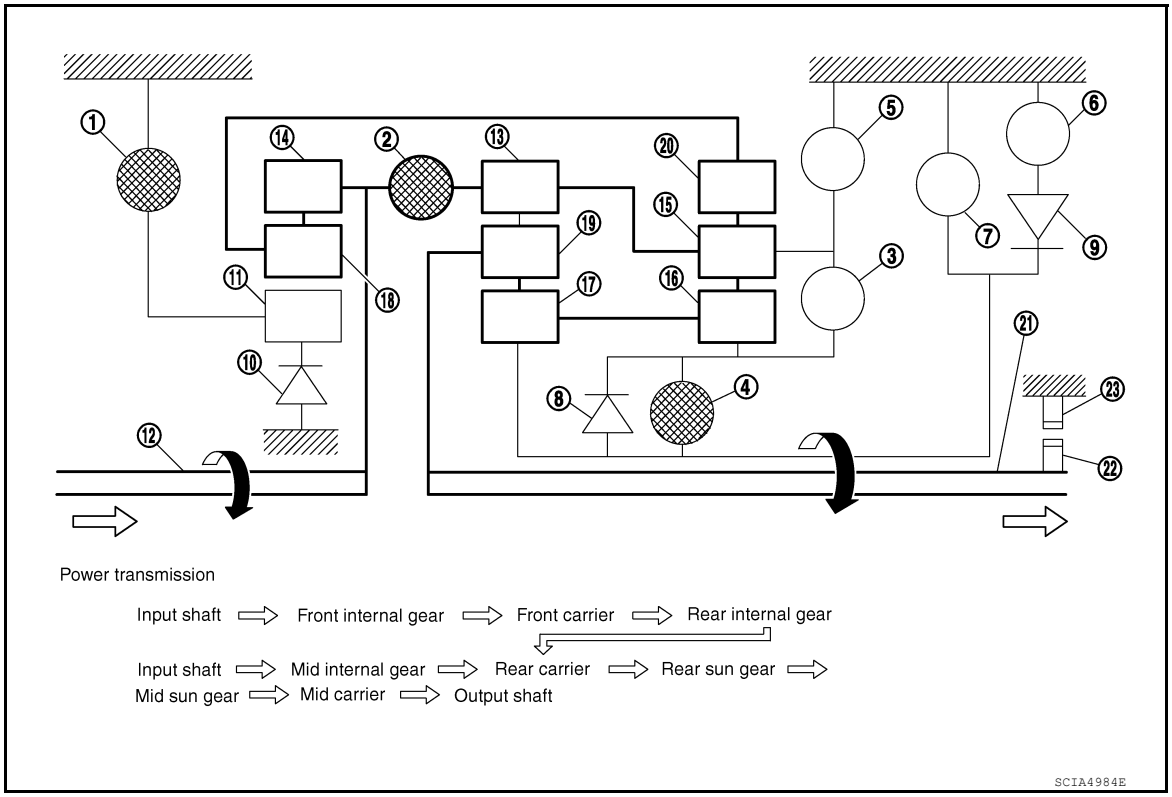
1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
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" Position
- 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.



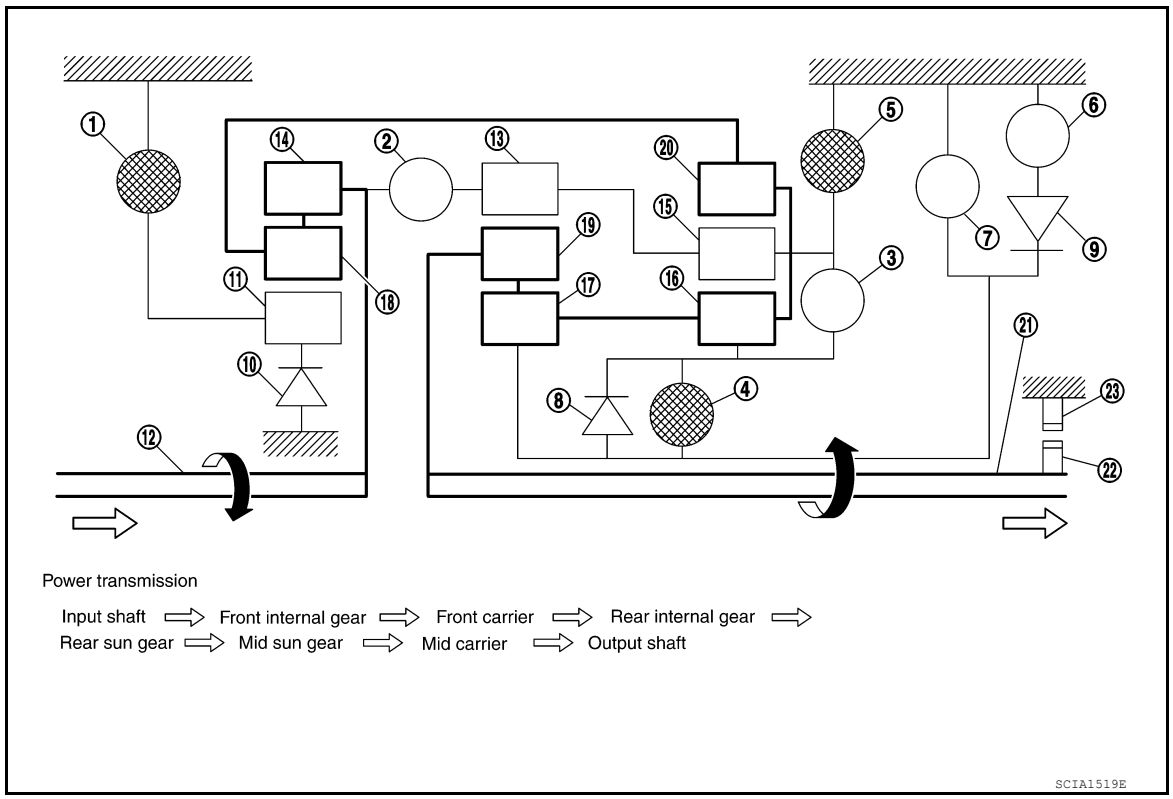
1. Front brake
2. Input clutch
3. Direct clutch
4. High and low reverse clutch
5. Reverse brake
6. Forward brake
7. Low coast brake
8. 1st one-way clutch
9. Forward one-way clutch
10. 3rd one-way clutch
11. Front sun gear
12. Input shaft
13. Mid internal gear
14. Front internal gear
15. Rear carrier
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" Position
- 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.



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

“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:0000000007360162

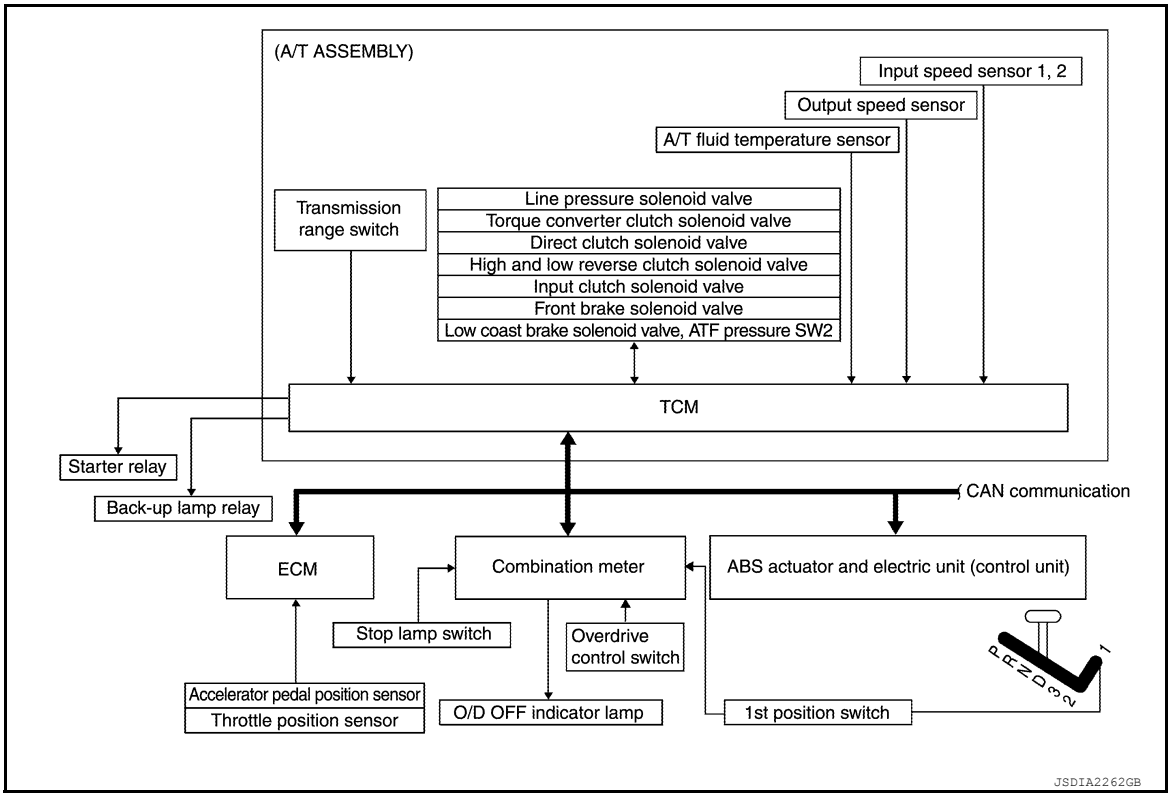
The function of the TCM is to:
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

CONTROL SYSTEM OUTLINE

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 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



CAN Communication

INFOID:0000000007360163

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-45, "CAN System Specification Chart".

Input/Output Signal of TCM

INFOID:0000000007360164

Control item			Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function (*3)	Self-diagnostics 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
	O/D OFF indicator lamp(*6)								X(*4)
	Starter relay							X	X

*1: Spare for output 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 is not started, it is judged that there is some kind of error.

*5: Input by CAN communications.

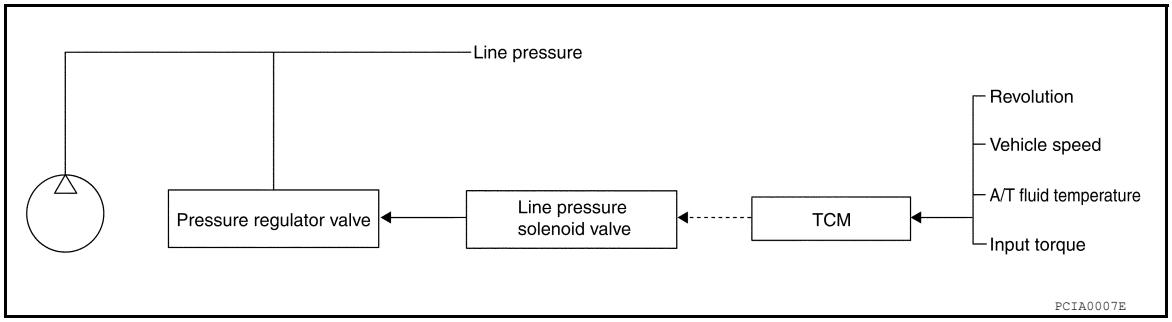
*6: Output by CAN communications.

Line Pressure Control

INFOID:0000000007360165

- 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.

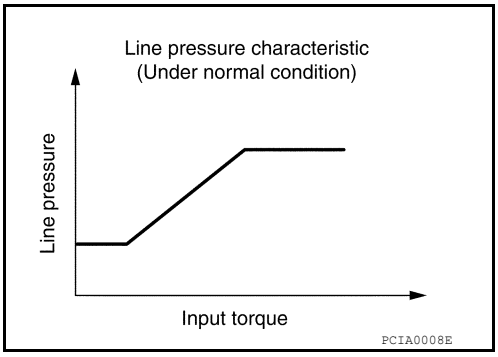


LINE PRESSURE CONTROL IS BASED ON THE TCM LINE PRESSURE CHARACTERISTIC PATTERN

- 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.

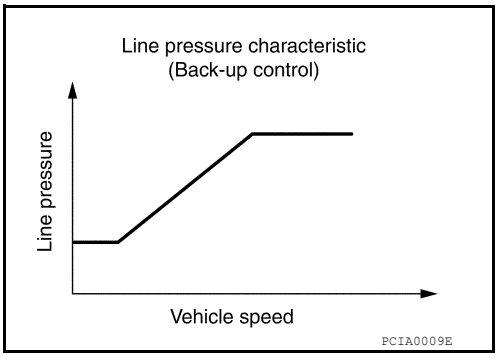
Normal Control

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



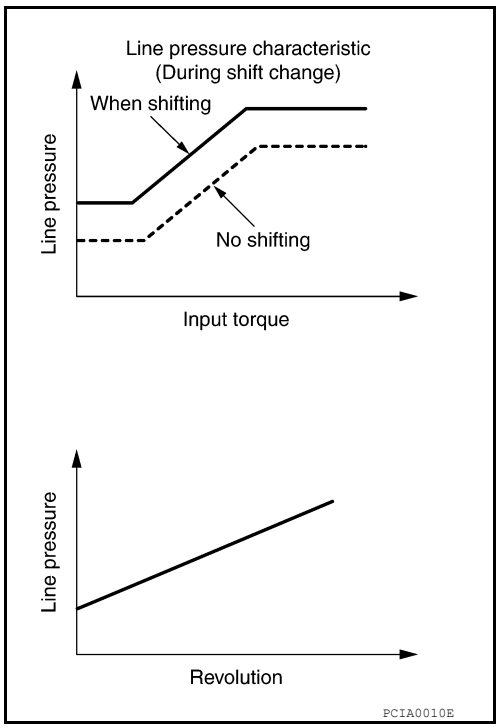
Back-up Control (Engine Brake)

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



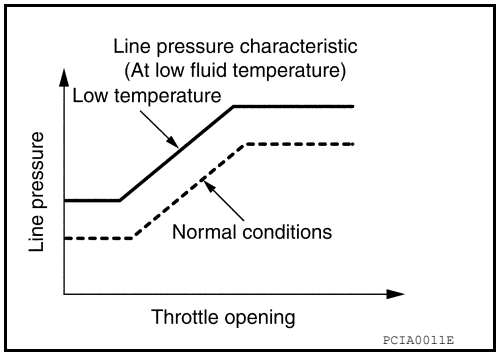
During Shift Change

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

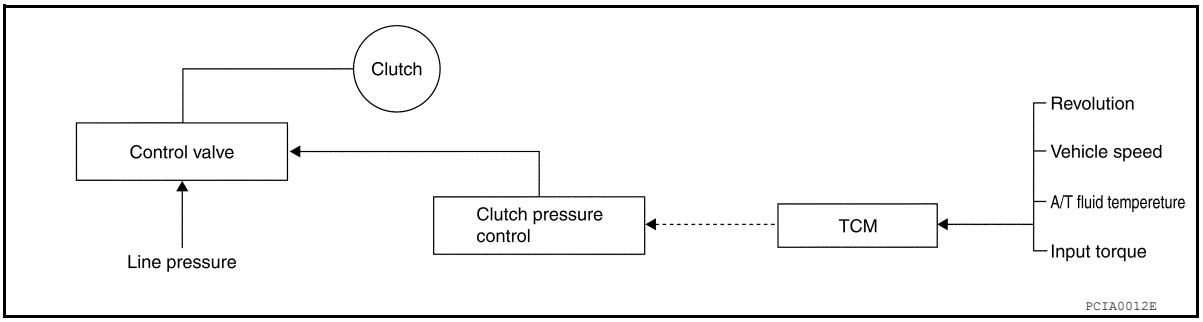
When the A/T fluid temperature drops below the prescribed temperature, in order to speed up the action of each friction element, the line pressure is set higher than the normal line pressure characteristic.



Shift Control

INFOID:0000000007360166

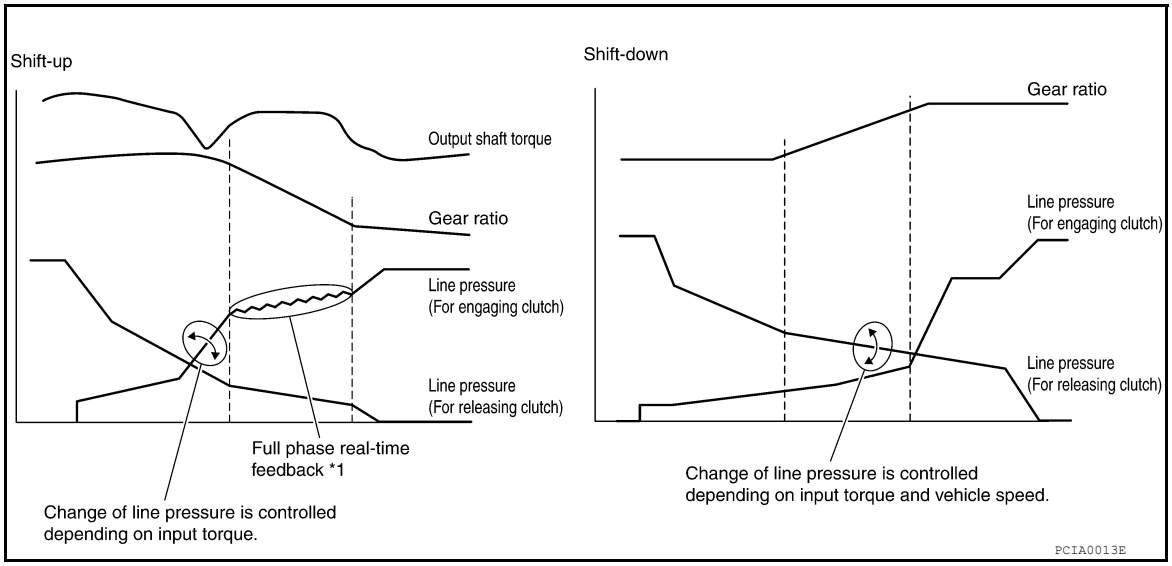
The clutch pressure control solenoid is controlled by the signals from the switches and sensors. Thus, the clutch pressure is adjusted to be appropriate to the engine load state and vehicle driving state. It becomes possible to finely control the clutch hydraulic pressure with high precision and a smoother 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:0000000007360167

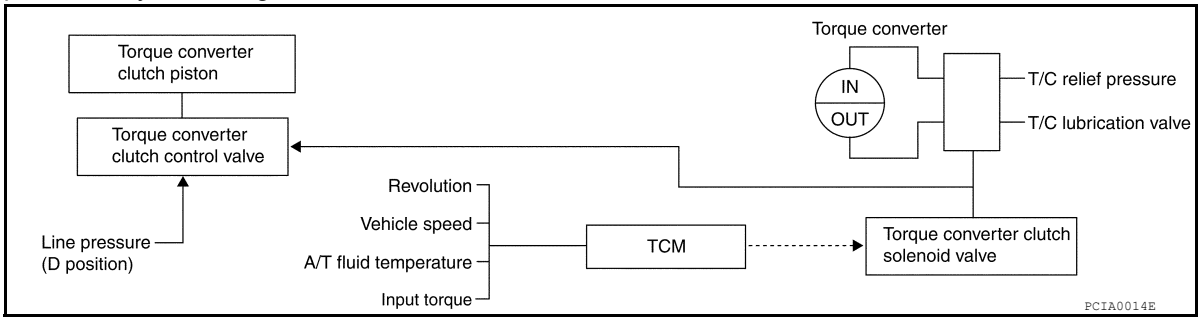
The torque converter clutch piston in the torque converter is engaged to eliminate torque converter slip to increase power transmission efficiency.
The torque converter clutch control valve operation is controlled by the torque converter clutch solenoid valve, which is controlled by a signal from TCM,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

Lock-up Operation Condition Table

Select lever	D position			3 position	2 position
Gear position	5	4	3	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.

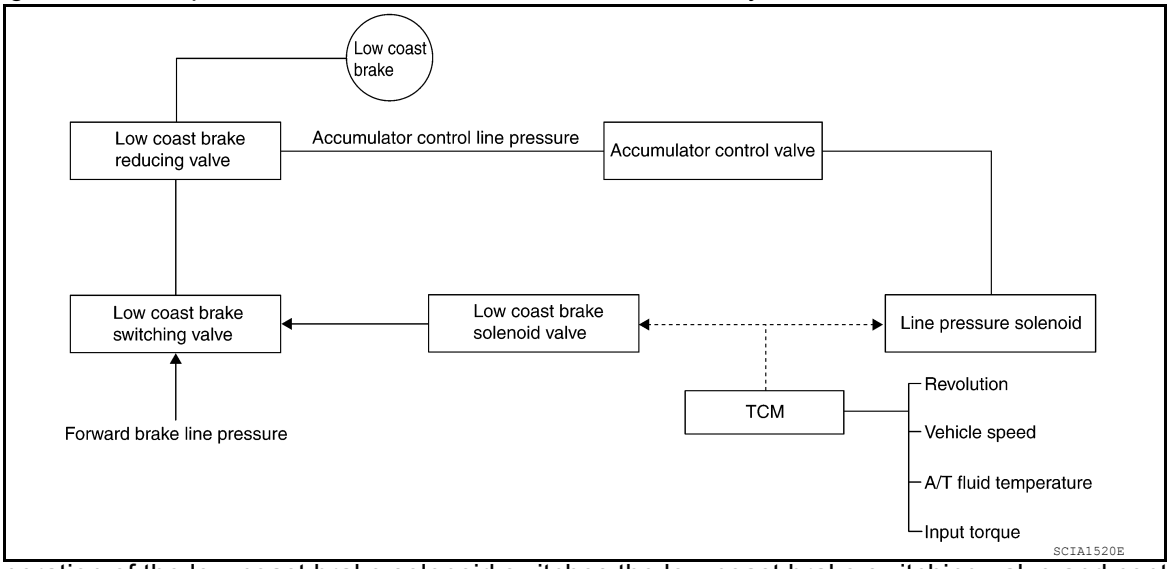
Slip Lock-up Control

- 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:0000000007360168

- 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:0000000007360169

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.
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.

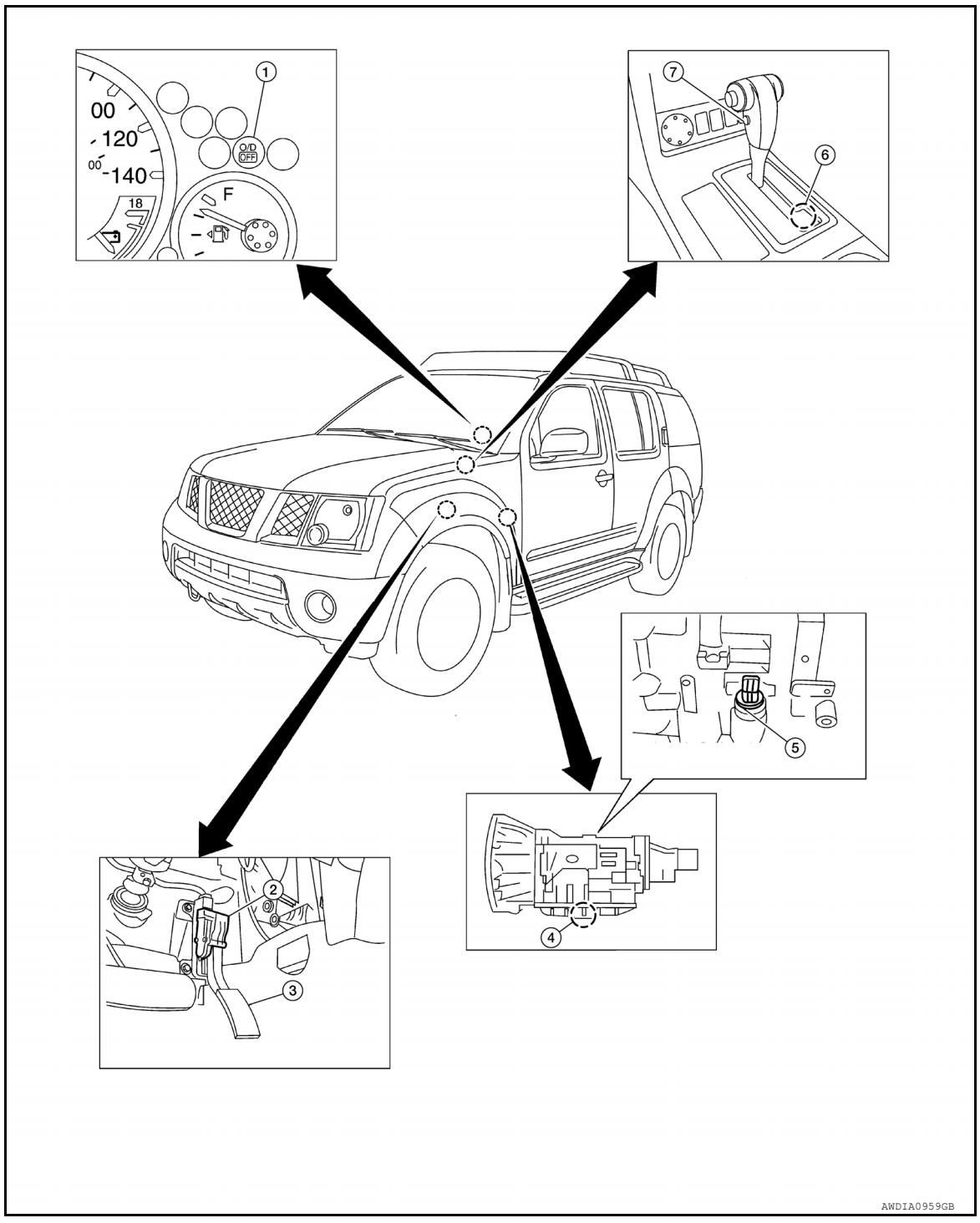
Name	Function
Pilot valve A	Adjusts the line pressure and produces the constant pressure (pilot pressure) required for line pressure control, shift change control, and lock-up control.
Pilot valve B	Adjusts the line pressure and produces the constant pressure (pilot pressure) required for shift change 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:0000000007360170



1. O/D OFF indicator lamp
2. Accelerator pedal position sensor
3. Accelerator pedal
4. Control valve with TCM*1
5. A/T assembly harness connector
6. 1st position switch
7. Overdrive control switch

*1: The following components are included in the control valve with TCM.

- TCM (transmission control module)
- Input speed sensor 1
- Input speed sensor 2
- Output speed sensor

- A/T fluid temperature sensor
- Transmission range switch
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low coast brake solenoid valve
- ATF pressure switch 2

A/T SHIFT LOCK SYSTEM

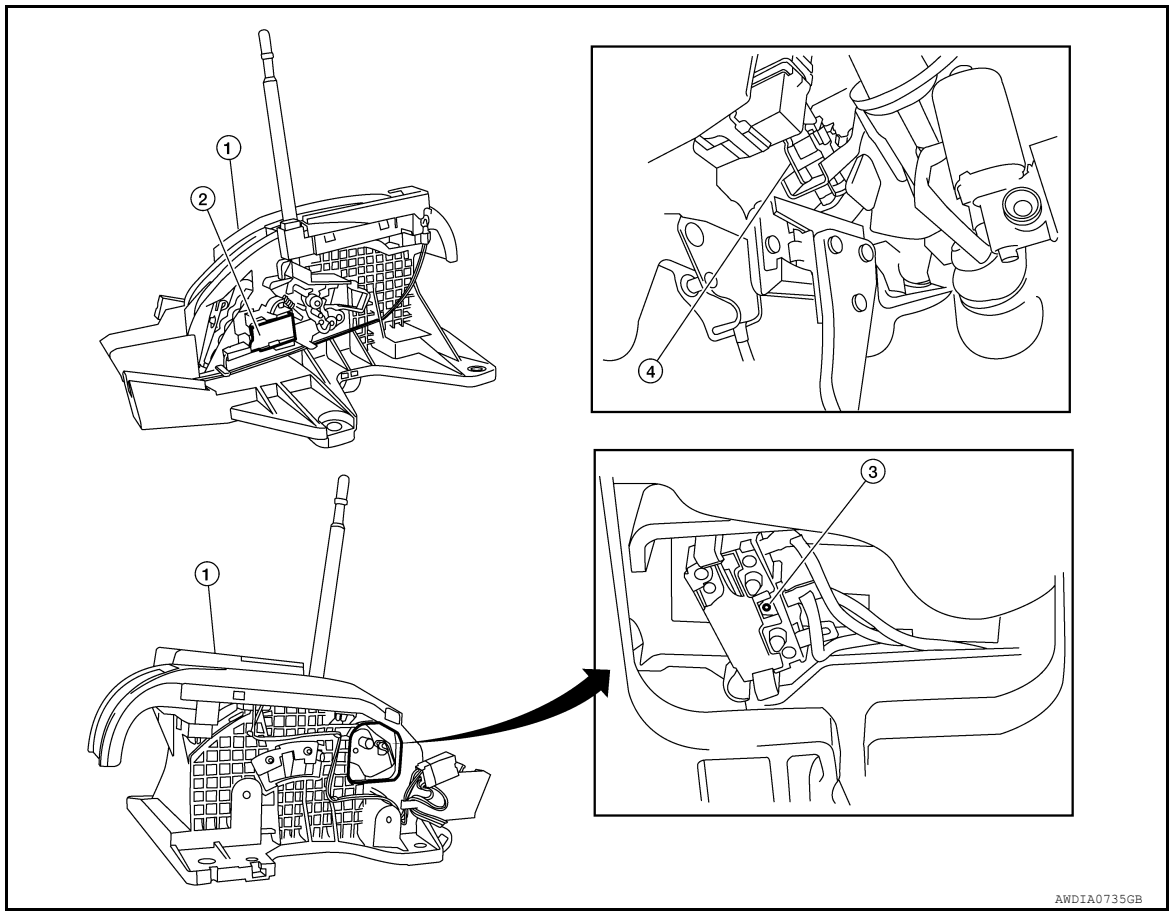
System Description

INFOID:0000000007360171

- 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 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

INFOID:0000000007360172



1. A/T shift selector
2. Shift lock solenoid
3. Park position switch (shift selector)
4. Stop lamp switch E39

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Introduction

INFOID:0000000007360173

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 O/D OFF 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-102, "CONSULT Function (TRANSMISSION)".

OBD-II Function for A/T System

INFOID:0000000007360174

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:0000000007360175

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:0000000007360176

HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.
(with CONSULT or GST) CONSULT or GST (Generic Scan Tool) Examples: P0705, P0720 etc.
These DTC are prescribed by SAE J2012.
(CONSULT 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 can identify them as shown below, therefore, CONSULT (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 or GST. The 1st trip freeze frame data can only be displayed on the CONSULT screen, not on the GST. For detail, refer to TM-100.
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, 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 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-49, "On Board Diagnosis Function".

- **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)

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.

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-41, "GST (Generic Scan Tool)".

HOW TO ERASE DTC (NO TOOLS)

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

Malfunction Indicator Lamp (MIL)

INFOID:0000000007360177

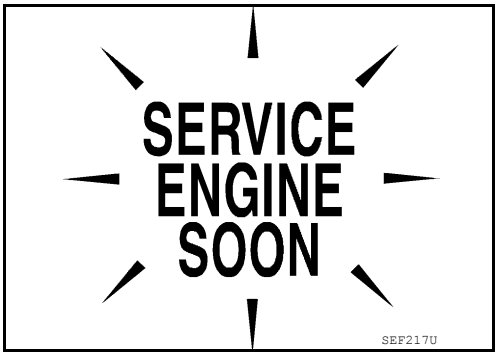
DESCRIPTION

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-18, "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 Function (TRANSMISSION)

INFOID:0000000007360178

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 screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD-II (DTC)	Reference page
		“TRANSMISSION” with CONSULT	MIL indicator lamp*1, “ENGINE” with CONSULT or GST	
CAN COMM CIRCUIT	• When TCM is not transmitting or receiving CAN communication signal for 2 seconds or more.	U1000	U1000	TM-110
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-111
TRANSMISSION CONT	• TCM is malfunctioning.	P0700	P0700	TM-113
T/M RANGE SENSOR 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-114
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-116
OUTPUT SPEED SENSOR	• Signal from output speed 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 signal before the vehicle starts moving	P0720	P0720	TM-118
ENGINE SPEED	• TCM does not receive the CAN communication signal from the ECM.	P0725	—	TM-121
1GR INCORRECT RATIO	• A/T cannot shift to 1GR	P0731	P0731	TM-124
2GR INCORRECT RATIO	• A/T cannot shift to 2GR	P0732	P0732	TM-126

Items (CONSULT screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD-II (DTC)	Reference page
		"TRANSMISSION" with CONSULT	MIL indicator lamp*1, "ENGINE" with CONSULT or GST	
3GR INCORRECT RATIO	• A/T cannot shift to 3GR	P0733	P0733	TM-128
4GR INCORRECT RATIO	• A/T cannot shift to 4GR	P0734	P0734	TM-130
5GR INCORRECT RATIO	• A/T cannot shift to 5GR	P0735	P0735	TM-132
TORQUE CONVERTER	• Normal voltage not applied to solenoid due to cut line, short, or the like	P0740	P0740	TM-133
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-135
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-137
TP SENSOR	• TCM does not receive the proper accelerator pedal position signals (input by CAN communication) from ECM.	P1705	—	TM-139
TRANS FLUID TEMP SEN	• During running, the ATF temperature sensor signal voltage is excessively high or low	P1710	P0710	TM-141
VEHICLE SPEED SIGNAL	• Signal (CAN communication) from vehicle speed signal not input due to cut line or the like • Unexpected signal input during running	P1721	—	TM-143
INTERLOCK	• Except during shift change, the gear position and ATF pressure switch states are monitored and comparative judgment made.	P1730	P1730	TM-145
1ST E/BRAKING	• Each ATF pressure switch and solenoid current is monitored and if a pattern is detected having engine braking 1GR other than in the "1" position, a malfunction is detected.	P1731	—	TM-147
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-149
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-151
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-153
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-155
L C BRAKE SOLENOID	• Normal voltage not applied to solenoid due to functional malfunction, cut line, short, or the like	P1772	P1772	TM-157

Items (CONSULT screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD-II (DTC)	Reference page
		"TRANSMISSION" with CONSULT	MIL indicator lamp*1, "ENGINE" with CONSULT 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-159
NO DTC IS DETECTED FURTHER TESTING MAY BE REQUIRED	• No NG item has been detected.	X	X	—

*1: Refer to TM-101, "Malfunction Indicator Lamp (MIL)".

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

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	—	▼	
ATF TEMP 1 (°C or °F)	—	X	▼	
ATF TEMP 2 (°C or °F)	—	X	▼	

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
BATTERY VOLT (V)	X	—	▼	
ATF PRES SW 1 (ON-OFF display)	X	X	▼	
ATF PRES SW 2 (ON-OFF display)	X	X	▼	(for LC/B solenoid)
ATF PRES SW 3 (ON-OFF display)	X	X	▼	
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)	—	—	▼	
SFT DWN ST SW (ON-OFF display)	—	—	▼	
ASCD-OD CUT (ON-OFF display)	—	—	▼	
ASCD-CRUISE (ON-OFF display)	—	—	▼	
ABS SIGNAL (ON-OFF display)	—	—	▼	
ACC OD CUT (ON-OFF display)	—	—	▼	Not mounted but displayed.
ACC SIGNAL (ON-OFF display)	—	—	▼	
TCS GR/P KEEP (ON-OFF display)	—	—	▼	
TCS SIGNAL 2 (ON-OFF display)	—	—	▼	
TCS SIGNAL 1 (ON-OFF display)	—	—	▼	
TCC SOLENOID (A)	—	X	▼	
LINE PRES SOL (A)	—	X	▼	
I/C SOLENOID (A)	—	X	▼	
FR/B SOLENOID (A)	—	X	▼	

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
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)	—	—	▼	Not mounted but displayed.
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)	—	—	▼	
TRGT PRES L/P (kPa, kg/cm^2 or psi)	—	—	▼	
TRGT PRES I/C (kPa, kg/cm^2 or psi)	—	—	▼	

Monitored item (Unit)	Monitor Item Selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
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

INFOID:0000000007360179

OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Refer to TM-101, "Malfunction Indicator Lamp (MIL)".

TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

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-185, "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. Release brake pedal. (Stop lamp switch signal “OFF”.)
13. Depress accelerator pedal fully and release it.

>> GO TO 3.

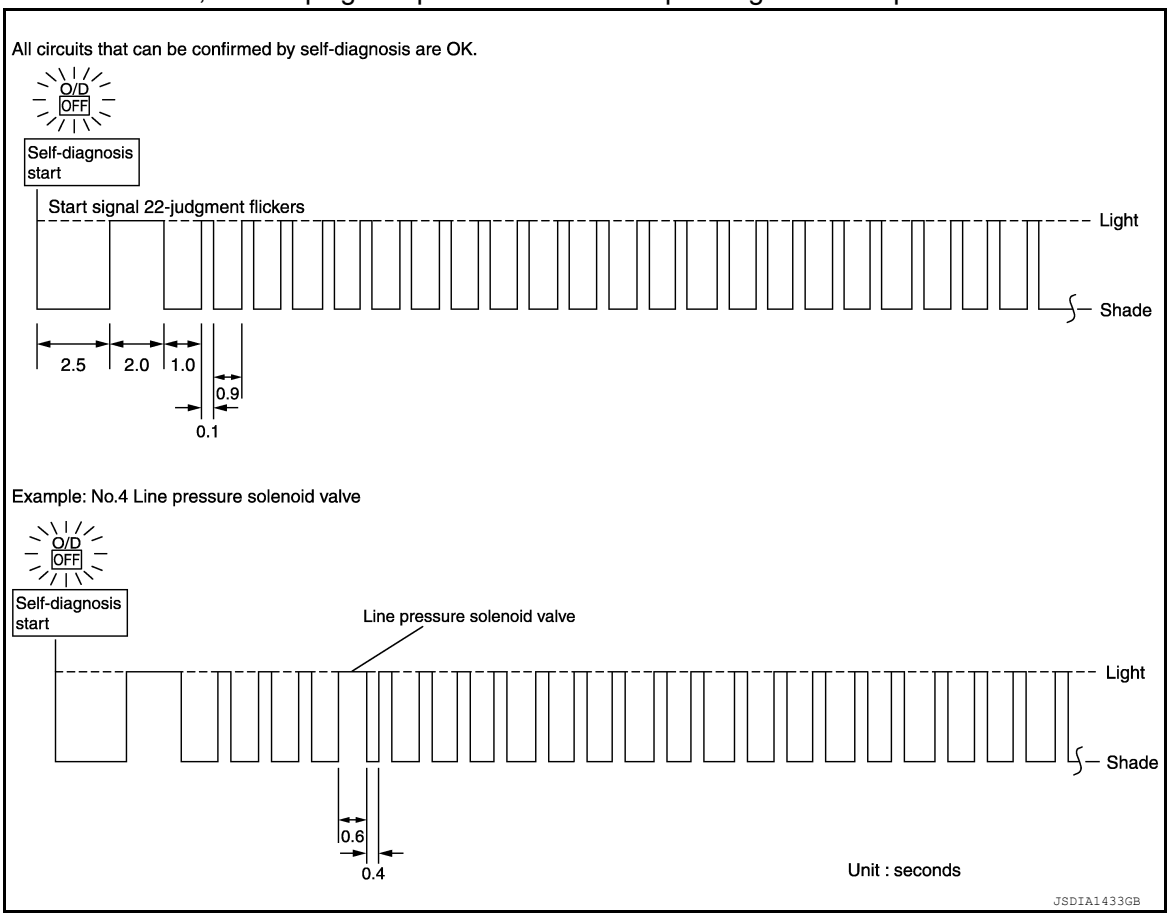
3.CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp.
Refer to "Judgment Self-diagnosis Code".
If the system does not go into self-diagnostics. Refer to TM-114, "Diagnosis Procedure", TM-163, "Diagnosis Procedure", TM-164, "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-118	12	Interlock TM-145
2	Direct clutch solenoid TM-153	13	1st engine braking TM-147
3	Torque converter TM-133, TM-135	14	Starter relay TM-111
4	Line pressure solenoid TM-137	15	TP sensor TM-139
5	Input clutch solenoid TM-149	16	Engine speed TM-121
6	Front brake solenoid TM-151	17	CAN communication line TM-110
7	Low coast brake solenoid TM-157, TM-159	18	1GR incorrect ratio TM-123
8	High and low reverse clutch solenoid TM-155	19	2GR incorrect ratio TM-125
9	Transmission range switch TM-114	20	3GR incorrect ratio TM-127
10	Transmission fluid temperature sensor TM-141	21	4GR incorrect ratio TM-129
11	Input speed sensor TM-116	22	5GR incorrect ratio TM-131

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.

DTC/CIRCUIT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000007360180

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:0000000007360181

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

Possible Cause

INFOID:0000000007360182

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

DTC Confirmation Procedure

INFOID:0000000007360183

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and wait for at least 6 seconds.
4. If DTC is detected, go to TM-110, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360184

1.CHECK CAN COMMUNICATION CIRCUIT

With CONSULT

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

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:0000000007360185

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

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007360186

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:0000000007360187

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0615” with CONSULT or 14th judgment flicker without CONSULT 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:0000000007360188

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

DTC Confirmation Procedure

INFOID:0000000007360189

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

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.
4. If DTC is detected, go to TM-111, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360190

1. CHECK STARTER RELAY

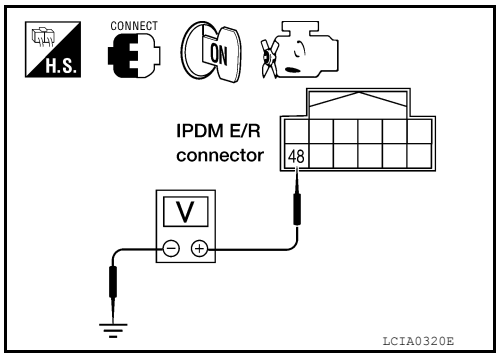
With CONSULT

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

Without CONSULT

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

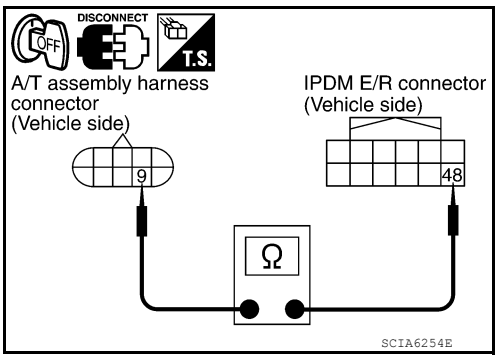


OK or NG

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	

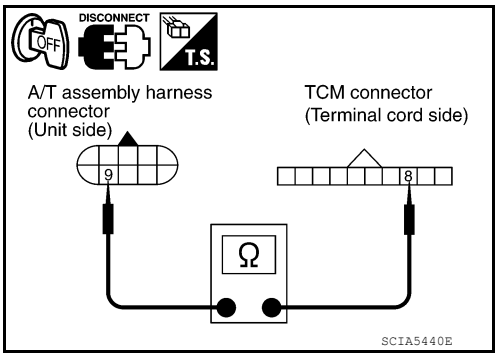
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

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-231, "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-6.
- IPDM E/R, Refer to PCS-3.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

5.CHECK DTC

Perform TM-111, "DTC Confirmation Procedure".

OK or NG

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

P0700 TRANSMISSION CONTROL

Description

INFOID:0000000007360191

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:0000000007360192

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

Possible Cause

INFOID:0000000007360193

TCM.

DTC Confirmation Procedure

INFOID:0000000007360194

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine.
4. Run engine for at least 2 consecutive seconds at idle speed.
5. If DTC is detected, go to TM-113, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360195

1.CHECK DTC

With CONSULT

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “SELF DIAG RESULTS” mode for “TRANSMISSION” with CONSULT.
3. Touch “ERASE”.
4. Turn ignition switch “OFF” and wait at least 10 seconds.
5. Perform TM-113, "DTC Confirmation Procedure".

Is the “P0700” displayed again?

YES >> Replace the control valve with TCM. Refer to TM-231, "Removal and Installation".
NO >> **INSPECTION END**

P0705 TRANSMISSION RANGE SENSOR A

Description

INFOID:0000000007360196

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

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007360197

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:0000000007360198

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0705” with CONSULT or 9th judgment flicker without CONSULT 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:0000000007360199

- 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:0000000007360200

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-114, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360201

1.CHECK TRANSMISSION RANGE AWITCH CIRCUIT

With CONSULT
1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "Diagnosis Procedure".

OK or NG

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

3. DETECT MALFUNCTIONING ITEM

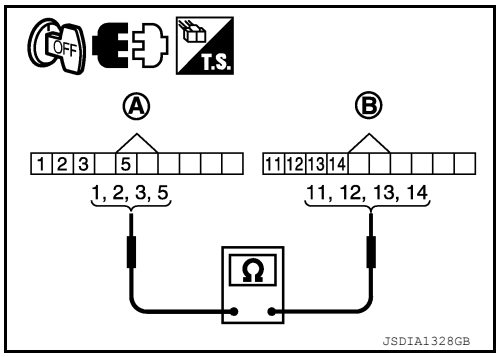
Check the following.
- A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

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-231, "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-231, "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-114, "DTC Confirmation Procedure".

OK or NG

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

P0717 INPUT SPEED SENSOR A

Description

INFOID:0000000007360202

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 Reference Value in Data Monitor Mode

INFOID:0000000007360203

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

On Board Diagnosis Logic

INFOID:0000000007360204

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0717” with CONSULT or 11th judgment flicker without CONSULT 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:0000000007360205

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

DTC Confirmation Procedure

INFOID:0000000007360206

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL/S SE-AT: 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-116, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360207

1.CHECK INPUT SIGNAL

With CONSULT

1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Drive vehicle 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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-116, "DTC Confirmation Procedure".

OK or NG

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

P0720 OUTPUT SPEED SENSOR

Description

INFOID:0000000007360208

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 Reference Value in Data Monitor Mode

INFOID:0000000007360209

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

On Board Diagnosis Logic

INFOID:0000000007360210

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0720” with CONSULT or 1st judgment flicker without CONSULT 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:0000000007360211

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

DTC Confirmation Procedure

INFOID:0000000007360212

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-119, "Diagnosis Procedure".
   If the check result is OK, go to following step.
4. Select “DATA MONITOR” mode for “ENGINE” with CONSULT.
5. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL/S SE-AT: 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-119, "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-119, "Diagnosis Procedure".

WITH GST
Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360213

1.CHECK INPUT SIGNAL

With CONSULT
1. Turn ignition switch ON.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "Diagnosis Procedure".

OK or NG

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

3.DETECT MALFUNCTIONING ITEM

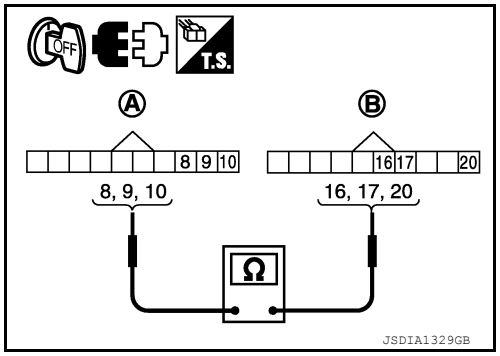
Check the following.
- The A/T assembly harness connector pin terminals for damage or loose connection with harness connector.

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-231, "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-264.
2. Perform “DTC Confirmation Procedure”. Refer to TM-118, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Replace the control valve with TCM. Refer to TM-231, "Removal and Installation".

6.CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-118, "DTC Confirmation Procedure".

OK or NG

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

P0725 ENGINE SPEED

Description

INFOID:0000000007360214

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

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007360215

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

On Board Diagnosis Logic

INFOID:0000000007360216

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

Possible Cause

INFOID:0000000007360217

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

DTC Confirmation Procedure

INFOID:0000000007360218

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

1. Turn ignition switch “ON” and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Start engine and maintain the following conditions for at least 10 consecutive seconds.
   VHCL/S SE-AT: 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-121, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360219

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)".

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

YES >> Check CAN communication line. Refer to TM-110.
NO >> GO TO 2.

2.CHECK DTC WITH TCM

With CONSULT

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check the ignition signal circuit.
- Refer to EC-467, "Diagnosis Procedure".

3.CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-121, "DTC Confirmation Procedure".

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> GO TO 4.

4. CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-161, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> 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.

Is the inspection result normal?

YES >> Replace the control valve with TCM. Refer to TM-231, "Removal and Installation".
NO >> Repair or replace damaged parts.

P0731 1GR INCORRECT RATIO

Description

INFOID:0000000007360220

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

On Board Diagnosis Logic

INFOID:0000000007360221

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

Possible Cause

INFOID:0000000007360222

- 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:0000000007360223

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

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 180°C (68°F – 356°F)
   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.
4. Drive vehicle and maintain the following conditions.
   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 screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:
   If “TESTING” does not appear on CONSULT for a long time, select “SELF-DIAG RESULTS”. In case a 1st trip DTC other than P0731 is shown, refer to TM-102, "CONSULT Function (TRANSMISSION)".
   If “COMPLETED RESULT NG” is detected, go to TM-124, "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-222, "Check Before Engine Is Started".
- Perform TM-102, "CONSULT Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither “OK” nor “NG” are indicated.)

WITH GST

1. Start the engine.

2. Drive vehicle for approximately 5 minutes in urban areas.
3. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   Selector lever: “1” position
   Gear position: “1” position
   Accelerator opening: 0.6/8 or more
   Vehicle speed: 10 km/h (6 MPH) or more
4. Check DTC.
5. If DTC is detected, go to TM-124, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360224

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)", TM-107, "Diagnosis Procedure without CONSULT".

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

YES >> Check CAN communication line. Refer to TM-110, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-161, "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-231, "Removal and Installation".
2. Perform TM-123, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by “ROAD TEST” to repair malfunctioning part. Refer to TM-222, "Check Before Engine Is Started".

P0732 2GR INCORRECT RATIO

Description

INFOID:0000000007360225

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

On Board Diagnosis Logic

INFOID:0000000007360226

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

Possible Cause

INFOID:0000000007360227

- 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:0000000007360228

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

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 180°C (68°F – 356°F)
   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.
4. Drive vehicle and maintain the following conditions.
   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 screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:
   If “TESTING” does not appear on CONSULT for a long time, select “SELF-DIAG RESULTS”. In case a 1st trip DTC other than P0732 is shown, refer to “TM-102, "CONSULT Function (TRANSMISSION)"”.
   If “COMPLETED RESULT NG” is detected, go to TM-126, "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-222, "Check Before Engine Is Started".
- Perform TM-102, "CONSULT Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither “OK” nor “NG” are indicated.)

WITH GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.
3. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   Selector lever: “2” position
   Gear position: “2” position
   Accelerator opening: 0.6/8 or more
   Vehicle speed: 10 km/h (6 MPH) or more
4. Check DTC.
5. If DTC is detected, go to TM-126, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360229

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)", TM-107, "Diagnosis Procedure without CONSULT".

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

YES >> Check CAN communication line. Refer to TM-110, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-161, "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-231, "Removal and Installation".
2. Perform TM-125, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by “ROAD TEST” to repair malfunctioning part. Refer to TM-222, "Check Before Engine Is Started".

P0733 3GR INCORRECT RATIO

Description

INFOID:0000000007360230

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

On Board Diagnosis Logic

INFOID:0000000007360231

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

Possible Cause

INFOID:0000000007360232

- 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:0000000007360233

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

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 180°C (68°F – 356°F)
   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.
4. Drive vehicle and maintain the following conditions.
   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 screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:
   If “TESTING” does not appear on CONSULT for a long time, select “SELF-DIAG RESULTS”. In case a 1st trip DTC other than P0733 is shown, refer to “TM-102, "CONSULT Function (TRANSMISSION)"”.
   If “COMPLETED RESULT NG” is detected, go to TM-128, "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-222, "Check Before Engine Is Started".
- Perform TM-102, "CONSULT Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither “OK” nor “NG” are indicated.)

WITH GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.
3. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   Selector lever: “3” position
   Gear position: “3” position
   Accelerator opening: 0.6/8 or more
   Vehicle speed: 10 km/h (6 MPH) or more
4. Check DTC.
5. If DTC is detected, go to TM-128, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360234

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)", TM-107, "Diagnosis Procedure without CONSULT".

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

YES >> Check CAN communication line. Refer to TM-110, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-161, "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-231, "Removal and Installation".
2. Perform TM-127, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by “ROAD TEST” to repair malfunctioning part. Refer to TM-222, "Check Before Engine Is Started".

P0734 4GR INCORRECT RATIO

Description

INFOID:0000000007360235

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

On Board Diagnosis Logic

INFOID:0000000007360236

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

Possible Cause

INFOID:0000000007360237

- 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:0000000007360238

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

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 180°C (68°F – 356°F)
   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.
4. Drive vehicle and maintain the following conditions.
   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 screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:
   If “TESTING” does not appear on CONSULT for a long time, select “SELF-DIAG RESULTS”. In case a 1st trip DTC other than P0734 is shown, refer to “TM-102, "CONSULT Function (TRANSMISSION)"”.
   If “COMPLETED RESULT NG” is detected, go to TM-130, "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-222, "Check Before Engine Is Started".
- Perform TM-102, "CONSULT Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither “OK” nor “NG” are indicated.)

WITH GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.
3. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   Selector lever: “D” position
   Gear position: “4” position
   Accelerator opening: 0.6/8 or more
   Vehicle speed: 10 km/h (6 MPH) or more
4. Check DTC.
5. If DTC is detected, go to TM-130, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360239

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)", TM-107, "Diagnosis Procedure without CONSULT".

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

YES >> Check CAN communication line. Refer to TM-110, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-161, "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-231, "Removal and Installation".
2. Perform TM-129, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by “ROAD TEST” to repair malfunctioning part. Refer to TM-222, "Check Before Engine Is Started".

P0735 5GR INCORRECT RATIO

Description

INFOID:0000000007360240

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

On Board Diagnosis Logic

INFOID:0000000007360241

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

Possible Cause

INFOID:0000000007360242

- 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:0000000007360243

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

1. Start the engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Make sure that “ATF TEMP 1” is within the following range.
   ATF TEMP 1: 20°C – 180°C (68°F – 356°F)
   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.
4. Drive vehicle and maintain the following conditions.
   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 screen changes from “OUT OF CONDITION” to “TESTING”.
   CAUTION:
   If “TESTING” does not appear on CONSULT for a long time, select “SELF-DIAG RESULTS”. In case a 1st trip DTC other than P0735 is shown, refer to “TM-102, "CONSULT Function (TRANSMISSION)"”.
   If “COMPLETED RESULT NG” is detected, go to TM-132, "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-222, "Check Before Engine Is Started".
- Perform TM-102, "CONSULT Function (TRANSMISSION)" when not shifted from the 1GR to 5GR. (Neither “OK” nor “NG” are indicated.)

WITH GST

1. Start the engine.
2. Drive vehicle for approximately 5 minutes in urban areas.
3. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   Selector lever: “D” position
   Gear position: “5” position
   Accelerator opening: 0.6/8 or more
   Vehicle speed: 10 km/h (6 MPH) or more
4. Check DTC.
5. If DTC is detected, go to TM-132, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360244

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)", TM-107, "Diagnosis Procedure without CONSULT".

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

YES >> Check CAN communication line. Refer to TM-110, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-161, "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-231, "Removal and Installation".
2. Perform TM-131, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Confirm malfunction phenomena by “ROAD TEST” to repair malfunctioning part. Refer to TM-222, "Check Before Engine Is Started".

P0740 TORQUE CONVERTER

Description

INFOID:0000000007360245

- 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 Reference Value in Data Monitor Mode

INFOID:0000000007360246

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:0000000007360247

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0740” with CONSULT or 3rd judgment flicker without CONSULT 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:0000000007360248

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

DTC Confirmation Procedure

INFOID:0000000007360249

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL/S SE-AT: 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-133, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360250

1.CHECK INPUT SIGNAL

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

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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-133, "DTC Confirmation Procedure".

OK or NG

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

P0744 TORQUE CONVERTER

Description

INFOID:0000000007360251

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 Reference Value in Data Monitor Mode

INFOID:0000000007360252

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:0000000007360253

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0744” with CONSULT or 3rd judgment flicker without CONSULT 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:0000000007360254

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

DTC Confirmation Procedure

INFOID:0000000007360255

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

1. Start engine.
2. Select “DATA MONITOR" mode for "TRANSMISSION" with CONSULT.
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-135, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360256

1.CHECK INPUT SIGNAL

With CONSULT
1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-135, "DTC Confirmation Procedure".

OK or NG

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

P0745 PRESSURE CONTROL SOLENOID A

Description

INFOID:0000000007360257

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 Reference Value in Data Monitor Mode

INFOID:0000000007360258

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

On Board Diagnosis Logic

INFOID:0000000007360259

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0745” with CONSULT or 4th judgment flicker without CONSULT 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:0000000007360260

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

DTC Confirmation Procedure

INFOID:0000000007360261

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

1. Turn ignition switch “ON” and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
2. Engine start and wait at least 5 second.
3. If DTC is detected, go to TM-137, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360262

1.CHECK INPUT SIGNAL

With CONSULT
1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4. CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-137, "DTC Confirmation Procedure".

OK or NG

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

P1705 TP SENSOR

Description

INFOID:0000000007360263

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 Reference Value in Data Monitor Mode

INFOID:0000000007360264

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:0000000007360265

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

Possible Cause

INFOID:0000000007360266

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

DTC Confirmation Procedure

INFOID:0000000007360267

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
1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for "TRANSMISSION" with CONSULT.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to TM-139, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360268

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)".

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

YES >> Check CAN communication line. Refer to TM-110.
NO >> GO TO 2.

2.CHECK DTC WITH TCM

With CONSULT
1. Turn ignition switch ON. (Do not start engine.)
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Depress accelerator pedal and read out the value of “ACCELE POSI”.
4. Select “SELF-DIAG RESULTS” mode for “TRANSMISSION” with CONSULT. Refer to TM-102, "CONSULT Function (TRANSMISSION)".

Is the inspection result normal?

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

3.CHECK DTC WITH ECM

With CONSULT

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “ENGINE” with CONSULT. Refer to EC-52, "CONSULT Function".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the DTC detected item. Refer to EC-75, "DTC Index".
- If CAN communication line is detected, go to TM-110, "Diagnosis Procedure".

4. CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-139, "DTC Confirmation Procedure".

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> GO TO 5.

5. CHECK TCM POWER SUPPLY AND GROUND CIRCUIT

Check TCM power supply and ground circuit. Refer to TM-161, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> 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.

Is the inspection result normal?

YES >> Replace the control valve with TCM. Refer to TM-231, "Removal and Installation".
NO >> Repair or replace damaged parts.

P1710 TRANSMISSION FLUID TEMPERATURE SENSOR

Description

INFOID:0000000007360269

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

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007360270

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:0000000007360271

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

Possible Cause

INFOID:0000000007360272

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

DTC Confirmation Procedure

INFOID:0000000007360273

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and maintain the following conditions for at least 14 minutes (Total). (It is not necessary to maintain continuously.)
   VHCL/S SE-AT: 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-141, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360274

1.CHECK A/T FLUID TEMPERATURE SENSOR SIGNAL

With CONSULT
1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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. Refer to TM-142, "Component Inspection".

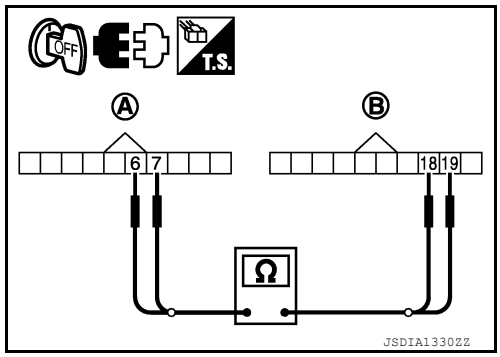
OK or NG

OK >> GO TO 3.

NG >> Replace the control valve with TCM. Refer to TM-231, "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-161, "Diagnosis Procedure".
2. Reinstall any part removed.

OK or NG

OK >> Replace the control valve with TCM. Refer to TM-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

5.CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-141, "DTC Confirmation Procedure".

OK or NG

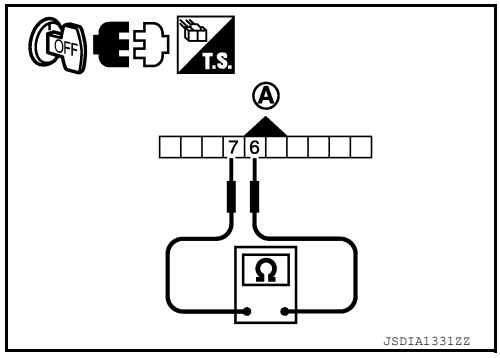
OK >> **INSPECTION END**
NG >> GO TO 1.

Component Inspection

INFOID:0000000007360275

A/T FLUID TEMPERATURE SENSOR

1. Remove control valve with TCM. Refer to TM-231, "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-324, "A/T Fluid Temperature Sensor"	

3. If NG, replace the control valve with TCM. Refer to TM-231, "Removal and Installation".

P1721 VEHICLE SPEED SIGNAL

Description

INFOID:0000000007360276

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 Reference Value in Data Monitor Mode

INFOID:0000000007360277

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

On Board Diagnosis Logic

INFOID:0000000007360278

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

Possible Cause

INFOID:0000000007360279

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

DTC Confirmation Procedure

INFOID:0000000007360280

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   ACCELE POSI: 1/8 or less
   VHCL/S SE-AT: 30 km/h (19 MPH) or more
4. If DTC is detected, go to TM-143, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360281

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)".

Is malfunction in the CAN communication indicated in the result?

YES >> Check CAN communication line. Refer to TM-110.
NO >> GO TO 2.

2.CHECK INPUT SIGNAL

With CONSULT

1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-143, "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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

P1730 INTERLOCK

Description

INFOID:0000000007360282

Fail-safe function to detect interlock conditions.

On Board Diagnosis Logic

INFOID:0000000007360283

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1730” with CONSULT or 12th judgment flicker without CONSULT 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:0000000007360284

- 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:0000000007360285

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-145, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Judgment of Interlock

INFOID:0000000007360286

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 input speed sensor malfunction.
When interlock is detected at the 3GR or more, it is locked at the 2GR.

Diagnosis Procedure

INFOID:0000000007360287

1.SELF-DIAGNOSIS

With CONSULT

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.

Without CONSULT

1. Drive vehicle.
2. Stop vehicle and turn ignition switch OFF.
3. Turn ignition switch ON.
4. Perform self-diagnosis. Refer to TM-107, "Diagnosis Procedure without CONSULT".

OK or NG

OK >> GO TO 2.
NG >> Check low coast brake solenoid valve circuit and function. Refer to TM-157, TM-159.

2.CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-145, "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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

P1731 1ST ENGINE BRAKING

Description

INFOID:0000000007360288

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

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007360289

Item name	Condition	Display value
ON OFF SOL	Low coast brake engaged. Refer to TM-78.	ON
	Low coast brake disengaged. Refer to TM-78.	OFF
ATF PRES SW 2	Low coast brake engaged. Refer to TM-78.	ON
	Low coast brake disengaged. Refer to TM-78.	OFF

On Board Diagnosis Logic

INFOID:0000000007360290

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1731” with CONSULT or 13th judgment flicker without CONSULT 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 1GR acts other than at “1” position.

Possible Cause

INFOID:0000000007360291

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

DTC Confirmation Procedure

INFOID:0000000007360292

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-147, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007360293

1. CHECK INPUT SIGNALS

With CONSULT

1. Start the engine.
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Drive vehicle in the “1” position (1st gear), 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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-147, "DTC Confirmation Procedure".

OK or NG

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

P1752 INPUT CLUTCH SOLENOID

Description

INFOID:0000000007360294

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 Reference Value in Data Monitor Mode

INFOID:0000000007360295

Item name	Condition	Display value (Approx.)
I/C SOLENOID	Input clutch disengaged. Refer to TM-78.	0.6 - 0.8 A
	Input clutch engaged. Refer to TM-78.	0 - 0.05 A

On Board Diagnosis Logic

INFOID:0000000007360296

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1752” with CONSULT or 5th judgment flicker without CONSULT 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:0000000007360297

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

DTC Confirmation Procedure

INFOID:0000000007360298

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-149, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360299

1.CHECK INPUT SIGNAL

With CONSULT
1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-149, "DTC Confirmation Procedure".

OK or NG

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

P1757 FRONT BRAKE SOLENOID

Description

INFOID:0000000007360300

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 Reference Value in Data Monitor Mode

INFOID:0000000007360301

Item name	Condition	Display value (Approx.)
FR/B SOLENOID	Front brake engaged. Refer to TM-78.	0.6 - 0.8 A
	Front brake disengaged. Refer to TM-78.	0 - 0.05 A

On Board Diagnosis Logic

INFOID:0000000007360302

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1757” with CONSULT or 6th judgment flicker without CONSULT 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:0000000007360303

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

DTC Confirmation Procedure

INFOID:0000000007360304

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-151, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360305

1.CHECK INPUT SIGNAL

With CONSULT
1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-151, "DTC Confirmation Procedure".

OK or NG

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

P1762 DIRECT CLUTCH SOLENOID

Description

INFOID:0000000007360306

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 Reference Value in Data Monitor Mode

INFOID:0000000007360307

Item name	Condition	Display value (Approx.)
D/C SOLENOID	Direct clutch disengaged. Refer to TM-78.	0.6 - 0.8 A
	Direct clutch engaged. Refer to TM-78.	0 - 0.05 A

On Board Diagnosis Logic

INFOID:0000000007360308

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1762” with CONSULT or 2nd judgment flicker without CONSULT 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:0000000007360309

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

DTC Confirmation Procedure

INFOID:0000000007360310

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-153, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360311

1.CHECK INPUT SIGNAL

With CONSULT

1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4. CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-153, "DTC Confirmation Procedure".

OK or NG

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

P1767 HIGH AND LOW REVERSE CLUTCH SOLENOID

Description

INFOID:0000000007360312

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 Reference Value in Data Monitor Mode

INFOID:0000000007360313

Item name	Condition	Display value (Approx.)
HLR/C SOL	High and low reverse clutch disengaged. Refer to TM-78.	0.6 - 0.8 A
	High and low reverse clutch engaged. Refer to TM-78.	0 - 0.05 A

On Board Diagnosis Logic

INFOID:0000000007360314

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1767” with CONSULT or 8th judgment flicker without CONSULT 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:0000000007360315

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

DTC Confirmation Procedure

INFOID:0000000007360316

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-155, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360317

1.CHECK INPUT SIGNAL

With CONSULT
1. Turn ignition switch ON.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.
- Refer to TM-155, "DTC Confirmation Procedure".

OK or NG

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

P1772 LOW COAST BRAKE SOLENOID

Description

INFOID:0000000007360318

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 Reference Value in Data Monitor Mode

INFOID:0000000007360319

Item name	Condition	Display value
ON OFF SOL	Low coast brake engaged. Refer to TM-78.	ON
	Low coast brake disengaged. Refer to TM-78.	OFF

On Board Diagnosis Logic

INFOID:0000000007360320

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

Possible Cause

INFOID:0000000007360321

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

DTC Confirmation Procedure

INFOID:0000000007360322

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

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
   SLCT LVR POSI: “1” or “2”
   GEAR: “1st” or “2nd” (LC/B ON/OFF)
5. If DTC is detected, go to TM-157, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360323

1.CHECK INPUT SIGNAL

With CONSULT

1. Turn ignition switch ON.
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4. CHECK DTC

Perform “DTC Confirmation Procedure”.
• Refer to TM-157, "DTC Confirmation Procedure".

OK or NG

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

P1774 LOW COAST BRAKE SOLENOID

Description

INFOID:0000000007360324

- 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 Reference Value in Data Monitor Mode

INFOID:0000000007360325

Item name	Condition	Display value
ON OFF SOL	Low coast brake engaged. Refer to TM-78.	ON
	Low coast brake disengaged. Refer to TM-78.	OFF
ATF PRES SW 2	Low coast brake engaged. Refer to TM-78.	ON
	Low coast brake disengaged. Refer to TM-78.	OFF

On Board Diagnosis Logic

INFOID:0000000007360326

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1774” with CONSULT or 7th judgment flicker without CONSULT 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:0000000007360327

- 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:0000000007360328

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

1. Start engine.
2. Accelerate vehicle to maintain the following conditions.
   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. If DTC (P1774) is detected, refer to TM-160, "Diagnosis Procedure".
   If DTC (P1772) is detected, go to TM-157, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT”.

Diagnosis Procedure

INFOID:0000000007360329

1.CHECK INPUT SIGNALS

With CONSULT

1. Start the engine.
2. Select “SELECTION FROM MENU” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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-161, "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-231, "Removal and Installation".
NG >> Repair or replace damaged parts.

4.CHECK DTC

Perform “DTC Confirmation Procedure”.

- Refer to TM-159, "DTC Confirmation Procedure".

OK or NG

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

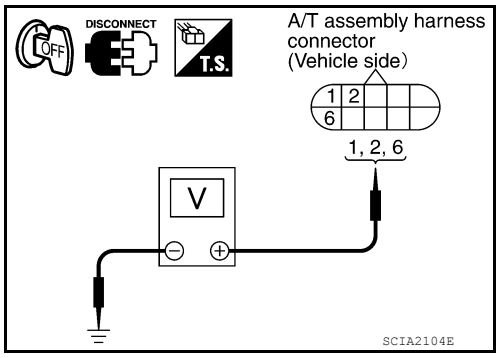
MAIN POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000007360330

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.



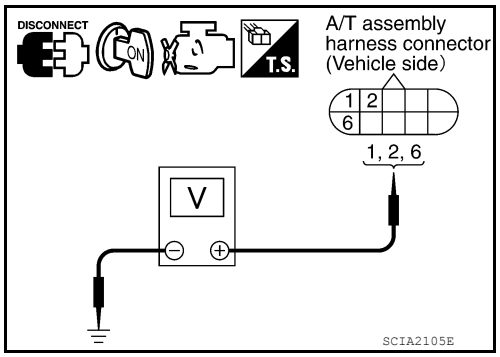
Item	Connector	Terminal	Voltage
TCM	F9	1 - Ground	Battery voltage
		2 - Ground	
		6 - Ground	0 V

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-20, "Wiring Diagram—Ignition Power Supply".

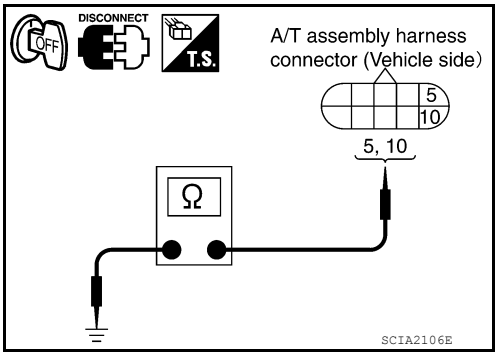
OK or NG

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
A/T assembly harness connector	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

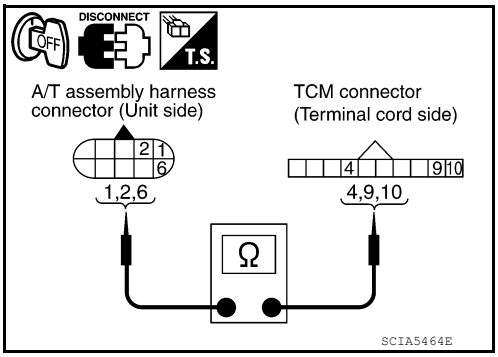
Perform self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)".

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-102, "CONSULT Function (TRANSMISSION)".

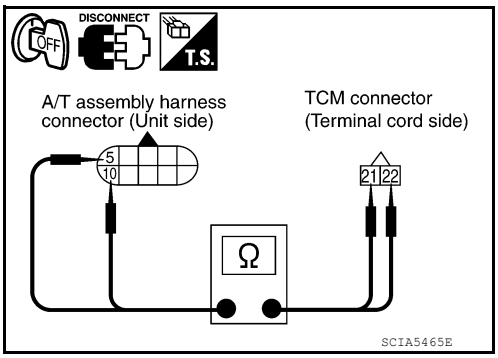
7. CHECK TERMINAL CORD ASSEMBLY

1. Remove control valve with TCM. Refer to TM-231, "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-231, "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 Reference Value in Data Monitor Mode

INFOID:0000000007360331

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:0000000007360332

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)".

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

YES >> Check CAN communication line. Refer to TM-110.
NO >> GO TO 2.

2.CHECK THROTTLE POSITION SIGNAL CIRCUIT

With CONSULT

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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.
- 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 Reference Value in Data Monitor Mode

INFOID:0000000007360333

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

Diagnosis Procedure

INFOID:0000000007360334

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)".

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

YES >> Check CAN communication line. Refer to TM-110.
NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH CIRCUIT

With CONSULT

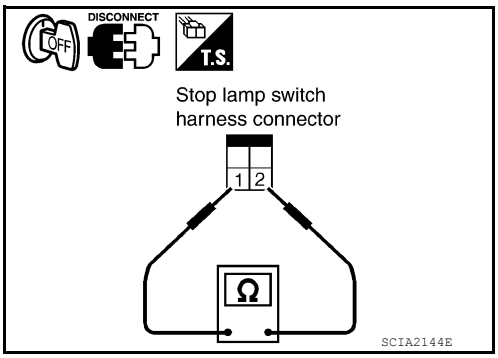
1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
3. Read out ON/OFF switching action of the “BRAKE SW”.

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-15, "Inspection and Adjustment".

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:0000000007360335

Refer to TM-99, "System Description".

Diagnosis Procedure

INFOID:0000000007360336

Regarding Wiring Diagram information, refer to TM-183, "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-241, "Removal and Installation".

2.CHECK SELECTOR LEVER

Check selector lever for damage. Refer to TM-228, "Inspection and Adjustment".

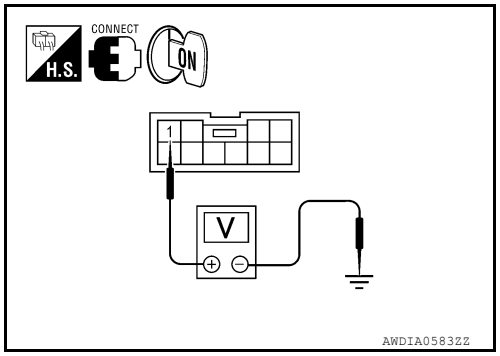
Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair selector lever. Refer to TM-227, "Removal and Installation".

3.CHECK INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between A/T shift selector connector M156 terminal 1 and ground.

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



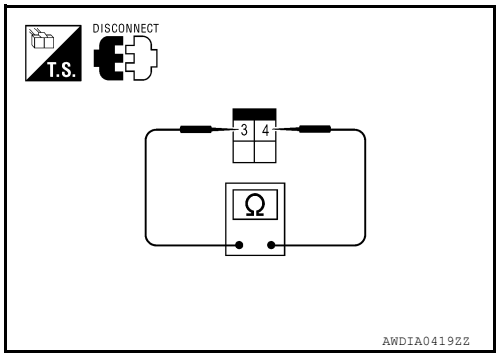
Is the inspection result normal?

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

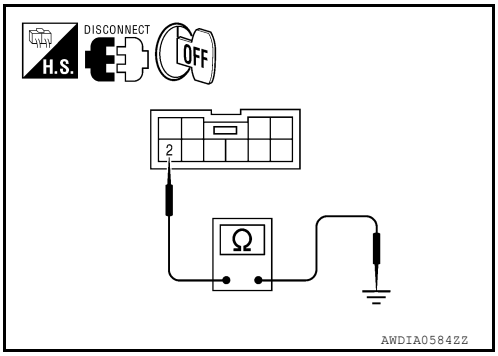


Is the inspection result normal?

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

5.CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect A/T shift selector connector.
3. Check continuity between A/T shift selector connector M156 terminal 2 and ground.



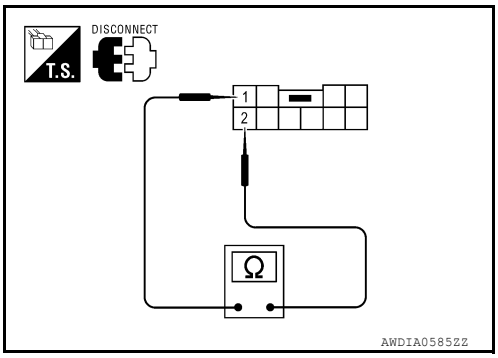
Continuity should exist.

Is the inspection result normal?

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

6. CHECK PARK POSITION SWITCH 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-227, "Removal and Installation".

OVERDRIVE CONTROL SWITCH

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007360337

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

Diagnosis Procedure

INFOID:0000000007360338

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)".

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

YES >> Check CAN communication line. Refer to TM-110.
NO >> GO TO 2.

2.CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

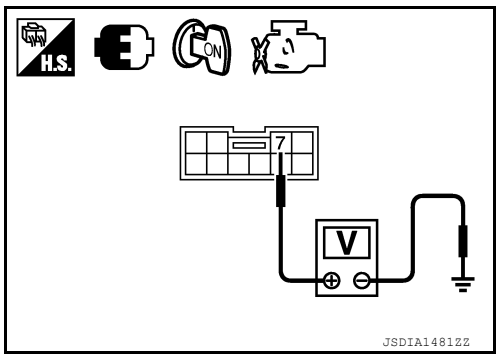
With CONSULT

1. Turn ignition switch “ON”.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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

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.)
Overdrive control switch	M156	7 - Ground	Releasing overdrive control switch	Battery voltage
			Holding overdrive control switch	0 V

OK or NG

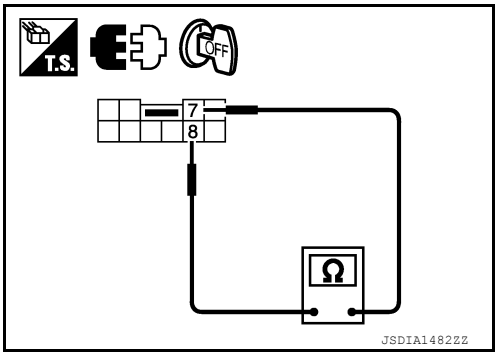
OK >> GO TO 5.
NG >> GO TO 3.

3.CHECK OVERDRIVE CONTROL SWITCH

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

3. Check continuity between A/T shift selector 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 shift selector connector terminal 7.
- Harness for short or open between A/T shift selector 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-24, "Diagnosis Description".

OK or NG

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

1ST POSITION SWITCH

CONSULT Reference Value in Data Monitor Mode

INFOID:0000000007360339

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:0000000007360340

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to TM-102, "CONSULT Function (TRANSMISSION)".

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

YES >> Check CAN communication line. Refer to TM-110.
NO >> GO TO 2.

2.CHECK 1ST POSITION SWITCH CIRCUIT

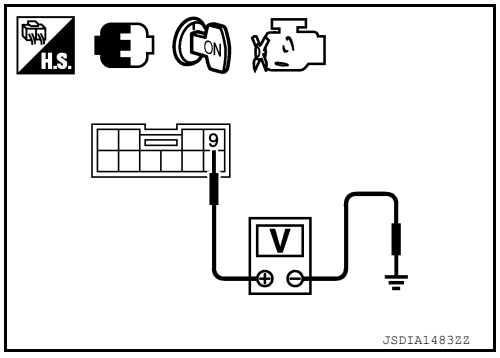
With CONSULT

1. Turn ignition switch “ON”.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
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

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.	0 V
			When setting selector lever to other positions.	Battery voltage

OK or NG

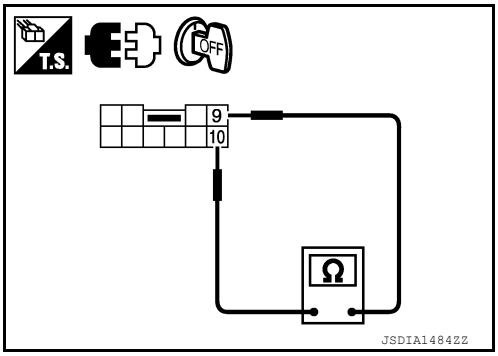
OK >> GO TO 5.
NG >> GO TO 3.

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-24, "Diagnosis Description".

OK or NG

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

ECU DIAGNOSIS INFORMATION

TCM

Reference Value

INFOID:0000000007360341

VALUES ON THE DIAGNOSIS TOOL

NOTICE:

1. The CONSULT electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
   Check for time difference between actual shift timing and the CONSULT display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2. Shift schedule (which implies gear position) displayed on CONSULT and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:

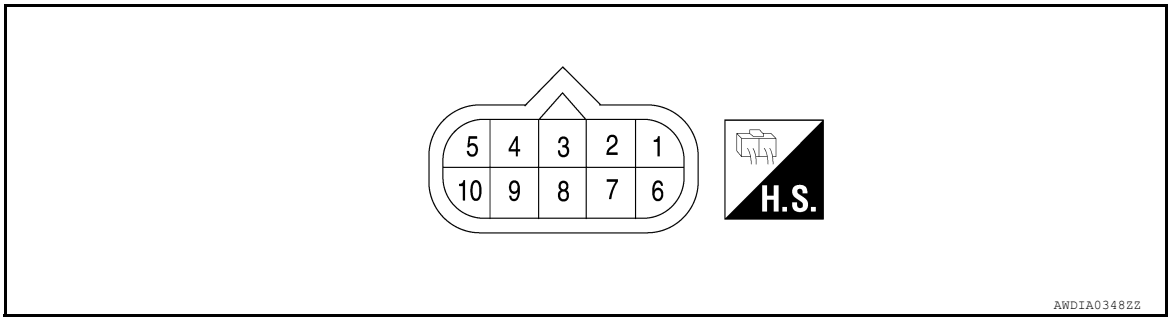
- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT indicates the point where shifts are completed.

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

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-78	ON
	Low coast brake disengaged. Refer to TM-78	OFF
I/C SOLENOID	Input clutch disengaged. Refer to TM-78	0.6 - 0.8 A
	Input clutch engaged. Refer to TM-78	0 - 0.05 A
FR/B SOLENOID	Front brake engaged. Refer to TM-78	0.6 - 0.8 A
	Front brake disengaged. Refer to TM-78	0 - 0.05 A
D/C SOLENOID	Direct clutch disengaged. Refer to TM-78	0.6 - 0.8 A
	Direct clutch engaged. Refer to TM-78	0 - 0.05 A
HLR/C SOL	High and low reverse clutch disengaged. Refer to TM-78	0.6 - 0.8 A
	High and low reverse clutch engaged. Refer to TM-78	0 - 0.05 A
ON OFF SOL	Low coast brake engaged. Refer to TM-78	ON
	Low coast brake disengaged. Refer to TM-78	OFF

Item name	Condition	Display value (Approx.)
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 signal)	The terminal is connected to the data link connector for CONSULT.		–
5	B	Ground	Always		0 V
6	W/G	Power supply		–	Battery voltage
				–	0 V
7	LG	Back-up lamp relay		Selector lever in “R” position.	0 V
				Selector lever in other positions.	Battery voltage
8	P	CAN L	–		–

Terminal No.	Wire color	Item	Condition		Data (Approx.)
9	R	Starter relay		Selector lever in “N”, “P” positions.	Battery voltage
				Selector lever in other positions.	0 V
10	B	Ground	Always		0 V

Fail-Safe

INFOID:0000000007360342

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 2GR, 4GR or 5GR (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-75, "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 input speed sensors, 5GR is prohibited.

DTC Inspection Priority Chart

INFOID:0000000007360343

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-110.

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

DTC No. Index

INFOID:0000000007360344

NOTE:
If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to TM-110.

DTC		Items (CONSULT screen terms)	Reference page
OBD-II	Except OBD-II		
CONSULT GST (*1)	CONSULT only “TRANSMISSION”		
—	P0615	STARTER RELAY	TM-111
P0700	P0700	TRANSMISSION CONT	TM-113
P0705	P0705	T/M RANGE SENSOR A	TM-114
P0710	P1710	TRANS FLUID TEMP SEN	TM-141
P0717	P0717	INPUT SPEED SENSOR A	TM-116
P0720	P0720	OUTPUT SPEED SENSOR	TM-118
—	P0725	ENGINE SPEED	TM-121
P0731	P0731	1GR INCORRECT RATIO	TM-133
P0732	P0732	2GR INCORRECT RATIO	TM-133
P0733	P0733	3GR INCORRECT RATIO	TM-133
P0734	P0734	4GR INCORRECT RATIO	TM-133
P0735	P0735	5GR INCORRECT RATIO	TM-133
P0740	P0740	TORQUE CONVERTER	TM-133

DTC		Items (CONSULT screen terms)	Reference page
OBD-II	Except OBD-II		
CONSULT GST (*1)	CONSULT only "TRANSMISSION"		
P0744 (*2)	P0744	TORQUE CONVERTER	TM-135
P0745	P0745	PC SOLENOID A	TM-137
—	P1705	TP SENSOR	TM-139
—	P1721	VEHICLE SPEED SIGNAL	TM-143
P1730	P1730	INTERLOCK	TM-145
—	P1731	1ST E/BRAKING	TM-147
P1752	P1752	INPUT CLUTCH SOL	TM-149
P1757	P1757	FR BRAKE SOLENOID	TM-151
P1762	P1762	DRCT CLUTCH SOL	TM-153
P1767	P1767	HLR CLUTCH SOLENOID	TM-155
P1772	P1772	L C BRAKE SOLENOID	TM-157
P1774 (*2)	P1774	L C BRAKE SOLENOID	TM-159
U1000	U1000	CAN COMM CIRCUIT	TM-110

*1: These numbers are prescribed by SAE J2012.

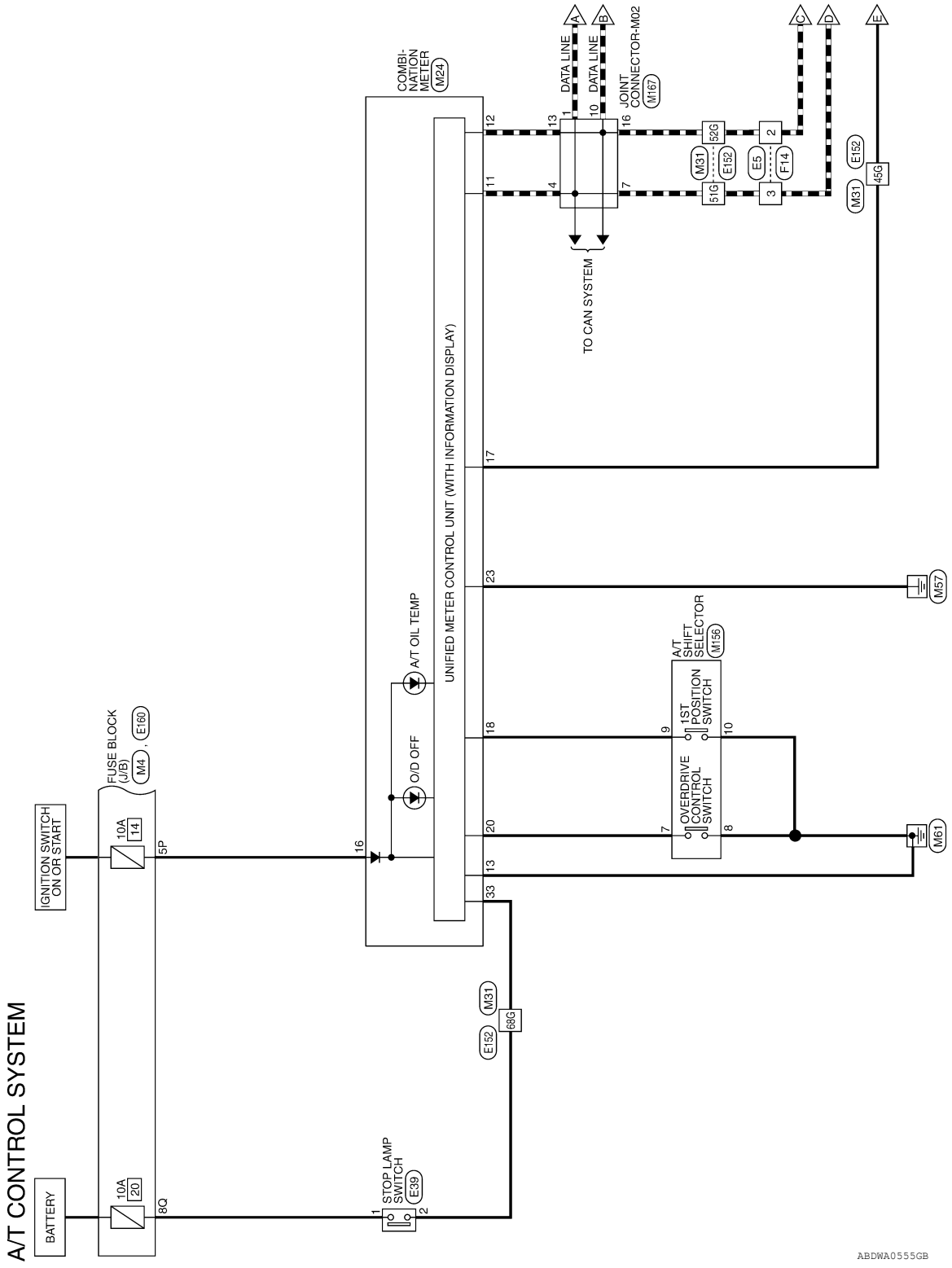
*2: These malfunctions cannot be displayed MIL if another malfunction is assigned to MIL.

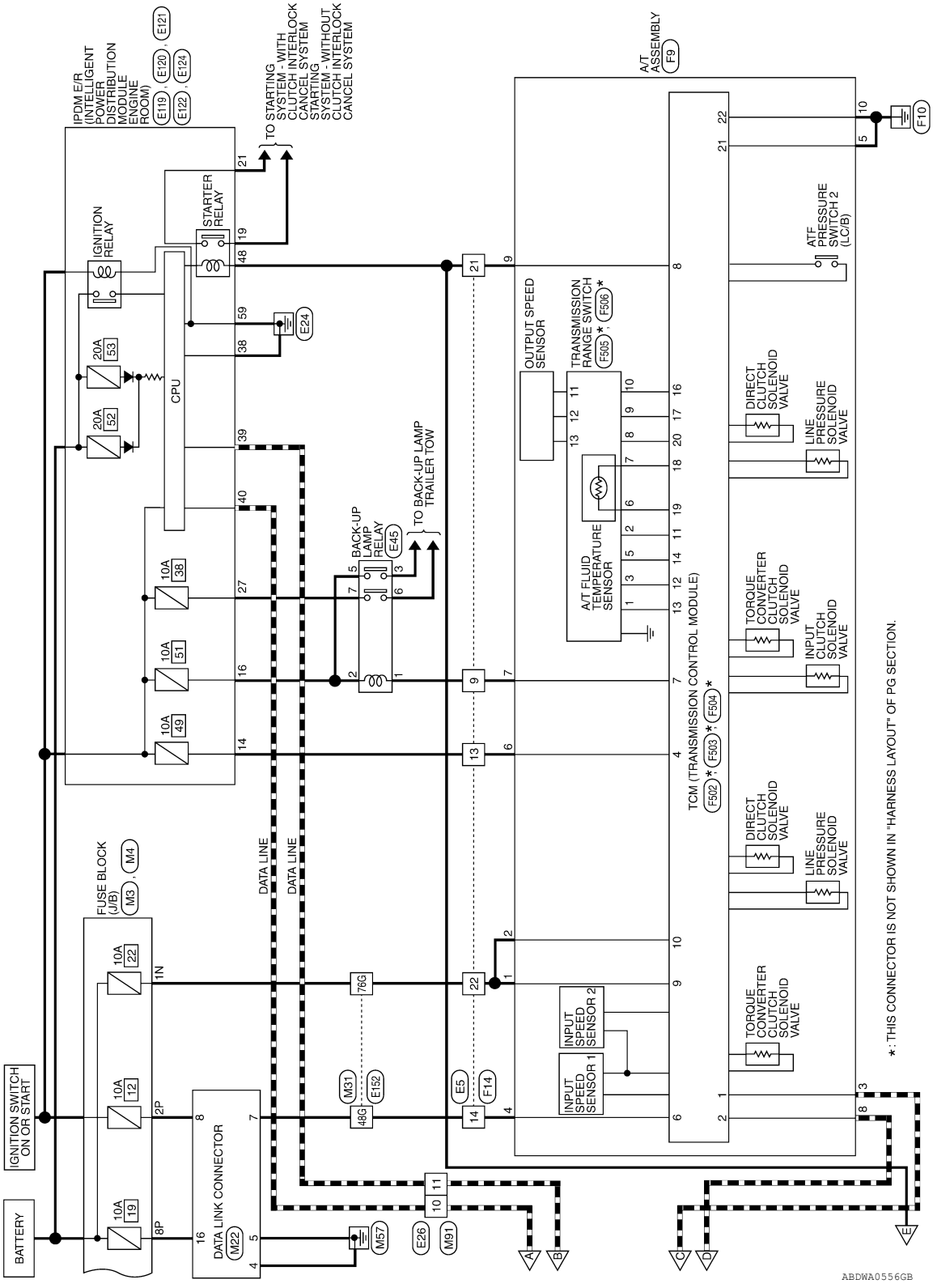
WIRING DIAGRAM

A/T CONTROL SYSTEM

Wiring Diagram

INFOID:0000000007360345

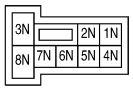



IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E119, E120, E121, E122, E124
TO STARTING SYSTEM - WITH CLUTCH INTERLOCK CANCEL SYSTEM
STARTING SYSTEM - WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM
A/T ASSEMBLY F9
IGNITION RELAY
STARTER RELAY
CPU
20A 53
20A 52
10A 38
10A 51
10A 49
BACK-UP LAMP RELAY E45
TO BACK-UP LAMP TRAILER TOW
E24
OUTPUT SPEED SENSOR
TRANSMISSION RANGE SWITCH F505*, F506*
A/T FLUID TEMPERATURE SENSOR
TCM (TRANSMISSION CONTROL MODULE) F502*, F503*, F504*
DIRECT CLUTCH SOLENOID VALVE
LINE PRESSURE SOLENOID VALVE
TORQUE CONVERTER CLUTCH SOLENOID VALVE
INPUT CLUTCH SOLENOID VALVE
ATF PRESSURE SWITCH 2 (LC/B)
F10
FUSE BLOCK (J/B) M3, M4
10A 22
10A 12
10A 19
DATA LINE
DATA LINE
76G
48G
M31
E152
E5
F14
INPUT SPEED SENSOR 2
INPUT SPEED SENSOR 1
IGNITION SWITCH ON OR START
BATTERY
DATA LINK CONNECTOR M22
M57
E26
M91
A
B
C
D
E
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.
ABDWA0556GB

A/T CONTROL SYSTEM CONNECTORS

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

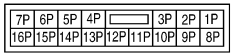
H.S.



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

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

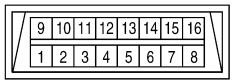
H.S.



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

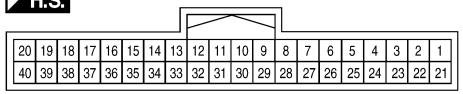
H.S.



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

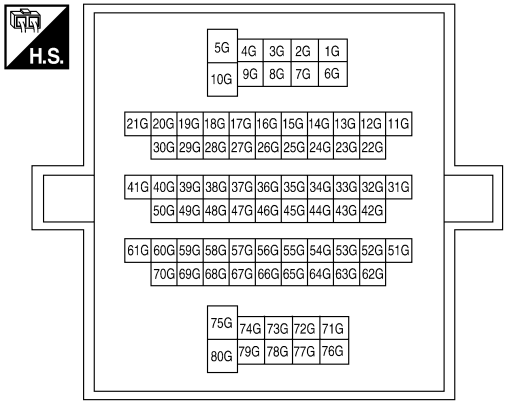
H.S.



Terminal No.	Color of Wire	Signal Name
11	P	CAN-L
12	L	CAN-H
13	GR	GROUND
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

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

H.S.



Terminal No.	Color of Wire	Signal Name
45G	B	–
48G	W	–
51G	P	–
52G	L	–
68G	LG	–
76G	R/B	–

ABDIA0166GB

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.	M156
Connector Name	A/T SHIFT SELECTOR
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	–

Connector No.	M167
Connector Name	JOINT CONNECTOR-M02
Connector Color	BLUE

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	P	–
4	P	–
7	P	–
10	L	–
13	L	–
16	L	–

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.	E39
Connector Name	STOP LAMP SWITCH (WITH A/T)
Connector Color	WHITE

H.S.

3	4
1	2

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

ABDIA0821GB

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

H.S.

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.

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

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

H.S.

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

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

H.S.

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.

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

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

H.S.

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

ABDIA0822GB

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

H.S.

30		20	10
80	70	60	50	40

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

Terminal No.	Color of Wire	Signal Name
45G	B	–
48G	W	–
51G	P	–
52G	L	–
68G	LG	–
76G	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	–

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

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	–
6	W/G	–
7	LG	–
8	P	–
9	R	–
10	B	–

AADIA0188GB

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

H.S.

20 19 18 17 16 15 14 13 12 11

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
15	–	–
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

H.S.

22 21

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

H.S.

10 9 8 7 6 5 4 3 2 1

Terminal No.	Color of Wire	Signal Name
1	BR	S1
2	W	S4
3	GR	S2
4	–	–
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

H.S.

11 12 13

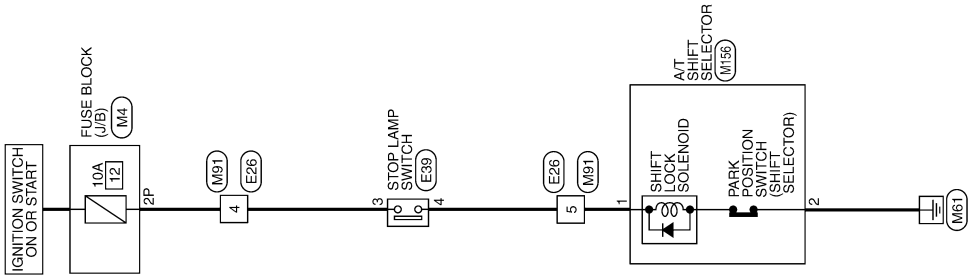
Terminal No.	Color of Wire	Signal Name
11	L	C3 (GND)
12	W	C2 (VOUT)
13	R	C1 (VIN)

AADIA0189GB

A/T SHIFT LOCK SYSTEM

Wiring Diagram

INFOID:0000000007360346



A/T SHIFT LOCK SYSTEM

ABDWA0557GB

A/T SHIFT LOCK SYSTEM CONNECTORS

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

H.S.

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

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

H.S.

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

Connector No.	M156
Connector Name	A/T SHIFT SELECTOR
Connector Color	WHITE

H.S.

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

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	–

Connector No.	E39
Connector Name	STOP LAMP SWITCH (WITH A/T)
Connector Color	WHITE

H.S.

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

ABDIA0412GB

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Chart

INFOID:0000000007360347

- **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-212, "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-116
				2. Engine speed signal	TM-121
				3. Accelerator pedal position sensor	TM-139
				4. Control cable adjustment	TM-228
				5. ATF temperature sensor	TM-141
				6. Front brake solenoid valve	TM-151
				7. CAN communication line	TM-110
				8. Fluid level and state	TM-212
				9. Line pressure test	TM-219
				10. Control valve with TCM	TM-231
			OFF vehicle	11. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
2		Shock is too large when changing D_1→ D_2.	ON vehicle	1. Accelerator pedal position sensor	TM-139
				2. Control cable adjustment	TM-228
				3. Direct clutch solenoid valve	TM-153
				4. CAN communication line	TM-110
				5. Engine speed signal	TM-121
				6. Input speed sensor	TM-116
				7. Output speed sensor and vehicle speed signal	TM-118, TM-143
				8. Fluid level and state	TM-212
				9. Control valve with TCM	TM-231
			OFF vehicle	10. Direct clutch	TM-299
3		Shock is too large when changing D_2→ D_3.	ON vehicle	1. Accelerator pedal position sensor	TM-139
				2. Control cable adjustment	TM-228
				3. High and low reverse clutch solenoid valve	TM-155
				4. CAN communication line	TM-110
				5. Engine speed signal	TM-121
				6. Input speed sensor	TM-116
				7. Output speed sensor and vehicle speed signal	TM-118, TM-143
				8. Fluid level and state	TM-212
				9. Control valve with TCM	TM-231
			OFF vehicle	10. High and low reverse clutch	TM-297

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-139
				2. Control cable adjustment	TM-228
				3. Input clutch solenoid valve	TM-149
				4. CAN communication line	TM-110
				5. Engine speed signal	TM-121
				6. Input speed sensor	TM-116
				7. Output speed sensor and vehicle speed signal	TM-118, TM-143
				8. Fluid level and state	TM-212
				9. Control valve with TCM	TM-231
			OFF vehicle	10. Input clutch	TM-287
5		Shock is too large when changing D4→D5.	ON vehicle	1. Accelerator pedal position sensor	TM-139
				2. Control cable adjustment	TM-228
				3. Front brake solenoid valve	TM-151
				4. CAN communication line	TM-110
				5. Engine speed signal	TM-121
				6. Input speed sensor	TM-116
				7. Output speed sensor and vehicle speed signal	TM-118, TM-143
				8. Fluid level and state	TM-212
				9. Control valve with TCM	TM-231
			OFF vehicle	10. Front brake (brake band)	TM-253
				11. Input clutch	TM-287
6		Shock is too large for downshift when accelerator pedal is pressed.	ON vehicle	1. Accelerator pedal position sensor	TM-139
				2. Control cable adjustment	TM-228
				3. CAN communication line	TM-110
				4. Engine speed signal	TM-121
				5. Input speed sensor	TM-116
				6. Output speed sensor and vehicle speed signal	TM-118, TM-143
				7. Fluid level and state	TM-212
				8. Control valve with TCM	TM-231
			OFF vehicle	9. Front brake (brake band)	TM-253
				10. Input clutch	TM-287
				11. High and low reverse clutch	TM-297
				12. Direct clutch	TM-299

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-139
				2. Control cable adjustment	TM-228
				3. Engine speed signal	TM-121
				4. CAN communication line	TM-110
				5. Input speed sensor	TM-116
				6. Output speed sensor and vehicle speed signal	TM-118, TM-143
				7. Fluid level and state	TM-212
				8. Control valve with TCM	TM-231
			OFF vehicle	9. Front brake (brake band)	TM-253
				10. Input clutch	TM-287
				11. High and low reverse clutch	TM-297
				12. Direct clutch	TM-299
8		Shock is too large for lock-up.	ON vehicle	1. Accelerator pedal position sensor	TM-139
				2. Control cable adjustment	TM-228
				3. Engine speed signal	TM-121
				4. CAN communication line	TM-110
				5. Input speed sensor	TM-116
				6. Output speed sensor and vehicle speed signal	TM-118, TM-143
				7. Torque converter clutch solenoid valve	TM-133
				8. Fluid level and state	TM-212
				9. Control valve with TCM	TM-231
			OFF vehicle	10. Torque converter	TM-264
9		Shock is too large during engine brake.	ON vehicle	1. Accelerator pedal position sensor	TM-139
				2. Control cable adjustment	TM-228
				3. CAN communication line	TM-110
				4. Fluid level and state	TM-212
				5. Control valve with TCM	TM-231
			OFF vehicle	6. Front brake (brake band)	TM-253
				7. Input clutch	TM-287
				8. High and low reverse clutch	TM-297
				9. Direct clutch	TM-299

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-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Direct clutch solenoid valve	TM-153
				4. Line pressure test	TM-219
				5. CAN communication line	TM-110
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Direct clutch	TM-299
11		Gear does not change from $D_2 \rightarrow D_3$.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. High and low reverse clutch solenoid valve	TM-155
				4. Line pressure test	TM-219
				5. CAN communication line	TM-110
				6. Control valve with TCM	TM-231
			OFF vehicle	7. High and low reverse clutch	TM-297
12		Gear does not change from $D_3 \rightarrow D_4$.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Input clutch solenoid valve	TM-149
				4. Front brake solenoid valve	TM-151
				5. Line pressure test	TM-219
				6. CAN communication line	TM-110
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Input clutch	TM-287
13		Gear does not change from $D_4 \rightarrow D_5$.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Front brake solenoid valve	TM-151
				4. Direct clutch solenoid valve	TM-153
				5. Input speed sensor	TM-116
				6. Line pressure test	TM-219
				7. CAN communication line	TM-110
				8. Control valve with TCM	TM-231
			OFF vehicle	9. Front brake (brake band)	TM-264
				10. Input clutch	TM-287

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
14	No Down Shift	In “D” range, does not downshift to 4GR.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Front brake solenoid valve	TM-151
				4. Direct clutch solenoid valve	TM-153
				5. CAN communication line	TM-110
				6. Line pressure test	TM-219
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Front brake (brake band)	TM-264
				9. Input clutch	TM-287
15		In “D” or “3” range, does not downshift to 3GR.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Input clutch solenoid valve	TM-149
				4. Front brake solenoid valve	TM-151
				5. CAN communication line	TM-110
				6. Line pressure test	TM-219
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Input clutch	TM-287
16		In “D” or “2” range, does not downshift to 2GR.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. High and low reverse clutch solenoid valve	TM-155
				4. CAN communication line	TM-110
				5. Line pressure test	TM-219
				6. Control valve with TCM	TM-231
			OFF vehicle	7. High and low reverse clutch	TM-297
17		In “D” or “1” range, does not downshift to 1GR.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Direct clutch solenoid valve	TM-153
				4. CAN communication line	TM-110
				5. Line pressure test	TM-219
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Direct clutch	TM-299

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
18	Slips/Will Not engage	When “D” position, remains in 1GR.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Direct clutch solenoid valve	TM-153
				4. Line pressure test	TM-219
				5. CAN communication line	TM-110
				6. Control valve with TCM	TM-231
			OFF vehicle	7. 3rd one-way clutch	TM-285
				8. 1st one-way clutch	TM-253
				9. Gear system	TM-253
				10. Reverse brake	TM-264
				11. Forward one-way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				12. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
19		When “D” position, remains in 2GR.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Low coast brake solenoid valve	TM-157
				4. Line pressure test	TM-219
				5. CAN communication line	TM-110
				6. Control valve with TCM	TM-231
			OFF vehicle	7. 3rd one-way clutch	TM-285
				8. Gear system	TM-253
				9. Direct clutch	TM-299
				10. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
20	Slips/Will Not engage	When “D” position, remains in 3GR.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Line pressure test	TM-219
				4. CAN communication line	TM-110
				5. Control valve with TCM	TM-231
			OFF vehicle	6. 3rd one-way clutch	TM-285
				7. Gear system	TM-253
				8. High and low reverse clutch	TM-297
				9. Forward one-way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				10. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
21		When “D” position, remains in 4GR.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Input clutch solenoid valve	TM-149
				4. Direct clutch solenoid valve	TM-153
				5. High and low reverse clutch solenoid valve	TM-155
				6. Low coast brake solenoid valve	TM-157
				7. Front brake solenoid valve	TM-151
				8. Line pressure test	TM-219
				9. CAN communication line	TM-110
				10. Control valve with TCM	TM-231
			OFF vehicle	11. Input clutch	TM-287
				12. Gear system	TM-253
				13. High and low reverse clutch	TM-297
				14. Direct clutch	TM-299

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
22	Slips/Will Not Engage	When “D” position, remains in 5GR.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Front brake solenoid valve	TM-151
				4. Line pressure test	TM-219
				5. CAN communication line	TM-110
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Front brake (brake band)	TM-264
				8. Input clutch	TM-287
				9. Gear system	TM-253
				10. High and low reverse clutch	TM-297
23		Vehicle cannot be started from D_1.	ON vehicle	1. Fluid level and state	TM-212
				2. Accelerator pedal position sensor	TM-139
				3. Line pressure test	TM-219
				4. CAN communication line	TM-110
				5. Control valve with TCM	TM-231
			OFF vehicle	6. Torque converter	TM-264
				7. Oil pump assembly	TM-282
				8. 3rd one-way clutch	TM-285
				9. 1st one-way clutch	TM-253
				10. Gear system	TM-253
				11. Reverse brake	TM-264
				12. Forward one-way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
24		Does not lock-up.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Engine speed signal	TM-121
				4. Input speed sensor	TM-116
				5. Torque converter clutch solenoid valve	TM-133
				6. CAN communication line	TM-110
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282

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-212
				2. Line pressure test	TM-219
				3. Engine speed signal	TM-121
				4. Input speed sensor	TM-116
				5. Torque converter clutch solenoid valve	TM-133
				6. CAN communication line	TM-110
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282
26		Lock-up is not released.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Engine speed signal	TM-121
				4. Input speed sensor	TM-116
				5. Torque converter clutch solenoid valve	TM-133
				6. CAN communication line	TM-110
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282
27		No shock at all or the clutch slips when vehicle changes speed $D_1 \rightarrow D_2$.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Direct clutch solenoid valve	TM-153
				4. CAN communication line	TM-110
				5. Line pressure test	TM-219
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264
				8. Oil pump assembly	TM-282
				9. 3rd one-way clutch	TM-285
				10. Gear system	TM-253
				11. Direct clutch	TM-299
				12. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264

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 D2 → D3.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. High and low reverse clutch solenoid valve	TM-155
				4. CAN communication line	TM-110
				5. Line pressure test	TM-219
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264
				8. Oil pump assembly	TM-282
				9. 3rd one-way clutch	TM-285
				10. Gear system	TM-253
				11. High and low reverse clutch	TM-297
				12. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
29		No shock at all or the clutch slips when vehicle changes speed D3 → D4.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Input clutch solenoid valve	TM-149
				4. Front brake solenoid valve	TM-151
				5. CAN communication line	TM-110
				6. Line pressure test	TM-219
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282
				10. Input clutch	TM-287
				11. Gear system	TM-253
				12. High and low reverse clutch	TM-297
				13. Direct clutch	TM-299

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.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Front brake solenoid valve	TM-151
				4. Direct clutch solenoid valve	TM-153
				5. CAN communication line	TM-110
				6. Line pressure test	TM-219
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282
				10. Front brake (brake band)	TM-264
				11. Input clutch	TM-287
				12. Gear system	TM-253
				13. High and low reverse clutch	TM-297
31		When you press the accelerator pedal and shift speed D5→ D4, the engine idles or the transmission slips.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Front brake solenoid valve	TM-151
				4. Direct clutch solenoid valve	TM-153
				5. CAN communication line	TM-110
				6. Line pressure test	TM-219
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282
				10. Input clutch	TM-287
				11. Gear system	TM-253
				12. High and low reverse clutch	TM-297
				13. Direct clutch	TM-299

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
32	Slips/Will Not engage	When you press the accelerator pedal and shift speed D4→ D3, the engine idles or the transmission slips.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Input clutch solenoid valve	TM-149
				4. Front brake solenoid valve	TM-151
				5. CAN communication line	TM-110
				6. Line pressure test	TM-219
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282
				10. 3rd one-way clutch	TM-285
				11. Gear system	TM-253
				12. High and low reverse clutch	TM-297
				13. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				14. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
33		When you press the accelerator pedal and shift speed D3→ D2, the engine idles or the transmission slips.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. High and low reverse clutch solenoid valve	TM-155
				4. Direct clutch solenoid valve	TM-153
				5. CAN communication line	TM-110
				6. Line pressure test	TM-219
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282
				10. 3rd one-way clutch	TM-285
				11. Gear system	TM-253
				12. Direct clutch	TM-299
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
34	Slips/Will Not Engage	When you press the accelerator pedal and shift speed D2→ D1, the engine idles or the transmission slips.	ON vehicle	1. Fluid level and state	TM-212
				2. Output speed sensor and vehicle speed signal	TM-118, TM-143
				3. Direct clutch solenoid valve	TM-153
				4. CAN communication line	TM-110
				5. Line pressure test	TM-219
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264
				8. Oil pump assembly	TM-282
				9. 3rd one-way clutch	TM-285
				10. 1st one-way clutch	TM-253
				11. Gear system	TM-253
				12. Reverse brake	TM-264
				13. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				14. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
35		With selector lever in “D” position, acceleration is extremely poor.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Accelerator pedal position sensor	TM-139
				4. CAN communication line	TM-110
				5. Transmission range switch	TM-114
				6. Control cable adjustment	TM-228
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282
				10. 1st one-way clutch	TM-253
				11. Gear system	TM-253
				12. Reverse brake	TM-264
				13. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				14. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264

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-212
				2. Line pressure test	TM-219
				3. Accelerator pedal position sensor	TM-139
				4. High and low reverse clutch solenoid valve	TM-155
				5. CAN communication line	TM-110
				6. Transmission range switch	TM-114
				7. Control cable adjustment	TM-228
				8. Control valve with TCM	TM-231
			OFF vehicle	9. Gear system	TM-253
				10. Output shaft	TM-264
				11. Reverse brake	TM-264
37		While starting off by accelerating in 1GR, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Accelerator pedal position sensor	TM-139
				4. CAN communication line	TM-110
				5. Control valve with TCM	TM-231
			OFF vehicle	6. Torque converter	TM-264
				7. Oil pump assembly	TM-282
				8. 3rd one-way clutch	TM-285
				9. 1st one-way clutch	TM-253
				10. Gear system	TM-253
				11. Reverse brake	TM-264
				12. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
38		While accelerating in 2GR, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Accelerator pedal position sensor	TM-139
				4. CAN communication line	TM-110
				5. Direct clutch solenoid valve	TM-153
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264
				8. Oil pump assembly	TM-282
				9. 3rd one-way clutch	TM-285
				10. Gear system	TM-253
				11. Direct clutch	TM-299
				12. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
39	Slips/Will Not Engage	While accelerating in 3GR, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Accelerator pedal position sensor	TM-139
				4. CAN communication line	TM-110
				5. High and low reverse clutch solenoid valve	TM-155
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264
				8. Oil pump assembly	TM-282
				9. 3rd one-way clutch	TM-285
				10. Gear system	TM-253
				11. High and low reverse clutch	TM-297
				12. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				13. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
40		While accelerating in 4GR, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Accelerator pedal position sensor	TM-139
				4. CAN communication line	TM-110
				5. Input clutch solenoid valve	TM-149
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264
				8. Oil pump assembly	TM-282
				9. Input clutch	TM-287
				10. Gear system	TM-253
				11. High and low reverse clutch	TM-297
				12. Direct clutch	TM-299

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
41	Slips/Will Not Engage	While accelerating in 5GR, engine races or slippage occurs.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Accelerator pedal position sensor	TM-139
				4. CAN communication line	TM-110
				5. Front brake solenoid valve	TM-151
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264
				8. Oil pump assembly	TM-282
				9. Front brake (brake band)	TM-264
				10. Input clutch	TM-287
				11. Gear system	TM-253
				12. High and low reverse clutch	TM-297
42		Slips at lock-up.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Engine speed signal	TM-121
				4. Input speed sensor	TM-116
				5. Torque converter clutch solenoid valve	TM-133
				6. CAN communication line	TM-110
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Torque converter	TM-264
				9. Oil pump assembly	TM-282
43		No creep at all.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Accelerator pedal position sensor	TM-139
				4. Direct clutch solenoid valve	TM-153
				5. Transmission range switch	TM-114
				6. CAN communication line	TM-110
				7. Control cable adjustment	TM-228
				8. Control valve with TCM	TM-231
			OFF vehicle	9. Torque converter	TM-264
				10. Oil pump assembly	TM-282
				11. 1st one-way clutch	TM-253
				12. Gear system	TM-253
				13. Reverse brake	TM-264
				14. Direct clutch	TM-299
				15. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				16. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264

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-212
				2. Line pressure test	TM-219
				3. Transmission range switch	TM-114
				4. Control cable adjustment	TM-228
				5. Control valve with TCM	TM-231
			OFF vehicle	6. Oil pump assembly	TM-282
				7. Gear system	TM-253
				8. Output shaft	TM-264
45		With selector lever in “D” position, driving is not possible.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Transmission range switch	TM-114
				4. Control cable adjustment	TM-228
				5. Control valve with TCM	TM-231
			OFF vehicle	6. Torque converter	TM-264
				7. Oil pump assembly	TM-282
				8. 1st one-way clutch	TM-253
				9. Gear system	TM-253
				10. Reverse brake	TM-264
				11. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				12. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
46		With selector lever in “R” position, driving is not possible.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Transmission range switch	TM-114
				4. Control cable adjustment	TM-228
				5. Control valve with TCM	TM-231
			OFF vehicle	6. Gear system	TM-253
				7. Output shaft	TM-264
				8. Reverse brake	TM-264
47	Others	Shift point is high in “D” position.	ON vehicle	1. Output speed sensor and vehicle speed signal	TM-118, TM-143
				2. Accelerator pedal position sensor	TM-139
				3. CAN communication line	TM-110
				4. ATF temperature sensor	TM-141
				5. Control valve with TCM	TM-231

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
48	Others	Shift point is low in “D” position.	ON vehicle	1. Output speed sensor and vehicle speed signal	TM-118, TM-143
				2. Accelerator pedal position sensor	TM-139
				3. CAN communication line	TM-110
				4. Control valve with TCM	TM-231
49		Judder occurs during lock-up.	ON vehicle	1. Fluid level and state	TM-212
				2. Engine speed signal	TM-121
				3. Input speed sensor	TM-116
				4. Output speed sensor and vehicle speed signal	TM-118, TM-143
				5. Accelerator pedal position sensor	TM-139
				6. CAN communication line	TM-110
				7. Torque converter clutch solenoid valve	TM-133
				8. Control valve with TCM	TM-231
			OFF vehicle	9. Torque converter	TM-264
50		Strange noise in “R” position.	ON vehicle	1. Fluid level and state	TM-212
				2. Engine speed signal	TM-121
				3. CAN communication line	TM-110
				4. Control valve with TCM	TM-231
			OFF vehicle	5. Torque converter	TM-264
				6. Oil pump assembly	TM-282
				7. Gear system	TM-253
				8. High and low reverse clutch	TM-297
				9. Reverse brake	TM-264
51		Strange noise in “N” position.	ON vehicle	1. Fluid level and state	TM-212
				2. Engine speed signal	TM-121
				3. CAN communication line	TM-110
				4. Control valve with TCM	TM-231
			OFF vehicle	5. Torque converter	TM-264
				6. Oil pump assembly	TM-282
				7. Gear system	TM-253
52		Strange noise in “D” position.	ON vehicle	1. Fluid level and state	TM-212
				2. Engine speed signal	TM-121
				3. CAN communication line	TM-110
				4. Control valve with TCM	TM-231
			OFF vehicle	5. Torque converter	TM-264
				6. Oil pump assembly	TM-282
				7. Gear system	TM-253
				8. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
53	Others	Vehicle does not decelerate by engine brake.	ON vehicle	1. Transmission range switch	TM-114
				2. Fluid level and state	TM-212
				3. Control cable adjustment	TM-228
				4. 1st position switch	TM-169
				5. CAN communication line	TM-110
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Input clutch	TM-287
				8. High and low reverse clutch	TM-297
				9. Direct clutch	TM-299
54		Engine brake does not operate in “2” position.	ON vehicle	1. Transmission range switch	TM-114
				2. Fluid level and state	TM-212
				3. Control cable adjustment	TM-228
				4. CAN communication line	TM-110
				5. Control valve with TCM	TM-231
			OFF vehicle	6. Front brake (brake band)	TM-264
				7. Input clutch	TM-287
				8. High and low reverse clutch	TM-297
55		Engine brake does not operate in “1” position.	ON vehicle	1. Transmission range switch	TM-114
				2. Fluid level and state	TM-212
				3. Control cable adjustment	TM-228
				4. 1st position switch	TM-169
				5. CAN communication line	TM-110
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Input clutch	TM-287
				8. High and low reverse clutch	TM-297
				9. Direct clutch	TM-299

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
56	Others	Maximum speed low.	ON vehicle	1. Fluid level and state	TM-212
				2. Line pressure test	TM-219
				3. Accelerator pedal position sensor	TM-139
				4. CAN communication line	TM-110
				5. Direct clutch solenoid valve	TM-153
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264
				8. Oil pump assembly	TM-282
				9. Input clutch	TM-287
				10. Gear system	TM-253
				11. High and low reverse clutch	TM-297
				12. Direct clutch	TM-299
				13. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				14 Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
57		Extremely large creep.	ON vehicle	1. Engine idle speed	EC-116
				2. CAN communication line	TM-110
			OFF vehicle	3. Torque converter	TM-264
58		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-114
				2. Control cable adjustment	TM-228
			OFF vehicle	3. Parking pawl components	TM-253
59		Vehicle runs with transmission in “P” position.	ON vehicle	1. Transmission range switch	TM-114
				2. Fluid level and state	TM-212
				3. Control cable adjustment	TM-228
				4. Control valve with TCM	TM-231
				5. Parking pawl components	TM-253
			OFF vehicle	6. Gear system	TM-253

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
60	Others	Vehicle runs with transmission in “N” position.	ON vehicle	1. Transmission range switch	TM-114
				2. Fluid level and state	TM-212
				3. Control cable adjustment	TM-228
				4. Control valve with TCM	TM-231
			OFF vehicle	5. Input clutch	TM-287
				6. Gear system	TM-253
				7. Direct clutch	TM-299
				8. Reverse brake	TM-264
				9. Forward one- way clutch (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
				10. Forward brake (Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-77.)	TM-264
61		Engine does not start in “N” or “P” position.	ON vehicle	1. Ignition switch and starter	PG-20, STR-9
				2. Control cable adjustment	TM-228
				3. Transmission range switch	TM-114
62		Engine starts in positions other than “N” or “P”.	ON vehicle	1. Ignition switch and starter	PG-20, STR-9
				2. Control cable adjustment	TM-228
				3. Transmission range switch	TM-114
63		Engine stall.	ON vehicle	1. Fluid level and state	TM-212
				2. Engine speed signal	TM-121
				3. Input speed sensor	TM-116
				4. Torque converter clutch solenoid valve	TM-133
				5. CAN communication line	TM-110
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264
64		Engine stalls when select lever shifted “N”→ “D”, “R”.	ON vehicle	1. Fluid level and state	TM-212
				2. Engine speed signal	TM-121
				3. Input speed sensor	TM-116
				4. Torque converter clutch solenoid valve	TM-133
				5. CAN communication line	TM-110
				6. Control valve with TCM	TM-231
			OFF vehicle	7. Torque converter	TM-264

No.	Items	Symptom	Condition	Diagnostic Item	Reference page
65	Others	Engine speed does not return to idle.	ON vehicle	1. Fluid level and state	TM-212
				2.Direct clutch solenoid valve	TM-153
				3. Front brake solenoid valve	TM-151
				4. Accelerator pedal position sensor	TM-139
				5. Output speed sensor and vehicle speed signal	TM-118, TM-143
				6. CAN communication line	TM-110
				7. Control valve with TCM	TM-231
			OFF vehicle	8. Front brake (brake band)	TM-264
				9. Direct clutch	TM-299
66		O/D OFF indicator lamp does not come on.	ON vehicle	1. CAN communication line	TM-110
				2. Combination meter	MWI-24
				3. TCM power supply	TM-161

PRECAUTION

PRECAUTIONS

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

INFOID:0000000007360348

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 FOR WORK

- 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.

Precaution for On Board Diagnosis (OBD) System of A/T and Engine

INFOID:0000000007360349

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.

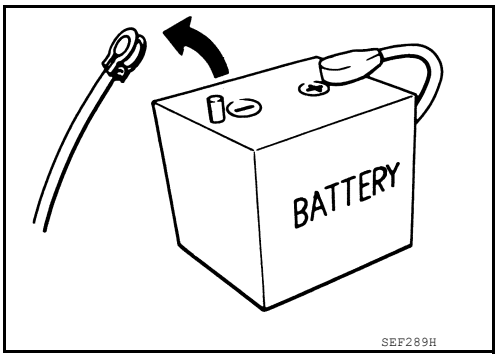
CAUTION:

- **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.**

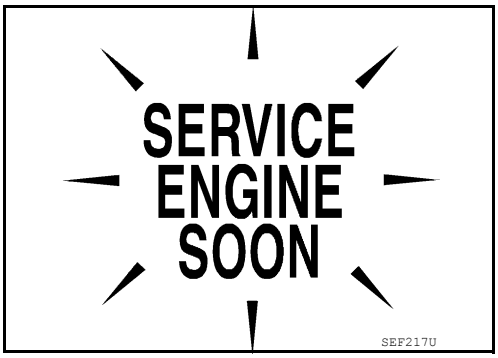
Precaution

INFOID:0000000007360350

- **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-13, "Fluids and Lubricants".
- 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-209, "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-214, "Changing the A/T Fluid (ATF)".

Service Notice or Precaution

INFOID:0000000007360351

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-215, "A/T Fluid Cooler Cleaning". For radiator replacement, refer to CO-15, "Removal and Installation".

OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. Refer to the table on TM-102, "CONSULT 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-100, "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-100, "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-63, "Description".**

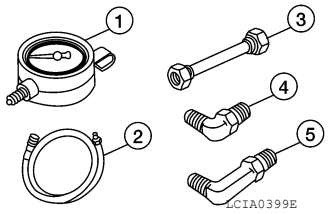
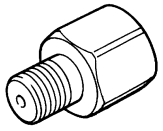
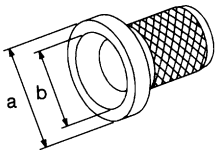
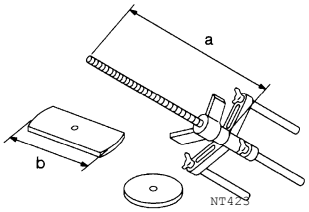
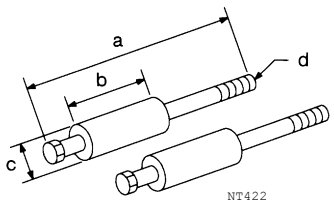
PREPARATION

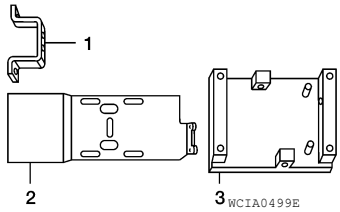
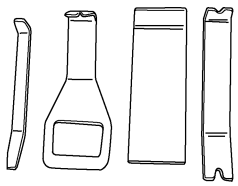
PREPARATION

Special Service Tool

INFOID:0000000007360352

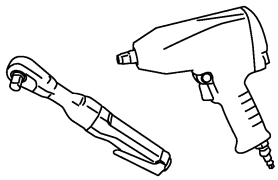
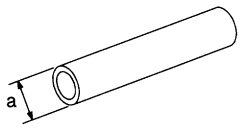
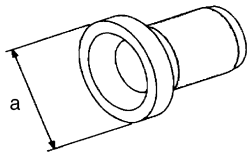
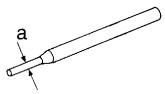
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

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 	Removing trim components

Commercial Service Tool

INFOID:0000000007360353

Tool name	Description
Power tool 	Loosening bolts and nuts
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

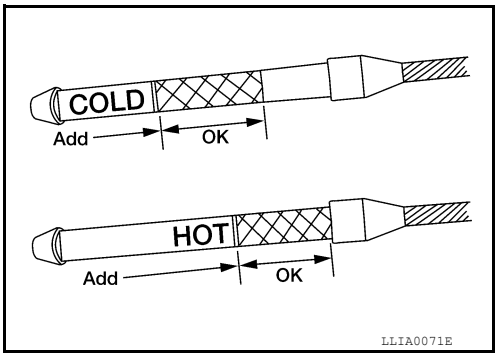
A/T FLUID

Checking the A/T Fluid (ATF)

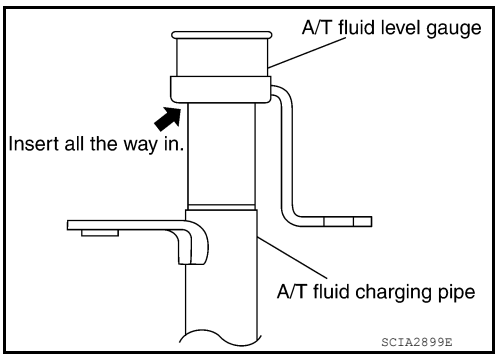
INFOID:0000000007360354

CAUTION:
If using the vehicle for towing, the A/T fluid must be replaced as specified. Refer to MA-8, "Introduction of Periodic Maintenance".

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.

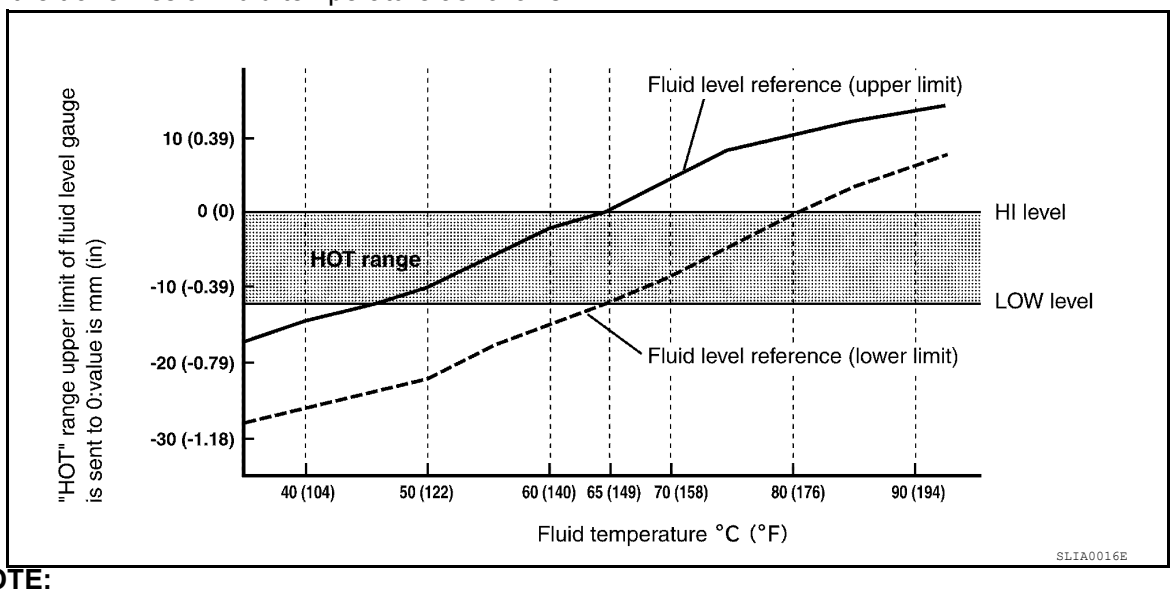


e. Re-insert the A/T fluid level gauge into the A/T fluid charging pipe until the cap contacts the top of the A/T fluid charging pipe as shown.
CAUTION:
To check A/T fluid level, insert the A/T fluid level gauge until the cap contacts the top of the A/T fluid charging pipe, with the gauge reversed from 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-247, "Removal and Installation (2WD)" for (2WD) or TM-249, "Removal and Installation (4WD)" for (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 transmission fluid temperature to fall to approximately 65°C (149°F). Use the CONSULT to monitor the transmission fluid temperature as follows:

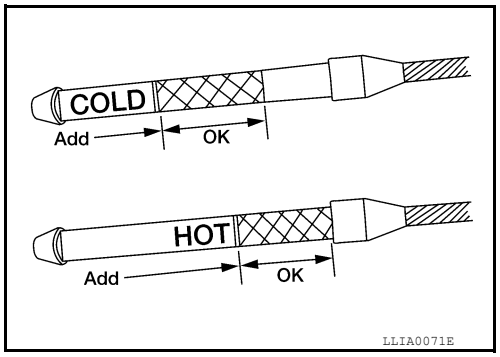


NOTE:
The transmission fluid level will be significantly affected by the transmission fluid temperature as shown. Therefore monitor the transmission fluid temperature data using the CONSULT.

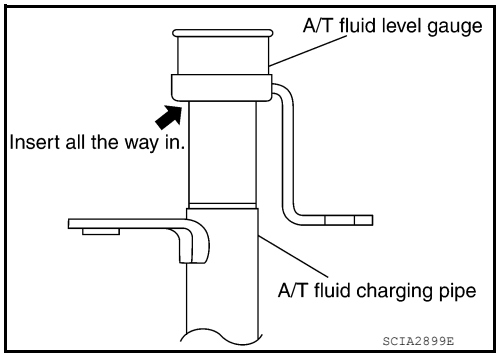
a. Connect CONSULT to data link connector.
b. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT.
c. Read out the value of “ATF TEMP 1”.

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-253, "Exploded View". 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.

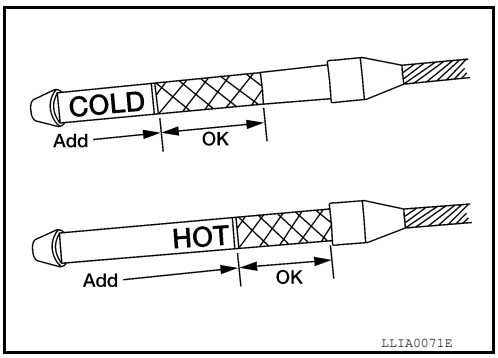
A/T fluid level gauge bolt : Refer to TM-247, "Removal and Installation (2WD)" for (2WD) or TM-249, "Removal and Installation (4WD)" for (4WD).

Changing the A/T Fluid (ATF)

INFOID:0000000007360355

CAUTION:
If using the vehicle for towing, the A/T fluid must be replaced as specified. Refer to MA-8, "Introduction of Periodic Maintenance".

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-253, "Exploded View".

- 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.

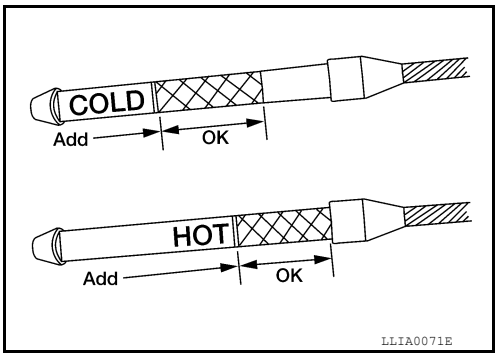
A/T fluid grade and capacity : Refer to MA-13, "Fluids and Lubricants".

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.**
- **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-247, "Removal and Installation (2WD)" for (2WD) or TM-249, "Removal and Installation (4WD)" for (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-247, "Removal and Installation (2WD)" for (2WD) or TM-249, "Removal and Installation (4WD)" for (4WD).**

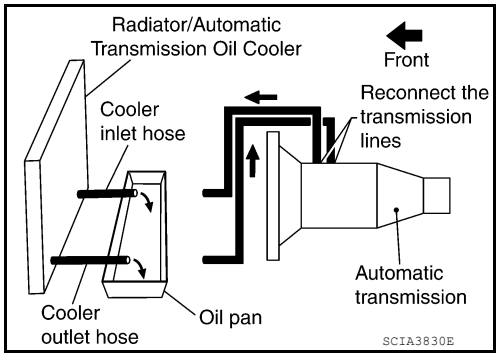
A/T Fluid Cooler Cleaning

INFOID:0000000007360356

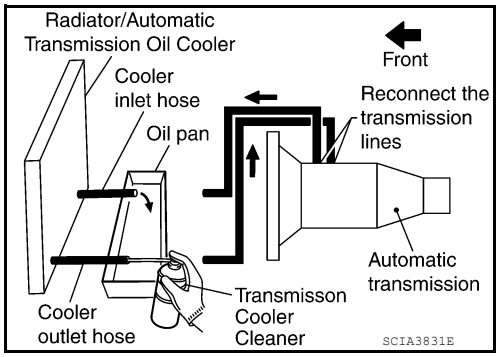
Whenever an A/T is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block 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.

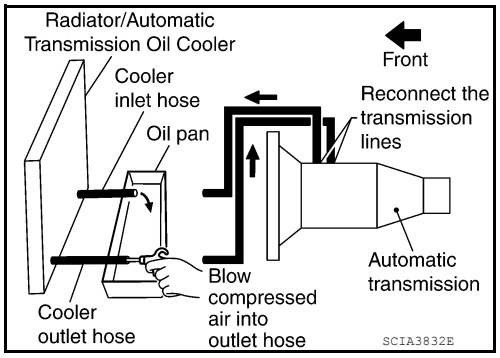
A/T FLUID COOLER CLEANING PROCEDURE

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.





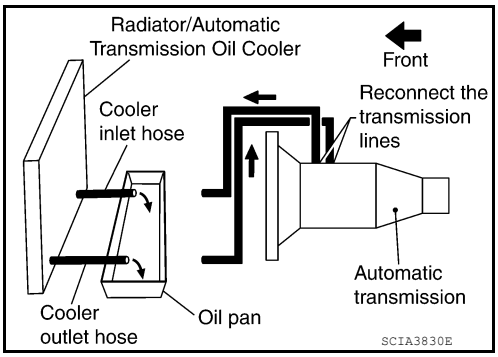
9. Blow compressed air regulated to 5 - 9 kg/cm^2 (71 - 128 psi) through the cooler outlet hose for 10 seconds to force out any remaining fluid.

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 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".

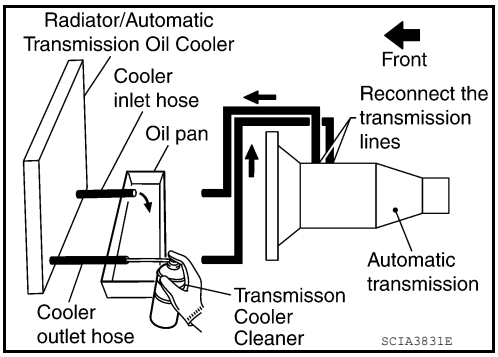
A/T FLUID COOLER DIAGNOSIS PROCEDURE

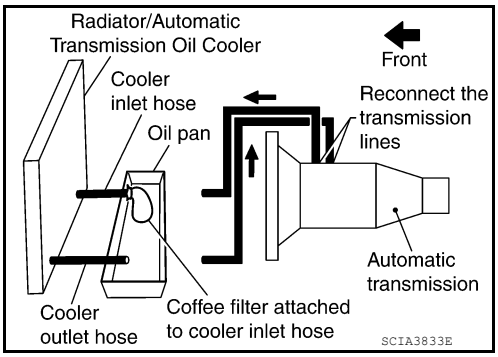
NOTE:
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

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.

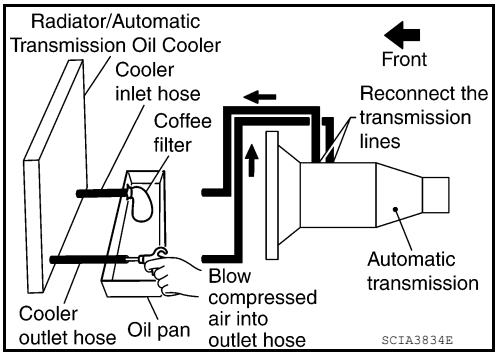


5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.
   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray cooler cleaner only with adequate ventilation.**
   - **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.





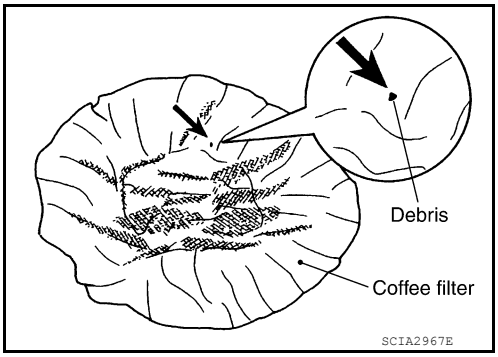
8. Insert the tip of an air gun into the end of the cooler outlet hose.
9. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
10. Blow compressed air regulated to 5 - 9 kg/cm^2 (71 - 128 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
11. Remove the coffee filter from the end of the cooler inlet hose.
12. Perform A/T fluid cooler inspection. Refer to "A/T FLUID COOLER INSPECTION PROCEDURE".



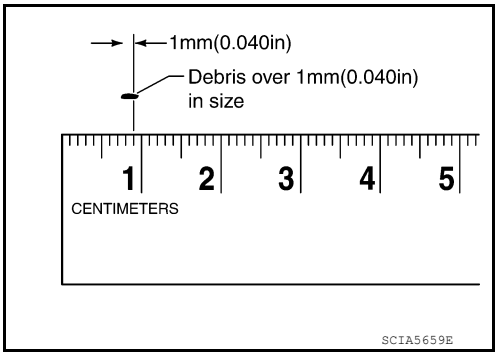
A/T FLUID COOLER INSPECTION PROCEDURE

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-15, "Removal and Installation".



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:0000000007360357

A/T FLUID CHECK

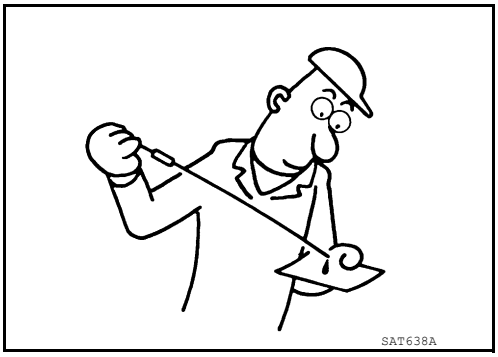
Fluid Leakage and Fluid Level Check

- Inspect for fluid leakage and check the fluid level. Refer to TM-212, "Checking 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.



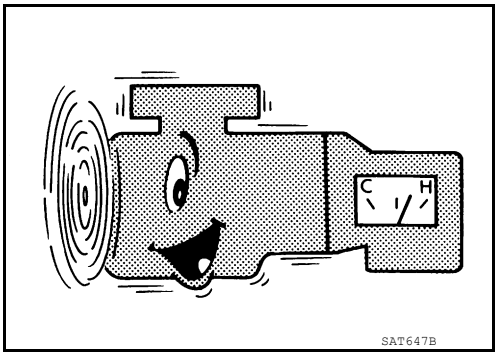
Stall Test

INFOID:0000000007360358

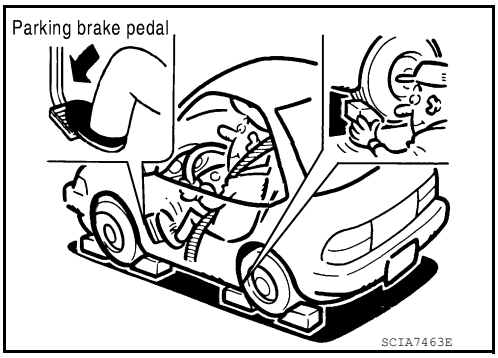
STALL TEST

Stall Test Procedure

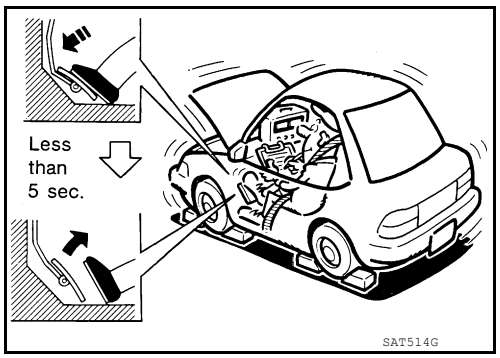
1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
2. Drive for about 10 minutes to warm up the vehicle so that the A/T fluid temperature is 50 to 80°C (122 to 176°F). Inspect the amount of ATF. Replenish if necessary.



3. Securely engage the parking brake so that the tires do not turn.



4. Engine start, apply foot brake, and place selector lever 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-324, "Stall Speed"

7. Move the selector lever 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 selector lever in “R” position.

Judgment of Stall Test

	Selector lever 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

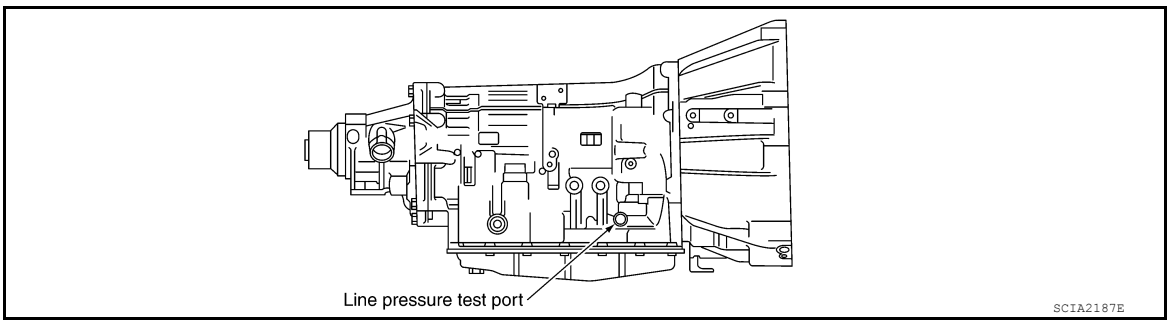
Does not shift-up D position 1 → 2	Slipping in 2GR, 3GR, 4GR	Direct clutch slippage
Does not shift-up D position 2 → 3	Slipping in 3GR, 4GR, 5GR	High and low reverse clutch slippage
Does not shift-up D position 3 → 4	Slipping in 4GR, 5GR	Input clutch slippage
Does not shift-up D position 4 → 5	Slipping in 5GR	Front brake slippage

Line Pressure Test

INFOID:0000000007360359

LINE PRESSURE TEST

Line Pressure Test Port

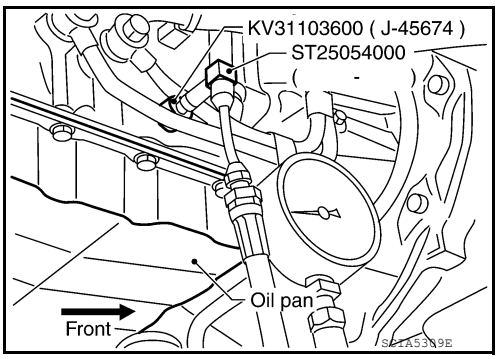


Line Pressure Test Procedure

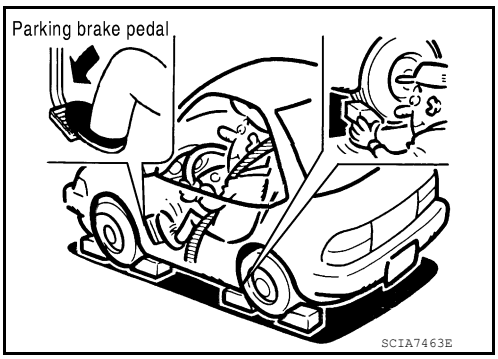
1. Inspect the amount of engine oil and replenish if necessary.

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.



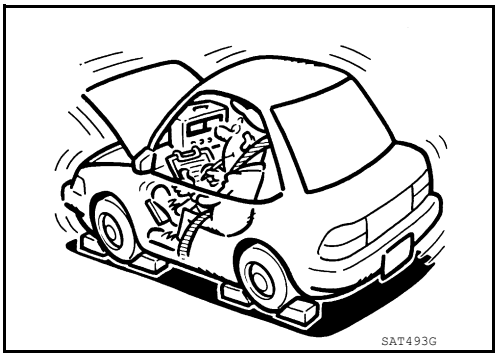
4. Securely engage the parking brake so that the tires do not turn.



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.

: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-324, "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

Description

INFOID:0000000007360360

ROAD TEST

- The road test inspects overall performance of the A/T and analyzes possible malfunction causes.
- The road test is carried out in the following three stages.

1. Check before engine is started. Refer to TM-222.
2. Check at idle. Refer to TM-222.
3. Cruise test
   - Inspect all the items from Part 1 to Part 3. Refer to TM-223, TM-225, TM-225.

- Before beginning the road test, check the test procedure and inspection items.
- Test all inspection items until the symptom is uncovered. Diagnose NG items when all road tests are complete.

Check Before Engine Is Started

INFOID:0000000007360361

1.CHECK O/D OFF INDICATOR LAMP

1. Park vehicle on level surface.
2. Move selector lever 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 light up for about 2 seconds?

YES >> 1. Turn ignition switch “OFF”.
2. Perform self-diagnostics and record all NG items on the diagnostic worksheet. Refer to TM-102, "CONSULT Function (TRANSMISSION)", TM-107, "Diagnosis Procedure without CONSULT".
3. Go to TM-222, "Check at Idle".

NO >> Stop the test and go to TM-185, "Symptom Chart".

Check at Idle

INFOID:0000000007360362

1.CHECK STARTING THE ENGINE

1. Park vehicle on level surface.
2. Move selector lever 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-185, "Symptom Chart".

2.CHECK STARTING THE ENGINE

1. Turn ignition switch to “ON” position.
2. Move selector lever 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-185, "Symptom Chart".
NO >> GO TO 3.

3.CHECK “P” POSITION FUNCTIONS

1. Move selector lever 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 4.
NO >> GO TO 4.

4.CHECK “N” POSITION FUNCTIONS

1. Start the engine.
2. Move selector lever to “N” position.
3. Release the parking brake.

Does vehicle move forward or backward?

YES >> Record the malfunction, GO TO 5.
NO >> GO TO 5.

5.CHECK SHIFT SHOCK

1. Engage the brake.
2. Move selector lever to “D” position.

When the transmission is shifted from “N” to “D”, is there an excessive shock?

YES >> Record the malfunction, GO TO 6.
NO >> GO TO 6.

6.CHECK “R” POSITION FUNCTIONS

1. Engage the brake.
2. Move selector lever to “R” position.
3. Release the brake for 4 to 5 seconds.

Does the vehicle creep backward?

YES >> GO TO 7.
NO >> Record the malfunction, GO TO 7.

7.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-223, "Cruise Test - Part 1".
NO >> Record the malfunction and go to TM-223, "Cruise Test - Part 1".

Cruise Test - Part 1

INFOID:0000000007360363

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 selector lever to “P” position.
4. Start the engine.
5. Set overdrive control switch to ON position (without manual mode).
6. Move selector lever to “D” position.
7. Press the accelerator pedal about half way down to accelerate the vehicle.

With CONSULT
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-323, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT
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-323, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT
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-323, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT
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-323, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT
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-323, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT
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
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
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

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-225, "Cruise Test - Part 2".

NO >> Record the malfunction and go to TM-225, "Cruise Test - Part 2".

Cruise Test - Part 2

INFOID:0000000007360364

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-323, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT

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-323, "Vehicle Speed at Which Gear Shifting Occurs".

With CONSULT

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.

Does the A/T shift-up D3 → D4 and apply the engine brake?

YES >> 1. Stop the vehicle.
2. Go to TM-225, "Cruise Test - Part 3".

NO >> Record the malfunction and go to TM-225, "Cruise Test - Part 3".

Cruise Test - Part 3

INFOID:0000000007360365

1. CHECK SHIFT-DOWN

1. Confirm overdrive control switch is ON position.
2. Confirm gear selector lever 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

Read the gear position.

Does A/T shift from D_5 to D_4 (O/D OFF)?

YES >> GO TO 2.

NO >> Record the malfunction, GO TO 2.

2. CHECK SHIFT-DOWN

During D_4 driving, move gear selector from D → 3 → 2 → 1.

With CONSULT
Read the gear position.

Is downshifting correctly performed?

YES >> GO TO 3.
NO >> Record the malfunction, GO TO 3.

3. CHECK ENGINE BRAKE

Check engine brake.

Does engine braking effectively reduce speed in 1st position?

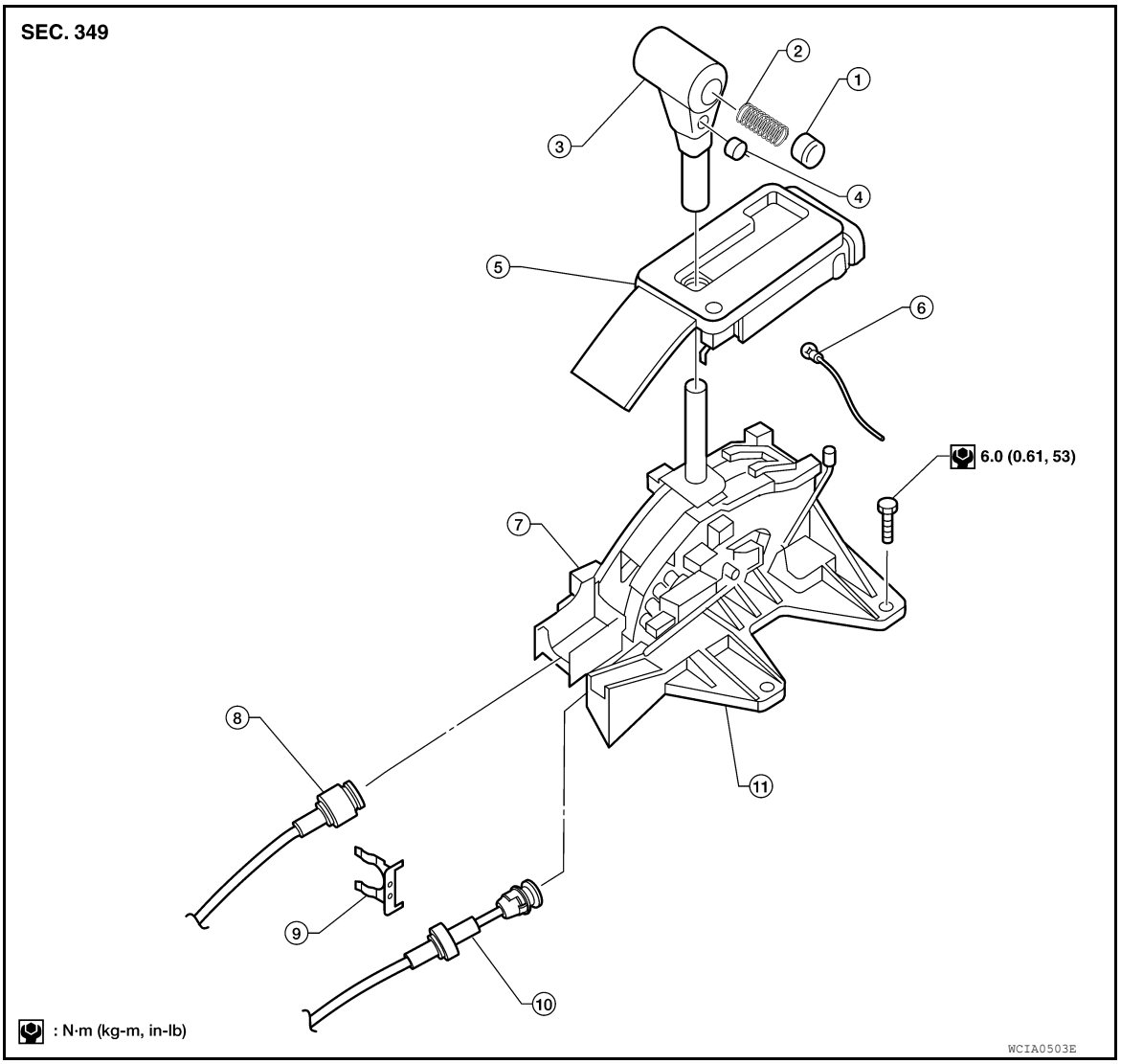
YES >> 1. Stop the vehicle.
2. Carry out the self-diagnostics. Refer to TM-102, "CONSULT Function (TRANSMISSION)".
NO >> Record the malfunction, then continue the trouble diagnosis.

REMOVAL AND INSTALLATION

SHIFT CONTROL SYSTEM

Exploded view

INFOID:0000000007360366



1. Shift selector handle button
2. Shift selector handle spring
3. Shift selector handle
4. Overdrive control switch
5. Position indicator
6. Position lamp
7. Shift selector harness connector
8. Shift selector control cable
9. Lock plate
10. Key interlock cable
11. Shift selector assembly

Removal and Installation

INFOID:0000000007360367

REMOVAL

1. Remove instrument lower panel RH and glove box. Refer to IP-20, "Removal and Installation".
2. Remove the center console. Refer to IP-23, "Removal and Installation".
3. Disconnect the following from the shift selector assembly.
   - Shift selector control cable
   - Key interlock cable
   - Shift selector harness connector
4. Remove the shift selector assembly.

5. Remove the shift selector handle, if necessary.
6. Remove the position indicator, if necessary.

INSTALLATION

Installation is in the reverse order of removal.
- Install and adjust the shift selector control cable. Refer to TM-228, "Inspection and Adjustment".
- Install and adjust the key interlock cable. Refer to TM-241, "Removal and Installation".

Inspection and Adjustment

INFOID:0000000007360368

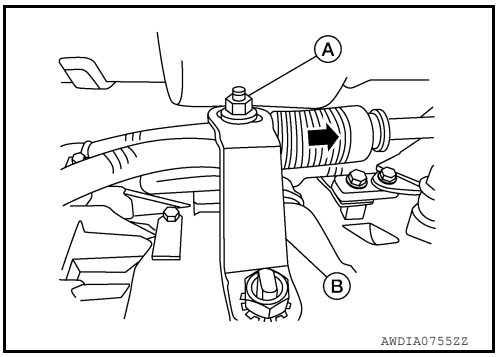
INSPECTION

With the shift selector handle 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 handle can be moved from the “P” position only when the brake pedal is depressed.
- The shift selector handle 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 handle matches the position shown by the position indicator and the A/T body.
- The back-up lamps illuminate only when the shift selector handle is placed in the “R” position.
- The back-up lamps do not illuminate when the shift selector handle is pushed against the “R” position when in the “P” or “N” position.
- The engine can only be started with the shift selector handle in the “P” and “N” positions.
- The A/T is locked completely when shift selector handle is in the “P” position.

ADJUSTMENT

1. Loosen shift selector control cable nut (A).
2. Place the manual lever (B) and shift selector handle 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 shift selector control cable nut (A) to specifications.

Shift selector control cable nut (A) : **14.7 N·m (1.5 kg-m, 11 ft-lb)**



OIL PAN

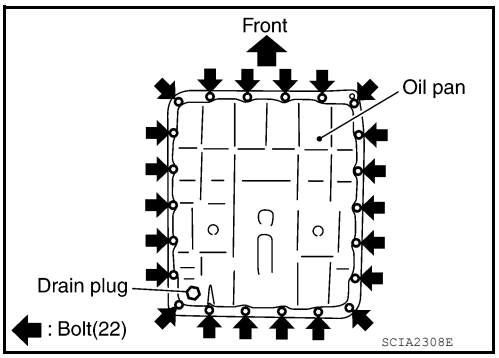
Removal and Installation

INFOID:0000000007360369

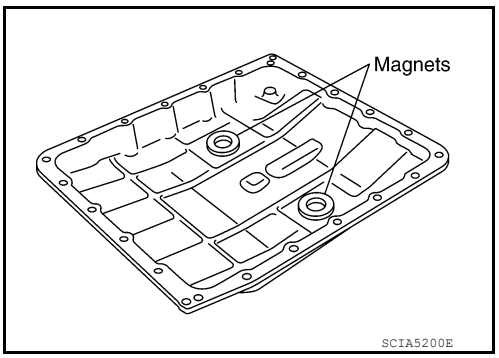
REMOVAL AND INSTALLATION

Removal

1. Remove the drain plug to drain A/T fluid. Refer to TM-214, "Changing the A/T Fluid (ATF)".
2. Remove oil pan bolts.
3. Remove oil pan and gasket.

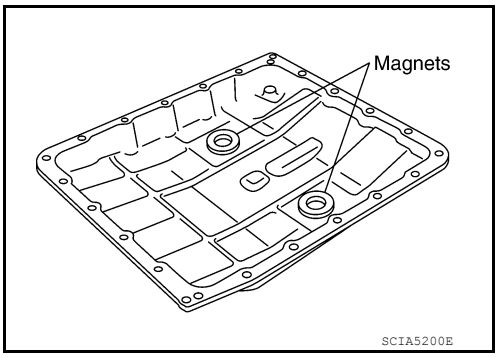


4. Check for foreign materials in oil pan to help determine cause of malfunction. If the A/T fluid is very dark, has some burned smell, or contains foreign particles then friction material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish 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-215, "A/T Fluid Cooler Cleaning".
5. Remove magnets from oil pan.

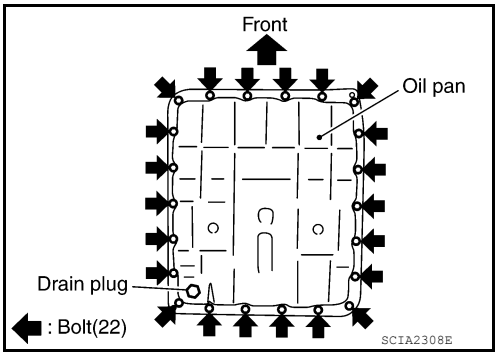


Installation

1. Install the oil pan magnets as shown.

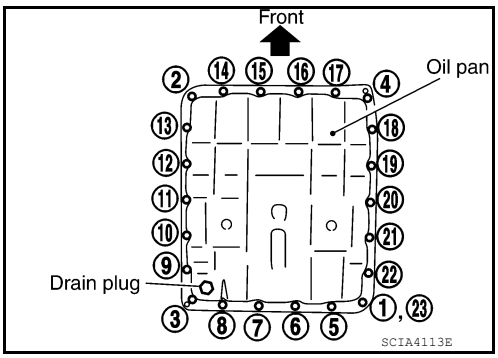


2. Install the oil pan with new oil pan gasket.
CAUTION:
- **Be sure the oil drain plug is located to the rear of the transmission assembly.**
- **Before installing oil pan bolts, remove any traces of old sealant from the sealing surfaces and threaded holes.**
- **Do not reuse old gasket, replace with 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)



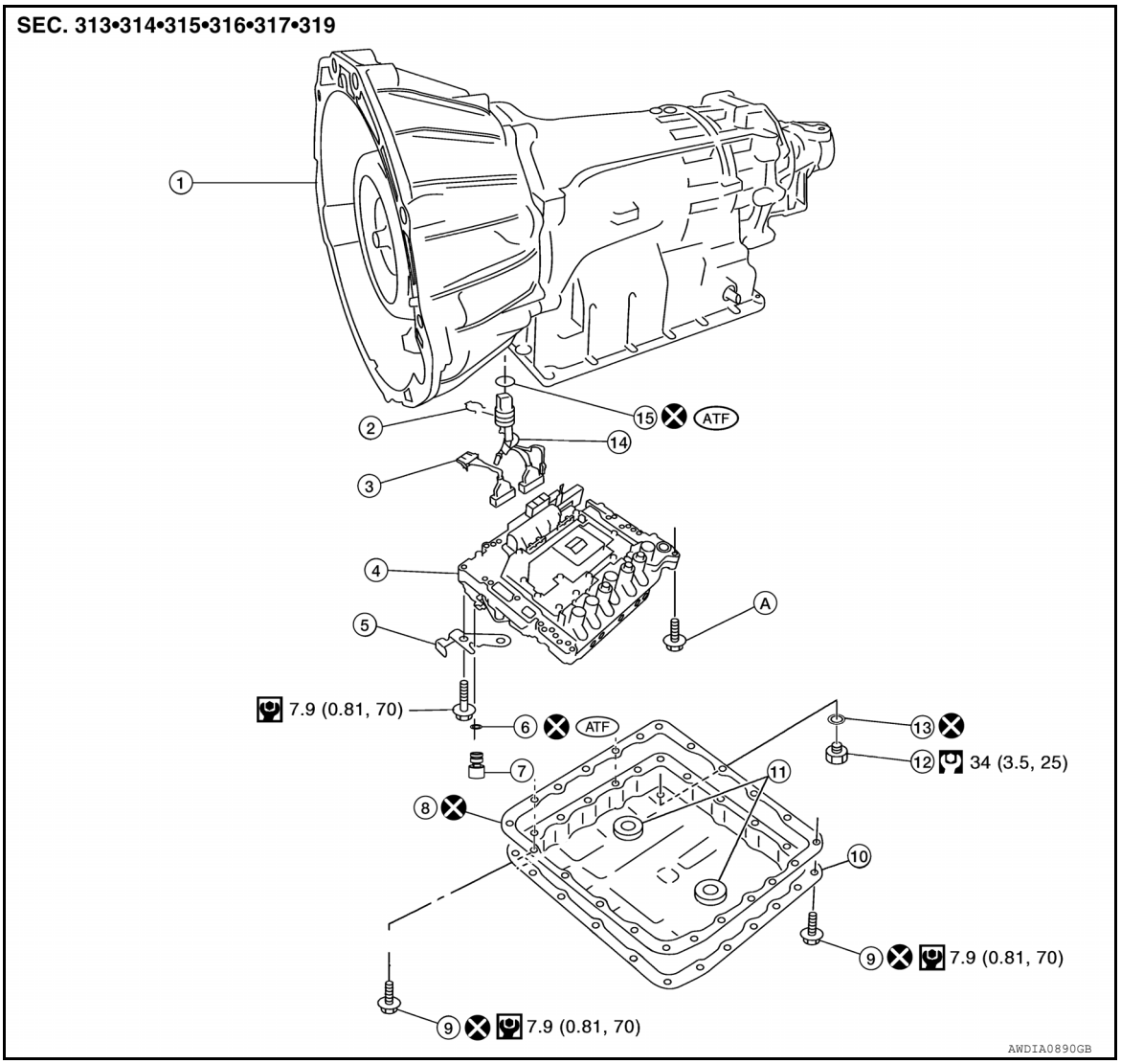
4. Refill the A/T with fluid and check for fluid leakage. Refer to TM-212, "Checking the A/T Fluid (ATF)".

CONTROL VALVE WITH TCM

Removal and Installation

INFOID:0000000007360370

COMPONENTS



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

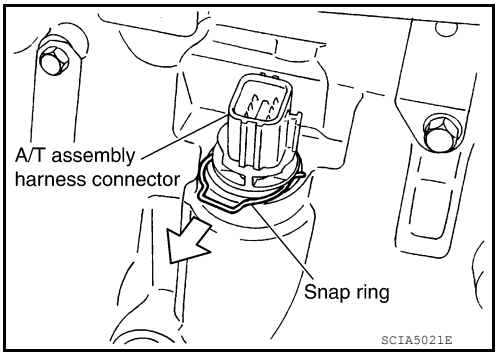
A. For tightening torque, refer to "Installation"

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

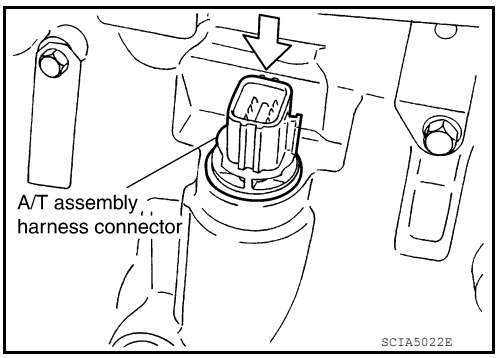
REMOVAL

1. Disconnect negative battery terminal. Refer to PG-72, "Removal and Installation".
2. Drain A/T fluid. Refer to TM-214, "Changing the A/T Fluid (ATF)".
3. Disconnect A/T assembly harness connector.

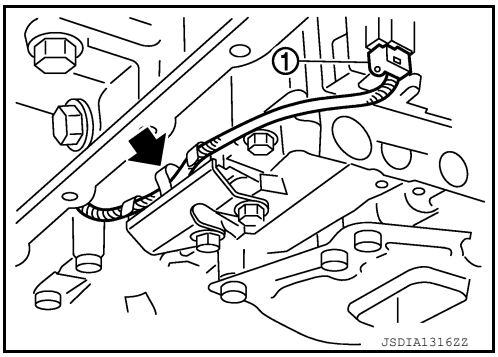
4. Remove snap ring from A/T assembly harness connector.



5. Push A/T assembly harness connector.
CAUTION:
Do not damage connector.

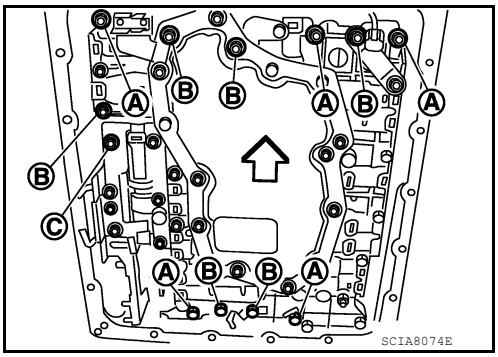


6. Remove oil pan and oil pan gasket. Refer to TM-229, "Removal and Installation".
7. Straighten terminal clip (⬅) to free the output speed sensor harness.
8. Disconnect output speed sensor connector (1).
CAUTION:
Do not damage connector.



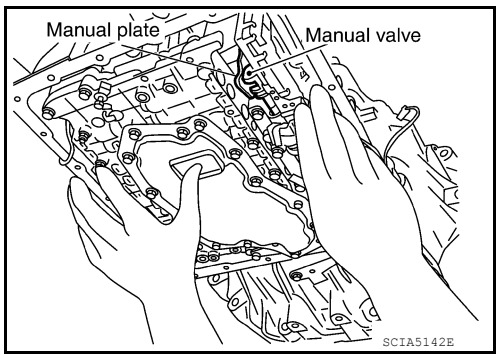
9. Remove bolts (A), (B) and (C) from control valve with TCM.

⇦ : Front

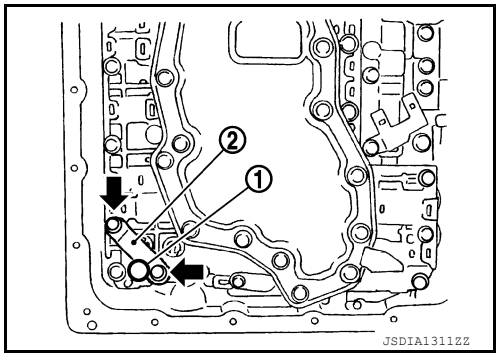


Bolt symbol	Length mm (in)	Number of bolts
(A)	42 (1.65)	5
(B)	55 (2.17)	6
(C)	40 (1.57)	1

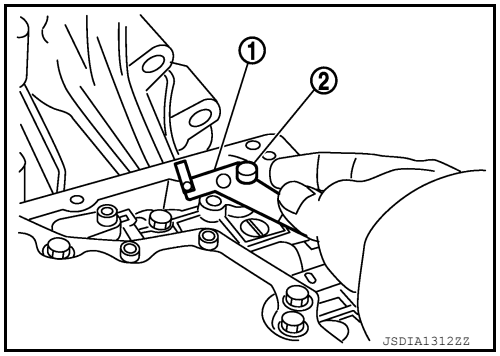
10. Remove control valve with TCM from transmission case.
CAUTION:
When removing, be careful with the manual valve notch and manual plate height. Remove it vertically.



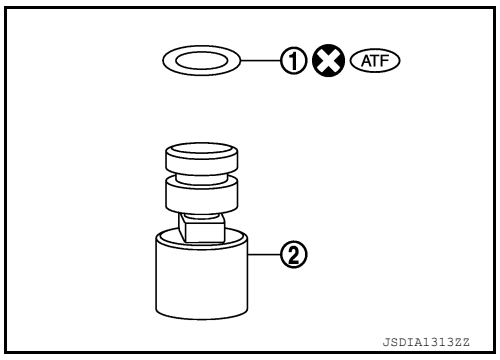
11. Remove plug (1) with bracket (2) from control valve with TCM.
• ⬅:Bolt



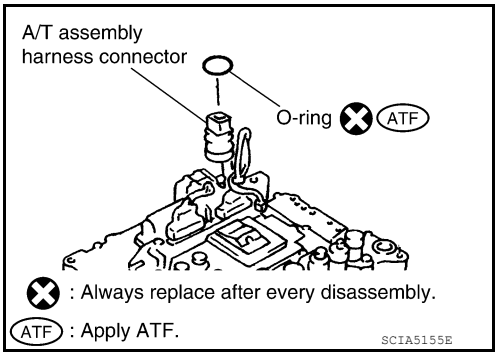
12. Remove the bracket (1) from plug (2).



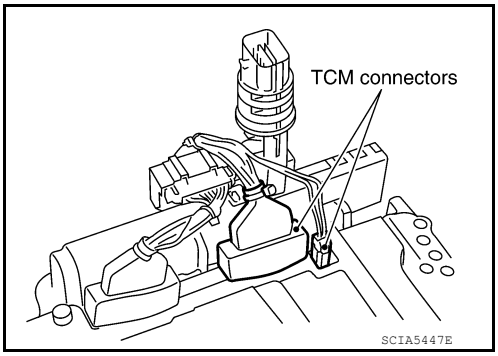
13. Remove O-ring (1) from plug (2).
CAUTION:
Do not reuse O-ring.



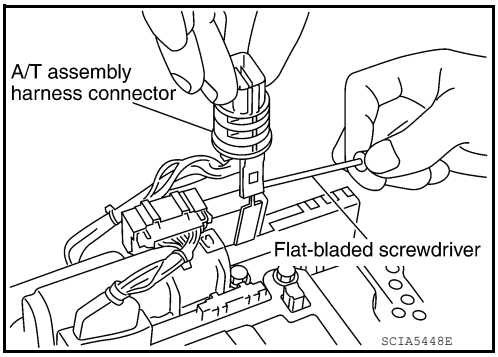
14. Remove O-ring from A/T assembly harness connector.
CAUTION:
Do not reuse O-ring.



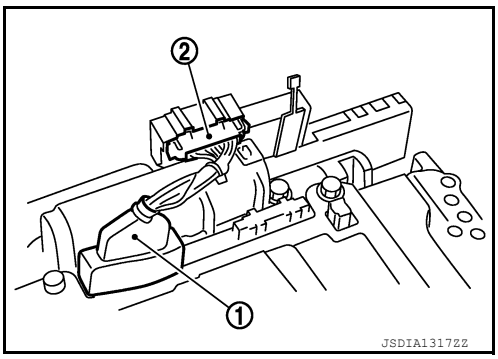
15. Disconnect TCM connectors.
CAUTION:
Do not damage connectors.



16. Remove A/T assembly harness connector from control valve with TCM using suitable tool.

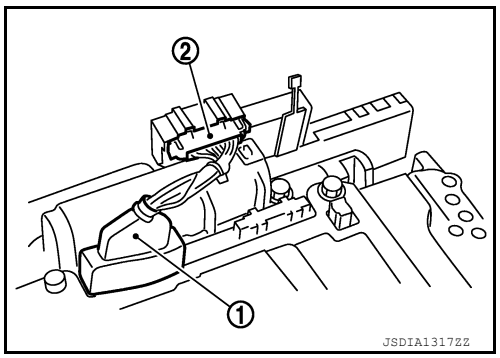


17. Disconnect TCM connector (1) and transmission range switch connector (2).
CAUTION:
Do not damage connectors.

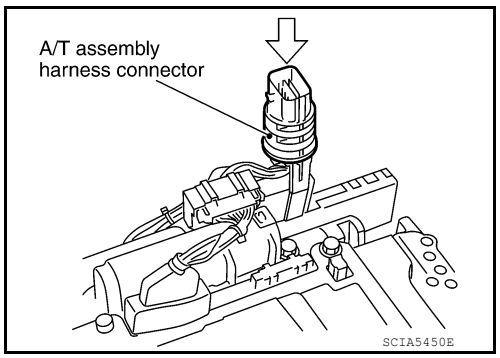


INSTALLATION
CAUTION:
After completing installation, check for A/T fluid leaks and fluid level. Refer to TM-212, "Checking the A/T Fluid (ATF)".

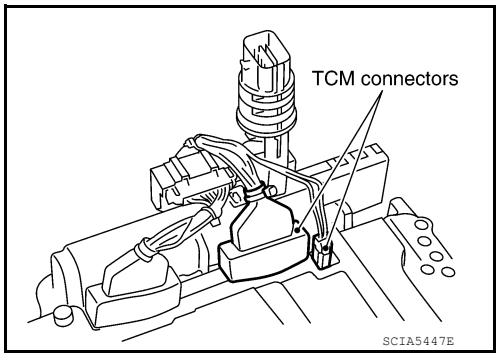
1. Connect TCM connector (1) and transmission range switch connector (2).



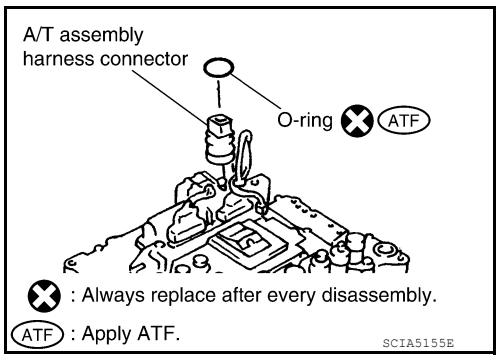
2. Install A/T assembly harness connector to control valve with TCM.



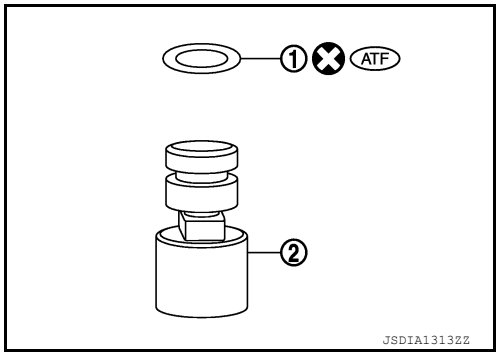
3. Connect TCM connector.



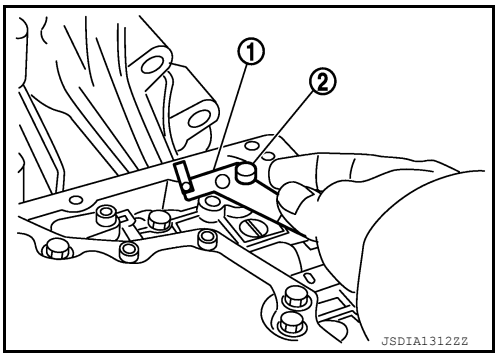
4. Install new O-ring in A/T assembly harness connector.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



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.**

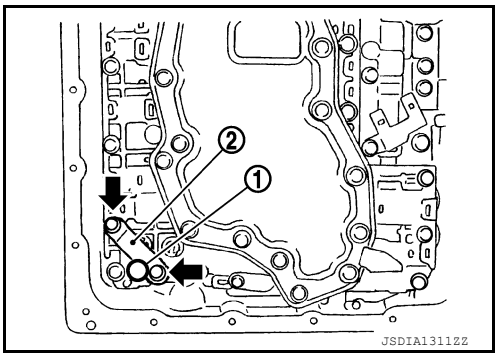


6. Install plug (2) to bracket(1).



7. Install plug (1) [with bracket (2)] to control valve with TCM.
   - ⬅:Bolt

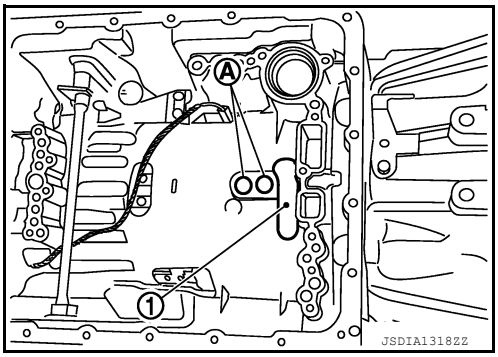
   CAUTION:
   Adjust bolt hole of bracket to bolt hole of control valve with TCM.



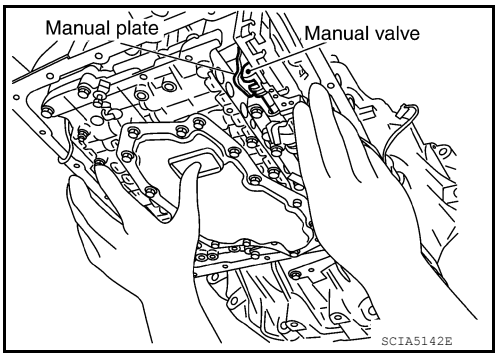
8. Install control valve with TCM in transmission case.

   (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.**

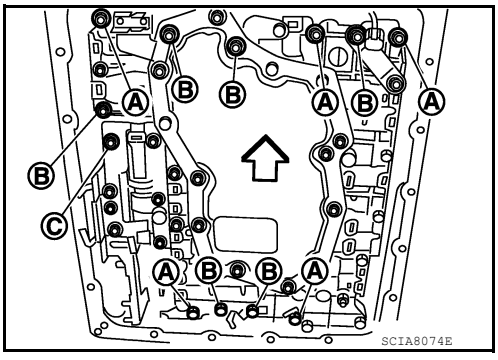


   - **Assemble it so that manual valve cutout is engaged with manual plate projection.**



9. Install bolts (A), (B) and (C) in control valve with TCM.

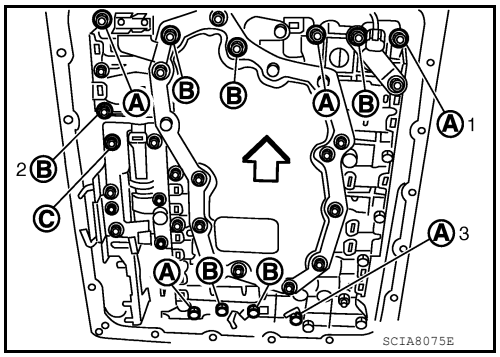
   ⇦ : Front



Bolt symbol	Length mm (in)	Number of bolts
(A)	42 (1.65)	5
(B)	55 (2.17)	6
(C)	40 (1.57)	1

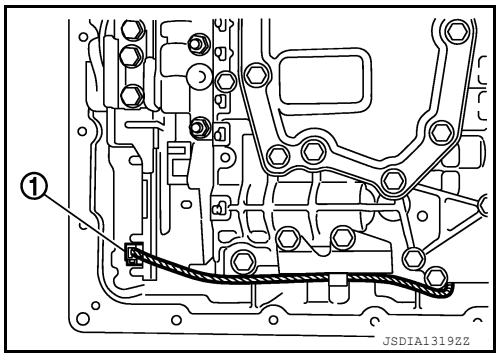
10. Tighten bolt (1A), (2B) and (3A) temporarily to prevent dislocation. After that tighten them in order (1 → 2 → 3). Then tighten other bolts. Tighten control valve with TCM bolts to the specified torque.

⇦ : Front

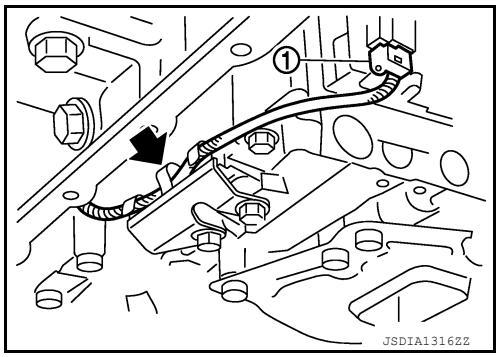


Bolt symbol	(A)	(B)	(C)
Number of bolts	5	6	1
Length mm (in)	42 (1.65)	55 (2.17)	40 (1.57)
Tightening torque N·m (kg-m, in-lb)	7.9 (0.81, 70)		With ATF applied
			7.9 (0.81, 70)

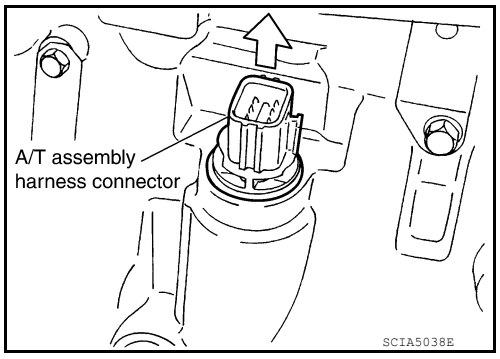
11. Connect output speed sensor connector (1).



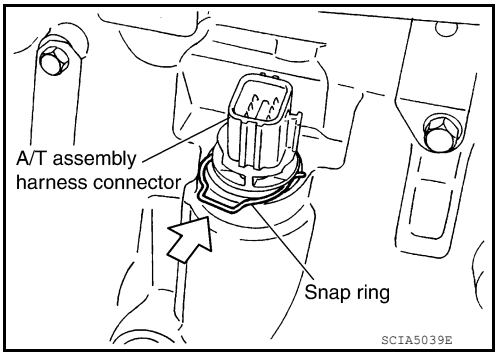
12. Securely fasten output speed sensor (1) harness with terminal clip (⬅).



13. Install oil pan to transmission case. Refer to TM-229, "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 MA-13, "Fluids and Lubricants".



REAR OIL SEAL

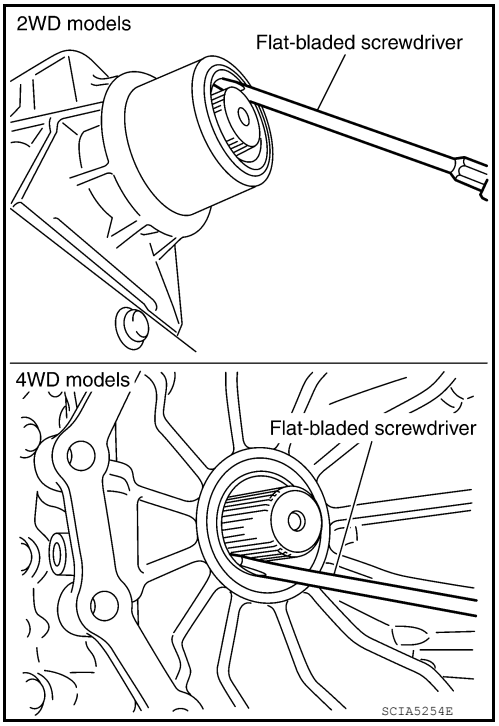
Removal and Installation

INFOID:0000000007360371

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Remove rear propeller shaft. Refer to DLN-143, "Removal and Installation" (2S1330) or DLN-152, "Removal and Installation" (2S1330-BJ100).
2. Remove transfer from transmission (4WD models). Refer to DLN-102, "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).



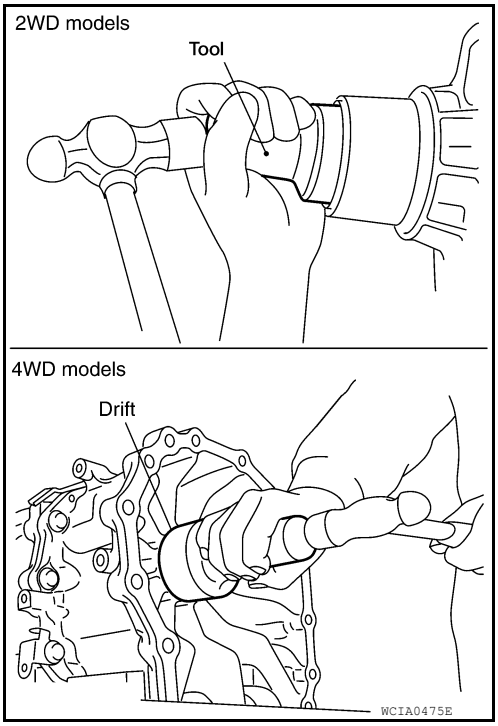
INSTALLATION

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.**

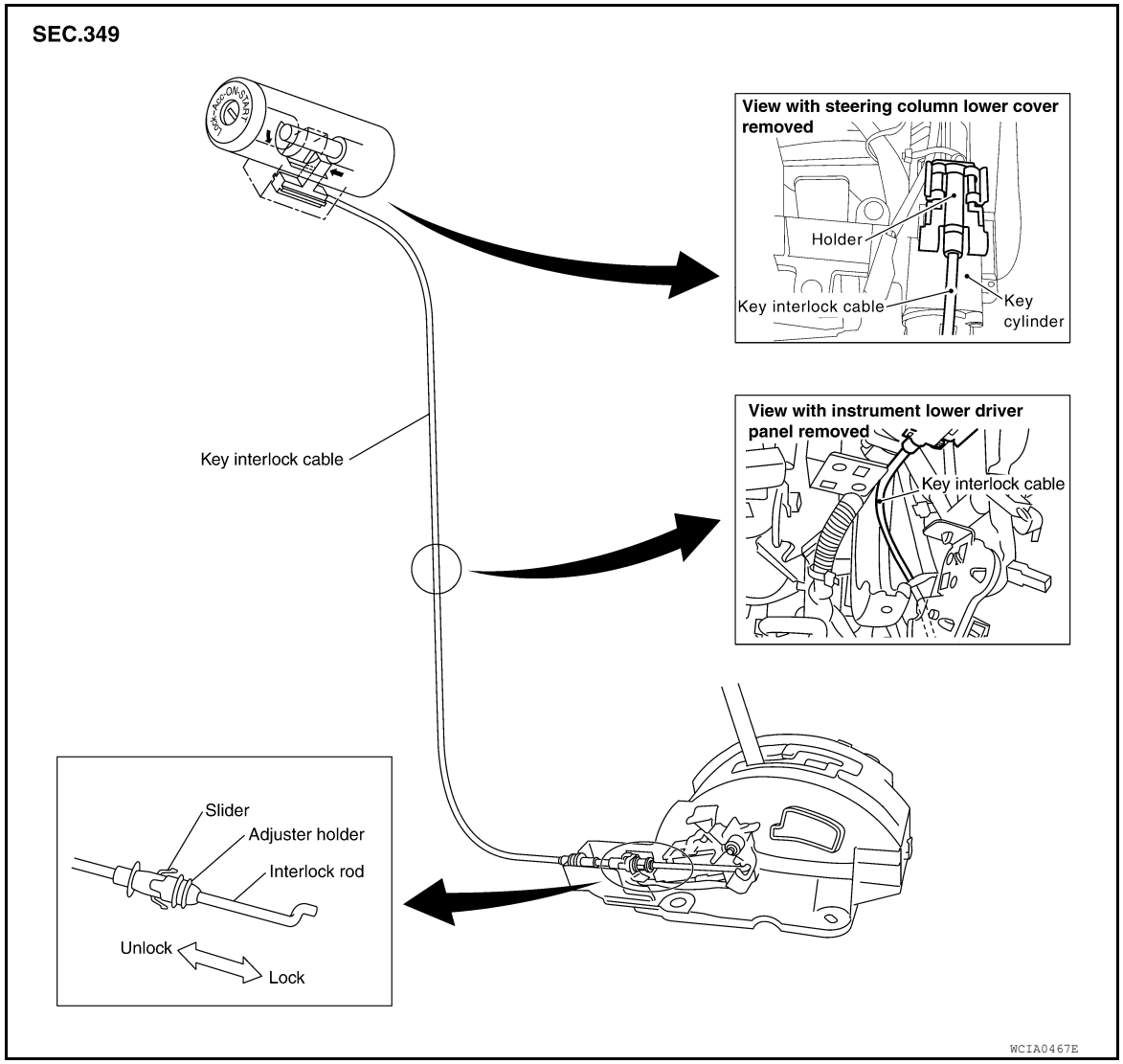
2. Install transfer to transmission (4WD models). Refer to DLN-102, "Removal and Installation" (TX15B).
3. Install rear propeller shaft. Refer to DLN-143, "Removal and Installation" (2S1330) or DLN-152, "Removal and Installation" (2S1330-BJ100)
4. Check the A/T fluid level and for fluid leaks. Refer to TM-212, "Checking the A/T Fluid (ATF)".



KEY INTERLOCK CABLE

Component

INFOID:0000000007360372



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 shift selector, 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.**

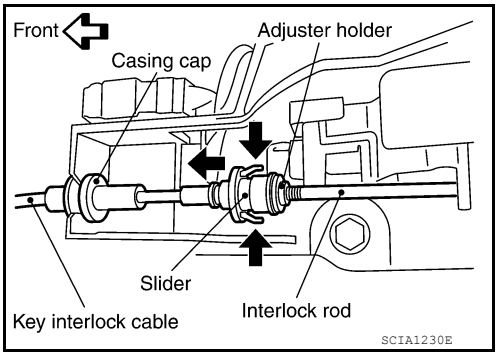
Removal and Installation

INFOID:0000000007360373

REMOVAL

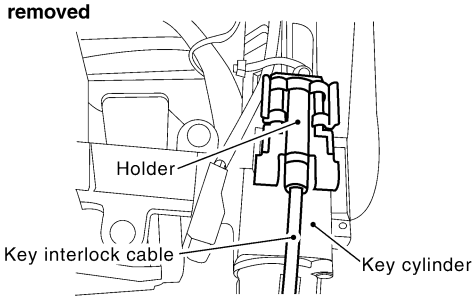
1. Remove the center console. Refer to IP-26, "Exploded View".
2. Remove instrument lower panel LH. Refer to IP-10, "Exploded View".

3. Unlock slider from adjuster holder by squeezing lock tabs.
4. Remove casing cap from bracket of shift selector assembly and remove interlock rod from adjuster holder.

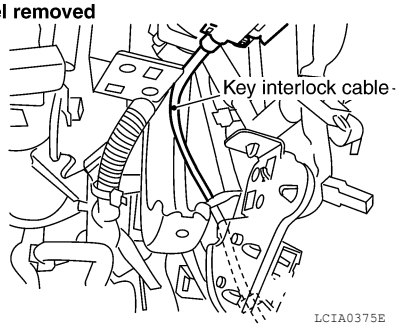


5. Remove holder from key cylinder and remove key interlock cable.

View with steering column lower cover removed



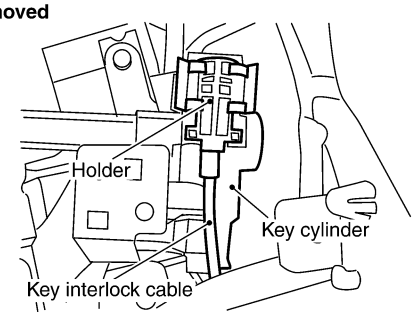
View with instrument lower driver panel removed



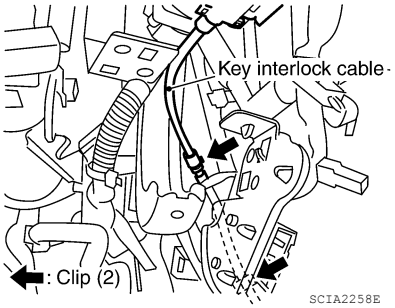
INSTALLATION

1. Set key interlock cable to key cylinder and install holder.
2. Set shift selector handle to “P” position.
3. Turn ignition key to "LOCK" position.

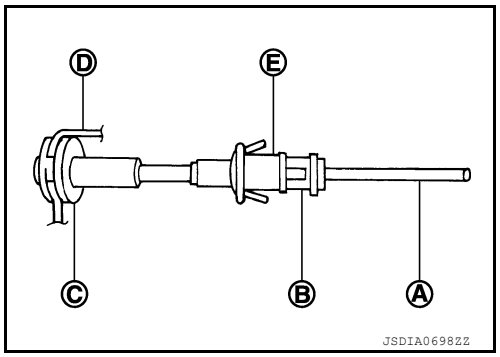
View with steering column lower cover removed



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).



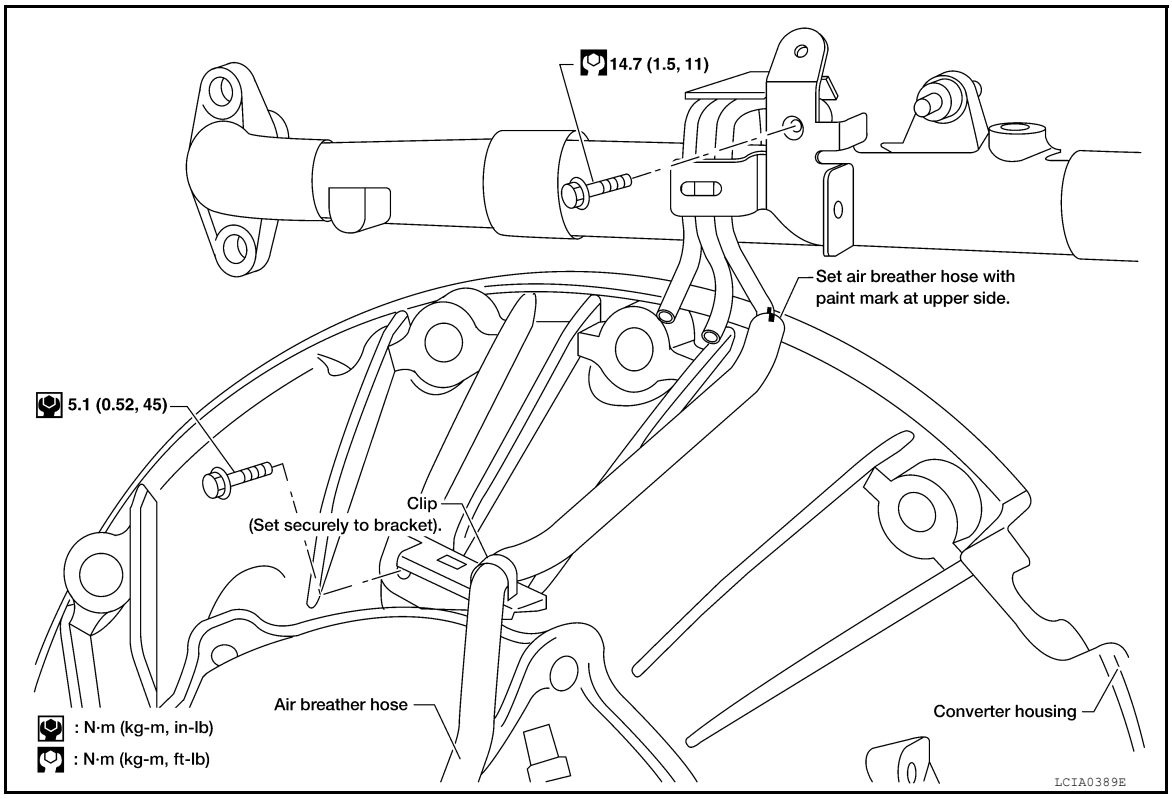
7. Install instrument lower panel LH. Refer to IP-10, "Exploded View".
8. Install the center console. Refer to IP-10, "Exploded View".

AIR BREATHER HOSE

Removal and Installation

INFOID:0000000007360374

COMPONENTS (2WD MODELS)



REMOVAL (2WD MODELS)

1. Release air breather hose from clip.
2. Disconnect air breather hose from transmission tube.
3. Disconnect air breather hose from air breather tube.

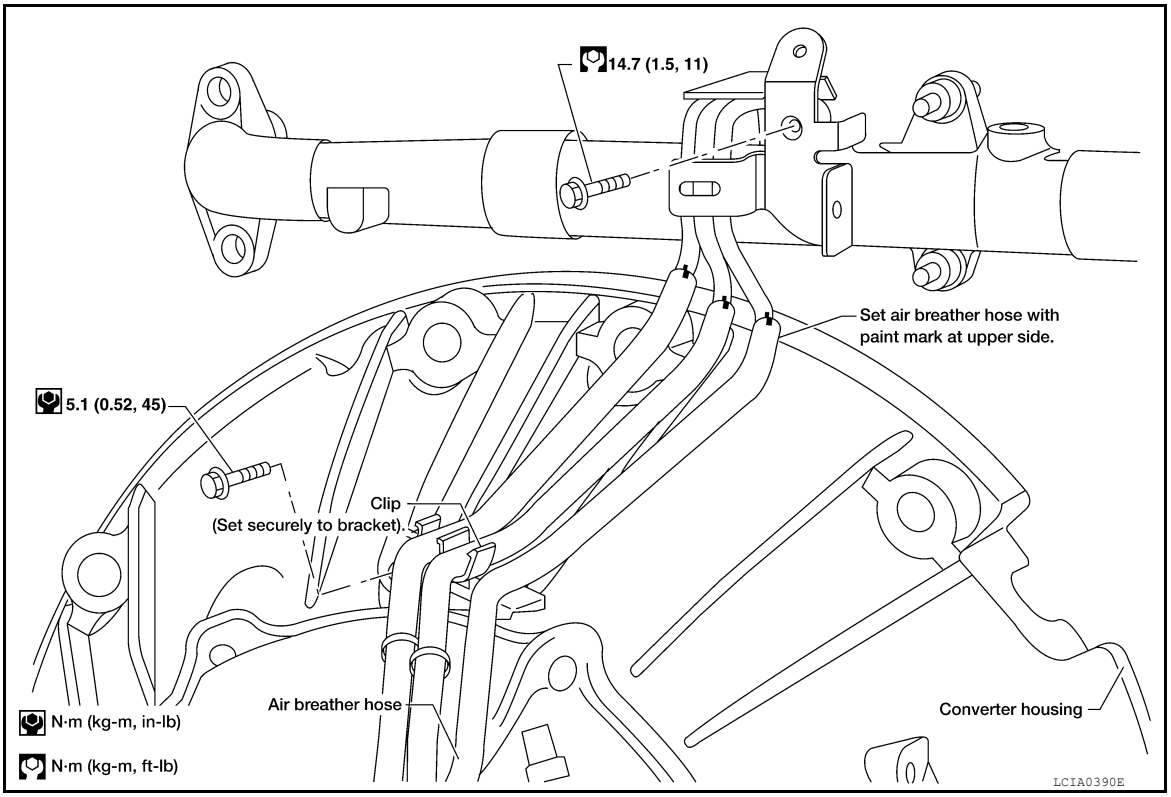
INSTALLATION (2WD MODELS)

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.**

COMPONENTS (4WD MODELS)



REMOVAL (4WD MODELS)

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 (4WD MODELS)

Installation is in the reverse order of removal.

CAUTION:

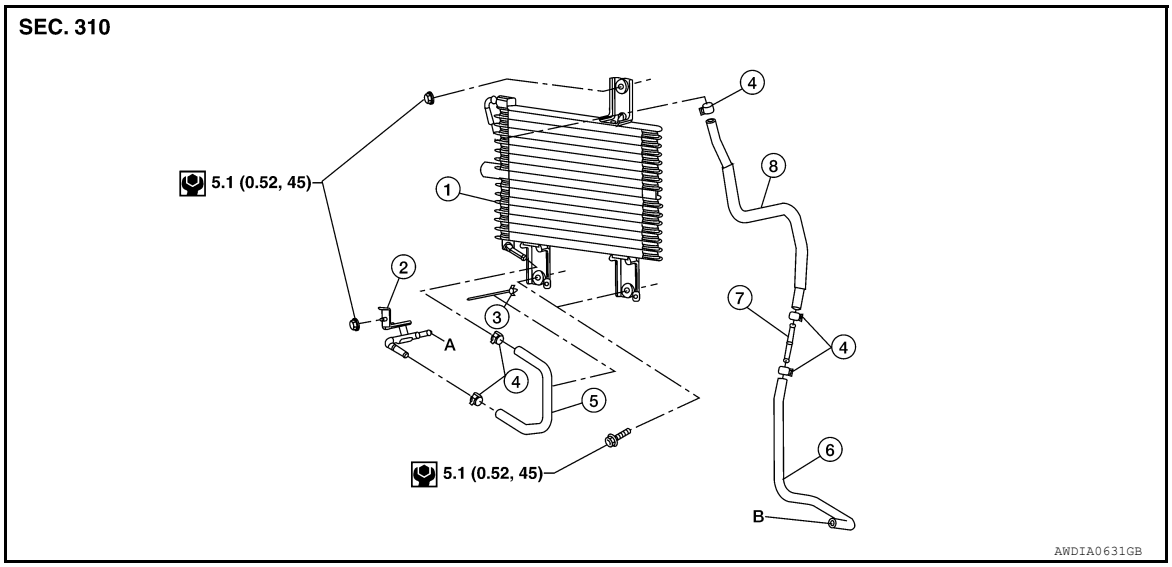
- **Install air breather hose with paint mark at upper side.**
- **When installing the air breather hose, do not crush or block by folding or bending the hose.**
- **When inserting the hose to the transmission tube, be sure to insert it fully until its end reaches the tube bend portion.**
- **Make sure clip is securely installed to bracket.**

A/T FLUID COOLER

Removal and Installation

INFOID:0000000007360375

COMPONENTS



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		

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

REMOVAL

1. Remove front grille. Refer to EXT-19, "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 leaks. Refer to TM-212, "Checking the A/T Fluid (ATF)".

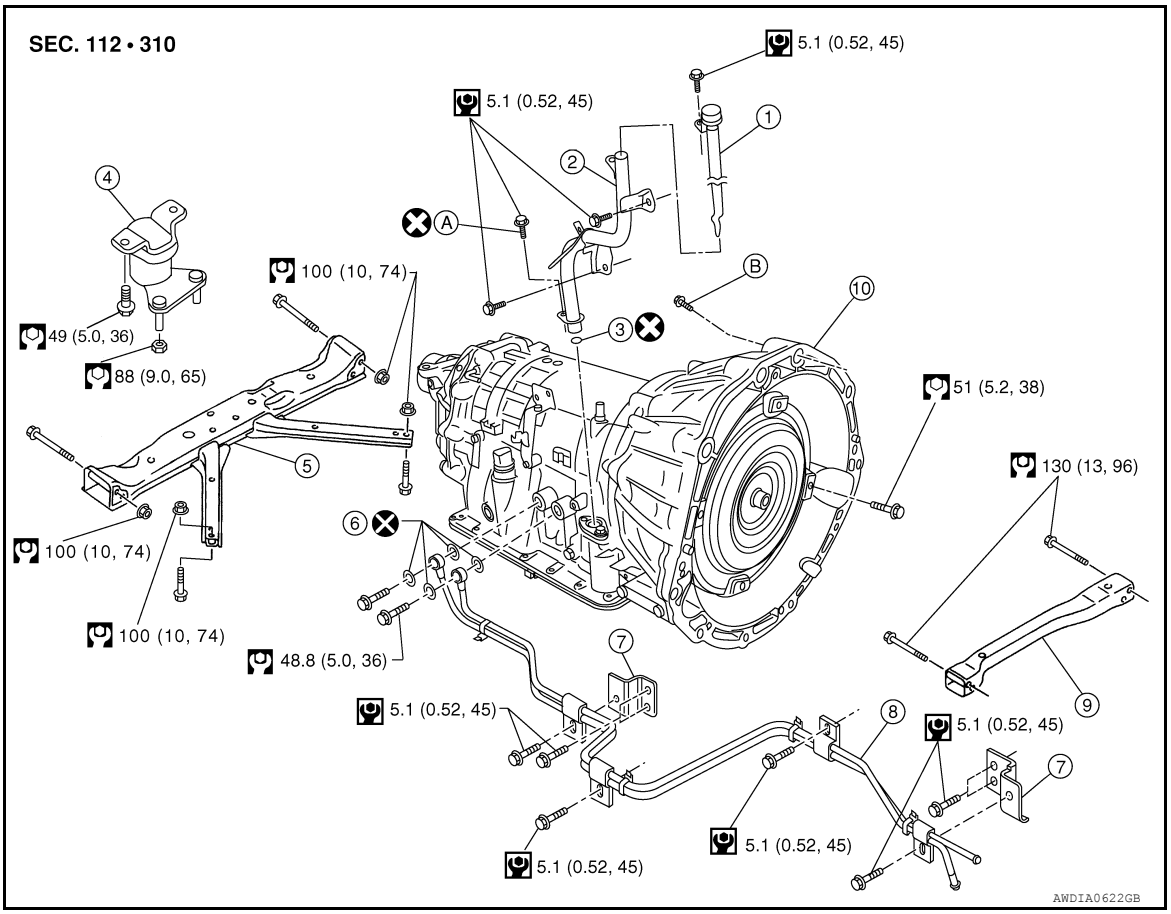
UNIT REMOVAL AND INSTALLATION

TRANSMISSION ASSEMBLY

Removal and Installation (2WD)

INFOID:0000000007360376

COMPONENTS



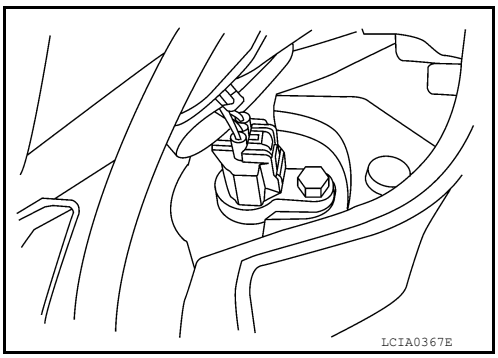
1.	A/T fluid level gauge	2.	A/T fluid charging pipe	3.	O-ring
4.	Insulator	5.	A/T crossmember	6.	Copper washer
7.	Bracket	8.	A/T fluid cooler tube	9.	Front crossmember
10.	Transmission assembly	A.	Self-sealing bolt	B.	Refer to installation.

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

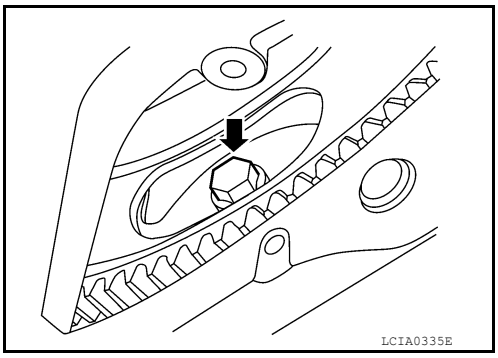
REMOVAL

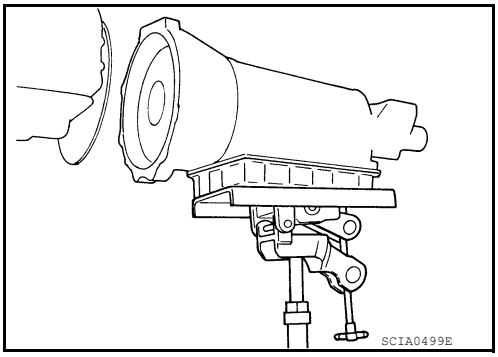
CAUTION:
When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.

1. Disconnect the negative battery terminal. Refer to PG-72, "Removal and Installation".
2. Remove the A/T fluid level gauge.
3. Remove the front LH wheel and tire assembly. Refer to WT-47, "Adjustment".
4. Remove the LH mud flap. Refer to EXT-24, "Removal and Installation".
5. Remove the LH fender protector. Refer to EXT-22, "Removal and Installation".

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 engine under cover using power tool.
8. Remove the front crossmember using power tool.
9. Remove the starter motor.
10. Remove the rear propeller shaft. Refer to DLN-143, "Removal and Installation".
11. Remove the left and right front exhaust tubes. Refer to EX-5, "Exploded View".
12. Remove the shift selector control cable and bracket from the A/T.
13. Disconnect the A/T fluid cooler tubes from the A/T assembly.
CAUTION:
Do not reuse copper sealing washers.
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.**

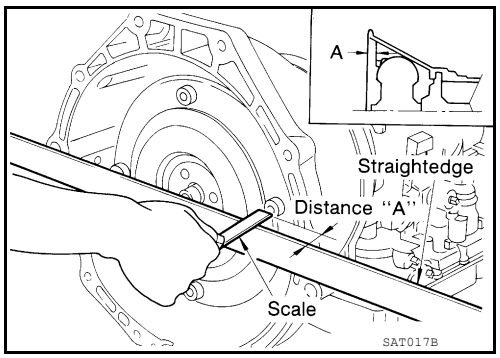
NOTE:
The actual special service Tool may differ from Tool shown.

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.

Dimension (A) : 25.0 mm (0.98 in) or more



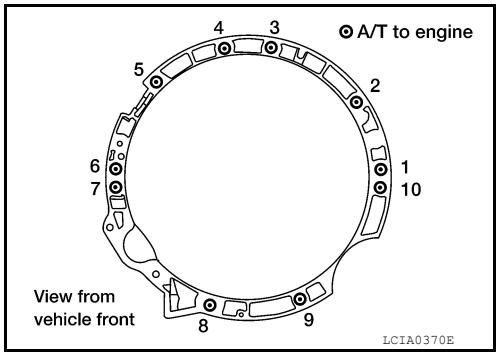
INSTALLATION

Installation is in the reverse order of the removal.

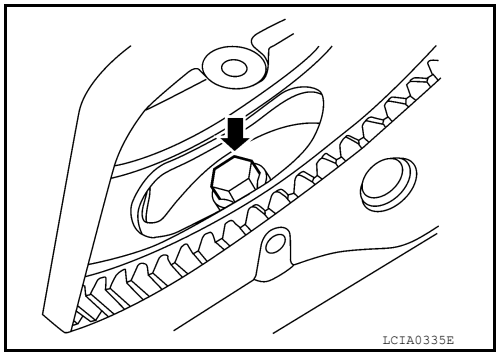
CAUTION:

- **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 and copper sealing washers. Refer to "COMPONENTS".**
- **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-99, "Exploded View".**
- When installing transmission to the engine, tighten the bolts to the specified torque using sequence shown.

Transmission bolts : 75 N·m (7.7 kg-m, 55 ft-lb)



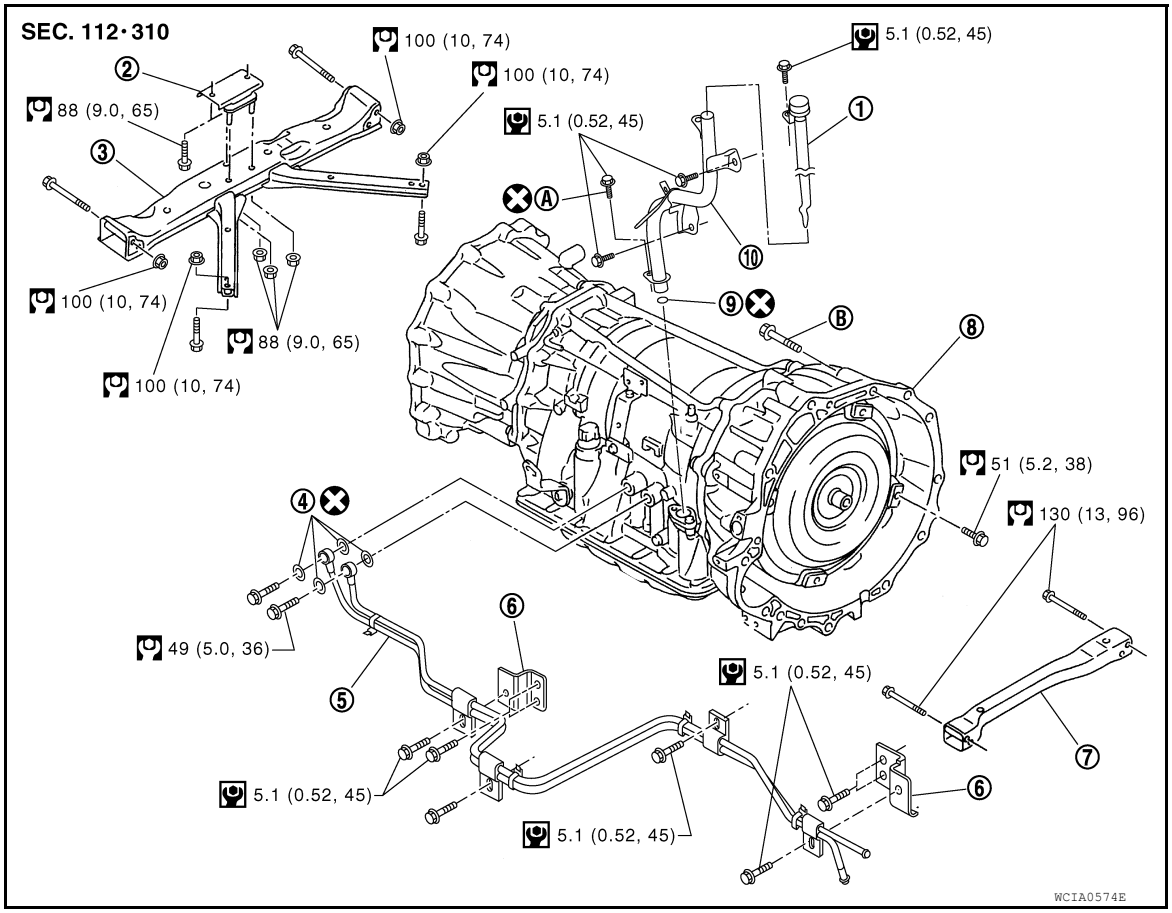
- When installing the drive plate to torque converter bolts, align the positions of bolts for drive plate with those of the torque converter and temporarily tighten the bolts. Then tighten the bolts to the specified torque.
- After completing installation, fill A/T with fluid and check for fluid leaks, fluid level, and the positions of A/T. Refer to TM-212, "Checking the A/T Fluid (ATF)" and TM-228, "Inspection and Adjustment".



Removal and Installation (4WD)

INFOID:0000000007360377

COMPONENTS



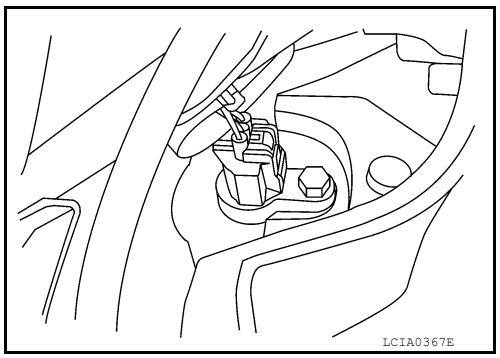
1.	A/T fluid level gauge	2.	Insulator	3.	A/T crossmember
4.	Copper washers	5.	A/T fluid cooler tube	6.	Bracket
7.	Front crossmember	8.	Transmission assembly	9.	O-ring
10.	A/T fluid charging pipe	A.	Self-sealing bolt	B.	Refer to installation.

NOTE:
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

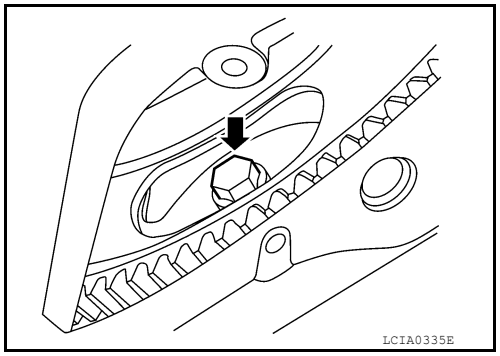
REMOVAL

CAUTION:
When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.

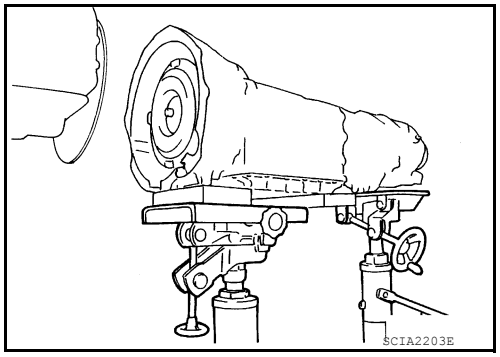
1. Disconnect the negative battery terminal. Refer to PG-72, "Removal and Installation".
2. Remove the A/T fluid level gauge.
3. Remove the front LH wheel and tire assembly. Refer to WT-47, "Adjustment".
4. Remove the LH mud flap. Refer to EXT-24, "Removal and Installation".
5. Remove the LH fender protector. Refer to EXT-22, "Removal and Installation".

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 engine under cover 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-134, "Removal and Installation" (front) and DLN-143, "Removal and Installation" (rear).
11. Remove the left and right front exhaust tubes. Refer to EX-5, "Exploded View".
12. Remove the shift selector control cable and bracket from the A/T.
13. Disconnect the fluid cooler tubes from the A/T assembly.
CAUTION:
Do not reuse copper sealing washers.
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
- 4LO switch connector
- Wait detection switch connector
- ATP switch connector
- 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.**

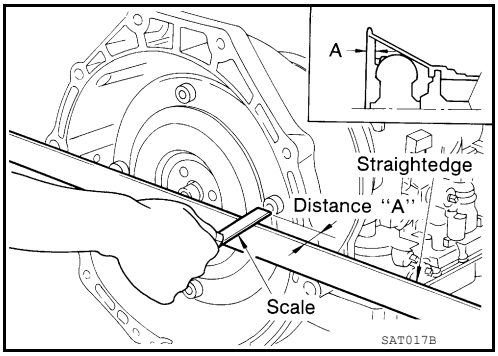
NOTE:
The actual special service Tool may differ from Tool shown.
25. Remove the transfer from the A/T assembly. Refer to DLN-102, "Removal and Installation".

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) : 25.0 mm (0.98 in) or more



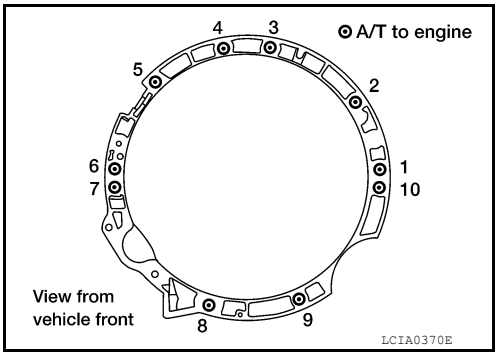
INSTALLATION

Installation is in the reverse order of removal.

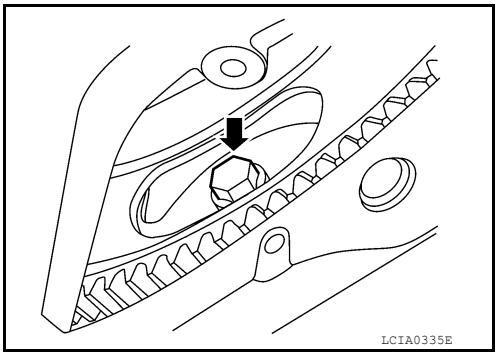
CAUTION:

- **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 and copper sealing washers. Refer to "COMPONENTS".**
- **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-99, "Exploded View".**
- When installing transmission to the engine, tighten the bolts to the specified torque using sequence shown.

Transmission bolts : 75 N·m (7.7 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 to the specified torque.
- After completing installation, fill A/T with fluid and check for fluid leaks, fluid level, and the positions of A/T. Refer to TM-212, "Checking the A/T Fluid (ATF)", and TM-228, "Inspection and Adjustment".



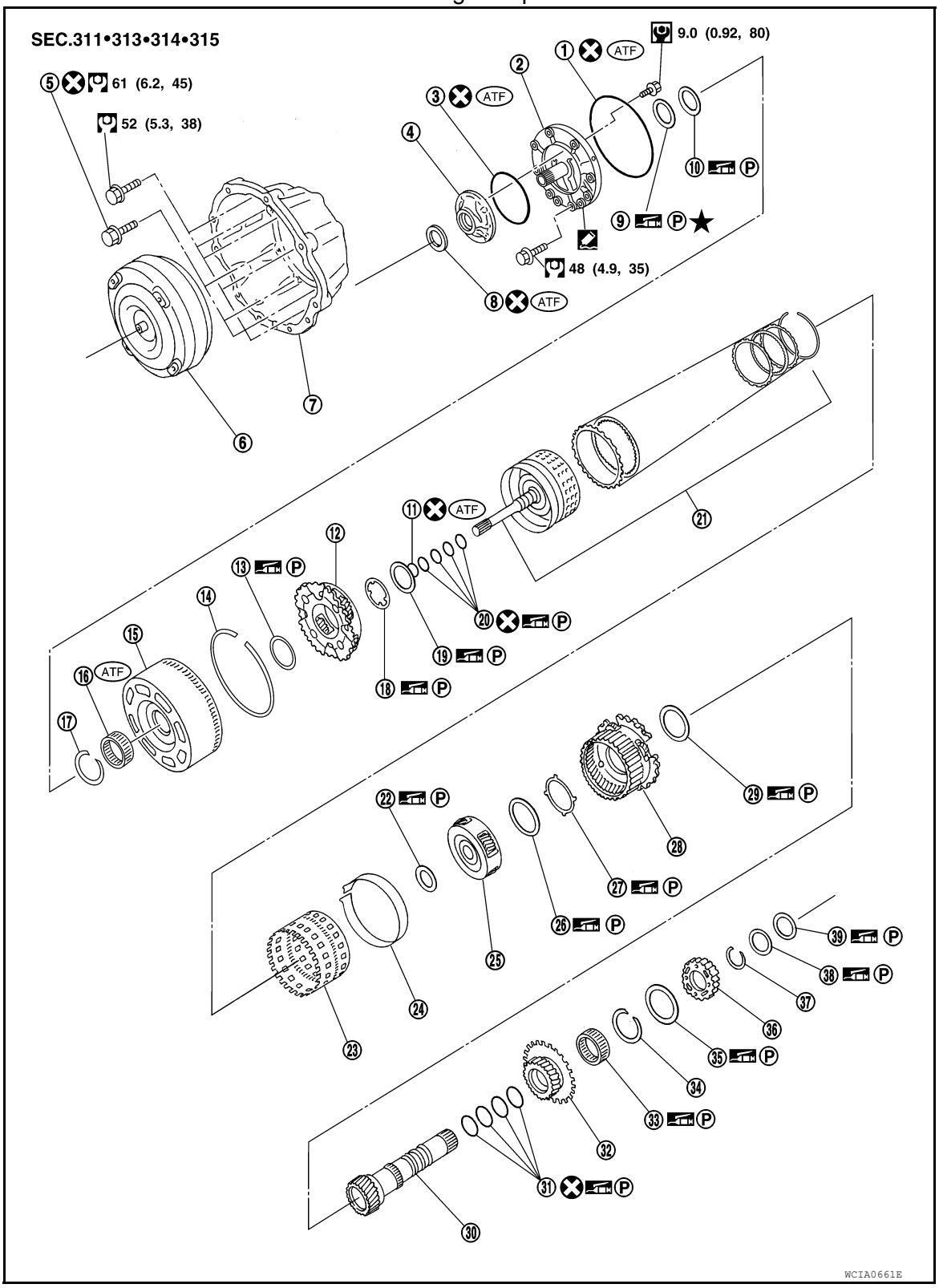
UNIT DISASSEMBLY AND ASSEMBLY

OVERHAUL

Exploded View

INFOID:0000000007360378

Bell Housing Components

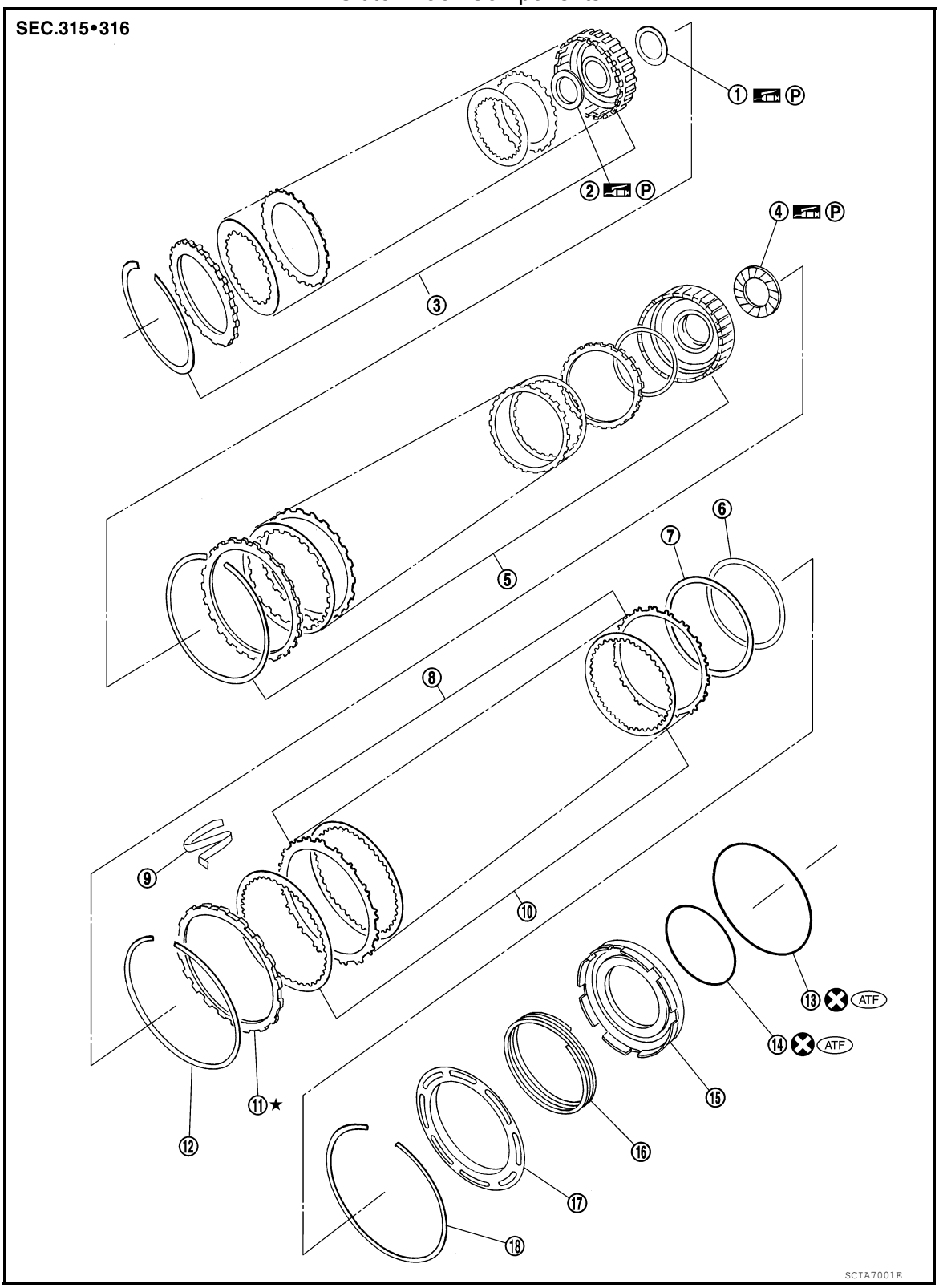


1. O-ring	2. Oil pump cover	3. O-ring
4. Oil pump housing	5. Self-sealing bolts	6. Torque converter
7. Converter housing	8. Oil pump housing oil seal	9. Bearing race
10. Needle bearing	11. O-ring	12. Front carrier assembly
13. Needle bearing	14. Snap ring	15. Front sun gear
16. 3rd one-way clutch	17. 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

: Apply Genuine RTV silicone sealant or equivalent. Refer to GI-15, "Recommended Chemical Products and Sealants".

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

Clutch Pack Components

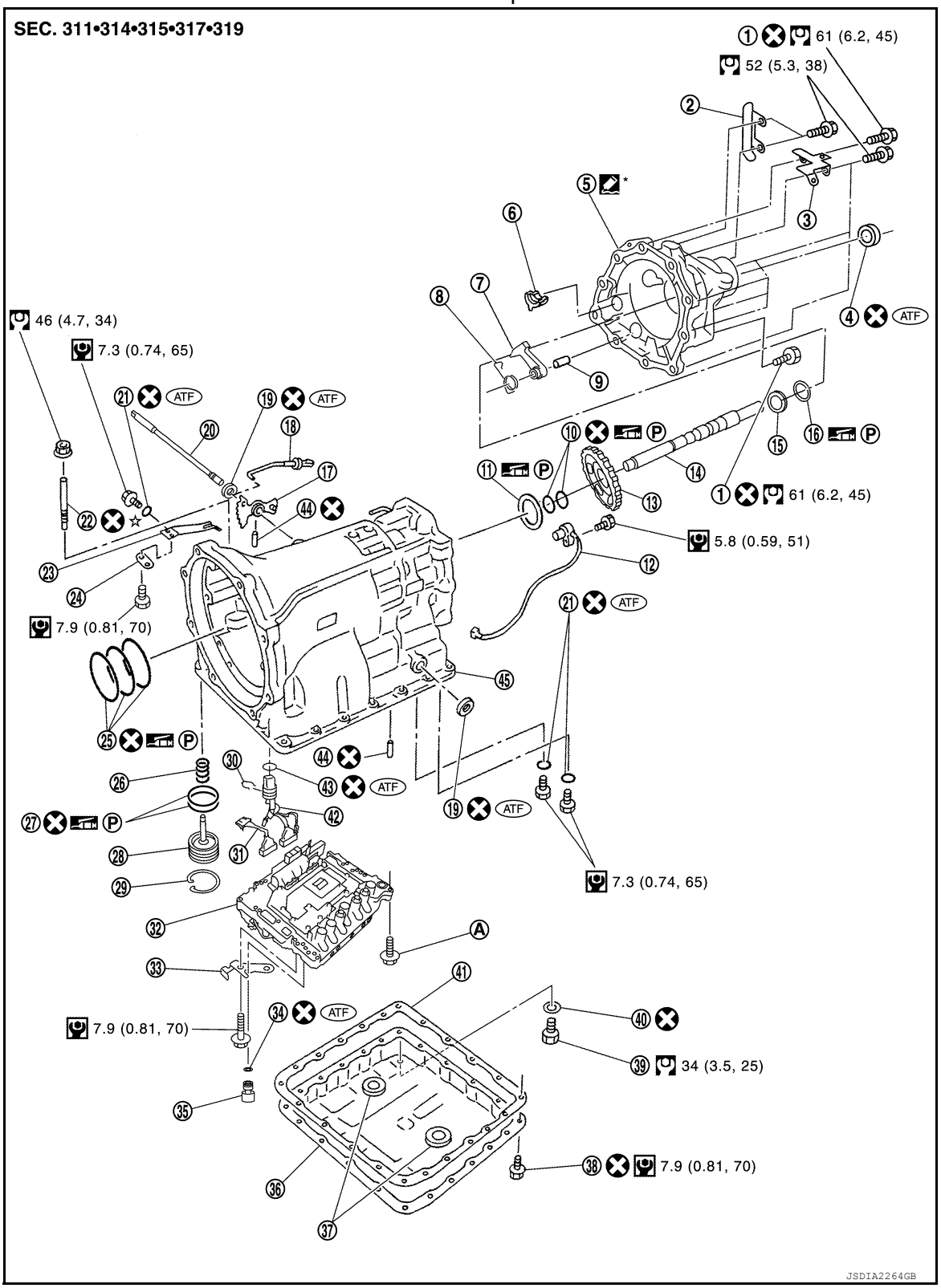


1. Needle bearing	2. Bearing race	3. High and low reverse clutch assembly
4. Needle bearing	5. Direct clutch assembly	6. Reverse brake dish plate
7. Reverse brake dish plate	8. Reverse brake driven plate	9. N-spring
10. Reverse brake drive plate	11. Reverse brake retaining plate	12. Snap ring
13. D-ring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

16. Return spring 17. Spring retainer 18. Snap ring

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

Transmission Case Components for 2WD



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

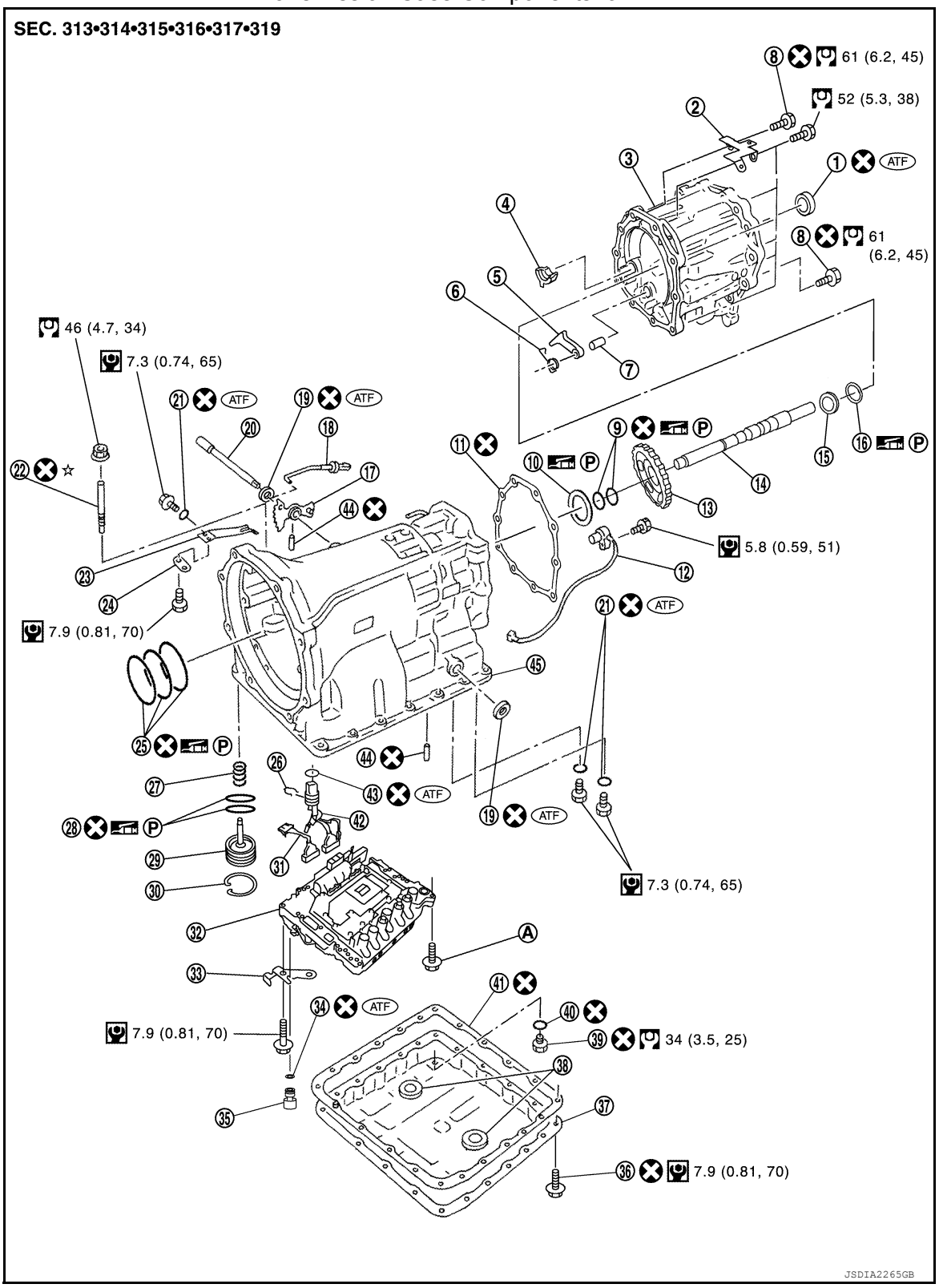
13. Parking gear	14. Output shaft	15. Bearing race
16. Needle bearing	17. Manual plate	18. Parking rod
19. Manual shaft oil seal	20. Manual shaft	21. O-ring
22. Band servo anchor end pin	23. Detent spring	24. Spacer
25. Seal ring	26. Return spring	27. O-ring
28. Servo assembly	29. Snap ring	30. Snap 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

A. Tightening must be done following the assembly procedure. Refer to TM-316, "Assembly (2)".

*: Apply Genuine Anaerobic Liquid Gasket or equivalent.

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

Transmission Case Components for 4WD



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

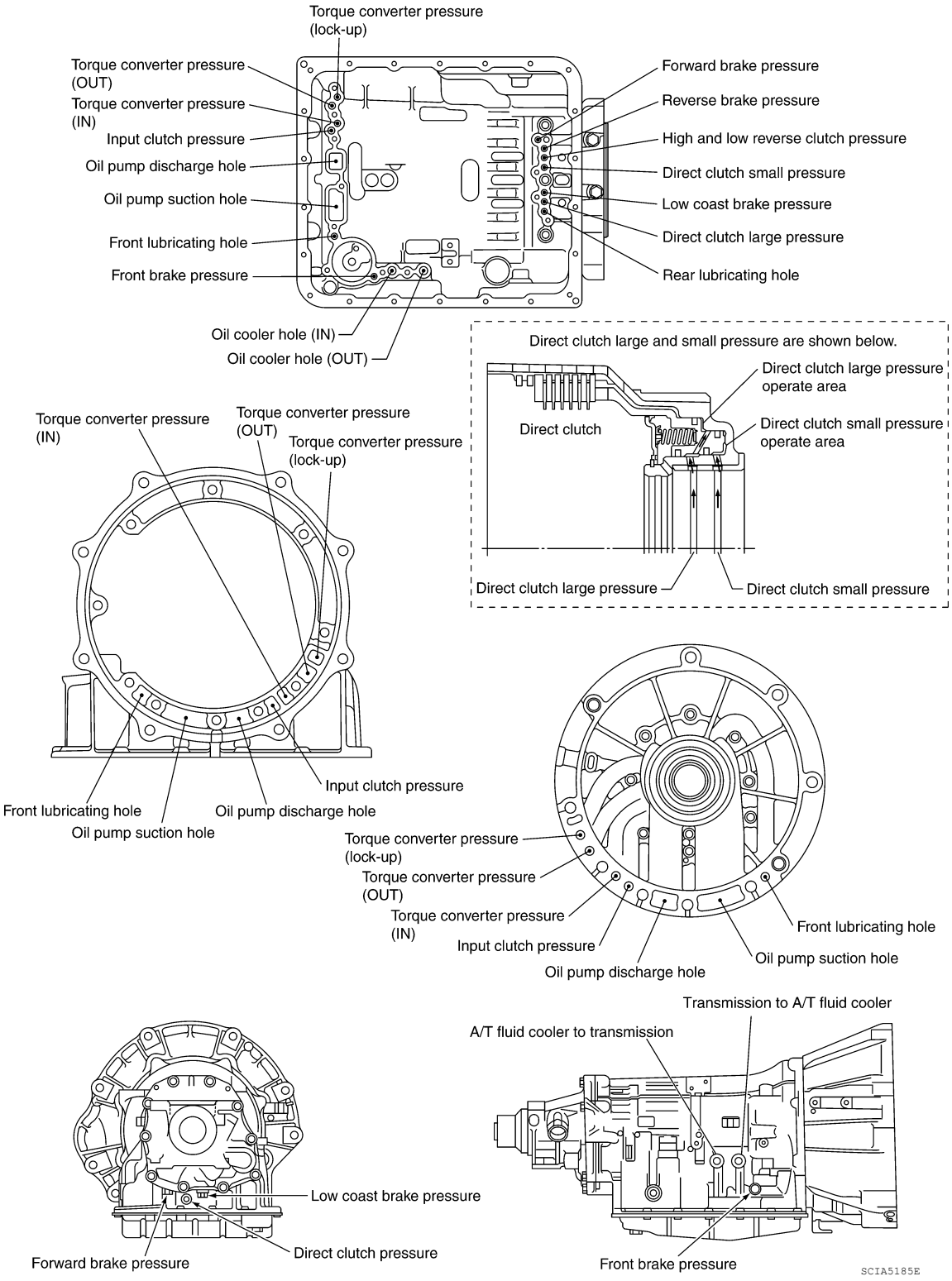
A. Tightening must be done following the assembly procedure. Refer to TM-316, "Assembly (2)".

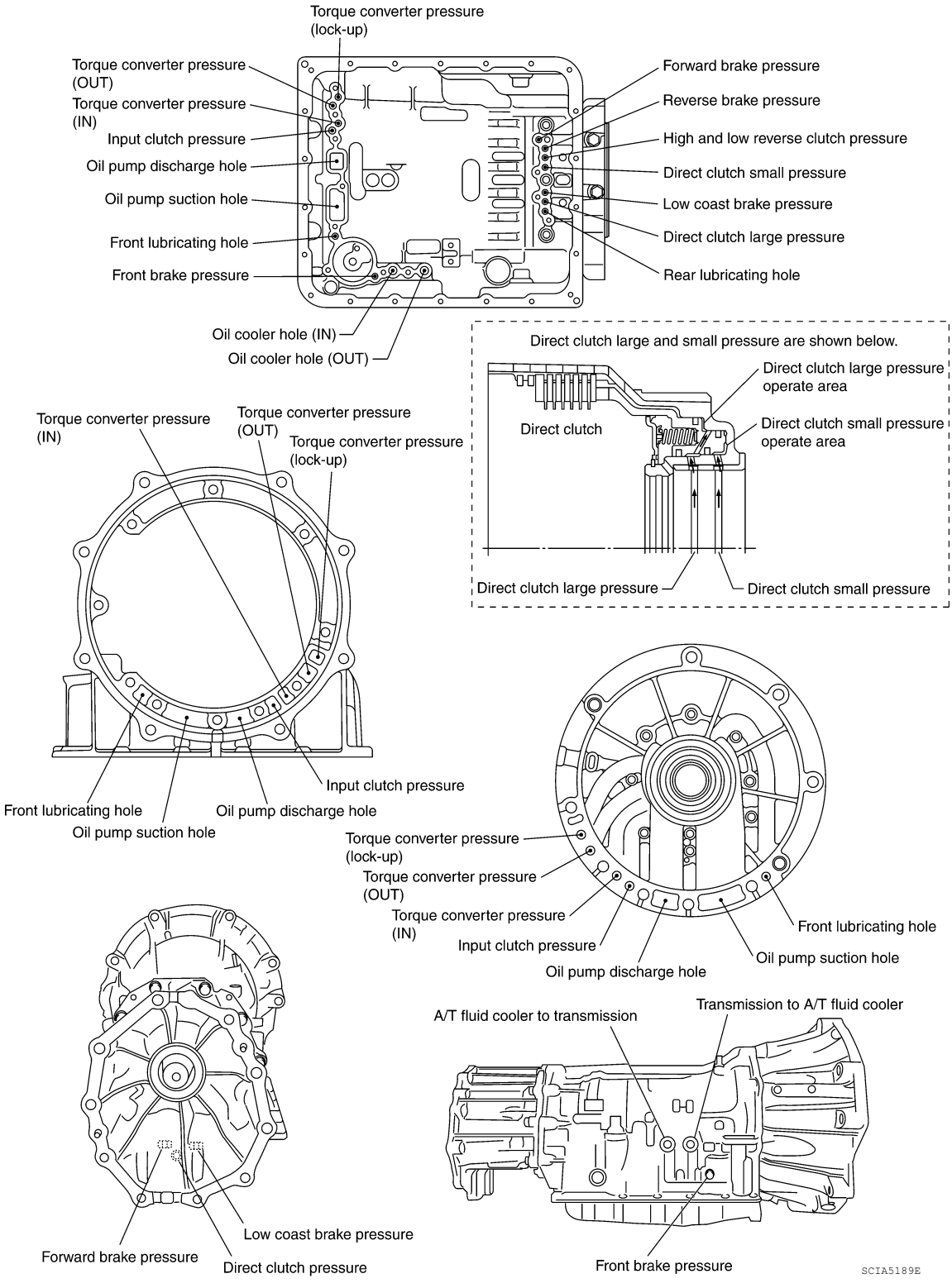
Refer to GI-4, "Component" for symbols in the figure.

Oil Channel

INFOID:0000000007360379

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 large pressure operate area
Direct clutch small pressure operate area
Direct clutch
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
Low coast brake pressure
Forward brake pressure
Direct clutch pressure
Front brake pressure
SCIA5189E

Location of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

INFOID:0000000007360380

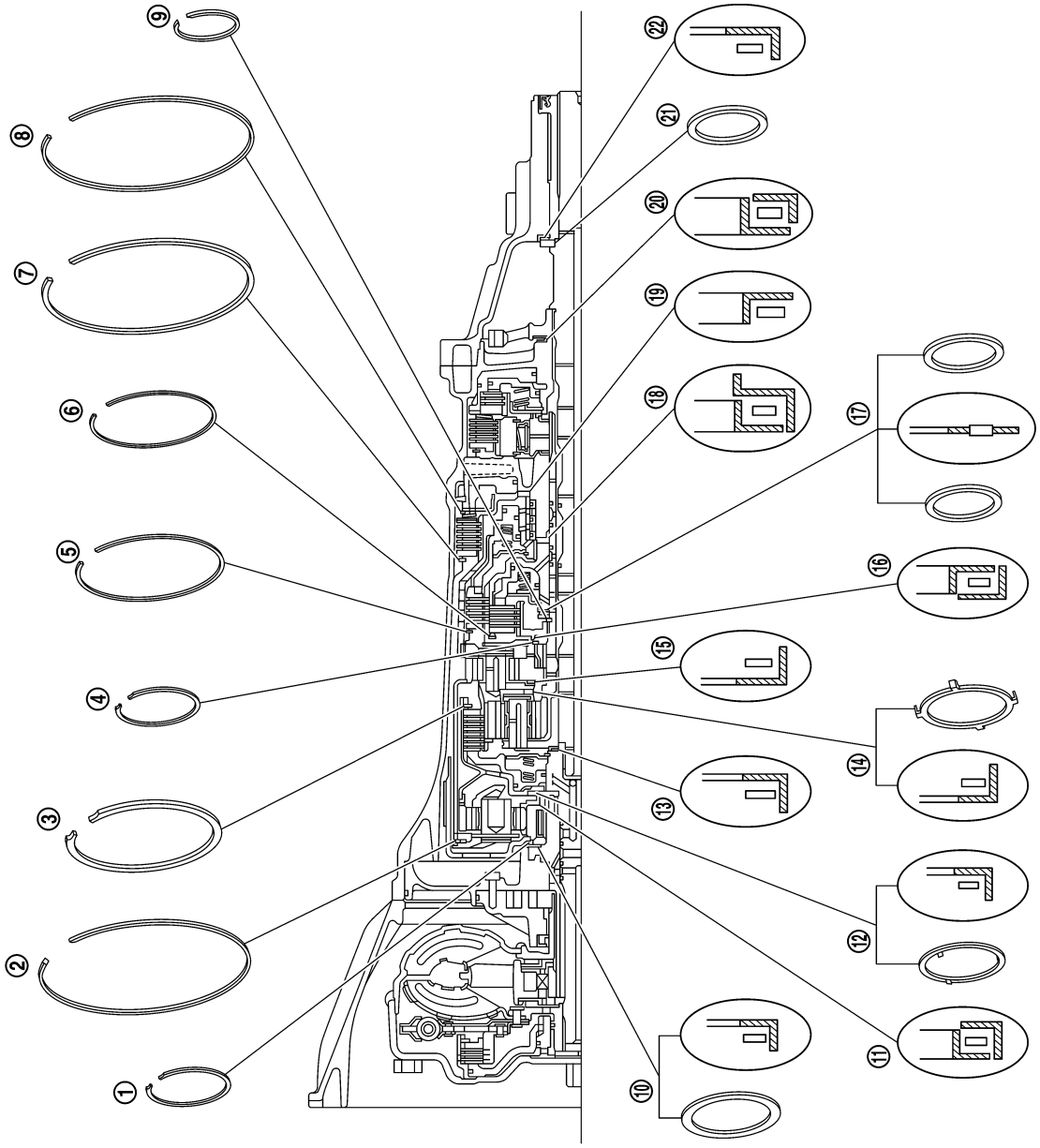
2WD models

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)



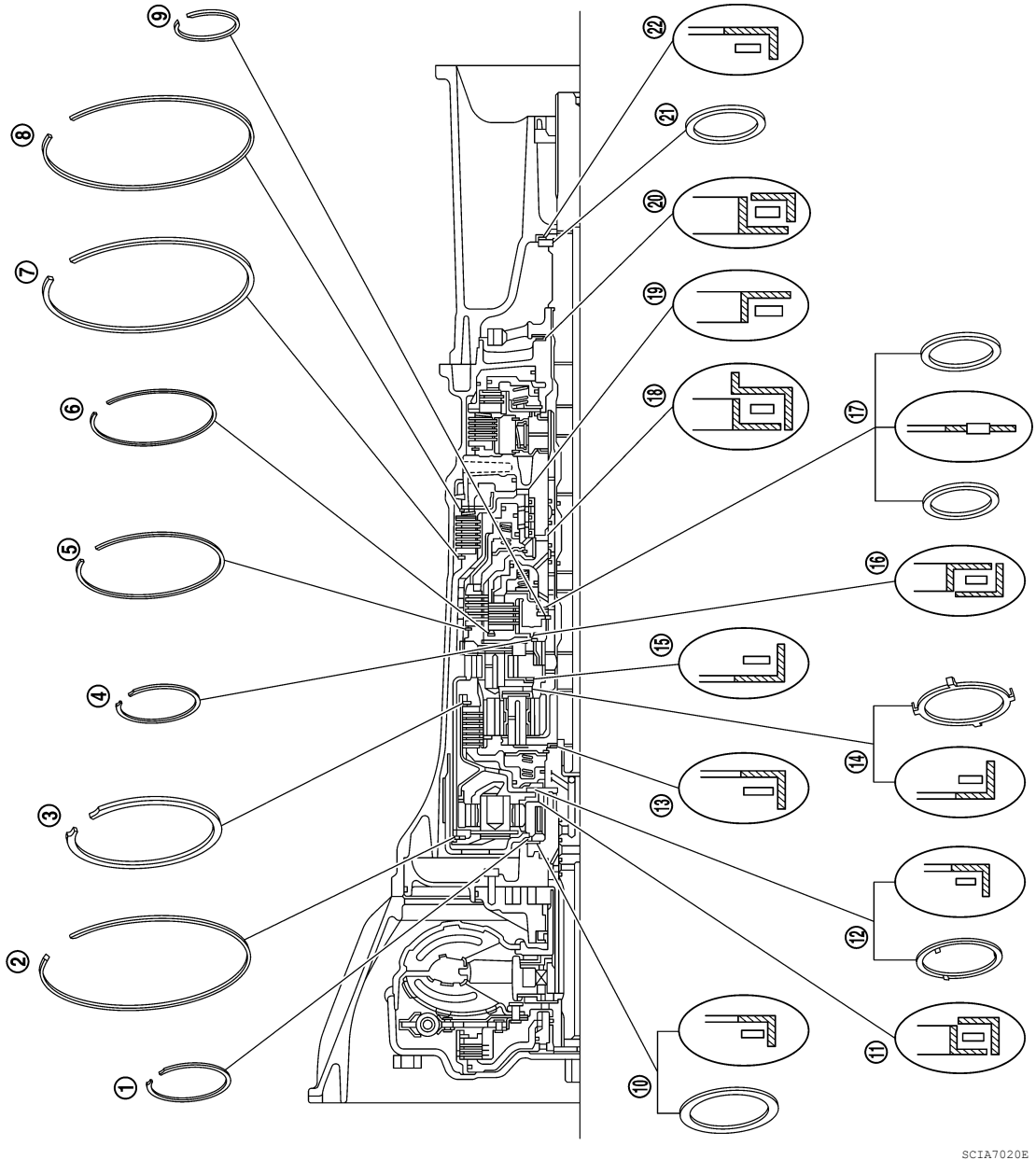
4WD models

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)



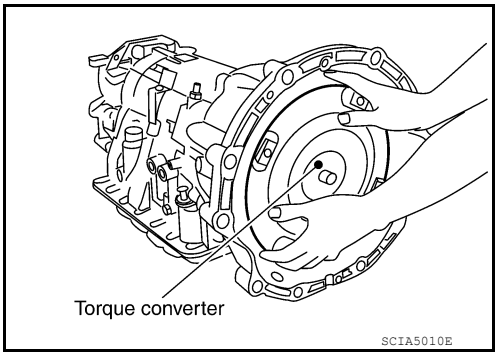
DISASSEMBLY

Disassembly

INFOID:0000000007360381

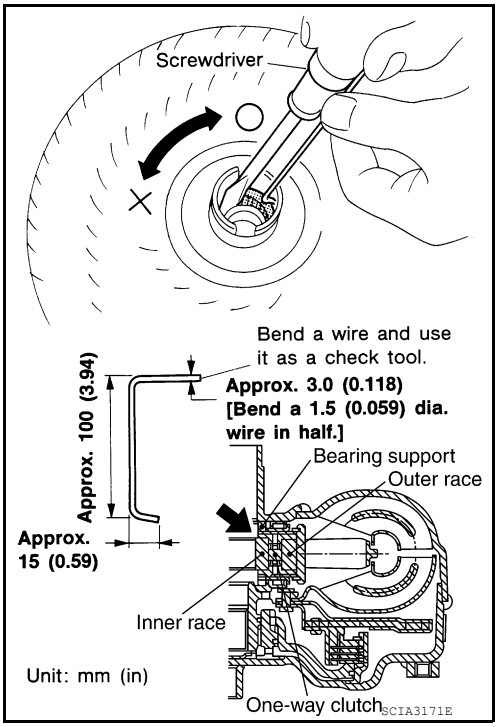
CAUTION:
Do not disassemble parts behind Drum Support. Refer to TM-77, "Cross-Sectional View".

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

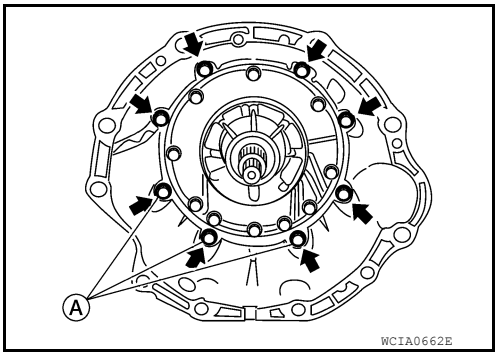


3. Check torque converter one-way clutch using a check tool as shown.

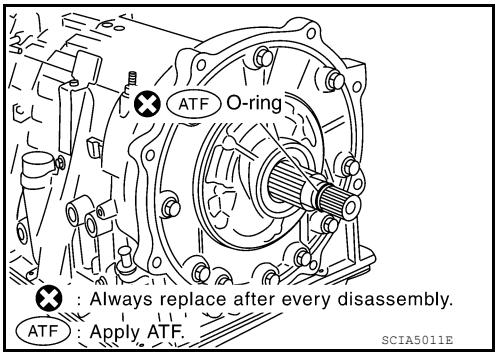
a. Insert a check tool into the groove of bearing support built into one-way clutch outer race.
b. While holding bearing support with a check tool, rotate one-way clutch spline using suitable tool.
c. Make sure that inner race rotates clockwise only. If not, replace torque converter assembly.



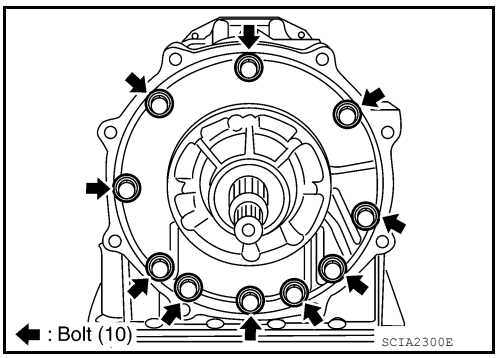
4. Remove bolts and converter housing from transmission case.
CAUTION:
Do not scratch converter housing.
- Self-sealing bolt (A)



5. Remove O-ring from input clutch assembly.



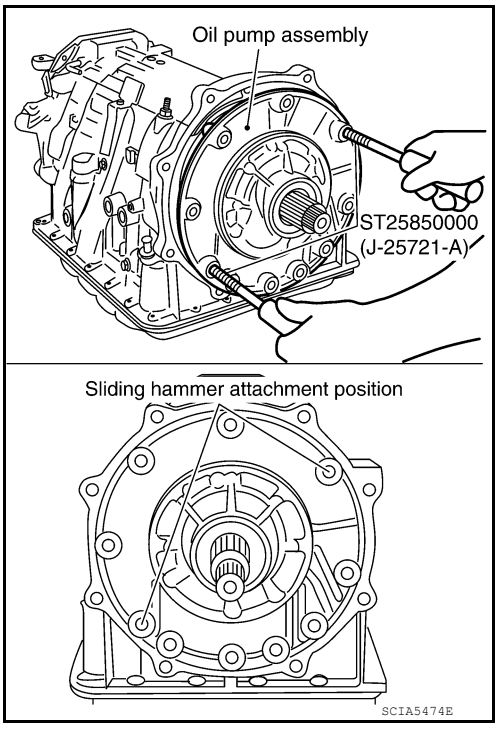
6. Remove oil pump assembly to transmission case bolts.



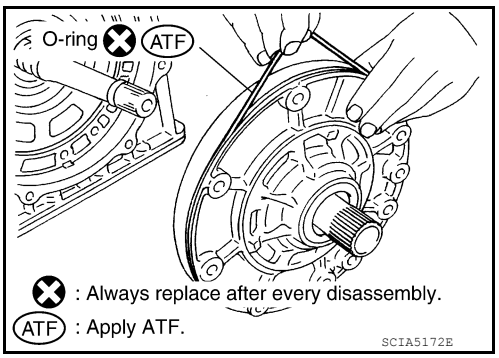
7. Remove the oil pump assembly evenly from the transmission case using Tools.

Tool number : ST25850000 (J-25721-A)

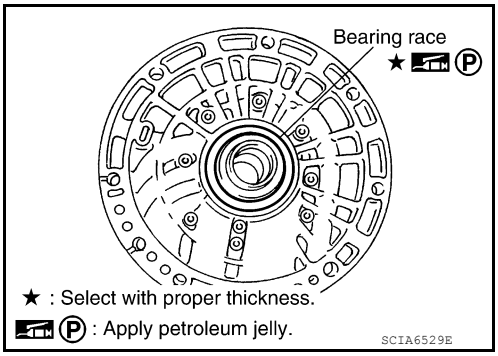
CAUTION:
- **Fully tighten the sliding hammer screws.**
- **Make sure that bearing race is installed to the oil pump assembly edge surface.**



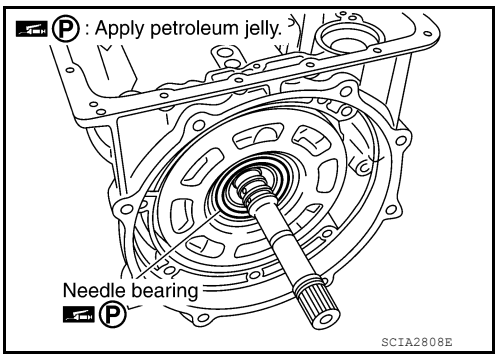
8. Remove O-ring from oil pump assembly.



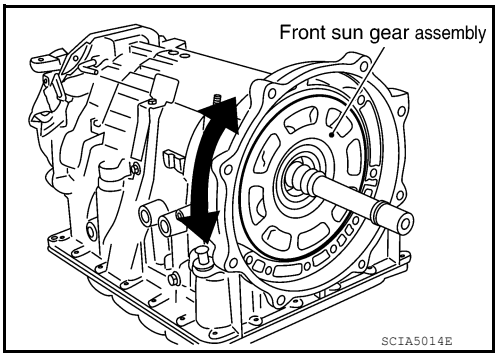
9. Remove bearing race from oil pump assembly.



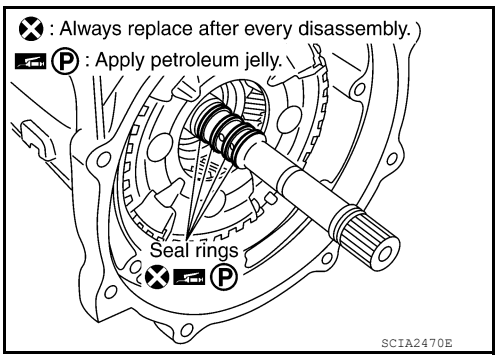
10. Remove needle bearing from front sun gear.



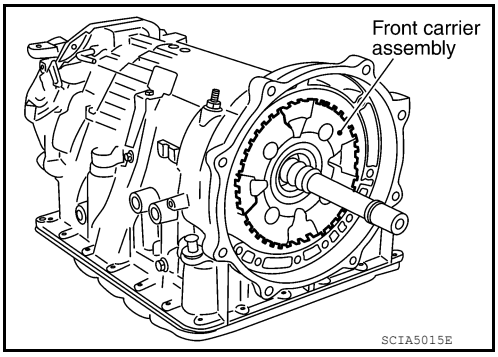
11. Remove front sun gear assembly from front carrier assembly.
NOTE:
Remove front sun gear by rotating it left and right.



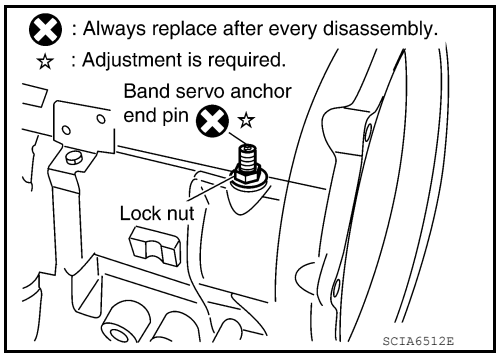
12. Remove seal rings from input clutch assembly.



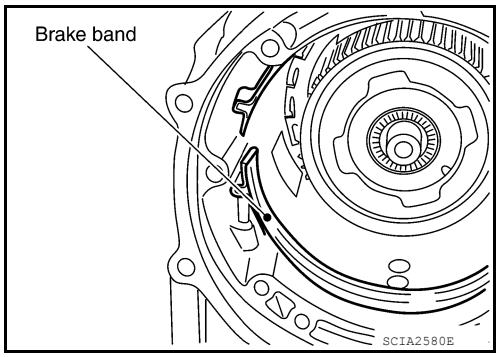
13. Remove front carrier assembly (with input clutch assembly and rear internal gear) from rear carrier assembly.
CAUTION:
Do not remove it with needle bearing.



14. Loosen lock nut and remove band servo anchor end pin from transmission case.

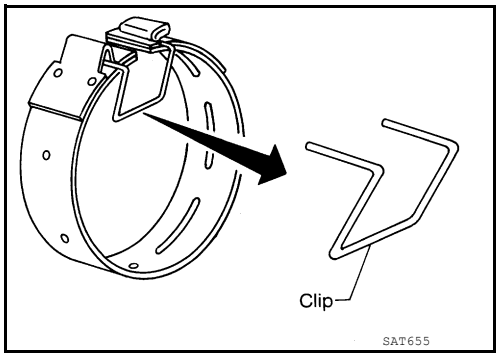


15. Remove brake band from transmission case.

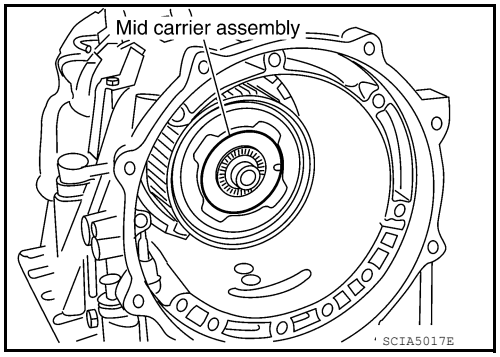


CAUTION:

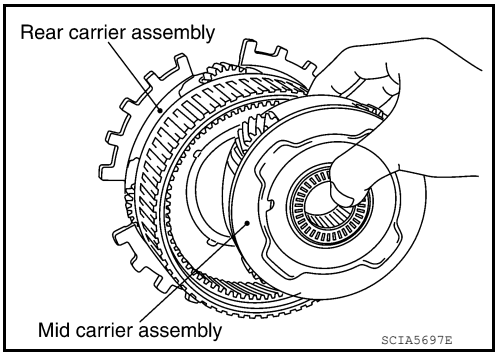
- **To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown.**
- **Check brake band facing for damage, cracks, wear or burns.**



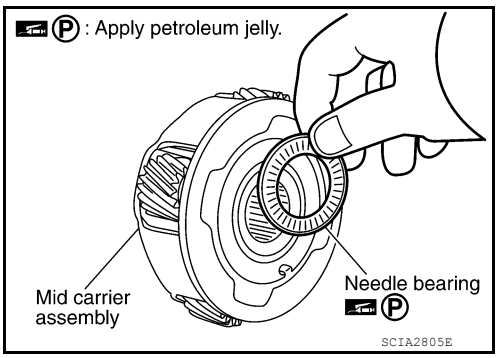
16. Remove mid carrier assembly and rear carrier assembly as a unit.



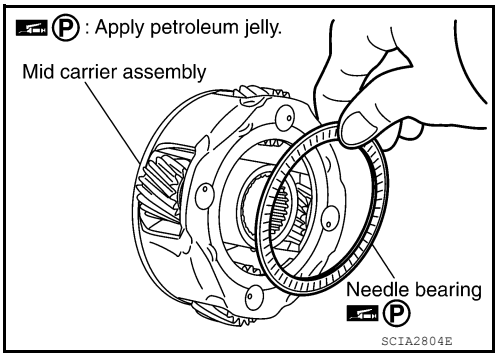
17. Remove mid carrier assembly from rear carrier assembly.



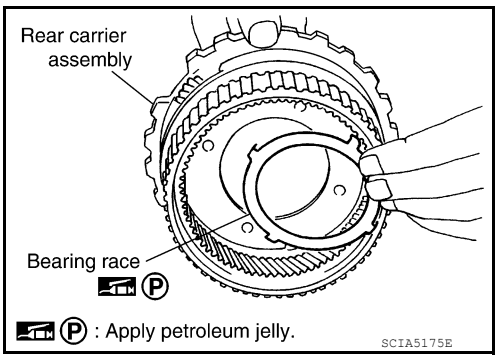
18. Remove needle bearing (front side) from mid carrier assembly.



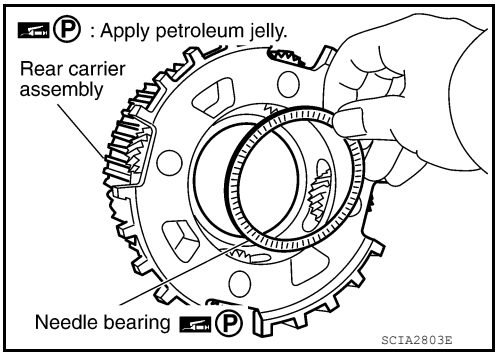
19. Remove needle bearing (rear side) from mid carrier assembly.



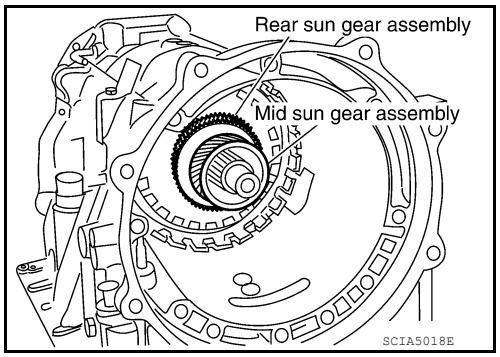
20. Remove bearing race from rear carrier assembly.



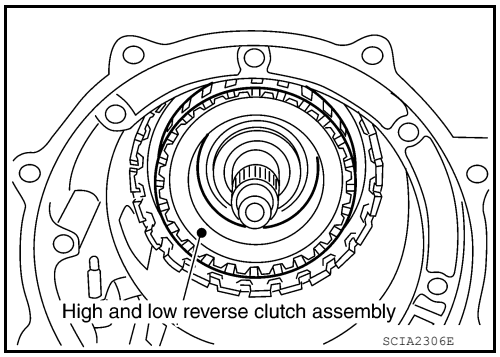
21. Remove needle bearing from rear carrier assembly.



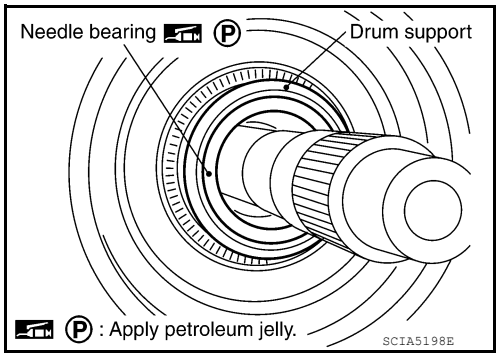
22. Remove mid sun gear assembly, rear sun gear assembly and high and low reverse clutch hub as a unit.
CAUTION:
Remove them with bearing race and needle bearing.



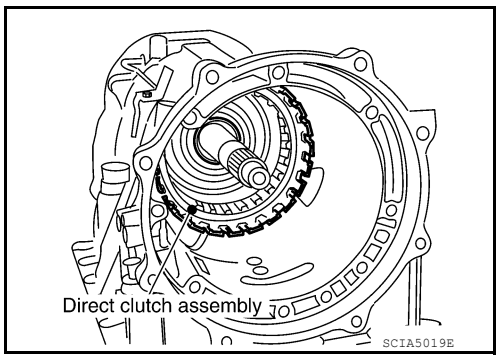
23. Remove high and low reverse clutch assembly from direct clutch assembly.
CAUTION:
Make sure that needle bearing is installed to the high and low reverse clutch assembly edge surface.



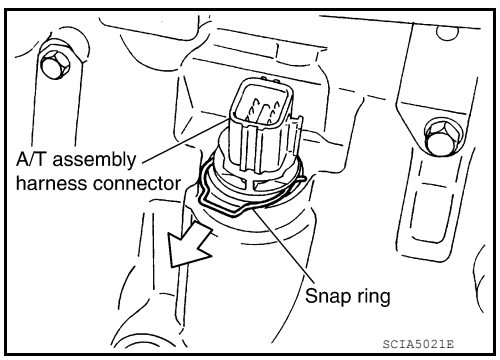
24. Remove needle bearing from drum support.



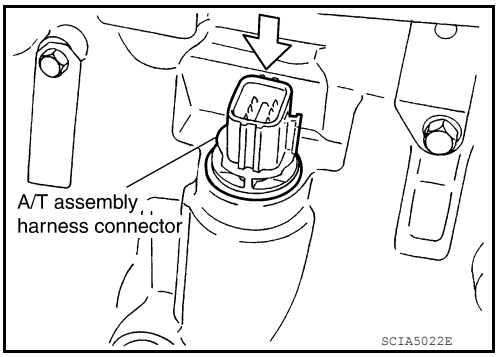
25. Remove direct clutch assembly from reverse brake.



26. Remove snap ring from A/T assembly harness connector.

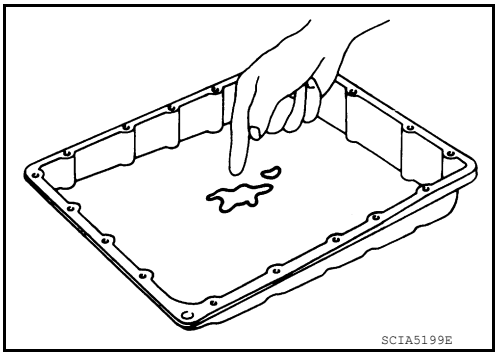


27. Push A/T assembly harness connector.
CAUTION:
Do not damage connector.

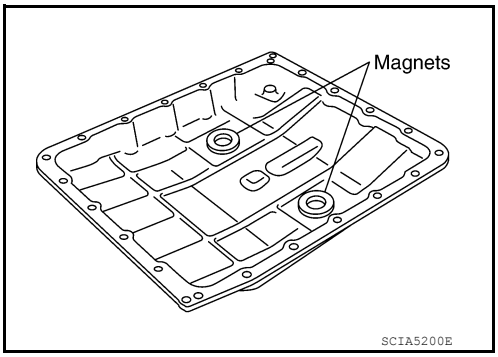


28. Remove oil pan and oil pan gasket. Refer to TM-229, "Removal and Installation".

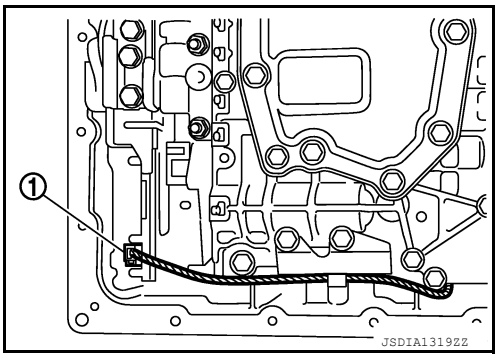
29. Check foreign materials in oil pan to help determine causes of malfunction. If the A/T fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause 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-215, "A/T Fluid Cooler Cleaning".**



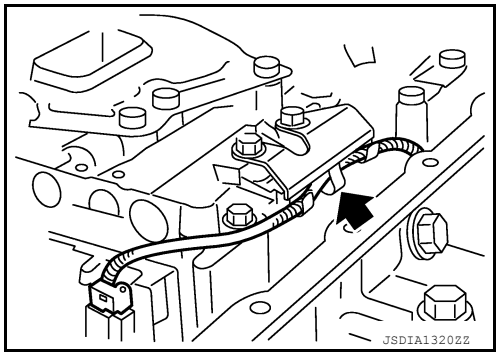
30. Remove magnets from oil pan.



31. Disconnect output speed sensor connector (1).
CAUTION:
Do not damage connector.

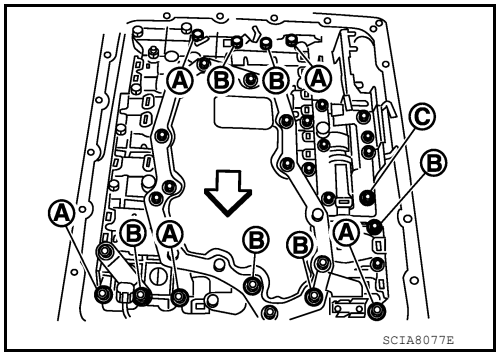


32. Straighten terminal clip (⬅) to free output speed sensor harness.

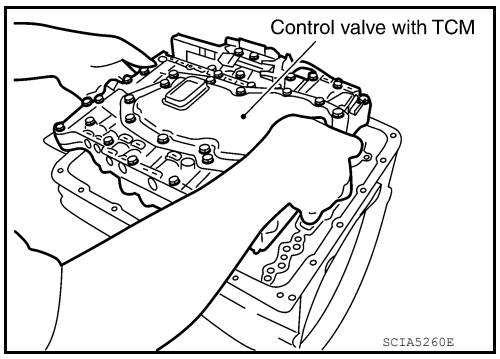


33. Remove bolts (A), (B) and (C) from control valve with TCM.
    - ⇦ : Front

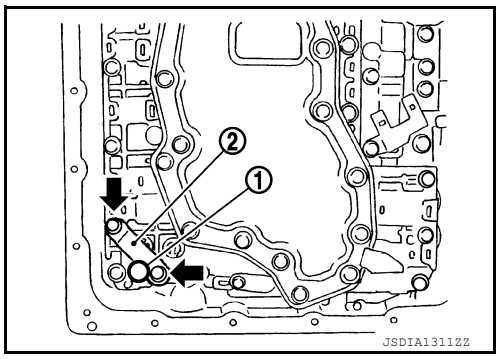
Bolt symbol	Length mm (in)	Number of bolts
A	42 (1.65)	5
B	55 (2.17)	6
C	40 (1.57)	1



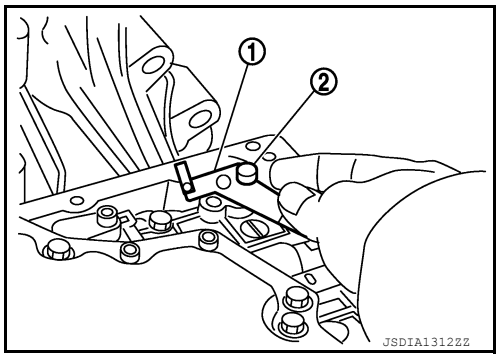
34. Remove control valve with TCM from transmission case.
    CAUTION:
    When removing, be careful with the manual valve notch and manual plate height. Remove it vertically.



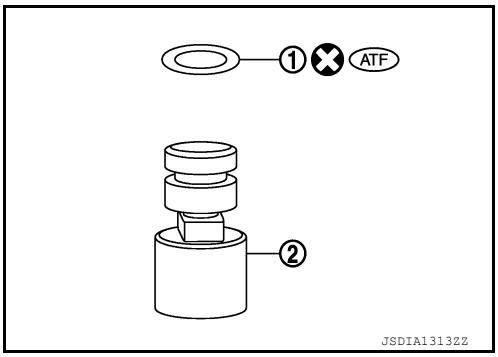
35. Remove plug (1) with bracket (2) from control valve with TCM.



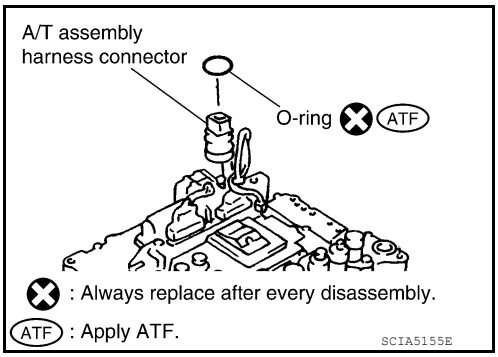
36. Remove bracket (1) from plug (2).



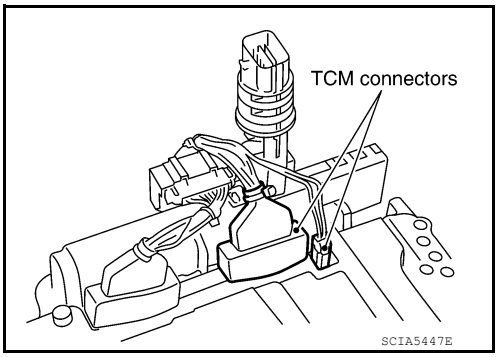
37. Remove O-ring (1) from plug (2).



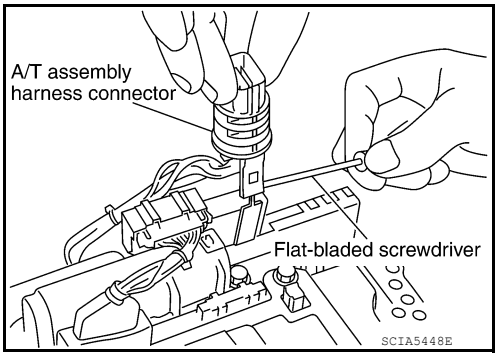
38. Remove O-ring from A/T assembly harness connector.



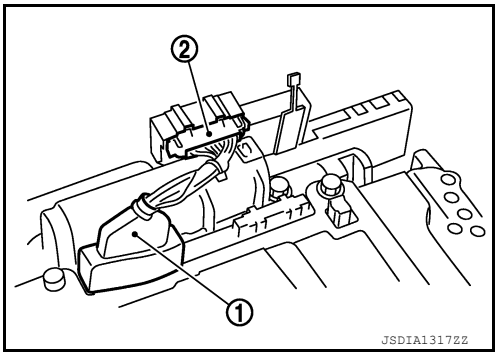
39. Disconnect TCM connectors.
CAUTION:
Do not damage connectors.



40. Remove A/T assembly harness connector from control valve with TCM using suitable tool.



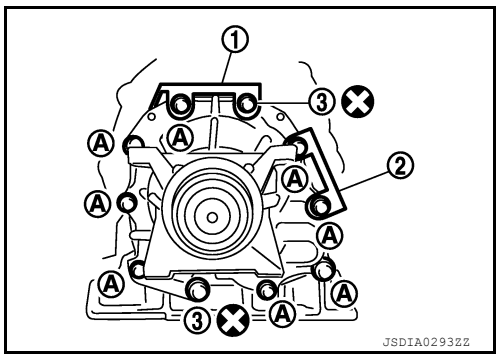
41. Disconnect TCM connector (1) and transmission range switch connector (2).
CAUTION:
Do not damage connectors.



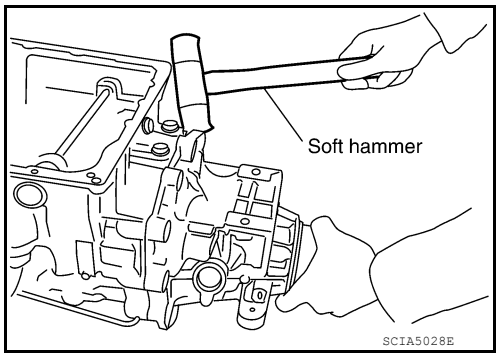
42. Remove rear extension assembly (2WD models) or adapter case assembly (4WD models) according to the following procedures.

a. **2WD models**

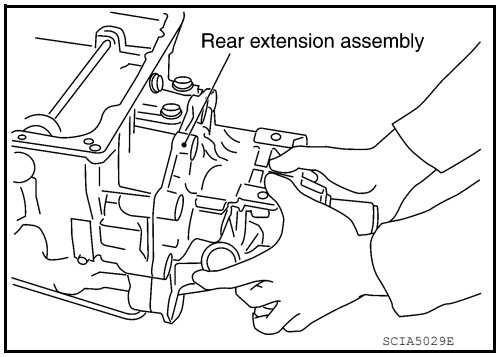
i. Remove tightening bolts for rear extension assembly and transmission case.
- Bracket (1)
- Bracket (2)
- Self-sealing bolts (3)
- Bolt (A)



ii. Tap rear extension assembly with soft hammer.

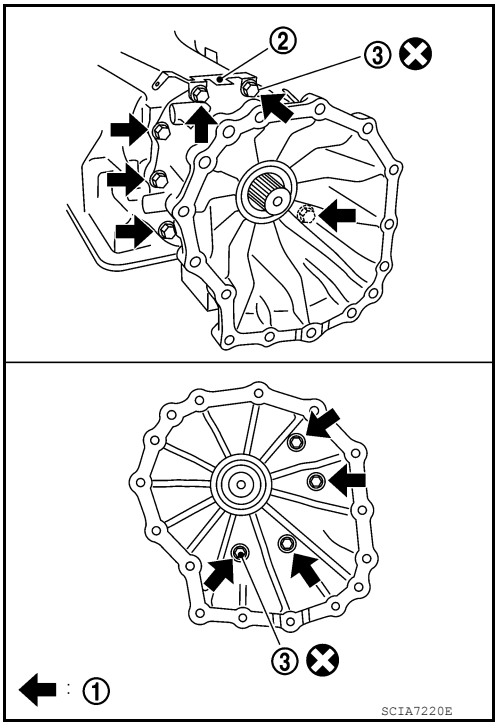


iii. Remove rear extension assembly (with needle bearing) from transmission case.

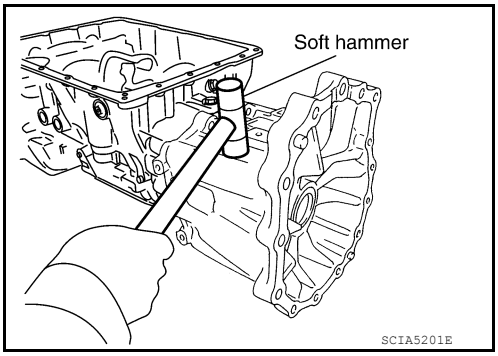


b. **4WD models**

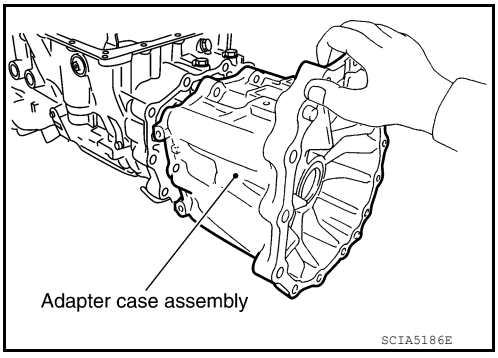
i. Remove adapter case to transmission case bolts and terminal bracket (2).
   - 1: Bolts
   - Self-sealing bolt (3)



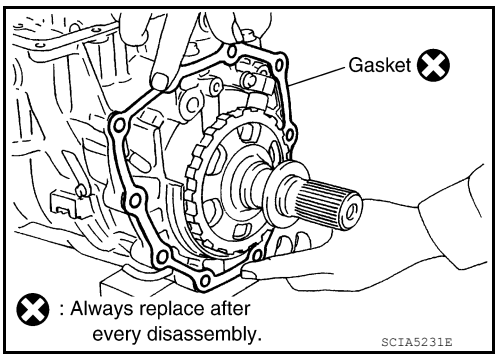
ii. Tap adapter case assembly using suitable tool.



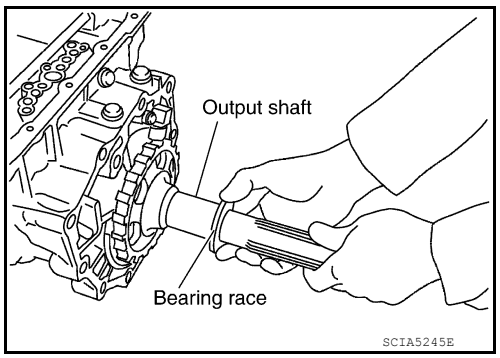
iii. Remove adapter case assembly (with needle bearing) from transmission case.



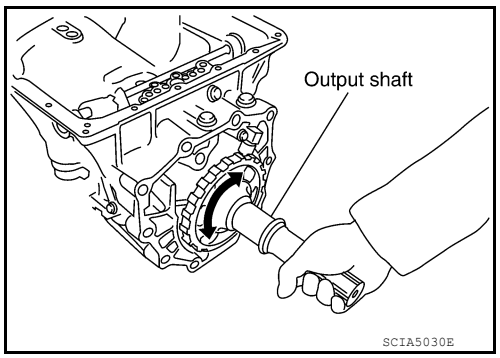
iv. Remove gasket from transmission case.



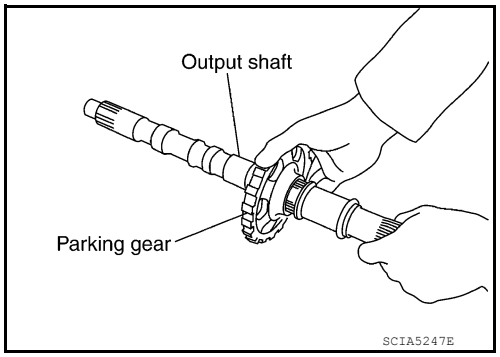
43. Remove bearing race from output shaft.



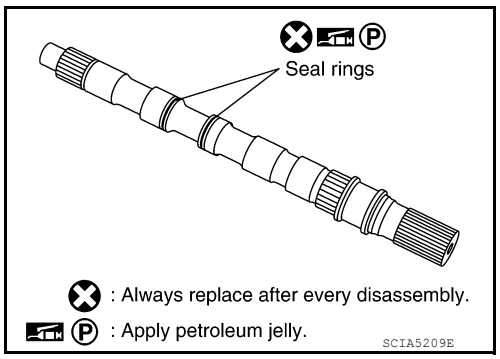
44. Remove output shaft from transmission case by rotating left and right.



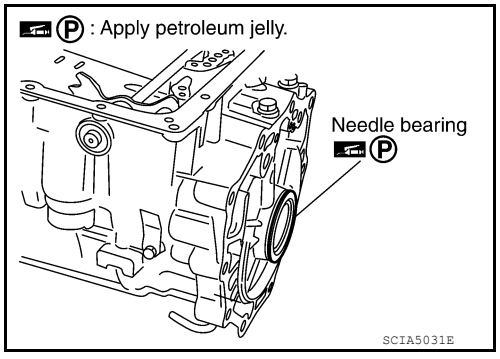
45. Remove parking gear from output shaft.



46. Remove seal rings from output shaft.



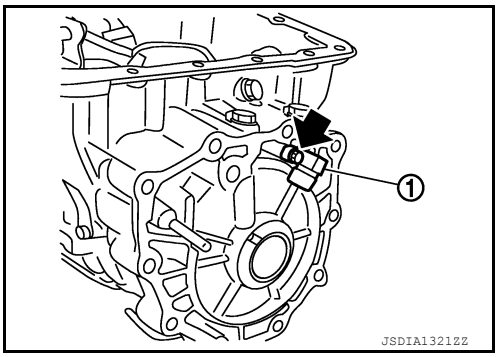
47. Remove needle bearing from transmission case.



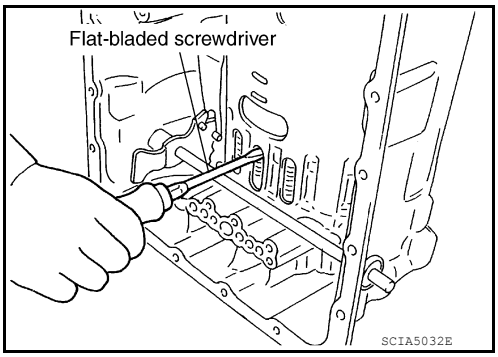
48. Remove output speed sensor (1) from transmission case.

⬅ : Bolt

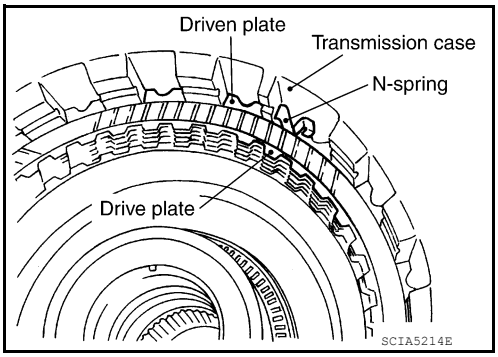
CAUTION:
- **Do not subject it to impact by dropping or hitting it.**
- **Do not disassemble.**
- **Do not allow metal filings or any foreign material to get on the sensor's front edge magnetic area.**
- **Do not place in an area affected by magnetism.**



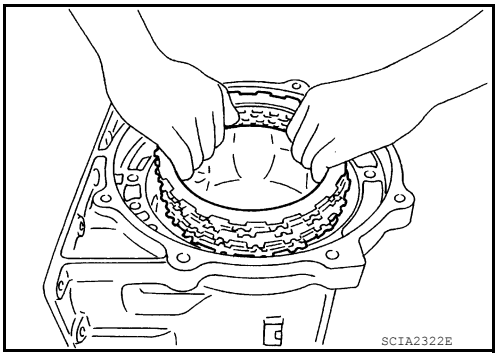
49. Remove reverse brake snap ring using two flat-bladed screwdrivers.
NOTE:
Press out snap ring from the transmission case oil pan side gap using a flat-bladed screwdriver, and remove it using a another screwdriver.
50. Remove reverse brake retaining plate from transmission case.
- Check facing for burns, cracks or damage. If necessary, replace the plate.



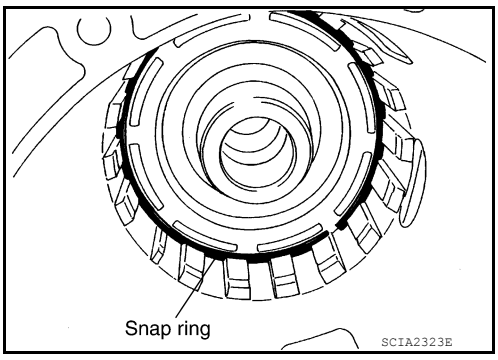
51. Remove N-spring from transmission case.



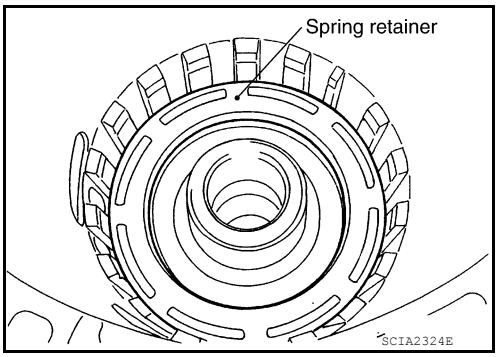
52. Remove reverse brake drive plates, driven plates and dish plate from transmission case.
- **Check facing for burns, cracks or damage. If necessary, replace the plate.**



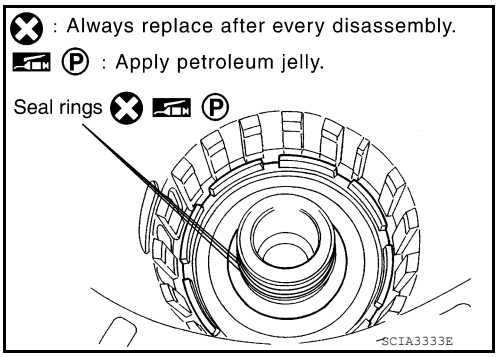
53. Remove snap ring using suitable tool.



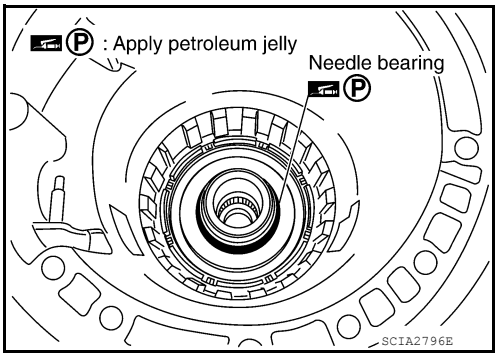
54. Remove spring retainer and return spring from transmission case.



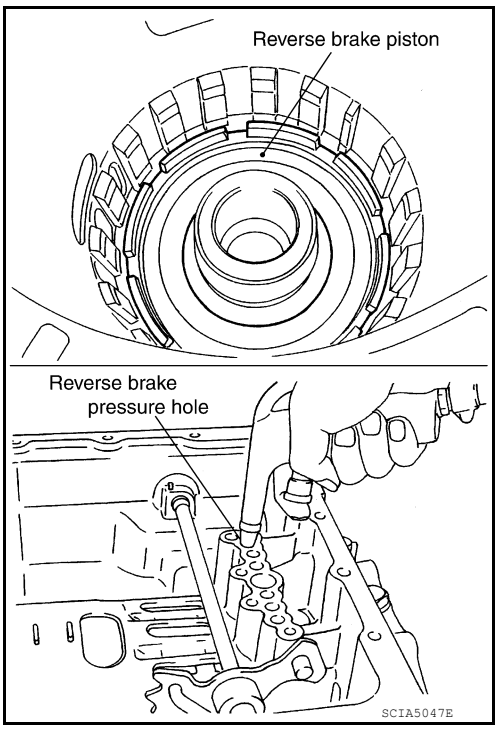
55. Remove seal rings from drum support.



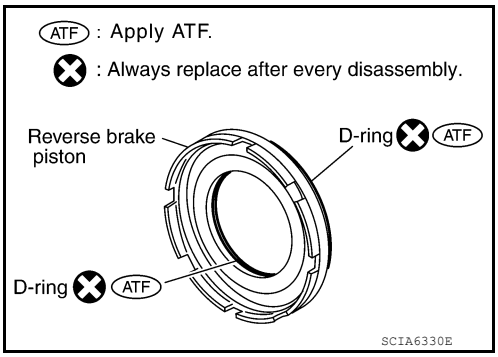
56. Remove needle bearing from drum support edge surface.



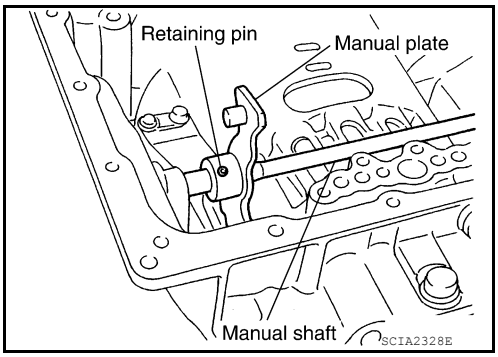
57. Remove reverse brake piston from transmission case using compressed air. Refer to TM-260, "Oil Channel".
CAUTION:
Care should be taken not to abruptly blow air. It makes the piston incline, and as a result, it becomes hard to disassemble the pistons.



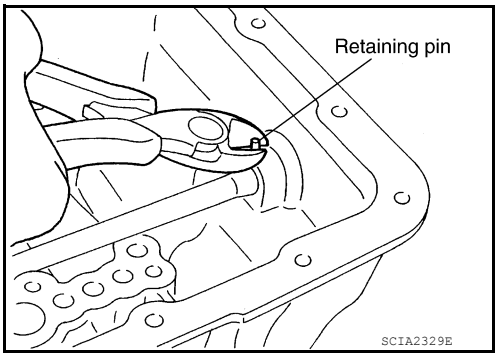
58. Remove D-rings from reverse brake piston.



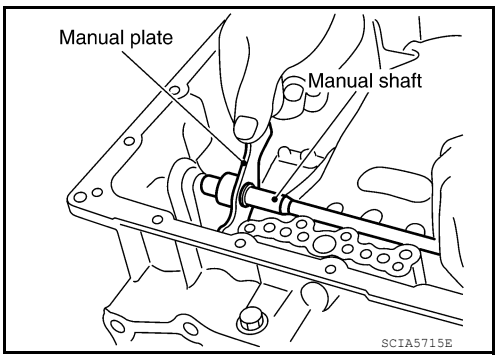
59. Knock out retaining pin using suitable tool.



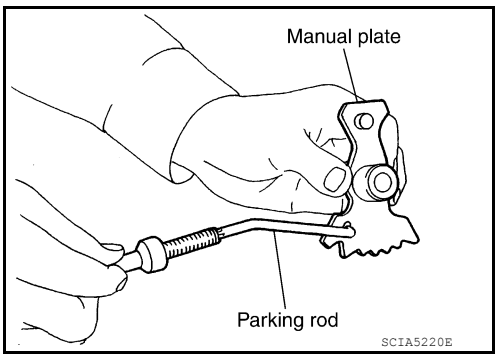
60. Remove manual shaft retaining pin using suitable tool.



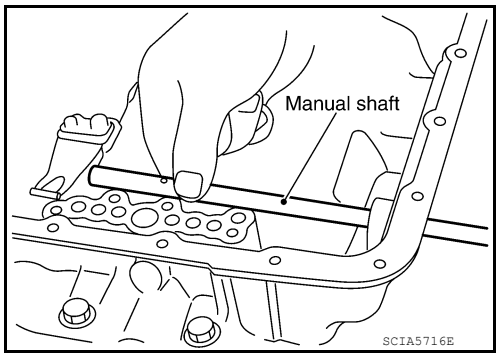
61. Remove manual plate (with parking rod) from manual shaft.



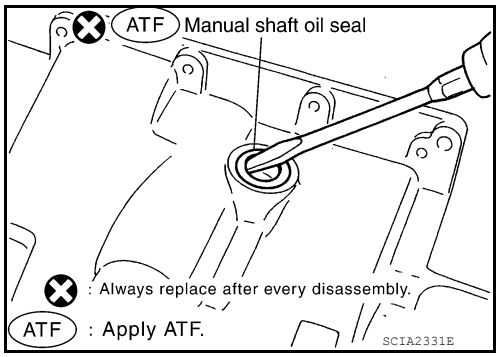
62. Remove parking rod from manual plate.



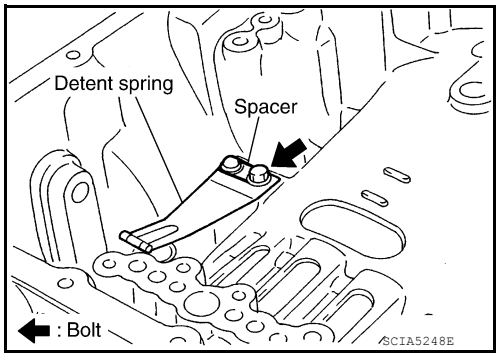
63. Remove manual shaft from transmission case.



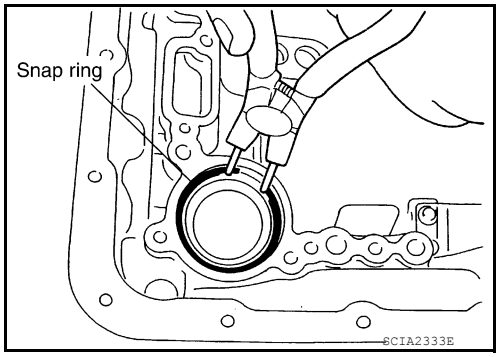
64. Remove manual shaft oil seals using suitable tool.
CAUTION:
Do not scratch transmission case.



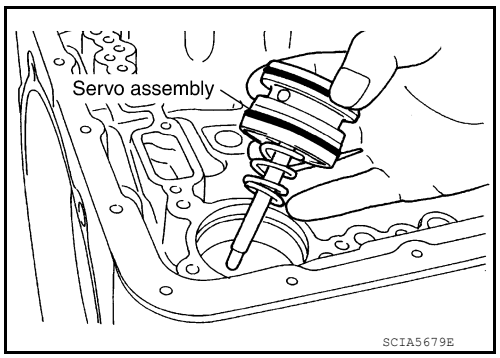
65. Remove detent spring and spacer from transmission case.



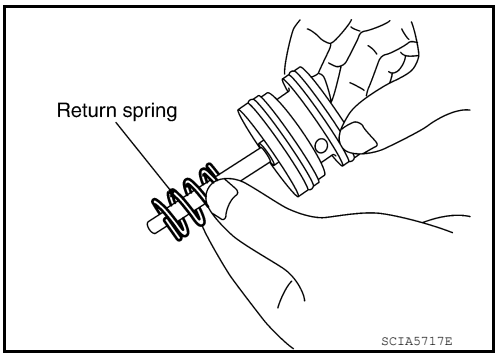
66. Remove snap ring from transmission case using suitable tool.



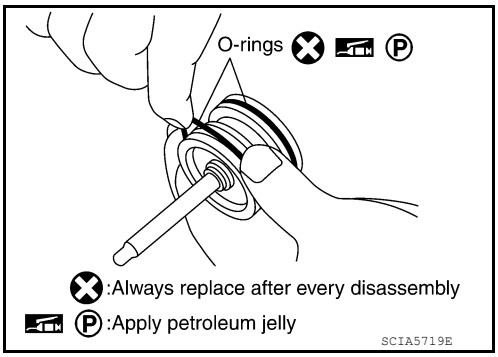
67. Remove servo assembly (with return spring) from transmission case.



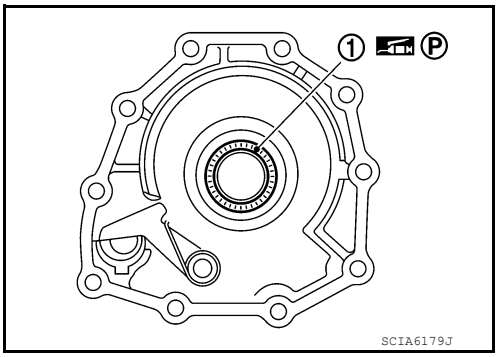
68. Remove return spring from servo assembly.



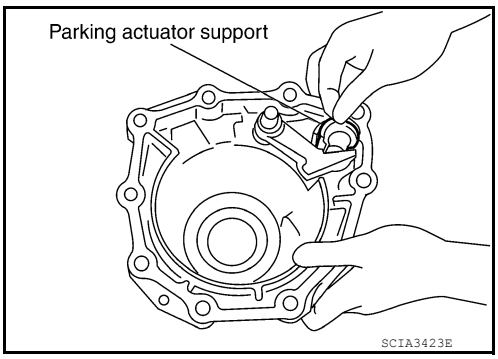
69. Remove O-rings from servo assembly.



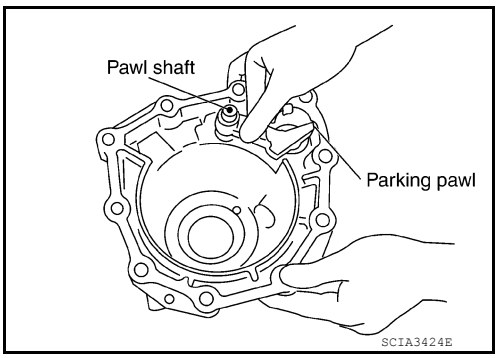
70. Remove needle bearing (1) from rear extension (2WD models) or adapter case (4WD models).



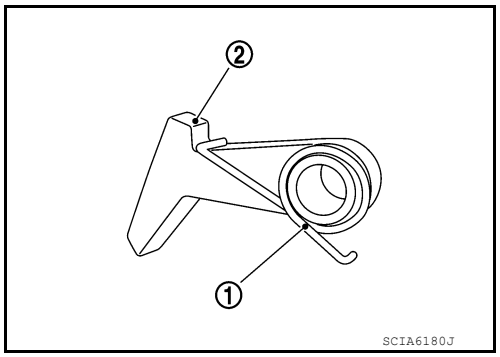
71. Remove parking actuator support from rear extension (2WD models) or adapter case (4WD models).



72. Remove parking pawl (with return spring) and pawl shaft from rear extension (2WD models) or adapter case (4WD models).



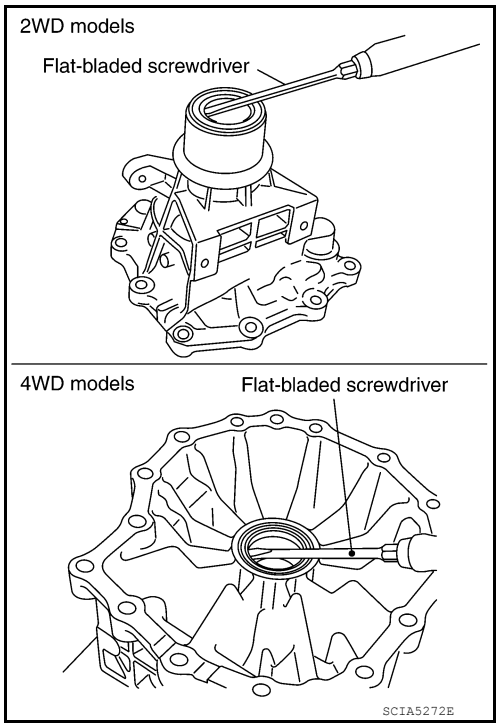
73. Remove return spring (1) from parking pawl (2).



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).

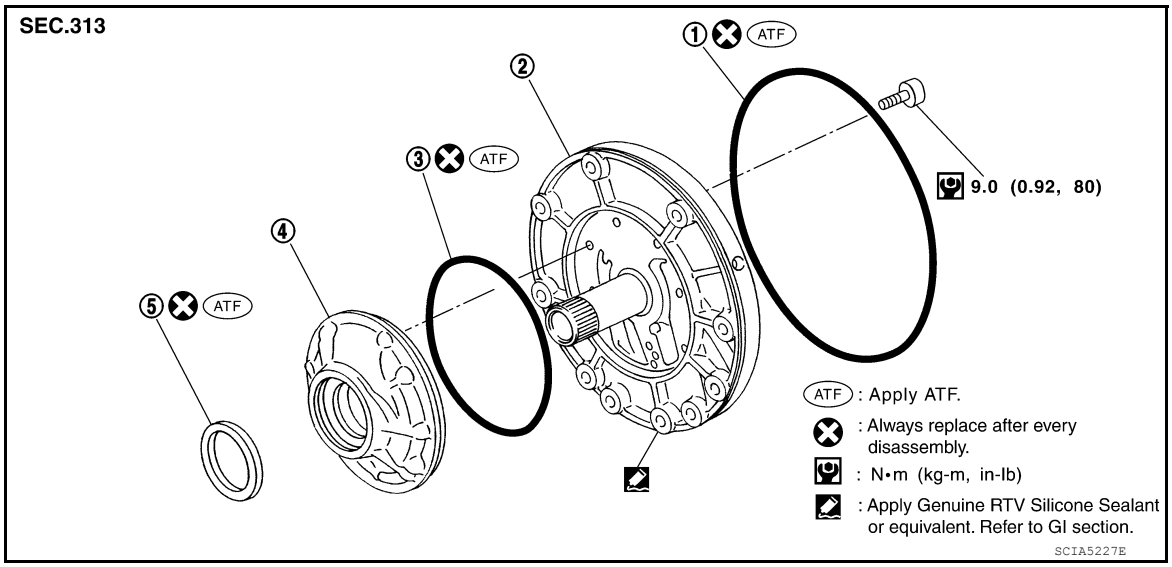


OIL PUMP

Exploded View

INFOID:0000000007360382

Oil Pump



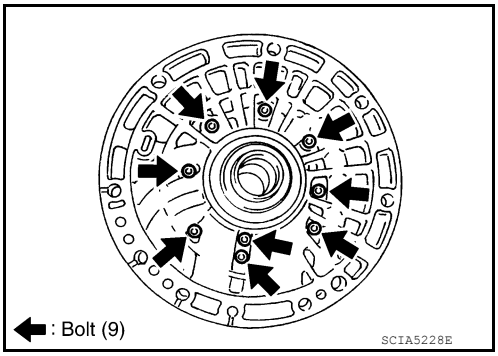
1. O-ring
2. Oil pump cover
3. O-ring
4. Oil pump housing
5. Oil pump housing oil seal

Disassembly and Assembly

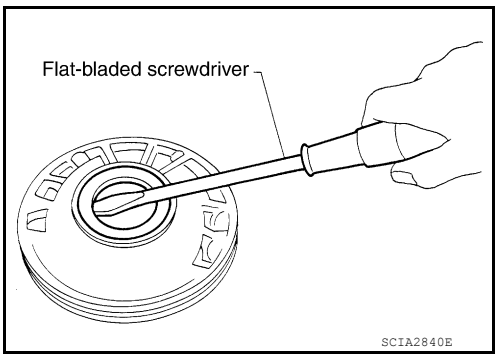
INFOID:0000000007360383

DISASSEMBLY

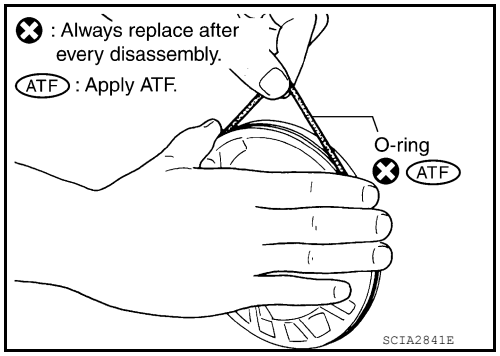
1. Remove oil pump housing from oil pump cover.



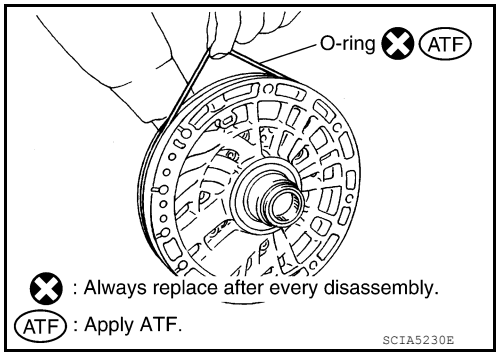
2. Remove oil pump housing oil seal using suitable tool.
CAUTION:
Do not scratch oil pump housing.



3. Remove O-ring from oil pump housing.

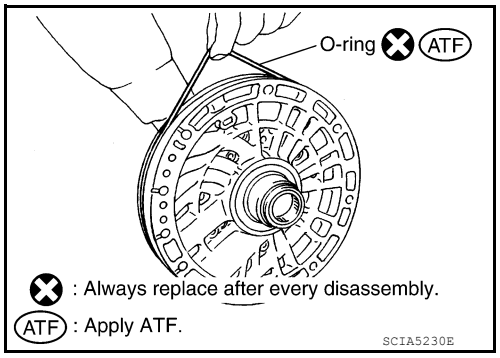


4. Remove O-ring from oil pump cover.

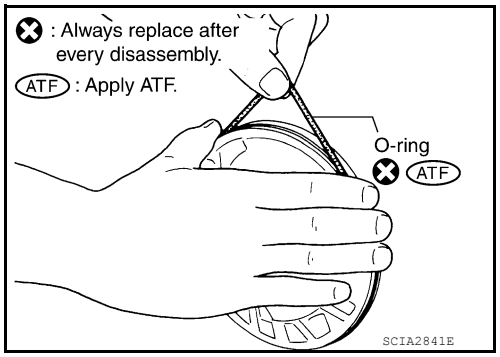


ASSEMBLY

1. Install O-ring to oil pump cover.
   CAUTION:
   - **Do not reuse O-ring.**
   - **Apply ATF to O-ring.**



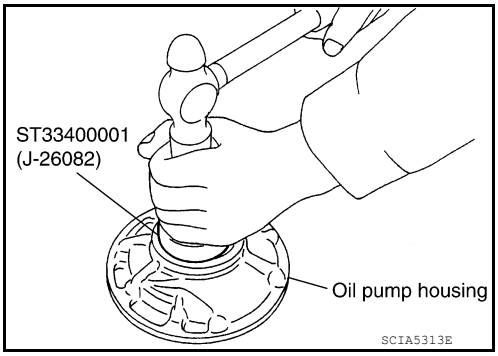
2. Install O-ring to oil pump housing.
   CAUTION:
   - **Do not reuse O-ring.**
   - **Apply ATF to O-ring.**



3. Install oil pump housing oil seal to the oil pump housing until it is flush using Tool.

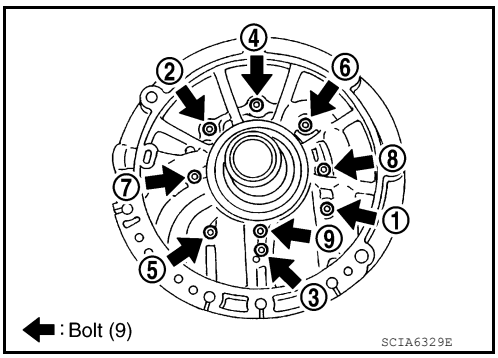
Tool number : ST33400001 (J-26082)

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.

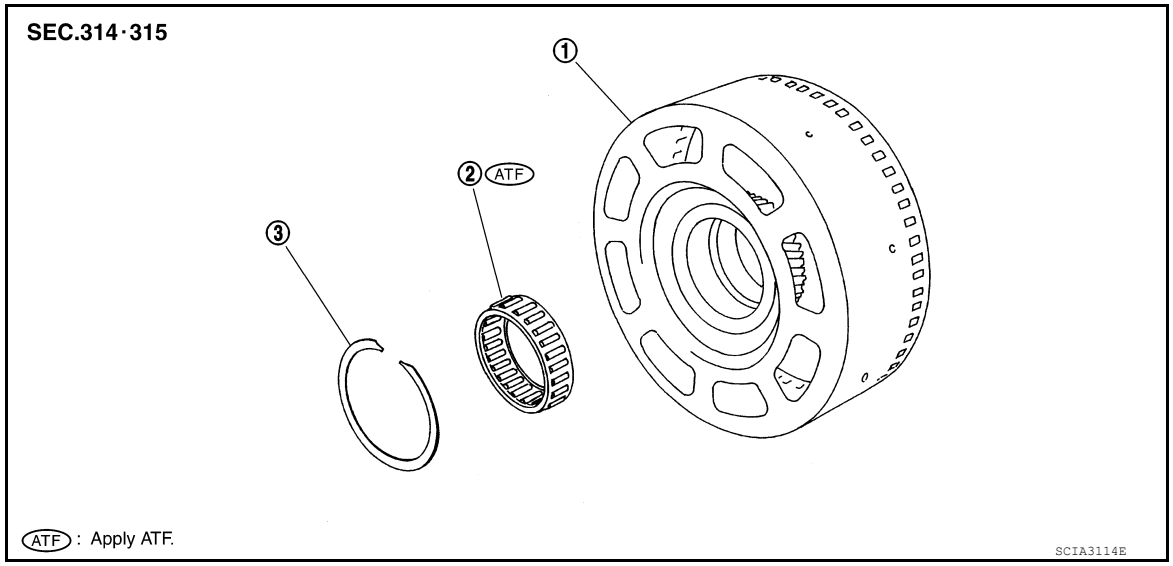
Oil pump housing bolts : 9.0 N·m (0.92 kg-m, 80 in-lb.)



FRONT SUN GEAR, 3RD ONE-WAY CLUTCH

Exploded View

INFOID:0000000007360384



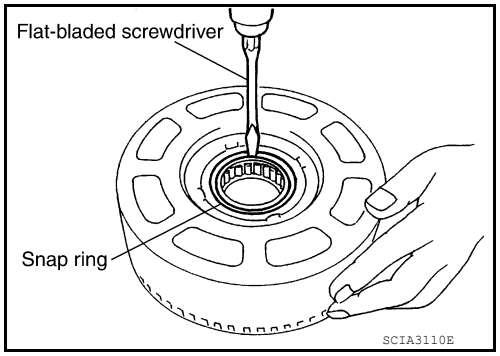
1. Front sun gear
2. 3rd one-way clutch
3. Snap ring

Disassembly and Assembly

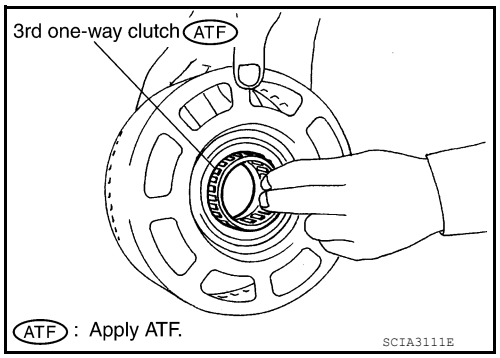
INFOID:0000000007360385

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

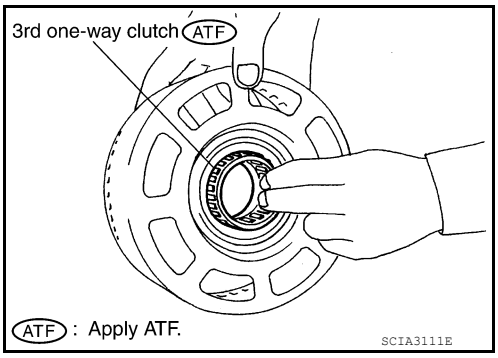
- Check for deformation, fatigue or damage.
  CAUTION:
  If necessary, replace the snap ring.

Front Sun Gear

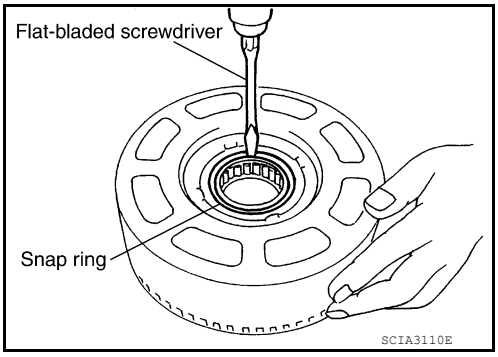
- Check for deformation, fatigue or damage.
  CAUTION:
  If necessary, replace the front sun gear.

ASSEMBLY

1. Install 3rd one-way clutch in front sun gear.
   CAUTION:
   Apply ATF to 3rd one-way clutch.



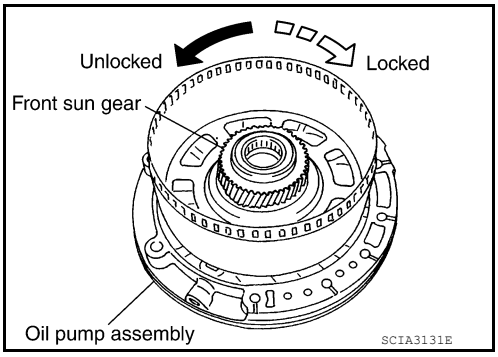
2. Install snap ring in front sun gear using suitable tool.



3. Check operation of 3rd one-way clutch.

a. Hold oil pump assembly and turn front sun gear.

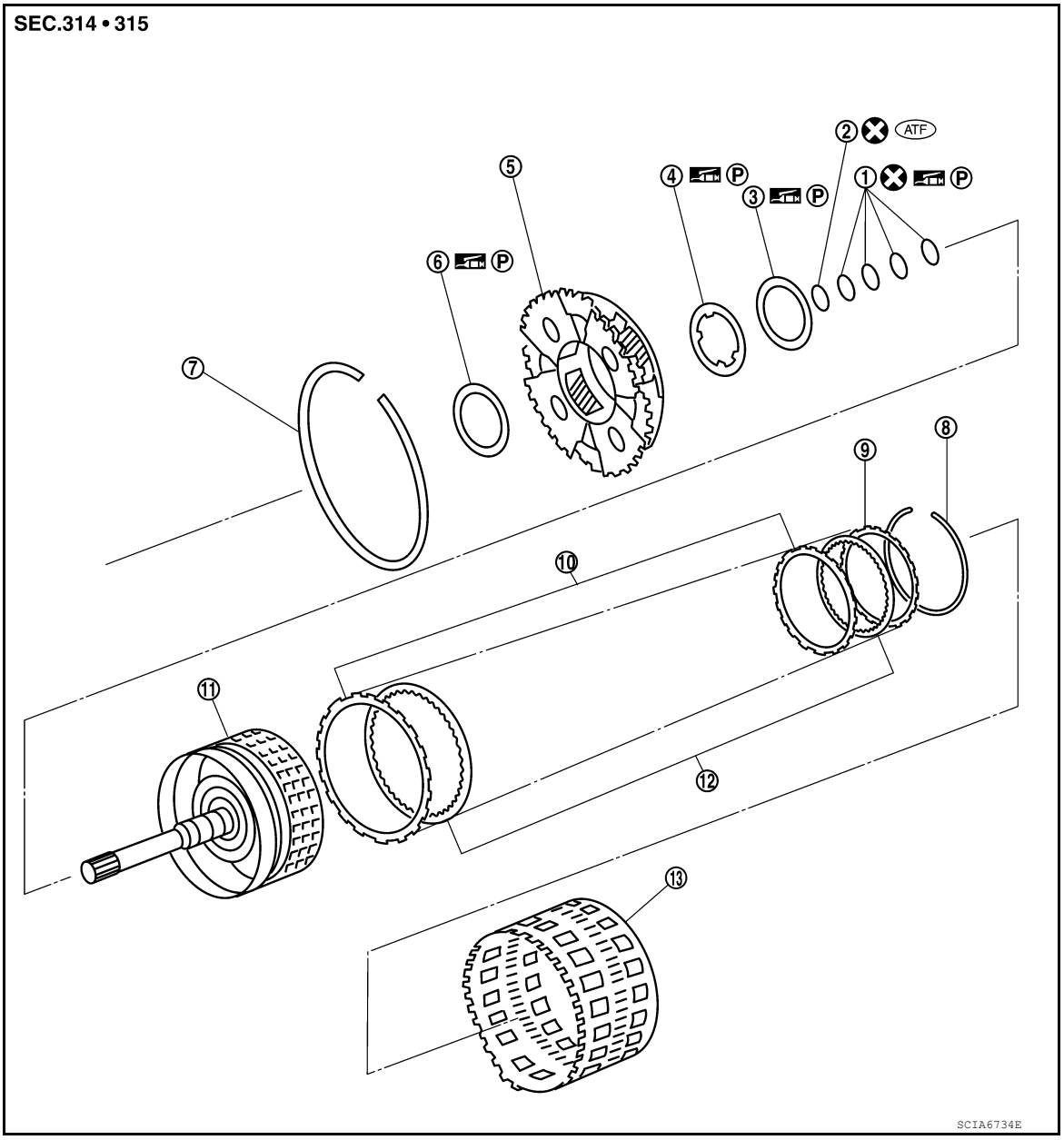
b. Check 3rd one-way clutch for correct locking and unlocking directions.
   CAUTION:
   If not as shown, check installation direction of 3rd one-way clutch.



FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

Exploded View

INFOID:0000000007360386



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

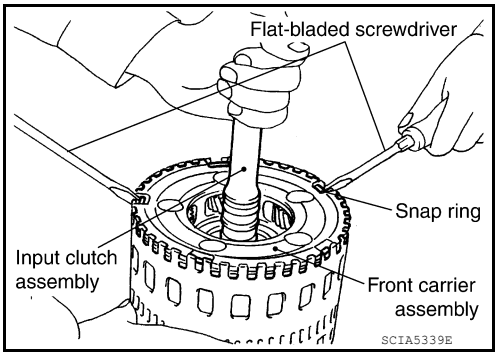
Refer to GI-4, "Component" for symbols in the figure.

Disassembly and Assembly

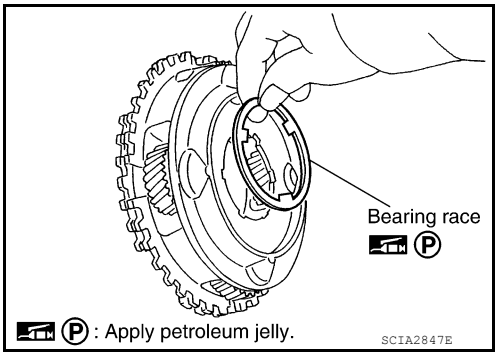
INFOID:0000000007360387

DISASSEMBLY

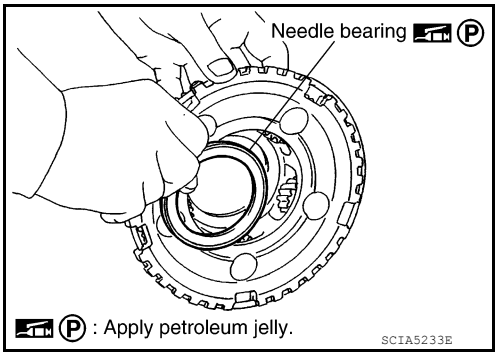
1. Compress snap ring using 2 flat-bladed screwdrivers.
2. Remove front carrier assembly and input clutch assembly from rear internal gear.
3. Remove front carrier assembly from input clutch assembly.



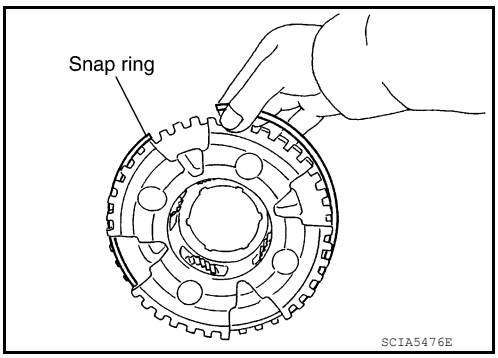
a. Remove bearing race from front carrier assembly.



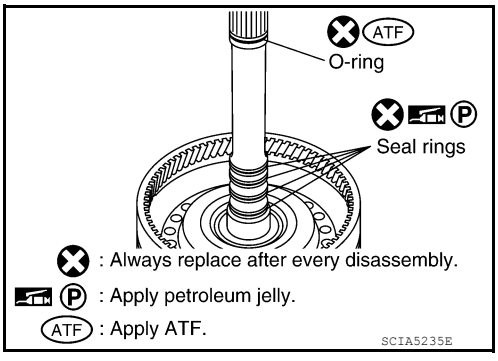
b. Remove needle bearing from front carrier assembly.



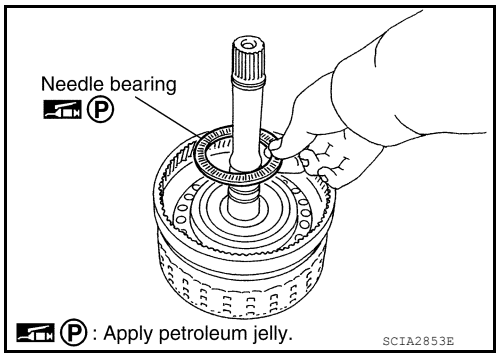
c. Remove snap ring from front carrier assembly.
CAUTION:
Do not excessively expand snap ring.



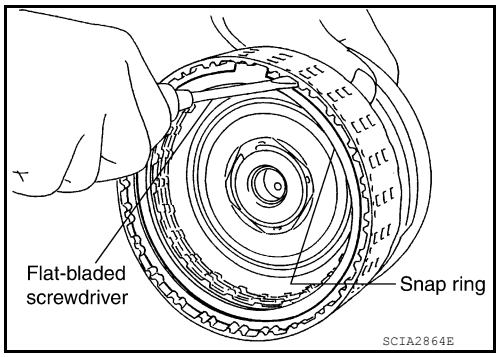
4. Disassemble input clutch assembly.
a. Remove O-ring and seal rings from input clutch assembly.



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

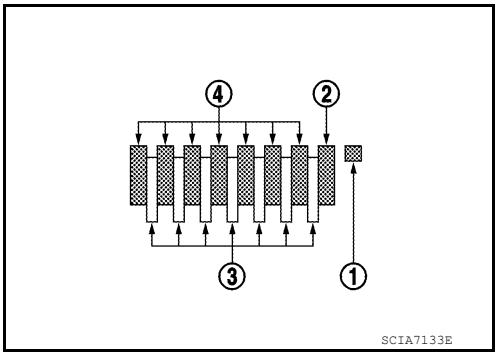
1. Install input clutch.

a. Install drive plates, driven plates and retaining plate in input clutch drum.

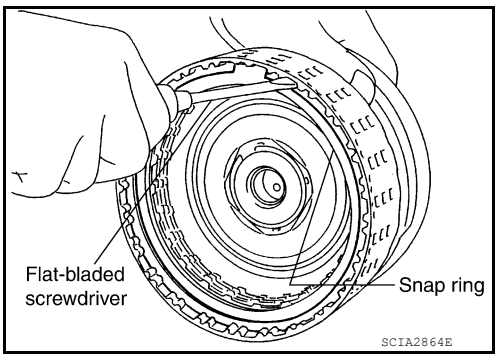
CAUTION:

Take care with order of plates.

- Snap ring (1)
- Retaining plate (2)
- Drive plate (3)
- Driven plate (4)
- Driveplate/Driven plate: 7/7



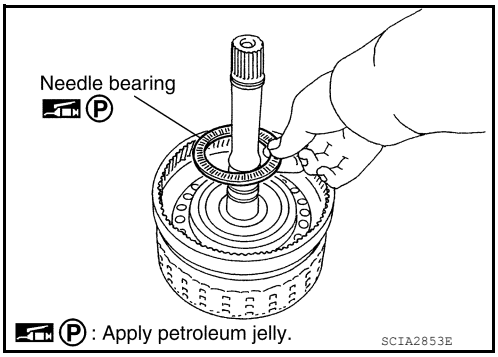
b. Install snap ring in input clutch drum using suitable tool.



c. Install needle bearing in input clutch assembly.

CAUTION:

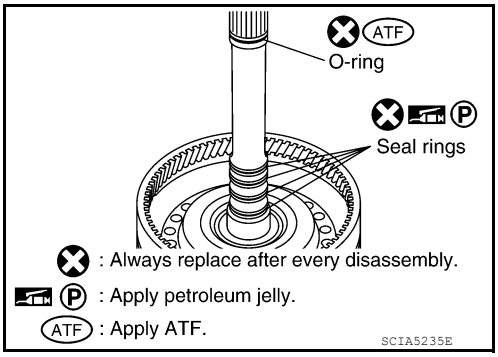
Apply petroleum jelly to needle bearing.



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.**

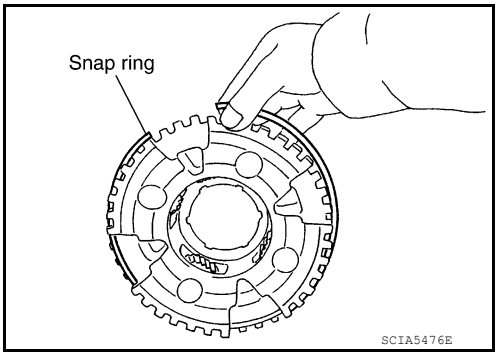


2. Install front carrier assembly.

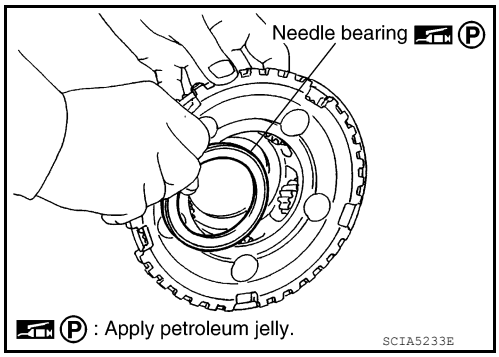
a. Install snap ring to front carrier assembly.

CAUTION:

Do not excessively expand snap ring.

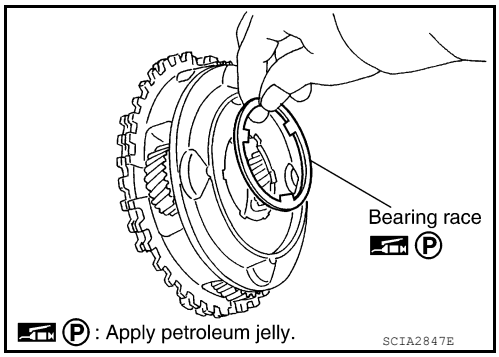


b. Install needle bearing in front carrier assembly.
CAUTION:
- **Take care with the direction of needle bearing. Refer to TM-262, "Location of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings".**
- **Apply petroleum jelly to bearing race.**

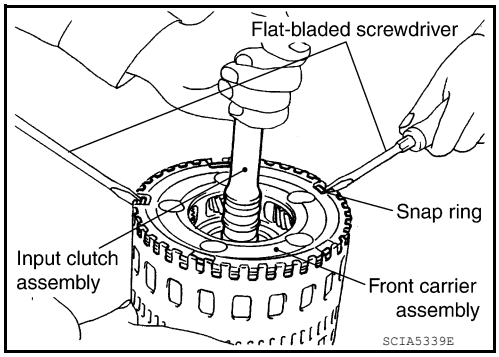


c. Install bearing race in front carrier assembly.
CAUTION:
Apply petroleum jelly to bearing race.

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.

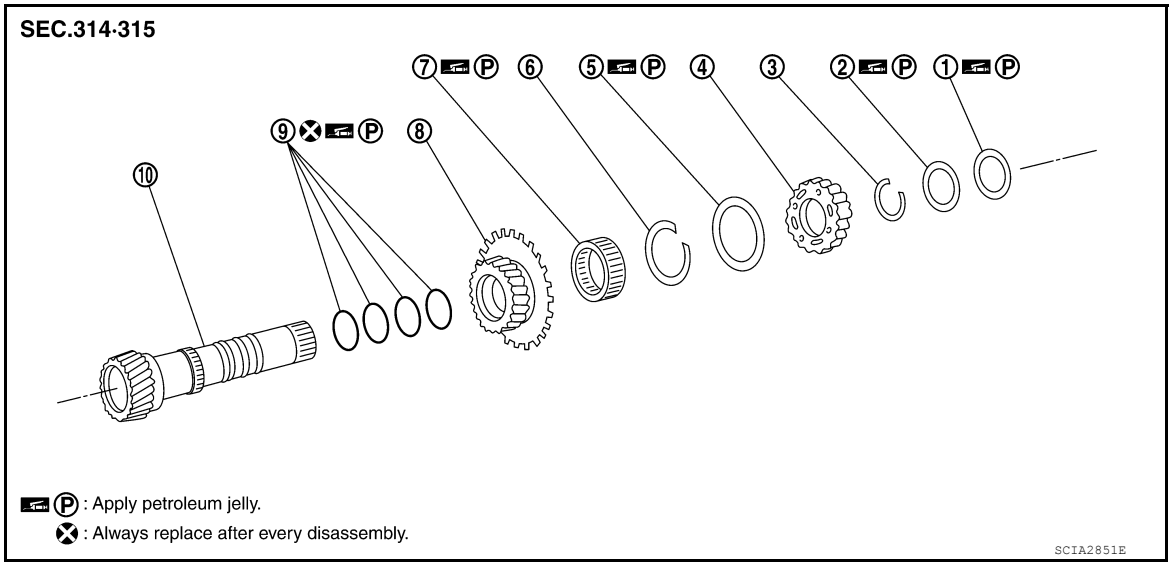


MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

Exploded View

INFOID:0000000007360388

VQ40DE models



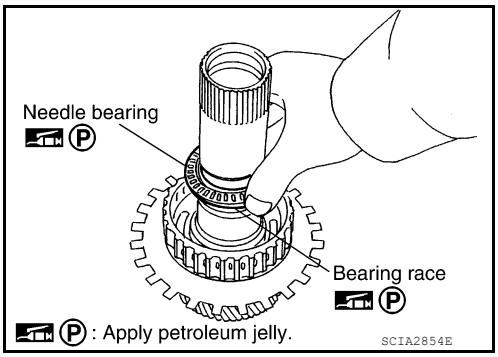
1. Needle bearing
2. Bearing race
3. Snap ring
4. High and low reverse clutch hub
5. Needle bearing
6. Snap ring
7. 1st one-way clutch
8. Rear sun gear
9. Seal ring
10. Mid sun gear

Disassembly and Assembly

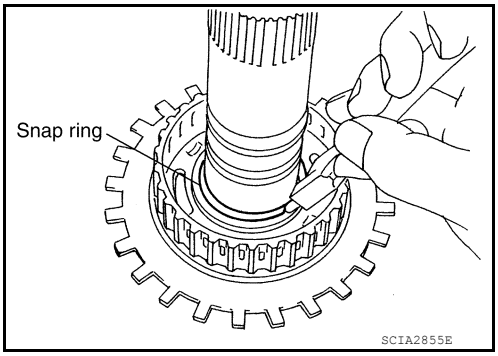
INFOID:0000000007360389

DISASSEMBLY

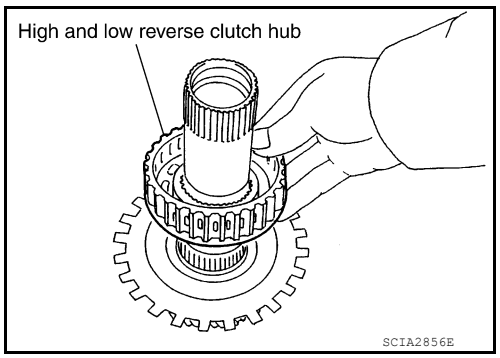
1. Remove needle bearing and bearing race from high and low reverse clutch hub.



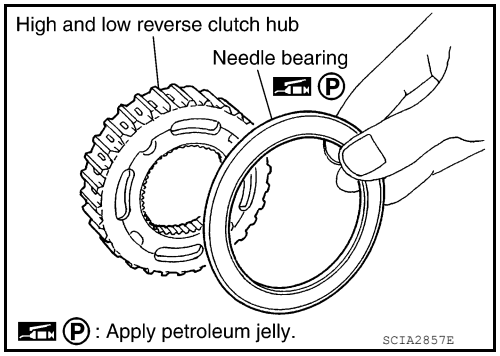
2. Remove snap ring from mid sun gear assembly using suitable tool.
   CAUTION:
   Do not excessively expand snap ring.



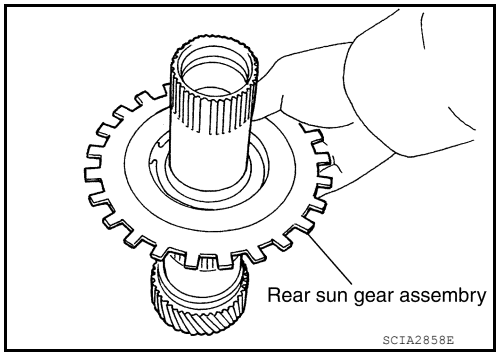
3. Remove high and low reverse clutch hub from mid sun gear assembly.



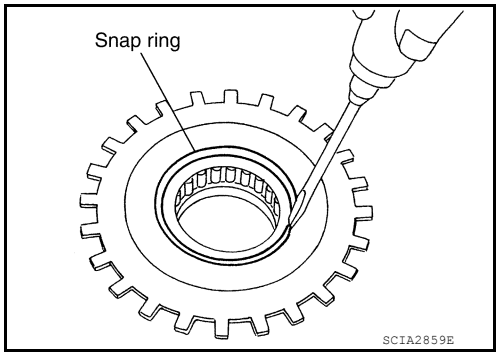
a. Remove needle bearing from high and low reverse clutch hub.



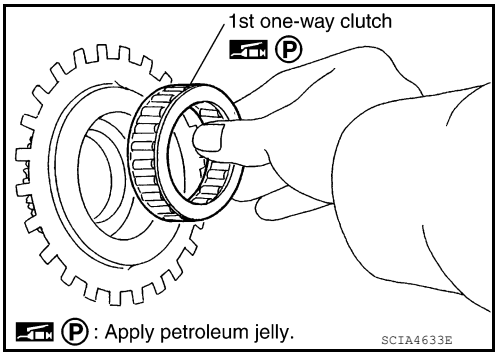
4. Remove rear sun gear assembly from mid sun gear assembly.



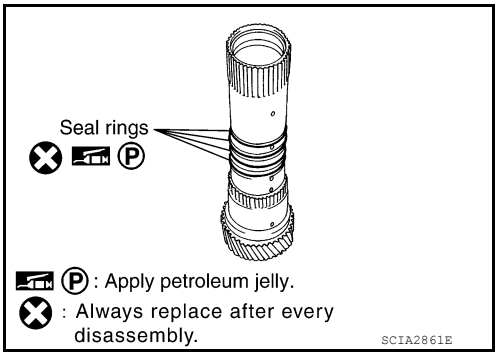
a. Remove snap ring from rear sun gear using suitable tool.



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.

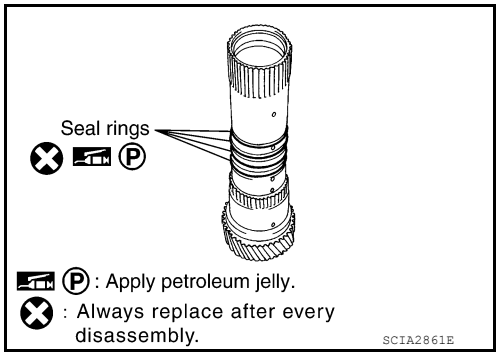
CAUTION:
If necessary, replace the rear sun gear.

High and Low Reverse Clutch Hub
- Check for deformation, fatigue or damage.

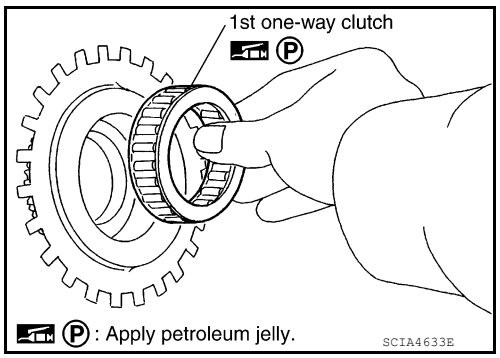
CAUTION:
If necessary, replace the high and low reverse clutch hub.

ASSEMBLY

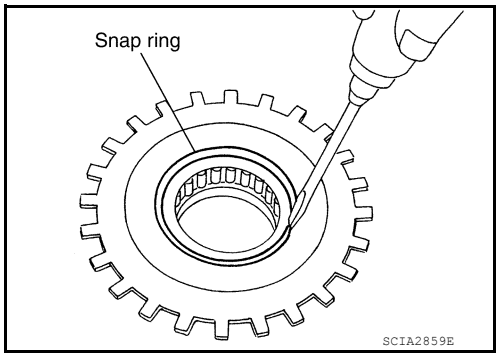
1. Install seal rings to mid sun gear.
CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



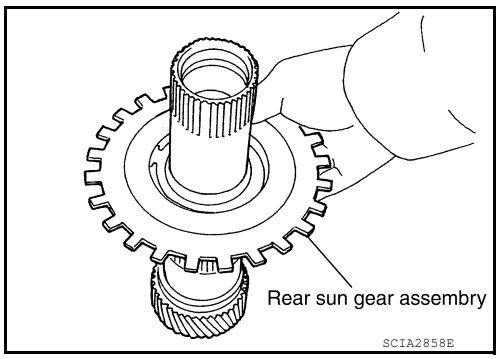
2. Install 1st one-way clutch to rear sun gear.
CAUTION:
Apply petroleum jelly to 1st one-way clutch.



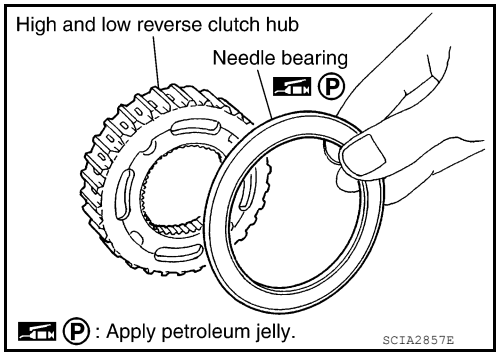
3. Install snap ring to rear sun gear using suitable tool.



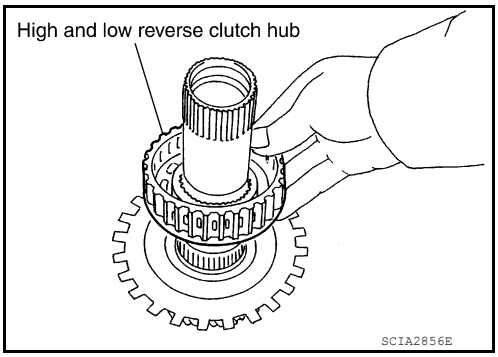
4. Install rear sun gear assembly to mid sun gear assembly.



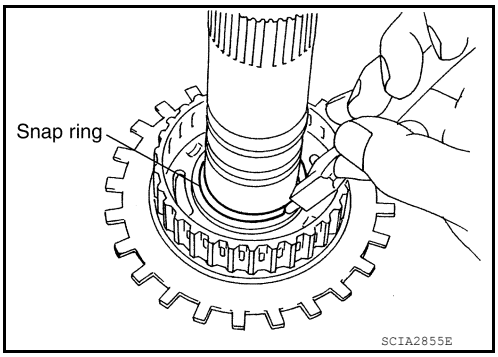
5. Install needle bearing to high and low reverse clutch hub.
CAUTION:
Apply petroleum jelly to needle bearing.



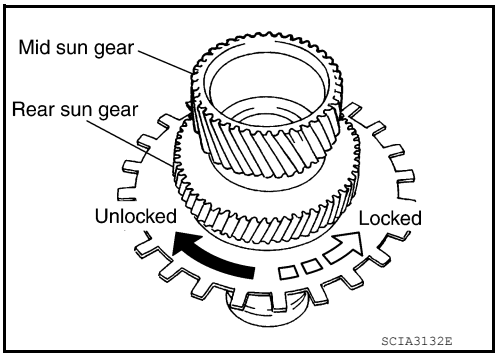
6. Install high and low reverse clutch hub to mid sun gear assembly.



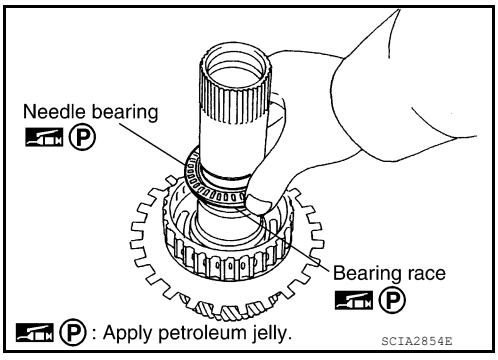
7. Install snap ring to mid sun gear assembly using suitable tool.
CAUTION:
Do not excessively expand snap ring.



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.



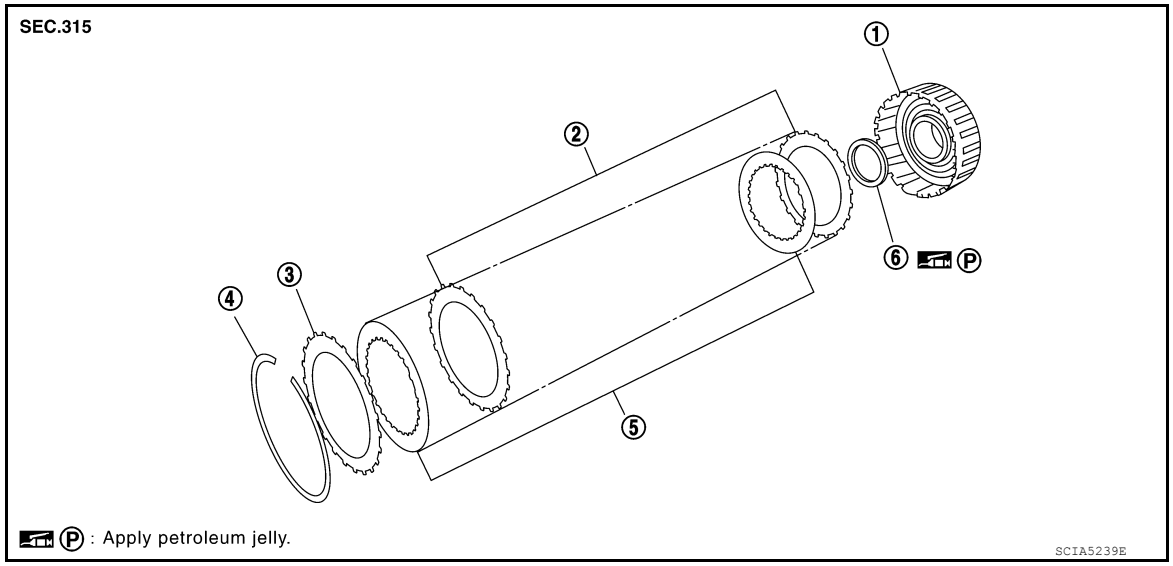
9. Install needle bearing and bearing race to high and low reverse clutch hub.
CAUTION:
Apply petroleum jelly to needle bearing and bearing race.



HIGH AND LOW REVERSE CLUTCH

Exploded View

INFOID:0000000007360390



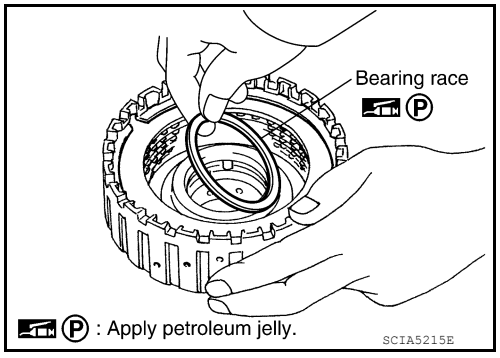
1. High and low reverse clutch drum
2. Driven plate
3. Retaining plate
4. Snap ring
5. Drive plate
6. Bearing race

Disassembly and Assembly

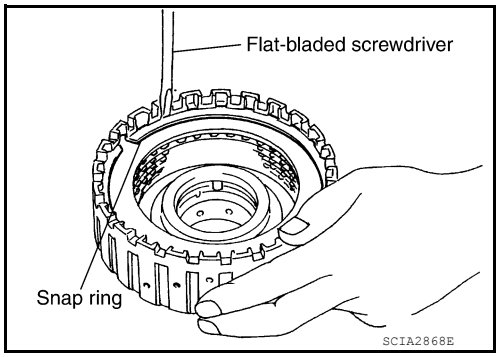
INFOID:0000000007360391

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.

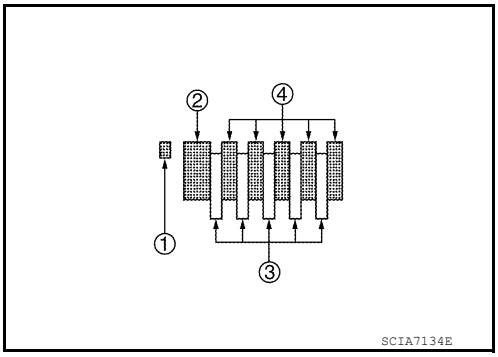
High and Low Reverse Clutch Drive Plates

• Check facing for burns, cracks or damage.

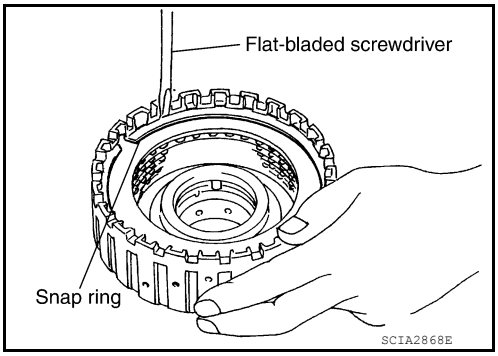
High and Low Reverse Clutch Retaining Plate and Driven Plates
• Check facing for burns, cracks or damage.

ASSEMBLY

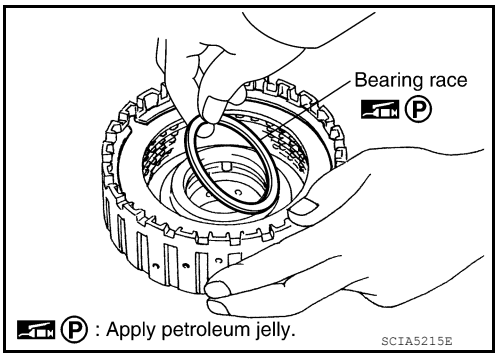
1. Install drive plates, driven plates and retaining plate in high and low reverse clutch drum.
   CAUTION:
   Take care with the order of plates.
   • Snap ring (1)
   • Retaining plate (2)
   • Drive plate (3)
   • Driven plate (4)
   • Drive plate/Driven plate: 5/5



2. Install snap ring in high and low reverse clutch drum using suitable tool.



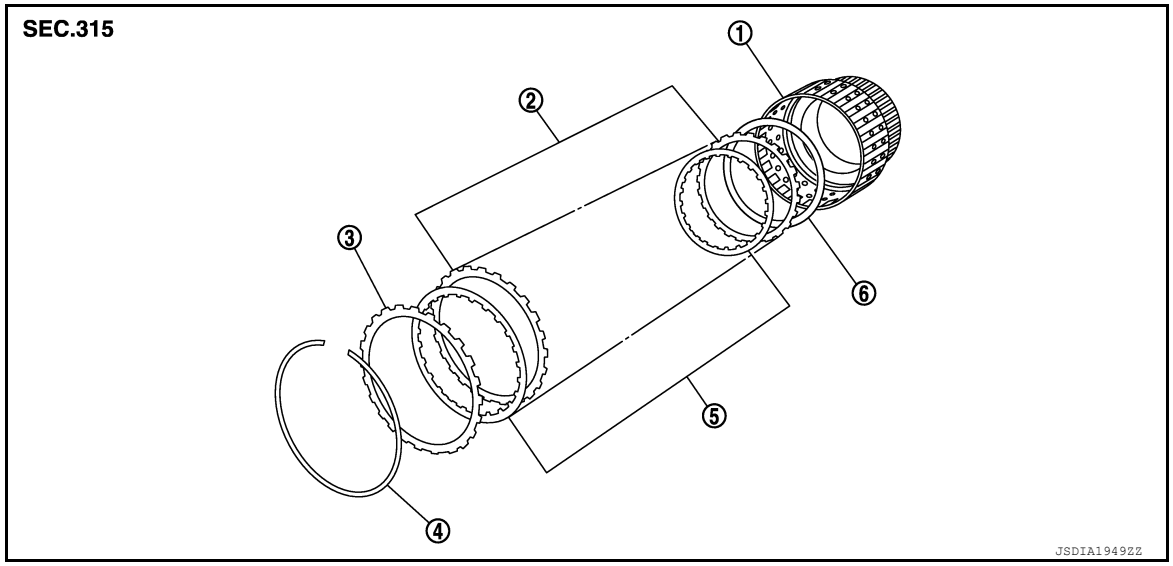
3. Install bearing race to high and low reverse clutch drum.
   CAUTION:
   Apply petroleum jelly to bearing race.



DIRECT CLUTCH

Exploded View

INFOID:0000000007360392



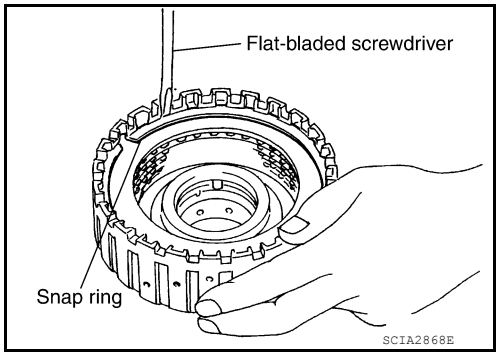
1. Direct clutch drum
2. Driven plate
3. Retaining plate
4. Snap ring
5. Drive plate
6. Dish plate

Disassembly and Assembly

INFOID:0000000007360393

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.

Direct Clutch Dish Plate
- Check facing for burns, cracks or damage.

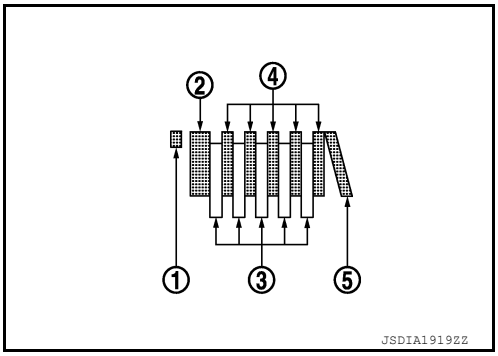
ASSEMBLY

1. Install dish plate, retaining plate, drive plates and driven plates in direct clutch drum.

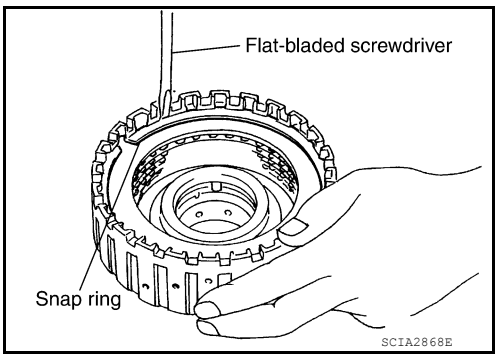
CAUTION:

Take care with order of plates.

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



2. Install snap ring in direct clutch drum using suitable tool.

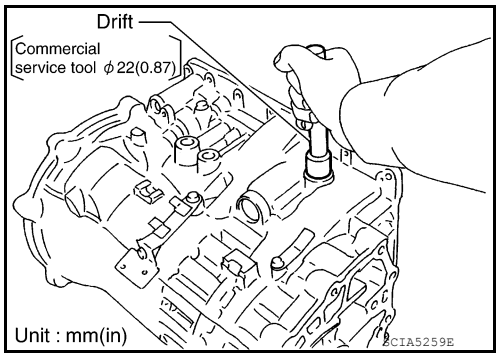


ASSEMBLY

Assembly (1)

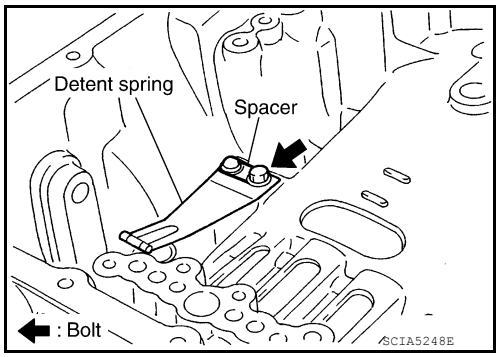
INFOID:0000000007360394

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.**

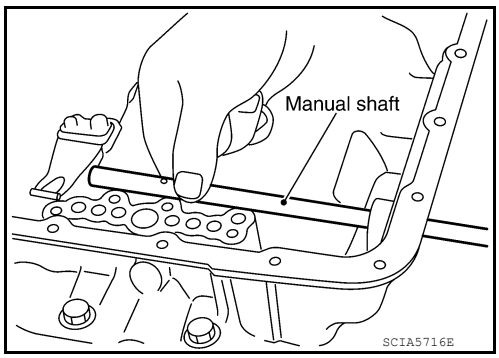


2. Install detent spring and spacer in transmission case and secure with the bolt.

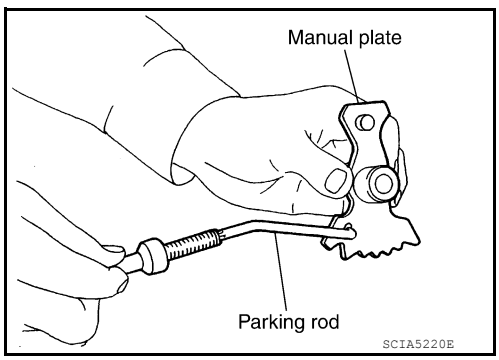
Bolt : 7.9 N·m (0.81 kg-m, 70 in-lb)



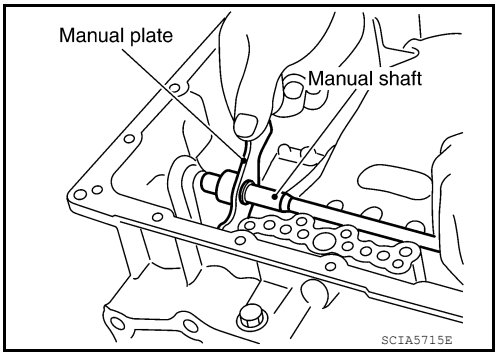
3. Install manual shaft to transmission case.



4. Install parking rod to manual plate.



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



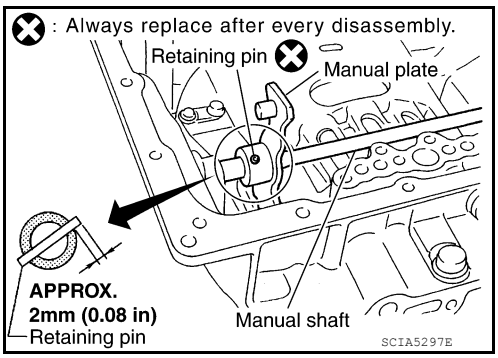
6. Install retaining pin into the manual plate and manual shaft.

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.**



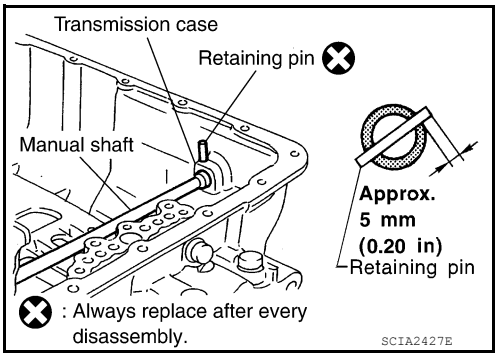
7. Install retaining pin into the transmission case and manual shaft.

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:

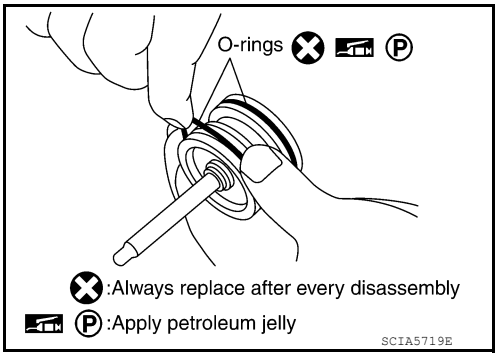
- **Drive retaining pin to 5±1 mm (0.20±0.04 in) over the transmission case.**
- **Do not reuse retaining pin.**



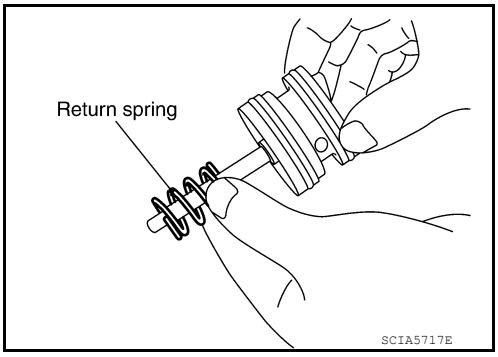
8. Install O-rings to servo assembly.

CAUTION:

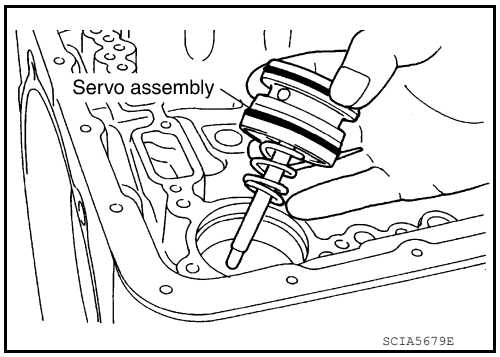
- **Do not reuse O-rings.**
- **Apply petroleum jelly to O-rings.**



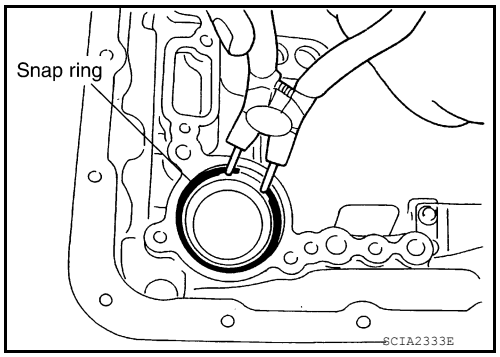
9. Install return spring to servo assembly.



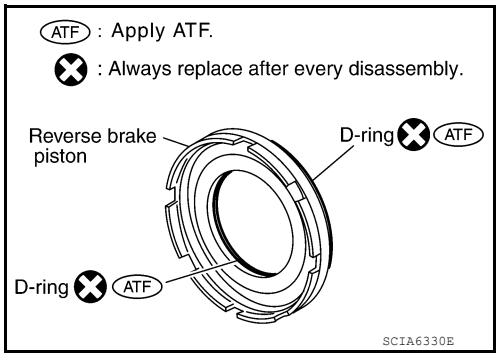
10. Install servo assembly in transmission case.



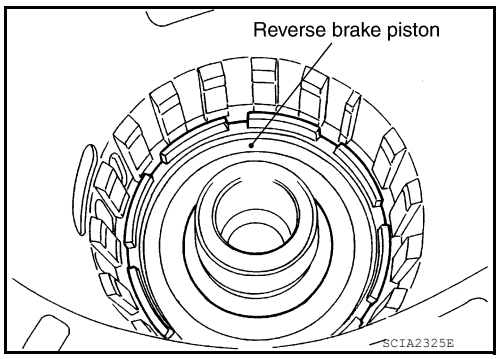
11. Install snap ring to transmission case using suitable tool.



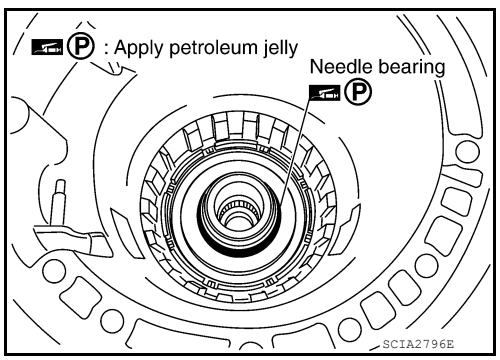
12. Install D-rings in reverse brake piston.
CAUTION:
- **Do not reuse D-rings.**
- **Apply ATF to D-rings.**



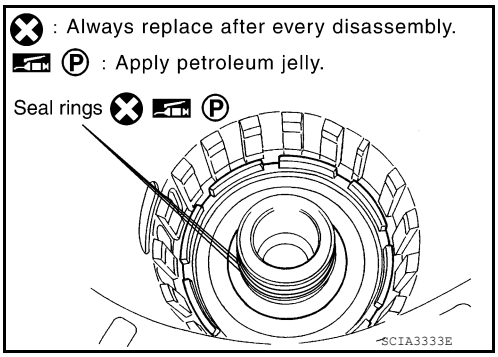
13. Install reverse brake piston in transmission case.



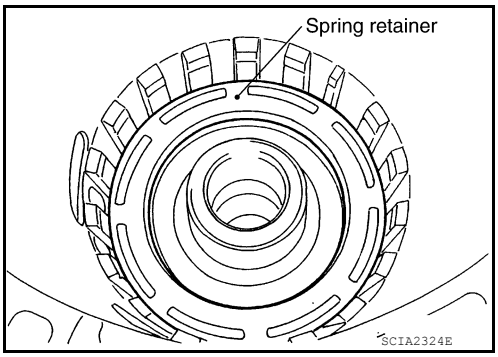
14. Install needle bearing to drum support edge surface.
CAUTION:
Apply petroleum jelly to needle bearing.



15. Install seal rings to drum support.
CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



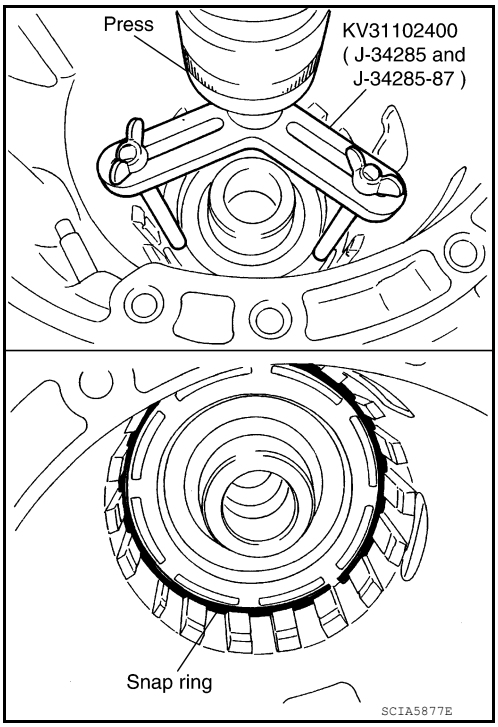
16. Install spring retainer and return spring in transmission case.



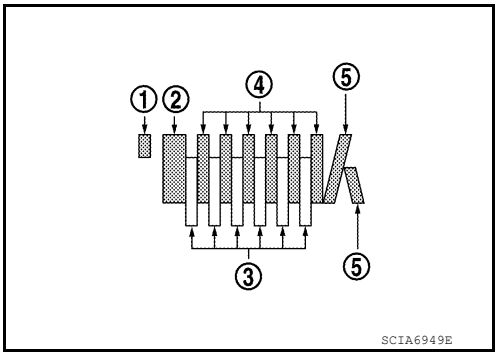
17. Install snap ring in transmission case while compressing return spring using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

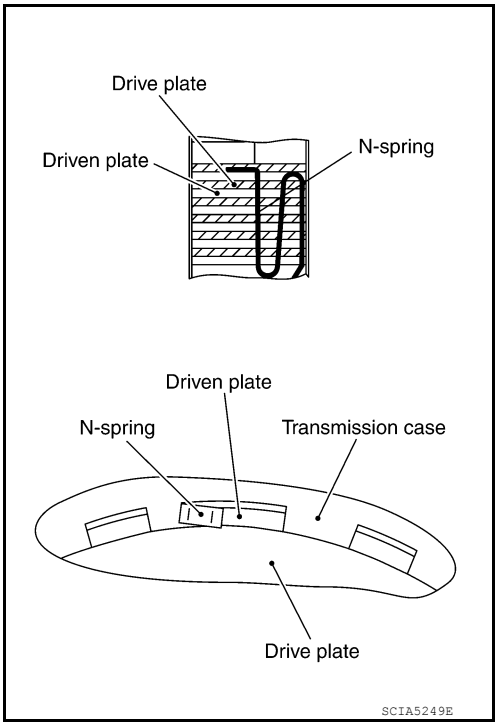
CAUTION:
Securely assemble them using a flat-bladed screwdriver so that snap ring tension is slightly weak.



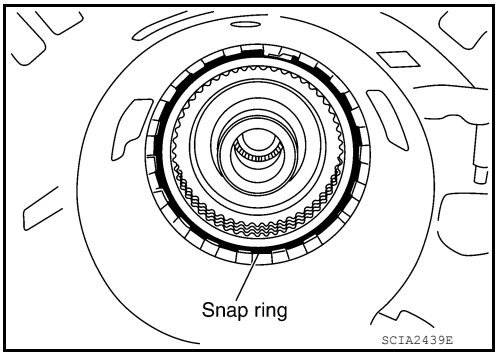
18. Install reverse brake drive plates driven plates and dish plates in transmission case.
CAUTION:
Take care with order of plates.
- VQ40DE models
- Snap ring (1)
- Retaining plate (2)
- Drive plate (3)
- Driven plate (4)
- Dish plate (5)
- Drive plate/Driven plate:6/6



19. Assemble N-spring.
20. Install reverse brake retaining plate in transmission case.

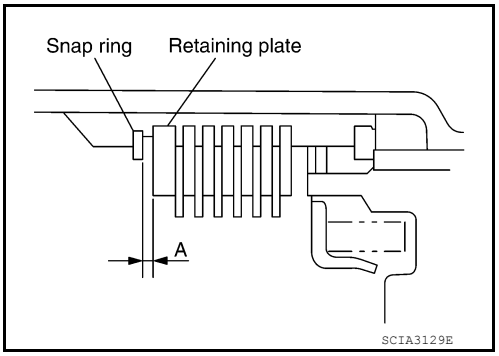


21. Install snap ring in transmission case.

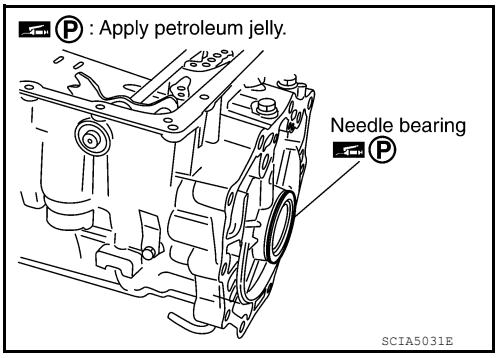


22. Measure clearance (A) between retaining plate and snap ring. If not within specified clearance, select proper retaining plate.

Clearance "A" : **0.7 - 1.1 mm (0.028 - 0.043 in)**
Retaining plate : **Refer to TM-325, "Reverse brake".**



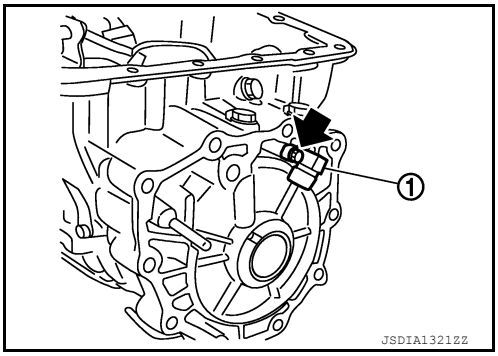
23. Install needle bearing to transmission case.
CAUTION:
- **Take care with the direction of needle bearing. Refer to TM-262, "Location of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings".**
- **Apply petroleum jelly to needle bearing.**



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)

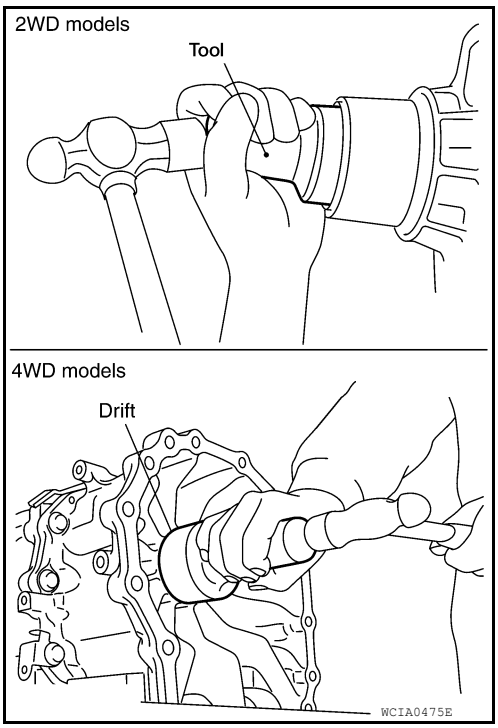
CAUTION:
- **Do not subject sensor to impact by dropping or hitting it.**
- **Do not disassemble sensor.**
- **Do not allow metal filings or any foreign material to get on the sensor's front edge magnetic area.**
- **Do not place sensor in an area affected by magnetism.**



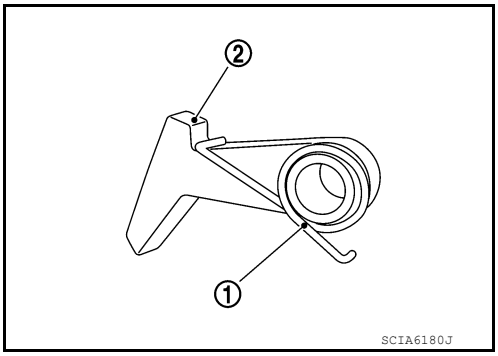
25. Install new rear oil seal until it is flush into the rear extension case (2WD models) using Tool or adapter case (4WD models) using suitable tool.

Tool number : ST33400001 (J-26082)

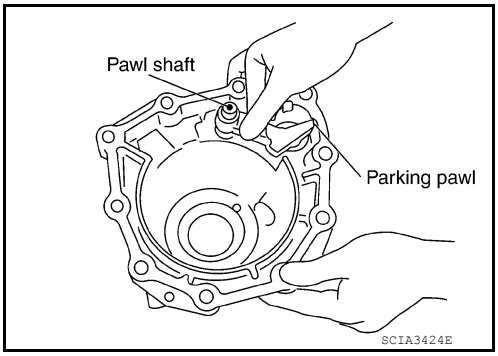
CAUTION:
- **Apply ATF to rear oil seal.**
- **Do not reuse rear oil seal.**



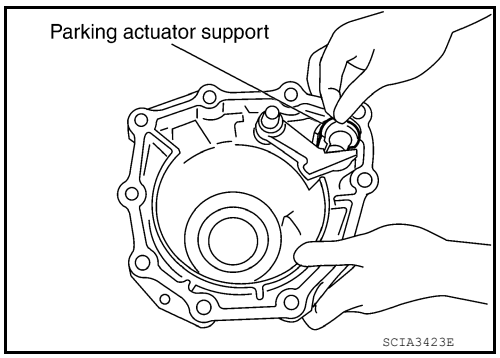
26. Install return spring (1) to parking pawl (2).



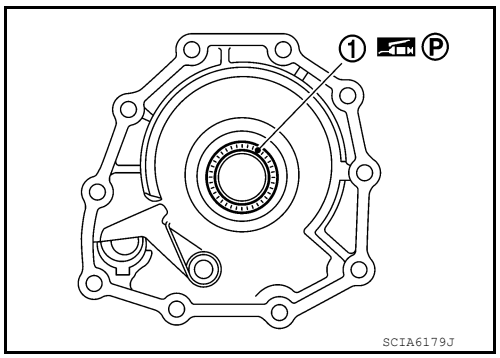
27. Install parking pawl (with return spring) and pawl shaft to rear extension (2WD models) or adapter case (4WD models).



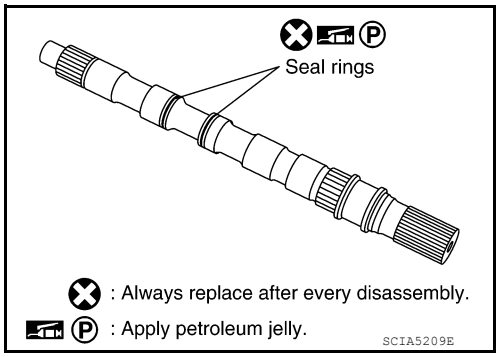
28. Install parking actuator support to rear extension (2WD models) or adapter case (4WD models).



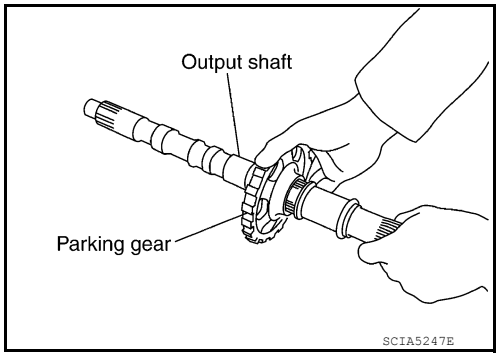
29. Install needle bearing (1) to rear extension (2WD models) or adapter case (4WD models).
CAUTION:
Apply petroleum jelly to needle bearing.



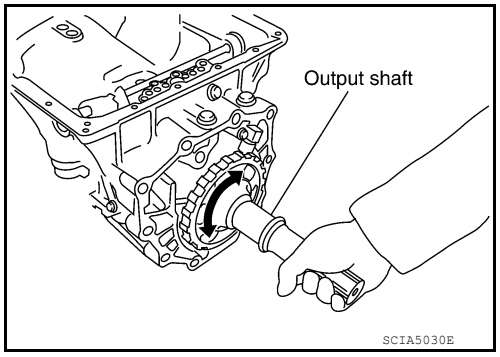
30. Install seal rings to output shaft.
CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



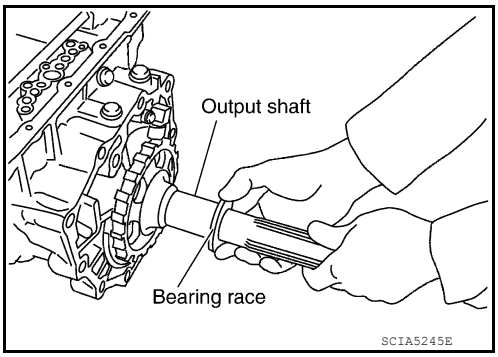
31. Install parking gear to output shaft.



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.

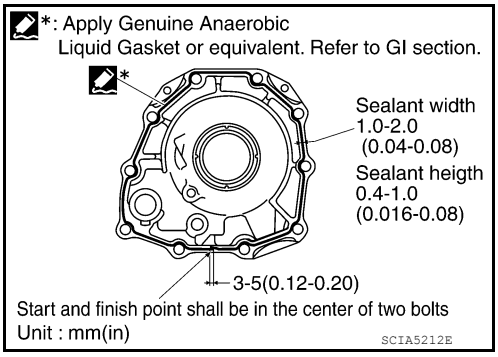


34. Install rear extension assembly (2WD models) or adapter case assembly (4WD models) according to the following procedures.

a. **2WD models**

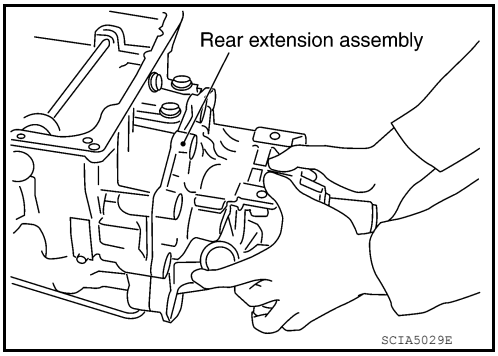
i. Apply recommended sealant (Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-15, "Recommended Chemical Products and Sealants".) to rear extension assembly as shown.

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.

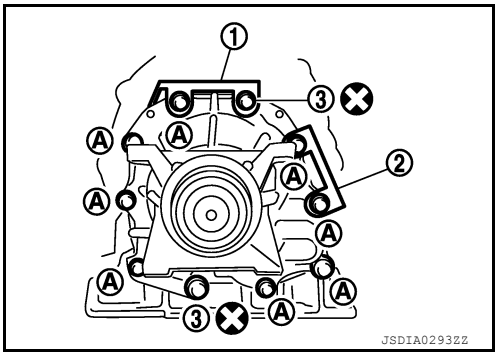
CAUTION:
Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the rear extension assembly.



iii. Install the rear extension assembly bolts and tighten to the specified torque.
- Brackets (1)
- Brackets (2)
- Self-sealing bolts (3)
- Bolt (A)

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.

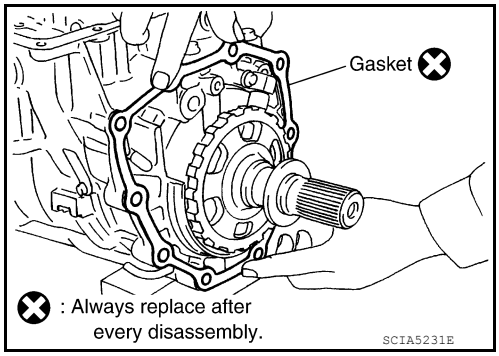


b. **4WD models**

i. Install gasket onto transmission case.

CAUTION:

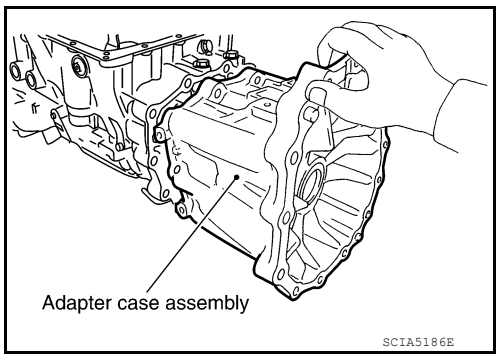
- **Completely remove all moisture, oil, old gasket and any foreign material from the transmission case and adapter case assembly mating surfaces.**
- **Do not reuse gasket.**



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.



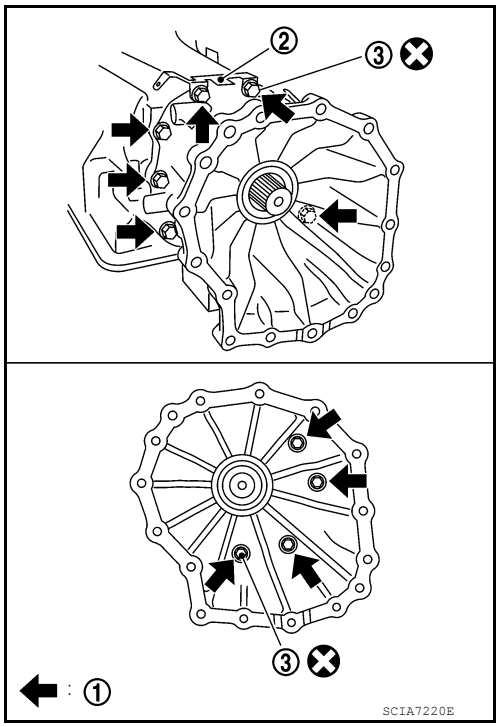
iii. Tighten adapter case assembly to specified torque.

- 1: Bolts
- 2: Brackets
- 3: Self-sealing bolts

CAUTION:

Do not reuse self-sealing bolt (3).

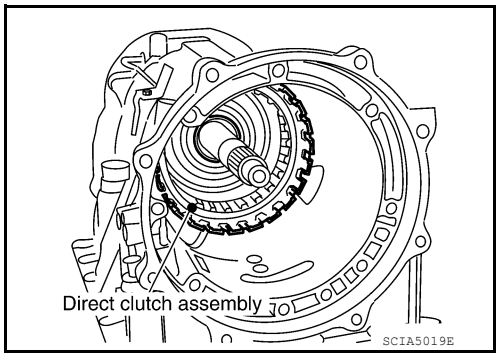
Adapter case assembly bolt	**: 52 N·m (5.3 kg-m, 38 ft-lb)**
Self-sealing bolt	**: 61 N·m (6.2 kg-m, 45 ft-lb)**



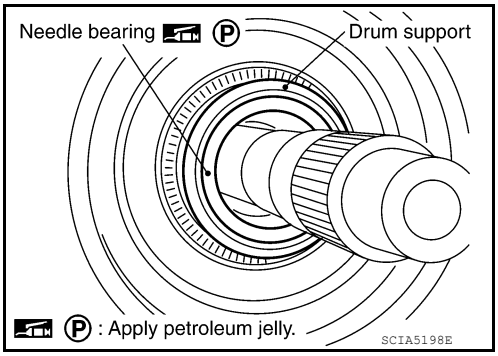
35. Install direct clutch assembly in reverse brake.

CAUTION:

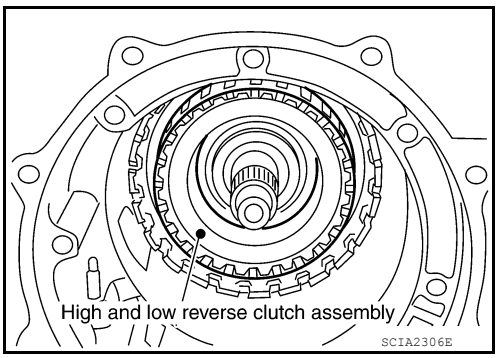
Make sure that drum support edge surface and direct clutch inner boss edge surface come to almost same place.



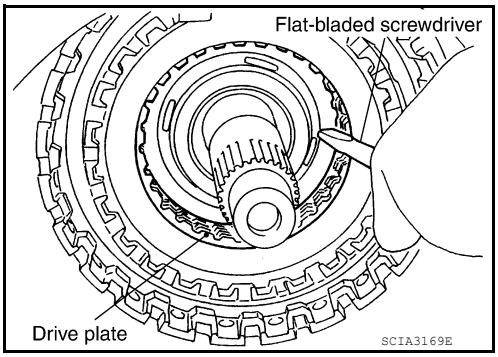
36. Install needle bearing in drum support.
CAUTION:
Apply petroleum jelly to needle bearing.



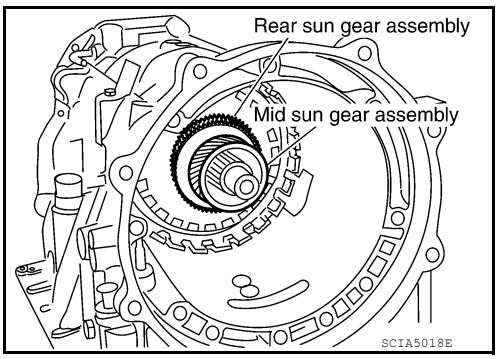
37. Install high and low reverse clutch assembly in direct clutch.



38. Align the drive plate using suitable tool.

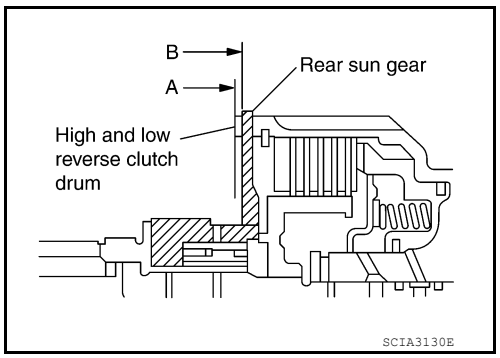


39. Install high and low reverse clutch hub, mid sun gear assembly and rear sun gear assembly as a unit.

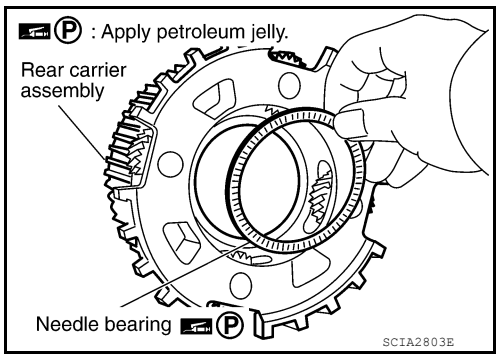


CAUTION:

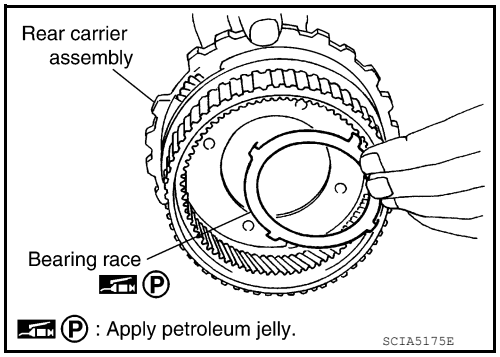
Make sure that portion “A” of high and low reverse clutch drum protrudes approximately 2 mm (0.08 in) beyond portion “B” of rear sun gear.



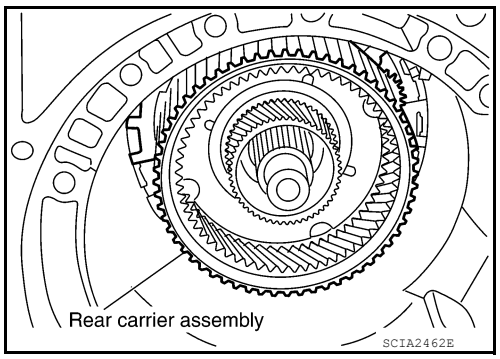
40. Install needle bearing in rear carrier assembly.
CAUTION:
Apply petroleum jelly to needle bearing.



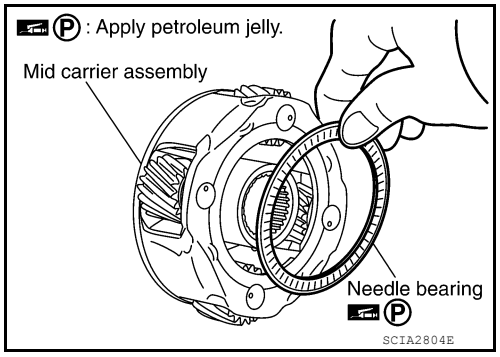
41. Install bearing race in rear carrier assembly.
CAUTION:
Apply petroleum jelly to bearing race.



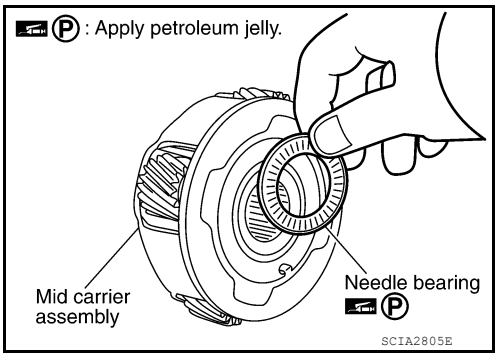
42. Install rear carrier assembly in direct clutch drum.



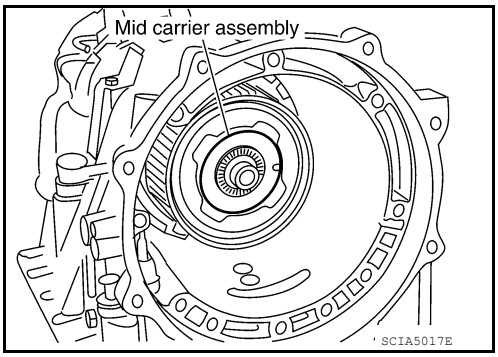
43. Install needle bearing (rear side) to mid carrier assembly.
CAUTION:
Apply petroleum jelly to needle bearing.



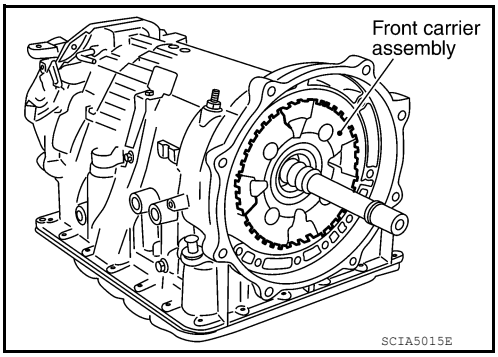
44. Install needle bearing (front side) to mid carrier assembly.
CAUTION:
Apply petroleum jelly to needle bearing.



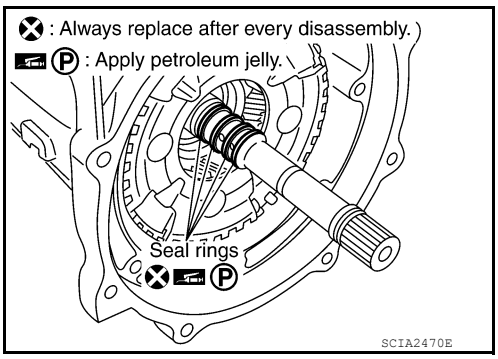
45. Install mid carrier assembly in rear carrier assembly.



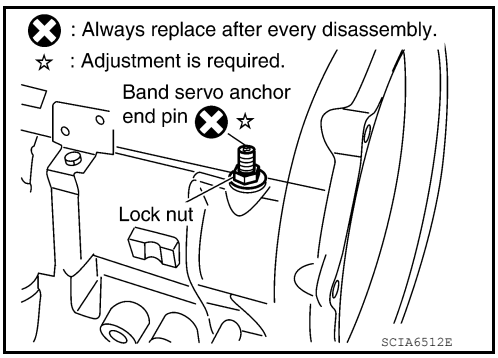
46. Install front carrier assembly, input clutch assembly and rear internal gear as a unit.



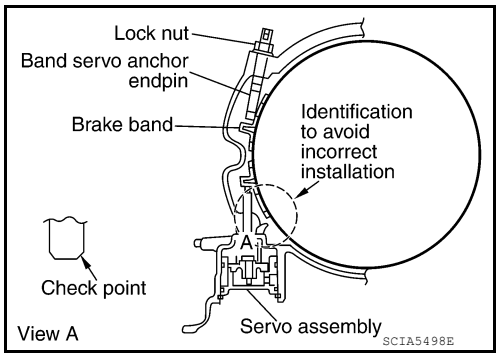
47. Install seal rings in input clutch assembly.
CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



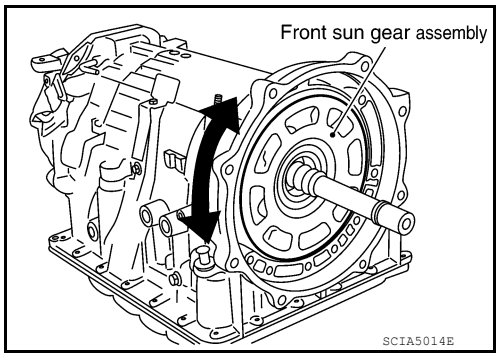
48. Install band servo anchor end pin and lock nut in transmission case.
CAUTION:
Do not reuse band servo anchor end pin.



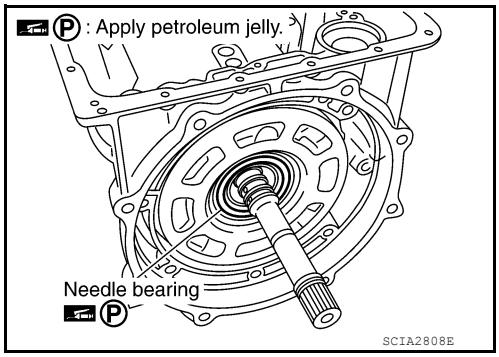
49. Install brake band in transmission case.
CAUTION:
Install it so that the identification to avoid incorrect installation faces the servo side.



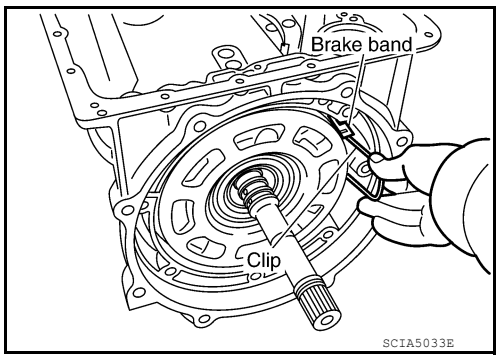
50. Install front sun gear to front carrier assembly.
CAUTION:
Apply ATF to front sun gear bearing and 3rd one-way clutch end bearing.



51. Install needle bearing to front sun gear.
CAUTION:
Apply petroleum jelly to needle bearing.



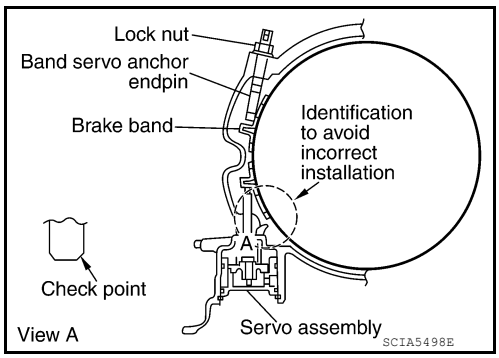
52. Adjust brake band tilting using a clip so that brake band contacts front sun gear drum evenly.



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.



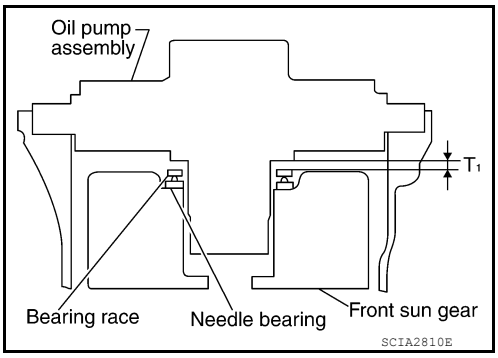
Lock nut : 46 N·m (4.7 kg-m, 34 ft-lb)

Adjustment

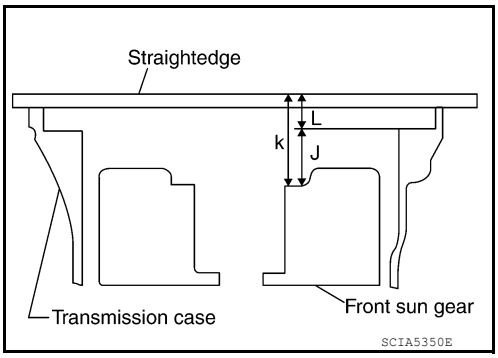
INFOID:0000000007360395

TOTAL END PLAY

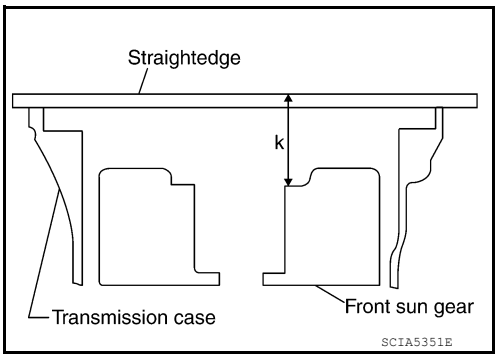
- Measure clearance between front sun gear and bearing race for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions “K” and “L” and then calculate dimension “J”.



a. Measure dimension “K”.

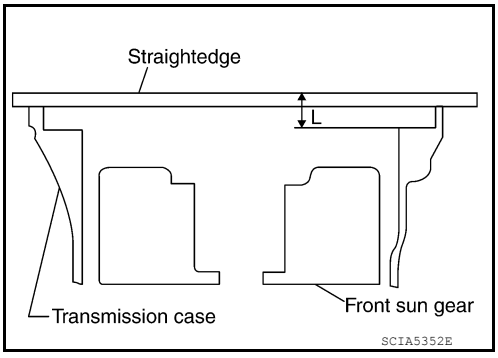


b. Measure dimension “L”.

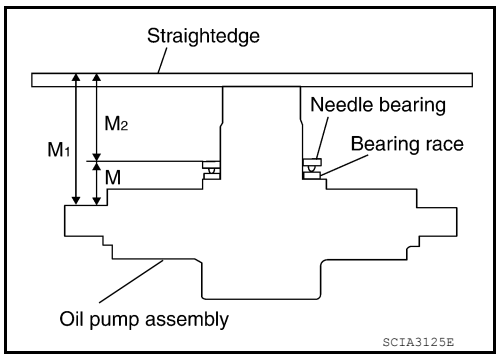
c. Calculate dimension “J”.

“J”: Distance between oil pump fitting surface of transmission case and needle bearing mating surface of front sun gear.

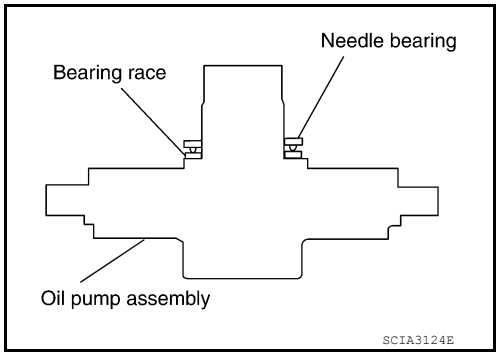
J = K – L



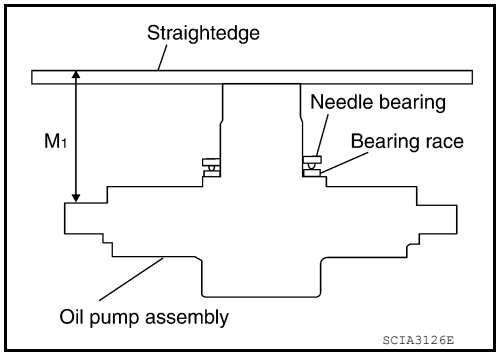
2. Measure dimensions “M_1” and “M_2” and then calculate dimension “M”.



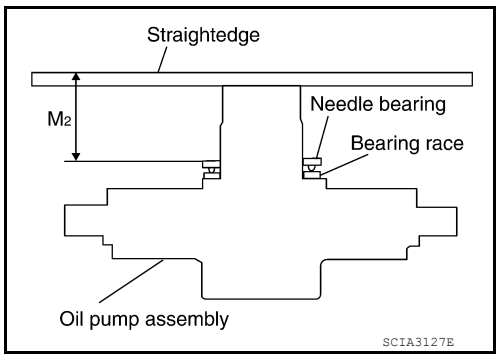
a. Place bearing race and needle bearing on oil pump assembly.



b. Measure dimension “M_1”.



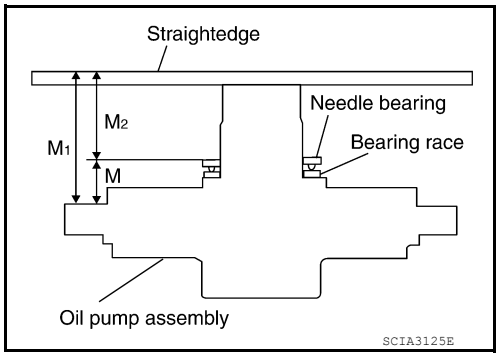
c. Measure dimension “M_2”.



d. Calculate dimension “M”.

“M”: Distance between transmission case fitting surface of oil pump and needle bearing on oil pump.

$M = M_1 - M_2$



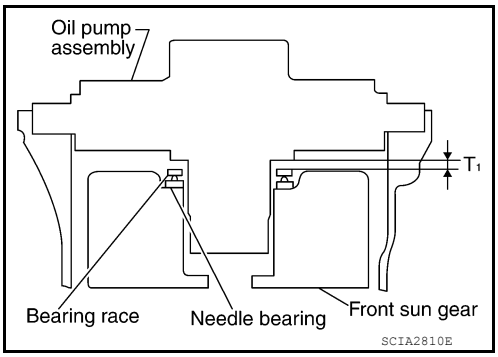
3. Adjust total end play "T_1".

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.

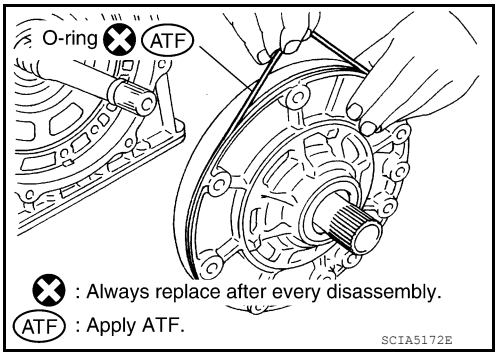
Bearing races :Refer to TM-325, "Total End Play".



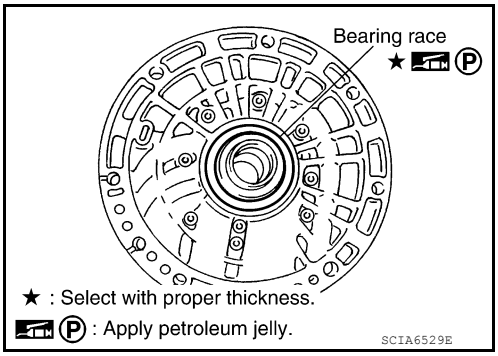
Assembly (2)

INFOID:0000000007360396

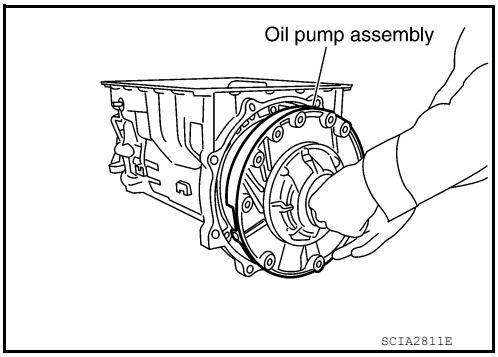
1. Install O-ring to oil pump assembly.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



2. Install bearing race to oil pump assembly.
CAUTION:
Apply petroleum jelly to bearing race.

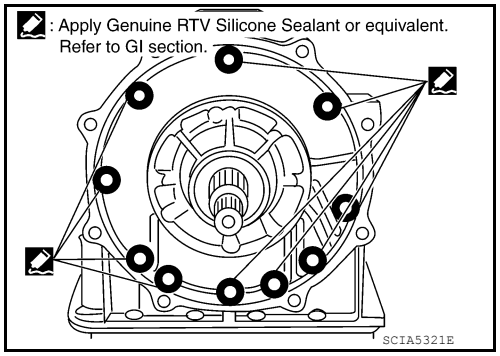


3. Install oil pump assembly in transmission case.
CAUTION:
Apply ATF to oil pump bearing.



4. Apply recommended sealant (Genuine RTV Silicone Sealant or equivalent. Refer to GI-15, "Recommended Chemical Products and Sealants".) to oil pump assembly as shown.

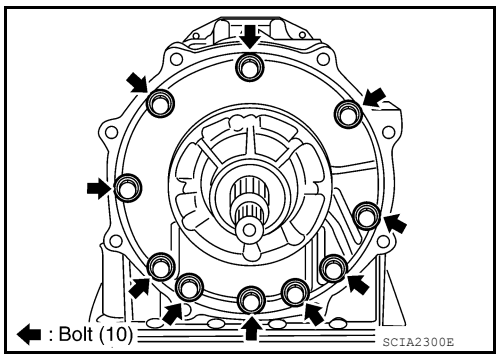
CAUTION:
Completely remove all moisture, oil, old sealant and any foreign material from the oil pump bolts and oil pump bolt mating surfaces.



5. Tighten oil pump bolts to specified torque.

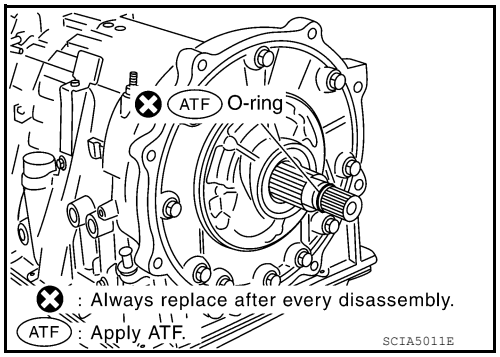
Oil pump bolts : 48 N·m (4.9 kg-m, 35 ft-lb)

CAUTION:
Apply ATF to oil pump bushing.



6. Install O-ring to input clutch assembly.

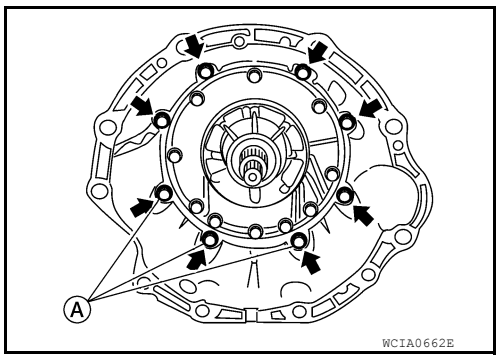
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



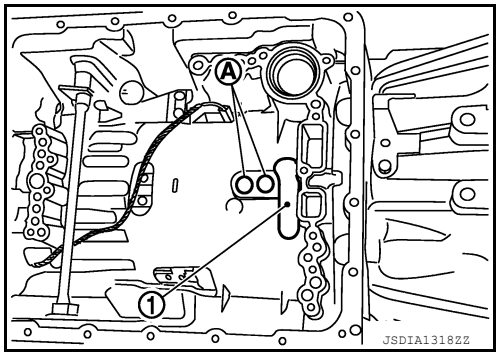
7. Install converter housing to transmission case and tighten bolts to specified torque.

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)

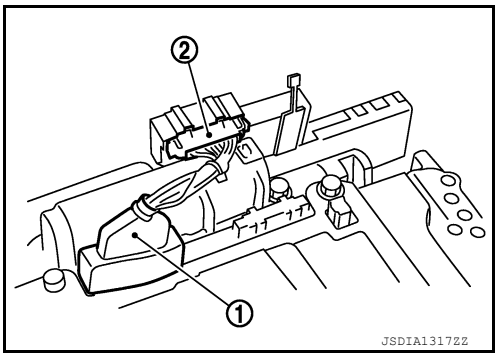
CAUTION:
Do not reuse self-sealing bolt (A).



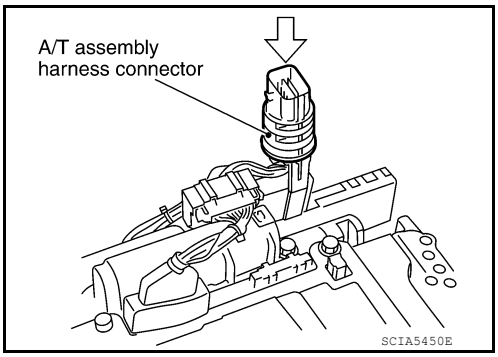
8. Make sure that brake band (1) does not close input speed sensor hole (A).



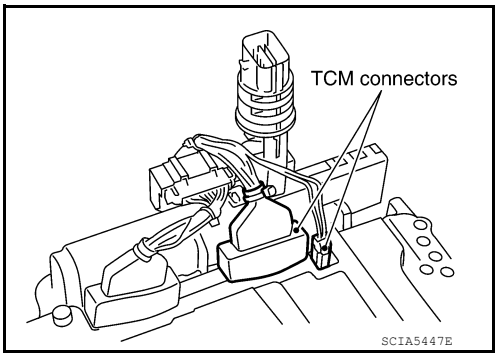
9. Connect TCM connector (1) and transmission range switch connector (2).



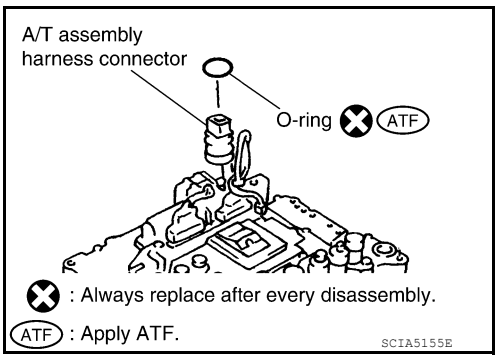
10. Install A/T assembly harness connector to control valve with TCM.



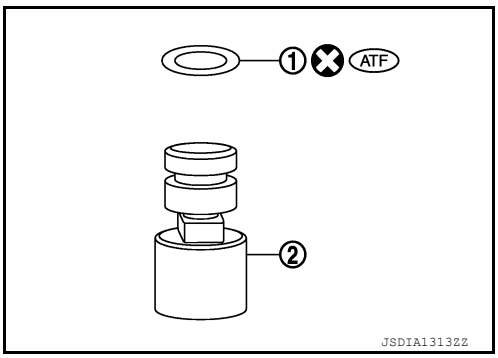
11. Connect TCM connectors.



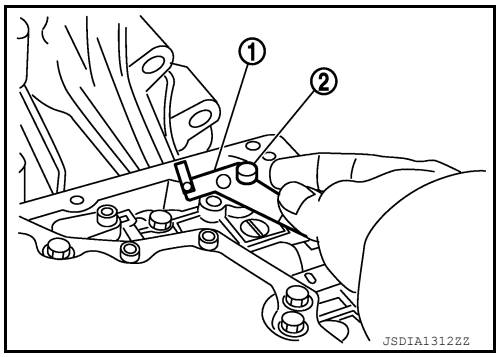
12. Install O-ring to A/T assembly harness connector.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



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.**



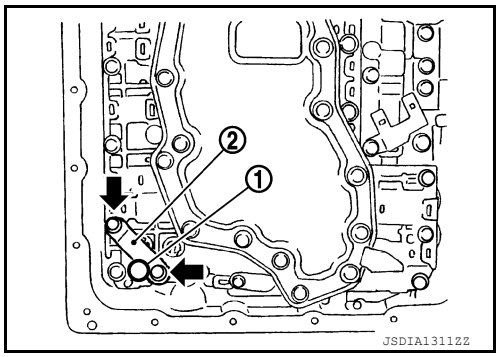
14. Install plug (2) to bracket (1).



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)

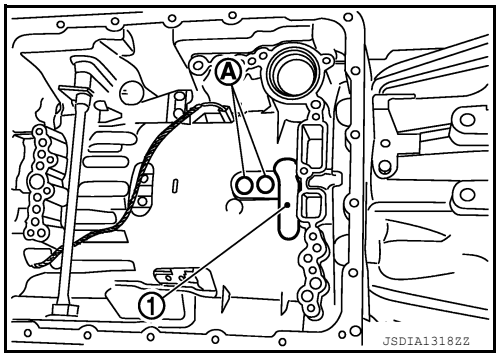
CAUTION:
Adjust bolt hole of bracket to bolt hole of control valve.



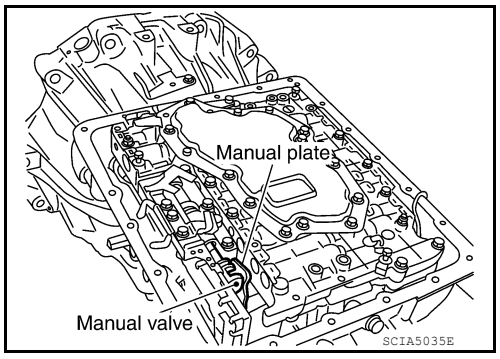
16. Install control valve with TCM in transmission case.

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.**

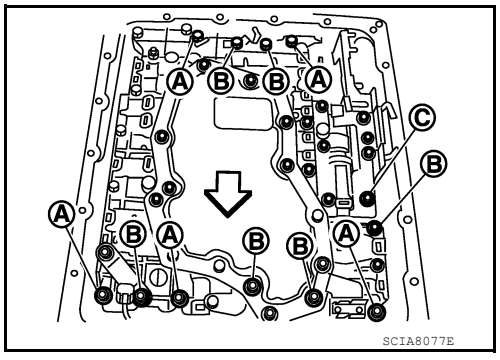


- **Assemble it so that manual valve cutout is engaged with manual plate projection.**



17. Install bolts (A), (B) and (C) to control valve with TCM.

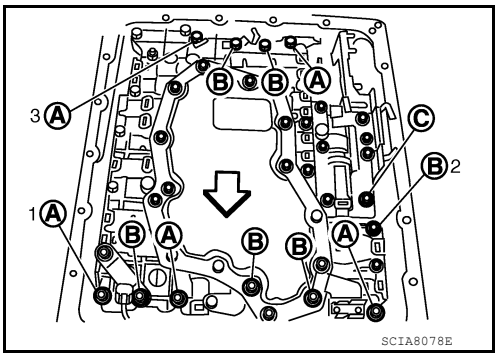
⇦ : Front



Bolt symbol	Length mm (in)	Number of bolts
A	42 (1.65)	5
B	55 (2.17)	6
C	40 (1.57)	1

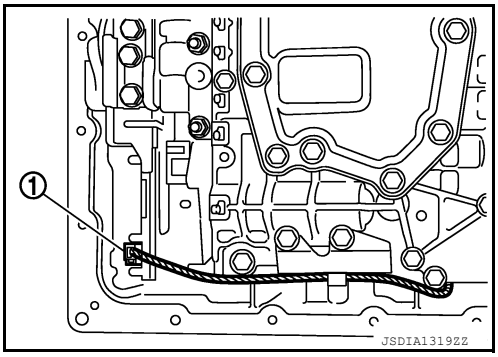
18. Tighten bolt (A), (B) and (C) temporarily to prevent dislocation. After that tighten them in order (A → B → C), and then tighten other bolts.

⇦ : Front

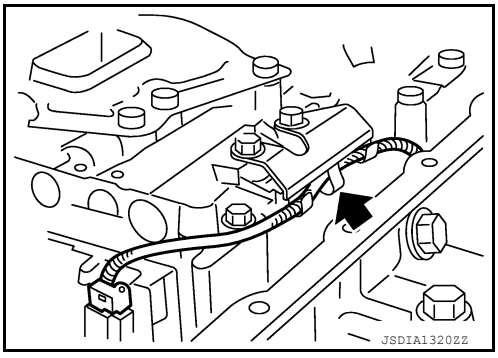


Bolt symbol	A	B	C
Number of bolts	5	6	1
Length mm (in)	42 (1.65)	55 (2.17)	40 (1.57)
Tightening torque N·m (km-g, in-lb)	7.9 (0.81, 70)		With ATF applied
			7.9 (0.81, 70)

19. Connect output speed sensor connector (1).

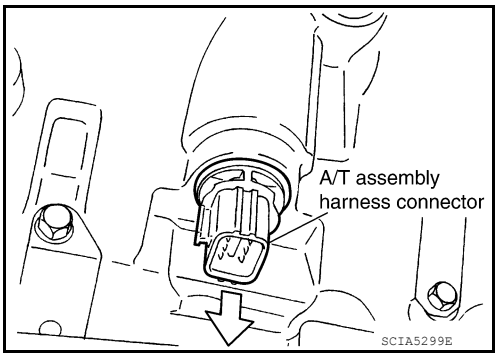


20. Securely fasten output speed sensor harness with terminal clip (⬅).

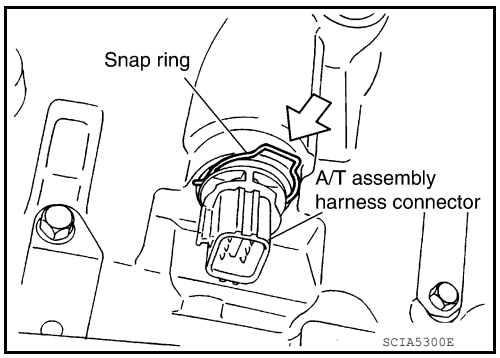


21. Securely fasten output speed sensor harness with terminal clip.

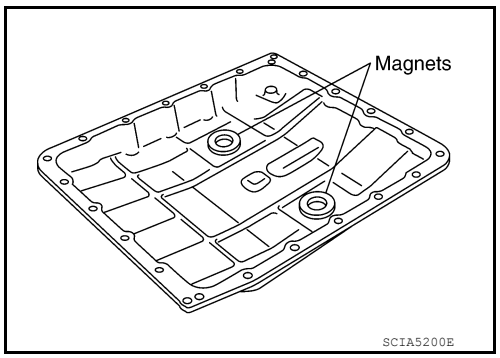
22. Pull down A/T assembly harness connector.
CAUTION:
Do not damage connector.



23. Install snap ring to A/T assembly harness connector.

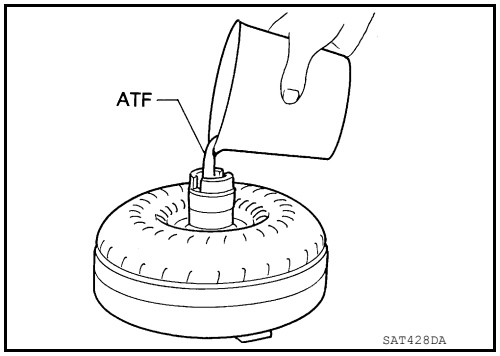


24. Install magnets in oil pan.

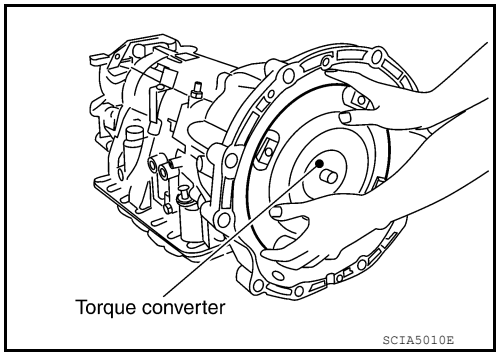


25. Install oil pan to transmission case. Refer to TM-229, "Removal and Installation".
26. Install torque converter.

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.

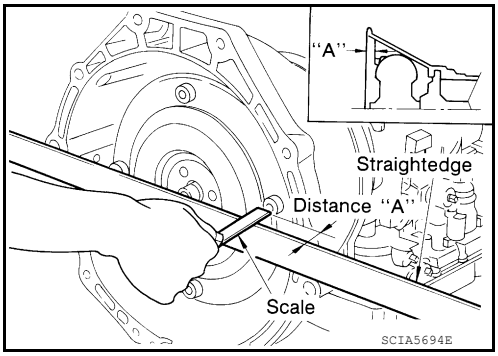


b. Install torque converter while aligning notches of torque converter with notches of oil pump.
CAUTION:
Install torque converter while rotating it.



c. Measure distance "A" to make sure that torque converter is in proper position.

Distance “A" : 25.0 mm (0.98 in) or more



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000007360397

Applied model		2WD	4WD
Automatic transmission model		RE5R05A	
Transmission model code number		3GX1A	3GX0B
Stall torque ratio		1.76: 1	
Transmission gear ratio	1st	3.842	
	2nd	2.353	
	3rd	1.529	
	4th	1.000	
	5th	0.839	
	Reverse	2.765	
Recommended fluid		Genuine NISSAN Matic S ATF*1	
Fluid capacity		10.3 liter (10-7/8 US qt, 9-1/8 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-13, "Fluids and Lubricants".

Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000007360398

2WD 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	68 - 72 (43 - 44)	109 - 117 (68 - 72)	169 - 179 (106 - 111)	249 - 294 (155 - 160)	245 - 255 (153 - 158)	157 - 167 (98 - 103)	95 - 103 (60 - 64)	43 - 47 (27 - 29)
Half throttle	54 - 58 (34 - 36)	88 - 94 (55 - 58)	137 - 145 (86 - 90)	165 - 173 (103 - 107)	137 - 145 (86 - 90)	77 - 85 (48 - 52)	54 - 60 (34 - 37)	11 - 15 (7 - 9)

- At half throttle, the accelerator opening is 1/2 of the full opening.

4WD 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	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 (779 - 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 opening is 1/2 of the full opening.

Vehicle Speed at Which Lock-up Occurs/Releases

INFOID:0000000007360399

2WD MODELS

Throttle position	Vehicle speed km/h (MPH)	
	Lock-up “ON”	Lock-up “OFF”
Closed throttle	57 - 65 (36 - 40)	53 - 61 (33 - 37)
Half throttle	182 - 190 (114 - 118)	137 - 145 (86 - 90)

- 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.

4WD MODELS

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.

Stall Speed

INFOID:0000000007360400

Stall speed	2,600 - 2,900 rpm

Line Pressure

INFOID:0000000007360401

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:0000000007360402

Name	Condition	CONSULT “DATA MONITOR” (Approx.) (V)	Resistance (Approx.) (kΩ)
A/T fluid temperature sensor 1	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:0000000007360403

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:0000000007360404

Name	Condition	Data (Approx.)
Output speed sensor	When moving at 20 km/h (12 MPH).	185 (Hz)

Reverse brake

INFOID:0000000007360405

Number of drive plates		6
Number of driven plates		6
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)

Total End Play

INFOID:0000000007360406

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)