SECTION TM
TRANSAXLE & TRANSMISSION

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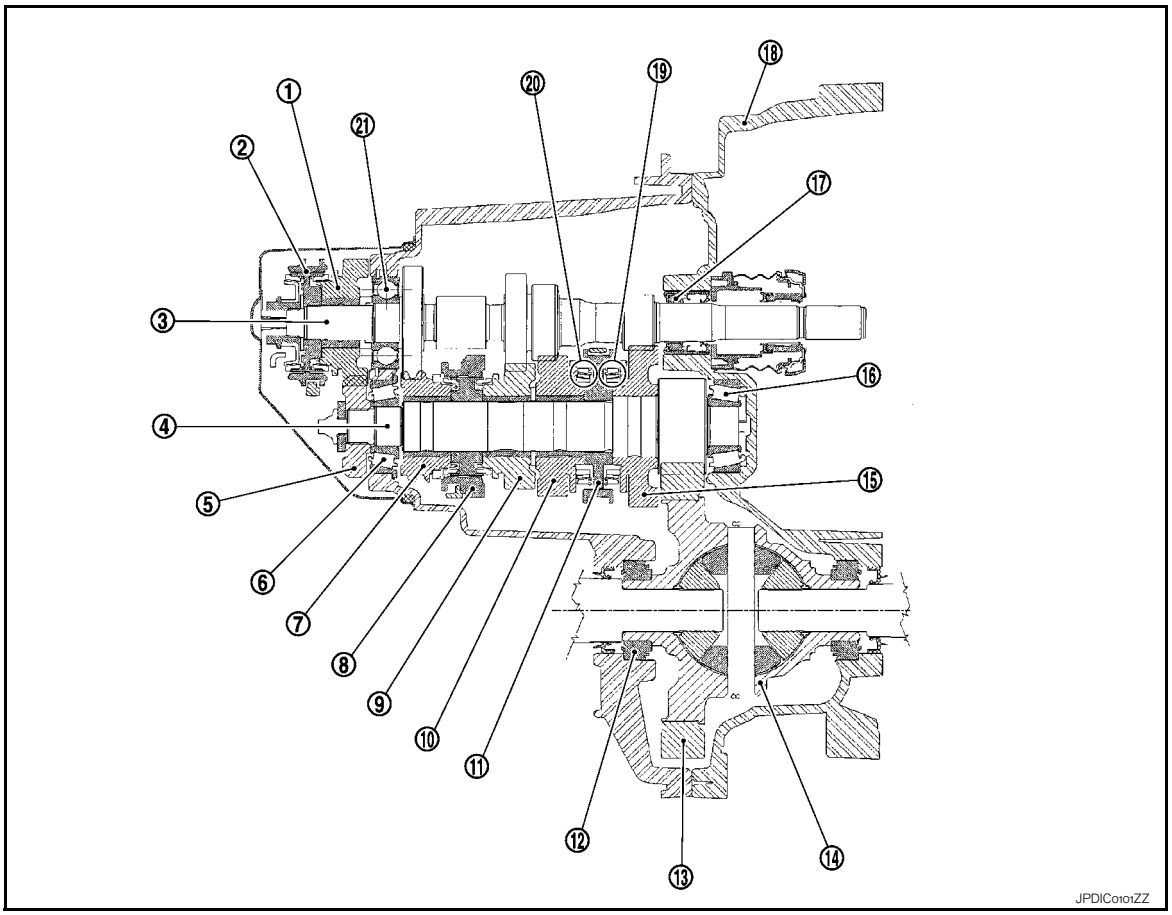
FUNCTION DIAGNOSIS

M/T SYSTEM

System Diagram

INFOID:0000000001070424

CROSS-SECTIONAL VIEW



1. 5th input gear
2. 5th-reverse synchronizer assembly
3. Input shaft
4. Mainshaft
5. 5th main gear
6. Mainshaft rear bearing
7. 4th main gear
8. 3rd-4th synchronizer assembly
9. 3rd main gear
10. 2nd main gear
11. 1st-2nd synchronizer assembly
12. Differential side bearing
13. Final gear
14. Differential assembly
15. 1st main gear
16. Mainshaft front bearing
17. Input shaft front bearing
18. Clutch housing
19. 1st double cone synchronizer
20. 2nd double cone synchronizer
21. Input shaft rear bearing

System Description

INFOID:0000000001098398

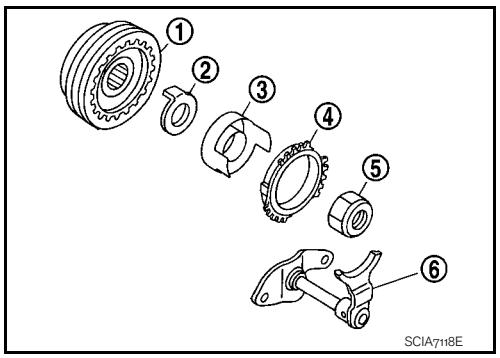
DOUBLE-CONE SYNCHRONIZER

Double-cone synchronizer are adopted for 1st and 2nd gears to reduce operating force of the control lever.

REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

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5th-reverse synchronizer hub assembly consists of reverse baulk ring, reverse synchronizer cone and reverse gear gate assembly. When the lever is shifted to the reverse position, the construction allows smooth shift operation by stopping the input shaft rotation by frictional force of synchronizer.



1 : 5th-reverse synchronizer hub assembly
2 : Lock washer
3 : Reverse synchronizer cone
4 : Reverse baulk ring
5 : Input shaft nut
6 : Reverse gear gate assembly

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COMPONENT DIAGNOSIS

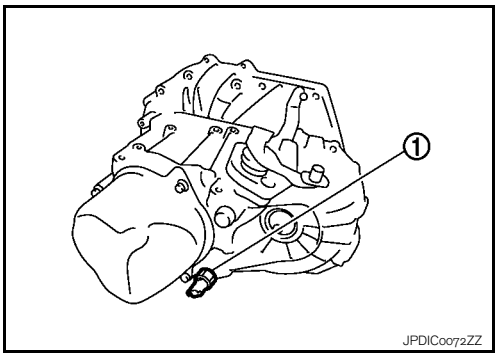
POSITION SWITCH

BACK-UP LAMP SWITCH

BACK-UP LAMP SWITCH : Component Parts Location

INFOID:0000000001070426

1 : Position switch



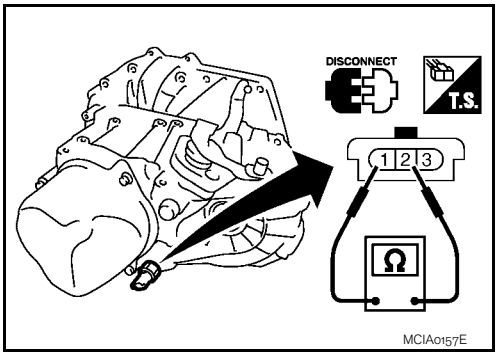
BACK-UP LAMP SWITCH : Component Inspection

INFOID:0000000001070427

1.CHECK BACK-UP LAMP SWITCH

Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
1 – 2	Reverse	Existed
	Except reverse	Not existed



Is the inspection result normal?

YES >> INSPECTION END

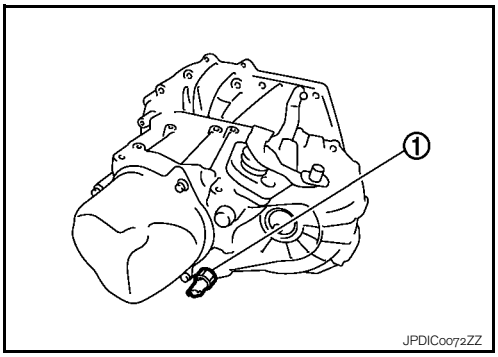
NO >> Replace position switch. Refer to TM-25, "Exploded View".

PARK/NEUTRAL POSITION (PNP) SWITCH

PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location

INFOID:0000000001070428

1 : Position switch



PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection

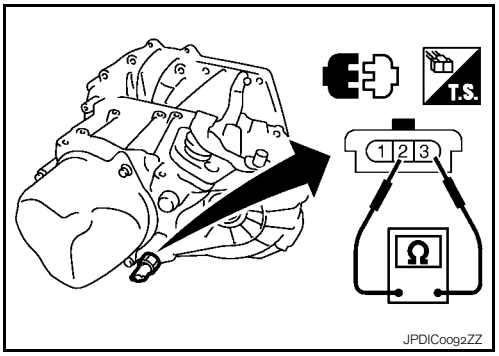
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1.CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

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Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
2 – 3	Neutral	Existed
	Except neutral	Not existed



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace position switch. Refer to TM-25, "Exploded View".

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SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001070430

Symptoms (after checking the clutch)	Possible causes

Symptoms	Oil level or grade	External control	Synchro-nizer	Gearing	Sliding gear hub	Fork and balls	Bearings	Engine mounting - housing
Gear grinding	1	2	3		4			
One or more gears cannot be selected	1	2	3			4		
Gear disengagement		2	4		4	3		1
One or more gears locked		1		4		2		3
Noisy	1			3			2	

NOTE:
The numbers indicate the order of priority for diagnostics.

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PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Manual Transaxle

INFOID:0000000001070431

CAUTION:

- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never reuse transaxle gear oil, once it has been drained.**
- **Check oil level or replace gear oil with vehicle on level surface.**
- **During removal or installation, keep inside of transaxle 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.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.**
- **Never damage sliding surfaces and mating surfaces.**
- **Removing and handling the parts must be carried out on a workbench with a knockproof cover. (rubber or thick plastic)**
- **Cover all turning and synchronizer points in gear oil.**
- **Observe the tightening torques.**
- **Carefully carry out the specific settings and adjustments.**
- **Be sure to properly refit parts in the same order and position after removal.**

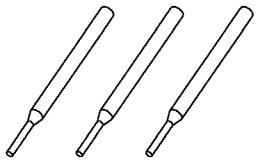
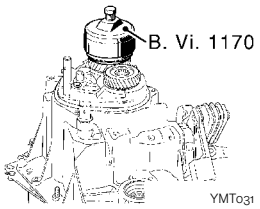
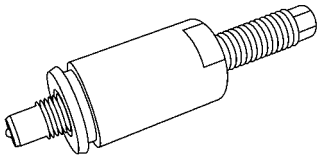
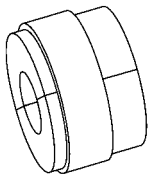
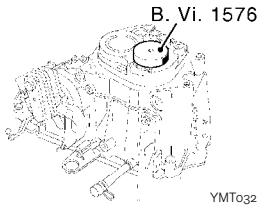
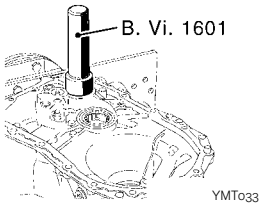
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PREPARATION

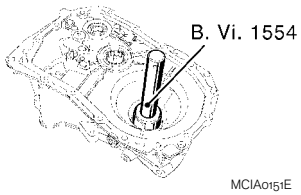
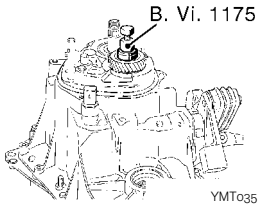
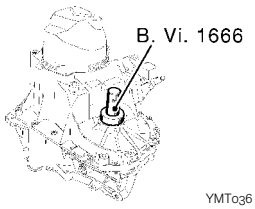
PREPARATION

Special Service Tools

INFOID:0000000001070432

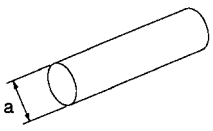
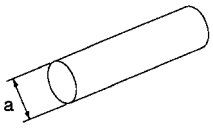
Tool number (Renault SST No.) Tool name	Description
— (B. Vi. 31-01) Pin punch  YMT030	Removing and installing retaining pin
— (B. Vi. 1170) Puller  YMT031	Removing 5th-reverse synchronizer hub
KV32300QAC (B. Vi. 22-01) Puller  SCIA1781J	Removing 5th main gear
KV32300QAD (B. Vi. 1000-01) Puller  SCIA1782J	Removing 5th main gear
— (B. Vi. 1576) Mandrel  YMT032	Removing and installing input shaft rear bearing
— (B. Vi. 1601) Mandrel  YMT033	Installing input shaft front bearing

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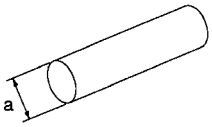
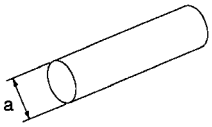
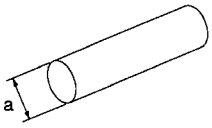
Tool number (Renault SST No.) Tool name	Description
— (B. Vi. 1554) Drift kit  MCIA0151E	Installing differential side bearing outer race
— (B. Vi. 1175) Installer  YMT035	Installing 5th main gear
— (B. Vi. 1666) Drift  YMT036	Installing differential side oil seal
— (B. Vi. 1161) Dial gauge support plate	Measuring preload of mainshaft rear bearing
— (B. Vi. 1527) Special spacer  S-NT135	Measuring preload of mainshaft rear bearing

Commercial Service Tools

INFOID:0000000001094778

Tool name	Description
Drift a: 55 mm (2.17 in) dia.  SZNT063	Removing mainshaft rear bearing outer race
Drift a: 38 mm (1.50 in) dia.  SZNT063	Removing input shaft front bearing

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Tool name	Description
Drift a: 60 mm (2.36 in) dia.  SZNT063	Installing the mainshaft rear bearing outer race
Drift a: 55 mm (2.17 in) dia.  SZNT063	Removing mainshaft front bearing outer race
Drift a: 14.5 mm (0.571 in) dia.  SZNT063	Installing bushing

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ON-VEHICLE MAINTENANCE

GEAR OIL

Exploded View

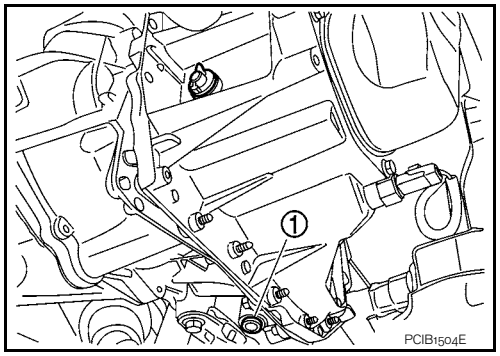
INFOID:0000000001070434

Refer to TM-25, "Exploded View".

Draining

INFOID:0000000001070435

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and then drain gear oil.
3. Set a new gasket on drain plug and install it to clutch housing. Tighten drain plug to the specified torque.
   CAUTION:
   Never reuse gasket.



Refilling

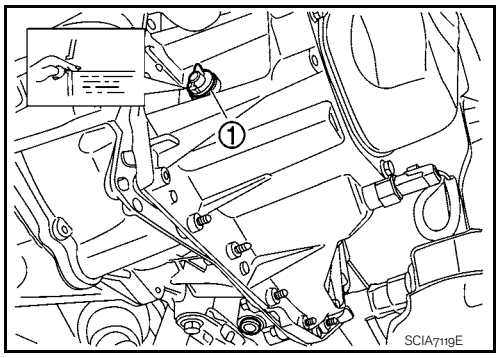
INFOID:0000000001070436

1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified limit at filler plug hole as shown.

   Oil grade and viscosity : **Refer to MA-21, "Fluids and Lubricants".**

   Oil capacity : **Refer to TM-50, "General Specification".**

2. After refilling gear oil, check oil level. Refer to TM-17, "Inspection".
3. Set a new gasket on filler plug and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
4. Tighten filler plug to the specified torque.



Inspection

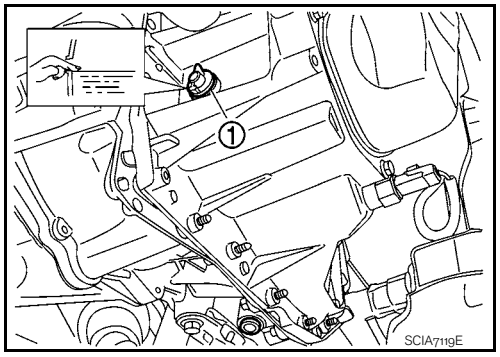
INFOID:0000000001070437

LEAKAGE

Make sure that gear oil is not leaking from transaxle or around it.

LEVEL

1. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Never start engine while checking oil level.
2. Set a new gasket on filler plug and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
3. Tighten filler plug to the specified torque.



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ON-VEHICLE REPAIR

SIDE OIL SEAL

Exploded View

INFOID:0000000001070438

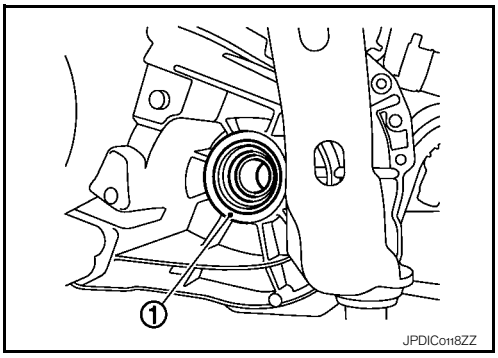
Refer to TM-25, "Exploded View".

Removal and Installation

INFOID:0000000001070439

REMOVAL

1. Remove front drive shafts. Refer to FAX-17, "HR16DE MODELS : Removal and Installation".
2. Remove differential side oil seals (1) using a suitable tool.
   CAUTION:
   Never damage transaxle case and clutch housing.



INSTALLATION

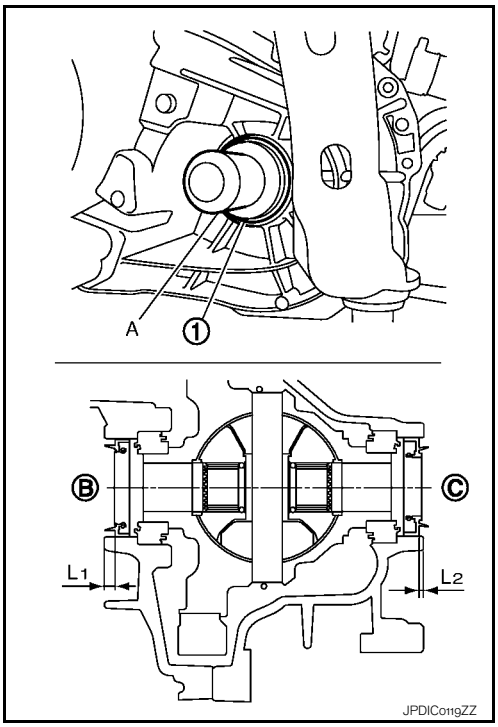
Note the following, and install in the reverse order of removal.

- Install differential side oil seals (1) to clutch housing and transaxle case using the drift (A) [SST: — (B. Vi. 1666)].

  B : Transaxle case side
  C : Clutch housing side

  Dimension "L_1" : 5.7 - 6.3 mm (0.224 - 0.248 in)
  Dimension "L_2" : 2.4 - 3.0 mm (0.094 - 0.118 in)

  CAUTION:
  - **Never reuse differential side oil seal.**
  - **When installing, never incline differential side oil seal.**
  - **Never damage clutch housing and transaxle case.**
- Check oil level and oil leakage after installation. Refer to TM-17, "Inspection".

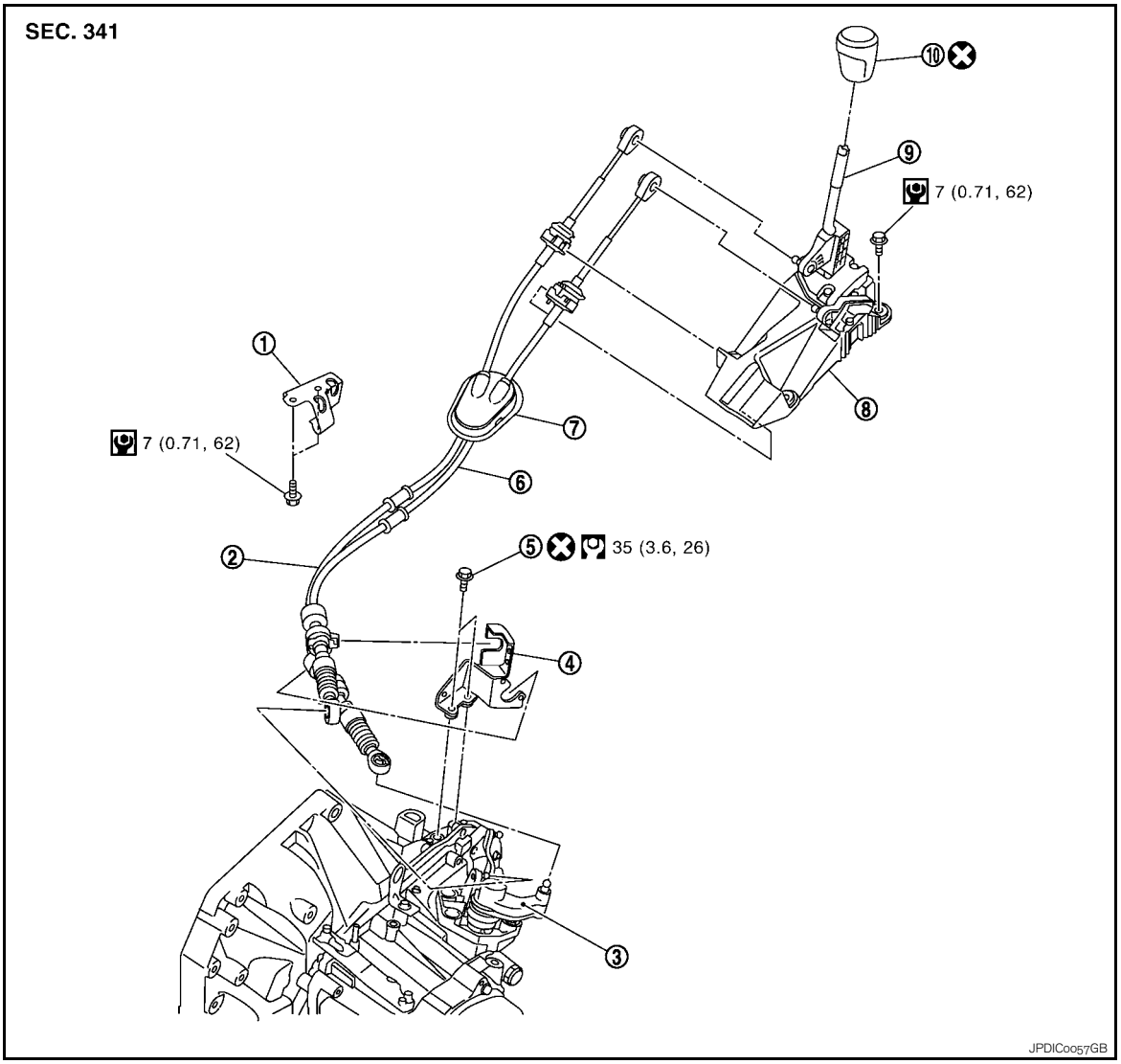


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CONTROL LINKAGE

Exploded View

INFOID:0000000001070440



1. Bracket
2. Shift cable
3. Control shaft assembly
4. Cable mounting bracket
5. Tapping bolt
6. Select cable
7. Grommet
8. Control device assembly
9. Control lever
10. Control lever knob

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

Removal and Installation

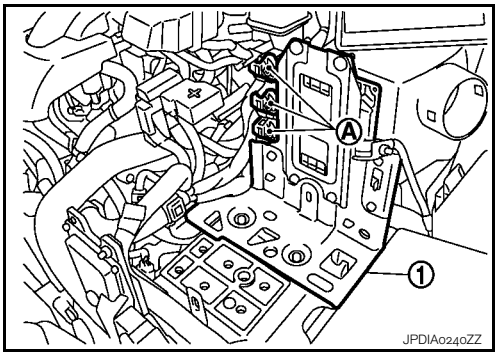
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REMOVAL

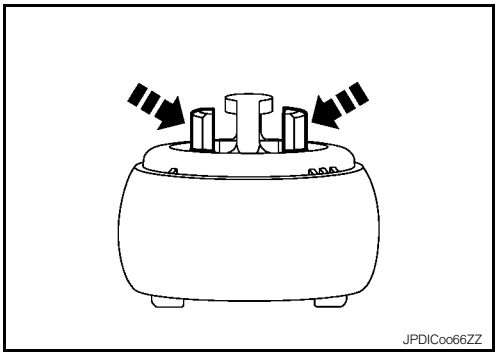
1. Remove the air cleaner case and air duct (inlet). Refer to EM-27, "Removal and Installation".
2. Remove the battery. Refer to PG-118, "Removal and Installation".

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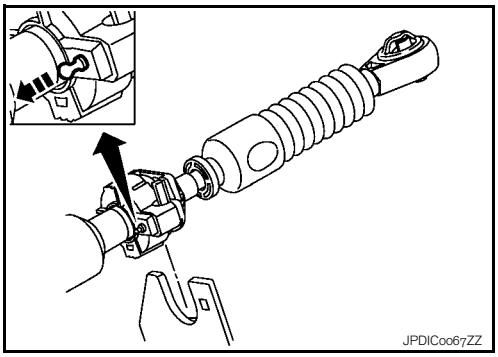
3. Disconnect the connectors (A) and then remove the bracket (1).



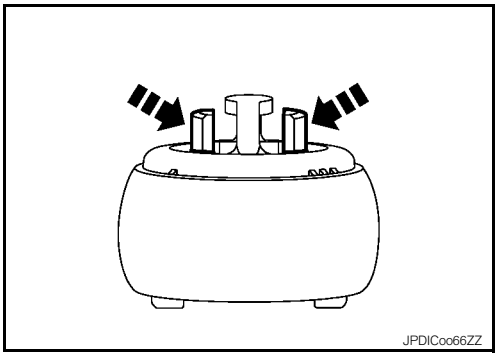
4. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control shaft assembly.
5. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control shaft assembly.



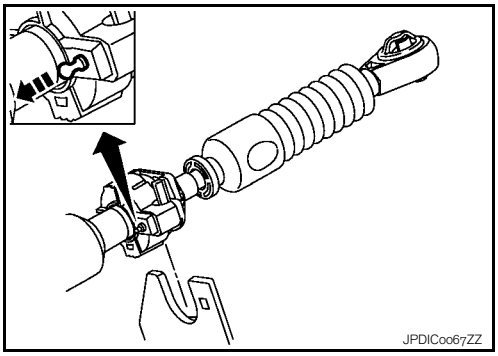
6. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the cable mounting bracket.
7. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the cable mounting bracket.
8. Remove the control lever knob.
9. Remove console finisher assembly and the center console assembly. Refer to IP-18, "Removal and Installation".
10. Shift the control lever to the neutral position.



11. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
12. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.



13. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
14. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.
15. Remove the control device assembly.
16. Remove the heat plate.
17. Remove the bracket.



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18. Remove the grommet and then remove the shift cable and select cable from the vehicle.

INSTALLATION

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

- Shift the control lever to the neutral position.
- Securely assemble each cable and the lever of the control shaft assembly.
- Securely assemble each cable and the cable mounting bracket.
- Securely assemble each cable and the control device assembly.
- Make sure that the claws of grommet are in contact with the floor.
- Be careful about the installation direction and push the control lever knob into the control lever.
  CAUTION:
  Never reuse control lever knob.
- Tapping work for tapping bolt is not applied to new clutch housing. Do not perform tapping by other than screwing tapping bolt because tapping is formed by screwing tapping bolt into clutch housing.
  CAUTION:
  Never reuse tapping bolt.

Inspection

INFOID:0000000001070442

After installing, confirm the following items:

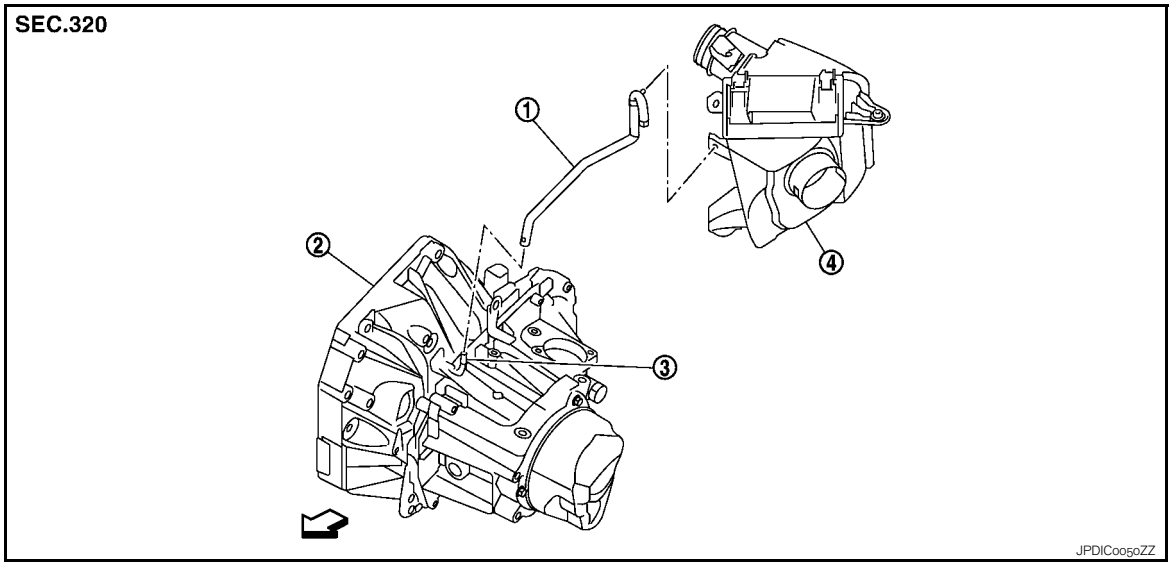
- When the control lever is shifted to 1st-2nd side and 5th-Reverse side, confirm the control lever returns to neutral position smoothly.
- When the control lever is shifted to each position, make sure there is no binding or disconnection in each boot.

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AIR BREATHER HOSE

Exploded View

INFOID:0000000001070443



1. Air breather hose
2. Transaxle assembly
3. Breather pipe
4. Air cleaner case

⇦: Vehicle front

Removal and Installation

INFOID:0000000001070444

REMOVAL

Refer to the figure for removal procedure.

CAUTION:

When removing air breather hose, be sure to hold breather pipe securely.

INSTALLATION

Refer to the figure for installation procedure.

- When installing air breather hose on breather pipe, aim paint mark face toward the vehicle front.
- When installing air breather hose on breather pipe, push it until it hits transaxle case.
- When installing air breather hose to air cleaner case, make sure that clip are fully inserted.

CAUTION:

Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

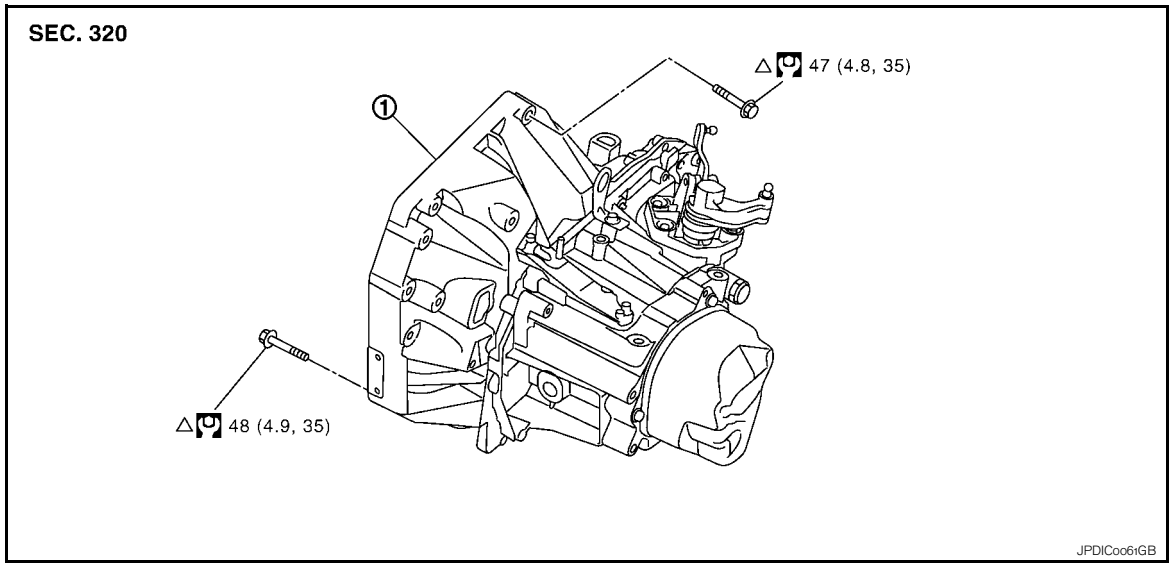
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REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001070445



1. Transaxle assembly

△: For the bolt mounting positions, refer to “INSTALLATION”.

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

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

Removal and Installation

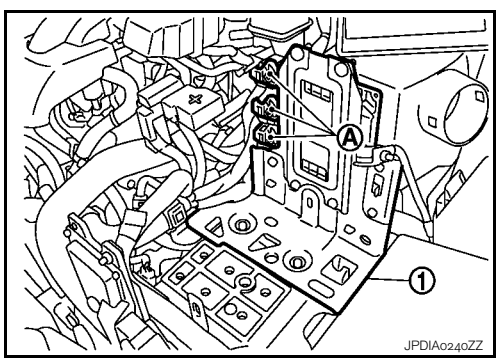
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CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-22, "Removal and Installation".
3. Remove air cleaner case and air duct (inlet). Refer to EM-27, "Removal and Installation".
4. Remove battery. Refer to PG-118, "Removal and Installation".
5. Disconnect connectors (A) and then remove bracket (1).
6. Drain clutch fluid and then remove clutch tube from CSC (Concentric Slave Cylinder). Refer to CL-14, "Removal and Installation".
   CAUTION:
   Never depress clutch pedal during removal procedure.
7. Disconnect position switch harness connector.
8. Disconnect ground cable.
9. Remove wire harnesses from transaxle assembly.
10. Disconnect select cable and shift cable from transaxle assembly. Refer to TM-19, "Removal and Installation".



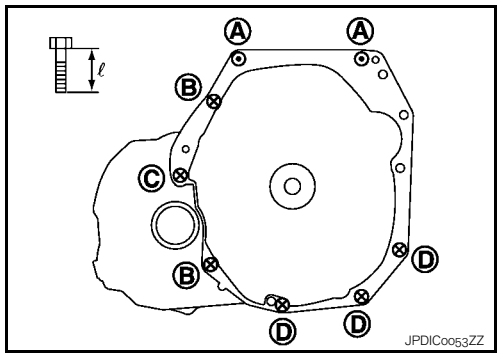
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11. Remove starter motor. Refer to STR-22, "HR16DE MODELS : Removal and Installation".
12. Remove engine under cover.
13. Drain gear oil. Refer to TM-17, "Draining".
14. Remove exhaust front tube. Refer to EX-5, "Removal and Installation".
15. Remove front drive shafts. Refer to FAX-17, "HR16DE MODELS : Removal and Installation".
    NOTE:
    Insert a suitable plug into differential side oil seal after removing front drive shaft.
16. Remove rear engine mounting brackets and rear torque rod. Refer to EM-83, "Removal and Installation".
17. Remove suspension member and suspension member stay. Refer to FSU-17, "Removal and Installation".
18. Set a suitable jack to transaxle assembly and then set a suitable jack to engine assembly.
    CAUTION:
    When setting a suitable jack, be careful so that it does not contact with the switch.
19. Remove transaxle assembly mounting bolts.
20. Remove engine mounting through bolt-securing nut. Refer to EM-83, "Removal and Installation".
21. Remove transaxle assembly from the vehicle.
    CAUTION:
    - **Secure transaxle assembly to a suitable jack while removing it.**
    - **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
22. Remove CSC (Concentric Slave Cylinder). Refer to CL-15, "Removal and Installation".
    CAUTION:
    If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

INSTALLATION

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

- Tighten transaxle assembly mounting bolts to the specified torque. The figure is the view from the engine.



: Transaxle to engine

: Engine to transaxle

Bolt symbol	A	B	C	D
Quantity	2	2	1	3
" ℓ " mm (in)	55 (2.17)	49 (1.93)	69 (2.72)	80 (3.15)

CAUTION:
- **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
- **When installing transaxle assembly, never bring input shaft into contact with clutch cover.**

- Refer to CL-15, "Removal and Installation" for CSC (Concentric Slave Cylinder) installation procedure.
- Refer to TM-19, "Removal and Installation" for select cable and shift cable installation procedure.
- Bleed the air from the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".
- After installation, check for oil leakage and oil level. Refer to TM-17, "Inspection".

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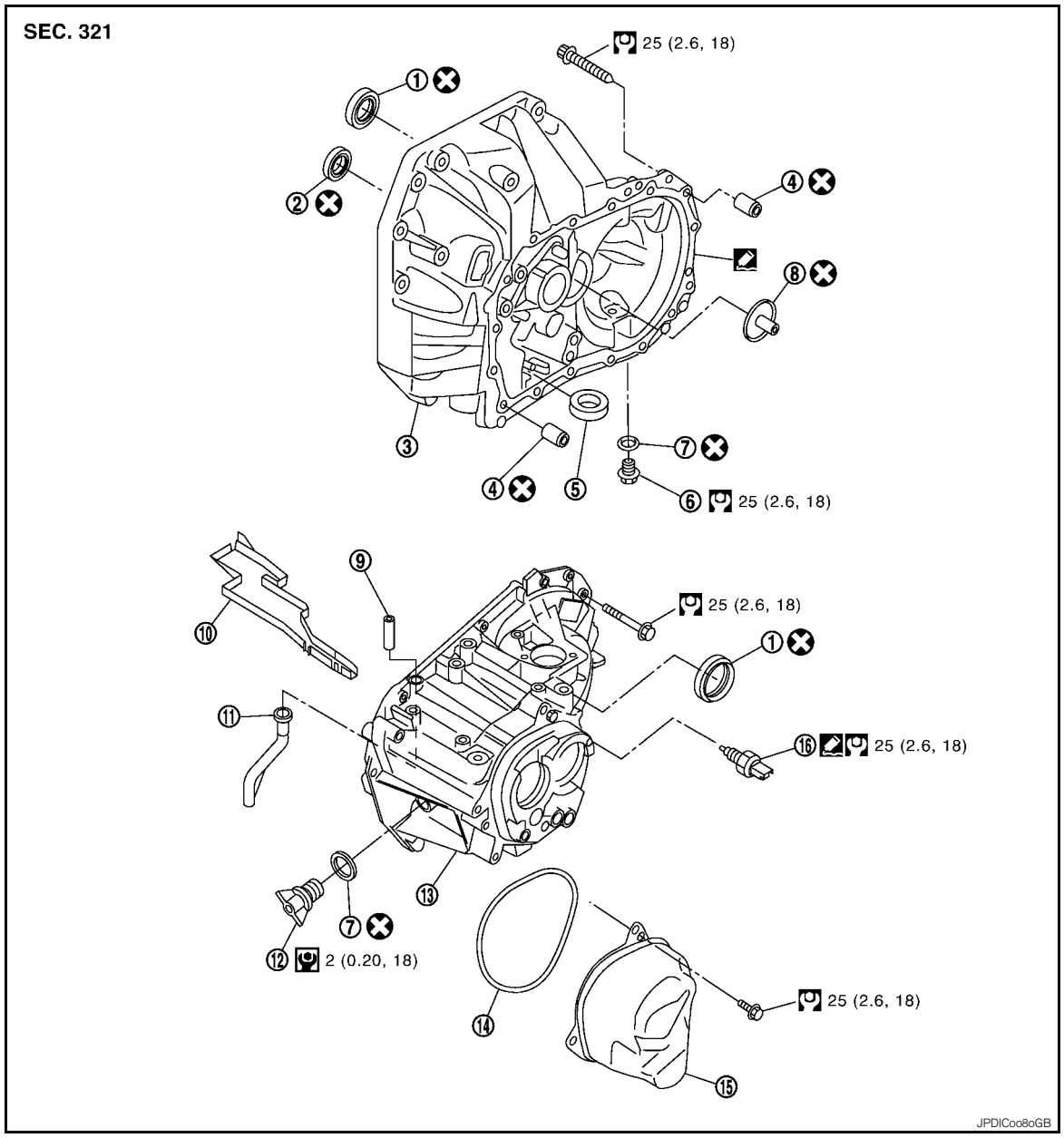
DISASSEMBLY AND ASSEMBLY

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001042531

CASE AND HOUSING



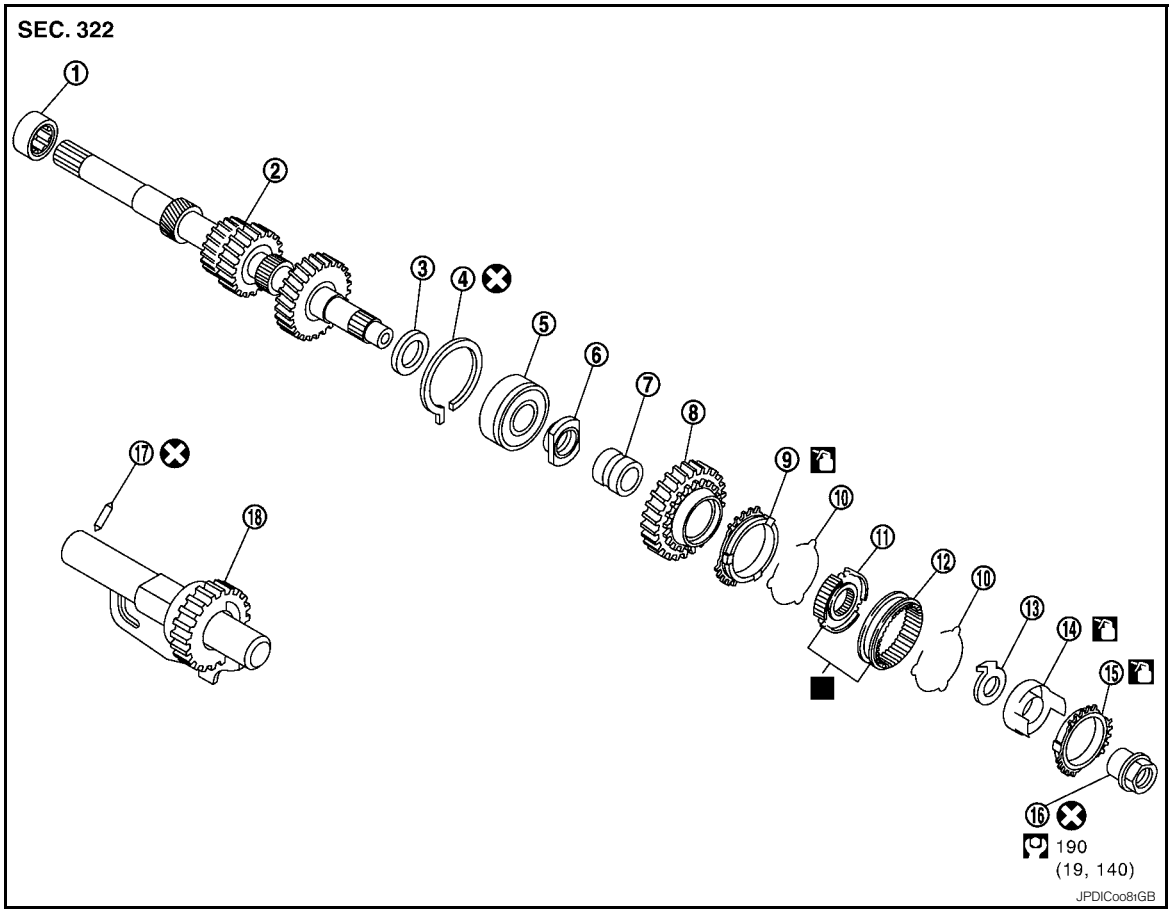
1. Differential side oil seal
2. Input shaft oil seal
3. Clutch housing
4. Dowel pin
5. Magnet
6. Drain plug
7. Gasket
8. Oil channel
9. 2 way connector
10. Oil gutter
11. Air breather inner tube
12. Filler plug
13. Transaxle case
14. O-ring
15. Rear housing
16. Position switch

: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

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

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SHAFT AND GEAR



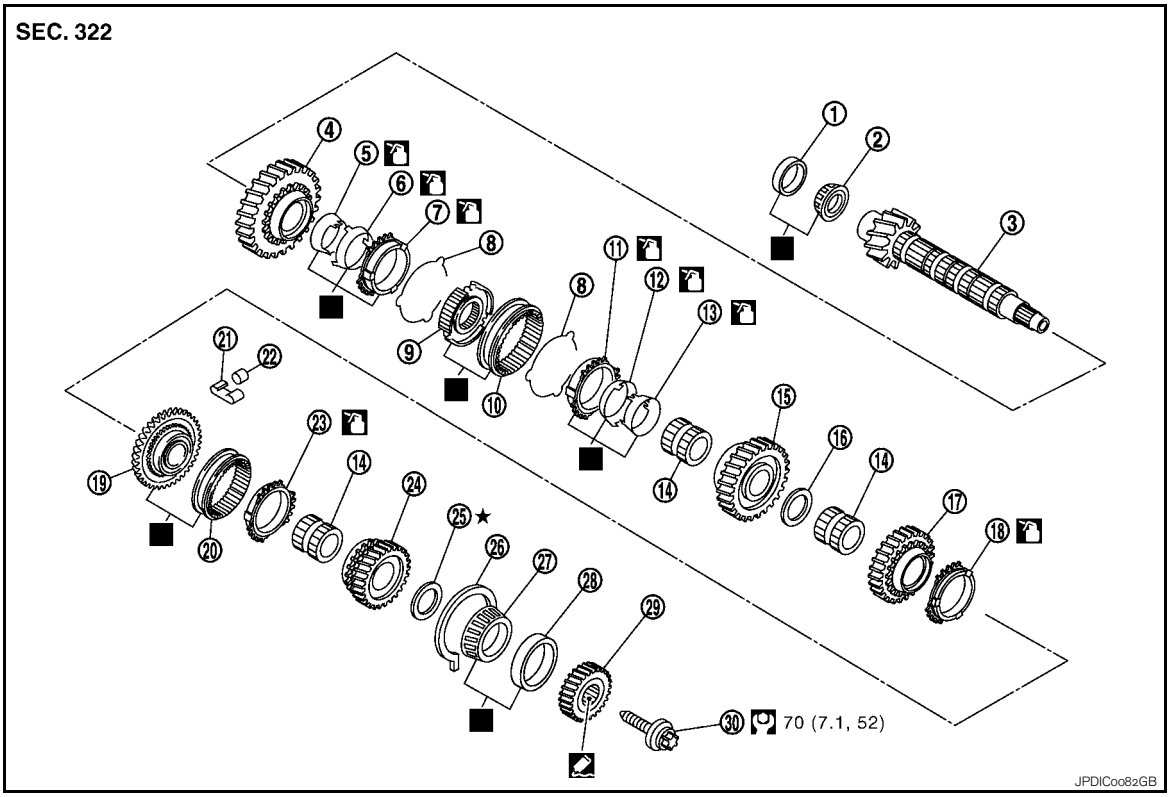
1. Input shaft front bearing
2. Input shaft
3. Washer
4. Snap ring
5. Input shaft rear bearing
6. Adapter plate
7. Bushing
8. 5th input gear
9. 5th baulk ring
10. Spread spring
11. 5th-reverse synchronizer hub
12. 5th-reverse coupling sleeve
13. Lock washer
14. Reverse synchronizer cone
15. Reverse baulk ring
16. Input shaft nut
17. Retaining pin
18. Reverse gear assembly

: Apply gear oil.

: Replace the parts as a set.

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

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1. Mainshaft front bearing outer race	2. Mainshaft front bearing inner race	3. Mainshaft
4. 1st main gear	5. 1st inner baulk ring	6. 1st synchronizer cone
7. 1st outer baulk ring	8. Spread spring	9. 1st-2nd synchronizer hub
10. 1st-2nd coupling sleeve	11. 2nd outer baulk ring	12. 2nd synchronizer cone
13. 2nd inner baulk ring	14. Needle bearing	15. 2nd main gear
16. Thrust washer	17. 3rd main gear	18. 3rd baulk ring
19. 3rd-4th synchronizer hub	20. 3rd-4th coupling sleeve	21. Spring
22. Insert key	23. 4th baulk ring	24. 4th main gear
25. Bearing preloading shim	26. Snap ring	27. Mainshaft rear bearing inner race
28. Mainshaft rear bearing outer race	29. 5th main gear	30. Mainshaft bolt

: Apply gear oil.

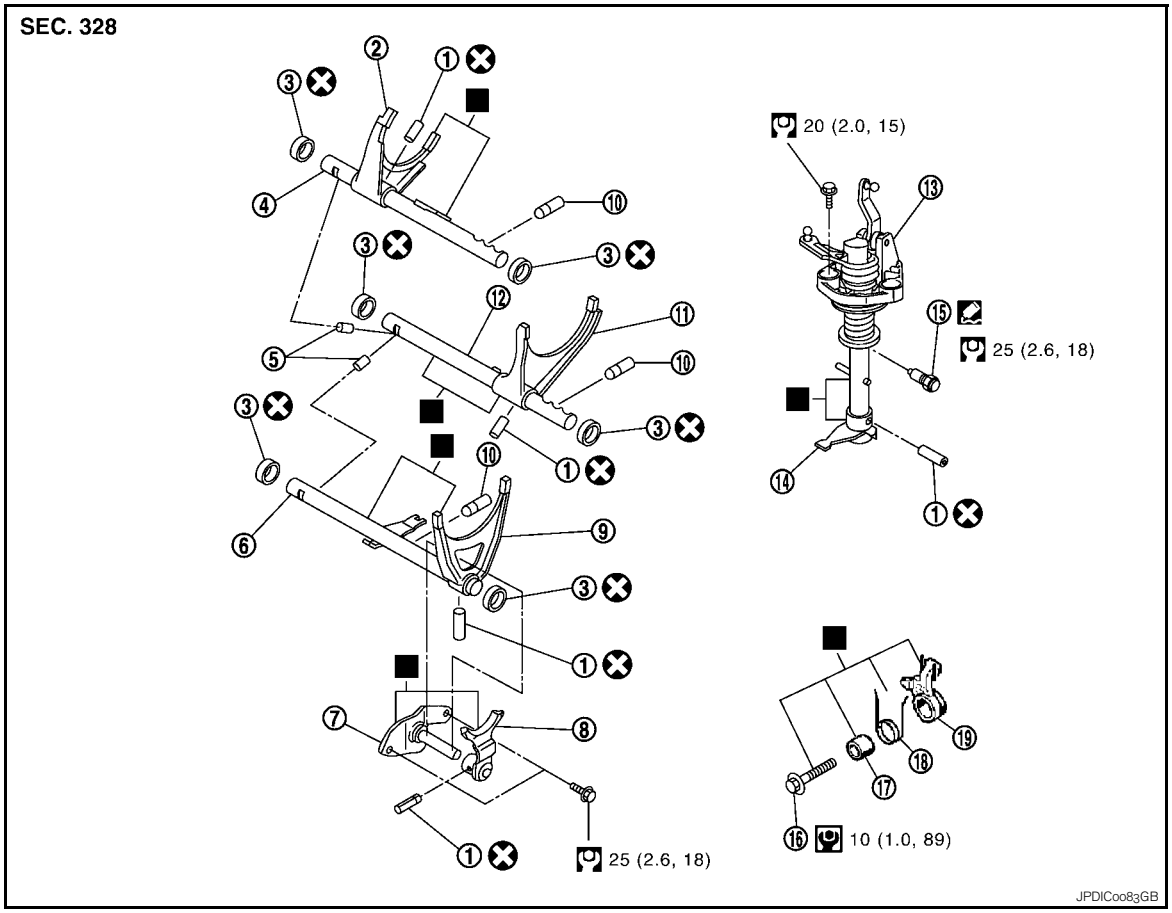
: Replace the parts as a set.

: Apply LOCTITE Frenbloc or an equivalent.

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

SHIFT FORK AND FORK ROD

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1. Retaining pin
2. 1st-2nd shift fork
3. Bushing
4. 1st-2nd fork rod
5. Lock pin
6. 5th-reverse fork rod
7. Bracket
8. Reverse gear gate
9. 5th-reverse shift fork
10. Check ball
11. 3rd-4th shift fork
12. 3rd-4th fork rod
13. Control shaft
14. Selector
15. Check ball plug
16. Interlock bolt
17. Bushing
18. Spring
19. Striking interlock

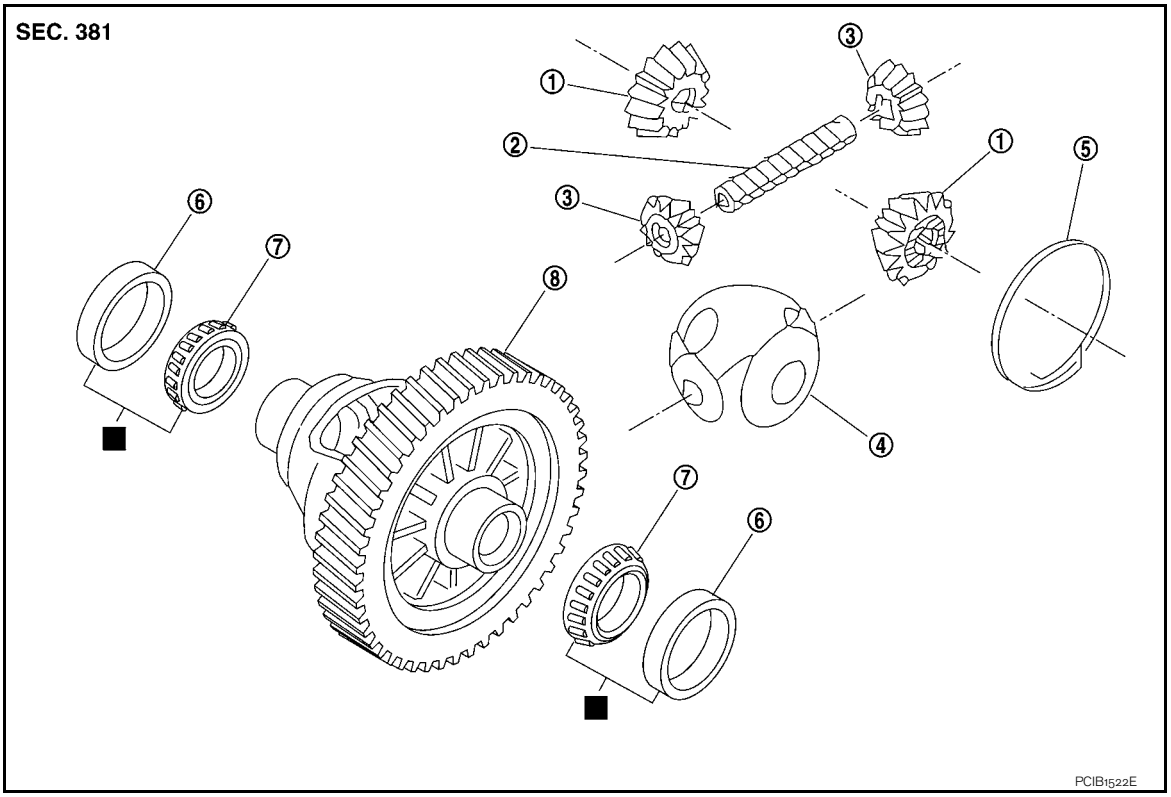
: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

: Replace the parts as a set.

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

FINAL DRIVE

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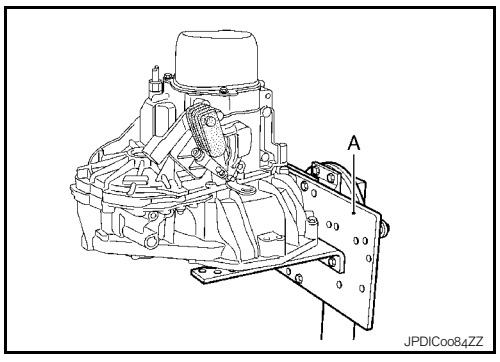
1. Side gear
2. Pinion mate shaft
3. Pinion mate gear
4. Thrust washer
5. Lock ring
6. Differential side bearing outer race
7. Differential side bearing inner race
8. Differential case

■: Replace the parts as a set.

Disassembly

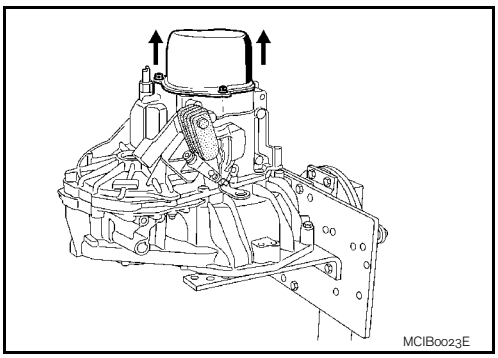
INFOID:0000000001070447

1. Remove drain plug and gasket from clutch housing and then drain oil.
2. Remove filler plug and gasket from transaxle case.
3. Install transaxle assembly on a suitable stand (A).
4. Remove mounting bolts from located inside the clutch housing.

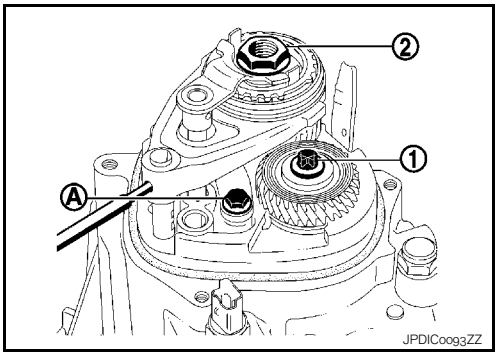


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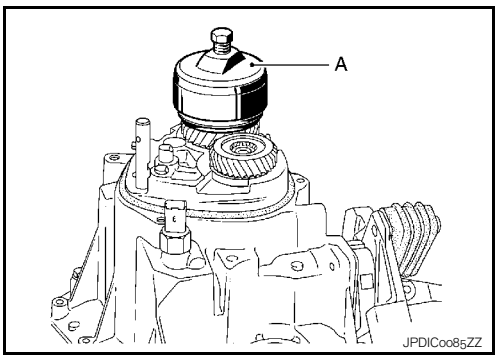
5. Remove rear housing and O-ring from transaxle case. This must be removed along the horizontal axis of the transaxle assembly because it has a lubrication spline which is located in the input shaft bore.



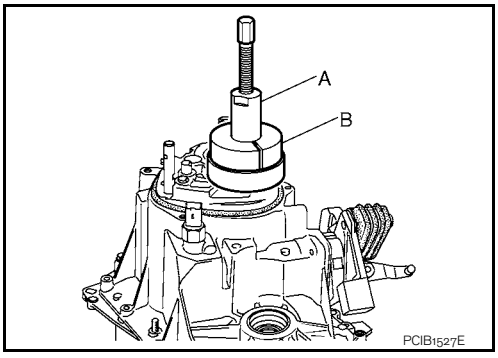
6. Remove reverse gear gate assembly mounting bolts (A).
7. Remove retaining pin from 5th-reverse shift fork using the pin punch [SST: — (B. Vi. 31-01)].
8. Shift the 3rd gear on the shift lever of control shaft assembly and the 5th gear by the 5th-reverse shift fork on its the 5th-reverse fork rod.
9. Remove the mainshaft bolt (1).
10. Remove the input shaft nut (2).
11. Remove the reverse synchronizer cone and reverse baulk ring.
12. Remove 5th-reverse shift fork, reverse gear gate assembly and 5th-reverse coupling sleeve from 5th-reverse synchronizer hub.



13. Remove the 5th-reverse synchronizer hub from input shaft using the puller (A) [SST: — (B. Vi. 1170)]. To do this, fit the puller and rotate it so that the splines are opposite those of the input shaft hub.

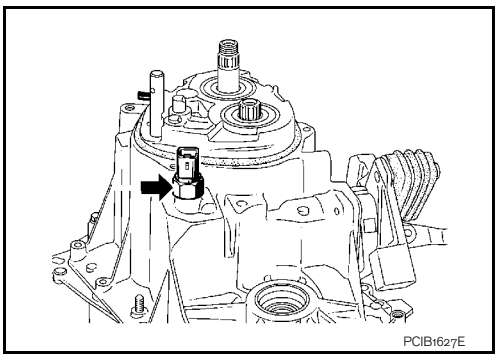


14. Remove 5th main gear using the puller (A) [SST: KV32300QAC (B. Vi. 22-01)] and (B) [SST: KV32300QAD (B. Vi. 1000-01)].

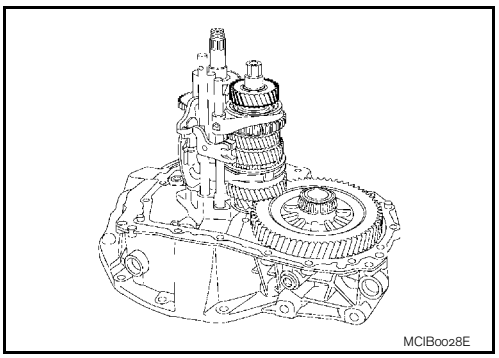


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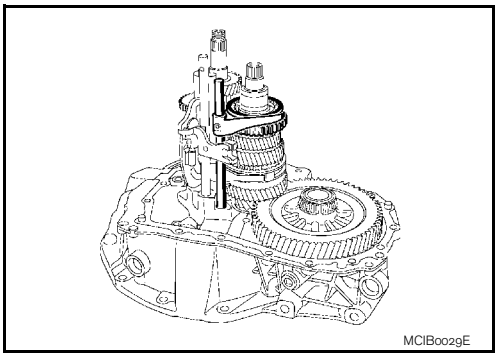
15. Remove position switch from transaxle case.
16. Engage 3rd gear.
17. Remove the transaxle case mounting bolts.
18. Remove the transaxle case from clutch housing.
19. Remove oil gutter from transaxle case.
20. Remove mainshaft rear bearing inner race from mainshaft using a suitable puller.


PCIB1627E

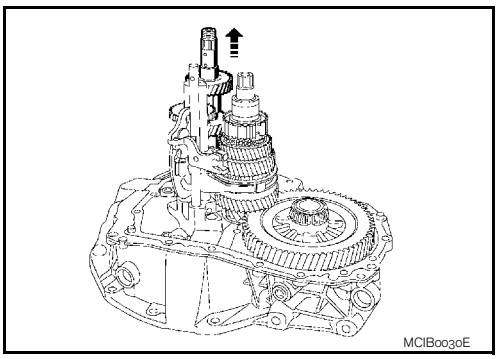
21. Remove bearing preloading shim, 4th main gear, needle bearing, and 4th baulk ring from mainshaft.


MCIB0028E

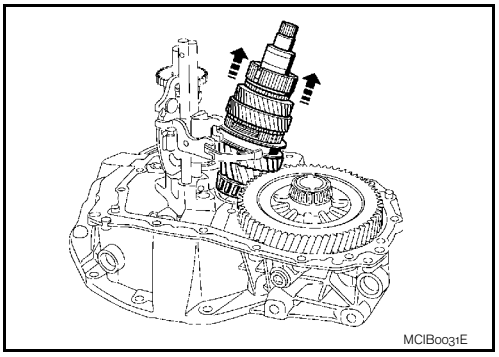
22. Remove 3rd-4th fork rod assembly and 3rd-4th coupling sleeve while gently lifting the mainshaft assembly.


MCIB0029E

23. Remove input shaft assembly.

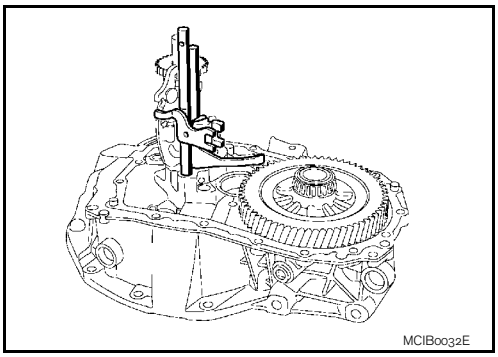

MCIB0030E

24. Remove mainshaft assembly.

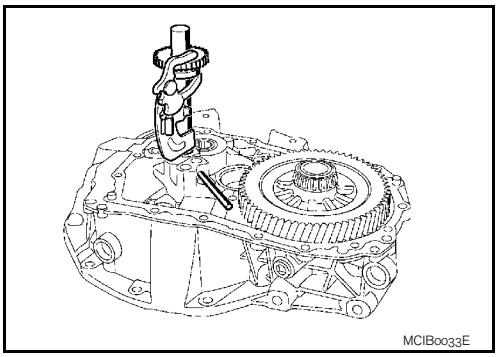

MCIB0031E

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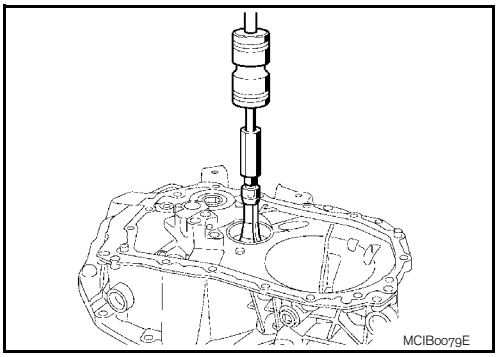
25. Remove 1st-2nd fork rod assembly and the 5th-reverse fork rod assembly.


MCIB0032E

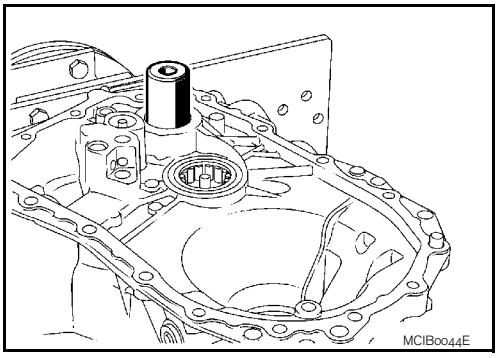
26. Remove retaining pin from reverse gear assembly using a pin punch.
27. Remove reverse gear assembly from clutch housing.
28. Remove final drive assembly from clutch housing.
29. Remove magnet and dowel pins from clutch housing.


MCIB0033E

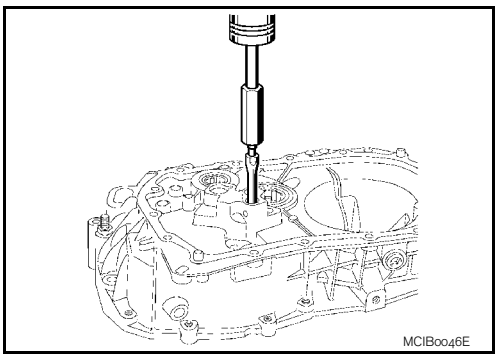
30. Cut the base of the oil channel plastic hollow needle located at the centre of the mainshaft front bearing.
31. Drive out mainshaft front bearing outer race using a suitable puller.


MCIB0079E

32. Remove input shaft front bearing using the press and the drift [Commercial service tool].

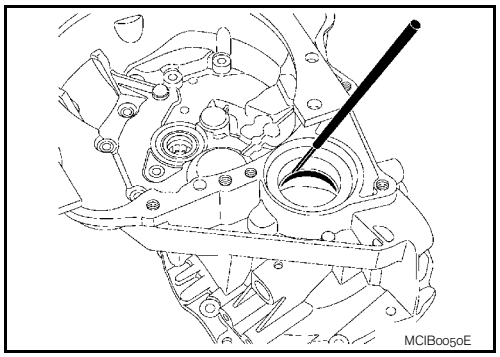

MCIB0044E

33. Remove bushings from clutch housing using a suitable puller.

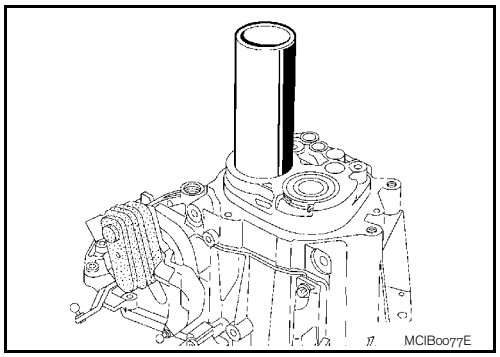

MCIB0046E

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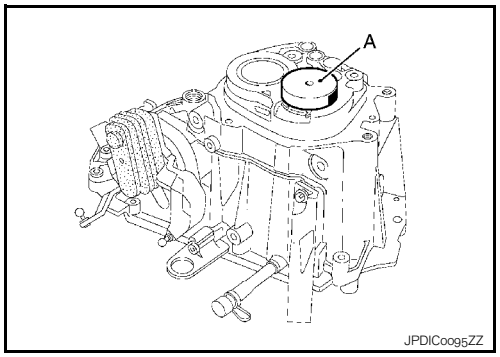
34. Remove differential side bearing outer races from clutch housing and transaxle case using a roll pin punch.
CAUTION:
Never damage clutch housing and transaxle case.



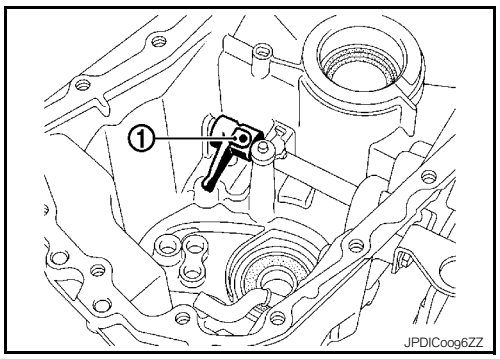
35. Remove snap ring and mainshaft rear bearing outer race using the drift [Commercial service tool].



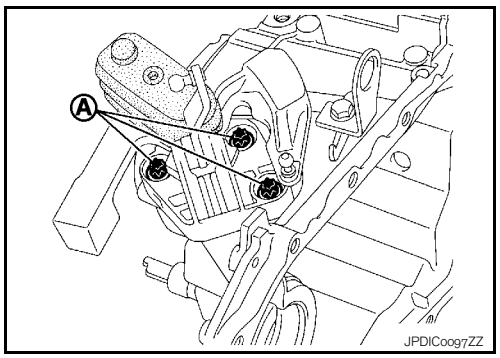
36. Remove snap ring and drive the input shaft rear bearing inside the transaxle case using the mandrel (A) [SST: — (B. Vi. 1576)].



37. Remove retaining pin from selector (1) using a pin punch.
38. Remove interlock bolt, bushing, spring, and striking interlock from transaxle case.



39. Remove mounting bolts (A) and then remove the control shaft assembly from transaxle case.
40. Pull out 2 way connector straight from air breather inner tube.
41. Remove air breather inner tube from transaxle case.



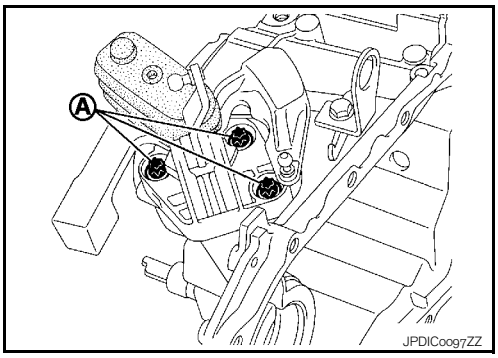
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Assembly

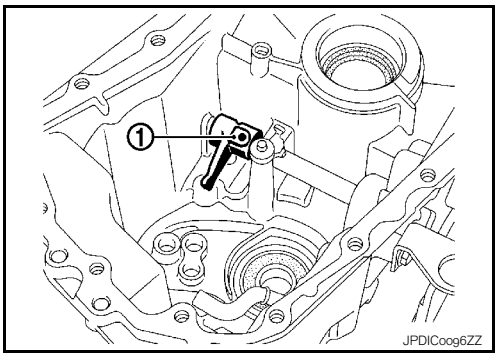
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CAUTION:
When replacing the parts below, adjust mainshaft rear bearing preload. Refer to TM-39, "Adjustment".
- **Mainshaft front bearing outer race**
- **Mainshaft front bearing inner race**
- **Mainshaft rear bearing inner race**
- **Mainshaft rear bearing outer race**
- **Clutch housing**
- **Transaxle case**
- **Mainshaft**

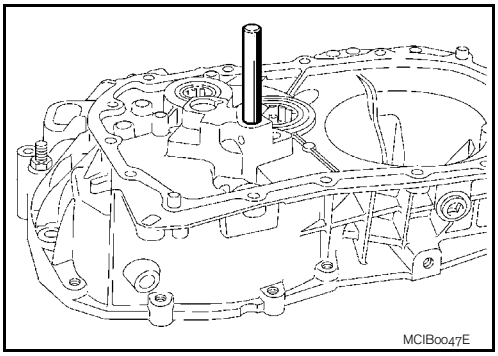
1. Install air breather inner tube to transaxle case.
   CAUTION:
   Never damage air breather inner tube.
   NOTE:
   It is easy to install the air breather inner tube when its end is closed with tape. Remove the tape after the installation.
2. Insert 2 way connector straight to air breather inner tube.
   CAUTION:
   Check air breather inner tube for twists after installing.
3. Install control shaft to transaxle case and then install selector to control shaft. Tighten mounting bolts (A) to the specified torque.



4. Install selector (1) onto control shaft, and then install retaining pin to selector.
5. Install striking interlock, spring, bushing, and interlock bolt to transaxle case, and then tighten interlock bolt to the specified torque.
6. Install bushings to transaxle case using a suitable drift.

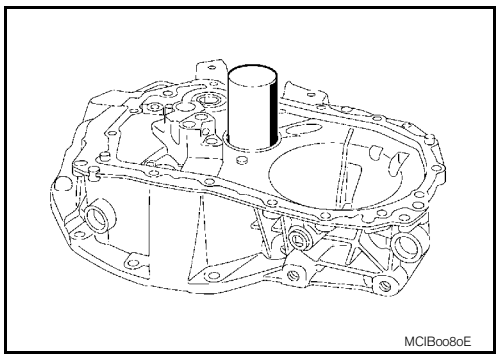


7. Install bushings using the drift [Commercial service tool] down to the thrust bearing.
   CAUTION:
   Never reuse bushing.

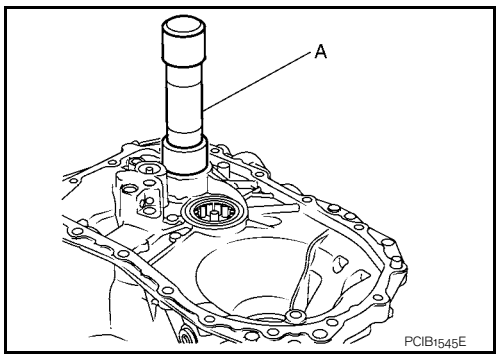


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8. Install the oil channel and then the mainshaft front bearing outer race using the drift [Commercial service tool].
CAUTION:
- **Never reuse oil channel.**
- **Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.**

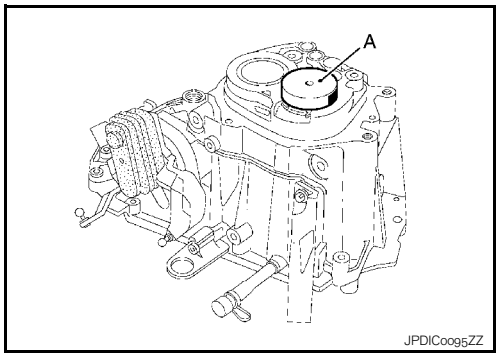

MCIB0080E

9. Install the input shaft front bearing using the press and the mandrel (A) [SST: — (B. Vi. 1601)].
10. Install input shaft oil seal to clutch housing using a suitable drift.



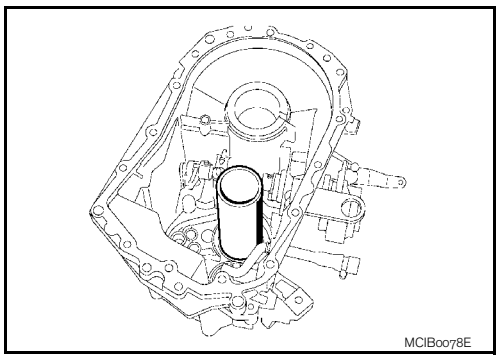
PCIB1545E

11. Install the snap rings.
CAUTION:
Never reuse snap ring.
12. Install the input shaft rear bearing using the mandrel (A) [SST: — (B. Vi. 1576)].

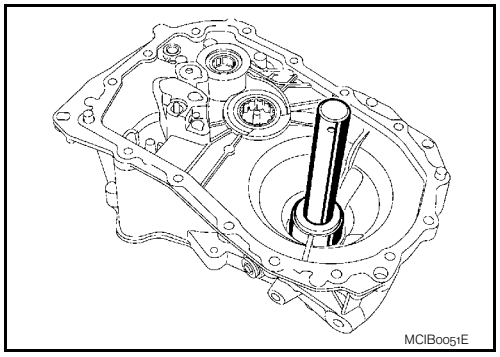


JPDIC0095ZZ

13. Install the mainshaft rear bearing outer race using the drift [Commercial service tool].
CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.


MCIB0078E

14. Install the differential side bearing outer races using the drift kit [SST: — (B. Vi. 1554)].
CAUTION:
Replace differential side bearing outer race and differential side bearing inner race as a set.


MCIB0051E

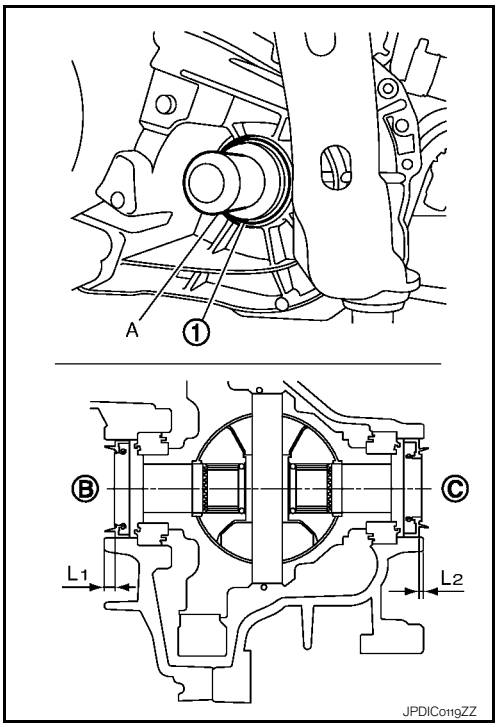
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15. Install differential side oil seals (1) using the drift (A) [SST: — (B. Vi. 1666)].

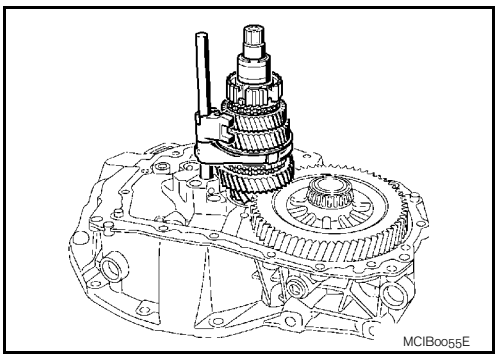
    B : Transaxle case side
    C : Clutch housing side

    Dimension "L_1" : 5.7 - 6.3 mm (0.224 - 0.248 in)
    Dimension "L_2" : 2.4 - 3.0 mm (0.094 - 0.118 in)

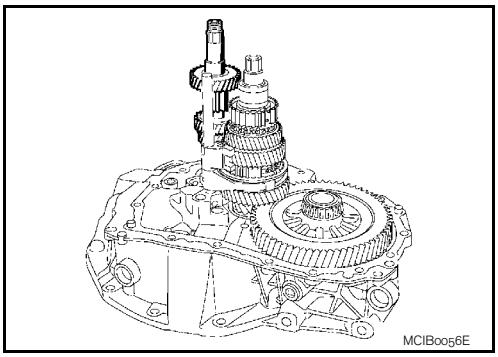
16. Install final drive assembly to clutch housing.
17. Install dowel pins and magnet to clutch housing.



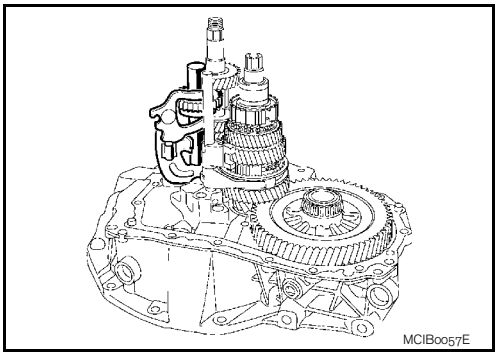
18. Install the mainshaft assembly and 1st-2nd fork rod assembly.



19. Install the input shaft assembly and washer.

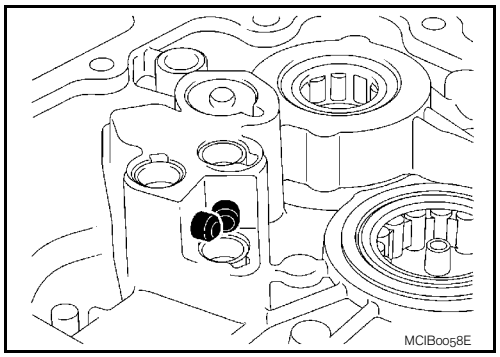


20. Install reverse gear assembly.

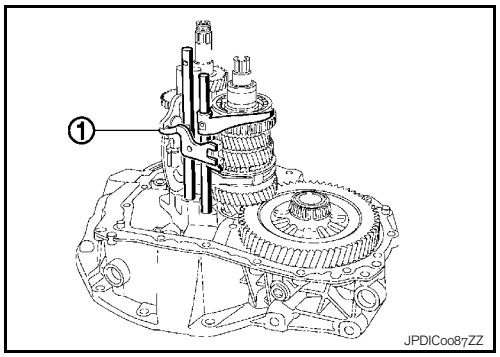


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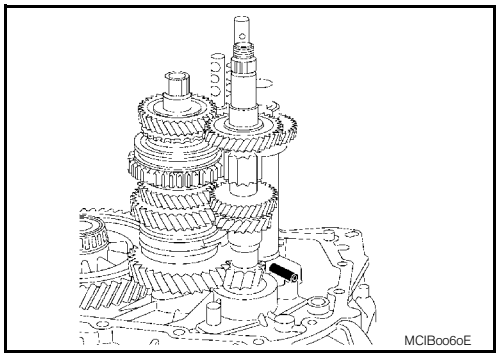
21. Install the lock pins.



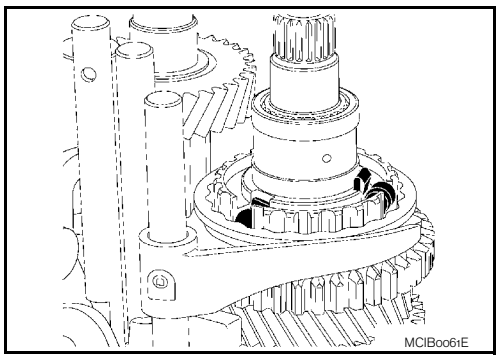
22. Install the 5th-reverse fork rod and the 3rd-4th fork rod assembly and the 3rd-4th coupling sleeve while gently lifting the input shaft assembly. Rotate the reverse gear assembly to position the 5th-reverse fork rod (1).
CAUTION:
Replace 3rd-4th coupling sleeve and 3rd-4th synchronizer hub as a set.



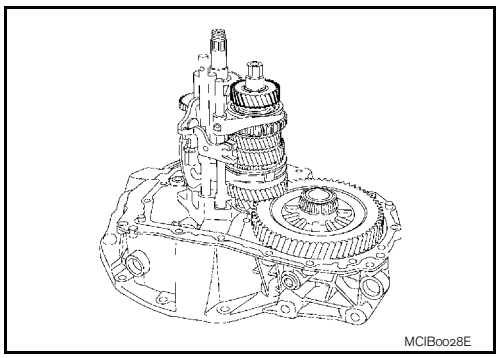
23. Install the retaining pin to the reverse gear assembly.
CAUTION:
Never reuse retaining pin.



24. Shift to 3rd gear and insert the springs and Insert keys.
25. Install needle bearing to mainshaft.

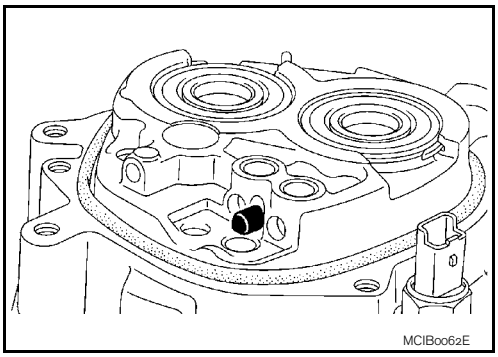


26. Apply gear oil to 4th baulk ring.
27. Install the 4th main gear fitted its 4th baulk ring.
28. Install selected bearing preloading shim to mainshaft.
    - For selection of bearing preloading shim, refer to TM-39, "Adjustment".
29. Install mainshaft rear bearing inner race to mainshaft using a suitable drift.
CAUTION:
Replace mainshaft rear bearing inner race and mainshaft rear bearing outer race as a set.



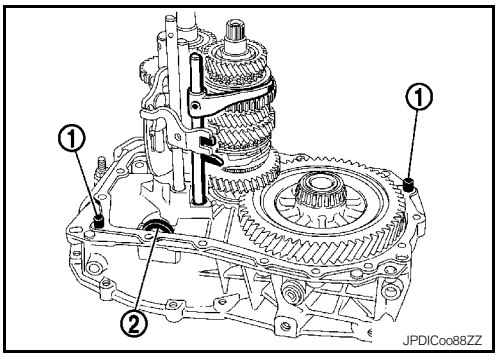
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30. Install the check balls into the transaxle case.
31. Install oil gutter to transaxle case.
32. Engage 3rd gear.

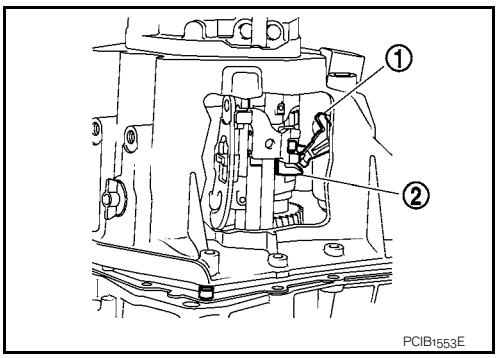


33. Check the positioning of the dowel pins (1).
    CAUTION:
    Never reuse dowel pin.
34. Check the positioning of magnet (2).
35. Apply recommended sealant to mating surface of clutch housing.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

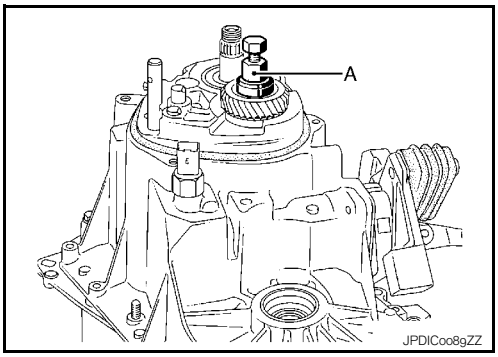
    CAUTION:
    - **Remove old sealant adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to both mounting surfaces.**
    - **Apply sealant so as not to break the bead.**



36. Offer up the transaxle case while guiding the selector (1) into shift fork (2) of the 3rd gear.
37. Pretighten the transaxle case mounting bolts and rotate the input shaft to check that they make contact with the bearings.
38. Tighten the transaxle case mounting bolts to the specified torque.

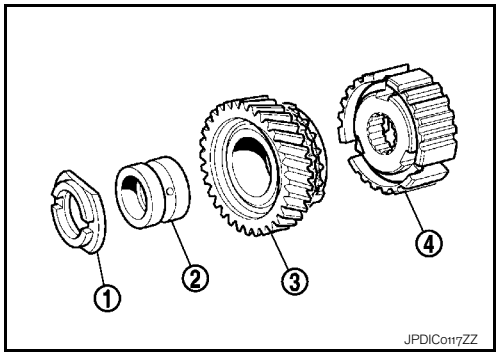


39. Put three drops of LOCTITE Frenbloc or an equivalent on the splines of the fixed 5th main gear and fit it using the installer (A) [SST: — (B. Vi. 1175)].

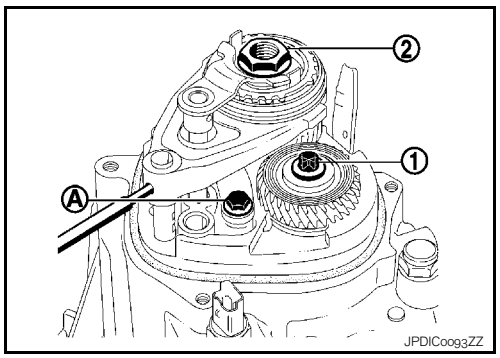


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40. On the input shaft, fit the adapter plate (1) (top side gear side).
41. On the input shaft, fit the bushing (2).
42. Apply gear oil to 5th baulk ring.
43. On the input shaft, fit the 5th input gear (3) fitted with its 5th baulk ring.
44. On the input shaft, fit the 5th-reverse synchronizer hub (4) fitted with its spread springs.
    CAUTION:
    Replace 5th-reverse coupling sleeve and 5th-reverse synchronizer hub as a set.

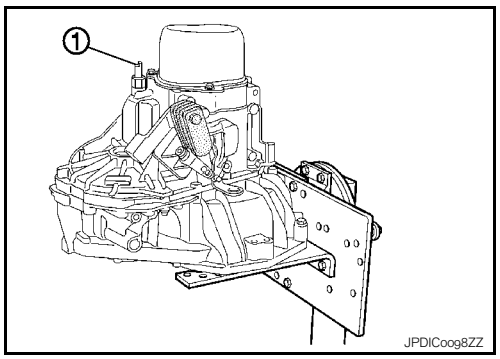


45. Install the 5th-reverse shift fork, 5th-reverse coupling sleeve, and reverse gear assembly.
    CAUTION:
    Replace 5th-reverse coupling sleeve and 5th-reverse synchronizer hub as a set.
46. Apply gear oil to the reverse synchronizer cone and the reverse baulk ring.
47. Install the reverse synchronizer cone and the reverse baulk ring.
48. Tighten mounting bolts (A) to the specified torque.
49. Slide the 5th-reverse shift fork on its 5th-reverse fork rod to engage 5th gear.



50. Tighten mainshaft bolt (1) to the specified torque.
51. Tighten input shaft nut (2) to the specified torque.
    CAUTION:
    Never reuse input shaft nut.
52. Reset to neutral and install retaining pin to the 5th-reverse shift fork.
53. Install O-ring to rear housing and then install them to transaxle case. Tighten mounting bolts to the specified torque.
    CAUTION:
    - **Rear housing oil channel is inserted to input shaft. Therefore, when installing rear housing, install it to axial direction of input shaft.**
    - **Be careful to pinch O-ring when installing rear housing.**
54. Apply recommended sealant to threads of the position switch (1) and then tighten it to the specified torque.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

    CAUTION:
    Remove old sealant and oil adhering to threads.
55. Install gaskets onto drain plug and filler plug, and then install them to clutch housing and transaxle case.
    CAUTION:
    - **Never reuse gasket.**
    - **After oil is filled, tighten filler plug to specified torque.**



Adjustment

INFOID:0000000001098127

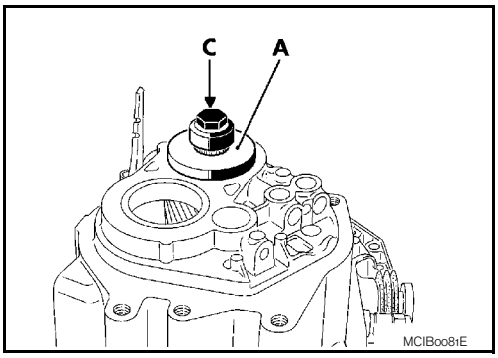
MAINSHAFT REAR BEARING PRELOAD

NOTE:
This operation is performed when replacing the mainshaft front bearing outer race, mainshaft front bearing inner race, mainshaft rear bearing inner race, mainshaft rear bearing outer race, clutch housing, transaxle case, or mainshaft.

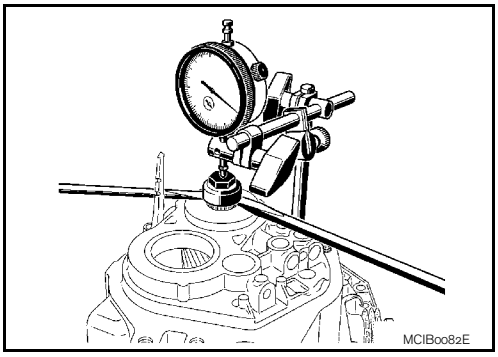
1. Remove final drive assembly and input shaft assembly from clutch housing.
2. Install the mainshaft assembly in the clutch housing with the mainshaft front bearing outer race, mainshaft front bearing inner race, mainshaft rear bearing inner race, mainshaft rear bearing outer race, and the presetting washer or an equivalent, of 1.60 mm (0.06 in) (large outer ϕ).

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3. Install the transaxle case assembly and then tighten mounting bolts to the specified torque.
4. Fit the dial gauge support plate [SST: — (B. Vi. 1161)], or equivalent, on the tripod basin mountings.
5. Install the special spacer (A) [SST: — (B. Vi. 1527)].
6. Install a suitable bolt (C).



7. Fit the dial indicator with its magnetic holder.
8. Rotate the mainshaft assembly several times to fit the mainshaft front bearing outer race, mainshaft front bearing inner race, mainshaft rear bearing inner race, mainshaft rear bearing outer race.
9. Set the dial indicator to zero.
10. Pull the mainshaft assembly upwards by making a lever out of two screwdrivers.
11. Take a reading from the dial indicator.
12. Repeat the operations several times (7 to 10).
13. Calculate the average of the readings.
14. Calculation of the value of the bearing preloading shim.



Prescribed value + average of the readings on the dial indicator + value of the pre-setting washer = value of the bearing preloading shim.

Example:

Unit: mm (in)

0.26	**+**	**0.49**	**+**	**1.60**	**=**	**2.35**
↓		↓		↓		↓
Prescribed value		Average reading		Pre-setting washer value		Bearing preloading shim value

NOTE:
A set of pre-load washers of 2.15 mm (0.08 in) to 2.43 mm (0.10 in) from 0.04 mm (0.002 in) to 0.04 mm (0.002 in) thickness is supplied as replacement parts.

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INPUT SHAFT AND GEAR

Exploded View

INFOID:0000000001070449

Refer to TM-25, "Exploded View".

Disassembly

INFOID:0000000001070450

Refer to TM-29, "Disassembly" for disassembly procedure.

Assembly

INFOID:0000000001070451

Refer to TM-34, "Assembly" for assembly procedure.

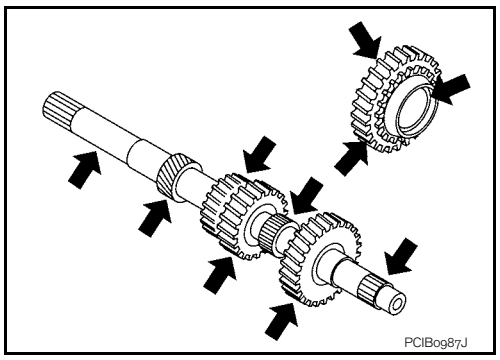
Inspection

INFOID:0000000001070452

INPUT SHAFT AND GEAR

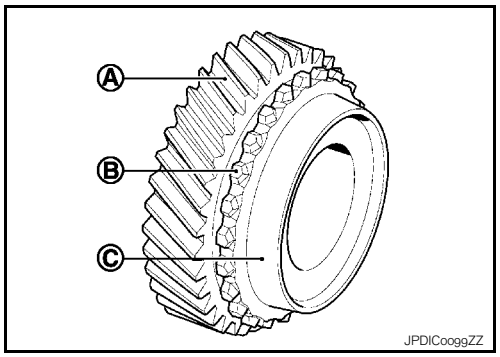
Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.



NOTE:
The inspection focuses mainly on the appearance of the teeth, especially in terms of claw chamfers.

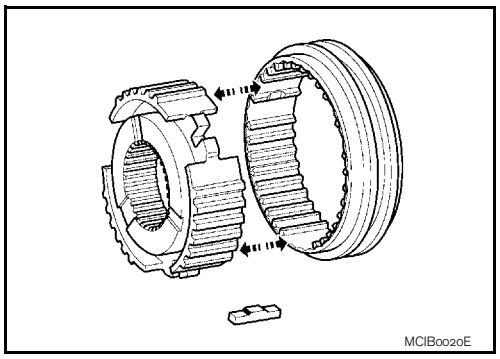
- Check that the teeth (A) are not broken or chipped.
- Check that the claws (B) are not broken, chipped or worn.
- Check that the cone (C) shows no scratches or blueness.



SYNCHRONIZER

Synchronizer Hub and Coupling Sleeve

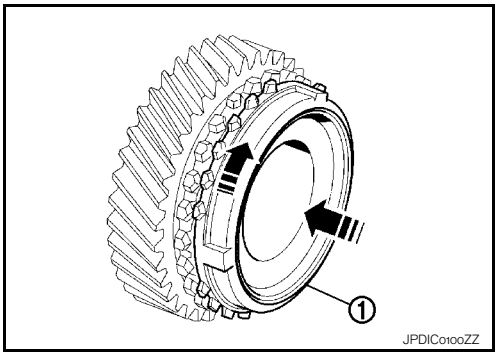
- Make sure the coupling sleeve turns smoothly in the synchronizer hub.
- Check that the springs or insert keys are in good condition.



Baulk Ring

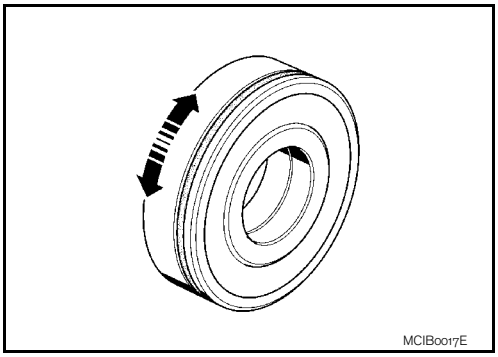
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Check that the grooves and ridges on the ring are not worn or damaged. Otherwise, replace the baulk ring.
- Check that put the baulk ring onto the gear cone.
- Check that rotate the baulk ring while applying force in the direction of the cone (1).
- Check that the baulk ring should lock against the cone.



BEARING

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



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MAINSHAFT AND GEAR

Exploded View

INFOID:0000000001070453

Refer to TM-25, "Exploded View".

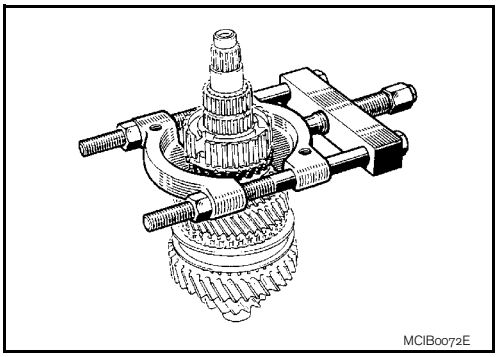
Disassembly

INFOID:0000000001070454

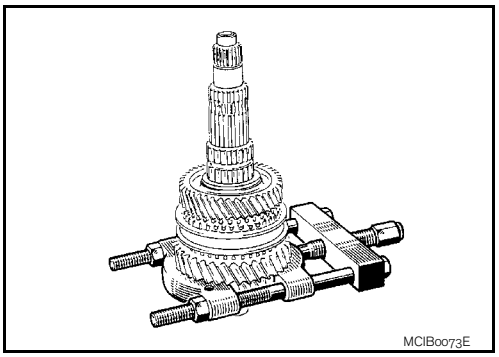
CAUTION:
- **Set mainshaft on the vise with back plate and remove gears.**
- **Disassemble gear components putting matching marks on the parts that do not affect any functions.**

NOTE:
The the parts below underneath the 2nd, 3rd, and 4th main gears are fitted tightened. They will be systematically replaced during assemble.
- 1st inner baulk ring
- 1st synchronizer cone
- 1st outer baulk ring
- 2nd inner baulk ring
- 2nd synchronizer cone
- 2nd outer baulk ring

1. Remove the 3rd main gear and 3rd-4th synchronizer hub with the press, resting underneath the 3rd main gear claw teeth.
2. Remove needle bearing and thrust washer.


MCIB0072E

3. Remove the 1st and 2nd main gears and 1st-2nd synchronizer assembly with the press, resting underneath the 1st main gear.
4. Remove mainshaft front bearing inner race from mainshaft using a suitable puller.


MCIB0073E

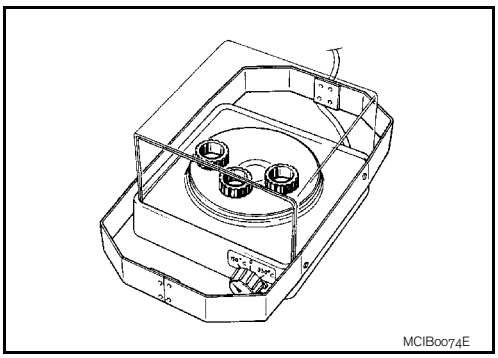
Assembly

INFOID:0000000001070455

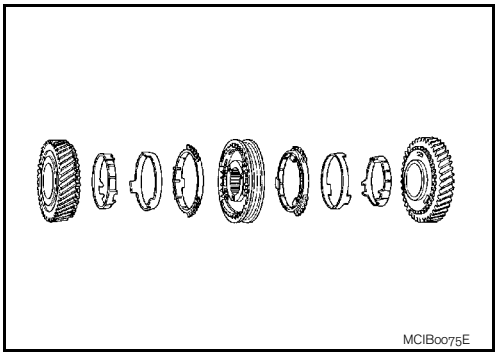
CAUTION:
- **When replacing the parts below, adjust mainshaft rear bearing preload. Refer to TM-39, "Adjustment".**
- **Mainshaft front bearing outer race**
- **Mainshaft front bearing inner race**
- **Mainshaft rear bearing inner race**
- **Mainshaft rear bearing outer race**
- **Clutch housing**
- **Transaxle case**
- **Mainshaft**

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- **Place the new parts below on the hot plate. Heat them for 15 minutes with a thermostat setting of 150°C (302°F). The hot plate with a setting of 150°C (302°F) should be used for assemble.**
- **1st inner baulk ring**
- **1st synchronizer cone**
- **1st outer baulk ring**
- **2nd inner baulk ring**
- **2nd synchronizer cone**
- **2nd outer baulk ring**


MCIB0074E

- **Remove the parts below from the hot plate, using pliers. And use a suitable tube with an internal diameter of 33 mm (1.30 in) to fit it on the mainshaft until it is resting on the synchronizer hub.**
- **1st inner baulk ring**
- **1st synchronizer cone**
- **1st outer baulk ring**
- **2nd inner baulk ring**
- **2nd synchronizer cone**
- **2nd outer baulk ring**


MCIB0075E

1. Install mainshaft front bearing inner race to mainshaft using a suitable drift.
   CAUTION:
   Replace mainshaft front bearing inner race and mainshaft front bearing outer race as a set.
2. Install 1st main gear to mainshaft using a suitable drift.
3. Apply gear oil to 1st inner baulk ring, 1st synchronizer cone, 1st outer baulk ring, 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring.
   CAUTION:
   - **Replace 1st inner baulk ring, 1st synchronizer cone, and 1st outer baulk ring as a set.**
   - **Replace 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring as a set.**
4. Install 1st-2nd synchronizer hub assembly to mainshaft using a suitable drift.
   CAUTION:
   Replace 1st-2nd synchronizer hub and 1st-2nd coupling sleeve as a set.
5. Install needle bearing, 2nd main gear, and thrust washer to mainshaft.
6. Install needle bearing and 3rd main gear to mainshaft.
7. Apply gear oil to 3rd baulk ring and then install it to mainshaft.
8. Install 3rd-4th synchronizer hub to mainshaft using a suitable drift.

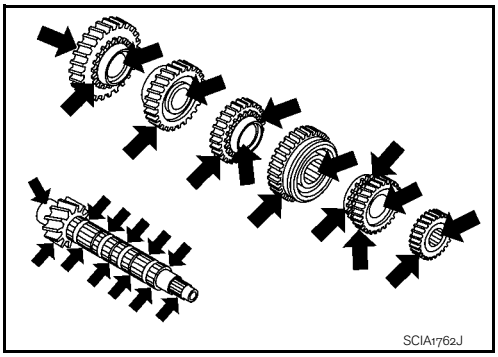
Inspection

INFOID:0000000001070456

MAINSHAFT AND GEAR

Check items below. If necessary, replace them with new ones.

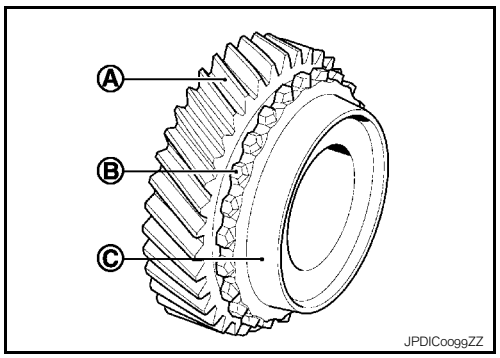
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.


SCIA1762J

NOTE:

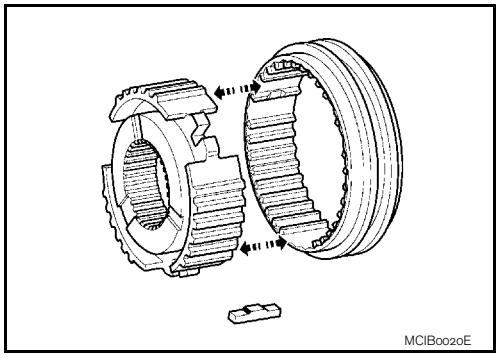
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The inspection focuses mainly on the appearance of the teeth, especially in terms of claw chamfers.
- Check that the teeth (A) are not broken or chipped.
- Check that the claws (B) are not broken, chipped or worn.
- Check that the cone (C) shows no scratches or blueness.



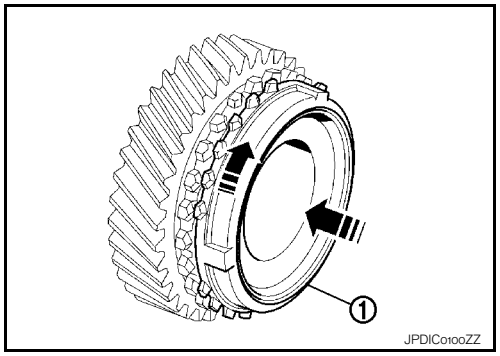
SYNCHRONIZER

Synchronizer Hub and Coupling Sleeve
- Make sure the coupling sleeve turns smoothly in the synchronizer hub.
- Check that the springs or insert keys are in good condition.
- The synchronizer hub teeth and the claws should not be chipped or excessively worn.
- Also ensure that there are no signs of grating or abnormal wear on the surfaces of the coupling sleeves or the inner walls of the synchronizer hubs.
- It is advisable to mark the position of the coupling sleeves in relation to the hub.



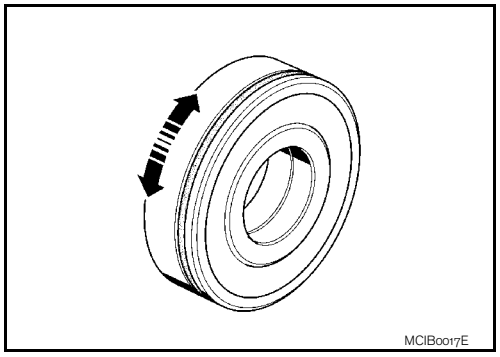
Baulk Ring

Check that the grooves and ridges on the ring are not worn or damaged. Otherwise, replace the baulk ring.
- Check that put the baulk ring onto the gear cone.
- Check that rotate the baulk ring while applying force in the direction of the cone (1).
- Check that the baulk ring should lock against the cone.



BEARING

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



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REVERSE IDLER SHAFT AND GEAR

Exploded View

INFOID:0000000001070457

Refer to TM-25, "Exploded View".

Disassembly

INFOID:0000000001070458

Refer to TM-29, "Disassembly" for disassembly procedure.

Assembly

INFOID:0000000001070459

Refer to TM-34, "Assembly" for assembly procedure.

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FINAL DRIVE

Exploded View

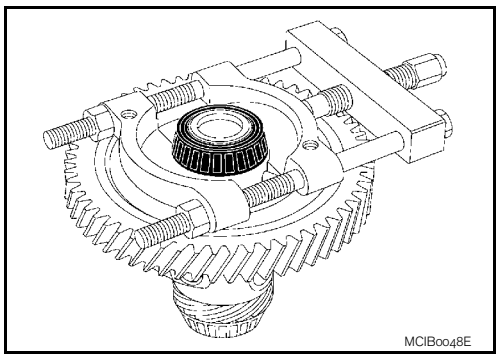
INFOID:0000000001070460

Refer to TM-25, "Exploded View".

Disassembly

INFOID:0000000001070461

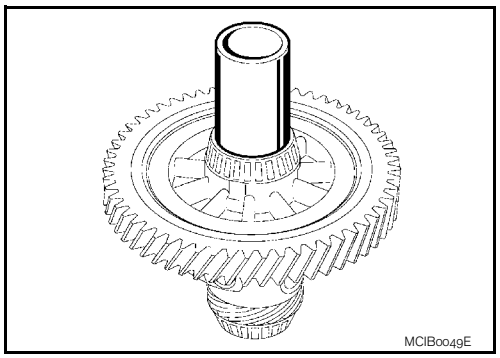
1. Remove differential side bearing inner races using a suitable puller.
2. Remove lock ring to differential case.
3. Remove pinion mate shaft, pinion mate gears, side gears, and thrust washer to differential case.



Assembly

INFOID:0000000001070462

Note the following, and assemble in the reverse order of disassembly.
- Install differential side bearing inner races using a suitable tube.

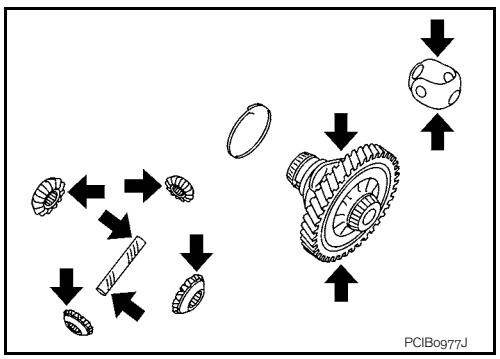


Inspection

INFOID:0000000001070463

GEAR, WASHER, SHAFT AND CASE

Check side gears, thrust washer, pinion mate shaft, pinion mate gears, lock ring and differential case. If necessary, replace with new one.



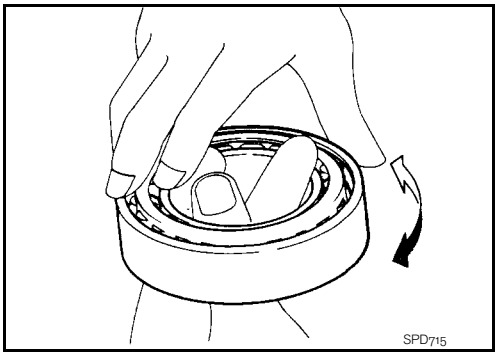
BEARING

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Check for bearing damage and rough rotation. If necessary, replace with new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.



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SHIFT FORK AND FORK ROD

Exploded View

INFOID:0000000001070464

Refer to TM-25, "Exploded View".

Disassembly

INFOID:0000000001070465

Refer to TM-29, "Disassembly" for disassembly procedure.

Assembly

INFOID:0000000001070466

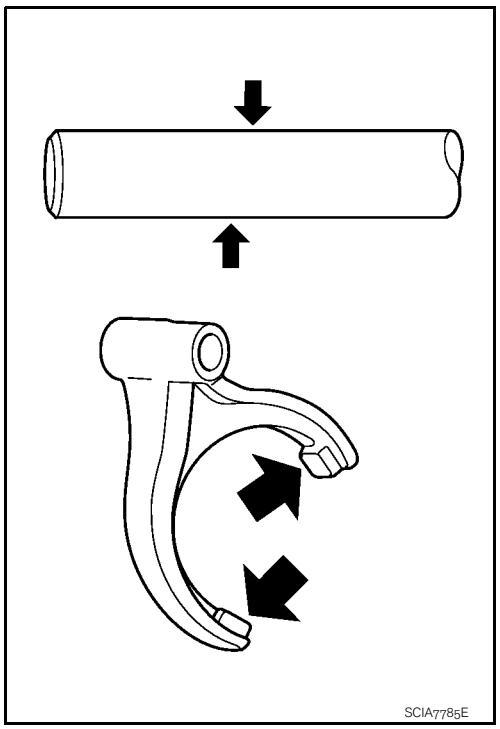
Refer to TM-34, "Assembly" for assembly procedure.

Inspection

INFOID:0000000001070467

FORK ROD AND SHIFT FORK

Check contact surface and sliding surface of fork rod and shift fork for wear, damage, and bend. Replace if necessary.



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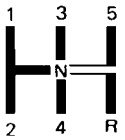
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000001042519

TRANSAXLE

Engine type			HR16DE
Transaxle model			RS5F92R
Model code number			JD00A
Number of speeds			5
Synchromesh type			Warner
Shift pattern			 SCIA0821E
Gear ratio	1st		3.7273
	2nd		2.0476
	3rd		1.3929
	4th		1.0968
	5th		0.8919
	Reverse		3.5455
	Final gear		4.5000
Number of teeth	Input gear	1st	11
		2nd	21
		3rd	28
		4th	31
		5th	37
		Reverse	11
	Main gear	1st	41
		2nd	43
		3rd	39
		4th	34
		5th	33
		Reverse	39
	Reverse idler gear		26
Oil capacity		ℓ (Imp pt)	Approx. 2.3 (4)
Remarks	Reverse synchronizer		Installed
	Double-cone synchronizer		1st and 2nd

FINAL GEAR

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Engine type		HR16DE
Transaxle model		RS5F92R
Model code number		JD00A
Final gear ratio		4.5000
Number of teeth	Final gear/Pinion	63/14
	Side gear/Pinion mate gear	13/9

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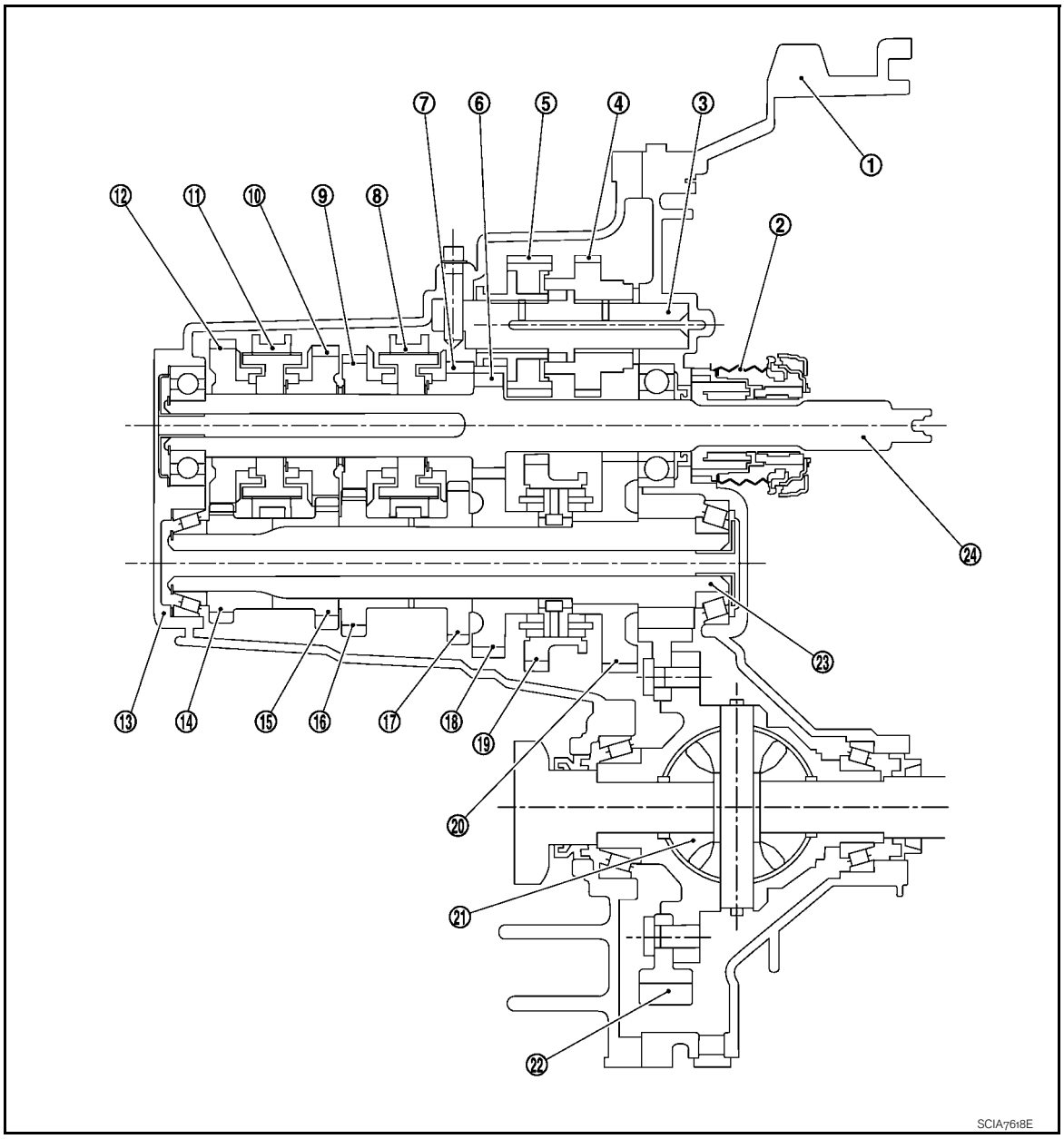
FUNCTION DIAGNOSIS

M/T SYSTEM

System Diagram

INFOID:0000000001070314

CROSS-SECTIONAL VIEW



1. Clutch housing
2. CSC (Concentric Slave Cylinder)
3. Reverse idler shaft
4. Reverse input gear
5. Reverse output gear
6. 2nd input gear
7. 3rd input gear
8. 3rd-4th synchronizer assembly
9. 4th input gear
10. 5th input gear
11. 5th-6th synchronizer assembly
12. 6th input gear
13. Transaxle case
14. 6th main gear
15. 5th main gear
16. 4th main gear
17. 3rd main gear
18. 2nd main gear
19. 1st-2nd synchronizer assembly
20. 1st main gear
21. Differential assembly
22. Final gear
23. Mainshaft
24. Input shaft

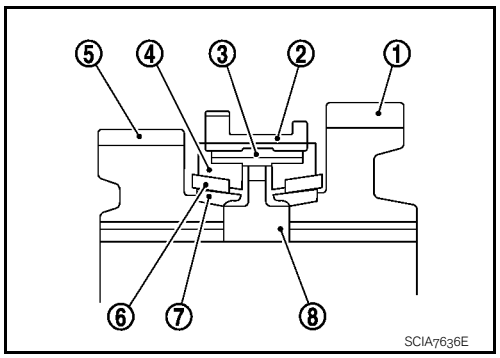
System Description

INFOID:0000000001070315

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TRIPLE-CONE SYNCHRONIZER

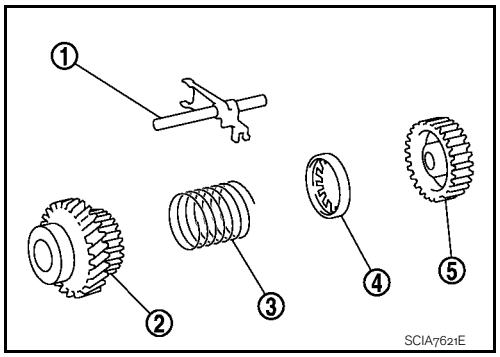
Triple-cone synchronizer is used for the 1st and the 2nd gears to reduce operating force of the control lever.



1 : 1st main gear
2 : 1st-2nd coupling sleeve
3 : Insert key
4 : Outer baulk ring
5 : 2nd main gear
6 : Synchronizer cone
7 : Inner baulk ring
8 : 1st-2nd synchronizer hub

REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

Reverse gear assembly consists of reverse input gear, return spring, reverse baulk ring and reverse output gear. When the control lever is shifted to the reverse position, the construction allows smooth shift operation by stopping the reverse idler shaft rotation by frictional force of synchronizer.



1 : Reverse fork rod
2 : Reverse output gear
3 : Return spring
4 : Reverse baulk ring
5 : Reverse input gear

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COMPONENT DIAGNOSIS

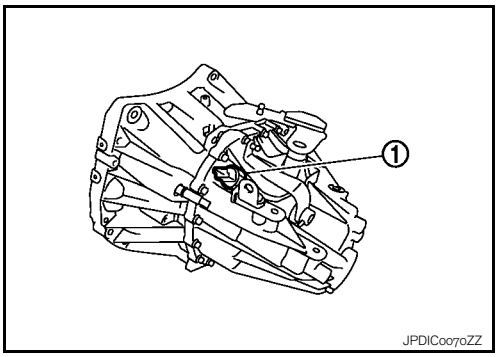
POSITION SWITCH

BACK-UP LAMP SWITCH

BACK-UP LAMP SWITCH : Component Parts Location

INFOID:0000000001070316

1 : Position switch



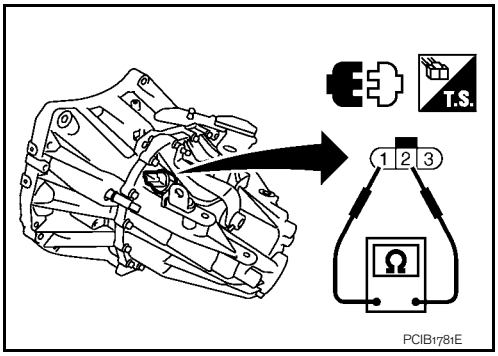
BACK-UP LAMP SWITCH : Component Inspection

INFOID:0000000001070317

1.CHECK BACK-UP LAMP SWITCH

Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
1 – 2	Reverse	Existed
	Except reverse	Not existed



Is the inspection result normal?

YES >> INSPECTION END

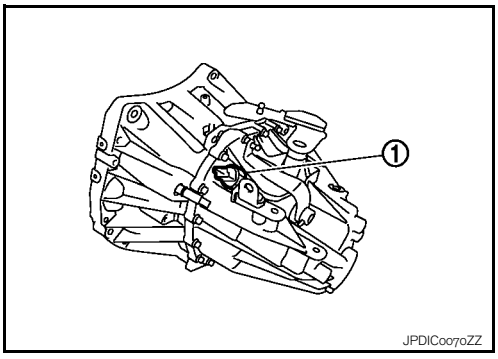
NO >> Replace position switch. Refer to TM-71, "Exploded View".

PARK/NEUTRAL POSITION (PNP) SWITCH

PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location

INFOID:0000000001070318

1 : Position switch



PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection

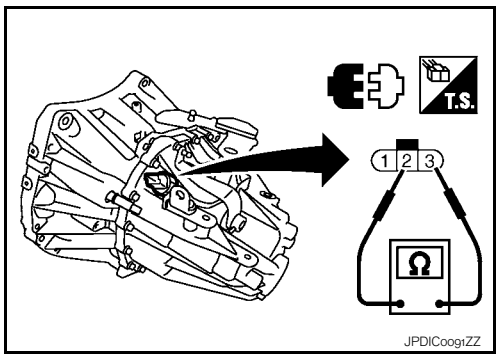
INFOID:0000000001070319

1.CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

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Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
2 – 3	Neutral	Existed
	Except neutral	Not existed



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace position switch. Refer to TM-71, "Exploded View".

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SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001070320

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-71			TM-71			TM-63	TM-71	TM-71			
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	O-RING (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	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	2						
	Hard to shift or will not shift		1	1				2				3	3
	Jumps out of gear							1	2	2			

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PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Manual Transaxle

INFOID:0000000001070321

CAUTION:

- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never reuse transaxle gear oil, once it has been drained.**
- **Check oil level or replace gear oil with vehicle on level surface.**
- **During removal or installation, keep inside of transaxle 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.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.**
- **Never damage sliding surfaces and mating surfaces.**

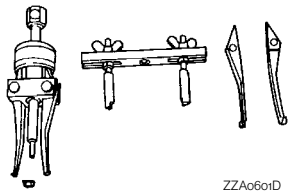
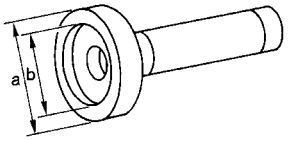
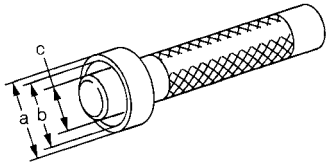
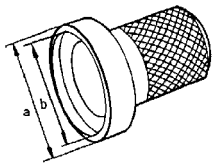
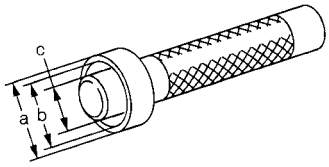
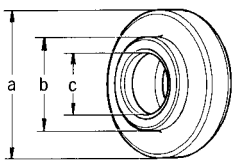
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PREPARATION

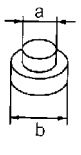
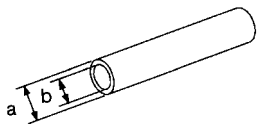
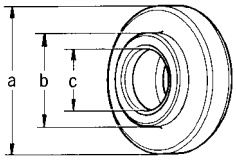
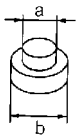
PREPARATION

Special Service Tools

INFOID:0000000001070322

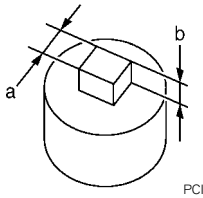
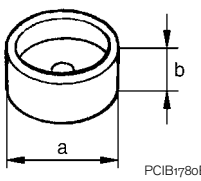
Tool number Tool name	Description
KV381054S0 Puller  ZZA0601D	Removing mainshaft front bearing outer race
KV38100200 Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.  ZZA1143D	• Installing mainshaft front bearing outer race • Installing mainshaft rear bearing outer race • Installing differential side bearing outer race (clutch housing side)
ST33220000 Drift a: 37 mm (1.46 in) dia. b: 31 mm (1.22 in) dia. c: 22 mm (0.87 in) dia.  ZZA1046D	Installing input shaft oil seal
ST33400001 Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  ZZA0814D	Installing differential side bearing outer race (transaxle case side)
KV38100300 Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia.  ZZA1046D	Installing differential side oil seal
ST36720030 Drift a: 70 mm (2.76 in) dia. b: 40 mm (1.57 in) dia. c: 29 mm (1.14 in) dia.  ZZA0978D	• Installing input shaft rear bearing • Installing mainshaft front bearing inner race

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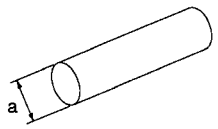
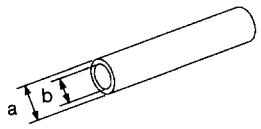
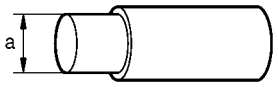
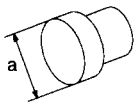
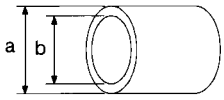
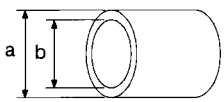
Tool number Tool name	Description
ST33052000 Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.  ZZA0969D	• Removing mainshaft rear bearing inner race • Removing 6th main gear • Removing 5th main gear • Removing 4th main gear • Removing 1st main gear • Removing 1st-2nd synchronizer assembly • Removing 2nd main gear • Removing bushing • Removing 3rd main gear • Removing mainshaft front bearing inner race
KV32102700 Drift a: 54 mm (2.13 in) dia. b: 32 mm (1.26 in) dia.  S-NT065	• Installing bushing • Installing 2nd main gear • Installing 3rd main gear • Installing 4th main gear • Installing 5th main gear • Installing 6th main gear
ST30901000 Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia.  ZZA0978D	Installing mainshaft rear bearing inner race
ST33061000 Drift a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia.  ZZA0969D	Removing differential side bearing inner race (clutch housing side)

Commercial Service Tools

INFOID:0000000001070323

Tool name	Description
Socket a: 8 mm (0.31 in) b: 5 mm (0.20 in)  PCIB1776E	Removing and installing drain plug
Spacer a: 25 mm (0.98 in) dia. b: 25 mm (0.98 in)  PCIB1780E	Removing mainshaft front bearing outer race

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Tool name	Description
Drift a: 17 mm (0.67 in) dia.  S-NT063	• Installing bushing • Installing shifter lever oil seal • Installing selector lever oil seal
Drift a: 35 mm (1.38 in) dia. b: 25 mm (0.98 in) dia.  S-NT065	Installing input shaft front bearing
Drift a: 24 mm (0.94 in) dia.  PCIB1779E	Removing input shaft rear bearing
Drift a: 43 mm (1.69 in) dia.  NT109	• Removing differential side bearing inner race (transaxle case side) • Installing input shaft rear bearing
Drift a: 45 mm (1.77 in) dia. b: 39 mm (1.54 in) dia.  S-NT474	Installing differential side bearing inner race (clutch housing side)
Drift a: 52 mm (2.05 in) dia. b: 45 mm (1.77 in) dia.  S-NT474	Installing differential side bearing inner race (transaxle case side)

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ON-VEHICLE MAINTENANCE

GEAR OIL

Exploded View

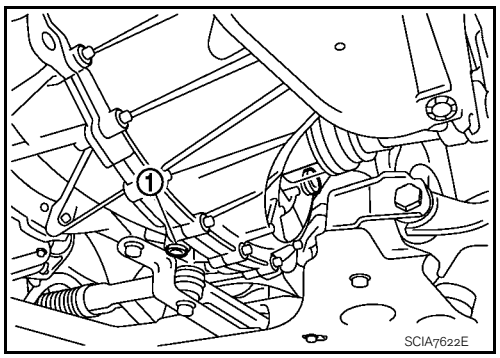
INFOID:0000000001070324

Refer to TM-71, "Exploded View".

Draining

INFOID:0000000001070325

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and then drain gear oil.
3. Set a new gasket on drain plug (1) and install it to clutch housing. Tighten drain plug to the specified torque.
   CAUTION:
   Never reuse gasket.



Refilling

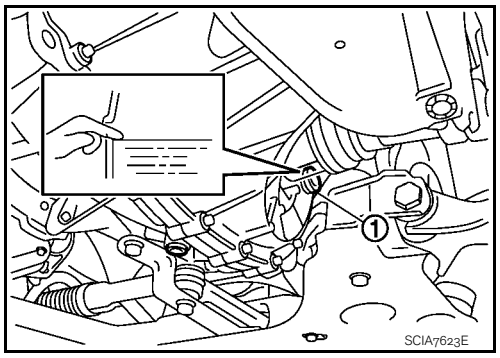
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1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified limit at filler plug hole as shown.

   Oil grade and viscosity : **Refer to MA-21, "Fluids and Lubricants".**

   Oil capacity : **Refer to TM-103, "General Specification".**

2. After refilling gear oil, check oil level. Refer to TM-61, "Inspection".
3. Set a new gasket on filler plug (1) and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
4. Tighten filler plug to the specified torque.



Inspection

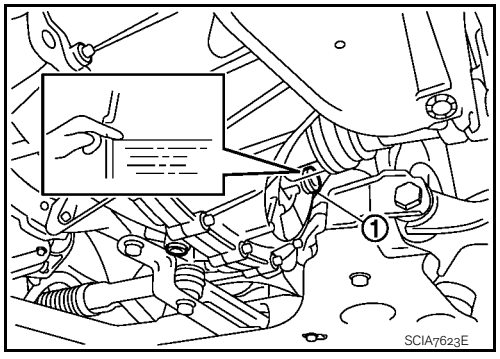
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LEAKAGE

Make sure that gear oil is not leaking from transaxle or around it.

LEVEL

1. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Never start engine while checking oil level.
2. Set a new gasket on filler plug (1) and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
3. Tighten filler plug to the specified torque.



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ON-VEHICLE REPAIR

SIDE OIL SEAL

Exploded View

INFOID:0000000001070328

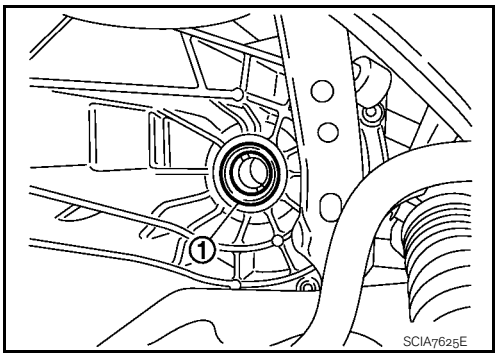
Refer to TM-71, "Exploded View".

Removal and Installation

INFOID:0000000001070329

REMOVAL

1. Remove front drive shafts. Refer to FAX-25, "MR20DE MODELS : Removal and Installation" (MR20DE) or FAX-33, "K9K MODELS : Removal and Installation" (K9K).
2. Remove differential side oil seals (1) using a suitable tool.
   CAUTION:
   Never damage transaxle case and clutch housing.



INSTALLATION

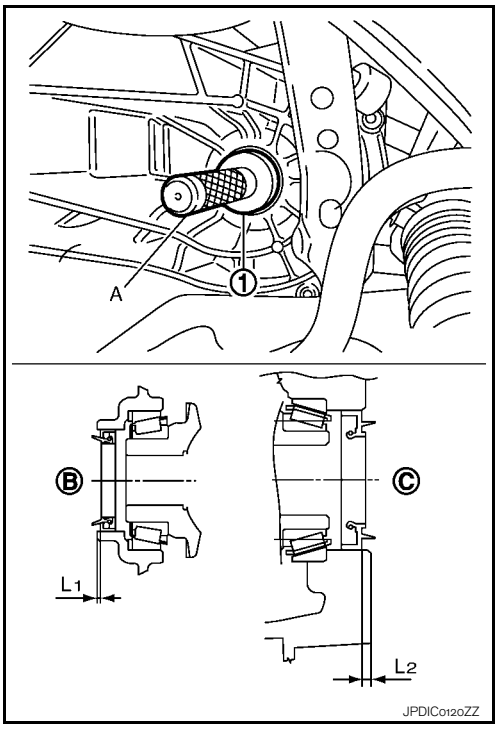
Note the following, and install in the reverse order of removal.

- Install differential side oil seals (1) to clutch housing and transaxle case using the drift (A) [SST: KV38100300].

  B : Transaxle case side
  C : Clutch housing side

  Dimension “L_1” : 1.2 - 1.8 mm (0.047 - 0.071 in)
  Dimension “L_2” : 2.7 - 3.3 mm (0.106 - 0.130 in)

  CAUTION:
  - **Never reuse differential side oil seal.**
  - **When installing, never incline differential side oil seal.**
  - **Never damage clutch housing and transaxle case.**
- Check oil level and oil leakage after installation. Refer to TM-61, "Inspection".

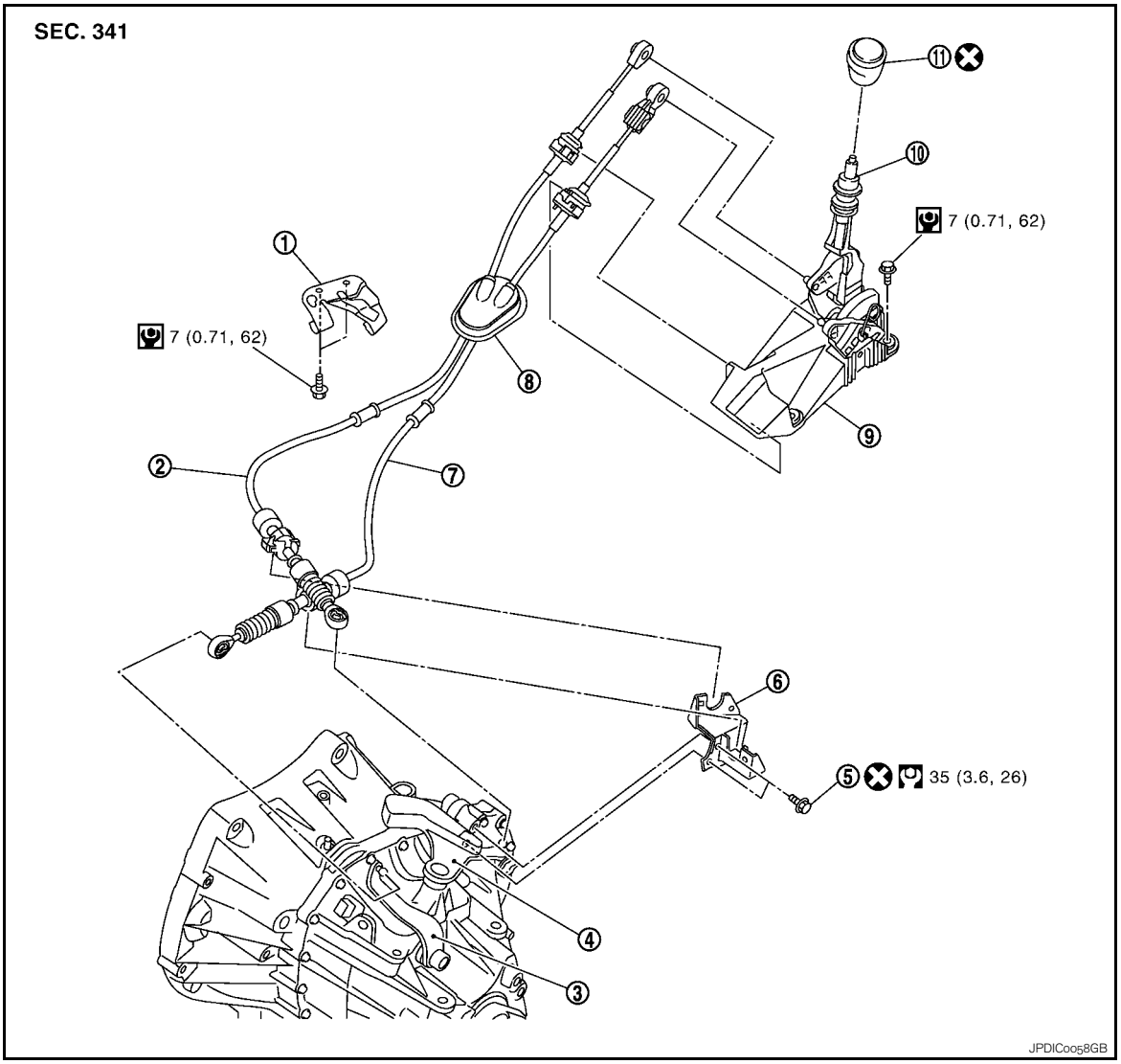


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CONTROL LINKAGE

Exploded View

INFOID:0000000001070330



1. Bracket
2. Shift cable
3. Selector lever
4. Shifter lever
5. Tapping bolt
6. Cable mounting bracket
7. Select cable
8. Grommet
9. Control device assembly
10. Control lever
11. Control lever knob

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

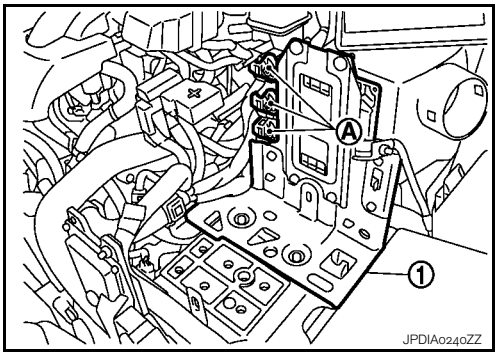
Removal and Installation

INFOID:0000000001070368

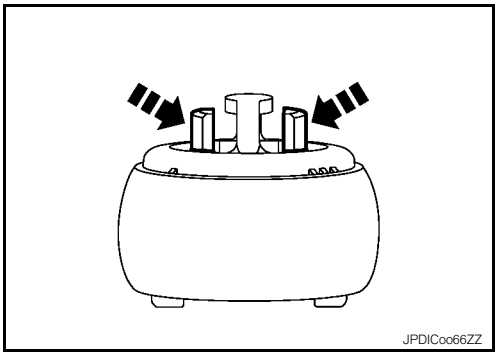
REMOVAL

1. Remove the air cleaner case and air duct (inlet) or air ducts. Refer to EM-144, "Removal and Installation" (MR20DE), EM-265, "Removal and Installation" (K9K).
2. Remove the battery. Refer to PG-118, "Removal and Installation".

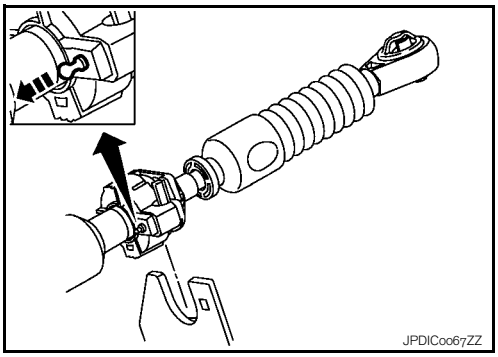
3. Disconnect connectors (A) and then remove bracket (1).



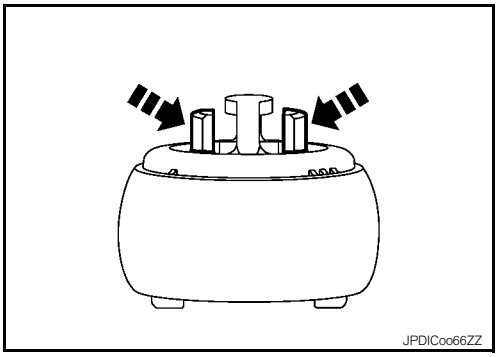
4. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the selector lever.
5. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the shifter lever.



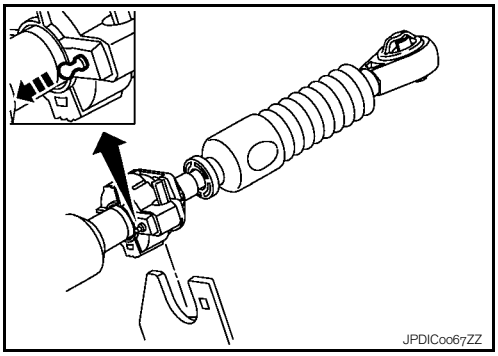
6. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the cable mounting bracket.
7. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the cable mounting bracket.
8. Remove the control lever knob.
9. Remove console finisher assembly and the center console assembly. Refer to IP-18, "Removal and Installation".
10. Shift the control lever to the neutral position.



11. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
12. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.



13. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
14. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.
15. Remove the control device assembly.
16. Remove the heat plate.
17. Remove the bracket.



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18. Remove the grommet and then remove the shift cable and select cable from the vehicle.

INSTALLATION

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

- Shift the control lever to the neutral position.
- Securely assemble each cable and the selector lever and shifter lever.
- Securely assemble each cable and the cable mounting bracket.
- Securely assemble each cable and the control device assembly.
- Make sure that the claws of grommet are in contact with the floor.
- Be careful about the installation direction and push the control lever knob into the control lever.

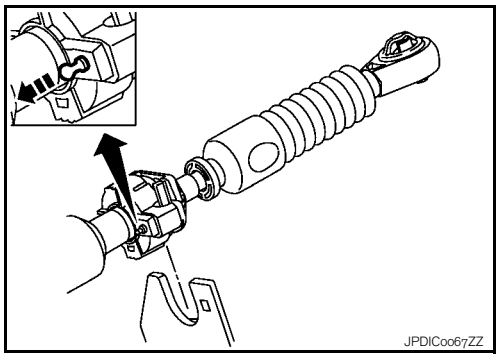
CAUTION:
Never reuse control lever knob.

- Tapping work for tapping bolt is not applied to new clutch housing. Do not perform tapping by other than screwing tapping bolt because tapping is formed by screwing tapping bolt into clutch housing.

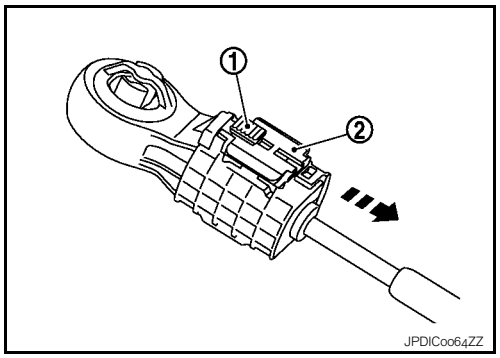
CAUTION:
Never reuse tapping bolt.

Install the select cable (the control device assembly side) with the following procedure.

1. While pulling the lock of the select cable in the direction of the arrow shown in the figure, install the select cable to the control device assembly.



2. Slide the lock (1) of the select cable in the direction of the arrow as shown in the figure to pull up the stopper (2) of the select cable.
3. Install the end of the select cable to the pin of the control device assembly.

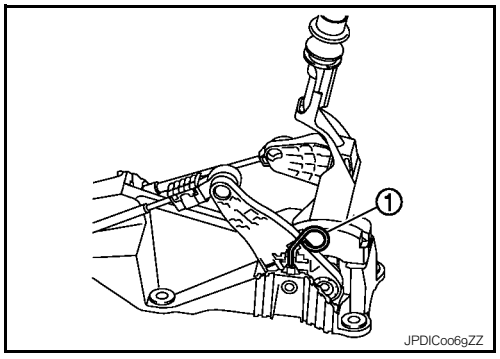


4. Install the lever stopper pin (1) or a pin [3 mm (0.12 in) dia.] to the control device assembly.

CAUTION:
Select cable cannot be adjusted accurately without a use of a lever stopper pin or a pin [3 mm (0.12 in) dia.].

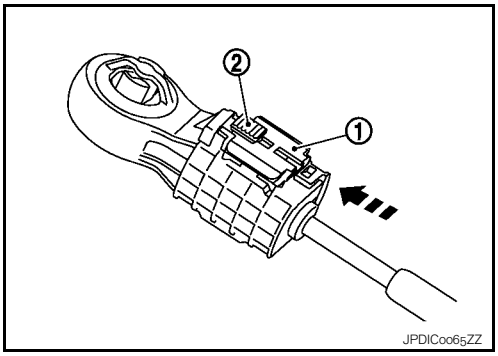
NOTE:
A lever stopper pin is not included in control device assembly. Therefore, if the control device assembly is not replaced, prepare a pin [3 mm (0.12 in) dia.].

5. Check that the control lever does not move in the direction of the select. If it moves, repeat step 3.
6. Shift the control lever to 4th gear position.



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7. With the stopper (1) of the select cable pressed into all the way, slide lock (2) of the select cable all the way in the direction of the arrow.
8. Remove the lever stopper pin or a pin [3 mm (0.12 in) dia.] from the control device assembly.
9. Shift the control lever to each gear position to check that there is no bindings. If any, repeat step 3.



Inspection

INFOID:0000000001070332

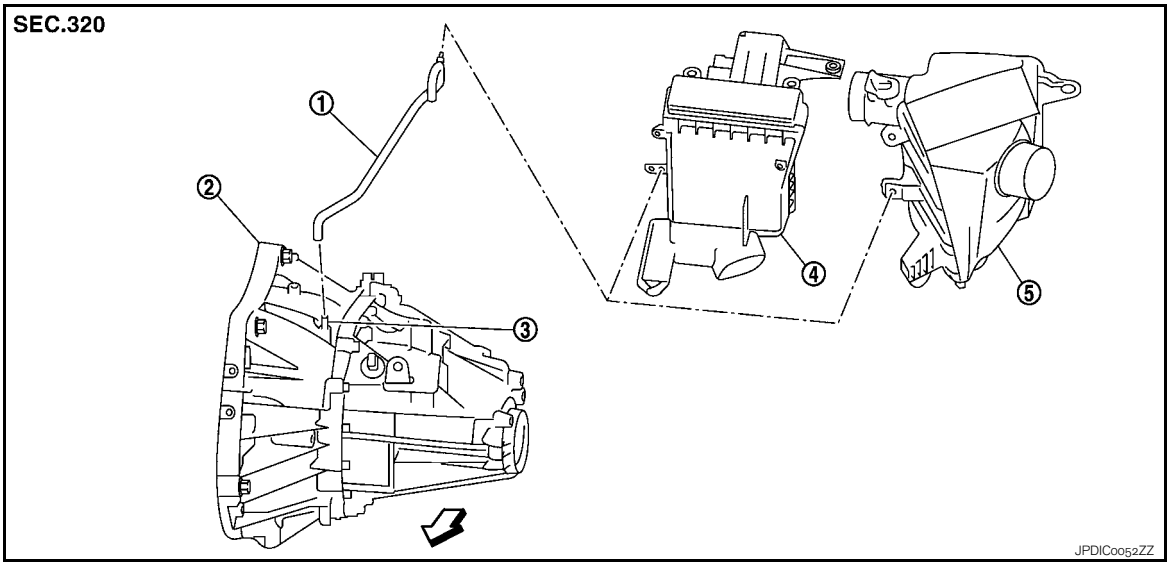
After installing, confirm the following items:
- When the control lever is shifted to 1st-2nd side and 5th-6th side, confirm the control lever returns to neutral position smoothly.
- When the control lever is shifted to each position, make sure there is no binding or disconnection in each boot.

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AIR BREATHER HOSE

Exploded View

INFOID:0000000001070333



1. Air breather hose
2. Transaxle assembly
3. Two way connector
4. Air cleaner case (MR20DE)
5. Air cleaner case (K9K)

⇦: Vehicle front

Removal and Installation

INFOID:0000000001070334

REMOVAL

Refer to the figure for removal procedure.

CAUTION:

When removing air breather hose, be sure to hold two way connector securely.

INSTALLATION

Refer to the figure for installation procedure.

- When installing air breather hose on two way connector, aim paint mark face toward the vehicle front.
- When installing air breather hose on two way connector, push it until it hits transaxle case.
- When installing air breather hose to air cleaner case, make sure that clip are fully inserted.

CAUTION:

Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

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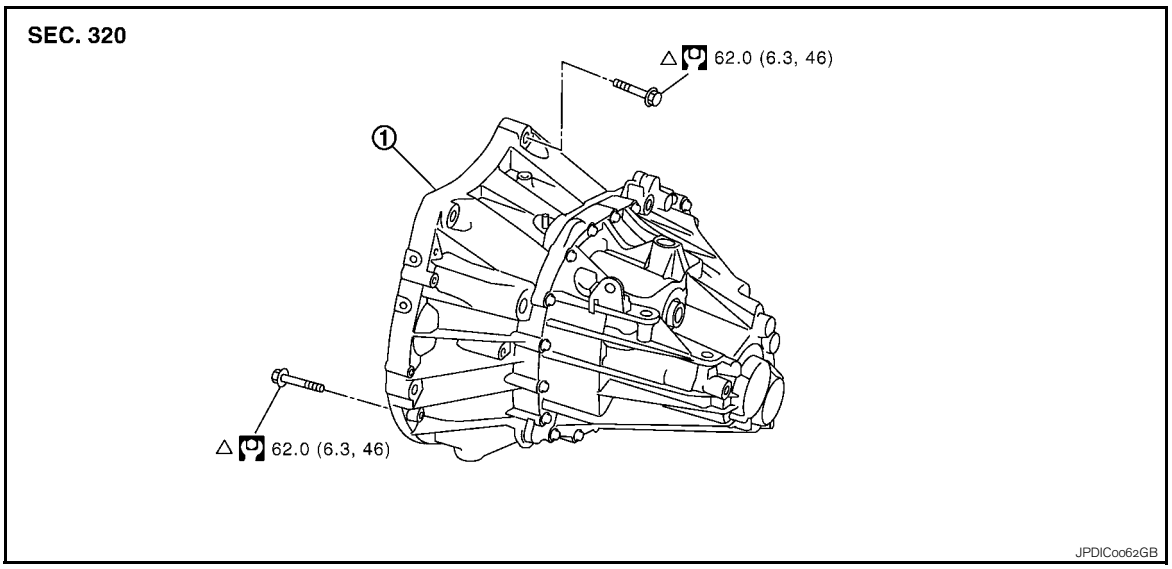
REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001070335

MR20DE



1. Transaxle assembly

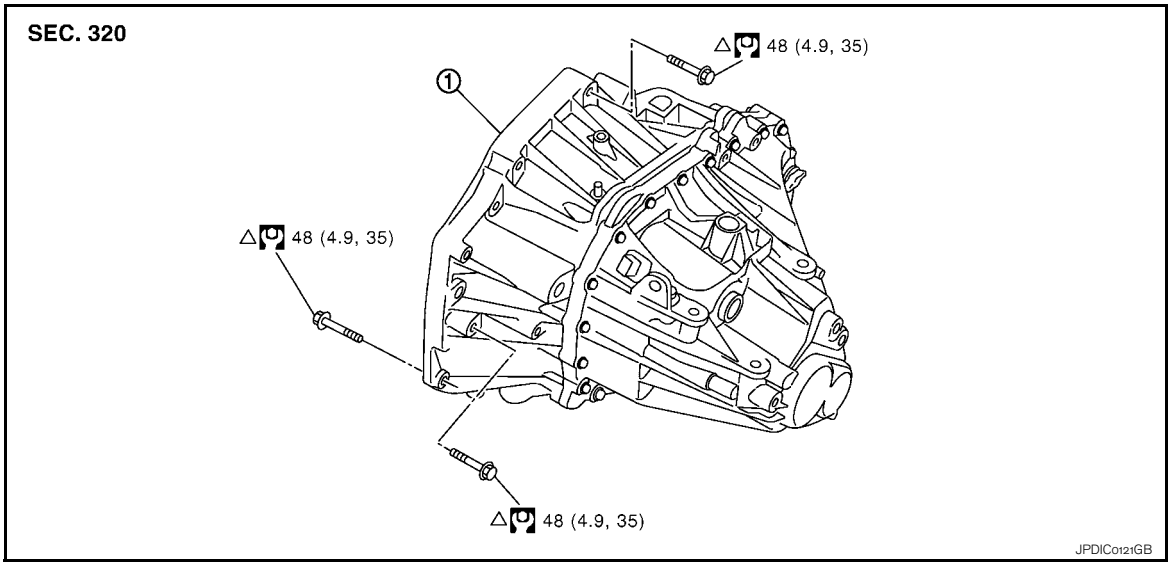
△: For the bolt mounting positions, refer to “INSTALLATION”.

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

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

K9K



1. Transaxle assembly

△: For the bolt mounting positions, refer to “INSTALLATION”.

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

CAUTION:

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If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

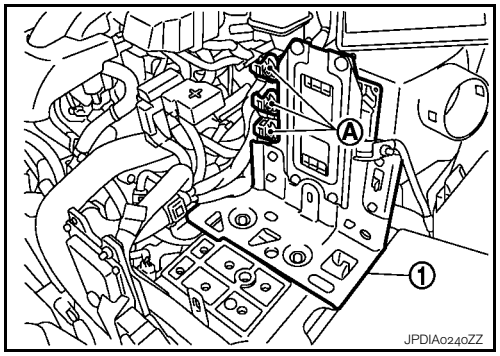
Removal and Installation

INFOID:0000000001070336

CAUTION:
If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-67, "Removal and Installation".
3. Remove air cleaner case and air duct (inlet). Refer to EM-144, "Removal and Installation" (MR20DE) or EM-265, "Removal and Installation" (K9K).
4. Remove battery. Refer to PG-118, "Removal and Installation".
5. Disconnect connectors (A) and then remove bracket (1).
6. Drain clutch fluid and then remove clutch tube from CSC (Concentric Slave Cylinder). Refer to CL-14, "Removal and Installation".
   CAUTION:
   Never depress clutch pedal during removal procedure.
7. Disconnect position switch harness connector.
8. Remove crankshaft position sensor (POS). (For K9K) Refer to EM-280, "Removal and Installation".
   CAUTION:
   - **Handle carefully to avoid dropping and shocks.**
   - **Never disassemble.**
   - **Never allow metal powder to adhere to magnetic part at sensor tip.**
   - **Never place sensors in a location where they are exposed to magnetism.**



9. Disconnect ground cable.
10. Remove wire harnesses from transaxle assembly.
11. Disconnect select cable and shift cable from transaxle assembly. Refer to TM-63, "Removal and Installation".
12. Remove starter motor. Refer to STR-27, "MR20DE MODELS : Removal and Installation" (MR20DE) or STR-20, "K9K MODELS : Removal and Installation" (K9K).
13. Remove engine under cover.
14. Drain gear oil. Refer to TM-61, "Draining".
15. Remove exhaust front tube. Refer to EX-10, "Removal and Installation" (MR20DE) or EX-15, "Removal and Installation" (K9K).
16. Remove front drive shafts. Refer to FAX-25, "MR20DE MODELS : Removal and Installation" (MR20DE) or FAX-33, "K9K MODELS : Removal and Installation" (K9K).
    NOTE:
    Insert a suitable plug into differential side oil seal after removing front drive shaft.
17. Remove rear engine mounting brackets and rear torque rod. (For MR20DE) Refer to EM-195, "M/T : Removal and Installation".
18. Remove transaxle mounting lower brackets and transaxle torque rod. (For K9K) Refer to EM-298, "Removal and Installation".
19. Remove suspension member and suspension member stay. Refer to FSU-17, "Removal and Installation".
20. Set a suitable jack to transaxle assembly and then set a suitable jack to engine assembly.
    CAUTION:
    When setting a suitable jack, be careful so that it does not contact with the switch.
21. Remove transaxle assembly mounting bolts.
22. Remove engine mounting through bolt-securing nut. Refer to EM-195, "M/T : Removal and Installation" (MR20DE) or EM-298, "Removal and Installation" (K9K).

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23. Remove transaxle assembly from the vehicle.
CAUTION:
- **Secure transaxle assembly to a suitable jack while removing it.**
- **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**

24. Remove CSC (Concentric Slave Cylinder). Refer to CL-15, "Removal and Installation".
CAUTION:
If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

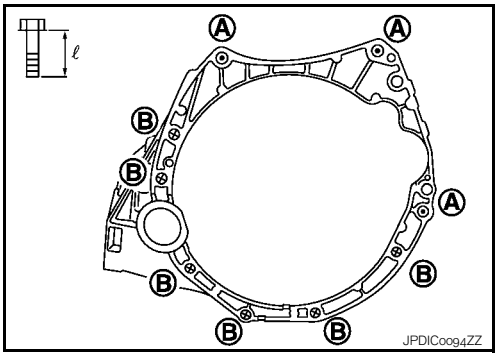
INSTALLATION

Note the following, and install in the reverse order of removal.
- Tighten transaxle assembly mounting bolts to the specified torque. The figure is the view from the engine.

- **MR20DE**

: Transaxle to engine

: Engine to transaxle

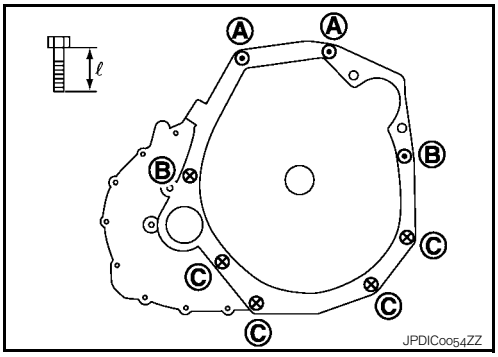


Bolt symbol	A	B
Quantity	3	6
"ℓ" mm (in)	60 (2.36)	50 (1.97)

- **K9K**

: Transaxle to engine

: Engine to transaxle



Bolt symbol	A	B	C
Quantity	2	2	4
"ℓ" mm (in)	50 (1.97)	80 (3.15)	65 (2.56)

CAUTION:
- **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
- **When installing transaxle assembly, never bring input shaft into contact with clutch cover.**
- Refer to CL-15, "Removal and Installation" for CSC (Concentric Slave Cylinder) installation procedure.
- Refer to TM-63, "Removal and Installation" for select cable and shift cable installation procedure.
- Bleed the air from the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".
- After installation, check for oil leakage and oil level. Refer to TM-61, "Inspection".

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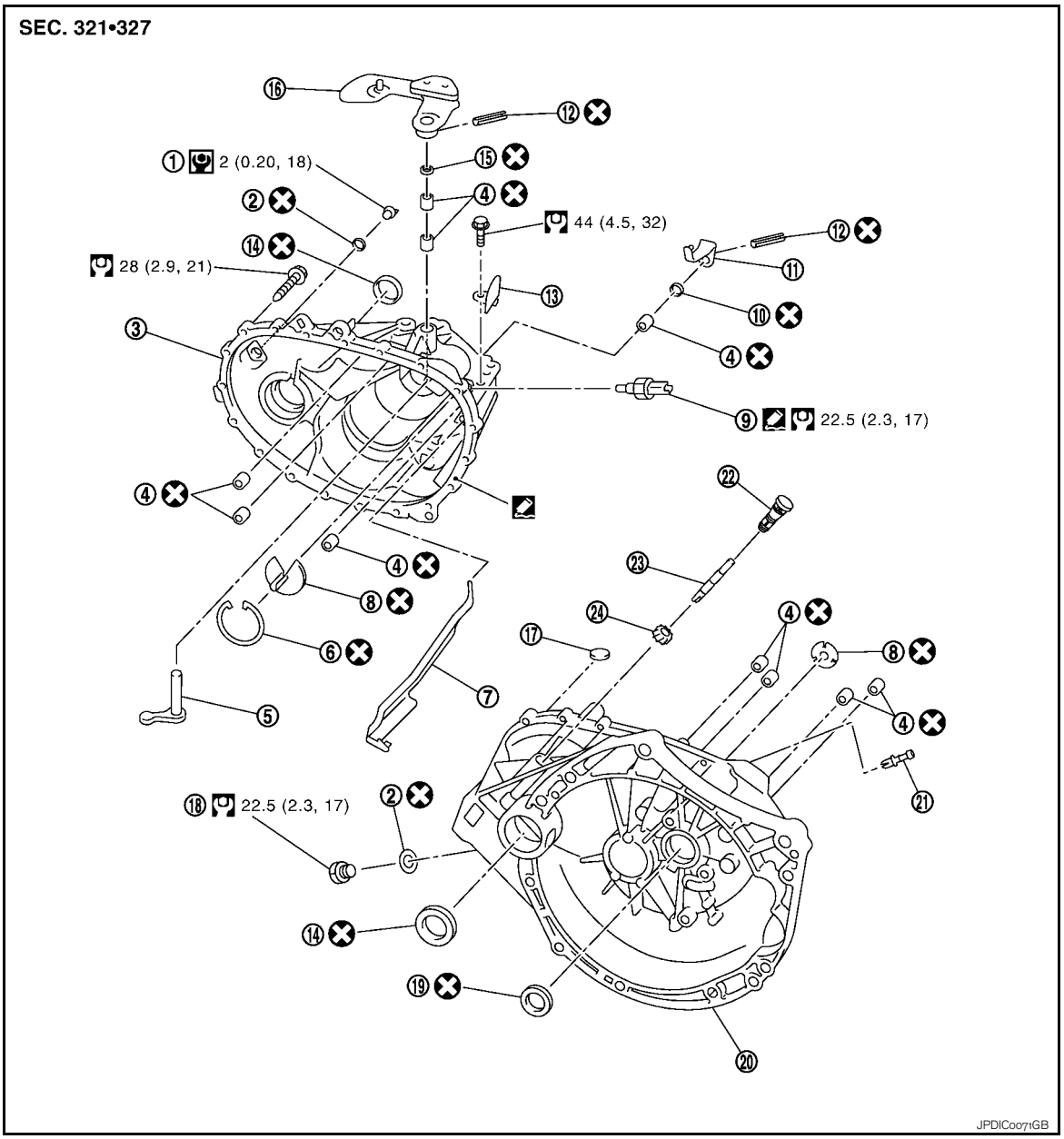
DISASSEMBLY AND ASSEMBLY

TRANSAXLE ASSEMBLY

Exploded View

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CASE AND HOUSING



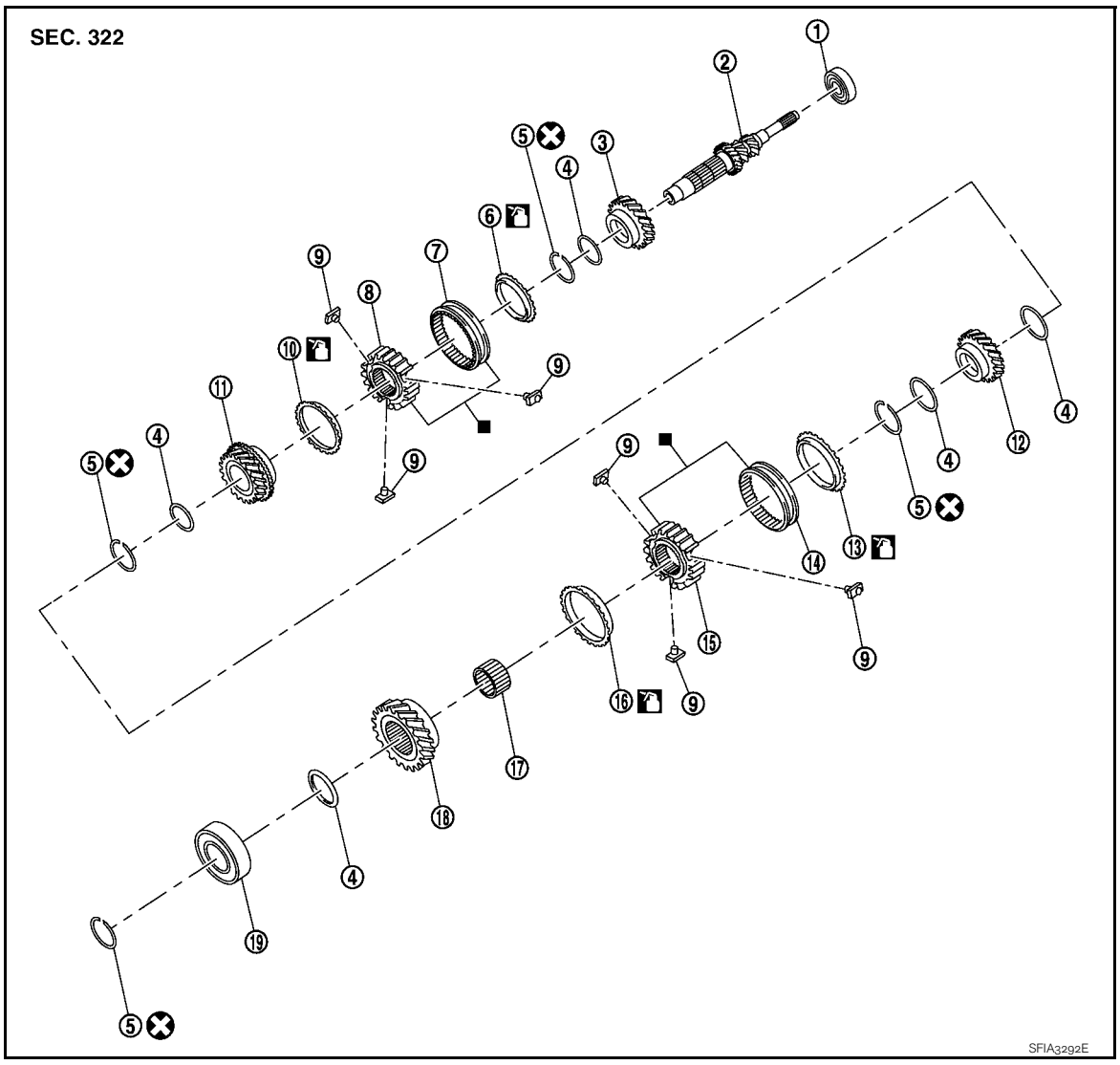
1. Filler plug
2. Gasket
3. Transaxle case
4. Bushing
5. Shift finger
6. Snap ring
7. Oil gutter
8. Oil channel
9. Position switch
10. Shifter lever oil seal
11. Shifter lever
12. Retaining pin
13. Bracket
14. Differential side oil seal
15. Selector lever oil seal
16. Selector lever
17. Magnet
18. Drain plug
19. Input shaft oil seal
20. Clutch housing
21. Two way connector
22. Plug (if equipped)
23. Pinion shaft (if equipped)
24. Pinion gear (if equipped)

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: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

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

SHAFT AND GEAR



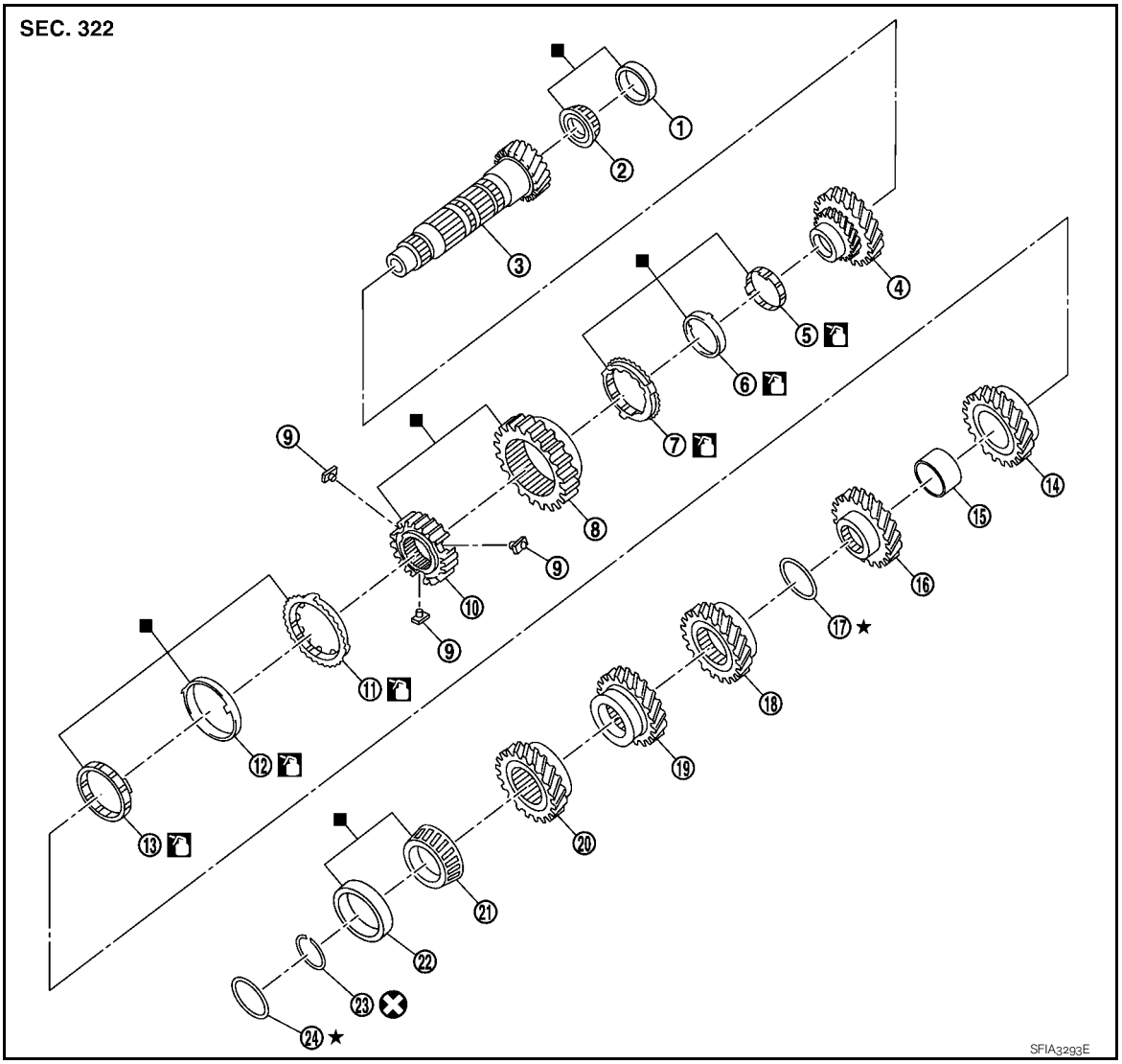
1. Input shaft front bearing
2. Input shaft
3. 3rd input gear
4. Washer
5. Snap ring
6. 3rd baulk ring
7. 3rd-4th coupling sleeve
8. 3rd-4th synchronizer hub
9. Insert key
10. 4th baulk ring
11. 4th input gear
12. 5th input gear
13. 5th baulk ring
14. 5th-6th coupling sleeve
15. 5th-6th synchronizer hub
16. 6th baulk ring
17. Needle bearing
18. 6th input gear
19. Input shaft rear bearing

: Apply gear oil.

: Replace the parts as a set.

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

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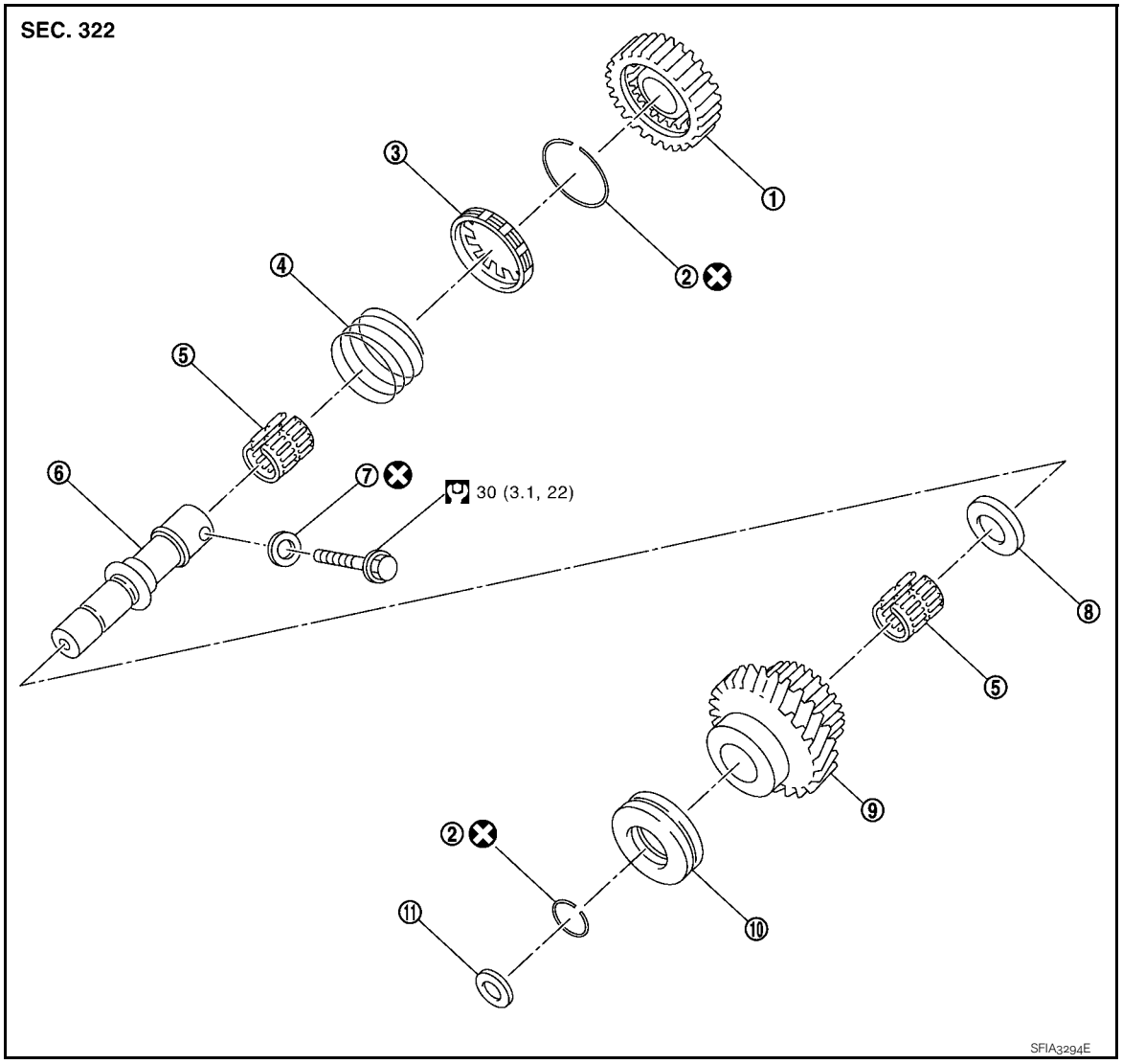
1. Mainshaft front bearing outer race	2. Mainshaft front bearing inner race	3. Mainshaft
4. 1st main gear	5. 1st inner baulk ring	6. 1st synchronizer cone
7. 1st outer baulk ring	8. 1st-2nd coupling sleeve	9. Insert key
10. 1st-2nd synchronizer hub	11. 2nd outer baulk ring	12. 2nd synchronizer cone
13. 2nd inner baulk ring	14. 2nd main gear	15. Bushing
16. 3rd main gear	17. Intermediate adjusting shim	18. 4th main gear
19. 5th main gear	20. 6th main gear	21. Mainshaft rear bearing inner race
22. Mainshaft rear bearing outer race	23. Snap ring	24. Bearing preloading shim

: Apply gear oil.

: Replace the parts as a set.

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

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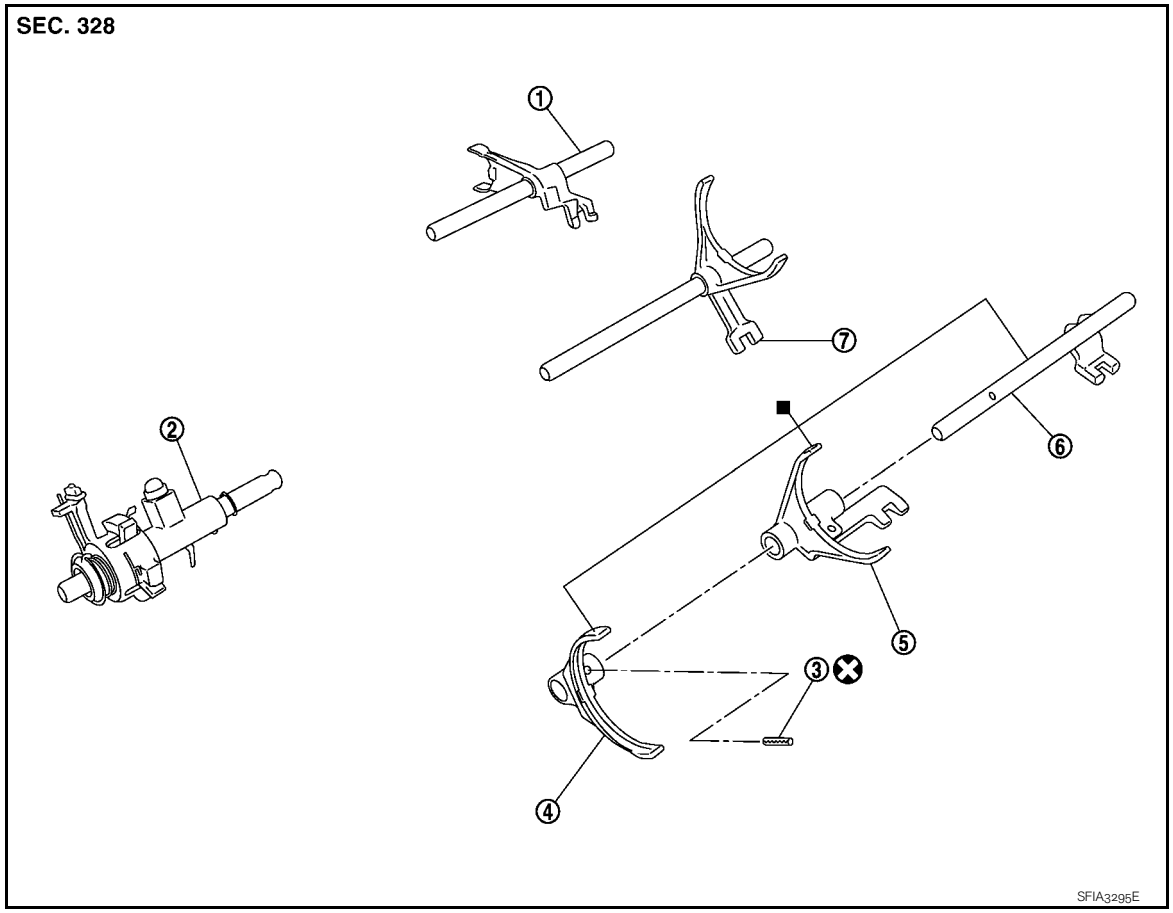


1. Reverse output gear
2. Snap ring
3. Reverse baulk ring
4. Return spring
5. Needle bearing
6. Reverse idler shaft
7. Seal washer
8. Washer
9. Reverse input gear
10. Lock washer
11. Spring washer

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

SHIFT FORK AND FORK ROD

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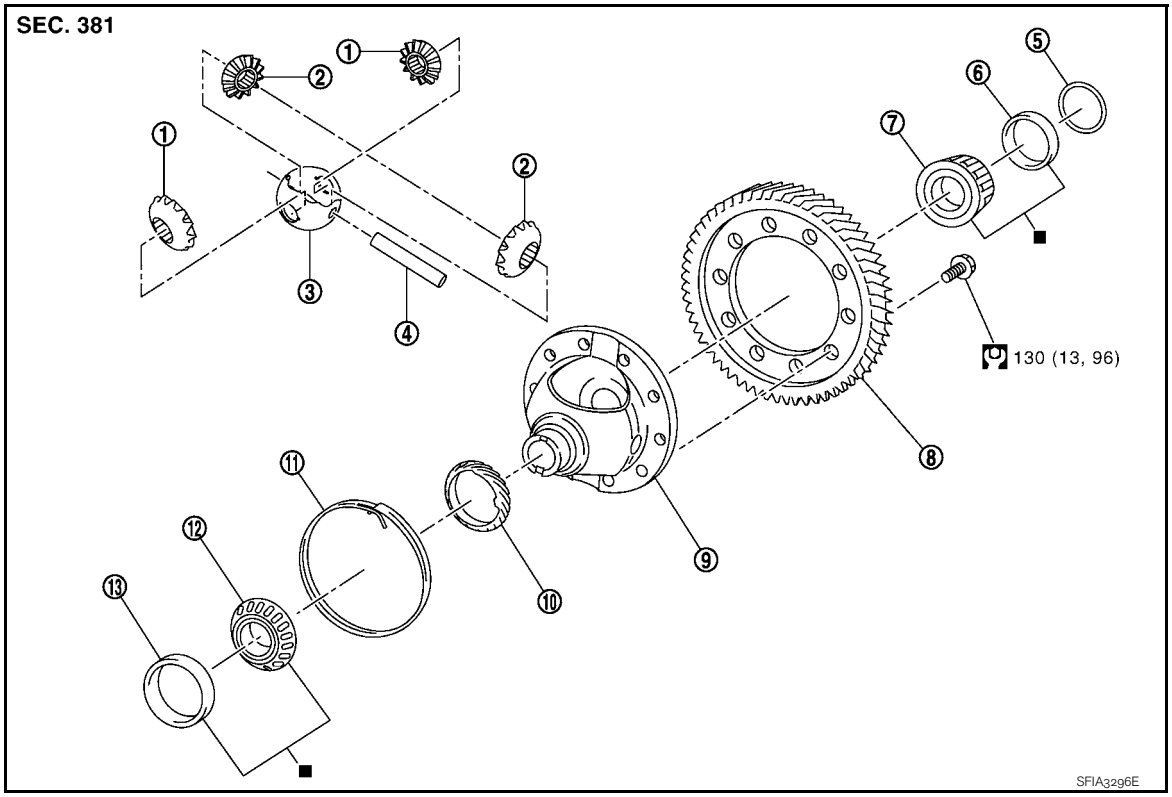
1. Reverse fork rod
2. Selector
3. Retaining pin
4. 5th-6th shift fork
5. 3rd-4th shift fork
6. 3rd-4th and 5th-6th fork rod
7. 1st-2nd fork rod

■: Replace the parts as a set.

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

FINAL DRIVE

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1. Side gear
2. Pinion mate gear
3. Thrust washer
4. Pinion mate shaft
5. shim
6. Differential side bearing outer race (transaxle case side)
7. Differential side bearing inner race (transaxle case side)
8. Final gear
9. Differential case
10. Speedometer drive gear
11. Lock ring
12. Differential side bearing inner race (clutch housing side)
13. Differential side bearing outer race (clutch housing side)

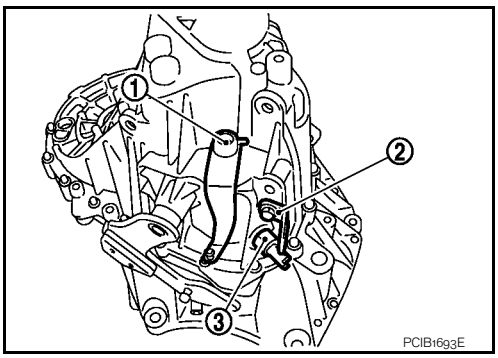
■: Replace the parts as a set.

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

Disassembly

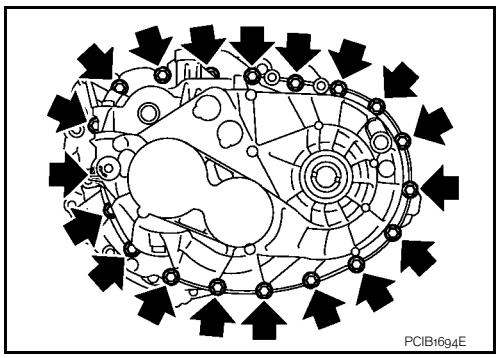
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1. Remove drain plug and gasket from clutch housing using the socket [Commercial service tool] and then drain gear oil.
2. Remove filler plug and gasket from transaxle case.
3. Remove retaining pin from shifter lever (1) using a pin punch. And then remove shifter lever.
4. Remove bracket (2) and position switch (3) from transaxle case.

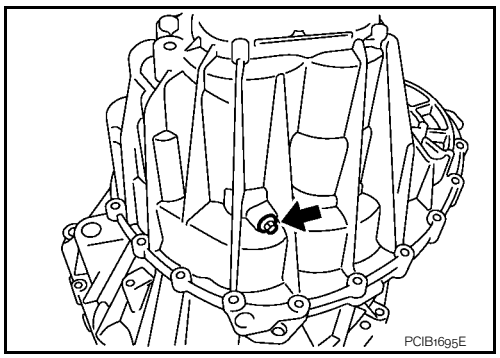


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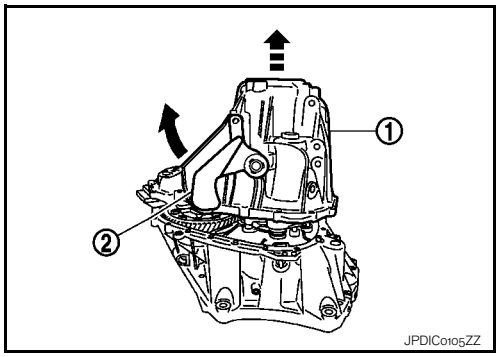
5. Remove mounting bolts.



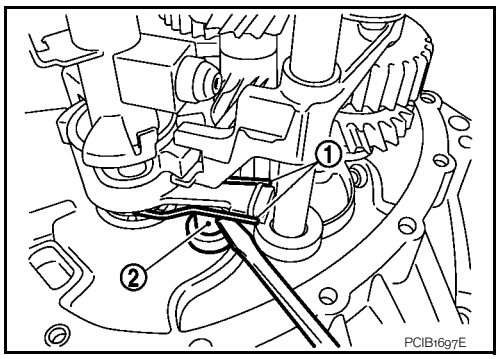
6. Remove reverse idler shaft mounting bolt and seal washer.



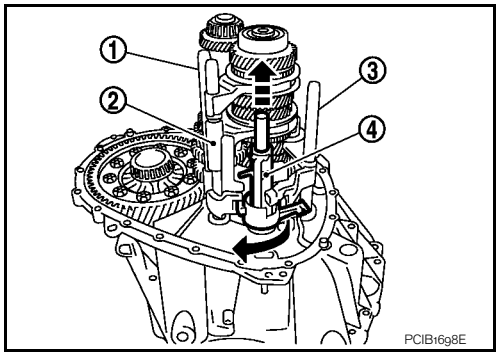
7. Remove transaxle case (1) upward while rotating selector lever (2).



8. Remove spring (1) of selector from return bushing (2).

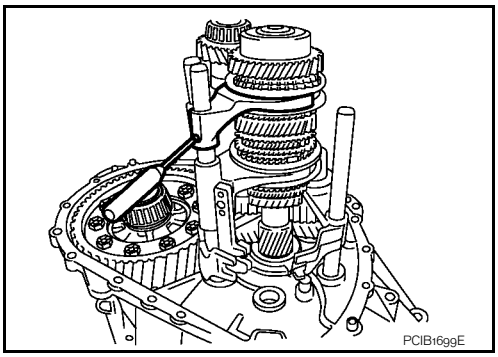


9. Move 1st-2nd fork rod (1), 3rd-4th and 5th-6th fork rod (2), and reverse fork rod (3) to neutral position.
10. Remove selector (4) from clutch housing.

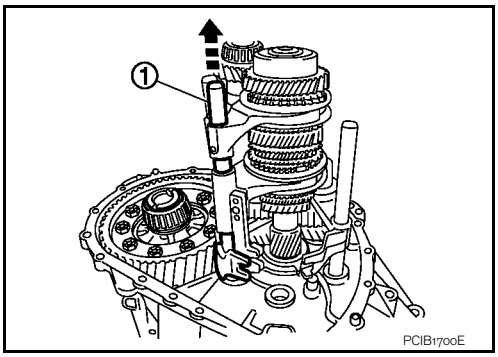


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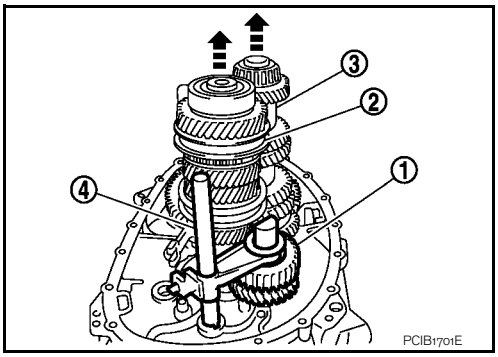
11. Remove retaining pin from 5th-6th shift fork using a pin punch.



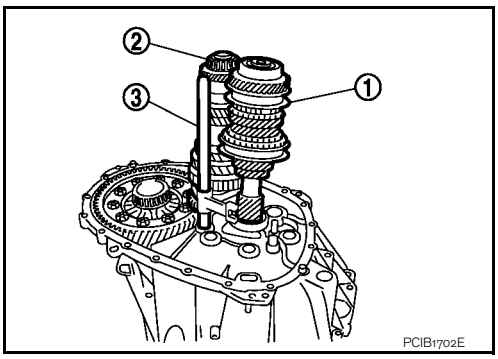
12. Remove 3rd-4th and 5th-6th fork rod (1) assembly according to the following.
a. Lift the fork rod up.
b. Remove 3rd-4th and 5th-6th fork rod (1) assembly from clutch housing.
c. Remove 3rd-4th shift fork and 5th-6th shift fork from 3rd-4th and 5th-6th fork rod.



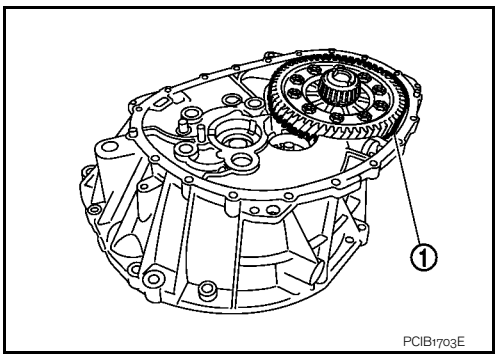
13. Remove reverse gear assembly (1) according to the following.
a. Lift up the input shaft assembly (2) and mainshaft assembly (3).
b. Remove reverse gear assembly (1) and reverse fork rod (4) from clutch housing.
14. Remove spring washer located under the reverse idler shaft.



15. Remove input shaft assembly (1), mainshaft assembly (2), and 1st-2nd fork rod (3) from clutch housing.

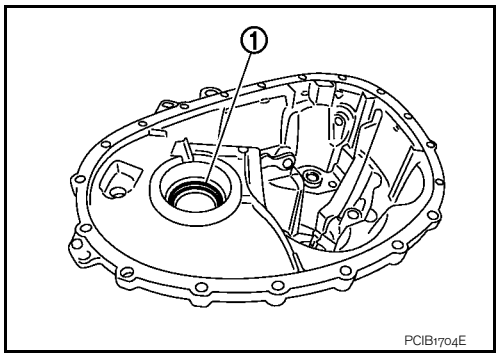


16. Remove final drive assembly (1) from clutch housing.
17. Remove magnet from clutch housing.

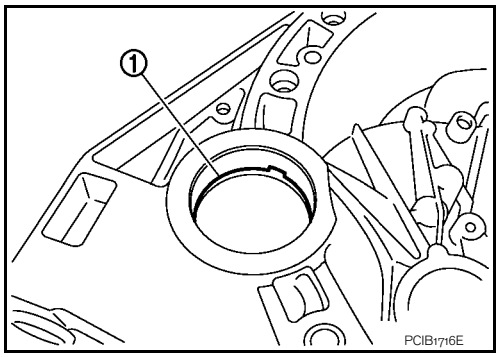


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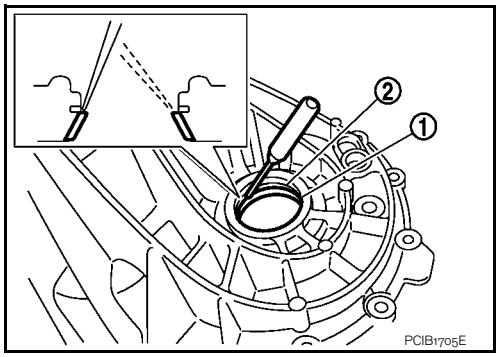
18. Remove differential side oil seals (1) from clutch housing and transaxle case using a flat-bladed screwdriver.
CAUTION:
Never damage clutch housing and transaxle case.



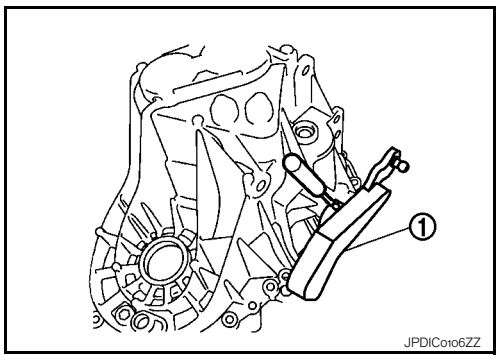
19. Remove differential side bearing outer race (1) from clutch housing using a brass bar.
CAUTION:
Never damage clutch housing.



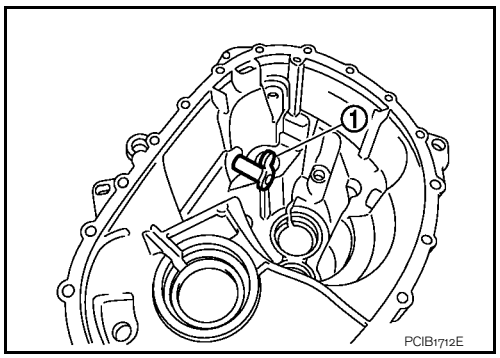
20. Remove differential side bearing outer race (1) and shim (2) from transaxle case using a brass bar as shown.
CAUTION:
Never damage transaxle case.



21. Remove retaining pin from selector lever (1) using a pin punch.
22. Remove selector lever.

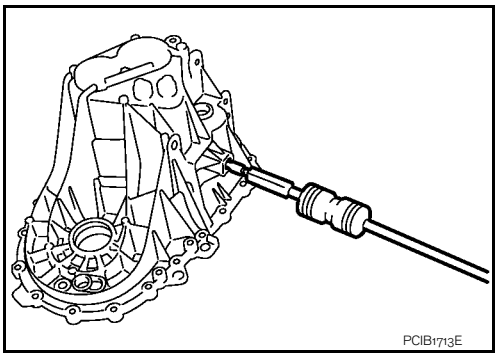


23. Remove shift finger (1) from transaxle case.

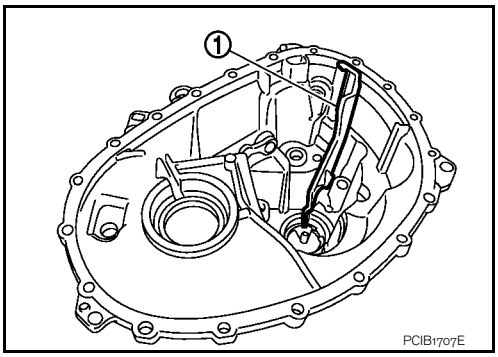


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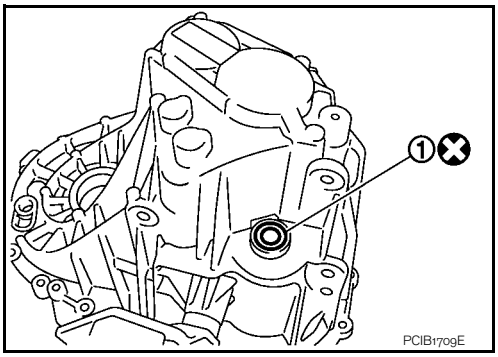
24. Remove selector lever oil seal and bushings from transaxle case using a suitable remover.



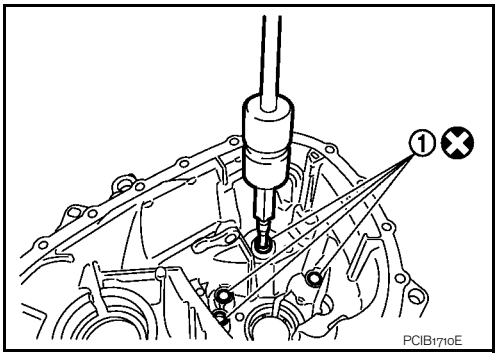
25. Remove oil gutter (1) from transaxle case.



26. Remove shifter lever oil seal (1) from transaxle case.



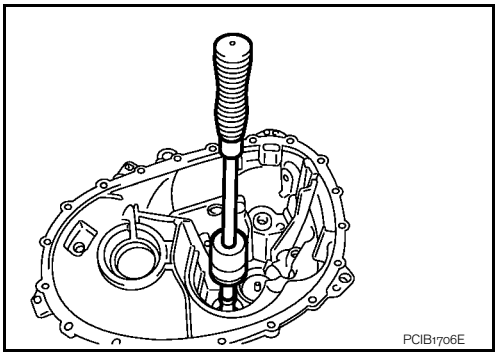
27. Remove bushings (1) from transaxle case using a suitable remover.



28. Remove mainshaft rear bearing outer race from transaxle case using a suitable remover and then remove bearing preloading shim.

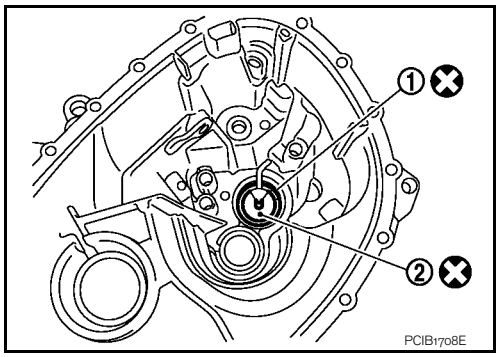
CAUTION:

Never damage transaxle case.

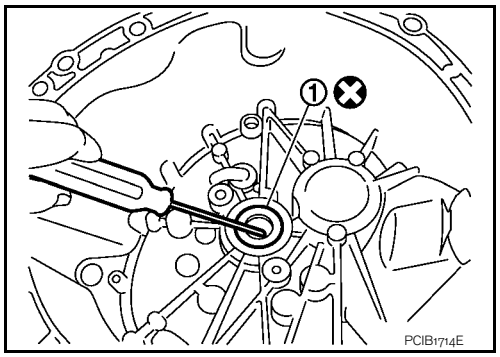


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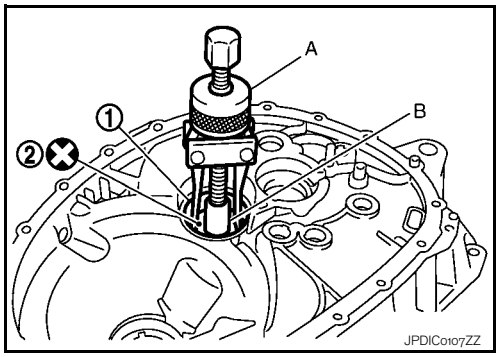
29. Remove snap ring (1) and oil channel (2) from transaxle case.



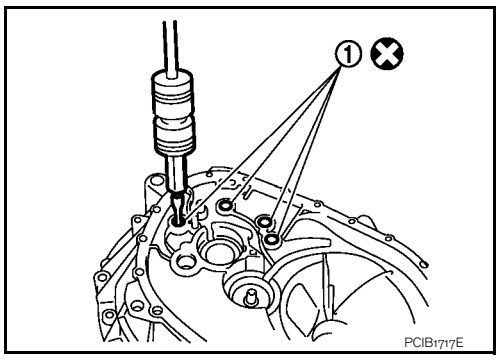
30. Remove input shaft oil seal (1) from clutch housing using a flat-bladed screwdriver.



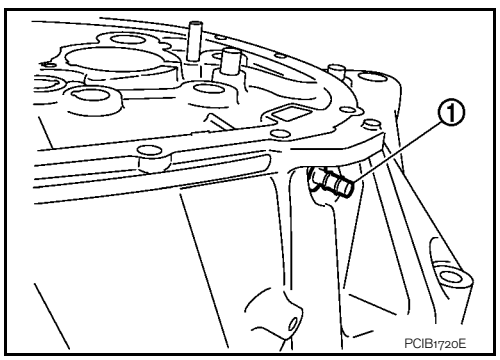
31. Remove mainshaft front bearing outer race (1) and oil channel (2) from clutch housing using the puller (A) [SST: KV381054S0] and the spacer (B) [Commercial service tool].



32. Remove bushings (1) from clutch housing using a suitable remover.

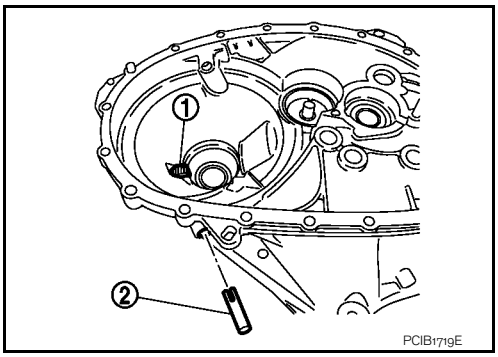


33. Remove two way connector (1) from clutch housing.



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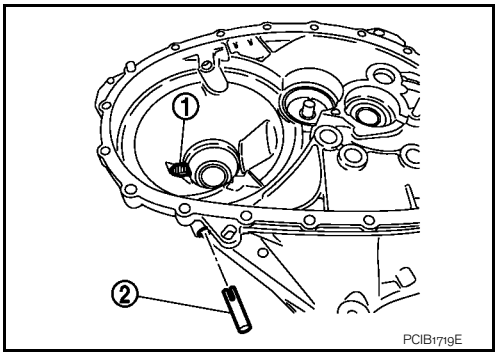
34. Remove pinion gear (1) and pinion shaft (2) from clutch housing.



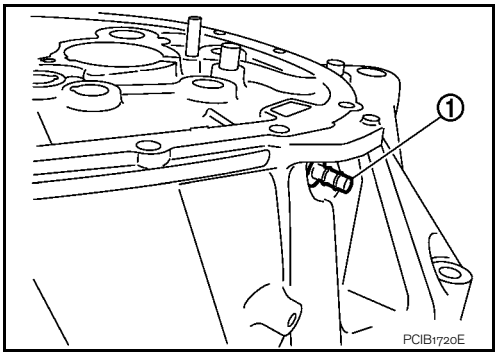
Assembly

INFOID:0000000001070339

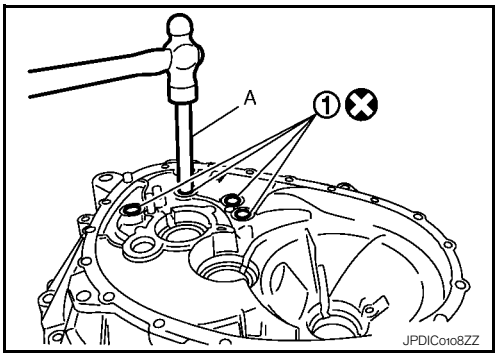
1. Install pinion gear (1) and pinion shaft (2) into clutch housing.



2. Install two way connector (1) into clutch housing.

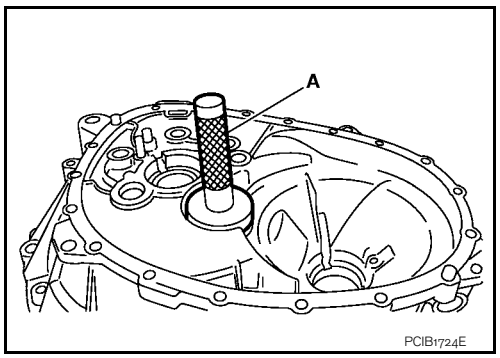


3. Install bushings (1) until they are flush with end face of clutch housing using the drift (A) [Commercial service tool].

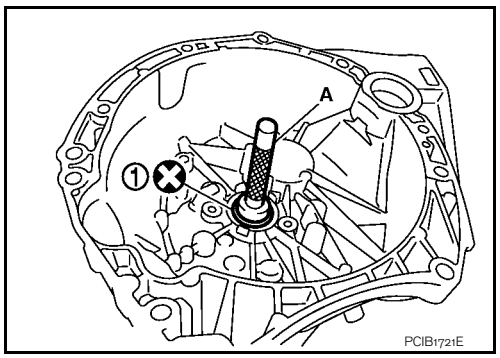


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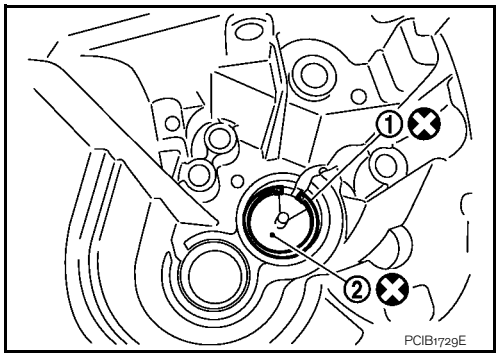
4. Install oil channel and mainshaft front bearing outer race into clutch housing using the drift (A) [SST: KV38100200].
CAUTION:
- **Never reuse oil channel.**
- **Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.**



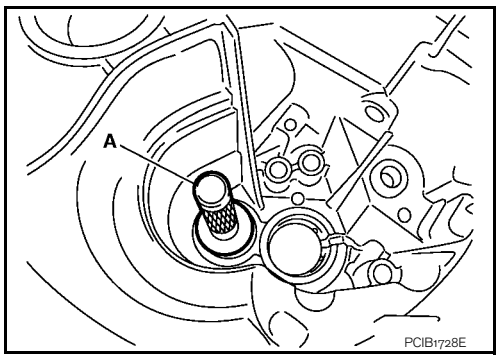
5. Install input shaft oil seal (1) into clutch housing using the drift (A) [SST: ST33220000].



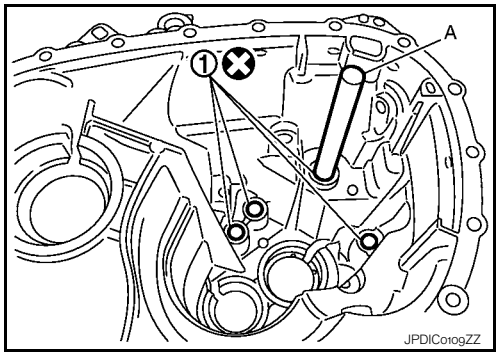
6. Install snap ring (1) and oil channel (2) onto transaxle case.



7. Install bearing preloading shim and mainshaft rear bearing outer race into transaxle case using the drift (A) [SST: KV38100200].
CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.

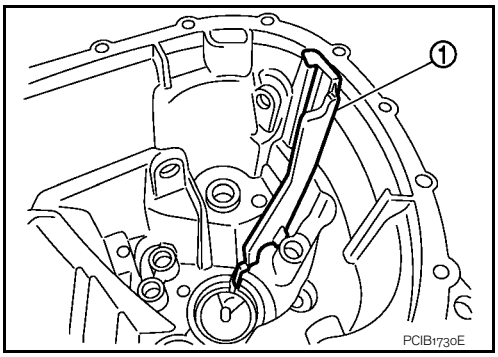


8. Install bushings (1) into transaxle case using the drift (A) [Commercial service tool].

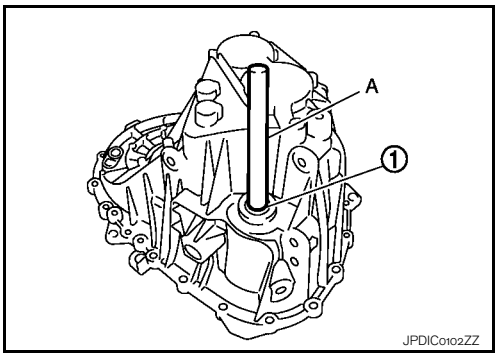


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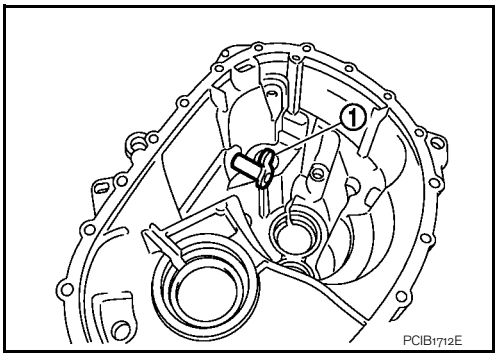
9. Install oil gutter (1) onto transaxle case.



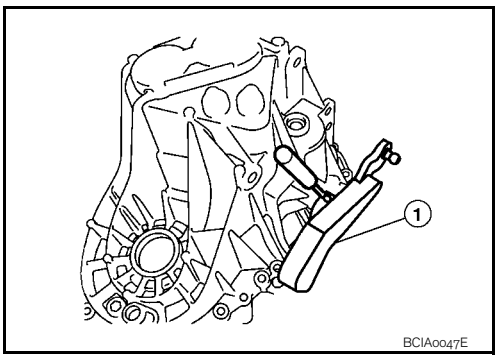
10. Install shifter lever oil seal (1) into transaxle case using the drift (A) [Commercial service tool].
11. Install selector lever oil seal and bushings into transaxle case using the drift [Commercial service tool].



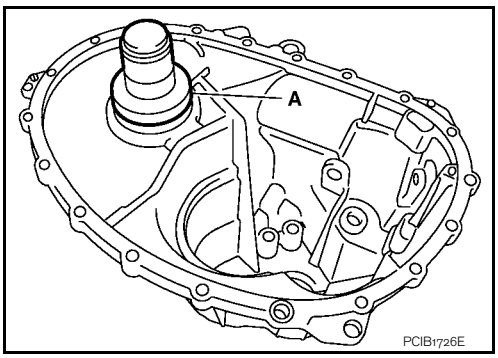
12. Install shift finger (1) into transaxle case.



13. Install selector lever (1) and then install retaining pin.
CAUTION:
Never reuse retaining pin.

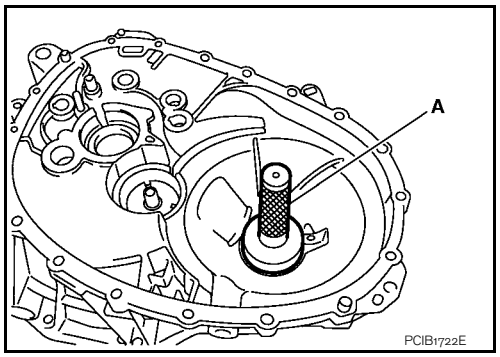


14. Install shim and differential side bearing outer race (transaxle case side) into transaxle case using the drift (A) [SST: ST33400001].
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.



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15. Install differential side bearing outer race (clutch housing side) into clutch housing using the drift (A) [SST: KV38100200].
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.

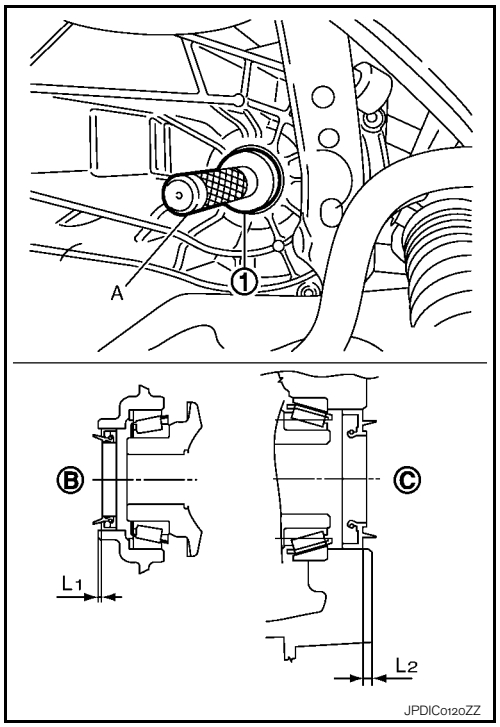


16. Install differential side oil seals (1) into clutch housing and transaxle case using the drift (A) [SST: KV38100300].

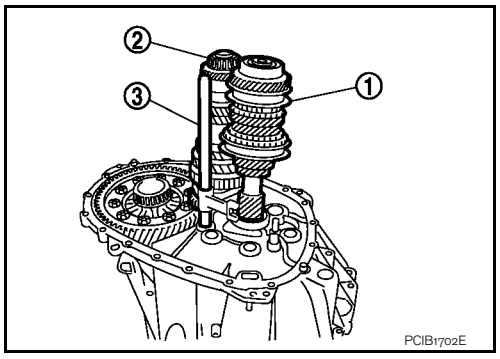
B : Transaxle case side
C : Clutch housing side

Dimension "L_1" : 1.2 - 1.8 mm (0.047 - 0.071 in)
Dimension "L_2" : 2.7 - 3.3 mm (0.106 - 0.130 in)

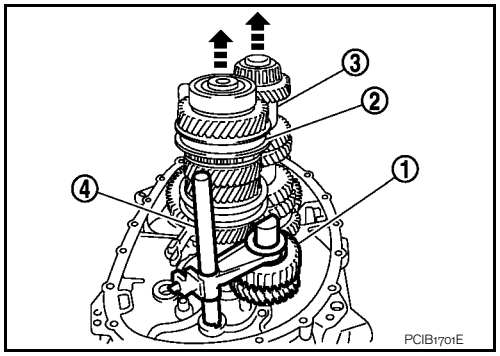
17. Install magnet onto clutch housing.
18. Install final drive assembly into clutch housing.



19. Install input shaft assembly (1), mainshaft assembly (2) and 1st-2nd fork rod (3) into clutch housing.
20. Install spring washer located under the reverse idler shaft.

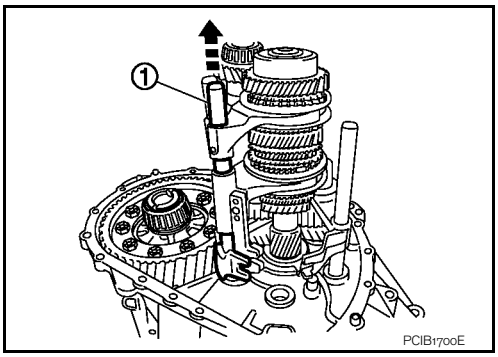


21. Install reverse gear assembly (1) according to the following.
a. Lift up the input shaft assembly (2) and mainshaft assembly (3).
b. Install reverse gear assembly and reverse fork rod (4) to clutch housing.
22. Install 3rd-4th shift fork and 5th-6th shift fork to 3rd-4th and 5th-6th fork rod.

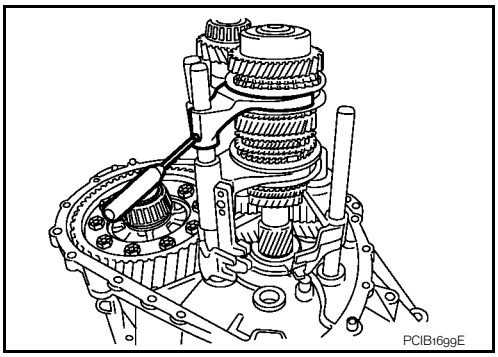


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23. While lifting up fork rod (1), install 3rd-4th and 5th-6th fork rod assembly to clutch housing.
CAUTION:
Replace the 5th-6th shift fork, the 3rd-4th shift fork, and the 3rd-4th and 5th-6th fork rod as a set.

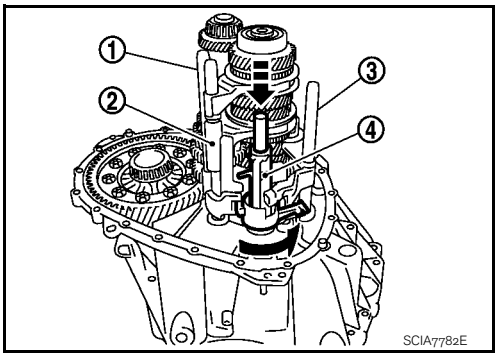


24. Install retaining pin into 5th-6th shift fork using a pin punch.
CAUTION:
Never reuse retaining pin.

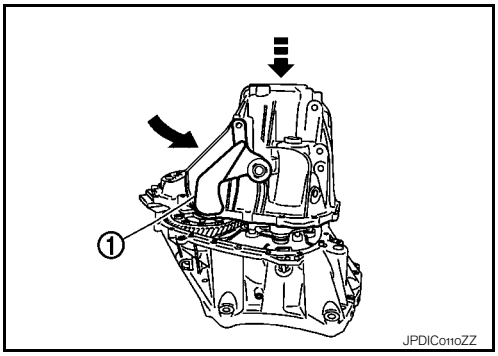


25. Move 1st-2nd fork rod (1), 3rd-4th and 5th-6th fork rod assembly (2), and reverse fork rod (3) to neutral position.
26. Install selector (4) into clutch housing.
27. Install spring of selector into return bushing.
28. Apply recommended sealant onto the mating surface of transaxle case.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

    CAUTION:
    - **Remove old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to both mating surfaces.**
    - **Check for damage on the mating surface.**
    - **Apply a continuous bead of liquid gasket to the mating surface.**

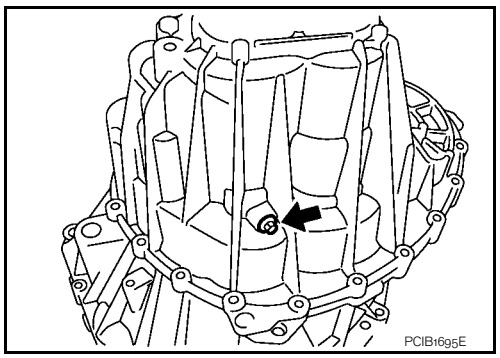


29. Engage shift finger and selector by moving selector lever (1). Install transaxle case to clutch housing.

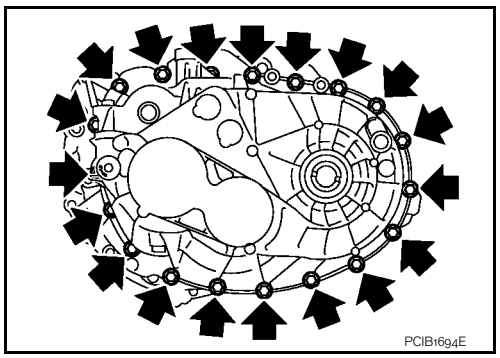


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30. Install seal washer and reverse idler shaft mounting bolt, and then tighten mounting bolt to the specified torque.
CAUTION:
Never reuse seal washer.

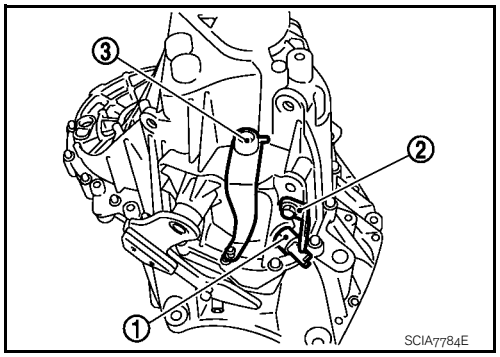


31. Tighten mounting bolts to the specified torque.



32. Apply recommended sealant to threads of position switch (1). Then install it to transaxle case and tighten to the specified torque.
- **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

33. Install bracket (2), and then mounting bolt to the specified torque.
34. Install shifter lever (3), and then install retaining pin using a pin punch.
CAUTION:
Never reuse retaining pin.



35. Install gasket onto drain plug, and then install it into clutch housing using the socket [Commercial service tool]. Tighten drain plug to the specified torque.
CAUTION:
Never reuse gasket.
36. Install gasket onto filler plug, and then install it into transaxle case. Tighten filler plug to the specified torque.
CAUTION:
- **Never reuse gasket.**
- **After gear oil is filled, tighten filler plug to specified torque.**

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INPUT SHAFT AND GEAR

Exploded View

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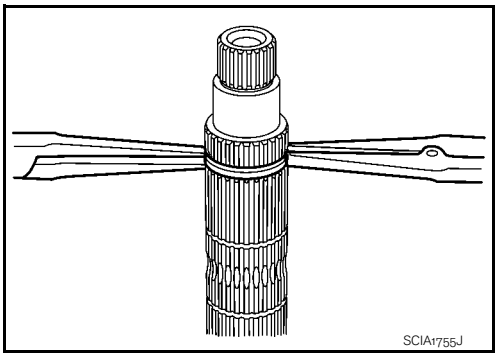
Refer to TM-71, "Exploded View".

Disassembly

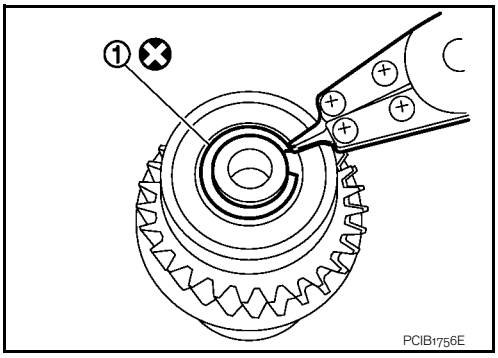
INFOID:0000000001070342

CAUTION:

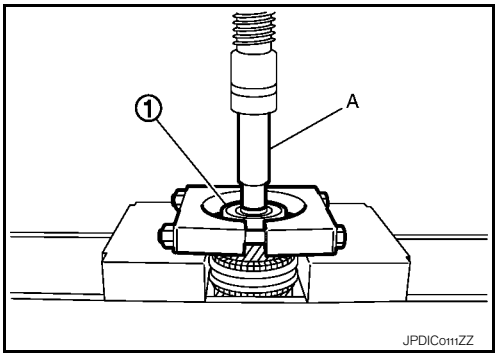
- **Set input shaft on the vise with back plate and remove gears and snap rings.**
- **For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.**
- **Disassemble gear components putting matching marks on the parts that do not affect any functions.**



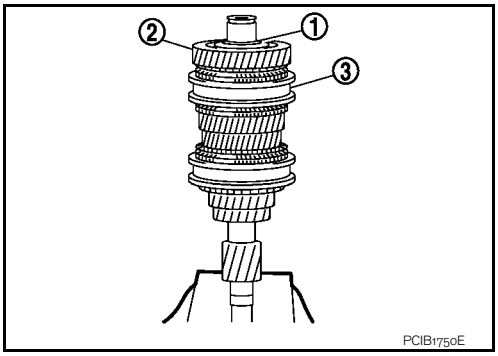
1. Remove snap ring (1).



2. Set the drift (A) [Commercial service tool] and puller to input shaft rear bearing (1), and remove input shaft rear bearing from input shaft using a press.

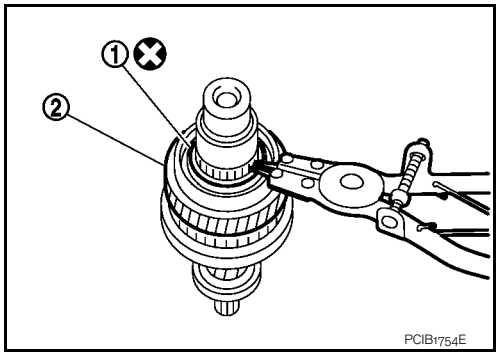


3. Remove washer (1), 6th input gear (2) and 5th-6th synchronizer assembly (3).
4. Remove needle bearing.

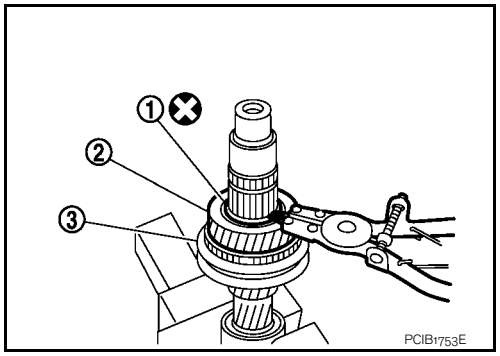


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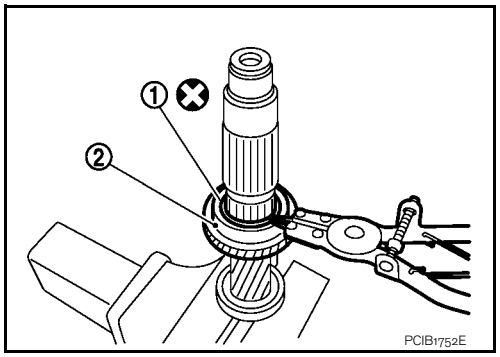
5. Remove snap ring (1), washer and 5th input gear (2).
6. Remove washer.



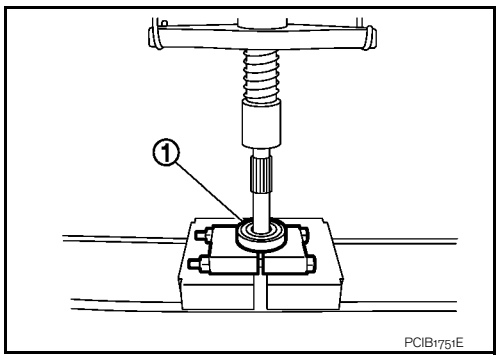
7. Remove snap ring (1), washer, 4th input gear (2) and 3rd-4th synchronizer assembly (3).



8. Remove snap ring (1), washer and 3rd input gear (2).



9. Remove input shaft front bearing (1) from input shaft using a press.



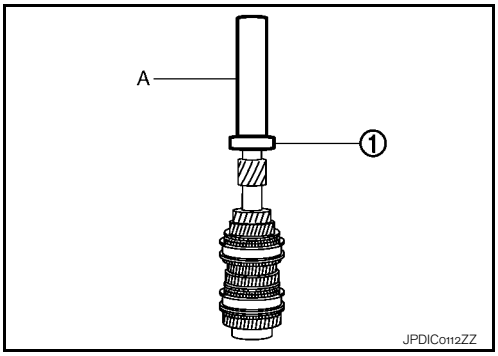
Assembly

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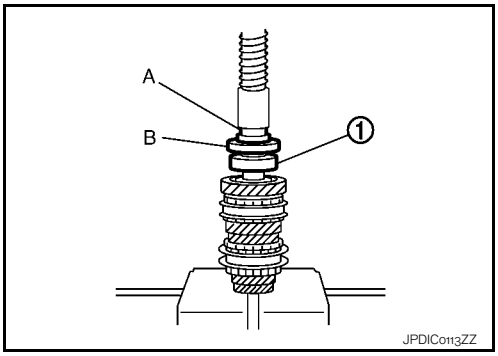
Note the following, and assembly is in the reverse order of disassembly.

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- Press-fit the input shaft front bearing (1) onto the input shaft using the drift (A) [Commercial service tool] and press.

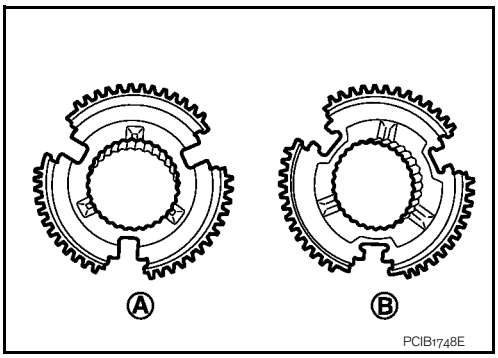


- Press-fit the input shaft rear bearing (1) onto the input shaft using the drift (A) [Commercial service tool], the drift (B) [SST: ST36720030] and press.



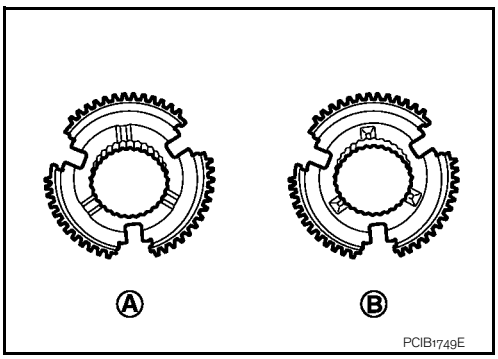
CAUTION:
- **Never reuse snap ring.**
- **Make sure that snap ring is securely installed in the groove.**
- **Apply gear oil to baulk ring.**
- **Replace coupling sleeve and synchronizer hub as a set.**
- **Be careful with the orientation of 3rd-4th synchronizer hub.**

A	: 3rd input gear side
B	: 4th input gear side



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

A	: 5th input gear side
B	: 6th input gear side



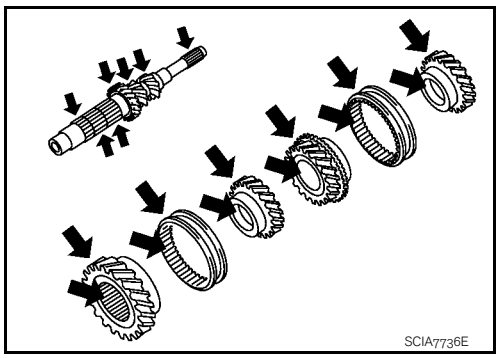
Inspection

INFOID:0000000001070344

INPUT SHAFT AND GEAR

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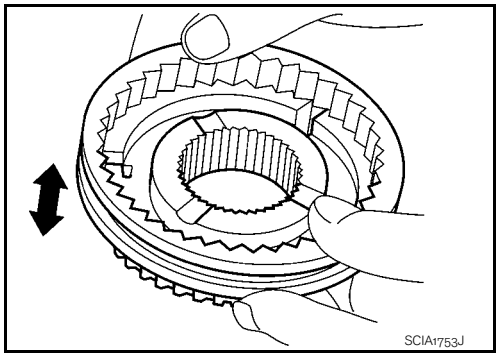
Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.


SCIA7736E

SYNCHRONIZER

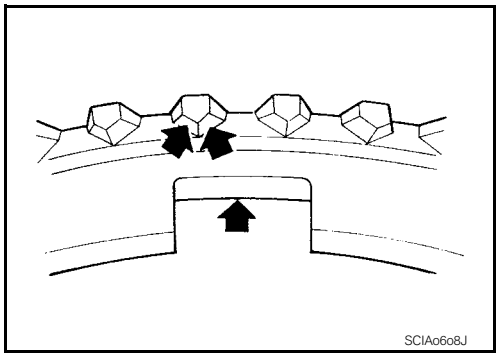
Synchronizer Hub and Coupling Sleeve

Check items below. If necessary, replace them with new ones.
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub and insert key.
- Coupling sleeve and synchronizer hub must move smoothly.


SCIA1753J

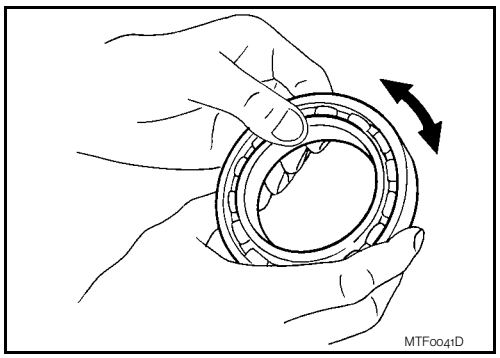
Baulk Ring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.


SCIA0608J

BEARING

Check items below. If necessary, replace them with new ones.
- Damage and rough rotation of bearing


MTF0041D

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MAINSHAFT AND GEAR

Exploded View

INFOID:0000000001070345

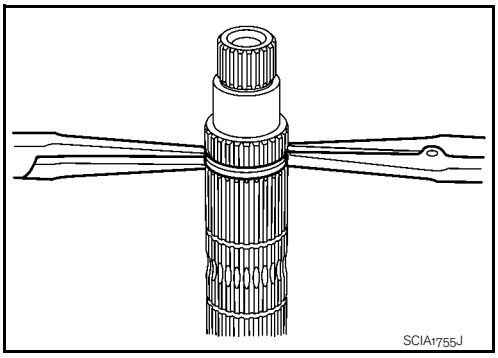
Refer to TM-71, "Exploded View".

Disassembly

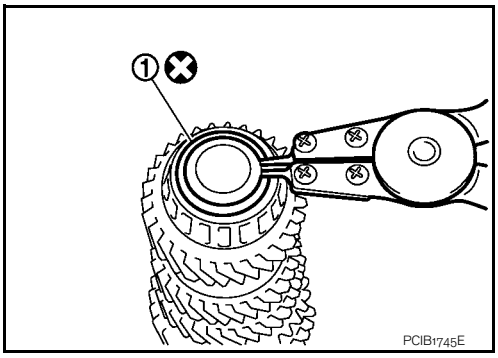
INFOID:0000000001070346

CAUTION:

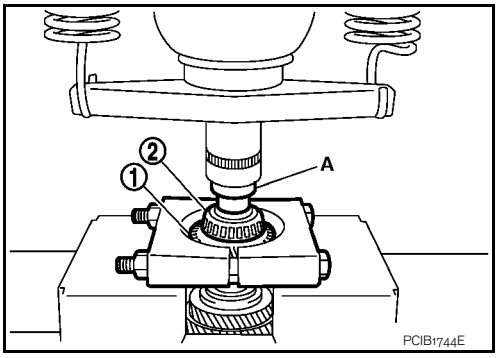
- **Set mainshaft on the vise with back plate and remove gears and snap rings.**
- **For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.**
- **Disassemble gear components putting matching marks on the parts that do not affect any functions.**



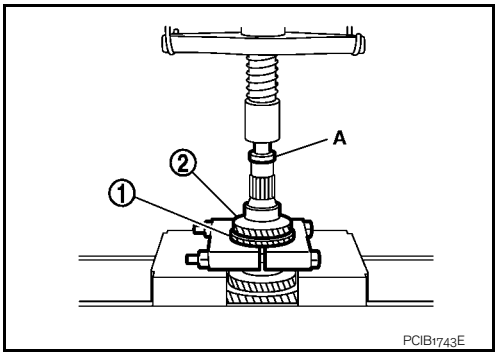
1. Remove snap ring (1).



2. Set the drift (A) [SST: ST33052000] and puller on 6th main gear (1), and remove mainshaft rear bearing inner race (2) and 6th main gear from mainshaft using a press.

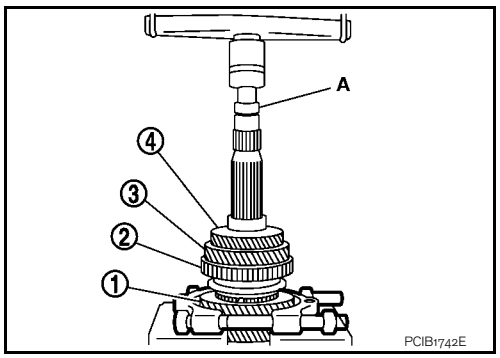


3. Set the drift (A) [SST: ST33052000] and puller on 4th main gear (1), and remove 5th main gear (2), and 4th main gear from mainshaft using a press.
4. Remove intermediate adjusting shim.

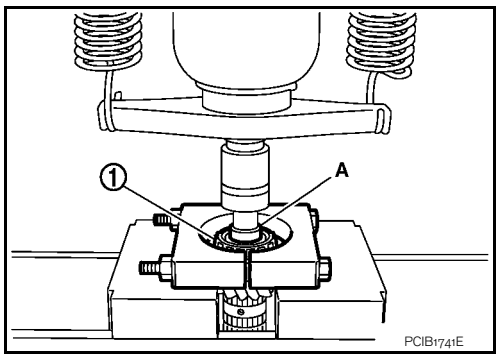


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5. Set the drift (A) [SST: ST33052000] and puller on 1st main gear (1), and remove 1st main gear, 1st-2nd synchronizer assembly (2), 2nd main gear (3), bushing, and 3rd main gear (4) from mainshaft using a press.



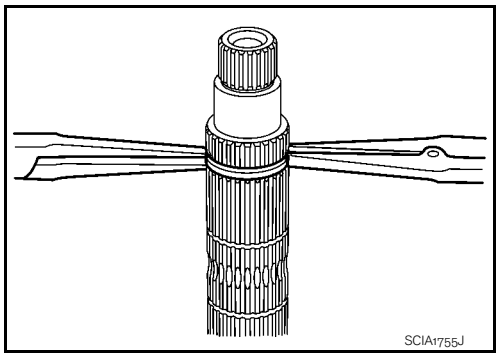
6. Set the drift (A) [SST: ST33052000] and puller on mainshaft front bearing inner race (1), and remove mainshaft front bearing inner race from mainshaft using a press.



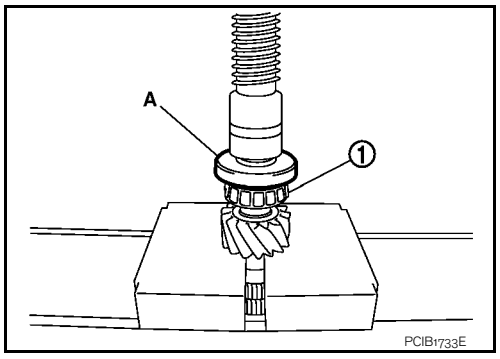
Assembly

INFOID:0000000001070347

CAUTION:
For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.

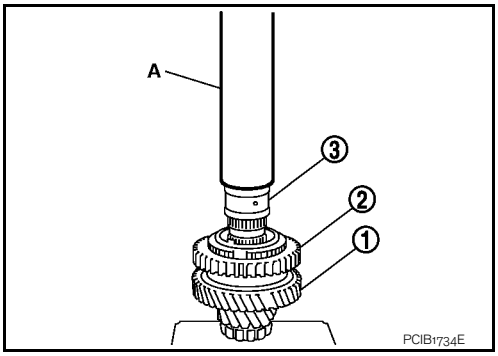


1. Press-fit the mainshaft front bearing inner race (1) onto the mainshaft using the drift (A) [SST: ST36720030] and press.
CAUTION:
Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.
2. Apply gear oil to 1st inner baulk ring, 1st synchronizer cone, 1st outer baulk ring, 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring.

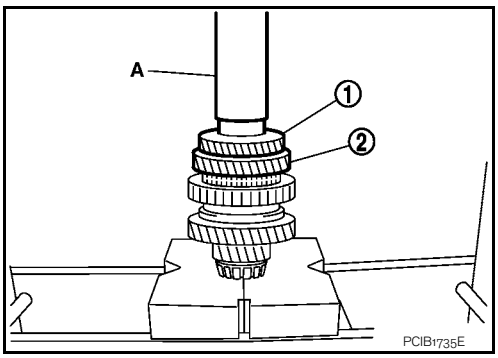


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3. Install 1st main gear (1), and 1st-2nd synchronizer assembly (2) onto the mainshaft.
   CAUTION:
   - **Replace 1st inner baulk ring, 1st synchronizer cone and 1st outer baulk ring as a set.**
   - **Replace 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring as a set.**
   - **Replace 1st-2nd coupling sleeve and 1st-2nd synchronizer hub as a set.**
4. Press-fit the bushing (3) onto the mainshaft using the drift (A) [SST: KV32102700] and press.



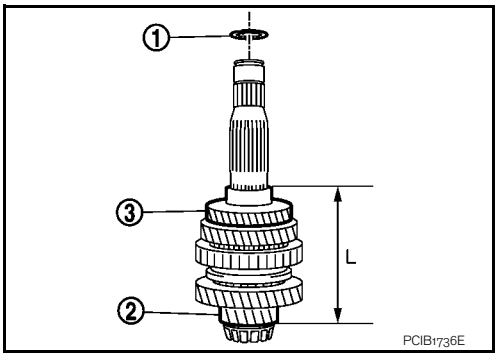
5. Press-fit 3rd main gear (1) to the mainshaft using the drift (A) [SST: KV32102700] and press after installing the 2nd main gear (2) and the 3rd main gear to the mainshaft.



6. Select the thickness of the intermediate adjusting shim (1) needed by measuring the distance “L” between the base of the mainshaft (2) and the top of the 3rd main gear (3).

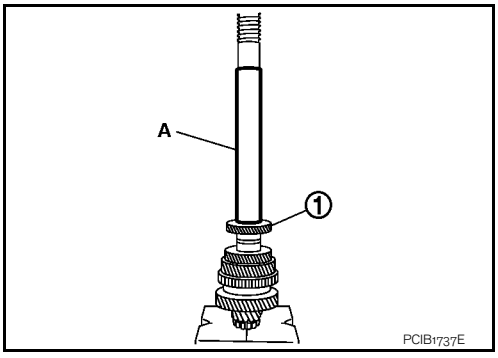
Unit: mm (in)

Distance “L”	Adjusting shim thickness
147.690 – 147.666 (5.8146 – 5.8136)	1.500 (0.0591)
147.665 – 147.641 (5.8136 – 5.8126)	1.525 (0.0600)
147.640 – 147.616 (5.8126 – 5.8116)	1.550 (0.0610)
147.615 – 147.591 (5.8116 – 5.8107)	1.575 (0.0620)
147.590 – 147.566 (5.8106 – 5.8097)	1.600 (0.0630)
147.565 – 147.541 (5.8096 – 5.8087)	1.625 (0.0640)
147.540 – 147.516 (5.8086 – 5.8077)	1.650 (0.0650)
147.515 – 147.491 (5.8077 – 5.8067)	1.675 (0.0659)
147.490 – 147.466 (5.8067 – 5.8057)	1.700 (0.0669)
147.465 – 147.441 (5.8057 – 5.8048)	1.725 (0.0679)
147.440 – 147.416 (5.8047 – 5.8038)	1.750 (0.0689)
147.415 – 147.391 (5.8037 – 5.8028)	1.775 (0.0699)



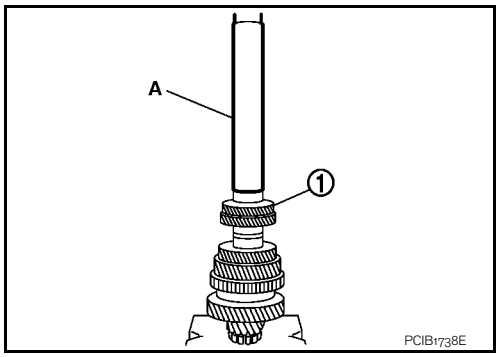
7. Install selected intermediate adjusting shim.

8. Press-fit the 4th main gear (1) onto the mainshaft using the drift (A) [SST: KV32102700].

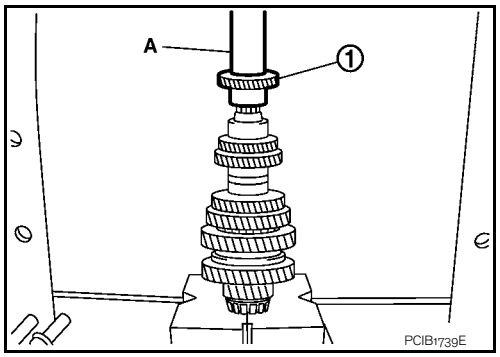


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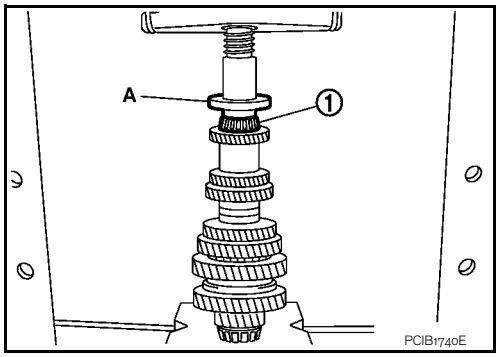
9. Press-fit the 5th main gear (1) onto the mainshaft using the drift (A) [SST: KV32102700].



10. Press-fit the 6th main gear (1) onto the mainshaft using the drift (A) [SST: KV32102700].



11. Press-fit the mainshaft rear bearing inner race (1) onto the mainshaft using the drift (A) [SST: ST30901000].
CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.
12. Install snap ring onto mainshaft.
CAUTION:
Never reuse snap ring.

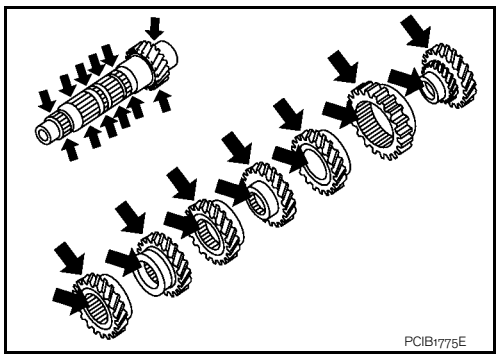


Inspection

INFOID:0000000001070348

MAINSHAFT AND GEAR

Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.

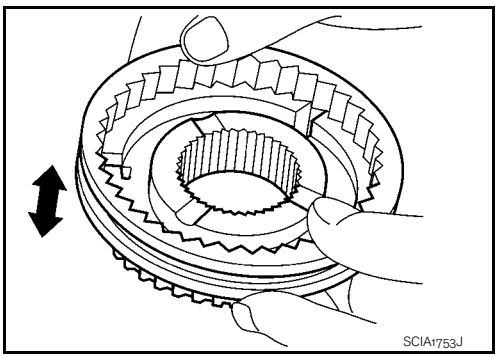


SYNCHRONIZER

Synchronizer Hub and Coupling Sleeve

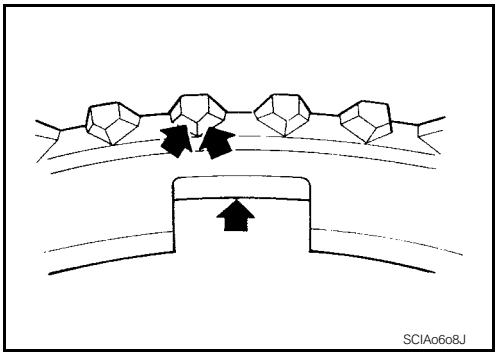
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Check items below. If necessary, replace them with new ones.
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub, insert key.
- Coupling sleeve and synchronizer hub must move smoothly.



Baulk Ring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.

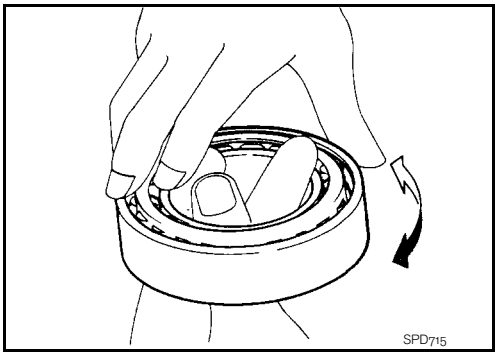


BEARING

Check for bearing damage and rough rotation. If necessary, replace with a new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.



CAUTION:

Bearing preloading shim: after the intermediate adjusting shim and/or the 6th main gear, 5th main gear, and 4th main gear have been replaced, it is necessary to modify the bearing preloading setting by changing the bearing preloading shim.
- **Replacing the intermediate adjusting shim.**
- **Increase the size of the bearing preloading shim, if the replaced intermediate adjusting shim is thinner than the shim used before.**
- **Decrease the size of the bearing preloading shim, if the replaced intermediate adjusting shim is thicker than the shim used before.**
- **Replacing the 6th main gear, 5th main gear, and 4th main gear.**
- **Measure the thickness of the main gear used before and the new main gear.**
- **Increase the thickness of the bearing preloading shim, if the difference is smaller than 0.025 mm (0.0010 in).**
- **Decrease the thickness of the bearing preloading shim, if the difference is greater than 0.025 mm (0.0010 in).**

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REVERSE IDLER SHAFT AND GEAR

Exploded View

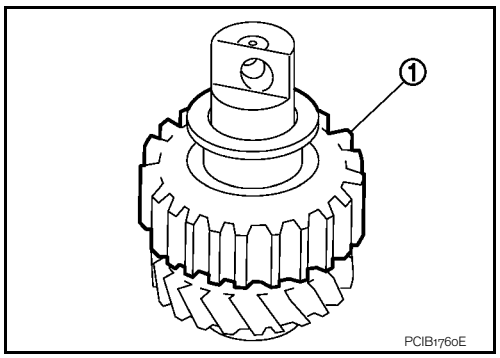
INFOID:0000000001070349

Refer to TM-71, "Exploded View".

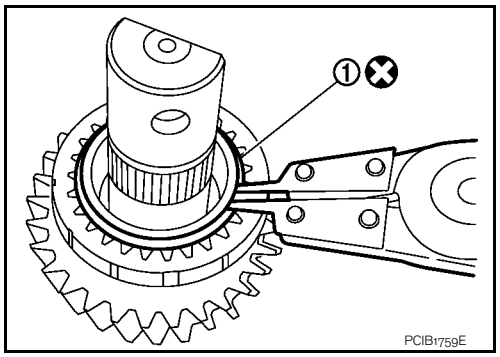
Disassembly

INFOID:0000000001070350

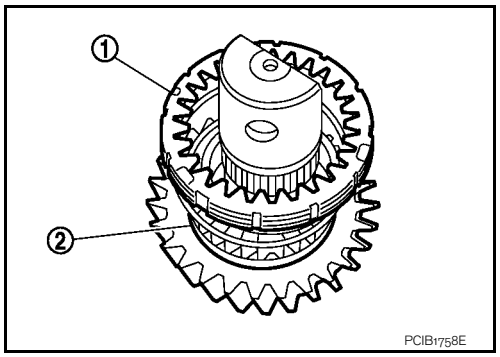
1. Remove reverse output gear (1).



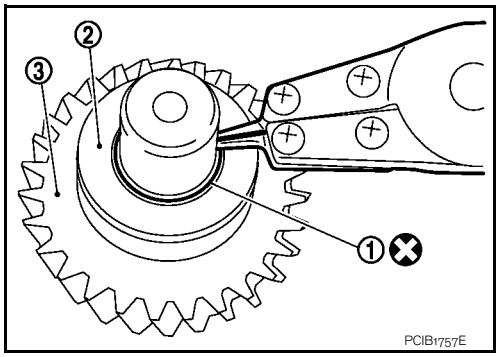
2. Remove snap ring (1).



3. Remove reverse baulk ring (1) and return spring (2).

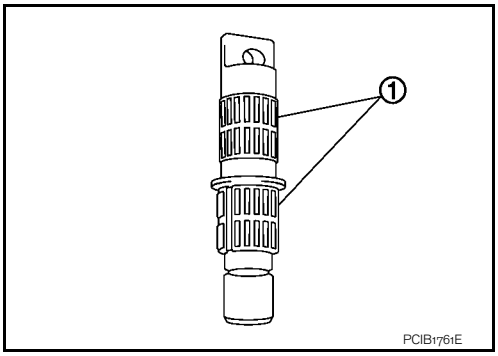


4. Remove snap ring (1), lock washer (2), reverse input gear (3) and washer.



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5. Remove needle bearings (1) and washer from reverse idler shaft.



Assembly

INFOID:0000000001070351

Note the following, and assemble in the reverse order of disassembly.

CAUTION:

- **Never reuse snap ring.**
- **Make sure that snap ring is securely installed in the groove.**

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FINAL DRIVE

Exploded View

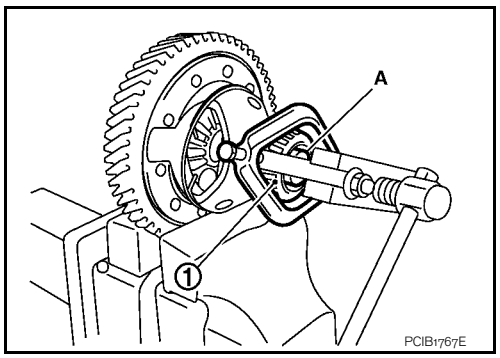
INFOID:0000000001070353

Refer to TM-71, "Exploded View".

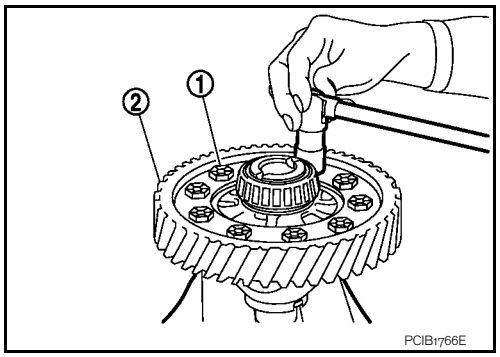
Disassembly

INFOID:0000000001070354

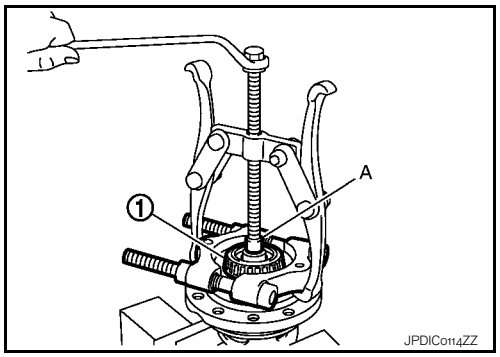
1. Remove differential side bearing inner race (clutch housing side) (1) using the drift (A) [SST: ST33061000] and a puller.
2. Remove speedometer drive gear.



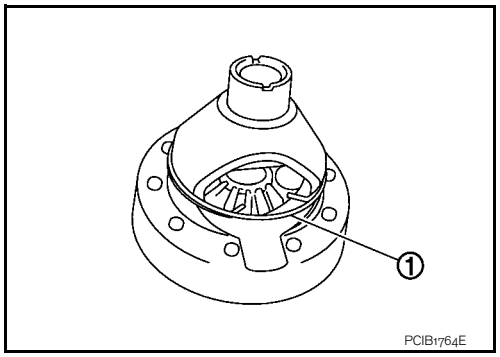
3. Remove final gear mounting bolts (1), and then separate the final gear (2) from differential case.



4. Remove differential side bearing inner race (transaxle case side) (1) using the drift (A) [Commercial service tool] and a suitable puller.



5. Remove lock ring (1) from differential case.
6. Remove pinion mate shaft, pinion mate gears, side gears and thrust washer from differential case.



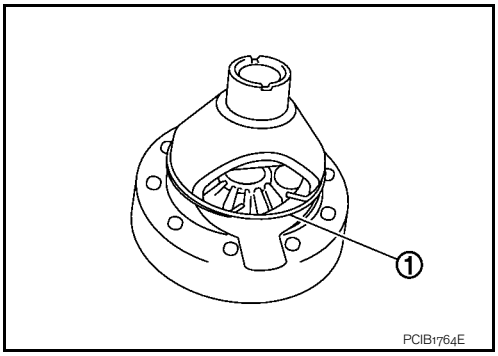
Assembly

INFOID:0000000001070355

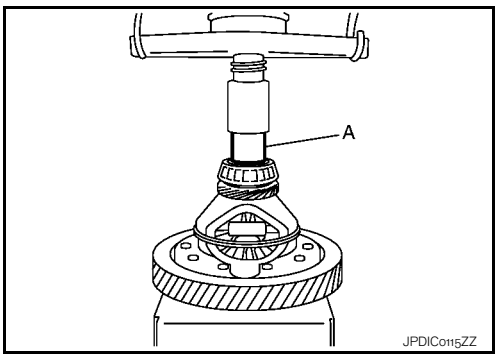
1. Install pinion mate shaft, pinion mate gears, side gears and thrust washer into differential case.

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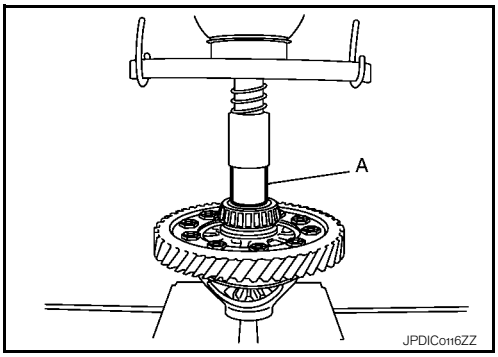
2. Install lock ring (1) onto differential case.
CAUTION:
Make sure that lock ring is securely installed in the groove.
3. Install final gear into differential case, and tighten final gear mounting bolts to the specified torque.
4. Install speedometer drive gear onto differential case.



5. Press-fit the differential side bearing inner race (clutch housing side) onto the differential case using the drift (A) [Commercial service tool] and press.
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.



6. Press-fit the differential side bearing inner race (transaxle case side) onto the differential case using the drift (A) [Commercial service tool] and press.
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.

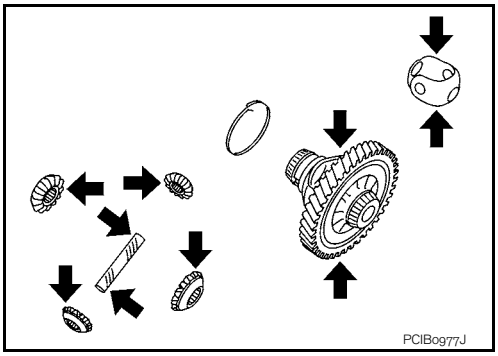


Inspection

INFOID:0000000001070356

GEAR, WASHER, SHAFT AND CASE

Check side gears, thrust washer, pinion mate shaft, pinion mate gears, lock ring and differential case. If necessary, replace with a new one.



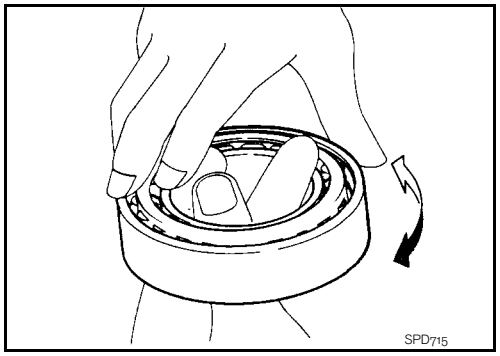
BEARING

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Check for bearing damage and rough rotation. If necessary, replace with a new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.



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SHIFT FORK AND FORK ROD

Exploded View

INFOID:0000000001070357

Refer to TM-71, "Exploded View".

Disassembly

INFOID:0000000001070358

Refer to TM-76, "Disassembly" for disassembly procedure.

Assembly

INFOID:0000000001070359

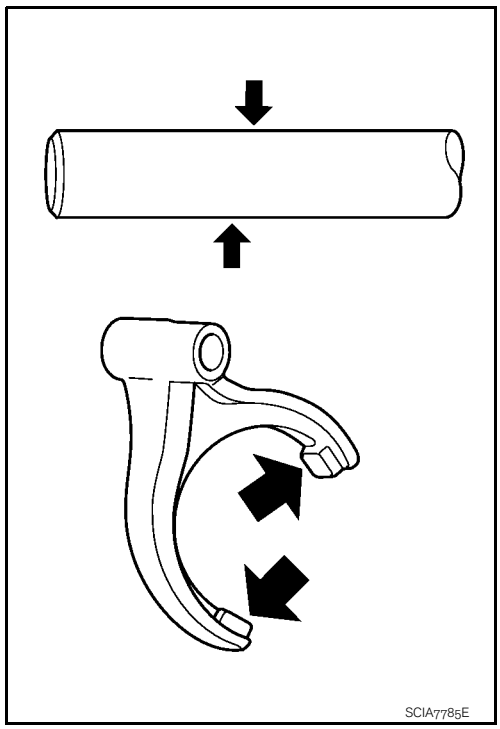
Refer to TM-82, "Assembly" for assembly procedure.

Inspection

INFOID:0000000001070360

FORK ROD AND SHIFT FORK

Check contact surface and sliding surface of fork rod and shift fork for wear, damage, and bend. Replace if necessary.



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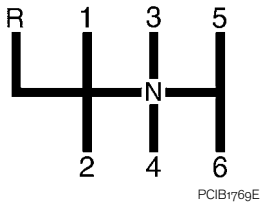
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000001043094

TRANSAXLE

Engine type			MR20DE	K9K
Transaxle model			RS6F94R	
Model code number			JD200	JD500
Number of speeds			6	
Synchromesh type			Warner	
Shift pattern			 PCIB1769E	
Gear ratio	1st		3.7273	
	2nd		2.1053	1.9474
	3rd		1.5185	1.3226
	4th		1.1714	0.975
	5th		0.9143	0.7632
	6th		0.7674	0.6383
	Reverse		3.6865	
Number of teeth	Input gear	1st	11	
		2nd	19	
		3rd	27	31
		4th	35	40
		5th	35	38
		6th	43	47
		Reverse	11	
	Main gear	1st	41	
		2nd	40	37
		3rd	41	
		4th	41	39
		5th	32	29
		6th	33	30
		Reverse	42	
	Reverse idler gear	Input/Output	28/29	
Oil capacity		ℓ (Imp pt)	Approx. 2.0 (3-1/2)	
Remarks	Reverse synchronizer		Installed	
	Triple-cone synchronizer		1st and 2nd	

FINAL GEAR

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Engine type		MR20DE	K9K
Transaxle model		RS6F94R	
Model code number		JD200	JD500
Final gear ratio		4.4375	
Number of teeth	Final gear/Pinion	71/16	
	Side gear/Pinion mate gear	13/10	

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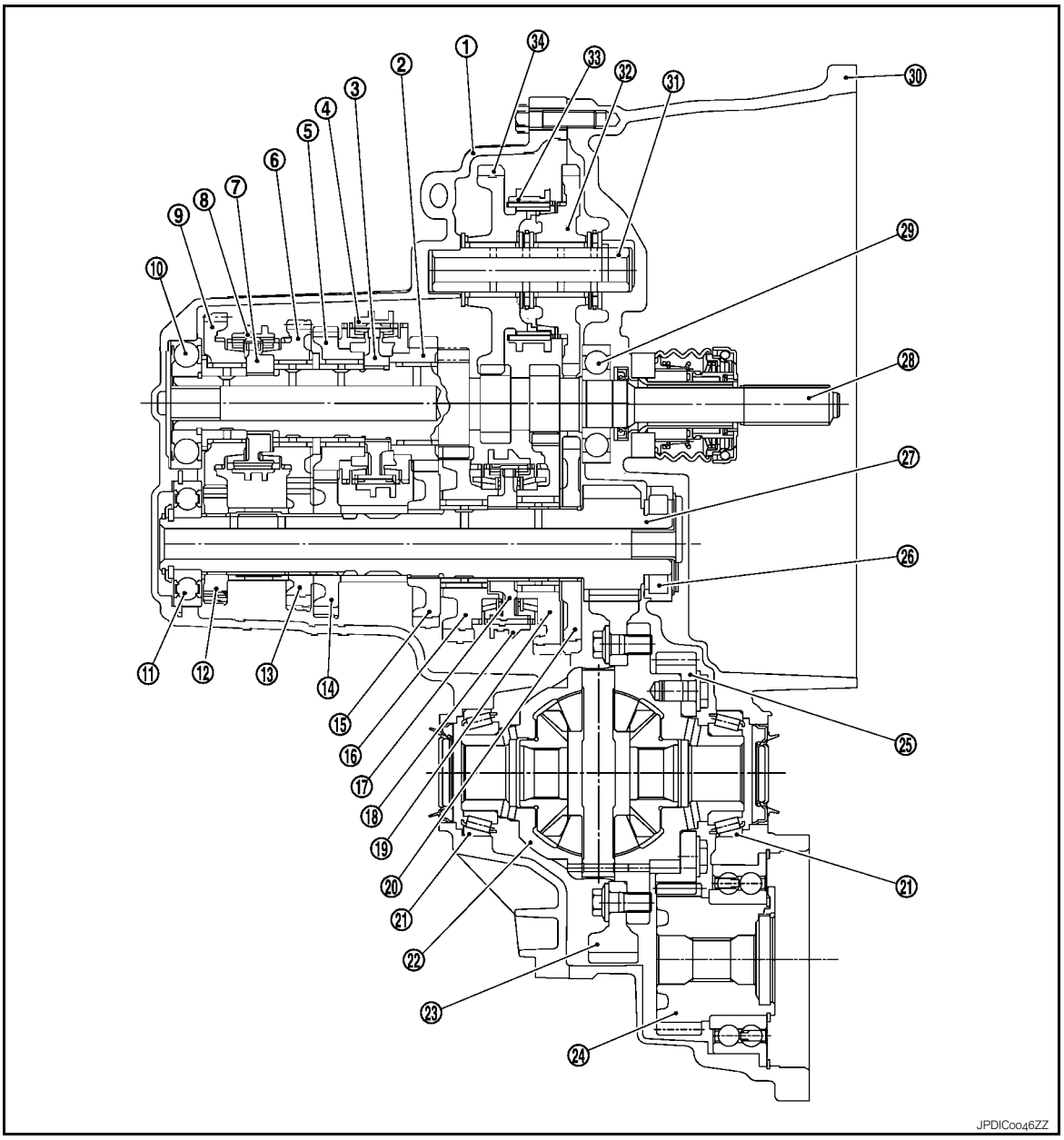
FUNCTION DIAGNOSIS

M/T SYSTEM

System Diagram

INFOID:0000000001034930

CROSS-SECTIONAL VIEW



1. Transaxle case
2. 3rd input gear
3. 3rd-4th synchronizer hub
4. 3rd-4th coupling sleeve
5. 4th input gear
6. 5th input gear
7. 5th-6th synchronizer hub
8. 5th-6th coupling sleeve
9. 6th input gear
10. Input shaft rear bearing
11. Mainshaft rear bearing
12. 6th main gear
13. 5th main gear
14. 4th main gear
15. 3rd main gear
16. 2nd main gear
17. 1st-2nd synchronizer hub
18. 1st-2nd coupling sleeve
19. 1st main gear
20. Reverse main gear
21. Differential side bearing
22. Differential case assembly
23. Final gear
24. Output gear assembly
25. Reduction gear
26. Mainshaft front bearing
27. Mainshaft

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28. Input shaft
29. Input shaft front bearing
30. Clutch housing
31. Reverse idler shaft
32. Reverse idler gear (front)
33. Reverse coupling sleeve
34. Reverse idler gear (rear)

System Description

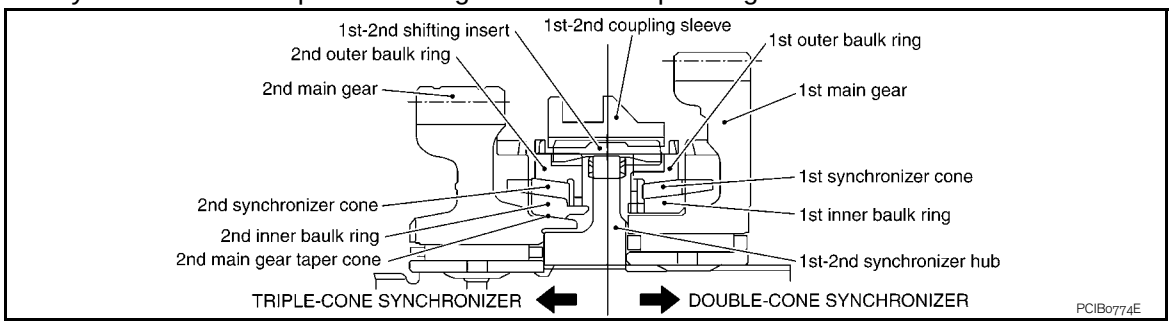
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DOUBLE-CONE SYNCHRONIZER

Double-cone synchronizer are adopted for 1st and 3rd gears to reduce operating force of the control lever.

TRIPLE-CONE SYNCHRONIZER

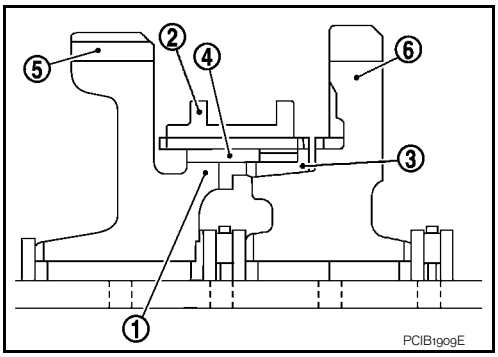
Triple-cone synchronizer is adopted for 2nd gear to reduce operating force of the control lever.



REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

Reverse gear can be matched smoothly in a structure by setting synchronizer hub (1) of reverse idler gear (rear), reverse coupling sleeve (2), reverse baulk ring (3), and reverse insert spring (4) to reverse idler gears, and letting reverse gear be synchronized.

5 : Reverse idler gear (rear)
6 : Reverse idler gear (front)



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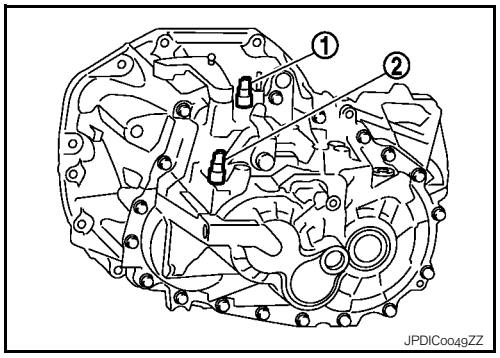
COMPONENT DIAGNOSIS

BACK-UP LAMP SWITCH

Component Parts Location

INFOID:0000000001065855

1 : Park/Neutral position (PNP) switch
2 : Back-up lamp switch



Component Inspection

INFOID:0000000001065856

1. CHECK BACK-UP LAMP SWITCH

Check continuity between back-up lamp switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
1 – 2	Reverse	Existed
	Except reverse	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace back up lamp switch. Refer to TM-125, "Exploded View".

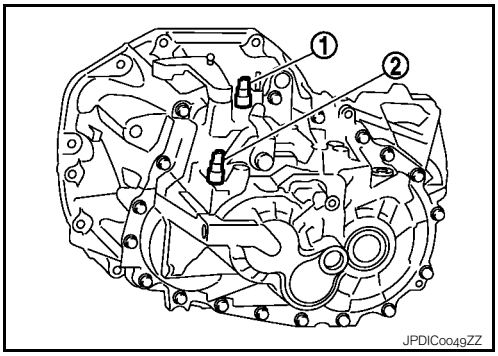
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PARK/NEUTRAL POSITION (PNP) SWITCH

Component Parts Location

INFOID:0000000001065857

1 : Park/Neutral position (PNP) switch
2 : Back-up lamp switch



Component Inspection

INFOID:0000000001065858

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

Check continuity between park/neutral position (PNP) switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
1 – 2	Neutral	Existed
	Except neutral	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace park/neutral position (PNP) switch. Refer to TM-125, "Exploded View".

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SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001034932

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-115			TM-125		TM-118	TM-125		TM-125			
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)	STRIKING ROD ASSEMBLY (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					3	3
	Jumps out of gear						1	2	3	3			

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PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Manual Transaxle

INFOID:0000000001066146

CAUTION:

- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never reuse transaxle gear oil, once it has been drained.**
- **Check oil level or replace gear oil with vehicle on level surface.**
- **During removal or installation, keep inside of transaxle 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.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.**
- **Never damage sliding surfaces and mating surfaces.**

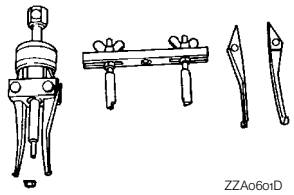
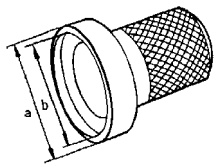
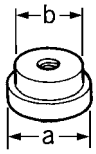
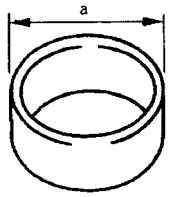
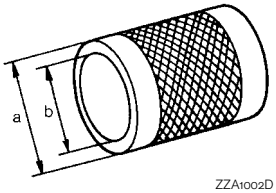
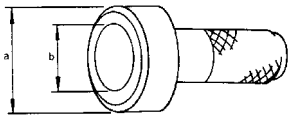
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PREPARATION

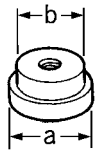
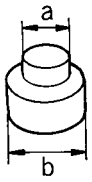
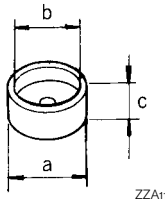
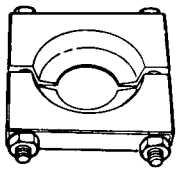
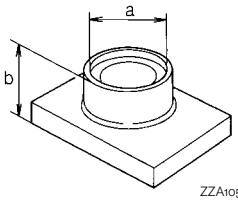
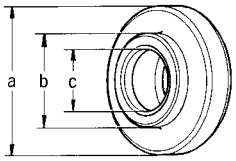
PREPARATION

Special Service Tools

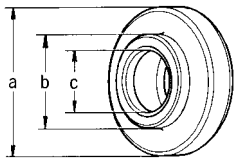
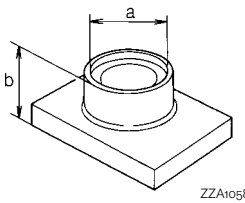
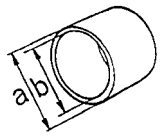
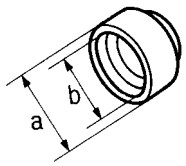
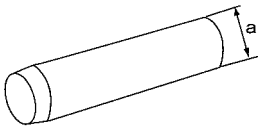
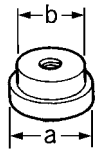
INFOID:0000000001069584

Tool number Tool name	Description
KV381054S0 Puller  ZZA0601D	• Removing differential side bearing outer race (transaxle case side) • Removing mainshaft front bearing • Removing differential side bearing outer race (clutch housing side)
ST33400001 Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  ZZA0814D	Installing differential side oil seal (clutch housing side)
ST35321000 Drift a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.  ZZA1000D	• Installing input shaft oil seal • Installing reverse main gear • Installing 1st main gear bushing • Installing 1st-2nd synchronizer hub assembly • Installing 2nd main gear bushing • Installing 3rd main gear
KV40105320 Drift a: 88 mm (3.46 in) dia.  ZZA0898D	Installing differential side bearing outer race (clutch housing side)
ST33200000 Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.  ZZA1002D	• Installing mainshaft front bearing • Installing 6th input gear bushing • Installing 4th main gear • Installing 5th main gear • Installing 6th main gear
ST30720000 Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.  ZZA0811D	• Installing differential side oil seal (transaxle case side) • Installing differential side bearing outer race (clutch housing side) • Installing differential side bearing outer race (transaxle case side) • Installing mainshaft rear bearing • Installing differential side bearing (clutch housing side) • Installing differential side bearing (transaxle case side)

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Tool number Tool name		Description
ST33061000 Drift a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia.	 ZZA1000D	• Installing bore plug • Removing differential side bearing (transaxle case side) • Removing differential side bearing (clutch housing side)
ST33052000 Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.	 ZZA1023D	• Removing input shaft rear bearing • Removing 6th input gear, 6th input gear bushing, 5th-6th synchronizer hub assembly, and 5th input gear • Removing 5th input gear bushing, 4th input gear, 4th input gear bushing, 3rd-4th synchronizer hub assembly, and 3rd input gear • Installing input shaft front bearing • Removing mainshaft rear bearing • Removing 6th main gear • Removing 4th main gear and 5th main gear
KV40105020 Drift a: 39.7 mm (1.563 in) dia. b: 35 mm (1.38 in) dia. c: 15 mm (0.59 in)	 ZZA1133D	Removing 3rd main gear, 2nd main gear, 2nd main gear bushing, 1st-2nd synchronizer hub assembly, 1st main gear, 1st main gear bushing, and reverse main gear
ST30031000 Puller	 ZZA0537D	Measuring wear of inner baulk ring
KV40105710 Press stand a: 46 mm (1.81 in) dia. b: 41 mm (1.61 in)	 ZZA1058D	• Installing 3rd-4th synchronizer hub assembly • Installing 4th input gear bushing • Installing 5th input gear bushing • Installing 5th-6th synchronizer hub assembly • Installing 2nd main gear bushing • Installing 3rd main gear
ST30901000 Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia.	 ZZA0978D	• Installing input shaft rear bearing • Installing 4th main gear • Installing 5th main gear • Installing 6th main gear • Installing mainshaft rear bearing

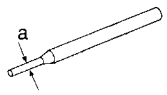
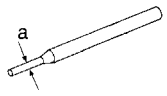
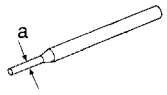
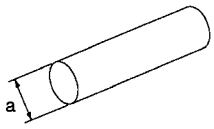
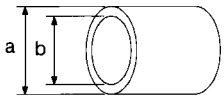
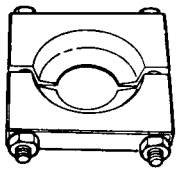
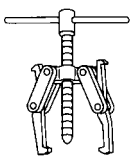
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Tool number Tool name		Description
ST30032000 Drift a: 80 mm (3.15 in) dia. b: 38 mm (1.50 in) dia. c: 31 mm (1.22 in) dia.	 ZZA0978D	Installing input shaft front bearing
ST38220000 Press stand a: 63 mm (2.48 in) dia. b: 65 mm (2.56 in)	 ZZA1058D	• Installing reverse main gear • Installing 1st main gear bushing • Installing 1st-2nd synchronizer hub assembly
KV40101630 Drift a: 68 mm (2.68 in) dia. b: 60 mm (2.36 in) dia.	 ZZA1003D	Installing reverse main gear
KV38102510 Drift a: 71 mm (2.80 in) dia. b: 65 mm (2.56 in) dia.	 ZZA0838D	• Installing 1st main gear bushing • Installing 1st-2nd synchronizer hub assembly • Installing differential side bearing (clutch housing side) • Installing differential side bearing (transaxle case side)
ST15243000 Drift a: 30 mm (1.18 in) dia.	 SCIA1088J	Measuring end play of side gear
ST30612000 Drift b: 62 mm (2.44 in) dia. b: 40 mm (1.57 in) dia.	 ZZA1000D	Removing output gear bearing

Commercial Service Tools

INFOID:0000000001069585

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Tool name	Description
Pin punch a: 4.5 mm (0.177 in) dia.  NT410	Removing and installing retaining pin
Pin punch a: 5.5 mm (0.217 in) dia.  NT410	Removing and installing retaining pin of selector lever
Pin punch a: 7.5 mm (0.295 in) dia.  NT410	Removing and installing retaining pin of each shifter lever
Drift a: 24.5 mm (0.965 in) dia.  S-NT063	Installing striking rod oil seal and shifter lever oil seal
Drift a: 80 mm (3.15 in) dia. b: 70 mm (2.76 in) dia.  S-NT474	Installing output gear bearing
Puller  ZZA0537D	Removing each bearing, gear, and bushing
Puller  NT077	Removing each bearing, gear, and bushing

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ON-VEHICLE MAINTENANCE

GEAR OIL

Exploded View

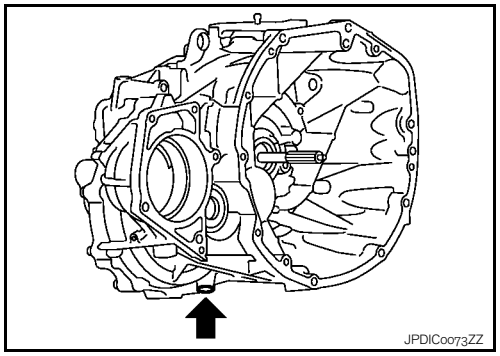
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Refer to TM-125, "Exploded View".

Draining

INFOID:0000000001034936

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug and then drain gear oil.
3. Set a new gasket on drain plug and install it to clutch housing. Tighten drain plug to the specified torque.
   CAUTION:
   Never reuse gasket.



Refilling

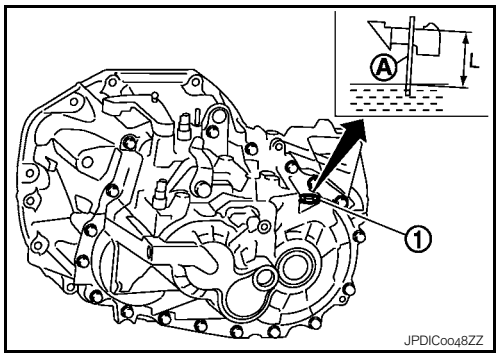
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1. Remove filler plug (1). Fill with new gear oil to transaxle.

   A : Suitable gauge

   Oil grade and viscosity **: Refer to MA-21, "Fluids and Lubricants".**

   Oil capacity (reference) **: Refer to TM-183, "General Specifications".**



2. After refilling gear oil, check oil level. Refer to TM-115, "Inspection".
3. Set a new gasket on filler plug and then install it to transaxle case.
   CAUTION:
   Never reuse gasket.
4. Tighten filler plug to the specified torque.

Inspection

INFOID:0000000001034938

LEAKAGE

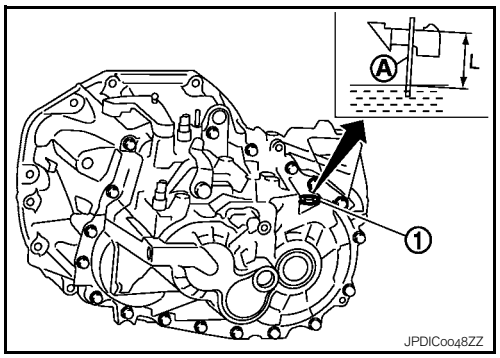
Make sure that gear oil is not leaking from transaxle or around it.

LEVEL

1. Remove filler plug (1).
2. Measure oil level using a suitable gauge (A) as shown in the figure and then check if it is within the specifications.

   Oil level "L" **: Refer to TM-183, "General Specifications".**

   CAUTION:
   Never start engine while checking oil level.
3. Set a new gasket on filler plug (1) and then install it to transaxle case.
   CAUTION:



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Never reuse gasket.

4. Tighten filler plug to the specified torque.

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ON-VEHICLE REPAIR

SIDE OIL SEAL

Exploded View

INFOID:0000000001066148

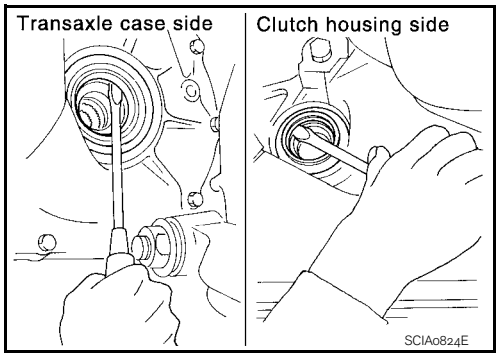
Refer to TM-125, "Exploded View".

Removal and Installation

INFOID:0000000001034939

REMOVAL

1. Remove front drive shafts. Refer to FAX-56, "Removal and Installation".
2. Remove differential side oil seals using a suitable tool.
   CAUTION:
   Never damage transaxle case and clutch housing.



INSTALLATION

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

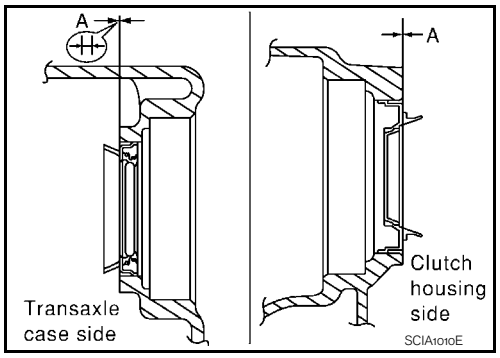
- Install differential side oil seal to clutch housing using the drift [SST: ST33400001].

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

  CAUTION:
  - **Never reuse differential side oil seal.**
  - **When installing, never incline differential side oil seal.**
  - **Never damage clutch housing.**
- Install differential side oil seal to transaxle case using the drift [SST: ST30720000].

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

  CAUTION:
  - **Never reuse differential side oil seal.**
  - **When installing, never incline differential side oil seal.**
  - **Never damage transaxle case.**
- Check oil level and oil leakage after installation. Refer to TM-115, "Inspection".

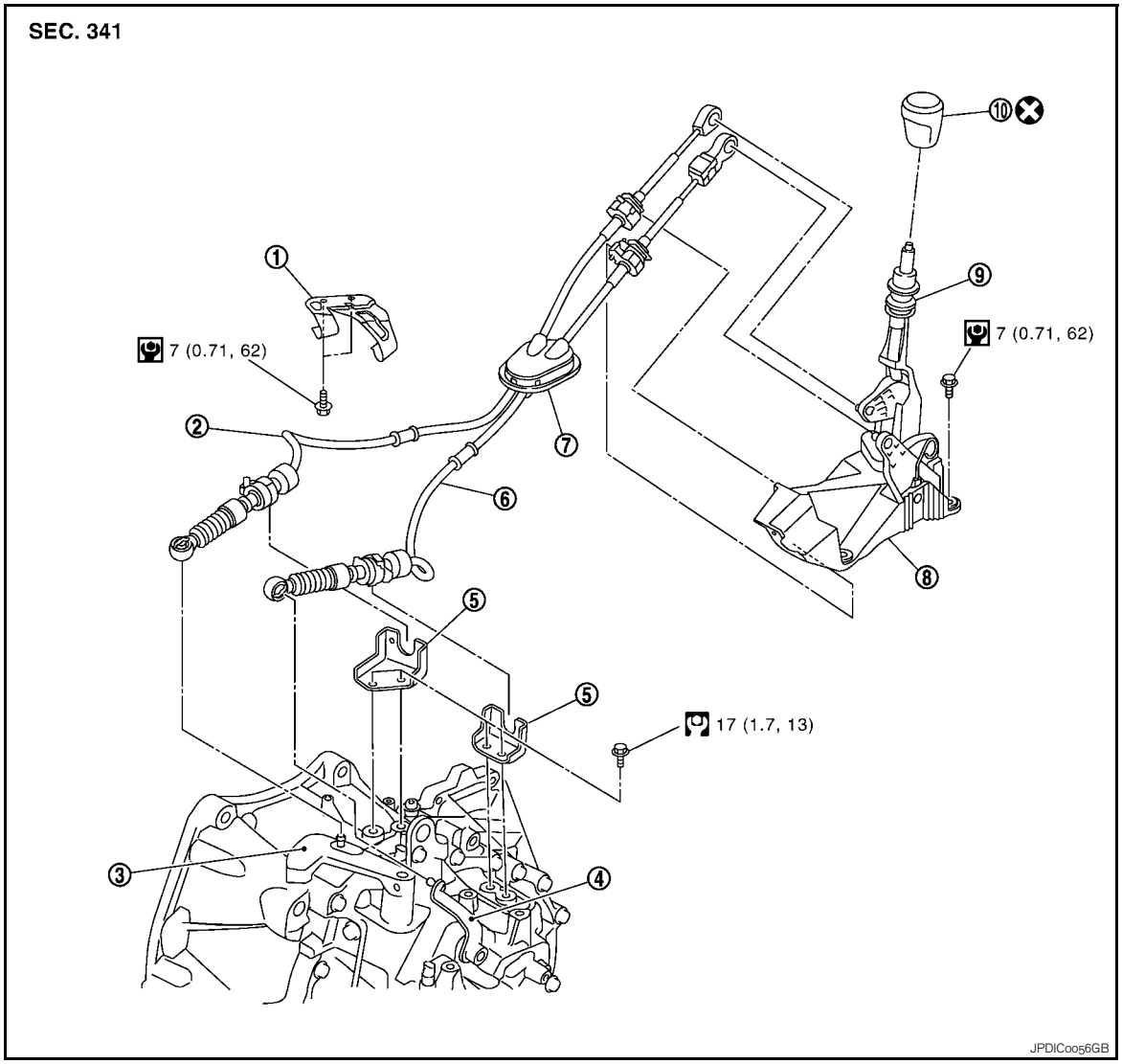


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CONTROL LINKAGE

Exploded View

INFOID:0000000001034944



1. Bracket
2. Shift cable
3. Shifter lever A
4. Selector lever
5. Cable mounting bracket
6. Select cable
7. Grommet
8. Control device assembly
9. Control lever
10. Control lever knob

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

Removal and Installation

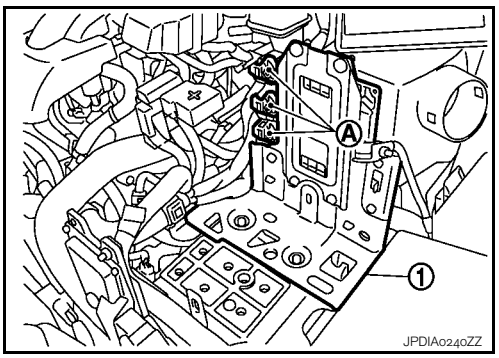
INFOID:0000000001034945

REMOVAL

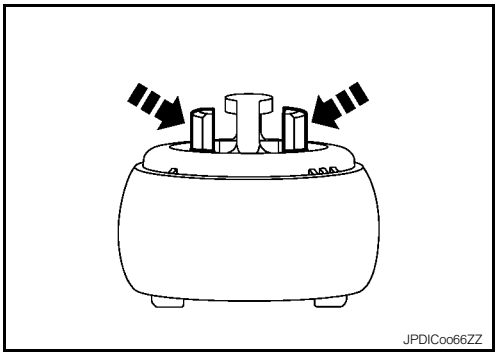
1. Remove the air cleaner case and air duct (inlet). Refer to EM-144, "Removal and Installation".
2. Remove the battery. Refer to PG-118, "Removal and Installation".

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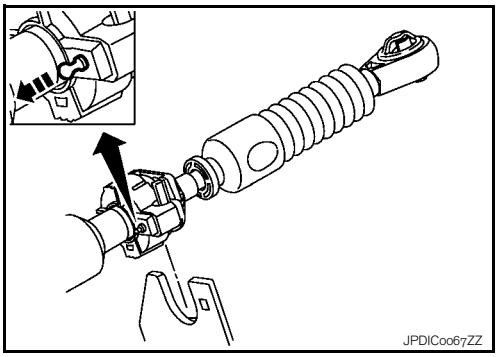
3. Disconnect connectors (A) and then remove bracket (1).



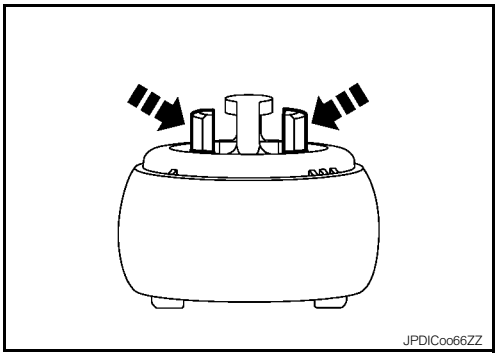
4. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the selector lever.
5. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the shifter lever A.



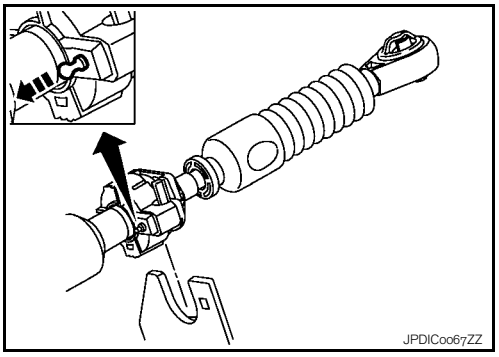
6. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the cable mounting bracket.
7. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the cable mounting bracket.
8. Remove the control lever knob.
9. Remove console finisher assembly and the center console assembly. Refer to IP-18, "Removal and Installation".
10. Shift the control lever to the neutral position.



11. While pressing the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
12. While pressing the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.



13. While pulling the lock of the select cable in the direction of the arrow shown in the figure, remove the select cable from the control device assembly.
14. While pulling the lock of the shift cable in the direction of the arrow shown in the figure, remove the shift cable from the control device assembly.
15. Remove the control device assembly.
16. Remove the heat plate.
17. Remove the bracket.



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18. Remove the grommet and then remove the shift cable and select cable from the vehicle.

INSTALLATION

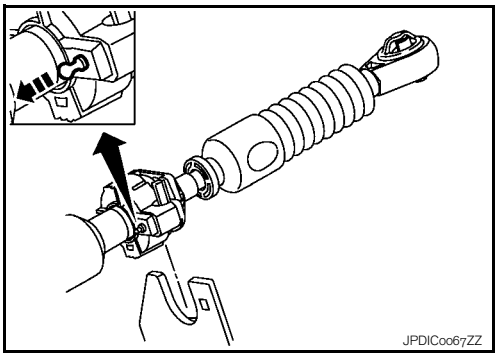
Note the following, and install in the reverse order of removal.

- Shift the control lever to the neutral position.
- Securely assemble each cable and the selector lever and shifter lever A.
- Securely assemble each cable and the cable mounting bracket.
- Securely assemble each cable and the control device assembly.
- Make sure that the claws of grommet are in contact with the floor.
- Be careful about the installation direction and push the control lever knob into the control lever.

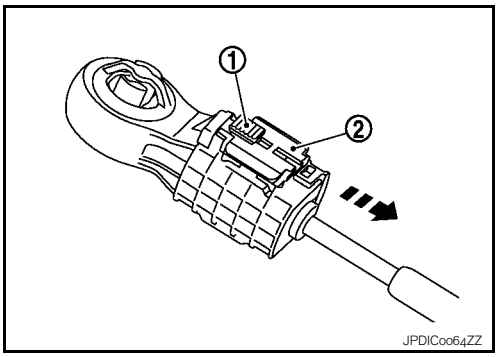
CAUTION:
Never reuse control lever knob.

Install the select cable (the control device assembly side) with the following procedure.

1. While pulling the lock of the select cable in the direction of the arrow shown in the figure, install the select cable to the control device assembly.



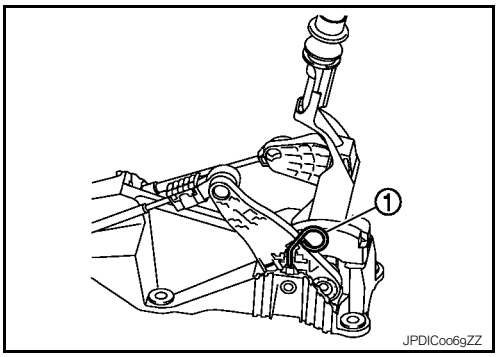
2. Slide the lock (1) of the select cable in the direction of the arrow as shown in the figure to pull up the stopper (2) of the select cable.
3. Install the end of the select cable to the pin of the control device assembly.



4. Install the lever stopper pin (1) or a pin [3 mm (0.12 in) dia.] to the control device assembly.

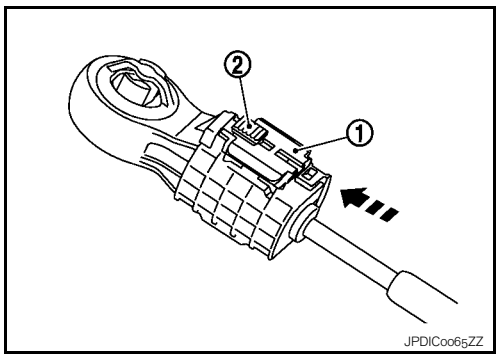
CAUTION:
Select cable cannot be adjusted accurately without a use of a lever stopper pin or a pin [3 mm (0.12 in) dia.].
NOTE:
A lever stopper pin is not included in control device assembly. Therefore, if the control device assembly is not replaced, prepare a pin [3 mm (0.12 in) dia.].

5. Check that the control lever does not move in the direction of the select. If it moves, repeat step 3.
6. Shift the control lever to 4th gear position.



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7. With the stopper (1) of the select cable pressed into all the way, slide lock (2) of the select cable all the way in the direction of the arrow.
8. Remove the lever stopper pin or a pin [3 mm (0.12 in) dia.] from the control device assembly.
9. Shift the control lever to each gear position to check that there is no bindings. If any, repeat step 3.



Inspection

INFOID:0000000001034946

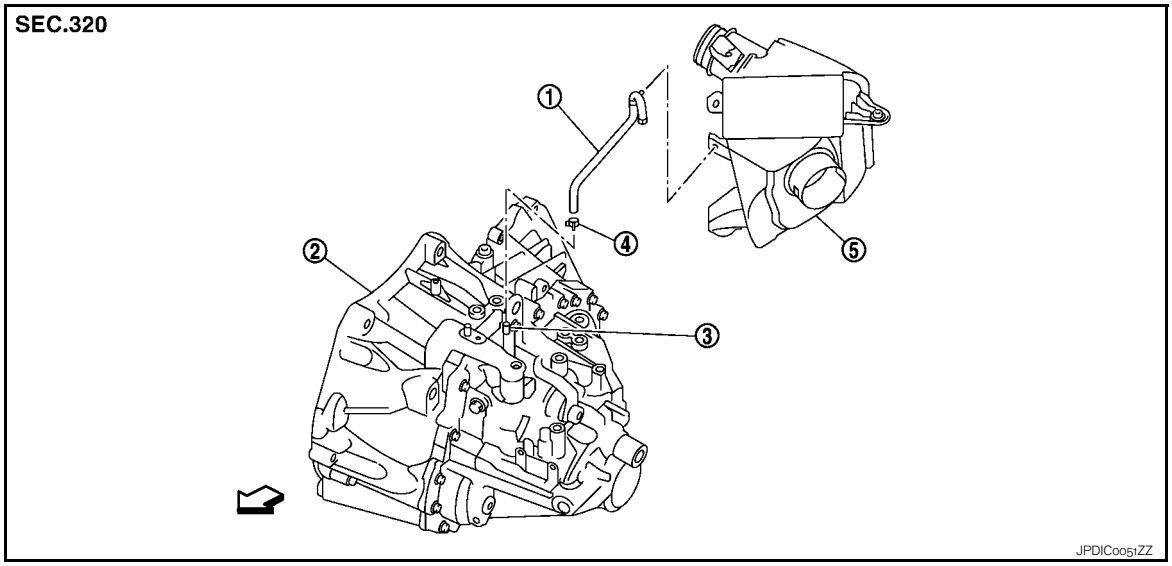
After installing, confirm the following items:
- When the control lever is shifted to 1st-2nd side and 5th-6th side, confirm the control lever returns to neutral position smoothly.
- When the control lever is shifted to each position, make sure there is no binding or disconnection in each boot.

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AIR BREATHER HOSE

Exploded View

INFOID:0000000001034947



1. Air breather hose
2. Transaxle assembly
3. Air breather tube
4. Clamp
5. Air cleaner case

⇦: Vehicle front

Removal and Installation

INFOID:0000000001034948

REMOVAL

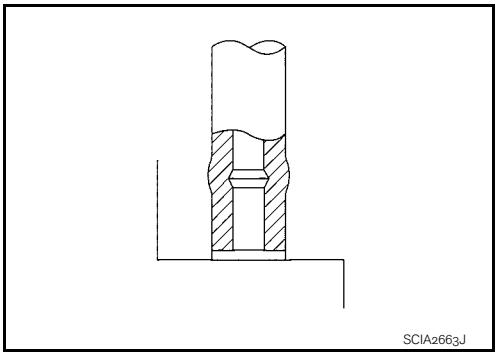
Refer to the figure for removal procedure.

INSTALLATION

Refer to the figure for installation procedure.

CAUTION:

- **Make sure there are no pinched or restricted areas on the air breather hose caused by bending or winding when installing it.**
- **Be sure to insert air breather hose into air breather tube until hose end reaches the tube's base.**
- **Set air breather hose with painted mark facing forward.**
- **Install air breather hose to air cleaner case by fully inserting the clip.**



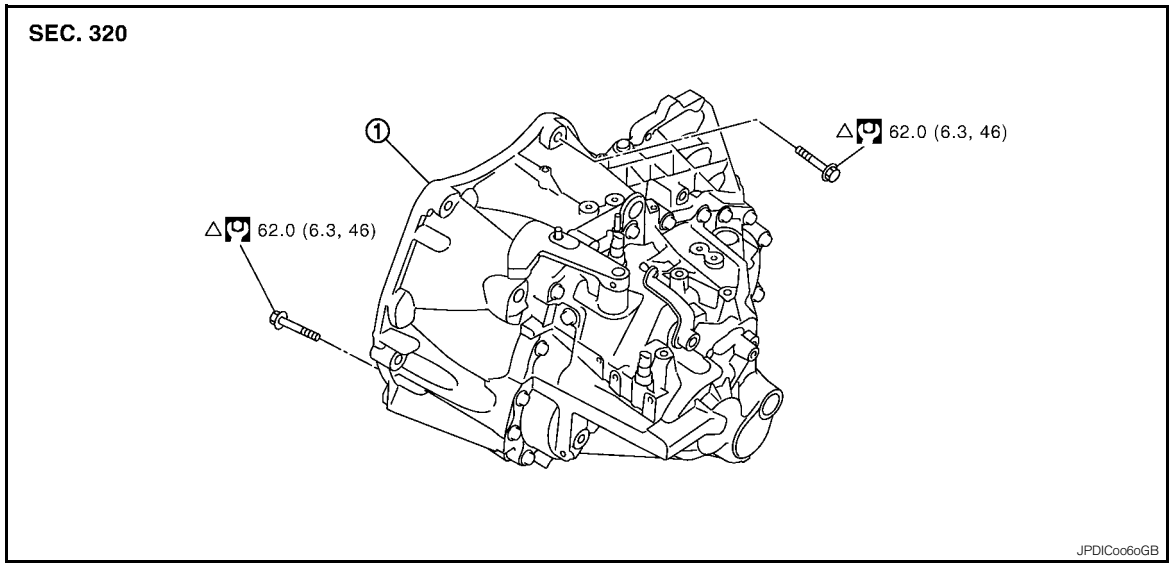
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REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001034949



1. Transaxle assembly

△: For the bolt mounting positions, refer to “INSTALLATION”.

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

CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

Removal and Installation

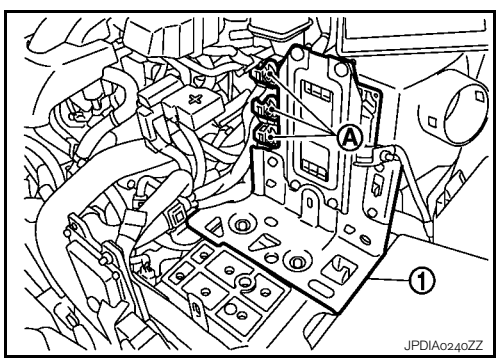
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CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-122, "Removal and Installation".
3. Remove air cleaner case and air duct (inlet). Refer to EM-144, "Removal and Installation".
4. Remove battery. Refer to PG-118, "Removal and Installation".
5. Disconnect connectors (A) and then remove bracket (1).
6. Drain clutch fluid and then remove clutch tube from CSC (Concentric Slave Cylinder). Refer to CL-14, "Removal and Installation".
   CAUTION:
   Never depress clutch pedal during removal procedure.
7. Disconnect park/neutral position (PNP) switch harness connector.
8. Disconnect back-up lamp switch harness connector.
9. Disconnect ground cable.
10. Remove wire harnesses from transaxle assembly.



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11. Disconnect select cable and shift cable from transaxle assembly. Refer to TM-118, "Removal and Installation".
12. Remove starter motor. Refer to STR-27, "MR20DE MODELS : Removal and Installation".
13. Remove engine under cover.
14. Drain gear oil. Refer to TM-115, "Draining".
15. Remove exhaust front tube. Refer to EX-10, "Removal and Installation".
16. Remove propeller shaft assembly. Refer to DLN-110, "Removal and Installation".
17. Remove front drive shafts. Refer to FAX-56, "Removal and Installation".
    NOTE:
    Insert a suitable plug into differential side oil seal after removing front drive shaft.
18. Remove transfer assembly. Refer to DLN-58, "M/T : Removal and Installation".
19. Remove rear engine mounting brackets and rear torque rod. Refer to EM-195, "M/T : Removal and Installation".
20. Remove suspension member and suspension member stay. Refer to FSU-17, "Removal and Installation".
21. Set a suitable jack to transaxle assembly and then set a suitable jack to engine assembly.
    CAUTION:
    When setting a suitable jack, be careful so that it does not contact with the switch.
22. Remove transaxle assembly mounting bolts.
23. Remove engine mounting through bolt-securing nut. Refer to EM-195, "M/T : Removal and Installation".
24. Remove transaxle assembly from the vehicle.
    CAUTION:
    - **Secure transaxle assembly to a suitable jack while removing it.**
    - **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
25. Remove CSC (Concentric Slave Cylinder). Refer to CL-15, "Removal and Installation".
    CAUTION:
    If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

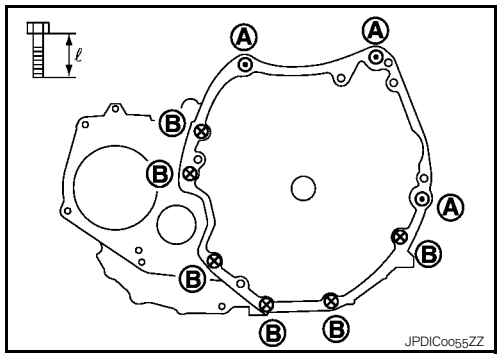
INSTALLATION

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

- Tighten transaxle assembly mounting bolts to the specified torque. The figure is the view from the engine.

: Transaxle to engine

: Engine to transaxle



Bolt symbol	A	B
Quantity	3	6
Bolt length " ℓ " mm (in)	60 (2.36)	50 (1.97)

CAUTION:
- **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
- **When installing transaxle assembly, never bring input shaft into contact with clutch cover.**

- Refer to CL-15, "Removal and Installation" for CSC (Concentric Slave Cylinder) installation procedure.
- Refer to TM-118, "Removal and Installation" for select cable and shift cable installation procedure.
- Bleed the air from the clutch hydraulic system. Refer to CL-6, "Air Bleeding Procedure".
- After installation, check for oil leakage and oil level. Refer to TM-115, "Inspection".

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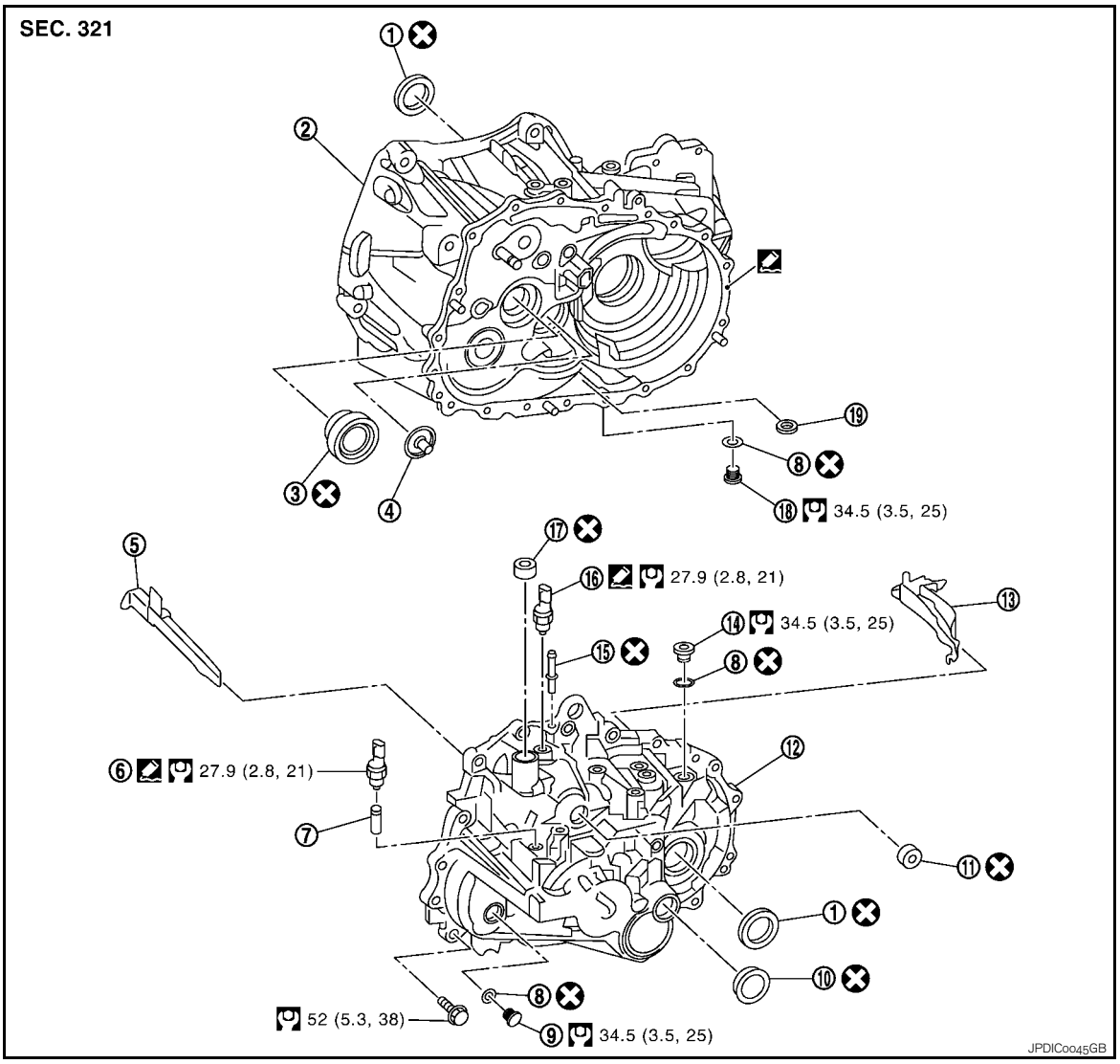
DISASSEMBLY AND ASSEMBLY

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001034951

CASE AND HOUSING



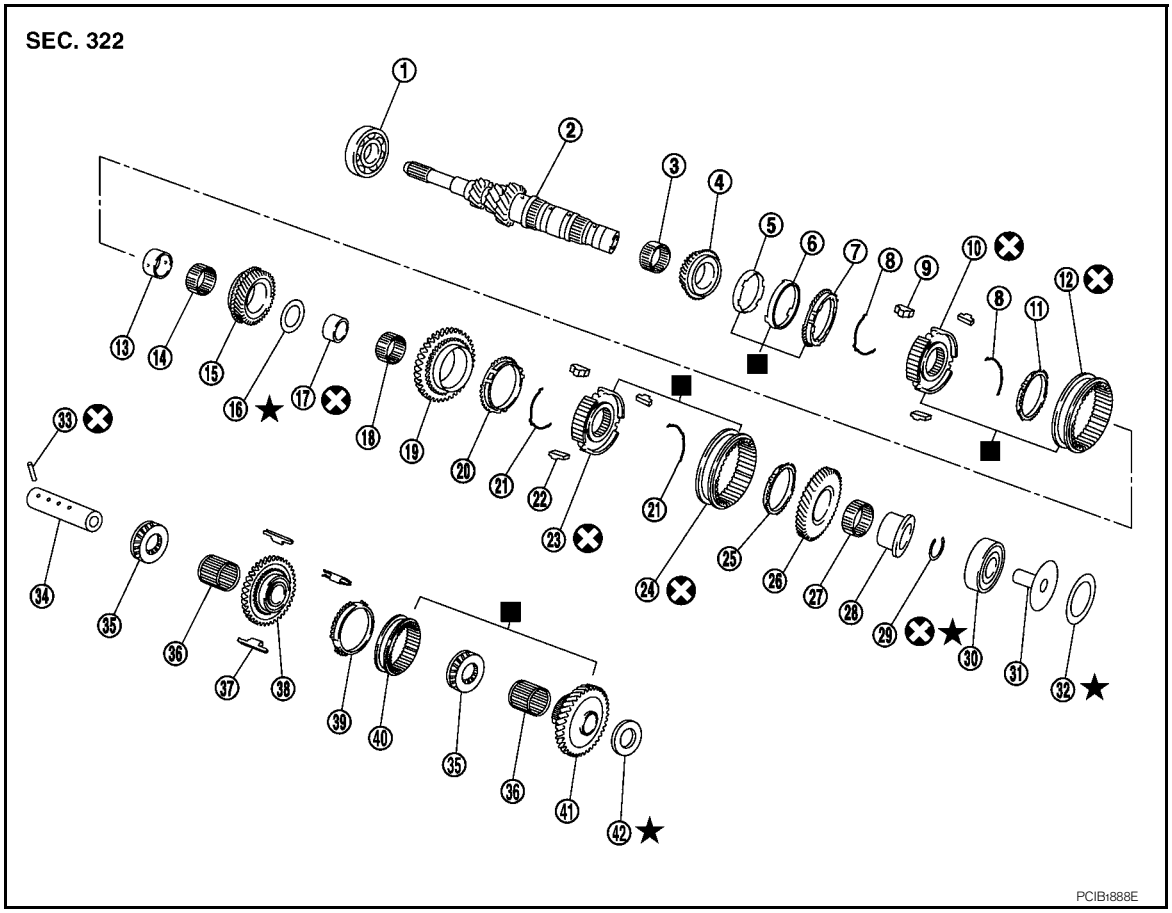
1. Differential side oil seal
2. Clutch housing
3. Input shaft oil seal
4. Oil channel
5. Oil gutter A
6. Back-up lamp switch
7. Plunger
8. Gasket
9. Plug
10. Bore plug
11. Striking rod oil seal
12. Transaxle case
13. Oil gutter B
14. Filler plug
15. Air breather tube
16. Park/Neutral position (PNP) switch
17. Shifter lever oil seal
18. Drain plug
19. Magnet

: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

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

SHAFT AND GEAR

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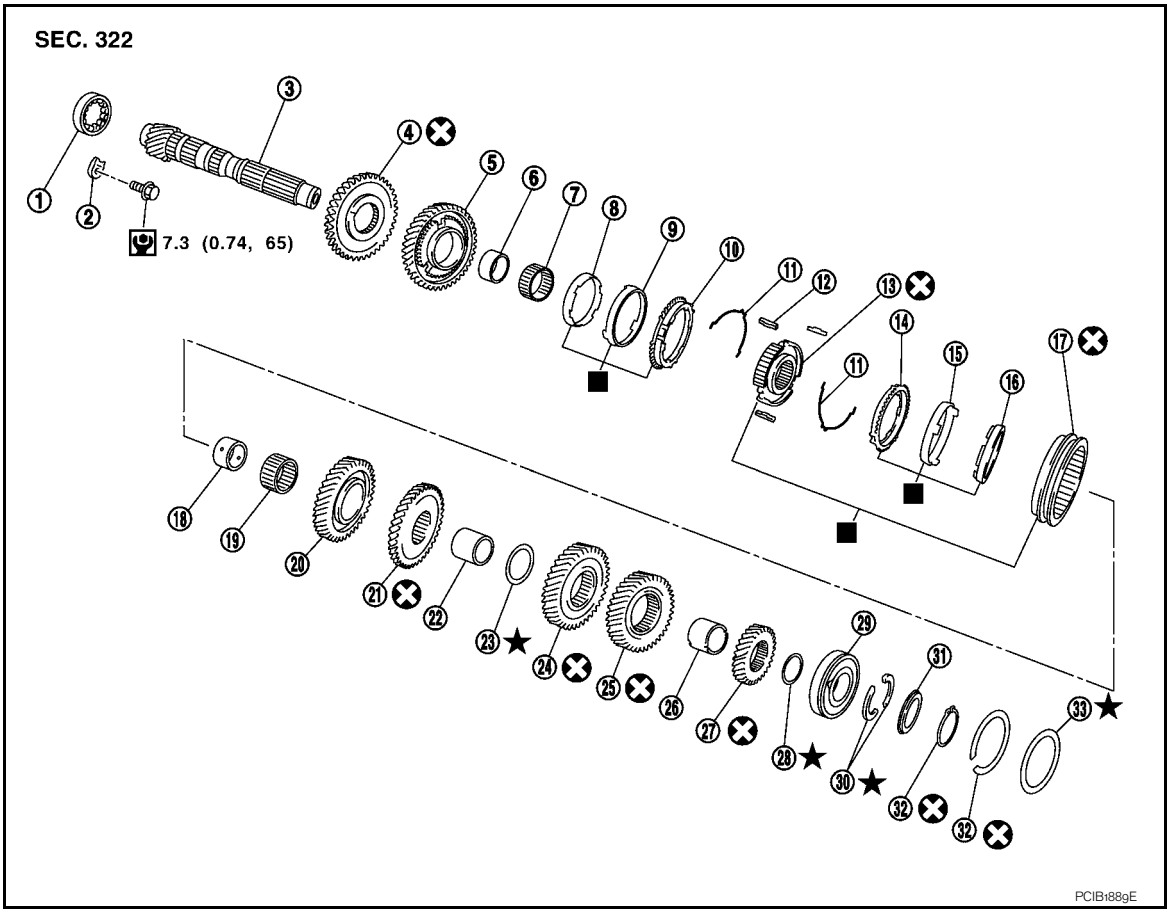
1. Input shaft front bearing
2. Input shaft
3. 3rd needle bearing
4. 3rd input gear
5. 3rd inner baulk ring
6. 3rd synchronizer cone
7. 3rd outer baulk ring
8. 3rd-4th spread spring
9. 3rd-4th shifting insert
10. 3rd-4th synchronizer hub
11. 4th baulk ring
12. 3rd-4th coupling sleeve
13. 4th input gear bushing
14. 4th needle bearing
15. 4th input gear
16. Thrust washer
17. 5th input gear bushing
18. 5th needle bearing
19. 5th input gear
20. 5th baulk ring
21. 5th-6th spread spring
22. 5th-6th shifting insert
23. 5th-6th synchronizer hub
24. 5th-6th coupling sleeve
25. 6th baulk ring
26. 6th input gear
27. 6th needle bearing
28. 6th input gear bushing
29. Snap ring
30. Input shaft rear bearing
31. Oil channel
32. Input shaft rear bearing adjusting shim
33. Retaining pin
34. Reverse idler shaft
35. Thrust needle bearing
36. Reverse idler gear needle bearing
37. Reverse insert spring
38. Reverse idler gear (front)
39. Reverse baulk ring
40. Reverse coupling sleeve
41. Reverse idler gear (rear)
42. Reverse idler gear adjusting shim

■: Replace the parts as a set.

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

- Apply gear oil to gears, shafts, synchronizers, and bearings when assembly.

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1. Mainshaft front bearing
2. Mainshaft bearing retainer
3. Mainshaft
4. Reverse main gear
5. 1st main gear
6. 1st main gear bushing
7. 1st needle bearing
8. 1st inner baulk ring
9. 1st synchronizer cone
10. 1st outer baulk ring
11. 1st-2nd spread spring
12. 1st-2nd shifting insert
13. 1st-2nd synchronizer hub
14. 2nd outer baulk ring
15. 2nd synchronizer cone
16. 2nd inner baulk ring
17. 1st-2nd coupling sleeve
18. 2nd main gear bushing
19. 2nd needle bearing
20. 2nd main gear
21. 3rd main gear
22. 3rd-4th mainshaft spacer
23. 4th main gear adjusting shim
24. 4th main gear
25. 5th main gear
26. 5th-6th mainshaft spacer
27. 6th main gear
28. 6th main gear adjusting shim
29. Mainshaft rear bearing
30. Mainshaft C-ring
31. C-ring holder
32. Snap ring
33. Mainshaft rear bearing adjusting shim

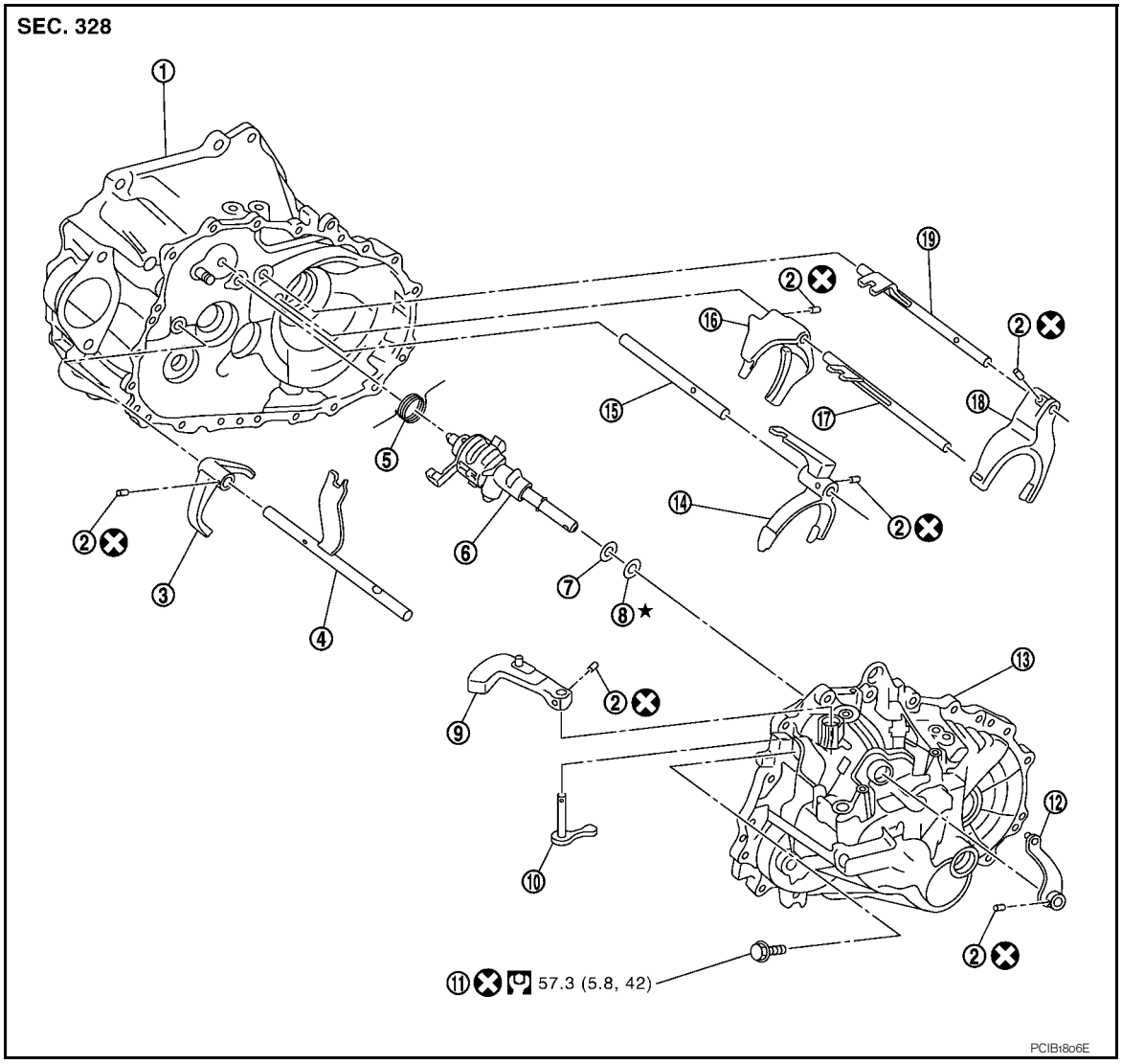
■: Replace the parts as a set.

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

- Apply gear oil to gears, shafts, synchronizers, and bearings when assembly.

SHIFT FORK AND FORK ROD

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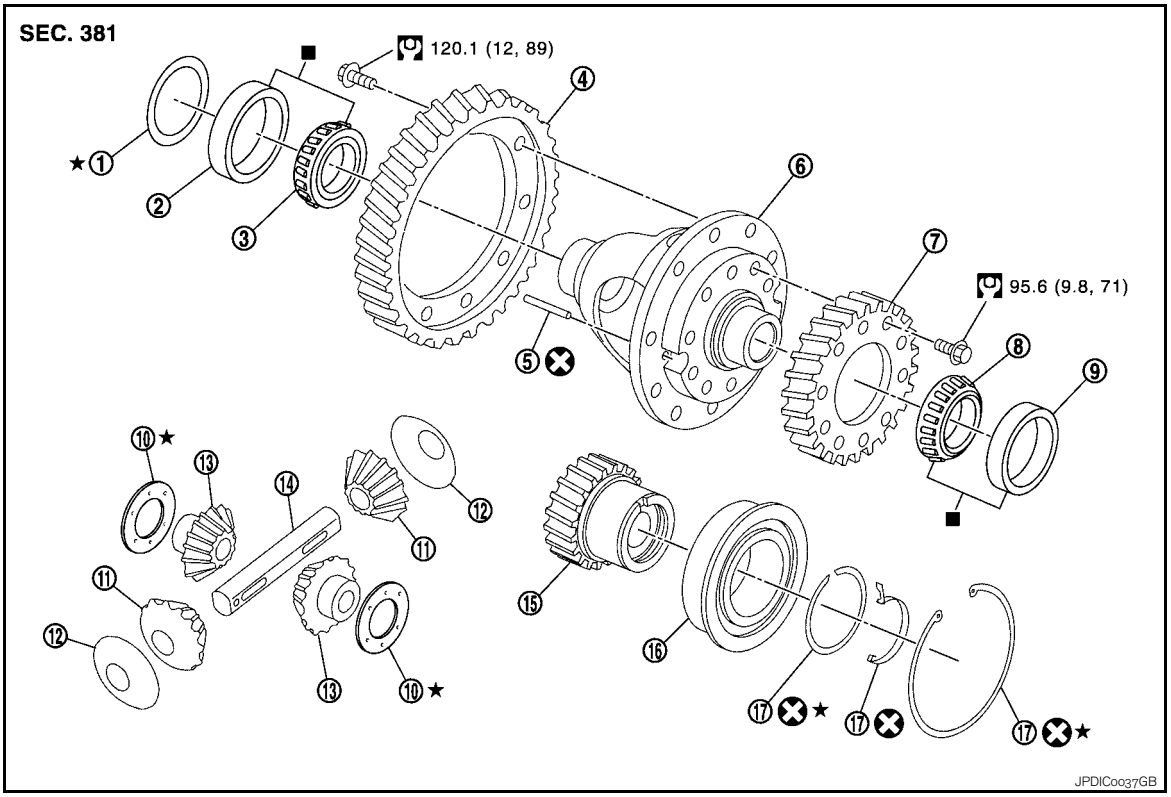


1. Clutch housing
2. Retaining pin
3. Reverse shift fork
4. Reverse fork rod
5. Return spring
6. Striking rod assembly
7. Striking rod shim
8. Striking rod adjusting shim
9. Shifter lever A
10. Shifter lever B
11. Guide bolt
12. Selector lever
13. Transaxle case
14. 3rd-4th shift fork
15. 3rd-4th fork rod
16. 1st-2nd shift fork
17. 1st-2nd fork rod
18. 5th-6th shift fork
19. 5th-6th fork rod

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

FINAL DRIVE

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1. Differential side bearing adjusting shim
2. Differential side bearing outer race (transaxle case side)
3. Differential side bearing (transaxle case side)
4. Final gear
5. Retaining pin
6. Differential case
7. Reduction gear
8. Differential side bearing (clutch housing side)
9. Differential side bearing outer race (clutch housing side)
10. Side gear thrust washer
11. Pinion mate gear
12. Pinion mate thrust washer
13. Side gear
14. Pinion mate shaft
15. Output gear
16. Output gear bearing
17. Snap ring

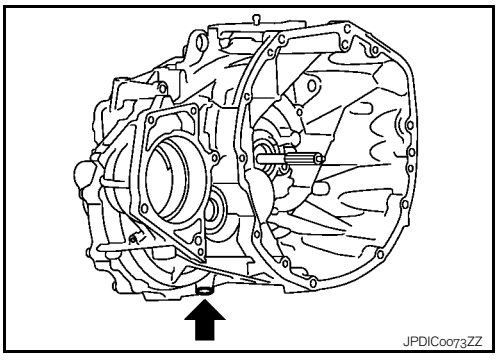
■: Replace the parts as a set.

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

Disassembly

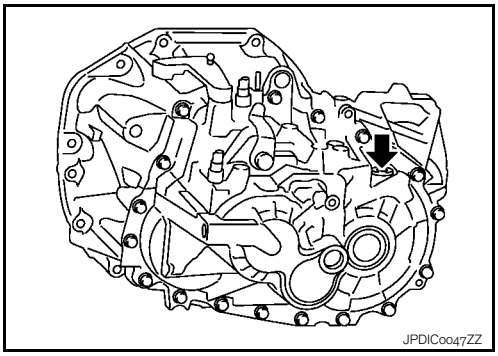
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1. Remove drain plug and gasket from clutch housing.

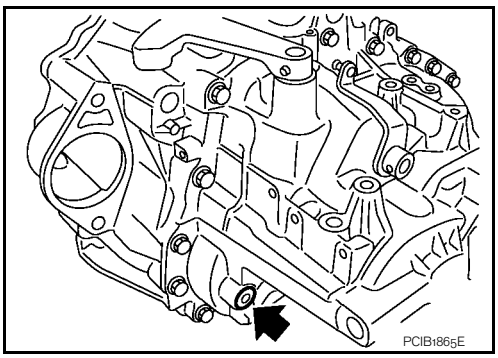


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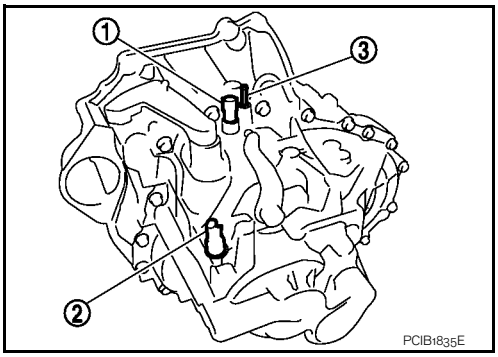
2. Remove filler plug and gasket from transaxle case.



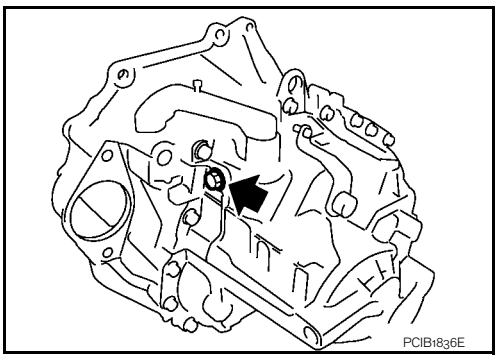
3. Remove plug and gasket from transaxle case.



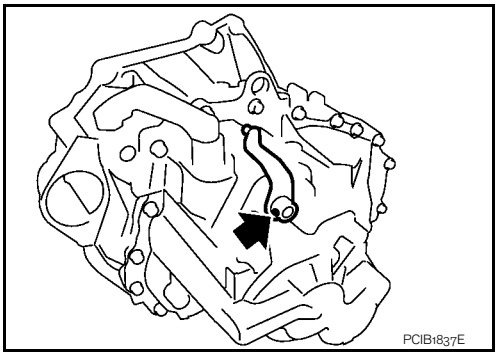
4. Remove park/neutral position (PNP) switch (1) from transaxle case.
5. Remove back-up lamp switch (2) and plunger from transaxle case.
   CAUTION:
   Never lose plunger.
6. Remove air breather tube (3) from transaxle case.



7. Remove guide bolt from transaxle case.

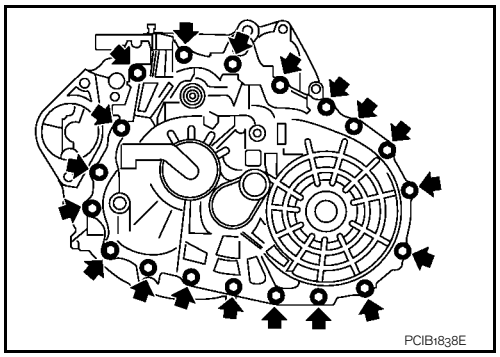


8. Remove retaining pin using a pin punch and then remove selector lever from transaxle case.

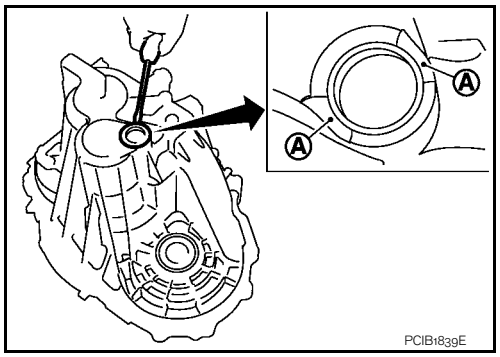


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9. Remove transaxle case mounting bolts.

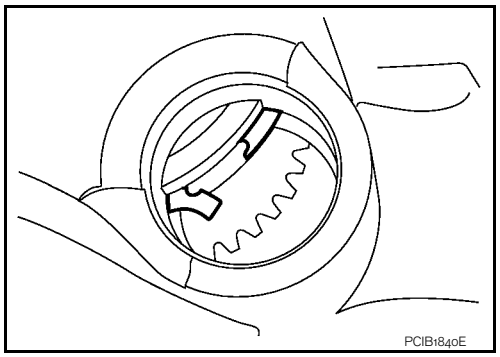


10. Remove bore plug from transaxle case.
CAUTION:
- **Never damage transaxle case.**
- **Access bore plug from cutout (A) of transaxle case when removing.**

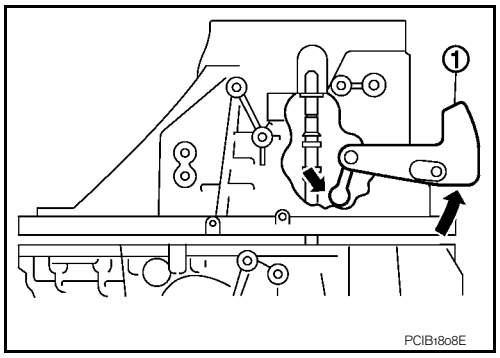


11. Remove transaxle case following the procedures below.

a. Expand snap ring at mainshaft rear bearing accessing from the bore plug hole. Then pull up transaxle case from clutch housing until snap ring comes off.



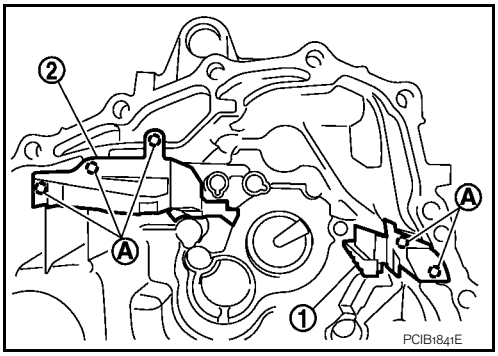
b. With shifter lever A (1) held in the position shown in the figure, remove transaxle case from clutch housing.
CAUTION:
Never drop each adjusting shim.
NOTE:
Make sure to hold shifter lever A in the position shown in the figure. Otherwise transaxle case cannot be removed from clutch housing.



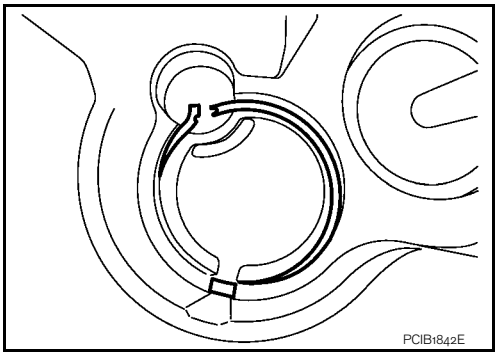
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12. Remove oil gutter A (1) and oil gutter B (2) from transaxle case.

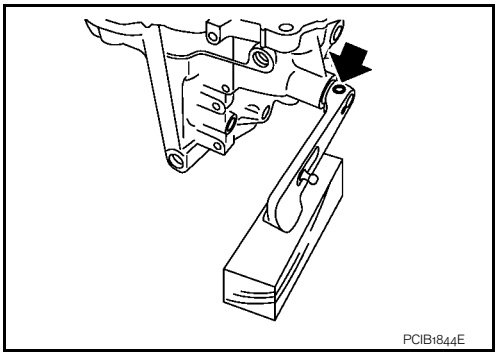
A : Tab of oil gutter



13. Remove snap ring from transaxle case.



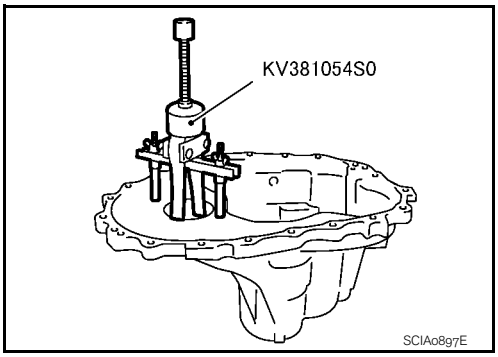
14. Remove retaining pin using a pin punch and then remove shifter lever A and shifter lever B from transaxle case.



15. Remove differential side bearing outer race (transaxle case side) from transaxle case using the puller and then remove differential side bearing adjusting shim from transaxle case.

CAUTION:

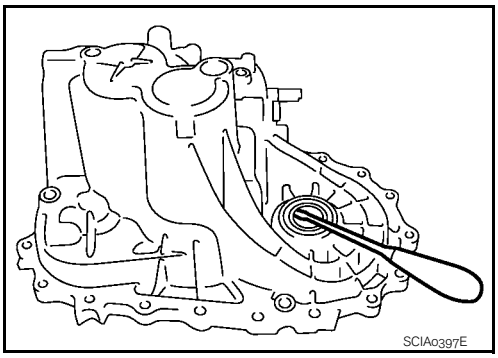
Never damage transaxle case and differential side bearing outer race.



16. Remove differential side oil seal from transaxle case.

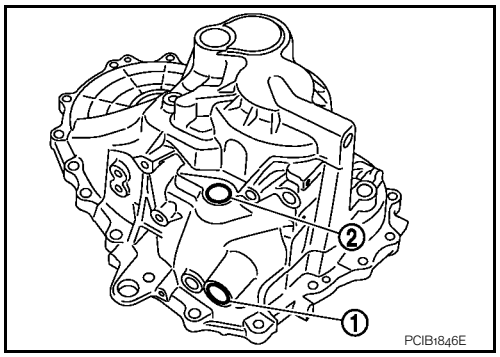
CAUTION:

Never damage transaxle case.

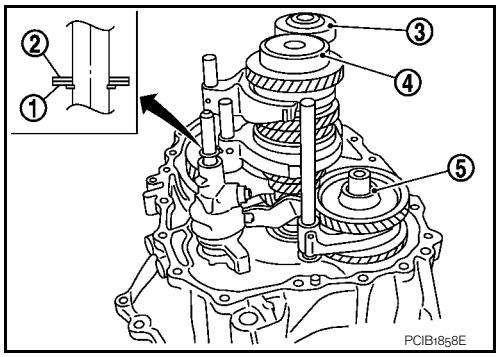


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17. Remove shifter lever oil seal (1) and striking rod oil seal (2) from transaxle case.
CAUTION:
Never damage transaxle case.

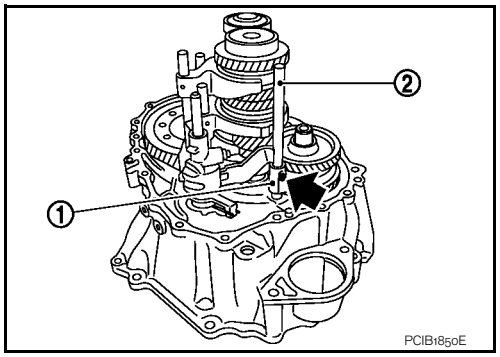


18. Remove striking rod shim (1), striking rod adjusting shim (2), mainshaft rear bearing adjusting shim (3), input shaft rear bearing adjusting shim (4), and reverse idler gear adjusting shim (5).

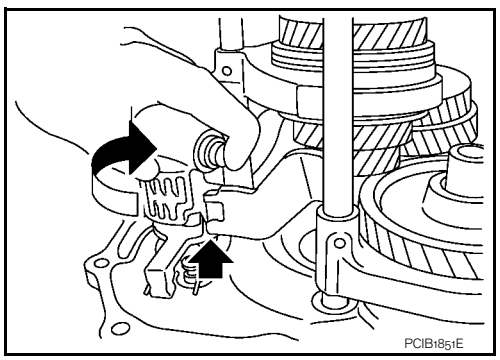


19. Remove retaining pin of reverse shift fork (1) using a pin punch.

2 : Reverse fork rod

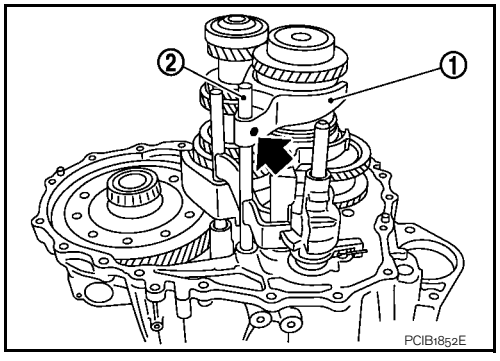


20. Rotate striking lever of striking rod assembly as shown in the figure. Then rotate reverse fork rod to a position where bracket of reverse fork rod does not interfere with striking lever of striking rod assembly.
21. Pull out reverse shift fork and reverse fork rod.



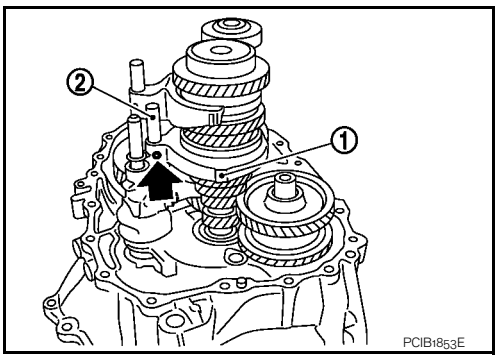
22. Remove retaining pin of 5th-6th shift fork (1) using a pin punch.

2 : 5th-6th fork rod

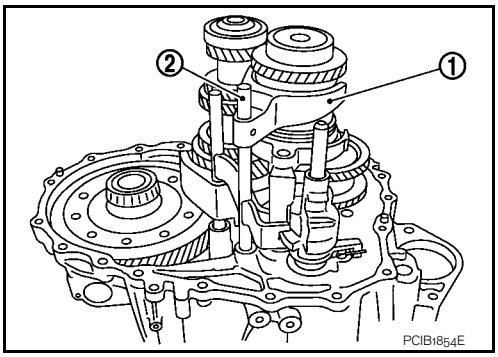


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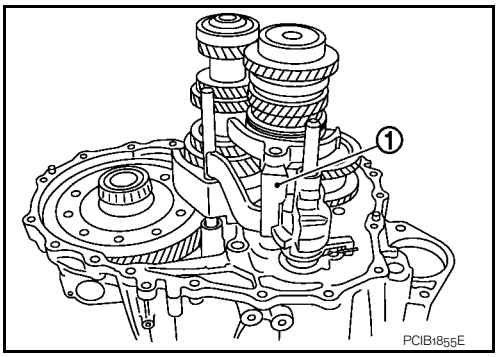
23. Remove retaining pin of 3rd-4th shift fork (1) using a pin punch.
24. Pull out 3rd-4th fork rod (2).



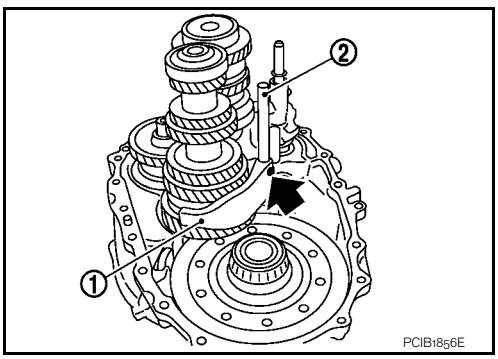
25. Pull out 5th-6th shift fork (1) and 5th-6th fork rod (2).



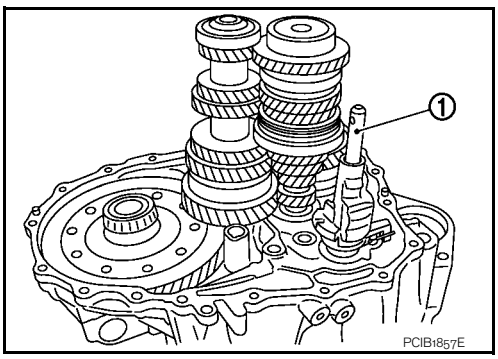
26. Pull out 3rd-4th shift fork (1).



27. Remove retaining pin of 1st-2nd shift fork (1) using a pin punch.
28. Pull out 1st-2nd shift fork and 1st-2nd fork rod (2).



29. Remove striking rod assembly (1).

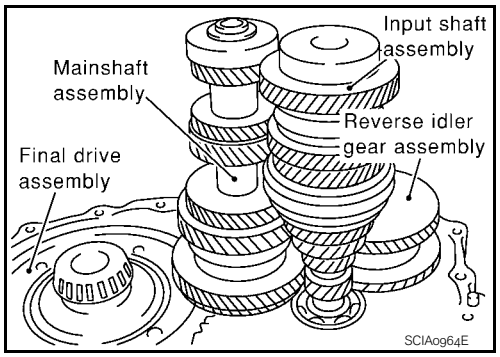


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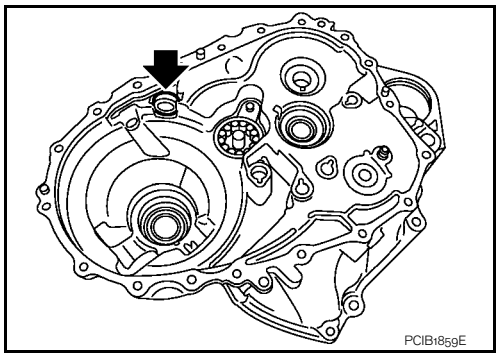
30. Remove gear components from clutch housing in the following procedure.

a. Remove a set of input shaft assembly, mainshaft assembly, and reverse idler gear assembly by tapping the tip of input shaft from the back of the clutch housing with a plastic hammer.
CAUTION:
Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.

b. Remove final drive assembly.

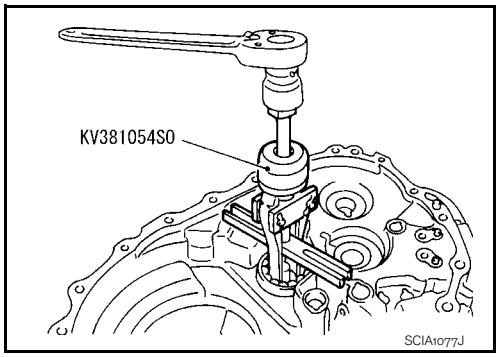


31. Remove magnet from clutch housing.

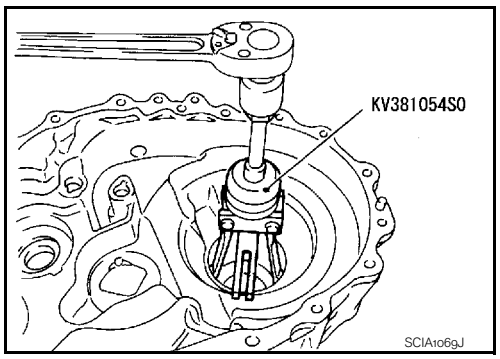


32. Remove mainshaft bearing retainer and then mainshaft front bearing from clutch housing using the puller.
CAUTION:
Never damage clutch housing, mainshaft front bearing, and oil channel.

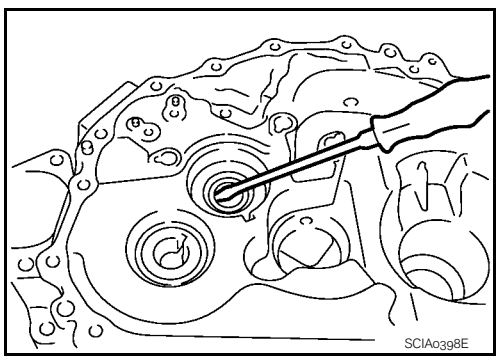
33. Remove oil channel from clutch housing.



34. Remove differential side bearing outer race (clutch housing side) from clutch housing using the puller.
CAUTION:
Never damage clutch housing and differential side bearing outer race.

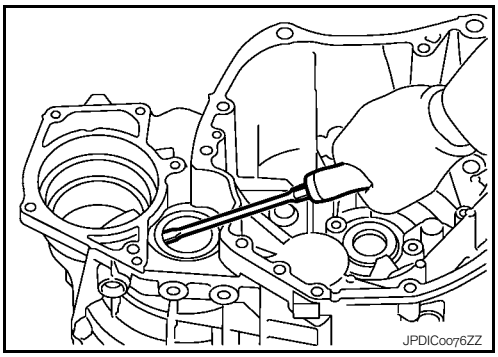


35. Remove input shaft oil seal from clutch housing.
CAUTION:
Never damage clutch housing.

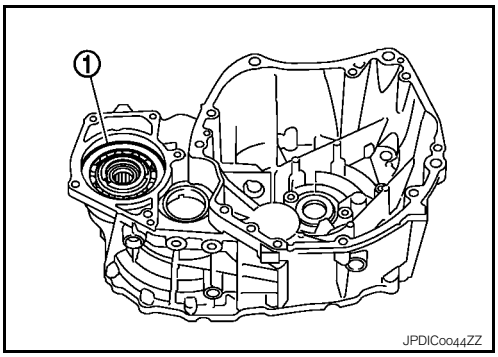


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36. Remove differential side oil seal from clutch housing.
CAUTION:
Never damage clutch housing.

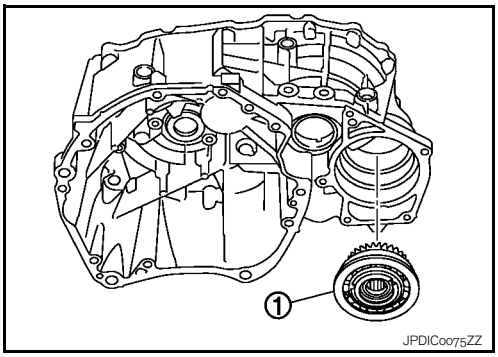


37. Remove snap ring (1) from clutch housing.
CAUTION:
Never damage clutch housing.



38. With output gear assembly (1) held by hand, turn clutch housing upside down as shown in the figure.
CAUTION:
- **When turning clutch housing upside down, hold output gear assembly by hand so that it will not become detached.**
- **Never damage clutch housing.**

NOTE:
Output gear assembly spontaneously falls when changing the clutch housing direction as shown in the figure.

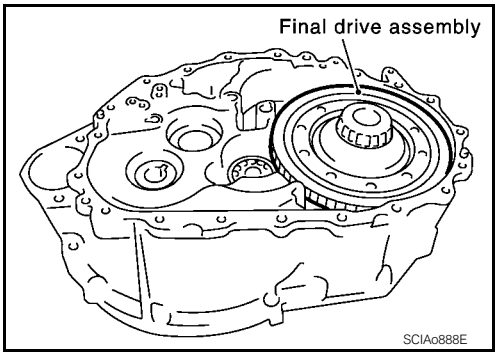


39. With output gear assembly held by hand, slowly remove output gear assembly from clutch housing. If output gear assembly can not be removed, tap it with a plastic hammer from the transaxle case contact surface side of clutch housing for removal.

Assembly

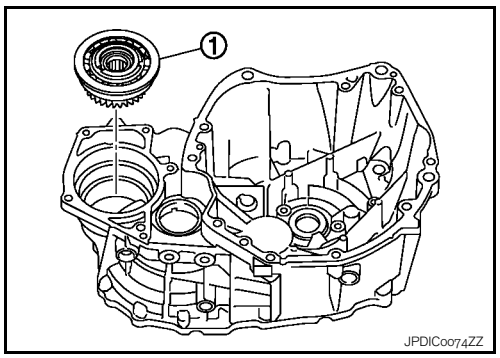
INFOID:0000000001034953

1. Install final drive assembly into clutch housing.
2. Select differential side bearing adjusting shim. Refer to TM-147, "Adjustment".
CAUTION:
Never select differential side bearing adjusting shim with output gear assembly installed on clutch housing.
3. Remove final drive assembly.



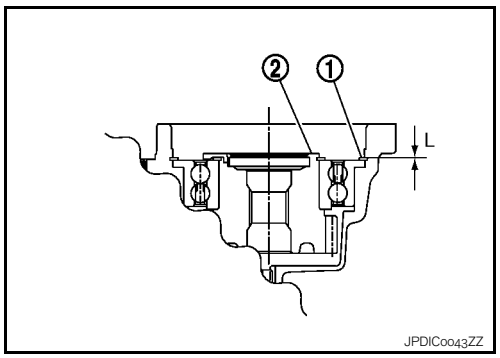
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4. Turn clutch housing upside down as shown in the figure. And then install output gear assembly (1) into clutch housing.



CAUTION:
- **Gently install it, aligning the clutch housing hole with the center of output gear assembly.**
- **Install output gear assembly, straightening it with a magnet.**
- **Never damage clutch housing and output gear assembly.**

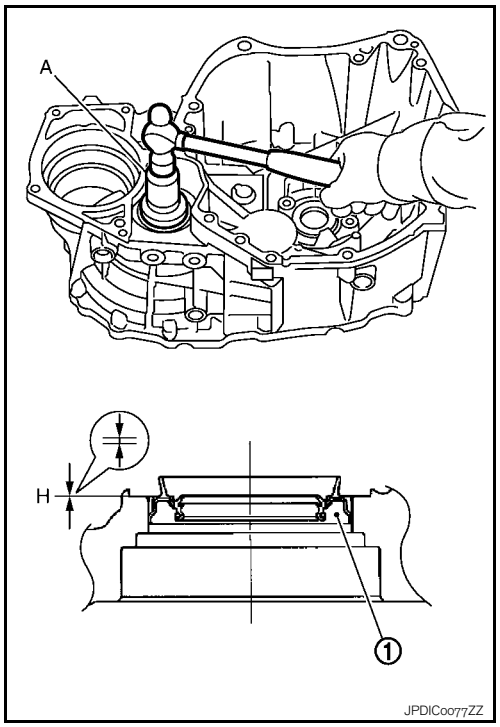
5. Install snap ring (1) onto clutch housing and make sure that end play (gap between snap ring and groove) of output gear assembly (2) satisfies the standard value.



End play standard value "L" : Refer to TM-184, "End Play".

CAUTION:
- **Only one snap ring can be selected.**
- **Never reuse snap ring.**
- **Never damage clutch housing.**

6. Install differential side oil seal (1) to clutch housing using the drift (A) [SST: ST33400001].



Dimension "H" : **-0.5 - 0.5 mm (-0.020 - 0.020 in)**

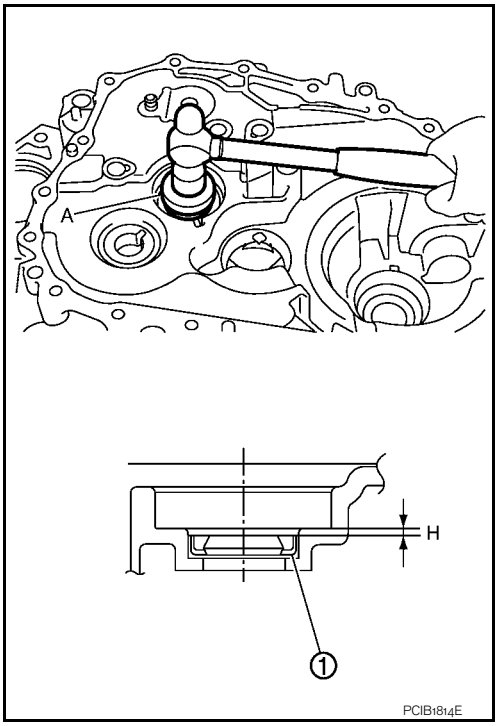
CAUTION:
- **Never reuse differential side oil seal.**
- **When installing, never incline differential side oil seal.**
- **Never damage clutch housing.**

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7. Install input shaft oil seal (1) to clutch housing using the drift (A) [SST: ST35321000].

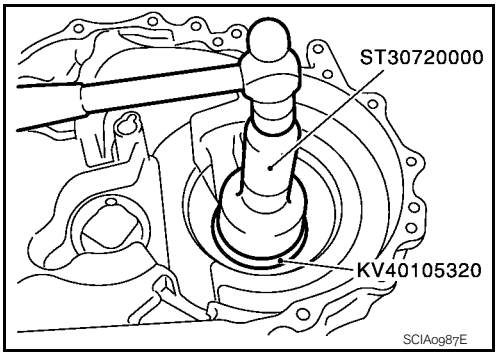
Dimension "H" : 1.1 - 2.1 mm (0.043 - 0.083 in)

CAUTION:
- **Never reuse input shaft oil seal.**
- **When installing, never incline input shaft oil seal.**
- **Never damage clutch housing.**



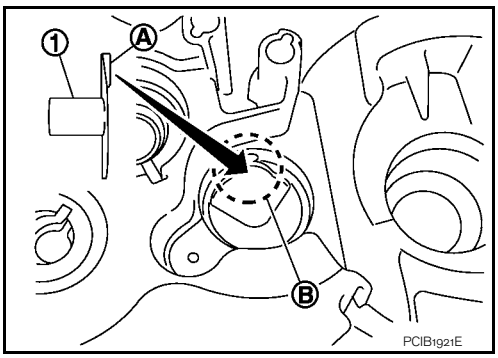
8. Install differential side bearing outer race (clutch housing side) to clutch housing using the drifts.

CAUTION:
Replace differential side bearing and differential side bearing outer race as a set.



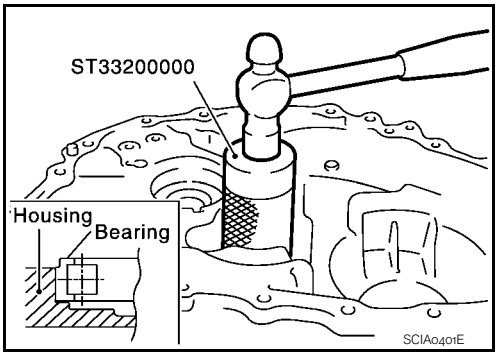
9. Install oil channel (1) on mainshaft side.

CAUTION:
When installing oil channel, fit the rib (A) of oil channel into the processed area of the spot facing (B).



10. Install mainshaft front bearing to clutch housing using the drift.

CAUTION:
Be careful with the orientation of mainshaft front bearing.

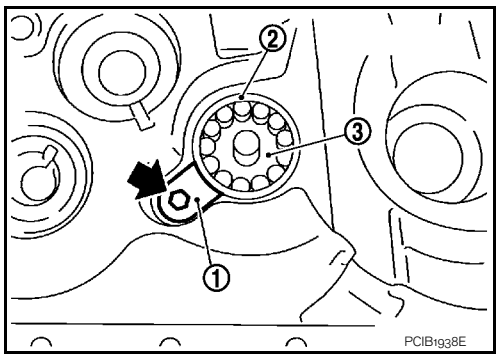


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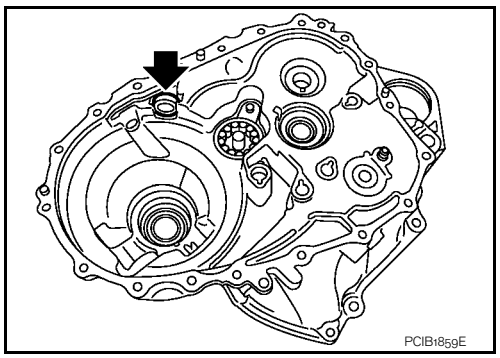
11. Install mainshaft bearing retainer (1) to clutch housing and tighten mounting bolt to the specified torque.

    2 : Mainshaft front bearing
    3 : Oil channel

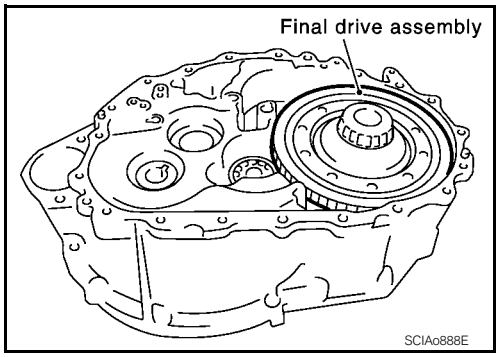
    CAUTION:
    Install with punched surface facing up.



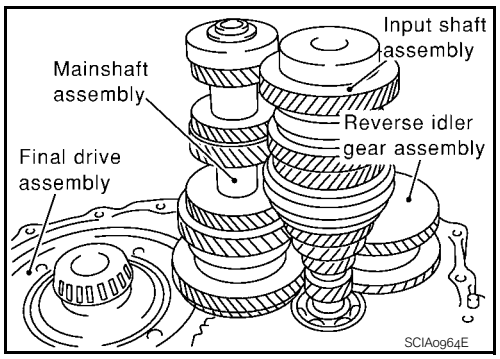
12. Install magnet to clutch housing.



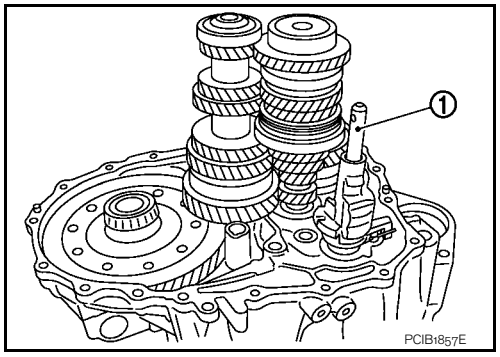
13. Install final drive assembly into clutch housing.
    CAUTION:
    Engage reduction gear teeth in output gear teeth.



14. Install input shaft assembly, mainshaft assembly, and reverse idler gear assembly into clutch housing.
    CAUTION:
    - **Wrap a tape, etc. to the spline of input shaft so as not to damage the input shaft oil seal.**
    - **Be careful with the orientation of reverse idler shaft.**

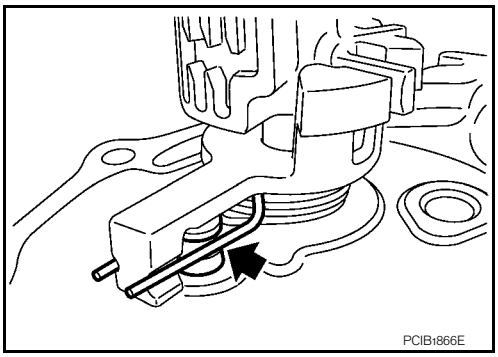


15. Install striking rod assembly (1) into clutch housing.

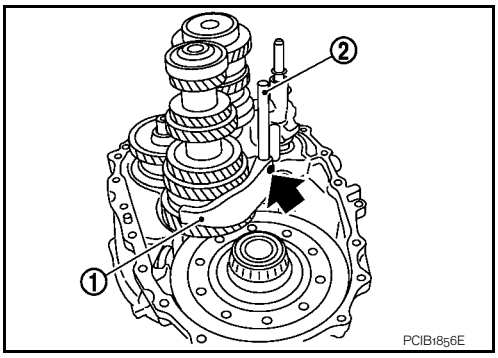


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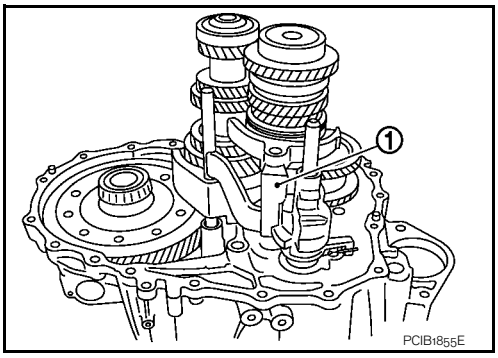
CAUTION:
Check that return spring is securely seated in the groove on return pin.



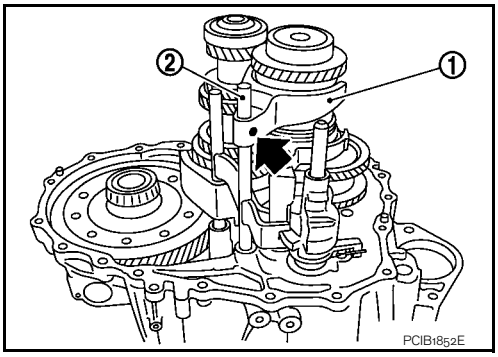
16. Install 1st-2nd shift fork (1) and 1st-2nd fork rod (2) and then install retaining pin to 1st-2nd shift fork.
CAUTION:
- **Never reuse retaining pin.**
- **Be careful with the orientation of 1st-2nd shift fork and 1st-2nd fork rod.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of 1st-2nd shift fork.**



17. Install 3rd-4th shift fork (1) to 3rd-4th coupling sleeve.
CAUTION:
Be careful with the orientation of 3rd-4th shift fork.



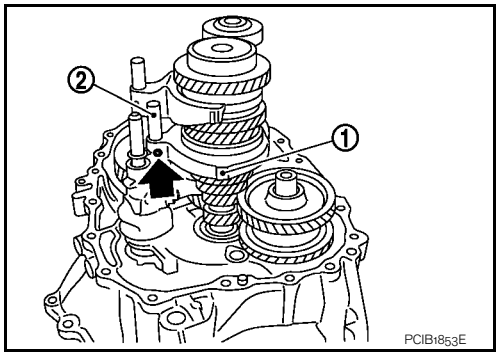
18. Install 5th-6th shift fork (1) and 5th-6th fork rod (2) and then install retaining pin to 5th-6th shift fork.
CAUTION:
- **Never reuse retaining pin.**
- **Be careful with the orientation of 5th-6th shift fork and 5th-6th fork rod.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of 5th-6th shift fork.**



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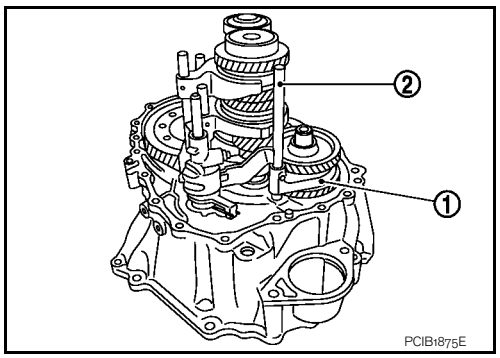
19. Install 3rd-4th fork rod (2) and then install retaining pin to 3rd-4th shift fork (1).

CAUTION:
- **Never reuse retaining pin.**
- **Be careful with the orientation of 3rd-4th fork rod.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of 3rd-4th shift fork.**

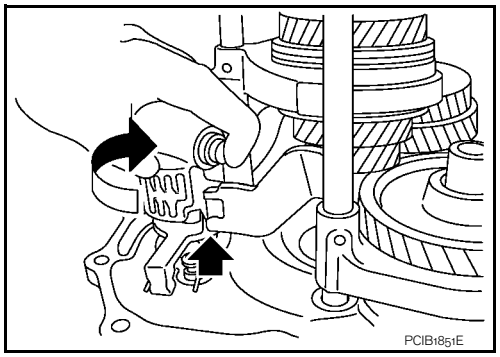


20. Install reverse shift fork (1) and reverse fork rod (2).

CAUTION:
Be careful with the orientation of reverse shift fork and reverse fork rod.



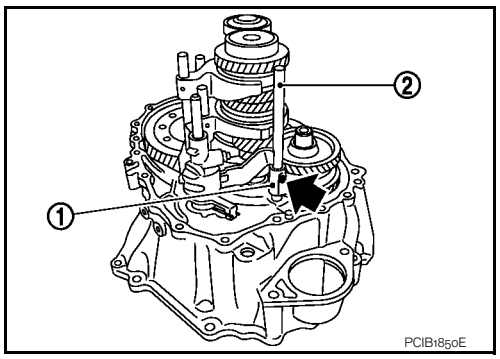
21. Rotate striking lever of striking rod assembly as shown in the figure. Then rotate reverse fork rod to a position where bracket of reverse fork rod does not interfere with striking lever of striking rod assembly.



22. Install retaining pin to reverse shift fork (1).

2 : Reverse fork rod

CAUTION:
- **Never reuse retaining pin.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of reverse shift fork.**



23. Install selected differential side bearing adjusting shim and differential side bearing outer race (transaxle case side).
- For selection of adjusting shim, refer to TM-147, "Adjustment".

24. Install selected reverse idler gear adjusting shim onto reverse idler gear assembly.
- For selection of adjusting shim, refer to TM-147, "Adjustment".

25. Install selected input shaft rear bearing adjusting shim onto input shaft.
- For selection of adjusting shim, refer to TM-147, "Adjustment".

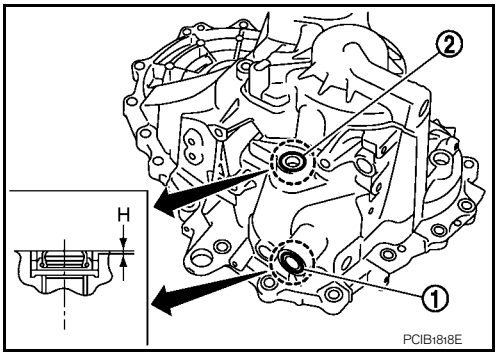
26. Install selected striking rod adjusting shim and striking rod shim onto striking rod assembly.
- For selection of adjusting shim, refer to TM-147, "Adjustment".

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27. Install shifter lever oil seal (1) and striking rod oil seal (2) to transaxle case using the drift [Commercial service tool].

Dimension "H" : 0 - 1.0 mm (0 - 0.039 in)

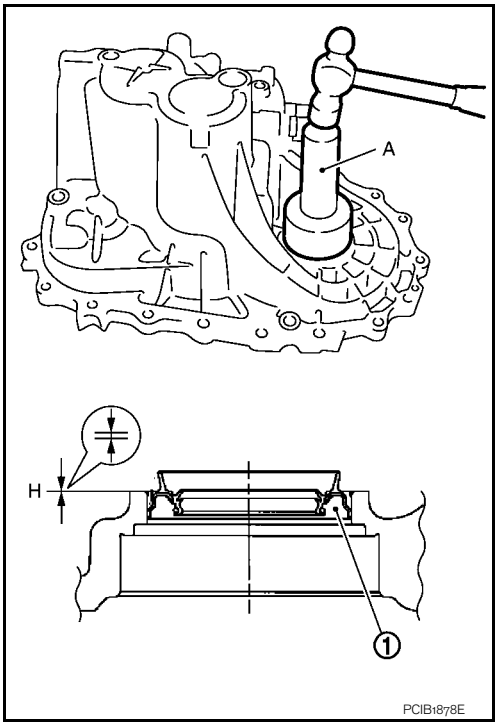
CAUTION:
- **Never reuse shifter lever oil seal and striking rod oil seal.**
- **When installing, never incline shifter lever oil seal and striking rod oil seal.**
- **Never damage transaxle case.**



28. Install differential side oil seal (1) to transaxle case using the drift (A) [SST: ST30720000].

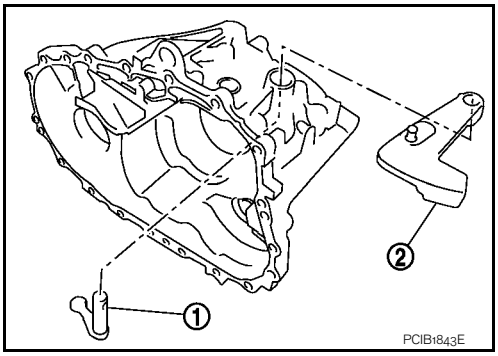
Dimension "H" : -0.5 - 0.5 mm (-0.020 - 0.020 in)

CAUTION:
- **Never reuse differential side oil seal.**
- **When installing, never incline differential side oil seal.**
- **Never damage transaxle case.**



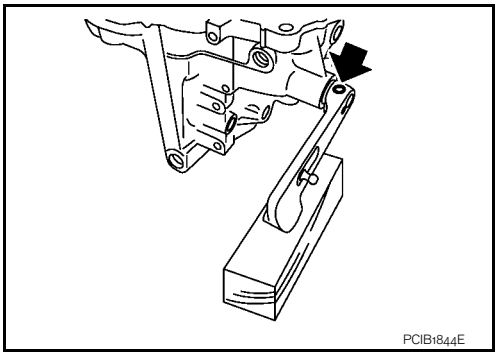
29. Install shifter lever B (1) and shifter lever A (2) to transaxle case.

CAUTION:
Be careful with the orientation of shifter lever B and shifter lever A.



30. Install retaining pin to shifter lever A.

CAUTION:
- **Never reuse retaining pin.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of shifter lever A.**

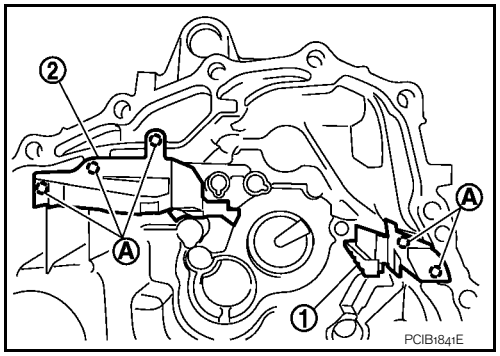


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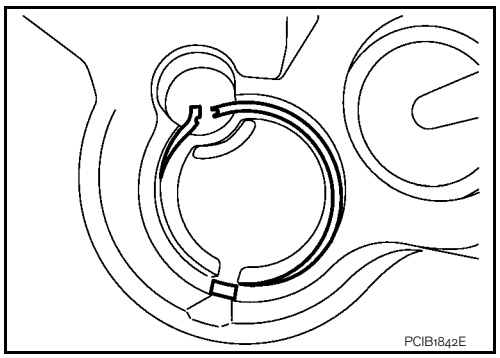
31. Install transaxle case following the procedures below.

a. Install selected mainshaft rear bearing adjusting shim into transaxle case.
   - For selection of adjusting shim, refer to TM-147, "Adjustment".

b. Install oil gutter A (1) and oil gutter B (2) to transaxle case.
   CAUTION:
   Insert the tab (A) of oil gutter A and oil gutter B into transaxle case.

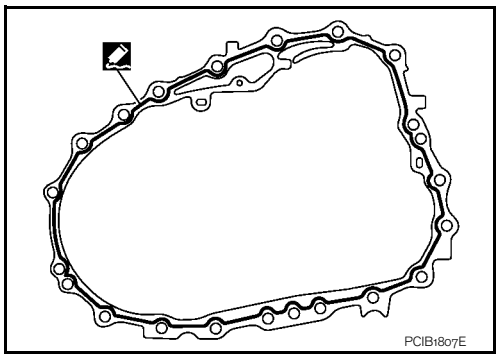


c. Temporarily install snap ring of mainshaft rear bearing into transaxle case.
   CAUTION:
   Never reuse snap ring.

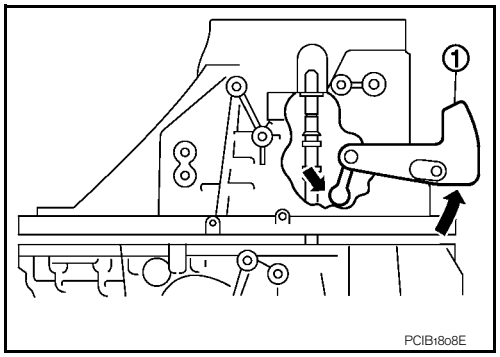


d. Apply recommended sealant to mating surface of clutch housing as shown in the figure.
   - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

   CAUTION:
   - **Remove old sealant adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to both mounting surfaces.**
   - **Apply sealant so as not to break the bead.**
   - **The width of sealant bead is 1 - 2 mm (0.04 - 0.08 in).**
   - **The height of sealant bead is 0.4 - 1 mm (0.016 - 0.04 in).**
   - **The overlap length of both ends of sealant bead is 3 - 5 mm (0.12 - 0.20 in).**



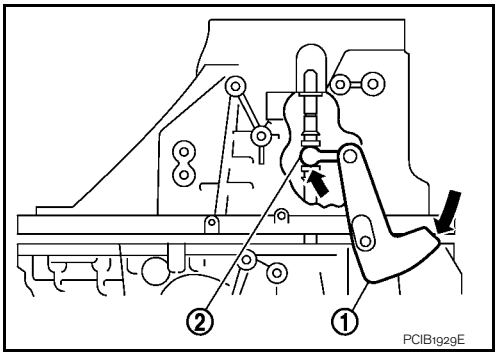
e. With shifter lever A (1) held in the position shown in the figure, temporarily assemble transaxle case to clutch housing.
   CAUTION:
   Never damage striking rod oil seal.
   NOTE:
   Make sure to hold shifter lever A in the position shown in the figure. Otherwise transaxle case cannot be installed to clutch housing.



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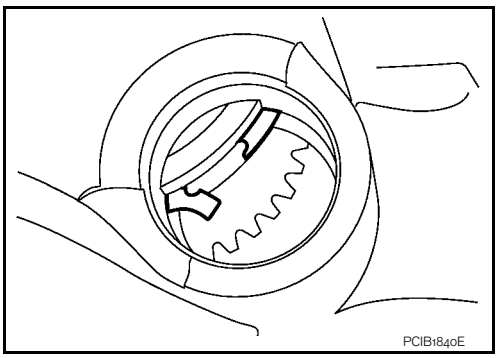
f. While rotating shifter lever A (1) in the direction of the arrow in the figure, assemble transaxle case to clutch housing.

2 : Shifter lever B

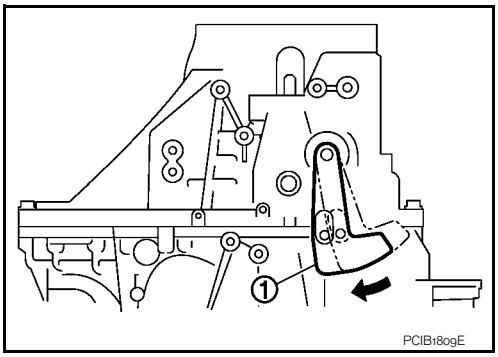


g. Accessing from the bore plug hole, expand snap ring at mainshaft rear bearing so that the ring catches the periphery of mainshaft rear bearing.

h. Temporarily tighten transaxle case mounting bolts.

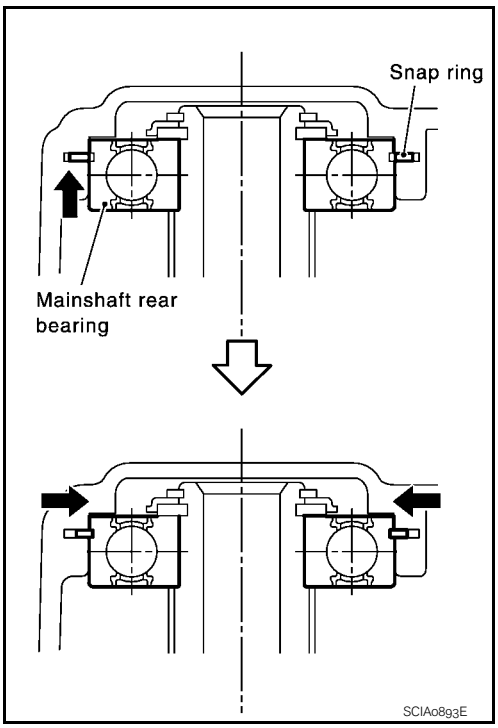


i. Shift the shifter lever A (1) to 2nd gear position.
NOTE:
- The 2nd gear position is attained when shifter lever A is in the position shown in the figure.



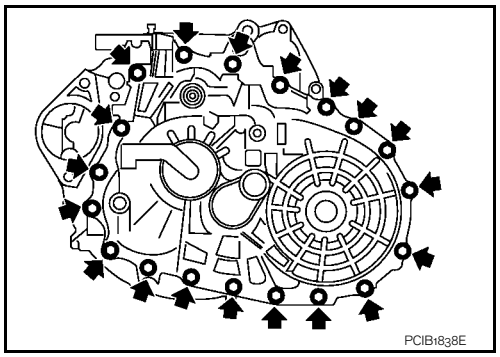
- When transaxle is shifted to the 2nd gear position, mainshaft assembly is lifted.

j. Seat snap ring in the groove on mainshaft rear bearing. If snap ring is not seated in the groove on mainshaft rear bearing, remove transaxle case and repeat the procedure from step d.

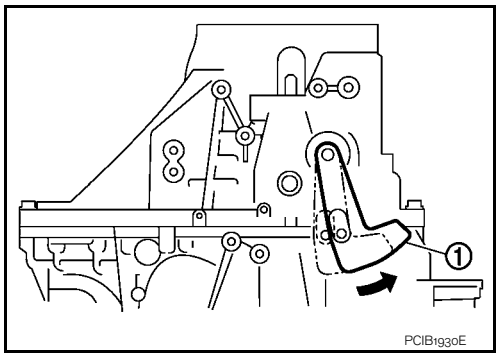


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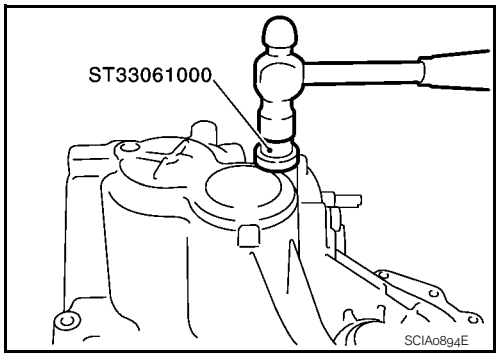
k. Tighten transaxle case mounting bolts to the specified torque.



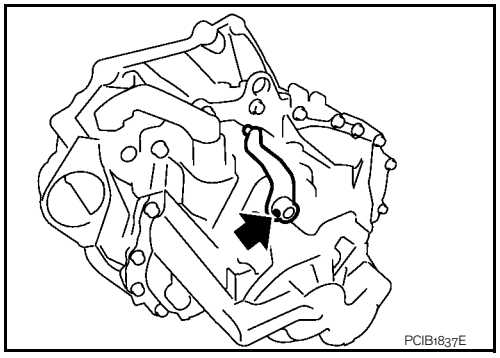
l. Shift the shifter lever A (1) to neutral position.
NOTE:
The neutral position is attained when shifter lever A is in the position shown in the figure.



32. Install bore plug to transaxle case using the drift.
CAUTION:
Never reuse bore plug.



33. Install selector lever to transaxle case and then install retaining pin to selector lever.
CAUTION:
- **Never reuse retaining pin.**
- **Assemble retaining pin from the direction shown by the arrow in the figure until it becomes flush with the end surface of selector lever.**



34. Install guide bolt following the procedures below.
a. Shift the shifter lever A and selector lever to neutral position.

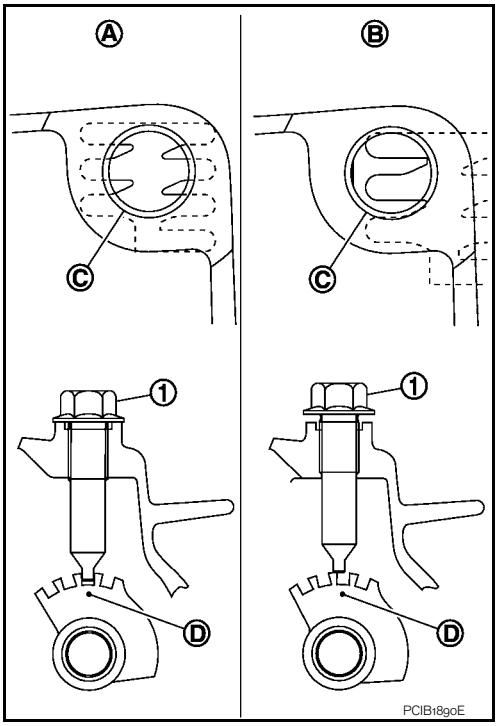
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b. Visually confirm from the guide bolt mounting hole (C) that the lever is securely set to neutral position (A). If it is not in the neutral position, repeat the procedure from step a.

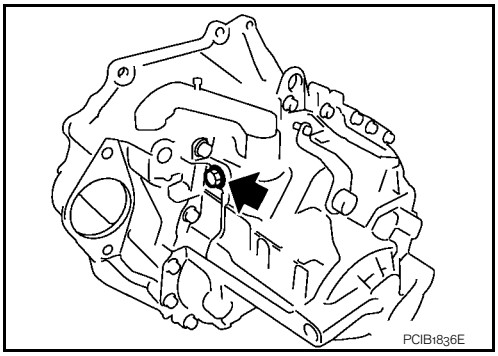
1 : Guide bolt

CAUTION:
The guide groove (D) of striking rod assembly will be damaged when assembling guide bolt with the lever is in except neutral position (B).

c. Check continuity between terminals of park/neutral position (PNP) switch to confirm it in the neutral position. If it is not in the neutral position, remove park/neutral position (PNP) switch and repeat the procedure from step a. Refer to TM-108, "Component Inspection".



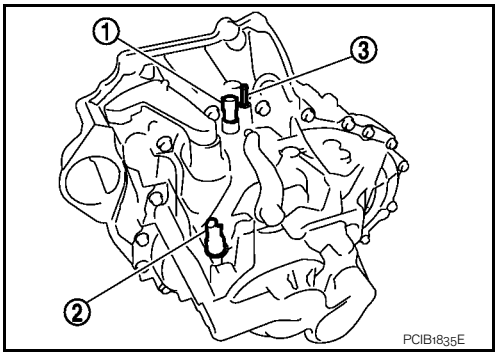
d. Install guide bolt to transaxle case and then tighten guide bolt to the specified torque.
CAUTION:
Never reuse guide bolt.



35. Apply recommended sealant to threads of park/neutral position (PNP) switch (1). Then install it to transaxle case and tighten to the specified torque.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

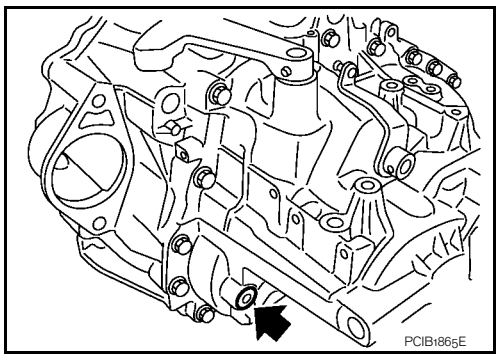
    CAUTION:
    Remove old sealant and oil adhering to threads.
36. Install plunger to transaxle case.
37. Apply recommended sealant to threads of back-up lamp switch (2). Then install it to transaxle case and tighten to the specified torque.
    - **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

    CAUTION:
    Remove old sealant and oil adhering to threads.
38. Install air breather tube (3) to transaxle case.
    CAUTION:
    - **Never reuse air breather tube.**
    - **Assemble air breather tube until its collar element contacts with transaxle case.**

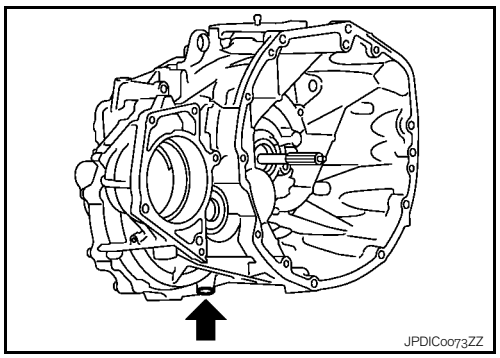


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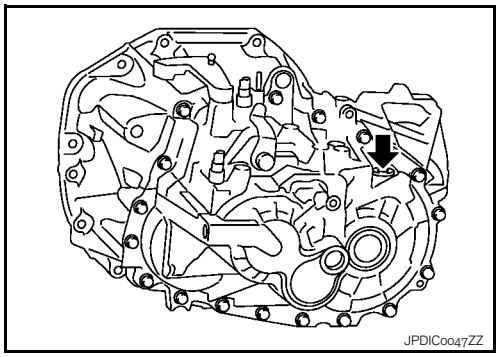
39. Install gasket onto plug and then install them into transaxle case. Tighten plug to the specified torque.
CAUTION:
Never reuse gasket.



40. Install gasket onto drain plug and then install them into clutch housing. Tighten drain plug to the specified torque.
CAUTION:
Never reuse gasket.



41. Install gasket onto filler plug and then install them into transaxle case. Tighten filler plug to the specified torque.
CAUTION:
- **Never reuse gasket.**
- **After gear oil is filled, tighten filler plug to specified torque.**

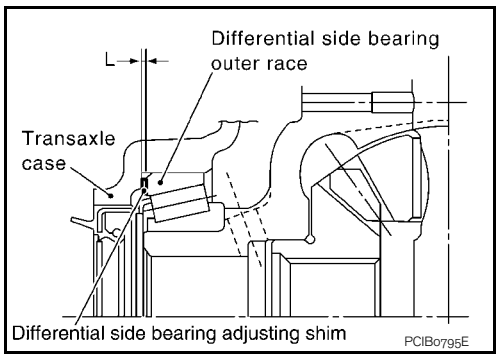


Adjustment

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DIFFERENTIAL SIDE BEARING PRELOAD

- When adjusting differential side bearing preload, select adjusting shim for differential side bearing. To select adjusting shim, measure clearance “L” between transaxle case and differential side bearing outer race.
CAUTION:
Up to 2 adjusting shims can be selected.
- Calculate dimension “L” (thickness of adjusting shim) using the following procedure to satisfy specification of preload for differential side bearing.



Preload : Refer to TM-185, "Differential Side Bearing Preload".

Dimension “L” = (L_1 - L_2) + Preload

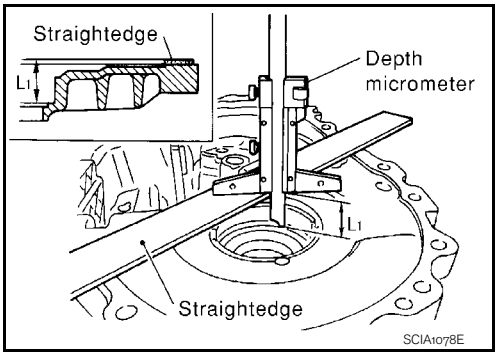
L : Thickness of adjusting shim

L_1 : Distance between transaxle case end face and mounting face of adjusting shim

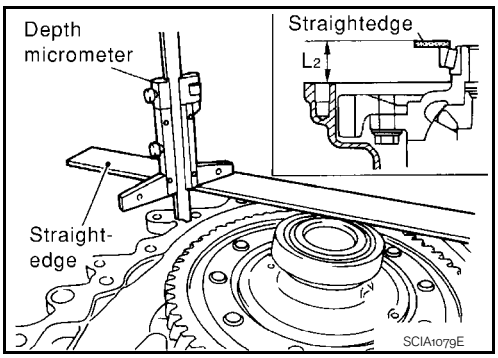
L_2 : Distance between differential side bearing outer race and clutch housing end face

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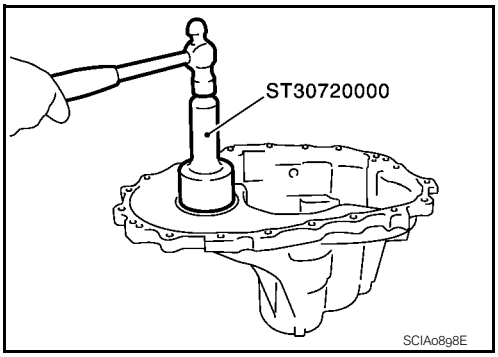
1. Using a depth micrometer and straightedge, measure dimension "L_1" between transaxle case end face and mounting face of adjusting shim.
2. Install differential side bearing outer race onto differential side bearing on final gear side. Holding lightly differential side bearing outer race horizontally by hand, rotate final gear five times or more (for smooth movement of bearing roller).



3. Using a depth micrometer and straightedge as shown in the figure, measure dimension "L_2" between differential side bearing outer race and clutch housing end face.
   CAUTION:
   "L_2": Measure at 4 point by approximately 90 degrees and use the average value.

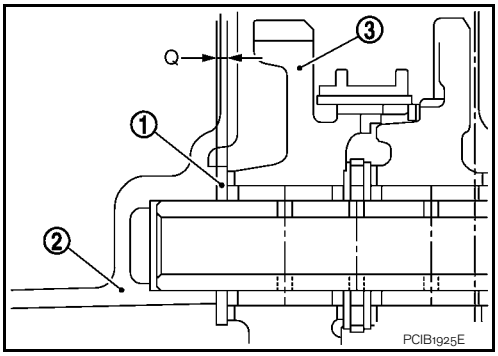


4. Install selected differential side bearing adjusting shim and then install differential side bearing outer race (transaxle case side) using the drift.
   CAUTION:
   Replace differential side bearing and differential side bearing outer race as a set.



REVERSE IDLER GEAR END PLAY

- When adjusting reverse idler gear end play, select adjusting shim for reverse idler gear. To select adjusting shim (1), measure clearance between transaxle case (2) and reverse idler gear (rear) (3).
  CAUTION:
  Only 1 adjusting shim can be selected.
- Calculate dimension "Q" (thickness of adjusting shim) using the following procedure to satisfy specification of end play for reverse idler gear.



End play : Refer to TM-184, "End Play".

Dimension "Q" = (Q_1 - Q_2) - End play

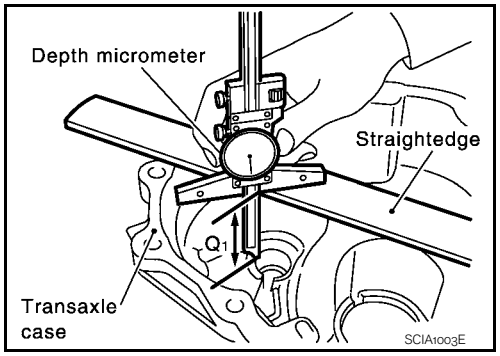
Q : Thickness of adjusting shim

Q_1 : Distance between transaxle case end face and mounting face of adjusting shim

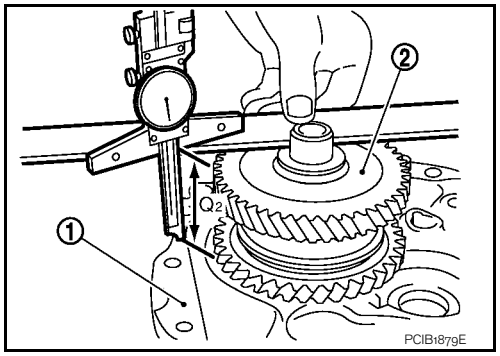
Q_2 : Distance between clutch housing end face and end face of reverse idler gear (rear)

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1. Using a depth micrometer and straightedge, measure dimension "Q_1" between transaxle case end face and mounting face of adjusting shim.

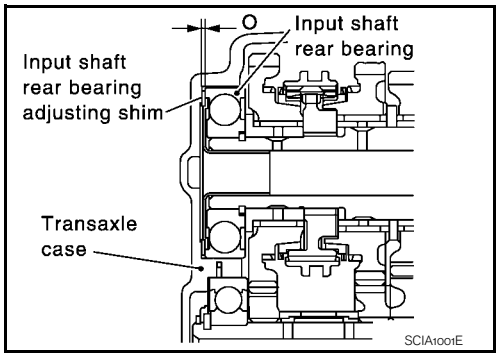


2. Using a depth micrometer and straightedge as shown in the figure, measure dimension "Q_2" between clutch housing (1) end face and end face of reverse idler gear (rear) (2).
CAUTION:
"Q_2": Measure at 4 point by approximately 90 degrees and use the average value.
3. Install selected reverse idler gear adjusting shim onto reverse idler gear (rear).



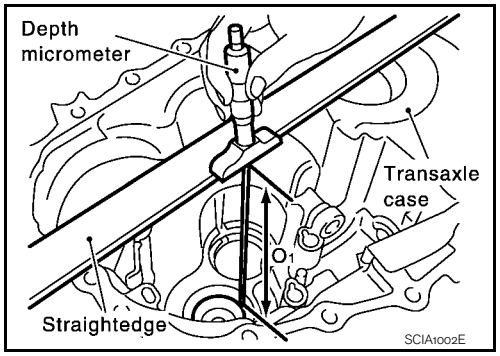
INPUT SHAFT END PLAY

- When adjusting input shaft end play, select adjusting shim for input shaft rear bearing. To select adjusting shim, measure clearance between transaxle case and input shaft rear bearing.
CAUTION:
Only 1 adjusting shim can be selected.
- Calculate dimension "O" (thickness of adjusting shim) using the following procedure to satisfy specification of end play for input shaft rear bearing.



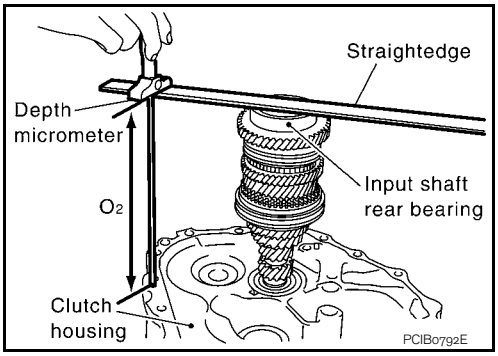
End play : Refer to TM-184, "End Play".
Dimension "O" = (O_1 - O_2) - End play
O : Thickness of adjusting shim
O_1 : Distance between transaxle case end face and mounting face of adjusting shim
O_2 : Distance between clutch housing end face and end face of input shaft rear bearing

1. Using a depth micrometer and straightedge, measure dimension "O_1" between transaxle case end face and mounting face of adjusting shim.
CAUTION:
"O_1": Measure at 4 point by approximately 90 degrees and use the average value.



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2. Using a depth micrometer and straightedge as shown in the figure, measure dimension "O_2" between clutch housing end face and end face of input shaft rear bearing.
CAUTION:
"O_2": Measure at 4 point by approximately 90 degrees and use the average value.
3. Install selected input shaft rear bearing adjusting shim onto input shaft.



STRIKING ROD END PLAY

- When adjusting striking rod end play, select adjusting shim (1) for striking rod (2). To select adjusting shim, measure clearance between transaxle case (3) and striking rod shim (4).
CAUTION:
Only 1 adjusting shim can be selected.
- Calculate dimension "R" (thickness of adjusting shim) using the following procedure to satisfy specification of end play for striking rod.

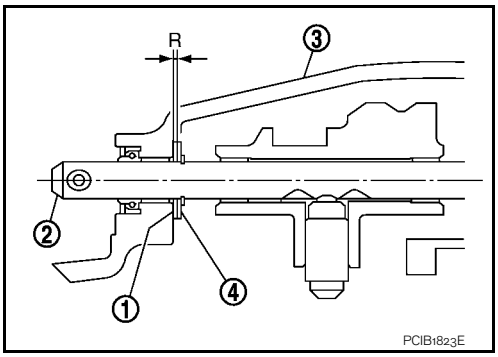
End play : Refer to TM-184, "End Play".

Dimension "R" = (R_1 - R_2) - End play

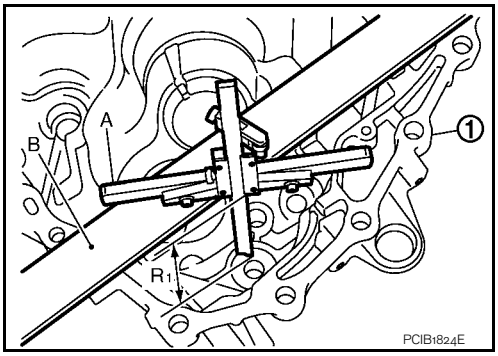
R : Thickness of adjusting shim

R_1 : Distance between transaxle case end face and mounting face of adjusting shim

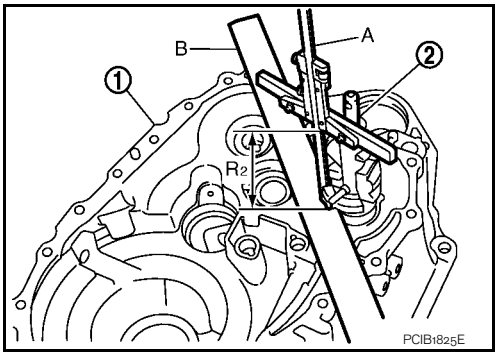
R_2 : Distance between clutch housing end face and end face of striking rod shim



1. Using a depth micrometer (A) and straightedge (B), measure dimension "R_1" between transaxle case (1) end face and mounting face of adjusting shim.
CAUTION:
"R_1": Measure at 4 point by approximately 90 degrees and use the average value.



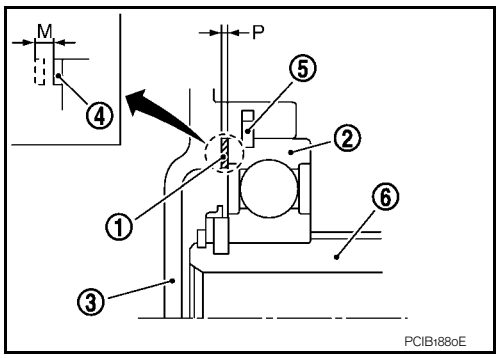
2. Using a depth micrometer (A) and straightedge (B) as shown in the figure, measure dimension "R_2" between clutch housing (1) end face and end face of striking rod shim (2).
CAUTION:
- **"R_2": Measure at 4 point by approximately 90 degrees and use the average value.**
- **When measuring, be careful for the inclination of striking rod assembly and striking rod shim.**
3. Install selected striking rod adjusting shim onto striking rod assembly.



MAINSHAFT END PLAY

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- When adjusting mainshaft end play, select adjusting shim (1) for mainshaft rear bearing (2). To select adjusting shim, measure clearance “M” between transaxle case (3) and dummy adjusting shim (4) on mainshaft rear bearing.



5 : Snap ring
6 : Mainshaft

CAUTION:
Only 1 adjusting shim can be selected.

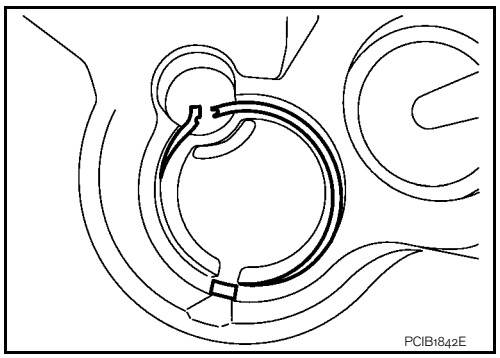
- Calculate dimension “P” (thickness of adjusting shim) using the following procedure to satisfy specification of end play for mainshaft rear bearing.

End play : Refer to TM-184, "End Play".
Dimension “P” = (M + N) - End play
P : Thickness of adjusting shim
M : Distance between dummy adjusting shim on mainshaft rear bearing end face and transaxle case end face
N* : Thickness of dummy adjusting shim

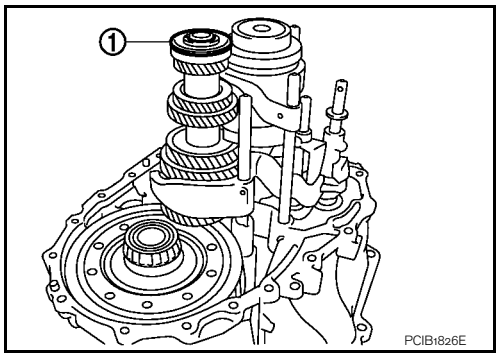
*: Refer to the latest parts information to use a dummy adjusting shim of which part number is the thinnest in thickness.

1. Install transaxle case following the procedures below.

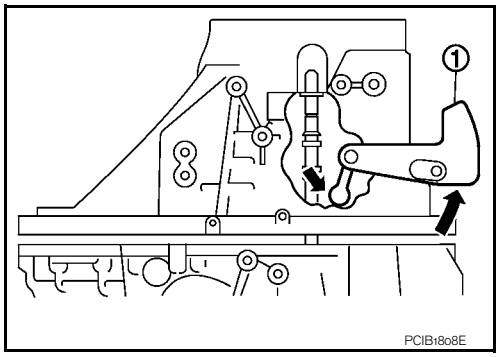
a. Temporarily install snap ring of mainshaft rear bearing into transaxle case.
CAUTION:
Do not reuse snap ring.



b. Install dummy adjusting shim (1) to mainshaft assembly.



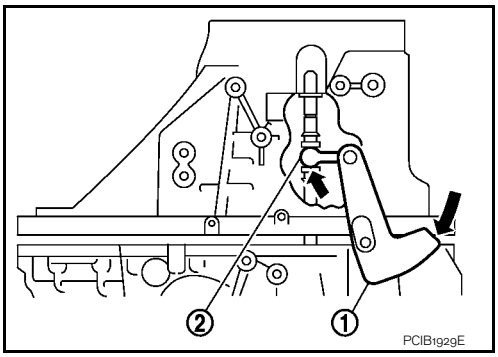
c. With shifter lever A (1) held in the position shown in the figure, temporarily assemble transaxle case to clutch housing.
CAUTION:
Be careful not to damage striking rod oil seal.
NOTE:
Make sure to hold shifter lever A in the position shown in the figure. Otherwise transaxle case cannot be installed to clutch housing.



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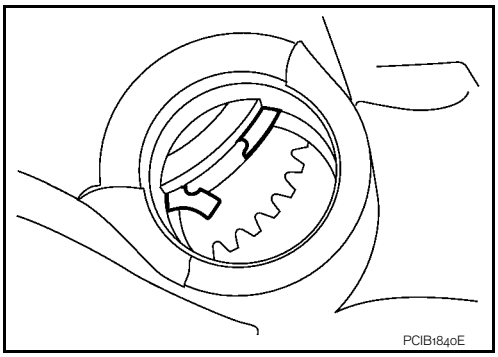
d. While rotating shifter lever A (1) in the direction of the arrow shown in the figure, assemble transaxle case to clutch housing.

2 : Shifter lever B

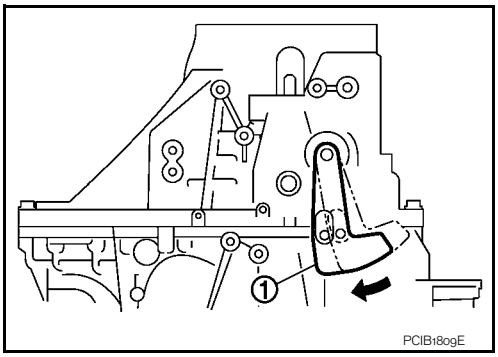


e. Accessing from the bore plug hole, expand snap ring at mainshaft rear bearing so that the ring catches the periphery of mainshaft rear bearing.

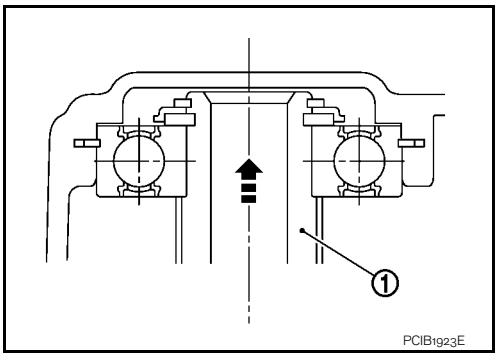
f. Temporarily tighten transaxle case mounting bolts.



2. Shift the shifter lever A (1) to 2nd gear position.
NOTE:
- The 2nd gear position is attained when shifter lever A is in the position shown in the figure.



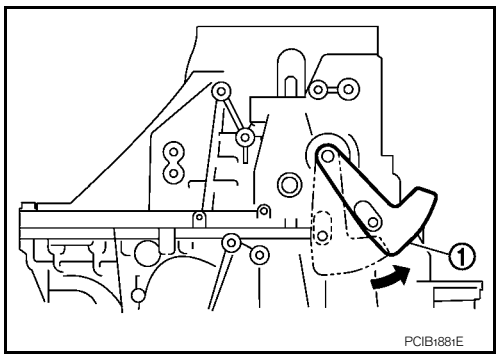
- When transaxle is shifted to the 2nd gear position, mainshaft assembly (1) is lifted.



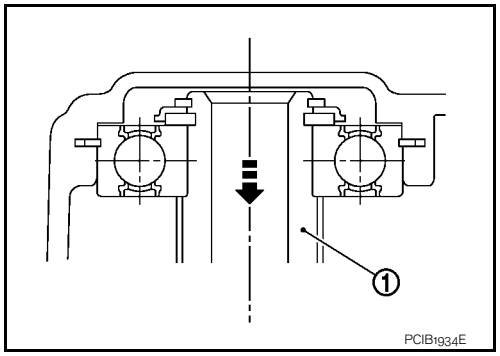
3. Seat snap ring in the groove on mainshaft rear bearing. If snap ring is not seated in the groove on mainshaft rear bearing, remove transaxle case and repeat the procedure 1 from step c.
4. Shift the shifter lever A to 1st gear position, and then shift it to 2nd gear position. Repeat 3 times.
NOTE:
- The mainshaft rear bearing position will be stabilized by shifting between 1st gear position and 2nd gear position alternately.

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- The 1st gear position is attained when shifter lever A (1) is in the position shown in the figure.

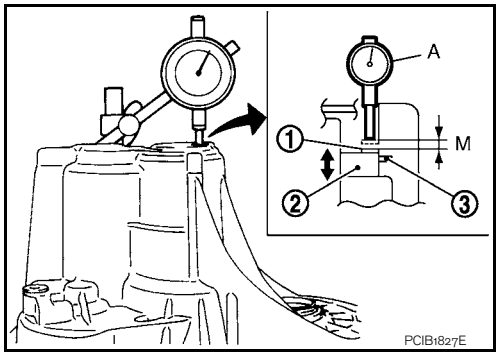


- When transaxle is shifted to the 1st gear position, mainshaft assembly (1) is declined.



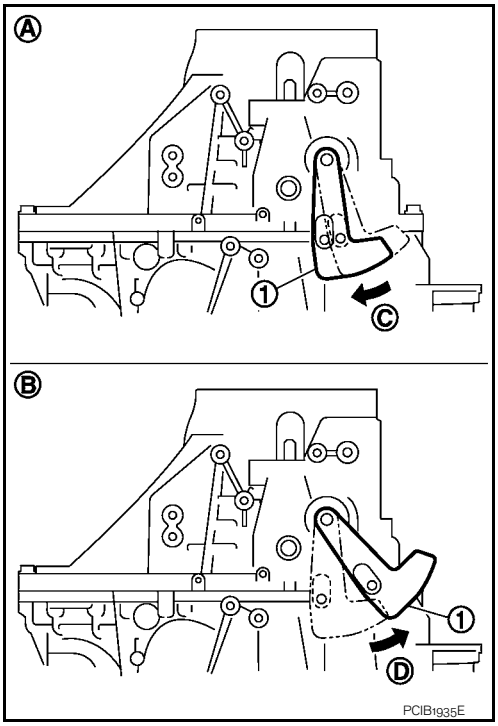
5. Set the dial indicator (A) to dummy adjusting shim (1) through the bore plug mounting hole.

   2 : Mainshaft rear bearing
   3 : Snap ring



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6. Shift the shifter lever A (1) to 2nd gear position (A), and then rotate it in the direction of the arrow (C) in the figure until it stops. Using this position as the reference point, measure the amount of movement when shifting shifter lever A to 1st gear position (B) and rotating it in the direction of the arrow (D) in the figure until it stops. This measurement is the "M" dimension.
7. When measurement "M" is 0 - 0.06 mm (0 - 0.0024 in), adjustment terminates, and the dummy adjusting shim becomes regular adjusting shim. Select adjusting shim from the computed expressions when measurement "M" is over 0.06 mm (0.0024 in).



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INPUT SHAFT AND GEAR

Exploded View

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Refer to TM-125, "Exploded View".

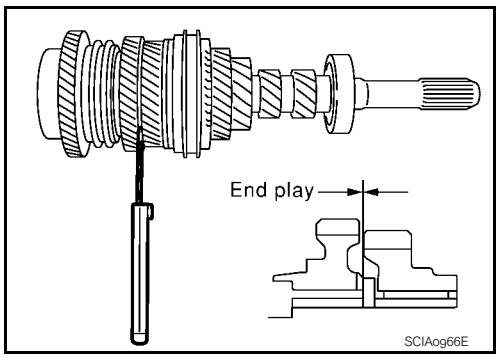
Disassembly

INFOID:0000000001034956

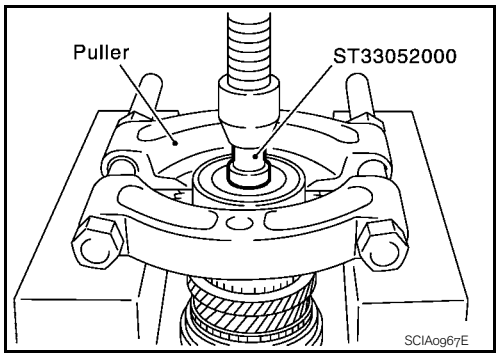
1. Before disassembling, measure end play for 3rd, 4th, 5th, and 6th input gears.

End play standard value : Refer to TM-184, "End Play".

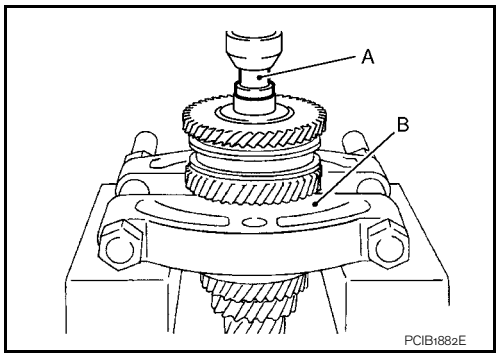
2. Remove oil channel.



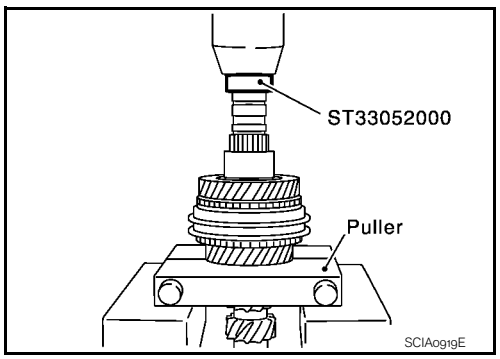
3. Press out input shaft rear bearing using the drift and a puller.
4. Remove snap ring.



5. Press out 6th input gear, 6th needle bearing, 6th input gear bushing, 5th-6th synchronizer hub assembly, and 5th input gear using the drift (A) [SST: ST33052000] and a puller (B).
6. Remove 5th needle bearing.

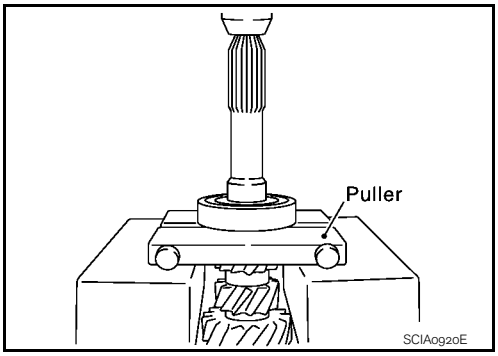


7. Press out 5th input gear bushing, thrust washer, 4th input gear, 4th needle bearing, 4th input gear bushing, 3rd-4th synchronizer hub assembly, and 3rd input gear using the drift and a puller.
8. Remove 3rd needle bearing.



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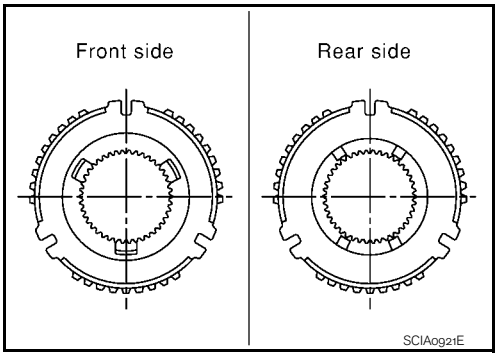
9. Press out input shaft front bearing using a puller.



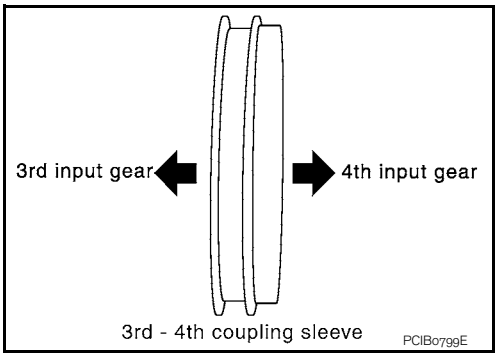
Assembly

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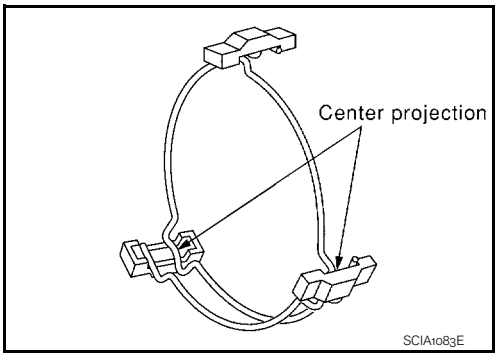
1. Install 3rd needle bearing to input shaft.
2. Install 3rd input gear, 3rd inner baulk ring, 3rd synchronizer cone, and 3rd outer baulk ring to input shaft.
   CAUTION:
   Replace 3rd inner baulk ring, 3rd synchronizer cone, and 3rd outer baulk ring as a set.
3. Install 3rd-4th spread springs, 3rd-4th shifting inserts, and 3rd-4th synchronizer hub onto 3rd-4th coupling sleeve.
   CAUTION:
   - **Be careful with orientation of 3rd-4th synchronizer hub.**
   - **Never 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 orientation of 3rd-4th coupling sleeve.**

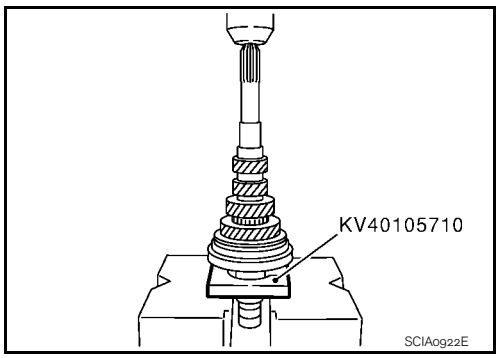


   - **Be sure not to hook center projection of 2 spread springs on same shifting insert.**

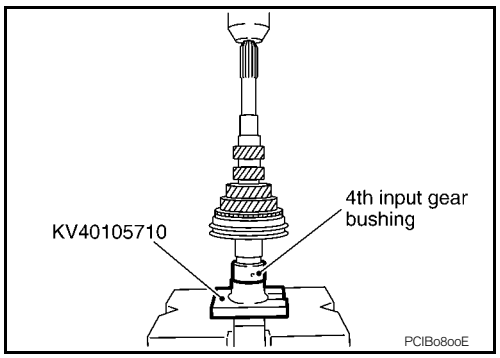


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4. Press in 3rd-4th synchronizer hub assembly using the press stand.
   CAUTION:
   Align grooves of 3rd-4th shifting insert and 3rd outer baulk ring.



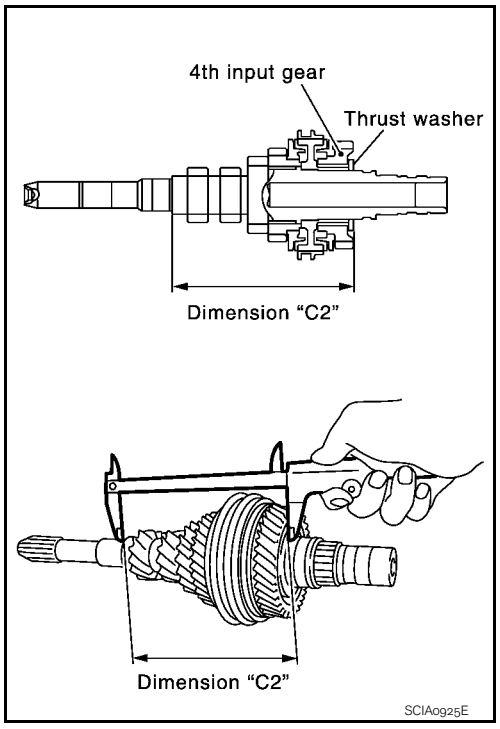
5. Press in 4th input gear bushing using the press stand.
6. Install 4th baulk ring.
7. Install 4th needle bearing and 4th input gear to input shaft.



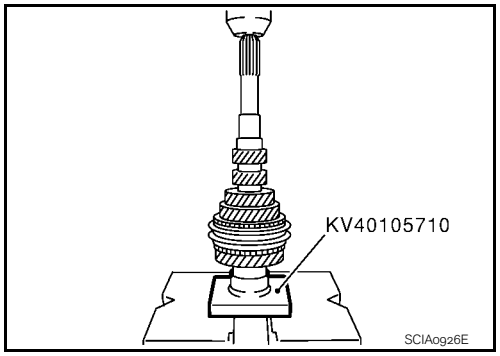
8. Select thrust washer so that dimension “C2” satisfies the standard value below. Then install thrust washer onto input shaft.

   Standard value for dimension “C2” : **Refer to TM-185, "Dimension".**

   CAUTION:
   Only one thrust washer can be selected.



9. Press in 5th input gear bushing using the press stand.
   CAUTION:
   Never reuse 5th input gear bushing.
10. Install 5th needle bearing and 5th input gear to input shaft.
11. Install 5th baulk ring.



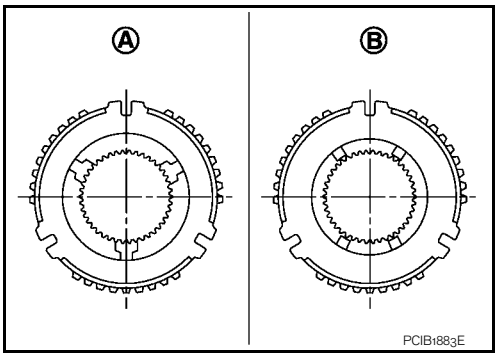
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12. Install 5th-6th synchronizer hub, 5th-6th spread springs, and 5th-6th shifting inserts onto 5th-6th coupling sleeve.

CAUTION:

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

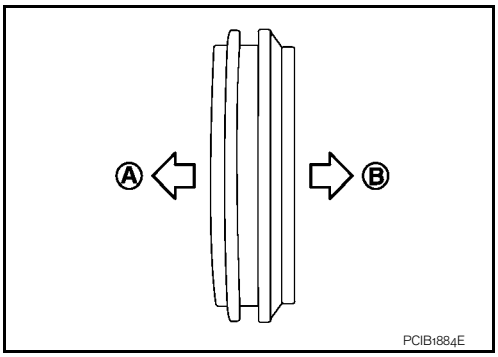
A	: Front side
B	: Rear side



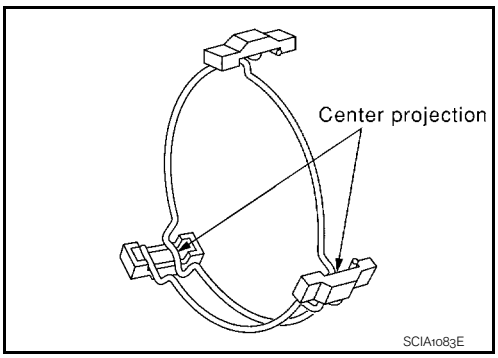
- **Never reuse 5th-6th synchronizer hub and 5th-6th coupling sleeve.**
- **Replace 5th-6th synchronizer hub and 5th-6th coupling sleeve as a set.**

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

A	: 5th input gear side
B	: 6th input gear side



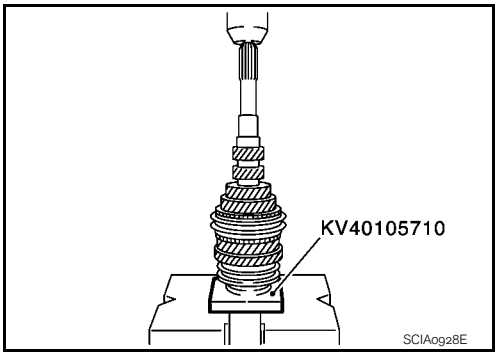
- **Be sure not to hook center projection of 2 spread springs on same shifting insert.**



13. Press in 5th-6th synchronizer hub assembly using the press stand.

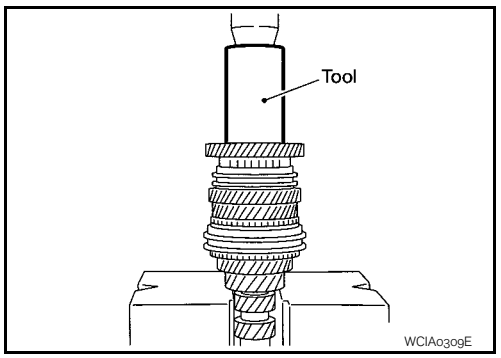
CAUTION:

Align grooves of 5th-6th shifting insert and 5th baulk ring.



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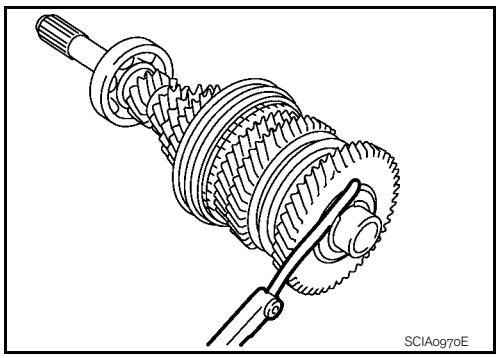
14. Install 6th needle bearing, 6th input gear, 6th baulk ring onto 6th input gear bushing and then press in 6th input gear bushing onto input shaft using the drift [SST: ST33200000].



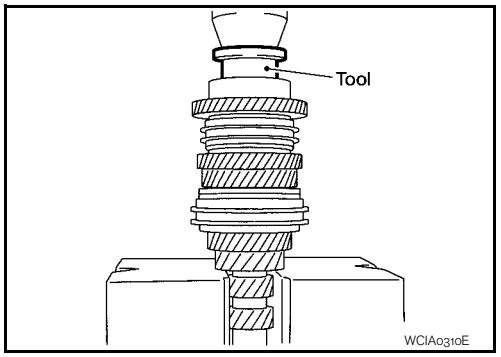
15. Install snap ring onto input shaft and make sure that end play (gap between snap ring and groove) of 6th input gear bushing satisfies the standard value.

End play standard value :Refer to TM-184, "End Play".

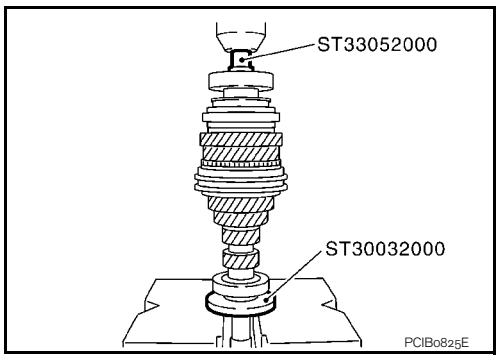
- If measurement is outside the standard range, select snap ring.
  CAUTION:
  Never reuse snap ring.



16. Press in input shaft rear bearing using the drift [SST: ST30901000].
    CAUTION:
    Install input shaft rear bearing with its brown surface facing the 6th input gear side.

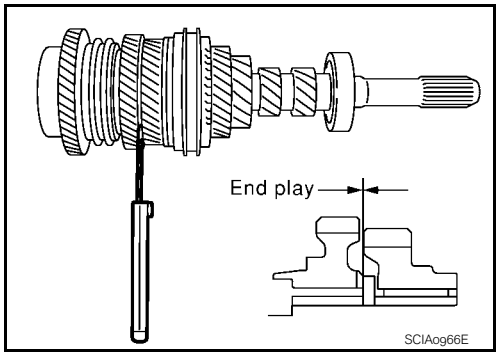


17. Press in input shaft front bearing using the drifts.
18. Install oil channel onto input shaft.



19. Check end play of 3rd, 4th, 5th, and 6th input gears.

End play standard value : Refer to TM-184, "End Play".



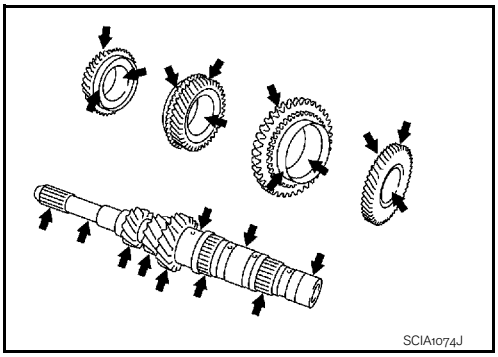
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Inspection

INFOID:0000000001034958

INPUT SHAFT AND GEAR

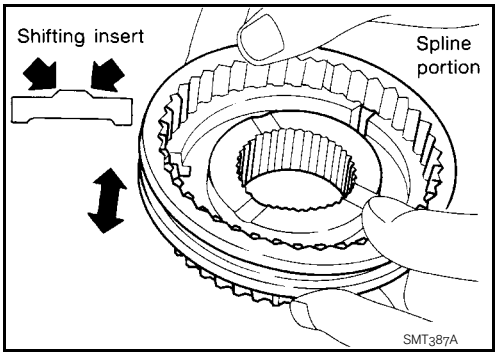
Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, etc. of shaft
- Excessive wear, damage, peeling, etc. of gears



SYNCHRONIZER

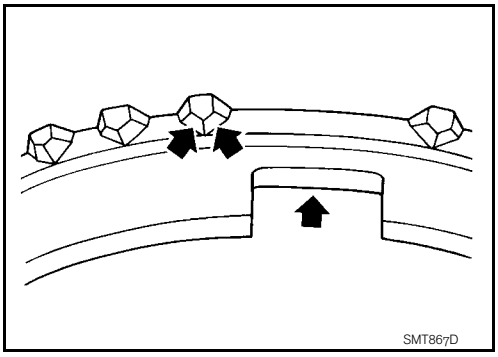
Synchronizer Hub and Coupling Sleeve

Check items below. If necessary, replace them with new ones.
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub and shifting insert
- Coupling sleeve and synchronizer hub must move smoothly.



Baulk Ring and Spread Spring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.

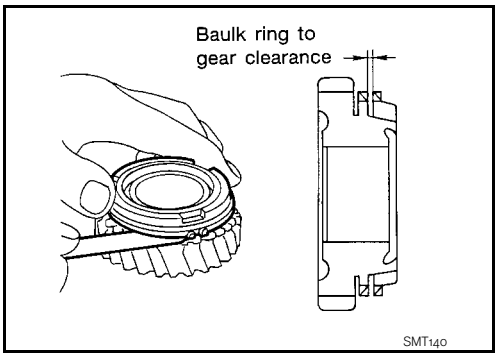


Baulk Ring Clearance for Single Cone Synchronizer (4th, 5th, and 6th)

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

Clearance

Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



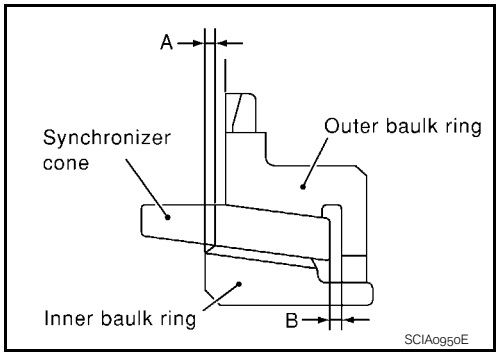
Baulk Ring Clearance for Double Cone Synchronizer (3rd)

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

CAUTION:

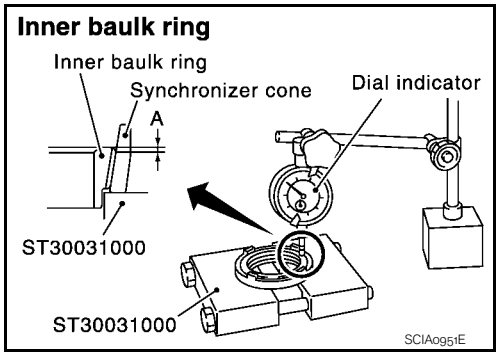
The clearances “A” and “B” are controlled with outer baulk ring, synchronizer cone, and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.



1. Measure the clearance “A” at 2 points or more diagonally opposite using a dial indicator. And then calculate mean value.

Clearance “A”

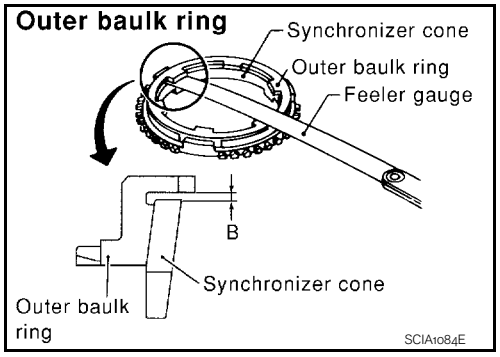
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



2. Measure the clearance “B” at 2 points or more diagonally opposite using a feeler gauge. And then calculate mean value.

Clearance “B”

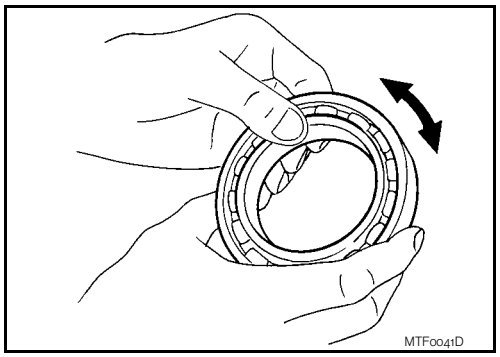
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



BEARING

Check items below. If necessary, replace them with new ones.

- Damage and rough rotation of bearing



MAINSHAFT AND GEAR

Exploded View

INFOID:0000000001034959

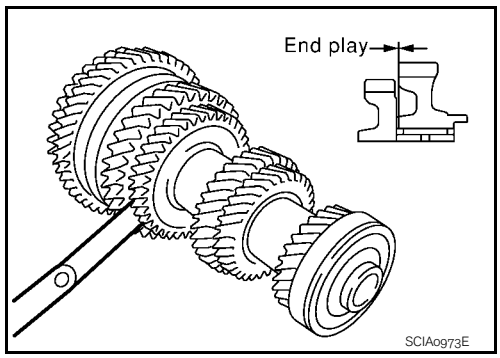
Refer to TM-125, "Exploded View".

Disassembly

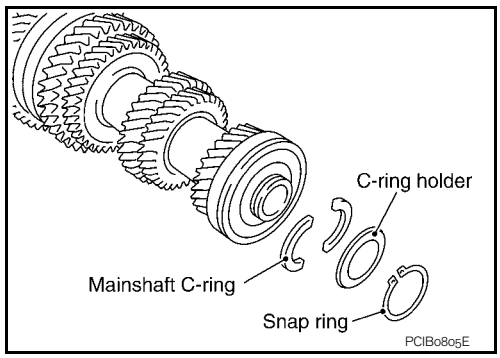
INFOID:0000000001034960

1. Before disassembling, measure the end play of 1st and 2nd main gears.

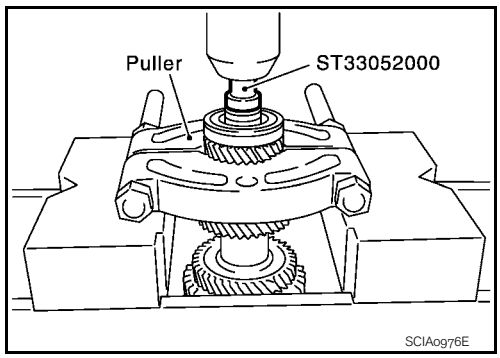
End play standard value : Refer to TM-184, "End Play".



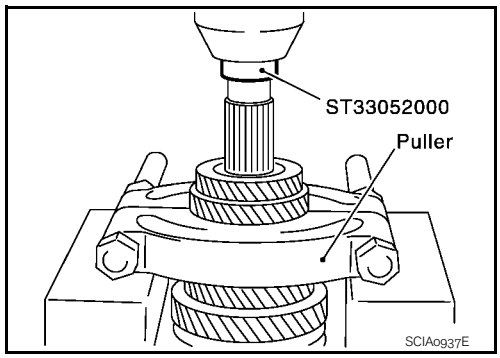
2. Remove snap ring.
3. Remove C-ring holder and then remove mainshaft C-rings.



4. Press out mainshaft rear bearing, 6th main gear adjusting shim, and 6th main gear using the drift and a puller.
5. Remove 5th-6th mainshaft spacer.

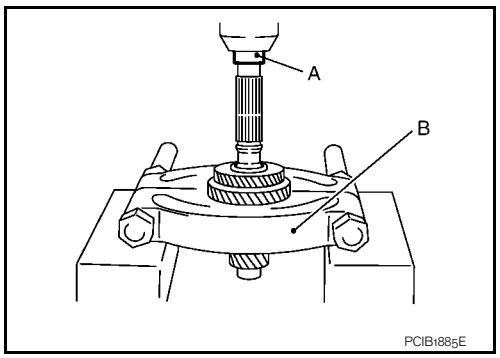


6. Press out 4th main gear and 5th main gear using the drift and a puller.
7. Remove 4th main gear adjusting shim.
8. Remove 3rd-4th mainshaft spacer.

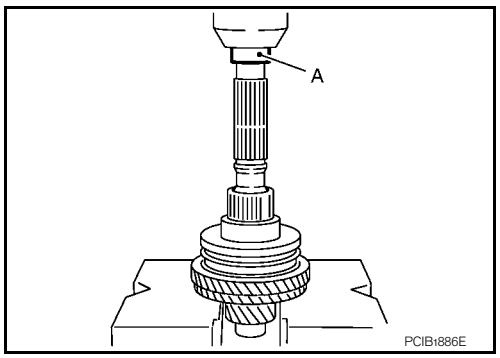


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9. Press out 3rd main gear and 2nd main gear using the drift (A) [SST: KV40105020] and a puller (B).
10. Remove 2nd needle bearing.



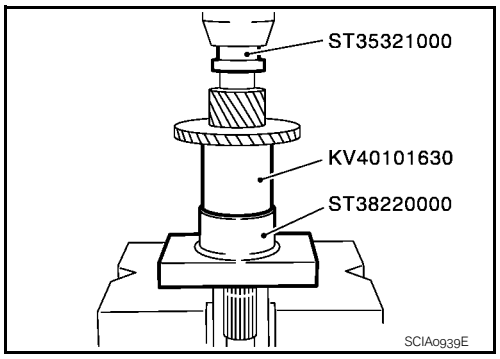
11. Press out 2nd main gear bushing, 1st-2nd synchronizer hub assembly, 1st main gear, 1st needle bearing, 1st main gear bushing, and reverse main gear using the drift (A) [SST: KV40105020].



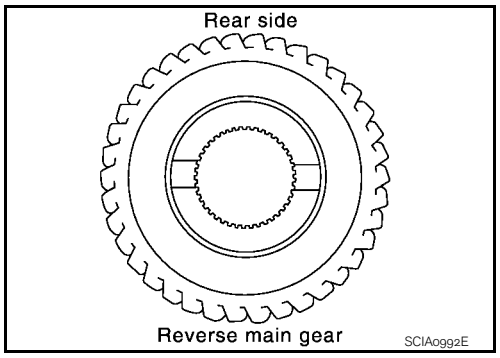
Assembly

INFOID:0000000001034961

1. Press in reverse main gear using the drifts and the press stand.

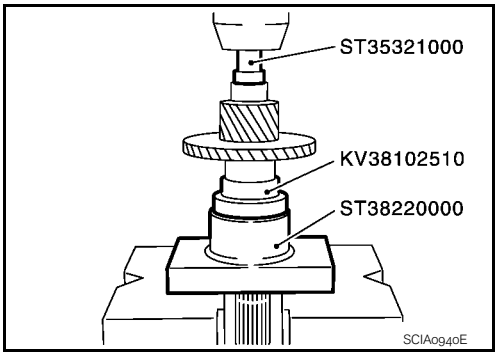


CAUTION:
- **Be careful with orientation of reverse main gear.**
- **Never reuse reverse main gear.**



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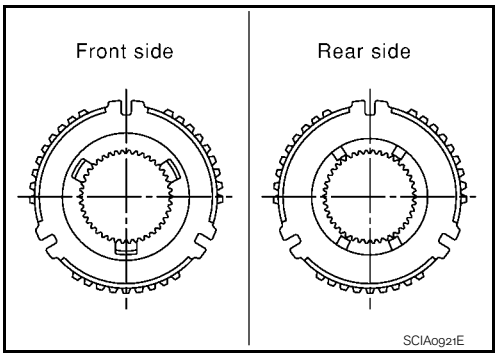
2. Press in 1st main gear bushing using the drifts and the press stand.
3. Install 1st needle bearing and then 1st main gear.



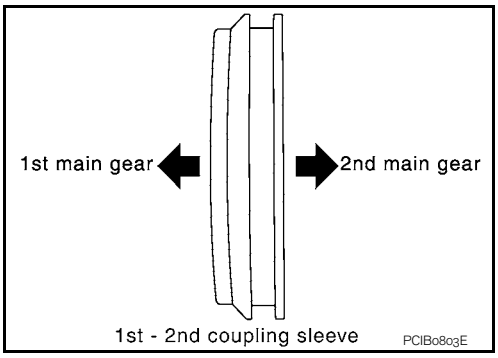
4. Install 1st-2nd spread springs, 1st-2nd shifting inserts, and 1st-2nd synchronizer hub onto 1st-2nd coupling sleeve.

CAUTION:

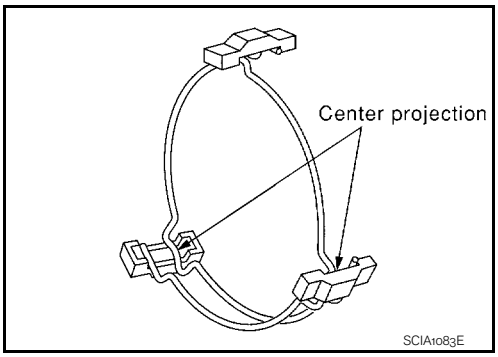
- **Be careful with orientation of 1st-2nd synchronizer hub.**
- **Never reuse 1st-2nd synchronizer hub and 1st-2nd coupling sleeve.**
- **Replace 1st-2nd synchronizer hub and 1st-2nd coupling sleeve as a set.**



- **Be careful with orientation of 1st-2nd coupling sleeve.**



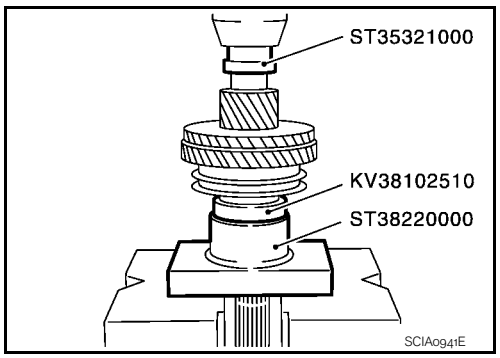
- **Be sure not to hook center projection of 2 spread springs on same 1st-2nd shifting insert.**



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5. Install 1st inner baulk ring, 1st synchronizer cone, and 1st outer baulk ring onto mainshaft and then press in 1st-2nd synchronizer hub assembly onto mainshaft using the drifts and the press stand.

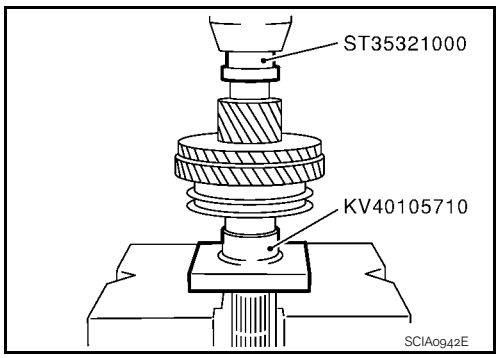
CAUTION:
- **Outer baulk ring, synchronizer cone, and inner baulk ring on 2nd gear-side must have been removed.**
- **Be careful with orientation of coupling sleeve.**
- **Replace 1st inner baulk ring, 1st synchronizer cone, and 1st outer baulk ring as a set.**



6. Press in 2nd main gear bushing using the drift and the press stand.
7. Install 2nd outer baulk ring, 2nd synchronizer cone, and 2nd inner baulk ring.

CAUTION:
Replace 2nd outer baulk ring, 2nd synchronizer cone, and 2nd inner baulk ring as a set.

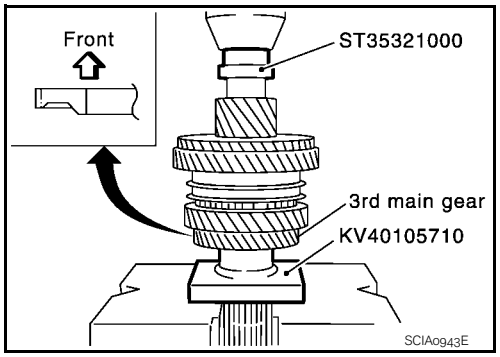
8. Install 2nd needle bearing and 2nd main gear.



9. Press in 3rd main gear using the drift and the press stand.

CAUTION:
- **Be careful with orientation of 3rd main gear.**
- **Never reuse 3rd main gear.**

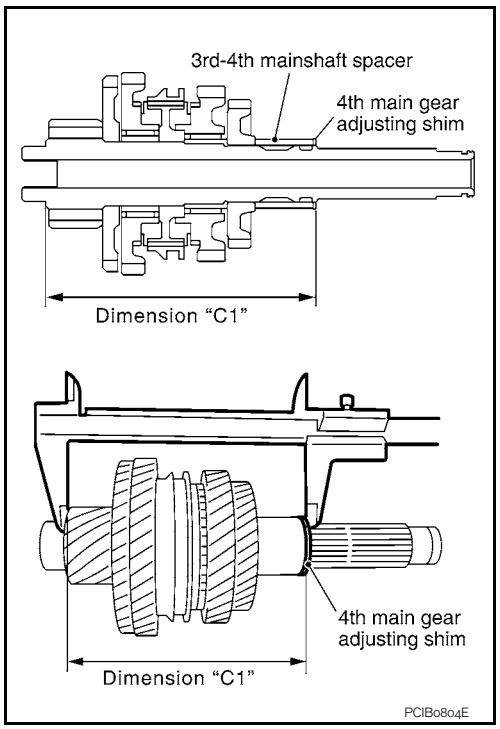
10. Install 3rd-4th mainshaft spacer.



11. Select 4th main gear adjusting shim so that dimension “C1” satisfies the standard value below and install 4th main gear adjusting shim onto mainshaft.

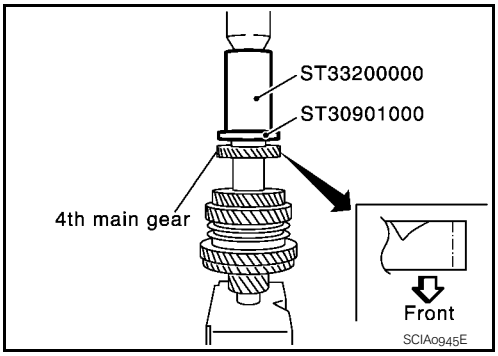
Standard value for dimension “C1” : Refer to TM-185, "Dimension".

CAUTION:
Only one adjusting shim can be selected.



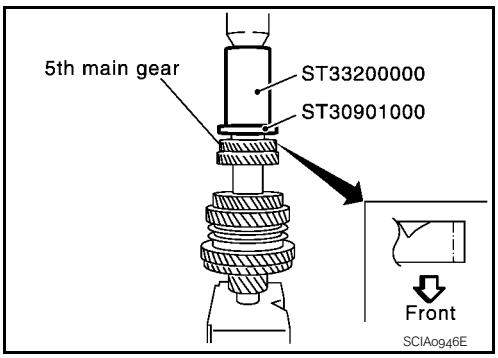
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12. Press in 4th main gear using the drifts.
CAUTION:
- **Be careful with orientation of 4th main gear.**
- **Never reuse 4th main gear.**

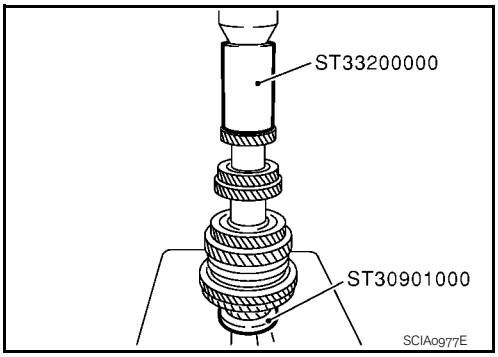


13. Press in 5th main gear using the drifts.
CAUTION:
- **Be careful with orientation of 5th main gear.**
- **Never reuse 5th main gear.**

14. Install 5th-6th mainshaft spacer.



15. Press in 6th main gear using the drifts.
CAUTION:
Never reuse 6th main gear.



16. Select 6th main gear adjusting shim and then install it onto mainshaft.
- Calculate thickness “S” of 6th main gear adjusting shim following the procedure below so that end play dimension between 6th main gear and mainshaft rear bearing becomes the dimension shown below.

End play :Refer to TM-184, "End Play".

Dimension “S” = (S_1 - S_2) - End play

S : Thickness of adjusting shim

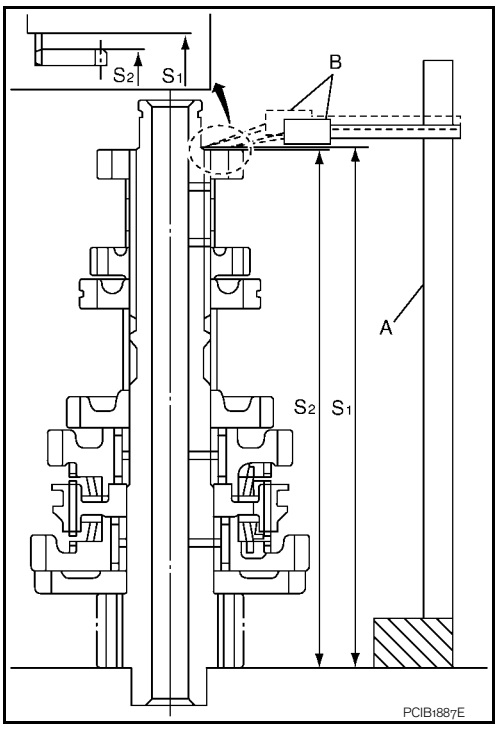
S_1 : Dimension from mainshaft standard face to mainshaft rear bearing press-fit end face

S_2 : Dimension from mainshaft standard face to 6th main gear end face

CAUTION:
Only one adjusting shim can be selected.

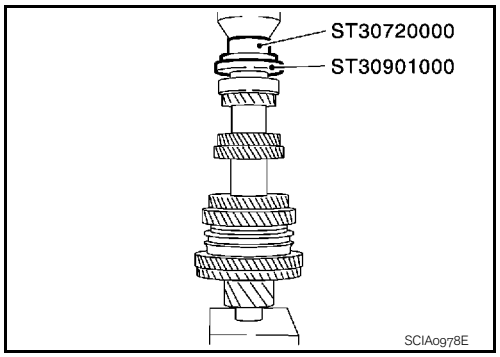
a. Measure dimension “S_1” and “S_2” using a height gauge (A) and pick tester (B).

b. Install selected 6th main gear adjusting shim to mainshaft.



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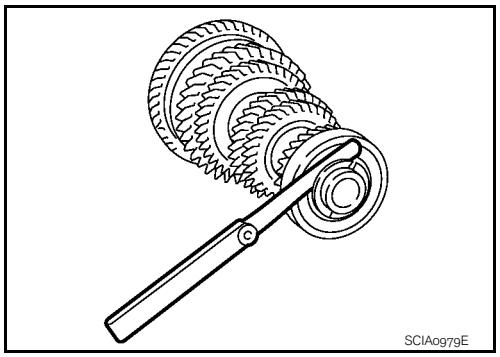
17. Press in mainshaft rear bearing using the drifts.



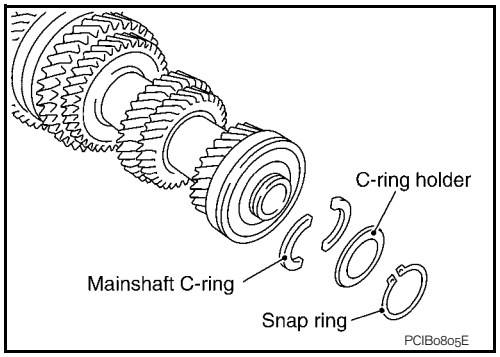
18. Install mainshaft C-rings onto mainshaft and check that end play of mainshaft rear bearing satisfies the standard value.

End play standard value : Refer to TM-184, "End Play".

- If measurement is outside the standard range, reselect mainshaft C-rings.

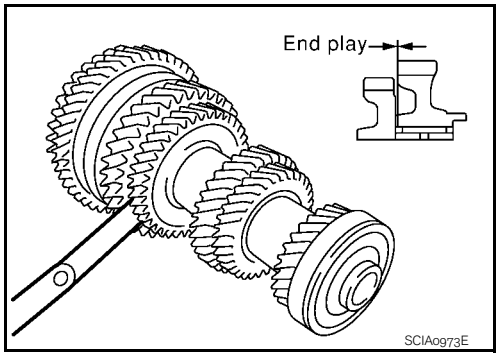


19. Install C-ring holder and then install snap ring.
CAUTION:
Never reuse snap ring.



20. Check end play of 1st and 2nd main gears.

End play standard value : Refer to TM-184, "End Play".



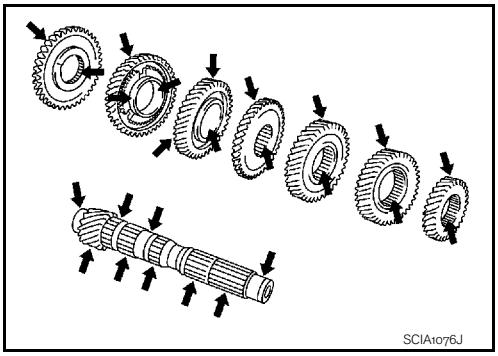
Inspection

INFOID:0000000001034962

MAINSHAFT AND GEAR

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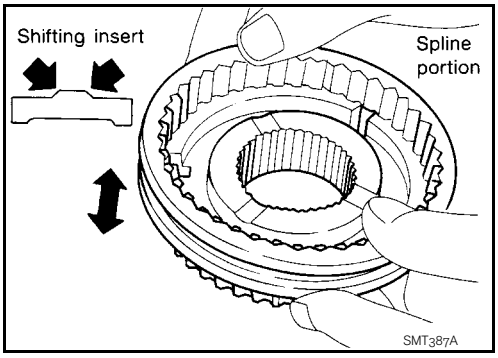
Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.



SYNCHRONIZER

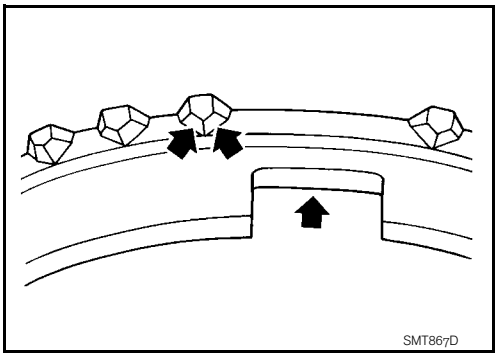
Synchronizer Hub and Coupling Sleeve

Check items below. If necessary, replace them with new ones.
- Damage and unusual wear on contact surfaces of coupling sleeve, synchronizer hub and shifting insert.
- Coupling sleeve and synchronizer hub must move smoothly.



Baulk Ring and Spread Spring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.

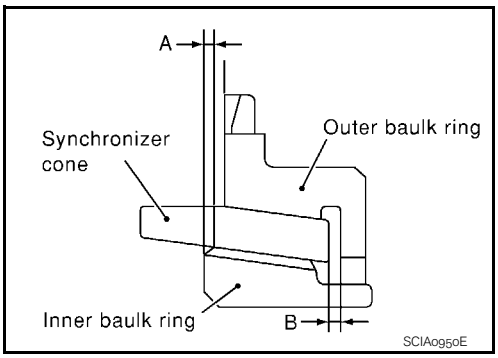


Baulk Ring Clearance for Double Cone Synchronizer (1st)

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.

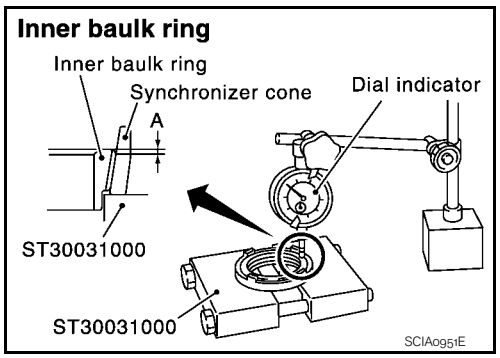


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1. Measure the clearance “A” at 2 points or more diagonally opposite using a dial indicator. And then calculate mean value.

Clearance “A”

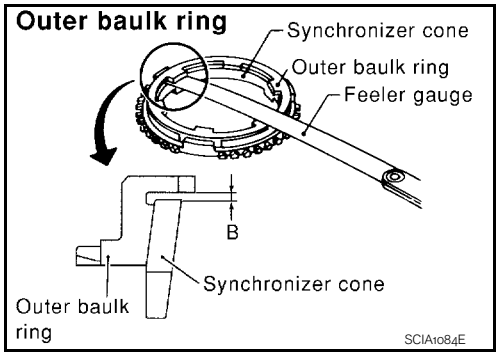
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



2. Measure the clearance “B” at 2 points or more diagonally opposite using a feeler gauge. And then calculate mean value.

Clearance “B”

Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**

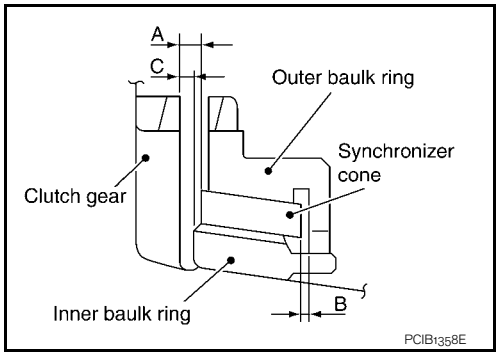


Baulk Ring Clearance for Triple Cone Synchronizer (2nd)

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

CAUTION:

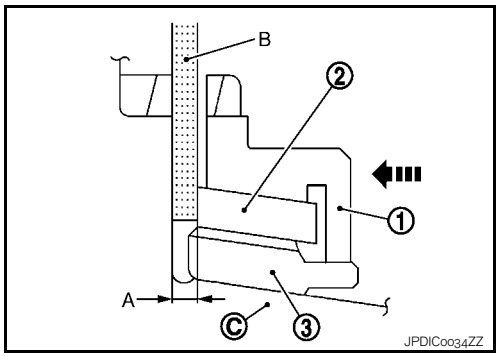
The clearances “A”, “B”, and “C” are controlled with outer baulk ring, synchronizer cone, and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.



1. Measure the clearance “A” at 2 points or more diagonally opposite using a feeler gauge (B) when pressing outer baulk ring (1), synchronizer cone (2), and inner baulk ring (3) toward gear taper cone (C). And then calculate mean value.

Clearance “A”

Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**

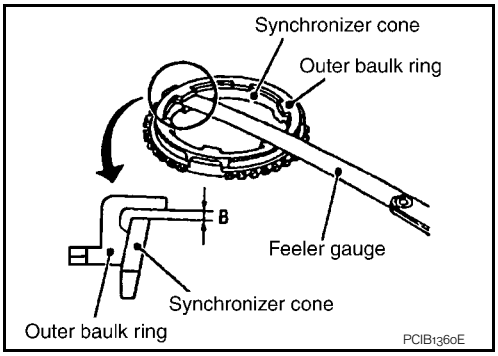


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2. Measure the clearance “B” at 2 points or more diagonally opposite using a feeler gauge. And then calculate mean value.

Clearance “B”

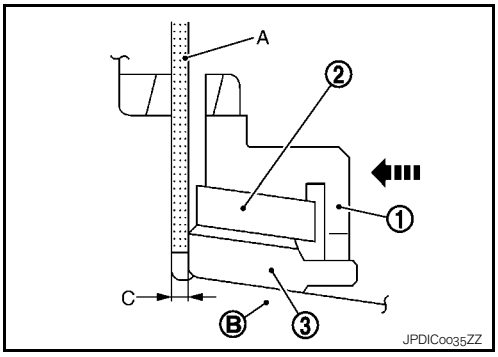
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



3. Measure the clearance “C” at 2 points or more diagonally opposite using a feeler gauge (A) when pressing outer baulk ring (1), synchronizer cone (2), and inner baulk ring (3) toward gear taper cone (B). And then calculate mean value.

Clearance “C”

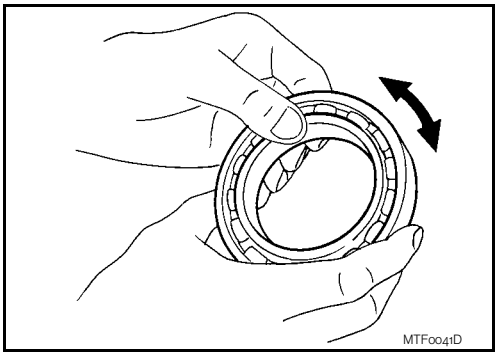
Standard value	**: Refer to TM-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



BEARING

Check items below. If necessary, replace them with new ones.

- Damage and rough rotation of bearing



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REVERSE IDLER SHAFT AND GEAR

Exploded View

INFOID:0000000001034963

Refer to TM-125, "Exploded View".

Disassembly

INFOID:0000000001034964

1. Remove reverse idler gear (rear), reverse coupling sleeve, and reverse insert springs simultaneously.
2. Remove reverse idler gear needle bearing.
3. Remove thrust needle bearing.
4. Remove reverse baulk ring.
5. Remove reverse idler gear (front).
6. Remove reverse idler gear needle bearing.
7. Remove thrust needle bearing.
8. Remove retaining pin from reverse idler shaft.

Assembly

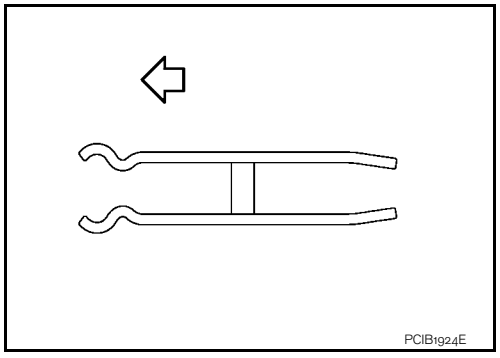
INFOID:0000000001034965

Note the following, and assemble in the reverse order of disassembly.

CAUTION:

- **Be careful with orientation of reverse insert spring.**

⇦ : Front



- **Never reuse retaining pin.**

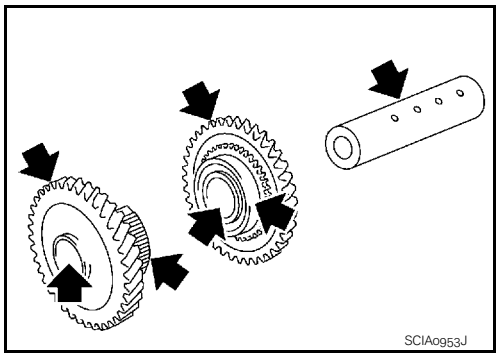
Inspection

INFOID:0000000001034966

REVERSE IDLER SHAFT AND GEAR

Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.

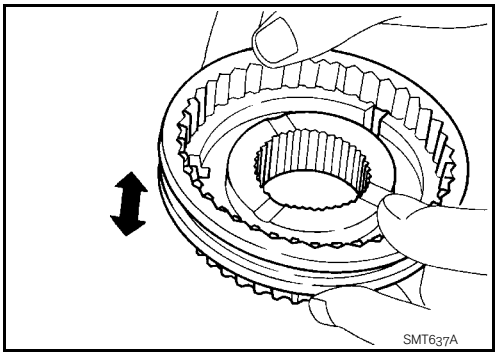


SYNCHRONIZER

Synchronizer Hub and Coupling Sleeve

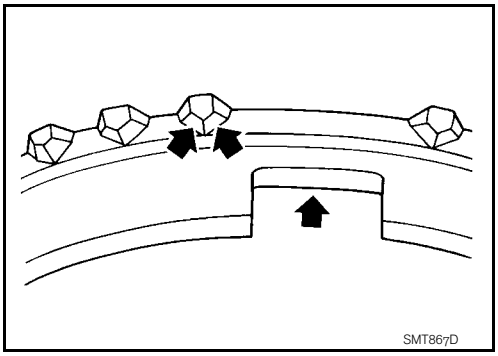
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Check items below. If necessary, replace them with new ones.
- Damage and unusual wear on contact surfaces of coupling sleeve, synchronizer hub of reverse idler gear (rear), and insert spring.
- Coupling sleeve and synchronizer hub of reverse idler gear (rear) must move smoothly.



Baulk Ring

Check damage, or excessive wear on cam face of baulk ring or working face of insert. If necessary, replace it with new ones.

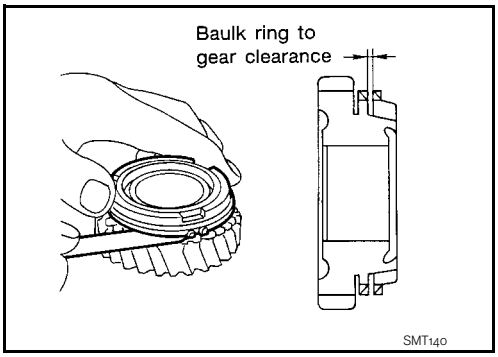


Baulk Ring Clearance for Single Cone Synchronizer (Reverse)

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-184, "Baulk Ring Clearance".**
Limit value	**: Refer to TM-184, "Baulk Ring Clearance".**



BEARING

Check items below. If necessary, replace them with new ones.
- Damage and rough rotation of bearing

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FINAL DRIVE

Exploded View

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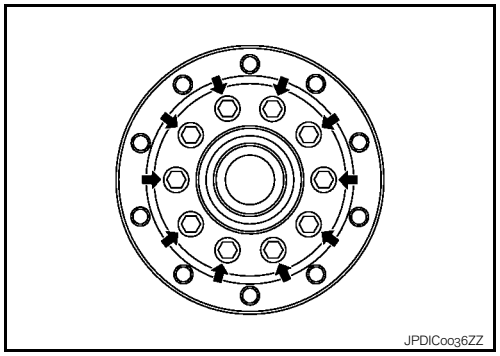
Refer to TM-125, "Exploded View".

Disassembly

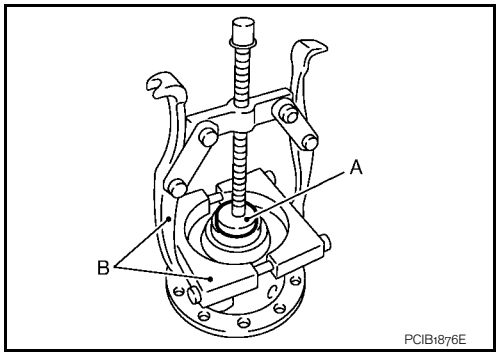
INFOID:0000000001034968

DIFFERENTIAL CASE

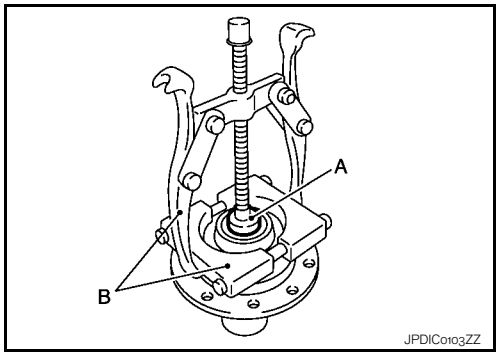
1. Remove final gear mounting bolts and then separate the final gear from differential case.
2. Remove reduction gear mounting bolts.



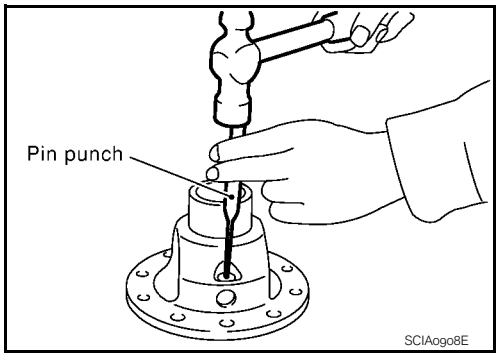
3. Remove differential side bearing (clutch housing side) using the drift (A) [SST: ST33061000] and pullers (B).
   CAUTION:
   Hook a puller on the inner race of differential side bearing.
4. Remove reduction gear.



5. Remove differential side bearing (transaxle case side) using the drift (A) [SST: ST33061000] and pullers (B).
   CAUTION:
   Hook a puller on the inner race of differential side bearing.



6. Remove retaining pin from differential case using a pin punch and then remove pinion mate shaft.
7. Rotate pinion mate gears and remove pinion mate gears, pinion mate thrust washers, side gears, and side gear thrust washers from differential case.

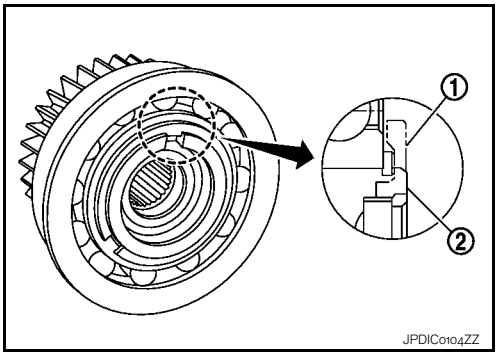


OUTPUT GEAR

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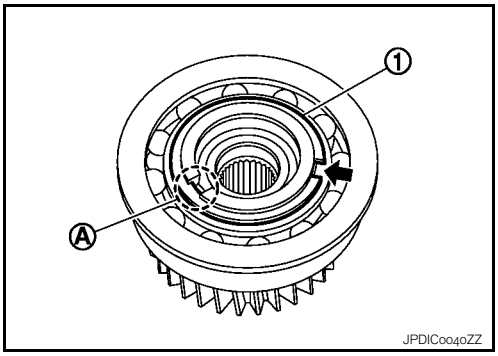
1. Remove snap ring (1).

2 : Output gear

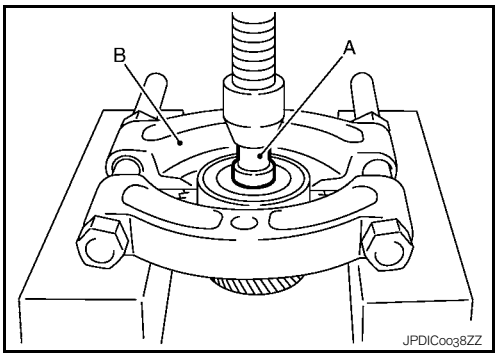


2. Remove snap ring (1).

A : Output gear groove
⬅ : Snap ring notch



3. Remove output gear bearing using the drift (A) [SST: ST30612000] and a puller (B).

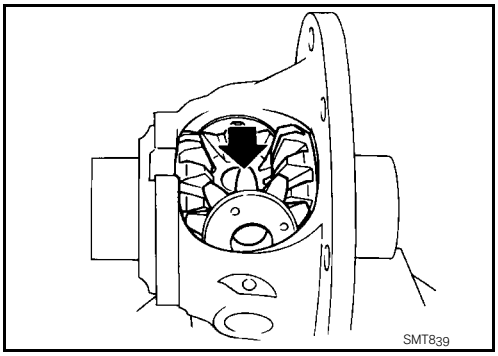


Assembly

INFOID:0000000001034969

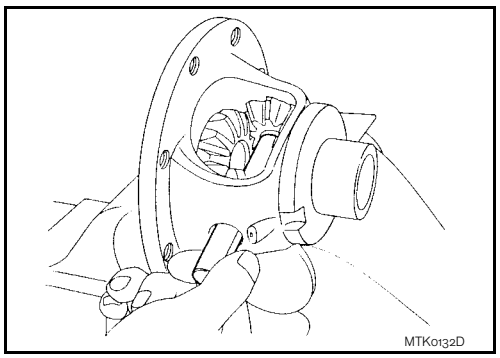
DIFFERENTIAL CASE

1. Apply gear oil to sliding area of differential case, each gear, and thrust washer.
2. Install side gear thrust washers and side gears into differential case.
3. While rotating pinion mate thrust washers and pinion mate gears, aligning them diagonally, install them into differential case.



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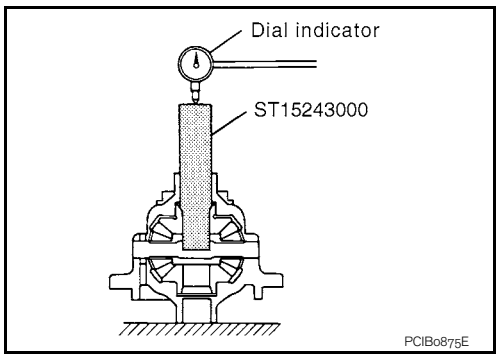
4. Insert pinion mate shaft into differential case.
CAUTION:
Be sure not to damage pinion mate thrust washers.



5. Measure end play of side gears following the procedure below. Then select side gear thrust washer.

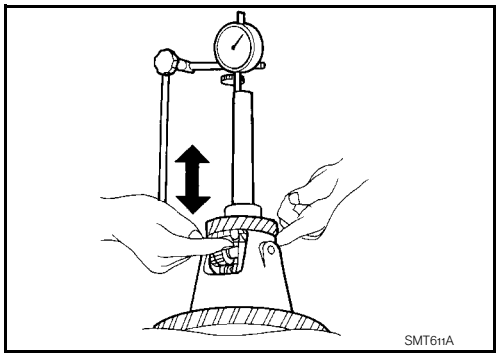
a. Put differential case vertically so that its side gear to be measured faces upward.

b. Place the drift and a dial indicator onto side gears.



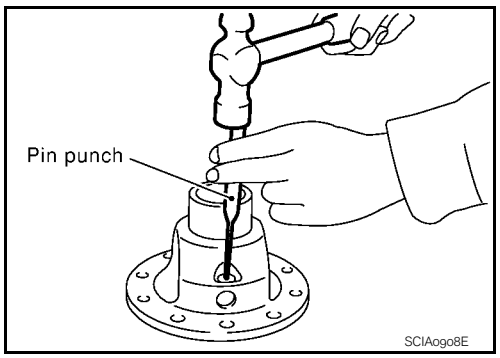
c. Move side gears up and down to measure the clearance and select thrust washer so that it satisfies the standard value.

Allowable Clearance between side gear and differential case with thrust washer	**: Refer to TM-185, "Differential Side Gear Clearance".**



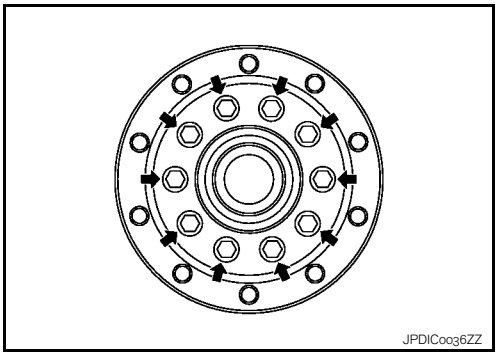
CAUTION:
- **There should be no resistance and gears should rotate freely.**
- **Place differential case upside down. Measure the end play for opposite side-gears likewise securely.**
- **Only one thrust washer can be selected.**

6. Install retaining pin into pinion mate shaft using a pin punch.
CAUTION:
Never reuse retaining pin.



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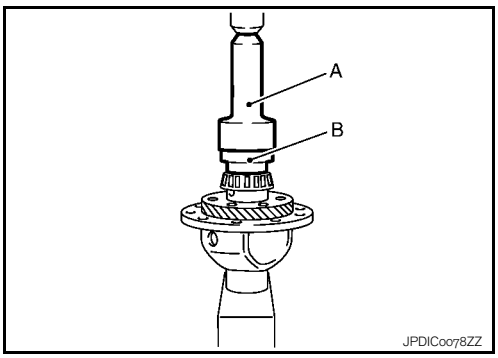
7. Install reduction gear into differential case and tighten reduction gear mounting bolts to the specified torque.



8. Press in differential side bearing (clutch housing side) to differential case using the drifts.

   A: Drift [SST: ST30720000]
   B: Drift [SST: KV38102510]

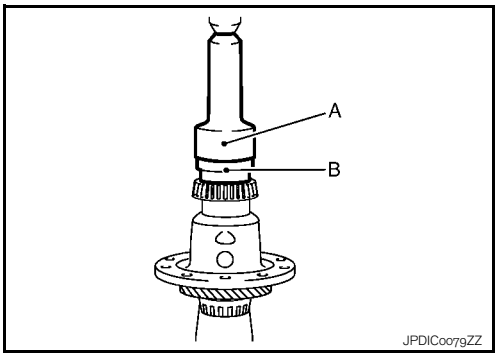
   CAUTION:
   Replace differential side bearing and differential side bearing outer race as a set.



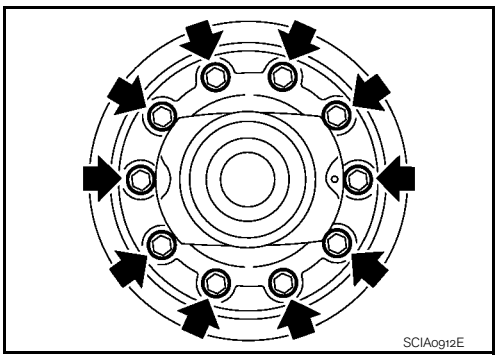
9. Press in differential side bearing (transaxle case side) to differential case using the drifts.

   A: Drift [SST: ST30720000]
   B: Drift [SST: KV38102510]

   CAUTION:
   Replace differential side bearing and differential side bearing outer race as a set.



10. Install final gear into differential case and tighten final gear mounting bolts to the specified torque.

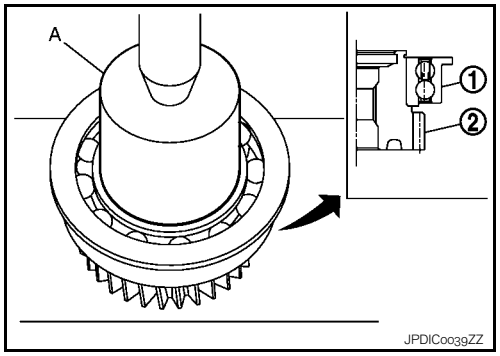


OUTPUT GEAR

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1. Install output gear bearing (1) to output gear (2) using the drift (A) [Commercial service tool].

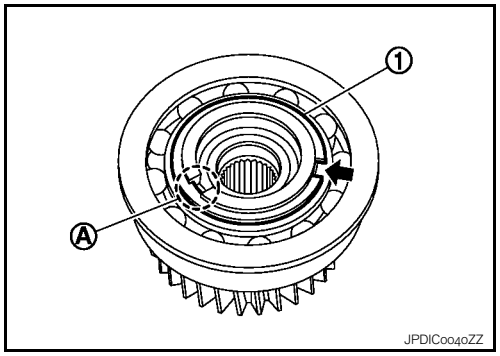
CAUTION:
Be careful with the orientation of output gear bearing.



2. Install snap ring (1) onto output gear and make sure that end play (gap between snap ring and groove) of output gear bearing satisfies the standard value.

End play standard value : Refer to TM-184, "End Play".

CAUTION:
- **Only one snap ring can be selected.**
- **Never reuse snap ring.**
- **Never align snap ring notch with output gear groove (A) when assembling.**



3. Install snap ring following the procedures below.

CAUTION:
If the following steps b and c are not performed when installing snap ring, it may become detached from output gear.

a. Press (A) of the snap ring (1) against (B) of the output gear (2).

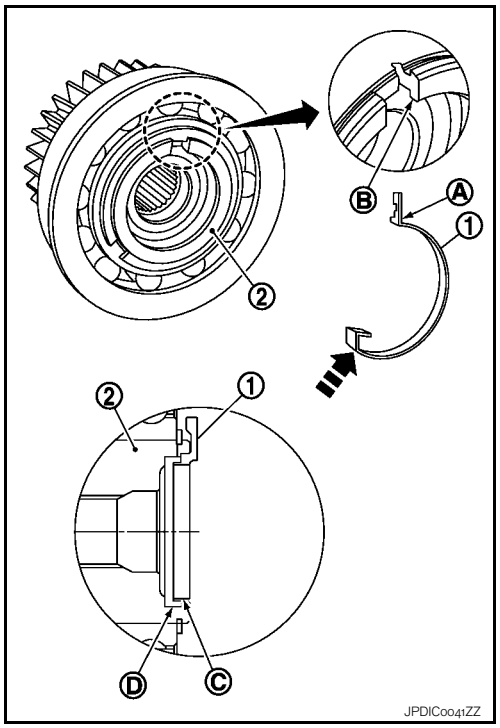
CAUTION:
Never reuse snap ring.

b. Press snap ring from the direction shown in the figure. Temporarily install it so that the rim of snap ring contacts with (C) of output gear.

CAUTION:
- **When compressing snap ring, outside diameter of snap ring must not become 46 mm (1.81 in) or less.**
- **Never press snap ring excessively.**
- **Never insert snap ring in (D) of output gear.**

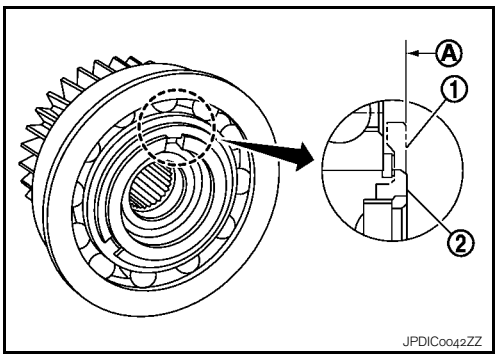
c. Evenly press snap ring in the axial direction to install it on (D) of output gear.

CAUTION:
- **Securely install snap ring on (D) of output gear.**



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- **Snap ring (1) must not lie off (A) of output gear (2).**



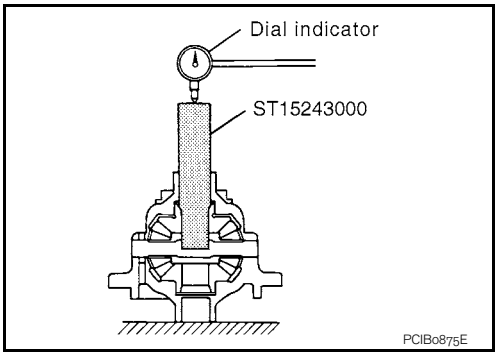
Inspection

INFOID:0000000001034970

INSPECTION BEFORE DISASSEMBLY

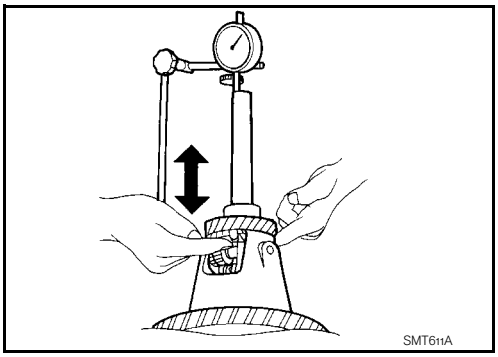
Check the clearance between side gear and differential case as follows.

1. Clean final drive assembly sufficiently to prevent side gear thrust washer, differential case, side gear, and other parts from sticking by gear oil.



2. Put differential case vertically so that side gear to be measured faces upward.
3. Place the drift and a dial indicator onto side gear. Move side gear up and down, and measure the clearance.

Allowable Clearance between side gear and differential case with thrust washer : **Refer to TM-185, "Differential Side Gear Clearance".**



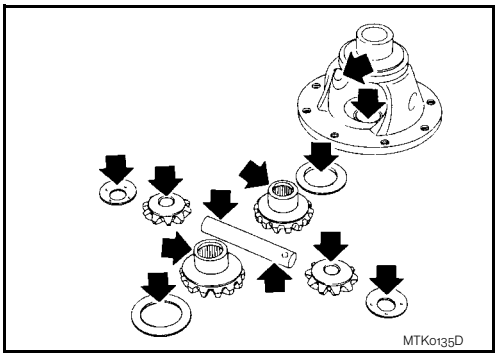
CAUTION:
There should be no resistance and gears should rotate freely.

4. If not within specification, adjust the clearance by changing side gear thrust washer thickness.
5. Turn differential case upside down and measure the clearance between side gear and differential case on the other side in the same way.

INSPECTION AFTER DISASSEMBLY

Gear, Washer, Shaft, and Case

- Check side gears, side gear thrust washers, pinion mate shaft, pinion mate gears, pinion mate thrust washers and differential case. If necessary, replace with a new one.



Gear

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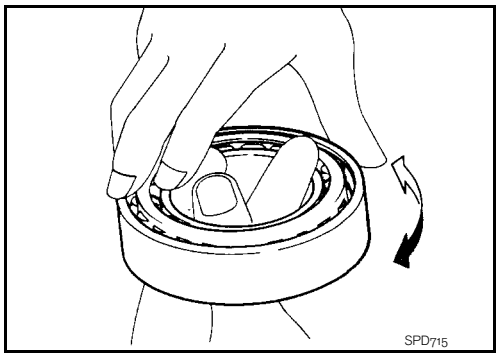
- Check output gear and reduction gear. If necessary, replace with a new one.

Bearing

Check for bearings damage and rough rotation. If necessary, replace with a new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.



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SHIFT FORK AND FORK ROD

Exploded View

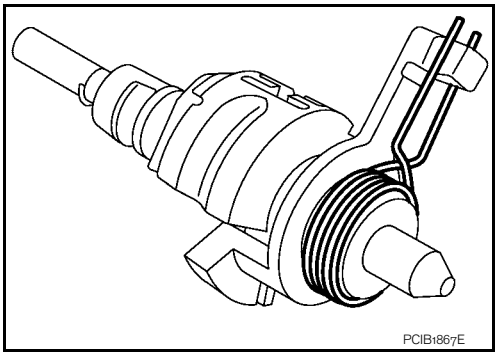
INFOID:0000000001034971

Refer to TM-125, "Exploded View".

Disassembly

INFOID:0000000001034972

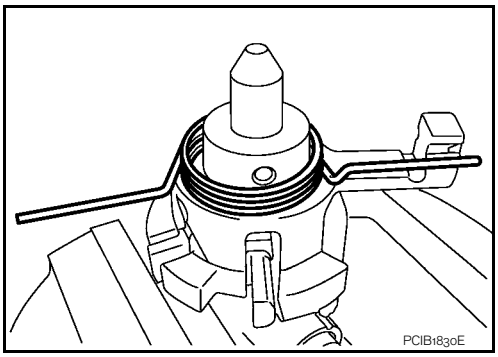
Remove return spring to striking rod assembly.



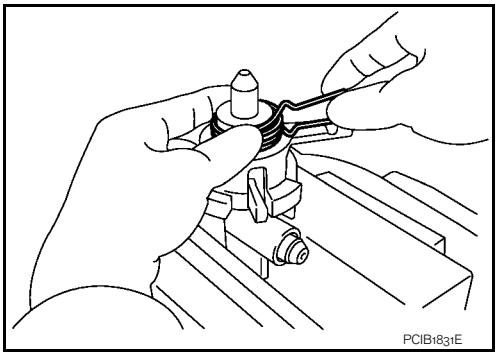
Assembly

INFOID:0000000001034973

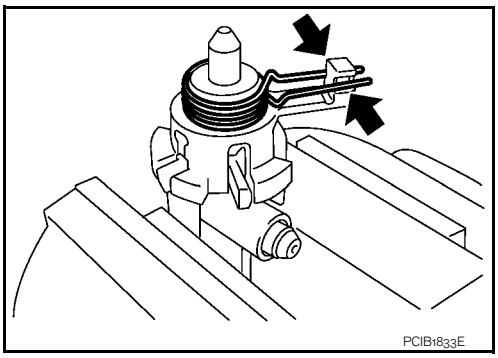
1. Temporarily install return spring to striking rod assembly.
   CAUTION:
   Be careful with the orientation of return spring.



2. Attach one end of the return spring to striking interlock of striking rod assembly while holding return spring.



CAUTION:
When installing, check that return spring is securely seated in the groove of striking interlock of striking rod assembly.



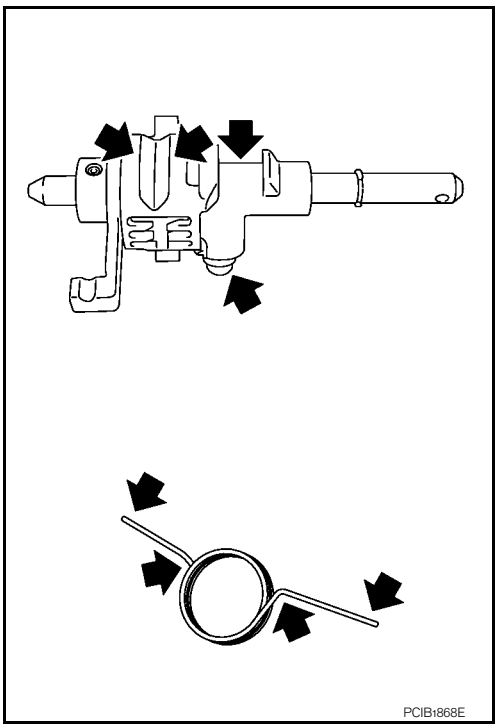
Inspection

INFOID:0000000001034974

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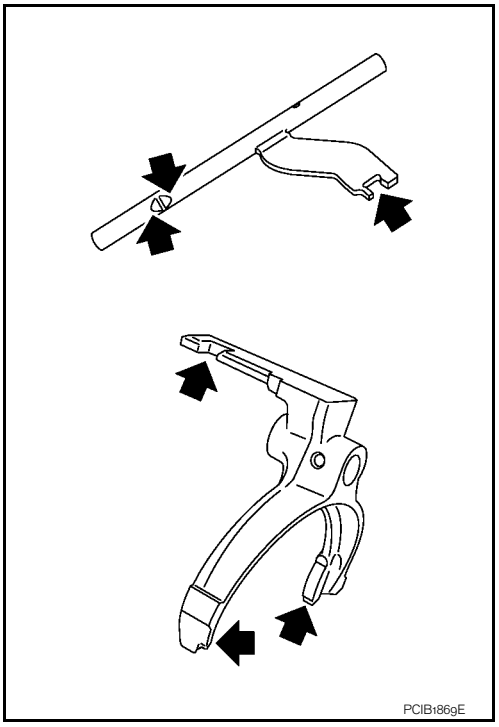
STRIKING ROD ASSEMBLY AND RETURN SPRING

Check contact surfaces and sliding area for wear, damage, bending, etc. If necessary, replace parts.



FORK ROD AND SHIFT FORK

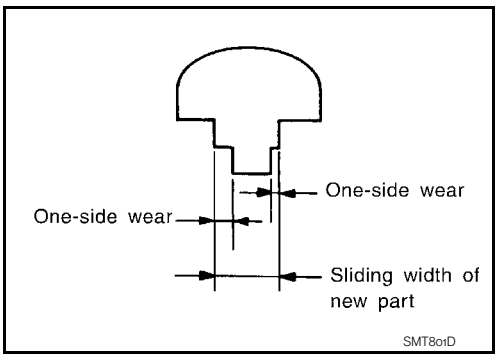
- Check contact surfaces and sliding area for wear, damage, bending, etc. If necessary, replace parts.



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• Check if the width of shift fork hook (sliding area with coupling sleeve) is within allowable specification below.

Item	One-side wear specification	Sliding width of new part
1st-2nd	0.2 mm (0.008 in)	7.80 - 7.93 mm (0.3071 - 0.3122 in)
3rd-4th	0.2 mm (0.008 in)	7.80 - 7.93 mm (0.3071 - 0.3122 in)
5th-6th	0.2 mm (0.008 in)	6.10 - 6.23 mm (0.2402 - 0.2453 in)
Reverse	0.2 mm (0.008 in)	12.80 - 12.93 mm (0.5039 - 0.5091 in)



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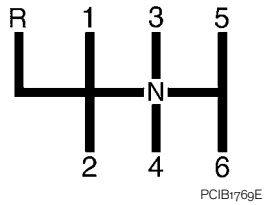
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000001034975

TRANSAXLE

Engine type			MR20DE
Transaxle model			RS6F52A
Model code number			JG20C
Number of speed			6
Synchromesh type			Warner
Shift pattern			 PCIB1769E
Gear ratio	1st		3.727
	2nd		2.043
	3rd		1.392
	4th		1.055
	5th		0.865
	6th		0.732
	Reverse		3.641
Number of teeth	Input gear	1st	11
		2nd	23
		3rd	28
		4th	36
		5th	52
		6th	56
		Reverse	11
	Main gear	1st	41
		2nd	47
		3rd	39
		4th	38
		5th	45
		6th	41
		Reverse	38
	Reverse idler gear	Front	37
		Rear	39
Oil level		mm (in)	85.0 - 90.0 (3.346 - 3.543)
Oil capacity (Reference)		ℓ (Imp pt)	2.0 (3-1/2)
Remarks	Reverse synchronizer		Installed
	Double-cone synchronizer		1st and 3rd
	Triple-cone synchronizer		2nd

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FINAL GEAR

Engine type		MR20DE
Transaxle model		RS6F52A
Model code number		JG20C
Final gear ratio		4.687
Number of teeth	Final gear/Pinion	75/16
	Side gear/Pinion mate gear	14/10

End Play

INFOID:0000000001034976

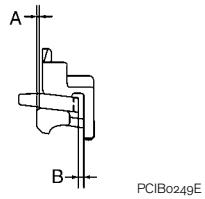
Unit: mm (in)

Items	Standard value
1st main gear	0.20 - 0.30 (0.0079 - 0.0118)
2nd main gear	0.06 - 0.16 (0.0024 - 0.0063)
6th main gear	0 - 0.1 (0 - 0.004)
3rd input gear	0.18 - 0.31 (0.0071 - 0.0122)
4th input gear	0.20 - 0.30 (0.0079 - 0.0118)
5th input gear	0.06 - 0.16 (0.0024 - 0.0063)
6th input gear	0.06 - 0.16 (0.0024 - 0.0063)
Reverse idler gear	0.04 - 0.10 (0.0016 - 0.0039)
6th input gear bushing	0 - 0.1 (0 - 0.004)
Input shaft	0 - 0.06 (0 - 0.0024)
Mainshaft	0 - 0.06 (0 - 0.0024)
Mainshaft C-ring	0 - 0.06 (0 - 0.0024)
Striking rod	0.05 - 0.152 (0.0020 - 0.0060)
Output gear bearing	0 - 0.06 (0 - 0.0024)
Output gear assembly	0 - 0.06 (0 - 0.0024)

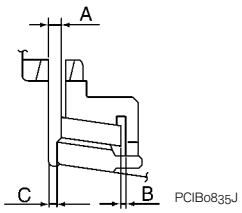
Baulk Ring Clearance

INFOID:0000000001034977

Unit: mm (in)

Measurement point		Standard value	Limit value
1st and 3rd (Double-cone synchronizer)	Clearance between synchronizer cone and inner baulk ring end face “A”	0.6 - 0.8 (0.024 - 0.031)	0.2 (0.008)
 PCIB0249E	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.6 - 1.1 (0.024 -0.043)	0.2 (0.008)
2nd (Triple-cone synchronizer)	Clearance between synchronizer cone and clutch gear end face “A”	0.6 - 1.2 (0.024 - 0.047)	0.3 (0.012)

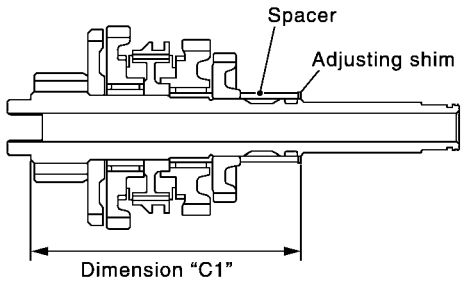
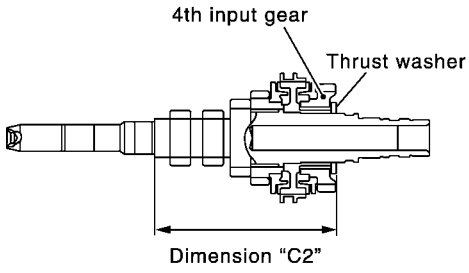
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Measurement point		Standard value	Limit value
	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.6 - 1.1 (0.024 - 0.043)	0.2 (0.008)
	Clearance between inner baulk ring and clutch gear end face “C”	0.7 - 1.1 (0.028 - 0.043)	0.3 (0.012)
4th		0.9 - 1.45 (0.035 - 0.0571)	0.7 (0.028)
5th		0.95 - 1.4 (0.0374 - 0.055)	0.7 (0.028)
6th		0.95 - 1.4 (0.0374 - 0.055)	0.7 (0.028)
Reverse		0.95 - 1.4 (0.0374 - 0.055)	0.7 (0.028)

Dimension

INFOID:0000000001034978

Unit: mm (in)

Measurement point	Standard value
Mainshaft: Dimension “C1” 	173.85 - 173.95 (6.844 - 6.848)
Input shaft: Dimension “C2” 	154.7 - 154.8 (6.091 - 6.094)

Differential Side Bearing Preload

INFOID:0000000001034979

Unit: mm (in)

Differential side bearing preload: L*	0.15 - 0.21 (0.0059 - 0.0083)

*: Install shims which are “deflection of differential case” + “L” in thickness.

Differential Side Gear Clearance

INFOID:0000000001034980

Unit: mm (in)

Allowable clearance between side gear and differential case with thrust washer	0.1 - 0.2 (0.004 - 0.008)

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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

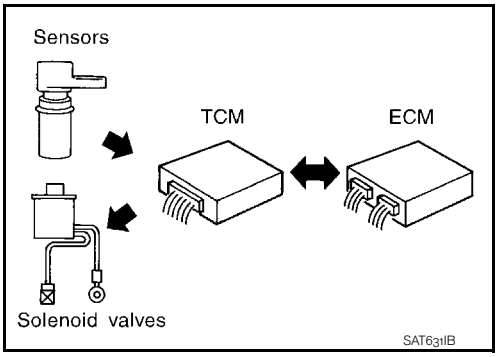
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INTRODUCTION

The TCM receives a signal from the vehicle speed sensor, PNP switch and provides shift control or lock-up control via CVT solenoid valves.

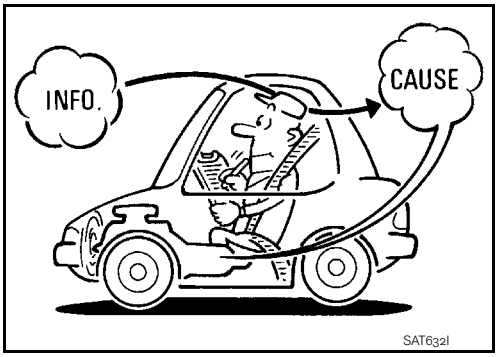
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the CVT system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

Input and output signals must always be correct and stable in the operation of the CVT system. The CVT system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.



It is much more difficult to diagnose an error that occurs intermittently rather than continuously. Most intermittent errors are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

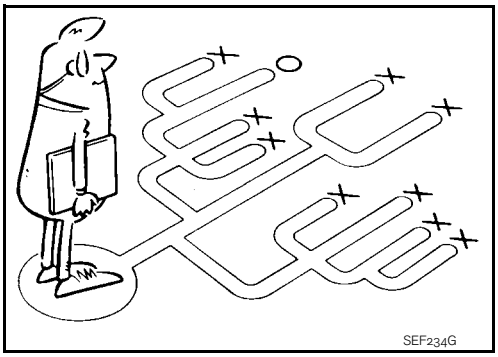
A visual check only may not find the cause of the errors. A road test with CONSULT-III (or GST) or a circuit tester connected should be performed. Follow the “DETAILED FLOW”.



Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such errors, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic Work Sheet” as shown on the example (Refer to TM-187) 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-187, "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-292, "Fail-safe".
- CVT fluid inspection. Refer to TM-314, "Inspection".
- Line pressure test. Refer to TM-318, "Inspection and Judgment".

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• Stall test. Refer to TM-316, "Inspection and Judgment".

>> 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-214, "Diagnosis Description".

Is any DTC detected?

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

4.PERFORM DIAGNOSTIC PROCEDURE

Perform “Diagnostic Procedure” for the displayed DTC.

>> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform “DTC CONFIRMATIOM PROCEDURE” for the displayed DTC.

Is DTC detected?

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

6.CHECK SYMPTOM 2

Confirm the symptom described by the customer.

Is any malfunction present?

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

7.RODE TEST

Perform “RODE TEST”. Refer to TM-320, "Description".

>> GO TO 8.

8.CHECK SYMPTOM 3

Confirm the symptom described by the customer.

Is any malfunction present?

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

Diagnostic Work Sheet

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INFORMATION FROM CUSTOMER

KEY POINTS

• **WHAT**..... Vehicle & CVT model
• **WHEN**..... Date, Frequencies
• **WHERE**..... Road conditions
• **HOW**..... Operating conditions, Symptoms

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

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Symptoms	o Vehicle does not move. (o Any position o Particular position)	
	o No shift	
	o Lock-up malfunction	
	o Shift shock or slip (o N → D o N → R o Lock-up o Any drive position)	
	o Noise or vibration	
	o No pattern select	
	o Others ( )	
Malfunction indicator (MI)	o Continuously lit	o Not lit

DIAGNOSTIC WORKSHEET

1	o Read the item on cautions concerning fail-safe and understand the customer's complaint.			TM-292
2	o CVT fluid inspection, stall test and line pressure test			
		o CVT fluid inspection		TM-314
			o Leak (Repair leak location.) o State o Amount	
		o Stall test		TM-316, TM-318
			o Torque converter one-way clutch o Reverse brake o Forward clutch o Steel belt	o Engine o Line pressure low o Primary pulley o Secondary pulley
		o Line pressure inspection - Suspected part:		
3	o Perform self-diagnosis.			TM-216
		Enter checks for detected items.		
4	o Perform road test.			TM-320
	4-1.	Check before engine is started		TM-320
	4-2.	Check at idle		TM-321
	4-3.	Cruise test		TM-322
	o After completing all rode test, check malfunction phenomena to repair or replace malfunctioning part.Refer to TM-295, "Symptom Table".			
5	o Drive vehicle to check that the malfunction phenomenon has been resolved.			
6	o Erase the results of the self-diagnosis from the TCM and the ECM.			TM-214, TM-216

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INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Service After Replacing TCM and Transaxle Assembly

INFOID:0000000000987943

SERVICE AFTER REPLACING TCM AND TRANSAXLE ASSEMBLY

Perform the applicable service in the following sheet when replacing TCM or transaxle assembly.

CAUTION:

- **Never start the engine until the service is completed.**
- **"TCM- POWER SUPPLY [P1701]" may be indicated soon after replacing TCM or transaxle assembly (after erasing the memory at the pattern B). Restart the self-diagnosis after erasing the self-diagnosis result. Check that no error is detected.**

TCM	CVT assembly	Service pattern
Replace the new unit.	Do not replace the unit.	"PATTERN A"
Do not replace the unit.	Replace the old unit with new one.	"PATTERN B"
Replace the old unit.	Do not replace the unit.	
	Replace the old unit with new one.	
Replace the new unit.	Replace the old unit with new one.	"PATTERN C"

NOTE:

Old unit means that the unit has been already used for another vehicle.

PATTERN A

1. Shift the selector lever to "P" position after replacing TCM. Turn the ignition switch ON.
2. Check that the shift position indicator in the combination meter turns ON (It indicates approximately 1 or 2 seconds after turning the ignition switch ON.)
   - Check the following items if the shift position indicator does not turn ON. Repair or replace the shift position indicator if necessary.
   - The harness between TCM and ROM ASSY in the transaxle assembly is open or short.
   - Cable disconnected, loosen, or bent from the connector housing.

PATTERN B

1. Turn the ignition switch ON after replacing each part.
2. Start engine.
   CAUTION:
   Never start the driving.
3. Select "DATA MONITOR".
4. Warm up the transaxle assembly until "ATFTEMP COUNT" indicates 47 [approximately 20°C (68°)] or more. Turn the ignition switch OFF.
5. Turn the ignition switch ON.
   CAUTION:
   Never start engine.
6. Select "SELF-DIAG RESULTS".
7. Shift the selector lever to "R" position.
8. Depress slightly the accelerator pedal (Pedal angle: 2/8) while depressing the brake pedal.
9. Perform "ERASE".
10. Shift the selector lever to "R" position after replacing TCM. Turn the ignition switch OFF.
11. Wait approximately 10 minutes after turning the ignition switch OFF.
12. Turn the ignition switch ON while shifting the selector lever to "R" position.
    CAUTION:
    Never start engine.
13. Select "Special function".
14. Check that the value on "CALIBRATION DATA" is same as the data after erasing "Calibration Data".

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- Restart the procedure from step 3 if the values are not same.

15. Shift the selector lever to “P” position.
16. Check that the shift position indicator in the combination meter turns ON (It indicates approximately 1 or 2 seconds after shifting the selector lever to “P” position.)
    - Check the following items if the shift position indicator does not turn ON. Repair or replace the shift position indicator if necessary.
    - The harness between TCM and ROM ASSY in the transaxle assembly is open or short.
    - Cable disconnected, loosen, or bent from the connector housing.
    - Power supply and ground of TCM. Refer to TM-265, "Description".

Calibration Data

Data after deletion

Item name	Display value	Item name	Display value
UNIT CLB ID 1	0000	GAIN PL	256
UNIT CLB ID 2	0000	OFFSET PL	40
UNIT CLB ID 3	0000	OFFSET2 PL	0
UNIT CLB ID 4	0000	MAP NO SEC	32
UNIT CLB ID 5	0000	GAIN SEC	256
UNIT CLB ID 6	0000	OFFSET SEC	40
MAP NO LU	33	OFFSET2 SEC	0
GAIN LU	256	MAP NO SL	32
OFFSET LU	40	GAIN SL	256
OFFSET2 LU	0	OFFSET SL	40
MAP NO PL	32	OFFSET2 SL	0

PATTERN C

1. Replace the transaxle assembly first, and then replace TCM.
2. Perform the service of “PATTERN A”.
   (Perform the service of “PATTERN B” if TCM is replaced first.)

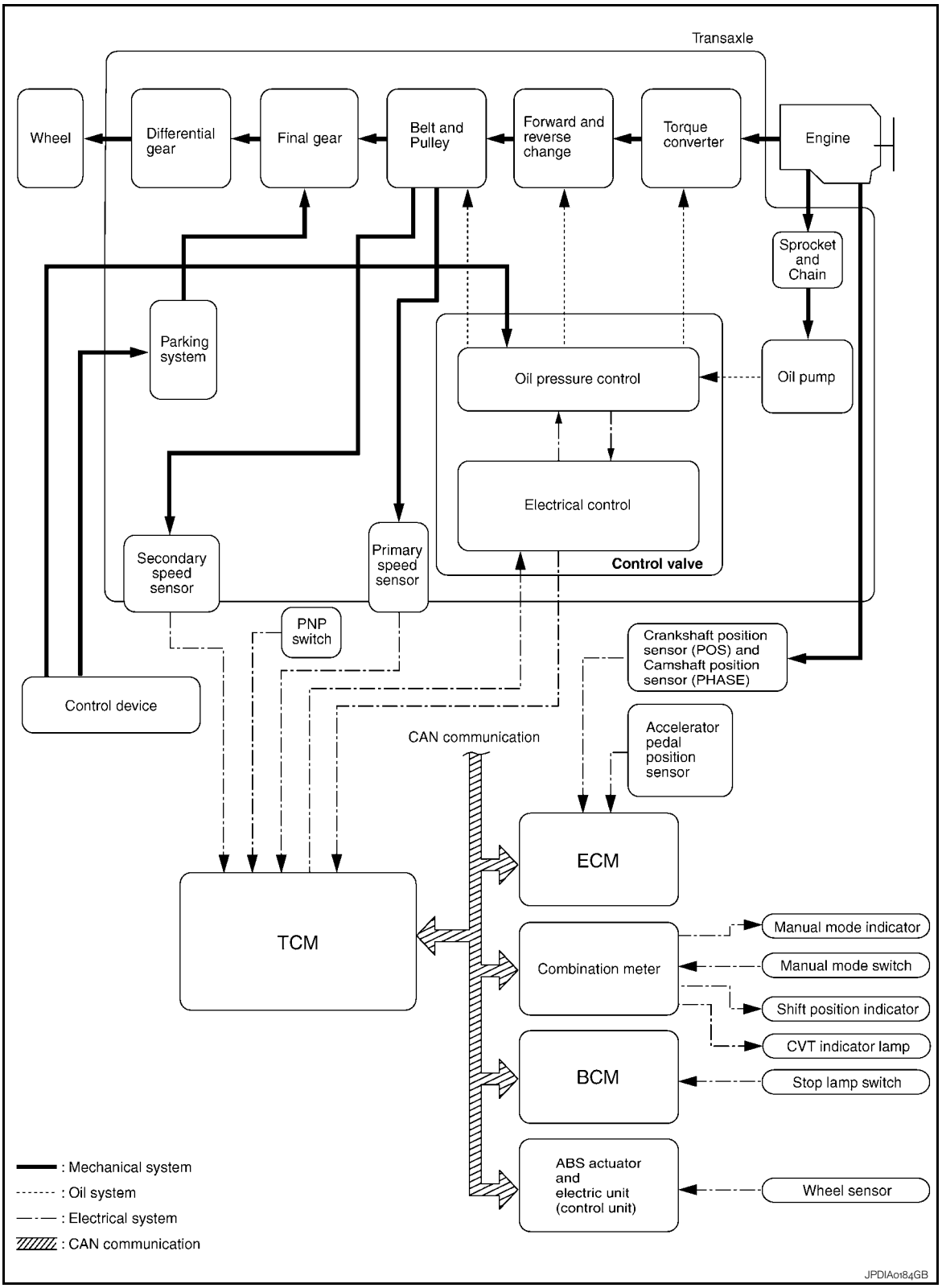
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FUNCTION DIAGNOSIS

CVT SYSTEM

System Diagram

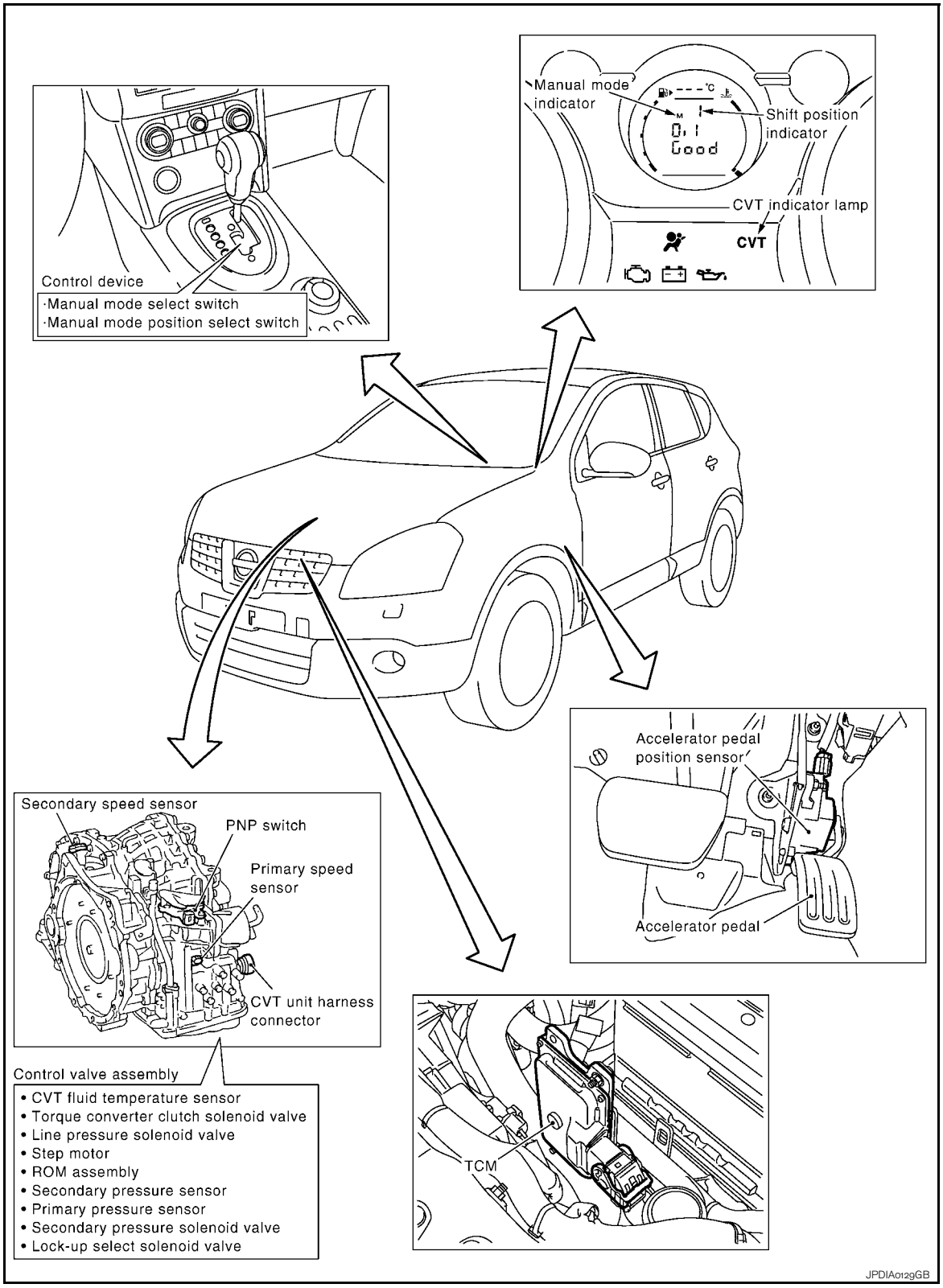
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Component Parts Location

INFOID:0000000000988604

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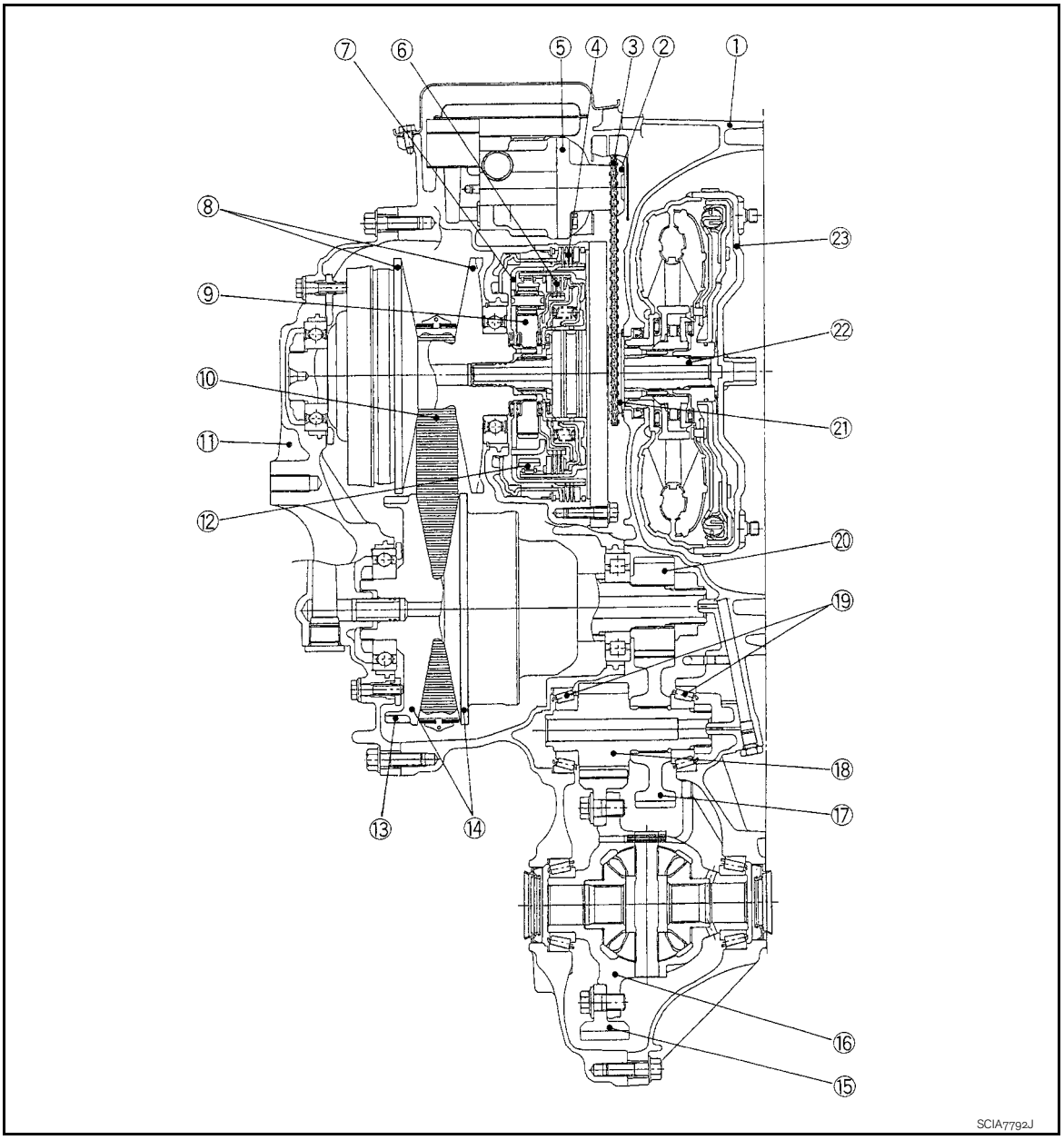


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MECHANICAL SYSTEM

Cross-Sectional View

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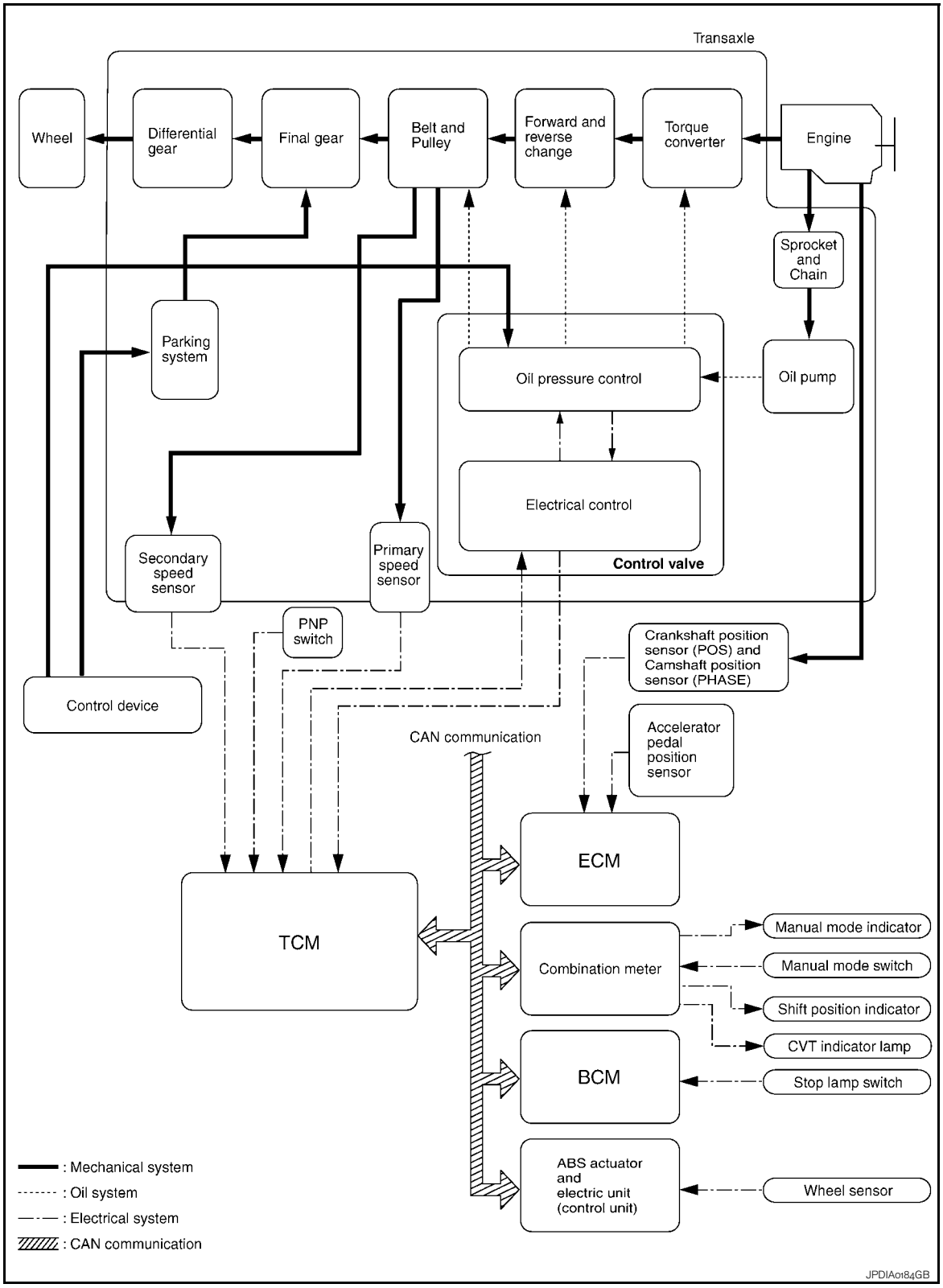


1. Converter housing
2. Driven sprocket
3. Chain
4. Reverse brake
5. Oil pump
6. Forward clutch
7. Planetary carrier
8. Primary pulley
9. Sun gear
10. Steel belt
11. Side cover
12. Internal gear
13. Parking gear
14. Secondary pulley
15. Final gear
16. Differential case
17. Idler gear
18. Reduction gear
19. Taper roller bearing
20. Output gear
21. Drive sprocket
22. Input shaft
23. Torque converter

System Diagram

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System Description

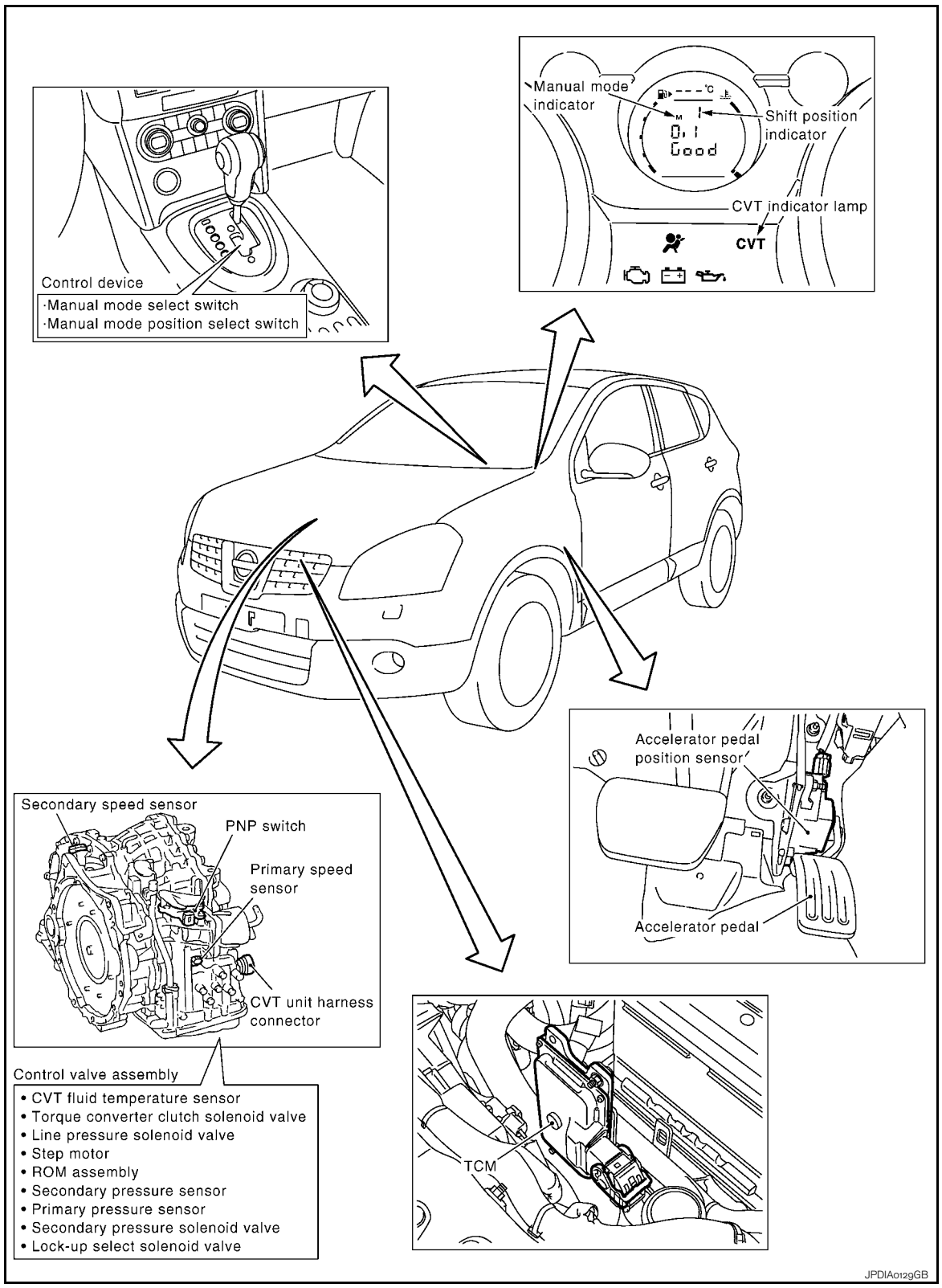
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Transmits the power from the engine to the drive wheel.

Component Parts Location

INFOID:0000000000988608

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Component Description

INFOID:0000000000988609

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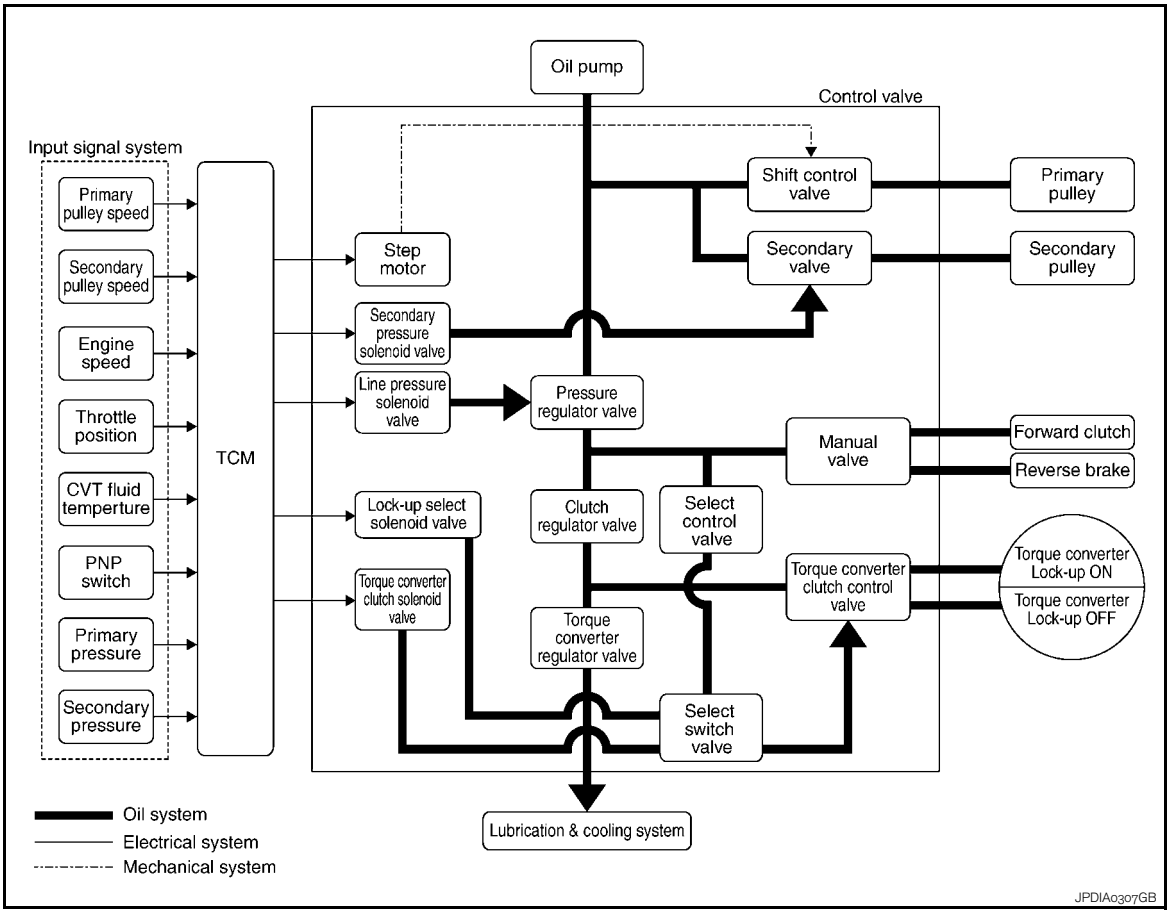
Item	Function
Torque converter	The torque converter is the device that increases the engine torque as well as the conventional CVT and transmits it to the transaxle.
Oil pump	The efficiency of pump discharge rate at low-rpm and the optimization at high-rpm have been increased through the oil pump drive chain by adopting a vane-type oil pump controlled by the engine. Discharged oil from oil pump is transmitted to the control valve. It is used as the oil of primary and secondary pulley operation and the oil of clutch operation and the lubricant for each part.
Planetary gear	Perform the transmission of drive power and the switching of forward/backward movement.
Forward clutch	
Reverse brake	
Primary pulley	It is composed of a pair of pulleys (the groove width is changed freely in the axial direction) and the steel belt (the steel star wheels are placed continuously and the belt is guided with the multilayer steel rings on both sides). The groove width changes according to wrapping radius of steel belt and pulley from low status to overdrive status continuously with non-step. It is controlled with the oil pressures of primary pulley and secondary pulley.
Secondary pulley	
Steel belt	
Output gear	The drive power from the secondary pulley returns the deceleration gears [primary deceleration (output gear/idler gear pair) and secondary deceleration (reduction gear/final gear pair)]. It is transmitted from differential to drive wheel.
Idler gear	
Reduction gear	
Final gear	
Differential	
Manual shaft	The parking rod rotates the parking pole and the parking pole engages with the parking gear when the manual shaft is in P position. As a result the parking gear and the output axis are fixed.
Parking rod	
Parking pawl	
Parking gear	

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HYDRAULIC CONTROL SYSTEM

System Diagram

INFOID:0000000000988610



System Description

INFOID:0000000000988611

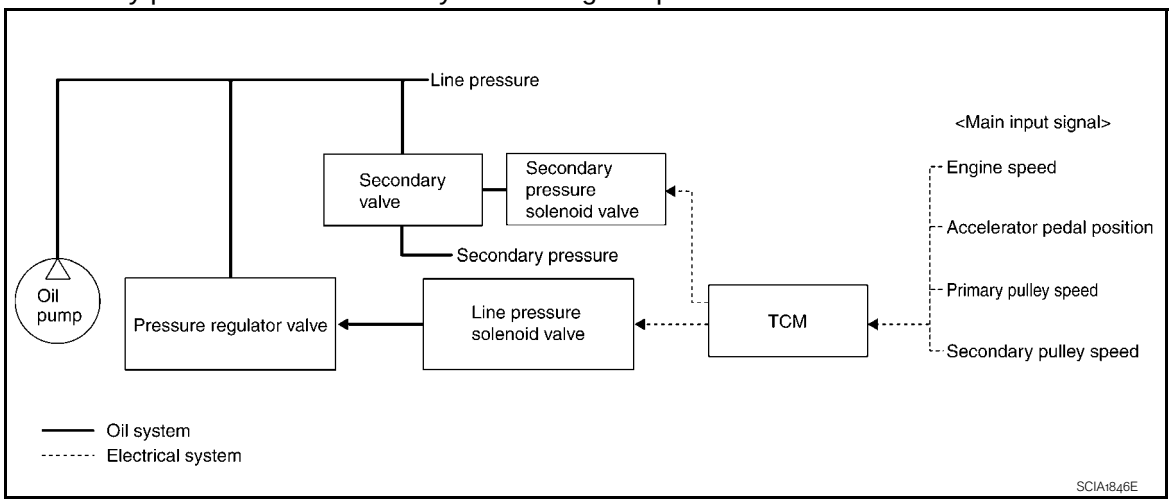
The hydraulic control mechanism consists of the oil pump directly driven by the engine, the hydraulic control valve that controls line pressure and transmission, and the input signal line.

LINE PRESSURE AND SECONDARY PRESSURE CONTROL

- 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 valve and secondary pressure solenoid valve.

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- 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. Secondary pressure is controlled by decreasing line pressure.



Normal Control

Optimize the line pressure and secondary pressure, depending on driving conditions, on the basis of the throttle position, the engine speed, the primary pulley (input) revolution speed, the secondary pulley (output) revolution speed, the brake signal, the PNP switch signal, the lock-up signal, the voltage, the target gear ratio, the fluid temperature, and the fluid pressure.

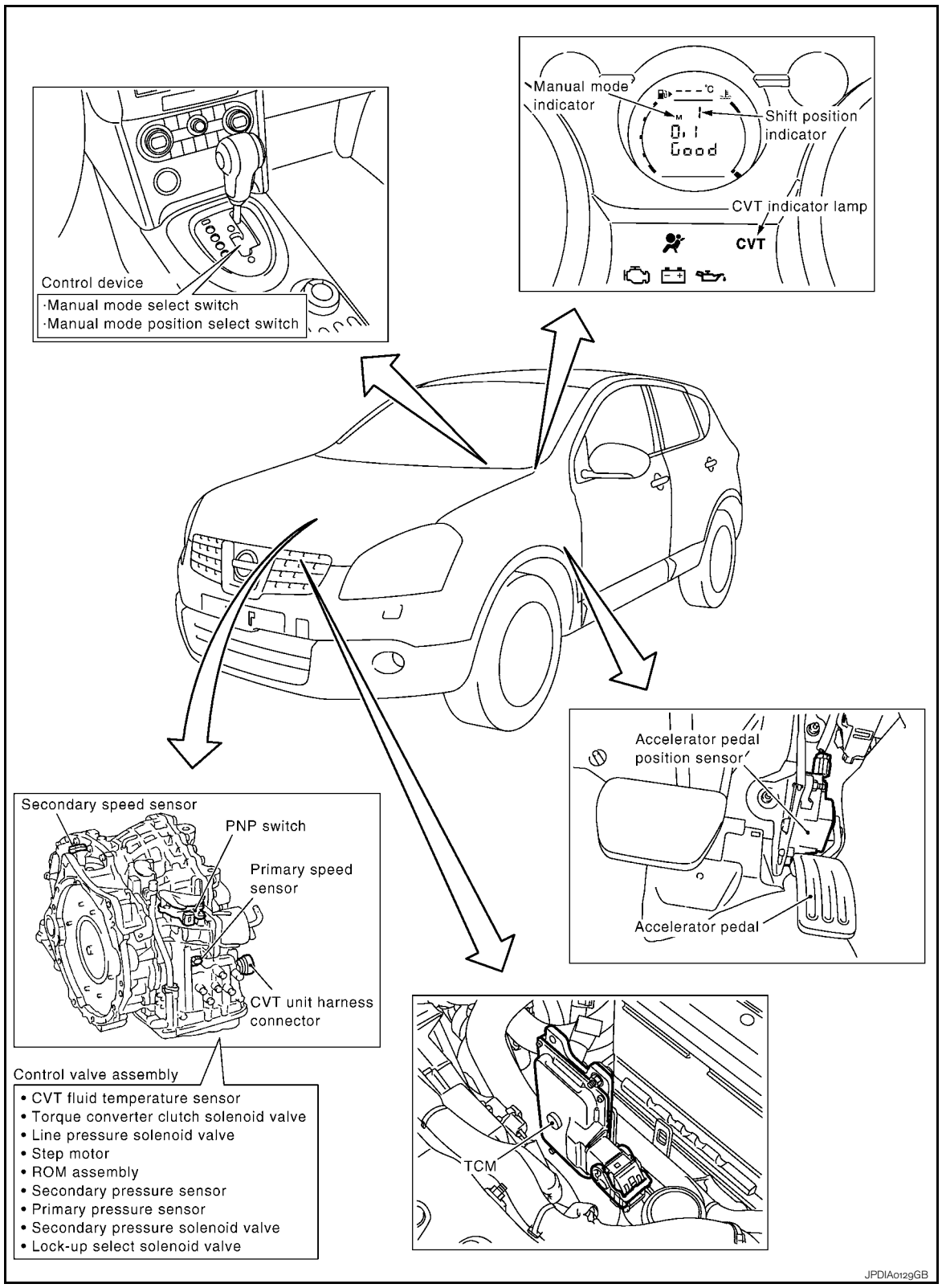
Feedback Control

When controlling the normal fluid pressure or the selected fluid pressure, the secondary pressure can be set more accurately by using the fluid pressure sensor to detect the secondary pressure and controlling the feedback.

Component Parts Location

INFOID:0000000000988612

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Component Description

INFOID:0000000000988613

TRANSAXLE ASSEMBLY

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Name	Function
Torque converter regulator valve	Optimizes the supply pressure for the torque converter depending on driving conditions.
Pressure regulator valve	Optimizes the discharge pressure from the oil pump depending on driving conditions.
TCC control valve	• Activates or deactivate the lock-up. • Lock-up smoothly by opening lock-up operation excessively.
TCC solenoid valve	TM-242
Shift control valve	Controls flow-in/out of line pressure from the primary pulley depending on the stroke difference between the stepping motor and the primary pulley.
Secondary valve	Controls the line pressure from the secondary pulley depending on operating conditions.
Clutch regulator valve	Adjusts the clutch operating pressure depending on operating conditions.
Secondary pressure solenoid valve	TM-250
Line pressure solenoid valve	TM-244
Step motor	TM-276
Manual valve	Transmits the clutch operating pressure to each circuit in accordance with the selected position.
Select control valve	Engages forward clutch, reverse brake smoothly depending on select operation.
Select switch valve	Switches torque converter clutch solenoid valve control pressure use to torque converter clutch control valve or select control valve.
Lock-up select solenoid valve	TM-273
Primary speed sensor	TM-231
Secondary speed sensor	TM-234
PNP switch	TM-231
Primary pulley	TM-195
Secondary pulley	
Forward clutch	
Torque converter	

EXCEPT TRANSAXLE ASSEMBLY

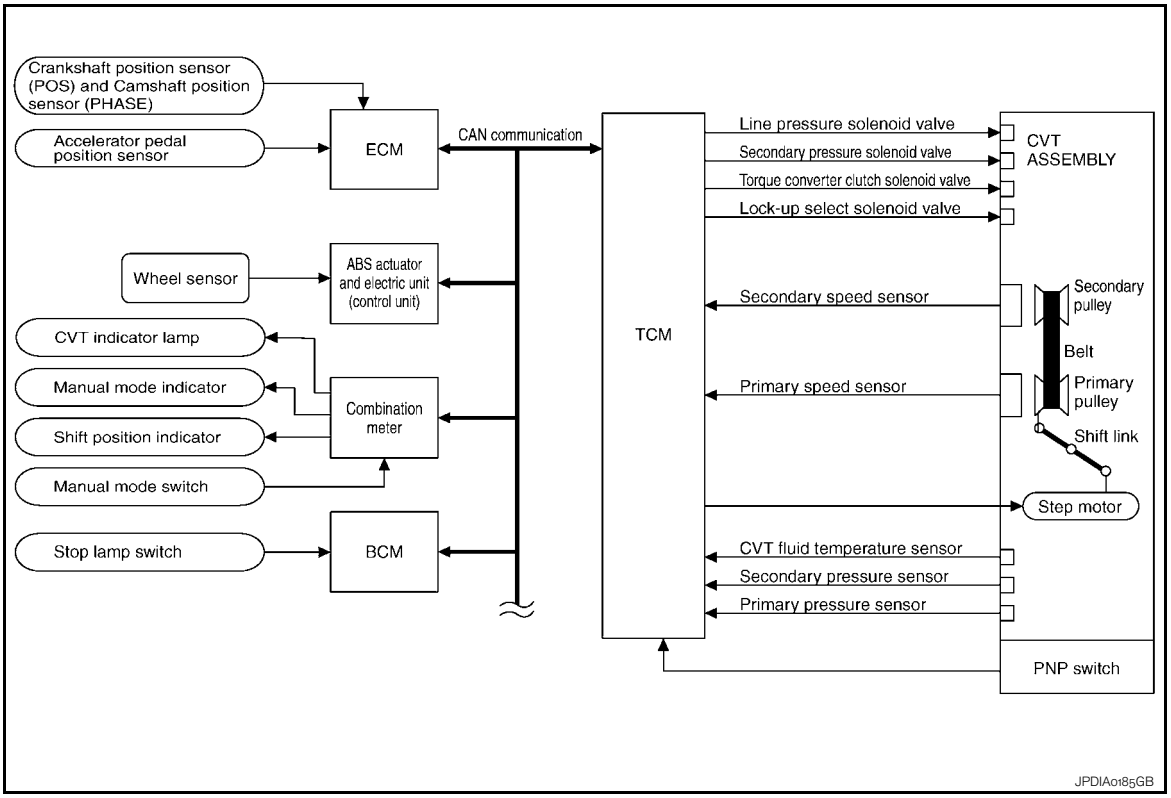
Name	Function
TCM	Judges the vehicle driving status according to the signal from each sensor and controls the non-step transmission mechanism properly.
Accelerator pedal position sensor	TM-267

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CONTROL SYSTEM

System Diagram

INFOID:0000000000988614



System Description

INFOID:0000000000988615

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

CONTROL SYSTEM OUTLINE

The CVT senses vehicle operating conditions through various sensors. It always controls the optimum shift position and reduces shifting and lock-up shocks.

SENSORS (or SIGNAL)		TCM		ACTUATORS
PNP switch Accelerator pedal position signal Closed throttle position signal Engine speed signal CVT fluid temperature sensor Vehicle speed signal Manual mode signal Stop lamp switch signal Primary speed sensor Secondary speed sensor Primary pressure sensor Secondary pressure sensor	⇒	Shift control Line pressure control Primary pressure control Secondary pressure control Lock-up control Engine brake control Vehicle speed control Fail-safe control Self-diagnosis CONSULT-III communication line Duet-EA control CAN system On board diagnosis	⇒	Step motor Torque converter clutch solenoid valve Lock-up select solenoid valve Line pressure solenoid valve Secondary pressure solenoid valve Manual mode indicator Shift position indicator CVT indicator lamp

INPUT/OUTPUT SIGNAL OF TCM

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Control item		Fluid pressure control	Select control	Shift control	Lock-up control	CAN communication control	Fail-safe function(*2)
Input	PNP switch	X	X	X	X	X	X
	Accelerator pedal position signal (*1)	X	X	X	X	X	X
	Closed throttle position signal(*1)	X		X	X	X	
	Engine speed signal(*1)	X	X		X	X	X
	CVT fluid temperature sensor	X	X	X	X		X
	Manual mode signal(*1)	X		X	X	X	X
	Stop lamp switch signal(*1)	X		X	X	X	
	Primary speed sensor	X		X	X	X	X
	Secondary speed sensor	X	X	X	X	X	X
	Primary pressure sensor	X		X			
	Secondary pressure sensor	X		X			X
Output	Step motor			X			X
	TCC solenoid valve		X		X		X
	Lock-up select solenoid valve		X		X		X
	Line pressure solenoid valve	X	X	X			X
	Secondary pressure solenoid valve	X		X			X

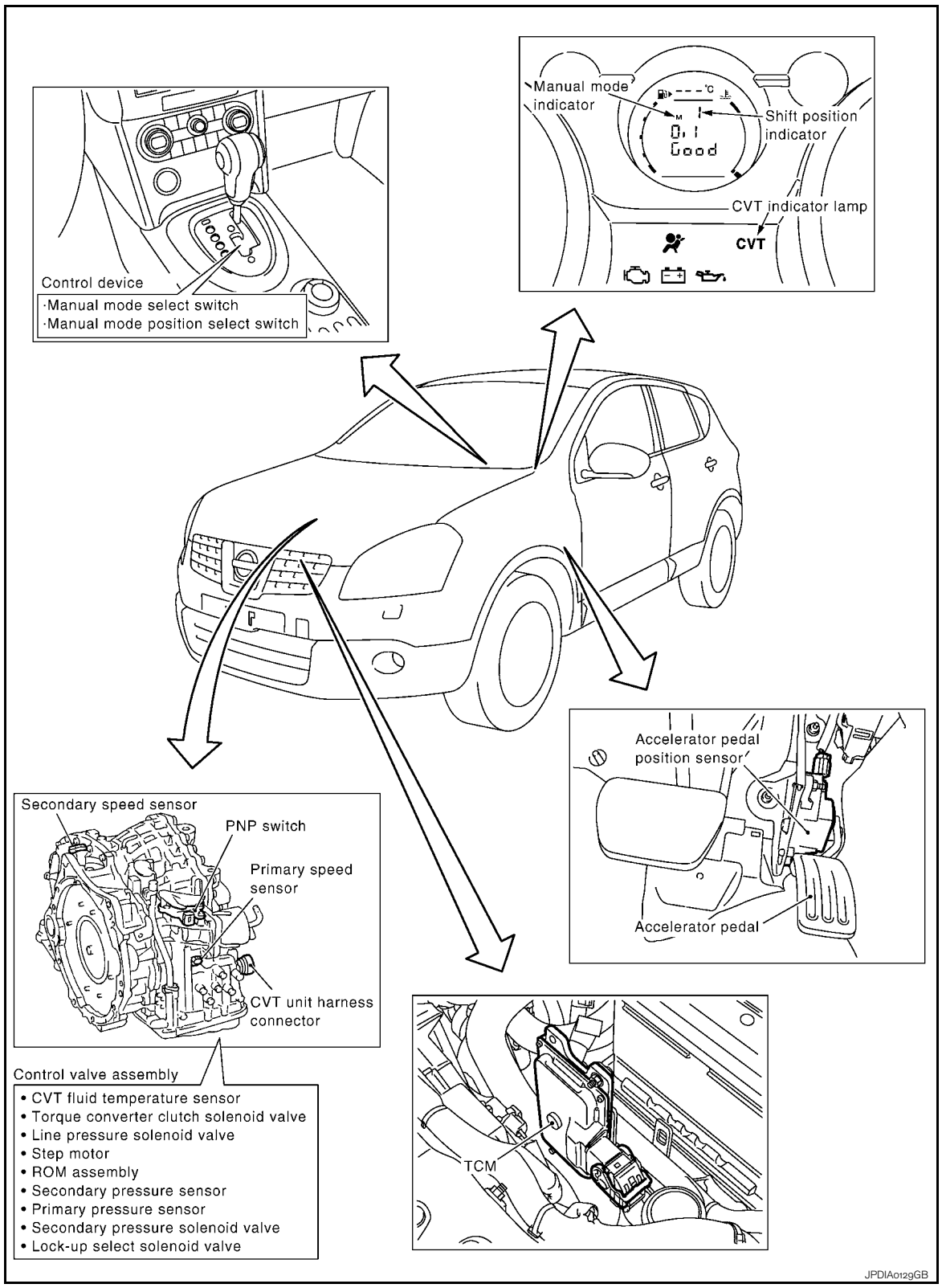
*1: Input by CAN communications.

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

Component Parts Location

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Component Description

INFOID:0000000000988617

TRANSAXLE ASSEMBLY

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Name	Function
PNP switch	TM-226
CVT fluid temperature sensor	TM-229
Primary speed sensor	TM-231
Secondary speed sensor	TM-234
Primary pressure sensor	TM-260
Secondary pressure sensor	TM-255
Step motor	TM-276
TCC solenoid valve	TM-240
Lock-up select solenoid valve	TM-273
Line pressure solenoid valve	TM-244
Secondary pressure solenoid valve	TM-248

EXCEPT TRANSAXLE ASSEMBLY

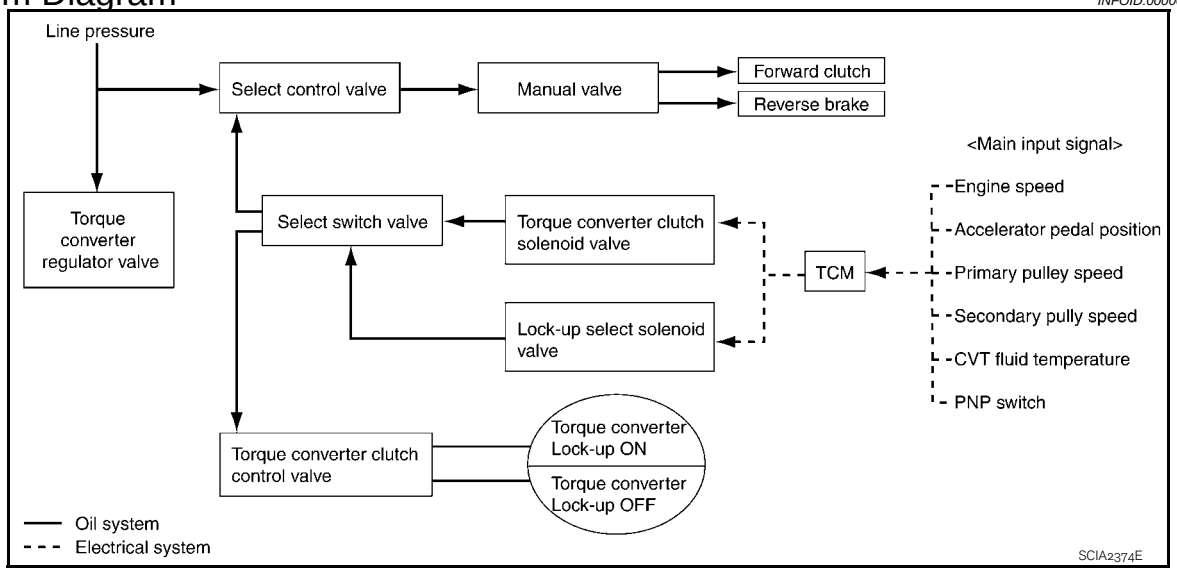
Name	Function
TCM	Optimally controls continuously variable transmission system by judging driving conditions based on signals from each sensor.
Stop lamp switch	TM-224

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LOCK-UP AND SELECT CONTROL SYSTEM

System Diagram

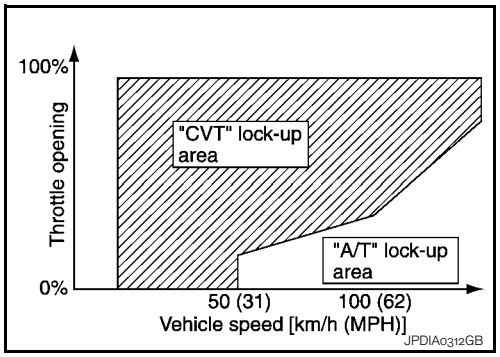
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System Description

INFOID:0000000000988619

- 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. The torque converter clutch control valve engages or releases the torque converter clutch piston.
- When shifting between “N” (“P”) ⇔“D” (“R”), torque converter clutch solenoid controls engagement power of forward clutch and reverse brake.
- The lock-up applied gear range was expanded by locking up the torque converter at a lower vehicle speed than conventional CVT models.



TORQUE CONVERTER CLUTCH AND SELECT CONTROL VALVE CONTROL

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.

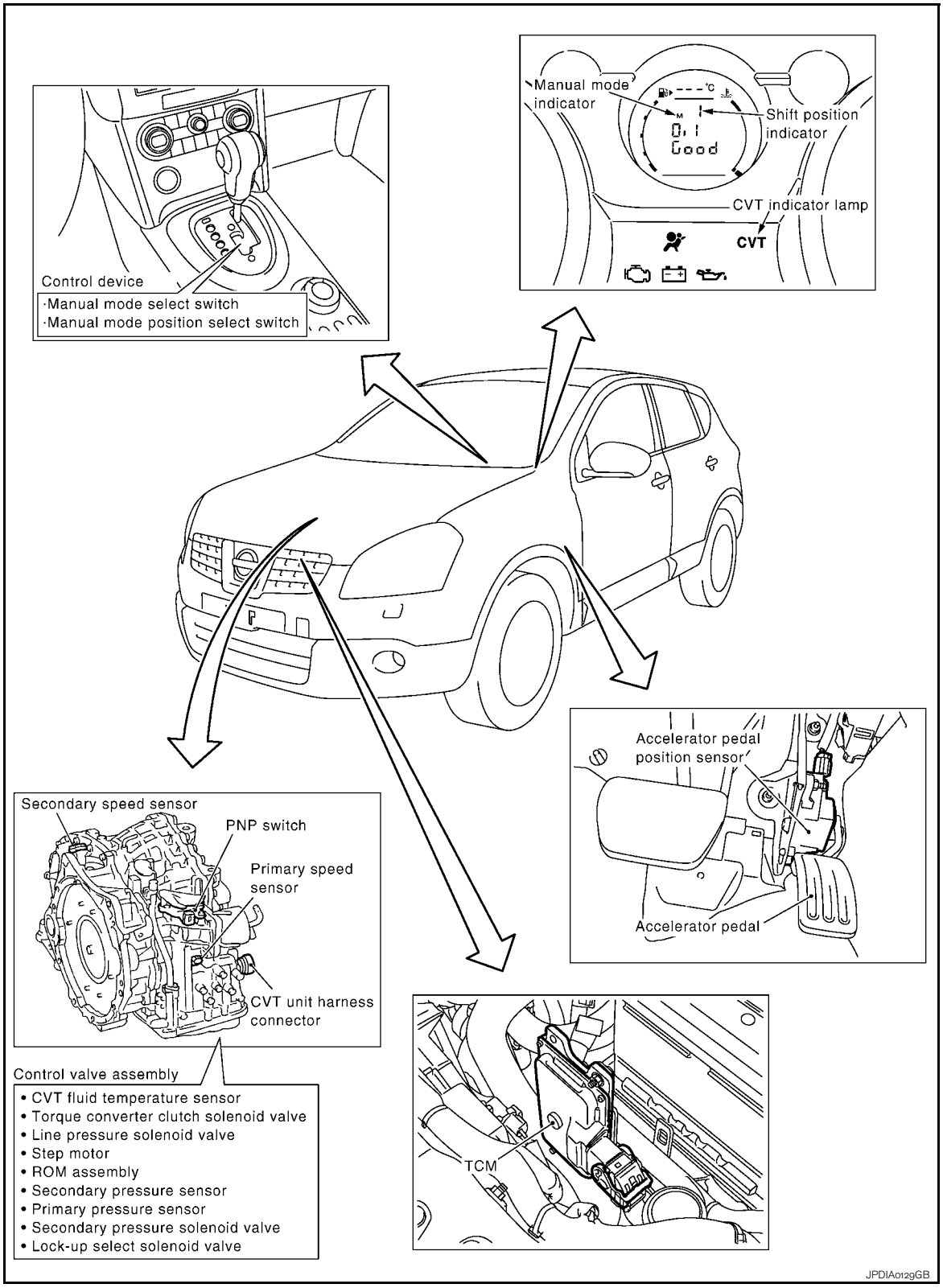
Select Control

When shifting between “N” (“P”) ⇔“D” (“R”), optimize the operating pressure on the basis of the throttle position, the engine speed, and the secondary pulley (output) revolution speed to lessen the shift shock.

Component Parts Location

INFOID:0000000000988620

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Component Description

INFOID:0000000000988621

TRANSAXLE ASSEMBLY

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Name	Function
Torque converter regulator valve	TM-199
TCC control valve	
Select control valve	
Select switch valve	
Manual valve	
TCC solenoid valve	TM-240
Lock-up select solenoid valve	TM-273
Primary speed sensor	TM-231
Secondary speed sensor	TM-234
CVT fluid temperature sensor	TM-229
PNP switch	TM-226
Forward clutch	TM-195
Reverse brake	
Torque converter	

EXCEPT TRANSAXLE ASSEMBLY

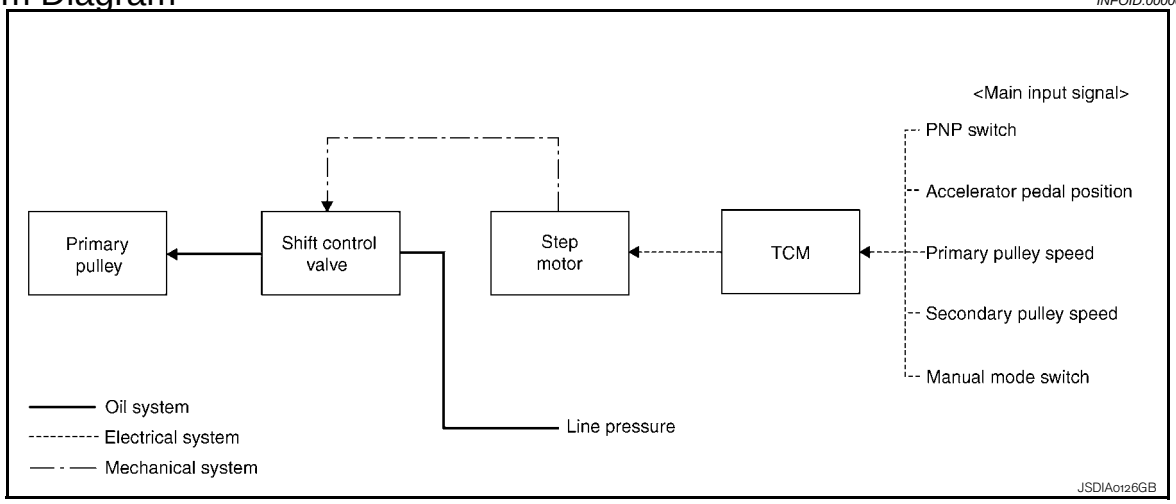
Name	Function
TCM	TM-203
Accelerator pedal position sensor	TM-267

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SHIFT CONTROL SYSTEM

System Diagram

INFOID:0000000000988622



NOTE:
The gear ratio is set for every position separately.

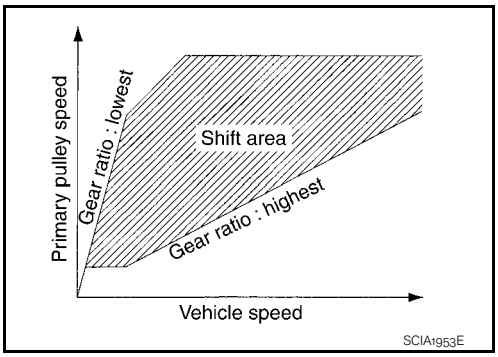
System Description

INFOID:0000000000988623

In order to select the gear ratio which can obtain the driving force in accordance with driver's intention and the vehicle condition, TCM monitors the driving conditions, such as the vehicle speed and the throttle position and selects the optimum gear ratio, and determines the gear change steps to the gear ratio. Then send the command to the step motor, and control the flow-in/flow-out of line pressure from the primary pulley to determine the position of the moving-pulley and control the gear ratio.

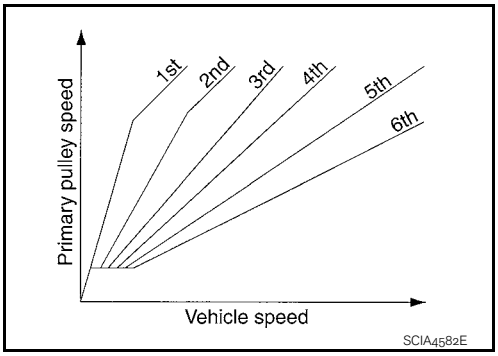
"D" POSITION

Shifting over all the ranges of gear ratios from the lowest to the highest.



"M" POSITION

When the selector lever is put in the manual shift gate side, the fixed changing gear line is set. By moving the selector lever to + side or - side, the manual mode switch is changed over, and shift change like M/T becomes possible following the changing gear set line step by step.



DOWNHILL ENGINE BRAKE CONTROL (AUTO ENGINE BRAKE CONTROL)

When downhill is detected with the accelerator pedal released, the engine brake will be strengthened up by downshifting so as not to accelerate the vehicle more than necessary.

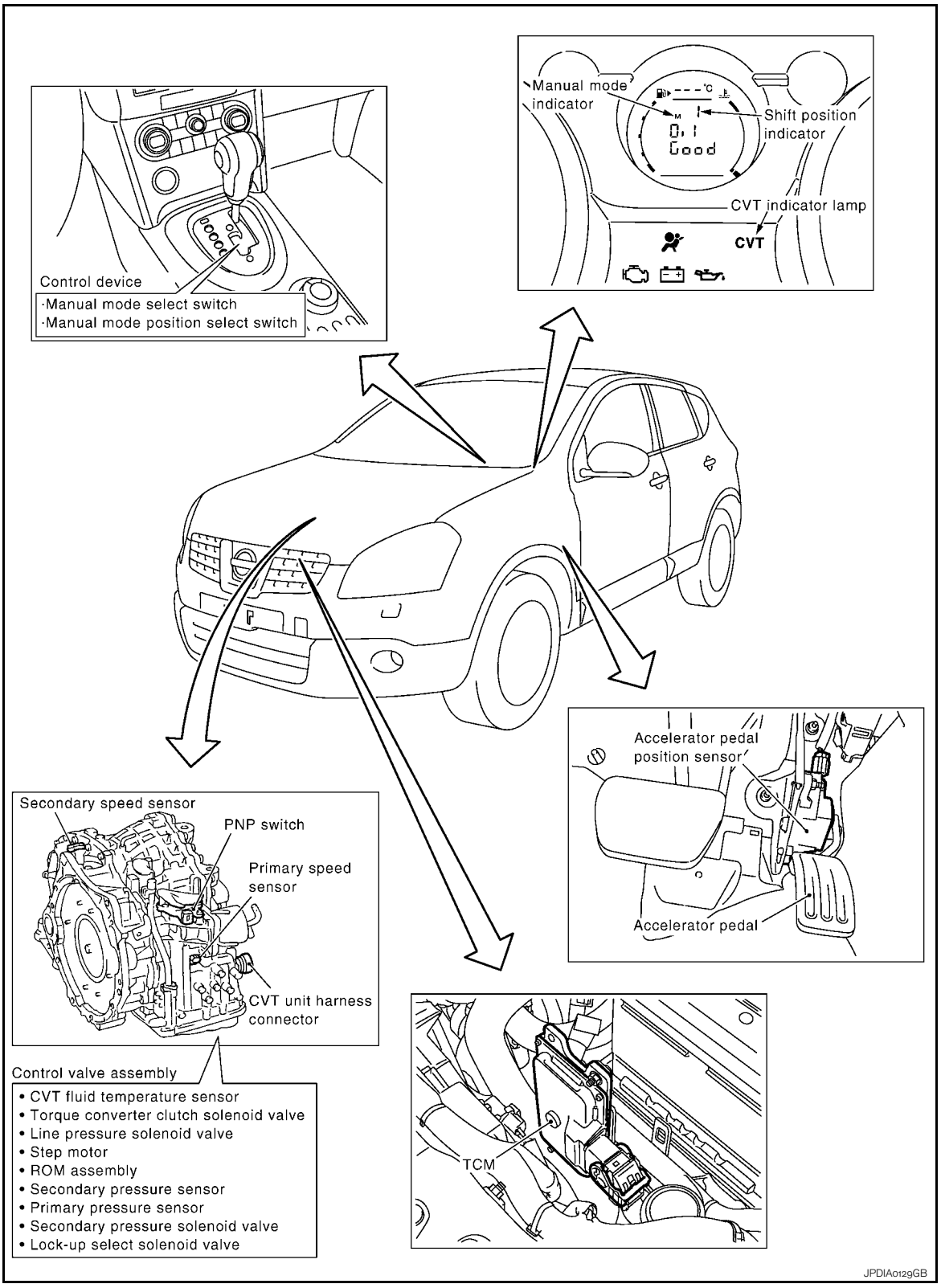
ACCELERATION CONTROL

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According to vehicle speed and a change of accelerator pedal angle, driver's request for acceleration and driving scene are judged. This function assists improvement in acceleration feeling by making the engine speed proportionate to the vehicle speed. And a shift map which can gain a larger driving force is available for compatibility of mileage with driveability.

Component Parts Location

INFOID:0000000000988624



Component Description

INFOID:0000000000988625

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TRANSAXLE ASSEMBLY

Item	Function
PNP switch	TM-226
Primary speed sensor	TM-231
Secondary speed sensor	TM-234
Step motor	TM-276
Shift control valve	TM-199
Primary pulley	TM-195
Secondary pulley	TM-195

EXCEPT TRANSAXLE ASSEMBLY

Item	Function
TCM	TM-203

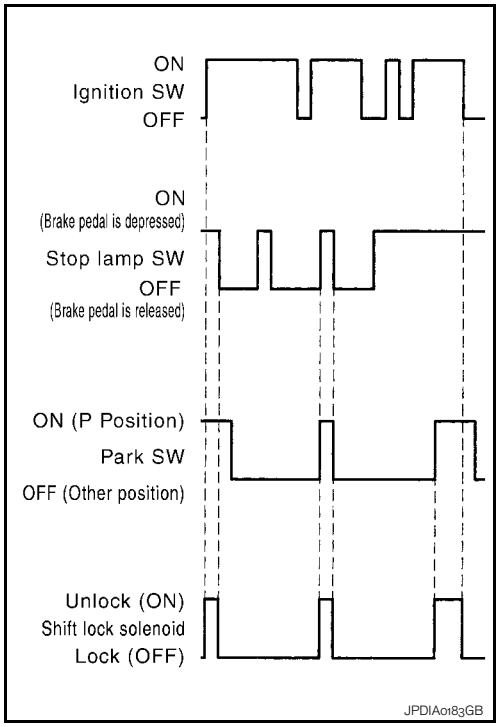
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SHIFT LOCK SYSTEM

System Description

INFOID:0000000000914573

It is designed so that it cannot be shifted from the P position unless the brake pedal is depressed while the ignition switch is set to ON. The shift lock is unlocked by turning the shift lock solenoid ON when the ignition switch is set to ON, the park switch is turned ON (selector lever is in P position), and the stop lamp switch is turned ON (brake pedal is depressed) as shown in the operation chart in the figure. Therefore, the shift lock solenoid receives no ON signal and the shift lock remains locked if all of the above conditions are not fulfilled. (However, selector operation is allowed if the shift lock release button is pressed.)

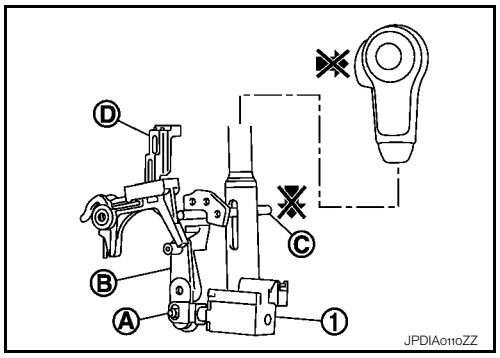


SHIFT LOCK OPERATION at P POSITION

When Brake Pedal Is Not Depressed (No Selector Operation Allowed)

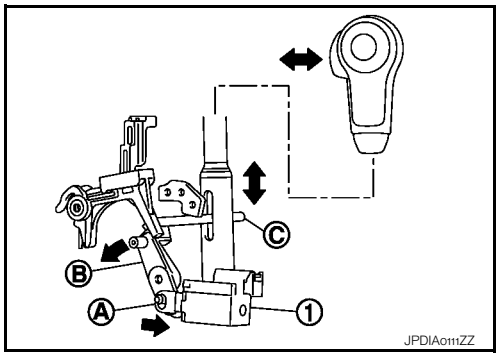
The shift lock solenoid (1) is turned OFF (not energized) and the solenoid rod (A) is extended with the spring when the brake pedal is not depressed (no selector operation allowed) with the ignition switch ON.

The connecting lock lever (B) is located at the position shown in the figure when the solenoid rod is extended. It prevents the movement of the detent rod (C). The selector lever cannot be shifted from the P position for this reason. However, the lock lever is forcibly moved to the direction opposite to that of the arrow when the shift lock release button (D) is pressed. Selector operation can be performed.



When Brake Pedal Is Depressed (Shift Operation Allowed)

The shift lock solenoid (1) is turned ON (energized) when the brake pedal is depressed with the ignition switch ON. The solenoid rod (A) is compressed with the electromagnetic force. The connecting lock lever (B) rotates when the solenoid is compressed. Therefore, the detent rod (C) can be moved. The selector lever can be shifted to other positions for this reason.



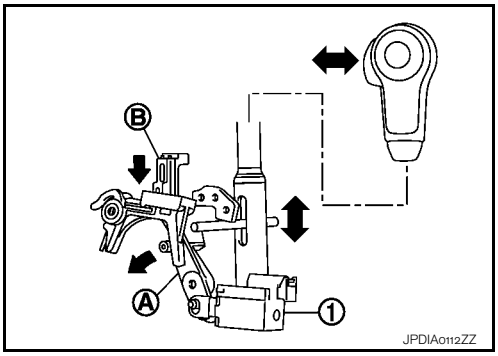
P POSITION HOLD MECHANISM (IGNITION SWITCH LOCK)

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The shift lock solenoid (1) is not energized when the ignition switch is in any position other than ON. The shift mechanism is locked and P position is held. The operation cannot be performed from P position if the brake pedal is depressed with the ignition switch ON when the operation system of shift lock solenoid is malfunctioning. However, the lock lever (A) is forcibly rotated and the shift lock is released when the shift lock release button (B) is pressed from above. The selector operation from P position can be performed.

CAUTION:

Use the shift lock release button only when the selector lever cannot be operated even if the brake pedal is depressed with the ignition switch ON.

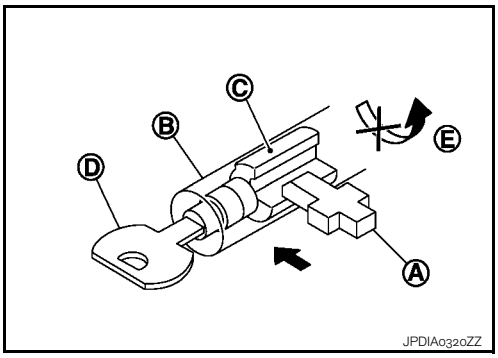


KEY LOCK MECHANISM

The key is not set to LOCK when the selector lever is not selected to P position. This prevents the key from being removed from the key cylinder.

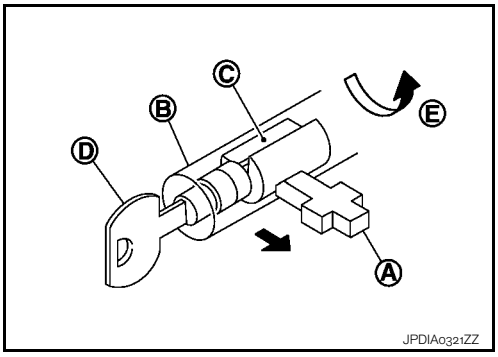
Key Lock Status

The slider (A) in the key cylinder (B) is moved to the left side of the figure when the selector lever is in any position other than P position. The rotator (C) that rotates together with the key (D) cannot be rotated for this reason. The key cannot be removed from the key cylinder because it cannot be turned to LOCK (E).



Key Unlock Status

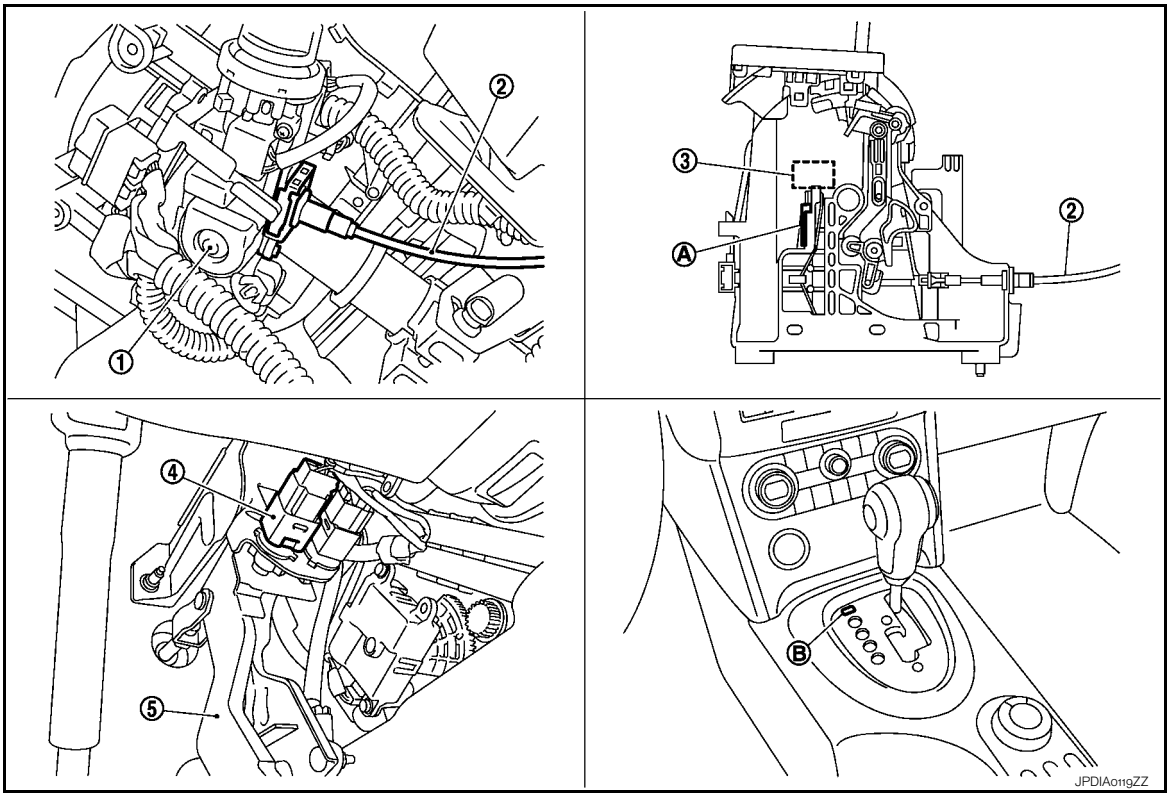
The slider (A) in the key cylinder (B) is moved to the right side of the figure when the selector lever is in P position and the finger is removed from the selector button. The rotator (C) can be rotated for this reason. The key (D) can be removed from the key cylinder because it can be turned to LOCK (E).



Component Parts Location

INFOID:0000000000914574

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1. Key cylinder
2. Key interlock cable
3. Shift lock solenoid
4. Stop lamp switch
5. Brake pedal
A. Park position switch
B. Shift lock release button*

*: Shift lock release button becomes operative by removing shift lock cover. (LHD only)

Component Description

INFOID:0000000000927611

SHIFT LOCK

Component	Function
Shift lock solenoid	Refer to TM-280, "Description"
Lock lever	
Detent rod	
Park position switch	
Key interlock cable and rod	
Shift lock release button	

KEY LOCK

Component		Function
Key cylinder	Rotator	It rotates together with the key and restricts the slider movement when the ignition switch is in LOCK position.
	Slider	It moves according to the rotation of the lock lever.
Key interlock cable and key interlock rod		Actuation of lock lever is conveyed to slider in the key cylinder.

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000000988626

DESCRIPTION

The CVT system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (OBD) performed by the TCM in combination with the ECM. The malfunction is indicated by the MI (malfunction indicator) and is stored as a DTC in the ECM memory, and the TCM memory.
The second is the TCM original self-diagnosis performed by the TCM. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD self-diagnostic items. For detail, refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

OBD FUNCTION

The ECM provides emission-related on board diagnostic (OBD) functions for the CVT system. One function is to receive a signal from the TCM used with OBD-related parts of the CVT 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 MI (malfunction indicator) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.
The MI automatically illuminates in “One or Two Trip Detection Logic” when a malfunction is sensed in relation to CVT system parts.

ONE OR TWO TRIP DETECTION LOGIC OF OBD

One Trip Detection Logic

If a malfunction is sensed during the first test drive, the MI 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 MI 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 MI 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 DIAGNOSTIC TROUBLE CODE (DTC)

How to Read DTC and 1st Trip DTC

DTC and 1st trip DTC can be read by the following methods.
(with CONSULT-III or GST) CONSULT-III or GST (Generic Scan Tool) Examples: P0705, P0720 etc.
These DTC are prescribed by ISO 15031-5.
(CONSULT-III also displays the malfunctioning component or system.)

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

- DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode for “ENGINE” with CONSULT-III. Time data indicates how many times the vehicle was driven after the last detection of a DTC.
- If the DTC is being detected currently, the time data will be “0”.
- If a 1st trip DTC is stored in the ECM, the time data will be “1t”.

Freeze Frame Data and 1st Trip Freeze Frame Data

- The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.
  Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST. For details, refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

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Only one set of freeze frame data (either 1st trip freeze frame data or 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/MI 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 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes CVT related items)
3	1st trip freeze frame data	

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

How to Erase DTC

- The diagnostic trouble code can be erased by CONSULT-III, GST or ECM DIAGNOSTIC TEST MODE as described following.
- **If the battery cable is disconnected, the diagnostic trouble code will be lost within 24 hours.**
- **When you erase the DTC, using CONSULT-III or GST is easier and quicker than switching the mode selector on the ECM.**
- The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD. For details, refer to EC-962, "DTC Index".
- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**
- **Freeze frame data**
- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

How to Erase DTC (With CONSULT-III)

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

How to Erase DTC (With GST)

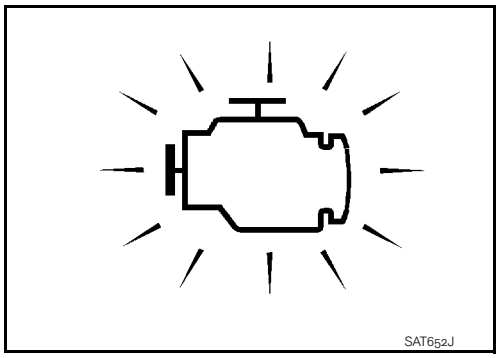
1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Select Mode 4 with GST (Generic Scan Tool). For details, refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

MALFUNCTION INDICATOR (MI)

Description

The MI is located on the instrument panel.

1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   - If the MI does not light up, refer to EC-934, "Component Function Check" (WITH EURO-OBD), EC-1213, "Component Function Check" (WITHOUT EURO-OBD).
2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



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DIAGNOSIS SYSTEM (TCM)

CONSULT-III Function (TRANSMISSION)

INFOID:0000000000988627

CONSULT-III can display each diagnostic item using the diagnostic test modes shown below.

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-III.
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the TCM can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
CALIB data	Characteristic information for TCM and CVT assembly can be read. Do not use, but displayed.
Function test	Performed by CONSULT-III instead of a technician to determine whether each system is “OK” or “NG”.
ECU part number	TCM part number can be read.

WORK SUPPORT MODE

Display Item List

Item name	Description
ENGINE BRAKE ADJ.	The engine brake level setting can be canceled.
CONFORM CVTF DETERIORTN	The CVT fluid deterioration level can be checked.

Engine Brake Adjustment

“ENGINE BRAKE LEVEL”

0: Initial set value (Engine brake level control is activated)

OFF: Engine brake level control is deactivated.

CAUTION:

Mode of “+1”“0”“–1”“–2”“OFF” can be selected by pressing the “UP”“DOWN” on CONSULT-III screen. However, do not select mode other than “0” and “OFF”. If the “+1” or “–1” or “–2” is selected, that might cause the irregular driveability.

Check CVT Fluid Deterioration Date

“CVTF DETERIORATION DATE”

More than 210000:

It is necessary to change CVT fluid.

Less than 210000:

It is not necessary to change CVT fluid.

CAUTION:

Touch “CLEAR” after changing CVT fluid, and then erase “CVTF DETERIORATION DATE”.

SELF-DIAGNOSTIC RESULT MODE

After performing self-diagnosis, place check marks for results on the TM-187, "Diagnostic Work Sheet". Reference pages are provided following the items.

Display Items List

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X: Applicable —: Not applicable

Items (CONSULT-III screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD (DTC)	Reference page
		"TRANSMISSION" with CONSULT-III	MI*, "ENGINE" with CONSULT-III or GST	
CAN COMM CIRCUIT	When TCM is not transmitting or receiving CAN communication signal for 2 seconds or more.	U1000	U1000	TM-222
CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller to TCM.	U1010	U1010	TM-223
BRAKE SW/CIRC	When the brake switch does not switch to ON or OFF.	P0703	—	TM-224
PNP SW/CIRC	TCM does not receive the correct voltage signal (based on the gear position) from the switch.	P0705	P0705	TM-226
ATF TEMP SEN/CIRC	During running, the CVT fluid temperature sensor signal voltage is excessively high or low.	P0710	P0710	TM-229
INPUT SPD SEN/CIRC	• Input speed sensor (primary speed sensor) signal is not input due to an open circuit. • An unexpected signal is input when vehicle is being driven.	P0715	P0715	TM-231
VEH SPD SEN/CIR AT	• Signal from vehicle speed sensor CVT [Output speed sensor (Secondary speed sensor)] not input due to open or short circuit. • Unexpected signal input during running.	P0720	P0720	TM-234
ENGINE SPEED SIG	• TCM does not receive the CAN communication signal from the ECM. • Engine speed is too low while driving.	P0725	—	TM-237
BELT DAMG	Unexpected gear ratio detected.	P0730	—	TM-239
TCC SOLENOID/CIRC	Normal voltage not applied to solenoid due to open or short circuit.	P0740	P0740	TM-240
A/T TCC S/V FNCTN	• CVT cannot perform lock-up even if electrical circuit is good. • TCM detects as irregular by comparing difference value with slip rotation. • There is big difference engine speed and primary speed when TCM lock-up signal is on.	P0744	P0744	TM-242
L/PRESS SOL/CIRC	• Normal voltage not applied to solenoid due to open or short circuit. • TCM detects as irregular by comparing target value with monitor value.	P0745	P0745	TM-244
PRS CNT SOL/A FCTN	Unexpected gear ratio was detected in the LOW side due to excessively low line pressure.	P0746	P0746	TM-246
PRS CNT SOL/B FCTN	Secondary pressure is too high or too low compared with the commanded value while driving.	P0776	P0776	TM-248
PRS CNT SOL/B CIRC	• 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.	P0778	P0778	TM-250
MANUAL MODE SWITCH	When an impossible pattern of switch signals is detected, a malfunction is detected.	P0826	—	TM-252
TR PRS SENS/A CIRC	Signal voltage of the transmission fluid pressure sensor A (secondary pressure sensor) is too high or too low while driving.	P0840	P0840	TM-255
PRESS SEN/FNCTN	Correlation between the values of the transmission fluid pressure sensor A (secondary pressure sensor) and the transmission fluid pressure sensor B (primary pressure sensor) is out of specification.	P0841	—	TM-258

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Items (CONSULT-III screen terms)	Malfunction is detected when...	TCM self-diagnosis	OBD (DTC)	Reference page
		"TRANSMISSION" with CONSULT-III	MI*, "ENGINE" with CONSULT-III or GST	
TR PRS SENS/B CIRC	Signal voltage of the transmission fluid pressure sensor B (primary pressure sensor) is too high or too low while driving.	P0845	P0845	TM-260
SEC/PRESS DOWN	Secondary fluid pressure is too low compared with the commanded value while driving.	P0868	—	TM-263
TCM-POWER SUPPLY	• When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnosis memory function stops. • This is not a malfunction message (Whenever shutting OFF a power supply to the TCM, this message appears on the screen).	P1701	—	TM-265
TP SEN/CIRC A/T	TCM does not receive the proper accelerator pedal position signals (input by CAN communication) from ECM.	P1705	—	TM-267
ESTM VEH SPD SIG	• CAN communication with the ABS actuator and the electric unit (control unit) is malfunctioning. • There is a great difference between the vehicle speed signal from the ABS actuator and the electric unit (control unit), and the vehicle speed sensor signal.	P1722	—	TM-268
CVT SPD SEN/ FNCTN	A rotation sensor error is detected because the gear does not change in accordance with the position of the stepping motor. **CAUTION:** **One of the "P0720 VEH SPD SEN/CIR AT", the "P0715 INPUT SPD SEN/CIRC" or the "P0725 ENGINE SPEED SIG" is displayed with the DTC at the same time.**	P1723	—	TM-270
ELEC TH CONTROL	The electronically controlled throttle for ECM is malfunctioning.	P1726	—	TM-272
LU-SLCT SOL/ CIRC	• 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.	P1740	P1740	TM-273
L/PRESS CONTROL	TCM detects the unexpected line pressure.	P1745	—	TM-275
STEP MOTR CIRC	Each coil of the step motor is not energized properly due to an open or a short.	P1777	P1777	TM-276
STEP MOTR/FNC	There is a great difference between the number of steps for the stepping motor and for the actual gear ratio.	P1778	P1778	TM-278
NO DTC IS DETECTED: FURTHER TESTING MAY BE REQUIRED	No NG item has been detected.	X	X	—

*: Refer to TM-214, "Diagnosis Description".

DATA MONITOR MODE

Display Items List

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

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VSP SENSOR (km/h)	X	—	▼	Output speed sensor (secondary speed sensor)
ESTM VSP SIG (km/h)	X	—	▼	—
PRI SPEED SEN (rpm)	X	—	▼	—
ENG SPEED SIG (rpm)	X	—	▼	—
SEC HYDR SEN (V)	X	—	▼	—
PRI HYDR SEN (V)	X	—	▼	—
ATF TEMP SEN (V)	X	—	▼	CVT fluid temperature sensor
VIGN SEN (V)	X	—	▼	—
VEHICLE SPEED (km/h)	—	X	▼	Vehicle speed recognized by the TCM.
PRI SPEED (rpm)	—	X	▼	Primary pulley speed
SEC SPEED (rpm)	—	—	▼	Secondary pulley speed
ENG SPEED (rpm)	—	X	▼	—
SLIP REV (rpm)	—	X	▼	Difference between engine speed and primary pulley speed.
GEAR RATIO	—	X	▼	—
G SPEED (G)	—	—	▼	—
ACC PEDAL OPEN (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.
TRQ RTO	—	—	▼	—
SEC PRESS (MPa)	—	X	▼	—
PRI PRESS (MPa)	—	X	▼	—
ATFTEMP COUNT	—	X	▼	Means CVT fluid temperature. Actual oil temperature (° numeric value is converted. Refer to TM-311
DSR REV (rpm)	—	—	▼	—
DGEAR RATIO	—	—	▼	—
DSTM STEP (step)	—	—	▼	—
STM STEP (step)	—	X	▼	—
LU PRS (MPa)	—	—	▼	—
LINE PRS (MPa)	—	—	▼	—
TGT SEC PRESS (MPa)	—	—	▼	—
ISOLT1 (A)	—	X	▼	Torque converter clutch solenoid valve output current
ISOLT2 (A)	—	X	▼	Pressure control solenoid valve A (line pressure solenoid valve) output current
ISOLT3 (A)	—	X	▼	Pressure control solenoid valve B (secondary pressure solenoid valve) output current

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Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
SOLMON1 (A)	X	X	▼	Torque converter clutch solenoid valve monitor current
SOLMON2 (A)	X	X	▼	Pressure control solenoid valve A (line pressure solenoid valve) monitor current
SOLMON3 (A)	X	X	▼	Pressure control solenoid valve B (secondary pressure solenoid valve) monitor current
P POSITION SW (ON/OFF)	X	—	▼	—
R POSITION SW (ON/OFF)	X	—	▼	—
N POSITION SW (ON/OFF)	X	—	▼	—
D POSITION SW (ON/OFF)	X	—	▼	—
L POSITION SW (ON/OFF)	X	—	▼	—
BRAKE SW (ON/OFF)	X	X	▼	Stop lamp switch (Signal input with CAN communications)
FULL SW (ON/OFF)	X	X	▼	Signal input with CAN communications
IDLE SW (ON/OFF)	X	X	▼	
SPORT MODE SW (ON/OFF)	X	X	▼	Not mounted but displayed.
STRDWNSW (ON/OFF)	X	—	▼	
STRUPSW (ON/OFF)	X	—	▼	
DOWNLVR (ON/OFF)	X	—	▼	—
UPLVR (ON/OFF)	X	—	▼	—
NONMMODE (ON/OFF)	X	—	▼	—
MMODE (ON/OFF)	X	—	▼	—
INDLRNG (ON/OFF)	—	—	▼	—
INDDRNG (ON/OFF)	—	—	▼	“D” position indicator output
INDNRNG (ON/OFF)	—	—	▼	“N” position indicator output
INDRRNG (ON/OFF)	—	—	▼	“R” position indicator output
INDPRNG (ON/OFF)	—	—	▼	“P” position indicator output
CVT LAMP (ON/OFF)	—	—	▼	—
SPORT MODE IND (ON/OFF)	—	—	▼	—
MMODE IND (ON/OFF)	—	—	▼	—
SMCOIL D (ON/OFF)	—	—	▼	Step motor coil “D” energizing status
SMCOIL C (ON/OFF)	—	—	▼	Step motor coil “C” energizing status
SMCOIL B (ON/OFF)	—	—	▼	Step motor coil “B” energizing status
SMCOIL A (ON/OFF)	—	—	▼	Step motor coil “A” energizing status
LUSEL SOL OUT (ON/OFF)	—	—	▼	—
LUSEL SOL MON (ON/OFF)	—	—	▼	—
VDC ON (ON/OFF)	X	—	▼	ESP (Electronic Stability Program System)

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Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
TCS ON (ON/OFF)	X	—	▼	—
ABS ON (ON/OFF)	X	—	▼	—
ACC ON (ON/OFF)	X	—	▼	Not mounted but displayed.
RANGE	—	X	▼	Indicates position is recognized by TCM. Indicates a specific value required for control when fail-safe function is activated.
M GEAR POS	—	X	▼	—
Voltage (V)	—	—	▼	Displays the value measured by the voltage probe.
Frequency (Hz)	—	—	▼	The value measured by the pulse probe is displayed.
DUTY-HI (high) (%)	—	—	▼	
DUTY-LOW (low) (%)	—	—	▼	
PLS WIDTH-HI (ms)	—	—	▼	
PLS WIDTH-LOW (ms)	—	—	▼	

Diagnostic Tool Function

INFOID:0000000000988628

OBD SELF-DIAGNOSTIC PROCEDURE (WITH GST)

Refer to EC-726, "Diagnosis Tool Function" (WITH EURO-OBD).

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COMPONENT DIAGNOSIS

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000000988643

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 and CAN-L) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000000988644

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
U1000	CAN COMM CIRCUIT	When TCM is not transmitting or receiving CAN communication signal for 2 seconds or more.	Harness or connectors (CAN communication line is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Start engine and wait for at least 6 seconds.
3. Perform “SELF-DIAG RESULTS”. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

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

Is “U1000 CAN COMM CIRCUIT” detected?

YES >> Go to TM-222, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988645

1.CHECK CAN COMMUNICATION CIRCUIT

With CONSULT-III
1. Turn ignition switch ON and start engine.
2. Select “SELF-DIAG RESULTS”.

Is any malfunction of the “U1000 CAN COMM CIRCUIT” indicated?

YES >> Go to LAN section. Refer to LAN-55, "CAN System Specification Chart".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

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U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000000988646

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 and CAN-L) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:0000000000988647

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller to TCM.	Harness or connectors (CAN communication line is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Start engine and wait for at least 6 seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST
Follow the procedure "With CONSULT-III".

Is "U1010 CONTROL UNIT (CAN)" detected?

YES >> Go to TM-223, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988648

1. CHECK CAN COMMUNICATION CIRCUIT

With CONSULT-III
1. Turn ignition switch ON and start engine.
2. Select "SELF-DIAG RESULTS".

Is any malfunction of the "U1010 CONTROL UNIT (CAN)" indicated?

YES >> Print out CONSULT-III screen, go to LAN section. Refer to LAN-46, "Trouble Diagnosis Flow Chart".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

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P0703 STOP LAMP SWITCH

Description

INFOID:0000000000988649

ON, OFF status of the stop lamp switch is sent via the CAN communication from the BCM to TCM using the signal.

DTC Logic

INFOID:0000000000988650

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0703	BRAKE SW/CIRC	When the brake switch does not switch to ON or OFF.	• Harness or connectors - (Stop lamp switch, and BCM circuit are open or shorted.) - (CAN communication line is open or shorted.) • Stop lamp switch

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Start engine.
3. Start vehicle for at least 3 consecutive seconds.
4. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is "P0703 BRAKE SW/CIRC" detected?

YES >> Go to TM-224, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988651

1. CHECK STOP LAMP SWITCH

Check stop lamp switch.

Is the inspection result normal?

YES >> 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 BCM.
- 10A fuse (No. 11, located in fuse block).

NO >> Repair or replace the stop lamp switch.

Component Inspection

INFOID:0000000000988652

1. CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

Stop lamp switch			Condition	Continuity
Connector	Terminal			
E115	1	2	Depressed brake pedal	Existed
			Released brake pedal	Not existed

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Check stop lamp switch after adjusting brake pedal — refer to BR-8, "Exploded View" (LHD), BR-52, "Exploded View"(RHD).

Is the inspection result normal?

YES >> 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 BCM.
- 10A fuse (No. 11, located in fuse block).

NO >> Repair or replace the stop lamp switch.

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P0705 PARK/NEUTRAL POSITION SWITCH

Description

INFOID:0000000000988653

- The PNP switch assembly includes a transaxle range switch.
- The transaxle range switch detects the selector lever position and sends a signal to the TCM.

Item name	Condition	Display value
P POSITION SW	Selector lever in “P” position	ON
	Other than the above position.	OFF
R POSITION SW	Selector lever in “R” position	ON
	Other than the above position.	OFF
N POSITION SW	Selector lever in “N” position	ON
	Other than the above position.	OFF
D POSITION SW	Selector lever in “D” position	ON
	Other than the above position.	OFF
RANGE	Selector lever in “N” or “P” position	N/P
	Selector lever in “R” position	R
	Selector lever in “D” position	D

DTC Logic

INFOID:0000000000988654

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0705	PNP SW/CIRC	TCM does not receive the correct voltage signal (based on the gear position) from the switch.	• Harness or connectors (PNP switches circuit is open or shorted.) • PNP switch

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 2 consecutive seconds.

VEHICLE SPEED	**: More than 10 km/h (6 MPH)**
ENG SPEED	**: More than 450 rpm**
ACC PEDAL OPEN	**: More than 1.0/8**

With GST

Follow the procedure “With CONSULT-III”.

Is “P0705 PNP SW/CIRC” detected?

YES >> Go to TM-227, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

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Diagnosis Procedure

INFOID:0000000000988655

1. CHECK HARNESS BETWEEN TCM AND PNP SWITCH

1. Turn ignition switch OFF.
2. Disconnect TCM connector and PNP switch connector.
3. Check continuity between TCM connector terminals and PNP switch connector terminals.

TCM connector		PNP switch connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	1	F21	8	Existed
	2		3	
	3		4	
	4		1	
	11		2	

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

Is the inspection result normal?

OK >> GO TO 2.
NG >> Repair or replace damaged parts.

2. DETECT MALFUNCTIONING ITEM

Check the following items.
- Harness for short or open between ignition switch and PNP switch.
- 10A fuse (No. 55, located in the IPDM E/R).
- Ignition switch.

Is the inspection result normal?

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

3. CHECK PNP SWITCH

Check PNP switch. Refer to TM-227, "Component Inspection".

Is the inspection result normal?

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

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988656

1. CHECK PNP SWITCH

Change selector lever to various positions to check the continuity between terminals on the PNP switch and ground.

Selector lever position	PNP switch connector		Continuity
	Connector	Terminal	

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P	F21	2	5	Existed
		6	7	
R		5	8	
N		3	5	
		6	7	
D		4	5	

Is the inspection result normal?

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

2.CHECK CVT POSITION

1. Disconnect control cable.
2. Check PNP switch. (Refer to step 1 above.)

Is the inspection result normal?

YES >> Adjust CVT position. Refer to TM-324, "Inspection and Adjustment".
NO >> GO TO 3.

3.CHECK PNP SWITCH

1. Remove PNP switch from transaxle assembly. Refer to TM-337, "Exploded View".
2. Check PNP switch. (Refer to step 1 above.)

Is the inspection result normal?

YES >> Adjust PNP switch. Refer to TM-337, "Inspection and Adjustment".
NO >> Replace PNP switch. Refer to TM-337, "Exploded View".

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P0710 CVT FLUID TEMPERATURE SENSOR

Description

INFOID:0000000000988657

The CVT fluid temperature sensor detects the CVT fluid temperature and sends a signal to the TCM.

DTC Logic

INFOID:0000000000988658

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0710	ATF TEMP SEN/CIRC	During running, the CVT fluid temperature sensor signal voltage is excessively high or low.	• Harness or connectors (Sensor circuit is open or shorted.) • CVT fluid temperature sensor

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 10 minutes (Total).

VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ENG SPEED	**: 450 rpm more than**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**

With GST

Follow the procedure "With CONSULT-III".

Is "P0710 ATF TEMP SEN/CIRC" detected?

YES >> Go to TM-229, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988659

1. CHECK CVT FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals.

TCM connector			Temperature °C (°F)	Resistance (Approx.)
Connector	Terminal			
F25	13	25	20 (68)	6.5 kΩ
			80 (176)	0.9 kΩ

Is the inspection result normal?

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

2. CHECK CVT FLUID TEMPERATURE SENSOR

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Check CVT fluid temperature sensor. Refer to TM-230, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the transaxle assembly. Refer toTM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

3. CHECK HARNESS BETWEEN TCM AND CVT FLUID TEMPERATURE SENSOR

1. Disconnect the CVT unit harness connector.
2. Check continuity between TCM connector terminals and CVT unit harness connector terminals.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	13	F24	17	Existed
	25		19	

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

Is the inspection result normal?

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

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988660

CVT FLUID TEMPERATURE SENSOR

1. CHECK CVT FLUID TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminals.

CVT unit harness connector			Temperature °C (°F)	Resistance (Approx.)
Connector	Terminal			
F24	17	19	20 (68)	6.5 kΩ
			80 (176)	0.9 kΩ

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

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P0715 INPUT SPEED SENSOR (PRI SPEED SENSOR)

Description

INFOID:0000000000988661

The input speed sensor (primary speed sensor) detects the primary pulley revolution speed and sends a signal to the TCM.

DTC Logic

INFOID:0000000000988662

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0715	INPUT SPD SEN/CIRC	• Input speed sensor (primary speed sensor) signal is not input due to an open circuit. • An unexpected signal is input when vehicle is being driven.	• Harness or connectors (Sensor circuit is open or shorted.) • Input speed sensor (Primary speed sensor)

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: “D” position**
ENG SPEED	**: 450 rpm or more**
Driving location	**: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

With GST

Follow the procedure “With CONSULT-III”.

Is “P0715 INPUT SPD SEN/CIRC” detected?

YES >> Go to TM-231, "Diagnosis Procedure".

NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988663

1. CHECK PRIMARY SPEED SENSOR

With CONSULT-III

1. Start engine.
2. Check power supply to input speed sensor (primary speed sensor) by voltage between TCM connector terminals.

TCM connector		Voltage (Approx.)
Connector	Terminal	

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F25	25	46	Battery voltage
		48	

3. If OK, check the pulse when vehicle cruises.

TCM connector		Condition	Data (Approx.)
Connector	Terminal		
F25	33	When running at 20 km/h (12 MPH) in "M1" position, use the CONSULT-III pulse frequency measuring function. **CAUTION:** **Connect the data link connector to the vehicle-side diagnosis connector.**	800 Hz

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK POWER AND SENSOR GROUND

1. Turn ignition switch OFF.
2. Disconnect the input speed sensor (primary speed sensor) harness connector.
3. Turn ignition switch ON.
4. Check voltage between input speed sensor (primary speed sensor) harness connector terminals.

Input speed sensor (primary speed sensor) harness connector			Voltage (Approx.)
Connector	Terminal		
F55	1	3	Battery voltage

5. Check voltage between input speed sensor (primary speed sensor) harness connector terminal and ground.

Input speed sensor (primary speed sensor) harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
F55	3		Battery voltage

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

Is the inspection result normal?

YES >> GO TO 3.
NO - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminal 3 and ground: GO TO 4.
NO - 2 >> Battery voltage is not supplied between terminals 1 and 3 only: GO TO 5.

3. CHECK HARNESS BETWEEN TCM AND INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminal and input speed sensor (primary speed sensor) harness connector terminal.

TCM connector		Input speed sensor (primary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	33	F55	2	Existed

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

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HARNESS BETWEEN TCM AND INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) (POW-

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ER)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and input speed sensor (primary speed sensor) harness connector terminal.

IPDM E/R		Input speed sensor (primary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E11	16	F55	3	Existed

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

Is the inspection result normal?

YES >> 10 A fuse (No. 55, located in the IPDM E/R) or ignition switch are malfunctioning.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HARNESS BETWEEN TCM AND INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) (SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminal and input speed sensor (primary speed sensor) harness connector terminal.

TCM connector		Input speed sensor (primary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	25	F55	1	Existed

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

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and then drive the vehicle [more than 10 km/h (6 MPH)], perform self-diagnosis check. Refer to TM-231, "DTC Logic".

Is “P0715 INPUT SPD SEN/CIRC” detected again?

YES >> Replace the primary speed sensor. Refer toTM-339, "Exploded View".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

7. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

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P0720 VEHICLE SPEED SENSOR CVT (SECONDARY SPEED SENSOR)

Description

INFOID:0000000000988664

The vehicle speed sensor CVT [output speed sensor (secondary speed sensor)] detects the revolution of the CVT output shaft and emits a pulse signal. The pulse signal is sent to the TCM, which converts it into vehicle speed.

DTC Logic

INFOID:0000000000988665

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0720	VEH SPD SEN/CIR AT	• Signal from vehicle speed sensor CVT [Output speed sensor (Secondary speed sensor)] not input due to open or short circuit. • Unexpected signal input during running.	• Harness or connectors (Sensor circuit is open or shorted.) • Output speed sensor (Secondary speed sensor)

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 12 consecutive seconds.

ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "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,

With GST

Follow the procedure "With CONSULT-III".

Is "P0720 VEH SPD SEN/CIR AT" detected?

YES >> Go to TM-234, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988666

1. CHECK SECONDARY SPEED SENSOR

With CONSULT-III

1. Start engine.
2. Check power supply to output speed sensor (secondary speed sensor) by voltage between TCM connector terminals.

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TCM connector			Voltage (Approx.)
Connector	Terminal		
F25	7	46	Battery voltage
		48	

3. If OK, check the pulse when vehicle cruises.

TCM connector		Condition	Data (Approx.)
Connector	Terminal		
F25	34	When running at 20 km/h (12 MPH) in “D” position, use the CONSULT-III pulse frequency measuring function. **CAUTION:** **Connect the data link connector to the vehicle-side diagnosis connector.**	500 Hz

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK POWER AND SENSOR GROUND

1. Turn ignition switch OFF.
2. Disconnect the output speed sensor (secondary speed sensor) harness connector.
3. Turn ignition switch ON.
4. Check voltage between output speed sensor (secondary speed sensor) harness connector terminals.

Output speed sensor (Secondary speed sensor) harness connector			Voltage (Approx.)
Connector	Terminal		
F19	1	3	Battery voltage

5. Check voltage between output speed sensor (secondary speed sensor) harness connector terminal and ground.

Output speed sensor (Secondary speed sensor) harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
F19	3		Battery voltage

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

Is the inspection result normal?

YES >> GO TO 3.
NO - 1 >> Battery voltage is not supplied between terminals 1 and 3, neither terminal 3 and ground: GO TO 4.
NO - 2 >> Battery voltage is not supplied between terminals 1 and 3 only: GO TO 5.

3. CHECK HARNESS BETWEEN TCM AND OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminal and output speed sensor (secondary speed sensor) harness connector terminal.

TCM connector		Output speed sensor (Secondary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	34	F19	2	Existed

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

Is the inspection result normal?

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YES >> GO TO 6.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HARNESS BETWEEN TCM AND OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) (POWER)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and output speed sensor (secondary speed sensor) harness connector terminal.

IPDM E/R		Output speed sensor (Secondary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E11	16	F19	3	Existed

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

Is the inspection result normal?

YES >> 10 A fuse (No. 55, located in the IPDM E/R) or ignition switch are malfunctioning.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HARNESS BETWEEN TCM AND OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) (SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminal and output speed sensor (secondary speed sensor) harness connector terminal.

TCM connector		Output speed sensor (Secondary speed sensor) harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	7	F19	1	Existed

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

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and then drive the vehicle [more than 40 km/h (25 MPH)], perform self-diagnosis check. Refer to TM-234, "DTC Logic".

Is “P0720 VEH SPD SEN/CIR AT” detected again?

YES >> Replace the secondary speed sensor. Refer to TM-340, "Exploded View".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

7. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

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P0725 ENGINE SPEED SIGNAL

Description

INFOID:0000000000988667

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

DTC Logic

INFOID:0000000000988668

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0725	ENGINE SPEED SIG	• TCM does not receive the CAN communication signal from the ECM. • Engine speed is too low while driving.	• Harness or connectors (The ECM to the TCM circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 10 consecutive seconds.

PRI SPEED SEN : More than 1000 rpm

Is "P0725 ENGINE SPEED SIG" detected?

YES >> Go to TM-237, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988669

1. CHECK DTC WITH ECM

With CONSULT-III
1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode for "ENGINE" with CONSULT-III. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

Is the inspection result normal?

OK >> GO TO 2.
NG >> Check the DTC detected item. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

2. CHECK DTC WITH TCM

With CONSULT-III
Select "SELF-DIAG RESULTS" mode for "TRANSMISSION" with CONSULT-III. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is the inspection result normal?

OK >> GO TO 3.
NG >> Check the DTC detected item. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

3. CHECK INPUT SIGNALS

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With CONSULT-III

1. Start engine.
2. Select “DATA MONITOR”.
3. While monitoring “ENG SPEED SIG”, check for engine speed change corresponding to “ACC PEDAL OPEN”.

Item name	Condition	Display value
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
ACC PEDAL OPEN	Released accelerator pedal – Fully depressed accelerator pedal	0.0/8 – 8.0/8

Is the inspection result normal?

OK >> GO TO 4.
NG >> Check ignition signal circuit. Refer to EC-929, "Description" (WITH EURO-OBD), EC-1208, "Description" (WITHOUT EURO-OBD).

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Replace the TCM. Refer to TM-325, "Exploded View".

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P0730 BELT DAMAGE

Description

INFOID:0000000000988670

TCM selects the gear ratio using the engine load (throttle position), the primary pulley revolution speed, and the secondary pulley revolution speed as input signal. Then it changes the operating pressure of the primary pulley and the secondary pulley and changes the groove width of the pulley.

DTC Logic

INFOID:0000000000988671

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0730	BELT DAMG	Unexpected gear ratio detected.	Transaxle assembly

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Make sure that output voltage of CVT fluid temperature sensor is within the range below.

ATF TEMP SEN	**: 1.0 – 2.0 V**

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

4. Start engine and maintain the following conditions for at least 30 consecutive seconds.

TEST START FROM 0 km/h (0 MPH)	
CONSTANT ACCELERATION	**: Keep 30 sec or more**
VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
ENG SPEED	**: 450 rpm or more**

Is "P0730 BELT DAMG" detected?

YES >> Go to TM-239, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988672

1. CHECK DTC

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS".

Are any DTC displayed?

YES - 1>> DTC except for "P0730 BELT DAMG" is displayed: Go to Check the DTC detected item. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".
YES - 2>> DTC for "P0730 BELT DAMG" is displayed: Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

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P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Description

INFOID:0000000000988673

- The torque converter clutch solenoid valve is activated by the TCM in response to signals sent from the vehicle speed and accelerator pedal position sensors. Lock-up piston operation will then be controlled.
- Lock-up operation, however, is prohibited when CVT fluid temperature is too low.
- When the accelerator pedal is depressed (less than 2.0/8) 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.

DTC Logic

INFOID:0000000000988674

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0740	TCC SOLENOID/CIRC	Normal voltage not applied to solenoid due to open or short circuit.	• Torque converter clutch solenoid valve • Harness or connectors (Solenoid circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Wait at least 10 consecutive seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST

Follow the procedure "With CONSULT-III".

Is "P0740 TCC SOLENOID/CIRC" detected?

YES >> Go to TM-240, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988675

1. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

TCM connector		Ground	Resistance (Approx.)
Connector	Terminal		
F25	38		3.0 – 9.0 Ω

Is the inspection result normal?

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

2. CHECK HARNESS BETWEEN TCM AND TORQUE CONVERTER CLUTCH SOLENOID VALVE

1. Disconnect CVT unit harness connector.
2. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

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TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	38	F24	12	Existed

3. If OK, check harness for short to ground and short to power.
4. If OK, check continuity between ground and CVT assembly.
5. Reinstall any part removed.

Is the inspection result normal?

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

3.CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE

Check torque converter clutch solenoid valve. Refer to TM-241, "Component Inspection".

Is the inspection result normal?

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

4.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988676

TORQUE CONVERTER CLUTCH SOLENOID VALVE

1.TORQUE CONVERTER CLUTCH SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	12		3.0 – 9.0 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

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P0744 A/T TCC S/V FUNCTION (LOCK -UP)

Description

INFOID:0000000000988677

This malfunction is detected when the torque converter clutch does not lock-up as instructed by the TCM. This is not only caused by electrical malfunction (circuits open or shorted), but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

INFOID:0000000000988678

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0744	A/T TCC S/V FNCTN	• CVT cannot perform lock-up even if electrical circuit is good. • TCM detects as irregular by comparing difference value with slip rotation. • There is big difference engine speed and primary speed when TCM lock-up signal is on.	• Torque converter clutch solenoid valve • Hydraulic control circuit

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following condition for at least 30 seconds.

ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
VEHICLE SPEED	**: Constant speed of more than 40 km/h (25 MPH)**

4. If DTC is detected

With GST

Follow the procedure "With CONSULT-III".

Is "P0744 A/T TCC S/V FNCTN" detected?

YES >> Go to TM-242, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988679

1.CHECK LINE PRESSURE

Perform line pressure test. Refer toTM-318, "Inspection and Judgment".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

2.CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE

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Check torque converter clutch solenoid valve. Refer to TM-241, "Component Inspection".

Is the inspection result normal?

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

3. CHECK LOCK-UP SELECT SOLENOID VALVE

Check lock-up select solenoid valve. Refer to TM-274, "Component Inspection".

Is the inspection result normal?

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

4. CHECK OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) SYSTEM

Check output speed sensor (secondary speed sensor) system. Refer to TM-234, "DTC Logic".

Is the inspection result normal?

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

5. CHECK INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) SYSTEM

Check input speed sensor (primary speed sensor) system. Refer to TM-231, "DTC Logic".

Is the inspection result normal?

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

6. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

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P0745 LINE PRESSURE SOLENOID VALVE

Description

INFOID:0000000000988680

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

DTC Logic

INFOID:0000000000988681

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0745	L/PRESS SOL/CIRC	• Normal voltage not applied to solenoid due to open or short circuit. • TCM detects as irregular by comparing target value with monitor value.	• Harness or connectors (Solenoid circuit is open or shorted.) • Pressure control solenoid valve A (Line pressure solenoid valve)

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Start engine and wait at least 5 seconds.
3. Perform “SELF-DIAG RESULTS” TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST

Follow the procedure “With CONSULT-III”.

Is “P0745 L/PRESS SOL/CIRC” detected?

YES >> Go to TM-244, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988682

1.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE) CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

TCM connector		Ground	Resistance (Approx.)
Connector	Terminal		
F25	40		3.0 – 9.0 Ω

Is the inspection result normal?

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

2.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve A (Line pressure solenoid valve). Refer to TM-245, "Component Inspection"

Is the inspection result normal?

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

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3. CHECK HARNESS BETWEEN TCM AND PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector and TCM connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	40	F24	2	Existed

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and CVT assembly.
6. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988683

PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

1. PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	2		3.0 – 9.0 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

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P0746 PRESSURE CONTROL SOLENOID A PERFORMANCE (LINE PRESSURE SOLENOID VALVE)

Description

INFOID:0000000000988684

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

DTC Logic

INFOID:0000000000988685

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0746	PRS CNT SOL/A FCTN	Unexpected gear ratio was detected in the LOW side due to excessively low line pressure.	• Line pressure control system • Output speed sensor (Secondary speed sensor) • Input speed sensor (Primary speed sensor)

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 10 consecutive seconds. Test start from 0 km/h (0 MPH).

ATF TEMP SEN	**: 1.0 – 2.0 V**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
VEHICLE SPEED	**: 10 km/h (6 MPH) More than**
Driving location	**: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

With GST
Follow the procedure "With CONSULT-III".

Is "P0746 PRS CNT SOL/A FCTN" detected?

YES >> Go to TM-246, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988686

1.CHECK LINE PRESSURE

Perform line pressure test. Refer to TM-318, "Inspection and Judgment".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

2.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

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Check pressure control solenoid valve A (line pressure solenoid valve). Refer to TM-245, "Component Inspection".

Is the inspection result normal?

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

3. CHECK OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) SYSTEM

Check output speed sensor (secondary speed sensor) system. Refer to TM-234, "DTC Logic".

Is the inspection result normal?

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

4. CHECK INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) SYSTEM

Check input speed sensor (primary speed sensor) system. Refer to TM-231, "DTC Logic".

Is the inspection result normal?

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

5. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

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P0776 PRESSURE CONTROL SOLENOID B PERFORMANCE (SEC PRESSURE SOLENOID VALVE)

Description

INFOID:0000000000988687

The pressure control solenoid valve B (secondary pressure solenoid valve) regulates the secondary pressure to suit the driving condition in response to a signal sent from the TCM.

DTC Logic

INFOID:0000000000988688

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0776	PRS CNT SOL/B FCTN	Secondary pressure is too high or too low compared with the commanded value while driving.	• Harness or connectors (Solenoid circuit is open or shorted.) • Pressure control solenoid valve B (Secondary pressure solenoid valve system) • Transmission fluid pressure sensor A (Secondary pressure sensor) • Line pressure control system

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 30 consecutive seconds.

ATF TEMP SEN	**: 1.0 – 2.0 V**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
VEHICLE SPEED	**: 10 km/h (6 MPH) More than**
Driving location	**: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

With GST

Follow the procedure "With CONSULT-III".

Is "P0776 PRS CNT SOL/B FCTN" detected?

YES >> Go to TM-248, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988689

1. CHECK LINE PRESSURE

Perform line pressure test. Refer to TM-318, "Inspection and Judgment".

Is the inspection result normal?

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YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

2.CHECK PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve B (Secondary pressure solenoid valve). Refer to TM-251, "Component Inspection".

Is the inspection result normal?

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

3.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve A (Line pressure solenoid valve). Refer to TM-245, "Component Inspection".

Is the inspection result normal?

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

4.CHECK TRANSMISSION FLUID PRESSURE SENSOR A (SECONDARY PRESSURE SENSOR) SYSTEM

Check transmission fluid pressure sensor A (secondary pressure sensor) system. Refer to TM-255, "DTC Logic".

Is the inspection result normal?

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

5.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

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P0778 PRESSURE CONTROL SOLENOID B ELECTRICAL (SEC PRESSURE SOLENOID VALVE)

Description

INFOID:0000000000988690

The pressure control solenoid valve B (secondary pressure solenoid valve) regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

DTC Logic

INFOID:0000000000988691

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0778	PRS CNT SOL/B CIRC	• 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.	• Harness or connectors (Sensor circuit is open or shorted.) • Pressure control solenoid valve B (Secondary pressure solenoid valve)

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Start engine.
3. Drive vehicle and maintain the following conditions for at least 5 consecutive seconds.
4. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST
Follow the procedure "With CONSULT-III".

Is "P0778 PRS CNT SOL/B CIRC" detected?

YES >> Go to TM-250, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988692

1.CHECK PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE) CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

TCM connector		Ground	Resistance (Approx.)
Connector	Terminal		
F25	39		3.0 – 9.0 Ω

Is the inspection result normal?

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

2.CHECK PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve B (secondary pressure solenoid valve). Refer to TM-251, "Component Inspection".

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Is the inspection result normal?

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

3. CHECK HARNESS BETWEEN TCM AND PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	39	F24	3	Existed

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

Is the inspection result normal?

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

4. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988693

PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

1. PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	3		3.0 – 9.0 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

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P0826 MANUAL MODE SWITCH

Description

INFOID:0000000000988694

Manual mode switch is installed in shift control device. The manual mode switch sends shift up and shift down switch signals to TCM.
TCM sends the switch signals to combination meter via CAN communication line. Then manual mode switch position is indicated on the shift position indicator.

DTC Logic

INFOID:0000000000988695

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0826	MANUAL MODE SWITCH	When an impossible pattern of switch signals is detected, a malfunction is detected.	• Harness or connectors - (These switches circuit is open or shorted.) - (TCM, and combination meter circuit are open or shorted.) - (CAN communication line is open or shorted.) • Manual mode select switch (Built into control device) • Manual mode position select switch (Built into control device)

DTC CONFIRMATION PROCEDURE

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

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Start engine.
4. Drive vehicle for at least 2 consecutive seconds.

MMODE : ON

Is “P0826 MANUAL MODE SWITCH” detected?

YES >> Go to TM-252, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988696

1. CHECK MANUAL MODE SWITCH SIGNALS

With CONSULT-III
1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Read out ON/OFF switching action of the “MMODE”, “NON M-MODE”, “UPLVR”, “DOWNLVR”.

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Item name	Condition	Display value
MMODE	Manual shift gate position (neutral)	ON
	Other than the above	OFF
NONMMODE	Manual shift gate position (neutral, +side, -side)	OFF
	Other than the above	ON
UPLVR	Selector lever: + side	ON
	Other than the above	OFF
DOWNLVR	Selector lever: - side	ON
	Other than the above	OFF

Without CONSULT-III

Drive vehicle in the manual mode, and confirm that the actual gear position and the meter's indication of the position mutually coincide when the selector lever is shifted to the “+ (up)” or “- (down)” side (1st ⇔ 6th gear).

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

2.CHECK MANUAL MODE SWITCH

Check manual mode switch. Refer to TM-254, "Component Inspection".

Is the inspection result normal?

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

3.CHECK SELF-DIAGNOSTIC RESULTS (COMBINATION METER)

Perform self-diagnosis check. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4.CHECK MANUAL MODE SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect control device connector and combination meter connector.
3. Check continuity between control device harness connector terminals and combination meter harness connector terminals.

Control device harness connector		Combination meter harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M57	7	M34	40	Existed
	8		38	
	9		39	
	11		37	

4. Check continuity between control device harness connector terminal and ground.

Control device harness connector		Ground	Continuity
Connector	Terminal		
M57	10		Existed

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

Is the inspection result normal?

YES >> GO TO 5.

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NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988697

MANUAL MODE SWITCH

1.MANUAL MODE SWITCH

Check continuity between control device harness connector terminals.

Item	Position	Control device harness connector			Continuity
		Connector	Terminal		
Manual mode select switch	Not manual	M57	10	11	Existed
	Manual		7	10	
Manual mode position select switch	Up		9	10	
	Down		8	10	

Is the inspection result normal?

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

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P0840 TRANSMISSION FLUID PRESSURE SENSOR A (SEC PRESSURE SENSOR)

Description

INFOID:0000000000988698

The transmission fluid pressure sensor A (secondary pressure sensor) detects secondary pressure of CVT and sends TCM the signal.

DTC Logic

INFOID:0000000000988699

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0840	TR PRS SENS/A CIRC	Signal voltage of the transmission fluid pressure sensor A (secondary pressure sensor) is too high or too low while driving.	• Transmission fluid pressure sensor A (Secondary pressure sensor) • Harness or connectors (Switch circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Make sure that output voltage of line temperature sensor is within the range below.

ATF TEMP SEN : 1.0 – 2.0 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

4. Start engine and wait for at least 5 consecutive seconds.

With GST
Follow the procedure "With CONSULT-III".

Is "P0840 TR PRS SENS/A CIRC" detected?

YES >> Go to TM-255, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988700

1. CHECK INPUT SIGNAL

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

TCM connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F25	15		"N" position idle	1.0 V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2. CHECK HARNESS BETWEEN TCM AND TRANSMISSION FLUID PRESSURE SENSOR A (SECOND-

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ARY PRESSURE SENSOR)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	15	F24	23	Existed

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK SENSOR POWER AND SENSOR GROUND

1. Connect TCM connector.
2. Turn ignition switch ON.
3. Check voltage between CVT unit harness connector terminals.

CVT unit harness connector			Voltage (Approx.)
Connector	Terminal		
F24	19	20	5.0 V

4. Reinstall any part removed.

Is the inspection result normal?

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

4. CHECK HARNESS BETWEEN TCM AND CVT UNIT HARNESS CONNECTOR (SENSOR POWER AND SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and CVT unit harness connector terminals.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	25	F24	19	Existed
	26		20	

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and then start engine perform self-diagnosis check. Refer to TM-255, "DTC Logic".

Is “P0840 TR PRS SENS/A CIRC” detected again?

YES >> Replace the transaxle assembly. Refer to TM-340, "Exploded View".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

6. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

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NO >> Replace TCM. Refer to TM-325, "Exploded View".

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P0841 PRESSURE SENSOR FUNCTION

Description

INFOID:0000000000988701

Using the engine load (throttle position), the primary pulley revolution speed, and the secondary pulley revolution speed as input signal, TCM changes the operating pressure of the primary pulley and the secondary pulley and changes the groove width of the pulley to control the gear ratio.

DTC Logic

INFOID:0000000000988702

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0841	PRESS SEN/FNCTN	Correlation between the values of the transmission fluid pressure sensor A (secondary pressure sensor) and the transmission fluid pressure sensor B (primary pressure sensor) is out of specification.	• Transmission fluid pressure sensor A (Secondary pressure sensor) • Transmission fluid pressure sensor B (Primary pressure sensor) • Harness or connectors (Sensor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 12 consecutive seconds.

VEHICLE SPEED	**: 40 km/h (25 MPH) More than**
RANGE	**: "D" position**

Is "P0841 PRESS SEN/FNCTN" detected?

YES >> Go to TM-258, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988703

1.CHECK LINE PRESSURE

Perform line pressure test. Refer to TM-318, "Inspection and Judgment".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

2.CHECK TRANSMISSION FLUID PRESSURE SENSOR A (SECONDARY PRESSURE SENSOR) SYSTEM

Check transmission fluid pressure sensor A (secondary pressure sensor) system. Refer to TM-255, "Description".

Is the inspection result normal?

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

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3. CHECK TRANSMISSION FLUID PRESSURE SENSOR B (PRIMARY PRESSURE SENSOR) SYSTEM

Check transmission fluid pressure sensor B (primary pressure sensor) system. Refer to TM-260, "Description".

Is the inspection result normal?

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

4. CHECK LINE PRESSURE SOLENOID VALVE

Check line pressure solenoid valve. Refer to TM-245, "Component Inspection".

Is the inspection result normal?

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

5. CHECK SECONDARY PRESSURE SOLENOID VALVE

Check secondary pressure solenoid valve. Refer to TM-251, "Component Inspection".

Is the inspection result normal?

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

6. CHECK STEP MOTOR

Check step motor. Refer to TM-277, "Component Inspection".

Is the inspection result normal?

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

7. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

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P0845 TRANSMISSION FLUID PRESSURE SENSOR B (PRI PRESSURE SENSOR)

Description

INFOID:0000000000988704

The transmission fluid pressure sensor B (primary pressure sensor) detects primary pressure of CVT and sends TCM the signal.

DTC Logic

INFOID:0000000000988705

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0845	TR PRS SENS/B CIRC	Signal voltage of the transmission fluid pressure sensor B (primary pressure sensor) is too high or too low while driving.	• Transmission fluid pressure sensor B (Primary pressure sensor) • Harness or connectors (Sensor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Make sure that output voltage of line temperature sensor is within the range below.

ATF TEMP SEN : 1.0 – 2.0 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

4. Start engine and wait for at least 5 consecutive seconds.

With GST

Follow the procedure "With CONSULT-III".

Is "P0845 TR PRS SENS/B CIRC" detected?

YES >> Go to TM-260, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988706

1. CHECK INPUT SIGNAL

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

TCM connector		Ground	Condition	Voltage (Approx.)
Connector	Terminal			
F25	14		"N" position idle	0.7 – 3.5 V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 2.

2. CHECK HARNESS BETWEEN TCM AND TRANSMISSION FLUID PRESSURE SENSOR B (PRIMARY

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PRESSURE SENSOR)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	14	F24	25	Existed

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK SENSOR POWER AND SENSOR GROUND

1. Connect TCM connector.
2. Turn ignition switch ON.
3. Check voltage between CVT unit harness connector terminals.

CVT unit harness connector			Voltage (Approx.)
Connector	Terminal		
F24	19	20	5.0 V

4. Reinstall any part removed.

Is the inspection result normal?

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

4. CHECK HARNESS BETWEEN TCM AND CVT UNIT HARNESS CONNECTOR (SENSOR POWER AND SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and CVT unit harness connector terminals.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	25	F24	19	Existed
	26		20	

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THE TCM SHORT

Replace same type TCM, perform self-diagnosis check. Erase self-diagnostic results and then start engine perform self-diagnosis check. Refer to TM-260, "DTC Logic".

Is “P0845 TR PRS SENS/B CIRC” detected again?

YES >> Replace the transaxle assembly. Refer to TM-340, "Exploded View".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

6. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

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NO >> Replace TCM. Refer to TM-325, "Exploded View".

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P0868 SECONDARY PRESSURE DOWN

Description

INFOID:0000000000988707

The pressure control solenoid valve B (secondary pressure solenoid valve) regulates the secondary pressure to suit the driving condition in response to a signal sent from the TCM.

DTC Logic

INFOID:0000000000988708

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P0868	SEC/PRESS DOWN	Secondary fluid pressure is too low compared with the commanded value while driving.	• Harness or connectors (Solenoid circuit is open or shorted.) • Pressure control solenoid valve B (Secondary pressure solenoid valve) system • Transmission fluid pressure sensor A (Secondary pressure sensor) • Line pressure control system

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Make sure that output voltage of CVT fluid temperature sensor is within the range below.

ATF TEMP SEN	**: 1.0 – 2.0 V**
If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)	

4. Start engine and maintain the following conditions for at least 10 consecutive seconds.

VEHICLE SPEED (accelerate slowly)	**: 0 → 50 km/h (31 MPH)**
ACC PEDAL OPEN	**: 0.5/8 – 1.0/8**
RANGE	**: “D” position**

Is “P0868 SEC/PRESS DOWN” detected?

YES >> Go to TM-263, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988709

1. CHECK LINE PRESSURE

Perform line pressure test. Refer to TM-318, "Inspection and Judgment".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace damaged parts. Refer to TM-318, "Inspection and Judgment".

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2.CHECK PRESSURE CONTROL SOLENOID VALVE B (SECONDARY PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve B (secondary pressure solenoid valve). Refer to TM-251, "Component Inspection".

Is the inspection result normal?

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

3.CHECK PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE SOLENOID VALVE)

Check pressure control solenoid valve A (line pressure solenoid valve). Refer to TM-245, "Component Inspection".

Is the inspection result normal?

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

4.CHECK TRANSMISSION FLUID PRESSURE SENSOR A (SECONDARY PRESSURE SENSOR) SYSTEM

Check transmission fluid pressure sensor A (secondary pressure sensor) system. Refer to TM-255, "DTC Logic".

Is the inspection result normal?

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

5.CHECK TCM

Check input/output signal. Refer to TM-285, "Reference Value"

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

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P1701 TRANSMISSION CONTROL MODULE (POWER SUPPLY)

Description

INFOID:0000000000988710

When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnosis memory function stops, malfunction is detected.

NOTE:

Since “P1701 TCM-POWER SUPPLY” will be indicated when replacing TCM, perform diagnosis after erasing “SELF-DIAG RESULTS”

DTC Logic

INFOID:0000000000988711

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1701	TCM-POWER SUPPLY	• When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnosis memory function stops. • This is not a malfunction message (Whenever shutting OFF a power supply to the TCM, this message appears on the screen).	• Harness or connectors (Battery or ignition switch and TCM circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

NOTE:

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

After the repair, perform the following procedure to confirm the malfunction is eliminated.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Wait for at least 2 consecutive seconds.
3. Perform “SELF-DIAG RESULTS”. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is “P1701 TCM-POWER SUPPLY” detected?

YES >> Go to TM-265, "Diagnosis Procedure".

NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988712

1. CHECK TCM POWER SOURCE

Check voltage between TCM connector terminals and ground.

Name	TCM connector		Ground	Condition	Voltage (Approx.)
	Connector	Terminal			
Power supply	F25	46	Ground	Ignition switch ON	Battery voltage
				Ignition switch OFF	0 V
		48		Ignition switch ON	Battery voltage
				Ignition switch OFF	0 V
Power supply (memory back-up)		45		Always	Battery voltage
		47			

Is the inspection result normal?

YES >> GO TO 4.

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NO >> GO TO 2.

2.DETECT MALFUNCTIONING ITEM

Check the following.
- Harness for short or open between battery and TCM connector terminal 45, 47
- Harness for short or open between ignition switch and TCM connector terminal 46, 48
- 10 A fuse (No. 55, located in the IPDM E/R)
- 15 A fuse (No. 13, located in the J/B)
- Ignition switch. Refer to TM-332, "Exploded View".

Is the inspection result normal?

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

3.CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and ground.

TCM connector		Ground	Continuity
Connector	Terminal		
F25	5		Existed
	42		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

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P1705 THROTTLE POSITION SENSOR

Description

INFOID:0000000000988713

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 the signal to TCM with CAN communication.

DTC Logic

INFOID:0000000000988714

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1705	TP SEN/CIRC A/T	TCM does not receive the proper accelerator pedal position signals (input by CAN communication) from ECM.	• ECM • Harness or connectors (CAN communication line is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Depress accelerator pedal fully and release it, then wait for 5 seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is "P1705 TP SEN/CIRC A/T" detected?

YES >> Go to TM-267, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988715

1. CHECK INPUT SIGNAL

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Read out the value of "ACC PEDAL OPEN".

Item name	Condition	Display value (Approx.)
ACC PEDAL OPEN	Released accelerator pedal - Fully depressed accelerator pedal	0.0/8 - 8.0/8

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> GO TO 2.

2. CHECK DTC WITH ECM

With CONSULT-III
1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode for "ENGINE" with CONSULT-III. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Check the DTC Detected Item. Go to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

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P1722 ESTM VEHICLE SPEED SIGNAL

Description

INFOID:0000000000988716

The vehicle speed signal is transmitted from ABS actuator and electric unit (control unit) to TCM by CAN communication line.

DTC Logic

INFOID:0000000000988717

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1722	ESTM VEH SPD SIG	• CAN communication with the ABS actuator and the electric unit (control unit) is malfunctioning. • There is a great difference between the vehicle speed signal from the ABS actuator and the electric unit (control unit), and the vehicle speed sensor signal.	• Harness or connectors (Sensor circuit is open or shorted.) • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

ACC PEDAL OPEN	**: 1.0/8 or less**
VEHICLE SPEED	**: 30 km/h (19 MPH) or more**

Is "P1722 ESTM VEH SPD SIG" detected?

YES >> Go to TM-268, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988718

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform "SELF-DIAG RESULTS". Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

Is the inspection result normal?

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

2.CHECK INPUT SIGNALS

With CONSULT-III

1. Start engine.
2. Select "DATA MONITOR".
3. Drive vehicle and read out the value of "VEHICLE SPEED" and "ESTM VSP SIG".

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Item name	Condition	Display value
ESTM VSP SIG	During driving	Approximately matches the speedometer reading.
VEHICLE SPEED		

4. Check if there is a great difference between the two values.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> GO TO 3.

3.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

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P1723 CVT SPEED SENSOR FUNCTION

Description

INFOID:0000000000988719

The vehicle speed sensor CVT [output speed sensor (secondary speed sensor)] detects the revolution of parking gear and generates a pulse signal. The pulse signal is sent to the TCM, which converts it into vehicle speed.
The input speed sensor (primary speed sensor) detects the primary pulley revolution speed and sends a signal to the TCM.

DTC Logic

INFOID:0000000000988720

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1723	CVT SPD SEN/FNCTN	A rotation sensor error is detected because the gear does not change in accordance with the position of the stepping motor. **CAUTION:** **One of the "P0720 VEH SPD SEN/CIR AT", the "P0715 INPUT SPD SEN/CIRC" or the "P0725 ENGINE SPEED SIG" is displayed with the DTC at the same time.**	• Harness or connectors (Sensor circuit is open or shorted.) • Output speed sensor (Secondary speed sensor) • Input speed sensor (Primary speed sensor) • Engine speed signal system

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON.
2. Select "DATA MONITOR".
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: "D" position**
ENG SPEED	**: 450 rpm or more**
Driving location	**: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

Is "P1723 CVT SPD SEN/FNCTN" detected?

YES >> Go to TM-270, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988721

1.CHECK STEP MOTOR FUNCTION

Perform the self-diagnosis check. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is a malfunction in the step motor function indicated in the results?

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YES >> Repair or replace damaged parts. (Check the step motor function. Refer to TM-278, "DTC Logic".)
NO >> GO TO 2.

2. CHECK OUTPUT SPEED SENSOR (SECONDARY SPEED SENSOR) SYSTEM

Check output speed sensor (secondary speed sensor) system. Refer to TM-234, "DTC Logic".

Is the inspection result normal?

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

3. CHECK INPUT SPEED SENSOR (PRIMARY SPEED SENSOR) SYSTEM

Check input speed sensor (primary speed sensor) system. Refer to TM-231, "DTC Logic".

Is the inspection result normal?

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

4. CHECK ENGINE SPEED SIGNAL SYSTEM

Check engine speed signal system. Refer to TM-237, "DTC Logic".

Is the inspection result normal?

OK >> GO TO 5.
NG >> Repair or replace damaged parts. Refer to EC-929, "Description" (WITH EURO-OBD), EC-1208, "Description" (WITHOUT EURO-OBD).

5. CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Replace the TCM. Refer to TM-325, "Exploded View".

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P1726 ELECTRIC THROTTLE CONTROL SYSTEM

Description

INFOID:0000000000988722

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 the signal to TCM with CAN communication.

DTC Logic

INFOID:0000000000988723

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1726	ELEC TH CONTROL	The electronically controlled throttle for ECM is malfunctioning.	Harness or connectors (Sensor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Start engine and let it idle for 5 seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is "P1726 ELEC TH CONTROL" detected?

YES >> Go to TM-272, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988724

1.CHECK DTC WITH ECM

With CONSULT-III

1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS" mode for "ENGINE" with CONSULT-III. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check the DTC Detected Item. Refer to EC-719, "CONSULT-III Function" (WITH EURO-OBD), EC-1054, "CONSULT-III Function" (WITHOUT EURO-OBD).

2.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

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P1740 LOCK-UP SELECT SOLENOID VALVE

Description

INFOID:0000000000988725

- Lock-up select solenoid valve controls lock-up clutch pressure or forward clutch pressure (reverse brake pressure).
- When controlling lock-up clutch, the valve is turned OFF. When controlling forward clutch, it is turned ON.

DTC Logic

INFOID:0000000000988726

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1740	LU-SLCT SOL/CIRC	• 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.	• Lock-up select solenoid valve • Harness or connectors (Solenoid circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

RANGE : “D” position and “N” positions

(At each time, wait for 5 seconds.)

With GST

Follow the procedure “With CONSULT-III”.

Is “P1740 LU-SLCT SOL/CIRC” detected?

YES >> Go to TM-273, "Diagnosis Procedure".

NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988727

1. CHECK LOCK-UP SELECT SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

TCM connector		Ground	Resistance (Approx.)
Connector	Terminal		
F25	37		17.0 – 38.0 Ω

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

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2.CHECK LOCK-UP SELECT SOLENOID VALVE

Check lock-up select solenoid valve.

Is the inspection result normal?

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

3.CHECK HARNESS BETWEEN TCM AND LOCK-UP SELECT SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect TCM connector and CVT unit harness connector.
3. Check continuity between TCM connector terminal and CVT unit harness connector terminal.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	37	F24	13	Existed

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

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988728

LOCK-UP SELECT SOLENOID VALVE

1.LOCK-UP SELECT SOLENOID VALVE

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminal and ground.

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	13		17.0 – 38.0 Ω

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

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P1745 LINE PRESSURE CONTROL

Description

INFOID:0000000000988729

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

DTC Logic

INFOID:0000000000988730

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1745	L/PRESS CONTROL	TCM detects the unexpected line pressure.	TCM

DTC CONFIRMATION PROCEDURE

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.

1. CHECK DTC DETECTION

With CONSULT-III
1. Turn ignition switch ON
2. Select "DATA MONITOR".
3. Make sure that output voltage of CVT fluid temperature sensor is within the range below.

ATF TEMP SEN : 1.0 – 2.0 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

Is "P1745 L/PRESS CONTROL" detected?

YES >> Go to TM-275, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988731

1. CHECK DTC

With CONSULT-III
1. Turn ignition switch ON.
2. Select "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".
3. Erase self-diagnostic results.
4. Turn ignition switch OFF, and wait for 10 seconds or more.
5. Start engine.
6. Confirm self-diagnostic results again. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is the "P1745 L/PRESS CONTROL" displayed?

YES >> Replace TCM. Refer to TM-325, "Exploded View".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

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P1777 STEP MOTOR

Description

INFOID:0000000000988732

The step motor changes the step with turning 4 coils ON/OFF according to the signal from TCM. As a result, the flow of line pressure to primary pulley is changed and pulley ratio is controlled.

DTC Logic

INFOID:0000000000988733

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1777	STEP MOTR CIRC	Each coil of the step motor is not energized properly due to an open or a short.	• Step motor • Harness or connectors (Step motor circuit is open or shorted.)

DTC CONFIRMATION PROCEDURE

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.

1.CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Drive vehicle for at least 5 consecutive seconds.
3. Perform "SELF-DIAG RESULTS". Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

With GST

Follow the procedure "With CONSULT-III".

Is "P1777 STEP MOTR CIRC" detected?

YES >> Go to TM-276, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988734

1.CHECK INPUT SIGNALS

With CONSULT-III

1. Start engine.
2. Select "DATA MONITOR".
3. Start vehicle and read out the value of "STM STEP", "SMCOIL A", "SMCOIL B", "SMCOIL C", and "SMCOIL D".

Item name	Condition	Display value (Approx.)
STM STEP	During driving	0 step – 177 step
SMCOIL A		Changes ON⇔OFF.
SMCOIL B		
SMCOIL C		
SMCOIL D		

Is the inspection result normal?

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

2.CHECK HARNESS BETWEEN TCM AND STEP MOTOR

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1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector and TCM connector.
3. Check continuity between TCM connector terminals and CVT unit harness connector terminals.

TCM connector		CVT unit harness connector		Continuity
Connector	Terminal	Connector	Terminal	
F25	27	F24	9	Existed
	28		8	
	29		7	
	30		6	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between body ground and transaxle assembly.
6. Reinstall any part removed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK STEP MOTOR

Check step motor. Refer to TM-277, "Component Inspection".

Is the inspection result normal?

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

4.CHECK TCM

Check TCM input/output signals. Refer to TM-285, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NO >> Replace the TCM. Refer to TM-325, "Exploded View".

Component Inspection

INFOID:0000000000988735

STEP MOTOR

1.STEP MOTOR

1. Turn ignition switch OFF.
2. Disconnect CVT unit harness connector.
3. Check resistance between CVT unit harness connector terminals and ground.

CVT unit harness connector			Resistance (Approx.)
Connector	Terminal		
F24	6	7	30.0 Ω
	8	9	

CVT unit harness connector		Ground	Resistance (Approx.)
Connector	Terminal		
F24	6		15.0 Ω
	7		
	8		
	9		

Is the inspection result normal?

YES >> **INSPECTION END**
NO >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).

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P1778 STEP MOTOR - FUNCTION

Description

INFOID:0000000000988736

- The step motor's 4 aspects of ON/OFF change according to the signal from TCM. As a result, the flow of line pressure to primary pulley is changed and pulley ratio is controlled.
- This diagnosis item is detected when electrical system is OK, but mechanical system is NG.
- This diagnosis item is detected when the state of the changing the speed mechanism in unit does not operate normally.

DTC Logic

INFOID:0000000000988737

DTC DETECTION LOGIC

DTC	Item (CONSULT-III screen term)	Malfunction is detected when...	Possible cause
P1778	STEP MOTR/FNC	There is a great difference between the number of steps for the stepping motor and for the actual gear ratio.	Step motor

DTC CONFIRMATION PROCEDURE

CAUTION:

- **Always drive vehicle at a safe speed.**
- **Before starting “DTC CONFIRMATION PROCEDURE”, confirm “Hi” or “Mid” or “Low” fixation by “PRI SPEED” and “VEHICLE SPEED” on “DATA MONITOR MODE”.**
- **If hi-geared fixation occurred, go to TM-278, "Diagnosis Procedure".**

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.

1. CHECK DTC DETECTION

With CONSULT-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR”.
3. Make sure that output voltage of CVT fluid temperature sensor is within the range below.

ATF TEMP SEN	**: 1.0 – 2.0 V**

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid)

4. Start engine and maintain the following conditions for at least 30 consecutive seconds.

TEST START FROM 0 km/h (0 MPH)	
CONSTANT ACCELERATION	**: Keep 30 sec or more**
VEHICLE SPEED	**: 10 km/h (6 MPH) or more**
ACC PEDAL OPEN	**: More than 1.0/8**
RANGE	**: “D” position**
ENG SPEED	**: 450 rpm or more**

With GST.

Follow the procedure “With CONSULT-III”.

Is “P1778 STEP MOTR/FNC” detected?

YES >> Go to TM-278, "Diagnosis Procedure".
NO >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000000988738

1. CHECK STEP MOTOR

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With CONSULT-III

It is monitoring whether “GEAR RATIO: 2.34 – 0.39” changes similarly to “STM STEP: 0 – 177” by “DATA MONITOR” mode. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Without CONSULT-III

Inspect the engine speed (rise and descend), vehicle speed, throttle position, and check shift change. Refer to TM-361, "Vehicle Speed When Shifting Gears".

OK or NG

OK >> Check intermittent incident. Refer to GI-39, "Intermittent Incident".
NG >> Replace the transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View"(4WD).

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CVT SHIFT LOCK SYSTEM

Description

INFOID:0000000000914676

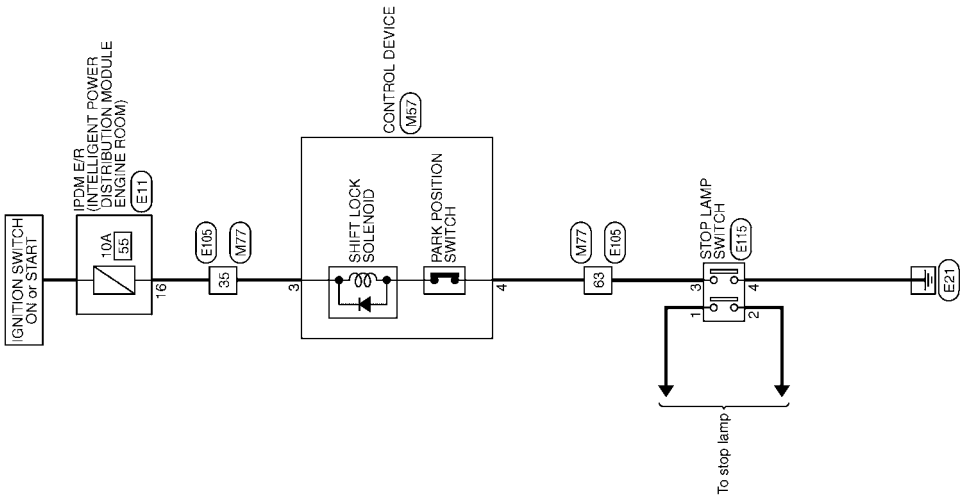
Component	Function
Shift lock solenoid	It operates according to the signal from the stop lamp switch and moves the lock lever.
Lock lever	It moves according to the operation of the shift lock solenoid and performs the release of the shift lock.
Detent rod	It links with the selector button and restricts the selector lever movement.
Park position switch	It detects that the selector lever is in P position.
Key interlock cable and key interlock rod	It transmits the lock lever operation to the slider in the key cylinder.
Shift lock release button	It moves the lock lever forcibly.

Wiring Diagram - CVT SHIFT LOCK SYSTEM -

INFOID:0000000000914677

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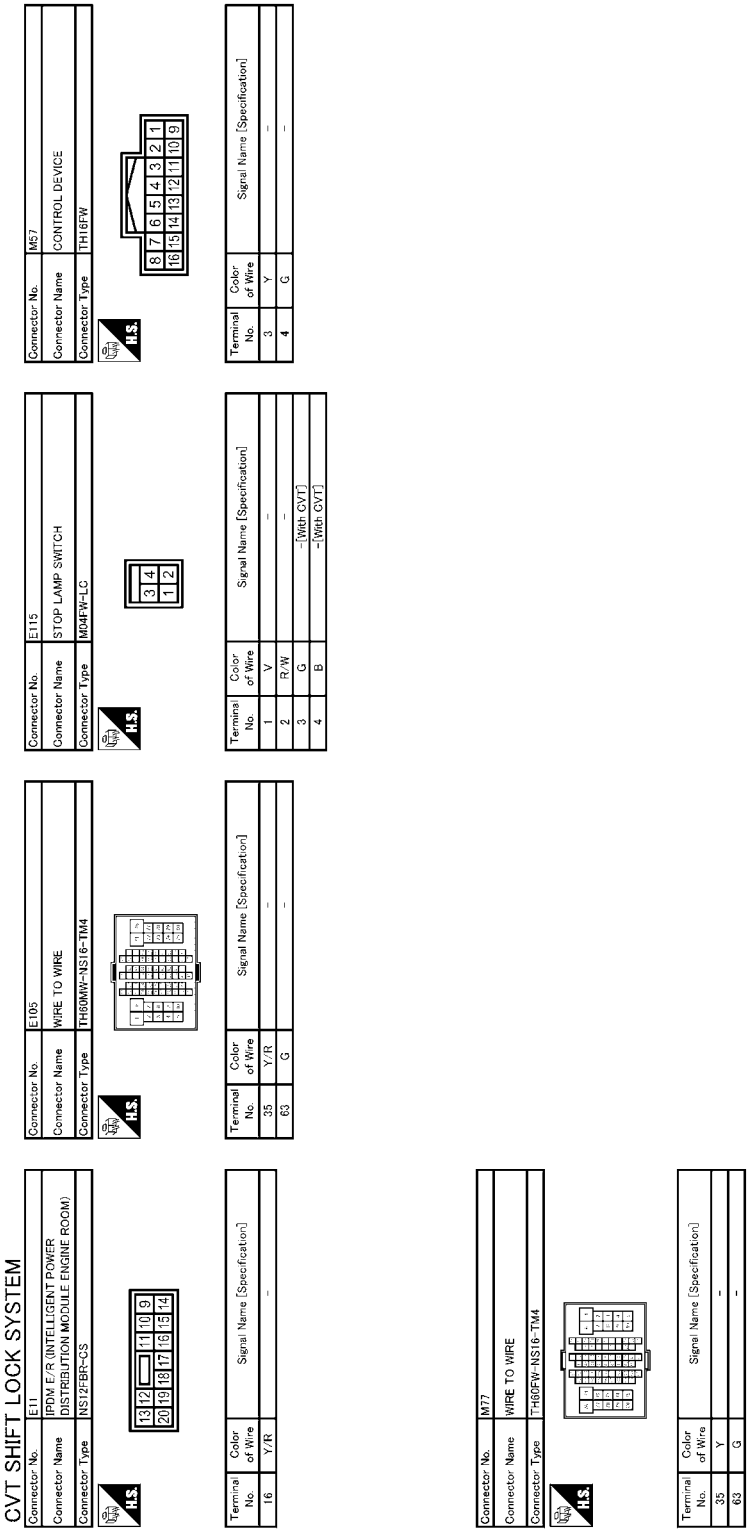
CVT SHIFT LOCK SYSTEM



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Diagnosis Procedure

INFOID:0000000000914678

1. CHECK POWER SOURSE

1. Turn ignition switch ON.
2. Check voltage between control device harness connector and ground.

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Control device harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
M57	3		Battery Voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> • Harness for short or open between ignition switch and control device harness connector terminal 3
• 10 A fuse [No. 55, located in the IPDM E/R]
• Ignition switch

2.CHECK HARNESS BETWEEN CONTROL DEVICE AND STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect control device harness connector and stop lamp switch connector.
3. Check continuity between control device harness connector terminal and stop lamp switch connector terminal.

Control device harness connector		Stop lamp switch harness connector		Continuity
Connector	Terminal	Connector	Terminal	
M57	4	E115	3	Existed

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch harness connector terminal 3 and 4.

Stop lamp switch harness connector			Condition	Continuity
Connector	Terminal			
E115	3	4	Depressed brake pedal	Existed
			Released brake pedal	Not existed

Is the inspection result normal?

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

4.CHECK GROUND CIRCUIT

Check continuity between stop lamp switch harness connector and ground.

Stop lamp switch harness connector		Ground	Continuity
Connector	Terminal		
E115	4		Existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK CONTROL DEVICE

1. Move selector lever to “P” position.
2. Check continuity between control device harness connector.

Control device harness connector			Continuity
Connector	Terminal		
M57	3	4	Existed

Is the inspection result normal?

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YES >> GO TO 6.
NO >> Replace control device. Refer to TM-326, "Exploded View".

6.CHECK SHIFT LOCK SOLENOID

1. Move selector lever to “P” position.
2. Apply voltage to terminals 3 and 4 of control device harness connector, and then shift lock solenoid is activated.

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

(+) (fuse)		(–)	Condition	Status
Control device harness connector				
Connector	Terminal			
M57	3	4	Apply 12 V direct current between terminals 3 and 4.	Shift lock solenoid operates

Is the inspection result normal?

YES >> INSPECTION END.
NO >> Replace control device. Refer to TM-326, "Exploded View".

Component Inspection (Stop lamp switch)

INFOID:0000000001115989

1.CHECK STOP LAMP SWITCH

1. Disconnect stop lamp switch harness connector.
2. Check continuity between stop lamp switch connector terminal 3 and 4.

Stop lamp switch connector			Condition	Continuity
Connector	Terminal			
E115	3	4	Depressed brake pedal	Existed
			Released brake pedal	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to BR-17, "Exploded View" (LHD), BR-61, "Exploded View" (RHD).

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ECU DIAGNOSIS

TCM

Reference Value

INFOID:0000000000988740

VALUES ON THE DIAGNOSIS TOOL

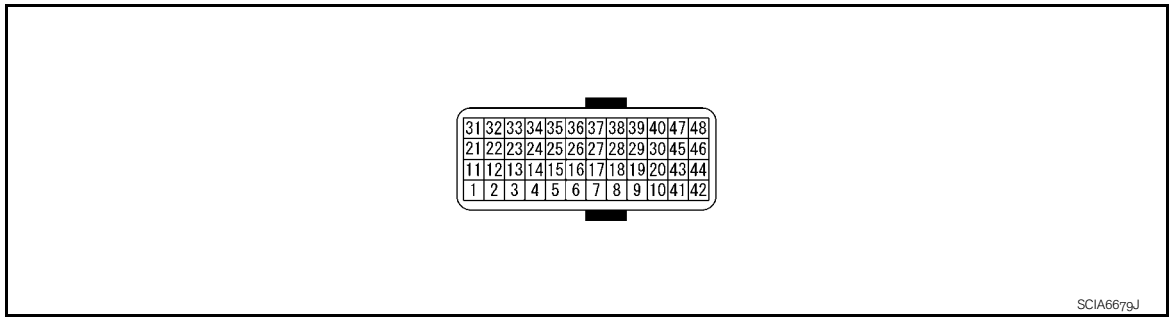
Item name	Condition	Display value (Approx.)
VSP SENSOR	During driving	Approximately matches the speedometer reading.
ESTM VSP SIG	During driving	Approximately matches the speedometer reading.
PRI SPEED SEN	During driving (lock-up ON)	Approximately matches the engine speed.
ENG SPEED SIG	Engine running	Closely matches the tachometer reading.
SEC HYDR SEN	“N” position idle	1.0 V
PRI HYDR SEN	“N” position idle	0.7 - 3.5 V
ATF TEMP SEN	When CVT fluid temperature is 20°C (68°F)	2.0 V
	When CVT fluid temperature is 80°C (176°F)	1.0 V
VIGN SEN	Ignition switch: ON	Battery voltage
VEHICLE SPEED	During driving	Approximately matches the speedometer reading.
PRI SPEED	During driving (lock-up ON)	Approximately matches the engine speed.
SEC SPEED	During driving	45 X Approximately matches the speedometer reading.
ENG SPEED	Engine running	Closely matches the tachometer reading.
GEAR RATIO	During driving	2.34 - 0.39
ACC PEDAL OPEN	Released accelerator pedal - Fully depressed accelerator pedal	0.0/8 - 8.0/8
SEC PRESS	“N” position idle	0.5 MPa
PRI PRESS	“N” position idle	0.3 - 0.7 MPa
STM STEP	During driving	0 step – 177 step
ISOLT1	Lock-up “OFF”	0.0 A
	Lock-up “ON”	0.7 A
ISOLT2	Release your foot from the accelerator pedal.	0.8 A
	Press the accelerator pedal all the way down.	0.0 A
ISOLT3	Secondary pressure low - Secondary pressure high	0.8 - 0.0 A
SOLMON1	Lock-up “OFF”	0.0 A
	Lock-up “ON”	0.7 A
SOLMON2	“N” position idle	0.8 A
	When stalled	0.3 - 0.6 A
SOLMON3	“N” position idle	0.6 - 0.7 A
	When stalled	0.4 - 0.6 A
P POSITION SW	Selector lever in “P” position	ON
	Other than the above position.	OFF
R POSITION SW	Selector lever in “R” position	ON
	Other than the above position.	OFF
N POSITION SW	Selector lever in “N“ position	ON
	Other than the above position.	OFF

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Item name	Condition	Display value (Approx.)
D POSITION SW	Selector lever in “D” position	ON
	Other than the above position.	OFF
BRAKE SW	Depressed brake pedal	ON
	Released brake pedal	OFF
FULL SW	Fully depressed accelerator pedal	ON
	Released accelerator pedal	OFF
IDLE SW	Released accelerator pedal	ON
	Fully depressed accelerator pedal	OFF
INDDRNG	Selector lever in “D” position	ON
	When setting selector lever to other positions.	OFF
INDNRNG	Selector lever in “N“ position	ON
	When setting selector lever to other positions.	OFF
INDRRNG	Selector lever in “R” position	ON
	When setting selector lever to other positions.	OFF
INDPRNG	Selector lever in “P” position	ON
	When setting selector lever to other positions.	OFF
SMCOIL A	During driving	Changes ON ⇔ OFF.
SMCOIL B	During driving	Changes ON ⇔ OFF.
SMCOIL C	During driving	Changes ON ⇔ OFF.
SMCOIL D	During driving	Changes ON ⇔ OFF.
LUSEL SOL OUT	Selector lever in “P”, “N” positions	ON
	Wait at least for 5 seconds with the selector lever in “R”, “D” position	OFF
LUSEL SOL MON	Selector lever in “P”, “N” positions	ON
	Wait at least for 5 seconds with the selector lever in “R”, “D” or position	OFF
ABS ON	ABS operate	ON
	Other conditions	OFF
RANGE	Selector lever in “N” or “P” position	N·P
	Selector lever in “R” position	R
	Selector lever in “D” position	D
DOWNLVR	Selector lever: - side	ON
	Other than the above	OFF
UPLVR	Selector lever: + side	ON
	Other than the above	OFF
NONMMODE	Manual shift gate position (neutral, +side, -side)	OFF
	Other than the above	ON
MMODE	Manual shift gate position (neutral)	ON
	Other than the above	OFF
M GEAR POS	During driving	1, 2, 3, 4, 5, 6

TERMINAL LAYOUT

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PHYSICAL VALUES

Terminal No. (wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
1 (Y/G)	Ground	R RANGE SW	Input	Ignition switch ON	Selector lever in “R” position	Battery voltage
					Other than the above position	0 V
2 (P/B)	Ground	N RANGE SW	Input		Selector lever in “N” position	Battery voltage
					Other than the above position	0 V
3 (G/O)	Ground	D RANGE SW	Input		Selector lever in “D” positions	Battery voltage
					Other than the above position	0 V
4 (GR)	Ground	L RANGE SW	Input		Selector lever in “L” position	Battery voltage
					Other than the above position	0 V
5 (B)	Ground	Ground	Output	Always		0 V
6 (O)	Ground	K-LINE	Input/Output	—		—
7 (R/W)	Ground	Sensor ground	Input	Always		0 V
8 (G/W)	—	CLOCK (SEL2)	—	—		—
9 (L/R)	—	CHIP SELECT (SEL1)	—	—		—
10 (Y)	—	DATA I/O (SEL3)	—	—		—
11 (BR/W)	Ground	P RANGE SW	Input	Ignition switch ON	Selector lever in “P” position	Battery voltage
					Other than the above position	0 V
13 (V)	Ground	CVT fluid temperature sensor	Output	Ignition switch ON	When CVT fluid temperature is 20°C (68°F)	2.0 V
					When CVT fluid temperature is 80°C (176°F)	1.0 V
14 (LG)	Ground	Transmission fluid pressure sensor B (Primary pressure sensor)	Input	“N” position idle		0.7 – 3.5 V
15 (V/W)	Ground	Transmission fluid pressure sensor A (Secondary pressure sensor)	Input			1.0 V

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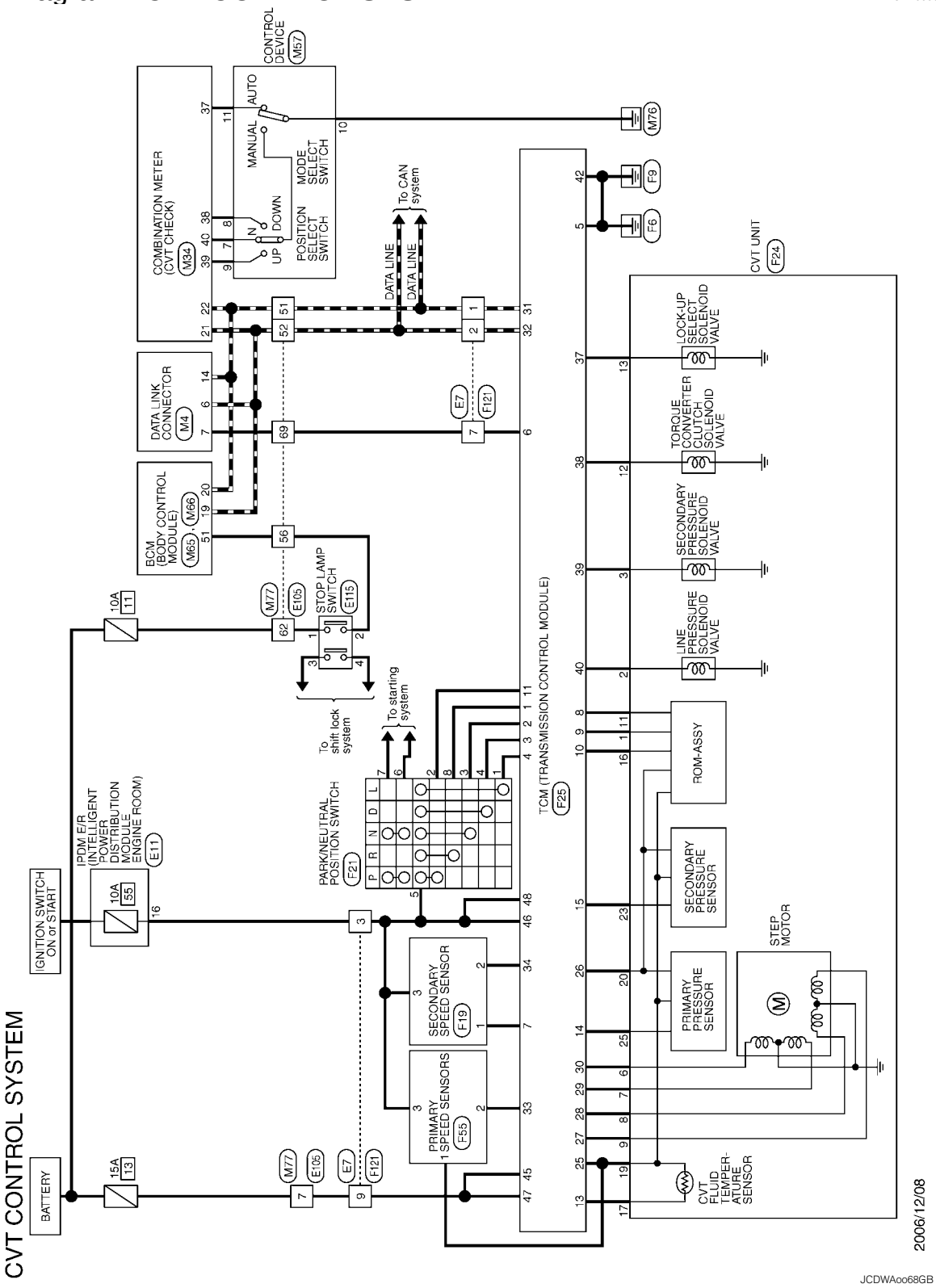
Terminal No. (wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
25 (W/R)	Ground	Sensor ground	Input	Always		0 V
26 (L/O)	Ground	Sensor power	Output	Ignition switch ON	—	5.0 V
				Ignition switch OFF	—	0 V
27 (R/G)	Ground	Step motor D	Output	Within 2 seconds after ignition switch ON, the time measurement by using the pulse width measurement function (Hi level) of CONSULT-III.* **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.**		10.0 msec
28 (R)	Ground	Step motor C	Output			30.0 msec
29 (O/B)	Ground	Step motor B	Output			10.0 msec
30 (G/R)	Ground	Step motor A	Output			30.0 msec
31 (P)	—	CAN-L	Input/Output	—		—
32 (L)	—	CAN-H	Input/Output	—		—
33 (LG/R)	Ground	Input speed sensor (Primary speed sensor)	Input	When driving [“M1” position, 20 km/h (12 MPH)]		800 Hz
34 (W)	Ground	Output speed sensor (Secondary speed sensor)	Input	When driving [“D” position, 20 km/h (12 MPH)]		500 Hz
37 (L/W)	Ground	Lock-up select solenoid valve	Output	Ignition switch ON	Selector lever in “P” or “N” positions	Battery voltage
					Wait at least for 5 seconds with the selector lever in “R” or “D” positions.	0 V
38 (G)	Ground	Torque converter clutch solenoid valve	Output	When vehicle cruises in “D” position	When CVT performs lock-up	6.0 V
					When CVT does not perform lock-up	1.5 V
39 (W/G)	Ground	Pressure control solenoid valve B (Secondary pressure solenoid valve)	Output	“P” or “N” position idle	Release your foot from the accelerator pedal.	5.0 – 7.0 V
					Press the accelerator pedal all the way down.	3.0 – 4.0 V
40 (R/Y)	Ground	Pressure control solenoid valve A (Line pressure solenoid valve)	Output		Release your foot from the accelerator pedal.	5.0 – 7.0 V
					Press the accelerator pedal all the way down.	1.0 V
42 (B)	Ground	Ground	Output	Always		0 V
45 (R/B)	Ground	Power supply (memory back-up)	Input	Always		Battery voltage
46 (Y/R)	Ground	Power supply	Input	Ignition switch ON	—	Battery voltage
				Ignition switch OFF	—	0 V
47 (R/B)	Ground	Power supply (memory back-up)	Input	Always		Battery voltage
48 (Y/R)	Ground	Power supply	Input	Ignition switch ON	—	Battery voltage
				Ignition switch OFF	—	0 V

*: A circuit tester cannot be used to test this item.

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Wiring Diagram - CVT CONTROL SYSTEM -

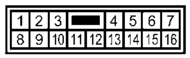
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CVT CONTROL SYSTEM

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

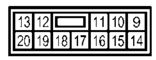
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	–
2	L	–
3	Y/R	–
7	O	–
9	R/B	–

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS

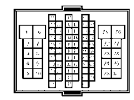
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Terminal No.	Color of Wire	Signal Name [Specification]
16	Y/R	–

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH60MW-NS16-TM4

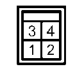
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Terminal No.	Color of Wire	Signal Name [Specification]
7	R/B	–
51	P	–
52	L	–
56	R/W	–
62	V	–
69	O	–

Connector No.	E115
Connector Name	STOP LAMP SWITCH
Connector Type	M04FW-LC

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	R/W	–
3	G	–[With CVT]
4	B	–[With CVT]

Connector No.	F19
Connector Name	SECONDARY SPEED SENSOR
Connector Type	RV03FB

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	R/W	–
2	W	–
3	Y	–

Connector No.	F21
Connector Name	PARK/NEUTRAL POSITION SWITCH
Connector Type	RK08FG

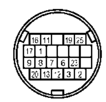
H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	BR/W	–
3	P/B	–
4	G/O	–
5	Y/R	–
6	W/B	–
7	R/B	–
8	Y/G	–

Connector No.	F24
Connector Name	CVT UNIT
Connector Type	Yazaki 7283-8750-30

H.S.



Terminal No.	Color of Wire	Signal Name [Specification]
1	L/R	–
2	R/Y	–
3	W/G	–
6	G/R	–
7	O/B	–
8	R	–
9	R/G	–
11	G/W	–
12	G	–
13	L/W	–
16	Y	–
17	V	–
19	W/R	–
20	L/O	–
23	V/W	–
25	LG	–

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CVT CONTROL SYSTEM

Connector No.	F25
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	MOLEX 600094-4111

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/G	R RANGE SW
2	P/B	N RANGE SW
3	G/O	D RANGE SW
4	GR	L RANGE SW
5	B	GND
6	O	K-LINE
7	R/W	SENSOR GND
8	G/W	CLOCK (SEL2)
9	L/R	CHIP SELECT (SEL1)
10	Y	DATA I/O (SEL3)
11	BR/W	P RANGE SW

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
6	L	-
7	O	-
14	P	-

13	V	ATF TEMP SENS
14	LG	PRI PRESS SEN
15	V/W	SEC PRESS SEN
25	W/R	SENSOR GND
26	L/O	SENS POWER SOURCE
27	R/G	S/M-D
28	R	S/M-C
29	O/B	S/M-B
30	G/R	S/M-A
31	P	CAN-L
32	L	CAN-H
33	LG/R	PRI SEN
34	W	SEC SENS
37	L/W	L/U&SELECT-ON/OFF SOL
38	G	L/U&SELECT-LINEAR SOL
39	W/G	SEC-LINEAR SOL
40	R/Y	PL-LINEAR SOL
42	B	GND
45	R/B	BATT
46	Y/R	VIGN
47	R/B	BATT
48	Y/R	VIGN

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L
37	R/Y	NOT MANUAL MODE
38	LG	SHIFT DOWN
39	G/W	SHIFT UP
40	L	MANUAL MODE

Connector No.	F55
Connector Name	PRIMARY SPEED SENSOR
Connector Type	RW03FB

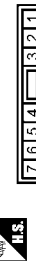
Terminal No.	Color of Wire	Signal Name [Specification]
1	W/R	-
2	LG/R	-
3	Y/R	-

Connector No.	M57
Connector Name	CONTROL DEVICE
Connector Type	TH16FW



Terminal No.	Color of Wire	Signal Name [Specification]
7	L	-
8	LG	-
9	W	-
10	B	-
11	R	-

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS



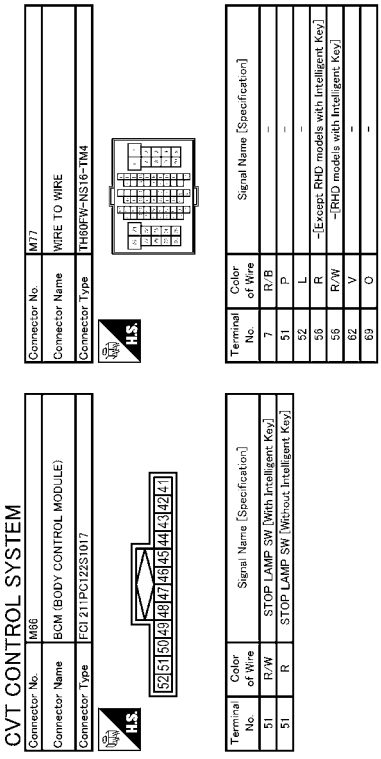
Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	L	-
3	Y/R	-
7	O	-
9	R/B	-

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AAB40FB

Terminal No.	Color of Wire	Signal Name [Specification]
19	L	CAN-H
20	P	CAN-L

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Fail-safe

INFOID:0000000000988742

The TCM has an electrical fail-safe mode. In this mode TCM is operator even if there is an error in a main electronic control input/output signal circuit.

FAIL-SAFE FUNCTION

If any malfunction occurs in a sensor or solenoid, this function controls the CVT to make driving possible.

Output Speed Sensor (Secondary Speed Sensor)

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The shift pattern is changed in accordance with throttle position when an unexpected signal is sent from the output speed sensor (secondary speed sensor) to the TCM. The manual mode position is inhibited, and the transaxle is put in “D”.

Input Speed Sensor (Primary Speed Sensor)
The shift pattern is changed in accordance with throttle position and secondary speed (vehicle speed) when an unexpected signal is sent from the input speed sensor (primary speed sensor) to the TCM. The manual mode position is inhibited, and the transaxle is put in “D”.

PNP Switch
If an unexpected signal is sent from the PNP switch to the TCM, the transaxle is put in “D”.

Manual Mode Switch
If an unexpected signal is sent from the manual mode switch to the TCM, the transaxle is put in “D”.

CVT Fluid Temperature Sensor
If an unexpected signal is sent from the CVT fluid temperature sensor to the TCM, the gear ratio in use before receiving the unexpected signal is maintained or the gear ratio is controlled to keep engine speed under 5000 rpm.

Transmission Fluid Pressure Sensor A (Secondary Pressure Sensor)
- If an unexpected signal is sent from the transmission fluid pressure sensor A (secondary pressure sensor) to the TCM, the secondary pressure feedback control is stopped and the offset value obtained before the non-standard condition occurs is used to control line pressure.
- If transmission fluid pressure sensor A (secondary pressure sensor) error signal is input to TCM, secondary pressure feedback control stops, but line pressure is controlled normally.

Pressure Control Solenoid A (Line Pressure Solenoid)
If an unexpected signal is sent from the solenoid to the TCM, the pressure control solenoid A (line pressure solenoid) is turned OFF to achieve the maximum fluid pressure.

Pressure Control Solenoid B (Secondary Pressure Solenoid)
If an unexpected signal is sent from the solenoid to the TCM, the pressure control solenoid B (secondary pressure solenoid) is turned OFF to achieve the maximum fluid pressure.

Torque Converter Clutch Solenoid
If an unexpected signal is sent from the solenoid to the TCM, the torque converter clutch solenoid is turned OFF to cancel the lock-up.

Step Motor
If an unexpected signal is sent from the step motor to the TCM, the step motor coil phases “A” through “D” are all turned OFF to hold the gear ratio used right before the non-standard condition occurred.

CVT Lock-up Select Solenoid
If an unexpected signal is sent from the solenoid to the TCM, the CVT lock-up select solenoid is turned OFF to cancel the lock-up.

TCM Power Supply (Memory Back-up)
Transaxle assembly is protected by limiting the engine torque when the memory back-up power supply (for controlling) from the battery is not supplied to TCM. Normal statues is restored when turning the ignition switch OFF to ON after the normal power supply.

DTC Inspection Priority Chart

INFOID:0000000000988743

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

NOTE:
If DTC “U1000 CAN COMM CIRCUIT” is displayed with other DTCs, first perform the trouble diagnosis for “DTC U1000 CAN COMMUNICATION LINE”. Refer to TM-222.

Priority	Detected items (DTC)
1	U1000 CAN communication line
2	Except above

DTC Index

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NOTE:
If DTC "U1000 CAN COMM CIRCUIT" is displayed with other DTCs, first perform the trouble diagnosis for "DTC U1000 CAN COMMUNICATION LINE". Refer to TM-222.

DTC		Items (CONSULT-III screen terms)	Reference page
OBD	Except OBD		
CONSULT-III GST*	CONSULT-III only "TRANSMISSION"		
—	P0703	BRAKE SW/CIRC	TM-224
P0705	P0705	PNP SW/CIRC	TM-226
P0710	P0710	ATF TEMP SEN/CIRC	TM-229
P0715	P0715	INPUT SPD SEN/CIRC	TM-231
P0720	P0720	VEH SPD SEN/CIR AT	TM-234
—	P0725	ENGINE SPEED SIG	TM-237
—	P0730	BELT DAMG	TM-239
P0740	P0740	TCC SOLENOID/CIRC	TM-240
P0744	P0744	A/T TCC S/V FNCTN	TM-242
P0745	P0745	L/PRESS SOL/CIRC	TM-244
P0746	P0746	PRS CNT SOL/A FCTN	TM-246
P0776	P0776	PRS CNT SOL/B FCTN	TM-248
P0778	P0778	PRS CNT SOL/B CIRC	TM-250
—	P0826	MANUAL MODE SWITCH	TM-252
P0840	P0840	TR PRS SENS/A CIRC	TM-255
—	P0841	PRESS SEN/FNCTN	TM-258
P0845	P0845	TR PRS SENS/B CIRC	TM-260
—	P0868	SEC/PRESS DOWN	TM-263
—	P1701	TCM-POWER SUPPLY	TM-265
—	P1705	TP SEN/CIRC A/T	TM-267
—	P1722	ESTM VEH SPD SIG	TM-268
—	P1723	CVT SPD SEN/FNCTN	TM-270
—	P1726	ELEC TH CONTROL	TM-272
P1740	P1740	LU-SLCT SOL/CIRC	TM-273
—	P1745	L/PRESS CONTROL	TM-275
P1777	P1777	STEP MOTR CIRC	TM-276
P1778	P1778	STEP MOTR/FNC	TM-278
U1000	U1000	CAN COMM CIRCUIT	TM-222
U1010	U1010	CONTROL UNIT (CAN)	TM-223

*: These numbers are prescribed by ISO 15031-5.

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SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Table

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The diagnostics item numbers show the sequence for inspection. Inspect in order from item 1.

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
1	Shift Shock	Large shock. (“N”→ “D” position)	ON vehicle	1. Engine idle speed	EC-646 (WITH EURO-OBD), EC-990 (WITH-OUT EURO-OBD)
				2. Engine speed signal	TM-237
				3. Accelerator pedal position sensor	TM-267
				4. CVT position	TM-324
				5. CVT fluid temperature sensor	TM-229
				6. CAN communication line	TM-222
				7. CVT fluid level and state	TM-314
				8. Line pressure test	TM-318
				9. Torque converter clutch solenoid valve	TM-240
				10. Lock-up select solenoid valve	TM-273
				11. PNP switch	TM-226
			OFF vehicle	12. Forward clutch	TM-351
				13. Control valve	
2		Large shock. (“N”→ “R” position)	ON vehicle	1. Engine idle speed	EC-646 (WITH EURO-OBD), EC-990 (WITH-OUT EURO-OBD)
				2. Engine speed signal	TM-237
				3. Accelerator pedal position sensor	TM-267
				4. CVT position	TM-324
				5. CVT fluid temperature sensor	TM-229
				6. CAN communication line	TM-222
				7. CVT fluid level and state	TM-314
				8. Line pressure test	TM-318
				9. Torque converter clutch solenoid valve	TM-240
				10. Lock-up select solenoid valve	TM-273
				11. PNP switch	TM-226
			OFF vehicle	12. Reverse brake	TM-351
				13. Control valve	
3		Shock is too large for lock-up.	ON vehicle	1. CVT position	TM-324
				2. Engine speed signal	TM-237
				3. CAN communication line	TM-222
				4. CVT fluid level and state	TM-314
			OFF vehicle	5. Torque converter	TM-359
				6. Control valve	TM-351

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
4	Slips/Will Not Engage	Vehicle cannot be started from “D” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. CVT position	TM-324
				3. CAN communication line	TM-222
				4. Line pressure test	TM-318
				5. Stall test	TM-316
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Oil pump assembly	TM-351
				14. Forward clutch	
				15. Control valve	
				16. Parking components	
5		Vehicle cannot be started from “R” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. CVT position	TM-324
				3. CAN communication line	TM-222
				4. Line pressure test	TM-318
				5. Stall test	TM-316
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Oil pump assembly	TM-351
				14. Reverse brake	
				15. Control valve	
				16. Parking components	

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
6	Slips/Will Not Engage	Does not lock-up.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Engine speed signal	TM-237
				4. Primary speed sensor	TM-231
				5. Torque converter clutch solenoid valve	TM-240
				6. CAN communication line	TM-222
				7. Stall test	TM-316
				8. Step motor	TM-276
				9. PNP switch	TM-226
				10. Lock-up select solenoid valve	TM-273
				11. CVT fluid temperature sensor	TM-229
				12. Secondary speed sensor	TM-234
				13. Secondary pressure sensor	TM-255
			OFF vehicle	14. Torque converter	TM-359
				15. Oil pump assembly	TM-351
				16. Control valve	
7		Does not hold lock-up condition.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Engine speed signal	TM-237
				4. Primary speed sensor	TM-231
				5. Torque converter clutch solenoid valve	TM-240
				6. CAN communication line	TM-222
				7. Stall test	TM-316
				8. Step motor	TM-276
				9. PNP switch	TM-226
				10. Lock-up select solenoid valve	TM-273
				11. CVT fluid temperature sensor	TM-229
				12. Secondary speed sensor	TM-234
				13. Secondary pressure sensor	TM-255
			OFF vehicle	14. Torque converter	TM-359
				15. Oil pump assembly	TM-351
				16. Control valve	

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
8	Slips/Will Not Engage	Lock-up is not released.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Engine speed signal	TM-237
				4. Primary speed sensor	TM-231
				5. Torque converter clutch solenoid valve	TM-240
				6. CAN communication line	TM-222
				7. Stall test	TM-316
			OFF vehicle	8. Torque converter	TM-359
				9. Oil pump assembly	TM-351
				10. Control valve	
9		With selector lever in “D” position, acceleration is extremely poor.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Stall test	TM-316
				4. Accelerator pedal position sensor	TM-267
				5. CAN communication line	TM-222
				6. PNP switch	TM-226
				7. CVT position	TM-324
				8. Step motor	TM-276
				9. Primary speed sensor	TM-231
				10. Secondary speed sensor	TM-234
				11. Accelerator pedal position sensor	TM-267
				12. Primary pressure sensor	TM-260
				13. Secondary pressure sensor	TM-255
				14. CVT fluid temperature sensor	TM-229
				15. Power supply	TM-265
			OFF vehicle	16. Torque converter	TM-359
				17. Oil pump assembly	TM-351
				18. Forward clutch	
				19. Control valve	

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
10	Slips/Will Not Engage	With selector lever in “R” position, acceleration is extremely poor.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Stall test	TM-316
				4. Accelerator pedal position sensor	TM-267
				5. CAN communication line	TM-222
				6. PNP switch	TM-226
				7. CVT position	TM-324
				8. Step motor	TM-276
				9. Primary speed sensor	TM-231
				10. Secondary speed sensor	TM-234
				11. Accelerator pedal position sensor	TM-267
				12. Primary pressure sensor	TM-260
				13. Secondary pressure sensor	TM-255
				14. CVT fluid temperature sensor	TM-229
				15. Power supply	TM-265
			OFF vehicle	16. Torque converter	TM-359
				17. Oil pump assembly	TM-351
				18. Reverse brake	
				19. Control valve	
11		Slips at lock-up.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Engine speed signal	TM-237
				4. Primary speed sensor	TM-231
				5. Torque converter clutch solenoid valve	TM-240
				6. CAN communication line	TM-222
				7. Stall test	TM-316
				8. Step motor	TM-276
				9. PNP switch	TM-226
				10. Lock-up select solenoid valve	TM-273
				11. CVT fluid temperature sensor	TM-229
				12. Secondary speed sensor	TM-234
				13. Secondary pressure sensor	TM-255
			OFF vehicle	14. Torque converter	TM-359
				15. Oil pump assembly	TM-351
				16. Control valve	

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
12	Other	No creep at all.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Accelerator pedal position sensor	TM-267
				4. PNP switch	TM-226
				5. CAN communication line	TM-222
				6. Stall test	TM-316
				7. CVT position	TM-324
				8. Step motor	TM-276
				9. Primary speed sensor	TM-231
				10. Secondary speed sensor	TM-234
				11. Accelerator pedal position sensor	TM-267
				12. CVT fluid temperature sensor	TM-229
				13. Primary pressure sensor	TM-260
				14. Secondary pressure sensor	TM-255
				15. Power supply	TM-265
			OFF vehicle	16. Torque converter	TM-359
				17. Oil pump assembly	TM-351
				18. Gear system	
				19. Forward clutch	
				20. Reverse brake	
				21. Control valve	
13		Vehicle cannot run in all positions.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. PNP switch	TM-226
				4. Stall test	TM-316
				5. CVT position	TM-324
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Torque converter	TM-359
				14. Oil pump assembly	TM-351
				15. Gear system	
				16. Forward clutch	
				17. Reverse brake	
				18. Control valve	
				19. Parking components	

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
14	Other	With selector lever in “D” position, driving is not possible.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. PNP switch	TM-226
				4. Stall test	TM-316
				5. CVT position	TM-324
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Torque converter	TM-359
				14. Oil pump assembly	TM-351
				15. Gear system	
				16. Forward clutch	
				17. Control valve	
				18. Parking components	
15		With selector lever in “R” position, driving is not possible.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. PNP switch	TM-226
				4. Stall test	TM-316
				5. CVT position	TM-324
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Accelerator pedal position sensor	TM-267
				10. CVT fluid temperature sensor	TM-229
				11. Secondary pressure sensor	TM-255
				12. Power supply	TM-265
			OFF vehicle	13. Torque converter	TM-359
				14. Oil pump assembly	TM-351
				15. Gear system	
				16. Reverse brake	
				17. Control valve	
				18. Parking components	

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
16	Other	Judder occurs during lock-up.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. Primary speed sensor	TM-231
				4. Secondary speed sensor	TM-234
				5. Accelerator pedal position sensor	TM-267
				6. CAN communication line	TM-222
				7. Torque converter clutch solenoid valve	TM-240
			OFF vehicle	8. Torque converter	TM-359
				9. Control valve	TM-351
17		Strange noise in “D” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. CAN communication line	TM-222
			OFF vehicle	4. Torque converter	TM-359
				5. Oil pump assembly	TM-351
				6. Gear system	
				7. Forward clutch	
				8. Control valve	
				9. Bearing	
18		Strange noise in “R” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. CAN communication line	TM-222
			OFF vehicle	4. Torque converter	TM-359
				5. Oil pump assembly	TM-351
				6. Gear system	
				7. Reverse brake	
				8. Control valve	
19		Strange noise in “N” position.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. CAN communication line	TM-222
			OFF vehicle	4. Torque converter	TM-359
				5. Oil pump assembly	TM-351
				6. Gear system	
				7. Control valve	

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
20	Other	Vehicle does not decelerate by engine brake.	ON vehicle	1. CVT fluid level and state	TM-314
				2. CVT position	TM-324
				3. CAN communication line	TM-222
				4. Step motor	TM-276
				5. Primary speed sensor	TM-231
				6. Secondary speed sensor	TM-234
				7. Line pressure test	TM-318
				8. Engine speed signal	TM-237
				9. Accelerator pedal position sensor	TM-267
			OFF vehicle	10. Control valve	TM-351
21		Maximum speed low.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Line pressure test	TM-318
				3. Accelerator pedal position sensor	TM-267
				4. CAN communication line	TM-222
				5. Stall test	TM-316
				6. Step motor	TM-276
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Primary pressure sensor	TM-260
				10. Secondary pressure sensor	TM-255
				11. CVT fluid temperature sensor	TM-229
			OFF vehicle	12. Torque converter	TM-359
				13. Oil pump assembly	TM-351
				14. Gear system	
				15. Forward clutch	
				16. Control valve	
22		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. PNP switch	TM-226
				2. CVT position	TM-324
			OFF vehicle	3. Parking components	TM-351
23		Vehicle runs with CVT in “P” position.	ON vehicle	1. PNP switch	TM-226
				2. CVT fluid level and state	TM-314
				3. CVT position	TM-324
			OFF vehicle	4. Parking components	TM-351
				5. Gear system	
				6. Control valve	

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
24	Other	Vehicle runs with CVT in “N” position.	ON vehicle	1. PNP switch	TM-226
				2. CVT fluid level and state	TM-314
				3. CVT position	TM-324
			OFF vehicle	4. Gear system	TM-351
				5. Forward clutch	
				6. Reverse brake	
				7. Control valve	
25		Engine stall.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. Primary speed sensor	TM-231
				4. Torque converter clutch solenoid valve	TM-240
				5. CAN communication line	TM-222
				6. Stall test	TM-316
				7. Secondary pressure sensor	TM-255
			OFF vehicle	8. Torque converter	TM-359
				9. Control valve	TM-351
26		Engine stalls when selector lever shifted “N”→“D”or “R”.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Engine speed signal	TM-237
				3. Primary speed sensor	TM-231
				4. Torque converter clutch solenoid valve	TM-240
				5. CAN communication line	TM-222
				6. Stall test	TM-316
			OFF vehicle	7. Torque converter	TM-359
				8. Control valve	TM-351
27		Engine speed does not return to idle.	ON vehicle	1. CVT fluid level and state	TM-314
				2. Accelerator pedal position sensor	TM-267
				3. Secondary speed sensor	TM-234
				4. CAN communication line	TM-222
			OFF vehicle	5. Control valve	TM-351
28		CVT does not shift	ON vehicle	1. CVT fluid level and state	TM-314
				2. CVT position	TM-324
				3. Line pressure test	TM-318
				4. Engine speed signal	TM-237
				5. Accelerator pedal position sensor	TM-267
				6. CAN communication line	TM-222
				7. Primary speed sensor	TM-231
				8. Secondary speed sensor	TM-234
				9. Step motor	TM-276
			OFF vehicle	10. Control valve	TM-351
				11. Oil pump assembly	

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No.	Item	Symptom	Condition	Diagnostic Item	Reference page
29	Other	Engine does not start in “N” or “P” position.	ON vehicle	1. Ignition switch and starter	PG-47,STC-4
				2. CVT position	TM-324
				3. PNP switch	TM-226
30		Engine starts in positions other than “N” or “P”.	ON vehicle	1. Ignition switch and starter	PG-47,STC-4
				2. CVT position	TM-324
				3. PNP switch	TM-226
31		When brake pedal is depressed with ignition switch ON, selector lever cannot be shifted from “P” position to other position.	ON vehicle	1. Stop lamp switch	TM-280
				2. Shift lock solenoid	
				2. Control device	
32		When brake pedal is not depressed with ignition switch ON, selector lever can be shifted from “P” position to other position.	ON vehicle	1. Stop lamp switch	TM-280
				2. Shift lock solenoid	
				2. Control device	

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PRECAUTION

PRECAUTIONS

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

INFOID:0000000000914688

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

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001102435

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

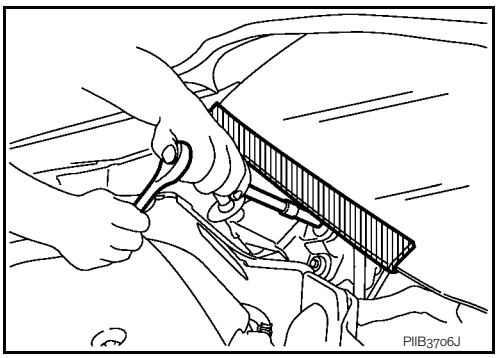
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000000914689

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



Precaution for On Board Diagnosis (OBD) System of CVT and Engine

INFOID:0000000000914691

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

CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the battery cable from the negative terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI 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 MI to light up due to a short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to a malfunction of the EVAP 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 for TCM and CVT Assembly Replacement

INFOID:0000000000914692

CAUTION:

- **Check if new data (Unit ID) are entered correctly after replacing CVT assembly and erasing data in TCM. (Connect CONSULT-III, and then turn ignition switch OFF.)**
- **When replacing CVT assembly or TCM, refer to the pattern table below and erase the EEPROM in the TCM if necessary.**

EEPROM ERASING PATTERNS

CVT assembly	TCM	Erasing EEPROM in TCM	Remarks
Replaced	Replaced	Not required	Not required because the EEPROM in the TCM is in the default state. (CVT assembly must be replaced first.)
Not replaced	Replaced	Not required	Not required because the EEPROM in the TCM is in the default state.
Replaced	Not replaced	Required	Required because data has been written in the EEPROM in the TCM and because the TCM cannot write data from the ROM assembly in the transmission.

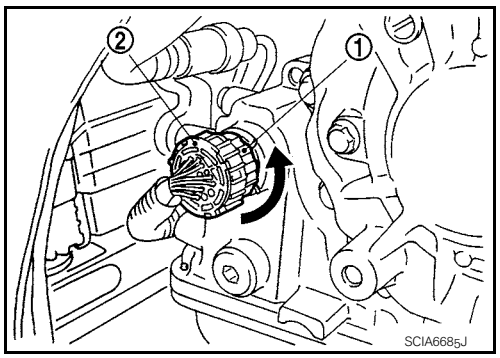
Removal and Installation Procedure for CVT Unit Connector

INFOID:0000000000914693

REMOVAL

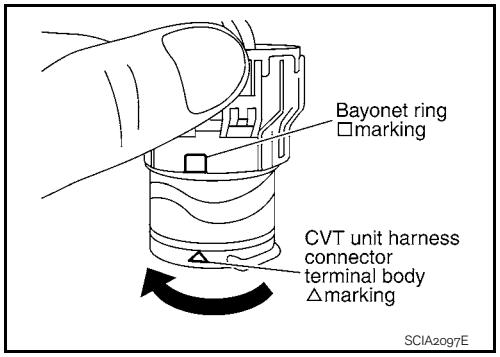
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Rotate bayonet ring (1) counterclockwise, pull out CVT unit harness connector (2) upward and remove it.

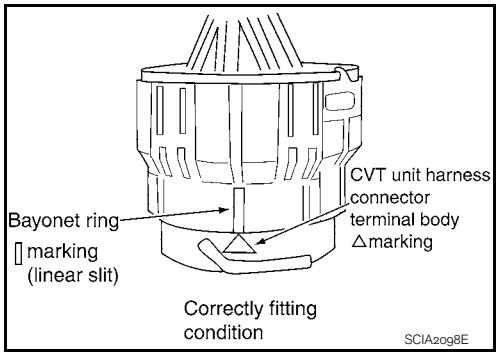


INSTALLATION

1. Align Δ marking on CVT unit harness connector terminal body with o marking on bayonet ring, insert CVT unit harness connector, and then rotate bayonet ring clockwise.

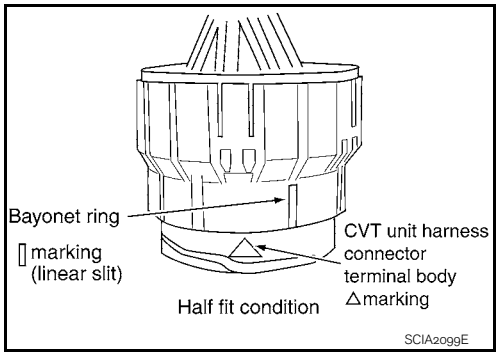


2. Rotate bayonet ring clockwise until Δ marking on CVT unit harness connector terminal body is aligned with the slit on bayonet ring as shown in the figure (correctly fitting condition), install CVT unit harness connector to CVT unit harness connector terminal body.



CAUTION:

- **Securely align Δ marking on CVT unit harness connector terminal body with bayonet ring slit. Then, be careful not to make a half fit condition as shown in the figure.**
- **Never mistake the slit of bayonet ring for other dent portion.**



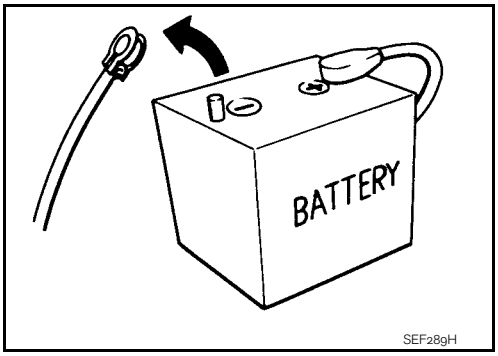
Precaution

INFOID:0000000000914694

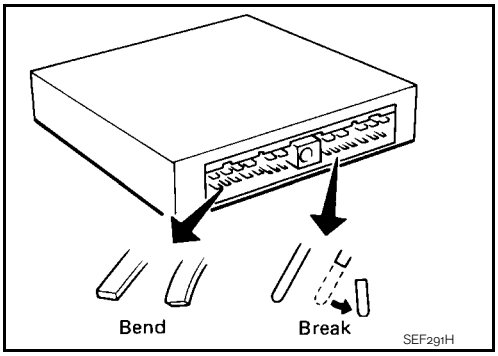
NOTE:
If any malfunction occurs in the RE0F10A model transaxle, replace the entire transaxle assembly.

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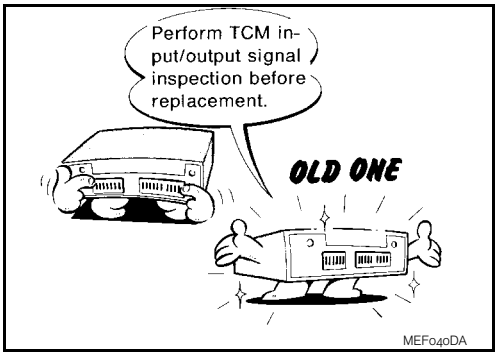
- **Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect negative battery cable. Because battery voltage is applied to TCM even if ignition switch is turned OFF.**



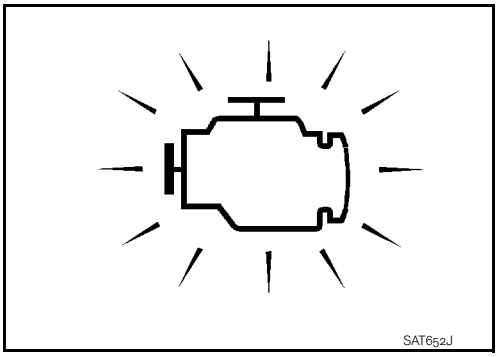
- **When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).**
  When connecting pin connectors make sure that there are not any bends or breaks on TCM pin terminal.



- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. TM-285, "Reference Value"**.



- **After performing each TROUBLE DIAGNOSIS, perform “DTC Confirmation Procedure”.**
  If the repair is completed the DTC should not be displayed in the “DTC Confirmation Procedure”.
- Always use the specified brand of CVT fluid. Refer to PG-47, "Wiring Diagram - IGNITION POWER SUPPLY -".
- Use lint-free paper, not cloth rags, during work.
- After replacing the CVT fluid, dispose of the waste oil using the methods prescribed by law, ordinance, etc.



Service Notice or Precaution

INFOID:0000000000914695

OBD SELF-DIAGNOSIS

- CVT self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the malfunction indicator (MI). Refer to the table on TM-216, "CONSULT-III Function (TRANSMISSION)" for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MI are automatically stored in both the ECM and TCM memories. **Always perform the procedure on TM-214, "Diagnosis Description" to complete the repair and avoid unnecessary blinking of the MI.**

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For details of OBD, refer to EC-706, "Diagnosis Description" (WITH EURO-OBD), EC-1050, "Diagnosis Description" (WITHOUT EURO-OBD).

- **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-105.**

ATFTEMP COUNT Conversion Table

INFOID:0000000001095943

ATFTEMP COUNT	Temperature °C (°F)	ATFTEMP COUNT	Temperature °C (°F)
4	–30 (–22)	177	90 (194)
8	–20 (–4)	183	95 (203)
13	–10 (14)	190	100 (212)
17	–5 (23)	196	105 (221)
21	0 (32)	201	110 (230)
27	5 (41)	206	115 (239)
32	10 (50)	210	120 (248)
39	15 (59)	214	125 (257)
47	20 (68)	218	130 (266)
55	25 (77)	221	135 (275)
64	30 (86)	224	140 (284)
73	35 (95)	227	145 (293)
83	40 (104)	229	150 (302)
93	45 (113)	231	155 (311)
104	50 (122)	233	160 (320)
114	55 (131)	235	165 (329)
124	60 (140)	236	170 (338)
134	65 (149)	238	175 (347)
143	70 (158)	239	180 (356)
152	75 (167)	241	190 (374)
161	80 (176)	243	200 (392)
169	85 (185)	—	—

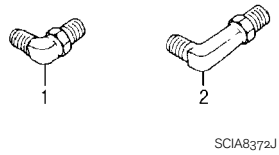
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PREPARATION

PREPARATION

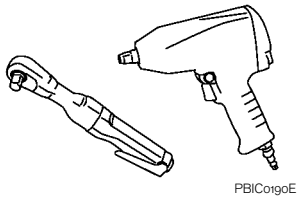
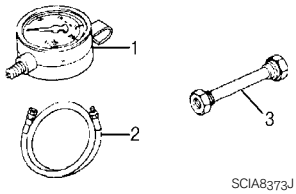
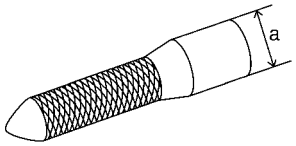
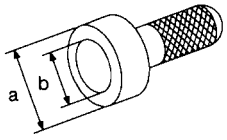
Special Service Tool

INFOID:0000000001136882

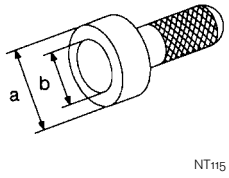
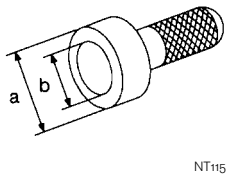
Tool number Tool name	Description
1. ST25054000 Adapter 2. ST25055000 Adapter  SCIA8372J	Measuring line pressure

Commercial Service Tool

INFOID:0000000000914697

Tool number Tool name	Description
Power tool  PBIC0190E	Loosening nuts and bolts
Oil pressure gauge set 1. Oil pressure gauge 2. Hose 3. Joint pipe  SCIA8373J	Measuring line pressure
31197CA000 Drive plate location guide a: Ø 14 mm (0.55 in)  SCIA2013E	Installing transaxle assembly
Drift a: 54 mm (2.13 in) dia. b: 47 mm (1.85 in) dia.  NT115	Installing differential side oil seal

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Tool number Tool name		Description
Drift a: 70 mm (2.76 in) dia. b: 56 mm (2.20 in) dia.	 NT115	Installing side oil seal (transfer joint)
Drift a: 65 mm (2.56 in) dia. b: 60 mm (2.36 in) dia.	 NT115	Installing converter housing oil seal

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ON-VEHICLE MAINTENANCE

CVT FLUID

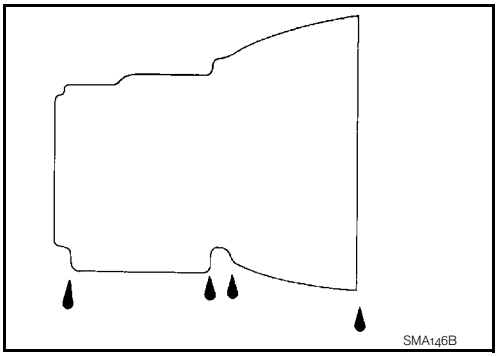
Inspection

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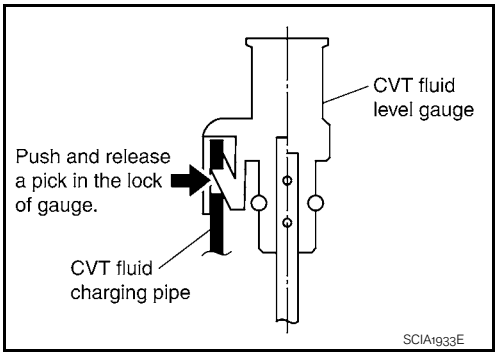
CHECKING CVT FLUID

Fluid level should be checked with the fluid warmed up to 50 to 80°C (122 to 176°F). The fluid level check procedure is as follows:

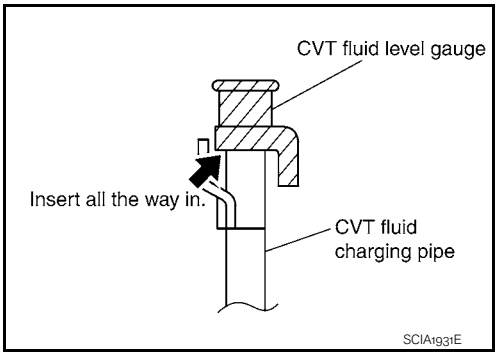
1. Check for fluid leakage.
2. With the engine warmed up, drive the vehicle in an urban area. When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50 to 80°C (122 to 176°F).
3. Park the vehicle on a level surface.
4. Apply parking brake firmly.
5. With engine at idle, while depressing brake pedal, move shift selector throughout the entire shift range.



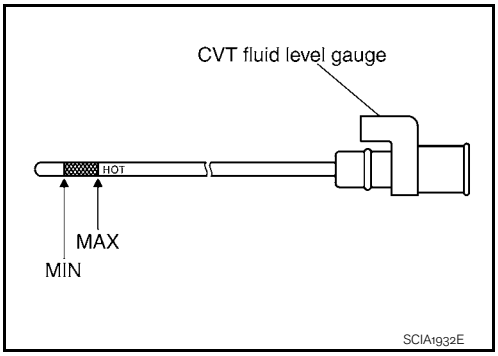
6. Pull out the CVT fluid level gauge from the CVT fluid charging pipe after pressing the tab on the CVT fluid level gauge to release the lock.



7. Wipe fluid off the CVT fluid level gauge. Insert the CVT fluid level gauge rotating 180° from the originally installed position, then securely push the CVT fluid level gauge until it meets the top end of the CVT fluid charging pipe.
   CAUTION:
   When wiping away the CVT fluid level gauge, always use lint-free paper, not a cloth rag.



8. Place the selector lever in “P” or “N” and make sure the fluid level is within the specified range.
   CAUTION:
   When reinstalling CVT fluid level gauge, insert it into the CVT fluid charging pipe and rotate it to the original installation position until securely locked.

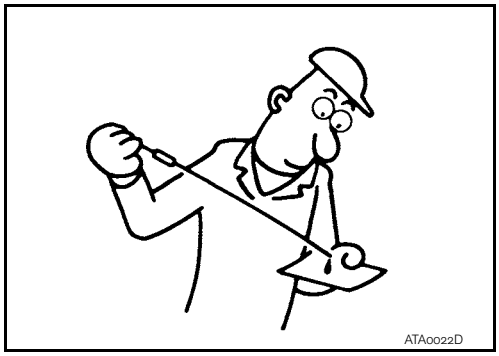


CVT FLUID CONDITION

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Check CVT fluid condition.

- If CVT fluid is very dark or smells burned, check operation of CVT. Flush cooling system after repair of CVT.
- If CVT fluid contains frictional material (clutches, brakes, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of CVT. Refer to CO-34, "Exploded View".



Fluid status	Conceivable cause	Required operation
Varnished (viscous varnish state)	CVT fluid become degraded due to high temperatures.	Replace the CVT fluid and check the CVT main unit and the vehicle for malfunctions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the CVT fluid and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within CVT	Replace the CVT fluid and check for improper operation of the CVT.

Changing

INFOID:0000000000988984

1. Remove drain plug, and then drain CVT fluid from oil pan.
2. Install drain plug to oil pan.
   CAUTION:
   Never reuse drain plug gasket.

   Drain plug – tightening torque : Refer to TM-335, "Exploded View".
3. Fill CVT fluid from CVT fluid charging pipe to the specified level.
4. With the engine warmed up, drive the vehicle in an urban area. When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50 to 80°C (122 to 176°F).
5. Check CVT fluid level and condition.
6. Repeat steps 1 to 5 if CVT fluid has been contaminated.

CVT fluid : Refer to TM-361, "General Specification".

Fluid capacity : Refer to TM-361, "General Specification".

CAUTION:

- **Use only Genuine NISSAN CVT Fluid NS-2. Never mix with other fluid.**
- **Using CVT fluid other than Genuine NISSAN CVT Fluid NS-2 will deteriorate in driveability and CVT durability, and may damage the CVT, which is not covered by the warranty.**
- **When filling CVT fluid, take care not to scatter heat generating parts such as exhaust.**
- **Sufficiently shake the container of CVT fluid before using.**
- **Delete CVT fluid deterioration date with CONSULT-III after changing CVT fluid.**

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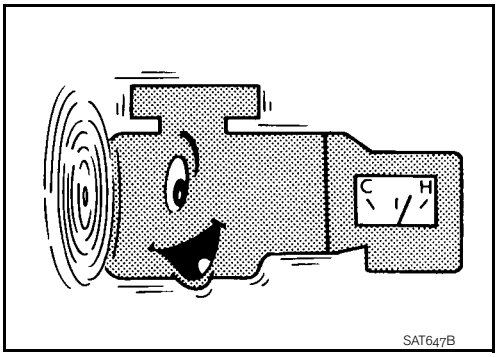
STALL TEST

Inspection and Judgment

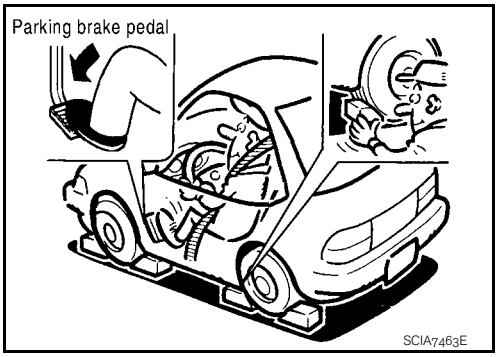
INFOID:0000000000914702

INSPECTION

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

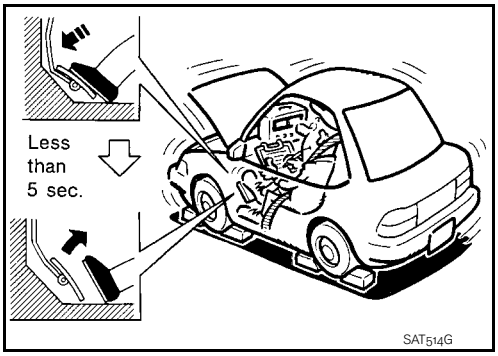


3. Securely engage the parking brake so that the tires do not turn.
4. Install a tachometer where it can be seen by driver during test.
   NOTE:
   It is good practice to mark the point of specified engine rpm on indicator.
5. Start engine, apply foot brake, and place selector lever in “D” position.



6. While holding down the foot brake, gradually press down the accelerator pedal.
7. Quickly read off the stall speed, and then quickly remove your foot from the accelerator pedal.
   CAUTION:
   Never hold down the accelerator pedal for more than 5 seconds during this test.

   Stall speed: **Refer to TM-361, "Stall Speed".**



8. Move the selector lever to the “N” position.
9. Cool down the CVT fluid.
   CAUTION:
   Run the engine at idle for at least 1 minute.
10. Repeat steps 6 through 9 with selector lever in “R” position.

JUDGMENT

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	Selector lever position		Expected problem location
	“D”	“R”	
Stall rotation	H	O	• Forward clutch
	O	H	• Reverse brake
	L	L	• Engine and torque converter one-way clutch
	H	H	• Line pressure low • Primary pulley • Secondary pulley • Steel belt

O: Stall speed within standard value position.

H: Stall speed is higher than standard value.

L: Stall speed is lower than standard value.

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LINE PRESSURE TEST

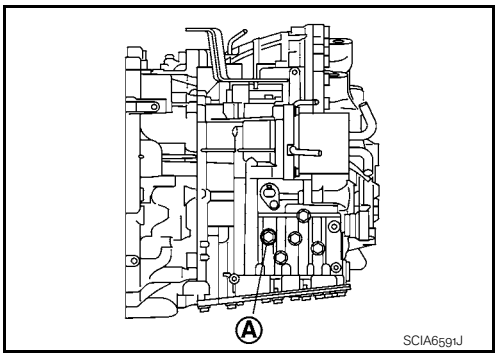
Inspection and Judgment

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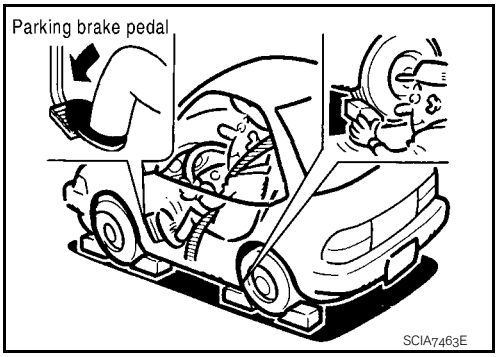
INSPECTION

Line Pressure Test Procedure

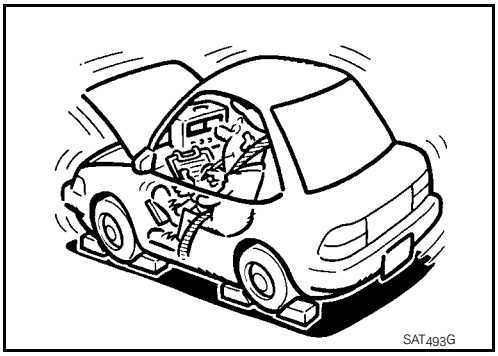
1. Inspect the amount of engine oil and replenish if necessary.
2. Drive the car for about 10 minutes to warm it up so that the CVT fluid reaches in the range of 50 to 80°C (122 to 176°F), then inspect the amount of CVT fluid and replenish if necessary.
   NOTE:
   The CVT fluid temperature rises in the range of 50 to 80°C (122 to 176°F) during 10 minutes of driving.
3. After warming up CVT, remove the oil pressure detection plug (A) and install the oil pressure gauge (commercial service tool).
   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, and 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 TM-316, "Inspection and Judgment".**
6. After the measurements are complete, install the oil pressure detection plug and tighten to the specified torque below.



: 7.5 N·m (0.77 kg-m, 66 in-lb)

CAUTION:
- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

Line Pressure

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kPa (bar, kg/cm^2, psi)

Engine speed	Line pressure
	"R" or "D" positions
At idle	750 (7.50, 7.65, 108.8)
At stall	5,700 (57.00, 58.14, 826.5)*

*: Reference values

JUDGMENT

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 • CVT fluid temperature sensor malfunction • Pressure control solenoid A (line pressure solenoid) malfunction (sticking in OFF state, filter clog, cut line) • Pressure regulator valve or plug sticking
Stall speed	Line pressure does not rise higher than the line pressure for idle.	Possible causes include a sensor malfunction or malfunction in the pressure adjustment function. For example • Accelerator pedal position signal malfunction • TCM malfunction • Pressure control solenoid A (line pressure solenoid) malfunction (shorting, sticking in ON state) • Pressure regulator valve or plug sticking
	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 • Pressure control solenoid A (line pressure solenoid) malfunction (sticking, filter clog) • Pressure regulator valve or plug sticking
	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.

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ROAD TEST

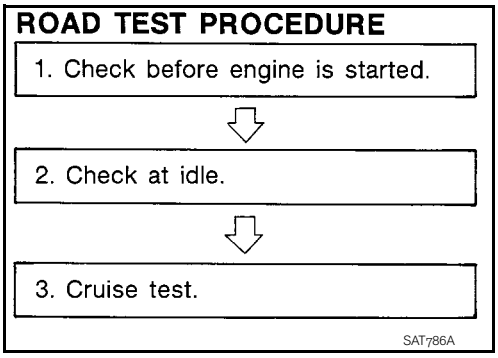
Description

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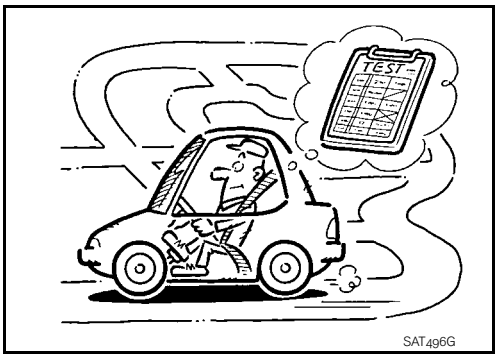
DESCRIPTION

- The purpose of the test is to determine overall performance of CVT and analyze causes of problems.
- The road test consists of the following three parts:

1. "Check Before Engine Is Started" TM-320.
2. "Check at Idle" TM-321.
3. "Cruise Test" TM-322.



- Before road test, familiarize yourself with all test procedures and items to check.
- Perform tests on all items until specified symptom is found. Troubleshoot items the malfunctioning items after road test.



CONSULT-III SETTING PROCEDURE

- Using CONSULT-III, perform a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule.

1. Touch "DATA MONITOR" on "SELECT DIAG MODE" screen.
2. Touch "MAIN SIGNALS" to set recording condition.
3. See "Numerical Display", "Barchart Display" or "Line Graph Display".
4. Touch "START".
5. When performing cruise test. Refer to TM-322, "Cruise Test".
6. After finishing cruise test part, touch "RECORD".
7. Touch "STORE".
8. Touch "BACK".
9. Touch "DISPLAY".
10. Touch "PRINT".
11. Check the monitor data printed out.

Check before Engine Is Started

INFOID:0000000000988986

1.CHECK CVT INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to "P" position.
3. Turn ignition switch OFF. Wait at least 5 seconds.
4. Turn ignition switch ON. (Do not start engine.)

Is shift position indicator activated for about 2 seconds?

YES >> 1. Turn ignition switch OFF.
2. Perform self-diagnosis and note NG items.
Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".
3. Go to TM-321, "Check at Idle".

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NO >> Stop “Road Test”. Refer to TM-295, "Symptom Table".

Check at Idle

INFOID:0000000000988987

1. CHECK STARTING THE ENGINE

1. Park vehicle on flat surface.
2. Move selector lever to “P” or “N” position.
3. Turn ignition switch OFF.
4. Turn ignition switch to “START” position.

Is engine started?

YES >> GO TO 2.
NO >> Stop “Road Test”. Refer to TM-295, "Symptom Table".

2. CHECK STARTING THE ENGINE

1. Turn ignition switch ON.
2. Move selector lever to “D”, “M” or “R” position.
3. Turn ignition switch to “START” position.

Is engine started?

YES >> Stop “Road Test”. Refer to TM-295, "Symptom Table".
NO >> GO TO 3.

3. CHECK “P” POSITION FUNCTION

1. Move selector lever to “P” position.
2. Turn ignition switch OFF.
3. Release parking brake.
4. Push vehicle forward or backward.
5. Apply parking brake.

Does vehicle move forward or backward?

YES >> Refer to TM-295, "Symptom Table". Continue “Road Test”.
NO >> GO TO 4.

4. CHECK “N” POSITION FUNCTION

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

Does vehicle move forward or backward?

YES >> Refer to TM-295, "Symptom Table". Continue “Road Test”.
NO >> GO TO 5.

5. CHECK SHIFT SHOCK

1. Apply foot brake.
2. Move selector lever to “R” position.

Is there large shock when changing from “N” to “R” position?

YES >> Refer to TM-295, "Symptom Table". Continue “Road Test”.
NO >> GO TO 6.

6. CHECK “R” POSITION FUNCTION

Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

YES >> GO TO 7.
NO >> Refer toTM-295, "Symptom Table". Continue “Road Test”.

7. CHECK “D” POSITION FUNCTION

Move selector lever to “D” position and check if vehicle creeps forward.

Does vehicle creep forward in all positions?

YES >> Go to TM-322, "Cruise Test".
NO >> Stop “Road Test”. Refer to TM-295, "Symptom Table".

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Cruise Test

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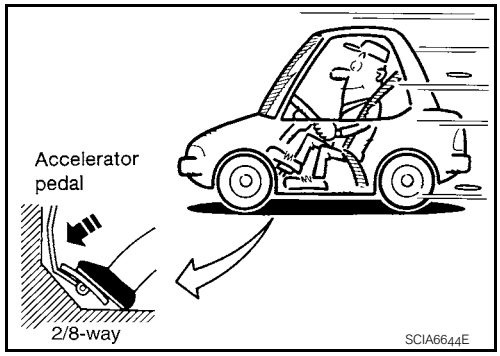
1.CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 1

1. Drive vehicle for approximately 10 minutes to warm engine oil and CVT fluid up to operating temperature.

CVT fluid operating temperature: 50 – 80°C (122 – 176°F)

2. Park vehicle on flat surface.
3. Move selector lever to “P” position.
4. Start engine.
5. Move selector lever to “D” position.
6. Accelerate vehicle to 2/8-way throttle depressing accelerator pedal constantly.

Read vehicle speed and engine speed. Refer to TM-361, "Vehicle Speed When Shifting Gears".



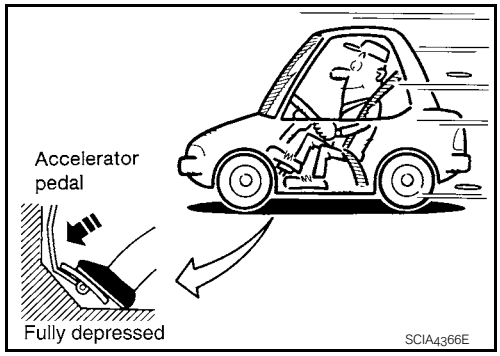
OK or NG

OK >> GO TO 2.
NG >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

2.CHECK VEHICLE SPEED WHEN SHIFTING GEARS — PART 2

1. Park vehicle on flat surface.
2. Move selector lever to “D” position.
3. Accelerate vehicle to full depression depressing accelerator pedal constantly.

Read vehicle speed and engine speed.Refer to TM-361, "Vehicle Speed When Shifting Gears".



OK or NG

OK >> GO TO 3.
NG >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

3.CHECK MANUAL MODE FUNCTION

Move to manual mode from “D” position.

Does it switch to manual mode?

YES >> GO TO 4.
NO >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

4.CHECK SHIFT-UP FUNCTION

During manual mode driving, is upshift from M1 → M2 → M3 → M4 → M5 → M6 performed?

Read the gear position. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is upshifting correctly performed?

YES >> GO TO 5.
NO >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

5.CHECK SHIFT-DOWN FUNCTION

During manual mode driving, is downshift from M6 → M5 → M4 → M3 → M2 → M1 performed?

Read the gear position. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

Is downshifting correctly performed?

YES >> GO TO 6.
NO >> Refer to TM-295, "Symptom Table". Continue “Road Test”.

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6.CHECK ENGINE BRAKE FUNCTION

Check engine brake.

Does engine braking effectively reduce speed in M1 position?

YES >> 1. Stop the vehicle.
2. Perform self-diagnosis. Refer to TM-216, "CONSULT-III Function (TRANSMISSION)".

NO >> Refer to TM-295, "Symptom Table". Then continue trouble diagnosis.

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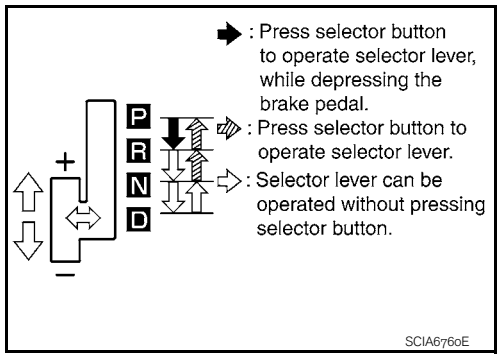
CVT POSITION

Inspection and Adjustment

INFOID:0000000000914708

INSPECTION

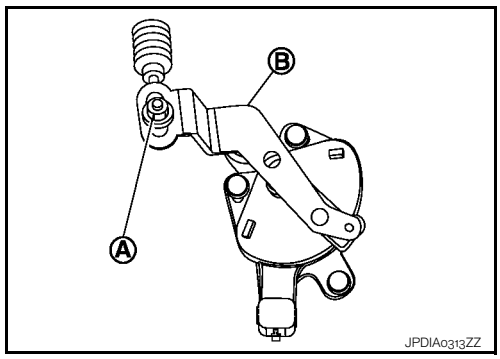
1. Place selector lever in “P” position, and turn ignition switch ON (engine stop).
2. Make sure that selector lever can be shifted to other than “P” position when brake pedal is depressed. Also make sure that selector lever can be shifted from “P” position only when brake pedal is depressed.
3. Move the selector lever and check for excessive effort, sticking, noise or rattle.
4. Confirm the selector lever stops at each position with the feel of engagement when it is moved through all the positions. Check that the actual position of the selector lever matches the position shown by the shift position indicator and the manual lever on the transaxle.
5. The method of operating the selector lever to individual positions correctly should be as shown.
6. When selector button is pressed in “P”, “R”, or “N” position without applying forward/backward force to selector lever, check button operation for sticking.
7. Confirm the back-up lamps illuminate only when selector lever is placed in the “R” position. Confirm the back-up lamps do not illuminate when the selector lever is pushed toward the “R” position when in the “P” or “N” position.
8. Confirm the engine can only be started with the selector lever in the “P” and “N” positions.



9. Make sure transaxle is locked completely in “P” position.
10. When selector lever is set to manual shift gate, make sure that manual mode is displayed on combination meter.
    Shift selector lever to “+” and “–” sides, and check that set shift position changes.

ADJUSTMENT

1. Place selector lever in “ P” position.
   CAUTION:
   Turn wheels more than 1/4 rotations and apply the park lock.
2. Loosen nut (A) and place manual lever (B) in “P” position.
   CAUTION:
   Never apply any force to the manual lever.
3. Tighten nut. Refer to TM-330, "Exploded View".
   CAUTION:
   Fix the manual lever when tightening.



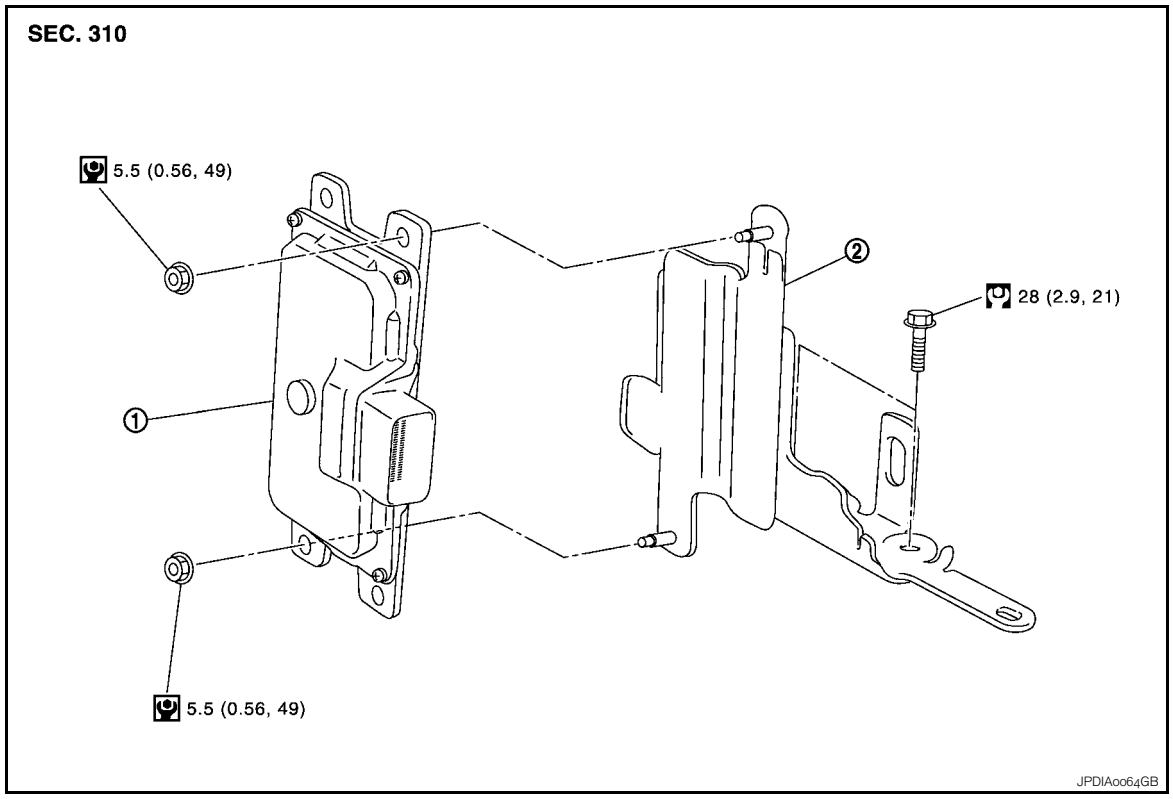
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ON-VEHICLE REPAIR

TRANSMISSION CONTROL MODULE

Exploded View

INFOID:0000000000914709



1. TCM
2. Bracket

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

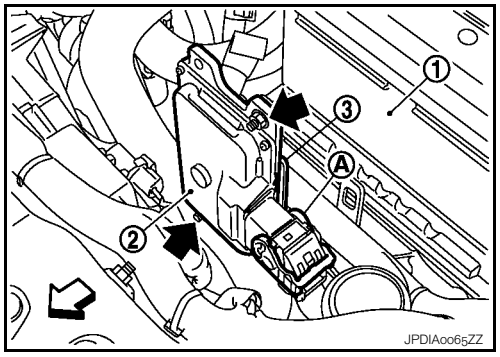
Removal and Installation

INFOID:0000000000914710

REMOVAL

1. Disconnect the battery cable from negative terminal.
2. Remove the Air duct (inlet). Refer to EM-144, "Exploded View".
3. Disconnect the TCM harness connector (A).

⇦ : Vehicle front
⬅ : Nut
1 : Battery



4. Remove the TCM (2) from the bracket (3).

INSTALLATION

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

CAUTION:

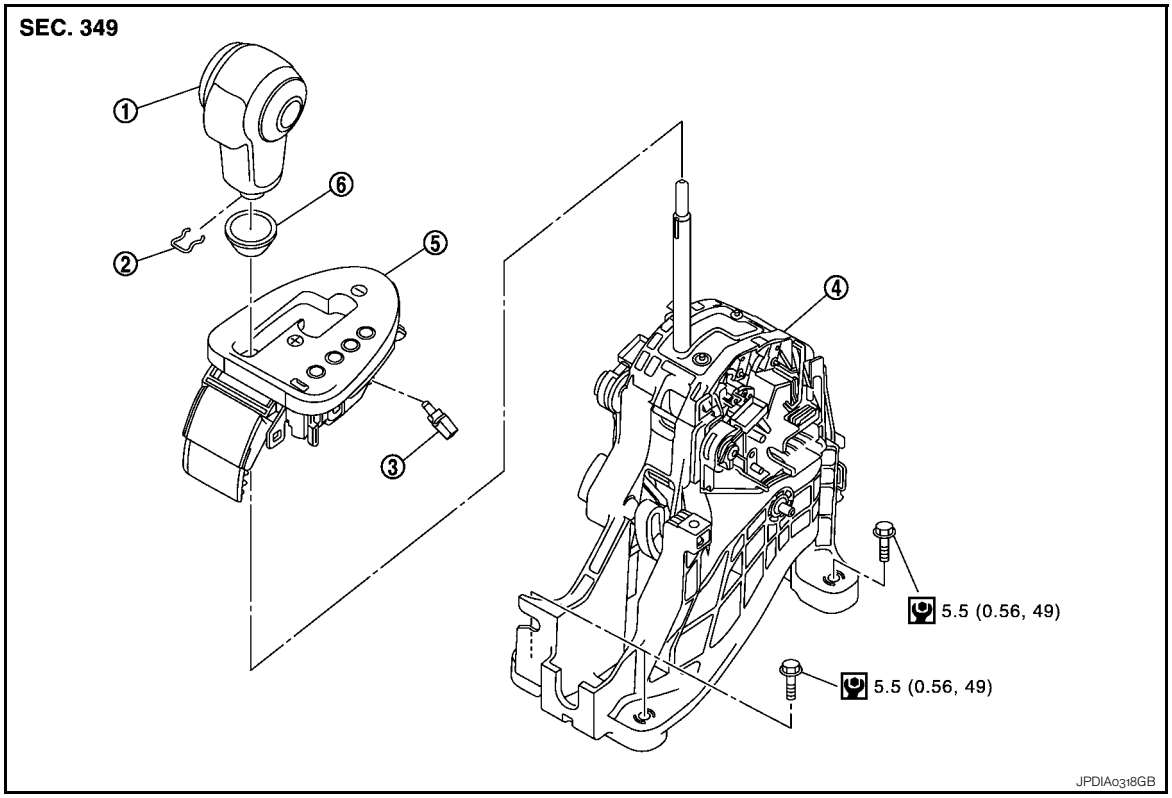
After TCM is replaced, refer to TM-189, "ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Service After Replacing TCM and Transaxle Assembly".

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CONTROL DEVICE

Exploded View

INFOID:0000000000914711



1. Selector lever knob
2. Lock pin
3. Position lamp
4. Control device assembly
5. Position indicator plate
6. Knob cover

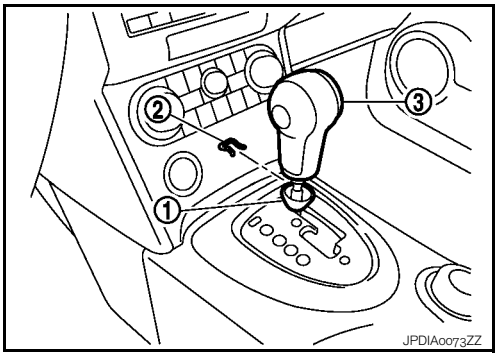
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000000914712

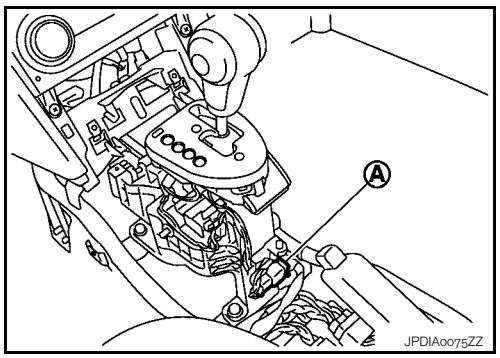
REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Move selector lever to “N” position.
3. Remove knob cover (1) below selector lever downward.
   CAUTION:
   Be careful not to damage the knob cover.
4. Pull lock pin (2) out of selector lever knob (3).
5. Remove selector lever knob and knob cover.
6. Remove center console. Refer to IP-18, "Exploded View".

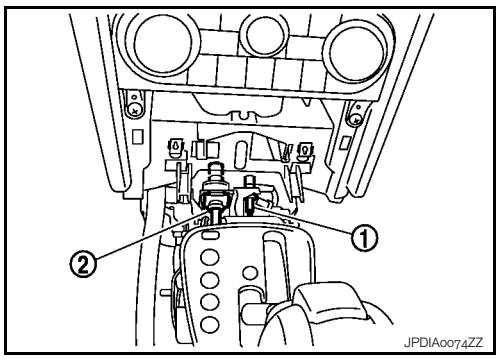


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7. Disconnect CVT device harness connector (A).



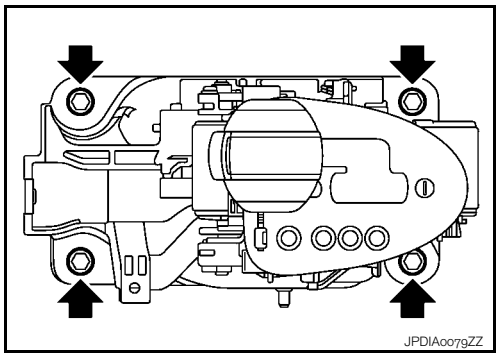
8. Move selector lever to “P” position.
9. Disconnect key interlock cable (1) from control device assembly.
10. Disconnect control cable (2) from control device assembly. Refer to TM-330, "Exploded View".



11. Remove control device assembly.

⬅ : Bolt

12. Remove position lamp.

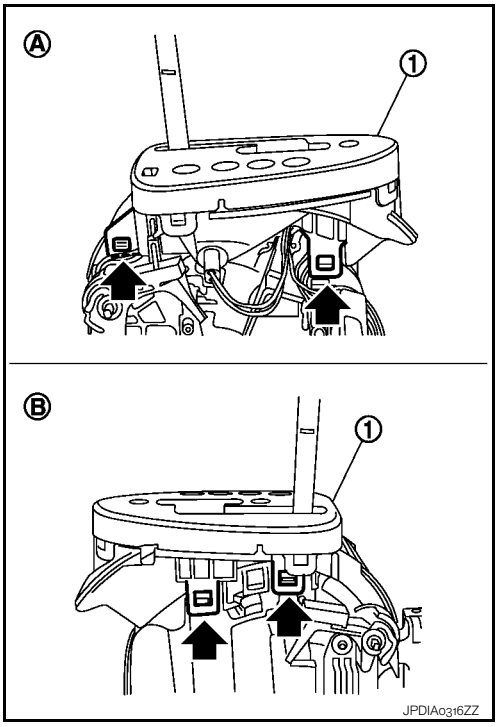


13. Unhook (⬅) position indicator plate (1) for removal.

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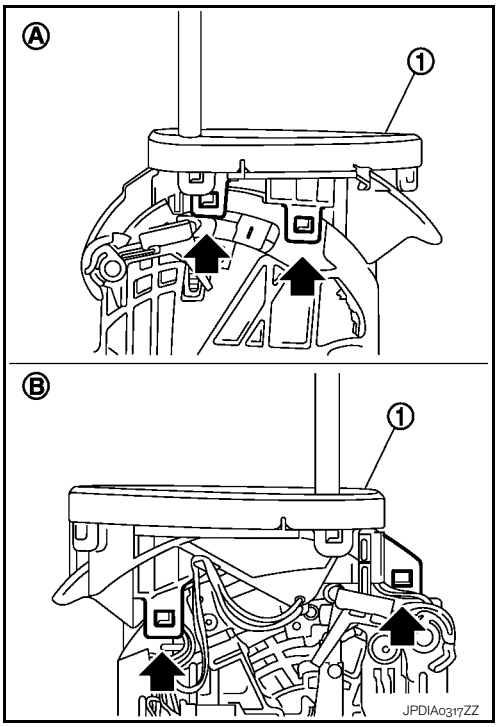
- LHD

A : Driver side
B : Passenger side



- RHD

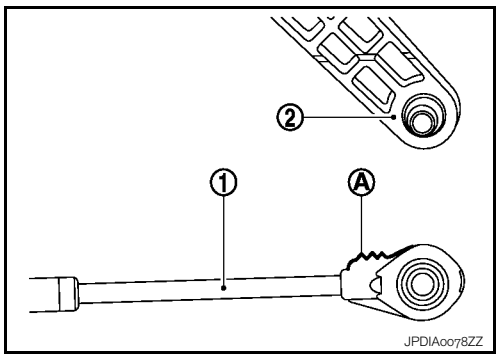
A : Passenger side
B : Driver side



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

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- When installing the control cable (1) to the control device assembly (2), make sure that the control cable is fully pressed in with the ribbed (A) surface facing upward.



Inspection and Adjustment

INFOID:0000000000914713

ADJUSTMENT AFTER INSTALLATION

Adjust the CVT positions after installing the control device. Refer to TM-324, "Inspection and Adjustment".

INSPECTION AFTER INSTALLATION

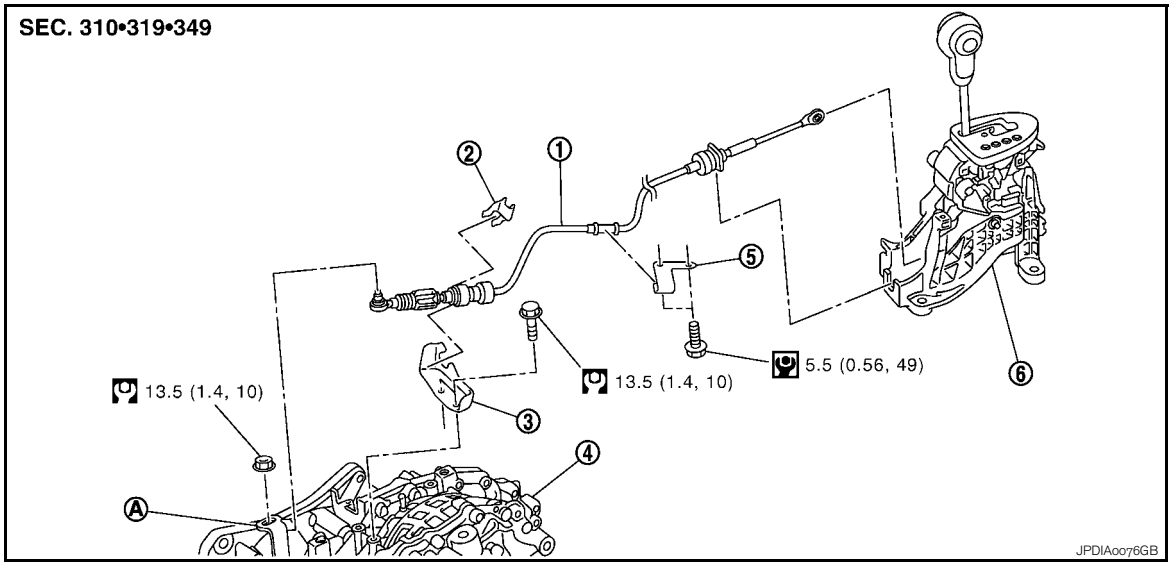
Check the CVT positions after adjusting the CVT positions. Refer to TM-324, "Inspection and Adjustment".

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CONTROL CABLE

Exploded View

INFOID:0000000000914714



1. Control cable
2. Lock plate
3. Bracket
4. Transaxle assembly
5. Bracket
6. Control device assembly

A. Manual lever

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

Removal and Installation

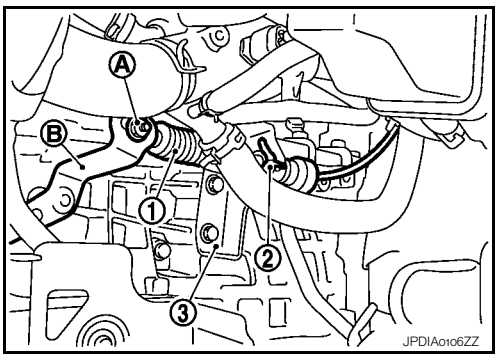
INFOID:0000000000914715

REMOVAL

CAUTION:

Make sure that parking brake is applied before removal/installation.

1. Disconnect control cable from control device assembly. Refer to TM-326, "Exploded View".
2. Move selector lever to “P” position.
3. Remove the air cleaner assembly. Refer to EM-144, "Exploded View".
4. Remove nut (A) and control cable (1) from the manual lever (B).
5. Remove the lock plate (2) and the control cable from the bracket (3).
6. Remove exhaust front tube. Refer to EX-10, "Exploded View".
7. Separate the propeller shaft. Refer to DLN-110, "Exploded View" (4WD only).
8. Remove heat plate.

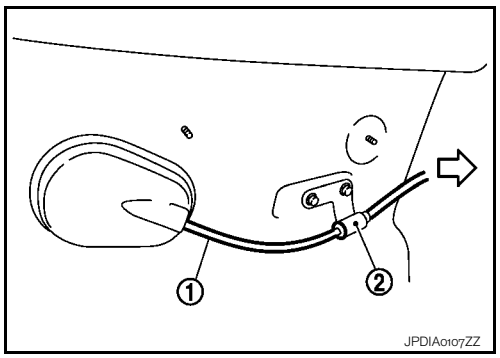


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9. Remove control cable (1) from bracket (2).

⇦ : Vehicle front

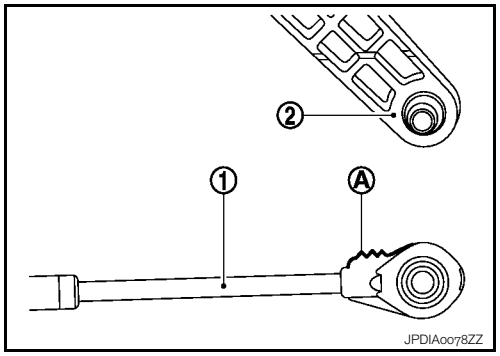
10. Remove the control cable from the vehicle.



INSTALLATION

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

- When installing the control cable (1) to the control device assembly (2), make sure that the control cable is fully pressed in with the ribbed (A) surface facing upward.



ADJUSTMENT AFTER INSTALLATION

Adjust the CVT positions after installing the control device. Refer to TM-324, "Inspection and Adjustment".

INSPECTION AFTER INSTALLATION

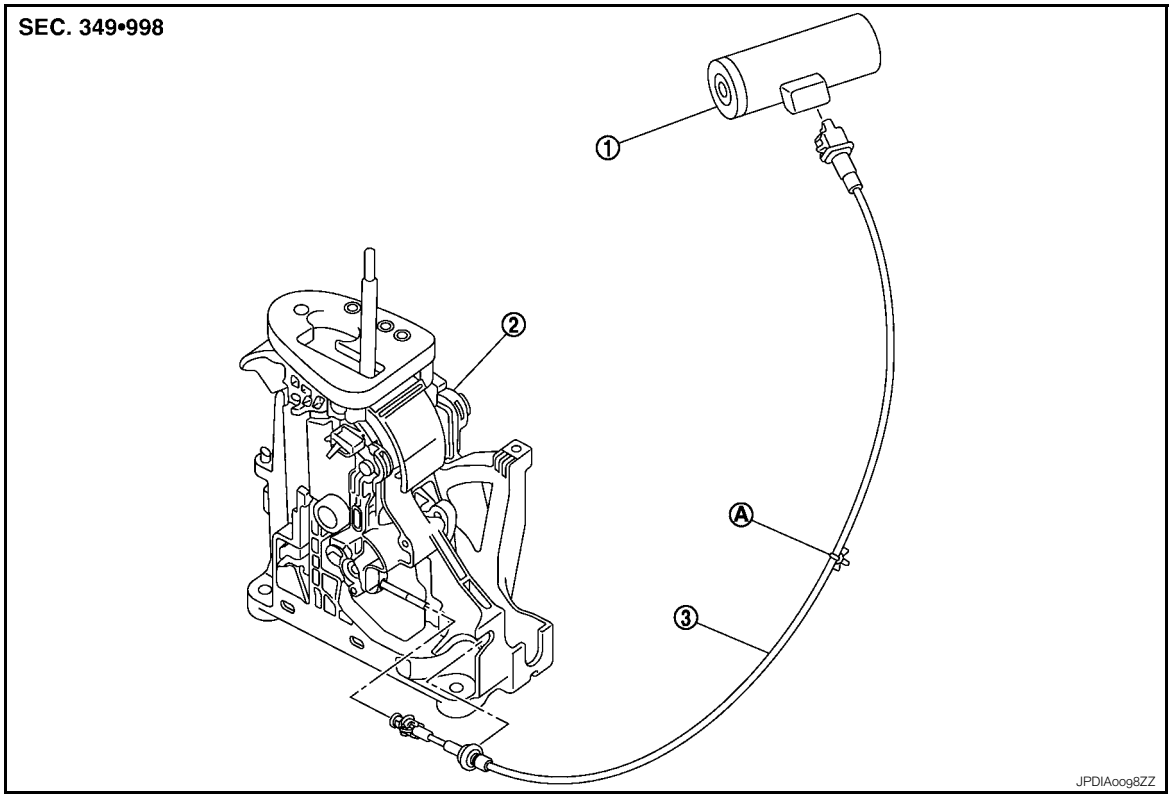
Check the CVT positions after adjusting the CVT positions. Refer to TM-324, "Inspection and Adjustment".

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KEY INTERLOCK CABLE

Exploded View

INFOID:0000000000941127



1. Key cylinder
2. Control device assembly
3. Key interlock cable

A. Clip

Removal and Installation

INFOID:0000000000941125

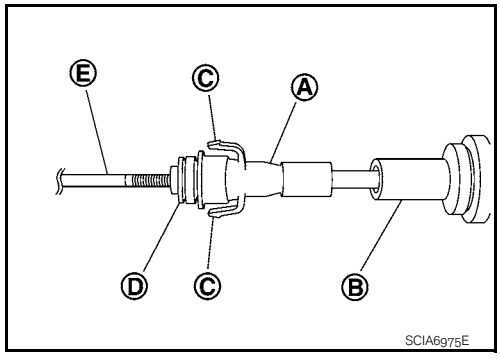
REMOVAL

CAUTION:

Make sure that parking brake is applied before removal/installation.

1. Move selector lever to “P” position.
2. Removal selector lever knob. Refer to TM-326, "Exploded View".
3. Removal center console. Refer to IP-18, "Exploded View".
4. Slide slider (A) toward casing cap (B) while pressing tabs (C) on slider to separate slider from adjust holder (D).

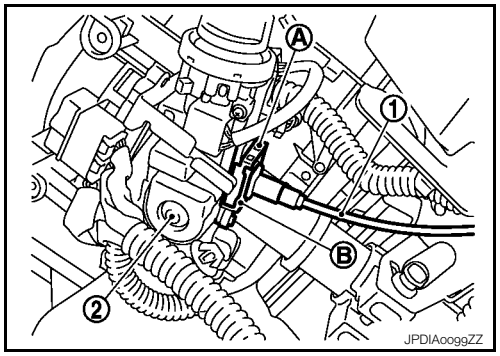
   E : Key interlock rod



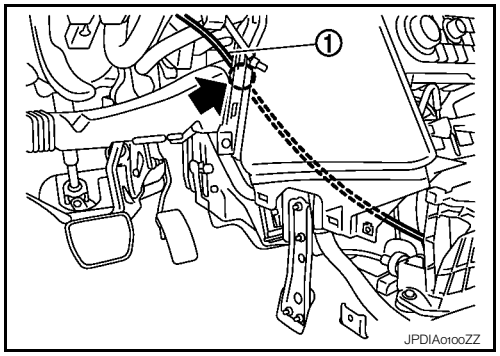
5. Remove steering column lower cover and lower instrument panel, driver side. Refer to IP-11, "Exploded View".

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6. Remove clip (A) from holder (B) and remove key inter lock cable (1) from key cylinder (2).



7. Remove clip (⬅) and remove key inter lock cable (1).



INSTALLATION

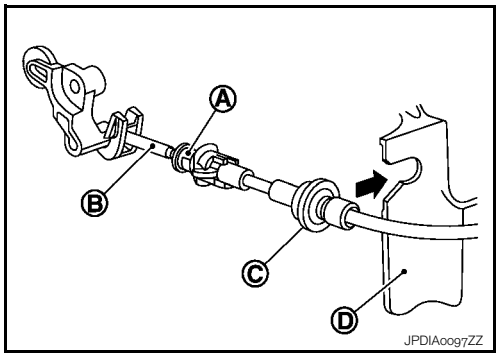
Note the following, and install in the reverse order of removal.

CAUTION:

- **Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.**
- **After installing key interlock cable to control device assembly, make sure that casing cap and bracket are firmly secured in their positions.**
- Temporarily install adjust holder (A) to key interlock rod (B). Install casing cap (C) to cable bracket (D) on control device assembly.

  CAUTION:

  - **Never bend or twist key interlock cable excessively when installing.**
  - **After installing key interlock cable to cable bracket on control device assembly, make sure casing caps is firmly secured in cable bracket on control device assembly.**
  - **If casing cap is loose [less than 39.2 N (4.0 kg, 8.8 lb) removing force], replace key interlock cable.**

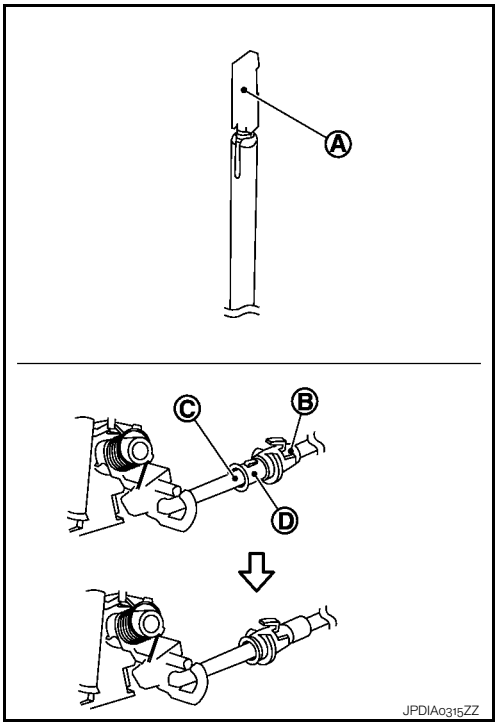


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- With the detent rod (A) pressed fully to the end, slider the key interlock cable slider (B) to the key interlock rod side (C), and install adjust holder (D) and key interlock rod.

CAUTION:

- **Never press tabs when holding slider.**
- **Never apply any force at the right angle to key interlock rod when slider.**

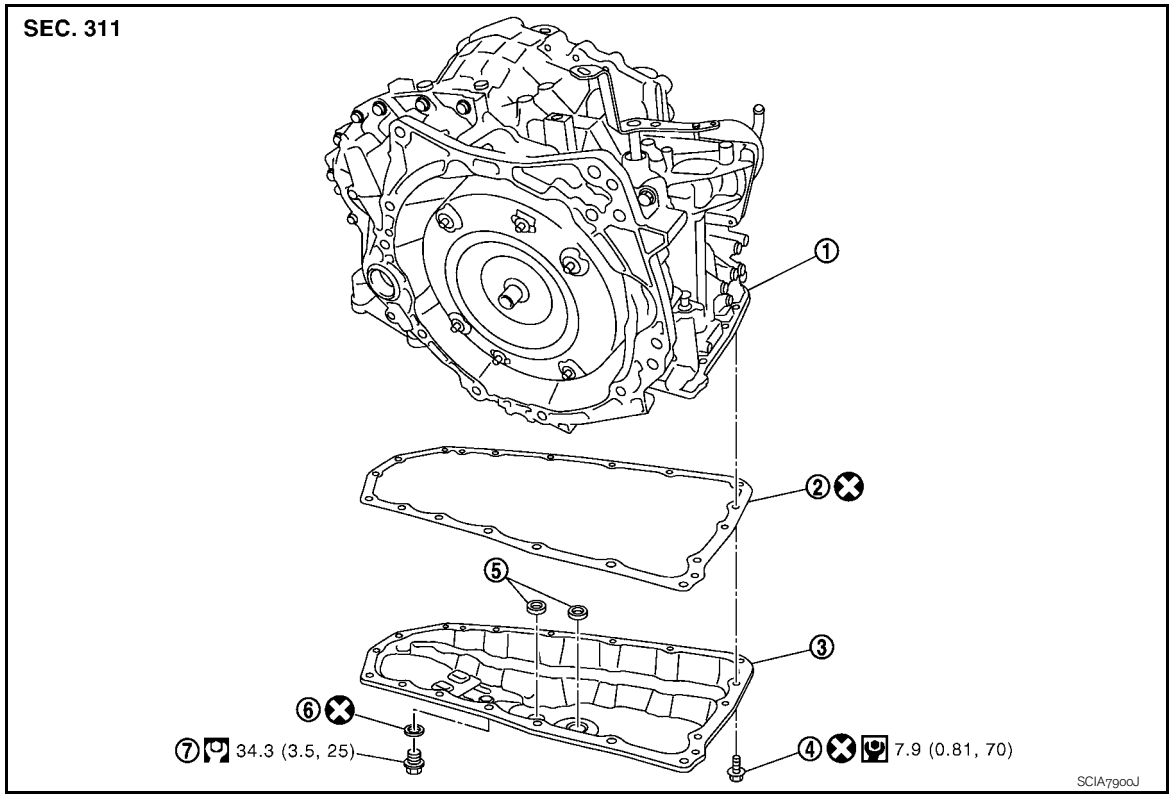


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OIL PAN

Exploded View

INFOID:0000000000950755



1. Transaxle assembly
2. Oil pan gasket
3. Oil pan
4. Oil pan fitting bolt
5. Magnet
6. Drain plug gasket
7. Drain plug

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

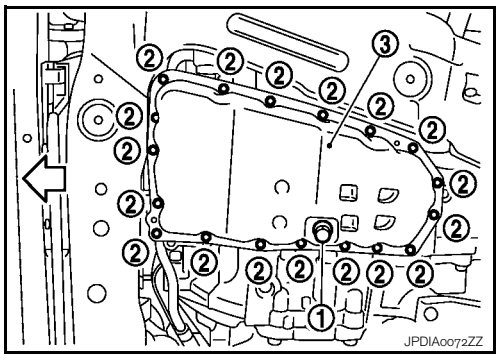
Removal and Installation

INFOID:0000000000950757

REMOVAL

1. Remove engine under cover with power tool.
2. Remove drain plug (1), and then drain CVT fluid from oil pan.

⇦ : Vehicle front



3. Remove oil pan fitting bolts (2).
4. Remove oil pan (3).
5. Remove oil pan gasket from oil pan.
6. Remove magnet from oil pan.

INSTALLTION

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

CAUTION:

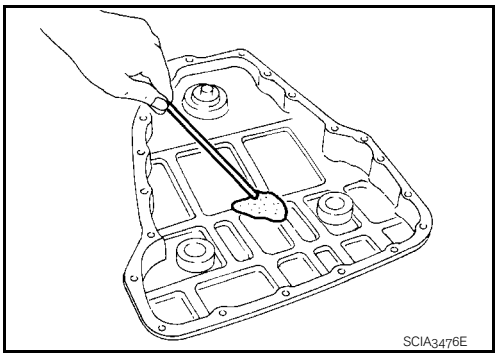
- **Completely remove all moisture, oil and old gasket, etc. from the oil pan gasket mounting surface of transaxle case and oil pan.**
- **Never reuse oil pan gasket and oil pan fitting bolts.**

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Inspection

INFOID:0000000000954882

- Check foreign materials in oil pan to help determine causes of malfunction. If the CVT fluid is very dark, smells burned, or contains foreign particles, frictional material (clutches) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves and clutches to stick and can inhibit pump pressure.



INSPECTION AFTER INSTALLATION

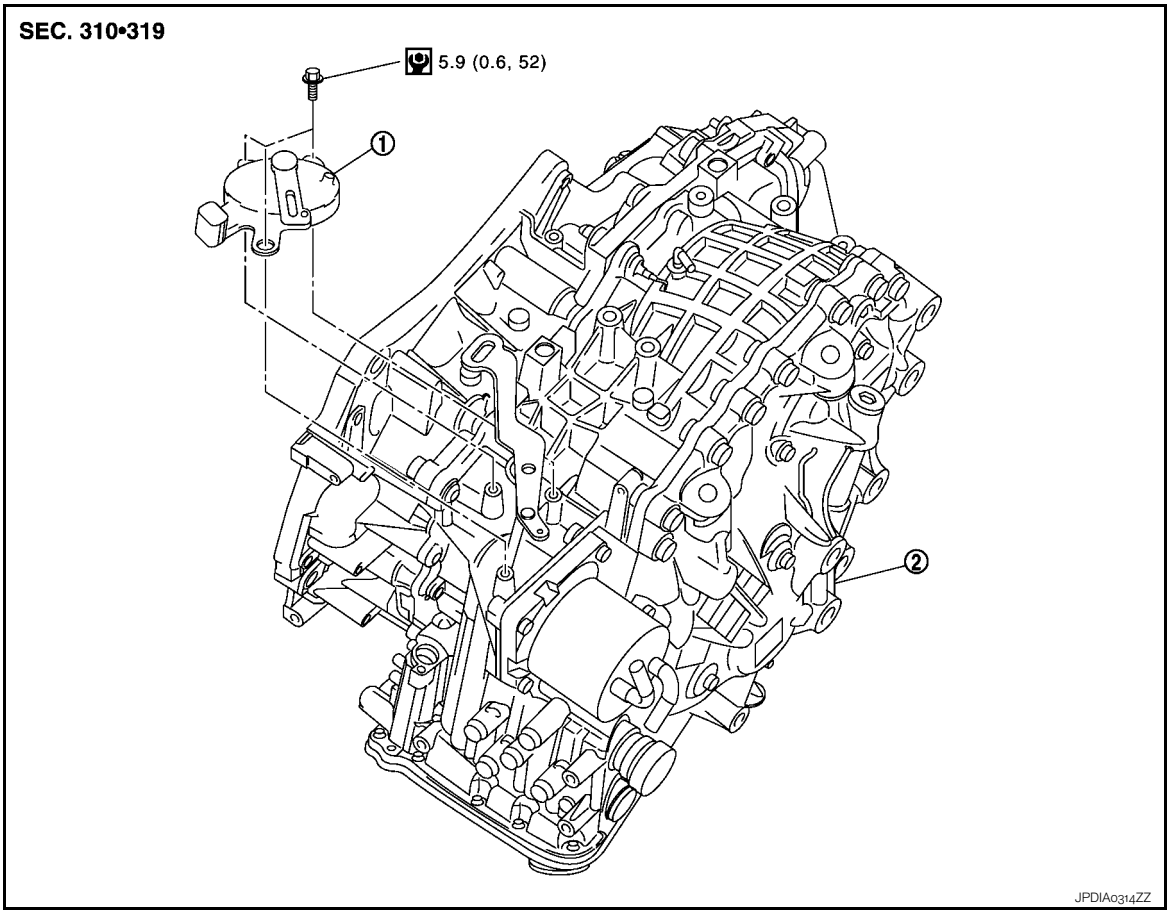
After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

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PARK/NEUTRAL POSITION (PNP) SWITCH

Exploded View

INFOID:0000000000950776



1. PNP switch
2. Transaxle assembly

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

Removal and Installation

INFOID:0000000000950777

REMOVAL

1. Remove battery. Refer to PG-118, "Exploded View".
2. Remove ECM bracket.
3. Remove PNP switch connector.
4. Remove control cable. Refer to TM-330, "Exploded View".
5. Remove PNP switch from transaxle assembly.

INSTALLATION

Install in the reverse order of removal.

Inspection and Adjustment

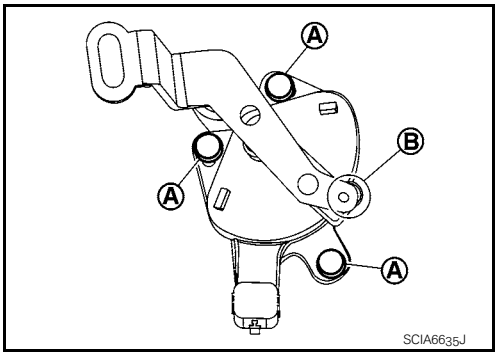
INFOID:0000000000950778

ADJUSTMENT OF PNP SWITCH

1. Move selector lever to “N” position.
2. Remove control cable from manual lever.

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3. Loosen mounting bolts (A) of PNP switch. Insert a pin (ϕ4 mm) into the adjusting holes (B) on both PNP switch and manual lever for adjusting the position.
4. Tighten mounting bolts of PNP switch.
5. Connect control cable on manual lever. Refer to TM-324, "Inspection and Adjustment".



ADJUSTMENT AFTER INSTALLATION

Adjust the CVT positions after installing the control device. Refer to TM-324, "Inspection and Adjustment".

INSPECTION AFTER INSTALLAION

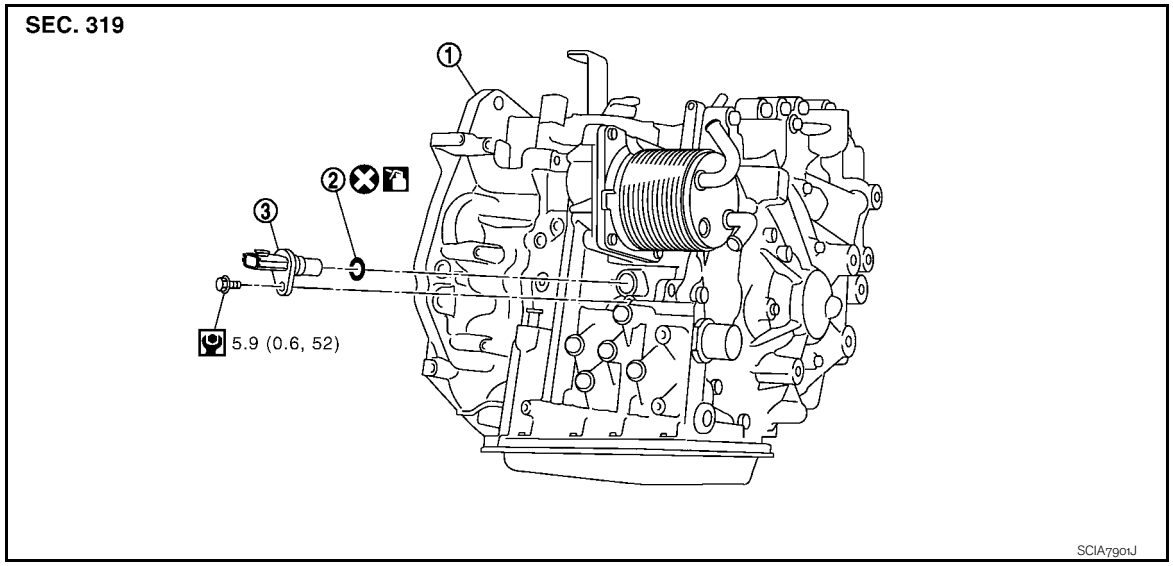
Check the CVT positions after adjusting the CVT positions. Refer to TM-324, "Inspection and Adjustment".

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PRIMARY SPEED SENSOR

Exploded View

INFOID:0000000000950779



1. Transaxle assembly
2. O-ring
3. Primary speed sensor

: Apply CVT Fluid NS-2.

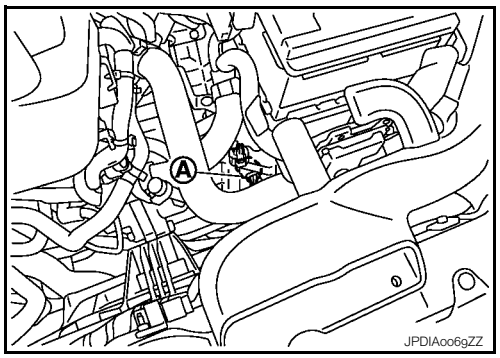
Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000950780

REMOVAL

1. Remove primary speed sensor connector (A).
2. Remove primary speed sensor.
3. Remove O-ring from primary speed sensor.



INSTALLATION

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

- After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

CAUTION:

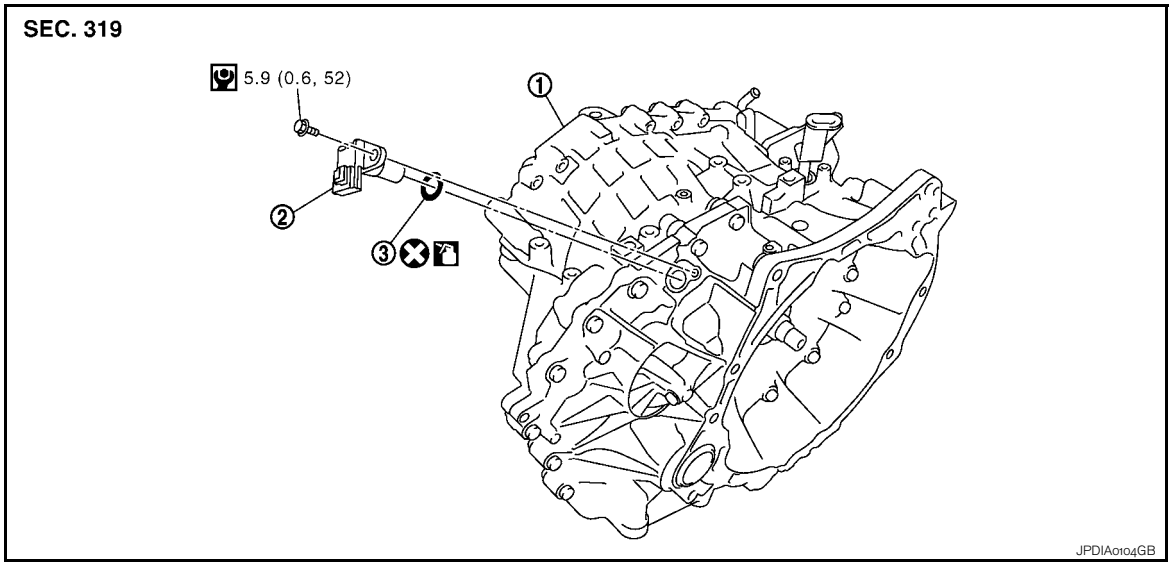
- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

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SECONDARY SPEED SENSOR

Exploded View

INFOID:0000000000950781



1. Transaxle assembly
2. Secondary speed sensor
3. O-ring

: Apply CVT Fluid NS-2.

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

Removal and Installation

INFOID:0000000000950782

REMOVAL

1. Remove secondary speed sensor connector.
2. Remove secondary speed sensor.
3. Remove O-ring from secondary speed sensor.

INSTALLATION

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

- After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

CAUTION:

- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

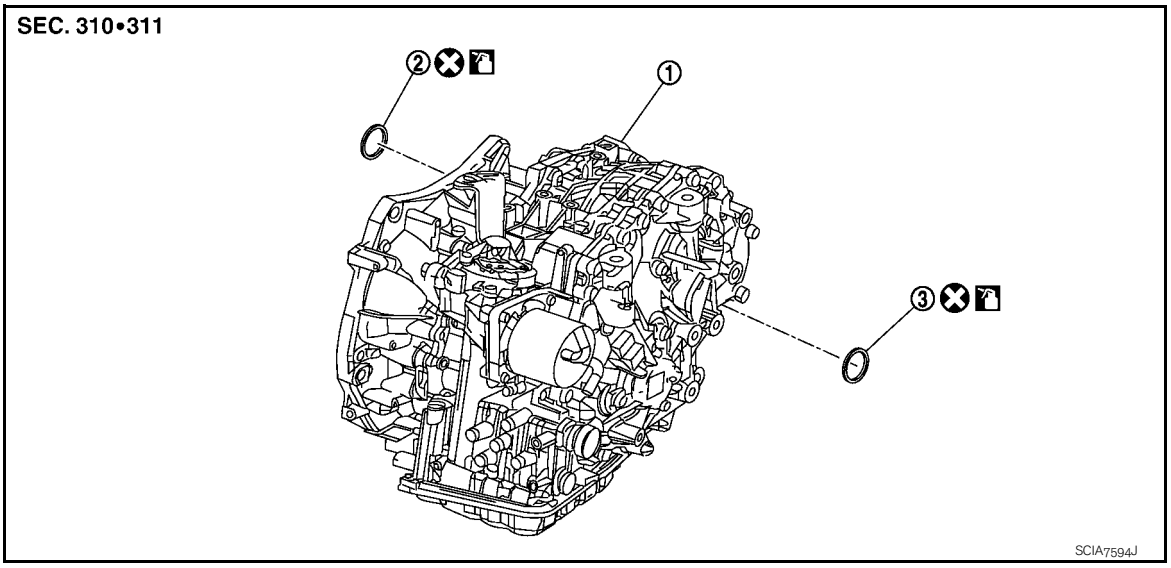
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DIFFERENTIAL SIDE OIL SEAL

2WD

2WD : Exploded View

INFOID:0000000000950783



1. Transaxle assembly
2. RH differential side oil seal
3. LH differential side oil seal

: Apply CVT Fluid NS-2.

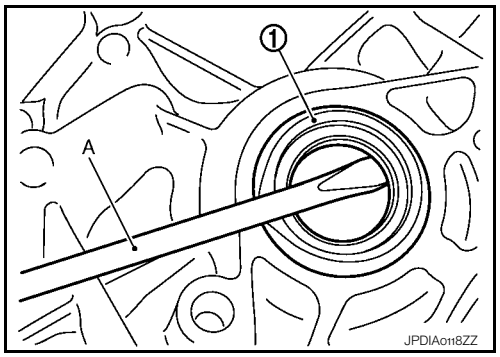
Refer to GI-4, "Components" for symbols not described on the above.

2WD : Removal and Installation

INFOID:0000000000950784

REMOVAL

1. Remove drive shaft assembly. Refer to FAX-22, "MR20DE MODELS : Exploded View".
2. Remove differential side oil seals (1) using a flat-bladed screwdriver (A).
   CAUTION:
   Be careful not to scratch transaxle case and converter housing.



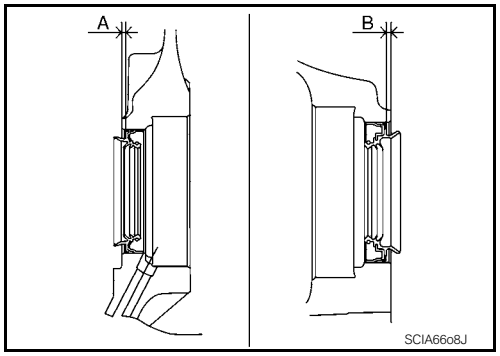
INSTALLTION

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

- Drive each differential side oil seal evenly using a commercial service tool so that differential side oil seal protrudes by the dimension (A) or (B) respectively.

Unit: mm (in)

Dimension A	1.8 ± 0.5 (0.071 ± 0.020)
Dimension B	2.2 ± 0.5 (0.087 ± 0.020)



NOTE:
Differential side oil seal pulling direction is used as the reference.
CAUTION:
- **Never reuse differential side oil seals.**

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- **Apply CVT fluid to differential side oil seals.**

Drift to be used:

Location	Tool number
Transaxle case side	Commercial service tool [Outer diameter: 54 mm (2.13 in), inner diameter: 47 mm (1.85 in)]
Converter housing side	

2WD : Inspection

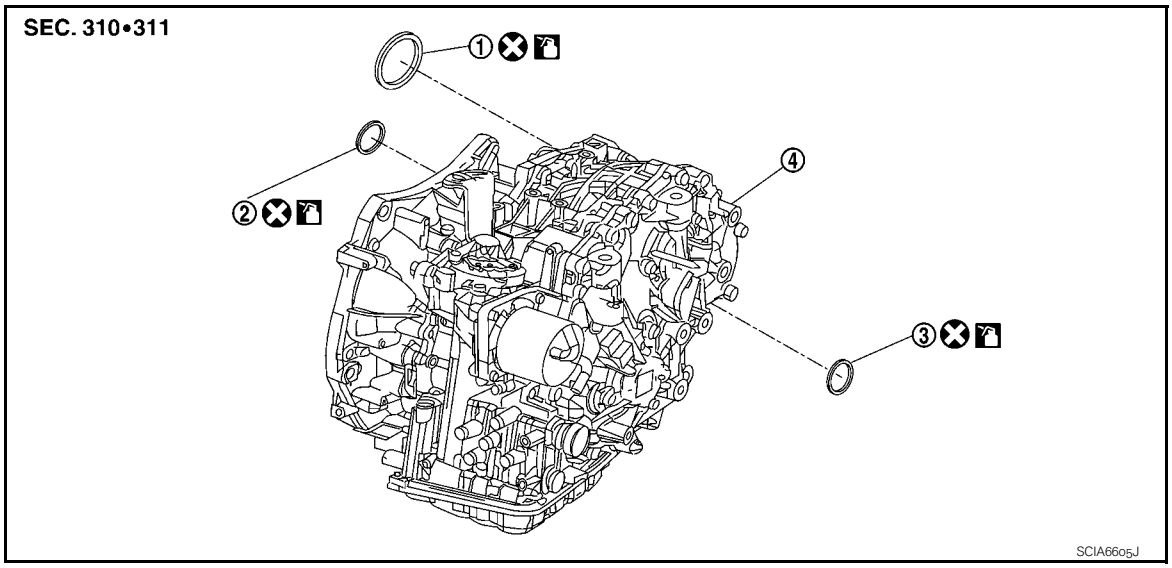
INFOID:0000000001091256

After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

4WD

4WD : Exploded View

INFOID:0000000001091129



1. Side oil seal (transfer joint)
2. RH differential side oil seal
3. LH differential side oil seal
4. Transaxle assembly

: Apply CVT Fluid NS-2.

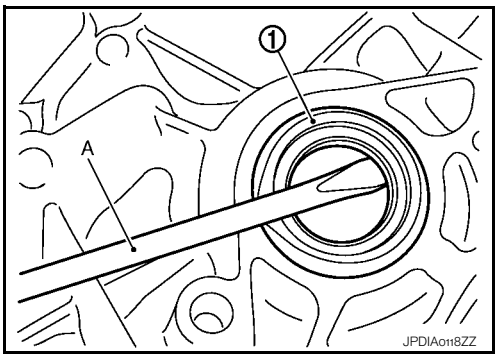
Refer to GI-4, "Components" for symbols not described on the above.

4WD : Removal and Installation

INFOID:0000000001091130

REMOVAL

1. Remove exhaust front tube. Refer to EX-10, "Exploded View".
2. Separate the propeller shaft. Refer to DLN-110, "Exploded View".
3. Remove drive shaft assembly. Refer to FAX-55, "Exploded View".
4. Remove transfer from transaxle assembly. Refer to DLN-59, "CVT : Exploded View".
5. Remove differential side oil seals (1) and side oil seal (transfer joint) using a flat-bladed screwdriver (A).
   CAUTION:
   Be careful not to scratch transaxle case and converter housing.

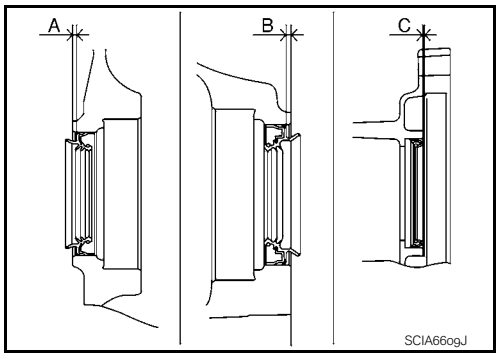


INSTALLTION

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

- Drive each differential side oil seal and side oil seal (transfer joint) evenly using a commercial service tool so that differential side oil seal and side oil seal (transfer joint) protrudes by the dimension (A), (B), or (C) respectively.



Unit: mm (in)

Dimension A	1.8 ± 0.5 (0.071 ± 0.020)
Dimension B	2.2 ± 0.5 (0.087 ± 0.020)
Dimension C	0.5 ± 0.5 (0.020 ± 0.020)

NOTE:
Differential side oil seal and side oil seal (transfer joint) pulling direction is used as the reference.

CAUTION:

- **Never reuse differential side oil seals and side oil seal (transfer joint).**
- **Apply CVT fluid to differential side oil seals and side oil seal (transfer joint).**

Drift to be used:

Location		Tool number
Differential side oil seal	Transaxle case side	Commercial service tool [Outer diameter: 54 mm (2.13 in), inner diameter: 47 mm (1.85 in)]
	Converter housing side	
Side oil seal (transfer joint)	Transaxle engagement	Commercial service tool [Outer diameter: 70 mm (2.76 in), inner diameter: 56 mm (2.20 in)]

4WD : Inspection

INFOID:0000000001091252

After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

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OIL PUMP FITTING BOLT

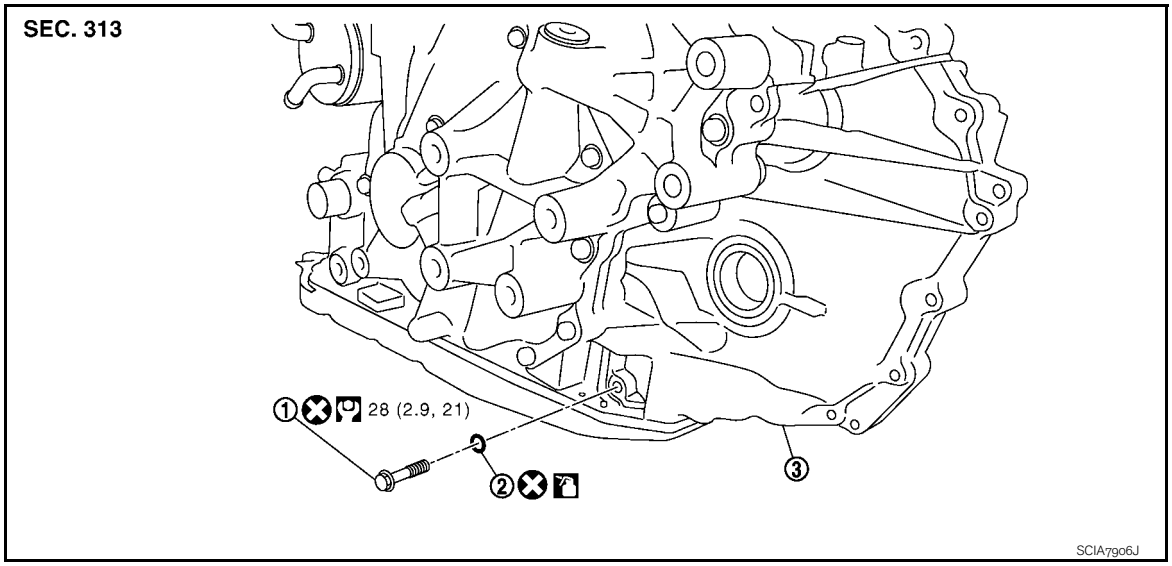
Description

INFOID:0000000000952022

Replace the oil pump fitting bolt and the O-ring if oil leakage or exudes from the oil pump fitting bolt.

Exploded View

INFOID:0000000000952023



1. Oil pump fitting bolt
2. O-ring
3. Transaxle assembly

: Apply CVT Fluid NS-2.

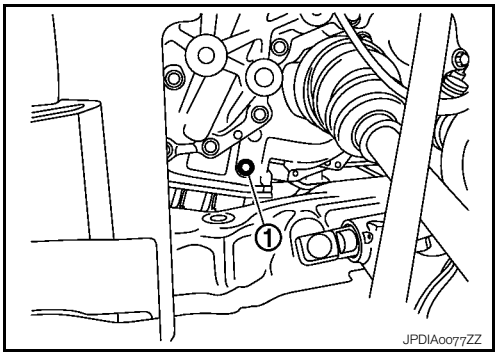
Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000000952024

REMOVAL

1. Remove Oil pump fitting bolt (1) from transaxle assembly.
2. Remove O-ring from oil pump fitting bolt.



INSTALLATION

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

- After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

CAUTION:

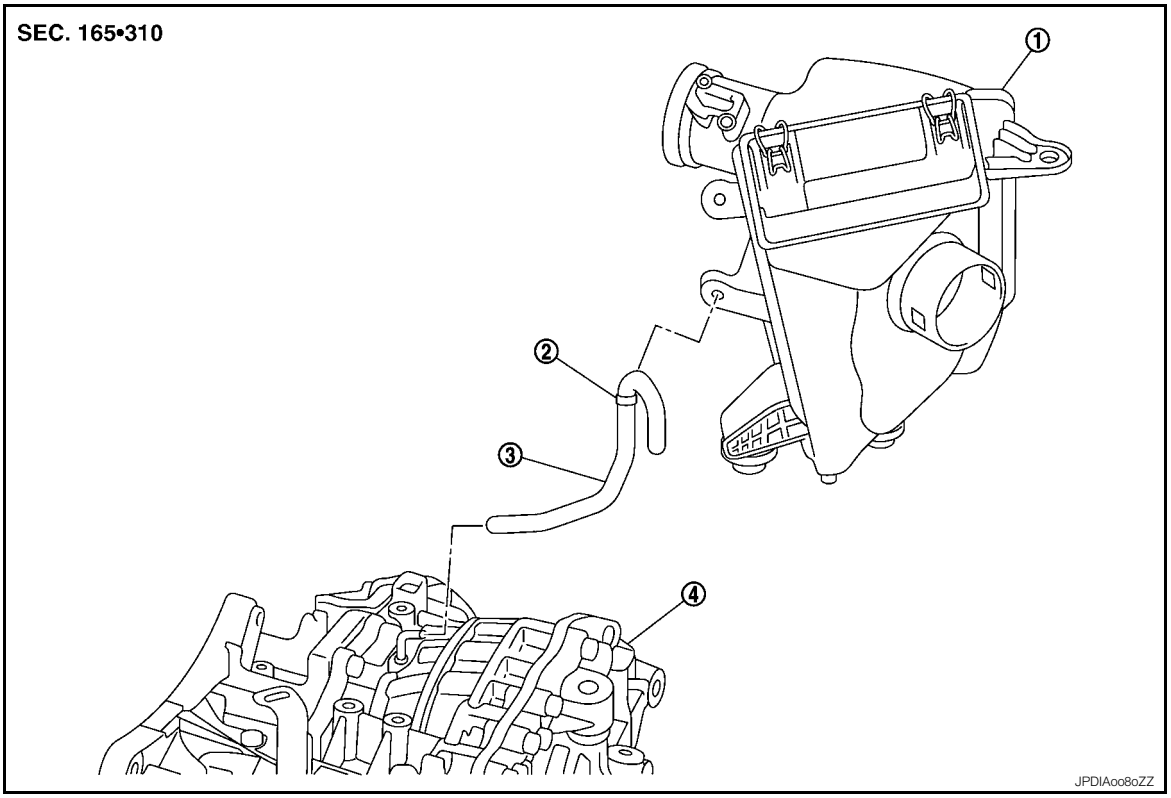
- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

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AIR BREATHER HOSE

Exploded View

INFOID:0000000000914718



1. Air cleaner assembly
2. Clip
3. Air breather hose
4. Transaxle assembly

Removal and Installation

INFOID:0000000000914719

REMOVAL

1. Remove clip from Air cleaner assembly.
2. Remove Air breather hose from transaxle assembly.

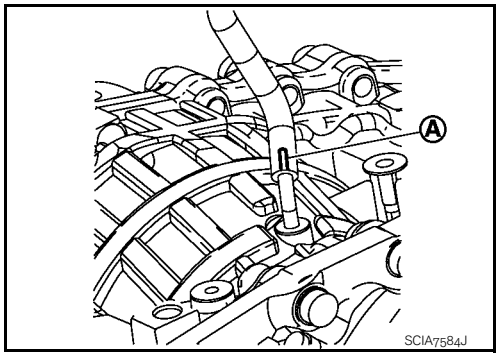
INSTALLATION

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

CAUTION:

Make sure air breather hose not collapsed or blocked due to folding or bending when installed.

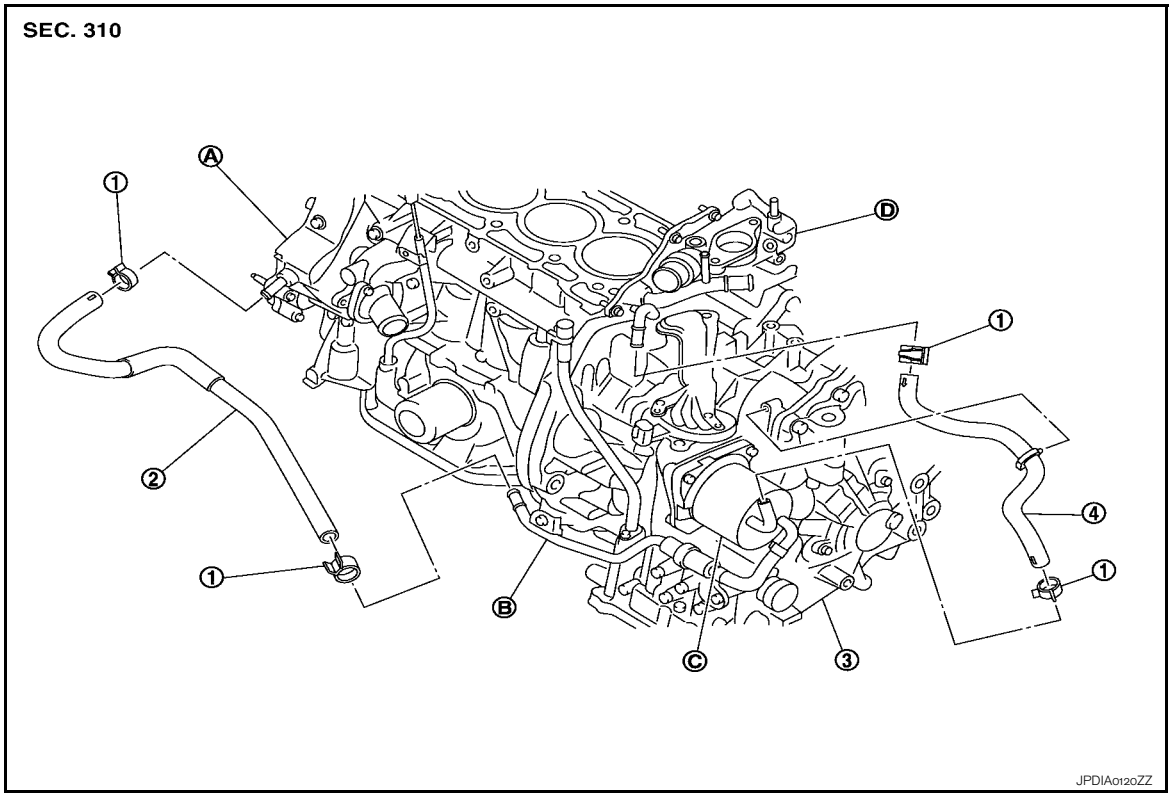
- Install air breather hose to air breather tube so that the paint mark (A) faces upward. Also insert hose to the bend of air breather tube.



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FLUID COOLER SYSTEM
WATER HOSE
WATER HOSE : Exploded View

INFOID:0000000000967500



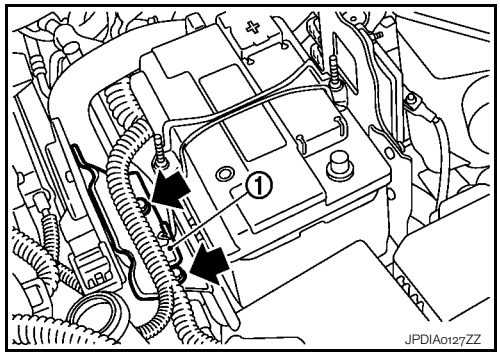
1. Hose clamp
2. CVT water hose A
3. Transaxle assembly
4. CVT water hose B
- A. Thermostat housing
- B. Heater thermostat
- C. CVT fluid cooler
- D. Water outlet

WATER HOSE : Removal and Installation

INFOID:0000000000967503

REMOVAL

1. Remove the TCM. Refer to TM-325, "Exploded View".
2. Remove TCM bracket (1). Refer to TM-325, "Exploded View".



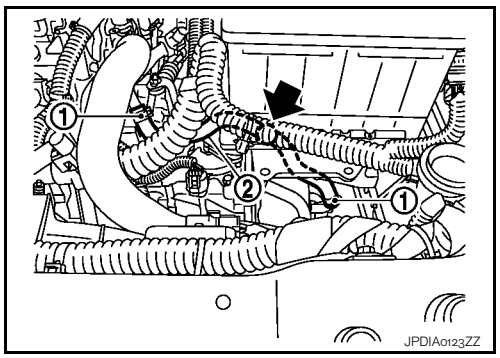
⬅ : Bolt

3. Remove hose clamp, and remove CVT water hose A.

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4. Remove hose clamp (1), and remove CVT water hose B (2).

⬅ : Clip



INSTALLATION

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

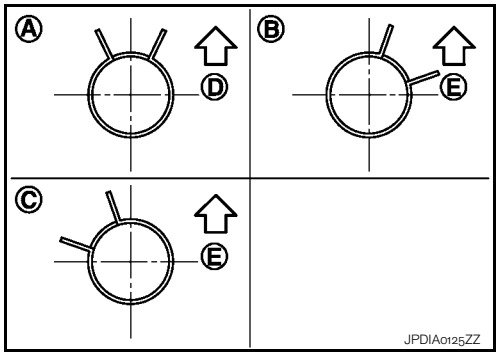
CVT water hose	Hose end	Paint mark	Position of hose clamp*
CVT water hose A	Thermostat housing	Facing upward	B
	Heater thermostat	Facing forward	C
CVT water hose B	CVT fluid cooler	Facing forward	A
	Water outlet	Facing forward	A

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

- The illustrations indicate the view from the hose ends.

⇦ D: Front

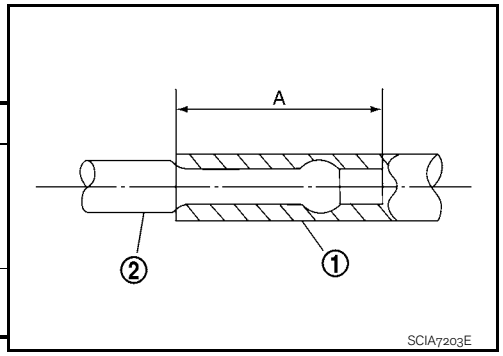
⇦ E: Upper



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

- Insert CVT water hose according to dimension (A) described below.

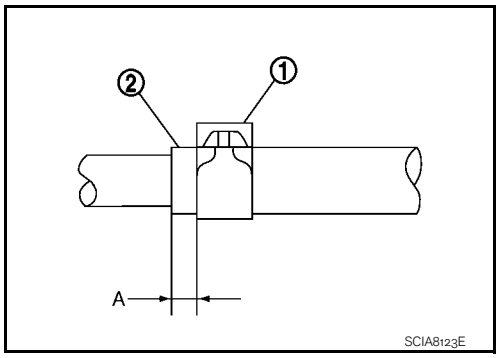
(1)	(2)	Distance A
CVT water hose A	Thermostat housing	27 mm (1.06 in)
	Heater thermostat	
CVT water hose B	Water outlet	
	CVT fluid cooler	End reaches the tube bend R position.



- Set hose clamps (1) from the end of fluid cooler hose (2) according to dimension (A) described below.

Dimension A : 5 – 7 mm (0.20 – 0.28 in)

- Hose clamp should not interfere with the bulge.

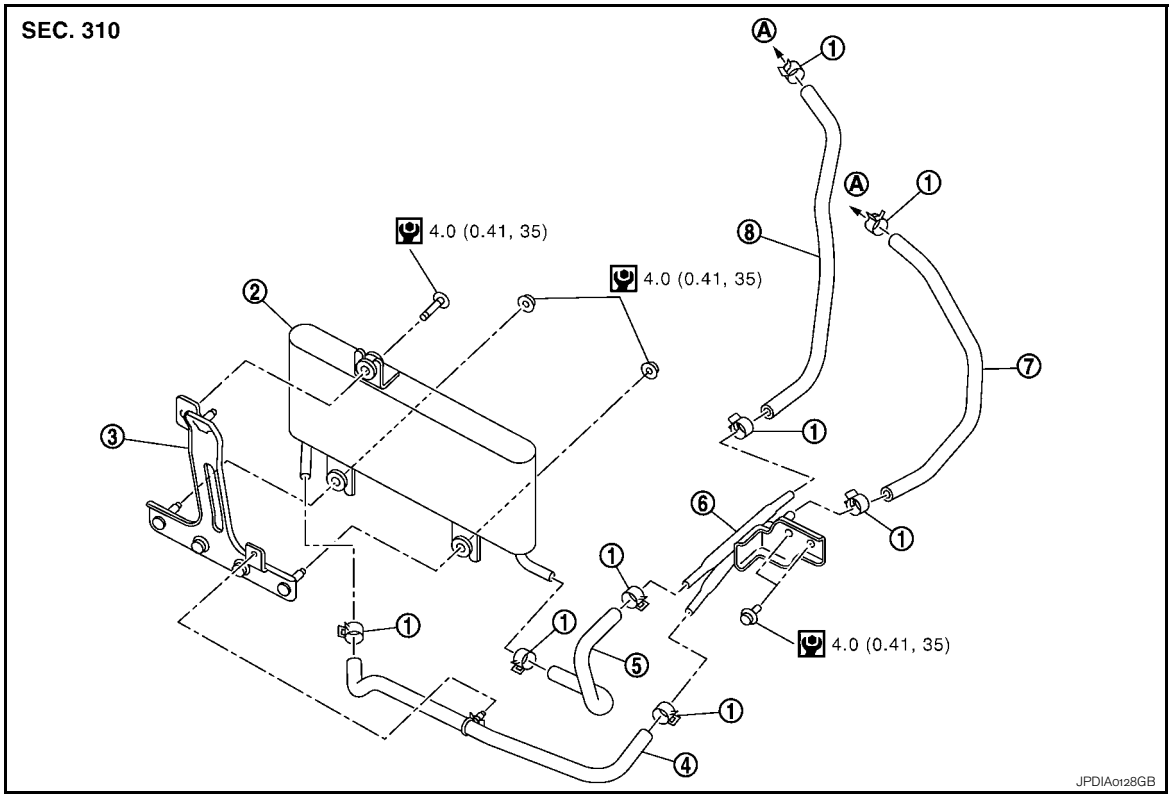


FLUID COOLER

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FLUID COOLER : Exploded view

INFOID:0000000000967504



1. Hose clamp
2. Fluid cooler
3. Bracket
4. Fluid cooler hose A
5. Fluid cooler hose B
6. Fluid cooler tube
7. Fluid cooler hose D
8. Fluid cooler hose C
A. To CVT fluid cooler

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

FLUID COOLER : Removal and Installation

INFOID:0000000000967505

REMOVAL

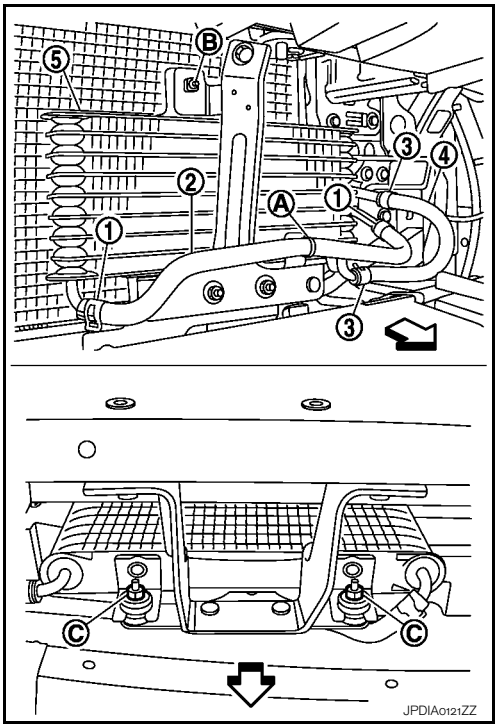
1. Remove engine under cover.
2. Remove front bumper assembly. Refer to EXT-11, "Exploded View".
3. Remove air duct (inlet). Refer to EM-144, "Exploded View".

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4. Remove clip (A).

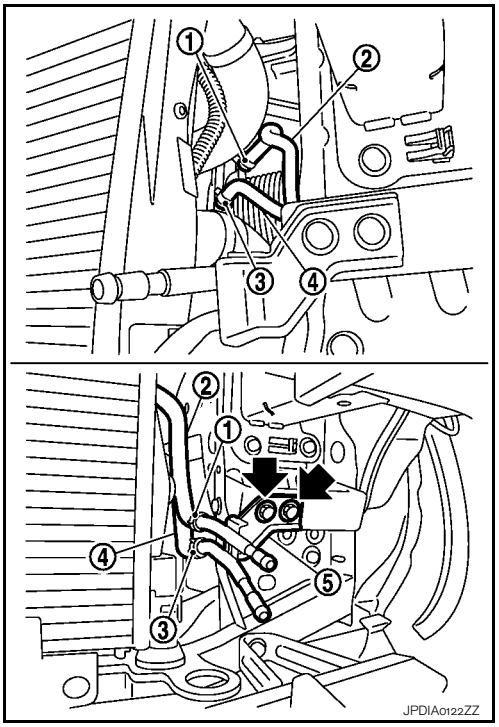
B : Bolt
C : Nut
⇦ : Vehicle front

5. Remove hose clamp (1) and fluid cooler hose A (2).
6. Remove hose clamp (3) and fluid cooler hose B (4).
7. Remove fluid cooler (5).



8. Remove hose clamp (1) and fluid cooler hose C (2).
9. Remove hose clamp (3) and fluid cooler hose D (4).
10. Remove fluid cooler tube (5).

⇦ : Bolt



INSTALLATION

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

CAUTION:

After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

Fluid cooler hose	Hose end	Paint mark	Position of hose clamp*
Fluid cooler hose A	Fluid cooler side	Facing forward	D
	Fluid cooler tube side	Facing to the left of the vehicle	C

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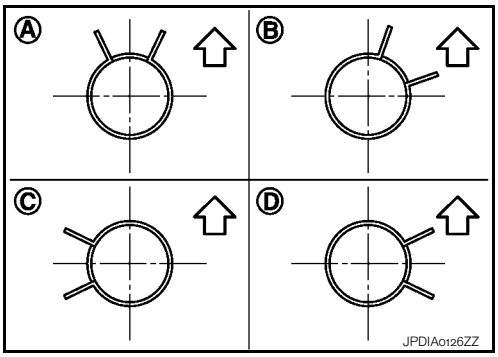
Fluid cooler hose	Hose end	Paint mark	Position of hose clamp*
Fluid cooler hose B	Fluid cooler side	Facing forward	D
	Fluid cooler tube side	Facing to the left of the vehicle	C
Fluid cooler hose C	Fluid cooler tube side	Facing to the Right of the vehicle	C
	CVT fluid cooler side	Facing upward	B
Fluid cooler hose D	Fluid cooler tube side	Facing to the Right of the vehicle	C
	CVT fluid cooler side	Facing upward	A

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

- The illustrations indicate the view from the hose ends.

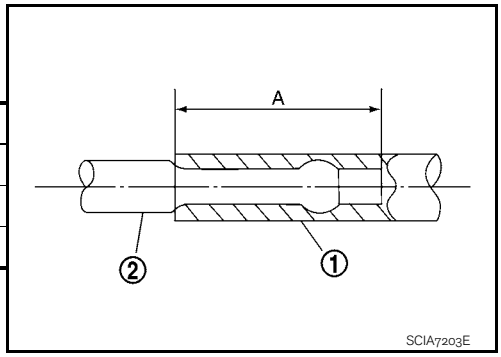
⇦ : Upper

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



- Insert fluid cooler hose according to dimension (A) described below.

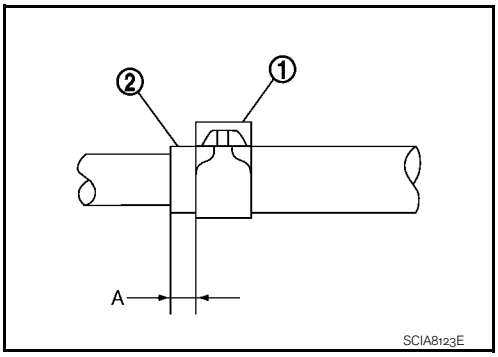
(1)	(2)	Distance A
Fluid cooler hose A, B	Fluid cooler	24 mm (0.94 in)
Fluid cooler hose B, C	Fluid cooler tube	33 mm (1.30 in)
Fluid cooler hose C, D	CVT fluid cooler	30 mm (1.18 in)



- Set hose clamps (1) from the end of fluid cooler hose (2) according to dimension (A) described below.

Dimension A : 5 – 7 mm (0.20 – 0.28 in)

- Hose clamp should not interfere with the bulge.



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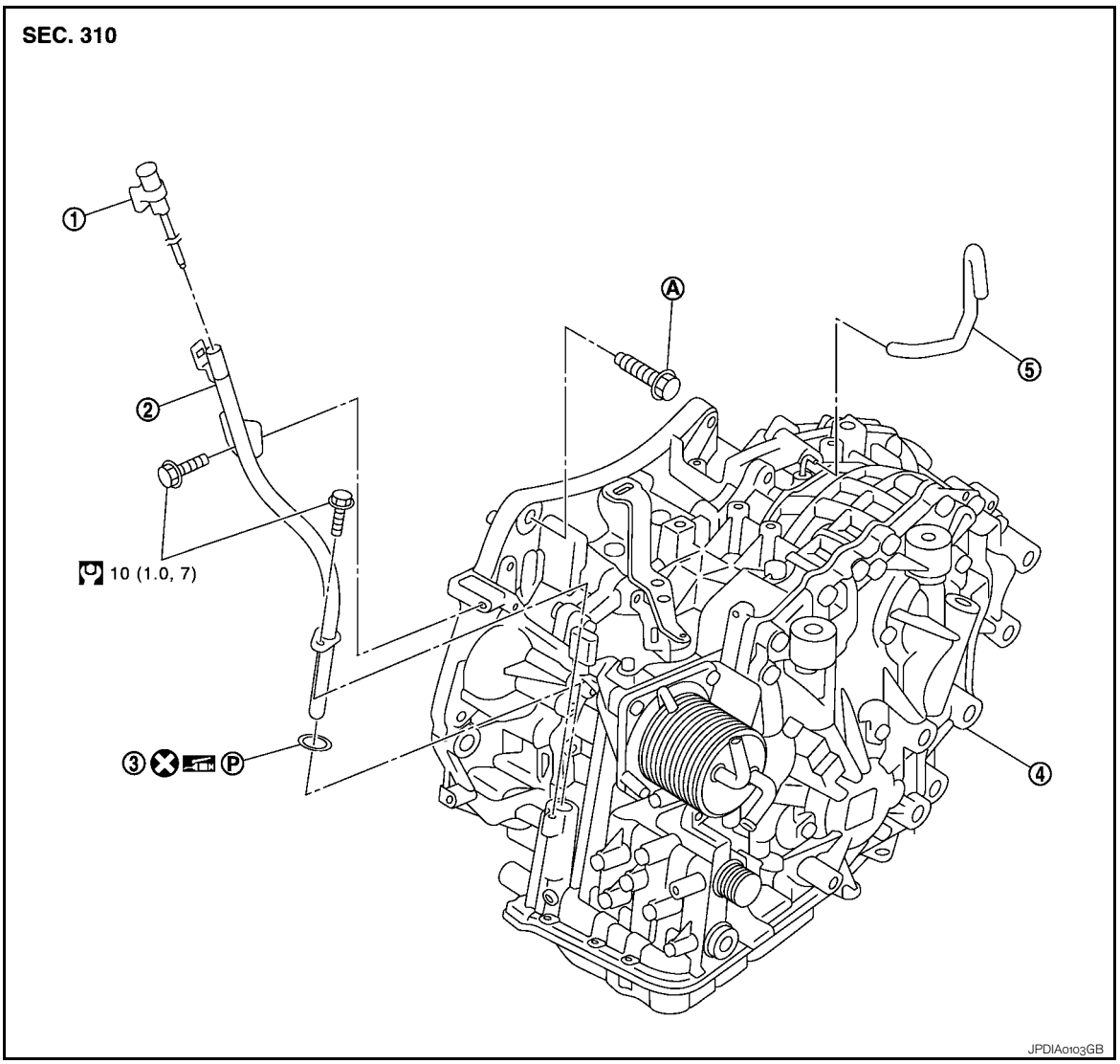
REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

2WD

2WD : Exploded View

INFOID:0000000000914726



1. CVT fluid level gauge
2. CVT fluid charging pipe
3. O-ring
4. Transaxle assembly
5. Air breather hose

A. For tightening torque, refer to TM-351, "2WD : Removal and Installation".

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

2WD : Removal and Installation

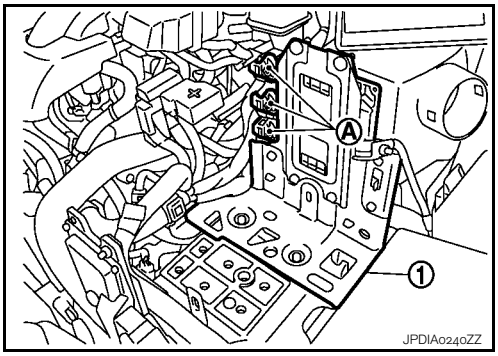
INFOID:0000000000914727

REMOVAL

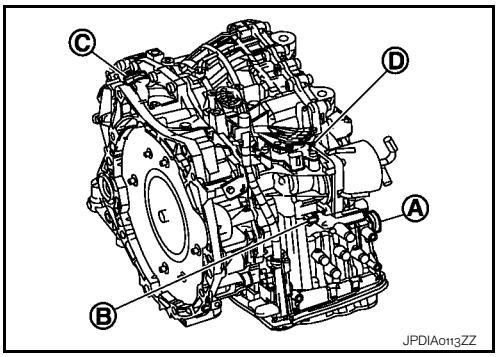
1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-345, "Exploded View".
3. Remove air duct (inlet). Refer to EM-144, "Exploded View".
4. Remove battery. Refer to PG-118, "Exploded View".

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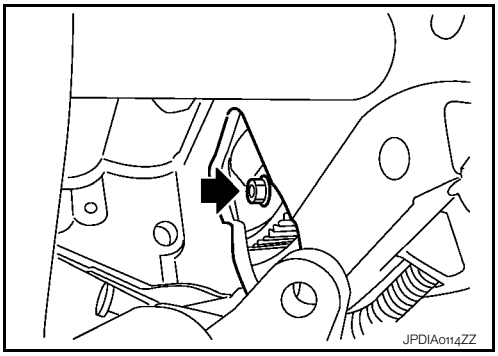
5. Disconnect connectors (A) and then remove bracket (1).
6. Remove air cleaner case. Refer to EM-144, "Exploded View".
7. Drain engine coolant.
8. Remove CVT fluid level gauge.
9. Remove CVT fluid charging pipe from transaxle assembly.
10. Remove O-ring from CVT fluid charging pipe.



11. Disconnect fluid cooler hose from transaxle assembly. Refer to TM-348, "FLUID COOLER : Exploded view".
12. Disconnect following harness connector and wire harness.
    - CVT unit harness connector (A).
    - Primary speed sensor harness connector (B).
    - Secondary speed sensor harness connector (C).
    - PNP switch connector (D).
13. Remove harness and clip from the transaxle assembly.
14. Remove CVT water hose. Refer to TM-346, "WATER HOSE : Exploded View".
15. Remove control cable from transaxle assembly. Refer to TM-330, "Exploded View".
16. Remove starter motor. Refer to STR-25, "MR20DE MODELS : Exploded View".
17. Remove engine under cover with power tool.



18. Turn crankshaft, and remove the four tightening nuts (⬅) for drive plate and torque converter.
    CAUTION:
    When turning crankshaft, turn it clockwise as viewed from the front of the engine.
19. Remove exhaust front tube. Refer to EX-10, "Exploded View".
20. Remove front drive shafts. Refer to FAX-22, "MR20DE MODELS : Exploded View".
21. Remove suspension member from vehicle. Refer to FSU-15, "Exploded View".
22. Support transaxle assembly with a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to collide against the drain plug.
23. Support engine assembly with a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to collide against the drain plug.
24. Remove engine mounting insulator (LH). Refer to EM-198, "CVT : Exploded View".
25. Remove bolts fixing transaxle assembly to engine assembly.
26. Remove transaxle assembly from vehicle.
    CAUTION:
    - **Secure torque converter to prevent it from dropping.**
    - **Secure transaxle assembly to a transmission jack.**
27. Remove heater thermostat. Refer to CO-41, "Exploded View".



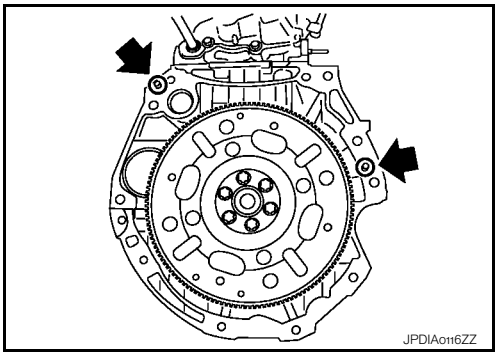
INSTALLATION

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

CAUTION:

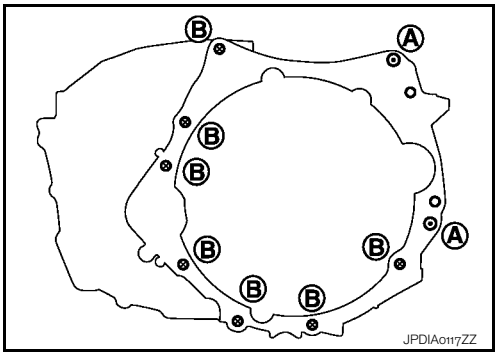
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- **Check fitting of dowel pin (⬅) when installing transaxle assembly to engine assembly.**



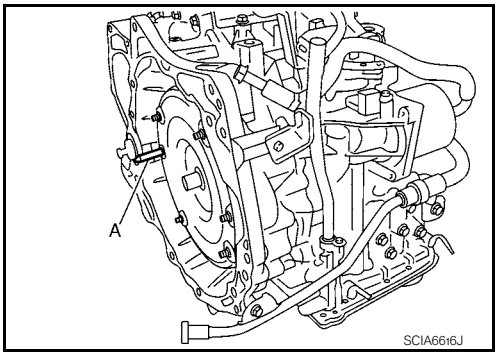
- **When installing Transaxle assembly to the engine assembly, attach the fixing bolts in accordance with the following.**

A : Transaxle to engine
B : Engine to transaxle

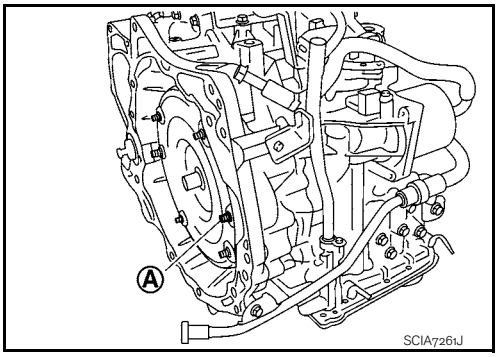


Bolt No.	A	B
Number of bolts	2	7
Bolt length " ℓ " mm (in)	55 (2.17)	50 (1.97)
Tightening torque N·m (kg-m, ft-lb)	62 (6.3, 46)	

- Set and screw in the drive plate location guide (commercial service tool: 31197CA000) (A) onto the stud bolts for the torque converter locate.



- When not using drive plate location guide, rotate torque converter so that the stud bolt (A) for mounting the drive plate location guide of torque converter aligns with the mounting position of starter motor.

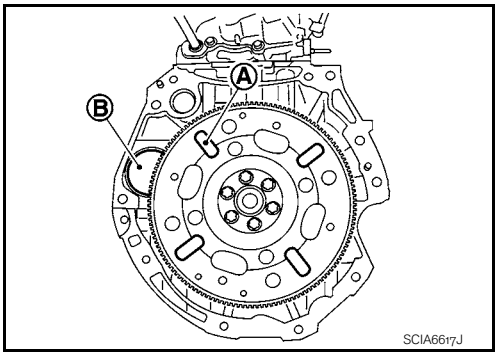


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- Rotate crankshaft so that the hole (A) for inserting drive plate location guide of drive plate aligns with the mounting position (B) of starter motor.

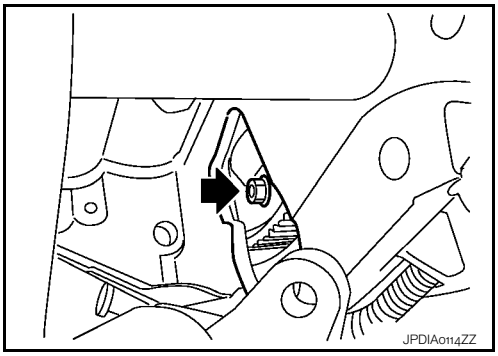
NOTE:
When not using drive plate location guide, insert stud bolt of torque converter into the hole of drive plate, aligning the drive plate hole position and torque converter.

CAUTION:
Note that the stud bolt strikes the drive plate hole position is not aligned the torque converter stud bolt.



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

:51 N·m (5.2 kg-m,38 ft-lb)



CAUTION:
- **When turning crankshaft, turn it clockwise as viewed from the front of the engine.**
- **When tightening the tightening nuts for the torque converter after fixing the crankshaft pulley bolts, confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-163, "Removal and Installation".**
- **After converter is installed to drive plate, rotate crankshaft several turns and check that transaxle rotates freely without binding.**

2WD : Inspection

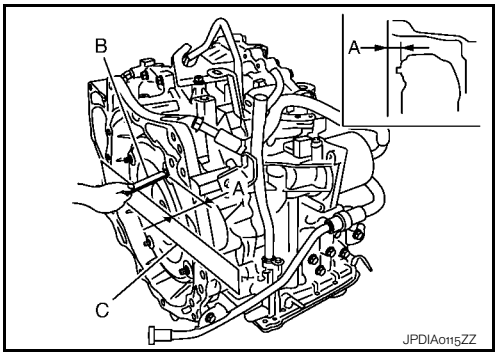
INFOID:0000000000914728

INSPECTION BE FORE INSTALLATION

- After inserting a torque converter to the CVT, check distance (A) with in the reference value limit.

B : Scale
C : Straightedge

Distance (A) : Refer to TM-362, "Removal and Installation".



INSPECTION AFTER INSTALLATION

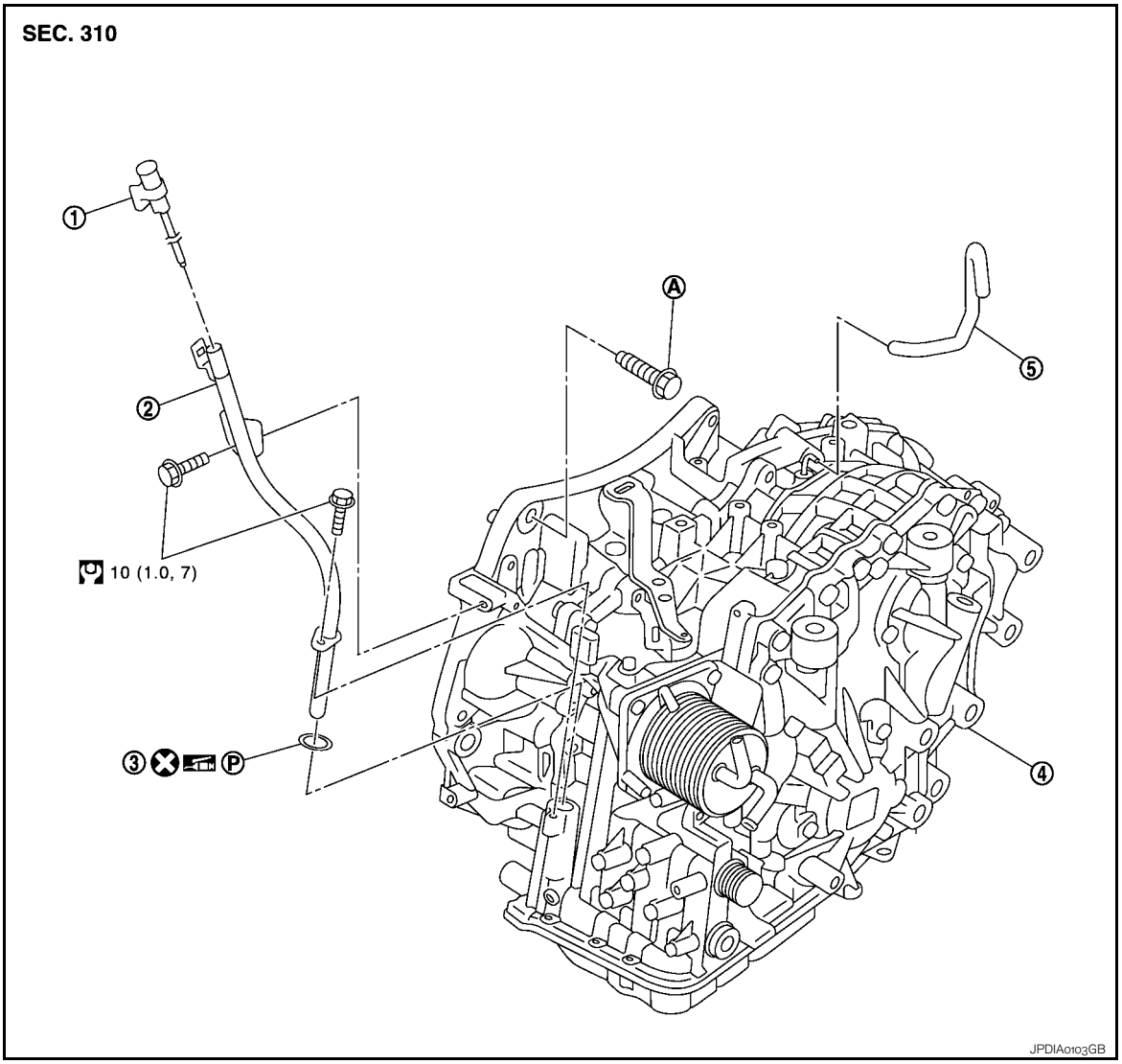
- After completing installation, check the following item.
- CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".
- CVT position. Refer to TM-324, "Inspection and Adjustment".

4WD

4WD : Exploded View

INFOID:0000000001116416

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1. CVT fluid level gauge
2. CVT fluid charging pipe
3. O-ring
4. Transaxle assembly
5. Air breather hose

A. For tightening torque, refer to TM-355, "4WD : Removal and Installation".

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

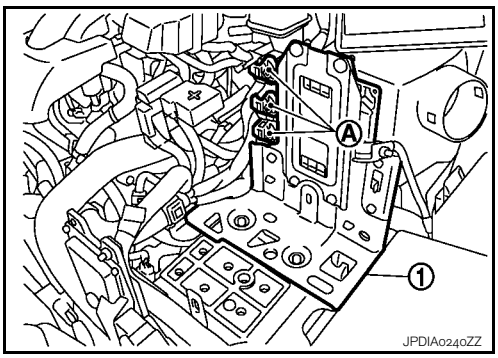
4WD : Removal and Installation

INFOID:0000000001116417

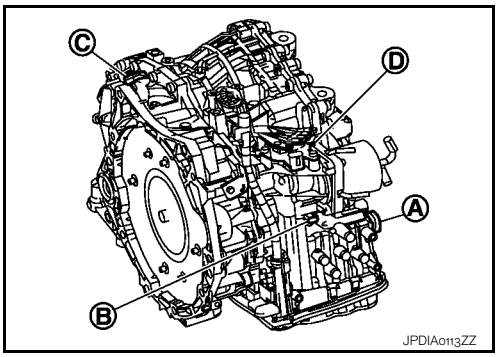
REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air breather hose. Refer to TM-345, "Exploded View".
3. Remove air duct (inlet). Refer to EM-144, "Exploded View".
4. Remove battery. Refer to PG-118, "Exploded View".

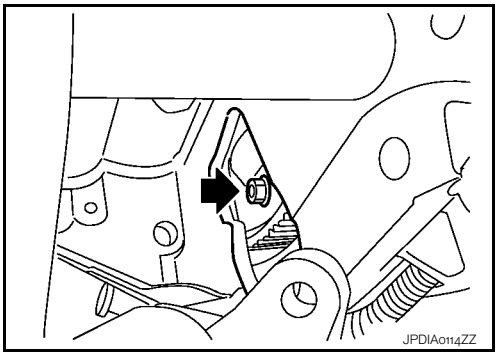
5. Disconnect connectors (A) and then remove bracket (1).
6. Remove air cleaner case. Refer to EM-144, "Exploded View".
7. Drain engine coolant.
8. Remove CVT fluid level gauge.
9. Remove CVT fluid charging pipe from transaxle assembly.
10. Remove O-ring from CVT fluid charging pipe.



11. Disconnect fluid cooler hose from transaxle assembly. Refer to TM-348, "FLUID COOLER : Exploded view".
12. Disconnect following harness connector and wire harness.
    - CVT unit harness connector (A).
    - Primary speed sensor harness connector (B).
    - Secondary speed sensor harness connector (C).
    - PNP switch connector (D).
13. Remove harness and clip from the transaxle assembly.
14. Remove CVT water hose. Refer to TM-346, "WATER HOSE : Exploded View".
15. Remove control cable from transaxle assembly. Refer to TM-330, "Exploded View".
16. Remove starter motor. Refer to STR-25, "MR20DE MODELS : Exploded View".
17. Remove engine under cover with power tool.



18. Turn crankshaft, and remove the four tightening nuts (⬅) for drive plate and torque converter.
    CAUTION:
    When turning crankshaft, turn it clockwise as viewed from the front of the engine.
19. Remove exhaust front tube. Refer to EX-10, "Exploded View".
20. Separate the propeller shaft. Refer to DLN-110, "Exploded View".
21. Remove front drive shafts. Refer to FAX-22, "MR20DE MODELS : Exploded View".
22. Remove suspension member from vehicle. Refer to FSU-15, "Exploded View".



23. Remove transfer assembly from transaxle assembly with power tool. Refer to DLN-59, "CVT : Exploded View".
24. Support transaxle assembly with a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to collide against the drain plug.
25. Support engine assembly with a transmission jack.
    CAUTION:
    When setting the transmission jack, be careful not to collide against the drain plug.
26. Remove engine mounting insulator (LH). Refer to EM-198, "CVT : Exploded View".
27. Remove bolts fixing transaxle assembly to engine assembly.
28. Remove transaxle assembly from vehicle.
    CAUTION:
    - **Secure torque converter to prevent it from dropping.**
    - **Secure transaxle assembly to a transmission jack.**
29. Remove heater thermostat. Refer to CO-41, "Exploded View".

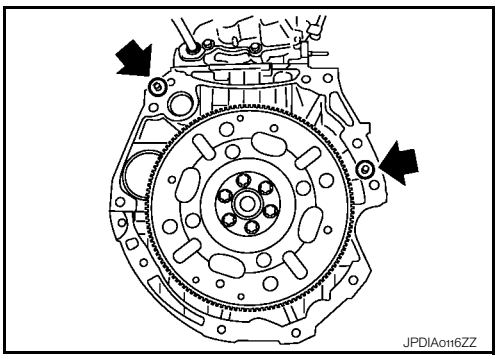
INSTALLATION

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

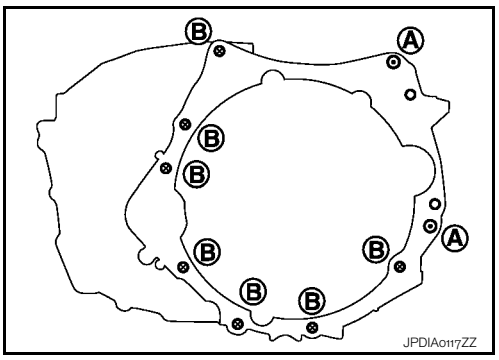
CAUTION:

- **Check fitting of dowel pin (⬅) when installing transaxle assembly to engine assembly.**



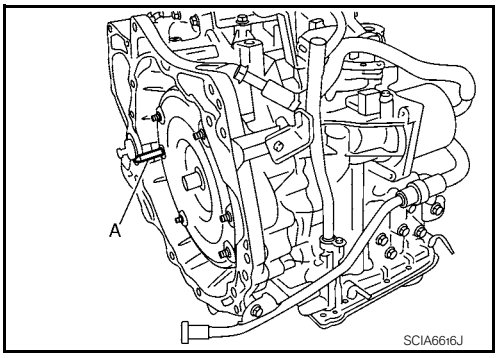
- **When installing transaxle assembly to the engine assembly, attach the fixing bolts in accordance with the following.**

A : Transaxle to engine
B : Engine to transaxle

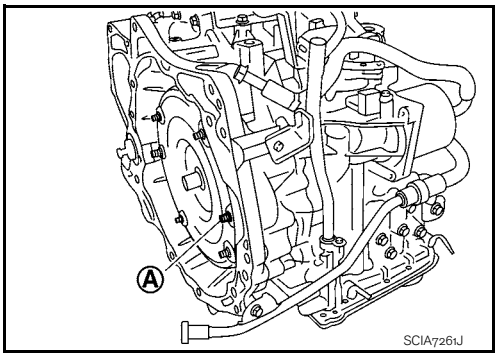


Bolt No.	A	B
Number of bolts	2	7
Bolt length " ℓ " mm (in)	55 (2.17)	50 (1.97)
Tightening torque N·m (kg-m, ft-lb)	62 (6.3, 46)	

- Set and screw in the drive plate location guide (commercial service tool: 31197CA000) (A) onto the stud bolts for the torque converter locate.



- When not using drive plate location guide, rotate torque converter so that the stud bolt (A) for mounting the drive plate location guide of torque converter aligns with the mounting position of starter motor.

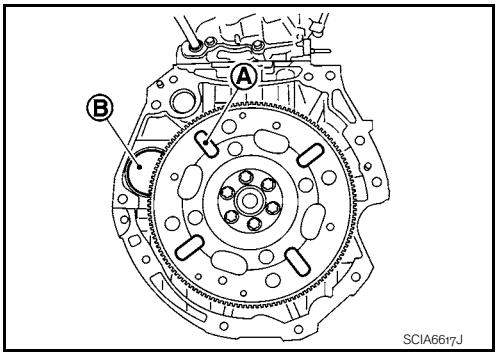


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- Rotate crankshaft so that the hole (A) for inserting drive plate location guide of drive plate aligns with the mounting position (B) of starter motor.

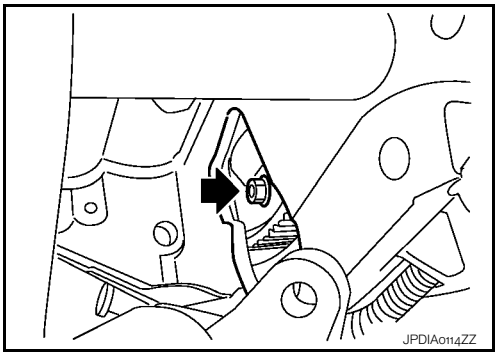
NOTE:
When not using drive plate location guide, insert stud bolt of torque converter into the hole of drive plate, aligning the drive plate hole position and torque converter.

CAUTION:
Note that the stud bolt strikes the drive plate hole position is not aligned the torque converter stud bolt.



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

:51 N·m (5.2 kg-m,38 ft-lb)



CAUTION:
- **When turning crankshaft, turn it clockwise as viewed from the front of the engine.**
- **When tightening the tightening nuts for the torque converter after fixing the crankshaft pulley bolts, confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-163, "Removal and Installation".**
- **After converter is installed to drive plate, rotate crankshaft several turns and check that transaxle rotates freely without binding.**

4WD : Inspection

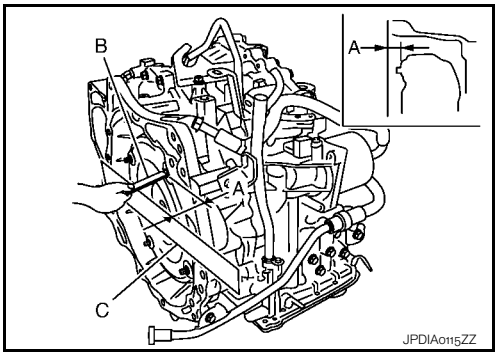
INFOID:0000000001116418

INSPECTION BE FORE INSTALLATION

- After inserting a torque converter to the CVT, check distance (A) with in the reference value limit.

B : Scale
C : Straightedge

Distance (A) : Refer to TM-362, "Removal and Installation".



INSPECTION AFTER INSTALLATION

- After completing installation, check the following item.
- CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".
- CVT position. Refer to TM-324, "Inspection and Adjustment".

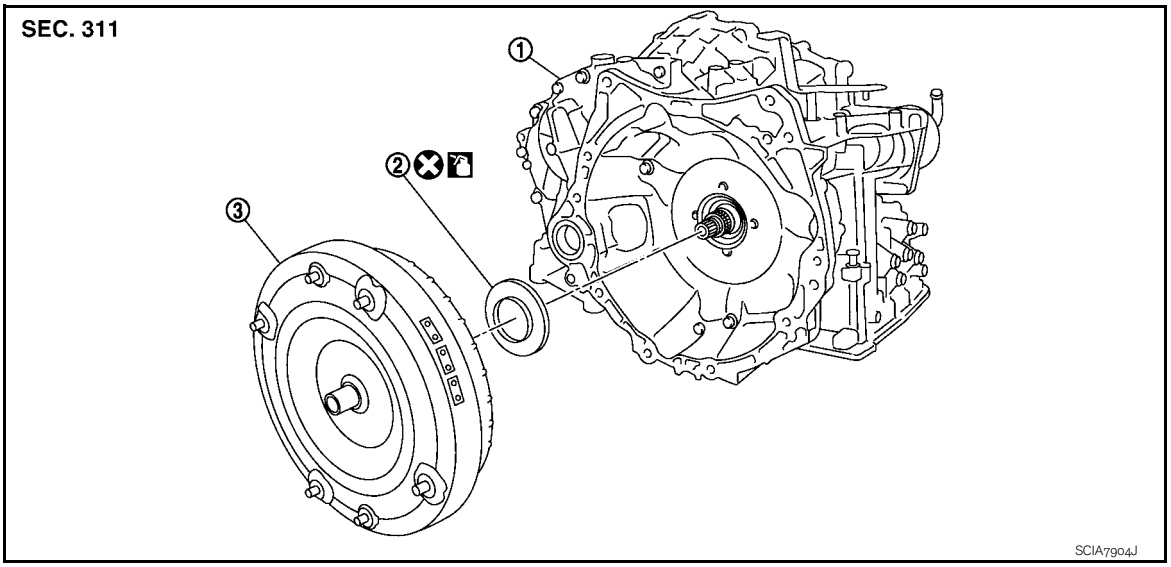
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DISASSEMBLY AND ASSEMBLY

TORQUE CONVERTER AND CONVERTER HOUSING OIL SEAL

Exploded View

INFOID:0000000000987937



1. Transaxle assembly
2. Converter housing oil seal
3. Torque converter

: Apply CVT Fluid NS-2.

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

Disassembly

INFOID:0000000000987938

1. Remove transaxle assembly. Refer to TM-351, "2WD : Exploded View" (2WD), TM-354, "4WD : Exploded View" (4WD).
2. Remove torque converter from transaxle assembly.
   CAUTION:
   Never damage bush on the inside of torque converter sleeve when removing torque converter.
3. Remove converter housing oil seal using a flat-bladed screwdriver.
   CAUTION:
   Be careful not to scratch converter housing.

Assembly

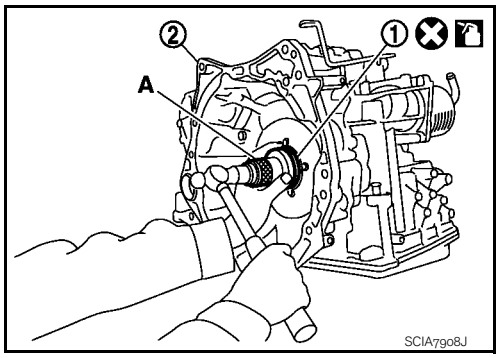
INFOID:0000000000987939

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

- Drive converter housing oil seal (1) evenly using a drift (A) (commercial service tool) so that converter housing oil seal protrudes by the dimension (B" respectively.

Unit: mm (in)

Commercial service tool: A	Outer diameter: 65 (2.56)
	Inner diameter: 60 (2.36)

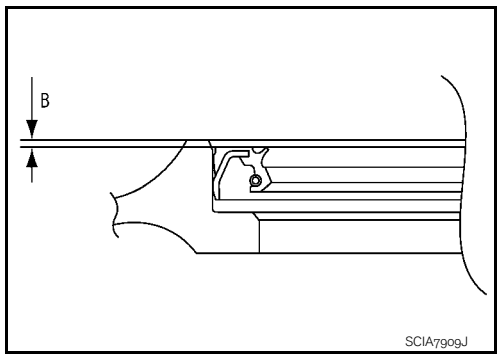


2 : Transaxle assembly

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Unit: mm (in)

Dimension B	1.0 ± 0.5 (0.039 ± 0.020)

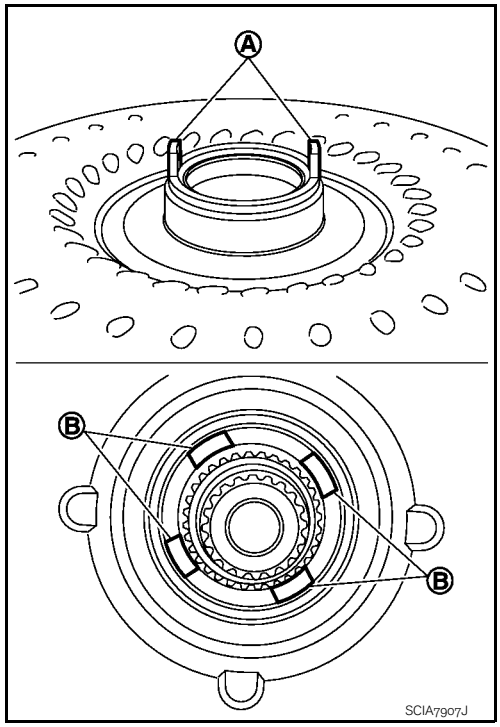


NOTE:
Converter housing oil seal pulling direction is used as the reference.

- After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-314, "Inspection".

- Attach the pawl (A) of the torque converter to the drive sprocket hole (B) on the transaxle assembly side.

CAUTION:
- **Rotate the torque converter for installing torque converter.**
- **Never damage the bushing inside the torque converter sleeve when installing the converter housing oil seal.**



Inspection

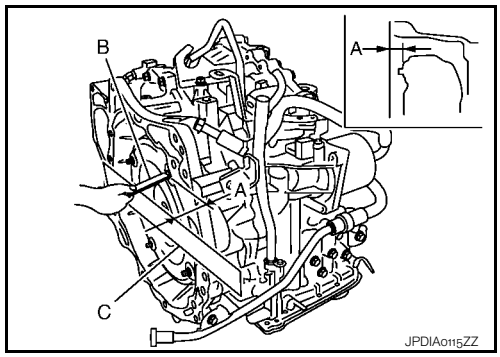
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INSPECTION AFTER INSTALLATION

- After inserting a torque converter to the CVT, check distance (A) with in the reference value limit.

B : Scale
C : Straightedge

Distance (A) : Refer to TM-362, "Removal and Installation".



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SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000000914729

Applied model		MR20DE	
		2WD	4WD
CVT model		RE0F10A	
CVT assembly	Model code number	1XF0D	1XF0E
Transmission gear ratio	D range	2.349 – 0.394	
	Reverse	1.750	
	Final drive	6.466	
Recommended fluid		NISSAN CVT Fluid NS-2*1	
Fluid capacity		8.3 liter (7-1/4 Imp qt)	

CAUTION:

- **Use only Genuine NISSAN CVT Fluid NS-2. Do not mix with other fluid.**
- **Using CVT fluid other than Genuine NISSAN CVT Fluid NS-2 will deteriorate in driveability and CVT durability, and may damage the CVT, which is not covered by the warranty.**

*1: Refer to MA-21, "Fluids and Lubricants".

Vehicle Speed When Shifting Gears

INFOID:0000000000914730

Numerical value data are reference values.

(rpm)

Engine type	Throttle position	Shift pattern	Engine speed	
			At 40 km/h (25 MPH)	At 60 km/h (37 MPH)
MR20DE	8/8	“D” position	3,600 – 4,500	4,500 – 5,400
	2/8	“D” position	1,200 – 3,100	1,300 – 3,500

CAUTION:

Lock-up clutch is engaged when vehicle speed is approximately 18 km/h (11 MPH) to 90 km/h (56 MPH).

Stall Speed

INFOID:0000000000914731

Stall speed	2,500 – 3,000 rpm

Line Pressure

INFOID:0000000000914732

kPa (bar, kg/cm^2, psi)

Engine speed	Line pressure
	“R” or “D” positions
At idle	750 (7.50, 7.65, 108.8)
At stall	5,700 (57.00, 58.14, 826.5)*

*: Reference values

Solenoid Valves

INFOID:0000000000914733

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Name	Resistance (Approx.)	Terminal
Pressure control solenoid valve B (secondary pressure solenoid valve)	3.0 – 9.0 Ω	3
Pressure control solenoid valve A (line pressure solenoid valve)		2
Torque converter clutch solenoid valve		12
Lock-up select solenoid valve	17.0 – 38.0 Ω	13

CVT Fluid Temperature Sensor

INFOID:0000000000914734

Name	Condition	CONSULT-III "DATA MONITOR" (Approx.)	Resistance (Approx.)
CVT fluid temperature sensor	20°C (68°F)	2.0 V	6.5 kΩ
	80°C (176°F)	1.0 V	0.9 kΩ

Primary Speed Sensor

INFOID:0000000000914735

Name	Condition	Data (Approx.)
Primary speed sensor	When driving ["M1" position, 20 km/h (12 MPH)]	800 Hz

Secondary Speed Sensor

INFOID:0000000000914736

Name	Condition	Data (Approx.)
Secondary speed sensor	When driving ["D" position, 20 km/h (12 MPH)]	500 Hz

Removal and Installation

INFOID:0000000000914737

Distance between end of converter housing and torque converter	14.4 mm (0.567 in)

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