SECTION MT
MANUAL TRANSAXLE

CONTENTS

SERVICE INFORMATION

PRECAUTIONS

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

INFOID:0000000004786253

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:

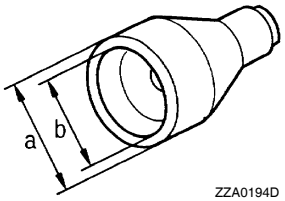
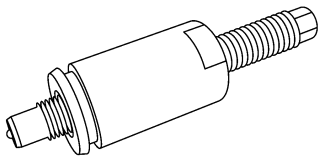
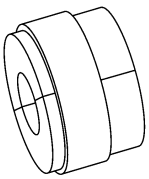
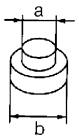
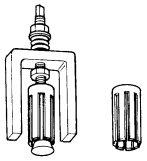
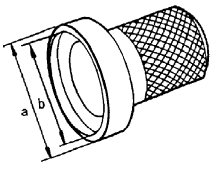
- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal 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.**
- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

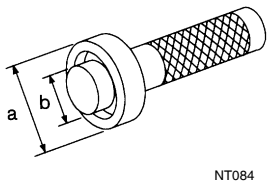
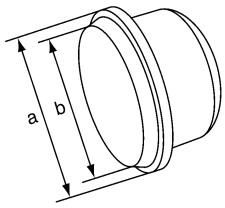
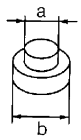
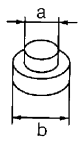
PREPARATION

Special Service Tools

INFOID:0000000004784217

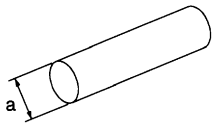
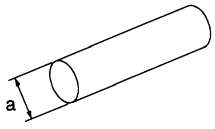
The actual shapes of tools may differ from those of special service tools illustrated here.

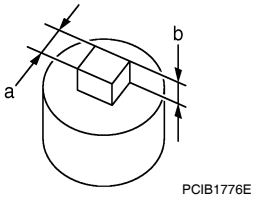
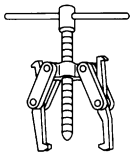
Tool number (Kent-Moore No.) Tool name	Description
ST27862000 (—) Drift  ZZA0194D	Installing differential side oil seal **a: 62.5 mm (2.461 in) dia.** **b: 49 mm (1.93 in) dia.**
KV32300QAC (—) Puller  SCIA1781J	Removing 5th main gear
KV32300QAD (—) Puller  SCIA1782J	Removing 5th main gear
ST35300000 (—) Drift  ZZA0969D	• Removing and installing input shaft rear bearing • Removing and installing mainshaft rear bearing **a: 45 mm (1.77 in) dia.** **b: 59 mm (2.23 in) dia.**
KV111011S0 (—) Valve seat remover  ZZA0872D	Removing mainshaft front bearing
ST33400001 (J-26082) Drift  ZZA0814D	Installing mainshaft front bearing **a: 60 mm (2.36 in) dia.** **a: 47 mm (1.85 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description
KV40100900 (—) Drift  NT084	Installing input shaft front bearing **a: 52 mm (2.05 in) dia.** **a: 39.5 mm (1.55 in) dia.**
KV32300QAE (—) Drift  SCIA1783J	Installing differential side bearing outer race **a: 65 mm (2.56 in) dia.** **a: 63 mm (2.48 in) dia.**
ST33052000 (—) Drift  ZZA0969D	Removing differential side bearing **a: 22 mm (0.87 in) dia.** **a: 28 mm (1.10 in) dia.**
KV40104920 (—) Drift  ZZA0969D	Installing differential side bearing **a: 21.7 mm (0.85 in) dia.** **a: 44.7 mm (1.76 in) dia.**

Commercial Service Tools

INFOID:0000000004784218

Tool name	Description
Drift  S-NT063	Removing input shaft front bearing **a: 38 mm (1.50 in) dia.**
Drift  S-NT063	Installing bushing **a: 14.5 mm (0.571 in) dia.**

Tool name	Description
Socket  PCIB1776E	Removing and installing drain plug **a: 8 mm (0.31 in)** **b: 5 mm (0.20 in)**
Puller  NT077	• Removing 5th-reverse synchronizer hub • Removing differential side bearing
Bearing remover  S-NT134	Removing bushing

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000004784215

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.

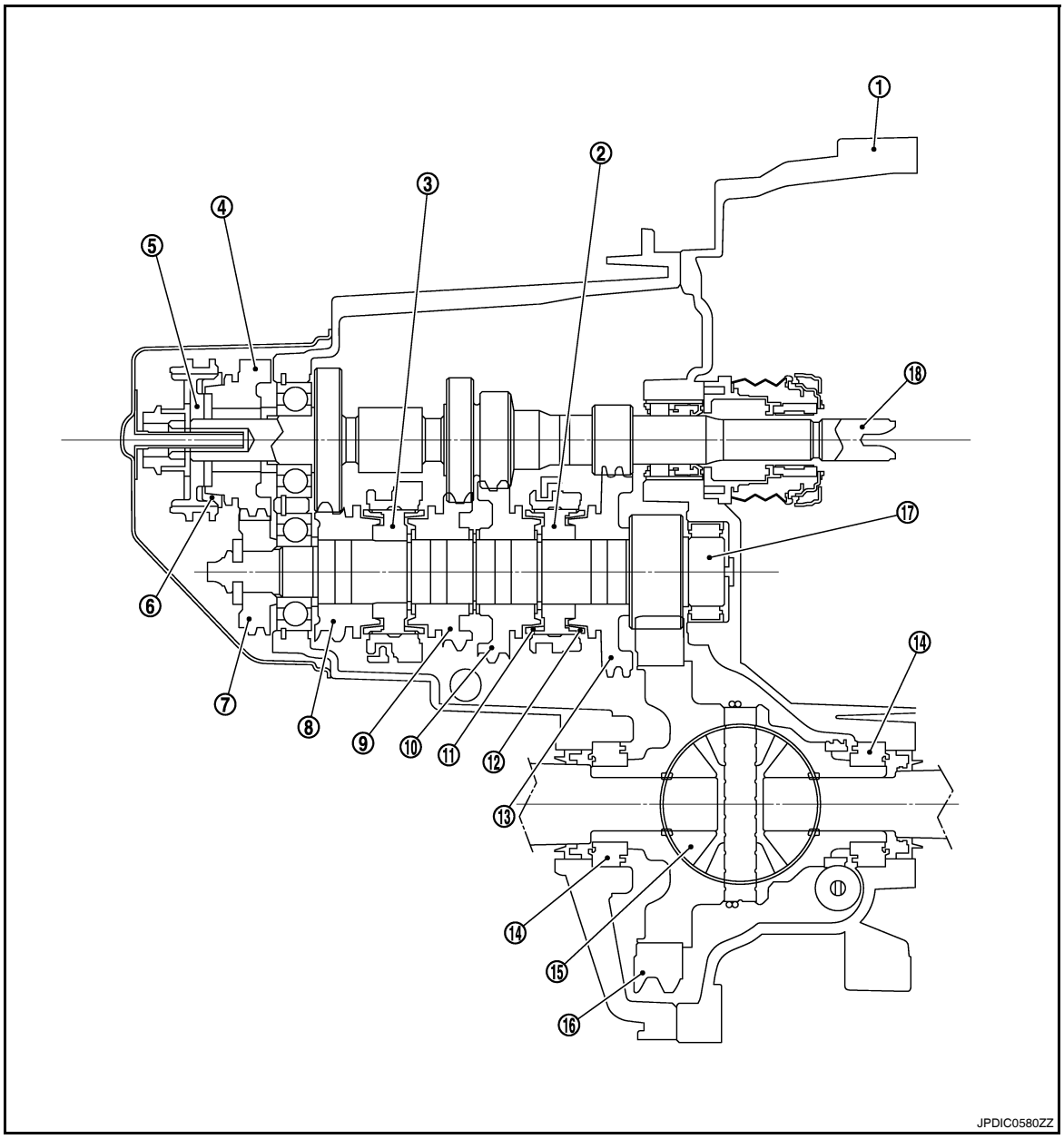
Reference page		MT-17			MT-17			MT-13	MT-17	MT-17			
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	O-RING (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn 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			

DESCRIPTION

System Diagram

INFOID:0000000004784209

CROSS-SECTIONAL VIEW



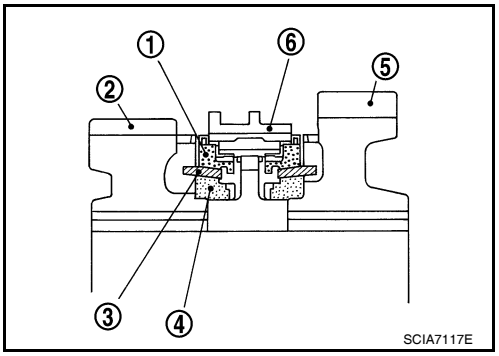
1. Clutch housing
2. 1st-2nd synchronizer hub assembly
3. 3rd-4th synchronizer hub assembly
4. 5th input gear
5. 5th-reverse synchronizer hub assembly
6. 5th-reverse baulk ring
7. 5th main gear
8. 4th main gear
9. 3rd main gear
10. 2nd main gear
11. 2nd double cone synchronizer
12. 1st double cone synchronizer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

System Description

INFOID:0000000004784210

DOUBLE-CONE SYNCHRONIZER

Double-cone synchronizer is adopted for 1st and 2nd gears to reduce operating force of the shift lever.
(1): Outer baulk ring
(2): 2nd main gear
(3): Synchronizer cone
(4): Inner baulk ring
(5): 1st main gear
(6): 1st-2nd coupling sleeve



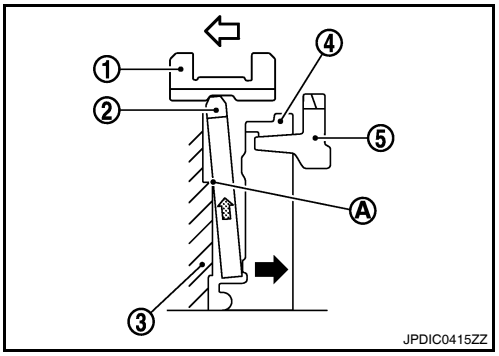
REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

Description

Soon after the clutch is disengaged, the input shaft is still rotating due to inertia. This may cause a gear noise when the gear is shifted to reverse position. The reverse gear noise prevention function stops the rotation of the input shaft and enables smooth gear shifting when the reverse gear is selected.

Operation Principle

1. When the gear is shifted to reverse position, 5th-reverse coupling sleeve (1) slides in the reverse direction( )
   5: 5th input gear
2. Synchronizer levers (2) with support point (A) at 5th-reverse synchronizer hub (3) presses 5th-reverse baulk ring (4).( )
3. Friction that is generated at 5-reverse baulk ring presses synchronizer lever on 5th-reverse coupling sleeve. ( )
4. 5th-reverse coupling sleeve that is presses by synchronizer lever stops the rotation of input shaft.

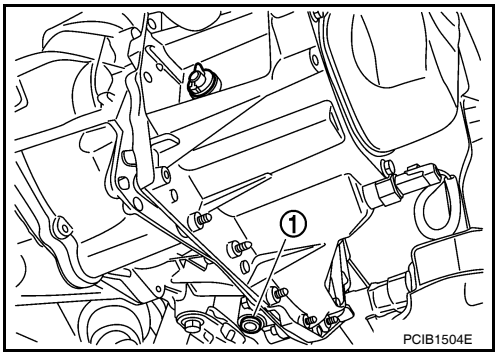


M/T OIL

Draining

INFOID:0000000004784220

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and drain oil.
3. Set a new gasket on drain plug (1) and install it to transaxle and tighten drain plug to the specified torque. Refer to MT-17, "Disassembly and Assembly".
   CAUTION:
   Do not reuse gasket.



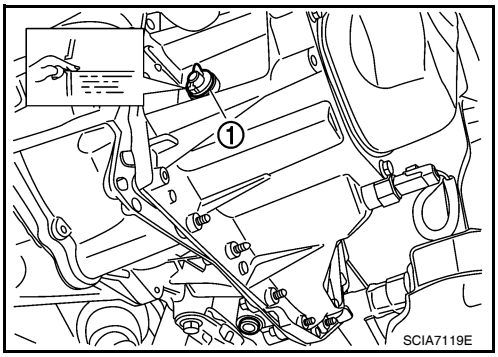
Refilling

INFOID:0000000004784221

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

   Oil grade and capacity : Refer to MA-14, "Fluids and Lubricants".

2. After refilling oil, check oil level.
3. Set a new gasket on filler plug (1), then install it to transaxle and tighten to the specified torque. Refer to MT-17, "Disassembly and Assembly".
   CAUTION:
   Do not reuse gasket.



Inspection

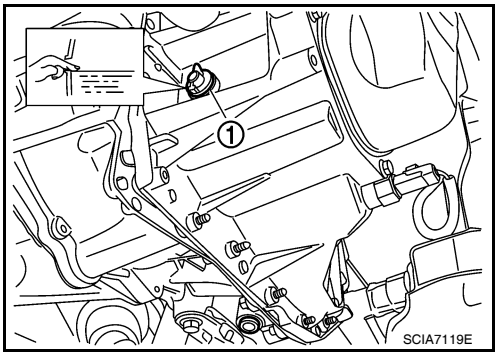
INFOID:0000000004784222

LEAKAGE

Make sure that 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:
   Do not start engine while checking oil level.
2. Set a new gasket on filler plug (1) and install it to the transaxle case.
   CAUTION:
   Do not reuse gasket.
3. Tighten filler plug to the specified torque. Refer to MT-17, "Disassembly and Assembly".



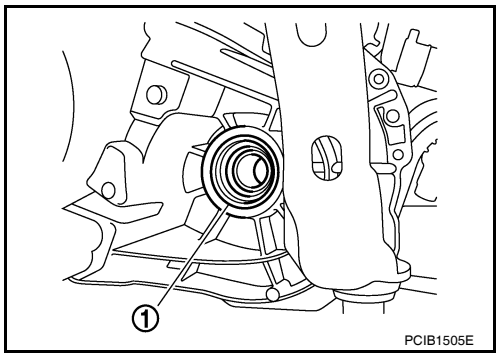
SIDE OIL SEAL

Removal and Installation

INFOID:0000000004784224

REMOVAL

1. Remove front drive shafts from transaxle assembly. Refer to FAX-9, "Removal and Installation (Left Side)" and FAX-10, "Removal and Installation (Right Side)".
2. Remove differential side oil seal (1) using suitable tool.
   CAUTION:
   Do not damage transaxle case or clutch housing.



INSTALLATION

Installation is in the reverse order of removal.

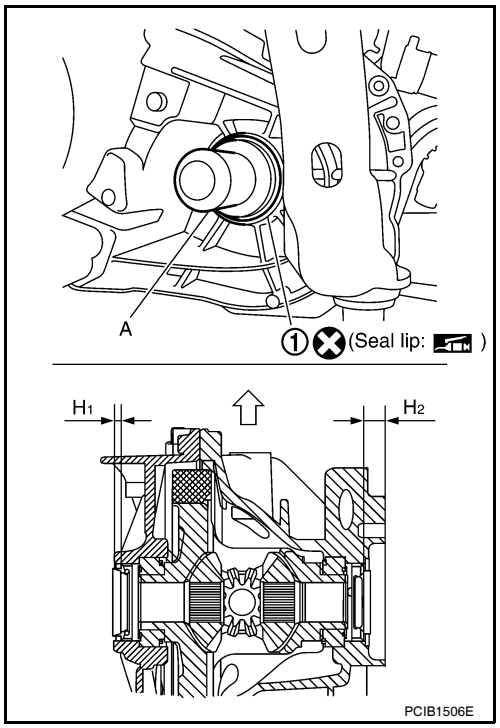
- ⇐: Front
- Install differential side oil seal (1) to clutch housing and transaxle case using Tool (A) as shown.

Tool number : ST27862000 (—)

Dimension (H_1) : 5.7 - 6.3 mm (0.224 - 0.248 in)
Dimension (H_2) : 2.4 - 3.0 mm (0.094 - 0.118 in)

CAUTION:
- **Do not reuse differential side oil seal.**
- **When installing, do not incline differential side oil seal.**
- **Do not damage clutch housing or transaxle case.**

- Check oil level and oil leakage after installation. Refer to MT-10, "Inspection".



POSITION SWITCH

Checking

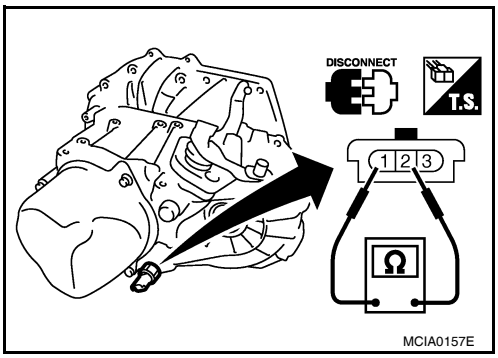
INFOID:0000000004786252

NOTE:
For removal and installation of the switches, refer to MT-17, "Disassembly and Assembly"

BACK-UP LAMP SWITCH

- Check continuity between terminals 1 and 2.

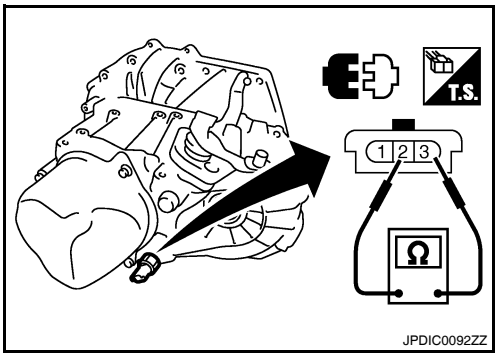
Gear position	Continuity
Reverse	Yes
Except reverse	No



PARK/NEUTRAL POSITION SWITCH

- Check continuity between terminals 2 and 3.

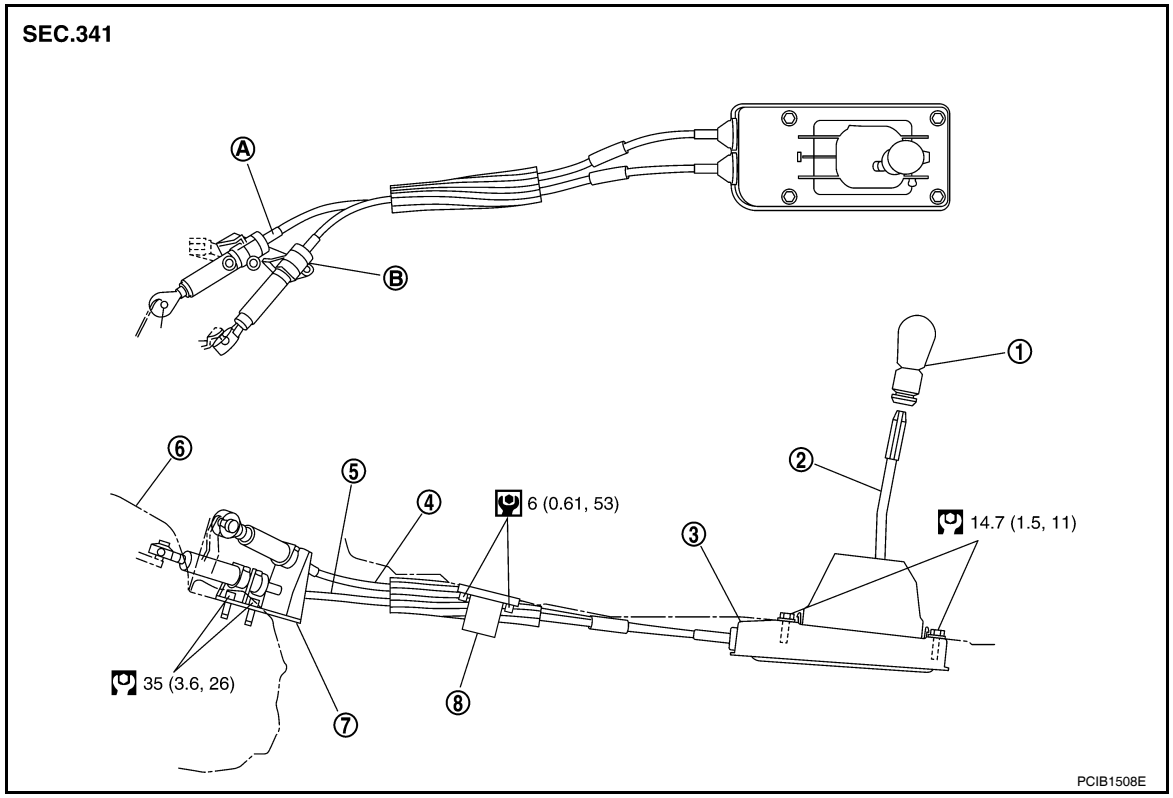
Gear position	Continuity
Neutral	Yes
Except neutral	No



CONTROL LINKAGE

Exploded View

INFOID:0000000004784225



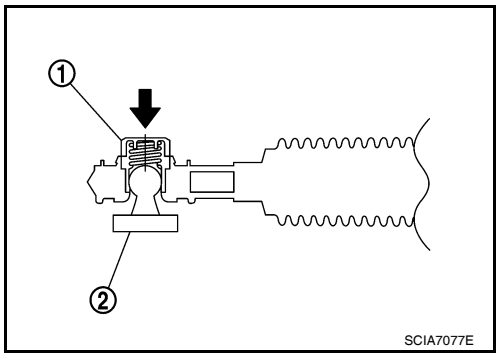
1. Control lever knob
2. Control lever
3. Control device assembly
4. Select cable
5. Shift cable
6. Clutch housing
7. Cable mounting bracket
8. Bracket
A: Black color
B: White color

Removal and Installation

INFOID:0000000004784226

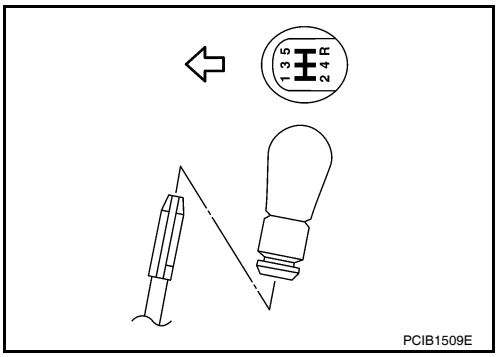
REMOVAL

1. Remove the battery. Refer to SC-7, "Removal and Installation".
2. Remove the air duct and air cleaner case. Refer to EM-26, "Removal and Installation" (HR16DE), or EM-139, "Removal and Installation" (MR18DE).
3. Press the release button (1) of select cable and shift cable, and then remove select cable and shift cable from lever of control shaft (2).
4. Shift control lever to neutral position.
5. Remove control lever knob.
6. Remove center console assembly. Refer to IP-12, "Removal and Installation".
7. Remove control device assembly bolts.
8. Remove exhaust front tube, center muffler and heat plate. Refer to EX-5, "Removal and Installation" (HR16DE), or EX-9, "Removal and Installation" (MR18DE).
9. Remove bracket.
10. Remove select cable and shift cable from cable mounting bracket.
11. Remove control device assembly from the vehicle.

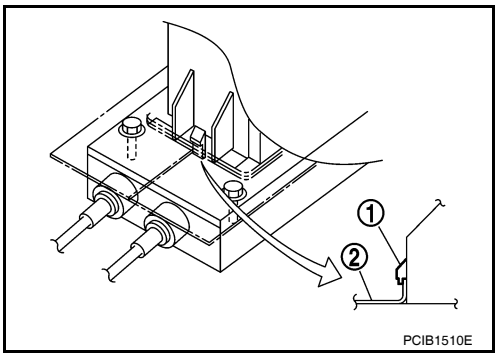


INSTALLATION

Installation is in the reverse order of removal.
- Shift the control lever to the neutral position.
- Securely assemble each the cables to each lever, mounting bracket, and the control device assembly.
- Be careful about the installation direction, and push control lever knob into control lever.
  ⇐: Front



- Make sure that the front/rear claws (1) of control device assembly are in contact with flange of the floor (2).



Inspection

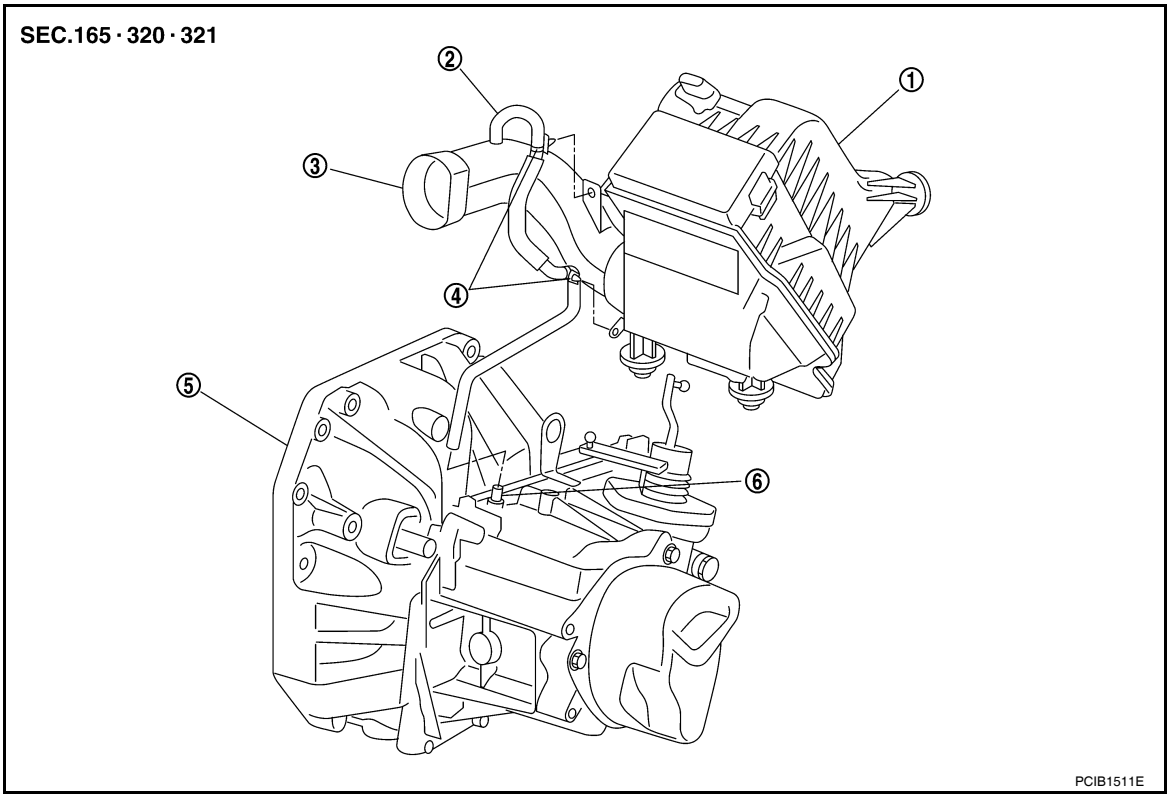
INFOID:0000000004784227

Inspect the following items:
- When control lever is selected to 1st-2nd side and 5th-reverse side, confirm 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.

AIR BREATHER HOSE

Exploded View

INFOID:0000000004784228



1. Air cleaner case
2. Air breather hose
3. Air duct
4. Clip
5. Transaxle assembly
6. Two way connector

Removal and Installation

INFOID:0000000004784229

REMOVAL

1. Remove the battery. Refer to SC-7, "Removal and Installation".
2. Remove the air duct and air cleaner case. Refer to EM-17, "Removal and Installation" (HR16DE), or EM-139, "Removal and Installation" (MR18DE).
3. Remove air breather hose.
   CAUTION:
   When air breather hose is removed, be sure to hold two way connector securely.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

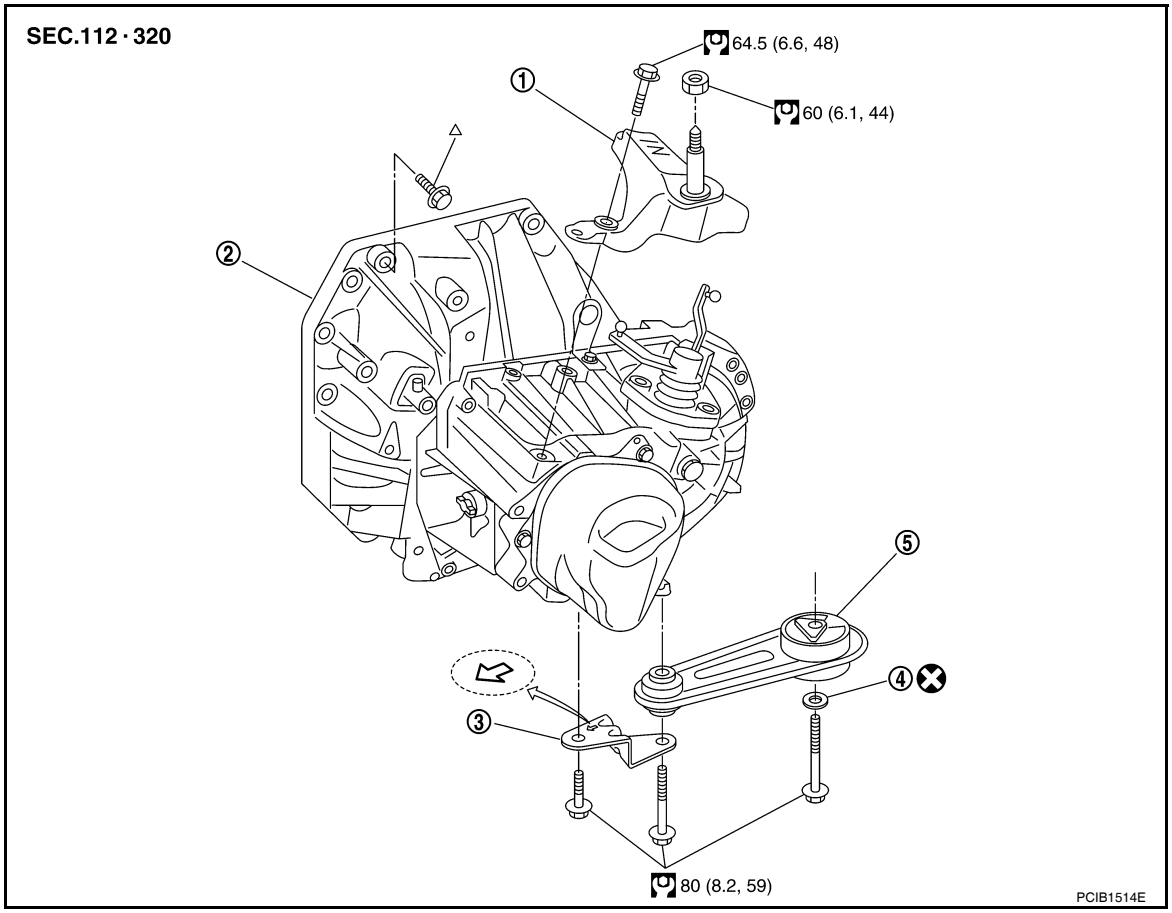
Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

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

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000004786260



1. LH engine mount bracket (transaxle side)
2. Transaxle assembly
3. Rear engine mount bracket
4. Washer
5. Rear torque rod
⇐: Front
: Refer to installation.

Removal and Installation

INFOID:0000000004786261

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. Refer to CL-12, "Removal and Installation".

REMOVAL

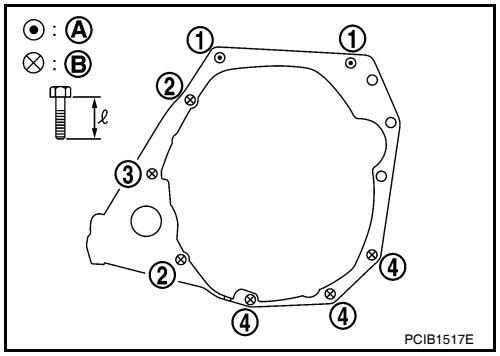
1. Drain gear oil. Refer to MT-10, "Draining" (RS5F91R), MT-52, "Changing M/T Oil" (RS6F94R).
2. Drain clutch fluid and remove clutch tube from CSC. Refer to CL-12, "Removal and Installation".
   CAUTION:
   Do not depress clutch pedal during removal procedure.
3. Remove the engine and transaxle as an assembly from the vehicle. Refer to EM-88, "Removal and Installation" (HR16DE), EM-195, "Removal and Installation" (MR18DE).
4. Remove the transaxle to engine and engine to transaxle bolts.
5. Separate the transaxle assembly from the engine.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Make sure the transaxle assembly does not interfere with the wire harnesses and clutch tube.**
- **When installing transaxle assembly, do not bring input shaft into contact with clutch cover.**
- **If transaxle is removed from the vehicle, always replace CSC. Refer to CL-12, "Removal and Installation".**
- When installing the transaxle assembly to the engine, install the bolts according to the following:
  (A): Transaxle to engine
  (B): Engine to transaxle



Bolt No.	1	2	3	4
Quantity	2	2	1	3
Bolt length "ℓ" mm (in)	55 (2.17)	49 (1.93)	69 (2.72)	55 (2.17)
Tightening torque N·m (kg-m, ft-lb)	48.0 (4.9, 35)			

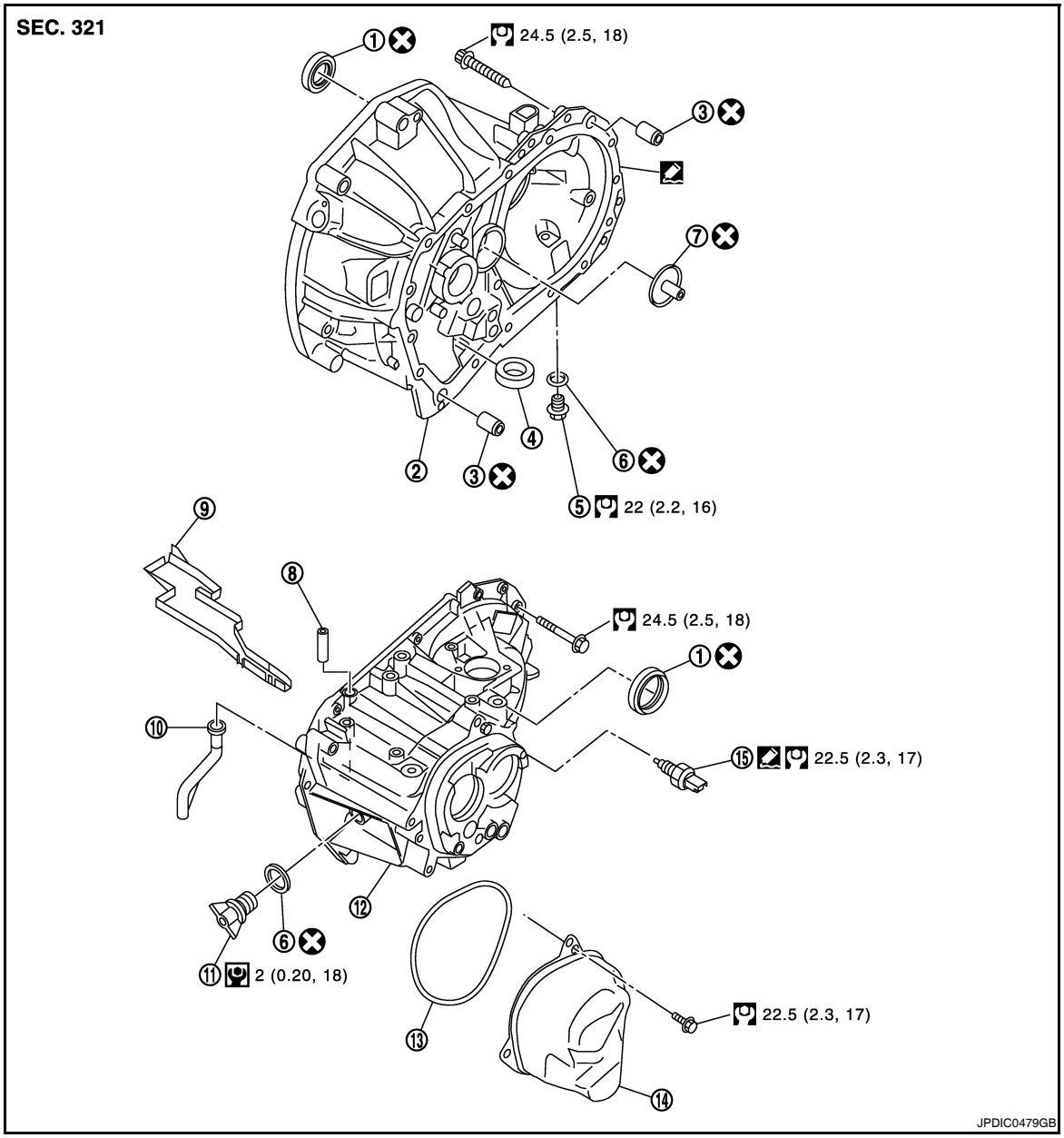
- After installation perform the following:
- Bleed the air from the clutch hydraulic system. Refer to CL-8, "Air Bleeding Procedure".
- Check for oil leakage and oil level. Refer to MT-10, "Inspection".
- Check the control linkage. Refer to MT-14, "Inspection".

Disassembly and Assembly

INFOID:0000000004784232

COMPONENTS

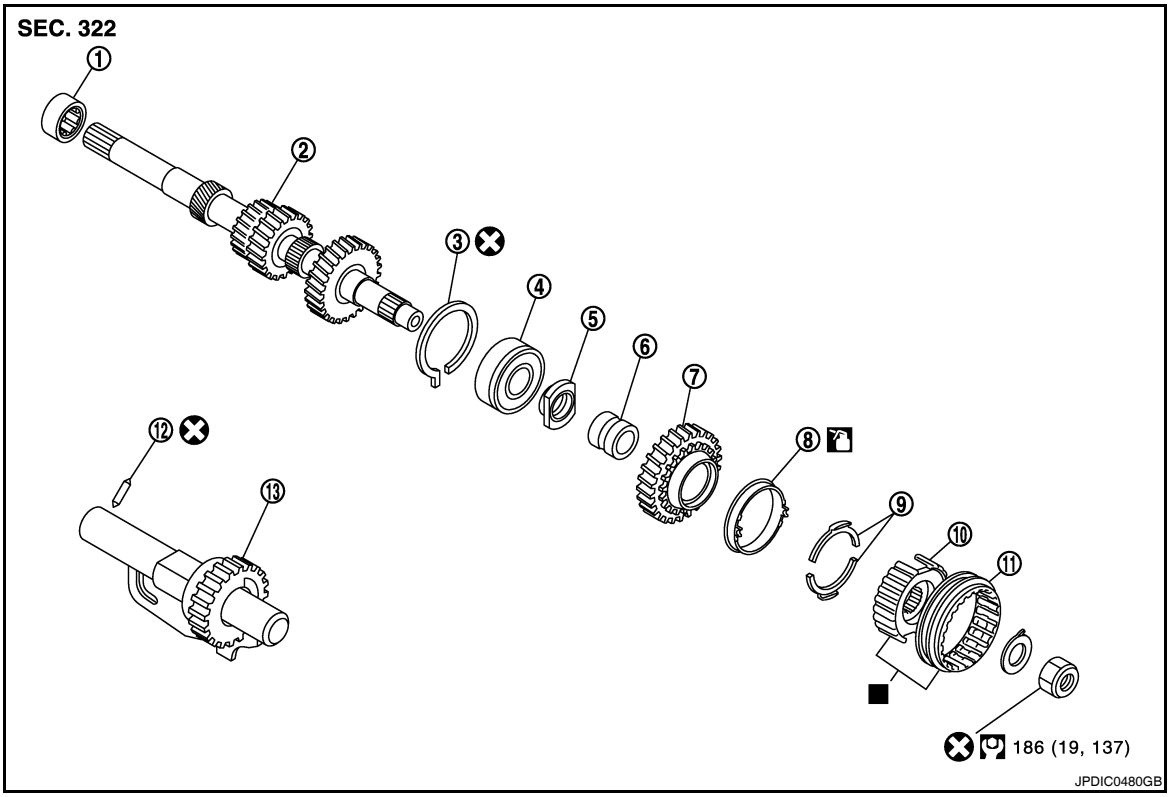
Case and Housing Component



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

: Apply Genuine Silicone RTV or an equivalent. Refer to XX-XX, "*****".

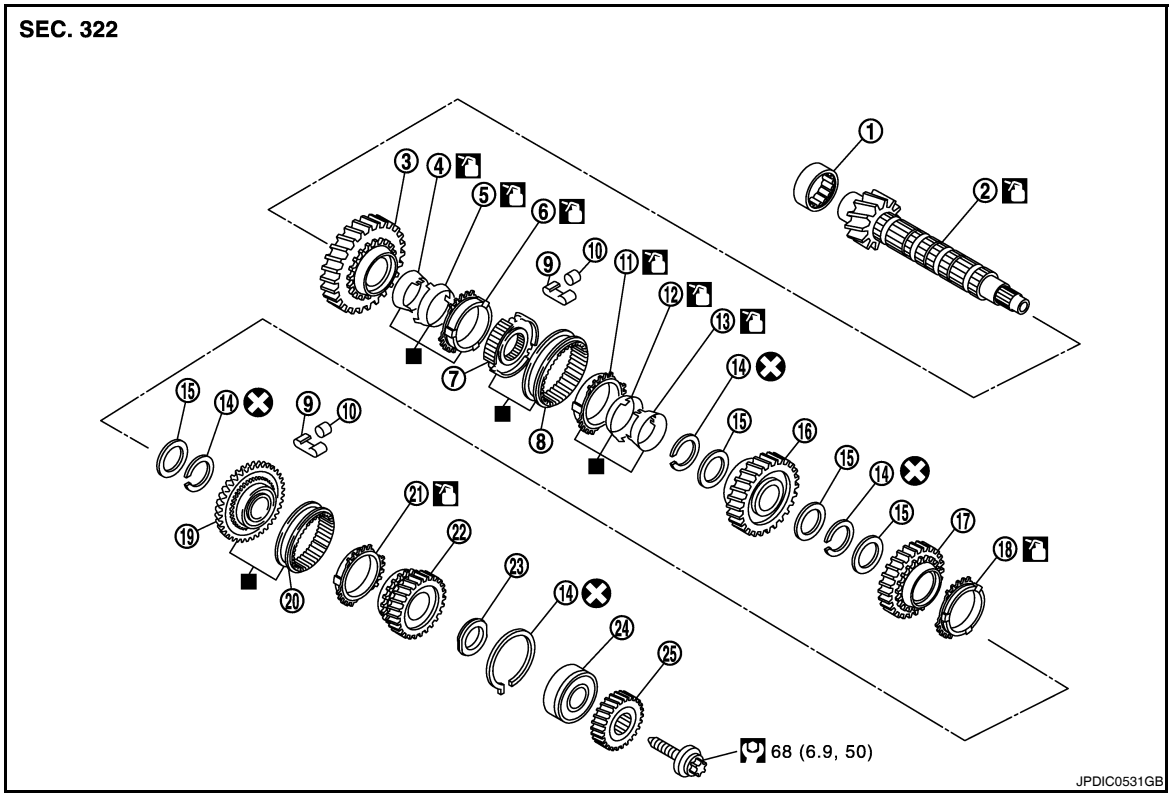
Gear Component



1. Input shaft front bearing
2. Input shaft
3. Snap ring
4. Input shaft rear bearing
5. Adapter plate
6. Bushing
7. 5th input gear
8. 5th-reverse baulk ring
9. Synchronizer lever
10. 5th-reverse synchronizer hub
11. 5th-reverse coupling sleeve
12. Retaining pin
13. Reverse gear assembly

: Apply gear oil.

: Replace the parts as a set.

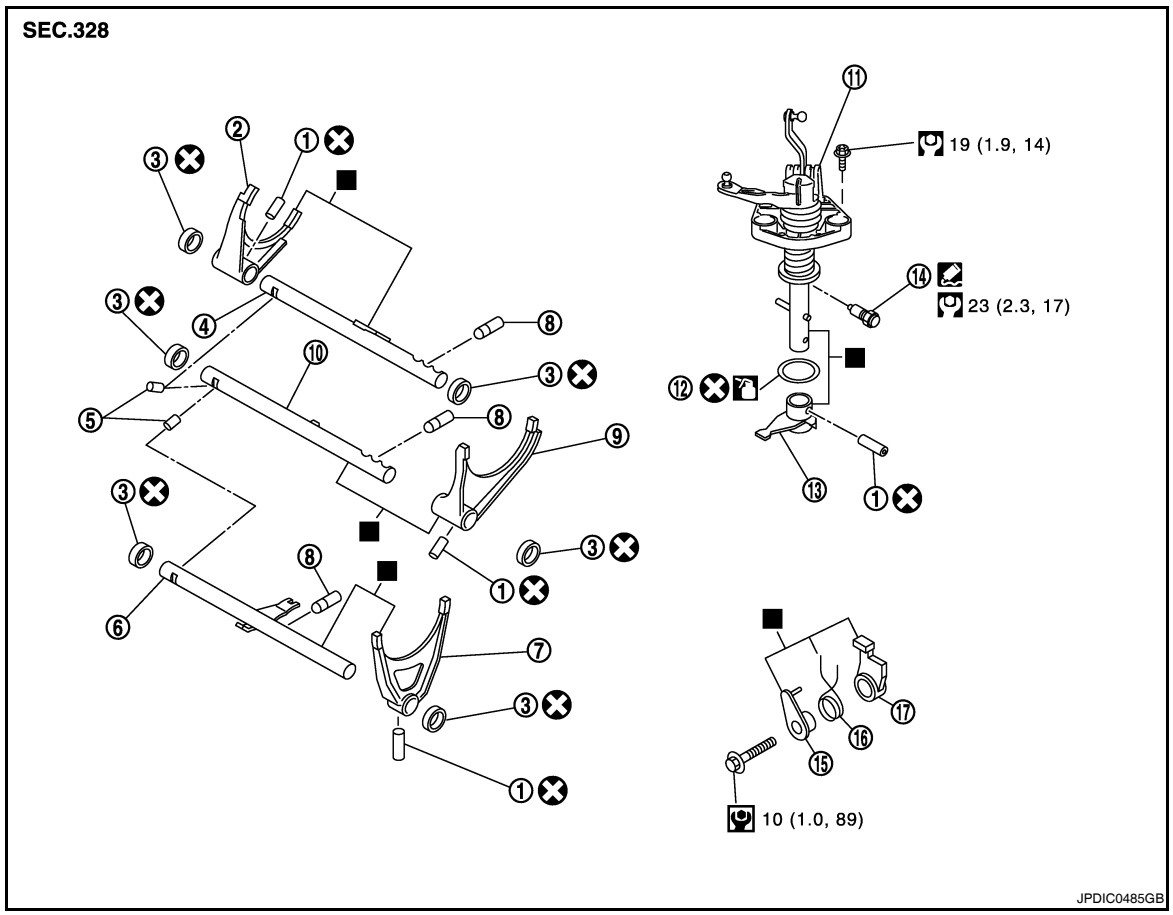


1. Mainshaft front bearing
2. Mainshaft
3. 1st main gear
4. 1st inner baulk ring
5. 1st synchronizer cone
6. 1st outer baulk ring
7. 1st-2nd synchronizer hub
8. 1st-2nd coupling sleeve
9. Spring
10. Insert key
11. 2nd outer baulk ring
12. 2nd synchronizer cone
13. 2nd inner baulk ring
14. Snap ring
15. Thrust washer
16. 2nd main gear
17. 3rd main gear
18. 3rd baulk ring
19. 3rd-4th synchronizer hub
20. 3rd-4th coupling sleeve
21. 4th baulk ring
22. 4th main gear
23. Spacer
24. Mainshaft rear bearing
25. 5th main gear

: Apply gear oil.

: Replace the parts as a set.

Shift Control Component



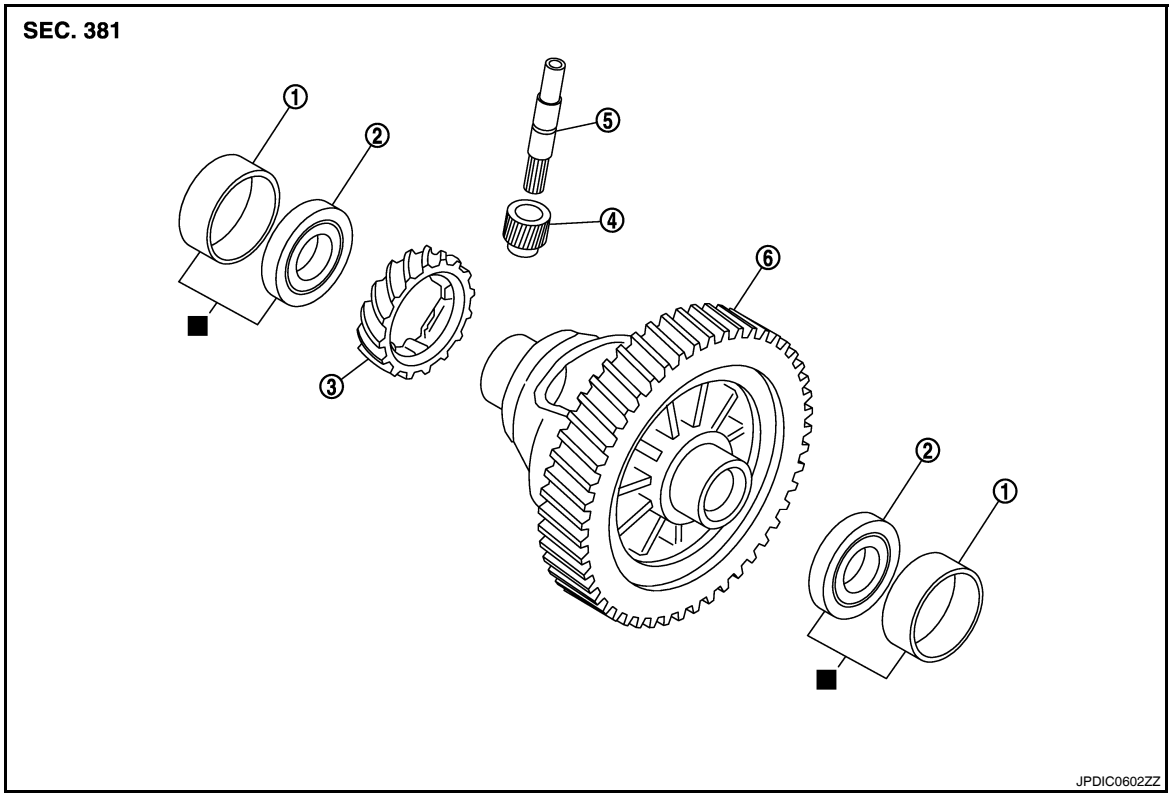
1. Retaining pin
2. 1st-2nd shift fork
3. Bushing
4. 1st-2nd fork rod
5. Lock pin
6. 5th-reverse fork rod
7. 5th-reverse shift fork
8. Check ball
9. 3rd-4th shift fork
10. 3rd-4th fork rod
11. Control shaft
12. O-ring
13. Selector
14. Check ball plug
15. Bushing
16. Spring
17. Gear catch

: Apply gear oil.

: Apply Genuine Silicone RTV or an equivalent. Refer to XX-XX, "******".

: Replace the parts as a set.

Final Drive Component

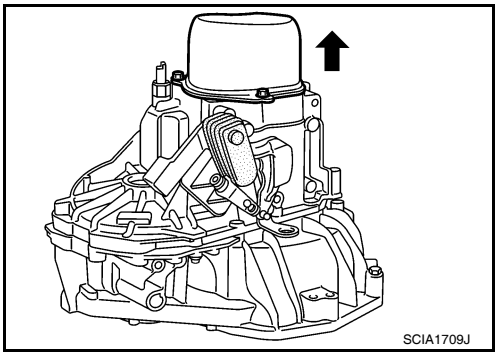


1. Differential side bearing outer race
2. Differential side bearing
3. Speedometer drive gear
4. Pinion gear
5. Pinion shaft
6. Final drive assembly

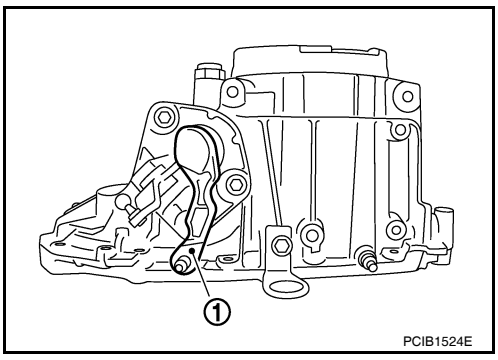
: Replace the parts as a set.

DISASSEMBLY

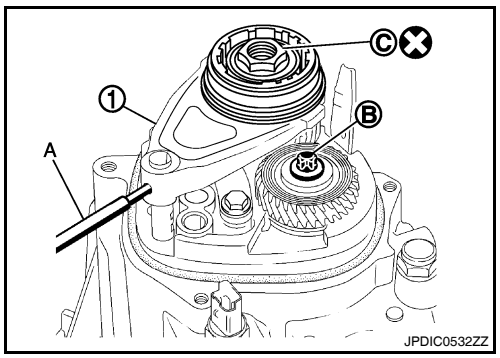
1. Remove drain plug and gasket from clutch housing using a suitable tool and drain gear oil.
2. Remove filler plug and gasket from transaxle case.
3. Remove rear housing and O-ring.
   CAUTION:
   Remove to axial direction of input shaft ( ) because rear housing oil channel is inserted to input shaft center hole.



4. Shift control shaft shift lever (1) to the 3rd gear position.
   NOTE:
   - If it is not shifted to the 3rd gear position, transaxle case cannot be removed from clutch housing.
   - The 3rd gear position means that control shaft select lever is fully rotated clockwise and it is returned approximately 10 degrees.



5. Remove 5th-reverse shift fork (1) and 5th-reverse coupling sleeve according to the following procedures.



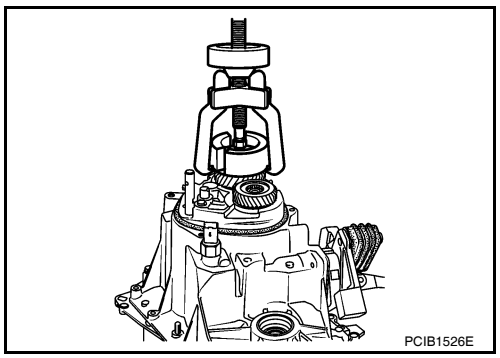
a. Remove retaining pin from 5th-reverse shift fork using a suitable tool (A).
b. Press 5th-reverse shift fork, shift to 5th, and then engage it with 3rd gear.
c. Remove bolt (B).
d. Remove nut (C) and washer.

CAUTION:
Never use an impact wrench for removal, or otherwise each gear may be damaged.

e. Remove 5th-reverse shift fork and 5th-reverse coupling sleeve from 5th-reverse synchronizer hub.

6. Remove 5th-reverse synchronizer hub from input shaft using a suitable tool.

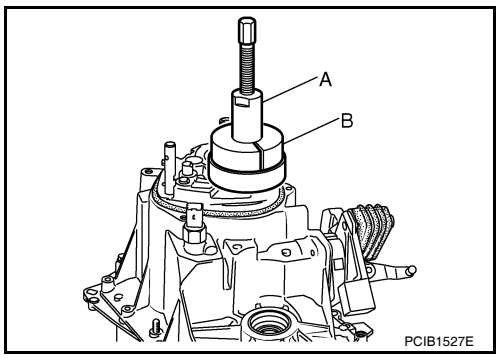
CAUTION:
Set claw of the puller to the wider side of the hub when setting the puller in 5th-reverse synchronizer hub.



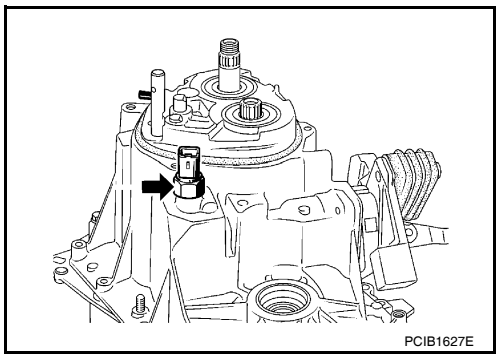
7. Remove synchronizer levers, 5th-reverse baulk ring, 5th input gear, bushing, and adapter plate from input shaft.

8. Remove 5th main gear from mainshaft using the pullers.

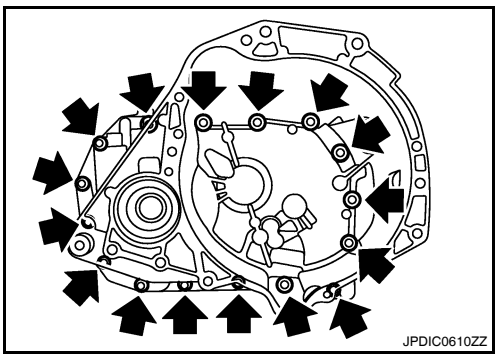
Tool number
A: KV32300QAC (—)
B: KV32300QAD (—)



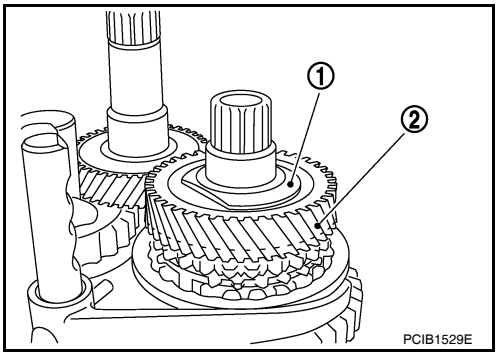
9. Remove position switch from transaxle case.



10. Remove transaxle case bolts ( ).
11. Remove transaxle case from clutch housing.

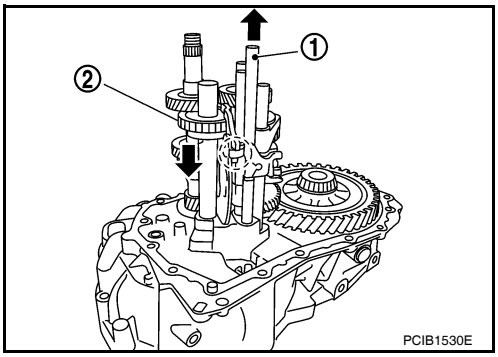


12. Remove spacer (1) and 4th main gear (2) from mainshaft.



13. Remove 5th-reverse fork rod (1) according to the following procedures.

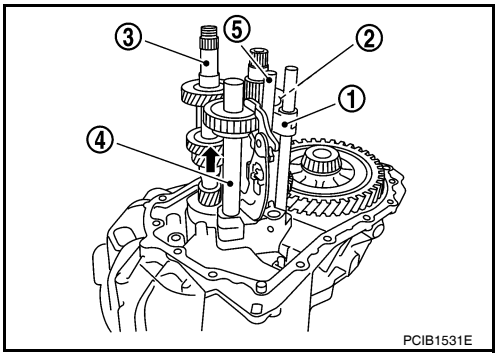
a. Pull 5th-reverse fork rod up until it contacts claw ( ) of reverse gear assembly (2).
b. Press gear portion of reverse gear assembly down, and then remove 5th-reverse fork rod from clutch housing.

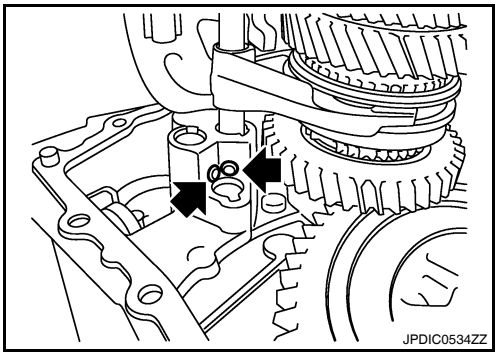


14. Remove 3rd-4th fork rod assembly (1), 3rd-4th coupling sleeve (2), and input shaft assembly (3) according to the following procedures.

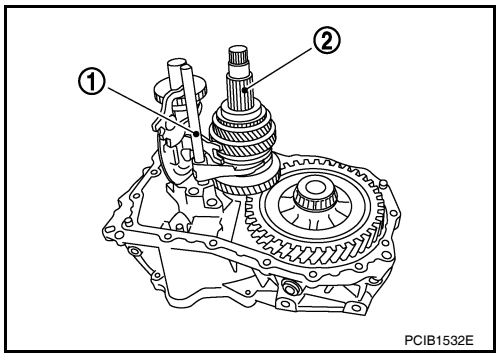
a. Remove 4th baulk ring, insert keys, and springs from mainshaft.
b. Pull gear of reverse gear assembly (4) up.
c. Pull 1st-2nd fork rod (5) up, and then maintain the neutral position.
d. Remove 3rd-4th fork rod assembly, 3rd-4th coupling sleeve, and input shaft assembly from clutch housing at the same time.

15. Remove retaining pin from 3rd-4th shift fork using a suitable tool.
16. Remove 3rd-4th shift fork from 3rd-4th shift fork rod.
17. Remove lock pins ( ) from clutch housing.

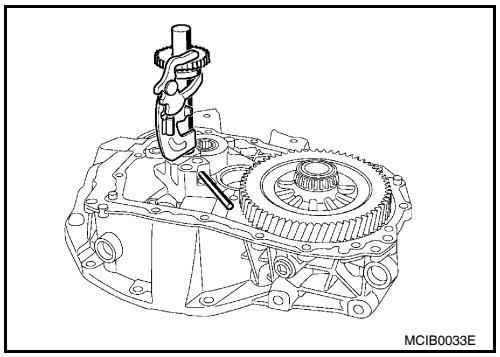




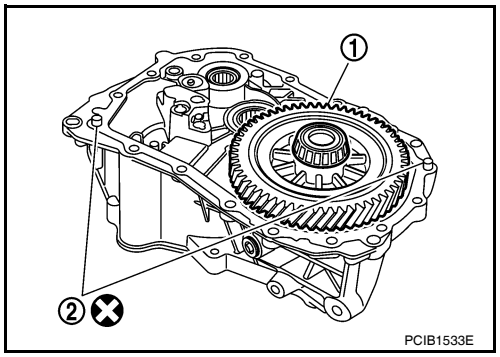
18. Remove 1st-2nd fork rod assembly (1) and mainshaft assembly (2) from clutch housing at the same time.
19. Remove retaining pin from 1st-2nd shift fork using a suitable tool.
20. Remove 1st-2nd shift fork from 1st-2nd shift fork rod.



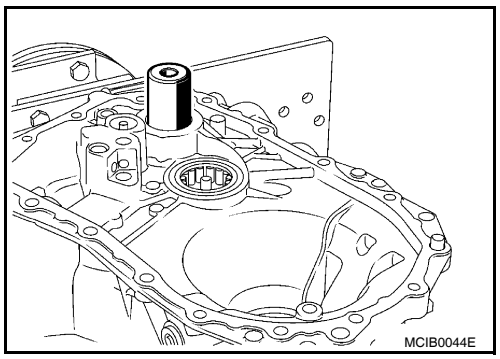
21. Remove retaining pin from reverse gear assembly using a suitable tool.
22. Remove reverse gear assembly from clutch housing.



23. Remove final drive assembly (1) from clutch housing.
24. Remove pinion shaft and pinion gear from clutch housing.
25. Remove magnet and dowel pins (2) from clutch housing.

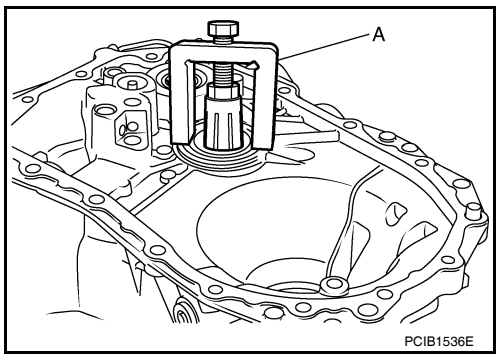


26. Remove input shaft front bearing from clutch housing using a suitable tool.

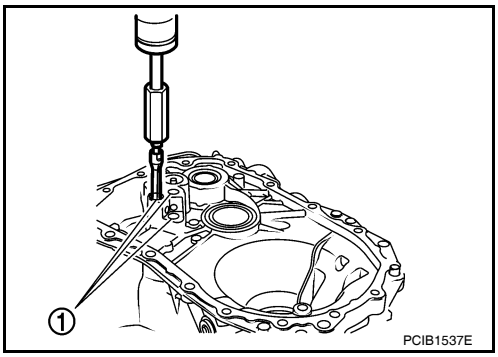


27. Cut oil channel tube at the root.
28. Remove mainshaft front bearing and oil channel from clutch housing using Tool (A).

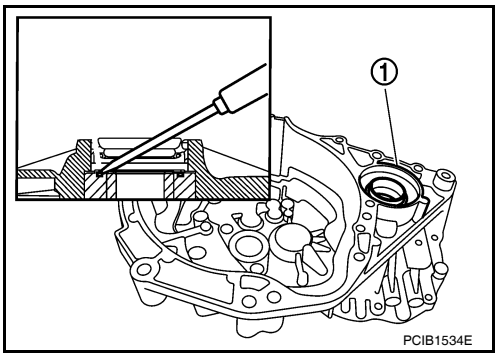
Tool number A: KV111011S0 (—)



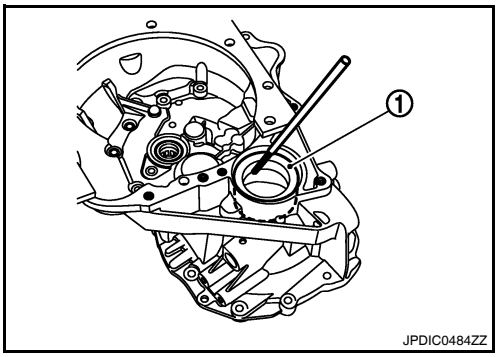
29. Remove bushings (1) from clutch housing using a suitable tool.



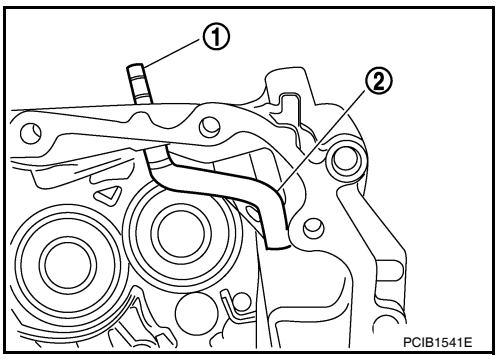
30. Remove differential side oil seals (1) from clutch housing and transaxle case using a suitable tool.
CAUTION:
Never damage transaxle case and clutch housing.



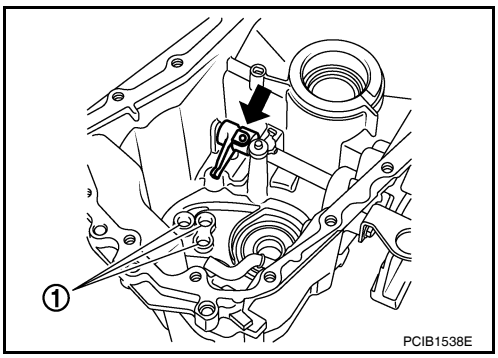
31. Remove differential side bearing outer races (1) from clutch housing and transaxle case using a suitable tool.
CAUTION:
Never damage transaxle case and clutch housing.



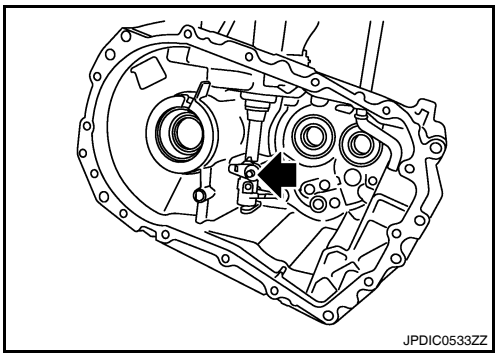
32. Pull two way connector (1) straight to remove it from air breather inner tube (2).
33. Remove air breather inner tube from transaxle case.



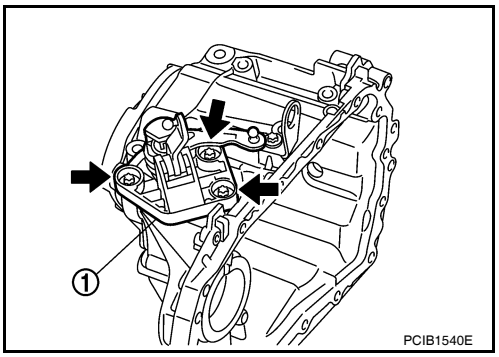
34. Remove bushings (1) from transaxle case using a suitable tool.
35. Remove retaining pin ( ) from selector using a suitable tool.
36. Remove selector from control shaft.
37. Remove oil gutter from transaxle case.



38. Remove bolt ( ), and then remove bushing, spring, and gear catch from transaxle case.
39. Remove check ball plug from transaxle case.



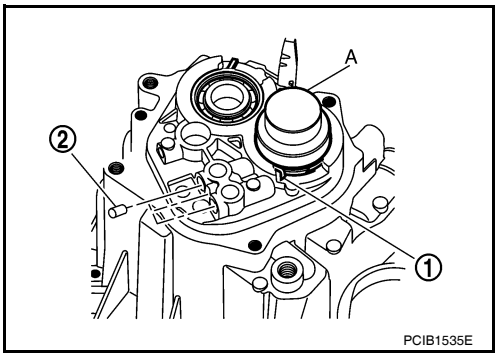
40. Remove bolts ( ), and then remove control shaft (1) from transaxle case.
41. Remove O-ring from control shaft.



42. Expand snap rings (1) and remove input shaft rear bearing and mainshaft rear bearing from transaxle case using Tool (A).

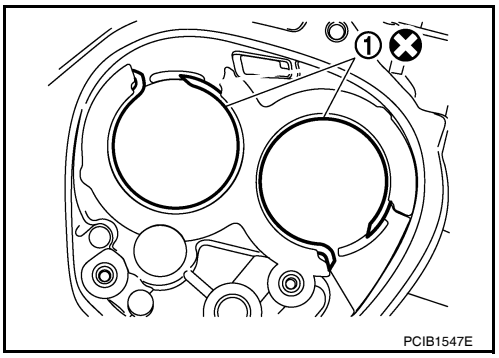
Tool number A: ST35300000 (—)

43. Remove snap rings from transaxle case.
44. Remove check balls (2) from transaxle case.



ASSEMBLY

1. Install snap rings (1) along transaxle case groove so that notch mates with housing as shown.
CAUTION:
Check snap ring installing direction. Never misassemble.

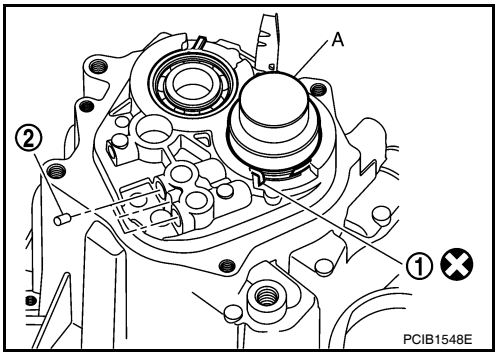


2. Expand snap rings (1) and install input shaft rear bearing and mainshaft rear bearing to transaxle case using Tool (A).

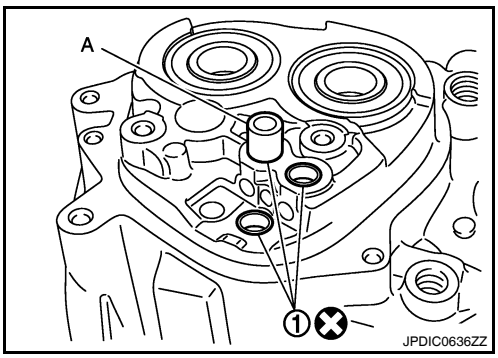
Tool number A: ST35300000 (—)

CAUTION:
Check that snap ring is correctly installed within bearing groove.

3. Install check balls (2) to transaxle case.

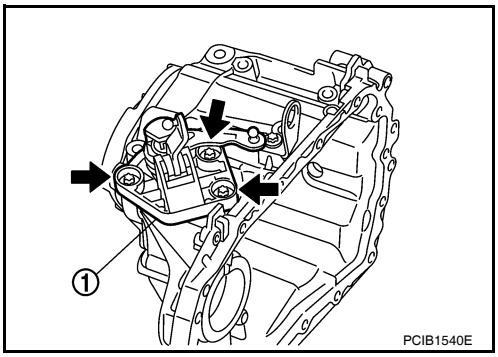


4. Install bushings (1) until they reach transaxle case using a suitable tool (A).
5. Apply gear oil to O-ring, and then install it to control shaft.



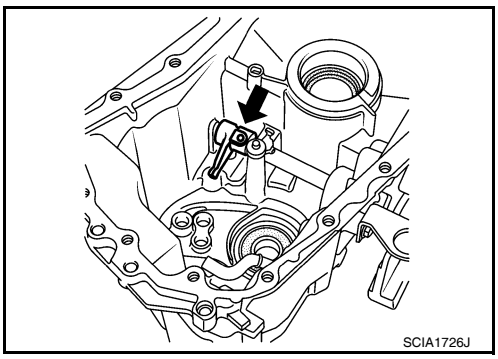
6. Install control shaft (1) to transaxle case, and tighten bolts ( ) to the specified torque. Refer to MT-16, "Exploded View".

CAUTION:
Replace control shaft and selector as a set.



7. Install selector to control shaft, and then install retaining pin ( ) to selector using a suitable tool.

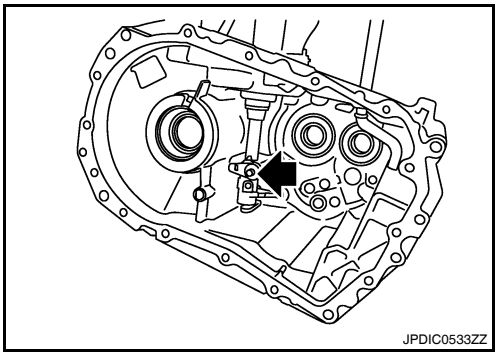
CAUTION:
- **Be careful with the orientation of selector.**
- **Replace control shaft and selector as a set.**
- **Never reuse retaining pin.**



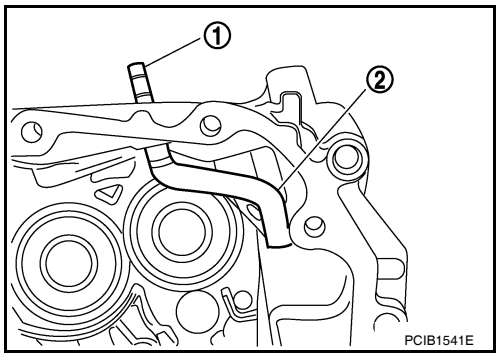
8. Install gear catch, spring, and bushing to transaxle case, and then tighten bolt ( ) to the specified torque. Refer to MT-16, "Exploded View".

CAUTION:
Replace gear catch, spring, and bushing as a set.

9. Install oil gutter to transaxle case.



10. Install air breather inner tube (2) to transaxle case.
CAUTION:
Never damage air breather inner tube.
NOTE:
It is easier to install when air breather inner tube end is wrapped and narrowed by tape. Remove tape after installation.
11. Insert two way connector (1) straight, and then install it to air breather inner tube.
CAUTION:
Check air breather inner tube for twists after installing.



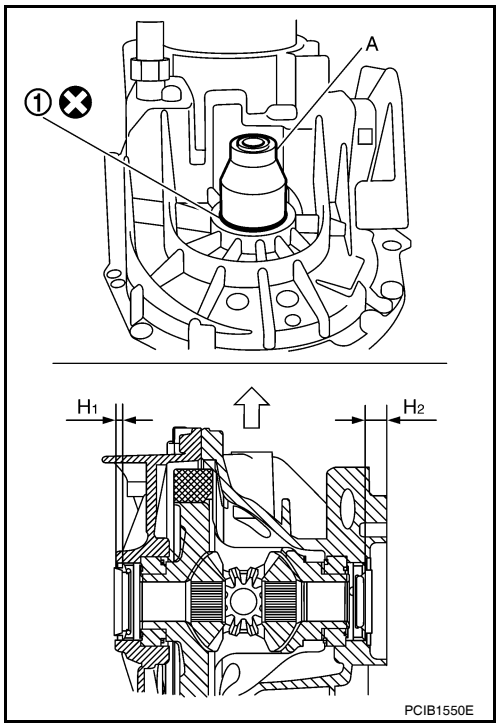
12. Install differential side oil seals (1) to clutch housing and transaxle case within the specified dimensions using Tool (A).

Tool number A: ST27862000 (—)

CAUTION:
- **Never incline differential side oil seal.**
- **Never damage clutch housing and transaxle case.**

Dimension

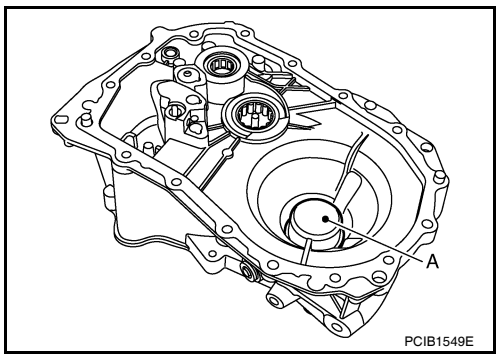
H_1 (Transaxle case side)	**: 5.7 – 6.3 mm (0.224 – 0.248 in)**
H_2 (Clutch housing side)	**: 2.4 – 3.0 mm (0.094 – 0.118 in)**



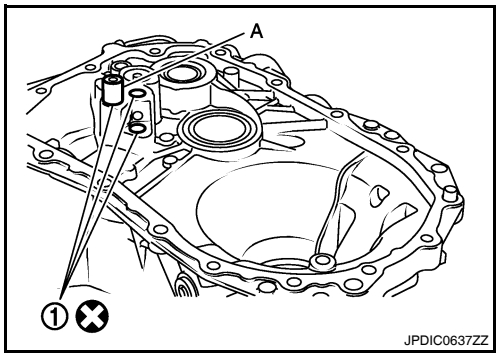
13. Install differential side bearing outer races until they reach clutch housing and transaxle case using the Tool (A).

Tool number A: KV32300QAE (—)

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

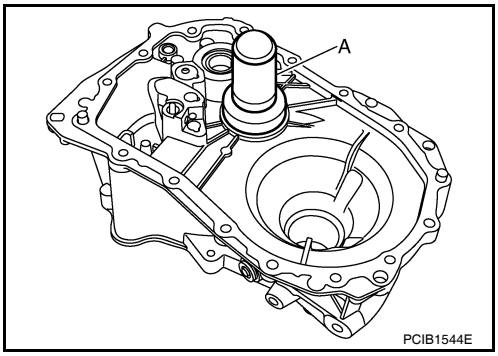


14. Install bushings (1) until they reach clutch housing using a suitable tool (A).
15. Install oil channel to clutch housing.
CAUTION:
Never reuse oil channel.



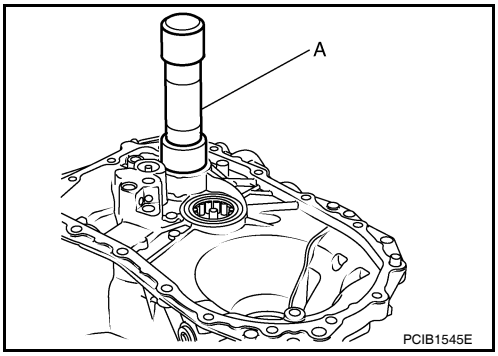
16. Install mainshaft front bearing so that it becomes even to clutch housing surface using Tool (A) .

Tool number A: ST33400001 (J-26082)

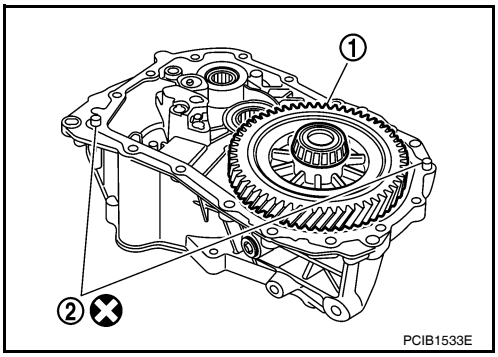


17. Install input shaft front bearing so that it becomes even to clutch housing surface using Tool (A).

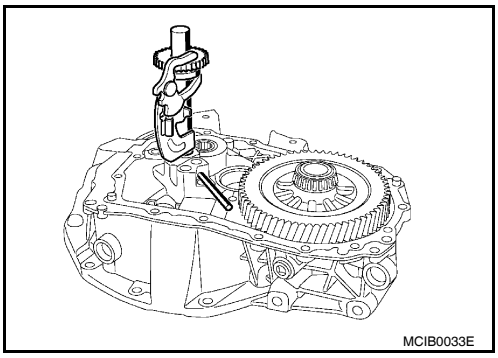
Tool number A: KV40100900 (—)



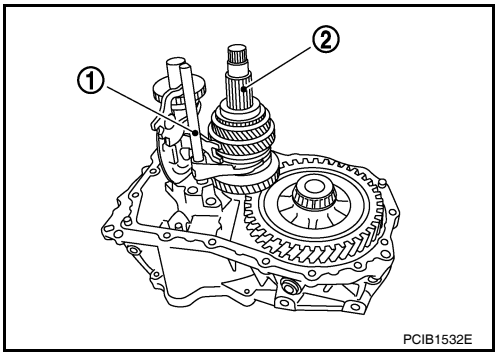
18. Install pinion gear and pinion shaft to clutch housing.
19. Install final drive assembly (1) to clutch housing.
20. Install dowel pins (2) and magnet to clutch housing.



21. Install reverse gear assembly to clutch housing, and then install retaining pin to clutch housing using a suitable tool.
CAUTION:
Never reuse retaining pin.
22. Install 1st-2nd shift fork to 1st-2nd fork rod, and then install retaining pin to 1st-2nd shift fork.
CAUTION:
- **Never reuse retaining pin.**
- **Replace 1st-2nd fork rod and 1st-2nd shift fork as a set.**

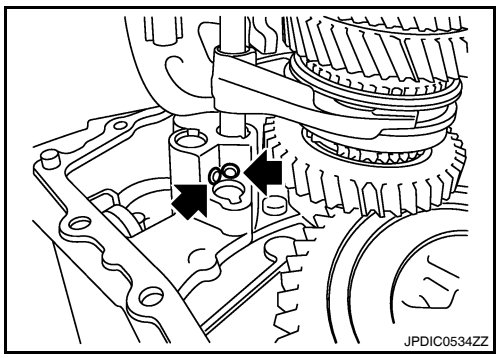


23. Set 1st-2nd fork rod assembly (1) onto mainshaft assembly (2), and then install them to clutch housing.



24. Install lock pins ( ) to clutch housing.
25. Install 3rd-4th shift fork to 3rd-4th fork rod, and then install retaining pin to 3rd-4th shift fork.

CAUTION:
- **Never reuse retaining pin.**
- **Replace 3rd-4th fork rod and 3rd-4th shift fork as a set.**

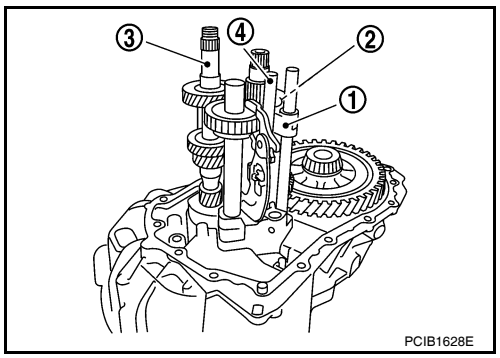


26. Install 3rd-4th fork rod assembly (1), 3rd-4th coupling sleeve (2), and input shaft assembly (3) to clutch housing according to the following procedures.

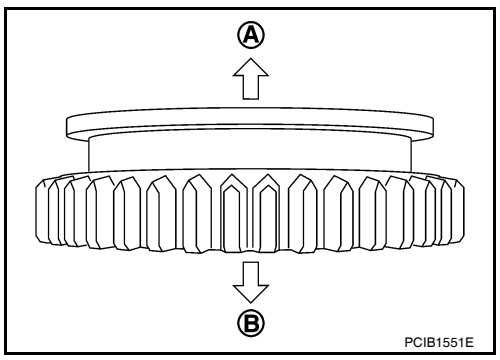
a. Pull 1st-2nd fork rod (4) up, and then maintain the neutral position.

b. Set 3rd-4th fork rod assembly onto 3rd-4th coupling sleeve, and then install them together with input shaft assembly to clutch housing.

CAUTION:
- **Set lock pin (3rd-4th fork rod side) onto 1st-2nd fork rod groove and then install 3rd-4th fork rod assembly.**



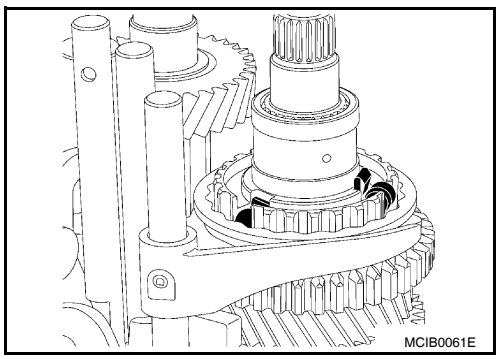
- **Be careful with the orientation of 3rd-4th coupling sleeve.**
- **A: 4th main gear side**
- **B: 3rd main gear side**
- **Install 3rd input gear of input shaft assembly so that it is set under reverse main gear of 3rd-4th coupling sleeve.**
- **Replace 3rd-4th coupling sleeve and 3rd-4th synchronizer hub as a set.**



c. Install springs and insert keys to 3rd-4th synchronizer hub.

d. Apply gear oil to 4th baulk ring.

e. Install 4th baulk ring.

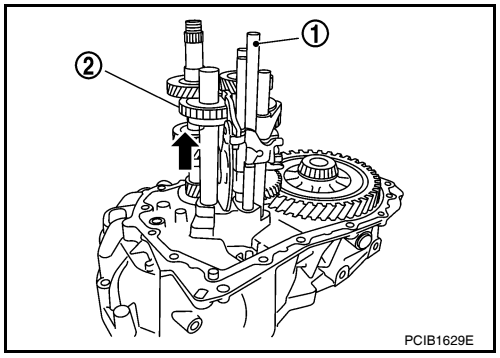


27. Install 5th-reverse fork rod (1) to clutch housing according to the following procedures.

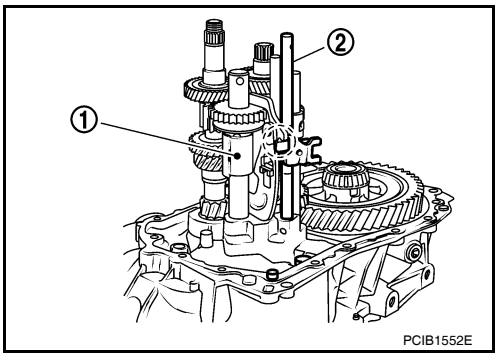
CAUTION:
Replace 5th-reverse fork rod and 5th-reverse shift fork as a set.

a. Pull gear of reverse gear assembly (2) up.

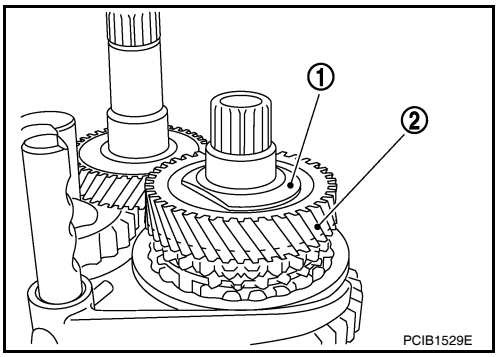
b. Temporarily install 5th-reverse fork rod to clutch housing.



c. Press gear of reverse gear assembly (1) down and then install 5th-reverse fork rod (2) to clutch housing.
CAUTION:
Set levers of 5th-reverse fork rod so as to align with reverse gear assembly groove ( ).



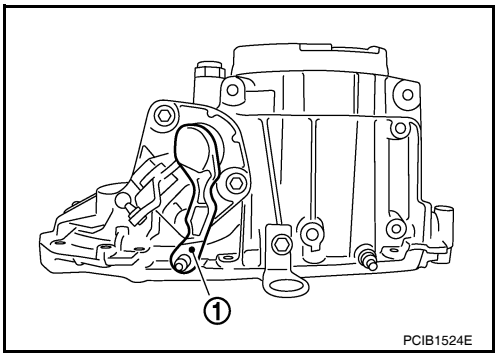
28. Install 4th main gear (2) and spacer (1) to mainshaft.
CAUTION:
Install spacer so that spacer protrusion faces to transaxle rear side.
29. Press 3rd-4th shift fork down and then shift 3rd-4th coupling sleeve to 3rd gear side.



30. Shift control shaft shift lever (1) to the 3rd gear position.
NOTE:
- If it is not shifted to the 3rd gear position, transaxle case cannot be installed to clutch housing.
- The 3rd gear position means that control shaft select lever is fully rotated clockwise and it is returned approximately 10 degrees.

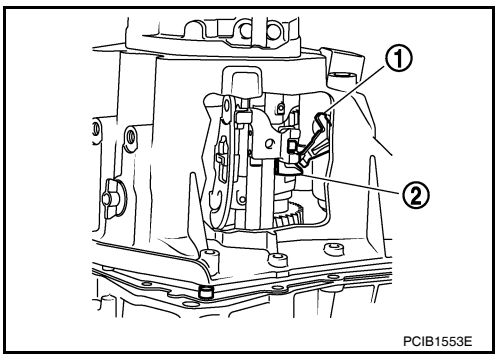
31. Apply recommended sealant to transaxle case mounting surface of clutch housing.
- **Use Genuine Silicone RTV or an equivalent. GI-42, "Recommended Chemical Product and Sealant".**

CAUTION:
- **Never allow old liquid gasket, moisture, oil, or foreign matter to remain on mounting surface.**
- **Check that mounting surface is not damaged.**
- **Apply a continuous bead of liquid gasket to the mounting surface.**

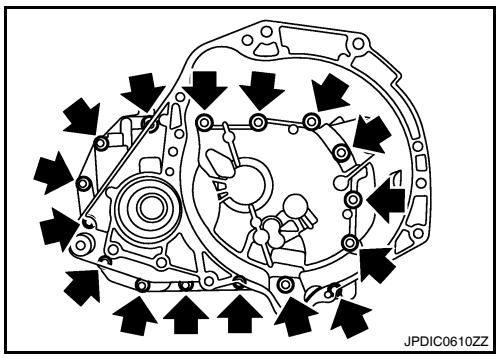


32. Install transaxle case to clutch housing. If it is difficult to install, slightly rotate control shaft shift lever counterclockwise, and then install.
- 1: Selector
- 2: Shift fork

CAUTION:
- **Never disrupt liquid gasket bead with transaxle case or other objects during installation.**
- **Be careful to align the lever of 5th-reverse fork rod with reverse gear assembly groove.**

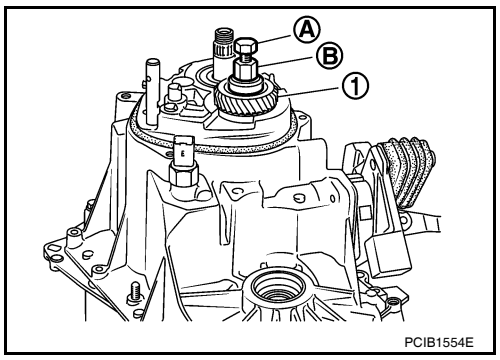


33. Rotate input shaft so that bearing and shaft fit each other, and then tighten transaxle bolts ( ) to the specified torque. Refer to MT-16, "Exploded View".



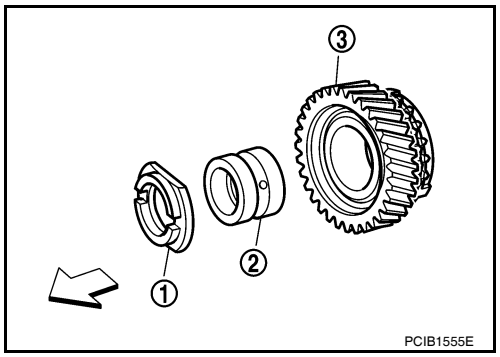
34. Apply recommended sealant to position switch thread and check ball plug thread. Tighten them to transaxle case and them to the specified torque. Refer to MT-16, "Exploded View".
    - **Use Genuine Silicone RTV or an equivalent. GI-42, "Recommended Chemical Product and Sealant".**

    CAUTION:
    Never allow old liquid gasket, moisture, oil, or foreign matter to remain on thread.
35. Apply gear oil to mainshaft spline.
36. Install 5th main gear (1) to mainshaft using a suitable bolt (A) [M10 x 1.0] and a suitable nut (B).



37. Install adapter plate (1), bushing (2), and 5th input gear (3) to input shaft.

    CAUTION:
    Be careful with the orientation of adapter plate.
    - : Transaxle case side



38. Install 5th-reverse synchronizer hub, 5th-reverse coupling sleeve, and 5th-reverse shift fork according to the following procedures.

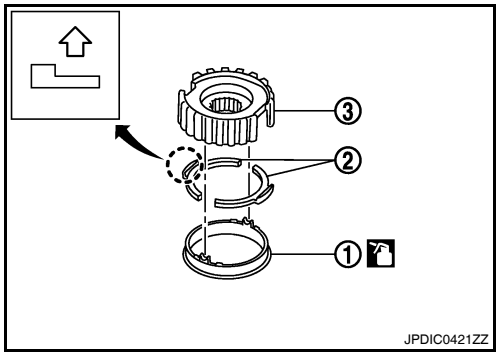
a. Apply gear oil to 5th-reverse baulk ring.

b. Install 5th-reverse baulk ring (1) to 5th input gear.

    CAUTION:
    Be careful with the orientation of 5th-reverse baulk ring.

c. Install synchronizer levers (2) to 5th-reverse synchronizer hub (3).

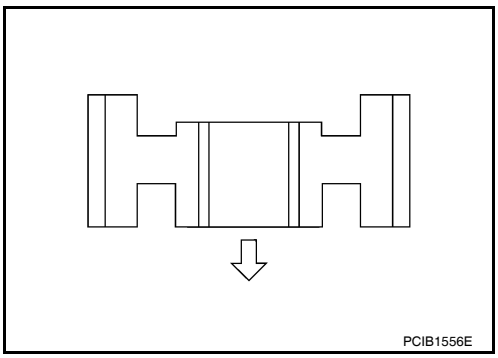
    CAUTION:
    - **Replace 5th-reverse synchronizer hub and 5th-reverse coupling sleeve as a set.**
    - **Be careful with the orientation of synchronizer lever.**
    - : 5th-reverse synchronizer hub side



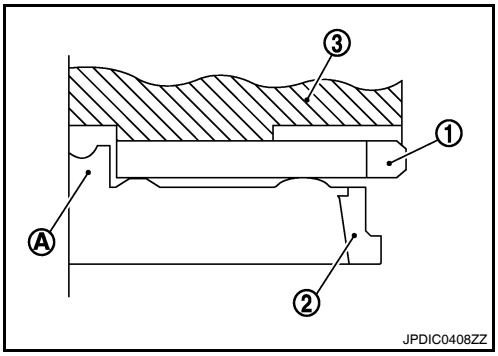
d. Install 5th-reverse synchronizer hub assembly and washer to input shaft.

    CAUTION:

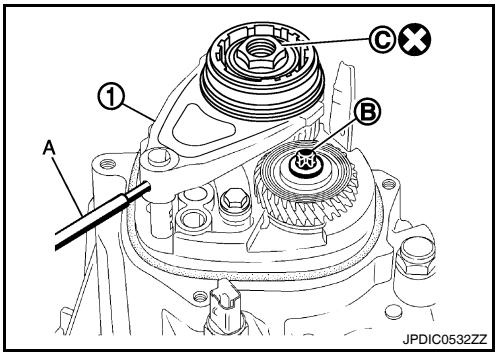
- **Be careful with the orientation of 5th-reverse synchronizer hub.**
- **- : 5th input gear side**



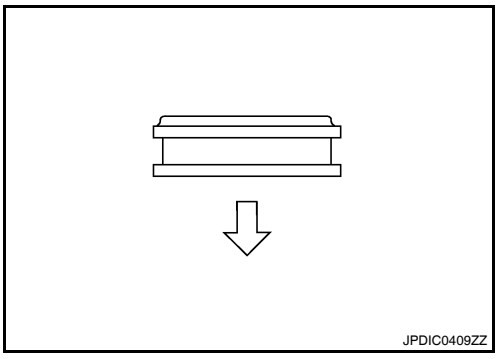
- **Never allow synchronizer lever (1) to mount on to 5th-reverse baulk ring (2) protrusion (A).**
- : 5th-reverse sychronizer hub



e. Set 5th-reverse shift fork (1) to 5th-reverse coupling sleeve, and then install them to 5th-reverse fork rod and input shaft.
- A: Pin punch
- B: Bolt
- C: Nut



CAUTION:
- **Be careful with the orientation of 5th-reverse coupling sleeve.**
- **- : 5th input gear side**
- **Replace 5th-reverse synchronizer hub and 5th-reverse coupling sleeve as a set.**
- **Replace 5th-reverse shift fork and 5th-reverse fork rod as a set.**



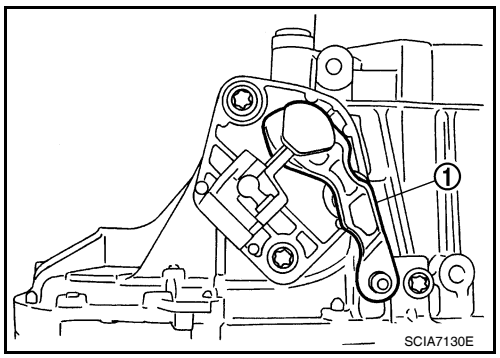
f. Check that the gear position is in the 3rd position. Press 5th-reverse shift fork and shift to 5th gear.

g. Tighten bolt to the specified torque. Refer to MT-16, "Exploded View".

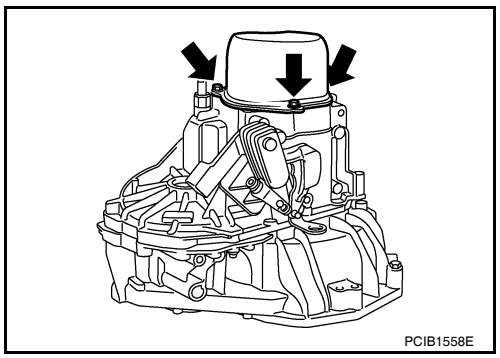
h. Tighten nut to the specified torque. Refer to MT-16, "Exploded View".
CAUTION:
Never reuse nut.

i. Install retaining pin to 5th-reverse shift fork using a suitable tool.
CAUTION:
Never reuse retaining pin.

39. Shift control shaft shift lever (1) to the neutral position.
40. Install O-ring to rear housing.



41. Install rear housing to transaxle case, and tighten bolts ( ) to the specified torque. Refer to MT-16, "Exploded View".
CAUTION:
Never pinch O-ring when installing rear housing.
42. Install drain plug according to the following procedures.
a. Install gasket to drain plug.
CAUTION:
Never reuse gasket.
b. Install drain plug to clutch housing using a suitable tool.
c. Tighten drain plug to the specified torque. Refer to MT-16, "Exploded View".



43. Install filler plug according to the following procedures.
a. Install gasket to filler plug, and then install them to transaxle case.
CAUTION:
Never reuse gasket.
b. Tighten filler plug to the specified torque. Refer to MT-16, "Exploded View".
CAUTION:
Fill with gear oil before tightening filler plug to the specified torque.

INPUT SHAFT AND GEAR

Disassembly and Assembly

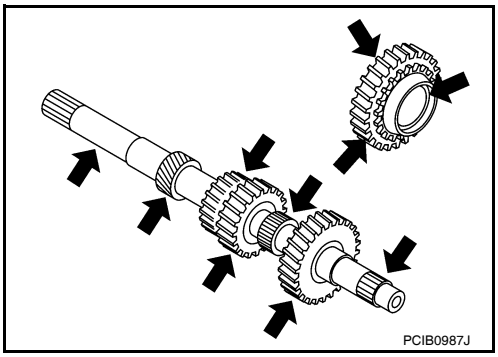
INFOID:0000000004788550

INSPECTION AFTER DISASSEMBLY

Input Shaft and Gears

Check the following items and replace if necessary.

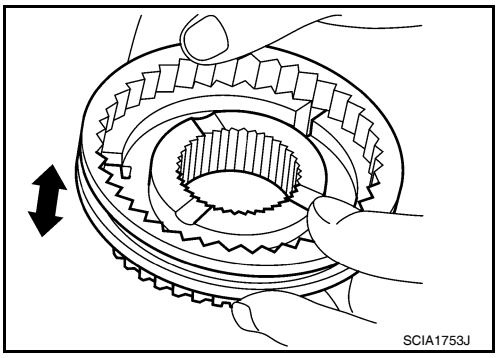
- Damage, peeling, bend, uneven wear, and distortion of shaft
- Excessive wear, damage, and peeling of gear



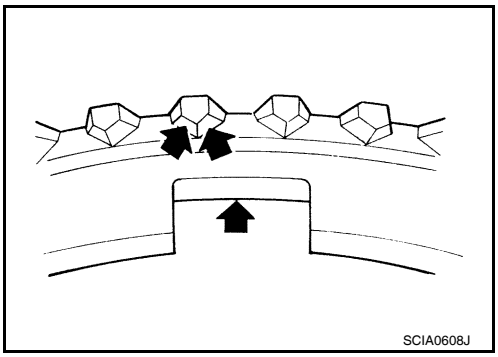
Synchronizer

Check for the following and replace if necessary.

- Contact surface breakage, damage, and unusual wear of coupling sleeve, synchronizer hub, and synchronizer lever.
- Coupling sleeve and synchronizer hub move smoothly.

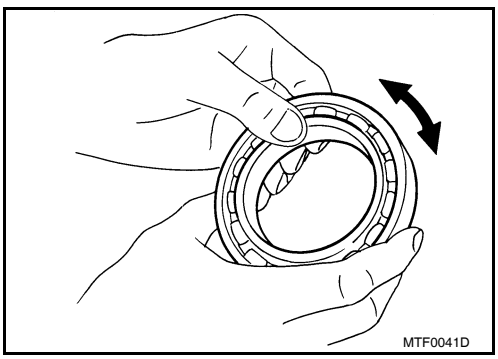


- Breakage, damage, and excessive wear of baulk ring cam surface and synchronizer lever contact surface.



Bearing

Check bearing for damage and unsmooth rotation. Replace if necessary.



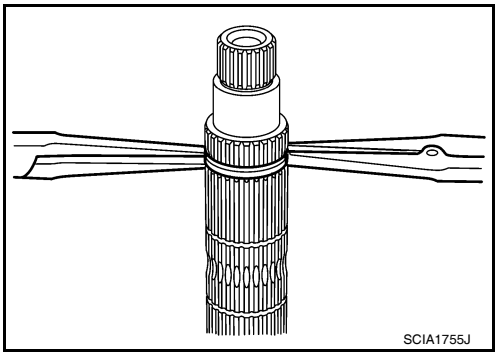
MAINSHAFT AND GEAR

Disassembly and Assembly

INFOID:0000000004788551

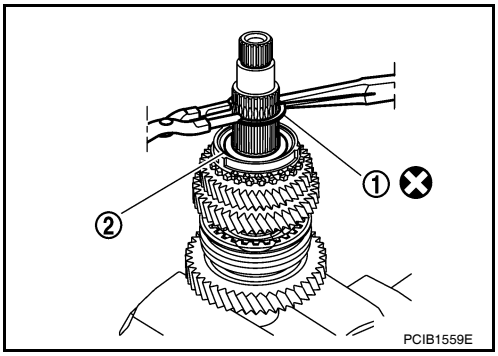
GENERAL PRECAUTIONS

- Never reuse snap ring.
- Secure mainshaft in a vise with backplate, and then 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. While expanding snap ring with snap ring pliers, move snap ring with flat pliers.
- Disassemble gear components putting direction marks on the parts that never affect any functions.

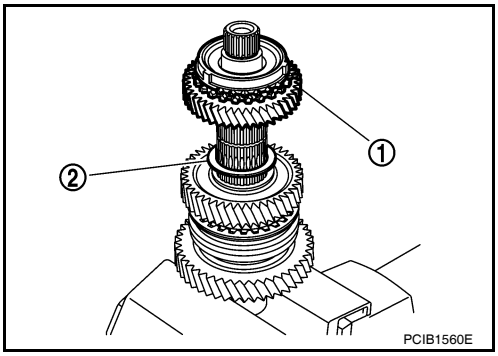


DISASSEMBLY

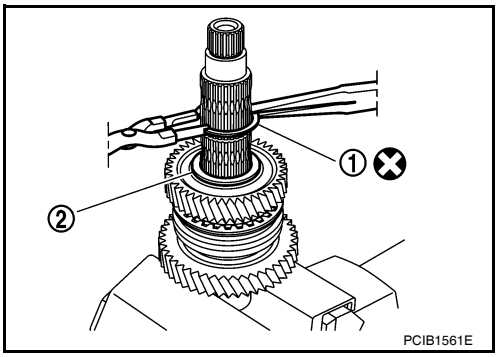
1. Remove 3rd-4th synchronizer hub and 3rd baulk ring.
2. Remove snap ring (1) and thrust washer (2) using suitable tools.



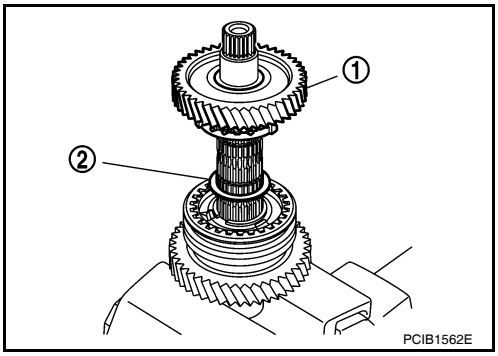
3. Remove 3rd main gear (1) and thrust washer (2).



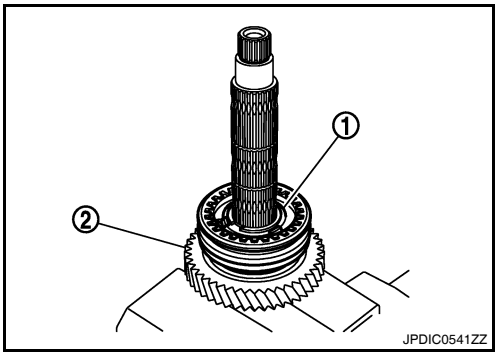
4. Remove snap ring (1) and thrust washer (2) using suitable tools.



5. Remove 2nd main gear (1) and thrust washer (2).



6. Remove snap ring (1), and then remove 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring.
7. Remove 1st-2nd coupling sleeve, insert keys, springs, and 1st-2nd synchronizer hub.
8. Remove 1st outer baulk ring, 1st synchronizer cone, 1st inner baulk ring, and 1st main gear (2).

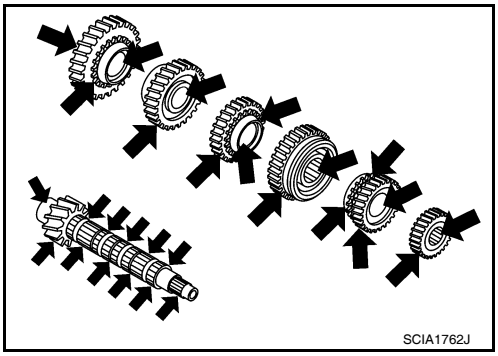


INSPECTION AFTER DISASSEMBLY

Mainshaft and Gear

Check the following items and replace if necessary.

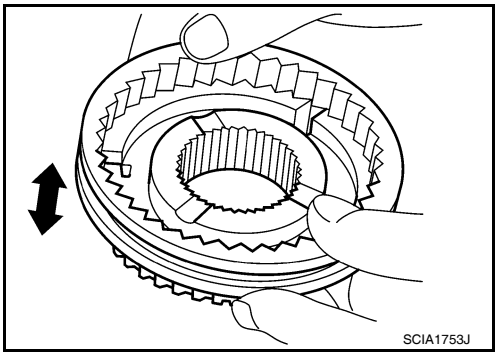
- Damage, peeling, bend, uneven wear, and distortion of shaft
- Excessive wear, damage, and peeling of gear



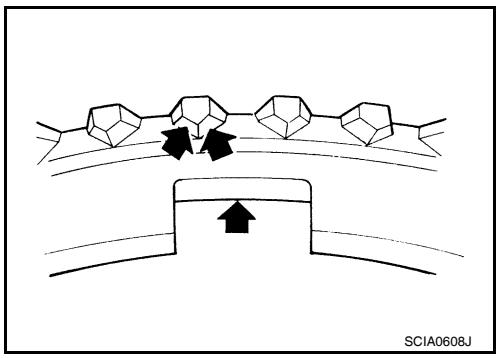
Synchronizer

Check the following items and replace if necessary.

- Contact surface breakage, damage, and unusual wear of coupling sleeve, synchronizer hub, insert key, and spring.
- Coupling sleeve and synchronizer hub move smoothly.



- Breakage, damage, and excessive wear of baulk ring cam surface and insert contact surface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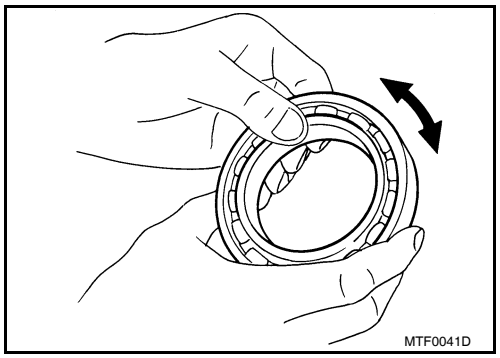
Bearing
Check bearing for damage and unsmooth rotation. Replace if necessary.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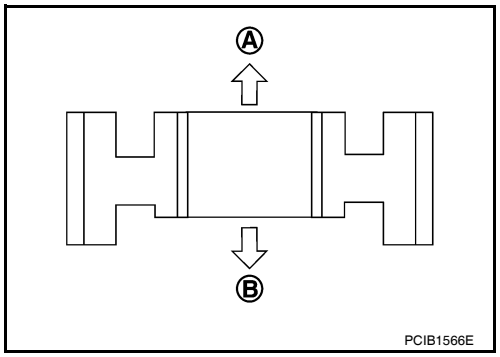
ASSEMBLY

Note the following items, and assemble in the reverse order of disassembly. Refer to MT-16, "Exploded View".

CAUTION:

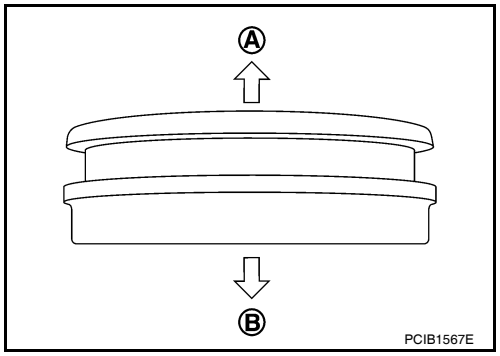
- **Never reuse snap ring.**
- **Check that snap ring is securely installed to the groove.**
- **Apply gear oil to 3rd baulk ring.**
- **Apply gear oil to 1st outer baulk ring, 1st synchronizer cone, and 1st inner baulk ring.**
- **Apply gear oil to 2nd outer baulk ring, 2nd synchronizer cone, and 2nd inner baulk ring.**
- **Replace 1st outer baulk ring, 1st synchronizer cone, and 1st inner baulk ring as a set.**
- **Replace 2nd outer baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring as a set.**

- **Be careful with the orientation of 1st-2nd synchronizer hub.**
- **A: 1st main gear side**
- **B: 2nd main gear side**
- **Replace 1st-2nd synchronizer hub and 1st-2nd coupling sleeve as a set.**



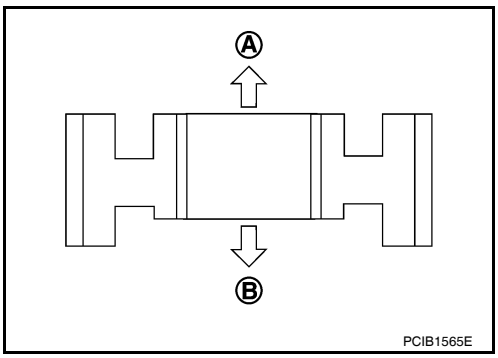
PCIB1566E

- **Be careful with the orientation of 1st-2nd coupling sleeve.**
- **A: 2nd main gear side**
- **B: 1st main gear side**



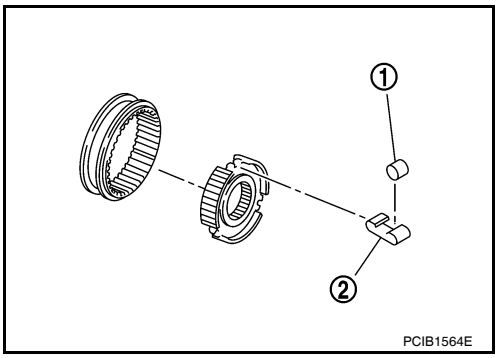
PCIB1567E

- **Be careful with the orientation of 3rd-4th synchronizer hub.**
- **A: 4th main gear side**
- **B: 3rd main gear side**



- **Replace 3rd-4th synchronizer hub and 3rd-4th coupling sleeve as a set.**

- **Be careful with the orientation of insert key (1) and spring (2).**



FINAL DRIVE

Disassembly and Assembly

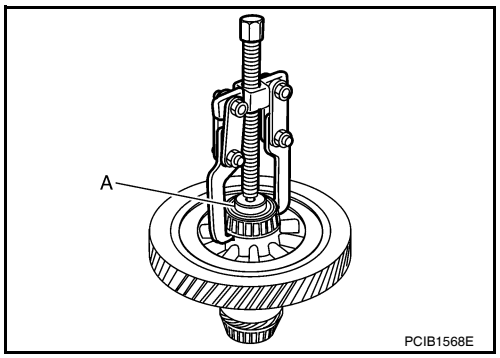
INFOID:0000000004788552

DISASSEMBLY

1. Remove differential side bearings using Tool (A) and a suitable tool.

Tool number A: ST33052000 (—)

2. Remove speedometer drive gear.



INSPECTION AFTER DISASSEMBLY

Case

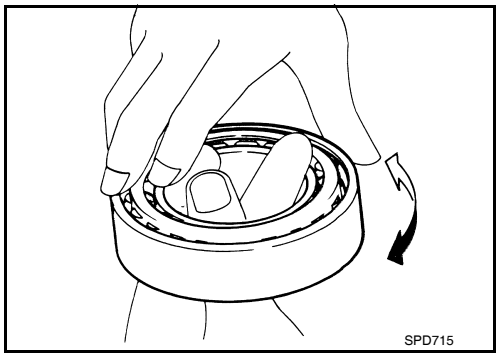
Check differential case and replace if necessary.

Bearing

Check bearing for damage and unsmooth rotation. Replace if necessary.

CAUTION:

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



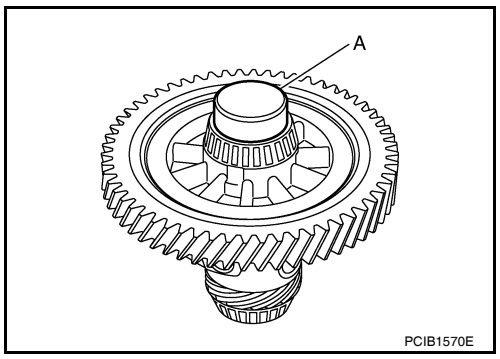
ASSEMBLY

1. Install speedometer drive gear.
2. Install differential side bearings using Tool (A).

Tool number A: KV40104920 (—)

CAUTION:

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

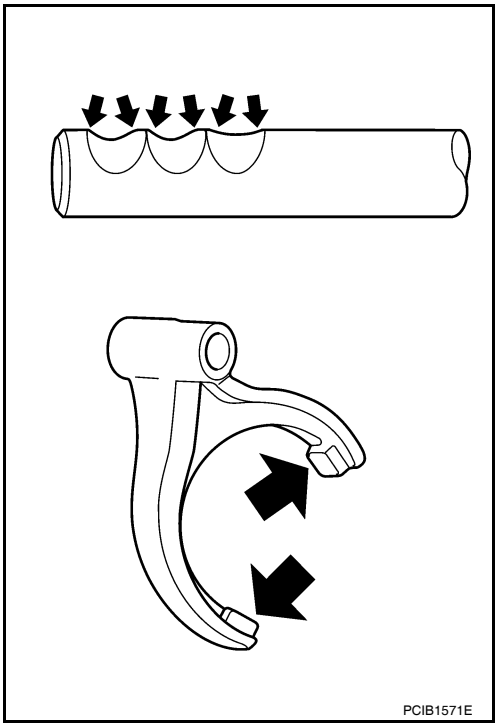


SHIFT CONTROL

Inspection

INFOID:0000000004788553

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



SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000004784251

TRANSAXLE

Transaxle type			RS5F91R
Engine type			HR16DE
Number of speed			5
Synchromesh type			Warner
Shift pattern			 SCIA0821E
Gear ratio	1st		3.7272
	2nd		2.0476
	3rd		1.3928
	4th		1.0294
	5th		0.8205
	Reverse		3.5454
	Final gear		4.0666
Number of teeth	Input gear	1st	11
		2nd	21
		3rd	28
		4th	34
		5th	39
		Reverse	11
	Main gear	1st	41
		2nd	43
		3rd	39
		4th	35
		5th	32
		Reverse	39
	Reverse idler gear		26
	Final gear	Final gear/Pinion	61/15
		Side gear/Pinion mate gear	13/9
Oil capacity (Reference)		(US pt, Imp pt)	Approx. 2.6 (5-1/2, 4-5/8)
Remarks	Reverse synchronizer		Installed
	Double-cone synchronizer		1st and 2nd

SERVICE INFORMATION

PRECAUTIONS

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

INFOID:0000000004305264

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.

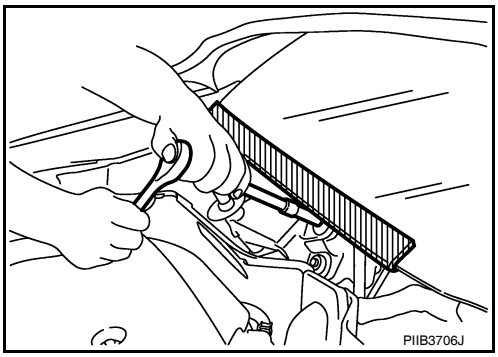
WARNING:

- **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 for Procedure without Cowl Top Cover

INFOID:0000000004305265

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



Precaution

INFOID:0000000004305266

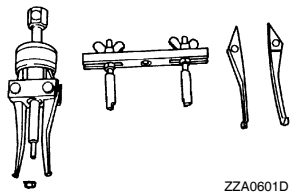
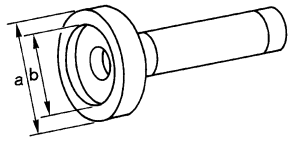
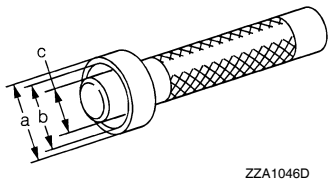
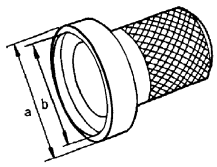
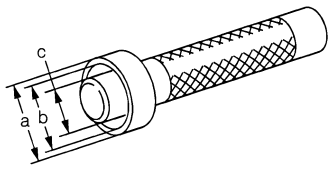
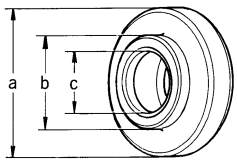
- If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Installed CSC returns to the original position when removing transaxle assembly. Dust on clutch disc sliding parts may damage CSC seal, and may cause clutch fluid leakage.
- Do not reuse transaxle oil.
- Drain, fill and check transaxle oil with the vehicle on level surface.
- During removal or installation, keep inside of transaxle clear of dust or dirt.
- Check for the correct installation orientation prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied to.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, follow it.
- Be careful not to damage the sliding surfaces and mating surfaces of parts.

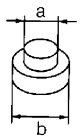
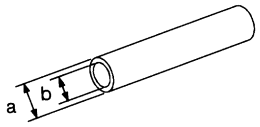
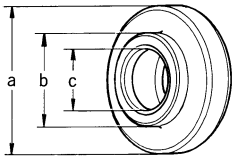
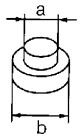
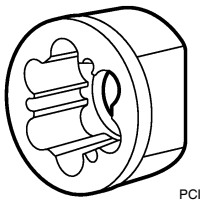
PREPARATION

Special Service Tool

INFOID:0000000004305267

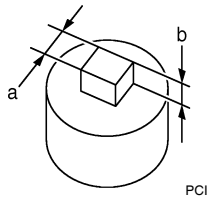
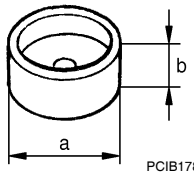
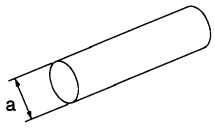
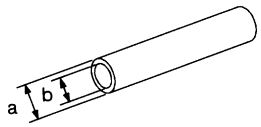
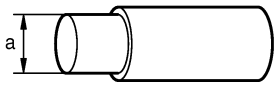
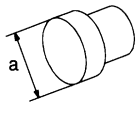
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

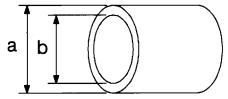
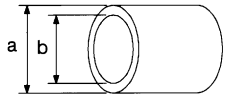
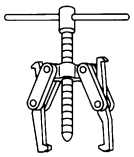
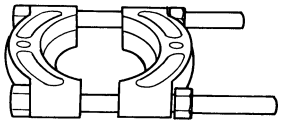
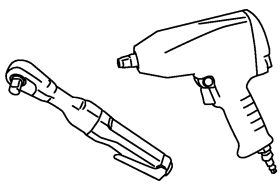
Tool number (Kent-Moore No.) Tool name	Description
KV381054S0 (J-34286) Puller  ZZA0601D	Removing mainshaft front bearing outer race
KV38100200 (—) Drift  ZZA1143D	• Installing mainshaft front bearing outer race • Installing mainshaft rear bearing outer race • Installing differential side bearing outer race (clutch housing side) **a: 65 mm (2.56 in) dia.** **b: 49 mm (1.93 in) dia**.
ST33220000 (—) Drift  ZZA1046D	Installing input shaft oil seal **a: 37 mm (1.46 in) dia**. **b: 31 mm (1.22 in) dia.** **c: 22 mm (0.87 in) dia.**
ST33400001 (J-26082) Drift  ZZA0814D	Installing differential side bearing outer race (transaxle case side) **a: 60 mm (2.36 in) dia**. **b: 47 mm (1.85 in) dia.**
KV38100300 (J-25523) Drift  ZZA1046D	Installing differential side oil seal **a: 54 mm (2.13 in) dia**. **b: 46 mm (1.81 in) dia.** **c: 32 mm (1.26 in) dia.**
ST36720030 (—) Drift  ZZA0978D	• Installing input shaft rear bearing • Installing mainshaft front bearing inner race **a: 70 mm (2.76 in) dia.** **b: 40 mm (1.57 in) dia.** **c: 29 mm (1.14 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description
ST33052000 (—) Drift  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 hub assembly • Removing 2nd main gear • Removing bushing • Removing 3rd main gear • Removing mainshaft front bearing inner race **a: 22 mm (0.87 in) dia.** **b: 28 mm (1.10 in) dia.**
KV32102700 (—) Drift  S-NT065	• Installing bushing • Installing 2nd main gear • Installing 3rd main gear • Installing 4th main gear • Installing 5th main gear • Installing 6th main gear **a: 54 mm (2.13 in) dia.** **b: 32 mm (1.26 in) dia.**
ST30901000 (J-26010-01) Drift  ZZA0978D	Installing mainshaft rear bearing inner race **a: 79 mm (3.11 in) dia.** **b: 45 mm (1.77 in) dia.** **c: 35.2 mm (1.386 in) dia.**
ST33061000 (J-8107-2) Drift  ZZA0969D	Removing differential side bearing inner race (clutch housing side) **a: 28.5 mm (1.122 in) dia.** **b: 38 mm (1.50 in) dia.**
KV32300QAM (—) (Renault SST: B.VI.1823)  PCIB2078J	Removing and installing input shaft rear bearing bolt

Commercial Service Tool

INFOID:0000000004305268

Tool name	Description
Socket  PCIB1776E	Removing and installing drain plug **a: 8 mm (0.31 in)** **b: 5 mm (0.20 in)**
Spacer  PCIB1780E	Removing mainshaft front bearing outer race **a: 25 mm (0.98 in) dia.** **b: 25 mm (0.98 in)**
Drift  S-NT063	Installing bushing **a: 17 mm (0.67 in) dia.**
Drift  S-NT065	Installing input shaft front bearing **a: 35 mm (1.38 in) dia.** **b: 25 mm (0.98 in) dia.**
Drift  PCIB1779E	Removing input shaft rear bearing **a: 24 mm (0.94 in) dia.**
Drift  NT109	• Removing differential side bearing inner race (transaxle case side) • Installing input shaft rear bearing **a: 43 mm (1.69 in) dia**.

Tool name	Description
Drift  S-NT474	Installing differential side bearing inner race (clutch housing side) **a: 45 mm (1.77 in) dia.** **b: 39 mm (1.54 in) dia**.
Drift  S-NT474	Installing differential side bearing inner race (transaxle case side) **a: 52 mm (2.05 in) dia.** **b: 45 mm (1.77 in) dia.**
Puller  NT077	Removing differential side bearing inner race (clutch housing side) Removing differential side bearing inner race (transaxle case side)
Puller  ZZB0823D	• Removing differential side bearing inner race (clutch housing side) • Removing differential side bearing inner race (transaxle case side) • Removing input shaft rear bearing • Removing input shaft front bearing • Removing mainshaft rear bearing inner race • Removing 6th main gear • Removing 4th main gear • Removing 5th main gear • Removing 1st main gear • Removing 1st - 2nd synchronizer hub assembly • Removing 2nd main gear • Removing 3rd main gear • Removing mainshaft front bearing outer race
Remover  S-NT134	• Removing bushing • Removing mainshaft rear bearing outer race
Power tool  PBIC0190E	• Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000004305269

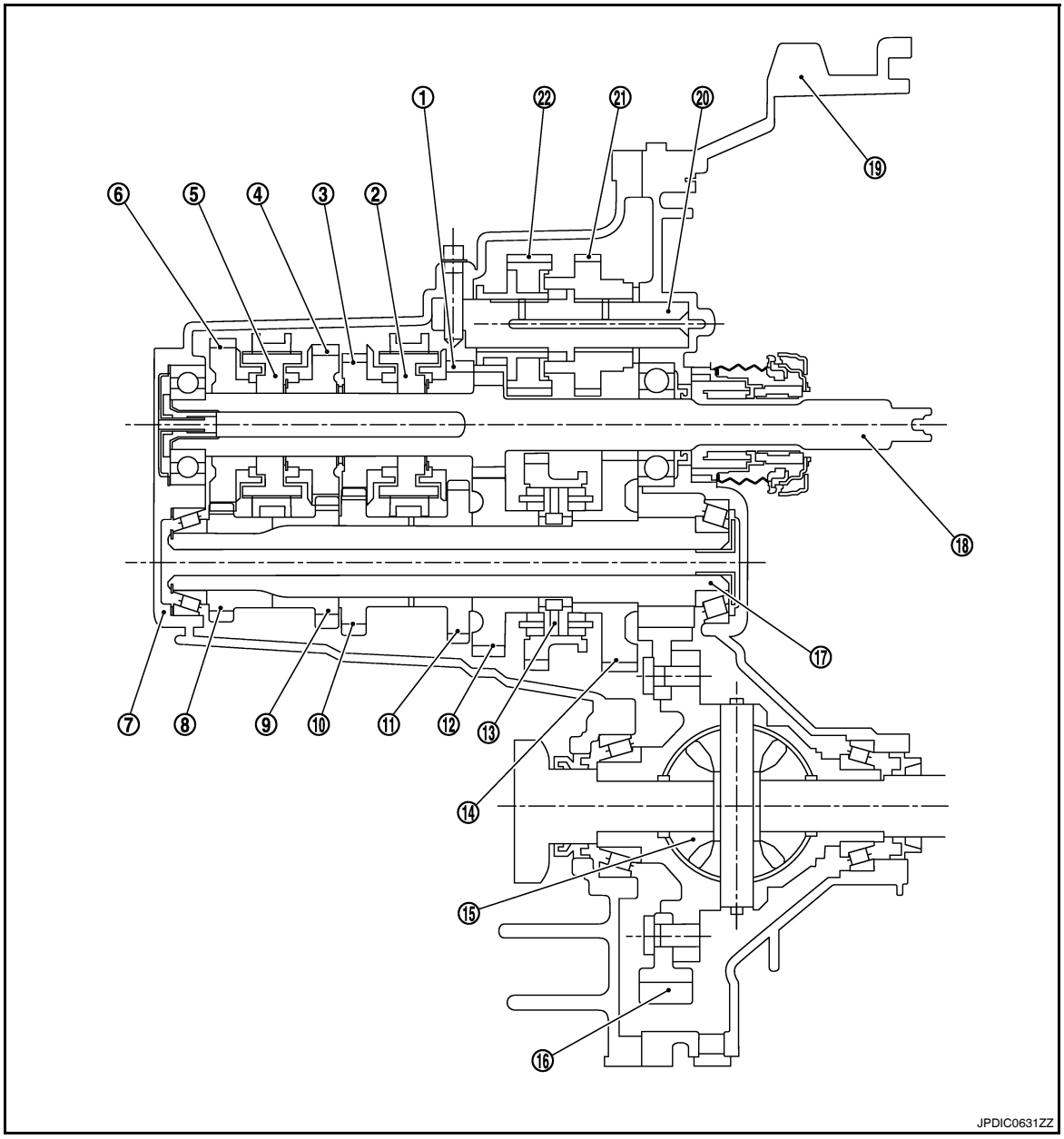
Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		MT-52			MT-59		MT-59	MT-55	MT-59	MT-59			
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	3	3			

DESCRIPTION

Cross-Sectional View

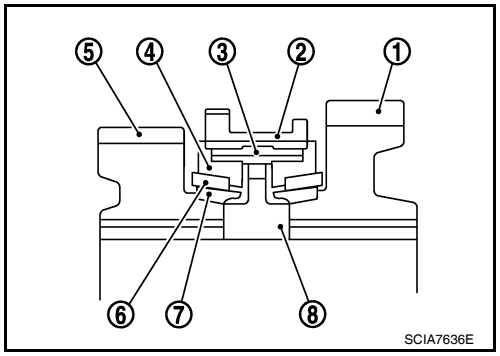
INFOID:0000000004305270



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

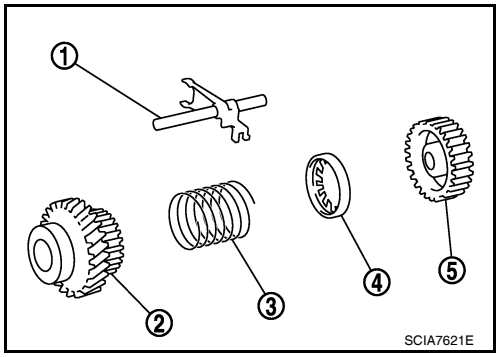
TRIPLE-CONE SYNCHRONIZER

Triple-cone synchronizer is used for the 1st and the 2nd gears to reduce operating force of the shift lever.
- 1st main gear (1)
- 1st-2nd coupling sleeve (2)
- Insert key (3)
- Outer baulk ring (4)
- 2nd main gear (5)
- Synchronizer cone (6)
- Inner baulk ring (7)
- 1st-2nd synchronizer hub (8)



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 shift 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.
- Reverse fork rod (1)
- Reverse output gear (2)
- Return spring (3)
- Reverse baulk ring (4)
- Reverse input gear (5)



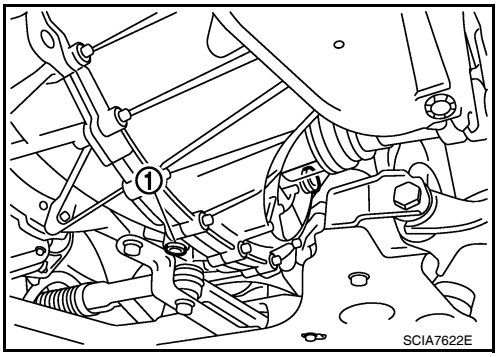
M/T OIL

Changing M/T Oil

INFOID:0000000004305271

DRAINING

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and drain oil.
3. Install a new gasket onto drain plug (1) and install it into transaxle. Tighten drain plug to specification. Refer to MT-59, "Disassembly and Assembly".
   CAUTION:
   Do not reuse gasket.

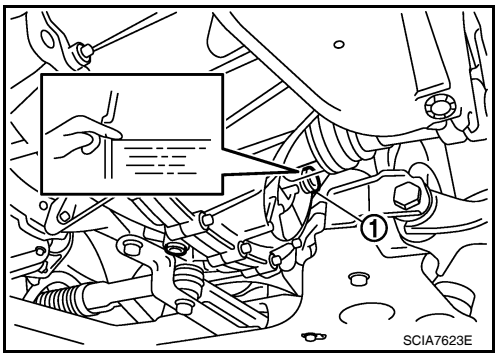


FILLING

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

   Oil grade and capacity
   : Refer to MA-14, "Fluids and Lubricants"

2. After refilling oil, check oil level. Install a new gasket on filler plug (1), then install it into transaxle. Tighten filler plug to specification. Refer to MT-59, "Disassembly and Assembly".
   CAUTION:
   Do not reuse gasket.

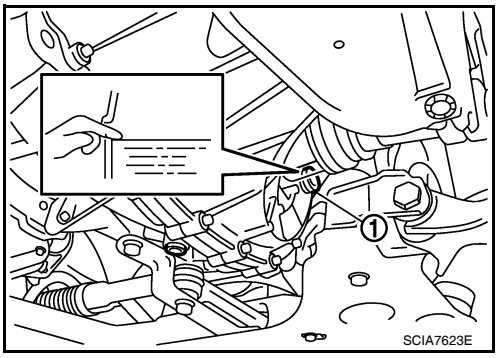


Checking M/T Oil

INFOID:0000000004305272

OIL LEAKAGE AND OIL LEVEL

1. Make sure that oil is not leaking from transaxle or around it.
2. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Do not start engine while checking oil level.
3. Install a new gasket onto filler plug (1) and install it into transaxle. Tighten filler plug to specification. Refer to MT-59, "Disassembly and Assembly".
   CAUTION:
   Do not reuse gasket.



SIDE OIL SEAL

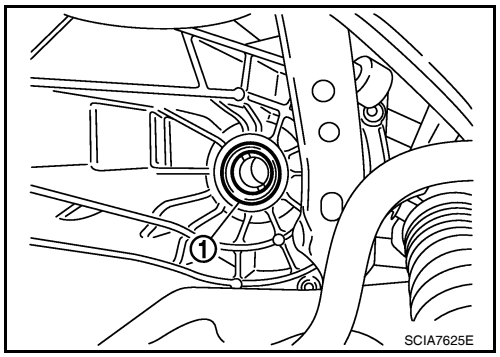
Removal and Installation

INFOID:0000000004305273

REMOVAL

1. Remove front drive shafts from transaxle assembly. Refer to FAX-9, "Removal and Installation (Left Side)".
2. Remove differential side oil seal (1) using a suitable tool.

CAUTION:
Be careful not to damage transaxle case and clutch housing.



INSTALLATION

Installation is in the reverse order of removal.

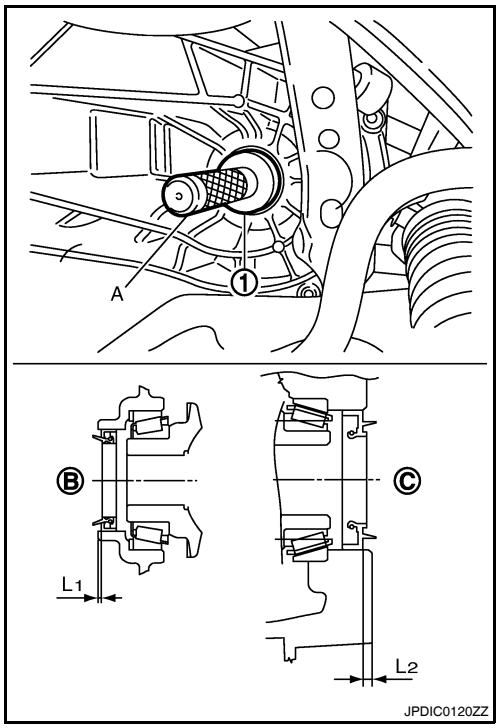
- Install differential side oil seals (1) to clutch housing and transaxle case using Tool (A).
- B: Transaxle case side
- C: Clutch housing side

Tool number A: KV38100300 (J-25523)

Dimension (L1) : 1.2 - 1.8 mm (0.047 - 0.071 in)
Dimension (L2) : 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 MT-52, "Checking M/T Oil".



POSITION SWITCH

Checking

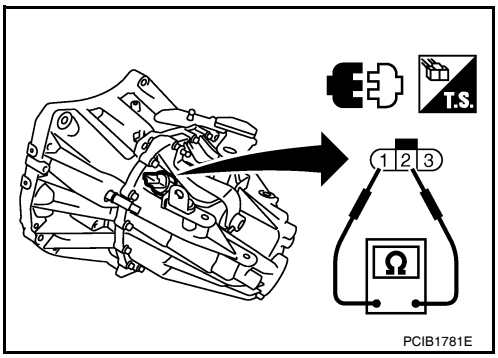
INFOID:0000000004305274

NOTE:
For removal and installation of the switches, refer to MT-59, "Disassembly and Assembly"

BACK-UP LAMP SWITCH

- Check continuity between terminals 1 and 2.

Gear position	Continuity
Reverse	Yes
Except reverse	No



PARK/NEUTRAL POSITION SWITCH

- Check continuity between terminals 2 and 3.

Gear position	Continuity
Neutral	Yes
Except neutral	No

CONTROL LINKAGE

Component of Control Device and Cable

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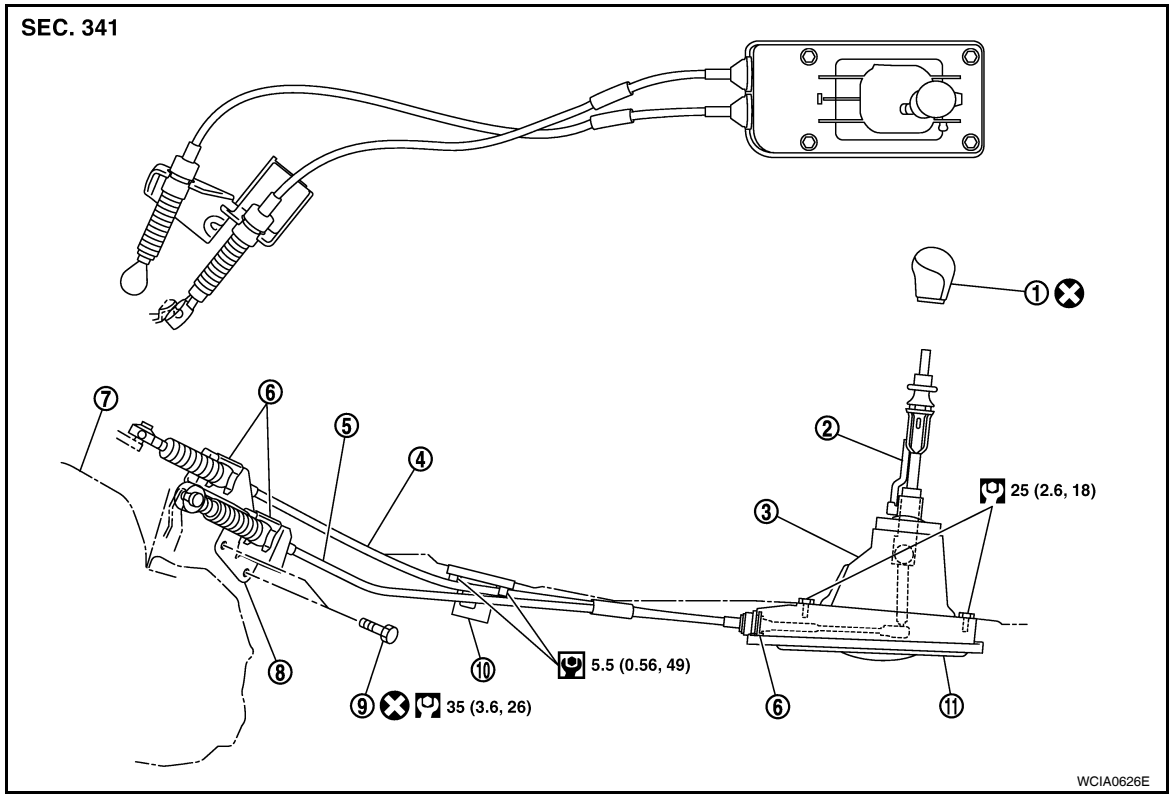


1. Control lever knob
2. Control lever
3. Control device assembly
4. Select cable
5. Shift cable
6. Lock plate
7. Clutch housing
8. Cable bracket
9. Tapping bolt
10. Cable support bracket
11. Adapter plate

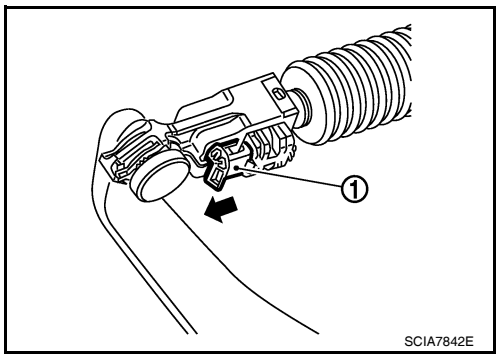
Removal and Installation

INFOID:0000000004305276

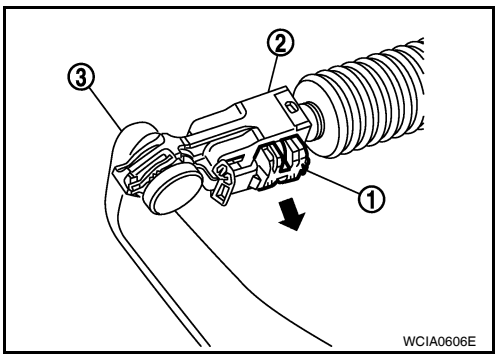
REMOVAL

1. Remove battery. Refer to SC-7, "Removal and Installation".
2. Remove air duct (front), air duct (Inlet) and air cleaner case. Refer to EM-139, "Removal and Installation".
3. Remove shift cable from shift lever.
4. Remove select cable according to the following.

a. Move stopper (1) to the unlocked position.



b. Pull the release button (1) of select cable (2) and then remove it from select lever (3).



5. Shift control lever to neutral position.
6. Remove control lever knob.
7. Remove center console assembly. Refer to IP-12, "Removal and Installation".
8. Remove control device assembly bolts.
9. Remove exhaust front tube, center muffler and heat plate. Refer to EX-9, "Removal and Installation".
10. Remove cable support bracket.
11. Remove select cable and shift cable from cable bracket.
12. Remove control device assembly from the vehicle.

INSTALLATION

Installation is in the reverse order of removal.

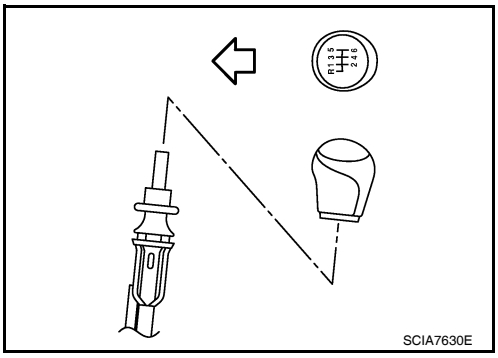
NOTE:

Self tapping bolts are used to attach cables to the clutch housing.

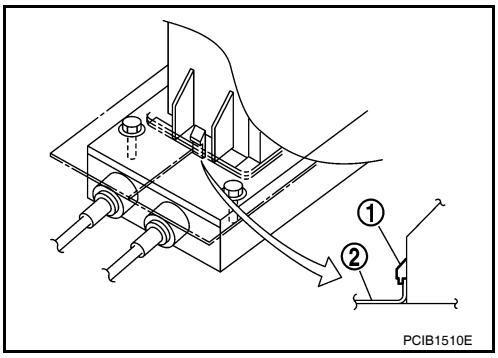
- Securely assemble each cable and lever of control shaft.
- Be careful about the installation direction, and push control lever knob onto control lever.

CAUTION:

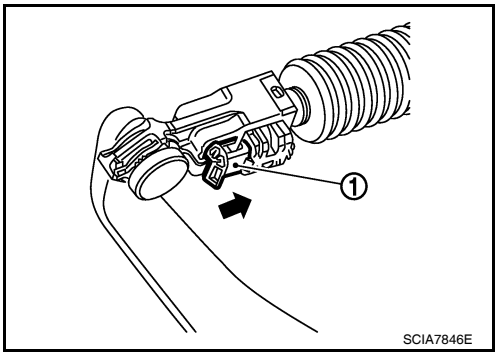
Do not reuse control lever knob.



- Make sure that the front/rear claws (1) of control device assembly are in contact with flange of the floor (2).
- When control lever is selected to 1st-2nd side and 5th-6th side, confirm control lever returns to neutral position smoothly.
- When control lever is shifted to each position, make sure there is no binding or disconnection in each boot.



- Move stopper (1) to lock position when installing the shift cable onto the shift lever.

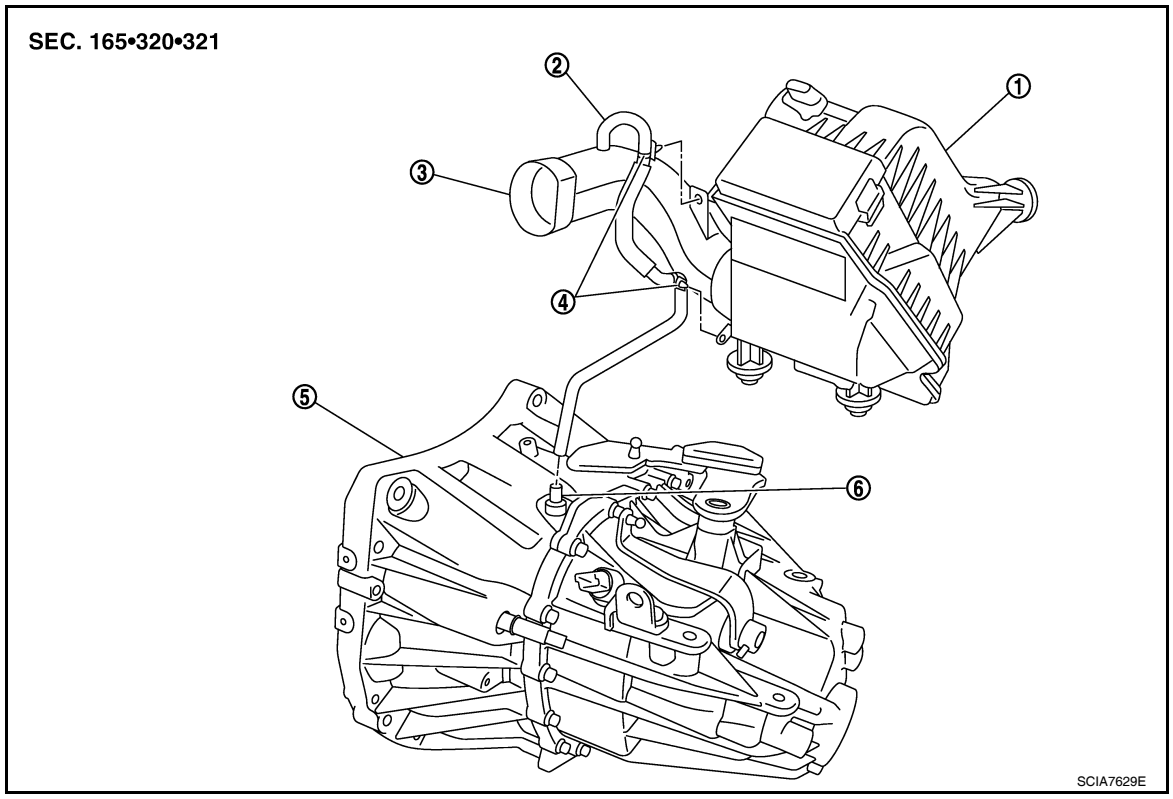


AIR BREATHER HOSE

Removal and Installation

INFOID:0000000004305277

COMPONENTS



1. Air cleaner case
2. Air breather hose
3. Air duct (inlet)
4. Clip
5. Transaxle assembly
6. Two way connector

REMOVAL

1. Remove battery. Refer to SC-7, "Removal and Installation".
2. Remove air duct (front), air duct (inlet) and air cleaner case. Refer to EM-139, "Removal and Installation".
3. Remove air breather hose.
   CAUTION:
   When air breather hose is removed, be sure to hold two way connector securely.

INSTALLATION

Installation is in the reverse order of removal.

- 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 duct and air cleaner case, make sure that clips are fully inserted.

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

TRANSAXLE ASSEMBLY

Exploded View

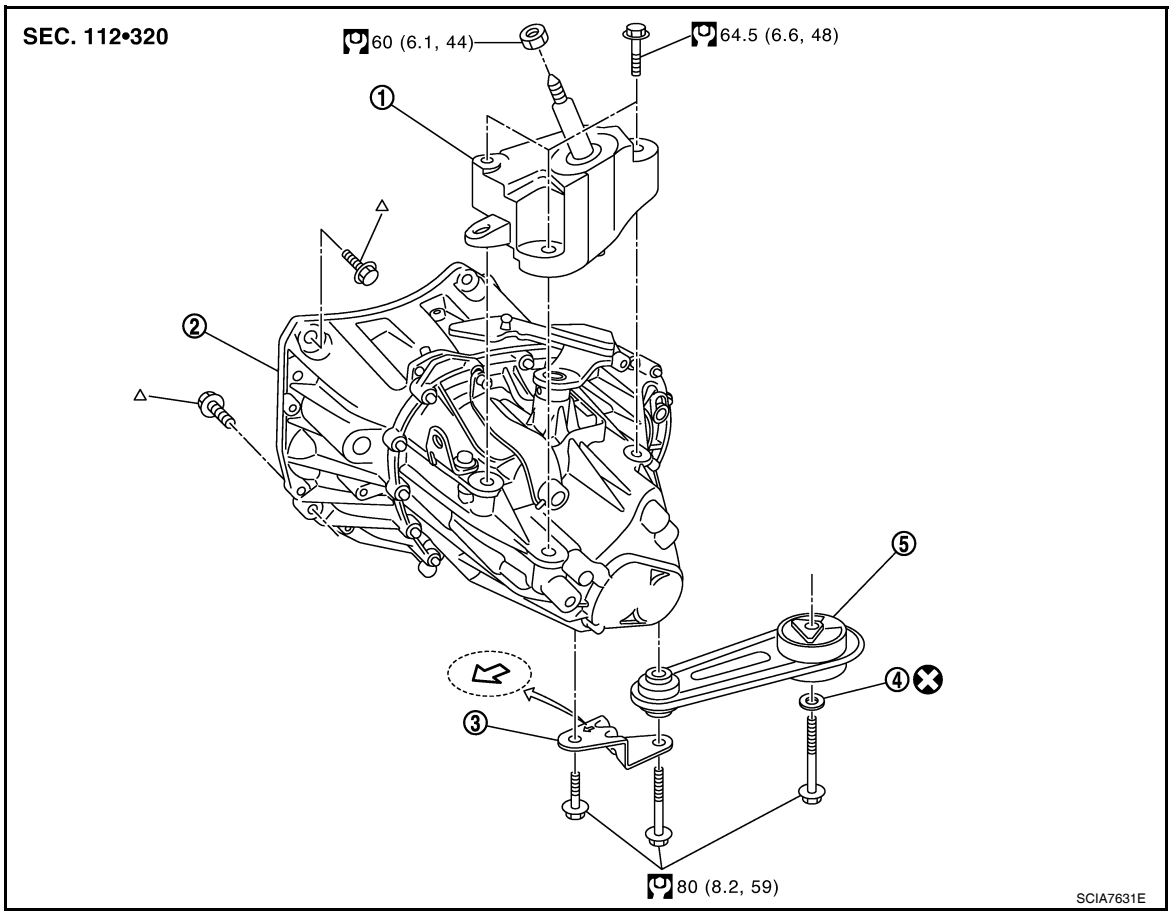
INFOID:0000000004786254

Removal and Installation

INFOID:0000000004305278

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

COMPONENTS



1. LH engine mount bracket (transaxle side)	2. Transaxle assembly	3. Rear engine mount bracket
4. Washer	5. Rear torque rod	⇐ Front

: Refer to MT-58, "Removal and Installation".

REMOVAL

1. Drain gear oil. Refer to MT-52, "Changing M/T Oil".
2. Drain clutch fluid and remove clutch tube from CSC. Refer to CL-10, "Removal and Installation".
   CAUTION:
   Do not depress clutch pedal during removal procedure.
3. Remove engine and transaxle assembly. Refer to EM-195, "Removal and Installation".
4. Remove starter motor. Refer to SC-20, "Removal and Installation MR18DE".
5. Remove transaxle assembly to engine bolts.
6. Separate transaxle assembly from engine.

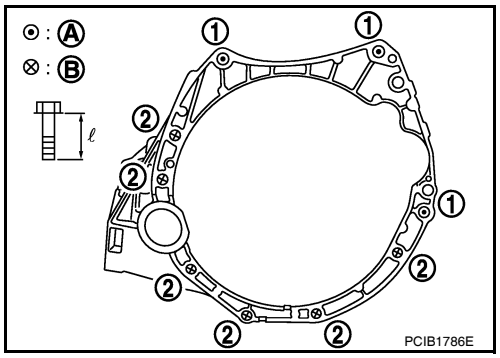
INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

When installing transaxle assembly, be careful not to bring transaxle input shaft into contact with clutch cover.

- If transaxle is removed from the vehicle, always replace CSC. Refer to CL-12, "Removal and Installation".
- When installing the transaxle assembly to the engine, install the bolts as shown.
  A: M/T to engine
  B: Engine to M/T



Bolt No.	1	2
Quantity	3	6
Bolt length "ℓ" mm (in)	60 (2.36)	50 (1.97)
Tightening torque N·m (kg-m, ft-lb)	62.0 (6.3, 46)	

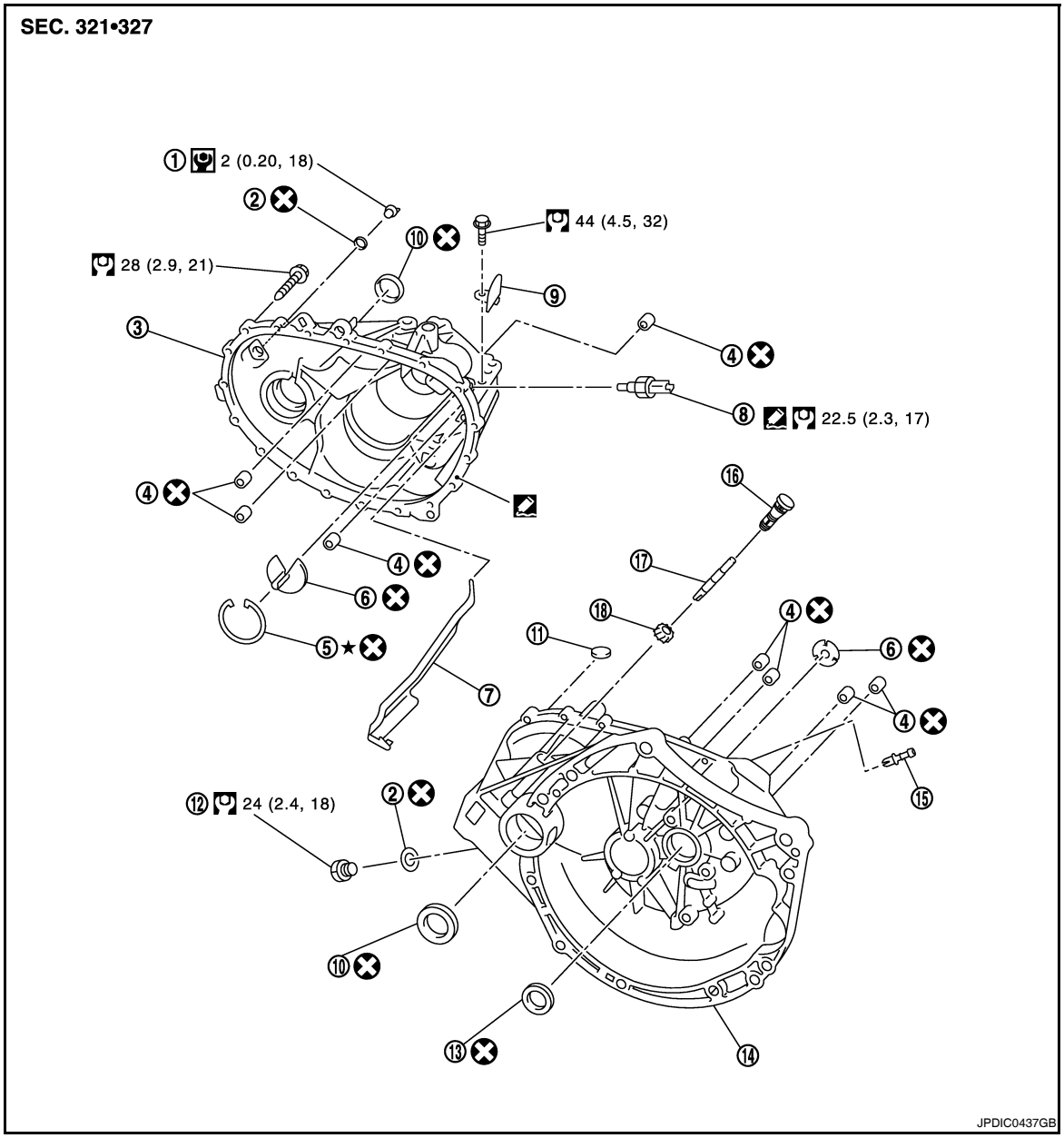
- After installation, bleed the air from the clutch hydraulic system. Refer to CL-8, "Air Bleeding Procedure".
- After installation, check oil level, and check for leaks and loose mechanisms. Refer to MT-52, "Checking M/T Oil".

Disassembly and Assembly

INFOID:0000000004305279

COMPONENTS

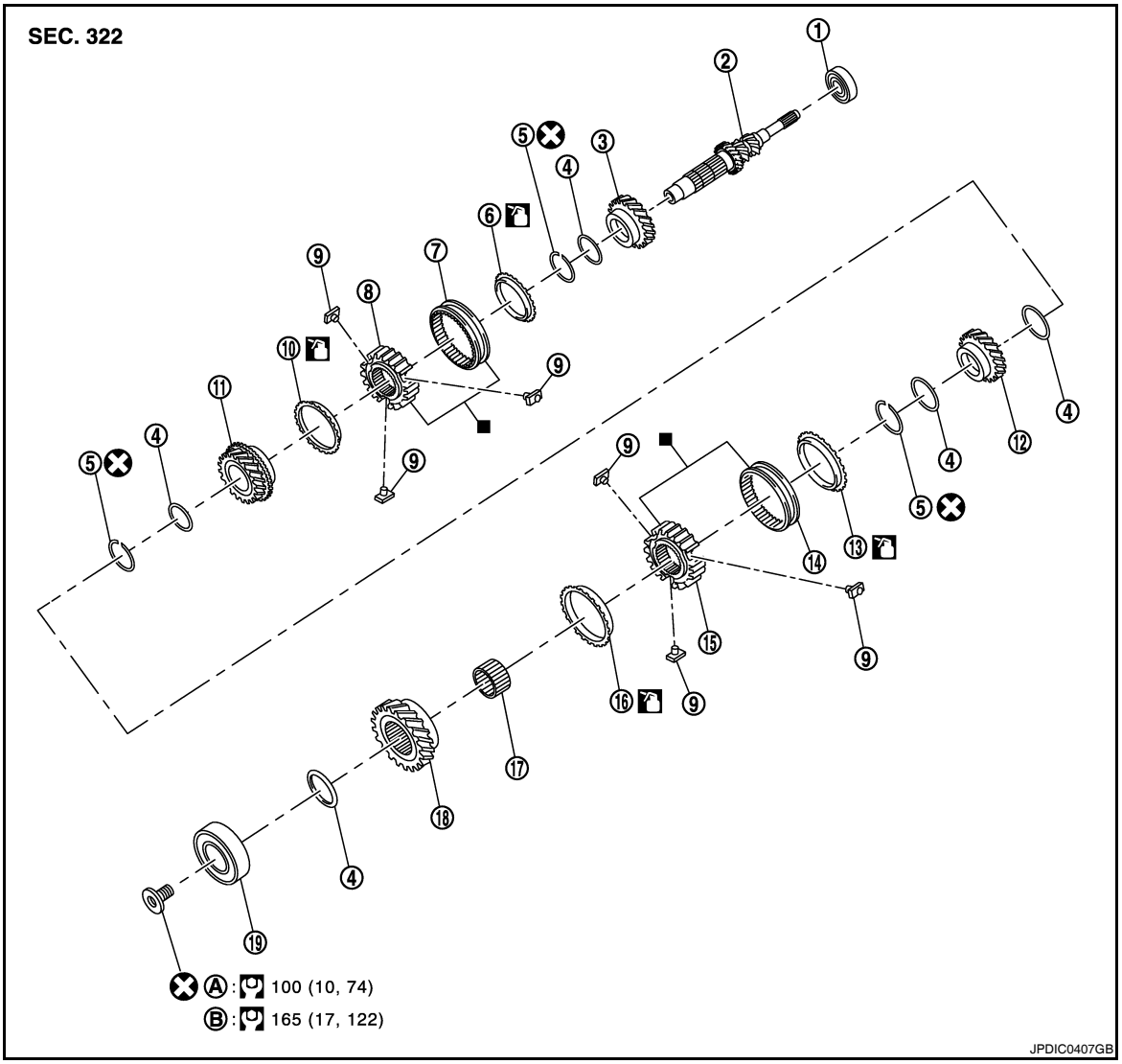
Case and Housing Components



1. Filler plug	2. Gasket	3. Transaxle case
4. Bushing	5. Snap ring	6. Oil channel
7. Oil gutter	8. Position switch	9. Bracket
10. Differential side oil seal	11. Magnet	12. Drain plug
13. Input shaft oil seal	14. Clutch housing	15. Two way connector
16. Plug	17. Pinion shaft	18. Pinion gear

: Apply Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

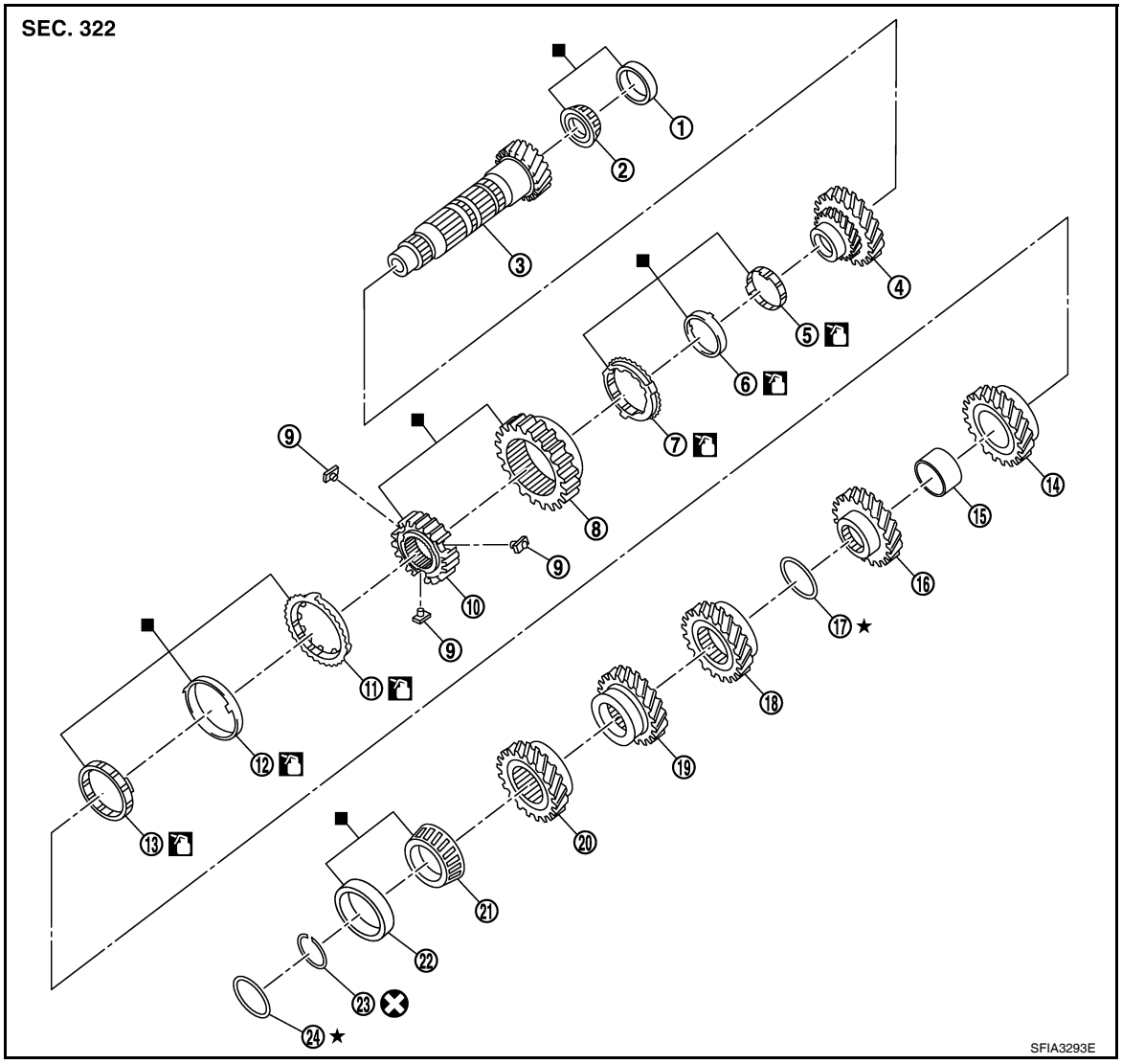
Gear Component



1. Input shaft front bearing
2. Input shaft
3. 3rd input gear
4. Spacer
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

A: 1st step
B: 2nd step

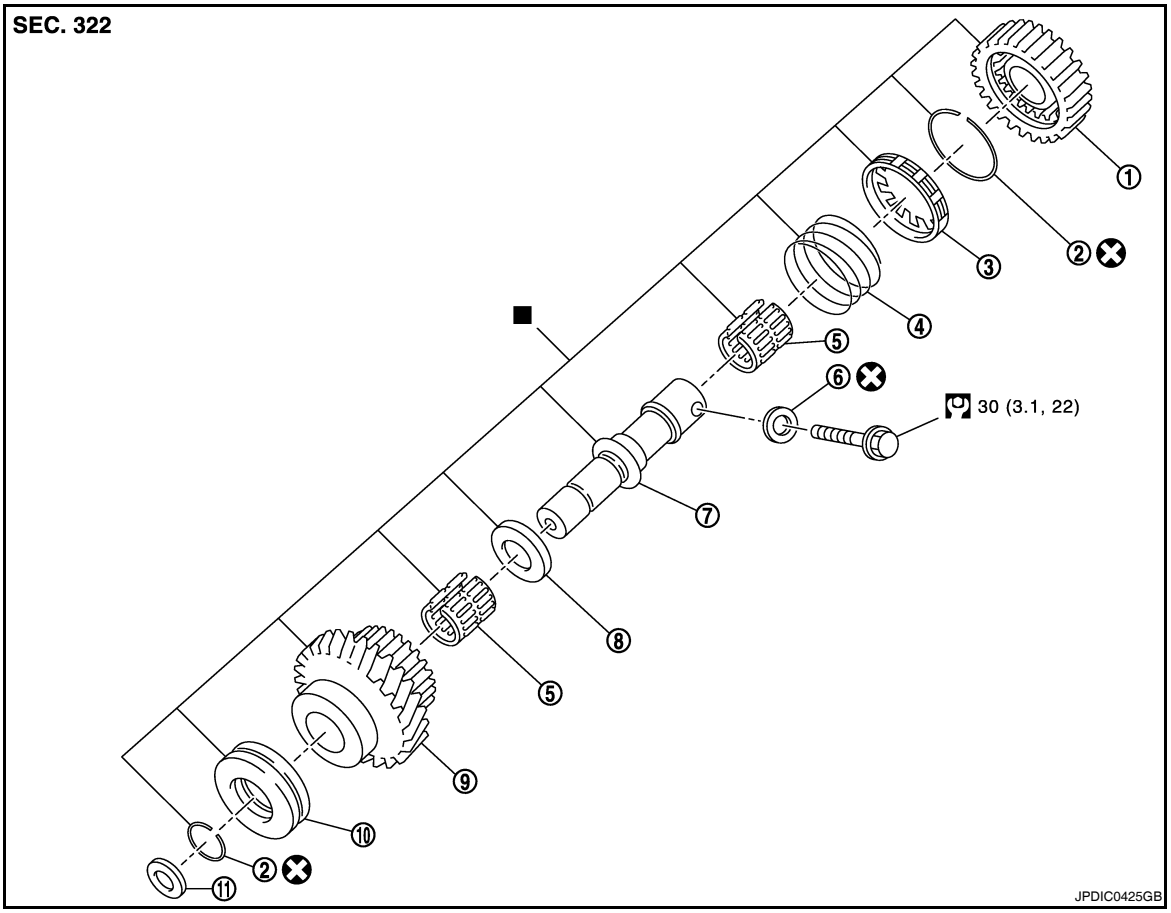
: Apply gear oil.
: Replace the parts as a set.



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. Mainshaft 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. Mainshaft rear bearing adjusting shim

: Apply gear oil.

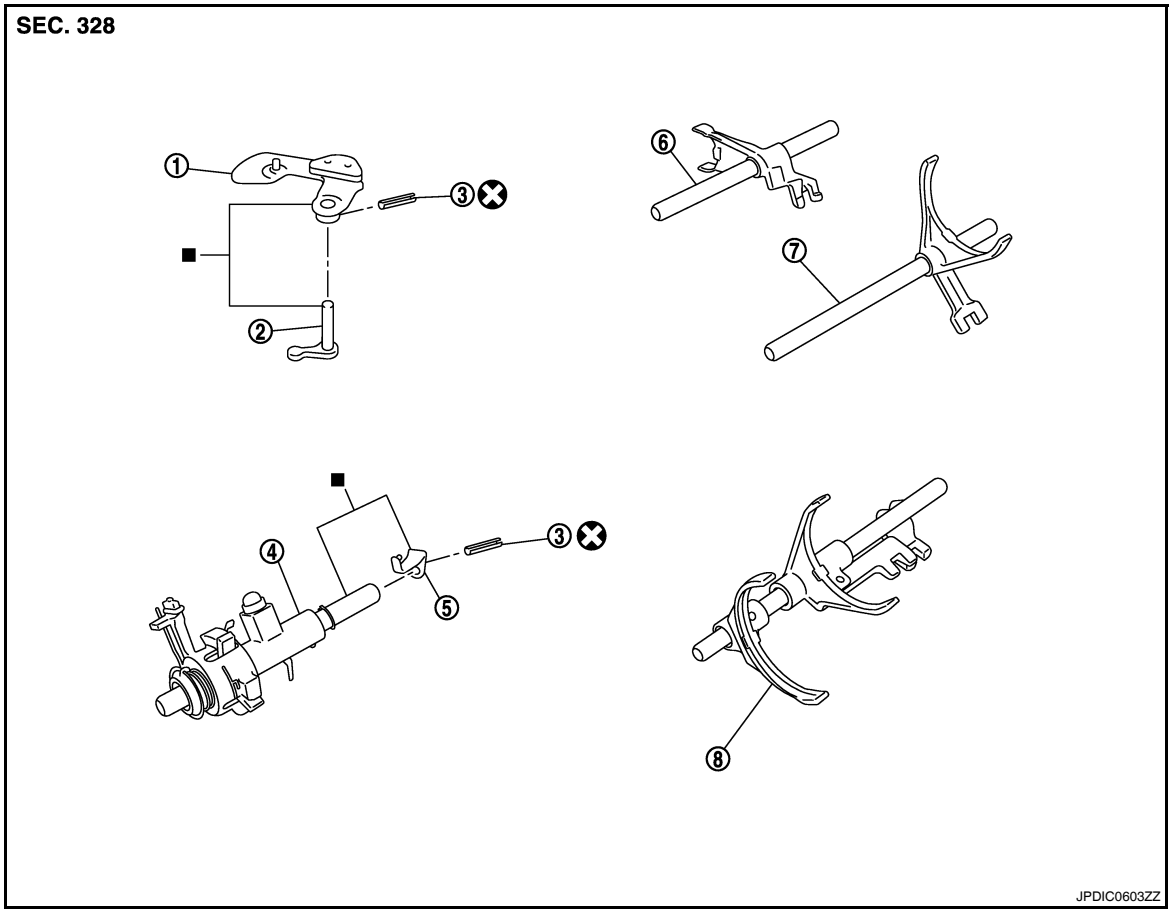
: Replace the parts as a set.



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

■: Replace the parts as a set.

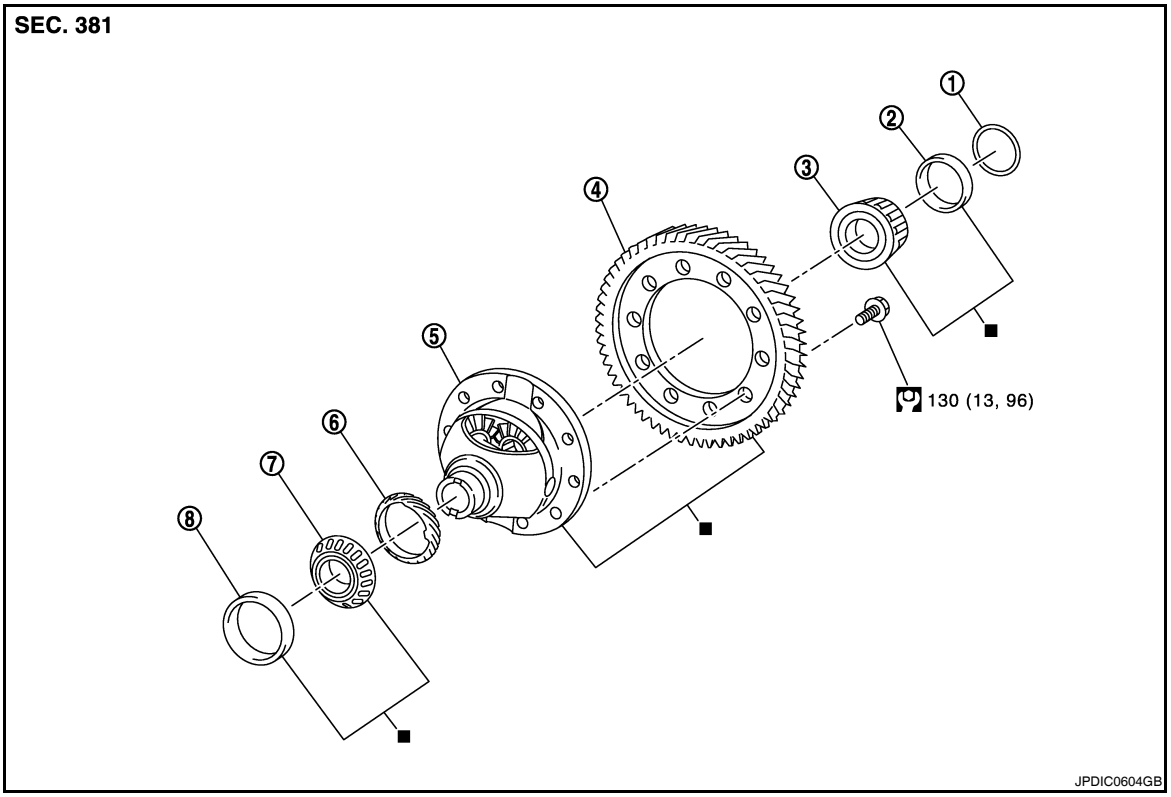
Shift Control Component



1. Shift lever A
2. Shift lever B
3. Retaining pin
4. Selector
5. Select lever
6. Reverse fork rod
7. 1st-2nd fork rod
8. Fork rod

: Replace the parts as a set.

Final Drive Component

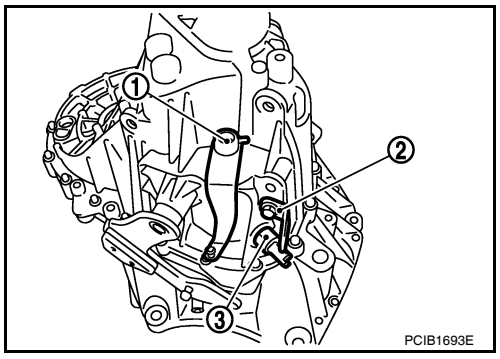


1. Shim
2. Differential side bearing outer race (transaxle case side)
3. Differential side bearing inner race (transaxle case side)
4. Final gear
5. Differential case
6. Speedometer drive gear
7. Differential side bearing inner race (clutch housing side)
8. Differential side bearing outer race (clutch housing side)

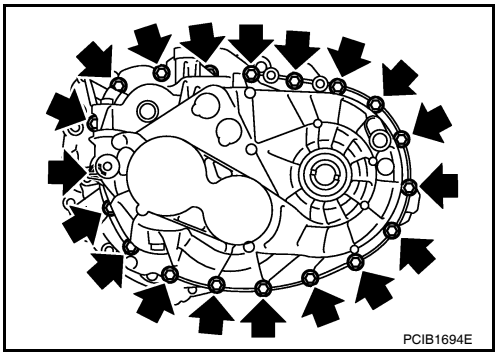
: Replace the parts as a set.

DISASSEMBLY

1. Remove drain plug and gasket from clutch housing using a suitable tool and drain gear oil.
2. Remove filler plug and gasket from transaxle case.
3. Remove select lever (1) retaining pin using a suitable tool, and then remove select lever.
4. Remove bracket (2) and position switch (3) from transaxle case.



5. Remove transaxle case bolts ( ).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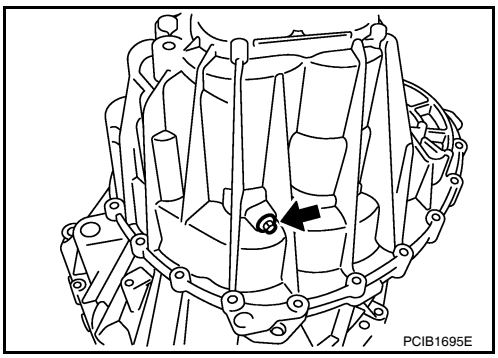
6. Remove reverse idler shaft bolt ( ) and seal washer.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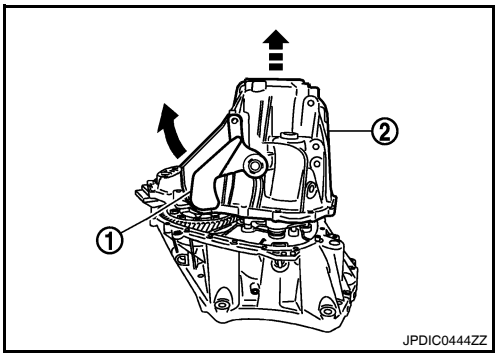
7. Remove transaxle case (2) while rotating shift lever A (1) in the direction as shown.



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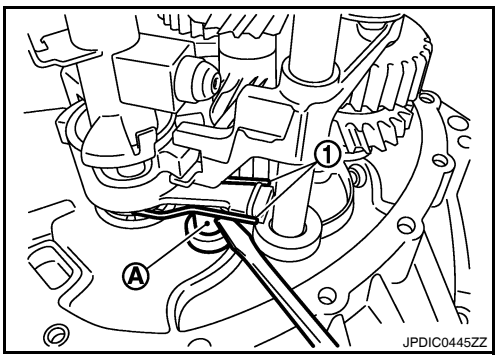
8. Remove selector spring (1) from return bushing (A).



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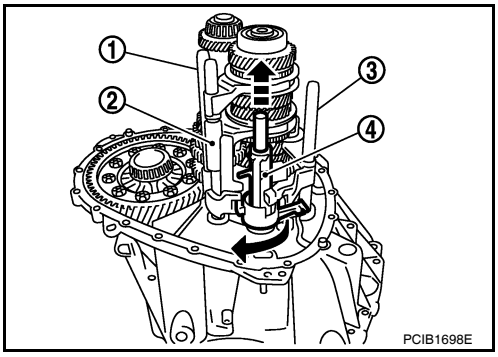
9. Shift 1st-2nd fork rod (1), fork rod (2), and reverse fork rod (3) to the neutral position.
10. Remove selector (4) from clutch housing.



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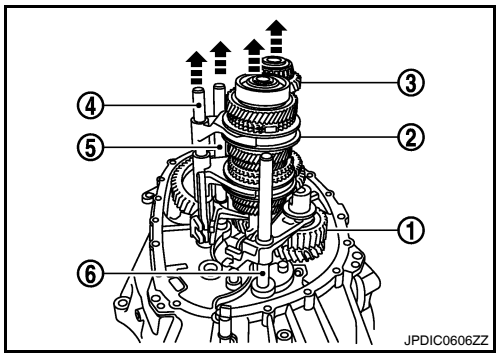
11. Remove reverse idler shaft assembly (1) according to the following procedures.

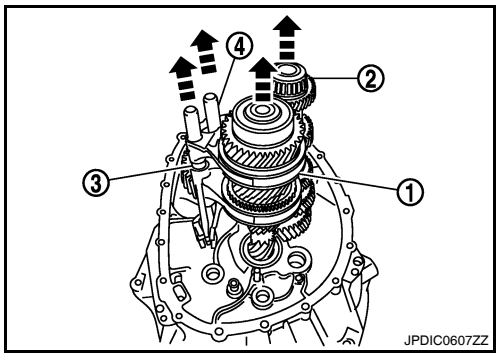
a. Pull up input shaft assembly (2), mainshaft assembly (3), fork rod (4), and 1st-2nd fork rod (5).
NOTE:
It is easier to pull up when shifting each fork rod to each shaft side.

b. Remove reverse idler shaft assembly and reverse fork rod (6) from clutch housing.

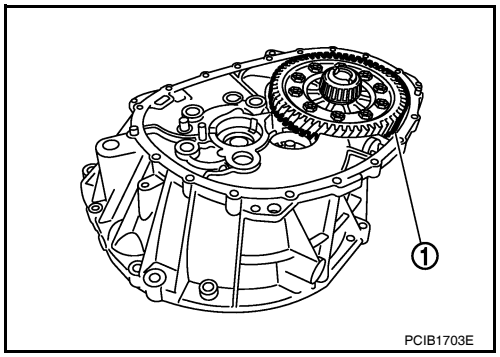
12. Remove spring washer from clutch housing.



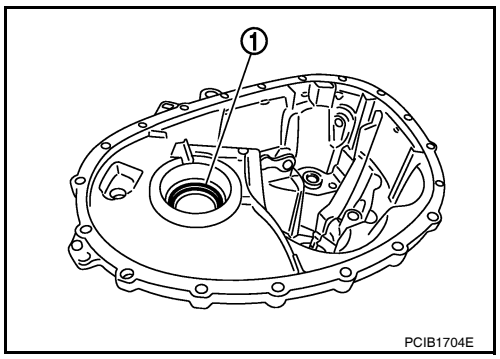
13. Pull up and remove input shaft assembly (1), mainshaft assembly (2), fork rod (3), and 1st-2nd fork rod (4) from clutch housing.
NOTE:
It is easier to pull up when shifting each fork rod to each shaft side.



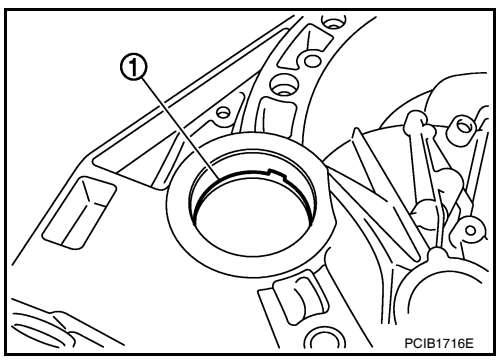
14. Remove final drive assembly (1) from clutch housing.
15. Remove magnet from clutch housing.



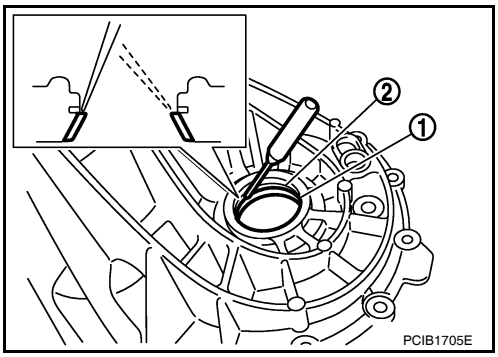
16. Remove differential side oil seals (1) from clutch housing and transaxle case.
CAUTION:
Never damage clutch housing and transaxle case.



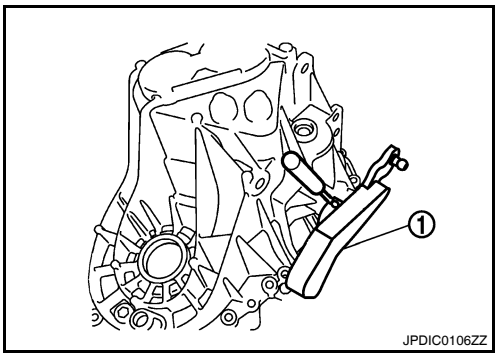
17. Remove differential side bearing outer race (1) from clutch housing using a suitable tool.
CAUTION:
Never damage clutch housing.



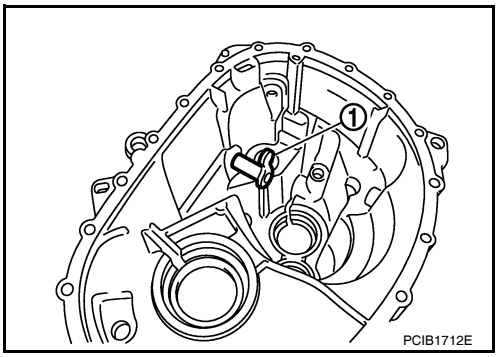
18. Remove differential side bearing outer race (1) from transaxle case using a suitable tool.
CAUTION:
Never damage transaxle case.
19. Remove shim (2) from transaxle case.



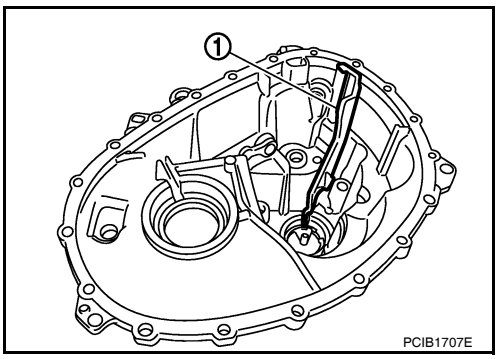
20. Remove shift lever A (1) retaining pin using a suitable tool.
21. Remove shift lever A from transaxle case.



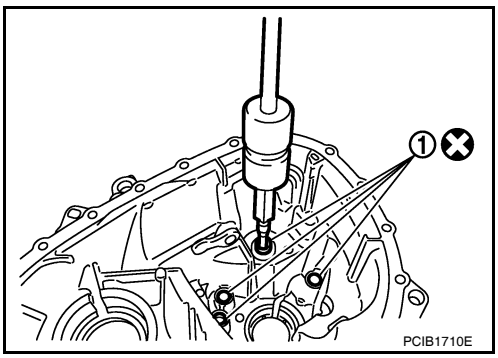
22. Remove shift lever B (1) from transaxle case.



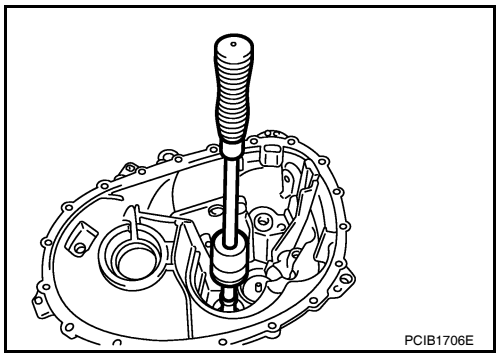
23. Remove oil gutter (1) from transaxle case.



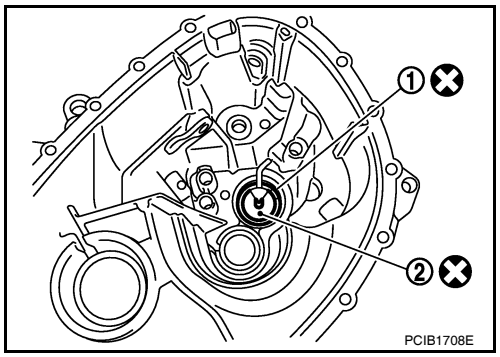
24. Remove bushings (1) from transaxle case using a suitable tool.



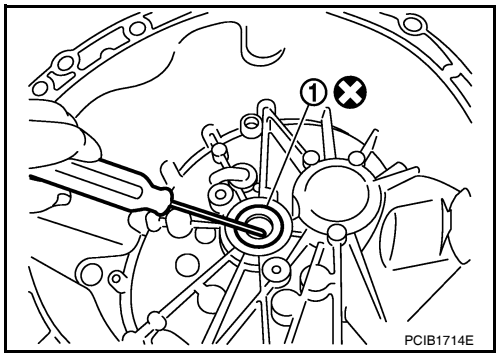
25. Remove mainshaft rear bearing outer race from transaxle case using a suitable tool.
26. Remove mainshaft rear bearing adjusting shim from transaxle case.



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



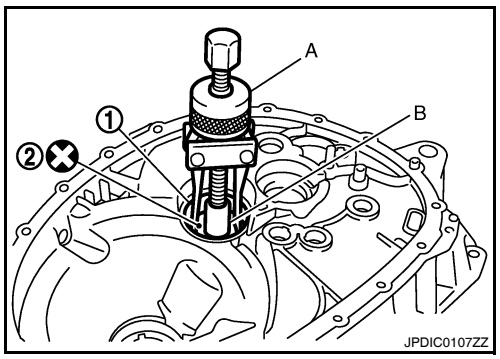
28. Remove input shaft oil seal (1) from clutch housing using a suitable tool.
CAUTION:
Never damage clutch housing.



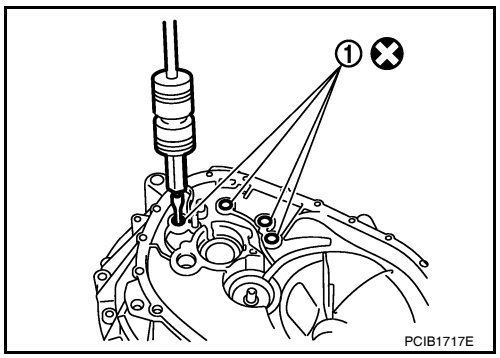
29. Remove mainshaft front bearing outer race (1) from clutch housing using Tool (A) and a spacer (B).

Tool number A: KV381054S0 (J-34286)

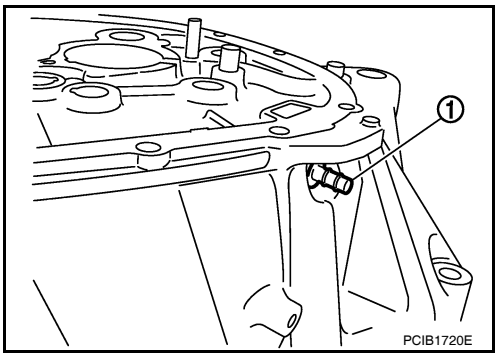
30. Remove oil channel (2) from clutch housing.



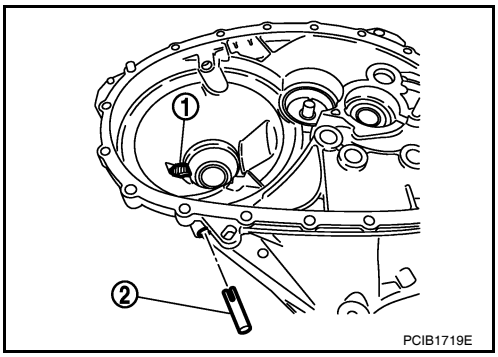
31. Remove bushing (1) from clutch housing using a suitable tool.



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

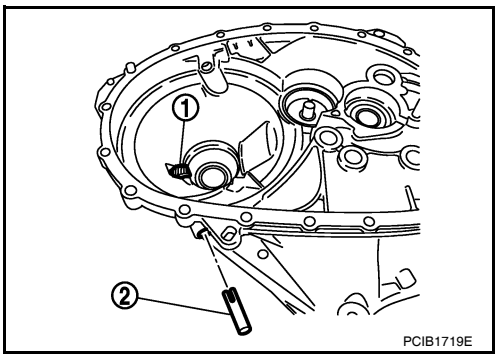


34. Remove pinion gear (1) and pinion shaft (2) from clutch housing.

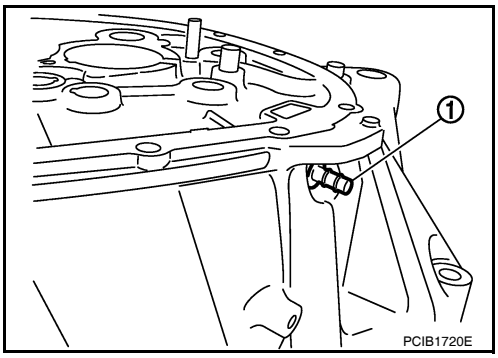


ASSEMBLY

1. Install pinion gear (1) and pinion shaft (2) to clutch housing.
   CAUTION:
   Replace transaxle assembly when replacing clutch housing.
2. Install plug to clutch housing.

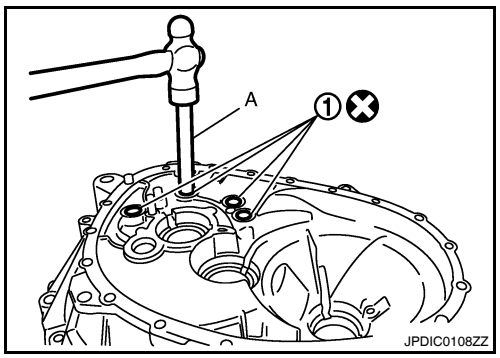


3. Install two way connector (1) to clutch housing.



4. Install bushings (1) so that they becomes even to clutch housing edge surface using a suitable tool (A).
5. Install oil channel to clutch housing.

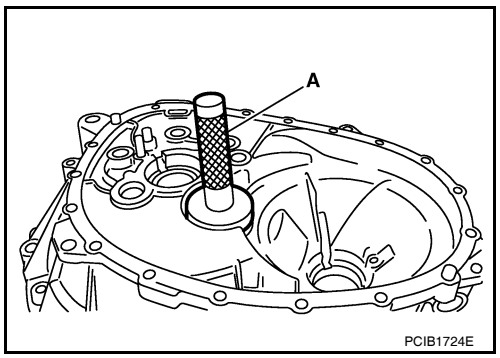
CAUTION:
Never reuse oil channel.



6. Install mainshaft front bearing outer race to clutch housing using Tool (A).

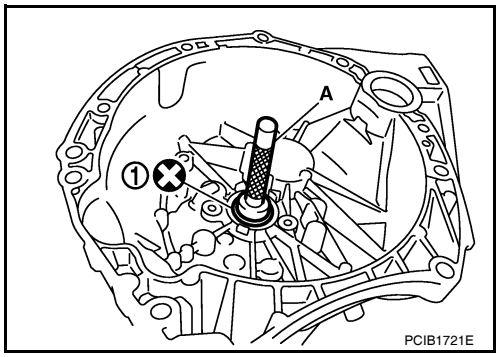
Tool number A: KV38100200 (—)

CAUTION:
Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.



7. Install input shaft oil seal (1) to clutch housing using Tool (A).

Tool number A: ST33220000 (—)

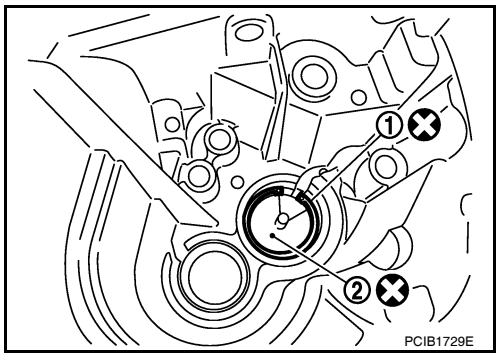


8. Install snap ring (1) and oil channel (2) to transaxle case.

CAUTION:
- **Select and install snap ring that has the same thickness as previous one.**
- **Replace transaxle assembly when replacing transaxle case.**

9. Install mainshaft rear bearing adjusting shim to transaxle case.

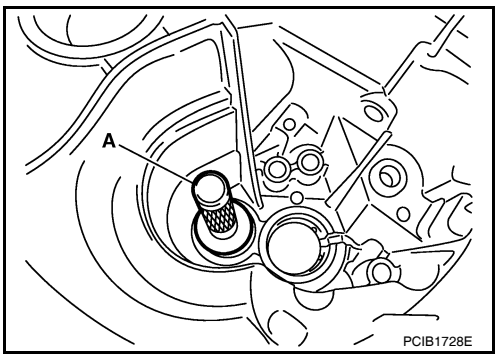
CAUTION:
Select mainshaft rear bearing adjusting shim according to the following procedures when replacing mainshaft adjusting shim, 6th main gear, 5th main gear, or 4th main gear.
- **Replace mainshaft adjusting shim.**
  - **If new mainshaft adjusting shim is thinner than previous one, offset the thickness difference by selecting thicker mainshaft rear bearing adjusting shim.**
  - **If new mainshaft adjusting shim is thicker than previous one, offset the thickness difference by selecting thinner mainshaft rear bearing adjusting shim.**
- **Replace 6th main gear, 5th main gear, or 4th main gear.**
  - **Measure the thickness of the main gear used before and the new main gear**
  - **Increase the thickness of the mainshaft rear bearing adjusting shim, if the difference is smaller than 0.025 mm (0.0010 in).**
  - **Decrease the thickness of the mainshaft rear bearing adjusting shim, if the difference is greater than 0.025 mm (0.0010 in).**



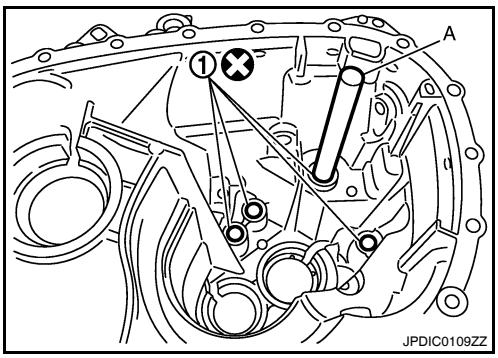
10. Install mainshaft rear bearing outer race to transaxle case using Tool (A)

Tool number A: KV38100200 (—)

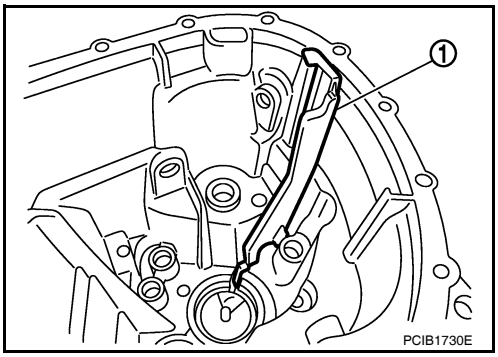
CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.



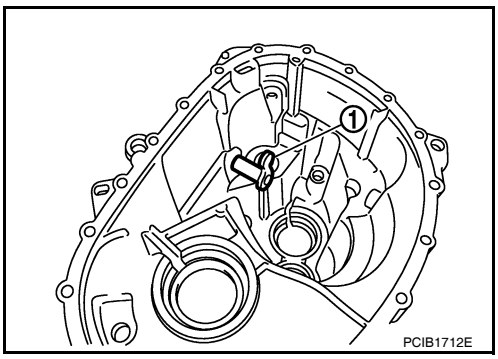
11. Install bushings (1) to transaxle case using a suitable tool (A).



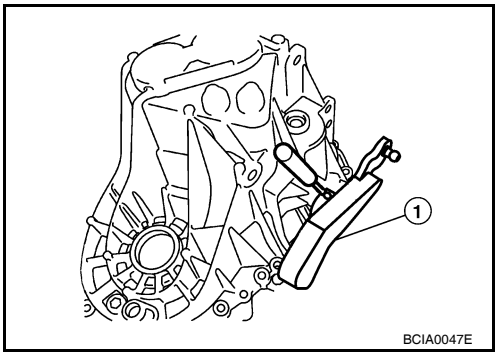
12. Install oil gutter (1) to transaxle case.



13. Install shift lever B (1) to transaxle case.
CAUTION:
Replace shift lever A and shift lever B as a set.
14. Install shift lever A to transaxle case.
CAUTION:
Replace shift lever A and shift lever B as a set.



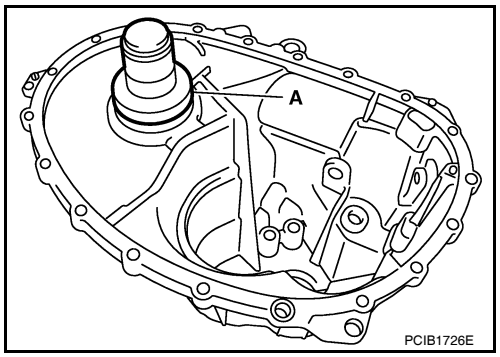
15. Install retaining pin to shift lever A (1) using a suitable tool.
CAUTION:
Never reuse retaining pin.
16. Install shim to transaxle case.



17. Install differential side bearing outer race (transaxle case side) to transaxle case using Tool (A).

Tool number A: ST33400001 (J-26082)

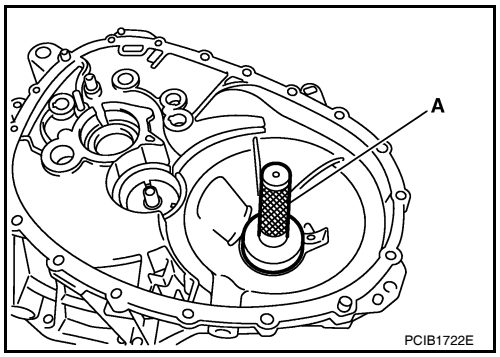
CAUTION:
Replace differential side bearing outer race (transaxle case side) and differential side bearing inner race (transaxle case side) as a set.



18. Install differential side bearing outer race (clutch housing side) to clutch housing using Tool (A).

Tool number A: KV38100200 (—)

CAUTION:
Replace differential side bearing outer race (clutch housing side) and differential side bearing inner race (clutch housing side) as a set.

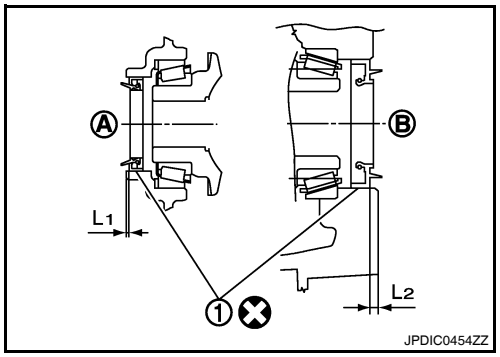


19. Install differential side oil seals (1) to clutch housing and transaxle case using Tool.

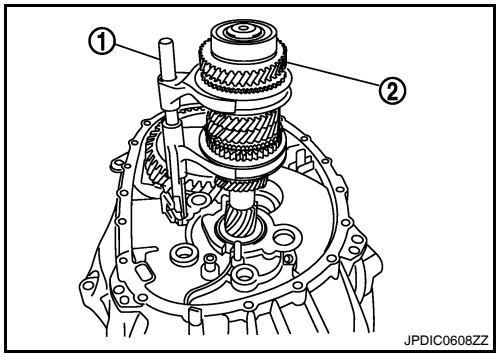
Tool number : KV38100300 (J-25523)

- A: Transaxle case side
- B: 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)



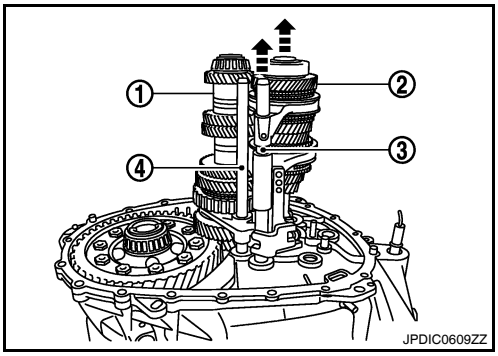
20. Install magnet to clutch housing.
21. Install final drive assembly to clutch housing.
22. Set fork rod (1) to input shaft assembly (2), and then install them to clutch housing.



23. Install mainshaft assembly (1) according to the following procedures.

a. Pull up input shaft assembly (2) and fork rod (3).

b. Set 1st-2nd fork rod (4) to mainshaft assembly, and then install them to clutch housing.

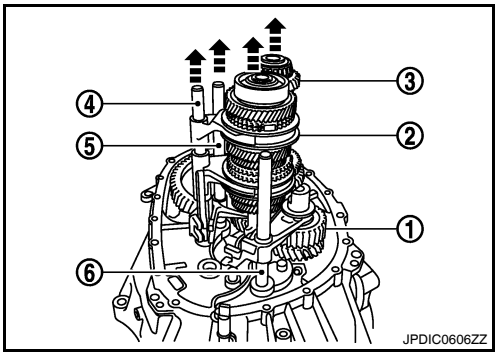


24. Install reverse idler shaft assembly (1) according to the following procedures.

a. Install spring washer to clutch housing.

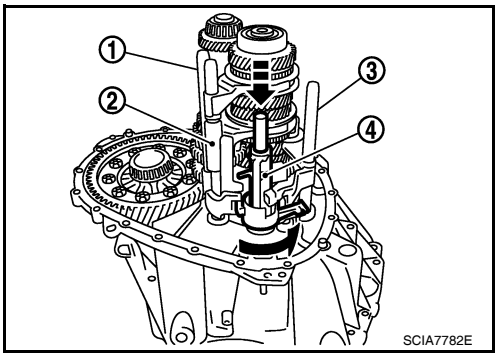
b. Pull up input shaft assembly (2), mainshaft assembly (3), fork rod (4), and 1st-2nd fork rod (5).
NOTE:
It is easier to pull up when shifting each fork rod to each shaft side.

c. Set reverse fork rod (6) to reverse idler shaft assembly, and then install them to clutch housing.



25. Shift 1st-2nd fork rod (1), fork rod (2), and reverse fork rod (3) to the neutral position.

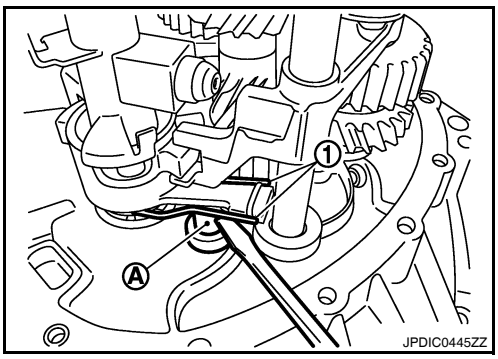
26. Install selector (4) to clutch housing.
CAUTION:
Replace select lever and selector as a set.



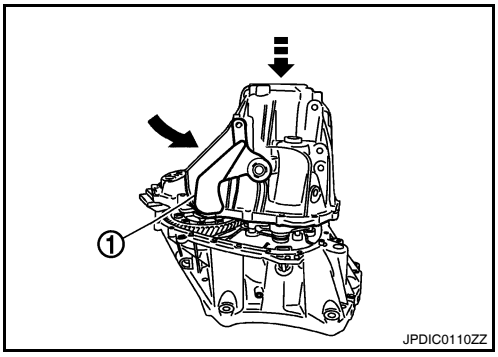
27. Install selector spring (1) to return bushing (A).

28. Apply recommended sealant to transaxle case mounting surface.
- **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

CAUTION:
- **Never allow old liquid gasket, moisture, oil, or foreign matter to remain on mounting surface.**
- **Check that mounting surface is not damaged.**
- **Apply liquid gasket bead continuously.**



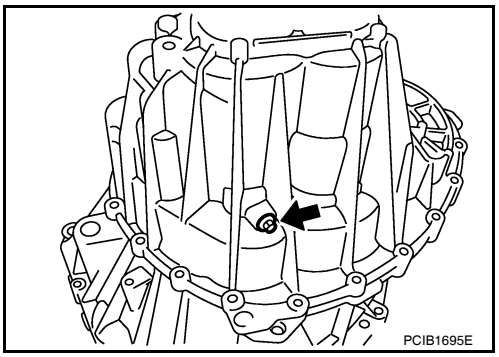
29. Install transaxle case to clutch housing while rotating shift lever A (1) in the direction as shown.



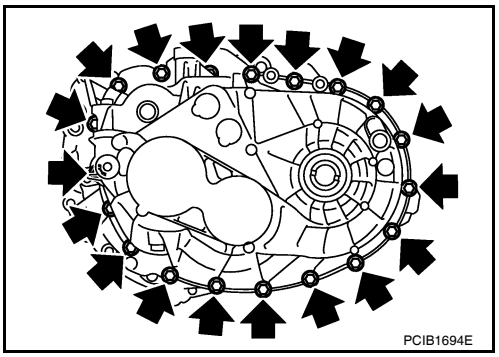
30. Install reverse idler shaft bolt ( ) according to the following procedures.

a. Install seal washer to reverse idler shaft bolt, and install reverse idler shaft bolt to transaxle case.
CAUTION:
Never reuse seal washer.

b. Tighten reverse idler shaft bolt to the specified torque. Refer to MT-59, "Disassembly and Assembly".



31. Tighten transaxle case bolts ( ) to the specified torque. Refer to MT-59, "Disassembly and Assembly".



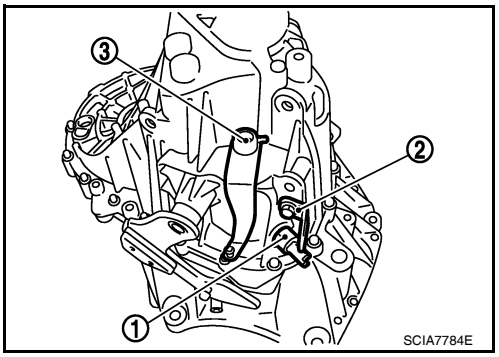
32. Install position switch (1) according to the following procedures.

a. Apply recommended sealant to position switch thread.
- **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

CAUTION:
Never allow old liquid gasket, moisture, oil, or foreign matter to remain on thread.

b. Install position switch to transaxle case, and tighten it to the specified torque. Refer to MT-59, "Disassembly and Assembly".

33. Install bracket (2) to transaxle case, and tighten bolt to the specified torque. Refer to MT-59, "Disassembly and Assembly".



34. Install select lever (3) according to following the procedures.

a. Install select lever to transaxle case.
CAUTION:
Replace select lever and selector as a set.

b. Install retaining pin to select lever using a suitable tool.
CAUTION:
Never reuse retaining pin.

35. Install drain plug according to the following procedures.

a. Install gasket to drain plug.
CAUTION:
Never reuse gasket.

b. Install drain plug to clutch housing.

c. Tighten drain plug to the specified torque. Refer to MT-59, "Disassembly and Assembly".

36. Install filler plug according to the following procedures.

a. Install gasket to filler plug, and then install them to transaxle case.
CAUTION:
Never reuse gasket.

b. Tighten filler plug to the specified torque. Refer to MT-59, "Disassembly and Assembly".
CAUTION:
Fill with gear oil before tighten filler plug to the specified torque.

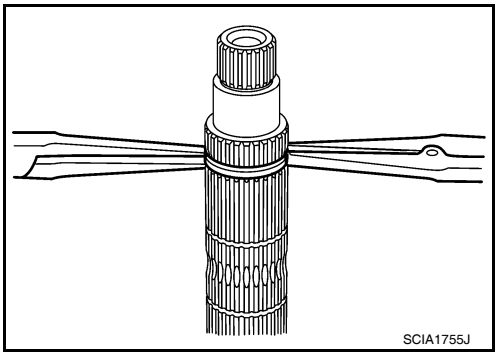
INPUT SHAFT AND GEARS

Disassembly and Assembly

INFOID:0000000004305280

GENERAL PRECAUTIONS

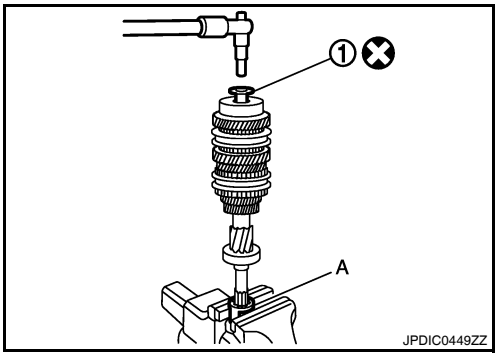
- Never reuse snap ring.
- Secure input shaft in a vise with backplate, and then remove gears and snap rings.
- For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. While expanding snap ring with snap ring pliers, move snap ring with flat pliers.
- Disassemble gear components putting direction marks on the parts that do not affect any functions.



DISASSEMBLY

1. Remove input shaft rear bearing bolt (1) using Tool (A).

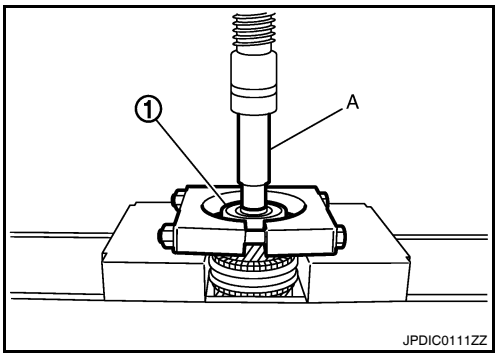
Tool number A: KV32300QAM (—)



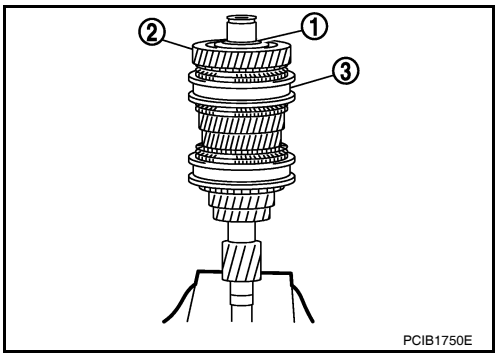
2. Remove input shaft rear bearing (1) according to the following procedures.

a. Set a suitable puller to input shaft rear bearing.

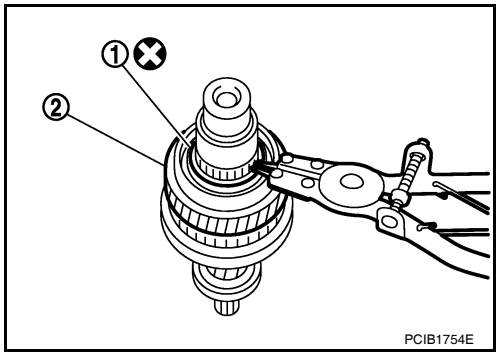
b. Remove input shaft rear bearing using a suitable drift (A).



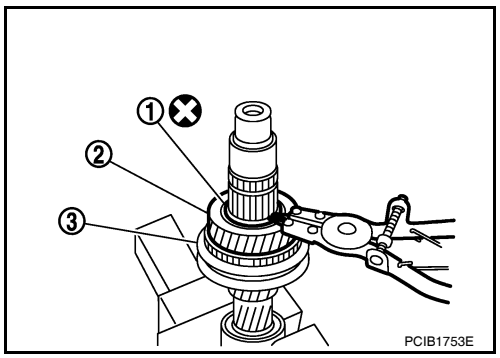
3. Remove spacer (1), 6th input gear (2), needle bearing, 6th baulk ring, and 5th-6th synchronizer hub assembly (3).
4. Remove insert keys and 5th-6th coupling sleeve from 5th-6th synchronizer hub.



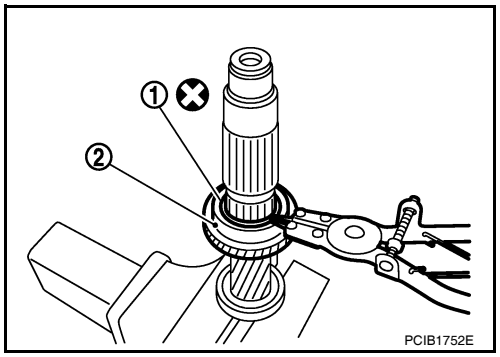
5. Remove snap ring (1) using suitable tool.
6. Remove spacer, 5th baulk ring, 5th input gear (2), and spacer.



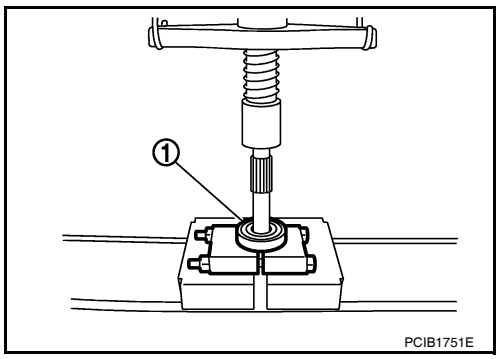
7. Remove snap ring (1) using suitable tool.
8. Remove spacer, 4th input gear (2), 4th baulk ring, and 3rd-4th synchronizer hub assembly (3).
9. Remove insert keys and 3rd-4th coupling sleeve from 3rd-4th synchronizer hub.



10. Remove snap ring (1).
11. Remove spacer, 3rd baulk ring, 3rd input gear (2).



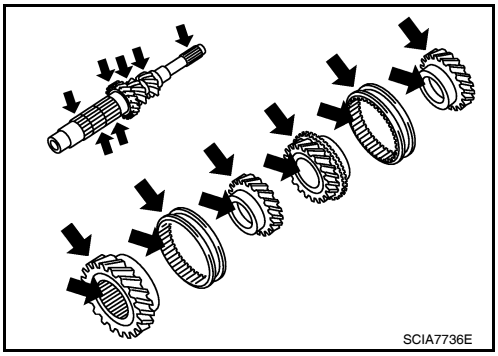
12. Set a suitable puller to input shaft front bearing (1), and then remove input shaft front bearing.



INSPECTION AFTER DISASSEMBLY

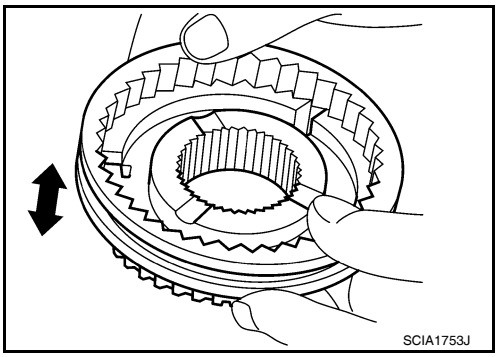
Input shaft and gear
Check the following items and replace if necessary.

- Damage, peeling, bend, uneven wear, and distortion of shaft.
- Excessive wear, damage, and peeling of gear.

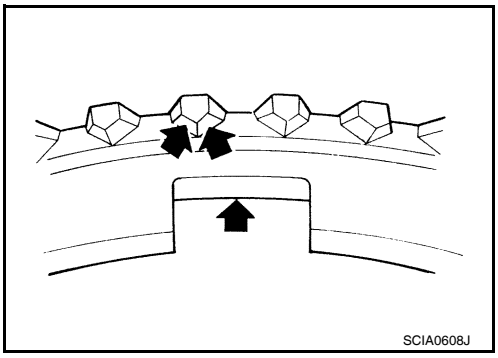

SCIA7736E

Synchronizer

- Synchronizer hub and coupling sleeve
  Check the following items and replace if necessary.
- Breakage, damage, and unusual wear on contact surface of coupling sleeve, synchronizer hub, and insert key.
- Coupling sleeve and synchronizer hub move smoothly.

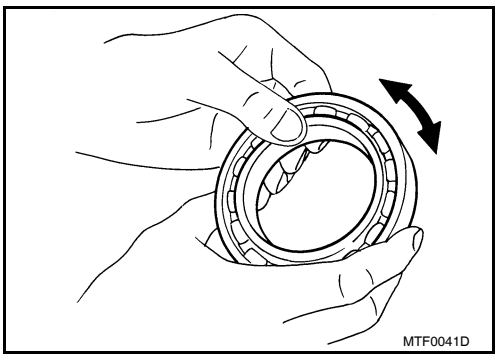

SCIA1753J

- Baulk ring
  Check contact surface of baulk ring cam and insert key for excessive wear, uneven wear, bend, and damage. Replace if necessary.


SCIA0608J

Bearing

Check bearing for damage and unsmooth rotation. Replace if necessary.


MTF0041D

ASSEMBLY

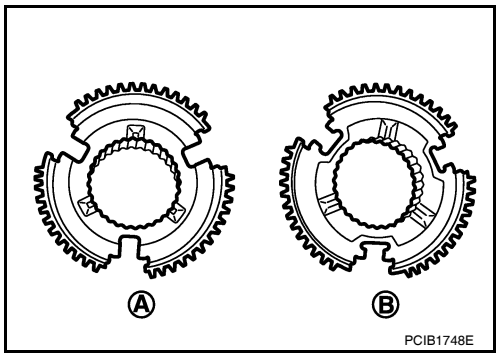
Note the following procedures, and assemble in the reverse order of disassembly.

CAUTION:

- **Replace transaxle assembly when replacing input shaft.**
- **Never reuse snap ring.**
- **Check that snap ring is securely installed in a groove.**
- **Replace 3rd-4th coupling sleeve and 3rd-4th synchronizer hub as a set.**

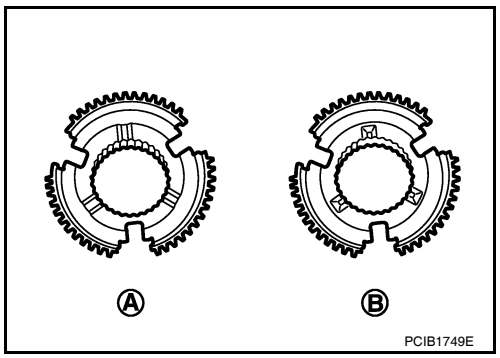
- **Replace 5th-6th coupling sleeve and 5th-6th synchronizer hub as a set.**
- **Be careful to install 3rd-4th synchronizer hub according to the specified direction.**

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

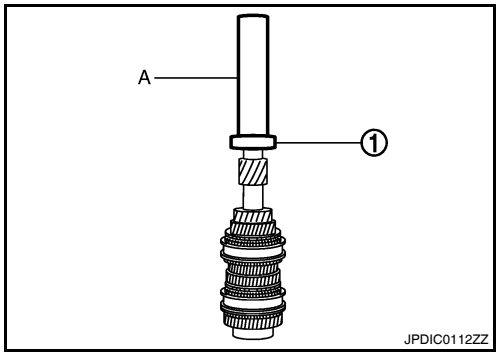


- **Be careful to install 5th-6th synchronizer hub according to the specified direction.**

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



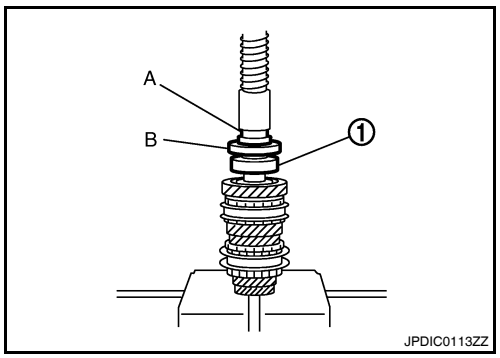
- Install input shaft front bearing (1) using a suitable drift (A).



- Install input shaft rear bearing (1) using a suitable drift (A) and the Tool (B).

Tool number B: ST36720030 (—)

- Apply gear oil to 3rd baulk ring, 4th baulk ring, 5th baulk ring, and 6th baulk ring.

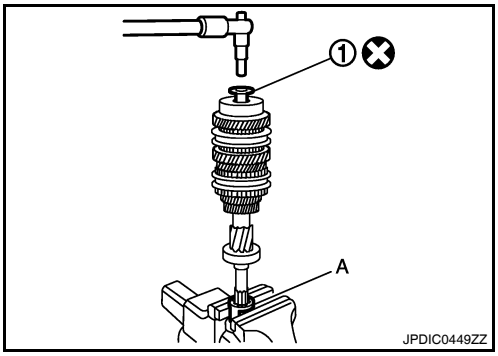


- Install input shaft rear bearing bolt (1) according to the following procedures.

CAUTION:
Follow the procedures. Otherwise it may cause a transaxle malfunction.

1. Secure the Tool (A) in a vise, and then set input shaft assembly.

Tool number A: KV32300QAM (—)



2. Install input shaft rear bearing bolt, and then tighten it to the specified torque of the 1st step. Refer to MT-59, "Disassembly and Assembly".
3. Loosen input shaft rear bearing bolt by a half turn.
4. Tighten input shaft rear bearing bolt to the specified torque of the 2nd step. Refer to MT-59, "Disassembly and Assembly".

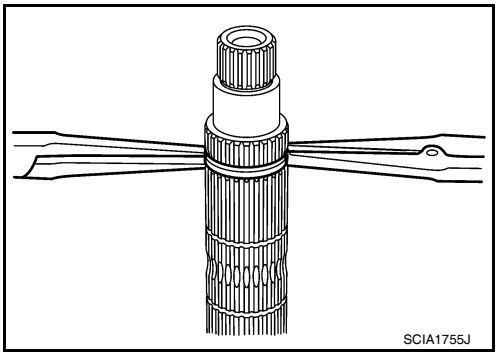
MAINSHAFT AND GEARS

Disassembly and Assembly

INFOID:0000000004305281

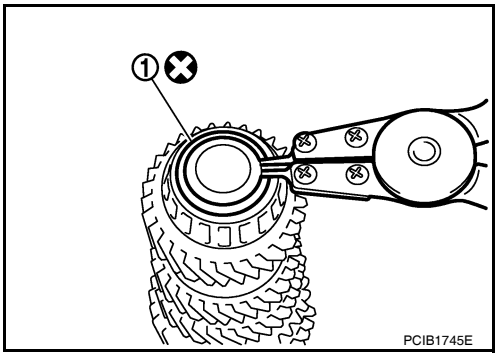
GENERAL PRECAUTIONS

- Never reuse snap ring.
- Secure mainshaft in a vise with backplate, and then 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. While expanding snap ring with snap ring pliers, move snap ring with flat pliers.
- Disassemble gear components putting direction marks on the parts that never affect any functions.



DISASSEMBLY

1. Remove snap ring (1) using suitable tool.

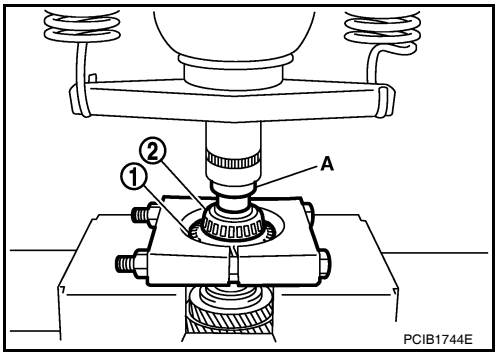


2. Remove 6th main gear (1) and mainshaft rear bearing inner race (2) according to the following procedures.

a. Set a suitable puller to 6th main gear.

b. Remove mainshaft rear bearing inner race and 6th main gear using the Tool (A).

Tool number A: ST33052000 (—)



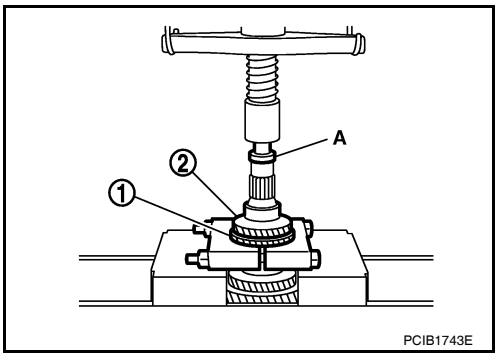
3. Remove 4th main gear (1) and 5th main gear (2) according to the following procedures.

a. Set a suitable tool to 4th main gear.

b. Remove 5th main gear and 4th main gear using Tool (A).

Tool number A: ST33052000 (—)

4. Remove mainshaft adjusting shim.

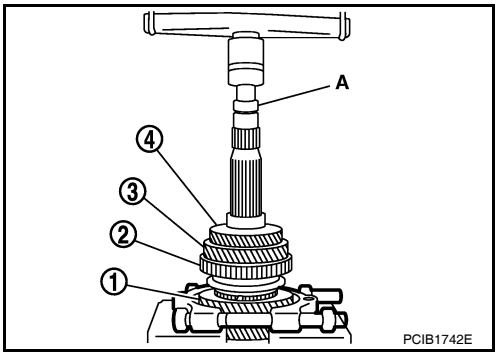


5. Remove 1st main gear (1), 1st-2nd synchronizer hub assembly (2) , 2nd main gear (3), and 3rd main gear (4) according to the following procedures.

a. Set a suitable tool to 1st main gear.

b. Remove 3rd main gear, busing, 2nd main gear, 2nd inner baulk ring, 2nd synchronizer cone, 2nd outer baulk ring, 1st-2nd synchronizer hub assembly, 1st outer baulk ring, 1st synchronizer cone, 1st inner baulk ring, and 1st main gear using the Tool (A).

Tool number A: ST33052000 (—)



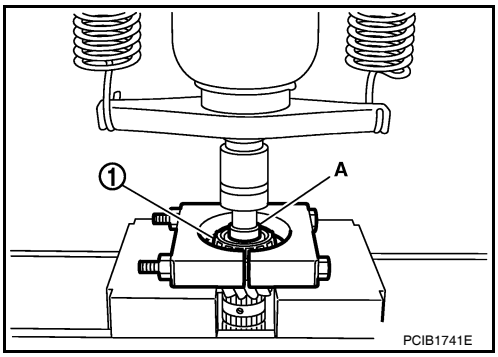
c. Remove insert keys and 1st-2nd coupling sleeve from 1st-2nd synchronizer hub.

6. Remove mainshaft front bearing inner race (1) according to the following procedures.

a. Set a suitable puller to mainshaft front bearing inner race.

b. Remove mainshaft front bearing inner race using the Tool (A).

Tool number A: ST33052000 (—)

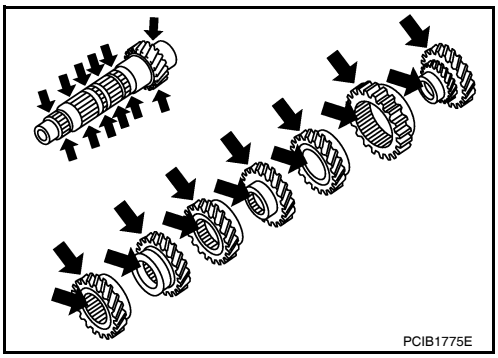


INSPECTION AFTER DISASSEMBLY

Mainshaft and Gear

Check the following items and replace if necessary.

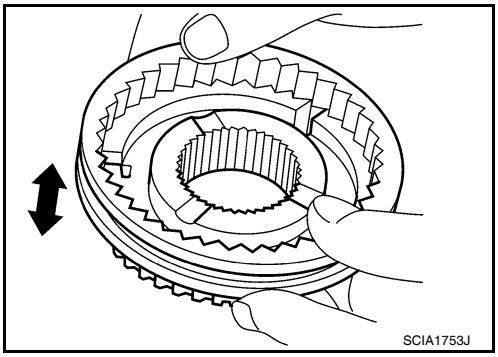
- Damage, peeling, bend, uneven wear, and distortion of shaft.
- Excessive wear, damage, and peeling of gear.



Synchronizer

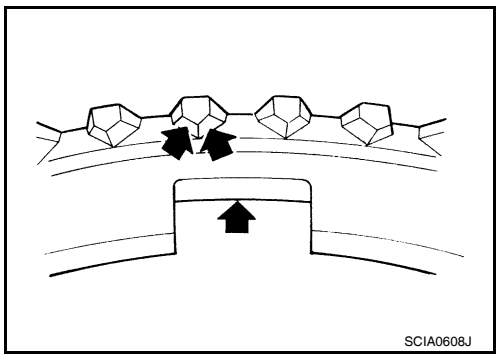
- Synchronizer hub and coupling sleeve
  Check the following items and replace if necessary.

- Breakage, damage, and unusual wear on contact surface of coupling sleeve, synchronizer hub, and insert key.
- Coupling sleeve and synchronizer hub move smoothly.



- Baulk ring

Check contact surface of baulk ring cam and insert key for excessive wear, uneven wear, bend, and damage. Replace if necessary.

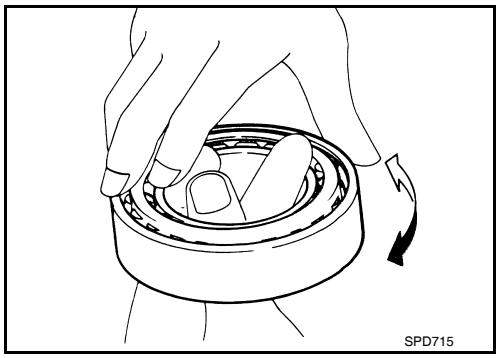

SCIA0608J

Bearing

Check bearing for damage and unsmooth rotation. Replace if necessary.

CAUTION:

- **Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.**
- **Replace mainshaft rear bearing inner race and mainshaft rear bearing outer race as a set.**


SPD715

ASSEMBLY

CAUTION:

- **Select mainshaft rear bearing adjusting shim according to the following procedures when replacing mainshaft adjusting shim, 6th main gear, 5th main gear, or 4th main gear.**

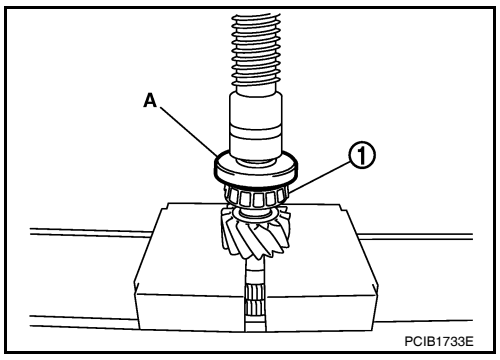
- **Replace mainshaft adjusting shim.**
- **If new mainshaft adjusting shim is thinner than previous one, offset the thickness difference by selecting thicker mainshaft rear bearing adjusting shim.**
- **If new mainshaft adjusting shim is thicker than previous one, offset the thickness difference by selecting thinner mainshaft rear bearing adjusting shim.**

- **Replace 6th main gear, 5th main gear, or 4th main gear.**
- **Measure the thickness of the main gear used before and the new main gear**
- **Increase the thickness of the mainshaft rear bearing adjusting shim, if the difference is smaller than 0.025 mm (0.0010 in).**
- **Replace transaxle assembly when replacing mainshaft.**

1. Install mainshaft front bearing inner race (1) using the Tool (A).

   Tool number A: ST36720030 (—)

   CAUTION:
   Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.

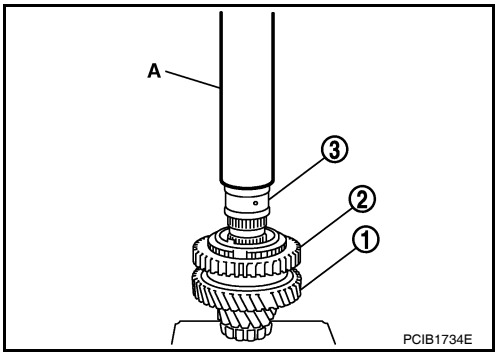


PCIB1733E

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.
   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.**
3. Install insert keys and 1st-2nd coupling sleeve to 1st-2nd synchronizer hub.
   CAUTION:
   Replace 1st-2nd synchronizer hub and 1st-2nd coupling sleeve as a set.

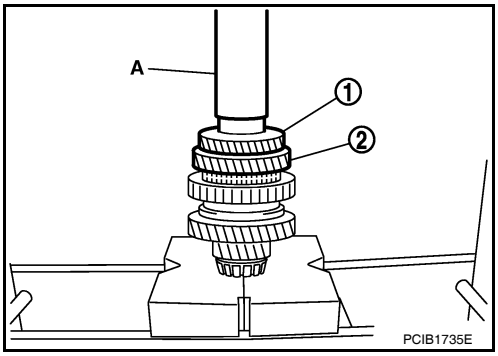
4. Install 1st main gear (1), 1st inner baulk ring, 1st synchronizer cone, 1st outer baulk ring, 1st-2nd synchronizer hub assembly (2), 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring.
5. Install bushing (3) using the Tool (A).

Tool number A: KV32102700 (—)



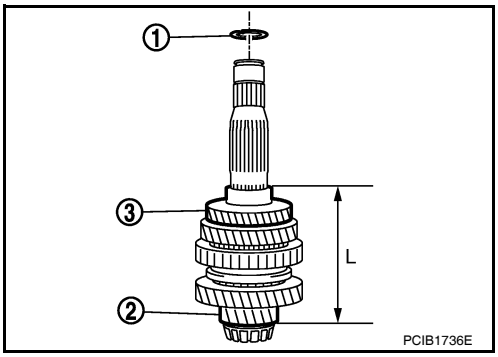
6. Install 3rd main gear (1) and 2nd main gear (2) using Tool (A).

Tool number A: ST32102700 (—)



7. Measure dimension (L) as shown. Select mainshaft adjusting shim (1) according to the following list, and then install it to mainshaft.

2 : Mainshaft
3 : 3rd main gear

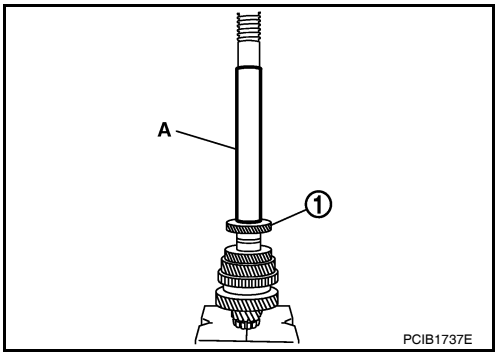


Unit: mm (in)

Dimension (L)	Mainshaft 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)

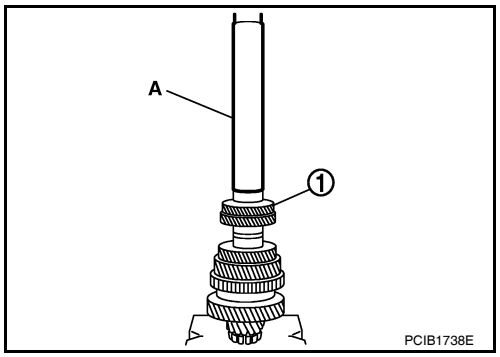
8. Install 4th main gear (1) using Tool (A).

Tool number A: KV32102700 (—)



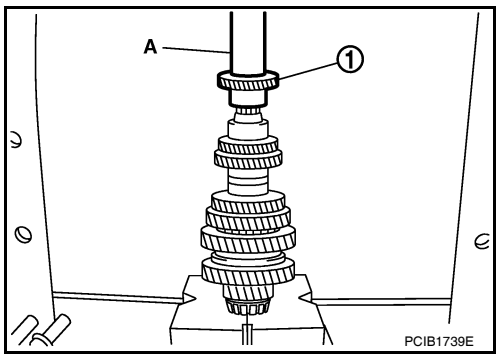
9. Install 5th main gear (1) using Tool (A).

Tool number A: KV32102700 (—)



10. Install 6th main gear (1) using Tool (A).

Tool number A: KV32102700 (—)



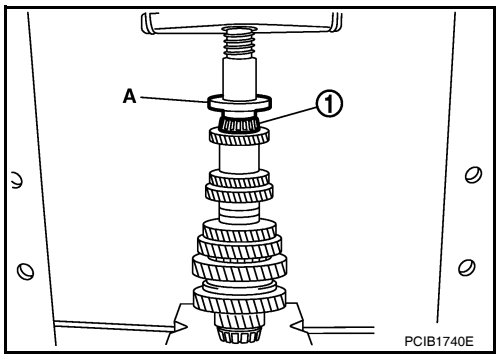
11. Install mainshaft rear bearing inner race (1) usingTool (A).

Tool number A: ST30901000 (J-26010-01)

CAUTION:
Replace mainshaft rear bearing inner race and mainshaft rear bearing outer race as a set.

12. Install snap ring.

CAUTION:
Never reuse snap ring.



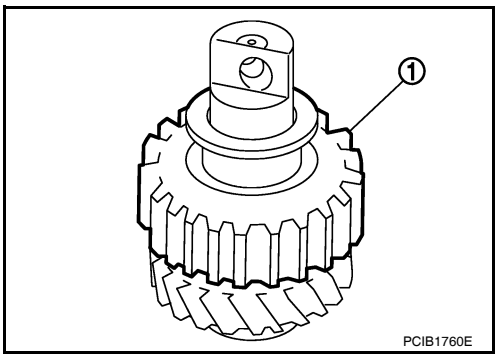
REVERSE IDLER SHAFT AND GEARS

Disassembly and Assembly

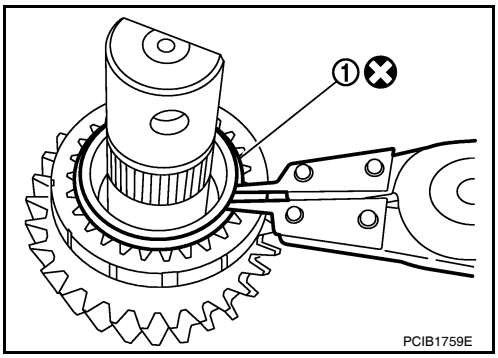
INFOID:0000000004305282

DISASSEMBLY

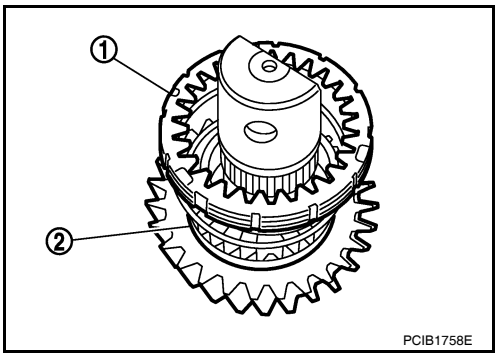
1. Remove reverse output gear (1).



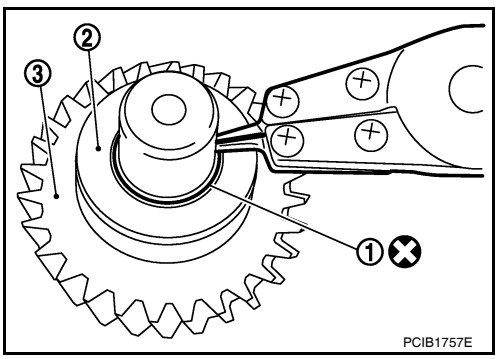
2. Remove snap ring (1) using suitable tool.



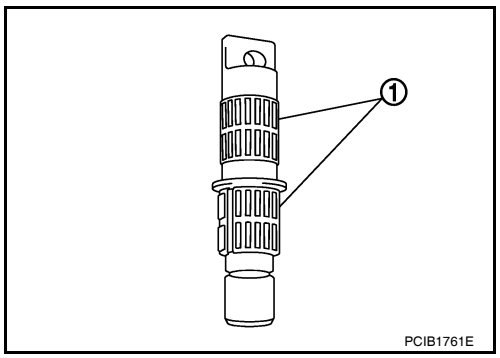
3. Remove reverse baulk ring (1) and return spring (2).



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



5. Remove needle bearings (1) and spacer.



INSPECTION AFTER DISASSEMBLY

Shaft and Gear

Check the following items. Replace reverse output gear, snap ring, reverse baulk ring, return spring, needle bearing, reverse idler shaft, spacer, reverse input gear, and lock washer as a set, if necessary.

- Damage, peeling, bend, uneven wear, and distortion of shaft
- Excessive wear, damage, and peeling of gear

Bearing

Check damage and rotation of bearing. Replace reverse output gear, snap ring, reverse baulk ring, return spring, needle bearing, reverse idler shaft, spacer, reverse input gear, and lock washer as a set, if necessary.

ASSEMBLY

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

CAUTION:

- **Never reuse snap ring.**
- **Check that snap ring is securely installed in a groove.**
- **Replace reverse output gear, snap ring, reverse baulk ring, return spring, needle bearing, reverse idler shaft, spacer, reverse input gear, and lock washer as a set.**

FINAL DRIVE

Disassembly and Assembly

INFOID:0000000004305283

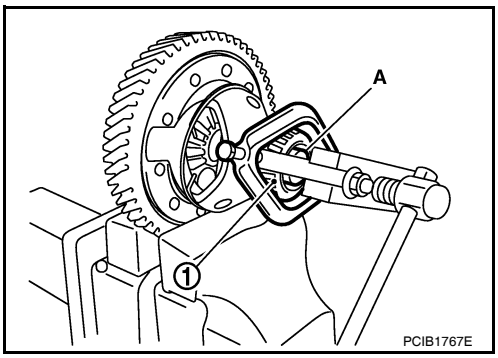
DISASSEMBLY

1. Remove differential side bearing inner race (clutch housing side) (1) according to the following procedures.

a. Set a suitable toolto differential side bearing inner race (clutch housing side).

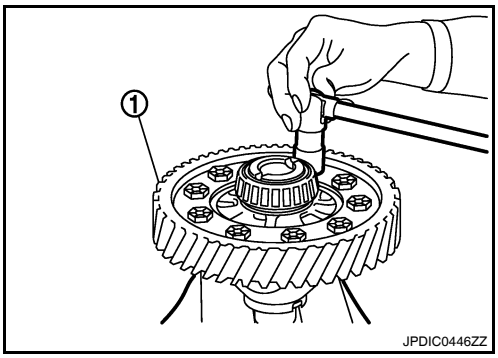
b. Remove differential side bearing inner race (clutch housing side) using Tool (A).

Tool number A: ST33061000 (J-8107-2)



2. Remove speedometer drive gear.

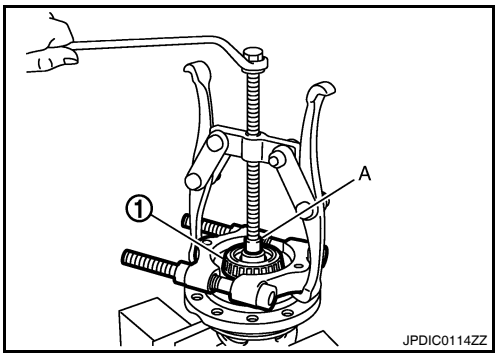
3. Remove final gear bolts, and then remove final gear (1).



4. Remove differential side bearing inner race (transaxle case side) (1) according to the following procedures.

a. Set a suitable tool to differential side bearing inner race (transaxle case side).

b. Remove differential side bearing inner race (transaxle case side) using a suitable tool (A).



INSPECTION AFTER DISASSEMBLY

Gear and Case

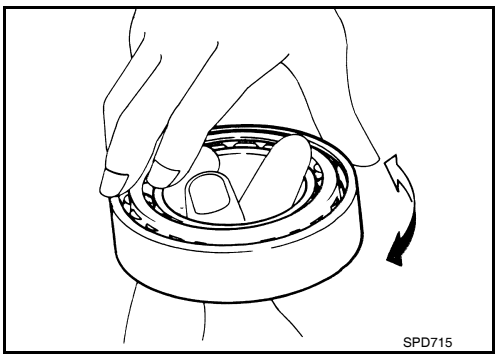
Check final gear and differential case. Replace if necessary.

Bearing

Check bearing for damage and unsmooth rotation. Replace if necessary.

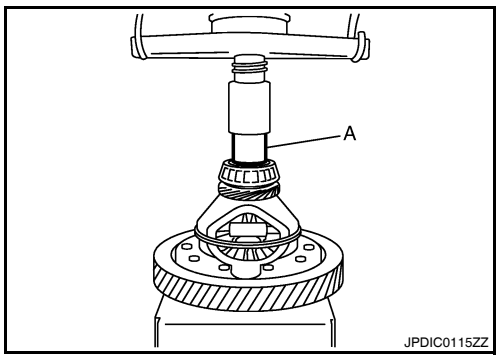
CAUTION:

- **Replace differential side bearing outer race (clutch housing side) and differential side bearing inner race (clutch housing side) as a set.**
- **Replace differential side bearing inner race (transaxle case side) and differential side bearing outer race (transaxle case side) as a set.**

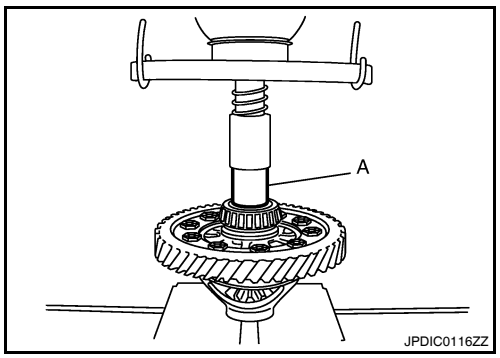


ASSEMBLY

1. Install final gear, and then tighten final gear bolts to the specified torque. Refer to MT-88, "Disassembly and Assembly".
   CAUTION:
   Replace final gear and differential case as a set.
2. Install speedometer drive gear.
3. Install differential side bearing inner race (clutch housing side) using a suitable tool (A).
   CAUTION:
   Replace differential side bearing inner race (clutch housing side) and differential side bearing outer race (clutch housing side) as a set.



4. Install differential side bearing inner race (transaxle case side) using a suitable tool (A).
   CAUTION:
   Replace differential side bearing inner race (transaxle case side) and differential side bearing outer race (transaxle case side) as a set.



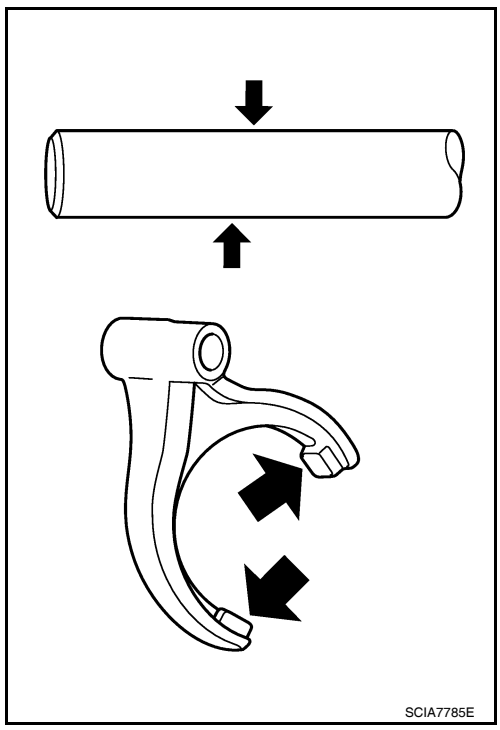
SHIFT CONTROL

Inspection

INFOID:0000000004305284

FORK ROD AND SHIFT FORK

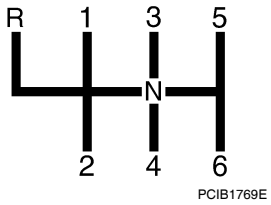
Check contact surface and sliding surface for excessive wear, uneven wear, bend, and damage. Replace if necessary.



SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000004305285

Transaxle type			RS6F94R
Engine type			MR18DE
Number of speed			6
Synchromesh type			Warner
Shift pattern			 PCIB1769E
Gear ratio	1st		3.727
	2nd		2.105
	3rd		1.452
	4th		1.171
	5th		0.971
	6th		0.811
	Reverse		3.687
	Final gear		3.933
Number of teeth	Input gear	1st	11
		2nd	19
		3rd	31
		4th	35
		5th	35
		6th	37
		Reverse	11
	Main gear	1st	41
		2nd	40
		3rd	45
		4th	41
		5th	34
		6th	30
		Reverse	42
	Reverse idler gear	Input/Output	28/29
	Final gear	Final gear/Pinion	59/15
		Side gear/Pinion mate gear	21/18
Oil capacity (Reference)		(US pt, Imp pt)	Approx. 2.0 (4-1/4, 3-1/2)
Remarks	Reverse synchronizer		Installed
	Triple-cone synchronizer		1st and 2nd