SECTION MT
MANUAL TRANSMISSION

CONTENTS

SERVICE INFORMATION 2

PRECAUTIONS 2
Precaution for Battery Service 2
Service Notice or Precaution 2

PREPARATION 3
Special Service Tool 3
Commercial Service Tool 5

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 7
NVH Troubleshooting Chart 7

DESCRIPTION 8
Cross-Sectional View 8

M/T OIL 10
Changing M/T Oil 10
Checking M/T Oil 10

REAR OIL SEAL 11
Removal and Installation 11

POSITION SWITCH 12
Checking 12

SHIFT CONTROL 13
Removal and Installation 13

AIR BREATHER HOSE 18
Removal and Installation 18

TRANSMISSION ASSEMBLY 19
Removal and Installation 19
Disassembly and Assembly 22

SERVICE DATA AND SPECIFICATIONS (SDS) 78
General Specification 78
End Play 79
Baulk Ring Clearance 79

SERVICE INFORMATION

PRECAUTIONS

Precaution for Battery Service

INFOID:0000000004657856

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

Service Notice or Precaution

INFOID:0000000004657857

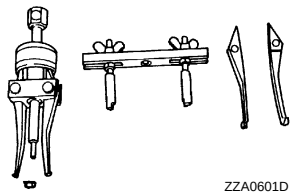
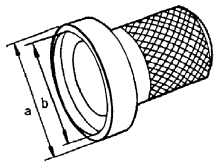
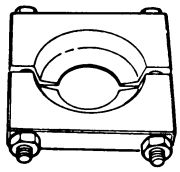
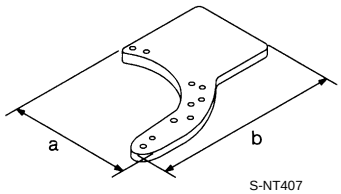
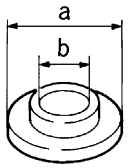
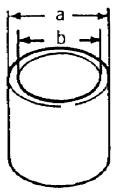
- Never reuse CSC (Concentric Slave Cylinder) body and CSC tube. Because CSC slides back to the original position every time when removing transmission assembly. At this timing, dust on the sliding parts may damage a seal of CSC and may cause clutch fluid leakage. Refer to CL-11, "Removal and Installation".
- Do not reuse transmission oil, once it has been drained.
- Check oil level or replace oil with vehicle on level ground.
- During removal or installation, keep inside of transmission clear of dust or dirt.
- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied to.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, observe it.
- Be careful not to damage sliding surfaces and mating surfaces.
- Do not hold control lever housing to prevent bushing of control lever housing from deformation when moving transmission assembly.

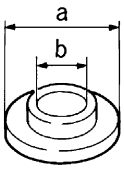
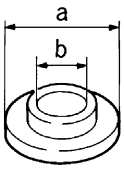
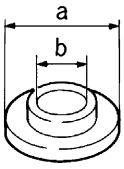
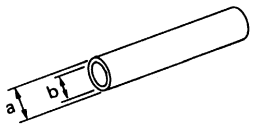
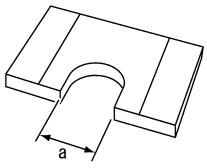
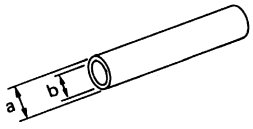
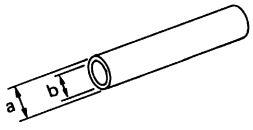
PREPARATION

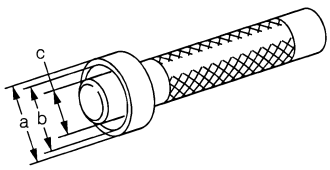
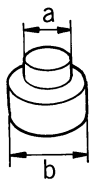
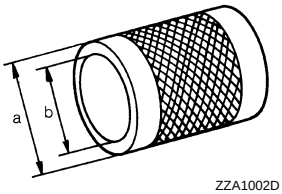
Special Service Tool

INFOID:0000000004657858

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

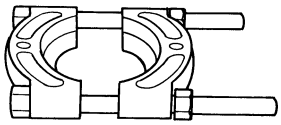
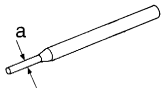
Tool number (Kent-Moore No.) Tool name		Description
KV381054S0 (J-34286) Oil seal puller	 ZZA0601D	Removing rear oil seal
ST33400001 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.	 ZZA0814D	Installing rear oil seal
ST30031000 (J-22912-01) Puller	 ZZA0537D	Measuring wear of inner baulk ring
ST22490000 (—) Adapter setting plate a: 156 mm (6.14 in) b: 220 mm (8.66 in)	 S-NT407	Holding a adapter plate
ST30911000 (—) Inserter a: 98 mm (3.86 in) dia. b: 40.5 mm (1.594 in) dia.	 ZZA0920D	• Installing main shaft bearing • Installing 5th-6th synchronizer assembly • Installing reverse main gear bushing • Installing 3rd gear bushing • Installing 3rd-4th synchronizer assembly
ST27861000 (—) Support ring a: 62 mm (2.44 in) dia. b: 52 mm (2.05 in) dia.	 ZZA0832D	• Installing 1st-2nd synchronizer assembly • Installing 1st gear bushing

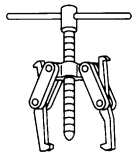
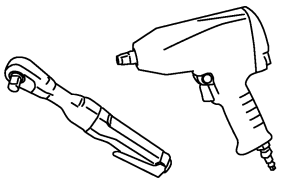
Tool number (Kent-Moore No.) Tool name		Description
ST30022000 (—) Inserter a: 110 mm (4.33 in) dia. b: 46 mm (1.81 in) dia.	 ZZA0920D	• Installing 3rd main gear • Installing 4th main gear
KV40100630 (J-26092) Inserter a: 67.5 mm (2.657 in) dia. b: 38.5 mm (1.516 in) dia.	 ZZA0920D	Installing 4th counter gear thrust washer
ST30032000 (J-26010-01) Inserter a: 80 mm (3.15 in) dia. b: 31 mm (1.22 in) dia.	 ZZA0920D	Installing counter rear bearing inner race
KV32102700 (—) Drift a: 48.6 mm (1.913 in) dia. b: 41.6 mm (1.638 in) dia.	 ZZA0534D	Installing main drive gear bearing
KV32103300 (J-46529) Press plate a: 73 mm (2.87 in)	 PCIB0165J	Installing reverse synchronizer assembly
ST01530000 (—) Drift a: 50 mm (1.97 in) dia. b: 41 mm (1.61 in) dia.	 ZZA0534D	Installing reverse synchronizer assembly
ST23860000 (—) Drift a: 38 mm (1.50 in) dia. b: 33 mm (1.30 in) dia.	 ZZA0534D	Installing reverse counter gear

Tool number (Kent-Moore No.) Tool name	Description
KV38102100 (J-25803-01) Drift a: 44 mm (1.73 in) dia. b: 36 mm (1.42 in) dia. c: 24.5 mm (0.965 in) dia.  ZZA1046D	Installing front cover oil seal
ST33061000 (J-8107-2) Drift a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia.  ZZA1023D	Installing striking rod oil seal
ST33200000 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.  ZZA1002D	Installing counter rear bearing

Commercial Service Tool

INFOID:0000000004657859

Tool name	Description
Puller  ZZB0823D	Removing each bearing, gear and bushing
Pin punch a: 6.0 mm (0.24 in) dia.  NT410	Removing and installing each retaining pin

Tool name	Description
Puller  NT077	• Removing reverse synchronizer assembly • Removing reverse counter gear • Removing reverse main gear
Power tool  PBIC0190E	Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000004657860

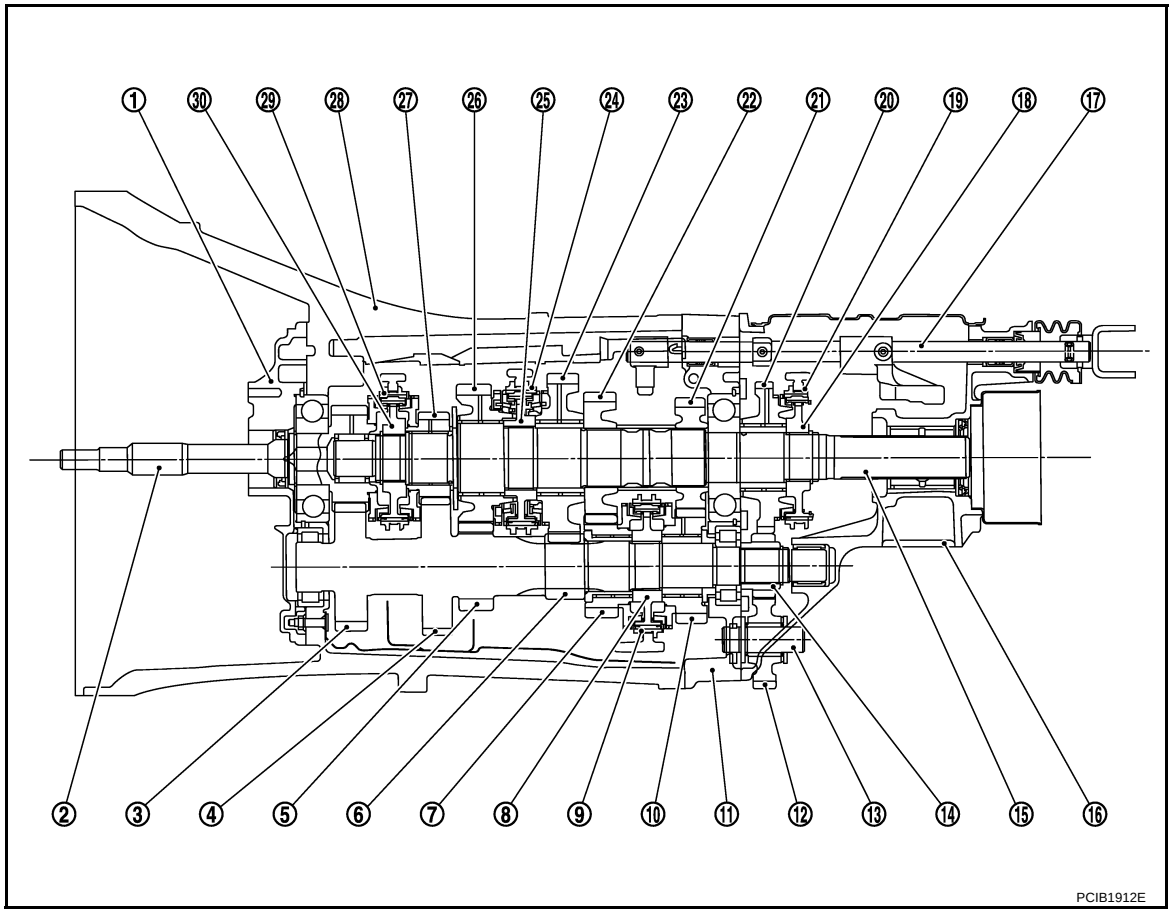
Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		MT-10	MT-10	MT-10	MT-22	MT-22	MT-13	MT-22	MT-22	MT-22	MT-22	MT-22	MT-22
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	CHECK PLUG RETURN SPRING AND CHECK BALL (Worn or damaged)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2							3	3		
	Oil leakage		3	1	2	2							
	Hard to shift or will not shift		1	1			2					2	2
	Jumps out of gear						1	1	2	2			

DESCRIPTION

Cross-Sectional View

INFOID:0000000004657861



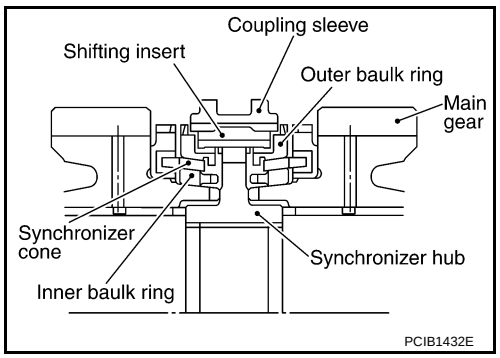
1. Front cover
2. Main drive gear
3. Counter shaft
4. 6th counter gear
5. 2nd counter gear
6. 1st counter gear
7. 3rd counter gear
8. 3rd-4th synchronizer hub
9. 3rd-4th coupling sleeve
10. 4th counter gear
11. Adapter plate
12. Reverse idler gear
13. Reverse idler shaft
14. Reverse counter gear
15. Main shaft
16. Rear extension
17. Striking rod
18. Reverse synchronizer hub
19. Reverse coupling sleeve
20. Reverse main gear
21. 4th main gear
22. 3rd main gear
23. 1st main gear
24. 1st-2nd coupling sleeve
25. 1st-2nd synchronizer hub
26. 2nd main gear
27. 6th main gear
28. Transmission case
29. 5th-6th coupling sleeve
30. 5th-6th synchronizer hub

DOUBLE-CONE SYNCHRONIZER

The 4th gear is equipped with a double-cone synchronizer to reduce the operating force of the shift lever.

TRIPLE-CONE SYNCHRONIZER

The 1st, 2nd and 3rd gears are equipped with a triple-cone synchronizer to reduce the operating force of the shift lever.



M/T OIL

Changing M/T Oil

INFOID:0000000004657862

DRAINING

1. Start the engine and warm up the transmission unit sufficiently.
2. After stopping engine, remove filler plug and drain plug to drain oil.
3. Replace gasket on drain plug with new one. Screw drain plug into transmission case, and tighten to the specified torque. Refer to MT-22, "Disassembly and Assembly".
   CAUTION:
   Do not reuse gasket.

FILLING

1. Fill new oil into the transmission to the level of the filler plug mounting hole.

   Oil grade and viscosity : Refer to MA-10, "Fluids and Lubricants".
   Oil capacity : Refer to MT-78, "General Specification".

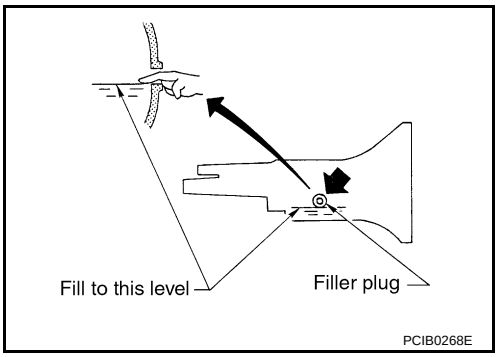
2. Replace gasket on filler plug with new one. Screw filler plug into transmission case, and tighten to the specified torque. Refer to MT-22, "Disassembly and Assembly".
   CAUTION:
   Do not reuse gasket.

Checking M/T Oil

INFOID:0000000004657863

OIL LEAKAGE AND OIL LEVEL

- Check if oil is leaking from transmission or around it.
- Check oil level from filler plug mounting hole as shown in the figure.
  CAUTION:
  Never start engine while checking oil level.
- When screwing in filler plug with a new gasket, first screw into the transmission by hand, then tighten to the specified torque. Refer to MT-22, "Disassembly and Assembly".
  CAUTION:
  Do not reuse gasket.



REAR OIL SEAL

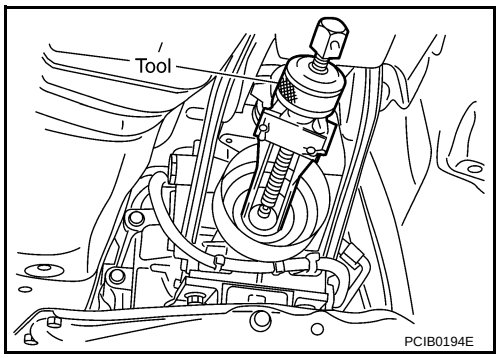
Removal and Installation

INFOID:0000000004657864

REMOVAL

1. Remove propeller shaft. Refer to PR-6, "Removal and Installation".
   CAUTION:
   Do not impact or damage propeller shaft tube.
2. Remove rear oil seal using oil seal puller.

Tool number : KV381054S0 (J-34286)

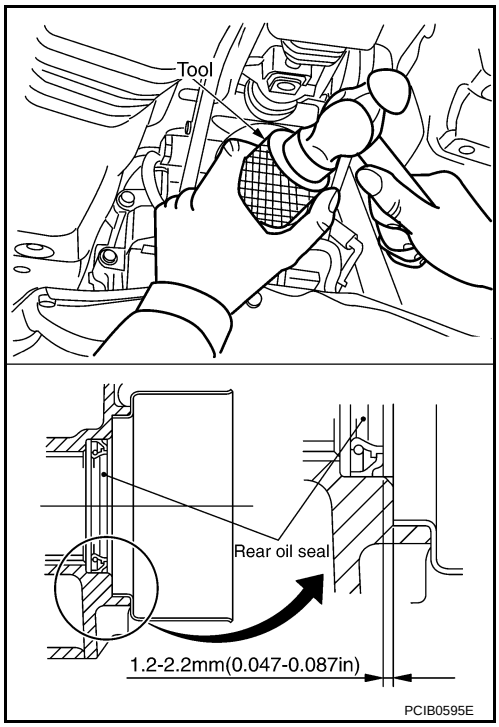


INSTALLATION

1. Apply multi-purpose grease to rear oil seal lip. Drive in rear oil seal until the edge is approximately 1.2 - 2.2 mm (0.047 - 0.087 in) above the boss edge using drift.

Tool number : ST33400001 (J-26082)

CAUTION:
- **Do not reuse rear oil seal.**
- **When installing, do not incline the rear oil seal.**



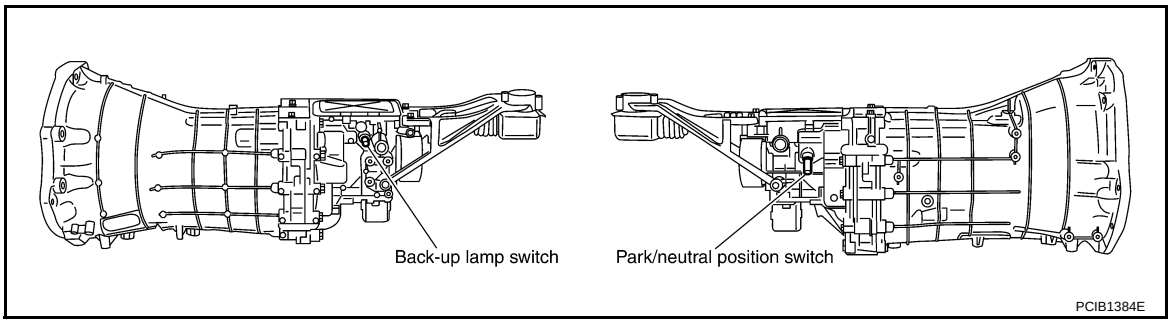
2. Install propeller shaft. Refer to PR-6, "Removal and Installation".
   CAUTION:
   - **Do not impact or damage propeller shaft tube.**
   - **If lubricant leak has occurred, after finishing work, check oil level. Refer to MT-10, "Checking M/T Oil".**

POSITION SWITCH

Checking

INFOID:0000000004657865

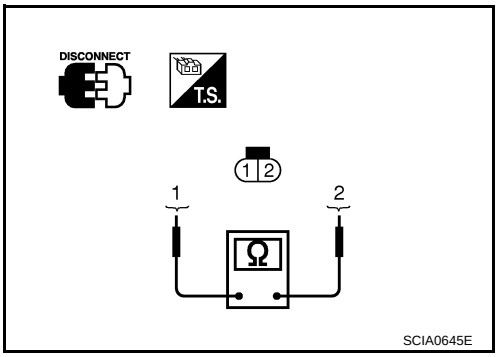
COMPONENT LOCATION



BACK-UP LAMP SWITCH

- Check continuity.

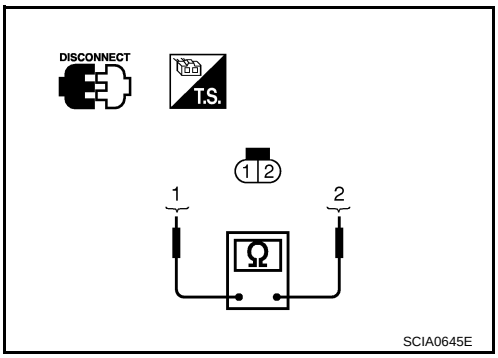
Gear position	Continuity
Reverse	Yes
Except reverse	No



PARK/NEUTRAL POSITION SWITCH

- Check continuity.

Gear position	Continuity
Neutral	Yes
Except neutral	No

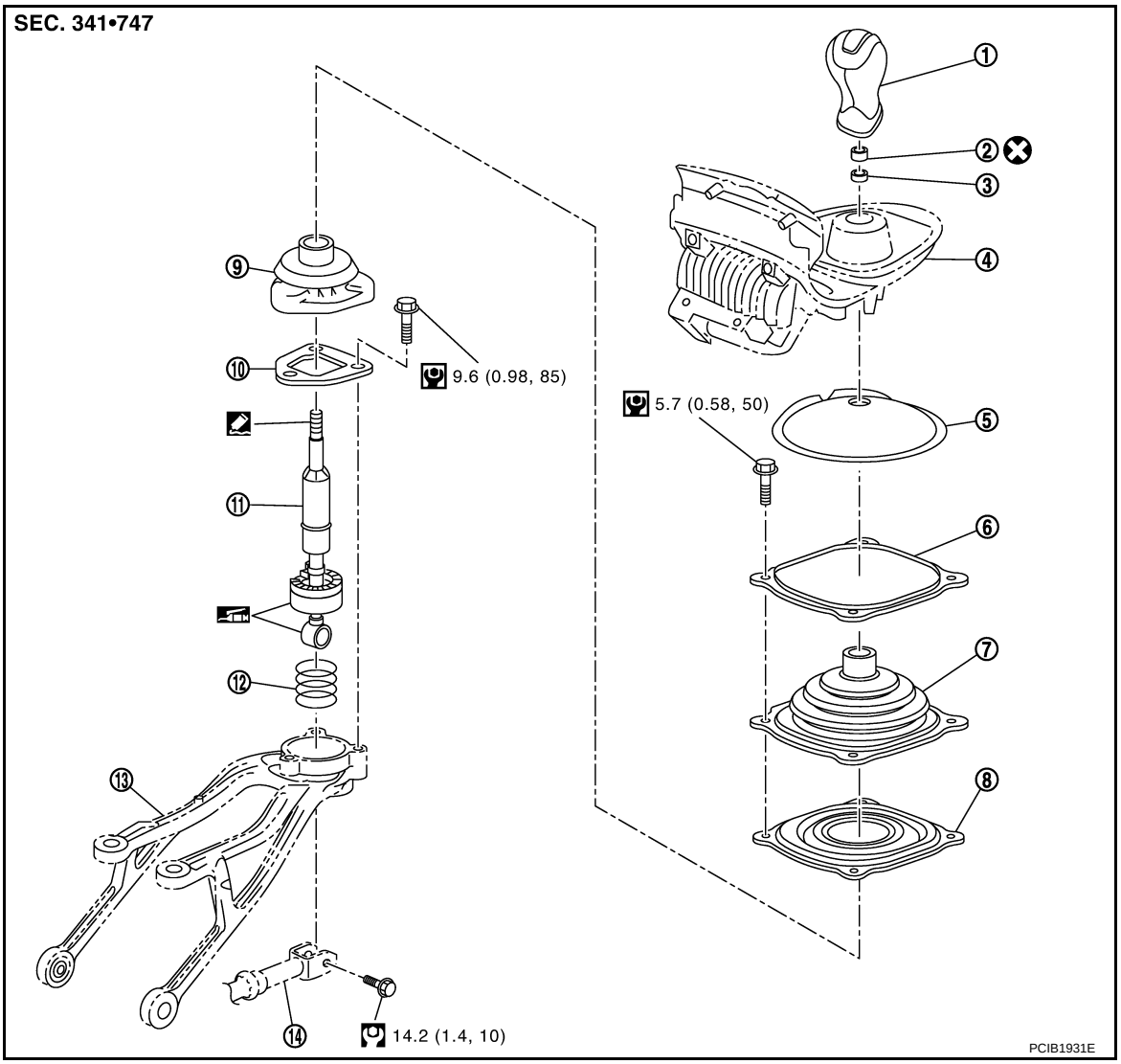


SHIFT CONTROL

Removal and Installation

INFOID:0000000004657866

COMPONENTS



1. Shift knob	2. Insulator	3. Seat
4. Console boot	5. Felt	6. Hole cover
7. Control lever boot B	8. Hole insulator	9. Control lever boot A
10. Guide plate	11. Control lever assembly	12. Control lever spring
13. Control lever housing	14. Control rod	

Refer to GI-8, "Component" and the followings for the symbols in the figure.

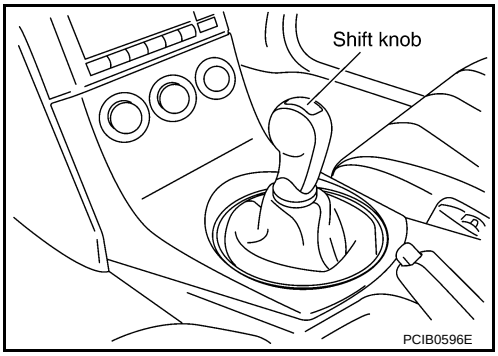
: Apply multi-purpose grease.

: Apply Genuine Medium Strength Thread Locking Sealant or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

REMOVAL

1. Remove the shift knob with the following procedure.

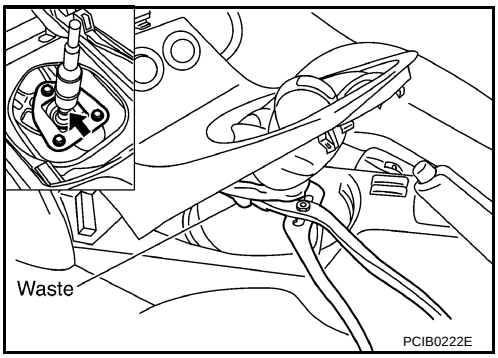
a. Release metal clips on console boot from center console. Refer to IP-13, "Removal and Installation".



b. Lift console boot, and push down control lever boot B and control lever boot A. Set water pump pliers and others to control lever assembly.

CAUTION:

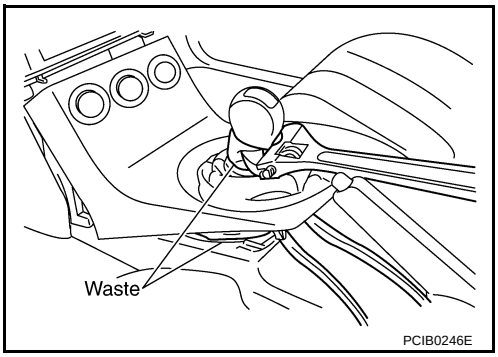
Put waste cloth between water pump pliers and control lever assembly to avoid damaging control lever assembly.



c. Set monkey wrench to shift knob.

CAUTION:

Put waste cloth between shift knob and monkey wrench to avoid damaging shift knob.



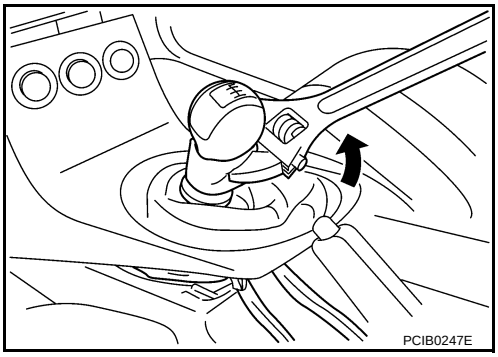
d. Keeping control lever assembly in place with water pump pliers, turn monkey wrench counterclockwise to loosen shift knob.

NOTE:

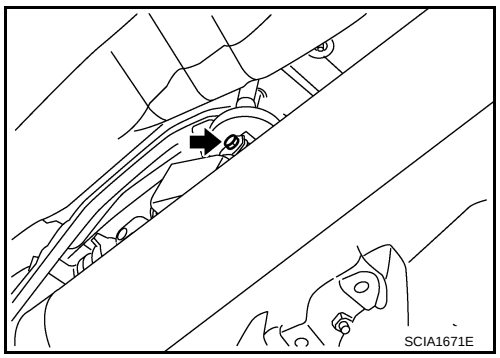
Remove shift knob from control lever assembly keeping water pump pliers in place because a certain power to turn shift knob is still necessary even after adhesive is peeled.

e. Remove shift knob from control lever assembly.

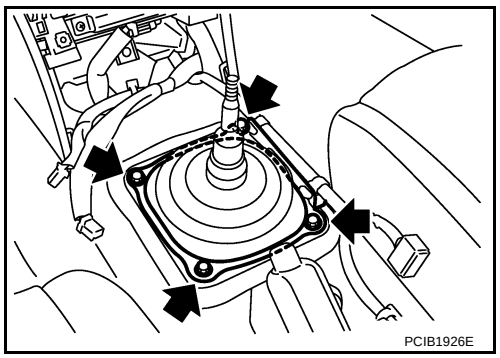
2. Remove insulator and seat from control lever assembly.
3. Remove console boot.
4. Remove center console assembly. Refer to IP-13, "Removal and Installation".
5. Remove felt.



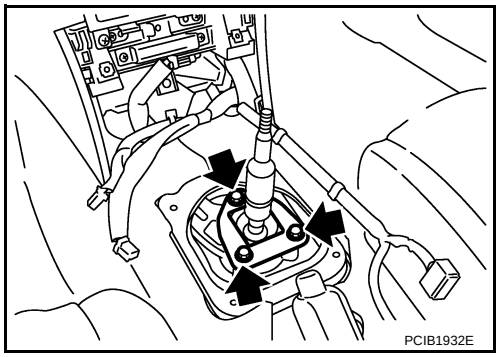
6. Release the boot, remove control rod mounting bolt, and separate control lever and control rod.



7. Remove the hole cover mounting bolts and then remove the hole cover.
8. Remove the control lever boot B and the hole insulator.
9. Remove the control lever boot A.

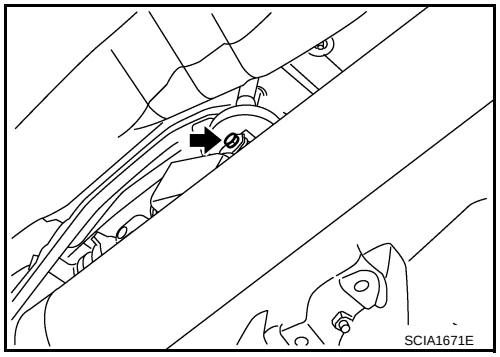


10. Remove guide plate mounting bolts, and then remove control lever assembly and control lever spring from control lever housing.
CAUTION:
Restrain guide plate while doing this because there is a danger control lever assembly will fly out of control lever housing.

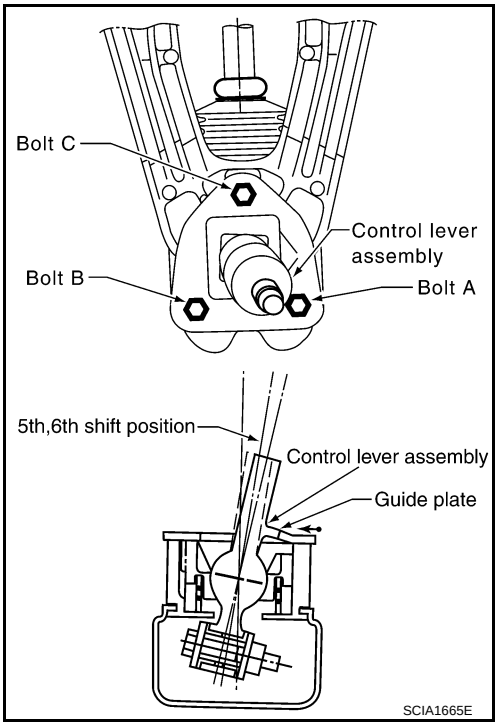


INSTALLATION

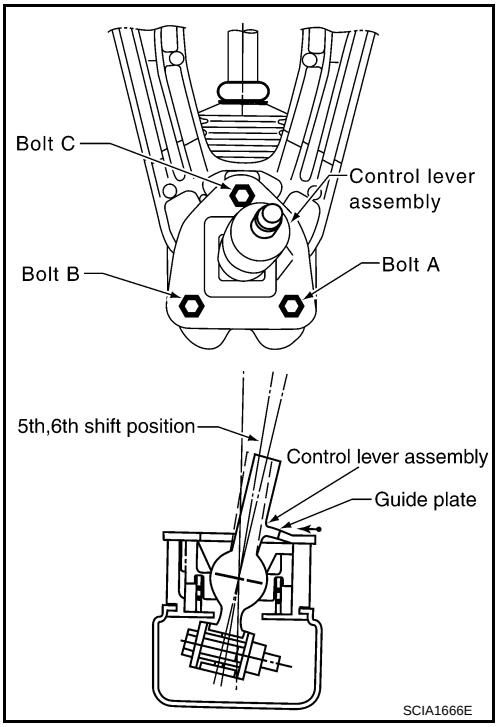
1. Set control lever spring, control lever assembly, and guide plate to control lever housing and then temporarily tightening guide plate mounting bolts.
CAUTION:
Restrain guide plate while doing this because there is a danger control lever assembly will fly out of control lever housing.
2. Install control lever assembly to control rod and then tighten bolt to the specified torque. Refer to "COMPONENTS".
3. Install boot to control lever housing.
CAUTION:
Fit the boot to the groove on the control lever housing.



4. After shifting control lever assembly into 6th gear, push it toward reverse gear (to the right) until it comes to a stop.
5. At the point where the control lever assembly stops, bring the guide plate closer until guide plate stopper contacts control lever assembly claw, and then loosely tighten mounting bolt A.

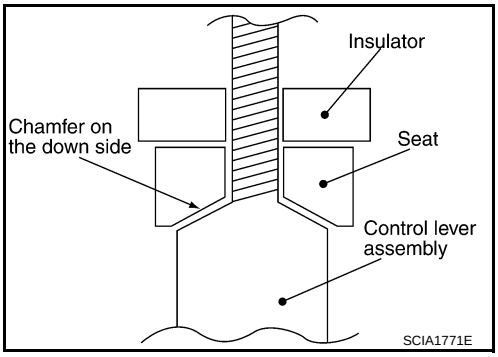


6. After shifting control lever assembly into 5th gear, push it toward reverse gear (to the right) until it comes to a stop.
7. At the point where control lever assembly stops, bring guide plate closer until the guide plate stopper contacts control lever assembly claw, and then tighten mounting bolt C to the specified torque. Refer to "COMPONENTS".
8. Tighten guide plate bolts A and B to the specified torque. Refer to "COMPONENTS".
9. Install control lever boot A.
   CAUTION:
   Fit the control lever boot A to the groove on the control lever housing.
10. Install hole insulator and control lever boot B.
11. Install hole cover and tighten bolts to the specified torque. Refer to "COMPONENTS".
12. Install felt.
13. Install center console assembly. Refer to IP-13, "Removal and Installation".
14. Install console boot to center console assembly. Refer to IP-13, "Removal and Installation".



15. As shown in the figure, assemble seat and insulator to control lever assembly.
    CAUTION:
    - **Do not reuse insulator.**
    - **Be careful with the orientation of seat.**
16. Apply locking sealant to control lever assembly threads, install shift knob.
    - **Use Genuine Medium Strength Thread Locking Sealant or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

    CAUTION:



Remove the remaining adhesive on control lever and shift knob threads.

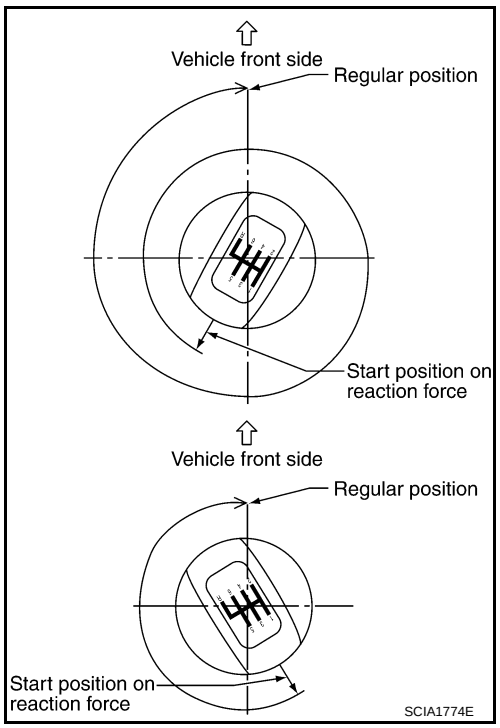
17. Put the shift knob in the correct position as the following indicates.

a. When tightening shift knob, if shift knob comes to the proper position within 1/2 turn from the position at which resistance begins to be felt, tighten it 1 more turn to set it in the proper position.

b. If it takes more than 1/2 turn from the position at which resistance begins to be felt, tighten it to set it in the proper position.

CAUTION:

- **Do not adjust the knob with loosing.**
- **After adjusting to the regular position, until 30 minutes pass, do not operate the shift intensely such as screwing or turning the shift knob to opposite direction since a locking sealant because stiff.**



INSPECTION AFTER INSTALLATION

After installing, confirm the following items:

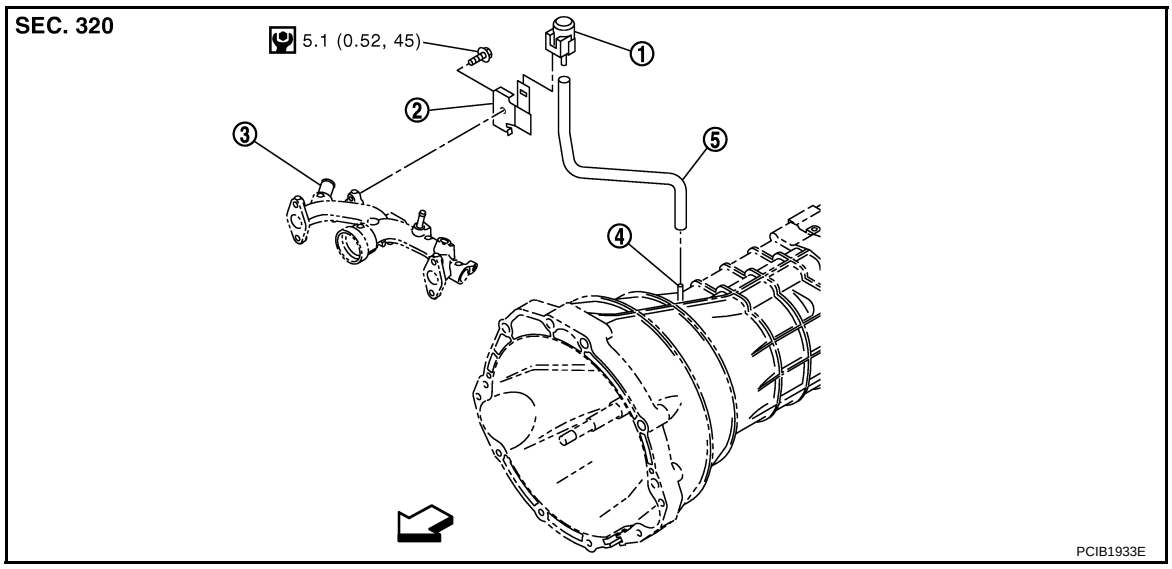
- When control lever assembly is shifted to each position, make sure there is no binding or disconnection in each boot.
- When shifted to each position, make sure there is no noise, binding, and backlash. Especially when control lever assembly is shifted to 5th, 6th without pressing downward, check for binding.
- When control lever assembly is shifted to 1st, 2nd side and 5th, 6th side, confirm control lever assembly returns to neutral position smoothly.
- In any position other than reverse, confirm that control lever assembly can be pressed downward.
- With control lever assembly pressed downward, confirm that it can be shifted to reverse.
- When shifted from reverse to neutral position, confirm control lever assembly returns to neutral position smoothly with spring power.
- Without control lever assembly pressed downward, confirm that it cannot be shifted to reverse.

AIR BREATHER HOSE

Removal and Installation

INFOID:0000000004657867

Refer to the figure for air breather hose removal and installation information.



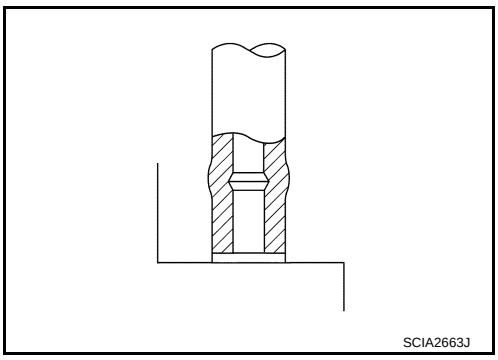
1. Breather
2. Bracket
3. Water outlet (rear)
4. Breather tube
5. Air breather hose

⇦ : Vehicle front

Refer to GI-8, "Component",for the symbols in the figure.

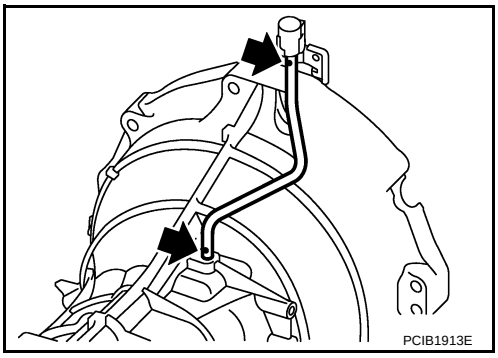
CAUTION:

- **Make sure there are no pinched or restricted areas on the air breather hose caused by bending or winding when installing it.**
- **Be sure to insert air breather hose into breather tube until hose end reaches the tube's base.**
- **Be sure to insert air breather hose into breather until hose end reaches the breather's base.**



- **Set air breather hose with painted mark facing backward.**

⇦ : Painted mark



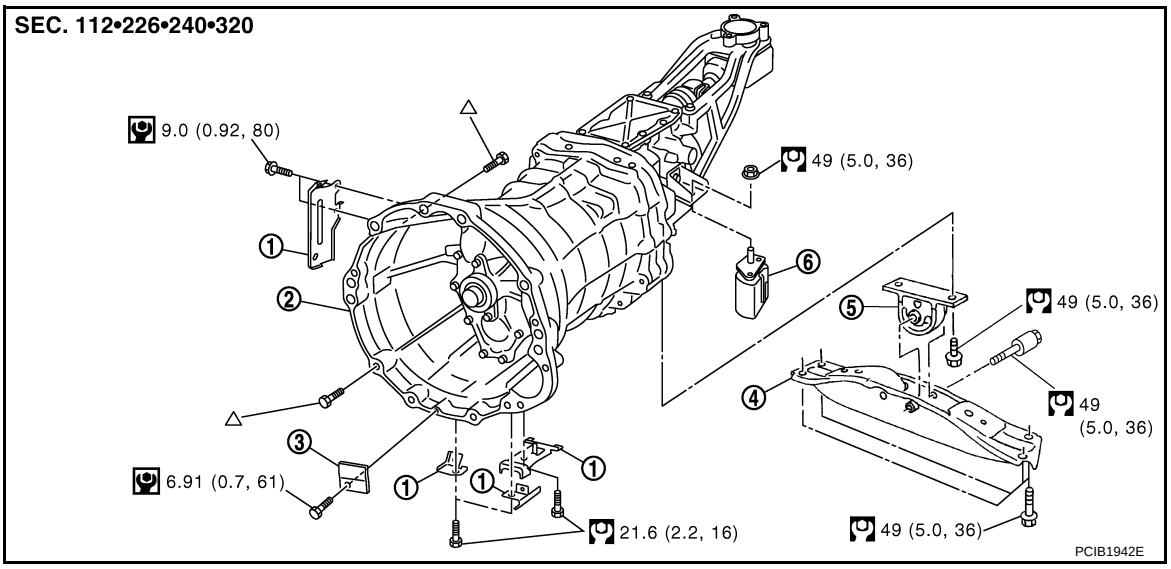
TRANSMISSION ASSEMBLY

Removal and Installation

INFOID:0000000004657868

CAUTION:
Never reuse CSC (Concentric Slave Cylinder) body and CSC tube. Because CSC slides back to the original position every time when removing transmission assembly. At this timing, dust on the sliding parts may damage a seal of CSC and may cause clutch fluid leakage. Refer to CL-11, "Removal and Installation".

COMPONENTS



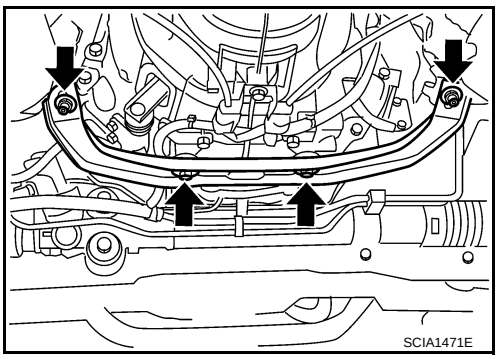
1. Harness bracket
2. Transmission assembly
3. Rear plate cover
4. Rear engine mounting member
5. Engine mounting insulator (rear)
6. Dynamic damper (For coupe)

Refer to GI-8, "Component" and the following for the symbols in the figure.

△: For the bolt tightening torque, refer to "INSTALLATION".

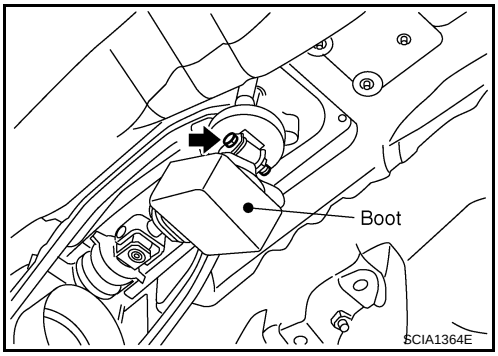
REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove tower bar. Refer to FSU-18, "Removal and Installation".
3. Remove front cross bar with power tool. Refer to FSU-8, "Removal and Installation".
4. Remove exhaust mounting bracket. Refer to EX-3, "Removal and Installation".

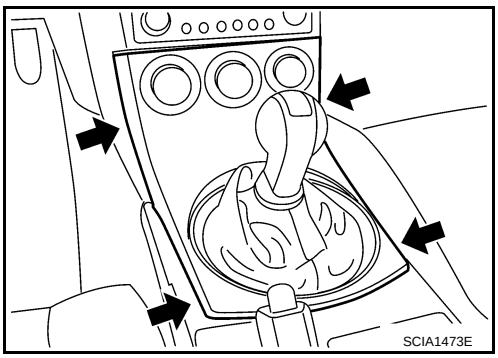


5. Remove nut connecting catalytic converter to exhaust manifold, and then remove three way catalyst and exhaust front tube as one unit. Refer to EX-3, "Removal and Installation" and EM-23, "Removal and Installation".
6. Remove propeller shaft. Refer to PR-6, "Removal and Installation".
   CAUTION:
   Do not impact or damage propeller shaft tube.

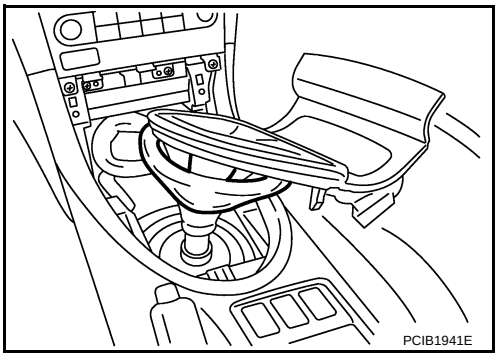
7. Remove control rod mounting bolt and then separate control lever assembly from the control rod.



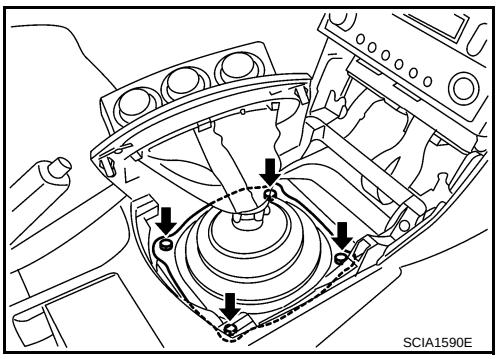
8. Using a suitable tool, release claws and separate console boot from center console. Refer to IP-13, "Removal and Installation".



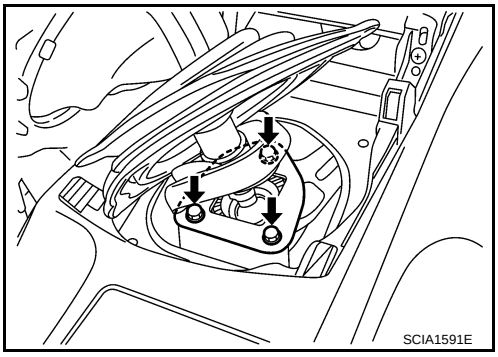
9. Remove felt as shown in the figure.
10. Slide center console assembly to remove hole cover mounting bolts.



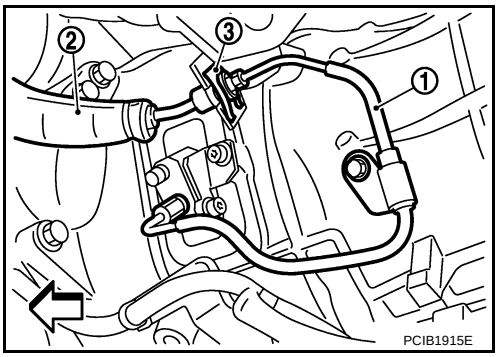
11. Remove hole cover.
12. Remove control lever boot B, hole insulator, and control lever boot A.



13. Remove guide plate mounting bolts and then separate control lever assembly from the control lever housing.
    CAUTION:
    Restrain guide plate while doing this because there is a danger control lever assembly will fly out of control lever housing.



14. Remove clutch tube (1), clutch hose (2), and lock plate (3). Refer to CL-15, "Removal and Installation".



⇦ : Vehicle front

CAUTION:
- **Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.**
- **Do not depress clutch pedal during removal procedure.**

NOTE:
Insert a suitable plug into clutch hose and CSC (Concentric Slave Cylinder) tube after removing clutch tube.

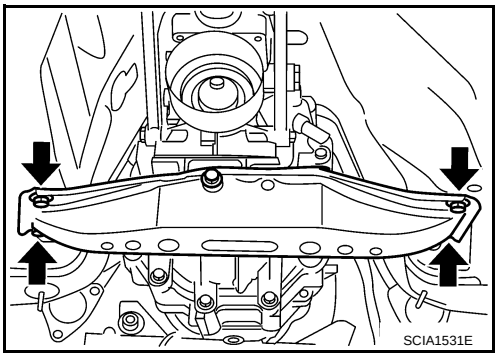
15. Remove crankshaft position sensor (POS). Refer to EM-106, "Disassembly and Assembly".

CAUTION:
- **Do not subject it to impact by dropping or hitting.**
- **Do not disassemble.**
- **Do not allow iron dust, etc., to get on the sensor's front edge magnetic area.**
- **Do not place in an area affected by magnetism.**

16. Remove starter motor. Refer to SC-14, "Removal and Installation".
17. Remove rear plate cover. Refer to EM-27, "Removal and Installation".
18. Disconnect Park/Neutral position (PNP) switch harness connector.
19. Remove harness brackets.
20. Separate heated oxygen sensor 2 wire harness, back-up lamp switch wire harness and Park/Neutral position (PNP) switch wire harness from the transmission.
21. Set transmission jack to the transmission assembly.

CAUTION:
When setting transmission jack, be careful not to contact with the switch.

22. Remove rear engine mounting member. Refer to EM-101, "Removal and Installation".
23. Remove engine and transmission mounting bolts with power tool.
24. Lower a suitable jack to the position where the back-up lamp switch harness connector can be disconnect. Then disconnect back-up lamp switch harness connector.



25. Remove transmission assembly from the vehicle.

CAUTION:
- **Secure transmission assembly to a suitable jack while removing it.**
- **The transmission assembly must not interfere with the wire harnesses and clutch hose.**
- **Do not hold control lever housing to prevent bushing of control lever housing from deformation when moving transmission assembly.**

26. Remove dynamic damper.
27. Remove CSC (Concentric Slave Cylinder) body and tube. Refer to CL-11, "Removal and Installation".

CAUTION:
Never reuse CSC (Concentric Slave Cylinder) body and CSC tube. Because CSC slides back to the original position every time when removing transmission assembly. At this timing, dust on the sliding parts may damage a seal of CSC and may cause clutch fluid leakage. Refer to CL-11, "Removal and Installation".

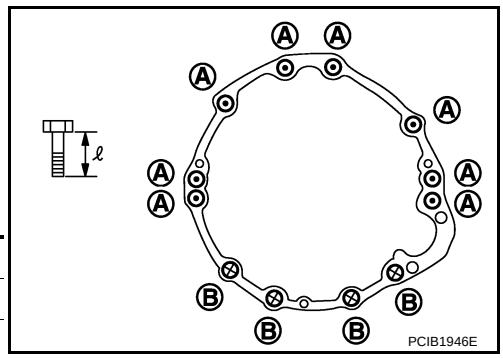
INSTALLATION

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

- Tighten transmission assembly mounting bolts to the specified torque. The figure is the view from the vehicle forward.

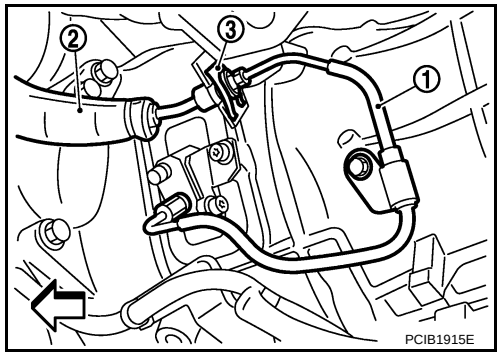
: Transmission to engine

: Engine to transmission



Bolt symbol	A	B
Quantity	8	4
" ℓ " mm (in)	65 (2.56)	35 (1.38)
Tightening torque N·m (kg-m, ft-lb)	75 (7.7,55)	46.6 (4.8,34)

- Install clutch tube (1), clutch hose (2), and lock plate (3) and then tighten clutch tube flare nut to the specified torque. Refer to CL-15, "Removal and Installation".



: Vehicle front

Clutch tube mounting bolt tightening torque

: 8.1 N·m (0.83 kg-m, 72 in-lb)

CAUTION:

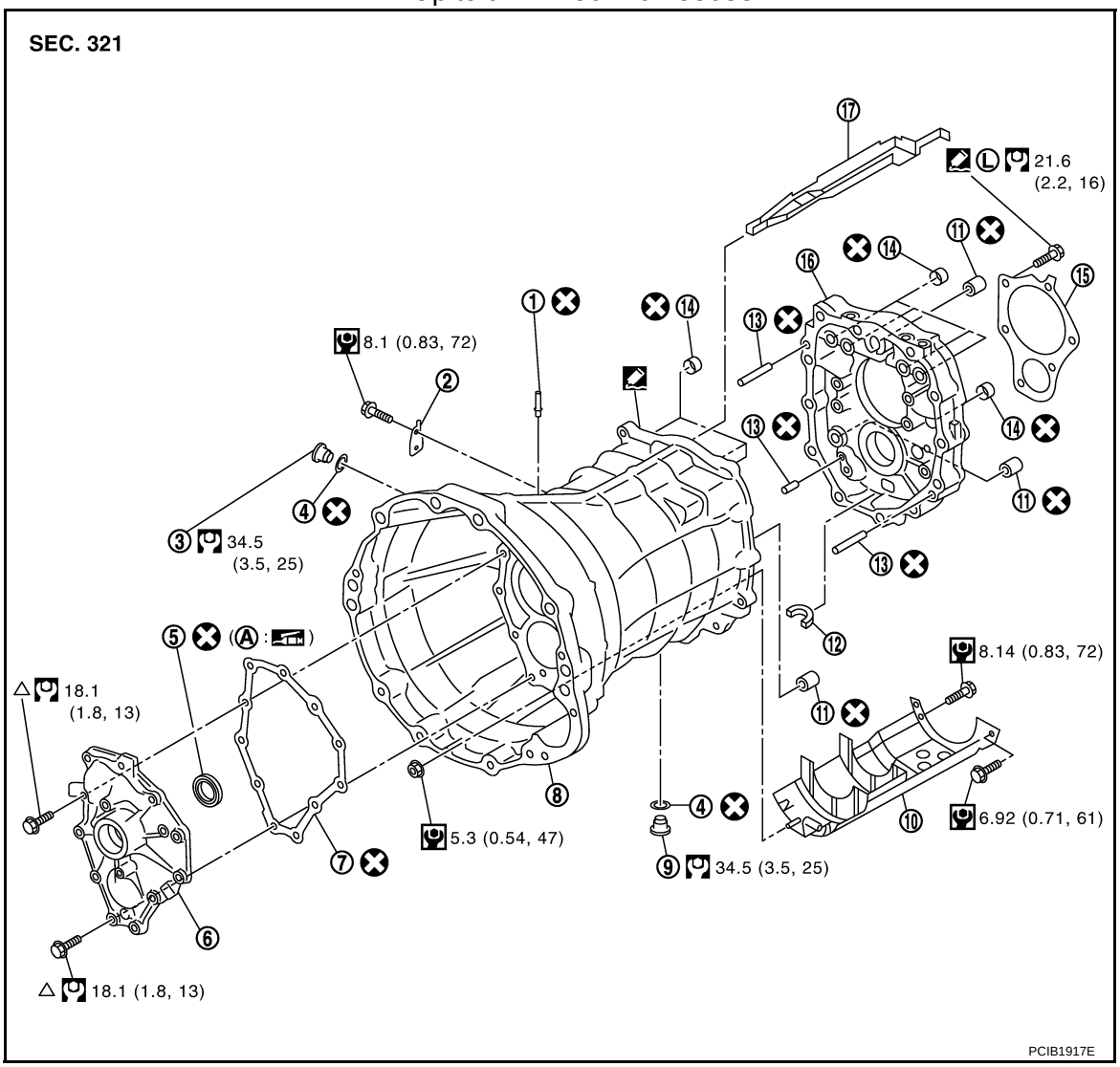
- **The transmission assembly must not interfere with the wire harnesses and clutch hose.**
- **When installing, be careful to avoid interference between transmission main drive gear and clutch cover.**
- **If flywheel is removed, align dowel pin with the smallest hole of flywheel. Refer to EM-106, "Disassembly and Assembly".**
- **Do not impact or damage propeller shaft tube.**
- **Refer to MT-13, "Removal and Installation" for control lever installation information.**
- **After installation, check oil level, and oil leaks and loose mechanisms. Refer to MT-10, "Checking M/T Oil".**
- **Do not hold control lever housing to prevent bushing of control lever housing from deformation when moving transmission assembly.**

Disassembly and Assembly

INFOID:0000000004657869

COMPONENTS

Case Components



1. Breather tube
2. Bracket
3. Filler plug
4. Gasket
5. Front cover oil seal
6. Front cover
7. Front cover gasket
8. Transmission case
9. Drain plug
10. Baffle plate
11. Sliding ball bearing
12. Magnet
13. Dowel pin
14. Bushing
15. Main shaft bearing retainer
16. Adapter plate
17. Oil gutter

A. Seal lip

Refer to GI-8, "Component" and the followings for the symbols in the figure.

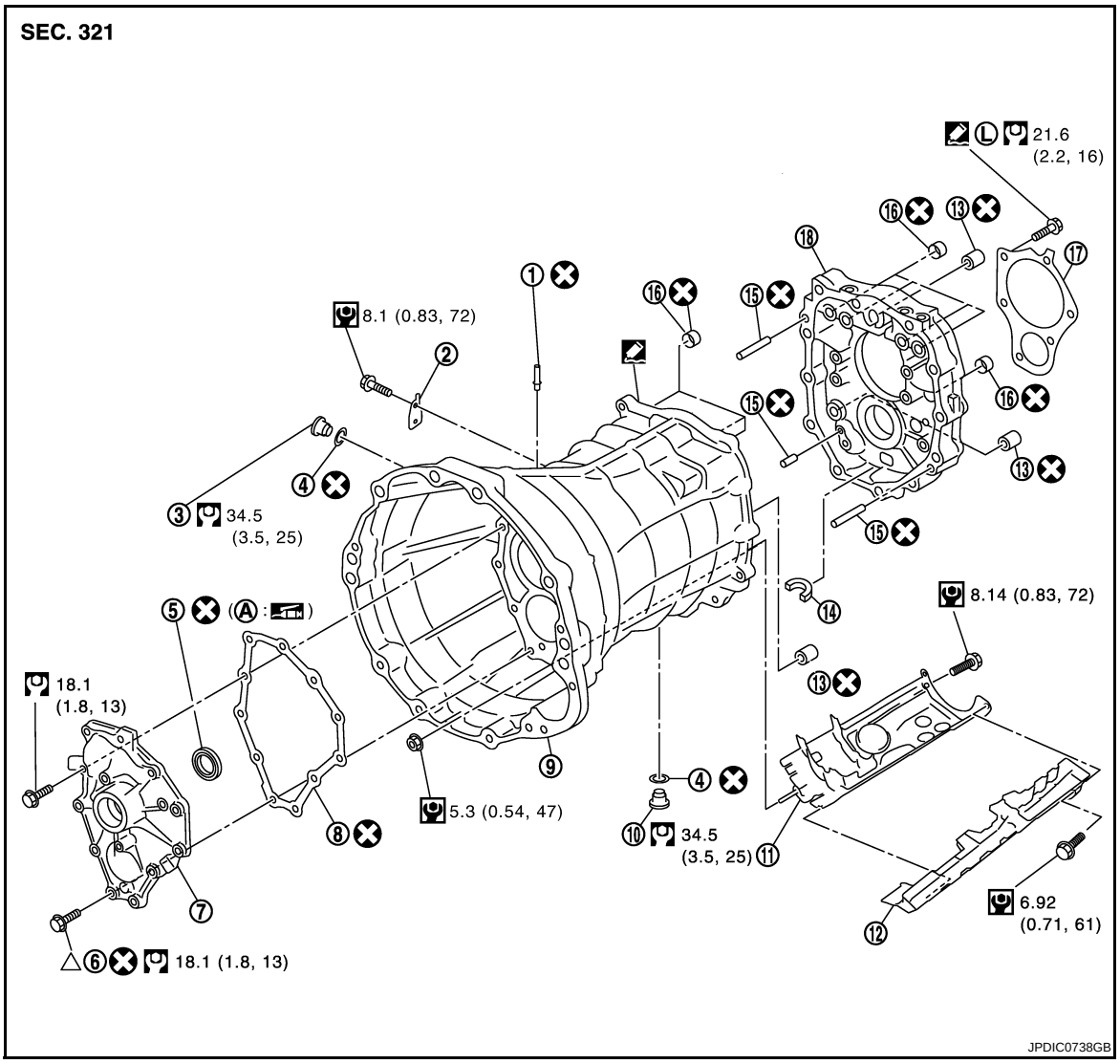
: Apply multi-purpose grease.

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

Ⓛ: Apply Genuine Medium Strength Thread Locking Sealant or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

△ : For the bolt mounting positions, Refer to "Case Components".

VIN: From JN1BZ36A29M550535



1. Breather tube	2. Bracket	3. Filler plug
4. Gasket	5. Front cover oil seal	6. Sealing bolt
7. Front cover	8. Front cover gasket	9. Transmission case
10. Drain plug	11. Baffle plate	12. Oil gutter
13. Sliding ball bearing	14. Magnet	15. Dowel pin
16. Bushing	17. Mainshaft bearing retainer	18. Adapter plate
A. Seal lip		

Refer to GI-8, "Component" and the followings for the symbols in the figure.

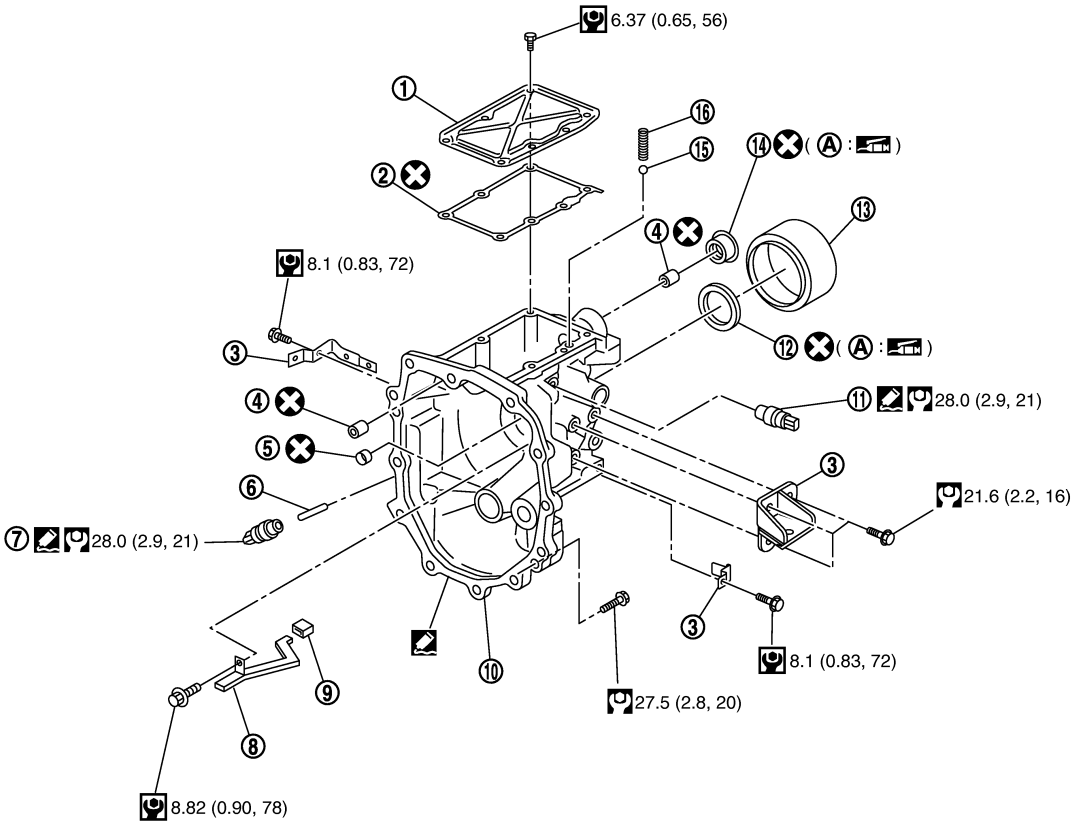
: Apply multi-purpose grease.

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

Ⓛ: Apply Genuine Medium Strength Thread Locking Sealant or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

△ : For the bolt mounting positions, Refer to "Case Components".

SEC. 321



1. Rear extension upper cover
2. Rear extension upper cover gasket
3. Bracket
4. Sliding ball bearing
5. Bushing
6. Plunger
7. Park/Neutral position (PNP) switch
8. Rear extension oil gutter
9. Cap
10. Rear extension
11. Back-up lamp switch
12. Rear oil seal
13. Rear extension dust cover
14. Striking rod oil seal
15. Check ball
16. Check select spring

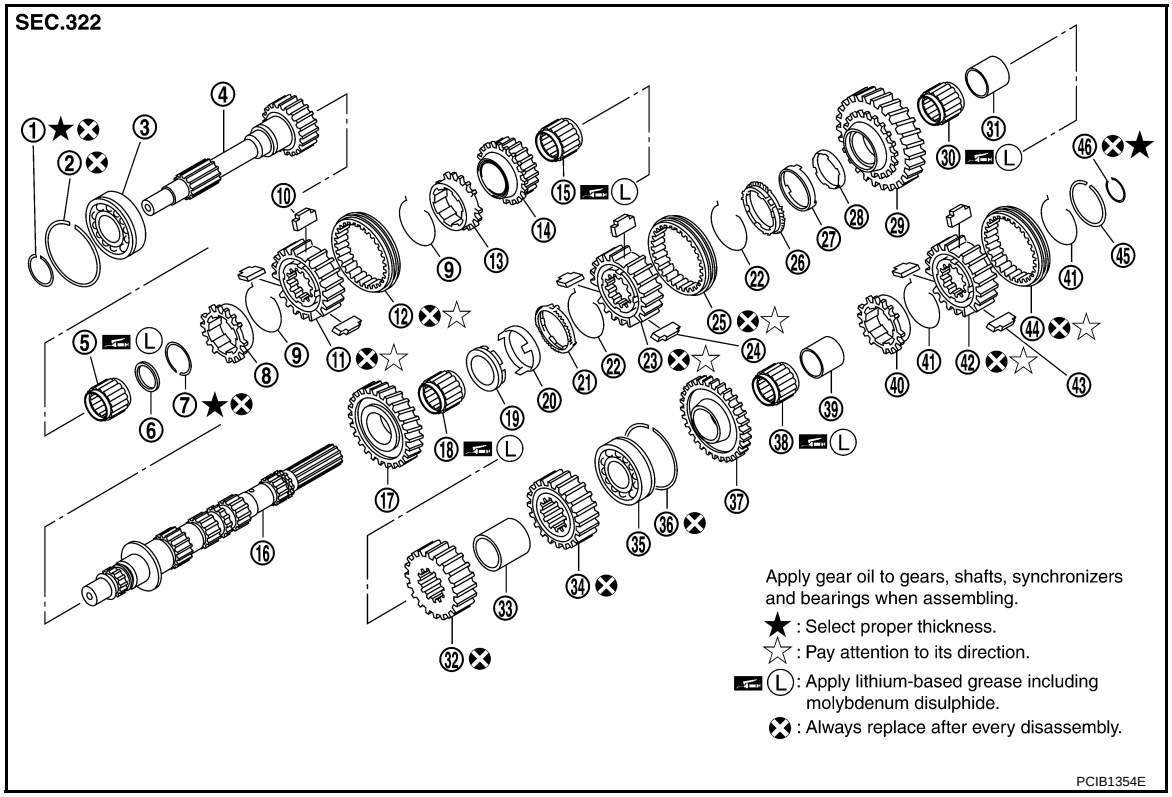
A. Seal lip

Refer to GI-8, "Component" and the followings for the symbols in the figure.

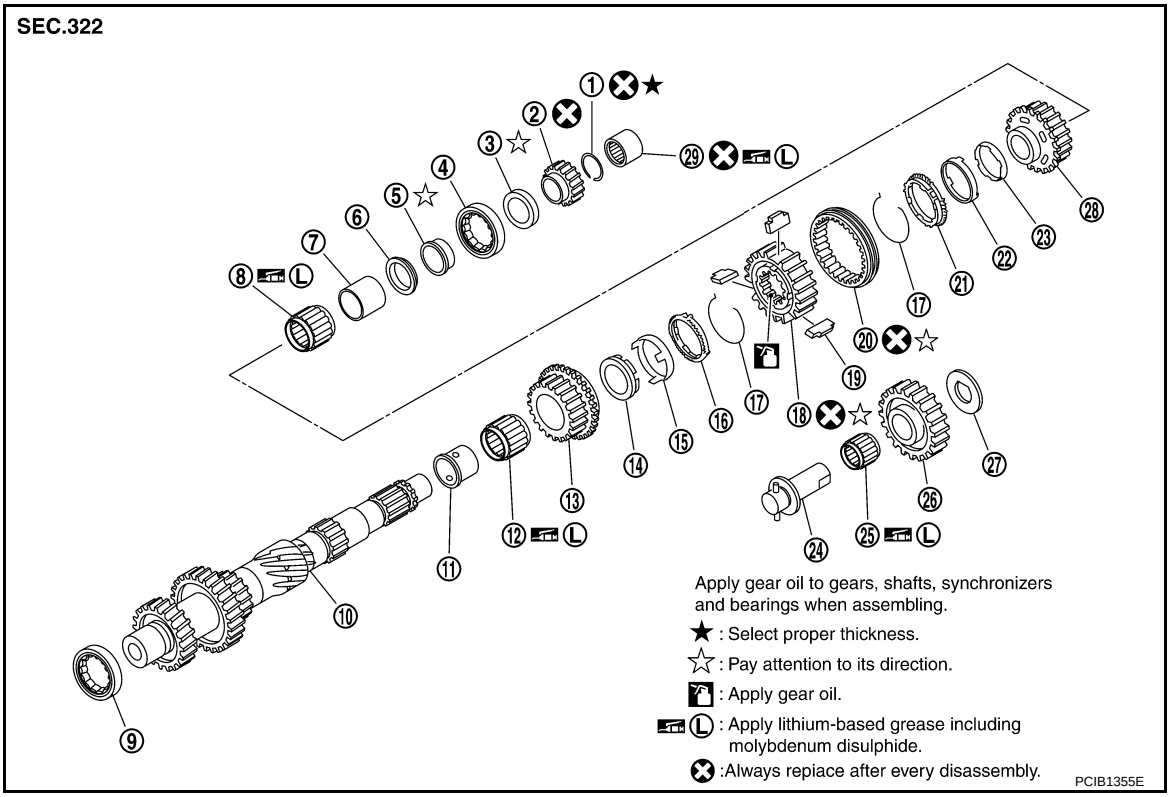
: Apply multi-purpose grease.

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

Gear Components

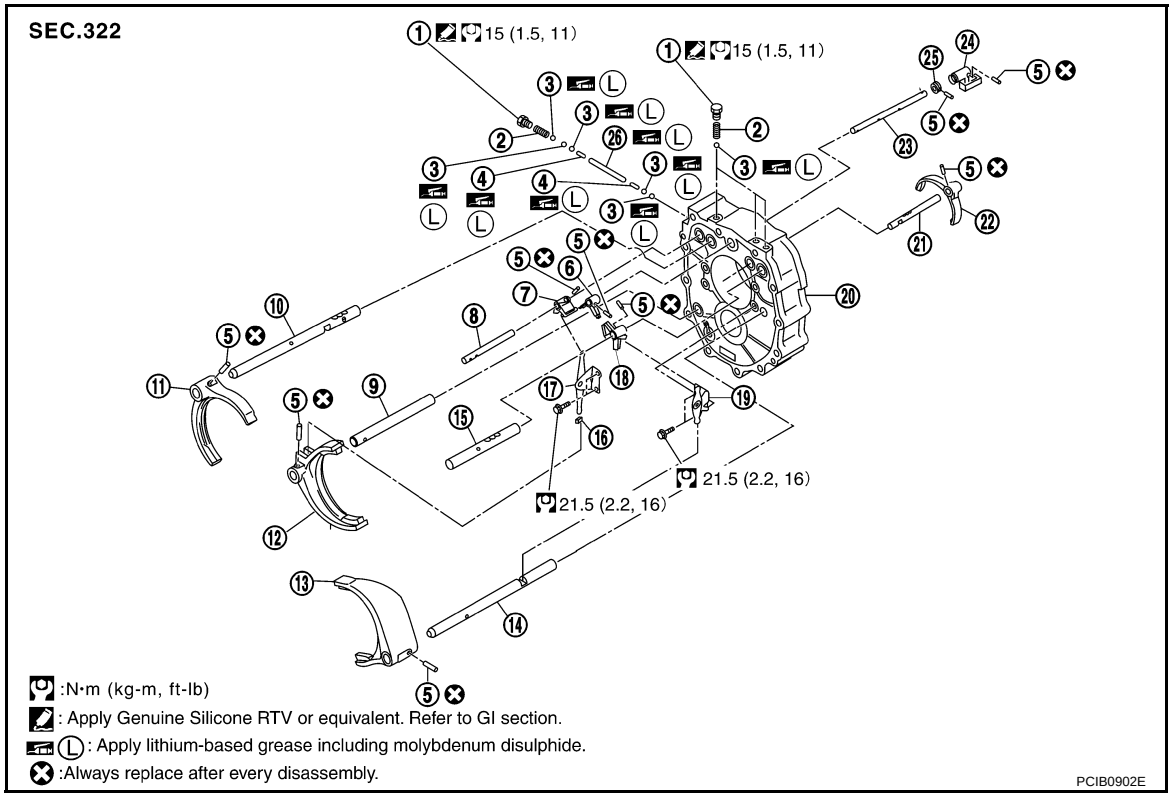


1. Snap ring
2. Snap ring
3. Main drive gear bearing
4. Main drive gear
5. Main pilot bearing
6. Pilot bearing spacer
7. Snap ring
8. 5th baulk ring
9. 5th-6th spread spring
10. 5th-6th shifting insert
11. 5th-6th synchronizer hub
12. 5th-6th coupling sleeve
13. 6th baulk ring
14. 6th main gear
15. 6th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

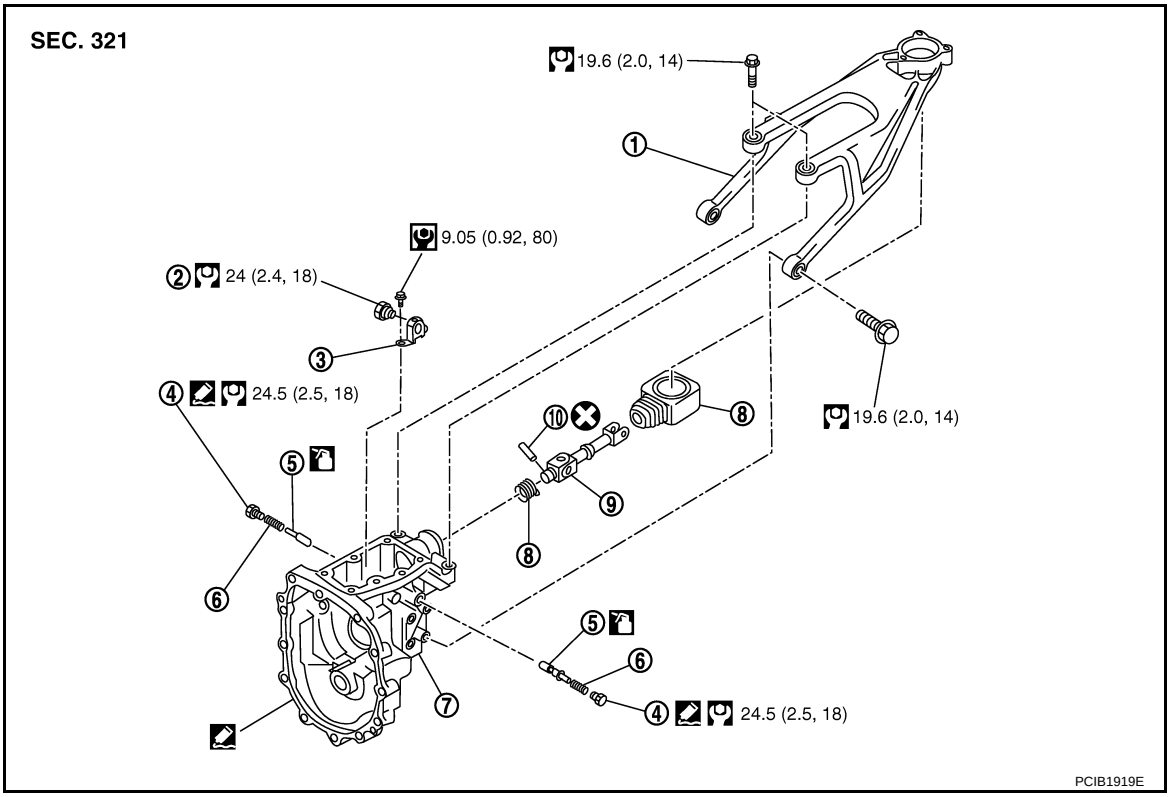


1. Snap ring
2. Reverse counter gear
3. Counter rear bearing spacer
4. Counter rear bearing
5. Counter rear bearing inner race
6. 4th counter gear thrust washer
7. 4th gear bushing
8. 4th needle bearing
9. Counter front bearing
10. Counter shaft
11. 3rd gear bushing
12. 3rd needle bearing
13. 3rd counter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

Shift Control Components



1. Check ball plug
2. Check ball spring
3. Check ball
4. Interlock pin
5. Retaining pin
6. Striking lever
7. 3rd-4th fork rod bracket
8. 3rd-4th fork rod
9. 3rd-4th fork rod (reversal side)
10. 1st-2nd fork rod
11. 1st-2nd shift fork
12. 3rd-4th shift fork
13. 5th-6th shift fork
14. 5th-6th fork rod (reversal side)
15. 5th-6th fork rod
16. Shiftier cap
17. 3rd-4th control lever
18. 5th-6th fork rod bracket
19. 5th-6th control lever
20. Adapter plate
21. Reverse fork rod
22. Reverse shift fork
23. Striking rod
24. Low/high control lever
25. Stopper ring
26. Interlock plunger



1. Control lever housing
2. Check shift pin
3. Control bracket
4. Return spring plug
5. Return spring plunger
6. Return spring
7. Rear extension
8. Boot
9. Control rod
10. Retaining pin

Refer to GI-8, "Component" and the followings for the symbols in the figure.

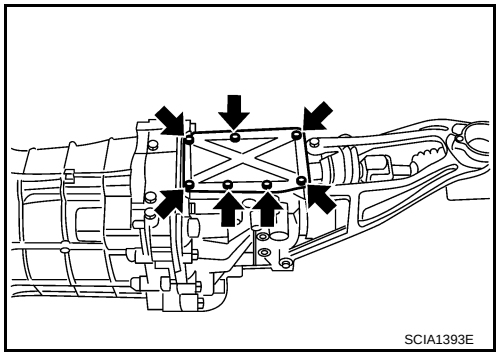
: Apply gear oil.

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

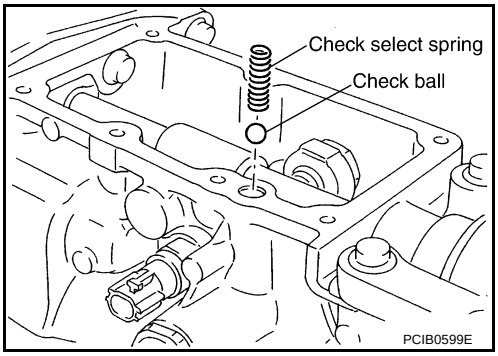
DISASSEMBLY

Case Components (VIN: Up to JN1BZ36A29M550534)

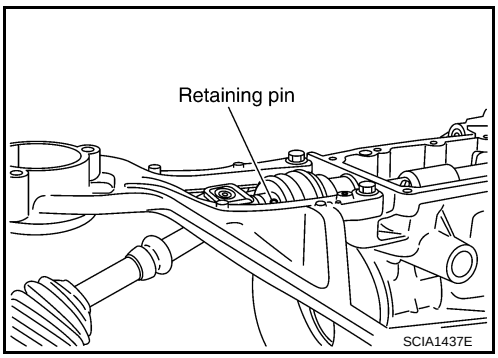
1. Remove filler plug and gasket from transmission case.
2. Remove drain plug and gasket from transmission case and then drain gear oil.
3. Remove rear extension upper cover mounting bolts.
4. Remove rear extension upper cover and rear extension upper cover gasket from the rear extension.



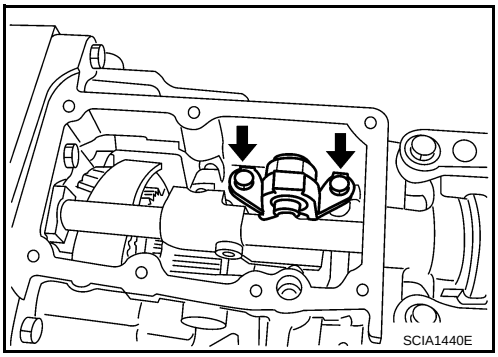
5. Remove check select spring and check ball from the rear extension.



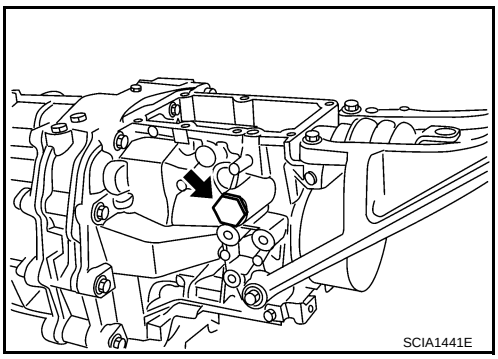
6. Remove retaining pin using a pin punch, and remove control rod.
7. Remove Park/Neutral position (PNP) switch, plunger and back-up lamp switch from the rear extension.



8. Remove control bracket mounting bolts. Then remove check shift pin and control bracket as one unit from the rear extension.



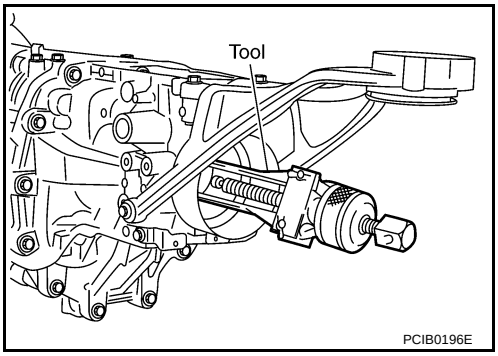
9. Remove right and left return spring plugs. Then remove return springs and return spring plungers from the rear extension.
   CAUTION:
   Return spring and return spring plunger have different lengths for right and left sides. Identify right and left side and then store.
10. Remove bracket mounting bolts. Then remove brackets from the rear extension.



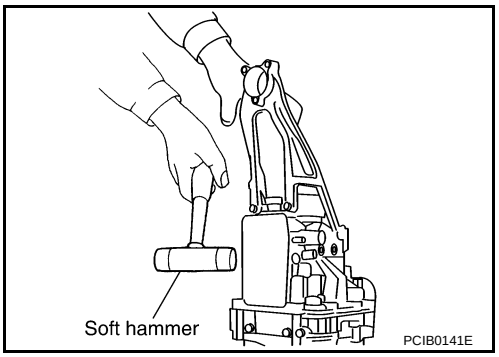
11. Remove rear oil seal from the rear extension using an oil seal puller.

    Tool number : KV381054S0 (J-34286)

    CAUTION:
    Be careful not to damage rear extension.

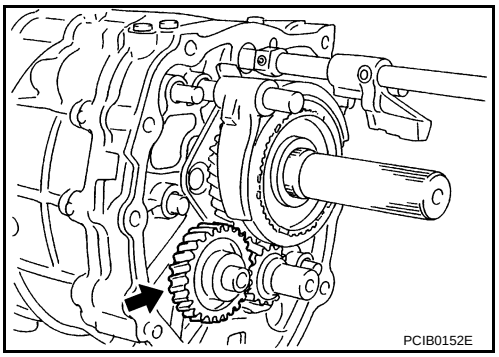


12. Remove rear extension mounting bolts. Using a soft hammer, tap rear extension assembly to remove.
CAUTION:
Do not hold control lever housing to prevent bushing of control lever housing from deformation when moving transmission assembly.
13. Remove control lever housing mounting bolts, and remove control lever housing from the rear extension.
14. Remove striking rod oil seal from the rear extension. Refer to "Case Components".
CAUTION:
Be careful not to damage rear extension.

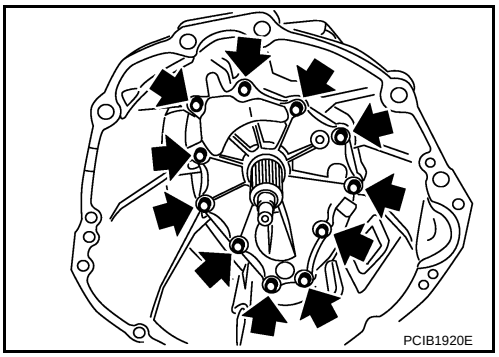


15. Remove rear extension oil gutter and cap from the rear extension. Refer to "Case Components".

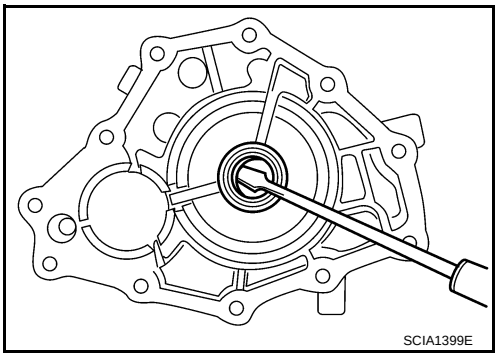
16. Remove reverse idler thrust washer, revers idler gear, and reverse idler needle bearing from the reverse idler shaft.
17. Remove reverse idler shaft from the adapter plate.



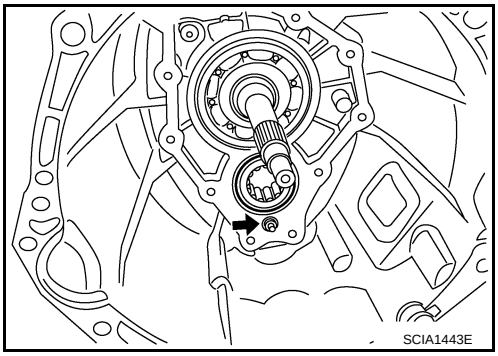
18. Remove front cover mounting bolts, then remove front cover and front cover gasket from the transmission case.



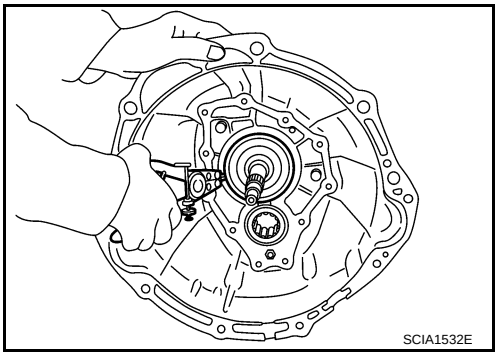
19. Remove front cover oil seal from the front cover, using a flat-bladed screwdriver.
CAUTION:
Be careful not to damage front cover mating surface.



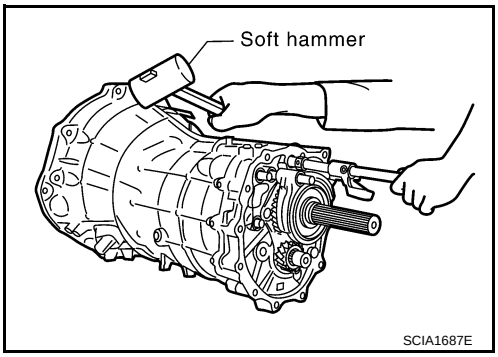
20. Remove baffle plate mounting nut from the transmission case.


SCIA1443E

21. Remove snap ring from the main drive gear bearing, using snap ring pliers.

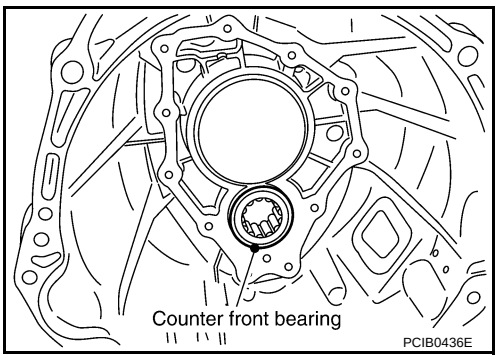

SCIA1532E

22. Using a soft hammer to carefully tap main shaft and counter shaft from the transmission case side, and then separate adapter plate and transmission case.



SCIA1687E

23. Remove counter front bearing from the transmission case.
24. Remove oil gutter and breather tube from the transmission case.
25. Remove bracket mounting bolt and then remove bracket from transmission case.

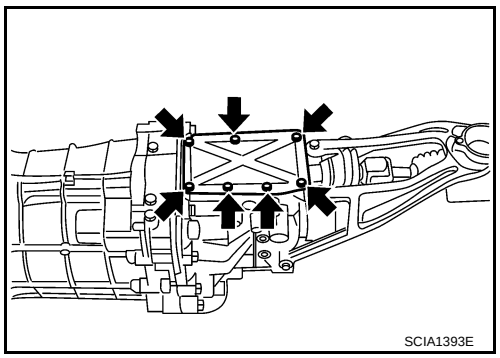


PCIB0436E

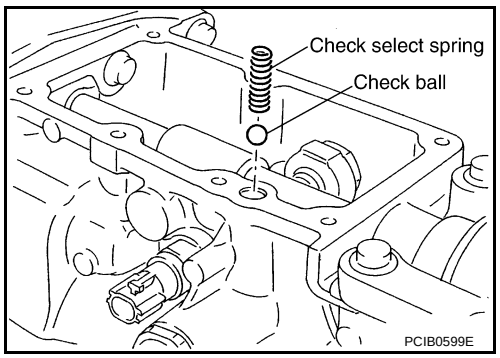
Case Components (VIN: From JN1BZ36A29M550535)

1. Remove filler plug and gasket from transmission case.
2. Remove drain plug and gasket from transmission case and then drain gear oil.

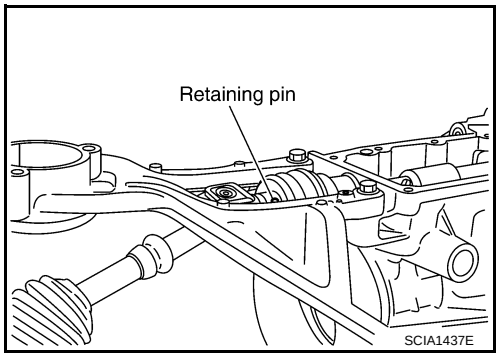
3. Remove rear extension upper cover mounting bolts.
4. Remove rear extension upper cover and rear extension upper cover gasket from the rear extension.



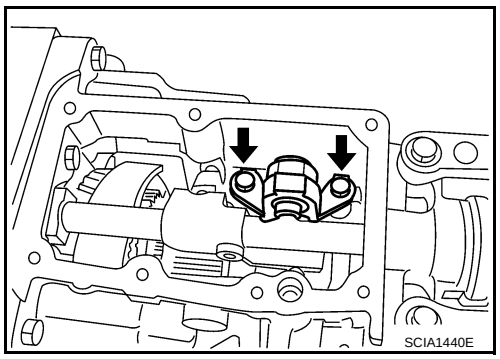
5. Remove check select spring and check ball from the rear extension.



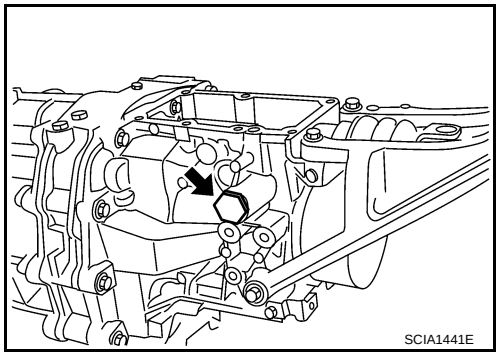
6. Remove retaining pin using a pin punch, and remove control rod.
7. Remove Park/Neutral position (PNP) switch, plunger and back-up lamp switch from the rear extension.



8. Remove control bracket mounting bolts. Then remove check shift pin and control bracket as one unit from the rear extension.



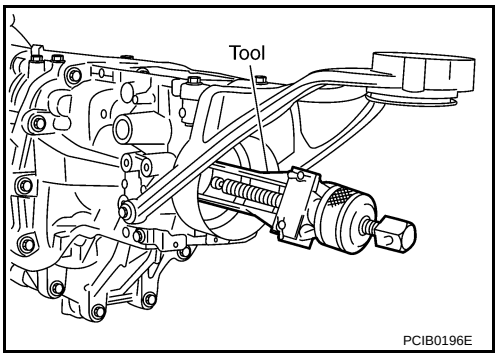
9. Remove right and left return spring plugs. Then remove return springs and return spring plungers from the rear extension.
CAUTION:
Return spring and return spring plunger have different lengths for right and left sides. Identify right and left side and then store.
10. Remove bracket mounting bolts. Then remove brackets from the rear extension.



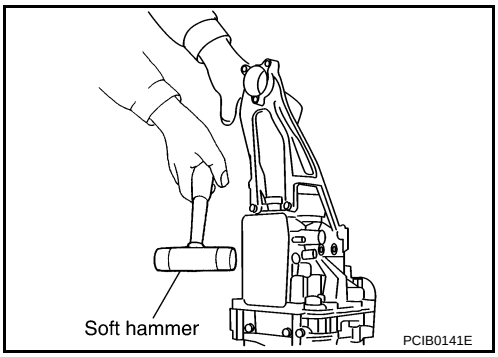
11. Remove rear oil seal from the rear extension using an oil seal puller.

Tool number : KV381054S0 (J-34286)

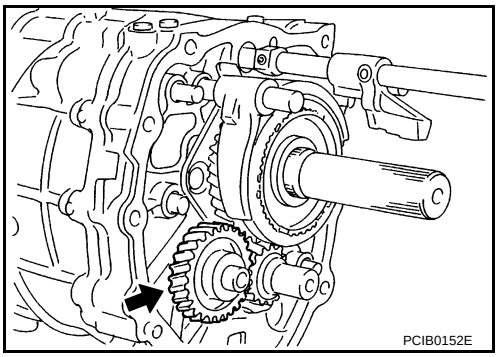
CAUTION:
Be careful not to damage rear extension.



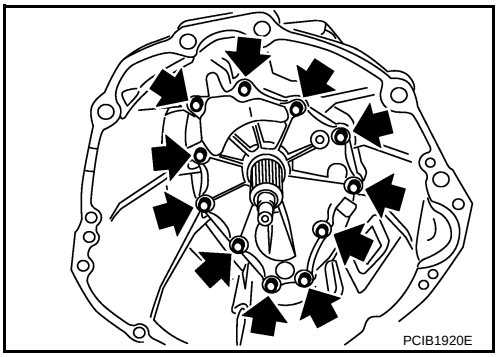
12. Remove rear extension mounting bolts. Using a soft hammer, tap rear extension assembly to remove.
CAUTION:
Do not hold control lever housing to prevent bushing of control lever housing from deformation when moving transmission assembly.
13. Remove control lever housing mounting bolts, and remove control lever housing from the rear extension.
14. Remove striking rod oil seal from the rear extension. Refer to "Case Components".
CAUTION:
Be careful not to damage rear extension.



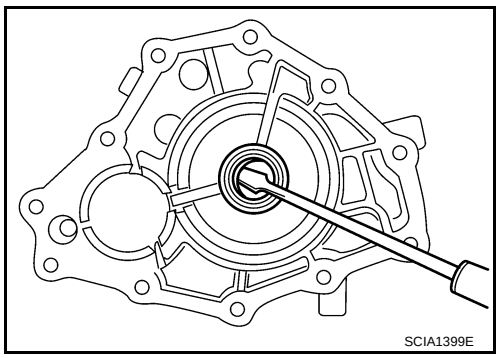
15. Remove rear extension oil gutter and cap from the rear extension. Refer to "Case Components".
16. Remove reverse idler thrust washer, revers idler gear, and reverse idler needle bearing from the reverse idler shaft.
17. Remove reverse idler shaft from the adapter plate.



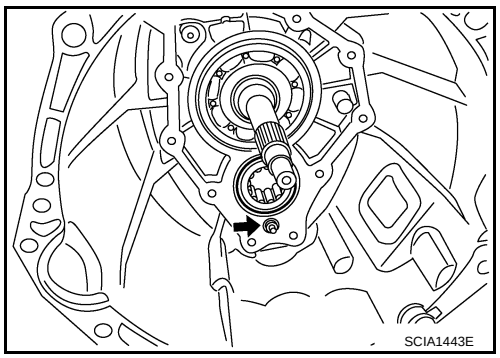
18. Remove front cover mounting bolts, then remove front cover and front cover gasket from the transmission case.



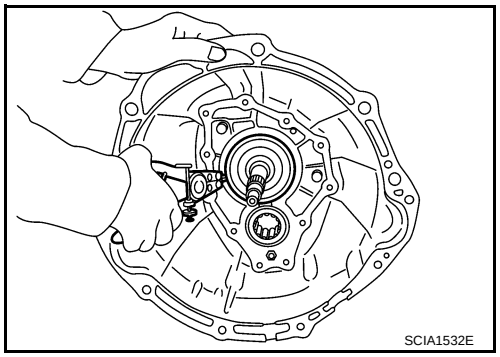
19. Remove front cover oil seal from the front cover, using a flat-bladed screwdriver.
CAUTION:
Be careful not to damage front cover mating surface.


SCIA1399E

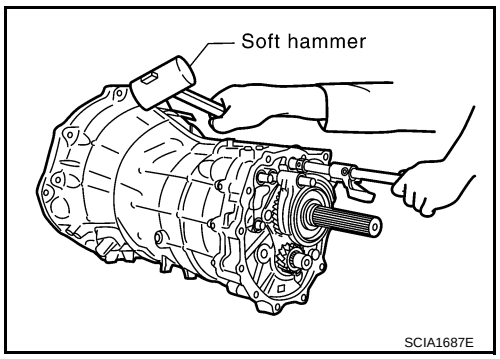
20. Remove baffle plate mounting nut from the transmission case.


SCIA1443E

21. Remove snap ring from the main drive gear bearing, using snap ring pliers.

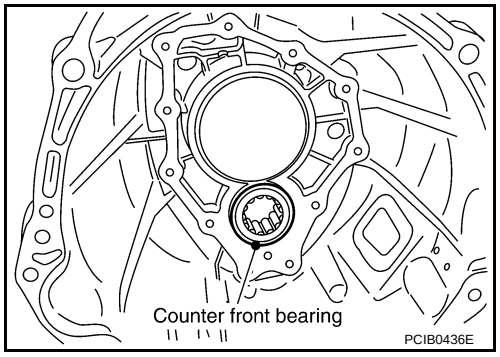

SCIA1532E

22. Using a soft hammer to carefully tap main shaft and counter shaft from the transmission case side, and then separate adapter plate and transmission case.



SCIA1687E

23. Remove counter front bearing from the transmission case.
24. Remove breather tube from the transmission case.
25. Remove bracket mounting bolt and then remove bracket from transmission case.



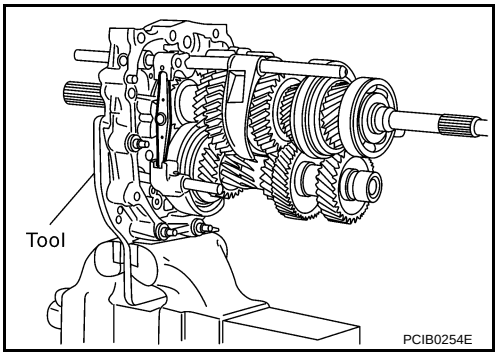
PCIB0436E

Shift Control Components (VIN: Up to JN1BZ36A29M550534)

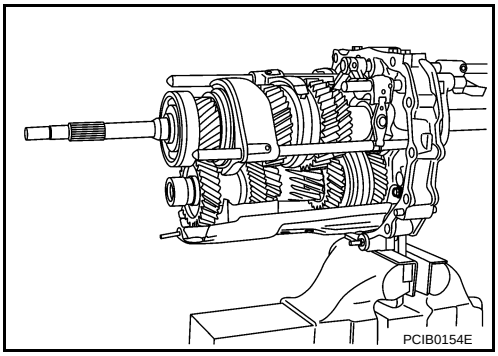
1. Install adapter setting plate to the adapter plate and then fixing in adapter setting plate using a vise.

   Tool number : ST22490000 (—)

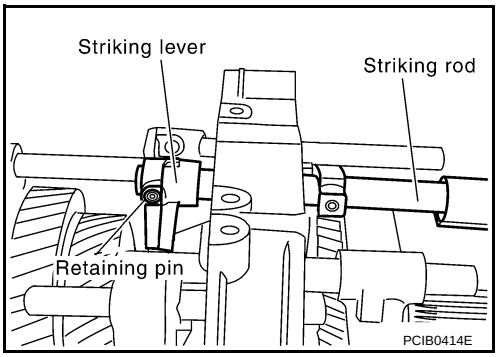
   CAUTION:
   Do not directly secure the surface in a vise.



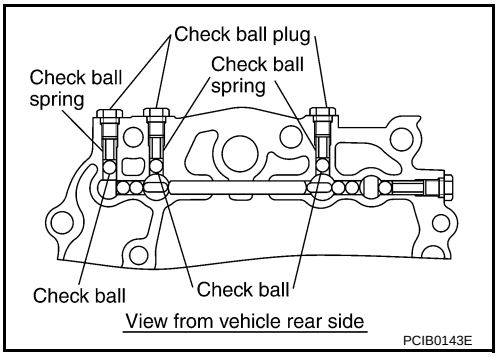
2. Remove baffle plate mounting bolts, and remove baffle plate from the adapter plate.



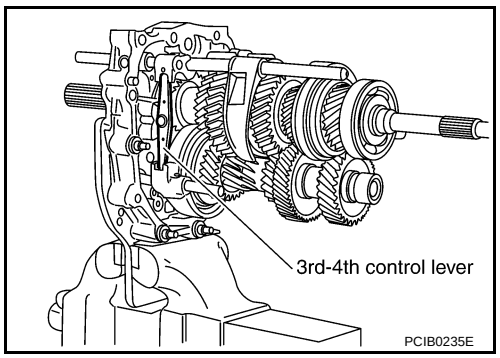
3. Remove retaining pin using a pin punch, and remove striking lever and striking rod.



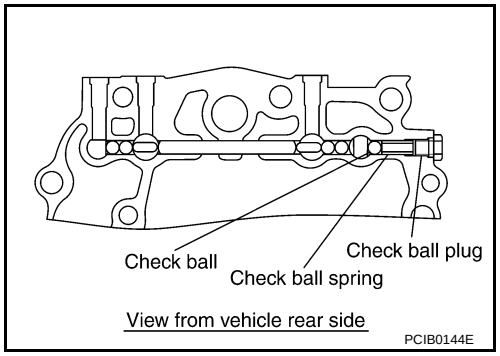
4. Remove check ball plugs and then remove check ball springs and check balls from the adapter plate.



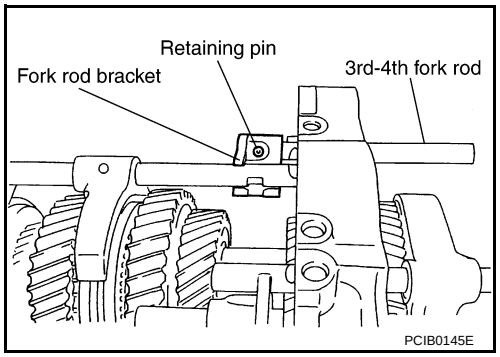
5. Remove 3rd-4th control lever mounting bolts and then remove 3rd-4th control lever and shifter cap.
CAUTION:
Be careful not to lose shifter cap.



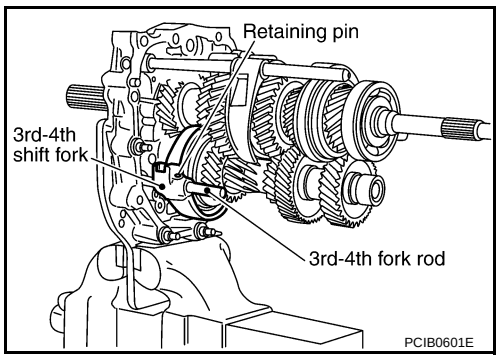
6. Remove check ball plug and then remove check ball spring and check ball from the adapter plate.



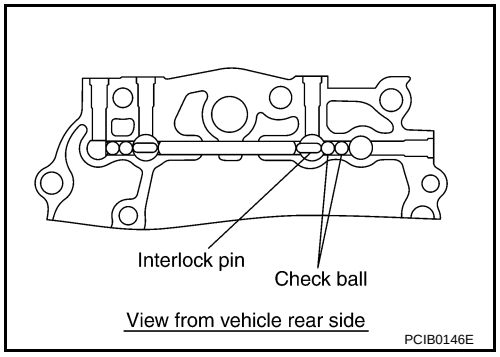
7. Using a pin punch to knock out retaining pin, and then remove 3rd-4th fork rod bracket and 3rd-4th fork rod.



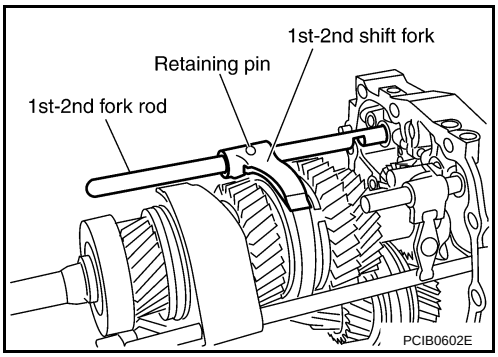
8. Using a pin punch to knock out retaining pin, and then remove 3rd-4th shift fork and 3rd-4th fork rod (reversal side).



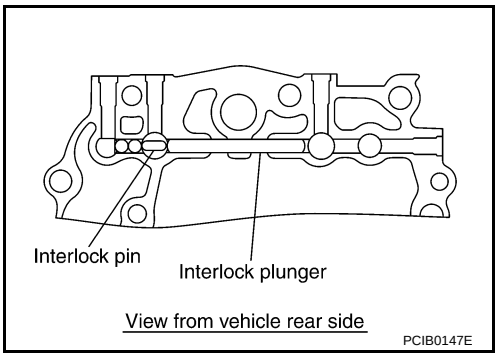
9. Remove check balls and interlock pin from the adapter plate.



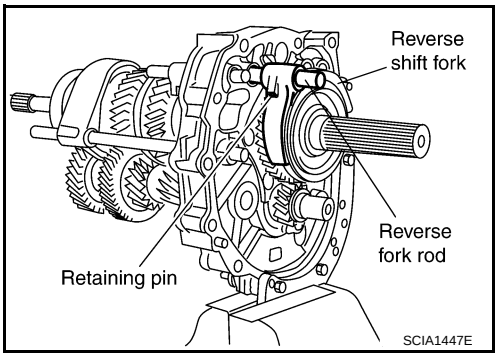
10. Using a pin punch to knock out retaining pin, and then remove 1st-2nd shift fork and 1st-2nd fork rod.



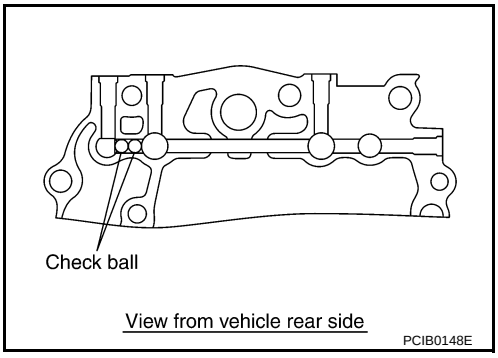
11. Remove interlock plunger and interlock pin from the adapter plate.



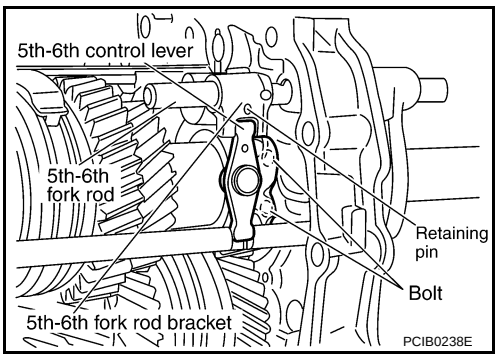
12. Using a pin punch to knock out retaining pin, and then remove reverse shift fork and reverse fork rod.



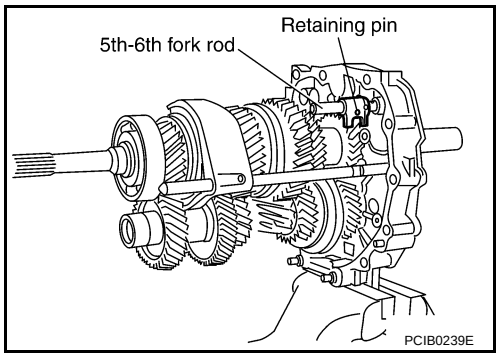
13. Remove check balls from the adapter plate.



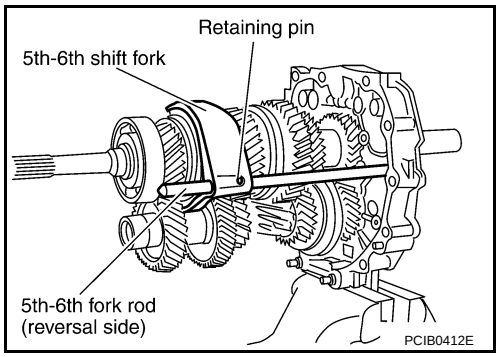
14. Remove 5th-6th control lever mounting bolts and then remove 5th-6th control lever from the adapter plate.



15. Using a pin punch to knock out retaining pin, and then remove 5th-6th fork rod bracket and 5th-6th fork rod.



16. Using a pin punch to knock out retaining pin, and then remove 5th-6th fork rod (reversal side) and 5th-6th shift fork.



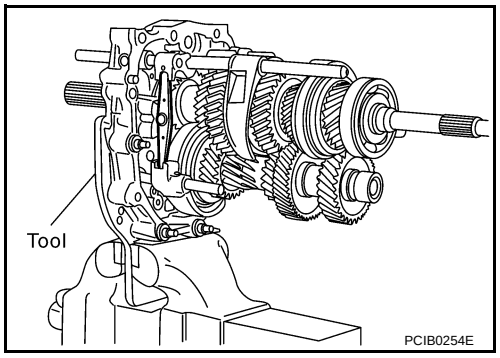
Shift Control Components (VIN: From JN1BZ36A29M550535)

1. Install adapter setting plate to the adapter plate and then fixing in adapter setting plate using a vise.

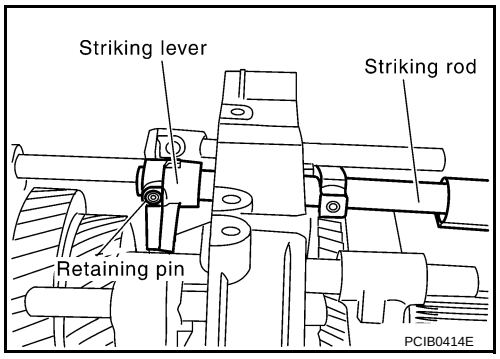
Tool number : ST22490000 (—)

CAUTION:
Do not directly secure the surface in a vise.

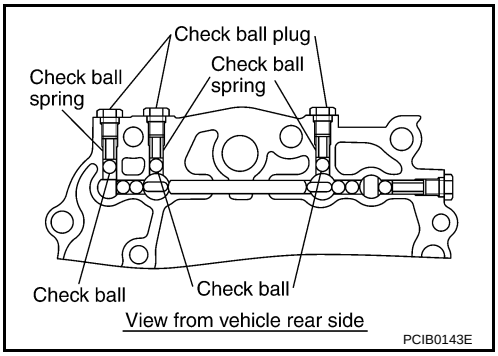
2. Remove baffle plate and oil gutter from the adapter plate.



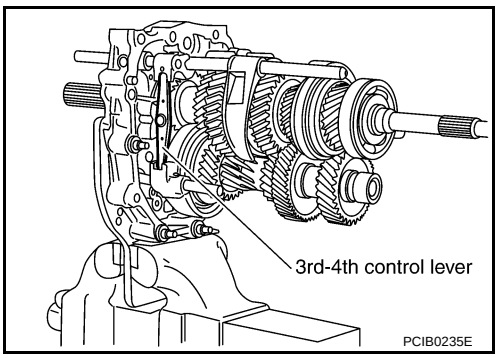
3. Remove retaining pin using a pin punch, and remove striking lever and striking rod.



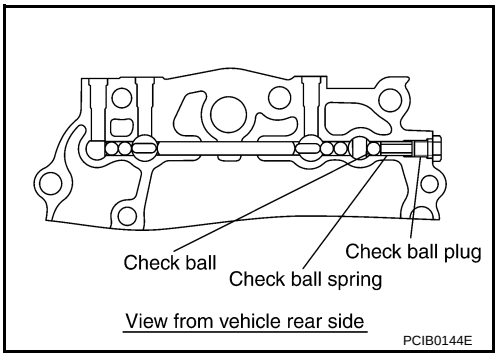
4. Remove check ball plugs and then remove check ball springs and check balls from the adapter plate.



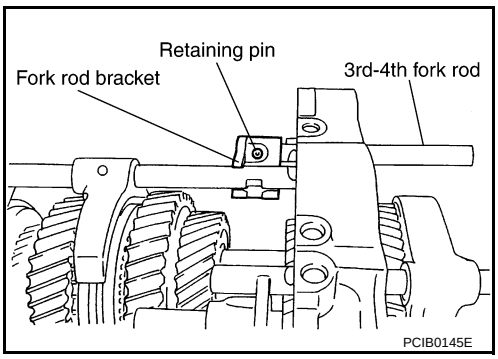
5. Remove 3rd-4th control lever mounting bolts and then remove 3rd-4th control lever and shifter cap.
CAUTION:
Be careful not to lose shifter cap.



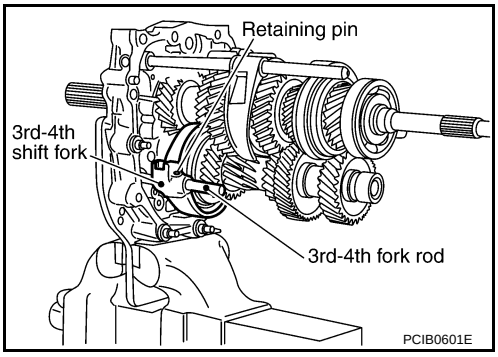
6. Remove check ball plug and then remove check ball spring and check ball from the adapter plate.



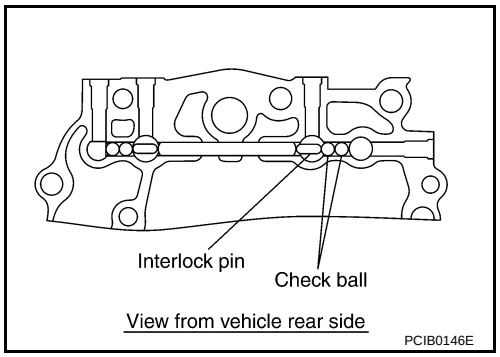
7. Using a pin punch to knock out retaining pin, and then remove 3rd-4th fork rod bracket and 3rd-4th fork rod.



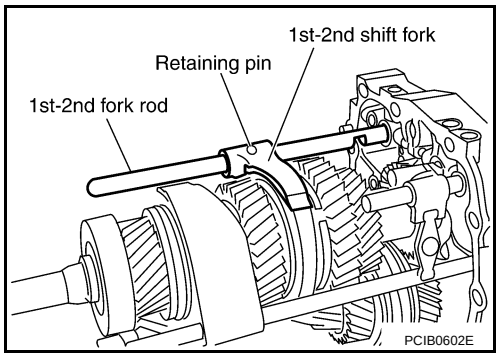
8. Using a pin punch to knock out retaining pin, and then remove 3rd-4th shift fork and 3rd-4th fork rod (reversal side).



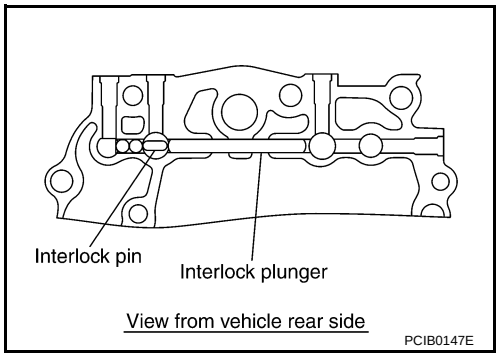
9. Remove check balls and interlock pin from the adapter plate.



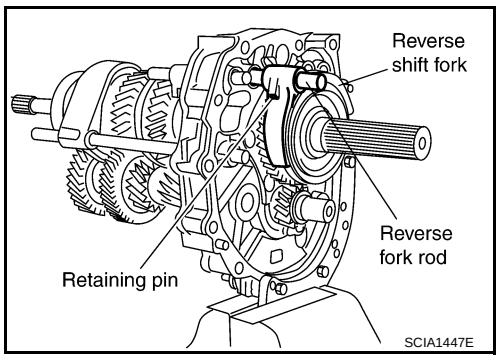
10. Using a pin punch to knock out retaining pin, and then remove 1st-2nd shift fork and 1st-2nd fork rod.



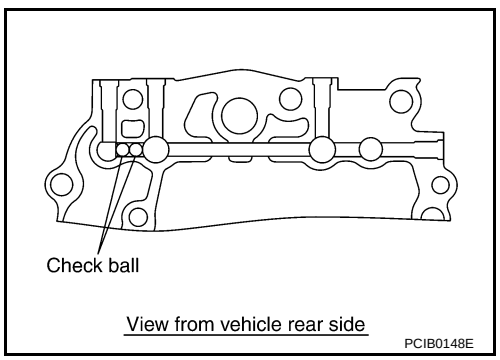
11. Remove interlock plunger and interlock pin from the adapter plate.



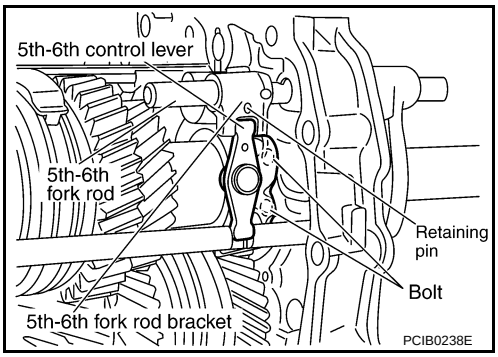
12. Using a pin punch to knock out retaining pin, and then remove reverse shift fork and reverse fork rod.



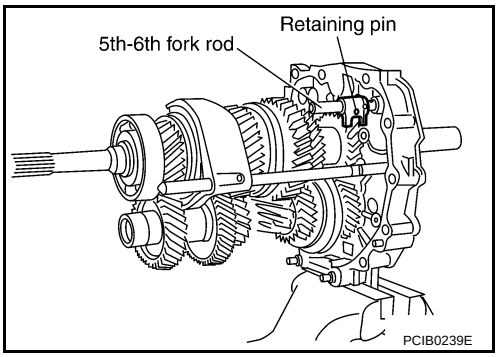
13. Remove check balls from the adapter plate.



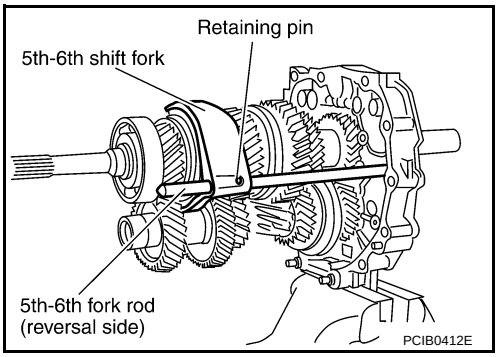
14. Remove 5th-6th control lever mounting bolts and then remove 5th-6th control lever from the adapter plate.



15. Using a pin punch to knock out retaining pin, and then remove 5th-6th fork rod bracket and 5th-6th fork rod.



16. Using a pin punch to knock out retaining pin, and then remove 5th-6th fork rod (reversal side) and 5th-6th shift fork.

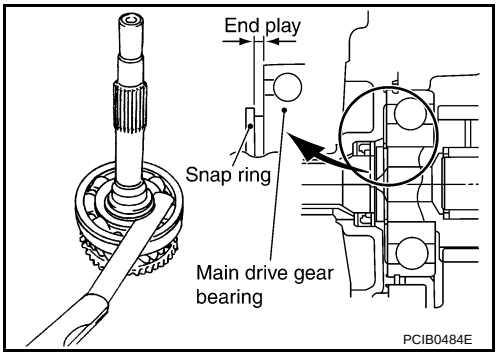


Gear Components

- Before disassembly, measure end play for each position. If the end play is outside the standards, disassemble and inspect.

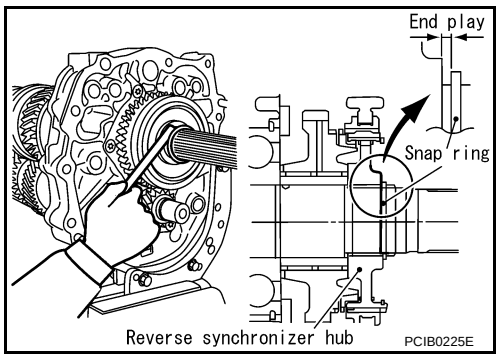
- Main drive gear

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



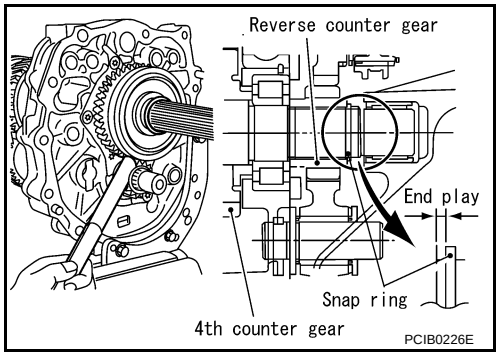
- Main shaft

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

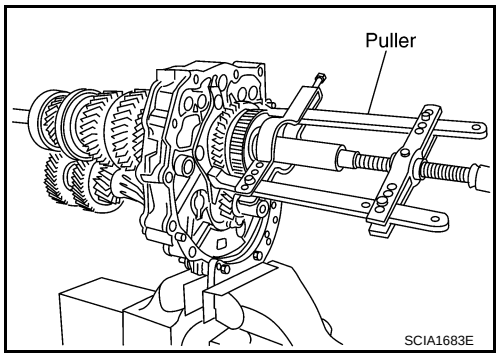


- Counter shaft

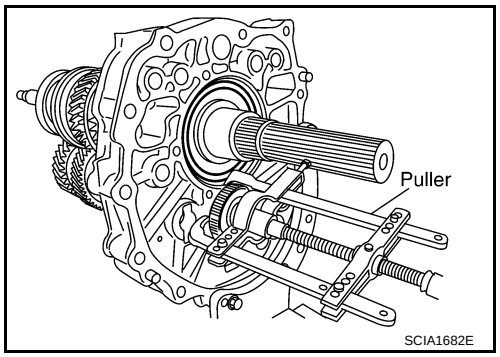
End play : 0 - 0.10 mm (0 - 0.004 in)



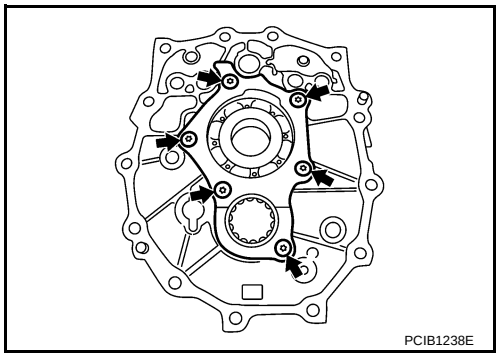
1. After removing snap ring and reverse coupling snap ring, using a puller to remove reverse main gear and reverse synchronizer assembly.
2. Remove reverse main needle bearing.



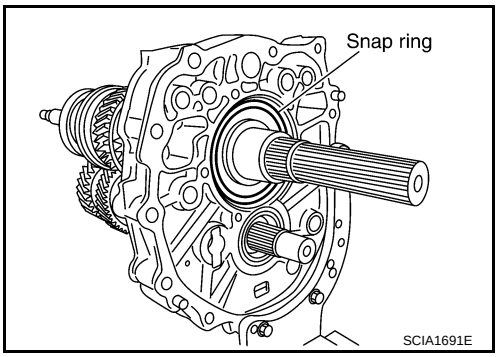
3. After removing snap ring, using the puller to remove reverse counter gear and counter rear bearing spacer.



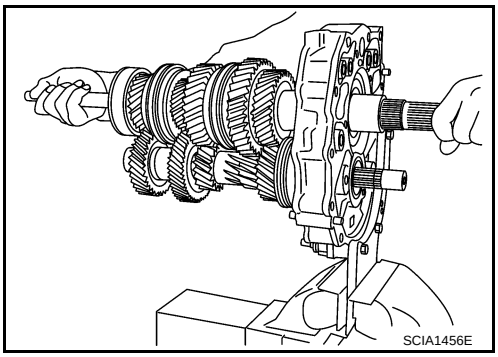
4. Remove main shaft bearing retainer mounting bolts and then remove main shaft bearing retainer.



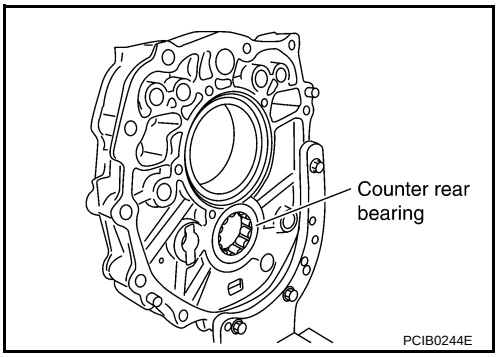
5. Remove snap ring from the main shaft bearing.



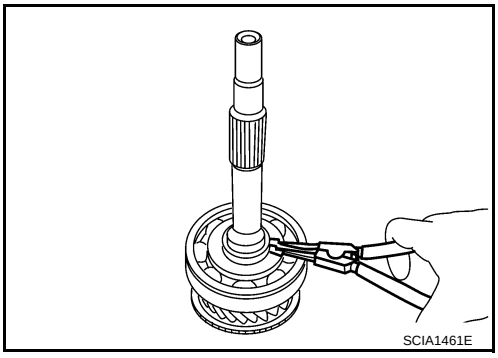
6. Carefully tap main shaft with a plastic hammer and then remove main shaft, main drive gear, and counter shaft from adapter plate.
7. Remove main pilot bearing, pilot bearing spacer and 5th baulk ring.



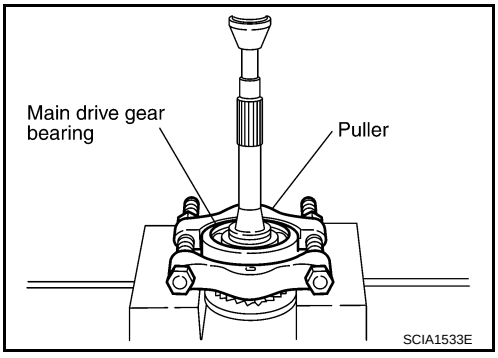
8. Remove counter rear bearing from the adapter plate.
9. Remove magnet from adapter plate.



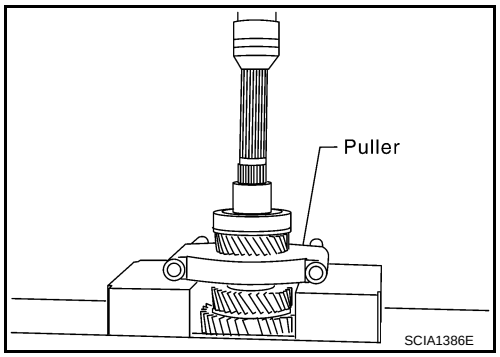
10. Remove snap ring from the main drive gear using snap ring pliers.



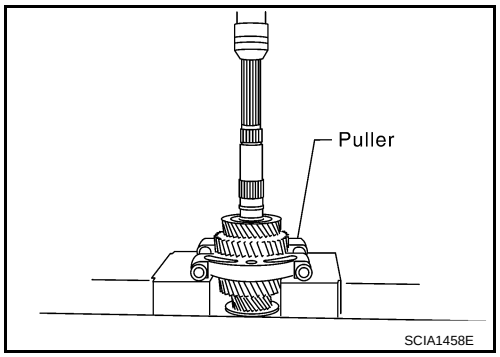
11. Set the suitable puller on the main drive gear and then using a press to remove main drive gear bearing from the main drive gear.



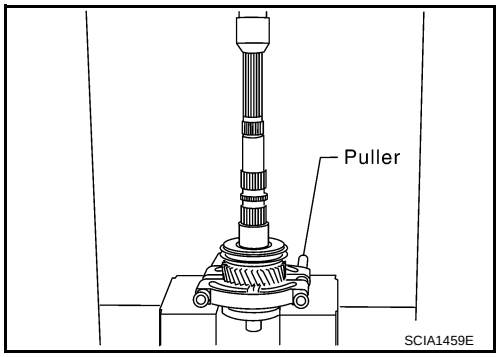
12. Using a press to remove the reverse main gear bushing, main shaft bearing and 4th main gear.
13. Remove 3rd-4th main spacer.



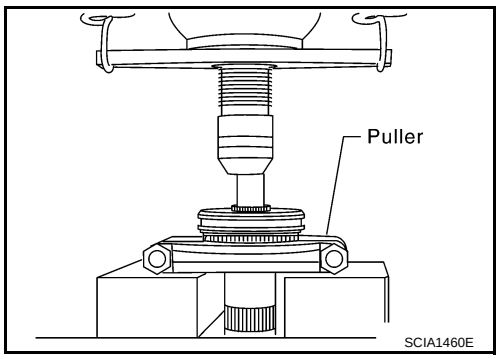
14. Using a press to remove 1st main gear and 3rd main gear.
CAUTION:
Be careful not to damage the baulk ring.
15. Remove 1st needle bearing.



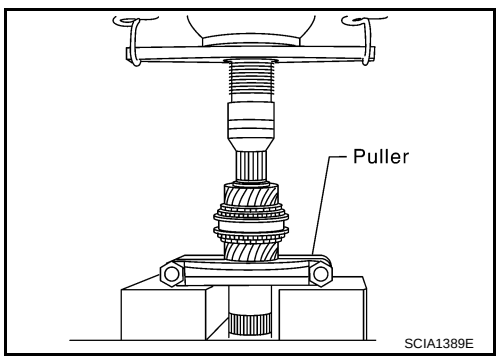
16. Using a press to remove 1st gear bushing, 1st-2nd synchronizer assembly, and 2nd main gear.
CAUTION:
Be aware that when using the press, if the main shaft gear positioner catches on the V-block, etc., the main shaft could be damaged.
17. Remove 2nd needle bearing.



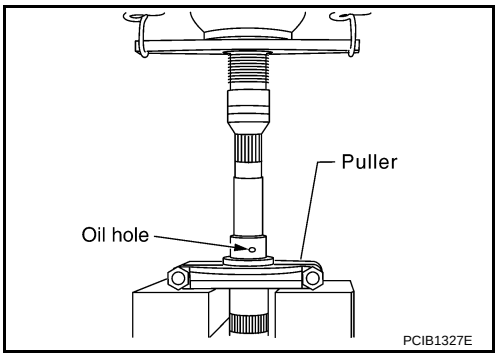
18. After removing snap ring, using a press to remove 6th main gear and 5th-6th synchronizer assembly.
19. Remove 6th needle bearing.



20. Using a press to remove the 3rd counter gear, 3rd-4th synchronizer assembly, 4th counter gear, 4th needle bearing, 4th gear bushing, 4th counter gear thrust washer, and counter rear bearing inner race.
21. Remove 3rd needle bearing.



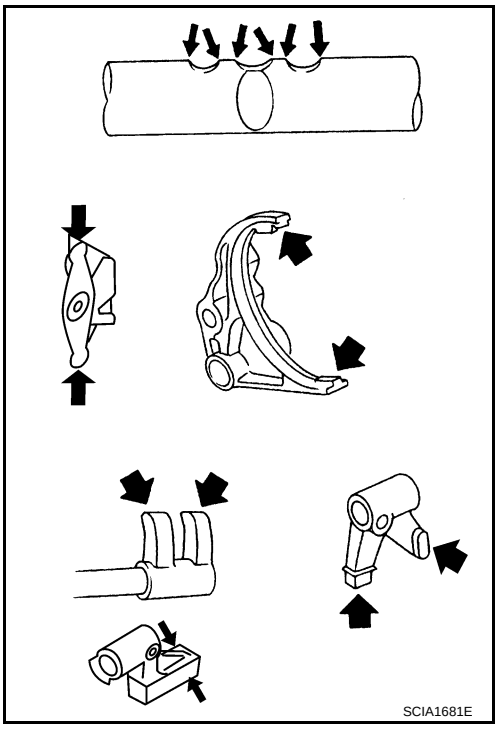
22. Using a press to remove the 3rd gear bushing.
CAUTION:
Do not use oil hole of 3rd gear bushing when press out.



INSPECTION AFTER DISASSEMBLY

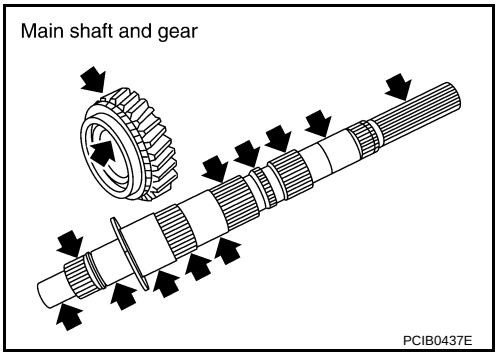
Shift Control

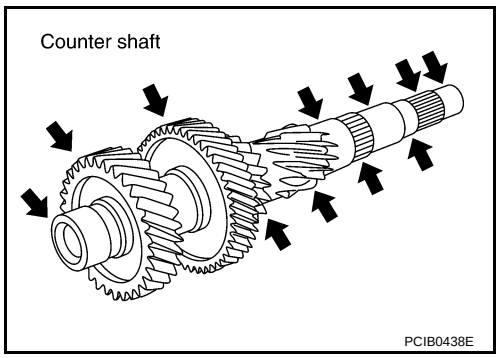
If the contact surface on striking lever, fork rod, shift fork, etc. has excessive wear, abrasion, bend, or any other damage, replace the components.



Gear and Shaft

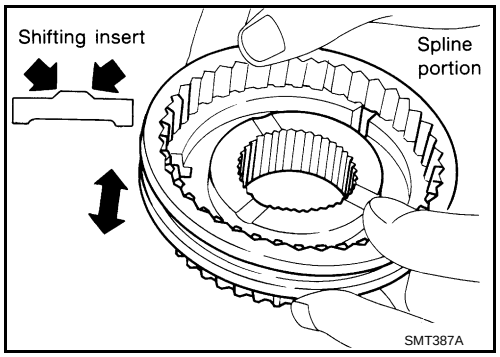
If the contact surface on each gear, main shaft, main drive gear, and counter shaft, etc. has damage, peeling, abrasion, dent, bent, or any other damage, replace the components.



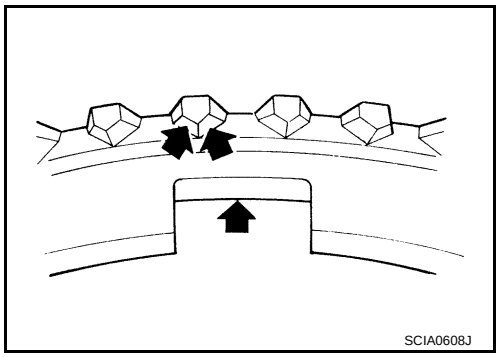


Synchronizer

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



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



Baulk Ring Clearance

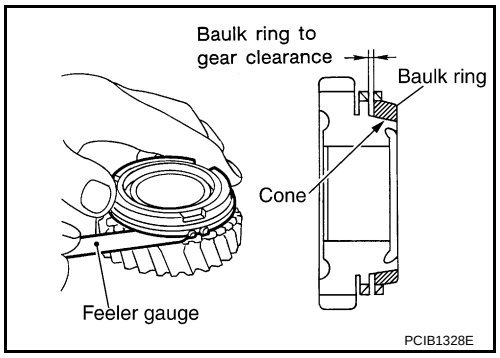
- **Single cone synchronizer (5th and 6th)**

- Push baulk ring on the cone and measure baulk ring back surface clearance at two locations or more on opposite sides, find the average value, and replace it if it is outside the limit value.

Clearance

Standard value : 0.70 - 1.35 mm (0.028 - 0.053 in)

Limit value : 0.5 mm (0.020 in) or less

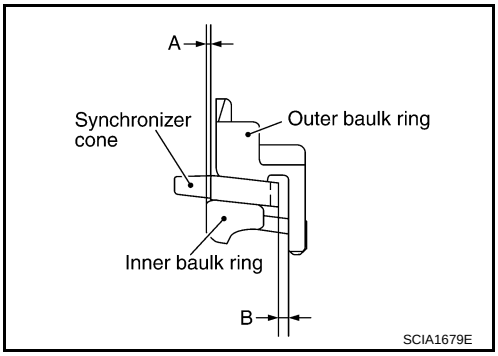


- **Double cone synchronizer (4th)**

Follow the instructions below and inspect the clearance of the outer baulk ring, synchronizer cone, inner baulk ring.

CAUTION:

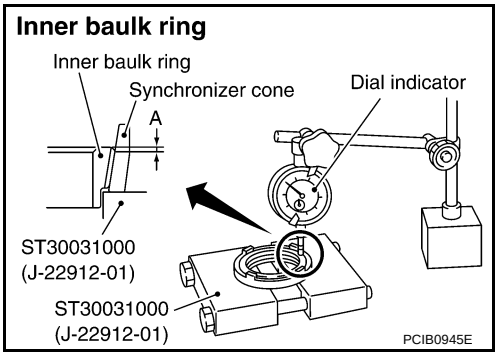
Clearances “A” and “B” of the outer baulk ring, synchronizer cone, and inner baulk ring are controlled as a set, so if the clearance is outside the limit value, replace the synchronizer assembly.



1. Using a dial indicator, measure clearance A at 2 or more points diagonally opposite, and calculate mean value.

Clearance A

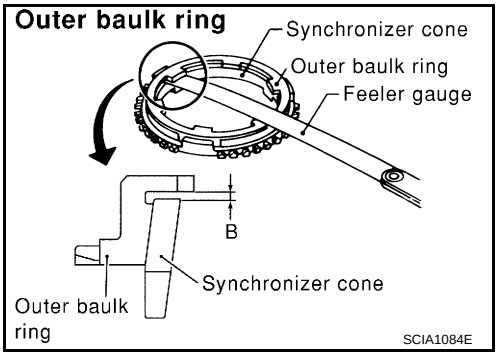
Standard value	**: 0.50 - 0.70 mm (0.020 - 0.028 in)**
Limit value	**: 0.3 mm (0.012 in) or less**



2. Using a feeler gauge, measure clearance B at 2 or more points diagonally opposite, and calculate mean value.

Clearance B

Standard value	**: 0.85 - 1.35 mm (0.033 - 0.053 in)**
Limit value	**: 0.7 mm (0.028 in) or less**

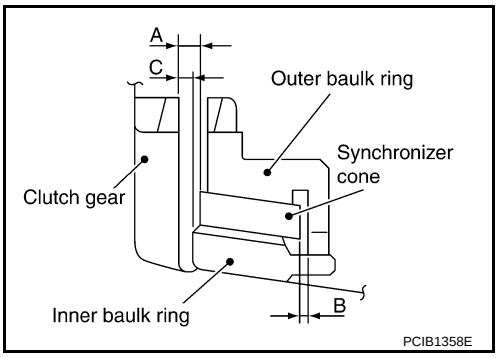


- **Triple cone synchronizer (1st, 2nd and 3rd)**

Check clearance for outer baulk ring, synchronizer cone and inner baulk ring of triple cone synchronizer following the direction.

NOTE:

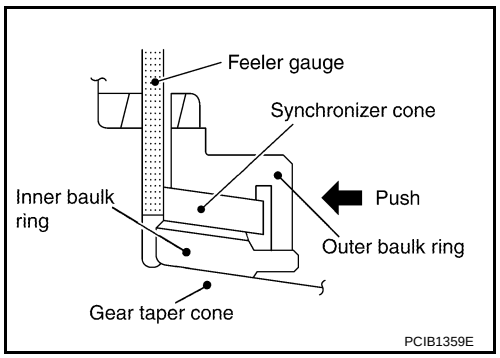
Outer baulk ring, synchronize cone and inner baulk ring, three control “clearance A, B and C” as a three-piece suite. If the value exceeds the limit value, replace them as a three-piece suite.



1. Using feeler gauge put and press baulk ring on gear taper cone, and then measure “clearance A” at more then 2 diagonal points, and calculate the average.

Clearance A

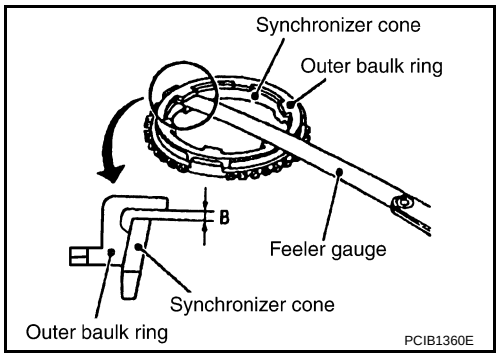
Standard value (1st)	**: 0.65 - 1.25 mm (0.026 - 0.049 in)**
Standard value (2nd, 3rd)	**: 0.60 - 1.30 mm (0.024 - 0.051 in)**
Limit value	**: 0.3 mm (0.012 in) or less**



2. Using feeler gauge measure “clearance B” at more than 2 diagonal positions, and calculate the average.

Clearance B

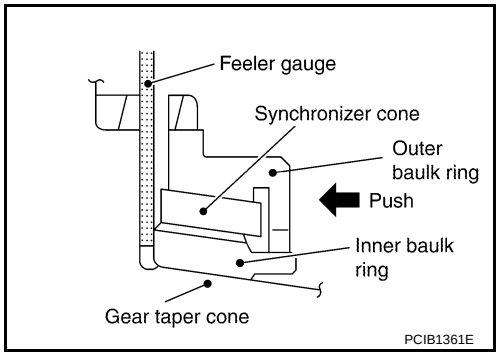
Standard value	**: 0.85 - 1.35 mm (0.033 - 0.053 in)**
Limit value	**: 0.7 mm (0.028 in) or less**



3. Using feeler gauge put and press baulk ring on gear taper cone, and then measure “clearance C” at more then 2 diagonal points, and calculate the average.

Clearance C

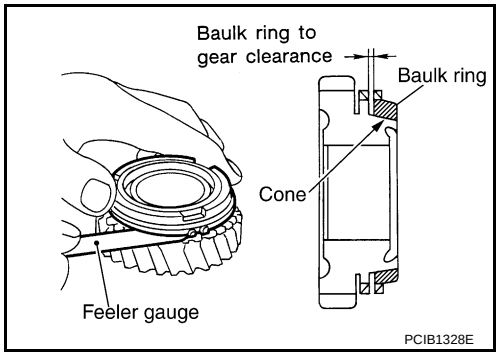
Standard value (1st)	**: 0.80 - 1.2 mm (0.031 - 0.047 in)**
Standard value (2nd, 3rd)	**: 0.75 - 1.25 mm (0.030 - 0.049 in)**
Limit value	**: 0.3 mm (0.012 in) or less**



- **Reverse synchronizer**
  Push baulk ring on the cone and measure baulk ring back surface clearance at two locations or more on opposite sides, find the average value, and replace if it is outside the limit value.

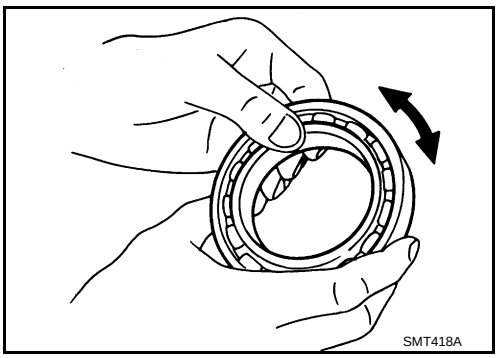
Clearance

Standard value	**: 0.75 - 1.20 mm (0.030 - 0.047 in)**
Limit value	**: 0.5 mm (0.020 in) or less**



Bearing

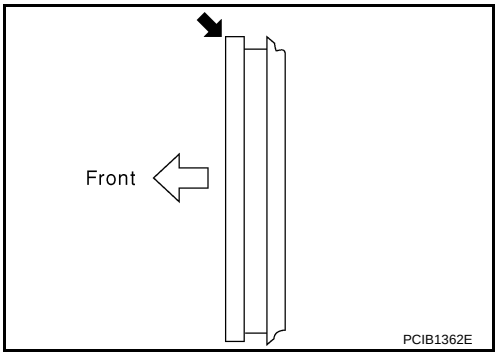
If the bearing does not rotate smoothly or the contact surface on ball or race is damaged or peeled, replace with new ones.



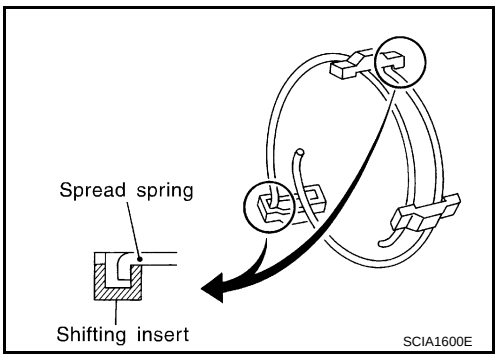
ASSEMBLY

Gear Components

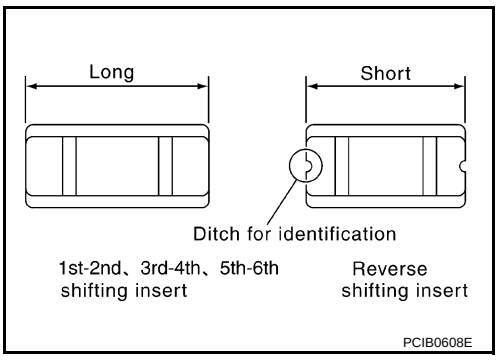
1. Install 5th-6th coupling sleeve and 5th-6th shifting inserts in the 5th-6th synchronizer hub.
   CAUTION:
   - **Do not reuse 5th-6th coupling sleeve and 5th-6th synchronizer hub.**
   - **Replace 5th-6th coupling sleeve and 5th-6th synchronizer hub as a set.**
   - **Install 5th-6th coupling sleeve with the large chamfer on the rear side.**



2. Install 5th-6th spread springs in the 5th-6th shifting inserts.
   CAUTION:
   - **Do not install 5th-6th spread spring hook onto the same 5th-6th shifting insert.**

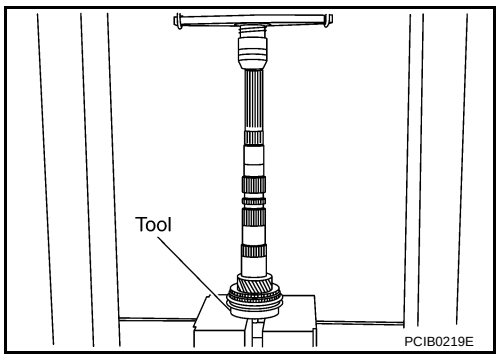


   - **Be careful with the shape of reverse shifting insert to avoid misassembly.**

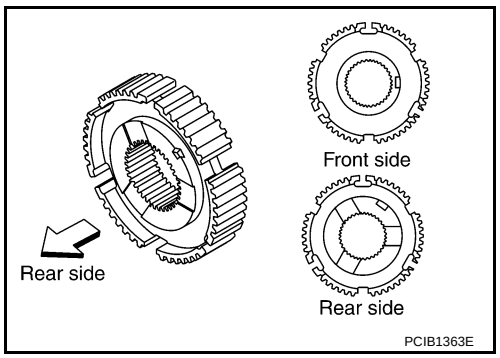


3. Apply recommended grease to 6th needle bearing.
4. Install 6th needle bearing, 6th main gear and 6th baulk ring on the main shaft and then using an inserter and a press to press fit the 5th-6th synchronizer assembly.

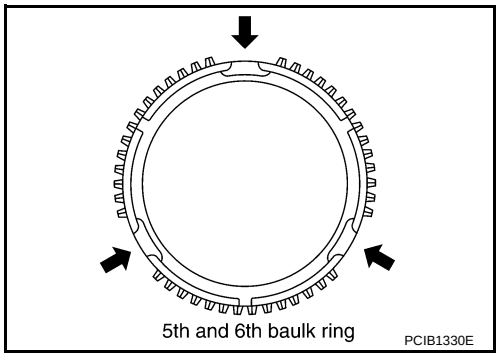
Tool number : ST30911000 (—)



CAUTION:
When press fitting, install with the side having the three boss edge oil grooves facing the rear side.



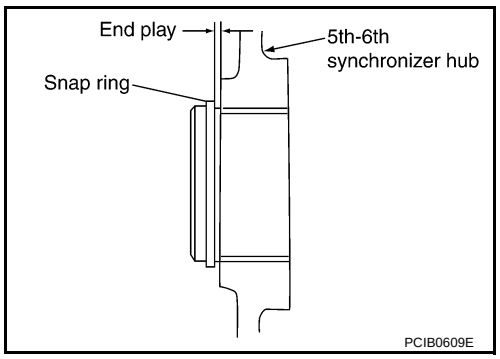
NOTE:
5th and 6th baulk rings have three spaces that four gear teeth are missing as shown in the figure.



5. Select and install a snap ring so that the end play comes within the standard value.

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

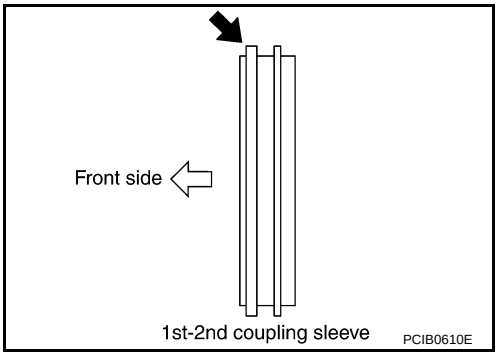
CAUTION:
Do not reuse snap ring.



6. Install 1st-2nd coupling sleeve and 1st-2nd shifting inserts into the 1st-2nd synchronizer hub.

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

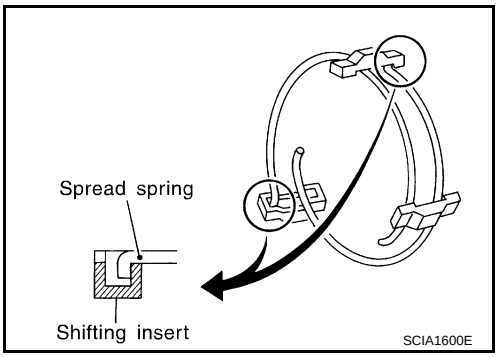
- **Install 1st-2nd coupling sleeve with the thicker flange faced the front side.**



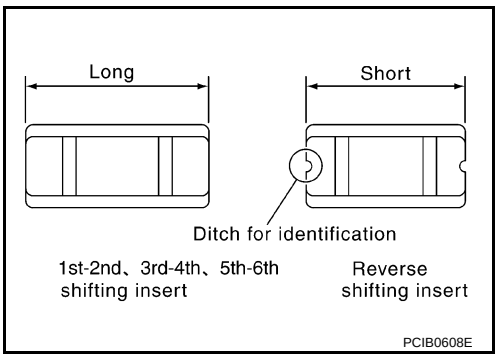
7. Install 1st-2nd spread springs in the 1st-2nd shifting inserts.

CAUTION:

- **Do not install 1st-2nd spread spring hook onto the same 1st-2nd shifting insert.**



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

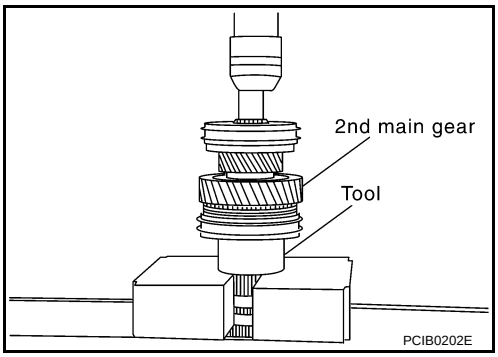


8. Apply recommended grease to 2nd needle bearing.
9. Install 2nd main gear, 2nd needle bearing, 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring on the main shaft and then using a support ring and a press to press fit the 1st-2nd synchronizer assembly.

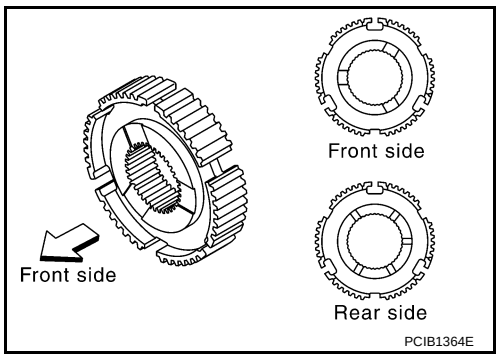
Tool number : ST27861000 (—)

CAUTION:

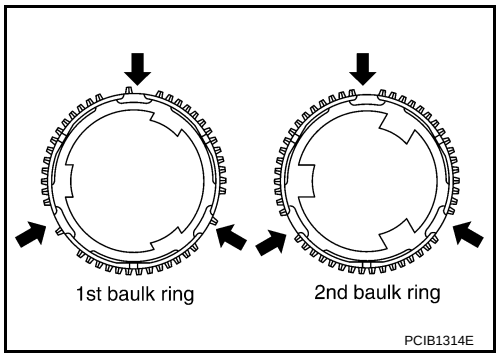
- **Replace 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring as a set.**



- **When press fitting, install with the side having the three boss edge oil grooves facing the front side.**

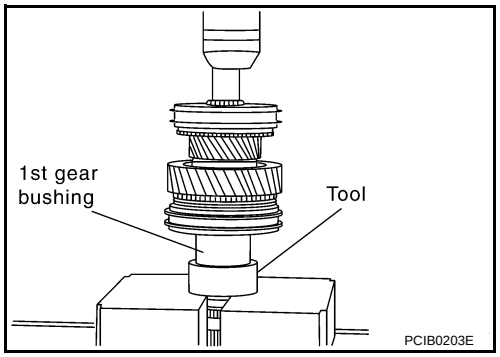


NOTE:
1st baulk ring has three spaces that four gear tooth is missing and 2nd baulk ring has three spaces that two gear teeth are missing.



10. Using a support ring and a press to press fit the 1st gear bushing.

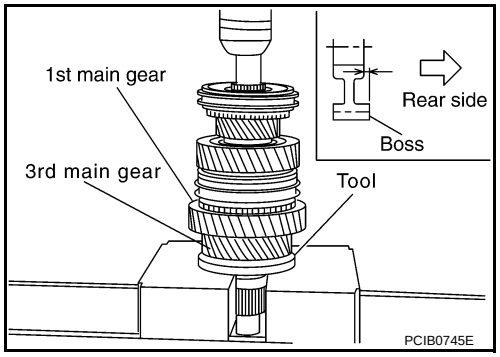
Tool number : ST27861000 (—)



11. Apply recommended grease to 1st needle bearing.
12. Install 1st outer baulk ring, 1st synchronizer cone, 1st inner baulk ring, 1st needle bearing and 1st main gear on the main shaft and then using the inserter and a press to press fit the 3rd main gear.

Tool number : ST30022000 (—)

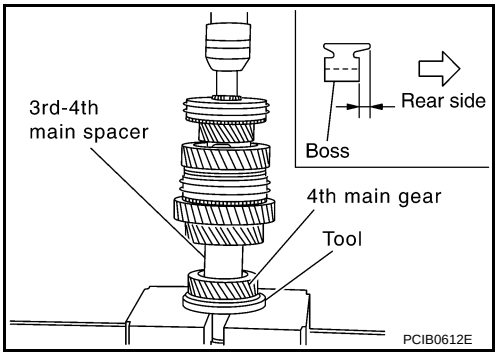
CAUTION:
- **Do not reuse 3rd main gear.**
- **Replace 1st outer baulk ring, 1st synchronizer cone and 1st inner baulk ring as a set.**



13. Install 3rd-4th main spacer on the main shaft and then using the inserter and a press to press fit the 4th main gear.

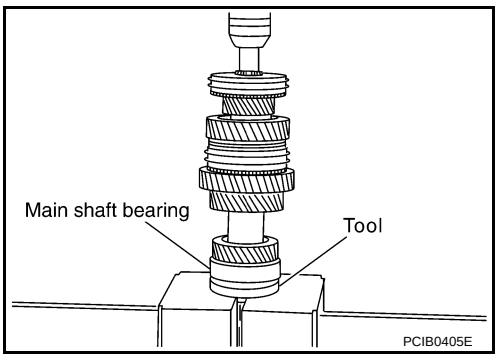
Tool number : ST30022000 (—)

CAUTION:
- **Do not reuse 4th main gear.**
- **When installing, set boss to rear side.**



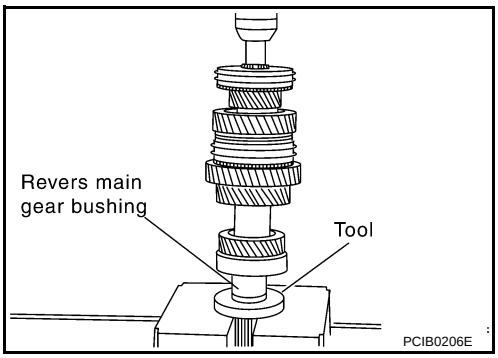
14. Using the inserter and a press to press fit the main shaft bearing onto the main shaft.

Tool number : ST30911000 (—)



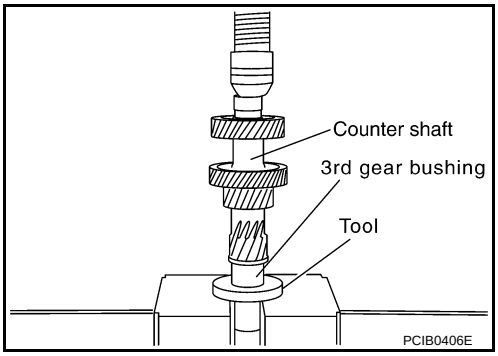
15. Using the inserter and a press to press fit the reverse main gear bushing onto the main shaft.

Tool number : ST30911000 (—)



16. Using the inserter and a press to press fit the 3rd gear bushing onto the counter shaft.

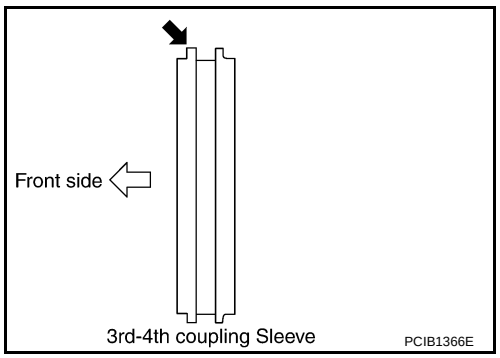
Tool number : ST30911000 (—)



17. Install 3rd-4th coupling sleeve and 3rd-4th shifting inserts into the 3rd-4th synchronizer hub.

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

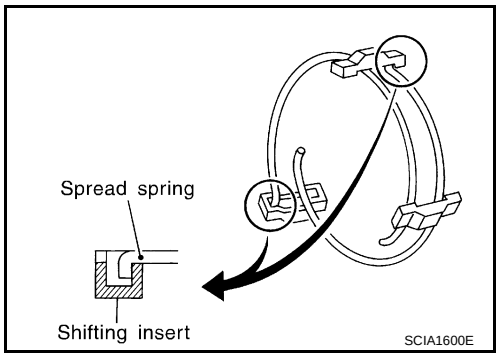
- **Install 3rd-4th coupling sleeve with the thicker flange faced the front side.**



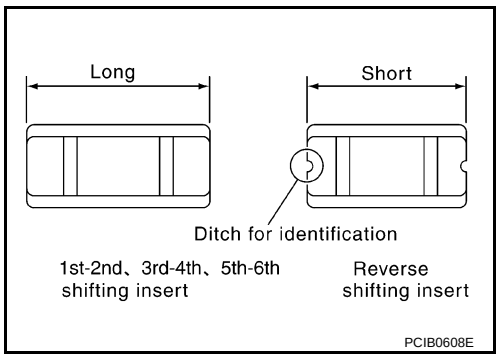
18. Install 3rd-4th spread springs in the 3rd-4th shifting inserts.

CAUTION:

- **Do not install 3rd-4th spread spring hook onto the same 3rd-4th shifting insert.**

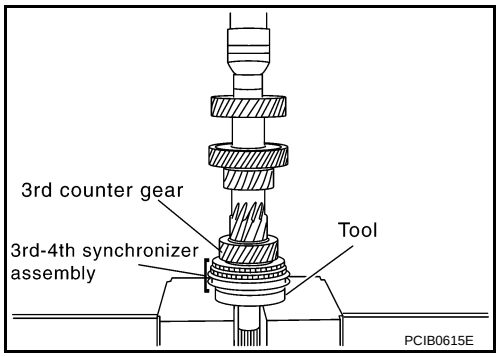


- **Be careful with the shape of reverse shifting insert to avoid misassembly.**



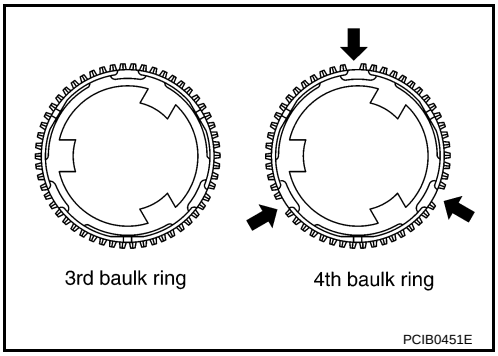
19. Apply recommended grease to 3rd needle bearing.
20. Apply gear oil to the hole spline press fitting side of 3rd-4th synchronizer hub.
21. Install 3rd needle bearing, 3rd counter gear, 3rd inner baulk ring, 3rd synchronizer cone and 3rd outer baulk ring on the counter shaft and then using the inserter and a press to press fit the 3rd-4th synchronizer assembly.

Tool number : ST30911000 (—)



CAUTION:
Replace 3rd inner baulk ring, 3rd synchronizer cone and outer baulk ring as a set.
NOTE:

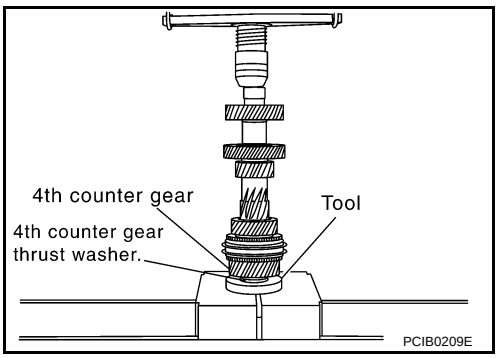
4th baulk ring has three spaces that one gear tooth is missing but 3rd baulk ring doesn't.



22. Apply recommended grease to 4th needle bearing.
23. Install 4th outer baulk ring, 4th synchronizer cone, 4th inner baulk ring, 4th needle bearing and 4th counter gear onto the counter shaft and then using the inserter and a press to press fit the 4th gear bushing and 4th counter gear thrust washer.

Tool number : KV40100630 (J-26092)

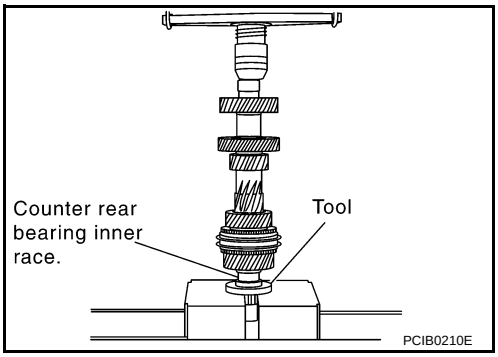
CAUTION:
Replace 4th outer baulk ring, 4th synchronizer cone and 4th inner baulk ring as a set.



24. Using the inserter and a press to press fit the counter rear bearing inner race onto the counter shaft.

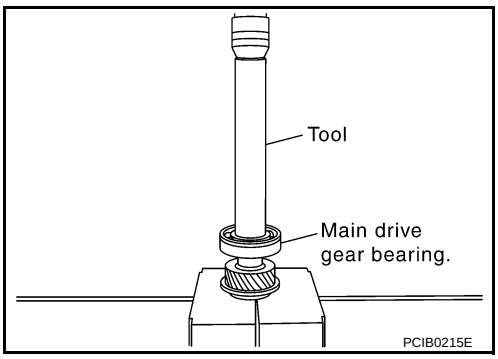
Tool number : ST30032000 (J-26010-01)

CAUTION:
Replace counter rear bearing inner race, counter rear bearing and counter rear bearing spacer as a set.



25. Using the drift and a press to press fit the main drive gear bearing onto the main drive gear.

Tool number : KV32102700 (—)

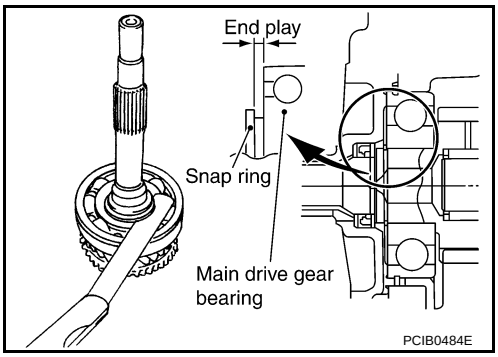


26. Select and install a snap ring to the main drive gear bearing so that the end play comes within the standard value.

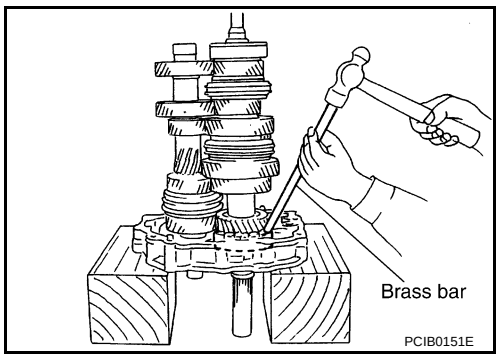
End play : 0 - 0.10 mm (0 - 0.004 in)

CAUTION:
Do not reuse snap ring.

27. Apply recommended grease to main pilot bearing.
28. Install main pilot bearing, pilot bearing spacer and 5th baulk ring to main drive gear.



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

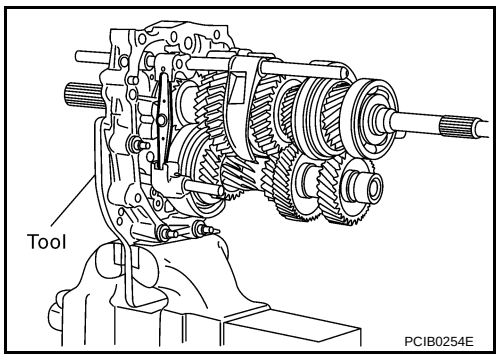


30. Install the adapter setting plate to adapter plate and then fixing in adapter setting plate using a vise.

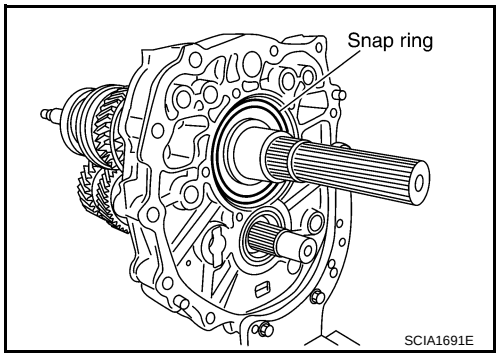
Tool number : ST22490000 (—)

CAUTION:
Do not directly secure the surface in a vise.

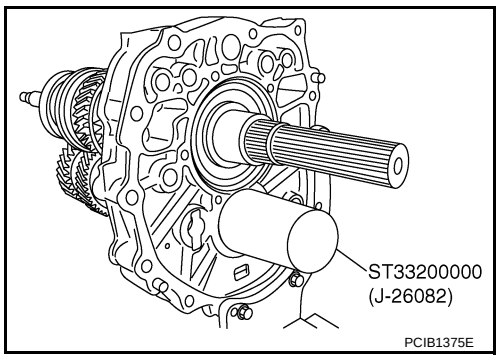
31. Install magnet to adapter plate.



32. Install snap ring to mainshaft bearing.
CAUTION:
Do not reuse snap ring.

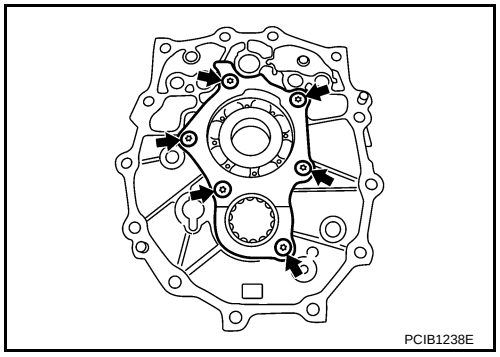


33. Install counter rear bearing onto the adapter plate using the drift.
CAUTION:
Replace counter rear bearing inner race, counter rear bearing and counter rear bearing spacer as a set.

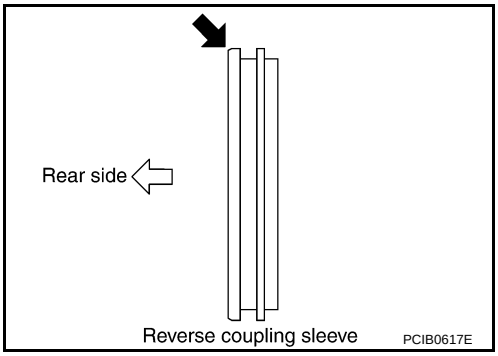


34. Apply recommended thread locking sealant to the end of the bolts (first 3 to 4 threads), screw the bolts into the main shaft bearing retainer, and tighten it to the specified torque. Refer to "Case Components".
- **Use Genuine Medium Strength Thread Locking Sealant or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

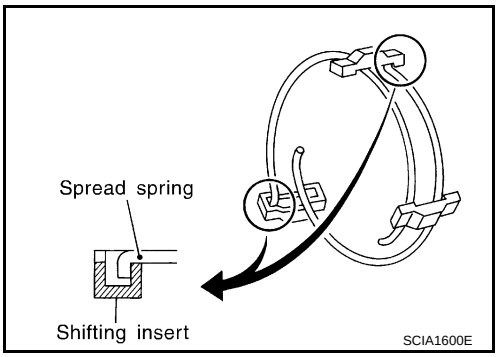
CAUTION:
Remove old sealant and oil adhering to threads.



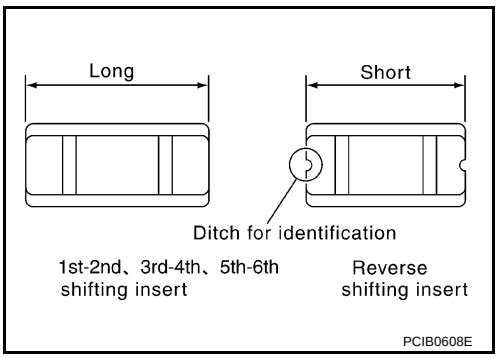
35. Install reverse coupling sleeve and reverse shifting inserts into the reverse synchronizer hub.
CAUTION:
- **Do not reuse reverse coupling sleeve and reverse synchronizer hub.**
- **Replace reverse coupling sleeve and reverse synchronizer hub as a set.**
- **Install reverse coupling sleeve with the flat flange on the rear side.**



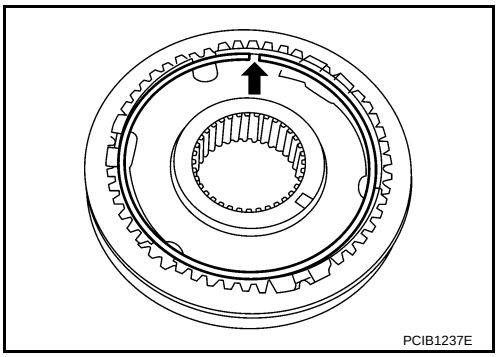
36. Install reverse spread springs in the reverse shifting inserts.
CAUTION:
- **Do not install reverse spread spring hook onto the same reverse shifting insert.**



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

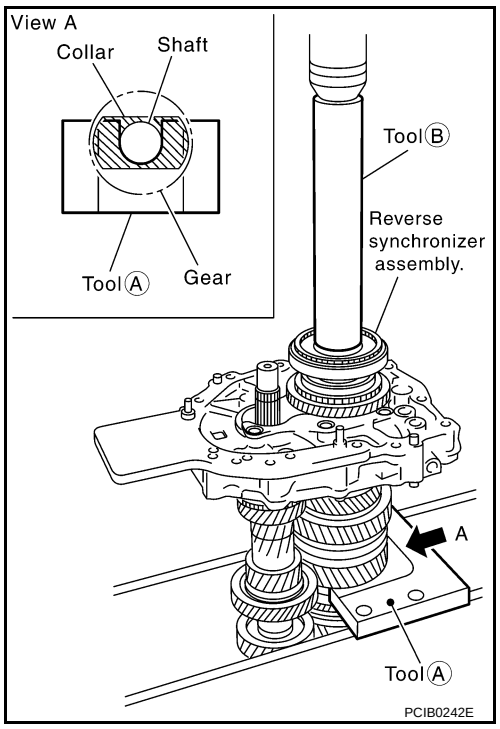


37. Install snap ring to reverse synchronizer hub.
CAUTION:
- **Do not reuse snap ring.**
- **Do not align the snap ring notch with synchronizer hub groove when assembling.**

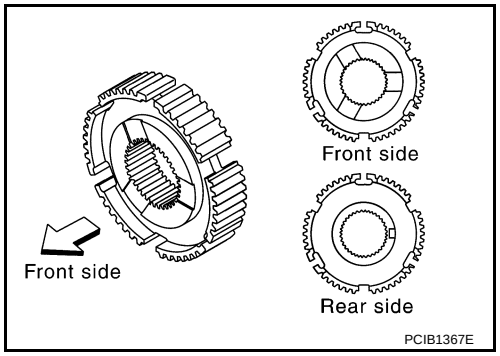


38. Apply recommended grease to reverse main needle bearing.
39. After installing reverse main gear bushing, reverse main needle bearing, reverse main gear and reverse baulk ring onto the main shaft, using the drift and press plate and a press to press fit the reverse synchronizer assembly.

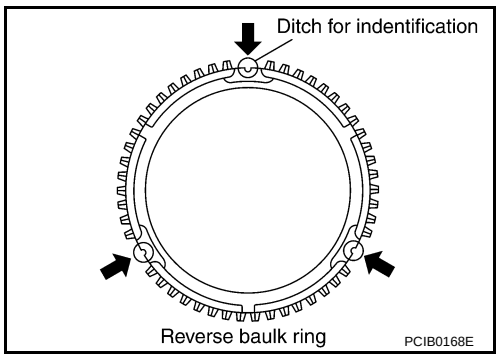
Tool number **A: KV32103300 (J-46529)**
Tool number **B: ST01530000 (—)**



CAUTION:
When installing, face the side with three ditches to the front side.



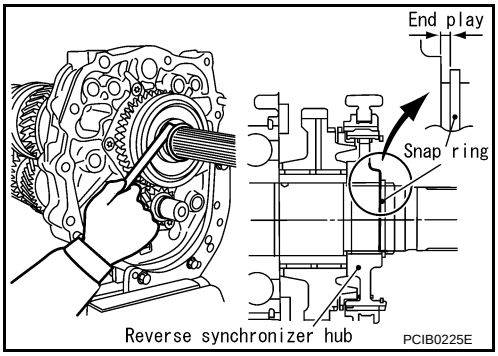
NOTE:
Reverse baulk ring has three spaces that two gear teeth are missing, and each space has small ditch for identification as shown in the figure.



40. Select and install a snap ring so that the end play comes within the standard value.

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

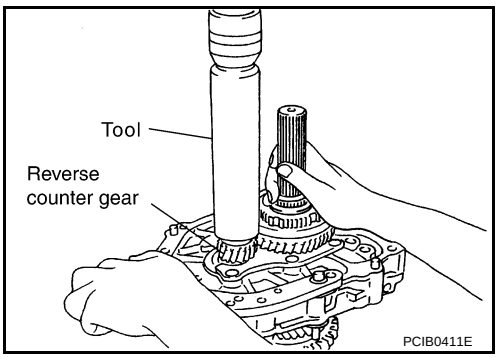
CAUTION:
Do not reuse snap ring.



41. After installing counter rear bearing spacer, press and fit reverse counter gear onto counter shaft with drift and press.

Tool number : ST23860000 (—)

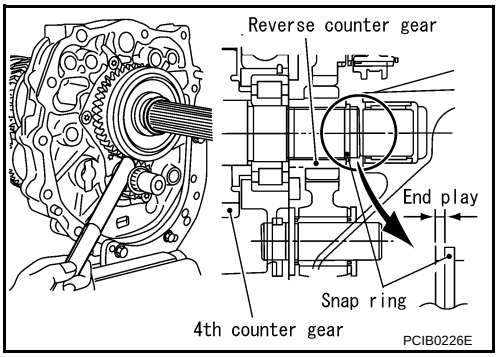
CAUTION:
- **Do not reuse reverse counter gear.**
- **When installing counter rear bearing spacer, identification ditch should face to the rear side.**
- **Replace counter rear bearing inner race, counter rear bearing and counter rear bearing spacer as a set.**



42. Select and install a snap ring so that the end play comes within the standard value.

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

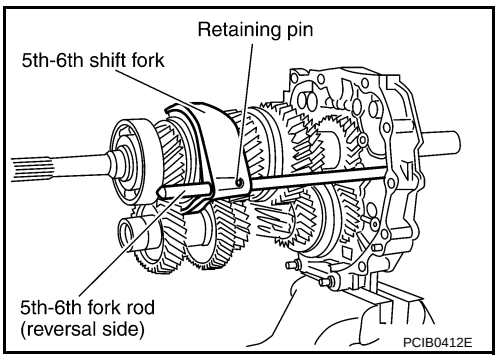
CAUTION:
Do not reuse snap ring.



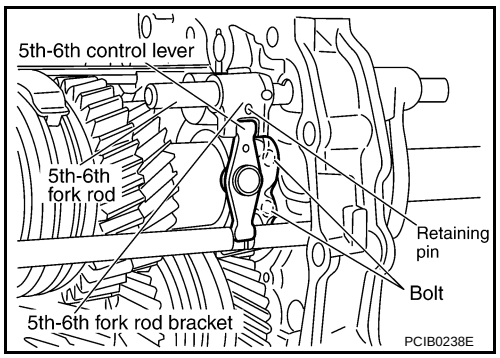
Shift Control Components (VIN: Up to JN1BZ36A29M550534)

1. Install 5th-6th shift fork to the 5th-6th coupling sleeve.
2. Install 5th-6th fork rod (reversal side) to the 5th-6th shift fork.
3. Using a pin punch to tap the retaining pin into the 5th-6th shift fork.

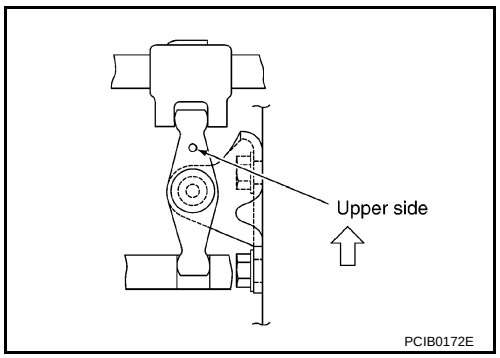
CAUTION:
Do not reuse retaining pin.



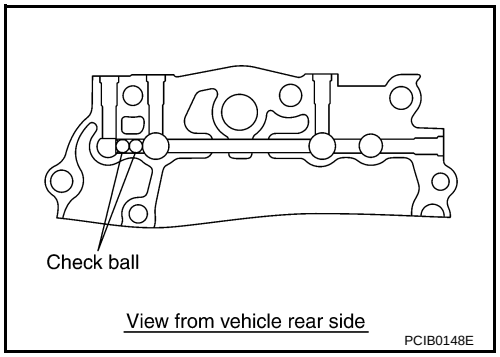
4. Install 5th-6th fork rod to the adapter plate.
5. Install 5th-6th fork rod bracket to the 5th-6th fork rod.
6. Using a pin punch to tap the retaining pin into the 5th-6th fork rod bracket.
   CAUTION:
   Do not reuse retaining pin.



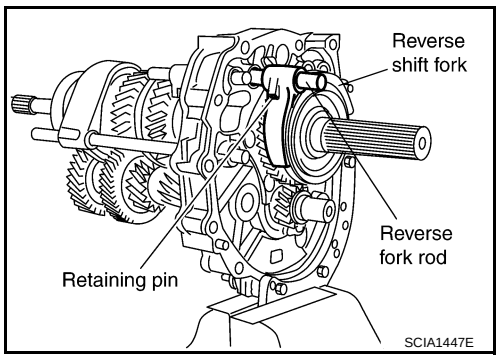
7. Install 5th-6th control lever to the adapter plate and then tighten mounting bolts to the specified torque. Refer to "Shift Control Components".
   CAUTION:
   Set the projection upward.



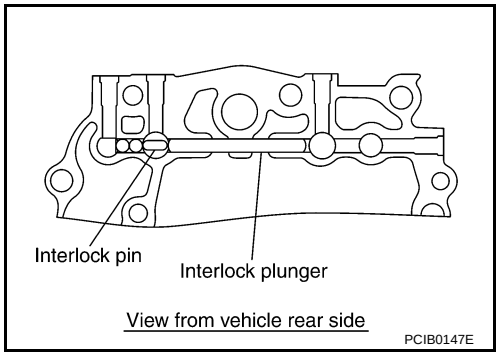
8. Apply recommended grease check balls and then install check balls to the adapter plate.



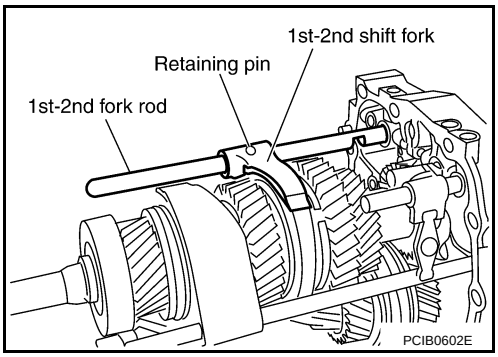
9. Install reverse shift fork to the reverse coupling sleeve.
10. Install reverse fork rod to the reverse shift fork.
11. Using a pin punch to tap the retaining pin into the reverse shift fork.
    CAUTION:
    Do not reuse retaining pin.



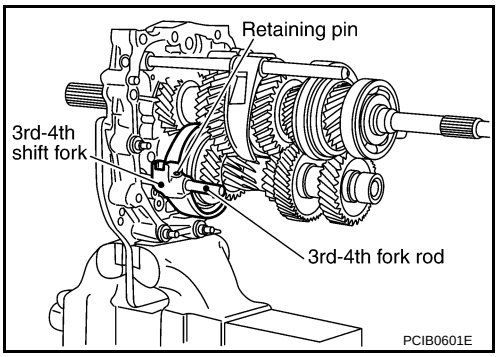
12. Apply recommended grease to interlock pin and interlock plunger.
13. Install interlock pin and interlock plunger to the adapter plate.



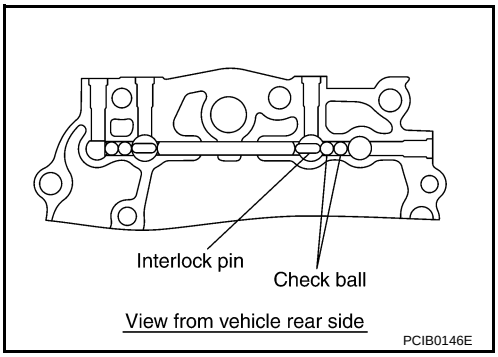
14. Install 1st-2nd shift fork to the 1st-2nd coupling sleeve.
15. Install 1st-2nd fork rod to the 1st-2nd shift fork.
16. Using a pin punch to tap the retaining pin into the 1st-2nd shift fork.
    CAUTION:
    Do not reuse retaining pin.



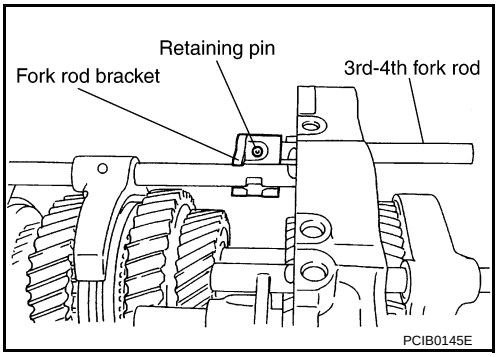
17. Install 3rd-4th shift fork to the 3rd-4th coupling sleeve.
18. Install 3rd-4th fork rod (reversal side) to the 3rd-4th shift fork.
19. Using a pin punch to tap the retaining pin into the 3rd-4th shift fork (reversal side).
    CAUTION:
    Do not reuse retaining pin.



20. Apply recommended grease to interlock pin and check balls.
21. Install interlock pin and check balls to the adapter plate.

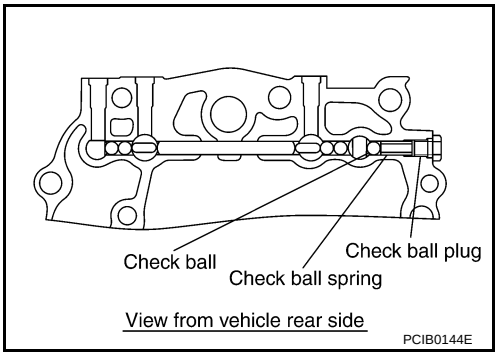


22. Install 3rd-4th fork rod to the adapter plate.
23. Install 3rd-4th fork rod bracket to the 3rd-4th fork rod.
24. Using a pin punch to tap the retaining pin into the 3rd-4th fork rod bracket.
    CAUTION:
    Do not reuse retaining pin.

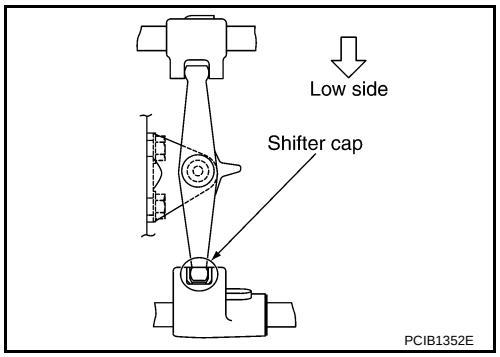


25. Apply recommended grease to check ball and then install check ball and check ball spring into adapter plate.
26. Apply recommended sealant to threads of check ball plugs, and tighten check ball plugs to the specified torque. Refer to "Shift Control Components".
    - **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

    CAUTION:
    Remove old sealant and oil adhering to threads.

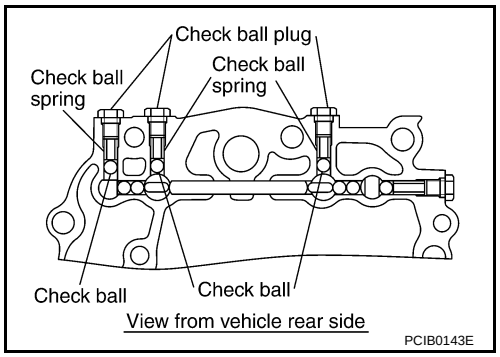


27. Install 3rd-4th control lever to the adapter plate, and then tighten mounting bolts to the specified torque. Refer to "Shift Control Components".
CAUTION:
- **Make sure the top and bottom are oriented correctly.**
- **Do not drop shifter cap.**

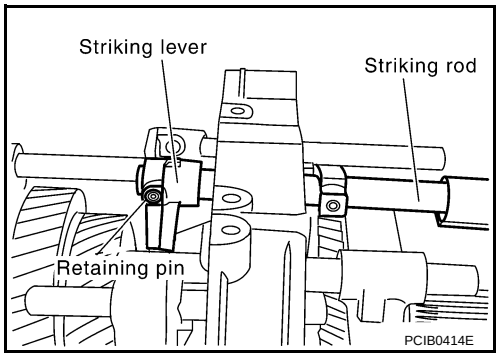


28. Apply recommended grease to check ball and then install check balls and check ball springs into adapter plate.
29. Apply recommended sealant to threads of check ball plugs, and tighten check ball plugs to the specified torque. Refer to "Shift Control Components".
- **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

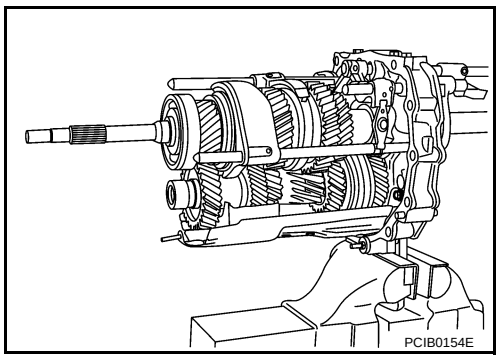
CAUTION:
Remove old sealant and oil adhering to threads.



30. Install striking rod to the adapter plate.
31. Install striking lever to the striking rod.
32. Using a pin punch to tap the retaining pin into the striking lever.
CAUTION:
Do not reuse retaining pin.

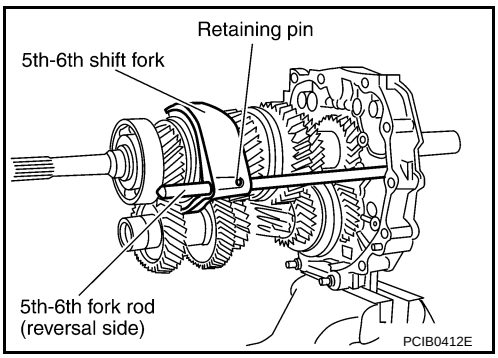


33. Install baffle plate to the adapter plate, and then tighten mounting bolts to the specified torque.

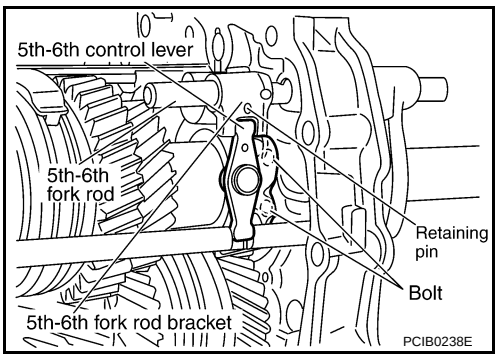


Shift Control Components (VIN: From JN1BZ36A29M550535)

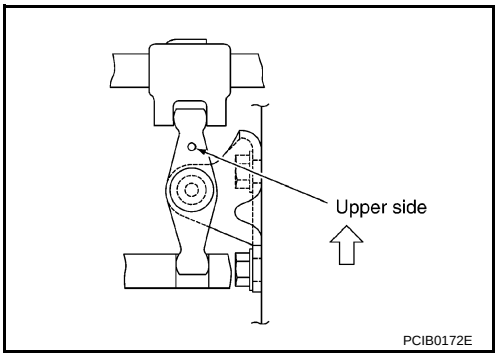
1. Install 5th-6th shift fork to the 5th-6th coupling sleeve.
2. Install 5th-6th fork rod (reversal side) to the 5th-6th shift fork.
3. Using a pin punch to tap the retaining pin into the 5th-6th shift fork.
   CAUTION:
   Do not reuse retaining pin.



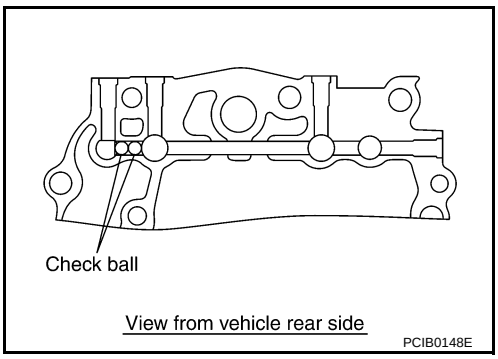
4. Install 5th-6th fork rod to the adapter plate.
5. Install 5th-6th fork rod bracket to the 5th-6th fork rod.
6. Using a pin punch to tap the retaining pin into the 5th-6th fork rod bracket.
   CAUTION:
   Do not reuse retaining pin.



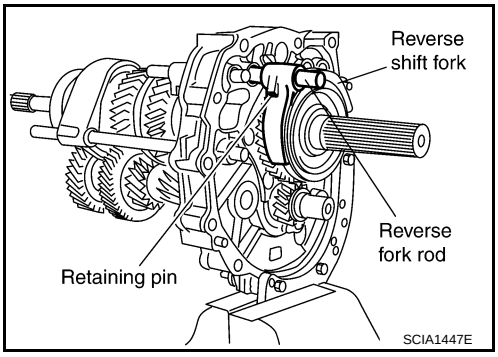
7. Install 5th-6th control lever to the adapter plate and then tighten mounting bolts to the specified torque. Refer to "Shift Control Components".
   CAUTION:
   Set the projection upward.



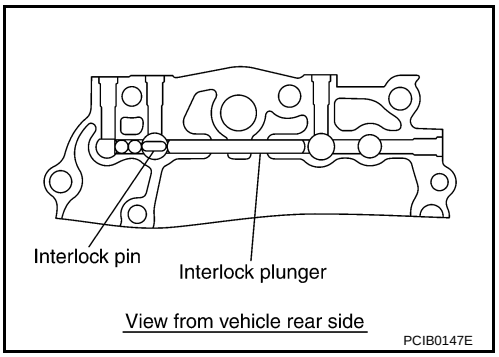
8. Apply recommended grease check balls and then install check balls to the adapter plate.



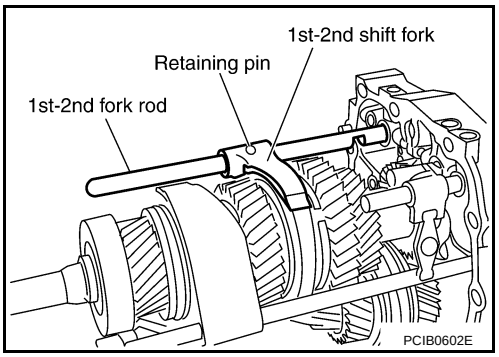
9. Install reverse shift fork to the reverse coupling sleeve.
10. Install reverse fork rod to the reverse shift fork.
11. Using a pin punch to tap the retaining pin into the reverse shift fork.
    CAUTION:
    Do not reuse retaining pin.



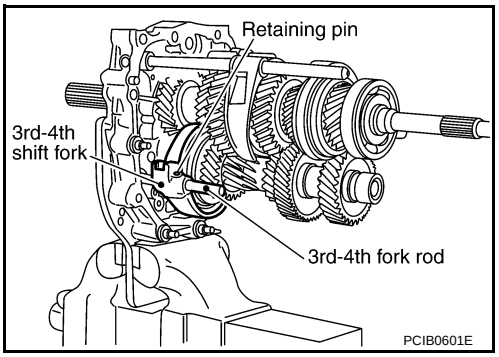
12. Apply recommended grease to interlock pin and interlock plunger.
13. Install interlock pin and interlock plunger to the adapter plate.



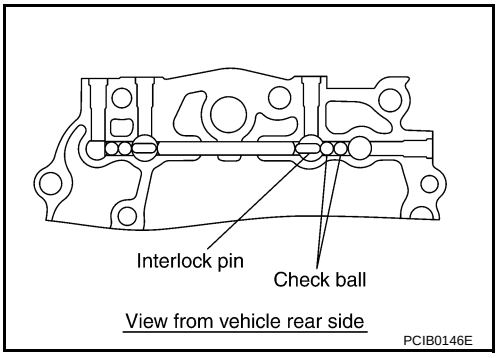
14. Install 1st-2nd shift fork to the 1st-2nd coupling sleeve.
15. Install 1st-2nd fork rod to the 1st-2nd shift fork.
16. Using a pin punch to tap the retaining pin into the 1st-2nd shift fork.
    CAUTION:
    Do not reuse retaining pin.



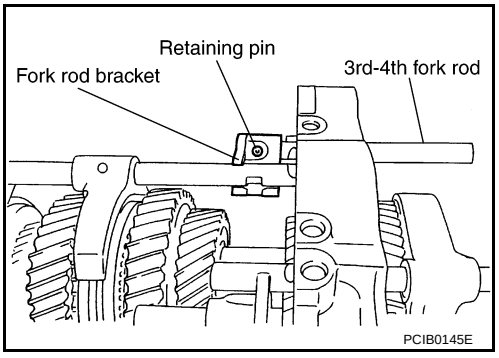
17. Install 3rd-4th shift fork to the 3rd-4th coupling sleeve.
18. Install 3rd-4th fork rod (reversal side) to the 3rd-4th shift fork.
19. Using a pin punch to tap the retaining pin into the 3rd-4th shift fork (reversal side).
    CAUTION:
    Do not reuse retaining pin.



20. Apply recommended grease to interlock pin and check balls.
21. Install interlock pin and check balls to the adapter plate.

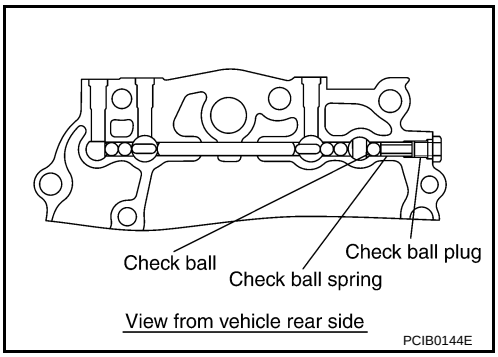


22. Install 3rd-4th fork rod to the adapter plate.
23. Install 3rd-4th fork rod bracket to the 3rd-4th fork rod.
24. Using a pin punch to tap the retaining pin into the 3rd-4th fork rod bracket.
    CAUTION:
    Do not reuse retaining pin.



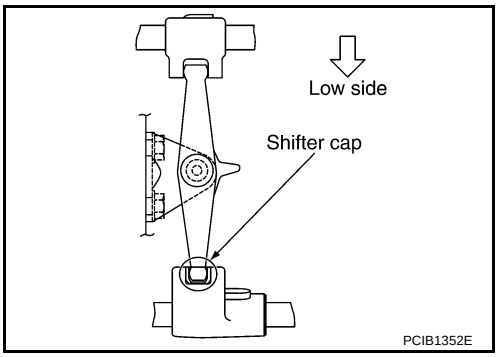
25. Apply recommended grease to check ball and then install check ball and check ball spring into adapter plate.
26. Apply recommended sealant to threads of check ball plugs, and tighten check ball plugs to the specified torque. Refer to "Shift Control Components".
    - **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

    CAUTION:
    Remove old sealant and oil adhering to threads.



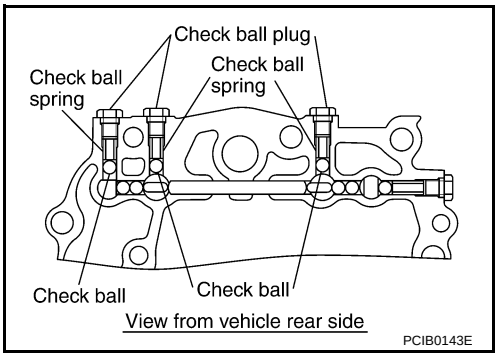
27. Install 3rd-4th control lever to the adapter plate, and then tighten mounting bolts to the specified torque. Refer to "Shift Control Components".

    CAUTION:
    - **Make sure the top and bottom are oriented correctly.**
    - **Do not drop shifter cap.**



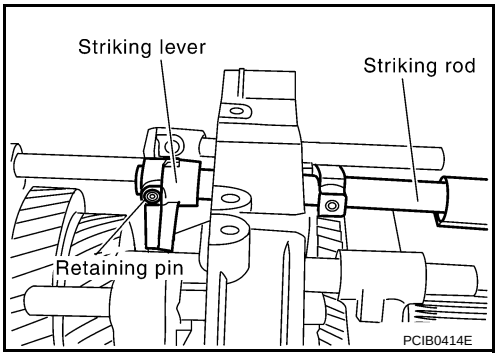
28. Apply recommended grease to check ball and then install check balls and check ball springs into adapter plate.
29. Apply recommended sealant to threads of check ball plugs, and tighten check ball plugs to the specified torque. Refer to "Shift Control Components".
    - **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

    CAUTION:
    Remove old sealant and oil adhering to threads.



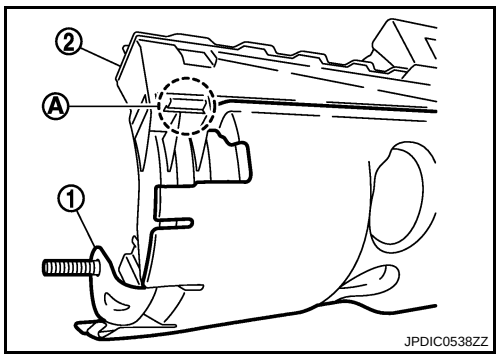
30. Install striking rod to the adapter plate.
31. Install striking lever to the striking rod.
32. Using a pin punch to tap the retaining pin into the striking lever.

    CAUTION:
    Do not reuse retaining pin.

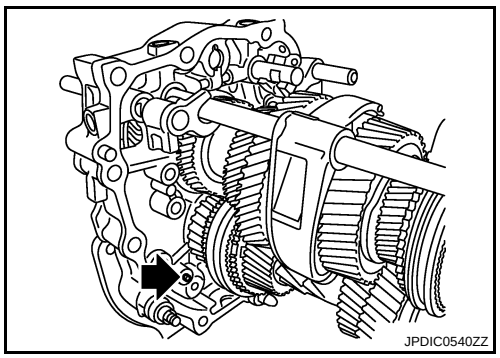


33. Install baffle plate with the following procedure.

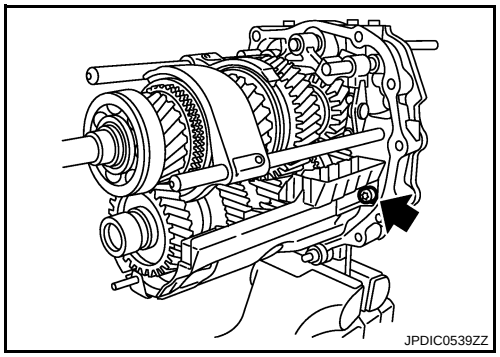
a. Insert baffle plate (1) until its projection contacts groove (A) of oil gutter (2).



b. Align baffle plate hole to adapter plate dowel pin (⬅).

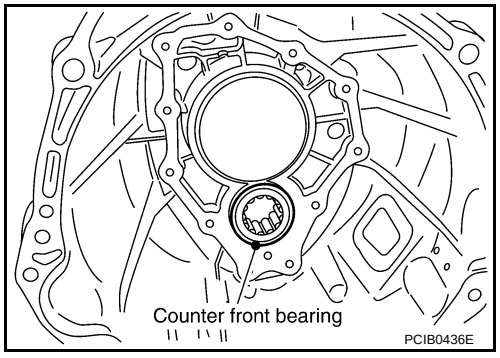


c. Install baffle plate mounting bolt (⬅) to adapter plate and then tighten baffle plate mounting bolt to the specified torque.



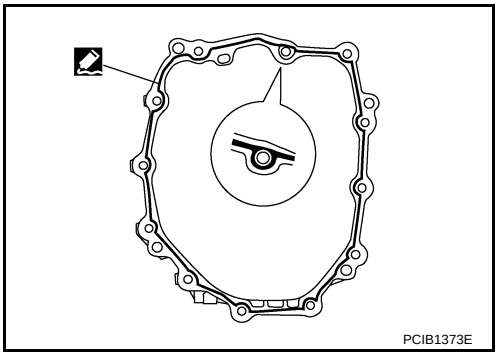
Case Components (VIN: Up to JN1BZ36A29M550534)

1. Install counter front bearing to the transmission case.
2. Install oil gutter to transmission case.
3. Install breather tube to transmission case.
   CAUTION:
   Do not reuse breather tube.

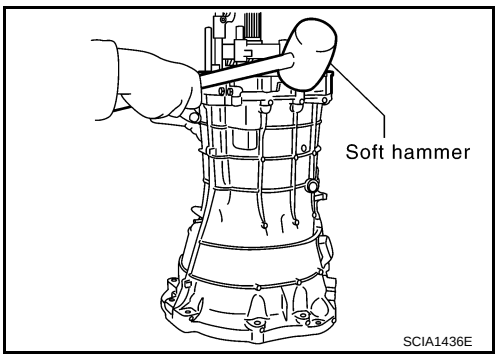


4. Apply recommended sealant to the transmission case adapter plate mounting surface as shown in the figure.
   - **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

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


PCIB1373E

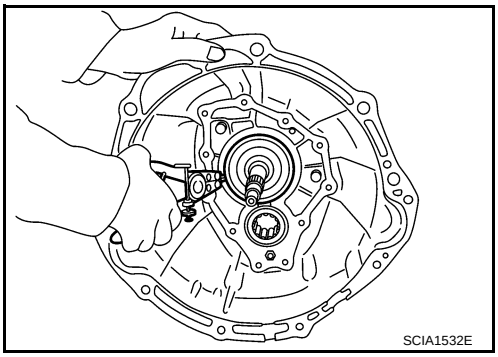
5. Place the adapter plate in the transmission case, using soft hammer to tap the adapter plate to install it into the transmission case.



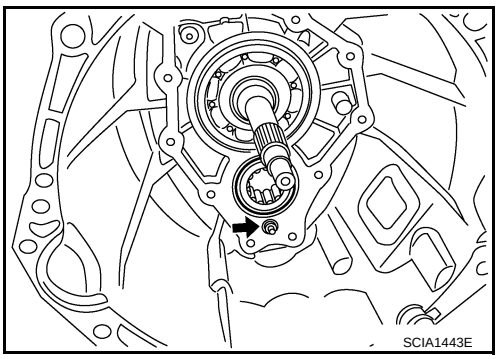
SCIA1436E

6. Install snap ring to main drive gear bearing, using snap ring pliers.

   CAUTION:
   Do not reuse snap ring.


SCIA1532E

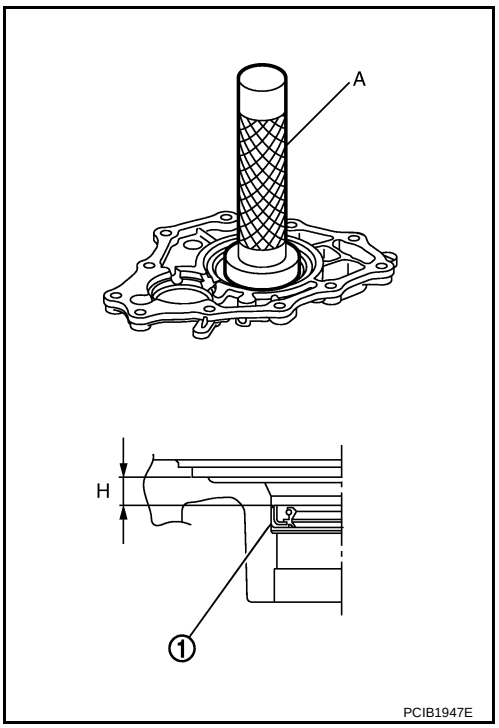
7. Tighten baffle plate mounting nut to the specified torque. Refer to "Case Components".


SCIA1443E

8. Apply multi-purpose grease to the lip of the front cover oil seal (1). Using a drift (A), to install oil seal approx. 8.55-9.55 mm (0.336-0.376 in) above from the front cover edge surface.

Tool number : KV38102100 (J-25803-01)

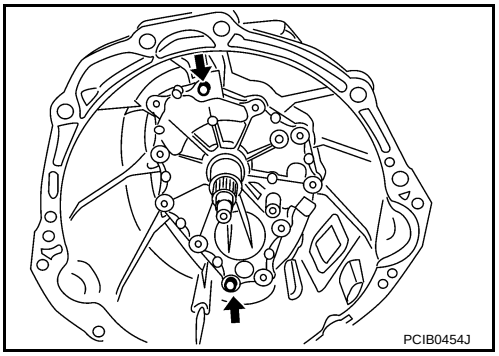
CAUTION:
- **Do not reuse front cover oil seal.**
- **When installing, do not incline the front cover oil seal.**



9. Install front cover gasket and front cover to the transmission case.

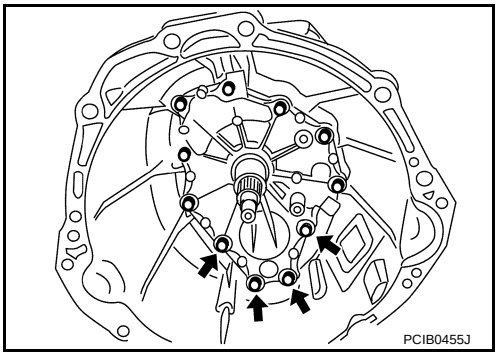
CAUTION:
- **Do not reuse front cover gasket.**
- **Do not damage front cover oil seal.**

10. Temporary tightening 2 bolts in the positions shown in the figure.

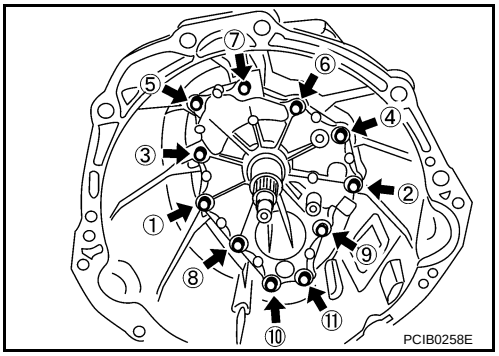


11. Temporary tightening remaining 9 bolts.

CAUTION:
Four bolts pointed by arrows in the figure are not reusable.



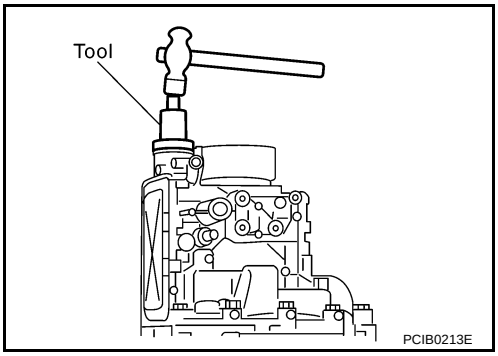
12. Tighten bolts to the specified torque in order as shown in the figure. Refer to "Case Components"
13. Install rear extension oil gutter and cap to rear extension and then tighten mounting bolt to the specified torque. Refer to "Case Components".
14. Install bracket to transmission case and then tighten mounting bolt to the specified torque. Refer to "Case Components".
15. Apply recommended grease to reverse idler needle bearing.
16. Install reverse idler shaft, reverse idler needle bearing, reverse idler gear, and reverse idler thrust washer to the adapter plate.



17. Apply multi-purpose grease to the striking rod oil seal lip, and then using the drift to install striking rod oil seal.

Tool number : ST33061000 (J-8107-2)

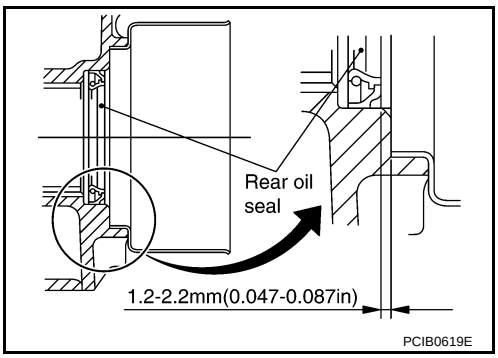
CAUTION:
- **Do not reuse striking rod oil seal.**
- **When installing, do not incline the striking rod oil seal.**



18. Apply multi-purpose grease to the lip of the rear oil seal. Using a drift to install rear oil seal. 1.2 - 2.2 mm (0.047 - 0.087 in) above from the rear extension edge surface.

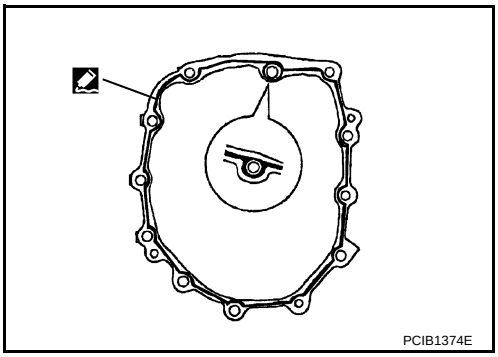
Tool number : ST33400001 (J-26082)

CAUTION:
- **Do not reuse rear oil seal.**
- **When installing, do not incline the rear oil seal.**



19. Apply recommended sealant to the adapter plate rear extension mounting surface as shown in the figure.
- **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

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

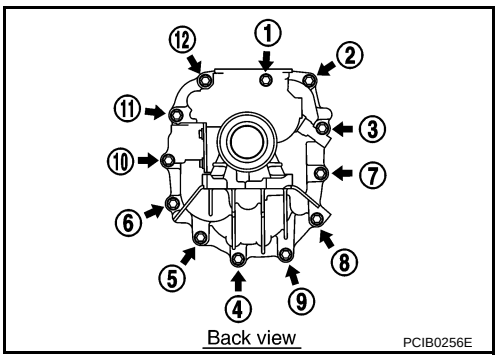


20. Install rear extension to the adapter plate and then tighten mounting bolts to the specified torque in order as shown on the figure. Refer to "Case Components".

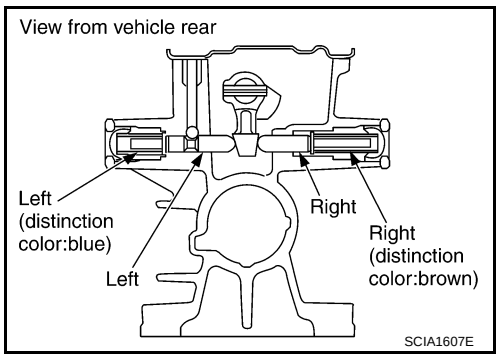
CAUTION:
Do not damage rear oil seal and striking rod oil seal.

21. Install control lever housing to the rear extension and then tighten mounting bolts to the specified torque. Refer to "Shift Control Components".

CAUTION:
Do not hold control lever housing to prevent bushing of control lever housing from deformation when moving transmission assembly.



22. Apply gear oil to return spring plungers.
23. Install return spring plungers and return springs into the rear extension, apply recommended sealant to threads of return spring plugs, and then tighten return spring plugs to the specified torque. Refer to "Shift Control Components".
    - **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

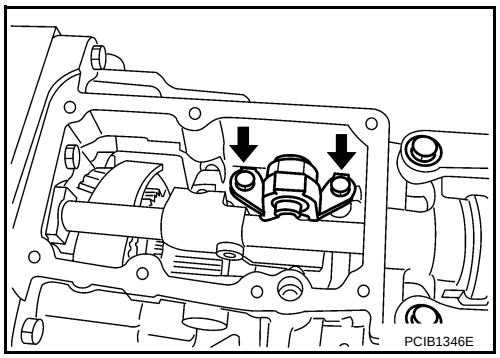


Region	Return spring identification mark	Plunger groove
RH	Brown	No
LH	Blue	Yes

CAUTION:
- **The right and left return springs and return spring plungers are different, so make sure they are installed correctly.**
- **Remove old sealant and oil adhering to threads.**

24. Install shift check pin as a one unit with the control bracket to rear extension and then tighten mounting bolts to the specified torque. Refer to "Shift Control Components".
25. Install plunger to the rear extension, and then screwing Park/Neutral position (PNP) switch and back-up lamp switch to the rear extension with 1-2 pitches. Apply recommended sealant to threads of switches, and tighten switches to the specified torque. Refer to "Case Components".
    - **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

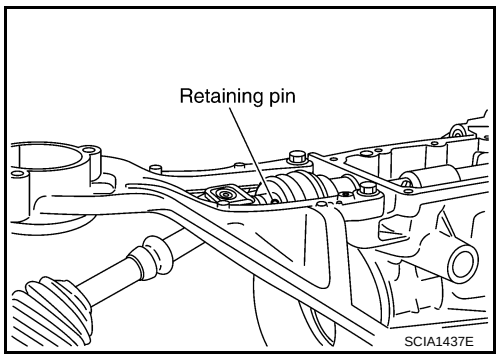
    CAUTION:
    Remove old sealant and oil adhering to threads.



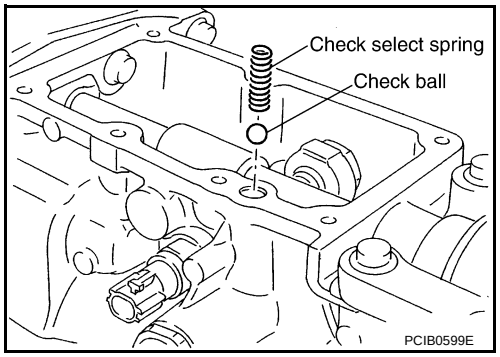
26. Install brackets to rear extension and then tighten bracket mounting bolts to the specified torque. Refer to "Case Components".
27. Install boot and control rod to striking rod.
28. Install retaining pin into the control rod, using a pin punch.

    CAUTION:
    Do not reuse retaining pin.
29. Install boot to control rod.

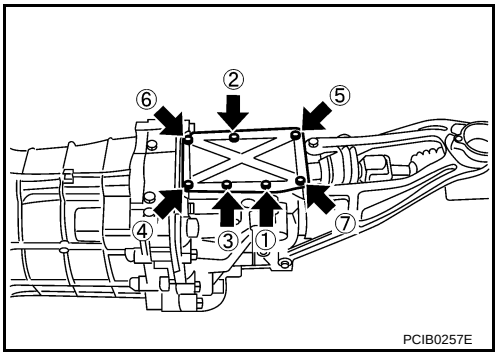
    CAUTION:
    Fit the boot to the groove on the control rod.



30. Install check ball and check select spring into the rear extension.



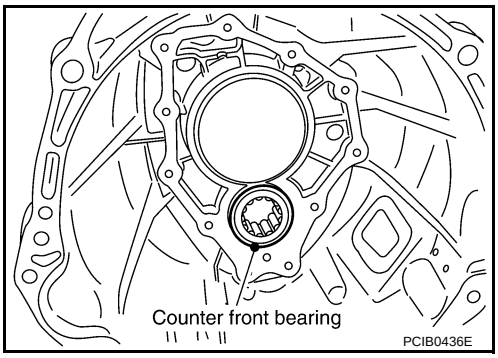
31. Install rear extension upper cover gasket and rear extension upper cover to rear extension.
CAUTION:
- **Do not reuse rear extension upper cover gasket.**
- **Avoid tangling check select spring.**



32. Tighten rear extension upper cover bolts to the specified torque in order as shown in the figure. Refer to "Case Components".
33. Install gasket to drain plug and then install it to transmission case. Tighten drain plug to the specified torque. Refer to "Case Components".
CAUTION:
Do not reuse gasket.
34. Install gasket to filler plug and then install it to transmission case. Tighten filler plug to the specified torque. Refer to "Case Components".
CAUTION:
- **Do not reuse gasket.**
- **After oil is filled, tighten filler plug to specified torque.**

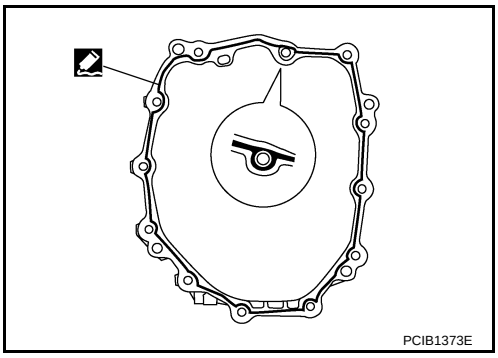
Case Components (VIN: From JN1BZ36A29M550535)

1. Install counter front bearing to the transmission case.
2. Install breather tube to transmission case.
CAUTION:
Do not reuse breather tube.

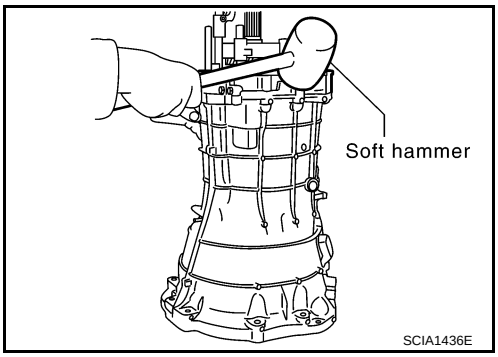


3. Apply recommended sealant to the transmission case adapter plate mounting surface as shown in the figure.
- **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

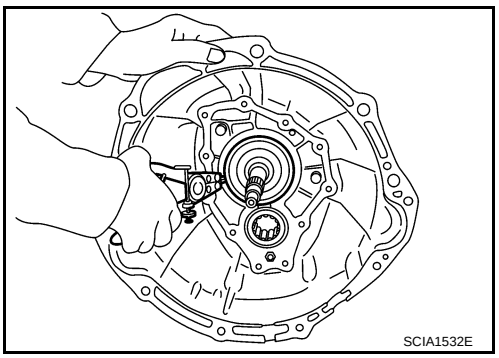
CAUTION:
Remove old sealant adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to both mounting surfaces.



4. Place the adapter plate in the transmission case, using soft hammer to tap the adapter plate to install it into the transmission case.

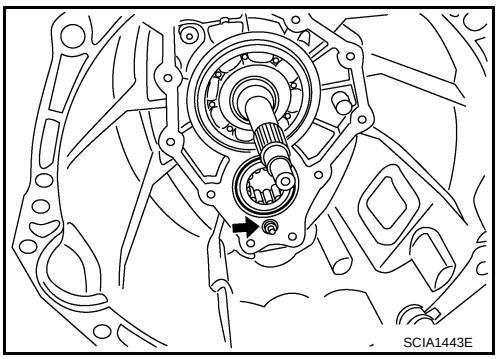


5. Install snap ring to main drive gear bearing, using snap ring pliers.
CAUTION:
Do not reuse snap ring.

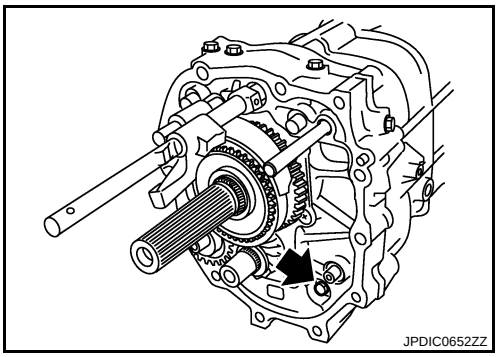

SCIA1532E

6. Install baffle plate with the following procedure.

a. Tighten baffle plate mounting nut (⬅) to the specified torque.


SCIA1443E

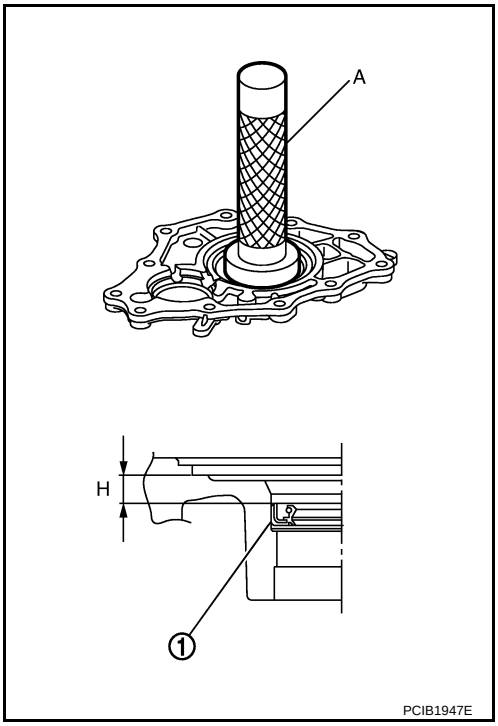
b. Install baffle plate mounting bolt (⬅) to adapter plate and then tighten baffle plate mounting bolt to the specified torque.


JPDIC0652ZZ

7. Apply multi-purpose grease to the lip of the front cover oil seal (1). Using a drift (A), to install oil seal approx. 8.55-9.55 mm (0.336-0.376 in) above from the front cover edge surface.

Tool number : KV38102100 (J-25803-01)

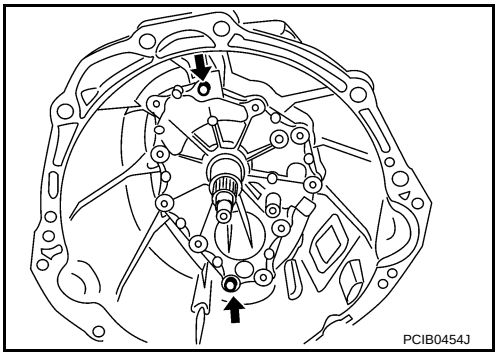
CAUTION:
- **Do not reuse front cover oil seal.**
- **When installing, do not incline the front cover oil seal.**



8. Install front cover gasket and front cover to the transmission case.

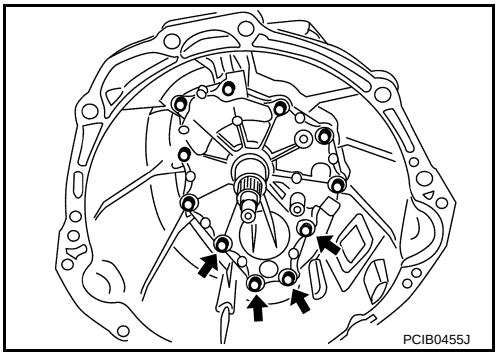
CAUTION:
- **Do not reuse front cover gasket.**
- **Do not damage front cover oil seal.**

9. Temporary tightening 2 bolts in the positions shown in the figure.

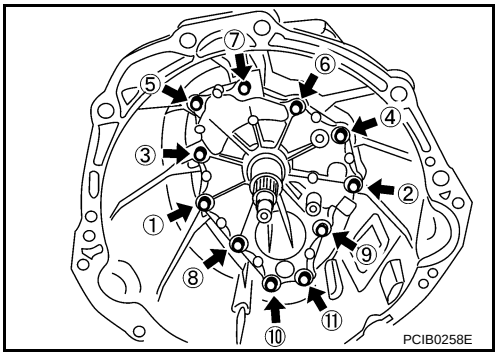


10. Temporary tightening remaining 9 bolts.

CAUTION:
Four bolts pointed by arrows in the figure are not reusable.



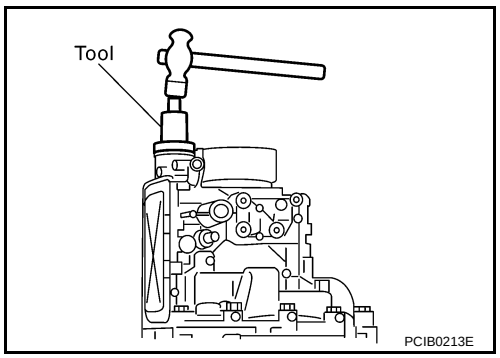
11. Tighten bolts to the specified torque in order as shown in the figure. Refer to "Case Components"
12. Install rear extension oil gutter and cap to rear extension and then tighten mounting bolt to the specified torque. Refer to "Case Components".
13. Install bracket to transmission case and then tighten mounting bolt to the specified torque. Refer to "Case Components".
14. Apply recommended grease to reverse idler needle bearing.
15. Install reverse idler shaft, reverse idler needle bearing, reverse idler gear, and reverse idler thrust washer to the adapter plate.



16. Apply multi-purpose grease to the striking rod oil seal lip, and then using the drift to install striking rod oil seal.

Tool number : ST33061000 (J-8107-2)

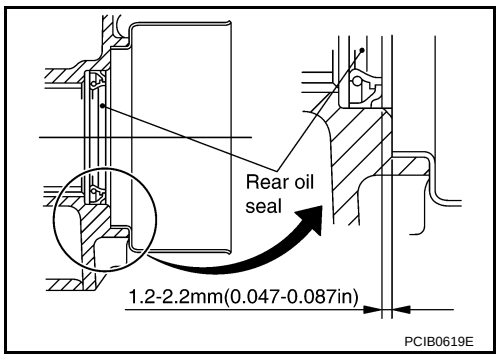
CAUTION:
- **Do not reuse striking rod oil seal.**
- **When installing, do not incline the striking rod oil seal.**



17. Apply multi-purpose grease to the lip of the rear oil seal. Using a drift to install rear oil seal. 1.2 - 2.2 mm (0.047 - 0.087 in) above from the rear extension edge surface.

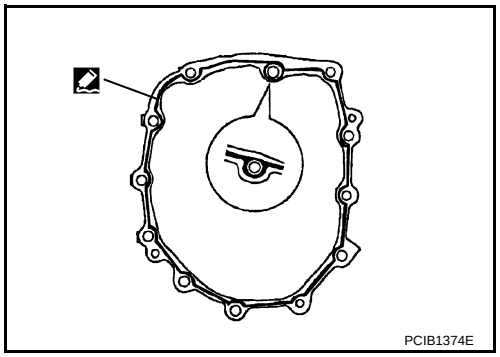
Tool number : ST33400001 (J-26082)

CAUTION:
- **Do not reuse rear oil seal.**
- **When installing, do not incline the rear oil seal.**



18. Apply recommended sealant to the adapter plate rear extension mounting surface as shown in the figure.
- **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

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

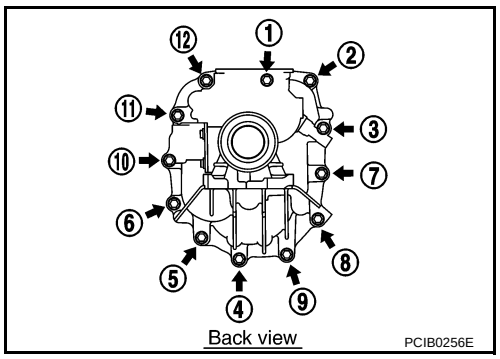


19. Install rear extension to the adapter plate and then tighten mounting bolts to the specified torque in order as shown on the figure. Refer to "Case Components".

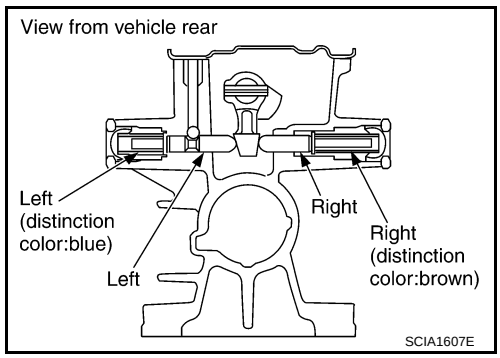
CAUTION:
Do not damage rear oil seal and striking rod oil seal.

20. Install control lever housing to the rear extension and then tighten mounting bolts to the specified torque. Refer to "Shift Control Components".

CAUTION:
Do not hold control lever housing to prevent bushing of control lever housing from deformation when moving transmission assembly.



21. Apply gear oil to return spring plungers.
22. Install return spring plungers and return springs into the rear extension, apply recommended sealant to threads of return spring plugs, and then tighten return spring plugs to the specified torque. Refer to "Shift Control Components".
    - **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

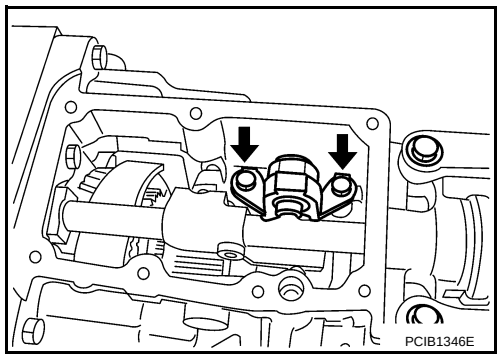


Region	Return spring identification mark	Plunger groove
RH	Brown	No
LH	Blue	Yes

CAUTION:
- **The right and left return springs and return spring plungers are different, so make sure they are installed correctly.**
- **Remove old sealant and oil adhering to threads.**

23. Install shift check pin as a one unit with the control bracket to rear extension and then tighten mounting bolts to the specified torque. Refer to "Shift Control Components".
24. Install plunger to the rear extension, and then screwing Park/Neutral position (PNP) switch and back-up lamp switch to the rear extension with 1-2 pitches. Apply recommended sealant to threads of switches, and tighten switches to the specified torque. Refer to "Case Components".
    - **Use Genuine Silicone RTV or an equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".**

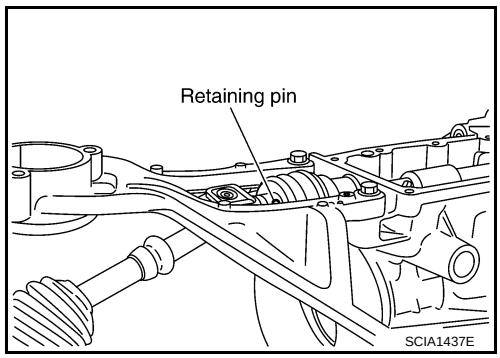
    CAUTION:
    Remove old sealant and oil adhering to threads.



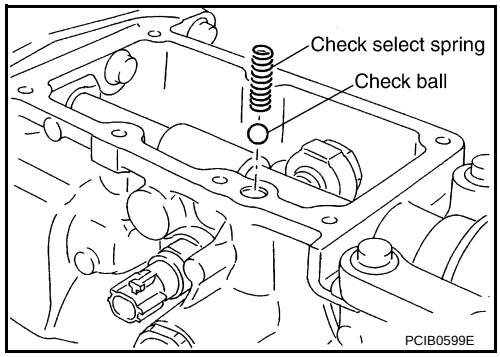
25. Install brackets to rear extension and then tighten bracket mounting bolts to the specified torque. Refer to "Case Components".
26. Install boot and control rod to striking rod.
27. Install retaining pin into the control rod, using a pin punch.

    CAUTION:
    Do not reuse retaining pin.
28. Install boot to control rod.

    CAUTION:
    Fit the boot to the groove on the control rod.

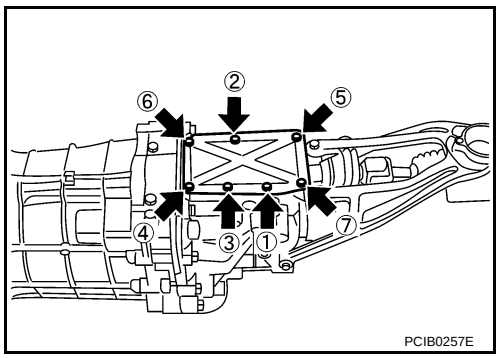


29. Install check ball and check select spring into the rear extension.



30. Install rear extension upper cover gasket and rear extension upper cover to rear extension.
CAUTION:
- **Do not reuse rear extension upper cover gasket.**
- **Avoid tangling check select spring.**

31. Tighten rear extension upper cover bolts to the specified torque in order as shown in the figure. Refer to "Case Components".



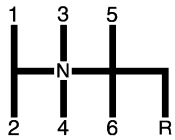
32. Install gasket to drain plug and then install it to transmission case. Tighten drain plug to the specified torque. Refer to "Case Components".
CAUTION:
Do not reuse gasket.

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

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000004657870

Transmission model		FS6R31A	
VIN		Up to JN1BZ36A29M550534	From JN1BZ36A29M550535
Number of speed		6	
Shift pattern		 SCIA0955E	
Synchromesh type		Warner	
Gear ratio	1st	3.794	
	2nd	2.324	
	3rd	1.624	
	4th	1.271	
	5th	1.000	
	6th	0.794	
	Reverse	3.446	
Main gear (Number of teeth)	Drive	26	
	1st	37	
	2nd	34	
	3rd	33	
	4th	31	
	6th	31	
	Reverse	42	
Counter gear (Number of teeth)	Drive	32	
	1st	12	
	2nd	18	
	3rd	25	
	4th	30	
	6th	48	
	Reverse	15	
Reverse idler gear (Number of teeth)		26	
Oil capacity (Approx.)	ℓ (US pt, Imp pt)	2.93 (6-1/4, 5-1/8)	2.83 (6, 5)
Remarks	Reverse synchronizer	Installed	
	Double cone synchronizer	4th	
	Triple cone synchronizer	1st, 2nd, and 3rd	

End Play

INFOID:0000000004657871

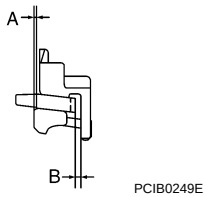
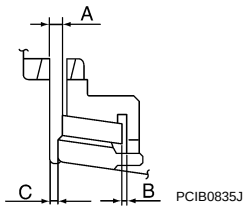
Unit: mm (in)

Item	Standard value
Counter shaft	0 - 0.10 (0 - 0.004)
Main drive gear	0 - 0.10 (0 - 0.004)
Main shaft	0 - 0.10 (0 - 0.004)

Baulk Ring Clearance

INFOID:0000000004657872

Unit: mm (in)

Measurement point		Standard value	Limit value
4th (Double-cone synchronizer)  PCIB0249E	Clearance between synchronizer cone and inner baulk ring end face “A”	0.50 - 0.70 (0.020 - 0.028)	0.3 (0.012)
	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.85 - 1.35 (0.033 -0.053)	0.7 (0.028)
1st, 2nd and 3rd (Triple-cone synchronizer)  PCIB0835J	Clearance between synchronizer cone and clutch gear end face “A”	1st: 0.65 - 1.25 (0.026 - 0.049) 2nd: 0.60 - 1.30 (0.024 - 0.051) 3rd: 0.60 - 1.30 (0.024 - 0.051)	0.3 (0.012) 0.3 (0.012) 0.3 (0.012)
	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.85 - 1.35 (0.033 - 0.053)	0.7 (0.028)
	Clearance between inner baulk ring and clutch gear end face “C”	1st: 0.8 - 1.2 (0.031 - 0.047) 2nd: 0.75 - 1.25 (0.030 - 0.049) 3rd: 0.75 - 1.25 (0.030 - 0.049)	0.3 (0.012) 0.3 (0.012) 0.3 (0.012)
5th and 6th		0.70 - 1.35 (0.028 - 0.053)	0.5 (0.020)
Reverse		0.75 - 1.20 (0.030 - 0.047)	0.5 (0.020)