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SECTION **MT**

MANUAL TRANSMISSION

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PRECAUTIONS

PRECAUTIONS

PFP:00001

Service Notice or Precautions

ECS00DYO

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

PREPARATION

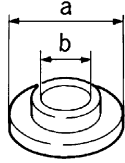
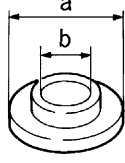
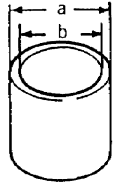
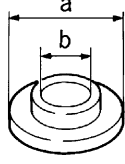
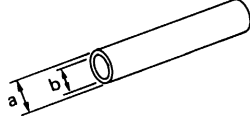
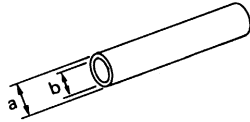
PREPARATION

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Special Service Tools

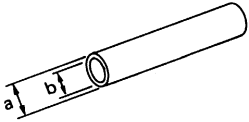
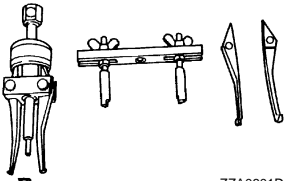
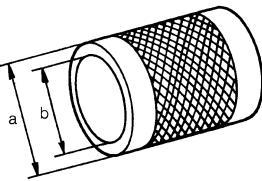
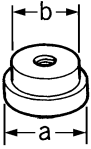
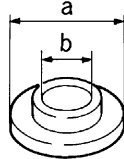
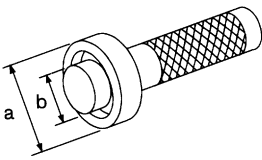
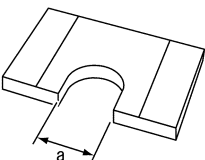
ECS00DYP

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

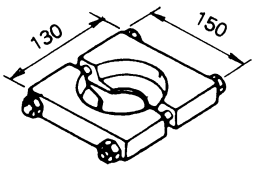
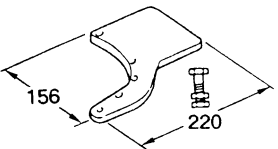
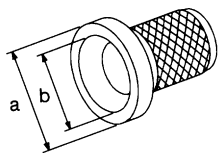
Tool number (Kent-Moore No.) Tool name	Description
ST30911000 (—) Inserter	 <p style="text-align: right; margin-right: 20px;">ZZA0920D</p> <ul style="list-style-type: none"> ● Installing mainshaft bearing ● Installing 5th-6th synchronizer hub assembly ● Installing reverse main gear bushing ● Installing 3rd gear bushing ● Installing 3rd-4th synchronizer hub assembly <p>a: 98 mm (3.86 in) dia. b: 40 mm (1.57 in) dia.</p>
ST30022000 (—) Inserter	 <p style="text-align: right; margin-right: 20px;">ZZA0920D</p> <ul style="list-style-type: none"> ● Installing 3rd main gear ● Installing 4th main gear <p>a: 110 mm (4.33 in) dia. b: 46 mm (1.81 in) dia.</p>
ST27861000 (—) Support ring	 <p style="text-align: right; margin-right: 20px;">ZZA0832D</p> <ul style="list-style-type: none"> ● Installing 1st-2nd synchronizer hub assembly ● Installing 1st gear bushing <p>a: 62 mm (2.44 in) dia. b: 52 mm (2.05 in) dia.</p>
ST30032000 (J-26010-01) Inserter	 <p style="text-align: right; margin-right: 20px;">ZZA0920D</p> <p>Installing counter rear bearing inner race a: 80 mm (3.15 in) dia. b: 31 mm (1.22 in) dia.</p>
KV32102700 (—) Drift	 <p style="text-align: right; margin-right: 20px;">ZZA0534D</p> <p>Installing main drive gear bearing a: 48 mm (1.89 in) dia. b: 41 mm (1.61 in) dia.</p>
ST23860000 (—) Drift	 <p style="text-align: right; margin-right: 20px;">ZZA0534D</p> <p>Installing reverse counter gear a: 38 mm (1.50 in) dia. b: 33 mm (1.30 in) dia.</p>

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PREPARATION

Tool number (Kent-Moore No.) Tool name	Description
ST01530000 (—) Drift <div style="text-align: center; margin-top: 20px;">  <p style="margin-top: 10px;">ZZA0534D</p> </div>	Installing reverse synchronizer hub assembly a: 50 mm (1.97 in) dia. b: 41 mm (1.61 in) dia.
KV381054S0 (J-34286) Puller <div style="text-align: center; margin-top: 20px;">  <p style="margin-top: 10px;">ZZA0601D</p> </div>	Removing rear oil seal
ST33200000 (J-26082) Drift <div style="text-align: center; margin-top: 20px;">  <p style="margin-top: 10px;">ZZA1002D</p> </div>	Installing counter rear bearing a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.
ST30621000 (J-25742-5) Drift <div style="text-align: center; margin-top: 20px;">  <p style="margin-top: 10px;">ZZA1000D</p> </div>	Installing dust seal a: 79 mm (3.11 in) dia. b: 59 mm (2.32 in) dia.
KV40100630 (J-26092) Inserter <div style="text-align: center; margin-top: 20px;">  <p style="margin-top: 10px;">ZZA0920D</p> </div>	Installing 4th counter gear thrust washer a: 67 mm (2.64 in) dia. b: 38 mm (1.50 in) dia.
KV38102100 (J-25803-01) Drift <div style="text-align: center; margin-top: 20px;">  <p style="margin-top: 10px;">NT084</p> </div>	Installing front cover oil seal a: 44 mm (1.73 in) dia. b: 28 mm (1.10 in) dia.
KV32103300 (J-46529) Press plate <div style="text-align: center; margin-top: 20px;">  <p style="margin-top: 10px;">PCIB0165J</p> </div>	Installing reverse synchronizer hub assembly a: 73 mm (2.87 in)

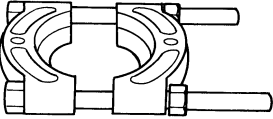

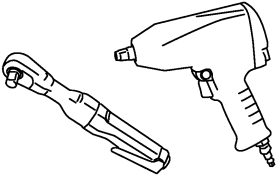
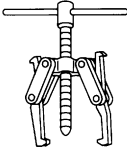
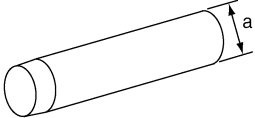
PREPARATION

Tool number (Kent-Moore No.) Tool name	Description	
ST30031000 (J-22912-01) Puller <div style="text-align: center;">  <p>ZZC0499D</p> </div>	Measuring wear of inner baulk ring	A B MT
ST22490000 (—) Adapter setting plate <div style="text-align: center;">  <p>ZZC0465D</p> </div>	Holding a adapter plate	D E F
ST33400001 (J-26082) Drift <div style="text-align: center;">  <p>NT086</p> </div>	Installing oil seal a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.	G H I J K L M

PREPARATION

Commercial Service Tools

ECS00DYQ

Tool name	Description
<p>Puller</p>  <p style="text-align: right; margin-right: 50px;">ZZB0823D</p>	<p>Removing each bearing, gear and bushing</p>
<p>Pin punch Tip diameter: 6.0 mm (0.236 in) dia.</p>  <p style="text-align: right; margin-right: 50px;">ZZA0815D</p>	<p>Removing and installing each retaining pin</p>
<p>Power tool</p>  <p style="text-align: right; margin-right: 50px;">PBIC0190E</p>	<p>Loosening bolts and nuts</p>
<p>Puller</p>  <p style="text-align: right; margin-right: 50px;">NT077</p>	<ul style="list-style-type: none"> ● Removing reverse synchronizer hub assembly ● Removing reverse counter gear ● Removing reverse main gear
<p>Drift</p>  <p style="text-align: right; margin-right: 50px;">LCIA0362E</p>	<p>Removing counter end bearing a: 32 mm (1.26 in) dia.</p>

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PF0:00003

NVH Troubleshooting Chart

ECS00DYR

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-21		MT-13	MT-25			MT-23		
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			

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DESCRIPTION

DESCRIPTION

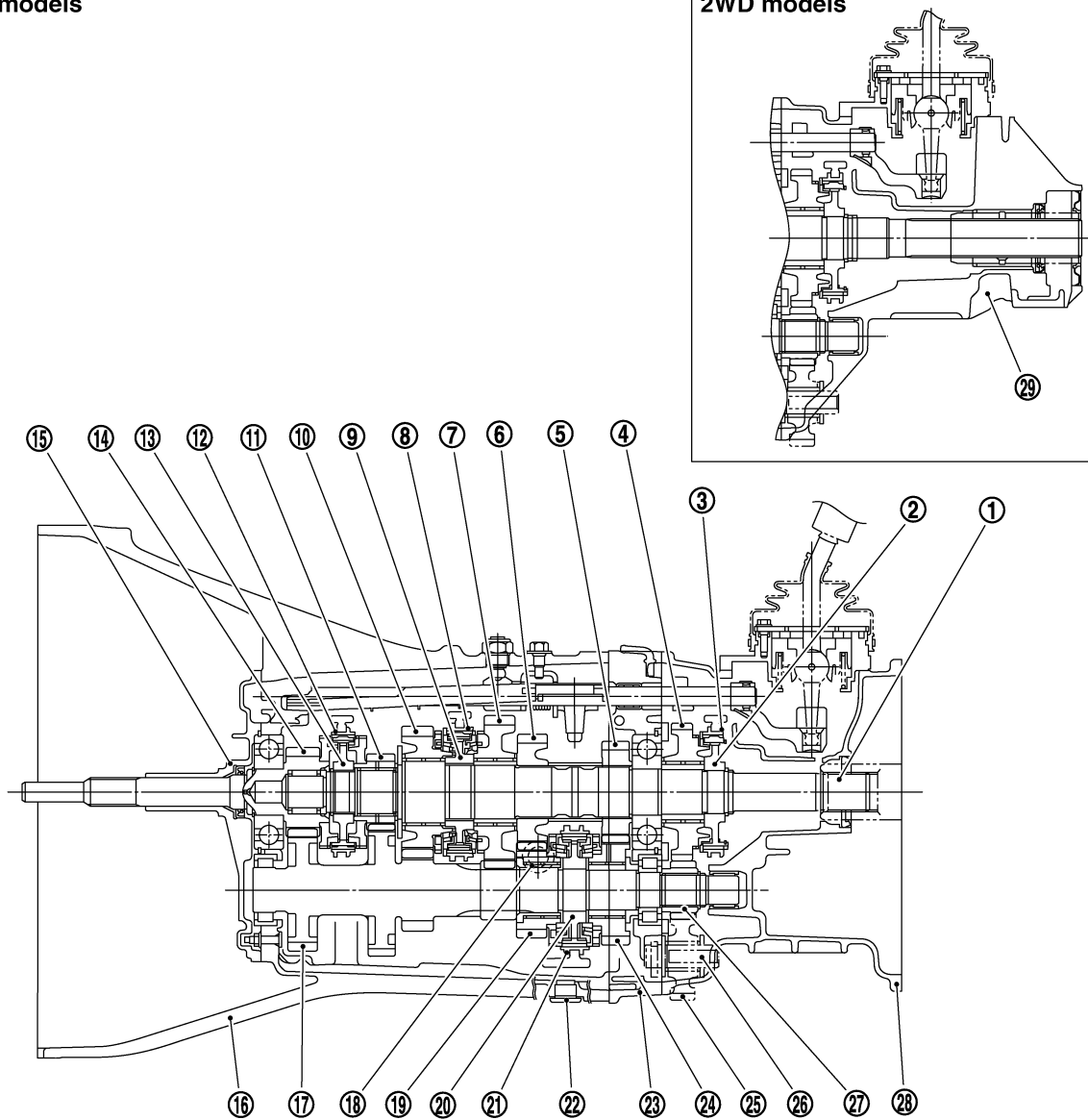
PFP:00000

Cross-Sectional View

ECS00DYS

4WD models

2WD models



PCIB1297E

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

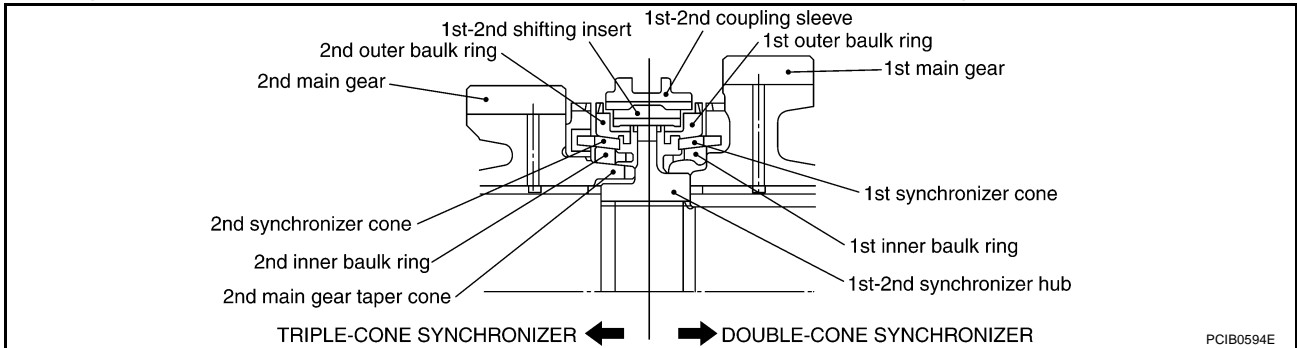
DESCRIPTION

DOUBLE-CONE SYNCHRONIZER

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

TRIPLE-CONE SYNCHRONIZER

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



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M/T OIL

Changing DRAINING

1. Start the engine and let it run to warm up the transmission.
2. Stop the engine. Remove the transmission drain plug and drain the oil.
3. Set a gasket on the drain plug and install it to the transmission. Tighten the drain plug to the specified torque. Refer to [MT-21, "Case Components"](#) .

CAUTION:

Do not reuse gasket.

FILLING

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

Oil grade and Viscosity : Refer to [MA-11, "Fluids and Lubricants"](#) .

Oil capacity : Refer to [MA-11, "Fluids and Lubricants"](#) .

2. After refilling the oil, check oil level. Set a gasket to the filler plug, then install it to the transmission. Tighten the filler plug to the specified torque. Refer to [MT-21, "Case Components"](#) .

CAUTION:

Do not reuse gasket.

Checking OIL LEAKAGE AND OIL LEVEL

- Make sure that oil is not leaking from the transmission or around it.
- Check oil level from the filler plug hole as shown.

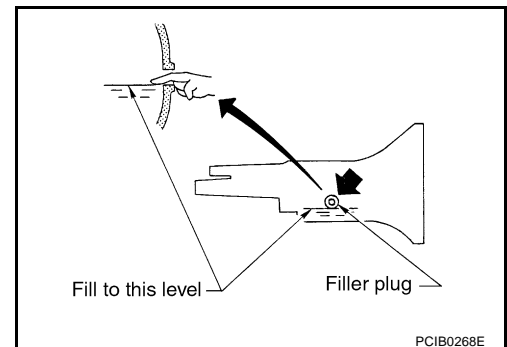
CAUTION:

Do not start engine while checking oil level.

- Set a gasket on the filler plug and install it to the transmission. Tighten the filler plug to the specified torque. Refer to [MT-21, "Case Components"](#) .

CAUTION:

Do not reuse gasket.



REAR OIL SEAL

PFP:33140

ECS00DYV

REAR OIL SEAL

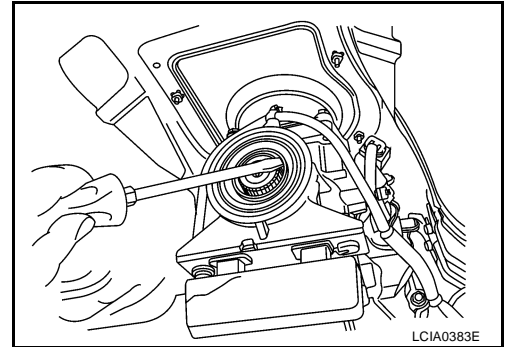
Removal and Installation (For 2WD models)

REMOVAL

1. Remove rear propeller shaft. Refer to [PR-10, "Removal and Installation"](#).
2. Remove dust seal and rear oil seal using suitable tool.

CAUTION:

- Do not damage rear extension assembly.
- Do not reuse dust seal and rear oil seal.



INSTALLATION

Installation is the reverse order of removal.

- Drive the new rear oil seal (1) and dust seal (2) using Tool A.

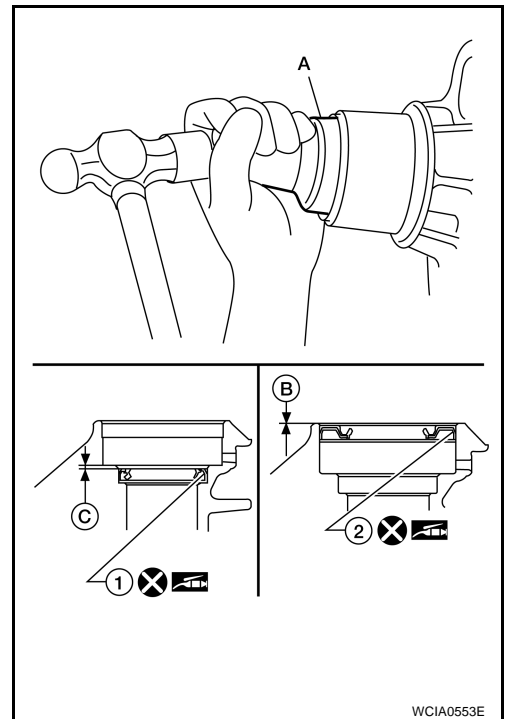
Tool number : ST33400001 (J-26082)

Dimension B : 0.5 - 1.5 mm (0.020 - 0.059 in)

Dimension C : 1.2 - 2.2 mm (0.047 - 0.087 in)

CAUTION:

- Do not reuse dust seal and rear oil seal.
 - Apply multi-purpose grease to seal lips before installing.
 - Do not incline the dust seal and rear oil seal during installation.
- Check the transmission oil level after installation. Refer to [MT-10, "Checking"](#).



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POSITION SWITCH

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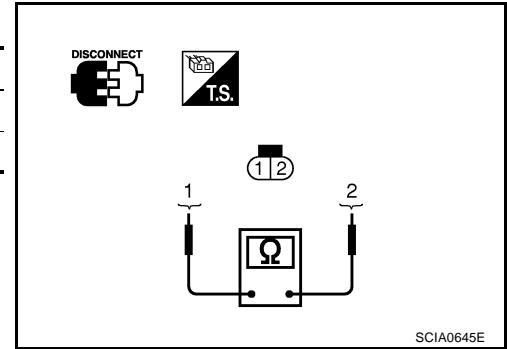
ECS00DYW

POSITION SWITCH

Checking 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

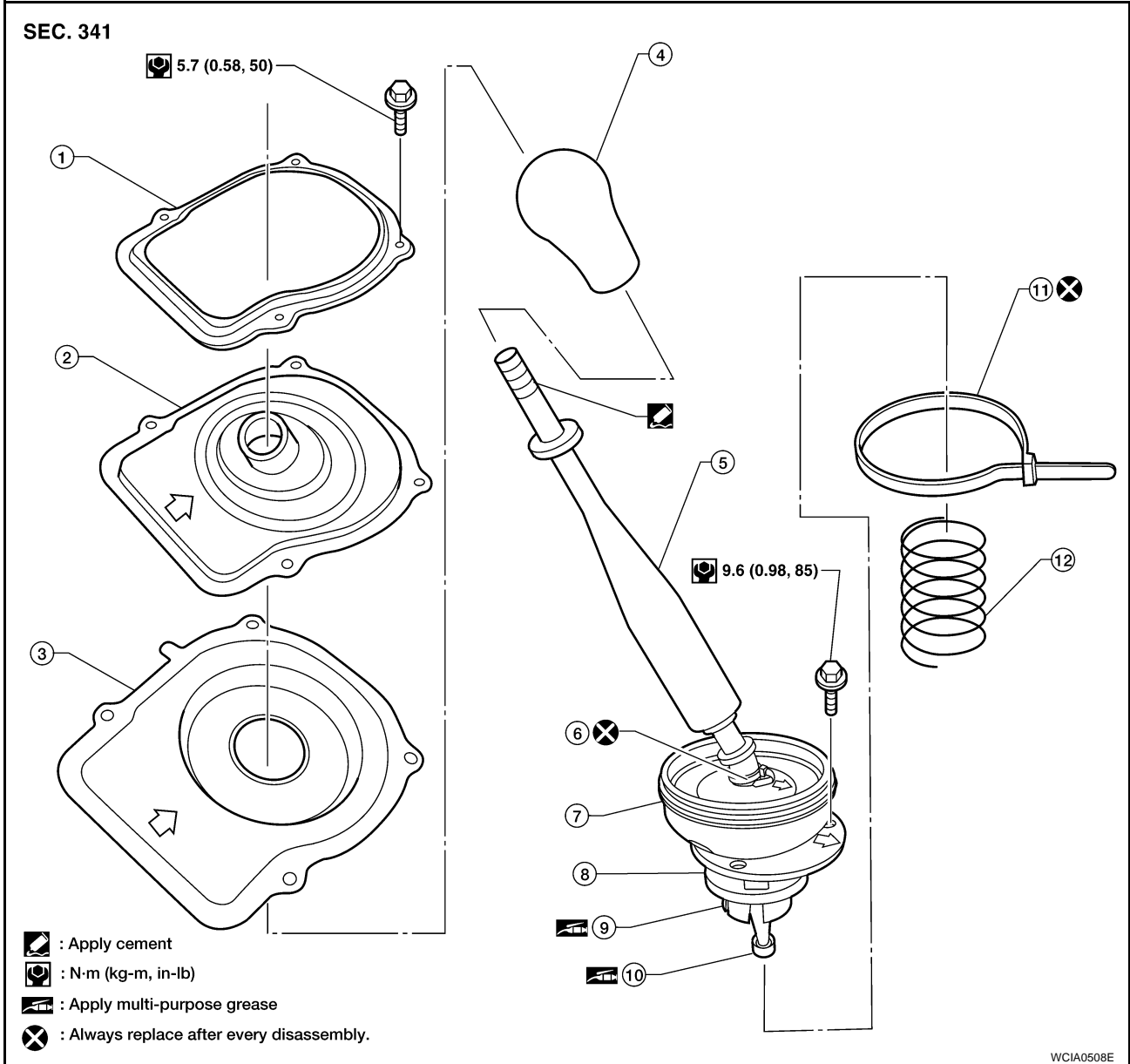
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SHIFT CONTROL

Removal and Installation COMPONENTS

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

REMOVAL

1. Remove the shift knob.
2. Remove the M/T finisher. Refer to [IP-13, "M/T FINISHER"](#).
3. Remove the retaining plate and dust boot covers.
4. Remove the clip (B) and then separate the boot from the control housing.
5. Remove the guide plate bolts and then separate the guide plate.
6. Remove the shift lever assembly and spring from the transmission.

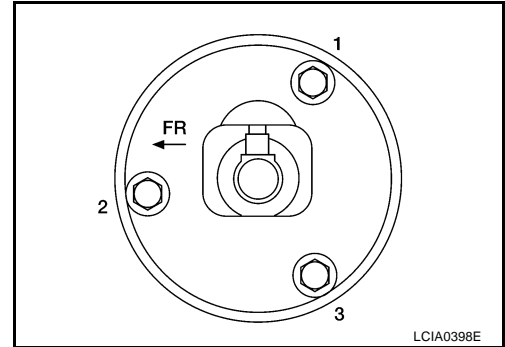
INSTALLATION

Installation is the reverse order of removal.

SHIFT CONTROL

CAUTION:

- Apply multi-purpose grease to the socket and bushing.
- Do not reuse clip.
- Apply cement to threads of the shift lever assembly.
- Temporarily tighten guide plate bolts. Then tighten guide plate bolts to the specified torque in the order shown. Refer to [MT-13](#), "[COMPONENTS](#)".
- When shift lever assembly is shifted to each position, make sure there is no binding or disconnection in either boot.
- When shifted to each position, make sure there is no noise, bending, and backlash. Especially when shift lever assembly is shifted to 5th, 6th without pressing downward, check for bending.
- When shift lever assembly is shifted to 1st, 2nd side and 5th, 6th side, confirm shift lever assembly returns to neutral position smoothly.
- In any position other than reverse, confirm that shift lever assembly can be pressed downward.
- With shift lever assembly pressed downward, confirm that it can be shifted to reverse.
- When shifted from reverse to neutral position, confirm shift lever assembly returns to neutral position smoothly with spring power.
- Without shift lever assembly pressed downward, confirm that it cannot be shifted to reverse.



AIR BREATHER HOSE

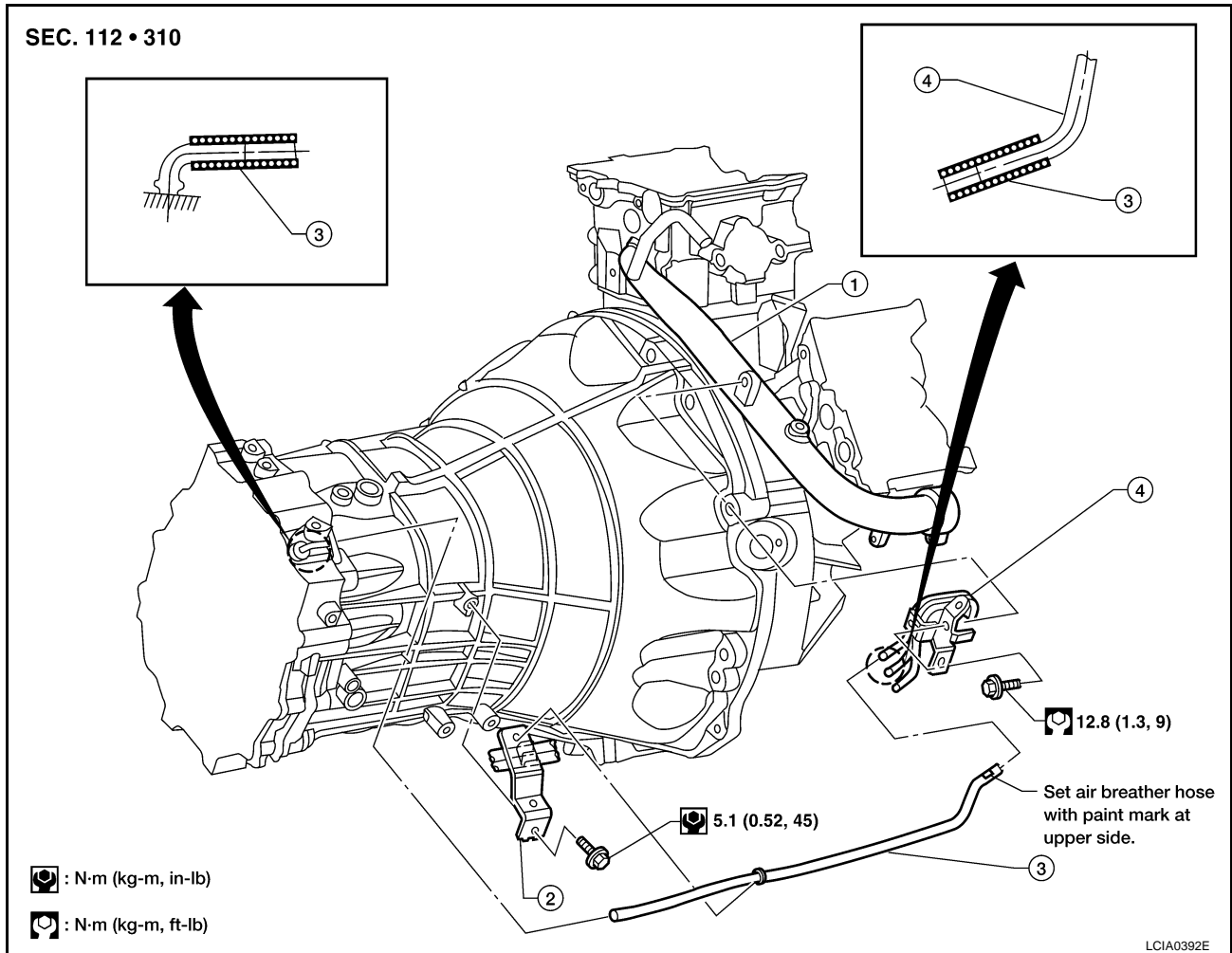
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ECS00DYY

AIR BREATHER HOSE

Removal and Installation

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



CAUTION:

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

TRANSMISSION ASSEMBLY

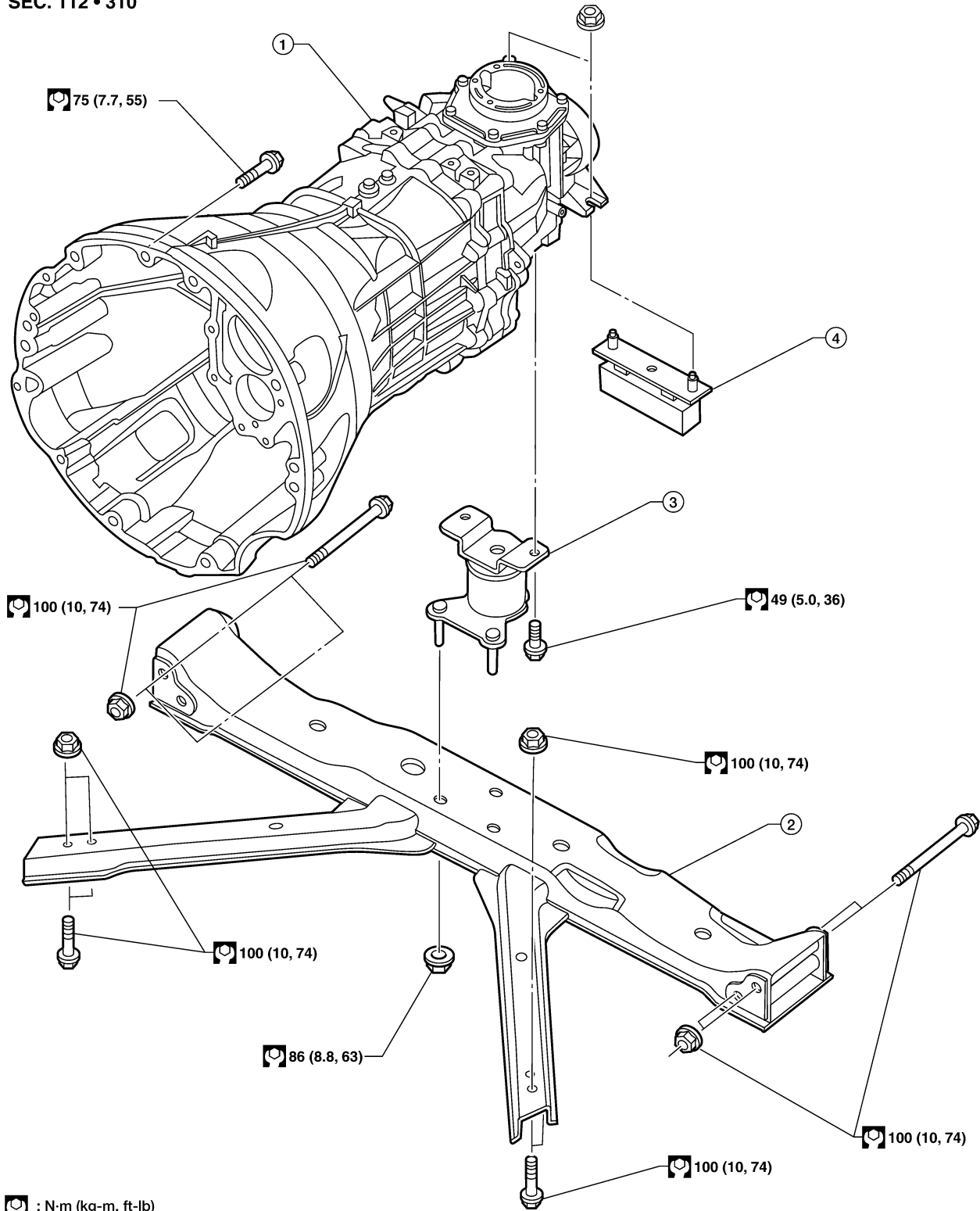
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TRANSMISSION ASSEMBLY

Removal and Installation from Vehicle (For 2WD models) COMPONENTS

ECS00DYZ

SEC. 112 • 310



LCIA0394E

- 1. Transmission assembly
- 4. Dynamic damper

- 2. Crossmember

- 3. Insulator

TRANSMISSION ASSEMBLY

REMOVAL

1. Drain transmission oil. Refer to [MT-10, "DRAINING"](#) .
2. Disconnect the battery cable from the negative terminal.
3. Remove the shift lever assembly. Refer to [MT-13, "Removal and Installation"](#) .
4. Remove the LH fender protector. Refer to [EI-19, "FENDER PROTECTOR"](#) .
5. Remove the crankshaft position sensor (POS) from M/T assembly.

CAUTION:

Do not damage the sensor edge.

6. Remove the undercovers using power tool.
7. Remove the front crossmember using power tool.
8. Remove the starter motor. Refer to [SC-22, "Removal and Installation"](#) .
9. Remove the rear propeller shaft. Refer to [PR-10, "Removal and Installation"](#) .
10. Remove the left and right front exhaust tubes. Refer to [EX-3, "Removal and Installation"](#) .
11. Remove the clutch operating cylinder from the transmission. Refer to [CL-11, "Removal and Installation"](#) .
12. Support the transmission using a suitable jack.
13. Remove the nuts securing the insulator to the crossmember.
14. Remove the crossmember using power tool.

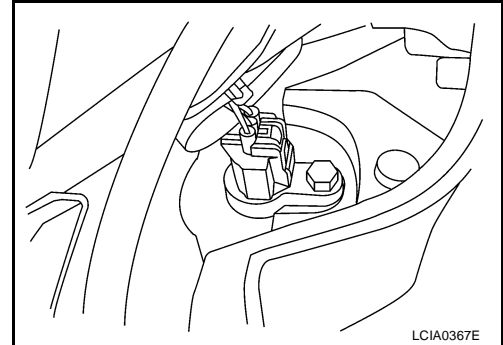
WARNING:

Support the transmission using suitable jack.

15. Tilt the transmission slightly to gain clearance between the body and the transmission, then disconnect the air breather hoses. Refer to [MT-15, "Removal and Installation"](#) .
16. Disconnect the following:
 - Back-up lamp switch connector
 - Park/neutral position (PNP) switch connector
17. Remove the wiring harness from the retainers.
18. Remove the transmission to engine bolts using power tool.
19. Separate the transmission from the engine and remove it from the vehicle.

WARNING:

Support the transmission while removing it using suitable jack.



INSTALLATION

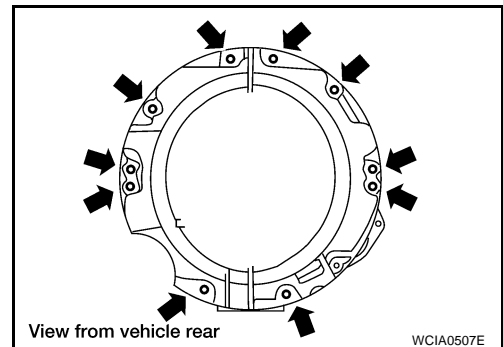
Installation is the reverse order of removal.

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

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

CAUTION:

- When installing be careful to avoid interference between transmission main drive gear and clutch cover.
- After installation, check for oil leakage and oil level. Refer to [MT-10, "Checking"](#) .
- If flywheel is removed, align dowel pin with the smallest hole of flywheel. Refer to [EM-112, "ASSEMBLY"](#) .
- When replacing an engine or transmission you must make sure the dowels are installed correctly during re-assembly.



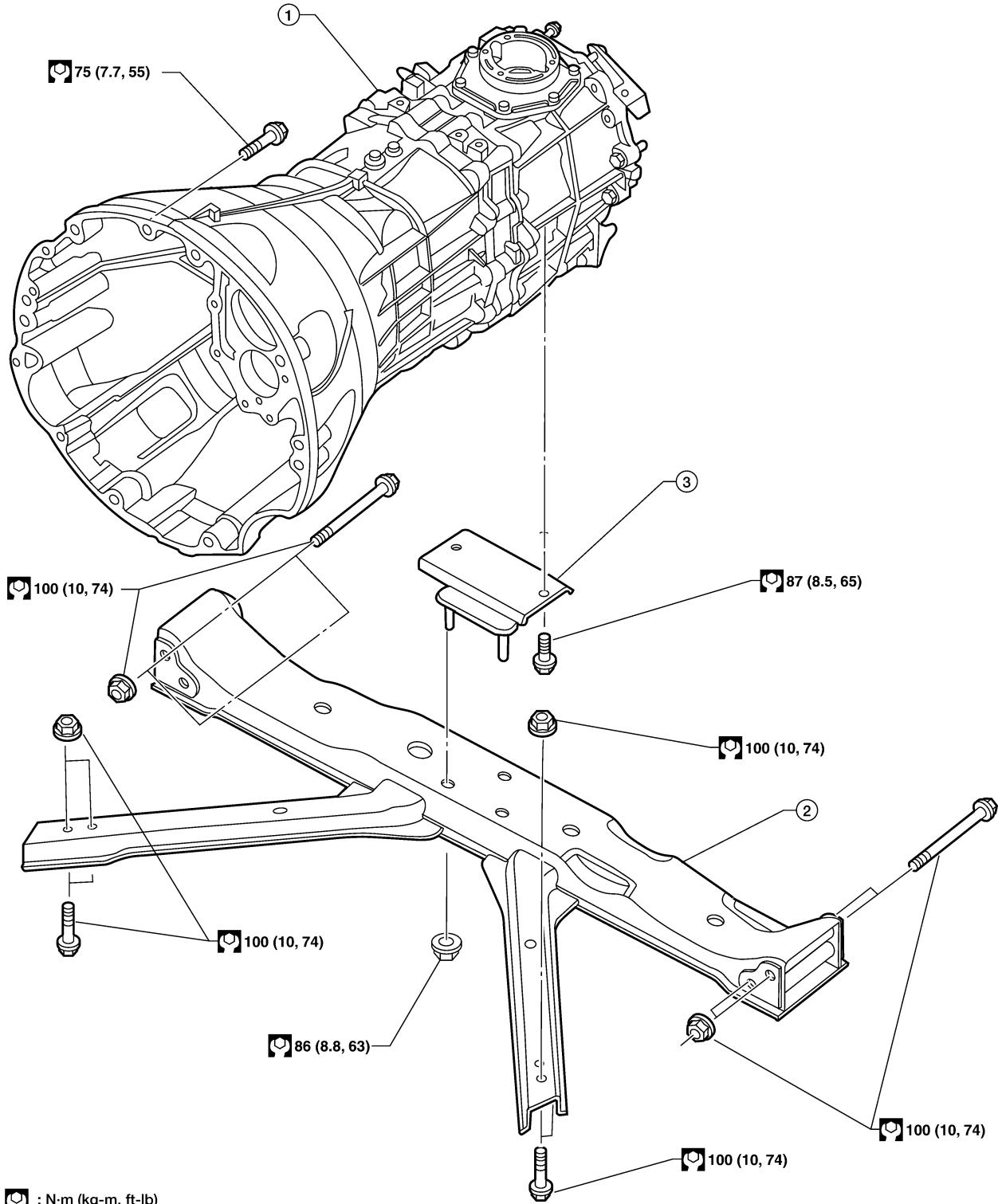
TRANSMISSION ASSEMBLY

- Improper alignment caused by missing dowels may cause vibration, oil leaks or breakage of drive train components.

Removal and Installation from Vehicle (For 4WD models) COMPONENTS

ECS00DZ0

SEC. 112 • 310



: N·m (kg-m, ft-lb)

1. Transmission assembly

2. Crossmember

3. Insulator

LCIA0393E

REMOVAL

1. Drain transmission oil. Refer to [MT-10, "DRAINING"](#).

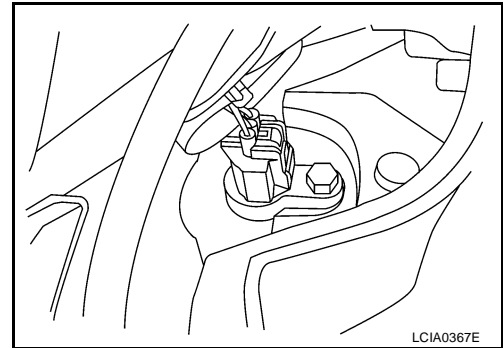
TRANSMISSION ASSEMBLY

2. Disconnect the battery cable from the negative terminal.
3. Remove the shift lever assembly. Refer to [MT-13, "Removal and Installation"](#) .
4. Remove the LH fender protector. Refer to [EI-19, "FENDER PROTECTOR"](#) .
5. Remove the crankshaft position sensor (POS) from the M/T assembly.

CAUTION:

Do not damage the sensor edge.

6. Remove the undercovers using power tool.
7. Remove the front crossmember using power tool.
8. Remove the starter motor. Refer to [SC-22, "Removal and Installation"](#) .
9. Remove the front and rear propeller shafts. Refer to [PR-5, "Removal and Installation"](#) and [PR-10, "Removal and Installation"](#) .



10. Remove the left and right front exhaust tubes. Refer to [EX-3, "Removal and Installation"](#) .
11. Remove the clutch operating cylinder from the transmission. Refer to [CL-11, "Removal and Installation"](#) .
12. Support the transmission using a suitable jack.
13. Remove the nuts securing the insulator to the crossmember.
14. Remove the crossmember using power tool.

WARNING:

Support the transmission using suitable jack.

15. Tilt the transmission slightly to gain clearance between the body and the transmission, then disconnect the air breather hoses. Refer to [MT-15, "Removal and Installation"](#) .
16. Disconnect the following:
 - Back-up lamp switch connector
 - Park/neutral position (PNP) switch connector
 - ATP switch connector
 - Neutral 4LO switch connector
 - Wait detection switch connector
 - Transfer control device connector

17. Remove the wiring harness from the retainers.
18. Remove the transmission to engine bolts using power tool.
19. Separate the transmission from the engine and remove it from the vehicle.

WARNING:

Support manual transmission while removing it.

INSTALLATION

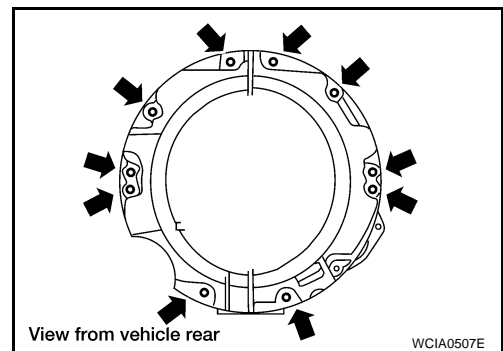
Installation is the reverse order of removal.

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

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

CAUTION:

- **When installing be careful to avoid interference between transmission main drive gear and clutch cover.**
- **After installation, check for oil leakage and oil level. Refer to [MT-10, "Checking"](#) .**
- **If flywheel is removed, align dowel pin with the smallest hole of flywheel. Refer to [EM-112, "ASSEMBLY"](#) .**



TRANSMISSION ASSEMBLY

- When replacing an engine or transmission you must make sure the dowels are installed correctly during re-assembly.
- Improper alignment caused by missing dowels may cause vibration oil leaks or breakage of drivetrain components.

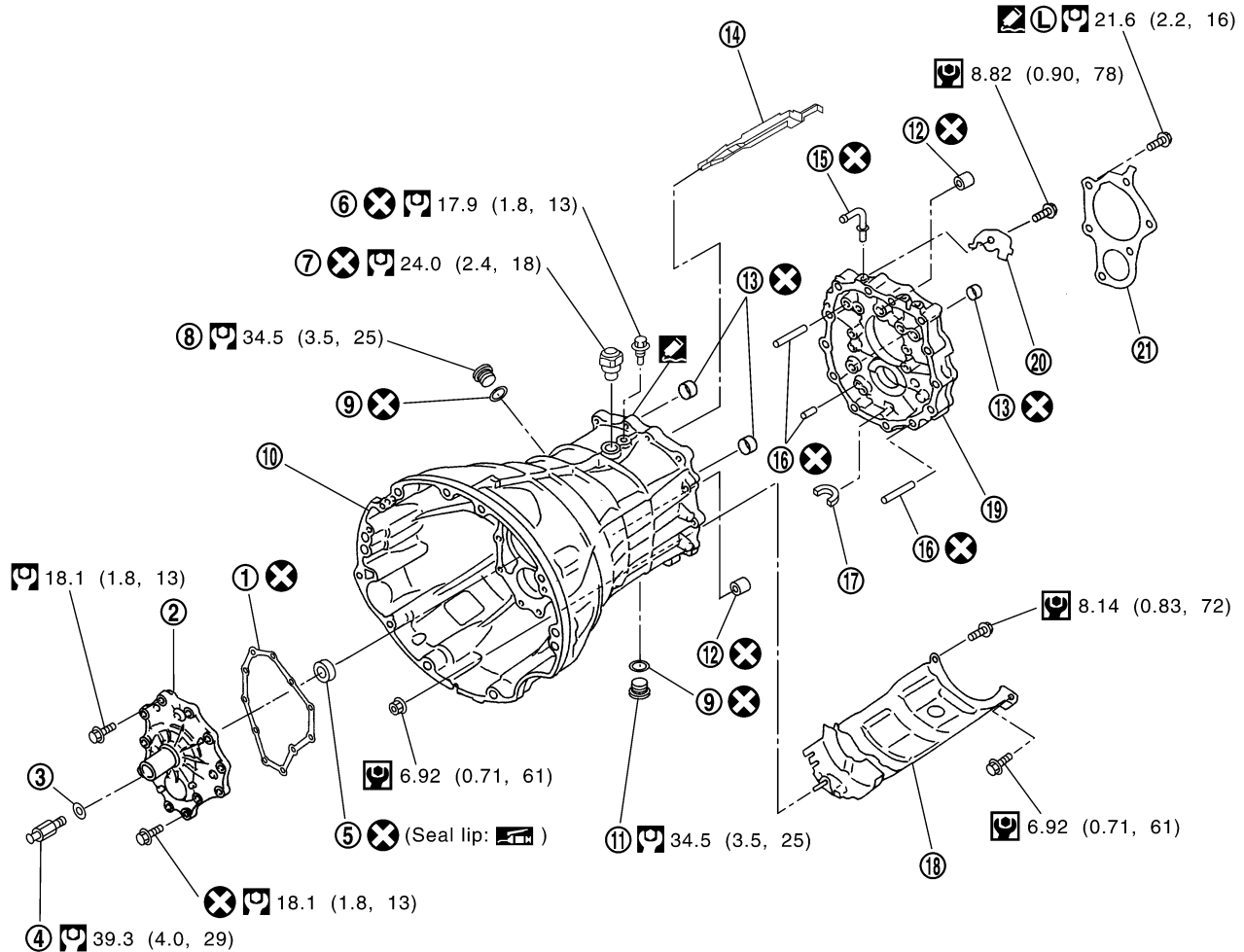
TRANSMISSION ASSEMBLY

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Disassembly and Assembly COMPONENTS

Case Components

SEC.321



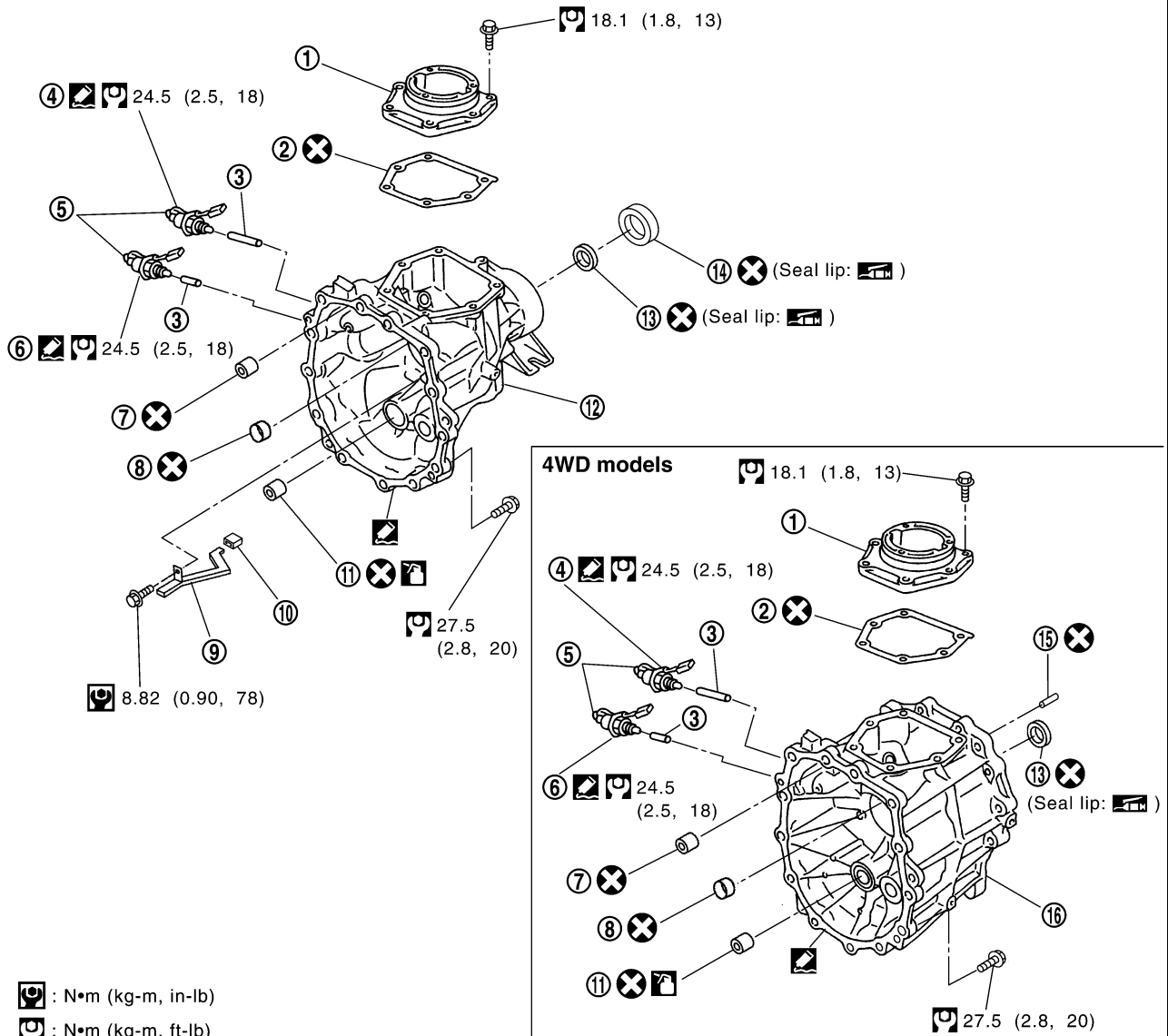
- : N•m (kg-m, in-lb)
- : N•m (kg-m, ft-lb)
- : Apply Genuine Silicone RTV or the equivalent. Refer to GI section.
- : Apply Genuine Medium Strength Thread Locking Sealant or the equivalent. Refer to GI section.
- : Apply multi-purpose grease.
- : Always replace after every disassembly.

PCIB1208E

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

TRANSMISSION ASSEMBLY

SEC.321



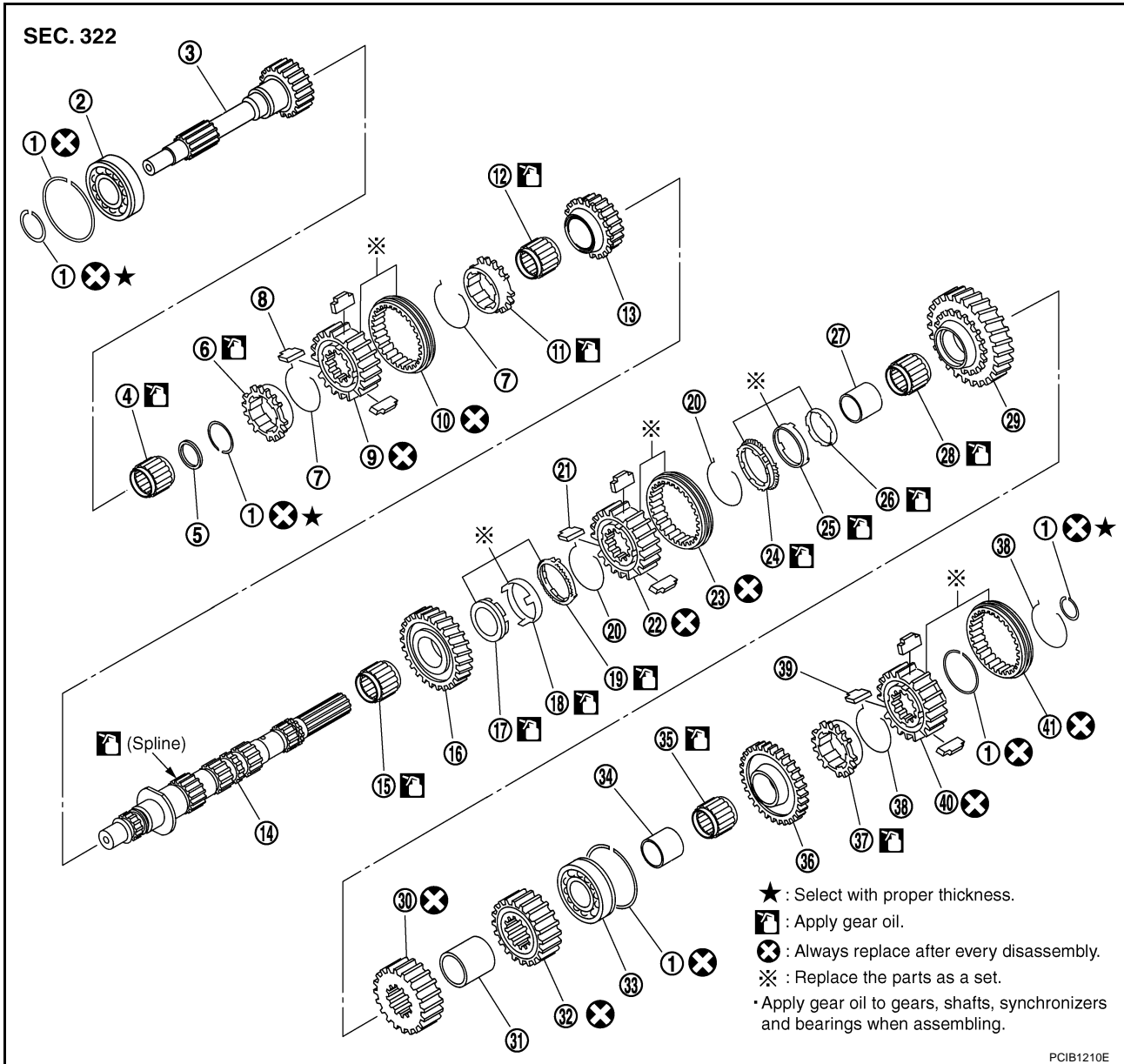
- : N•m (kg-m, in-lb)
- : N•m (kg-m, ft-lb)
- : Apply Genuine Silicone RTV or the equivalent. Refer to GI section.
- : Apply gear oil.
- : Apply multi-purpose grease.
- : Always replace after every disassembly.

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

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TRANSMISSION ASSEMBLY

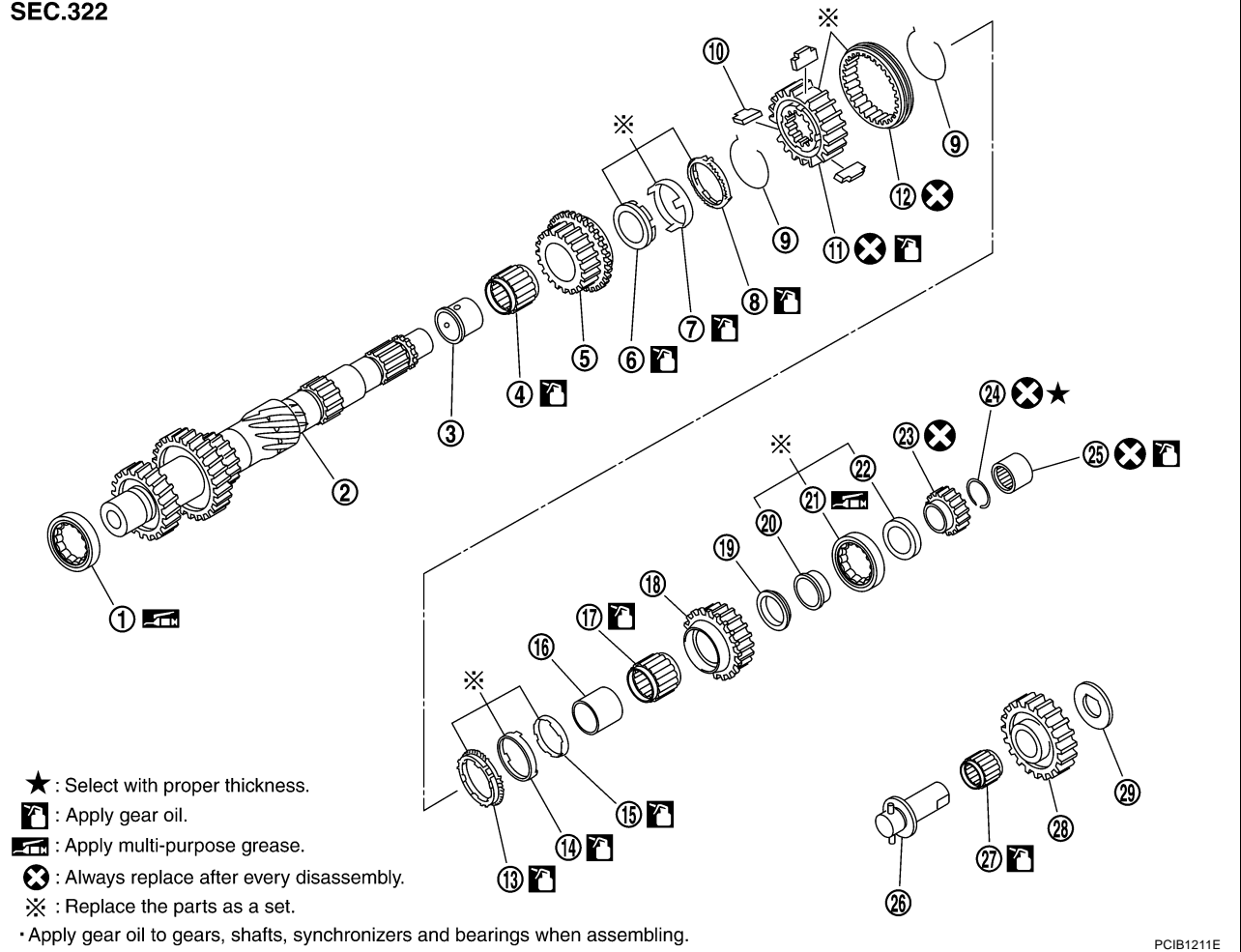
Gear Components



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

TRANSMISSION ASSEMBLY

SEC.322

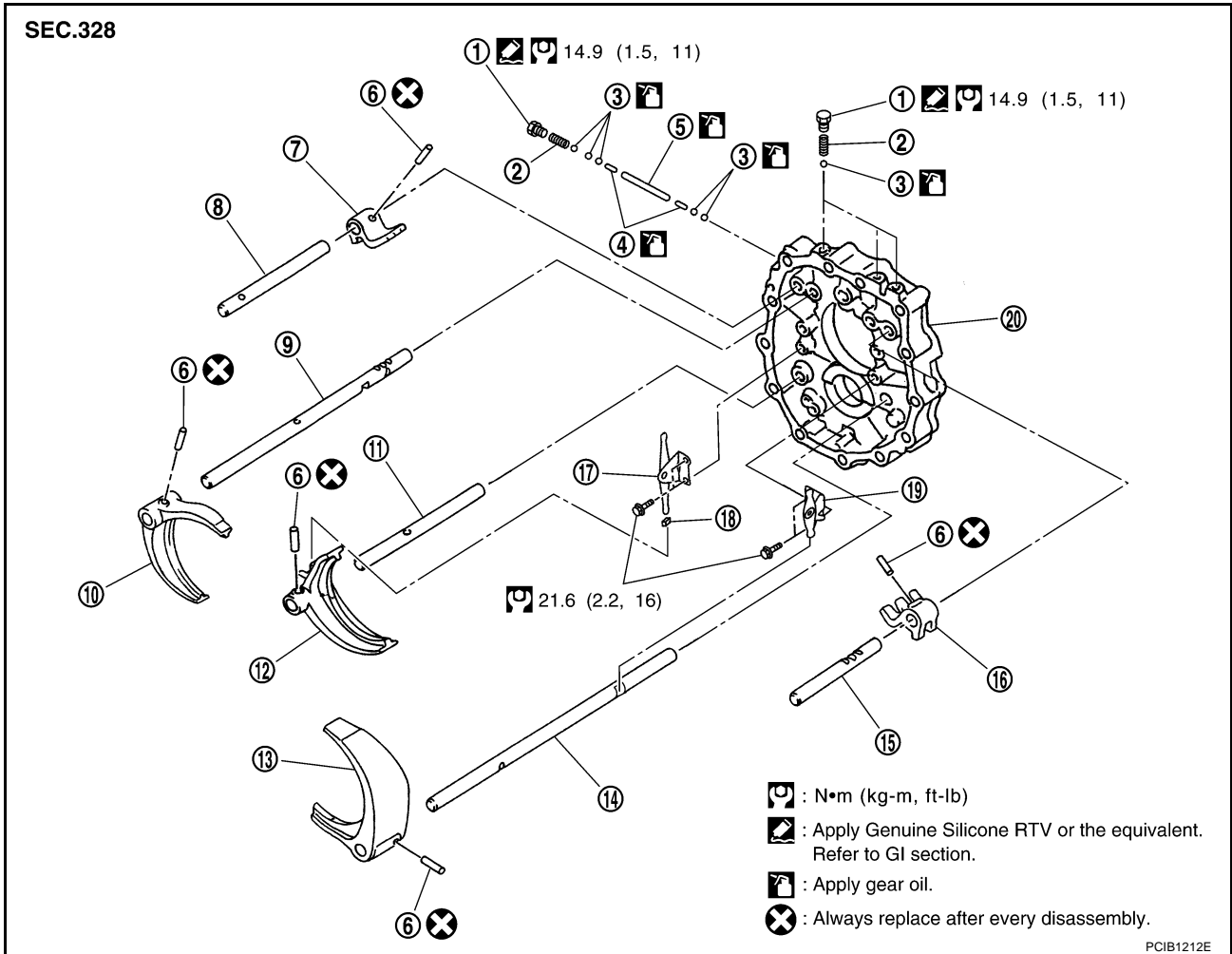


PCIB1211E

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

TRANSMISSION ASSEMBLY

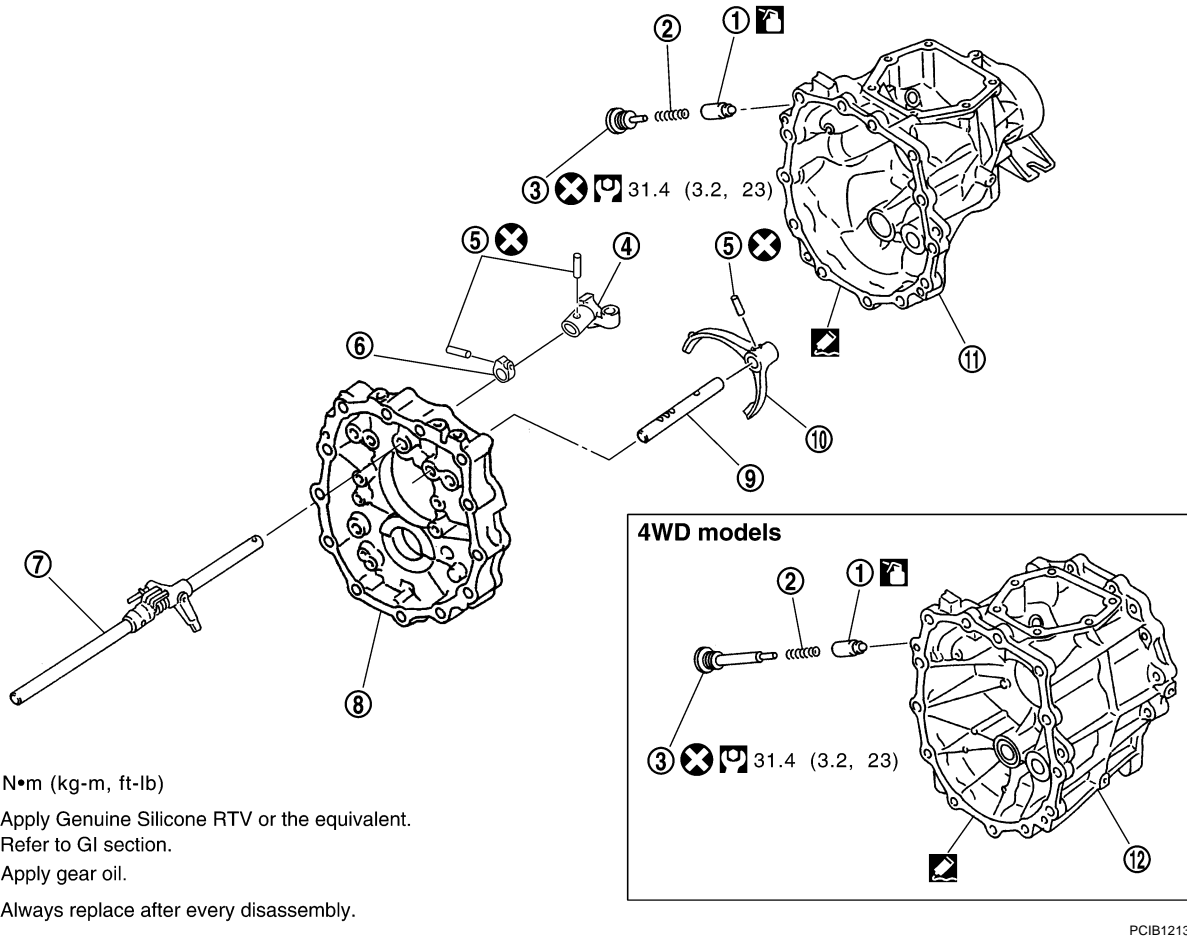
Shift Control Components



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

TRANSMISSION ASSEMBLY

SEC.328



PCIB1213E

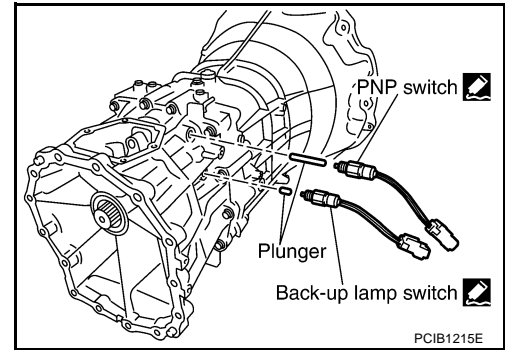
- | | | |
|--------------------------|--------------------|-----------------------|
| 1. Return spring plunger | 2. Return spring | 3. Return spring plug |
| 4. Striking arm | 5. Retaining pin | 6. Stopper ring |
| 7. Striking rod assembly | 8. Adapter plate | 9. Reverse fork rod |
| 10. Reverse shift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

TRANSMISSION ASSEMBLY

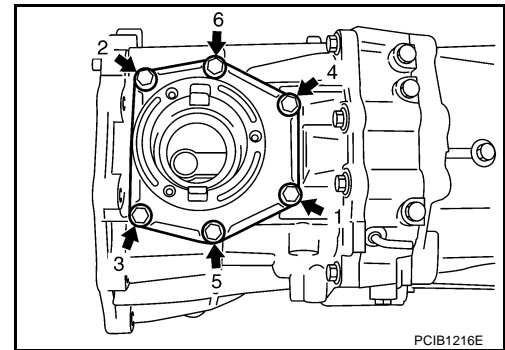
DISASSEMBLY

Case Components

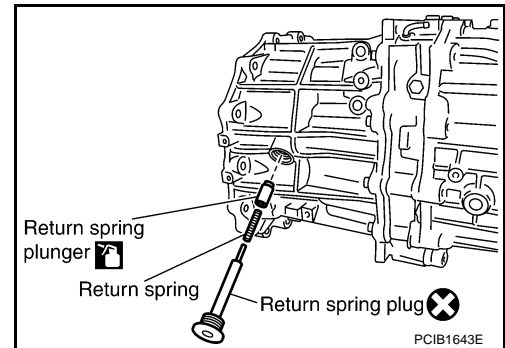
1. Remove clips from PNP switch and back-up lamp switch.
2. Remove PNP switch, back-up lamp switch and plungers from rear extension (or OD gear case).



3. Remove control housing bolts, and then remove control housing and gasket from rear extension (or OD gear case).



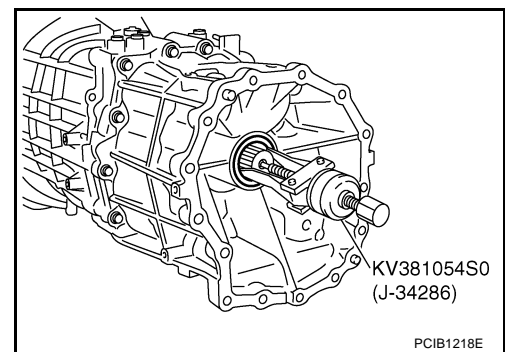
4. Remove return spring plug, return spring and return spring plunger from rear extension (or OD gear case).



5. Remove rear oil seal from OD gear case using Tool. (For 4WD models)

CAUTION:

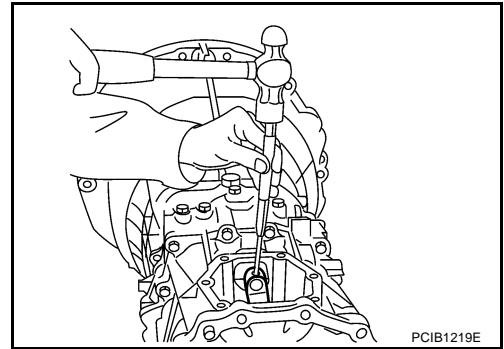
Be careful not to damage OD gear case.



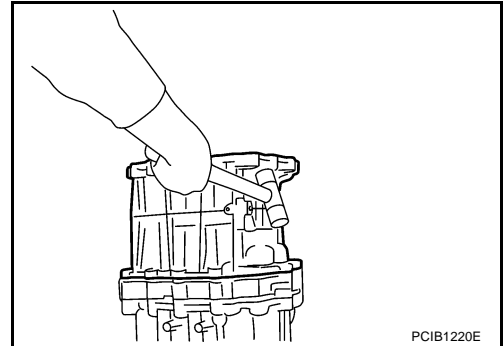
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TRANSMISSION ASSEMBLY

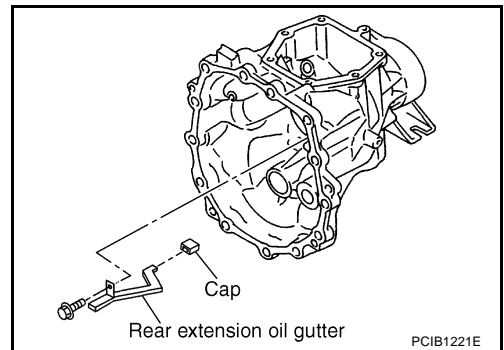
6. Remove retaining pin using suitable tool, and then remove striking arm from striking rod assembly.



7. Remove rear extension (or OD gear case) bolts, and then remove rear extension (or OD gear case) from adapter plate using suitable tool.



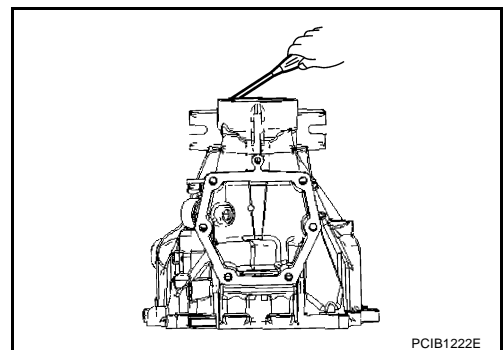
8. Remove rear extension oil gutter bolt, and then remove rear extension oil gutter and cap from rear extension. (For 2WD models)



9. Remove dust seal and rear oil seal from rear extension using suitable tool. (For 2WD models)

CAUTION:

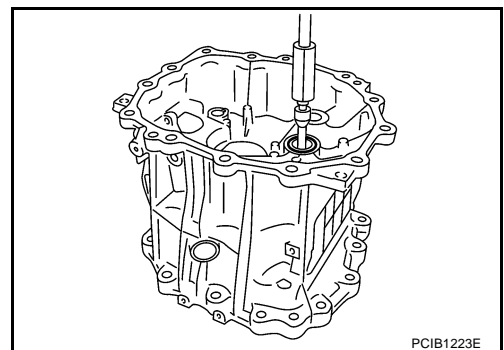
Be careful not to damage rear extension.



10. Remove counter end bearing from rear extension (or OD gear case) using suitable tool.

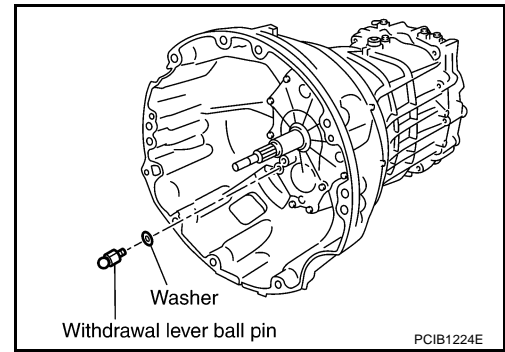
CAUTION:

Be careful not to damage rear extension (or OD gear case).

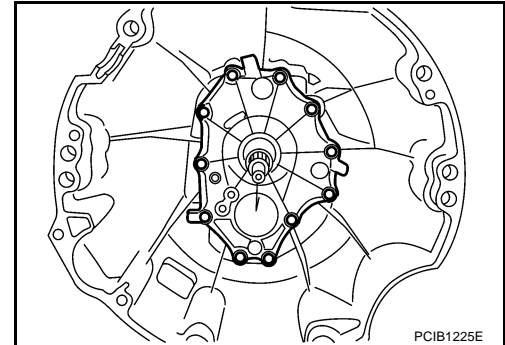


TRANSMISSION ASSEMBLY

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



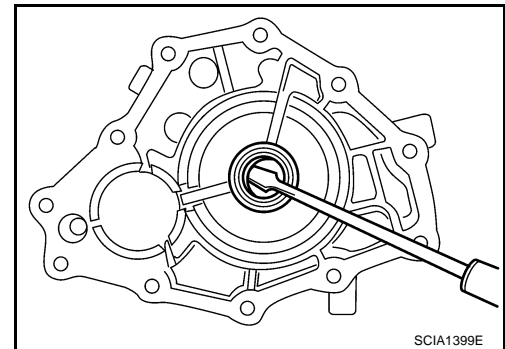
12. Remove front cover bolts, and then remove front cover and front cover gasket from transmission case.



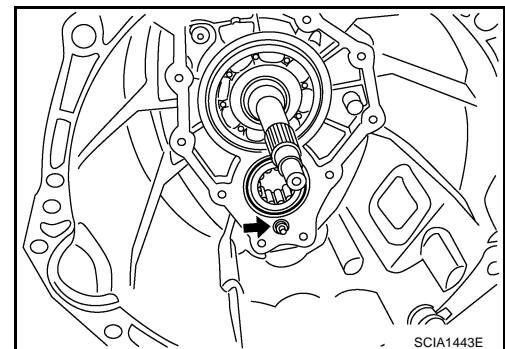
13. Remove front cover oil seal from front cover using suitable tool.

CAUTION:

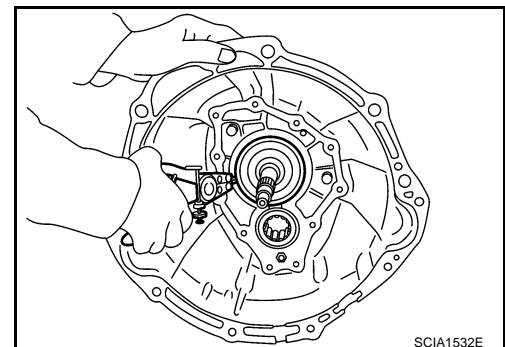
Be careful not to damage front cover.



14. Remove baffle plate nut from transmission case.

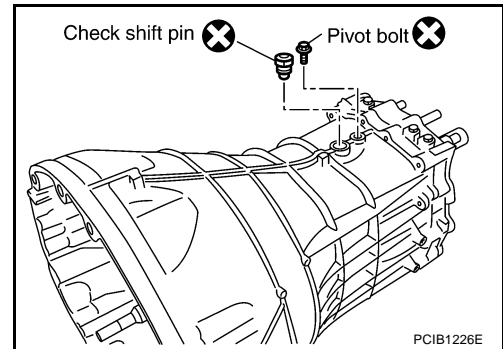


15. Remove snap ring from main drive gear bearing using suitable tool.

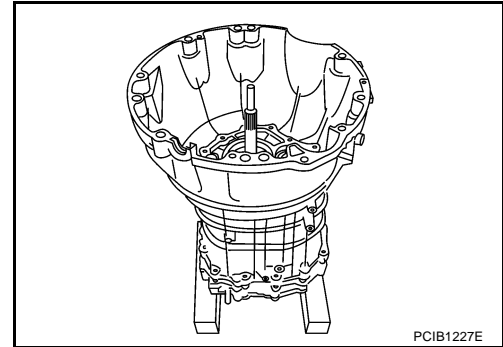


TRANSMISSION ASSEMBLY

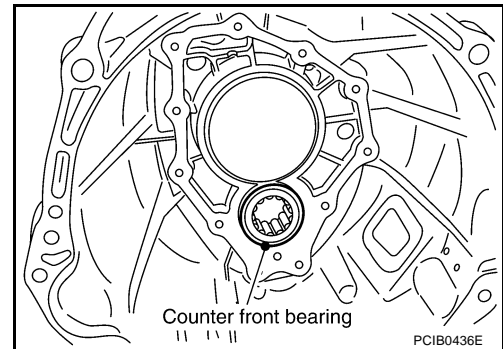
16. Remove pivot bolt and check shift pin from transmission case.



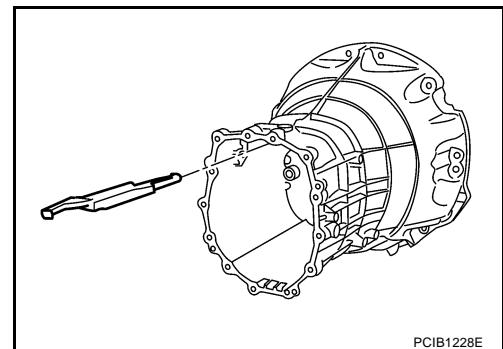
17. Remove transmission case from adapter plate.



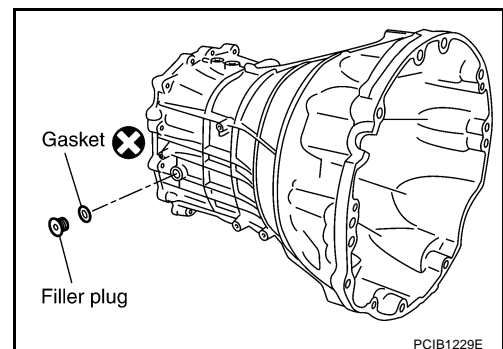
18. Remove counter front bearing from transmission case.



19. Remove oil gutter from transmission case.



20. Remove filler plug and gasket from transmission case.



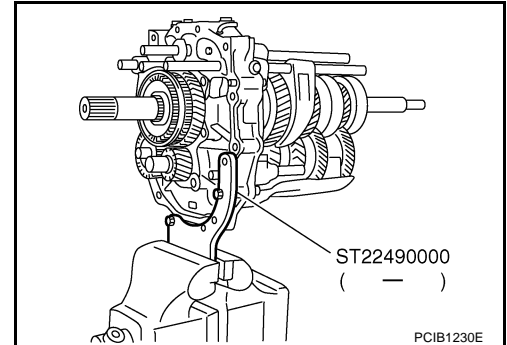
TRANSMISSION ASSEMBLY

Shift Control Components

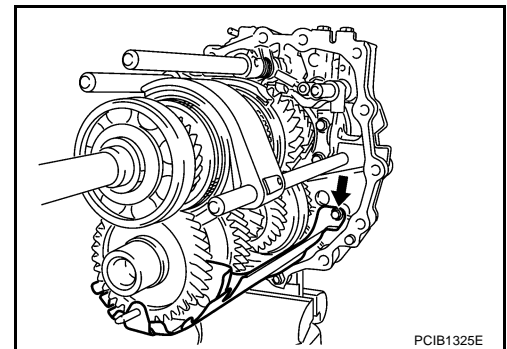
1. Remove rear extension (or OD gear case) and transmission case. Refer to [MT-27, "Case Components"](#).
2. Install Tool to adapter plate, and then position in a vise.

CAUTION:

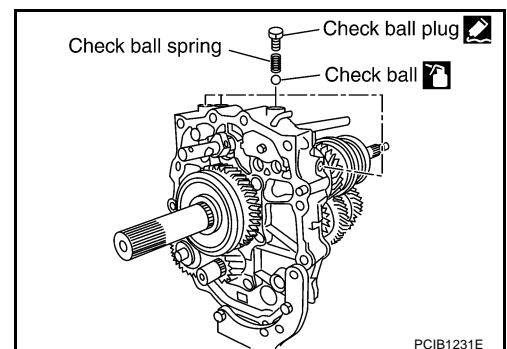
Do not directly secure mating surface of adapter plate in a vise.



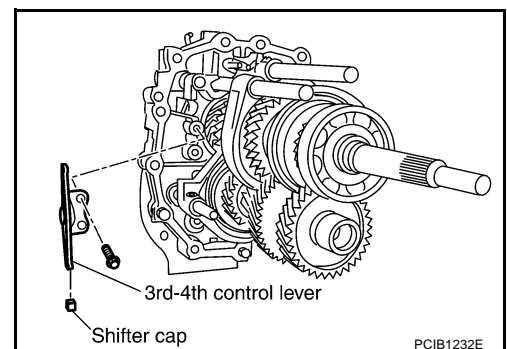
3. Remove baffle plate bolts, and then remove baffle plate from adapter plate.



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



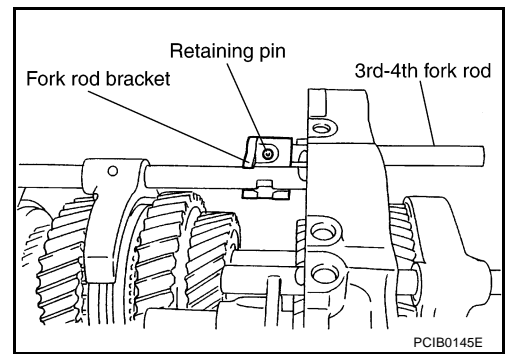
5. Remove 3rd-4th control lever bolts, and then remove 3rd-4th control lever and shifter cap from adapter plate.



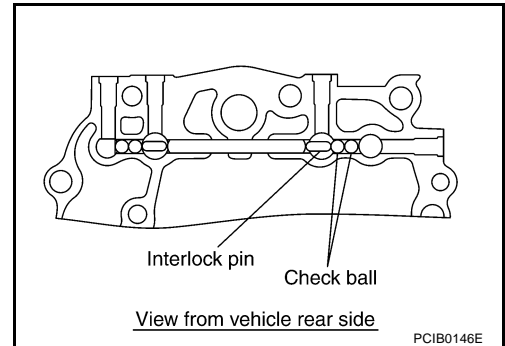
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TRANSMISSION ASSEMBLY

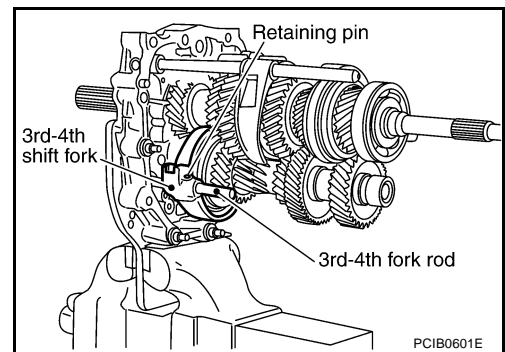
6. Remove retaining pin using suitable tool, and then remove 3rd - 4th fork rod bracket and 3rd-4th fork rod from adapter plate.



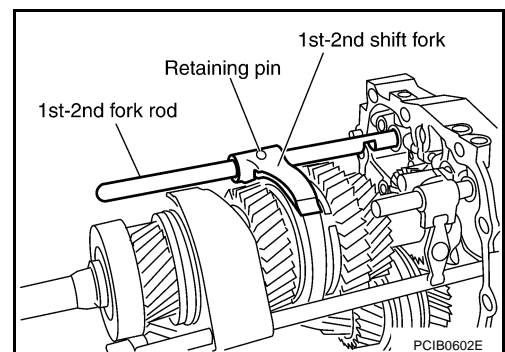
7. Remove check balls and interlock pin from adapter plate.



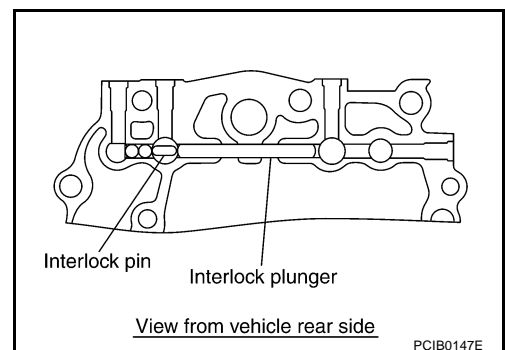
8. Remove retaining pin using a suitable tool, and then remove 3rd-4th shift fork and 3rd-4th fork rod (reversal side) from adapter plate.



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

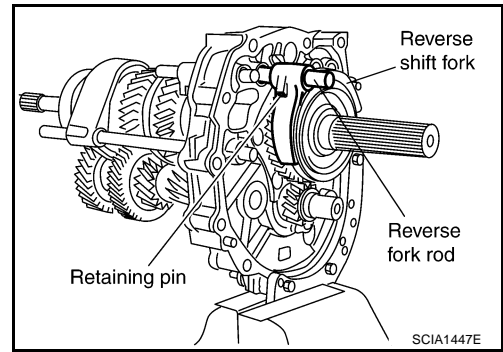


10. Remove interlock plunger and interlock pin from adapter plate.

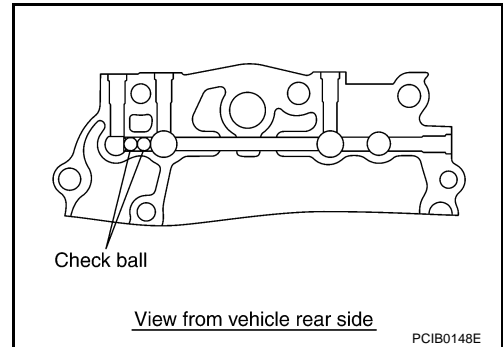


TRANSMISSION ASSEMBLY

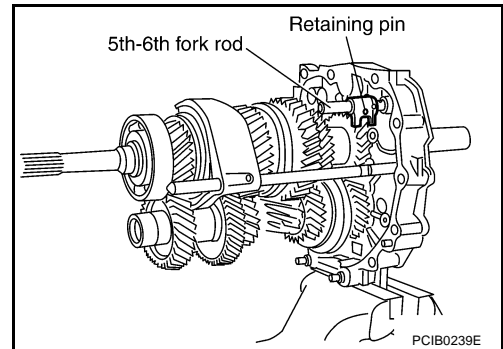
11. Remove retaining pin using suitable tool, and then remove reverse shift fork and reverse fork rod from adapter plate.



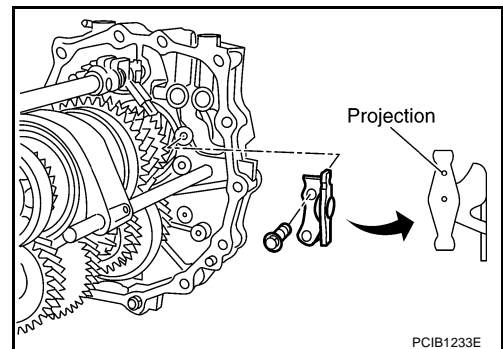
12. Remove check balls from adapter plate.



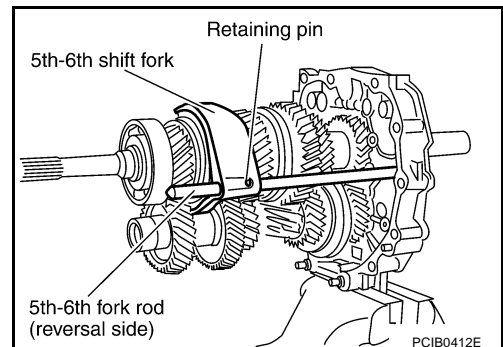
13. Remove retaining pin using suitable tool, and then remove 5th-6th fork rod bracket and 5th-6th fork rod from adapter plate.



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



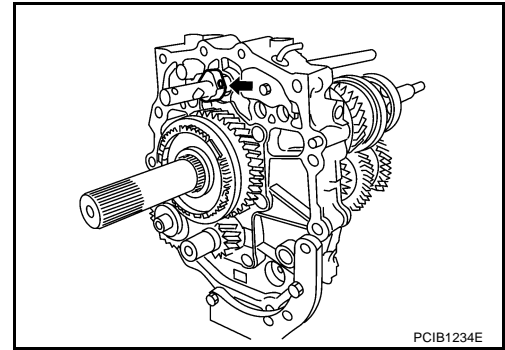
15. Remove retaining pin using suitable tool, and then remove 5th-6th shift fork and 5th-6th fork rod (reversal side) from adapter plate.



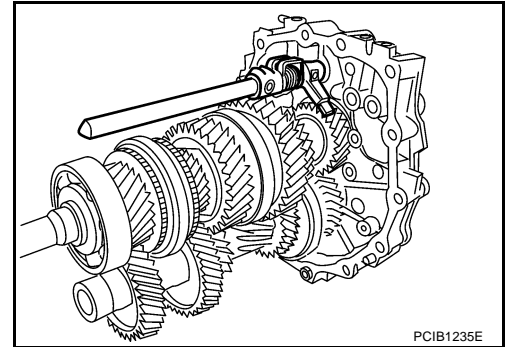
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TRANSMISSION ASSEMBLY

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



17. Remove striking rod assembly from adapter plate.

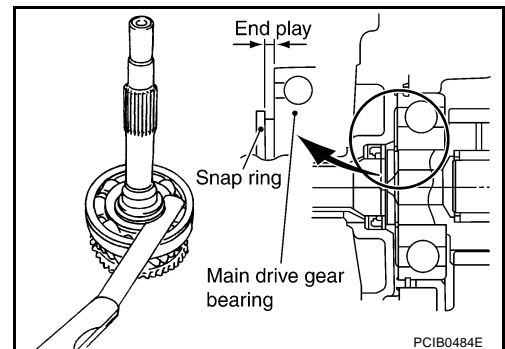


Gear Components

1. Remove rear extension (or OD gear case) and transmission case. Refer to [MT-27, "Case Components"](#).
2. Remove shift forks and fork rods. Refer to [MT-31, "Shift Control Components"](#).
3. Before disassembling, measure the end play for each position. If the end play is outside the standards, disassemble and inspect.

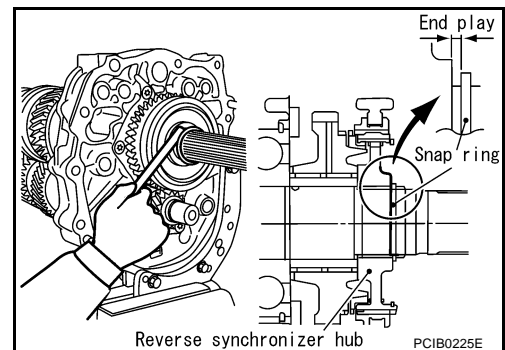
- Main drive gear

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



- Mainshaft (Rear side)

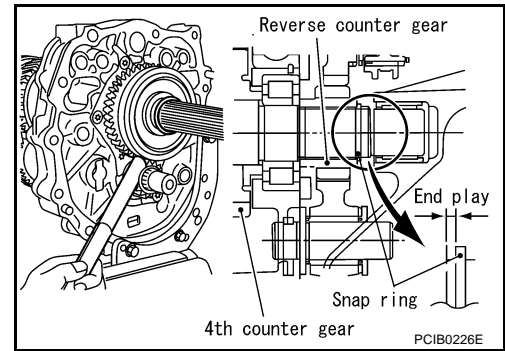
End play : 0 - 0.10 mm (0 - 0.004 in)



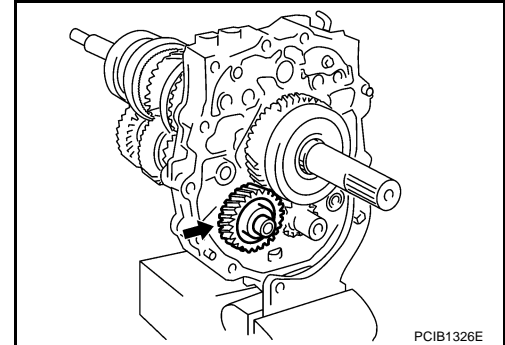
TRANSMISSION ASSEMBLY

- Counter gear

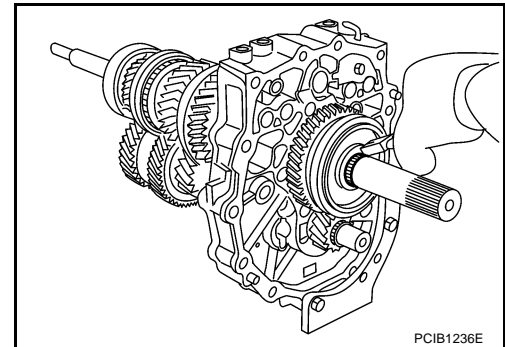
End play : 0 - 0.10 mm (0 - 0.004 in)



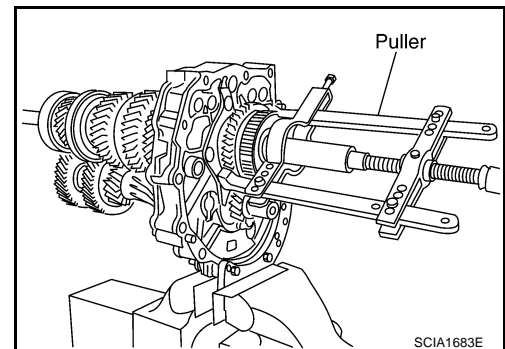
4. Remove reverse idler gear according to the following.
 - a. Remove reverse idler shaft assembly from adapter plate.
 - b. Remove reverse idler thrust washer, reverse idler gear and reverse idler needle bearing from reverse idler shaft.



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



- b. Remove reverse main gear and reverse synchronizer hub assembly using suitable tool.
- c. Remove reverse main needle bearing from mainshaft.

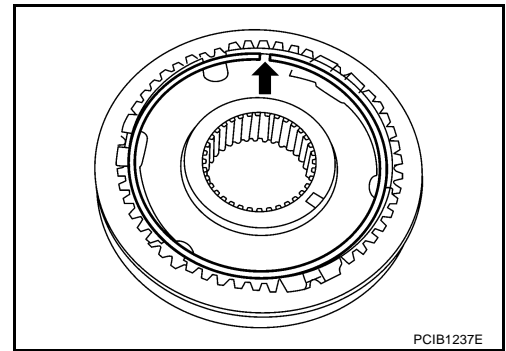


6. Remove reverse coupling sleeve according to the following.

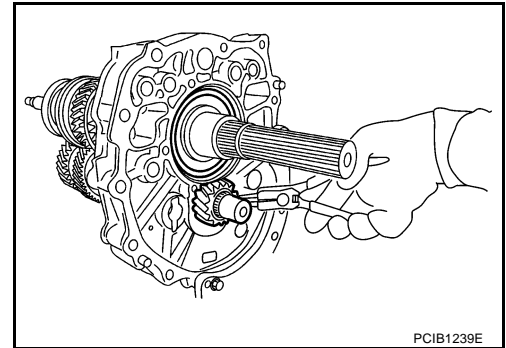
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TRANSMISSION ASSEMBLY

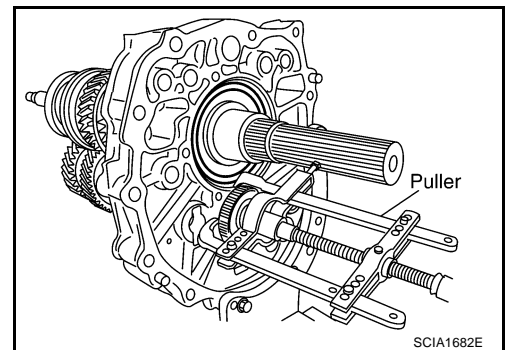
- a. Remove snap ring from reverse synchronizer hub.
- b. Remove spread springs and shifting inserts from reverse synchronizer hub.
- c. Remove reverse coupling sleeve from reverse synchronizer hub.



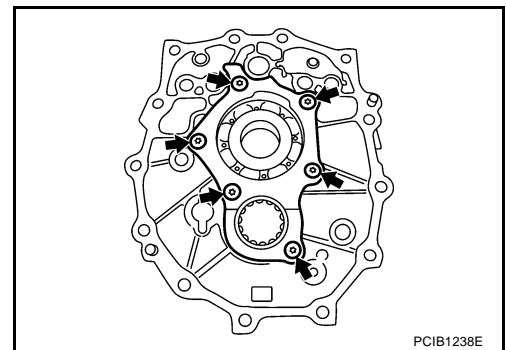
7. Remove reverse counter gear according to the following.
 - a. Remove snap ring from counter gear using suitable tool.



- b. Remove reverse counter gear using suitable tool.
8. Remove counter rear bearing spacer from counter gear.



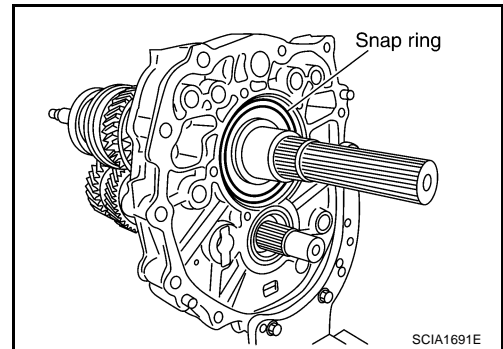
9. Remove bearing retainer bolts, and then remove bearing retainer.



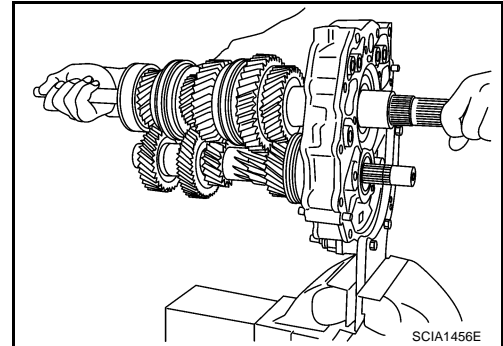
10. Remove main drive gear assembly, mainshaft assembly and counter gear assembly according to the following.

TRANSMISSION ASSEMBLY

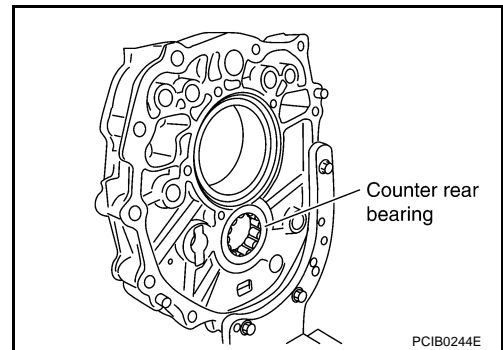
- a. Remove snap ring from mainshaft bearing using suitable tool.



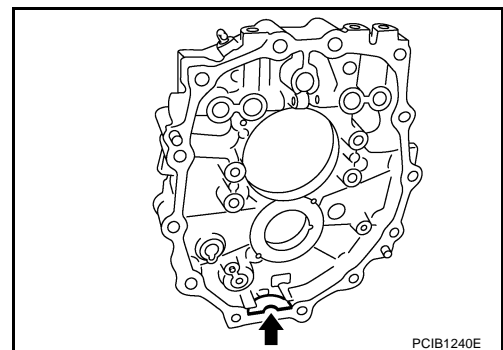
- b. Carefully tap mainshaft using suitable tool, and then remove main drive gear assembly, mainshaft assembly and counter gear assembly from adapter plate.
c. Remove main pilot bearing, pilot bearing spacer from mainshaft.
d. Remove 5th baulk ring from main drive gear.



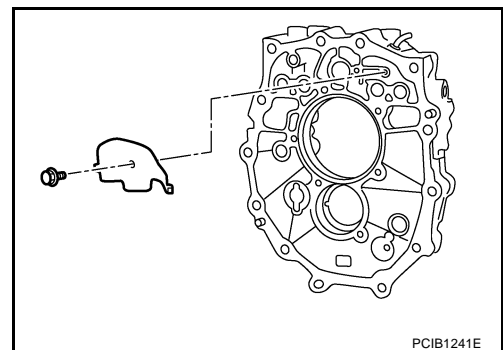
11. Remove counter rear bearing from adapter plate.



12. Remove magnet from adapter plate.



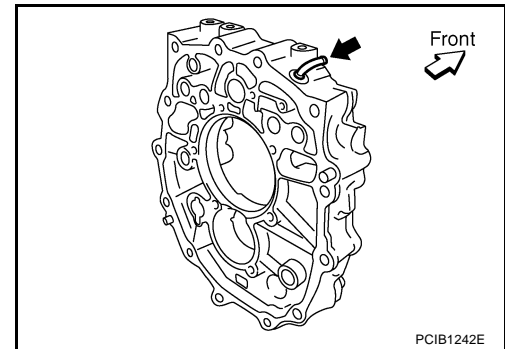
13. Remove baffle plate bolt, and then remove baffle plate from adapter plate.



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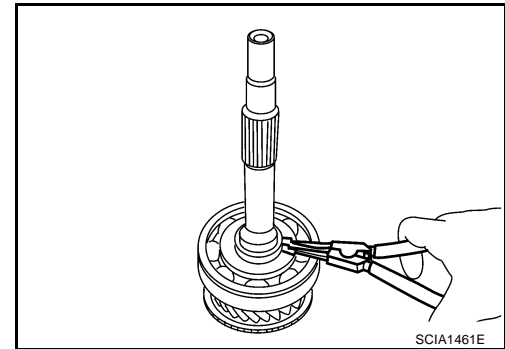
TRANSMISSION ASSEMBLY

14. Remove breather from adapter plate.

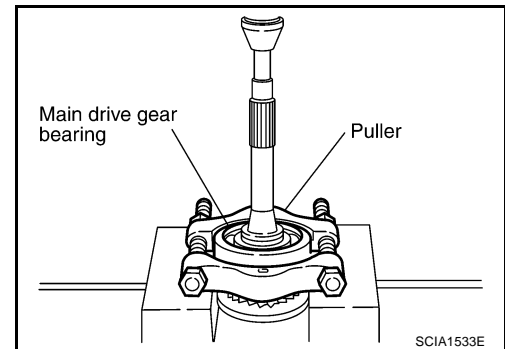


15. Remove main drive gear bearing according to the following.

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

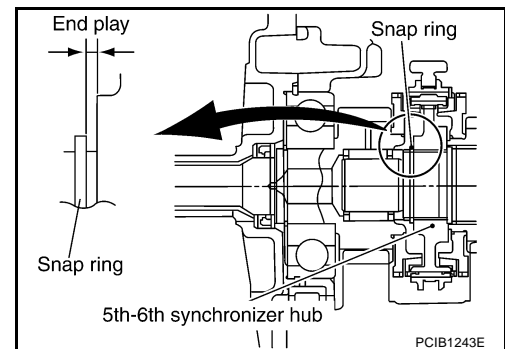


b. Press out main drive gear bearing using suitable tool.



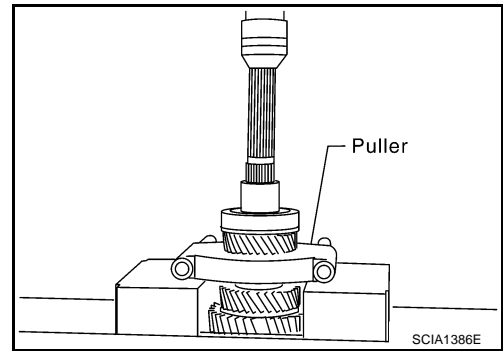
16. Before disassembling, measure the end play for mainshaft (Front side). If the end play is outside the standards, disassemble and inspect.

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

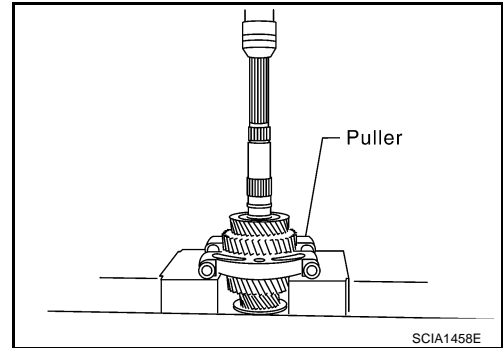


TRANSMISSION ASSEMBLY

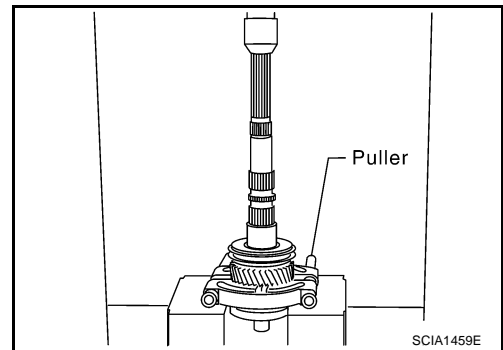
17. Press out reverse main gear bushing, mainshaft bearing and 4th main gear using suitable tool.
18. Remove 3rd-4th main spacer from mainshaft.



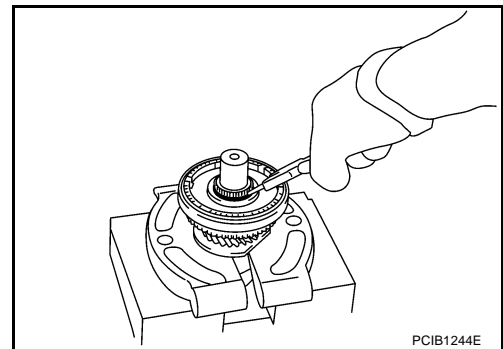
19. Remove 3rd main gear and 1st main gear according to the following.
 - a. Press out 3rd main gear and 1st main gear using suitable tool.
CAUTION:
Be careful not to damage 1st outer baulk ring.
 - b. Remove 1st needle bearing from mainshaft.



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



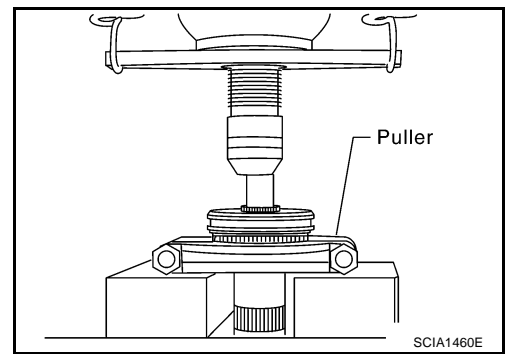
22. Remove 6th main gear and 5th-6th synchronizer hub assembly according to the following.
 - a. Remove snap ring from mainshaft using suitable tool.



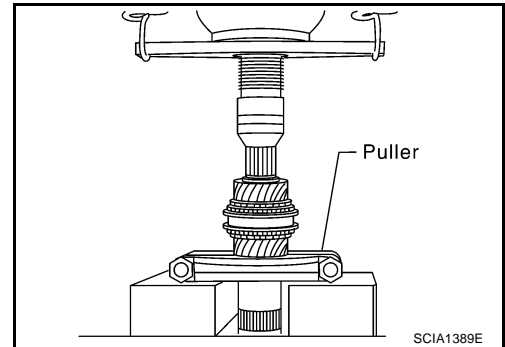
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TRANSMISSION ASSEMBLY

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



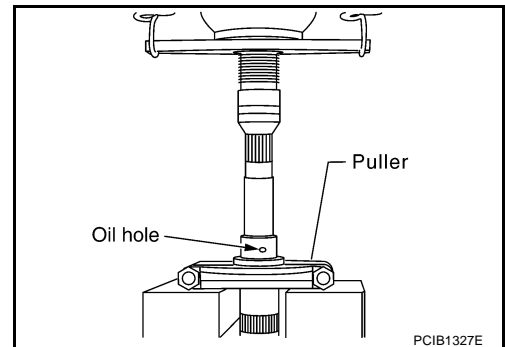
24. Remove 3rd counter gear, 3rd-4th synchronizer hub assembly, 4th counter gear according to the following.
- a. Press out 3rd counter gear, 3rd-4th synchronizer hub assembly, 4th counter gear, 4th needle bearing, 4th gear bushing, 4th counter gear thrust washer, and counter rear bearing inner race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



26. Press out 3rd gear bushing using suitable tool.

CAUTION:

Do not use oil hole of 3rd gear bushing when press out.

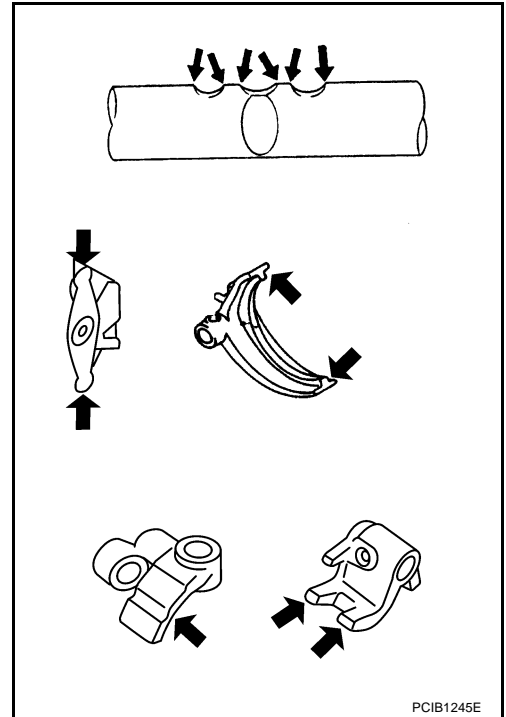


TRANSMISSION ASSEMBLY

INSPECTION AFTER DISASSEMBLY

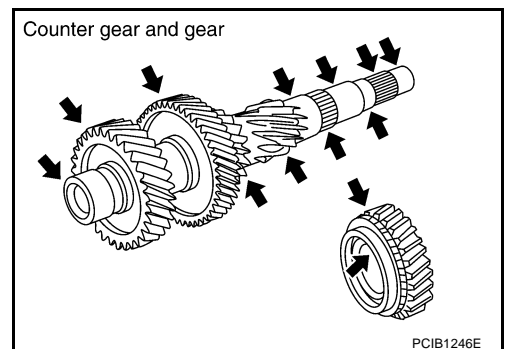
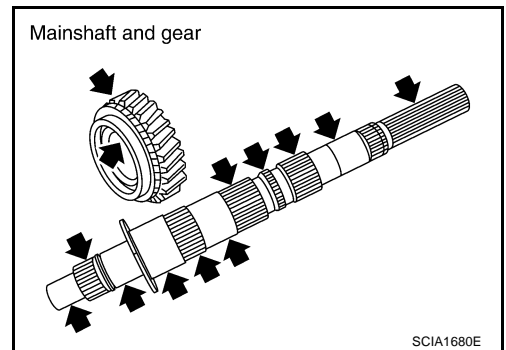
Shift Control

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

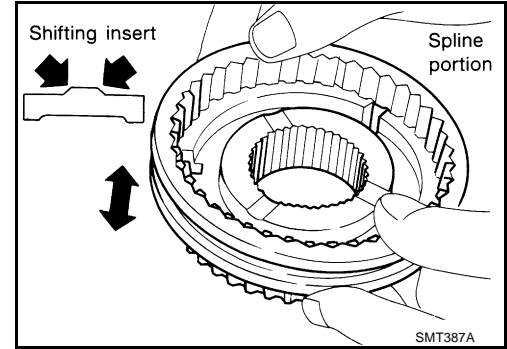


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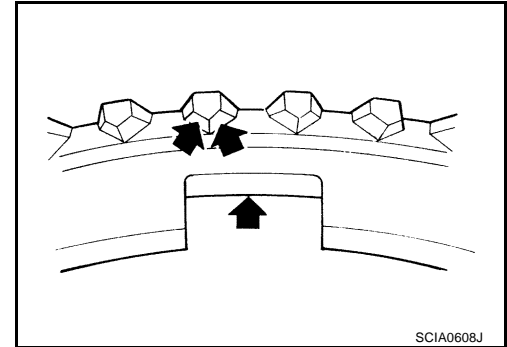
TRANSMISSION ASSEMBLY

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 damaged, replace with a new one.



Baulk Ring Clearance

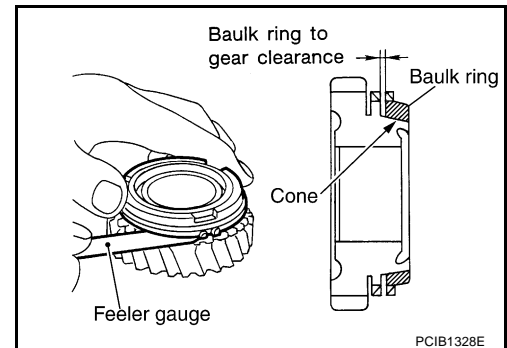
- **Single Cone Synchronizer (5th and 6th)**

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

Clearance

Standard value : 0.7 - 1.35 mm (0.028 - 0.0531 in)

Limit value : 0.5 mm (0.020 in)

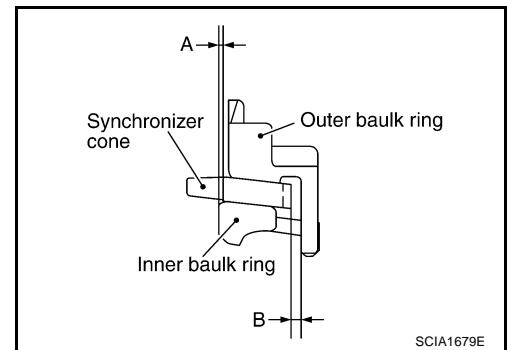


- **Double Cone Synchronizer (1st, 3rd and 4th)**

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

CAUTION:

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



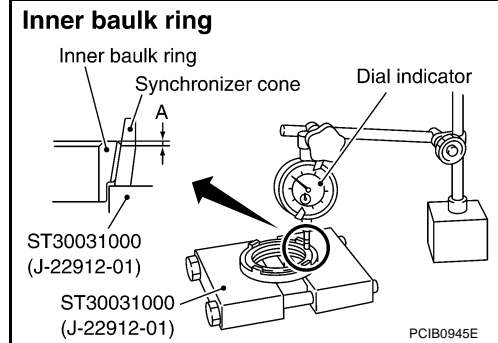
TRANSMISSION ASSEMBLY

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

Clearance "A"

Standard value : 0.5 - 0.7 mm (0.020 - 0.028 in)

Limit value : 0.3 mm (0.012 in)



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

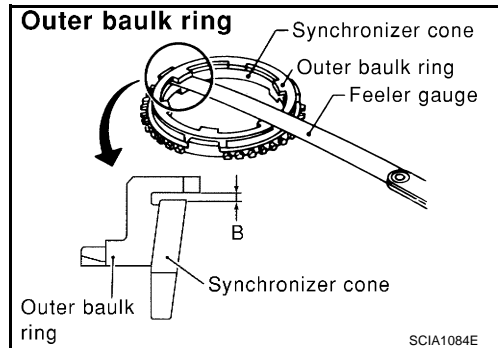
Clearance "B"

Standard value

1st : 1.0 - 1.5 mm (0.039 - 0.059 in)

3rd,4th : 0.85 - 1.35 mm (0.0335 - 0.0531 in)

Limit value : 0.7 mm (0.028 in)

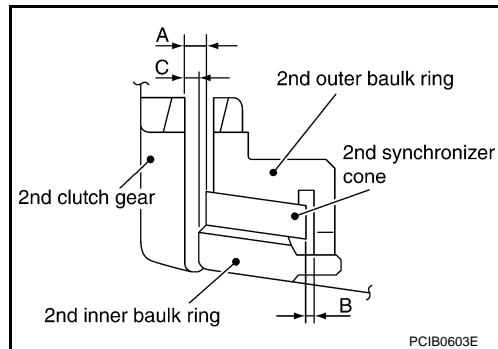


- **Triple Cone Synchronizer (2nd)**

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

CAUTION:

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

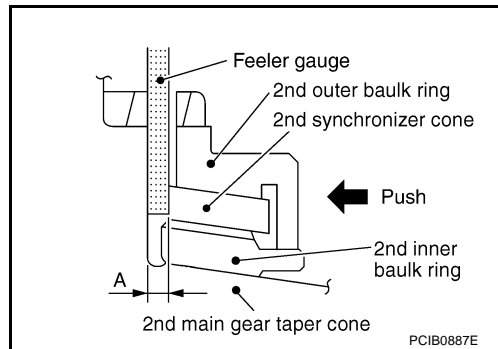


1. Measure the clearance "A" at 2 points or more diagonally opposite using a feeler gauge when pressing baulk ring toward clutch gear taper cone. Then calculate the mean value.

Clearance "A"

Standard value : 0.6 - 1.3 mm (0.024 - 0.051 in)

Limit value : 0.3 mm (0.012 in)

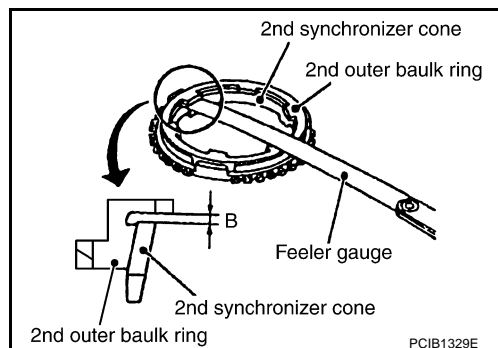


2. Measure the clearance "B" at 2 points or more diagonally opposite using a feeler gauge. Then calculate the mean value.

Clearance "B"

Standard value : 0.85 - 1.35 mm (0.0335 - 0.0531 in)

Limit value : 0.7 mm (0.028 in)



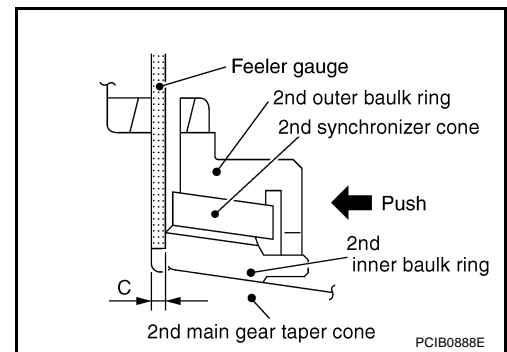
TRANSMISSION ASSEMBLY

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

Clearance "C"

Standard value : 0.7 - 1.25 mm (0.028 - 0.0492 in)

Limit value : 0.3 mm (0.012 in)



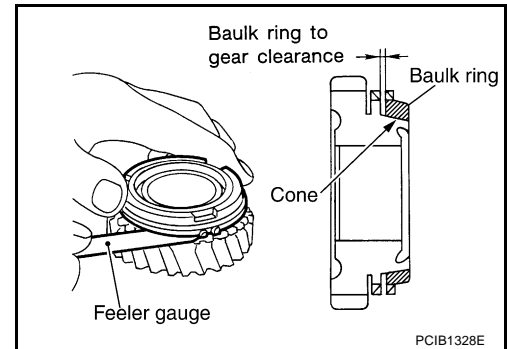
Reverse Synchronizer

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

Clearance

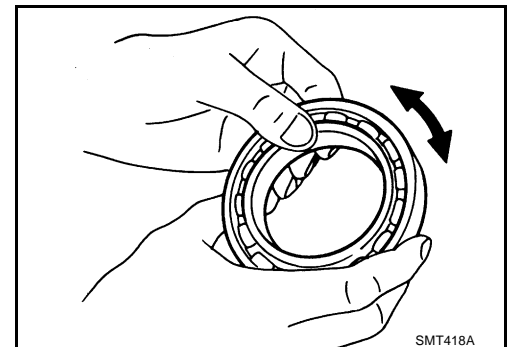
Standard value : 0.75 - 1.2 mm (0.0295 - 0.047 in)

Limit value : 0.5 mm (0.020 in)



Bearing

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



TRANSMISSION ASSEMBLY

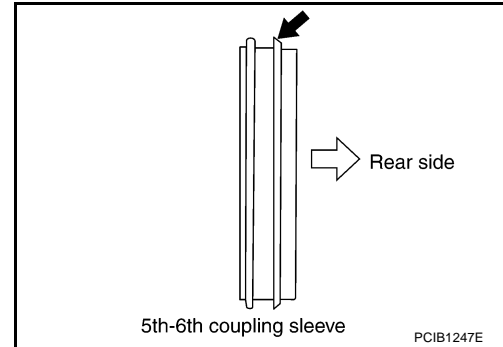
ASSEMBLY

Gear Components

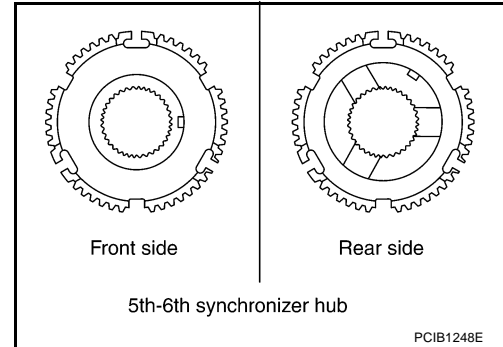
1. Install 5th-6th synchronizer hub assembly according to the following.
 - a. Install 5th-6th coupling sleeve to 5th-6th synchronizer hub.

CAUTION:

- Do not reuse 5th-6th synchronizer hub and 5th-6th coupling sleeve.
- Replace 5th-6th synchronizer hub and 5th-6th coupling sleeve as a set.
- Be careful with the orientation 5th-6th coupling sleeve.



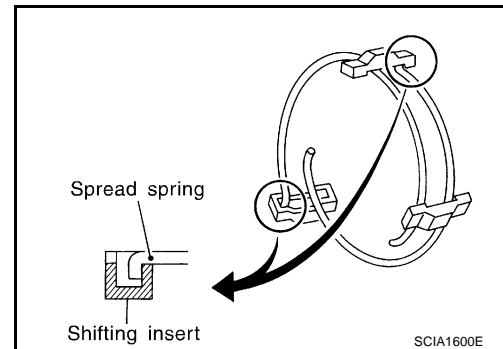
- Be careful with the orientation 5th-6th synchronizer hub.



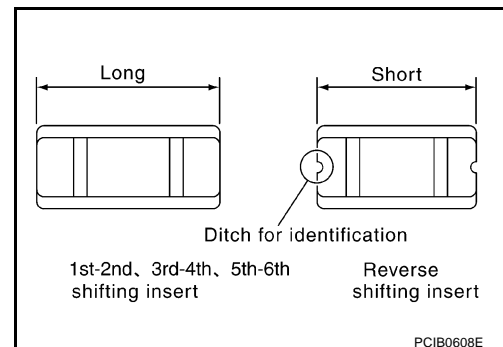
- b. Install shifting inserts and spread springs to 5th-6th synchronizer hub.

CAUTION:

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



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



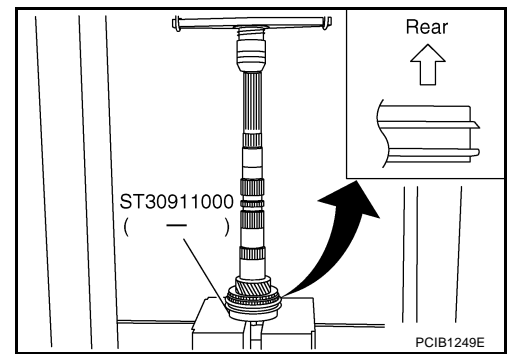
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TRANSMISSION ASSEMBLY

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

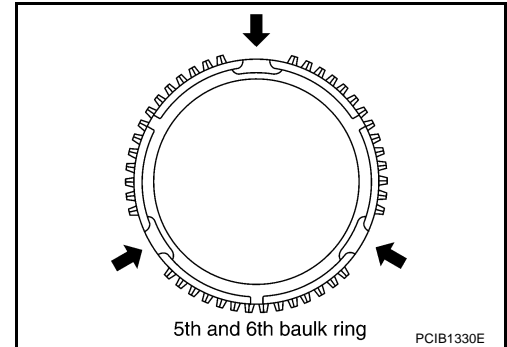
CAUTION:

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



NOTE:

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

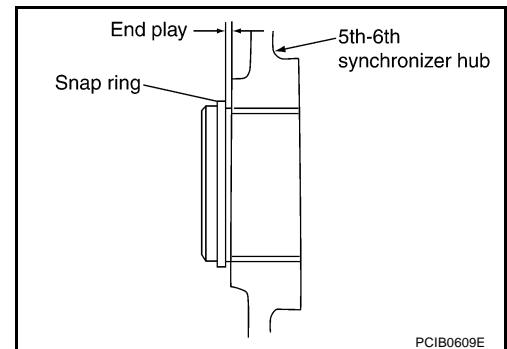


2. Select and install a snap ring so that the end play comes within the standard value. Refer to [MT-69, "Snap Rings"](#).

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

CAUTION:

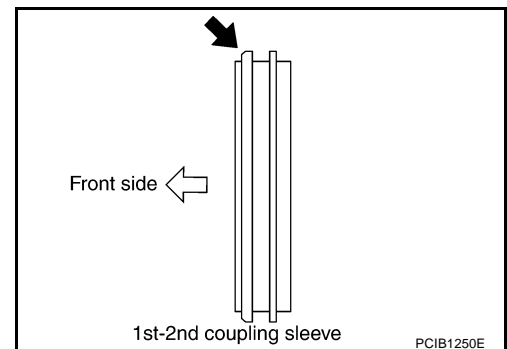
Do not reuse snap ring.



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

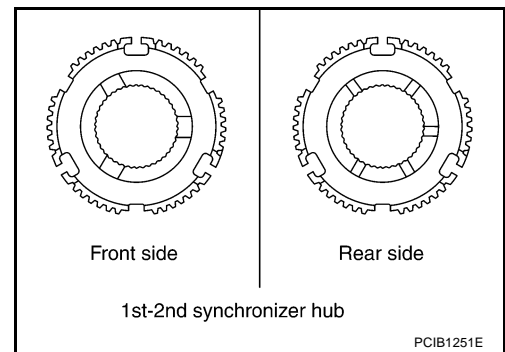
CAUTION:

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



TRANSMISSION ASSEMBLY

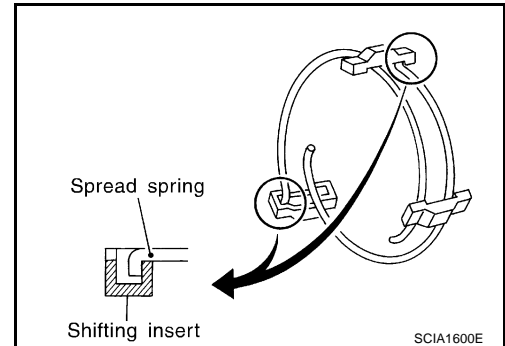
- Be careful with the orientation 1st-2nd synchronizer hub.



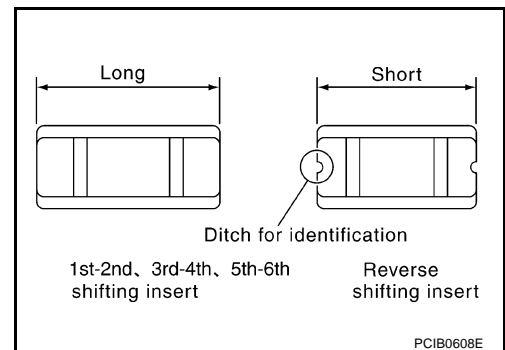
- b. Install spread springs and shifting inserts to 1st-2nd synchronizer hub.

CAUTION:

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



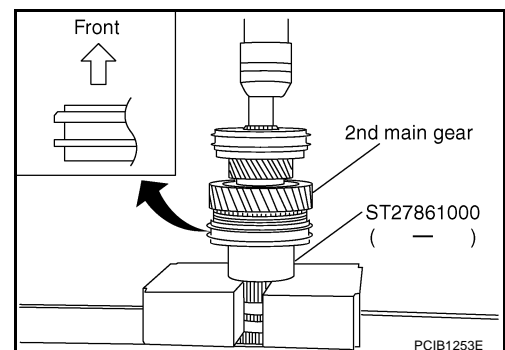
- Be careful with the shape of reverse shifting insert to avoid misassembly.



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

CAUTION:

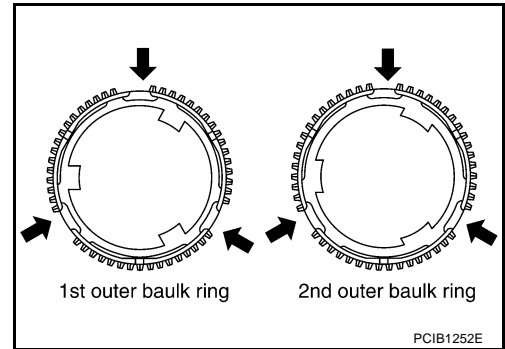
- Apply gear oil to 2nd needle bearing, 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring, 1st-2nd synchronizer hub spline of mainshaft.
- Replace 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring as a set.
- Be careful with the orientation 1st-2nd coupling sleeve.



TRANSMISSION ASSEMBLY

NOTE:

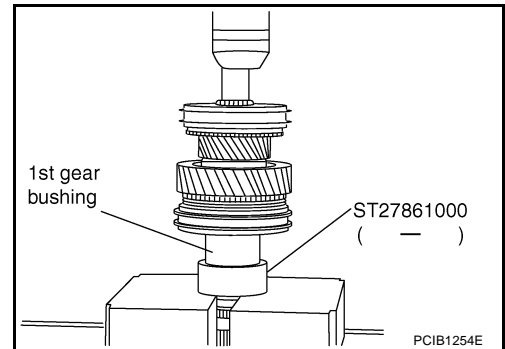
1st outer baulk ring has three spaces that three gear tooth is missing and 2nd outer baulk ring has three spaces that two gear teeth are missing.



4. Press in 1st gear bushing using Tool.
5. Install 1st outer baulk ring, 1st synchronizer cone, 1st inner baulk ring, 1st needle bearing and 1st main gear to mainshaft.

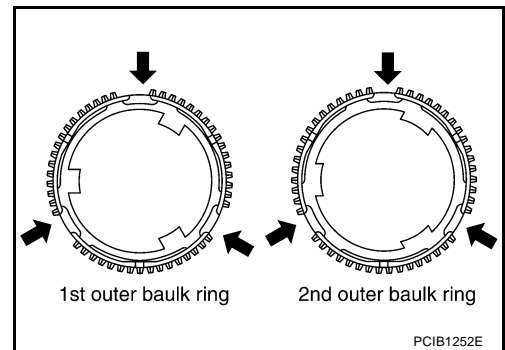
CAUTION:

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



NOTE:

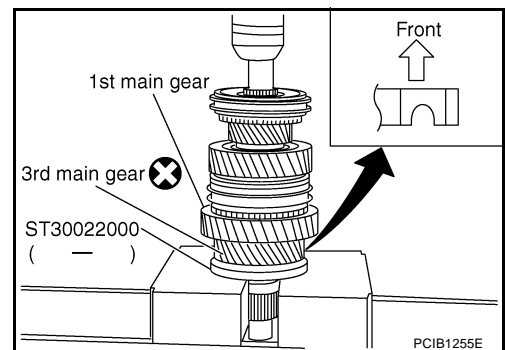
1st outer baulk ring has three spaces that three gear tooth is missing and 2nd outer baulk ring has three spaces that two gear teeth are missing.



6. Press in 3rd main gear using Tool.

CAUTION:

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

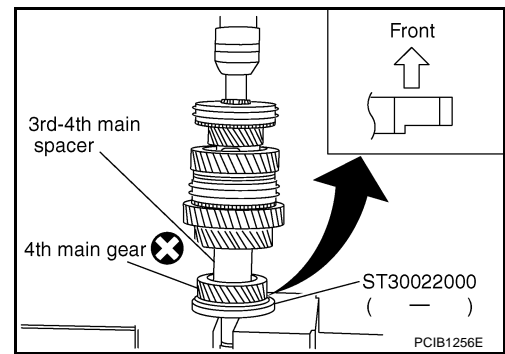


TRANSMISSION ASSEMBLY

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

CAUTION:

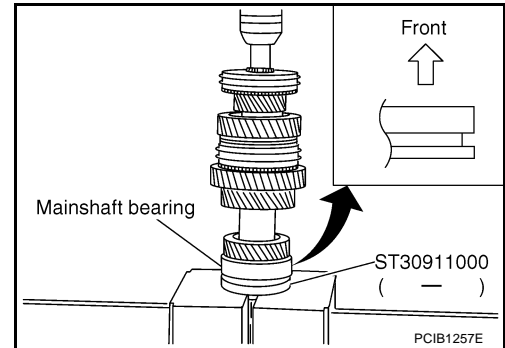
- Do not reuse 4th main gear.
- Be careful with the orientation 4th main gear.



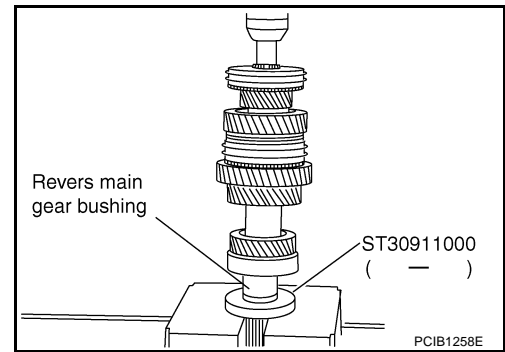
9. Press in mainshaft bearing using Tool.

CAUTION:

- Be careful with the orientation mainshaft bearing.



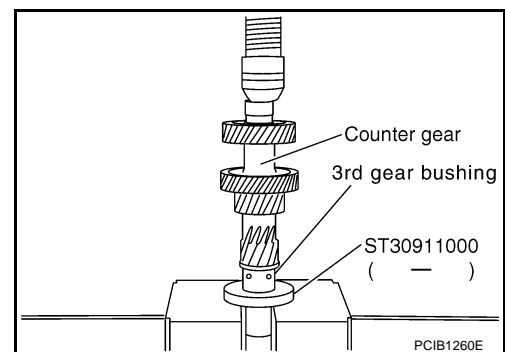
10. Press in reverse main gear bushing using Tool.



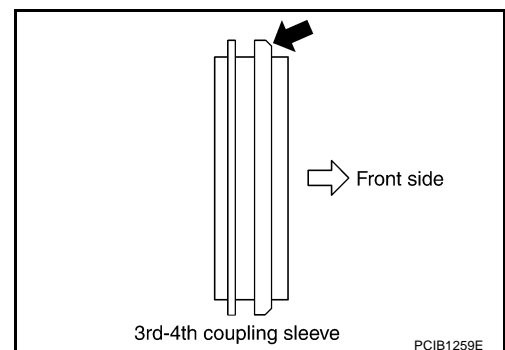
11. Press in 3rd gear bushing using Tool.
12. Install 3rd-4th synchronizer hub assembly according to the following.
 - a. Install 3rd-4th coupling sleeve to 3rd-4th synchronizer hub.

CAUTION:

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



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



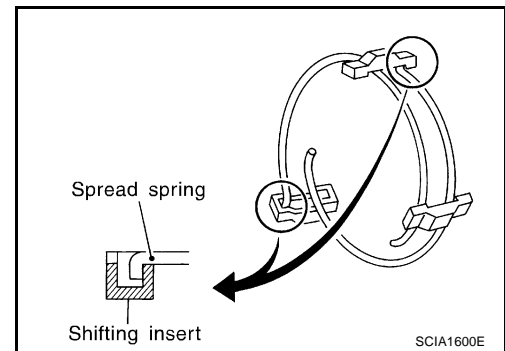
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TRANSMISSION ASSEMBLY

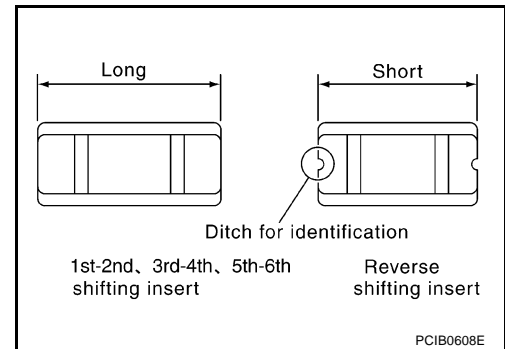
- b. Install spread springs and shifting inserts to 3rd-4th synchronizer hub.

CAUTION:

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



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



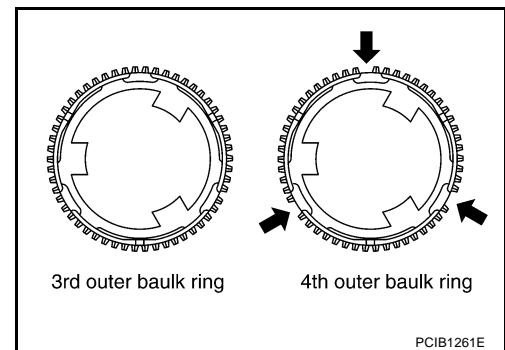
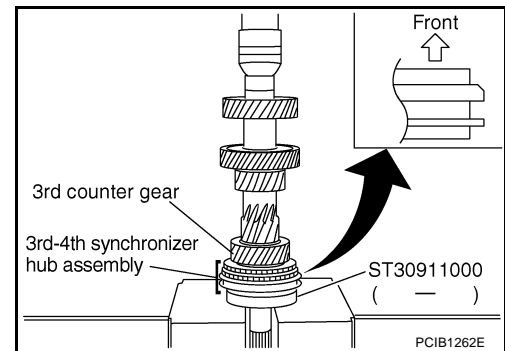
- c. Press in 3rd-4th synchronizer hub assembly, 3rd inner baulk ring, 3rd synchronizer cone, 3rd outer baulk ring, 3rd counter gear and 3rd needle bearing using Tool.

CAUTION:

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

NOTE:

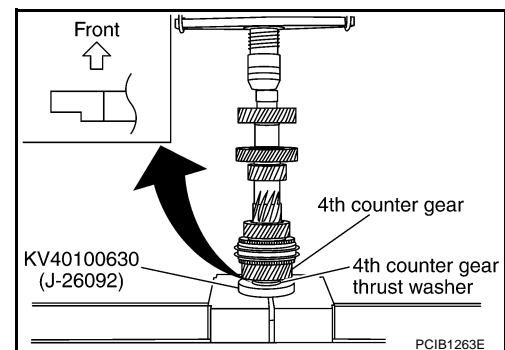
4th baulk ring has three spaces that one gear tooth is missing but 3rd baulk ring doesn't.



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

CAUTION:

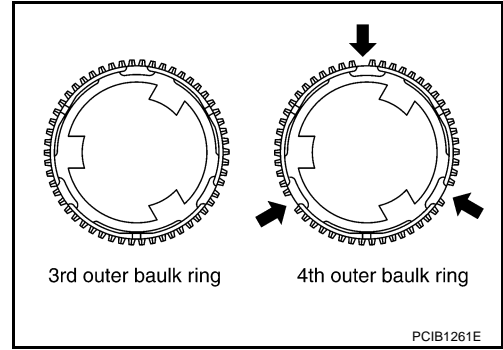
- Apply gear oil to 4th needle bearing, 4th outer baulk ring, 4th synchronizer cone and 4th inner baulk ring.
- Replace 4th outer baulk ring, 4th synchronizer cone and 4th inner baulk ring as a set.
- Be careful with the orientation 4th counter gear thrust washer.



TRANSMISSION ASSEMBLY

NOTE:

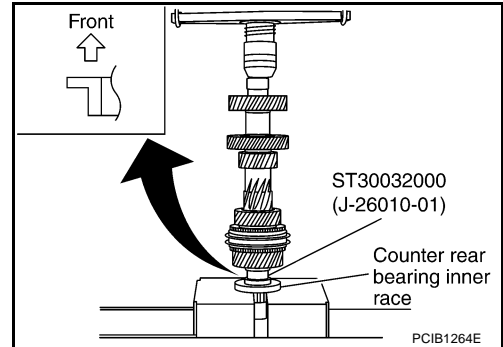
4th baulk ring has three spaces that one gear tooth is missing but 3rd baulk ring doesn't.



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

CAUTION:

Be careful with the orientation counter rear bearing inner race.

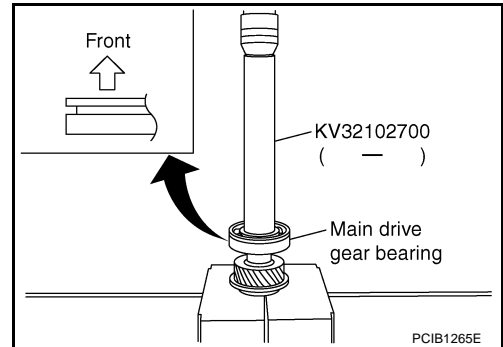


15. Install main drive gear bearing according to the following.

a. Press in main drive gear bearing using Tool.

CAUTION:

Be careful with the orientation main drive gear bearing.

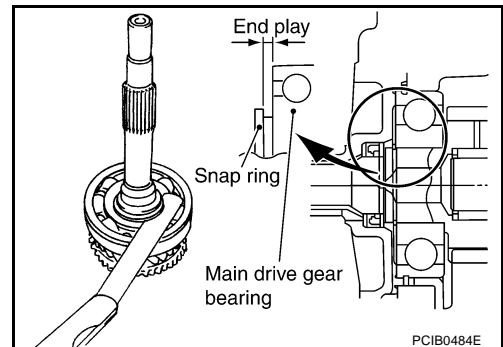


b. Select and install a snap ring to main drive gear bearing so that the end play comes within the standard value. Refer to [MT-69, "Snap Rings"](#) .

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

CAUTION:

Do not reuse snap ring.

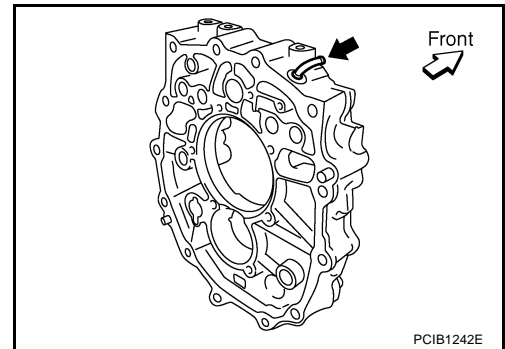


TRANSMISSION ASSEMBLY

16. Install breather to adapter plate.

CAUTION:

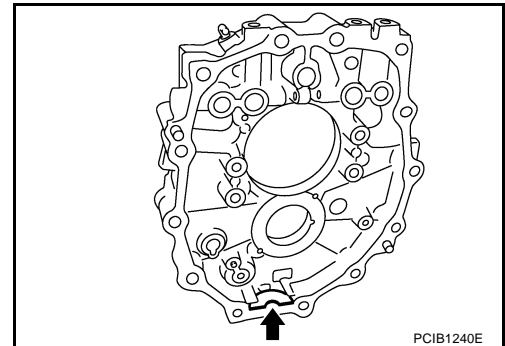
- Do not reuse breather.
- Be careful with the orientation breather.



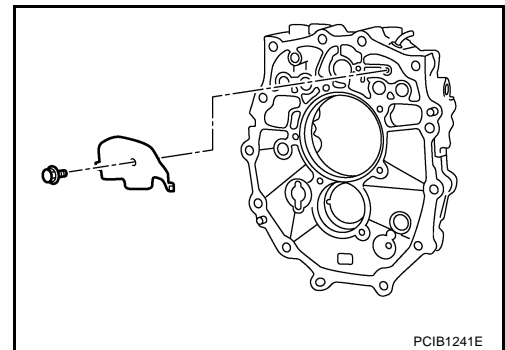
17. Install magnet to adapter plate.

CAUTION:

- Be careful with the orientation magnet.

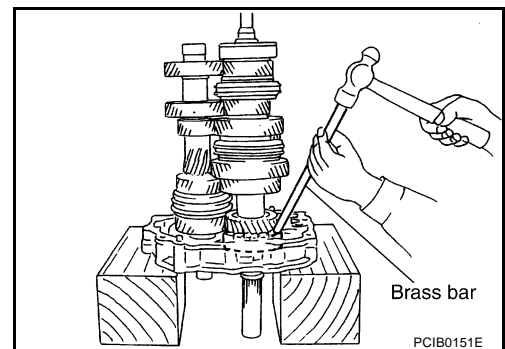


18. Install baffle plate to adapter plate, and then tighten bolt to the specified torque. Refer to [MT-21, "Case Components"](#) .



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

- Install main pilot bearing, pilot bearing spacer and 5th baulk ring to main drive gear.
- Install main drive gear assembly, mainshaft assembly and counter gear assembly combined in one unit to adapter plate using brass bar.

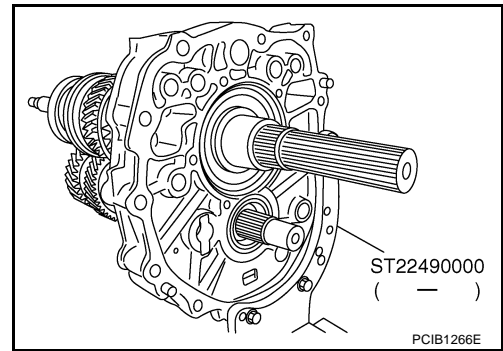


TRANSMISSION ASSEMBLY

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

CAUTION:

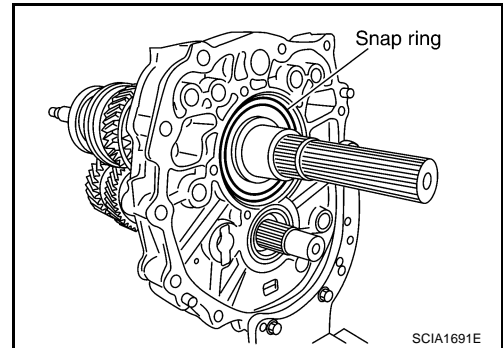
Do not directly secure mating surface of adapter plate in a vise.



21. Install snap ring to mainshaft bearing.

CAUTION:

Do not reuse snap ring.

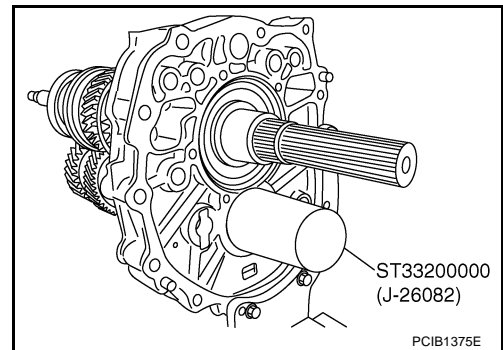


22. Install counter rear bearing to adapter plate using Tool.

23. Install counter rear bearing spacer to counter gear.

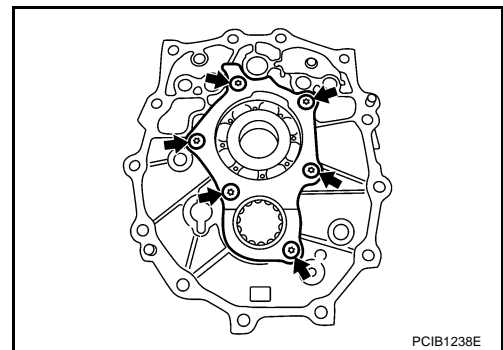
CAUTION:

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



24. Install bearing retainer according to the following.

- Instal bearing retainer to adapter plate.
- Apply recommended thread locking sealant to threads of bolts, and then tighten bolts to the specified torque. Refer to [MT-21, "Case Components"](#).
 - Use Genuine Medium Strength Thread Locking Sealant or the equivalent. Refer to [GI-46, "Recommended Chemical Products and Sealants"](#).



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

a. Install reverse coupling sleeve to reverse synchronizer hub.

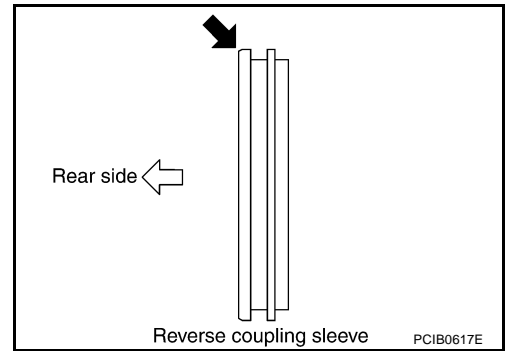
CAUTION:

- Do not reuse reverse coupling sleeve and reverse synchronizer hub.
- Replace reuse reverse coupling sleeve and reverse synchronizer hub as a set.

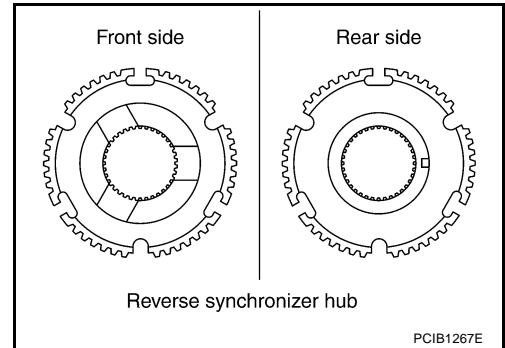
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TRANSMISSION ASSEMBLY

- Be careful with the orientation reverse coupling sleeve.



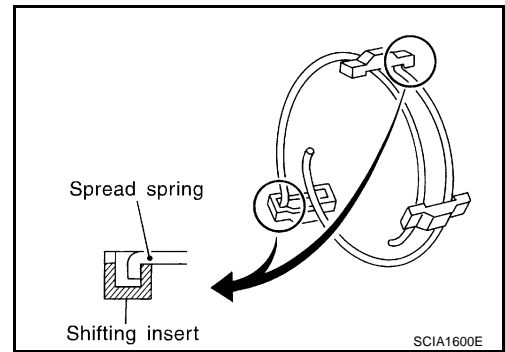
- Be careful with the orientation reverse synchronizer hub.



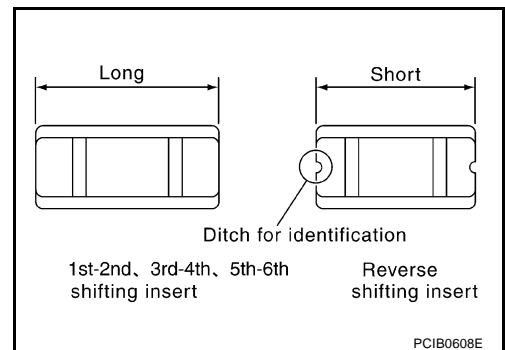
- b. Install spread springs to shifting inserts to reverse synchronizer hub.

CAUTION:

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



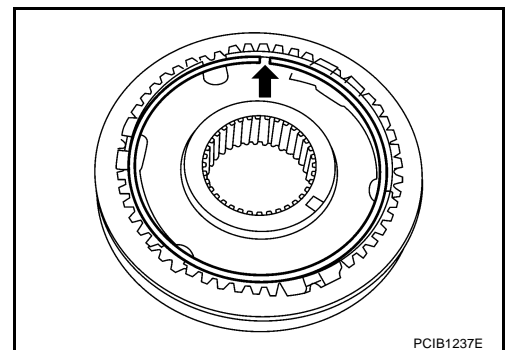
- Be careful with the shape of 1st-2nd, 3rd-4th and 5th-6th shifting insert to avoid misassembly.



- c. Install snap ring to reverse synchronizer hub.

CAUTION:

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

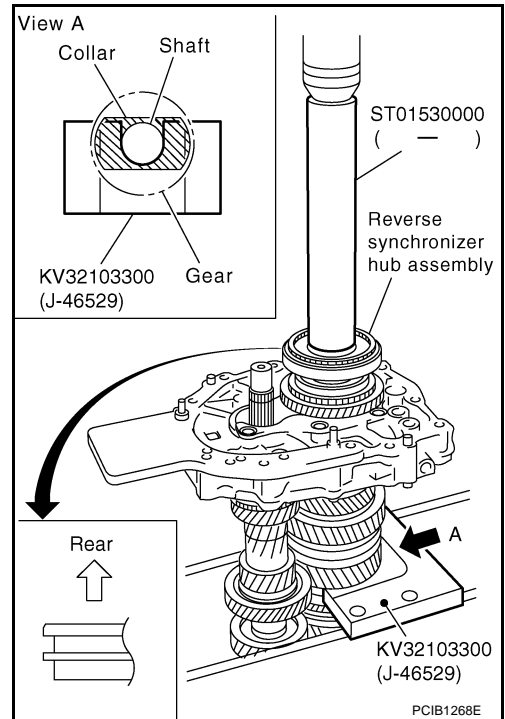


TRANSMISSION ASSEMBLY

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

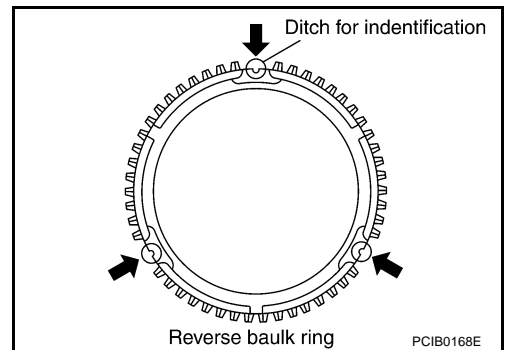
CAUTION:

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



NOTE:

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

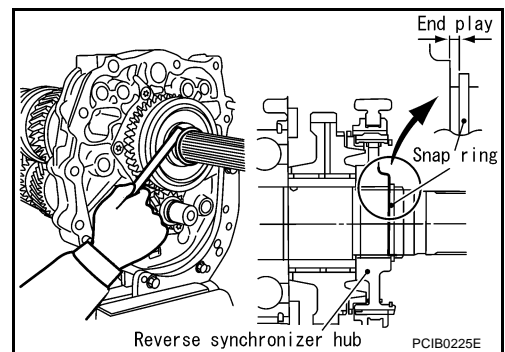


26. Select and install a snap ring so that the end play comes within the standard value. Refer to [MT-69, "Snap Rings"](#).

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

CAUTION:

Do not reuse snap ring.

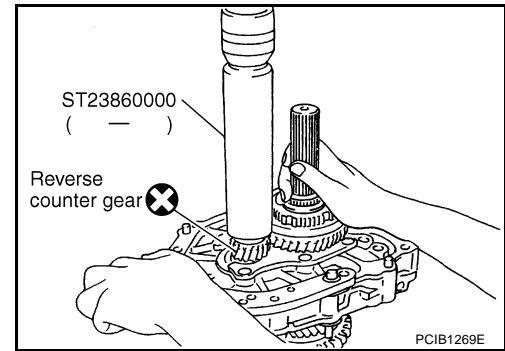


TRANSMISSION ASSEMBLY

27. Press in reverse counter gear using Tool.

CAUTION:

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

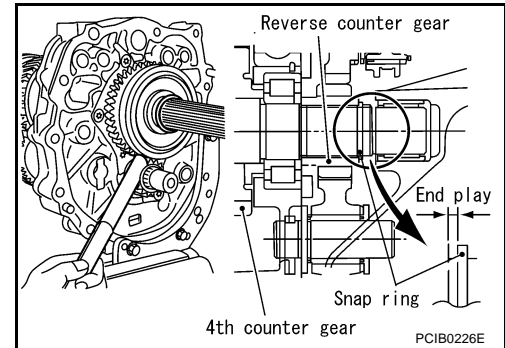


28. Select and install a snap ring so that the end play comes within the standard value. Refer to [MT-69, "Snap Rings"](#).

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

CAUTION:

Do not reuse snap ring.



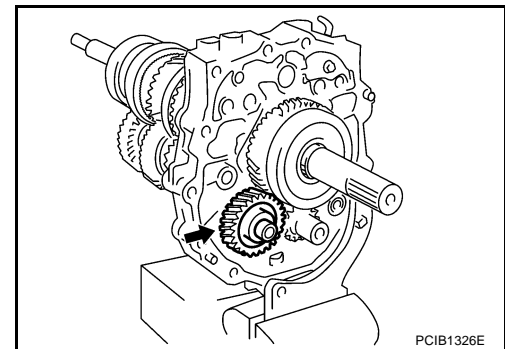
29. Install reverse idler shaft assembly according to the following.

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

CAUTION:

Apply gear oil to reverse idler needle bearing.

b. Install reverse idler shaft assembly to adapter plate.

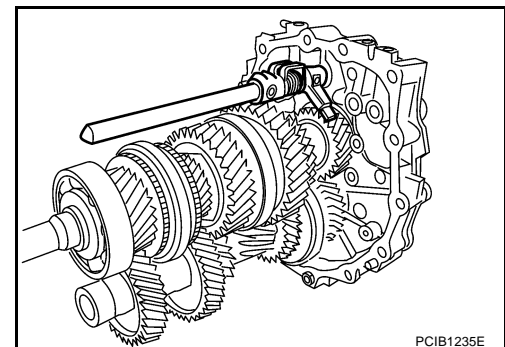


Shift Control Components

1. Install main drive gear assembly, mainshaft assembly, counter gear assembly and reverse idler shaft assembly. Refer to [MT-45, "Gear Components"](#).

2. Install striking rod assembly according to the following.

a. Install striking rod assembly to adapter plate.

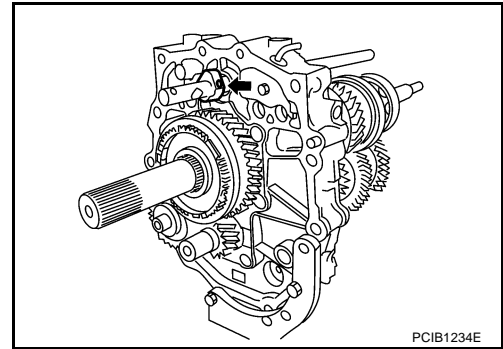


TRANSMISSION ASSEMBLY

- b. Install stopper ring to striking rod assembly.
- c. Install retaining pin onto stopper ring using suitable tool.

CAUTION:

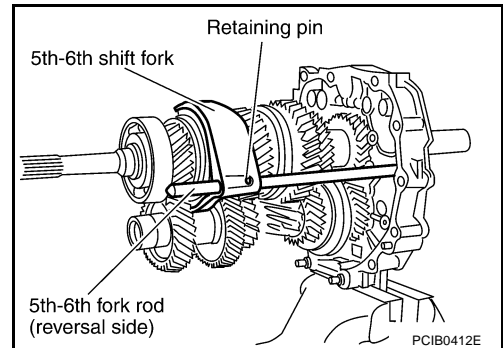
Do not reuse retaining pin.



3. Install 5th-6th fork rod (reversal side) according to the following.
 - a. Install 5th-6th shift fork to 5th-6th coupling sleeve.
 - b. Install 5th-6th fork rod (reversal side) to 5th-6th shift fork.
 - c. Install retaining pin onto 5th-6th shift fork using suitable tool.

CAUTION:

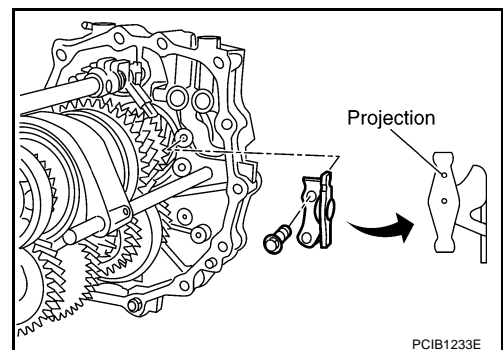
Do not reuse retaining pin.



4. Install 5th-6th control lever to adapter plate, and then tighten bolts to the specified torque. Refer to [MT-25, "Shift Control Components"](#).

CAUTION:

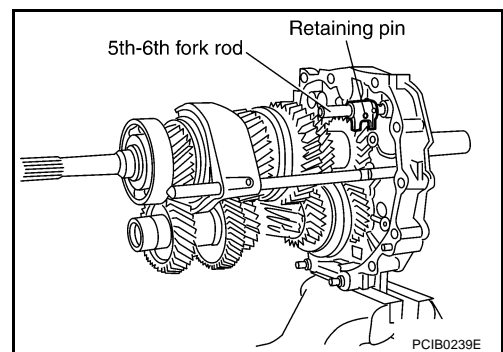
Install 5th-6th control lever with projection side at upward.



5. Install 5th-6th fork rod according to the following.
 - a. Install 5th-6th fork bracket and 5th-6th fork rod to adapter plate.
 - b. Install retaining pin onto 5th-6th fork bracket using suitable tool.

CAUTION:

Do not reuse retaining pin.



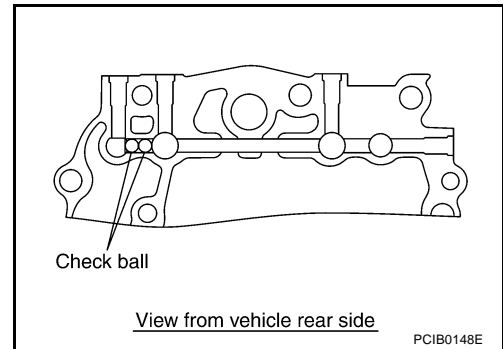
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TRANSMISSION ASSEMBLY

6. Install check balls to adapter plate.

CAUTION:

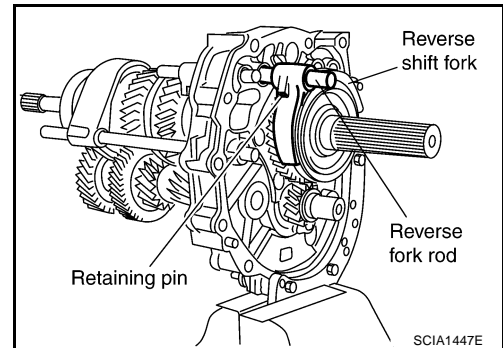
Apply gear oil to check balls.



7. Install reverse fork rod according to the following.
- Install reverse shift fork to reverse coupling sleeve.
 - Install reverse fork rod to reverse shift fork.
 - Install retaining pin onto reverse shift fork using suitable tool.

CAUTION:

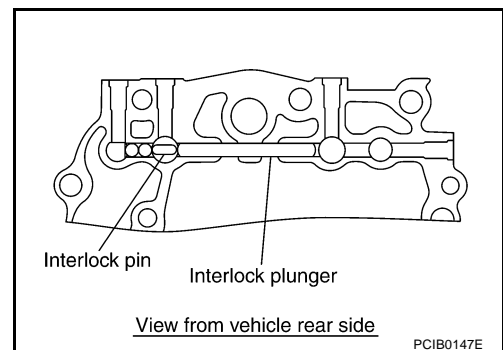
Do not reuse retaining pin.



8. Install interlock pin and interlock plunger to adapter plate.

CAUTION:

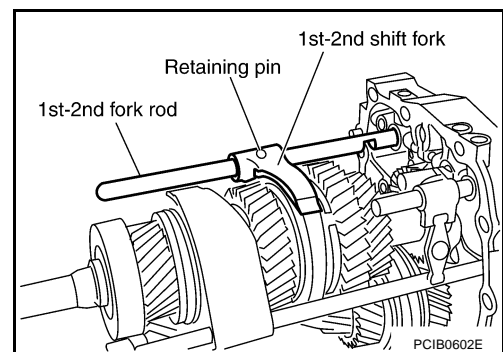
Apply gear oil to interlock pin and interlock plunger.



9. Install 1st-2nd fork rod according to the following.
- Install 1st-2nd shift fork to 1st-2nd coupling sleeve.
 - Install 1st-2nd fork rod to 1st-2nd shift fork.
 - Install retaining pin onto 1st-2nd shift fork using suitable tool.

CAUTION:

Do not reuse retaining pin.

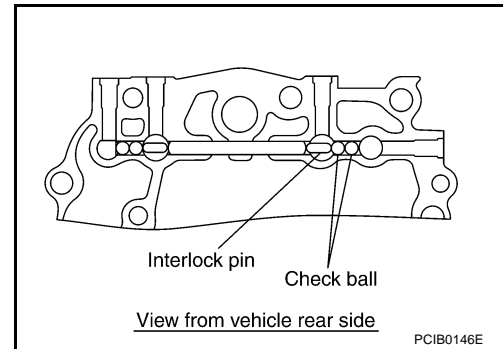


TRANSMISSION ASSEMBLY

10. Install interlock pin and check balls to adapter plate.

CAUTION:

Apply gear oil to interlock pin and check balls.

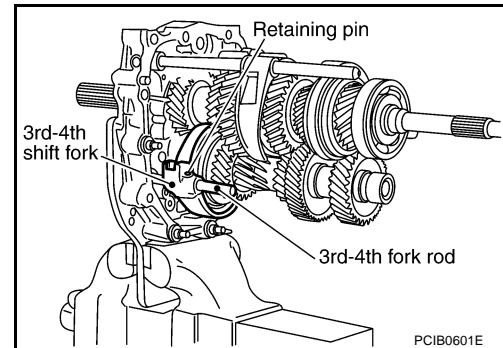


11. Install 3rd-4th fork rod (reversal side) according to the following.

- Install 3rd-4th shift fork to 3rd-4th coupling sleeve.
- Install 3rd-4th fork rod (reversal side) to 3rd-4th shift fork.
- Install retaining pin onto 3rd-4th shift fork using suitable tool.

CAUTION:

Do not reuse retaining pin.

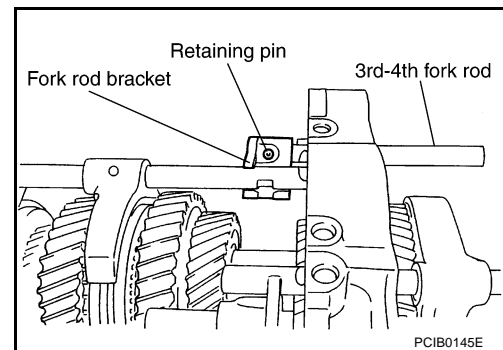


12. Install 3rd-4th fork rod according to the following.

- Install 3rd-4th fork rod to adapter plate.
- Install 3rd-4th fork rod bracket to 3rd-4th fork rod.
- Install retaining pin onto 3rd-4th fork rod bracket using suitable tool.

CAUTION:

Do not reuse retaining pin.

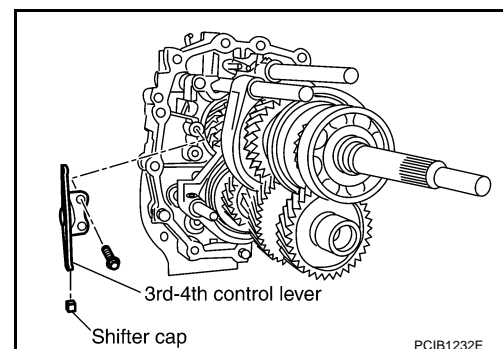


13. Install 3rd-4th control lever according to the following.

- Install shifter cap to 3rd-4th control lever.
- Install 3rd-4th control lever to adapter plate, and then tighten bolts to the specified torque. Refer to [MT-25, "Shift Control Components"](#).

CAUTION:

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



14. Install check ball plug according to the following.

TRANSMISSION ASSEMBLY

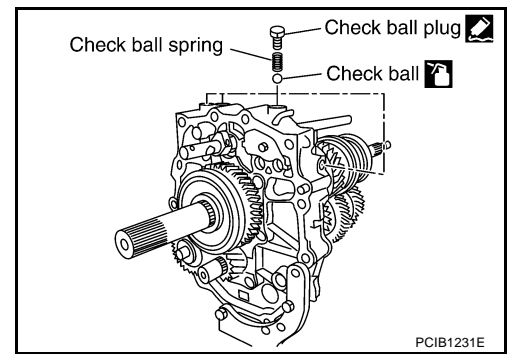
- a. Install check balls, check ball springs to adapter plate.

CAUTION:

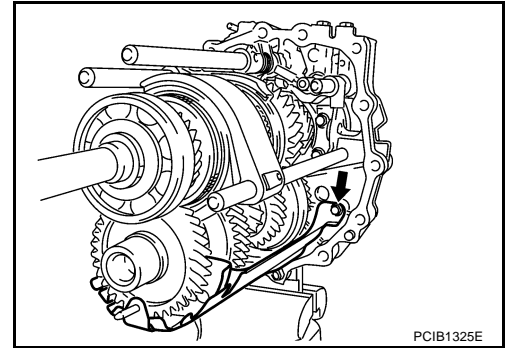
Apply gear oil to check ball.

- b. Apply recommended sealant to threads of check ball plugs, and tighten check ball plugs to the specified torque. Refer to [MT-25, "Shift Control Components"](#).

- Use Genuine Silicone RTV or the equivalent. Refer to [GI-46, "Recommended Chemical Products and Sealants"](#).

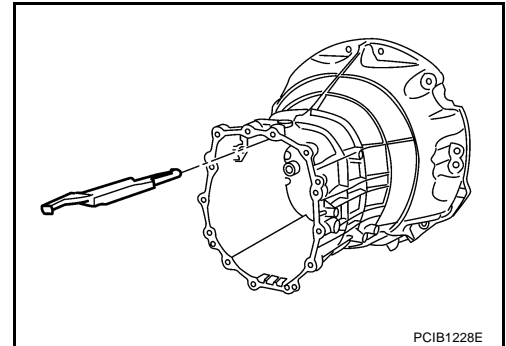


15. Install baffle plate to adapter plate, and then tighten bolt to the specified torque. Refer to [MT-21, "Case Components"](#).



Case Components

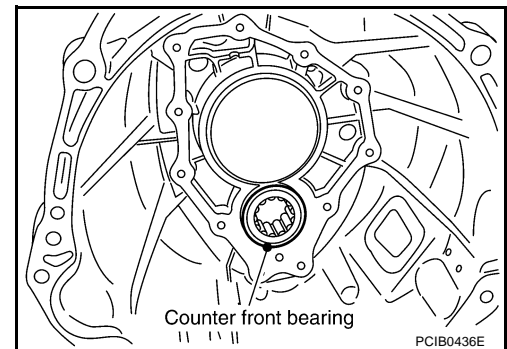
1. Install main drive gear assembly, mainshaft assembly, counter gear assembly and reverse idler shaft assembly. Refer to [MT-45, "Gear Components"](#).
2. Install fork rods and shift forks. Refer to [MT-56, "Shift Control Components"](#).
3. Install oil gutter to transmission case.



4. Install counter front bearing to transmission case.

CAUTION:

Apply multi-purpose grease to counter front bearing.



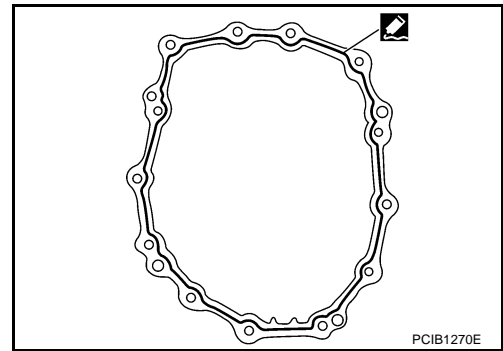
TRANSMISSION ASSEMBLY

5. Apply recommended sealant to mating surface of transmission case as shown.

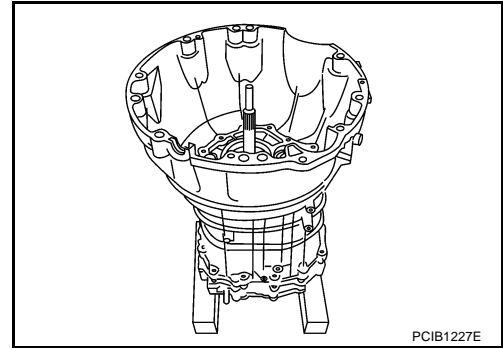
- Use Genuine Silicone RTV or the equivalent. Refer to [GI-46, "Recommended Chemical Products and Sealants"](#).

CAUTION:

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



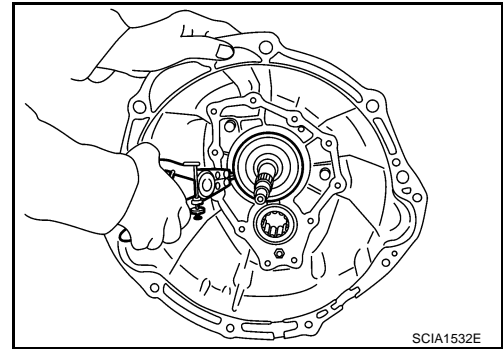
6. Install transmission case to adapter plate assembly.



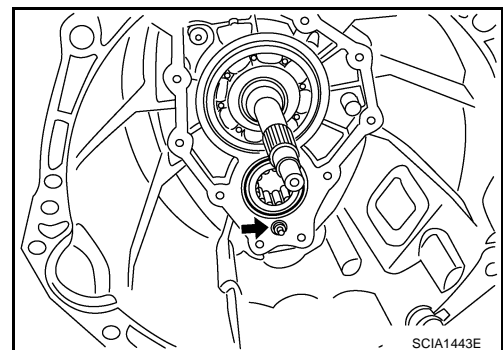
7. Install snap ring to main drive gear bearing using suitable tool.

CAUTION:

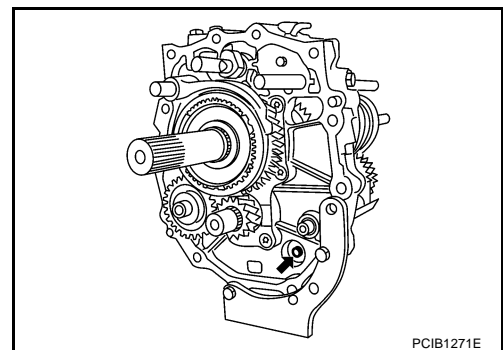
Do not reuse snap ring.



8. Tighten baffle plate nut to the specified torque. Refer to [MT-21, "Case Components"](#).



9. Tighten baffle plate bolt to the specified torque. Refer to [MT-21, "Case Components"](#).



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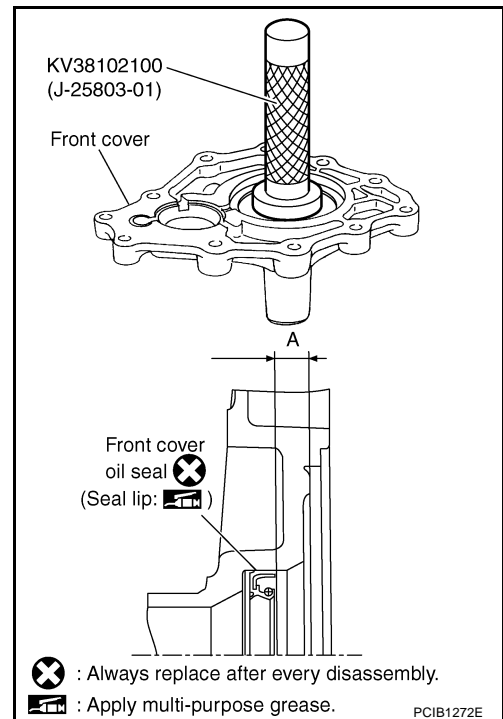
TRANSMISSION ASSEMBLY

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

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

CAUTION:

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



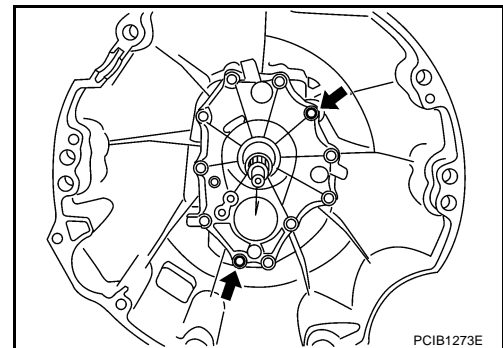
11. Install front cover according to the following.

a. Install front cover gasket and front cover to transmission case.

CAUTION:

Do not reuse front cover gasket.

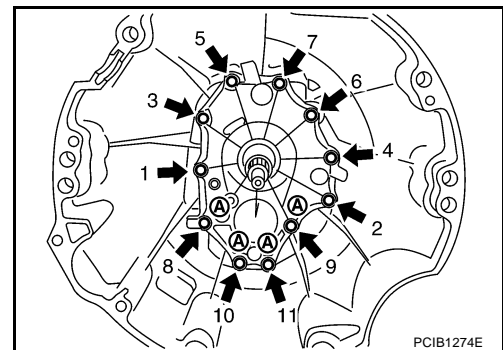
- b. Temporarily tighten 2 bolts in the positions shown.
 c. Temporarily tighten remaining 9 bolts.



d. Tighten bolts to the specified torque in order as shown. Refer to [MT-21, "Case Components"](#).

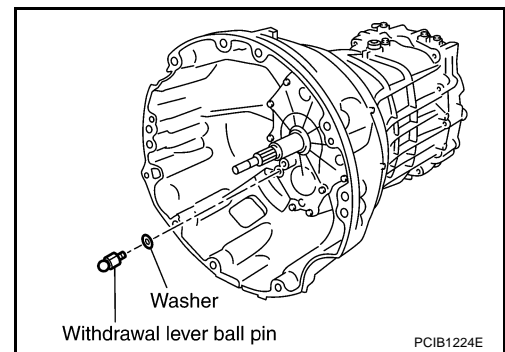
CAUTION:

Do not reuse bolts indicated as A in the figure.



TRANSMISSION ASSEMBLY

12. Install washer to withdrawal lever ball pin, and then install it to front cover. Tighten withdrawal lever ball pin to the specified torque. Refer to [MT-21, "Case Components"](#) .

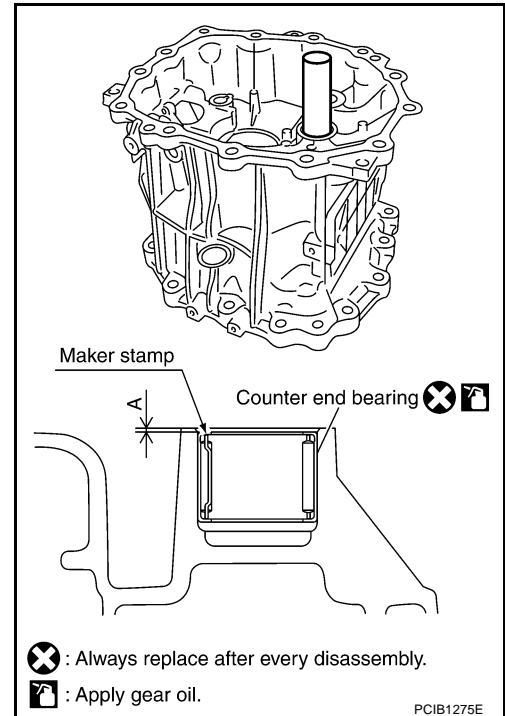


13. Install counter end bearing to rear extension (or OD gear case) using suitable tool [32 mm (1.26 in) dia.].

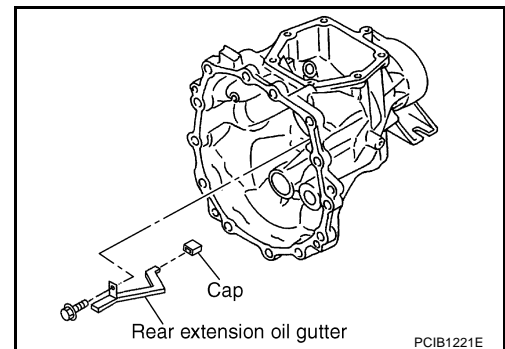
Dimension A: 0.5 - 1.5 (0.020 - 0.059 in)

CAUTION:

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



14. Install rear extension oil gutter according to the following. (For 2WD models)
- Install cap to rear extension oil gutter.
 - Install rear extension oil gutter to rear extension, and then tighten bolt to specified torque. Refer to [MT-21, "Case Components"](#) .



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TRANSMISSION ASSEMBLY

15. Install rear oil seal to rear extension (or OD gear case) using Tool.

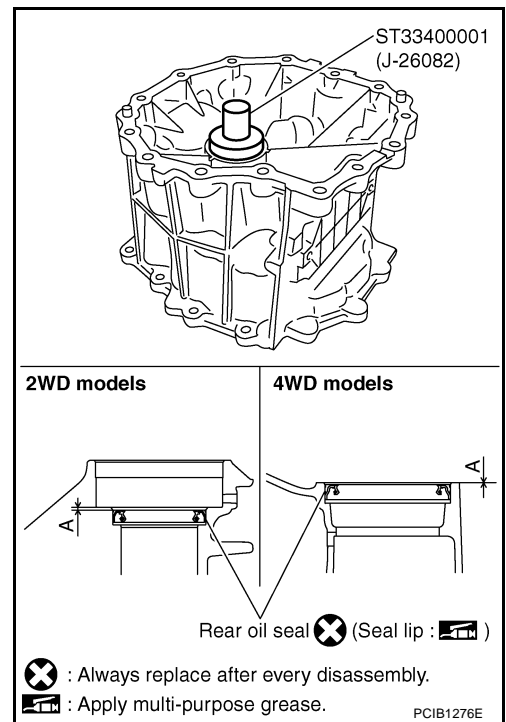
Dimension A

2WD models : 1.2 - 2.2 mm (0.047 - 0.087 in)

4WD models : -0.5 - 0.5 mm (-0.020 - 0.020 in)

CAUTION:

- Do not reuse rear oil seal.
- Apply multi-purpose grease onto oil seal lip.
- When installing, do not incline rear oil seal.

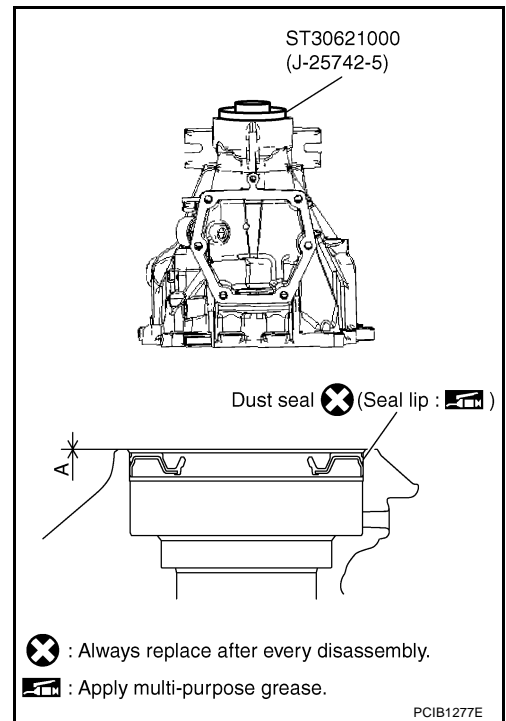


16. Install dust seal to rear extension using Tool. (For 2WD models)

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

CAUTION:

- Do not reuse dust seal.
- Apply multi-purpose grease onto dust seal lip.
- When installing, do not incline dust seal.

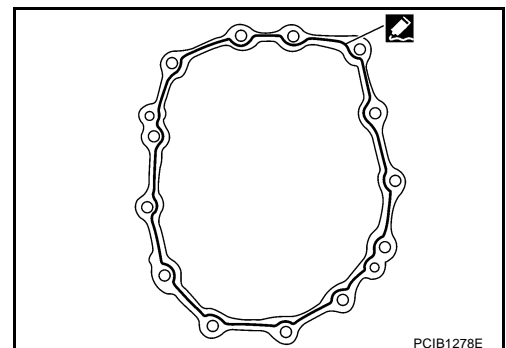


17. Apply recommended sealant to mating surface of rear extension as shown.

- Use Genuine Silicone RTV or the equivalent. Refer to [GL-46, "Recommended Chemical Products and Sealants"](#).

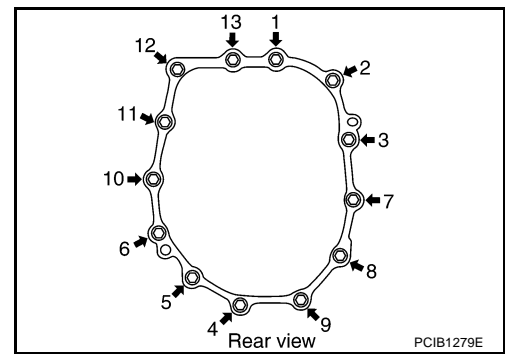
CAUTION:

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



TRANSMISSION ASSEMBLY

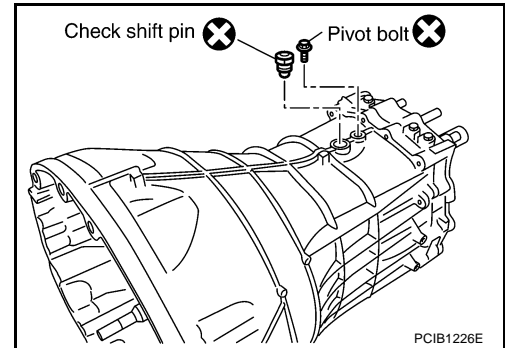
18. Install rear extension (or OD gear case) to adapter plate, and then tighten bolts to the specified torque in order as shown. Refer to [MT-21, "Case Components"](#) .



19. Install check shift pin and pivot bolt to transmission case, and then tighten them to the specified torque. Refer to [MT-21, "Case Components"](#) .

CAUTION:

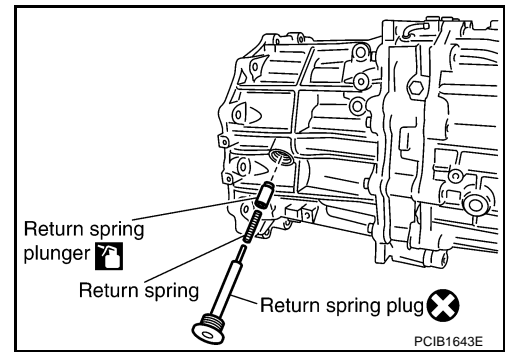
Do not reuse check shift pin and pivot bolt.



20. Install return spring plunger, return spring and return spring plug to rear extension (or OD gear case), and then tighten return spring plug to the specified torque. Refer to [MT-25, "Shift Control Components"](#) .

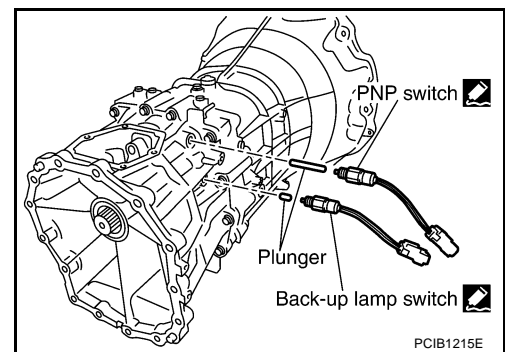
CAUTION:

- Do not reuse return spring plug.
- Apply gear oil to return spring plunger.



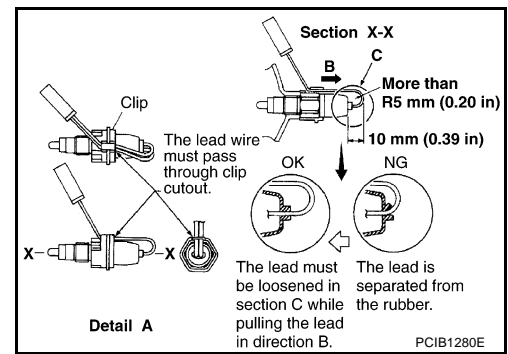
21. Install PNP switch and back-up lamp switch according to the following.

- a. Install plunger to rear extension (or OD gear case).
- b. Apply recommended sealant to threads of PNP switch and back-up lamp switch.
 - Use Genuine Silicone RTV or the equivalent. Refer to [GI-46, "Recommended Chemical Products and Sealants"](#) .
- c. Install PNP switch and back-up lamp switch to rear extension (or OD gear case), and tighten them to the specified torque. Refer to [MT-21, "Case Components"](#) .



TRANSMISSION ASSEMBLY

22. Install clips to PNP switch and back-up lamp switch.

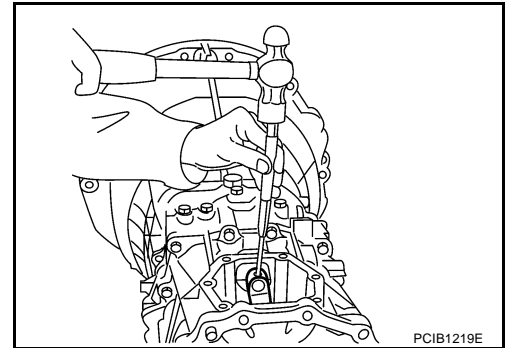


23. Install striking arm according to the following.

- Install striking arm to striking rod assembly.
- Install retaining pin to striking arm using suitable tool.

CAUTION:

Do not reuse retaining pin.



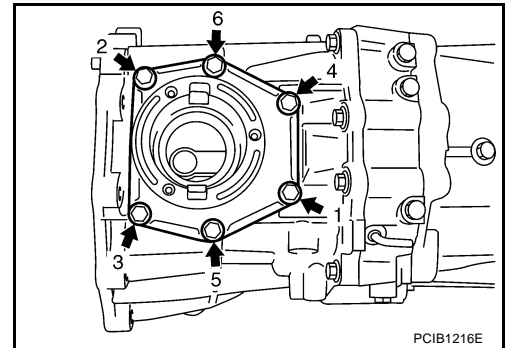
24. Install control housing according to the following.

- Install gasket and control housing to rear extension (or OD gear case).

CAUTION:

Do not reuse gasket.

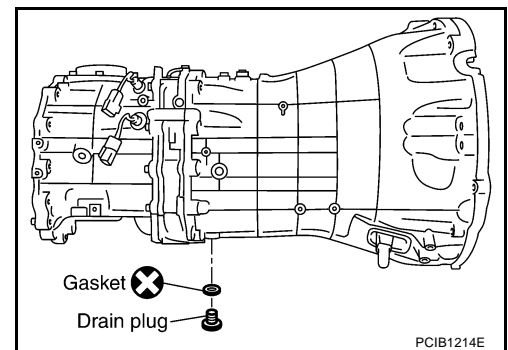
- Tighten bolts to the specified torque in order as shown. Refer to [MT-21, "Case Components"](#).



25. Install gasket to drain plug, and then install it to transmission case. Tighten drain plug to the specified torque. Refer to [MT-21, "Case Components"](#).

CAUTION:

Do not reuse gasket.

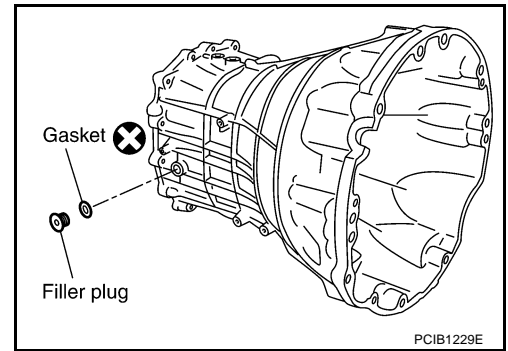


TRANSMISSION ASSEMBLY

26. Install gasket to filler plug, and then install it to transmission case. Tighten filler plug to the specified torque. Refer to [MT-21, "Case Components"](#).

CAUTION:

- Do not reuse gasket.
- After oil is filled, tighten filler plug to specified torque.



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SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ECS00DZ2

Engine		VQ40DE	
Transmission model		FS6R31A	
Axle type		2WD	4WD
Number of speed		6	
Synchromesh type		Warner	
Shift pattern		<p style="text-align: center;">SCIA0955E</p>	
Gear ratio	1st	4.368	
	2nd	2.518	
	3rd	1.743	
	4th	1.283	
	5th	1.000	
	6th	0.769	
	Reverse	3.966	
Main gear (Number of teeth)	Drive	24	
	1st	37	
	2nd	32	
	3rd	32	
	4th	29	
	6th	25	
	Reverse	42	
Counter gear (Number of teeth)	Drive	34	
	1st	12	
	2nd	18	
	3rd	26	
	4th	32	
	6th	46	
	Reverse	15	
Reverse idler gear (Number of teeth)		26	
Oil capacity (Approx.)		ℓ (US qt, Imp qt)	3.98 (4-1/4, 3-1/2) 4.18 (4-3/8, 3-5/8)
Remarks	Reverse synchronizer	Installed	
	Double cone synchronizer	1st, 3rd and 4th	
	Triple cone synchronizer	2nd	

SERVICE DATA AND SPECIFICATIONS (SDS)

Gear End Play

ECS00DZ3

Unit: mm (in)

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

Snap Rings

ECS00DZ4

Unit: mm (in)

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

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

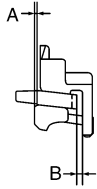
SERVICE DATA AND SPECIFICATIONS (SDS)

ECS00DZ5

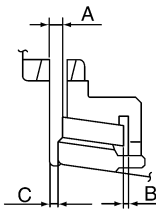
Unit: mm (in)

Baulk Ring Clearance

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



PCIB0249E



PCIB0835J