SECTION MT
MANUAL TRANSAXLE

CONTENTS

PRECAUTIONS

PFP:00001

Caution

ECS009T2

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

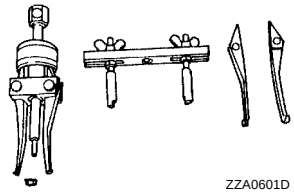
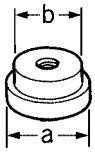
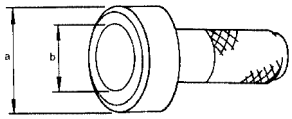
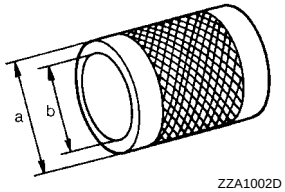
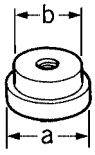
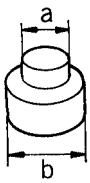
PREPARATION

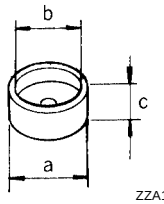
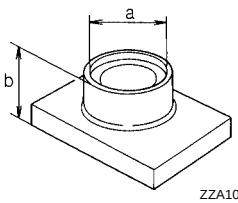
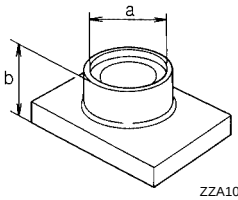
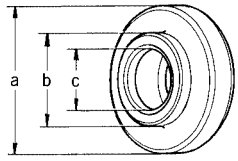
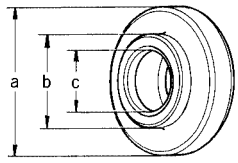
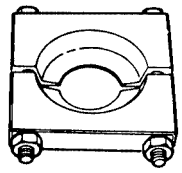
PFP:00002

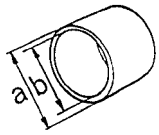
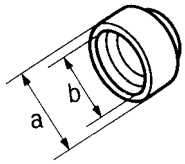
Special Service Tools

ECS009T3

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

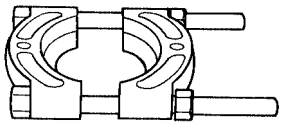
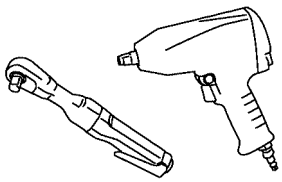
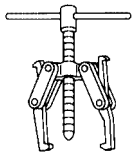
Tool number (Kent-Moore No.) Tool name	Description
KV381054S0 (J-34286) Puller  ZZA0601D	Side bearing outer race removal Mainshaft front bearing removal
ST35321000 (—) Drift  ZZA1000D	Input shaft oil seal installation Reverse main gear installation 1st bushing installation 1st-2nd synchronizer hub installation 2nd bushing installation 3rd main gear installation **a: 49 mm (1.93 in) dia.** **b: 41 mm (1.61 in) dia.**
ST30720000 (J-25405) Drift  ZZA0811D	Differential oil seal installation Differential side bearing outer race installation Mainshaft rear bearing installation Differential side bearing installation **a: 77 mm (3.03 in) dia.** **b: 55.5 mm (2.185 in) dia.**
ST33200000 (J-26082) Drift  ZZA1002D	Mainshaft front bearing installation 6th bushing installation 4th main gear installation 5th main gear installation 6th main gear installation **a: 60 mm (2.36 in) dia.** **b: 44.5 mm (1.752 in) dia.**
ST33061000 (J-8107-2) Drift  ZZA1000D	Bore plug installation Differential side bearing removal **a: 38 mm (1.50 in) dia.** **b: 28.5 mm (1.122 in) dia.**
ST33052000 (—) Drift  ZZA1023D	Welch plug installation Input shaft rear bearing removal 5th bushing, thrust washer, 4th input gear, 4th gear bushing, 3rd-4th synchronizer hub and 3rd input gear removal Input shaft front bearing installation 6th input gear and 6th bushing removal Mainshaft rear bearing removal 4th main gear and 5th main gear removal 6th main gear removal **a: 22 mm (0.87 in) dia.** **b: 28 mm (1.10 in) dia.**

Tool number (Kent-Moore No.) Tool name		Description
KV40105020 (—) Drift	 ZZA1133D	5th input gear and synchronizer hub removal 3rd main gear, 2nd main gear, 2nd bushing, 1st-2nd synchronizer hub, 1st main gear, re- verse main gear and 1st bushing removal **a: 39.7 mm (1.563 in) dia.** **b: 35 mm (1.38 in) dia.** **c: 15 mm (0.59 in)**
KV40105710 (—) Press stand	 ZZA1058D	3rd-4th synchronizer hub installation 4th bushing installation 5th bushing installation 5th-6th synchronizer hub installation 2nd bushing installation 3rd main gear installation **a: 46 mm (1.81 in) dia.** **b: 41 mm (1.61 in)**
ST38220000 (—) Press stand	 ZZA1058D	Reverse main gear installation 1st bushing installation 1st-2nd synchronizer hub installation **a: 63 mm (2.48 in) dia.** **b: 65 mm (2.56 in)**
ST30032000 (J-26010-01) Drift	 ZZA0978D	Input shaft front bearing installation **a: 80 mm (3.15 in) dia.** **b: 38 mm (1.50 in) dia.** **c: 31 mm (1.22 in) dia.**
ST30901000 (J-26010-01) Drift	 ZZA0978D	Input shaft rear bearing installation 4th main gear installation 5th main gear installation 6th main gear installation Mainshaft rear bearing installation **a: 79 mm (3.11 in) dia.** **b: 45 mm (1.77 in) dia.** **c: 35.2 mm (1.386 in) dia.**
ST30031000 (J-22912-01) Puller	 ZZA0537D	Measuring wear of 1st and 2nd baulk ring

Tool number (Kent-Moore No.) Tool name	Description
KV40101630 (J-35870) Drift  ZZA1003D	Reverse main gear installation **a: 68 mm (2.68 in) dia.** **b: 60 mm (2.36 in) dia.**
KV38102510 (—) Drift  ZZA0838D	1st bushing installation 1st-2nd synchronizer hub installation Differential side bearing installation **a: 71 mm (2.80 in) dia.** **b: 65 mm (2.56 in) dia.**

Commercial Service Tools

ECS009T4

Tool name	Description
Puller  ZZB0823D	Each bearing gear and bushing removal
Power tool  PBIC0190E	Loosening bolts and nuts
Puller  NT077	Each bearing gear and bushing removal
Pin punch  ZZA0815D	Each retaining pin removal and installation **Tip: 4.5 mm (0.177 in) dia.**

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ECS009T5

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

Reference page		MT-10	MT-10	MT-10	MT-11			MT-13	MT-65		MT-49, MT-41			
Suspected parts (possible cause)		(oil level is low)	(wrong oil)	(oil level is high)	Gasket (damaged)	Oil seal (worn or damaged)	O-Ring (worn or damaged)	Control device and cable (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, shifting insert (damaged)
Symptom	Noise	1	2								3	3		
	Oil leakage		3	1	2	2	2							
	Hard to shift or will not shift		1	1				2					3	3
	Jumps out of gear							1	2	3	3			

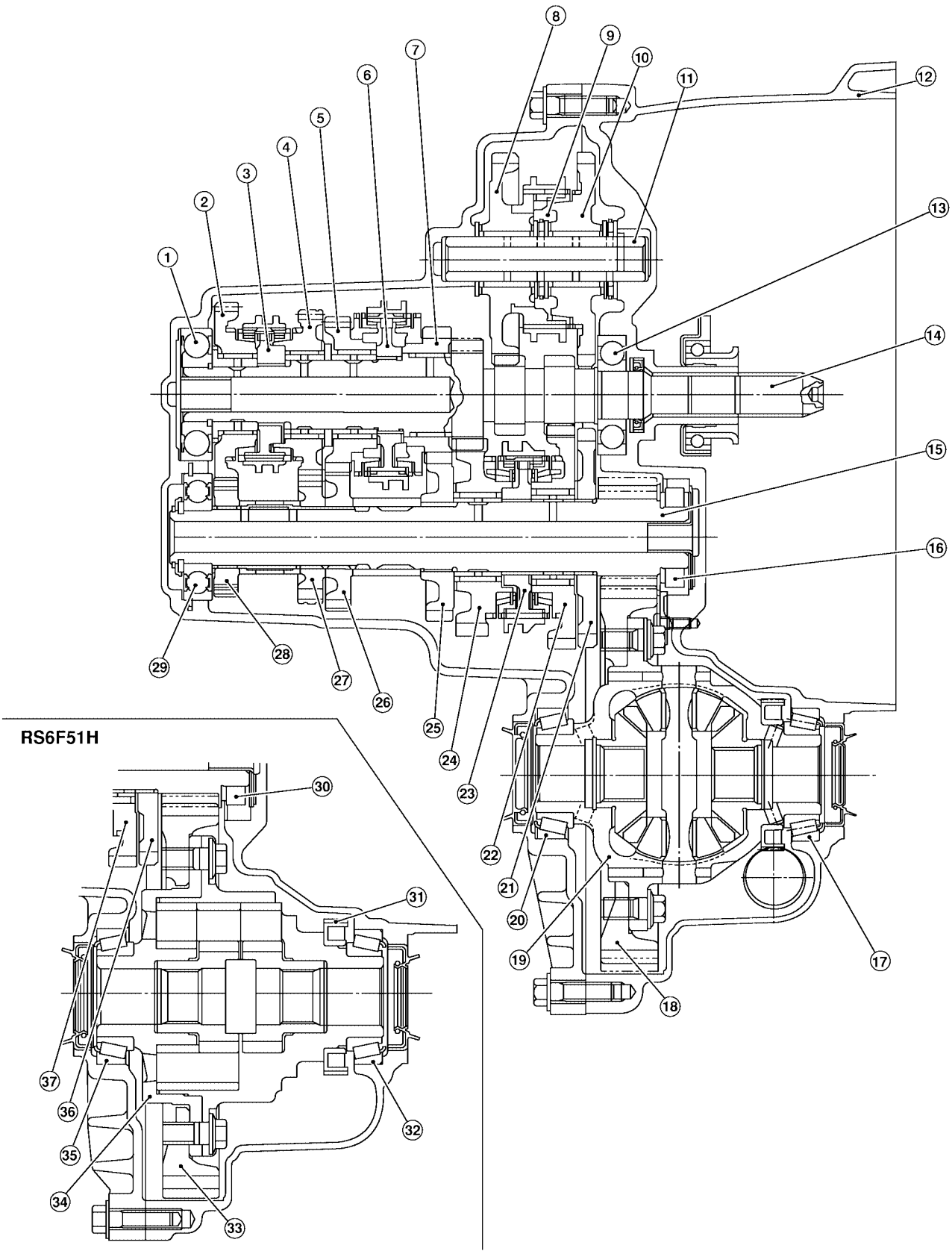
DESCRIPTION

PFP:00000

Cross-sectional View

ECS009T6

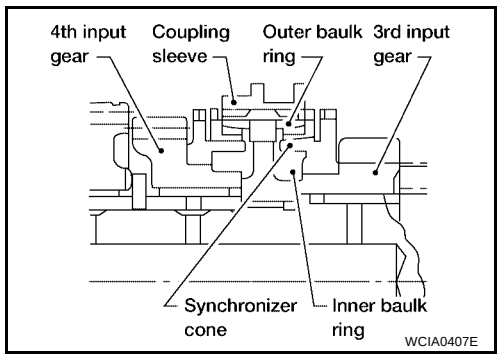
RS6F51A



1. Input shaft rear bearing
2. 6th input gear
3. 5th & 6th synchronizer
4. 5th input gear
5. 4th input gear
6. 3rd & 4th synchronizer
7. 3rd input gear
8. Reverse idler gear (rear)
9. Reverse synchronizer
10. Reverse idler gear (front)
11. Reverse idler shaft
12. Clutch housing
13. Input shaft front bearing
14. Input shaft
15. Mainshaft
16. Mainshaft front bearing
17. Differential side bearing (front)
18. Final gear
19. Differential case
20. Differential side bearing (rear)
21. Reverse main gear
22. 1st main gear
23. 1st & 2nd synchronizer
24. 2nd main gear
25. 3rd main gear
26. 4th main gear
27. 5th main gear
28. 6th main gear
29. Mainshaft rear bearing
30. Mainshaft front bearing
31. Speedometer drive gear
32. Differential side bearing (front)
33. Final gear
34. Differential case
35. Differential side bearing (rear)
36. Reverse main gear
37. 1st main gear

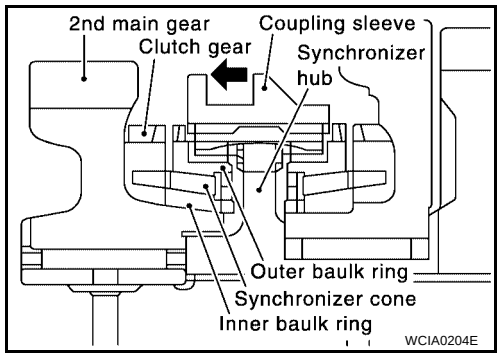
DOUBLE-CONE SYNCHRONIZER

The 3rd gear is equipped with a double-cone synchronizer to reduce the operating force of the shift lever as shown.



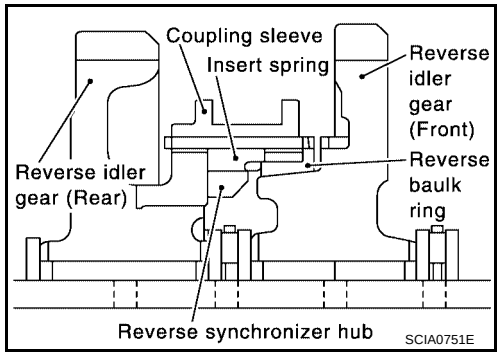
TRIPLE-CONE SYNCHRONIZER

The 1st and 2nd gears are equipped with a triple-cone synchronizer to reduce the operating force of the control lever as shown.



REVERSE GEAR

Description of reverse gear components is as shown.



M/T OIL

PFP:KLD20

Replacement

ECS009T7

DRAINING

1. Start the engine and let it run to warm up the transaxle oil.
2. Stop the engine. Remove drain plug and drain oil.
3. Set a new gasket on the drain plug and install it in transaxle case.

Drain plug : 30 - 39 N·m (3.1 - 4.0 kg-m, 23 - 28 ft-lb)

CAUTION:
Do not reuse gasket.

FILLING

1. Remove speedometer pinion gear. Fill the transaxle with new oil.

Oil grade and capacity : Refer to MA-9, "Fluids and Lubricants" .

2. After refilling oil, check oil level. Assemble a new o-ring on to the speedometer pinion gear, then install it in transaxle case.

Speedometer pinion gear : 4.9 - 6.8 N·m (0.5 - 0.7 kg-m, 43 - 61 in-lb)

CAUTION:
Do not reuse o-ring.

Checking

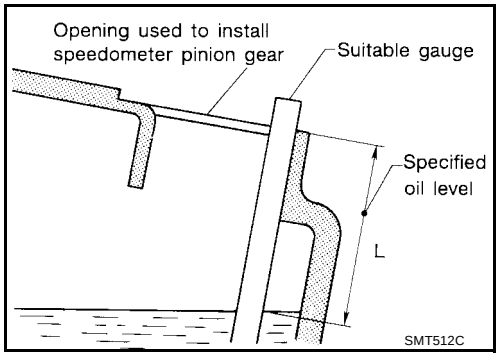
ECS009T8

OIL LEAKAGE AND OIL LEVEL

- Check that oil is not leaking from transaxle.
- Remove speedometer pinion gear.
- Measure oil level using suitable gauge as shown, and check if "L" is within the specifications.

Oil level "L" : 49 - 55 mm (1.93 - 2.17 in)

CAUTION:
Never start engine while checking oil level.



- Set a new o-ring on the speedometer pinion gear and install it in the transaxle case.

Speedometer pinion gear : 4.9 - 6.8 N·m (0.5 - 0.7 kg-m, 43 - 61 in-lb)

CAUTION:
Do not reuse o-ring.

SIDE OIL SEAL

PFP:32113

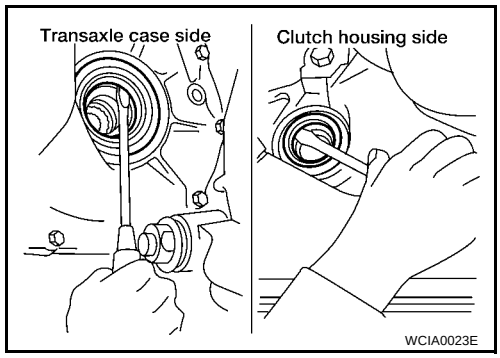
Removal and Installation

ECS009T9

REMOVAL

1. Remove the drive shaft from the transaxle case. Refer to FAX-11, "Removal and Installation" .
2. Remove the oil seal using suitable tool as shown.

CAUTION:
Be careful not to damage the transaxle case surface when removing the oil seal.



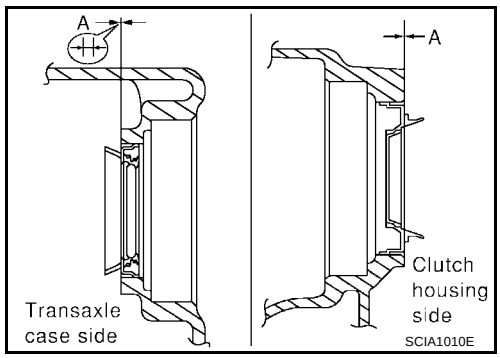
INSTALLATION

Installation is in the reverse order of removal.

- Drive the new oil seal straight until it protrudes from the transaxle case end equal to dimension “A” using Tool.

Dimension “A” : Within 0.5 mm (0.02 in) or flush with the case.

Tool : ST30720000 (J-25405)



CAUTION:
- **Before installing oil seal, apply multi-purpose grease to oil seal lips.**
- **Oil seal is not reusable.**

- Check the transaxle oil level after installation. Refer to MA-20, "Checking M/T Oil" .

POSITION SWITCH

PFP:32005

Checking

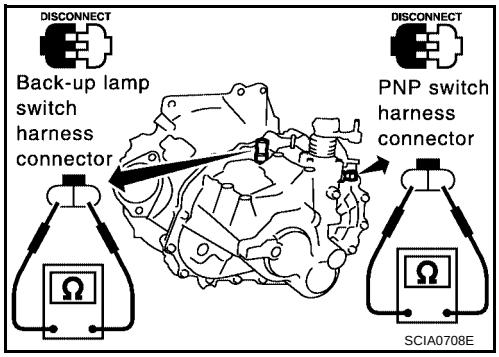
ECS009TA

NOTE:
For removal and installation of the switches. Refer to MT-19, "CASE AND HOUSING COMPONENTS" .

BACK-UP LAMP SWITCH

- Check continuity.

Gear position	Continuity
Reverse	Yes
Except reverse	No



PARK/NEUTRAL POSITION SWITCH

- Check continuity.

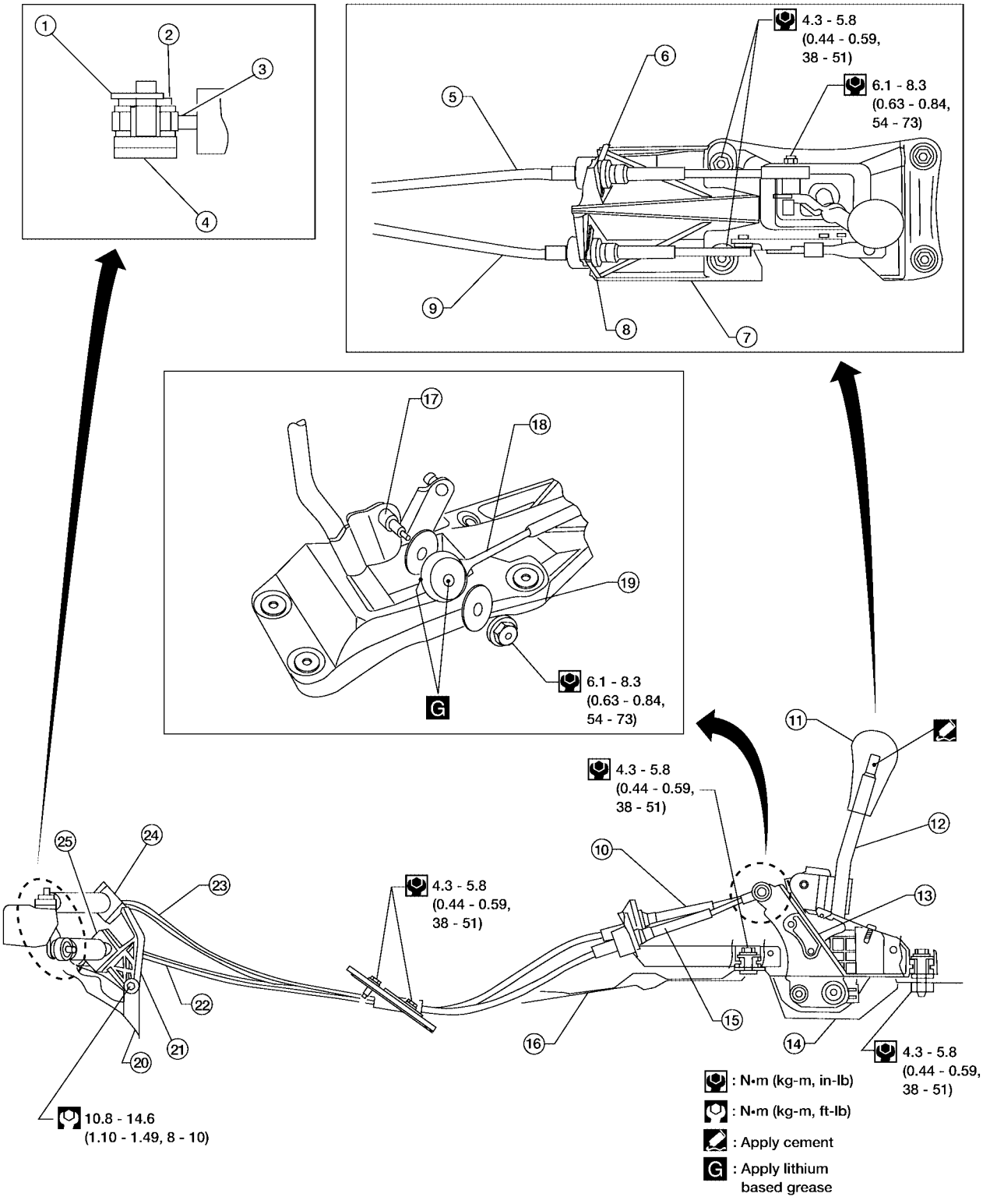
Gear position	Continuity
Neutral	Yes
Except neutral	No

CONTROL LINKAGE

PFP:34103

Removal and Installation of Control Device and Cable

ECS009TB



WCIA0203E

1. Snap pin
2. Washer
3. Cable
4. Manual lever
5. Shift cable
6. Lock plate
7. Control device assembly
8. Lock plate
9. Select cable
10. Shift cable
11. Control lever knob
12. Control lever

13. Control device assembly
14. Cover
15. Select cable
16. Floor
17. Pin
18. Shift cable
19. Washer
20. Clutch housing
21. Cable mounting bracket
22. Select cable
23. Shift cable
24. Lock plate
25. Lock plate

CAUTION:

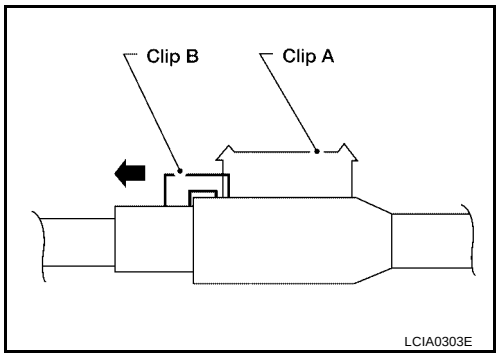
- **Note that the select side lock plate for securing the control cable is different from the one on the shift side.**
- **After assembly, make sure selector lever automatically returns to Neutral when it is moved to 1st, 2nd, or Reverse.**

Cable Adjustment

ECS00AH9

NOTE:
After installation of the select cable, the cable must be adjusted for proper operation. This adjustment is performed before installing the interior console and shift boot.

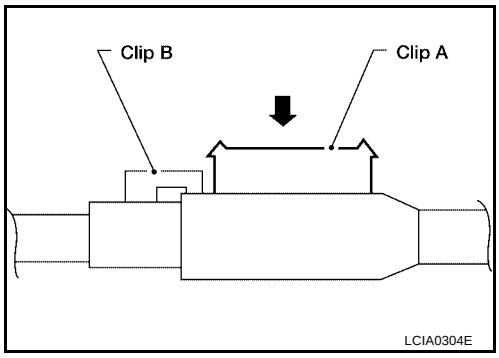
1. Slide clip “B” from under clip “A” as shown.



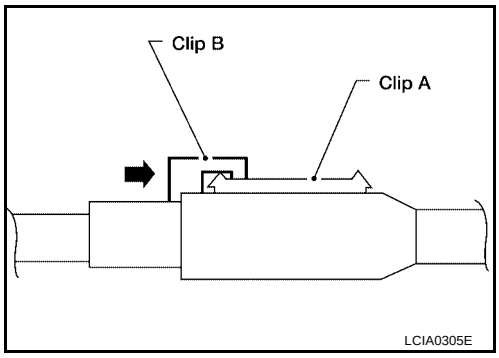
2. Shift the control lever to the neutral position.

   CAUTION:
   Do not move the control lever when adjusting the cables.

3. Push clip “A” into the cable end case until it snaps into place as shown.



4. Slide clip “B” back over clip “A” until it snaps into place and holds clip “A” in place as shown.

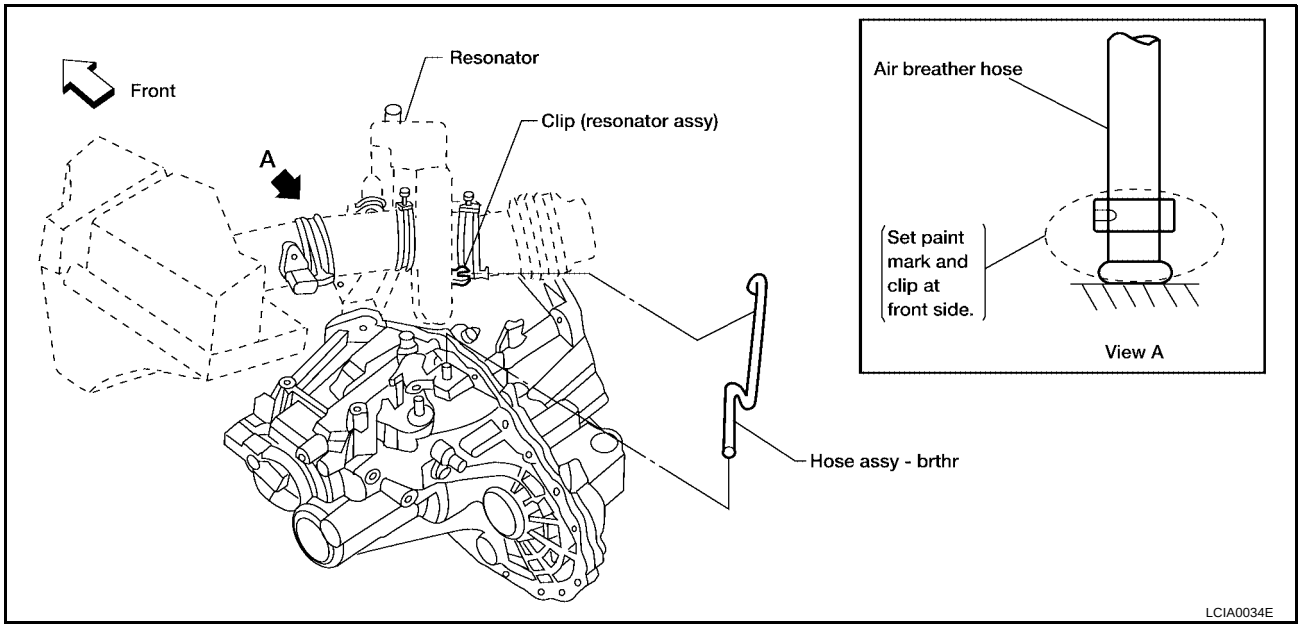


AIR BREATHER HOSE

PFP:31098

Removal and Installation

ECS009TC



CAUTION:

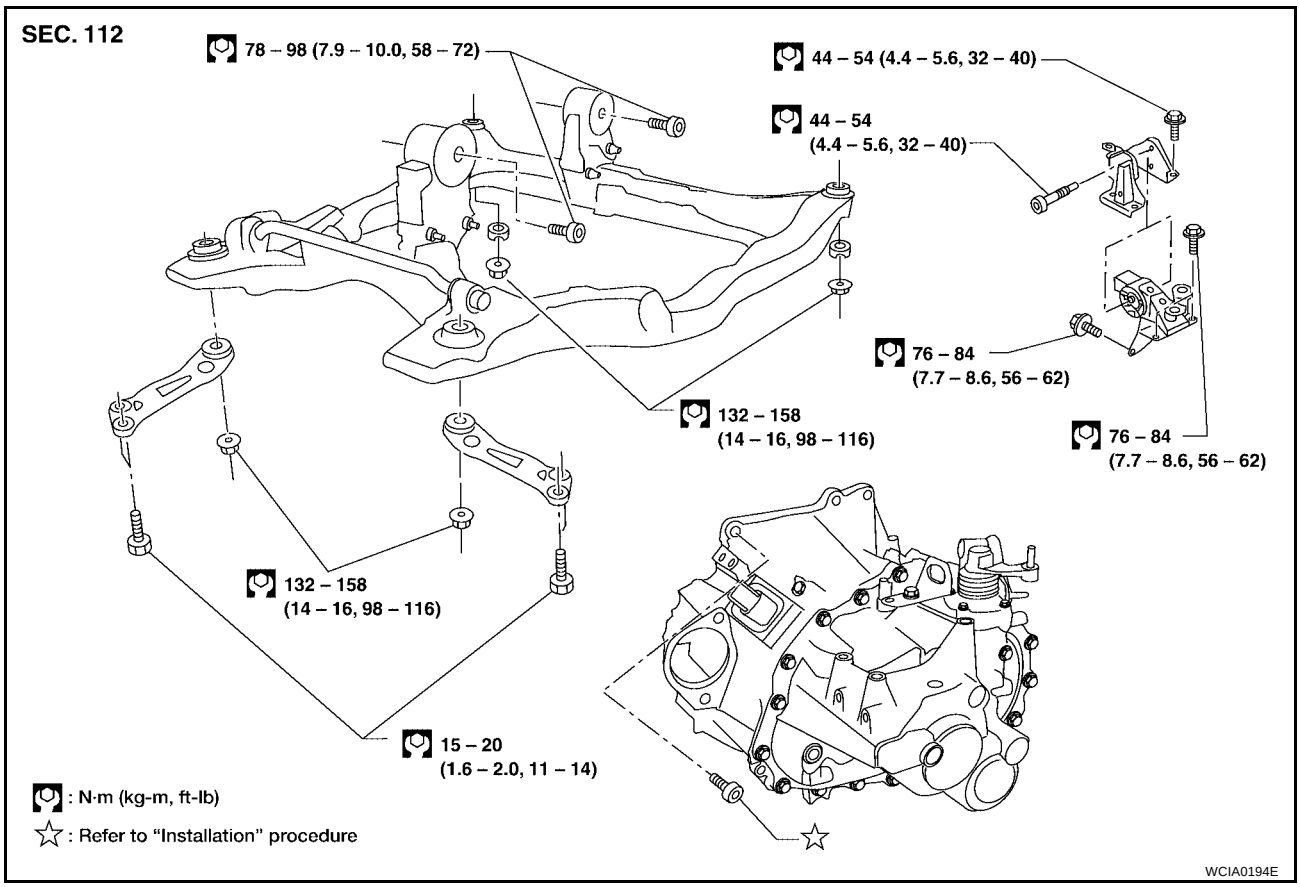
- **Make sure there are no pinched or restricted areas on the air breather hose caused by bending or winding when installing it.**
- **Insert the air breather hose into the transaxle tube until the overlap area reaches the spool.**

TRANSAXLE ASSEMBLY

PFP:32010

Removal and Installation

ECS009TD

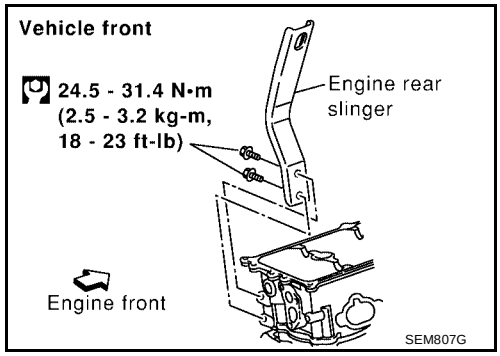


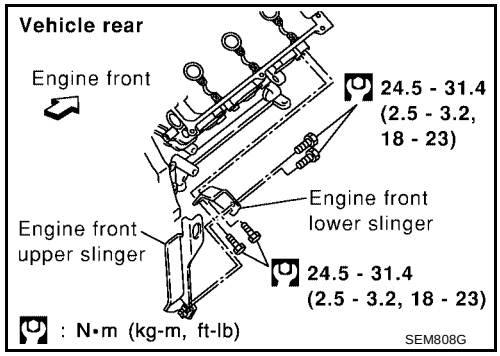
REMOVAL

1. Remove the air cleaner and air duct. Refer to EM-16, "Removal and Installation" .
2. Remove the battery using power tool. Refer to SC-9, "Removal and Installation" .
3. Remove the air breather hose.
4. Remove the clutch operating cylinder from the transaxle case and position aside without disconnecting the hydraulic lines. Refer to CL-11, "Removal and Installation" .

   CAUTION:
   Do not depress the clutch pedal during the removal procedure.
5. Remove the engine under cover and splash shields using power tool.
6. Disconnect the control cable from the transaxle. Refer to MT-13, "Removal and Installation of Control Device and Cable" .
7. Drain the gear oil from the transaxle. Refer to MA-21, "Changing M/T Oil" .
8. Remove the connectors and harnesses for:
   - PNP switch
   - Back-up lamp switch
   - Ground strap
   - Crankshaft position sensor
   - Vehicle speed sensor
9. Remove the bolt and heated oxygen sensor harness clamp, then remove the crankshaft position sensor.
10. Remove the exhaust front tube using power tool. Refer to EX-5, "REMOVAL" .
11. Remove the drive shafts using power tool. Refer to FAX-11, "REMOVAL" .
12. Remove the starter motor using power tool. Refer to SC-17, "Removal and Installation" .

13. Install the engine slingers on the front of the left bank cylinder, and the rear of the right bank cylinder head as shown.





14. Support the engine using an engine support tool or suitable tool.
15. Remove the front suspension member, LH engine insulator, and LH engine mount bracket. Refer to FSU-15, "Removal and Installation" .
16. Place a suitable jack support under the transaxle.

    CAUTION:
    When setting the jack, be careful not to bring it into contact with the switches.
17. Remove the bolts that mount the transaxle to the engine using power tool.
18. Remove the transaxle from the vehicle.

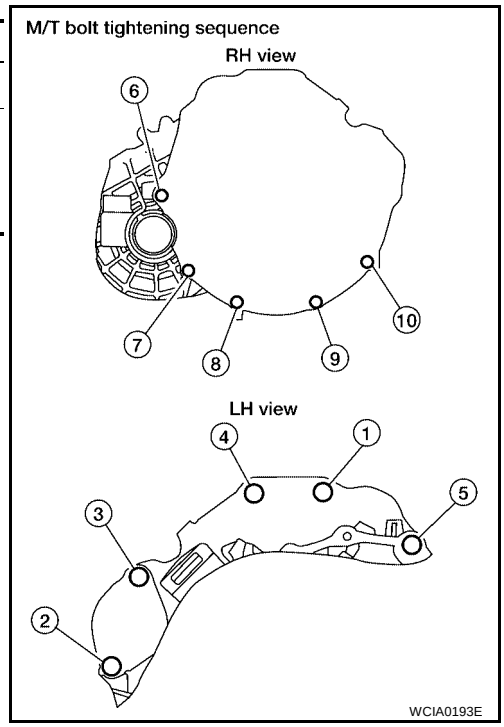
INSTALLATION

Installation is the reverse order of removal.

CAUTION:

- **When installing the transaxle, do not allow the transaxle input shaft to make contact with the clutch cover.**
- **If the flywheel is removed, align the dowel pin with the smallest hole of flywheel. Refer to EM-126, "ASSEMBLY" in CYLINDER BLOCK.**
- When installing the transaxle to the engine, use the specified tightening torque in the numerical sequence as shown.

Bolt No.	1	2	3	4	5	6	7	8	9	10
" ℓ " mm (in)	52 (2.05)				113 (4.45)		40 (1.57)			
Tightening torque N·m (kg-m, ft-lb)	70 - 79 (7.1 - 8.1, 52 - 58)						36 - 47 (3.7 - 4.7, 27 - 34)			



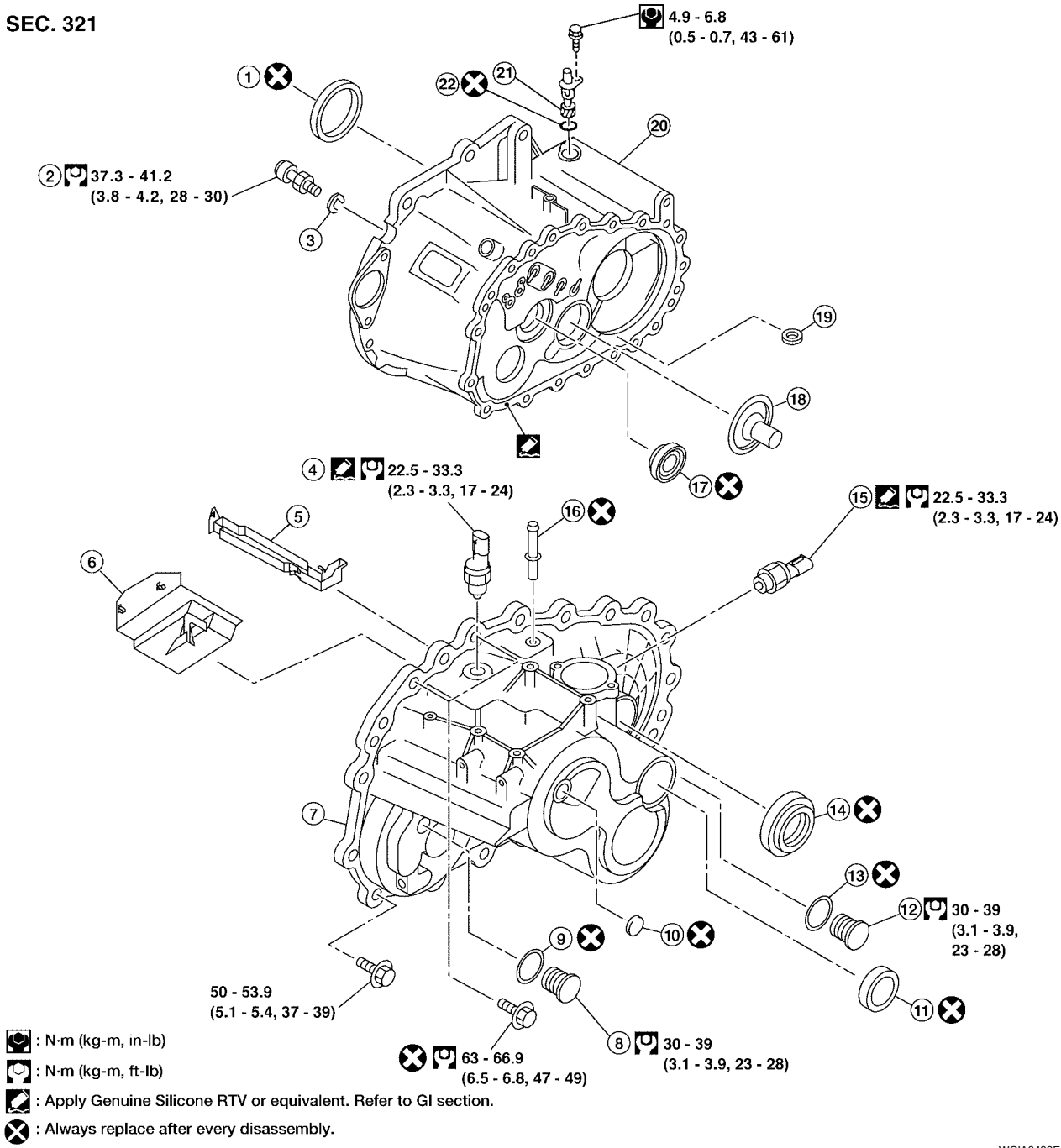
- After installation, check the transaxle oil level, and check for any leaks and any loose mechanisms. Refer to MT-10, "M/T OIL" .
- Check the control linkage cable adjustment. Refer to MT-14, "Cable Adjustment" .

Component Parts

ECS009TE

CASE AND HOUSING COMPONENTS

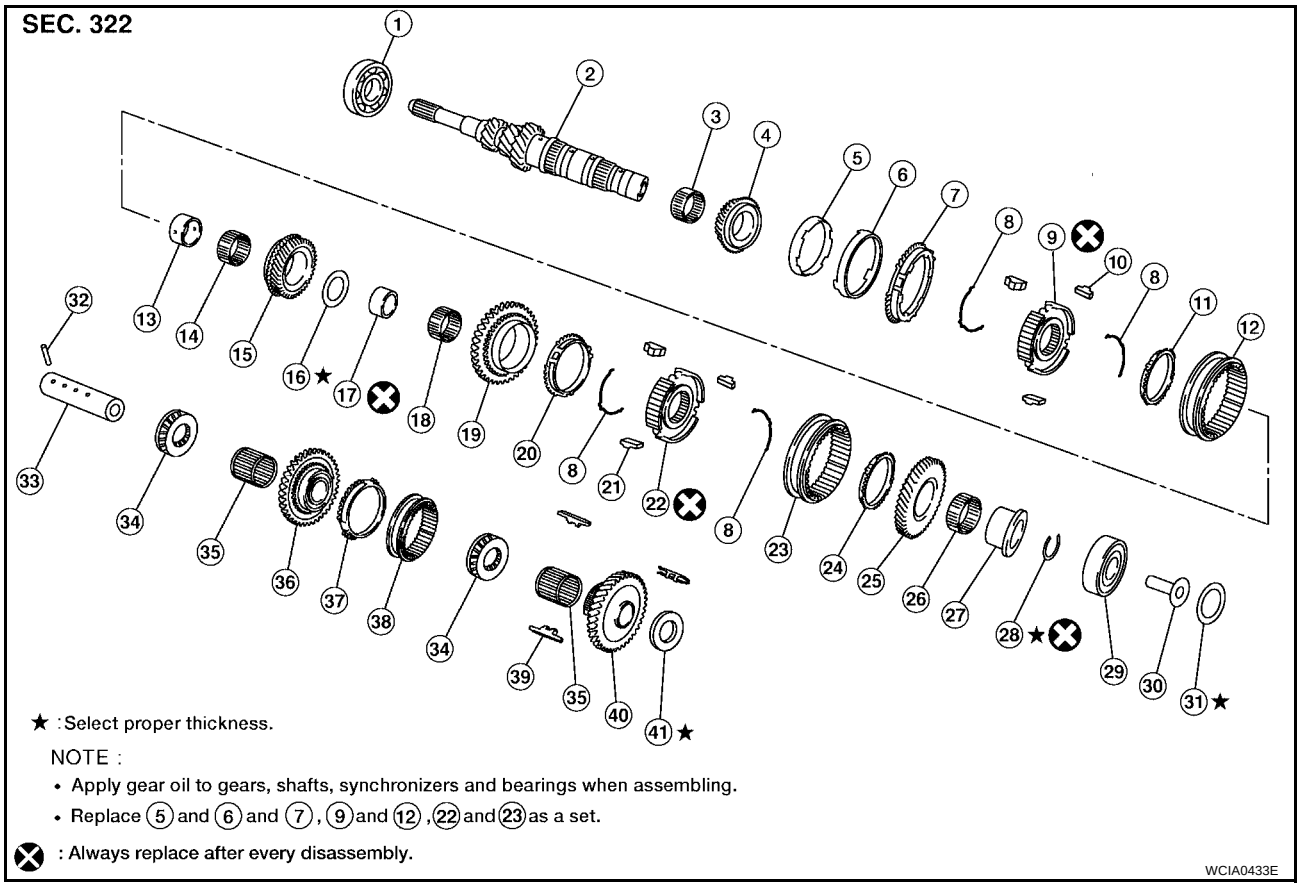
SEC. 321



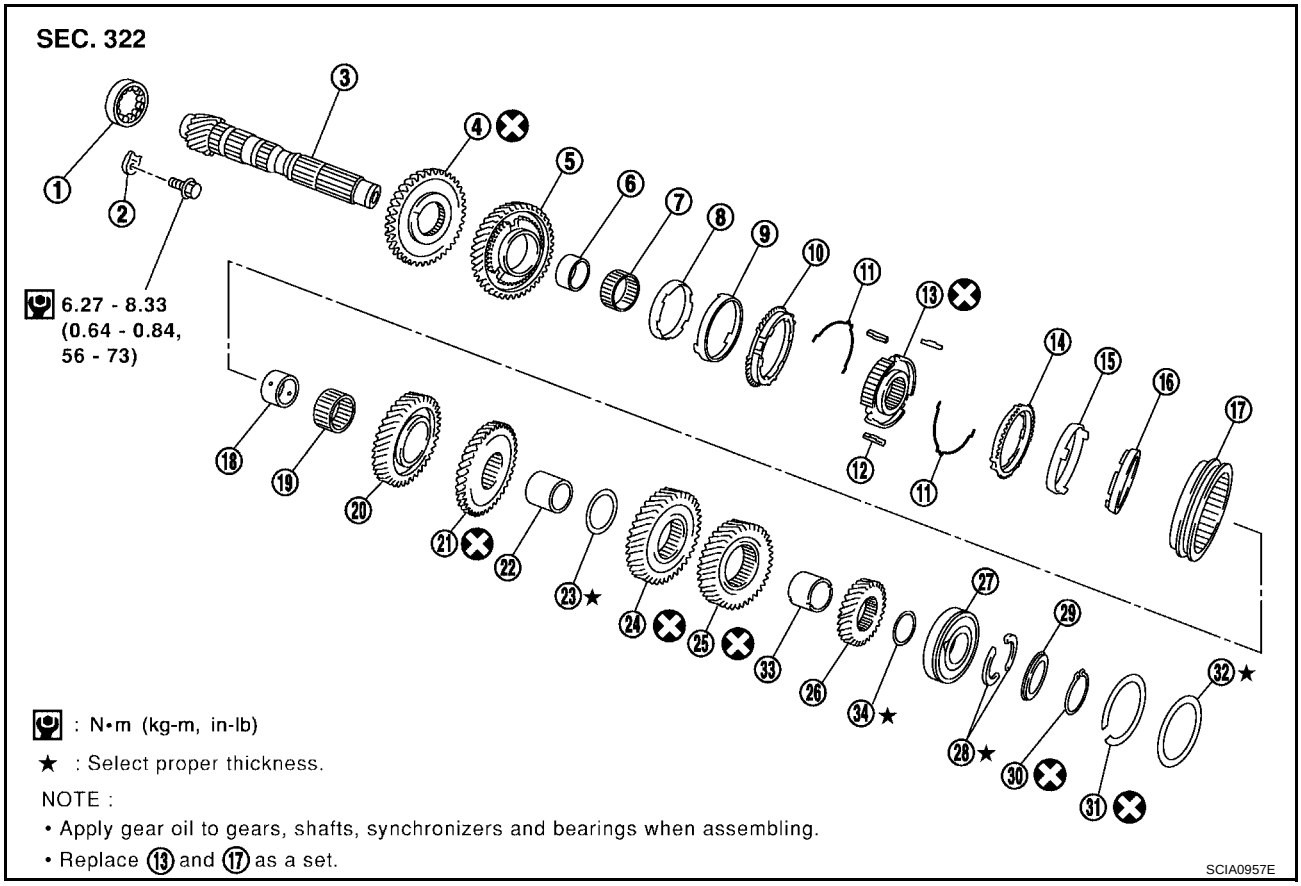
WCIA0409E

1. Differential oil seal
2. Ball pin
3. Washer
4. Back-up lamp switch
5. Oil gutter
6. Baffle plate
7. Transaxle case
8. Filler plug
9. Gasket
10. Welch plug
11. Bore plug
12. Drain plug
13. Gasket
14. Differential oil seal
15. Park/Neutral position switch
16. Air breather tube
17. Input shaft oil seal
18. Oil channel
19. Magnet
20. Clutch housing
21. Speedometer pinion gear
22. O-ring

GEAR COMPONENTS

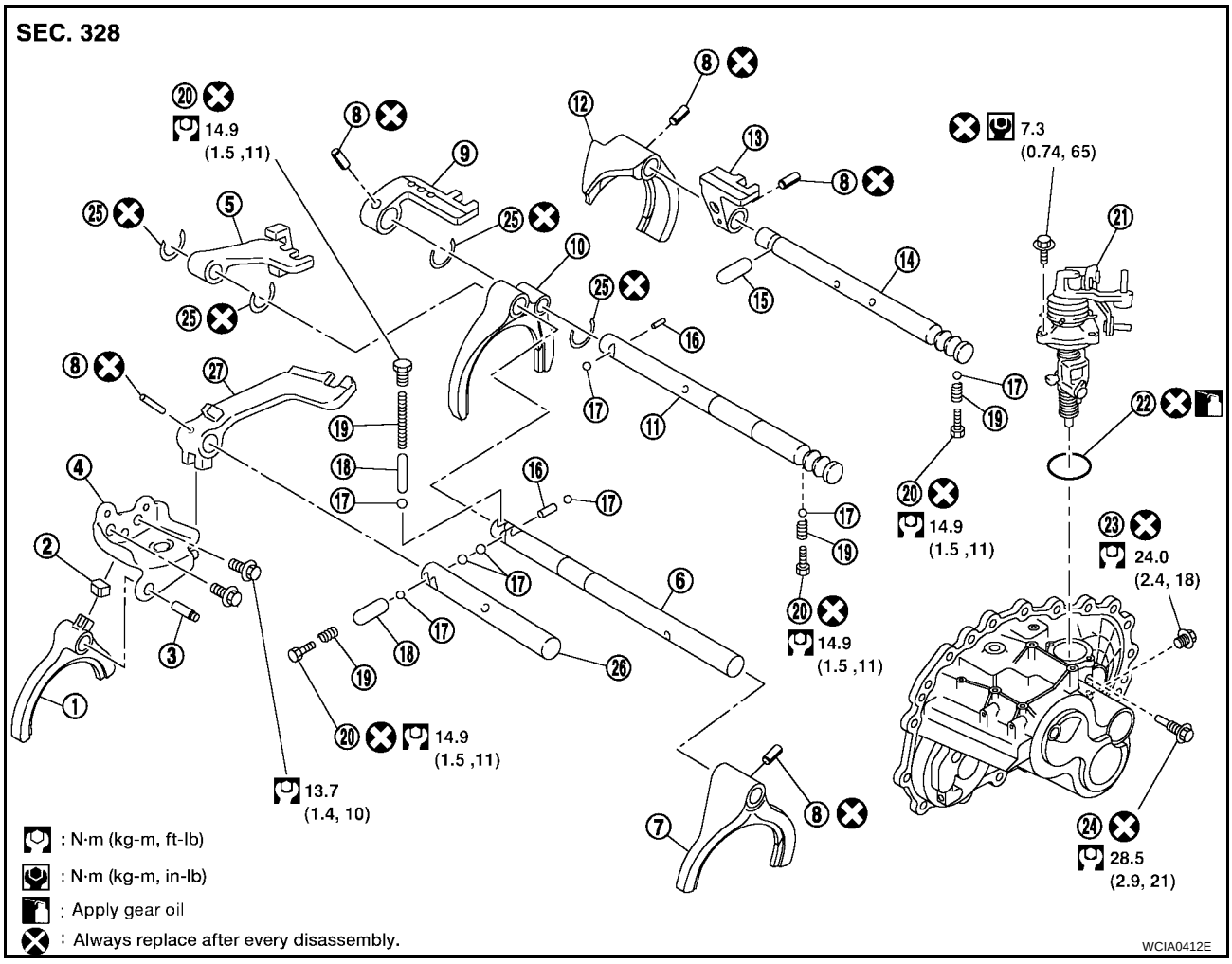


1. Input shaft front bearing
2. Input shaft
3. Needle bearing
4. 3rd input gear
5. 3rd inner baulk ring
6. 3rd gear synchronizer cone
7. 3rd outer baulk ring
8. Spread spring
9. 3rd & 4th synchronizer hub
10. 3rd & 4th shifting insert
11. 4th baulk ring
12. 3rd & 4th coupling sleeve
13. Bushing
14. Needle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



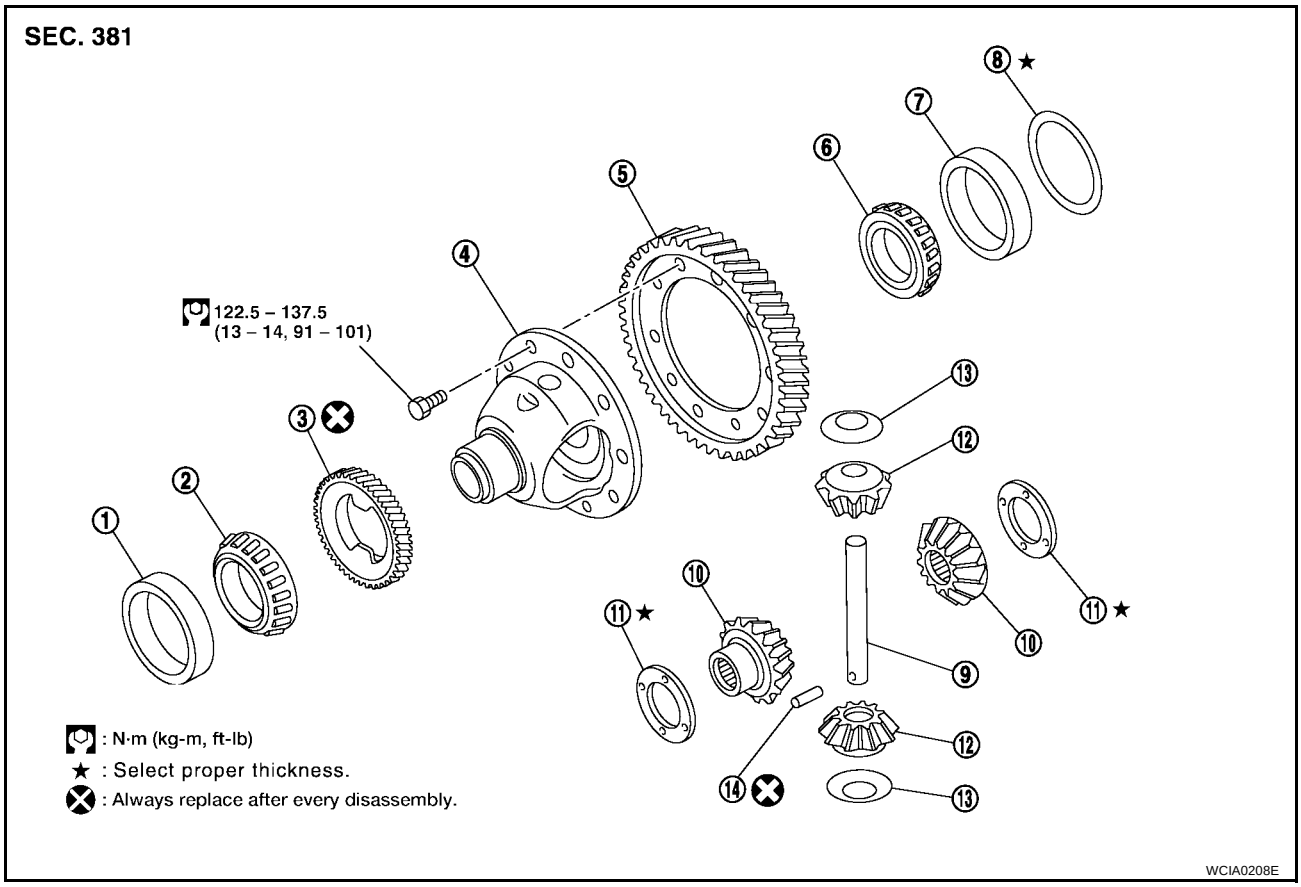
1. Mainshaft front bearing
2. Mainshaft bearing retainer
3. Mainshaft
4. Reverse main gear
5. 1st main gear
6. Bushing
7. Needle bearing
8. 1st inner baulk ring
9. 1st gear synchronizer cone
10. 1st outer baulk ring
11. Spread spring
12. 1st & 2nd shifting insert
13. 1st & 2nd synchronizer hub
14. 2nd outer baulk ring
15. 2nd gear synchronizer cone
16. 2nd inner baulk ring
17. 1st & 2nd coupling sleeve
18. Bushing
19. Needle bearing
20. 2nd main gear
21. 3rd main gear
22. 3rd & 4th mainshaft spacer
23. 4th main adjusting shim
24. 4th main gear
25. 5th main gear
26. 6th main gear
27. Mainshaft rear bearing
28. Mainshaft C-ring
29. C-ring holder
30. Snap ring
31. Snap ring
32. Mainshaft rear bearing adjusting shim
33. 5th & 6th mainshaft spacer
34. 6th main adjusting shim

SHIFT CONTROL COMPONENTS



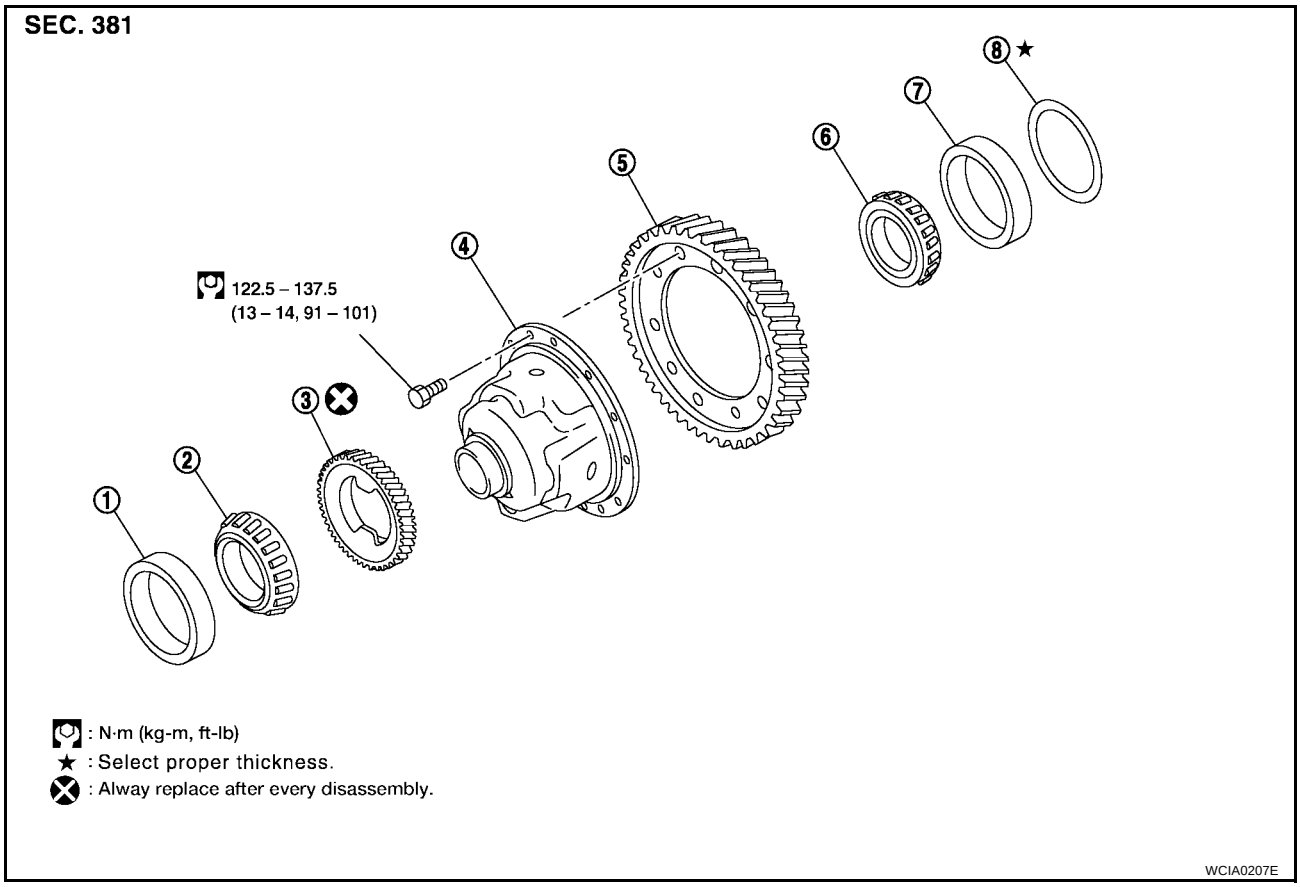
1. Reverse shift fork
2. Shifter cap
3. Reverse fork rod
4. Reverse lever assembly
5. 5th & 6th bracket
6. 5th & 6th fork rod
7. 5th & 6th shift fork
8. Retaining pin
9. 3rd & 4th bracket
10. 3rd & 4th shift fork
11. 3rd & 4th fork rod
12. 1st & 2nd shift fork
13. 1st & 2nd bracket
14. 1st & 2nd fork rod
15. Shift check sleeve
16. Inter lock pin
17. Check ball
18. Shift check sleeve
19. Check spring
20. Check plug
21. Control assembly
22. O-ring
23. Shift check
24. Stopper bolt
25. Stopper ring
26. Reverse bracket fork rod
27. Reverse bracket

FINAL DRIVE COMPONENTS (RS6F51A)



1.	Differential side bearing outer race	2.	Differential side bearing	3.	Speedometer drive gear
4.	Differential case	5.	Final gear	6.	Differential side bearing
7.	Differential side bearing outer race	8.	Differential side bearing adjusting shim	9.	Pinion mate shaft
10.	Side gear	11.	Side gear thrust washer	12.	Pinion mate gear
13.	Pinion mate thrust washer	14.	Lock pin		

FINAL DRIVE COMPONENTS (RS6F51H)



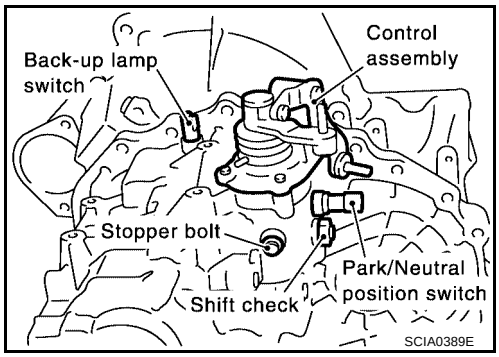
1. Differential side bearing outer race
2. Differential side bearing
3. Speedometer drive gear
4. Differential case
5. Final gear
6. Differential side bearing
7. Differential side bearing outer race
8. Differential side bearing adjusting shim

Disassembly and Assembly

ECS009TF

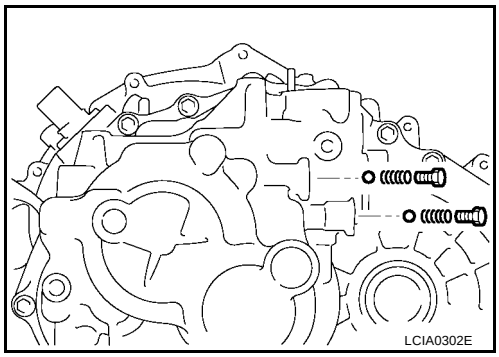
DISASSEMBLY

1. Remove the drain plug and filler plug.
2. Remove the park/neutral position switch and back-up lamp switch.
3. After removing the shift check and stopper bolt, remove the control assembly.

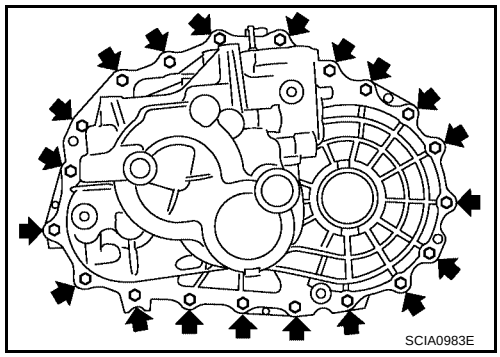


4. Remove the 2 check plugs, 2 check springs, 2 check balls as shown. Discard the check plugs.

CAUTION:
Do not reuse the check plugs.



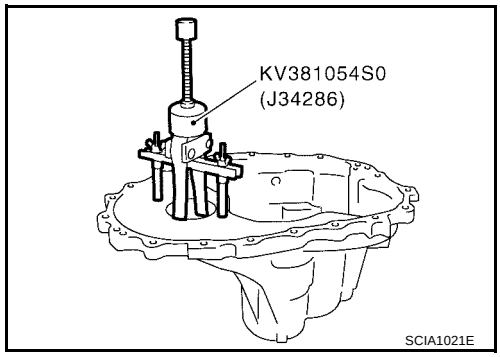
5. Remove the transaxle case bolts as shown.



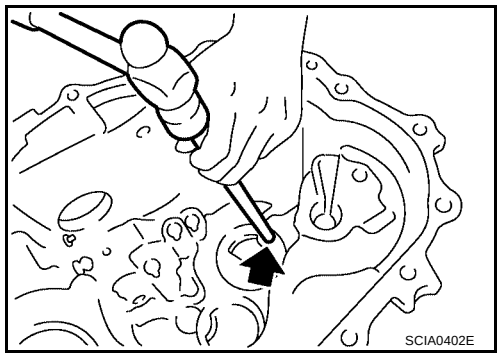
6. Remove the bore plug.

CAUTION:
Do not damage the transaxle case.

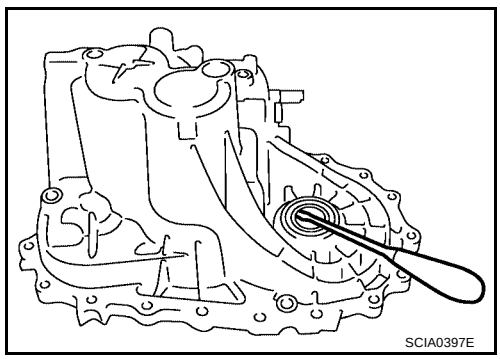
7. While spreading the snap ring of the mainshaft rear bearing located at bore plug hole, remove the transaxle case.
8. Remove the oil gutter and baffle plate.
9. Remove the snap ring, mainshaft rear bearing adjusting shim, and input shaft rear bearing adjusting shim from the transaxle case.
10. Remove the differential side bearing outer race (transaxle case side) using Tool as shown, and then remove the adjusting shim.



11. Remove the welch plug using suitable tools as shown.



12. Remove the differential oil seal using suitable tool as shown.



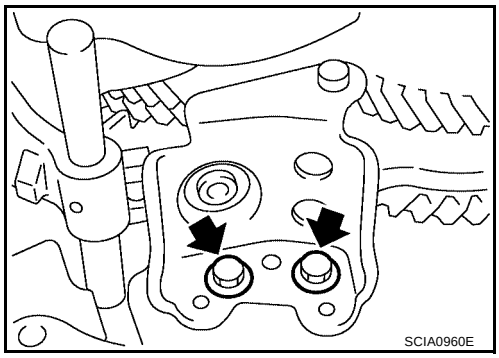
13. Remove the magnet from the clutch housing.

14. Remove the reverse check plug, reverse check spring, reverse shift check sleeve, and check ball. Discard the check plug.

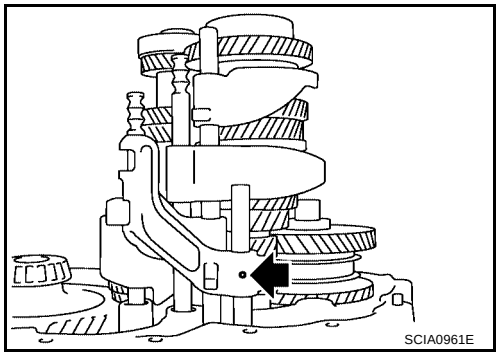
    CAUTION:
    - **Do not reuse the check plug.**
    - **Do not drop the check ball.**

15. With the shift lever in 5th position, remove the bracket bolts from the reverse lever assembly as shown. Lift the reverse lever assembly to remove.

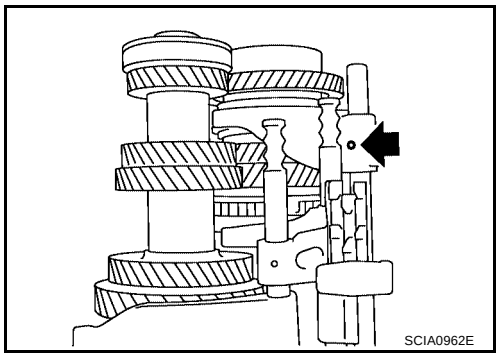
    CAUTION:
    Retain the shifter cap for installation.


SCIA0960E

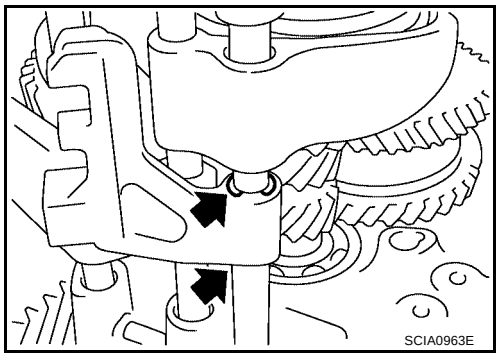
16. Pull out the reverse fork rod then remove the reverse shift fork.
17. Remove the retaining pin of the reverse bracket.


SCIA0961E

18. Pull out the reverse lever and the reverse bracket fork rod.
19. Remove the check ball (2 pieces) and the interlock pin.
20. Shift the 3rd-4th fork rod to the 3rd position. Remove the retaining pin of the 5th-6th shift fork using suitable tool.

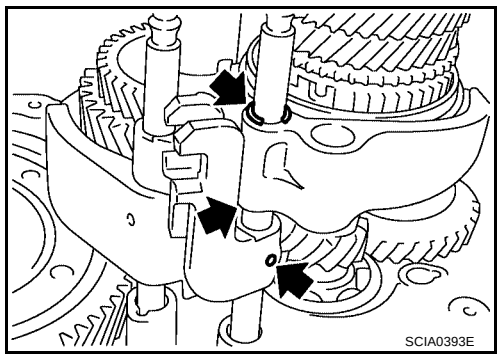

SCIA0962E

21. Remove the stopper rings for the 5th-6th bracket.

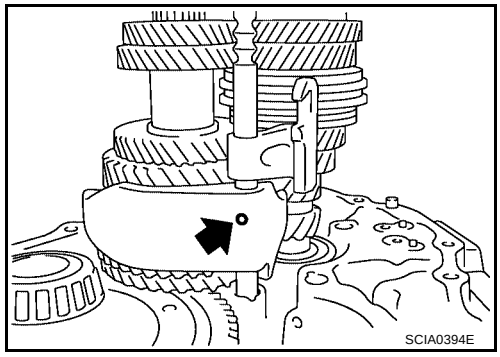

SCIA0963E

22. Pull out the 5th-6th fork rod and remove the 5th-6th shift fork and the 5th-6th bracket.
23. Remove the check balls (2 pieces) and interlock pin.

24. Remove the retaining pin of 3rd-4th bracket using suitable tool.
25. Remove the stopper rings for 3rd-4th shift fork.



26. Pull out the 3rd-4th fork rod and remove 3rd-4th shift fork and bracket.
27. Remove the shift check sleeve from the clutch housing.
28. Remove the retaining pin of 1st-2nd shift fork using suitable tool.

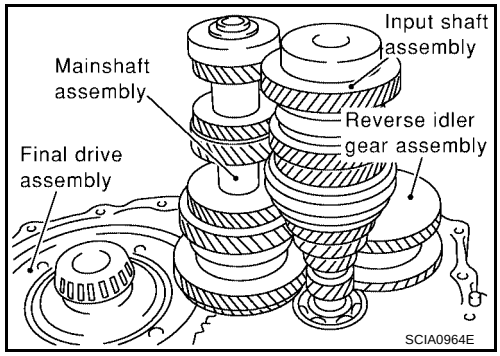


29. Pull out the 1st-2nd fork rod with bracket.
30. Remove the 1st-2nd shift fork.
31. Remove the retaining pin of 1st-2nd bracket using a suitable tool and separate the fork rod and bracket.
32. Remove the gear components from the clutch housing.

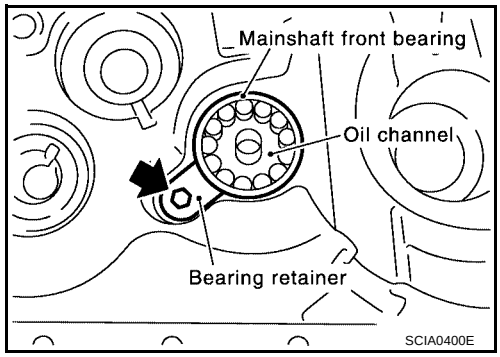
a. While tapping the input shaft remove the input shaft assembly, mainshaft assembly, and reverse idler gear assembly as a set.

CAUTION:
Always withdraw the mainshaft straight out. Failure to do so can damage the resin oil channel on the clutch housing side.

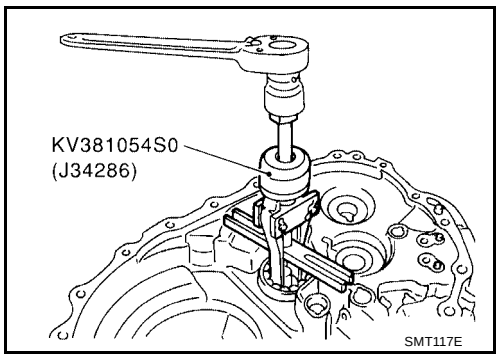
b. Remove the final drive assembly.



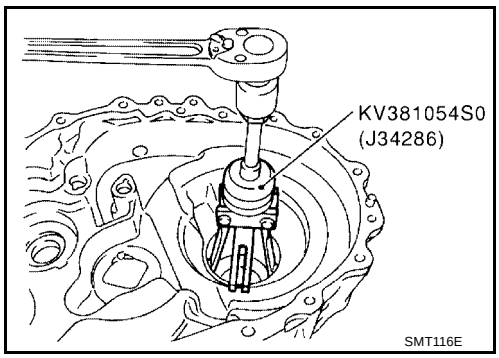
33. Remove the bearing retainer and then the mainshaft front bearing as shown.
34. Remove the oil channel on the mainshaft side.



35. Remove the differential oil seal (clutch housing side) using Tool as shown.

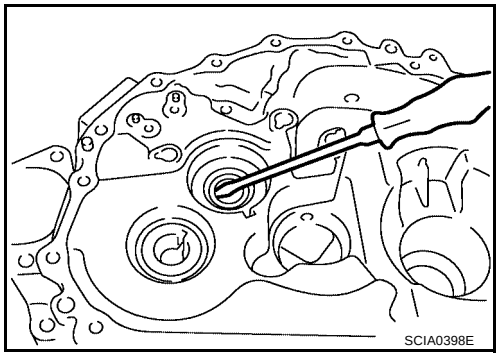


36. Remove the differential side bearing outer race (clutch housing side) using Tool as shown.



37. Remove the input shaft oil seal using suitable tool as shown.

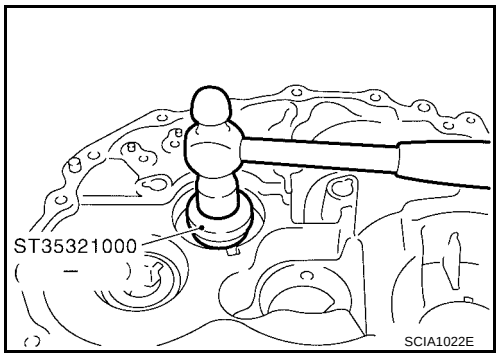
CAUTION:
Do not damage the clutch housing sealing surface.



ASSEMBLY

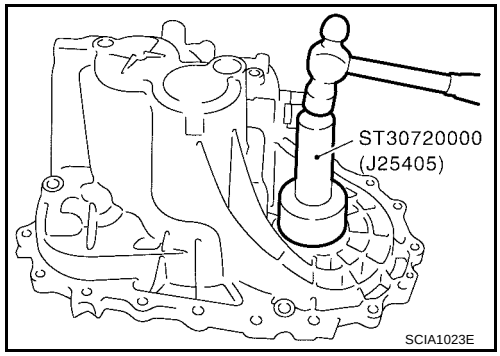
1. Install a new input shaft oil seal from the clutch housing end of the side, to the depth of 1.8 - 2.8 mm (0.071 - 0.110 in) using Tool as shown.

CAUTION:
Do not reuse the oil seals.



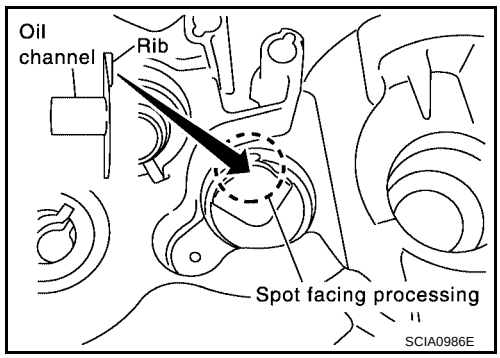
2. Install a new differential oil seal using Tool as shown.

CAUTION:
Do not reuse the oil seals.



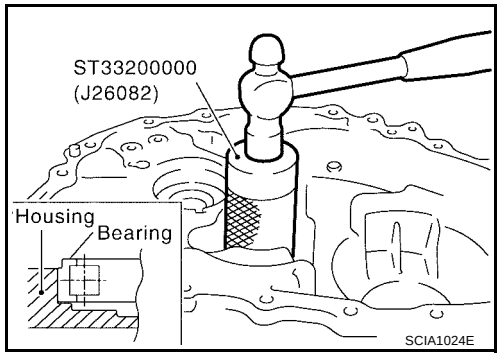
3. Install the oil channel on the mainshaft side as shown.

CAUTION:
Position the oil channel with the orientation as shown, for installation.



4. Install the mainshaft front bearing using Tool as shown.

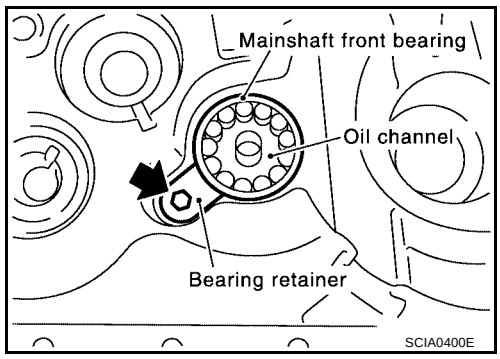
CAUTION:
Position the mainshaft front bearing with the orientation as shown, for installation



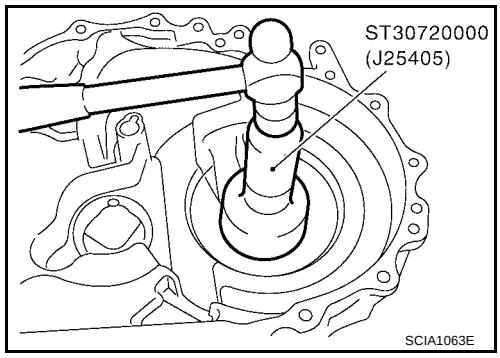
5. Install the mainshaft front bearing retainer.

CAUTION:
Install the bearing retainer with the punched surface facing up.

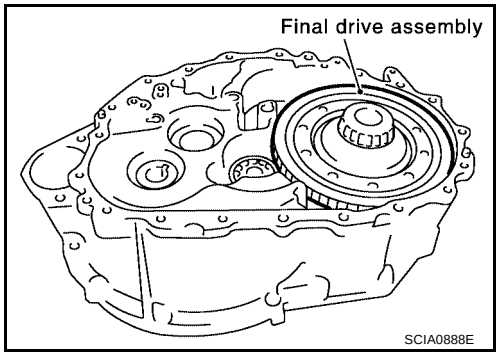
Retainer bolt : 6.27 - 8.33 N·m (0.64 - 0.84 kg-m, 56 - 73 in-lb)



6. Install the differential side bearing outer race using Tool as shown.

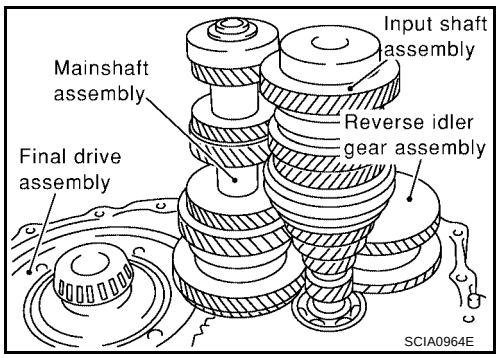


7. Install the final drive assembly into the clutch housing.



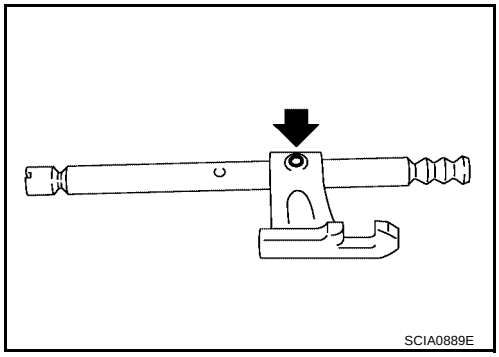
8. Install the input shaft assembly, mainshaft assembly, and reverse idler gear assembly into the clutch housing.

CAUTION:
Do not damage the input shaft oil seal.



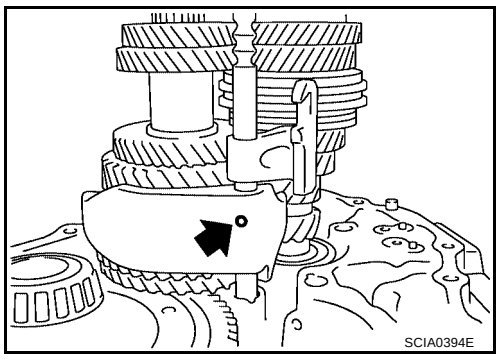
9. Install the 1st-2nd fork rod bracket onto the 1st-2nd fork rod, and then install a new retaining pin as shown.

CAUTION:
Do not reuse the retaining pins.



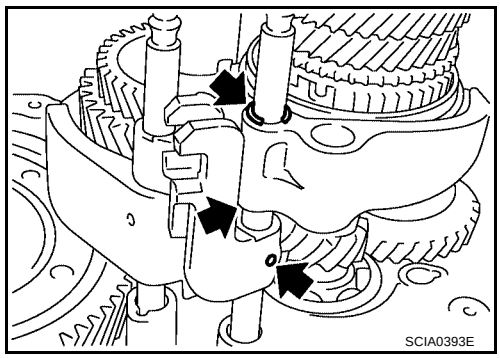
10. Install the 1st-2nd fork rod and the 1st-2nd shift fork, and then install a new retaining pin.

CAUTION:
Do not reuse the retaining pins.

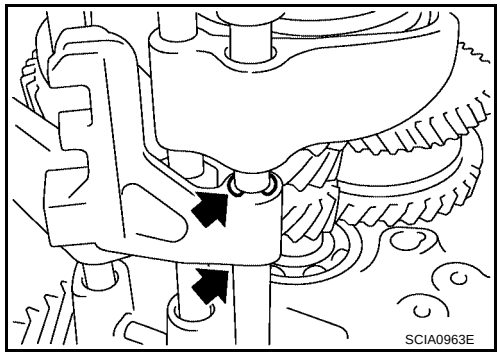


11. Install the shift check sleeve.
12. Install the 3rd-4th bracket, 3rd-4th shift fork, and 3rd-4th fork rod with the interlock pin.

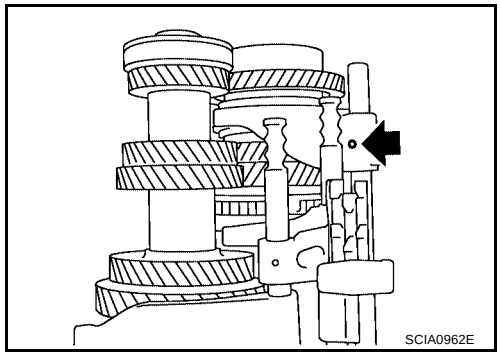
13. Install the new stopper rings onto the 3rd-4th shift fork.
    CAUTION:
    Do not reuse the stopper rings.
14. Install a new retaining pin onto the 3rd-4th bracket.
    CAUTION:
    Do not reuse the retaining pins.


SCIA0393E

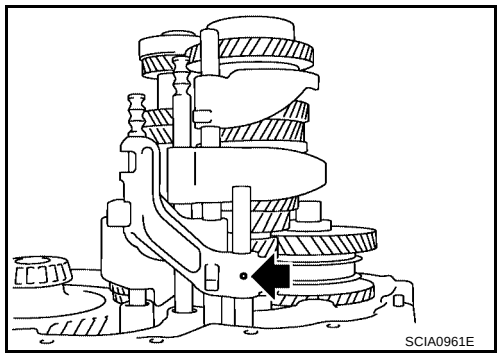
15. Install the 2 check balls.
16. Install the 5th-6th bracket, 5th-6th shift fork, and 5th-6th fork rod.
17. Install new stopper rings onto the 5th-6th bracket with interlock pin.
    CAUTION:
    Do not reuse the stopper rings.


SCIA0963E

18. Install a new retaining pin onto the 5th-6th shift fork.
    CAUTION:
    Do not reuse the retaining pins.


SCIA0962E

19. Install the two check balls.
20. Install the 5th-6th check ball, 5th-6th shift check sleeve, 5th-6th check spring, and the new 5th-6th check plug.
    CAUTION:
    - **Do not reuse the check plug.**
    - **Do not drop the check ball.**
21. Install the reverse bracket fork rod and reverse lever bracket.
22. Install a new retaining pin onto the reverse bracket.
    CAUTION:
    Do not reuse the retaining pins.


SCIA0961E

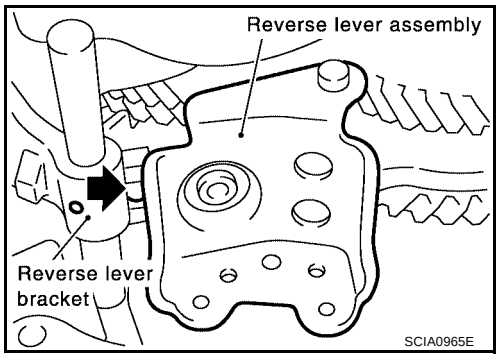
23. Install the reverse shift fork and reverse fork rod.

24. Install the reverse lever assembly using the following steps:

a. Install the shifter cap onto the reverse lever assembly cam, and then install them onto the reverse shift fork.

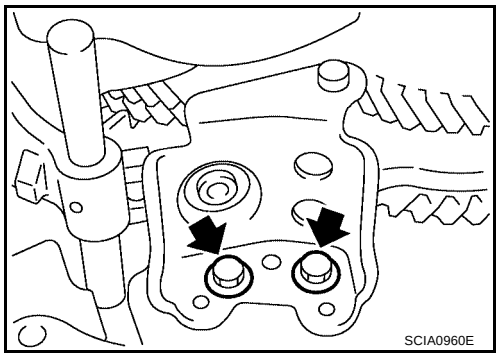
CAUTION:
Do not drop the shifter cap.

b. While lifting the reverse shift fork, align the cam with the reverse bracket.



c. Tighten the bracket bolts to specification, and install the reverse lever assembly.

Bracket bolts : 13.7 N·m (1.4 kg-m, 10 ft-lb)



25. Install the check ball, reverse shift check sleeve, reverse check spring, and the new reverse check ball plug.

CAUTION:
- **Do not reuse the check plug.**
- **Do not drop the check ball.**

26. Install the magnet onto the clutch housing.
27. Install the selected input shaft adjusting shim onto the input shaft.
    - For selection of adjusting shims, refer to MT-35, "INPUTSHAFT END PLAY" .
28. Install the selected differential side bearing adjusting shim and differential side bearing outer race.
    - For selection of adjusting shims, refer to MT-36, "DIFFERENTIAL SIDE BEARING PRELOAD" .
29. Install the baffle plate and oil gutter.
30. Install the transaxle case using the following steps:

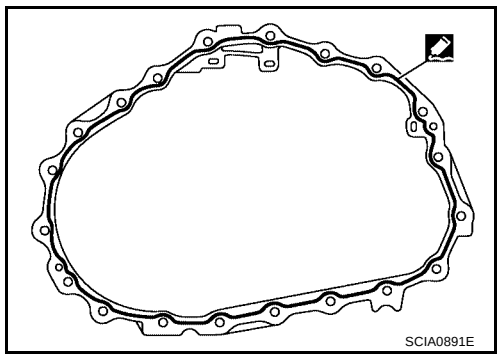
a. Install the selected mainshaft rear bearing adjusting shim into the transaxle case.
    - For selection of adjusting shims, refer to MT-37, "MAINSHAFT END PLAY" .

b. Temporarily install the new snap ring of the mainshaft rear bearing into the transaxle case.

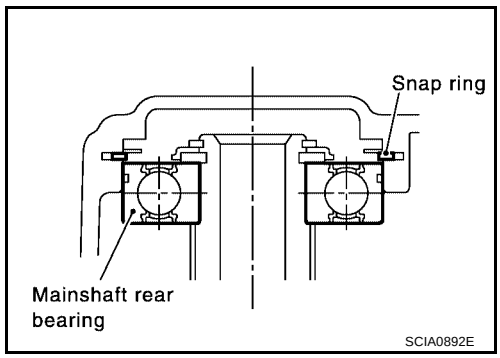
CAUTION:
Do not reuse the snap ring.

c. Apply sealant to the mating surfaces of the transaxle case and clutch housing as shown. Use Genuine Silicone RTV or equivalent. Refer to GI-43, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .

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


SCIA0891E

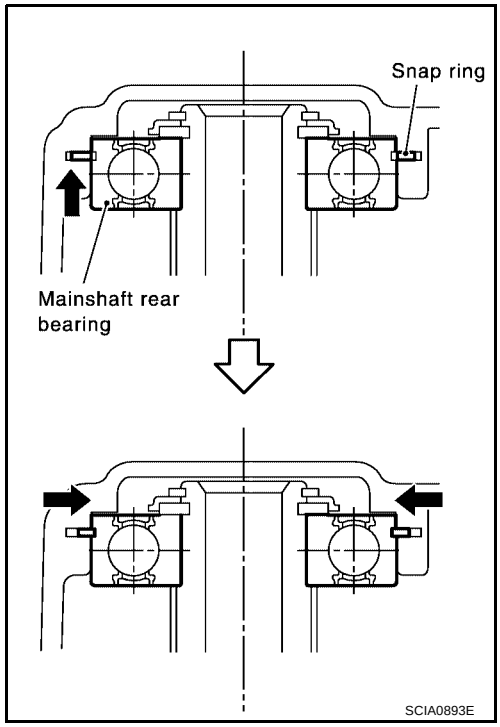
d. Using a snap ring of the mainshaft rear bearing temporarily, install the transaxle case over the clutch housing as shown.



SCIA0892E

e. Through the bore plug mounting hole, with the snap ring stretched, lift up the mainshaft assembly from the control assembly mounting hole.

f. Securely install the snap ring onto the mainshaft rear bearing as shown.



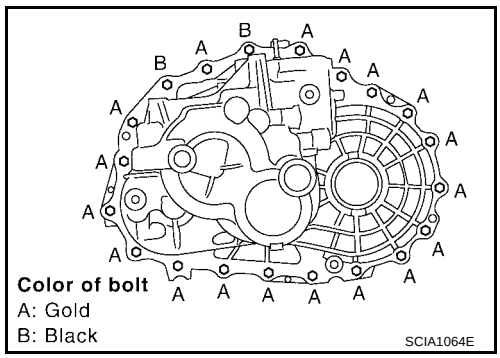
SCIA0893E

g. Tighten the “A” bolts (gold) and new “B” bolts (black) to specification.

“A” Bolt : 50.0 - 53.9 N-m (5.1 - 5.4 kg-m, 37 - 39 ft-lb)

“B” Bolt : 63.0 - 66.9 N-m (6.5 - 6.8 kg-m, 47 - 49 ft-lb)

CAUTION:
Always replace the "B" bolts as they are self-sealing bolts.



SCIA1064E

h. Apply gear oil to new O-ring and install it to the control assembly. Then install the control assembly to the transaxle case. Tighten the bolts to the specified torque. Refer to MT-22, "SHIFT CONTROL COMPONENTS" .

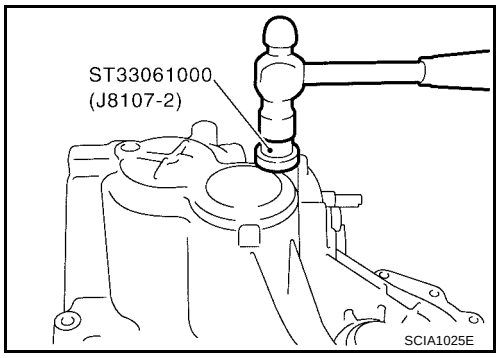
CAUTION:
Do not reuse the O-ring.

i. Install a new shift check and a new stopper bolt.

CAUTION:
Do not reuse the shift check and stopper bolt.

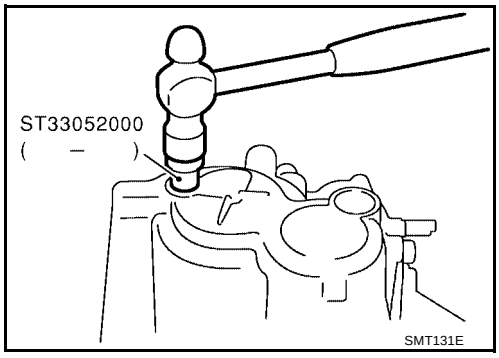
31. Install a new bore plug using Tool as shown.

CAUTION:
Do not reuse the bore plugs.



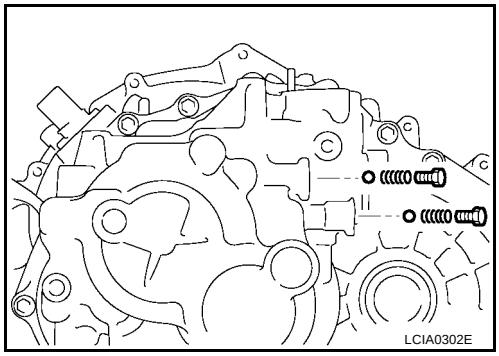
32. Install the new welch plug using Tool.

CAUTION:
Do not reuse the welch plug.

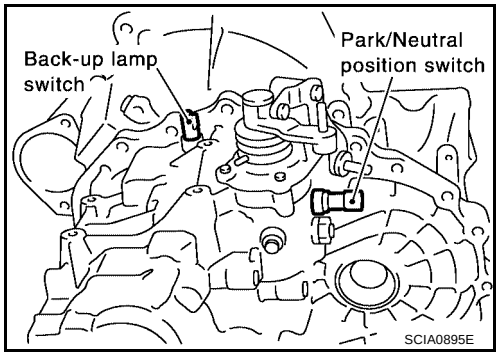


33. Install the 2 check balls, 2 check springs, and the 2 new check plugs.

CAUTION:
Do not reuse the check plugs.



34. Apply sealant to the threads of the park/neutral position switch and back-up lamp switch. Then install them into the transaxle case. Refer to MT-19, "CASE AND HOUSING COMPONENTS" . Use Genuine Silicone RTV or equivalent. Refer to GI-43, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .



35. Install a new gasket onto the drain plug and then install it into the transaxle case.

CAUTION:
- **Do not reuse the gasket.**

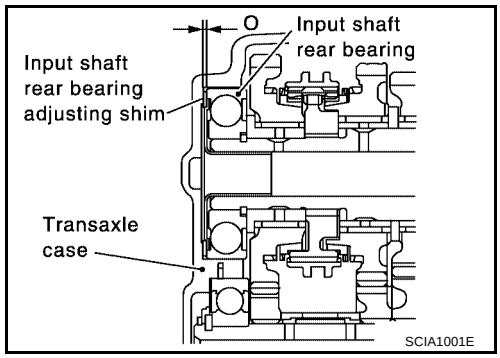
36. Fill the transaxle with the specified fluid. Refer to MT-10, "M/T OIL" .

Adjustment

ECS009TG

INPUTSHAFT END PLAY

- When adjusting the input shaft end play, select the adjusting shim for the input shaft bearing. To select the correct thickness for the adjusting shim, measure the clearance between the transaxle case and input shaft rear bearing.
- Calculate the dimension “O” (thickness of adjusting shim) using the following steps to adjust the input shaft rear bearing for the specified end play.



CAUTION:
Only 1 adjusting shim can be selected.

End play : 0 - 0.06 mm (0 - 0.0024 in)

Dimension “O” = (O_1 - O_2) - End play

“O” : Thickness of adjusting shim

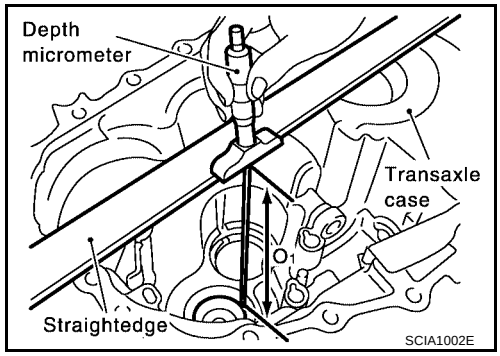
“O_1” : Distance between transaxle case end face and mounting face of adjusting shim

“O_2” : Distance between clutch housing case end face and end face of input shaft rear bearing

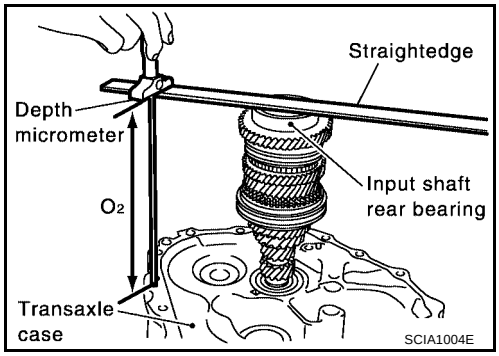
Adjusting Shims

Shim thickness	Part number	Shim thickness	Part number	Shim thickness	Part number
0.40 mm (0.0157 in)	32225 8H500	0.88 mm (0.0346 in)	32225 8H512	1.36 mm (0.0535 in)	32225 8H524
0.44 mm (0.0173 in)	32225 8H501	0.92 mm (0.0362 in)	32225 8H513	1.40 mm (0.0551 in)	32225 8H560
0.48 mm (0.0189 in)	32225 8H502	0.96 mm (0.0378 in)	32225 8H514	1.44 mm (0.0567 in)	32225 8H561
0.52 mm (0.0205 in)	32225 8H503	1.00 mm (0.0394 in)	32225 8H515	1.48 mm (0.0583 in)	32225 8H562
0.56 mm (0.0220 in)	32225 8H504	1.04 mm (0.0409 in)	32225 8H516	1.52 mm (0.0598 in)	32225 8H563
0.60 mm (0.0236 in)	32225 8H505	1.08 mm (0.0425 in)	32225 8H517	1.56 mm (0.0614 in)	32225 8H564
0.64 mm (0.0252 in)	32225 8H506	1.12 mm (0.0441 in)	32225 8H518	1.60 mm (0.0630 in)	32225 8H565
0.68 mm (0.0268 in)	32225 8H507	1.16 mm (0.0457 in)	32225 8H519	1.64 mm (0.0646 in)	32225 8H566
0.72 mm (0.0283 in)	32225 8H508	1.20 mm (0.0472 in)	32225 8H520		
0.76 mm (0.0299 in)	32225 8H509	1.24 mm (0.0488 in)	32225 8H521		
0.80 mm (0.0315 in)	32225 8H510	1.28 mm (0.0504 in)	32225 8H522		
0.84 mm (0.0331 in)	32225 8H511	1.32 mm (0.0520 in)	32225 8H523		

1. Using a depth micrometer and straight edge, measure the dimension "O_1 " between the transaxle case end face and mounting face of the adjusting shim as shown.



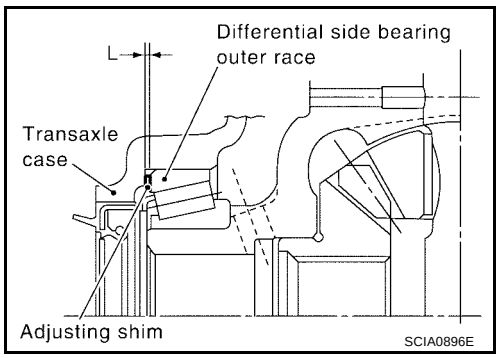
2. Using a depth micrometer and straight edge, measure the dimension "O_2 " between the clutch housing case end face and end face of the input shaft rear bearing as shown.



3. Install the selected input shaft rear bearing adjusting shim onto the input shaft.

DIFFERENTIAL SIDE BEARING PRELOAD

- When adjusting differential side bearing preload, select adjusting shim for differential side bearing. To select adjusting shim, measure clearance “L” between transaxle case and differential side bearing outer race.
- Calculate dimension “L” (thickness of adjusting shim) using the following procedure to meet specification of preload for differential side bearing.



Preload : 0.15 - 0.21 mm (0.0059 - 0.0083 in)

Dimension "L" = ("L_1" - "L_2") + Preload

"L" : Thickness of adjusting shim

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

"L_2" : Distance between the differential side bearing and the clutch housing end face

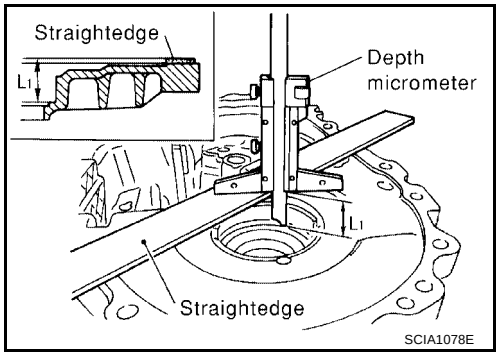
CAUTION:

Up to only 2 adjusting shims can be selected.

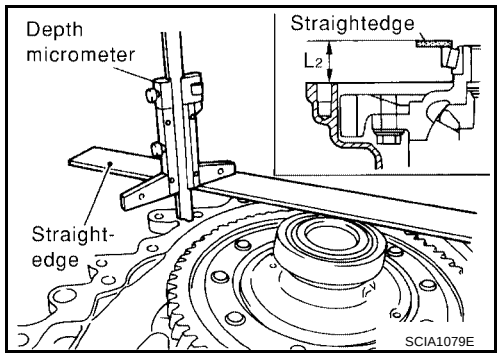
Adjusting Shim

Shim thickness	Part number
0.48 mm (0.0189 in)	31438 80X00
0.52 mm (0.0205 in)	31438 80X01
0.56 mm (0.0220 in)	31438 80X02
0.60 mm (0.0236 in)	31438 80X03
0.64 mm (0.0252 in)	31438 80X04
0.68 mm (0.0268 in)	31438 80X05
0.72 mm (0.0283 in)	31438 80X06
0.76 mm (0.0299 in)	31438 80X07
0.80 mm (0.0315 in)	31438 80X08
0.84 mm (0.0331 in)	31438 80X09
0.88 mm (0.0346 in)	31438 80X10
0.92 mm (0.0362 in)	31438 80X11

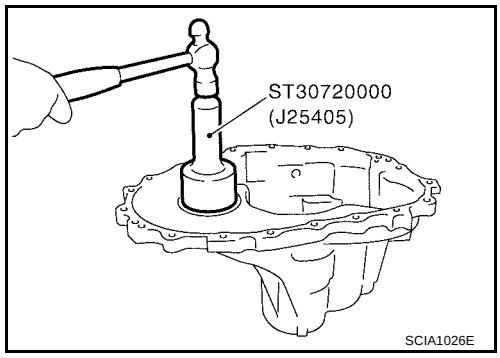
1. Using a depth micrometer and straight edge, measure the dimension "L_1 " between the transaxle case end face and the mounting face of the adjusting shim as shown.



2. Install the outer race onto the differential side bearing on the final gear side. Holding the outer race horizontally by hand, rotate the final gear five times or more (for smooth movement of the bearing roller).
3. Using a depth micrometer and straight edge, measure the dimension "L_2 " between the differential side bearing outer race and the clutch housing end face as shown.

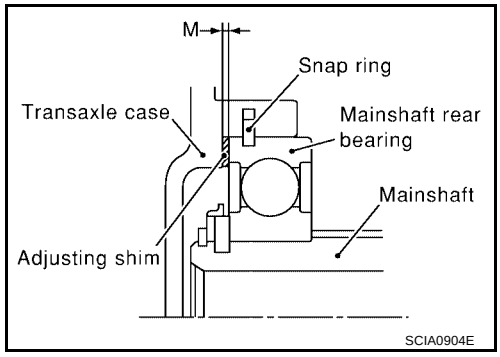


4. Install the selected adjusting shim and then the differential side bearing outer race using Tool as shown.



MAINSHAFT END PLAY

- When adjusting the mainshaft end play, select the adjusting shim for the mainshaft rear bearing. To select the adjusting shim, measure clearance “M” between the transaxle case and mainshaft rear bearing.
- Calculate the dimension “P” (thickness of adjusting shim) using the following procedure to meet specification of end play for mainshaft rear bearing.



End play : 0 - 0.06 mm (0 - 0.0024 in)

Dimension "P" = "M" - End play

"P" : Thickness of adjusting shim

"M" : Distance between mainshaft rear bearing and transaxle case

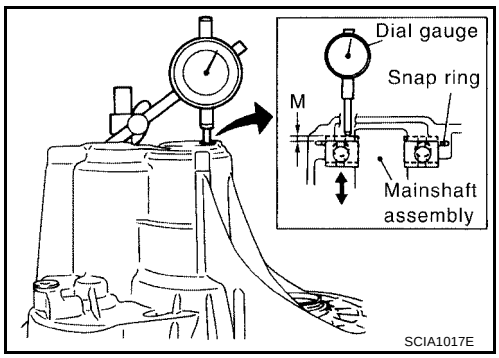
CAUTION:

Only 1 adjusting shim can be selected.

Adjusting Shim

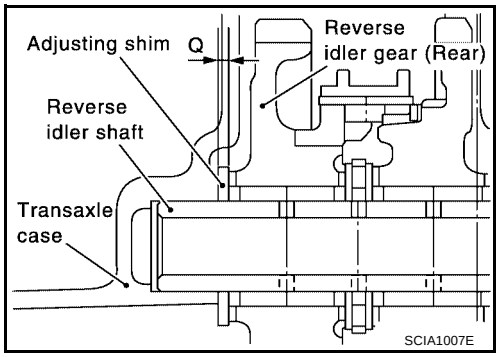
Shim thickness	Part number
0.44 mm (0.0173 in)	32238 8H510
0.48 mm (0.0189 in)	32238 8H511
0.52 mm (0.0205 in)	32238 8H512
0.56 mm (0.0220 in)	32238 8H513
0.60 mm (0.0236 in)	32238 8H514
0.64 mm (0.0252 in)	32238 8H515
0.68 mm (0.0268 in)	32238 8H516
0.72 mm (0.0283 in)	32238 8H517
0.76 mm (0.0299 in)	32238 8H518
0.80 mm (0.0315 in)	32238 8H519
0.84 mm (0.0331 in)	32238 8H520
0.88 mm (0.0346 in)	32238 8H521
0.92 mm (0.0362 in)	32238 8H522
0.96 mm (0.0378 in)	32238 8H523
1.00 mm (0.0394 in)	32238 8H524
1.04 mm (0.0409 in)	32238 8H560
1.08 mm (0.0425 in)	32238 8H561

1. Install the mainshaft assembly to the clutch housing.
2. Install the snap ring to the transaxle case.
3. Install the transaxle case to clutch housing, and temporarily assemble them with bolts. Temporarily install the snap ring to the mainshaft rear bearing.
4. Install the dial gauge to the snap ring access hole, and expand the snap ring as shown. Lift the mainshaft assembly through the control assembly installation hole, and push it against the transaxle case. This state shall be defined as base. Moving the distance of the mainshaft assembly, with the snap ring installed on the main bearing, becomes “M”.



REVERSE IDLER GEAR END PLAY

- When adjusting the reverse idler gear end play, select the adjusting shim for the reverse idler gear. To select the correct thickness of adjusting shim, measure the clearance between the transaxle case and reverse idler gear.
- Calculate the dimension “Q” (thickness of adjusting shim) using the following steps to adjust the end play of the reverse idler gear to specification.



End play : 0.04 - 0.10 mm (0.0016 - 0.0039 in)

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

"Q" : Thickness of adjusting shim

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

"Q_2" : Distance between clutch housing case end face and end face of reverse idler gear

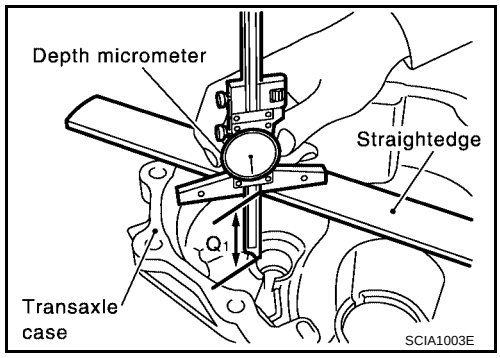
CAUTION:

Only 1 adjusting shim can be selected.

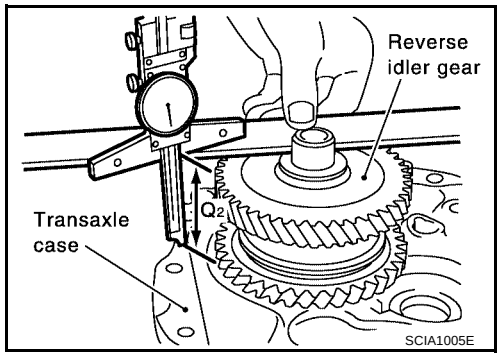
Adjusting Shim

Shim thickness mm (in)	Part number
1.76 (0.0693)	32237 8H800
1.80 (0.0709)	32237 8H801
1.84 (0.0724)	32237 8H802
1.88 (0.0740)	32237 8H803
1.92 (0.0756)	32237 8H804
1.96 (0.0772)	32237 8H805
2.00 (0.0787)	32237 8H806
2.04 (0.0803)	32237 8H807
2.08 (0.0819)	32237 8H808
2.12 (0.0835)	32237 8H809
2.16 (0.0850)	32237 8H810
2.20 (0.0866)	32237 8H811
2.24 (0.0882)	32237 8H812
2.28 (0.0898)	32237 8H813
2.32 (0.0913)	32237 8H814
2.36 (0.0929)	32237 8H815
2.40 (0.0945)	32237 8H816
2.44 (0.0961)	32237 8H817
2.48 (0.0976)	32237 8H818
2.52 (0.0992)	32237 8H819
2.56 (0.1008)	32237 8H820
2.60 (0.1024)	32237 8H821
2.64 (0.1039)	32237 8H822

1. Using a depth micrometer and straight edge, measure the dimension "Q_1 " between the transaxle case end face and the mounting face of the adjusting shim as shown.



2. Using a depth micrometer and straight edge, measure the dimension "Q_2 " between the clutch housing case end face and the end face of reverse idler gear as shown.



3. Install the selected reverse idler gear adjusting shim onto the reverse idler gear.

INPUT SHAFT AND GEARS

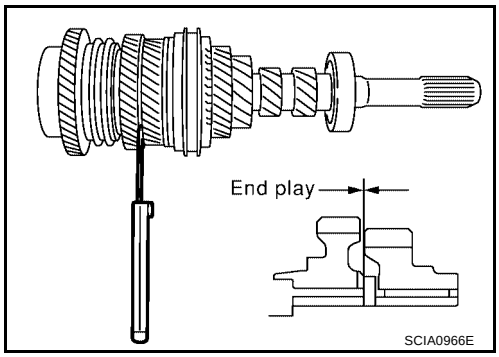
PFP:32200

Disassembly and Assembly

ECS009TH

DISASSEMBLY

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



End play standard values

3rd gear : 0.18 - 0.31 mm (0.0071 - 0.0122 in)

4th gear : 0.20 - 0.30 mm (0.0079 - 0.0118 in)

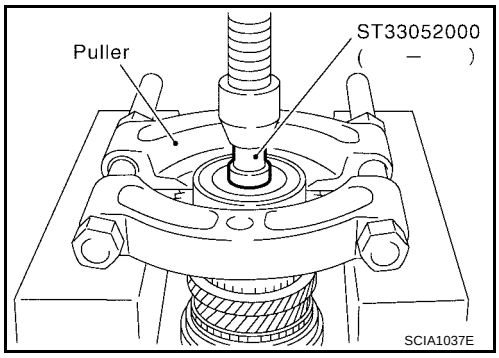
5th gear : 0.06 - 0.16 mm (0.0024 - 0.0063 in)

6th gear : 0.06 - 0.16 mm (0.0024 - 0.0063 in)

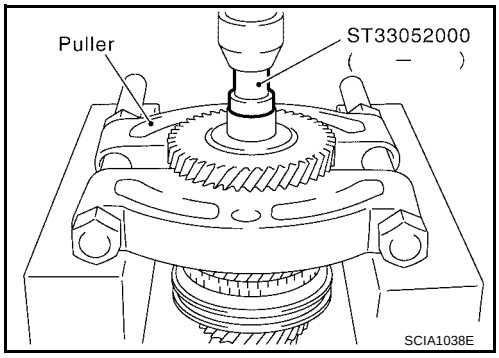
CAUTION:

If the measurement is outside the standard value, disassemble to check the contact surfaces of the gear, shaft, and hub. Adjust using the correct size snap ring for assembly.

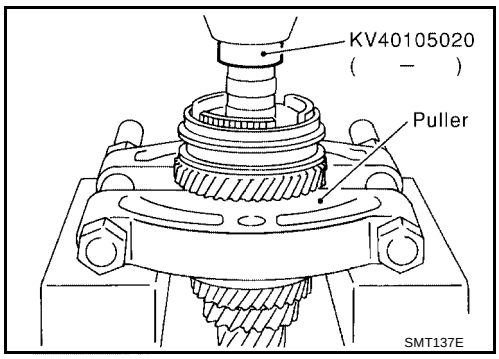
2. Remove the oil channel.
3. Remove the input shaft rear bearing using Tool as shown.
4. Remove the snap ring.



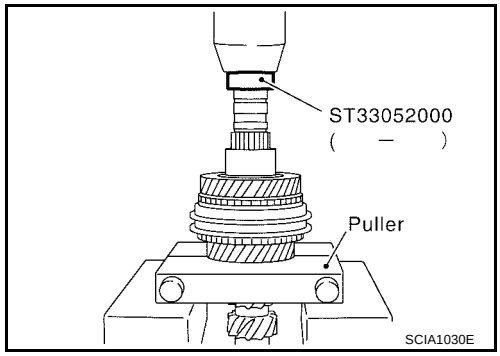
5. Remove the 6th input gear, 6th bushing, and 6th needle bearing using Tool as shown.
6. Remove the 6th baulk ring, 5th-6th coupling sleeve, and shifting insert.



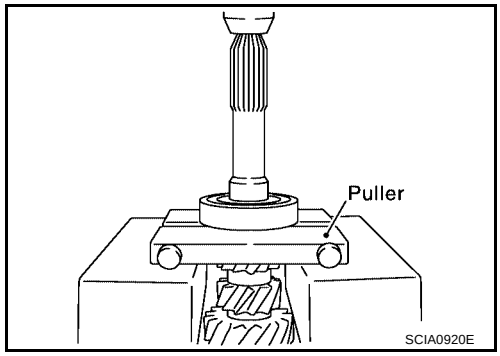
7. Remove the 5th input gear and synchronizer hub assembly simultaneously using Tool as shown.
8. Remove the 5th needle bearing.



9. Remove the 5th bushing, thrust washer, 4th input gear, 4th needle bearing, 4th bushing, 4th baulk ring, 3rd-4th synchronizer hub assembly, 3rd baulk ring, and 3rd input gear simultaneously using Tool as shown.
10. Remove the 3rd needle bearing.



11. Remove the input shaft front bearing using suitable tool as shown.

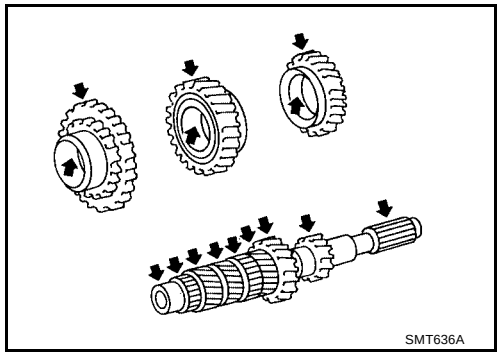


INSPECTION AFTER DISASSEMBLY

Input Shaft and Gear

Check the items listed. If necessary, replace them with new ones.

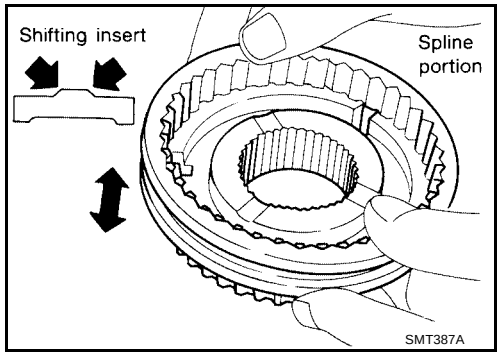
- Damage, peeling, dent, uneven wear, or bending of the input shaft.
- Excessive wear, damage, or peeling of the input gears.



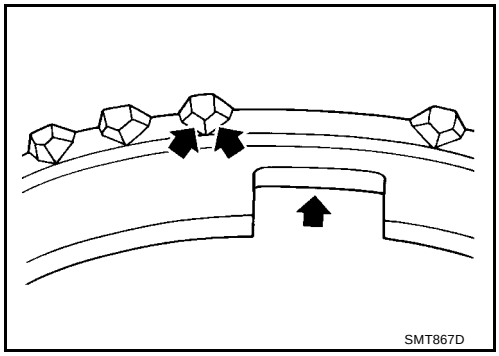
Synchronizer

Check the items listed. If necessary, replace them with new ones.

- Damage and excessive wear of the contact surfaces of coupling sleeve, synchronizer hub, and shifting insert.
- Coupling sleeve and synchronizer hub must move smoothly as shown.



- If any cracks, damage, or excessive wear is found on the cam face of baulk ring or working face of the insert as shown, replace it.

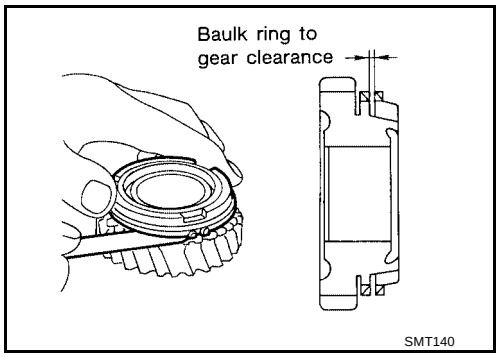


Baulk Ring Clearance for Single Cone Synchronizer (4th, 5th and 6th)

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

Clearance - standard

4th	**: 0.9 - 1.45 mm (0.035 - 0.0571 in)**
5th and 6th	**: 0.95 - 1.4 mm (0.0374 - 0.055 in)**
Limit	**: 0.7 mm (0.028 in)**

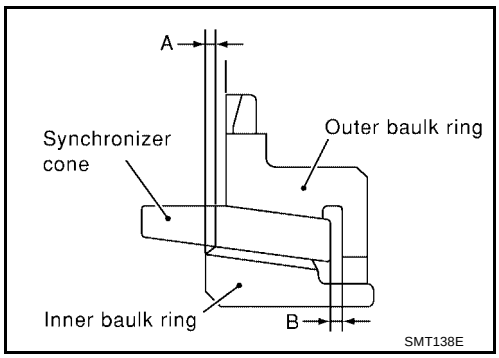


Baulk Ring Clearance for Double-cone Synchronizer (3rd)

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

CAUTION:

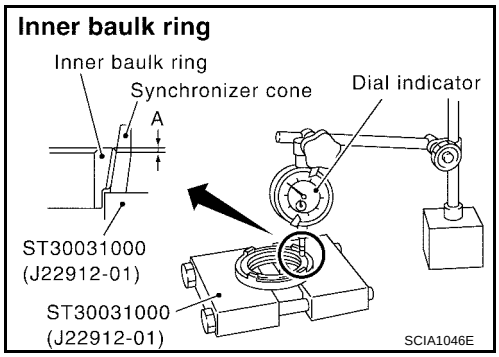
Outer baulk ring, synchronizer cone, and inner baulk ring act as a set to control the clearances “A” and “B”. If the measurement exceeds the service limit value, replace all of them as a set.



1. Using a dial gauge and Tool, measure clearance “A” at two or more points diagonally opposite, and calculate mean value.

Clearance “A”

Standard	**: 0.6 - 0.8 mm (0.024 - 0.031 in)**
Limit value	**: 0.2 mm (0.008 in)**

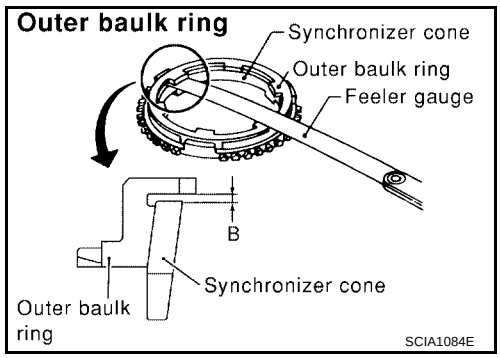


2. Using a feeler gauge, measure clearance “B” at two or more points diagonally opposite, and calculate mean value as shown.

Clearance “B”

Standard : 0.6 - 1.1 mm (0.024 - 0.043 in)

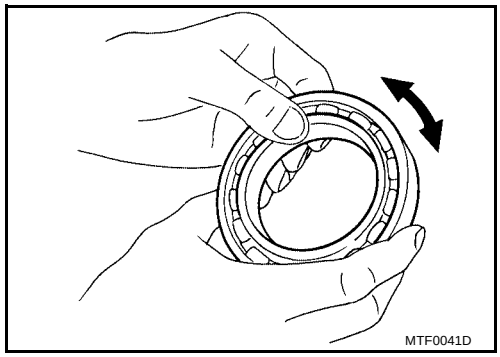
Limit value : 0.2 mm (0.008 in)



Bearing

Check the item listed. If necessary, replace it with a new one.

- Damage and rough rotation of the bearing as shown.

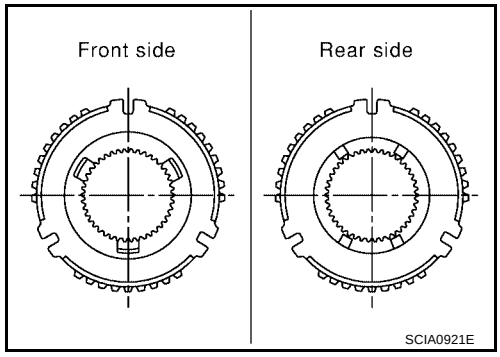


ASSEMBLY

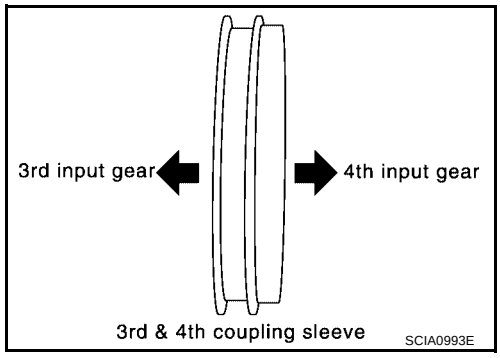
1. Install the 3rd needle bearing.
2. Install the 3rd input gear and 3rd baulk ring.
3. Install the spread spring, shifting insert, and a new 3rd-4th synchronizer hub onto the 3rd-4th coupling sleeve.

CAUTION:

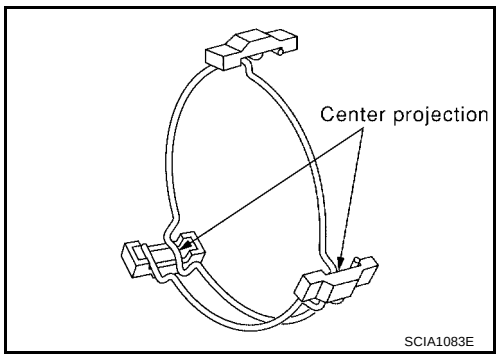
- **Install with the orientation of the new synchronizer hub as shown.**
- **Do not reuse the 3rd-4th synchronizer hub.**



- **Install with the orientation of the coupling sleeve as shown.**

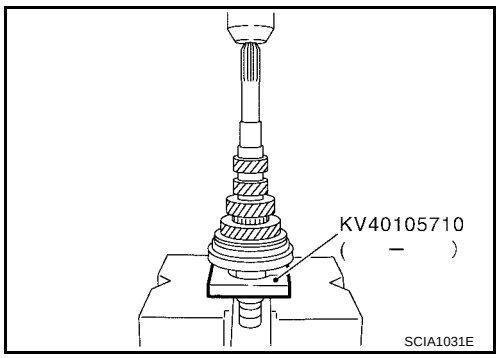


- **Do not hook the ends of the two spread springs (front and back have two each) on the same shifting insert.**

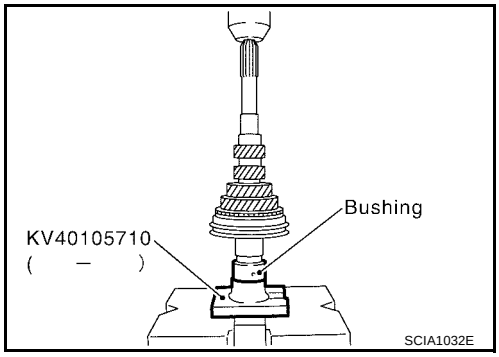


4. Install the 3rd-4th synchronizer assembly using Tool as shown.

CAUTION:
Align grooves of the shifting insert and 3rd baulk ring.



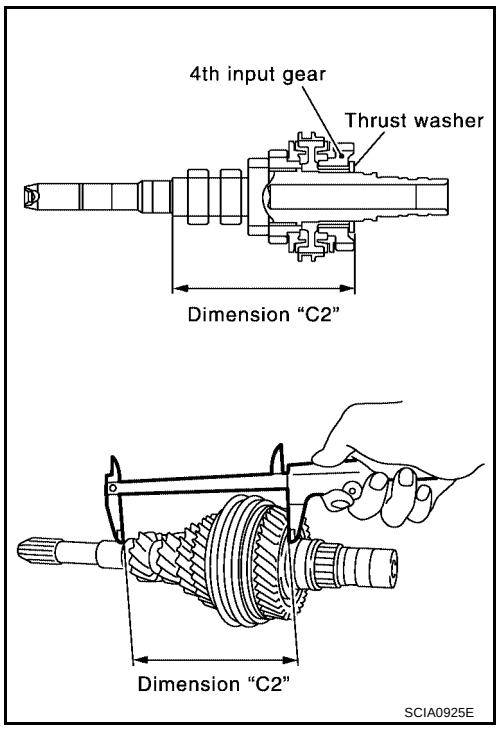
5. Install the 4th bushing using Tool as shown.
6. Install the 4th baulk ring.
7. Install the 4th input gear and 4th needle bearing.



8. Measure the dimension "C_2 " as shown. Select a suitable thrust washer so that dimension "C_2 " satisfies the standard dimension specification. Then install the thrust washer onto the input shaft.

Standard for dimension "C_2" : 154.7 - 154.8 mm (6.091 - 6.094 in)

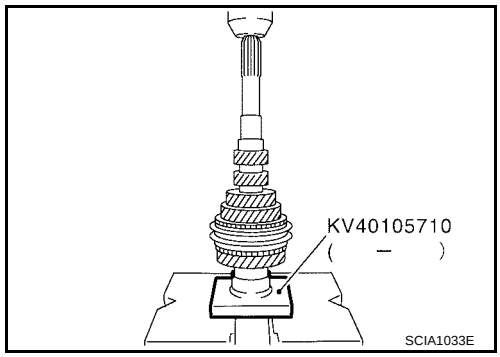
CAUTION:
Only 1 thrust washer can be selected.



Thrust Washer

Thickness	Part number	Thickness	Part number
3.84 mm (0.1512 in)	32347 8H500	4.02 mm (0.1583 in)	32347 8H503
3.90 mm (0.1535 in)	32347 8H501	4.08 mm (0.1606 in)	32347 8H504
3.96 mm (0.1559 in)	32347 8H502	4.14 mm (0.1630 in)	32347 8H505

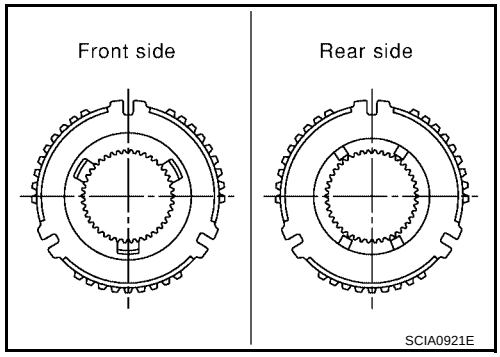
9. Install the 5th bushing using Tool as shown.
10. Install the 5th needle bearing and 5th input gear.
11. Install the 5th baulk ring.



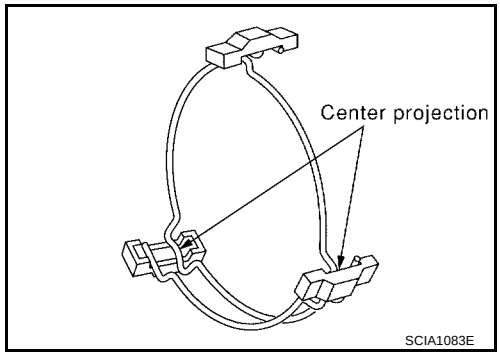
12. Install the synchronizer assembly onto a new 5th-6th synchronizer hub.

CAUTION:

- **Install with the orientation of the new synchronizer hub as shown.**
- **Do not reuse the 5th-6th synchronizer hub.**



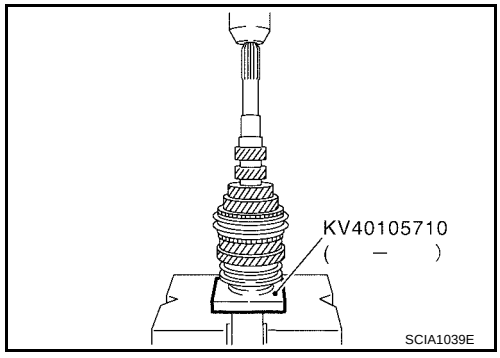
- **Do not to hook the ends of the 2 spread springs (front and back have two each) on the same shifting insert.**



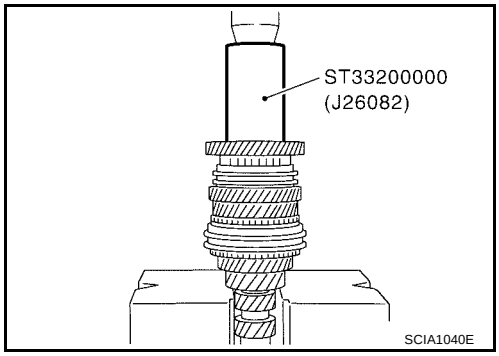
13. Install the 5th-6th synchronizer hub assembly using Tool as shown.

CAUTION:

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



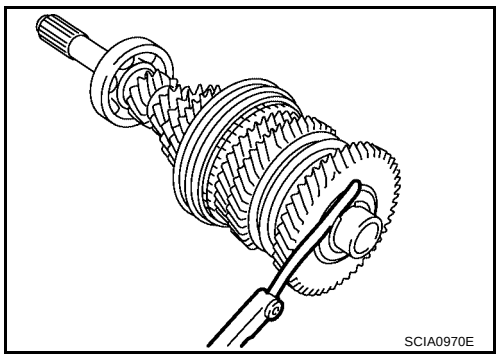
14. Install the needle bearing, 6th input gear and then 6th bushing using Tool as shown.



15. Install the snap ring onto the input shaft, and measure to check that end play (gap between snap ring and groove) of the 6th bushing is within specification.

End play standard value : 0 - 0.1 mm (0 - 0.004 in)

- If the measurement is outside the standard value, select the appropriate size snap ring.

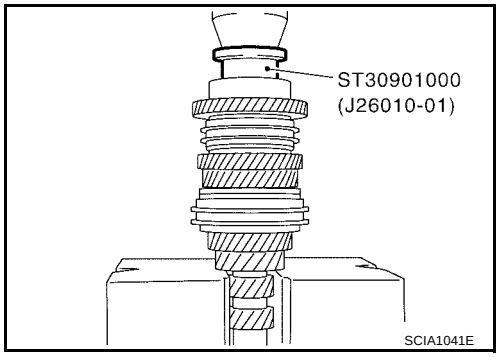


Snap Rings

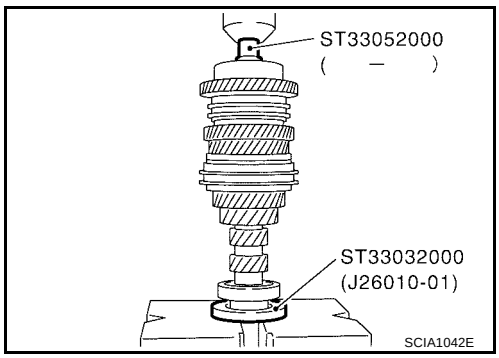
Thickness	Part number	Thickness	Part number
1.76 mm (0.0693 in)	32204 8H511	2.01 mm (0.0791 in)	32204 8H516
1.81 mm (0.0713 in)	32204 8H512	2.06 mm (0.0811 in)	32204 8H517
1.86 mm (0.0732 in)	32204 8H513	2.11 mm (0.0831 in)	32204 8H518
1.91 mm (0.0752 in)	32204 8H514	2.16 mm (0.0850 in)	32204 8H519
1.96 mm (0.0772 in)	32204 8H515	2.21 mm (0.0871 in)	32204 8H520

16. Install the input shaft rear bearing using Tool as shown.

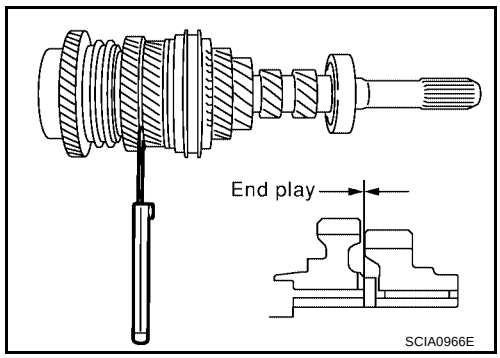
CAUTION:
Install input shaft rear bearing with its brown surface facing the input gear side.



17. Install the input shaft front bearing using Tool as shown.
18. Install the oil channel onto the input shaft.



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



End play standard values

3rd gear : 0.18 - 0.31 mm (0.0071 - 0.0122 in)
4th gear : 0.20 - 0.30 mm (0.0079 - 0.0118 in)
5th gear : 0.06 - 0.16 mm (0.0024 - 0.0063 in)
6th gear : 0.06 - 0.16 mm (0.0024 - 0.0063 in)

MAINSHAFT AND GEARS

PFP:32241

Disassembly and Assembly

ECS009TI

DISASSEMBLY

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

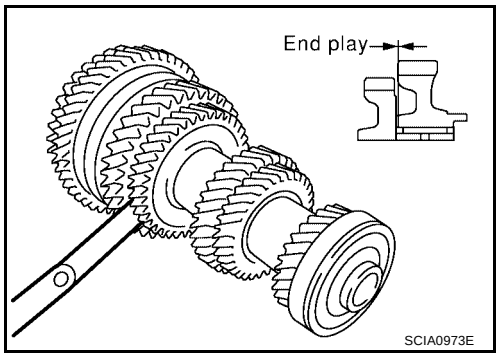
End play standard values

1st gear : 0.20 - 0.30 mm (0.0079 - 0.0118 in)

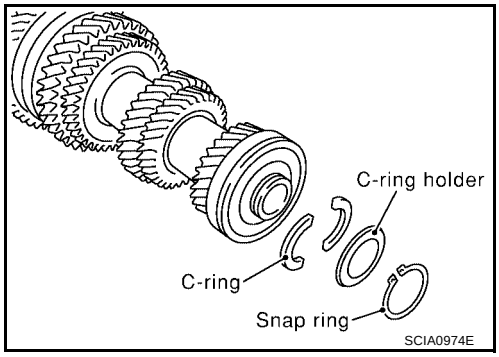
2nd gear : 0.06 - 0.16 mm (0.0024 - 0.0063 in)

CAUTION:

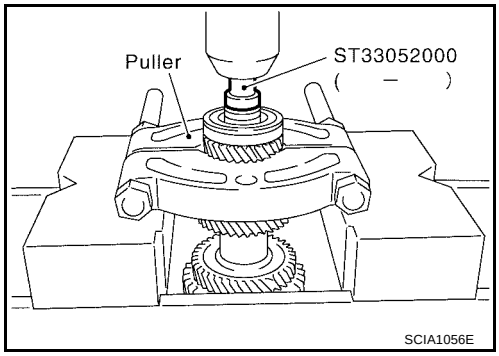
If the measurement is outside the standard value, disassemble to check the contact surfaces of the gear, shaft, and hub. Adjust with the snap ring at assembly.



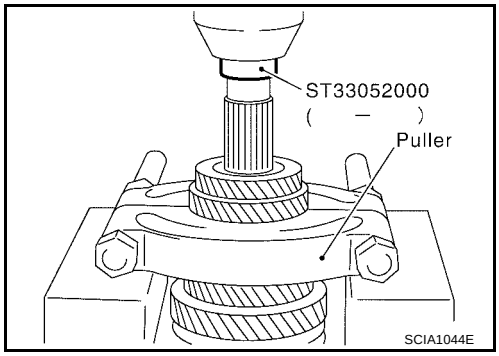
2. Remove the snap ring.
3. Remove the C-ring holder, and then mainshaft C-ring as shown.



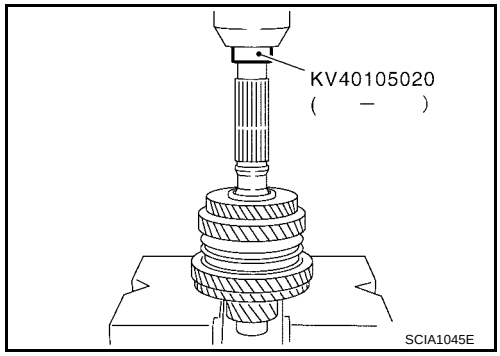
4. Remove the mainshaft rear bearing, adjust shim, and 6th main gear using Tool as shown.
5. Remove the 5th-6th mainshaft spacer.



6. Remove the 4th main gear and 5th main gear simultaneously using Tool as shown.
7. Remove the adjusting shim.
8. Remove the 3rd-4th mainshaft spacer.



9. Remove the 3rd main gear, 2nd main gear, 2nd gear needle bearing, 2nd bushing, 1st-2nd synchronizer assembly, 1st main gear, reverse main gear, 1st gear needle bearing, and 1st bushing simultaneously using Tool as shown.

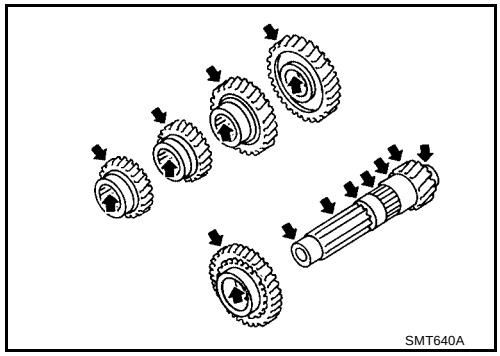


INSPECTION AFTER DISASSEMBLY

Mainshaft and Gears

Check the items listed as shown. If necessary, replace them with new ones.

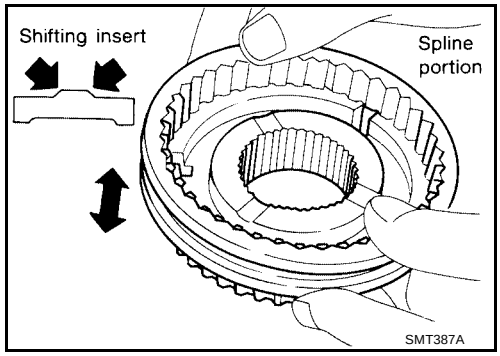
- Damage, peeling, dent, uneven wear, and bending of the mainshaft.
- Excessive wear, damage and peeling of the mainshaft gears.



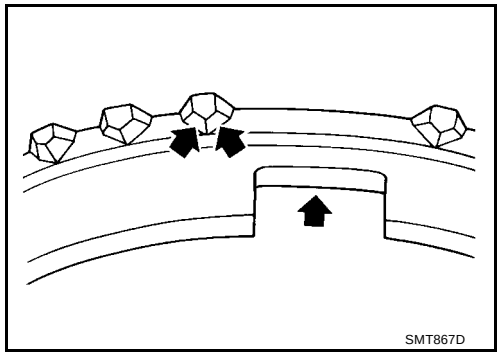
Synchronizer

Check the items listed as shown. If necessary, replace them with new ones.

- Damage, excessive wear on contact surfaces of the coupling sleeve, synchronizer hub, and shifting insert.
- Coupling sleeve and synchronizer hub must move smoothly as shown.



- If any cracks, damage, or excessive wear is found on the cam face of baulk ring or working face of the insert as shown, replace it.

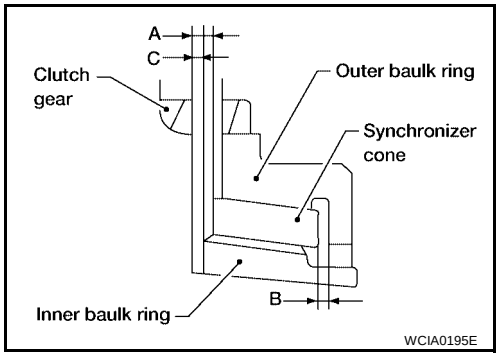


Triple Cone Synchronizer (1st and 2nd)

- Check the clearance of the outer baulk ring, synchronizer cone, and inner baulk ring of the 1st and 2nd triple cone synchronizers, using the following procedure.

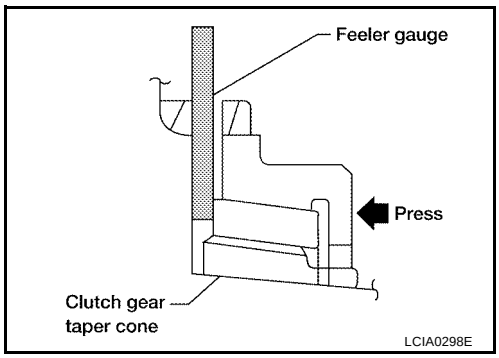
CAUTION:
The outer baulk ring, synchronizer cone, and inner baulk ring operate as a set to control the clearances “A”, “B”, and “C”. If the measured clearances exceed the service limit value, replace the components as a set.

NOTE:
To calculate the mean value of two or more measured values, add the highest and lowest measured values and divide by two.



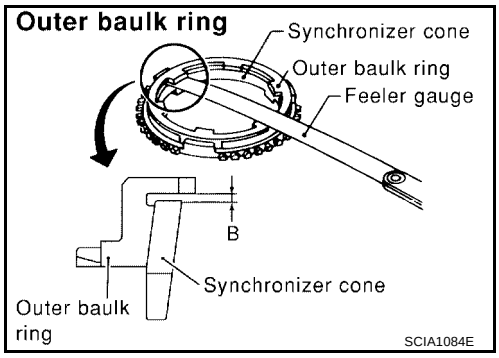
1. Press the baulk ring on to the clutch gear taper cone by hand, then measure the clearance “A” at two or more points diagonally opposite with a feeler gauge, and then calculate the mean value.

Clearance “A”
Standard : 0.6 - 1.2 mm (0.024 - 0.047 in)
Limit : 0.3 mm (0.012 in)



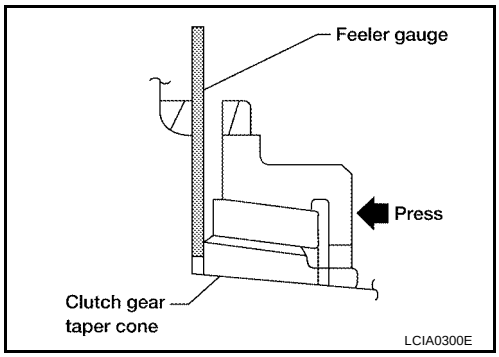
2. Measure clearances “B” at two or more points diagonally opposite with a feeler gauge, and then calculate the mean value.

Clearance “B”
Standard : 0.6 - 1.1 mm (0.024 - 0.043 in)
Limit : 0.2 mm (0.008 in)



3. Press the baulk ring on to the clutch gear taper cone by hand, then measure the clearance “C” at two or more points diagonally opposite with a feeler gauge, and then calculate the mean value.

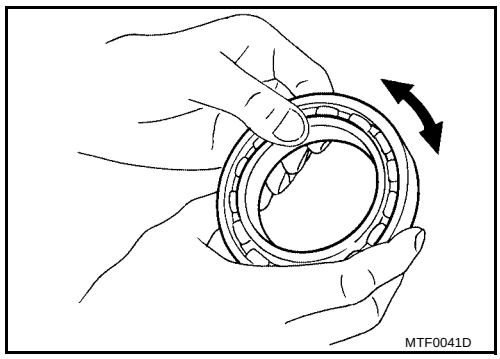
Clearance “C”
Standard : 0.7 - 1.1 mm (0.028 - 0.043 in)
Limit : 0.3 mm (0.012 in)



Bearing

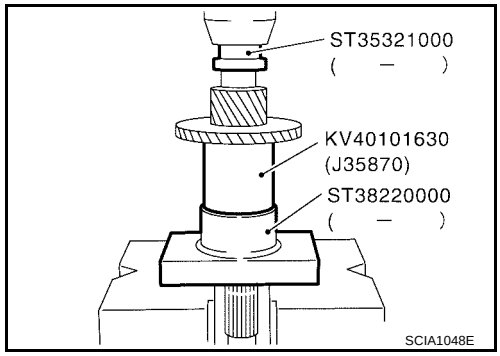
Check the item listed. If necessary, replace it with a new one.

- Damage and rough rotation of the bearing as shown.



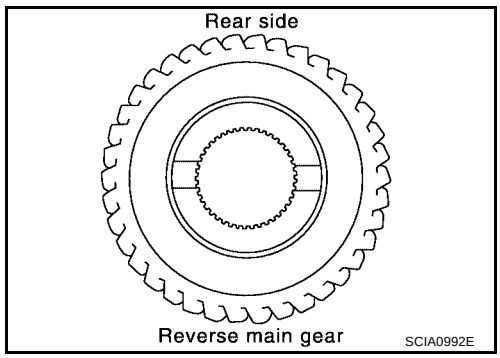
ASSEMBLY

1. Install the reverse main gear using Tools as shown.

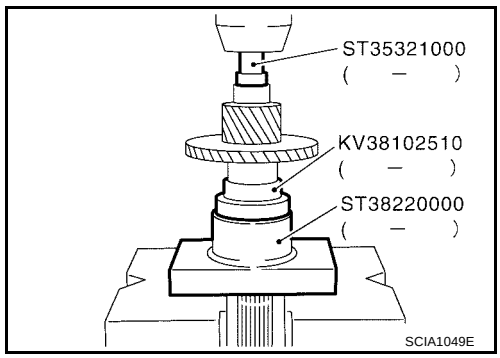


CAUTION:

Install with the orientation of reverse main gear as shown.



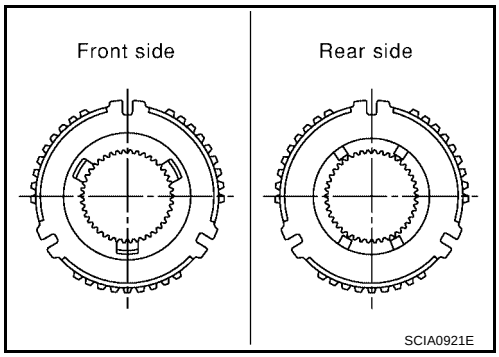
2. Install the 1st bushing using Tools as shown.
3. Install the needle bearing, and then the 1st main gear.



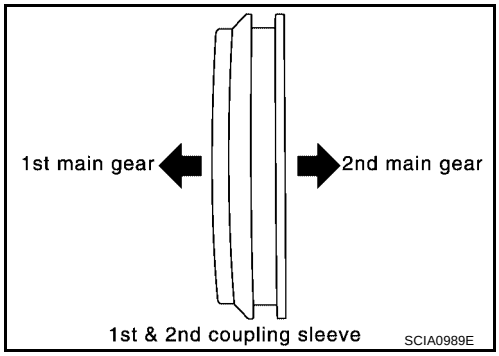
4. Install the spread spring, shifting insert, and a new 1st-2nd synchronizer hub onto the 1st-2nd coupling sleeve.

CAUTION:

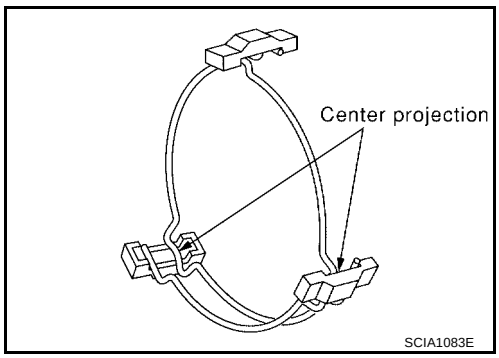
- **Install with the orientation of the new synchronizer hub as shown.**
- **Do not reuse 1st-2nd synchronizer hub**



- **Install with the orientation of coupling sleeve as shown.**



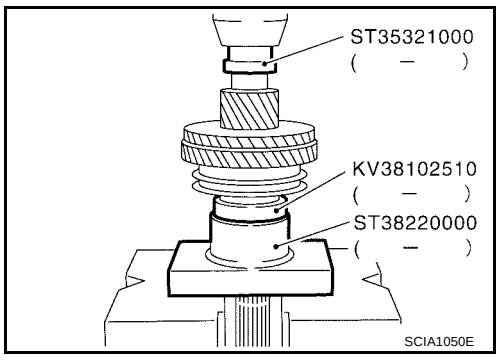
- **Do not hook the ends of the two spread springs (front and back have two each) on the same shifting insert.**



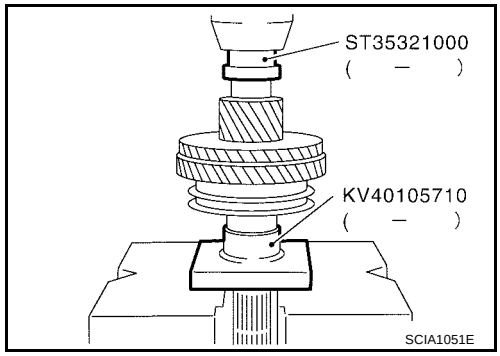
5. Install the 1st gear synchronizer assembly onto the mainshaft, and the synchronizer hub assembly onto the mainshaft using Tools as shown.

CAUTION:

- **Outer baulk ring, synchronizer cone, and inner baulk ring on the 2nd gear-side must have been removed.**
- **Install the coupling sleeve with the proper orientation.**



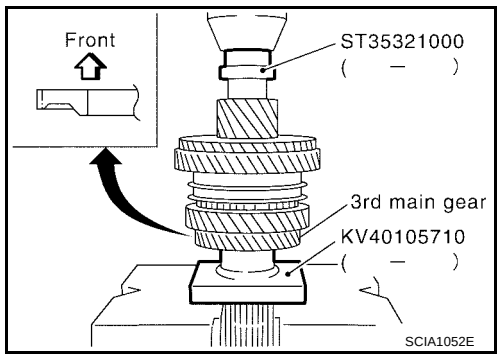
6. Install the 2nd bushing using Tools as shown.
7. Install the outer baulk ring, synchronizer cone, and inner baulk ring on 2nd gear-side.
8. Install the 2nd needle bearing and 2nd gear.



9. Install the 3rd main gear using Tools as shown.

CAUTION:
Install the 3rd main gear with the orientation as shown.

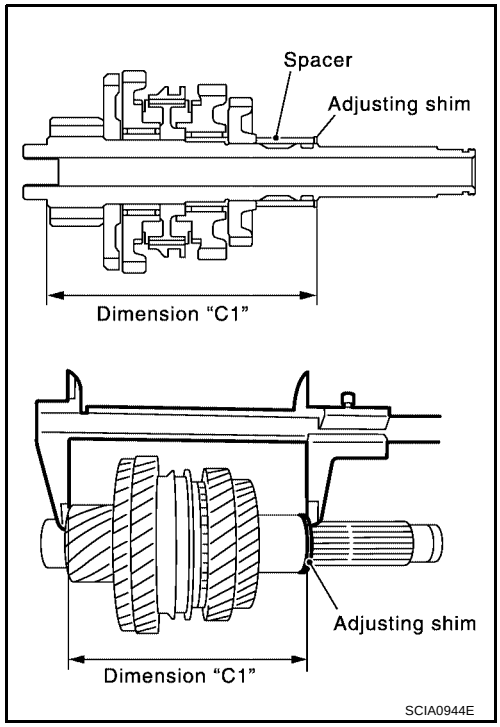
10. Install the 3rd-4th mainshaft spacer.



11. Measure the dimension "C_1" . Select a suitable adjusting shim so that the dimension "C_1 " satisfies the standard dimension specification, and install it onto the mainshaft.

Standard for dimension "C_1 " : 173.85 - 173.95 mm (6.844 - 6.848 in)

CAUTION:
Only 1 adjusting shim can be selected.

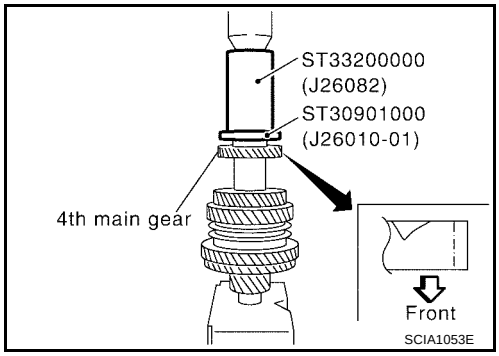


Adjusting Shim

Thickness	Part number	Thickness	Part number
0.52 mm (0.0205 in)	32238 8H500	0.84 mm (0.0331 in)	32238 8H504
0.60 mm (0.0236 in)	32238 8H501	0.92 mm (0.0362 in)	32238 8H505
0.68 mm (0.0268 in)	32238 8H502	1.00 mm (0.0394 in)	32238 8H506
0.76 mm (0.0299 in)	32238 8H503	1.08 mm (0.0425 in)	32238 8H507

12. Install the 4th main gear with the specified orientation as shown, using Tools as shown.

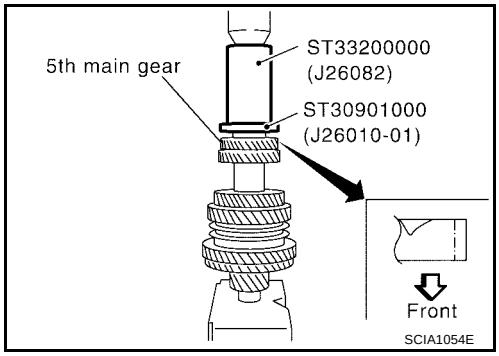
    CAUTION:
    Install the 4th main gear with the orientation as shown.



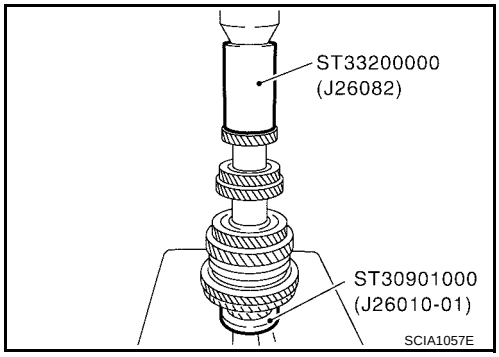
13. Install the 5th main gear with the specified orientation as shown, using Tools as shown.

    CAUTION:
    Install the 5th main gear with the orientation as shown.

14. Install the 5th-6th mainshaft spacer.



15. Install the 6th main gear using Tools as shown.



16. Select the 6th main adjusting shim and then install it onto the mainshaft.

- Calculate thickness “S” of 6th main adjusting shim by procedure below so that end play dimension between 6th main gear and mainshaft rear bearing becomes the dimension specified.

End play : 0 - 0.1 mm (0 - 0.004 in)

Dimension "S" = ("S_1 " - "S_2 ") - End play

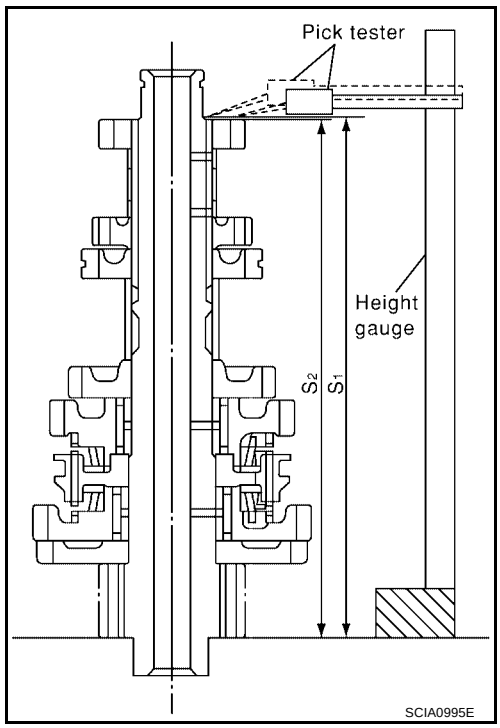
"S" : Thickness of adjusting shim

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

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

CAUTION:

Only 1 adjusting shim can be selected.



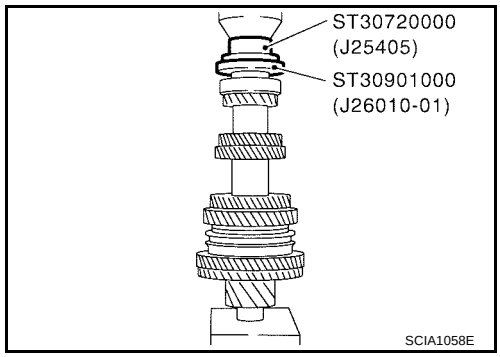
Adjusting Shim

Thickness	Part number	Thickness	Part number
0.88 mm (0.0346 in)	32237 8H560	1.20 mm (0.0472 in)	32237 8H564
0.96 mm (0.0378 in)	32237 8H561	1.28 mm (0.0504 in)	32237 8H565
1.04 mm (0.0409 in)	32237 8H562	1.36 mm (0.0535 in)	32237 8H566
1.12 mm (0.0441 in)	32237 8H563		

a. Using a height gauge, measure the dimension “S_1 ” and “S_2 ” as shown.

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

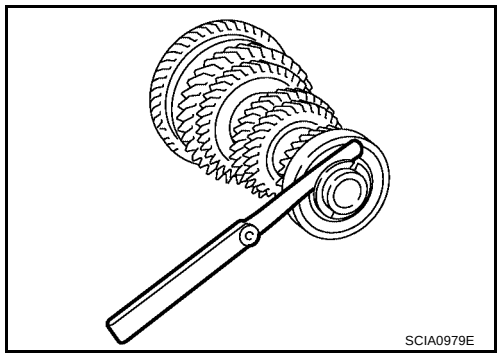
17. Install the mainshaft rear bearing using Tools as shown.



18. Install the C-ring onto the mainshaft, and check that the end play of mainshaft rear bearing meets specifications.

End play standard value : 0 - 0.06 mm (0 - 0.0024 in)

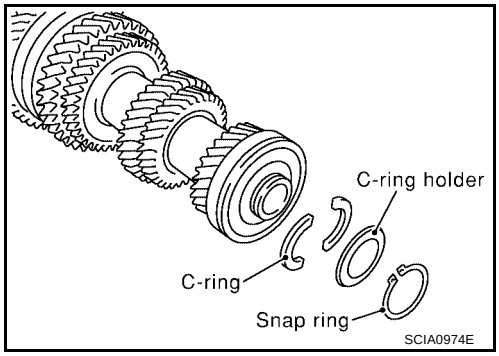
- If the measurement is outside the specified standard value, reselect a new C-ring.



C-Ring

Thickness	Part number	Thickness	Part number
2.535 mm (0.0998 in)	32348 8H800	2.835 mm (0.1116 in)	32348 8H810
2.565 mm (0.1010 in)	32348 8H801	2.865 mm (0.1128 in)	32348 8H811
2.595 mm (0.1022 in)	32348 8H802	2.895 mm (0.1140 in)	32348 8H812
2.625 mm (0.1033 in)	32348 8H803	2.925 mm (0.1152 in)	32348 8H813
2.655 mm (0.1045 in)	32348 8H804	2.955 mm (0.1163 in)	32348 8H814
2.685 mm (0.1057 in)	32348 8H805	2.985 mm (0.1175 in)	32348 8H815
2.715 mm (0.1069 in)	32348 8H806	3.015 mm (0.1187 in)	32348 8H816
2.745 mm (0.1081 in)	32348 8H807	3.045 mm (0.1199 in)	32348 8H817
2.775 mm (0.1093 in)	32348 8H808	3.075 mm (0.1211 in)	32348 8H818
2.805 mm (0.1104 in)	32348 8H809		

19. Fit the C-ring holder, and install the snap ring as shown.

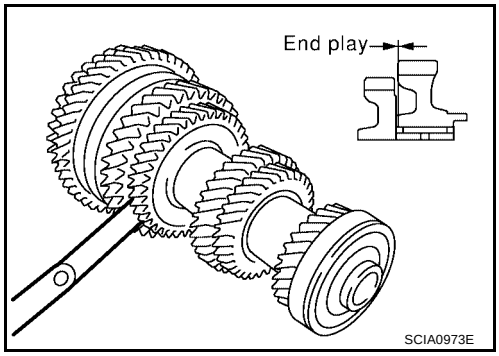


20. Check the end play of the 1st and 2nd main gears as shown.

End play standard values

1st gear : 0.20 - 0.30 mm (0.0079 - 0.0118 in)

2nd gear : 0.06 - 0.16 mm (0.0024 - 0.0063 in)



REVERSE IDLER SHAFT AND GEARS

PFP:32281

Disassembly and Assembly

ECS009TJ

DISASSEMBLY

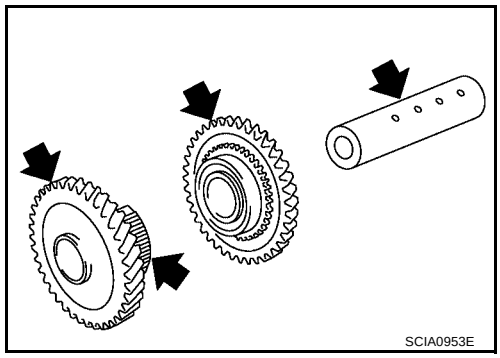
1. Remove the reverse idler gear adjusting shim.
2. Remove the reverse idler gear (rear), reverse coupling sleeve and insert spring simultaneously.
3. Remove the reverse idler gear needle bearing.
4. Remove the thrust needle bearing.
5. Remove the reverse baulk ring.
6. Remove the reverse idler gear (front).
7. Remove the reverse idler gear needle bearing.
8. Remove the thrust needle bearing.
9. Pull off the locking pin from the reverse idler shaft.

INSPECTION AFTER DISASSEMBLY

Reverse Idler Shaft and Gears

Check the items listed. If necessary, replace them with new ones.

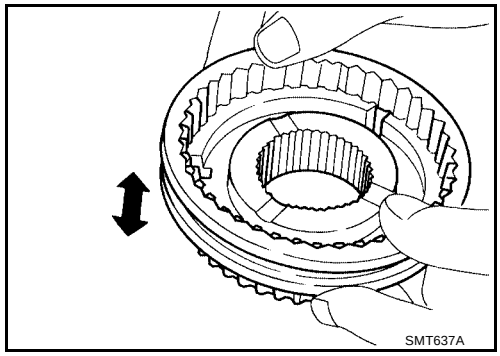
- Damage, peeling, dent, uneven wear and bending of the reverse idler shaft.
- Excessive wear, damage and peeling, of the reverse idler gears.



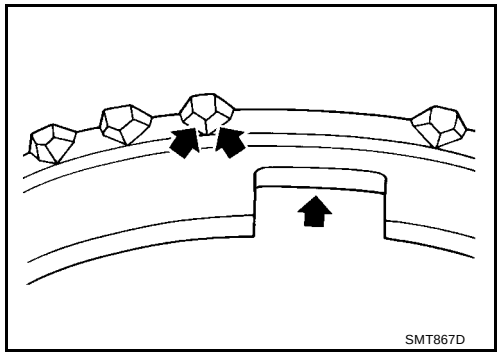
Synchronizer

Check the items listed. If necessary, replace them with new ones.

- Damage and excessive wear on contact surfaces of coupling sleeve, synchronizer hub, and insert spring.
- Coupling sleeve and synchronizer hub must move smoothly as shown.



- If any crack, damage, or excessive wear is found on the cam face of the baulk ring or working face of the insert as shown, replace it.



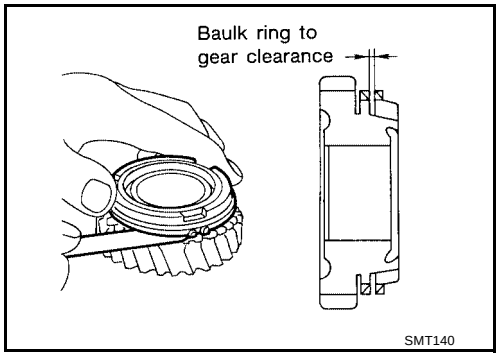
Baulk ring clearance

- Press the baulk ring against the cone, and measure the clearance between the baulk ring and cone as shown. If the measurement is below the specified limit, replace it with a new one.

Baulk ring to gear clearance

Standard : 0.95 - 1.4 mm (0.0374 - 0.055 in)

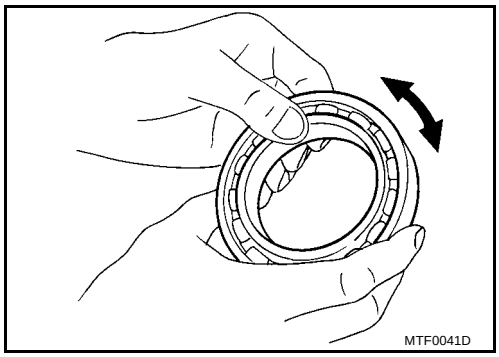
Limit value : 0.7 mm (0.028 in)



Bearing

Check the item listed. If necessary, replace it with a new one.

- Damage and rough rotation of the bearing.

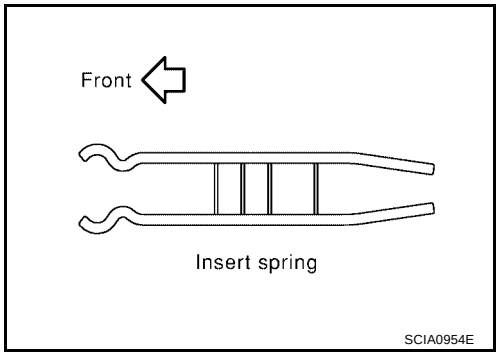


ASSEMBLY

Assembly is in the reverse order of disassembly.

CAUTION:

- **Install the insert spring with the orientation as shown.**



FINAL DRIVE (RS6F51A)

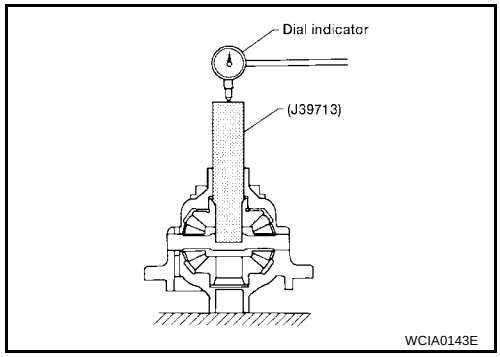
PFP:38411

Disassembly and Assembly

ECS009TK

PRE-INSPECTION

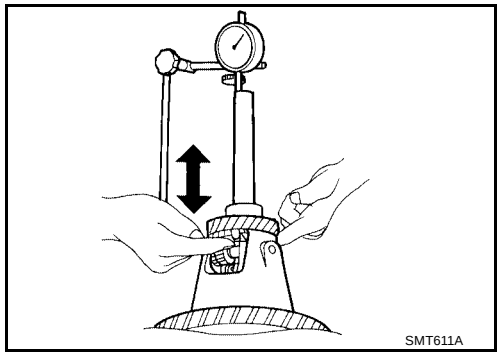
1. Clean final drive assembly sufficiently to prevent side gear thrust washer, differential case, side gear, and other parts from sticking by gear oil.
2. Upright the differential case so that the side gear to be measured faces upward.
3. Place final drive adapter and dial indicator onto side gears using Tool as shown.



4. Move side gears up and down, and measure the clearance as shown.

Clearance between side gear and differential case: 0.1 - 0.2 mm (0.004 - 0.008 in)

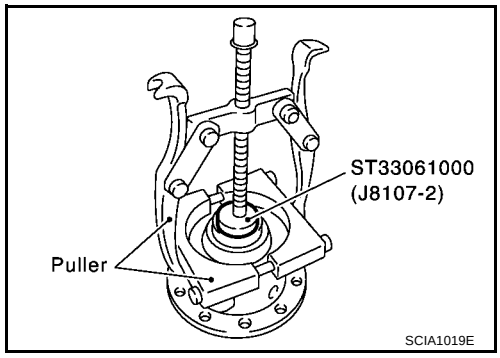
CAUTION:
There must be no resistance and the gears must rotate freely.



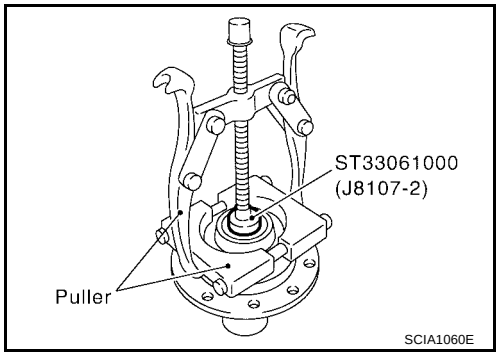
5. If the clearance measured is not within specification, adjust the clearance by changing the thrust washer thickness.
6. Turn the differential case upside down, and measure the clearance between the side gear and differential case on the other side to the same specifications, adjust using a thrust washer as necessary.

DISASSEMBLY

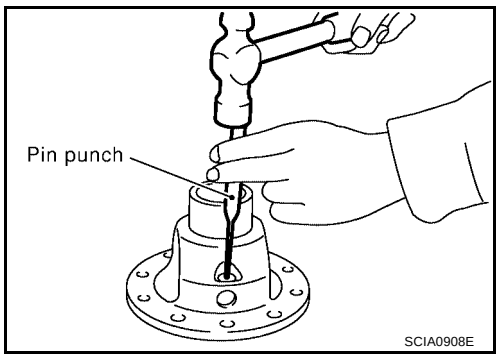
1. Remove the bolts and then separate the final gear from the differential case.
2. Remove speedometer drive gear.
3. Remove the differential side bearing (clutch housing side) using tool and puller as shown.



4. Remove the differential side bearing (transaxle case side) using tool and puller as shown.



5. Pull out lock pin and pinion mate shaft using suitable tool as shown.

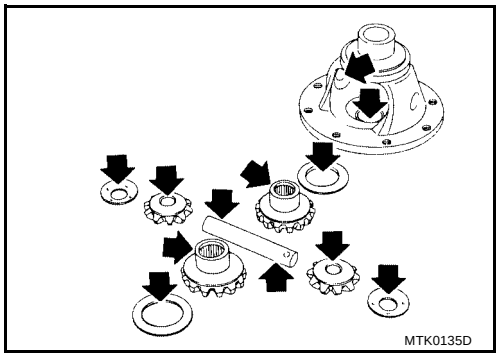


6. Rotate pinion mate gears, and remove pinion mate gears, pinion mate thrust washers, side gears, and side gear thrust washers from differential case.

INSPECTION AFTER DISASSEMBLY

Gear, Washer, Shaft and Case

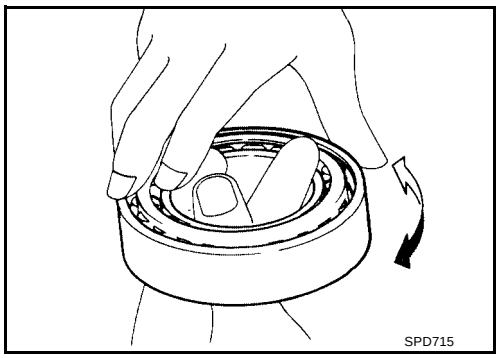
Check side gears, side gear thrust washers, pinion mate shaft, pinion mate gears, pinion mate thrust washers and differential case as shown. If necessary, replace with new parts.



Bearing

Check for bearing damage and rough rotation as shown. If necessary, replace with new parts.

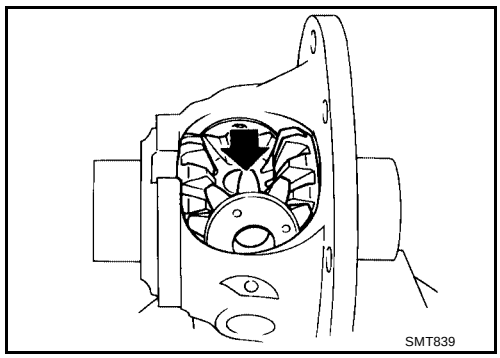
CAUTION:
When replacing the tapered roller bearing, replace the outer and inner races as a set.



ASSEMBLY

1. Apply gear oil to sliding area of differential case, each gear, and thrust washer.

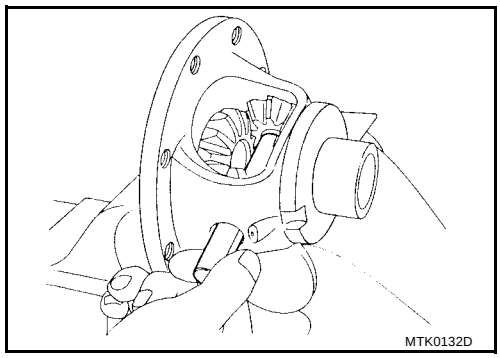
2. Install side gear thrust washers and side gears into differential case as shown.



3. While rotating pinion mate thrust washers and pinion mate gears, and aligning them diagonally, install them into differential case.

4. Insert pinion mate shaft into differential case as shown.

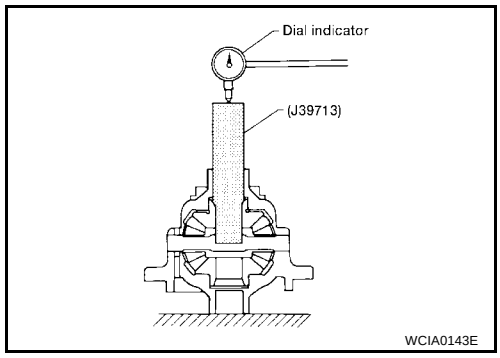
CAUTION:
Be sure not to damage pinion mate thrust washers.



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

a. Upright the differential case so that the side gear to be measured faces upward.

b. Place final drive adapter and dial indicator onto side gears using tool as shown.

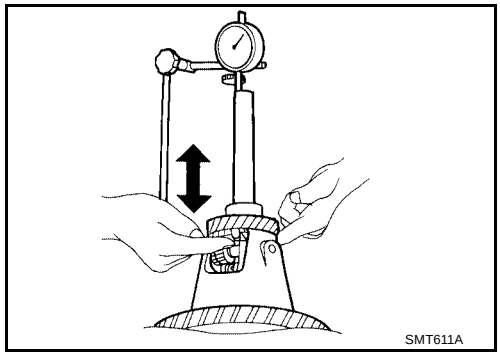


c. Move side gears up and down to measure end play, and select thrust washer so that it meets specification.

End play standard value : 0.1 - 0.2 mm (0.004 - 0.008 in)

CAUTION:

- **There must be no resistance and the gears must rotate freely.**
- **Place differential case upside down. Measure the end play for opposite side-gears using the same procedure.**
- **Only one thrust washer can be selected.**

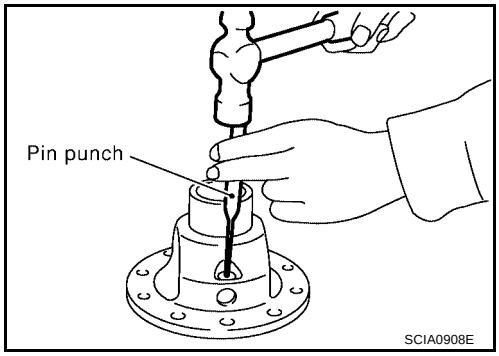


Thrust washers

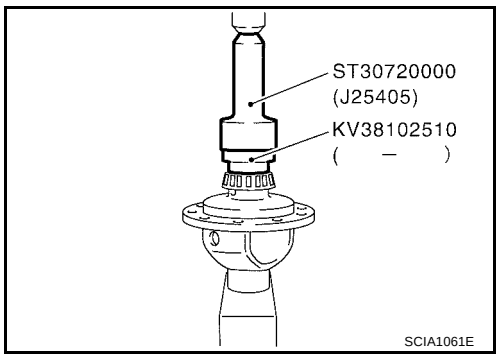
Thickness	Part number
0.75 mm (0.0295 in)	38424 81X00
0.80 mm (0.0315 in)	38424 81X01
0.85 mm (0.0335 in)	38424 81X02
0.90 mm (0.0354 in)	38424 81X03
0.95 mm (0.0374 in)	38424 81X04

6. Drive a new lock pin into the pinion mate shaft using suitable tool.

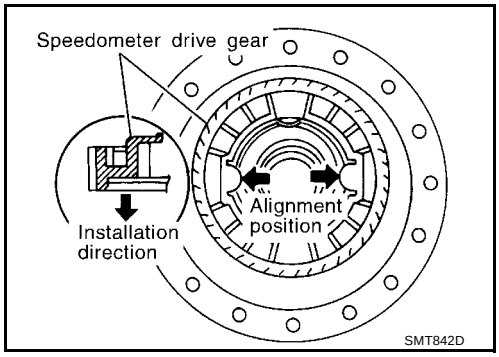
   CAUTION:
   Do not reuse the lock pin.



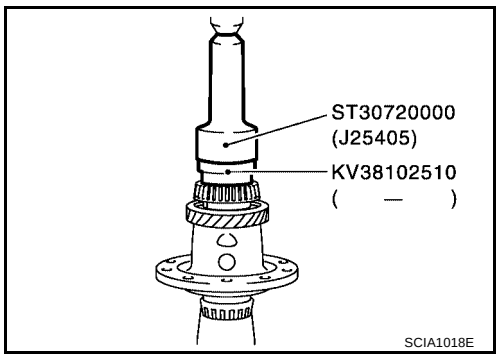
7. Install differential side bearing (transaxle case side) using Tools as shown.



8. Align and install the speedometer drive gear onto the differential case as shown.

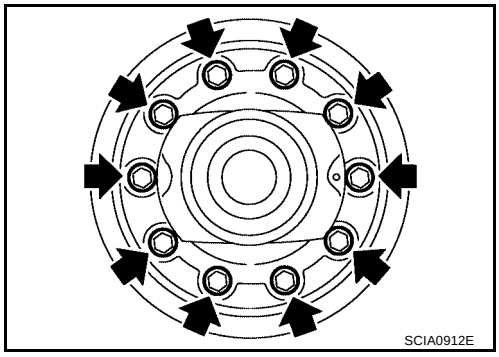


9. Install differential side bearing (clutch housing side) using Tools as shown.



10. Install the final gear into the differential case, and tighten the final gear bolts to specification.

    Final gear bolts : 122.5 - 137.5 N·m (13 - 14 kg-m, 91 - 101 ft-lb)



FINAL DRIVE (RS6F51H)

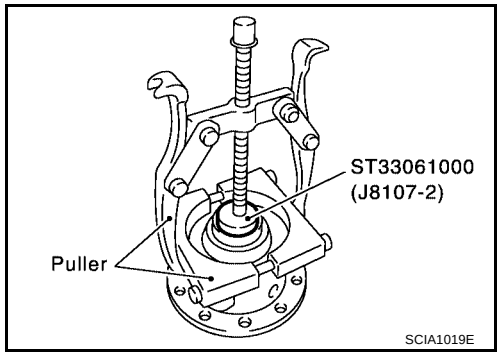
PFP:38411

Disassembly and Assembly

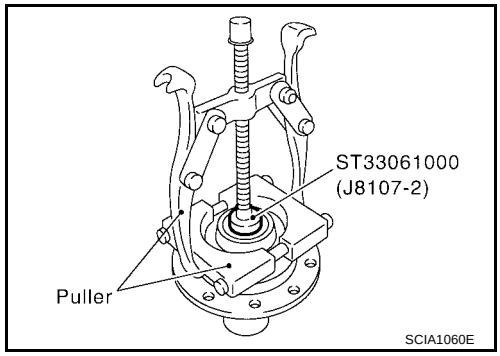
ECS009TL

DISASSEMBLY

1. Remove the bolts. Then, separate the final gear from the differential case.
2. Remove the speedometer drive gear.
3. Remove the differential side bearing (clutch housing side) using Tool as shown.



4. Remove the differential side bearing (transaxle case side) using Tool as shown.



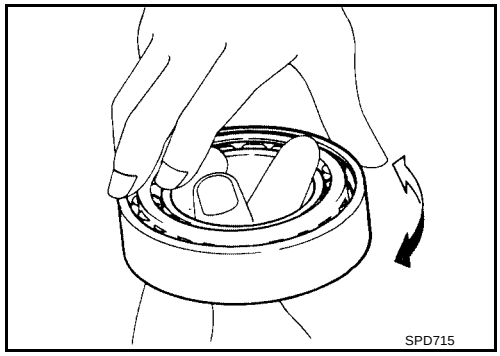
INSPECTION AFTER DISASSEMBLY

Bearing

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

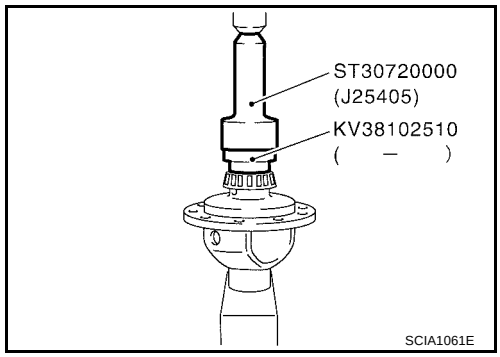
CAUTION:

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

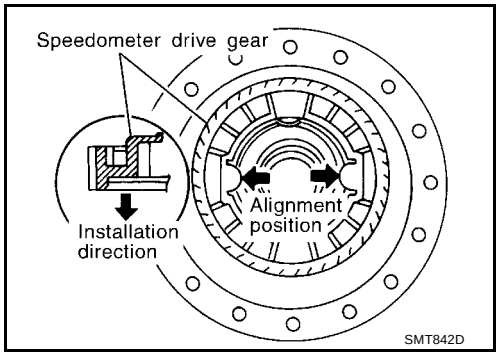


ASSEMBLY

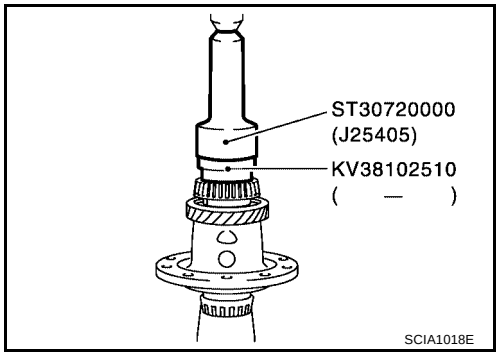
1. Install the differential side bearing (transaxle case side) using Tools as shown.



2. Align and install the speedometer drive gear onto the differential case as shown.

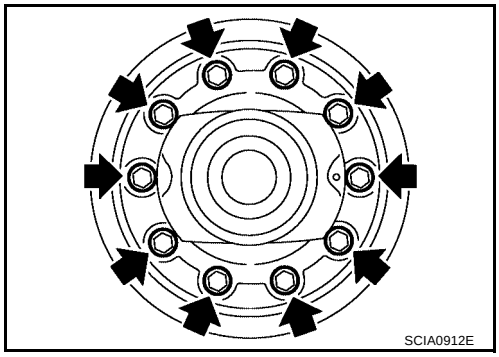


3. Install the differential side bearing (clutch housing side) using Tools as shown.



4. Install the final gear into the differential case, and tighten the final gear bolts to specification.

Final gear bolts : 122.5 - 137.5 N·m (13 - 14 kg-m, 91 - 101 ft-lb)



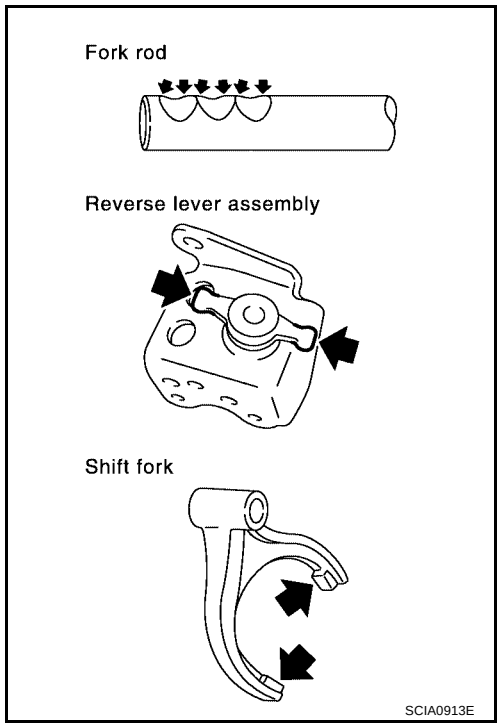
SHIFT CONTROL

PFP:32982

Inspection

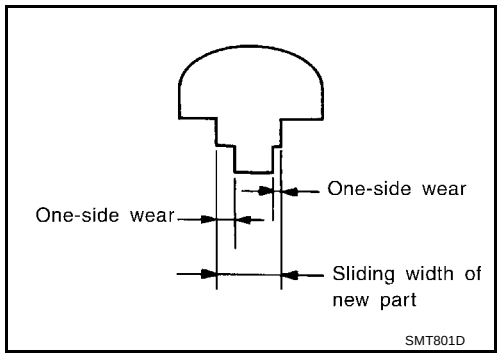
ECS009TM

- Check the contact surfaces and sliding area for wear, damage, or bending as shown. If necessary, replace the parts.



SHIFT FORK

- Check if the width of the shift fork hook (sliding area with coupling sleeve) is within specification, as shown.



Shift Fork

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

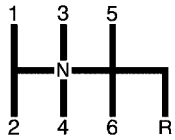
SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ECS009TN

TRANSAXLE

Engine			VQ35DE	
Transaxle model			RS6F51A	RS6F51H
Model code number			7Y466	7Y476
Number of speeds			6	
Synchromesh type			Warner	
Shift pattern			 SCIA0955E	
Gear ratio	1st		3.153	
	2nd		1.944	
	3rd		1.392	
	4th		1.055	
	5th		0.809	
	6th		0.630	
	Reverse		3.002	
Number of teeth	Input gear	1st	13	
		2nd	18	
		3rd	28	
		4th	36	
		5th	42	
		6th	46	
		Reverse	13	
	Main gear	1st	41	
		2nd	35	
		3rd	39	
		4th	38	
		5th	34	
		6th	29	
		Reverse	38	
	Reverse idler gear	Front	37	
		Rear	38	
Oil capacity (reference)	ℓ (US qt, Imp qt)		2.2 (2 3/8, 2)	
Oil level mm (in)			49 - 55 (1.93 - 2.17)	
Remarks	Reverse synchronizer		Installed	
	Double cone synchronizer		3rd	
	Triple cone synchronizer		1st and 2nd	

FINAL GEAR

Engine		VQ35DE	
Transaxle model		RS6F51A	RS6F51H*
Model code number		7Y466	7Y476
Final gear ratio		4.133	
Number of teeth	Final gear/Pinion	62/15	
	Side gear/Pinion mate gear	—	

* Replace the entire helical LSD (limited slip differential) assembly.

Gear End Play

ECS009TO

Unit: mm (in)

Gear	End play
1st main gear	0.20 - 0.30 (0.0079 - 0.0118)
2nd main gear	0.06 - 0.16 (0.0024 - 0.0063)
3rd input gear	0.18 - 0.31 (0.0071 - 0.0122)
4th input gear	0.20 - 0.30 (0.0079 - 0.0118)
5th input gear	0.06 - 0.16 (0.0024 - 0.0063)
6th input gear	0.06 - 0.16 (0.0024 - 0.0063)

Clearance Between Baulk Ring and Gear

ECS009TP

4TH, 5TH, 6TH & REVERSE BAULK RING

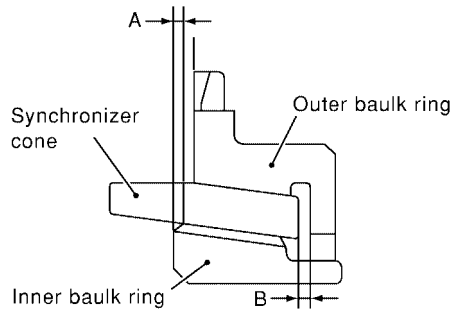
Unit: mm (in)

Baulk ring	Standard	Wear limit
4th	0.9 - 1.45 (0.035 - 0.0571)	0.7 (0.028)
5th	0.95 - 1.4 (0.0374 - 0.055)	0.7 (0.028)
6th	0.95 - 1.4 (0.0374 - 0.055)	0.7 (0.028)
Reverse	0.95 - 1.4 (0.0374 - 0.055)	0.7 (0.028)

1ST, 2ND AND 3RD BAULK RING

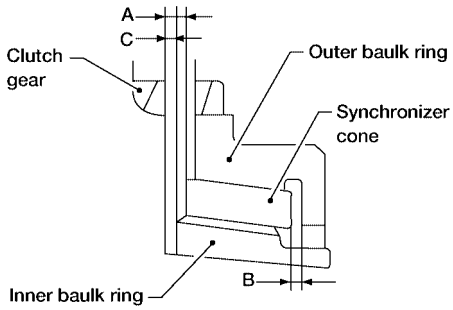
Unit: mm (in)

3rd Double Baulk Ring



SMT138E

1st and 2nd Triple Baulk Ring



WCIA0195E

Dimension	Standard		Wear limit	
	Double baulk ring	Triple baulk ring	Double baulk ring	Triple baulk ring
A	0.6 - 0.8 (0.024 - 0.031)	0.6 - 1.2 (0.024 - 0.047)	0.2 (0.008)	0.3 (0.012)
B	0.6 - 1.1 (0.024 - 0.043)	0.6 - 1.1 (0.024 - 0.043)	0.2 (0.008)	0.2 (0.008)
C	—	0.7 - 1.1 (0.028 - 0.043)	—	0.3 (0.012)

Available Snap Rings

ECS009TQ

6TH BUSHING

End play		0 - 0.1 mm (0 - 0.004 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
1.76 (0.0693)	32204 8H511	2.01 (0.0791)	32204 8H516
1.81 (0.0713)	32204 8H512	2.06 (0.0811)	32204 8H517
1.86 (0.0732)	32204 8H513	2.11 (0.0831)	32204 8H518
1.91 (0.0752)	32204 8H514	2.16 (0.0850)	32204 8H519
1.96 (0.0772)	32204 8H515	2.21 (0.0871)	32204 8H520

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

Available C-rings

ECS009TR

MAINSHAFT C-RING

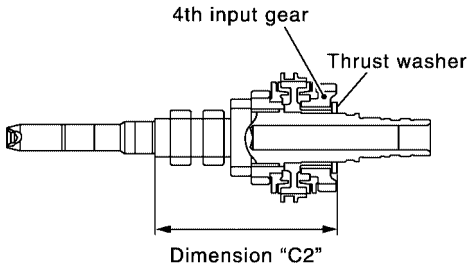
End play		0 - 0.06 mm (0 - 0.0024 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
2.535 (0.0998)	32348 8H800	2.835 (0.1116)	32348 8H810
2.565 (0.1010)	32348 8H801	2.865 (0.1128)	32348 8H811
2.595 (0.1022)	32348 8H802	2.895 (0.1140)	32348 8H812
2.625 (0.1033)	32348 8H803	2.925 (0.1152)	32348 8H813
2.655 (0.1045)	32348 8H804	2.955 (0.1163)	32348 8H814
2.685 (0.1057)	32348 8H805	2.985 (0.1175)	32348 8H815
2.715 (0.1069)	32348 8H806	3.015 (0.1187)	32348 8H816
2.745 (0.1081)	32348 8H807	3.045 (0.1199)	32348 8H817
2.775 (0.1093)	32348 8H808	3.075 (0.1211)	32348 8H818
2.805 (0.1104)	32348 8H809		

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

Available Thrust Washers

ECS009TS

INPUT SHAFT THRUST WASHERS



SCIA1008E

Standard length “C2”		154.7 - 154.8 mm (6.091 - 6.094 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
3.84 (0.1512)	32347 8H500	4.02 (0.1583)	32347 8H503
3.90 (0.1535)	32347 8H501	4.08 (0.1606)	32347 8H504
3.96 (0.1559)	32347 8H502	4.14 (0.1630)	32347 8H505

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

FINAL DRIVE THRUST WASHERS (RS6F51A)

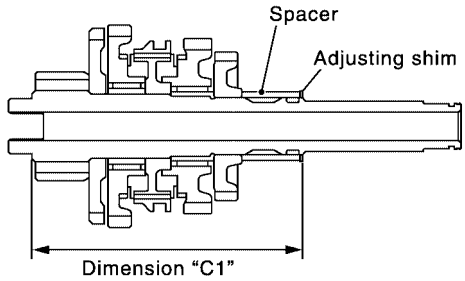
Thickness	Part number*
0.75 mm (0.0295 in)	38424 81X00
0.80 mm (0.0315 in)	38424 81X01
0.85 mm (0.0335 in)	38424 81X02
0.90 mm (0.0354 in)	38424 81X03
0.95 mm (0.0374 in)	38424 81X04

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

Available Adjusting Shims

ECS009TT

MAINSHAFT ADJUSTING SHIM



SCIA1009E

Standard length “C1”		173.85 - 173.95 mm (6.844 - 6.848 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.52 (0.0205)	32238 8H500	0.84 (0.0331)	32238 8H504
0.60 (0.0236)	32238 8H501	0.92 (0.0362)	32238 8H505
0.68 (0.0268)	32238 8H502	1.00 (0.0394)	32238 8H506
0.76 (0.0299)	32238 8H503	1.08 (0.0425)	32238 8H507

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

INPUT SHAFT REAR BEARING ADJUSTING SHIM

End play			0 - 0.06 mm (0 - 0.0024 in)		
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.40 (0.0157)	32225 8H500	0.88 (0.0346)	32225 8H512	1.36 (0.0535)	32225 8H524
0.44 (0.0173)	32225 8H501	0.92 (0.0362)	32225 8H513	1.40 (0.0551)	32225 8H560
0.48 (0.0189)	32225 8H502	0.96 (0.0378)	32225 8H514	1.44 (0.0567)	32225 8H561
0.52 (0.0205)	32225 8H503	1.00 (0.0394)	32225 8H515	1.48 (0.0583)	32225 8H562
0.56 (0.0220)	32225 8H504	1.04 (0.0409)	32225 8H516	1.52 (0.0598)	32225 8H563
0.60 (0.0236)	32225 8H505	1.08 (0.0425)	32225 8H517	1.56 (0.0614)	32225 8H564
0.64 (0.0252)	32225 8H506	1.12 (0.0441)	32225 8H518	1.60 (0.0630)	32225 8H565
0.68 (0.0268)	32225 8H507	1.16 (0.0457)	32225 8H519	1.64 (0.0646)	32225 8H566
0.72 (0.0283)	32225 8H508	1.20 (0.0472)	32225 8H520		
0.76 (0.0299)	32225 8H509	1.24 (0.0488)	32225 8H521		
0.80 (0.0315)	32225 8H510	1.28 (0.0504)	32225 8H522		
0.84 (0.0331)	32225 8H511	1.32 (0.0520)	32225 8H523		

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

MAINSHAFT REAR BEARING ADJUSTING SHIM

End play		0 - 0.06 mm (0 - 0.0024 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.44 (0.0173)	32238 8H510	0.80 (0.0315)	32238 8H519
0.48 (0.0189)	32238 8H511	0.84 (0.0331)	32238 8H520
0.52 (0.0205)	32238 8H512	0.88 (0.0346)	32238 8H521
0.56 (0.0220)	32238 8H513	0.92 (0.0362)	32238 8H522
0.60 (0.0236)	32238 8H514	0.96 (0.0378)	32238 8H523
0.64 (0.0252)	32238 8H515	1.00 (0.0394)	32238 8H524
0.68 (0.0268)	32238 8H516	1.04 (0.0409)	32238 8H560
0.72 (0.0283)	32238 8H517	1.08 (0.0425)	32238 8H561
0.76 (0.0299)	32238 8H518		

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

REVERSE IDLER GEAR ADJUSTING SHIM

End play		0.04 - 0.10 mm (0.0016 - 0.0039 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
1.76 (0.0693)	32237 8H800	2.24 (0.0882)	32237 8H812
1.80 (0.0709)	32237 8H801	2.28 (0.0898)	32237 8H813
1.84 (0.0724)	32237 8H802	2.32 (0.0913)	32237 8H814
1.88 (0.0740)	32237 8H803	2.36 (0.0929)	32237 8H815
1.92 (0.0756)	32237 8H804	2.40 (0.0945)	32237 8H816
1.96 (0.0772)	32237 8H805	2.44 (0.0961)	32237 8H817
2.00 (0.0787)	32237 8H806	2.48 (0.0976)	32237 8H818
2.04 (0.0803)	32237 8H807	2.52 (0.0992)	32237 8H819
2.08 (0.0819)	32237 8H808	2.56 (0.1008)	32237 8H820
2.12 (0.0835)	32237 8H809	2.60 (0.1024)	32237 8H821
2.16 (0.0850)	32237 8H810	2.64 (0.1039)	32237 8H822
2.20 (0.0866)	32237 8H811		

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

6TH MAIN GEAR ADJUSTING SHIM

End play		0 - 0.1 mm (0 - 0.004 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.88 (0.0346)	32237 8H560	1.20 (0.0472)	32237 8H564
0.96 (0.0378)	32237 8H561	1.28 (0.0504)	32237 8H565
1.04 (0.0409)	32237 8H562	1.36 (0.0535)	32237 8H566
1.12 (0.0441)	32237 8H563		

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

Available Shims

ECS009TU

— Differential Side Bearing Preload and Adjusting Shim —

BEARING PRELOAD

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

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

DIFFERENTIAL SIDE BEARING ADJUSTING SHIM(S)

Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.48 (0.0189)	31438 80X00	0.72 (0.0283)	31438 80X06
0.52 (0.0205)	31438 80X01	0.76 (0.0299)	31438 80X07
0.56 (0.0220)	31438 80X02	0.80 (0.0315)	31438 80X08
0.60 (0.0236)	31438 80X03	0.84 (0.0331)	31438 80X09
0.64 (0.0252)	31438 80X04	0.88 (0.0346)	31438 80X10
0.68 (0.0268)	31438 80X05	0.92 (0.0362)	31438 80X11

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