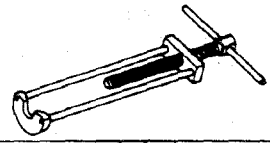
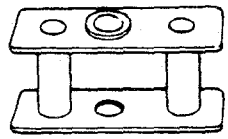
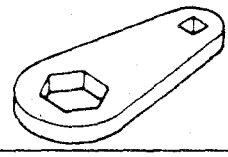
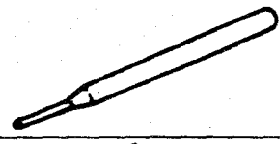
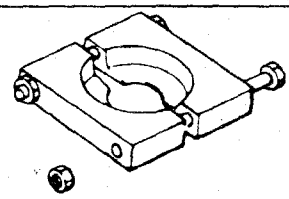
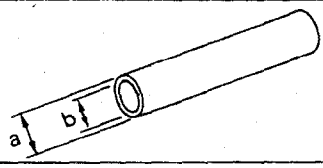
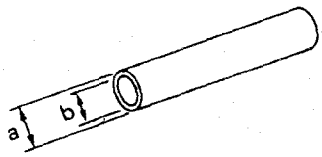
MANUAL TRANSMISSION

SECTION MT

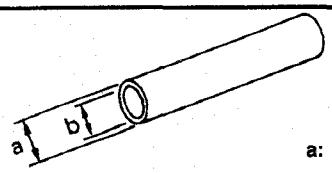
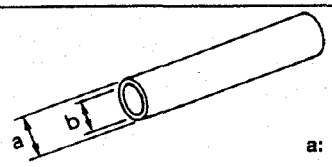
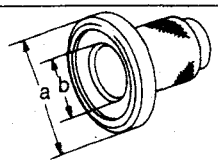
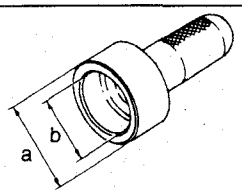
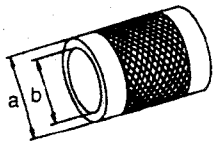
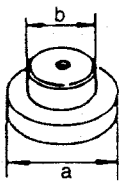
CONTENTS

SPECIAL SERVICE TOOLS

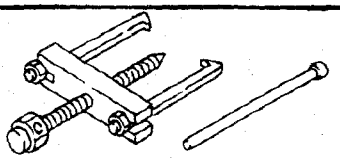
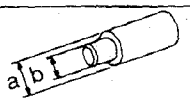
*: Special tool or commercial equivalent

Tool number Tool name	Description	
ST23810001 Adapter setting plate		Fixing adapter plate with gear assembly
KV32101330 Puller		Removing overdrive mainshaft bearing
KV31100401 Transmission press stand		Pressing counter gear and mainshaft
ST22520000 Wrench		Tightening mainshaft lock nut
ST23540000* Pin punch		Removing and installing fork rod retaining pin
ST30031000* Puller		Removing main drive gear bearing
ST23860000* Drift	 **a: 38 mm (1.50 in) dia.** **b: 33 mm (1.30 in) dia.**	Installing counter drive gear
ST22360002* Drift	 **a: 29 mm (1.14 in) dia.** **b: 23 mm (0.91 in) dia.**	Installing counter gear front and rear end bearings

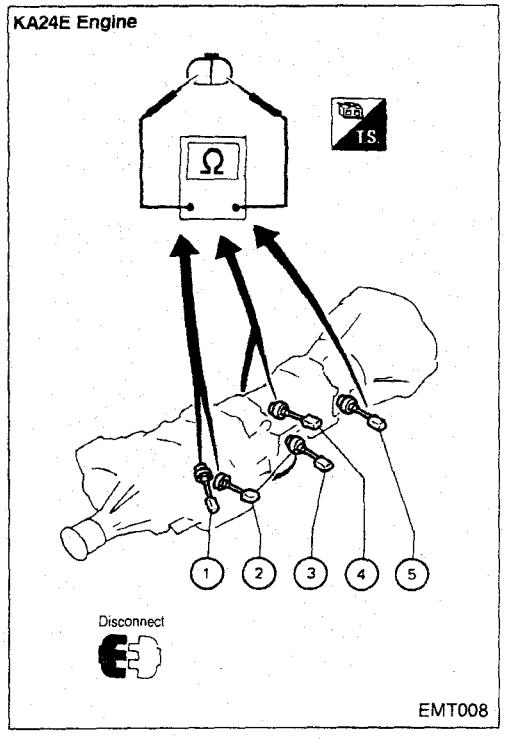
*: Special tool or commercial equivalent

Tool number Tool name	Description	
ST22350000* Drift	 **a: 34 mm (1.34 in) dia.** **b: 28 mm (1.10 in) dia.**	Installing O.D. gear bushing
ST23800000* Drift	 **a: 44 mm (1.73 in) dia.** **b: 31 mm (1.22 in) dia.**	Installing front cover oil seal
ST33400001* Drift	 **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**	Installing rear oil seal
ST33290001* Puller		Removing rear oil seal
ST30720000* Drift	 **a: 77 mm (3.03 in) dia.** **b: 55.5 mm (2.185 in) dia.**	Installing mainshaft ball bearing
ST33200000* Drift	 **a: 60 mm (2.36 in) dia.** **b: 44.5 mm (1.752 in) dia.**	Installing counter rear bearing
ST30613000* Drift	 **a: 71.5 mm (2.815 in) dia.** **b: 47.5 mm (1.870 in) dia.**	Installing main drive gear bearing

COMMERCIAL SERVICE TOOLS

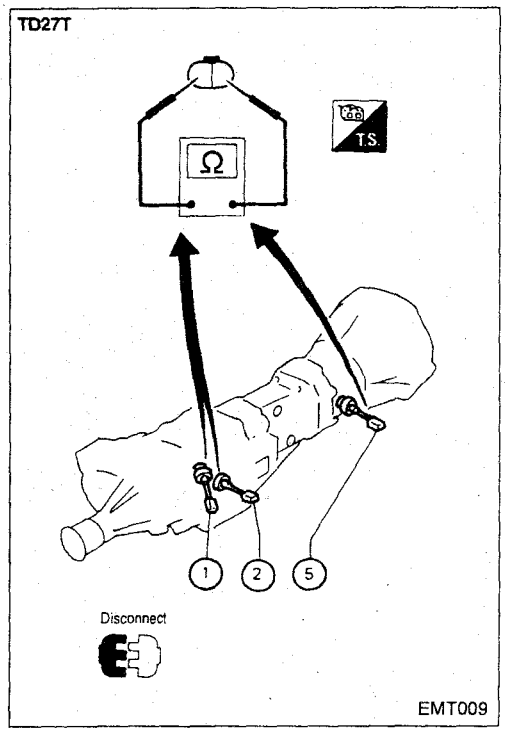
Tool name	Description	
Puller		Removing counter bearings, counter drive and O.D. gears
Drift	 **a: 40 mm (1.57 in) dia.** **b: 30 mm (1.18 in) dia.**	Installing counter shaft rear end bearing

KA24E Engine



EMT008

TD27T



EMT009

Check of Position Switches

Switch			Gear position	Continuity
①	4WD	Transfer case	4WD	Yes
			Except 4WD	No
②	Neutral (Transfer)		Neutral	Yes
			Except Neutral	No
③	5th	Overdrive gear case	5th	Yes
			Except 5th	No
④	Neutral (Transmission)		Neutral	Yes
			Except neutral	No
⑤	Reverse	Transmission case	Reverse	Yes
			Except rerverse	No

Removal

Transmission has to be removed as a unit together with transfer box.

Remove transmission assembly as follows:

- Disconnect negative battery terminal.
- Remove shift levers of transmission and transfer.
- Remove front and rear propeller shafts. — Refer to PD section.
- **Insert plug into rear oil seal after removing propeller shaft.**

CAUTION:

Be careful not to damage spline, sleeve yoke and rear oil seal, when removing propeller shaft.

- Remove torsion bar spring. — Refer to FA section.
- Remove third crossmember (the one supporting front differential).
- Remove fifth crossmember (the one situated at the rear of transfer).
- Support transmission and transfer with a suitable transmission jack.

WARNING:

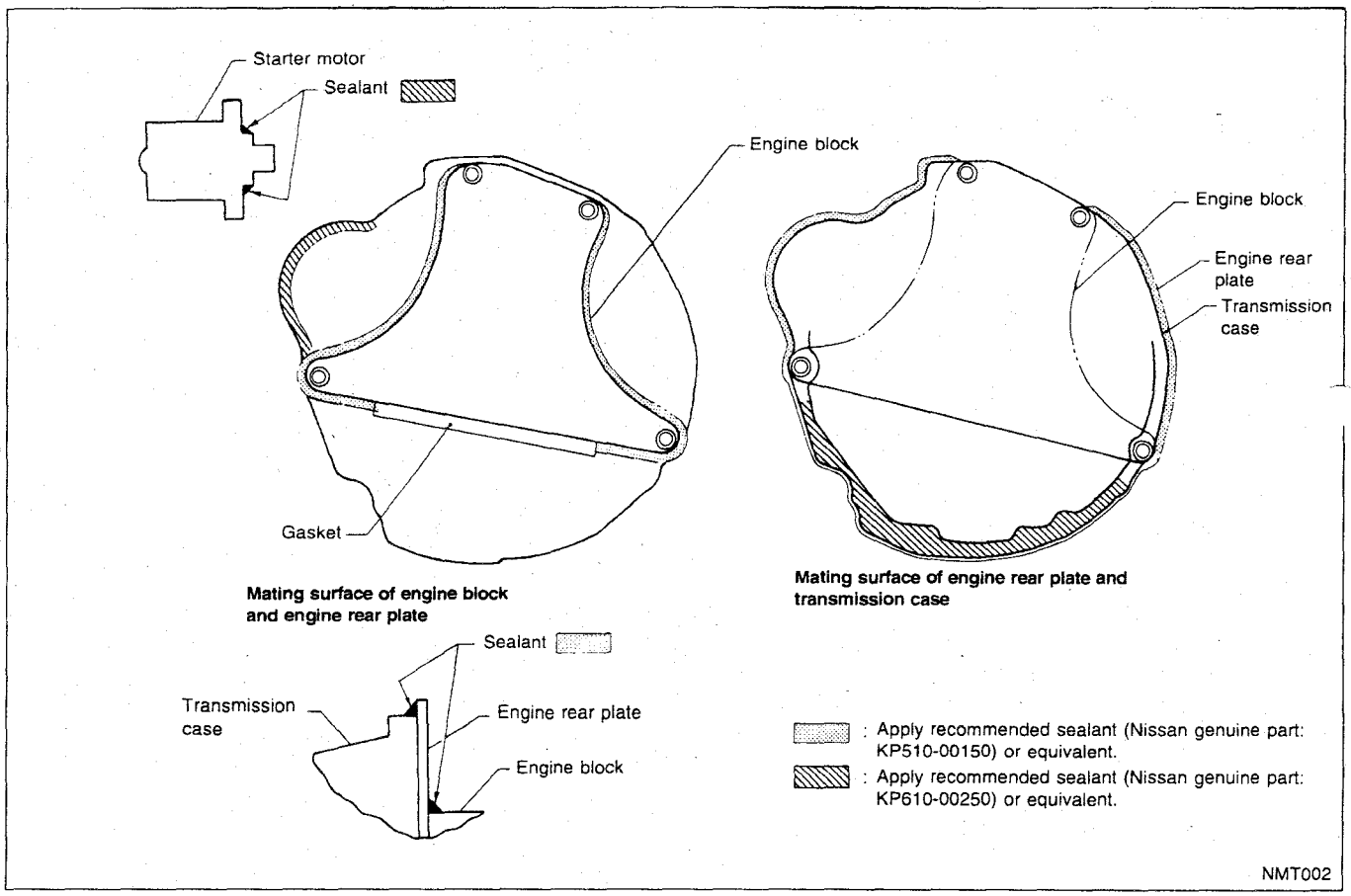
Support transmission and transfer with suitable jacks, while removing them.

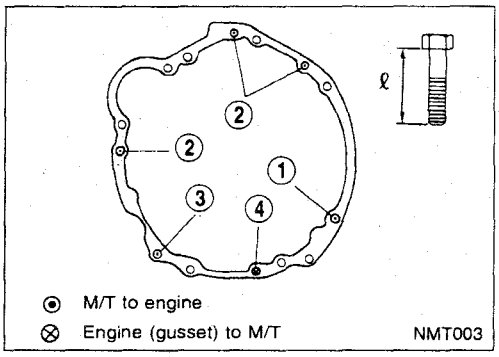
- Remove fourth crossmember (the one supporting transmission).
- Remove clutch operating cylinder.
- Remove starter motor.
- Remove exhaust tube from transmission.
- Disconnect electrical connectors.
- Remove transmission from engine.

Installation

Transmission has to be installed as a unit together with transfer box.
Install transmission assembly as follows:

- Apply sealant as below:

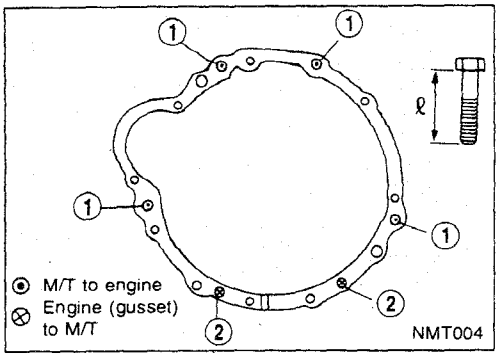




- Tighten bolts securing transmission.
- **KA24E engine model**

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	ℓ mm (in)
1	39 - 49 (4.0 - 5.0, 29 - 36)	65 (2.56)
2	39 - 49 (4.0 - 5.0, 29 - 36)	60 (2.36)
3	19 - 25 (1.9 - 2.5, 14 - 18)	25 (0.98)
4	19 - 25 (1.9 - 2.5, 14 - 18)	16 (0.63)

Installation (Cont'd)

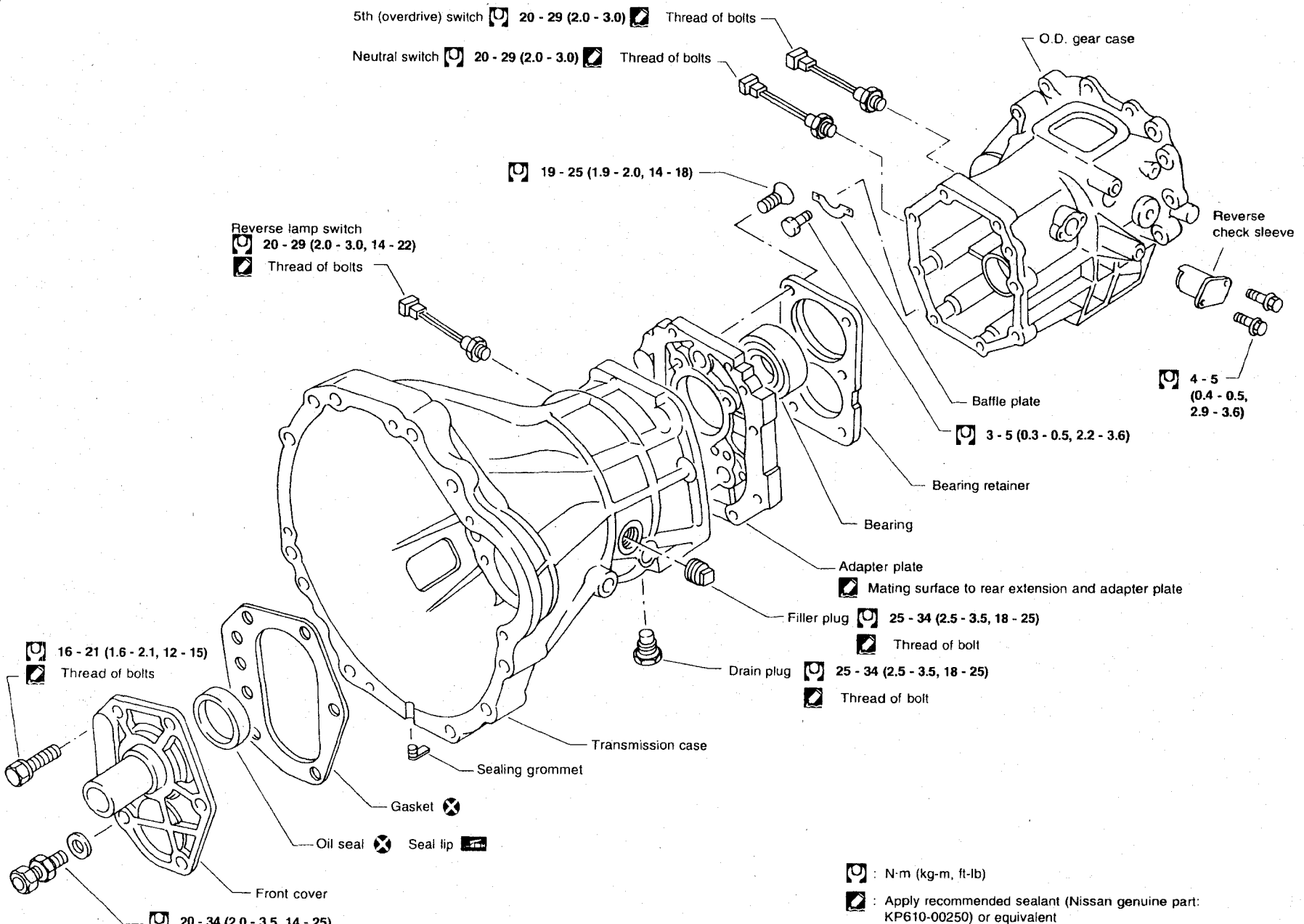


- **TD27T engine model**

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	ℓ mm (in)
1	39 - 49 (4.0 - 5.0, 29 - 36)	60 (2.36)
2	18 - 22 (1.8 - 2.2, 13 - 16)	16 (0.63)

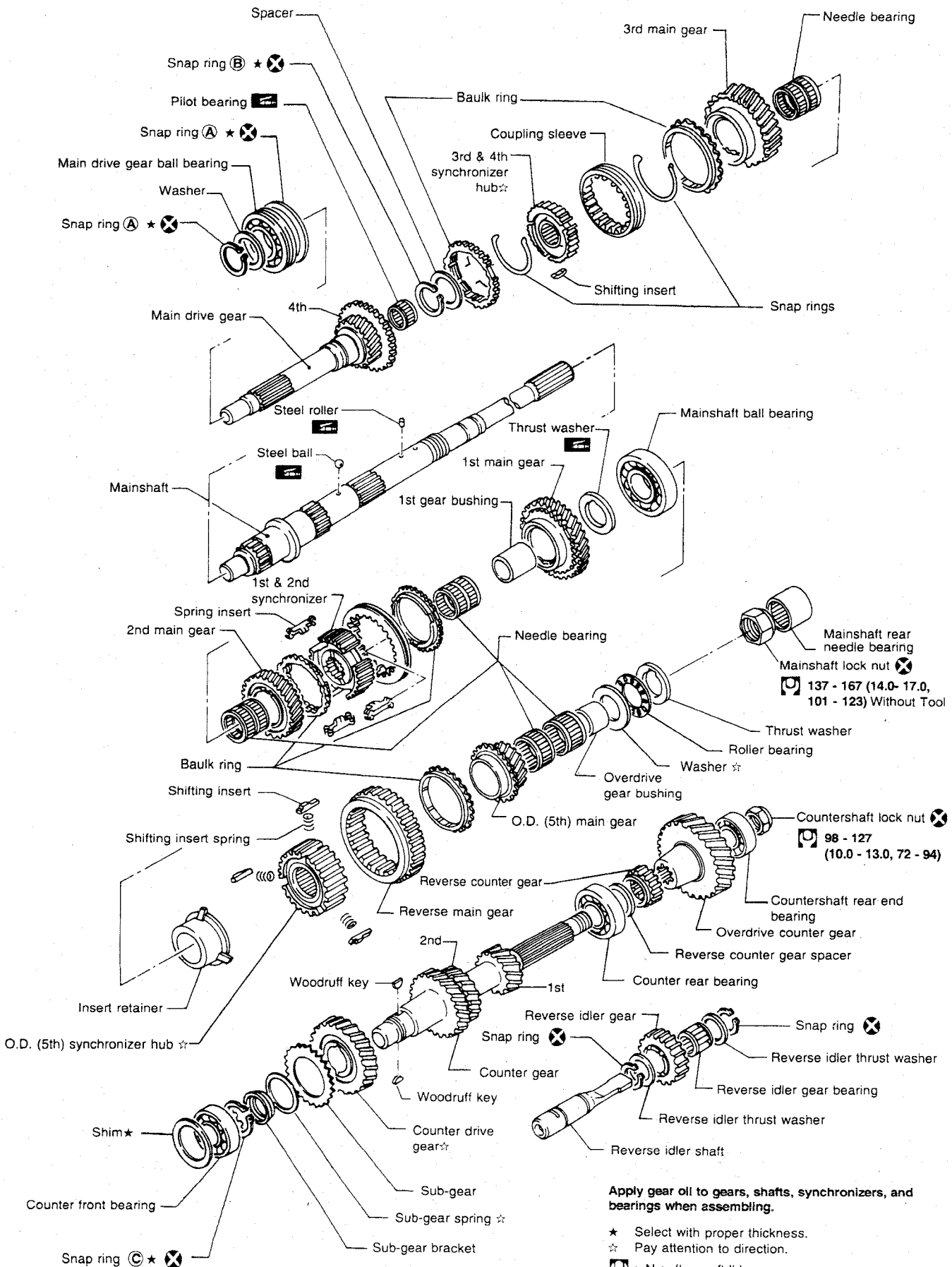
- Disconnect negative battery terminal.
- Raise the unit with a hoist.
- Position the transmission assembly on a portable jack and secure it with a suitable tool.
  Lift the assembly until the gearbox input shaft faces its housing.
  Move the assembly towards the engine. The assembly must be rotated slightly so that the starter motor housing clears the projection on the companion floor. Insert input shaft into its housing (slightly raising the rear of the transfer box may facilitate the introduction of the shaft into its housing).
- Tighten the screws securing the gearbox to the engine.
  : 39 - 49 N·m (4.0 - 5.0 kg-m, 29 - 36 ft-lb)
- Connect the electrical wiring. Secure with the respective clips.
- Fit the exhaust pipe support bracket to the transfer box.
  : 13 - 16 N·m (1.3 - 1.6 kg-m, 9 - 12 ft-lb)
- Fit the starter motor. Secure the earth wire to the starter motor lower screw (KA24E).
  : 31 - 41 N·m (3.2 - 4.2 kg-m, 23 - 30 ft-lb)
- Fit the clutch slave cylinder.
  : 30 - 40 N·m (3.1 - 4.1 kg-m, 22 - 30 ft-lb)
- Install fourth crossmember (Note the "front" mark).
  Crossmember fixing bolts to chassis:
  : 41 - 52 N·m (4.2 - 5.3 kg-m, 30 - 38 ft-lb)
  Crossmember fixing bolts to transmission:
  : 68 - 87 N·m (6.9 - 8.9 kg-m, 50 - 64 ft-lb)
- Take away the portable jack holding boxes assembly.
- Install fifth crossmember.
  : 59 - 78 N·m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)
- Install third crossmember.
  : Screws: 41 - 52 N·m (4.2 - 5.3 kg-m, 30 - 38 ft-lb)
  Nuts: 68 - 87 N·m (6.9 - 8.9 kg-m, 50 - 64 ft-lb)
- Install torsion bar springs. — Refer to FA section.
- Install front and rear propeller shafts. — Refer to PD section.
- Install shift levers of transmission and transfer.
  : 14 - 18 N·m (1.4 - 1.8 kg-m, 10 - 13 ft-lb)
- Connect negative battery terminal.

Case Components — FS5W71C



EMT010

Gear Components — FS5W71C

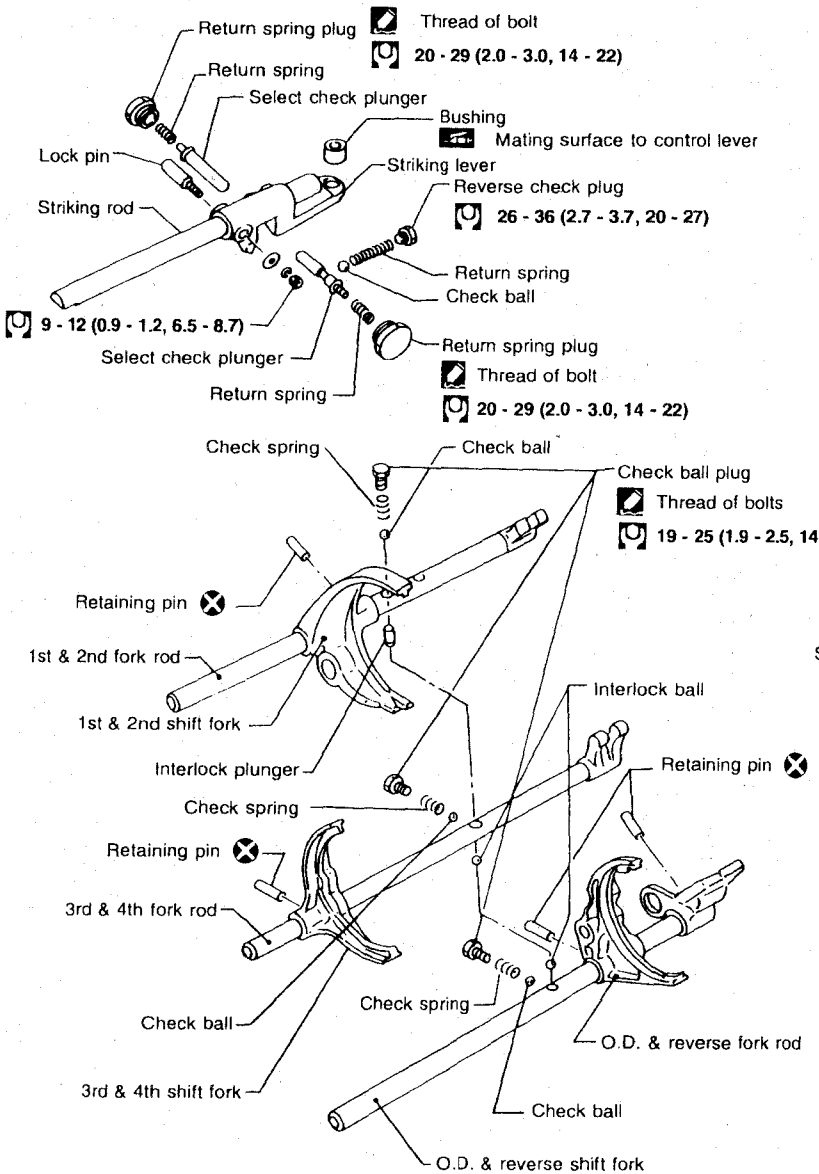


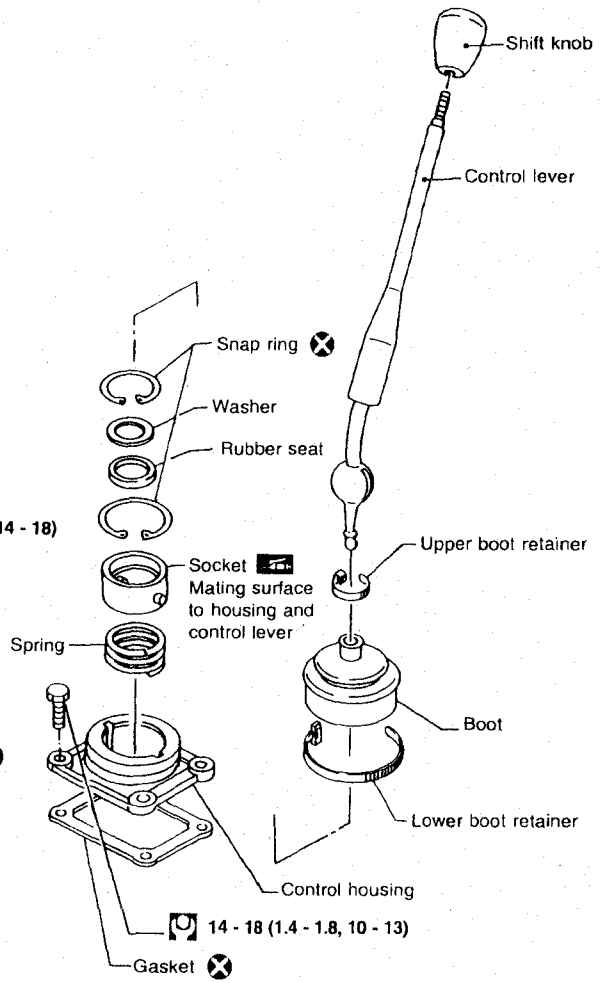
Apply gear oil to gears, shafts, synchronizers, and bearings when assembling.

★ Select with proper thickness.
☆ Pay attention to direction.
: N·m (kg-m, ft-lb)

EMT013

Shift Control Components — FS5W71C

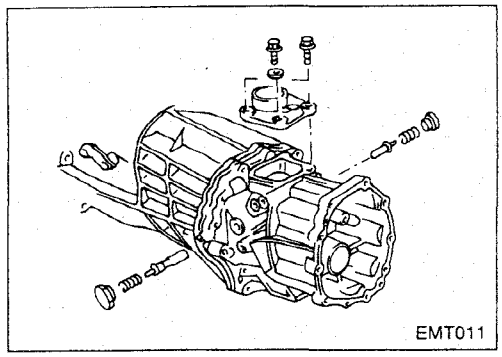




: Apply recommended sealant (Nissan genuine part: KP610-00250) or equivalent.

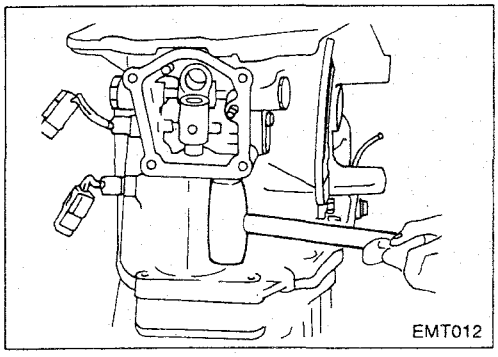
: N·m (kg-m, ft-lb)

SMT561A

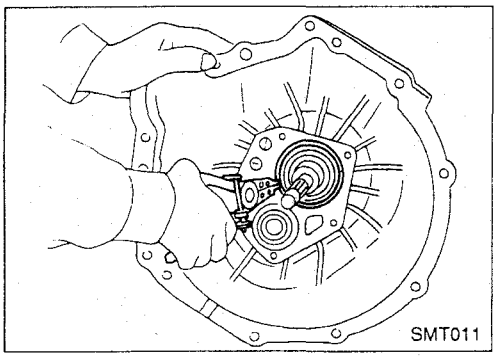

EMT011

Case Components

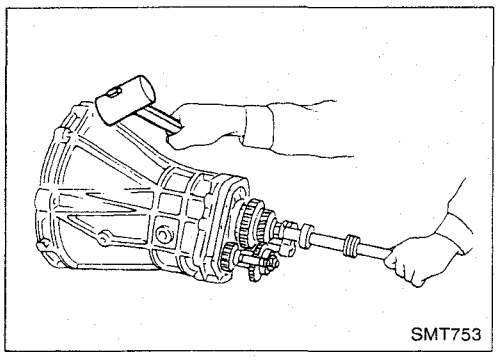
1. Remove rear extension.
a. Remove control housing, check ball, return spring plug, select check plunger and return springs.


EMT012

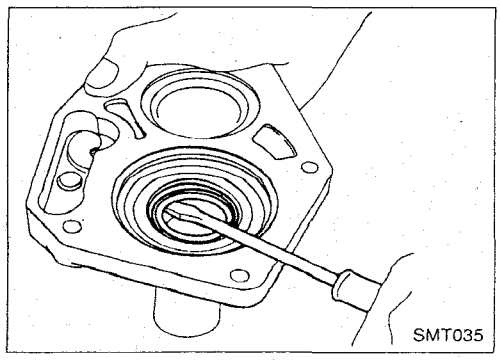
b. Remove O.D. gear case by lightly tapping it.


SMT011

2. Remove front cover, gasket, countershaft front bearing shim, and main drive bearing snap ring.

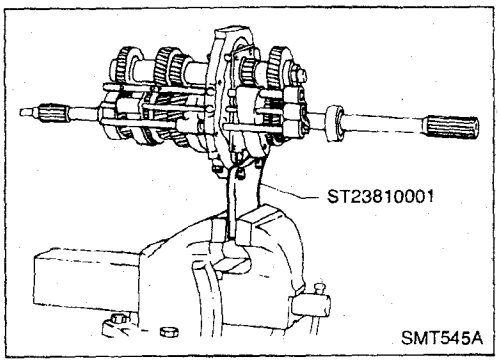

SMT753

3. Separate transmission case from adapter plate.


SMT035

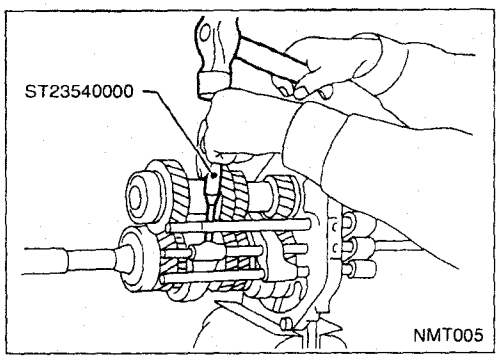
4. Remove front cover oil seal.

Be careful not to damage mating surface of front cover.

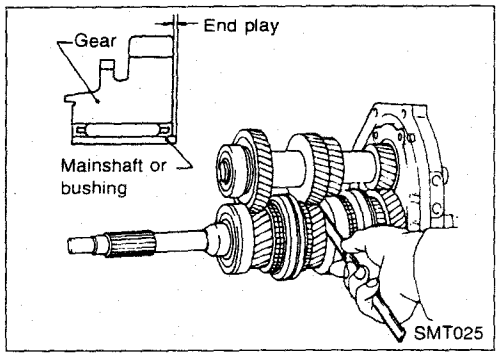


Shift Control Components

1. Set up Tool on adapter plate.
2. Remove check ball plugs, check springs, and check balls.



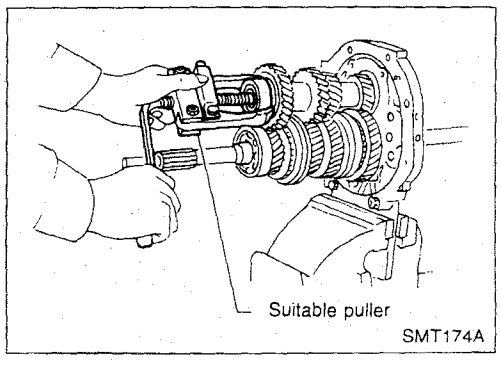
3. Drive out retaining pins. Then drive out fork rods and remove interlock balls.



Gear Components

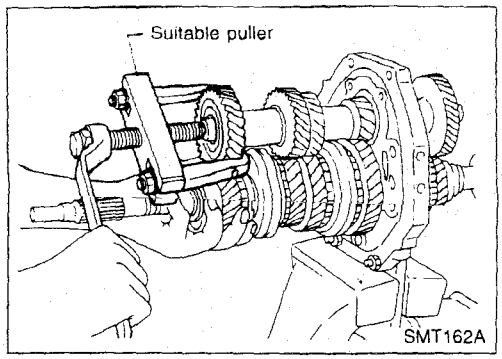
1. Before disassembly, measure each gear end play.
- If end play is not within the specified limit, disassemble and check the parts.
- Replace any part which is worn or damaged.

Gear	End play mm (in)
1st	0.31 - 0.41 (0.0122 - 0.0161)
2nd	0.11 - 0.21 (0.0043 - 0.0083)
3rd	0.11 - 0.21 (0.0043 - 0.0083)
O.D. 5th	0.32 - 0.39 (0.0126 - 0.0154)



2. Mesh 2nd and reverse gear, then draw out counter front bearing with suitable puller.
3. Remove snap ring and remove sub-gear bracket, sub-gear spring and sub-gear.

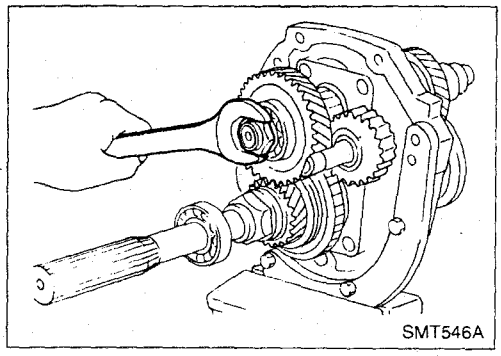
Gear Components (Cont'd)



4. Draw out counter drive gear with main drive gear assembly with suitable puller.

When drawing out main drive gear assembly, be careful not to drop pilot bearing and baulk ring.

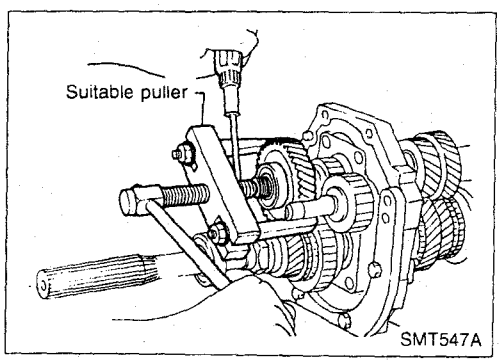
5. Remove snap ring and draw out 3rd & 4th synchronizer and 3rd gear.



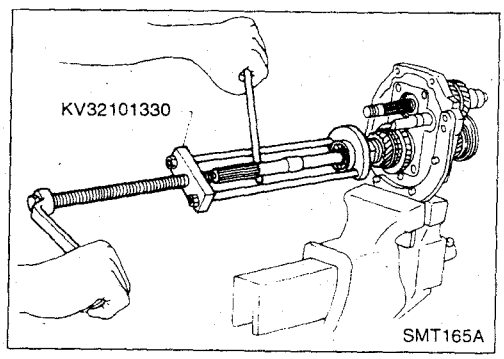
6. Disassemble parts at rear of adapter plate as follows:

a. Release staking on countershaft nut and mainshaft nut and loosen these nuts.

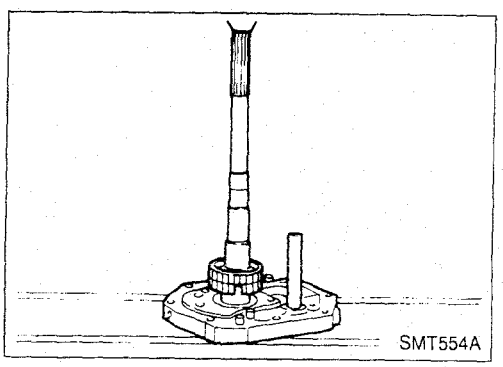
Mainshaft nut: Left-hand thread



b. Pull out O.D. counter gear with bearing with suitable puller.
c. Draw out reverse counter gear and spacer.
d. Remove snap rings from reverse idler shaft, and draw out reverse idler gear, thrust washers and needle bearing.

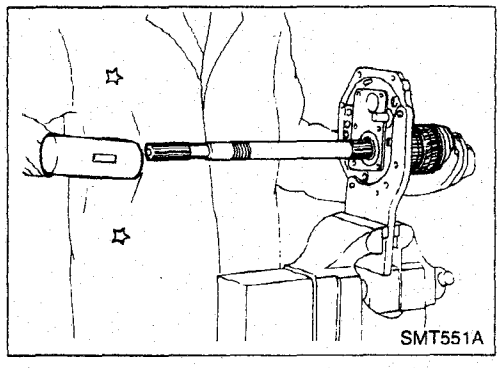


e. Remove thrust washer, steel roller, roller bearing and washer.
f. Remove O.D. main gear, needle bearing and baulk ring (O.D.).
g. Remove O.D. coupling sleeve, shifting inserts and shifting insert springs.
h. Remove counter gear by tapping rear end of counter gear.



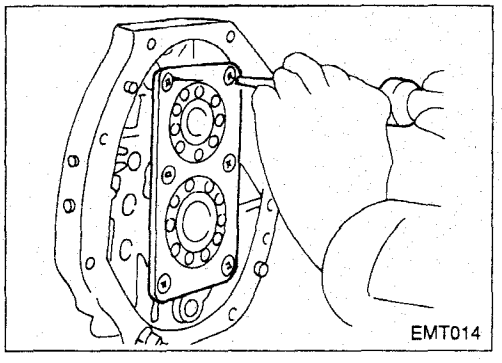
i. Press out O.D. gear bushing, insert retainer and O.D. synchronizer hub.

Gear Components (Cont'd)

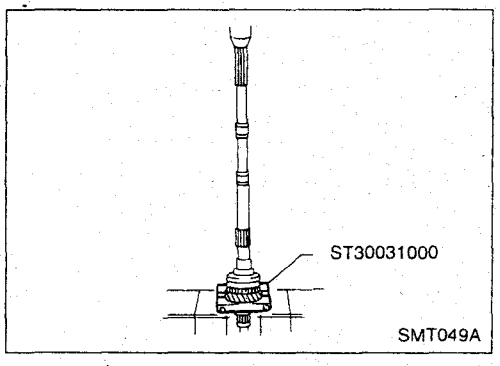


7. Draw out mainshaft assembly by tapping rear end of mainshaft.
8. Remove thrust washer, steel ball, 1st main gear and needle bearing.

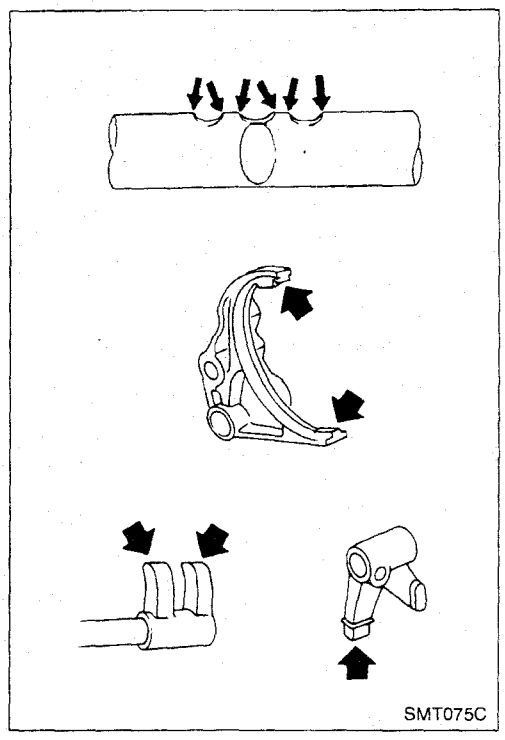
Be careful not to lose steel ball.



9. Remove bearing retainer.
   Remove reverse idler shaft.
   Remove ball bearings.

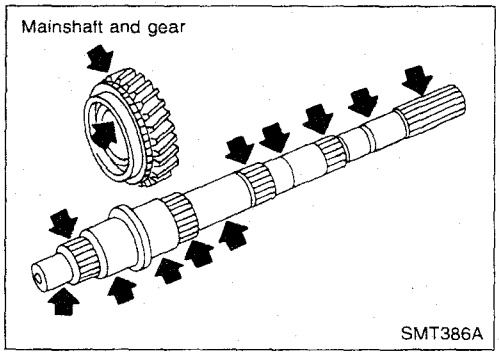


10. Press out 1st gear mainshaft bushing together with 2nd main gear with Tool.
    Then remove 2nd gear needle bearing.


SMT075C

Shift Control Components

- Check contact surface and sliding surface of fork rods for wear, scratches, projections or other damage.

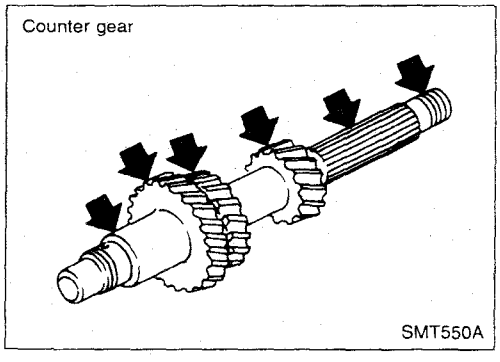


SMT386A

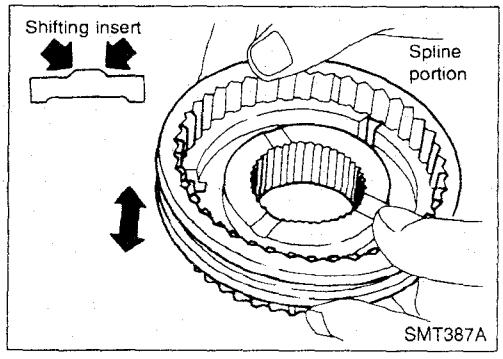
Gear Components

GEARS AND SHAFTS

- Check shafts for cracks, wear or bending.
- Check gears for excessive wear, chips or cracks.



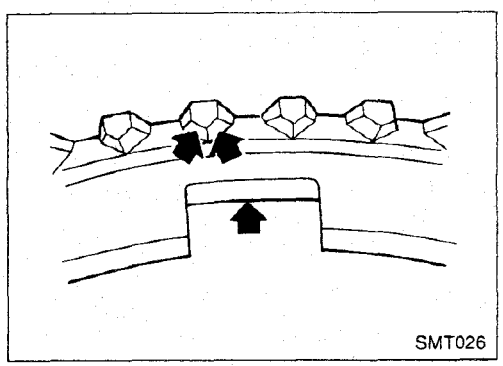
SMT550A

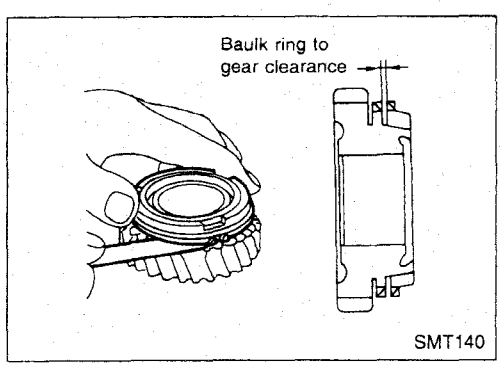


SMT387A

SYNCHRONIZERS

- Check spline portion of coupling sleeves, hubs and gears for wear or cracks.
- Check baulk rings for cracks or deformation.
- Check shifting inserts for wear or deformation.
- Check insert springs for deformation.


SMT026



SMT140

- Measure wear of baulk rings.

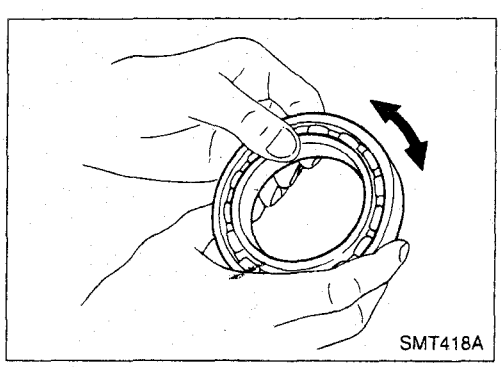
a. Measure clearance between baulk ring and gear.

Clearance between baulk ring and gear:

Unit: mm (in)

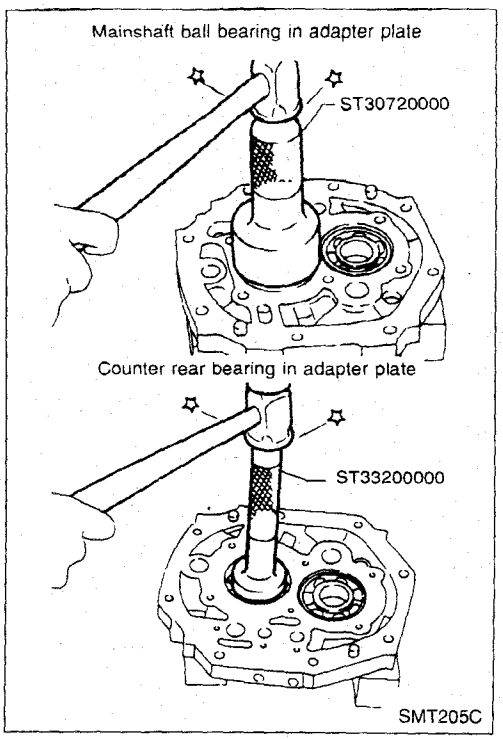
Dimension	Standard	Wear limit
1st and 2nd	1.2 - 1.6 (0.047 - 0.063)	0.8 (0.031)
3rd and main drive		
O.D. 5th	1.0 - 1.4 (0.039 - 0.055)	0.5 (0.02)

If the clearance is smaller than the wear limit, replace baulk ring.


SMT418A

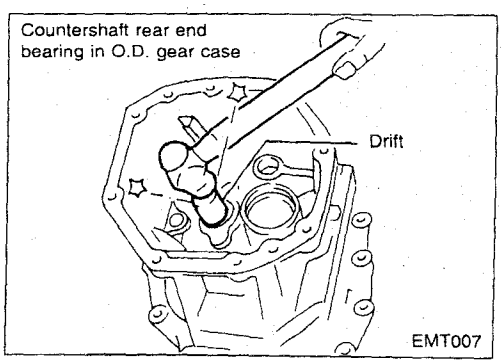
BEARINGS

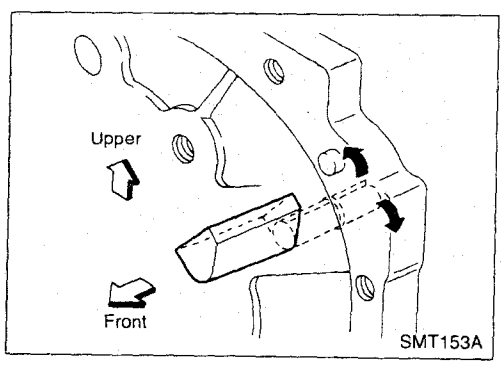
- Make sure bearings roll freely and are free from noise, crack, pitting or wear.



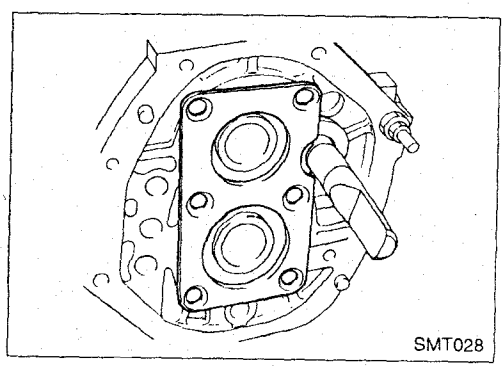
Gear Components

1. Install bearings into case components.





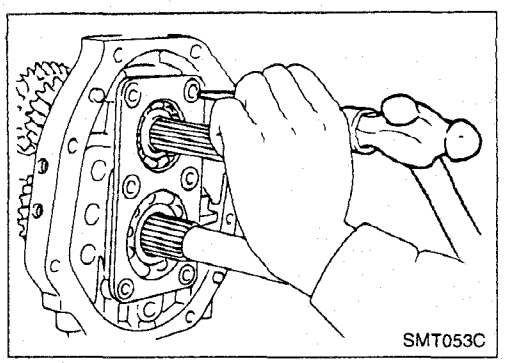
2. Assemble adapter plate parts.
- Install oil gutter on adapter plate and expand on rear side



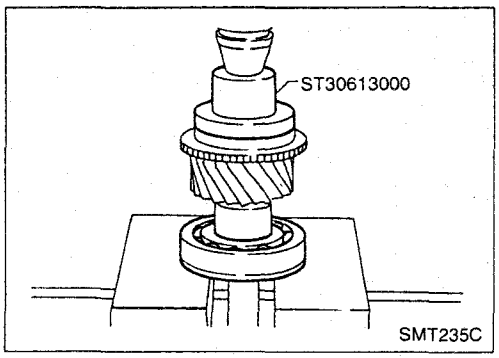
- Install bearing retainer.

a. Insert reverse shaft, then install bearing retainer.

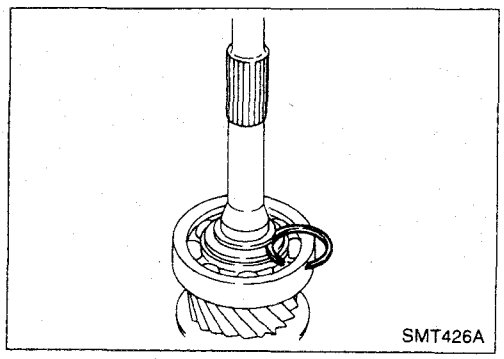
Gear Components (Cont'd)



b. Tighten each screw to 16 - 23 N·m (1.6 - 2.3 kg-m, 12 - 17 ft-lb), then stake each at two points.

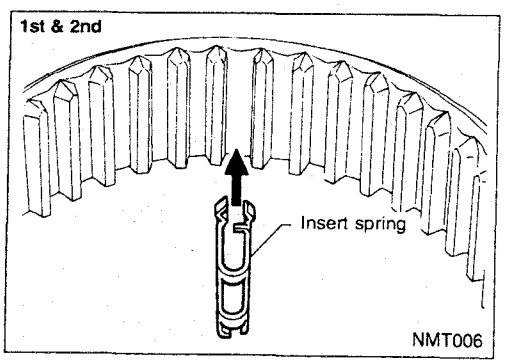


3. Install main drive gear bearing.
a. Press main drive gear bearing.
b. Install main drive gear spacer.

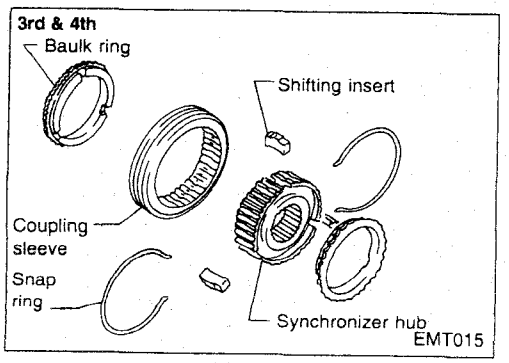


c. Select proper main drive gear snap ring Ⓐ to minimize clearance of groove and install it.

Allowable clearance of groove:
0 - 0.13 mm (0 - 0.0051 in)
Main drive gear snap ring:
Refer to S.D.S.

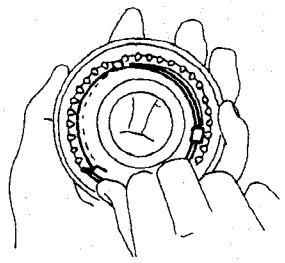


4. Assemble synchronizers.



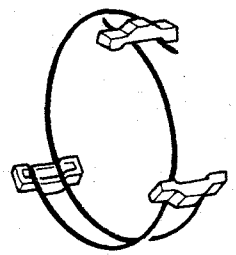
Gear Components (Cont'd)

3rd and 4th



EMT016

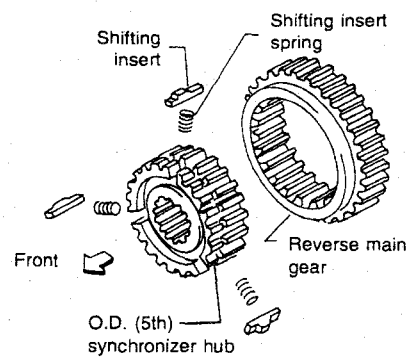
Place the two spread rings so that their open parts do not coincide. See figure.



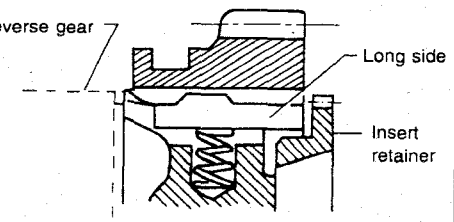
EMT017

Make sure that one end of the spread ring is mounted to the inside of the shifting insert whereas the other end is mounted to the outside of the shifting insert.

5th

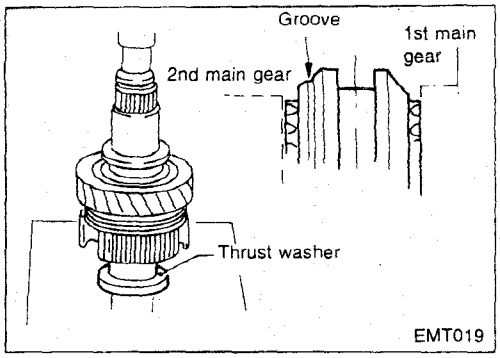


Shifting insert assembly

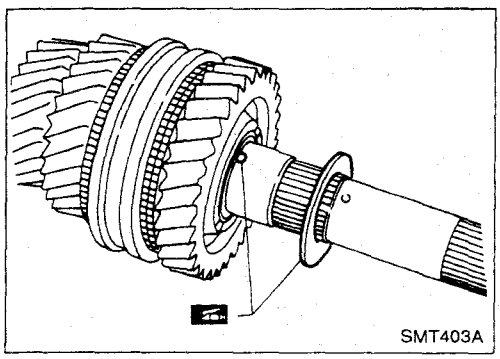


EMT018

Gear Components (Cont'd)

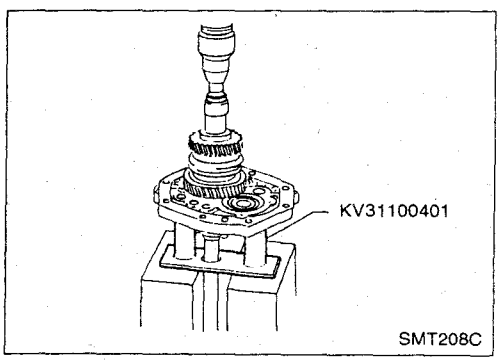


5. Install front side components on mainshaft.
a. Assemble 2nd main gear, needle bearing and 1st & 2nd synchronizer assembly, then press 1st gear bushing on mainshaft.
b. Install 1st main gear.

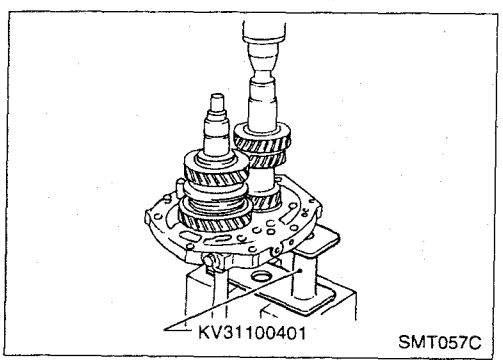


c. Install steel ball and 1st gear washer.

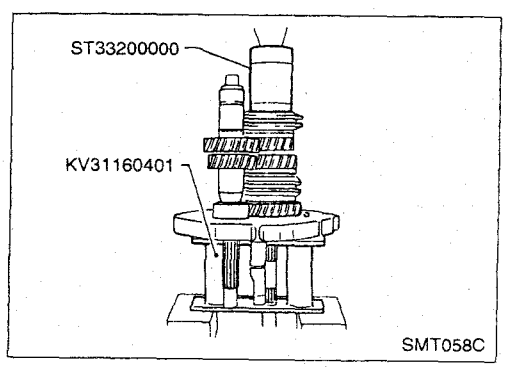
Apply multi-purpose grease to steel ball and 1st gear washer before installing.



6. Install mainshaft and counter gear on adapter plate and main drive gear on mainshaft as follows:
a. Press mainshaft assembly to adapter plate with Tool.

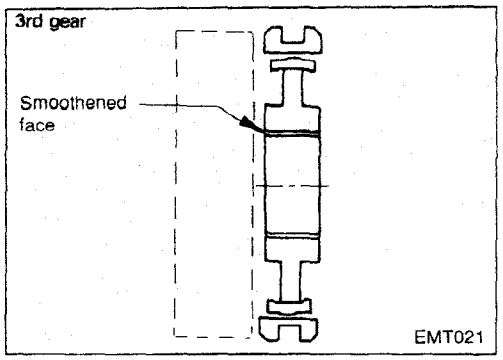


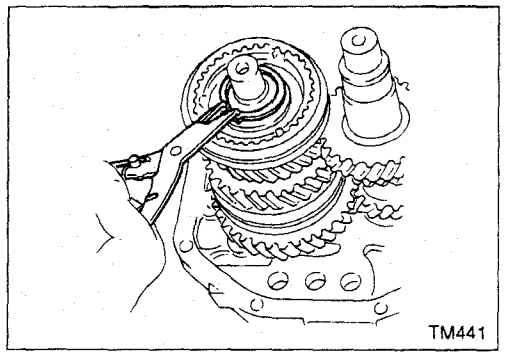
b. Press counter gear into adapter plate with Tool.



c. Install 3rd main gear and then press 3rd & 4th synchronizer assembly.

Pay attention to direction of 3rd & 4th synchronizer.



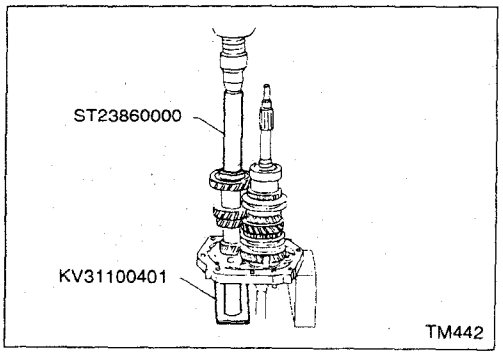


7. Install thrust washer on mainshaft and secure it with mainshaft front snap ring Ⓑ.

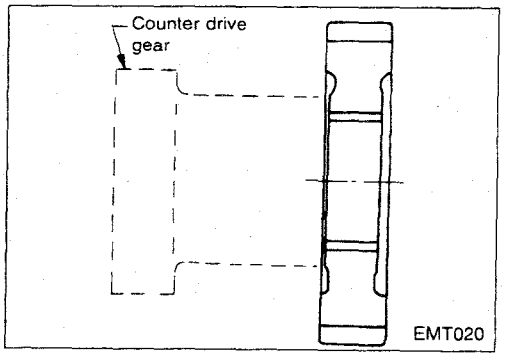
Select proper snap ring Ⓑ that will minimize clearance of groove in mainshaft.

Allowable clearance of groove:
0 - 0.18 mm (0 - 0.0071 in)
Mainshaft front snap ring Ⓑ:
Refer to S.D.S.

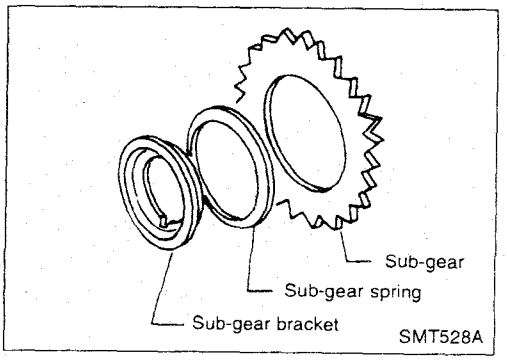
8. Apply gear oil to mainshaft pilot bearing and install it on mainshaft.



9. Press counter drive gear together with main drive gear with Tool.



Pay attention to direction of counter drive gear.

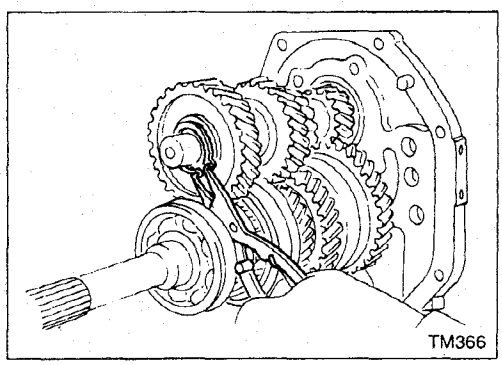


10. Install sub-gear components.
a. Install sub-gear, sub-gear spring and sub-gear bracket or counter drive gear and then select proper snap ring Ⓒ to minimize clearance of groove in counter gear.

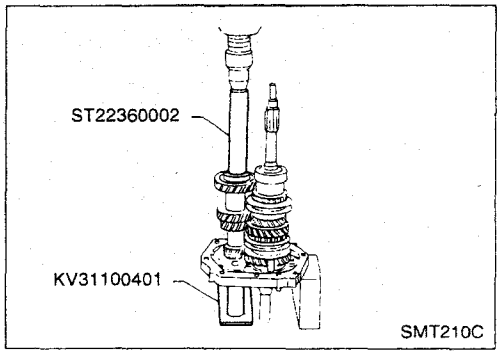
Allowable clearance of groove:
0 - 0.18 mm (0 - 0.0071 in)
Counter drive gear snap ring Ⓒ:
Refer to S.D.S.

b. Remove snap ring Ⓒ, sub-gear bracket and sub-gea from counter gear.
c. Reinstall sub-gear, sub-gear spring and sub-gear bracket.

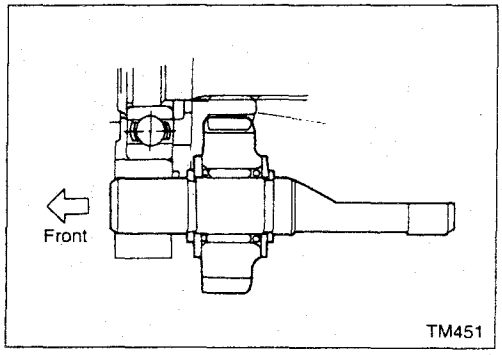
Gear Components (Cont'd)



11. Install selected counter drive gear snap ring Ⓒ.

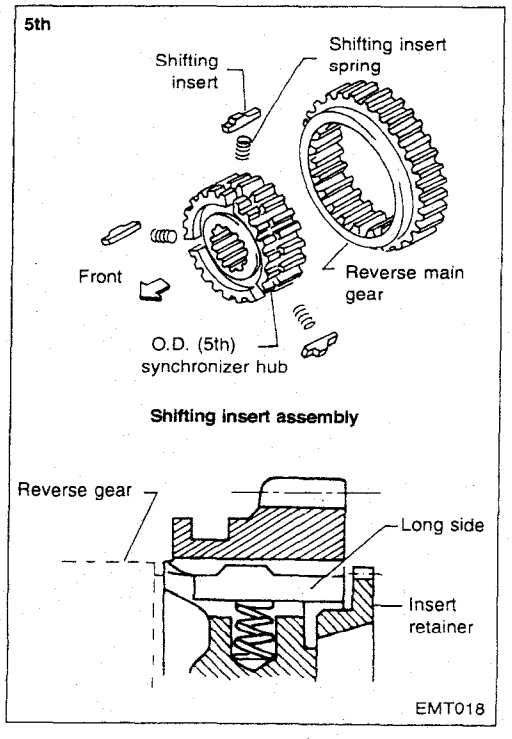


12. Press counter gear front bearing onto counter gear.



13. Install rear side components on mainshaft and counter gear as follows:

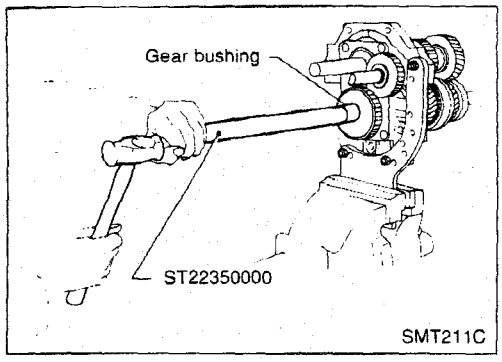
a. Install reverse idler gear to reverse idler shaft with spacers, snap rings and needle bearing.



b. Install bush, reverse main gear, needle bearing, baulk ring (reverse) and O.D. & reverse synchronizer hub to mainshaft.

Pay attention to direction of hub.

Gear Components (Cont'd)

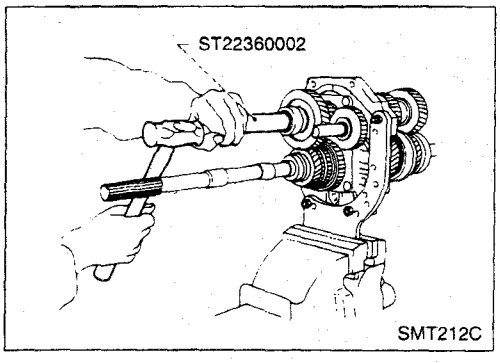


c. Install O.D. gear bushing with Tool.
d. Install baulk ring (O.D.), main gear and needle bearing.
e. Install spacer, reverse counter gear and O.D. counter gear.

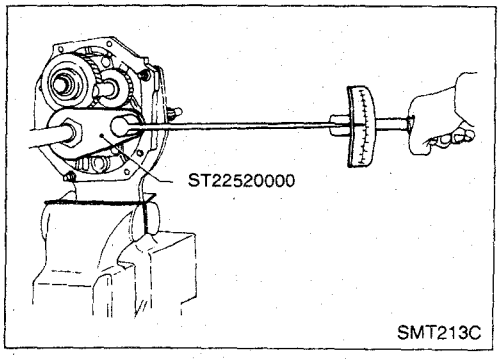
O.D. main gear and O.D. counter gear should be handled as a matched set.

f. Install thrust washer to mainshaft.
g. Tighten mainshaft lock nut temporarily.

Always use new lock nut.
Mainshaft nut: left-hand thread



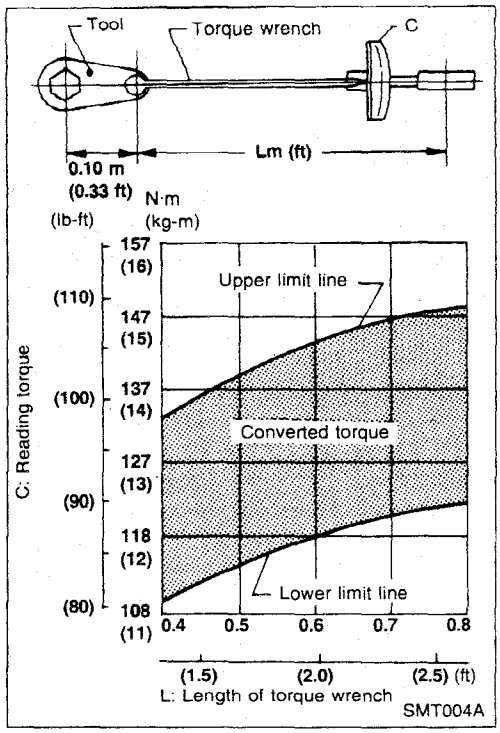
h. Install countershaft rear end bearing with Tool.



14. Mesh 2nd and reverse gears, then tighten mainshaft lock nut with Tool.

Mainshaft nut:
[O]: 137 - 167 N·m (14.0 - 17.0 kg-m, 101 - 123 ft-lb)

Gear Components (Cont'd)



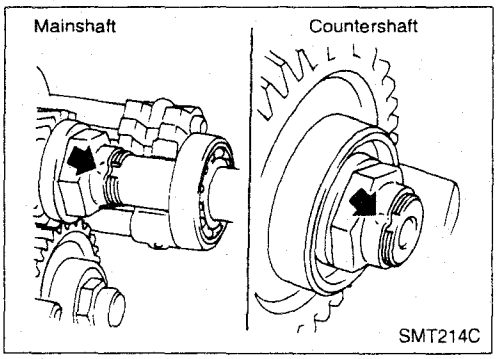
- Use the chart at left when deciding the reading torque. (Length of torque wrench vs. setting or reading torque)

15. Tighten countershaft lock nut.

Always use new lock nut.

Mainshaft lock nut:

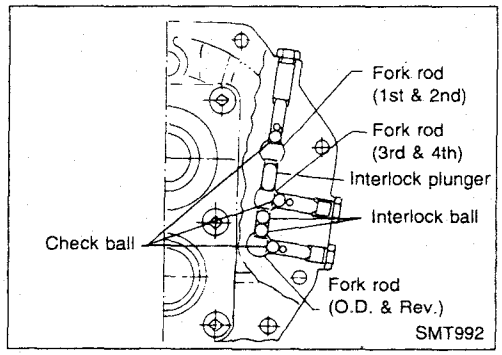
: 137 - 167 N·m (14.0 - 17.0 kg-m, 101 - 123 ft-lb)



16. Stake mainshaft lock nut and countershaft lock nut with a punch.
17. Measure gear end play. For the instructions, refer to DISASSEMBLY for Gear Components.
18. Install main shaft, rear end bearing and snap ring.

Countershaft lock nut:

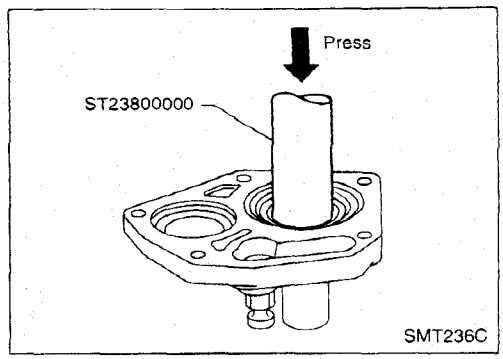
: 98 - 127 N·m (10.0 - 13.0 kg-m, 72 - 94 ft-lb)



Shift Control Components

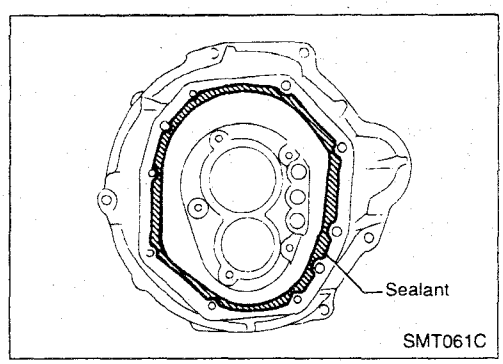
1. Install shift rods, interlock plunger, interlock balls and check balls.
   Fit the respective forks into their housings.

a. Install the 5th/reverse fork rod. Fit the retain pins securing the rod to the fork.
   Install the two interlock balls at the 5th/reverse and 3rd/4th rods.
b. Install the 3rd/4th fork rod. Fit the retaining pins securing the rod to the fork.
   Insert the interlock plunger between the 3rd/4th fork rod and the 1st/2nd fork rod.
c. Install the 1st/2nd fork rod.
d. Install check balls, check springs and check ball plugs to their respective position .

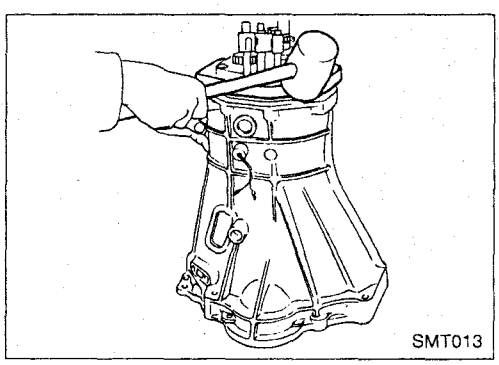


Case Components

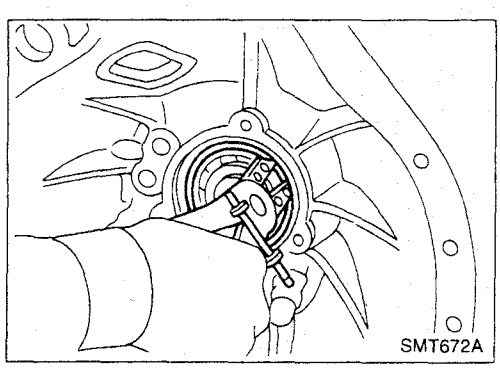
1. Install front cover oil seal.
- **Apply multi-purpose grease to seal lip.**



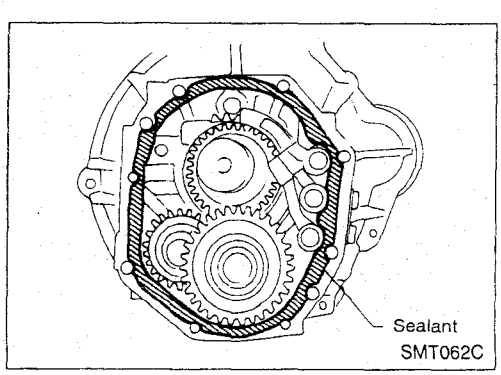
2. Apply sealant to mating surface of transmission case.



3. Slide gear assembly with adapter plate into transmission case by slightly tapping on adapter plate with a soft hammer.

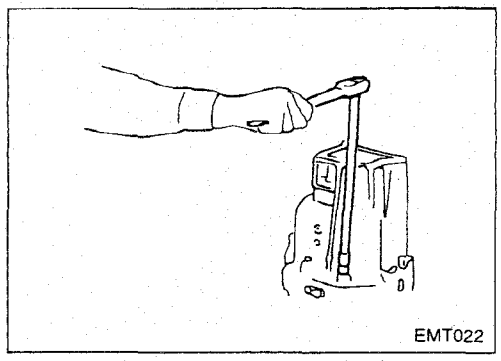


4. Install main drive bearing snap ring.

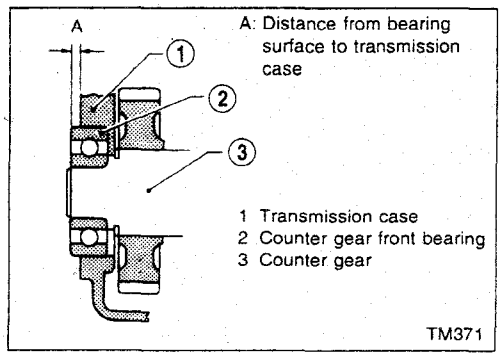


5. Apply sealant to mating surface of adapter plate.

Case Components (Cont'd)

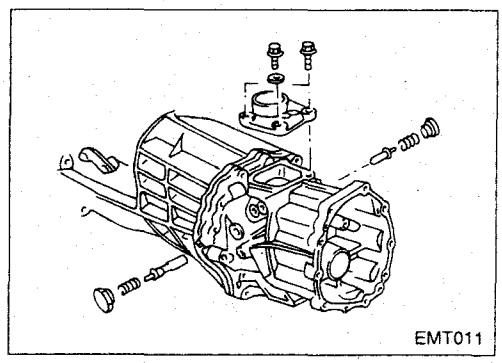

EMT022

6. Install rear extension.
7. Fit main drive bearing snap ring.



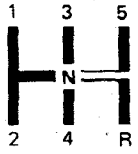
TM371

8. Select counter front bearing shim.
   Refer to S.D.S.
9. Install gasket and front cover.


EMT011

10. Install return spring plugs, check ball, return springs and select check plunger.
11. Install control housing and gasket.

General Specifications

Applied model		KA24E	TD27T
Transmission model		FS5W71C	
Number of speeds		5	
Shift pattern			
Synchromesh type		Warner	
Gear ratio	1st	3.592	
	2nd	2.246	
	3rd	1.415	
	4th	1.000	
	O.D.	0.821	
	Reverse	3.657	
Number of teeth			
Mainshaft	Drive	21	
	1st	33	
	2nd	28	
	3rd	26	
	O.D.	21	
	Reverse	36	
Countershaft	Drive	32	
	1st	14	
	2nd	19	
	3rd	28	
	O.D.	39	
	Reverse	15	
Reverse idler gear		21	
Oil capacity	ℓ (Imp pt)	3.5 (6-1/8)	

Inspection and Adjustment

GEAR END PLAY

Gear	End play mm (in)
1st gear	0.31 - 0.41 (0.0122 - 0.0161)
2nd gear	0.11 - 0.21 (0.0043 - 0.0083)
3rd gear	0.11 - 0.21 (0.0043 - 0.0083)
O.D. gear	0.32 -0.39 (0.0126 - 0.0154)

CLEARANCE BETWEEN BAULK RING AND GEAR

1st, 3rd, main drive and O.D. baulk ring

Unit: mm (in)

	Standard	Wear limit
1st & 2nd 3rd and main drive	1.2 - 1.6 (0.047 - 0.063)	0.8 (0.031)
O.D.	1.0 - 1.4 (0.039 - 0.055)	0.5 (0.02)

AVAILABLE SNAP RING

Main drive gear bearing (Snap Ring Ⓐ)

Allowable clearance	0 - 0.13 mm (0 - 0.0051 in)
Thickness mm (in)	Part number
1.73 (0.0681)	32204-78005
1.80 (0.0709)	32204-78000
1.87 (0.0736)	32204-78001
1.94 (0.0764)	32204-78002
2.01 (0.0791)	32204-78003
2.08 (0.0819)	32204-78004

Mainshaft 3rd & 4th synchronizer hub (Snap Ring Ⓑ)

Allowable clearance	0 - 0.18 mm (0 - 0.0071 in)
Thickness mm (in)	Part number
2.4 (0.094)	32263-V5200
2.5 (0.098)	32263-V5201
2.6 (0.102)	32263-V5202

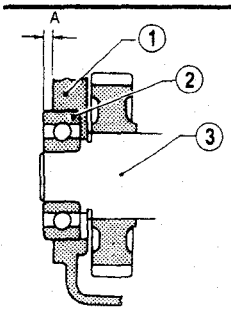
Counter drive gear (Snap Ring Ⓒ)

Allowable clearance	0 - 0.18 mm (0 - 0.0071 in)
Thickness mm (in)	Part number
1.4 (0.055)	32215-E9000
1.5 (0.059)	32215-E9001
1.6 (0.063)	32215-E9002

AVAILABLE SHIMS

Counter front bearing

Unit: mm (in)



A: Distance from bearing surface to transmission case

1 Transmission
2 Counter gear front bearing
3 Counter gear

SMT371

"A"	Thickness of shim	Part number
4.52 - 4.71 (0.1780 - 0.1854)	Not necessary	
4.42 - 4.51 (0.1740 - 0.1776)	0.1 (0.004)	32218-V5000
4.32 - 4.41 (0.1701 - 0.1736)	0.2 (0.008)	32218-V5001
4.22 - 4.31 (0.1661 - 0.1697)	0.3 (0.012)	32218-V5002
4.12 - 4.21 (0.1622 - 0.1657)	0.4 (0.016)	32218-V5003
4.02 - 4.11 (0.1583 - 0.1618)	0.5 (0.020)	32218-V5004
3.92 - 4.01 (0.1543 - 0.1579)	0.6 (0.024)	32218-V5005