

MANUAL TRANSAXLE

SECTION **MT**

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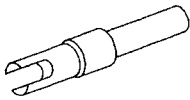
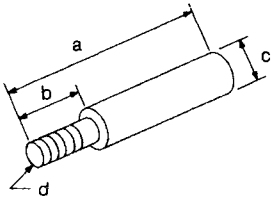
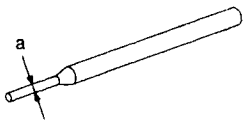
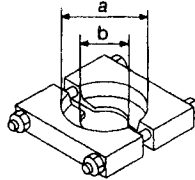
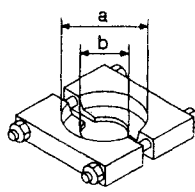
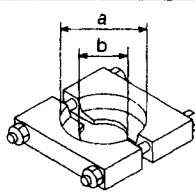
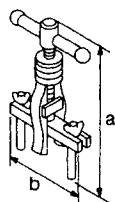
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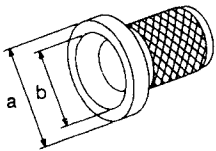
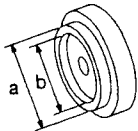
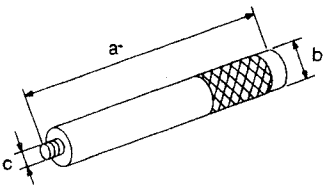
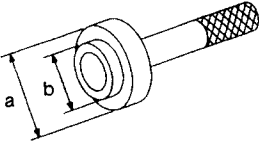
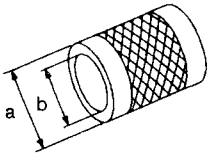
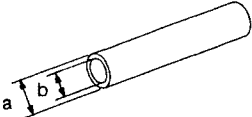
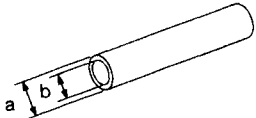
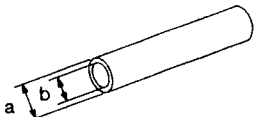
PREPARATION

Special Service Tools

Tool number Tool name	Description
KV38105900-For F30A & F31A KV38107700-For F32A Preload adapter	 Measuring turning torque of final drive assembly Measuring total turning torque Measuring clearance between side gear and differential case with washer Selecting differential side bearing adjusting shim (Use with KV38106000.) NT087
KV38106000 Height gauge adapter (differential side bearing)	 Selecting differential side bearing adjusting shim (Use with KV38105900 or KV38107700.) a: 140 mm (5.51 in) b: 40 mm (1.57 in) c: 16 mm (0.63 in) dia. d: M8 x 1.25P NT418
KV32101000 Pin punch	 Removing and installing retaining pin a: 4 mm (0.16 in) dia. NT410
ST22730000 Puller	 Removing mainshaft front and rear bearing inner race (F30A & F31A) Removing 5th main gear a: 82 mm (3.23 in) dia. b: 30 mm (1.18 in) dia. NT411
ST30031000 Puller	 Removing differential side bearing inner race (F30A & F31A) Removing 3rd and 4th synchronizer Measuring wear of 2nd & 3rd baulk ring (F32A) a: 90 mm (3.54 in) dia. b: 50 mm (1.97 in) dia. NT411
ST30021000 Puller	 Removing 5th synchronizer a: 110 mm (4.33 in) dia. b: 68 mm (2.68 in) dia. NT411
ST33290001 Puller	 Removing differential oil seal Removing mainshaft front bearing outer race (F30A & F31A) Removing differential side bearing outer race a: 250 mm (9.84 in) b: 160 mm (6.30 in) NT414

PREPARATION

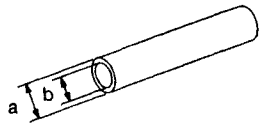
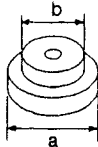
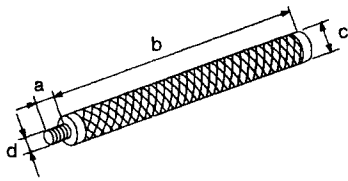
Special Service Tools (Cont'd)

Tool number Tool name	Description
ST33400001 Drift	 Installing differential oil seal (F30A & F31A) a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia. NT086
KV31103000 Drift	 Installing differential oil seal (F32A) Right and left sides (Use with ST35325000.) a: 56 mm (2.20 in) dia. b: 49 mm (1.93 in) dia. NT105
ST35325000 Drift handle	 Installing differential oil seal (F32A) (Use with KV31103000.) a: 215 mm (8.46 in) b: 25 mm (0.98 in) dia. c: M12 x 1.5P NT417
KV38102100 Drift	 Installing input shaft rear bearing a: 44 mm (1.73 in) dia. b: 24.5 mm (0.965 in) dia. NT427
ST33200000 Drift	 Installing mainshaft front bearing outer race (F30A & F31A) Installing mainshaft front bearing (F32A) a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia. NT091
ST22350000 Drift	 Installing input shaft front bearing a: 34 mm (1.34 in) dia. b: 28 mm (1.10 in) dia. NT065
ST22452000 Drift	 Installing 1st & 2nd synchronizer Installing 3rd & 4th synchronizer (F32A) a: 45 mm (1.77 in) dia. b: 36 mm (1.42 in) dia. NT065
ST37750000 Drift	 Installing 5th main gear Installing 3rd & 4th synchronizer Installing input shaft oil seal Installing 5th synchronizer (F30A & F31A) Installing mainshaft rear bearing (F32A) a: 40 mm (1.57 in) dia. b: 31 mm (1.22 in) dia. NT065

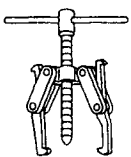
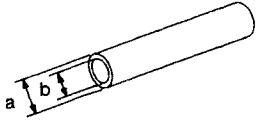
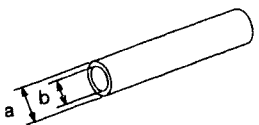
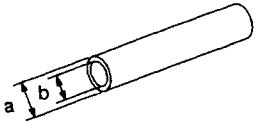
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PREPARATION

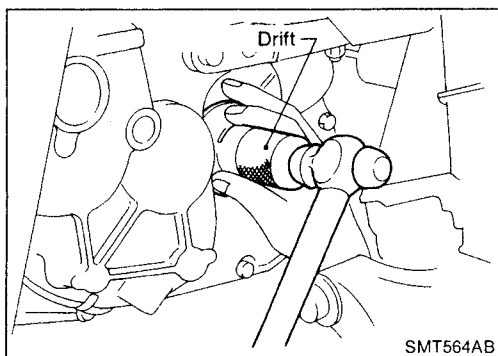
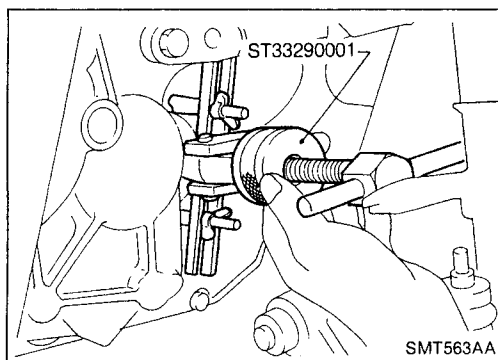
Special Service Tools (Cont'd)

Tool number Tool name	Description	
ST22360002 Drift	 NT065	Installing mainshaft rear bearing inner race (F30A & F31A) a: 29 mm (1.14 in) dia. b: 23 mm (0.91 in) dia.
ST30621000 Drift	 NT073	Installing differential side bearing outer race (Use with ST30611000.) a: 79 mm (3.11 in) dia. b: 59 mm (2.32 in) dia.
ST30611000 Drift handle	 NT419	Installing differential side bearing outer race (Use with ST30621000.) a: 15 mm (0.59 in) b: 335 mm (13.19 in) c: 25 mm (0.98 in) dia. d: M12 x 1.5P

Commercial Service Tools

Tool name	Description	
Puller	 NT077	Removing input shaft front bearing (F30A & F31A) Removing mainshaft rear bearing (F32A)
Drift	 NT065	Installing mainshaft front bearing inner race a: 26 mm (1.02 in) dia. b: 21 mm (0.83 in) dia. (F30A) a: 31 mm (1.22 in) dia. b: 26 mm (1.02 in) dia. (F31A & F32A)
Drift	 NT065	Installing differential side bearing inner race a: 56 mm (2.20 in) dia. b: 50.5 mm (1.988 in) dia.
Drift	 NT065	Installing striking rod oil seal a: 38 mm (1.50 in) dia. b: 32 mm (1.26 in) dia.

ON-VEHICLE SERVICE



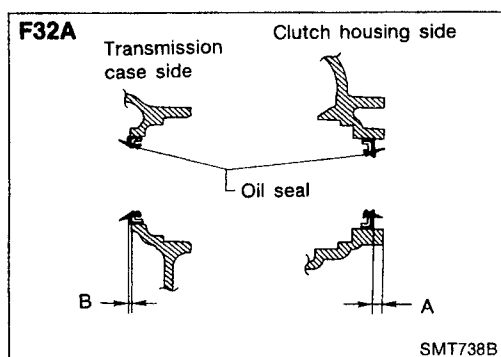
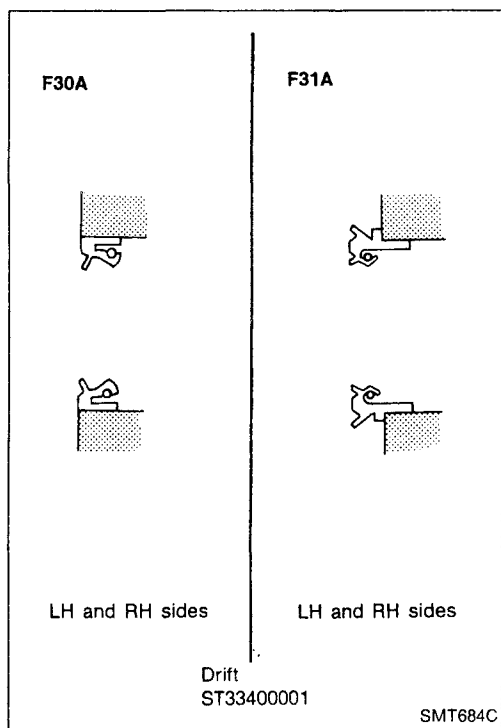
Replacing Oil Seal

DIFFERENTIAL OIL SEAL

1. Drain gear oil from transaxle.
2. Remove drive shafts. Refer to FA section ("Removal", "FRONT AXLE — Drive Shaft").
3. Remove differential oil seal.
4. Install differential oil seal.
 - **Apply multi-purpose grease to seal lip of oil seal before installing.**
5. Install drive shafts — Refer to FA section ("Installation", "FRONT AXLE — Drive Shaft").

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— F30A & F31A —



— F32A —

- **Install differential oil seal so that dimension "A" and "B" are within specifications.**

Unit: mm (in)

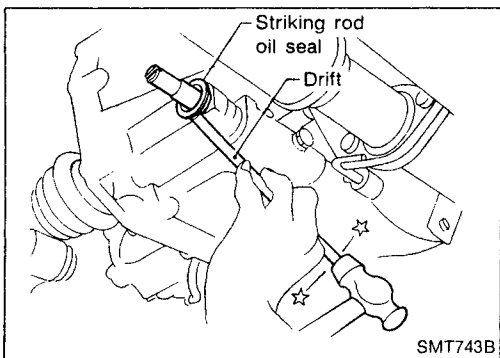
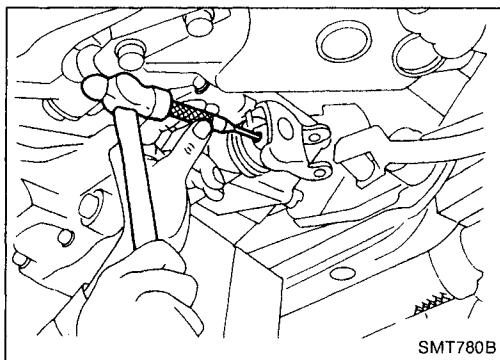
A	B
5.9 - 6.1 (0.232 - 0.240)	0.5 (0.020) or less

ON-VEHICLE SERVICE

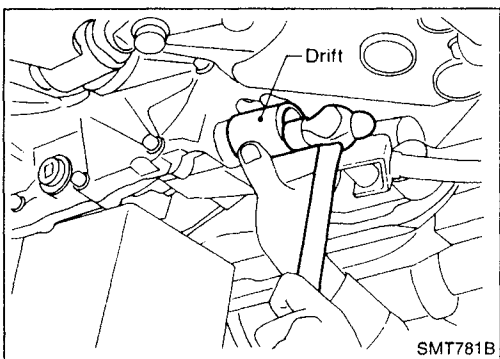
Replacing Oil Seal (Cont'd)

STRIKING ROD OIL SEAL

1. Remove transaxle control rod from yoke.
2. Remove yoke retaining pin.
 - Be careful not to damage boot.

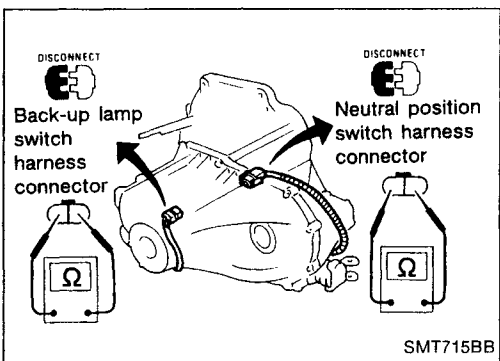


3. Remove striking rod oil seal.



4. Install striking rod oil seal.

- Apply multi-purpose grease to seal lip of oil seal before installing.

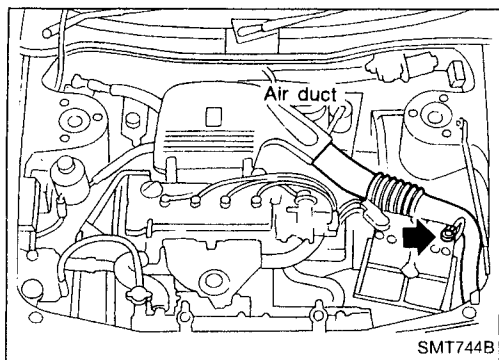


Position Switch Check

- Check continuity.

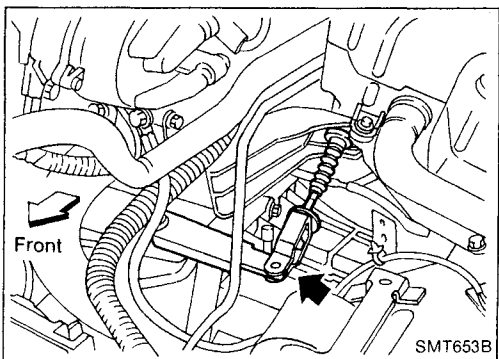
Switch	Gear position	Continuity
Back-up lamp switch	Reverse	Yes
	Except reverse	No
Neutral position switch	Neutral	Yes
	Except neutral	No

REMOVAL AND INSTALLATION

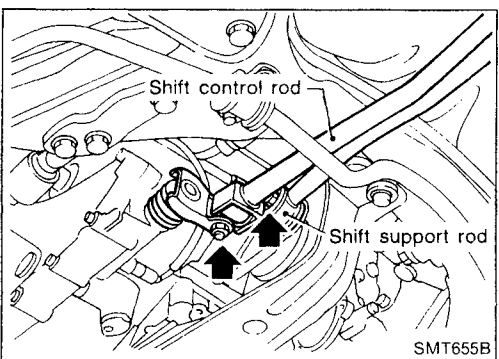


Removal

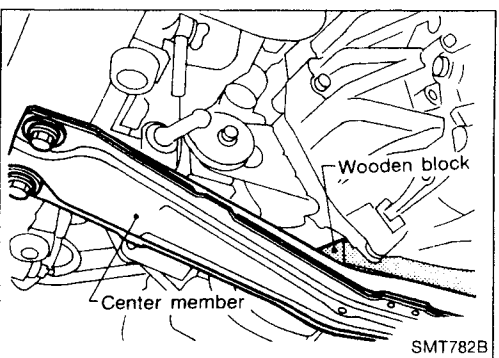
1. Remove battery negative terminal.
2. Remove air duct.



3. Disconnect clutch control cable. (Except for CD20 engine models)
Remove clutch operating cylinder and clutch operating cylinder bracket from transaxle. (CD20 engine models)
4. Disconnect back-up lamp switch, neutral position switch, speedometer sensor and ground harness connectors.
5. Remove starter motor from transaxle.



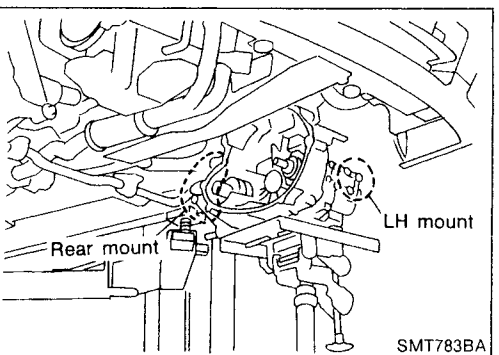
6. Remove shift control rod and support rod from transaxle.
7. Drain gear oil from transaxle.
8. Remove drive shafts. Refer to FA section ("Removal", "FRONT AXLE — Drive Shaft").



9. Jack up transaxle together with engine slightly and insert wooden block between center member and engine oil pan.

CAUTION:

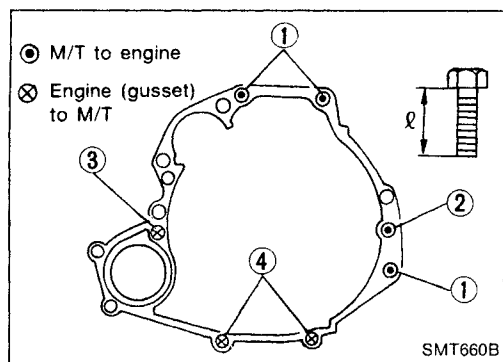
Do not place jack under oil pan drain plug.



10. Remove rear and LH mounts supporting transaxle with jack.
11. Remove bolts securing transaxle.
12. Lower transaxle.

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REMOVAL AND INSTALLATION

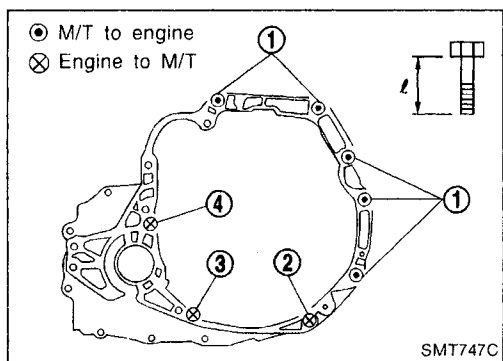


Installation

Tighten bolts securing transaxle and install any part removed.

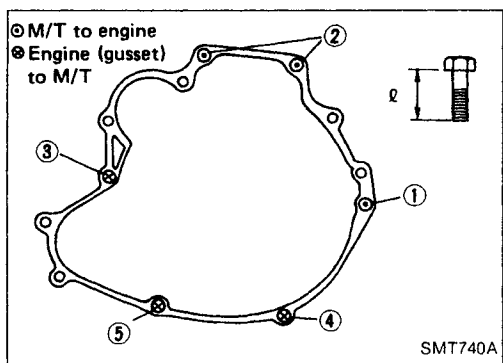
● GA engine models

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	"ℓ" mm (in)
①	30 - 40 (3.1 - 4.1, 22 - 30)	70 (2.76)
②	30 - 40 (3.1 - 4.1, 22 - 30)	85 (3.35)
③	30 - 40 (3.1 - 4.1, 22 - 30)	30 (1.18)
④	16 - 21 (1.6 - 2.1, 12 - 15)	25 (0.98)
Front gusset to engine	30 - 40 (3.1 - 4.1, 22 - 30)	20 (0.79)
Rear gusset to engine	16 - 21 (1.6 - 2.1, 12 - 15)	16 (0.63)



● SR engine models

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	"ℓ" mm (in)
①	70 - 79 (7.1 - 8.1, 51 - 59)	55 (2.17)
②	30 - 40 (3.1 - 4.1, 22 - 30)	35 (1.38)
③	30 - 40 (3.1 - 4.1, 22 - 30)	45 (1.77)
④	70 - 79 (7.1 - 8.1, 51 - 59)	65 (2.56)

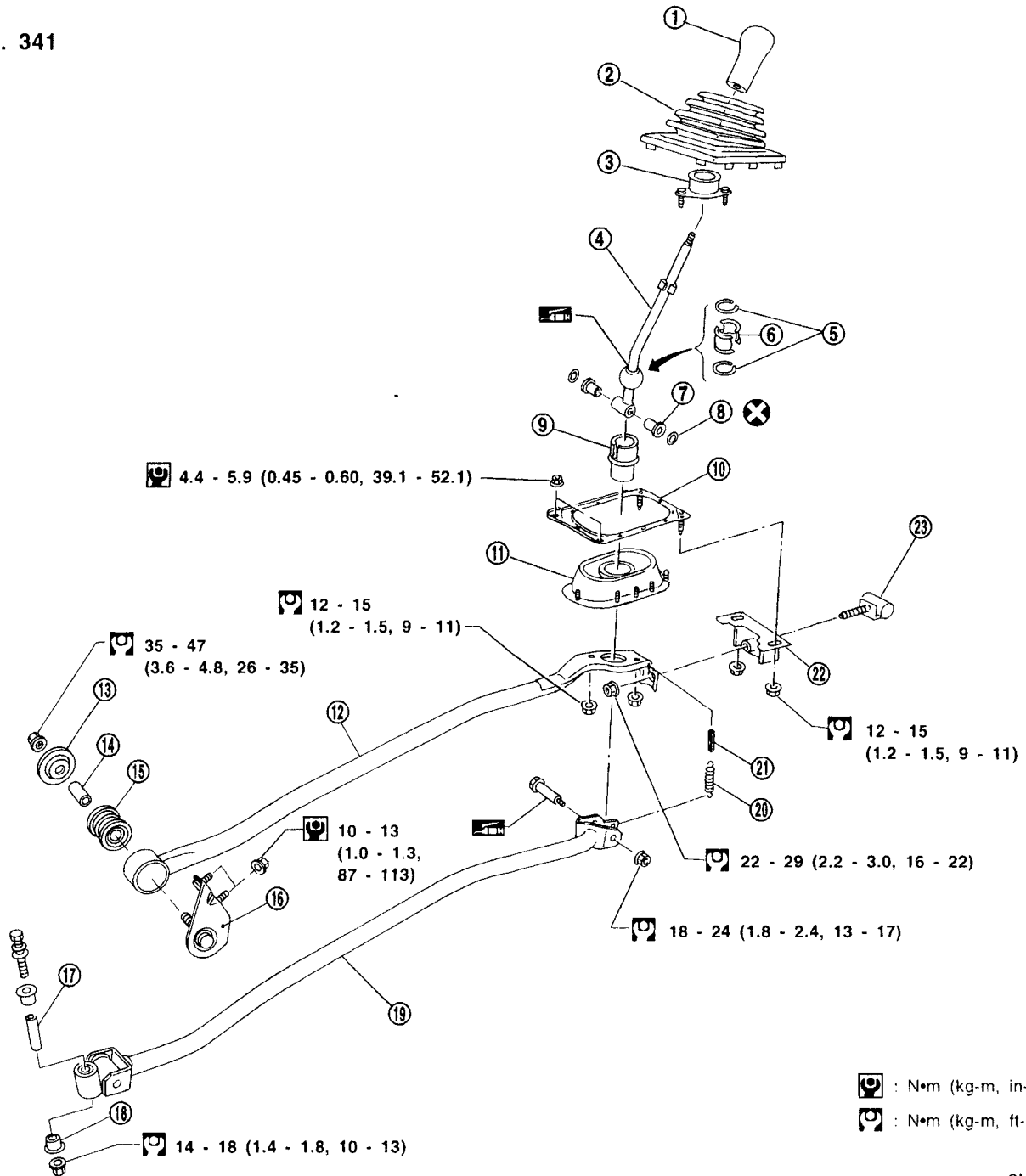


● CD20 engine models

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	"ℓ" mm (in)
①	30 - 40 (3.1 - 4.1, 22 - 30)	120 (4.72)
②	30 - 40 (3.1 - 4.1, 22 - 30)	85 (3.35)
③	44 - 54 (4.5 - 5.5, 33 - 40)	75 (2.95)
④	16 - 21 (1.6 - 2.1, 12 - 15)	30 (1.18)
⑤	16 - 21 (1.6 - 2.1, 12 - 15)	25 (0.98)
Front gusset to engine	30 - 40 (3.1 - 4.1, 22 - 30)	35 (1.38)
Rear gusset to engine	30 - 40 (3.1 - 4.1, 22 - 30)	40 (1.57)

TRANSAXLE GEAR CONTROL

SEC. 341

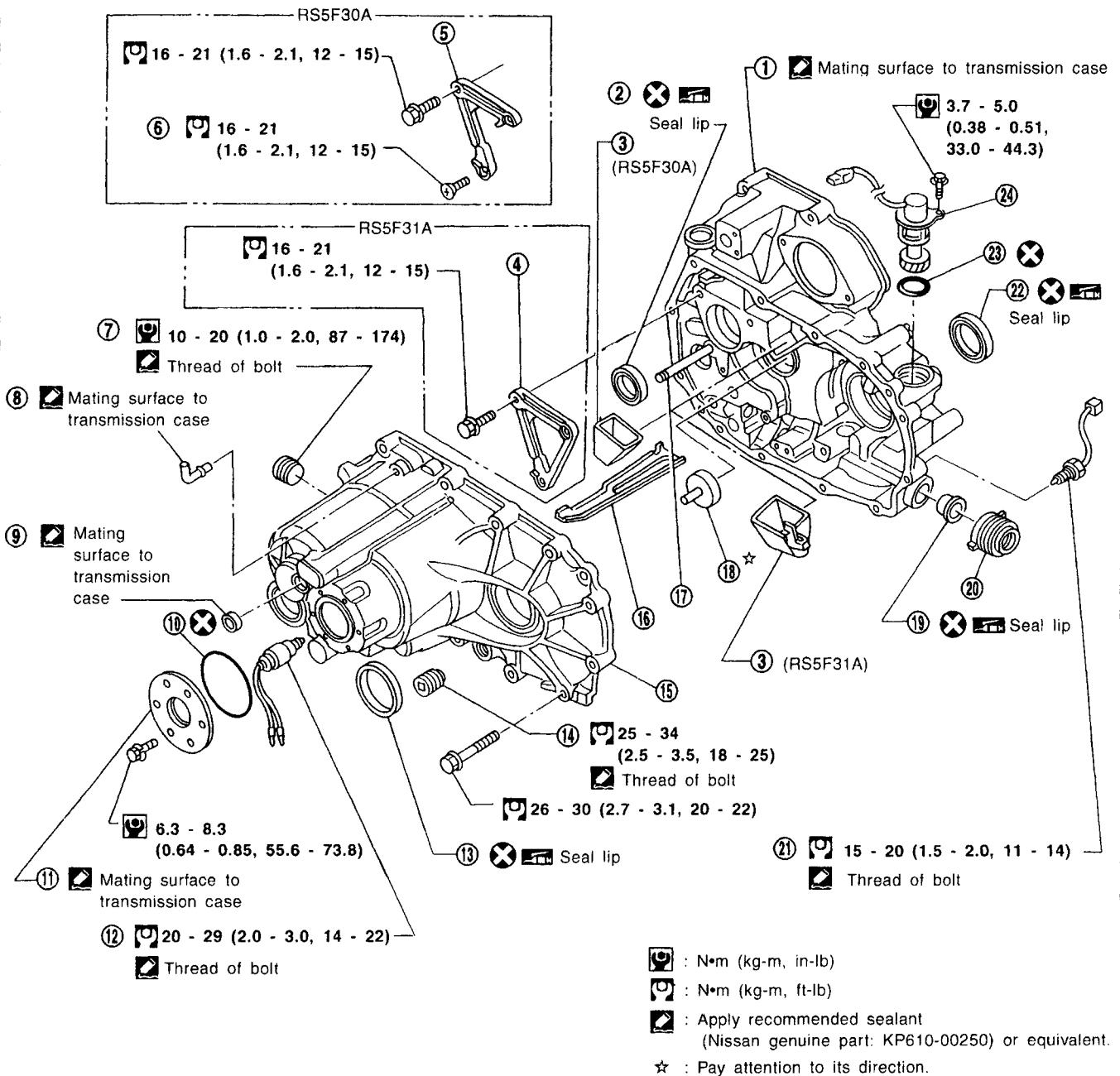


SMT756C

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|------------------------|------------------------|----------------------------------|
| ① Control lever knob | ⑨ Hand lever socket | ⑰ Collar |
| ② Boot | ⑩ Plate bolt | ⑱ Bushing |
| ③ Control lever socket | ⑪ Transaxle hole cover | ⑲ Control rod |
| ④ Control lever | ⑫ Support rod | ⑳ Return spring |
| ⑤ Bearing seat spring | ⑬ Plate | ㉑ Return spring rubber |
| ⑥ Seat | ⑭ Collar | ㉒ Holder bracket |
| ⑦ Bushing | ⑮ Bushing | ㉓ Mass damper (CD20 engine only) |
| ⑧ O-ring | ⑯ Support rod bracket | |

Case Components

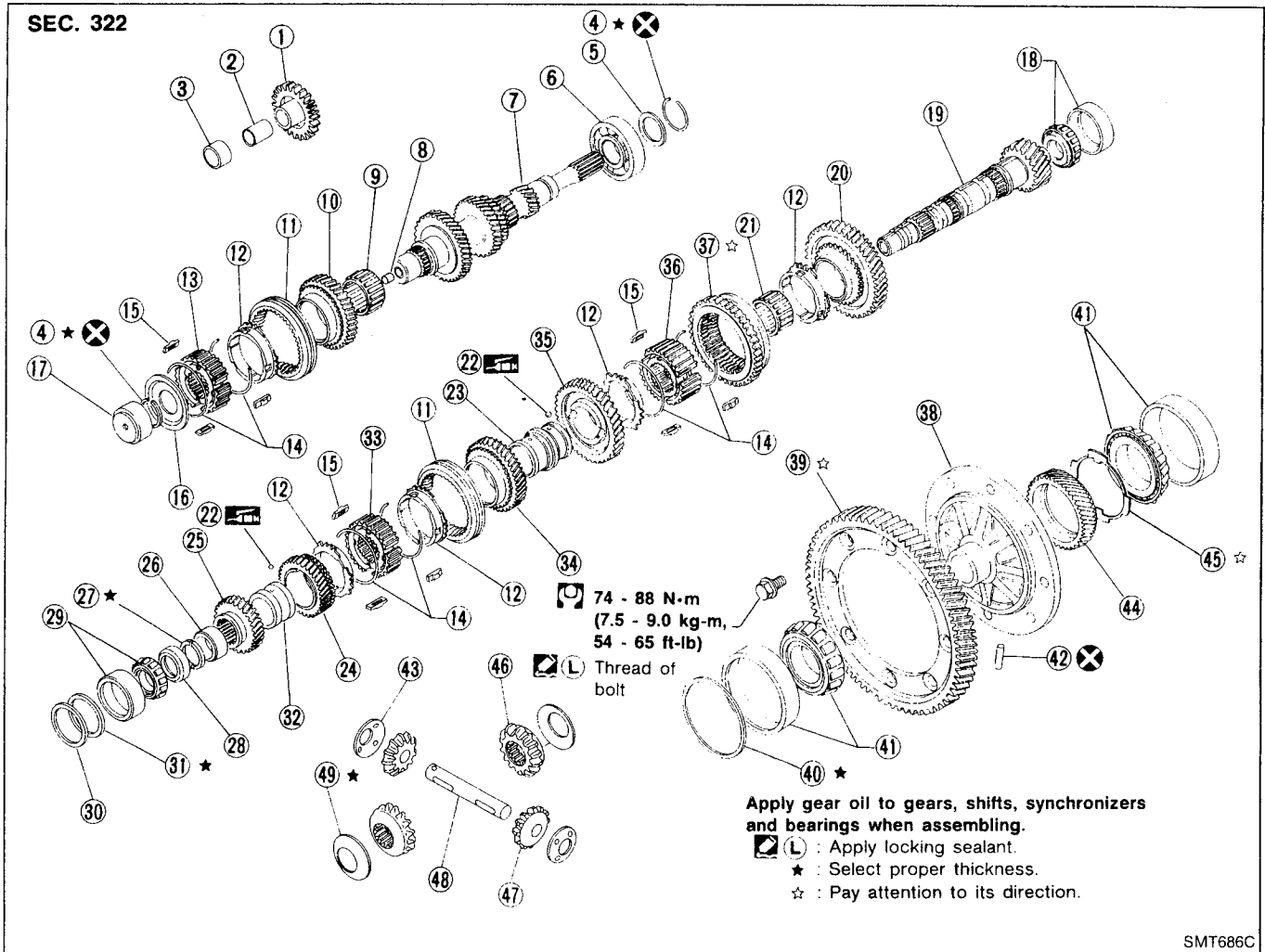
SEC. 320



SMT755C

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|------------------------|-------------------------|--|
| ① Clutch housing | ⑩ O-ring | ⑲ Striking rod oil seal |
| ② Input shaft oil seal | ⑪ Case cover | ⑳ Boot |
| ③ Oil pocket | ⑫ Back-up lamp switch | ㉑ Neutral position switch (GA engine) or switch plug (CD engine) |
| ④ Bearing retainer | ⑬ Differential oil seal | ㉒ Differential oil seal |
| ⑤ Bearing retainer | ⑭ Drain plug | ㉓ O-ring |
| ⑥ Torx screw | ⑮ Transmission case | ㉔ Speedometer pinion assembly |
| ⑦ Filler plug | ⑯ Oil gutter | |
| ⑧ Air breather | ⑰ Reverse idler shaft | |
| ⑨ Welch plug | ⑱ Oil channel | |

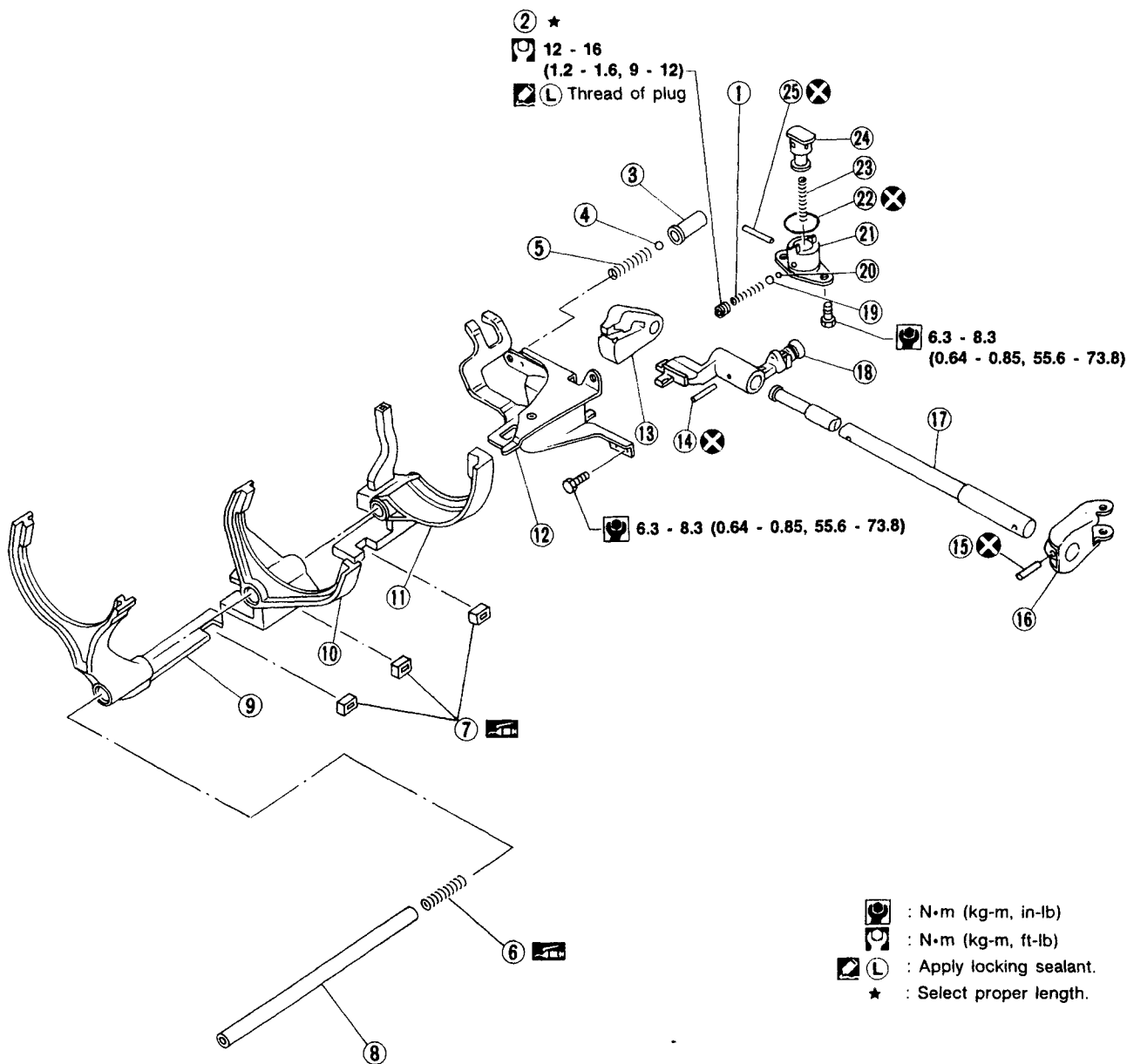
Gear Components



- | | | | |
|-----------------------------|----------------------------|---------------------------------------|---|
| ① Reverse idler gear | ⑭ Spread spring | ⑳ C-ring holder | ④① Differential side bearing adjusting shim |
| ② Reverse idler bushing | ⑮ Shifting insert | ㉑ Mainshaft rear bearing | ④② Differential side bearing |
| ③ Reverse idler spacer | ⑯ 5th stopper | ㉒ Spacer | ④③ Retaining pin |
| ④ Snap ring | ⑰ Input shaft rear bearing | ㉓ Mainshaft bearing adjusting shim | ④④ Pinion mate thrust washer |
| ⑤ Spacer | ⑱ Mainshaft front bearing | ㉔ 4th bushing | ④⑤ Speedometer drive gear |
| ⑥ Input shaft front bearing | ⑲ Mainshaft | ㉕ 3rd & 4th synchronizer hub | ④⑥ Speedometer stopper |
| ⑦ Input shaft | ㉑ 1st main gear | ㉖ 3rd main gear | ④⑦ Side gear |
| ⑧ Oil plug | ㉒ 1st gear needle bearing | ㉗ 2nd main gear | ④⑧ Pinion mate gear |
| ⑨ 5th gear needle bearing | ㉓ Steel ball | ㉘ 1st & 2nd synchronizer hub | ④⑨ Pinion mate shaft |
| ⑩ 5th input gear | ㉔ 2nd & 3rd bushing | ㉙ Reverse main gear (Coupling sleeve) | ④⑩ Side gear thrust washer |
| ⑪ Coupling sleeve | ㉕ 4th main gear | ㉚ Differential case | |
| ⑫ Baulk ring | ㉖ 5th main gear | ㉛ Final gear | |
| ⑬ 5th synchronizer hub | ㉗ Thrust washer | | |
| | ㉘ Mainshaft C-ring | | |

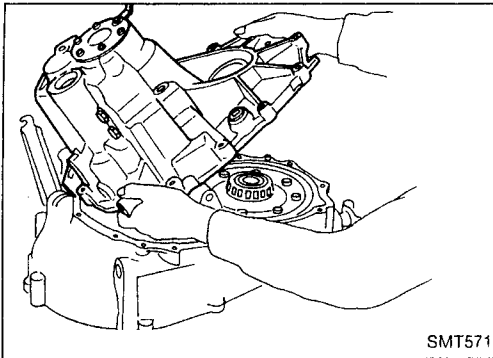
Shift Control Components

SEC. 328

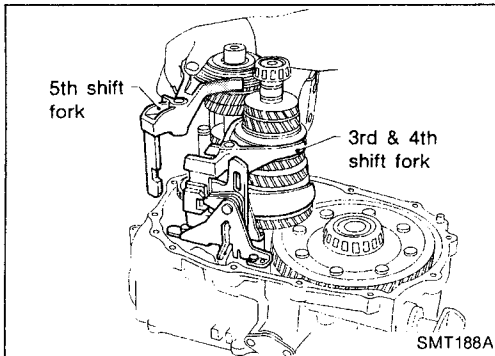


SMT750C

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|-----------------------------|------------------------|------------------------|
| ① Reverse check spring | ⑩ 3rd & 4th shift fork | ⑱ Striking lever |
| ② Reverse check plug | ⑪ 1st & 2nd shift fork | ⑲ Check ball (Large) |
| ③ Check ball plug | ⑫ Control bracket | ⑳ Check ball (Small) |
| ④ Shift check ball | ⑬ Striking interlock | ㉑ Check sleeve |
| ⑤ Shift check spring | ⑭ Retaining pin | ㉒ O-ring |
| ⑥ Fork shaft support spring | ⑮ Retaining pin | ㉓ Select return spring |
| ⑦ Shifter cap | ⑯ Yoke | ㉔ Check plunger |
| ⑧ Fork shaft | ⑰ Striking rod | ㉕ Stopper pin |
| ⑨ 5th shift fork | | |

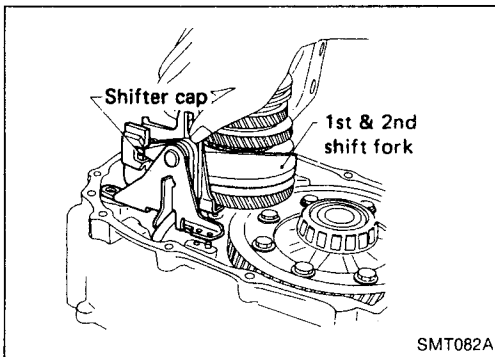


1. Remove transmission case while slightly tilting it to prevent 5th shift fork from interfering with case.



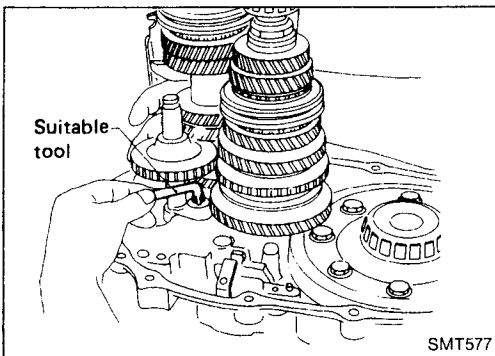
2. Draw out reverse idler spacer and fork shaft, then remove 5th and 3rd & 4th shift forks.

- **Be careful not to lose shifter cap.**



3. Remove control bracket with 1st & 2nd shift fork.

- **Be careful not to lose shifter cap.**

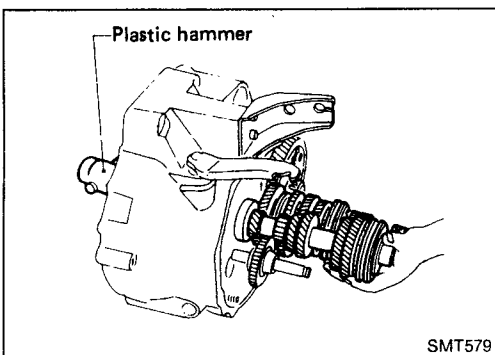


4. Remove gear components from clutch housing.

— **RS5F30A** —

- a. Remove three screws and detach bearing retainer.

- **One of these three screws is torx type and should be removed with a suitable tool, as shown.**

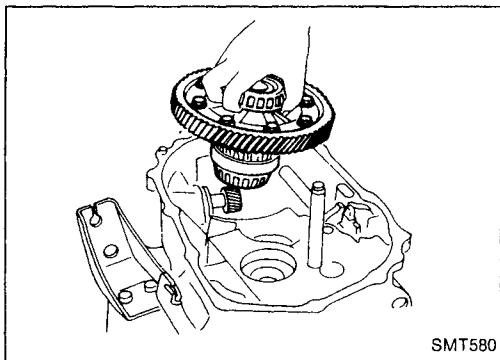


- b. Remove input shaft together with mainshaft by tapping lightly.

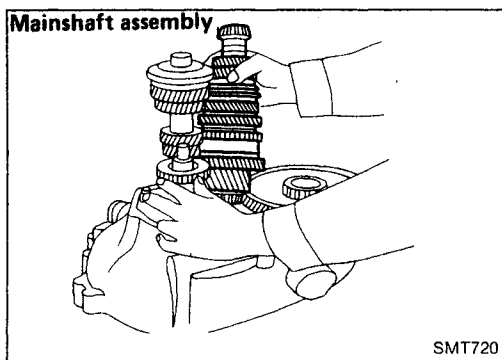
- **Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.**

- **Do not draw out reverse idler shaft from clutch housing because these fittings will be loose.**

- **When removing input shaft, be careful not to scratch oil seal lip with shaft spline.**

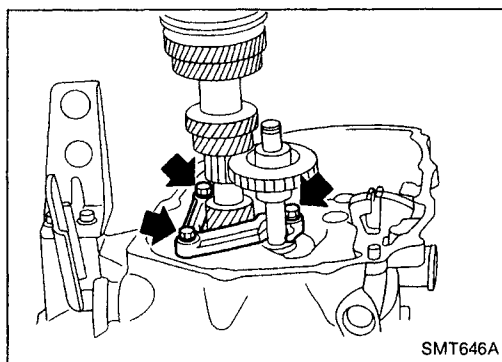
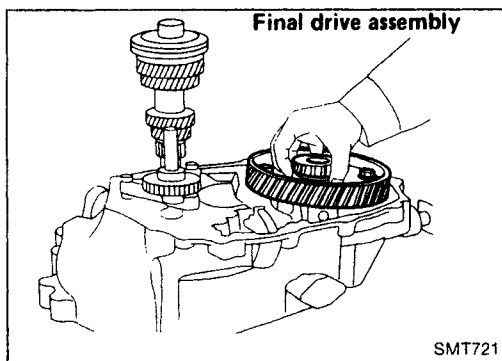


- c. Remove reverse idler gear and final drive assembly.

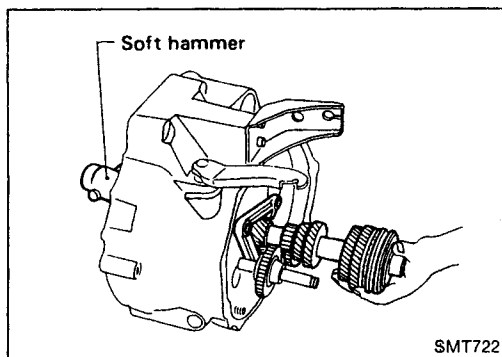


— RS5F31A —

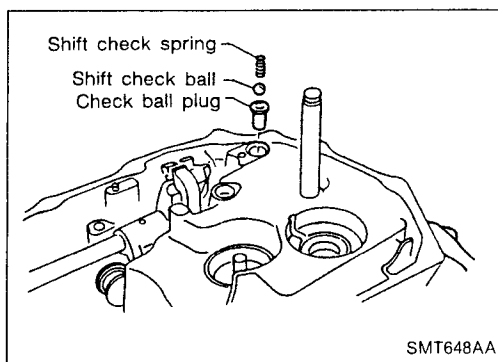
- a. Remove mainshaft and final drive assembly.
- Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.



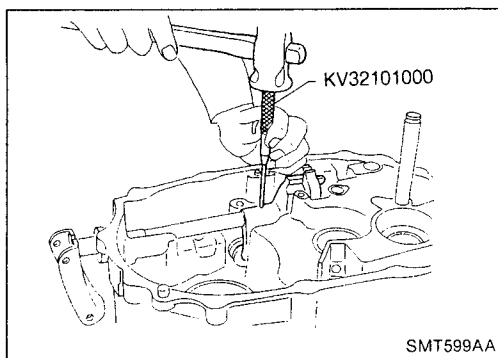
- b. Remove bearing retainer securing bolts.



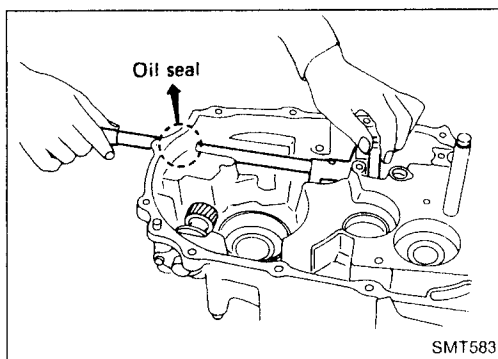
- c. Remove input shaft together with bearing retainer and reverse idler gear by tapping lightly.
- Do not draw out reverse idler shaft from clutch housing because these fittings will be loose.
 - Be careful not to scratch oil seal lip with shaft spline when removing input shaft.



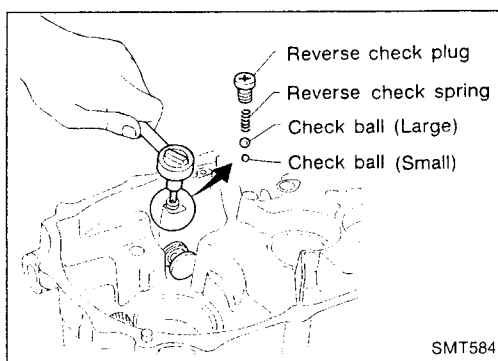
5. Remove oil pocket, shift check ball, shift check spring and check ball plug.



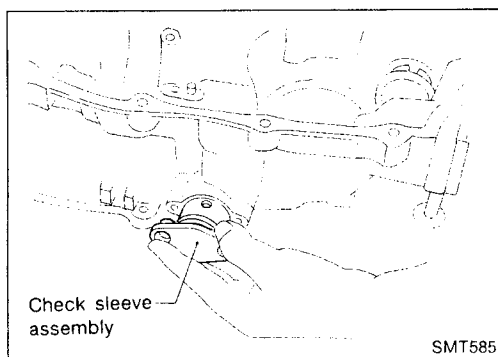
6. Drive retaining pin out of striking lever, then remove striking rod, striking lever and striking interlock.
 - **Select a position where retaining pin does not interfere with clutch housing when removing retaining pin.**



- **Be careful not to damage oil seal lip, when removing striking rod. If necessary, tape edges of striking rod.**

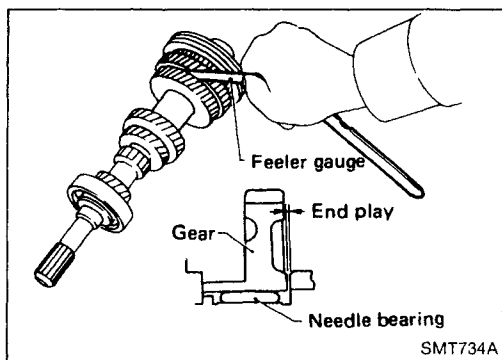


7. Remove reverse check plug, then detach reverse check spring and check balls.



8. Remove check sleeve assembly.

MT



Input Shaft and Gears

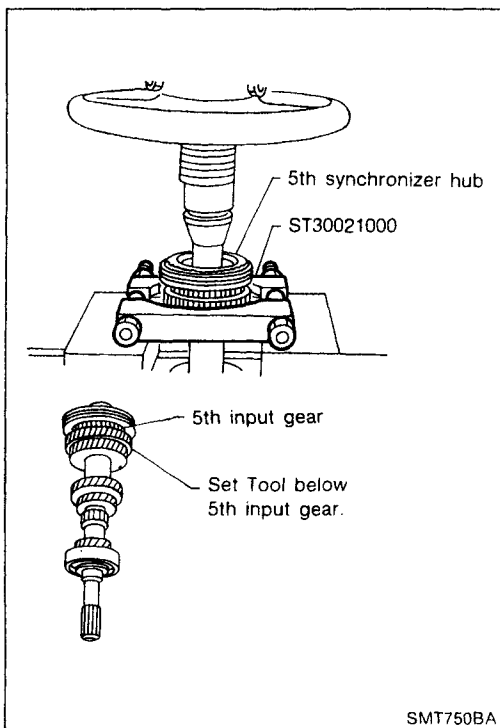
DISASSEMBLY

1. Before disassembly, check 5th input gear end play.

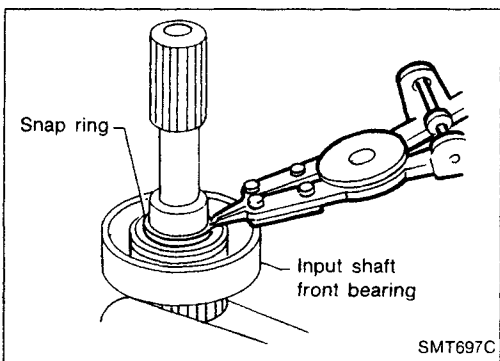
Gear end play:

Refer to SDS, MT-61.

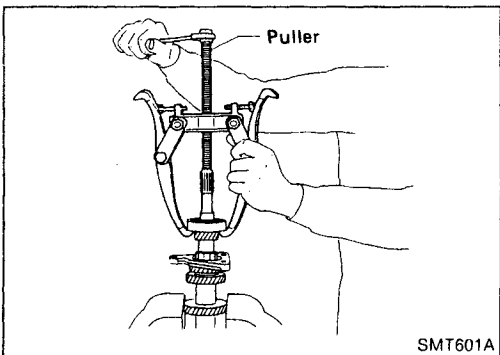
- If not within specification, disassemble and check contact surface of gear, shaft and hub. Then check clearance of snap ring groove. Refer to "ASSEMBLY", MT-17.



2. Remove snap ring and 5th stopper.
3. Remove 5th synchronizer, 5th input gear and 5th gear needle bearing.



4. Remove snap ring of input shaft front bearing and input gear spacer.



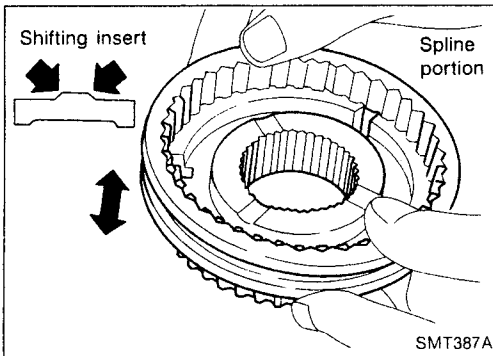
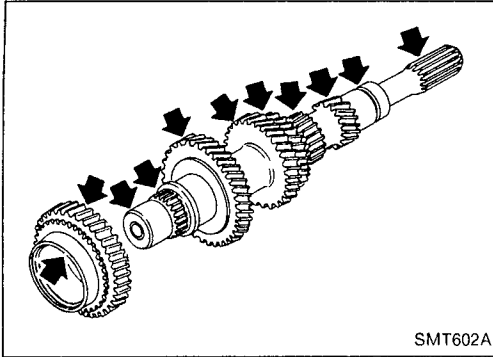
5. Pull out input shaft front bearing.
6. Remove bearing retainer.

Input Shaft and Gears (Cont'd)

INSPECTION

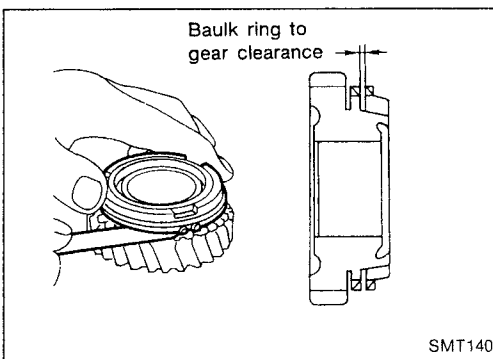
Gear and shaft

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



Synchronizer

- 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.



- Measure clearance between baulk ring and gear.

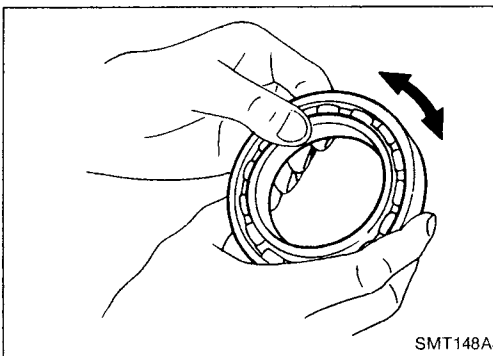
Clearance between baulk ring and gear:

Standard

1.0 - 1.35 mm (0.0394 - 0.0531 in)

Wear limit

0.7 mm (0.028 in)

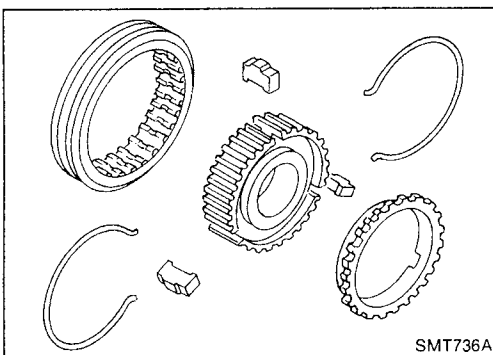


Bearing

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

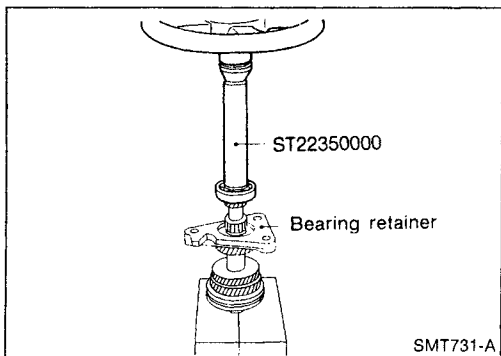
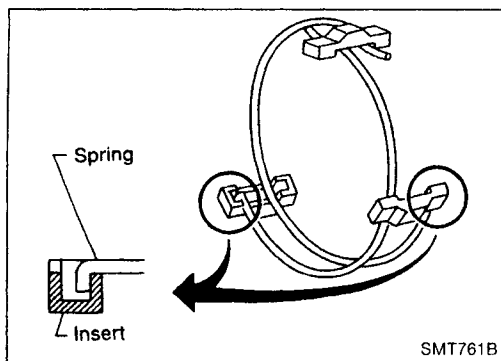
ASSEMBLY

1. Assemble 5th synchronizer.

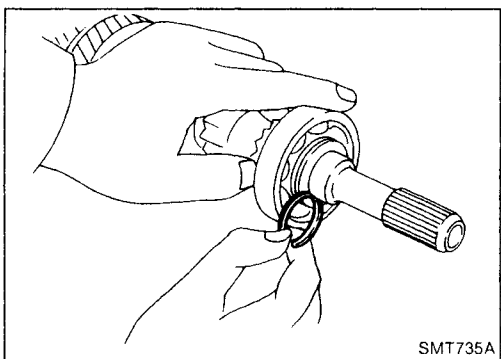


Input Shaft and Gears (Cont'd)

- Be careful not to hook front and rear ends of spread spring to the same insert.



2. Install bearing retainer.
3. Press on input shaft front bearing.
4. Install spacer.



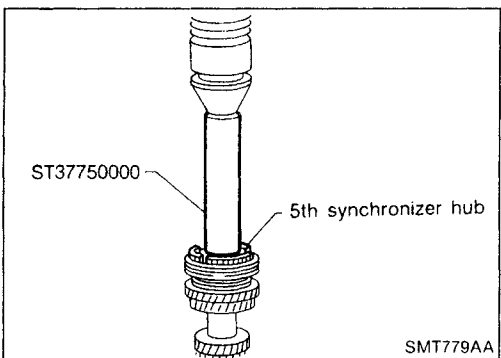
5. Select and install snap ring that gives the proper clearance of input shaft groove.

Allowable clearance of groove:

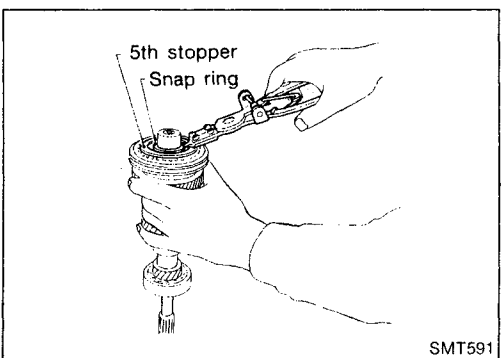
0 - 0.1 mm (0 - 0.004 in)

Snap ring of input shaft front bearing:

Refer to SDS, MT-61.



6. Install 5th gear needle bearing, 5th input gear, 5th synchronizer and 5th stopper.
7. Measure gear end play as the final check. Refer to "DISASSEMBLY", MT-16.



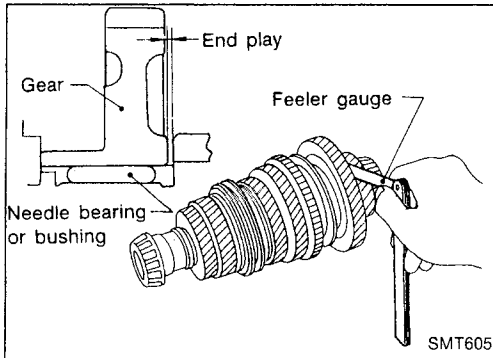
8. Select and install snap ring that gives the proper clearance of input shaft groove.

Allowable clearance of groove:

0 - 0.1 mm (0 - 0.004 in)

Snap ring of 5th synchronizer:

Refer to SDS, MT-61.



Mainshaft and Gears

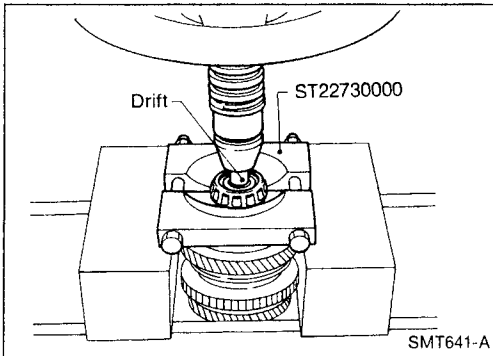
DISASSEMBLY

1. Before disassembly, check 1st, 2nd, 3rd and 4th main gear end plays.

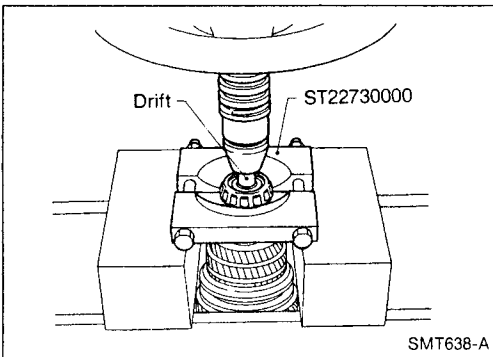
Gear end play:

Refer to SDS, MT-61.

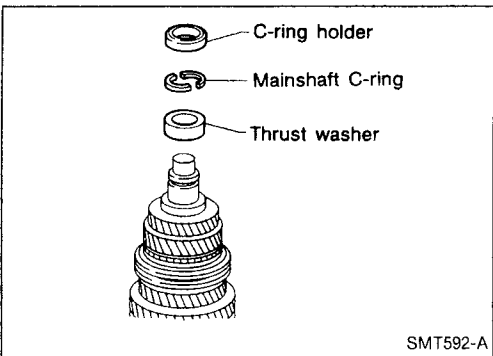
- If not within specification, disassemble and check contact surface of gear, shaft and hub. Then check clearance of C-ring groove. Refer to "ASSEMBLY", MT-21.



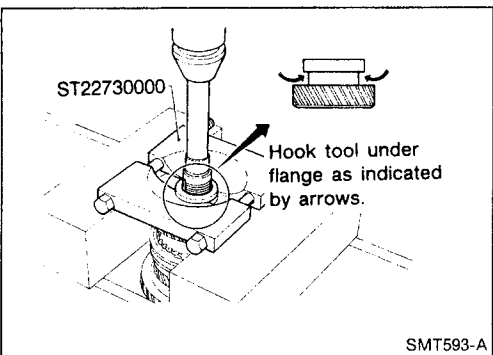
2. Press out mainshaft front bearing.



3. Press out mainshaft rear bearing.



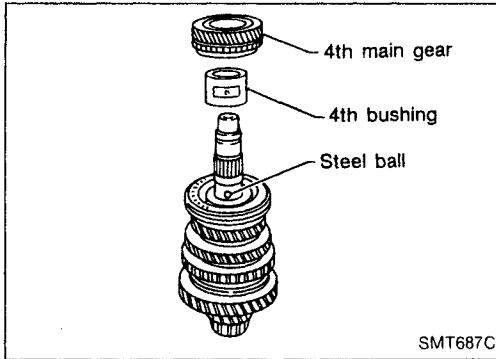
4. Remove C-ring holder, mainshaft C-rings and thrust washer.



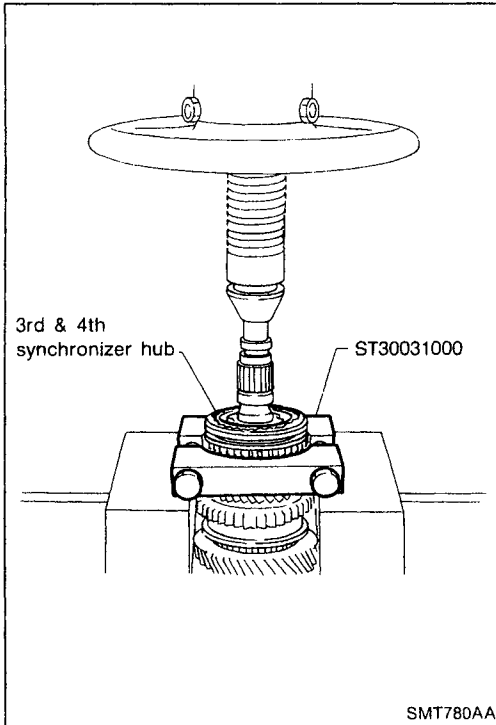
5. Press out 5th main gear.

MT

Mainshaft and Gears (Cont'd)

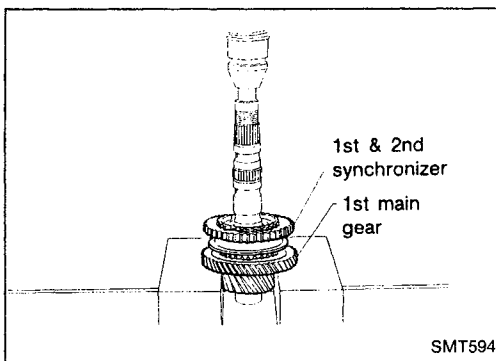


6. Remove 4th main gear, 4th bushing and steel ball.
- **Be careful not to lose steel ball.**

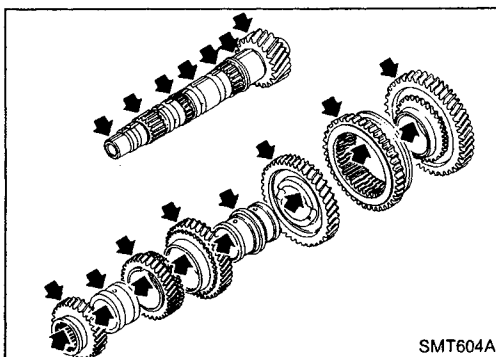


7. Remove 3rd & 4th synchronizer, 3rd main gear, 2nd & 3rd bushing, steel ball and 2nd main gear.

- **Be careful not to lose steel ball.**



8. Remove 1st & 2nd synchronizer and 1st main gear, then remove 1st gear needle bearing.



INSPECTION

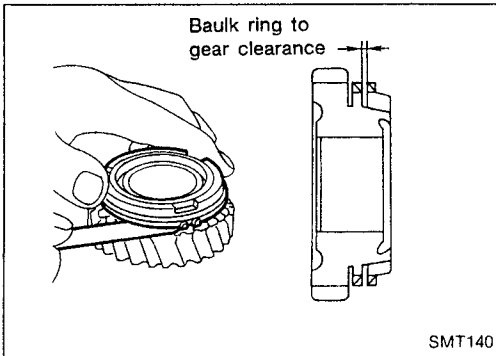
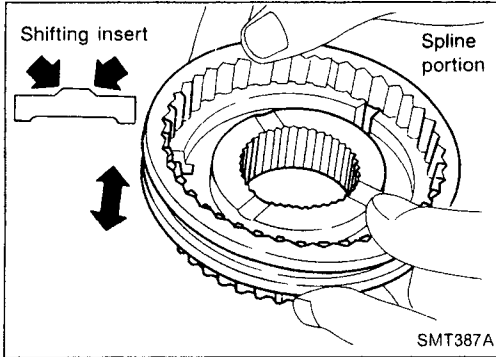
Gear and shaft

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

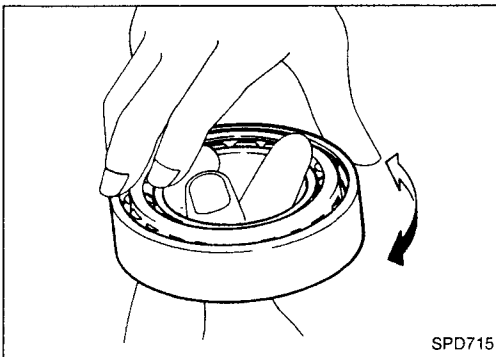
Mainshaft and Gears (Cont'd)

Synchronizer

- 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.

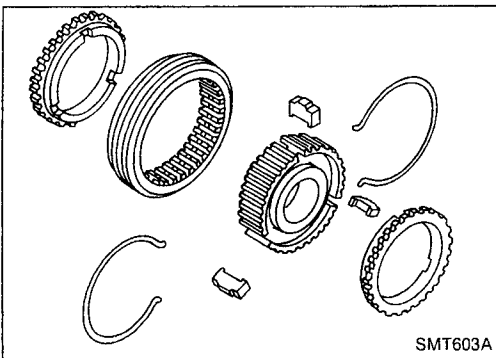


- Measure clearance between baulk ring and gear.
Clearance between baulk rings and 1st-4th main gears:
Standard
1.0 - 1.35 mm (0.0394 - 0.0531 in)
Wear limit
0.7 mm (0.028 in)



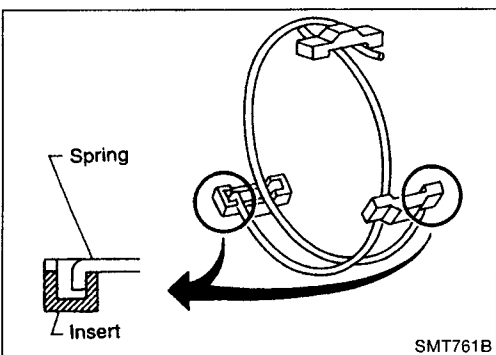
Bearing

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing tapered roller bearing, replace outer and inner race as a set.**



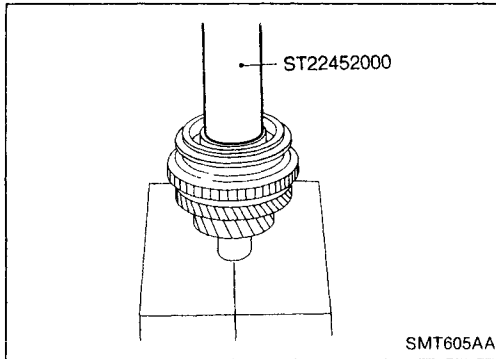
ASSEMBLY

1. Assemble 1st & 2nd and 3rd & 4th synchronizers.

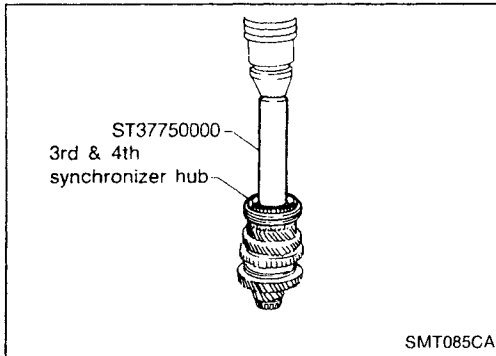


- **Be careful not to hook front and rear ends of spread spring to the same insert.**

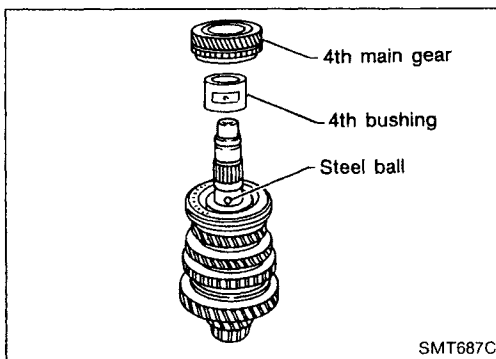
Mainshaft and Gears (Cont'd)



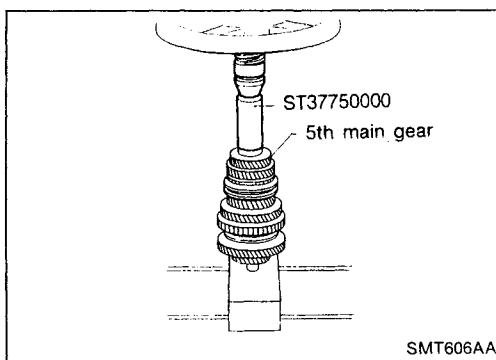
2. Install 1st gear needle bearing and 1st main gear.
3. Press on 1st & 2nd synchronizer.



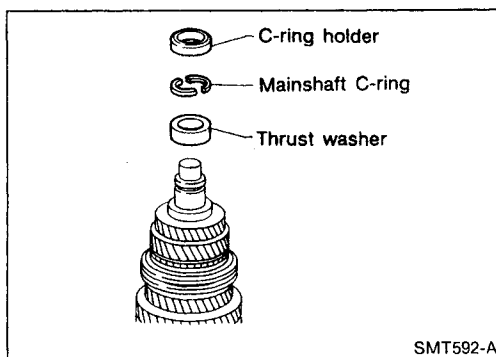
4. Install steel ball, 2nd main gear, 2nd & 3rd bushing, 3rd main gear and 3rd & 4th synchronizer.
- **Apply multi-purpose grease to steel ball before installing it.**
- **2nd & 3rd bushing has a groove in which steel ball fits.**



5. Install steel ball, 4th bushing and 4th main gear.
- **Apply multi-purpose grease to steel ball before installing it.**
- **4th bushing has a groove in which steel ball fits.**

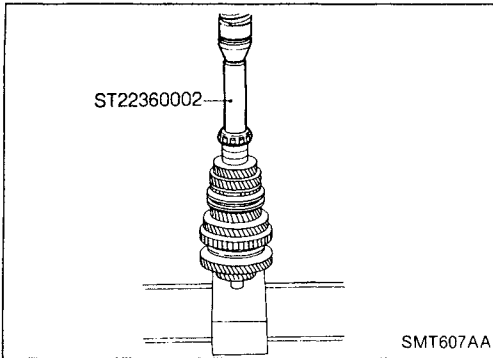


6. Press on 5th main gear.

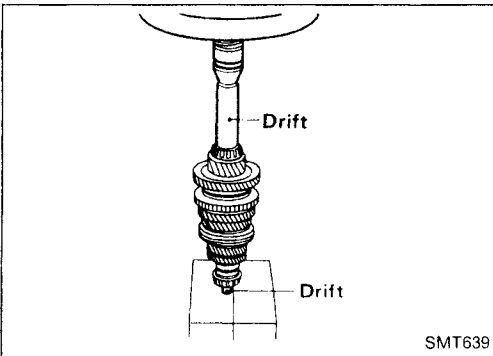


7. Install thrust washer.
8. Select and install mainshaft C-ring that gives proper clearance of groove in mainshaft.
Allowable clearance of groove:
0 - 0.1 mm (0 - 0.004 in)
Mainshaft C-ring:
Refer to SDS, MT-61.
9. Install C-ring holder.

Mainshaft and Gears (Cont'd)

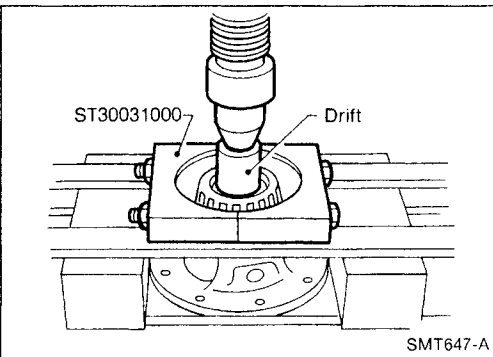


10. Press on mainshaft rear bearing.



11. Press on mainshaft front bearing.

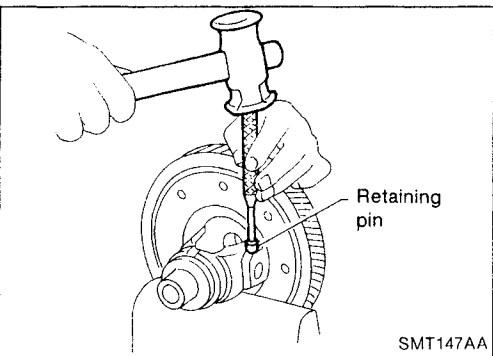
12. Measure gear end play as the final check — Refer to "DISASSEMBLY", MT-19.



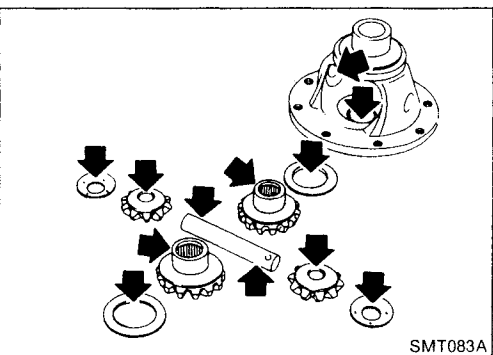
Final Drive

DISASSEMBLY

1. Remove final gear.
2. Remove speedometer drive gear by cutting it.
3. Press out differential side bearings.
- **Be careful not to mix up the right and left bearings.**



4. Drive out retaining pin and draw out pinion mate shaft.
5. Remove pinion mate gears and side gears.



INSPECTION

Gear, washer, shaft and case

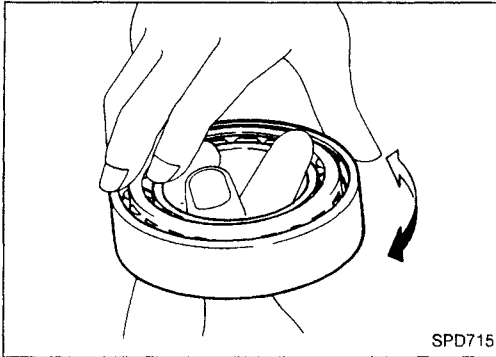
- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.

MT

Final Drive (Cont'd)

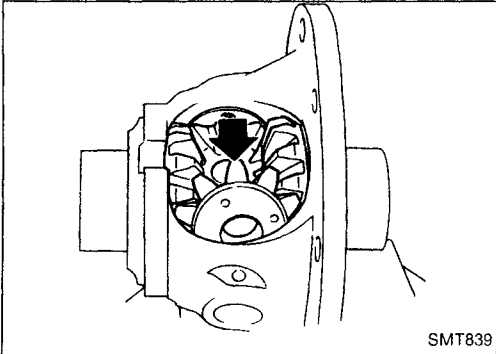
Bearing

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing tapered roller bearing, replace outer and inner race as a set.**

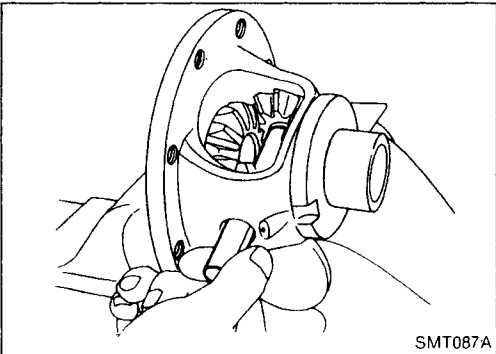


ASSEMBLY

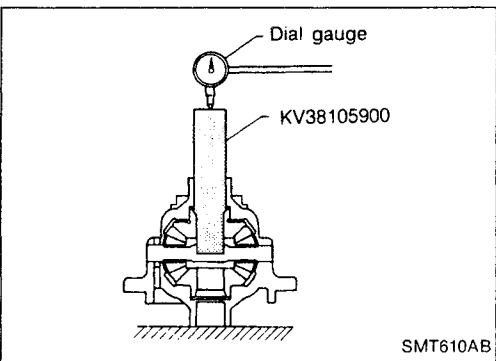
1. Attach side gear thrust washers to side gears and install in differential case.
2. Install pinion mate thrust washers and pinion mate gears.



3. Insert pinion mate shaft.
 - **When inserting, be careful not to damage pinion mate thrust washers.**



4. Measure clearance between side gear and differential case with washers following the procedure below:
 - a. Set Tool and dial indicator on side gear.



- b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

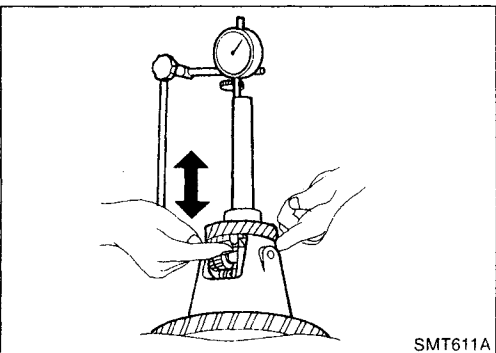
Clearance between side gear and differential case with washers:

0.1 - 0.2 mm (0.004 - 0.008 in)

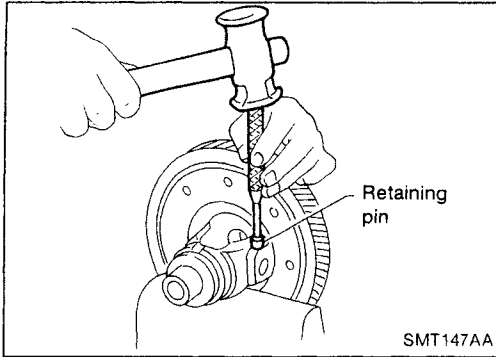
- c. If not within specification, adjust clearance by changing thickness of side gear thrust washers.

Side gear thrust washer:

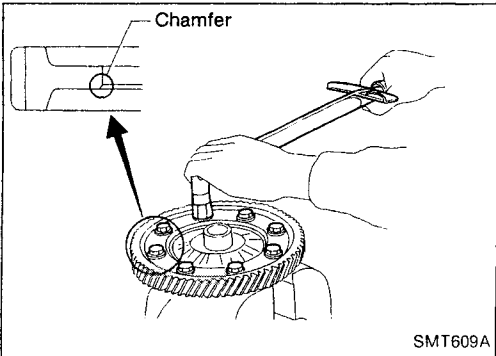
Refer to SDS, MT-62.



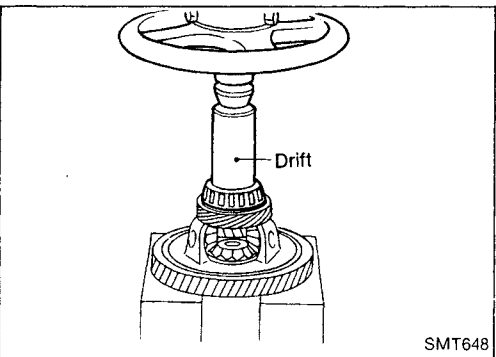
Final Drive (Cont'd)



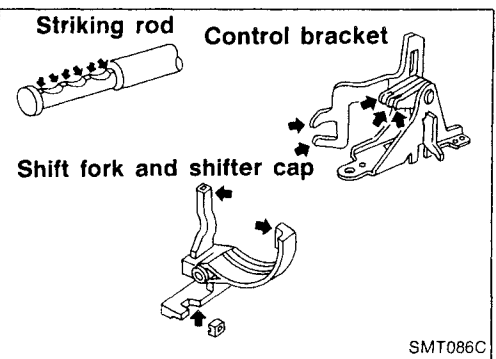
5. Install retaining pin.
 - **Make sure that retaining pin is flush with case.**



6. Install final gear.
 - **Apply locking sealant to final gear fixing bolts before installing them.**
7. Install speedometer drive gear and stopper.



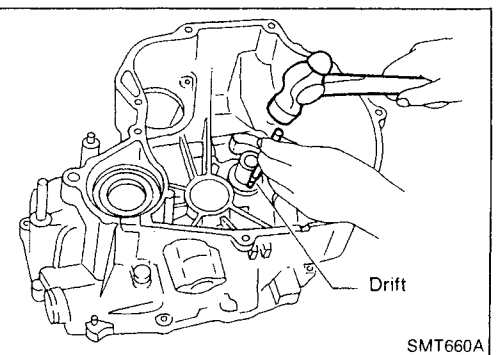
8. Press on differential side bearings.



Shift Control Components

INSPECTION

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



Case Components

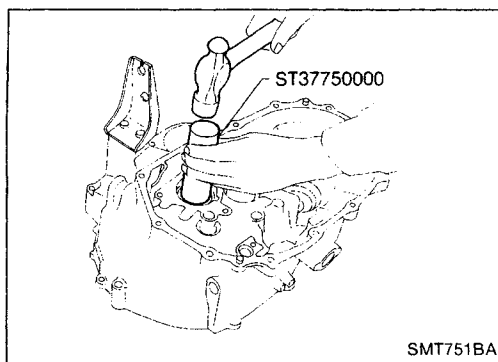
Input shaft oil seal

1. Drive out input shaft oil seal.

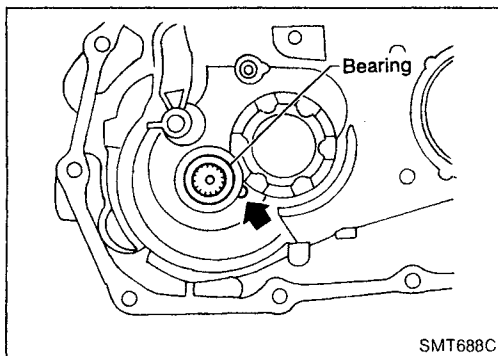
Case Components (Cont'd)

2. Install input shaft oil seal.

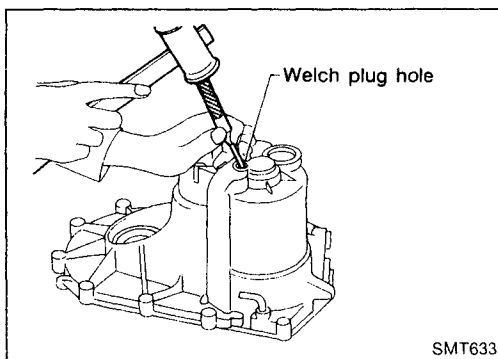
- **Apply multi-purpose grease to seal lip of oil seal before installing.**

**Input shaft rear bearing**

1. Remove welch plug from transmission case.

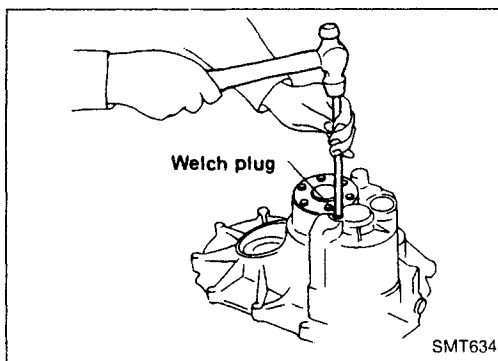


2. Remove input shaft rear bearing by tapping it from welch plug hole.

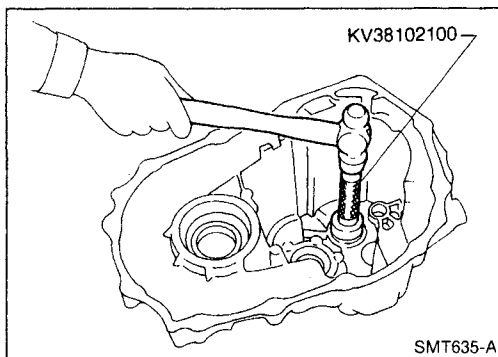


3. Install welch plug.

- **Apply recommended sealant to mating surface of transmission case.**



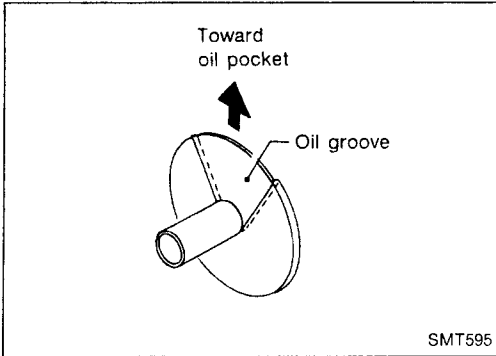
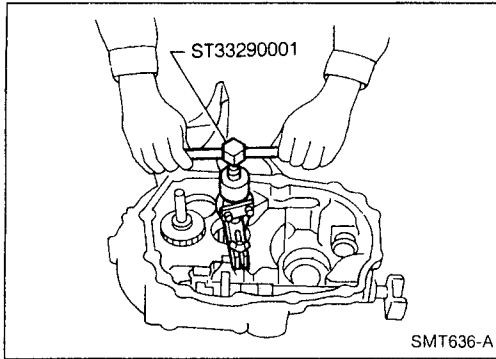
4. Install input shaft rear bearing.



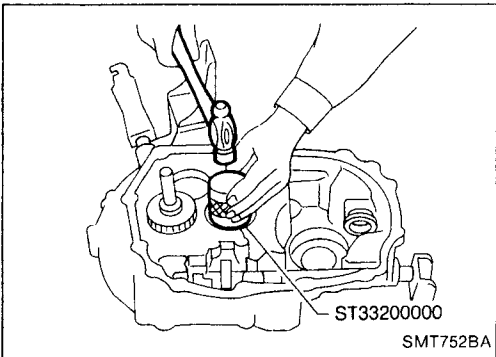
Case Components (Cont'd)

Mainshaft front bearing outer race and oil channel

1. Remove mainshaft front bearing outer race.
2. Remove oil channel.



3. Install oil channel.
- Ensure the oil groove faces the oil pocket.



4. Install mainshaft front bearing outer race.

Mainshaft rear bearing outer race

- Refer to "Differential Side Bearing Preload", MT-29.

Differential side bearing outer race

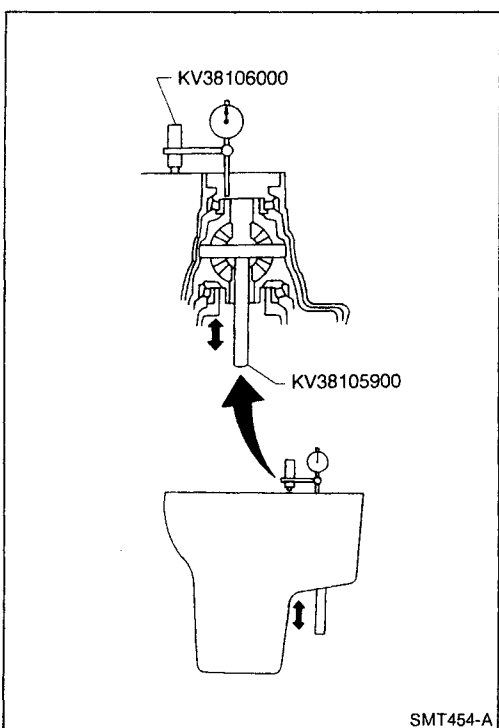
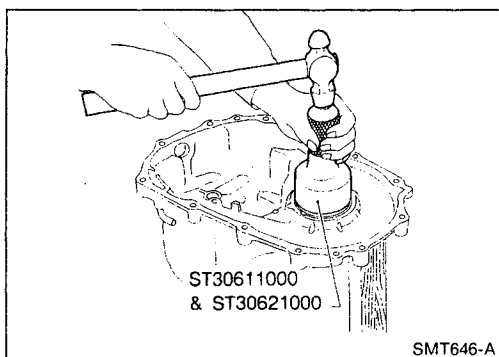
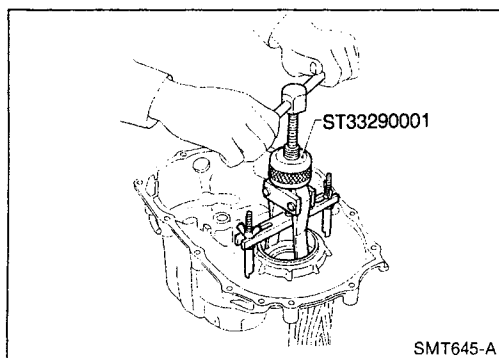
- Refer to "Mainshaft Bearing Preload", MT-28.

MT

Differential Side Bearing Preload

If any of the following parts are replaced, adjust differential side bearing preload.

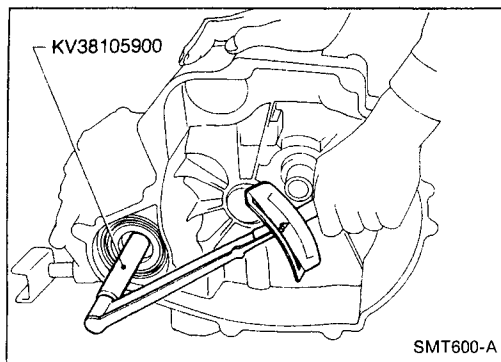
- Differential case
- Differential side bearing
- Clutch housing
- Transmission case



1. Remove differential side bearing outer race (transmission case side) and shim(s).
2. Reinstall differential side bearing outer race without shim(s).
3. Install final drive assembly on clutch housing.
4. Install transmission case on clutch housing.
- Tighten transmission case fixing bolts to the specified torque. Refer to MT-10.
5. Set dial indicator on front end of differential case.
6. Insert Tool all the way into differential side gear.
7. Move Tool up and down and measure dial indicator deflection.
8. Select shim considering bearing preload.

Suitable shim thickness =
Dial indicator deflection
+ specified bearing preload

Differential side bearing preload and adjusting shims:
Refer to SDS, MT-62, 63.
9. Install selected shim(s) and differential side bearing outer race.
10. Check differential side bearing turning torque.
 - a. Install final drive assembly on clutch housing.
 - b. Install transmission case on clutch housing.
 - Tighten transmission case fixing bolts to the specified torque. Refer to MT-10.



Differential Side Bearing Preload (Cont'd)

- c. Measure turning torque of final drive assembly.

Turning torque of final drive assembly

(New bearing):

Refer to SDS, MT-62.

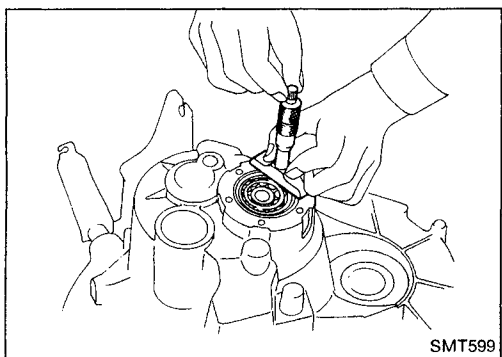
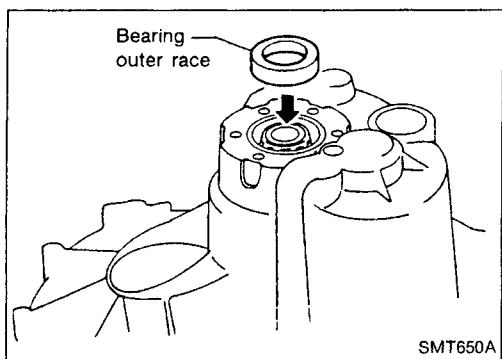
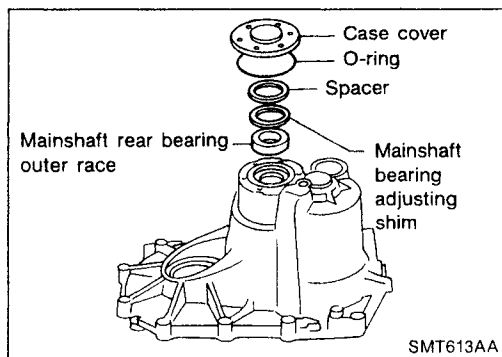
- When old bearing is used again, turning torque will be slightly less than the above.
- Make sure torque is close to the specified range.
- Changes in turning torque of final drive assembly per revolution should be within 1.0 N·m (10 kg-cm, 8.7 in-lb) without binding.

Mainshaft Bearing Preload

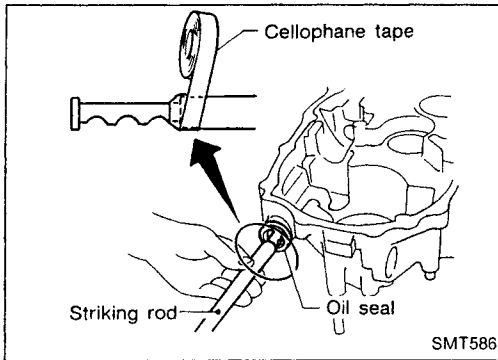
If any of the following parts are replaced, adjust mainshaft bearing preload.

- Mainshaft
- Mainshaft bearings
- Clutch housing
- Transmission case

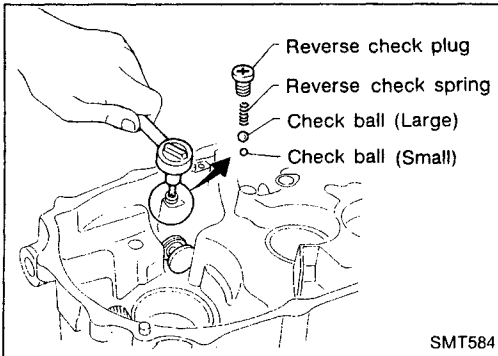
MT



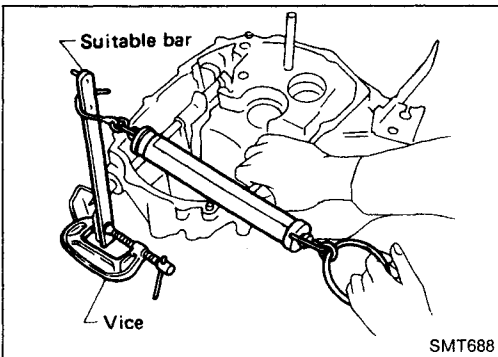
1. Remove case cover, O-ring, spacer, mainshaft bearing adjusting shim and mainshaft rear bearing outer race from transmission case.
2. Install mainshaft assembly on clutch housing.
3. Install transmission case on clutch housing.
- **Tighten transmission case fixing bolts to the specified torque. Refer to MT-10.**
4. Install mainshaft rear bearing outer race on inner race.
5. Measure distance from transmission case to bearing outer race.
- **Make sure that bearing is properly seated.**
6. Select shim. Refer to SDS, MT-62.
7. Check total turning torque after assembling. Refer to "ASSEMBLY", MT-30.



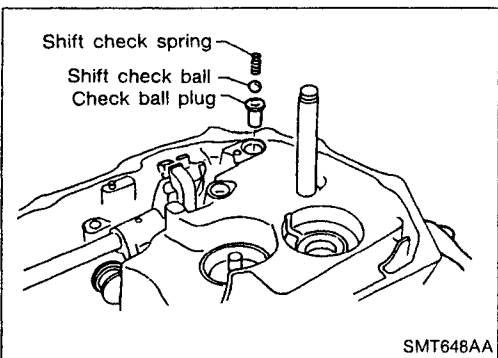
1. Install striking rod, lever and interlock.
 - Tape edges of striking rod to avoid damaging oil seal lip during installation.
 - When taped edges of striking rod are past the oil seal, remove tape.



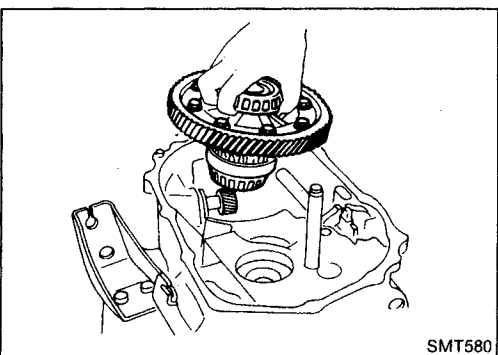
2. Install reverse check sleeve assembly.
3. Install check balls, reverse check spring and check plug.



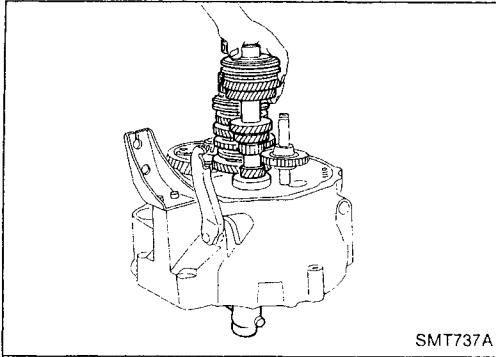
4. Check reverse check turning torque (At striking rod).
Reverse check turning torque (At striking rod):
Refer to SDS, MT-61.
 - If not within specification, select another check plug having a different length and reinstall it.**Reverse check plug:**
Refer to SDS, MT-61.
5. Install selected reverse check plug.
 - Apply locking sealant to thread of plug before installing it.



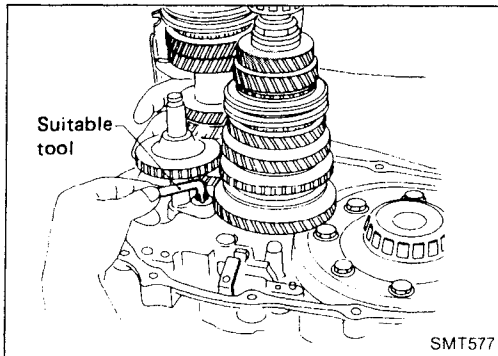
6. Install check ball plug, shift check ball and shift check spring.
7. Install oil pocket.



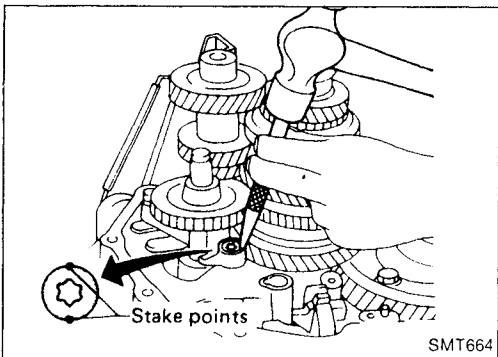
8. Install gear components onto clutch housing.
— RS5F30A —
 - a. Install final drive assembly and reverse idler gear.



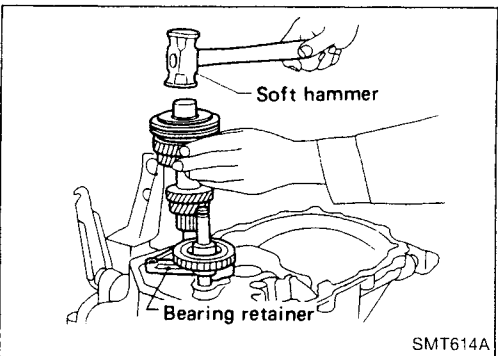
- b. Install mainshaft and input gear as a set.
 - Take care not to damage oil seal lip with splines of input shaft while shaft is being inserted into clutch housing.
 - Take care not to damage oil channel when inserting mainshaft into clutch housing.



- c. Install bearing retainer.
 - One of these three screws is torx type and should be installed with suitable tool, as shown.

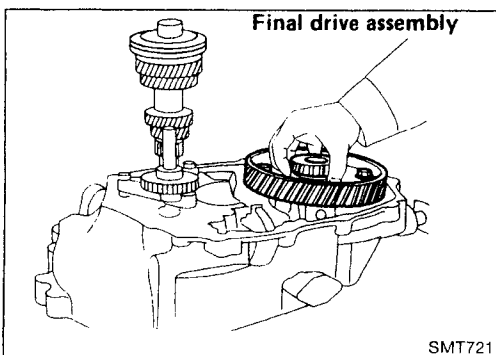


- d. After installing torx screw, stake it at two points.

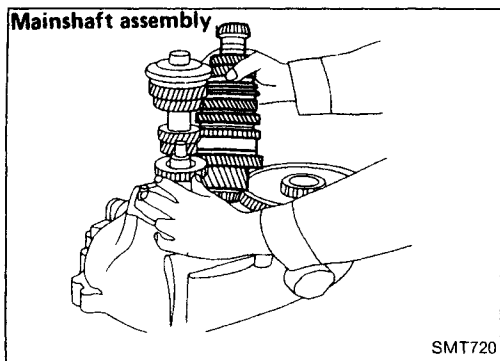


— RS5F31A —

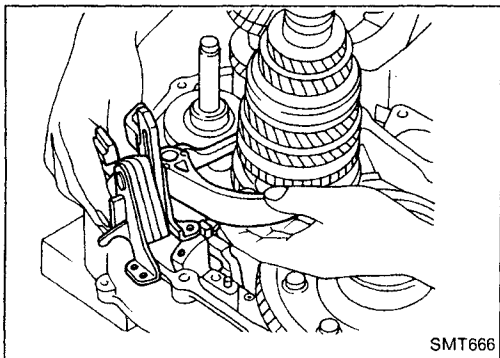
- a. Install input shaft assembly and reverse idler gear.
 - Be careful not to damage oil seal lip with splines of input shaft.



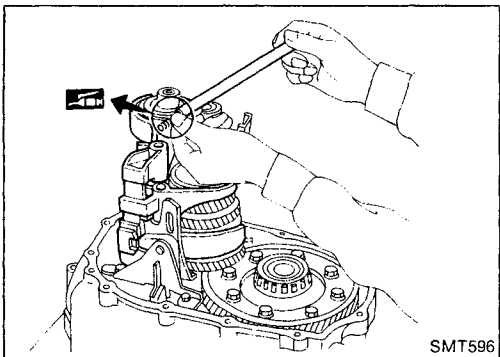
- b. Install final drive assembly.



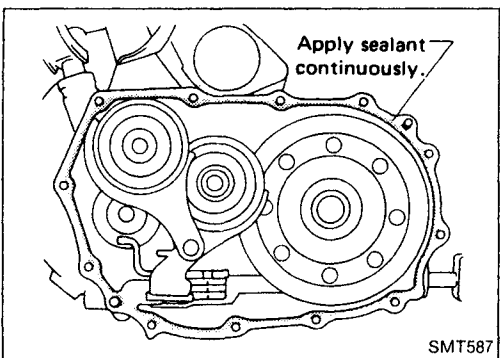
- c. Install mainshaft assembly.
 - Take care not to damage oil channel when inserting mainshaft into clutch housing.



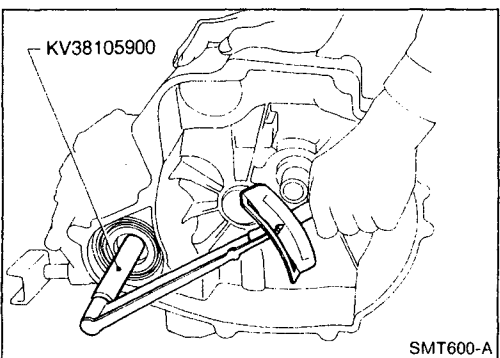
9. Apply grease to shifter caps, then install it to control bracket. Install control bracket with 1st & 2nd shift fork.
10. Install 3rd & 4th and 5th shift forks.



11. Insert fork shaft.
 - Apply multi-purpose grease to support spring before installing.
12. Install reverse idler spacer.



13. Apply recommended sealant to mating surface of clutch housing.
14. Install transmission case on clutch housing.



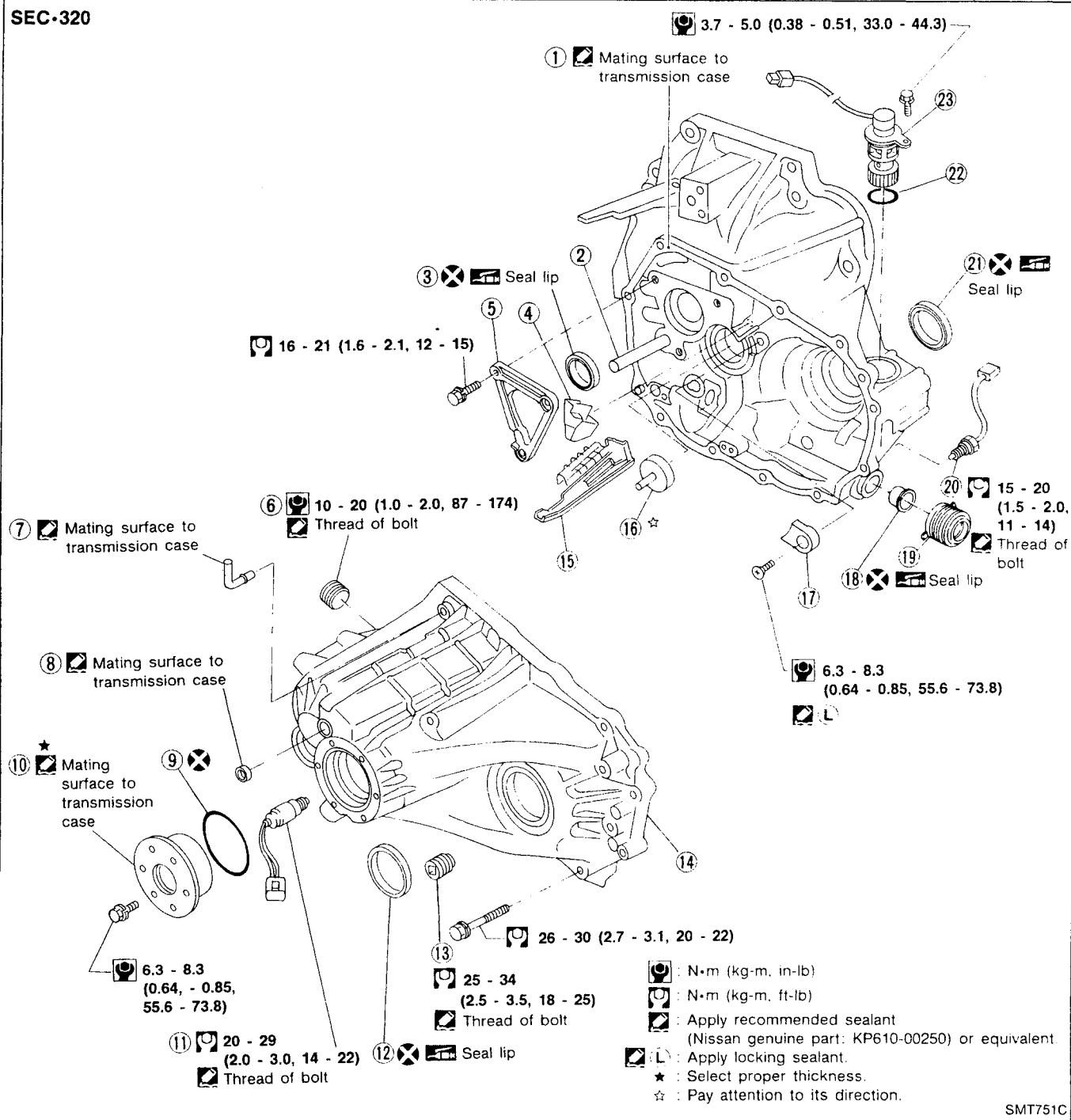
15. Measure total turning torque.

Total (Final drive + Mainshaft) turning torque (New bearing):

Refer to SDS, MT-62.

 - When old bearing is used again, turning torque will be slightly less than the above.
 - Make sure torque is close to the specified range.

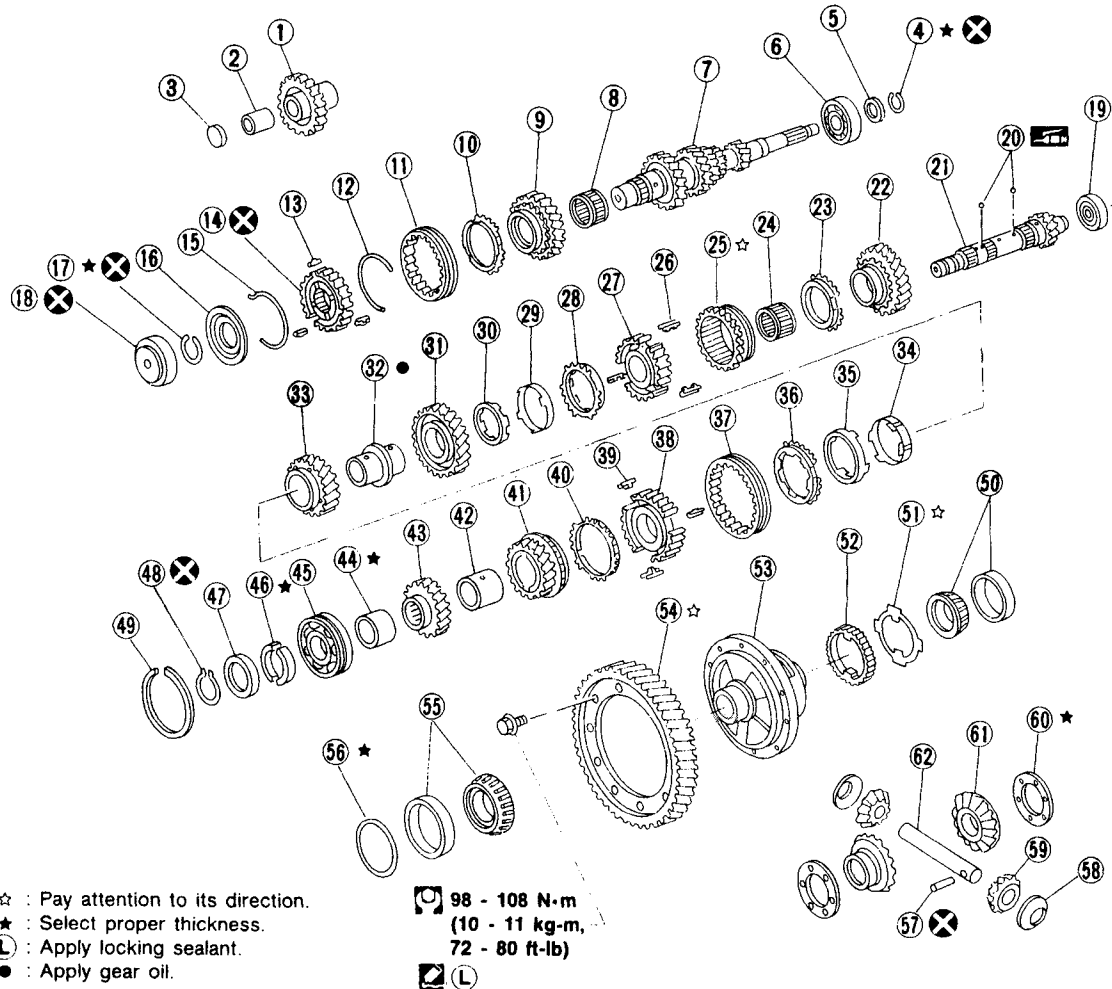
SEC-320



- | | | |
|------------------------|-------------------------|-------------------------------|
| ① Clutch housing | ⑨ O-ring | ⑰ Bearing retainer |
| ② Reverse idler shaft | ⑩ Case cover | ⑱ Striking rod oil seal |
| ③ Input shaft oil seal | ⑪ Back-up lamp switch | ⑲ Boot |
| ④ Oil pocket | ⑫ Differential oil seal | ⑳ Neutral position switch |
| ⑤ Bearing retainer | ⑬ Drain plug | ㉑ Differential oil seal |
| ⑥ Filler plug | ⑭ Transmission case | ㉒ O-ring |
| ⑦ Air breather | ⑮ Oil gutter | ㉓ Speedometer pinion assembly |
| ⑧ Welch plug | ⑯ Oil channel | |

Gear Components

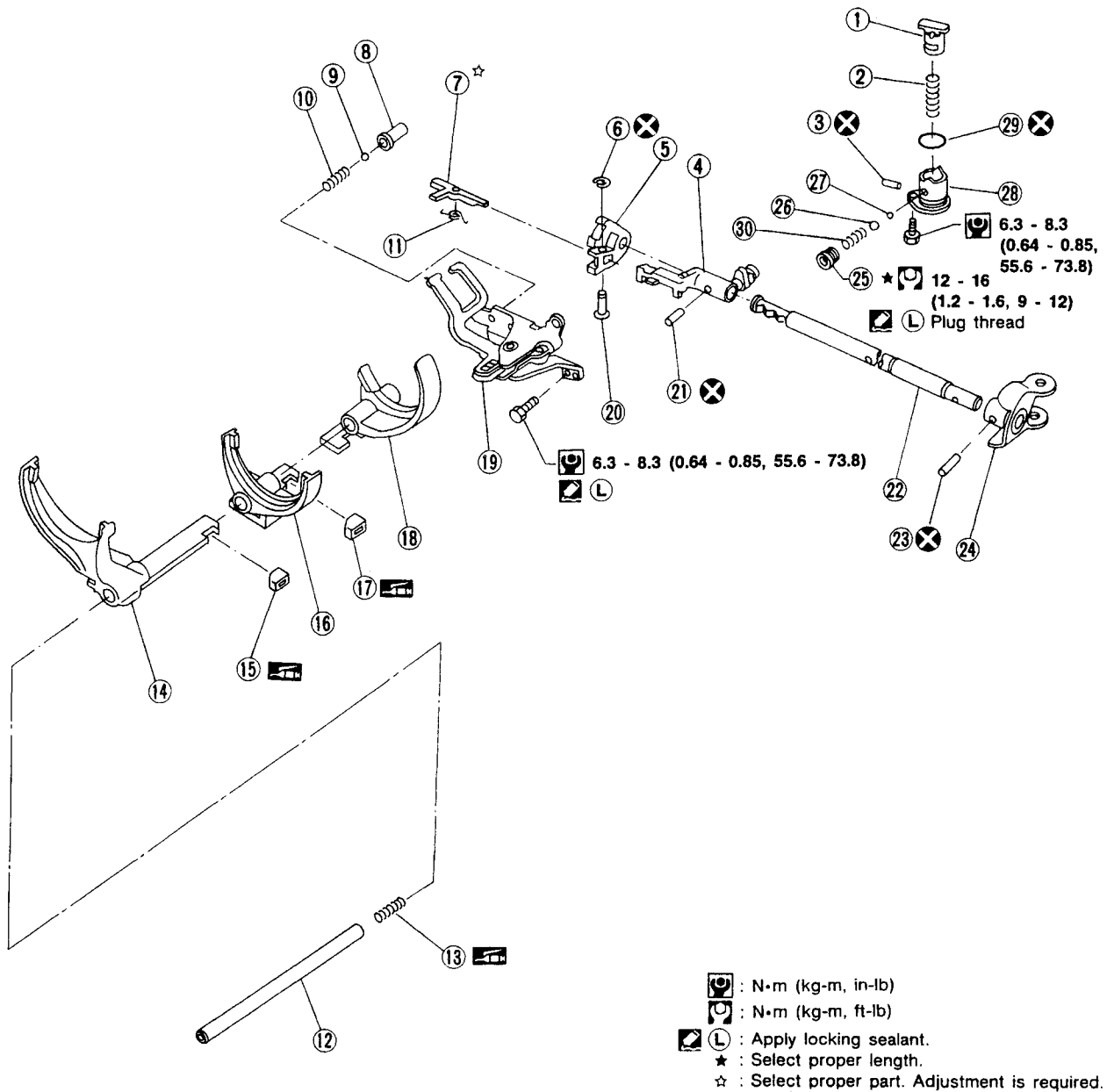
SEC. 322



- | | | |
|-----------------------------|--|---|
| ① Reverse idler gear | ②② 1st main gear | ④③ 5th main gear |
| ② Reverse idler bushing | ②③ Baulk ring | ④④ Spacer |
| ③ Reverse idler spacer | ②④ 1st gear needle bearing | ④⑤ Mainshaft rear bearing |
| ④ Snap ring | ②⑤ Reverse main gear (Coupling sleeve) | ④⑥ Mainshaft C-ring |
| ⑤ Spacer | ②⑥ Insert spring | ④⑦ C-ring holder |
| ⑥ Input shaft front bearing | ②⑦ 1st & 2nd synchronizer hub | ④⑧ Snap ring |
| ⑦ Input shaft | ②⑧ 2nd outer baulk ring | ④⑨ Snap ring |
| ⑧ 5th gear needle bearing | ②⑨ 2nd synchronizer cone | ⑤① Differential side bearing |
| ⑨ 5th input gear | ②⑩ 2nd inner baulk ring | ⑤② Speedometer stopper |
| ⑩ Baulk ring | ②⑪ 2nd main gear | ⑤③ Speedometer drive gear |
| ⑪ Coupling sleeve | ②⑫ 2nd & 3rd bushing | ⑤④ Differential case |
| ⑫ Spread spring | ②⑬ 3rd main gear | ⑤⑤ Final gear |
| ⑬ Shifting insert | ②⑭ 3rd inner baulk ring | ⑤⑥ Differential side bearing |
| ⑭ 5th gear synchronizer hub | ②⑮ 3rd synchronizer cone | ⑤⑦ Differential side bearing adjusting shim |
| ⑮ Spread spring | ②⑯ 3rd outer baulk ring | ⑤⑧ Retaining pin |
| ⑯ 5th stopper | ②⑰ Coupling sleeve | ⑤⑨ Pinion mate thrust washer |
| ⑰ Snap ring | ②⑱ 3rd & 4th synchronizer hub | ⑤⑩ Pinion mate gear |
| ⑱ Input shaft bearing | ②⑲ Insert spring | ⑥① Thrust washer |
| ⑲ Mainshaft front bearing | ④① Baulk ring | ⑥② Side gear |
| ⑲ Steel ball | ④② 4th main gear | ⑥③ Pinion mate shaft |
| ⑲ Mainshaft | ④③ 4th bushing | |

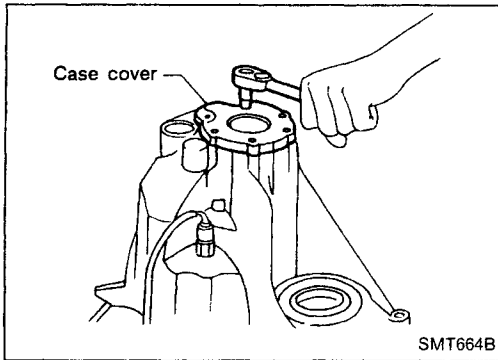
Shift Control Components

SEC. 328

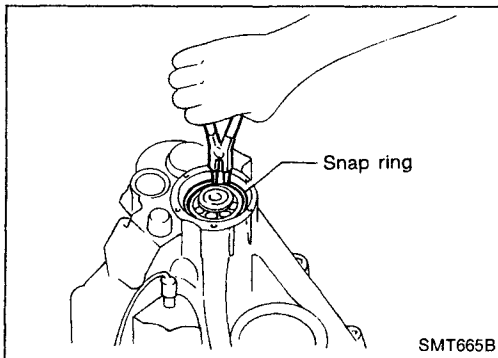


SMT695CB

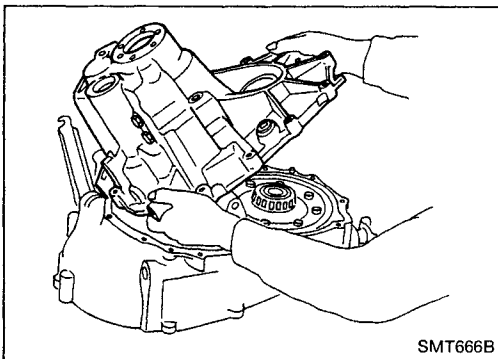
- | | | |
|----------------------------|-----------------------------|------------------------|
| ① Check plunger | ⑫ Fork shaft | ⑳ Retaining pin |
| ② Select return spring | ⑬ Fork shaft support spring | ㉑ Yoke |
| ③ Stopper pin | ⑭ 5th shift fork | ㉒ Reverse check plug |
| ④ Striking lever | ⑮ Shifter cap | ㉓ Check ball (Large) |
| ⑤ Striking interlock | ⑯ 3rd & 4th shift fork | ㉔ Check ball (Small) |
| ⑥ E-ring | ⑰ Shifter cap | ㉕ Check sleeve |
| ⑦ Reverse brake cam | ⑱ 1st & 2nd shift fork | ㉖ O-ring |
| ⑧ Check ball plug | ㉒ Control bracket | ㉗ Reverse check spring |
| ⑨ Shift check ball | ㉓ Interlock pin | |
| ⑩ Shift check spring | ㉔ Retaining pin | |
| ⑪ Reverse brake cam spring | ㉕ Striking rod | |



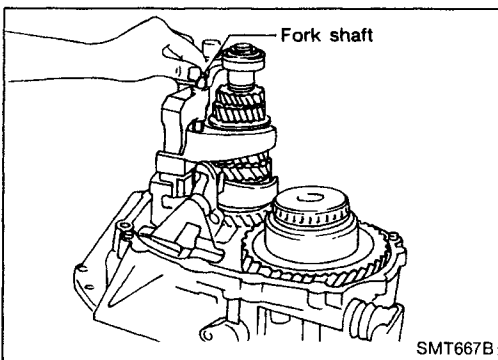
1. Remove case cover.



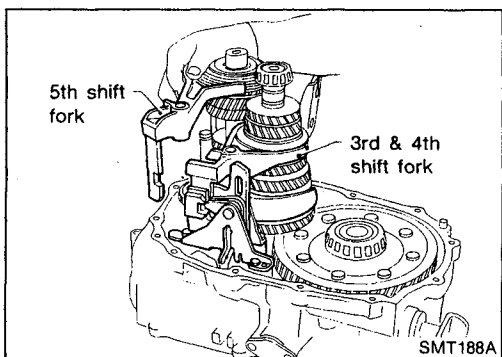
2. Remove mainshaft bearing snap ring.



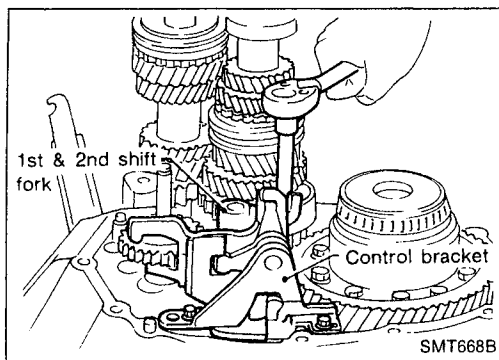
3. Remove transmission case while slightly tilting it to prevent 5th shift fork from interfering with case.



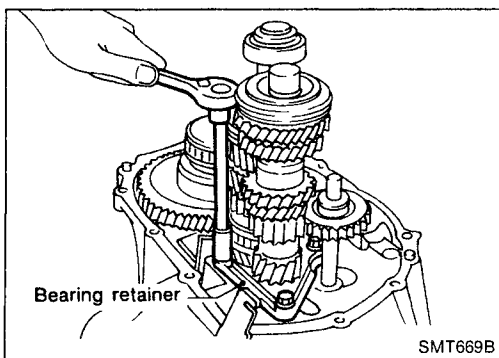
4. Draw out reverse idler spacer and fork shaft.



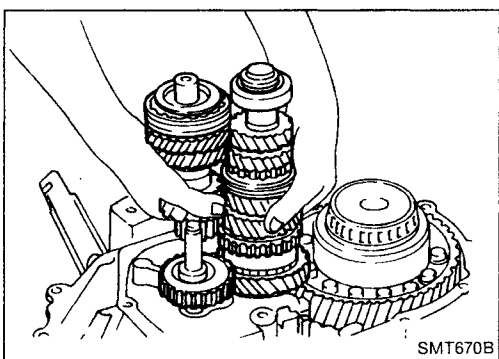
5. Remove 5th and 3rd & 4th shift forks.
 - Be careful not to lose shifter cap.



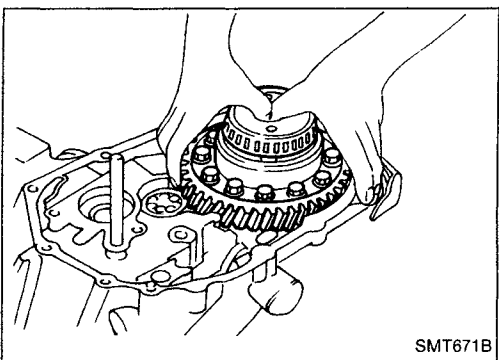
6. Remove control bracket with 1st & 2nd shift fork.



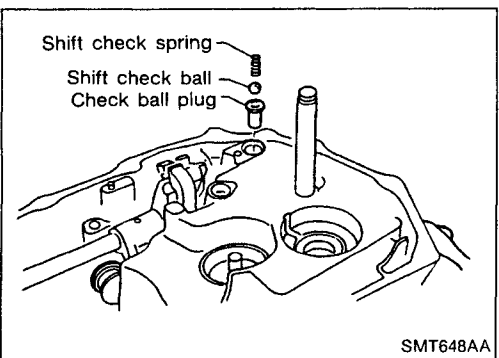
7. Remove gear components from clutch housing.
a. Remove input shaft front bearing retainer securing bolts.



- b. Remove input shaft with bearing retainer, mainshaft assembly and reverse idler gear.
- **Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.**
 - **Do not draw out reverse idler shaft from clutch housing because these fittings will be loose.**
- When removing input shaft, be careful not to scratch oil seal lip with shaft spline.**

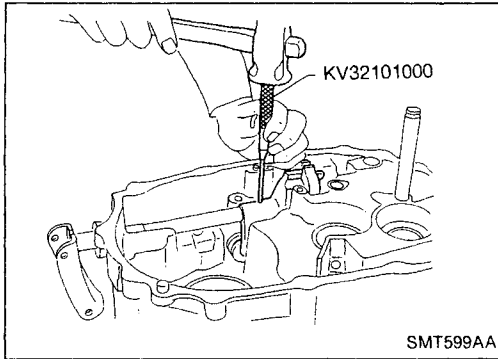


- c. Remove final drive assembly.

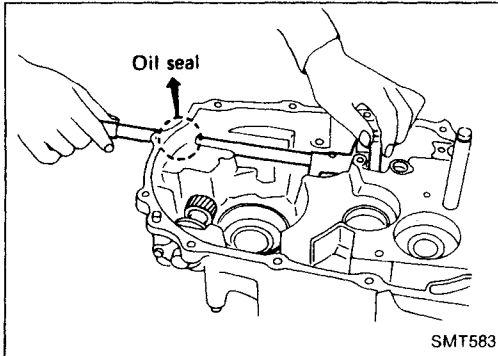


8. Remove oil pocket, shift check ball, shift check spring and check ball plug.

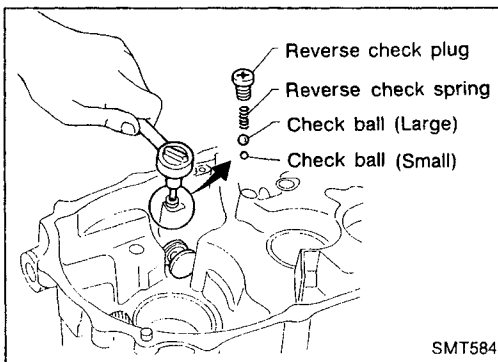
MT



9. Drive retaining pin out of striking lever, then remove striking rod, striking lever and striking interlock.
- **Select a position where retaining pin does not interfere with clutch housing when removing retaining pin.**

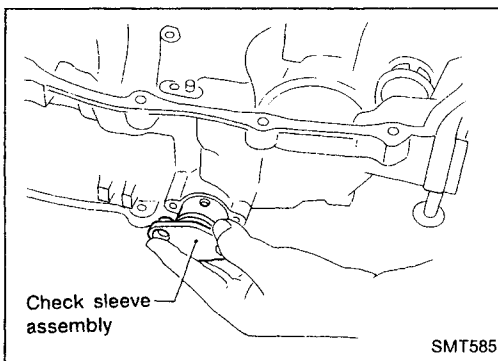


- **Be careful not to damage oil seal lip, when removing striking rod. If necessary, tape edges of striking rod.**

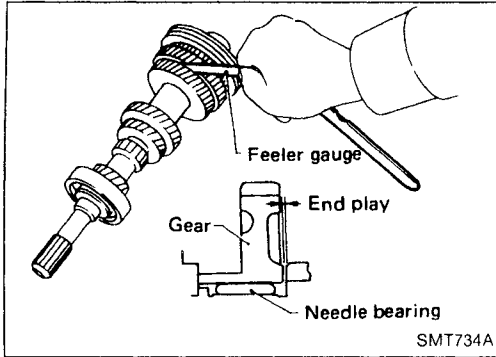


10. Remove reverse check plug, then detach reverse check spring and check balls.

- **If the smaller ball does not come out, remove it together with check sleeve assembly.**



11. Remove check sleeve assembly.



Input Shaft and Gears

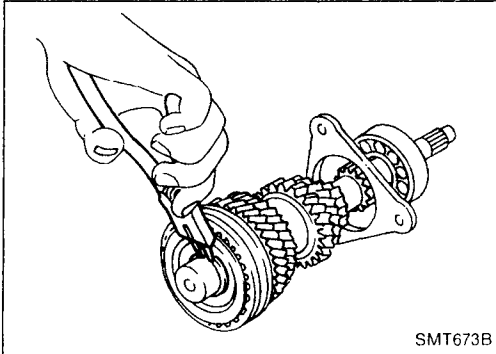
DISASSEMBLY

1. Before disassembly, check 5th input gear end play.

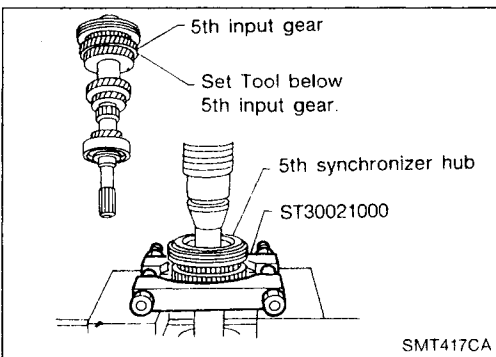
Gear end play:

Refer to SDS, MT-64.

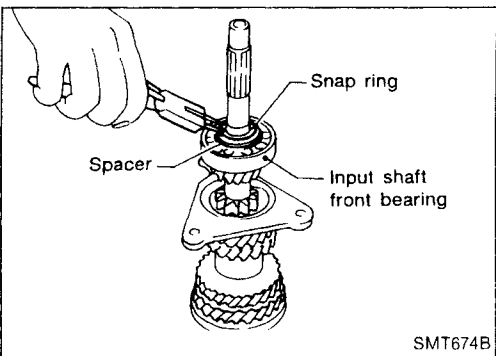
- If not within specification, disassemble and check contact surface of gear, shaft and hub. Check clearance of snap ring groove. Refer to "ASSEMBLY", MT-40.



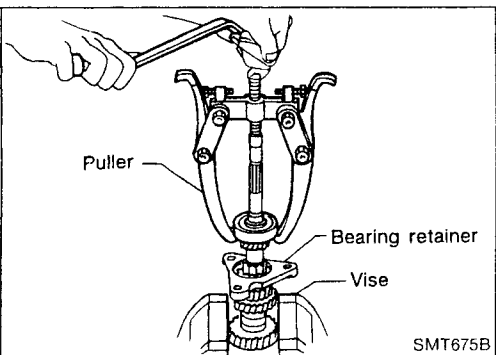
2. Remove snap ring and 5th stopper.



3. Remove 5th synchronizer, 5th input gear and 5th gear needle bearing.



4. Remove snap ring of input shaft front bearing and input gear spacer.



5. Remove input shaft front bearing.
6. Remove bearing retainer.

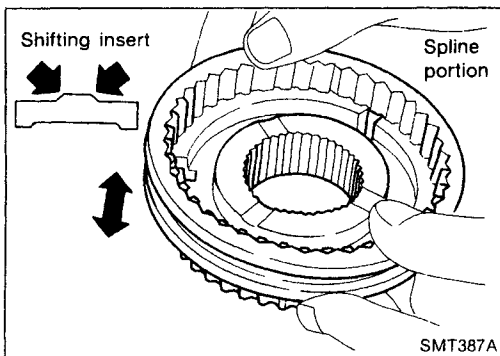
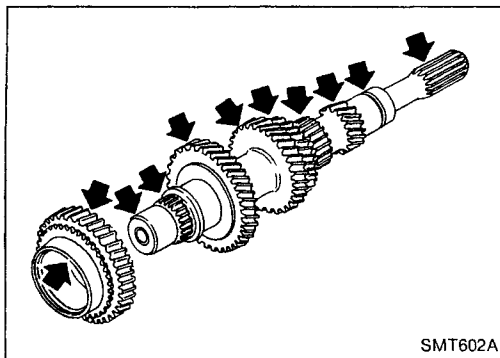
MT

Input Shaft and Gears (Cont'd)

INSPECTION

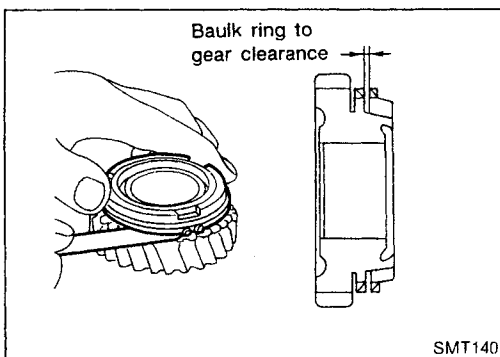
Gear and shaft

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



5th synchronizer

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



- Measure clearance between baulk ring and gear.

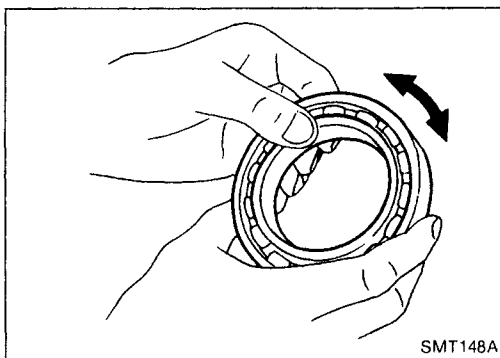
Clearance between baulk ring and gear:

Standard

0.90 - 1.50 mm (0.0354 - 0.0591 in)

Wear limit

0.7 mm (0.028 in)

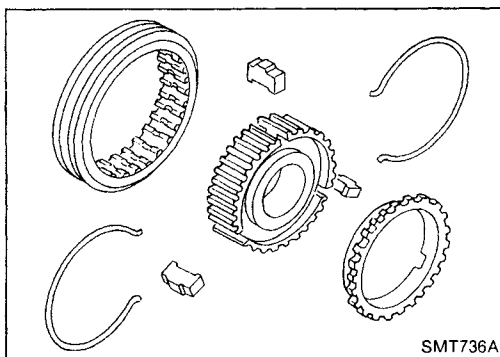


Bearing

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

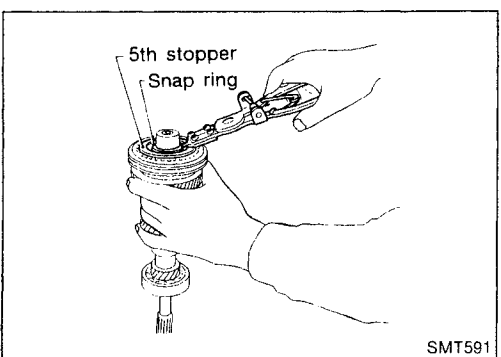
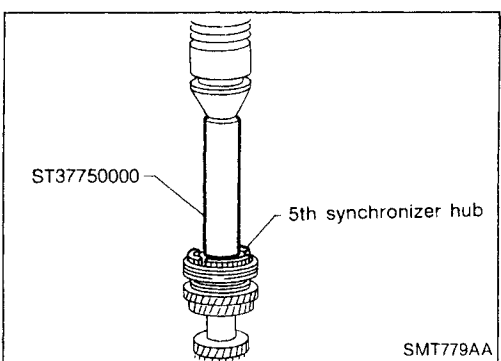
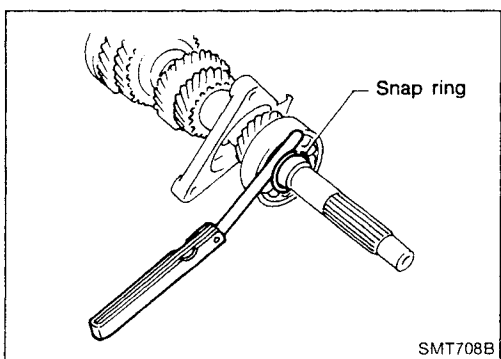
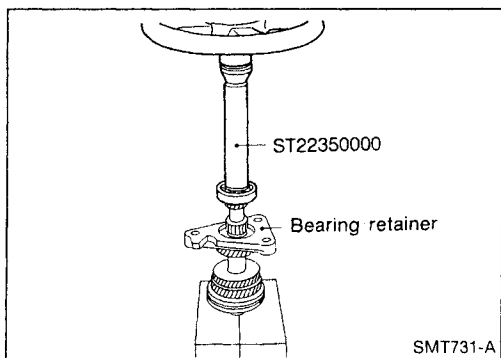
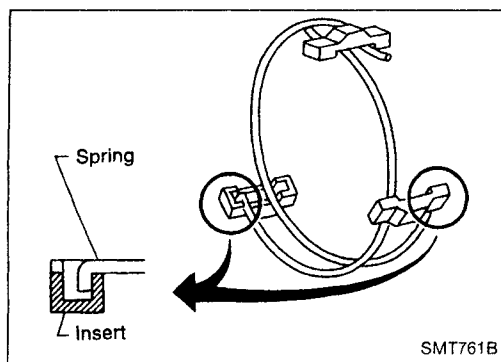
ASSEMBLY

1. Assemble 5th synchronizer.



Input Shaft and Gears (Cont'd)

- Be careful not to hook front and rear ends of spread spring to the same insert.



2. Install bearing retainer.
3. Press on input shaft front bearing.
4. Install input gear spacer.

5. Select and install snap ring that gives proper clearance of input shaft groove.

Allowable clearance of groove:

0 - 0.1 mm (0 - 0.004 in)

Snap rings of input shaft front bearing:

Refer to SDS, MT-65.

- Be sure to replace 5th gear synchronizer hub with new one when it is removed.

6. Install 5th gear needle bearing, 5th input gear, 5th synchronizer and 5th stopper.

- Input shaft must be vertical to press on synchronizer hub.

7. Measure gear end play as a final check. Refer to "DISASSEMBLY", MT-39.

8. Select and install snap ring that gives proper clearance of input shaft groove.

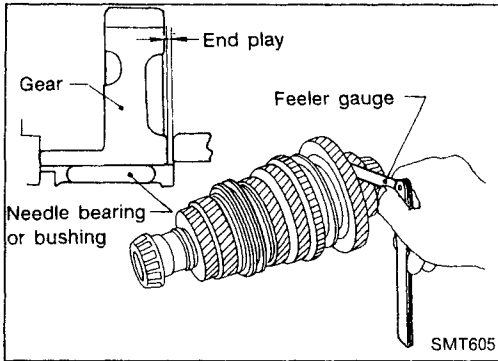
Allowable clearance of groove:

0 - 0.1 mm (0 - 0.004 in)

Snap ring of 5th synchronizer:

Refer to SDS, MT-65.

MT



Mainshaft and Gears

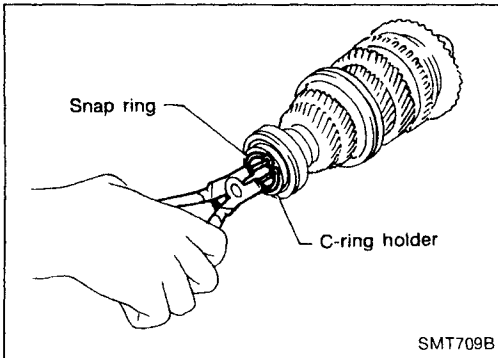
DISASSEMBLY

1. Before disassembly, measure gear end play.

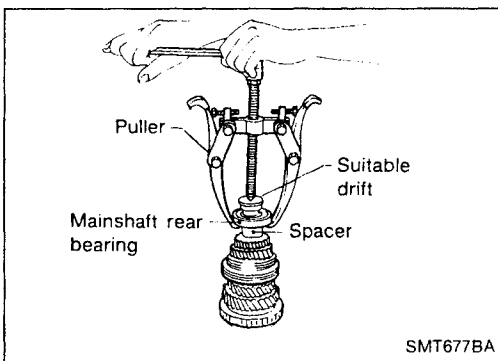
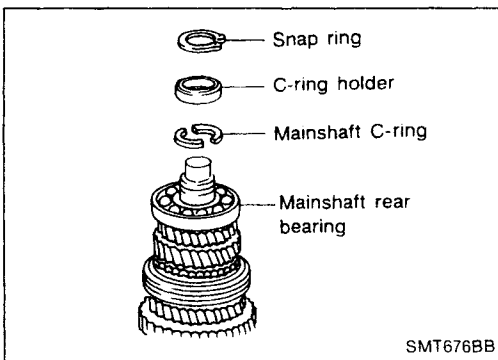
Gear end play:

Refer to SDS, MT-64.

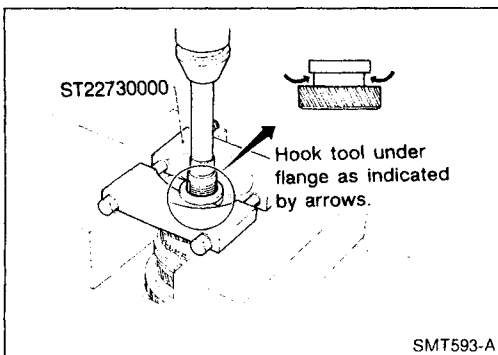
- If end play is not within the specified limit, disassemble and check the parts.



2. Remove mainshaft rear bearing snap ring, C-ring holder and mainshaft C-rings.

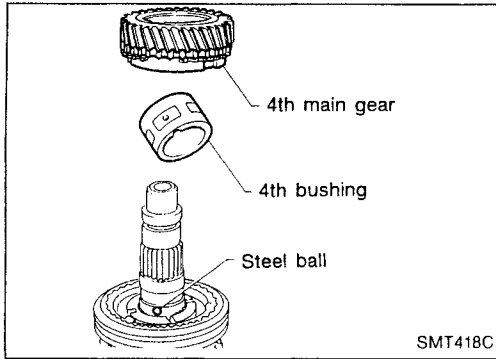


3. Remove mainshaft rear bearing and spacer.

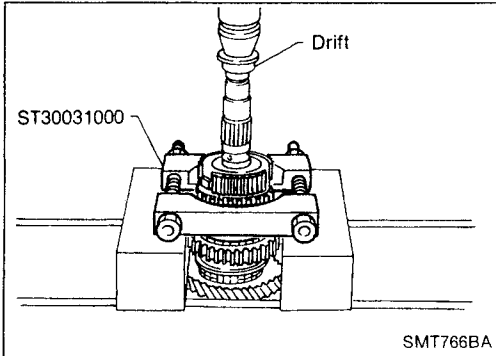


4. Remove 5th main gear.

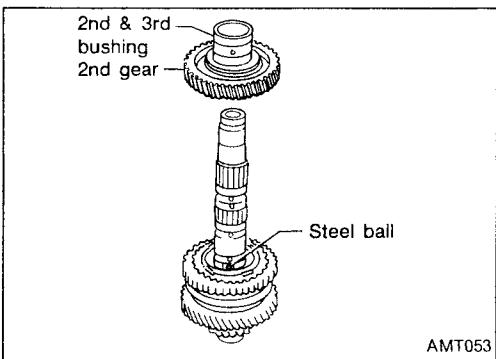
Mainshaft and Gears (Cont'd)



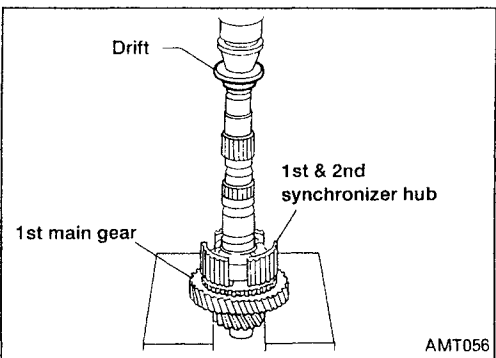
5. Remove 4th main gear, bushing and steel ball.
 - Take care not to lose steel ball.



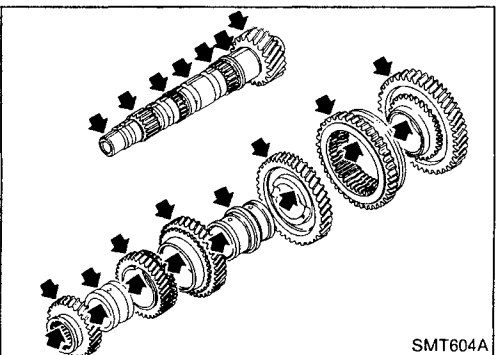
6. Remove 3rd & 4th synchronizer and 3rd main gear.



7. Remove 2nd & 3rd bushing and 2nd main gear.
 - Take care not to lose the steel ball.



8. Remove 1st & 2nd synchronizer hub and 1st main gear.



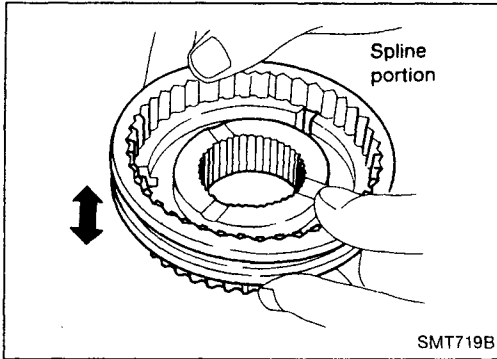
INSPECTION

Gear and shaft

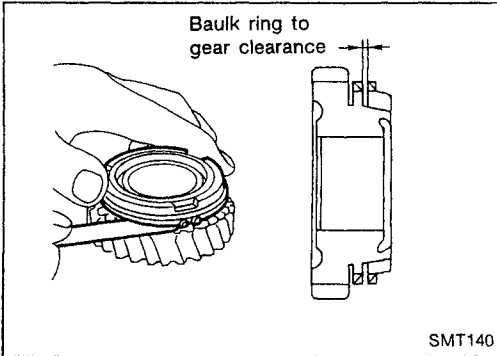
- Check shaft for cracks, wear or bending.
- Check gears for excessive wear, chips or cracks.

Mainshaft and Gears (Cont'd)

Synchronizer



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



- Measure clearance between baulk ring and gear.

Clearance between baulk rings and gears, for 1st and 4th gear only:

Standard

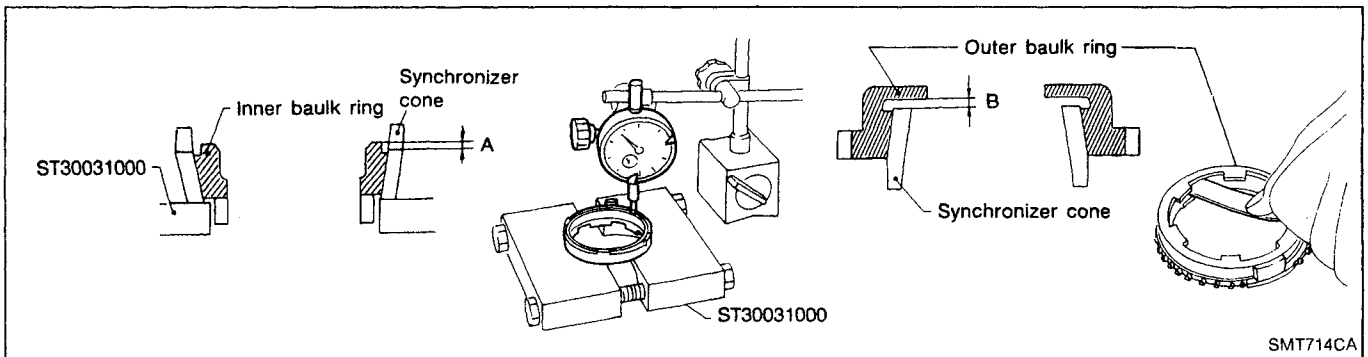
1st 0.95 - 1.45 mm (0.0374 - 0.0571 in)

4th 0.90 - 1.45 mm (0.0354 - 0.0571 in)

Wear limit

0.7 mm (0.028 in)

- 2nd and 3rd gears have inner and outer baulk rings and so have different measurements.



- Measure wear of 2nd and 3rd baulk rings.
 - a. Place inner baulk ring in position on synchronizer cone.
 - b. Hold baulk ring evenly against synchronizer cone and measure distance "A".
 - c. Place outer baulk ring in position on synchronizer cone.
 - d. Hold baulk ring evenly against synchronizer cone and measure distance "B".

Standard:

Inner-A 0.7 - 0.9 mm (0.028 - 0.035 in)

Outer-B 0.6 - 1.1 mm (0.024 - 0.043 in)

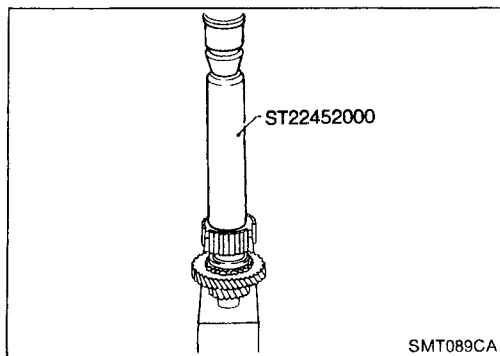
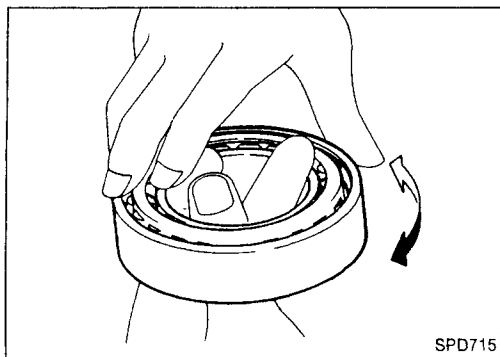
Wear limit:

0.2 mm (0.008 in)

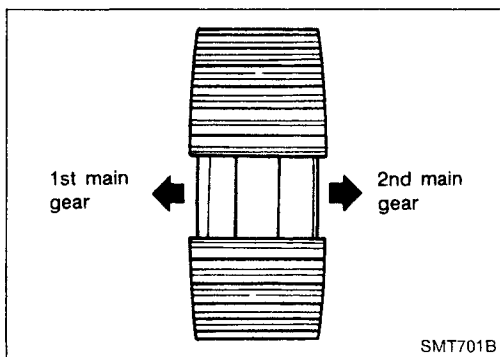
- e. If distance "A" or "B" is smaller than the wear limit, replace baulk ring.

Mainshaft and Gears (Cont'd)**Bearing**

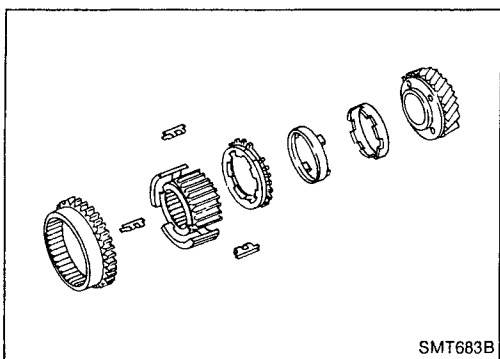
- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **The mainshaft front bearing cannot be re-used. It must be replaced once removed.**

**ASSEMBLY**

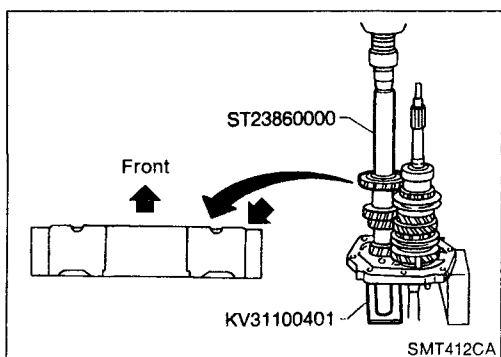
1. Install 1st gear needle bearing, 1st main gear and baulk ring.
2. Press on 1st & 2nd synchronizer hub.



- **Ensure correct fitting of 1st & 2nd synchronizer hub.**



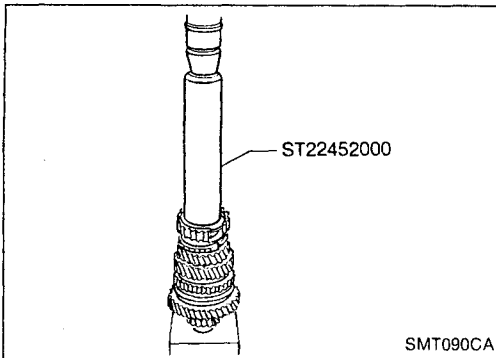
3. Install 2nd synchronizer cone, outer & inner baulk ring and reverse main gear (coupling sleeve).



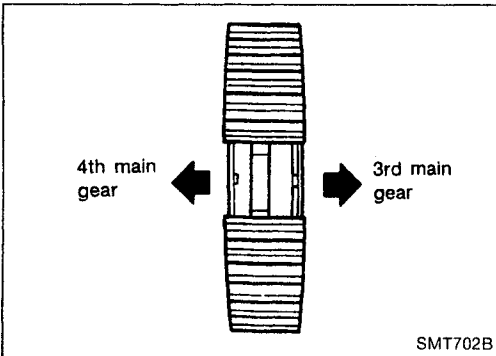
4. Install steel ball, 2nd main gear, 2nd & 3rd bushing.
 - **Apply gear oil to 2nd & 3rd bushing before installing it.**
 - **Apply multi-purpose grease to steel ball before installing it.**
 - **2nd & 3rd bushing has a groove in which steel ball fits.**

MT

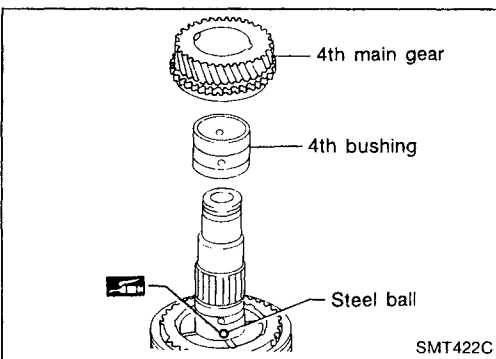
Mainshaft and Gears (Cont'd)



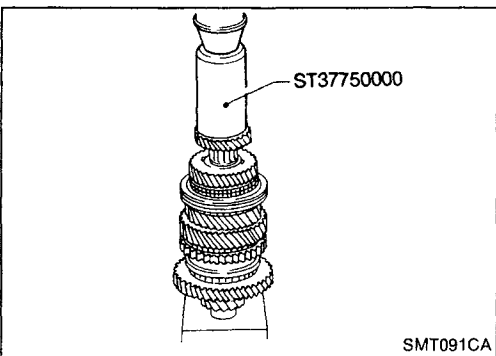
5. Install 3rd main gear, synchronizer cone, outer & inner baulk ring.
6. Press on 3rd & 4th synchronizer hub.



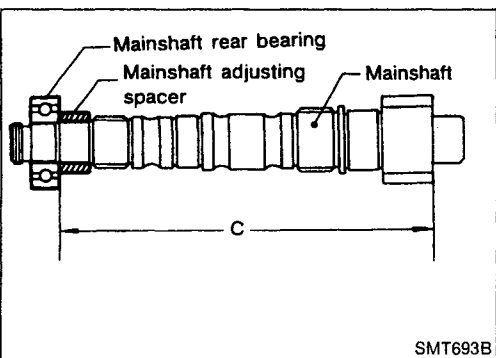
- **Ensure correct fitting of 3rd & 4th synchronizer hub.**
7. Install 3rd & 4th coupling sleeve and 4th baulk ring.



8. Install steel ball, 4th bushing and 4th main gear.
- **Apply multi-purpose grease to steel ball before installing it.**
 - **4th bushing has a groove in which steel ball fits.**



9. Press on 5th main gear.



10. Select proper mainshaft bearing spacer to give correct bearing distance.

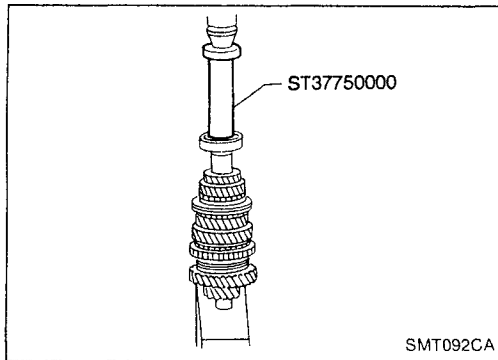
Bearing distance "C":

230.15 - 230.25 mm (9.0610 - 9.0649 in)

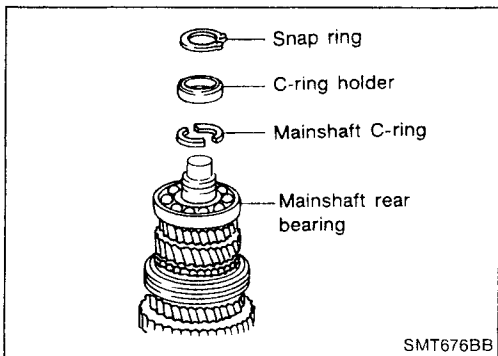
Spacers available:

Refer to SDS, MT-65.

Mainshaft and Gears (Cont'd)



11. Press on mainshaft rear bearing.



12. Select and install mainshaft C-ring that gives proper clearance of groove in mainshaft.

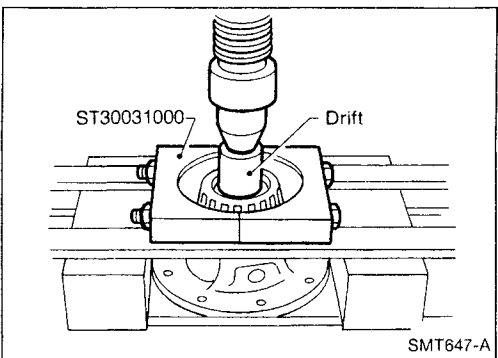
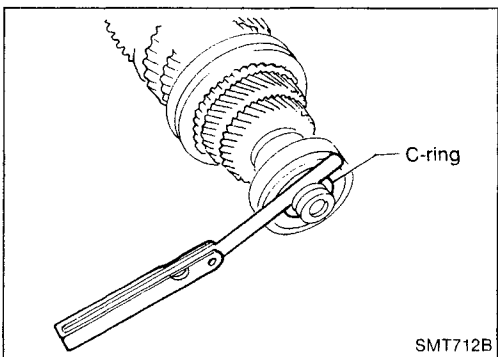
Allowable clearance of groove:
0 - 0.1 mm (0 - 0.004 in)

Mainshaft C-rings:

Refer to SDS, MT-65.

13. Install C-ring holder and snap ring.

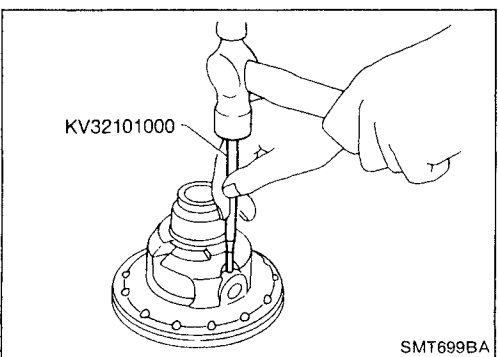
14. Measure gear end play as the final check. Refer to "DISASSEMBLY", MT-42.



Final Drive

DISASSEMBLY

1. Remove final gear.
 2. Remove speedometer drive gear by cutting it.
 3. Press out differential side bearings.
- **Be careful not to mix up the right and left bearings.**



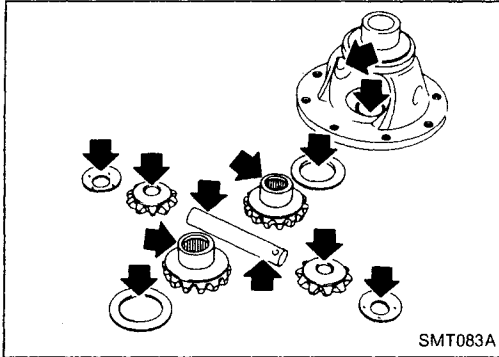
4. Drive out retaining pin and draw out pinion mate shaft.
5. Remove pinion mate gears and side gears.

MT

Final Drive (Cont'd) INSPECTION

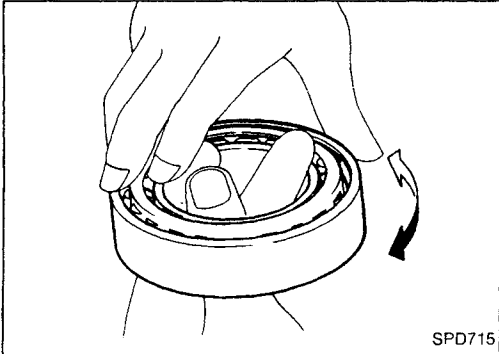
Gear, washer, shaft and case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.



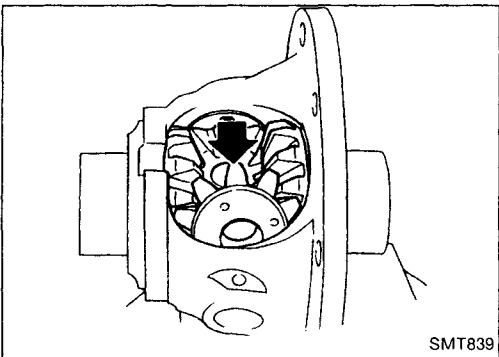
Bearing

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing tapered roller bearing, replace outer and inner race as a set.**



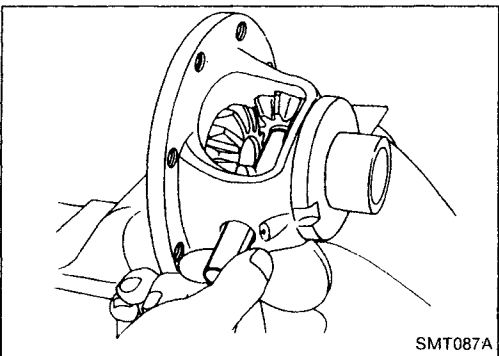
ASSEMBLY

1. Attach side gear thrust washers to side gears, then install pinion mate washers and pinion mate gears in place.



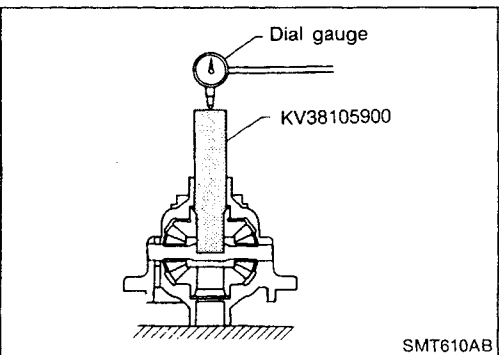
2. Insert pinion mate shaft.

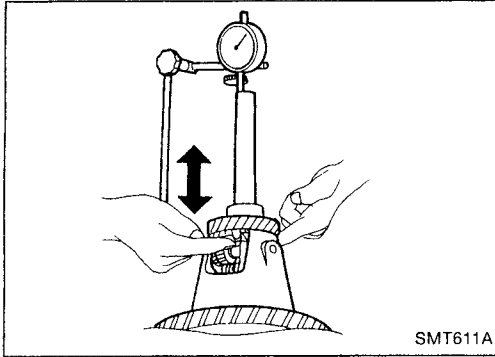
- **When inserting, be careful not to damage pinion mate thrust washers.**



3. Measure clearance between side gear and differential case with washers following the procedure below:

- a. Set Tool and dial indicator on side gear.





Final Drive (Cont'd)

- b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

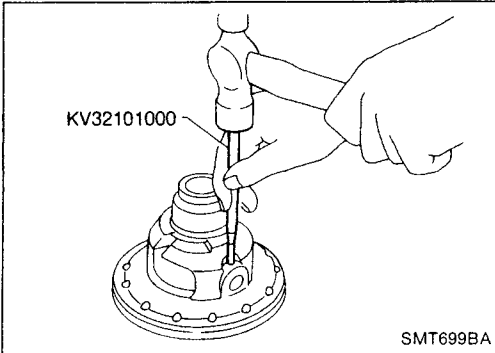
Clearance between side gear and differential case with washers:

0.1 - 0.2 mm (0.004 - 0.008 in)

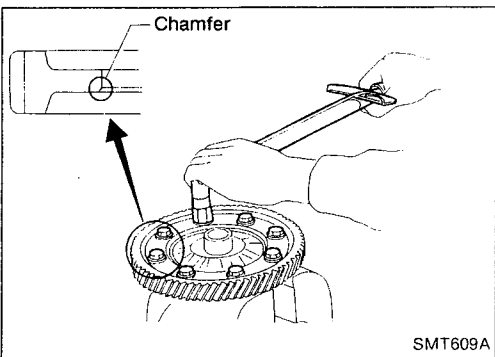
- c. If not within specification, adjust clearance by changing thickness of side gear thrust washers.

Side gear thrust washer:

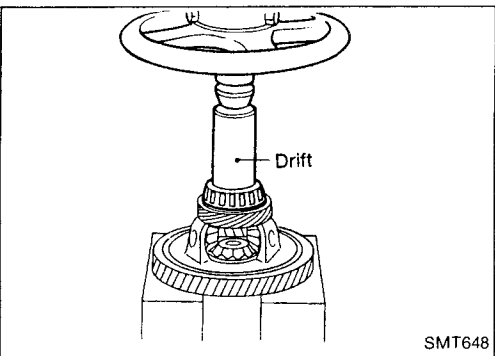
Refer to SDS, MT-65.



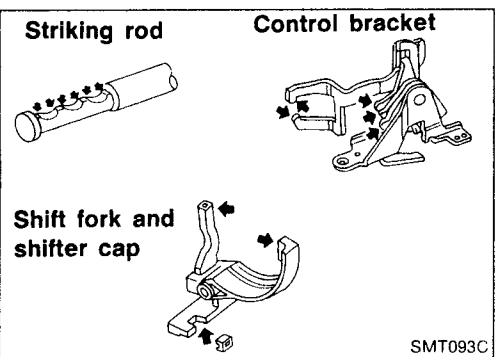
4. Install retaining pin.
 - **Make sure that retaining pin is flush with case.**



5. Install final gear.
 - **Apply locking sealant to final gear fixing bolts before installing them.**
6. Install speedometer drive gear.



7. Press on differential side bearings.



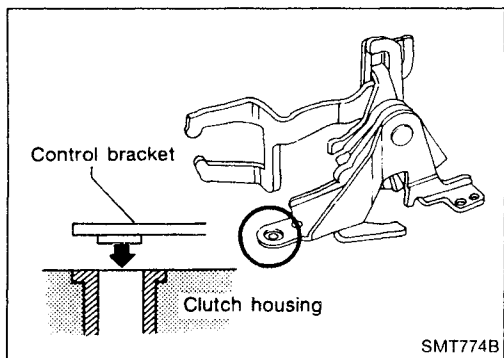
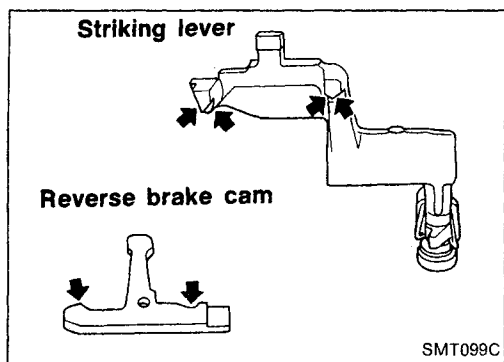
Shift Control Components

INSPECTION

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

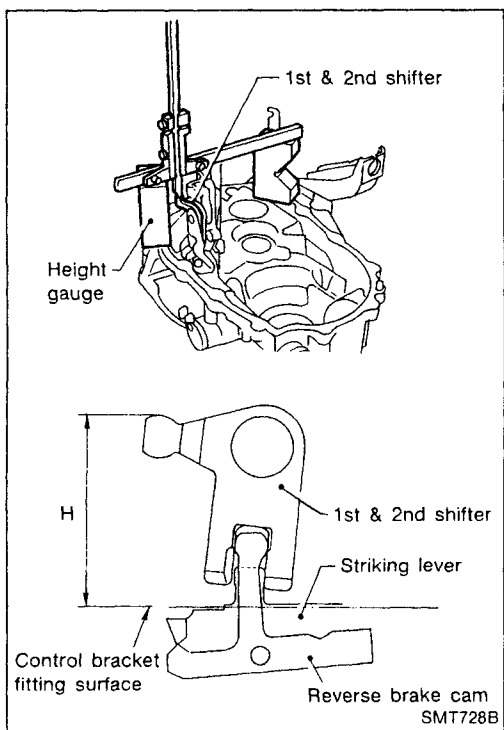
MT

Shift Control Components (Cont'd)



ADJUSTMENT OF INPUT SHAFT BRAKING MECHANISM

1. Install striking lever & rod, striking interlock assembly and control bracket on clutch housing exactly.
 - When installing control bracket on clutch housing, assure protrusion beneath bracket is correctly seated.



2. Measure maximum height "H" while shifting from neutral to reverse position.

Maximum height "H":

67.16 - 67.64 mm (2.6441 - 2.6630 in)

Shift Control Components (Cont'd)

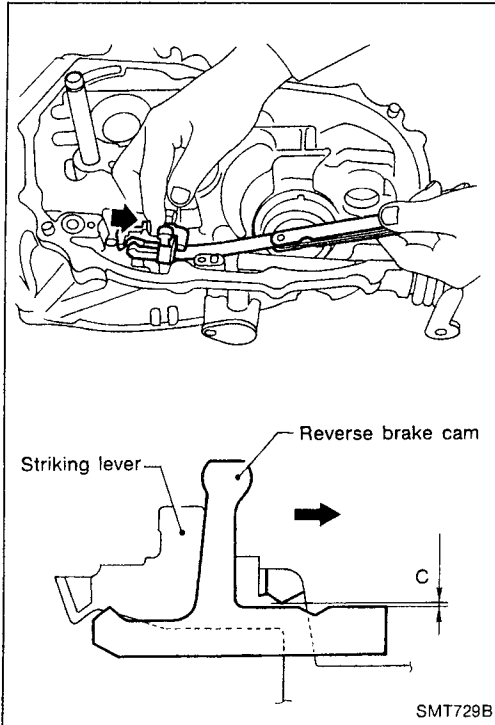
3. Measure clearance "C" between reverse brake cam and striking lever while shifting to reverse position.

Clearance "C":

0.05 - 0.125 mm (0.0020 - 0.0049 in)

If "H" or "C" is not within specification, replace the following parts as a set.

- Striking lever assembly
- Striking interlock assembly (This includes reverse brake cam.)
- Control bracket assembly

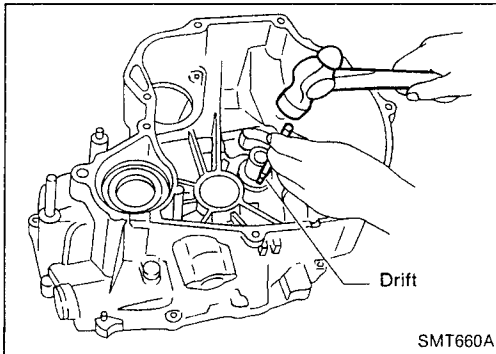


Case Components

REMOVAL AND INSTALLATION

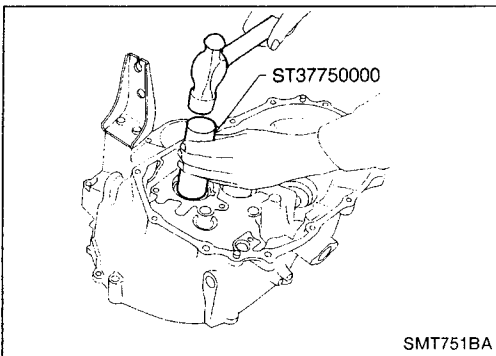
Input shaft oil seal

1. Drive out input shaft oil seal.



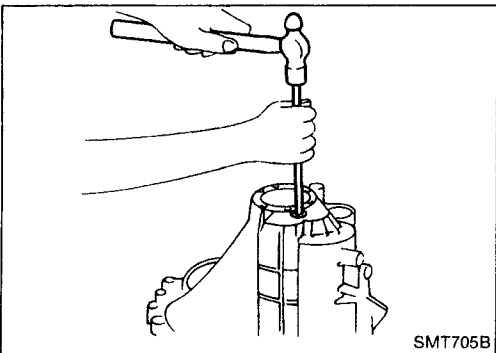
2. Install input shaft oil seal.

- Apply multi-purpose grease to seal lip of oil seal before installing.



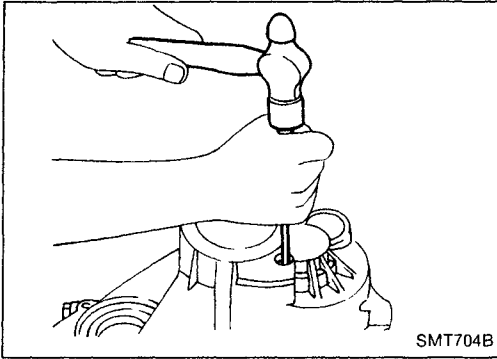
Input shaft rear bearing

1. Remove welch plug from transmission case.



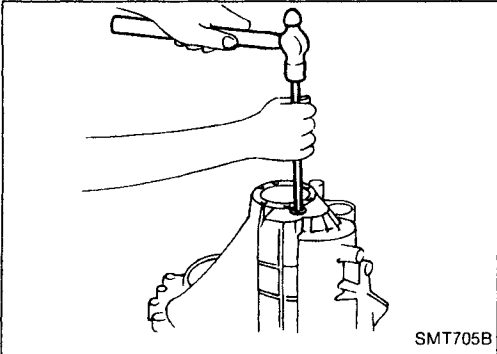
Case Components (Cont'd)

2. Remove input shaft rear bearing by tapping it from welch plug hole.

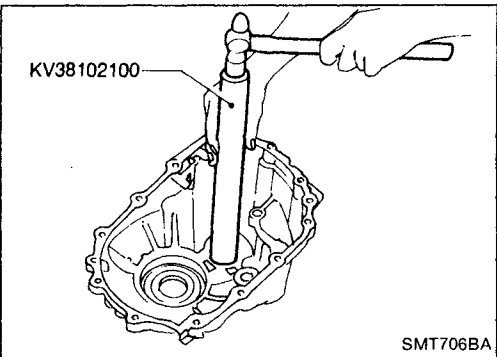


3. Install welch plug.

- Apply recommended sealant to mating surface of transmission case.

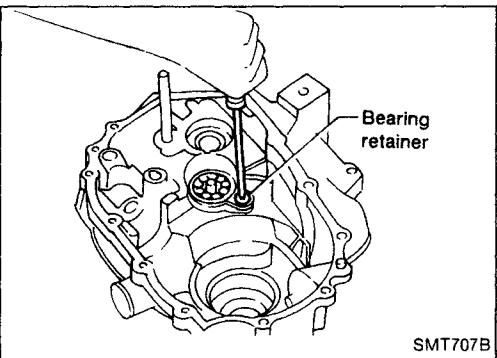


4. Install input shaft rear bearing.

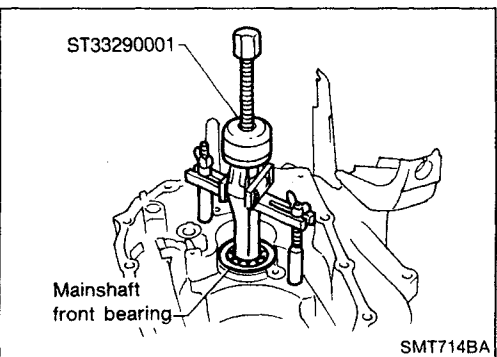


Mainshaft front bearing and oil channel

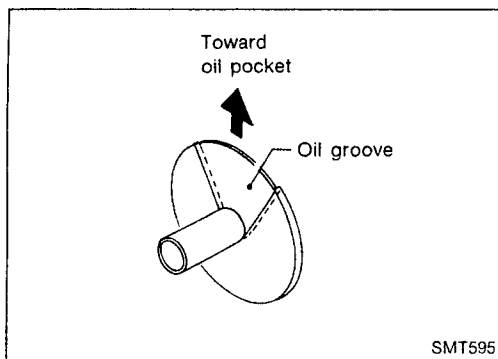
1. Remove mainshaft front bearing retainer.



2. Remove mainshaft front bearing.
3. Remove oil channel.

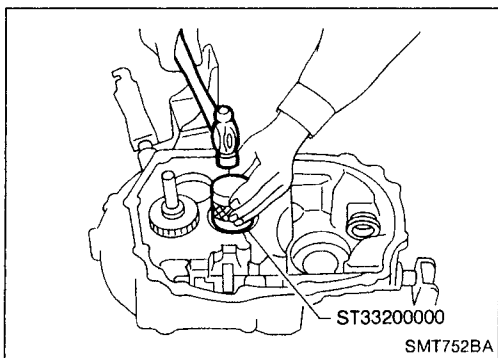


Case Components (Cont'd)



4. Install oil channel.

- Ensure the oil groove faces the oil pocket.



5. Install mainshaft front bearing.

6. Install mainshaft front bearing retainer.

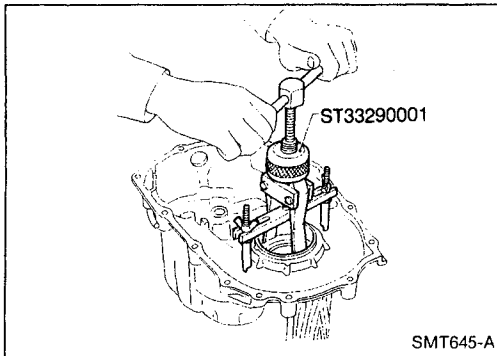
- Apply locking sealant to thread of screw before installation.

MT

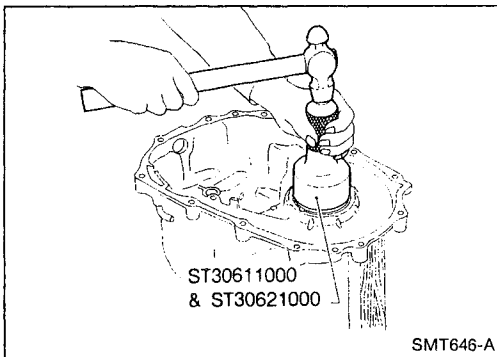
Differential Side Bearing Preload

If any of the following parts are replaced, adjust differential side bearing preload.

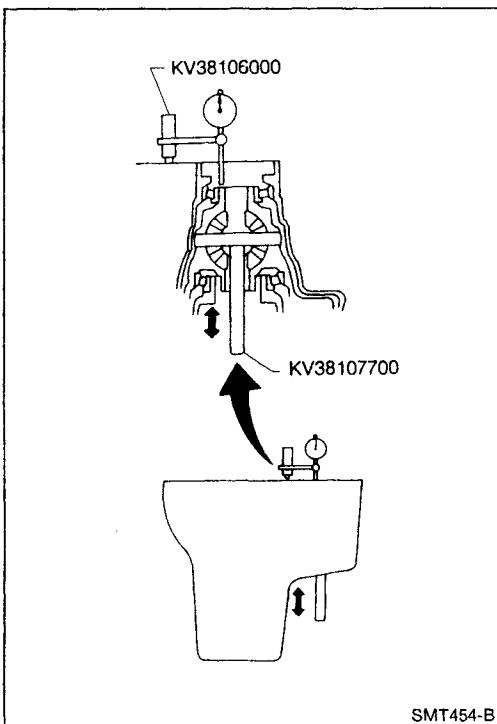
- Differential case
- Differential side bearing
- Clutch housing
- Transmission case



1. Remove differential side bearing outer race (transmission case side) and shim.



2. Install differential side bearing outer race without shim.
3. Install final drive assembly on clutch housing.
4. Install transmission case on clutch housing.
- **Tighten transmission case fixing bolts to the specified torque. Refer to MT-33.**



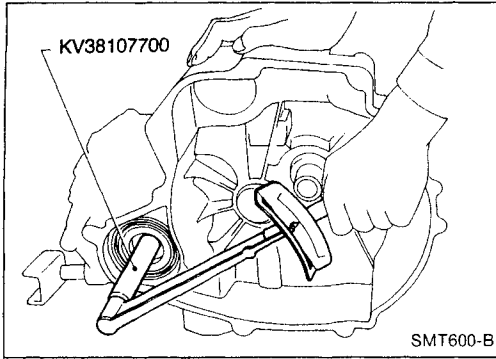
5. Set dial indicator on front end of differential case.
6. Insert Tool all the way into differential side gear.
7. Move Tool up and down and measure dial indicator deflection.
8. Select shim considering bearing preload.

- **Suitable shim thickness = Dial indicator deflection + Specified bearing preload**

Differential side bearing preload and adjusting shims:
Refer to SDS, MT-66.

Bearing preload:
0.25 - 0.30 mm (0.0098 - 0.0118 in)

9. Install selected shim and differential side bearing outer race.
10. Check differential side bearing turning torque.
 - a. Install final drive assembly on clutch housing.
 - b. Install transmission case on clutch housing.
- **Tighten transmission case fixing bolts to the specified torque. Refer to MT-33.**

**Differential Side Bearing Preload (Cont'd)**

c. Measure turning torque of final drive assembly.

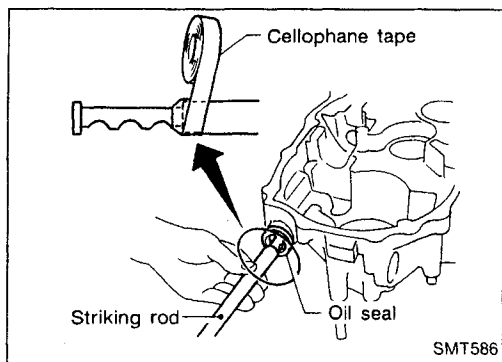
Turning torque of final drive assembly

(New bearing):

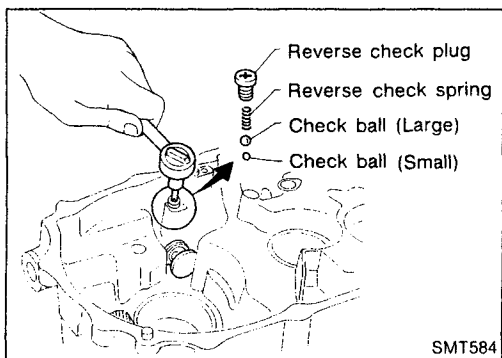
2.9 - 6.9 N·m (30 - 70 kg-cm, 26 - 61 in-lb)

- When old bearing is used again, turning torque will be slightly less than the above.
- Make sure torque is close to the specified range.
- Changes in turning torque of final drive assembly per revolution should be within 1.0 N·m (10 kg-cm, 8.7 in-lb) without binding.

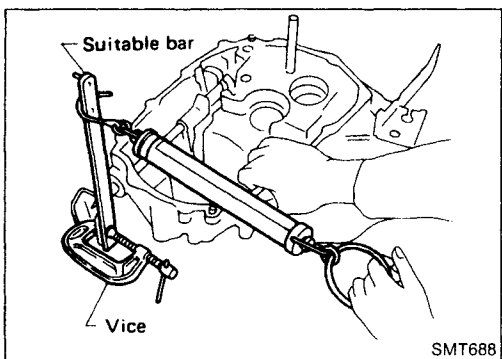
MT



1. Install striking rod, lever and interlock.
 - **Tape edges of striking rod to avoid damaging oil seal lip during installation. When taped edges of striking rod are past the oil seal, remove tape.**



2. Install reverse check sleeve assembly.
3. Install check balls, reverse check spring and check plug.

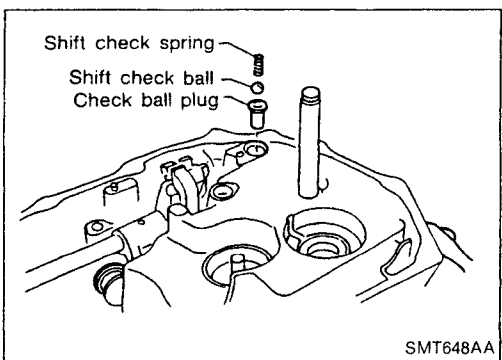


4. Check reverse check turning torque (At striking rod).

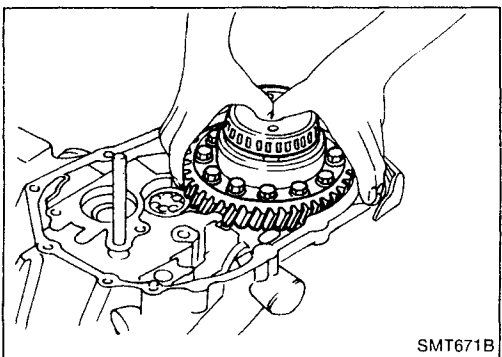
Reverse check turning torque (At striking rod):
4.9 - 7.4 N·m (50 - 75 kg-cm, 43 - 65 in-lb)

 - If not within specification, select another check plug having a different length and reinstall it.

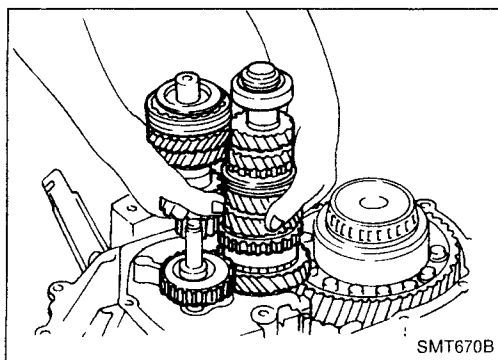
Available reverse check plugs:
Refer to SDS, MT-64.
5. Install selected reverse check plug.
 - **Apply locking sealant to thread of plug before installing it.**



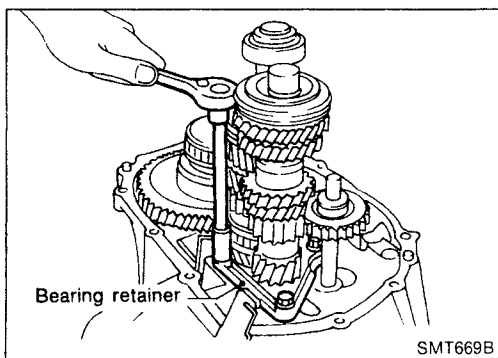
6. Install check ball plug, shift check ball and shift check spring.
7. Install oil pocket.



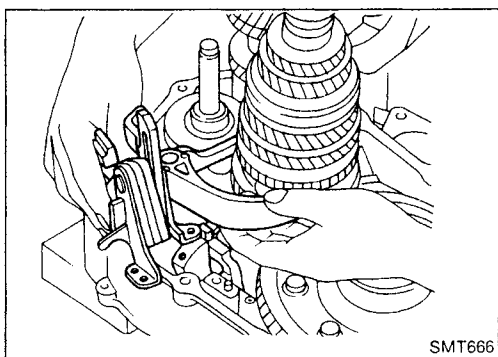
8. Install gear components onto clutch housing.
 - a. Install final drive assembly.



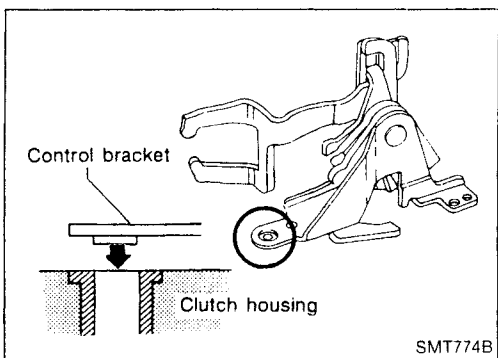
- b. Install input shaft assembly with bearing retainer, mainshaft assembly and reverse idler gear.
- **Be careful not to damage oil seal lip with splines of input shaft.**
 - **Be careful not to damage oil channel when inserting mainshaft into clutch housing.**



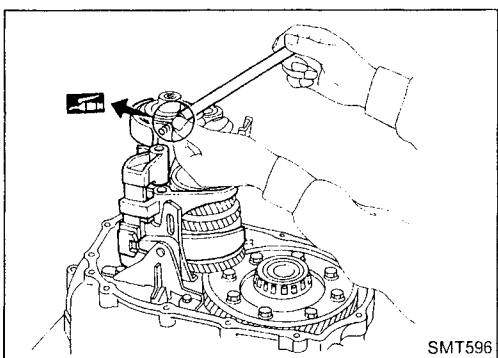
- c. Install input shaft front bearing retainer.



9. Apply grease to shifter caps, then install it to control bracket. Install control bracket with 1st & 2nd shift fork.

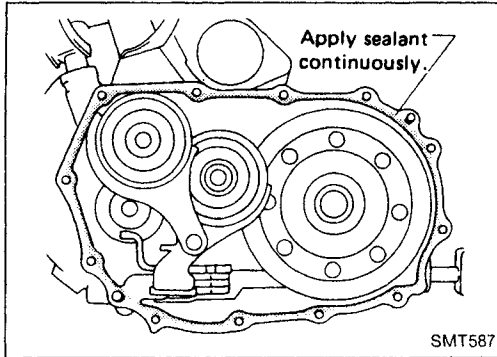


- When installing control bracket on clutch housing, ensure bracket is correctly seated.
10. Install 3rd & 4th and 5th shift forks.

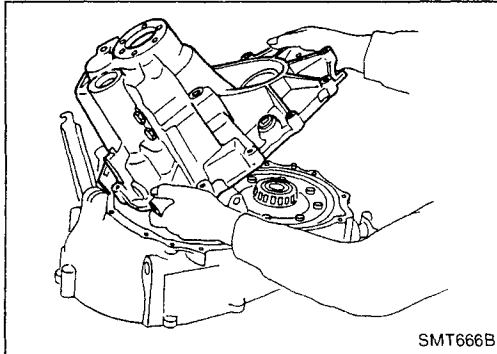


11. Insert fork shaft.
- **Apply multi-purpose grease to support spring before installing.**
12. Install reverse idler spacer.

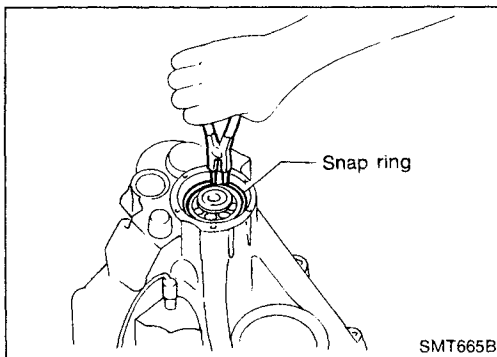
MT



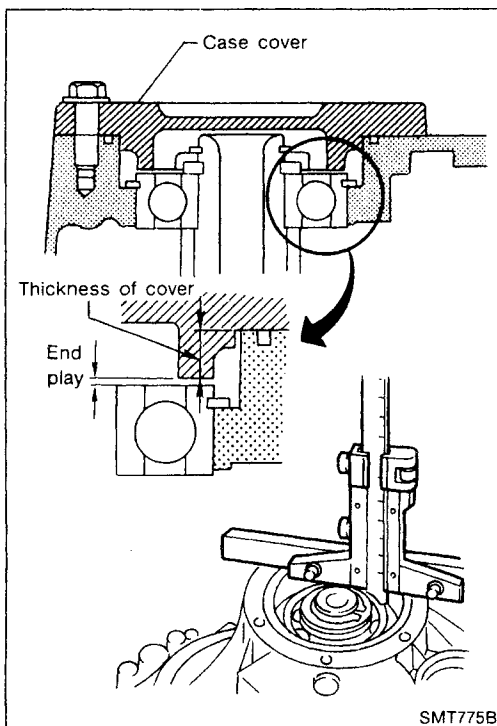
13. Apply recommended sealant to mating surface of clutch housing.



14. Install transmission case on clutch housing.



15. Install mainshaft front bearing snap ring.



16. Check mainshaft bearing end play.

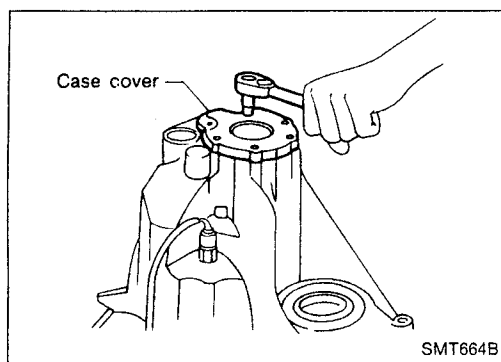
Mainshaft bearing end play:

0 - 0.1 mm (0 - 0.004 in)

- Make sure that bearing is properly seated. If not, tap main shaft end with a rubber hammer.
- If not within specification, select another case cover having a different thickness.

Available case covers:

Refer to SDS, MT-64.



17. Install O-ring and case cover on transmission case.

- **Apply recommended sealant to mating surface of transmission case.**

MT

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

TRANSAXLE

Applied model			Europe	Except for Europe and Australia	Europe	Except for Europe	Australia	Europe
			GA14DE	GA15DE	GA16DE		SR20DE	CD20
			With catalyzer			Without catalyzer		
Transaxle model			RS5F30A		RS5F31A		RS5F32A	RS5F31A
Number of speeds			5					
Synchromesh type			Warner					
Shift pattern			135 24R H N					
Gear ratio	1st		3.333	3.333	3.063		3.063	3.333
	2nd		1.955	1.955	1.826		1.826	1.955
	3rd		1.286	1.286	1.286		1.286	1.286
	4th		0.902	0.926	0.975		0.975	0.902
	5th		0.733	0.756	0.810		0.756	0.756
	Reverse		3.417	3.417	3.417		3.153	3.417
Number of teeth	Input gear	1st	15	15	16		16	15
		2nd	22	22	23		23	22
		3rd	28	28	28		28	28
		4th	41	41	40		40	41
		5th	45	45	42		45	45
		Rev.	12	12	12		13	12
	Main gear	1st	50	50	49		49	50
		2nd	43	43	42		42	43
		3rd	36	36	36		36	36
		4th	37	38	39		39	37
		5th	33	34	34		34	34
		Rev.	41	41	41		41	41
	Reverse idler gear		30				31	30
Oil capacity ℓ (Imp pt)			2.8 - 3.0 (4-7/8 - 5-1/4)		2.9 - 3.2 (5-1/8 - 5-5/8)		3.7 - 3.9 (6-1/2 - 6-7/8)	2.9 - 3.2 (5-1/8 - 5-5/8)
Oil level* mm (in)			58 - 66 (2.28 - 2.60)		57 - 66 (2.24 - 2.60)		39 - 44 (1.54 - 1.73)	54 - 61 (2.13 - 2.40)

*: Refer to MA section.

FINAL GEAR

Engine		GA14DE	GA15DE	GA16DE	SR20DE	CD20
Final gear ratio		4.167	3.789	4.167	4.176	3.650
Number of teeth	Final gear/Pinion	75/18	72/19	75/18	71/17	73/20
	Side gear/Pinion mate gear	14/10	14/10	16/10	14/10	16/10

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment — RS5F30A & RS5F31A

GEAR END PLAY

Gear	End play mm (in)
1st main gear	0.18 - 0.31 (0.0071 - 0.0122)
2nd main gear	0.20 - 0.30 (0.0079 - 0.0118)
3rd main gear	0.20 - 0.30 (0.0079 - 0.0118)
4th main gear	0.20 - 0.30 (0.0079 - 0.0118)
5th input gear	0.18 - 0.31 (0.0071 - 0.0122)

CLEARANCE BETWEEN BAULK RING AND GEAR

1st, 2nd, 3rd, 4th, 5th baulk ring

Unit: mm (in)

Standard	Wear limit
1.0 - 1.35 (0.0394 - 0.0531)	0.7 (0.028)

AVAILABLE CHECK PLUGS

Reverse check plug

Reverse check turning torque (At striking rod) N·m (kg·cm, in·lb)	4.9 - 7.4 (50 - 75, 43 - 65)
Thickness mm (in)	Part number
8.3 (0.327)	32188-M8001*
7.1 (0.280)	32188-M8002
7.7 (0.303)	32188-M8003
8.9 (0.350)	32188-M8004

* Standard size check plug

AVAILABLE SNAP RINGS

Input shaft front bearing

Allowable clearance	0 - 0.1 mm (0 - 0.004 in)
Thickness mm (in)	Part number
1.27 (0.0500)	32204-M8004
1.33 (0.0524)	32204-M8005
1.39 (0.0547)	32204-M8006
1.45 (0.0571)	32204-M8007

Input shaft 5th synchronizer hub

Allowable clearance	0 - 0.1 mm (0 - 0.004 in)
Thickness mm (in)	Part number
2.00 (0.0787)	32311-M8812
2.05 (0.0807)	32311-M8813
2.10 (0.0827)	32311-M8814
2.15 (0.0846)	32311-M8815
2.20 (0.0866)	32311-M8816
2.25 (0.0886)	32311-M8817
2.30 (0.0906)	32311-M8818

MT

AVAILABLE C-RINGS

Mainshaft C-ring

Allowable clearance		0 - 0.1 mm (0 - 0.004 in)	
Thickness mm (in)	Part number	Thickness mm (in)	Part number
3.63 (0.1429)	32348-M8800	4.12 (0.1622)	32348-M8807
3.70 (0.1457)	32348-M8801	4.19 (0.1650)	32348-M8808
3.77 (0.1484)	32348-M8802	4.26 (0.1677)	32348-M8809
3.84 (0.1512)	32348-M8803	4.33 (0.1705)	32348-M8810
3.91 (0.1539)	32348-M8804	4.40 (0.1732)	32348-M8811
3.98 (0.1567)	32348-M8805	4.47 (0.1760)	32348-M8812
4.05 (0.1594)	32348-M8806	4.54 (0.1787)	32348-M8813

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment — RS5F30A & RS5F31A (Cont'd)

AVAILABLE WASHERS

Differential side gear thrust washer

● GA16DE and CD20 engine models

Allowable clearance between side gear and differential case with washer		0.1 - 0.2 mm (0.004 - 0.008 in)
Thickness mm (in)	Part number	
0.75 - 0.80 (0.0295 - 0.0315)	38424-D2111	
0.80 - 0.85 (0.0315 - 0.0335)	38424-D2112	
0.85 - 0.90 (0.0335 - 0.0354)	38424-D2113	
0.90 - 0.95 (0.0354 - 0.0374)	38424-D2114	
0.95 - 1.00 (0.0374 - 0.0394)	38424-D2115	

● Except for GA16DE and CD20 engine models

Allowable clearance between side gear and differential case with washer		0.1 - 0.2 mm (0.004 - 0.008 in)
Thickness mm (in)	Part number	
0.76 - 0.81 (0.0299 - 0.0319)	38424-01M10	
0.81 - 0.86 (0.0319 - 0.0339)	38424-01M11	
0.86 - 0.91 (0.0339 - 0.0358)	38424-01M12	
0.91 - 0.96 (0.0358 - 0.0378)	38424-01M13	

AVAILABLE SHIMS

— MAINSHAFT AND DIFFERENTIAL SIDE BEARING PRELOAD AND ADJUSTING SHIM

Bearing preload (Reused bearing)

Unit: mm (in)		
	Mainshaft bearing	Differential side bearing
RS5F30A	0.18 - 0.23 (0.0071 - 0.0091)	0.24 - 0.32 (0.0094 - 0.0126)
RS5F31A	0.18 - 0.27 (0.0071 - 0.0106)	0.20 - 0.25 (0.0079 - 0.0098)

Turning torque (New bearing)

Unit: N·m (kg-cm, in-lb)		
	Final drive only	Total (Final drive + Mainshaft)
RS5F30A	2.0 - 7.8 (20 - 80, 17 - 69)	3.9 - 12.3 (40 - 125, 35 - 109)
RS5F31A	2.0 - 7.8 (20 - 80, 17 - 69)	3.9 - 13.7 (40 - 140, 35 - 122)

Mainshaft bearing adjusting shims

Thickness mm (in)	Part number
0.10 (0.0039)	32137-M8000
0.15 (0.0059)	32137-M8001
0.20 (0.0079)	32137-M8002
0.25 (0.0098)	32137-M8003
0.30 (0.0118)	32137-M8004
0.35 (0.0138)	32137-M8005
0.40 (0.0157)	32137-M8006
0.45 (0.0177)	32137-M8007
0.50 (0.0197)	32137-M8008
0.55 (0.0217)	32137-M8009
0.60 (0.0236)	32137-M8010
0.65 (0.0256)	32137-M8011
0.70 (0.0276)	32137-M8012
0.75 (0.0295)	32137-M8013
0.80 (0.0315)	32137-M8014
0.85 (0.0335)	32137-M8015
0.90 (0.0354)	32137-M8016
0.95 (0.0374)	32137-M8017
1.00 (0.0394)	32137-M8018

Table for selecting mainshaft bearing adjusting shim

Unit: mm (in)	
Measured distance	Suitable shim thickness
2.35 - 2.40 (0.0925 - 0.0945)	0.10 (0.0039)
2.40 - 2.45 (0.0945 - 0.0965)	0.15 (0.0059)
2.45 - 2.50 (0.0965 - 0.0984)	0.20 (0.0079)
2.50 - 2.55 (0.0984 - 0.1004)	0.25 (0.0098)
2.55 - 2.60 (0.1004 - 0.1024)	0.30 (0.0118)
2.60 - 2.65 (0.1024 - 0.1043)	0.35 (0.0138)
2.65 - 2.70 (0.1043 - 0.1063)	0.40 (0.0157)
2.70 - 2.75 (0.1063 - 0.1083)	0.45 (0.0177)
2.75 - 2.80 (0.1083 - 0.1102)	0.50 (0.0197)
2.80 - 2.85 (0.1102 - 0.1122)	0.55 (0.0217)
2.85 - 2.90 (0.1122 - 0.1142)	0.60 (0.0236)
2.90 - 2.95 (0.1142 - 0.1161)	0.65 (0.0256)
2.95 - 3.00 (0.1161 - 0.1181)	0.70 (0.0276)
3.00 - 3.05 (0.1181 - 0.1201)	0.75 (0.0295)
3.05 - 3.10 (0.1201 - 0.1220)	0.80 (0.0315)
3.10 - 3.15 (0.1220 - 0.1240)	0.85 (0.0335)
3.15 - 3.20 (0.1240 - 0.1260)	0.90 (0.0354)
3.20 - 3.25 (0.1260 - 0.1280)	0.95 (0.0374)
3.25 - 3.30 (0.1280 - 0.1299)	1.00 (0.0394)

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment — RS5F30A & RS5F31A (Cont'd)

Differential side bearing adjusting shims

Thickness mm (in)	Part number
0.44 (0.0173)	38454-M8000
0.48 (0.0189)	38454-M8001
0.56 (0.0220)	38454-M8003
0.60 (0.0236)	38454-M8004
0.64 (0.0252)	38454-M8005
0.68 (0.0268)	38454-M8006
0.72 (0.0283)	38454-M8007
0.76 (0.0299)	38454-M8008
0.80 (0.0315)	38454-M8009
0.84 (0.0331)	38454-M8010
0.88 (0.0346)	38454-M8011

MT

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment — RS5F32A

GEAR END PLAY

Gear	End play mm (in)
1st main gear	0.18 - 0.31 (0.0071 - 0.0122)
2nd main gear	0.20 - 0.30 (0.0079 - 0.0118)
3rd main gear	0.20 - 0.30 (0.0079 - 0.0118)
4th main gear	0.20 - 0.30 (0.0079 - 0.0118)
5th input gear	0.18 - 0.31 (0.0071 - 0.0122)

CLEARANCE BETWEEN BAULK RING AND GEAR

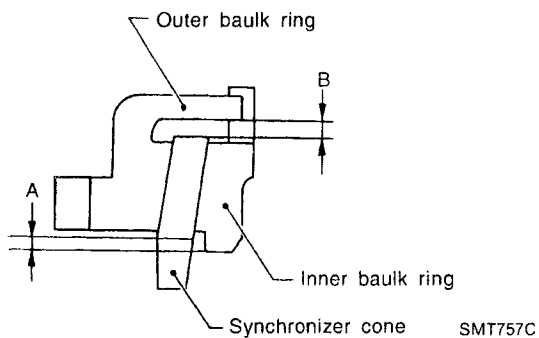
1st, 4th, 5th baulk ring

Unit: mm (in)

	Standard	Wear limit
1st	0.95 - 1.45 (0.0374 - 0.0571)	0.7 (0.028)
4th	0.90 - 1.45 (0.0354 - 0.0571)	
5th	0.90 - 1.50 (0.0354 - 0.0591)	

2nd and 3rd baulk ring

Unit: mm (in)



Dimension	Standard	Wear limit
A	0.7 - 0.9 (0.028 - 0.035)	0.2 (0.008)
B	0.6 - 1.1 (0.024 - 0.043)	

AVAILABLE REVERSE CHECK PLUGS AND CASE COVERS

Reverse check plug

Reverse check turning torque (At striking rod)	4.9 - 7.4 N·m (50 - 75 kg·cm, 43 - 65 in·lb)
Length mm (in)	Part number
8.3 (0.327)	32188-M8001*
7.1 (0.280)	32188-M8002
7.7 (0.303)	32188-M8003
8.9 (0.350)	32188-M8004

* Standard size check plug

Case cover

Main shaft bearing end play	0 - 0.1 mm (0 - 0.004 in)
Thickness mm (in)	Part number
10.78 (0.4244)	32131-50J00
10.83 (0.4264)	32131-50J01
10.88 (0.4283)	32131-50J02
10.93 (0.4303)	32131-50J03
10.98 (0.4323)	32131-50J04
11.03 (0.4343)	32131-50J05

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment — RS5F32A (Cont'd)

AVAILABLE SNAP RINGS

Input shaft front bearing

Allowable clearance	0 - 0.1 mm (0 - 0.004 in)
Thickness mm (in)	Part number
1.27 (0.0500)	32204-M8004
1.33 (0.0524)	32204-M8005
1.39 (0.0547)	32204-M8006
1.45 (0.0571)	32204-M8007

Input shaft 5th synchronizer hub

Allowable clearance	0 - 0.1 mm (0 - 0.004 in)
Thickness mm (in)	Part number
2.00 (0.0787)	32311-M8812
2.05 (0.0807)	32311-M8813
2.10 (0.0827)	32311-M8814
2.15 (0.0846)	32311-M8815
2.20 (0.0866)	32311-M8816
2.25 (0.0886)	32311-M8817
2.30 (0.0906)	32311-M8818

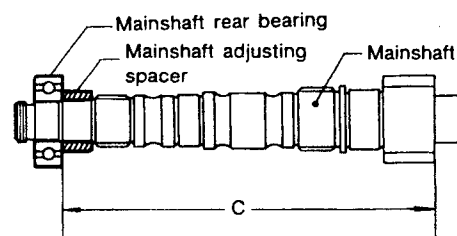
AVAILABLE C-RINGS

Mainshaft C-ring

Allowable clearance	0 - 0.1 mm (0 - 0.004 in)
Thickness mm (in)	Part number
4.45 (0.1752)	32348-50J00
4.52 (0.1780)	32348-50J01
4.59 (0.1807)	32348-50J02
4.66 (0.1835)	32348-50J03
4.73 (0.1862)	32348-50J04
4.80 (0.1890)	32348-50J05
4.87 (0.1917)	32348-50J06
4.94 (0.1945)	32348-50J07

AVAILABLE SPACERS

Mainshaft bearing adjusting spacer



SMT693B

Bearing distance "C"	230.15 - 230.25 mm (9.0610 - 9.0649 in)
Thickness mm (in)	Part number
18.91 (0.7445)	32347-50J00
18.98 (0.7472)	32347-50J01
19.05 (0.7500)	32347-50J02
19.12 (0.7528)	32347-50J03
19.19 (0.7555)	32347-50J04
19.26 (0.7583)	32347-50J05
19.33 (0.7610)	32347-50J06
19.40 (0.7638)	32347-50J07
19.47 (0.7665)	32347-50J08

MT

AVAILABLE WASHERS

Differential side gear thrust washer

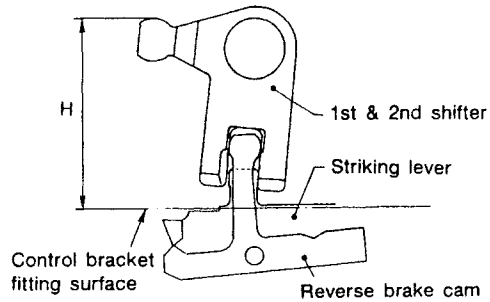
Allowable clearance between side gear and differential case with washer	0.1 - 0.2 mm (0.004 - 0.008 in)
Thickness mm (in)	Part number
0.75 - 0.80 (0.0295 - 0.0315)	38424-D2111
0.80 - 0.85 (0.0315 - 0.0335)	38424-D2112
0.85 - 0.90 (0.0335 - 0.0354)	38424-D2113
0.90 - 0.95 (0.0354 - 0.0374)	38424-D2114
0.95 - 1.00 (0.0374 - 0.0394)	38424-D2115

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment — RS5F32A (Cont'd)

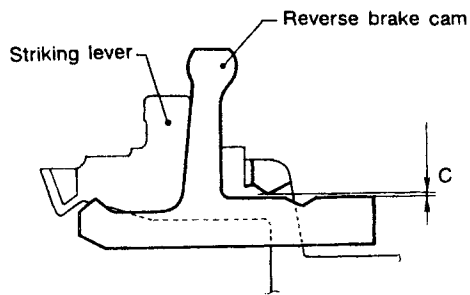
INPUT SHAFT BRAKING MECHANISM

Reverse brake cam



SMT735B

Maximum height "H" between the control bracket fitting surface and 1-2 shifter	67.16 - 67.64 (2.6441 - 2.6330)
mm (in)	



SMT736B

Clearance "C" between reverse brake cam and striking lever	0.05 - 0.125 (0.0020 - 0.0049)
mm (in)	

AVAILABLE SHIMS

— DIFFERENTIAL SIDE BEARING PRELOAD AND ADJUSTING SHIM

Bearing preload (Reused bearing)

Unit: mm (in)

Differential side bearing	0.25 - 0.30 (0.0098 - 0.0118)
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Turning torque (New bearing)

Unit: N·m (kg-cm, in-lb)

Final drive	2.9 - 6.9 (30 - 70, 26 - 61)
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Differential side bearing adjusting shims

Thickness mm (in)	Part number
0.44 (0.0173)	38454-M8000
0.48 (0.0189)	38454-M8001
0.56 (0.0220)	38454-M8003
0.60 (0.0236)	38454-M8004
0.64 (0.0252)	38454-M8005
0.68 (0.0268)	38454-M8006
0.72 (0.0283)	38454-M8007
0.76 (0.0299)	38454-M8008
0.80 (0.0315)	38454-M8009
0.84 (0.0331)	38454-M8010
0.88 (0.0346)	38454-M8011