

MANUAL TRANSMISSION

SECTION **MT**

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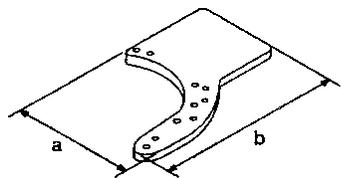
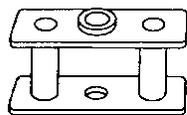
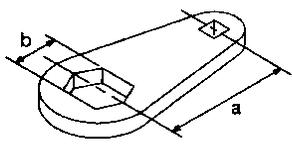
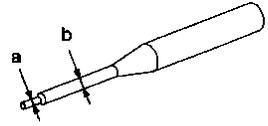
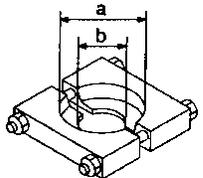
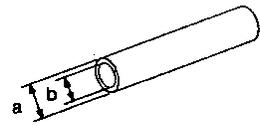
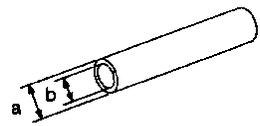
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PREPARATION

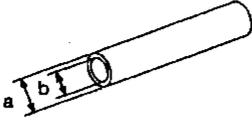
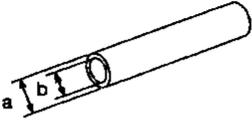
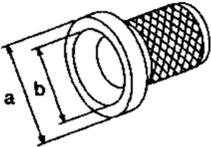
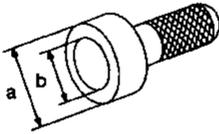
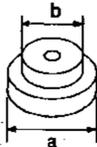
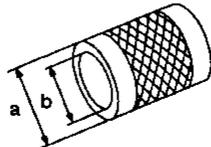
Special Service Tools

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

Tool number (Kent-Moore No.) Tool name	Description	
ST23810001 (—) Adapter setting plate	 <p style="text-align: center;">NT407</p>	Fixing adapter plate with gear assembly a: 166 mm (6.54 in) b: 270 mm (10.63 in)
KV31100401 (—) Transmission press stand	 <p style="text-align: center;">NT068</p>	Pressing counter gear and mainshaft
ST22520000 (J26348) Wrench	 <p style="text-align: center;">NT409</p>	Tightening mainshaft lock nut a: 100 mm (3.94 in) b: 41 mm (1.61 in)
ST23540000 (J25689-A) Pin punch	 <p style="text-align: center;">NT442</p>	Removing and installing fork rod retaining pin a: 2.3 mm (0.091 in) dia. b: 4 mm (0.16 in) dia.
ST30031000 (J22912-01) Puller	 <p style="text-align: center;">NT411</p>	Removing and installing 1st gear bushing Removing main drive gear bearing Measuring wear of baulk rings a: 90 mm (3.54 in) dia. b: 50 mm (1.97 in) dia.
ST23860000 (—) Drift	 <p style="text-align: center;">NT065</p>	Installing counter drive gear a: 38 mm (1.50 in) dia. b: 33 mm (1.30 in) dia.
ST22360002 (J25679-01) Drift	 <p style="text-align: center;">NT065</p>	Installing counter gear front and rear end bearings a: 29 mm (1.14 in) dia. b: 23 mm (0.91 in) dia.

PREPARATION

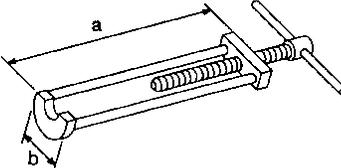
Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description			
ST22350000 (J25678-01) Drift	NT065		Installing OD gear bushing a: 34 mm (1.34 in) dia. b: 28 mm (1.10 in) dia.	GI MA
ST23800000 (J25691-01) Drift	NT065		Installing front cover oil seal a: 44 mm (1.73 in) dia. b: 31 mm (1.22 in) dia.	EM LC EC
ST33400001 (J26082) Drift	NT086		Installing rear oil seal a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.	FE CL
ST33290001 (J34286) Puller	NT414		Removing rear oil seal a: 250 mm (9.84 in) b: 160 mm (6.30 in)	<div style="background-color: black; color: white; padding: 2px;">MT</div> AT PD
ST30720000 (—) Drift	NT115		Installing mainshaft ball bearing a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.	FA RA BR
ST30613000 (J25742-3) Drift	NT073		Installing main drive gear bearing a: 71.5 mm (2.815 in) dia. b: 47.5 mm (1.870 in) dia.	ST RS
ST33200000 (J26082) Drift	NT091		Installing counter rear bearing Installing 3rd & 4th synchronizer assembly a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.	BT HA EL

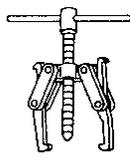
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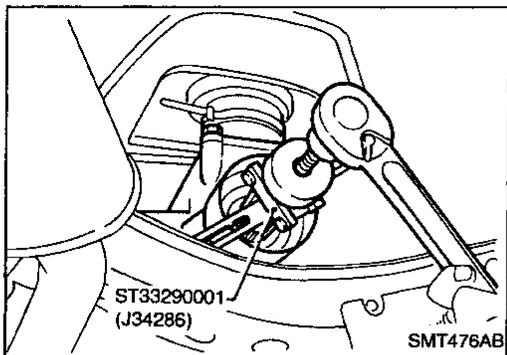
PREPARATION

Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
KV32101330 (See J26349-A) Puller		Removing overdrive mainshaft bearing a: 447 mm (17.60 in) b: 100 mm (3.94 in)
	NT408	

Commercial Service Tool

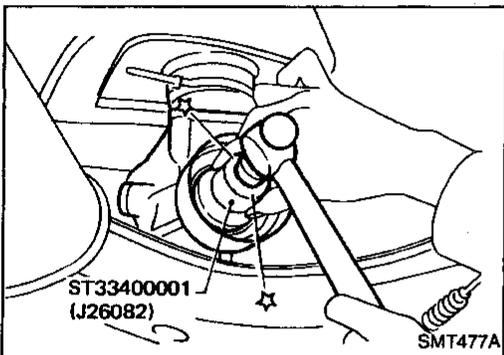
Tool name	Description	
Puller		Removing counter bearings, counter drive and OD gears
	NT077	



Replacing Rear Oil Seal

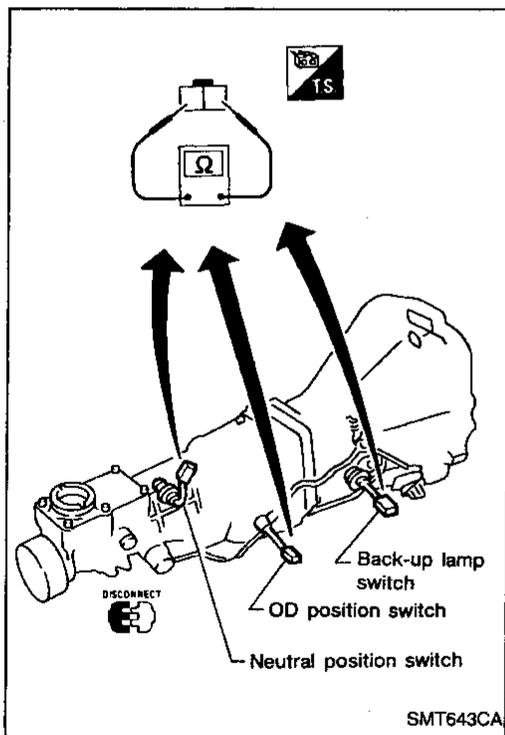
REMOVAL

1. Remove propeller shaft. Refer to PD section ("Removal", "PROPELLER SHAFT").
2. Remove rear oil seal.



INSTALLATION

1. Install rear oil seal.
2. Install propeller shaft. Refer to PD section ("Installation", "PROPELLER SHAFT").



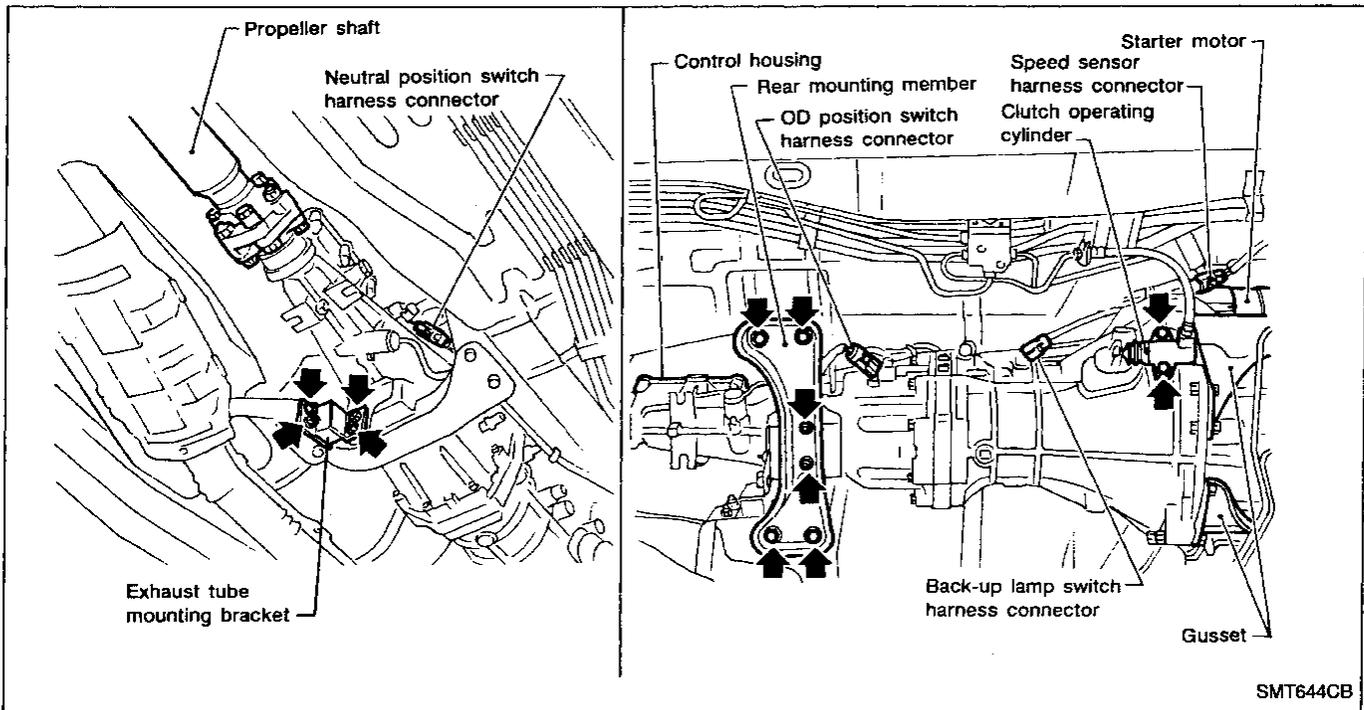
Position Switch Check

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

Removal

CAUTION:

When removing the transmission assembly from engine, first remove the crankshaft position sensor (OBD) from the assembly. Be careful not to damage sensor edge and ring gear teeth.



1. Remove battery negative terminal.
2. Remove control lever with control housing from transmission.
3. Remove crankshaft position sensor (OBD) from upper side of transmission case.
4. Remove clutch operating cylinder from transmission. Tighten clutch operating cylinder to the specified torque. Refer to CL section ("CLUTCH SYSTEM").
5. Disconnect speed sensor, OD position switch, back-up lamp switch, rear heated oxygen sensor and neutral position switch harness connectors.
6. Remove starter motor from transmission.
 \square : 30 - 41 N·m (3.1 - 4.2 kg·m, 22 - 30 ft·lb)
7. Remove propeller shaft. Refer to PD section ("Removal", "PROPELLER SHAFT").
 - Insert plug into rear oil seal after removing propeller shaft.
 - Be careful not to damage spline, sleeve yoke and rear oil seal when removing propeller shaft.
8. Remove gussets from transmission or engine.
9. Remove exhaust tube mounting bracket from transmission. Refer to FE section ("EXHAUST SYSTEM").
10. Support manual transmission with a jack.
11. Remove rear mounting member. Tighten rear mounting member to the specified torque. Refer to EM section ("ENGINE REMOVAL").
12. Lower manual transmission as much as possible.

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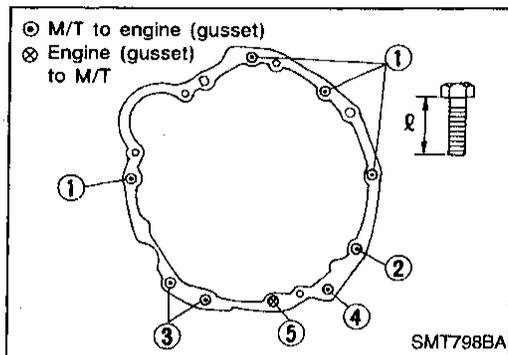
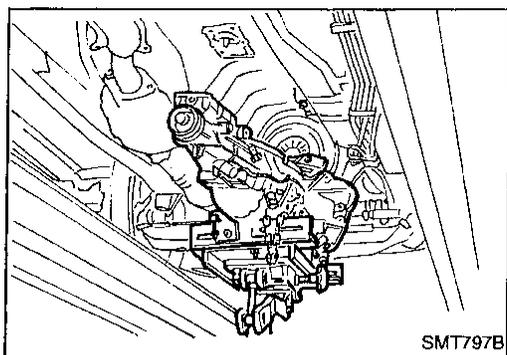
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REMOVAL AND INSTALLATION

Removal (Cont'd)

13. Remove transmission fixing bolts.
 14. Remove transmission from engine.
- Support manual transmission while removing it.



Installation

- Tighten transmission fixing bolts.

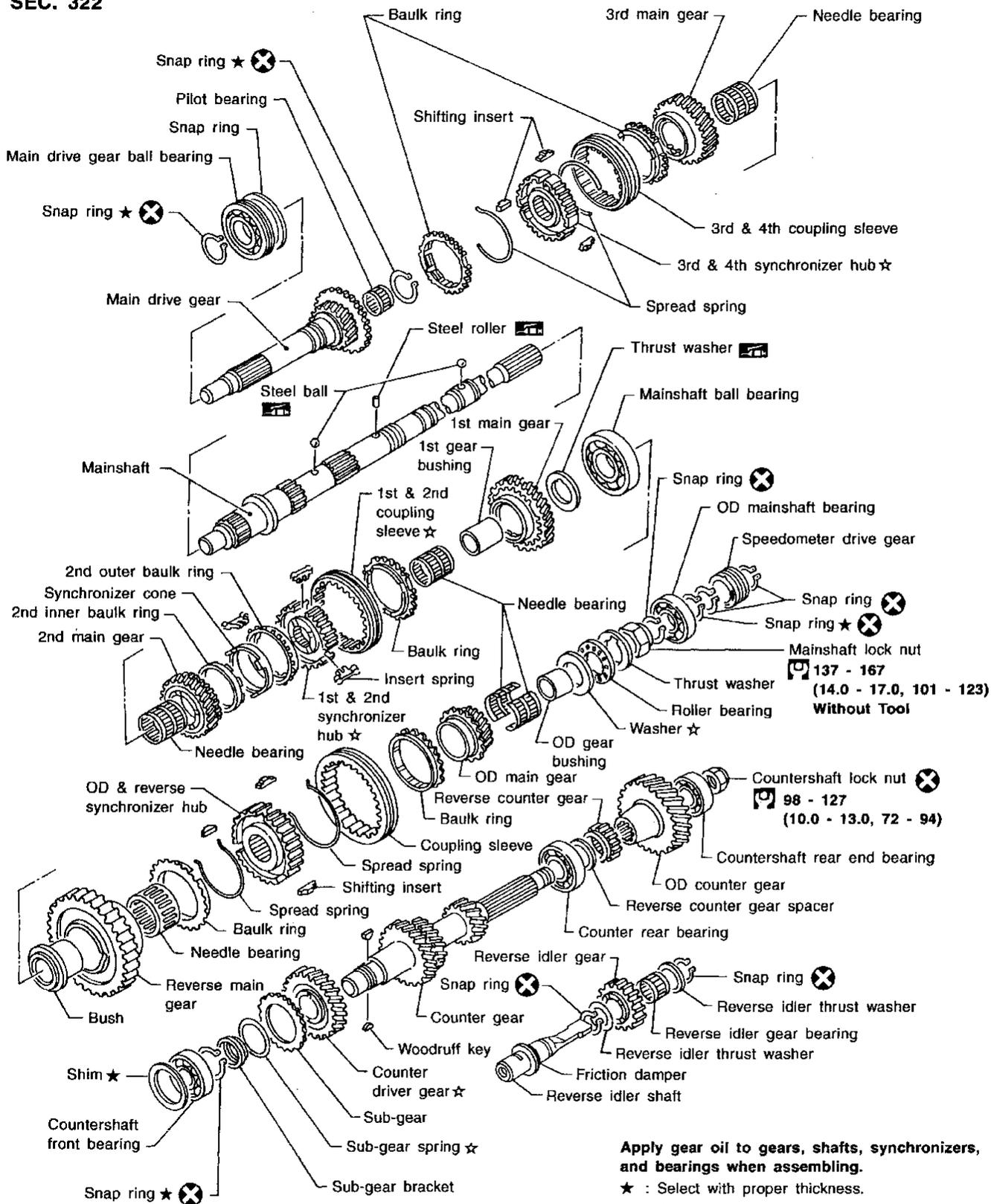
Bolt No.	Tightening torque N·m (kg·m, ft·lb)	"l" mm (in)
①	39 - 49 (4.0 - 5.0, 29 - 36)	60 (2.36)
②	39 - 49 (4.0 - 5.0, 29 - 36)	70 (2.76)
③ *	29 - 39 (3.0 - 4.0, 22 - 29)	35 (1.38)
④ *	29 - 39 (3.0 - 4.0, 22 - 29)	65 (2.56)
⑤	29 - 39 (3.0 - 4.0, 22 - 29)	25 (0.98)
Gusset to engine	29 - 39 (3.0 - 4.0, 22 - 29)	20 (0.79)

*: With nut.

- Install any part removed.

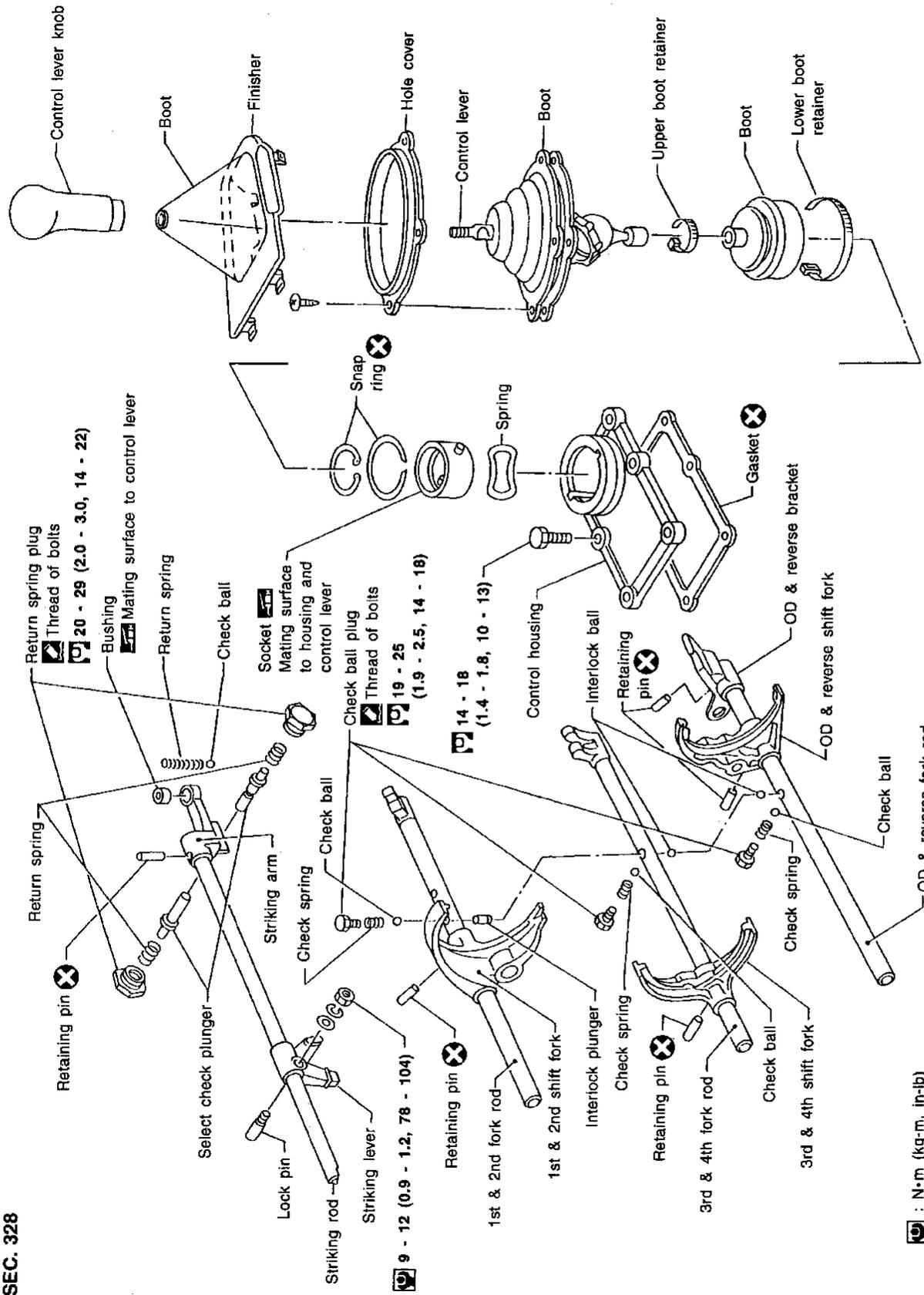
Gear Components

SEC. 322



Apply gear oil to gears, shafts, synchronizers, and bearings when assembling.
 ★ : Select with proper thickness.
 ☆ : Pay attention to its direction.
 [N] : N•m (kg-m, ft-lb)

Shift Control Components



CAUTION:
 To avoid damage when replacing control lever knob, remove control lever with knob as an assembly.

: N·m (kg·m, in·lb)
 : N·m (kg·m, ft·lb)
 : Apply recommended sealant (Nissan genuine part: KP610-00250) or equivalent.

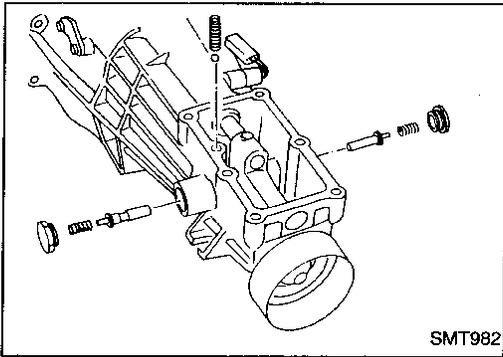
SEC. 328

MT-11

SMT846C

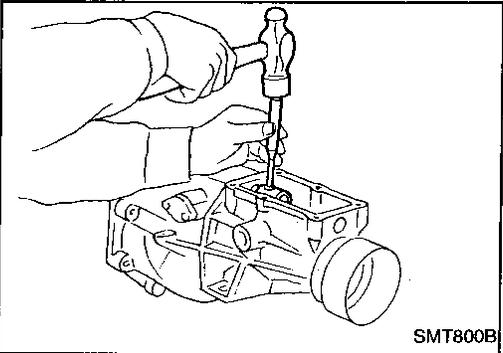
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DISASSEMBLY

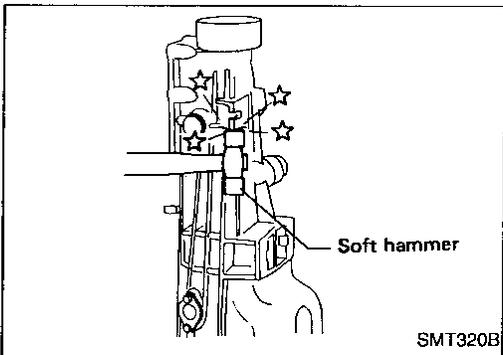


Case Components

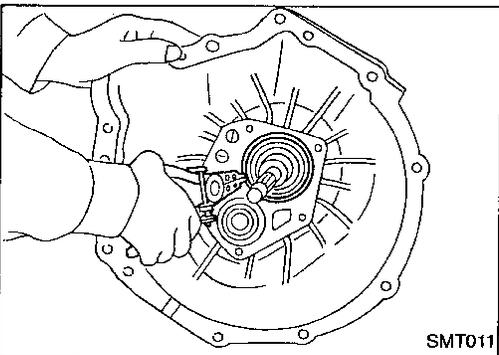
1. Remove rear extension.
 - a. Remove control housing, check ball, return spring plug, select check plunger and return springs.



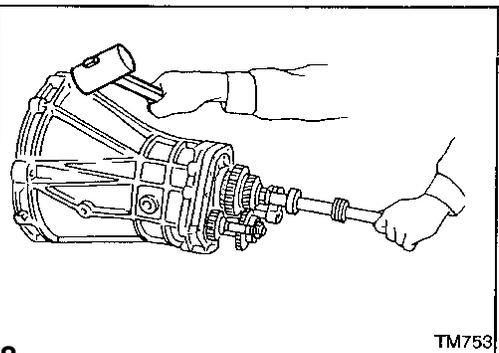
- b. Drive out striking arm retaining pin.
 - c. Remove striking arm from striking rod.



- d. Remove rear extension by lightly tapping it.



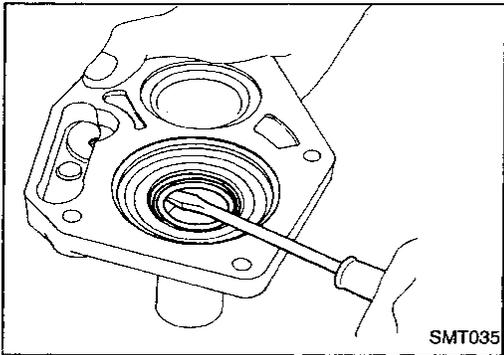
2. Remove front cover, gasket, shim of countershaft front bearing, and snap ring of main drive gear ball bearing.



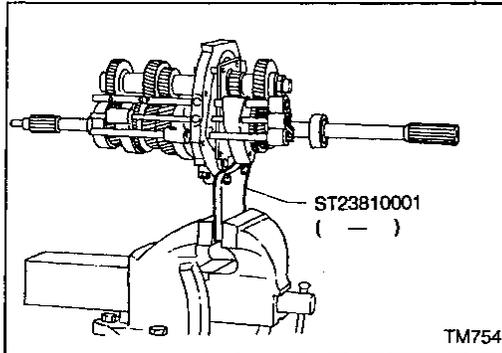
3. Remove transmission case by tapping lightly.

DISASSEMBLY

Case Components (Cont'd)

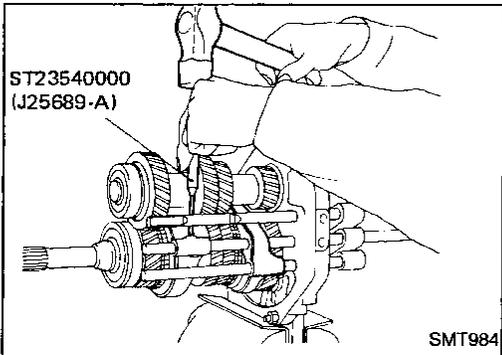


4. Remove front cover oil seal.

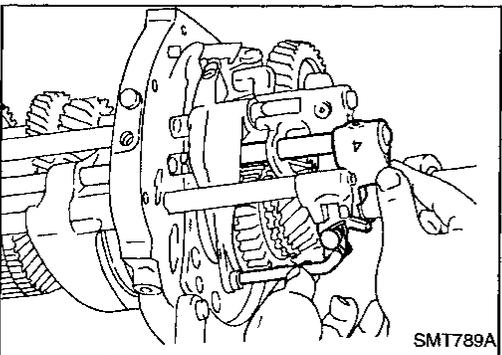


Shift Control Components

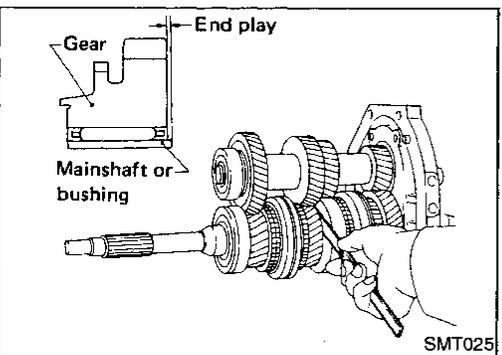
1. Set up Tool on adapter plate.
2. Remove striking rod from adapter plate.
3. Remove check ball plugs, check springs, and check balls.



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



5. Draw out 3rd-4th and OD-reverse fork rods.



Gear Components

1. Before removing gears and shafts, measure each gear end play.

Gear end play:

Refer to SDS, MT-28.

If not within specification, disassemble and check contact surface of gear to hub, washer, bushing, needle bearing and shaft.

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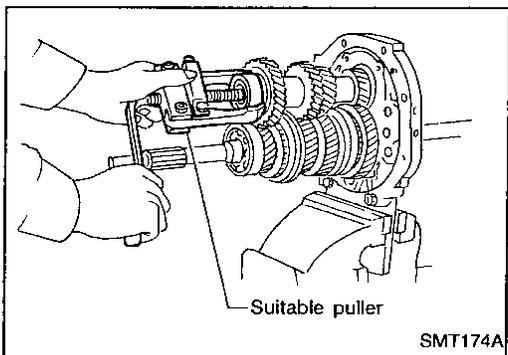
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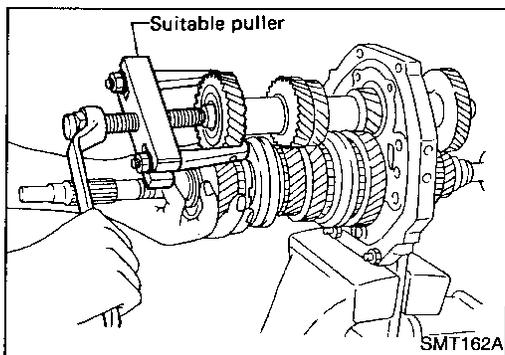
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DISASSEMBLY

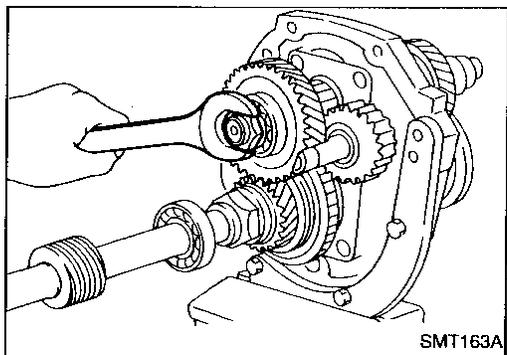
Gear Components (Cont'd)



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

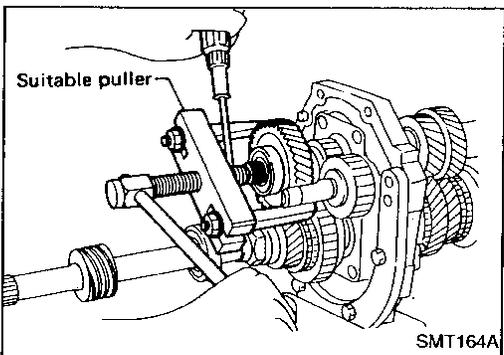


4. Draw out counter drive gear with main drive gear assembly with suitable puller.
 - **When drawing out main drive gear assembly, be careful not to drop pilot bearing and baulk ring.**

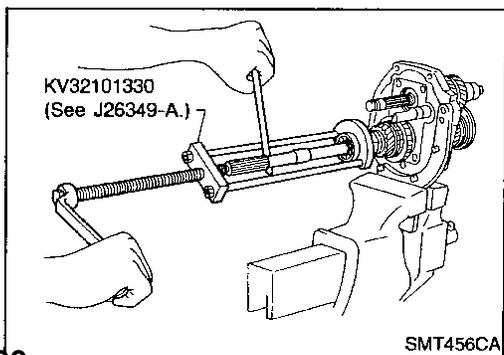


5. Remove rear side components on mainshaft and counter gear.
 - a. Release staking on countershaft nut and mainshaft nut and loosen these nuts.

Mainshaft nut: Left-hand thread



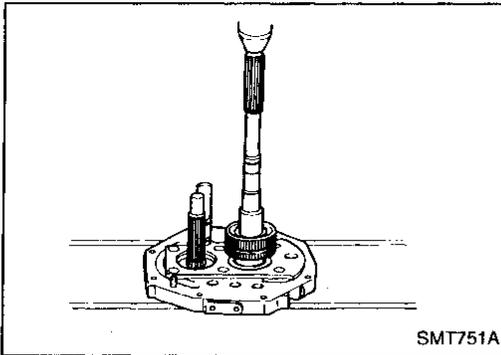
- b. Pull out OD counter gear with bearing with suitable puller.
 - c. Draw out reverse counter gear and spacer.
 - d. Remove snap rings from reverse idler shaft and draw out reverse idler gear, thrust washers and reverse idler gear bearing.
 - e. Remove speedometer drive gear and steel ball.



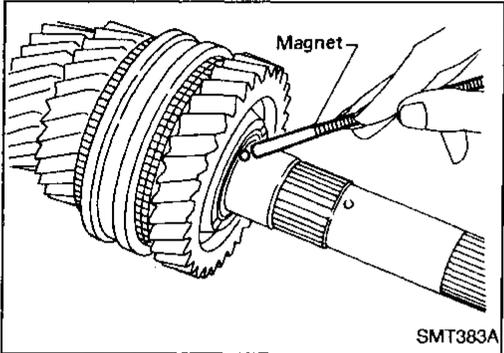
- f. Remove snap ring and pull out OD mainshaft bearing, then remove snap ring.
 - g. Remove mainshaft nut.
 - h. Remove steel roller and washer.
 - i. Remove roller bearing and washer.
 - j. Remove OD main gear, needle bearing and baulk ring (OD).
 - k. Remove OD coupling sleeve and shifting inserts.

DISASSEMBLY

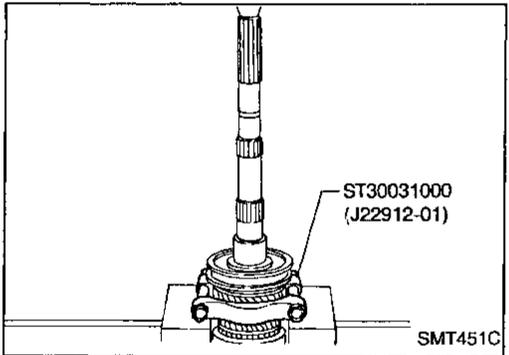
Gear Components (Cont'd)



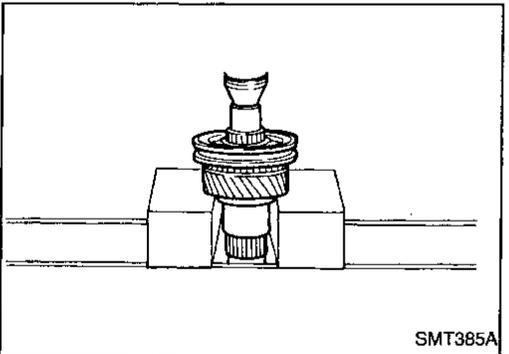
- i. Press out mainshaft and counter gear alternately.
- **Press down mainshaft and counter gear alternately and carefully. Do not allow gears attached to mainshaft and counter gear underneath adapter plate to hit each other.**



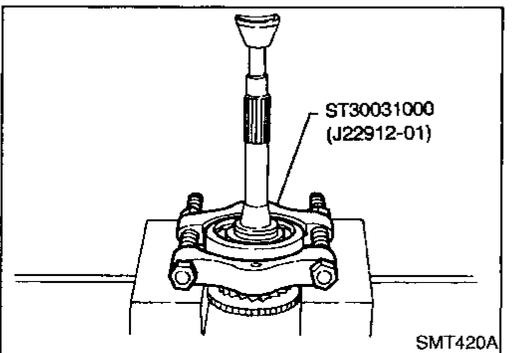
6. Remove front side components on mainshaft.
 - a. Remove 1st gear washer and steel ball.
 - b. Remove 1st main gear and 1st gear needle bearing.



- c. Press out 2nd main gear together with 1st gear bushing and 1st & 2nd synchronizer assembly.
- d. Remove mainshaft front snap ring.



- e. Press out 3rd main gear together with 3rd & 4th synchronizer assembly and 3rd gear needle bearing.



7. Remove main drive gear bearing.
 - a. Remove main drive gear snap ring and spacer.
 - b. Press out main drive gear bearing.

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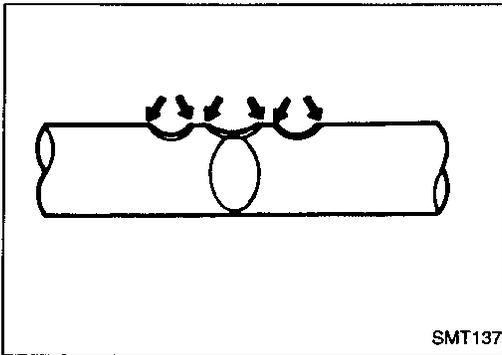
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Shift Control Components

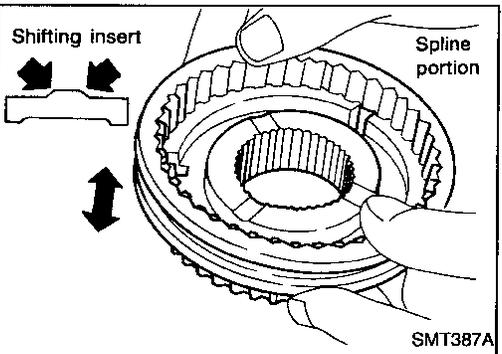
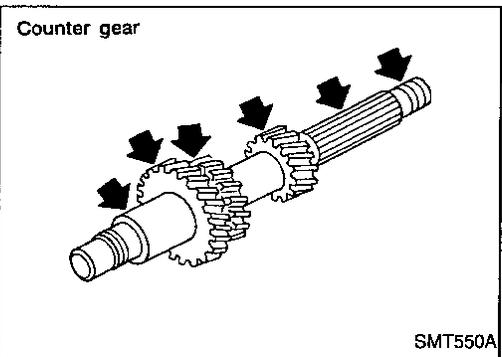
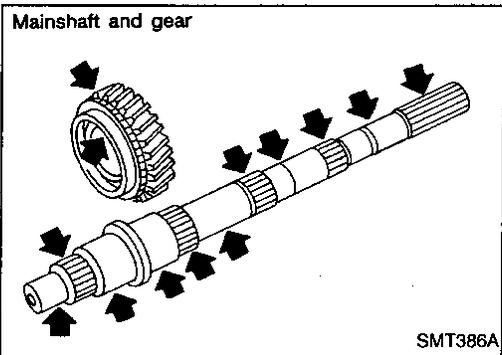
- Check contact surface and sliding surface for wear, scratches, projections or other damage.



Gear Components

GEAR AND SHAFT

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

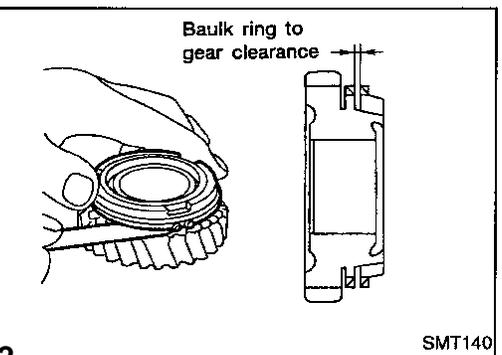


SYNCHRONIZERS

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

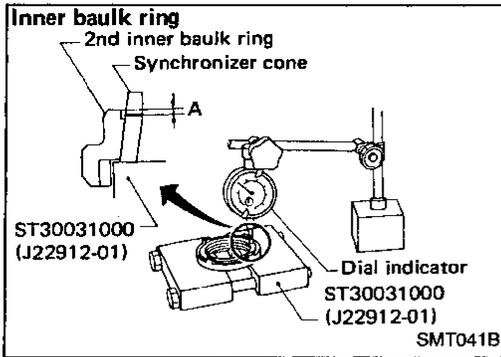
- Measure clearance between baulk ring and gear.
Clearance between baulk ring and gear
(1st, 3rd, main drive, OD and reverse baulk ring):
Refer to SDS, MT-29.

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



INSPECTION

Gear Components (Cont'd)



- Measure wear of 2nd baulk ring.
- a. Place baulk rings in position on synchronizer cone.
- b. While holding baulk rings against synchronizer cone as far as it will go, measure dimensions "A" and "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)

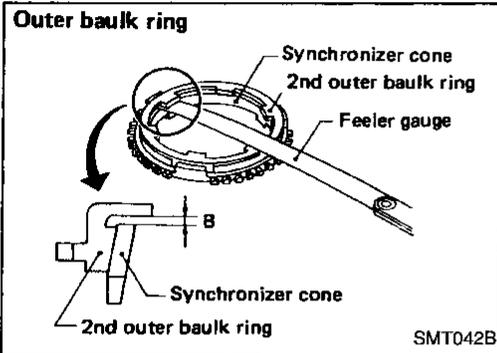
Wear limit:

0.2 mm (0.008 in)

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

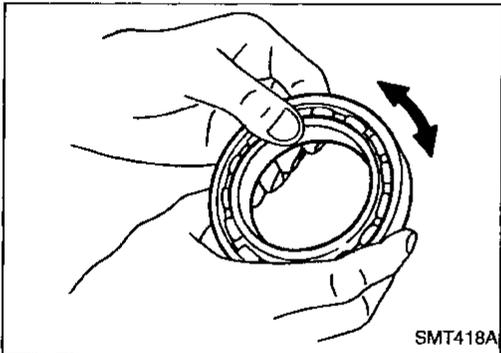
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BEARINGS



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

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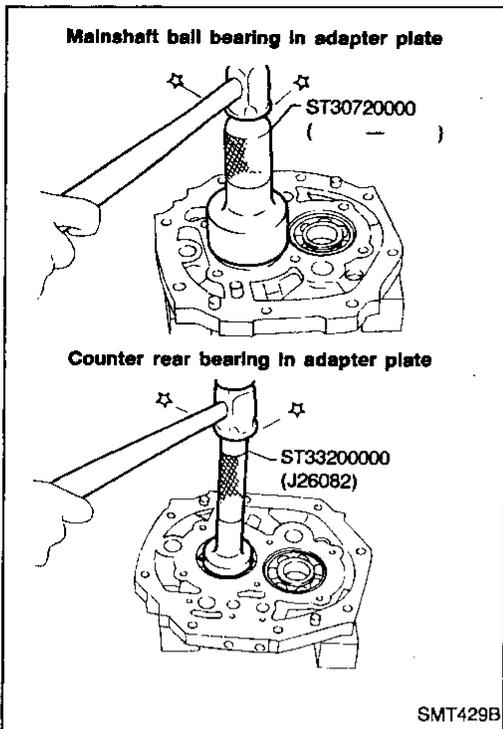
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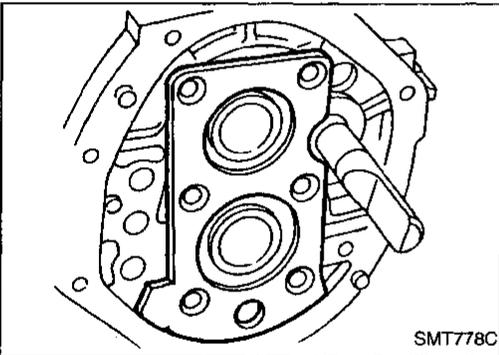
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Gear Components

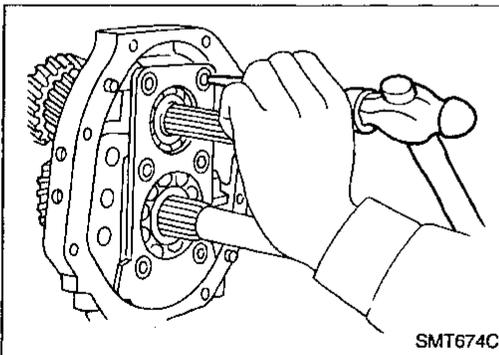
1. Install bearings into case components.



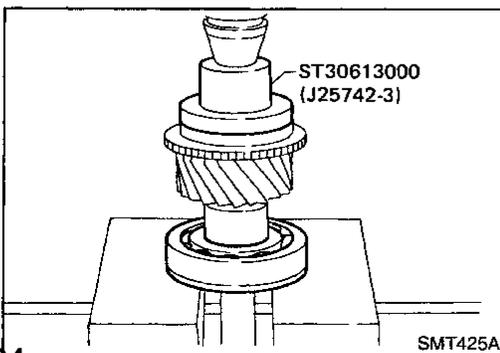
2. Assemble adapter plate parts.
- Install bearing retainer.
 - a. Insert reverse shaft, then install bearing retainer.



- b. Tighten each screw, then stake each at two points.

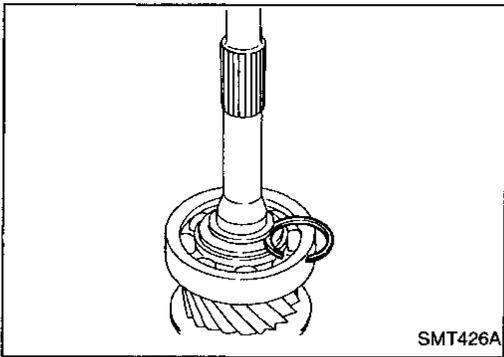


3. Install main drive gear bearing.
- a. Press main drive gear bearing.
 - b. Install main drive gear spacer.



ASSEMBLY

Gear Components (Cont'd)



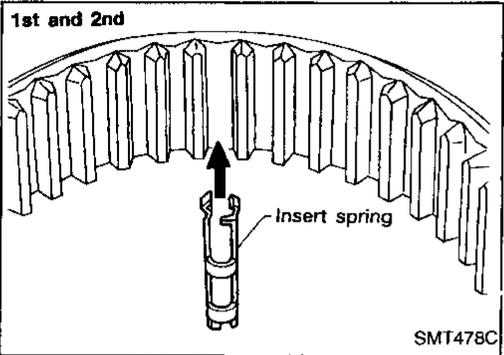
- c. Select proper main drive gear snap ring to minimize clearance of groove and install it.

Allowable clearance of groove:

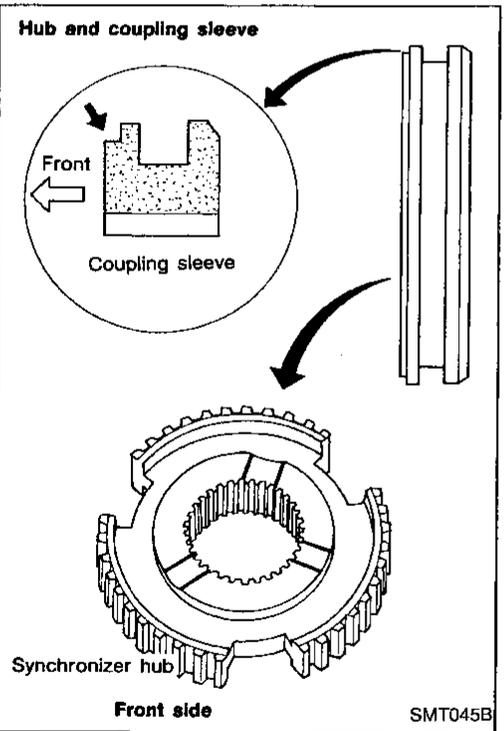
0 - 0.13 mm (0 - 0.0051 in)

Main drive gear bearing snap ring:

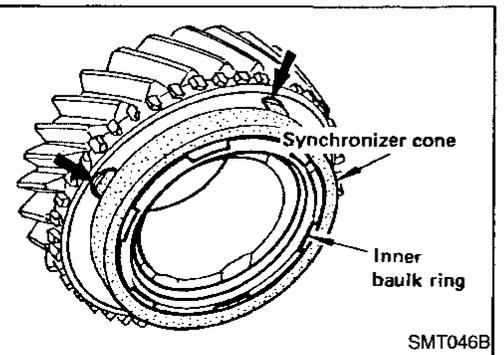
Refer to SDS, MT-29.



4. Assemble synchronizers.
- 1st & 2nd synchronizer



- Check coupling sleeve and synchronizer hub orientation.



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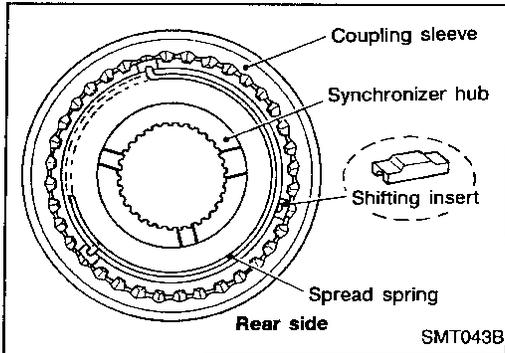
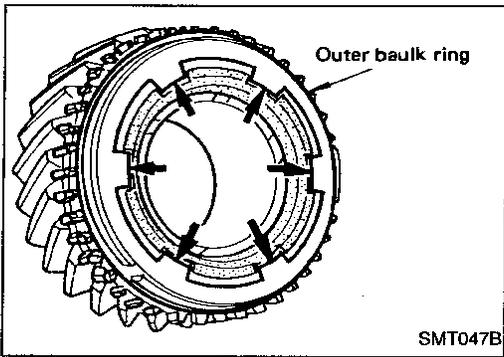
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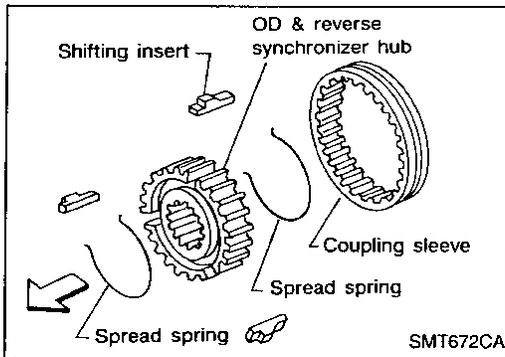
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ASSEMBLY

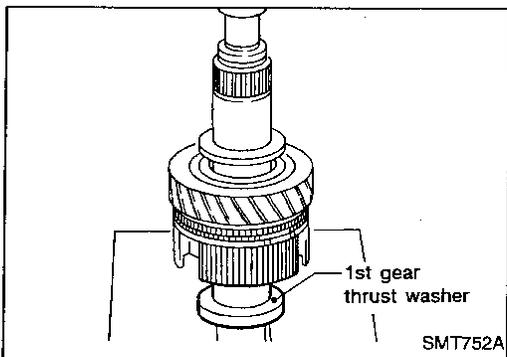
Gear Components (Cont'd)



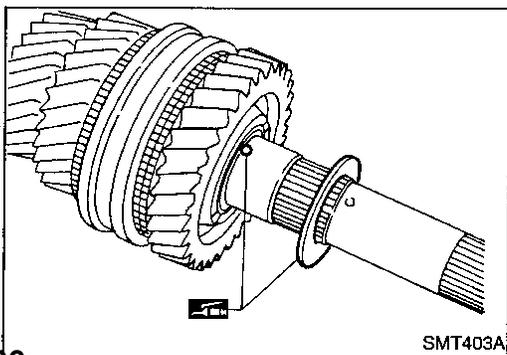
- 3rd & 4th synchronizer



- OD & reverse synchronizer



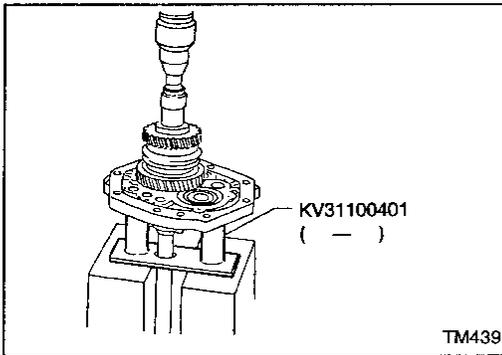
5. Install front side components on main shaft.
 - a. Assemble 2nd main gear, needle bearing and 1st & 2nd synchronizer assembly. Then press 1st gear bushing on main shaft.
 - b. Install 1st main gear.



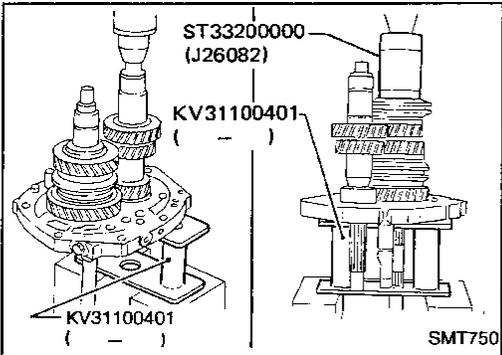
- c. Install steel ball and 1st gear washer.
 - Apply multi-purpose grease to steel ball and 1st gear washer before installing.

ASSEMBLY

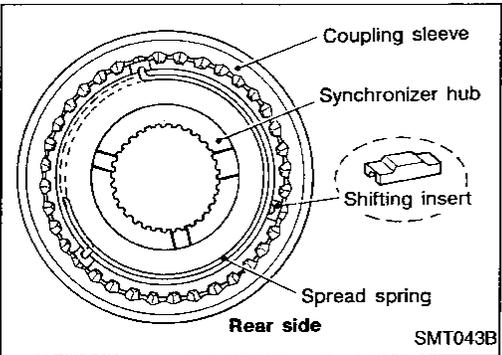
Gear Components (Cont'd)



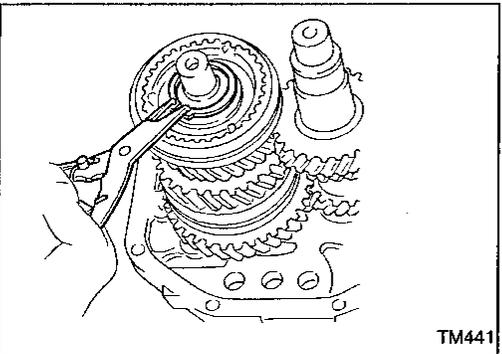
6. Install mainshaft and counter gear on adapter plate and main drive gear on mainshaft.
 - a. Press mainshaft assembly to adapter plate with Tool.



- b. Press counter gear into adapter plate with Tool.
 - c. Install 3rd main gear and then press 3rd & 4th synchronizer assembly.



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



- d. Install thrust washer on mainshaft and secure it with mainshaft front snap ring. Select proper snap ring to minimize clearance of groove in mainshaft.

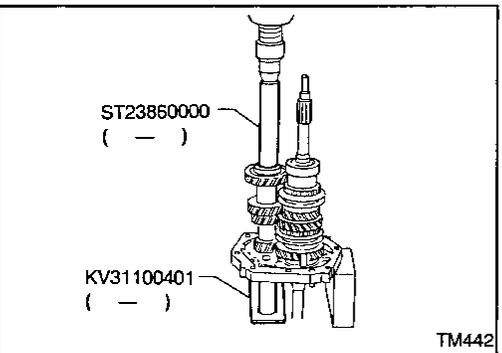
Allowable clearance of groove:

0 - 0.18 mm (0 - 0.0071 in)

Mainshaft front snap ring:

Refer to SDS, MT-29.

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



- f. Press counter drive gear with main drive gear with Tool.

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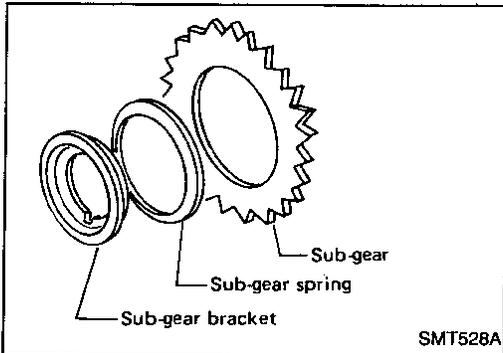
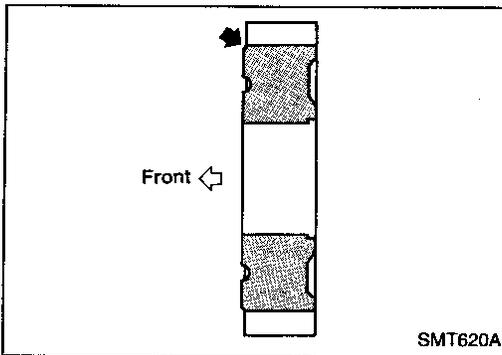
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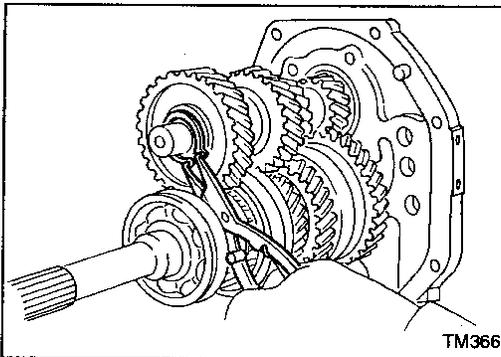
ASSEMBLY

Gear Components (Cont'd)

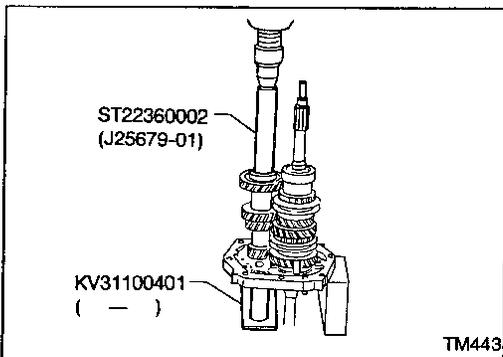
- Pay attention to direction of counter drive gear.



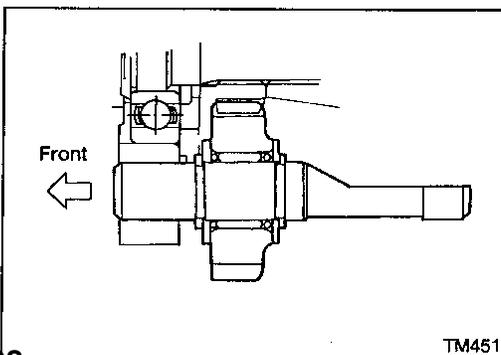
- g. Install sub-gear components.
- (1) Install sub-gear and sub-gear bracket on counter drive gear. Then select proper snap ring to minimize clearance of groove in counter gear.
 - Allowable clearance of groove:**
0 - 0.13 mm (0 - 0.0051 in)
 - Counter drive gear snap ring:**
Refer to SDS, MT-29.
 - (2) Remove snap ring, sub-gear bracket and sub-gear from counter gear.
 - (3) Reinstall sub-gear, sub-gear spring and sub-gear bracket.



- h. Install selected counter drive gear snap ring.



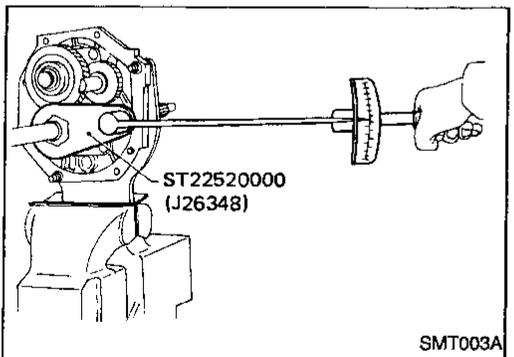
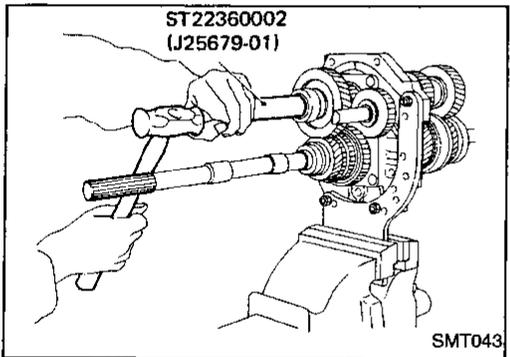
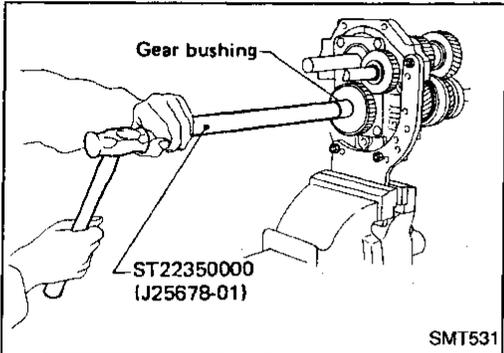
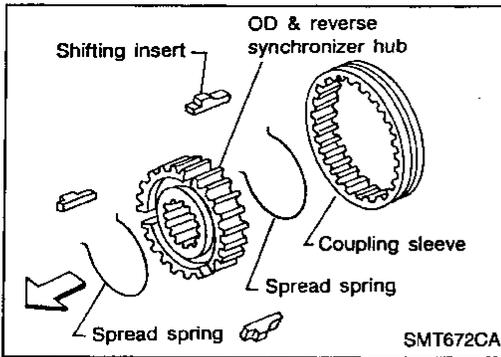
- i. Press counter gear front bearing onto counter gear.



7. Install rear side components on mainshaft and counter gear.
- a. Install reverse idler gear to reverse idler shaft with spacers, snap rings and needle bearing.

ASSEMBLY

Gear Components (Cont'd)



- b. Install insert retainer and OD & reverse synchronizer to mainshaft.
- Pay attention to direction of hub.

- c. Install OD gear bushing with Tool.
 d. Install OD main gear and needle bearing.
 e. Install spacer, reverse counter gear and OD counter gear.
- OD main gear and OD counter gear should be handled as a matched set.
- f. Install washer, roller bearing, steel roller and thrust washer.
 g. Tighten mainshaft lock nut temporarily.
- Always use new lock nut.

- h. Install countershaft rear end bearing with Tool.

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

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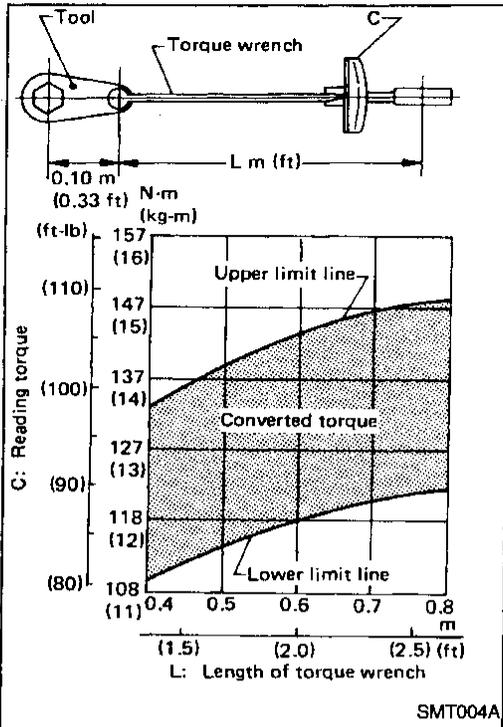
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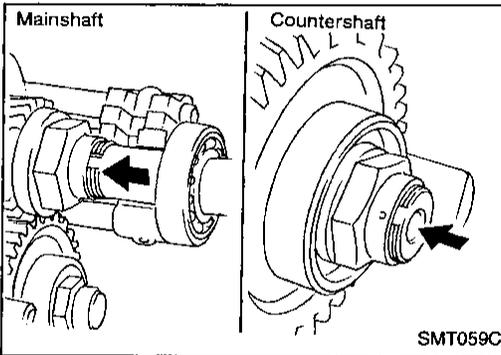
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ASSEMBLY

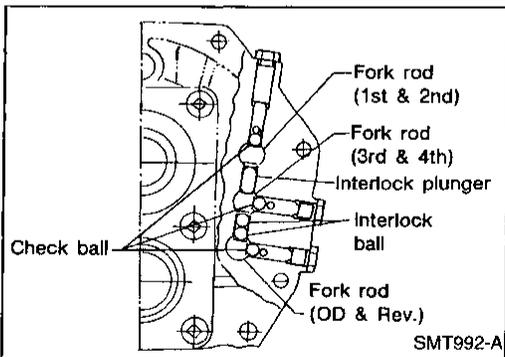
Gear Components (Cont'd)



- Use the left chart when deciding the reading torque. (Length of torque wrench vs. setting or reading torque)
9. Tighten countershaft lock nut.
- **Always use new lock nut.**



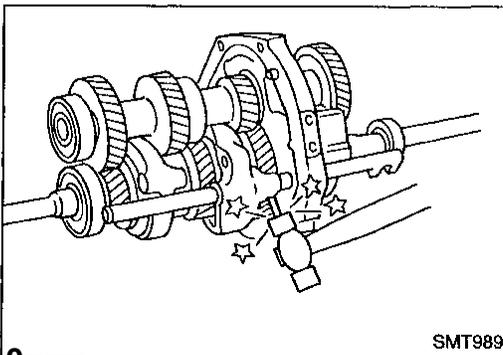
10. Stake mainshaft lock nut and countershaft lock nut with a punch.
11. Measure gear end play. For the description, refer to DISASSEMBLY for Gear Components, MT-13.



Shift Control Components

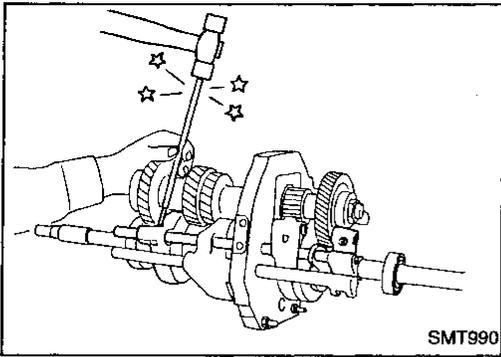
1. Install fork rods, interlock plunger, interlock balls and check balls.

- a. 1st-2nd shift fork

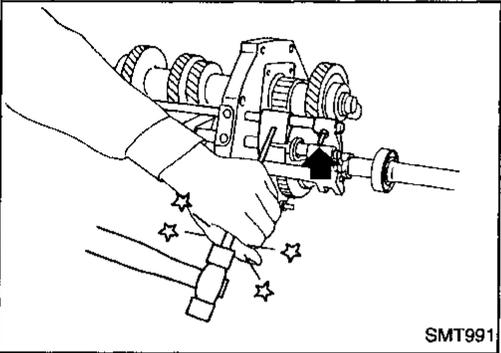


ASSEMBLY

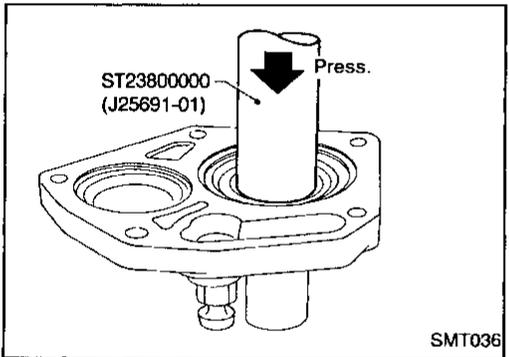
Shift Control Components (Cont'd)



b. 3rd-4th shift fork

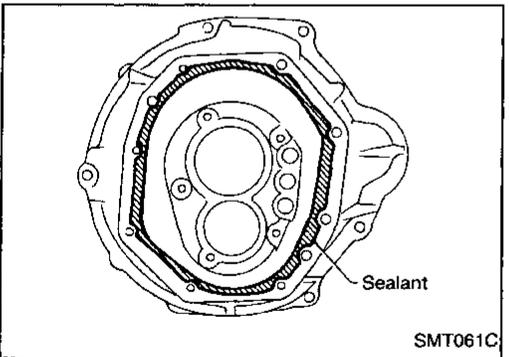


c. OD-reverse shift fork or reverse shift fork

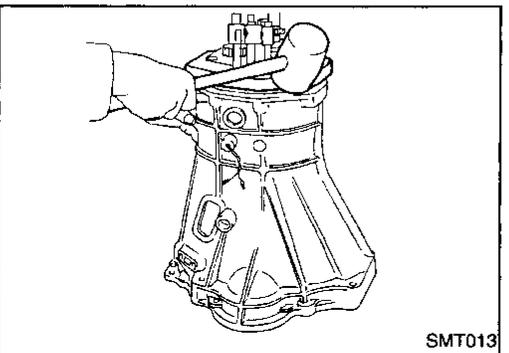


Case Components

1. Install front cover oil seal.
 - Apply multi-purpose grease to seal lip of oil seal before installing.



2. Apply sealant to mating surface of transmission case.



3. Install gear assembly onto transmission case.

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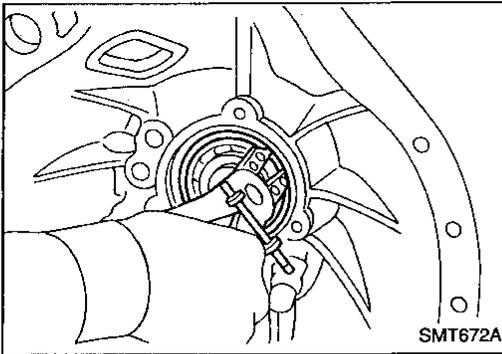
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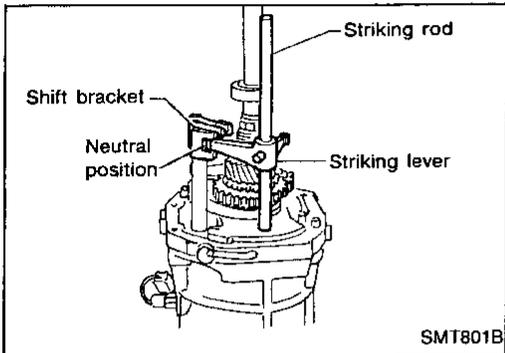
ASSEMBLY

Case Components (Cont'd)

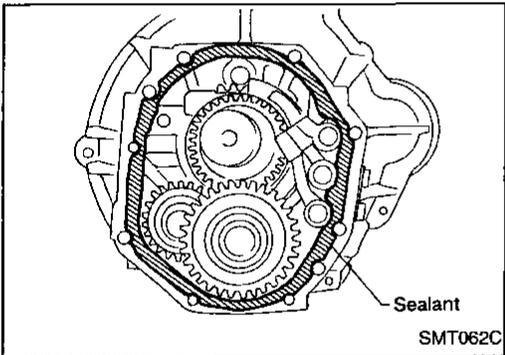
4. Install snap ring of main drive bearing.



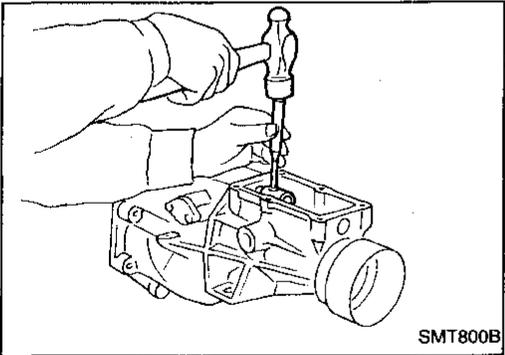
5. Set 1st & 2nd, 3rd & 4th and 5th & reverse shift forks in neutral position.
6. Install striking rod onto adapter plate while aligning striking lever with shift brackets.



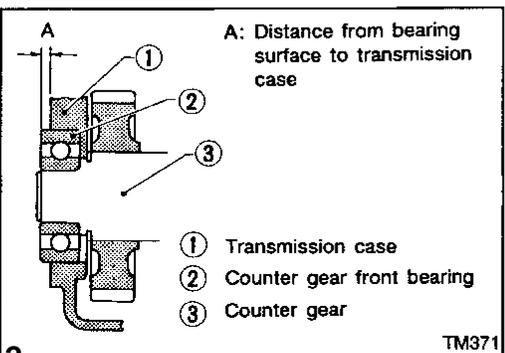
7. Apply sealant to mating surface of adapter plate.
8. Install rear extension while inserting striking arm into striking rod.



9. Install striking arm retaining pin.

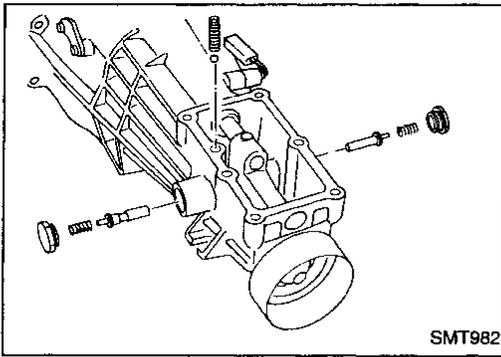


10. Select counter front bearing shim.
**Counter front bearing shim:
Refer to SDS, MT-29.**
11. Install gasket and front cover.



ASSEMBLY

Case Components (Cont'd)



12. Install return spring plugs, check ball, return springs and select check plunger.
13. Install control housing and gasket.

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SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

Transmission model		F55W71C													
Number of speeds		5													
Shift pattern															
Synchromesh type		Wamer													
Gear ratio		<table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 30%;">1st</td><td style="text-align: right;">3.321</td></tr> <tr><td>2nd</td><td style="text-align: right;">1.902</td></tr> <tr><td>3rd</td><td style="text-align: right;">1.308</td></tr> <tr><td>4th</td><td style="text-align: right;">1.000</td></tr> <tr><td>OD</td><td style="text-align: right;">0.759</td></tr> <tr><td>Reverse</td><td style="text-align: right;">3.382</td></tr> </table>		1st	3.321	2nd	1.902	3rd	1.308	4th	1.000	OD	0.759	Reverse	3.382
1st	3.321														
2nd	1.902														
3rd	1.308														
4th	1.000														
OD	0.759														
Reverse	3.382														
Number of teeth	Mainshaft	Drive	22												
		1st	33												
		2nd	27												
		3rd	26												
		OD	21												
		Reverse	36												
	Countershaft	Drive	31												
		1st	14												
		2nd	20												
		3rd	28												
OD		39													
Reverse idler gear		15													
Reverse idler gear		21													
Oil capacity		ℓ (US pt, Imp pt)	2.5 (5-1/4, 4-3/8)												
Remarks	Sub-gear	○													
	Reverse synchronizer	○													
	Double baulk ring type synchronizer	2nd synchronizer													

Inspection and Adjustment

GEAR END PLAY

Gear	End play mm (in)
1st gear	0.31 - 0.41 (0.0122 - 0.0161)
2nd gear	0.11 - 0.21 (0.0043 - 0.0083)
3rd gear	0.11 - 0.21 (0.0043 - 0.0083)
OD gear	0.24 - 0.41 (0.0094 - 0.0161)

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment (Cont'd)

CLEARANCE BETWEEN BAULK RING AND GEAR

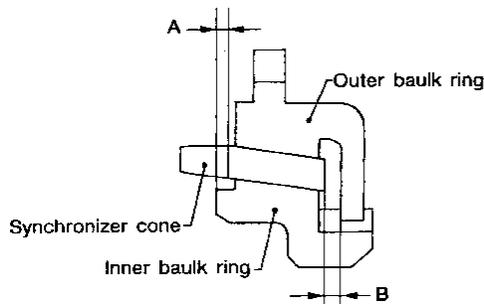
1st, 3rd, main drive, OD and reverse baulk ring

Unit: mm (in)

	Standard	Wear limit
1st	1.2 - 1.6 (0.047 - 0.063)	0.8 (0.031)
3rd and main drive	1.2 - 1.6 (0.047 - 0.063)	
OD	1.2 - 1.6 (0.047 - 0.063)	
Reverse	1.10 - 1.55 (0.0433 - 0.0610)	0.7 (0.028)

2nd baulk ring

Unit: mm (in)



SMT733C

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 SNAP RINGS

Main drive gear bearing

Allowable clearance	0 - 0.13 mm (0 - 0.0051 in)	
Thickness mm (in)	Part number	
1.87 (0.0736)	32204-78001	
1.94 (0.0764)	32204-78002	
2.01 (0.0791)	32204-78003	

Mainshaft front

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

OD mainshaft bearing

Allowable clearance	0 - 0.14 mm (0 - 0.0055 in)	
Thickness mm (in)	Part number	
1.1 (0.043)	32228-20100	
1.2 (0.047)	32228-20101	
1.3 (0.051)	32228-20102	
1.4 (0.055)	32228-20103	

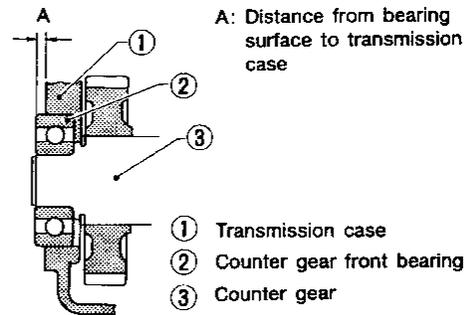
Counter drive gear

Allowable clearance	0 - 0.13 mm (0 - 0.0051 in)	
Thickness mm (in)	Part number	
1.4 (0.055)	32215-E9000	
1.5 (0.059)	32215-E9001	
1.6 (0.063)	32215-E9002	

AVAILABLE SHIMS

Counter front bearing

Unit: mm (in)



A: Distance from bearing surface to transmission case

- ① Transmission case
- ② Counter gear front bearing
- ③ Counter gear

TM371

Allowable clearance	0 - 0.16 mm (0 - 0.0063 in)	
"A"	Thickness of shim	Part number
4.52 - 4.71 (0.1780 - 0.1854)	Not necessary	
4.42 - 4.51 (0.1740 - 0.1776)	0.1 (0.004)	32218-V5000
4.32 - 4.41 (0.1701 - 0.1736)	0.2 (0.008)	32218-V5001
4.22 - 4.31 (0.1661 - 0.1697)	0.3 (0.012)	32218-V5002
4.12 - 4.21 (0.1622 - 0.1657)	0.4 (0.016)	32218-V5003
4.02 - 4.11 (0.1583 - 0.1618)	0.5 (0.020)	32218-V5004
3.92 - 4.01 (0.1543 - 0.1579)	0.6 (0.024)	32218-V5005

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