SERVICE MANUAL

DATSUN 240Z
MODEL S30 SERIES



NISSAN

NISSAN MOTOR CO., LTD.
TOKYO, JAPAN

SECTION TM

TRANSMISSION

TM

MANUAL TRANSMISSION ..... TM- 1
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MANUAL TRANSMISSION

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DESCRIPTION

The transmission is of a 4-speed forward, fully synchronized constant-mesh type that uses helical gears.

The reverse gear is of a slidingmesh type using spur gears. In construction, the main drive shaft gear is meshed with the counter drive gear which is keyed to the countershaft.

The forward speed gears on the countershaft are in constant mesh with the mainshaft gears which ride on the mainshaft freely through the needle roller bearing.

When shifting is accomplished, the inner teeth of the coupling sleeve slide over the synchronizer hub and mesh with the outer teeth which are provided on the mainshaft gear.

The synchronizer hub is fitted to the mainshaft by splines so the main drive shaft turns together with the mainshaft.

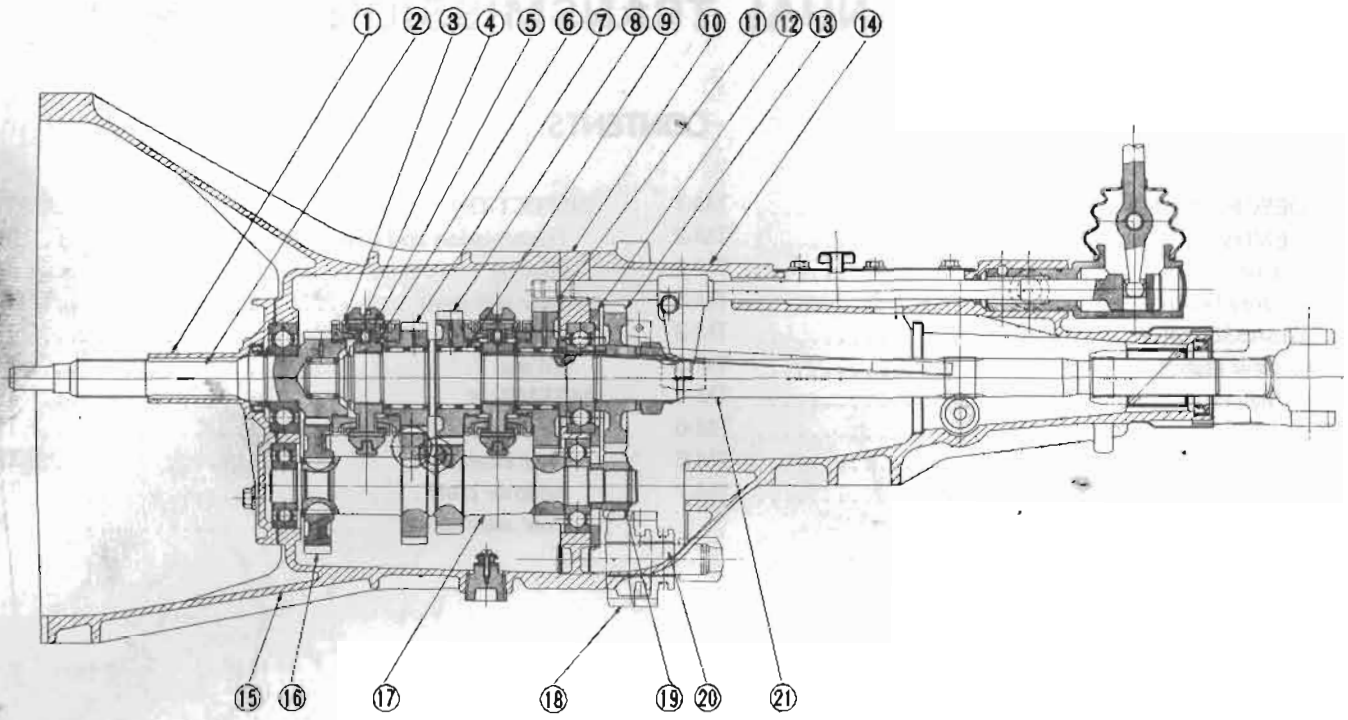
The baulk ring serves to synchronize the coupling sleeve and mainshaft gear.

Placing the control lever in reverse position brings the reverse idler gear into mesh with mainshaft reverse gear.

The transmission assembly consists of three main parts; a transmission case with clutch housing, adapter plate to which all gears and shafts are installed, and rear extension.

The cast-iron adapter plate supports the mainshaft, countershaft, reverse idler shaft and three fork rods, and is bolted, at the front to the transmission case and, at the rear, to the rear extension by means of through-bolts.

By removing these through-bolts, all gears and shafts are stripped.



1 Front cover
2 Main drive gear
3 Baulk ring
4 Coupling sleeve
5 Shifting insert
6 Synchronizer hub, 3rd & 4th
7 3rd speed gear, mainshaft
8 2nd speed gear, mainshaft
9 Needle roller bearing
10 Adapter plate
11 1st gear, mainshaft
12 Bearing retainer
13 Reverse gear, mainshaft
14 Rear extension housing
15 Transmission case
16 Counter drive gear
17 Countershaft
18 Reverse idler gear
19 Reverse counter gear
20 Reverse idler shaft
21 Mainshaft

TM191

Fig. TM-1 Sectional view of F4W71B transmission

REMOVAL AND INSTALLATION

Removal

1. Jack up the vehicle and support it with stands in a safe manner. Recommend a hydraulic hoist or open pit be utilized, if available.
2. Disconnect the battery terminals.
3. Disconnect the accelerator control from the carburetor linkage.
4. Unscrew the drain plug to drain gear oil (if necessary).
5. Remove the front exhaust tube.
6. Disconnect wire connections at the reverse lamp switch and the neutral switch.
7. Remove the clutch operating cylinder from the clutch housing.
8. Disconnect the speedometer cable from the rear extension housing.
9. Remove the propeller shaft.

Note: Plug the rear extension opening with a suitable cap to prevent oil from flowing out.

10. Support the engine by placing a jack beneath the oil pan with a wooden block. Do not place the jack on the drain plug.
11. Support the transmission with the transmission jack.
12. Remove the nut attaching the mounting member to the rear engine mounting insulator. Also remove two mounting member attaching bolts and then remove mounting member.

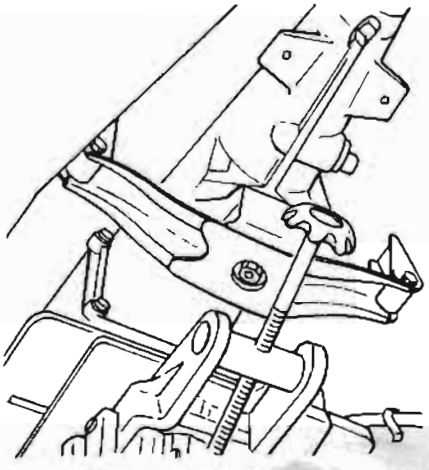


Fig. TM-2 Removing mounting member

13. Lower the jack gradually until the transmission can be taken out.
14. Remove starter motor.
15. Remove bolts attaching the clutch housing to the engine. Draw off the transmission rearward.

Note: Since the engine needs to be tilted use care not to force adjacent or surrounding parts or transmission main drive shaft.

Installation

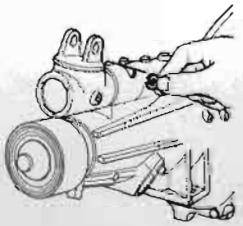
Remount transmission in reverse sequence of dismounting.

DISASSEMBLY

1. Prior to disassembling transmission assembly, thoroughly remove mud and other foreign matters from the outer surfaces.

Drain oil thoroughly.

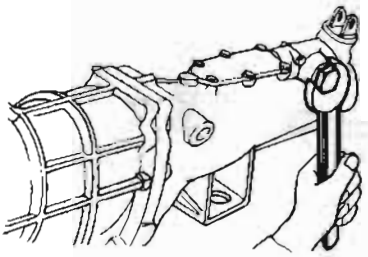
2. Remove dust cover from clutch housing. Remove release bearing with bearing sleeve, and withdrawal lever by taking off holder spring.
3. Remove back-up lamp switch.
4. Remove speedometer pinion and pinion sleeve by taking off lock plate.
5. Place all gears in their neutral positions.
6. Remove C-ring and pin from the rear end of rear extension.



TM200

Fig. TM-3 Removing striking rod C-ring

7. Remove return spring plug, return spring, reverse check spring, and plunger from rear extension.

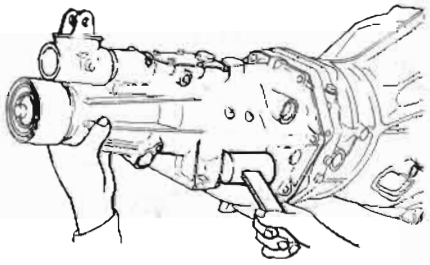


TM201

Fig. TM-4 Removing return spring plug

8. Remove eight (8) rear extension attaching bolts and turn the striking rod toward left.

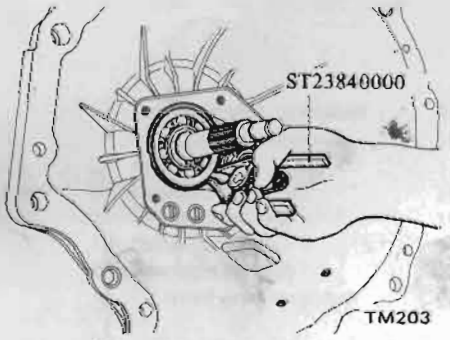
Drive out rear extension backward by lightly tapping it around with a soft hammer.



TM202

Fig. TM-5 Removing rear extension

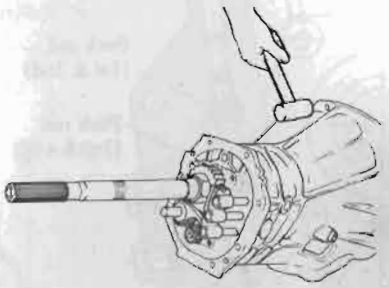
9. Remove five (5) bolts securing front cover to transmission case and remove front cover. Detach countershaft front bearing shim.
8. Remove main drive bearing snap ring with the special tool "Expander ST23840000."



TM203

Fig. TM-6 Removing main drive bearing snap ring

10. Separate transmission case from adapter plate with a soft hammer.



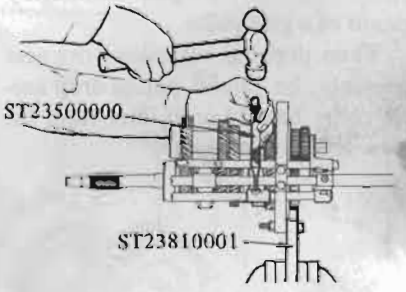
TM204

Fig. TM-7 Removing transmission case

11. Set up special tool "Setting Plate Adapter ST23810001" on adapter plate. With countershaft side up, place the above assembly in a vise.

Gear assembly

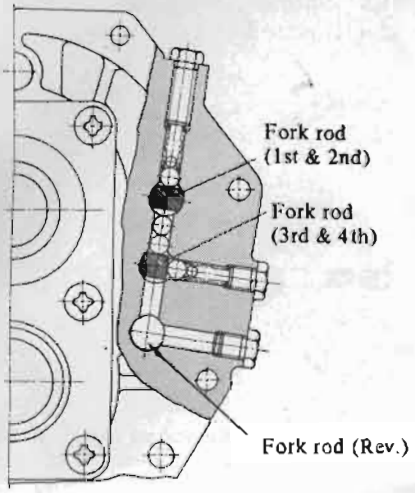
1. Drive out retaining pin from each fork rod with special tool "Fork Rod Pin Punch ST23500000."



TM206

Fig. TM-8 Removing retaining pin

2. Remove three (3) check ball plugs, and withdraw each fork rod from adapter plate by lightly tapping on the front end. Be careful not to lose three (3) check balls and four (4) interlock balls.



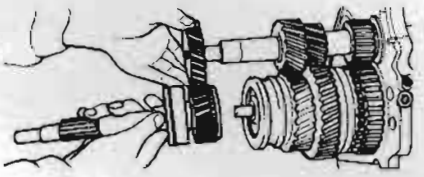
TM199

Fig. TM-9 Layout of check ball and interlock ball

Note: Each gear and shaft can be detached from adapter plate without removing each fork rod.

3. With gears doubly engaged, draw out countershaft front bearing using a suitable gear puller.
4. Remove counter drive gear snap ring.
5. Draw out counter drive gear complete with main drive gear assembly by means of a gear puller.

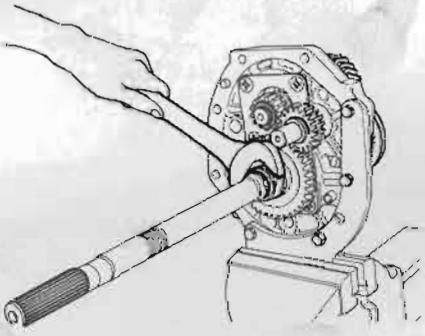
When drawing out main drive gear assembly, be careful not to drop needle roller bearing onto floor from the front end of mainshaft.



TM206

Fig. TM-10 Removing counterdrive gear and main drive gear

6. Remove snap ring and then thrust washer from mainshaft front end. Draw out 3rd & 4th synchronizer assembly and remove 3rd gear assembly.
7. Release caulking on main drive shaft nut and loosen mainshaft nut.



TM207

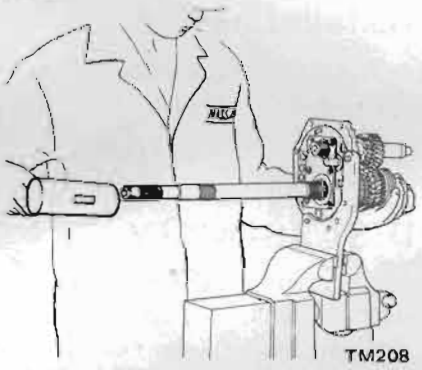
Fig. TM-11 Removing mainshaft nut

8. Remove mainshaft nut, thrust washer and main reverse gear.
9. Remove snap ring from countershaft rear end, and remove counter reverse gear.

Remove reverse idler gear.

10. Draw out mainshaft gear assembly together with countershaft by lightly tapping on rear end with a soft hammer while holding the front of mainshaft gear assembly by hand.

Be careful not to drop off gear shaft.



TM208

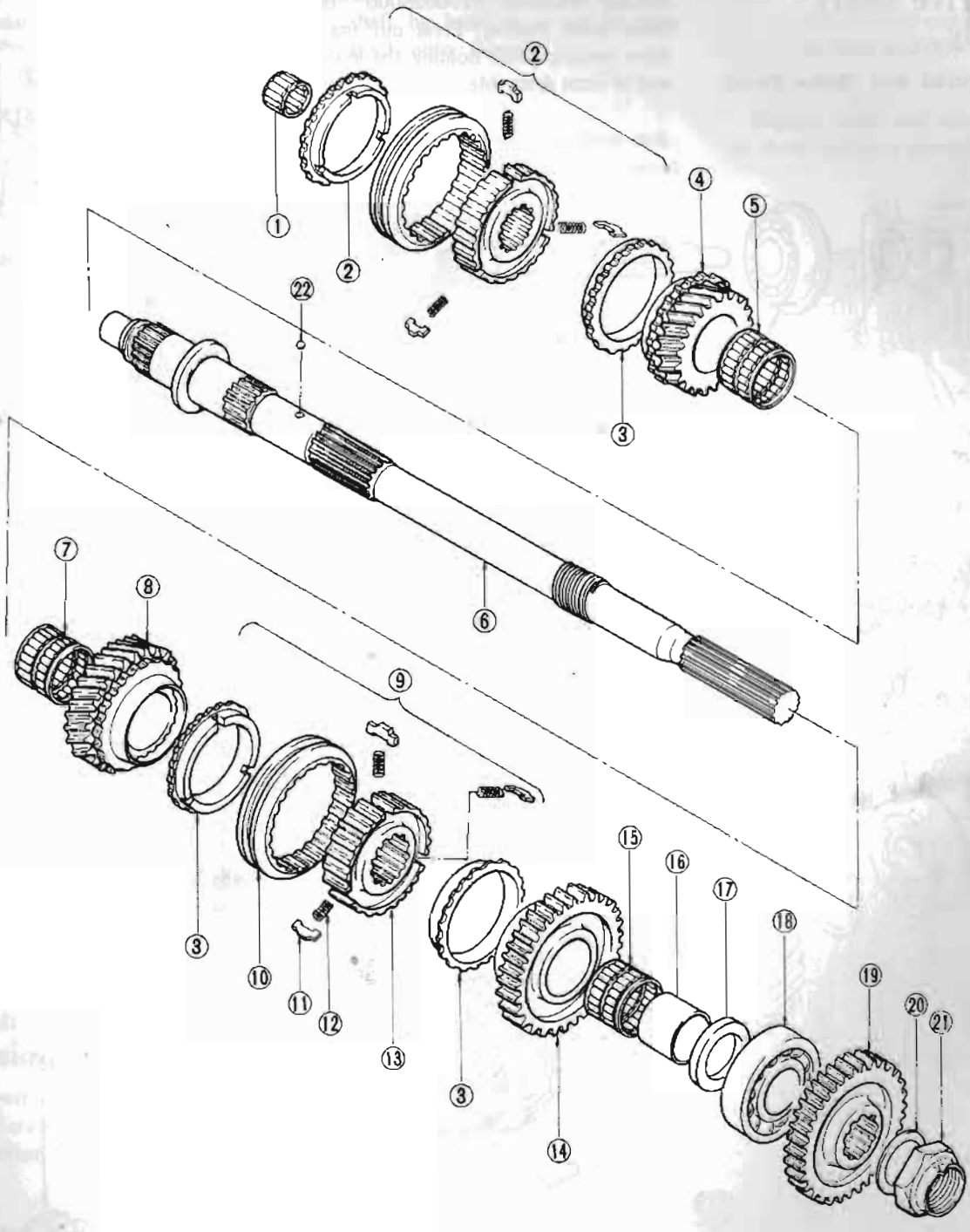
Fig. TM-12 Driving out gear assembly

11. Remove six (6) bearing retainer attaching screws with an impact wrench and remove bearing retainer from adapter plate.

Remove reverse idler shaft.

Mainshaft assembly

Disassemble mainshaft gear assembly.



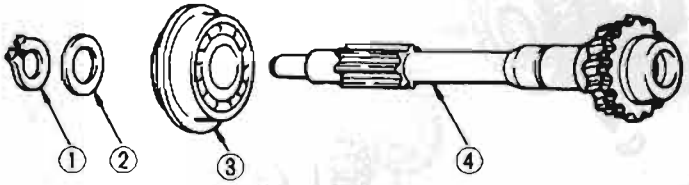
1 Pilot bearing
2 3rd & 4th synchromesh assembly
3 Baulk ring
4 3rd speed gear, mainshaft
5 Needle bearing
6 Mainshaft
7 Needle bearing
8 2nd speed gear, mainshaft
9 1st & 2nd synchromesh assembly
10 Coupling sleeve
11 Shifting insert
12 Spread spring
13 Synchronizer hub
14 1st speed gear, mainshaft
15 Needle bearing
16 Bush, 1st speed gear
17 Thrust washer, mainshaft
18 Mainshaft bearing
19 Reverse gear, mainshaft
20 Thrust washer
21 Nut
22 Steel ball

TM195

Fig. TM-13 Exploded view of mainshaft assembly

Main drive shaft assembly

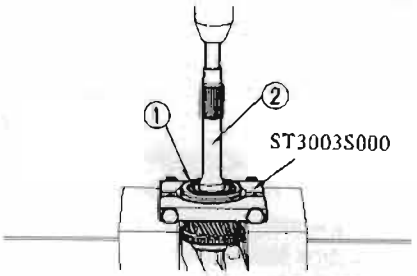
Install special tool "Drive Pinion Bearing Replacer ST3003S000" on main drive bearing. Press out main drive bearing while holding the lower end of main drive side.



1 Snap ring
2 Spacer
3 Main drive bearing with snap ring
4 Main drive shaft

TM159

Fig. TM-14 Exploded view of main drive shaft



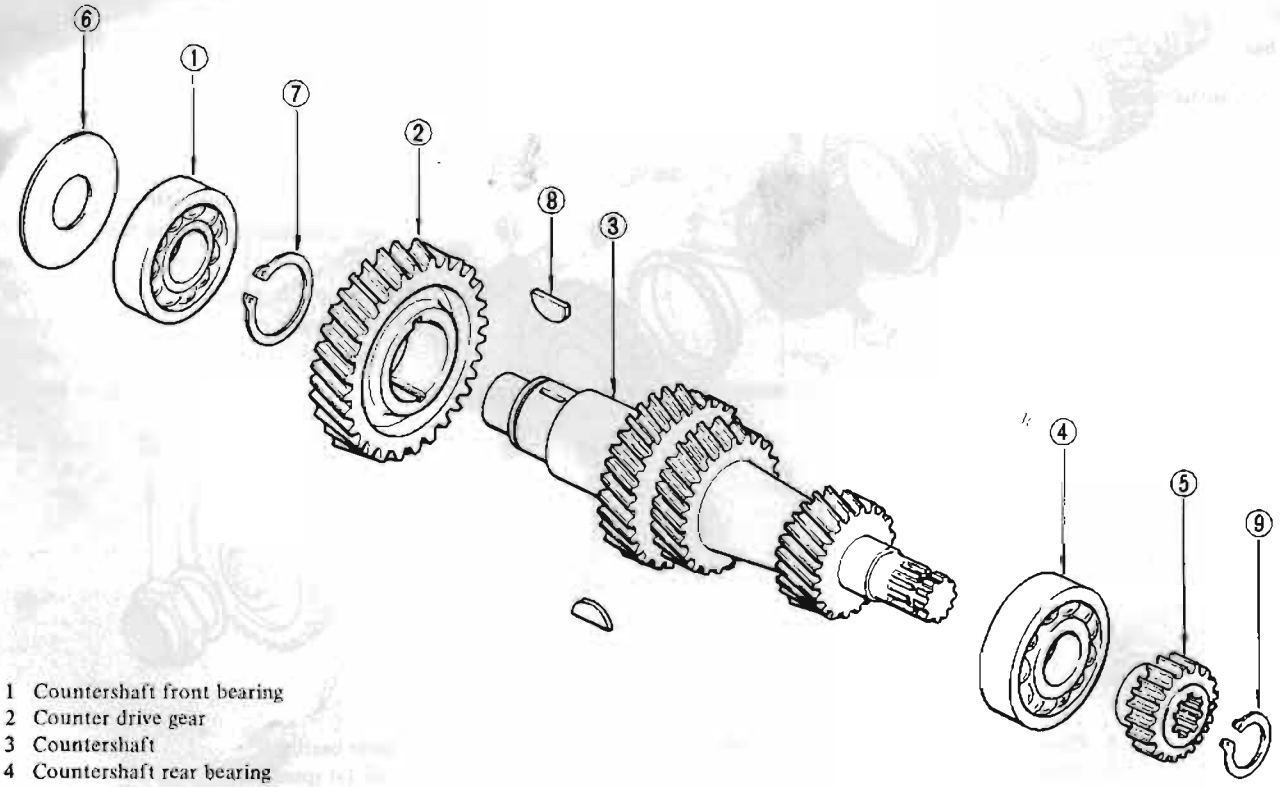
1 Main drive bearing
2 Main drive shaft

TM061

Fig. TM-15 Removing main drive bearing

Countershaft assembly

Install special tool "Drive Pinion Bearing Replacer ST3003S000" on countershaft rear bearing; press out countershaft rear bearing through a rod.



1 Countershaft front bearing
2 Counter drive gear
3 Countershaft
4 Countershaft rear bearing
5 Countershaft reverse gear
6 Countershaft front bearing shim
7 Snap ring
8 Woodruff key
9 Snap ring

TM196

Fig. TM-16 Exploded view of counter shaft assembly

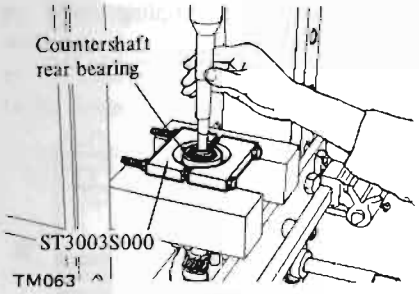


Fig. TM-17 Removing countershaft bearing

Note: When pressing out bearing, hold shaft by hand so as not to drop shaft onto floor.

Remove C-ring and pin from striking rod guide, and remove control lever.

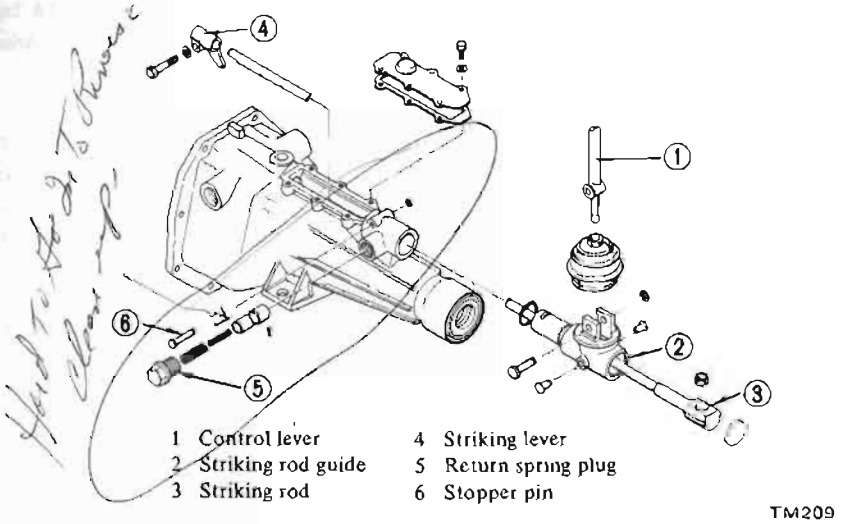


Fig. TM-18 Exploded view of shifting mechanism

INSPECTION

Wash all parts is solvent and check for wear, damage and other defective conditions.

Transmission and rear extension

Clean with solvent thoroughly and check for cracks which might cause oil leak and other defective conditions.

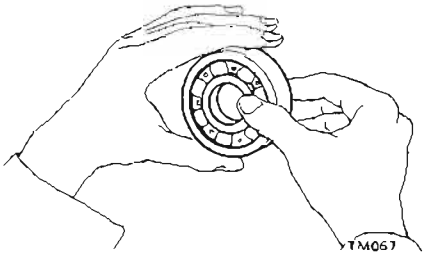


Fig. TM-19 Inspecting ball bearing

Bearing

1. Thoroughly clean bearing and dry with a compressed air.
2. When ball surfaces are worn or roughened, or when balls are out-of-round or roughened, replace bearing with a new one.
3. Replace needle bearing if found wear or damage.
4. Replace rear extension bushing if worn or cracked beyond limits.

Gear and shaft

1. Check all gears for excessive wear, chips or cracks; replace as required.
2. Check shaft for bending, crack, wear, and worn spline; if necessary, replace.
3. Measure backlash in gears:

Main drive gear:
0.05 to 0.10 mm
(0.0020 to 0.0040 in)

Other gears:
0.05 to 0.10 mm
(0.0020 to 0.0040 in)

Replace drive and driven gears if the above limits are exceeded.

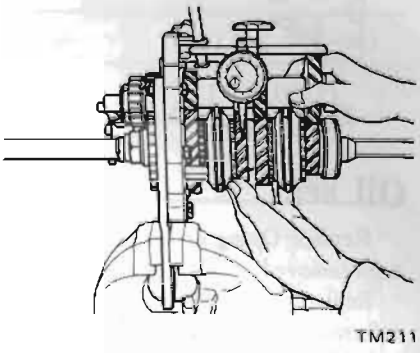


Fig. TM-20 Measuring gear backlash

4. Measure gear end play;

Standard:
1st: 0.32 to 0.39 mm
(0.0126 to 0.0154 in)
2nd and 3rd:
0.12 to 0.19 mm
(0.0047 to 0.0075 in)

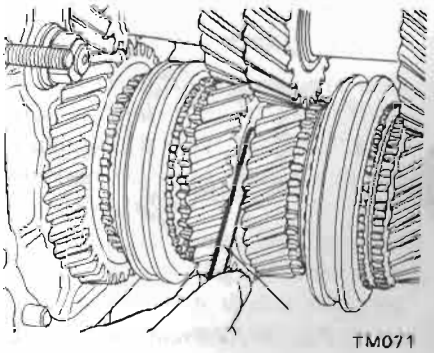


Fig. TM-21 Measuring end play

Baulk ring

1. Replace baulk ring if found to be deformed, cracked or otherwise damaged excessively.
2. Place baulk ring in position on gear cone.

While holding baulk ring against gear as far as it will go, measure gap between baulk ring and outer gear. If gap is small, discard baulk ring.

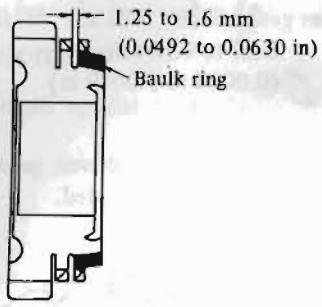


Fig. TM-22 Baulk ring-to-cone gap

Oil seal

Replace O-ring or oil seal which is once removed.

Replace oil seal if sealing lip is deformed or cracked. Also discard oil seal if spring is displaced out of position.

ASSEMBLY

Front cover

1. Wipe clean seal seat in front cover, then press fit oil seal in place. Coat oil seal with gear oil to provide initial lubrication.

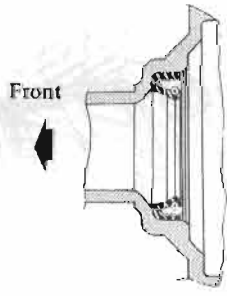


Fig. TM-23 Front cover oil seal

2. Apply sealer to withdrawal lever ball pin screw. Install withdrawal lever ball pin to front cover and tighten screw to 2.0 to 3.5 kg-m (14.5 to 25.3 ft-lb) torque.

Rear extension

1. Wipe clean seal seat in rear extension housing; press fit oil seal in place. Coat oil seal and bushing with gear oil for initial lubrication.

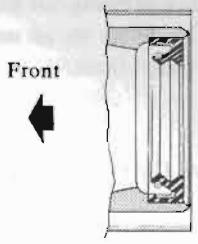


Fig. TM-24 Rear extension oil seal

2. Install O-ring cap and O-ring to rear extension, and apply grease to it.
3. Apply grease to O-ring and plunger grooves in striking rod. Insert striking rod through rear extension.
4. Install striking lever on front end of striking rod. Install cotter pin and tighten with hexagon-nut, lock and flat washers.

Tightening torque:
0.9 to 1.2 kg-m
(6.5 to 8.6 ft-lb)

Adapter plate

Place dowel pin, mainshaft bearing and oil gutter on adapter plate and tap them with a soft hammer in the position properly. Use a new dowel pin.

Bend oil gutter on front side and expand on rear side.

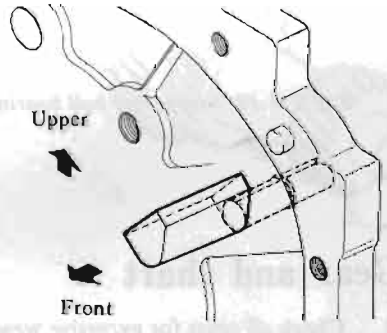


Fig. TM-25 Oil gutter

Gear assembly

1. Clean all parts in solvent and dry with compressed air.
2. Assemble synchronizer assembly. Position spreader springs and shifting inserts in three (3) slots in synchronizer hub; put coupling sleeve on synchronizer hub.

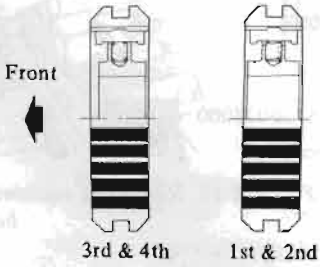


Fig. TM-26 Installing synchronizer hub

3. Assemble 2nd gear needle roller bearing, 2nd gear, baulk ring, 1st & 2nd speed synchronizer assembly, 1st gear baulk ring, 1st gear bush, needle bearing 1st gear, steel ball, and thrust washer on mainshaft.

Before installing a steel ball, apply grease to it.

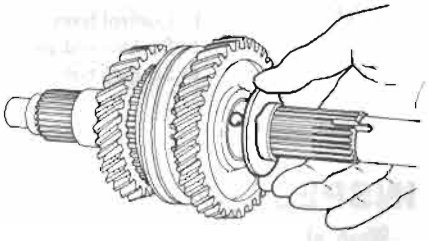


Fig. TM-27 Installing thrust washer

4. Install mainshaft bearing with adapter plate on mainshaft and special tool "Transmission Adapter ST23800000." Use extreme care to place bearing squarely against shaft and press it into place on shaft gradually.

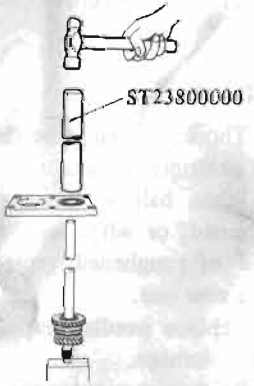


Fig. TM-28 Fitting mainshaft bearing with adapter plate

5. Support adapter plate in a vise with special tool "Setting Plate Adapter ST23810001," with mainshaft facing down.

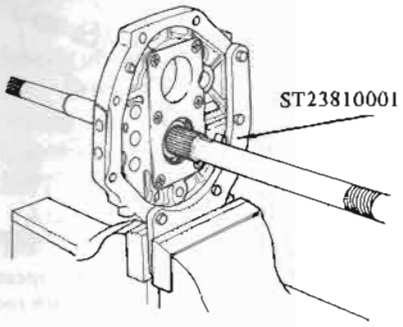


Fig. TM-29 Installing adapter plate in a vise

6. Install countershaft rear bearing in adapter plate; insert drive reverse idler shaft in adapter plate by 1/3 of its engine length. Make sure that cut-out portion of reverse idler shaft is lined up with inner face of adapter plate.

7. Install bearing retainer in adapter plate. Align adapter plate with reverse idle shaft at cut-out portion of this shaft, torque screws to 1.9 to 2.5 kg-m (13.7 to 18.0 ft-lb), and stake each screw at two points with a punch.

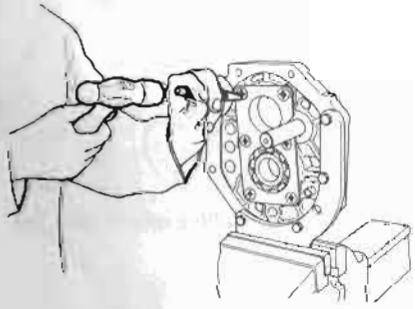


Fig. TM-30 Staking machine screw

8. Place new woodruff keys in grooves in countershaft and tap them lightly until they seat. Use a soft hammer to avoid damaging keys.

9. Install countershaft assembly into countershaft rear bearing in adapter plate.

10. Install mainshaft reverse gear, plain washer on rear of mainshaft and install mainshaft nut.

Tighten mainshaft nut temporarily.

11. Install counter reverse gear on rear of countershaft and secure with snap ring. Use snap ring to give a minimum gear end play.

Snap ring

No.	Thickness mm (in)
1	1.4 (0.0551)
2	1.5 (0.0590)
3	1.6 (0.0630)

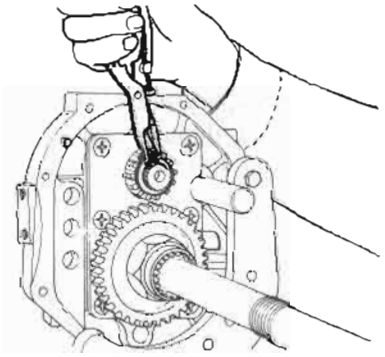


Fig. TM-31 Installing snap ring

12. Install reverse idler gear on reverse idler shaft.

13. Tighten mainshaft nut to 14.0 to 17.0 kg-m (101.2 to 122.9 ft-lb) torque, and stake mainshaft nut to groove of mainshaft with a punch.

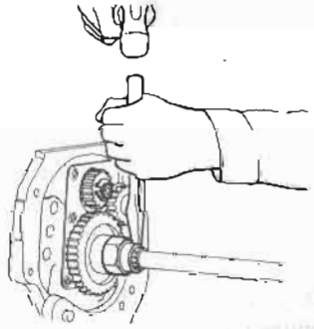


Fig. TM-32 Staking mainshaft nut

14. Position 3rd gear needle roller bearing, mainshaft 3rd gear, baulk ring, and 3rd & 4th synchronizer assembly on front of mainshaft.

15. Install thrust washer on mainshaft and secure 3rd & 4th synchronizer assembly and thrust washer with suitable thick snap ring that will fit the groove in mainshaft.

Snap ring

No.	Thickness mm (in)
1	1.4 (0.0551)
2	1.5 (0.0590)
3	1.6 (0.0630)

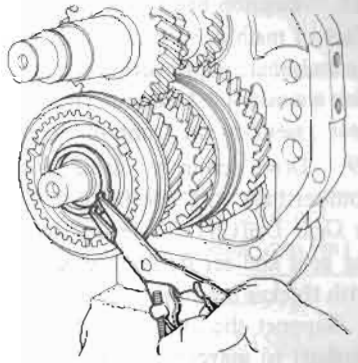


Fig. TM-33 Installing snap ring

Main drive gear assembly

16. Press main drive bearing on main drive shaft with special tool "Transmission Adapter ST23800000." Make sure that snap ring groove is toward front of shaft.

17. Place main drive bearing spacer on main drive bearing and secure main drive bearing with thicker snap ring that will eliminate end play.

Snap ring

No.	Thickness mm (in)
1	1.80 (0.0709)
2	1.87 (0.0736)
3	1.94 (0.0764)
4	2.01 (0.0791)
5	2.08 (0.0819)
6	1.73 (0.0681)

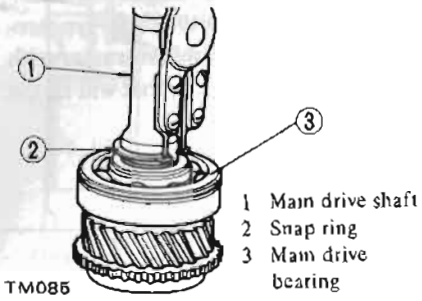


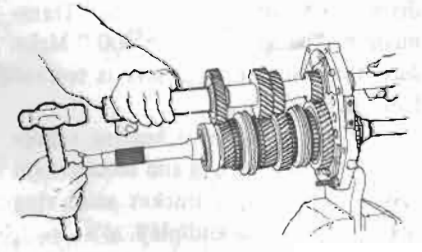
Fig. TM-34 Installing snap ring

18. Position baulk ring on cone surface of main drive gear. Apply gear oil to mainshaft pilot bearing and install it on mainshaft. Assemble main drive gear assembly on front of mainshaft.

19. Drive counter drive gear on countershaft with special tool "Counter Gear Drift ST23860000" by meshing gear and secure counter drive gear with thicker snap ring.

Support the opposite side of countershaft to prevent damage to countershaft rear bearing.

Note: Be sure to drive in counter drive gear and main drive gear simultaneously.

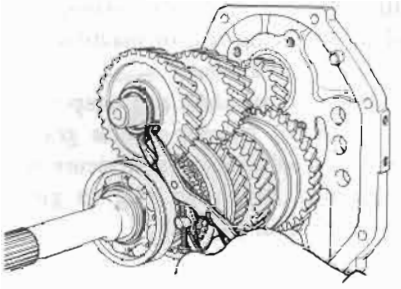


TM223

Fig. TM-35 Installing countershaft drive gear

Snap ring

No.	Thickness mm (in)
1	1.4 (0.0551)
2	1.5 (0.0590)
3	1.6 (0.0630)



TM224

Fig. TM-36 Installing snap ring

20. Measure gear end play and backlash.

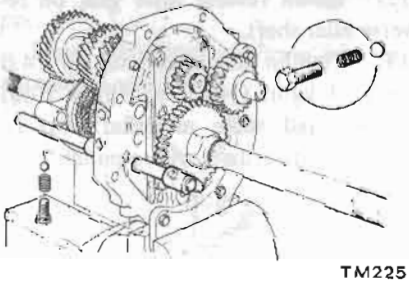
Make sure that they are held within the specified values. For details, refer to the instructions under topic "INSPECTION."

21. Place 1st & 2nd shift fork in groove in 1st & 2nd coupling sleeve. Place 3rd & 4th shift fork in groove in 3rd & 4th coupling sleeve. Slide 1st & 2nd fork rod through adapter plate and 1st & 2nd shift fork.

Secure 1st & 2nd fork rod to shift fork with a new retaining pin.

22. Install check ball, check ball spring, and check ball plug. Prior to tightening check ball plug, apply locking agent to check ball plug.

Align notch in 1st & 2nd fork rod with check ball.



TM225

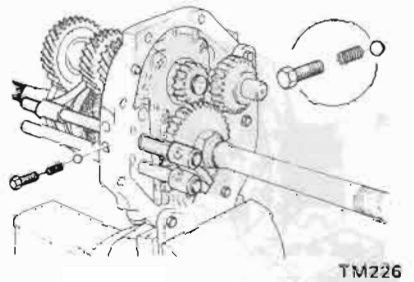
Fig. TM-37 Installing 1st & 2nd speed fork rod

23. Slide 3rd & 4th fork rod through adapter plate and 3rd & 4th shift fork, and secure with a new retaining pin.

Prior to assembling 3rd & 4th fork rod, install two (2) interlock balls into adapter plate as shown in Figure TM-9.

24. Install check ball and check ball spring. Apply locking agent to check ball plug and install it in place.

Align notch in 3rd & 4th fork rod with check ball by sliding 3rd & 4th fork rod as necessary.



TM226

Fig. TM-38 Installing 3rd & 4th speed fork rod

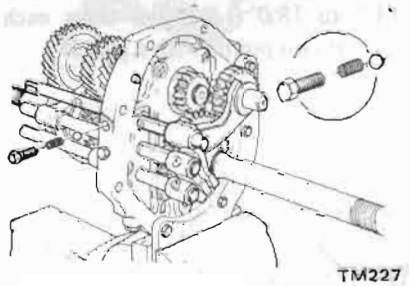
25. Place reverse shift fork in reverse idler gear.

Slide reverse fork rod through reverse shift fork and adapter plate, and secure with a new retaining pin.

Prior to assembling reverse fork rod, install two (2) interlock balls into adapter plate as shown in Figure TM-9.

26. Install check ball and check ball spring. Apply locking agent to check ball plug and install it in place.

Align notch in reverse fork rod with check ball.



TM227

Fig. TM-39 Installing reverse fork rod

27. Torque each check ball plug to 1.9 to 2.5 kg-m (13.7 to 18.1 ft-lb).

Note: Check ball plug for 1st & 2nd fork rod is longer than those of reverse shift fork rod and 3rd & 4th fork rod.

28. Apply gear oil to all sliding surfaces and check to make sure that shift rods operate correctly and gears engage smoothly.

29. Clean mating surfaces of adapter plate and transmission case.

Apply sealer to mating surfaces of adapter plate and transmission case.

Slide transmission case onto adapter plate by lightly tapping with a soft hammer until case bears against adapter plate.

Use care to locate main drive shaft bearing in hole in the case.

30. Drive fit countershaft front bearing to transmission case until it bottoms with special tool "Drift C ST22360001."

Check to be sure that front end of countershaft clears bearing.

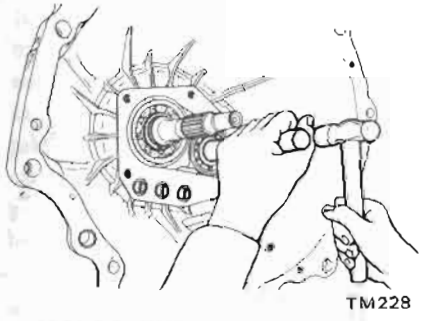


Fig. TM-40 Installing countershaft front bearing

Also make certain that mainshaft rotates freely.

31. Fit main drive bearing snap ring to groove in main drive bearing with special tool "Expander ST23840000."

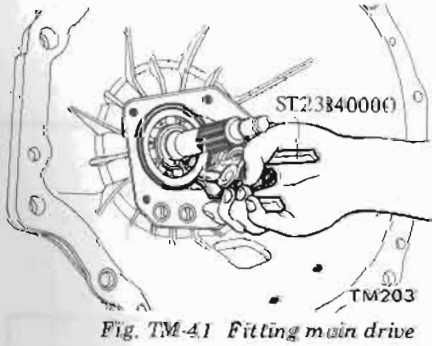


Fig. TM-41 Fitting main drive bearing snap ring

32. Clean mating surfaces of adapter plate and rear extension.

Apply sealer to mating surfaces of adapter plate and rear extension.

(1) With gears in their neutral positions, turn the striking rod toward left and slide rear extension over adapter plate making sure that striking lever engages fork rod bracket correctly.

(2) Install washers and through-bolts and torque to 1.6 to 2.1 kg-m (11.6 to 15.2 ft-lb).

(3) Insert stopper guide pin into rear extension and secure with C-ring.

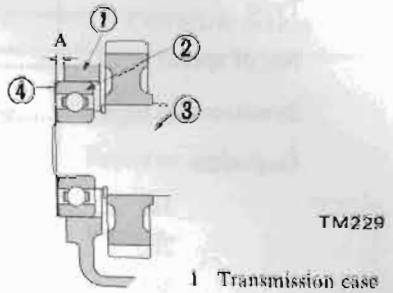
(4) Apply grease to plunger, reverse check spring and return spring. Install plunger, reverse check spring, and return spring. Apply sealant to return spring plug and install it in place.

Torque to 1.0 to 2.0 kg-m (7.2 to 14.5 ft-lb).

(5) Insert a striking rod pin through striking rod guide and control lever; connect control lever to striking rod and secure with C-ring.

33. Selecting countershaft front bearing shim.

(1) Measure depth "A" from front end of transmission case to countershaft front bearing.



1 Transmission case
2 Countershaft front bearing
3 Countershaft
4 Shim

Fig. TM-42 Selection countershaft front bearing shim

No.	"A" mm (in)	Countershaft front bearing shim mm (in)
1	3.02 to 3.11 (0.1189 to 0.1224)	0.5 (0.0197)
2	3.12 to 3.21 (0.1228 to 0.1264)	0.4 (0.0158)
3	3.22 to 3.31 (0.1268 to 0.1303)	0.3 (0.0118)
4	3.32 to 3.41 (0.1307 to 0.1343)	0.2 (0.0079)
5	3.42 to 3.51 (0.1346 to 0.1382)	0.1 (0.0039)
6	3.52 to 3.61 (0.1386 to 0.1421)	———
7	3.62 to 3.71 (0.1425 to 0.1461)	———

(2) Select a shim of thickness "A" measured.

34. Clean mating surfaces of front cover and transmission case.

Apply grease to shim selected to retain it on front cover, install front cover to transmission case with gasket placed in between. Install through-bolts with washers under them and tighten to 1.6 to 2.1 kg-m (11.6 to 15.2 ft-lb) torque. Apply sealant to threads of through-bolts before installation.

35. Install speedometer pinion assembly on rear extension. After making sure that lock plate is lined up with groove in speedometer pinion sleeve, install through-bolts and torque to 0.4 to 0.5 kg-m (2.89 to 3.62 ft-lb).

36. Install back-up lamp switch and torque to 2.0 to 3.0 kg-m (14.5 to 21.7 ft-lb). Be sure to apply sealant before installation.

37. After lubricating with a light coat of multi-purpose grease, install withdrawal lever, release bearing and bearing sleeve on clutch housing.

After connecting them with holder spring, install dust cover on clutch housing.

38. Shift transmission control lever through all gears to make sure that gears operate smoothly.

39. Pour recommended gear oil into transmission [1.6 liters (3 3/8 U.S.gal, 1/4 Imper.gal)].

Note: Install drain plug and filler plug with sealant in place.

SERVICE DATA AND SPECIFICATIONS

General specifications

Type	F4W71B
No. of speeds	4-forward
Synchromesh type	Warner
Gear ratio	
1st	3.592
2nd	2.246
3rd	1.415
4th	1.000
Rev.	3.657
Final gear ratio	3.364
Oil capacity ℓ (U.S.pt., Imp.pt.)	1.6 (2 ⅜, 2 ¼)

Tightening torque

	kg-m	(ft-lb)
Machine screw for bearing retainer	1.9 to 2.5	(13.7 to 18.0)
Mainshaft nut	14.0 to 17.0	(101.2 to 122.9)
Check ball plug	1.9 to 2.5	(13.7 to 18.0)
Rear extension installation bolt	1.6 to 2.1	(11.5 to 15.2)
Front cover installation bolt	1.6 to 2.1	(11.5 to 15.2)
Speedometer pinion sleeve locking plate nut	0.4 to 0.5	(2.9 to 3.6)
Reverse lamp switch	2.0 to 3.0	(14.5 to 21.7)
Gear oil filler plug	2.5 to 3.5	(18.0 to 25.3)
Gear oil drain plug	2.5 to 3.5	(18.0 to 25.3)
Withdrawal lever ball pin	2.0 to 3.5	(14.5 to 25.3)
Return spring plug	1.0 to 2.0	(7.2 to 14.5)
Rear extension upper cover installation bolt	0.4 to 0.5	(2.9 to 3.6)
Selector shaft installation nut	1.2 to 1.8	(8.7 to 13.0)
Striking lever cotter pin	0.9 to 1.2	(6.5 to 8.7)

Specifications

Gear backlash		
Main drive gear	mm (in)	0.05 to 0.10 (0.0019 to 0.0039)
Other gears	mm (in)	0.05 to 0.10 (0.0019 to 0.0039)
Gear end play		
Main gear 1st	mm (in)	0.32 to 0.39 (0.0126 to 0.0154)
2nd and 3rd	mm (in)	0.12 to 0.19 (0.0047 to 0.0075)
Clearance between baulk ring and gear		
All gears	mm (in)	1.25 to 1.6 (0.0492 to 0.0629)

TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Difficult to intermesh gears Causes for difficult gear shifting are classified to troubles concerning control system and transmission. When gear shift lever is heavy and it is difficult to shift gears, clutch disengagement may also be unsmooth. First, make sure that clutch operates correctly, and inspect tranmission.	Worn gears, shaft, and/or bearing. Insufficient operating stroke due to worn or loose sliding part. Defective or damaged synchronizer.	Replace. Repair or replace. Replace.
Gear slips out of mesh. In most cases, this trouble oc when interlock ball, check ball, and/or spri worn or weakened, or when control system is defective. In this case, the trouble cannot be corrected by replacing gears, and therefore, trouble shooting must be carried out carefully. It should also be noted that gear slips out of mesh due to vibration generated by weakened front and rear engine mounts.	Worn interlock plunger. Worn check ball and/or weakened or broken spring. Worn fork rod ball groove. Worn or damaged bearing. Worn or damaged gear.	Replace. Replace. Replace. Replace. Replace.
Noise When noise occurs with enigne idling and ceases when clutch is disengaged, or when noise occurs while shifting gears, it may be that the noise is from transmission.	Insufficient or improper lubricant. Oil leaking due to defective oil seal and gasket, clogged breather, etc. Worn bearing (High humming occurs at a high speed.). Damaged bearing (Cyclic knocking sound occurs also at a low speed.). Worn each spline. Worn each bushing.	Add oil or replace with designated oil. Clean or replace. Replace. Replace. Replace. Replace.

SERVICE JOURNAL OR BULLETIN REFERENCE

DATE	JOURNAL or BULLETIN No.	PAGE No.	SUBJECT

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