DATSUN 280Z
MODEL S30 SERIES

SECTION MT

MANUAL TRANSMISSION

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NISSAN

NISSAN MOTOR CO., LTD.
TOKYO, JAPAN

4-SPEED TRANSMISSION (TYPE: F4W71B)

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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 sliding-mesh type using spur gears.

The shift control is floor mounted.

In construction, the main drive 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 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 mainshaft gear turns together with the mainshaft.

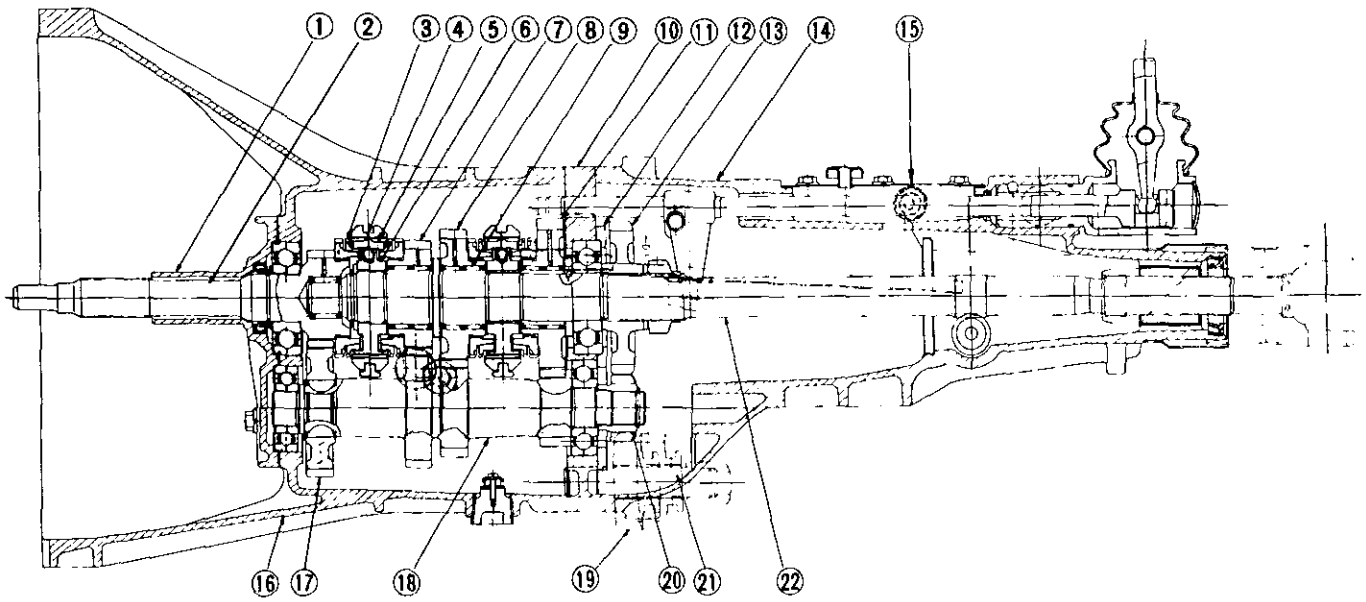
The baulk ring serves to synchronize the coupling sleeve and mainshaft gear.

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 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 bearing
10 Adapter plate
11 1st gear, mainshaft
12 Bearing retainer
13 Reverse gear, mainshaft
14 Rear extension housing
15 Neutral switch
16 Transmission case
17 Countershaft drive gear
18 Countershaft
19 Reverse idler gear
20 Reverse counter gear
21 Reverse idler shaft
22 Mainshaft

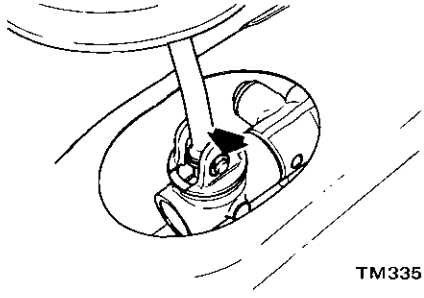
TM744

Fig. MT-1 Sectional view of F4W71B transmission

REMOVAL

In dismounting transmission from the vehicle, proceed as follows:

1. Disconnect battery ground cable from terminal.
2. Disconnect accelerator linkage.
3. Remove floor console. Refer to Section BF (Page BF-27) for Removal.
4. Place transmission control lever in neutral position.
5. Remove C-ring and control lever pin from transmission striking rod guide, and remove control lever. See Figure MT-2.



TM335

Fig. MT-2 Removing control lever

6. Jack up the vehicle and support its weight on safety stands. Use a hydraulic hoist or open pit, if available.

Confirm that safety is insured.

7. Disconnect exhaust front tube from exhaust manifold.
8. Remove front tube bracket from rear extension housing. Refer to Section ER for Removal.

Note: Hold front tube end up with a thread or wire to prevent tube from falling.

9. Disconnect wires (1) from reverse lamp switch and neutral switch. See Figure MT-3.
10. Remove clutch operating cylinder (2) from transmission case. See Figure MT-3.
11. Disconnect speedometer cable (3) from rear extension housing. See Figure MT-3.
12. Remove insulator securing bolts and place insulator on exhaust tube.
13. Remove propeller shaft.

Refer to Section PD (Page PD-2) for Removal.

Note: Plug up the opening in the rear extension housing to prevent oil from flowing out.

14. Support engine by locating a jack under oil pan with a wooden block used between oil pan and jack.
15. Support transmission with a transmission jack.
16. Remove nut attaching mounting member to rear mounting insulator. Remove two mounting member attaching bolts and then remove mounting member.

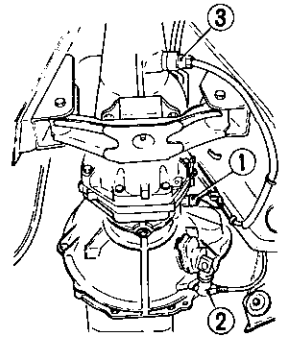


Fig. MT-3 Bottom view of car

17. Remove starter motor.
18. Remove bolts securing transmission to engine.

After removing these bolts, support the engine and transmission with jacks, and then slide transmission rearward away from engine and remove from the vehicle.

Note: Take care in dismounting transmission not to strike any adjacent parts and main drive shaft.

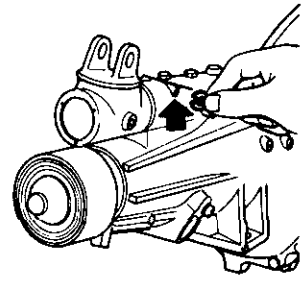
DISASSEMBLY

TRANSMISSION CASE DISASSEMBLY

1. Prior to disassembling transmission, thoroughly wipe off dirt and grease from it.
2. Drain oil thoroughly.
3. Remove dust cover from transmission case.

Remove release bearing and withdrawal lever.

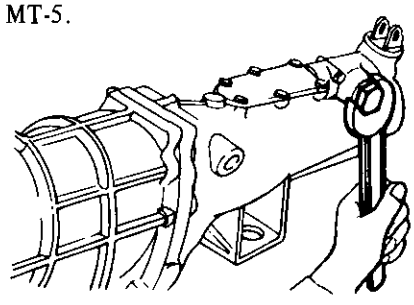
4. Remove reverse lamp switch and neutral switch.
5. Remove speedometer pinion and pinion sleeve by taking off lock plate.
6. Remove C-ring and stopper guide pin from rear end of rear extension. See Figure MT-4.



TM337

Fig. MT-4 Removing striking rod C-ring and stopper pin

7. Remove return spring plug, return spring, reverse check spring, and plunger from rear extension. See Figure MT-5.

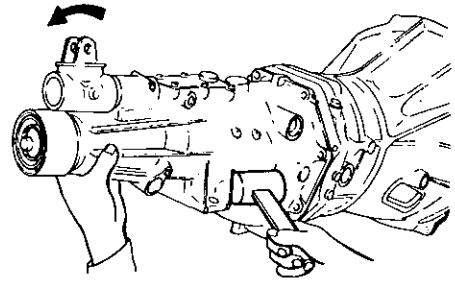


TM338

Fig. MT-5 Removing return spring plug

8. Remove rear extension securing bolts and turn the striking rod toward left.

Drive out rear extension backward by lightly tapping around it with a soft hammer. See Figure MT-6.



TM339

Fig. MT-6 Removing rear extension

9. Remove front cover securing bolts and remove front cover.

Detach countershaft front bearing shim.

10. Remove main drive bearing snap ring with Expander ST23840000. See Figure MT-7.

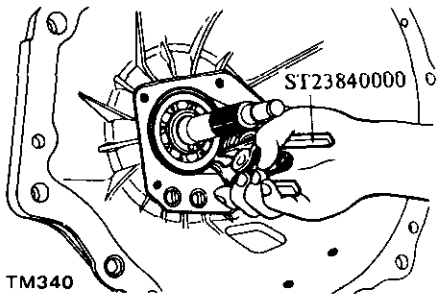


Fig. MT-7 Removing main drive bearing snap ring

11. Separate transmission case from adapter plate with a soft hammer. See Figure MT-8.

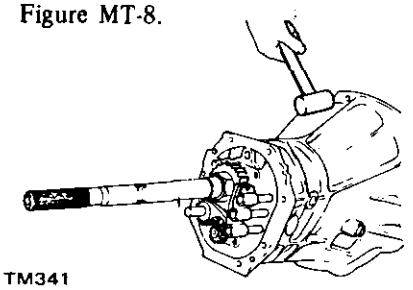


Fig. MT-8 Remvoing transmission case

12. Set up Setting Plate Adapter ST23810001 on adapter plate.

With countershaft side up, place the above assembly in a vise. See Figure MT-9.

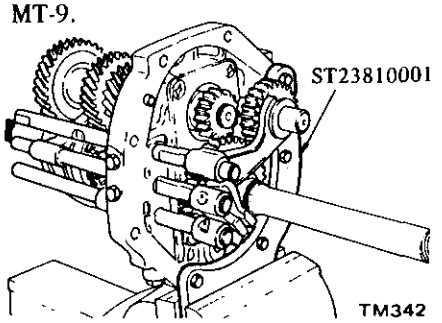


Fig. MT-9 Attaching gear assembly to special tool

DISASSEMBLY OF GEAR ASSEMBLY

Fork rod

1. Drive out retaining pins from each fork rod with Fork Rod Pin Punch ST23540000. See Figure MT-10.

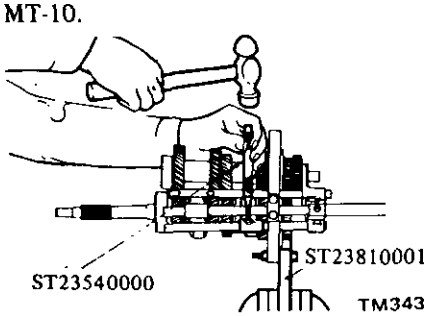


Fig. MT-10 Drive out retaining pins

2. Remove three(3) check ball plugs, and drive out fork rods from adapter plate by lightly tapping on the front end.

Be careful not to lose three(3) check balls and four(4) interlock balls. See Figure MT-11.

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

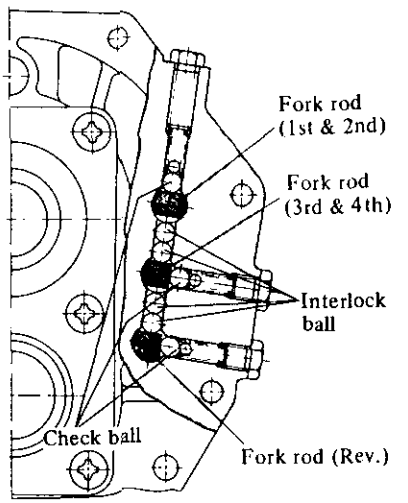


Fig. MT-11 Layout of check ball and interlock ball

Gear assembly

1. With gears doubly engaged, draw out countershaft front bearing using a suitable gear puller. See Figure MT-12-1.
2. Remove counter drive gear snap ring.
3. 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 pilot needle bearing onto floor from the front end of mainshaft. See Figure MT-12-2.

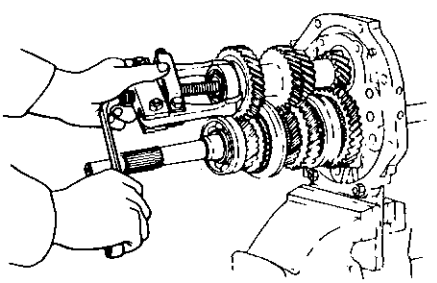


Fig. MT-12-1 Removing countershaft front bearing

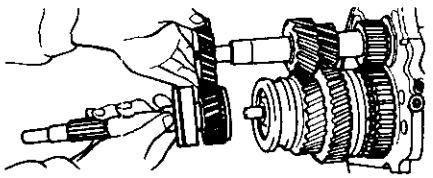


Fig. MT-12-2 Removing counter drive gear and main drive gear

4. Remove snap ring and then thrust washer from mainshaft front end.

Draw out 3rd & 4th synchronizer assembly and remove 3rd gear assembly.

5. Release caulking on mainshaft nut and loosen it. See Figure MT-13.

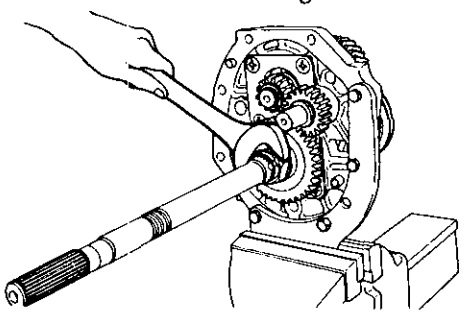


Fig. MT-13 Removing mainshaft nut

6. Remove mainshaft nut, thrust washer and mainshaft reverse gear.
7. Remove snap ring from countershaft rear end, and remove reverse idler gear.
8. Draw out mainshaft gear assembly together with countershaft by lightly tapping the rear end with a soft hammer while holding the front of mainshaft gear assembly by hand.

Be careful not to drop off gear shaft. See Figure MT-14.

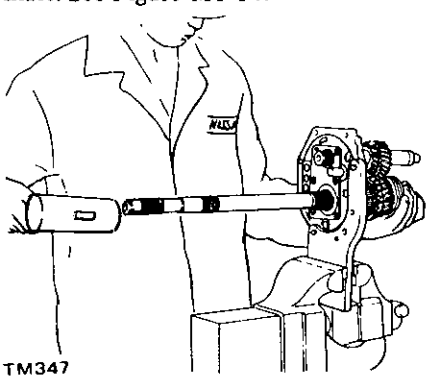
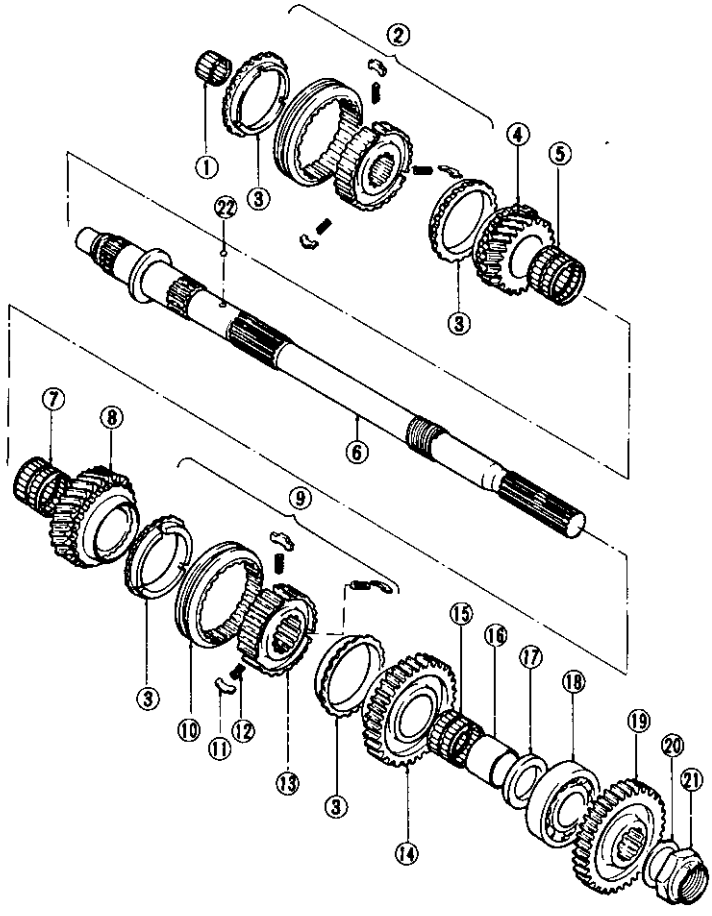


Fig. MT-14 Driving out gear assembly

Mainshaft assembly

Disassemble mainshaft gear assembly.



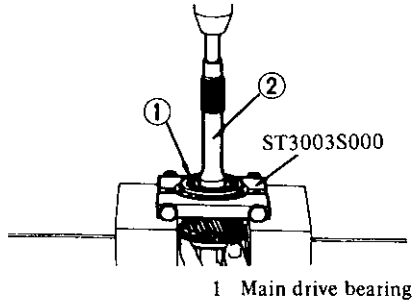
1 Pilot bearing
2 3rd & 4th synchronizer assembly
3 Baulk ring
4 3rd speed gear, mainshaft
5 Needle bearing
6 Mainshaft
7 Needle bearing
8 2nd speed gear, mainshaft
9 1st & 2nd synchronizer assembly
10 Coupling sleeve
11 Shifting insert
12 Shifting insert spring
13 Synchronizer hub
14 1st speed gear, 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

TM348

Fig. MT-15 Exploded view of mainshaft assembly

Mainshaft drive assembly

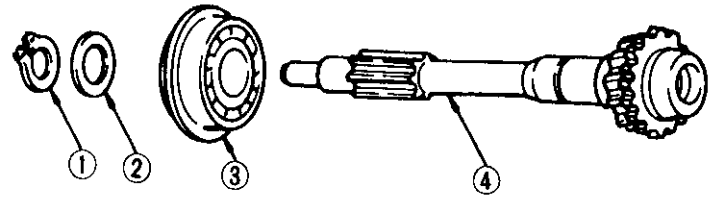
1. Remove main drive gear snap ring and spacer.
2. Remove main drive bearing with Bearing Puller ST3003S000 and a suitable press. See Figure MT-16.



1 Main drive bearing
2 Main drive gear

TM349

Fig. MT-16 Removing main drive bearing



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

TM350

Fig. MT-17 Exploded view of main drive gear

Countershaft assembly

Install Bearing Puller ST3003S000 on countershaft rear bearing; press out countershaft rear bearing through a rod.

See Figure MT-18.

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

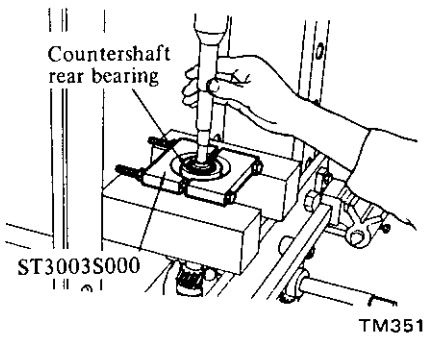
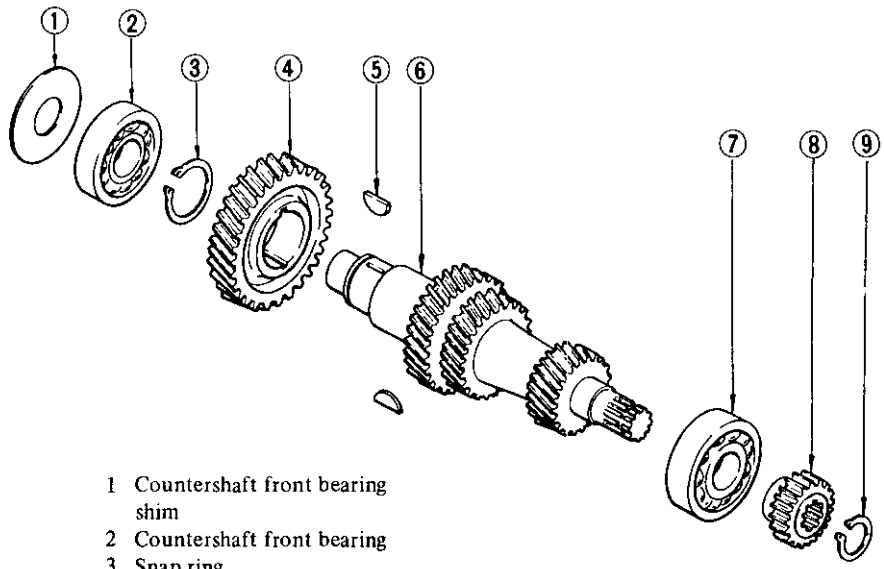


Fig. MT-18 Removing countershaft bearing



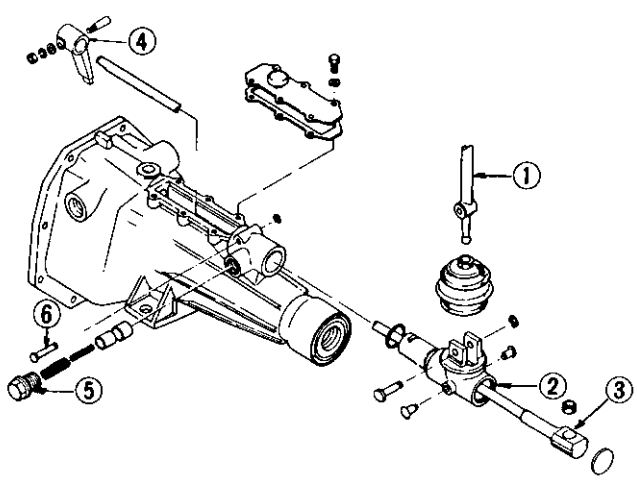
1 Countershaft front bearing shim
2 Countershaft front bearing
3 Snap ring
4 Countershaft drive gear
5 Woodruff key
6 Countershaft
7 Countershaft rear bearing
8 Reverse counter gear
9 Snap ring

Fig. MT-19 Exploded view of countershaft assembly

REAR EXTENSION DISASSEMBLY

Remove lock pin from striking lever, and remove striking rod.

Note: Do not disassemble rear extension bush from rear extension.



1 Control lever
2 Striking rod guide
3 Striking rod
4 Striking lever
5 Return spring plug
6 Stopper pin

Fig. MT-20 Exploded view of shifting mechanism

ADAPTER PLATE DISASSEMBLY

1. Remove six(6) bearing retainer attaching screws with an impact wrench and remove bearing retainer from adapter plate.
2. Remove reverse idler shaft.
3. Remove mainshaft bearing from the rear extension side.

INSPECTION

Wash all parts in a suitable cleaning solvent and check for wear, damage or other faulty conditions.

Notes:

a. **Be careful not to damage any parts with scraper.**
b. **Do not clean, wash or soak oil seals in solvent.**

TRANSMISSION CASE AND REAR EXTENSION HOUSING

1. Clean with solvent thoroughly and check for cracks which might cause oil leak or other faulty conditions.
2. Check mating surface of the case to engine or adapter plate for small nicks, projection or sealant.

Remove all nicks, projection or sealant with a fine stone.

3. If rear extension bush is worn or cracked, replace it as an assembly of bush and rear extension housing.

BEARING

1. Thoroughly clean bearing and dry with a compressed air.
2. When race and ball surfaces are worn or rough, or when balls are out-of-round or rough, replace bearing with a new one. See Figure MT-21.

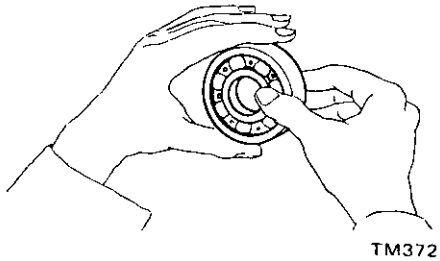


Fig. MT-21 Inspecting ball bearing

3. Replace needle bearing if worn or damaged.

GEARS AND SHAFTS

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.

Standard:
0.05 to 0.10 mm
(0.0020 to 0.0039 in)

If the above limits are exceeded, replace drive and driven gears as a set.

4. Measure gear end play:

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

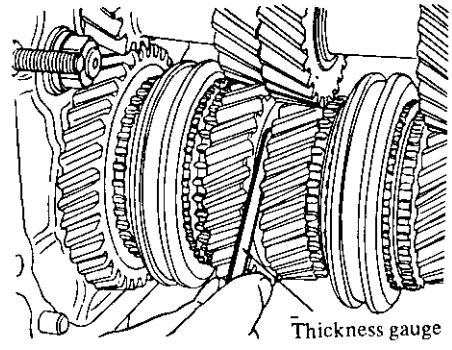


Fig. MT-22 Measuring end play

5. Check for stripped or damaged speedometer pinion gear. If necessary, replace.

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. See Figure MT-23.

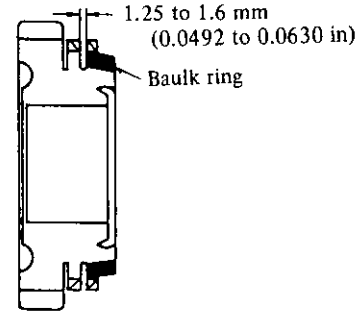


Fig. MT-23 Baulk ring-to-cone gap

OIL SEAL

Discard 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 out of position.

ASSEMBLY

To assemble, reverse the order of disassembly. Observe the following instructions.

FRONT COVER ASSEMBLY

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.

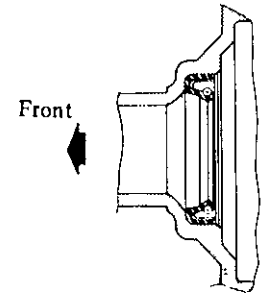


Fig. MT-24 Front cover oil seal

2. Apply sealant 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 to 25 ft-lb) torque.

REAR EXTENSION ASSEMBLY

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.

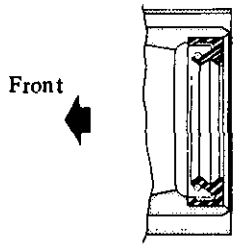


Fig. MT-25 Rear extension oil seal

2. Apply grease to O-ring and plunger grooves in striking rod.

Insert striking rod with striking rod guide through rear extension.

3. Install striking lever on front end of striking rod. Install lock pin and torque screw to 0.9 to 1.2 kg-m (6.5 to 8.7 ft-lb).

ADAPTER PLATE ASSEMBLY

1. Place dowel pin, mainshaft bearing and oil gutter on adapter plate, and tap with a soft hammer until they are properly positioned in place.

Use a new dowel pin.

Bend oil gutter on front side and expand on rear side. See Figure MT-26.

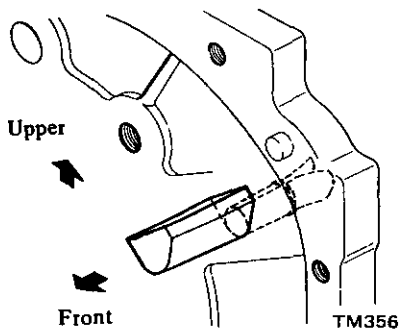


Fig. MT-26 Oil gutter

2. Install mainshaft bearing by lightly tapping around it with a soft hammer.

3. Insert drive reverse idler shaft in adapter plate by 1/3 of its entire length.

Make sure that the cut-out portion of reverse idler shaft is lined up with inner face of adapter plate.

4. Install bearing retainer in adapter plate.

Align bearing retainer with reverse idler shaft at the cut-out portion of this shaft, torque screws to 1.9 to 2.5 kg-m (14 to 18 ft-lb) and stake each screw at two points with a punch. See Figure MT-27.

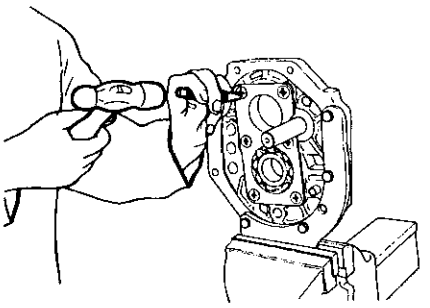


Fig. MT-27 Staking screw

5. Install countershaft rear bearing in adapter plate by lightly tapping around it with a soft hammer.

GEAR ASSEMBLY

Clean all parts in solvent and dry with compressed air.

Synchronizer assembly

Assemble synchronizer assembly.

Position shifting insert springs and shifting inserts in three(3) slots in synchronizer hub; put coupling sleeve on synchronizer hub.

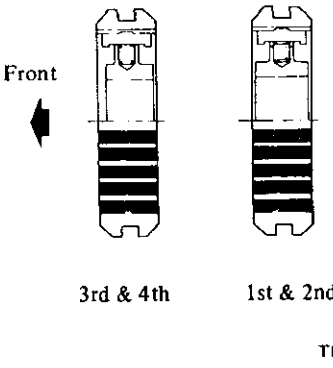


Fig. MT-28 Installing synchronizer hub

Mainshaft assembly

1. Assemble 2nd gear needle 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. See Figure MT-29.

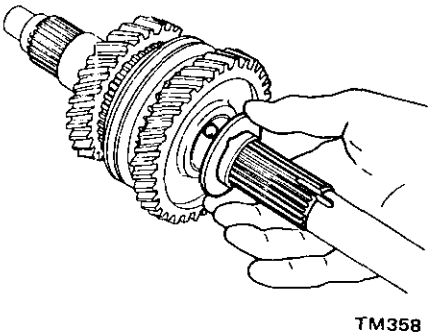


Fig. MT-29 Installing thrust washer

2. Set Transmission Press Stand ST23870000 and place adapter plate assembly on it. See Figure MT-30.

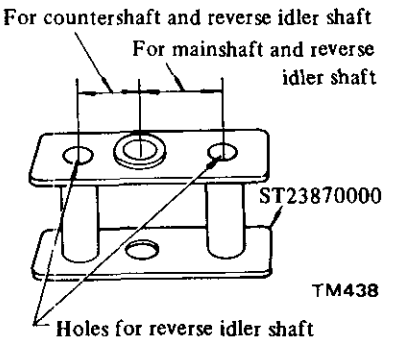


Fig. MT-30 Transmission Press Stand

3. Install mainshaft assembly to adapter plate assembly. Be sure to place bearing squarely against shaft and press it into place on shaft gradually. See Figure MT-31.

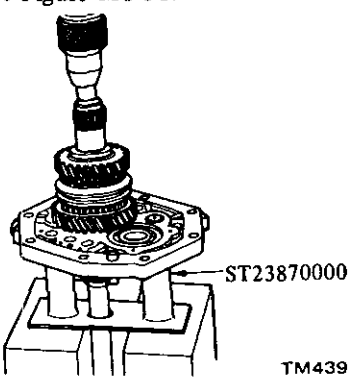


Fig. MT-31 Installing mainshaft assembly

Countershaft assembly

1. Place new woodruff keys in grooves in countershaft and tap them lightly until they are seated securely.

Use a soft hammer to avoid damaging keys.

2. Place adapter plate assembly and mainshaft assembly so that countershaft rear bearing rests on Transmission Press Stand ST23870000 properly.
3. Install countershaft into adapter plate by pressing it. See Figure MT-32.

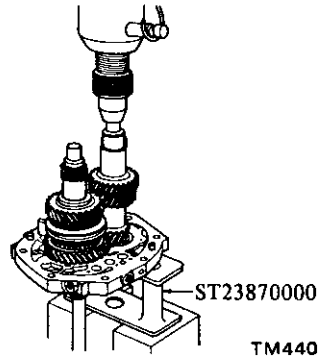


Fig. MT-32 Installing countershaft

4. Position 3rd gear needle bearing, mainshaft 3rd gear, baulk ring, and 3rd & 4th synchronizer assembly on the front of mainshaft.
5. Install thrust washer on mainshaft and secure it with snap ring of proper thickness that will fit the groove in mainshaft. See Figure MT-33.

Available snap ring

No.	Thickness mm (in)
1	1.4 (0.055)
2	1.5 (0.059)
3	1.6 (0.063)

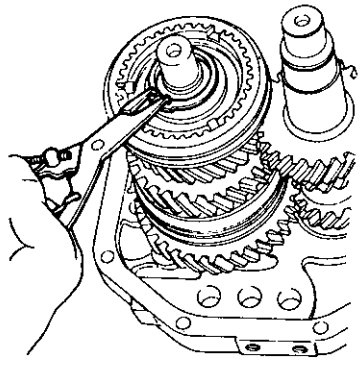


Fig. MT-33 Installing snap ring

Main drive gear assembly

1. Using Transmission Adapter ST23800000, press main drive bearing onto the shaft of main drive gear. Make sure that snap ring groove on shaft clears bearing.
2. Place main drive bearing spacer on main drive bearing and secure main drive bearing with thicker snap ring that will eliminate end play. See Figure MT-34.

Available 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)

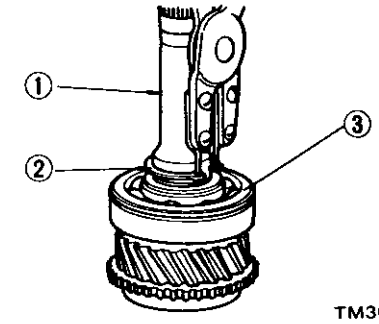


Fig. MT-34 Installing snap ring

3. 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 the front end of mainshaft.
4. Press counter drive gear onto countershaft with Counter Gear Drift ST23860000 by meshing gears and secure counter drive gear with thicker snap ring. See Figures MT-35 and MT-36.

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

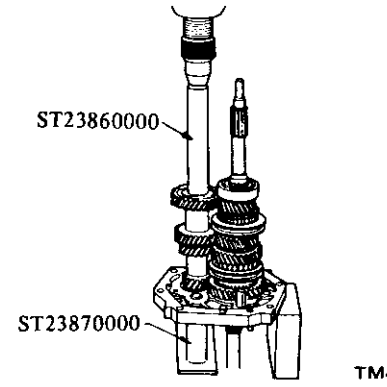


Fig. MT-35 Installing countershaft drive gear

Available counter drive gear snap ring

No.	Thickness mm (in)
1	1.4 (0.055)
2	1.5 (0.059)
3	1.6 (0.063)

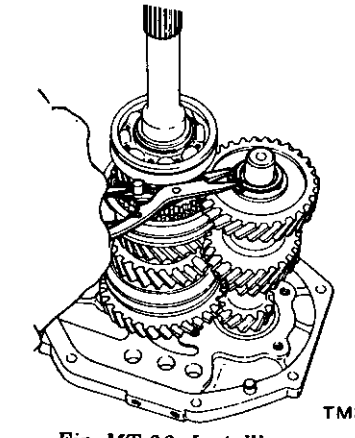


Fig. MT-36 Installing snap ring

5. Press countershaft front bearing onto countershaft with Drift C ST22360001. See Figure MT-37.

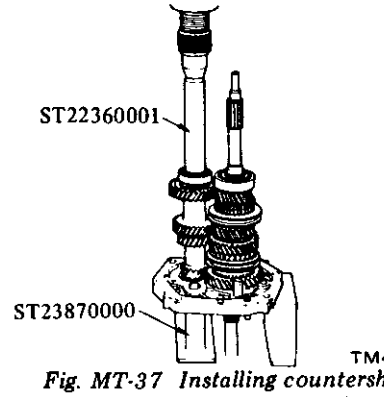


Fig. MT-37 Installing countershaft front bearing

6. Support adapter plate in a vise with Setting Plate Adapter ST23810001, with mainshaft facing down.

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

Tighten mainshaft nut temporarily.

8. Install counter reverse gear on the rear of countershaft and secure with snap ring.

Use snap ring to give a minimum gear end play. See Figure MT-38.

No.	Thickness mm (in)
1	1.4 (0.055)
2	1.5 (0.059)
3	1.6 (0.063)

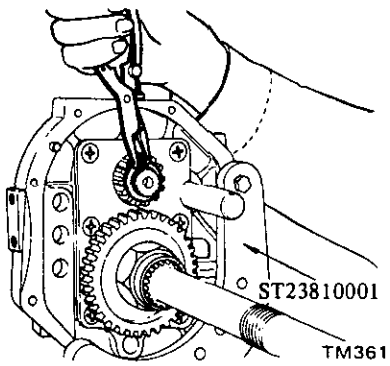


Fig. MT-38 Installing counter reverse gear snap ring

9. Install reverse idler gear on reverse idler shaft.

10. Tighten mainshaft nut to 14.0 to 17.0 kg-m (101 to 123 ft-lb) torque, and stake mainshaft nut to groove of mainshaft with a punch. See Figure MT-39.

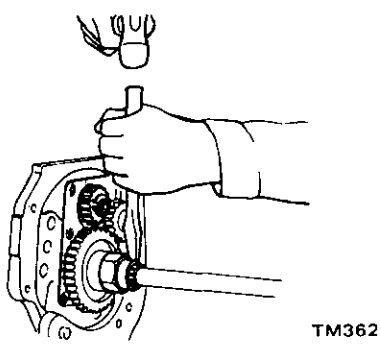


Fig. MT-39 Staking mainshaft nut

11. 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"

Note: The main drive gear and counter drive gear should be handled as a matched set.

When you replace a main drive gear or counter drive gear, be sure to replace as a set of main drive gear and counter drive gear.

Shift forks and fork rods assembly

1. Place 1st & 2nd shift fork in groove in 1st & 2nd coupling sleeve, and slide 1st & 2nd fork rod through adapter plate and 1st & 2nd shift fork. Prior to installing 1st & 2nd fork rod, install 3rd & 4th shift fork in groove in 3rd & 4th coupling sleeve.

Note: Shift forks for 1st & 2nd and 3rd & 4th are one and the same parts.

Make sure that the long end of shift fork for 1st & 2nd is placed on the counter gear side and the long end for 3rd & 4th is on the opposite side.

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

2. Install check ball, check ball spring, and check ball plug. Prior to tightening check ball plug, apply sealant to check ball plug.

Align notch in 1st & 2nd fork rod with check ball. See Figure MT-40.

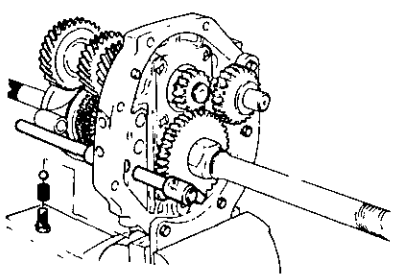


Fig. MT-40 Installing 1st & 2nd fork rod

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

Note: Prior to assembling 3rd & 4th fork rod, install two(2) interlock balls into adapter plate as shown in Figure MT-11.

4. Install check ball and check ball spring.

Apply sealant 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. See Figure MT-41.

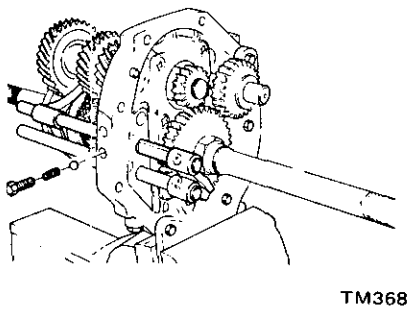


Fig. MT-41 Installing 3rd & 4th fork rod

5. 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.

Note: Prior to assembling reverse fork rod, install two(2) interlock balls into adapter plate as shown in Figure MT-11.

6. Install check ball and check ball spring.

Apply sealant to check ball plug and install it in place.

Align notch in reverse fork rod with check ball. See Figure MT-42.

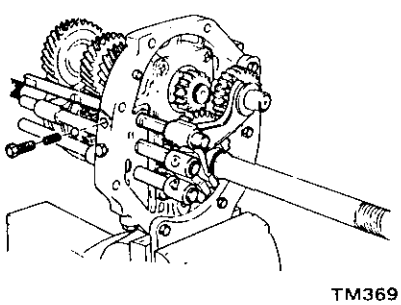


Fig. MT-42 Installing reverse fork rod

7. Torque each check ball plug to 1.9 to 2.5 kg-m (14 to 18 ft-lb).

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

8. Apply gear oil to all sliding surfaces and check to see that shift rods operate correctly and gears are engaged smoothly.

TRANSMISSION ASSEMBLY

Transmission case assembly

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

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

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

Carefully install main drive bearing and countershaft front bearing.

Make certain that mainshaft rotates freely.

3. Fit main drive bearing snap ring to groove in main drive bearing by using Expander ST23840000. See Figure MT-43.

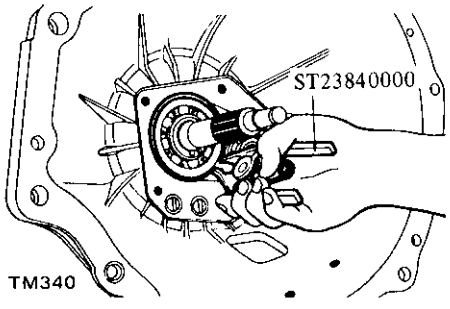


Fig. MT-43 Fitting main drive bearing snap ring

Rear extension assembly

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

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

2. With fork rods in their neutral positions, gradually slide rear extension onto adapter plate, making sure that speed change cross lever engages with fork rod brackets correctly.

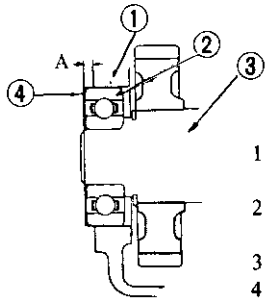
3. Install washers and through-bolts and torque to 1.6 to 2.1 kg-m (12 to 15 ft-lb)

Front cover assembly

1. Select countershaft front bearing shim as follows: See Figure MT-44.

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

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



1 Transmission case
2 Countershaft front bearing
3 Countershaft
4 Shim

Fig. MT-44 Selecting countershaft front bearing shim

Available shim

No.	"A" mm (in)	Countershaft front bearing shim mm (in)
1	2.92 to 3.01 (0.1150 to 0.1185)	0.6 (0.0236)
2	3.02 to 3.11 (0.1189 to 0.1224)	0.5 (0.0197)
3	3.12 to 3.21 (0.1228 to 0.1264)	0.4 (0.0157)
4	3.22 to 3.31 (0.1268 to 0.1303)	0.3 (0.0118)
5	3.32 to 3.41 (0.1307 to 0.1343)	0.2 (0.0079)
6	3.42 to 3.51 (0.1346 to 0.1382)	0.1 (0.0039)
7	3.52 to 3.61 (0.1386 to 0.1421)	–
8	3.62 to 3.71 (0.1425 to 0.1461)	–

2. 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 in place.

Install through-bolts with washers under them and tighten to 1.6 to 2.1 kg-m (12 to 15 ft-lb) torque.

Apply sealant to threads of through-bolts before installation.

3. 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 (2.9 to 3.6 ft-lb).

4. Install back-up lamp switch and torque to 2.0 to 3.0 kg-m (14 to 22 ft-lb).

Be sure to apply sealant before installation.

5. Apply a light coat of multi-purpose grease to withdrawal lever, release bearing and bearing sleeve; install them on clutch housing.

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

6. Install control lever temporarily, and shift control lever through all gears to make sure that gears operate smoothly.

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

INSTALLATION

Install the transmission in the reverse order of removal paying attention to the following points.

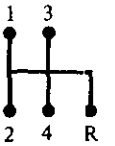
1. Before installing, clean mating surfaces of engine rear plate and transmission case.

2. Before installing, lightly apply grease to spline parts of clutch disc and main drive gear.

3. Remove filler plug and fill transmission with recommended gear oil to the level of the plug hole. [Approximately 1.6 liters (3 3/8 U.S.pt., 2 7/8 Imp.pt.)].

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

Transmission type	F4W71B
Synchromesh type	Warner
Shift pattern	
Gear ratio	
1st	3.321
2nd	2.077
3rd	1.308
4th	1.000
Reverse	3.382

Speedometer gear ratio

Tire		Speedometer gear ratio
Standard	175HR14 Tubeless	18/6
Optional	195/70HR14 With tube	

Final gear ratio		3.545
Oil capacity	liters (U.S. pts., Imp. pts.)	1.6 (3 3/8, 2 3/8)

TIGHTENING TORQUE

Installation	Unit: kg-m (ft-lb)
Engine to transmission installation bolt	4.4 to 5.9 (32 to 43)
Clutch operating cylinder installation bolt	2.5 to 3.0 (18 to 22)
Rear mounting insulator to transmission installation bolt	0.8 to 1.1 (5.8 to 8)
Crossmenber mounting bolt	3.2 to 3.7 (23 to 27)
Propeller shaft to diff. installation bolt	2.5 to 3.2 (18 to 23)
Gear assembly	
Rear extension installation bolt	1.6 to 2.1 (12 to 15)
Front cover installation bolt	1.6 to 2.1 (12 to 15)
Mainshaft retainer to transmission case	1.9 to 2.5 (14 to 18)
Mainshaft nut	14.0 to 17.0 (101 to 123)
Check ball plug	1.9 to 2.5 (14 to 18)
Reverse select return plug	0.9 to 1.2 (7 to 9)

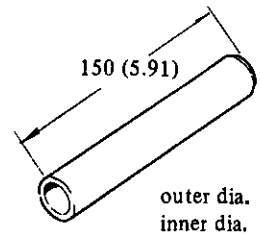
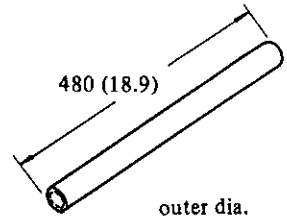
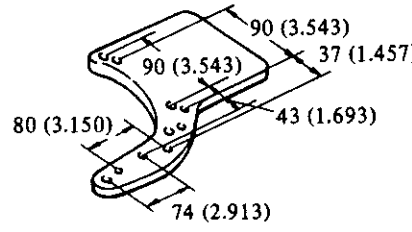
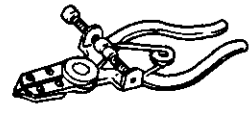
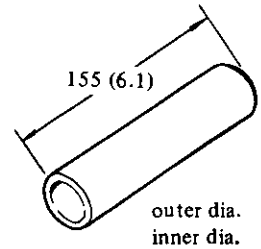
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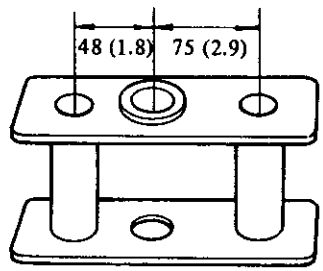
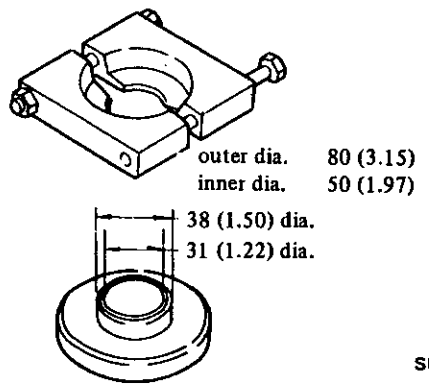
Gear backlash		
Maindrive gear to counter dirve gear	mm (in)	0.05 to 0.10 (0.0020 to 0.0039)
1st gear	mm (in)	0.05 to 0.20 (0.0020 to 0.0079)
2nd gear	mm (in)	0.05 to 0.20 (0.0020 to 0.0079)
3rd gear	mm (in)	0.05 to 0.20 (0.0020 to 0.0079)
Gear end play		
1st gear	mm (in)	0.32 to 0.39 (0.0126 to 0.0154)
2nd gear	mm (in)	0.13 to 0.37 (0.0051 to 0.0146)
3rd gear	mm (in)	0.13 to 0.37 (0.0051 to 0.0146)
Counter gear	mm (in)	0.01 to 0.21 (0.0004 to 0.0083)
Reverse idler gear	mm (in)	0.05 to 0.20 (0.0020 to 0.0079)
Clearance between balk ring and gear		
All gears	mm (in)	1.25 to 1.6 (0.0492 to 0.0630)
Counter bearing adjusting shim	mm (in)	0.6 (0.0236) 0.5 (0.0197) 0.4 (0.0157) 0.3 (0.0118) 0.2 (0.0079) 0.1 (0.0039)

TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Difficult to intermesh gears Causes for difficult gear shifting are classified to problems 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 transmission.	Worn gears, shaft, and/or bearing. Insufficient operating stroke due to worn or loose sliding part. Worn or damaged synchronizer.	Replace. Repair or replace. Replace.
Gear slips out of mesh. In most cases, this problem occurs when interlock ball, check ball, and/or spring is worn or weakened, or when control system is faulty. In this case, the problem 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 faulty 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.

SPECIAL SERVICE TOOLS

No.	Tool number & tool name	Description Unit: mm (in)	For use on	Reference page or Figure No.
1.	ST22360001 Drift C	For assembly of counter drive bearing.  outer dia. 32 (1.26) inner dia. 23 (0.91) SE034	71BT/M	Page MT-9 Fig. MT-37
2.	ST23800000 Transmission adapter	For assembly of main bearing.  outer dia. 44 (1.73) inner dia. 31 (1.22) SE037	S30 620	Page MT-9
3.	ST23810001 Setting plate adapter	For setting adapter plate in a vise.  SE132	71BT/M	Page MT-4 Fig. MT-9 Fig. MT-10 Page MT-9 Fig. MT-38
4.	ST23840000 Expander	For removal and assembly of main drive bearing snap ring.  SE099	S30	Page MT-3 Fig. MT-7 Page MT-11 Fig. MT-43
5.	ST23860000 Counter gear drift	For assembly of counter drive gear.  outer dia. 38 (1.50) inner dia. 33 (1.30) SE039	71BT/M	Page MT-9 Fig. MT-35

No	Tool number & tool name	Description Unit: mm (in)	For use on	Reference page or Figure No.
6.	ST23870000 Transmission press stand	For assembly of mainshaft, countershaft, counter drive gear and counter drive bearing.  	71BT/M	Page MT-8 Fig. MT-30 Fig. MT-31 Fig. MT-32 Fig. MT-35 Fig. MT-37
7.	ST3003S000 Drive pinion rear bearing inner race replacer (Bearing puller) ST30031000 Puller ST30032000 Base	For replacing bearing.  	65L, 63L & 71BT/M	Page MT-5 Fig. MT-16 Page MT-6 Fig. MT-18

509 Debby Lane
Adamsville, AL 35005
http://www.zcarcreations.com
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This Agreement will be governed by the laws of the State of Alabama, USA, excluding the application of its conflicts of law rules. This Agreement will not be governed by the United Nations Convention on Contracts for the International Sale of Goods, the application of which is expressly excluded. If any part of this Agreement is found void and unenforceable, it will not affect the validity of the balance of the Agreement, which shall remain valid and enforceable according to its terms. You agree that the Service Manual on CDROM will not be shipped, transferred or exported into any country or used in any manner prohibited by the United States Export Administration act or any other export laws, restrictions or regulations. This Agreement shall automatically terminate upon failure by you to comply with its terms. This Agreement may only be modified in writing signed by and authorized officer for Z Car Creations, LLC.

Craig Borden
Z Car Creations, LLC
509 Debby Lane
Adamsville, AL 35005
USA

YOUR ACCEPTANCE OF THE FOREGOING AGREEMENT IS IMPLIED UPON PURCHASING AND USING THE SERVICE MANUAL CDROM.