SERVICE MANUAL

DATSUN 280Z
MODEL S30 SERIES

NISSAN

NISSAN MOTOR CO., LTD.
TOKYO, JAPAN

SECTION MT

MANUAL TRANSMISSION

MT

4-SPEED TRANSMISSION (TYPE: F4W71B) ..... MT- 2

5-SPEED TRANSMISSION (TYPE : FS5W71B) MT-13

SERVICE DATA AND SPECIFICATIONS MT-18

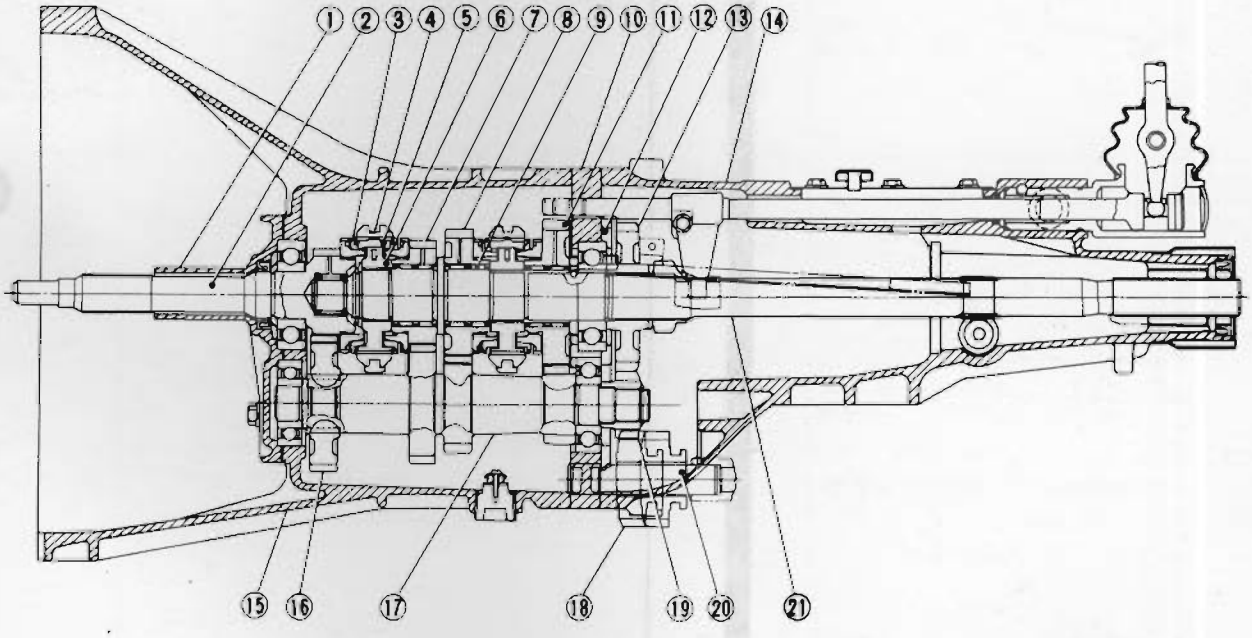
TROUBLE DIAGNOSES AND CORRECTIONS MT-21

SPECIAL SERVICE TOOLS MT-22

4-SPEED TRANSMISSION (TYPE: F4W71B)

CONTENTS

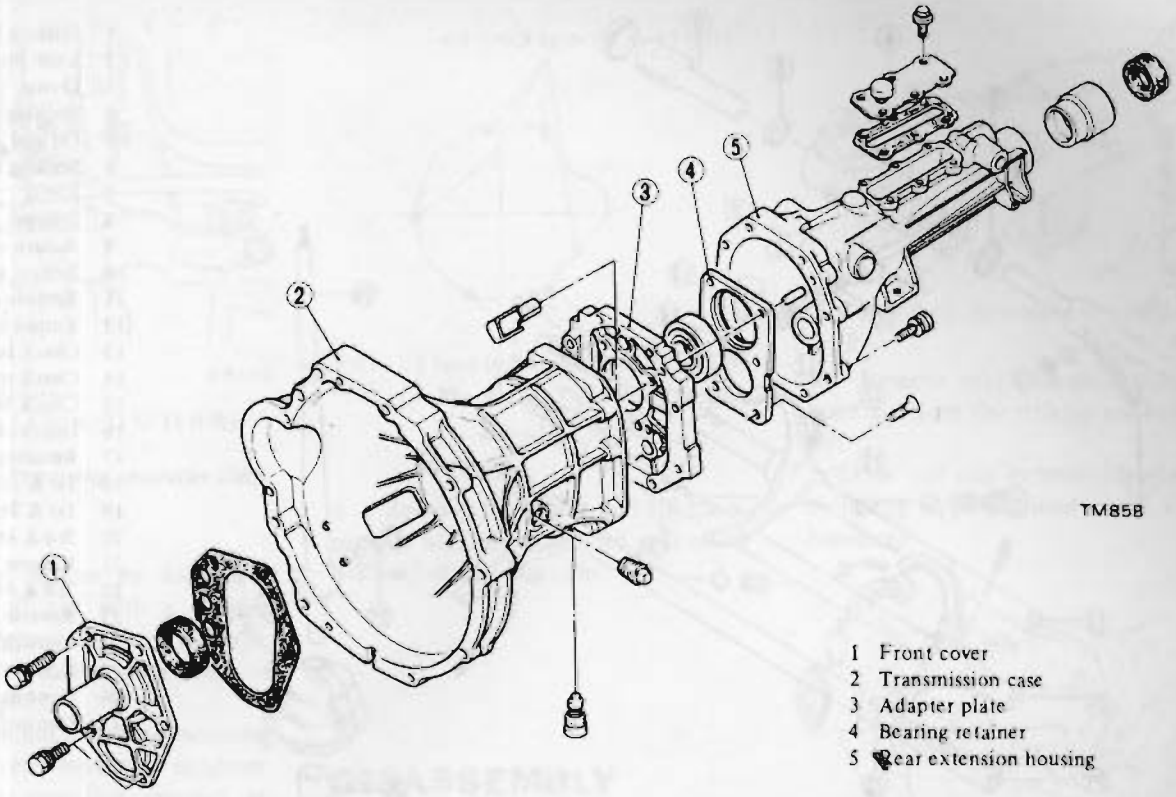
REMOVAL ..... MT- 4
INSTALLATION ..... MT- 5
DISASSEMBLY ..... MT- 5
HOUSING ..... MT- 5
FORK ROD ..... MT- 6
GEAR ..... MT- 6
REAR EXTENSION ..... MT- 7
ADAPTER PLATE ..... MT- 7
INSPECTION ..... MT- 7
TRANSMISSION CASE AND REAR EXTENSION HOUSING ..... MT- 8
BEARING ..... MT- 8
GEAR ..... MT- 8
BAULK RING ..... MT- 8
OIL SEAL ..... MT- 8
ASSEMBLY ..... MT- 8
FRONT COVER ..... MT- 8
REAR EXTENSION ..... MT- 8
ADAPTER PLATE ..... MT- 9
GEAR ..... MT- 9
HOUSING MT-12



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

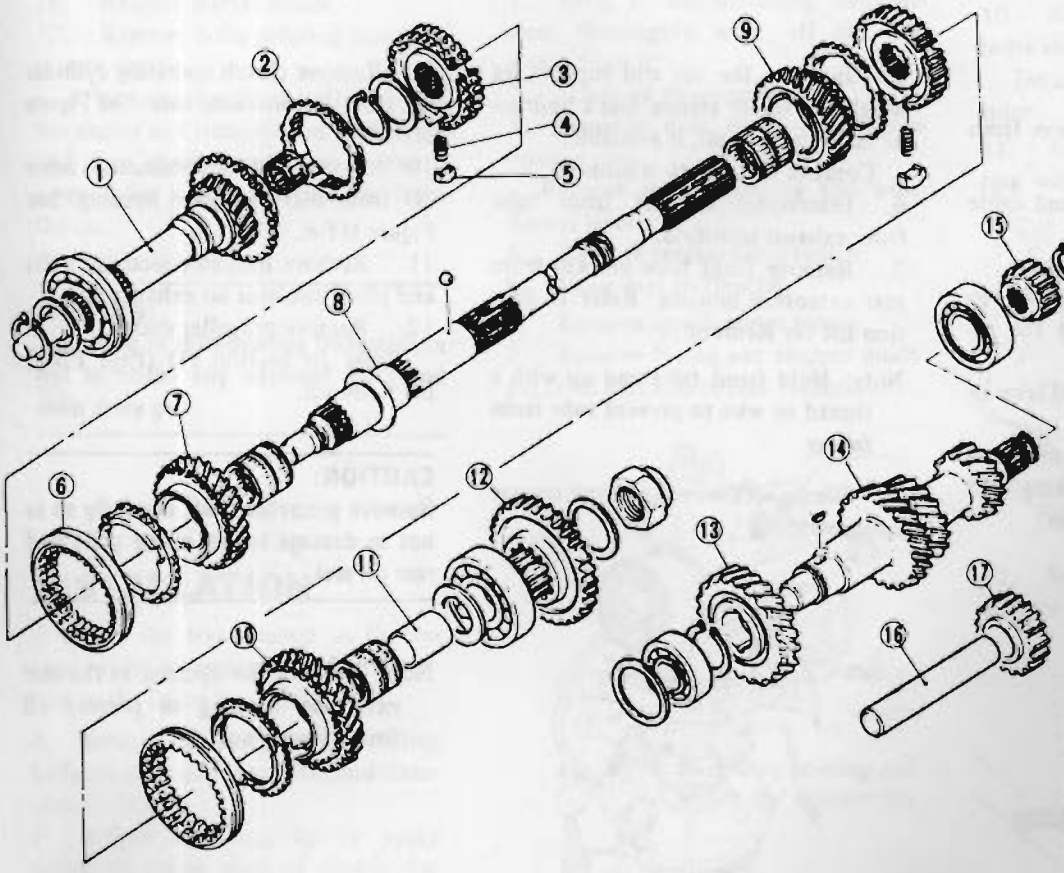
TM126A

Fig. MT-1 F4W71B transmission



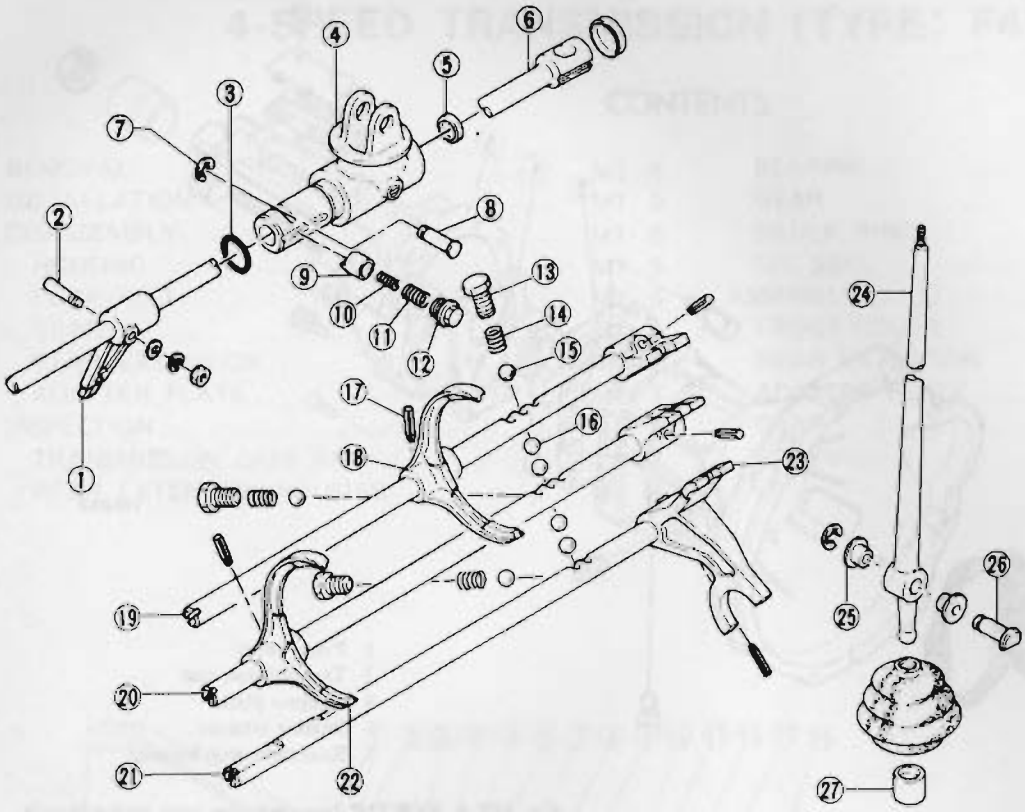
1 Front cover
2 Transmission case
3 Adapter plate
4 Bearing retainer
5 Rear extension housing

Fig. MT-2 F4W71B transmission case components



1 Main drive gear
2 Baulk ring
3 Synchronizer hub, 3rd & 4th
4 Shifting insert spring
5 Shifting insert
6 Coupling sleeve
7 3rd main gear
8 Mainshaft
9 2nd main gear
10 1st main gear
11 1st gear spacer
12 Reverse main gear
13 Counter drive gear
14 Counter gear
15 Reverse counter gear
16 Reverse idler shaft
17 Reverse idler gear

Fig. MT-3 F4W71B transmission gear components



1 Striking lever
2 Lock pin
3 O-ring
4 Striking guide
5 Oil seal
6 Striking rod
7 E-ring
8 Stopper guide pin
9 Return spring plunger
10 Return spring
11 Reverse check spring
12 Return spring plug
13 Check ball plug
14 Check spring
15 Check ball
16 Interlock ball
17 Retaining pin
18 1st & 2nd shift fork
19 1st & 2nd fork rod
20 3rd & 4th fork rod
21 Reverse fork rod
22 3rd & 4th shift fork
23 Reverse shift fork
24 Control lever
25 Control lever bushing
26 Control lever pin
27 Control lever bushing

Fig. MT-4 F4W71B transmission shift control components

REMOVAL

In dismounting transmission from the car, proceed as follows:

1. Disconnect battery ground cable from terminal.
2. Disconnect accelerator linkage.
3. Remove floor console. Refer to Floor Console (Section BF) for removal.
4. Place transmission control lever in neutral position.

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

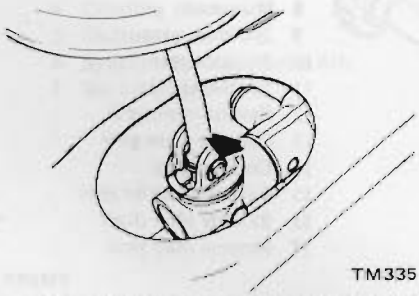


Fig. MT-5 Removing control lever

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

Confirm that safety is insured.

6. Disconnect exhaust front tube from exhaust manifold.
7. 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.

8. Disconnect wires ① from reverse lamp switch.

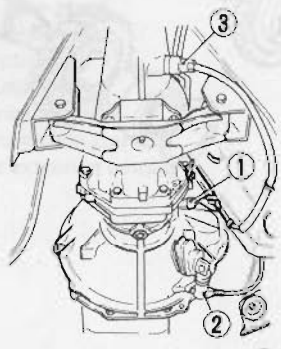


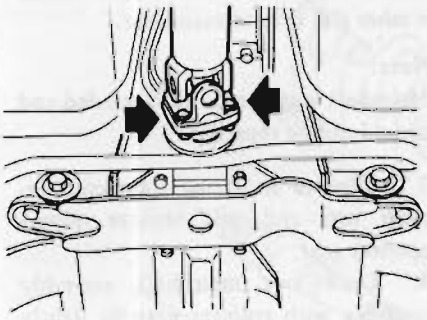
Fig. MT-6 Bottom view of car

9. Remove clutch operating cylinder ② from transmission case. See Figure MT-6.
10. Disconnect speedometer cable ③ from rear extension housing. See Figure MT-6.
11. Remove insulator securing bolts and place insulator on exhaust tube.
12. Remove propeller shaft.

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

CAUTION:
Remove propeller shaft carefully so as not to damage spline, sleeve yoke and rear oil seal.

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



Tightening torque:
3.5 to 4.5 kg-m (25 to 33 ft-lb)

Fig. MT-7 Removing propeller shaft

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

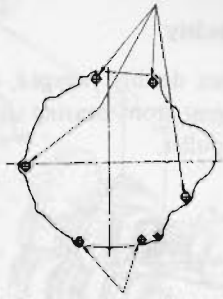
CAUTION:
Take care in dismounting transmission not to strike any adjacent parts and main drive gear.

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. Tighten bolts securing transmission to engine to specifications.

4.4 to 5.9 kg-m (32 to 43 ft-lb)



0.9 to 1.2 kg-m (6.5 to 8.7 ft-lb) TM773

Fig. MT-8 Tightening torque

4. Remove filler plug and fill transmission with recommended gear oil to the level of the plug hole.

DISASSEMBLY

HOUSING

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.
5. Move gear to Neutral.
6. Remove speedometer pinion.
7. Remove E-ring and stopper guide pin from rear end of rear extension.

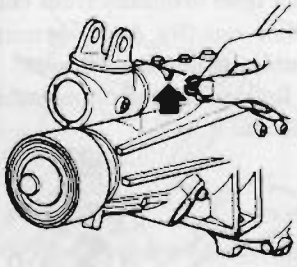


Fig. MT-9 Removing striking rod E-ring and stopper pin

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

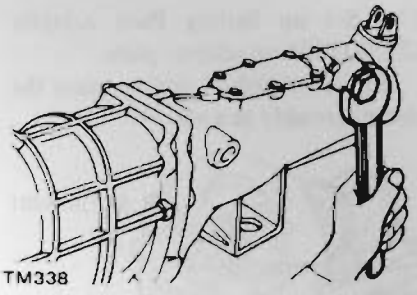


Fig. MT-10 Removing return spring plug

9. 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.

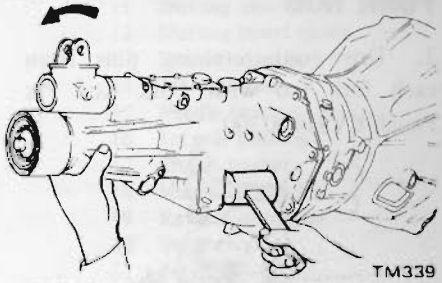


Fig. MT-11 Removing rear extension

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

Detach countershaft front bearing shim.

11. Remove main drive bearing snap ring with Expander.

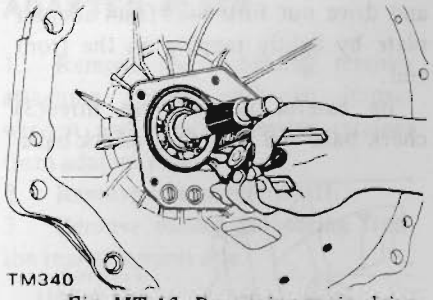


Fig. MT-12 Removing main drive bearing snap ring

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

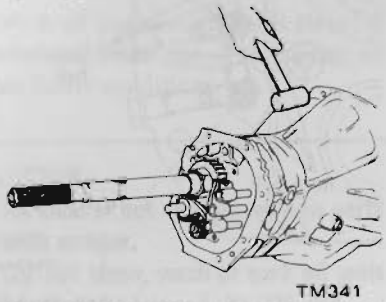


Fig. MT-13 Removing transmission case

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

With countershaft side up, place the above assembly in a vise.

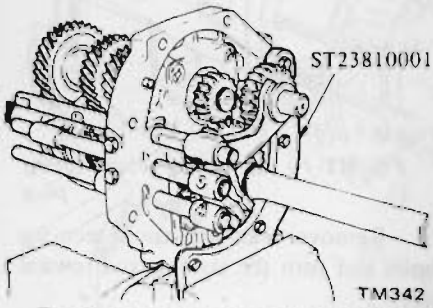


Fig. MT-14 Attaching gear assembly to special tool

FORK ROD

1. Drive out retaining pins from each fork rod with Fork Rod Pin Punch KV31100300.

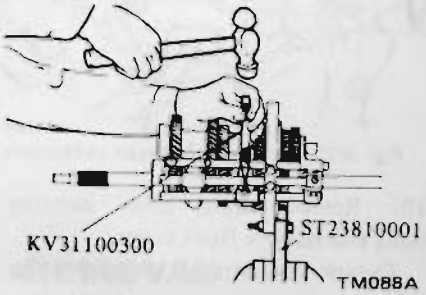


Fig. MT-15 Drive out retaining pins

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.

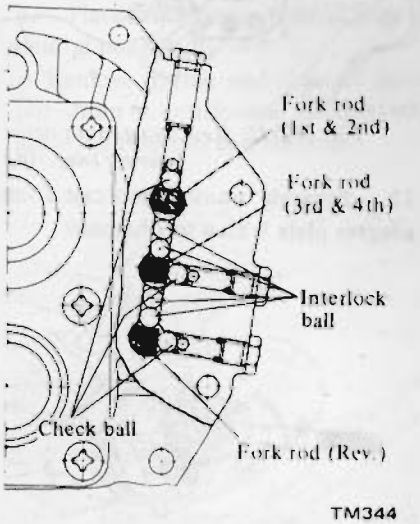


Fig. MT-16 Layout of check ball and interlock ball

GEAR

Gear assembly

1. With gears doubly engaged, draw out counter gear front bearing using a suitable gear puller.

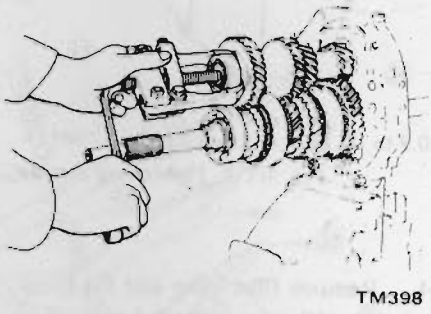


Fig. MT-17 Removing countershaft front bearing

2. Remove counter drive gear snap ring.
3. Draw out counter drive gear with main drive gear 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.

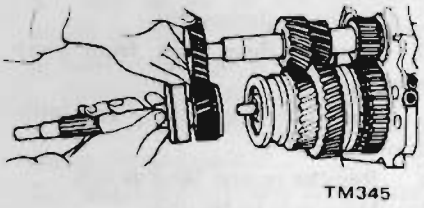


Fig. MT-18 Removing counter drive gear and main drive gear

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

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

5. Release staking on mainshaft nut and loosen it.

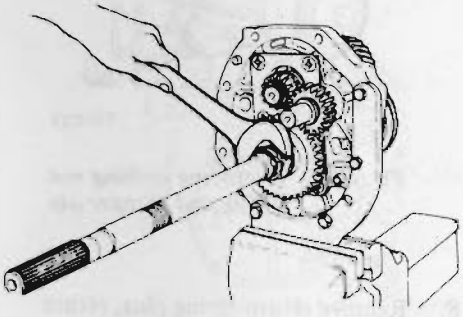


Fig. MT-19 Removing mainshaft nut

6. Remove mainshaft nut, thrust washer and reverse main gear.

Note:
Mainshaft nut should be discarded and should not be reused.

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

Be careful not to drop counter gear.

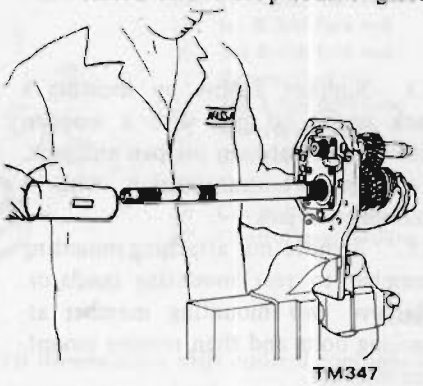


Fig. MT-20 Driving out gear assembly

Mainshaft

1. Remove thrust washer, steel ball, 1st gear and needle bearing. Be careful not to lose steel ball retaining thrust washer.
2. Press out 1st gear mainshaft bushing together with 2nd gear and 1st & 2nd synchronizer using Bearing Puller ST30031000.

Note:
When pressing out bushing, hold mainshaft by hand so as not to drop it.

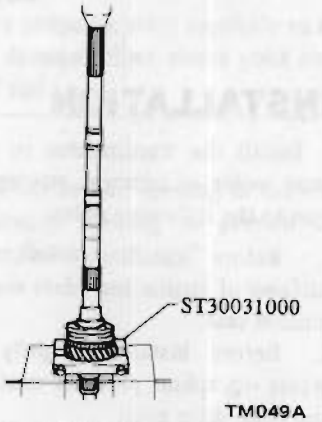
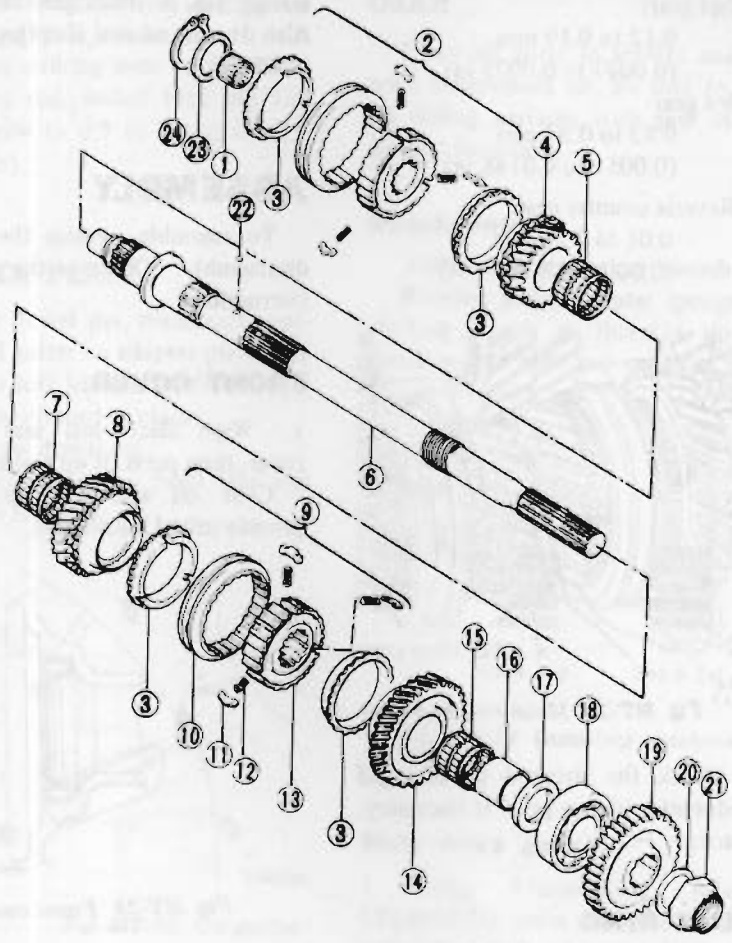


Fig. MT-21 Removing 1st gear bushing



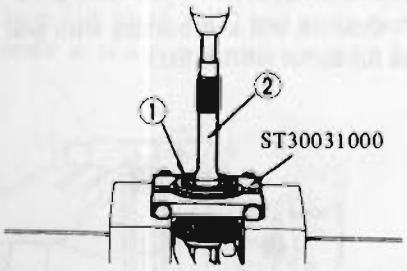
1 Pilot bearing
2 3rd & 4th synchronizer assembly
3 Baulk ring
4 3rd main gear
5 Needle bearing
6 Mainshaft
7 Needle bearing
8 2nd main gear
9 1st & 2nd synchronizer assembly
10 Coupling sleeve
11 Shifting insert
12 Shifting insert spring
13 Synchronizer hub
14 1st main gear
15 Needle bearing
16 1st gear bushing
17 Thrust washer
18 Mainshaft bearing
19 Reverse main gear
20 Thrust washer
21 Mainshaft nut
22 Steel ball
23 Thrust washer
24 Snap ring

TM127A

Fig. MT-22 Mainshaft assembly

Main drive gear

1. Remove main drive gear snap ring and spacer.
2. Remove main drive bearing with Bearing Puller ST30031000 and a suitable press.



1 Main drive bearing
2 Main drive gear

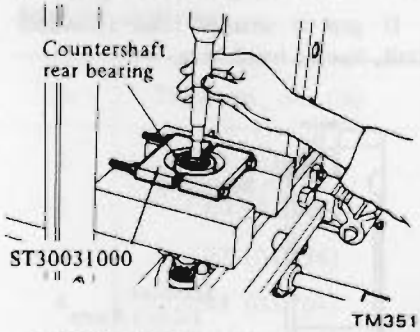
TM349

Fig. MT-23 Removing main drive bearing

Counter gear

Press out counter gear rear bearing using Bearing Puller ST30031000.

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



TM351

Fig. MT-24 Removing countershaft bearing

REAR EXTENSION

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

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

ADAPTER PLATE

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.

CAUTION:
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 bushing is worn or cracked, replace it as an assembly of bushing and rear extension housing.

BEARING

1. Thoroughly clean bearing and dry with a compressed air.

CAUTION:
Do not allow the bearings to spin. Because it will damage the race and balls. Turn them slowly by hand.

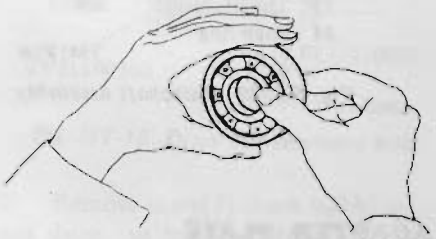


Fig. MT-25 Inspecting ball bearing

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.
3. Replace needle bearing if worn or damaged.

GEAR

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 gear end play:

1st gear:
0.32 to 0.39 mm
(0.0126 to 0.0154 in)

2nd gear:
0.12 to 0.19 mm
(0.0047 to 0.0075 in)

3rd gear:
0.13 to 0.37 mm
(0.0051 to 0.0146 in)

Reverse counter gear:
0.01 to 0.20 mm
(0.0004 to 0.0079 in)

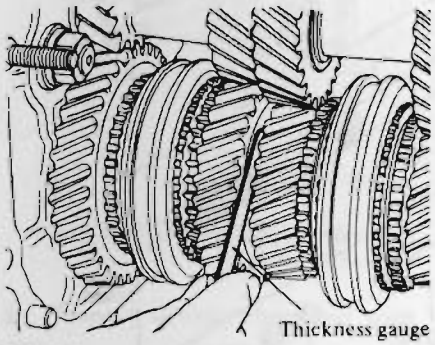


Fig. MT-26 Measuring end play

4. 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 smaller than allowable limit, discard baulk ring.

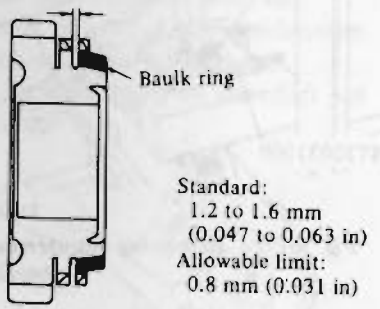


Fig. MT-27 Baulk ring-to-cone gap

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

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.

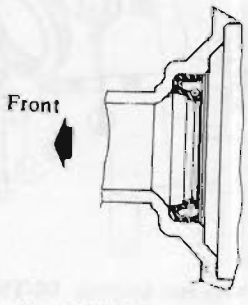


Fig. MT-28 Front cover oil seal

2. Apply sealant to withdrawal lever ball pin screw. Install withdrawal lever ball pin to front cover and tighten screw to 1.6 to 2.1 kg-m (12 to 15 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.

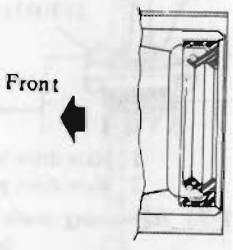


Fig. MT-29 Rear extension oil seal

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

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.

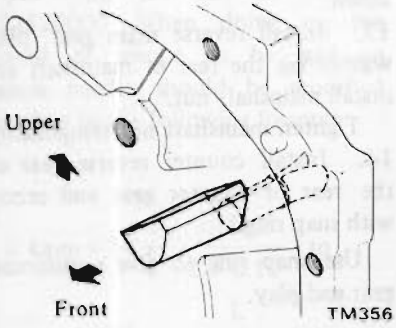


Fig. MT-30 Oil gutter

2. Insert reverse idler shaft in adapter plate.

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

3. 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.

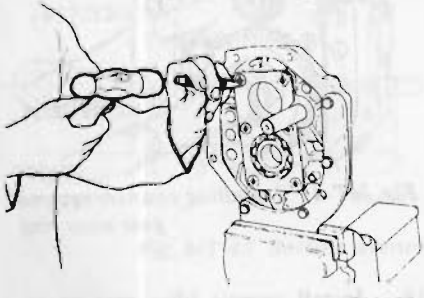


Fig. MT-31 Staking screw

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

GEAR

Clean all parts in solvent and dry with compressed air. Be sure to coat all sliding surfaces with gear oil for initial lubrication.

Synchronizer

Assemble synchronizer assembly.

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

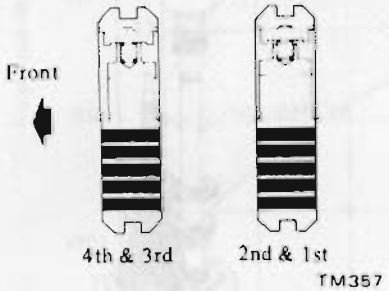


Fig. MT-32 Installing synchronizer hub

Main drive gear

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.

Available snap ring

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

Gear 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.

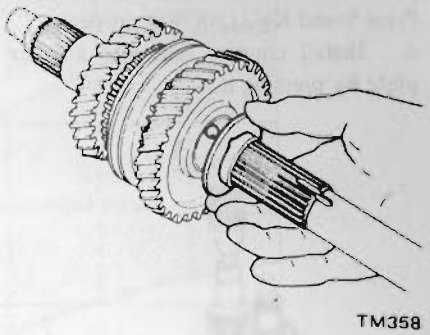


Fig. MT-33 Installing thrust washer

2. Set Transmission Press Stand KV31100400 and place adapter plate assembly on it.

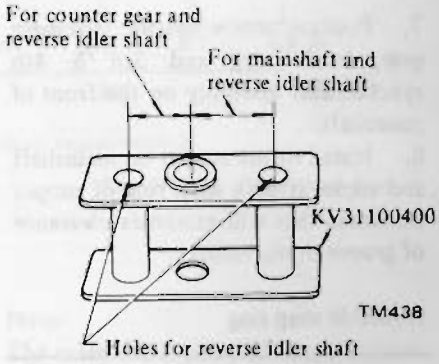


Fig. MT-34 Transmission Press Stand

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

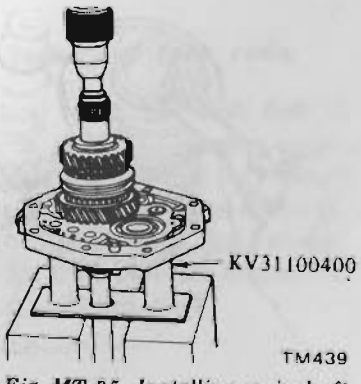


Fig. MT-35 Installing mainshaft assembly

4. Place new woodruff keys in grooves in counter gear and tap them lightly until they are seated securely.

Use a soft hammer to avoid damaging keys.

5. Place adapter plate assembly and mainshaft assembly so that counter gear rear bearing rests on Transmission Press Stand KV31100400 properly.

6. Install counter gear into adapter plate by pressing it.

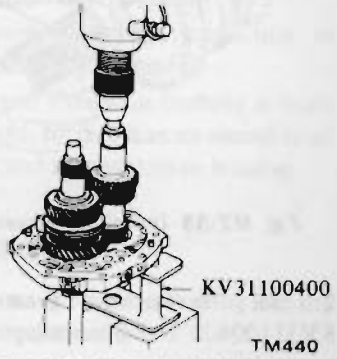


Fig. MT-36 Installing counter gear

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

8. Install thrust washer on mainshaft and secure it with snap ring of proper thickness that will minimize clearance of groove in mainshaft.

Available snap ring

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



Fig. MT-37 Installing snap ring

9. 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.

10. Press counter drive gear onto counter gear with Counter Gear Drift ST23860000 by meshing gears and secure counter drive gear with thicker snap ring.

Note:

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

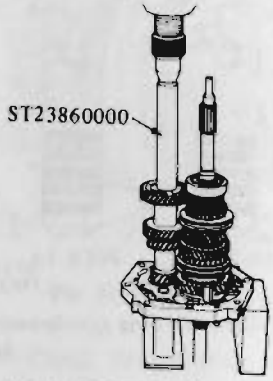


Fig. MT-38 Installing counter drive gear

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)

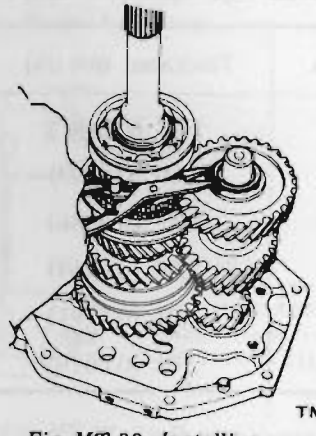


Fig. MT-39 Installing snap ring

11. Press counter gear front bearing onto counter gear with Bearing Drift ST22360002.

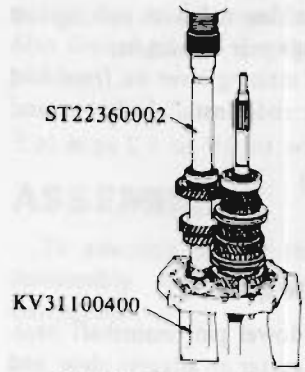


Fig. MT-40 Installing counter gear front bearing

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

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

Tighten mainshaft nut temporarily.

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

Use snap ring to give a minimum gear end play.

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

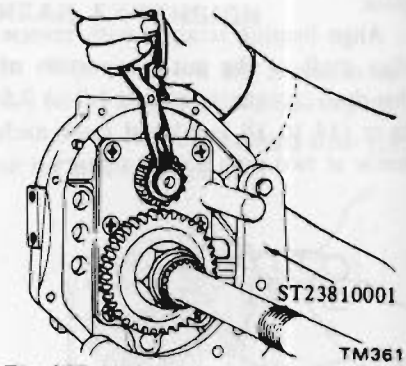


Fig. MT-41 Installing counter reverse gear snap ring

15. Install reverse idler gear on reverse idler shaft.

16. With gears doubly engaged, tighten mainshaft nut to the converted torque "C" (See Fig. MT-44.) using Wrench ST22520000.

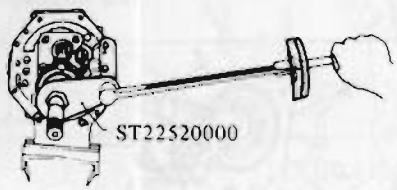


Fig. MT-42 Tightening mainshaft nut

Explanation of converted torque

Mainshaft nut should be tightened to 14 to 17 kg-m (101 to 123 ft-lb) torque with the aid of Wrench ST22520000. When doing so, the amount of torque to be read on wrench needle should be modified according to the following formula:

$$C\ kg\text{-}m = 14 \times \left(\frac{L}{L + 0.10}\right) \text{ to } 17 \times \left(\frac{L}{L + 0.10}\right)$$

or

$$C\ (ft\text{-}lb) = 101 \times \left(\frac{L}{L + 0.33}\right) \text{ to } 123 \times \left(\frac{L}{L + 0.33}\right)$$

Where,

C: Value read on the torque wrench kg-m (ft-lb)

L: Effective length of torque wrench m (ft)

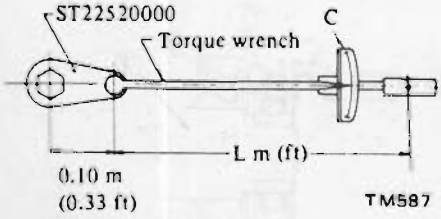


Fig. MT-43 Setting wrench

Example,

When a 0.40 m (1.31 ft)-long torque wrench is used, the "C" in Fig. MT-44 will be 11.2 to 13.6 kg-m (81 to 98 ft-lb).

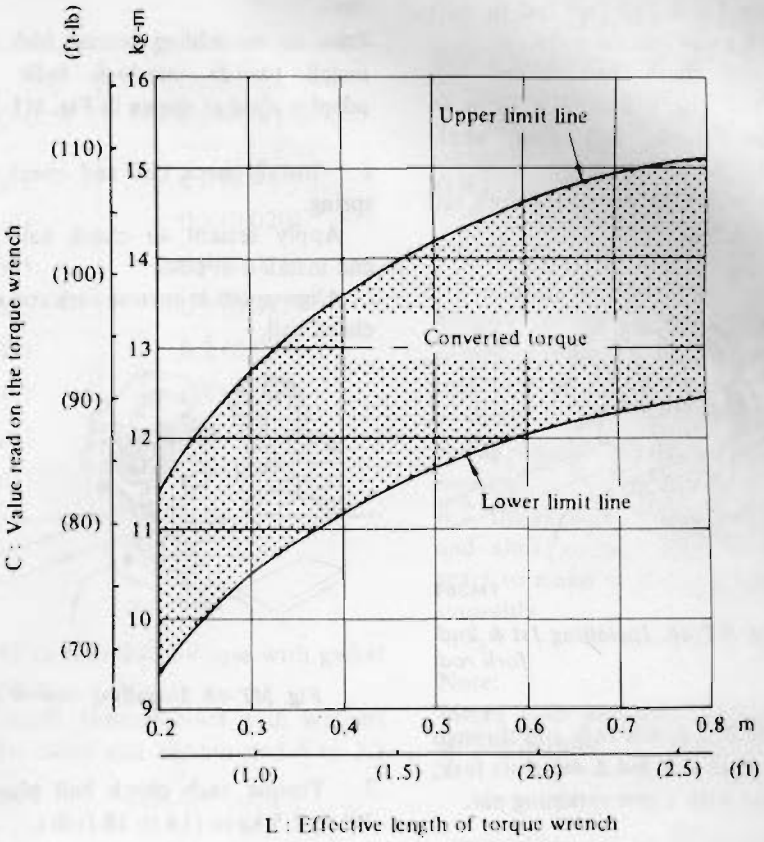


Fig. MT-44 Converted torque

17. 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.

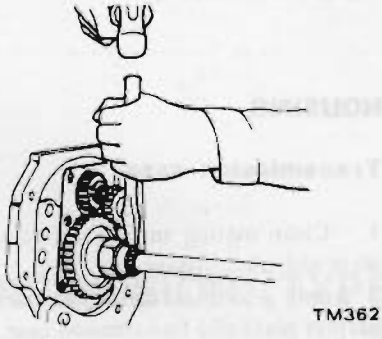


Fig. MT-45 Staking mainshaft nut

18. 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

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:

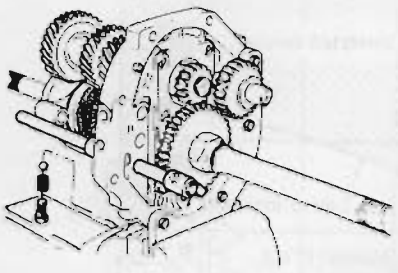
Shift forks for 1st & 2nd and 3rd & 4th are one and the same parts.

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.



TM367

Fig. MT-46 Installing 1st & 2nd fork rod

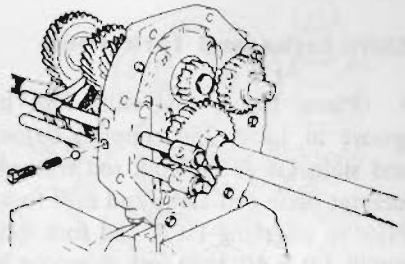
3. Slide 3rd & 4th fork rod through adapter plate and 3rd & 4th shift fork, and secure with a new retaining pin.

Note:
Prior to assembling 3rd & 4th fork rod, install two(2) interlock balls into adapter plate as shown in Fig. MT-16.

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.



TM368

Fig. MT-47 Installing 3rd & 4th fork rod

5. Place reverse shift fork in reverse idler gear.

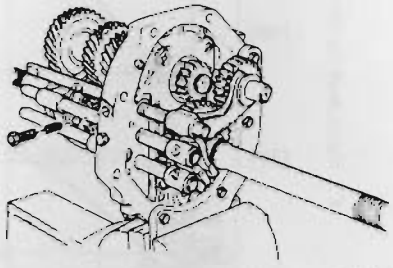
Slide reverse fork rod through reverse shift fork and adapter plate, and secure with a new retaining pin.

Note:
Prior to assembling reverse fork rod, install two(2) interlock balls into adapter plate as shown in Fig. MT-16.

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.



TM369

Fig. MT-48 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.

HOUSING

Transmission case

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

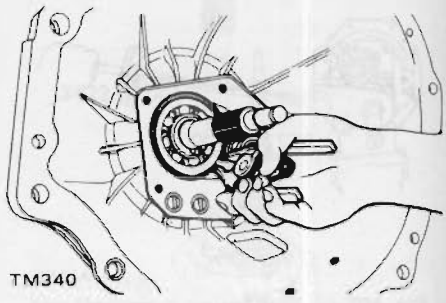
Apply sealant to mating surfaces of adapter plate and transmission case.

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.



TM340

Fig. MT-49 Fitting main drive bearing snap ring

Rear extension

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 striking lever engages with fork rod brackets correctly.

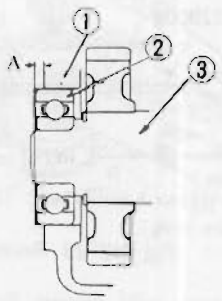
3. Install washers and through-bolts and torque to 1.6 to 2.1 kg-m (12 to 15 ft-lb).

Front cover assembly

1. Select countershaft front bearing shim as follows:

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

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



1 Transmission case
2 Counter gear front bearing
3 Counter gear

TM371

Fig. MT-50 Selecting counter gear front bearing shim

Available shim

No.	"A" mm (in)	Counter gear front bearing shim mm (in)
1	2.92 to 3.01 (0.1150 to 0.1185)	0.6 (0.024)
2	3.02 to 3.11 (0.1189 to 0.1224)	0.5 (0.020)
3	3.12 to 3.21 (0.1228 to 0.1264)	0.4 (0.016)
4	3.22 to 3.31 (0.1268 to 0.1303)	0.3 (0.012)
5	3.32 to 3.41 (0.1307 to 0.1343)	0.2 (0.008)
6	3.42 to 3.51 (0.1346 to 0.1382)	0.1 (0.004)
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.
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.

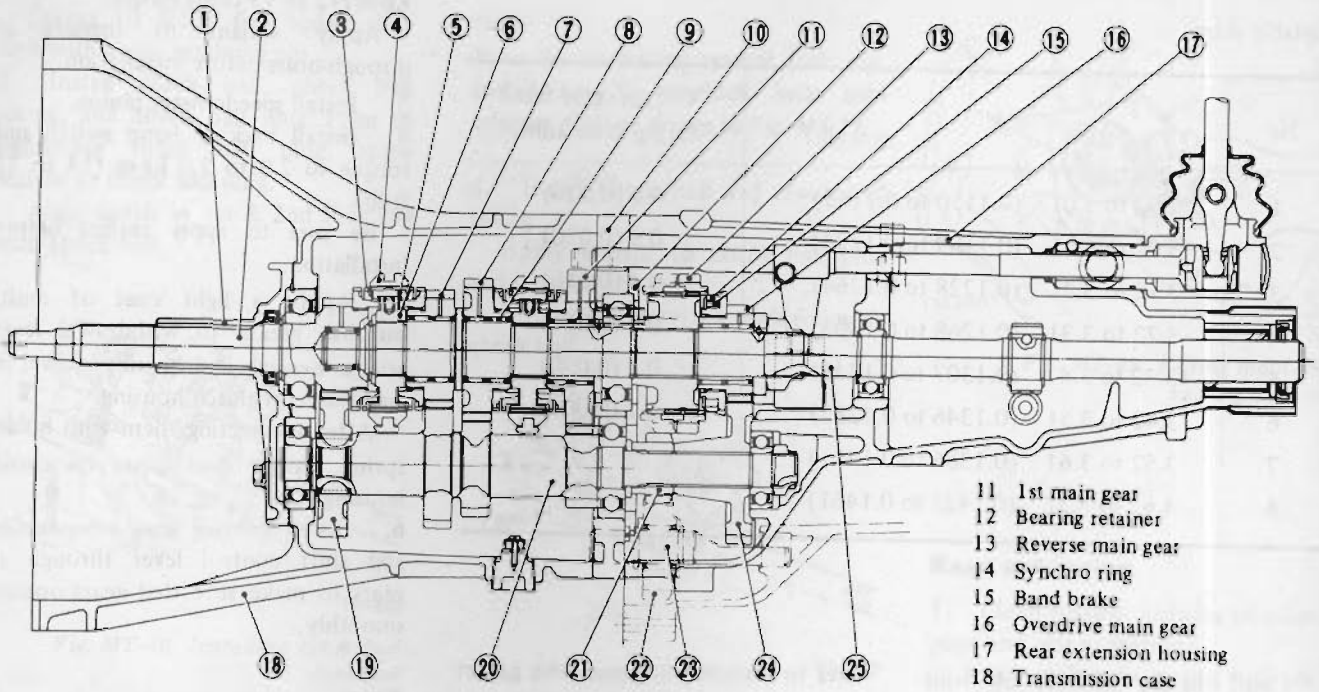
6. Install control lever temporarily, and shift control lever through all gears to make sure that gears operate smoothly.

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

5-SPEED TRANSMISSION (TYPE : FS5W71B)

CONTENTS

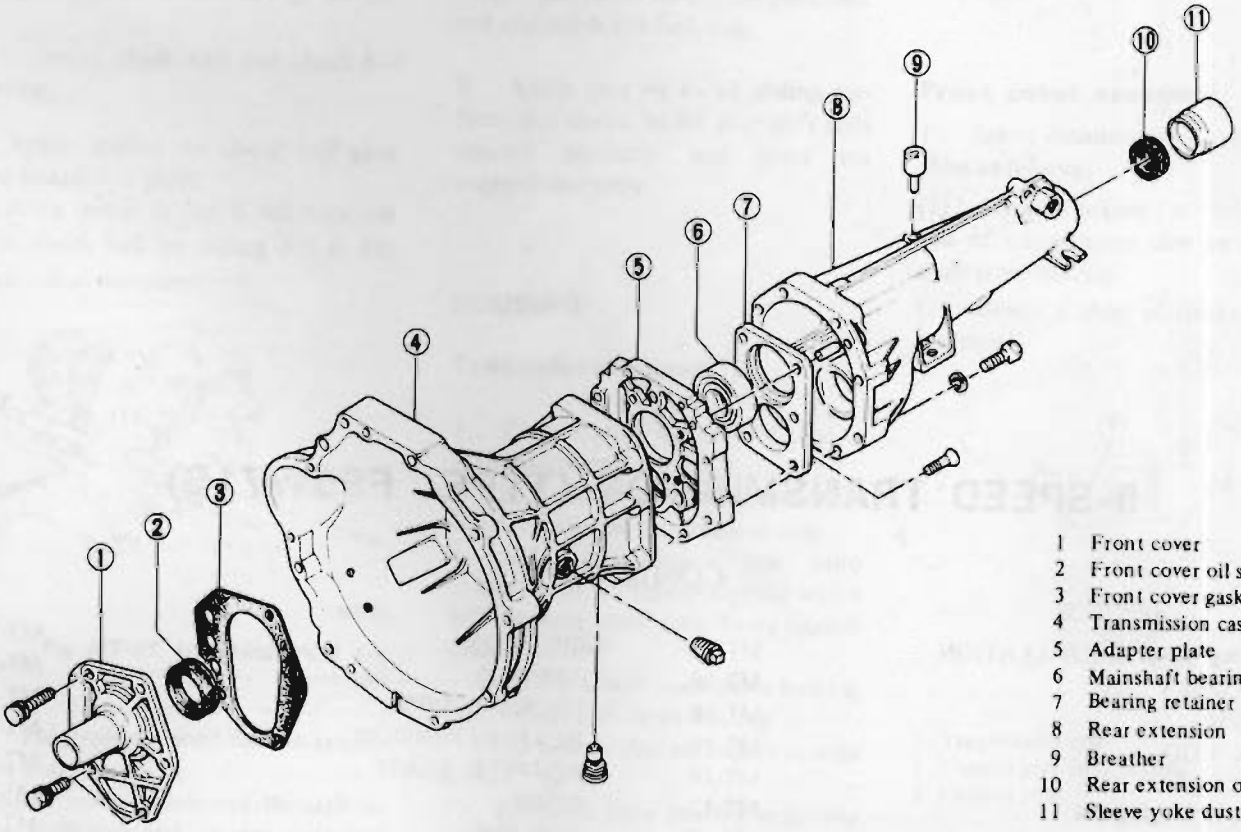
REMOVAL AND INSTALLATION MT-16
DISASSEMBLY MT-16
HOUSING MT-16
FORK ROD MT-16
GEAR MT-16
REAR EXTENSION MT-17
ADAPTER PLATE MT-17
INSPECTION MT-17
ASSEMBLY MT-17
FRONT COVER MT-17
REAR EXTENSION MT-17
ADAPTER PLATE MT-17
GEAR MT-17
HOSUING MT-18



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

TM128A

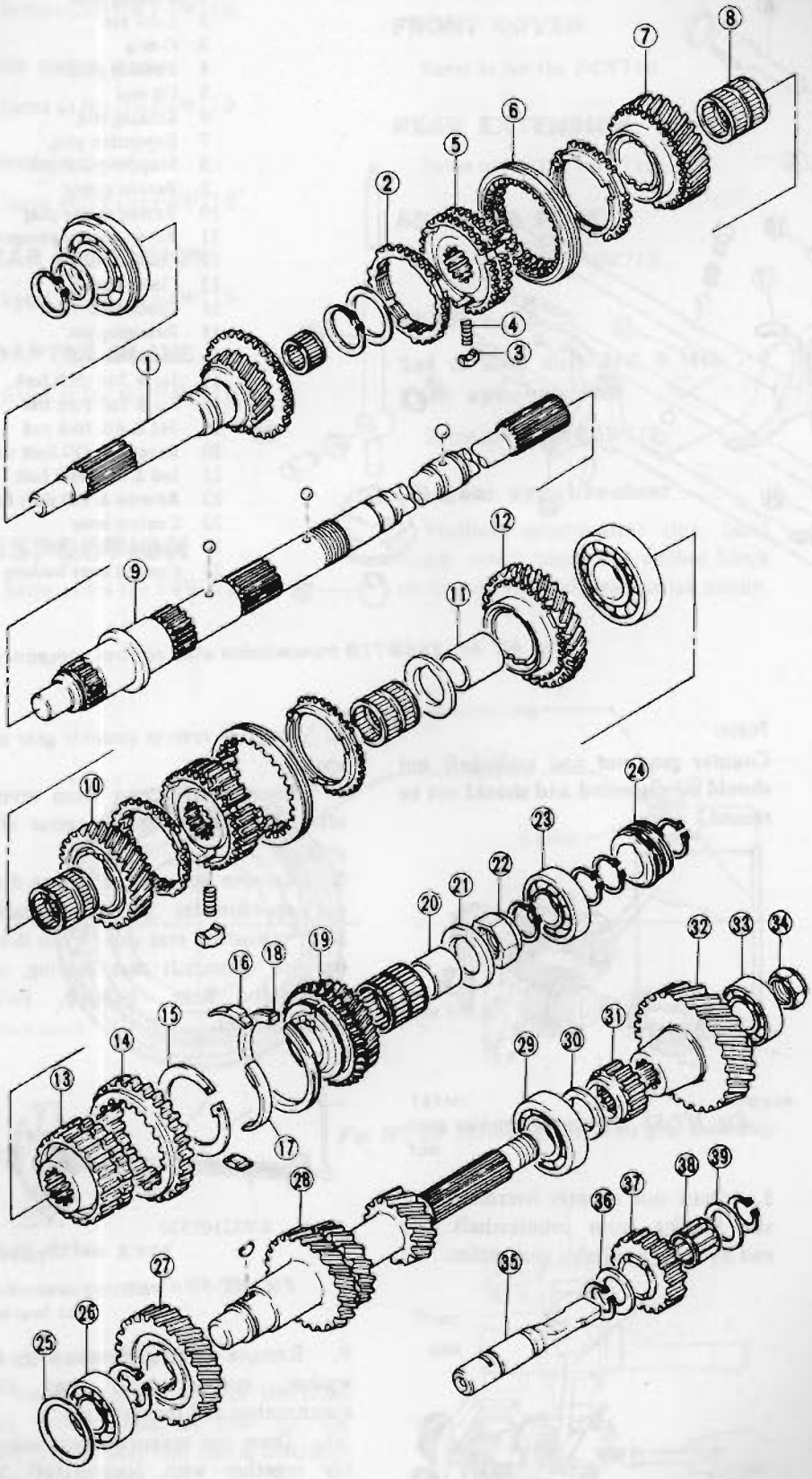
Fig. MT-51 FS5W71B transmission



1 Front cover
2 Front cover oil seal
3 Front cover gasket
4 Transmission case
5 Adapter plate
6 Mainshaft bearing
7 Bearing retainer
8 Rear extension
9 Breather
10 Rear extension oil seal
11 Sleeve yoke dust cover

TM046A

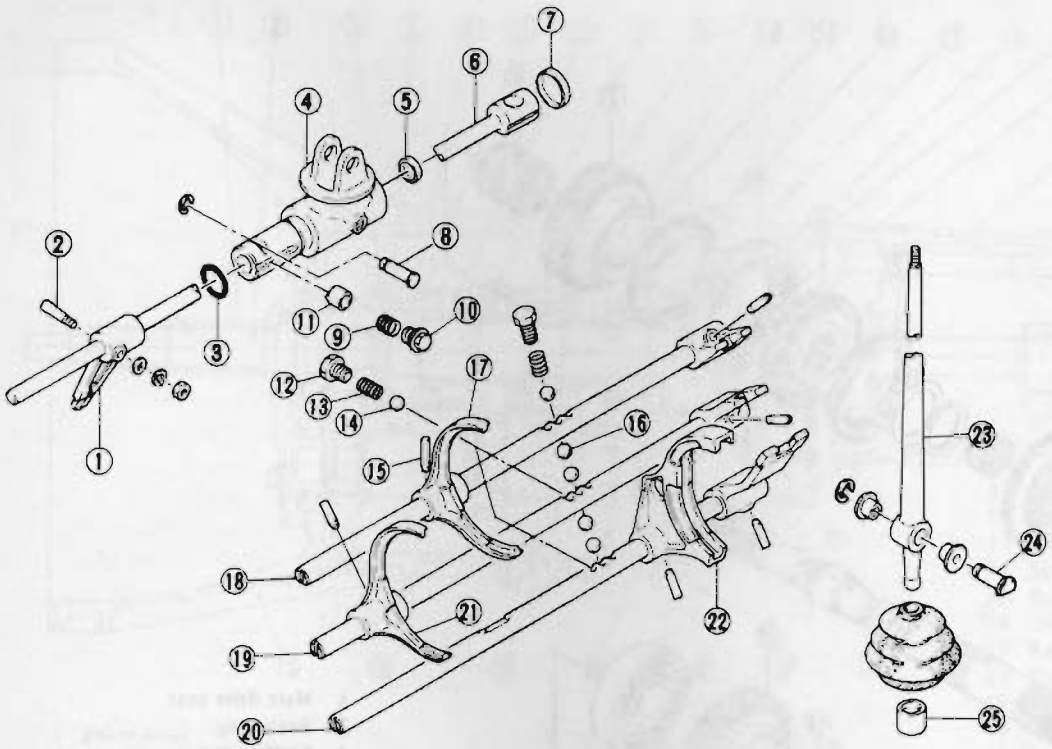
Fig. MT-52 FS5W71B transmission case components



1 Main drive gear
2 Baulk ring
3 Shifting insert
4 Shifting insert spring
5 Synchronizer hub
6 Coupling sleeve
7 3rd main gear
8 Needle bearing
9 Mainshaft
10 2nd main gear
11 Bushing
12 1st main gear
13 OD-reverse synchronizer hub
14 Reverse main gear
15 Circlip
16 Thrust block
17 Brake band
18 Synchronizer ring
19 Overdrive main gear
20 Overdrive gear bushing
21 Washer
22 Mainshaft nut
23 Mainshaft rear bearing
24 Speedometer drive gear
25 Counter gear front bearing shim
26 Counter gear front bearing
27 Counter drive gear
28 Counter gear
29 Counter gear bearing
30 Reverse counter gear spacer
31 Reverse counter gear
32 Overdrive counter gear
33 Counter gear rear bearing
34 Counter gear nut
35 Reverse idler shaft
36 Reverse idler thrust washer
37 Reverse idler gear
38 Reverse idler gear bearing
39 Reverse idler thrust washer

TM047A

Fig. MT-53 FS5W71B transmission gear components



1 Striking lever
2 Lock pin
3 O-ring
4 Striking guide
5 Oil seal
6 Striking rod
7 Expansion plug
8 Stopper guide pin
9 Return spring
10 Return spring plug
11 Return spring plunger
12 Check ball plug
13 Check spring
14 Check ball
15 Retaining pin
16 Interlock ball
17 1st & 2nd shift fork
18 1st & 2nd fork rod
19 3rd & 4th fork rod
20 Reverse & OD fork rod
21 3rd & 4th shift fork
22 Reverse & OD shift fork
23 Control lever
24 Control lever pin
25 Control lever bushing

Fig. MT-54 FS5W71B transmission shift control components

REMOVAL AND INSTALLATION

Same as for the F4W71B.

DISASSEMBLY

Disassembly and assembly procedures are almost the same as those for the F4W71B. Unless otherwise noted, refer to the F4W71B.

HOUSING

Same as for the F4W71B.

FORK ROD

Same as for the F4W71B.

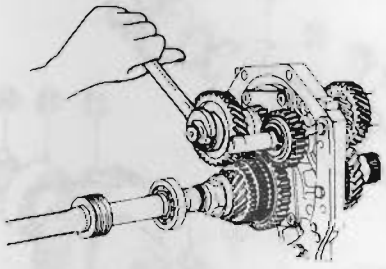
GEAR

Gear assembly

1. Remove counter gear front bearing.
2. Remove counter drive gear snap ring.
3. Draw out counter drive gear and main drive gear.
4. With gears doubly engaged, release staking on counter gear nut and mainshaft nut then loosen them.

Remove counter gear nut.

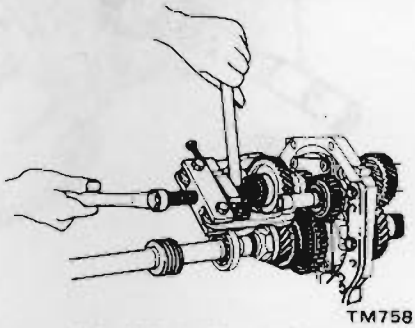
Note:
Counter gear nut and mainshaft nut should be discarded and should not be reused.



TM757

Fig. MT-55 Removing counter gear nut

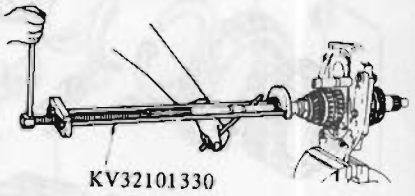
5. Draw out counter overdrive gear and bearing from countershaft rear end by using a suitable gear puller.



TM758

Fig. MT-56 Removing counter overdrive gear and bearing

6. Remove reverse counter gear and spacer.
7. Remove snap ring from reverse idler shaft, and remove reverse idler gear.
8. Remove snap rings and then draw out speedometer gear and bearing from mainshaft rear side. When drawing out mainshaft rear bearing, use Mainshaft Rear Bearing Puller KV32101330.



TM760

Fig. MT-57 Removing mainshaft rear bearing

9. Remove mainshaft nut, thrust washer, reverse main gear, OD synchronizer and overdrive gear.
10. 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 counter gear.

Mainshaft

Same as for the F4W71B.

Main drive gear

Same as for the F4W71B.

Counter gear

Same as for the F4W71B.

REAR EXTENSION

Same as for the F4W71B.

ADAPTER PLATE

Same as for the F4W71B.

INSPECTION

Same as for the F4W71B.

ASSEMBLY

FRONT COVER

Same as for the F4W71B.

REAR EXTENSION

Same as for the F4W71B.

ADAPTER PLATE

Same as for the F4W71B.

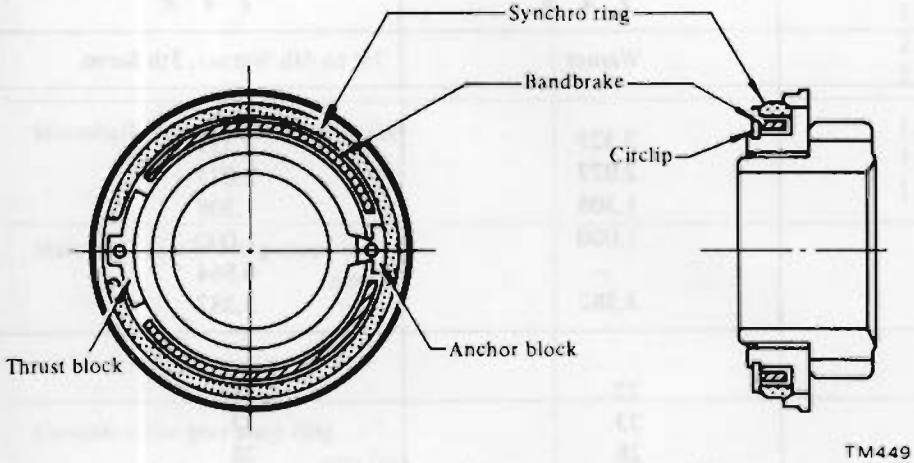
GEAR

1st & 2nd and 3rd & 4th gear synchronizer

Same as for the F4W71B.

OD gear synchronizer

Position synchronizer ring, band brake, thrust block and anchor block on overdrive clutch gear; install circlip.



TM449

Fig. MT-58 Installing overdrive gear assembly

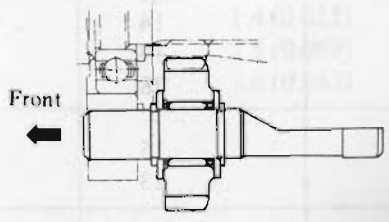
Main drive gear

Same as for the F4W71B.

Gear assembly

Assembly procedure for the front side is the same as that for the F4W71B. So only rear side is described here.

1. After front side is assembled, assemble snap ring, spacer, needle bearing, reverse idler gear, spacer and snap ring.



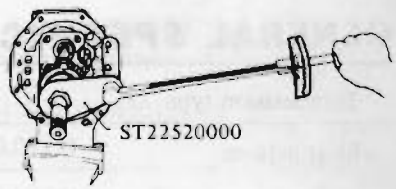
TM451

Fig. MT-59 Reverse idler gear

2. Assemble OD-reverse synchronizer hub, reverse gear, OD gear bushing, needle bearing, OD gear assembly, steel ball and thrust washer on mainshaft rear side. Before installing a steel ball, apply grease to it.
3. Assemble new mainshaft nut, and tighten it temporarily.
4. Assemble spacer, reverse counter gear, overdrive counter gear, bearing and new counter gear lock nut.

Tightening torque:
Counter gear lock nut:
10.0 to 13.0 kg-m
(72 to 94 ft-lb)

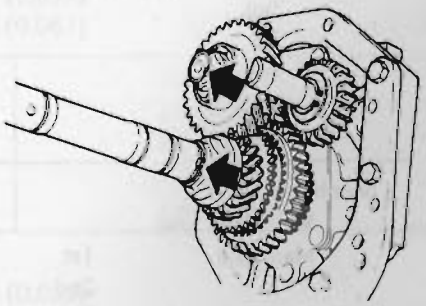
5. With gears doubly engaged, tighten mainshaft lock nut.



TM768

Fig. MT-60 Tightening mainshaft nut

6. Stake mainshaft and counter gear nuts to groove of mainshaft and counter gear with a punch.



TM130A

Fig. MT-61 Staking mainshaft nuts

7. Assemble mainshaft rear bearing using Bearing Drift ST22350000. Fit thick snap ring to the rear side of bearing to eliminate end play.

Available snap ring

No.	Thickness mm (in)
1	1.1 (0.043)
2	1.2 (0.047)
3	1.3 (0.051)
4	1.4 (0.055)

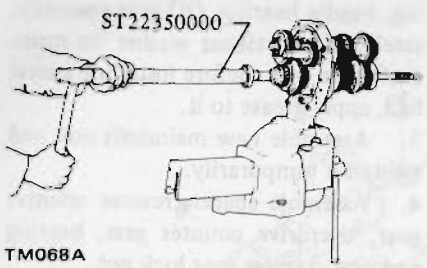


Fig. MT-62 Assembling mainshaft rear bearing

8. Fit snap ring to front of speedometer drive gear.
9. Assemble steel ball, speedometer drive gear and rear snap ring.

Shift forks and fork rods

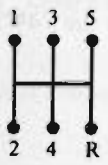
Same as for the F4W71B.

HOUSING

Same as for the F4W71B.

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

Transmission type		F4W71B	FS5W71B
Shift pattern			
Synchromesh type		Warner	1st to 4th Warner, 5th Servo
Gear ratio			
	1st	3.321	3.321
	2nd	2.077	2.077
	3rd	1.308	1.308
	4th	1.000	1.000
	5th	–	0.864
	Reverse	3.382	3.382
Number of teeth			
Main drive gear		22	22
Main gear	1st	33	33
	2nd	28	28
	3rd	26	26
	5th	–	19
	Reverse	36	36
Counter drive gear		31	31
Counter gear	1st	14	14
	2nd	19	19
	3rd	28	28
	5th	–	31
	Reverse	15	15
Reverse idler gear		23	23
Oil capacity	liter (US pt, Imp pt)	1.7 (3 5/8, 3)	2.0 (4 1/4, 3 1/2)
Speedometer gear ratio		17/6	17/6
Final gear ratio		3.545	3.545
Tire size		195/70HR-14	195/70HR-14

INSPECTION AND REPAIR

Transmission type	F4W71B	FS5W71B
Gear backlash mm (in)		
Main drive gear	0.05 to 0.10 (0.0020 to 0.0039)	
1st gear	0.05 to 0.20 (0.0020 to 0.0079)	
2nd gear	0.05 to 0.20 (0.0020 to 0.0079)	
3rd gear	0.05 to 0.20 (0.0020 to 0.0079)	
5th gear	–	0.05 to 0.20 (0.0020 to 0.0079)
Reverse idler gear	0.05 to 0.20 (0.0020 to 0.0079)	
Gear end play mm (in)		
1st gear	0.32 to 0.39 (0.0126 to 0.0154)	
2nd gear	0.12 to 0.19 (0.0047 to 0.0075)	
3rd gear	0.13 to 0.37 (0.0051 to 0.0146)	
5th gear	–	0.12 to 0.19 (0.0047 to 0.0075)
Reverse counter gear	Less than 0.20 (0.0079)	–
Reverse idler gear	–	0.05 to 0.50 (0.0020 to 0.0197)
Baulk ring to cone gap mm (in)		
Standard	1.20 to 1.60 (0.0472 to 0.0630)	
Allowable limit	0.8 (0.0315)	
Main drive gear snap ring mm (in)	1.73 (0.0681) 1.80 (0.0709) 1.87 (0.0736) 1.94 (0.0764) 2.01 (0.0791) 2.08 (0.0819)	
Mainshaft front snap ring mm (in)	1.4 (0.055) 1.5 (0.059) 1.6 (0.063)	
Mainshaft rear bearing snap ring mm (in)	–	1.1 (0.043) 1.2 (0.047) 1.3 (0.051) 1.4 (0.055)
Counter drive gear snap ring mm (in)	1.4 (0.055) 1.5 (0.059) 1.6 (0.063)	
Counter reverse gear snap ring mm (in)	1.4 (0.055) 1.5 (0.059) 1.6 (0.063)	–
Counter gear front bearing shim mm (in)	0.1 (0.004) 0.2 (0.008) 0.3 (0.012) 0.4 (0.016) 0.5 (0.020) 0.6 (0.024)	

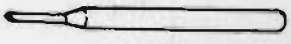
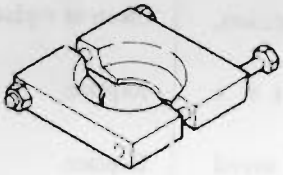
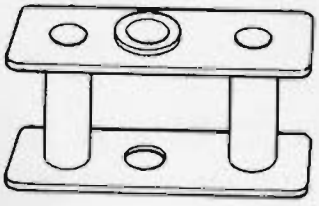
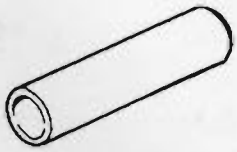
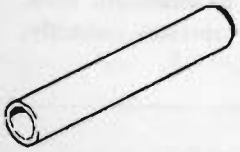
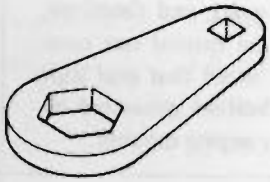
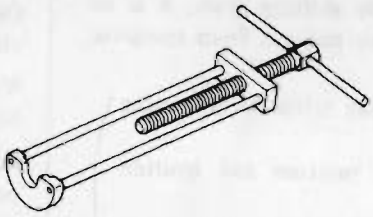
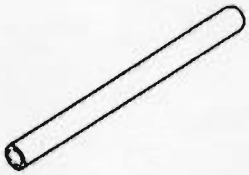
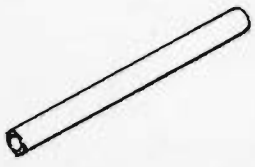
TIGHTENING TORQUE

Transmission installation		
Clutch operating cylinder installation bolt	kg-m (ft-lb)	2.5 to 3.0 (18 to 22)
Bolt fixing transmission to engine	kg-m (ft-lb)	4.4 to 5.9 (32 to 43)
Bolt fixing engine rear plate to transmission	kg-m (ft-lb)	0.9 to 1.2 (6.5 to 8.7)
Bolt fixing crossmember to body	kg-m (ft-lb)	3.2 to 4.3 (23 to 31)
Bolt fixing rear mounting insulator to crossmember	kg-m (ft-lb)	3.2 to 4.3 (23 to 31)
Bolt fixing rear mounting insulator to rear extension	kg-m (ft-lb)	3.2 to 4.3 (23 to 31)
Gear assembly		
Bolt fixing bearing retainer to adapter plate	kg-m (ft-lb)	1.9 to 2.5 (14 to 18)
Mainshaft lock nut	kg-m (ft-lb)	14.0 to 17.0 (101 to 123)
Counter gear lock nut (FS5W71B only)	kg-m (ft-lb)	10.0 to 13.0 (72 to 94)
Bolt fixing rear extension to transmission case	kg-m (ft-lb)	1.6 to 2.1 (12 to 15)
Bolt fixing front cover to transmission case	kg-m (ft-lb)	1.6 to 2.1 (12 to 15)
Filler plug	kg-m (ft-lb)	2.5 to 3.5 (18 to 25)
Drain plug	kg-m (ft-lb)	2.5 to 3.5 (18 to 25)

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 transmission.	Worn gears, shaft, and/or bearing. Insufficient operating stroke due to worn or loose sliding part. Faulty or damaged synchronizer.	Replace. Repair or replace. Replace.
Gear slips out of mesh. In most cases, this trouble occurs, when interlock ball, check ball, and/or spring is worn or weakened, or when control system is faulty. 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 ball. 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 engine idling and ceases when clutch is disengaged, or when noise occurs while shifting gears, it is an indication that the noise is from transmission. (Transmission may rattle during engine idling. Check air-fuel mixture and ignition timing. After above procedure, readjust engine idling.)	Insufficient or improper lubricant. Oil leaking due to faulty oil seal or sealant, clogged breather, etc. Worn bearing (High humming occurs at a high speed.). Damaged bearing (Cyclic knocking sound occurs also at a low speed.). Worn spline. Worn bushing.	Add oil or replace with designated oil. Clean or replace. Replace. Replace. Replace. Replace.

SPECIAL SERVICE TOOLS

Tool number & tool name	Kent-Moore No. / Reference page or Fig. No. / Unit application
ST23810001 Setting plate adapter 	J25693 Fig. MT-14 Fig. MT-15 Fig. MT-41 *
KV31100300 Fork rod pin punch 	— Fig. MT-15 *
ST30031000 Bearing puller 	J 25733-1 Fig. MT-21 Fig. MT-23 Fig. MT-24 *
KV31100400 Transmission press stand 	— Fig. MT-34 Fig. MT-35 Fig. MT-36 Fig. MT-40 *
ST23860000 Counter gear drift 	— Fig. MT-38 *
ST22360002 Bearing drift 	J25679 Fig. MT-40 *
ST22520000 Wrench 	— Fig. MT-42 Fig. MT-43 Fig. MT-60 *
KV32101330 Bearing puller 	— Fig. MT-57 FS5W71B
ST22350000 Mainshaft bearing drift 	J25678 Fig. MT-62 FS5W71B
ST23800000 Transmission adapter 	J25691 Page MT-9 *

*: Applicable to all S30 series models