

SERVICE MANUAL

Datsun

MODEL 510 SERIES
CHASSIS and BODY



SECTION TM

TRANSMISSION

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TRANSMISSION

GENERAL DESCRIPTION

The 510 series Datsun can be equipped with either of three manual transmissions or a three speed automatic transmission. The manual units are designed and built by Nissan Motor Corporation and the automatic transmission is manufactured by Borg-Warner.

Service and repair instructions for the Borg-Warner automatic transmission are given in a separate manual.

The designs of the three manual transmissions are almost the same. The transmission case and the rear extension housing manufactured from cast aluminum alloy and the clutch housing and transmission case are integral.

The rear extension housing is detachable from the transmission case. At the bottom of the transmission case a cover is provided for easy servicing.

The main shaft and main drive gear are supported by two ball bearings. A spline at the end of the main shaft allows fore and aft movement of the propeller shaft.

All transmissions use a Borg-Warner type synchronize mechanism except for the Datsun Sports Sedan which utilizes a Servo type synchronizer.

APPLICATION OF TRANSMISSION MODELS

Type of transmission	Operating method and synchro. system	Vehicle model	Speedometer gear	Final gear ratio
3-Forward speed (R3W65L)	Column shift Borg-Warner type synchro.	510-(S)U	19/5	4.375
		L510-(S)	19/5	4.375
		P510-(S)U	17/5	3.900
		PL510-(S)	17/5	3.900
		WP510-U	17/5	3.889
		WPL510	17/5	3.889
4-Forward speed (F4W63L)	Floor shift Borg-Warner type synchro.	P510-(S)UT	16/5	3.700
		PL510-(S)T	16/5	3.700
		PL510-UT	16/5	3.700
		WP510-UT	16/5	3.700
		WPL510-T	16/5	3.700
		WPL510-UT	16/5	3.700
4-Forward speed (F4C63L)	Floor shift Servo type synchro.	P510-UTK	16/5	3.700
		PL510-TK	16/5	3.700
BW automatic transmission (AS18-35EC)	Column shift	P510-UA	17/5	3.900
		PL510-A	17/5	3.900
		PL510-UA	17/5	3.900

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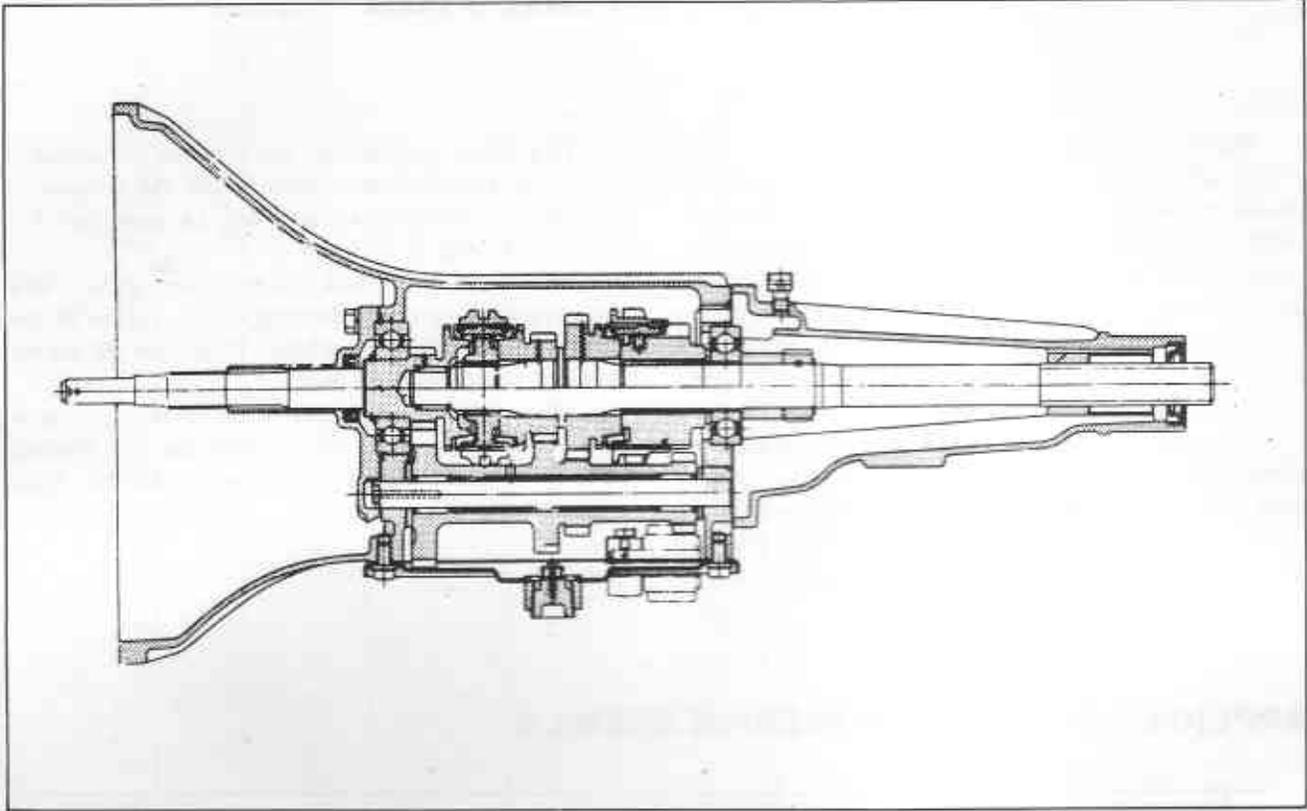


Fig. TM-1 3-Forward speed transmission

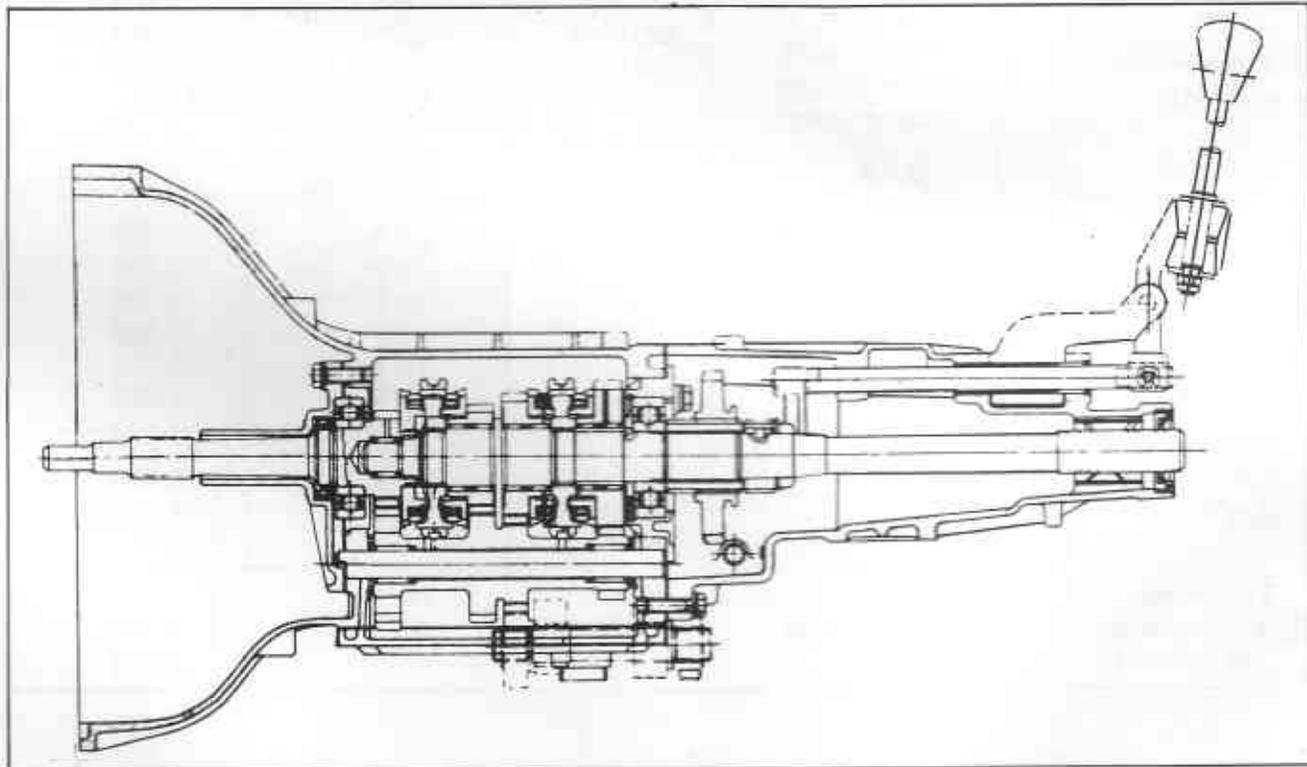


Fig. TM-2 4-Forward speed transmission

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3-FORWARD SPEED TRANSMISSION

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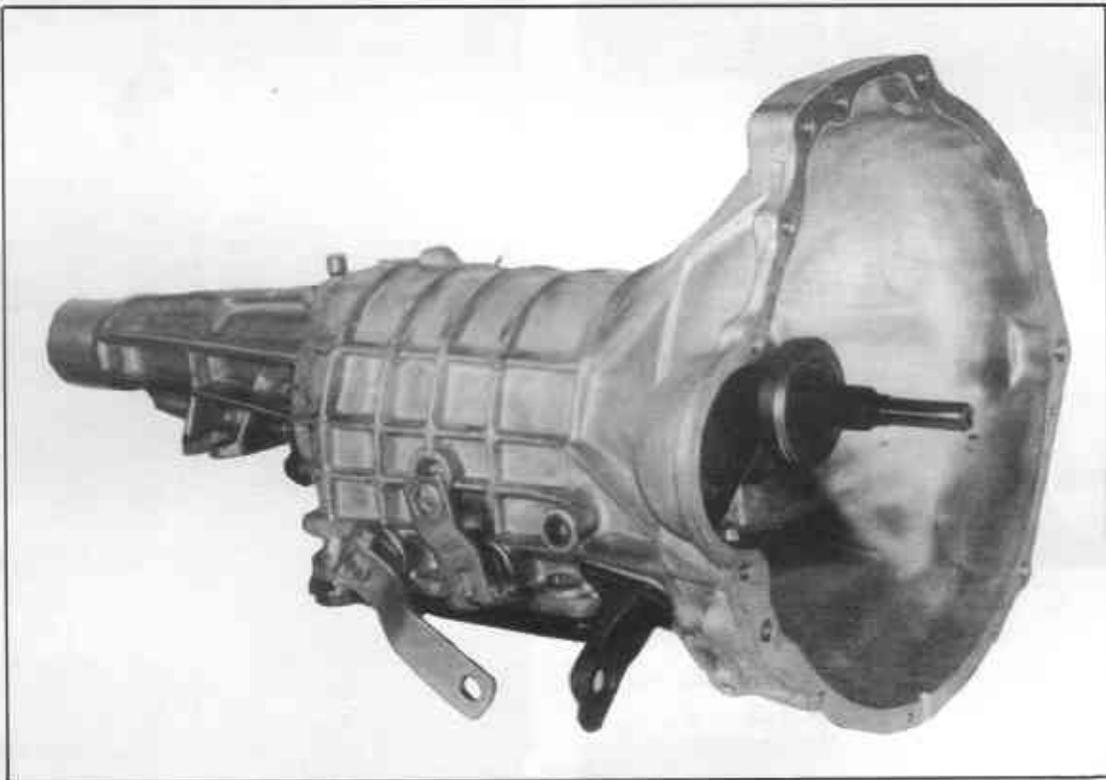


Fig. TM-3 3-Forward speed transmission

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REMOVAL

When removing the transmission from the vehicle it is necessary to follow the undermentioned procedure.

1. Jack up the vehicle and support it with four stands. If available a hydraulic hoist or open pit can be utilized.

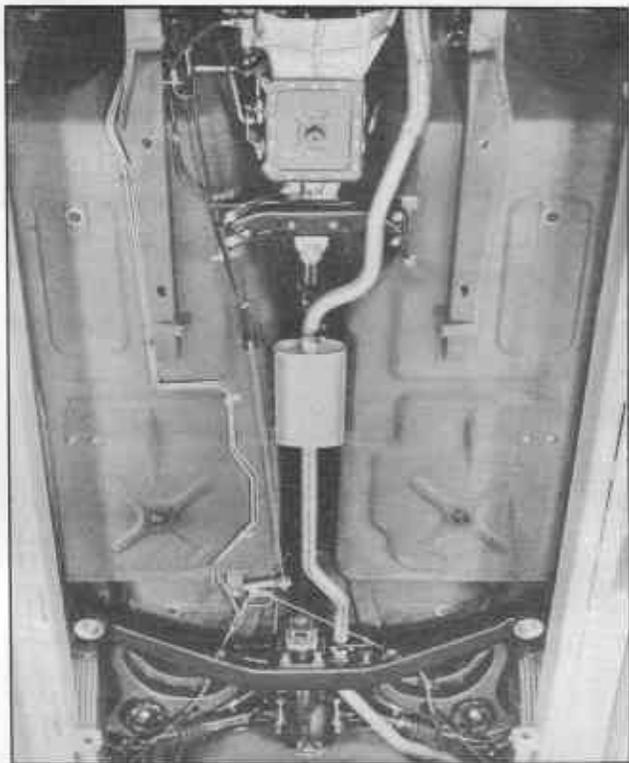


Fig. TM-4 Underside of vehicle

2. Disconnect the hand brake wire at the equalizer pivot as shown in Figure TM-5.

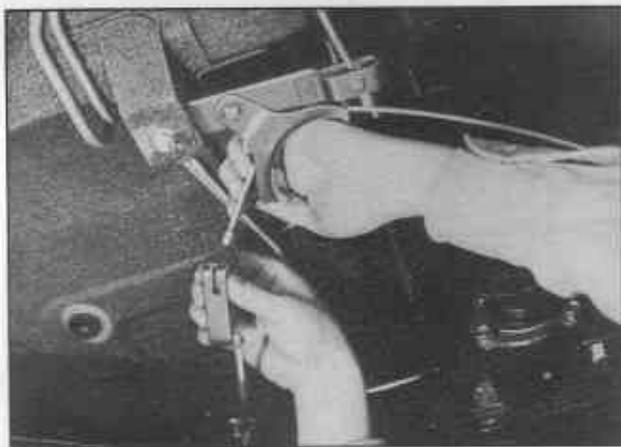


Fig. TM-5 Disconnecting hand brake wire

3. Loosen the two exhaust center pipe clamps and turn the premuffler complete with center pipe to the left as shown in Figure TM-6. This will allow sufficient room for the propeller shaft to be removed.

4. Remove the propeller shaft by disconnecting the four securing bolts at the companion flange of the gear carrier. Seal the end of the rear extension housing to prevent oil leakage.

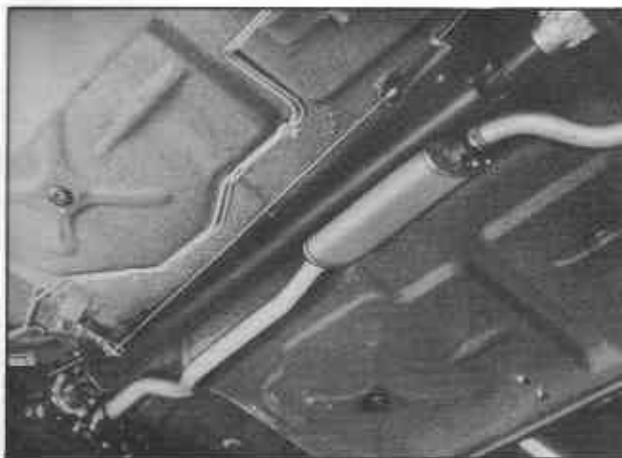


Fig. TM-6 Removing propeller shaft

5. Disconnect the speedometer drive cable from the adapter in the transmission extension housing (See Fig. TM-7).



Fig. TM-7 Disconnecting speedometer cable

6. Disconnect the lower shift rods from the shift levers and remove the cross shaft assembly from the transmission case (See Fig. TM-8).

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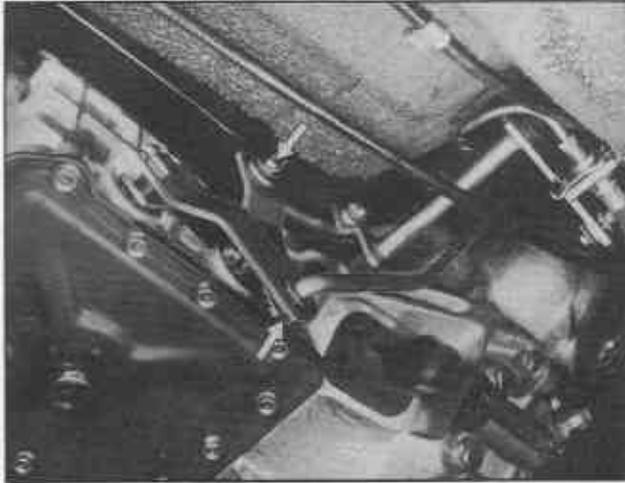


Fig. TM-8 Disconnecting remote control linkage

7. Remove the clutch operating cylinder from the clutch housing.



Fig. TM-9 Detaching clutch operating cylinder

5. Support the engine with a jack placed under the oil pan. Do not locate the jack under the oil pan drain plug. To prevent damage to the oil pan insert a wooden block between the pan and jack.

9. Remove the two bolts attaching the transmission to the rear engine mount. Place a jack under the transmission and remove the four bolts fixing the rear engine mounting cross member to the body.

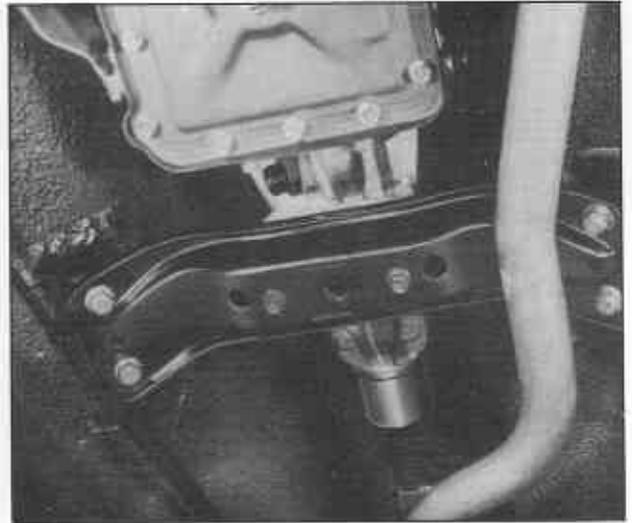


Fig. TM-10 Cross member removal

10. Lower the jack supporting the engine to incline the engine in a rearward direction. This will allow sufficient room for the transmission to be removed.

11. Remove the starting motor and the bolts attaching the clutch housing to the engine.

12. Lower the jack gradually and withdraw the transmission.

DISASSEMBLY

When disassembling the transmission the following procedure should be adopted. Since the casings are manufactured from aluminum alloy care should be taken not to damage any of the castings.

1. Drain gear oil from the transmission.

2. Remove the dust cover, and release the retainer spring securing the withdrawal lever and remove the lever complete with release bearing from the clutch housing.

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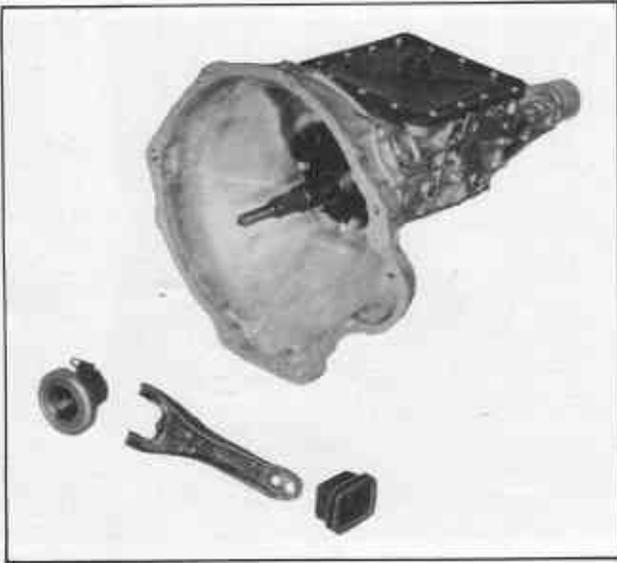


Fig. TM-11 Withdrawal lever and release bearing

3. Remove the fourteen bolts attaching the bottom cover to the transmission case and remove the bottom cover.

4. Remove the speedometer pinion assembly.

5. Remove the six bolts securing the rear extension housing and remove the housing (See Fig. TM-12).

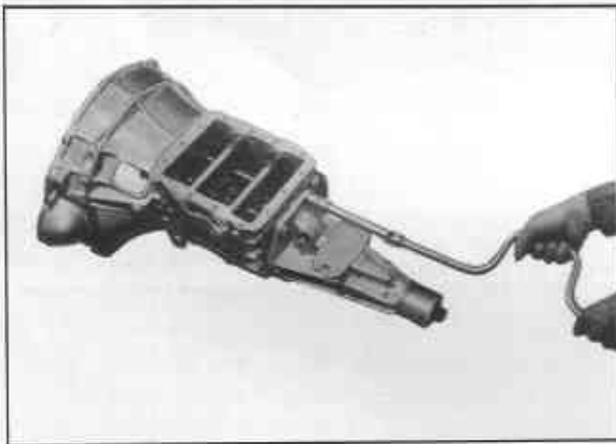


Fig. TM-12 Removing the rear extension housing

6. Take out the retaining ring of securing the cross shaft (See Fig. TM-35 item 5).

7. Unscrew the nuts securing the operating lever lock pins. With the use of a hammer and punch, drive pins out of position then remove both cross shafts.

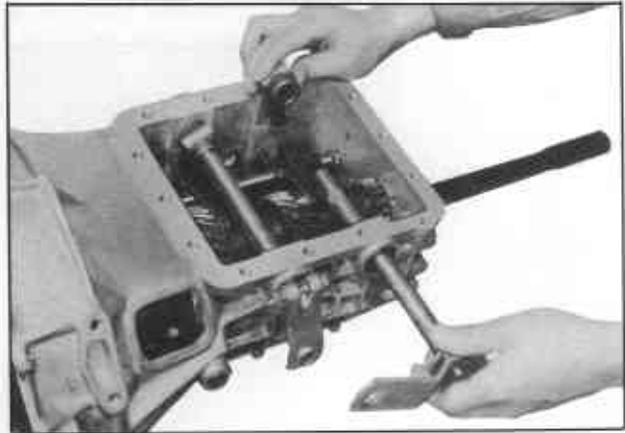


Fig. TM-13 Cross shaft removal

8. Remove the transmission front cover.

9. Withdraw the counter shaft and remove the counter gear with the two needle roller bearings and spacers.



Fig. TM-14 Counter gear removal

10. Remove the lock bolt securing the reverse idler shaft.

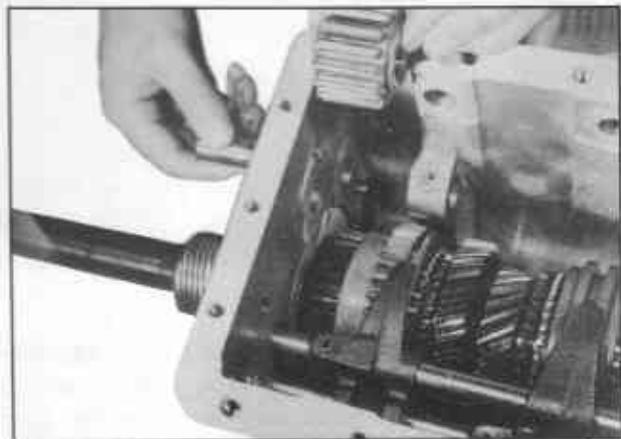


Fig. TM-15 Reverse idler gear removal

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11. Remove the reverse idler shaft and gear.
12. Drive out the pins securing the forks to the fork rods.
13. Unscrew the inter-lock plug and remove the check ball and spring as shown in Figure TM-16.

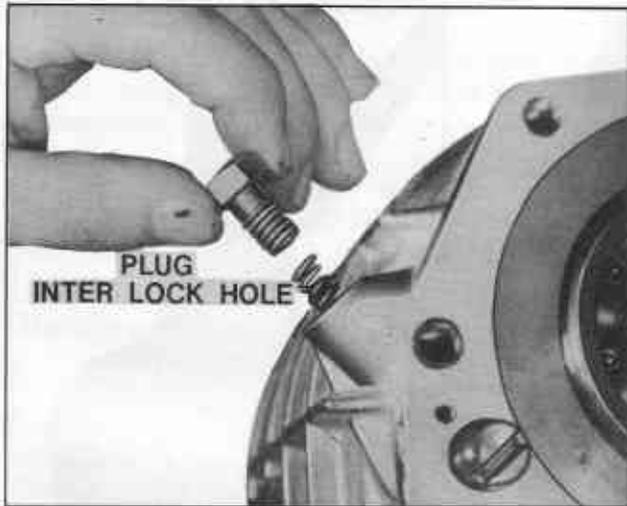


Fig. TM-16 Removing the inter-lock plug

14. Remove the 1st and reverse fork rod and 2nd and 3rd speed fork rod and withdraw both forks.
15. Withdraw the main shaft gear assembly as shown in Figure TM-17.

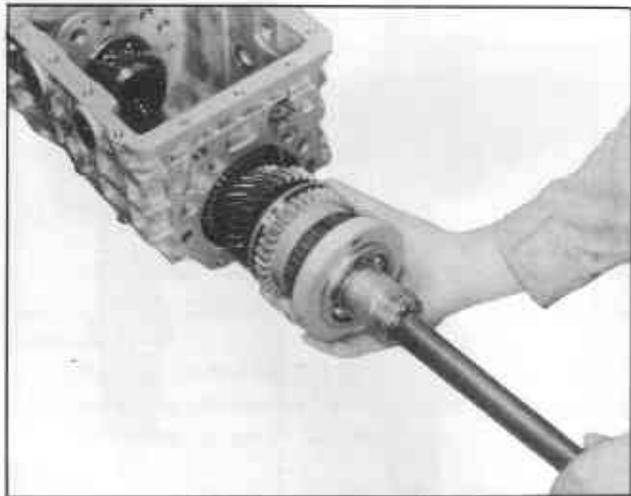


Fig. TM-17 Withdrawing main shaft assembly

16. Remove the main drive gear assembly.

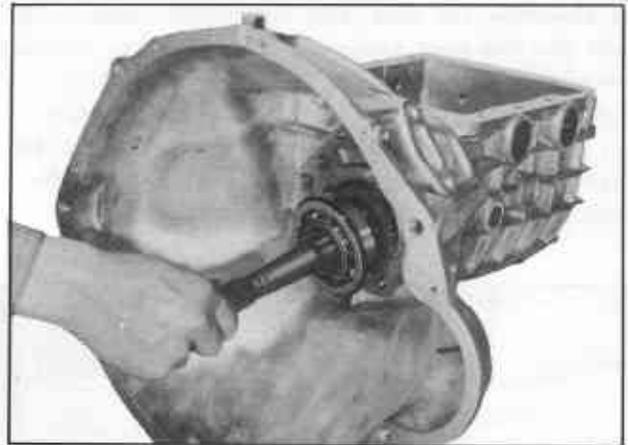


Fig. TM-18 Removing the main drive gear

Disassembly of main shaft gear

1. Release the snap ring located at the front end of the main shaft (See Fig. TM-19).



Fig. TM-19 Releasing 2nd and 3rd speed hub snap ring

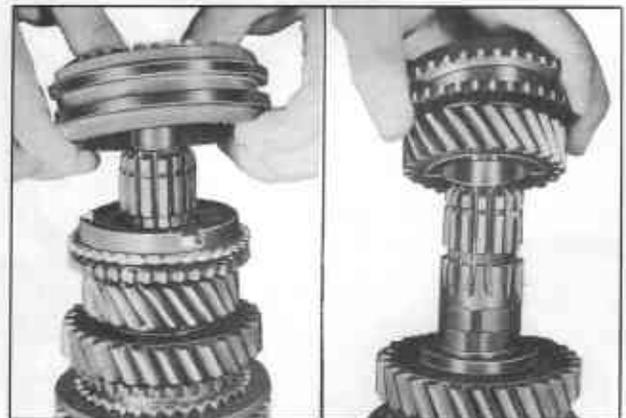


Fig. TM-20 Removing the 2nd and 3rd speed hub

Fig. TM-21 Removing the main shaft 2nd gear

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2. Remove the 2nd and 3rd synchronizer, the hub and 2nd gear assembly.

3. Release the snap ring which secures the speedometer drive gear and remove the gear complete with the steel ball and spacer.

4. Press out the main shaft bearing and retainer as shown in Figure TM-23, item 1.

5. Hold the main shaft reverse gear and strike the end of the main shaft on a small piece of wood. This will release the reverse gear assembly which can then be removed together with the 1st speed gear.

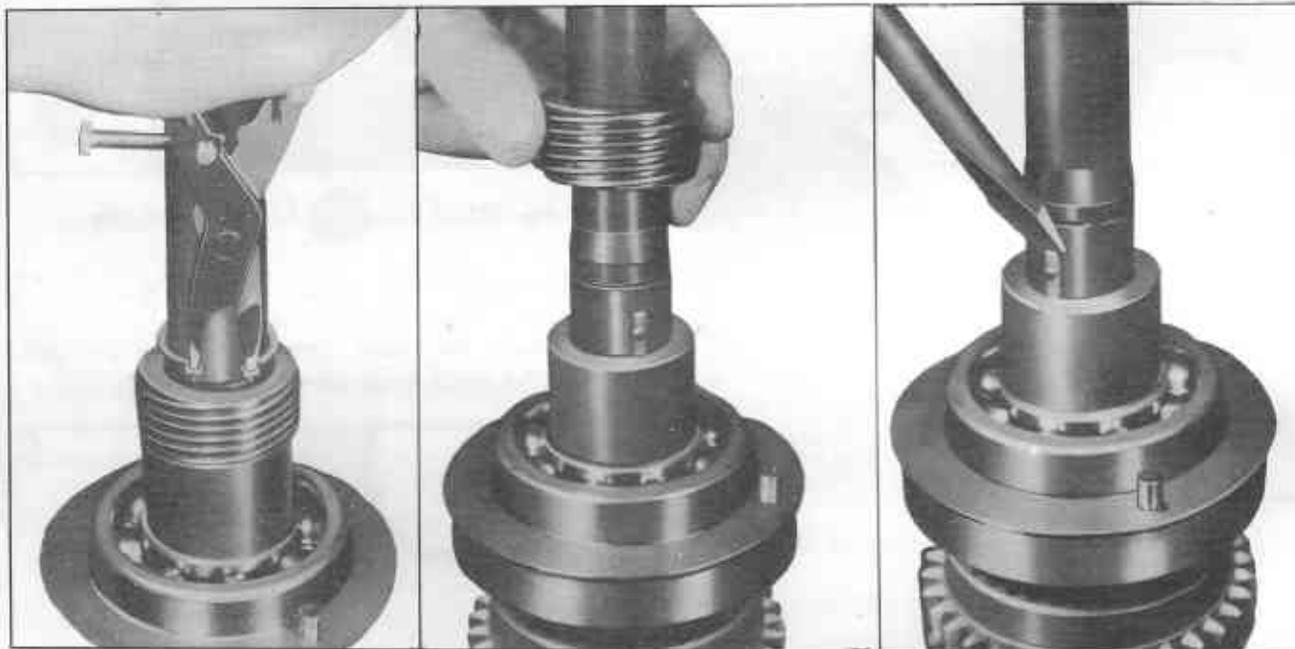


Fig. TM-22 Removing speedometer drive gear and spacer

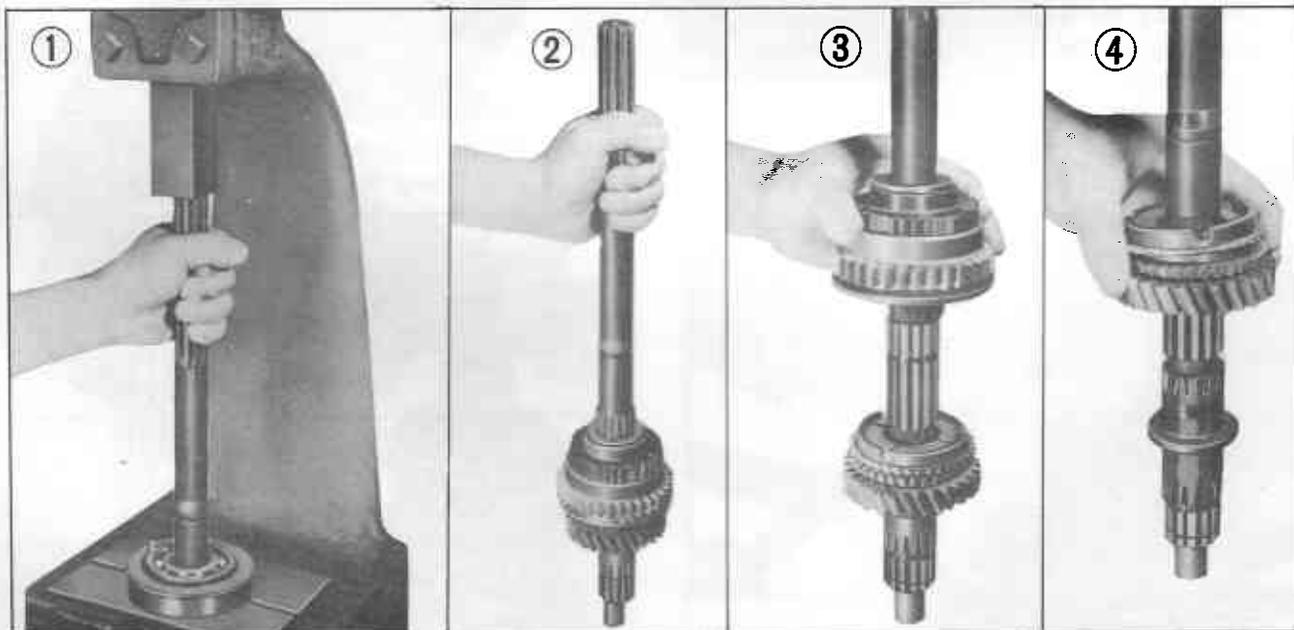


Fig. TM-23 Removing the main shaft bearing and gears

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INSPECTION AND REPAIR

After disassembly, clean the parts and check them for wear, damage and other abnormal conditions. Should any excessive wear or damage be evident then the part or component should be replaced.

Transmission case and rear extension housing

1. Thoroughly clean the case and rear extension housing. Check the castings cracks and indentations.

2. Examine the machined surfaces for burrs and indentations. Small surface flaws can be removed by filing.

Bearings

1. Wash the bearings in clean solvent and blow dry with compressed air. Take care not to spin the bearing as this may result in serious damage.

2. Lubricate the ball bearings with light gear oil and check them for wear, scoring, pits or roughness. If any of these conditions exist the bearing should be replaced.

3. Inspect the needle roller bearings for wear or pitting. As wear of the needle rollers is difficult to discern, it is advisable to replace the bearings with new ones where substantial mileage has been accumulated.

In addition inspect the surfaces of the shafts and gears to ensure they are free of scores and burrs.

Gears and shaft

1. Clean and inspect the gear teeth and other machined surfaces for wear, scoring, pitting, and burrs.

Slight scores or burrs may be removed with a fine stone, however, if any gear is chipped or unduly worn, it must be replaced.

2. Check that the synchronizer hubs slide freely on the main shaft splines with minimum clearance.

3. Inspect the main shaft for straightness as shown in Figure TM-24.

If run-out at the rear end of the shaft exceeds the maximum limit the main shaft should be replaced.

Maximum run-out 0.15 mm
(0.0059 in.)

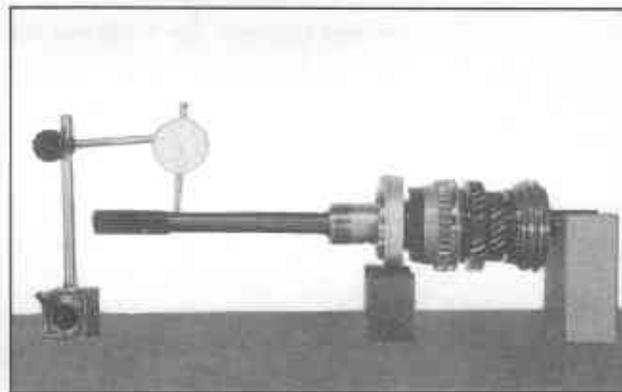


Fig. TM-24 Checking main shaft for straightness

Baulk rings

1. Check the baulk rings for wear, pitting, chips or burrs. If any abnormal conditions are detected, they must be replaced with new ones.

2. Place the baulk ring in position on the cone of each gear. Push the ring to the gear and check the gap between the end face of the baulk ring and the front face of the clutch teeth (See Fig. TM-25).

This should be within 1.2 to 1.6 mm (0.0472 to 0.0630 in.). If it is less than 0.8 mm (0.0315 in.), a worn baulk ring may be the cause and a new ring should be fitted.

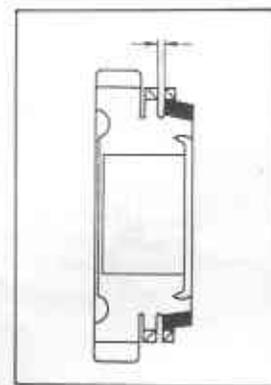


Fig. TM-25 Checking baulk ring for wear

Selector and shifting mechanism

1. Check the fork rods on a flat surface to see whether they are bent.

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A bent fork rod will cause hardshifting and must be replaced.

2. Inspect the fork lock pins and inter-lock check balls for wear and damage. Replace if necessary.

3. Check the clearance between the fork and the groove on the coupling sleeve. The standard dimension is 0.15 to 0.30 mm (0.0059 to 0.0118 in.).

Oil seals

1. Ensure the oil seals show no sign of wear or damage. Check the sealing lips for cuts and replace if any defects are found.

2. O-rings once removed should be replaced and not used again.

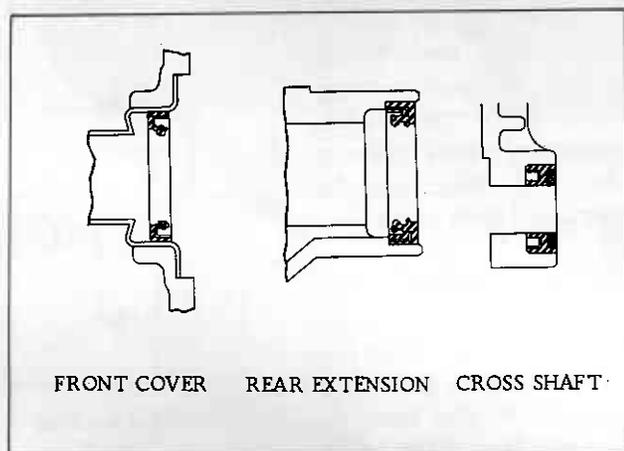


Fig. TM-26 Oil seals

ASSEMBLY

Main drive gear

1. Install the main drive gear bearing on the shaft with the aid of a press.

2. Install the spacer and select a new snap ring so that no play exists between the bearing and the snap ring.

There are seven snap rings available details of which are given below.

Thickness	1.52 mm (0.0598 in.)
	1.59 mm (0.0626 in.)
	1.65 mm (0.0649 in.)
	1.71 mm (0.0673 in.)
	1.77 mm (0.0697 in.)
	1.83 mm (0.0720 in.)
	1.89 mm (0.0747 in.)

Synchronizer assembly

Synchromesh device

The synchromesh device consists of a coupling sleeve, baulk ring, spring, synchronizer hub and insert (See Fig. TM-27). The springs for pressing the insert toward the synchronizer sleeve are different between the 1st gear synchronizer and the 2nd-3rd gear synchronizer. The former uses the three coil springs and the latter uses two expanding type springs.

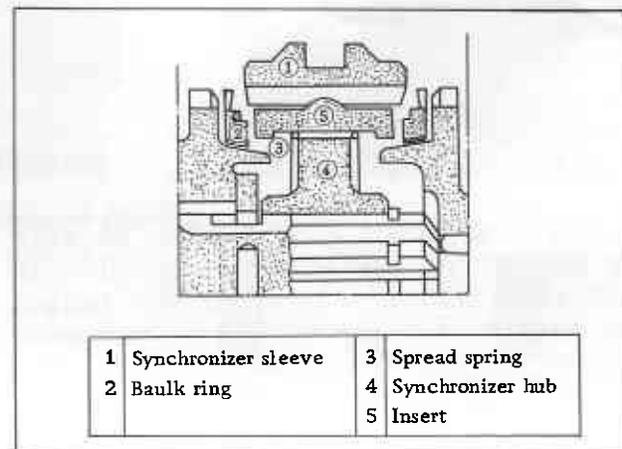


Fig. TM-27 Synchromesh device

The hub is attached to the main shaft by means of splines. Three grooves on its periphery locate the synchronizer inserts. A protrusion on the insert engages with a groove in the coupling sleeve when in the neutral position. Two spring rings apply a radial load to the inserts which hold them in position.

The baulk ring between the hub and the gear has a inside cone that engages with a tapered mating face on the gear and acts as a clutch. The leading edge of the baulk ring

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teeth and coupling ring teeth are chamfered to assist engagement.

1st gear synchronizer

1. Install the shifting insert snap ring onto the synchronizer hub as shown in Figure TM-28.

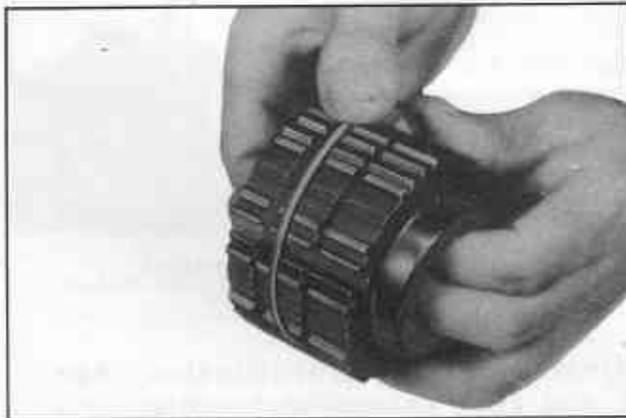


Fig. TM-28 Installing insert snap ring

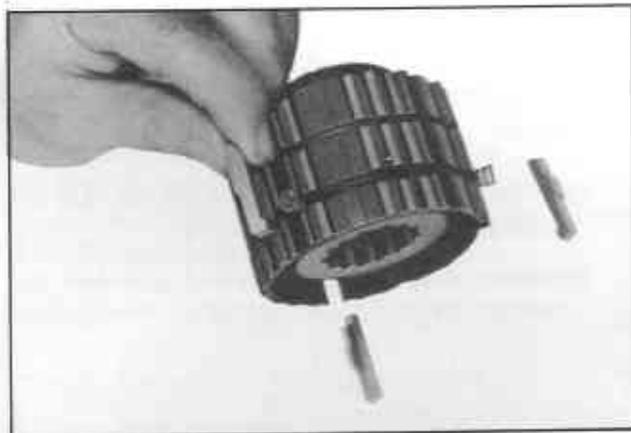


Fig. TM-29 Fitting shifting inserts



Fig. TM-30 Installing the hub to the main shaft 1st gear

2. Fit the shifting inserts and synchronizer springs in the correct position on the synchronizer hub. Assemble the synchronizer hub complete with inserts into the coupling sleeve (See Fig. TM-30).

2nd and 3rd gear synchronizer

1. Assemble the synchronizer hub and coupling sleeve, ensuring that the sleeve slides freely on the synchronizer hub splines.

2. Fit the three shifting inserts into position and install a spring ring on each side of the hub.

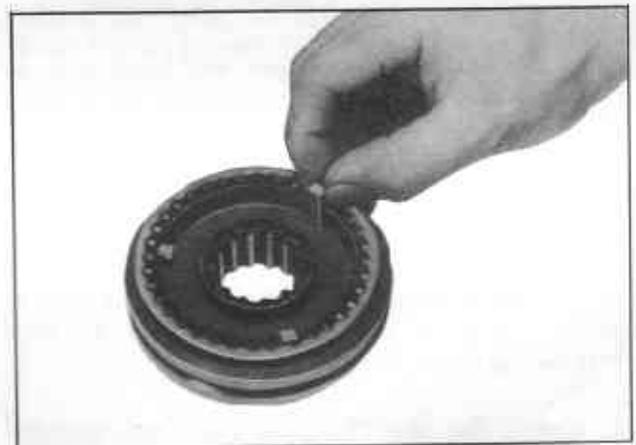


Fig. TM-31 Fitting spring rings



Fig. TM-32 2nd and 3rd synchronizer

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Main shaft assembly

1. Working from the front end of the main shaft, slide the 2nd speed gear on the shaft with the tapered cone facing the front.
2. Install the baulk ring on the 2nd speed gear.
3. Fit the 2nd-3rd speed synchronizer assembly on the front end of the main shaft and retain with one of the following snap rings which will give an end play of 0.05 to 0.25 mm (0.0020 to 0.0087 in.).

Available snap rings

Thickness	1.60 mm (0.0630 in.)
	1.65 mm (0.0650 in.)
	1.70 mm (0.0669 in.)
	1.75 mm (0.0689 in.)
	1.80 mm (0.0709 in.)

4. Install the 1st speed gear and baulk ring on the rear end of the main shaft with the tapered cone facing the rear.
5. Assemble the 1st speed synchronizer and reverse gear assembly onto the main shaft.
6. Fit the spacer and using a suitable press, press the main shaft bearing complete with retainer onto the shaft.
7. Install the spacer, steel ball and speedometer drive gear. Secure the gear with one of the following snap rings. Select a snap ring which will give an end play of 0.05 to 0.22 mm (0.0020 to 0.0087 in.) on the main shaft first gear.

Available snap rings

Thickness	1.30 mm (0.0512 in.)
	1.40 mm (0.0551 in.)
	1.45 mm (0.0571 in.)
	1.50 mm (0.0591 in.)
	1.55 mm (0.0610 in.)
	1.60 mm (0.0630 in.)
	1.65 mm (0.0650 in.)
	1.70 mm (0.0669 in.)

8. The end play of the gears should be checked as shown in Figure TM-33.

Gear end play

1st gear	0.05 ~ 0.22 mm (0.0020 ~ 0.0087 in.)
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2nd gear	0.10 ~ 0.22 mm (0.0039 ~ 0.0087 in.)
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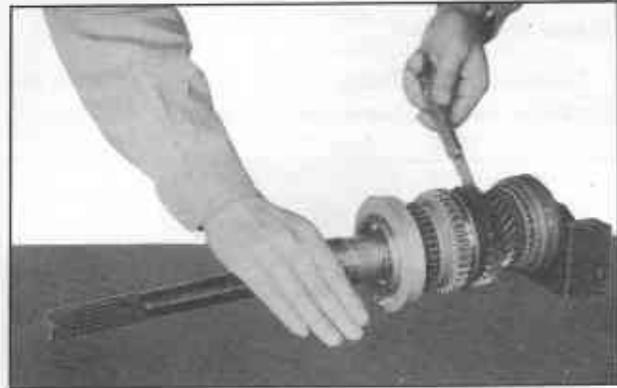


Fig. TM-33 Gear end play check

Gear assembly, transmission case and rear extension housing

1. Install the main drive gear and main shaft assembly into the transmission case.
2. Fit the fork rods and forks into their appropriate positions following the undermentioned procedure.
 - (1) Place the transmission case so as the check ball hole faces upward.
 - (2) Insert a spring and a steel ball into the bottom of the check ball hole.

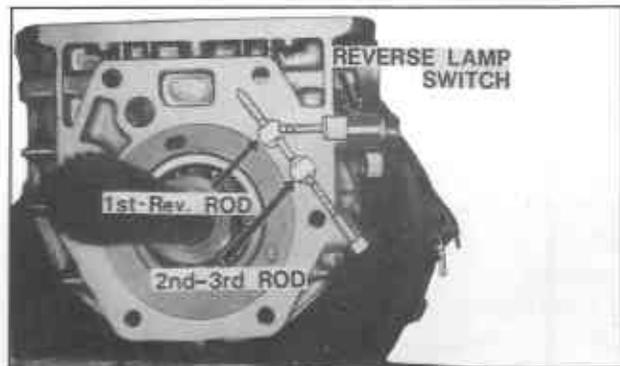


Fig. TM-34 Inter-lock mechanism

- (3) Using a dummy shaft, retain the steel ball and install the 1st-reverse fork and fork rod pushing the dummy shaft out of position.

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- (4) Inseal an inter-lock plunger.
- (5) Fit the 2nd - 3rd fork and fork rod.
- (6) Insert a steel ball and spring and screw in the inter-lock plug. Smear the plug threads with sealing compound.
- (7) Secure both forks to the fork rod with the retaining pins.

3. Install the reverse idler shaft and gear and secure the shaft with the lock bolt and plate.

4. Insert the counter gear and shaft, using selected thrust washers which will give the correct end play.

Counter gear end
 play 0.04 ~ 0.12 mm
 (0.0016 ~ 0.0047 in.)

Available thrust washers

Thickness	3.83 mm (0.151 in.)
	3.88 mm (0.153 in.)
	3.93 mm (0.155 in.)
	3.98 mm (0.157 in.)
	4.03 mm (0.159 in.)

5. Install the cross shafts ①, the thrust washers ② and the operating levers ③. Secure the cross shafts with the retaining rings ④ and lock the operating levers to the shafts with the lock pins ⑤.

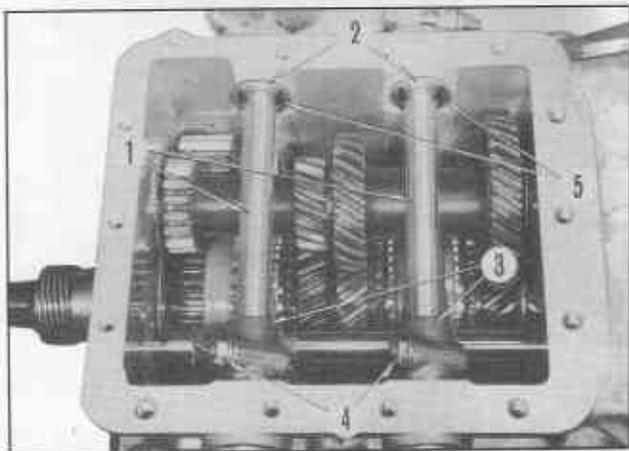


Fig. TM-35 Cross shaft installation

6. Install the rear extension housing to the transmission case and tighten the fixing bolts to 2.2 to 3.0 kg-m (15.9 to 21.7 ft-lb) torque.

7. Insert the speedometer pinion and retain with the set-bolt and locking plate.

8. With the use of a dial indicator check the gear backlash.

Gear backlash 0.08 ~ 0.13 mm
 (all gears) (0.0031 ~ 0.0051 in.)

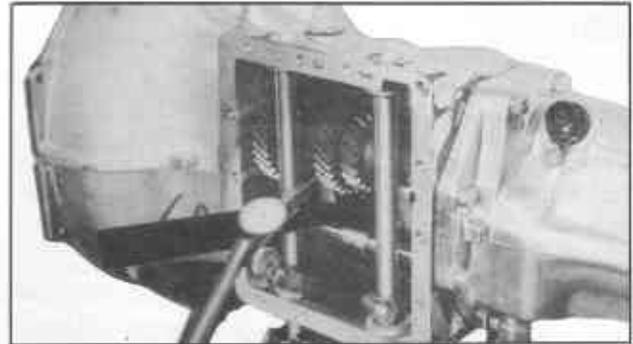


Fig. TM-36 Checking gear backlash

9. Install the transmission front cover and tighten the fixing bolts to 1.1 to 1.7 kg-m (8.0 to 12.3 ft-lb) torque. Be careful not to damage the oil seal.

10. Fit the release bearing and clutch withdrawal lever.

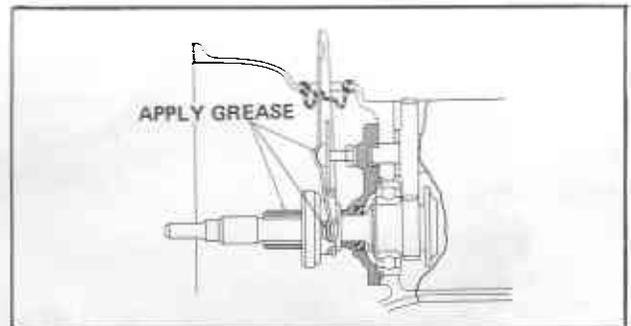


Fig. TM-37 Withdrawal lever and release bearing

11. Install the bottom cover and tighten all bolts to 1.1 to 1.7 kg-m (8.0 to 12.3 ft-lb) to torque.

INSTALLATION

Installation of the transmission is the reversal of the procedure given for removal. However, attention should be given to the following points.

Note: a. Fill the transmission with the recommend gear oil MP 90.

Oil capacity 1.7 ℓ (0.45 U.S.gal.)
 (0.37 Imp.gal.)

b. Adjust the clutch operating cylinder at the push rod so that the play at the withdrawal lever will be 2.2 mm (0.087 in.).

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4-FORWARD SPEED TRANSMISSION

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The 4-forward speed transmission utilizes two different synchronizer mechanisms. These are the Servo type synchronizer and the Borg-Warner type. If you refer to the section titled "General Description" page TM-1 details are given as to the application of these transmission models.

Although two different synchronizer mechanisms are used the basic transmission design is the same, therefore, the synchronizer unit discussed in this section will relate to the Servo type. For information and repair procedure on the Borg-Warner type synchronizer reference should be made to the section covering the 3-forward speed transmission.

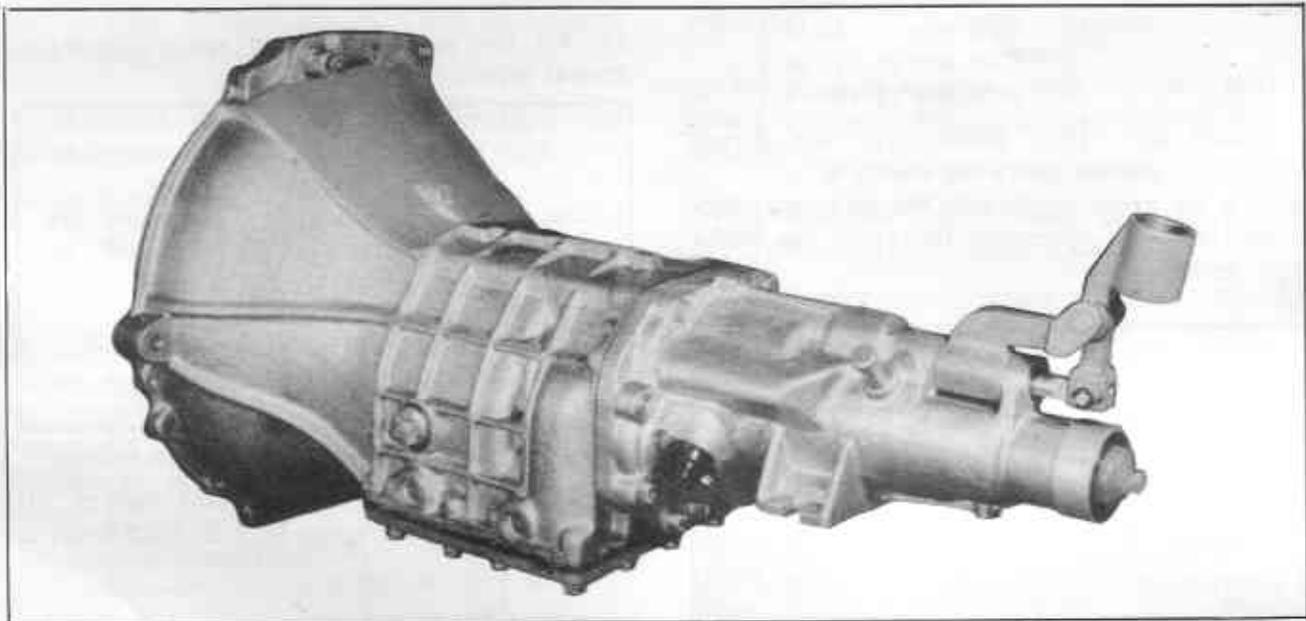


Fig. TM-38 4-Forward speed transmission

REMOVAL AND INSTALLATION

Removal and installation of the 4-forward speed transmission are similar to the procedure given for the 3-speed transmission. However, the 4-speed transmission is of the floor shift type, therefore, in addition to completing the operations described in the section covering the 3-forward speed transmission it will be necessary to remove the shift lever from the control lever bracket.

DISASSEMBLY

1. Drain the transmission gear oil.
2. Remove the dust cover and release the retainer spring securing the withdrawal lever and remove the lever complete with release bearing from the clutch housing.
3. Remove the clevis pin securing the striking rod to the control lever.

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Fig. TM-39 Control arm

4. Remove the speedometer drive pinion assembly.

5. Release the six bolts securing the rear extension housing and remove the housing. Disengage the striking rod from the fork rod gates.

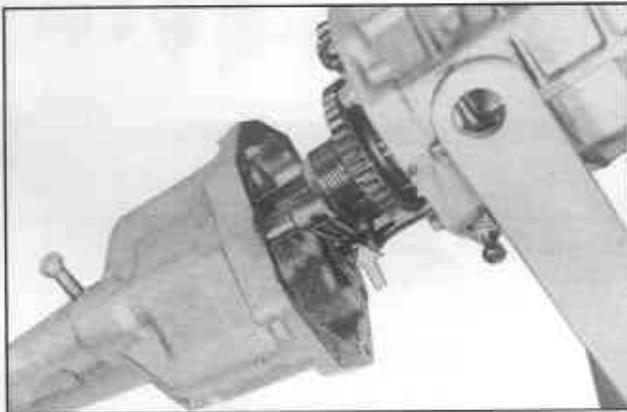


Fig. TM-40 Rear extension removal

6. Remove the transmission bottom cover and front cover.

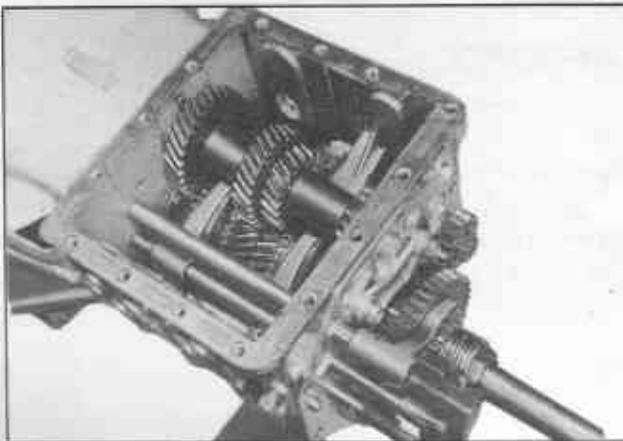


Fig. TM-41 Bottom cover removal

7. Unscrew the three check ball plugs and remove the springs and balls.

8. Drive out the retaining pins securing the forks to the fork rods and remove the rods and forks.

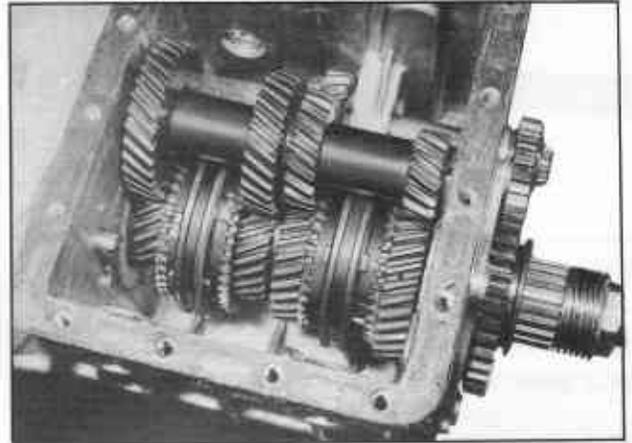


Fig. TM-42 Inside view of transmission

9. Move the 1st-2nd and 3rd-4th coupling sleeve into gear at the same time to lock the main shaft. Release the main shaft nut.

10. Withdraw the counter shaft and remove the counter gear with the two needle roller bearings and spacers.

11. Release the snap ring securing the reverse idler gear and remove the reverse idler gears and shaft.

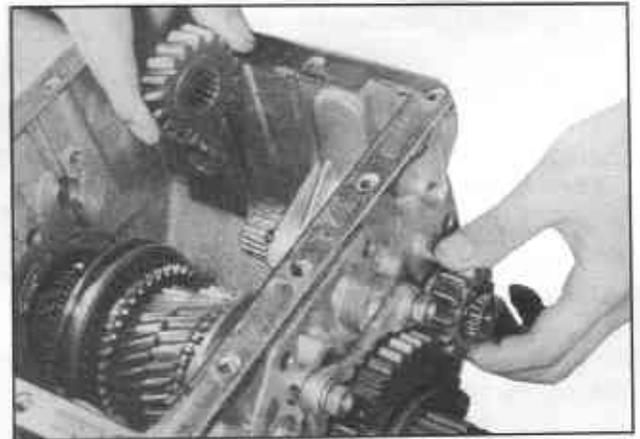


Fig. TM-43 Reverse idler gear removal

12. Remove the four bolts that secure the main shaft bearing retainer to the transmission case (See Fig. TM-44).

CHASSIS

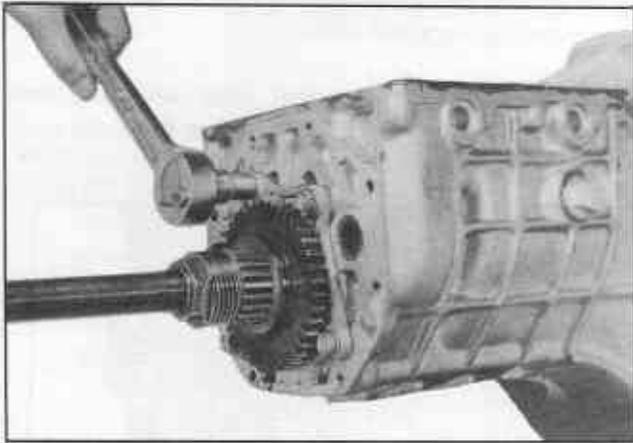


Fig. TM-44 Removing main shaft bearing retainer

13. Draw out the main shaft assembly as shown in Figure TM-45.

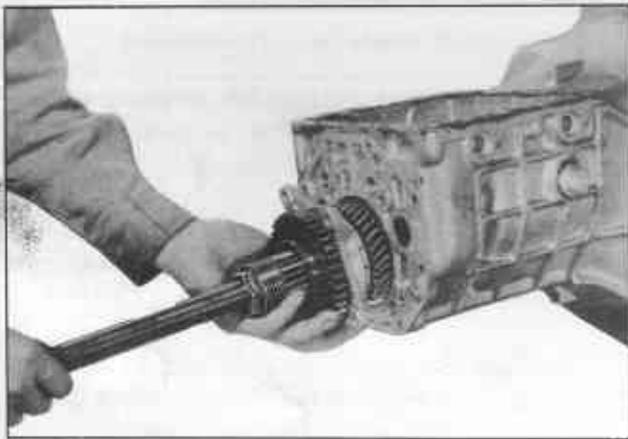


Fig. TM-45 Withdrawing main shaft assembly

14. Draw out the main drive shaft.

Disassembly of main shaft assembly

1. Release the snap ring securing the 3rd-4th synchronizer and hub and remove the hub complete with coupling sleeve.
2. Remove the 3rd speed gear complete with the needle roller bearing from the main shaft.
3. Unscrew the main shaft nut and remove the nut and locking plate.
4. Remove the speedometer drive gear and steel ball.

5. Withdraw the main shaft reverse gear and hub.

6. Press off the main shaft bearing complete with the bearing retainer.

7. Remove the thrust washer and the main shaft 1st speed gear complete with the needle roller bearing. Be careful that you do not lose the small steel ball which locates the thrust washer. Then remove the main shaft 1st gear bush.

8. Withdraw the 1st-2nd speed synchronizer and hub.

9. Remove the main shaft 2nd speed gear complete with the needle roller bearing.

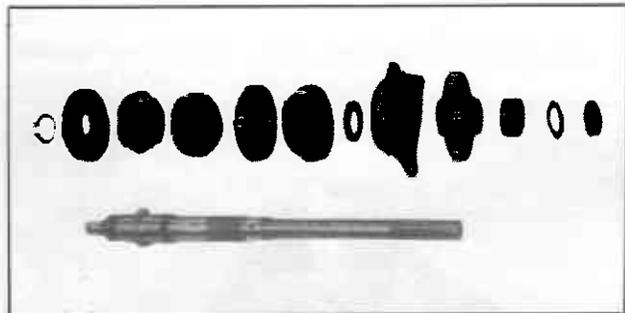


Fig. TM-46 Exploded view of the main shaft assembly

INSPECTION AND REPAIR

For detail of the procedure for inspection and repair refer to the section covering the 3-forward speed transmission.

Service data and specifications are given on page number TM-24.

ASSEMBLY

Assembly of the transmission is the reversal of the procedure given for disassembling, however, attention should be given to the point mentioned in the section covering the 3-forward speed transmission. Where differences do occur in the assembly of the 4-forward speed transmission these are described below.

Main drive gear

Available snap rings for adjusting the main drive gear are as follows:

TRANSMISSION

Thickness	1.52 mm (0.0598 in.)
	1.61 mm (0.0634 in.)
	1.64 mm (0.0646 in.)
	1.74 mm (0.0685 in.)
	1.77 mm (0.0697 in.)

Select a snap ring which will give zero play between the bearing and the snap ring.

Synchronizer assembly

For the Borg-Warner type synchronizer service instruction is given in the section for the 3-forward speed transmission. Therefore the instruction in this section only relates to the Servo type synchronizer.

Synchromesh device

The clutch gear ③ is pressed onto the main shaft gear. The synchronizer ring ④, thrust block ⑤, anchor block ⑥, and the two brake bands ⑦ are mounted on the clutch gear ③ as shown in Figure TM-47 and are held in position by a circlip ⑧. Between the two gears (which are free to rotate on the shaft) is the coupling sleeve ① which moves axially along the synchronizer hub ②.

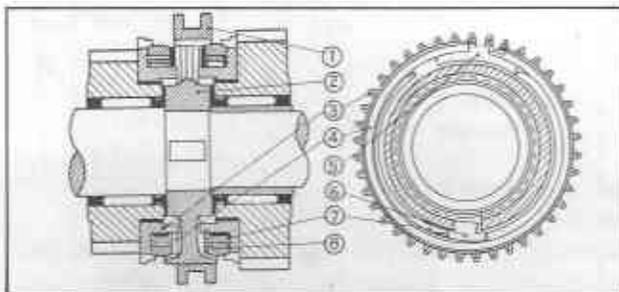


Fig. TM-47 Synchromesh device

Assembling the synchronizer

The assembly procedure is the same for all synchronizers. However the components of each synchronizer differ as follows:

The anchor block, the thrust block and one of the brake bands on the 1st speed synchronizer differ from those used in the 2-3-4-speed synchronizer.

1. Place each gear on a flat surface.
2. Install the synchronizer ring into the inside of the clutch gear.

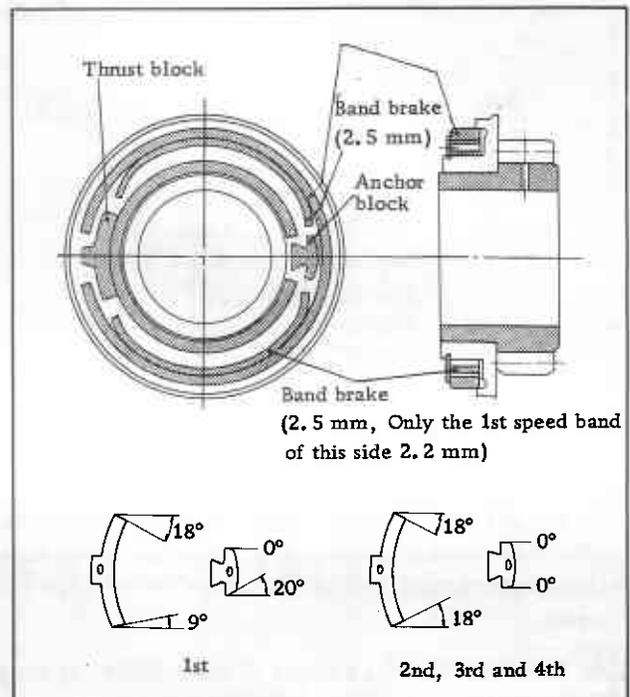


Fig. TM-48 Synchronizer assembly

3. Install the thrust block in the position shown in Figure TM-48.
4. Fit the anchor block to each gear and install the brake bands as shown in Figure TM-48.
5. Install the circlip into the groove on each gear securing the synchronizer assembly.

Main shaft gear

Available snap rings for adjusting the main shaft 3rd gear and hub are as follows. Select a snap ring which will give an end play of 0.05 to 0.15 mm (0.0020 to 0.0059 in.) on the 3rd gear.

Thickness	1.40 mm (0.0551 in.)
	1.45 mm (0.0571 in.)
	1.50 mm (0.0591 in.)
	1.55 mm (0.0610 in.)
	1.60 mm (0.0630 in.)

Tighten the lock nut at the main shaft rear end to 9 to 11 kg-m (65.1 to 79.5 ft-lb) torque.

Reverse idler gear

1. Assemble the reverse idler driving gear ③ (14T) on the end of the reverse shaft ① with the longest spline and retain with a suitable snap ring ② (See Fig. TM-49).

CHASSIS

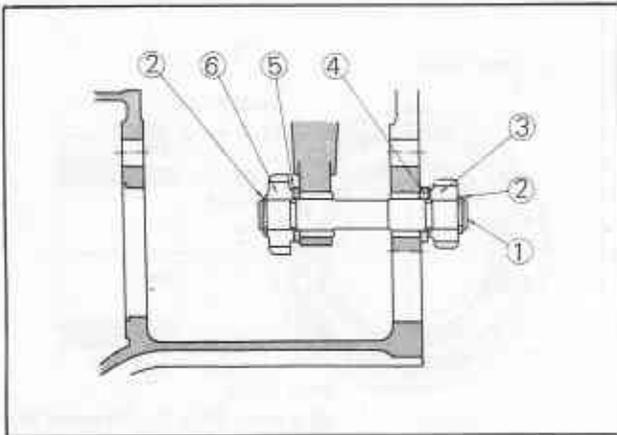


Fig. TM-49 Reverse idler gear

2. Install the reverse shaft and gear assembly into the transmission case from the rear side, inserting thrust washer ④ between the gear and case.

3. Fit the thrust washer ⑤ and idler gear ⑥ (18T) and retain with a suitable snap ring ②.

4. Check the gear end play. The end play is adjusted by selecting one of the following snap rings.

Reverse gear
end play 0.1 ~ 0.3 mm
(0.0039 ~ 0.0118 in.)

Idler gear snap rings
Thickness 1.1 mm (0.0433 in.)
 1.2 mm (0.0472 in.)
 1.3 mm (0.0512 in.)
 1.4 mm (0.0551 in.)
 1.5 mm (0.0591 in.)

Counter gear

Counter gear end
play 0.05 ~ 0.15 mm
(0.0020 ~ 0.0059 in.)

Available thrust washer
Thickness 2.40 mm (0.0945 in.)
 2.45 mm (0.0965 in.)
 2.50 mm (0.0984 in.)
 2.55 mm (0.1004 in.)
 2.60 mm (0.1024 in.)

Shift fork assembling

1. Assemble the shift forks (1st-2nd ①, 3rd-4th ②) onto the coupling sleeves and insert the 1st-2nd fork rod ③.

2. Install an inter-lock plunger ④ and fit the 3rd-4th fork rod ⑤. Do not forget the inter-lock pin ⑦.

3. Install an inter-lock plunger ⑥ and assemble the reverse shift fork ⑧ and fork rod ⑨.

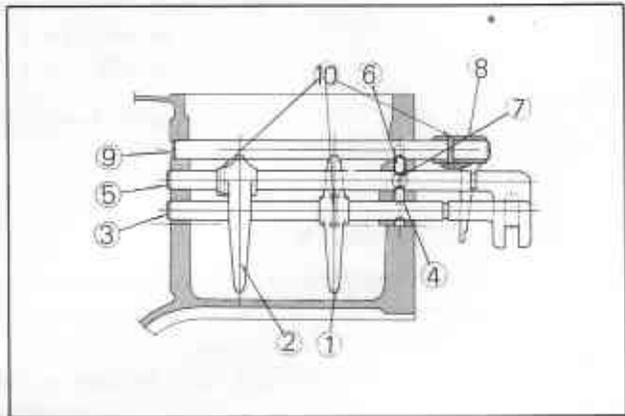


Fig. TM-50 Assembly of fork rods

4. Secure each fork to the fork rods with a retaining pin ⑩.

5. Install a check ball and a spring into each check ball hole and screw in the plug. Smear the threads of the plug with sealing compound and tighten to 1.70 to 2.10 kg-m (12.29 to 15.18 ft-lb) torque.

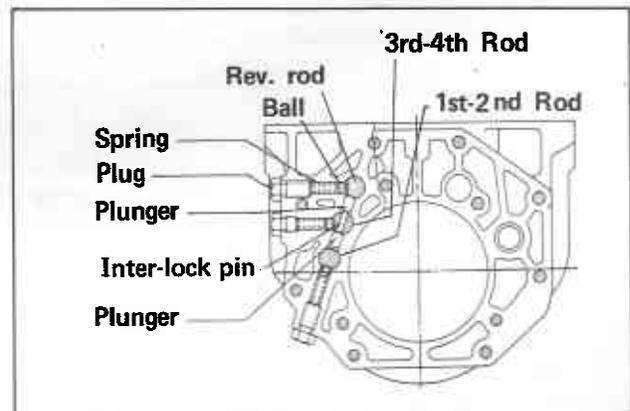


Fig. TM-51 Inter-lock mechanism

Rear extension housing, front cover and bottom cover assembling

1. Install the rear extension housing, engaging the striking rod with the fork rod gates.

Tighten fixing bolts to 2.2 to 3.0 kg-m (15.9 to 21.7 ft-lb).

2. Install the front cover and tighten the bolts to 1.1 to 1.7 kg-m (8.0 to 12.3 ft-lb).

3. Fit the bottom cover and tighten the bolts to 1.1 to 1.7 kg-m (8.0 to 12.3 ft-lb).

TRANSMISSION

AUTOMATIC TRANSMISSION

The service procedure for the automatic transmission is described in a separate manual. However, the automatic transmission fitted in the DATSUN 510 Series (AS18-35EC) has no rear oil pump. Therefore the following component parts are not included in the AS18-35EC automatic transmission.

Abolished parts:

- Housing - rear pump
- Plate - rear pump body
- Key - rear pump drive
- Gear - rear pump drive
- Gear - rear pump driven
- Valve - front pump check
- Oil strainer - rear pump

TRANSMISSION GEAR CONTROL

CONTENTS

DESCRIPTION	TM-19	Adjustment	TM-23
3-FORWARD SPEED TRANSMISSION		AUTOMATIC TRANSMISSION GEAR	
GEAR CONTROL	TM-22	CONTROL	TM-23
Removal	TM-22	Removal	TM-23
Inspection and repair	TM-23	Inspection and repair	TM-24
Installation	TM-23	Installation	TM-24

DESCRIPTION

Two kinds of transmission control systems are used in the DATSUN 510 Series. Vehicles equipped with 3-forward speed transmissions and automatic transmissions utilize a column shift control system. On vehicles fitted with the 4-forward speed transmission a floor shift mechanism is used.

These instruction relate to the column shift control system.

The transmission control consists of a system of levers and control linkage which relay the movement of the hand lever on the steering column to the transmission shift mechanism. If difficult gear engagement is experienced check the control system for adjustment and wear before checking the transmission assembly.

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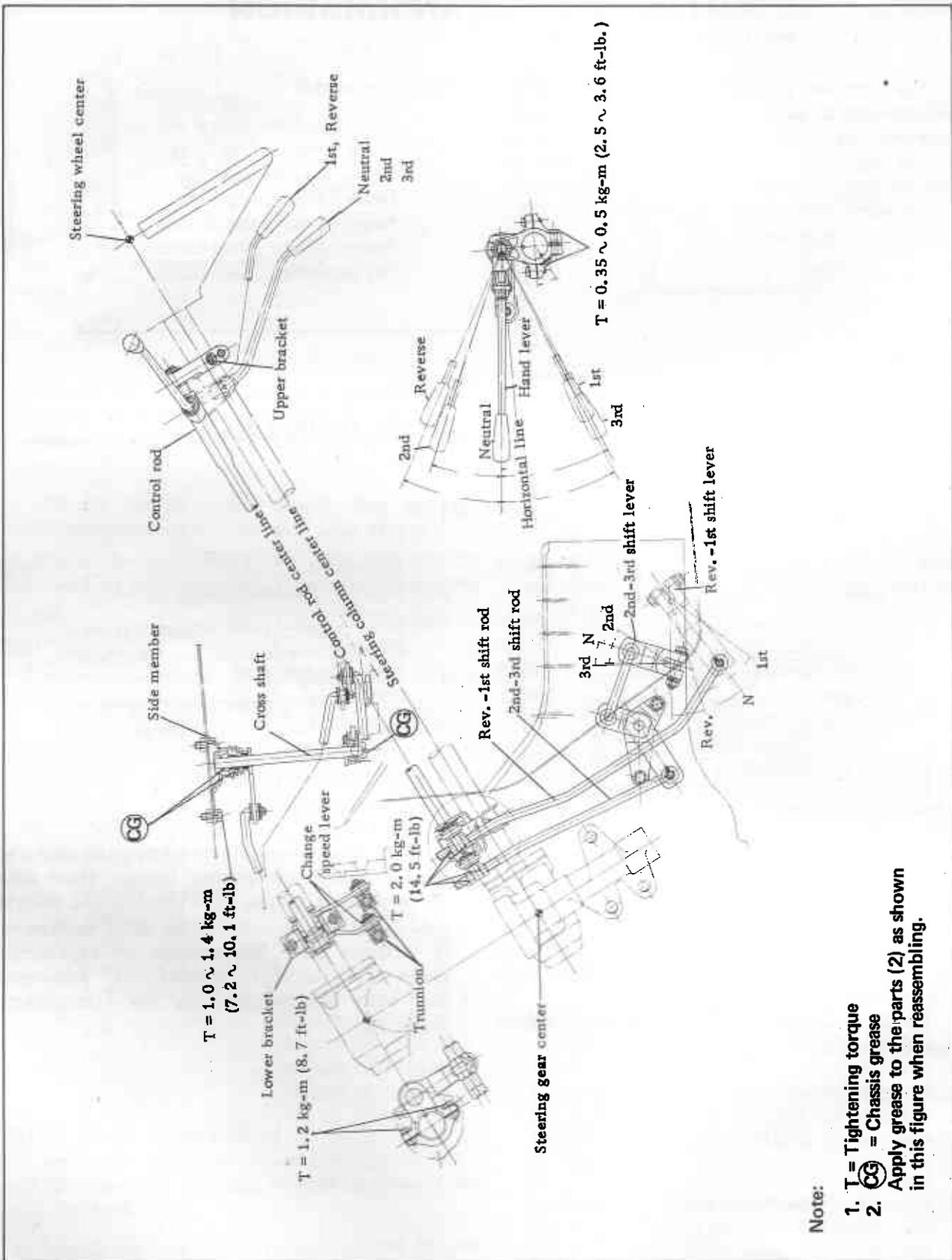
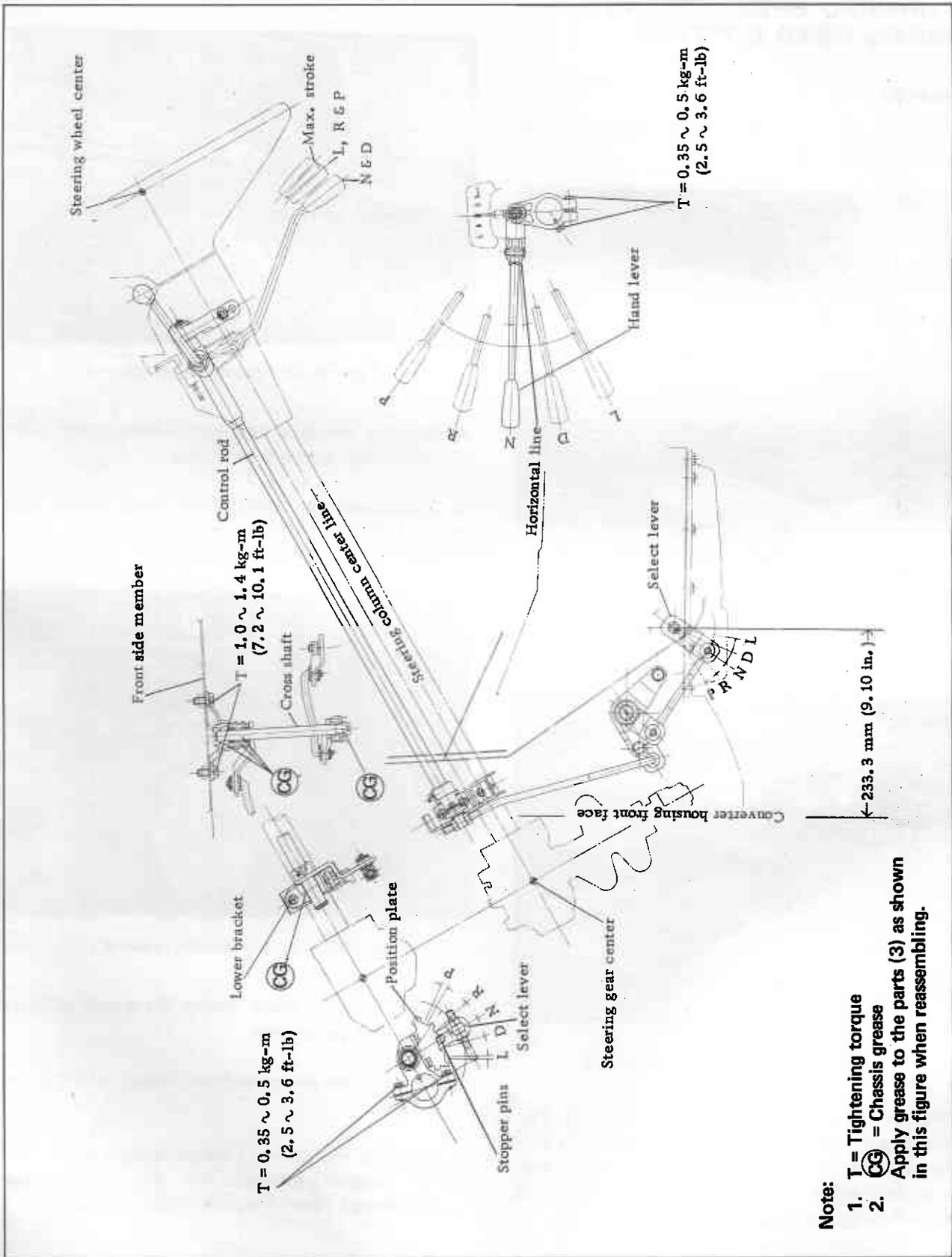


Fig. TM-52 Control system 3-forward speed transmission (R.H. drive)

TRANSMISSION



- Note:**
1. T = Tightening torque
 2. CG = Chassis grease
- Apply grease to the parts (3) as shown in this figure when reassembling.

Fig. TM-53 Control system automatic transmission (R.H. drive)

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3-FORWARD SPEED TRANS MISSION GEAR CONTROL

Removal

1. Remove the steering wheel assembly as shown in Figure TM-54.



Fig. TM-54 Steering wheel removal

2. Remove the steering column shell and the turn signal and lighting switch complete.

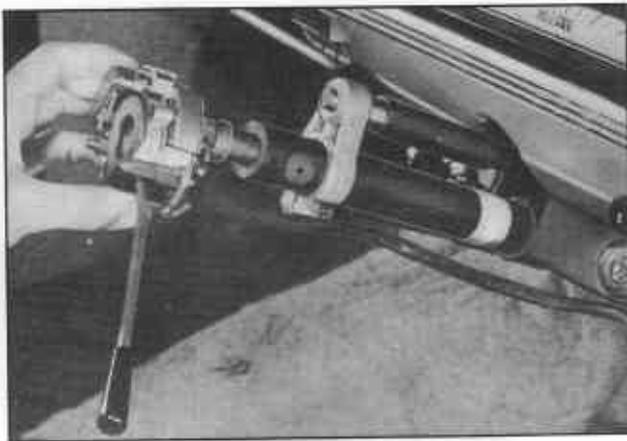


Fig. TM-55 Lighting switch removal

3. Remove the "C" washer (See item 1 Fig. TM-56) and washer. Then remove the upper support bracket by releasing the locating bolt and socket screw. The control rod insert with bush and return spring can now be removed.

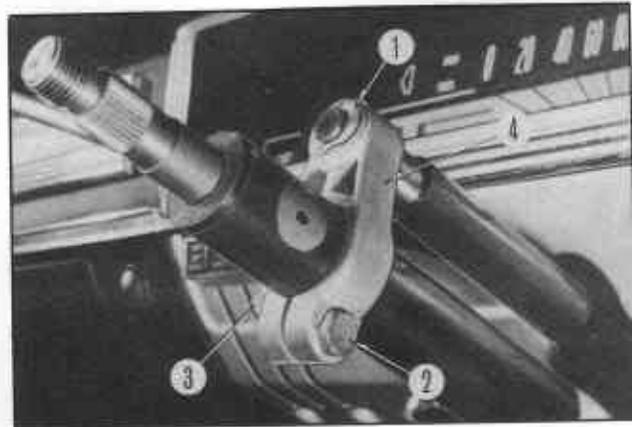


Fig. TM-56 Upper bracket removal

4. Remove the snap ring and control lever pivot pin and draw out the hand lever.

5. Disconnect the shift rods from the change speed levers by removing the cotter pin, plain washer and spring washer (See Fig. TM-57).

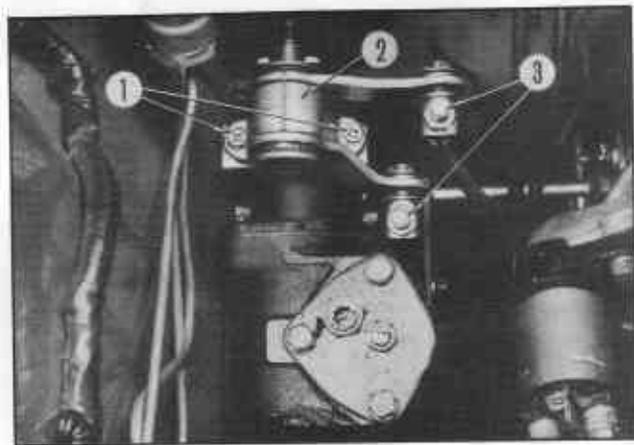


Fig. TM-57 Lower bracket removal

6. Unscrew the bolts fixing the lower support bracket and the clamp.

7. Remove the clamp and the change speed lever retainer.

8. Remove the 2nd-3rd speed change lever, the lower support bracket and the 1st-Reverse speed change lever from the control rod.

TRANSMISSION

9. Withdraw the control rod.

10. Disconnect the change speed rods by removing the cotter pins. Remove the cross shaft bracket from the side member and then withdraw the corss shaft assembly.

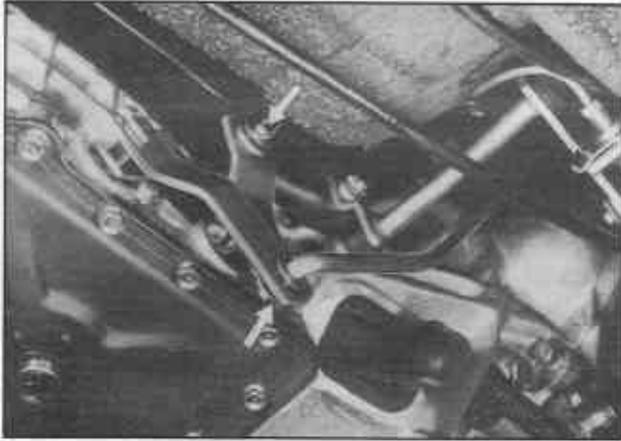


Fig. TM-58 Cross shaft assembly

Inspection and repair

Clean parts and check for wear, damage and other abnormal conditions.

Should any damage or wear be detected then the part should be replaced.

Installation

Installation of the control system is the reversal of the procedure given for removal noting the following point.

Coat all sliding surfaces with chassis grease prior to assembly.

Adjustment

Neutral setting

After installing the remote control linkage adjust the neutral setting as follows.

1. Connect the shift rod with the trunnion of each change lever.
2. Release the adjusting nuts fixing the shift rod to the trunnion and align the groove on

each change lever with the projection on the head of the lower support bracket.

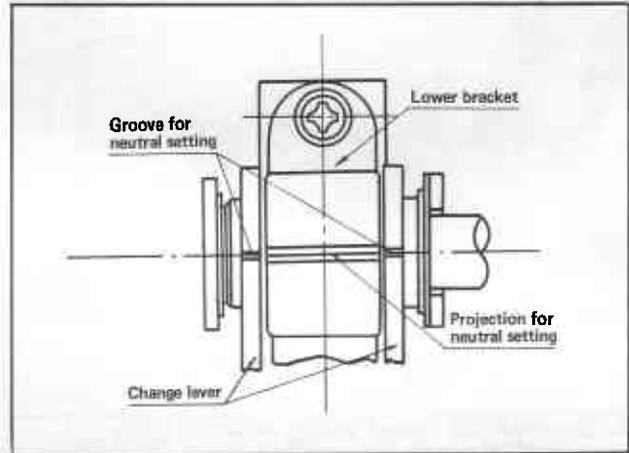


Fig. TM-59 Adjustment of neutral setting

3. Check the operation of the change levers and lock the adjusting nuts.

AUTOMATIC TRANSMISSION GEAR CONTROL

Removal

1. Remove the steering wheel assembly as shown in Figure TM-54.
2. Remove the steering column shell and the turn signal and lighting switch complete.
3. Remove the "C" washer and washer. Then remove the upper support bracket by releasing the locating bolt and socket screw. The control rod insert with bush and return spring can now be removed.
4. Remove the snap ring and control lever pivot pin and draw out the hand lever.
5. Disconnect the upper selector rod from the selector lever by removing the cotter pin, plain washer and lock washer.

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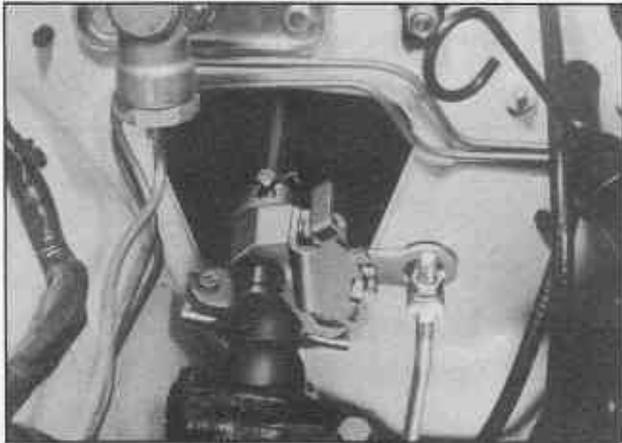


Fig. TM-60 Selector lever

6. Remove the speed range position plate.
7. Remove the snap ring at the control rod lower end and unscrew the lower bracket fixing bolts. Then slide off the lower support bracket complete.
8. Release the locking screw and slide off the selector lever assembly.
9. Withdraw the control rod.
10. Disconnect the selector rods. Remove the

cross shaft bracket from the side member and withdraw the cross shaft assembly.

Inspection and repair

Clean the parts and inspect for wear and damage. Repair or replace as necessary.

Installation

Installation is the reversal of the procedure given for removal noting the following points.

1. Coat all sliding surfaces with chassis grease prior to assembly.
2. Set the converter side lever and the hand lever in the neutral position.
3. Install the upper selector rod to the selector lever and adjust the position plate so the clearance between the stopper pin of the selector lever and position plate will be 0.5 to 1.0 mm (0.0197 to 0.0394 in.). This adjustment is obtained by turning the selector rod adjusting nuts.
4. Tighten the nuts located on each side of the trunnion.

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

Model		R3W65L	F4W63L	F4C63L
Control type		Column shift	Floor shift	Floor shift
Synchro. type		Borg-Warner	Borg-Warner	Servo
Gear ratio	1st gear	3.263	3.382 (3.657)	3.382
	2nd gear	1.645	2.013 (2.177)	2.013
	3rd gear	1.000	1.312 (1.419)	1.312
	4th gear	-----	1.000	1.000
	Rev. gear	3.355	3.364 (3.638)	3.364
Number of teeth				
main shaft	Main drive gear	19	22 (21)	22
	3rd gear	-----	27	27
	2nd gear	25	30	30
	1st gear	31	36	36
	Reverse gear	34	39	39

TRANSMISSION

Counter shaft	Counter driven gear	30	31	(32)	31
	3rd gear	-----	29	29	29
	2nd gear	24	21	2	21
	1st gear	15	15		15
	Reverse gear	16	14		14
Reverse idler gear		16	18		18
Speedometer	Drive gear	5	5		5
	Driven gear	19 or 17	16		16

Note: The gear ratios in parenthesis are used only in Models WP(L)510-(U)T and WPL510-UT.

TIGHTENING TORQUE

Unit: kg-m (lb-ft)	3-Forward speed T/M	4-Forward speed T/M
Rear extension to case bolts	2.2 ~ 3.0 (15.9 ~ 21.7)	2.2 ~ 3.0 (15.9 ~ 21.7)
T/M ass'y to engine bolts	4.5 ~ 5.3 (32.6 ~ 38.3)	4.5 ~ 5.3 (32.6 ~ 38.3)
Bottom cover bolts	1.1 ~ 1.7 (8.0 ~ 12.3)	1.1 ~ 1.7 (8.0 ~ 12.3)
Front cover to case bolts	1.1 ~ 1.7 (8.0 ~ 12.3)	1.1 ~ 1.7 (8.0 ~ 12.3)
Drain plug	3.5 ~ 5.0 (25.3 ~ 36.2)	3.5 ~ 5.0 (25.3 ~ 36.2)
Outer lever fixing bolts	1.8 ~ 2.1 (13.0 ~ 15.2)	—
Reverse lamp switch	2 ~ 4 (14.5 ~ 28.9)	2 ~ 4 (14.5 ~ 28.9)
Idler shaft set screw	0.7 ~ 1.1 (5.1 ~ 8.0)	—
Cross shaft lock pin	0.7 ~ 1.1 (5.1 ~ 8.0)	—
Main shaft end lock nut	—	9 ~ 11 (65.1 ~ 79.5)

Note: For the torque specifications of the transmission control linkage, refer to Fig. TM-52 and TM-53.

SPECIFICATIONS

Model		R3W65L	F4W63L	F4C63L
Main shaft end play	mm	0 ~ 0.19	0.08 ~ 0.29	0.08 ~ 0.29
	(in.)	(0 ~ 0.0075)	(0.0031 ~ 0.0114)	(0.0031 ~ 0.0114)
Maximum allowable main shaft end play	mm	0.20	0.30	0.30
	(in.)	(0.0079)	(0.0118)	(0.0118)
Counter shaft end play	mm	0.04 ~ 0.12	0.05 ~ 0.15	0.05 ~ 0.15
	(in.)	(0.0016 ~ 0.0047)	(0.0020 ~ 0.0059)	(0.0020 ~ 0.0059)
Maximum allowable counter shaft end play	mm	0.20	0.20	0.20
	(in.)	(0.0079)	(0.0079)	(0.0079)

CHASSIS

Reverse idler gear end play	mm (in.)	0.20 ~ 0.40 (0.0079 ~ 0.0157)	0.10 ~ 0.30 (0.0039 ~ 0.0118)	0.10 ~ 0.30 (0.0039 ~ 0.0118)
Maximum allowable end play of reverse idler gear	mm (in.)	0.50 (0.020)	0.50 (0.020)	0.50 (0.020)
Gear end play				
1st gear	mm (in.)	0.05 ~ 0.22 (0.0020 ~ 0.0087)	0.05 ~ 0.15 (0.0020 ~ 0.0059)	0.05 ~ 0.15 (0.0020 ~ 0.0059)
2nd gear	mm (in.)	0.10 ~ 0.22 (0.0039 ~ 0.0087)	0.05 ~ 0.15 (0.0020 ~ 0.0059)	0.05 ~ 0.15 (0.0020 ~ 0.0059)
3rd gear	mm (in.)	0.05 ~ 0.22 (0.0020 ~ 0.0087)	0.05 ~ 0.15 (0.0020 ~ 0.0059)	0.05 ~ 0.15 (0.0020 ~ 0.0059)
Gear backlash all gears	mm (in.)	0.08 ~ 0.13 (0.0031 ~ 0.0051)	0.05 ~ 0.10 (0.0020 ~ 0.0039)	0.05 ~ 0.10 (0.0020 ~ 0.0039)
Clearance between fork and coupling sleeve	mm (in.)	0.15 ~ 0.30 (0.0059 ~ 0.00118)	0.15 ~ 0.30 (0.0059 ~ 0.00118)	0.15 ~ 0.30 (0.0059 ~ 0.00118)
Main shaft run-out	mm (in.)	0.15 (0.0059)	0.25 (0.0098)	0.25 (0.0098)

TROUBLE DIAGNOSES AND CORRECTIONS

Trouble	Possible cause	Remedies
Noisy transmission	Excessive backlash of gears due to worn teeth.	Rebuild transmission and replace worn gears.
	Gears, bearings and synchromesh rings damaged.	Rebuild transmission and replace worn parts.
	Dirt or metal chips in the lubricant.	Disassemble transmission, clean all components and make sure that they are serviceable. Replace lubricant.
	Insufficient oil level in transmission case.	Locate the cause of oil leak. Repair and add the specified gear oil to the level of the filter plug aperture.
Transmission shifts hard	Splines of gears, synchronizer hubs, coupling sleeve and shafts damaged or worn.	Rebuild transmission and replace worn parts.
	Transmission gear control mechanism out of adjustment.	Adjust control mechanism.
	Worn or damaged components of transmission control mechanism.	Replace worn or damaged parts, rebuild and adjust control mechanism.
	Gear shift fork rod distorted.	Disassemble, repair or replace the rod, as required.

TRANSMISSION

	<p>Fork rods binding in transmission case.</p> <p>Coupling sleeves tight on hubs, due to dirt in splines or spreading springs broken or weak.</p> <p>Improper grade of transmission lubricant.</p> <p>Failure to engage clutch due to inefficiency of hydraulic control or misadjusted clutch assembly.</p>	<p>Disassemble, locate cause of binding and repair as required.</p> <p>Locate cause of binding, clean all components and replace damaged parts.</p> <p>Drain the transmission and refill with the specified gear oil.</p> <p>Check operation of hydraulic clutch control and adjust as required.</p>
<p>Transmission jumps out of gear or gear shifting irregular</p>	<p>Improper shifting.</p> <p>Transmission control mechanism out of adjustment.</p> <p>Incorrect assembly of wear of inter-lock and check balls, or weak of springs.</p> <p>Synchromesh baulk rings worn.</p> <p>Oil level too high.</p> <p>Gasket or oil seal damaged.</p> <p>Rear extension-to-transmission case bolts loose.</p> <p>Transmission case or rear extension cracked.</p>	<p>Engage the gears completely before releasing the clutch pedal.</p> <p>Adjust as outlined.</p> <p>Remove check springs and plugs. Clean and replace any damaged or worn parts.</p> <p>Check gears and coupling sleeves and replace if they are damaged. Replace synchromesh baulk rings.</p> <p>Check oil for correct level.</p> <p>Replace gasket and oil seal, if necessary.</p> <p>Tighten bolts to proper torque specifications.</p> <p>Wipe clean the surfaces of case and rear extension and check for oil leak and replace cracked parts.</p>

SERVICE JOURNAL OR BULLETIN REFERENCE

DATE	JOURNAL or BULLETIN No.	PAGE No.	SUBJECT

