

CLUTCH DISC AND
COVER

SERVICE MANUAL

DATSUN
MODEL 330 SERIES
CHASSIS & BODY

Z·ONE·DATSUN

SECTION CL

CLUTCH

CL

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NISSAN MOTOR CO., LTD.
TOKYO, JAPAN

CLUTCH

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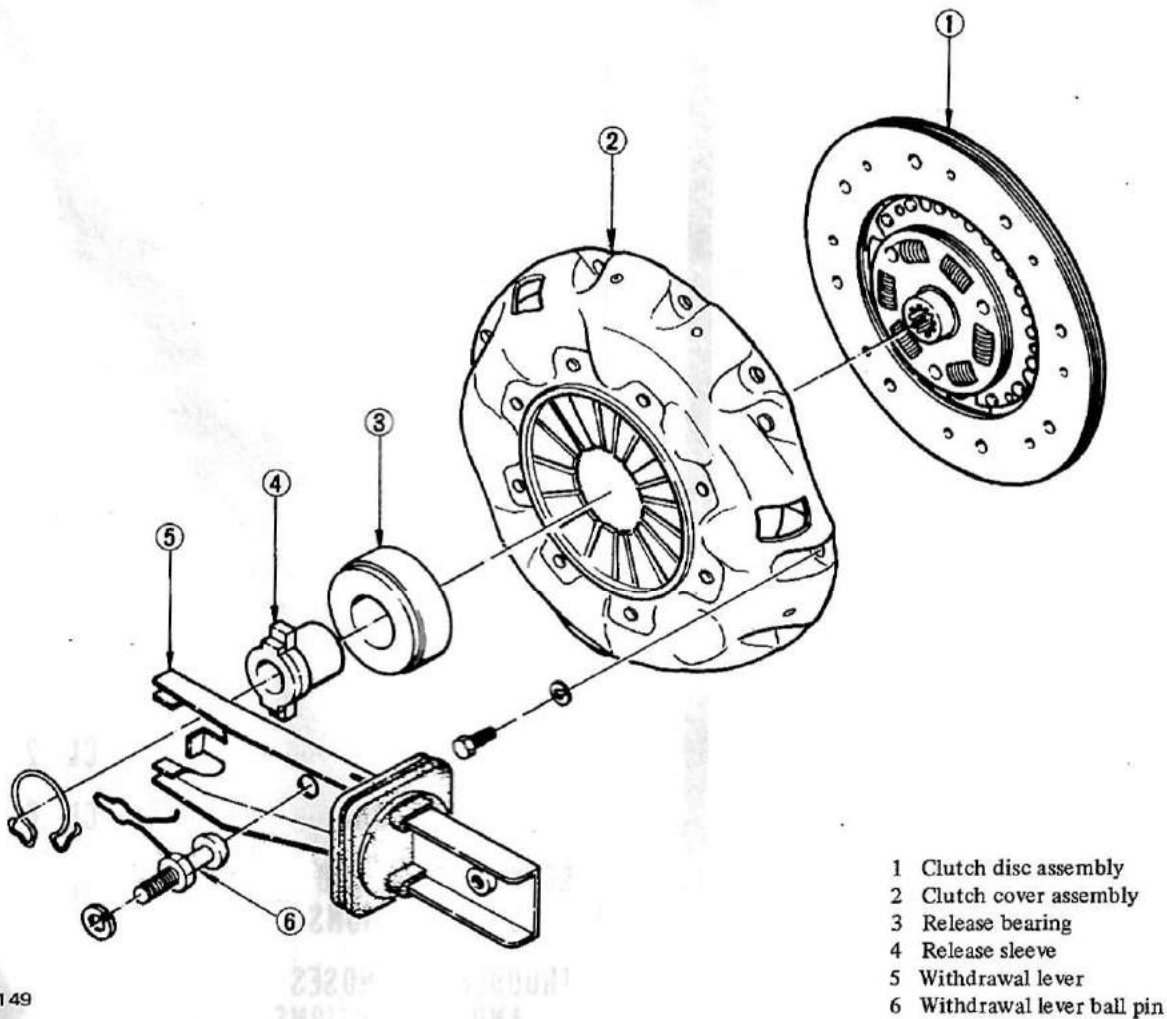
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DESCRIPTION

The clutch is a single dry disc type utilizing a diaphragm spring. It consists

of a clutch disc, pressure plate, diaphragm spring, clutch cover and clutch

release bearing.



CL149

Fig. CL-1 Exploded view of clutch assembly

CLUTCH DISC AND COVER

REMOVAL

1. Remove transmission from engine. For transmission removal procedures, refer to Section TM (Page TM-3).

2. Insert Clutch Aligning Bar ST20630000 all the way into clutch disc hub. It is important to support weight of clutch disc in the steps that follow. See Figure CL-2.

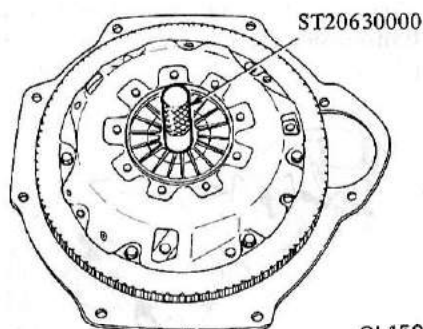


Fig. CL-2 Supporting clutch

3. Loosen bolts attaching clutch cover to flywheel, each one turn at a time, until spring pressure is released. Be sure to back them off in a crisscross fashion.

4. Remove clutch disc and cover assembly.

Note: Do not allow grease or oil to get on clutch linings.

INSPECTION

Flywheel and pressure plate

Check friction surface of flywheel and pressure plate for scoring or roughness. Slight roughness may be smoothed by using fine emery cloth. If surface is deeply scored or grooved, the part should be replaced.

Clutch disc assembly

1. Check torsional spring for damage or fatigue, and hub and rivet for looseness. If necessary, replace.

2. If facings are oily, disc should be replaced. In this case, inspect transmission front cover oil seal, pilot bushing, engine rear oil seal and other points for oil leakage.

3. Disc should be replaced if facings are worn locally or worn down to less than 0.3 mm (0.012 in) at rivet. See Figure CL-3.

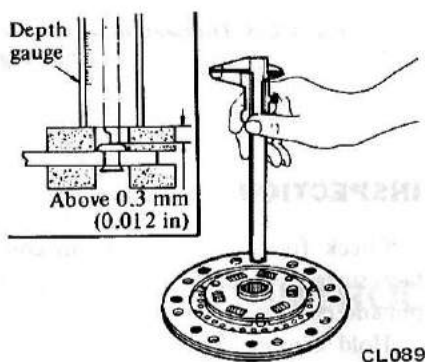


Fig. CL-3 Measuring clutch facing

4. Check disc plate for runout whenever old or new disc is installed. Allowable facing runout is less than 0.5 mm (0.020 in).

5. Check fit of disc hub on transmission main drive gear splines for smooth sliding. If splines are worn (that is, if backlash exceeds 0.4 mm (0.016 in) at the outer edge of clutch disc), clutch disc or main drive gear should be replaced.

Clutch cover assembly

1. Check end surface of diaphragm spring for wear. If excessive wear is found, replace clutch cover assembly.

2. Measure height of diaphragm spring as outlined below:

(1) Place Distance Piece ST20050100 on Base Plate ST20050010 and then tighten clutch cover assembly on base plate with Set Bolts ST20050051. See Figure CL-4.

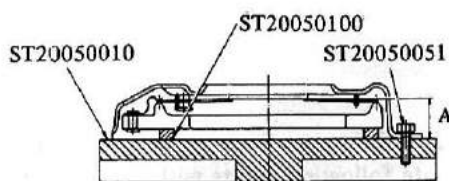


Fig. CL-4 Measuring height of diaphragm spring

(2) Measure height "A" at several points with a vernier caliper depth gauge. If height "A" of spring end is beyond specified value of 33 to 35 mm (1.30 to 1.38 in), adjust spring height with Diaphragm Adjusting Wrench ST20050240. See Figure CL-5.

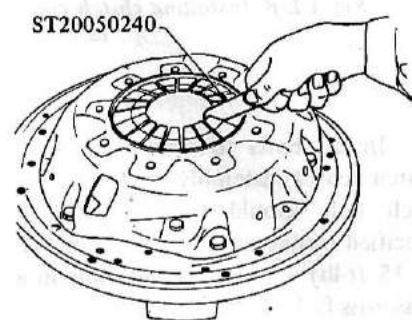


Fig. CL-5 Adjusting spring height

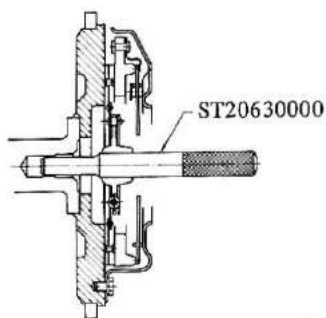
INSTALLATION

1. Apply a light coat of grease (including Molybdenum Disulphide) to transmission main drive gear splines. Slide clutch disc on main drive gear several times. Remove clutch disc and wipe off excess lubricant pushed off by disc hub.

Note: Take special care to prevent grease or oil from getting on clutch facing.

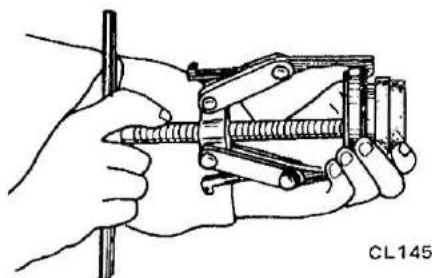
2. Reinstall clutch disc and clutch cover assembly. Support clutch disc and cover assemblies with Clutch Aligning Bar ST20630000. See Figure CL-6.

Note: Be sure to keep disc facings, flywheel and pressure plate clean and dry.



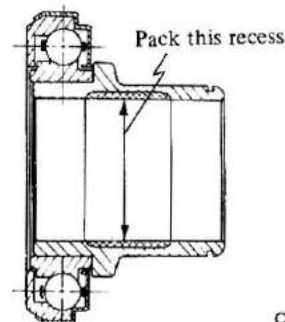
CL153

Fig. CL-6 Installing clutch cover assembly



CL145

Fig. CL-8 Disassembling release bearing



CL093

Fig. CL-10 Lubricating recess of bearing sleeve

3. Install bolts to squarely tighten clutch cover assembly to flywheel. Each bolt should be tightened to specified torque of 1.6 to 2.1 kg-m (12 to 15 ft-lb) – one turn at a time in a crisscross fashion.

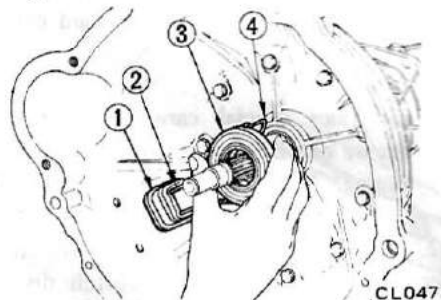
Note: Use dowels to properly locate clutch cover on flywheel.

4. Remove Clutch Aligning Bar.
5. Reinstall transmission as described in Section TM (Page TM-4).

RELEASE BEARING

REMOVAL

1. Remove holder spring from bearing sleeve; disconnect clutch withdrawal lever from bearing sleeve.
2. Remove release bearing and sleeve as an assembly from mainshaft. See Figure CL-7.



CL047

- | | |
|--------------------|-------------------|
| 1 Dust cover | 3 Release bearing |
| 2 Withdrawal lever | 4 Holder spring |

Fig. CL-7 Removing clutch release mechanism

3. Remove clutch release bearing from bearing sleeve with a universal puller and a suitable adapter. See Figure CL-8.

INSPECTION

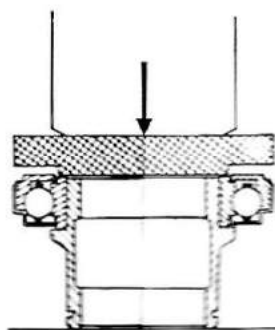
Check for abnormal wear on contact surface of withdrawal lever, ball pin and bearing sleeve.

Hold bearing inner race and rotate outer race while applying pressure to it. If bearing rotation is rough or noisy, replace bearing.

INSTALLATION

1. Assemble release bearing on sleeve with a press. See Figure CL-9.

Note: Do not depress outer race.



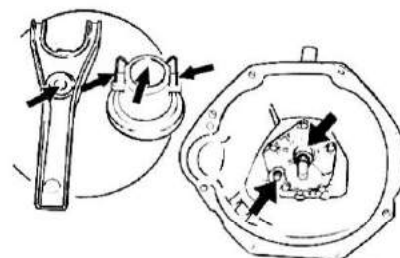
CL117

Fig. CL-9 Installing release bearing

2. Before or during assembly, lubricate following points with a light coat of multipurpose grease.

- (1) Inner groove of release bearing sleeve. See Figure CL-10.

- (2) Contact surface of withdrawal lever, lever ball pin, bearing sleeve and transmission front cover. See Figure CL-11.



CL111

Fig. CL-11 Lubricating points of withdrawal lever and front cover

- (3) Contact surface of transmission main drive gear splines apply grease (including Molybdenum Disulphide).

Note: Above points should be coated with only a very small amount of grease. If too much lubricant is applied, it will run out on friction plates when hot, resulting in damaged clutch disc facings.

3. After lubricating, install withdrawal lever, release bearing and bearing sleeve on clutch housing. After connecting them with holder spring, install dust cover on clutch housing.

PILOT BUSHING

REMOVAL

Remove pilot bushing in crankshaft with Pilot Bushing Puller ST16610001. See Figure CL-12.

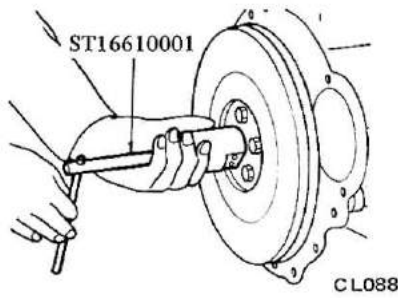


Fig. CL-12 Removing pilot bushing

INSPECTION

Check pilot bushing in crankshaft for wear or roughness. If necessary, replace it.

Note: When bushing is faulty, be sure to check transmission main drive gear at the same time.

INSTALLATION

Before installing a new bushing, thoroughly clean bushing hole. Install bushing in crankshaft using a soft hammer. Bushing need not be oiled.

CLUTCH CONTROL

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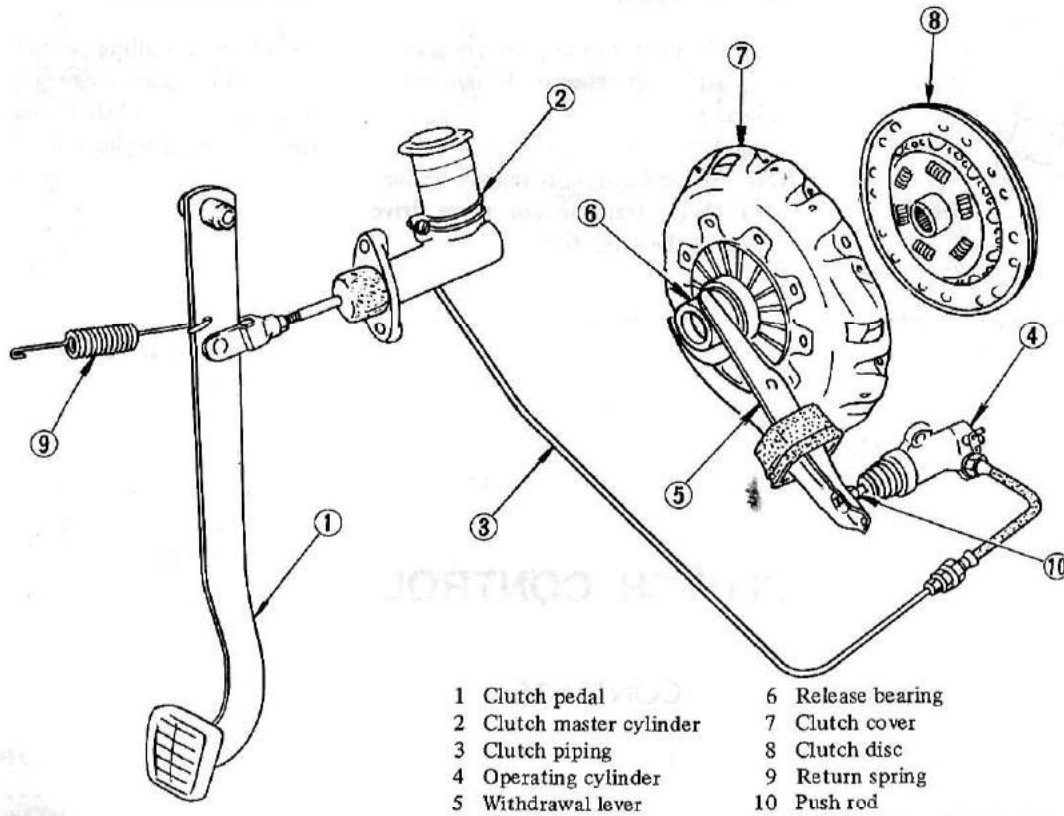
DESCRIPTION

The hydraulic clutch control consists of a pendent pedal, master cylinder, operating cylinder and withdrawal lever.

The operating cylinder is a non-adjustable type that employs no return spring. In this unit, withdrawal-to-push rod play adjustment is not necessary

since the "S" shown in Figure CL-14 serves to automatically compensate for wear on clutch disc.

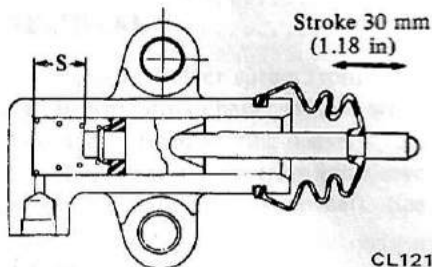
Clutch



- | | |
|--------------------------|-------------------|
| 1 Clutch pedal | 6 Release bearing |
| 2 Clutch master cylinder | 7 Clutch cover |
| 3 Clutch piping | 8 Clutch disc |
| 4 Operating cylinder | 9 Return spring |
| 5 Withdrawal lever | 10 Push rod |

CL155

Fig. CL-13 Clutch operating system



CL121

Fig. CL-14 Non-adjustable operating cylinder

BLEEDING CLUTCH SYSTEM

To bleed clutch system, use same procedures as outlined in Section BR (Page BR-4) for Bleeding Hydraulic System.

1. Fill oil reservoir of operating cylinder with brake fluid.
2. Detach cap from bleeder screw on operating cylinder and connect a vinyl tube in its place.

3. Pour a small amount of brake fluid into a clean container and dip open end of vinyl tube into it.
4. Have a co-worker depress clutch pedal two or three times. With clutch pedal depressed fully, loosen bleeder screw to bleed air out of clutch system.
5. Tighten bleeder screw and release pedal.
6. Repeat above steps until no air bubbles appear in vinyl tube.

Notes:

- a. Always keep brake fluid in oil reservoir so that it continuously flows into the line.
- b. Be careful not to allow brake fluid to come into contact with painted surfaces.
- c. Make sure that there is no leakage at connections.
- d. Pour brake fluid into oil reservoir up to specified level.

CLUTCH PEDAL

REMOVAL

1. Unhook return spring.
2. Disconnect push rod from pedal assembly.
3. Remove fulcrum bolt and drop pedal assembly down.

Note: Loosen fulcrum bolt clockwise.

INSPECTION

Clean following parts in cleaning solvent and check for wear, damage or any other abnormal condition. Replace parts which are no longer good for further use.

1. Return spring
2. Pedal boss
3. Bushing
4. Fulcrum bolt, etc.

Clutch

INSTALLATION AND ADJUSTMENT

Install clutch pedal in reverse procedure of Removal. Apply multi-purpose grease to friction surfaces.

After installing clutch pedal, adjust clutch pedal height as follows:

1. Adjust pedal height to 167 mm (6.57 in) by adjusting pedal stopper and tighten lock nut "A" to specification.
2. By turning push rod adjusting screw in or out, adjust clutch pedal play resulting from clearance between clevis pin and clutch pedal to 2 to 5 mm (0.079 to 0.197 in). Measure on top face of pedal pad.

Tightening torque:

Pedal installation bolt

3.1 to 4.1 kg-m
(22 to 30 ft-lb)

Lock nut "A"

0.8 to 1.1 kg-m
(5.8 to 8.0 ft-lb)

Lock nut "B"

0.8 to 1.1 kg-m
(5.8 to 8.0 ft-lb)

Notes:

- In adjusting play, be careful not to block port of master cylinder. A blocked port may result if play at clevis pin is too small.
- Depress and release clutch pedal over its entire stroke to ensure that clutch linkage operates smoothly without squeaking, interference or binding.

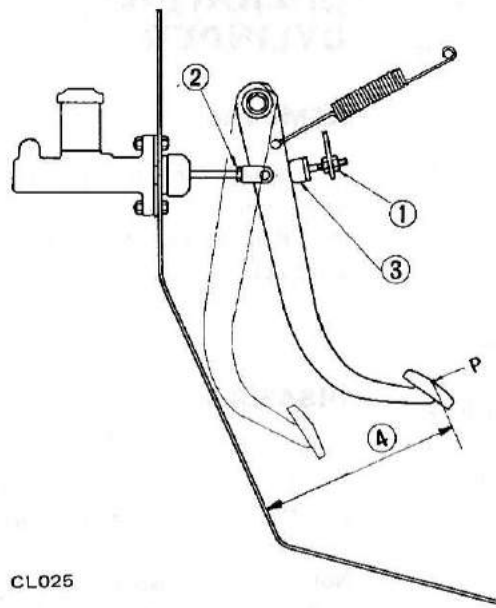
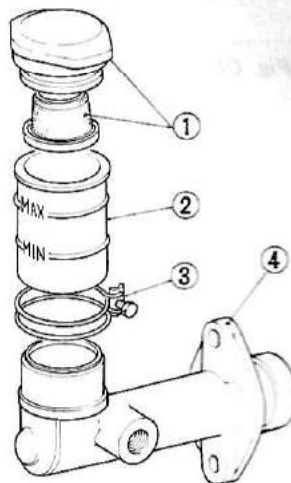


Fig. CL-15 Pedal height adjustment

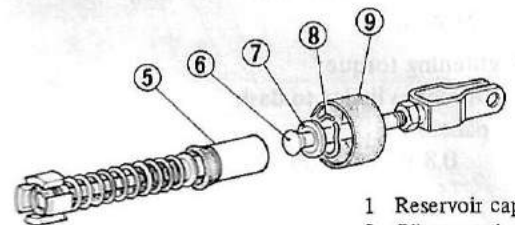
CLUTCH MASTER CYLINDER

REMOVAL

1. Remove clevis pin at push rod.
2. Disconnect clutch tube from master cylinder.
3. Remove nuts securing master cylinder to dash panel and disconnect master cylinder.



CL264



- 1 Reservoir cap
- 2 Oil reservoir
- 3 Reservoir band
- 4 Cylinder
- 5 Piston assembly
- 6 Push rod
- 7 Stopper
- 8 Stopper ring
- 9 Dust cover

Fig. CL-16 Clutch master cylinder

DISASSEMBLY

1. Remove dust cover and take off stopper ring from cylinder body.
2. Remove push rod and piston assembly. Never disassemble piston assembly.

INSPECTION

Note: Use clean brake fluid to clean or wash all parts of master cylinder. Never use mineral oils such as gasoline or kerosene. These will ruin rubber parts of hydraulic system.

1. Check cylinder and piston for uneven wear or damage, and replace if necessary.
2. Any damaged dust cover, oil reservoir or cap should be replaced.

ASSEMBLY

Assemble clutch master cylinder in reverse order of disassembly, observing following instructions closely.

1. Dip piston assembly in brake fluid before installing.
2. Apply a coating of brake fluid to cylinder and piston when assembling.

INSTALLATION

Install clutch master cylinder in reverse order of removal, observing following instructions closely.

1. Adjust pedal height by changing length of push rod, referring to "Clutch Pedal" section.
2. Bleed air out of hydraulic system, referring to section on "Bleeding Clutch System".

Tightening torque:

Master cylinder to dash panel

0.8 to 1.1 kg-m
(5.8 to 8.0 ft-lb)

Clutch tube connector

1.5 to 1.8 kg-m
(11 to 13 ft-lb)

OPERATING CYLINDER**REMOVAL**

1. Detach clutch hose from operating cylinder.
2. Remove two bolts securing operating cylinder to clutch housing.

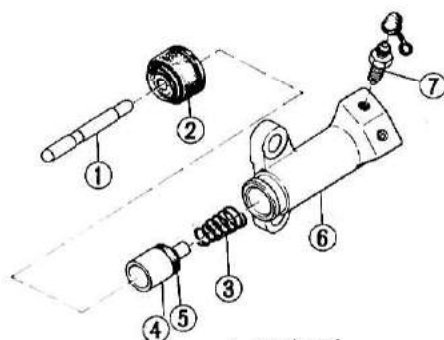
DISASSEMBLY

See Figure CL-17.

1. Remove push rod and dust cover.
2. Remove piston and piston spring.

Note: Discard piston cup if it is removed from piston assembly.

3. Remove bleeder screw.



CL222

- 1 Push rod
- 2 Dust cover
- 3 Piston spring
- 4 Piston
- 5 Piston cup
- 6 Operating cylinder
- 7 Bleeder screw

Fig. CL-17 Operating cylinder

INSPECTION

Note: Use clean brake fluid to clean or wash all parts of operating cylinder. Never use mineral oils such as gasoline or kerosene. These will ruin rubber parts of hydraulic system.

1. Check cylinder and piston for uneven wear or damage, and replace if necessary.
2. A damaged dust cover should be replaced.

ASSEMBLY

Assemble operating cylinder in reverse order of disassembly. Dip cylinder and piston in clean brake fluid before assembly.

INSTALLATION

Install operating cylinder in reverse order of removal.

Note: Bleed air thoroughly from clutch hydraulic system, referring to section on "Bleeding Clutch System".

Tightening torque:

Operating cylinder to clutch housing securing bolts:

2.5 to 3.0 kg-m
(18 to 22 ft-lb)

Clutch hose connector:

1.7 to 2.0 kg-m
(12 to 14 ft-lb)

SERVICE DATA AND SPECIFICATIONS

Type		C225S
Diaphragm spring		
Distance to flywheel	mm (in)	33 to 35 (1.30 to 1.38)
Unevenness of spring height	mm (in)	Less than 0.5 (0.020)
Installed load	kg (lb)	500 (1,103) for L26 Engine 400 (882) for L20 Engine 450 (992) for SD22 Engine
Clutch disc		
Facing size (Outer dia. x inner dia. x thickness)	mm (in)	225 x 150 x 3.5 (8.86 x 5.91 x 0.138)
Thickness of disc assembly	mm (in)	7.8 (0.307)
Allowable minimum depth of rivet head from surface	mm (in)	0.3 (0.012)
Allowable free play of spline	mm (in)	0.4 (0.016)
Clutch pedal		
Height	mm (in)	167 (6.57)
Free play	mm (in)	2 to 5 (0.079 to 0.197)
Free travel	mm (in)	6 to 12 (0.236 to 0.472)
Clutch master cylinder		
Diameter	mm (in)	15.87 ($\frac{5}{8}$)
Clutch operating cylinder		
Diameter	mm (in)	17.46 ($1\frac{1}{8}$)
Tightening torque		
Clutch assembly bolt	kg-m (ft-lb)	1.6 to 2.1 (12 to 15)
Push rod adjusting nut	kg-m (ft-lb)	0.8 to 1.1 (5.8 to 8.0)
Tube connector	kg-m (ft-lb)	1.5 to 1.8 (11 to 13)
Hose connector	kg-m (ft-lb)	1.7 to 2.0 (13 to 14)
Master cylinder to dash panel bolt	kg-m (ft-lb)	0.8 to 1.1 (5.8 to 8.0)
Operating cylinder to clutch housing bolt	kg-m (ft-lb)	2.5 to 3.0 (18 to 22)
Flywheel bolt	kg-m (ft-lb)	14 to 16 (101 to 120)

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TROUBLE DIAGNOSES AND CORRECTIONS

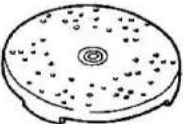
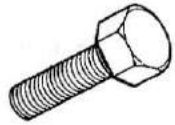
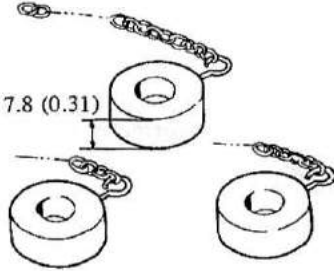
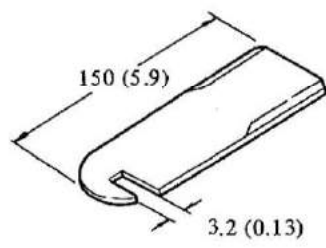
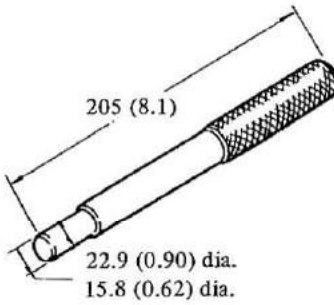
Condition	Probable cause	Corrective action
Clutch slips	<p>Clutch may be slipping when any of the following symptoms is noticed while driving.</p> <ol style="list-style-type: none"> (1) Car will not respond to engine speed during acceleration. (2) Insufficient car speed. (3) Lack of power during uphill driving. <p>Some of the above conditions may also be caused by an engine problem. First determine whether engine or clutch is causing the problem.</p> <p>If slipping clutch is left unheeded, wear and/or overheating will occur on clutch facing to such an extent that it will become unserviceable.</p> <p>TO TEST FOR SLIPPING CLUTCH, proceed as follows:</p> <p>During upgrade travelling, run engine at about 40 to 50 km/h (25 to 31 MPH) with gear shift lever in 3rd-speed position, shift into highest gear and at the same time rev up engine. If clutch is slipping, car will not readily respond to depression of accelerator pedal.</p>	
	<ul style="list-style-type: none"> ● Clutch facing worn excessively. ● Oil or grease on clutch facing. ● Warped clutch cover or pressure plate. 	<p>Replace.</p> <p>Replace.</p> <p>Repair or replace.</p>
Clutch drags	<p>Dragging clutch is particularly noticeable when shifting gears, especially into low gear.</p> <p>TO TEST FOR DRAGGING CLUTCH, proceed as follows:</p> <ol style="list-style-type: none"> (1) Start engine. Disengage clutch. Shift into reverse gear, and then into Neutral. Gradually increase engine speed, and again shift into reverse gear. If clutch is dragging, gear "grating" will be heard when gears are shifted from Neutral into Reverse. Proceed to item (4) below. (2) Stop engine and shift gears. (Conduct this test at each gear position.) (3) Each gear shifts smoothly in step (2) above, but drags when lever is shifted to 1st gear during idling. <ol style="list-style-type: none"> a. If dragging is encountered at the end of shifting, check synchro mechanism in transmission. b. If dragging is encountered at the beginning of shifting, proceed to step (4) below. (4) Push gear lever toward Reverse, depress pedal to check for free travel of pedal. <ol style="list-style-type: none"> a. If pedal can be depressed further, check clutch for condition. b. If pedal cannot be depressed further, proceed to step (5) below. (5) Check clutch control. (pedal height, free pedal play, etc.) If no abnormal condition exists and if pedal cannot be depressed further, check clutch for condition. 	
	<ul style="list-style-type: none"> ● Clutch disc run out or warped. ● Wear or rust on hub splines in clutch disc. ● Diaphragm spring toe height out of adjustment or toe tip worn. ● Worn or improperly installed parts. 	<p>Replace.</p> <p>Clean and lubricate with grease, or replace.</p> <p>Adjust or replace.</p> <p>Repair or replace.</p>

Clutch

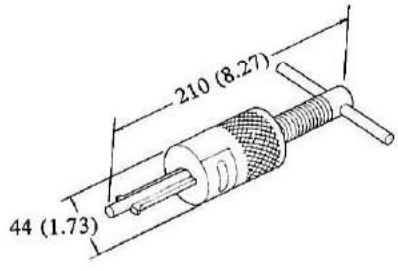
Condition	Probable cause	Corrective action
Clutch chatters	Clutch chattering is usually noticeable when car was just rolled off with clutch partially engaged.	
	<ul style="list-style-type: none"> ● Weak or broken clutch disc torsion spring. 	Replace.
	<ul style="list-style-type: none"> ● Oil or grease on clutch facing. 	Replace.
	<ul style="list-style-type: none"> ● Clutch facing out of proper contact or clutch disc runout. 	Replace.
	<ul style="list-style-type: none"> ● Loose rivets. 	Replace.
	<ul style="list-style-type: none"> ● Warped pressure plate or clutch cover surface. 	Repair or replace.
	<ul style="list-style-type: none"> ● Unevenness of diaphragm spring toe height. 	Adjust or replace.
Noisy clutch	A noise is heard after clutch is disengaged.	
	<ul style="list-style-type: none"> ● Damaged release bearing. 	Replace.
	A noise is heard when clutch is disengaged.	
	<ul style="list-style-type: none"> ● Insufficient grease on sliding surface of bearing sleeve. 	Apply grease.
	<ul style="list-style-type: none"> ● Clutch cover and bearing incorrectly installed. 	Adjust.
	A noise is heard when car rolls off slowly with clutch partially engaged.	
<ul style="list-style-type: none"> ● Damaged pilot bushing. 	Replace.	
Clutch grabs	When grabbing of clutch occurs, car will not roll off smoothly from a standing start or clutch will be engaged before clutch pedal is fully depressed.	
	<ul style="list-style-type: none"> ● Oil or grease on clutch facing. ● Worn clutch facing or loose rivets. ● Wear or rust on splines in drive shaft and clutch disc. ● Warped flywheel or pressure plate. ● Loose mountings for engine or power train units. 	Replace. Replace. Clean or replace. Repair or replace. Retighten.

Clutch

SPECIAL SERVICE TOOLS

No.	Tool number & tool name	Description Unit: mm (in)	For use on	Reference page or Figure No.
1.	ST20050010 Clutch assembly base plate	For measuring diaphragm spring height (Use with distance piece ST20050100)  SE002	330 230 710 610 C110 C130 S30 250 B120 620 140 T20 T40 C240 C80 780 60 4W73	Fig. CL-4
2.	ST20050051 Set bolt			
3.	ST20050100 Clutch assembly distance piece	For measuring diaphragm spring height (Use with base plate ST20050010)  SE003	330 230 B210 710 610 C110 C130 S30 250 B120 620 140 T20 C240 C80	Fig. CL-4
4.	ST20050240 Diaphragm spring adjusting wrench	For adjusting diaphragm spring height  SE032	330 230 710 610 C110 C130 S30 B120 620 T20 T40 C240	Fig. CL-5
5.	ST20630000 Clutch aligning bar	For centering clutch disc  SE033	330 230 710 610 C110 C130 S30 620 T20 T40 C240	Fig. CL-2 Fig. CL-6

Clutch

No.	Tool number & tool name	Description Unit: mm (in)	For use on	Reference page or Figure No.
6.	ST16610001 Pilot bushing puller	For removing pilot bushing  SE191	L series SD series G series J series	Fig. CL-12



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NISSAN MOTOR CO., LTD.
TOKYO, JAPAN

SECTION TM

TRANSMISSION

TM

4-SPEED TRANSMISSION (Type : F4W71B, R4W71B)	TM- 2
3-SPEED TRANSMISSION (Type : R3W71B)	TM-12
TRANSMISSION GEAR CONTROL FOR COLUMN SHIFT	TM-13
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4-SPEED TRANSMISSION (Type : F4W71B, R4W71B)

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DESCRIPTION

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

The transmission assembly consists

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

The cast-iron adapter plate supports the main shaft, counter shaft, reverse

idler shaft and three fork rods, and is bolted, at the front, to the transmission case and, at the rear, to the rear extension by means of through-bolts. Therefore, by removing these through-bolts, all gears and shafts are stripped.

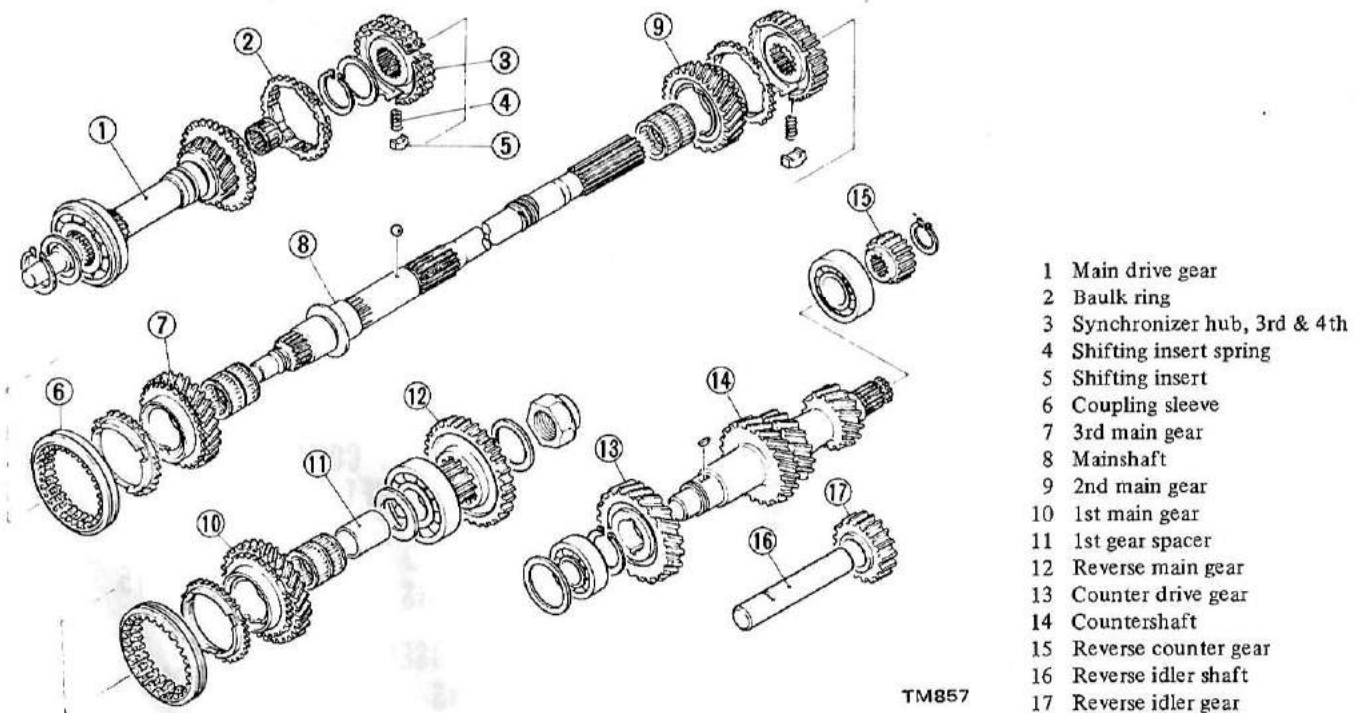
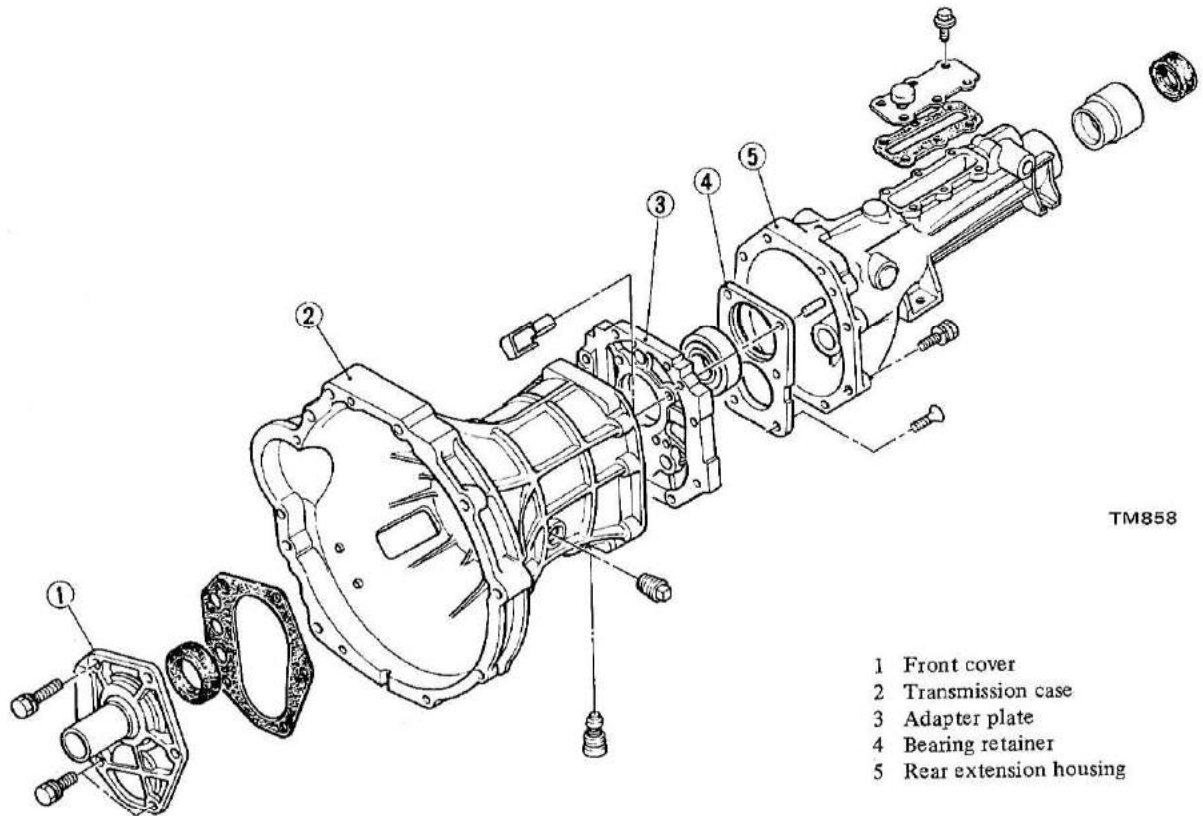


Fig. TM-1 F4W71B, R4W71B transmission gear components

Transmission



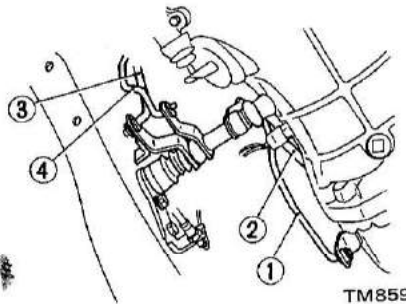
TM858

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

Fig. TM-2 F4W71B, R4W71B transmission case components

REMOVAL

1. Jack up the vehicle and support it with stands in a safe manner. Recommend a hydraulic hoist or open pit be utilized, if available.
2. Disconnect battery ground cable.
3. Disconnect accelerator control from carburetor linkage.
4. Unscrew drain plug to drain gear oil (if necessary).
5. Remove front exhaust tube.
6. Disconnect wire connection at reverse lamp switch.
7. • Floor-shift control
 - (1) Place transmission control lever in neutral position.
 - (2) Remove E-ring and control lever pin from transmission striking rod guide and remove control lever.
- Column-shift control
 - (1) Disconnect lower shift rod ① and lower select rod ②, upper shift rod ③, and upper select rod ④ from each lever of cross shaft assembly.
 - (2) Remove cross shaft by removing cross shaft bracket.



TM859

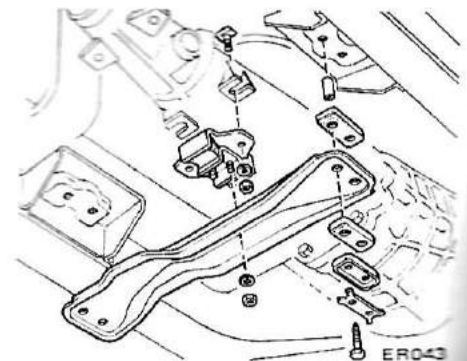
Fig. TM-3 Disconnecting shift and select rods

8. Remove clutch operating cylinder from clutch housing.
9. Disconnect speedometer cable from rear extension housing.
10. Remove propeller shaft.

For details on propeller shaft removal, refer to Section PD (Page PD-3).

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

11. Support engine by placing a jack beneath oil pan with a wooden block. Do not place jack on drain plug.
12. Support transmission with transmission jack.
13. Remove two bolts attaching transmission to rear engine mounting insulator. Also remove four cross-member attaching bolts.



ER043

Fig. TM-4 Removing crossmember

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

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

INSTALLATION

To install, reverse the order of removal observing the following.

Remove filler plug at inspection hole and fill transmission case with recommended gear oil to level of filler hole [approximately 1.7 liters (3 $\frac{3}{4}$ U.S. pt., 3 Imper. pt.)].

Tightening torque:

- Bolt securing transmission to engine:
4.4 to 5.9 kg-m
(32 to 43 ft-lb)
- Starter motor installation bolt:
2.7 to 3.6 kg-m
(20 to 26 ft-lb)
- Crossmember mounting bolt:
3.2 to 3.7 kg-m
(23 to 27 ft-lb)
- Rear mounting insulator to crossmember fixing nut:
1.9 to 2.3 kg-m
(14 to 17 ft-lb)
- Rear mounting insulator to rear extension fixing bolt:
0.8 to 1.1 kg-m
(5.8 to 8.0 ft-lb)
- Bolt securing propeller shaft to companion flange:
2.5 to 3.2 kg-m
(18 to 23 ft-lb)
- Center-bearing bracket to body fixing nut:
3.2 to 3.7 kg-m
(23 to 27 ft-lb)
- Clutch operating cylinder installing bolt:
2.5 to 3.5 kg-m
(18 to 25 ft-lb)
- Exhaust front tube securing nut:
1.6 to 2.1 kg-m
(12 to 15 ft-lb)

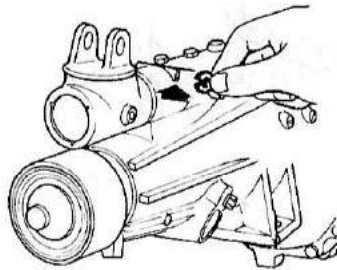
DISASSEMBLY

TRANSMISSION CASE

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.

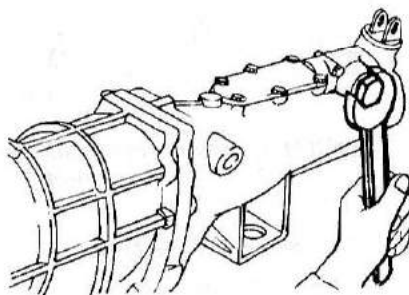
4. Remove reverse lamp switch.
5. Remove speedometer pinion and pinion sleeve by taking off lock plate.
6. • Floor-shift control only
(1) Remove E-ring and stopper guide pin from rear end of rear extension. See Figure TM-5.



TM337

Fig. TM-5 Removing striking rod E-ring and stopper pin

- (2) Remove return spring plug, return spring, reverse check spring, and plunger from rear extension. See Figure TM-6.

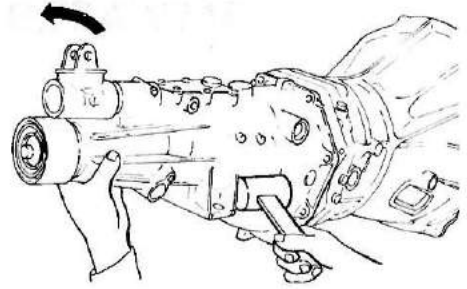


TM338

Fig. TM-6 Removing return spring plug

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

Drive out rear extension backward by lightly tapping around it with a soft hammer. See Figure TM-7.



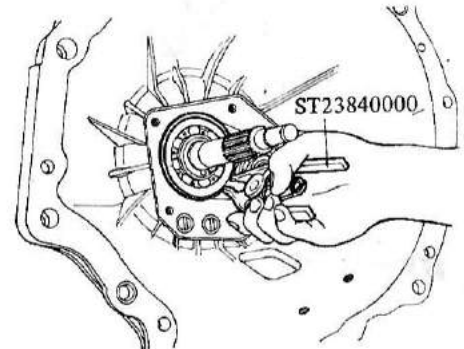
TM339

Fig. TM-7 Removing rear extension

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

Detach countershaft front bearing shim.

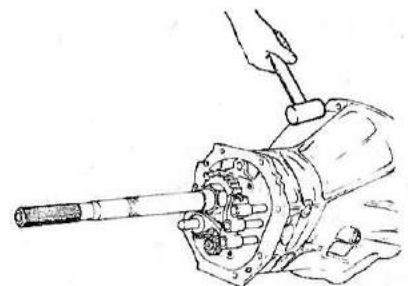
9. Remove main drive bearing snap ring with Expander ST23840000. See Figure TM-8.



TM340

Fig. TM-8 Removing main drive bearing snap ring

10. Separate transmission case from adapter plate with a soft hammer. See Figure TM-9.



TM341

Fig. TM-9 Removing transmission case

Transmission

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

With countershaft side up, place the above assembly in a vise. See Figure TM-10.

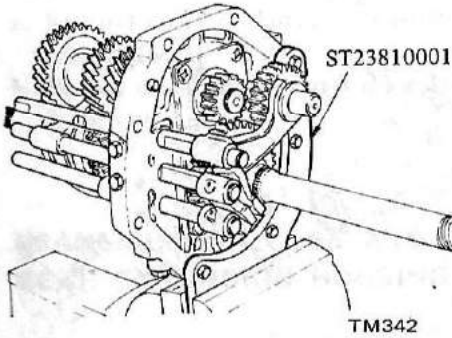


Fig. TM-10 Attaching gear assembly to special tool

DISASSEMBLY OF GEAR ASSEMBLY

Fork rod

1. Drive out retaining pins from each fork rod with Fork Rod Pin Punch ST23540000. See Figure TM-11.

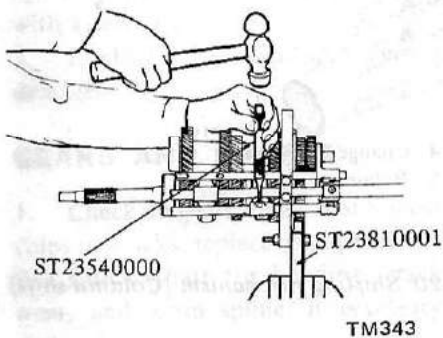


Fig. TM-11 Driving out retaining pins

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

Be careful not to lose three(3) check balls and four(4) interlock balls. See Figure TM-12.

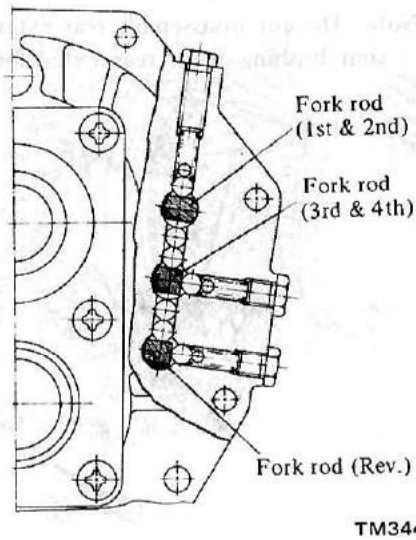


Fig. TM-12 Layout of check ball and interlock ball

Gear assembly

1. With gears doubly engaged, draw out countershaft front bearing using a suitable gear puller. See Figure TM-13.
2. Remove counter drive gear snap ring.
3. Draw out counter drive gear complete with main drive gear assembly by means of a gear puller.

When drawing out main drive gear assembly, be careful not to drop pilot needle bearing onto floor from the front end of mainshaft. See Figure TM-14.

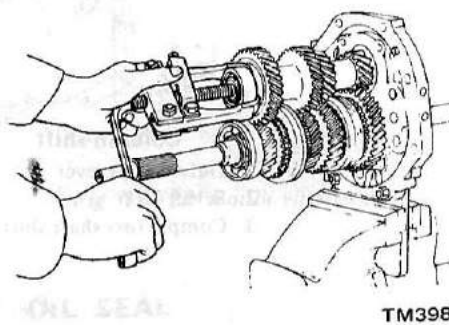


Fig. TM-13 Removing countershaft front bearing

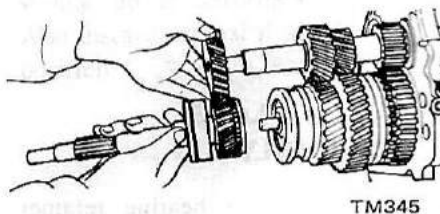


Fig. TM-14 Removing counter drive gear and main drive gear

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

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

5. Release caulking on mainshaft nut and loosen it. See Figure TM-15.

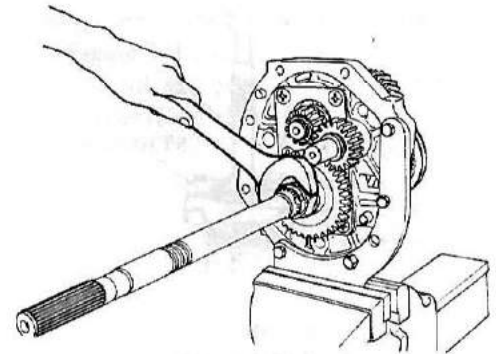


Fig. TM-15 Removing mainshaft nut

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

7. Remove snap ring from countershaft rear end, and remove reverse counter gear and reverse idler gear.

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

Be careful not to drop off countershaft. See Figure TM-16.

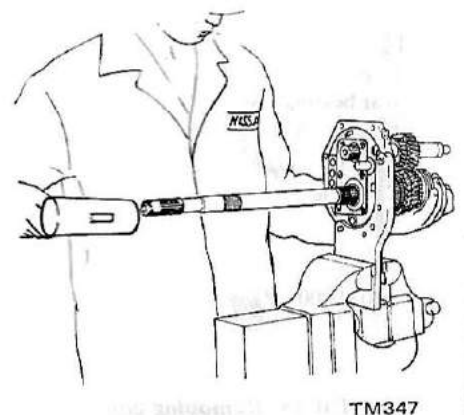


Fig. TM-16 Driving out gear assembly

Mainshaft assembly

Disassemble mainshaft gear assembly. See Figure TM-1.

Transmission

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. See Figure TM-17.

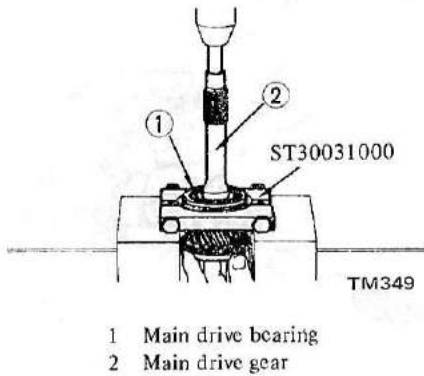


Fig. TM-17 Removing main drive bearing

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

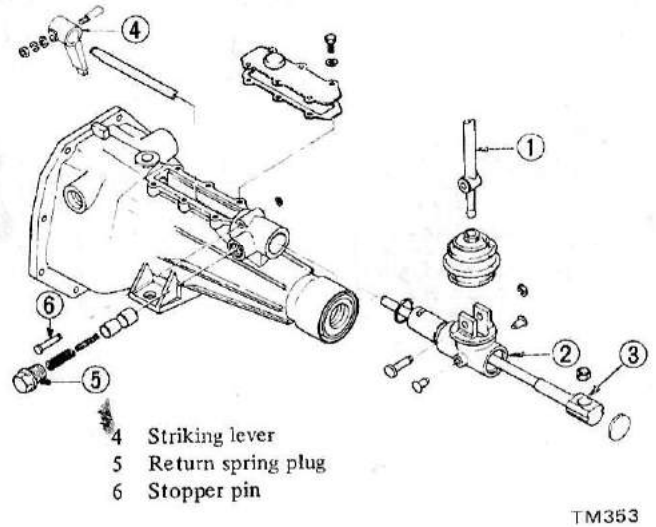


Fig. TM-19 Shifting mechanism (Floor-shift)

Countershaft assembly

Install Bearing Puller ST30031000 on countershaft rear bearing; press out countershaft rear bearing through a rod.

See Figure TM-18.

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

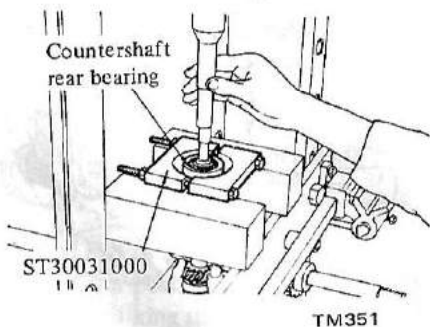


Fig. TM-18 Removing countershaft bearing

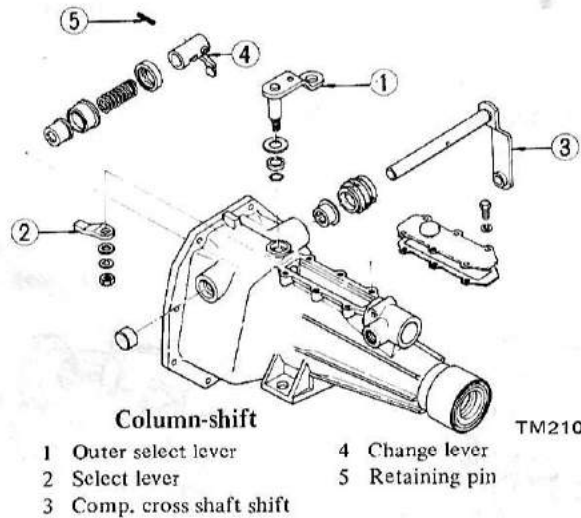


Fig. TM-20 Shifting mechanism (Column-shift)

REAR EXTENSION DISASSEMBLY

Remove lock pin from striking lever, and remove striking rod. See Figure TM-19.

ADAPTER PLATE DISASSEMBLY

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

INSPECTION

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

Notes:

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

TRANSMISSION CASE AND REAR EXTENSION HOUSING

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

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

BEARING

- Thoroughly clean bearing and dry with a compressed air.
- When race and ball surfaces are worn or rough, or when balls are out-of-round or rough, replace bearing with a new one.
- Replace needle bearing if worn or damaged.

GEARS AND SHAFTS

- Check all gears for excessive wear, chips or cracks; replace as required.
- Check shaft for bending, crack, wear, and worn spline; if necessary, replace.
- Measure gear end play. See Figure TM-21.

1st gear:

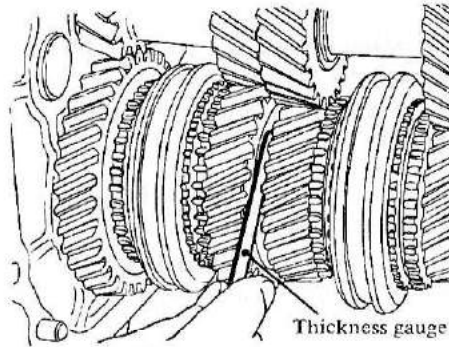
0.32 to 0.39 mm
(0.0126 to 0.0154 in)

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)



TM860

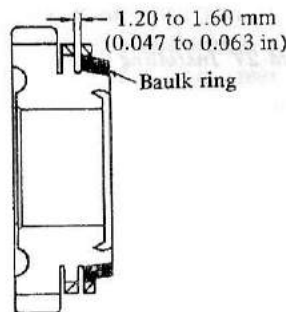
Fig. TM-21 Measuring end play

BAULK RING

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

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

If gap is small, discard baulk ring. See Figure TM-22.



TM375

Fig. TM-22 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.

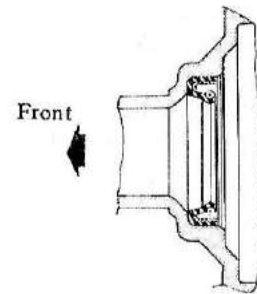
ASSEMBLY

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

FRONT COVER

- Wipe clean seal seat in front cover, then press fit oil seal in place. See Figure TM-23.

Coat oil seal with gear oil to provide initial lubrication.



TM354

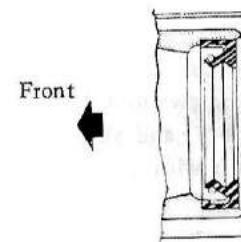
Fig. TM-23 Front cover oil seal

- Apply sealant to withdrawal lever ball pin screw. Install withdrawal lever ball pin to front cover and tighten screw to 2.0 to 3.5 kg-m (14 to 25 ft-lb) torque.

REAR EXTENSION

- Wipe clean seal seat in rear extension housing; press fit oil seal in place. See Figure TM-24.

Coat oil seal and bushing with gear oil for initial lubrication.



TM355

Fig. TM-24 Rear extension oil seal

Transmission

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. See Figure TM-25.

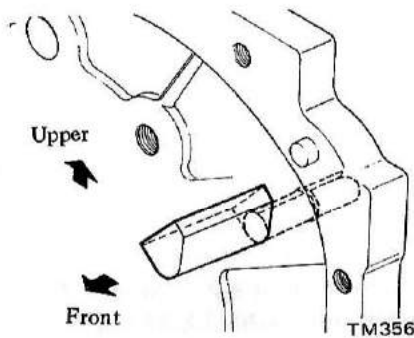


Fig. TM-25 Oil gutter

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. See Figure TM-26.

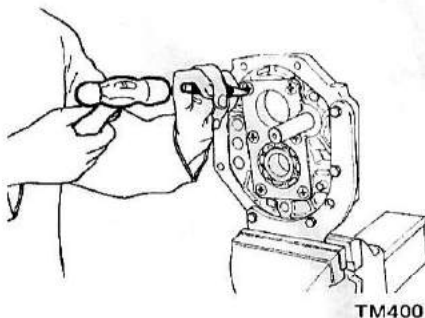


Fig. TM-26 Staking screw

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 assembly

Assemble synchronizer assembly.

Position shifting insert springs and shifting inserts in three(3) slots in synchronizer hub; put coupling sleeve on synchronizer hub. See Figure TM-27.

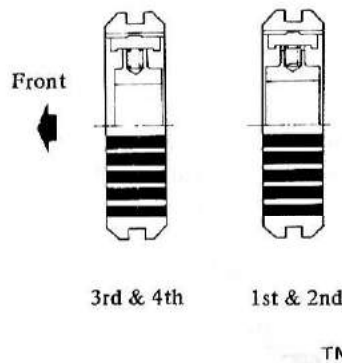


Fig. TM-27 Installing synchronizer hub

Mainshaft assembly

1. Assemble 2nd gear needle bearing, 2nd gear, baulk ring, 1st & 2nd speed synchronizer assembly, 1st gear baulk ring, 1st gear bushing, needle bearing, 1st gear, steel ball, and thrust washer on mainshaft. Before installing a steel ball, apply grease to it. See Figure TM-28.

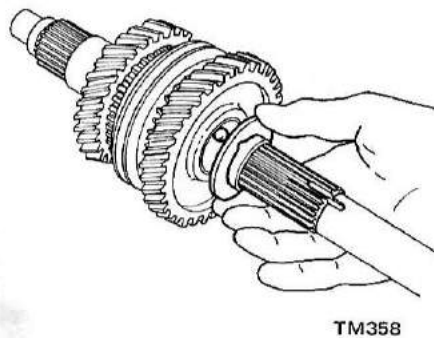


Fig. TM-28 Installing thrust washer

2. Set Transmission Press Stand ST23870000 and place adapter plate assembly on it. See Figure TM-29.

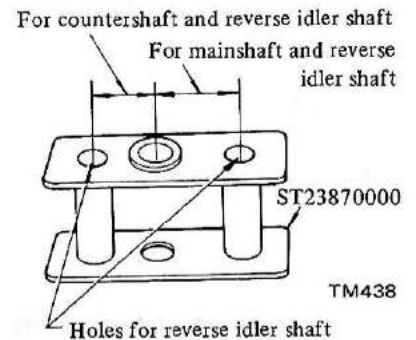


Fig. TM-29 Transmission Press Stand

3. Install mainshaft assembly to adapter plate assembly. Be sure to place mainshaft squarely against bearing and press it into place on shaft gradually. See Figure TM-30.

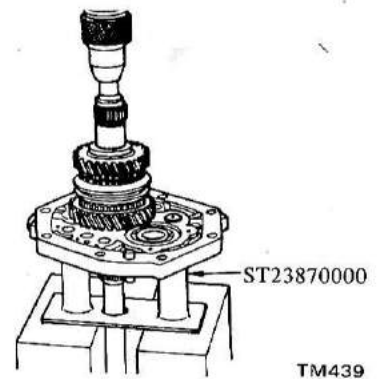


Fig. TM-30 Installing mainshaft assembly

Countershaft assembly

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

Use a soft hammer to avoid damaging keys.

2. Place adapter plate assembly and mainshaft assembly so that countershaft rear bearing rests on Transmission Press Stand ST23870000 properly.

3. Install countershaft into adapter plate by pressing it. See Figure TM-31.

Transmission

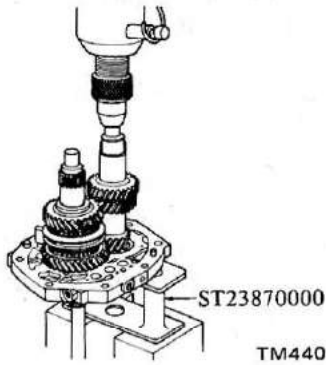


Fig. TM-31 Installing countershaft

4. Position 3rd gear needle bearing, 3rd gear, baulk ring, and 3rd & 4th synchronizer assembly on the front of mainshaft.
5. Install thrust washer on mainshaft and secure it with snap ring of proper thickness that will fit the groove in mainshaft. See Figure TM-32.

Available snap ring

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

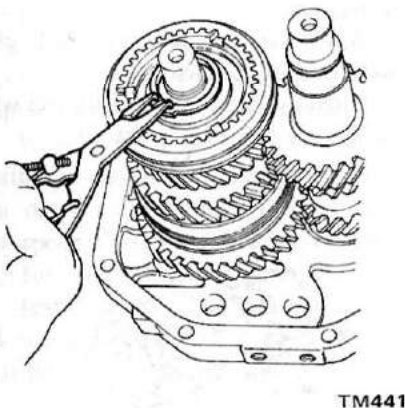


Fig. TM-32 Installing snap ring

Main drive gear assembly

1. Using Transmission Adapter ST23800000, press main drive bearing

onto the shaft of main drive gear. Make sure that snap ring groove on shaft clears bearing.

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

Available snap ring

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

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

Assemble main drive gear assembly on the front end of mainshaft.

4. Press counter drive gear onto countershaft with Counter Gear Drift ST23860000 by meshing gears and secure counter drive gear with thicker snap ring. See Figures TM-33 and TM-34.

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

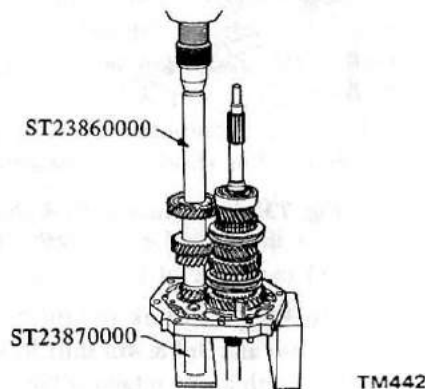


Fig. TM-33 Installing countershaft drive gear

Available counter drive gear snap ring

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

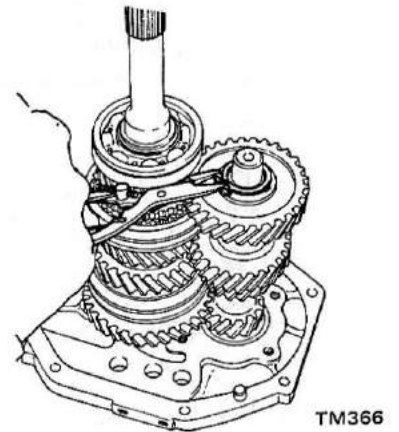


Fig. TM-34 Installing snap ring

5. Press countershaft front bearing onto countershaft with Drift C ST22360002. See Figure TM-35.

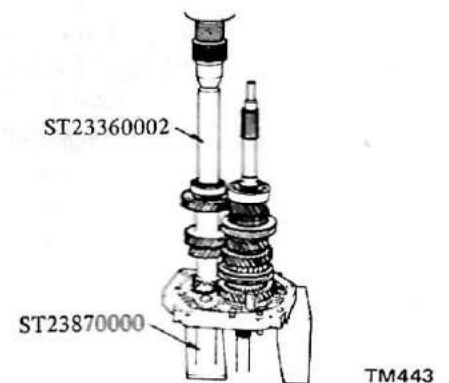


Fig. TM-35 Installing countershaft front bearing

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

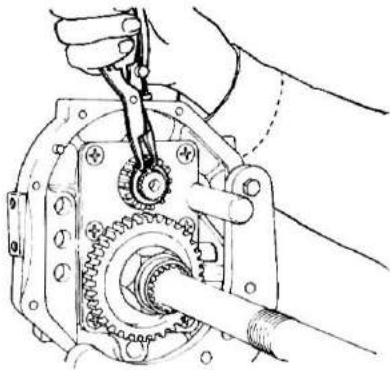
7. Install mainshaft reverse gear, plain washer on the rear of mainshaft and install mainshaft nut.

Transmission

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

Use snap ring to give a minimum gear end play. See Figure TM-36.

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

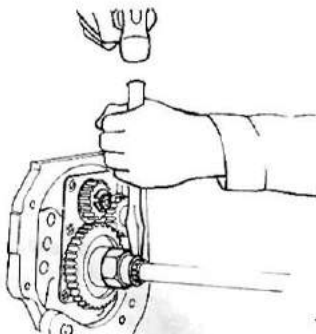


TM361

Fig. TM-36 Installing counter reverse gear snap ring

9. Install reverse idler gear on reverse idler shaft.

10. With gears doubly engaged, tighten mainshaft nut to torque of 14.0 to 17.0 kg-m (101 to 123 ft-lb), and stake mainshaft nut to groove of mainshaft with a punch. See Figure TM-37.



TM362

Fig. TM-37 Staking mainshaft nut

11. Measure gear end play.

Make sure that they are held within the specified values.

For details, refer to the instructions under topic "Inspection."

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

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

Shift forks and fork rods assembly

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

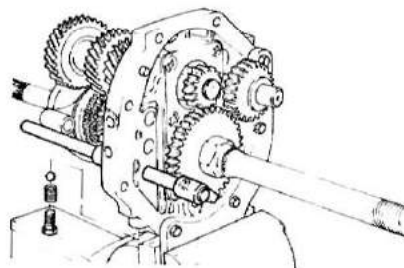
Note: Shift forks for 1st & 2nd and 3rd & 4th are one and the same parts.

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

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

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

Align notch in 1st & 2nd fork rod with check ball. See Figure TM-38.



TM367

Fig. TM-38 Installing 1st & 2nd fork rod

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

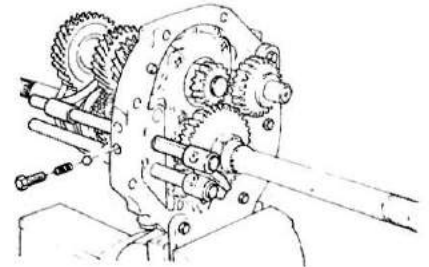
Note: Prior to assembling 3rd & 4th fork rod, install two(2) interlock

balls into adapter plate as shown in Figure TM-12.

4. Install check ball and check ball spring.

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

Align notch in 3rd & 4th fork rod with check ball by sliding 3rd & 4th fork rod as necessary. See Figure TM-39.



TM368

Fig. TM-39 Installing 3rd & 4th fork rod

5. Place reverse shift fork in reverse idler gear.

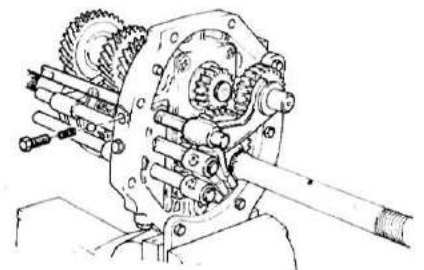
Slide reverse fork rod through reverse shift fork and adapter plate, and secure with a new retaining pin.

Note: Prior to assembling reverse fork rod, install two(2) interlock balls into adapter plate as shown in Figure TM-12.

6. Install check ball and check ball spring.

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

Align notch in reverse fork rod with check ball. See Figure TM-40.



TM369

Fig. TM-40 Installing reverse fork rod

Transmission

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.

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

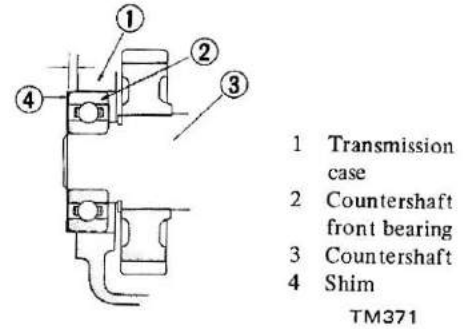


Fig. TM-41 Selecting countershaft front bearing shim

TRANSMISSION

Transmission case assembly

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

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

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

Carefully install main drive bearing and countershaft front bearing.

Make certain that mainshaft rotates freely.

3. Fit main drive bearing snap ring to groove in main drive bearing by using Expander ST23840000. See Figure TM-8.

Rear extension assembly

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

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

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

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

Front cover assembly

1. Select countershaft front bearing shim as follows: See table (Available shim).

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

Available shim

No.	"A" mm (in)	Countershaft front bearing shim mm (in)
1	2.92 to 3.01 (0.1152 to 0.1181)	0.6 (0.0236)
2	3.02 to 3.11 (0.1189 to 0.1224)	0.5 (0.0197)
3	3.12 to 3.21 (0.1228 to 0.1264)	0.4 (0.0158)
4	3.22 to 3.31 (0.1268 to 0.1303)	0.3 (0.0118)
5	3.32 to 3.41 (0.1307 to 0.1343)	0.2 (0.0079)
6	3.42 to 3.51 (0.1346 to 0.1382)	0.1 (0.0039)
7	3.52 to 3.61 (0.1386 to 0.1421)	—
8	3.62 to 3.71 (0.1425 to 0.1461)	—

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

Apply grease to shim selected to retain it on front cover; install front cover to transmission case with gasket in place.

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

Apply sealant to threads of through-bolts before installation.

3. Install speedometer pinion assembly on rear extension. After making sure that lock plate is lined up with groove in speedometer pinion sleeve, install through-bolts and torque to 0.4 to 0.5 kg-m (2.9 3.6 ft-lb).

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

Be sure to apply sealant before installation.

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

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

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

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

3-SPEED TRANSMISSION (Type : R3W71B)

CONTENTS

REMOVAL AND INSTALLATION	TM-12	INSPECTION AND REPAIR	TM-13
DISASSEMBLY	TM-12	ASSEMBLY	TM-13

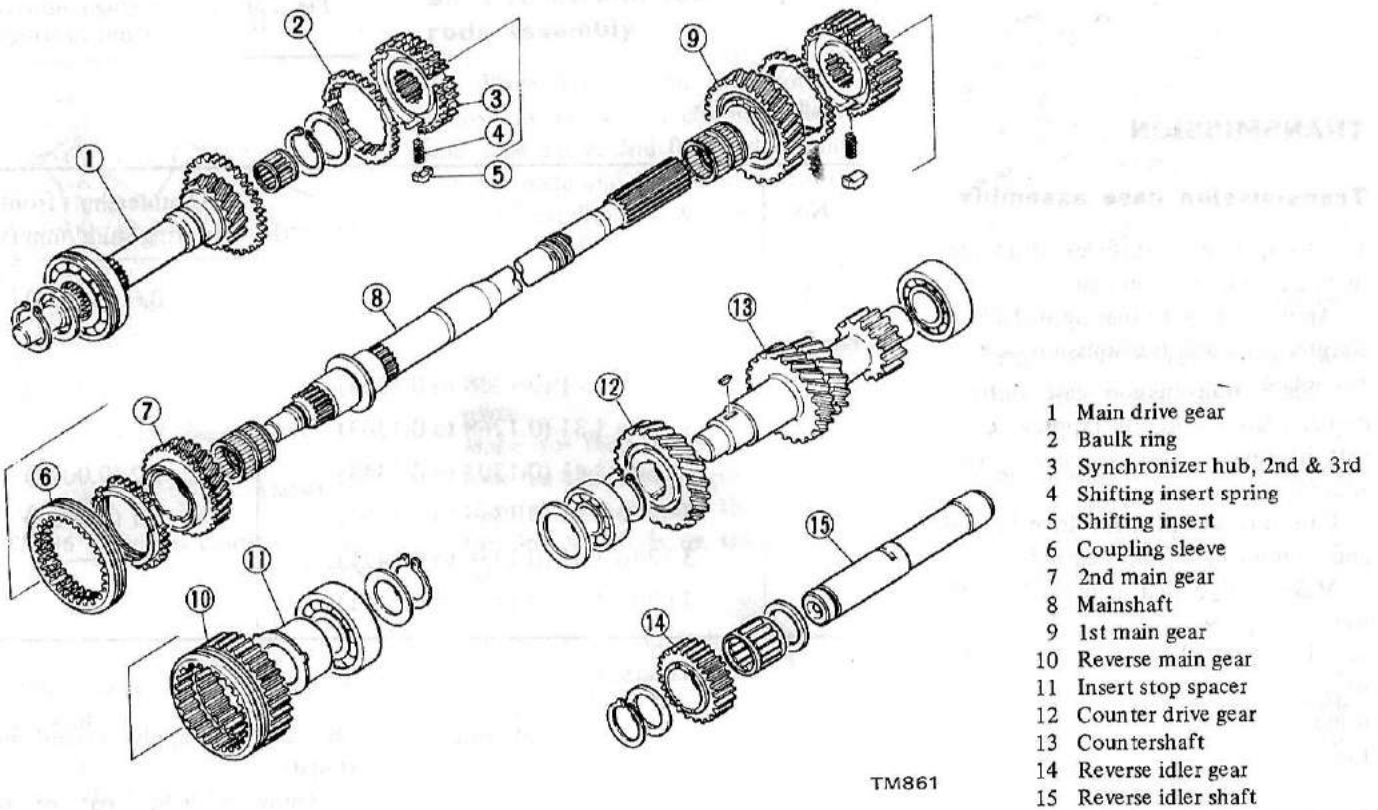


Fig. TM-42 R3W71B transmission gear components

REMOVAL AND INSTALLATION

Since removal and installation procedures of this transmission are similar to those of 4-speed transmission, no instruction is given here.

Install transmission in reverse sequence of removal.

Liberal apply multi-purpose grease to cross shaft assembly and shifting rod, especially ball ends of cross shaft.

Pour recommended gear oil into transmission [1.7 liters (3 $\frac{3}{4}$ U.S. pt., 3 Imper. pt.)].

DISASSEMBLY

Disassembling procedure is the same as that used in disassembling 4-speed transmission.

Separate transmission case and rear extension from adapter plate and install special tool "Setting Plate Adapter ST23810001" on adapter plate with gear assembly; install them in a vise.

1. To disassemble reverse idler gear, remove snap ring, spacer, reverse idler gear, needle roller bearing and spacer.
2. Remove mainshaft snap ring from rear end of mainshaft bearing instead of loosening off mainshaft nut.

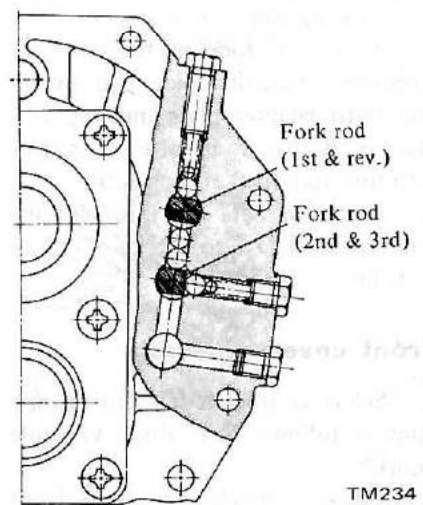


Fig. TM-43 Layout of check ball and interlock ball

Transmission

INSPECTION AND REPAIR

Inspection and repair procedures are similar to those of 4-speed transmission except the following:

Gear end play:

1st gear:

0.12 to 0.19 mm
(0.0047 to 0.0075 in)

2nd gear:

0.13 to 0.37 mm
(0.0051 to 0.0146 in)

Reverse idler gear:

0.05 to 0.45 mm
(0.0020 to 0.0177 in)

1. Selecting mainshaft bearing snap ring.

When securing mainshaft bearing with snap ring, use thicker snap ring that will eliminate end play.

2. Selecting reverse idler gear front spacer and adjusting end play to 0.05 to 0.45 mm (0.0020 to 0.1772 in).

Snap ring

No.	Thickness mm (in)
1	2.4 (0.0945)
2	2.5 (0.0984)
3	2.6 (0.1024)
4	2.7 (0.1063)
5	2.8 (0.1102)
6	2.9 (0.1142)

Spacer

No.	Thickness mm (in)
1	2.50 (0.0984)
2	2.83 (0.1114)

Note: Use thinner spacer at rear of reverse idler gear.

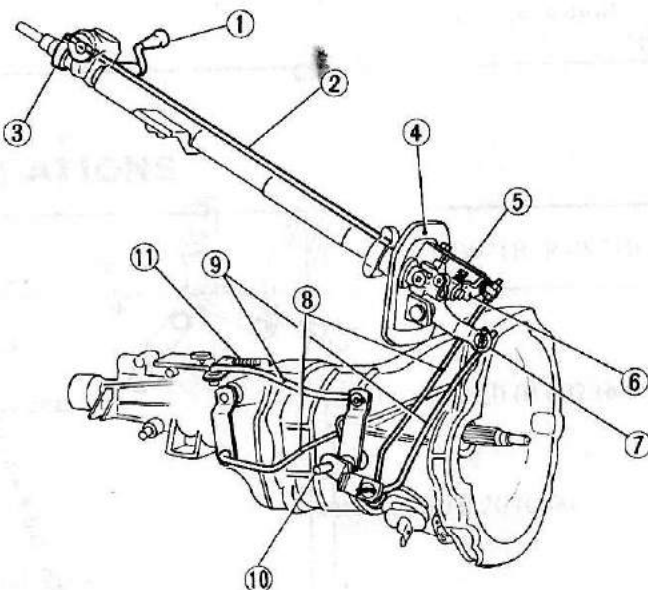
ASSEMBLY

Assemble in reverse order of disassembly procedure. However, observe the following precautions.

TRANSMISSION GEAR CONTROL FOR COLUMN SHIFT

CONTENTS

REMOVAL	TM-14	INSPECTION AND REPAIR	TM-14
INSTALLATION	TM-14	ADJUSTMENT	TM-14



- 1 Gear lever
- 2 Control rod
- 3 Upper support bracket
- 4 Jacket tube bracket
- 5 Shift stopper
- 6 Shift lever
- 7 Select lever
- 8 Shift rod
- 9 Select rod
- 10 Cross shaft assembly
- 11 Select return spring

TM862

Fig. TM-44 Control system

REMOVAL

1. Disconnect battery ground cable.
2. Remove horn pad.
3. Remove steering wheel.
4. Remove steering column shells, turn signal and lighting switch assembly.
5. Remove E-ring ① and gear lever pivot pin ②. Draw out gear lever.
6. Remove C-washer ③ and insert washer ④.

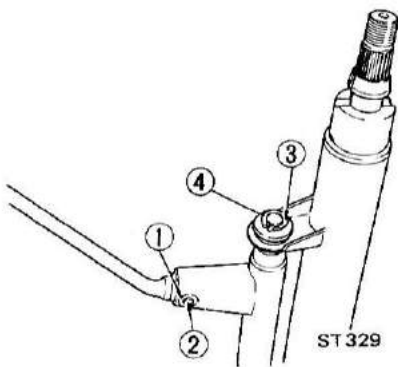


Fig. TM-45 Withdrawing hand lever

7. Remove shift stopper from jacket tube bracket.
8. Remove cotter pins, plain washers and spring washers from trunnions and then separate shift and select rods from shift and select levers.
9. Remove E-ring and plain washer from select lever pivot bolt.
10. Remove shift lever and select lever by unscrewing rock bolt and pivot bolt.
11. Remove location bolt and screw, then remove upper support bracket. Control rod insert, return spring, etc. can then be removed.
12. Draw control rod out into driver's compartment.
13. Separate upper shift and select rods.
14. Separate lower shift and select rods.
15. Remove two bolts securing cross shaft bracket.
16. Remove cross shaft assembly by pushing it toward cross shaft bracket.

INSTALLATION

Install control system in reverse sequence of removal.

Coat all sliding or friction surfaces with multipurpose grease.

Tightening torque:

Cross shaft bracket securing bolt:

2.7 to 3.7 kg-m
(20 to 27 ft-lb)

Upper support bracket securing bolt:

0.8 to 1.1 kg-m
(5.8 to 8.0 ft-lb)

Upper support bracket location bolt:

0.3 to 0.4 kg-m
(2.2 to 2.9 ft-lb)

Bolt and nut securing shift lever:

1.4 to 1.8 kg-m
(10 to 13 ft-lb)

Shift stopper securing bolt:

0.3 to 0.4 kg-m
(2.2 to 2.9 ft-lb)

Select lever pivot securing bolt:

5.1 to 6.9 kg-m
(37 to 50 ft-lb)

Steering wheel nut:

4.0 to 5.0 kg-m
(29 to 36 ft-lb)

INSPECTION AND REPAIR

Check all sliding parts and other components for wear or damage.

If any part is found to be faulty, replace as required.

ADJUSTMENT

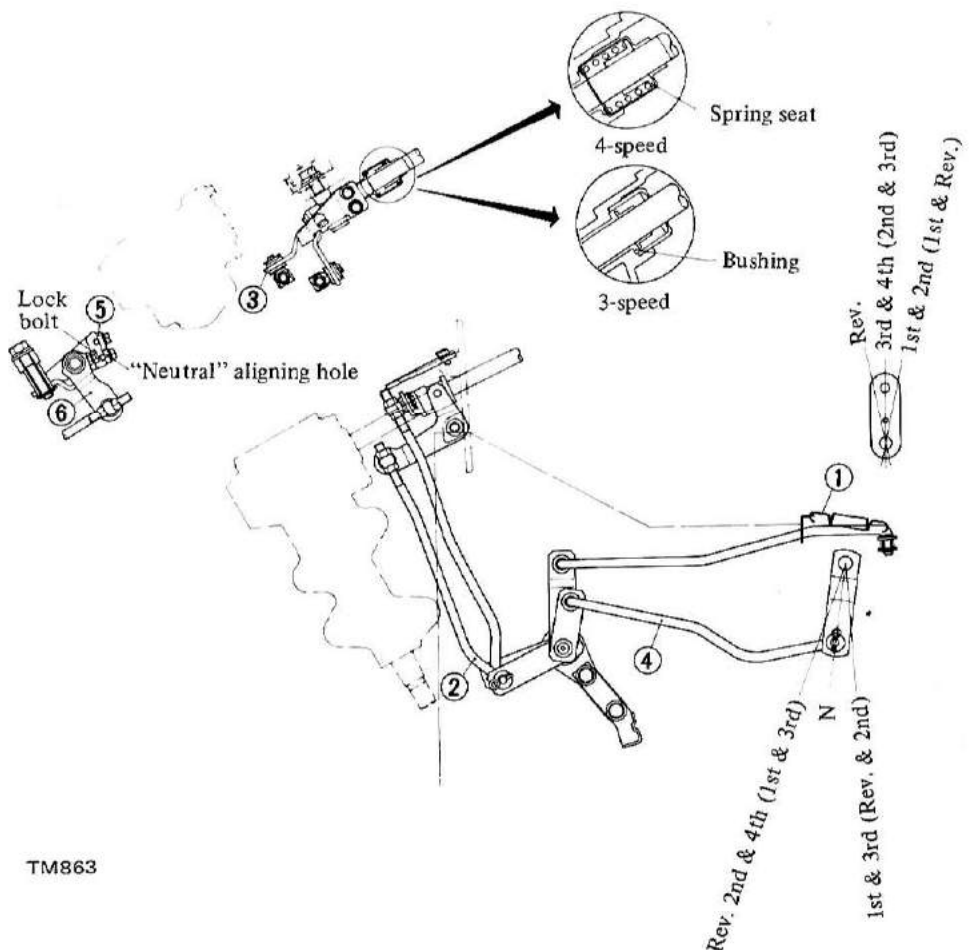


Fig. TM-46 Adjusting control system (R.H. drive)

Transmission

SELECT LINKAGE

1. Make sure that flange of control rod is seated in spring seat (4-speed transmission) or bushing (3-speed transmission) in jacket tube bracket by select return spring ①.
2. Connect upper select rod ② to select lever ③ and lock adjusting nuts against trunnion.

SHIFT LINKAGE

1. Set lower shift rod ④ in the "neutral" position.
2. Using a cross head screwdriver, align "Neutral" hole in shift stopper ⑤ with cross groove in shift lever ⑥ lock bolt; tighten adjusting nuts on both sides of trunnion to specified torque.

Tightening torque:

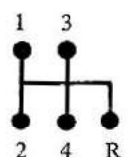
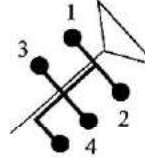
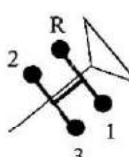
Select and shift lever adjusting nuts:

1.6 to 2.2 kg-m
(12 to 16 ft-lb)

All service operations are the same as those for L.H. drive model.

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

Transmission type	F4W71B		R4W71B		R3W71B		
Synchromesh type	Warner		Warner		Warner		
Shift type							
Gear ratio							
1st	3.592		3.592		3.143		
2nd	2.246		2.246		1.641		
3rd	1.415		1.415		1.000		
4th	1.000		1.000		—		
Reverse	3.657		3.657		3.657		
Final gear ratio	4.111	3.889	4.375	4.111	3.889	4.111	3.889
Speedometer gear ratio	20/6	18/6 19/6	20/6	21/6	19/6	20/6	18/6
Oil capacity	1.7 l (3 5/8 U.S. pt., 3 Imper. pt.)		1.7 l (3 5/8 U.S. pt., 3 Imper. pt.)		1.7 l (3 5/8 U.S. pt., 3 Imper. pt.)		

SPECIFICATIONS

	F4W71B, R4W71B	R3W71B
Gear backlash mm (in)		
Main drive gear	0.05 to 0.10 (0.002 to 0.004)	0.05 to 0.10 (0.002 to 0.004)
1st gear	} 0.05 to 0.20 (0.002 to 0.008)	} 0.05 to 0.20 (0.002 to 0.008)
2nd gear		
3rd gear		
Reverse idler gear		— 0.05 to 0.20 (0.002 to 0.008)

Transmission

	F4W71B, R4W71B	R3W71B
End play mm (in)		
1st gear	0.32 to 0.39 (0.013 to 0.015)	0.12 to 0.19 (0.005 to 0.007)
2nd gear	0.12 to 0.19 (0.005 to 0.007)	0.13 to 0.37 (0.005 to 0.015)
3rd gear	0.13 to 0.37 (0.005 to 0.015)	—
Reverse idler gear	—	0.05 to 0.45 (0.002 to 0.018)
Counter gear	0.01 to 0.21 (0.0004 to 0.008)	0.01 to 0.21 (0.0004 to 0.008)
Counter front bearing adjusting shim	Measured height mm (in)	Shim mm (in)
	2.92 to 3.01 (0.115 to 0.119)	0.6 (0.024)
	3.02 to 3.11 (0.119 to 0.122)	0.5 (0.020)
	3.12 to 3.21 (0.123 to 0.126)	0.4 (0.016)
	3.22 to 3.31 (0.127 to 0.130)	0.3 (0.012)
	3.32 to 3.41 (0.131 to 0.134)	0.2 (0.008)
	3.42 to 3.51 (0.135 to 0.138)	0.1 (0.004)
	3.52 to 3.61 (0.139 to 0.142)	—
Clearance between baulk ring and gear mm (in)		
Standard	1.2 to 1.6 (0.047 to 0.063)	
Allowable limit	0.8 (0.031)	

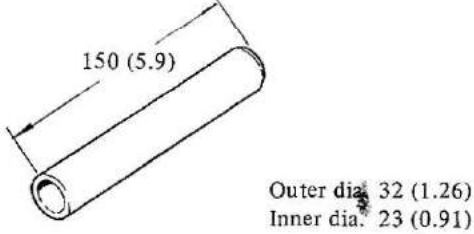
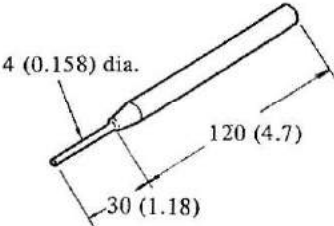
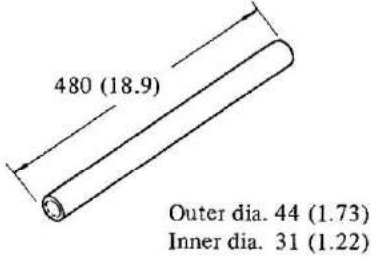
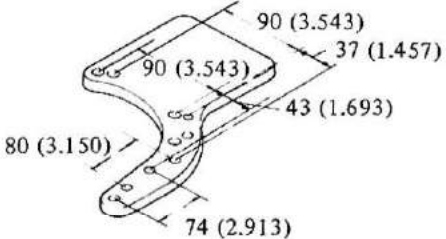
TIGHTENING TORQUE

Transmission to engine bolt	kg-m (ft-lb)	4.4 to 5.9 (32 to 43)
Clutch operating cylinder bolt	kg-m (ft-lb)	2.5 to 3.5 (18 to 25)
Rear mounting insulater to transmission bolt	kg-m (ft-lb)	0.8 to 1.1 (5.8 to 8.0)
Crossmember bolt	kg-m (ft-lb)	3.2 to 3.7 (23 to 27)
Propeller shaft to differential	kg-m (ft-lb)	2.5 to 3.2 (18 to 23)
Center bearing bracket to body nut	kg-m (ft-lb)	3.2 to 3.7 (23 to 27)
Rear extension bolt	kg-m (ft-lb)	1.6 to 2.1 (12 to 15)
Front cover bolt	kg-m (ft-lb)	1.6 to 2.1 (12 to 15)
Bearing retainer to adapter plate screw	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)
Check ball plug	kg-m (ft-lb)	1.9 to 2.5 (14 to 18)
Rear extension upper cover installation bolt	kg-m (ft-lb)	0.4 to 0.5 (2.9 to 3.6)
Return spring plug	kg-m (ft-lb)	1.0 to 2.0 (7.2 to 14.5)
Reverse lamp switch	kg-m (ft-lb)	2.0 to 3.0 (14 to 22)
Steering wheel nut	kg-m (ft-lb)	4.0 to 5.0 (29 to 36)

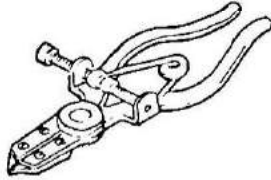
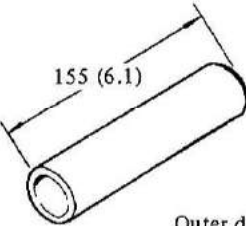
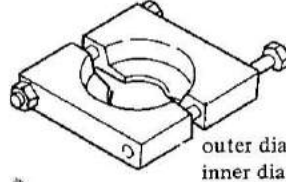
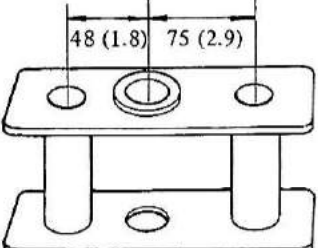
TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Hard shifting	<p>When "hard shifting" is encountered, it is necessary to determine whether transmission or remote control system is causing the malfunction.</p> <p>If this condition is accompanied by another symptom, "dragging clutch", the malfunction may be due to failure of clutch to disengage. Thus check clutch to ensure that it is coupling or uncoupling engine and transmission properly. If inspection indicates that clutch is in good condition, then check to determine whether source of the problem is located in transmission or remote control system.</p>	
	<p>Control linkage out of adjustment or lack of lubrication.</p> <p>Failure of parts to reach their full stroke due to worn sliding contact surfaces or excessive free play.</p> <p>Improper contact pattern of baulk ring-to-gear cone or worn parts.</p>	<p>Readjust or lubricate.</p> <p>Check and, if necessary, repair or replace worn parts.</p> <p>Replace worn parts.</p>
Gear slippage	<p>"Gear slippage" is often encountered when wear occurs on steel ball, locking spring, etc., or when control system is out of adjustment.</p>	
	<p>Control linkage out of adjustment.</p> <p>Steel ball worn, or locking spring fatigued or broken.</p> <p>Worn groove in shift rod.</p> <p>Gear tip worn or damaged.</p> <p>Bushing worn.</p> <p>Excessive end play.</p>	<p>Readjust.</p> <p>Replace faulty parts.</p> <p>Replace.</p> <p>Replace gear.</p> <p>Replace.</p> <p>Replace worn parts.</p>
Noise	<p>Noise originating in transmission is characteristically heard when engine is running at idling speed or when gears are shifted from one speed position to another, and ceases when clutch is disengaged. To determine whether noise is being produced in transmission or differential, run car with gear lever in "TOP" speed position. If noise ceases, it is being produced in transmission.</p>	
	<p>Lack of lubricating oil or use of improper oil.</p> <p>Bearing worn (humming at high speeds).</p> <p>Bearing damaged (rattling noise at low speeds).</p> <p>Worn splines.</p> <p>Gear contact surfaces damaged.</p> <p>Oil leakage or insufficient oil due to damaged oil seal or gasket, or clogged breather.</p>	<p>Lubricate or use recommended lubricant.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace worn shaft or gear.</p> <p>Replace damaged gears.</p> <p>Clean or replace.</p>

SPECIAL SERVICE TOOLS

No.	Tool number & tool name	Description Unit: mm (in)	For use on	Reference page or Figure No.
1.	ST22360002 Drift C	For assembly of the counter drive bearing.  SE034	63A & 71B T/M	Fig. TM-35
2.	ST23540000 Fork rod pin punch	For removal of the fork rod retaining pin.  SE082	56A F60A 63L 63A 65L & 71B T/M	Fig. TM-11
3.	ST23800000 Transmission adapter	For assembly of the main drive gear.  SE037	65L & 71B T/M	Page TM-9
4.	ST23810001 Setting plate adapter	For setting adapter plate in a vise.  SE132	71B T/M	Fig. TM-10 Fig. TM-11

Transmission

No.	Tool number & tool name	Description Unit: mm (in)	For use on	Reference page or Figure No.
5.	ST23840000 Expander	For removal and assembly of main drive bearing snap ring.  SE099	All models	Fig. TM-8
6.	ST23860000 Counter gear drift	For assembly of the counter drive gear.  Outer dia. 38 (1.50) Inner dia. 33 (1.30) SE039	71B T/M	Fig. TM-33
7.	ST30031000 Bearing puller	For replacing bearing.  outer dia. 80 (3.15) inner dia. 50 (1.97) SE041	63L 65L & 71B T/M	Fig. TM-17 Fig. TM-18
8.	ST23870000 Transmission press stand	For assembly of mainshaft, countershaft, counter drive gear and counter drive bearing.  TM438	71B T/M	Fig. TM-29 Fig. TM-30 Fig. TM-31 Fig. TM-33 Fig. TM-35

