

TRANSMISSION

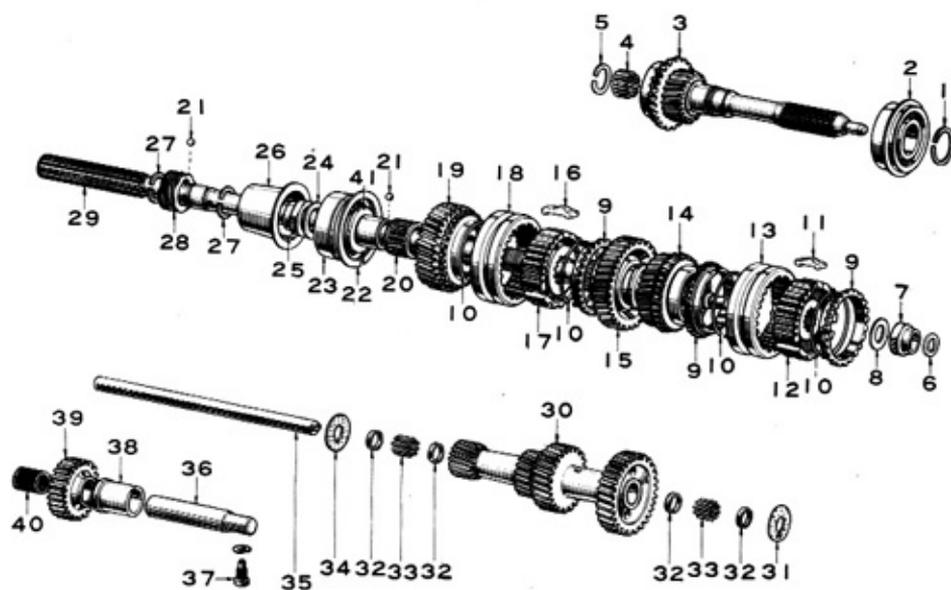
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TROUBLE SHOOTING

Symptoms and Possible Causes	Remedies
<p>Hard Shifting into Gear Causes for difficult shifting into gear in the 3-speed transmission can be divided into troubles at the control shaft parts and into troubles at the transmission unit itself. However, hard shifting and difficulty in meshing may also be due to 'clutch not releasing properly'. Thus, the clutch should be checked to see that it is operating properly before starting to inspect the control shaft and transmission parts.</p> <ol style="list-style-type: none"> 1. Connecting rod out of adjustment (3-speed). 2. Cross-shaft support knob or bushings worn (3-speed) 3. Improper contact or wear between synchronizer ring and gear coned part. 4. Shifting key spring worn or damaged 	<p>Adjust rod length Replace Repair or replace Replace</p>
<p>Transmission Slips Out of Gear</p> <ol style="list-style-type: none"> 1. Gear mesh defective due to improper adjustment of connecting rod (3-speed). 2. Shaft fork worn or spring (for lock ball) broken. 3. Input and output shaft bearings worn or damaged. 4. Clearance between clutch hub No. 2 and hub sleeve splines excessive. 5. Second gear and bushing worn. 6. First gear and bushing worn. 7. Clearance between clutch hub No. 1 and first & reverse gear splines excessive 8. Reverse idler gear and bushing worn. 9. Counter gear worn 	<p>Adjust rod, or repair deformed or worn part. Replace Replace Replace clutch hub or hub sleeve Replace gear and bushing Replace gear and bushing Replace clutch hub or gear Replace gear and bushing Replace</p>
<p>Transmission Noisy With vehicle stationary (engine idling and transmission in neutral), if noise develops when clutch is engaged but disappears when disengaged, it would be safe to assume that the transmission is producing the noise.</p> <ol style="list-style-type: none"> 1. Lubricating oil insufficient or improper kind. 2. Gears and bearings worn or damaged. <p>Note: If merely worn at tooth surface, a groaning sound will be produced at high speeds only. If damaged, noise will be accompanied by periodical knocking sound at low speeds.</p> <ol style="list-style-type: none"> 3. Output shaft splines worn. 4. Bushing for second gear, first gear, or idler gear worn. 	<p>Add oil or replace with recommended type. Replace gears or bearings Replace Replace</p>

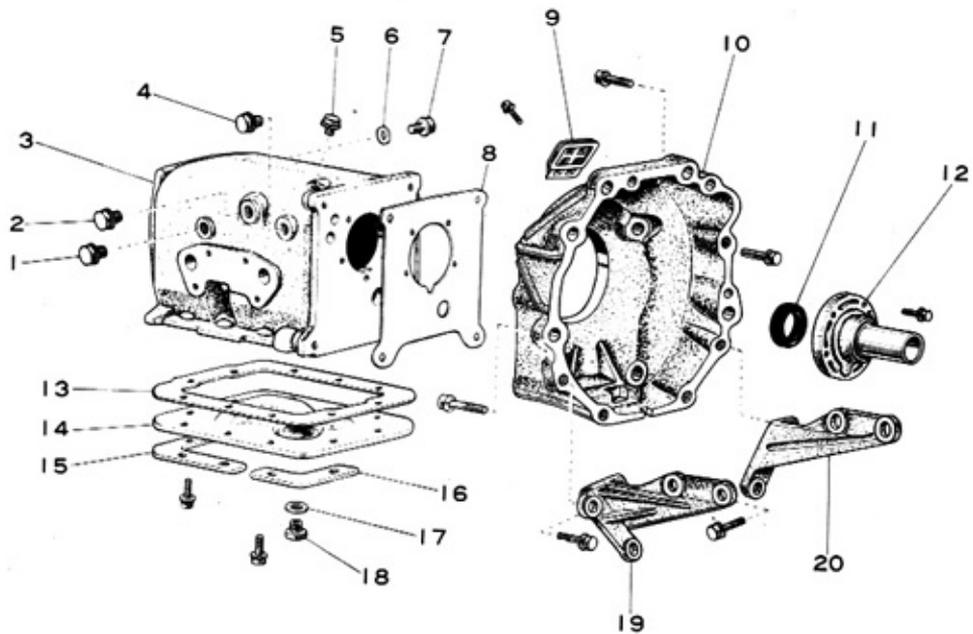
3-SPEED TRANSMISSION

Component Parts



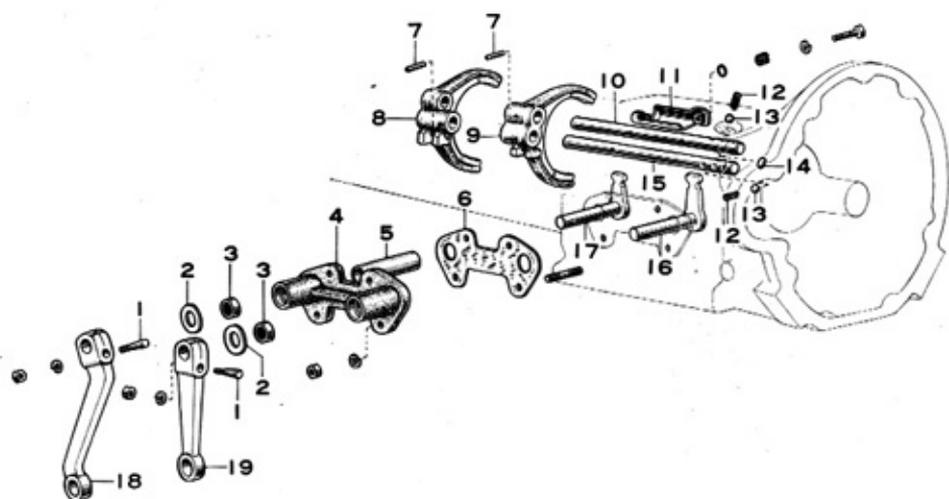
- | | |
|--|--|
| 1 Ring, snap | 22 Ring, shaft snap |
| 2 Bearing, radial ball | 23 Bearing |
| 3 Shaft subassy., input | 24 Shim |
| 4 Roller | 25 Nut |
| 5 Ring, hole snap | 26 Deflector, extension housing oil |
| 6 Spacer | 27 Ring, shaft snap |
| 7 Nut | 28 Gear, speedometer drive |
| 8 Shim | 29 Shaft, output |
| 9 Ring, synchronizer, No. 2 | 30 Gear, counter |
| 10 Spring, synchromesh shifting key, No. 1 | 31 Washer, counter gear case side thrust |
| 11 Key, synchromesh shifting, No. 2 | 32 Spacer |
| 12 Hub, transmission clutch, No. 2 | 33 Roller |
| 13 Sleeve, transmission hub, No. 2 | 34 Washer, counter gear side thrust |
| 14 Gear subassy., second | 35 Counter shaft |
| 15 Gear subassy., first | 36 Shaft, reverse idler gear |
| 16 Key, synchromesh shifting No. 1 | 37 Bolt, shaft retaining |
| 17 Hub, transmission, clutch, No. 1 | 38 Washer, reverse idler thrust |
| 18 Sleeve, transmission hub, No. 1 | 39 Gear, reverse idler |
| 19 Gear subassy., reverse | 40 Bearing, needle roller |
| 20 Bearing, needle roller | 41 Bushing, reserve gear |

Fig. 2-1 3-Speed Transmission Component Parts (1)



- | | |
|-----------------------------------|--------------------------------------|
| 1 Plug, with head, straight screw | 11 Seal, type "T" oil |
| 2 Plug, with head, straight screw | 12 Retainer, front bearing |
| 3 Case, transmission | 13 Gasket, transmission oil pan |
| 4 Plug, with head, straight screw | 14 Pan subassy., transmission oil |
| 5 Plug, with head, straight screw | 15 Plate, transmission oil pan No. 1 |
| 6 Gasket, drain plug | 16 Plate, transmission oil pan No. 2 |
| 7 Plug, transmission case cover | 17 Gasket, drain plug |
| 8 Gasket, front bearing retainer | 18 Plug, transmission case cover |
| 9 Cover, clutch housing | 19 Plate, stiffener, RH |
| 10 Housing, clutch | 20 Plate, stiffener, LH |

Fig. 2-2 3-Speed Transmission Component Parts (2)



- | | |
|---------------------------------------|---------------------------------------|
| 1 Pin, lever lock | 11 Receiver, transmission oil |
| 2 Washer, plate | 12 Spring, compression |
| 3 Seal, type "K" oil | 13 Ball, gear shift fork lock |
| 4 Housing subassy., shift lever shaft | 14 Pin, shift interlock, No. 2 |
| 5 Bushing, bimetel formed | 15 Shaft, gear shift fork, No. 1 |
| 6 Gasket, shift lever shaft housing | 16 Shaft subassy., shift lever, No. 2 |
| 7 Pin, slotted spring | 17 Shaft subassy., shift lever, No. 1 |
| 8 Fork, gear shift, No. 1 | 18 Lever, shift outer, No. 1 |
| 9 Fork, gear shift, No. 2 | 19 Lever, shift outer, No. 2 |
| 10 Shaft, gear shift fork, No. 2 | |

Fig. 2-3 3-Speed Transmission Component Parts (3)

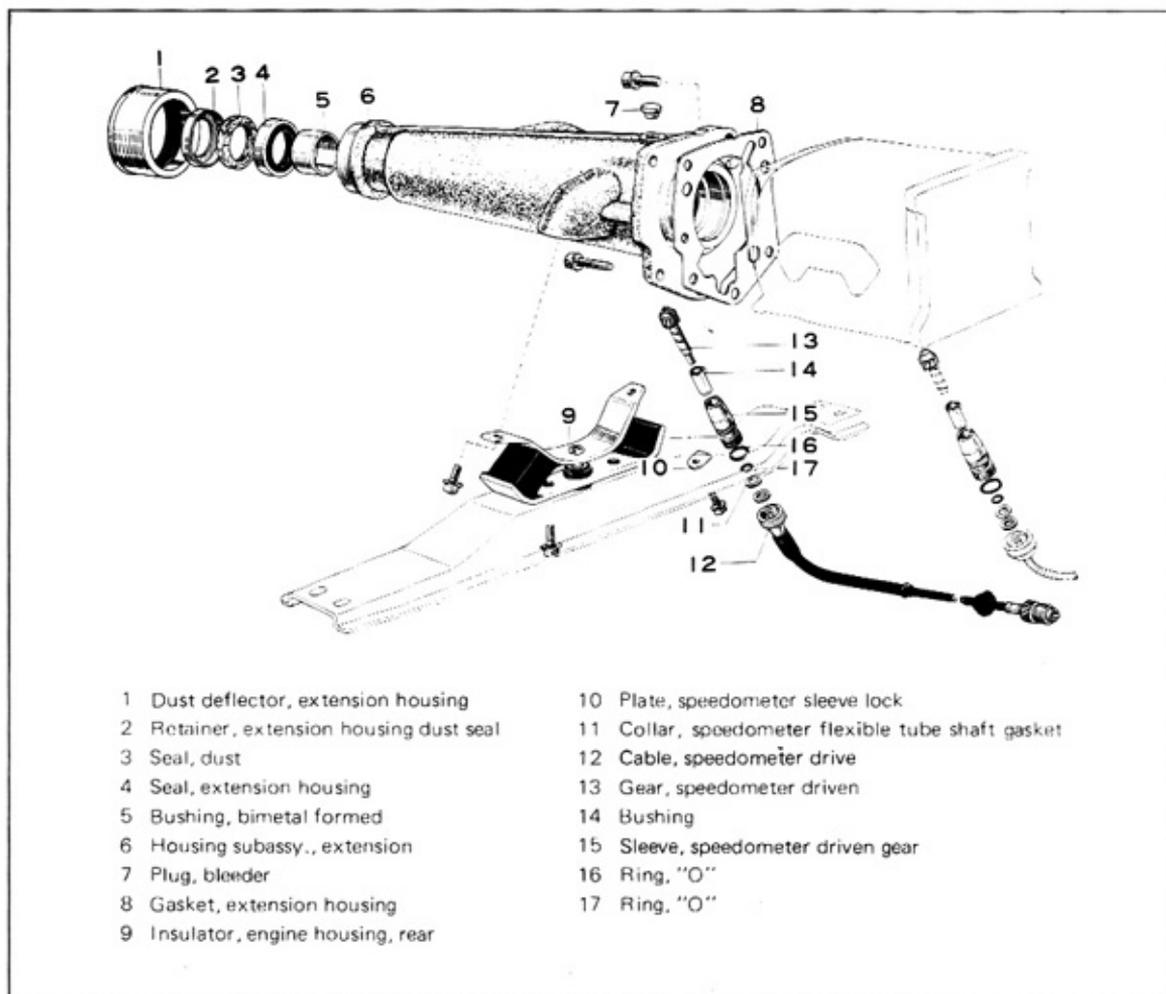


Fig. 2-4 3-Speed Transmission Component Parts (4)

SPECIFICATIONS

Table 2-1 3-Speed Transmission Specifications

Type	1st, 2nd, 3rd gears synchromesh	
Gear ratio	First	3.337
	Second	1.653
	Third	1.000
	Reverse	4.449
Operating system	Column lever shift	
Speedometer gear (teeth)	Drive	5
	Driven	17

REMOVAL

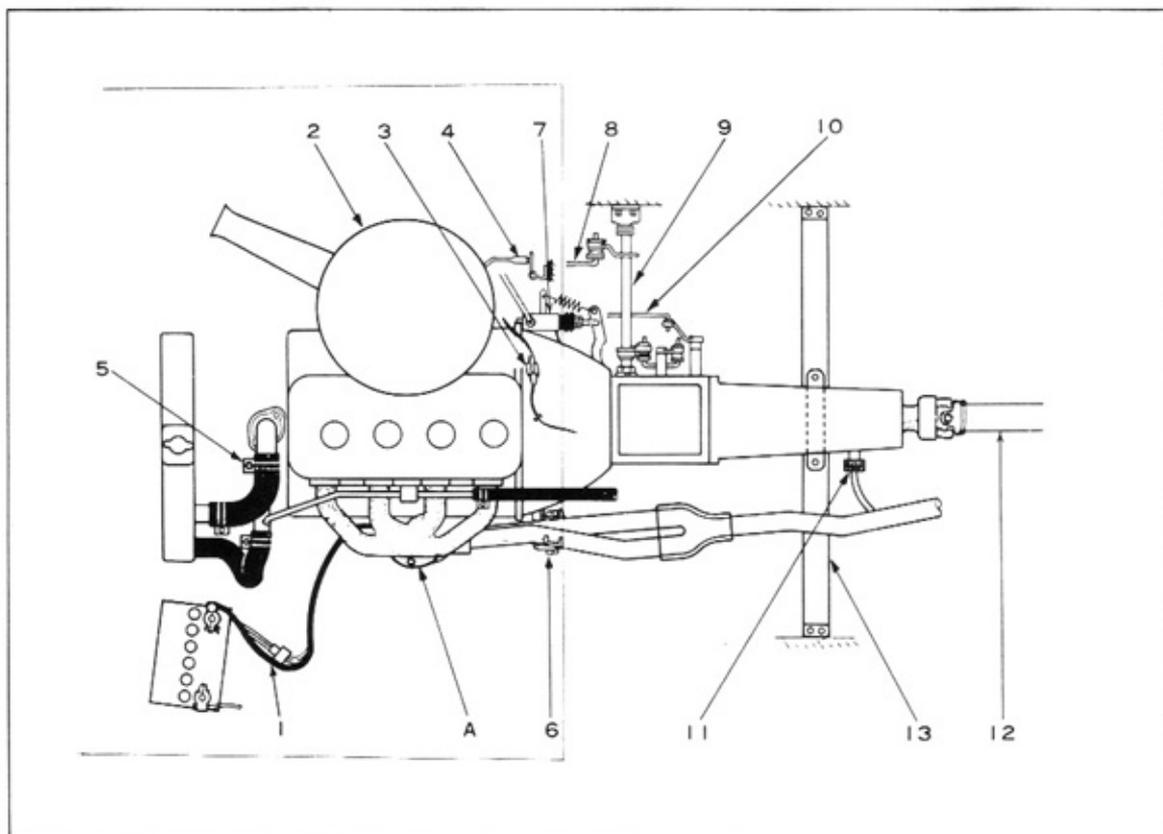


Fig. 2-5 Transmission Removal

1. Perform the following work in the engine room :
 - (1) Disconnect the cable (1) from the battery.
 - (2) Remove the air cleaner (2), rod (4), and starter.
 - (3) Disconnect the back-up lamp wire (3).
 - (4) Drain out the coolant and disconnect the hose (5).
2. Jack up the vehicle and perform the following work :
 - (1) Disconnect the exhaust pipe at part A and remove the clamp (6).
 - (2) Remove (7), (8), (9), (10), and (11).
 - (3) Remove the propeller shaft (12) and insert transmission oil plug [09325-20010].
 - (4) Support the transmission with a jack and remove the rear support (13)

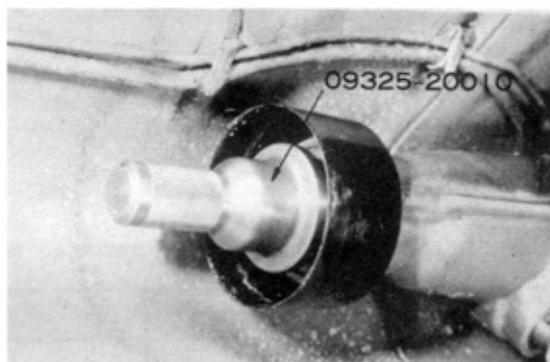


Fig. 2-6 Transmission Oil Plug Insertion

3. Lower the jack slightly and remove the stiffener plate and the clutch housing mounting bolts.
4. Lower the jack and remove the transmission assembly to the rear.

DISASSEMBLY

1. Remove the plug (drain) and drain out the gear oil.
2. Remove (1) and take out bearing (2) and fork (3).
3. Remove the clutch housing (4).
4. Remove the front bearing retainer.

Note : After removing the retainer, use a bolt at the bearing or snap ring in order to prevent the input shaft from jumping out.

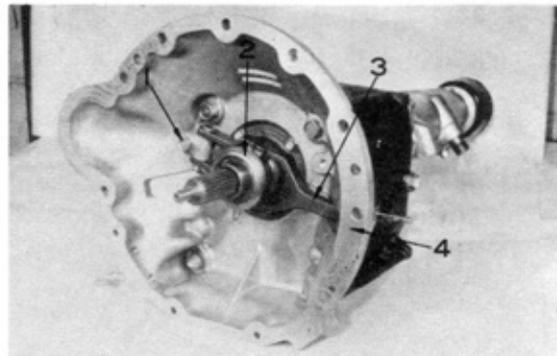


Fig. 2-7 Clutch Fork Removal

5. Remove the transmission oil pan plates and oil pan.

Note : Remove the two stud bolts if found necessary to do so.

6. Remove the counter gear.
 - (1) Measure the thrust clearances at (1) and (2), and record the values for assembly reference.

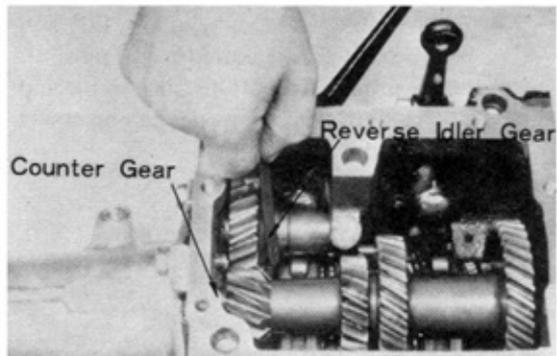


Fig. 2-8 Thrust Clearance Measurements

- (2) Remove the extension housing mounting bolts. Set the extension housing cutaway part (1) to the counter shaft end and remove the counter gear by using Counter Gear Needle Roller Guide Shaft [09311-20011].

Note : Store the front rollers separately from the rear rollers.

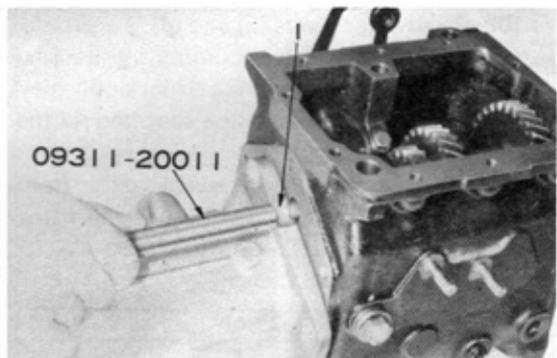


Fig. 2-9 Counter Gear Removal

7. Remove the reverse idler gear.
 - (1) Remove the rear idler gear retaining bolt.
 - (2) Set the extension housing cutaway part (1) to the shaft (2) position, and pull out shaft (2) and take out the gear (3) and washer (4).

Note : Lightly bolt the extension housing to prevent it from pulling out.

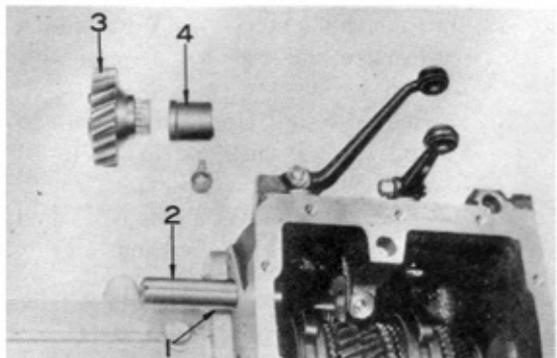


Fig. 2-10 Reverse Idler Gear Removal

8. Remove the shift forks.

- (1) Install a bolt to the end of gear shift fork shaft.

Note: Bolt outside diameter 5 mm, thread pitch 0.9 mm, bolt length 60 mm, 1 each.

- (2) Remove the two screw plugs (3), and take out two compression springs (2) and two balls (1).

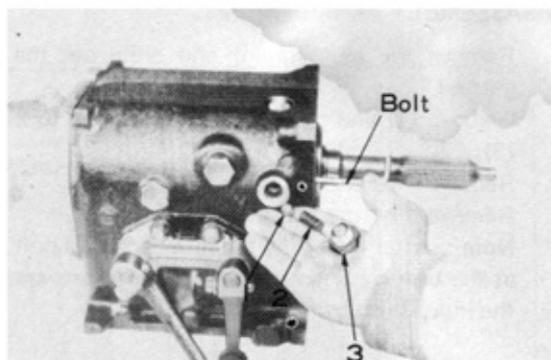


Fig. 2-11 Ball Spring Removal

- (3) Remove the two screw plugs (2), and punch out the two slotted spring pins (1).
- (4) While turning the bolt installed in the end of gear shift shaft, remove the gear shafts one at a time.

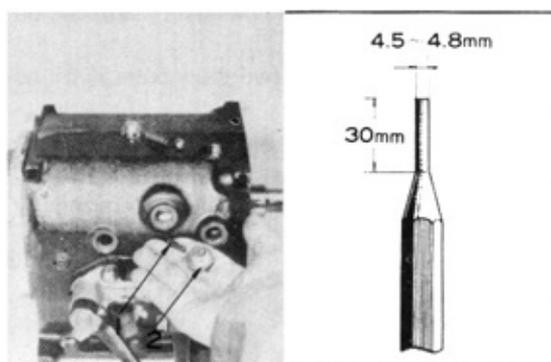


Fig. 2-12 Plug Removal

- (5) Remove the levers (3) and (4).
- (6) Remove the nuts mounting the housing (1), push the forks (2) in until they contact the transmission case, and set the levers horizontally.

Note: To prevent the lever shafts from becoming damaged, leave the housing fitted on to the lever shafts.

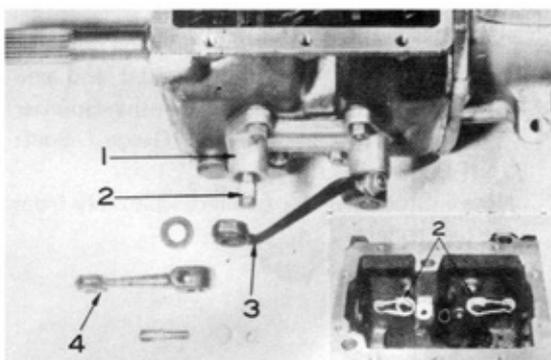


Fig. 2-13 Fork Removal

- (7) Shift the clutch hub No. 1 (1) toward the reverse side and take out the gear shift fork No. 1.
- (8) Set the gear fork No. 2 to neutral and take out the gear shift fork No. 2 (2).
- (9) Remove the extension housing.
- (10) Remove the shift lever shafts No. 1 and No. 2 and the shift lever housing.

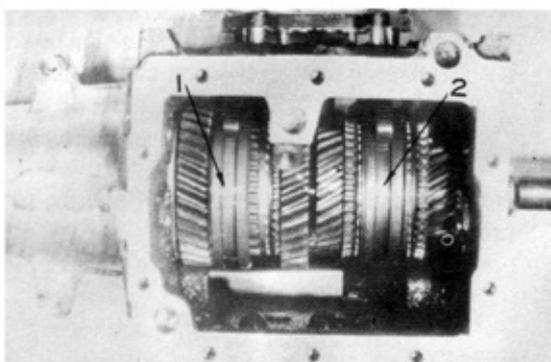


Fig. 2-14 Clutch No. 1 and No. 2 Positions

9. Remove the input shaft.
 - (1) Remove the snap ring by using Snap Ring Expander [09905-00010].
 - (2) Drive out the input shaft into the transmission case.

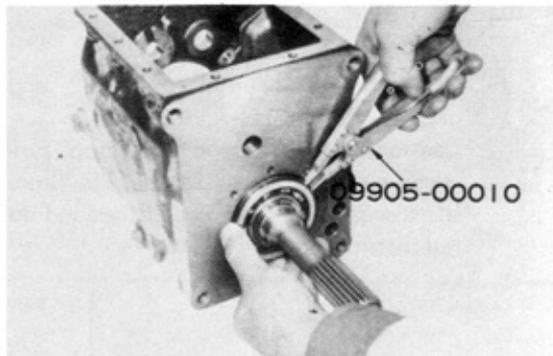


Fig. 2-15 Input Shaft Removal

10. Remove the output shaft from the extension housing.
 - (1) Remove the speedometer driven gear from the extension housing.
 - (2) Using Snap Ring Expander [09905-00010], expand the snap ring and remove the output shaft from the extension housing.

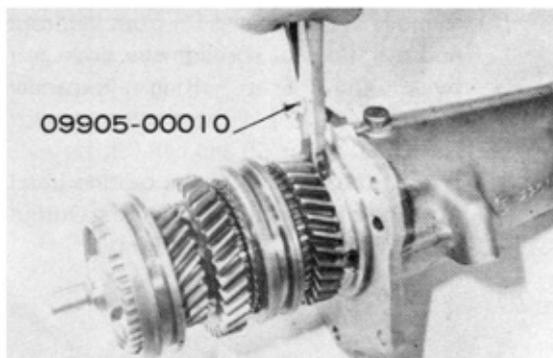


Fig. 2-16 Extension Housing Removal

11. Remove the various parts from the output shaft.
 - (1) Measure and inspect the thrust clearances at the reverse, first, and second gears, and record the results for reference use at assembly.

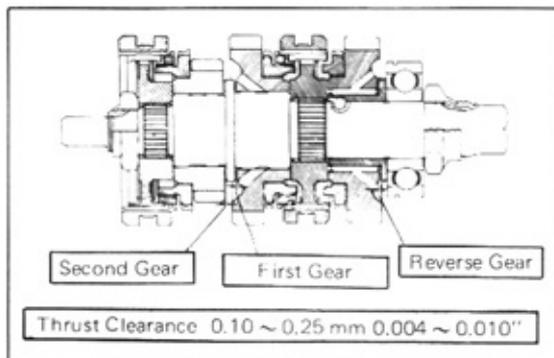


Fig. 2-17 Thrust Clearance Measurements

- (2) Remove the spacer (1) from the end of output shaft, and loosen the peened part of the nut with a center punch.
 - (3) Insert a spare universal joint sleeve yoke over the output shaft, and remove the nut by using Output Shaft Wrench [09326-20010].
- Caution:** Do not clamp the shaft directly in a vise.

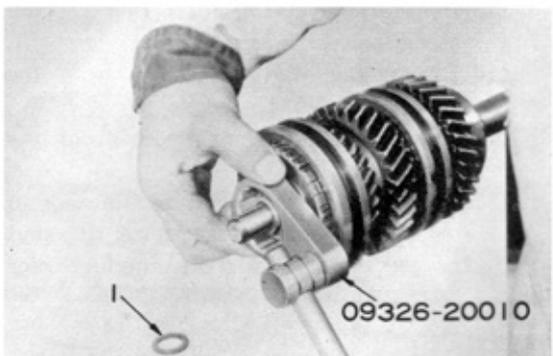


Fig. 2-18 Nut Removal

- (4) Remove the hub (1) with the hub sleeve still attached.
- (5) Remove the synchronizer ring (2) and gear (3).

Caution : First, second, and top synchronizer rings are all same parts. Store them separately from each other and do not intermix them.

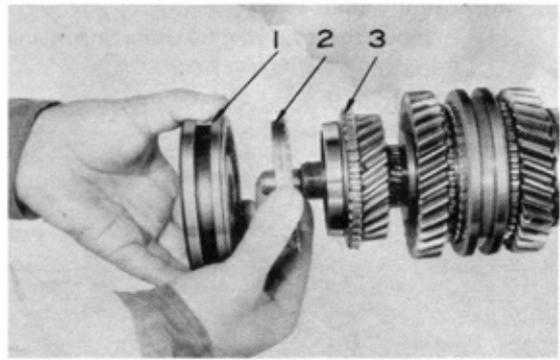


Fig. 2-19 Shaft Front Part Removal

- (6) Remove the snap rings (1) from the front and rear sides of speedometer drive gear by using Snap Ring Expander [09905-00010].
- (7) Remove the gear (2) and ball (3).
- (8) Loosen the peening on the bearing (rear) nut, and remove the nut by using Output Shaft Wrench [09326-20020].

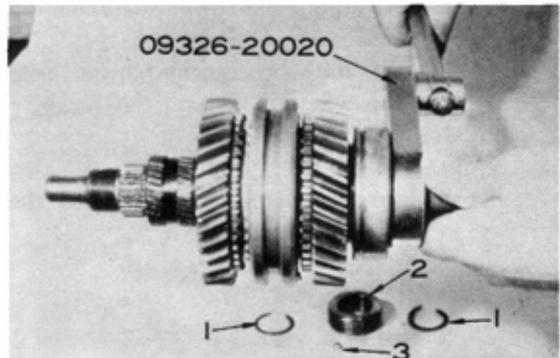


Fig. 2-20 Shaft Rear Part Removal

- (9) Remove the shims.
- (10) Remove the bearing (rear) by driving it out with a press.

Caution : Do not attempt to remove the shaft rear parts by holding the reverse gear by hand and using the rebound force. In this case, the clutch hub No. 1 splines will be damaged by striking against the reverse gear bushing turn lock ball.

- (11) Remove the gear (1), bearing (2), bushing (3), and ball (4).

- (12) Remove the hub (5) with hub sleeve (6) still attached.

- (13) Remove the synchronizer ring (7) and gear (8).

- (14) Disassemble the hub sleeve from the bearing hub No. 1.

- (15) Disassemble the hub sleeve from the bearing hub No. 2.

- (16) Inspect the transmission case interior to see if there are any synchronizer ring keys or gear shift fork shaft interlock pins dropped inside.

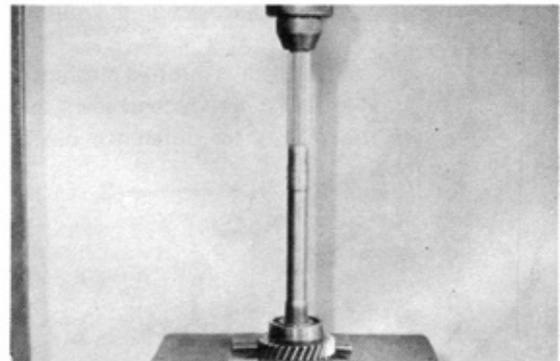


Fig. 2-21 Bearing Removal

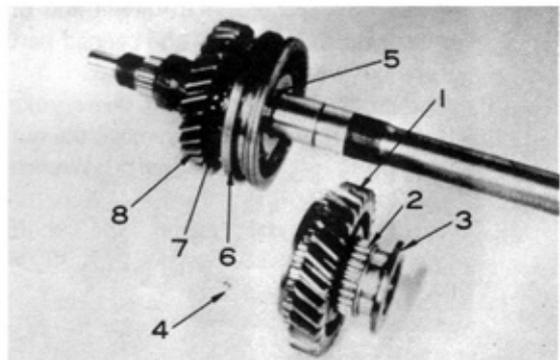


Fig. 2-22 Gear Removal

INSPECTION AND REPAIRS

Inspect all disassembled parts in accordance with the instructions outlined below, and repair or replace any part found defective.

Refer to the clearance and backlash measurements made during disassembly. If any of these exceed the limit, check the parts concerned to find which part is at fault.

Table 2-2 Gear Backlash and Thrust Clearance Limits

Gear Backlash	Input shaft x counter gear	0.4 (0.10–0.20) mm
	Second gear x counter gear	0.4 (0.10–0.20) mm
	First gear x counter gear	0.4 (0.10–0.20) mm
	Reverse gear x idler gear	0.4 (0.10–0.20) mm
	Idler gear x counter gear	0.4 (0.10–0.20) mm
Thrust Clearance	Reverse idler	0.8 (0.07–0.39) mm
	Counter gear	0.8 (0.12–0.29) mm
	First gear	0.5 (0.10–0.25) mm
	Second gear	0.5 (0.10–0.25) mm
	Reverse gear	0.5 (0.10–0.25) mm

Note : Values in parenthesis () are reference values.

OUTPUT SHAFT

1. Roller contacting surface (1) at shaft end for damage or wear.
2. Parts (2) and (3) serving as bushings for second and first gears, and the intermediate flange part (4) for damage or wear.

Second and first gear parts

Oil clearance	Limit	0.10 mm (0.004")
	Reference	0.05–0.10 mm (0.002"–0.004")

3. Splines (5) at shaft rear end
 - (1) Splines for damage or wear.
 - (2) Fit the splines into propeller shaft universal joint yoke with sleeve and check to see if excessively loose or slides improperly.
4. Shaft bending

Support the shaft on the center holes at both ends and measure the deflection at the center of bearing installation part.

Bending limit 0.03 mm (0.0012")

Note : Amount of bending will be one-half of the deflection reading.

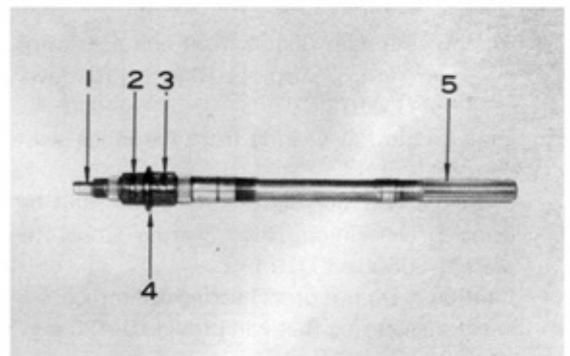


Fig. 2-23 Output Shaft Inspection

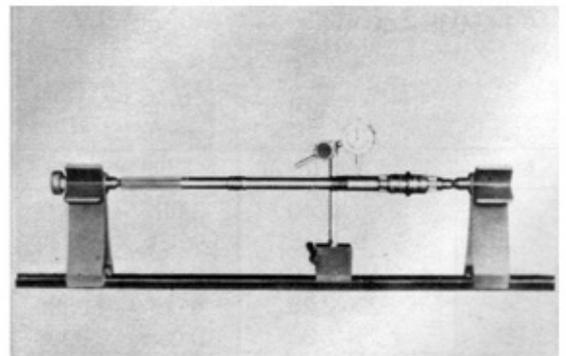


Fig. 2-24 Output Shaft Deflection Inspection

INPUT SHAFT

1. Tapered part (1) (synchronizer ring contacting surface) for damage or wear.
2. Clutch hub sleeve meshing part (2) for damage or wear.
3. Roller (12 ea.) fitting part (3) for damage or wear.
4. Part (4) for damage or wear.
5. Part (5), that contacts against the type "T" oil seal in front bearing retainer, for damage or wear.
6. Part (6), on which the clutch disc slides over, for damage or wear.
Fit on clutch disc and check if it is too loose or slides improperly.
7. Part (7) that contacts against the bearing, for damage.

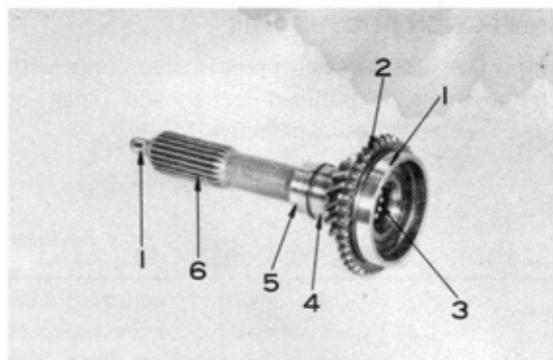


Fig. 2-25 Input Shaft Inspection

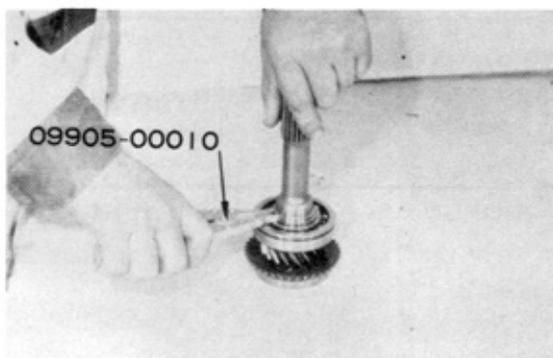


Fig. 2-26 Snap Ring Removal

BEARING REPLACEMENT (for transmission front)

1. Remove the snap ring at front end of bearing by using Snap Ring Remover [09905-00010].
2. Disassemble the bearing from the input shaft by using a press.
3. Press the new bearing on the input shaft by using Drive Pinion Rear Bearing Cone Replacer [09506-30010].
Caution : Do not press bearing outer race.
4. Select a snap ring that will provide 0–0.5 mm (0–0.002") axial play between the bearing and input shaft, and install the snap ring on the input shaft by using Snap Ring Expander [09905-00010].

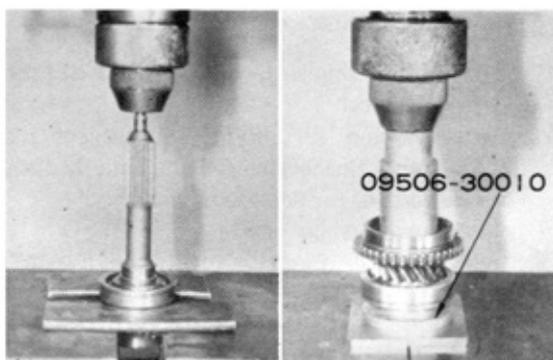


Fig. 2-27 Bearing Replacement

Table 2-3 Snap Ring Sizes

Mark	Thickness (mm)	Thickness (in)
1	2.05–2.10	0.0807–0.0827
2	2.10–2.15	0.0827–0.0846
3	2.15–2.20	0.0846–0.0866
4	2.20–2.25	0.0866–0.0886
5	2.25–2.30	0.0886–0.0906
6	2.30–2.35	0.0906–0.0975



Fig. 2-28 Snap Ring Selection

REVERSE GEAR BUSHING AND BEARING

- Bushing for damage or wear.

Oil clearance	Limit	0.064 mm
		(0.0025")
	Reference	0.009–0.064 mm
		(0.0004"–0.0025")

- Bearing for damage or wear.

SECOND, FIRST, AND REVERSE GEARS

- Tapered part (1) for damage or wear.
- Splined part (2) for damage or wear.
- Gear teeth (3) for damage or wear.
- Gear inside surface (4) for damage or wear.

Second and first gears

Oil clearance	Limit	0.10 mm (0.004")
	Reference	0.05–0.10 mm
		(0.002"–0.004")

Reverse gear

Oil clearance	Limit	0.064 mm
		(0.004")
	Reference	0.009–0.064 mm
		(0.00035"–0.00252")

- Gear end (5) for damage or wear.

Note: Use a dial gauge to measure the oil clearance. Measure by holding the shaft stationary and moving the gear.

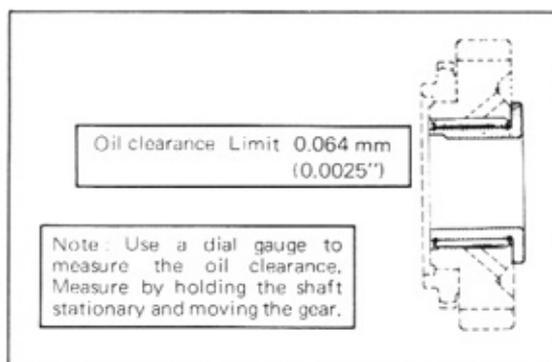


Fig. 2-29 Bushing and Bearing Inspection

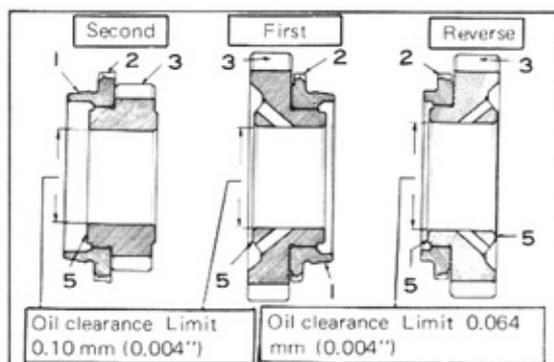


Fig. 2-30 Gear Inspection

CLUTCH HUB SLEEVE AND FORK

- Inside splines (1) for damage or wear.
- Shift fork slot for damage or wear.

Clearance limit	1.0 mm (0.039")
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- Fork tip (3) for damage or wear.

Clearance limit between hub sleeve and fork	1.0 mm (0.039")
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- Contacting surfaces (4) between fork and shift lever for damage or wear.

Fork clearance limit with lever	1.0 mm (0.039")
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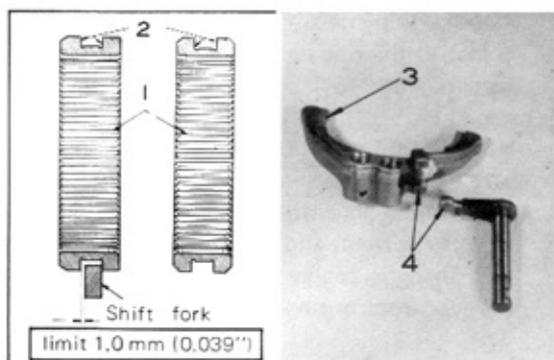


Fig. 2-31 Sleeve and Fork Inspection

CLUTCH HUB

- Clutch hub outside splines (1) for damage or wear.
- Synchromesh shifting key grooves for damage or wear.
- End gear contacting faces (2) for damage or wear.
- For smooth sliding when hub and hub sleeve are fitted together.

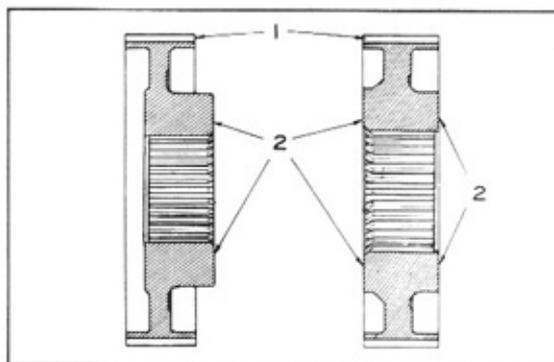


Fig. 2-32 Clutch Hub Inspection

SYNCHROMESH SHIFTING KEY AND KEY SPRING

1. Key center protrusion (1) for wear.
2. Key spring for weakening and surface (2) contacting against keys for wear.

SYNCHRONIZER RING

1. Splines (1) for damage or wear.
2. Tapered part (part (2) contacting against keys) for damage or wear.
3. Clearance when synchronizer ring and gear are pressed together and rotated by hand.
Limit 0.8 mm (0.031")
Reference Top and Second 1.0–2.0 mm (0.04"–0.08")
Reverse 0.95–2.05 mm (0.0374"–0.0807")
4. When synchronizer ring and gear are pressed together and rotated by hand, there should be no slipping between ring and tapered part. (Braking effect).

SYNCHRONIZER RING CONTACT CORRECTION

In case the braking effect between ring and gear is defective, or when the ring is replaced, the following correction is made.

1. Apply a thin coat of abrasive compound (fine grade) to the ring and gear tapered parts, and seat together by pressing and rotating by hand.
Note: More than 80% of the entire ring and gear tapered parts should be contacting.
2. Remove the abrasive compound with gasoline or other solvent, and check once more to see that there is proper braking effect between the synchronizer ring and gear.

COUNTER GEAR AND COUNTER SHAFT

1. Gears (1) for damage or wear.
2. Parts (2) at both ends, that contact against the thrust washers, for damage or wear.
3. Needle rollers (3) and their contacting surfaces for damage or wear.
Note: Even if only one needle roller requires replacement, the entire set at that end must be replaced.
4. Countershaft for damage or wear.

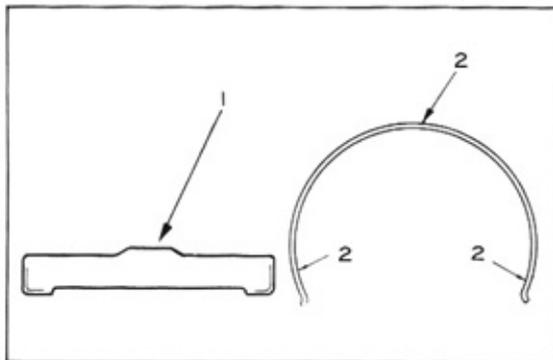


Fig. 2-33 Key and Key Spring Inspection

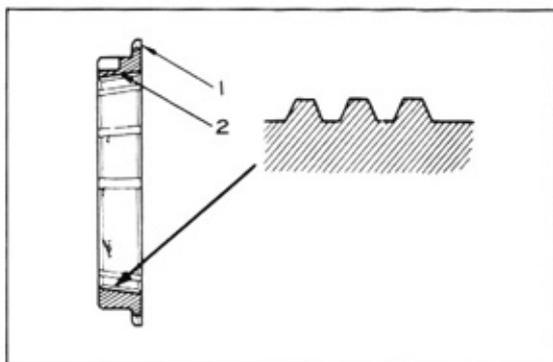


Fig. 2-34 Synchronizer Ring Inspection

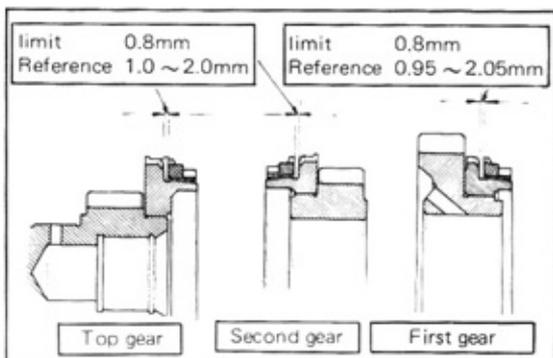


Fig. 2-35 Synchronizer Ring Inspection

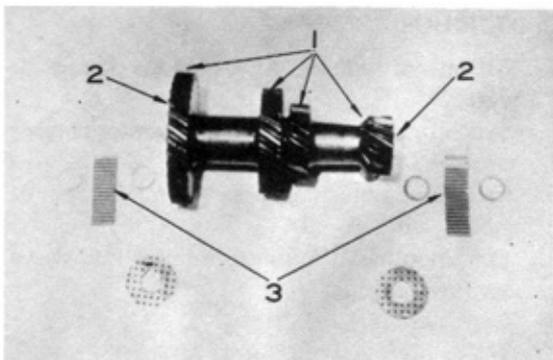


Fig. 2-36 Counter Gear Inspection

REVERSE IDLER GEAR, SHAFT, and bearing

1. Gear (1) for damage or wear.
2. Gear inside surface (2) for damage or wear.

Oil clearance

Limit 0.056 mm (0.00220")

Reference 0.005–0.056 mm
(0.00020"–0.00220")

3. Shaft (4) for damage or wear.
4. Bearing (3) for damage or wear.

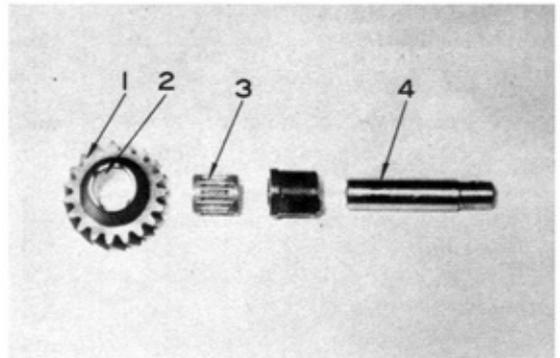


Fig. 2-37 Reverse Idler Gear Inspection

SHIFT LEVER SHAFTS AND HOUSING

1. Lever shafts (1) for wear.
2. Housing bushing (2) for wear.
3. Oil seal (3) for weakening or oil leakage.

BEARING (Transmission Rear)

1. Bearing for damage or wear.
2. Abnormal resistance or sticking when bearing is spun while pressing the balls with hand.

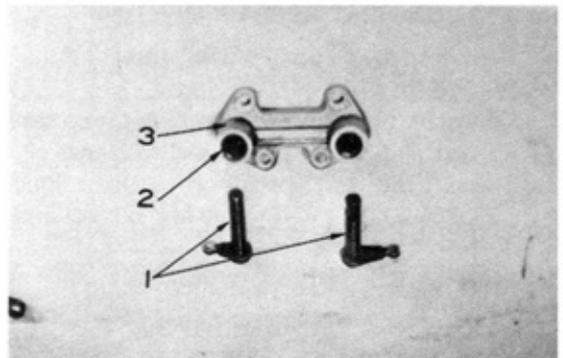


Fig. 2-38 Shift Lever & Housing Inspection

SPEEDOMETER GEAR

1. Drive gear and driven gear (1) tooth parts for damage or wear.
2. Driven gear shaft (2) for damage or wear.
3. Bushing (3) inside shaft sleeve for damage or wear.
4. "O" rings (4) and (5) for damage or wear.

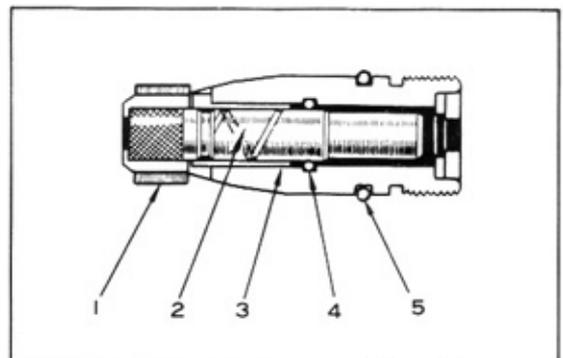


Fig. 2-39 Speedometer Gear Inspection

FRONT BEARING RETAINER

1. Lip part (1) of type "T" oil seal for damage or wear.
2. Clutch release hub sliding part (2) for damage or wear.

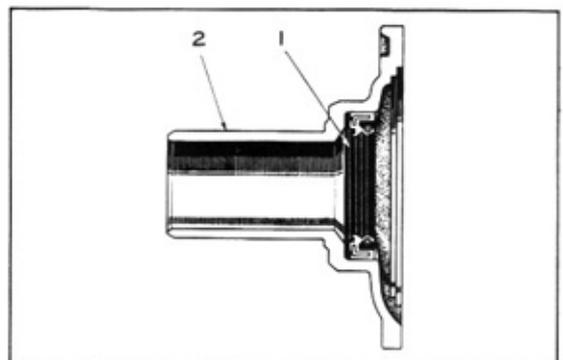


Fig. 2-40 Front Bearing Retainer Inspection

EXTENSION HOUSING

1. Lip part (1) of Type "T" oil seal for damage or wear.
2. Bimetal formed bushing for damage or wear.
Oil clearance limit 0.055 mm (0.00217")
3. Dust deflector (3) for damage and for installed state.

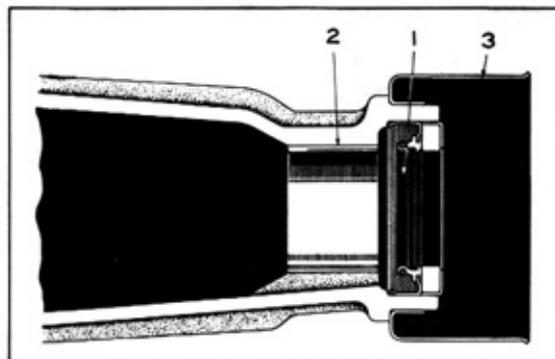


Fig. 2-41 Oil Seal and Bushing Inspection

TYPE "T" OIL SEAL REPLACEMENT

1. Remove by using Oil Seal Puller [09398-10010].
2. To install, first apply MP grease to the oil seal lip part and soak the dust seal with gear oil. Then use Transmission Oil Plug [09325-20010] and install the oil seal and dust seal in the order named.

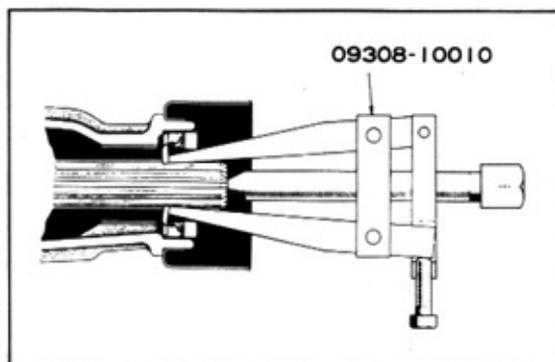


Fig. 2-42 Oil Seal Removal

BIMETAL FORMED BUSHING REPLACEMENT

1. Remove the type "T" oil seal.
2. Heat the rear part of extension housing with piston heater (oil bath type) to 80-100°C (176-212°F) and force out the bimetal formed bushing by using Extension Housing Bushing Replacer [09307-20010] and a press.
3. Heat the rear part of extension housing to 80-100°C (176-212°F) and press in the new bimetal formed bushing by using Extension Housing Bushing Replacer [09307-20010] and press.

Note : Install the bimetal formed bushing such that its seamed part will be positioned toward top side of extension housing.

4. Finish the bushing bore.
Bore finished dimension 38.00-38.025 mm (1.496"-1.497")
Oil clearance 0.005-0.055 mm (0.0002"-0.0020")
5. Install new type "T" oil seal.

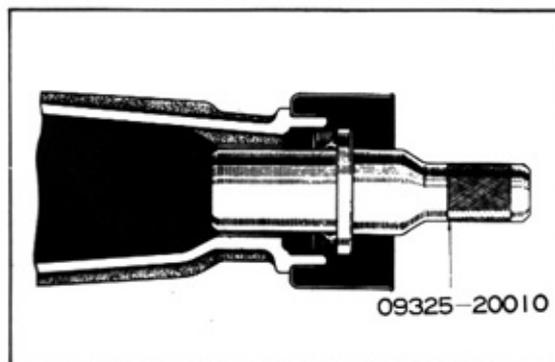


Fig. 2-43 Oil Seal Installation

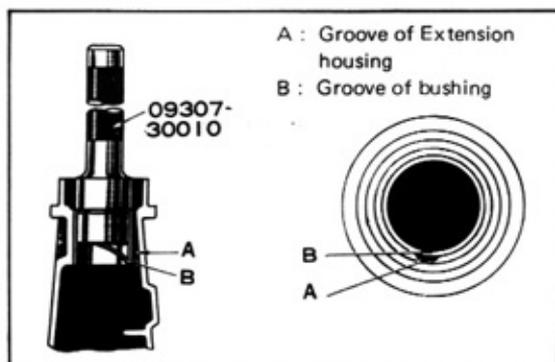


Fig. 2-44 Bushing Installed Position

ASSEMBLY:

Notes

1. Use Transmission Overhaul Gasket Kit (34331-210010) when assembling the transmission.
2. Apply genuine Toyota Seal Packing No. 5 to the specified parts before assembling.
3. Apply gear oil or grease to the sliding surfaces of all parts before assembling.
4. If the shaft snap rings removed at disassembly are to be used once more, correct them to the shape that will allow proper installation.
5. Wave washers must be installed at proper places.
6. Sufficient care must be taken not to exceed the specified torque when tightening the bolts and nuts on the clutch housing and extension housing as these parts are made of aluminum alloy.
7. Sufficient care must be taken when removing, installing, and tightening of clutch hubs No. 1 and No. 2, and counter gear washer (rear) as these are made of sintered alloy.

8. In tightening the output shaft front and rear nuts, use spare universal joint sleeve yoke.



Fig. 2-45 Seal Packing No. 5

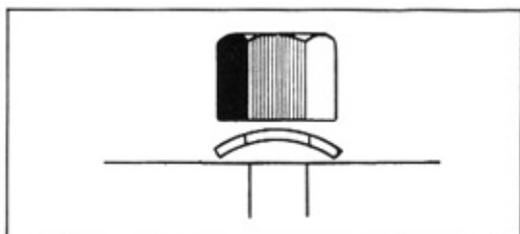


Fig. 2-46 Wave Washer Installing Position

1. Wash all assembly parts.
2. Assemble the clutch hubs No. 1 and No. 2.
 - (1) Install the hub sleeve (1), three shifting keys (3), and two key springs (4) to the clutch hub No. 1 (2).

Notes

1. Hub, hub sleeve, and keys are directional parts.
2. In case of key springs, they must be installed so that their end gaps will not be positioned in the same direction.

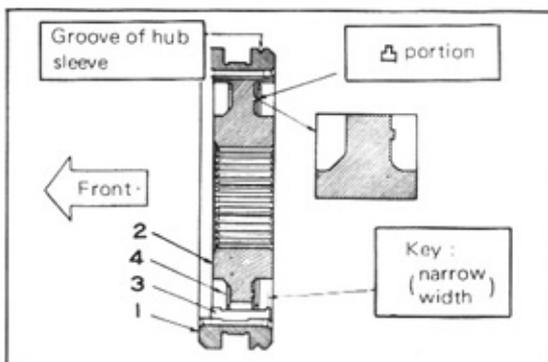


Fig. 2-47 Clutch Hub No. 1 Assembly

- (2) Install the hub sleeve (2), three shifting keys (3), and two key springs to the clutch hub No. 2 (1).

Notes

1. Hub, hub sleeve, and keys are directional parts.
2. In case of key springs, they must be installed so that their end gaps will not be positioned in the same direction.

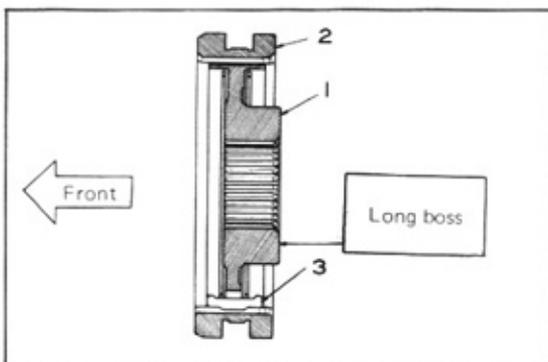


Fig. 2-48 Clutch Hub No. 2 Assembly

3. Install the various gears to the output shaft.
- (1) Install the gear (1), synchronizer ring (2), and clutch hub No. 1 (3) previously assembled in 2 above, to the output shaft from the rear end.

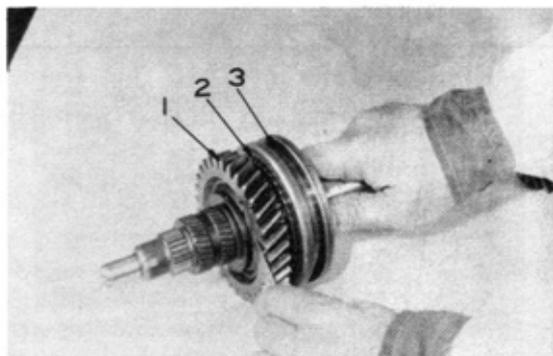


Fig. 2-49 Gear Installation

- (2) Measure the first gear thrust clearance while pushing the clutch hub No. 1 against the first gear.
Limit 0.25 mm (0.010")
Reference 0.10–0.25 mm (0.004"–0.010")
- (3) Insert the ball (1) into the output shaft.
- (4) Apply MP grease on gear (2), bearing (3), and bushing (4), and install them on the output shaft.
Note: Mesh the ball with the bushing groove.

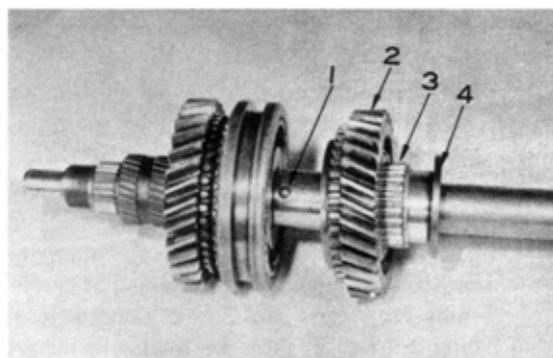


Fig. 2-50 Gear Installation

- (5) Insert the bearing (1) over the output shaft and tighten the nut (2) by using the Output Shaft Wrench [09326-20029].
Nut torque 1000–1300 kg-cm (72–94 ft-lb)
Note: Make sure that ball is fitting into the bushing before tightening.

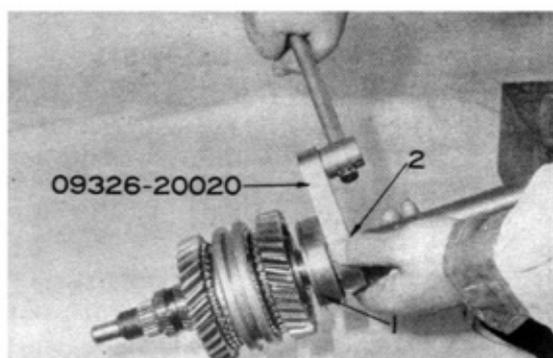


Fig. 2-51 Tightening Output Shaft

- (6) Measure the reverse gear thrust clearance.
Limit 0.25 mm (0.010")
Reference 0.10–0.25 mm (0.004"–0.010")
Note: Measure the first gear thrust clearance once more.
- (7) Loosen the nut and insert the shim (for adjusting nut peening location).
Then, tighten the nut once more.
- (8) Peen the nut to the output shaft.

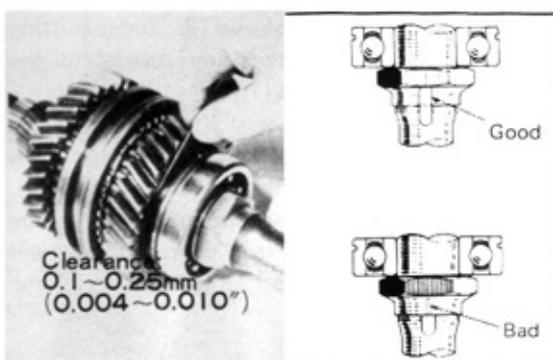


Fig. 2-52 Thrust Clearance Measurement and Nut Peening

- (9) Install the snap ring, ball, speedometer drive gear, and snap ring on the output shaft.
- (10) Install the second gear (1) and synchronizer ring (2) to the output shaft.
- (11) Install the clutch hub No. 2 (3) previously assembled in 2 above, and shims (4) and tighten the nut (5) by using Output Shaft Wrench [09326-20010]. Nut torque 800-1100 kg-cm (58-80 ft-lb)

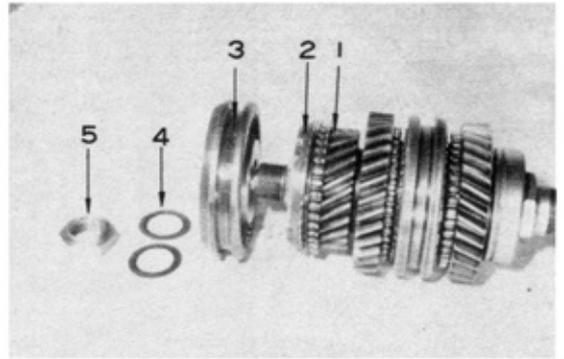


Fig. 2-53 Gear Hub Installation

- (12) Measure the second gear thrust clearance.
Limit 0.25 mm (0.010")
Reference 0.10-0.25 mm (0.004"-0.010")

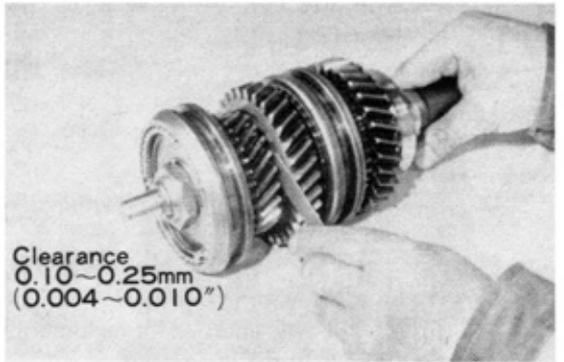


Fig. 2-54 Thrust Clearance Measurement

- (13) Peen the nut to the output shaft as shown in Fig. 2-52.

4. Install the output shaft in to the extension housing.
- (1) Select and use shaft snap ring that will give the minimum axial thrust clearance.

Table 2-4 Shaft Snap Ring Thickness

Mark	Thickness (mm)	Thickness (in)
1	1.35-1.45	0.053-0.057
2	1.45-1.55	0.057-0.061
3	1.55-1.65	0.061-0.065
4	1.65-1.75	0.065-0.069
5	1.75-1.85	0.069-0.073

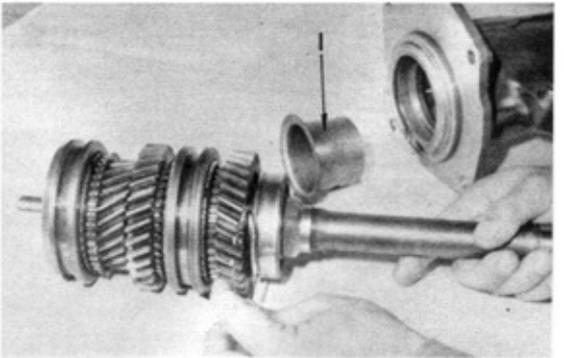


Fig. 2-55 Snap Ring Selection

- (2) Insert the oil baffle (1) into the extension housing.
- (3) Insert the Transmission Oil Plug [09325-20010] into the extension housing rear end.
- (4) Install the output shaft to the extension housing by using Snap Ring Expander [09905-00010].

Note : Make sure that the shaft snap ring fits properly into the bearing groove.

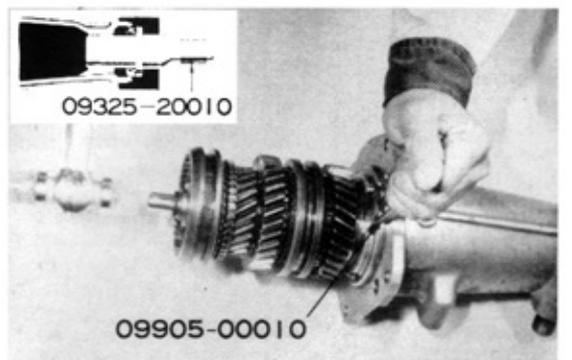


Fig. 2-56 Output Shaft Assembly

5. Install the "O" rings (2) and (3), bushing (4), and gear (5) to the speedometer shaft sleeve (1), and then install this assembly to the extension housing.

Note: Apply gear oil to the bushing (4) before installing it.

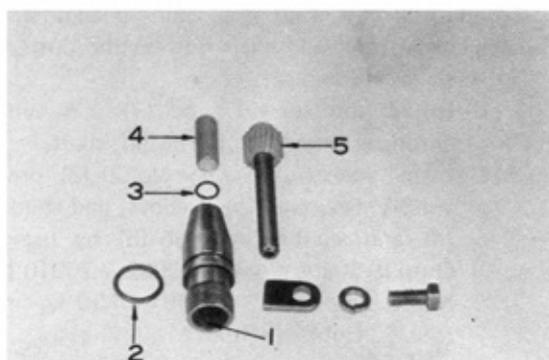


Fig. 2-57 Driven Gear Assembly

6. Install the input shaft to the transmission case.

- (1) Install rollers (12 ea.) and snap ring to the input shaft.

Note: Apply MP grease to the rollers before installing.

- (2) Install the input shaft from within the transmission case.

- (3) Install the snap ring by using Snap Ring Expander [09905-00010].

Note: Bolt the input shaft temporarily; to prevent it from jumping out.

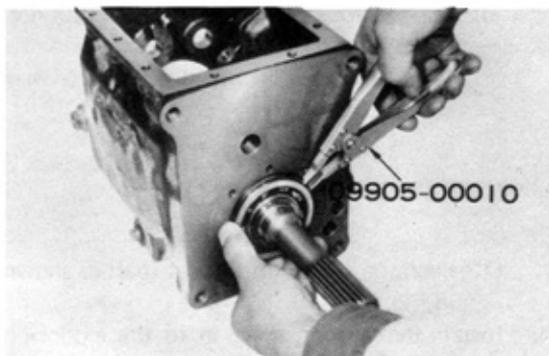


Fig. 2-58 Input Shaft Installation

7. Install the shift fork parts.

- (1) Fit the shift lever shaft housing (1) and gasket (2) to the transmission case.

Note: Do not tighten the nuts.

- (2) Insert the shift lever shaft No. 1 (3) and No. 2 (4) from inside the transmission case until they strike against the case and then set the levers horizontally.

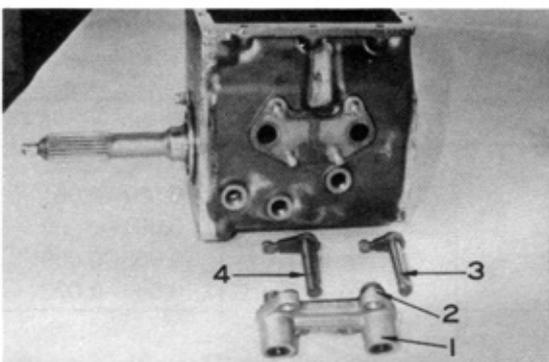


Fig. 2-59 Lever Shaft Installation

- (3) Install the synchronizer ring (1) to input shaft.

- (4) Fit the spacer (2) to end of output shaft and install gasket (3) to (4).

- (5) Install the extension housing while fitting the shifting forks into the synchronizer ring cutaways.

Note: Bolt the extension housing finger-tight.

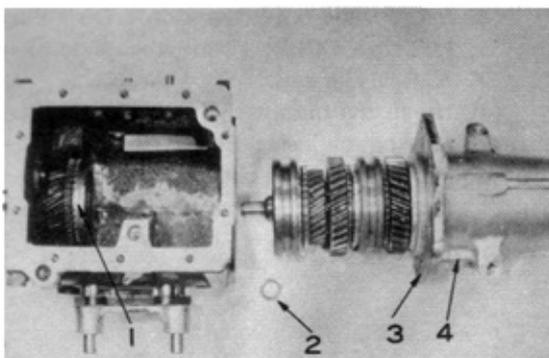


Fig. 2-60 Extension Housing Installation

Installed directions of gear shift forks and gear shift forks shafts, and part names :

- (1) Gear shift fork No. 1
- (2) Gear shift fork No. 2
- (3) Gear shift fork shaft No. 1
- (4) Gear shift fork shaft No. 2
- (5) Slotted spring pin fitting position
- (6) Shift interlock pin position
- (7) Gear shift fork shaft No. 1 entry hole
- (8) Gear shift fork shaft No. 2 entry hole

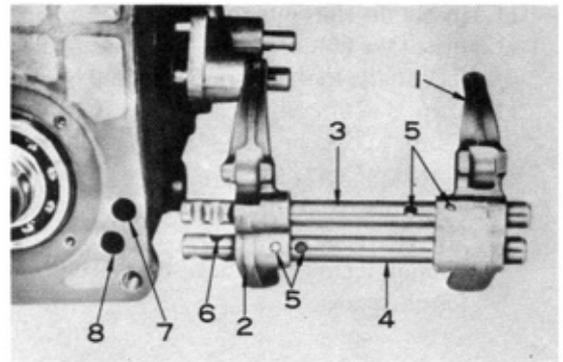


Fig. 2-61 Shaft and Fork Directions

- (6) Shift the hub sleeve (1) into neutral and hub sleeve (2) into reverse and insert the shift forks (3) and (4) into the respective hub sleeves.

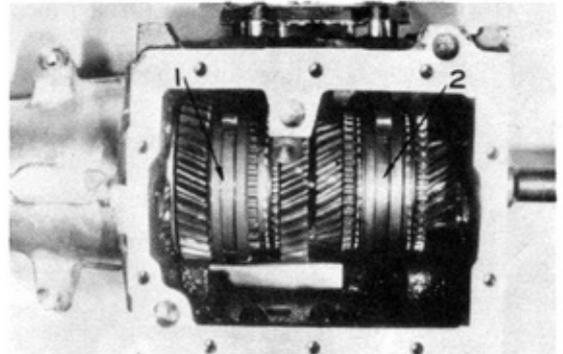


Fig. 2-62 Fork Installation

- (7) Install the ball (2) into gear shift fork shaft No. 1 (1).
- (8) Combine the shift fork No. 2 (3) with shift lever shaft No. 2 (4) and shift fork No. 1 (5) with shift lever shaft No. 1 (6), and insert the fork shaft No. 1, while turning it, from the front side.

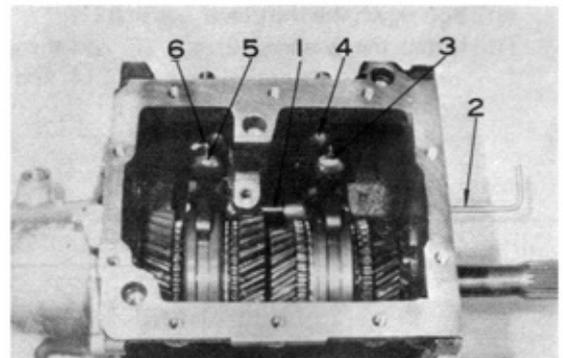


Fig. 2-63 Fork Shaft Installation

- (9) Set the fork shaft No. 1 (6) to neutral (7) and align the holes for installation of the slotted spring pin.
- (10) Install the ball (1), spring (2) and plug (3).
Tightening torque 400–550 kg-cm (29–36 ft-lb)
- (11) Drive in the Pin (4) and install the plug (5).
Tightening torque 400–550 kg-cm (29–36 ft-lb)

Note : Apply liquid packing No. 5 to the threaded parts of plugs (3) and (5).

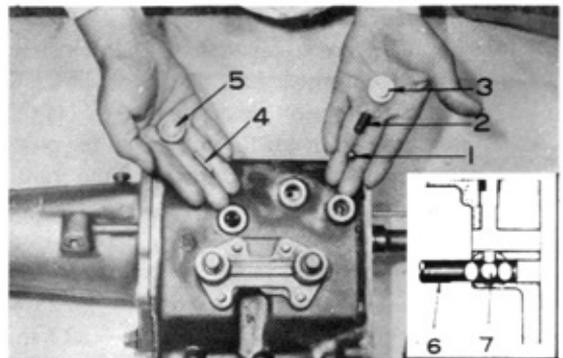


Fig. 2-64 Ball and Pin Installation

- (12) Install the shift interlock pin
 (13) Install the bolt on shaft (2) and install the fork shafts to shift forks No. 1 and No. 2.
 (14) Turn the fork shaft and align it to the neutral position (3). Then, install the slotted pin and plug.

Tightening torque 400–500 kg-cm
 (29–36 ft-lb)

Caution: Do not mistake the ball groove for pin groove.

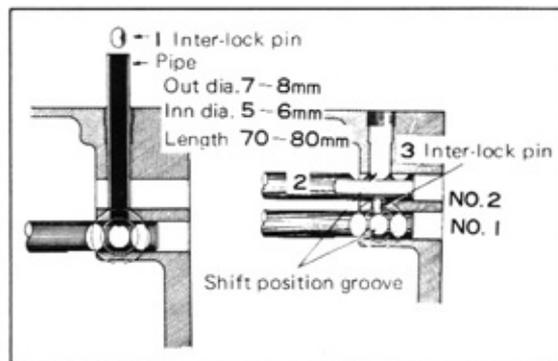


Fig. 2-65 Interlock Pin Installation

- (15) Install the ball (1), spring (2) and plug (3).

Tightening torque 350–500 kg-cm
 (25–36 ft-lb)

Note: After installing plug (3), make sure threads are in proper mesh.

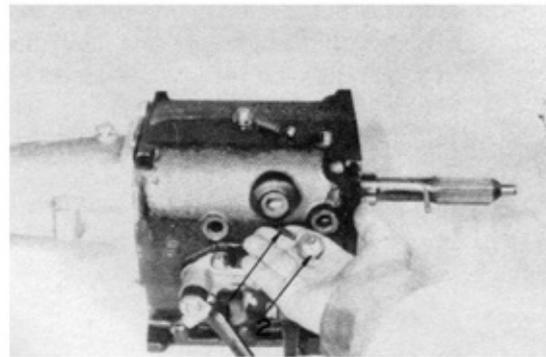


Fig. 2-66 Pin and Ball Installation

- (16) Bolt down the shift lever housing (1).
 (17) Install the washers (2) and (3) and then install the shift outer levers No. 1 (4) and No. 2 (5).

Table 2-5 Reverse Idler Gear
 Thrust Washer Thickness

Mark	Thickness (mm)	Thickness (in)
A	28.44–28.50	1.1197–1.1221
B	28.64–28.70	1.1276–1.1300
C	28.84–28.90	1.1355–1.1378
D	29.04–29.10	1.1433–1.1456

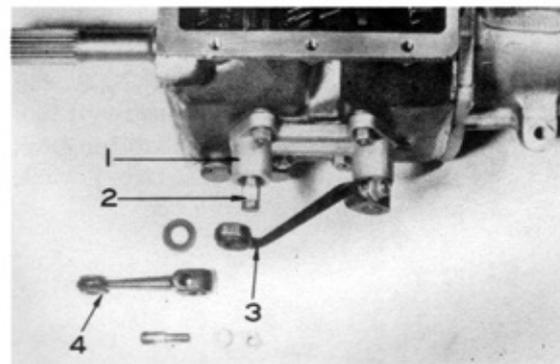


Fig. 2-67 Lever Installation

8. Install the reverse idler gear.
 (1) Apply MP grease on washer (4) and install it to the idler gear (3).
 (2) Set the extension housing cutaway (1) to the idler gear shaft (2) and install the gear (3) and washer (4) by inserting the shaft from the case rear end.
 Bolt torque 150–220 kg-cm
 (10.8–15.9 ft-lb) (130–182 in-lb)
 (3) Measure the thrust clearance.
 Reference value 0.07–0.39 mm
 (0.0027"–0.0154")

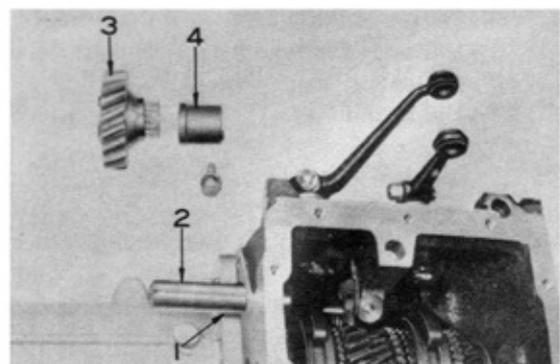


Fig. 2-68 Idler Gear Installation

9. Install the counter gear.
- (1) Insert the Counter Gear Roller Guide Shaft [09311-20011] into the counter gear. Insert into each end of counter gear, the washer (1) and 20 needle rollers after coating them with MP grease.
 - (2) Install the spacer (3) into each end of counter gear.
 - (3) Install the side thrust washer (4) (brass) into the transmission case front side after coating it with MP grease.
 - (4) Place the counter gear inside the case.
 - (5) Set the extension housing cutaway to the counter gear shaft position and insert the counter gear shaft from the front side.
 - (6) Insert the side thrust washer into the rear end of counter gear and insert the counter gear shaft into the case.
- Note :** Insert so that turn lock part at counter shaft front end will be horizontal. (See Fig. 2-72)
- (7) Measure the thrust clearance.
Reference value 0.12–0.29 mm (0.0047"–0.0114")

Notes :

1. Using the thrust clearance measured at disassembly as reference, install the proper thickness thrust washer selected from the table.
2. Thrust clearance is 0.07–0.24 mm (0.0028"–0.0094") when the clutch housing is bolted to the transmission case with specified torque.

10. Turn the extension housing to its proper position and install.

Bolt torque 300–450 kg-cm (21.7–32.6 ft-lb)

Notes :

1. Apply Seal Packing No. 5 to the bolt threads.
2. Bolt sizes
 - (1) Outside diam. 10 mm, length 32 mm, 1 ea. (About 3/8" x 1-1/4")
 - (2) Outside diam. 10 mm, length 25 mm, 4 ea. (About 3/8" x 1")

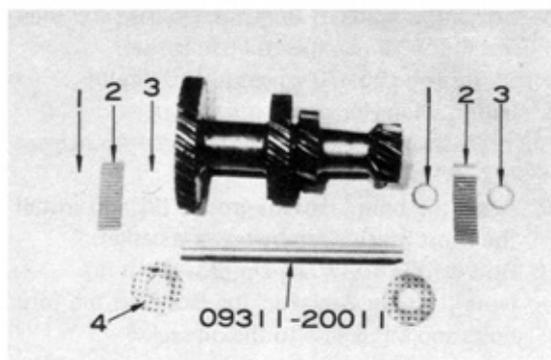


Fig. 2-69 Roller Installation

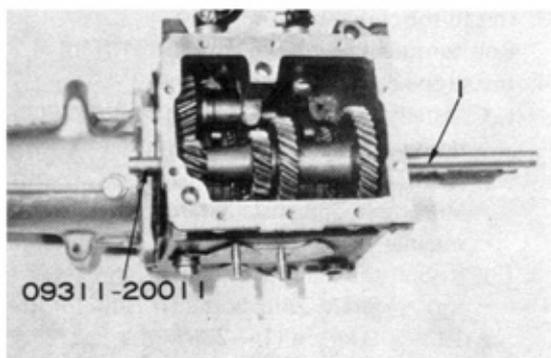


Fig. 2-70 Counter Gear Installation

Table 2-6 Counter Gear Side Thrust Washer (Rear)

Mark	Thickness (mm)	Thickness (in)
0	2.240–2.290	0.0882–0.0902
1	2.300–2.350	0.0906–0.0925
2	2.360–2.410	0.0929–0.0949
3	2.420–2.470	0.0953–0.0972
4	2.480–2.530	0.0976–0.0996
5	2.540–2.590	0.1000–0.1020

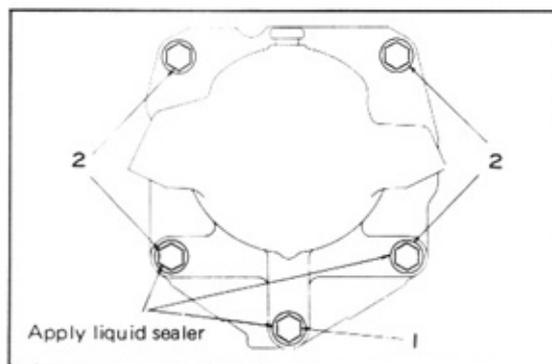


Fig. 2-71 Extension Housing Installation

11. Check the inside of transmission case and then install the oil pan over oil pan gasket.
Bolt torque 55–70 kg-cm (48–61 in-lb)
Note : Plug (for drain)
Tightening torque 370–450 kg-cm (27–33 ft-lb)
12. Align the hole (1) with groove (2) and install the front bearing retainer over a gasket.
Bolt torque 40–70 kg-cm (35–61 in-lb)
Note : Apply Seal Packing No. 5 to the four bolts and MP grease to the oil seal.

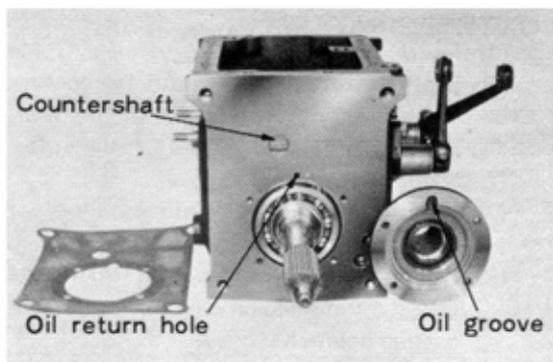


Fig. 2-72 Front Bearing Installation

13. Install the clutch housing. (4).
Bolt torque 500–700 kg-cm (36–51 ft-lb)
14. Install the clutch release fork.
 - (1) Install the release fork (3) to clutch housing temporarily.
 - (2) Lubricate the inside of bearing (2) with MP grease and install it to front bearing retainer.
 - (3) Install the clip and tighten the release fork securely with bolt (1). Bolt torque 190–310 kg-cm (14–22 ft-lb)

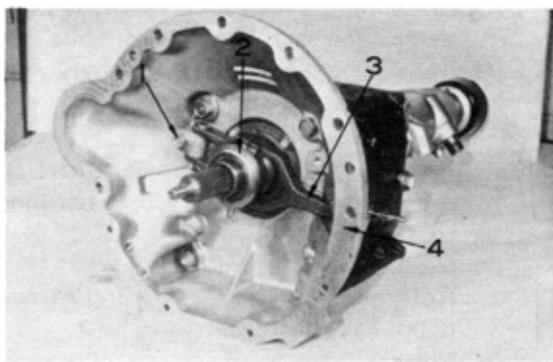


Fig. 2-73 Release Bearing Installation

INSTALLATION

1. Install by following the removal procedures in reverse order.

Notes :

1. Use the Clutch Guide Tool [09301–20020] and check the clutch disc position to see if properly aligned.
2. Apply thin coat of MP grease on input shaft end and on the contacting surfaces between release bearing and diaphragm spring.
3. The bolts used to couple the clutch housing to the cylinder block and to install the starter must be tightened to the specified torque. Bolt torque 300–450 kg-cm (22–33 ft-lb)
2. Adjust the clutch release fork play. For adjustment procedures, refer to P1-2.
3. Check and adjust the low and high speed connecting rods. For adjustment procedures, refer to P2-27.

4. Fill the transmission with oil.
Kind of oil Gear oil SAE 80
Quantity Approx. 1.7 liter (1.8 U.S. qts.) (0–5 mm (3/8") from filler plug)
5. Install the accelerator torque rod (5) by assembling the parts (1), (2), (3), and (4), in the order named.

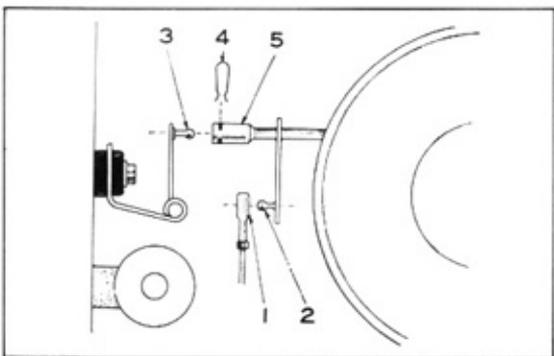


Fig. 2-74 Torque Rod Installation

CONTROL SHAFT

COMPONENT PARTS

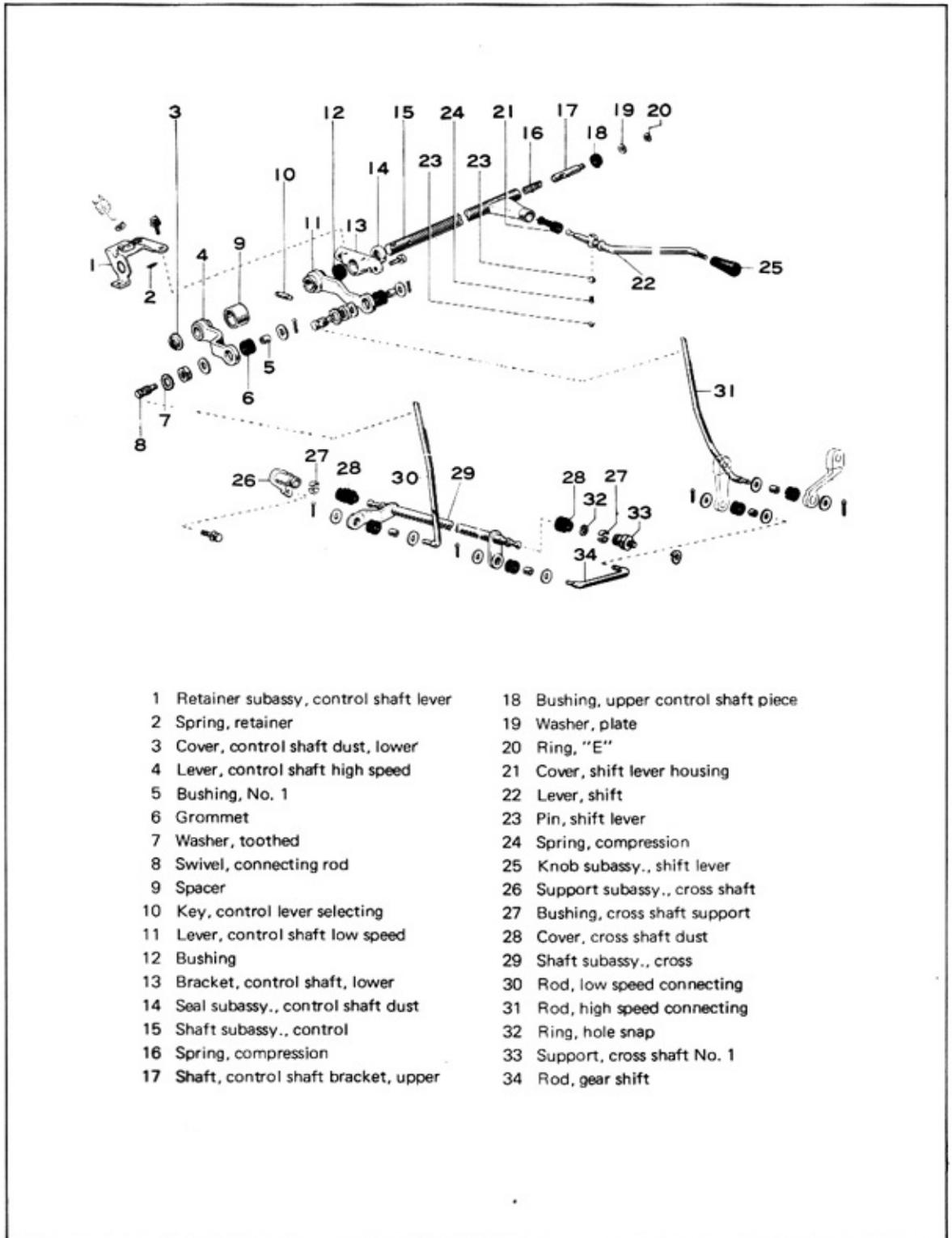


Fig. 9-75 Control Shaft Component Parts

REMOVAL

1. Remove the control shaft high speed lever.
 - (1) Loosen the nuts (1) and disconnect the levers (2) and (3) from the rods.
 - (2) Remove the cover (4) and washer, and remove the lever (3).

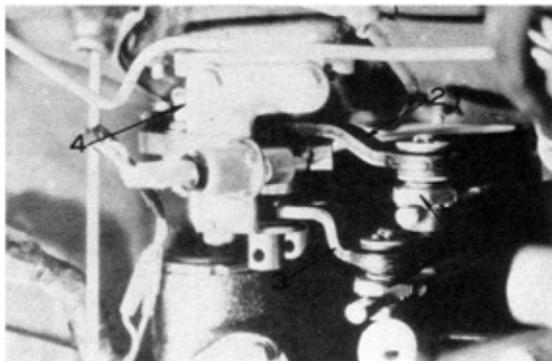


Fig. 2-76 High Speed Lever Removal

2. Remove the low speed control lever.
 - (1) Place a piece of wood across the cylinder block and steering gear box and gently drive out the key on top of this wood.

Note: Use a wooden piece about 15 x 40 x 260 mm (1/2" x 1-1/2" x 10").

 - (2) Pull out the low speed lever (1) and bushing (2).

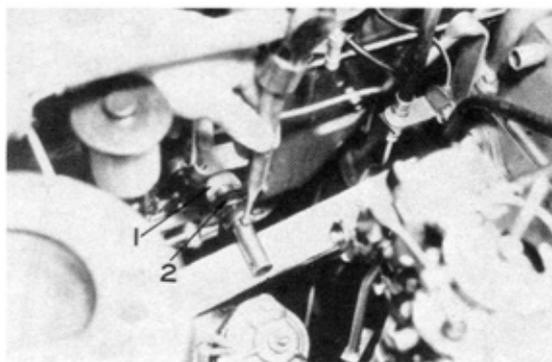


Fig. 2-77 Driving out Key

3. Remove the control shaft.
 - (1) Remove the steering column upper and lower covers.
 - (2) With a piece of wire, push the pins (1) from both sides and pull out the lever (3), taking care not to lose the pins (1) and spring (2).

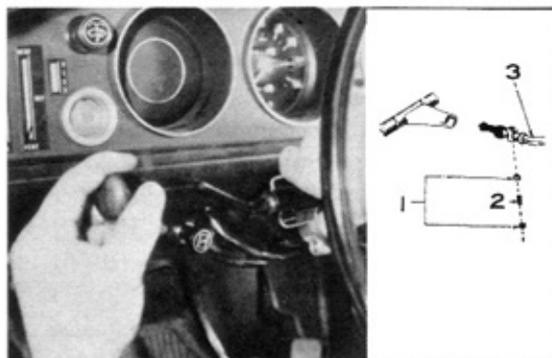


Fig. 2-78 Control Lever Removal

- (3) Remove the "E" ring (1) and washer, and remove the shaft (2) and spring.
- (4) Pull out the control shaft to the vehicle interior.

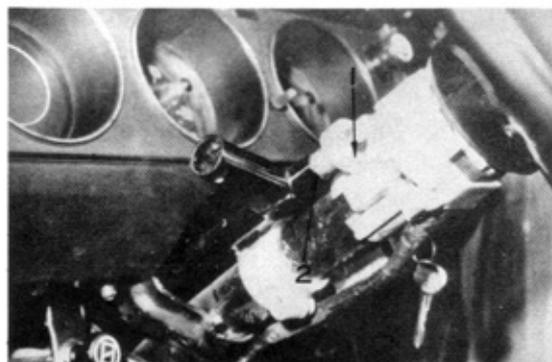


Fig. 2-79 Upper Shaft Removal

INSPECTION

Wash all disassembled parts and inspect them specially for wear or damage on the sliding or fitting portions. Repair or replace any part found defective.

INSTALLATION

Note : Apply MP grease to the bushings and all sliding parts.

1. Install the control shaft.
 - (1) Insert the spring (1) and shaft (2), and from the other side of column (3), install the washer (4) and "E" ring (5).

Note : Position the shift lever hole in the upper shaft (2) so that larger chamfered end will be positioned toward the shift lever.

- (2) Insert the pins (6) and spring (7) into the lever (8) and after aligning the pin holes, insert the lever into the shaft.

2. Install the speed levers.
 - (1) Insert the bushing (3) and lever (4) over the shaft (3) and drive in the key (5).

Note : Drive in the key (5) by procedure described in P2-26. Make sure that the key (5) is driven in perpendicular to the shaft and that it fits smoothly into the grooves in levers (4) and (7).

- (2) Fit the protruded part of bushing (3) into the groove in bracket (2) and install the spacer (6), lever (7), cover (8), and retainer (9).

(3) Connect the back-up lamp switch.

(4) Install the levers (4) and (7) to the rods (10) and (11) respectively.

3. Install the cross shaft (1) to the clutch housing and frame. Install the low speed connecting rod (2) to the shift outer lever (3) and the high speed connecting rod (4) to the cross shaft (1). Install the shift rod (6) to the shift outer lever (7).

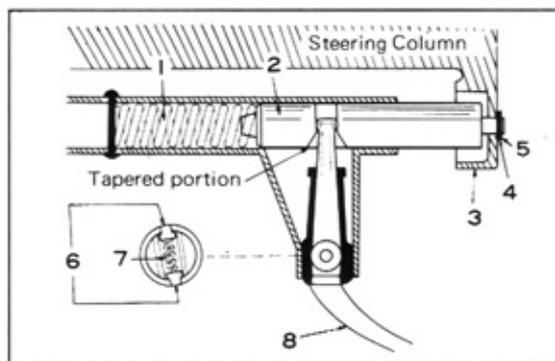


Fig. 2-80 Control Shaft Installation

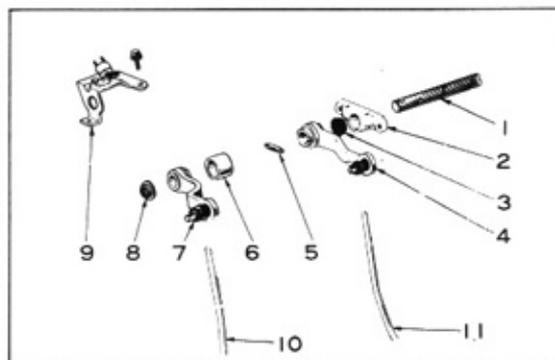


Fig. 2-81 Speed Lever Installation

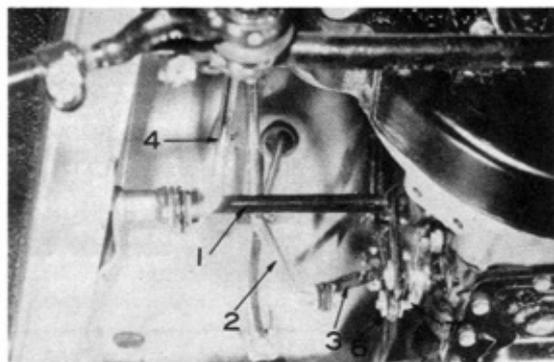


Fig. 2-82 Cross Shaft Parts Installation

CONTROL SHAFT ADJUSTMENT

1. Set the shift lever to neutral, and loosen the nuts (1) and (2).
2. Align the control shaft and retainer adjusting holes and insert a guide pin through the holes. (6-mm dia. [1/4"] Phillips-head screwdriver can be used for guide pin).
3. Lock the nuts at the point where the shift lever can be moved smoothly up and down while at the neutral position.

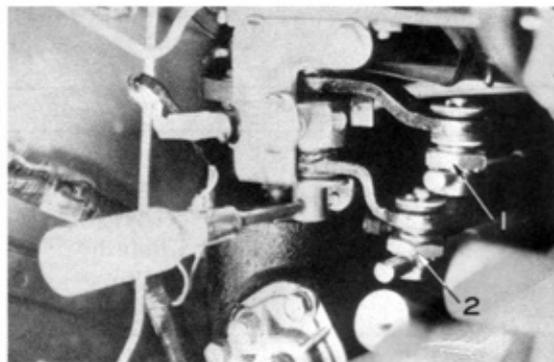


Fig. 2-83 Control Shaft Adjustment

4-SPEED AND 5-SPEED TRANSMISSIONS

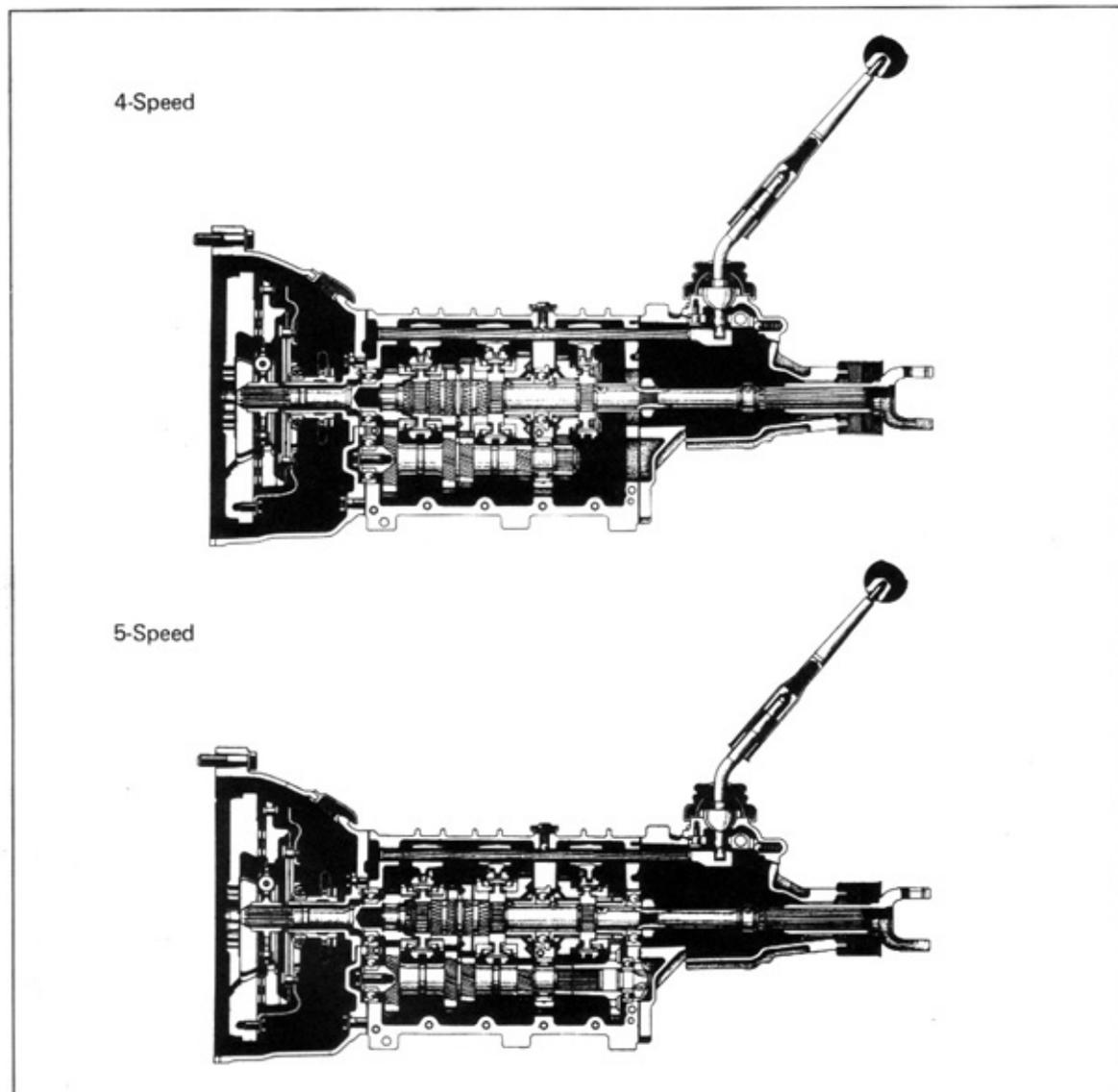


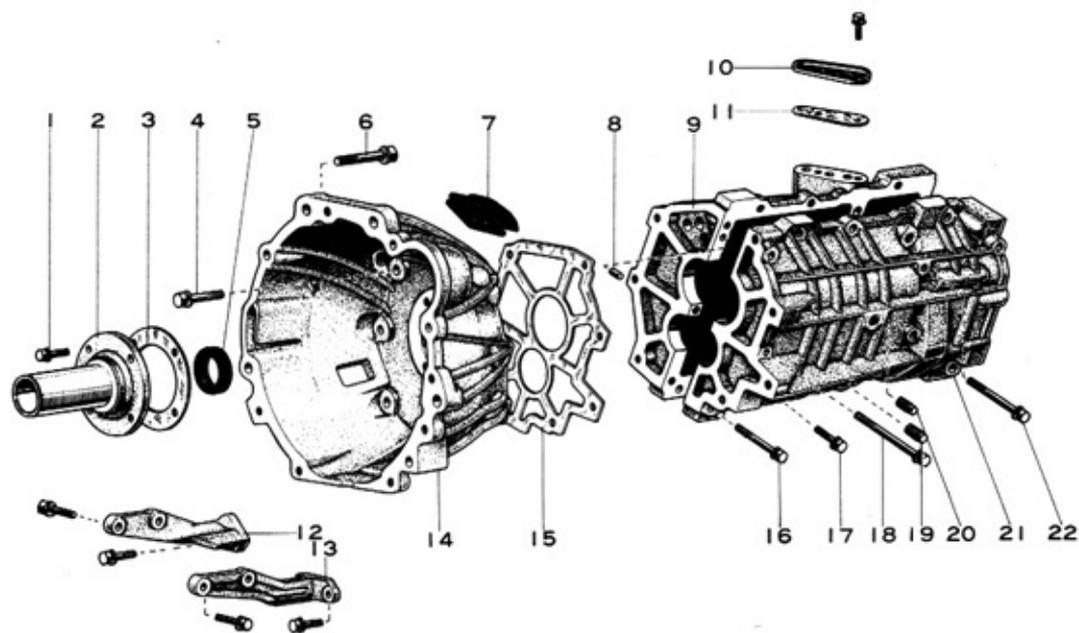
Fig. 2-84 Sectional Views of 4- and 5-Speed Transmissions

SPECIFICATIONS

Table 2-7 Transmission Specifications

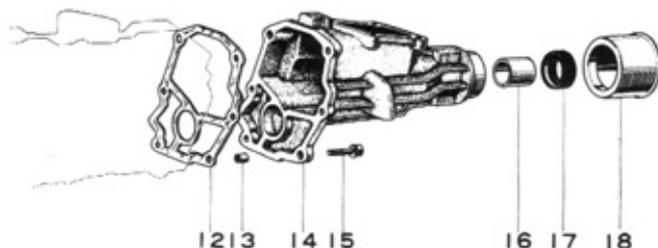
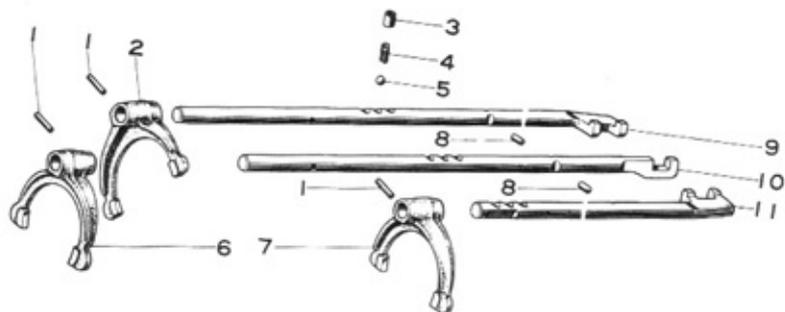
Transmission	Oil capacity	1.54 liter (1.6 U.S. qt.)
Gear Ratio	First	3.587
	Second	2.022
	Third	1.384
	Fourth	1.000
	Fifth	0.861
	Reverse	3.384
Speedometer Gears	Drive	6
	Driven	21

COMPONENT PARTS

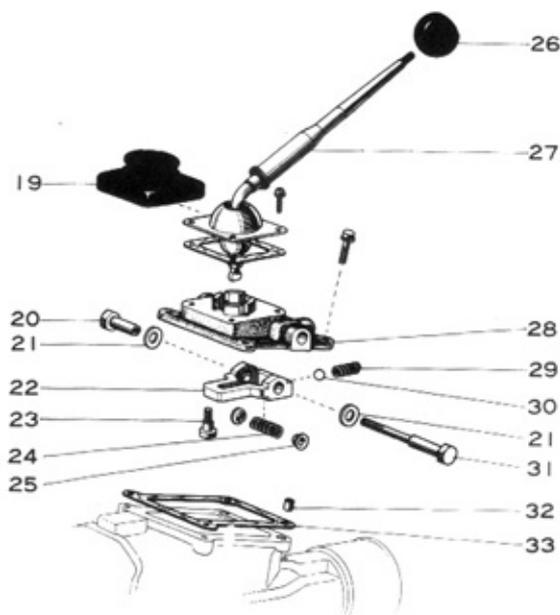


- | | |
|------------------------------------|---|
| 1 Bolt, with washer | 12 Plate, stiffener, RH |
| 2 Retainer, front bearing | 13 Plate, stiffener, LH |
| 3 Gasket, front bearing retainer | 14 Housing, clutch |
| 4 Bolt, with washer | 15 Gasket, transmission case, front |
| 5 Seal, type "T" oil | 16 Bolt, with washer |
| 6 Bolt, with washer | 17 Bolt, with washer |
| 7 Cover, clutch housing No. 1 | 18 Bolt, with washer |
| 8 Pin, straight | 19 Plug, with head tapered screw (drain) |
| 9 Case, transmission, RH | 20 Plug, with head tapered screw (filler) |
| 10 Cover, transmission case | 21 Case, transmission, LH |
| 11 Gasket, transmission case cover | 22 Bolt, with washer |

Fig. 2-85 Transmission Component Parts (1)



- 1 Pin, slotted spring
- 2 Fork, shift, No. 1
- 3 Seat, shift detent ball spring
- 4 Spring, compression
- 5 Ball
- 6 Fork, shift, No. 2
- 7 Fork, shift, No. 3
- 8 Pin, straight
- 9 Shaft, shift fork, No. 1
- 10 Shaft, shift fork, No. 2
- 11 Shaft, shift fork, No. 3
- 12 Gasket, extension housing
- 13 Pin, ring
- 14 Housing, extension
- 15 Bolt, with washer
- 16 Bushing, bimetal formed
- 17 Seal, type "T" oil
- 18 Deflector, extension housing dust
- 19 Boot, shift lever cap
- 20 Bushing, select return
- 21 Gasket
- 22 Plate, select return
- 23 Bolt, select return plate set
- 24 Spring, compression
- 25 Seat, select return spring
- 26 Knob, shift lever
- 27 Lever assembly, shift
- 28 Retainer, control shift lever
- 29 Spring, compression



- 30 Ball 1
- 31 Shaft, select return
- 32 Pin, ring
- 33 Gasket, control shift lever retainer, No. 1

Fig. 2-86 Transmission Component Parts (2)

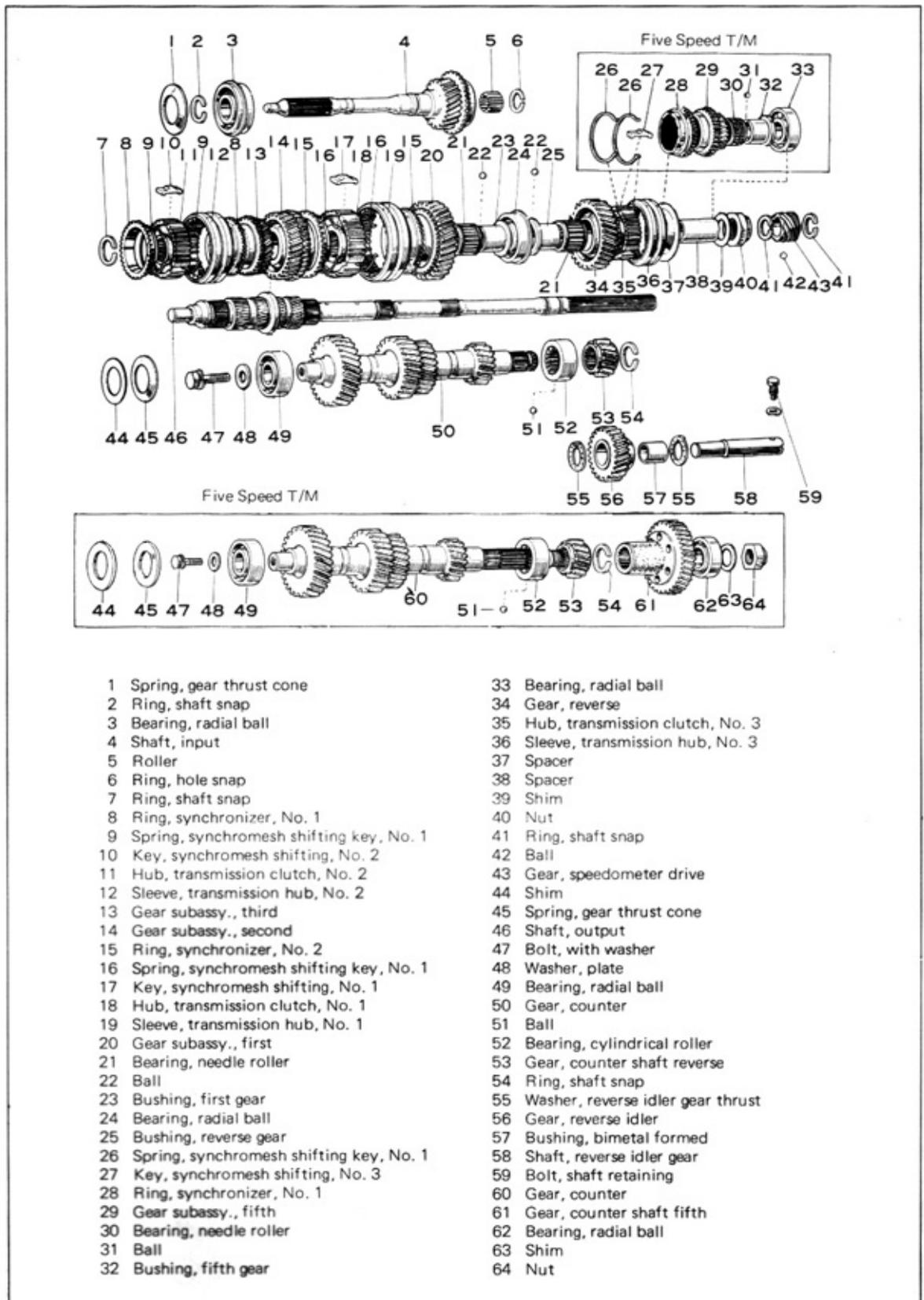


Fig. 2-87 Transmission Component Parts (3)

REMOVAL

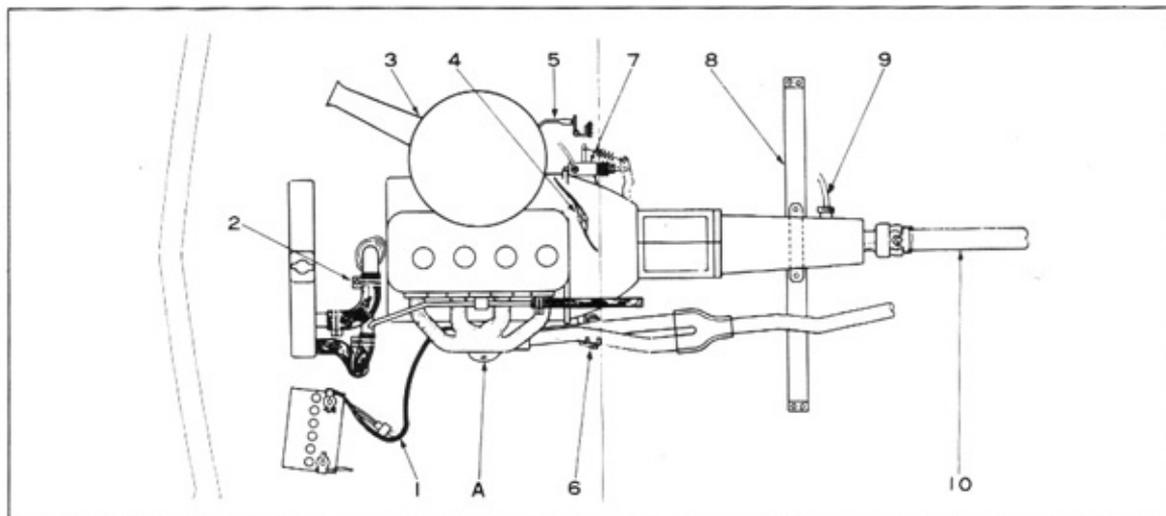


Fig. 2-88 Transmission Removal

1. Remove the shift lever from inside the vehicle.
2. Perform the following work in the engine room :
 - (1) Disconnect the cable (1) from the battery.
 - (2) Drain out the cooling water and disconnect the hose (2) from the engine.
 - (3) Remove the air cleaner (3), rod (5), and starter.
 - (4) Disconnect the back-up lamp wire (4).
3. Jack up the vehicle and rest it on stands. Then perform the following work :
 - (1) Disconnect the exhaust pipes at the flange A and remove the clamp (6).
 - (2) Remove the release cylinder (7) and the cable (9).
 - (3) Remove the propeller shaft (10) and the same time, insert Transmission Oil Plug [09325-12010].
 - (4) Support the transmission on jack and remove the rear support (8).

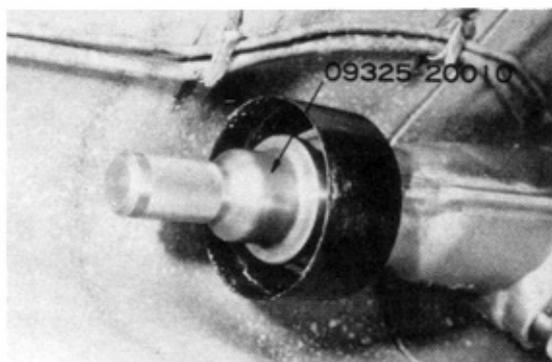


Fig. 2-89 Oil Plug Installation

4. Lower the jack slightly and remove the stiffener plate and the clutch housing mounting bolts.
5. Remove the jack and draw out the transmission assembly to the rear.

DISASSEMBLY

Caution : Clutch housing, LH and RH transmission cases, and extension housing are made of aluminum alloy so that special care must be taken in handling these parts, especially their finished surfaces.

1. Remove the drain plug and drain out the gear oil.
2. Remove the clutch housing.

Notes :

1. When removing the clutch housing, care must be taken to see that the two gear thrust cone springs (at front bearing and at counter bearing) do not fall off.
2. Remove the clutch housing with the front bearing retainer, clutch release bearing, and fork still attached.

3. Remove the extension housing.
 - (1) Remove the bolt (1) and take out the shaft sleeve and driven gear.
 - (2) Remove the housing (6 bolts).

Caution: Take care not to allow the output shaft rear end splines to damage the oil seal (2).

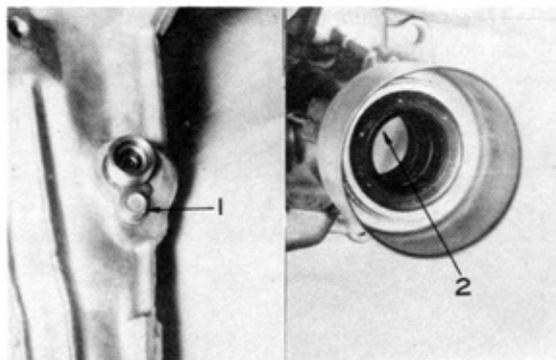


Fig. 2-90 Extension Housing Removal

4. Separate the LH and RH transmission cases and take out the back-up lamp switch and the balls.

Note: Separate the transmission case by tapping lightly the protrusion at the RH case with a wooden mallet. Avoid inserting a screwdriver into the case joint and prying the case apart.

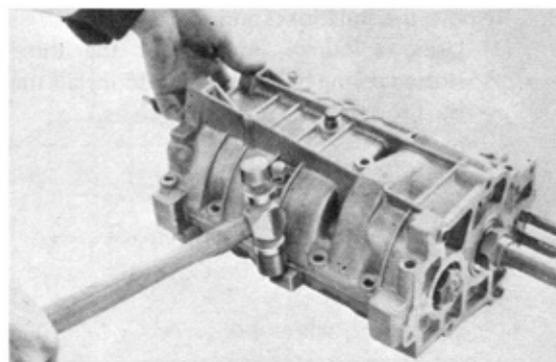


Fig. 2-91 Transmission Case Disassembly

5. Measure the backlash in all gears and record the values for use as reference during re-assembly.

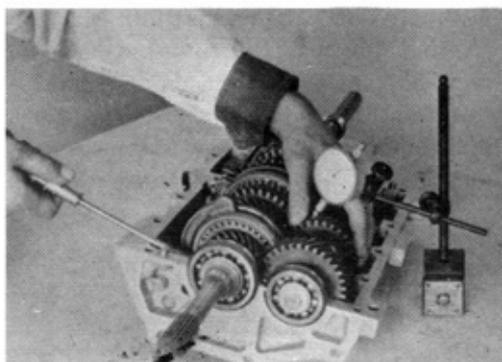


Fig. 2-92 Backlash Measurement

6. Take out the counter gear assembly.
 - (1) Take out the counter gear carefully from the case RH.
 - (2) Take out the ball (1) (turn stopper for counter second bearing).

Note: Ball can be removed easily with a magnet.

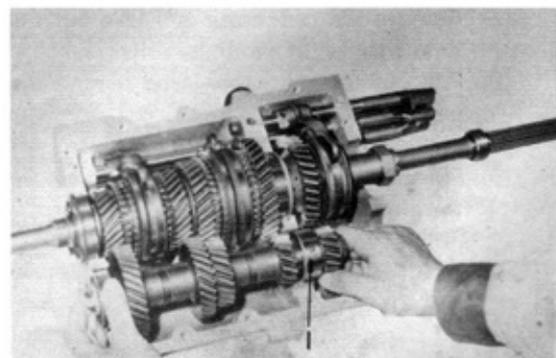


Fig. 2-93 Counter Gear Removal

7. Take out the input and output shafts together as one unit.

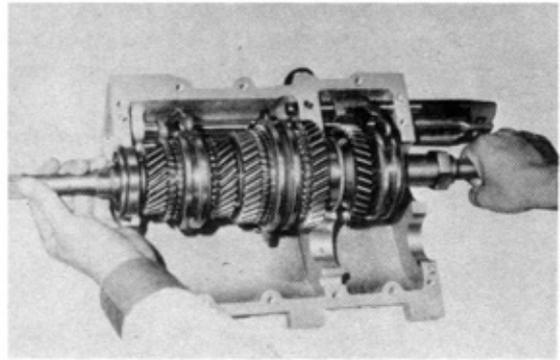


Fig. 2-94 Input and Output Shaft Removal

8. Remove the shift forks and shafts.
 - (1) Using a punch, knock out the three slotted spring pins pressed in to install the shift forks to the shift fork shafts.

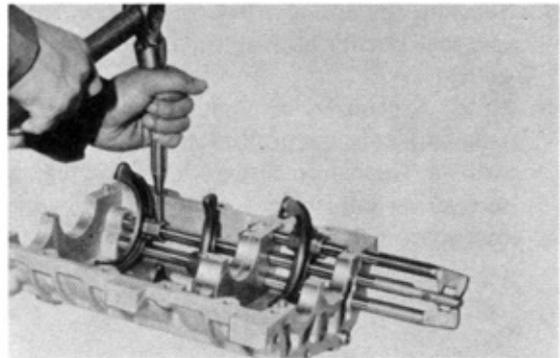


Fig. 2-95 Punching Out Slotted Spring Pin

Note : In removing the shift fork No. 1 from the shift fork shaft No. 1, the pin may not be removed completely from the shift fork, but this will not prevent the shaft from being pulled out. Do not attempt to punch out this pin forcibly.

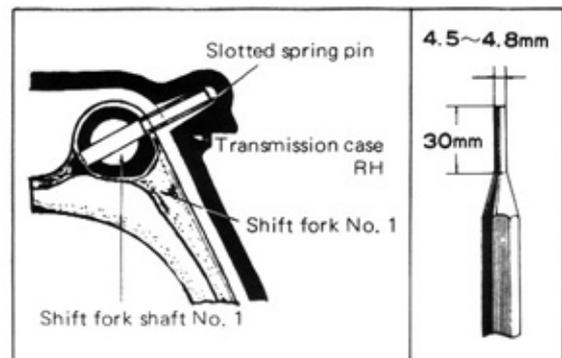


Fig. 2-96 Slotted Spring Pin Removal

- (2) Remove the case cover and take out the three springs (6) and three balls (7).
- (3) Pull out the shaft No. 1 and remove the pin (8).
- (4) Pull out the shaft No. 3 (5).
- (5) Pull out the shaft No. 2 (4) and remove the pin (9).

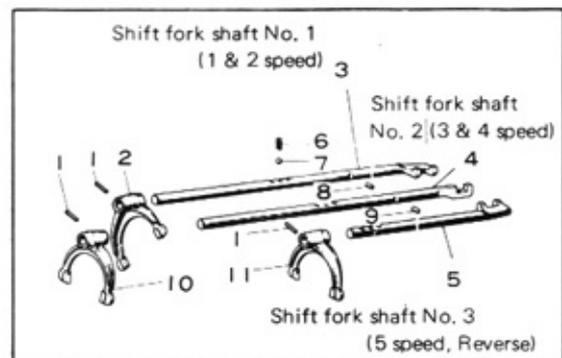


Fig. 2-97 Fork Shaft Removal

9. Remove the reverse idler gear from the transmission case LH.
 - (1) Before removing the gear, measure the thrust clearance and record it for use as reference in inspection.
 - (2) Remove the bolt (6) and pull out shaft (5) in arrow direction, and then take out parts (1)–(4).

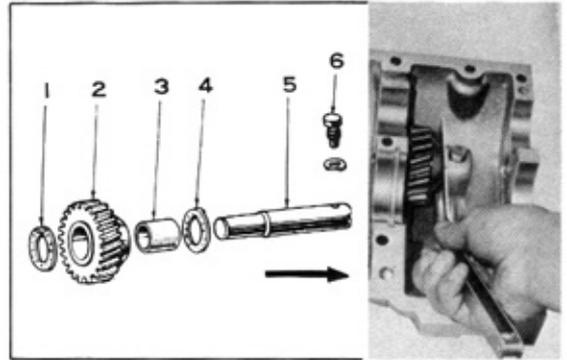


Fig. 2-98 Reverse Idler Gear Removal

10. Remove the various parts from the output shaft.

Note :

1. Before removing the gears, measure their thrust clearances and record the values for use as reference in inspection.
2. The steel balls in the output shaft can be removed easily with a magnet.
3. It would be preferable to remove the hubs with the sleeve, keys, and springs still attached.

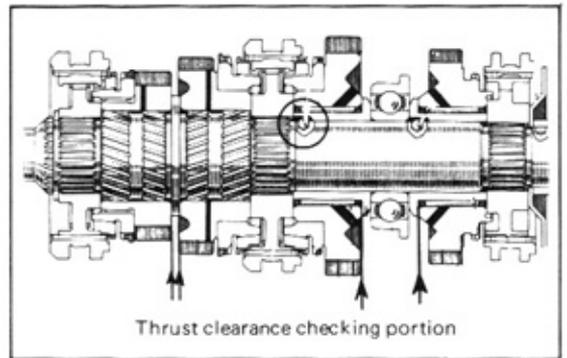


Fig. 2-99 Thrust Clearance Measurements

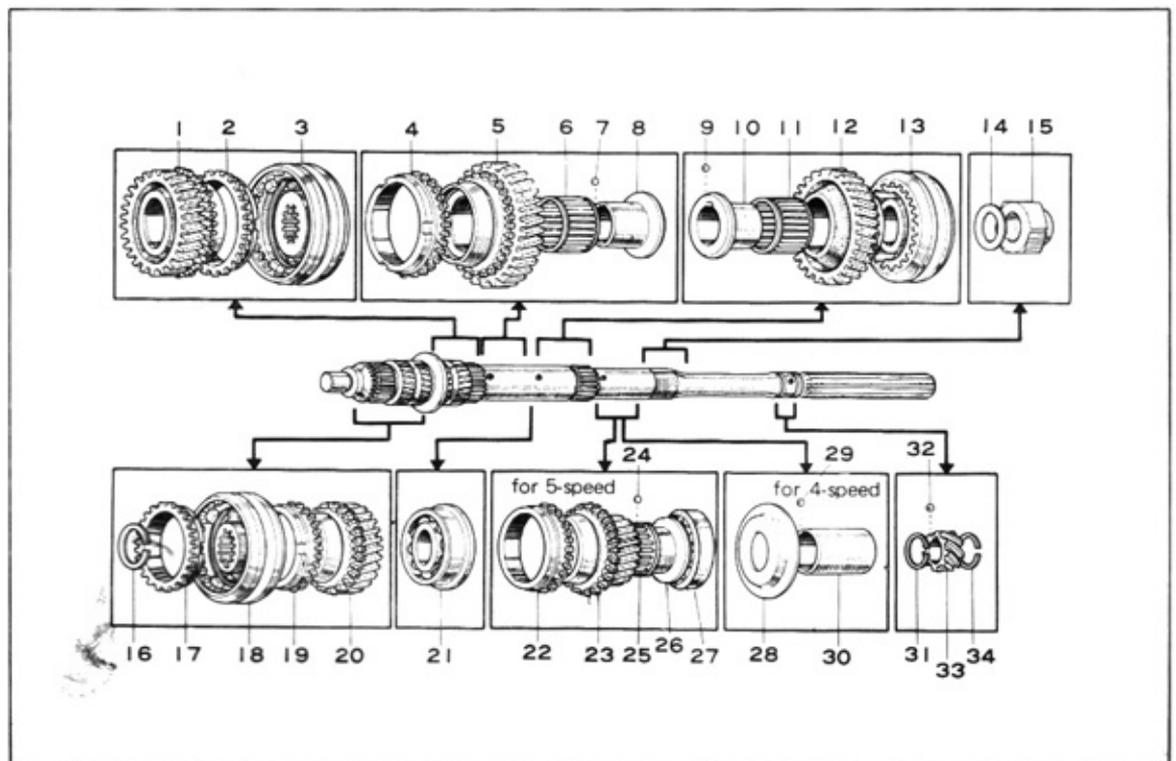


Fig. 2-100 Parts Removal

- (1) Disengage the snap ring (16) and take out the parts (17)–(20).
- (2) Take out the parts (31)–(34).

Note : Use Snap Ring Expander [09905-00010] to disengage the snap rings (16), (31), and (34).

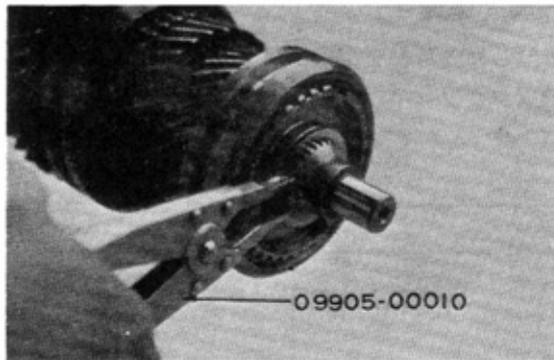


Fig. 2-101 Disengaging Snap Ring

- (3) Loosen the peened part of nut (15) with a sharp-pointed punch, and using Output Shaft Bearing Lock Nut Wrench [09326-12011] with handle attached, remove the nut (15) and take out the washer (14).

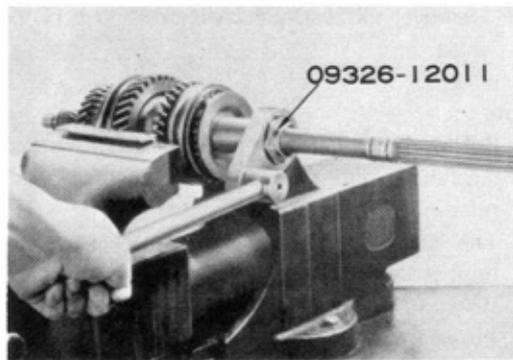


Fig. 2-102 Removing Nut.

- (4) Remove the plate (28) and take out ball (29) and spacer (30). (4-Speed).
- (5) Remove the parts (22), (23), (25), (26), and (27), and take out the ball (24). (5-speed).
- (6) Remove the parts (10)–(13), and take out the ball (9).
- (7) Remove the parts (4)–(8), and take out the ball (7).
- (8) Remove the parts (1)–(3).
- (9) Disassemble the clutch hubs No. 1, No. 2, and No. 3.

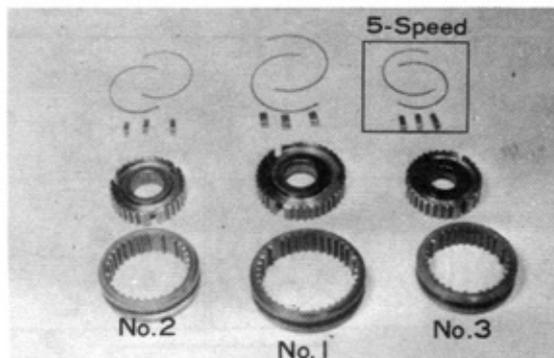


Fig. 2-103 Clutch Hub Disassembly

11. Remove the shift lever retainer subassembly from the extension housing.
 - (1) Remove the bushing (1) and take out gasket (2) and (9) and shaft (10).
 - (2) Remove the bolt (4) and take out (3), (5), (6), (7), and (8).

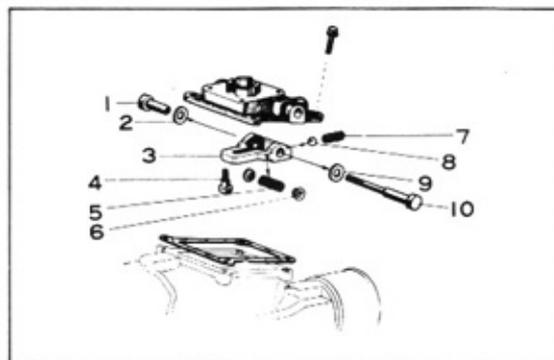


Fig. 2-104 Shift Lever Retainer Disassembly

INSPECTION AND REPAIRS

Inspect all disassembled parts in accordance with the instructions given below, and repair or replace any part found defective.

BACKLASH AND THRUST CLEARNACE

Check the backlash and thrust clearance of all gears and if found exceeding the limit, replace the bushing or gear.

Table 2-6 Backlash and Thrust Clearance of Gears

	Part Name	Reference Value	Wear Limit
Backlash	Input shaft x counter gear	0.10–0.20 mm (0.004–0.008")	0.40 mm (0.016")
	Third gear x counter gear	0.10–0.20 mm (0.004–0.008")	0.40 mm (0.016")
	Second gear x counter gear	0.10–0.20 mm (0.004–0.008")	0.40 mm (0.016")
	First gear x counter gear	0.10–0.20 mm (0.004–0.008")	0.40 mm (0.016")
	Reverse gear x counter gear	0.10–0.20 mm (0.004–0.008")	0.40 mm (0.016")
	Fifth gear x counter gear	0.10–0.20 mm (0.004–0.008")	0.40 mm (0.016")
Thrust Clearance	First gear	0.10–0.25 mm (0.006–0.010")	0.5 mm (0.020")
	Second gear	0.15–0.25 mm (0.006–0.010")	0.5 mm (0.020")
	Third gear	0.15–0.30 mm (0.006–0.012")	0.6 mm (0.024")
	Reverse gear	0.20–0.30 mm (0.008–0.012")	0.6 mm (0.024")
	Reverse idler gear	0.05–0.50 mm (0.002–0.020")	1.0 mm (0.039")
	Fifth gear	0.15–0.25 mm (0.006–0.010")	0.5 mm (0.020")

OUTPUT SHAFT

1. Needle roller contacting surface (1) at shaft end for damage or wear.
2. Parts (2) and (3), serving as bushings for second and third gears, and flange part (4) in between for damage or wear.
Bushing outside diam wear limit 37.8 mm (1.488")
Flange part thickness wear limit 4.0 mm (0.157")

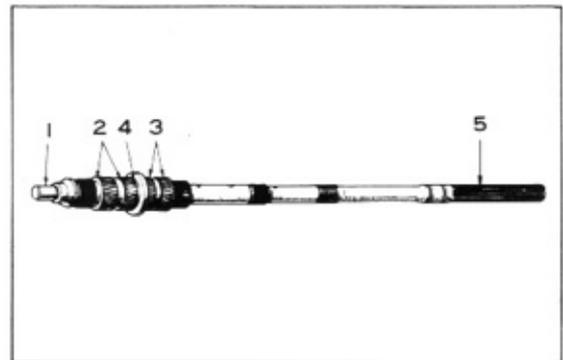


Fig. 2-105 Output Shaft Inspection

3. Shaft rear end splines
 - (1) Splines (5) for damage or wear.
 - (2) Fit the splines into propeller shaft universal joint yoke with sleeve and check if excessively loose or slides improperly.
4. Shaft bending
Support the shaft on the center holes at both ends and measure the deflection at the bearing surface at center of shaft.
Bending limit 0.03 mm (0.0012")
Note: Amount of bending will be equal to one-half of deflection reading.

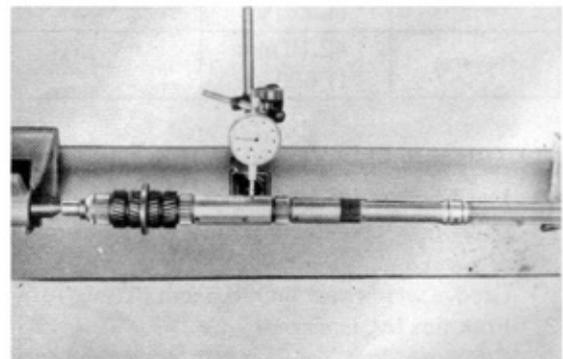


Fig. 2-106 Output Shaft Deflection Inspection

INPUT SHAFT

1. Check the parts (1)–(7) for damage or wear.
2. Fit the splines (6) into clutch disc and check if excessively loose or slides improperly.
3. Bearing (transmission front) for damage or wear. Rotate the bearing while pressing the balls with hand and check if there is abnormal resistancy or sticking.

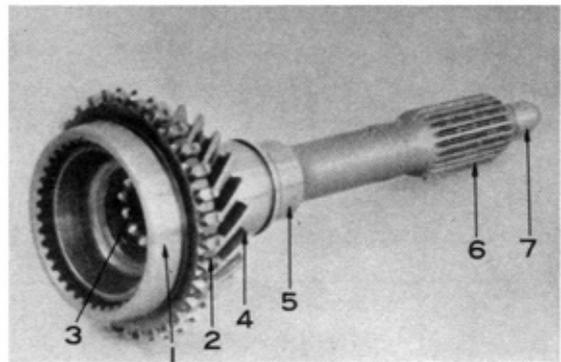


Fig. 2-107 Input Shaft Inspection

GEAR BUSHINGS AND BEARINGS (FIRST, FIFTH, AND REVERSE)

1. Bushing for damage or wear.
Oil clearance limit 0.064 mm (0.0025")
Reference 0.009–0.0064 mm (0.00035"–0.0025")
2. Bearing for damage or wear. Reassemble the bearing between bushing and first gear, and also between reverse gear, and check if there is abnormal resistance or sticking.

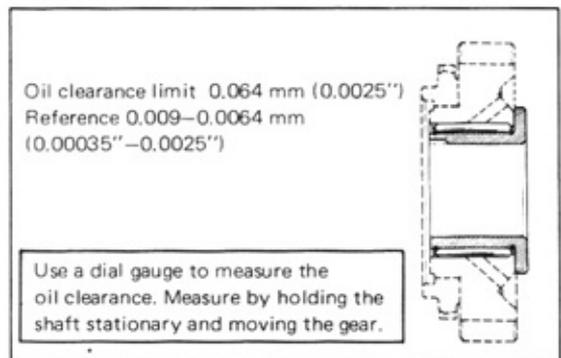


Fig. 2-108 Bushing and Bearing Inspection

FIRST, SECOND, THIRD, FIFTH, AND REVERSE GEARS

Check the following parts for wear or damage.
Gear inside surface (1) Tapered part (2)
Gear teeth (3) Gear ends (4)

Table 2-8 Gear Inner Surface wear Limit

	Inside Diameter Wear Limit	Oil Clearance Limit
First	42.15 mm (1.660 in)	—
Second Third	38.15 mm (1.502 in)	0.101 mm (0.0040 in)
Fifth	36.06 mm (1.420 in)	—
Reverse	42.15 mm (1.660 in)	—

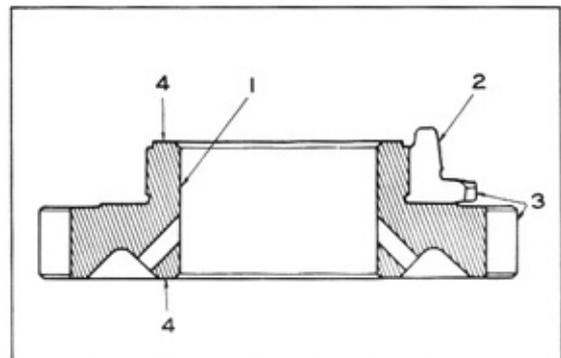


Fig. 2-109 Gear Inspection

CLUTCH HUB SLEEVE AND FORK

1. Inside splines (1) for damage or wear.
2. Shaft fork contacting groove (2) for damage or wear.
Groove width wear limit 8.5 mm (0.355")
3. Fork tips for damage or wear.
Clearance limit between hub sleeve and fork 1.0 mm (0.039")

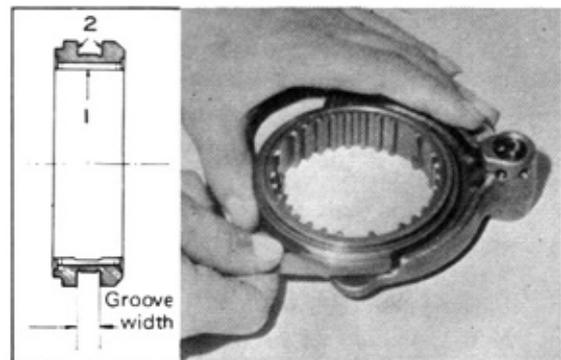


Fig. 2-110 Hub Sleeve Inspection

CLUTCH HUBS

1. Clutch hub outside splines (1) for damage or wear.
2. Synchromesh shifting key grooves (2) for damage or wear.
3. Gear contacting end faces (3) for damage or wear.
4. Shall slide smoothly when fitted together with hub and hub sleeve.

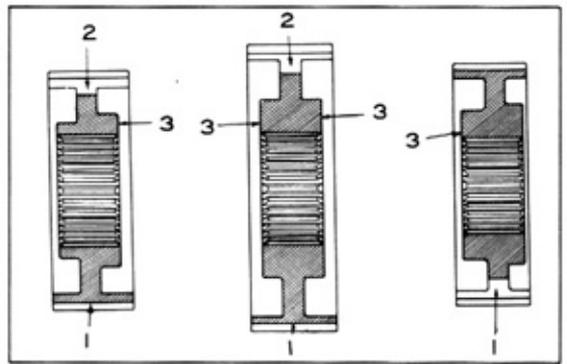


Fig. 2-111 Clutch Hub Inspection

SYNCHROMESH SHIFTING KEYS AND KEY SPRINGS

1. Key center protrusion (1) for wear.
2. Key spring for weakening, and key contacting surfaces (2) for wear.

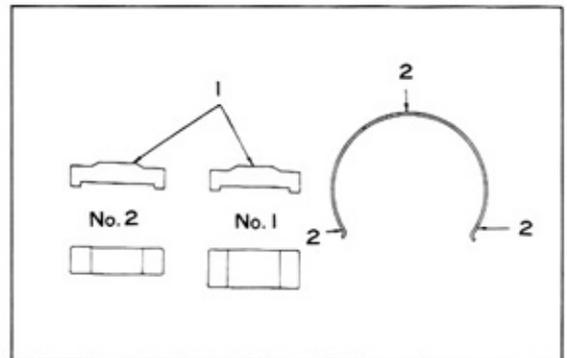


Fig. 2-112 Key and Key Spring Inspection

SYNCHRONIZER RINGS

1. Splines (1) for damage or wear.
2. Tapered part (2) (part contacting against keys) for damage or wear.
Clearance when synchronizer ring and gear are pressed together by hand.
Limit 0.8 mm (0.031")
Reference 1.0–2.0 mm (0.04"–0.08")
3. When the synchronizer ring and gear are pressed together and rotated by hand, there should be no slipping between the ring and tapered part. (Braking effect).

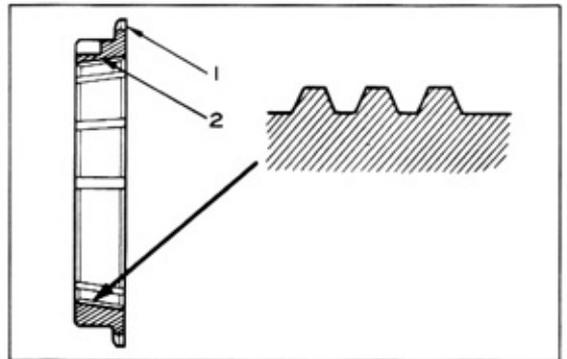


Fig. 2-113 Synchronizer Ring Inspection

COUNTER GEAR AND BEARING

1. Counter gears (1) and reverse gear (5) for damage or wear.
2. Counter gear roller bearing contacting surface (2) for damage or wear.
3. Bearing (3) (counter shaft front) for damage or wear.
4. Cylindrical roller bearing (4) for damage or wear.

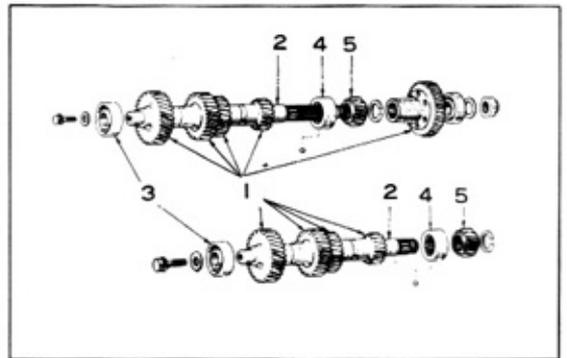


Fig. 2-114 Counter Gear and Bearing Inspection

REVERSE IDLER GEAR AND REVERSE IDLER GEAR SHAFT

1. Reverse idler gear tooth part (1) for damage or wear.
2. Bimetal formed bushing (2) inside the gear for damage or wear.
Inside diameter wear limit 16.1 mm (0.634")
3. Reverse idler gear shaft for damage or wear.
Outside diameter wear limit 15.9 mm (0.626")

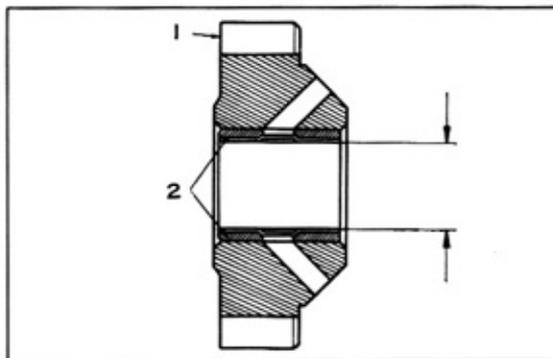


Fig. 2-115 Reverse Idler Gear Inspection

SPPEDOMETER GEAR

1. Drive gear (1) and driven gear (2) teeth for damage or wear.
2. Driven gear shaft (3) for damage or wear.
3. Bushing (4) inside shaft sleeve for damage or wear.
4. "O" ring for deterioration or wear.

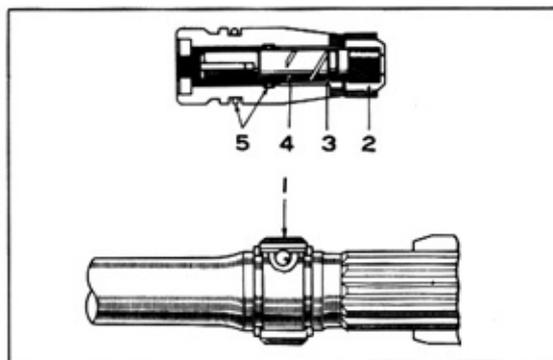


Fig. 2-116 Speedometer Gear Inspection

FRONT BEARING RETAINER

1. Type "T" oil seal lip (1) for deterioration or wear.
2. Part (2) sliding against clutch release hub for damage or wear.
Outside diameter wear limit 32.9 mm (1.295")

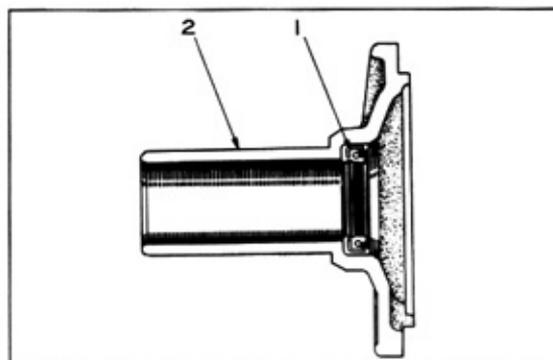


Fig. 2-117 Front Bearing Retainer Inspection

SHIFT LEVER HOUSING AND SHIFT LEVER

1. Shift lever part (1) fitting into select return plate for damage or wear.
Clearance reference value 0.5–1.0 mm (0.020"–0.040")
2. Shift lever part (2) sliding against shift fork shaft for damage or wear.
Clearance reference value 0.2–0.6 mm (0.008"–0.024")
3. Parts (3) and (4) for 5-speed transmission reverse for damage or wear.

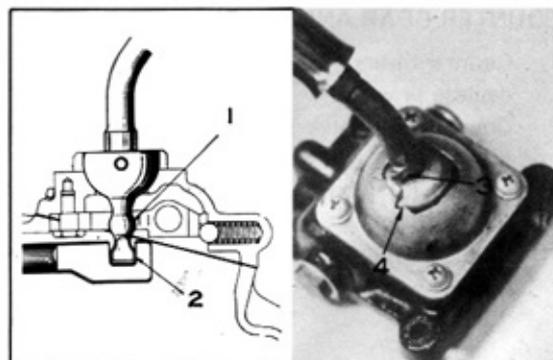


Fig. 2-118 Shift Lever Inspection

EXTENSION HOUSING

1. Type "T" oil seal lip (1) for deterioration or wear.
2. Bimetal formed bushing (2) for damage or wear.
Inside diameter wear limit 32.2 mm (1.268")
3. Extension housing dust deflector (3) for damage and for installed state.

SHIFT FORK SHAFT PARTS

1. Sliding surfaces of shafts (3), (4) and (5) for damage or wear.
2. Spring (6), ball (7), and pins (8) and (9) for damage or wear.

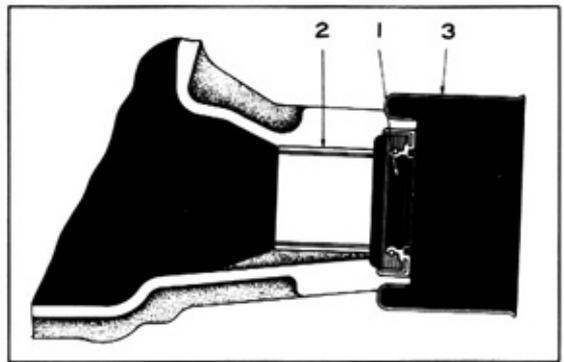


Fig. 2-119 Extension Housing Inspection

REPLACEMENT**BEARING (TRANSMISSION FRONT)**

1. Disengage the snap ring at front end of bearing by using Snap Ring Expander No. 1 [09905-00010].
2. Using a press, force out the shaft from the bearing.
3. Install the new bearing by using Front Hub Inner Bearing Cup Replacer (No. 5) of Bearing Replacing Replacer Set [09608-20010] and a press.
4. Select a shaft snap ring from Table 9-9 that will engage securely in the groove and provide small axial play between the bearing and input shaft and install it on the input shaft, using Snap Ring Expander [09905-00010].

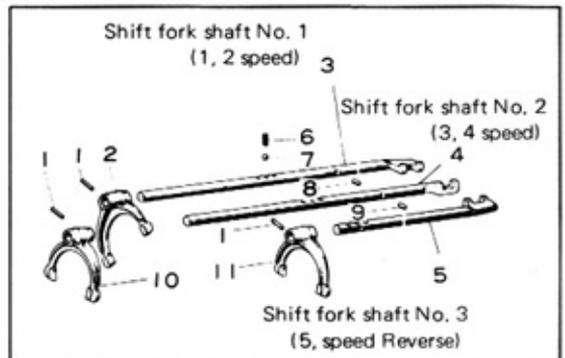


Fig. 2-120 Shift Fork Shaft Parts Inspection

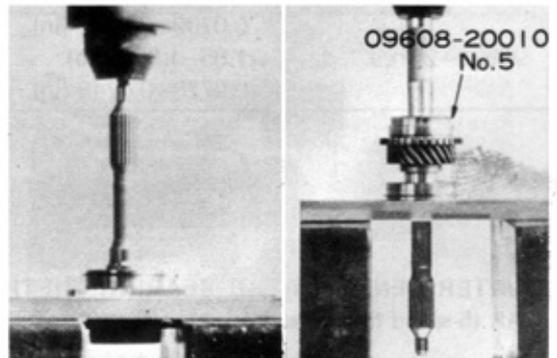


Fig. 2-121 Bearing Replacement

Table 2-9 Snap Ring Sizes

Part No.	Thickness
90520-28067-A	2.35-2.40 (mm) 0.0925-0.0954 (in)
90520-28205	2.40-2.45 (mm) 0.0945-0.0965 (in)
90520-28068-A	2.45-2.50 (mm) 0.0965-0.0984 (in)
90520-28206	2.50-2.55 (mm) 0.0984-0.1004 (in)
90520-28207	2.55-2.60 (mm) 0.1004-0.1024 (in)

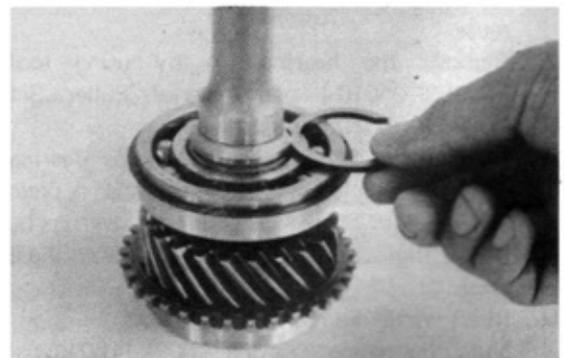


Fig. 2-122 Snap Ring Selection

COUNTER FRONT BEARING

1. Remove the bolt and separate the bearing from the counter gear by using a press or part [09953-20010] of Universal Puller Set [09950-20010].
2. Using a press, force the counter gear into the new bearing, and install the bolt.
Bolt torque 300–450 kg-cm (22–36 ft-lb)

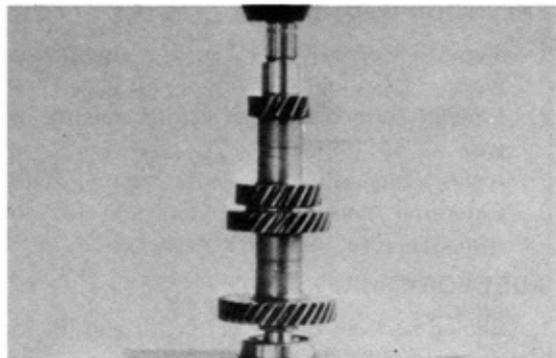


Fig. 2-123 Bearing Replacement

COUNTER CENTER BEARING

(4-speed transmission)

1. Remove the ring (3), and take out gear (2) and bearing (1).
2. Select a shaft snap ring from Table 2-10 that will engage securely in the groove and give small axial play between the counter gear and counter shaft reverse gear, and install it on the counter gear.

Table 2-10 Snap Ring Sizes

Part No.	Thickness
90520-21198	1.80–1.85 (mm) 0.0709–0.0728 (in)
90520-21199	1.85–1.90 (mm) 0.0728–0.0748 (in)

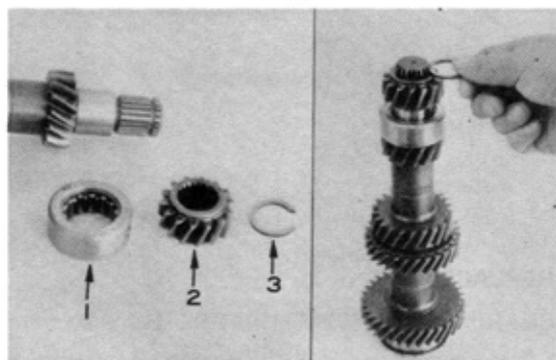


Fig. 2-124 Cylindrical Roller bearing Installation

COUNTER CENTER, REAR BEARING, FIFTH GEAR (5-speed transmission)

1. Loosen the peened part of nut and remove the nut it.
Note : This nut has left hand threads. Do not reuse.
2. Remove the bearing (4) by using tool [09953-35010] of Universal Puller Set [09950-20010] or a press.
3. Remove the fifth gear (3) by using Bearing Replacer Set [09608-20010] and a press and take out reverse gear (2) and bearing (1).
4. Install the new parts in reverse order, using a press.
5. Insert washer and screw on the nut.
Nut tightening torque 800–1100 kg-cm (59–80 ft-lb)

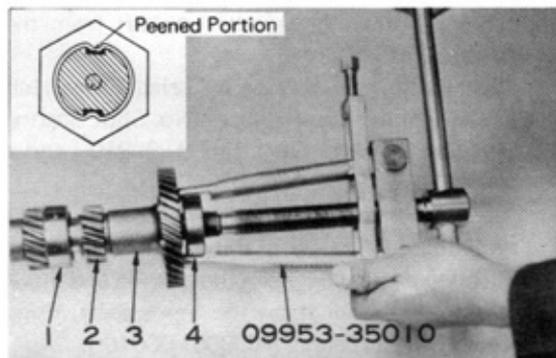


Fig. 2-125 Radial Ball Bearing Removal

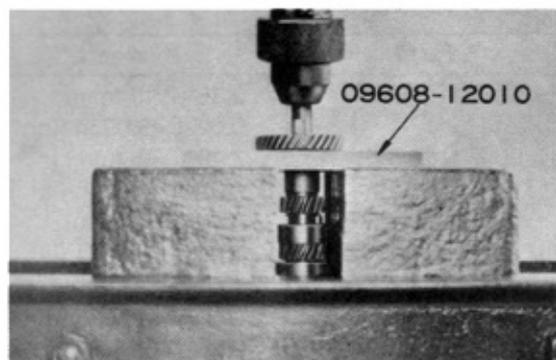


Fig. 2-126 Fifth Gear Removal

SYNCHRONIZER RING CONTACT CORRECTION

Synchronizer ring seating is performed when the braking effect between the ring and gear is defective or when the ring is replaced.

1. Apply a thin coat of abrasive compound (fine grade) to the tapered parts of ring and gear, and lap the parts by pressing together and turning by hand.

Note : More than 80% of the entire ring and gear tapered parts should be contacting.

2. Remove the abrasive compound with gasoline or other solvent, and check once more to see that there is proper braking effect between the synchronizer ring and gear.

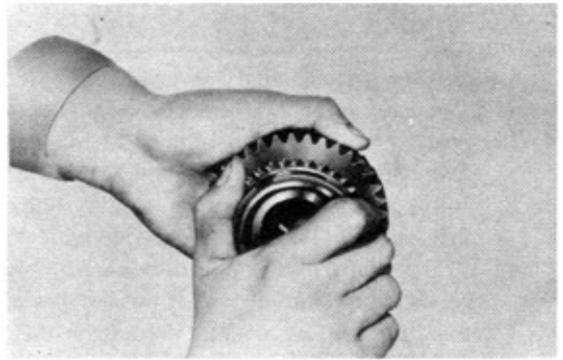


Fig. 2-127 Synchronizer Ring Seating

TYPE "T" OIL SEAL

1. Remove the type "T" oil seal from the extension housing.

Note : Use of Oil Seal Puller [09308-10010] will make the work easier.

2. Press the new oil seal into the extension housing by using Transmission oil Plug [09325-12010].

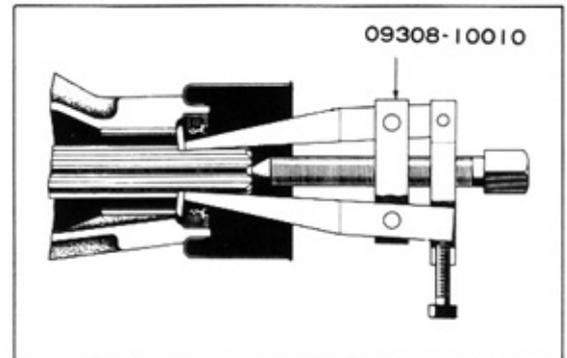


Fig. 2-128 Removing Oil Seal

BIMETAL FORMED BUSHING

1. Remove the type "T" oil seal.
2. Heat the rear part of extension housing with piston heater (oil bath type) to 80–100°C (176–212°F) and using Extension Housing Bushing Replacer [09307-20010] and a press, force out the bimetal formed bushing.
3. Have the rear part of extension housing heated to 80–100°C and using Extension Housing Bushing Replacer [09307-20010] and a press, force in the new bimetal formed bushing.

Note : Position the bimetal formed bushing so that its 5 mm diam. hole will be positioned upward and press in up to a distance of 15 mm (0.59") from the end surface A.

4. Finish the bushing bore.
Bore finished dimension 32.000–32.025 (1.25984"–1.26092")
Oil clearance Reference Value
0.009–0.059 mm (0.00035"–0.00323")
5. Install new type "T" oil seal.

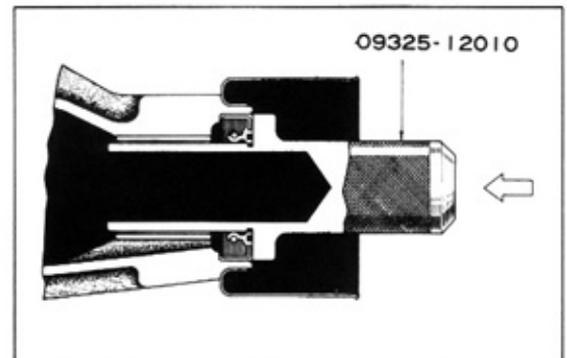


Fig. 2-129 Pressing In Oil Seal

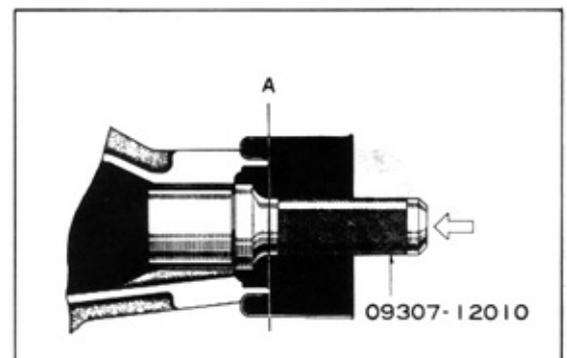


Fig. 2-130 Bushing Replacement

ASSEMBLY

Note :

1. Wash and clean all parts to be assembled.
2. Use new gaskets and apply genuine Toyota Seal Packing No. 5 to both surfaces of all specified places before assembling.
3. Apply gear oil or grease to the sliding surfaces of all parts before assembling.
4. If the snap rings removed at disassembly are to be used again, correct their shapes so that they will be securely engaged in their grooves.
5. Sufficient care must be taken not to exceed the specified torques when tightening the bolts and nuts on the RH and LH transmission cases, extension housing, and clutch housing as these are made of aluminum alloy. Also do not mar their joining surfaces.
6. Sufficient care must be taken in removing, installing, and nut tightening on clutch hubs: No. 1, No. 2, and No. 3, as these parts are made of sintered alloy.
7. Greasing the balls before installing them is recommended.

1. Install the shift forks and shift shafts.

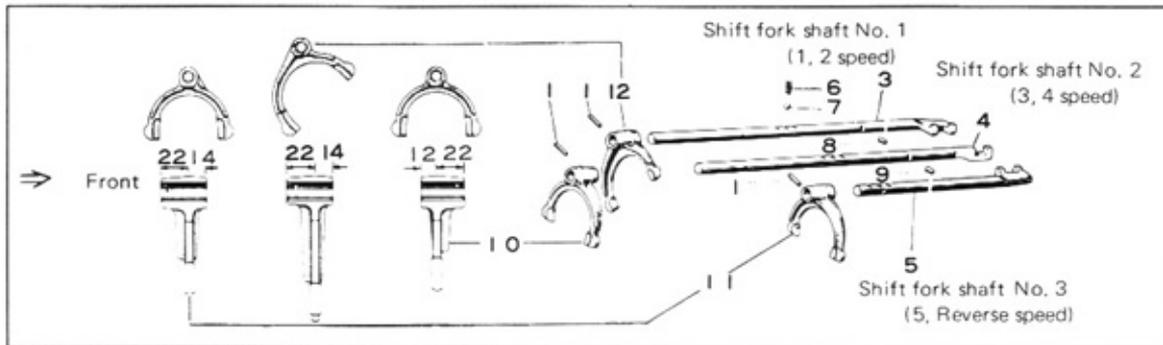


Fig. 2-131 Shift Fork and Shaft Reassembly

Note: Make sure that the directions and positions of the forks and shafts are correct.

- (1) Insert the shaft (4) into case after inserting fork (10).
- (2) Insert the pins (8) and (9) fully into the grooves in shaft (4) from both sides.
Note: Grease the pins (8) and (9) before assembling them.
- (3) Insert the shafts (3) and (5) into the case after inserting the forks (12) and (11) respectively.
- (4) Insert the respective springs (6) and balls (7) into the transmission case and install transmission cover.

Bolt torque 100–160 kg-cm
(7.2–10.9 ft-lb)

- (5) Check the springs (6), balls (7), and pins (8) and (9) to see that they operate properly.
- (6) Drive in the pins (1)

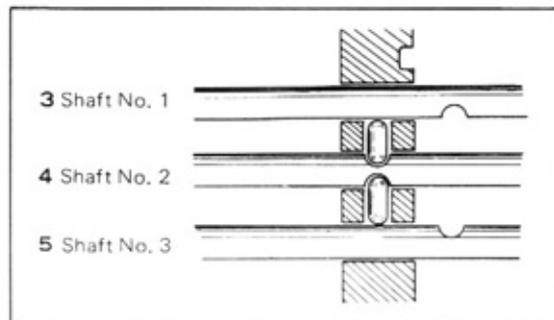


Fig. 2-133 Straight Pins Installed in Shift Fork Shaft

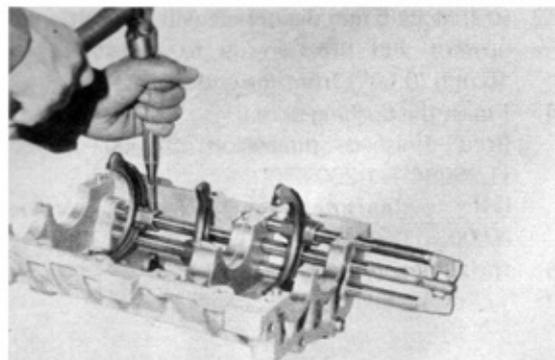


Fig. 2-133 Driving In Pins

2. Assemble the parts (1)–(4) in the order named to the clutch hubs No. 1, No. 2, and No. 3.

Notes :

1. Assemble only parts (1) and (2) to 4-speed transmission hub No. 3.
 2. Hub sleeves are directional parts.
 3. Hubs No. 2 and No. 3 are directional parts.
 4. Key springs must not be installed with their open ends facing the same direction.
 5. In the keys for 5-speed transmission hub No. 3, assemble them so that the longer distance (part A) from the protruded part will be positioned toward the front.
3. Install the various parts to the output shaft

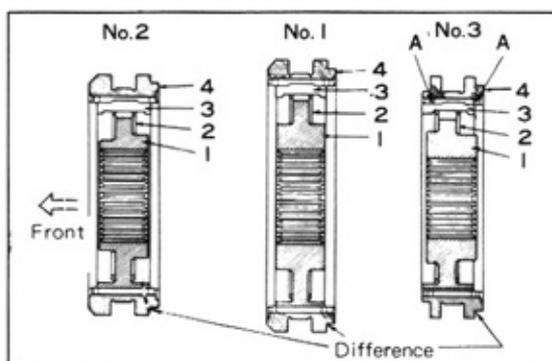


Fig. 2-134 Clutch Hub Reassembly

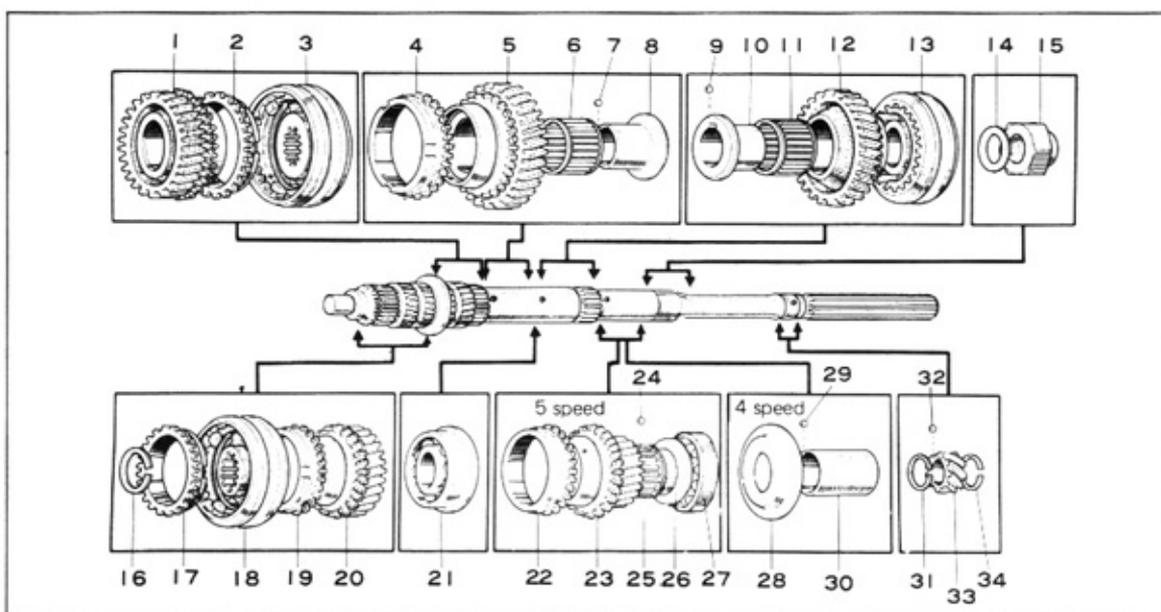


Fig. 2-135 Reassembly of Output Shaft

- (1) Install the parts (1), (2), and (3), and insert the ball (7)

Note : Line up the grooves in part (2) with the keys.

- (2) Fit the ball (7) into the groove in part (8) and install the parts (4), (5), (6), and (8).

Note : Line up the grooves in part (4) with the keys.

- (3) Insert the part (21) and insert the ball (9).

Note : Be sure that part (21) is assembled in correct direction.

- (4) Fit the ball (9) into the groove in part (10) and install the parts (10)–(13).

- (5) Insert part (28) and ball (29), and then

insert (30) after aligning its groove with the ball. (4-speed transmission).

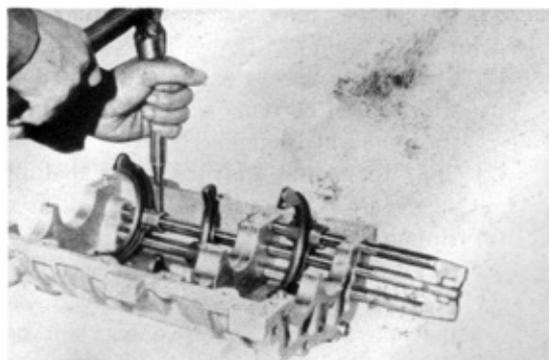


Fig. 2-136 Tightening Nut

- (6) Insert the ball (28), and after fitting the ball into the groove in (26), install the parts (22), (23), (25), (26), and (27). (5-speed transmission).

Note : Position the part (27) so that its seal plate will be facing the rear. Line up the grooves in part (22) with the keys.

- (7) Insert parts (14) and (15), tighten part (15) with Output Shaft Locknut Wrench [09326-12011] and thenpeen it.

Tightening torque 450-750 kg-cm (33-54 ft-lb).

- (8) Install part (31) and insert ball (32), insert part (33) after aligning its groove with the ball, and install part (33).

Note : Insert part (33) with number-punched surface facing the rear.

- (9) Install the parts (17)-(20), and after making sure that thrust clearance is small, install the snap ring (16).

- (10) Check the thrust clearances at all gears.

4. Fit the output and input shafts together and install them into the transmission case RH.

- (1) Fit the hub sleeve grooves to their respective shift forks.

- (2) Place the snap ring at bearing (1) against the case front surface.

5. Install the counter gear assembly into the case RH.

- (1) Grease the bearing (1)

- (2) Insert the ball (3) into ball hole in bearing (1) (for locking the bearing) and fit the ball into the ball hole in the case.

- (3) Place the snap ring at bearing (2) against the case front surface and install the counter gear assembly.

6. At the above state, check the following point :

- (1) Shift to all speeds and make sure that shifting can be done smoothly and that the gears will rotate.

- (2) Shift to neutral and make sure that all sleeves are at the center of gears.

- (3) Rotate the input and output shafts by hand to see that there is no excessive dragging resistance. Also, check to see that there is no excessive backlash or sleeve spinning.

Table 2-11 Shaft Snap Ring Sizes

Part No.	Thickness (mm)	Thickness (inch)
90250-30200	1.95-2.00	0.0768-0.0787
90250-30201	2.00-2.05	0.0787-0.0807
90250-30202	2.05-2.10	0.0807-0.0827
90250-30203	2.10-2.15	0.0828-0.0846
90250-30204	2.15-2.20	0.0846-0.0866

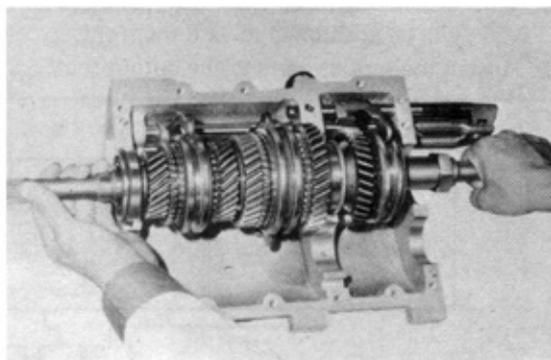


Fig. 2-137 Input and Output Shaft Installation

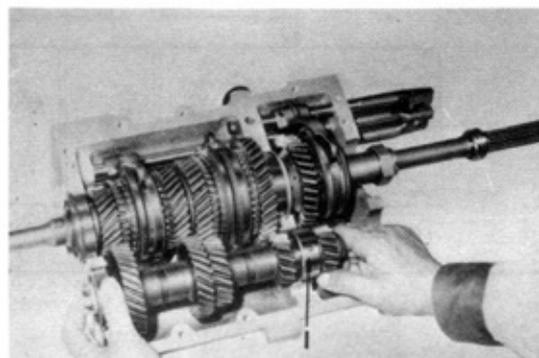


Fig. 2-138 Counter gear Installation

7. Install the reverse idler gear.

- (1) Grease the shaft, washers, and case sliding surfaces.

- (2) Fit the washer in the case groove and install the washer, gear, and shaft.

- (3) Line up the shaft groove, and screw in the shaft retaining bolt. Bolt torque 130-180 kg-cm (9.4-13.0 ft-lb)

8. Assemble together the transmission RH and LH cases.
 - (1) Apply a thin coat of liquid packing uniformly over the joining surface of case LH.

Note : Do not coat the area of about 13 mm diameter (1/2") for the back-up lamp switch.
 - (2) Line up the dowel pins and bolt together the RH and LH cases.

Bolt torque 150–200 kg-cm (10.9–14.5 ft-lb)

Caution : Do not intermix the bolts.

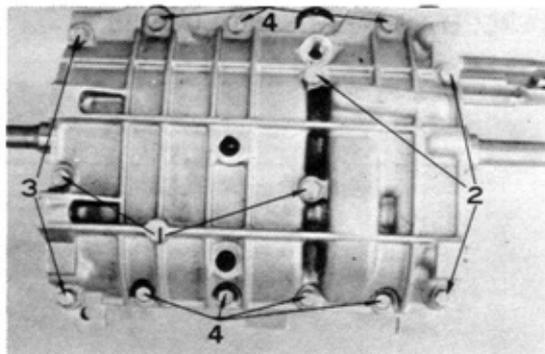


Fig. 2-139 Bolt Installation Positions

9. Install the back-up lamp switch over ball spring washer.

Bolt torque 300–500 kg-cm (22–36 ft-lb)
10. Install the extension housing to the transmission case over gasket.

Bolt torque 300–450 kg-cm (22–33 ft-lb)
11. Reassemble the shift lever retainer by following the disassembly procedures in reverse order, and install it to the extension housing.

Bolt torque 100–160 kg-cm (7.2–11.6 ft-lb) (86–139 in-lb)

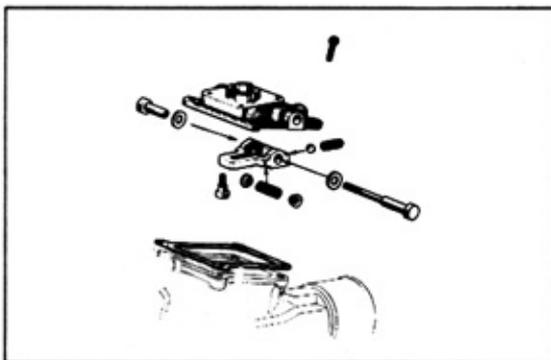


Fig. 2-140 Shift Lever Retainer Reassembly

12. Install the speedometer shaft sleeve and speedometer driven gear to the extension housing.

Bolt torque 40–70 kg-cm (36–61 in-lb)
13. Install the clutch housing to the transmission case over cone (1), washer (2), cone (3), and gasket.

Bolt torque 300–450 kg-cm (22–33 ft-lb)

Caution : Make sure that (1) and (3) are positioned correctly.

Note : Coating (1), (2), and (3) with grease will make the work easier.

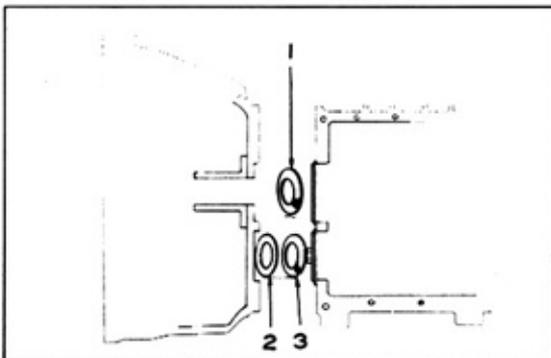


Fig. 2-141 Washer and Cone Installation

INSTALLATION

1. Using Clutch Guide Tool [09301–36010], check the disc location. (See P1-10)
2. Apply a thin coat of MP grease to the input shaft end, splines, and contacting surface surfaces between the release bearing and diaphragm spring.
3. Refer to P2-32 and install the various parts by following the removal procedure in reverse order.

Clutch housing x engine

Bolt torque 480–680 kg-cm (35–49 ft-lb)

4. Adjust the clutch release fork play. Refer to adjustment procedures P1-2.

Reference value 2.5–3.5 mm (0.055"–0.077")

5. Fill oil into transmission.

Oil type API service GL-4 classification gear
Oil Use SAE 80 throughout the year.
Quantity 1.54 liter (1.65 qt. U.S.)

4-SPEED TRANSMISSION (RA 20L)

GENERAL

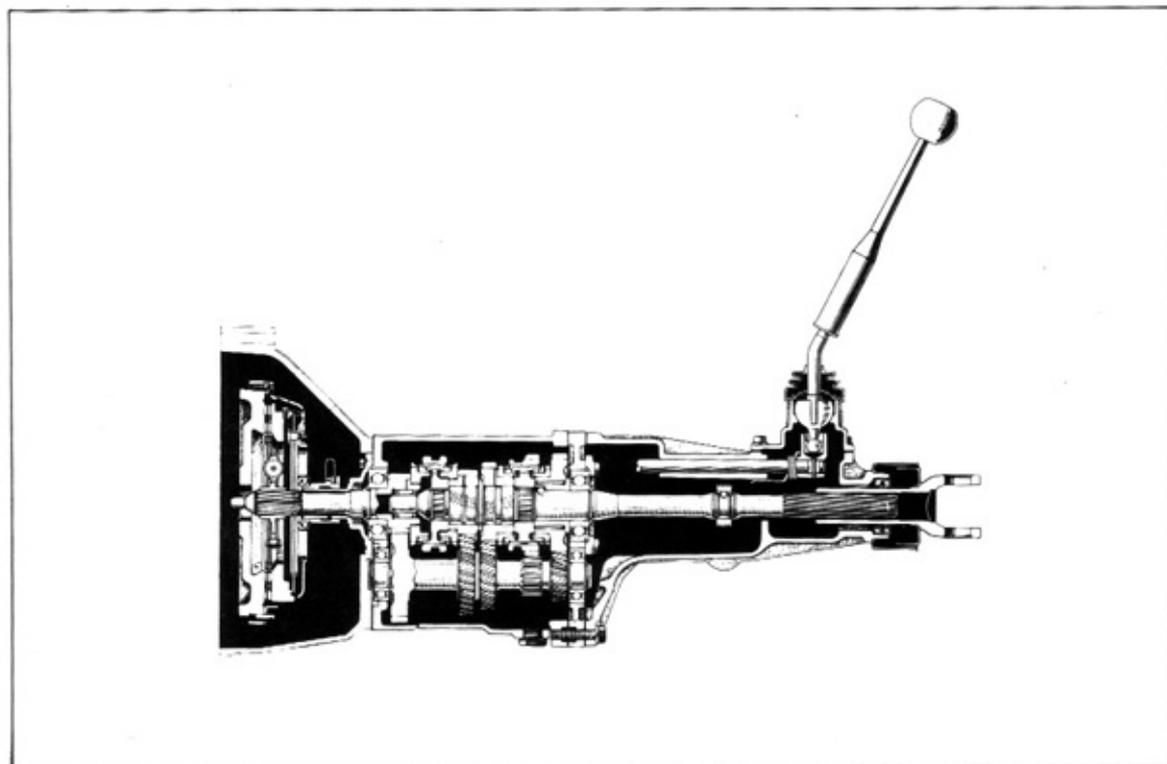


Fig. 2-142 Sectional Views of 4-Speed Transmission (RA20L)

SPECIFICATIONS

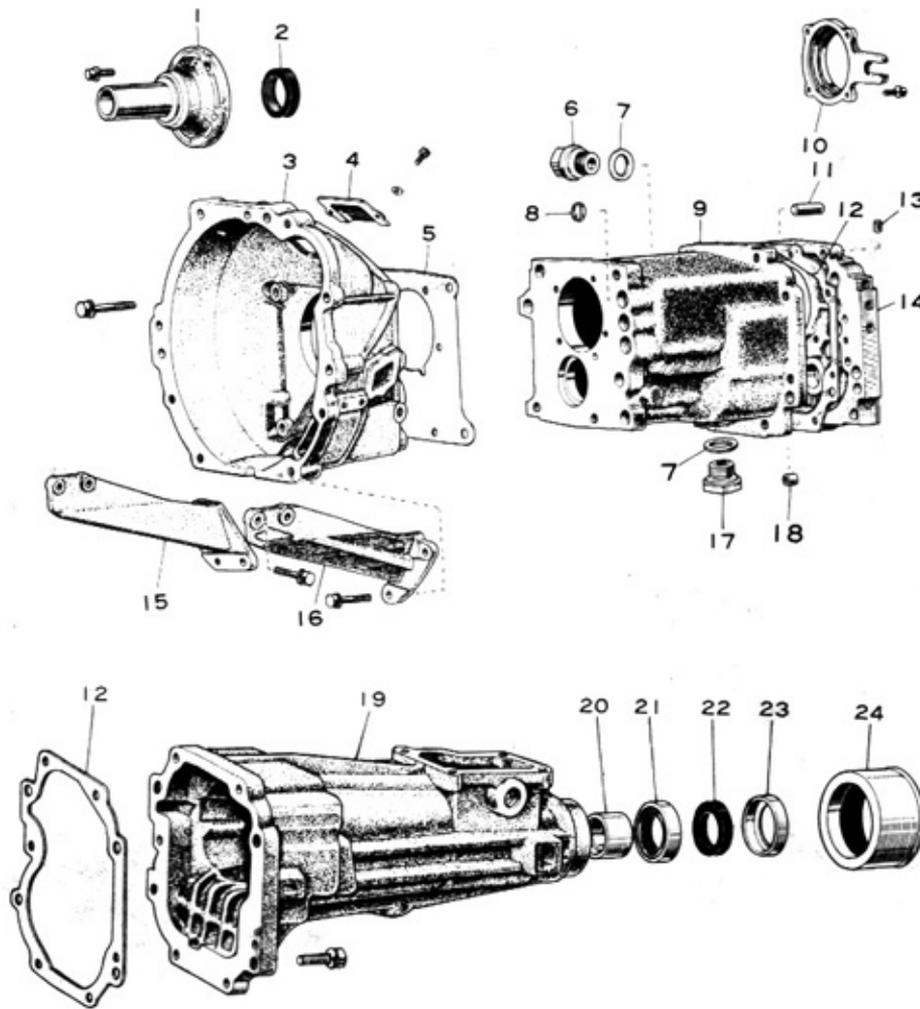
Table 2-12 Transmission Specifications

Type	Forward 1st, 2nd, 3rd, & 4th speeds all synchromesh. Reverse speed selective sliding type.	
Gear Ratios	First	3.579
	Second	2.081
	Third	1.397
	Fourth	1.000
	Reverse	4.399
Operating Method	Floor shift	

TROUBLE SHOOTING

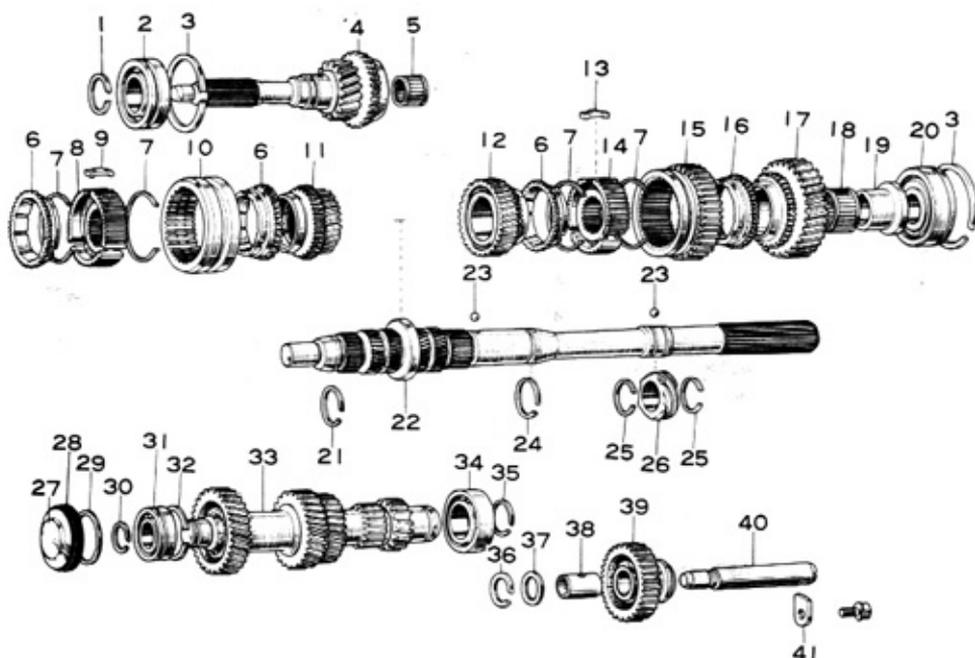
Symptoms and Probable Causes	Remedies
<p>Gears difficult to mesh</p> <p>Causes for hard shifting can be divided into troubles in gear shift linkages and in transmission itself. However, heavy shifting and difficult meshing can also be caused by "clutch not disengaging properly". Thus, clutch should be verified for correct operation before starting to trouble-shoot the gear shift linkages or transmission.</p> <ol style="list-style-type: none"> 1. Connecting rod out of adjustment. 2. Bushings in cross shaft support knobs worn. 3. Synchronizer ring making faulty contact with gear cone, or worn. 4. Shifting key springs weakened 	<p>Adjust rod length Replace Replace synchronizer ring Replace springs</p>
<p>Slips out of gear</p> <ol style="list-style-type: none"> 1. Improper meshing of gears due to connecting rod being out of adjustment 2. Shift fork worn or spring (lock ball) broken. 3. Bearings related to input and output shafts worn or damaged. 4. Excessive clearance between clutch hub No. 2 and hub sleeve splines. 5. Third gear and output shaft worn. 6. Second gear and output shaft worn. 7. First gear and output shaft worn. 8. Excessive clearance between clutch hub No. 1 and hub sleeve splines. 9. Reverse idler gear and bushing worn. 10. Counter gear worn. 	<p>Adjust rod</p> <p>Replace Replace bearings Replace clutch hub or hub sleeve. Replace Replace Replace Replace clutch Replace gear or bushing. Replace counter gear</p>
<p>Transmission noisy</p> <p>With vehicle stopped (engine running and transmission in neutral), if noise develops when clutch is engaged but stops when clutch is released, it would be safe to assume that the transmission is causing the noise.</p> <ol style="list-style-type: none"> 1. Lubrication oil insufficient or wrong variety. 1. Gears and bearings worn or damaged. Note : If only sectional wear, growling noise will be produced at high speed, but when damaged, periodic knocking sound will be heard even at low speed. 3. Output shaft splines worn. 4. Reverse idler gear bushing worn. 	<p>Add oil, or replace with recommended oil.</p> <p>Replace shaft. Replace bushing.</p>

COMPONENT PARTS

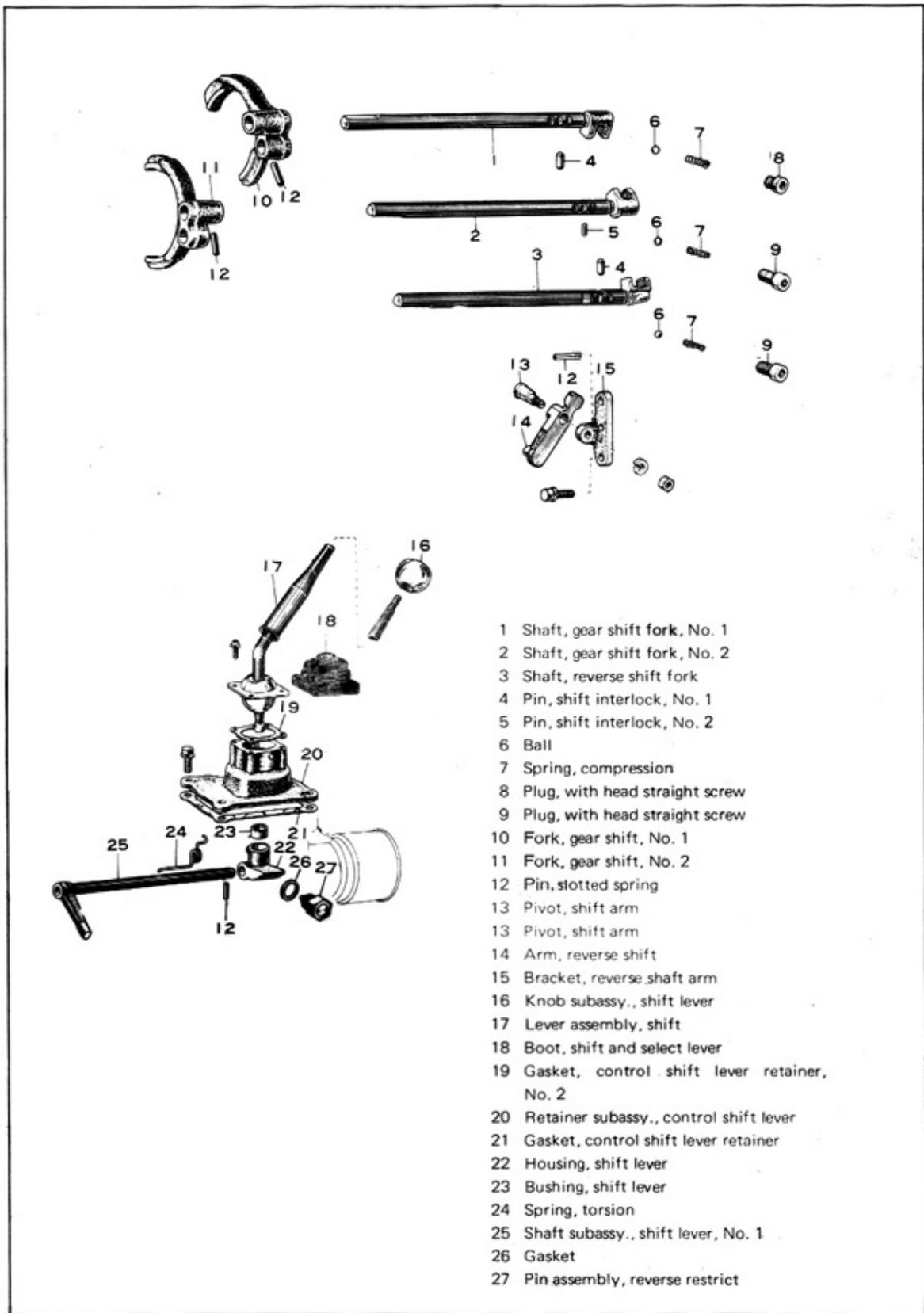


- | | |
|--|--|
| 1 Retainer, front bearing | 13 Pin, straight |
| 2 Seal, Type "T" oil | 14 Plate, transmission intermediate |
| 3 Housing, clutch | 15 Plate, stiffener, RH |
| 4 Cover, clutch housing, No. 1 | 16 Plate, stiffener, LH |
| 5 Gasket, front bearing retainer | 17 Plug subassy., with head straight screw |
| 6 Plug, transmission case cover | 18 Pin, ring |
| 7 Gasket, drain plug | 19 Housing, extension |
| 8 Plug, tight | 20 Bushing, bimetal formed |
| 9 Case, transmission | 21 Seal, type "T" oil |
| 10 Retainer, output shaft rear bearing | 22 Seal, dust |
| 11 Pin, straight | 23 Retainer, extension housing dust seal |
| 12 Gasket, extension housing | 24 Deflector, extension housing dust |

Fig. 2-143 4-Speed Transmission Component Parts (1)



- | | |
|-------------------------------------|--------------------------------------|
| 1 Ring, shaft snap | 22 Shaft, output |
| 2 Bearing, radial ball | 23 Ball, reverse shaft restrict |
| 3 Ring shaft snap | 24 Ring, shaft snap |
| 4 Shaft subassy., input | 25 Ring, shaft snap |
| 5 Bearing, needle roller | 26 Gear, speedometer drive |
| 6 Ring, synchronizer, No. 2 | 27 Cover, counter shaft, No. 1 |
| 7 Spring, synchromesh shifting key | 28 Cover, counter shaft, No. 2 |
| 8 Hub, transmission clutch, No. 2 | 29 Spacer |
| 9 Key, synchromesh shifting, No. 2 | 30 Ring, shaft snap |
| 10 Spring, transmission hub, No. 2 | 31 Bearing, radial ball |
| 11 Gear subassy., third | 32 Ring, shaft snap |
| 12 Gear subassy., second | 33 Gear, counter |
| 13 Key, synchromesh shifting, No. 1 | 34 Bearing, radial ball |
| 14 Hub, transmission clutch, No. 1 | 35 Ring, shaft snap |
| 15 Gear, reverse | 36 Ring, shaft snap |
| 16 Ring, synchronizer, No. 1 | 37 Spacer |
| 17 Gear subassy., first | 38 Bushing, bimetal formed |
| 18 Bearing, needle roller | 39 Gear, reverse idler |
| 19 Race, first gear bearing inner | 40 Shaft, reverse idler |
| 20 Bearing, radial ball | 41 Stopper, reverse idler gear shaft |
| 21 Ring, shaft snap | |



- 1 Shaft, gear shift fork, No. 1
- 2 Shaft, gear shift fork, No. 2
- 3 Shaft, reverse shift fork
- 4 Pin, shift interlock, No. 1
- 5 Pin, shift interlock, No. 2
- 6 Ball
- 7 Spring, compression
- 8 Plug, with head straight screw
- 9 Plug, with head straight screw
- 10 Fork, gear shift, No. 1
- 11 Fork, gear shift, No. 2
- 12 Pin, slotted spring
- 13 Pivot, shift arm
- 14 Arm, reverse shift
- 15 Bracket, reverse shaft arm
- 16 Knob subassy., shift lever
- 17 Lever assembly, shift
- 18 Boot, shift and select lever
- 19 Gasket, control shift lever retainer, No. 2
- 20 Retainer subassy., control shift lever
- 21 Gasket, control shift lever retainer
- 22 Housing, shift lever
- 23 Bushing, shift lever
- 24 Spring, torsion
- 25 Shaft subassy., shift lever, No. 1
- 26 Gasket
- 27 Pin assembly, reverse restrict

Fig. 2-144 4-Speed Transmission Component Parts

REMOVAL

For removal of 4-speed transmission, refer to removal procedures for the 3-speed transmission outlined.

Notes :

1. Remove console box.
2. Loosen the 4 screws attaching the shift lever to shift lever retainer, and remove shift lever.



Fig. 2-145 Removing Shift Lever

DISASSEMBLY

1. Remove clutch housing from transmission case.

Note : Remove with clutch release fork, release bearing, and release hub attached.

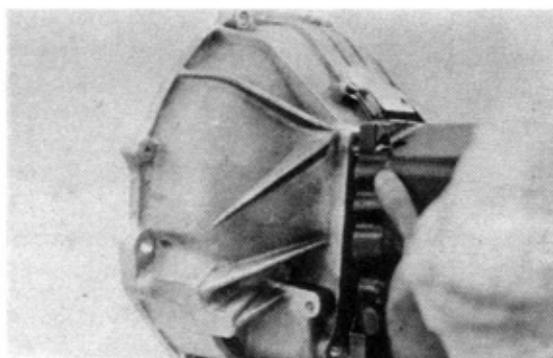


Fig. 2-146 Removing Clutch Housing

2. Remove the extension housing.
 - (1) Remove the back up lamp switch, reverse restrict pin, and speedometer driven gear.
 - (2) Remove the control shift lever restrainer.
 - (3) Remove the extension housing.

Note : Turn the shift lever housing counter-clockwise (as viewed from the rear), disconnect the shift and select lever from the fork shafts, and remove the extension housing.



Fig. 2-147 Removing Extension Housing

- (4) Remove the slotted pin, and remove the shift lever shaft No. 1, shift lever housing, and spring.

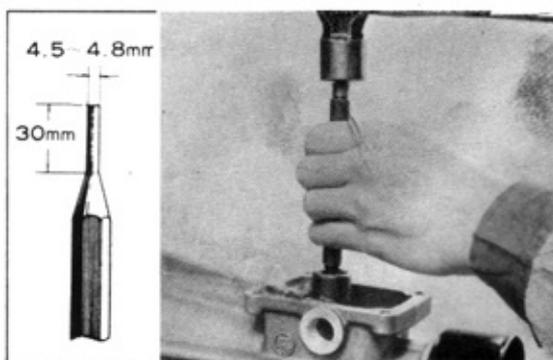


Fig. 2-148 Punching Out Slotted Pin

3. Remove the transmission case.

- (1) Remove the front bearing retainer, counter shaft covers No. 1 and No. 2, and spacer. Using SST [09905-00010], remove snap rings from input shaft bearing and counter bearing.

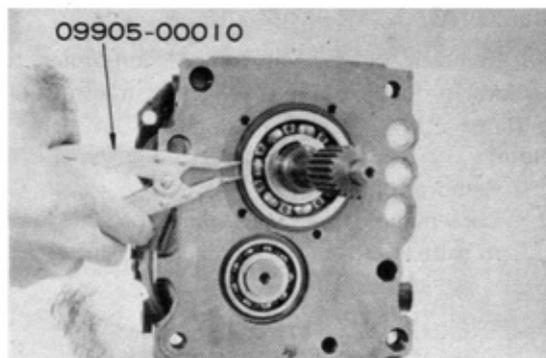


Fig. 2-149 Transmission Removal

- (2) Separate the transmission case from intermediate plate, and pull it out toward the front.

Note : Transmission case can be drawn out with the input shaft, output shaft, counter gear, and other parts still attached to the intermediate plate.

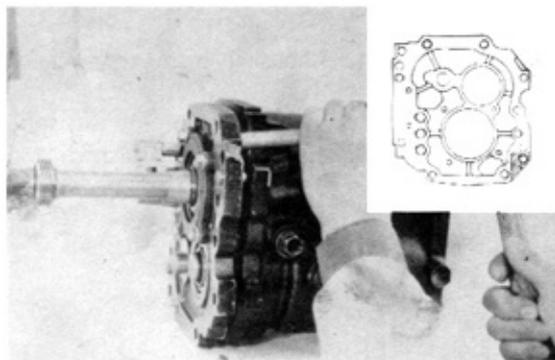


Fig. 2-150 Transmission Removal

4. Clamp the intermediate plate in a vise.

Note : Clamp the intermediate plate in the vise using a copper sheet or at cross-hatched part shown in figure, and do not mar the joining surface.

5. Remove the speedometer drive gear.

Note : Do not lose the ball.

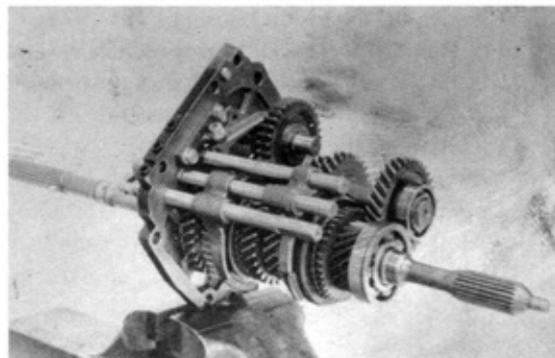


Fig. 2-151 Intermediate Plate Held in Vise

6. Remove the reverse idler gear.

- (1) Punch out the slotted spring pin, loosen the shift arm bracket bolt, and remove the shift arm bracket with shift arm attached.
- (2) Remove the reverse idler shaft stopper, and draw out the idler gear and idler shaft toward the front.

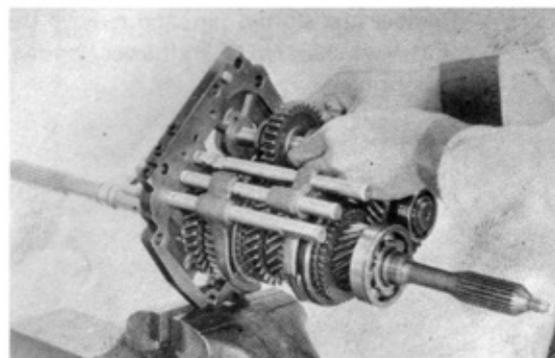


Fig. 2-152 Removing Reverse Idler Gear

7. Remove the shift forks.
 - (1) Remove the output rear bearing retainer.
 - (2) Remove the straight screw plug, and remove the spring.

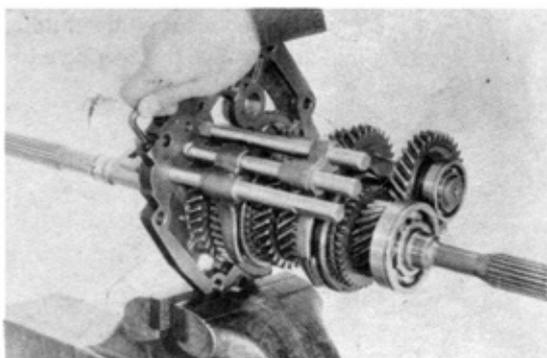


Fig. 2-153 Shift Fork Removal

- (3) Punch out the slotted pin from each shift fork.
- (4) Pull out the reverse shift fork shaft, gear shift fork shaft No. 2, and gear shift fork shaft No. 1, in the order named, and remove the shift forks.

Note : Do not lose the three sets of interlock pin and ball.

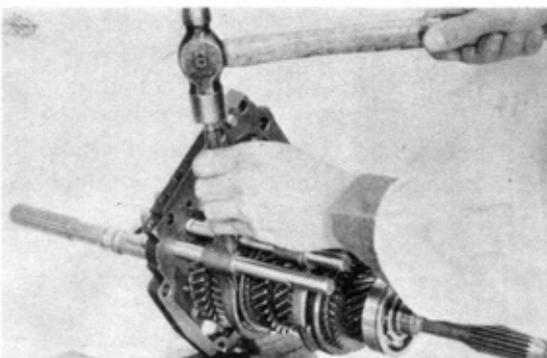


Fig. 2-154 Shift Fork Removal

8. Remove the input shaft, output shaft, and counter gear from the intermediate plate.
 - (1) Remove the snap ring from output rear bearing.
 - (2) Push the output shaft and counter gear together from the rear side and remove them from the intermediate plate.

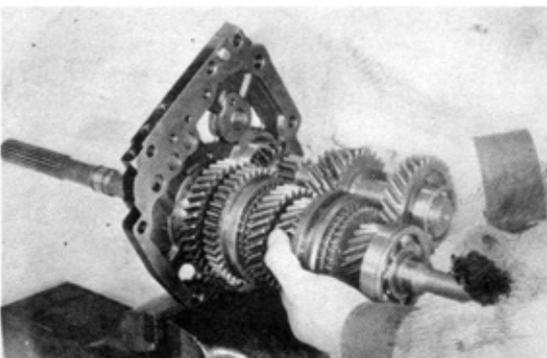


Fig. 2-155 Removing Output Shaft and Counter Gear

9. Disassemble the output shaft.
 - (1) Remove the input shaft and synchronizer ring from the output shaft.
 - (2) Using SST [09905-00010], remove the snap ring. Then pull out the clutch hub No. 2, synchronizer ring, and third gear.

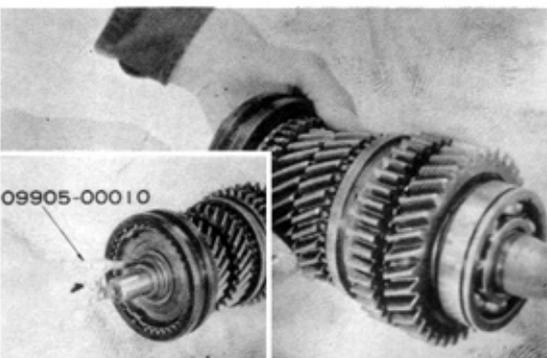


Fig. 2-156 Removing Third Gear

- (3) Remove the snap ring securing the output rear bearing, and remove the bearing with a press.

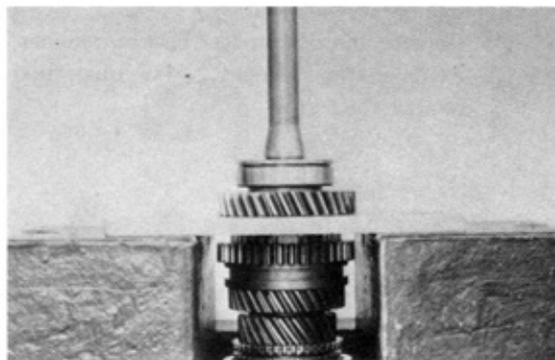


Fig. 2-157 Output Rear Bearing Removal

10. Remove the first gear, needle roller bearing, bearing inner race, and synchronizer ring.

Note : Do not lose the balls (for bearing inner race lock).

11. Remove the reverse gear and clutch hub No. 1.
12. Remove the second gear and synchronizer ring.

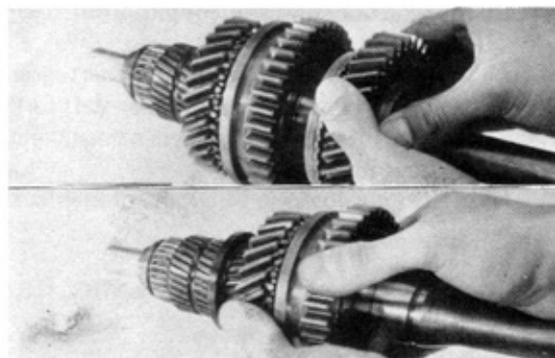


Fig. 2-158 Removing Bearings

INSPECTION

After washing all disassembled parts, inspect them on the following points. Replace any part found defective.

OUTPUT SHAFT

1. Measure the shaft deflection at the rear bearing installation part.
Deflection limit 0.03 mm (0.001")

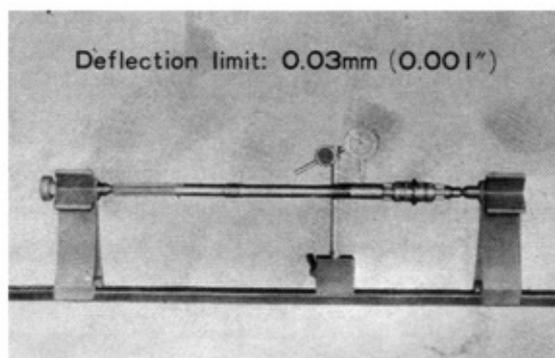


Fig. 2-159 Measuring Shaft Deflection

2. Shaft gear and bearing fitting parts for damage or wear.
3. Shaft flanged parts and bearing inner race for damage or wear.

Flange thickness wear limit (shaft) 4.50 mm (0.177")

Flange thickness wear limit (inner race) 4.55 mm (0.178")

Bushing part outside diameter wear limit 40.8 mm (1.606")

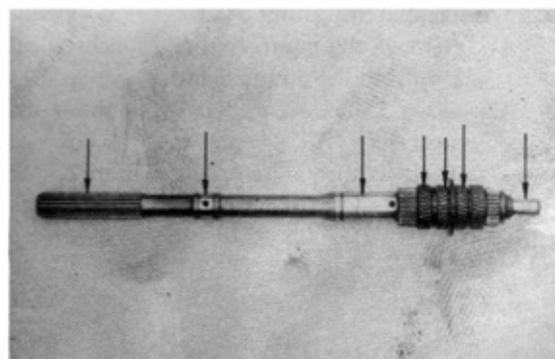


Fig. 2-160 Output Shaft Inspection

FIRST, SECOND, THIRD, AND REVERSE GEARS

1. All gear tooth surfaces, thrust faces, inside diameter surfaces, and coned parts for damage or wear.
2. Output rear bearing and needle roller bearing for damage and wear.

Oil clearances

First gear Limit 0.051 mm (0.002")

Standard 0.019–0.051 mm
(0.0003"–0.0022")

Second & third gears Limit 0.10 mm
(0.004")

Standard 0.06 mm–0.10 mm
(0.002"–0.004")

SYNCHRONIZER RING

1. Braking effect
2. Fit the synchronizer ring on the gear and measure the clearance between synchronizer ring back surface and gear spline end.
Wear limit 0.8 mm (0.031")
Standard 1.0–2.0 mm (0.039"–0.079")

CLUTCH HUB SPRINGS, CLUTCH HUBS, SHIFTING KEYS, AND SHIFTING KEY SPRINGS

1. Splined part of hubs (1) and hub sleeves (2) for damage or wear.
2. Center protrusion of keys (3) for damage or wear.
3. Key springs (4) for weakening or wear.

4. Contacting surfaces between hub sleeve and shift fork for damage or wear.
5. Clearance between hub sleeve and shift fork.
Wear limit 1.0 mm (0.04")

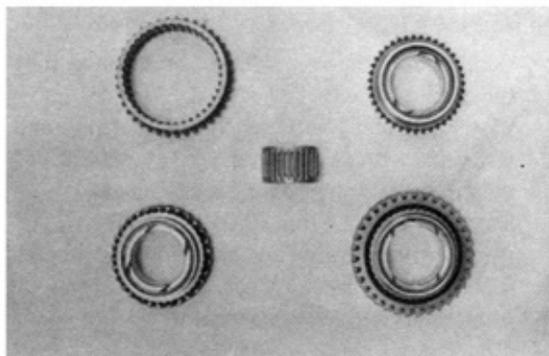


Fig. 2-161 Gear and Needle Roller Bearing Inspection

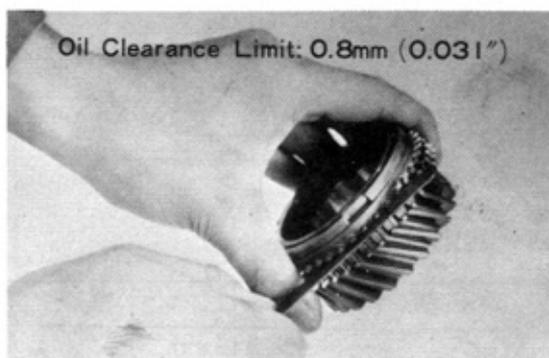


Fig. 2-162 Inspecting Synchronizer Ring

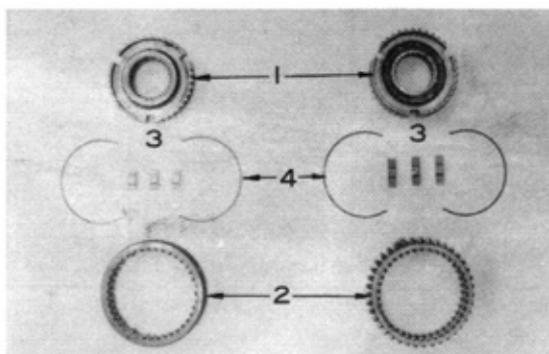


Fig. 2-163 Hub, Hub Sleeve, Key, Key Spring Inspection

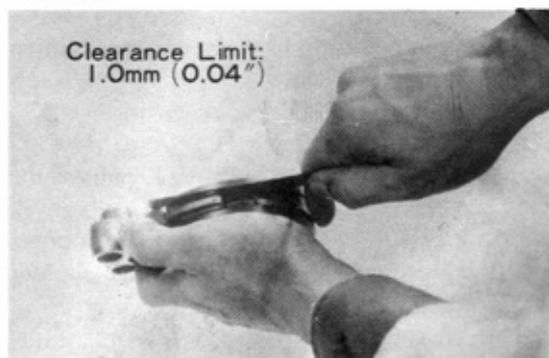


Fig. 2-164 Measuring Clearance between Hub Sleeve and Shift Fork

INPUT SHAFT

1. Gear tooth surfaces, splines, and coned part for damage or wear.
2. Braking effect with synchronizer ring, and clearance with gear splines.
Wear limit 0.8 mm (0.03")
Standard 1.0–2.0 mm (0.04"–0.08")
3. Needle roller bearing and shaft inside diameter surface for damage or wear.
4. Input shaft bearing replacement.
 - (1) Remove the snap ring.
 - (2) Using a press, force out the bearing.
 - (3) Using SST [09506–30010] and a press, force in the new bearing.
 - (4) Select proper size snap ring and install on shaft.

Note : Do not remove the bearing unless defective.

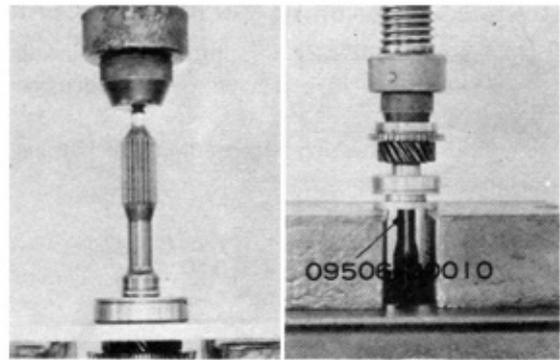


Fig. 2-165 Bearing Replacement

Table 2-13 Snap Ring Sizes

Part No.	Thickness	Mark
90520-30214	2.05–2.10 mm (0.081–0.083")	0
90520-30215	2.10–2.15 mm (0.083–0.085")	1
90520-30216	2.15–2.20 mm (0.085–0.087")	2
90520-30217	2.20–2.25 mm (0.087–0.089")	3
90520-30218	2.25–2.30 mm (0.089–0.091")	4
90520-30219	2.30–2.35 mm (0.091–0.093")	5

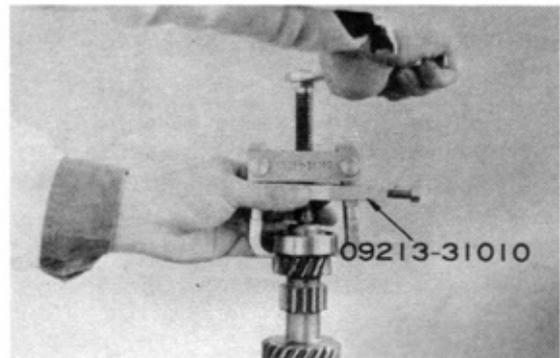


Fig. 2-166 Removing Bearing

COUNTER GEAR AND BEARING

1. Gear toothed surfaces, front and rear bearing for damage or wear.
2. Front and rear bearing replacement.
 - (1) Remove snap ring.
 - (2) Using SST [09213–31010], remove the bearing.
 - (3) Using SST [09515–20010] and a press, force the new bearing into the counter gear.
 - (4) Install the snap ring.

Note : Do not remove the bearing unless defective.

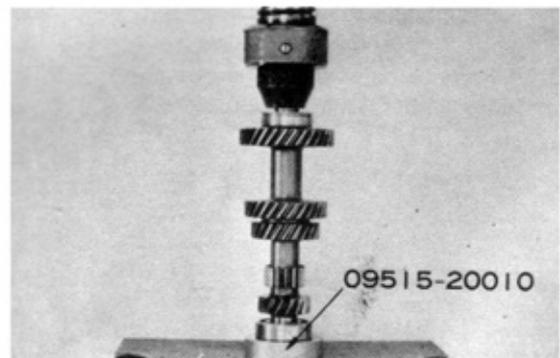


Fig. 2-167 Pressing In Bearing

REVERSE IDLER GEAR

1. Gear toothed surfaces and bushing for damage or wear.
2. Bushing replacement.
Remove and install new bushing, using SST [09222-30010] and a press.
Bore finished size 20.04–20.06 mm (0.7890–0.7898")

Notes :

1. Install the bushing such that the bushing oil hole will be in alignment with the oil hole in the gear.
2. If the bushing fits too tightly on the shaft, finish to proper size using a pin hole grinder or reamer.

SHIFT FORK SHAFTS AND ALLIED PARTS

1. All sliding parts of shafts for damage or wear.
2. Springs, balls, and pins for damage or wear.

SPEEDOMETER DRIVE GEAR AND DRIVEN GEAR

1. Toothed surface drive gear (1) and driven gear (2) for damage or wear.
2. Driven gear shaft (3), bushing (4), and "O" ring (5) for damage or wear.

FRONT BEARING RETAINER

1. Type "T" oil seal lip part (1) for damage or wear.
2. Clutch release hub sliding part (2) for damage or wear.

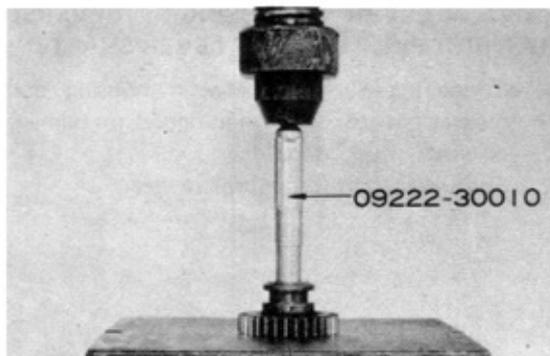


Fig. 2-168 Bushing Replacement

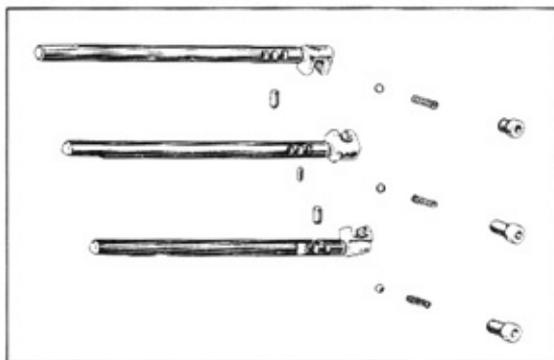


Fig. 2-169 Shift Fork Shaft Inspection

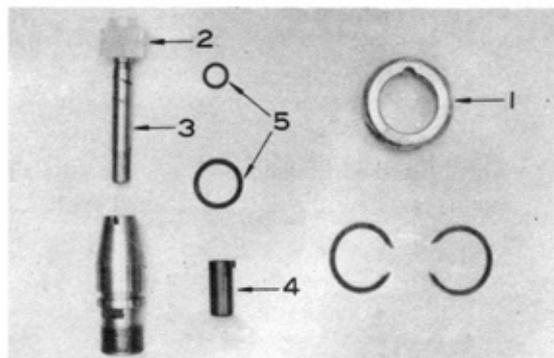


Fig. 2-170 Speedometer Gear Inspection

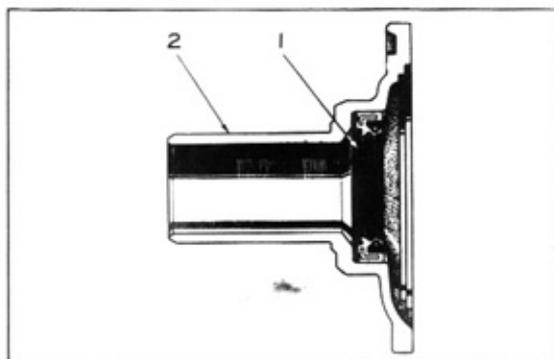


Fig. 2-171 Front Bearing Retainer Inspection

SHIFT LEVER HOUSING, REVERSE RESTRICT PIN, AND SHIFT LEVER SHAFT

1. Contacting surfaces between housing and restrict pin (parts shown in figure) for damage or wear.
2. Shift lever shaft for damage or wear.

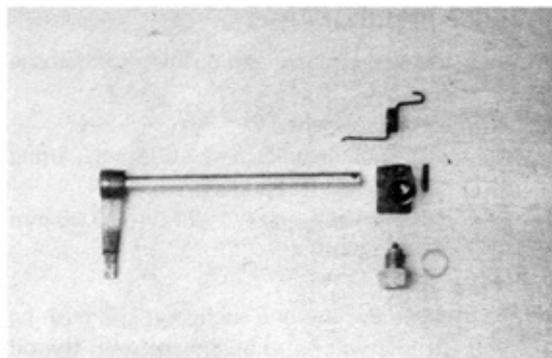


Fig. 2-172 Shift Lever Shaft Inspection

EXTENSION HOUSING

1. Type "T" oil seal lip part (1) for damage or wear.
2. Bushing (2) for damage or wear.
3. Dust deflector (3) for damage and installed state.

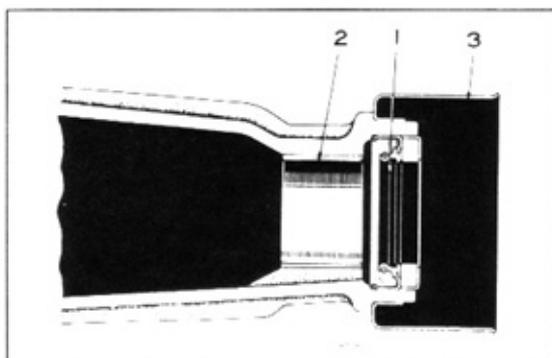


Fig. 2-173 Extension Housing Inspection

4. Oil seal replacement
 - (1) Using SST [09308-10010], remove the oil seal from the extension housing.
 - (2) Using SST [09325-20010], install the oil seal and then the dust seal.

Note : Before installing, coat grease on the oil seal lip and have the dust seal soaked in oil.

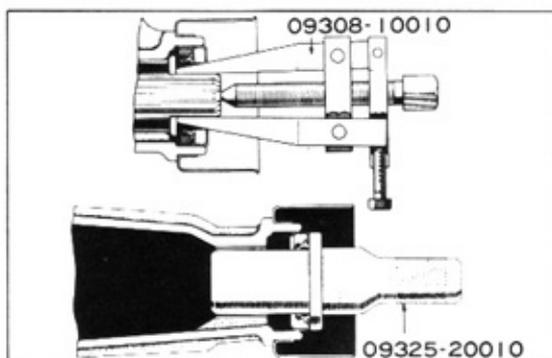


Fig. 2-174 Oil Seal Replacement

5. Bushing replacement

Remove and install the new bushing by heating the extension housing rear end with piston heater (oil bath type) to 80°–100°C (177°–220°F) and using SST [09307-30010] and a press.

Note : Install the new bushing such that its oil groove will be in alignment with the oil groove in extension housing. At the same time, replace the oil seal.

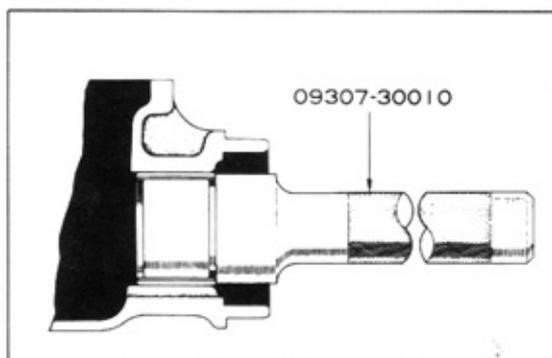


Fig. 2-175 Bushing Replacement

ASSEMBLY

1. Assemble the output shaft.
 - (1) Fit the clutch hub No. 2 and sleeve No. 2 together and check that they slide smoothly.

Note: Make sure that the hub and sleeve No. 2 are properly positioned as illustrated.
 - (2) Insert the 3 shifting keys into the key slots in hub and sleeve and fit on the 2 key springs.
 - (3) Fit the synchronizer ring No. 2 on the third gear and install them on the output shaft.

Note: Coat the gear inside surfaces liberally with grease.
 - (4) Install the hub assembly No. 2 on the output shaft, inserting it until it contacts the shaft shoulder.

Note: If the fit with the output shaft is tight, use a wooden mallet and lightly tap in the hub assembly.
 - (5) Select a snap ring of the thickness that will provide 0–0.05 mm (0.002") axial play, and install it on the shaft.

Table 2-14 Snap Ring Sizes

Part No.	Thickness	Mark
90520-30228	1.80–1.85 mm (0.071–0.073")	0
90520-30229	1.85–1.90 mm (0.073–0.075")	1
90520-30230	1.90–1.95 mm (0.075–0.077")	2
90520-30231	1.95–2.00 mm (0.077–0.079")	3

- (6) Measure the third gear thrust clearance
Limit 0.25 mm (0.010")
Standard 0.10–0.25 mm
(0.004"–0.010")
- (7) Fit the synchronizer ring No. 2 on the second gear, and install them on the output shaft.

Note: Have the gear inside surface amply coated with grease.
- (8) Fit the reverse gear on the clutch hub No. 1 and verify that they slide smoothly.

Note: Make sure that clutch hub sleeve No. 1 is properly positioned.

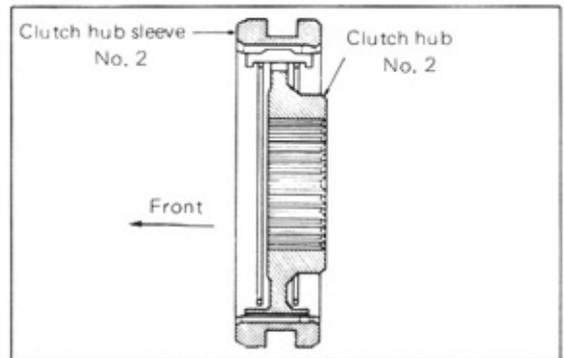


Fig. 2-176 Clutch Hub No. 2 Assembly

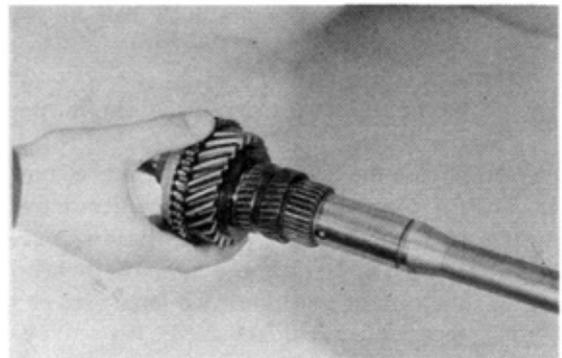


Fig. 2-177 Third Gear Assembly

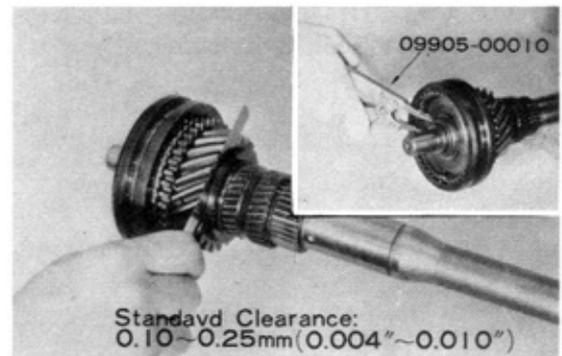


Fig. 2-178 Third Gear Thrust Clearance

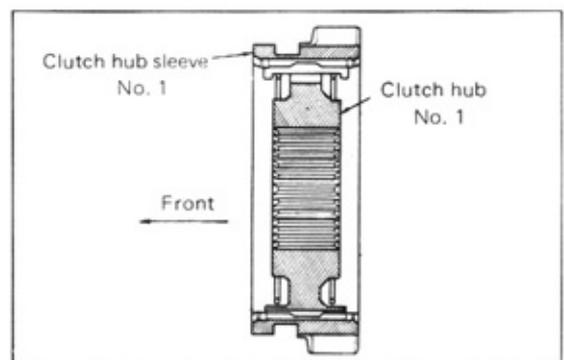


Fig. 2-179 Clutch Hub No. 1 Assembly

- (9) Insert the 3 shifting keys into the key slots in hub and sleeve, and fit on the 2 key springs.
- (10) Install the hub assembly No. 1 on the output shaft, inserting it until it contacts the shaft shoulder.
- (11) Measure the second gear thrust clearance.
Limit 0.25 mm (0.010")
Standard 0.10 – 0.25 mm
(0.004"–0.010")

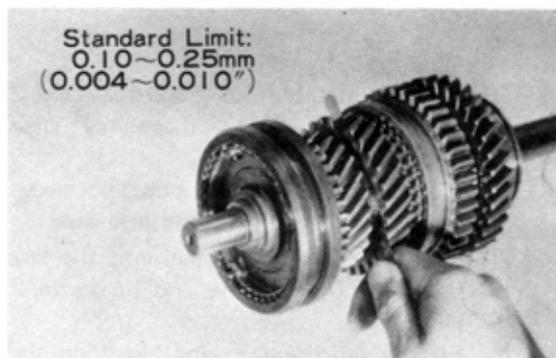


Fig. 2-180 Second Gear Thrust Clearance

- (12) Insert the inner race lock ball in the output shaft.

Notes :

1. Do not have the ball protruding out from the shaft.
 2. Grease the ball so that it will not fall out.
- (13) Fit together the first gear, synchronizer ring No. 1 (Mark No.4), bearing, and bearing inner race, and assemble them on the output shaft until the inner race end face contacts clutch hub No. 1.

Note : Align the inner race groove against the lock ball.

- (14) Using SST[09506-30010] and a press, install the output rear bearing.

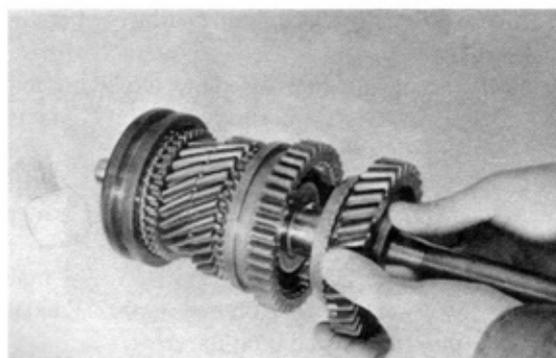


Fig. 2-181 Installing First Gear

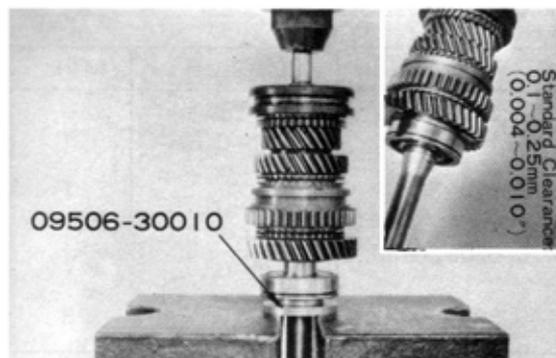


Fig. 2-182 Installing Output Rear Bearing

Table 12-15 Snap Ring Sizes

Part No.	Thickness	Mark
90520-30214	2.05-2.10 mm (0.081-0.083")	0
90520-30215	2.10-2.15 mm (0.083-0.085")	1
112, 90520-30216	2.15-2.20 mm (0.085-0.087")	2
30520-30217	2.20-2.25 mm (0.087-0.089")	3
30520-30218	2.25-2.30 mm (0.089-0.091")	4
30520-30219	2.30-2.35 mm (0.091-0.093")	5

- (15) Measure the first gear thrust clearance.
Limit 0.25 mm (0.010")
Standard 9.10 – 0.25 mm
(0.004"–0.010")
- (16) Select a snap ring for securing the output rear bearing, of the thickness that will provide 0–0.05 mm (0.002") axial play, and install it on the shaft.

2. Assemble the transmission intermediate plate assembly.

- (1) Using a press or copper hammer, insert the straight pin until it protrudes out 6–8 mm (1/4"–5/16") from the front side of intermediate plate.
- (2) Clamp the intermediate plate in a vise.

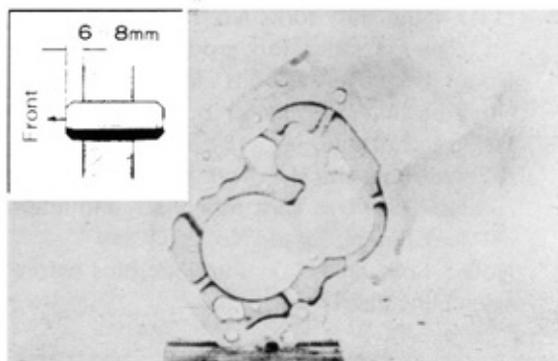


Fig. 2-183 Intermediate Plate Clamped

- (3) Coat grease on the needle roller bearing and assemble it on the input shaft.
- (4) Apply gear oil on the synchronizer ring No. 2 and assemble it in the gear.
- (5) Install the input shaft in the output shaft.

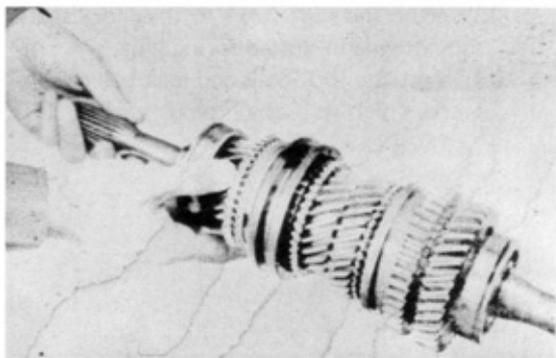


Fig. 2-184 Installing Input Shaft

- (6) Fit together the output shaft and counter gear and install them on the intermediate plate.
- (7) Install the snap rings.

Note : Push in until the bearing snap ring groove extends slightly out of intermediate plate rear side. Then, install the snap ring and push back until flush with intermediate plate surface.

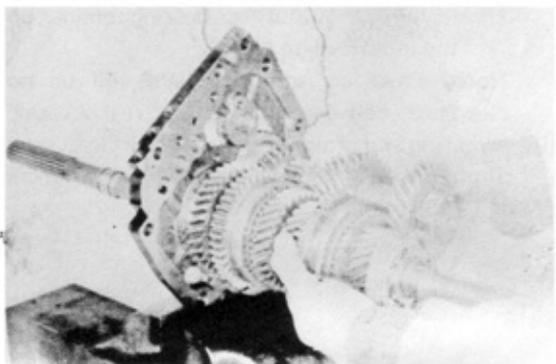


Fig. 2-185 Installing Output Shaft & Counter Gear

- (8) Insert the idler gear shaft into the idler gear and install the shaft in to the intermediate plate.
- (9) Insert the spacer over the shaft and secure with snap ring.
- (10) Secure the shaft with shaft stopper.

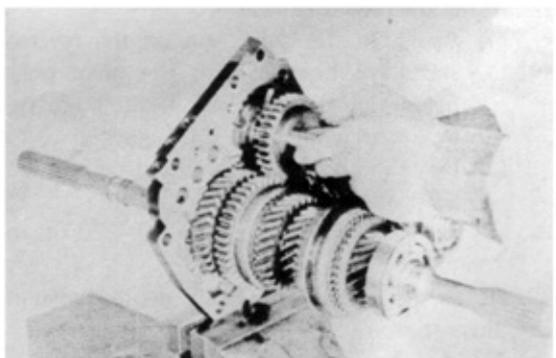


Fig. 2-186 Installing Idler Gear

(11) Fit the shift forks No. 1 and No. 2 into their hub sleeve fork grooves.

Note : Position the shift forks No. 1 and No. 2 so that their longer boss parts will be facing each other.

(12) Assemble the shift fork shafts No. 1 and No. 2, reverse shift fork shaft, and interlock pins No. 1 and No. 2.

Note : Coat grease on interlock pins before assembling them.

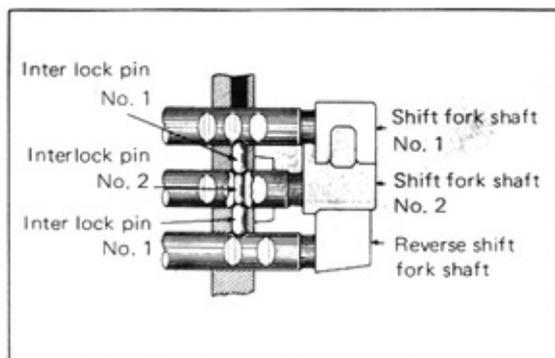


Fig. 2-187 Shift Fork Shaft Assembly

(13) Secure the shift forks to their fork shafts by driving in slotted spring pins.

(14) Insert the lock balls and lock ball springs, and tighten the plugs with SST [09313-30020].

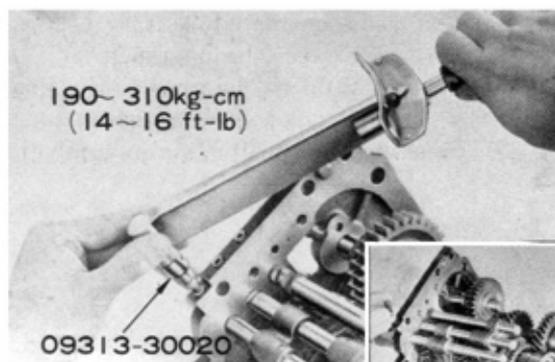


Fig. 2-188 Installing Lock Ball

(15) Install the output rear bearing retainer on the intermediate plate.

Note : Press on so that there will be no clearance between the output rear bearing snap ring and intermediate plate surface.

Tightening torque 150-220 kg-cm (11-16 ft-lb)

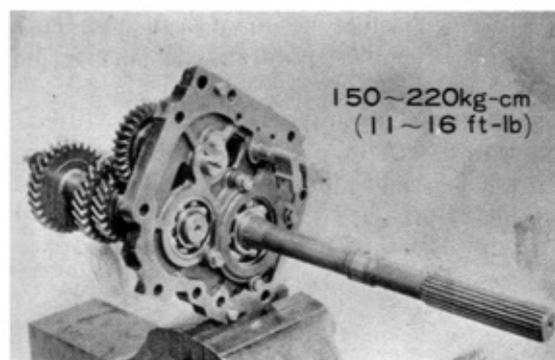


Fig. 2-189 Installing Bearing Retainer

3. Install the reverse shift arm.

(1) Assemble the shift arm on the reverse shift arm bracket with the pivot only made finger tight, and install them on intermediate plate.

(2) Drive in the slotted pin, and tighten the bolts at specified torque.

Tightening torque 150-220 kg-cm (11-16 ft-lb)

Note : Drive the pin in to the depth shown in illustration.

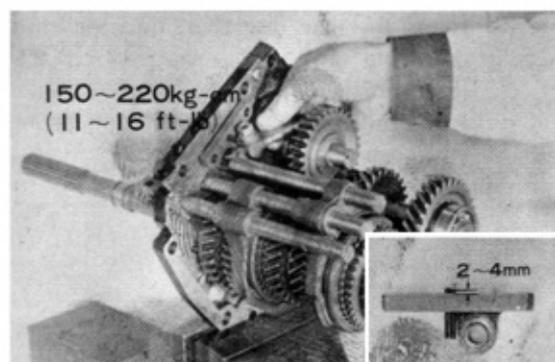


Fig. 2-190 Installing Reverse Shift Arm

4. Adjust the reverse idler gear.
 - (1) Shift to reverse position with the reverse shift arm in finger-tight state.
 - (2) Check the mesh between the reverse gear and idler gear. If meshed properly, the idler gear front face will be aligned with reverse gear front face or will be slightly behind.

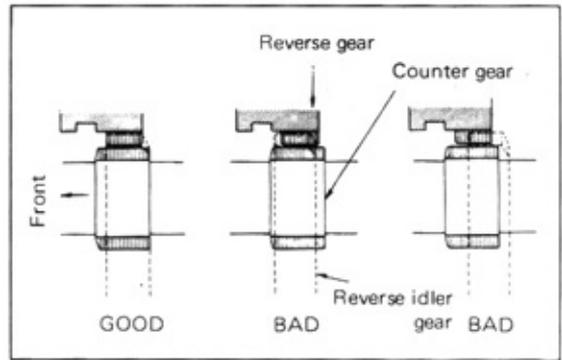


Fig. 2-191 Reverse Idler Gear Adjustment

- (3) Tighten the shift arm pivot nut at specified torque.
Tightening torque 100–160 kg-cm
(7–12 ft-lb)
- (4) Make the gear mesh adjustment at shift arm pivot.

Note : If meshed at proper place, the slot in the shift arm pivot will be at right angle to the intermediate plate.

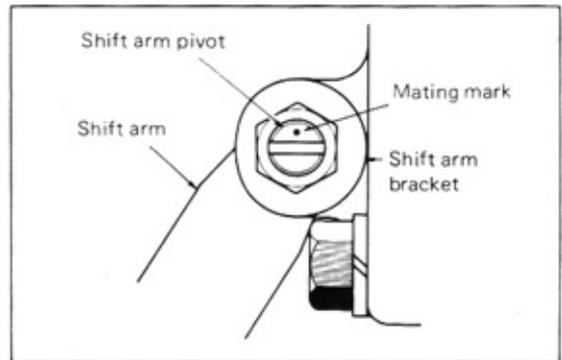


Fig. 2-192 Reverse Idler Gear Adjustment

5. Install the shift lever shaft
 - (1) Insert the shift lever shaft into the extension housing from front end.
 - (2) Assemble the torsion spring and shift lever housing on the shift lever shaft.
 - (3) Drive in the slotted spring pin.

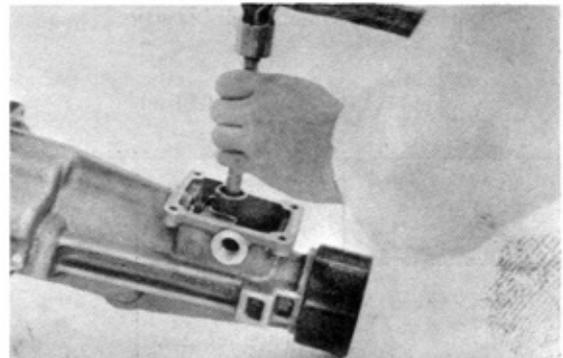


Fig. 2-193 Installing Shift Lever Shaft

6. Install the transmission case.
 - (1) Install the transmission case on the intermediate plate over a gasket.

Note : Wipe clean all oil or grease on the gasket contacting faces of plate and case.

 - (2) Install the snap rings for input bearing and counter front bearing.

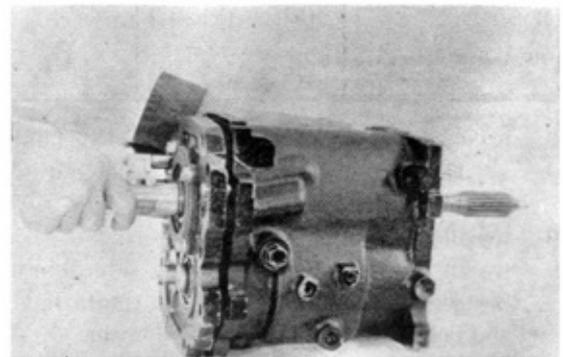


Fig. 2-194 Installing Transmission Case

7. Install the extension housing.
- (1) Install the extension housing on the intermediate plate over a gasket.

Notes :

- Wipe clean all oil or grease on the gasket contacting faces of plate and housing.
 - When installing the extension housing, on the intermediate plate have the shift lever housing positioned as illustrated.
 - Have the bushing bore amply coated with grease.
- (2) Tighten the bolts for transmission case, intermediate case, and extension housing at specified torque.
- Tightening torque 300–450 kg-cm (22–32 ft-lb)
- (3) Install the reverse restrict pin over a gasket.
- Tightening torque 300–450 kg-cm (22–32 ft-lb)
8. Select counter gear spacer.
- (1) Push the counter gear strongly toward the rear and measure the clearance between the points shown in figure, using a dial gauge, and select proper spacer.

Table 2-16 Spacer Selection

Part No.	Thickness	Etched Marks (No.)
90560-38331	2.87–2.99 mm (0.113–0.118")	1
90560-38332	3.00–3.09 mm (0.118–0.120")	2
90560-38333	3.10–3.19 mm (0.122–0.126")	3
90560-38334	3.20–3.32 mm (0.126–0.131")	4

- (2) Install the counter shaft covers No. 1 and No. 2 and spacer into the counter front hole in transmission case.
9. Install the front bearing retainer.
- Install the front bearing retainer after inserting gasket and aligning with oil return hole, and tighten the bolts at specified torque.
- Tightening torque 60–90 kg-cm (4.3–6.5 ft-lb)

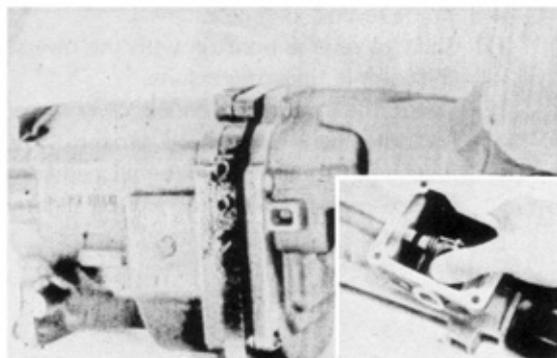


Fig. 2-195 Installing Extension Housing

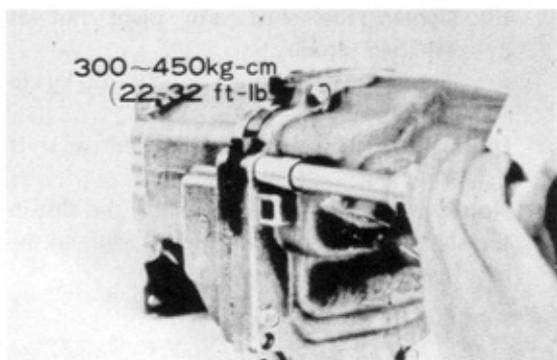


Fig. 2-196 Installing Extension Housing

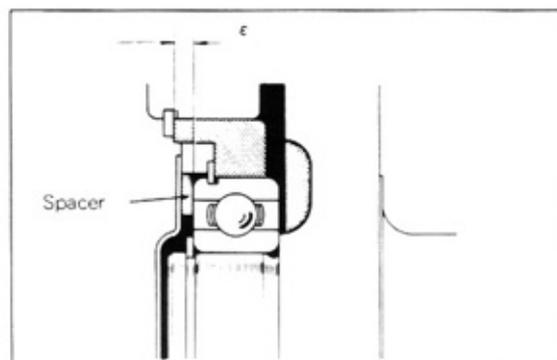


Fig. 2-197 Counter Front Adjustment

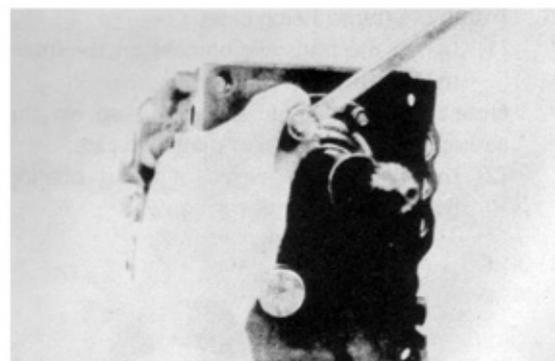


Fig. 2-198 Installing Front Bearing Retainer

10. Install the clutch housing.
Bolt the clutch housing on to the transmission case at specified torque.
Tightening torque 500–700 kg-cm
(36–50 ft-lb)

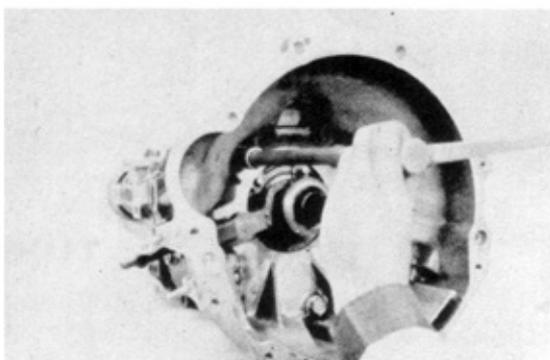


Fig. 2-199 Installing Clutch Housing

11. Install the shift lever retainer.
Bolt the shift lever housing on to the extension housing at specified torque.
Tightening torque 150–220 kg-cm
(10.9–15.9 ft-lb)
12. Assemble the speedometer driven gear, and secure the driven gear with lock plate.
Tightening torque 100–160 kg-cm
(7.2–11.6 ft-lb)

13. Install the back up-lamp switch.
Tightening torque 370–450 kg-cm
(27–33 ft-lb)
14. Install the drain plug.
Tightening torque 370–450 kg-cm
(27–33 ft-lb)

INSTALLATION

Perform the removal procedures in the reverse order.

Notes :

- Apply a thin coating of clutch grease on the input shaft front end and splines, and on the contacting surfaces between the release bearing and diaphragm spring.
- Install the transmission on the engine.
Tightening torque 500–700 kg-cm
(36–41 ft-lb)
- Adjust the clutch release push rod so that the play at clutch release fork tip will be 2.0–3.5 mm (0.08"–0.14"). (On no-adjustment vehicles 6.0–7.0 mm [0.24"–0.28"])
- Gear oil.
Oil capacity 1.7 liter (1.8 U.S. qt.)
Type API Service, GL-4 Gear Oil Use SAE 80 throughout the year.

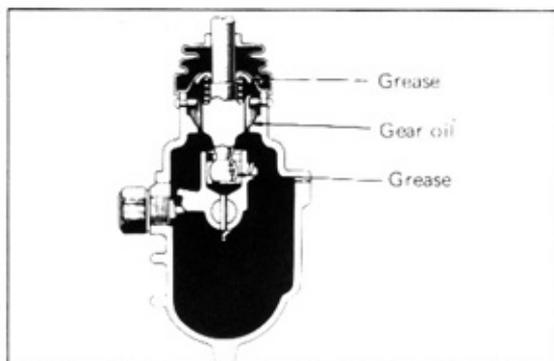


Fig. 2-200 Greasing and Oiling Points

- Install the filler plug.
Tightening torque 370–450 kg-cm
(27–33 ft-lb)
- Apply gear oil on the spherical end of shift lever (not grease).
- Apply MP grease on the shift lever bushing.