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who, well, didn't do much this time, since Paul Lee provided the thing already scanned and compiled into a PDF! (Thanks!). Go visit his website: <http://www.iluvmyrx7.com/index.htm> Lots of RX-7 goodness there.

There are several ways to get around in the document. I have provided Bookmarks to all the sections, and thumbnails are also provided in the Thumbnails side bar.

I have also included a label for the spine of a binder, for those who wish to print out all the pages and keep a dead-tree edition handy.☺

The original document is © 1979 Toyo Kogyo Co., Ltd., and remains so. This version is provided as a service for owners of first generation Mazda RX-7s who are having a devil of a time locating the factory service manual for a reasonable price.

If you really want to send me money, email me and I'll tell you where to send it, but it's not necessary. Consider this payback for all the good advice and information gleaned from the various RX-7 email lists!

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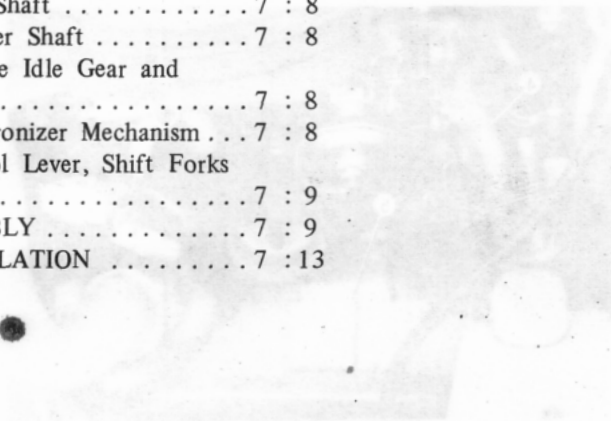
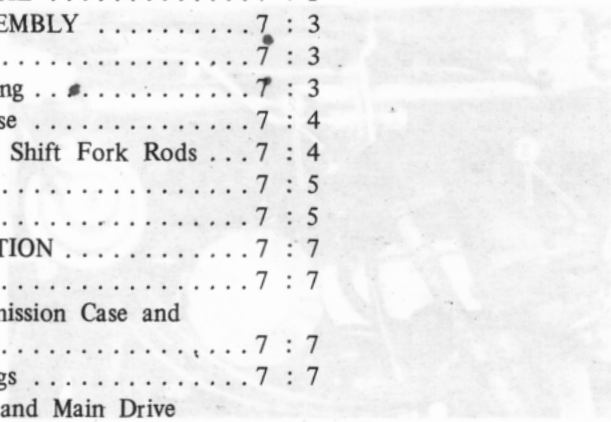
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09/16/03

MANUAL TRANSMISSION

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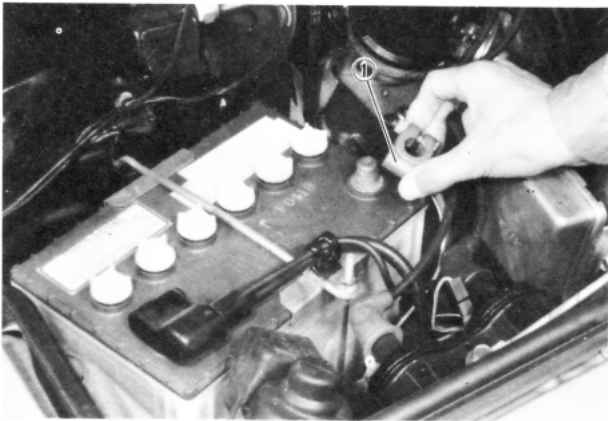


Fig. 7-1

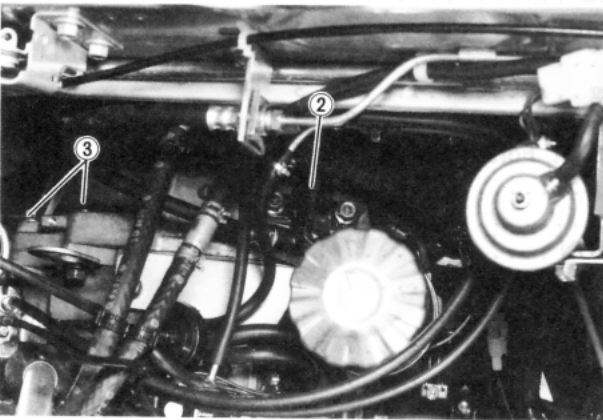


Fig. 7-2

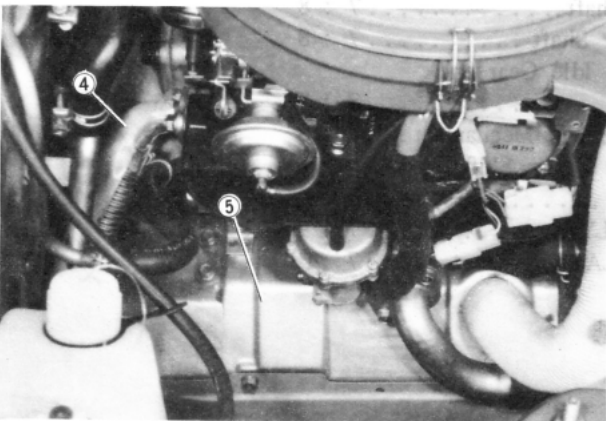


Fig. 7-3

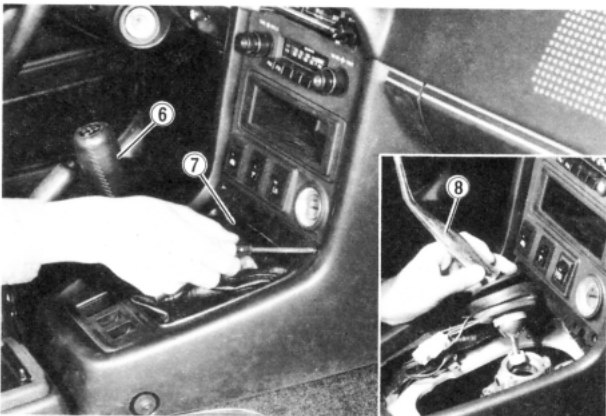


Fig. 7-4

7-A. TRANSMISSION REMOVAL

The procedures for removing the transmission from the vehicle are as follows:

Apply the parking brake and block the wheels.

1. Open the bonnet and disconnect the battery negative cable.

2. Remove the clutch release cylinder.

3. Remove the bolts attaching the transmission to rear end of the engine.

4. Remove the nuts and disconnect the air pipe.

5. Remove the thermal reactor cover.

6. Unscrew and remove the gear shift lever knob.

7. Remove the gear shift lever boot and boot plate.

8. Remove the gear shift lever, rubber boot, retaining plate and shim assembly.

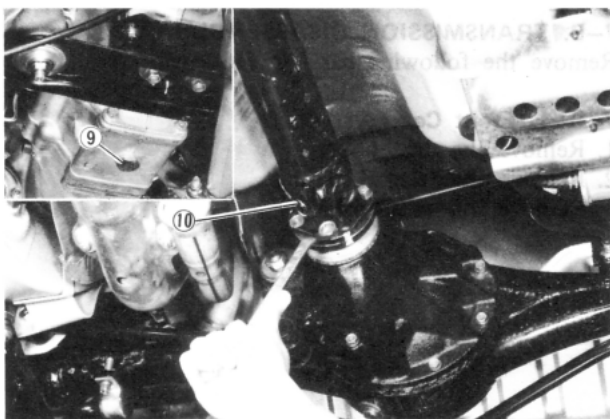


Fig. 7-5

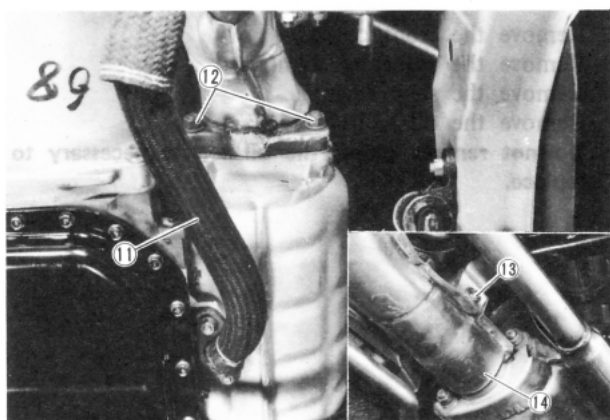


Fig. 7-6

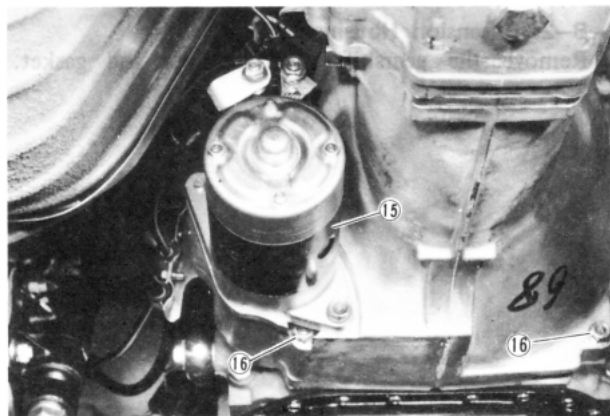


Fig. 7-7

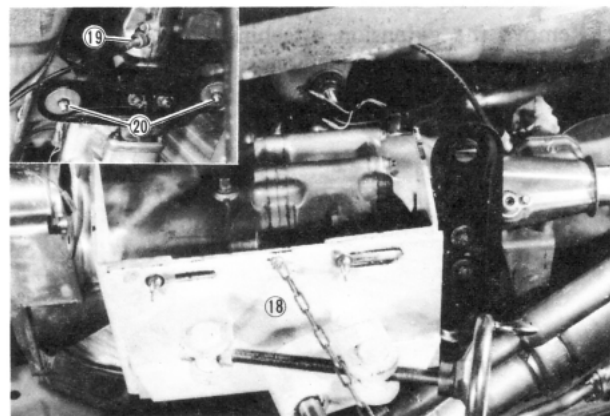


Fig. 7-8

Jack up the vehicle and support it with stands.

9. Drain the lubricant from the transmission. After draining, clean and reinstall the drain plug.
10. Remove the propeller shaft referring to Par. 8-A.

11. Remove the air pipe (thermal reactor ~ air duct).
12. Remove the nuts and disconnect the air duct from the thermal reactor.
13. Disconnect the air duct hanger.
14. Disconnect the air duct from the silencer.

15. Disconnect the wirings and remove the starting motor.
16. Remove the bolts attaching the transmission to rear end of the engine.
17. Disconnect the couplers from the back-up lamp switch, top switch and over-drive switch.

18. Place the jacks under the transmission and the engine, and support them securely.
19. Disconnect the speedometer cable.
20. Remove the nuts attaching the transmission support to the body.
21. Slide the transmission rearward until the main drive shaft clears the clutch disc and carefully remove the transmission from under the vehicle.

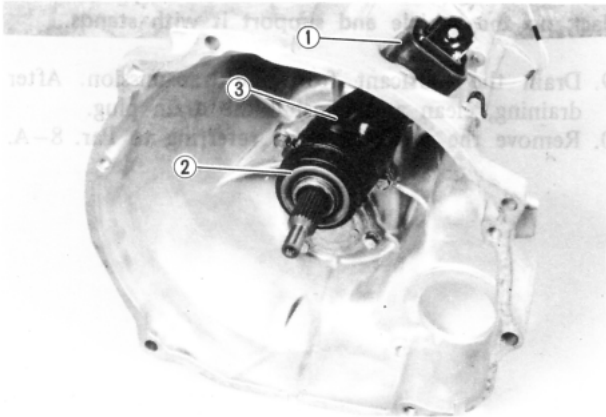


Fig. 7-9

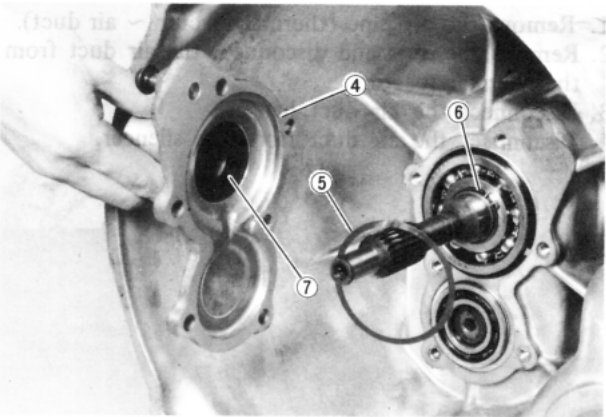


Fig. 7-10

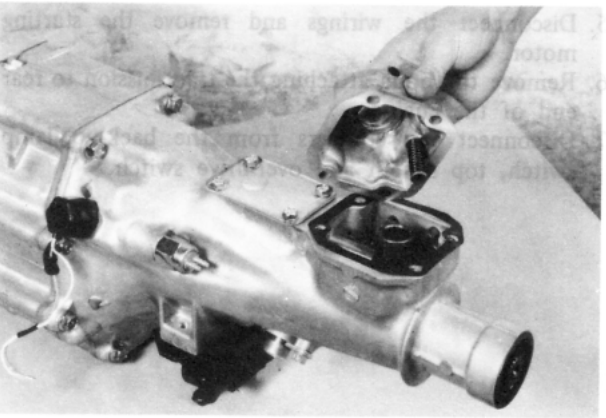


Fig. 7-11

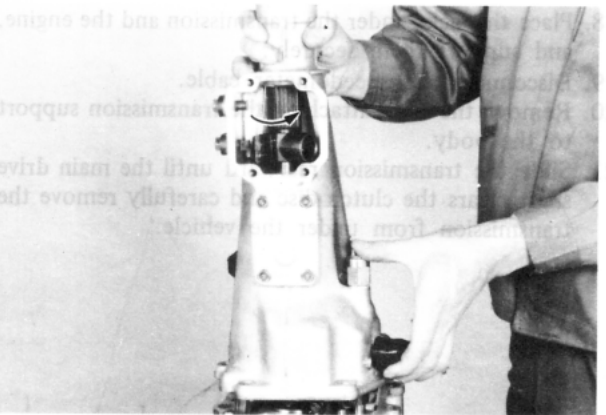


Fig. 7-12

7-B. TRANSMISSION DISASSEMBLY

Remove the following parts in sequence.

7-B-1. Front Cover

1. Remove the dust boot.
2. Remove the release bearing.
3. Remove the shift fork.

4. Remove the front cover.
5. Remove the adjusting shim(s).
6. Remove the snap ring.
7. Remove the oil seal.

Do not remove unless the oil seal is necessary to replace.

7-B-2. Extension Housing

1. Remove the gearshift lever retainer and gasket.

2. Remove the extension attaching bolts.
3. Remove the extension housing, with the control rod end laid down to the left as far as it will go.

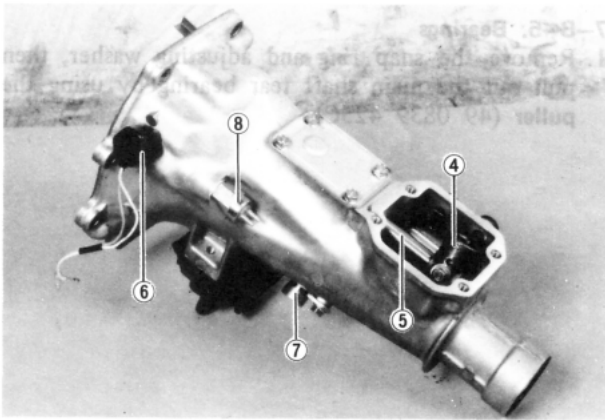


Fig. 7-13

4. Remove the control rod end.
5. Remove the control rod.
6. Remove the back-up light switch.
7. Remove the speedometer driven gear assembly.
8. Remove the over-drive switch.
(5-speed transmission only)

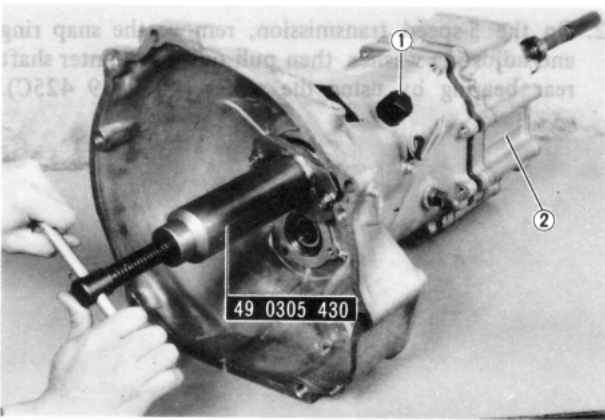


Fig. 7-14

7-B-3. Transmission Case

1. Remove the top switch (except for Canada)
2. Remove the bearing housing and gear assembly by using the **pusher** (49 0305 430) or tapping the main drive shaft with a plastic hammer.

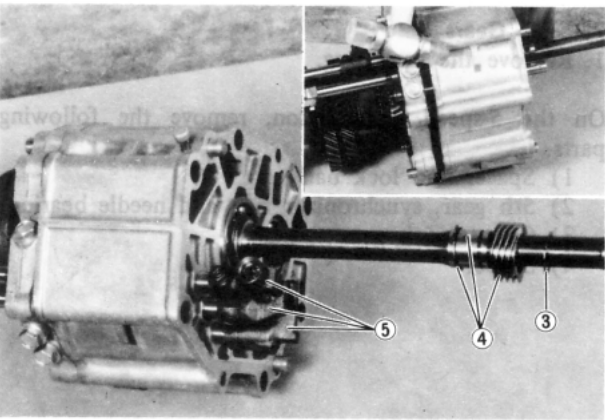


Fig. 7-15

3. Remove the snap ring.
4. Remove the speedometer drive gear, steel ball and snap ring.
5. Remove the shift rod end attaching bolts and shift rod ends.
6. Remove the intermediate housing by lightly tapping the intermediate housing with a plastic hammer.

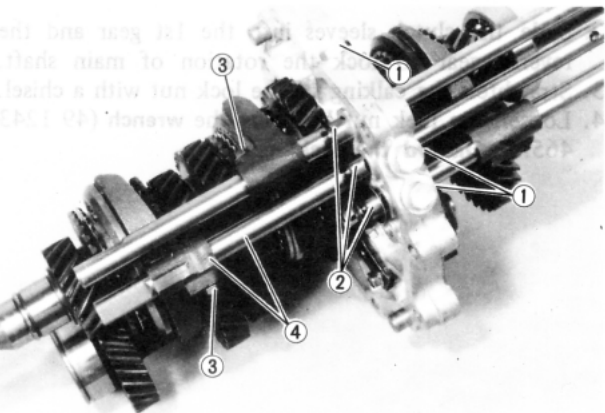


Fig. 7-16

7-B-4. Shift Forks and Shift Fork Rods

1. Remove the cap bolts, springs and lock balls.
2. Remove the snap rings on the shift rods.
3. Remove the shift fork attaching bolts.
4. Remove the shift fork rods and shift forks.
When removing the 5th and reverse shift rod (or reverse shift rod), be careful not to lose the lock ball.
5. Remove the lock ball, spring and interlock pins.

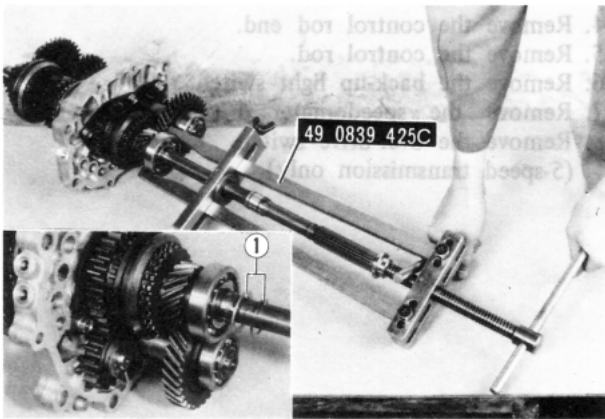


Fig. 7-17

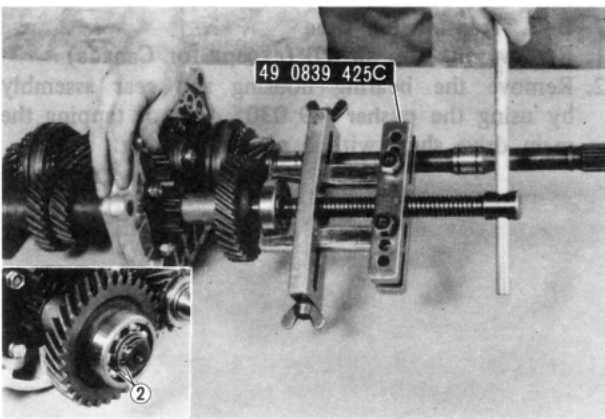


Fig. 7-18

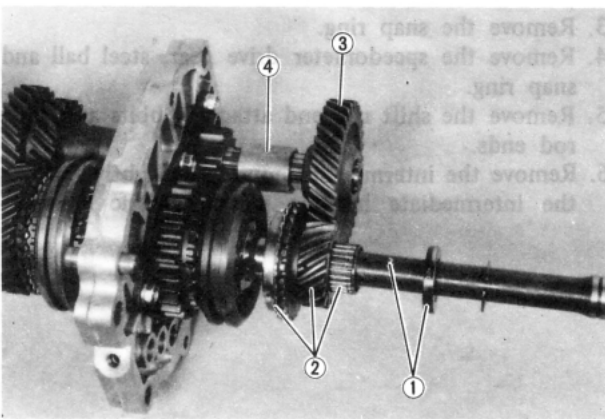


Fig. 7-19



Fig. 7-20

7-B-5. Bearings

1. Remove the snap ring and adjusting washer, then pull out the main shaft rear bearing by using the puller (49 0839 425C).

2. On the 5-speed transmission, remove the snap ring and adjusting washer, then pull out the counter shaft rear bearing by using the puller (49 0839 425C).

7-B-6. Gears

1. Remove the snap ring.

On the 5-speed transmission, remove the following parts.

- 1) Spacer and lock ball
- 2) 5th gear, synchronizer ring and needle bearing
- 3) Counter 5th gear
- 4) Spacer

2. Slide the clutch sleeves into the 1st gear and the reverse gear to lock the rotation of main shaft.
3. Straighten the calking of the lock nut with a chisel.
4. Loosen the lock nut by using the wrench (49 1243 465A). Discard the lock nut.

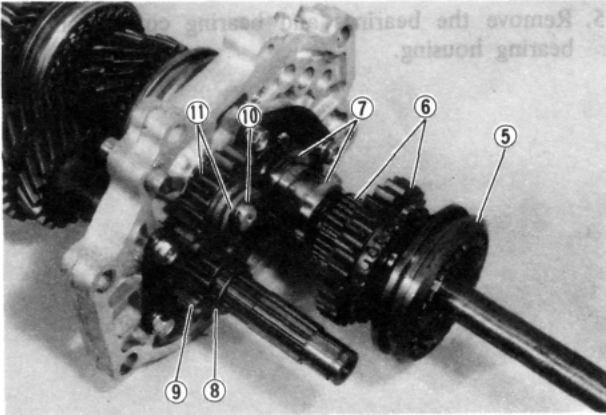


Fig. 7-21

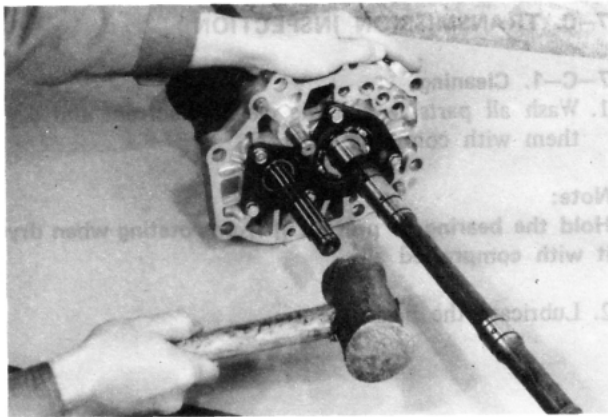


Fig. 7-22

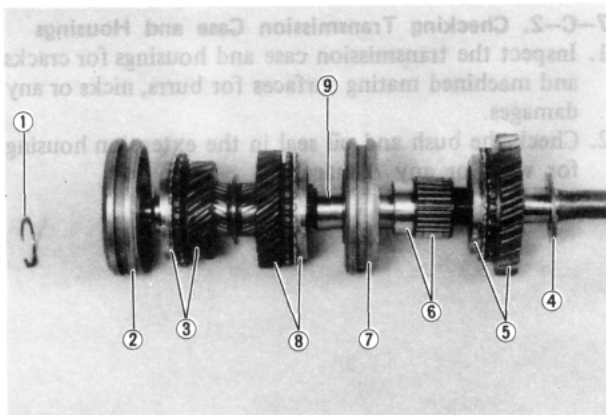


Fig. 7-23

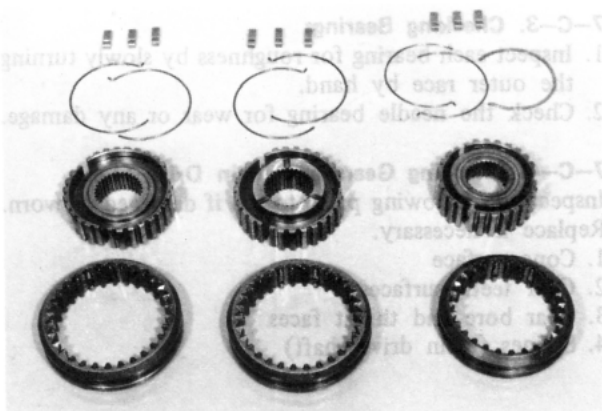


Fig. 7-24

5. Remove the clutch hub assembly.
6. Remove the reverse gear and needle bearing.
7. Remove the inner race and thrust washer.
8. Remove the snap ring. (4-speed transmission only)
9. Remove the counter reverse gear.
10. Remove the snap ring.
11. Remove the thrust washers and reverse idle gear.

12. Remove the main shaft and counter shaft from the bearing housing.
Tap the rear end of the main shaft and counter shaft in turn with a plastic hammer.

13. Remove the following parts from the main shaft.
 - 1) Snap ring
 - 2) Clutch hub assembly (press out)
 - 3) Synchronizer ring and 3rd gear
 - 4) Thrust washer
 - 5) Synchronizer ring and 1st gear
 - 6) Needle bearing and inner race
 - 7) Clutch hub assembly (press out)
 - 8) Synchronizer ring and 3rd gear
 - 9) Main shaft

14. Disassemble the clutch hub assemblies, being careful not to mix up the parts.

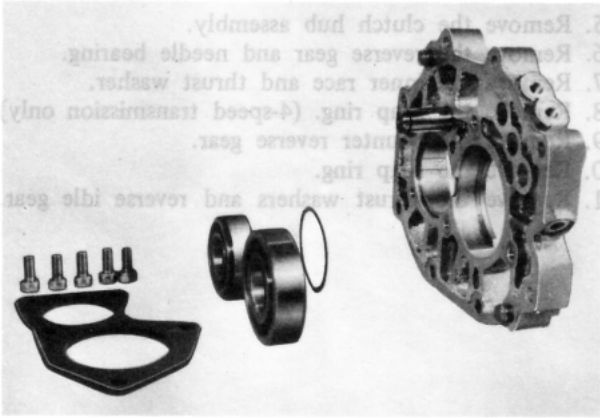


Fig. 7-25

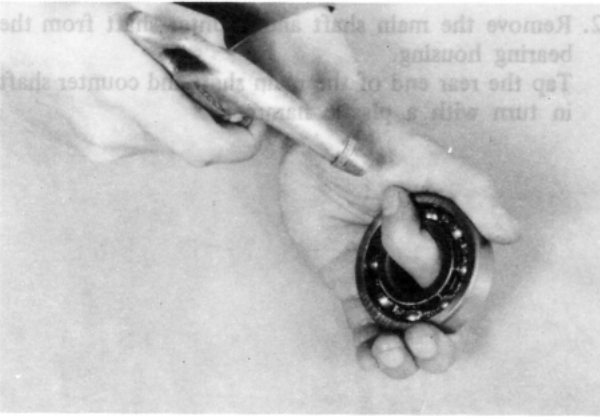


Fig. 7-26

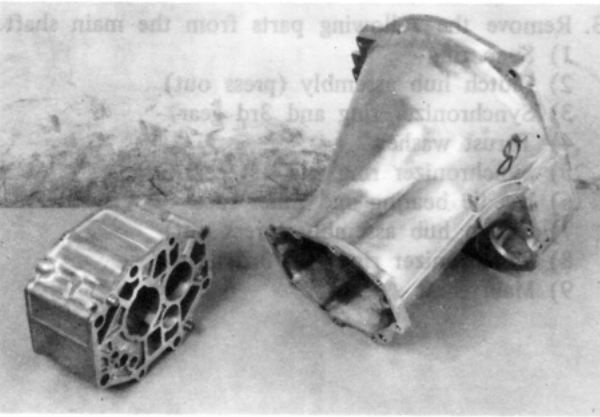


Fig. 7-27

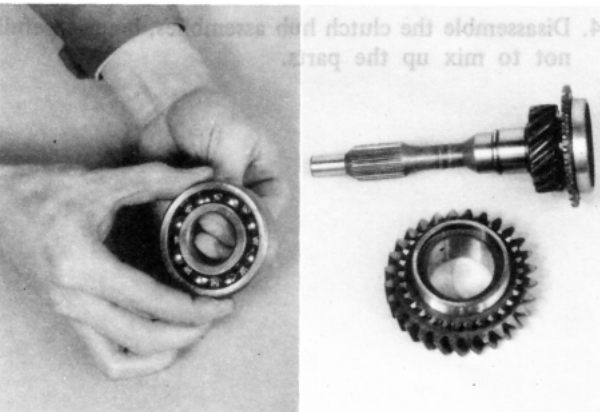


Fig. 7-28

15. Remove the bearings and bearing cover from the bearing housing.

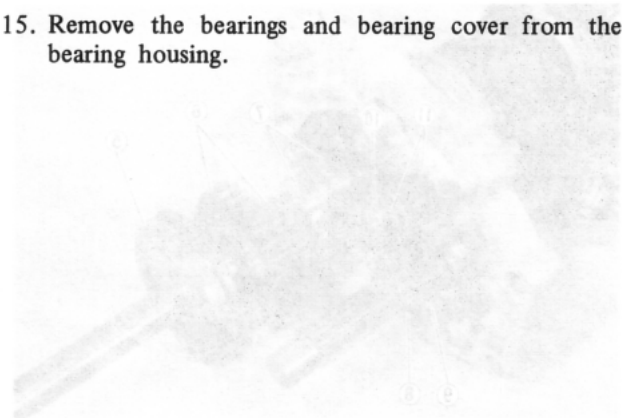


Fig. 7-29

7-C. TRANSMISSION INSPECTION

7-C-1. Cleaning

1. Wash all parts in suitable cleaning solvent and dry them with compressed air.

Note:

Hold the bearing to prevent it from rotating when dry it with compressed air.

2. Lubricate the bearings.

7-C-2. Checking Transmission Case and Housings

1. Inspect the transmission case and housings for cracks and machined mating surfaces for burrs, nicks or any damages.
2. Check the bush and oil seal in the extension housing for wear or any damage.

7-C-3. Checking Bearings

1. Inspect each bearing for roughness by slowly turning the outer race by hand.
2. Check the needle bearing for wear or any damage.

7-C-4. Checking Gears and Main Drive Shaft

Inspect the following parts to see if damaged or worn. Replace if necessary.

1. Cone surface
2. Gear teeth surfaces
3. Gear bore and thrust faces
4. Splines (main drive shaft)

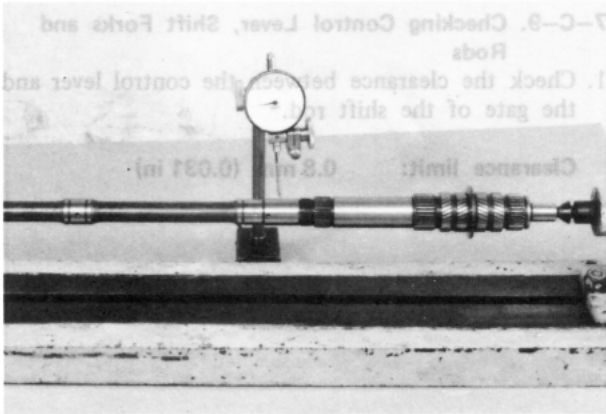


Fig. 7-29

7-C-5. Checking Main Shaft

1. Inspect the main shaft for run-out by applying a dial indicator.

Run-out limit: 0.03 mm (0.0012 in)

2. Check the fit of the main shaft and each gear bore.

Standard clearance: 0.03 ~ 0.08 mm
(0.0012 ~ 0.0031 in)

Limit: 0.15 mm (0.006 in)



Fig. 7-30

7-C-6. Checking Counter Shaft

Inspect the teeth surfaces and splines of the counter shaft for wear and damage.

7-C-7. Checking Reverse Idle Gear and Shaft

1. Inspect the gear for wear and damage.
2. Check the fit of the gear bore and shaft.

Standard clearance: 0.02 ~ 0.05 mm
(0.0008 ~ 0.0020 in)

Limit: 0.15 mm (0.006 in)



Fig. 7-31

7-C-8. Checking Synchronizer Mechanism

1. Inspect the gear teeth on the synchronizer ring for wear and damage.
2. Check the clearance between the side faces of the synchronizer ring and gear.

Standard clearance: 1.5 mm (0.059 in)

Limit: 0.8 mm (0.031 in)

3. Check the contact between the synchronizer ring and gear cone surface by using a thin coat of "red lead". If the contact pattern is poor, correct it by applying compound and lapping the surfaces together.

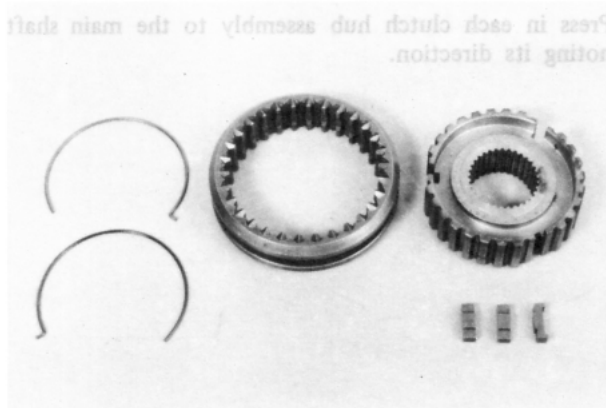


Fig. 7-32

4. See if the clutch sleeve slides easily on the clutch hub.
5. Check the synchronizer key, the inner surface of the clutch sleeve, and the key groove on the clutch hub for wear.
6. Check the synchronizer key spring for tension.



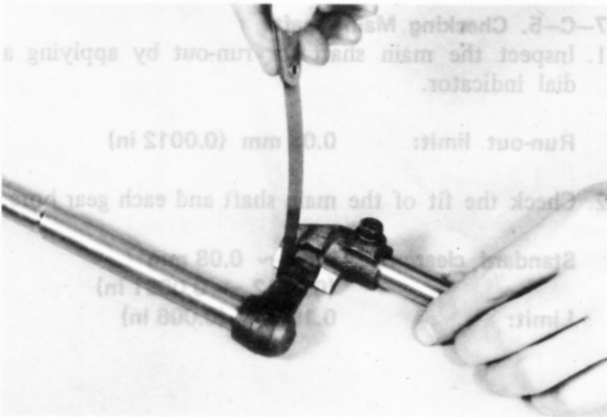


Fig. 7-33



Fig. 7-34

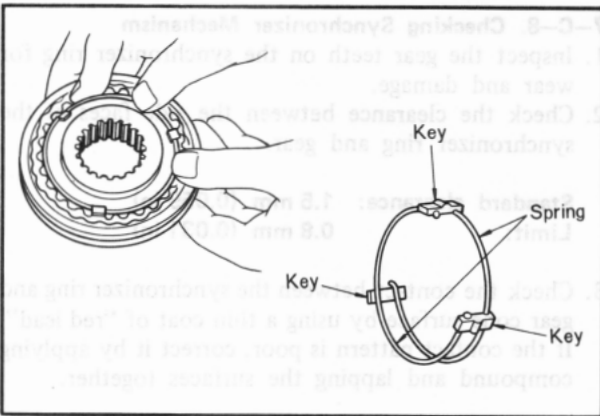


Fig. 7-35

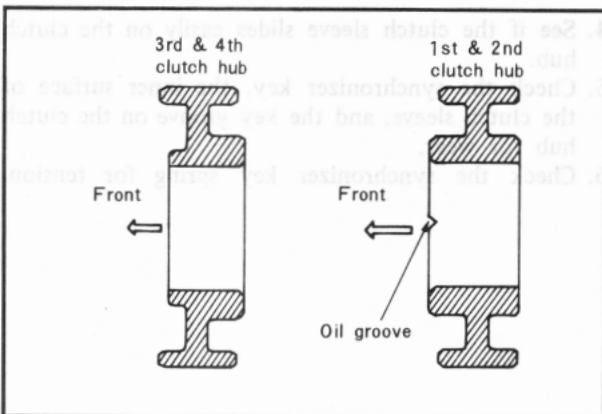


Fig. 7-36

7-C-9. Checking Control Lever, Shift Forks and Rods

1. Check the clearance between the control lever and the gate of the shift rod.

Clearance limit: 0.8 mm (0.031 in)

2. Check the clearance between the shift fork and clutch sleeve.

Clearance limit: 0.5 mm (0.020 in)

7-D. TRANSMISSION ASSEMBLY

Assemble the transmission in the reverse order of disassembly.

When assembling, **note** the following instructions.

Apply lubricant on sliding portions, gears and bearings before re-assembly.

1. Clutch Hub Assembly

Install the key springs so that the open ends of the springs should be kept 120 degrees apart as shown in figure.

This will keep the spring tension on each key uniform.

Press in each clutch hub assembly to the main shaft noting its direction.



Fig. 7-37

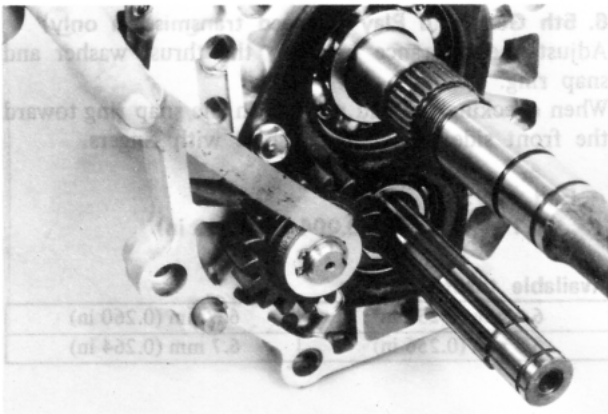


Fig. 7-38



Fig. 7-39



Fig. 7-40

2. Bearing Housing and Bearing Clearance

Place a straight edge across the bearing housing, and measure the clearance between the straight edge and each bearing with a feeler gauge.

If the clearance is not within the specification, adjust it with a shim.

Clearance: $0 \pm 0.05 \text{ mm}$ ($0 \pm 0.002 \text{ in}$)

Available shims

0.1 mm (0.004 in)	0.3 mm (0.012 in)
-------------------	-------------------

3. Reverse Idle Gear End Play

Check the clearance between the snap ring and thrust washer. If the clearance is not within the specification, adjust it with a thrust washer.

End play:
 $0.1 \sim 0.3 \text{ mm}$ ($0.004 \sim 0.012 \text{ in}$)

Available thrust washers

2.8 mm (0.110 in)	3.0 mm (0.118 in)
-------------------	-------------------

4. Main Shaft Lock Nut

After installing the clutch hub assembly, slide the clutch sleeves into 1st gear and reverse gear to lock the rotation of the main shaft.

Using the wrench (49 1243 465A), tighten a new lock nut to the specified torque.

Tightening torque:
 $13 \sim 21 \text{ m}\cdot\text{kg}$ ($94 \sim 152 \text{ ft}\cdot\text{lb}$)

After tightening the main shaft lock nut, calk the lock nut securely with a chisel.

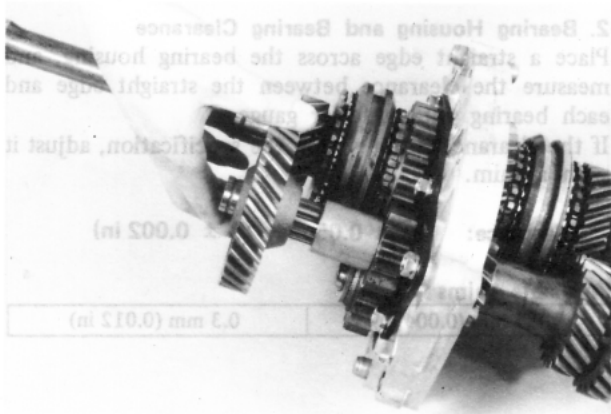


Fig. 7-41

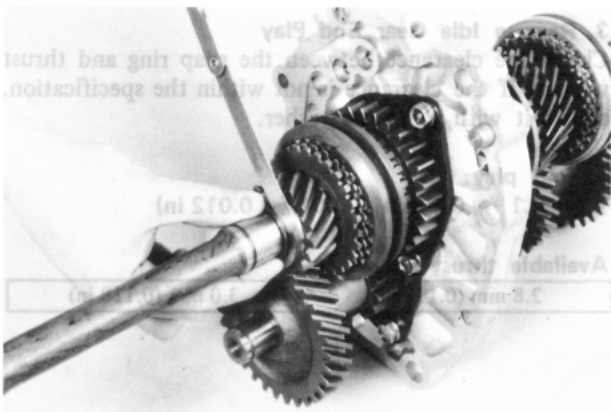


Fig. 7-42

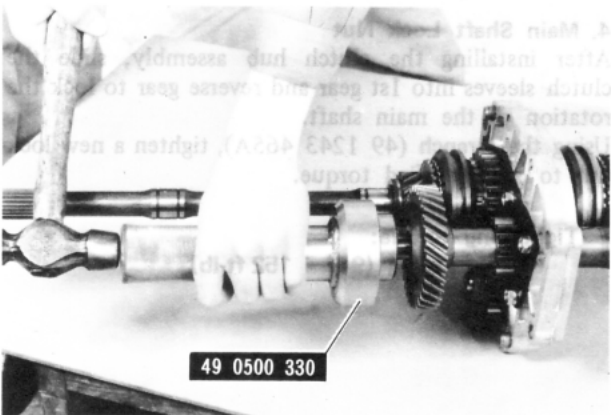


Fig. 7-43

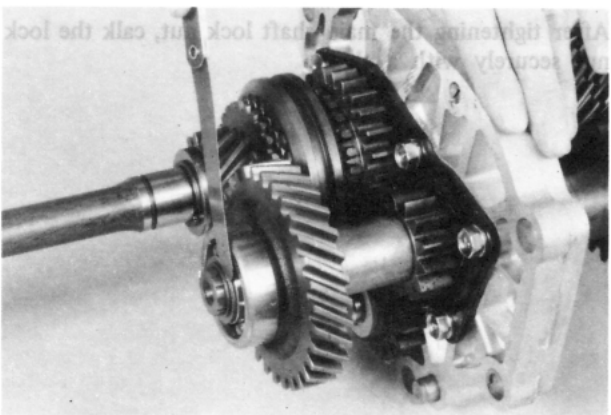


Fig. 7-44

5. 5th Gear (5-speed transmission only)

Install the 5th gear to the counter shaft gear with use care its direction shown in figure.

6. 5th Gear End Play (5-speed transmission only)

Adjust the clearance between the thrust washer and snap ring.

When checking the end play, push the snap ring toward the front side of the main shaft with fingers.

End play:
0.1 ~ 0.3 mm (0.004 ~ 0.012 in)

Available thrust washers

6.4 mm (0.252 in)	6.6 mm (0.260 in)
6.5 mm (0.256 in)	6.7 mm (0.264 in)

7. Counter Shaft Rear Bearing (5-speed transmission only)

Install the counter shaft rear bearing by using the bearing installer (49 0500 330).

8. Counter Shaft Rear Bearing End play (5-speed transmission only)

Adjust the clearance between the adjusting washer and snap ring.

End play:
Less than 0.1 mm (0.004 in)

Available adjusting washers

2.1 mm (0.083 in)	2.3 mm (0.091 in)
2.2 mm (0.087 in)	2.4 mm (0.094 in)



Fig. 7-45

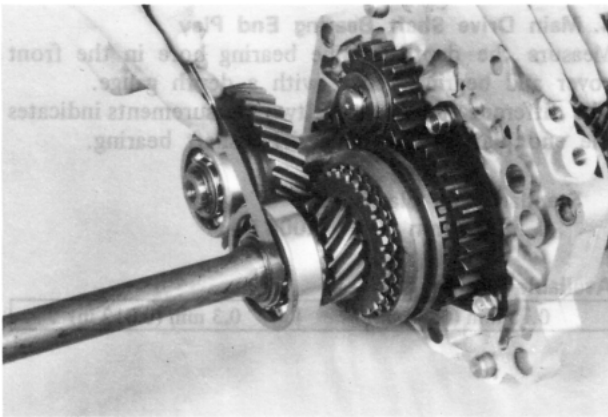


Fig. 7-46



Fig. 7-47

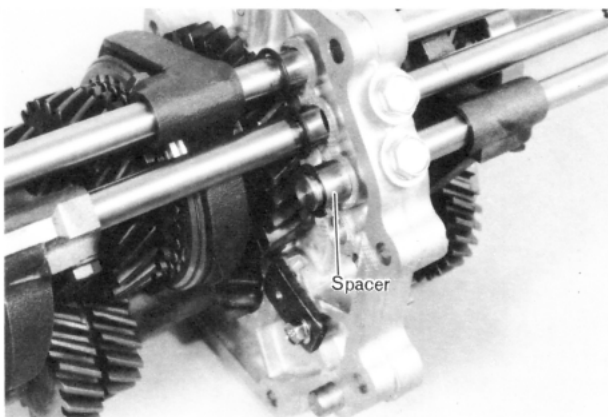


Fig. 7-48

9. Main Shaft Rear Bearing

Install the main shaft rear bearing by using the wrench (49 1243 465A).

10. Main Shaft Rear Bearing End play

Adjust the clearance between the adjusting washer and snap ring.

End play:
Less than 0.1 mm (0.004 in)

Available adjusting washers

1.9 mm (0.075 in)	2.1 mm (0.083 in)
2.0 mm (0.079 in)	2.2 mm (0.087 in)

11. Shift Forks, Rods and Interlock Pins

Use the shift fork rod guide (49 0862 350) and interlock pin guide (49 0187 451A) to assist in installing the shift fork rods and interlock pins.

Note:

On the 4-speed transmission, make sure that the spacer must be installed in position on the reverse shift fork rod.

When installing the shift fork lock bolts, apply locking agent on the threads.

Tightening torque:

Shift fork attaching bolts	1.2 ~ 1.6 m·kg (9 ~ 12 ft·lb)
Spring cap bolts	1.0 ~ 1.5 m·kg (7 ~ 11 ft·lb)

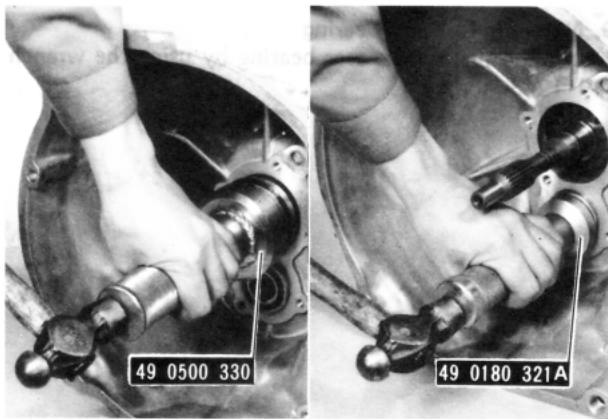


Fig. 7-49

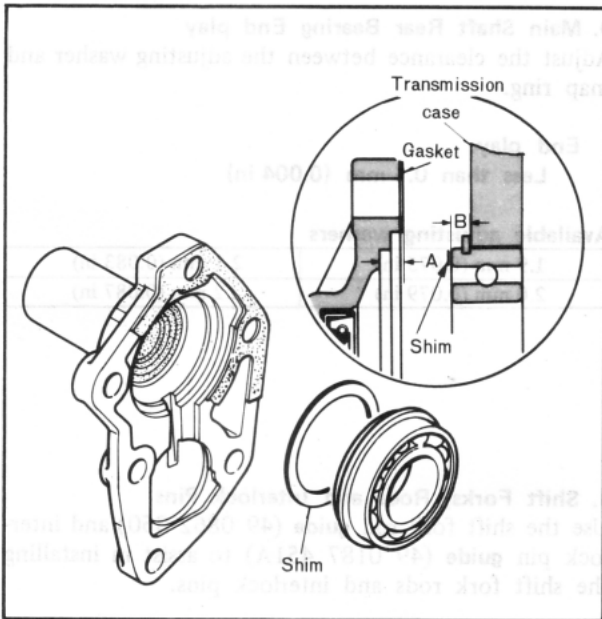


Fig. 7-50

12. Main Drive Shaft Bearing

Install the main drive shaft bearing by using the installer (49 0500 330).

13. Counter Shaft Front Bearing

Install the counter shaft front bearing by using the installer (49 0180 321A).

14. Main Drive Shaft Bearing End Play

Measure the depth of the bearing bore in the front cover and bearing height with a depth gauge. The difference between the two measurements indicates the end play of the main drive shaft bearing.

Standard end play(A-B):

0 ~ 0.1 mm (0 ~ 0.004 in)

Available shims

0.15 mm (0.006 in)	0.3 mm (0.012 in)
--------------------	-------------------

7-E. TRANSMISSION INSTALLATION

Install the transmission in the reverse order of removal.

Note:

Fill the transmission with the correct grade and quantity of lubricant.