

MANUAL TRANSMISSION

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OUTLINE

SPECIFICATIONS

		12A engine	13B engine
Type		5-speed Floor shift	
Transmission type		Forward : Synchromesh Reverse : Constant-mesh	
Synchromesh system		Borg – Warner	
Gear ratios	1st	3.622	
	2nd	2.186	
	3rd	1.419	
	4th	1.000	
	5th	0.758	0.807
	Reverse	3.493	
Oil	Type	API Service GL-4 or GL-5 Outside temp. -18°C (0°F) or lower: SAE 80W Outside temp. -18°C (0°F) or higher: SAE 90 All-season type: SAE 80W-90	
	Amount	1.7 liters (1.8 U.S. quarts, 1.5 Imp. quarts)	

57U07A-001

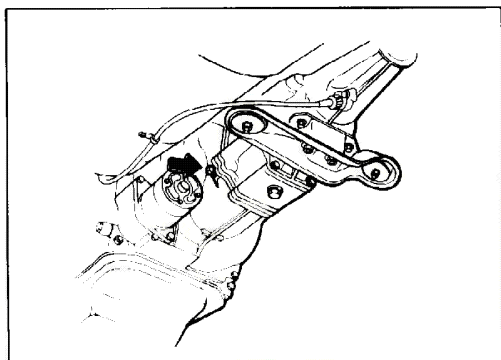
TROUBLESHOOTING GUIDE

Problem	Probable Cause	Remedy	Page
Abnormal noise The noise can be considered to be from the transmission if the noise is heard with the vehicle stopped and the engine idling, and then disappears when the clutch pedal is depressed, or if the noise is heard when the transmission is shifted.	Insufficient oil	Add oil	7A-3
	Deterioration of oil quality	Replace with oil of specified quality	7A-3
	Worn bearing	Adjust or replace	7A-10
	Wear of sliding surfaces of counter-shaft gear	Replace	7A-11
	Wear of sliding surfaces of gears	Replace	7A-10, 11
	Excessive gear backlash	Replace	7A-10, 11
	Damaged gear teeth	Replace	7A-10, 11

47U07A-002

Problem	Probable Cause	Remedy	Page
Difficult to shift Check by shifting up and shifting down while driving. Then stop the engine and check and shifting. If a gear cannot be shifted into, the problem can be considered to be a malfunction related to transmission control.	Bent change rod	Replace	
	No grease in transmission control system	Lubricate with grease	
	Insufficient oil	Add oil	7A-3
	Deterioration of oil quality	Replace with oil of specified quality	7A-3
	Wear or play of shift fork or shift rod	Replace	7A-12
	Wear of synchronizer ring	Replace	7A-11
	Wear of synchronizer cone of gear	Replace	7A-11
	Bad contact of synchronizer ring and cone of gear	Replace	7A-11
	Excessive longitudinal play of gears	Replace	7A-11
	Wear of bearing	Adjust or replace	7A-10
Wear of synchronizer key spring	Replace	7A-11	
Improper disengagement of clutch	Refer to 6 groups		
Jumps out of gear (to neutral) After determining which gear returns to neutral, first check the parts related to transmission control. Then remove the transmission from the vehicle and check the inside of the transmission.	Bent change rod	Replace	
	Weak or broken lock-ball spring	Replace	
	Wear of shift fork	Replace	7A-12
	Wear of clutch hub	Replace	7A-11
	Wear of clutch-hub sleeve	Replace	7A-11
	Wear of gear sliding parts	Replace	7A-10
	Excessive gear backlash	Replace	7A-10
	Wear of bearing	Adjust or replace	7A-10
	Incorrect (loose) installation of engine mounts or transmission mounts	Tighten	
Rough or difficult operation of gearshift lever	Sticking of control rod	Replace	7A-12
	Malfunction of ball joint of change rod	Replace	
	Bent change rod	Replace	

47U07A-003



57U07A-004

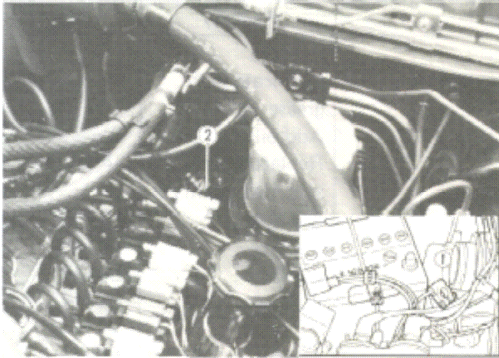
INSPECTION

Checking the transmission oil level

Remove the oil-supply port plug. Check whether the oil level is near the port.

If the level is low, add oil of the specified quality.

7A REMOVAL



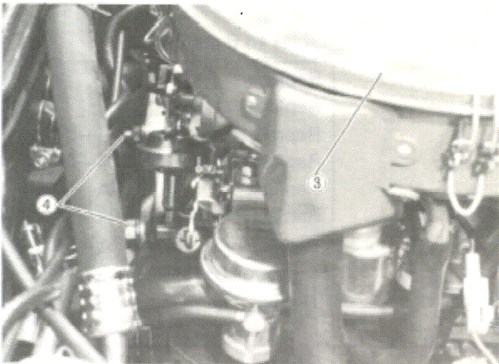
47U07A-005

REMOVAL

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

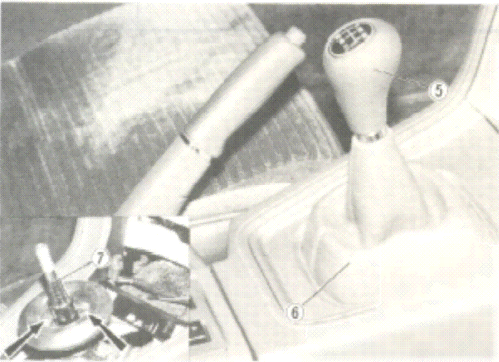
Apply the parking brake and block the wheels.

1. Open the hood and disconnect the battery negative cable.
2. Remove the clutch release cylinder.



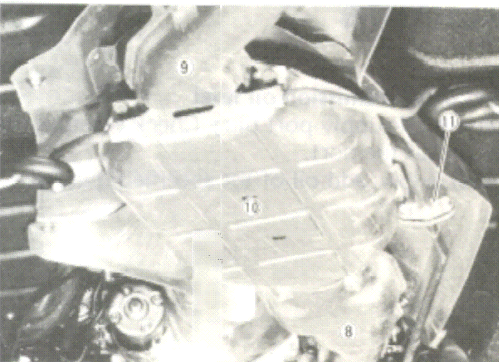
47U07A-006

3. Remove the air cleaner assembly. (12A engine only)
4. Remove the bolts attaching the transmission to rear end of the engine.



57U07A-007

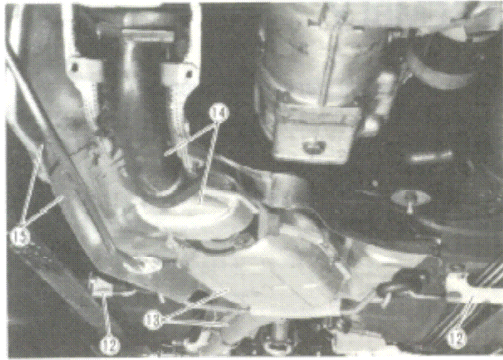
5. Unscrew and remove the gear shift lever knob.
6. Remove the gear shift lever boot and boot plate.
7. Remove the gear shift lever and retainer assembly.



47U07A-008

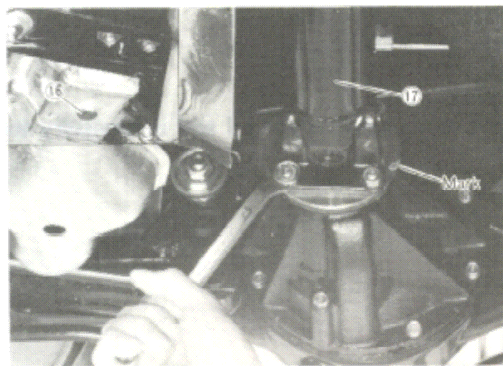
Jack up the vehicle and support it with stands.

8. Remove the under cover front.
9. Remove the under cover rear.
10. Remove the converter under cover.
11. Remove the nuts and disconnect the air pipe.



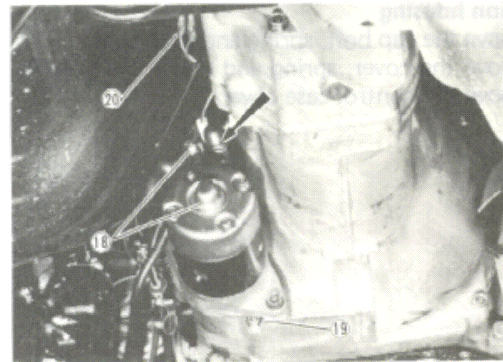
57U07A-009

12. Remove the converter brackets.
13. Loosen the nuts and carefully remove the exhaust pipe rear and converter assembly.
14. Loosen the nuts and remove the exhaust pipe front and monolith converter assembly.
15. Remove the floor under covers.



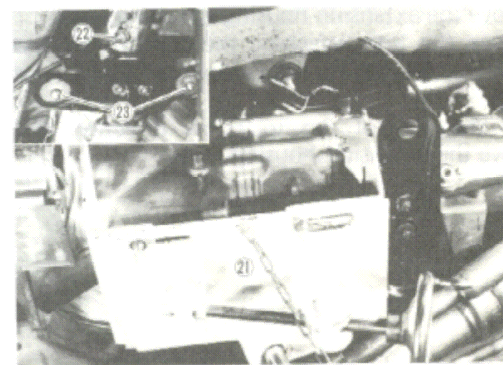
47U07A-010

16. Drain the lubricant from the transmission. After draining, clean and reinstall the drain plug.
17. Remove the propeller shaft referring to 8 group.



47U07A-011

18. Disconnect the wirings and remove the starting motor.
19. Remove the bolts attaching the transmission to rear end of the engine.
20. Disconnect the couplers from the back-up lamp switch.



57U07A-012

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

Caution

Place the suitable wooden spacer [height \approx 25 mm (1 in)] between the oil pan and center link. It is to prevent the engine from interfering to the dash panel.

DISASSEMBLY

Remove the following parts in sequence.

Front cover

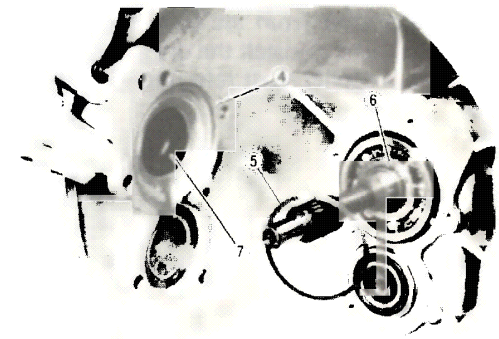
1. Remove the dust boot.
2. Remove the release bearing.
3. Remove the shift fork.



47U07A-013

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

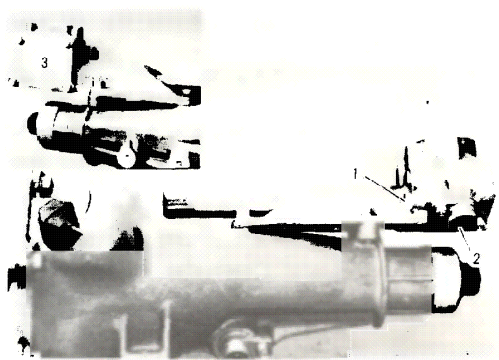
Do not remove unless the oil seal is necessary to replace.



47U07A-014

Extension housing

1. Remove the cap bolt, spring and lock ball.
2. Remove the cover, spring and select lock spindle.
3. Remove the control case cover.

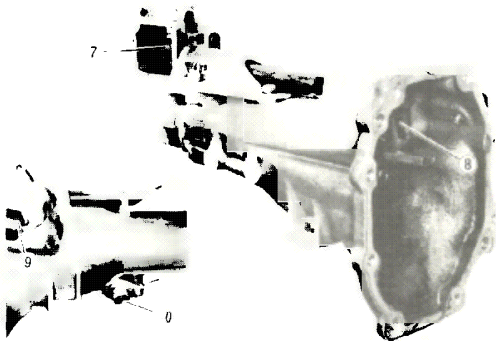


47U07A-015

4. Remove the extension housing attaching bolts.
5. Remove the bolt attaching the control rod end to the control rod. **Do not** remove the control rod end.
6. Turn the control rod to arrow direction and remove the extension housing.

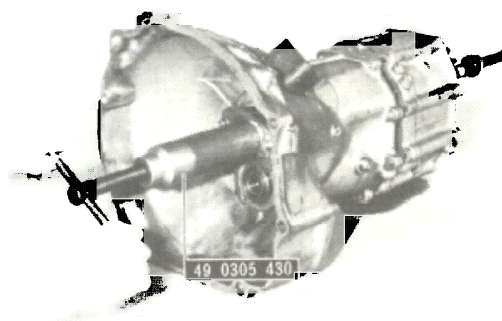


47U07A-016



47U07A-017

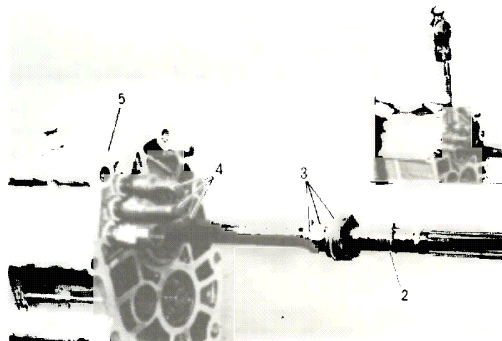
7. Remove the control rod end.
8. Remove the control rod and spring.
9. Remove the back-up light switch.
10. Remove the speedometer driven gear assembly.



57U07A-018

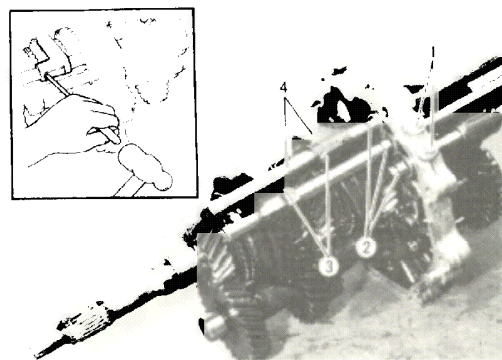
Transmission case

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



47U07A-019

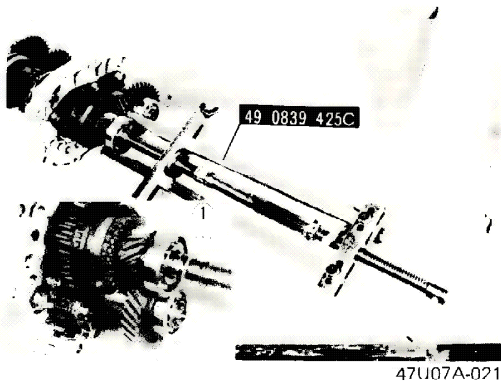
2. Remove the snap ring.
3. Remove the speedometer drive gear, steel ball and snap ring.
4. Drive out the spring pin attaching the shift rod end to the shift rod, using a small drift. Remove the shift rod ends.
5. Remove the intermediate housing by lightly tapping the intermediate housing with a plastic hammer.



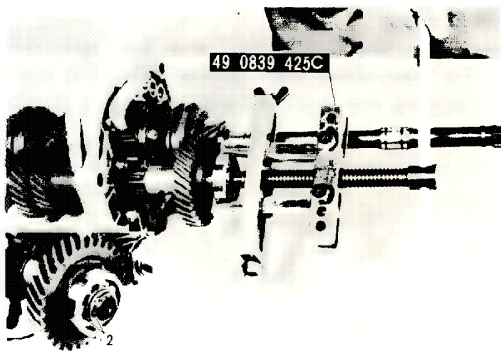
47U07A-020

Shift forks and shift fork rods

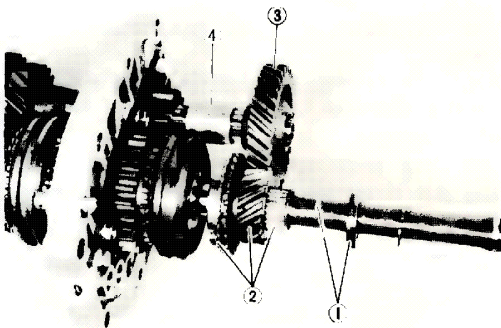
1. Remove the cap bolts, springs and lock balls.
2. Remove the snap rings on the shift rods.
3. Drive out the spring pin attaching the shift fork to shift rod, using a small drift.
4. Remove the shift fork rods and shift forks.
When removing the 5th and reverse shift rod, be careful not to lose the lock ball.
5. Remove the lock ball, spring and interlock pins.



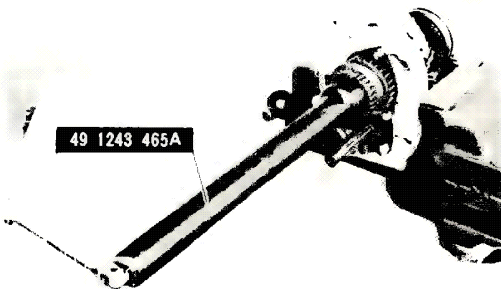
47U07A-021



47U07A-022



47U07A-023



57U07A-024

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

Gears

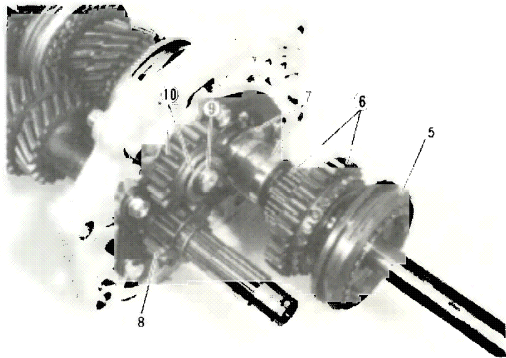
1. Remove the following parts.

- 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.

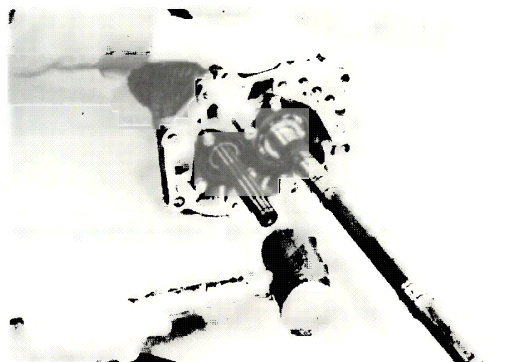
3. Straighten the calking of the lock nut with a chisel.

4. Loosen the lock nut by using the **main shaft lock nut wrench** (49 1243 465A). Discard the lock nut.



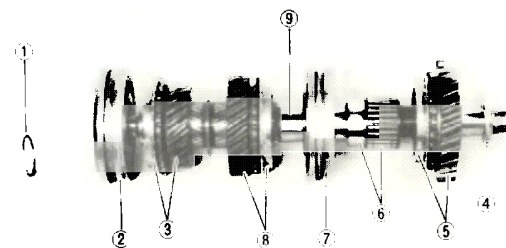
47U07A-025

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 counter reverse gear.
9. Remove the snap ring.
10. Remove the thrust washers and reverse idle gear.



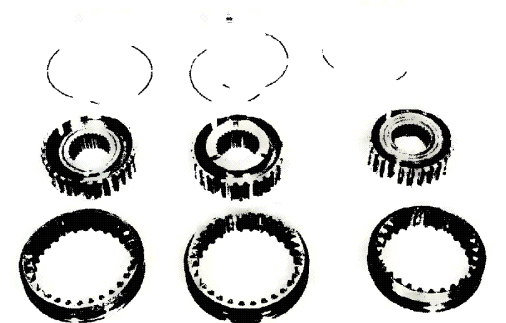
47U07A-026

11. 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.



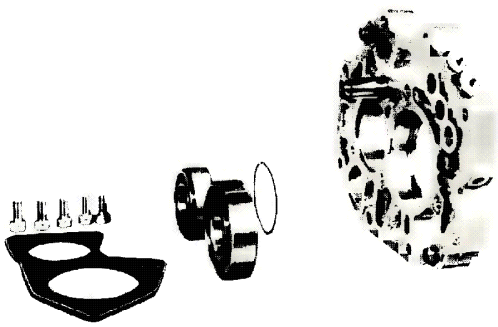
47U07A-027

12. 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



47U07A-028

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



47U07A-029

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

INSPECTION

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.



47U07A-030

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.



47U07A-031

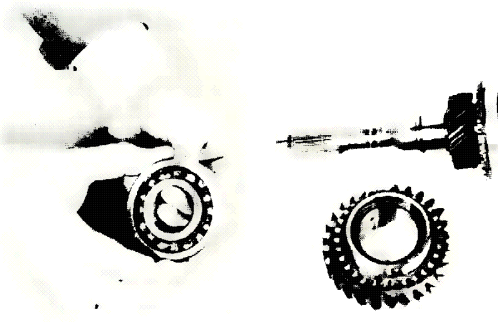
Bearings

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

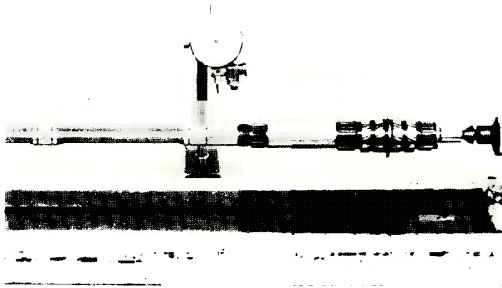
Gears and main drive shaft

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)



47U07A-032



47U07A-033

Main shaft

1. Inspect the main shaft run-out with 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 (0.0059 in)



47U07A-034

Counter shaft

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

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 (0.0059 in)



47U07A-035

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)

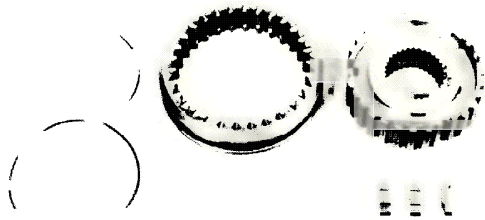
Limit: 0.8 mm (0.0315 in)

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.

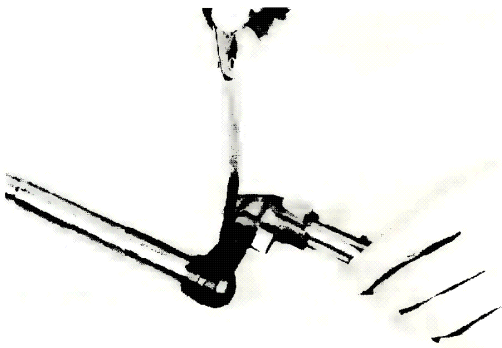
4. See if the clutch sleeve slides easily on the clutch hub.

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.



47U07A-036



47U07A-037

Control lever, shift forks and rods

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

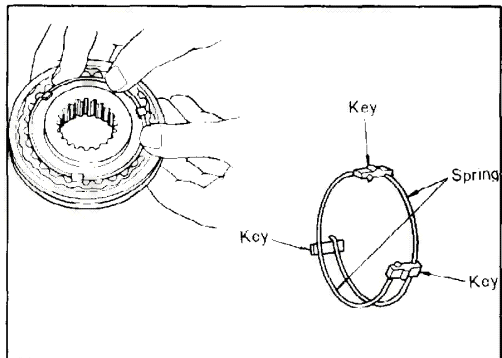
Clearance limit: 0.8 mm (0.0315 in)



47U07A-038

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

Clearance limit: 0.5 mm (0.0197 in)



57U07A-039

ASSEMBLY

Assemble the transmission in the reverse order of disassembly.

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

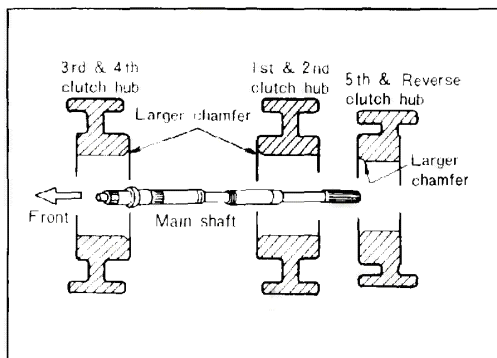
Apply lubricant on sliding portions, gears and bearings before re-assembly.

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.



47U07A-040



47U07A-041

2. Bearing housing and bearing clearance

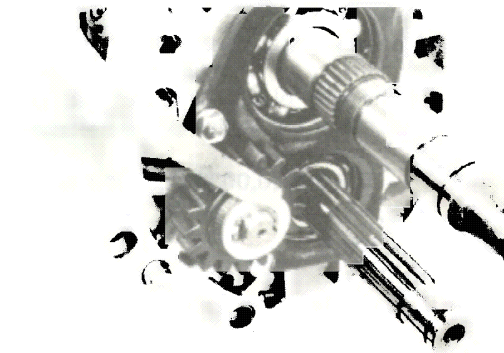
Place a straight edge across the bearing housing, and measure the clearance between the straight edge and each bearing with a feeler gauge.

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

Clearance: 0 ± 0.05 mm (0 ± 0.0020 in)

Available shims

0.1 mm (0.0039 in)	0.3 mm (0.0118 in)
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4/U07A-042

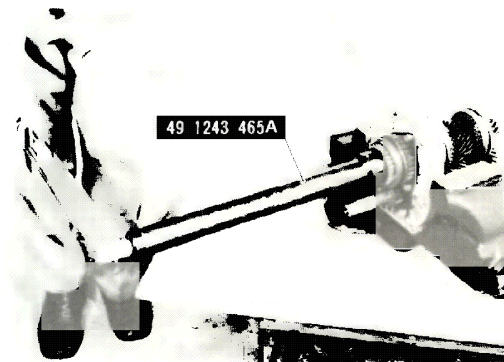
3. Reverse idle gear end play

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 ~ 0.3 mm (0.0039 ~ 0.0118 in)

Available thrust washers

2.8 mm (0.1102 in)	3.0 mm (0.1181 in)
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57U07A-043

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.

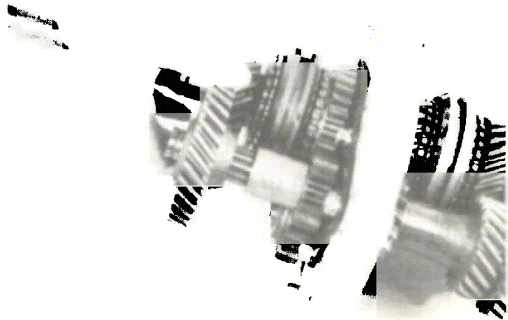
Using the **main shaft wrench** (49 1243 465A), tighten a new lock nut to the specified torque.

Tightening torque:
130 ~ 210 N·m (94 ~ 152 ft·lb)



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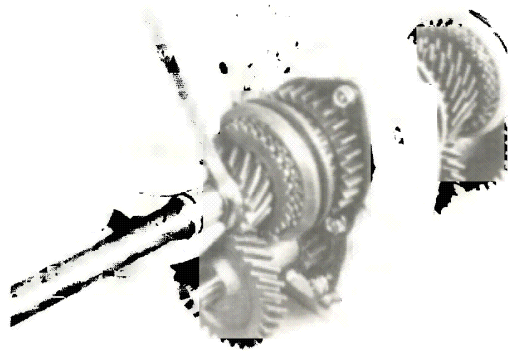
After tightening the main shaft lock nut, calk the lock nut securely with a chisel.



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5. 5th gear

Install the 5th gear on the counter shaft gear, be careful to position it as shown.



47U07A-046

6. 5th gear end play

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 (0.0039 ~ 0.0118 in)

Available thrust washers

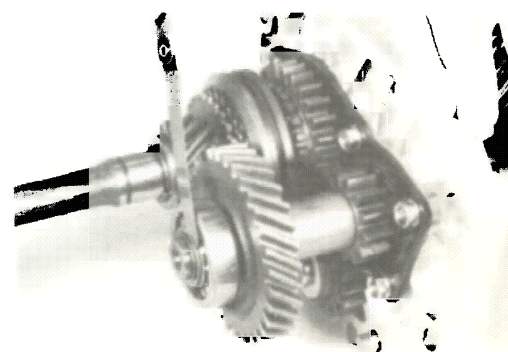
6.4 mm (0.2520 in)	6.6 mm (0.2598 in)
6.5 mm (0.2559 in)	6.7 mm (0.2638 in)



57U07A-047

7. Counter shaft rear bearing

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



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8. Counter shaft rear bearing end play

Adjust the clearance between the adjusting washer and snap ring.

End play: Less than 0.1 mm (0.0039 in)

Available adjusting washers

2.1 mm (0.0827 in)	2.3 mm (0.0906 in)
2.2 mm (0.0866 in)	2.4 mm (0.0945 in)

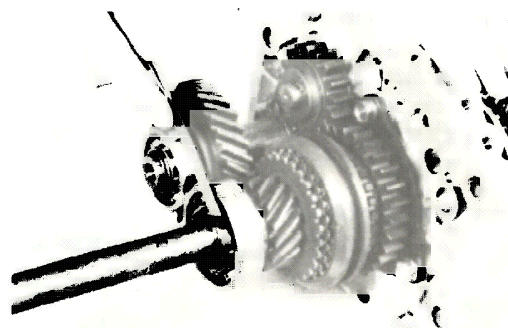


49 1243 465A

57U07A-049

9. Main shaft rear bearing

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



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10. Main shaft rear bearing end play

Adjust the clearance between the adjusting washer and snap ring.

End play: Less than 0.1 mm (0.0039 in)

Available adjusting washers

1.9 mm (0.0748 in)	2.1 mm (0.0827 in)
2.0 mm (0.0787 in)	2.2 mm (0.0866 in)



49 0187 451A

49 0862 350

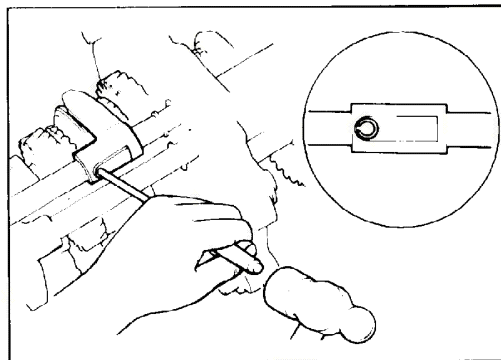
57U07A-051

11. Shift forks, rods and interlock pins

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

Tightening torque:

Spring cap bolts 10 ~ 15 N·m (7 ~ 11 ft·lb)



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Drive in the new spring pin with a small punch so that the spring pin slit is faced as shown in figure.

7A INSTALLATION



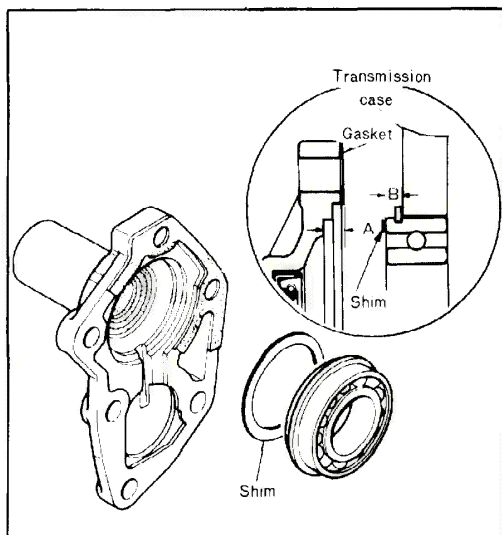
57U07A-053

12. Main drive shaft bearing

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

13. Counter shaft front bearing

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



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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 ~ 0.0039 in)

Available shims

0.15 mm (0.0059 in)	0.3 mm (0.0118 in)
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INSTALLATION

Install the transmission in the reverse order of removal.

Note

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

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