Before beginning any service procedure, refer to the 1993 RX-7 Body Electrical Troubleshooting Manual; see section S for air bag system precautions and J1 for audio anti-theft system precautions.

MANUAL TRANSMISSION (R15M-D)

÷...

ì

3

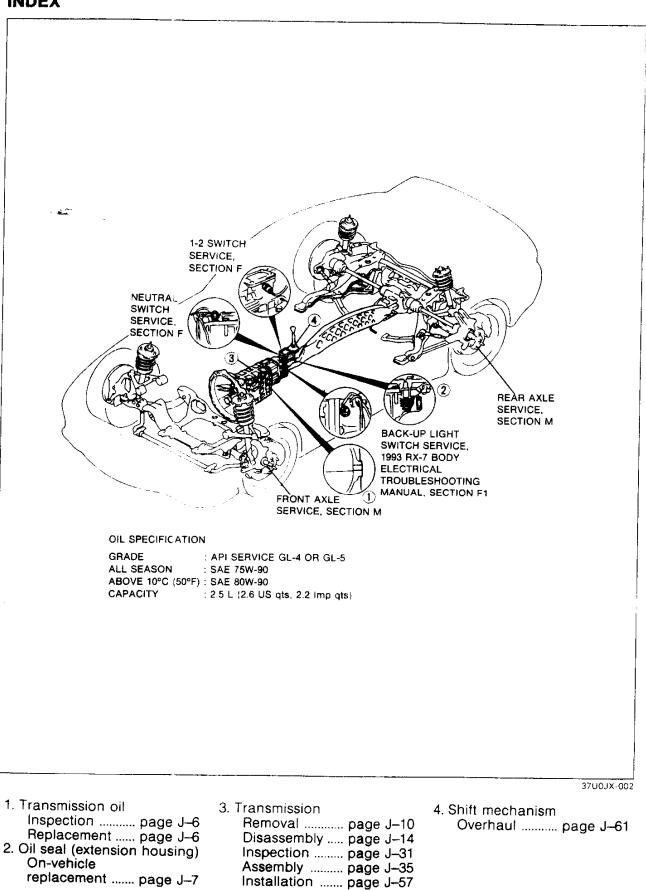
INDEX	J		2
OUTLINE	J.	_	3
SPECIFICATIONS	J٠		3
STRUCTURAL VIEW	J.		3
POWERFLOW	J	_	4
TROUBLESHOOTING GUIDE	J.	_	5
TRANSMISSION OIL	J.	_	6
INSPECTION	J.	_	6
REPLACEMENT	J.		6
OIL SEAL (EXTENSION HOUSING)	J.	_	7
PREPARATION		_	7
ON-VEHICLE REPLACEMENT	J ·	_	7
TRANSMISSION	J.	-	8
PREPARATION	J.		8
REMOVAL	J-	-1	0
DISASSEMBLY	J-	-1	4
INSPECTION	J -	3	1
ASSEMBLY	J.	-3	5
INSTALLATION		-	
SHIFT MECHANISM	J.	-6	1
OVERHAUL	J٠	6	1
3	7UQJ	X-0	01

J

24

J





. .

J-2

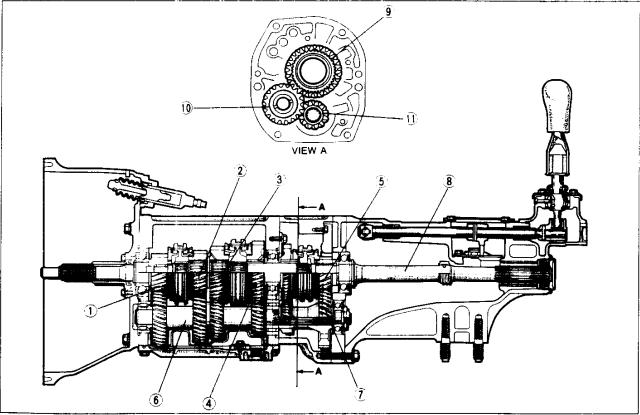
OUTLINE

SPECIFICATIONS

		Model	R15M-D (R5M-D)		
			Forward: Synchromesh		
Synchronization mechanism			Reverse: Synchromesh		
Shift type			5-speed, floor shift		
Shift pattern					
Gear ratio	1st		3.483		
	2nd		2.015		
	3rd		1.391		
	4th		1.000		
	5th		0.719		
	Reverse		3.288		
Oil	Grade		API service GL-4 or GL-5		
	Viscosity	All-season	SAE 75W-90		
		Above 10°C (50°F)	SAE 80W-90		
	Capacity	L (US gts, Imp gts)	2.5 {2.6, 2.2}		
		, and a second secon	37UQIX-0		

STRUCTURAL VIEW

2



37U0JX-004

- Main drive gear (4th gear)
 3rd gear
 2nd gear
 1st gear
 5th gear
 Countershaft

···.)

- 7. Counter 5th gear 8. Mainshaft

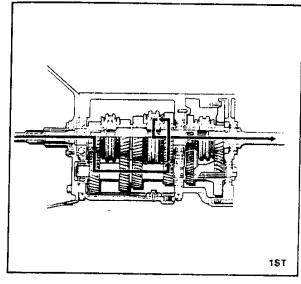
- 9. Reverse gear 10. Reverse idler gear 11. Counter reverse gear

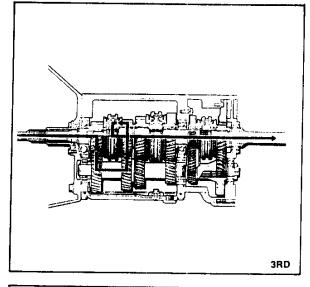


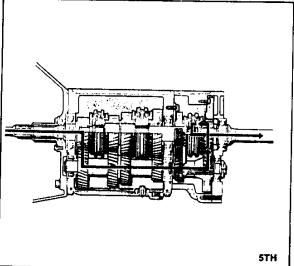
J

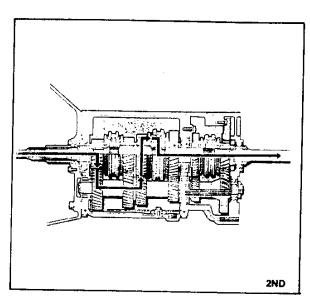
4

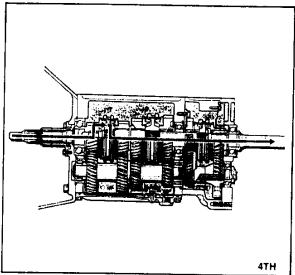
POWERFLOW

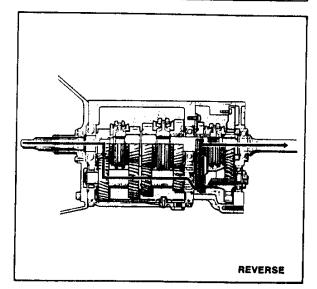












37U0JX-005

2

TROUBLESHOOTING GUIDE

÷,

1

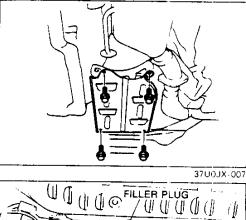
8.1

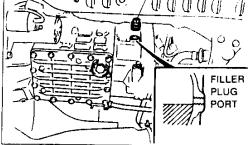
Problem	Possible Cause	Action	Page
Abnormal noise	Insufficient oil	Add oil	J6
	Deter oration of oil quality	Replace with specified oil	J6
	Worn bearing	Replace	-
	Worn contact surface of countershaft gear	Replace	J-26
	Worn contact surface of gears	Replace	J18, 22, 26
	Excessive gear backlash	Replace	J-18, 22, 26
	Damaged gear teeth	Replace	J-18, 22, 26
	Object caught in gears	Repair or replace	J-18, 22, 26
Difficult to shift	Bent shift rod	Replace	J–18
	Insufficient oil	Add oil	J6
	Deter oration of oil quality	Replace with specified oil	jJ6
	Wear or play of shift fork or shift rod	Replace	J18, 22
	Worn or damaged synchronizer ring		
	(1st, 4th, 5th, Reverse)	Replace	J–18, 26
	Worn or damaged synchronizer assembly		
	(2nd and 3rd)	Replace	J26
	Worn synchronizer gear cone	Replace	J–18, 22, 26
	Poor contact of synchronizer ring and gear cone	Replace	J18, 22, 26
	Excessive longitudinal play of gears	Replace	J–18, 22, 26
	Worn bearing	Replace	-
	Improper disengagement of clutch	Refer to section H	-
	Weak synchronizer key spring	Replace	J–18. 26
Jumps out of gear	Weak detent ball spring	Replace	J18
	Worn shift fork	Replace	J18, 22
	Worn clutch hub	Replace	J–18, 26
	Worn clutch hub sleeve	Replace	J18, 26
	Worn gears	Replace	J18, 22, 26
	Excessive gear backlash	Replace	J-18, 22, 26
	Worn bearing	Replace	_
	Loose engine mounts or transmission mounts	Tighten	-

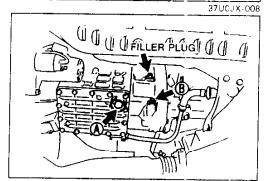
J

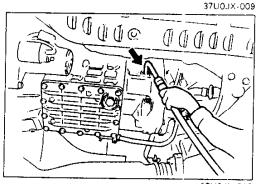
.

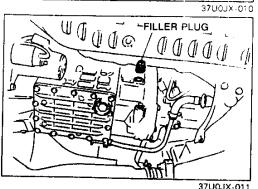
;











TRANSMISSION OIL INSPECTION

Caution

- Park the vehicle on level ground.
- 1. Remove the transmission cover.
- 2. Remove the filler plug.
- 3. Verify that the oil is up to the bottom of the filler plug hole.
- 4. If the oil level is low, add the specified oil through the filler plug port.
- 5. Install a new filler plug.

Tightening torque: 25-39 N·m {2.5-4.0 kgf·m, 19-28 ft·lbf}

6. Install the transmission cover.

Tightening torque: 7.9–10.7 N·m {80–110 kgf·cm, 70–95.4 in·lbf}

REPLACEMENT

- 1. Remove the transmission cover.
- 2. Remove plug A (with washer) and B, and drain the oil into a suitable container.
- 3. Wipe both plugs clean.
- 4. Apply sealant to the B plug threads.
- 5. Install plug A (with new washer) and B.

Tightening torque:

A: 40-58 N·m {4.0-6.0 kgf·m, 29-43 ft·lbf} B: 21-31 N·m {2.1-3.2 kgf·m, 16-23 ft·lbf}

6. Remove the filler plug and add the specified oil through the filler plug port until the level rises to the bottom of the port.

Specified oil:

Grade: API service GL-4 or GL-5 All-season: SAE 75W-90 Above 10°C {50°F}: SAE 80W-90

Capacity: 2.5 L {2.6 US qts, 2.2 Imp qts}

7. Install a new filler plug.

Tightening torque: 25–39 N·m {2.5–4.0 kgf·m, 19–28 ft·lbf}

8. Install the transmission cover.

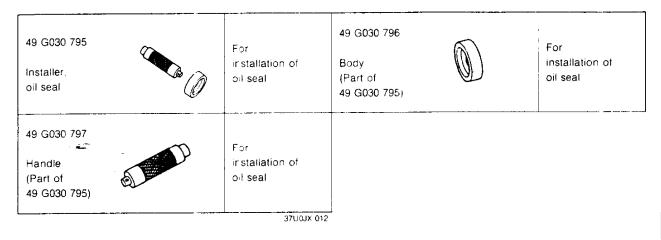
Tightening torque: 7.9-10.7 N·m {80-110 kgf·cm, 70-95.4 in·lbf}



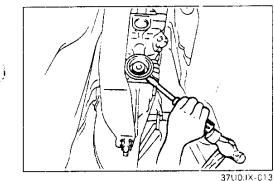
J--6

OIL SEAL (EXTENSION HOUSING)

PREPARATION SST







37UO.IX-C⁻4

.

ON-VEHICLE REPLACEMENT

Caution

- Do not damage the extension housing or mainshaft splines.
- 1. Remove the transmission cover.
- 2. Remove the propeller shaft. (Refer to section L.)
- 3. Remove the oil seal with a screwdriver.
- 4. Apply the specified oil to the new oil seal.
- 5. Install the oil seal by using the SST.
- 6. Install the propeller shaft. (Refer to section L.)
- 7. Inspect the oil level. (Refer to page J-6)
- 8. Install the transmission cover.

Tightening torque: 7.9-10.7 N·m {80-110 kgf·cm, 70-95.4 in·lbf}

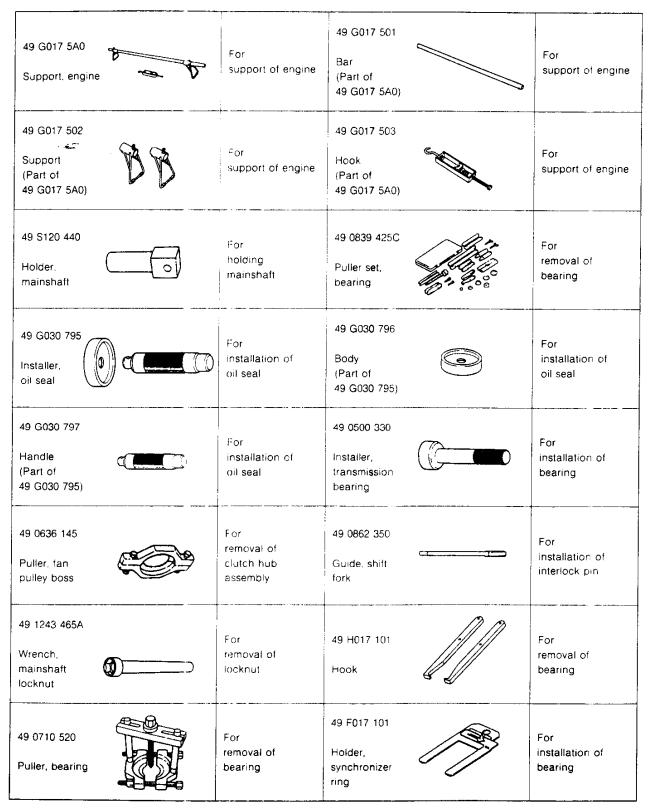
•1

TRANSMISSION

PREPARATION

SST

. |



TRANSMISSION

49 F401 330B	For Installation of bearing	49 F401 331 Body (Part of 49 F401 330B)	For installation of clutch hub assembly
49 F401 335A Attachment A Part of 49 F401 330B)	For installation of bearing race	49 0813 235 Replacer, main bearing	For installation of main bearing

ł

1 - 1 - 1

J

4

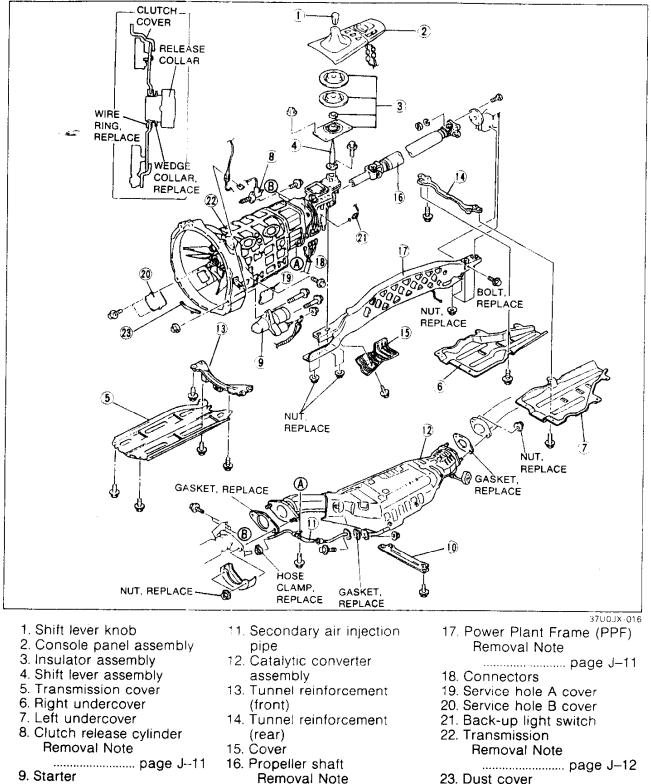
REMOVAL

. |

Caution

• Remove the clutch release collar from the clutch cover before removing transmission.

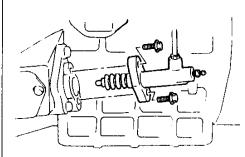
- 1. Disconnect the negative battery cable.
- 2. Remove in the order shown in the figure, referring to Removal Note.

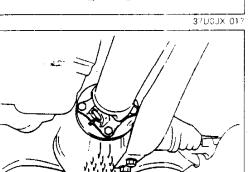


.....page J-11

10. Tunnel reinforcement (center)

J-10







Removal Note Clutch release cylinder

Caution

- Do not damage the clutch pipe.
- 1. Loosen the clutch release cylinder installation bolts.
- 2. Loosen the clutch pipe bracket bolt.
- 3. Secure the clutch release cylinder/clutch pipe assembly in a place where it will not interfere with transmission removal.

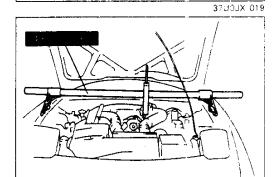
Propeller shaft

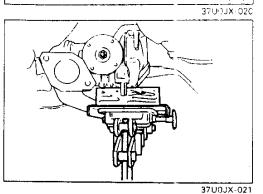
- 1. Mark the flanges for correct reinstallation.
- 2. Remove the propeller shaft.

3. Install the **SST** to the extension housing.

Power plant frame (PPF)

1. Hold the engine by using the SST (engine supports).

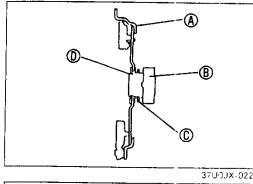


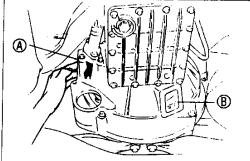


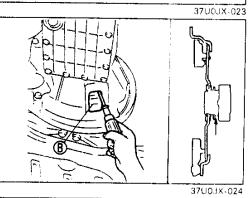
المغن

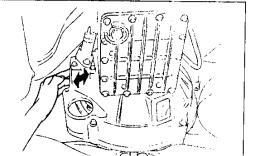
- 2. Hold the differential with a transmission jack.
- 3. Remove the PPF.
- 4. Remove the back-up light switch from the transmission.











37U0JX-025

Transmission

- 1. The clutch cover and clutch release collar are joined as shown in the figure.
 - A: Clutch cover
 - B: Clutch release collar
 - C: Wedge collar
 - D: Wire ring

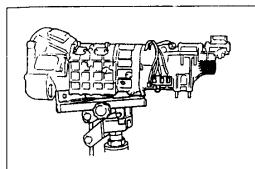
Caution

- Separation of the clutch cover and release collar must be done with the release collar pushed into the clutch cover, away from the transmission.
- Do not reuse wedge collar or wire ring. (Refer to section H.)
- 2. Remove the covers from service holes A and B.
- 3. Through service hole A, swing the release fork so that the release collar is pushed and held toward the clutch cover (engine side).
- 4. Insert a screwdriver through service hole B, into the space between the wedge collar and the release collar. Pry and separate the release collar from the clutch cover.

5. Swing the release fork back and forth to make sure that the release collar and clutch cover are separated.

- 6. If the above procedure does not work, then separate the clutch cover from the flywheel, following the procedure below.
 - (1) Through service hole B, gradually loosen the 6 clutch cover installation bolts in a crisscross pattern.
 - (2) Remove the clutch cover installation bolts, and separate the clutch cover from the flywheel.

J-12



7. Support the transmission with a transmission jack.

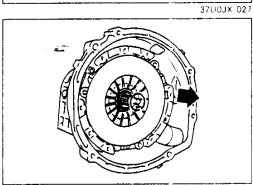
Warning

• Do not allow the transmission to fall from the jack.

- 8. Loosen the transmission installation bolts.
- 9. Remove the transmission.

10. Remove the clutch cover.

- (1) Remove the clutch cover from the flywheel. (Refer to section H.)
- (2) If the transmission was removed by following step 6, remove the wire ring from the release collar and separate the release collar from the clutch cover.



37U0JX-028

DISASSEMBLY

Precaution

- 1. Clean the transmission exterior thoroughly with a steam cleaner or cleaning solvents before disassembly.
- 2. Clean the removed parts (except sealed bearings) with cleaning solvent, and dry with compressed air. Clean out all holes and passages with compressed air, and check that there are no obstructions.
- 3. Wear eye protection when using compressed air.
- 4. Use a plastic hammer when disassembling the transmission case and other light alloy metal parts.
- 5. Keep all disassembled parts in a clean area.
- 6. When using a vise, insert protective plates to prevent damage to the part.
- 7. Note the assembly position of each part as it is disassembled.
- 8. Inspect each part for damage while disassembling.

37U0JX-029

Clutch Housing and Extension Housing Components

Note

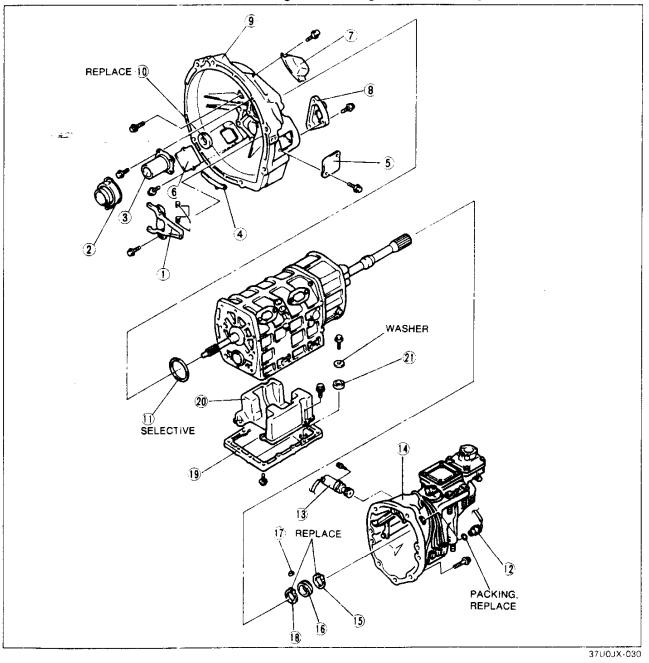
ì

5

- 1

• Do not remove the front and rear oil seals unless necessary.

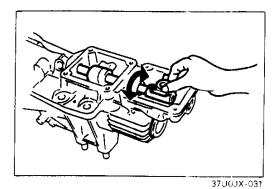
Disassemble in the order shown in the figure, referring to Disassembly Note.



- 1. Release fork assembly
- 2. Release collar
- 3. Front cover
- 4. Dust cover
- 5. Service hole A cover
- 6. Service hole B cover
- 7. Vent cover
- 8. Release cylinder support
- 9. Clutch housing

- 10. Oil seal (clutch housing)
- 11. Adjustment shim
- 12. Back-up light switch
- 13. Speedometer sensor
- (Speedometer driven gear) 14. Extension housing Disassembly note
- 15. Snap ring

- 16. Speedometer drive gear
- 17. Key
- 18. Snap ring
- 19. Undercover
- 20. Oil baffle
- 21. Magnet



+ 2

Disassembly note Extension housing

1. Move the control rod end to the neutral position.

 Remove the extension housing installation bolts.
 Lift up on and remove the extension housing from the center housing.

J-16

مسهمة

MEMO

. منتخب

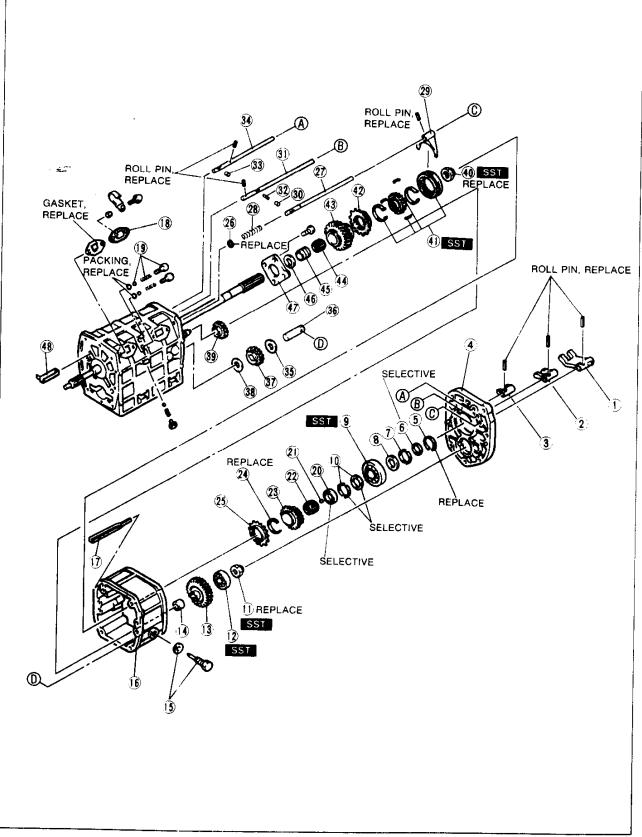
ş

.) 14

J

5th/Reverse Gear and Housing Components

Disassemble in the order shown in the figure, referring to Disassembly Note.



37U0JX-032

TRANSMISSION

- 1, 5th/Reverse shift rod end Inspection page J-32 2. 3rd/4th shift rod end Inspection page J-32 3. 1st/2nd shift rod end Inspection page J-32
- 4. Bearing housing **Disassembly Note**

..... below

- 5. Snap ring
- 6. Thrust washer
- 7. C-washers
- 8. Retaining ring
- 9. Mainshaft rear bearing Disassembly Notebelow
- Inspect for damage 10. C-washers and
- retaining ring
- 11. Locknut **Disassembly Note**
- page J-20 12. Countershaft rear bearing **Disassembly Note** page J-20
- Inspect for damage 13. Counter 5th gear Inspection page J-31
- 14. Spacer
- 15. Set bolt and washer

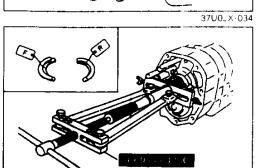
- 16. Center housing **Disassembly Note** page J-20
- 17. Oil quide
- 18. Blind cover
- 19. Cap plug, spring, and detent ball
- 20. Thrust lock washer
- 21. Steel ball
- 22. Bearing
- Inspect for damage 23.5th gear
- Inspection page J-31 24. Retaining ring
- 25. Synchronizer ring (5th) Inspection page J-32
- 26. Retaining ring
- 27. 5th/Reverse shift rod Disassembly Note
-page J-20 28. Spring
- Inspection page J-33
- 29. 5th/Reverse shift fork
- 30. Interlock pin (large)
- 31. 3rd/4th shift rod **Disassembly Note**
- page J-21
- 32. Interlock pin (small) 33. Interlock pin (large)

- 34. 1st/2nd shift rod **Disassembly Note**
 - page J-21
- 35. Thrust washer
- 36. Reverse idler gear shaft Inspection page J-33
- 37. Reverse idler gear
- Inspection page J-33
- 38. Thrust washer 39. Counter reverse gear
- Inspection page J-31 40. Locknut
 - **Disassembly Note** page J-21
- 41. 5th/Reverse clutch hub assembly

Disassembly Note page J-21

- Inspection page J-32
- 42. Synchronizer ring (Reverse)
- Inspection page J-32 43. Reverse gear
- Inspection page J-31 44. Bearing
- Inspect for damage
- 45. Bearing race
- 46. Thrust washer
- 47. Bearing cover
- 48. Oil guide

37U0JX-033



Disassembly note Bearing housing

- Caution
- Using metal tools to remove the bearing housing could cause severe damage to its machined surfaces.

Hit down and outward on the bearing housing with a plastic hammer to remove.

Mainshaft rear bearing

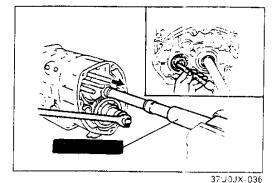
Caution

3700.1X-035

- The front and rear C-washers may have different thicknesses.
- 1. Remove the snap ring, washer, retaining ring, and rear C-washers.
- 2. Remove the mainshaft rear bearing by using the SST.
- 3. Remove the retaining ring and the front C-washers.

<u>;</u>)

TRANSMISSION



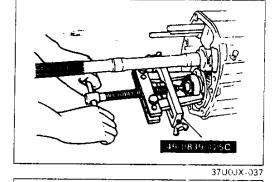
J

Locknut and countershaft rear bearing

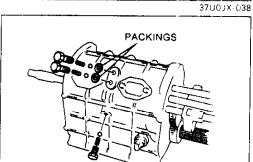
1. Shift the 1st/2nd shift rod to 1st gear.

Caution

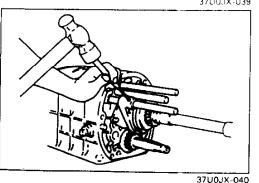
- Do not reuse the locknut.
- Do not scratch or damage the countershaft.
- 2. Uncrimp the tab of the locknut.
- 3. Hold the mainshaft by using the SST and a vise.
- 4. Remove the locknut.
- 5. Remove the countershaft rear bearing by using the SST.



Center housing



37LI0JX-039



1. Remove the set bolt and washer from the center housing.

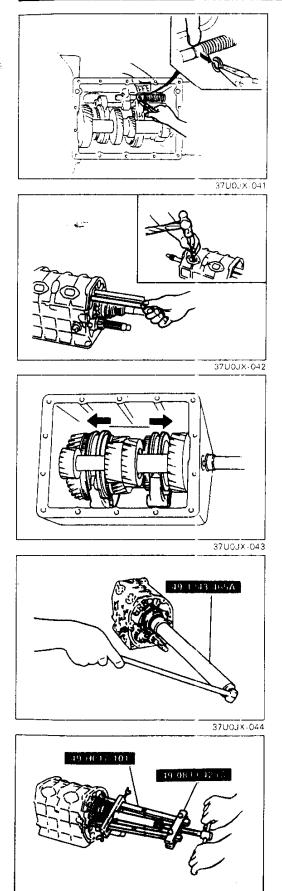
Note

- If the center housing is difficult to remove, tap around the edge of the center housing with a plastic hammer.
- 2. Remove the center housing.

5th/Reverse shift rod

1. Remove the three cap plugs, packings, detent balls, and springs.

2. Drive the roll pin from the 5th/Reverse shift fork.



)

)

- 3. Pull the retaining ring from the 5th/Reverse shift rod.
- 4. Slide the 5th/Reverse shift rod out of the transmission case, and remove the spring.

1st/2nd and 3rd/4th shift rods

- Shift the transmission into 4th gear to gain access to the roll pin. Drive the roll pin from the 3rd/4th shift fork.
 Slide the 3rd/4th shift rod and interlock pin (small) out
- from the rear of the transmission case.
- 3. Drive the roll pin from the 1st/2nd shift fork. Slide the 1st/2nd shift rod out from the rear of the transmission case, and remove the interlock pin (large).

Locknut

- 1. Uncrimp the tab of the locknut.
- 2. Shift into 1st and 4th gears to lock the rotation of the mainshaft.

Caution

- Do not reuse the locknut.
- 3. Remove the locknut by using the SST.

5th/Reverse clutch hub assembly

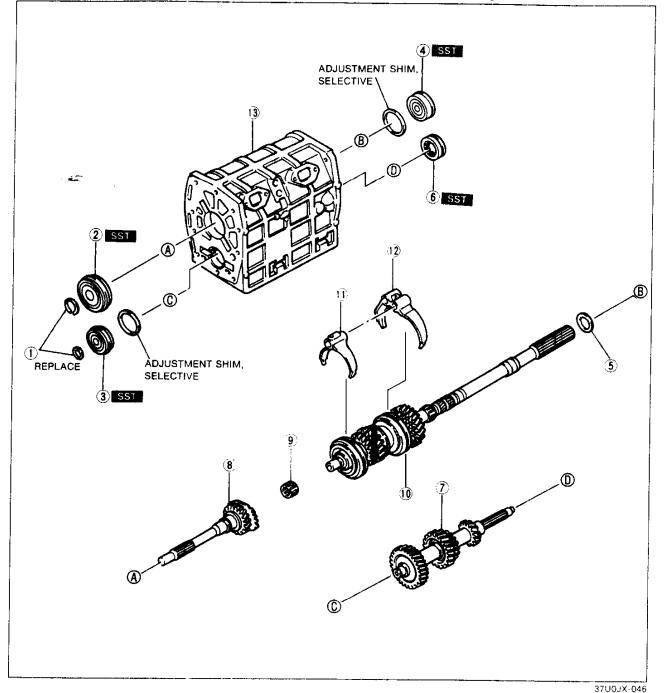
- 1. Remove the bearing cover installation bolts.
- 2. Attach the **SST** to the bearing cover and remove the assembly, which consists of the following parts:
 - 5th/Reverse clutch hub assembly
 - Synchronizer ring
 - Needle bearing
 - Bearing race
 - Reverse gear
 - Thrust washer

37U0JX-045

. . . .

Transmission Case Components

Disassemble in the order shown in the figure, referring to **Disassembly Note**.



- 1. Snap rings Disassembly Note
- page J-23
 2. Main drive gear bearing Disassembly Note
 page J-23
 Inspect for damage
 3. Countershaft front bearing
- Disassembly Note Inspect for damage

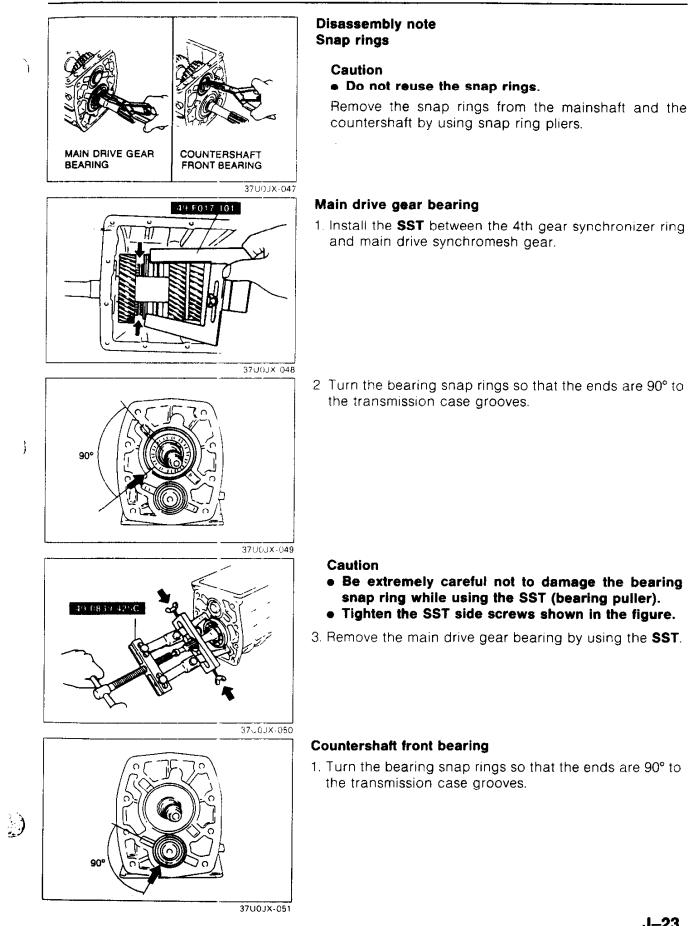
J-22

- 4. Mainshaft front bearing Disassembly Note
- Inspect for damage
- 5. Thrust washer
- 6. Countershaft center bearing Disassembly Note

..... page J-24

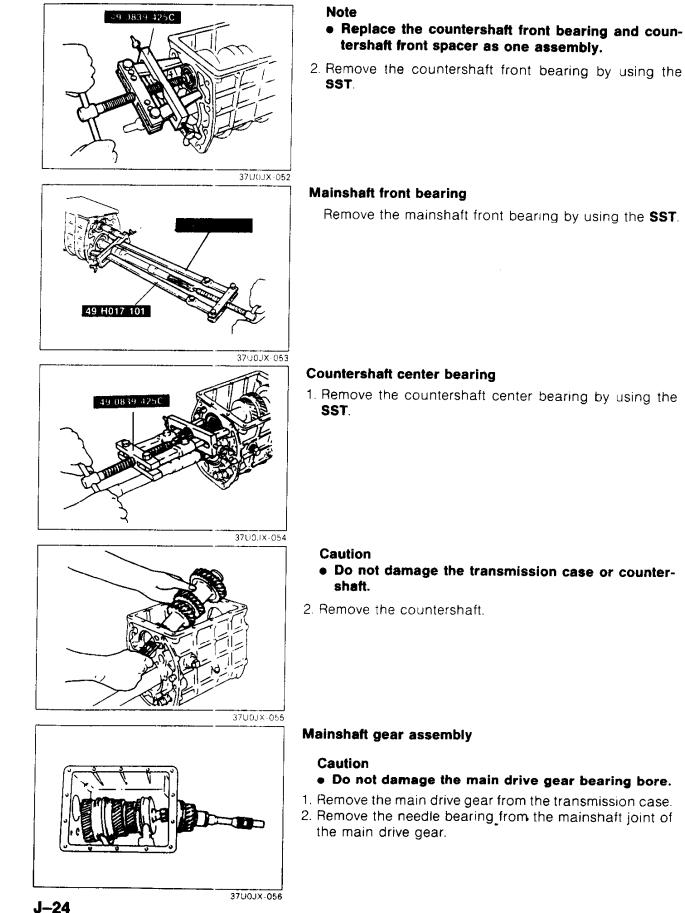
- inspect for damage
- 7. Countershaft assembly

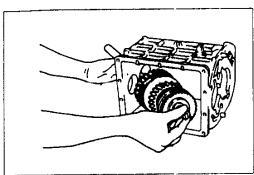
- 8. Main drive gear
- Inspection page J-31 9. Bearing
- 10. Mainshaft gear assembly
 - Disassembly Note
- 11. 3rd/4th shift fork
- 12. 1st/2nd shift fork
- 13. Transmission case



• • • • • •

J-23





. . میک

. المعنية 3. Remove the mainshaft gear assembly from the transmission case.

J

÷.

37U0JX-057



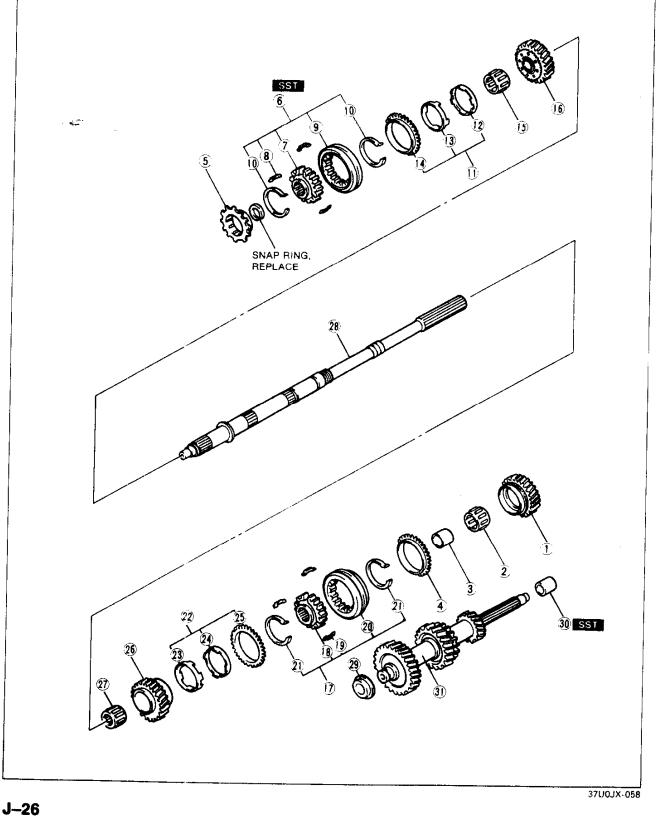
Mainshaft and Countershaft Components

Caution

J

• Do not remove the countershaft center bearing race unless necessary.

Disassemble in the order shown, referring to Disassembly Note.



TRANSMISSION

- 1. 1st gear
- Inspection page J-31 2. Bearing
- Inspect for damage
- 3. Bearing race
- 4. Synchronizer ring (1st) Inspection page J-32
- 5. Synchronizer ring (4th) Inspection page J-32
- Inspection page J-32 7. 3rd #th clutch hub
- 8. Synchronizer key
- 9. Clutch hub sleeve
- 10. Synchronizer key

1

7)

- spring (3rd/4th)
- 11. Synchronizer assembly (3rd) Inspection page J-33

- 12. Inner cone
- 13. Double cone
- 14. Synchronizer ring
- 15. Bearing
- Inspect for damage 16. 3rd gear
- Inspection page J-31 17. 1st/2nd clutch hub
 - assembly
 - Disassembly Note
 - Inspection page J-32
- 18. 1st/2nd clutch hub
- 19. Synchronizer key
- 20. Clutch hub sleeve
- 21. Synchronizer key spring
- 21. Synchronizer key spring
- 22. Synchronizer assembly (2nd)
 - Inspection page J-33

- 23. Inner cone
- 24. Double cone
- 25. Synchronizer ring
- 26. 2nd gear
- Inspection page J-31 27. Bearing
- Inspect for damage 28. Mainshaft
- Inspection page J-31 29. Countershaft front
- bearing spacer
- 31. Countershaft Inspection page J-31

37U0JX-059

Disassembly note 3rd/4th clutch hub assembly

Caution

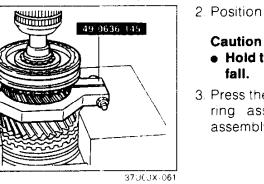
- Do not reuse the snap ring.
- 1. Remove the snap ring from the front of the mainshaft.
- 2. Position the SST between 2nd and 3rd gears.
 - Hold the mainshaft with one hand so that it does not fall.
- 3. Press the mainshaft out from the 3rd gear, synchronizer ring assembly (3rd), and the 3rd/4th clutch hub assembly.

1st/2nd clutch hub assembly

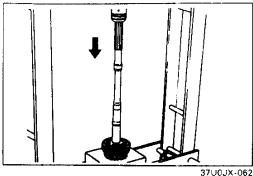
Caution

• Hold the mainshaft with one hand so that it does not fall.

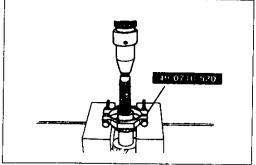
Press the 1st/2nd clutch hub assembly, synchronizer ring assembly (2nd), and 2nd gear from the mainshaft.



37UGJX-060



J-27



· ****

J

37U0JX-063

Countershaft center bearing race

Caution

• Hold the countershaft with one hand so that it does not fall.

Note

• Replace the countershaft center bearing and bearing race as one assembly.

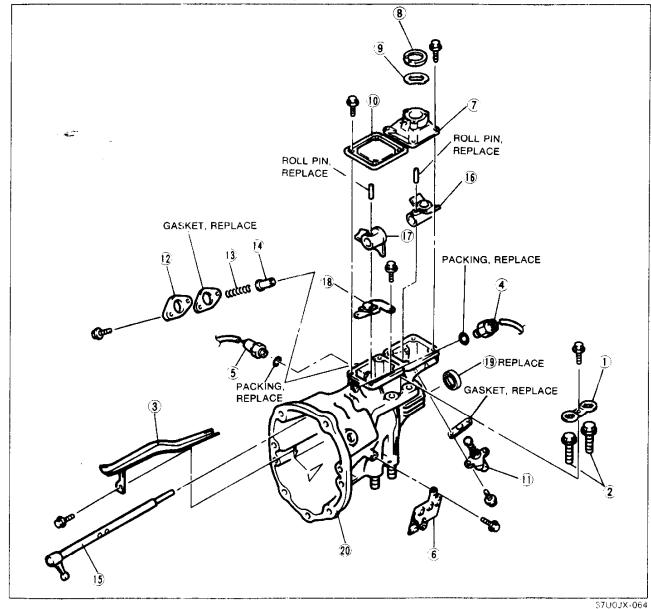
Remove the countershaft bearing race from the mainshaft by using the **SST**.

Extension Housing Components

Caution

• Do not remove the extension housing oil seal unless necessary.

Disassemble in the order shown, referring to Disassembly Note.



1. Stopper

1

- 2. Power plant frame installation bolts
- 3. Oil guide
- 4. Neutral switch
- 5. 1-2 switch
- 6. Bracket
- 7. Control case
- 8. Bushing

3

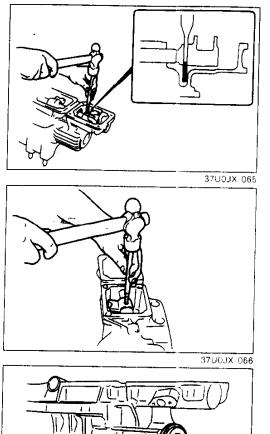
- Inspect for wear and damage
- 9. Wave washer Inspect for wear and damage
- 10. Blind cover
- 11. Select spindle assembly
- 12. Spring cap

.

- 13. Select lock spindle spring Inspection page J-33
- 14. Select lock spindle

Inspection page J-32

- 16. Control rod end
- 17. Selector
- 18. Shift guide assembly
- 19. Oil seal Disassembly Note
- 20. Extension housing
- Inspection page J-34



Disassembly note Control rod

- 1. Slide the control rod end to the point where the roll pin is directly above the recess in the extension housing.
- 2. Remove the roll pin from the control rod end by using a pin punch and hammer.
- 3. Remove the roll pin from the selector by using a pin punch and hammer.
- 4. Slide the control rod from the extension housing, and remove the control rod end and selector.

Oil seal (extension housing)

Caution

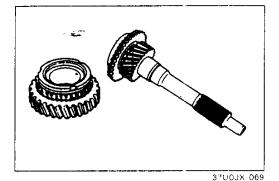
• Do not scratch or damage the extension housing.

Remove the oil seal from the extension housing by using a screwdriver.

37U0JX-067

INSPECTION

Inspect all parts, and repair or replace as necessary.



Each Gear and Main Drive Gear

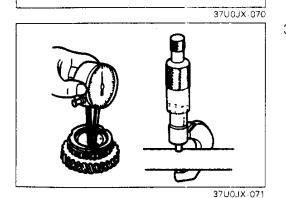
- 1. Inspect synchronizer cones for wear.
- 2. Inspect individual gear teeth for damage, wear, and cracks.
- 3. Inspect synchronizer ring matching teeth for damage and wear.
- 4. Inspect main drive gear splines for damage and wear.

Mainshaft

1. Measure the mainshaft runout.

Runout: 0.03 mm {0.0012 in} max.

2. Inspect splines for damage and wear.



3. Measure the clearance between mainshaft and gear (or bushing).

Clearance: 0.15 mm {0.006 in} max.

Countershaft

- 1. Inspect gear teeth for damage, wear, and cracks.
- 2. Inspect splines for damage and wear.



ì

37U0JX-072

J-31

•

TRANSMISSION

C

Control Rod Lever and Shift Rod

Measure the clearance between the control rod lever and the shift rod gate.

Clearance: 0.8 mm {0.031 in} max.

Each Clutch Hub Assembly

- 1. Inspect clutch hub sleeve and hub operation.
- 2. Inspect individual gear teeth for damage, wear, and cracks.
- 3. Inspect synchronizer keys for damage, wear, and cracks.

4. Measure the clearance between the hub sleeve groove and shift fork.

37U0JX-074

37U0JX-073

Clearance: 0.2–0.3 mm {0.008–0.012 in} Maximum: 0.5 mm {0.020 in}

Synchronizer Ring (1st, 4th, 5th, Reverse)

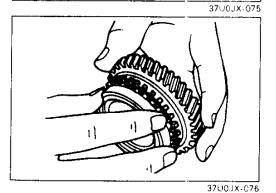
- 1. Inspect individual synchronizer ring teeth for damage, wear, and cracks.
- 2. Inspect taper surface for wear and cracks.

Note

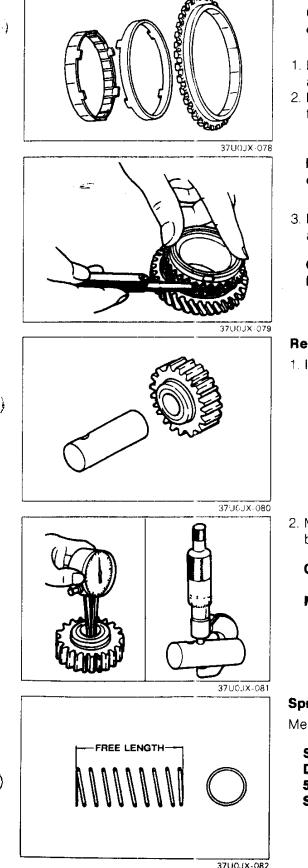
- Set the synchronizer ring squarely in the gear.
- 3. Measure the clearance between the synchronizer ring and flank surface of gear.

Clearance: 1.5 mm {0.059 in} Minimum: 0.8 mm {0.031 in}

37U0JX-077



J-32



Ì

-

Synchronizer Assembly (2nd/3rd)

Caution

- If any part of the synchronizer assembly is damaged, replace the assembly as a whole.
- 1. Inspect individual synchronizer ring gear teeth for damage, wear, and cracks.
- 2. Inspect for wear and damage to the tapered surfaces of the inner cone, double cone, and synchronizer ring.

Note

- Set the synchronizer assembly squarely in the gear.
- 3. Measure the clearance between the synchronizer ring and flank surface of gear.

Clearance: 1.5 mm {0.059 in} Minimum: 0.8 mm {0.031 in}

Reverse Idler Gear and Shaft

1. Inspect gear teeth for damage, wear, and cracks.

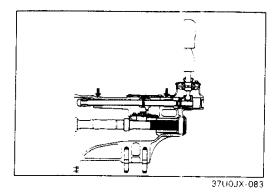
2. Measure the clearance between the reverse idler gear bushing and shaft.

Clearance: 0.02-0.05 mm {0.0008-0.0020 in} Maximum: 0.15 mm {0.006 in}

Spring

Measure the free length of the spring.

Standard free length: mm {in} Detent ball spring: 22.5 {0.886} 5th/Reverse retaining spring: 73.00 {2.874} Select lock spindle spring: 43.25 {1.703}



J

Extension Housing

- Inspect the indicated bearings for damage.
 Replace the extension housing if necessary.

...

2)

.

ASSEMBLY

Precaution

ţ

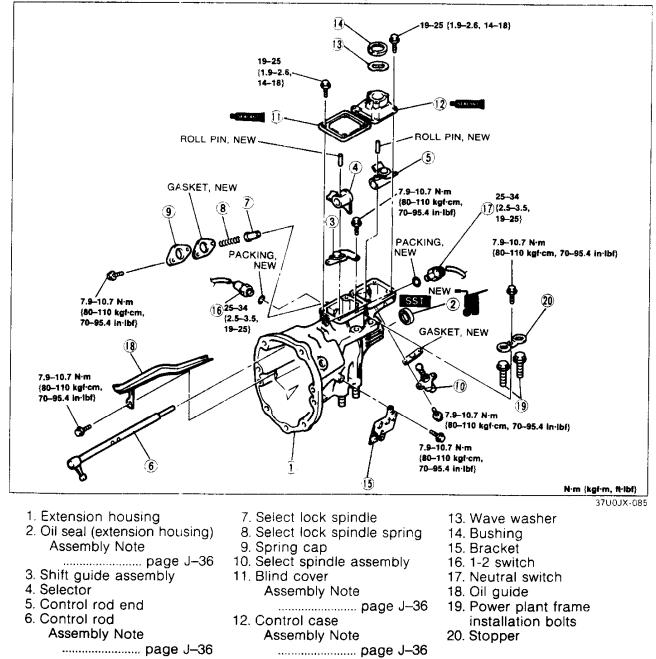
н, /

- 1. Make sure each part is cleaned before assembling.
- 2. Coat all movable parts with the specified oil.
- 3. Replace parts wherever required.
- 4. Remove old sealant from contact surfaces before applying new sealant.
- 5. Assemble the parts within 10 minutes after applying sealant. Allow all sealant to cure at least 30 minutes after assembly before filling the transmission with transmission oil.
- 6. When using a vise, insert protective plates to prevent damage to the part.

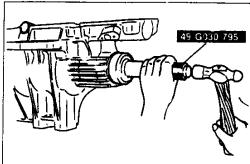
37U0JX-084

Extension Housing Components

Assemble in the order shown, referring to Assembly Note.



A . . .



Assembly note Oil seal (extension housing)

- 1. Apply clean oil to the lip and outer edge of a new oil seal.
- 2. Install the oil seal evenly and gradually by using the SST.

Control rod

- 1. Install the control rod through the selector and control rod end, into the extension housing.
- 2. Install new roll pins into the selector and control rod ends as shown in the figure.

Blind cover

- 1. Apply sealant to the contact surfaces of the blind cover and extension housing.
- 2. Install the blind cover.

Tightening torque: 19-25 N·m {1.9-2.6 kgf·m, 14-18 ft·lbf}

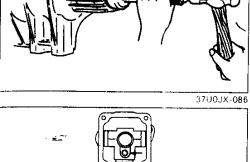
Control case

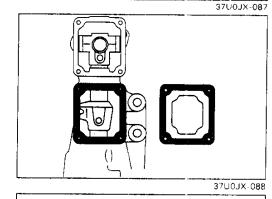
- 1. Apply sealant to the contact surfaces of the extension housing and control case.
- 2. Install the control case to the extension housing.

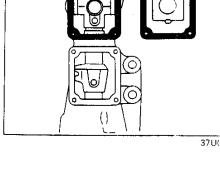
Tightening torque: 19-25 N·m {1.9-2.6 kgf·m, 14-18 ft·lbf}

37U0JX-089









MEMO

-

Ŧ

;

)

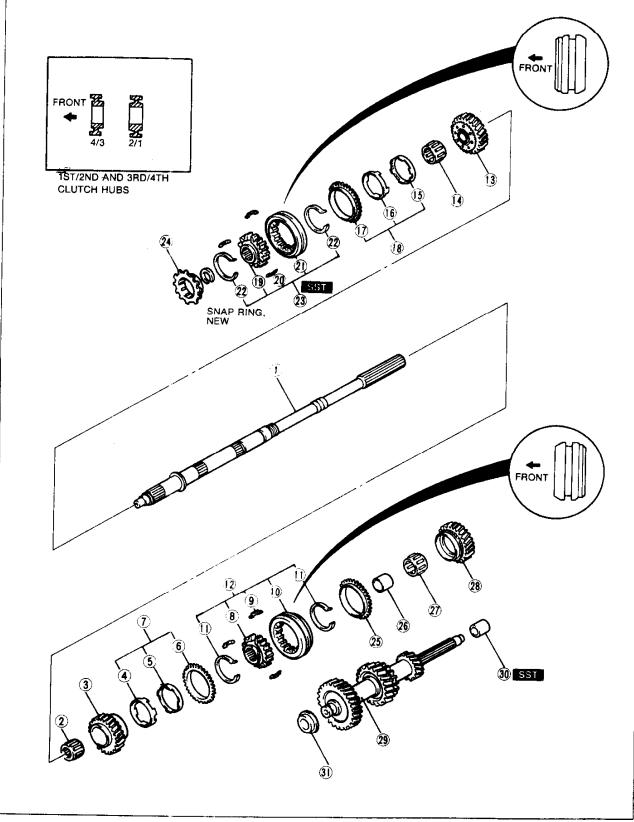
K

--

1.7.

Mainshaft and Countershaft Components

Assemble in the order shown, referring to Assembly Note.



37U0JX-090

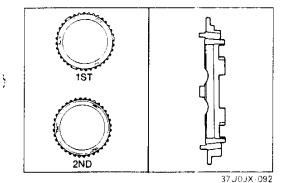
- 1. Mainshaft
- 2. Bearing
- 3. 2nd gear
- 4. Inner cone
- 5. Double cone
- 6. Synchronizer ring
- 7. Synchronizer assembly (2nd)
- Assembly Note below
- 8. 1st/2nd clutch hub
- 9. Synchronizer key
- 10. Clutch hub sleeve
- 11. Synchronizer key spring
- 12. 1st/2nd clutch hub assembly

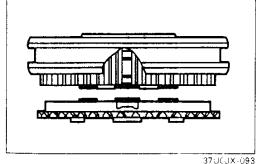
Assembly Note below

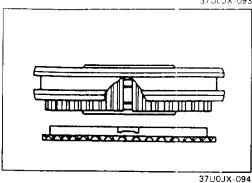
- 13. 3rd gear
- 14. Bearing
- 15. Inner cone
- 16. Double cone
- 17. Synchronizer ring
- 18. Synchronizer assembly (3rd)
- Assembly Note below 19. 3rd/4th clutch hub
- 20. Synchronizer key
- 21. Clutch hub sleeve
- 22. Synchronizer key spring
- 23. 3rd/4th clutch hub assembly Assembly Note below
- 24. Synchronizer ring (4th)

- 25. Synchronizer ring (1st)
- 26. Bearing race
- 27. Bearing
- 28. 1st gear
- 29. Countershaft 30. Countershaft center bearing race Assembly Note
 - page J-41
- 31. Countershaft front bearing spacer Assembly Note page J-41

37U0JX-091







)

Assembly note

Synchronizer assembly (2nd, 3rd)

Note

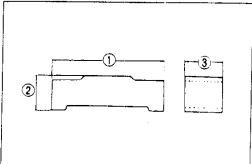
• The 1st and 2nd synchronizer rings can be easily distinguished by noting that the 1st synchronizer ring has two teeth fused together at three equally spaced places around its outer edge. The 2nd synchronizer ring has no distinguishing marks.

Install the inner cone, double cone, and synchronizer ring as shown in the figure.

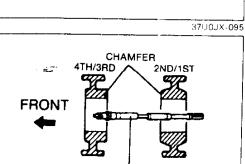
Clutch hut assembly (1st/2nd, 3rd/4th)

Caution

- Align the synchronizer ring grooves (2nd, 3rd) with the synchronizer keys during installation.
- Align the slots in the clutch hub with the tabs on the inner cone.
- Align the synchronizer ring grooves (1st, 4th) with the synchronizer keys.



J



MAINSHAFT

Note

• Standard key dimensions are as follows:

			mm {	
	1	2	3	
1st and 2nd	18.00 {0.709}	5.45 {0.215}	6.00 {0.236}	
3rd and 4th	17.00 {0.669}	4.25 {0.167}	5.00 {0.197}	

Caution

 Press each clutch hub assembly onto the mainshaft in the proper direction as shown.

Caution

37U0JX-096

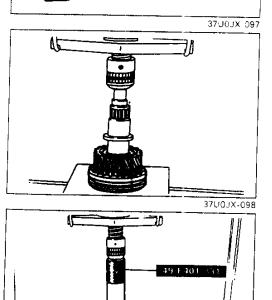
37U0JX-099

- Do not damage parts while using the press.
- Install the double cone pegs into the holes in the flank side of the gear as shown in the figure.

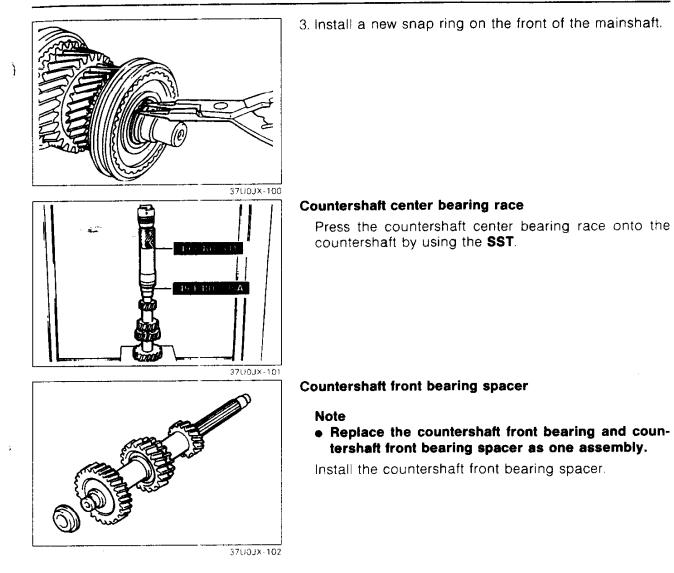
1 Set the needle bearing, 2nd gear, synchronizer assembly (2nd), and the 1st/2nd clutch hub assembly on the mainshaft, then press in the mainshaft.

2. Set the needle bearing. 3rd gear, synchronizer assembly (3rd), and 3rd/4th clutch hub assembly on the main-shaft, then press them onto the mainshaft by using the **SST**.

٣Ľ



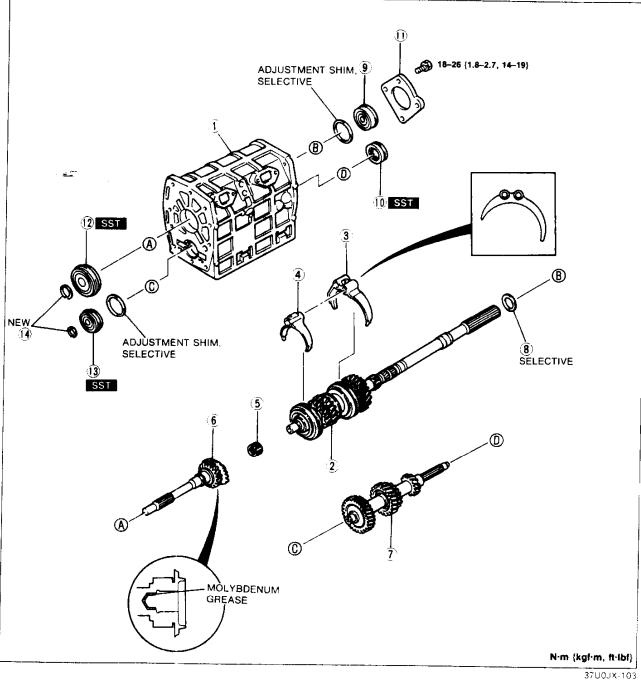
J-40



J-41

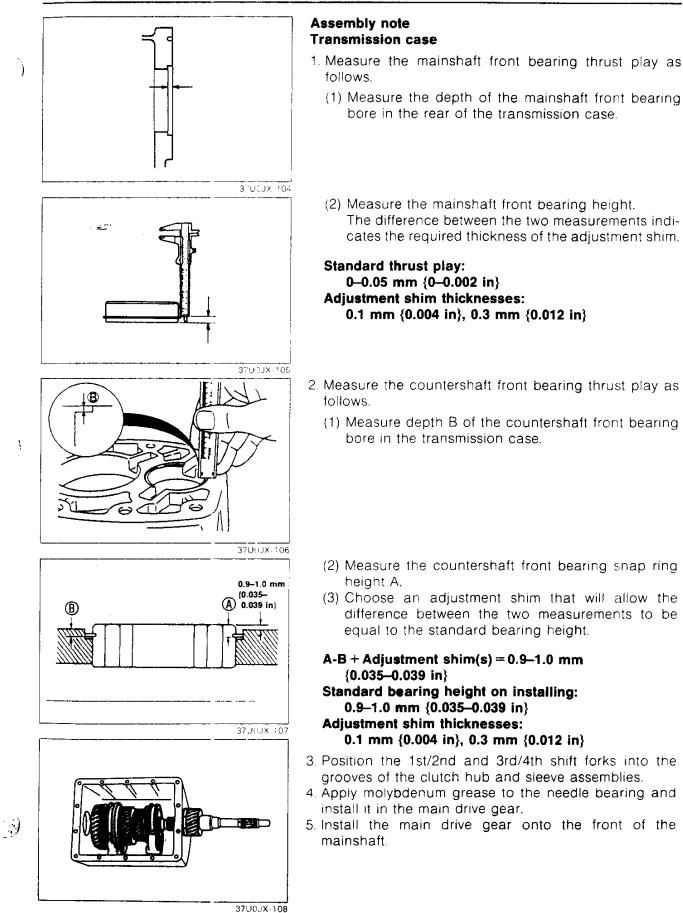
Transmission Case Components

Assemble in the order shown, referring to Assembly Note.



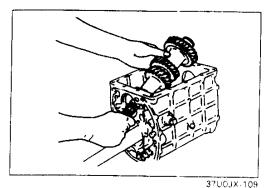
- 1. Transmission case Assembly Note
- 2 Mainten and J-43
- 2. Mainshaft gear assembly
- 3. 1st/2nd shift fork
- 4. 3rd/4th shift fork
- 5. Bearing
- 6. Main drive gear

- 7. Countershaft assembly
- 8. Thrust washer
- 9. Mainshaft front bearing Assembly Note
- 10. Countershaft center bearing Assembly Note
- 11. Bearing cover
- 12. Main drive gear bearing Assembly Note
- 13. Countershaft front bearing Assembly Note
- 4514. Snap rings



• ••

J-43



6. Set the countershaft assembly into the case, making sure the countershaft gears engage each gear of the mainshaft assembly.

Mainshaft front bearing

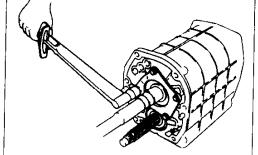
- 1. Install the correct shim onto the rear of the mainshaft as determined in the transmission case assembly note (page J-43.)
- 2. Install the mainshaft front bearing with a suitable pipe.

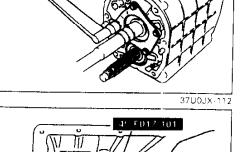
Bearing inner diameter: 32 mm {1.3 in} Bearing outer diameter: 75 mm {3.0 in}

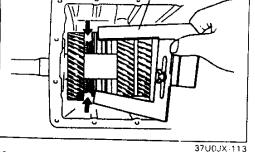
Countershaft center bearing

- 1. Install the countershaft center bearing onto the rear of the countershaft by using the SST.
- 37U0JX-110 49 E401 335A

37U0JX-111







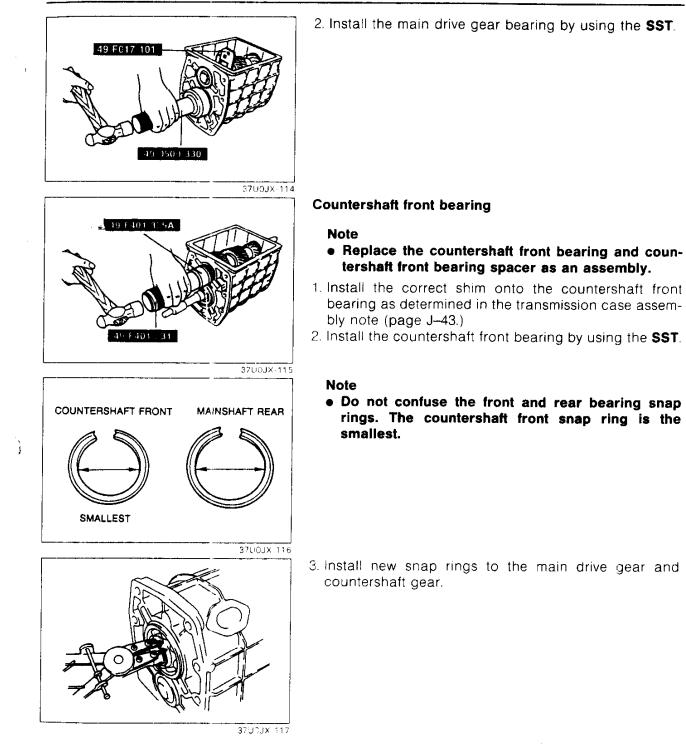
J-44

2. Install the bearing cover.

Tightening torque: 18-26 N·m {1.8-2.7 kgf·m, 14-19 ft·lbf}

Main drive gear bearing

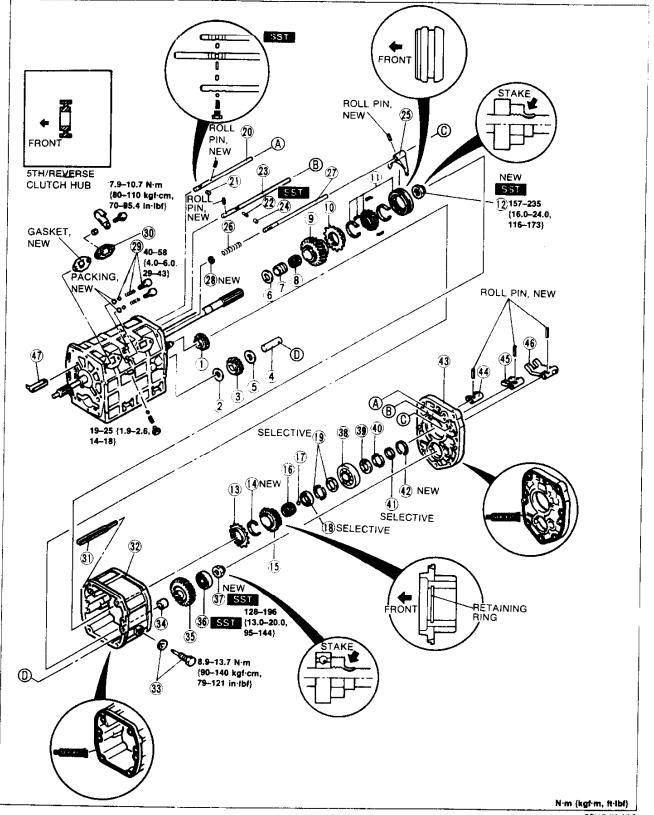
1. Install the SST between the 4th synchronizer ring and the main drive synchromesh gear.



:)

5th/Reverse Gear and Housing Components

Assemble in the order shown, referring to Assembly Note.



37U0JX-118

<u>م</u>ي:

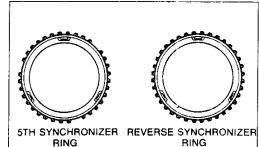
لمعا

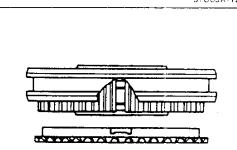
- 1. Counter reverse gear
- 2. Thrust washer
- 3. Reverse idler gear
- 4. Reverse idler gear shaft
- 5. Thrust washer
- 6 Thrust washer
- 7. Bearing race
- 8. Bearing
- 9. Reverse gear
- 10. Synchronizer ring (Reverse) Assembly Note below
- 11.5th/Reverse clutch hub assembly Assembly Note below
- 12. Locknut
- Assembly Notebelow 13. Synchronizer ring (5th)
- Assembly Note below
- 14. Retaining ring
- 15.5th gear
- Assembly Note page J-48 16. Bearing
- 17. Steel ball

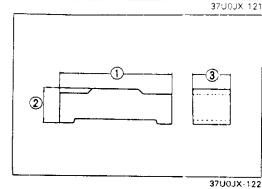
- 18. Thrust lock washer
- 19. C-washers and retaining ring
- 20. 1st/2nd shift rod
- Assembly Note page J-49 21. Interlock pin (large)
- 22. Interlock pin (small)
- 23. 3rd/4th shift rod
- Assembly Note page J-49 24. Interlock pin (large)
- 25. 5th/Reverse shift fork
- Assembly Note page J-49 26. Spring
- 27. 5th/Reverse shift rod
- Assembly Note page J-49 28. Retaining ring
- 29. Cap plug, spring, and detent ball
- 30. Blind cover
- 31. Oil guide
- 32. Center housing
 - Assembly Note page J-50

- 33. Set bolt and washer
- 34. Spacer
- 35. Counter 5th gear
- 36. Countershaft rear bearing
- Assembly Note page J-51
- 37. Locknut
- 38. Mainshaft rear bearing
- Assembly Note page J-51
- 39. Retaining ring
- 40. C-washers
- 41. Thrust washer
- 42. Snap ring
- 43. Bearing housing
- Assembly Note page J-52 44. 1st/2nd shift rod end
- Assembly Note page J-52 45. 3rd/4th shift rod end
- Assembly Note page J-52 46. 5th/Reverse shift rod end Assembly Note page J-52
- 47. Oil guide

37U0JX-119







Assembly note Synchronizer ring (5th/Reverse)

The 5th and Reverse synchronizer rings are differentiated as follows.

- (1) The 5th synchronizer ring has 3 places on its circumference with one tooth missing in each place.
- (2) The Reverse synchronizer ring has no distinguishing marks.

5th/Reverse clutch hub assembly and locknut

Caution

• Align the 5th/Reverse synchronizer grooves with the synchronizer keys.

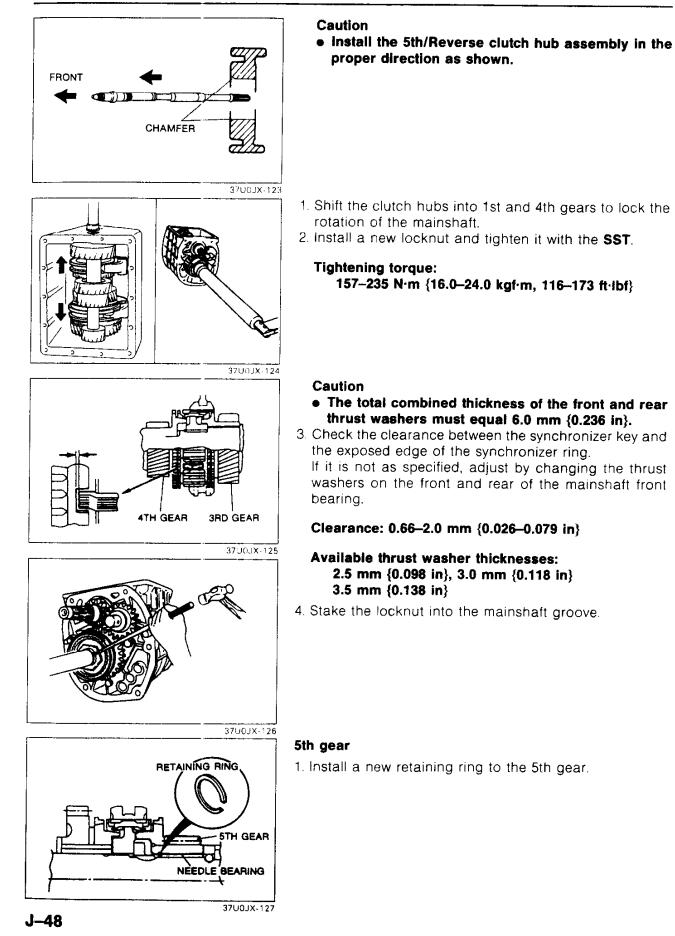
Note

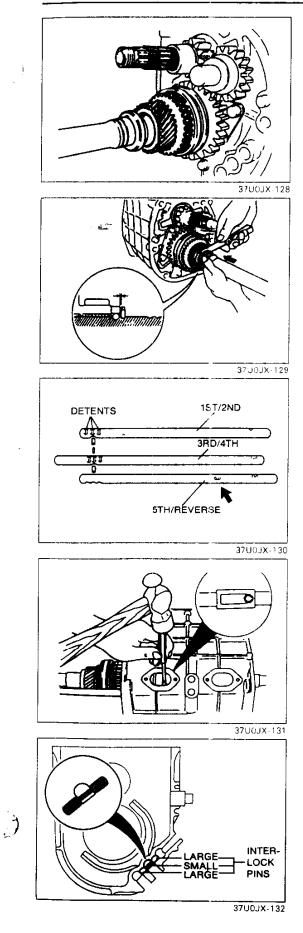
Standard key dimensions are as follows.

	mm {in}		
	1	2	3
5th/Reverse	17.00 {0.669}	4.250 {0.167}	5.00 {0.197}



37U0JX-120





- 2. Install the synchronizer ring, 5th gear, and needle bearing.
- 3. Install the steel ball and thrust lock washer.
- 4. Install the 3.0 mm {0.118 in} C-washers and hold them with a rotaining ring.
- 5. Push the C-washers toward 5th gear and measure the clearance between the C-washers and thrust lock washer. If the clearance is not as specified, select the proper thrust lock washer.

Standard: 0.1-0.2 mm {0.004-0.008 in}

Available thrust lock washer thicknesses:

- 6.2 mm {0.244 in}, 6.3 mm {0.248 in}
- 6.4 mm {0.252 in}, 6.5 mm {0.256 in}
- 6.6 mm {0.260 in}, 6.7 mm {0.264 in}

Shift forks and rods

Note

- A simple way to identify the shift rods is as follows:
- The 3rd/4th shift rod is the longest.
- The 5th/Reverse shift rod has an extra hole for the shift fork roll pin at the rear of the rod.
- When installing the shift rods, set the detents toward the ball side.

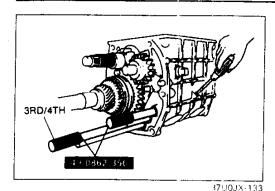
Caution

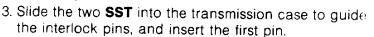
- The roll pin must be installed with the split as shown.
- 1. Slide the 1st/2nd shift rod into the case.
- 2. Secure the 1st/2nd shift fork to the rod with a new roll pin.

Note

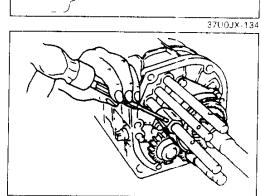
• The interlock pins must be installed as shown.

TRANSMISSION

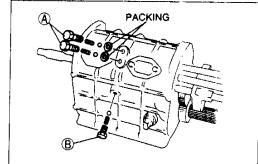




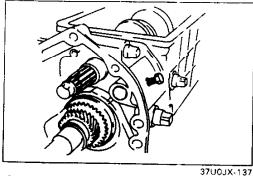
- 4. Remove the 3rd/4th shift fork guide from the case.
- 5. Slide the 3rd/4th shift rod containing the interlock pir (small) into the case.
- 6. Secure the 3rd/4th shift rod onto the fork with the new roll pin.
- 7. Insert the remaining interlock pin and remove the SST
- 8. Install the 5th/Reverse shift fork onto the clutch hub.
- 9. Install the 5th/Reverse shift rod in the transmission case through the spring.
- 10. Push back the spring, and install a new clip to the 5th/Reverse shift rod.
- 11. Install a new roll pin into the 5th/Reverse shift fork.



37U0JX-135



37U0JX-136



12. Install the two blind covers and two new gaskets.

Tightening torque: 7.9-10.7 N·m {80-110 kgf·cm, 70-95.4 in·lbf}

13. Install the packings, detent balls, springs, and cap bolts.

Tightening torque:

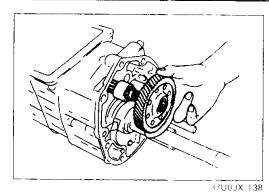
- A: 40-58 N·m {4.0-6.0 kgf·m, 29-43 ft·ibf} B: 19-25 N·m {1.9-2.6 kgf·m, 14-18 ft·lbf}

Center housing

- 1. Apply sealant to the contact surfaces of the transmission case and center housing.
- 2. Install the oil guide.
- 3. Install the center housing.
- 4. Align the reverse idler gear shaft with the set bolt hole, and install the set bolt and washer.

Tightening torque: 8.9-13.7 N·m {90-140 kgf·cm, 79-121 in·lbf}

J--50

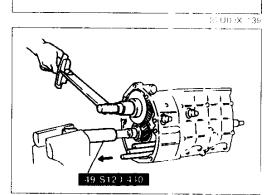


49 F401 335A

5. Install the spacer and counter 5th gear.

Countershaft rear bearing

1. Install the countershaft rear bearing by using the SST



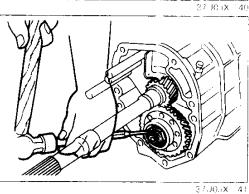
49 E401

331

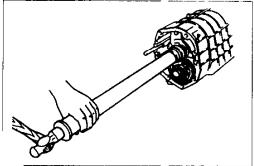
- 2. Connect the **SST** to the mainshaft and mount it s∈curely in a vise.
- 3. Shift into 1st gear to lock the countershaft.
- 4. Install the new countershaft locknut.

Tightening torque: 128–196 N·m {13.0–20.0 kgf·m, 95–144 ft·lbf}

5. Stake the locknut into the countershaft groove.





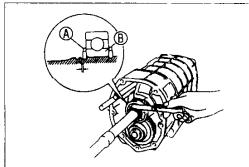


Mainshaft rear bearing

1. Drive on the mainshaft rear bearing with a suitable pipe

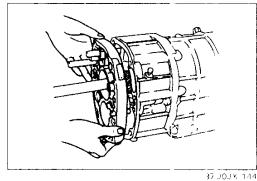
Bearing diameter (inner): 22 mm {0.87 in} Bearing diameter (outer): 56 mm {2.2 in}

37J0JX 142



J

37:00UX-143



- 2. Install the C-washers and hold them in place with a new retaining ring.
- 3. With points A and B pressed tightly together, measure the clearance between the C-washers and the groove. If the clearance is not as specified, select the proper C-washers.

Standard: 0-0.1 mm {0-0.004 in}

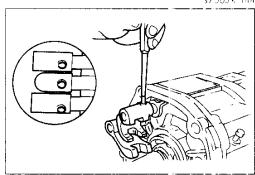
Available C-washer thicknesses: 2.9 mm {0.114 in}, 3.0 mm {0.118 in} 3.1 mm {0.122 in}, 3.2 mm {0.126 in} Bearing housing

earing nousing

- 1. Apply sealant to the contact surfaces of the center housing and bearing housing.
- 2. Install the bearing housing onto the center housing.

Shift rod ends

Install the shift rod ends onto the proper shift rods, and secure them with new roll pins facing as shown in the figure.



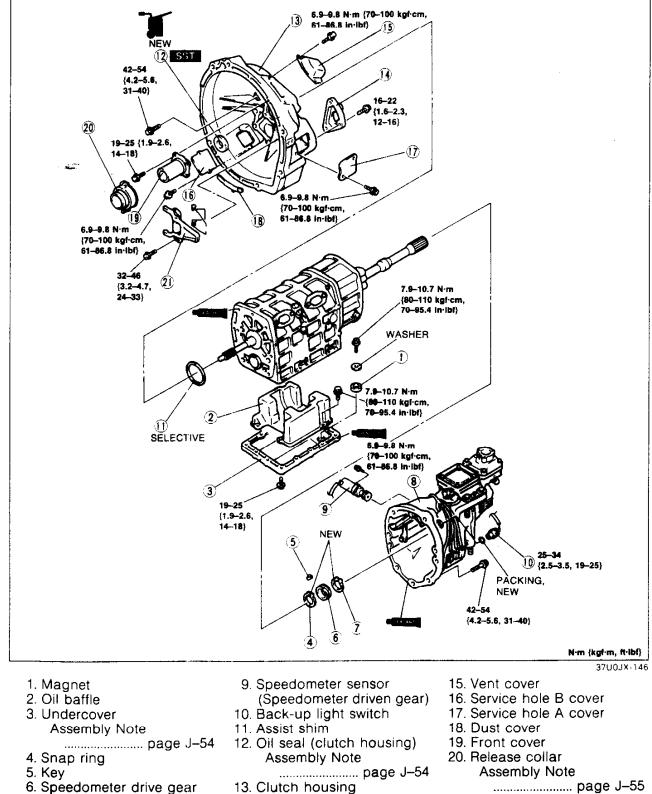
37 IOJX-145

Clutch Housing and Extension Housing Components

ì

<u>3</u>.)

Assemble in the order shown, referring to Assembly Note.



- 21. Release fork assembly Assembly Note
 - page J-55

..... page J-54

7. Snap ring

8. Extension housing

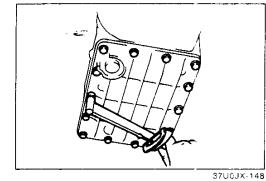
Assembly Note

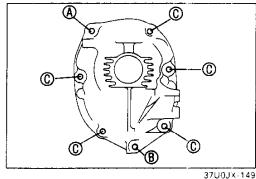
- 13. Clutch housing
- Assembly Note page J-54

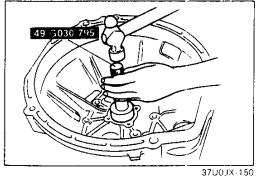
14. Release cylinder support

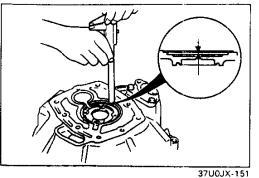
TRANSMISSION

37UQJX-147









Assembly note

Undercover

1. Install the magnet to the undercover.

Tightening torque: 7.9–10.7 N·m {80–110 kgf·cm, 70–95.4 in·lbf}

2. Install the oil baffle to the undercover.

Tightening torque: 7.9-10.7 N·m {80-110 kgf·cm, 70-95.4 in·lbf}

- 3. Apply sealant to the contact surfaces of the undercover and the transmission case.
- 4. Install the undercover.

Tightening torque: 19–25 N·m {1.9–2.6 kgf·m, 14–18 ft·lbf}

Extension housing

- 1. Apply sealant to the contact surfaces of the extension housing and bearing housing.
- 2. Install the extension housing.

Bolt length (measured from below the head):

- A: 135 mm {5.31 in}
- **B: 48 mm {1.89 in}**
- C: 165 mm {6.50 in}

Tightening torque: 42–54 N·m {4.2–5.6 kgf·m, 31–40 ft·lbf} Dil seal (clutch housing)

Oil seal (clutch housing)

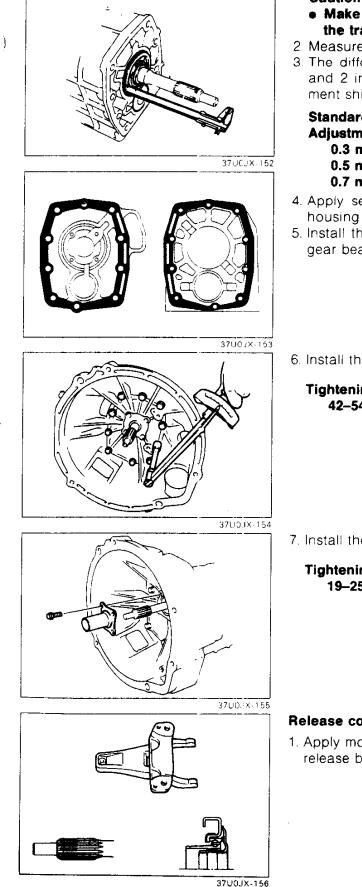
1. Apply the specified oil to the lip of a new oil seal.

2. Install the oil seal evenly by using the SST.

Clutch housing

1. Measure the depth of the main drive gear bearing bore in the clutch housing by using vernier calipers.

J--54



Ì

Caution

- Make the following measurement after assembling the transmission case.
- 2. Measure the main drive gear bearing height.

3 The difference between the measurements in steps 1 and 2 indicates the required thickness of the adjustment shim.

Standard thrust play: 0–0.1 mm {0–0.004 in} Adjustment shim thicknesses:

- 0.3 mm {0.012 in}, 0.4 mm {0.016 in} 0.5 mm {0.020 in}, 0.6 mm {0.024 in} 0.7 mm {0.028 in}
- 4. Apply sealant to the contact surfaces of the clutch housing and transmission case.
- 5. Install the correct adjustment shim on the main drive gear bearing as determined in steps 1 and 2.

6. Install the clutch housing.

Tightening torque: 42–54 N·m {4.2–5.6 kgf·m, 31–40 ft·ibf}

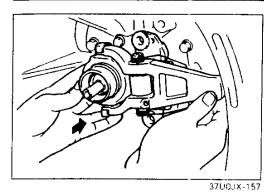
7. Install the front cover to the clutch housing.

Tightening torque: 19–25 N·m {1.9–2.6 kgf·m, 14–18 ft·lbf}

Release collar and release fork assembly

1. Apply molybdenum grease to the shaded areas of the release bearing and release fork.

J--55



· 🖅

2. Install the release bearing and release fork assembly.

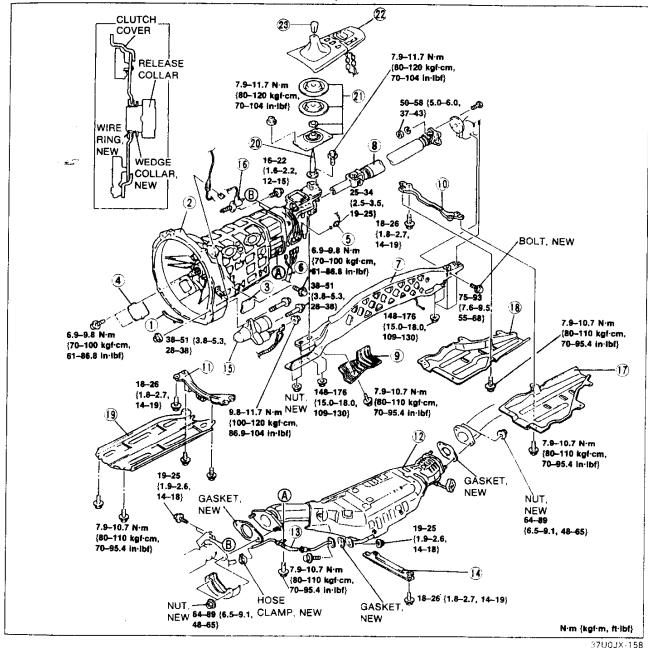
ŀ

Tightening torque: 32--46 N·m {3.2--4.7 kgf·m, 24--33 ft·lbf}

INSTALLATION

ì

- 1. Install in the order shown, referring to Installation Note.
- 2. After installation, fill the transmission with the specified oil and do a road test.



- 1. Dust cover
- 2. Transmission Installation Note
- page J-58
- 3. Service hole A cover
- 4. Service hole B cover 5. Back-up light switch
- 6. Connectors

<u>;</u>)

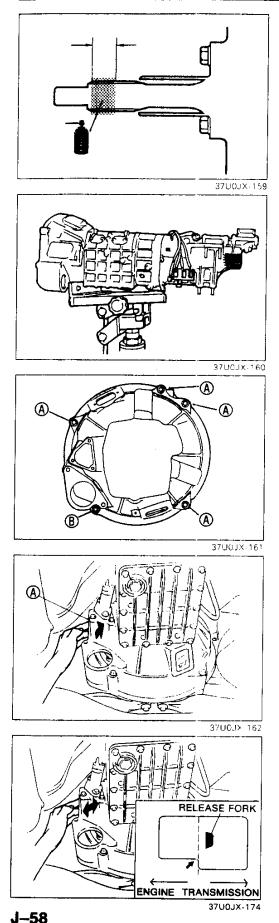
- 7. Power Plant Frame (PPF) Installation Note page J--59
- 8. Propeller shaft Installation Note page J-60

9. Cover

1 A 4

- 10. Tunnel reinforcement (rear)
- 11. Tunnel reinforcement (front)
- 12. Catalytic converter assembly
- 13. Secondary air injection pipe

- 14. Tunnel reinforcement (center)
- 15. Starter
- 16. Clutch release cylinder
- 17. Left undercover
- 18. Right undercover
- 19. Transmission cover
- 20. Shift lever assembly
- 21. Insulator assembly
- 22. Console panel assembly
- 23. Shift lever knob



Installation Note Transmission

Caution

• Do not install the back-up light switch until after the transmission is installed.

٦

1. Coat the main drive gear splines with grease as shown in the figure.

Warning

- Do not allow the transmission to fall from the jack.
- 2. Set the transmission on a transmission jack.

Caution

- Do not damage the wedge collar when installing the transmission to the engine.
- Do not damage the harnesses, clutch pipe, or clutch release cylinder.
- 3. Raise the transmission into place and install it to the engine.
- 4. Tighten the installation bolts.

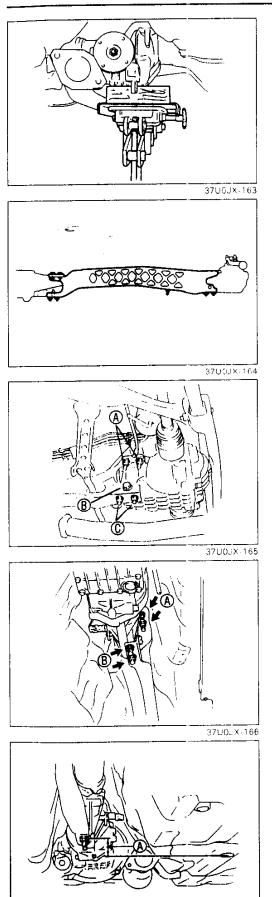
Bolt length:

A: 55 mm {2.2 in} B: 90 mm {3.5 in}

Tightening torque: 38-51 N·m {3.8-5.3 kgf·m, 28-38 ft·lbf}

Caution

- Make sure that the clutch release collar snaps properly into the clutch cover.
- 5. Through service hole A, push the release-cylinder end of the clutch release fork toward the transmission, and connect the clutch release collar to the clutch cover.
- 6. Swing the clutch release fork back and forth to verify that the clutch release collar is connected to the clutch cover.
- 7. Push the release-cylinder end of the clutch release fork toward the engine, and verify that it does not move past the dotted line.



ļ

3

Power plant frame (PPF)

Caution

- Do not reuse PPF installation nuts.
- 1. Hold the differential at a 0° angle by using the trans mission jack.
- 2. Hold the PPF in place with a new bolt and 8 new nuts.

Caution

- Tighten the differential-side PPF installation bolt/ nuts first.
- 3. Tighten the differential-side PPF installation bolt and nuts in the order shown.

Tightening torque:

- A, C: 148–176 N·m {15.0–18.0 kgf·m, 109–130 ft·lbf} B: 75–93 N·m {7.6–9.5 kgf·m, 55–68 ft·lbf}
- 4. Tighten the transmission-side PPF installation nuts in the order shown.

Tightening torque: 148–176 N·m {15.0–18.0 kgf·m, 109–130 ft·lbf}

- 5. Remove the transmission jack.
- 6. Lower the vehicle to the ground, and remove the **SST** (engine supports).
- 7. Measure A as shown in the figure.

Standard:

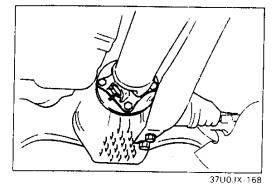
- Right: 73 mm {2.9 in} min. Left : 75 mm {3.0 in} min.
- Note

37U0JX-167

.

- When measuring by using a straight edge placed on both the right and left sides, the clearance should be 74.0 mm {2.91 in} minimum.
- 8. If outside the standard, readjust the PPF.

J--59



Propeller shaft

Align the marks on the flanges (made during removal).
 Install the propeller shaft.

Tightening torque:

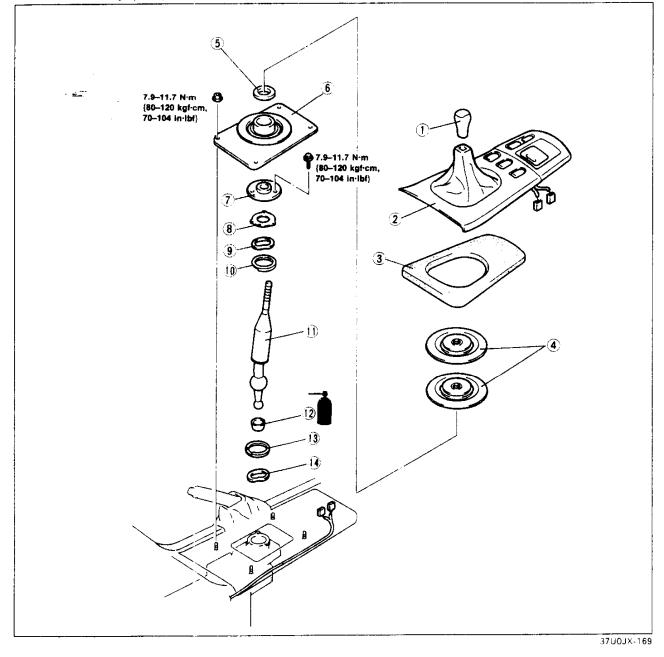
50-58 N·m {5.0-6.0 kgf·m, 37-43 ft·lbf}

SHIFT MECHANISM

OVERHAUL

}

- 1. Disassemble as shown in the figure.
- 2. Inspect each part, and replace if necessary.
- 3. Assemble in the reverse order of disassembly.
- 4. After assembly, pump the clutch pedal and verify that the shift lever moves smoothly.



- 1. Shift lever knob
- 2. Console panel assembly
- 3. Bushing pad
- 4. Insulator boot pads
- 5. Insulator boot ring
- 6. Insulator boot
- 7. Dust boot

Y

- 8. Gasket
- 9. Wave washer 10. Bushing
- 11. Shift lever

4.5

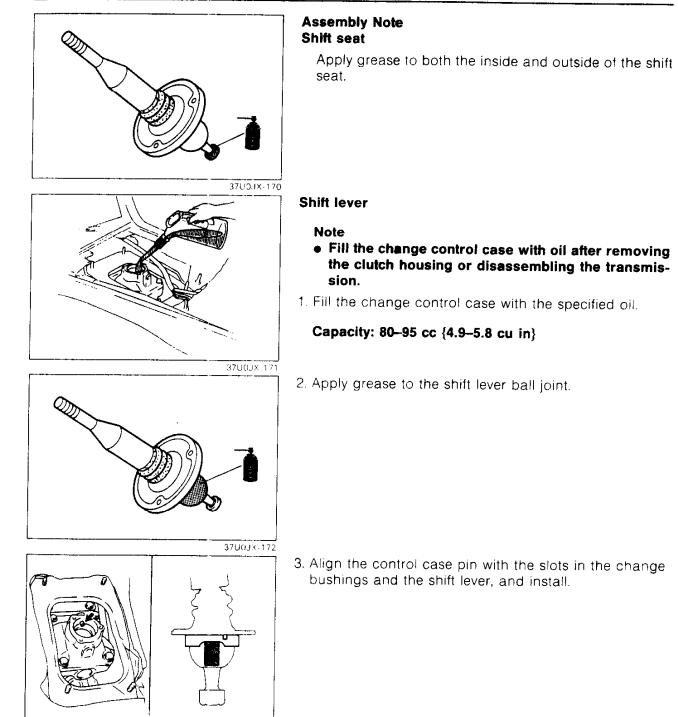
Assembly Note

_____ page J-62

- 12. Shift seat Assembly Note
 - page J-62

J_61

- 13. Bushing
- 14. Wave washer



37U0JX 173