

DAIHATSU F300

MANUAL TRANSMISSION

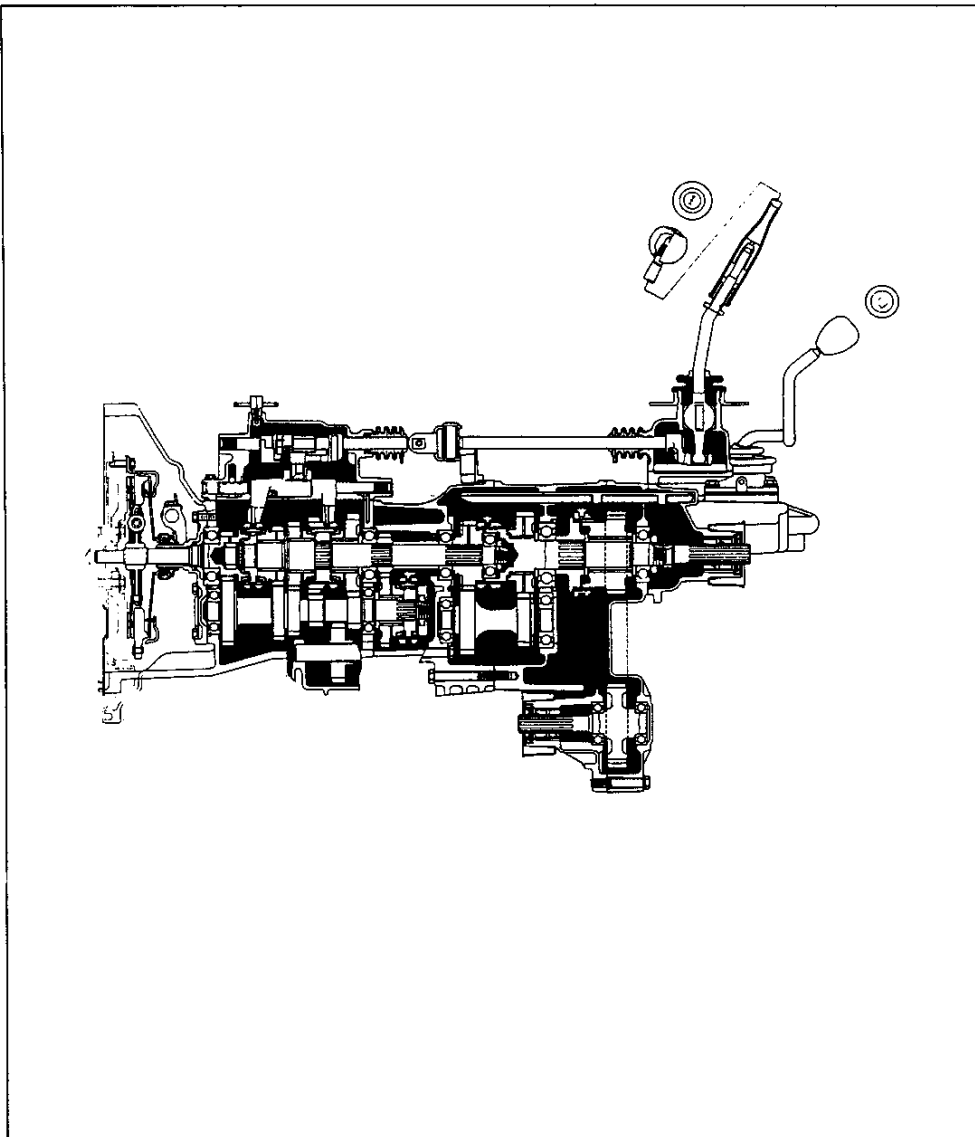
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MANUAL TRANSMISSION

SECTIONAL VIEW

The manual transmission is connected directly to the engine and mounted longitudinally. A five-speed transmission is available on all models. A center-through type transfer is employed, in which the power train components from the input shaft to the output shaft are arranged straight in one row. The transmission controls employ a semi-direct method in which the transmission control section is connected with the shift lever section by means of a cross joint.



WFE90-MT002

MANUAL TRANSMISSION

Transmission and transfer gear ratio specifications

[] : General specification

Transmission	Gear ratio	1st gear	3.752
		2nd gear	2.182
		3rd gear	1.428 [1.529]
		4th gear	1.000
		5th gear	0.865
		Reverse gear	3.942
	Oil used	Kind	API GL-3 or GL-4 SAE 75W-85 or 75W-90
		Capacity	1.7 L
Transfer	Gear ratio	High gear	1.000
		Low gear	1.754 (part time only)
	Oil used	Kind	API GL-3 or GL-4 SAE 75W-85 or 75W-90
		Capacity	1.4 L

WFE90-MT003

Transmission and transfer teeth number

[] : General specification

Transmission	Input shaft gear		23
	Counter gear	Driven gear	34
		1st gear	13
		2nd gear	21
		3rd gear	30 [29]
		5th gear	41
		Reverse gear	12
	Output gear	1st gear	33
		2nd gear	31
		3rd gear	29 [30]
		5th gear	24
		Reverse gear	32
	Reverse idle gear		23
Transfer	Input shaft gear		33
	Counter gear	Driven gear	32
		Low gear	21
	Output shaft gear		38
	Sprocket	Driven gear	33
		Drive gear	33

WFE90-MT004

MANUAL TRANSMISSION

TRANSMISSION

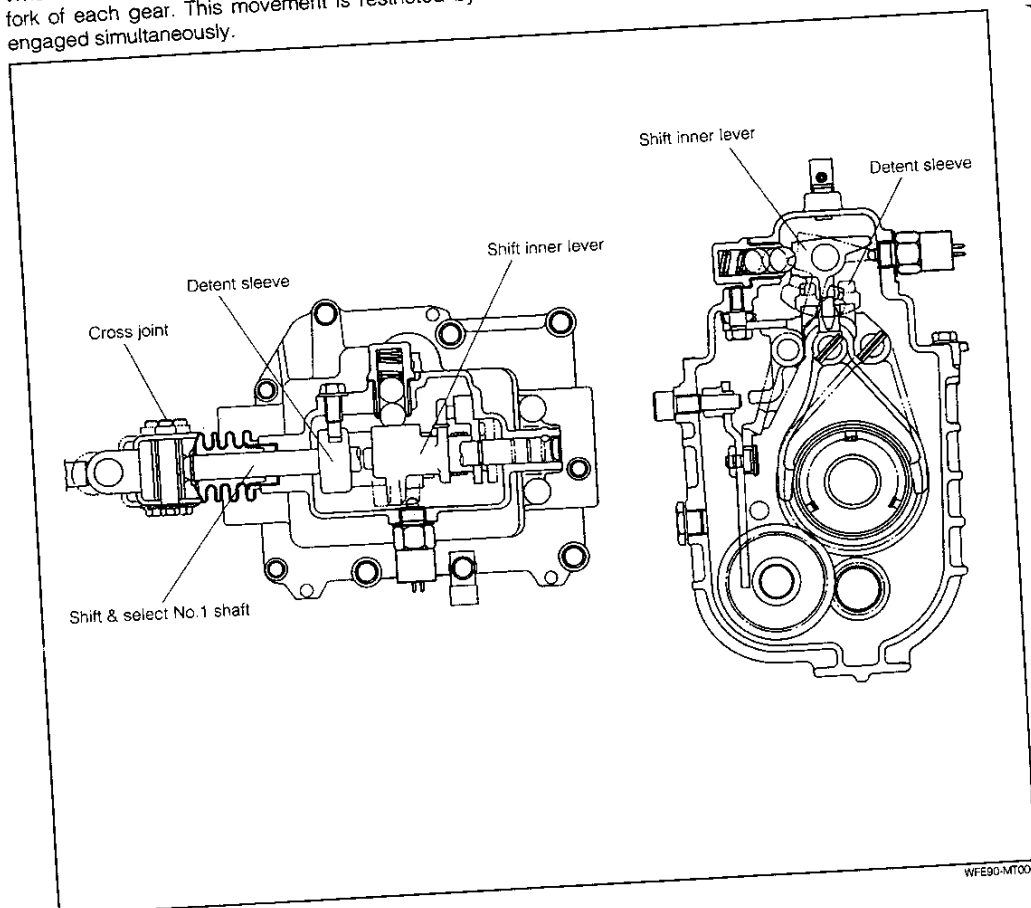
TRANSMISSION SHIFT & SELECT MECHANISM

The transmission controls employ a semi-direct method, where the control section at the transmission side is connected to the shift lever section by means of a cross joint. The shift & select mechanism incorporates such safe mechanisms as mis-shift preventing mechanism, interlock mechanism and one-way mechanism.

WFE90-MT006

INTERLOCK MECHANISM

The transmission control shaft is connected to the shift & select No. 1 shaft by means of a cross joint. When the transmission control shaft is moved in the selecting direction, the shift inner lever attached to the shift & select No. 1 shaft swings in the selecting direction like a pendulum. When the transmission control shaft is moved in the shifting direction, the shift inner lever moves the shift fork of each gear. This movement is restricted by a detent sleeve, thus preventing two gears from being engaged simultaneously.

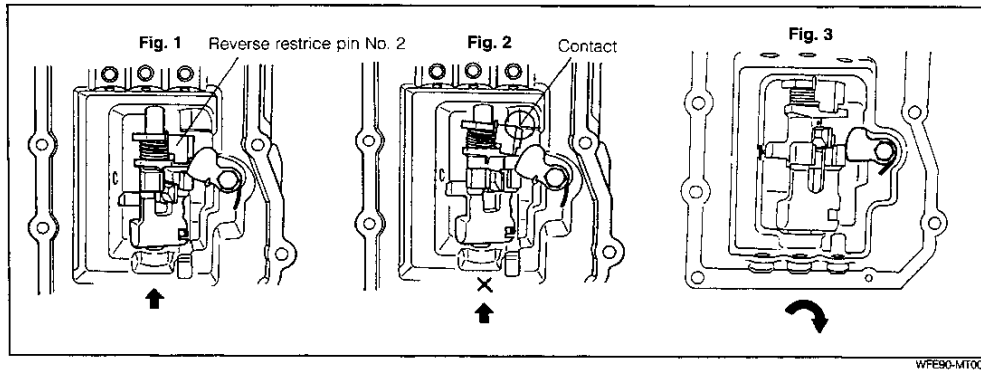


WFE90-MT006

MIS-SHIFT PREVENTING MECHANISM (5TH GEAR-TO-REVERSE GEAR SHIFT)

When the transmission control shaft is shifted into the 5th gear position, the shift inner lever attached to the transmission control shaft is shifted into the 5th gear position, as shown in Fig. 1. Simultaneously, the same movement of the reverse restrict pin No. 2 also takes place. However, if an effort is made under this condition to shift the transmission control shaft from the 5th gear position directly into the reverse gear position, the reverse restrict pin No. 2 is brought into contact with the stopper surface of the transmission case cover, thus preventing the shifting of the control shaft into the reverse gear, as shown in Fig. 2.

Once the transmission control shaft is returned to the neutral position, as shown in Fig. 3, the reverse restrict pin No. 2 returns to the original position, thus making it possible for the control shaft to be shifted into the reverse gear.

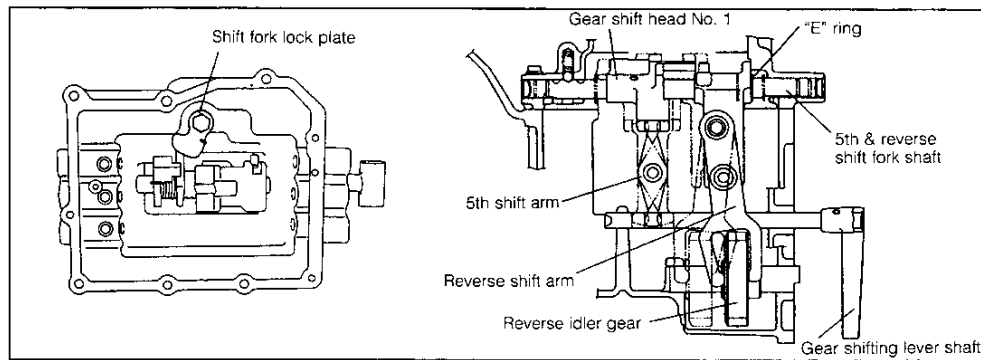


WFE90-MT007

ONE-WAY MECHANISM

When the transmission control shaft is shifted into the 5th gear position, the gear shift head No. 1 attached to the 5th & reverse shift fork shaft moves backward (to the transfer side). In this way, the shift is made into the 5th gear from the 5th shift arm through the gear shifting lever shaft.

On the other hand, when the transmission control shaft is shifted into the reverse gear position, the "E" ring of the 5th & reverse shift fork shaft pushes the reverse shift fork forward (to the clutch side). Then, the reverse idler gear is shifted into the reverse gear position through the reverse shift arm. Moreover, when the transmission control shaft is returned to the neutral position, the returning force of the return spring of the shift fork lock plate returns the reverse shift fork to the original position. Consequently, the reverse idler gear is returned to the neutral position.



WFE90-MT008

MANUAL TRANSMISSION

TROUBLE SHOOTING

Symptom	Possible causes	Checking points
Noise emitted from gear Slipping out of gear	Malfunctioning control-related components	Check control-related components.
Abnormal noise from bearing	Bearing seizure, Abnormal wear	Check bearing and gear for seizure.
Hard shifting	Malfunctioning control-related components	Check control-related components.
	Improper contact of synchronizer rings	Check synchronizer rings.

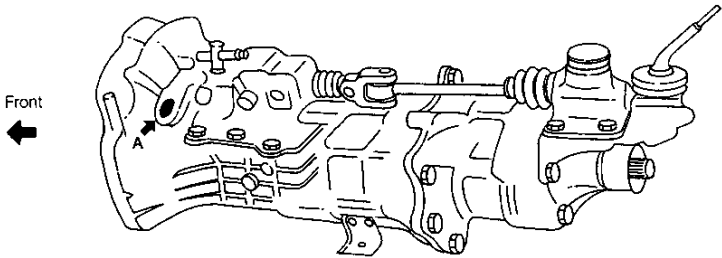
WFE90-M7009

TRANSMISSION & TRANSFER

1. The Ferroza models are available with either a full-time transmission with transfer assembly or a part-time transmission with transfer assembly; the latter being used only in conventional models. The coating colors for identification between the full-time transmission with transfer assembly and the part-time transmission with transfer assembly are as follows:

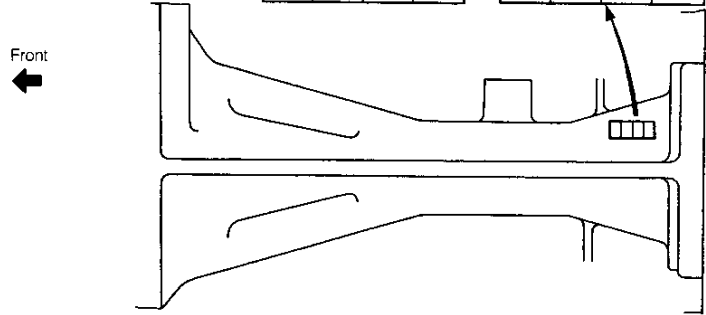
A: Identification marking position

A	European	Australian	General
Part time	Blue	←	Pink
Full time	White	←	←



B: Lot number inscription position

EX: 0 9 Y A or 1 0 S B

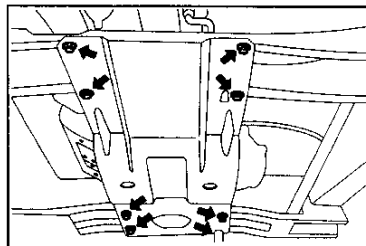


MANUAL TRANSMISSION

OIL SEAL REPLACEMENT (IN-VEHICLE SERVICE)

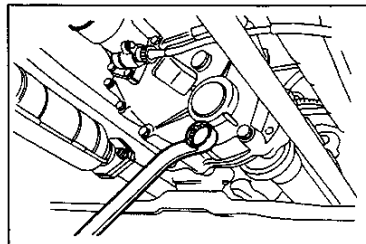
REMOVAL

1. Remove the transmission undercover by removing the eight bolts.



WFE90-MT011

2. Drain the oil of the transfer.

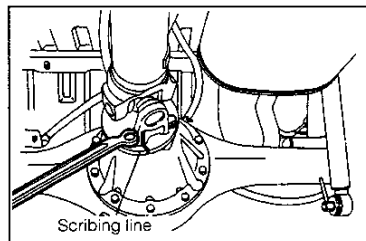


WFE90-MT012

3. Remove the rear propeller shaft.

CAUTION:

- Prior to the removal, be sure to put a scribing line. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.

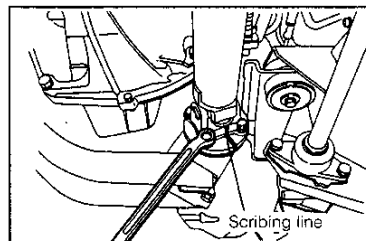


WFE90-MT013

4. Remove the front propeller shaft.

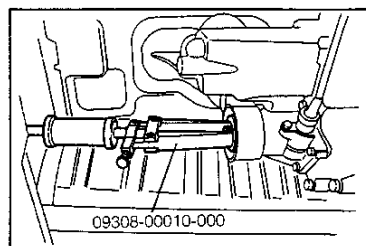
CAUTION:

- Prior to the removal, be sure to put a scribing line. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.



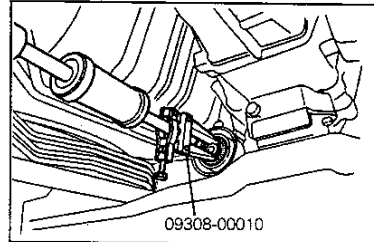
WFE90-MT014

5. Remove the rear oil seal, using the following SST.
SST: 09308-00010-000



WFE90-MT015

6. Remove the front oil seal, using the following SST.
SST: 09308-00010

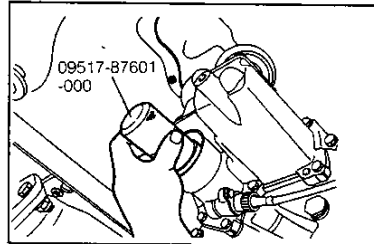


INSTALLATION

1. Press the rear oil seal, using the following SST.
SST: 09517-87601-000

NOTE:

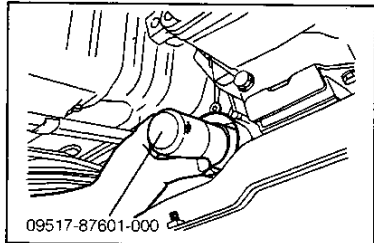
- Apply lithium base multi purpose grease to the lip section of the oil seal.



2. Press the front oil seal, using the following SST.
SST: 09517-87601-000

NOTE:

- Apply lithium base multi purpose grease to the lip section of the oil seal.



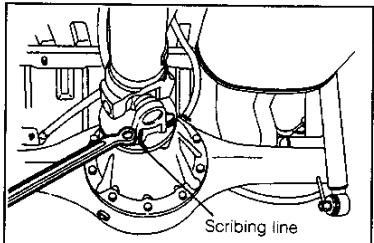
3. Install the rear propeller shaft.

Tightening Torque:

58.8 - 78.5 N·m (6.0 - 8.0 kgf·m)

CAUTION:

- Install the propeller shaft, while aligning the scribing lines which were put during the removal. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.



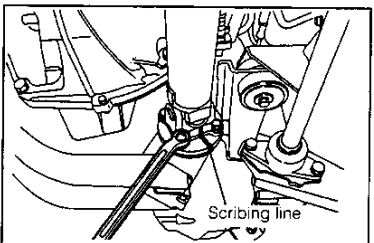
4. Install the front propeller shaft.

Tightening Torque:

58.8 - 78.5 N·m (6.0 - 8.0 kgf·m)

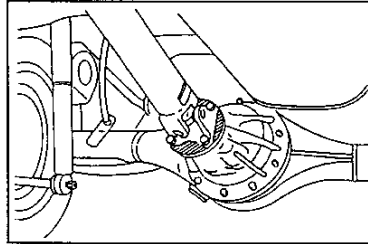
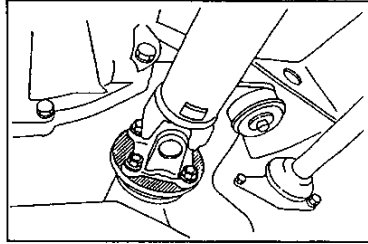
CAUTION:

- Install the propeller shaft, while aligning the scribing lines which were put during the removal. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.



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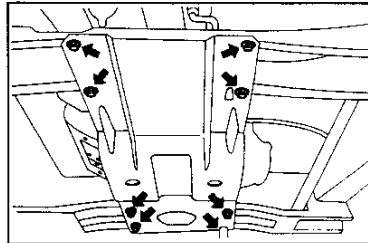
5. After installing the propeller shaft, apply black paint to the exposed machined surface of the differential (slant line section in the right figure) as a rust preventive measure.



WFEB90-MT021

6. Install the transmission undercover with the eight bolts.
7. Fill the transfer with oil.

Transfer Oil Capacity: 1.4 L
Transfer Oil: API GL-3 or GL-4
SAE 75W-85 or 75W-90

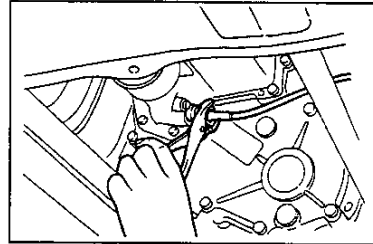


WFEB90-MT022

SPEEDOMETER GEAR

REMOVAL

1. Disconnect the speedometer cable with oil seal from the transfer shift lever retainer, using the common tool of plier.

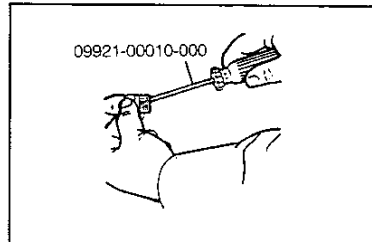


WFE90-MT023

DISASSEMBLY

Remove the oil seal, using the following SST.

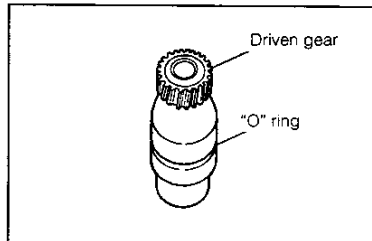
SST: 09921-00010-000



WFE90-MT024

INSPECTION

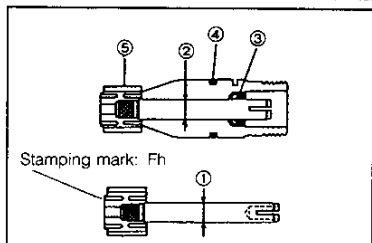
1. Check the oil seal, "O" ring and driven gear of the speedometer shaft sleeve for wear or damage.



WFE90-MT025

Unit: mm

Part		Specified value	Limit
Driven gear shaft diameter	①	8 $\begin{smallmatrix} -0.013 \\ -0.028 \end{smallmatrix}$	7.96
Shaft sleeve bore	②	8 $\begin{smallmatrix} +0.035 \\ +0.029 \end{smallmatrix}$	8.10
Oil seal lip section	③	Visually inspect the section for excessive wear or damage.	
"O" ring	④		
Driven gear tooth surface	⑤		



WFE90-MT026

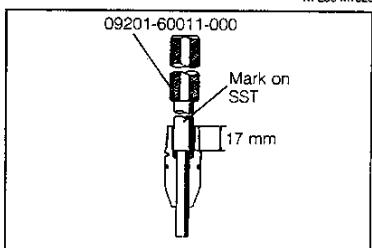
ASSEMBLY

Assembly the oil seal for speedometer shaft sleeve, using the following SST.

SST: 09201-60011-000

INSTALLATION

Install the speedometer shaft sleeve to the transfer rear output shaft bearing retainer.



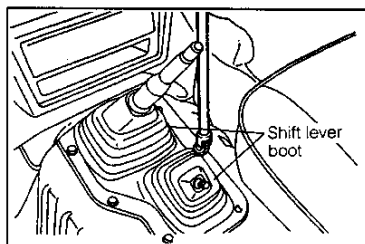
WFE90-MT027

MANUAL TRANSMISSION

MANUAL TRANSMISSION & TRANSFER REMOVAL

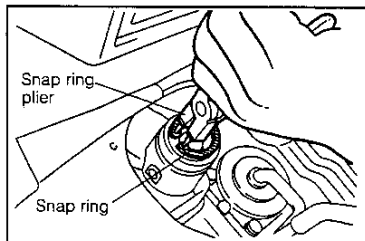
REMOVAL

1. Working from the vehicle interior
 - (1) Remove the Transmission and Transfer shift lever knob by turning the counterclockwise directions.
 - (2) Turn over the floor carpet.
 - (3) Remove the shift lever boot by removing the six bolts and then, pull up toward you.



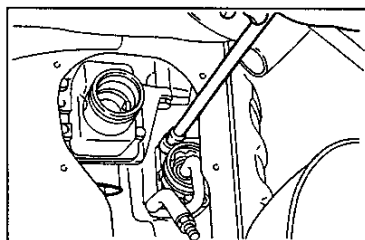
WFE90-MT028

- (4) Remove the transmission control lever by detaching the snap ring, using the common tool of snap ring plier.

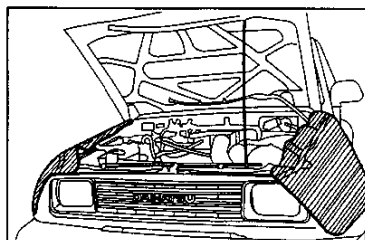


WFE90-MT029

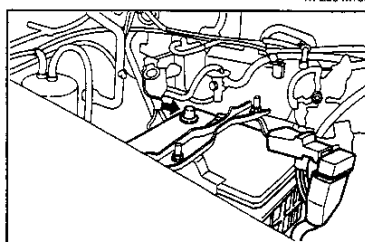
- (5) Remove the transfer control lever by removing the four bolts attaching to the transfer rear case.



2. Working from the engine compartment room
 - (1) Install the fender cover to the fenders so that no scratch may be made to the fenders.

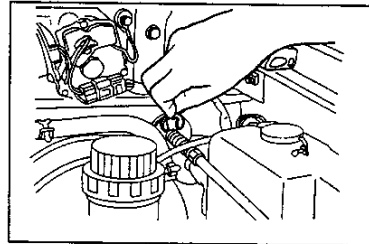


- (2) Disconnect the battery ground cable from the negative (-) terminal of the battery.



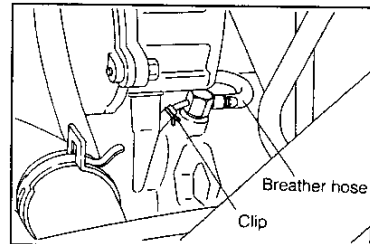
MANUAL TRANSMISSION

- (3) Remove the E-ring for the adjusting play.



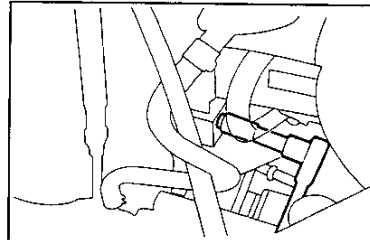
WFE90-MT033

- (4) Detach a clip on the transmission breather hose from the union.



WFE90-MT034

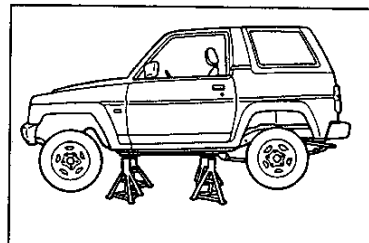
- (5) Remove the direct connecting one-both under the starter motor.



WFE90-MT035

3. Working from the vehicle outside

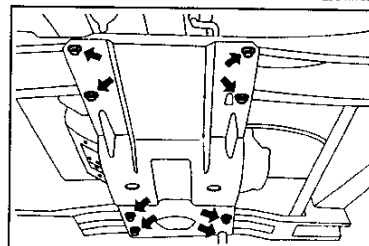
- (1) Jack or lift up the vehicle and support the vehicle body with safety stands securely. (As for the jack or lift up points, refer with the GI-section.)



WFE90-MT036

4. Working from the under vehicle

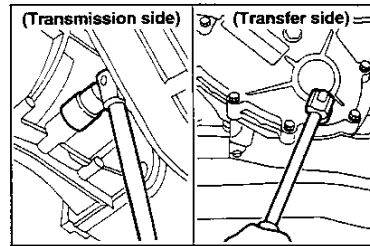
- (1) Remove the transmission under cover by removing the eight bolts.



WFE90-MT037

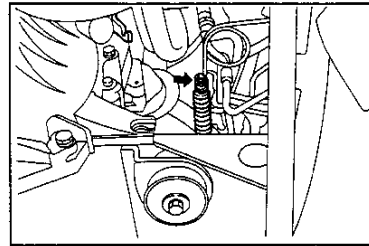
MANUAL TRANSMISSION

- (2) Drain the oil from the transmission and transfer by removing the drain plugs.



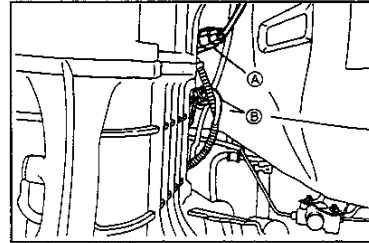
WFE90-MT038

- (3) Disconnect the clutch release cable subassembly at the clutch housing side.



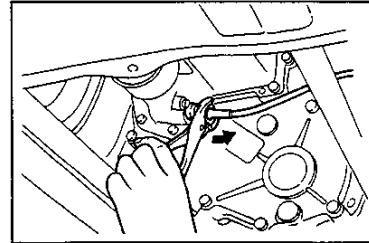
WFE90-MT039

- (4) Disconnect the coupler of back up lamp ① and transmission position detect switch ②.



WFE90-MT040

- (5) Disconnect the speedometer cable with oil seal from the transmission case, using the common tool of plier.

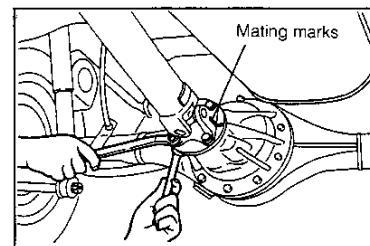


WFE90-MT041

- (6) Remove the front propeller shaft and rear propeller shaft by removing the four bolts and four nuts.

CAUTION:

- When installing these parts, align the mating marks with each other which were put on the connecting section during the removal as guide during the installation. If this operation should fail to be performed, the propeller shaft may emit abnormal noise or vibration.



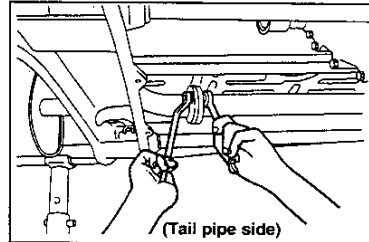
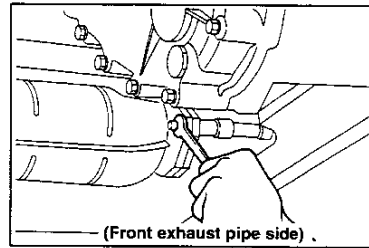
WFE90-MT042

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- (7) Separate by catalyst converter assembly by removing the two nuts.

WARNING:

Be sure to put on a pair of gloves because the exhaust pipe may be still hot for a little while after the engine has stopped.

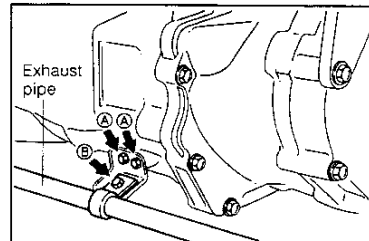


WFE90-MT043

- (8) Remove the exhaust pipe support bracket by removing the three bolts.

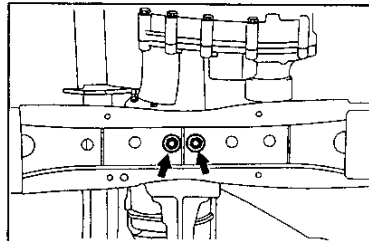
WARNING:

Be very careful not to touch the exhaust pipe because the exhaust pipe may be still hot for a little while after the engine has stopped.



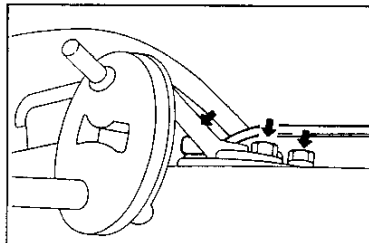
WFE90-MT044

- (9) Remove the two attaching nuts at the crossmember No. 2.



WFE90-MT045

- (10) Remove the exhaust pipe bracket attaching to the crossmember No. 3 by removing the three bolts.



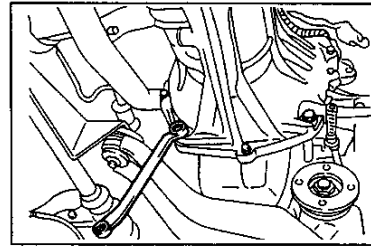
WFE90-MT046

MANUAL TRANSMISSION

- (11) Remove the starter motor by removing the two bolts.
- (12) Remove the transmission direct-connecting six bolts and leave them in inserted condition.

WARNING:

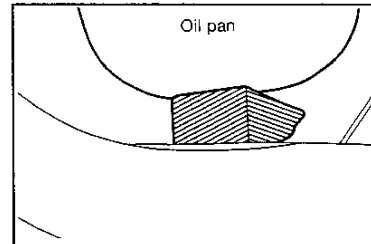
Be very careful not to touch the exhaust pipe, engine and transmission because they may be still hot for a little while after engine has stopped.



WFE90-MT047

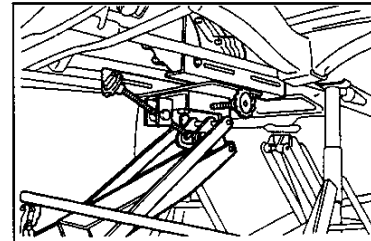
NOTE:

- As directed in the relevant section on remounting, insert a wooden piece(s) between the oil pan and the differential carrier support front bracket to prevent downward movement of the engine assembly to the transmission side (and to prevent contact between the fan and the fan shroud).



WFE90-MT048

- (13) Support the transmission with a transmission jack.

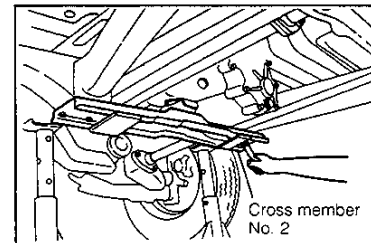


WFE90-MT049

- (14) Remove the crossmember No. 2 by removing the four bolts on both left and right sides.
- (15) While supporting the transmission with a transmission jack, remove the transmission direct-connecting bolts. Then, take out the transmission from the engine with installed the crossmember No. 2.

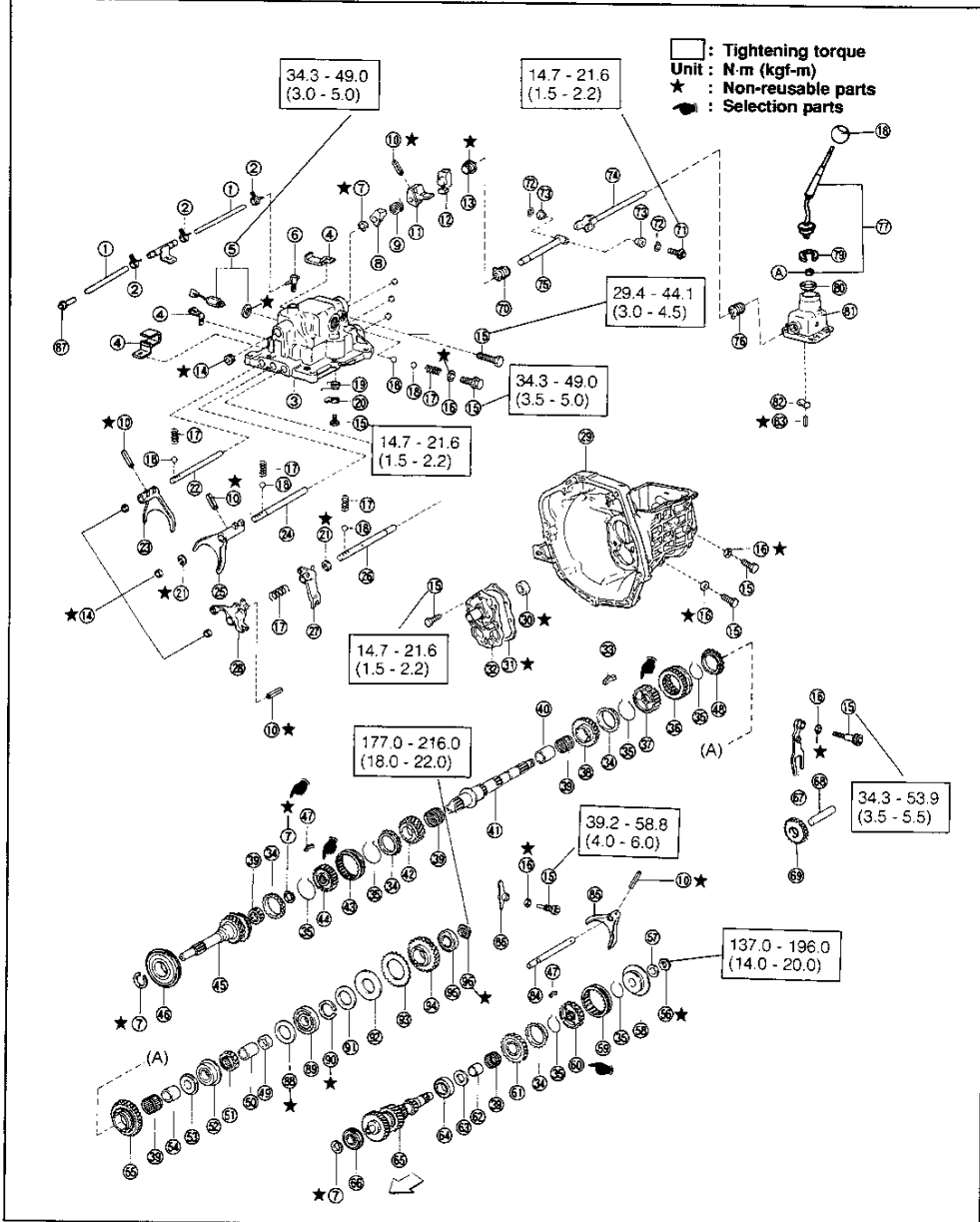
NOTE:

- The transmission direct-connecting bolts should be removed, while raising the rear section of the transfer with a transmission jack. Then, pull out the transmission input shaft from the clutch. Thus, remove the transmission and transfer by sliding them toward the rear.



WFE90-MT050

TRANSMISSION (PART TIME) COMPONENTS



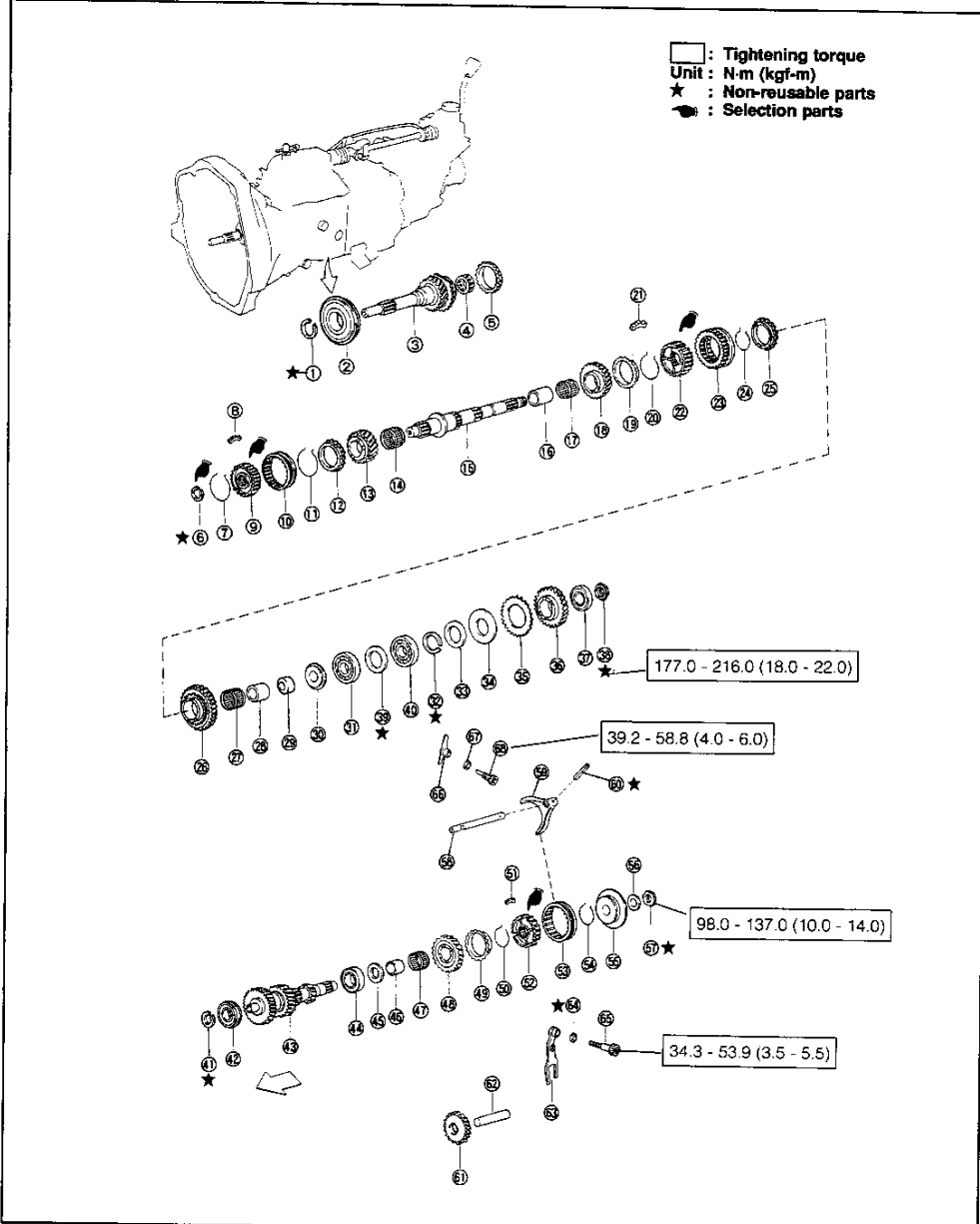
WFE90-MT051

MANUAL TRANSMISSION

- | | |
|--|------------------------------------|
| ① Breather hose | ④⑨ Synchronizer ring No. 2 |
| ② Clip | ④⑩ Output shaft gear spacer No. 2 |
| ③ T/M case cover | ④⑪ Output shaft gear spacer No. 1 |
| ④ Clamp | ⑤① 5th gear |
| ⑤ Backup lamp switch | ⑤② Radial ball bearing |
| ⑥ Union | ⑤③ 1st gear thrust washer |
| ⑦ Snap ring | ⑤④ 1st gear bearing inner race |
| ⑧ Reverse restrict pin No. 2 | ⑤⑤ 1st gear |
| ⑨ Torsion spring | ⑤⑥ Lock nut |
| ⑩ Slotted pin | ⑤⑦ Conical washer spring |
| ⑪ Shift inner lever | ⑤⑧ Shifting key retainer |
| ⑫ Detent sleeve | ⑤⑨ T/M hub sleeve |
| ⑬ Oil seal | ⑤⑩ Synchronizer hub No. 1 |
| ⑭ Tight plug | ⑤⑪ Counter shaft 5th gear |
| ⑮ Bolt | ⑤⑫ 5th gear bearing inner race |
| ⑯ Gasket | ⑤⑬ 5th gear thrust washer |
| ⑰ Spring | ⑤⑭ Radial ball bearing |
| ⑱ Ball | ⑤⑮ Counter gear |
| ⑲ Torsion spring | ⑤⑯ Radial ball bearing |
| ⑳ Shift fork lock plate | ⑤⑰ Reverse shift arm |
| ㉑ "E" ring | ⑤⑱ Reverse idle gear shaft |
| ㉒ 1st & 2nd shift fork shaft | ⑤⑲ Reverse idle gear S/A |
| ㉓ 1st & 2nd shift fork | ⑤⑳ Shift & select shaft No. 1 boot |
| ㉔ 3rd & 4th shift fork shaft | ⑥① Bolt |
| ㉕ 3rd & 4th shift fork | ⑥② "O" ring |
| ㉖ 5th & reverse shift fork shaft | ⑥③ Bush |
| ㉗ Reverse shift fork | ⑥④ Control shaft |
| ㉘ Gear shift head No. 1 | ⑥⑤ Shift & select shaft No. 1 |
| ㉙ T/M case assy | ⑥⑥ Control shaft boot |
| ㉚ Oil seal | ⑥⑦ T/M shift lever assy (②: Bush) |
| ㉛ Gasket | ⑥⑧ T/M control shift knob |
| ㉜ Bearing front retainer | ⑥⑨ Snap ring |
| ㉝ Synchronmesh shifting key (3 pieces) | ⑥⑩ T/M shift lever ball seat |
| ㉞ Synchronizer ring No. 3 | ⑥⑪ Shift lever retainer S/A |
| ㉟ Synchronmesh shifting key spring | ⑥⑫ Shift lever outer |
| ㊱ Reverse gear | ⑥⑬ Slotted spring pin |
| ㊲ T/M clutch hub No. 1 | ⑥⑭ Gear shifting lever shaft |
| ㊳ 2nd gear | ⑥⑮ 5th shift fork |
| ㊴ Needle roller bearing | ⑥⑯ 5th shift arm |
| ㊵ 1st gear bearing inner race | ⑥⑰ 2way |
| ㊶ Output shaft | ⑥⑱ Oil seal |
| ㊷ 3rd gear | ⑥⑲ Radial ball bearing |
| ㊸ Hub sleeve No. 1 | ⑥⑳ Snap ring |
| ㊹ T/M clutch hub No. 2 | ⑥㉑ Conical spring washer |
| ㊺ Input shaft | ⑥㉒ Washer plate |
| ㊻ Radial ball bearing | ⑥㉓ Sub gear No. 1 |
| ㊼ Synchronmesh shifting key No. 2 | ⑥㉔ Transfer low speed input gear |
| | ⑥㉕ Bearing |
| | ⑥㉖ Lock nut |

WFE9C-MT052

INPUT SHAFT-, OUTPUT SHAFT- & COUNTERSHAFT-RELATED COMPONENTS



WFE90-MT063

MANUAL TRANSMISSION

- | | |
|---|--|
| ① Snap ring | ②⑥ Transfer low speed input gear |
| ② Radial ball bearing | ②⑦ Bearing |
| ③ Input shaft | ②⑧ Lock nut |
| ④ Needle roller bearing | ②⑨ Oil seal |
| ⑤ Synchronizer ring No. 3 | ②⑩ Bearing |
| ⑥ Snap ring | ②⑪ Snap ring |
| ⑦ Synchromesh shifting key spring | ②⑫ Radial ball bearing |
| ⑧ Synchromesh shifting key No. 2 (3 pieces) | ②⑬ Counter gear |
| ⑨ Transmission clutch hub No. 2 | ②⑭ Radial ball bearing |
| ⑩ Transmission hub sleeve No. 1 | ②⑮ 5th gear thrust washer |
| ⑪ Synchromesh shifting key spring | ②⑯ 5th gear bearing inner race |
| ⑫ Synchronizer ring No. 3 | ②⑰ Needle roller bearing |
| ⑬ 3rd gear | ②⑱ Counter shaft 5th gear |
| ⑭ Needle roller bearing | ②⑲ Synchronizer ring No. 3 |
| ⑮ Output shaft | ②⑳ Synchromesh shifting key spring |
| ⑯ 1st gear bearing inner race | ②㉑ Synchromesh shifting key No. 2 (3 pieces) |
| ⑰ Needle roller bearing | ②㉒ Synchronizer No. 1 hub |
| ⑰ 2nd gear | ②㉓ Transmission hub sleeve No. 2 |
| ⑱ Synchronizer ring No. 3 | ②㉔ Synchromesh shifting key spring |
| ⑲ Synchromesh shifting key spring | ②㉕ 5th Shifting key retainer |
| ⑲ Synchromesh shifting key No. 1 (3 pieces) | ②㉖ Conical spring washer |
| ⑲ Transmission clutch hub No. 1 | ②㉗ Lock nut |
| ⑲ Reverse gear | ②㉘ Gear shifting lever shaft |
| ⑲ Synchromesh shifting key spring | ②㉙ 5th shift fork |
| ⑲ Synchronizer ring No. 2 | ②㉚ Slotted pin |
| ⑲ 1st gear | ②㉛ Reverse idle gear S/A |
| ⑲ Needle roller bearing | ②㉜ Reverse idle gear shaft |
| ⑲ 1st gear bearing inner race | ②㉝ Reverse shift arm |
| ⑲ 1st gear bearing inner race No. 2 | ②㉞ Gasket |
| ⑲ 1st gear thrust washer | ②㉟ Bolt |
| ⑲ Radial ball bearing | ③① 5th shift arm |
| ⑲ Snap ring | ③② Gasket |
| ⑲ Conical spring washer | ③③ Bolt |
| ⑲ Washer plate | |
| ⑲ Sub gear No. 1 | |

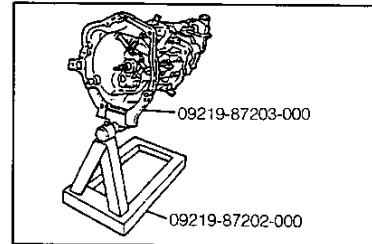
TRANSMISSION DISASSEMBLY

1. Install the transmission assembly with transfer on the over-haul stand using the following SSTs.

SST: 09219-87202-000

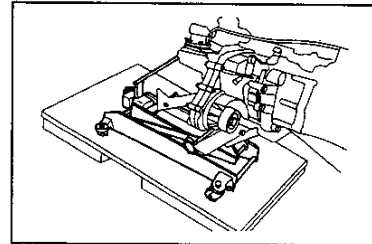
09219-87203-000

As for the removal of transmission assembly with transfer, see page MT-12 to MT-16.



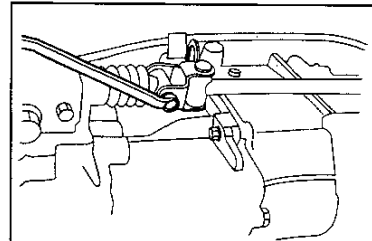
WP890-MT055

2. Place wooden plates or any other suitable materials on the overhauling stand, as shown in the diagram at right.
3. Support the transfer front and transfer rear case with a transmission jack.



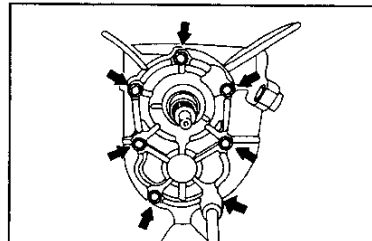
WP890-MT056

4. Remove the control shaft with installed the shift lever retainer subassembly by removing the hexagon bolt.



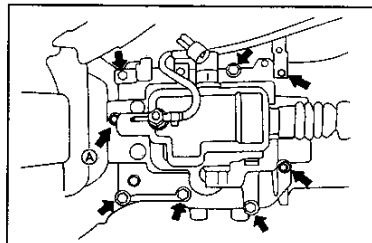
WP890-MT057

5. Remove the clutch release bearing and related parts. (Refer CL-section.)
6. Remove the front bearing retainer by removing the seven bolts.



WP890-MT058

7. Remove the transmission case cover subassembly by removing the seven bolts and a reamer bolt (A).



WP890-MT059

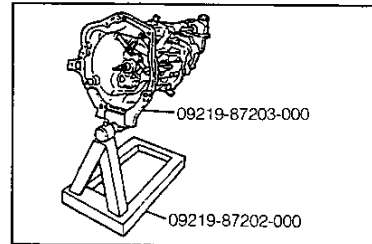
TRANSMISSION DISASSEMBLY

1. Install the transmission assembly with transfer on the over-haul stand using the following SSTs.

SST: 09219-87202-000

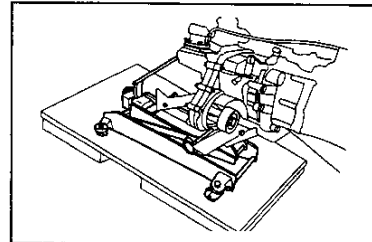
09219-87203-000

As for the removal of transmission assembly with transfer, see page MT-12 to MT-16.



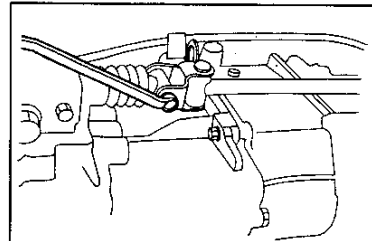
WFE90-MT055

2. Place wooden plates or any other suitable materials on the overhauling stand, as shown in the diagram at right.
3. Support the transfer front and transfer rear case with a transmission jack.



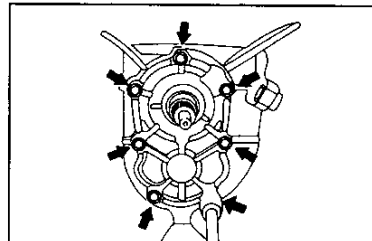
WFE90-MT056

4. Remove the control shaft with installed the shift lever retainer subassembly by removing the hexagon bolt.



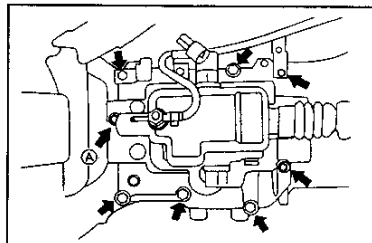
WFE90-MT057

5. Remove the clutch release bearing and related parts. (Refer CL-section.)
6. Remove the front bearing retainer by removing the seven bolts.



WFE90-MT058

7. Remove the transmission case cover subassembly by removing the seven bolts and a reamer bolt ④.



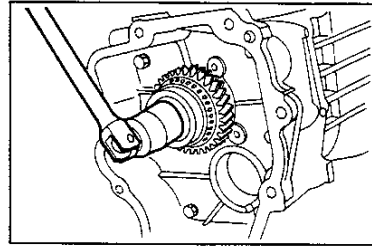
WFE90-MT059

MANUAL TRANSMISSION

13. Raise the lock section of the lock nut of the transfer lower speed input gear. Remove the lock nut.

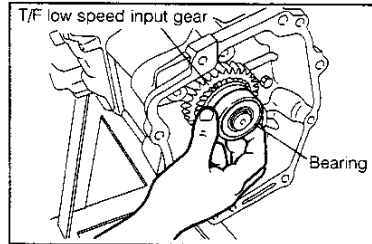
NOTE:

- Never use the impact wrench.
- The radial ball bearing seal face may be avoided from the damage.
- Never reuse the removed lock nut.



WFE90-MT064

14. Remove the bearing and transfer lower speed input gear. (As for the inspection for the removed parts. See page MT-31.)

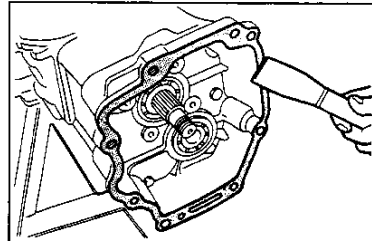


WFE90-MT065

15. Remove the gasket on the transfer adapter with a gasket scraper.

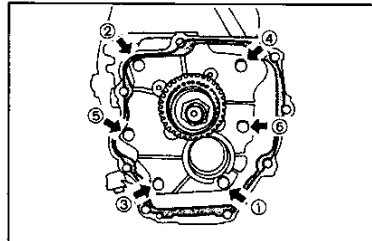
NOTE:

- Remove the gasket on the transmission case attaching surface of the transfer adapter, using a gasket scraper. Be very careful not to scratch the attaching surface.



WFE90-MT066

16. Remove the transfer adapter by removing the six bolts with installed the radial ball bearing and oil seal.

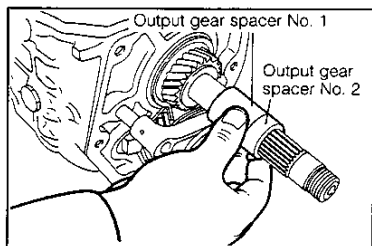


WFE90-MT067

17. Remove the output gear spacer No. 1 and output gear spacer No. 2.

NOTE:

- Measure the backlash and thrust clearance of the 5th gear.



WFE90-MT068

Unit: mm

Backlash	0.05 - 0.13
Thrust clearance	0.11 - 0.30

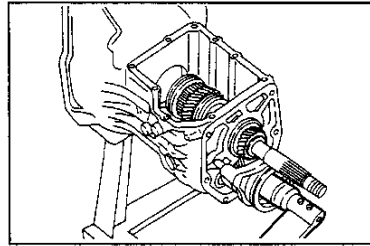
MANUAL TRANSMISSION

18. Raise the lock section of the lock nut of the countershaft 5th gear.

19. Remove the lock nut of the countershaft 5th gear.

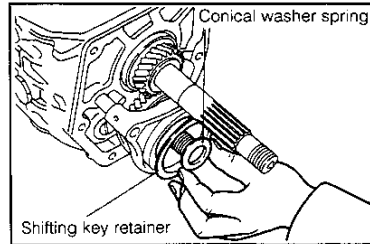
NOTE:

- Never reuse the removed lock nut.



WFE90-MT069

20. Remove the conical washer spring and shifting key retainer.

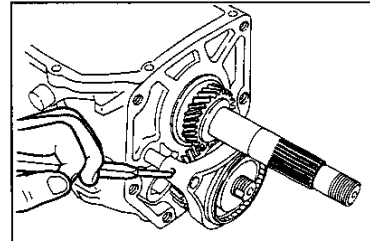


WFE90-MT070

21. Drive off the slotted pin of the 5th shift fork.

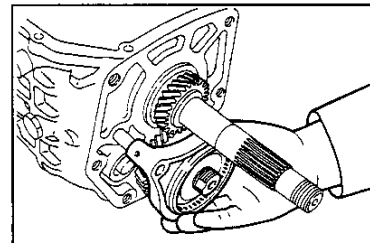
NOTE:

- Never reuse the removed slotted pin.



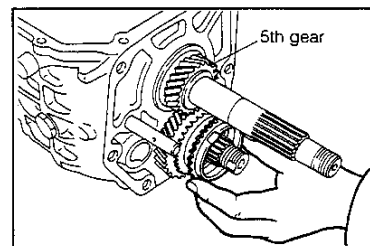
WFE90-MT071

22. Remove the 5th shift fork together with synchronizer hub sleeve in a set.



WFE90-MT072

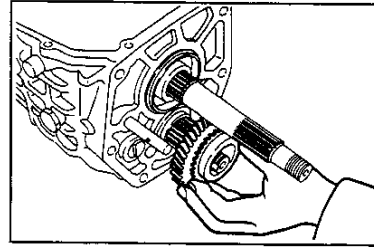
23. Remove the synchronizer ring and 5th gear.



WFE90-MT073

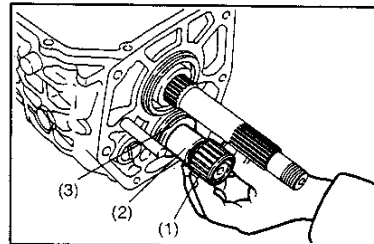
MANUAL TRANSMISSION

24. Remove the countershaft 5th gear.



WFE90-MT074

25. Remove the following parts from the countershaft.
(1) Needle roller bearing
(2) 5th gear bearing inner race
(3) 5th gear thrust washer

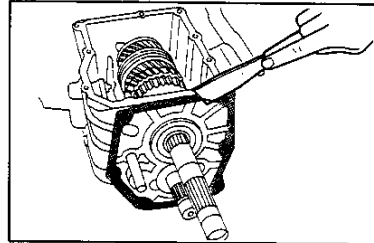


WFE90-MT075

26. Remove the liquid gasket from the transmission case, using a gasket scraper.

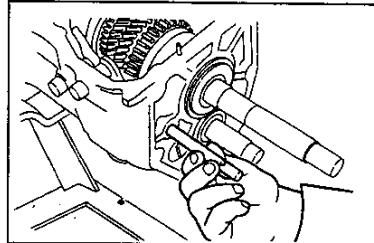
NOTE:

- Be very careful not to scratch the transmission case during the removal.



WFE90-MT076

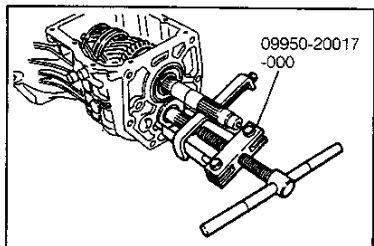
27. Remove the gear shifting lever shaft.



WFE90-MT077

28. Remove the countershaft rear bearing, using the following SST.

SST: 09950-20017-000

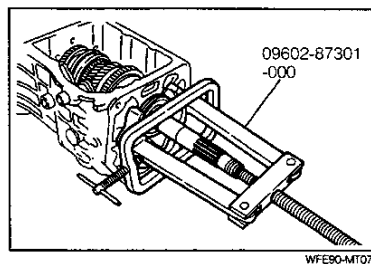


WFE90-MT078

MANUAL TRANSMISSION

29. Detach the stop ring of the output shaft bearing. Remove the output shaft bearing, using the following SST.

SST: 09602-87301-000



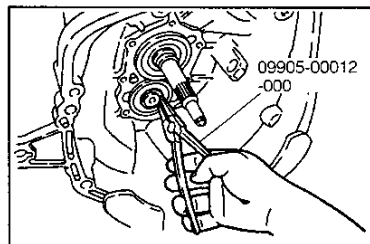
WFE90-MT079

30. Detach the snap ring of the countershaft, using the following SST.

SST: 09905-00012-000

NOTE:

- Never reuse the removed snap ring.



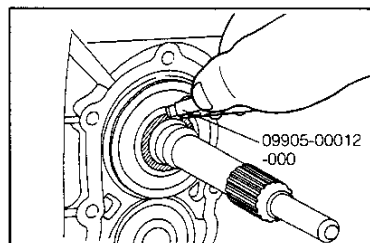
WFE90-MT080

31. Detach the snap ring of the input shaft, using the following SST.

SST: 09905-00012-000

NOTE:

- Never reuse the removed snap ring.



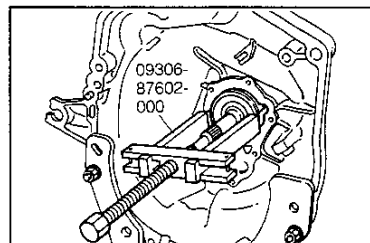
WFE90-MT081

32. Remove the input shaft bearing, using the following SST.

SST: 09306-87602-000

NOTE:

- Detach the stop ring, prior to remove the bearing.



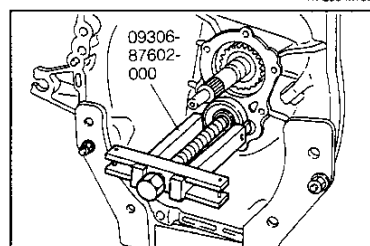
WFE90-MT082

33. Remove the bearing of the countershaft at the clutch side, using the following SST.

SST: 09306-87602-000

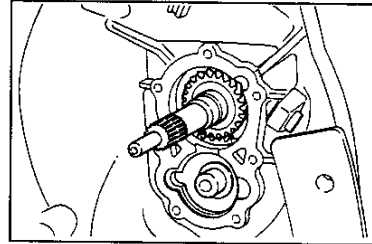
NOTE:

- Push out the bearing by tapping the countershaft at the output shaft side, using a plastic hammer.
- Detach the stop ring, prior to remove the bearing.



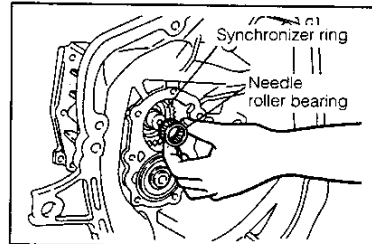
WFE90-MT083

34. Remove the input shaft.
(As for the inspection procedures for each section, see page MT-32.)



WFE90-MT084

35. Remove the needle roller bearing and synchronizer ring.
(As for the inspection on the removed parts, see page MT-32.)

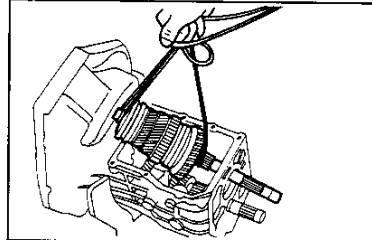


WFE90-MT085

36. Remove the output shaft assembly.
(As for the disassembly, inspection and assembly for the removed parts, see page MT-28.)

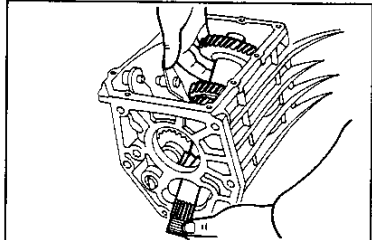
NOTE:

- It is recommended that as shown in the diagram at right, an operation rope (about 3 mm in outside diameter) be used to remove the output shaft assembly from the transmission case assembly.



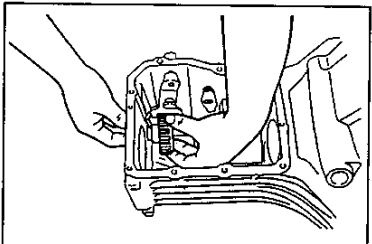
WFE90-MT086

37. Remove the countershaft from the transmission case.



WFE90-MT087

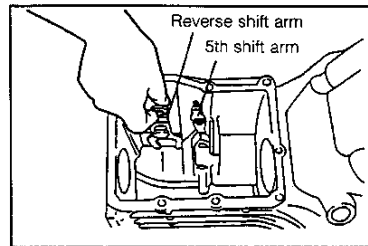
38. Remove the reverse idler gear and reverse idler gear shaft.



WFE90-MT088

MANUAL TRANSMISSION

39. Remove the reverse shift arm and 5th shift arm.

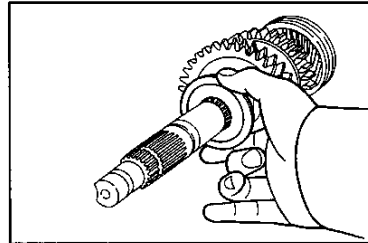


WFE90-MT089

TRANSMISSION OUTPUT SHAFT

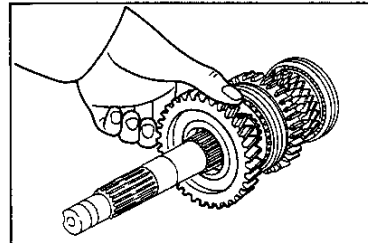
DISASSEMBLY

1. Remove the 1st gear thrust washer.



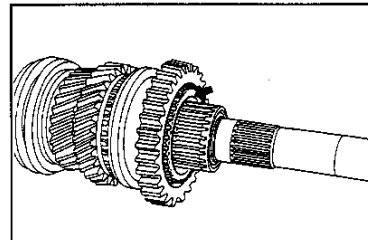
WFE90-MT090

2. Remove the 1st gear.



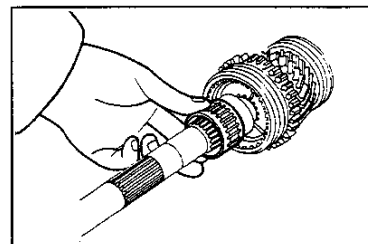
WFE90-MT091

3. Remove the synchronizer ring No. 2.



WFE90-MT092

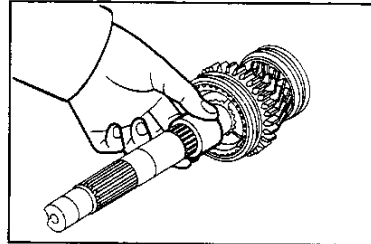
4. Remove the needle roller bearing.



WFE90-MT093

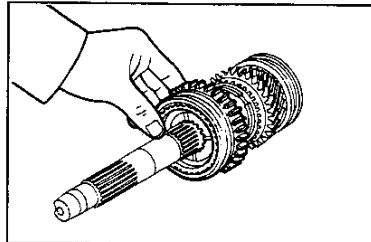
MANUAL TRANSMISSION

5. Remove the 1st gear bearing inner race.

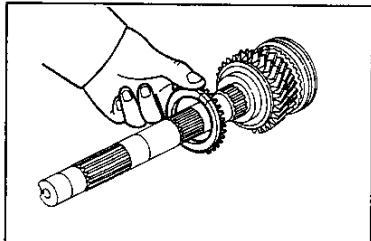


6. Remove the reverse gear with installed the following parts in a set.

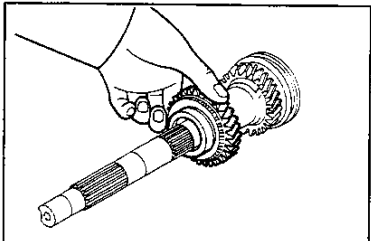
- (1) Transmission clutch hub No. 1
- (2) Synchromesh shifting key spring
- (3) Synchromesh shifting key



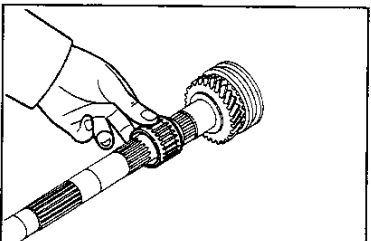
7. Remove the synchronizer ring.



8. Remove the 2nd gear.



9. Remove the needle roller bearing.



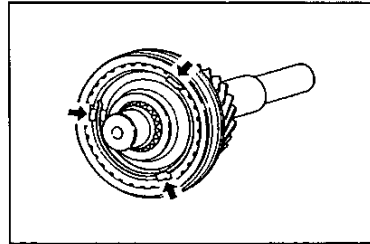
MANUAL TRANSMISSION

10. Remove the following parts.

- (1) Transmission hub sleeve No. 1
- (2) Synchromesh shifting key spring (1 piece)
- (3) Synchromesh shifting key (3 pieces)

NOTE:

- Make sure that an axial clearance of transmission clutch hub No. 2 should be measured, prior to assembly the above parts (See page MT-39).

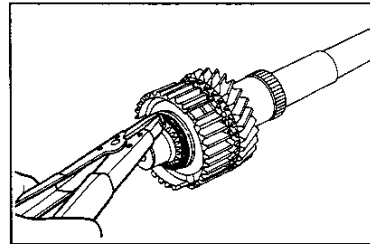


WFE90-MT099

11. Detach the snap ring.

NOTE:

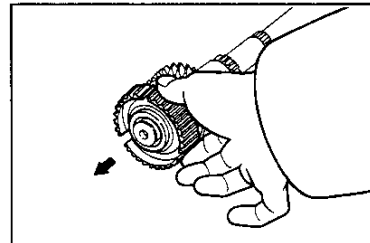
- Never reuse the removed snap ring.



WFE90-MT100

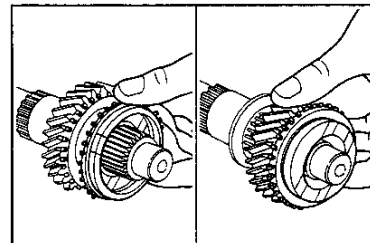
12. Remove the following parts in a set

- (1) Transmission clutch hub No. 2.
- (2) Synchromesh shifting key spring (1 piece)



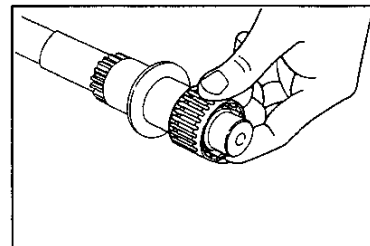
WFE90-MT101

13. Remove the synchronizer ring No. 3 and 3rd gear.



WFE90-MT102

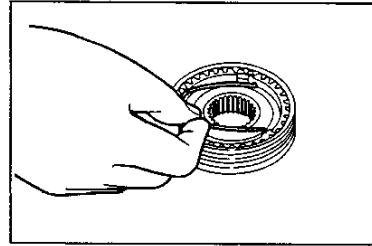
14. Remove the needle roller bearing.



WFE90-MT103

MANUAL TRANSMISSION

15. Remove the synchromesh shifting key spring and synchromesh shifting key from the following transmission clutch hub sleeve No. 1, No. 2 and hub sleeve.

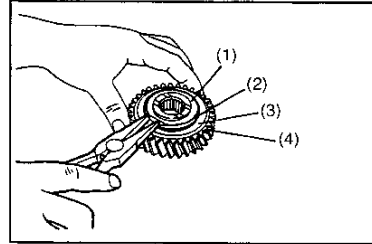


WFEB90-MT104

TRANSFER ADAPTER

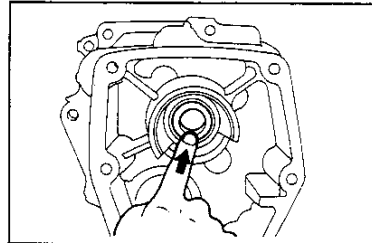
DISASSEMBLY

1. Remove the following parts of the transfer low speed input gear in this sequence.
 - (1) Snap ring
 - (2) Conical spring
 - (3) Washer plate
 - (4) Sub gear No. 1



WFEB90-MT105

2. Remove the bearing of the transmission output shaft of the transfer adapter by pushing the output gear spacer No. 2 to the transfer front case side.

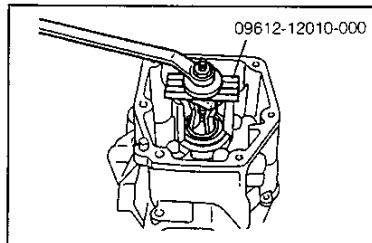


WFEB90-MT106

3. Remove the oil seal of the transmission output shaft, using the following SSTs.
SST: 09612-12010-000

NOTE:

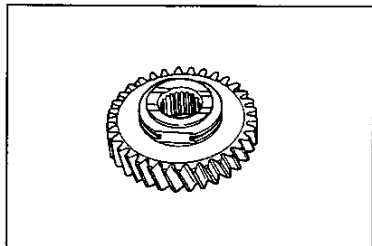
- Never reuse the removed oil seal.



WFEB90-MT107

INSPECTION

1. Check the transfer low speed input gear for wear or damage.

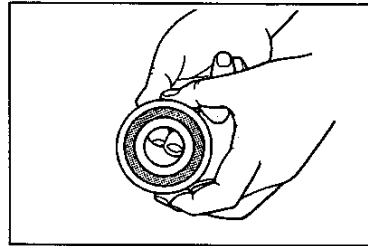


WFEB90-MT108

MANUAL TRANSMISSION

2. Rotate the bearing inner race of the following parts by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any binding.

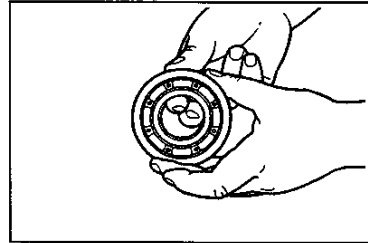
- (1) Transmission input shaft and out put shaft rear
- (2) Transmission counter front



WFE90-MT106

3. Rotate the bearing inner race of the following parts by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any binding.

- (1) Transfer counter gear of the transfer adapter.
- (2) Transmission output shaft of the transfer adapter.

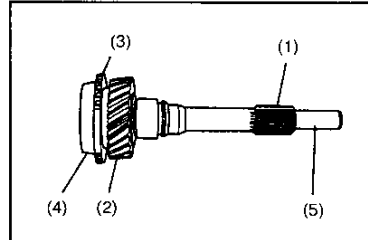


WFE90-MT110

INPUT SHAFT

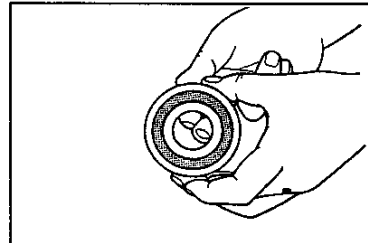
1. Check the input shaft for the following items.

- (1) Spline section for damage
- (2) Gear for damage and wear
- (3) Engaging section of hub sleeve for damage
- (4) Tapered section for wear or damage
- (5) Race section of roller bearing for wear or damage



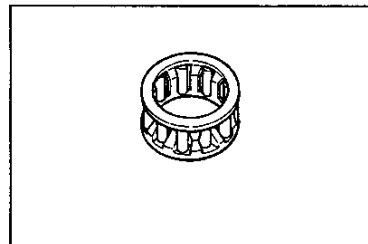
WFE90-MT111

2. Rotate the bearing inner race by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any sticking.



WFE90-MT112

3. Check the needle roller bearing for wear or damage.



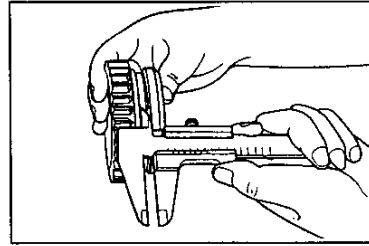
WFE90-MT113

HUB SLEEVE, SYNCHRONIZER RING & GEARS

1. Measure the contact width of the reverse gear with the shift fork, using vernier calipers.

Unit: mm

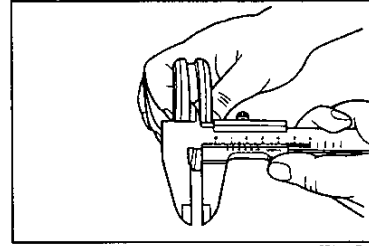
Item	Specified value	Allowable limit
Part name		
Reverse gear	7.05 - 7.12	7.3



2. Measure the contact width of the transmission hub sleeve with the shift fork, using vernier calipers.

Unit: mm

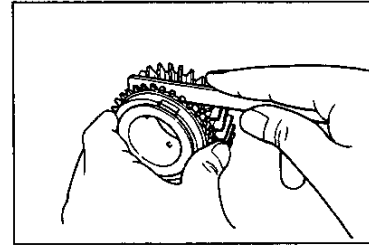
Item	Specified value	Allowable limit
Part name		
Transmission hub sleeve	7.05 - 7.12	7.3



3. Measure the clearance between each gear and the synchronizer ring, using a thickness gauge.

Unit: mm

Item	Specified value	Allowable limit
Measuring point		
1st gear 2nd gear 3rd gear 4th gear 5th gear	0.85 - 1.45	0.5



NOTE:

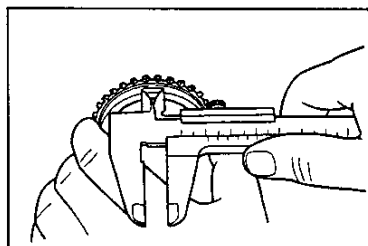
- The measurement should be performed at several points for each gear. The minimum value is regarded as the clearance for the said gear.

MANUAL TRANSMISSION

4. Measure the contact width of each synchronizer ring with the synchromesh shifting key, using vernier calipers. Replace the synchronizer ring which does not conform to the specifications with a new one.

Unit: mm

Measuring point \ Item	Specified value
1st gear	9.9 - 10.1
2nd gear 3rd gear 4th gear 5th gear	11.3 - 11.5



WFE90-MT117

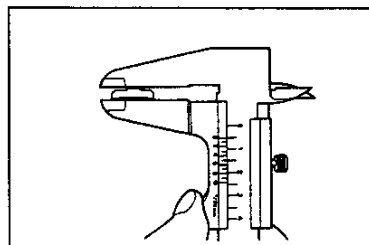
NOTE:

- The measurement should be performed at three points for each synchronizer ring. The maximum value is regarded as the contact width for the said ring.

5. Measure the height of each synchromesh shifting key, using vernier calipers.

Unit: mm

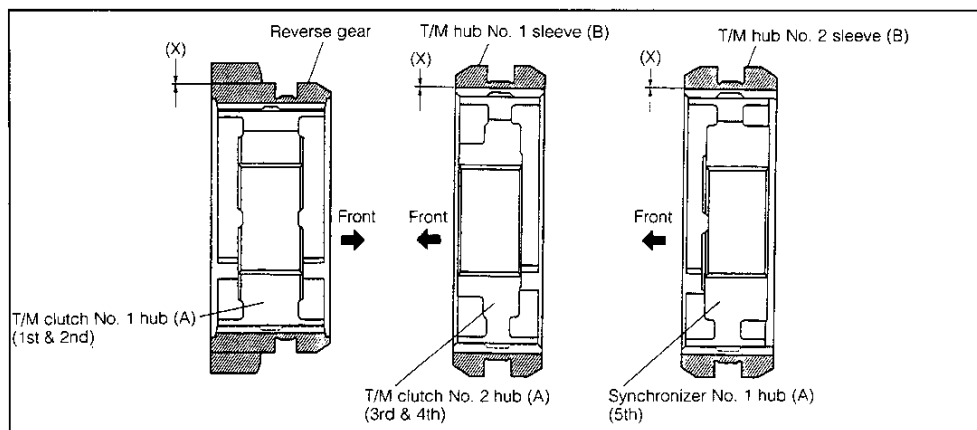
Measuring point \ Item	Specified value	Allowable limit
1st & 2nd gears 3rd & 4th gears 5th gear	5.0 - 5.2	4.7



WFE90-MT118

6. Measure the dimension (A) and (B) of the followings parts. Make sure that the clearance (X) between this hubs and sleeves may confirm to the specification.

Specified Value: 0.03 - 0.19 mm



WFE90-MT119

MANUAL TRANSMISSION

7. The outer diameter dimension of the (A) above parts has been machined in accordance with the bore dimension of the (B) parts. If either part exceeds the specified value above, be certain to replace them as a set.

CAUTION:

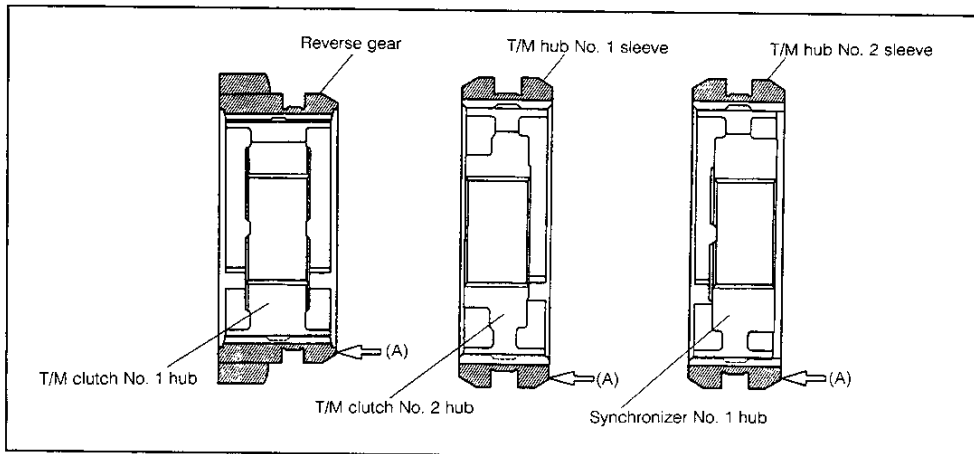
- If either part which has been exceeded the the specified value should be used against this caution, it would cause slipping-out of gear and or emanation of abnormal noise.

Unit: mm

	Outer dimension	Classification No.		Bore dimension
T/M clutch No. 1 hub	69.78 - 69.84	2	Reverse gear	69.871 - 69.97
T/M clutch No. 2 hub	69.68 - 69.74	1	T/M hub No. 1 sleeve	69.971 - 69.87
Synchronizer No. 1 hub	69.58 - 69.64	3	T/M hub No. 2 sleeve	69.67 - 69.77

WFE90-MT122

8. With the sleeves assembled to the hubs, measure the tilt width at the section (A) of the sleeves.
Specified Value: Not to exceed 0.5 mm

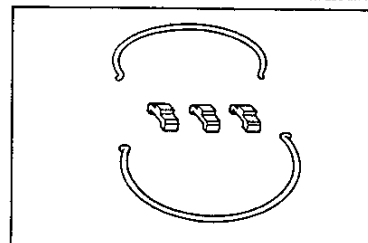


NOTE:

- If the tilt width of the sleeves exceeds the above specified value, be certain to replace those parts as a set.

9. Check the synchromesh shifting key and synchromesh shifting key spring for evidence of wear or damage.

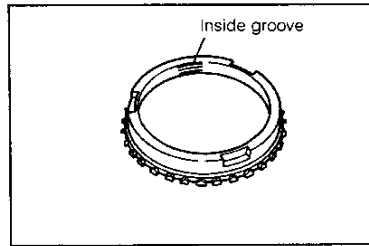
WFE90-MT121



WFE90-MT122

MANUAL TRANSMISSION

10. Check the inside groove of the synchronizer ring for wear or damage.

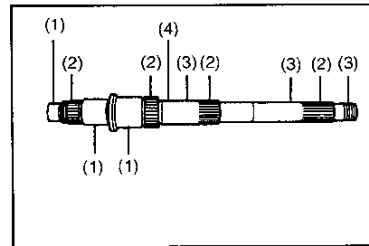


WFE90-MT123

OUTPUT SHAFT

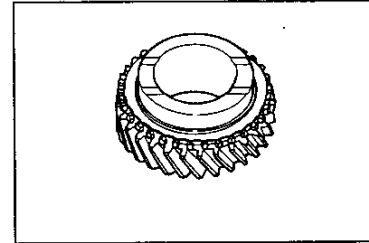
1. Check the output shaft for the following items.
 - (1) Needle roller bearing race section for wear or damage
 - (2) Spline section for damage
 - (3) Fitting section of bearing inner race for wear
 - (4) Measure the runout of the output shaft, using a dial gauge and V-block.

Allowable Runout Limit: 0.05 mm



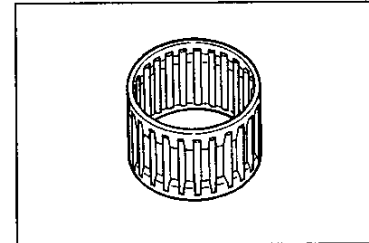
WFE90-MT124

2. Check the gear section of each gear for damage or abnormal wear.



WFE90-MT125

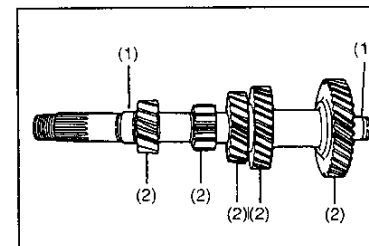
3. Check each needle roller bearing for damage.



WFE90-MT126

COUNTER GEAR- & REVERSE IDLER GEAR-RELATED PARTS

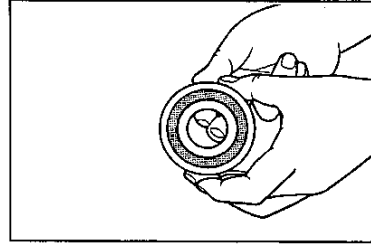
1. Check the transmission countershaft for the following items.
 - (1) Bearing fitting section for wear or damage
 - (2) Gear engaging section for damage or abnormal wear



WFE90-MT127

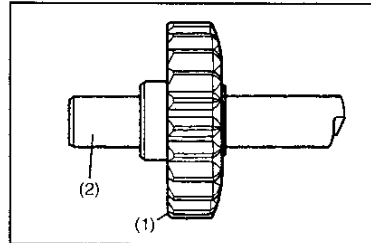
MANUAL TRANSMISSION

2. Rotate the bearing inner race by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any sticking.



WFE90-MT128

3. Check the reverse idler gear and reverse idler gear shaft for the following items.
 - (1) Reverse gear engaging section for damage or abnormal wear
 - (2) Reverse gear sliding section for damage or wear



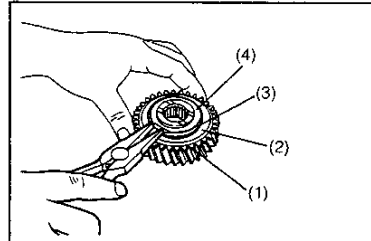
WFE90-MT129

ASSEMBLY (TRANSFER ADAPTER)

1. Install the following parts to the transfer low speed input gear in this sequence.
 - (1) Sub gear No. 1
 - (2) Plate washer
 - (3) Conical spring washer
 - (4) Snap ring

NOTE:

- Never reuse the removed snap ring.
- Install the conical spring washer with its expanded side facing toward the sub gear No. 1.



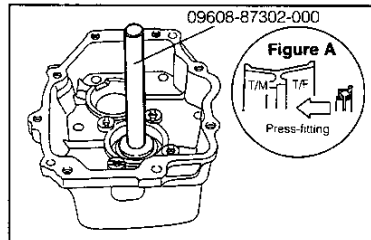
WFE90-MT130

2. Press a new oil seal from the bearing side of the transmission output shaft, using the following SST.

SST: 09608-87302-000

NOTE:

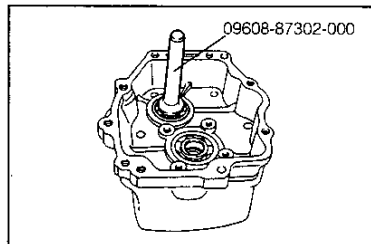
- Be sure to install the oil seal in the correct direction, as indicated in the right figure A.
- Make sure that the oil seal exhibits no tilt and the garter spring of the oil seal is not disengaged.
- Apply gear oil to the oil seal lip section, prior to press.



WFE90-MT131

3. Press the bearing of the transfer counter gear of the transfer adapter, using the following SST.

SST: 09608-87302-000



WFE90-MT132

MANUAL TRANSMISSION

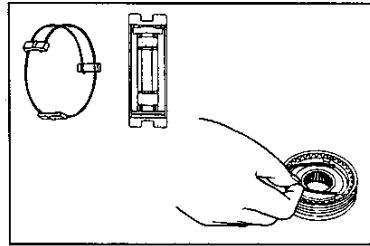
ASSEMBLY OF CLUTCH HUB

1. Assemble the selected transmission clutch hub to the following parts, using the synchromesh shifting key and synchromesh shifting key spring.

- (1) Reverse gear
- (2) Transmission hub sleeve (3rd ↔ 4th)
- (3) Transmission hub sleeve (5th)

NOTE:

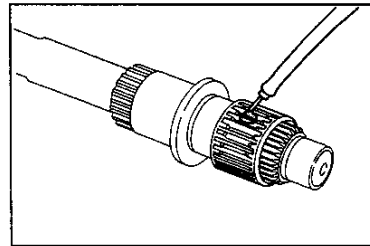
- As for the synchromesh shifting key spring, the bent sections at the front and rear should not come at the same direction, as shown in the right figure.



WFE90-MT133

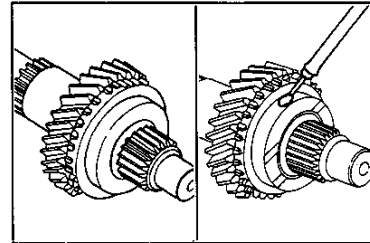
TRANSMISSION OUTPUT SHAFT ASSEMBLY

1. Apply the gear oil to the needle roller bearing and then, install to the output shaft.



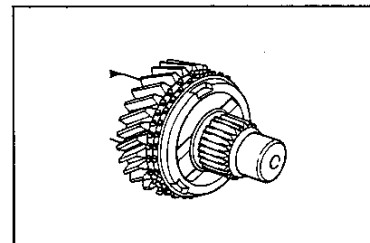
WFE90-MT134

2. Install the 3rd gear to the output shaft.
3. Apply the gear oil to the tapered section of the 3rd gear.



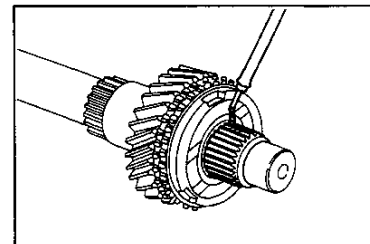
WFE90-MT135

4. Install the synchronizer ring No. 3.



WFE90-MT136

5. Apply the gear oil to the sprine section of the output shaft.



WFE90-MT137

MANUAL TRANSMISSION

6. Attach the new snap ring. Ensure that the clearance (A) in the right figure conforms to the specification. If it does not conform to the specification, select a suitable snap ring.

NOTE:

- Never reuse the removed snap ring.

Specification:

Not to exceed 0.1 mm

Snap Ring Availability

Unit: mm

Snap ring thickness:	2.0
	2.1
	2.2

7. Install the transmission clutch hub No. 2 with installed the two pieces of the synchromesh shifting key spring to the output shaft.

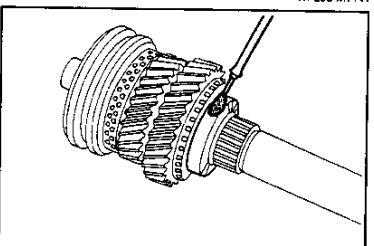
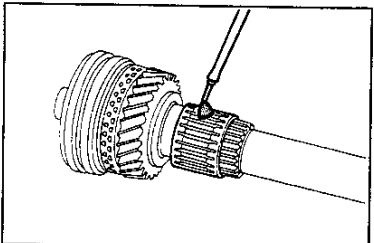
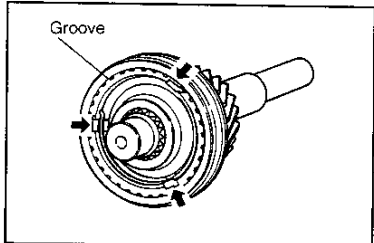
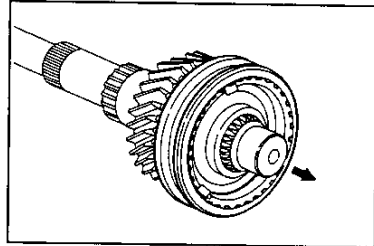
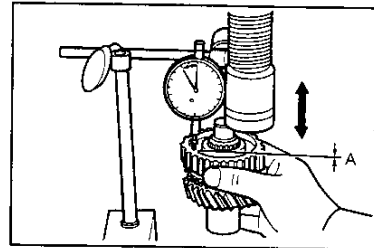
8. Install the synchromesh shifting key (three pieces) to the transmission clutch hub No. 2 and then, install the transmission clutch hub No. 2 and then, install the transmission hub sleeve No. 1.

NOTE:

- Ensure that the groove section of the transmission hub sleeve No. 1 faces toward the input shaft.

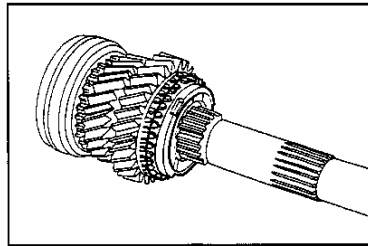
9. Apply the gear oil to the needle roller bearing and then, install to the output shaft.

10. Apply the gear oil to the tapered section of the 2nd gear and then, install to the output shaft.

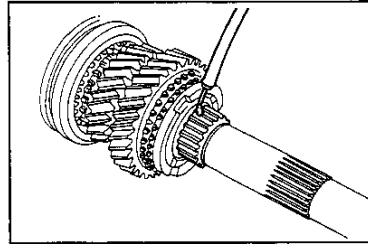


MANUAL TRANSMISSION

11. Install the synchronizer ring No. 3.



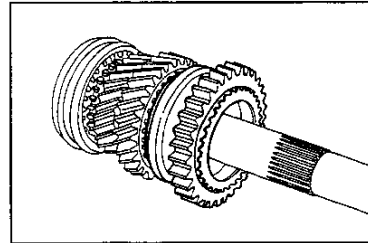
12. Apply the gear oil to the spline section of the output shaft.



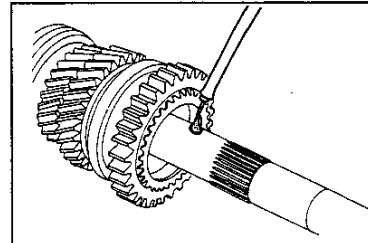
13. Install the reverse gear to the output shaft in a set.
(1) Synchromesh shifting key (Three pieces)
(2) Synchromesh shifting key spring (Two pieces)
(3) Transmission clutch hub sleeve No. 1

NOTE:

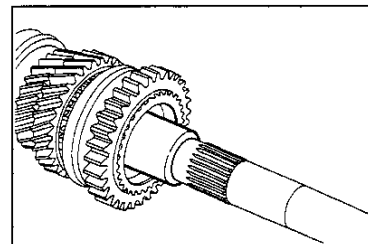
- Make sure that the sleeve section of the reverse gear faces toward the input shaft.



14. Apply the gear oil to the outer periphery of the output shaft.

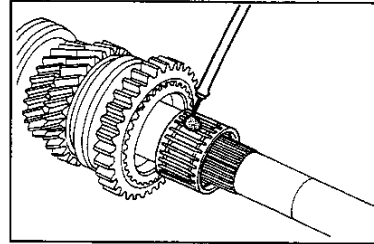


15. Install the 1st gear inner race to the output shaft.



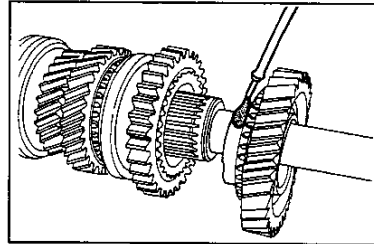
MANUAL TRANSMISSION

16. Apply the gear oil to the needle roller bearing and then, install to the outer periphery of the 1st gear inner race.



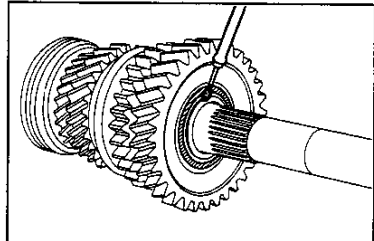
WFE90-MT148

17. Apply the gear oil to the tapered section of the 1st gear and then, install to the output shaft.



WFE90-MT149

18. Apply the gear oil to the end section of the 1st gear as shown in the right figure illustration and then, install the 1st gear thrust washer.



WFE90-MT150

TRANSMISSION ASSEMBLY

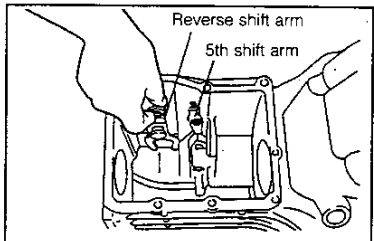
NOTE:

- Prior to assembling the transmission case, clean the transmission case by removing any dirt, gasket materials or the like.

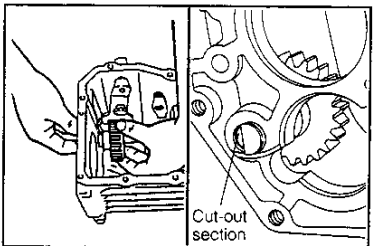
1. Install the reverse shift arm and 5th shift arm.
2. Install the reverse idler gear shaft and reverse idler gear.

NOTE:

- Be sure to install the reverse idler gear shaft in such a way that the cut-out section of the shaft faces toward the opposite side of the countershaft.
- If this operation should fail to be observed correctly, there may be a case where the transfer adaptor can not be installed.
- Before remounting the reverse idler gear, make sure that the gear chambering section faces toward the front side. If the reverse idler gear is remounted with the gear chambering section facing toward the rear, it may become difficult to put the gear in reverse or noise may result during shifting to reverse.



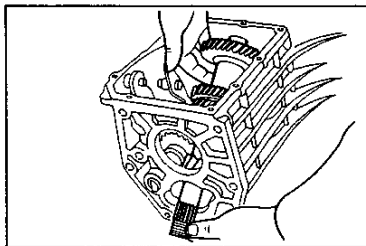
WFE90-MT151



WFE90-MT152

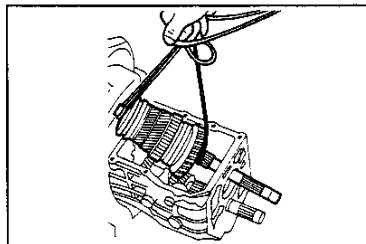
MANUAL TRANSMISSION

3. Insert the transmission countershaft into the transmission case.



WFES0-MT153

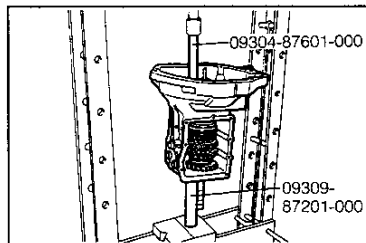
4. Place the output shaft in the transmission case.



WFES0-MT154

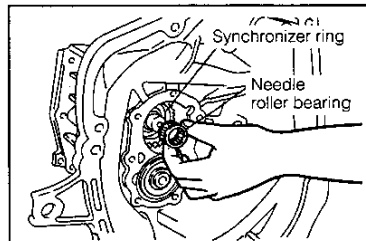
5. Press the bearings provided at the front and rear of the transmission countershaft, using the following SSTs at the same time.

SSTs: 09304-87601-000
09309-87201-000



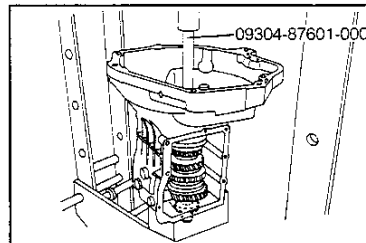
WFES0-MT155

6. Apply the gear oil to the needle roller bearing and then, install to the output shaft.
7. Install the synchronizer ring No. 3.



WFES0-MT156

8. Press the input shaft bearing into position, using the following SST at the same time.
SST: 09304-87601-000



WFES0-MT157

NOTE:

- Prior to install the above bearing, remove the stop ring.

9. Install new snap ring to the countershaft, using the following SST:

SST: 09306-87601-000

NOTE:

- Make sure that the snap ring should be installed to the groove section of the countershaft securely.

10. Install the stop ring to the countershaft front bearing.

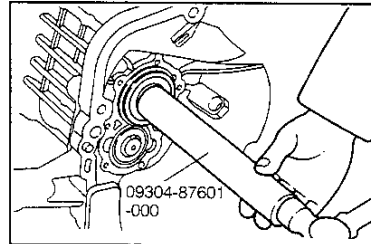
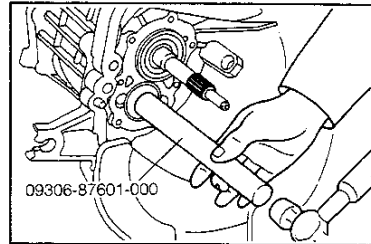
NOTE:

- Push out the bearing by tapping the countershaft at the output shaft side, using a plastic hammer.

11. Install the new snap ring to the input shaft, using the following SST:

SST: 09304-87601-000

12. Install the stop ring to the input shaft bearing.

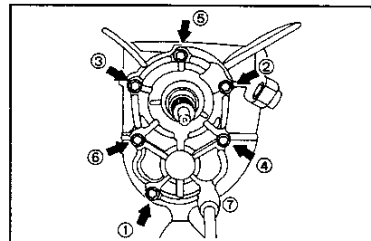


13. With a new gasket used, install the front bearing retainer.

NOTE:

- (1) Apply gear oil to the oil seal lip section.
 - (2) Apply molybdenum disulphide lithium base grease to the clutch hub sliding section of the front bearing retainer.
- Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

- (3) Be sure to tighten the bolts alternately and diagonally. (Right figure illustration indicates a typical example of the tightening sequence.)

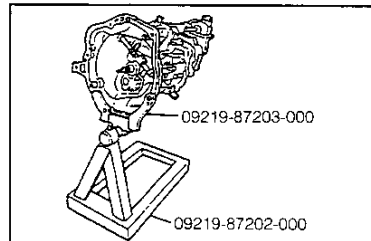


14. Install the clutch related parts (Refer CL-section).

15. Install the transmission case on the overhaul stand.

NOTE:

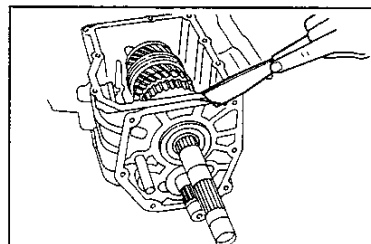
- After the transmission case has been remounted on the overhauling stand, cover the transmission case temporarily with a cloth or any other suitable materials to prevent foreign matter, dust, etc. from entering the transmission case.



16. Remove any remaining gasket material from the transmission, using a gasket scraper.

NOTE:

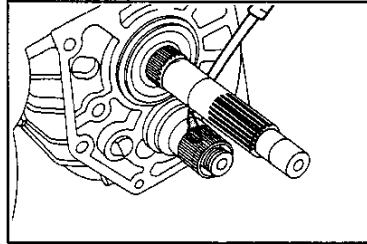
- Be very careful not to scratch the attaching surface.



MANUAL TRANSMISSION

17. Apply the gear oil to the following parts and then, install then in this sequence to the countershaft.

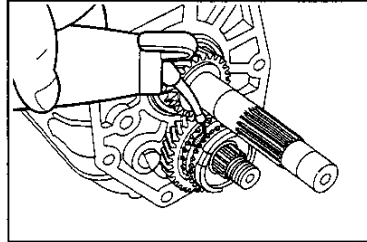
- (1) 5th gear thrust washer
- (2) 5th gear bearing inner race
- (3) Needle roller bearing



WFE90-MT163

18. Apply the gear oil to the following parts in this sequence.

- (1) 5th gear
- (2) Countershaft 5th gear (Tapered section)
- (3) Synchronizer ring.

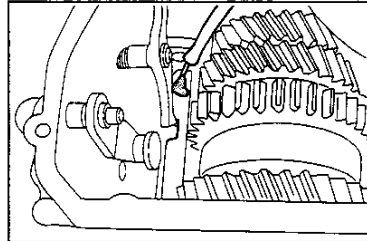


WFE90-MT164

19. Apply the gear oil to the gear shifting lever shaft and then, insert to the transmission case.

NOTE:

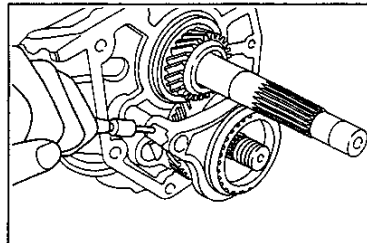
- Make sure that cut out section of the gear shifting lever faces toward the outside of transmission case.



WFE90-MT165

20. Install the following parts to the counter shaft in a set (use new slotted pin securely).

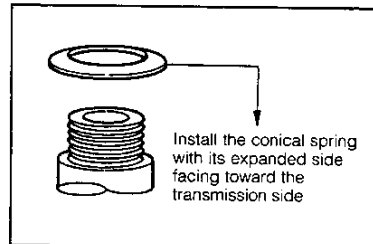
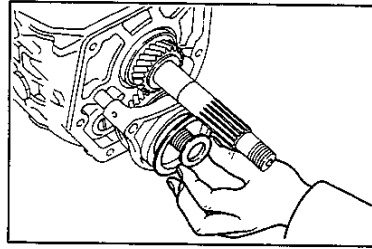
- (1) Transmission hub sleeve No. 2
- (2) Synchronizer hub assy No. 1
- (3) Synchromesh shifting key spring (Three pieces)
- (4) Synchromesh shifting key (Two pieces)
- (5) Synchronizer ring



WFE90-MT166

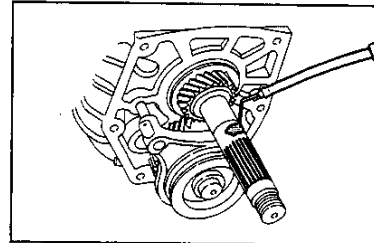
MANUAL TRANSMISSION

21. Install the following parts in this sequence.
 (1) Shifting key retainer
 (2) Conical washer spring



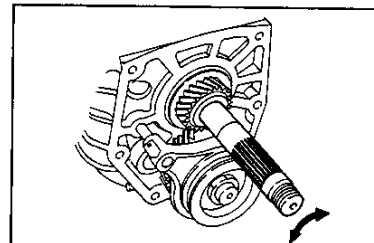
WFE90-MT167

22. Apply the gear oil onto the outer periphery of the output shaft.



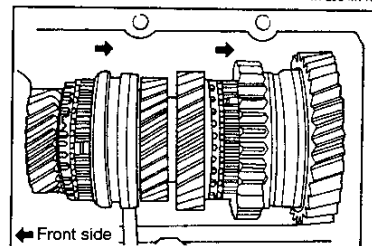
WFE90-MT168

23. Perform checks for smooth gear shifting by manual operation of the transmission, using the following procedure:
 (1) Fully hand-tighten the lock nut on the fifth gear of the countershaft.
 (2) Engage each gear in order of the manual transmission shift position.
 (3) Visually check that both the input shaft and the output shaft rotate clockwise during engagement of each gear (for the reverse gear, however, the output shaft rotates counterclockwise).



WFE90-MT169

24. Interlock the first and third gears.



WFE90-MT170

MANUAL TRANSMISSION

25. Tighten the countershaft 5th gear with the lock nut. Stake the lock nut with a chisel or the like.

Tightening Torque: 137.0 - 196.0 N·m
(14.0 - 20.0 kgf·m)

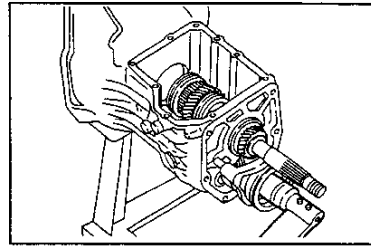
NOTE:

- Measure the following sections, prior to stake the lock nut.

Specified Value:

Unit: mm

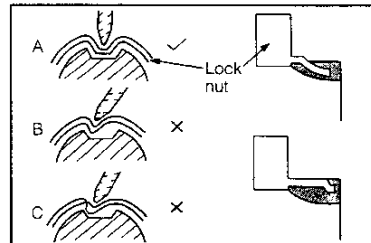
	1st	2nd	3rd	4th	5th
Backlash	0.05 - 0.18	0.05 - 0.16	0.05 - 0.14	0.05 - 0.13	0.05 - 0.13
Thrust clearance	0.17 - 0.30	0.10 - 0.37	0.10 - 0.33		0.11 - 0.30



WFES90-MT171

NOTE:

- When staking the lock nut, point a suitable staking tool toward the transmission counter shaft axis center and stake to lock nut securely as shown in the right figure A.
- Poor staking may cause abnormal noise as shown in the right figure illustration B and C.



WFES90-MT172

26. Install the output gear spacer No. 1 and No. 2 to the output shaft.
27. Apply gear oil to the outer periphery of the output gear spacer No. 2.
28. Apply the following bond to the transfer adapter attaching surface of the transmission case.

Bond: Three bond 1216 (Three bond made)

29. Apply the following bond to the threaded section of the bolts. Install the transfer adaptor and bearing.

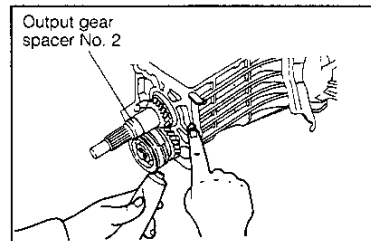
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf·m)

Bond: Three bond 1324 (Three bond made)

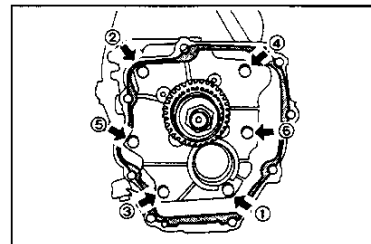
NOTE:

- If the transmission adaptor can not be installed properly (i.e. a gap occurs between the transmission case and the transmission adaptor), probably it is caused by the reverse idle gear shaft that has not been installed correctly.

(As for the installing procedure of the reverse idle gear shaft, see page MT-41.)



WFES90-MT173



WFES90-MT174

MANUAL TRANSMISSION

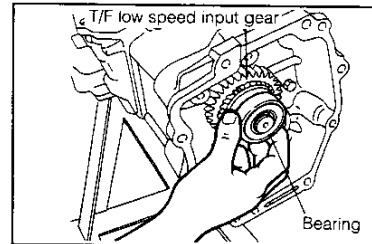
NOTE:

- Be sure to tighten the bolts alternately and diagonally (The right figure illustration indicates a the typical example of the tightening sequence).
- Apply the gear oil to the lip section of the oil seal so that the lip may be avoided from the turned over.

WFE90-MT175

30. Install the following parts in this sequence.

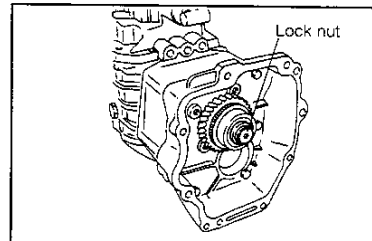
- (1) Transfer low speed input gear
- (2) Bearing



WFE90-MT176

31. Tighten the transfer low speed input gear by means of the lock nut. Stake the lock nut, using a chisel as below illustration securely.

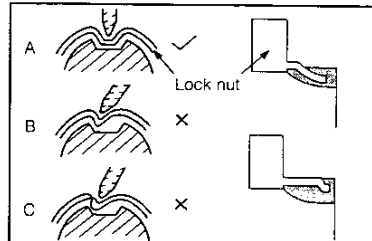
Tightening Torque: 177.0 - 216.0 N·m
(18.0 - 22.0 kgf·m)



WFE90-MT177

NOTE:

- When staking the lock nut, point a suitable staking tool toward the transmission output rear shaft axis center and stake to lock nut securely as shown in the right figure A.
- Poor staking may cause abnormal noise as shown in the right figure illustration B and C.



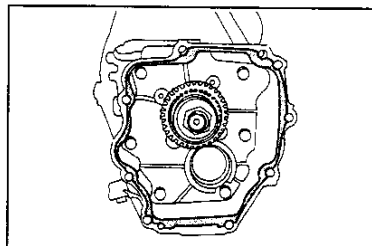
WFE90-MT178

32. Apply the following bond to the mating surface between the transfer adapter and the transfer front case subassembly:

Bond: THREE BOND 1216 (made by THREE BOND)

NOTE:

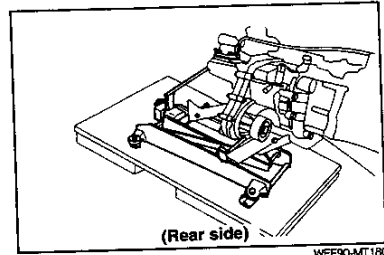
- Apply the bond to the inside of the bolt hole.
- Overlap the bond joints.



WFE90-MT179

ANUAL TRANSMISSION

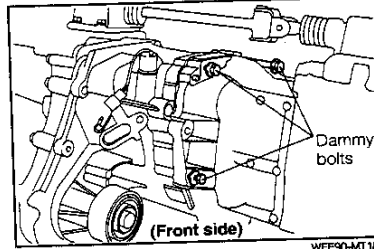
3. Support the transfer front case subassembly and transfer rear case subassembly with a transmission jack.



4. Press and hold down the transfer front case subassembly against the transfer adapter, and temporarily connect them using three to four dummy bolts.

CAUTION:

- The case of the transfer front case subassembly and that of the transfer adapter must be matched by slowly rotating the rear output shaft by hand until both sides have come into firm contact. Failure to observe the caution may bend the subgears, thus causing gear noise from the transmission.

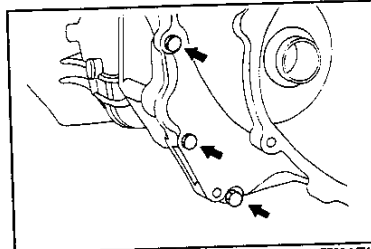
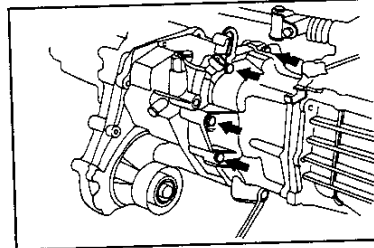


35. Tighten the transfer front case subassembly with the eight bolts.

Tightening Torque: 29.4 - 44.1 N-m (3.0 - 4.5 kgf-m)

NOTE:

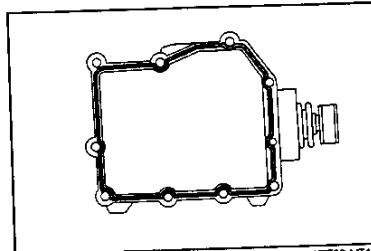
- Apply the THREE BOND 1324 (made by THREE BOND) to the threaded sections of the bolts before tightening the transfer front case subassembly.



36. Apply Three bond 1104 (Three bond made) to the transmission case cover attaching surface of the transmission case. Proceed to install the transmission case cover subassembly.

NOTE:

- Apply the bond to the inside of each bolt as shown in the diagram at right.

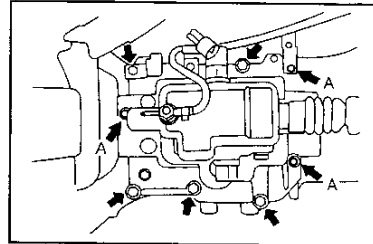


MANUAL TRANSMISSION

37. Install the transmission case cover subassembly, and tighten the bolts.

NOTE:

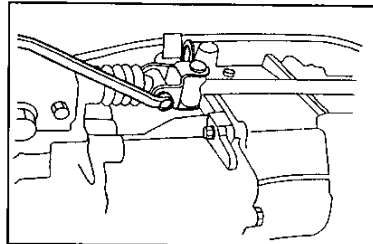
- Apply the **THREE BOND 1324** (made by **THREE BOND**) to the threaded section of each bolt.
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)
A-section 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)



WFES0-MT184

38. Install the shift lever retainer subassembly and the control shaft with a hexagon bolt (Use new hexagon bolt).

Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

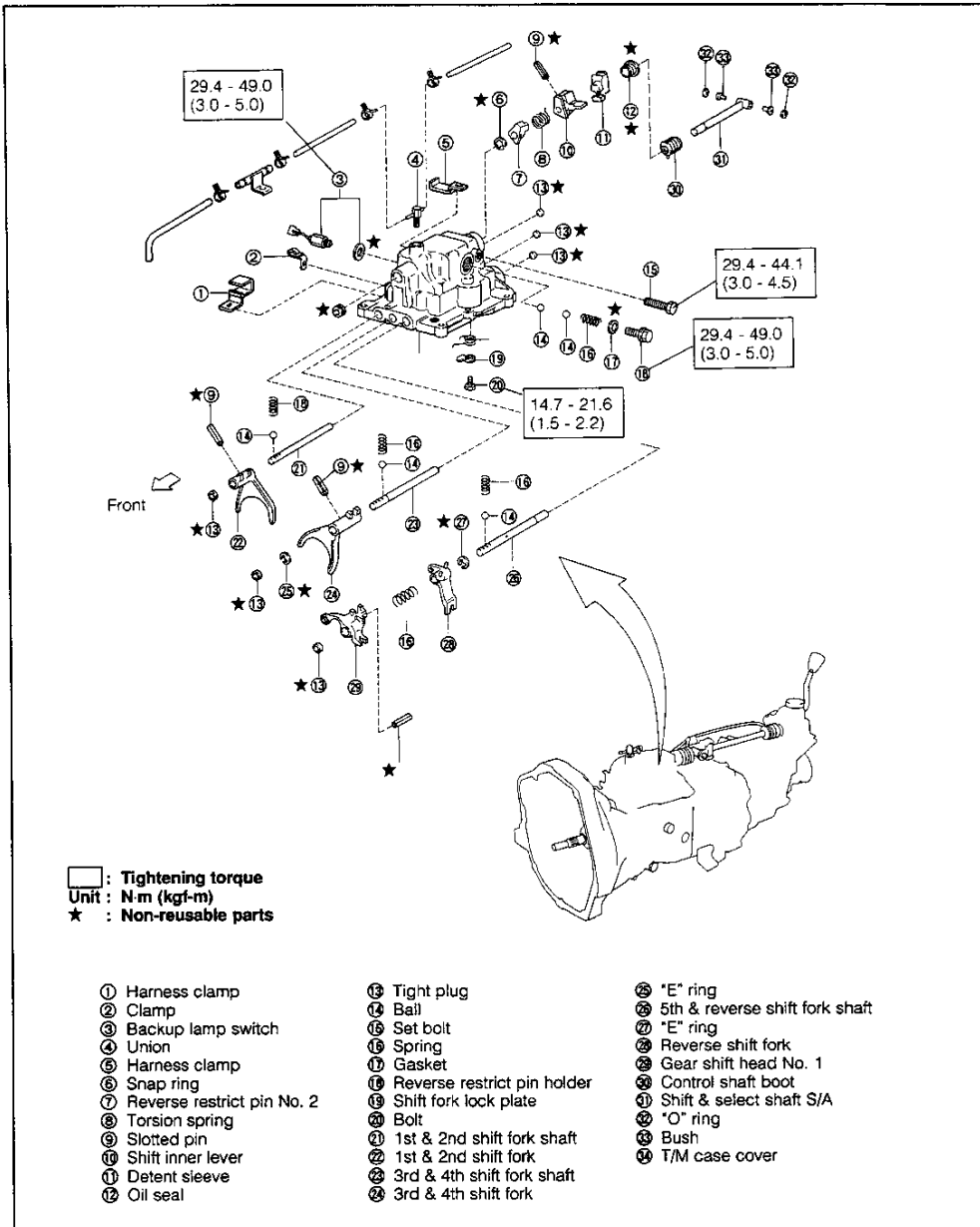


WFES0-MT185

39. Install the transmission assy with transfer to the vehicle (As for the installation procedures, see page MT-101 to MT-105).

MANUAL TRANSMISSION

TRANSMISSION CASE COVER (PART AND FULL TIME) COMPONENTS

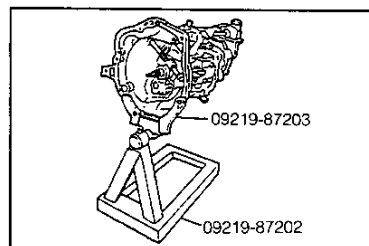


WPE90-MT196

MANUAL TRANSMISSION

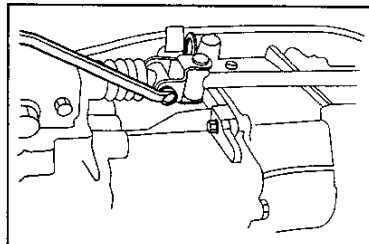
REMOVAL

1. Remove the transmission assembly with transfer from the vehicle. (See page MT-12 to MT-16.)
2. Install the transmission assembly with transfer on the over-haul stand, using the following SSTs.
SST: 09219-87202-000
SST: 09219-87203-000



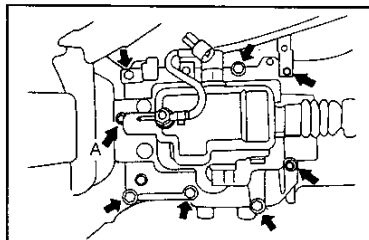
WFE90-MT187

3. Remove the shift lever retainer subassembly and the control shaft by removing the hexagon bolt.



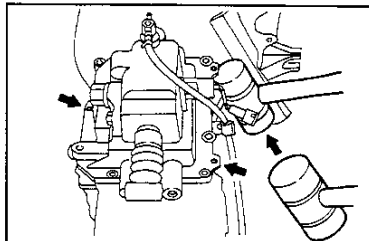
WFE90-MT188

4. Remove the transmission case cover subassembly by removing the seven bolts and a reamer bolt.



WFE90-MT189

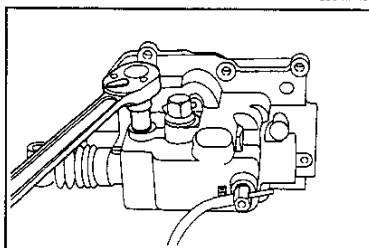
5. Remove the transmission case cover subassembly by lightly tapping each of the ribs evenly toward the upper side of the transmission case.



WFE90-MT190

DISASSEMBLY

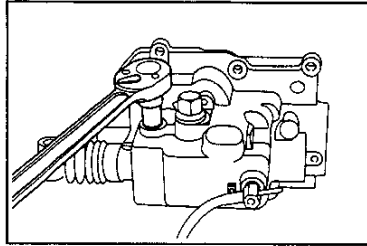
1. Set the transmission case cover subassembly in a vice.



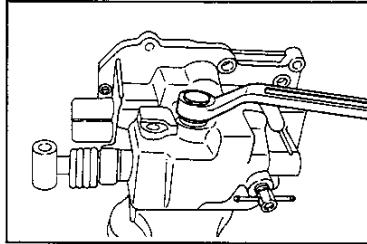
WFE90-MT191

MANUAL TRANSMISSION

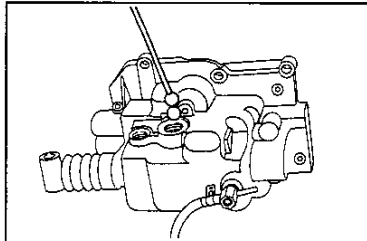
2. Remove the set bolt and the spring lock washer.



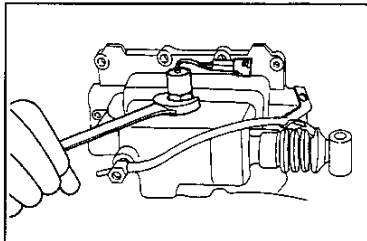
3. Remove the reverse restrict pin holder, gasket and compression spring.



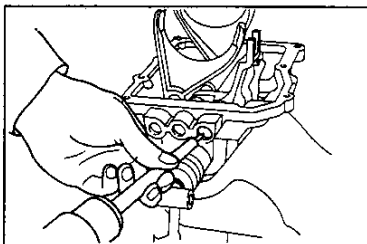
4. Remove the two balls from the transmission case subassembly using a standard tool or magnet hand.



5. Turn the transmission case cover subassembly through 180 degrees.
6. Remove the backup lamp switch assembly and the gasket.
NOTE:
• Never reuse the removed gasket.



7. Remove the tight plugs in this sequence.
(1) Set a sharp-edged rod to the end of each tight plug, and lightly tap the rod with a hammer.

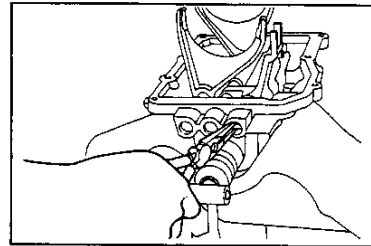


MANUAL TRANSMISSION

- (2) Rotate each tight plug through about 90 degrees, and pull them toward you with nose pliers or any other suitable tools.

NOTE:

- Never reuse the removed tight plugs.



WFE90-MT197

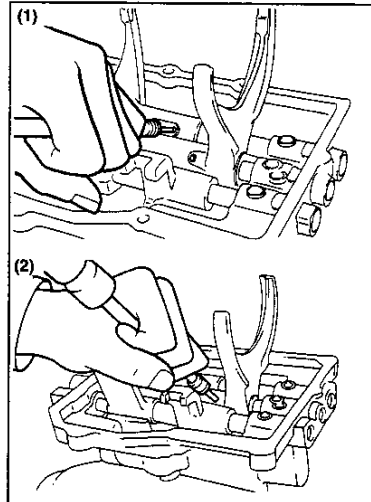
8. Drive off the slotted pin of the following parts, using the pin punch.

(1) 1st & 2nd shift fork

(2) 3rd & 4th shift fork

NOTE:

- Never reuse the removed slotted pin.

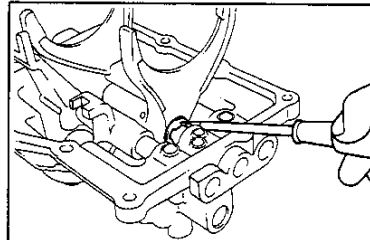


WFE90-MT198

9. Remove the "E" ring of the 3rd & 4th shift fork, using the standard tool of flat driver.

NOTE:

- Never reuse the removed "E"-ring.



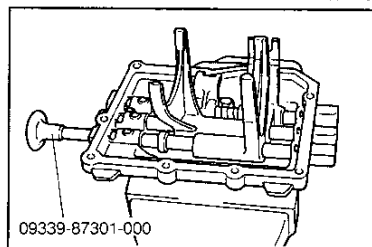
WFE90-MT199

10. Remove the 1st & 2nd shift fork shaft by inserting the following SST into the 1st & 2nd shift fork shaft hole of the transmission case cover subassembly and pushing those SST to the front side.

SST: 09339-87301-000

NOTE:

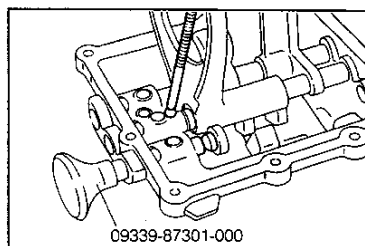
- (1) Remove the shaft on both 3rd & 4th shift fork shaft and the 5th & reverse shift fork shaft in the same manner.



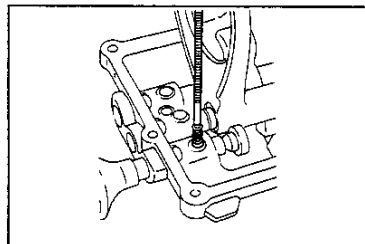
WFE90-MT200

MANUAL TRANSMISSION

- (2) Remove the 1st & 2nd shift fork.
- (3) Compress the ball and compression spring by inserting a small size SST to the shift fork shaft hole in the transmission case cover subassembly.
- (4) Remove the shift fork shaft.
- (5) Depress the small SST by inserting the large SST. remove the ball and compression spring, using the standard tool of magnet hand by rotating the SST either clockwise or counterclockwise.



WFE90-MT201



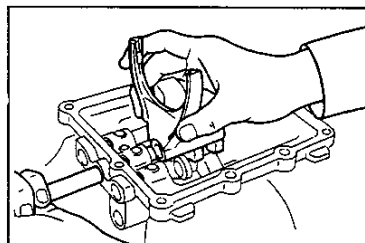
WFE90-MT202

11. Remove the 3rd & 4th shift fork shaft, using the following SST:

SST: 09339-87301-000

NOTE:

- Removal of shift fork shaft is same manner with the 1st & 2nd shift fork shaft.

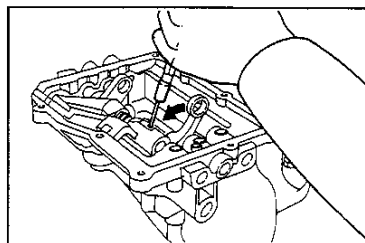


WFE90-MT203

12. Drive off the slotted pin using the pin punch, while the gear shift No. 1 head is being tilted.
13. Remove the gear shift No. 1 head with the slotted pin installed from the 5th & reverse shift fork shaft.

NOTE:

- Never reuse the removed slotted pin.

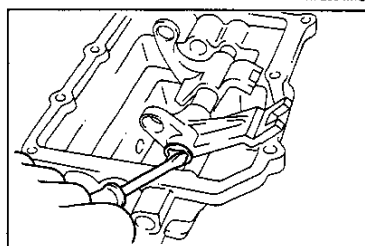


WFE90-MT204

14. Remove the E-ring of the 5th & reverse shift fork shaft, using the standard tool of minus driver.

NOTE:

- Never reuse the removed E-ring.



WFE90-MT205

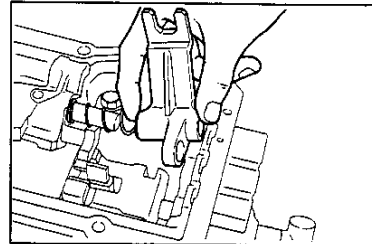
MANUAL TRANSMISSION

15. Remove the 5th & reverse shift fork shaft, using the following SST.

SST: 09339-87301-000

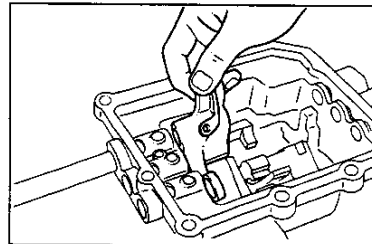
NOTE:

- Removal of shift fork shaft is same manner with the 1st & 2nd shift fork shaft.



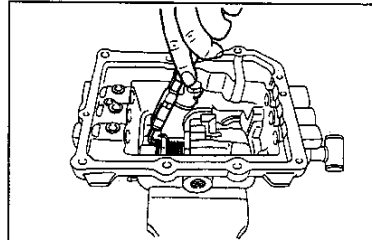
WFE90-MT206

16. Remove the gear shift No. 1 head and the compression spring, while pulling out the 5th & reverse shift fork shaft to ward you.
17. With the same manner to that of the above operation, remove the reverse shift fork.



WFE90-MT207

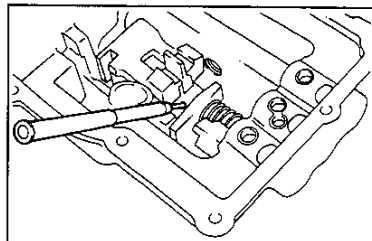
18. Detach the snap ring of the shift & select shaft No. 1 and slightly move to toward the and of transmission case cover subassembly.



WFE90-MT208

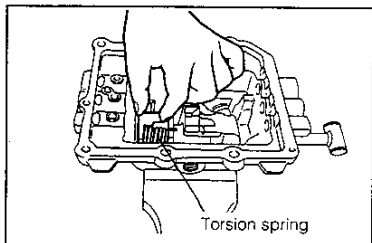
19. Drive off the slotted pin of the shift inner lever. When driving off the slotted pin, tilt the shift inner lever as large angle as possible, while enabling the knock pin to be used.

If the slotted pin is driven off vertically, the movement of the gear shift head NO.1 may be prevented due to contact of the slotted pin with the transmission case cover.



WFE90-MT209

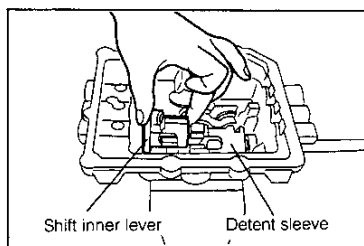
20. Remove the reverse restrict pin and torsion spring.



WFE90-MT210

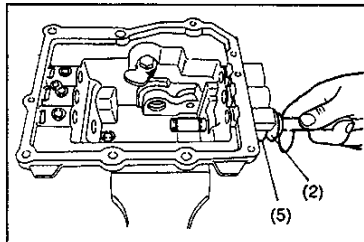
MANUAL TRANSMISSION

21. Remove the shift inner lever and detent sleeve.



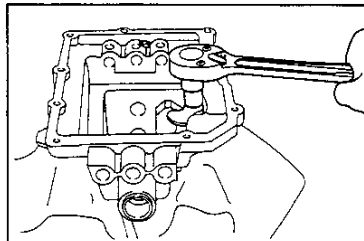
WFE90-MT211

22. Remove the shift & select shaft No. 1 with control shaft boot installed.



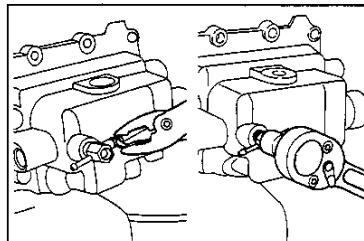
WFE90-MT212

23. Remove the shift fork lock plate and torsion spring by removing the hexagon bolt.



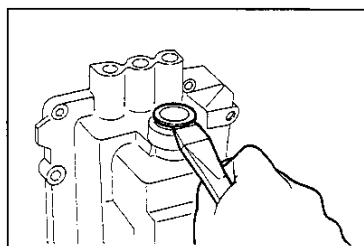
WFE90-MT213

24. Disconnect clamp of the breather hose.
25. Remove the union.



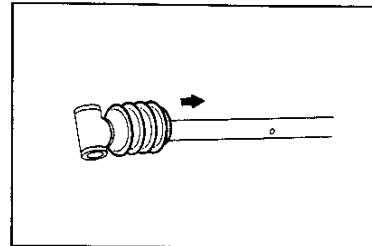
WFE90-MT214

26. Remove the oil seal, using the chisel or the like.
NOTE:
• Never reuse the removed oil seal.



WFE90-MT215

27. Remove the control shaft No. 2 boots from the shift & select shaft subassembly.



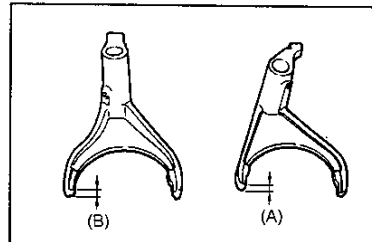
WFE90-MT216

INSPECTION

1. Measure the contact width of each shift fork with the hub sleeve, using vernier calipers.

Unit: mm

Item	Specified value	Allowable limit
Part name		
1st & 2nd shift fork Dimension (A) in right figure	6.80 - 7.00	6.3
3rd & 4th shift fork dimension (B) in right figure	6.80 - 7.00	

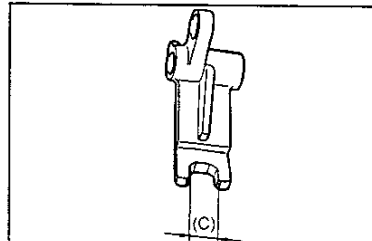


WFE90-MT217

2. Measure the contact width of the reverse shift fork with the reverse shift arm, using vernier calipers.

Unit: mm

Item	Specified value	Allowable limit
Part name		
Reverse shift fork Dimension (C) in right figure	15.000 - 15.043	15.1

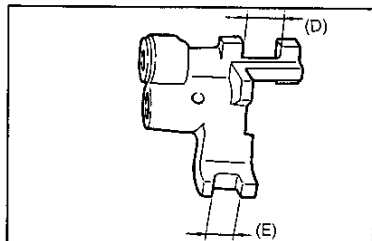


WFE90-MT218

3. Measure the contact width of the gear shift head No. 1 with 5th shift arm, using vernier calipers.

Unit: mm

Item	Specified value	Allowable limit
Part name		
Gear shift head No. 1 Dimension (D) in right figure	16.1 - 16.2	16.7
Gear shift head No. 1 Dimension (E) in right figure	12.1 - 12.2	12.7

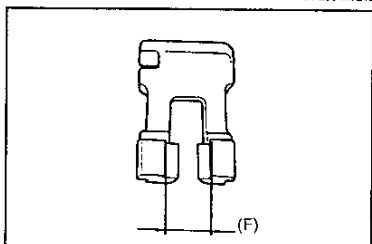


WFE90-MT219

4. Measure the dimension (F) of the detent sleeve shown in the right figure, using vernier calipers.

Unit: mm

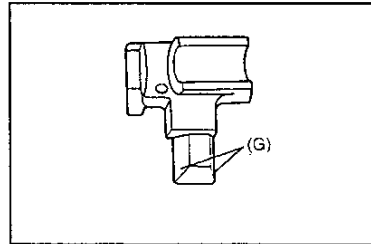
Item	Specified value	Allowable limit
Part name		
Detent sleeve Dimension (F) in right figure	18.8 - 19.2	19.5



WFE90-MT220

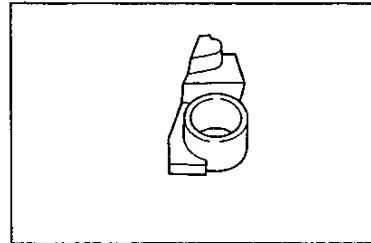
MANUAL TRANSMISSION

5. Visually inspect the shift inner lever (G) for wear or damage.



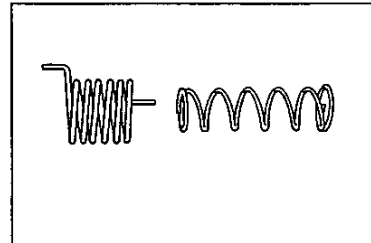
WFE90-MT221

6. Visually inspect the reverse restrict pin No. 2 for wear or damage.



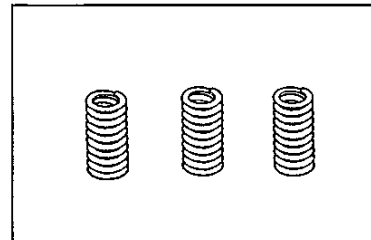
WFE90-MT222

7. Check the spring for damage.



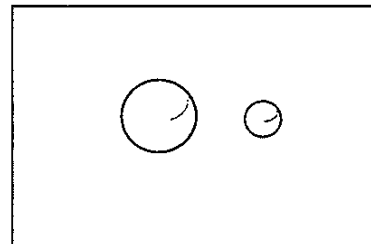
WFE90-MT223

8. Check the spring of the shift fork shaft for damage.



WFE90-MT224

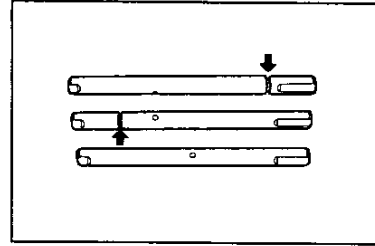
9. Check the balls of the reverse restrict pin holder and shift fork shaft for wear or damage.



WFE90-MT225

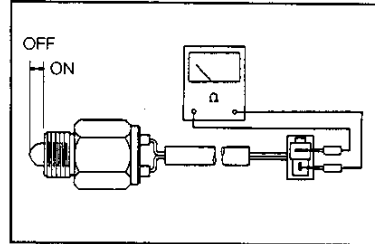
MANUAL TRANSMISSION

10. Visually inspect the outer periphery of the shift fork shaft for wear, or damage.



WFE90-MT226

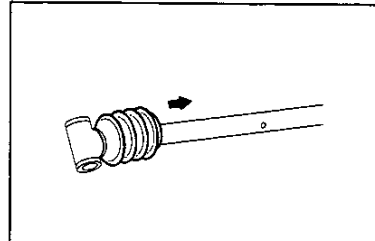
11. Turn ON and OFF the switch section of the backup lamp switch assembly. Ensure that continuity exists when the switch is turned ON. Also, ensure that no continuity exists when the switch is turned OFF.



WFE90-MT227

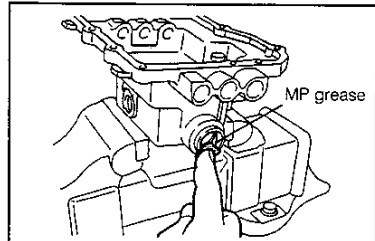
ASSEMBLY

1. Insert the control shaft No. 2 boots to the shift & select shaft subassembly.



WFE90-MT228

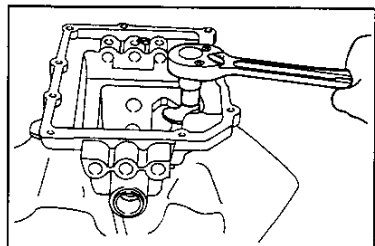
2. Apply Lithium base multi purpose grease to the lip section of the oil seal and then, drive the oil seal into the transmission case cover, using a hammer in combination with a wooden block interposed.



WFE90-MT229

3. Apply the Three bond 1324 to the threaded section of the hexagon bolt.
4. Install the torsion spring and shift fork lock plate and then, tighten the hexagon bolt.

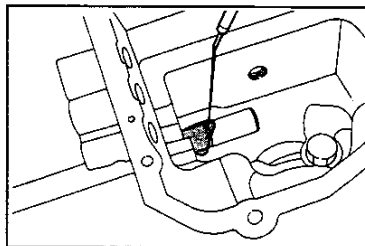
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf·m)



WFE90-MT230

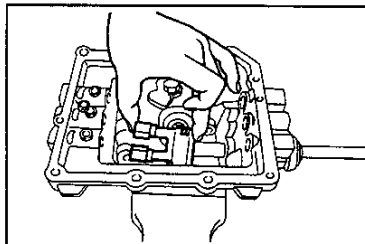
MANUAL TRANSMISSION

5. Apply the gear oil to the outer periphery of the shift & select shaft No. 1.



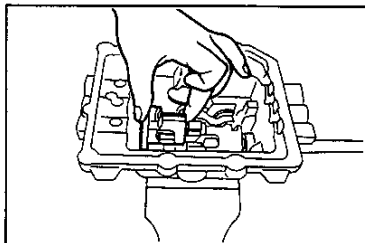
WFE90-MT231

6. Install the detent sleeve to the shift & select shaft No. 1.



WFE90-MT232

7. Install the shift inner lever to the shift & select shaft No. 1.

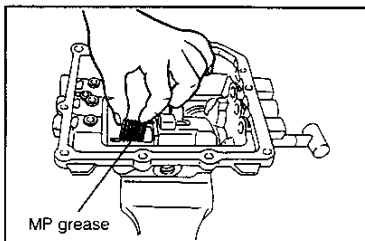


WFE90-MT233

8. Install the torsion spring to the shift & select shaft No. 1.

NOTE:

- Apply Lithium base multi purpose grease to the torsion spring installation section of the shift & select shaft No. 1.

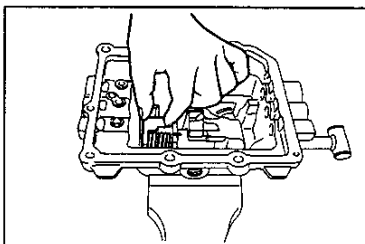


WFE90-MT234

9. Install the reverse restrict pin to the shift & select shaft No. 1. Temporarily attach the new snap ring.

NOTE:

- Never reuse the removed snap ring.



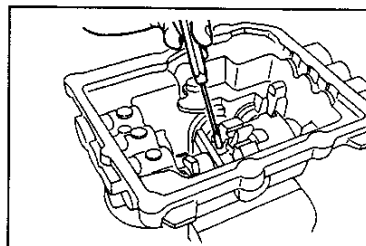
WFE90-MT235

MANUAL TRANSMISSION

10. Secure the shift inner lever by driving the new slotted pin into position.

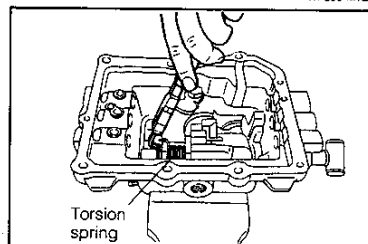
NOTE:

- Never reuse the removed slotted pin.



WFE90-MT236

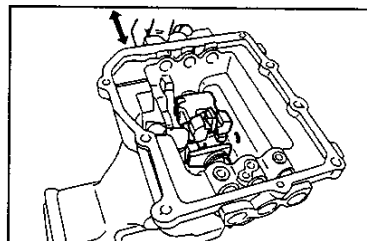
11. Attach the snap ring into the groove section of the shift & select shaft No. 1 securely, while the torsion spring is being compressed with your fingers.



WFE90-MT237

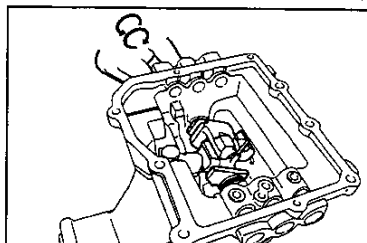
12. Inspection of operation

- (1) Move the shift & select shaft No. 1 in the shifting direction. Ensure that it operates smoothly.



WFE90-MT238

- (2) Move the shift & select shaft No. 1 in the selecting direction. Ensure that it operates smoothly.



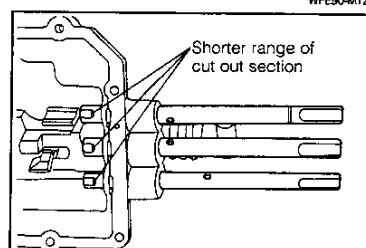
WFE90-MT239

13. Install the following shift fork shaft.

- (1) 1st & 2nd shift fork shaft
- (2) 3rd & 4th shift fork shaft
- (3) 5th & reverse shift fork shaft

NOTE:

- Make sure that the shorter range of cut out section faces toward the front side as shown in the right figure illustration.

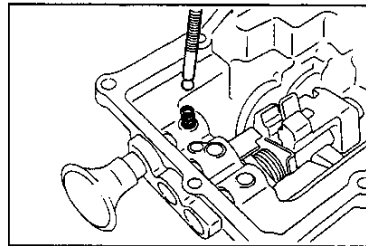


WFE90-MT240

MANUAL TRANSMISSION

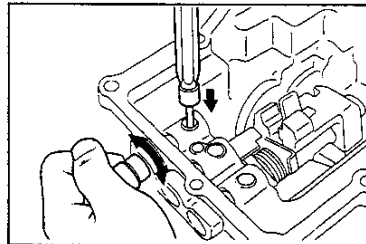
14.

- (1) Insert the large-sized SST into the shift fork shaft of the transmission case cover.
- (2) Install the compression spring and ball in this sequence.



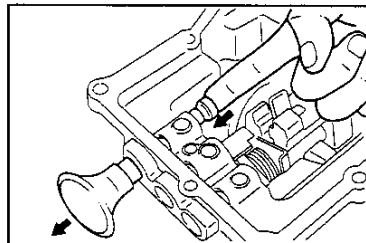
WFEB0-MT241

- (3) Turn the SST 90 degrees while pushing down the ball by means of a pin punch or the like.



WFEB0-MT242

- (4) Insert the small-sized SST into position from the transmission case cover.
- (5) Remove the large-sized SST by pushing the small-sized SST with your fingers.
- (6) Install the 5th & reverse shift fork shaft by pushing the small-sized SST.

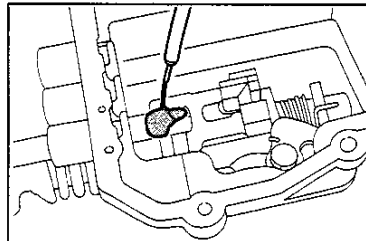


WFEB0-MT243

NOTE:

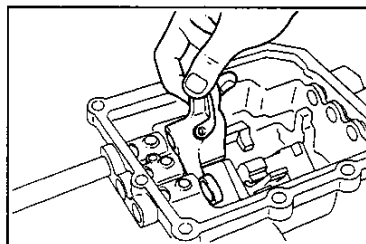
- At this stage, install the compression springs and balls for the 1st & 2nd and 3rd & 4th shift fork shafts in the transmission case cover subassembly, following the aforesaid procedure.

15. Apply the gear oil to the 5th & reverse shift fork shaft and then, insert them into the position.



WFEB0-MT244

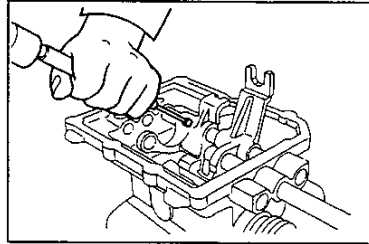
16. Install the reverse shift fork to the 5th & reverse shift fork shaft.
17. Install the gear shift No. 1 head in the 5th & reverse shift fork shaft.



WFEB0-MT245

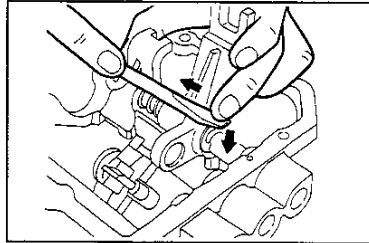
MANUAL TRANSMISSION

18. Drive the new slotted pin into the gear shift No. 1 head securely.



WFE90-MT246

19. Attach the new "E" ring, while the reverse shift fork is being compressed with your fingers.

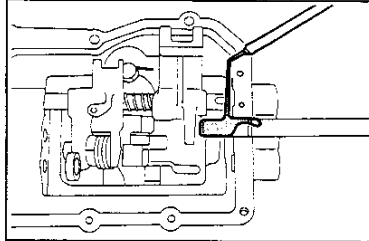


WFE90-MT247

20. Install the 3rd & 4th shift fork shaft to the transmission case cover subassembly.

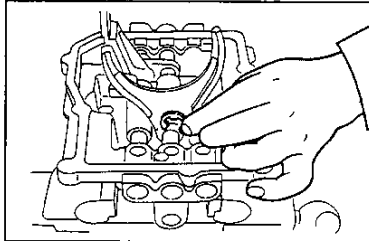
NOTE:

- Apply the gear oil to the outer periphery of the 3rd & 4th shift fork shaft, prior to install.



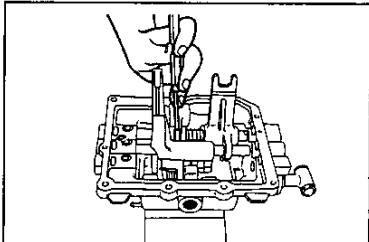
WFE90-MT248

21. Attach the new "E" ring to the 3rd & 4th shift fork.



WFE90-MT249

22. Secure the 3rd & 4th shift fork shaft and 3rd & 4th shift fork by driving the new slotted pins.



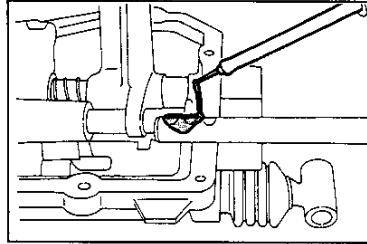
WFE90-MT250

MANUAL TRANSMISSION

23. Install the 1st & 2nd shift fork shaft to the transmission case cover subassembly.

NOTE:

- Apply the gear oil to the outer periphery of the 1st & 2nd shift fork shaft prior to install.

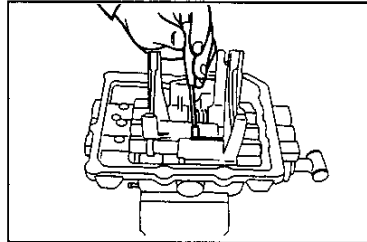


WFE90-MT251

24. Secure the 1st & 2nd shift fork shaft and 1st & 2nd shift fork by driving the new slotted pins.

NOTE:

- Never reuse the removed slotted pin.

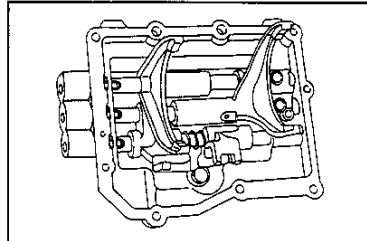


WFE90-MT252

25. Move the shift fork shafts to put the gear into the neutral position.

NOTE:

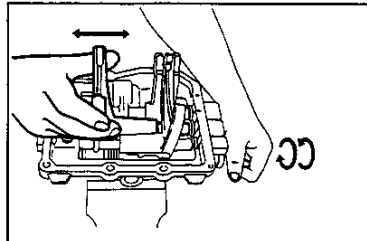
- Make sure that the long notch sections of the shift fork shafts are arranged uniformly.



WFE90-MT253

26. Inspection of operation

Select the shift & select shaft No. 1 to each control shaft. Move the shift & select shaft No. 1 in the shifting direction. Ensure that the shift & select shaft No. 1 operates smoothly without any binding.



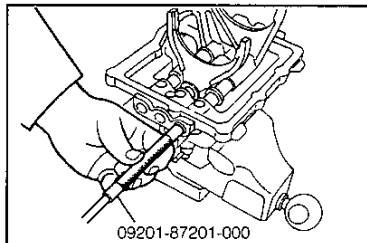
WFE90-MT254

27. Apply the Three bond 1104 (Three bond made) to the new tight plug. Press all tight plugs into position, using the following SST.

SST: 09201-87201-000

NOTE:

- Never reuse the removed tight plug.

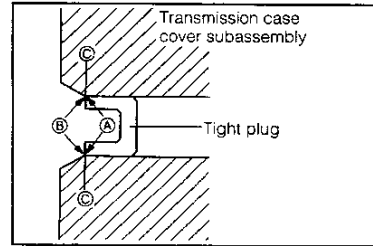


09201-87201-000

WFE90-MT255

MANUAL TRANSMISSION

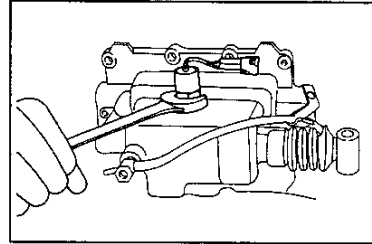
- Visually inspect that the both edge in the tight plugs (A) and chamber in the transmission case cover (B) should be well matched with the vertical line (C) as shown in the right figure illustration.



WFE90-MT256

- Turn the transmission case cover subassembly upside down, and then tighten the backup lamp switch assembly (use a new gasket).

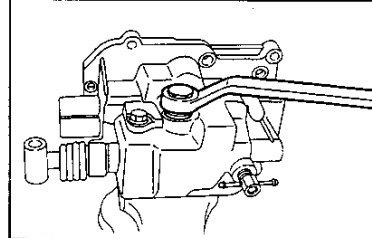
Tightening Torque: 29.4 - 49.0 N-m (3.0 - 5.0 kgf-m)



WFE90-MT257

- Tighten the reverse restrict pin with the two balls and compression spring (use new gasket).

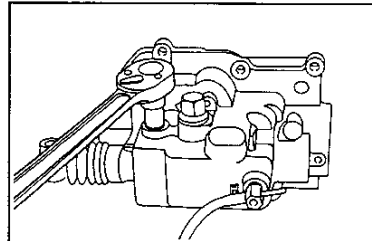
Tightening Torque: 29.4 - 49.0 N-m (3.0 - 5.0 kgf-m)



WFE90-MT258

- Tighten the set bolt with a spring washer.

Tightening Torque: 29.4 - 44.1 N-m (3.0 - 4.5 kgf-m)



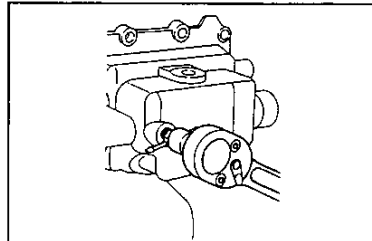
WFE90-MT259

- Apply the THREE BOND 1214 (made by THREE BOND) to the threaded sections of the union, and tighten the union.

Tightening Torque: 12.7 - 15.7 N-m (1.3 - 1.6 kgf-m)

NOTE:

- The unions must be parallel in their longitudinal directions.



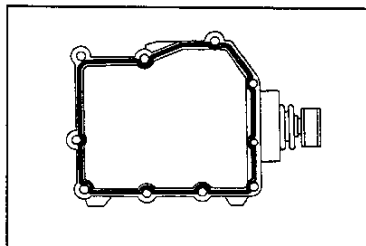
WFE90-MT260

MANUAL TRANSMISSION

32. Connect the breather hose to the union with a clamp.
33. Apply the Three bond 1216 (Three bond made) to the transmission case cover attaching surface of the transmission case.

NOTE:

- Apply the bond to the inside of the bolt hole, as shown in the right figure illustration.

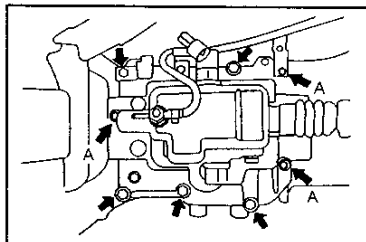


WFE90-MT261

34. Install the transmission case cover subassembly, and tighten the mounting bolts.

Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf·m)

A-section 6.9 - 9.8 N·m (0.7 - 1.0 kgf·m)

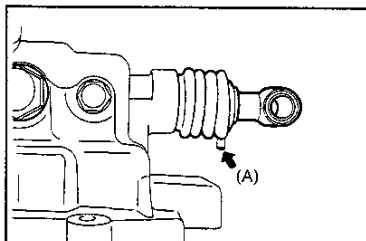


WFE90-MT262

35. Install fit the control shaft No. 2 boot to the oil seal groove section securely.

NOTE:

- Air breeding holl (A) in the control shaft No. 2 faces toward with the transmission A/y.



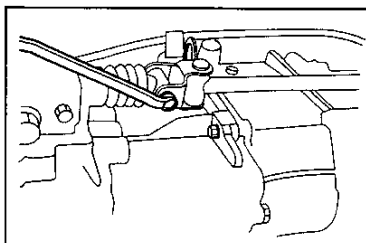
WFE90-MT263

36. Bolt down and tighten the shift lever retainer assembly and the control shaft.

Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf·m)

NOTE:

- Apply the THREE BOND 1324 (made by THREE BOND) to the threaded sections of the bolts.

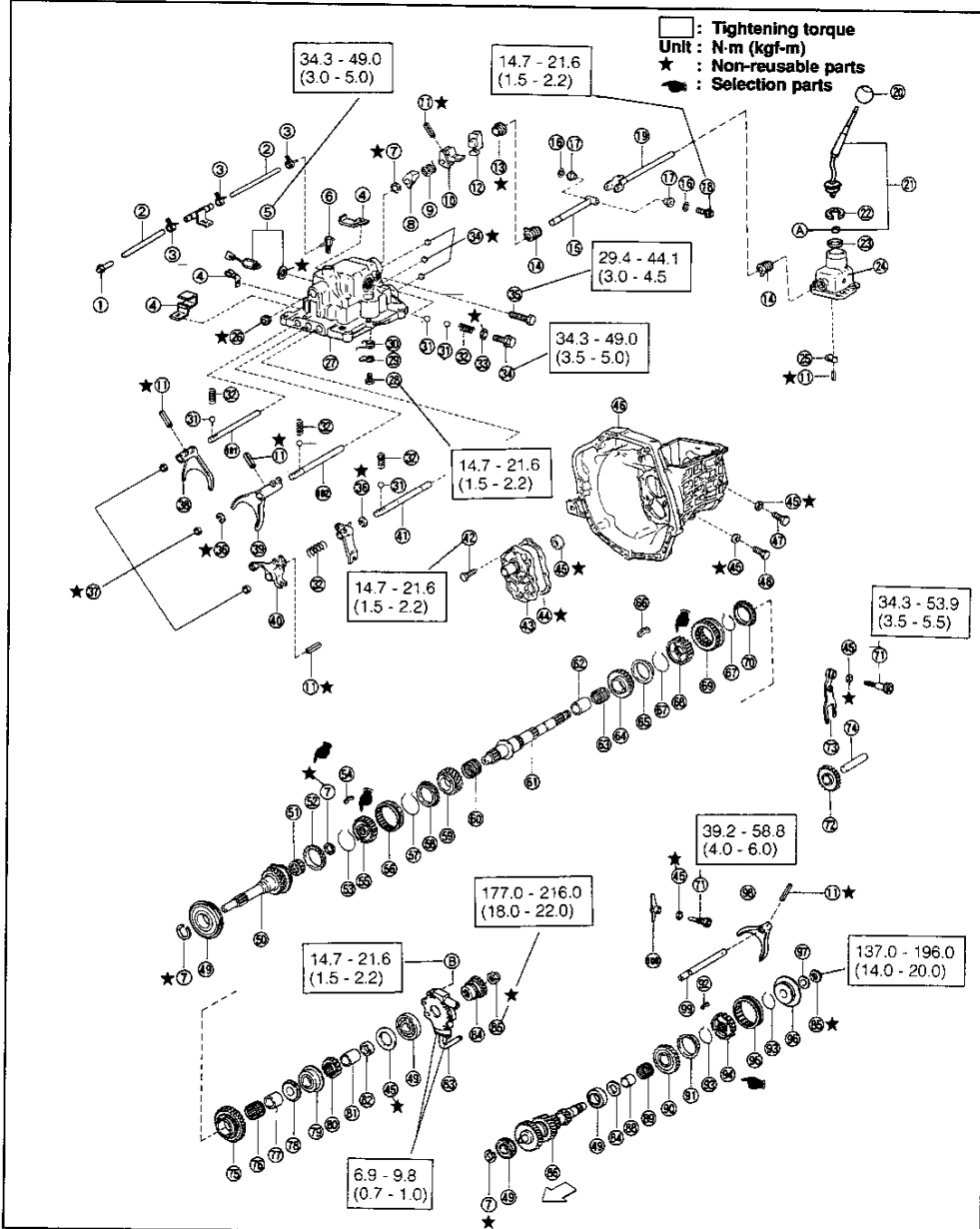


WFE90-MT264

37. Install the transmission assembly with transfer to the vehicle (As for the installation procedure, see page MT-101 to MT-105).

WFE90-MT265

TRANSMISSION (FULL TIME) COMPONENTS



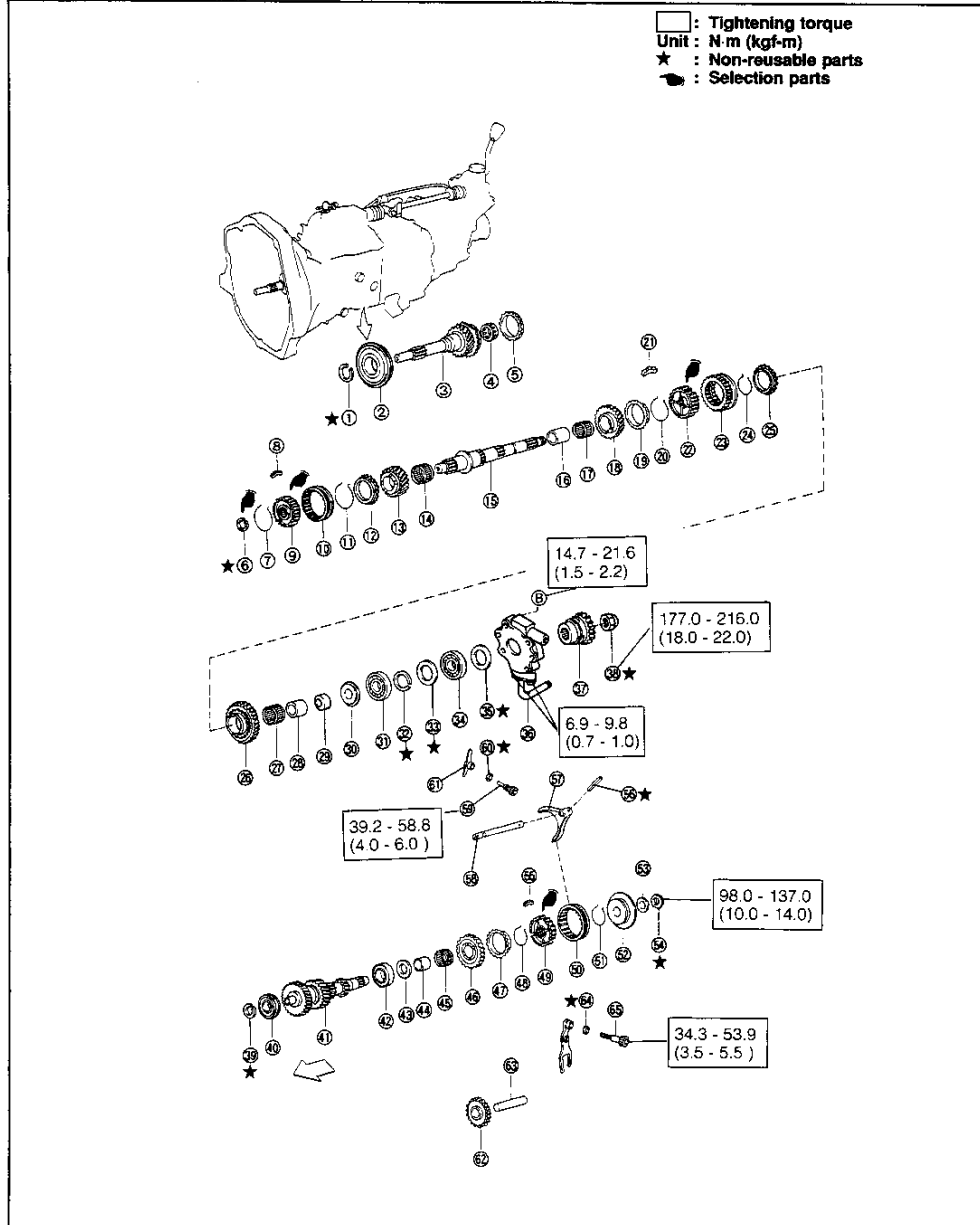
WFE90-MT266

MANUAL TRANSMISSION

- | | |
|-----------------------------------|------------------------------------|
| ① 2 way | ⑤⑩ Synchronizer ring No. 3 |
| ② Breather hose | ⑤⑪ Synchronesh shifting key spring |
| ③ Clip | ⑤⑫ Synchronesh shifting key No. 2 |
| ④ Clamp | ⑤⑬ T/M clutch hub No. 2 |
| ⑤ Back up lamp switch | ⑤⑭ Hub sleeve No. 1 |
| ⑥ Union | ⑤⑮ Synchronesh shifting key spring |
| ⑦ Snap ring | ⑤⑯ Synchronizer ring No. 3 |
| ⑧ Reverse restrict pin No. 2 | ⑤⑰ 3rd gear |
| ⑨ Torsion spring | ⑤⑱ Needle roller bearing |
| ⑩ Shift inner lever | ⑤⑲ Output shaft |
| ⑪ Slotted pin | ⑤⑳ 1st gear bearing inner race |
| ⑫ Detent sleeve | ⑤㉑ Needle roller bearing |
| ⑬ Oil seal | ⑤㉒ 2nd gear |
| ⑭ Shift & select shaft No. 1 boot | ⑤㉓ Synchronizer ring No. 3 |
| ⑮ Shift & select shaft | ⑤㉔ Synchronesh shifting key |
| ⑯ "O" ring | ⑤㉕ Synchronesh shifting key spring |
| ⑰ Bush | ⑤㉖ T/M clutch hub No. 1 |
| ⑱ Bolt | ⑤㉗ Reverse gear |
| ⑲ Control shaft | ⑤㉘ Synchronizer ring No. 2 |
| ⑳ T/M control shift knob | ⑤㉙ Bolt |
| ㉑ T/M shift lever assy (A: Bush) | ⑤㉚ Reverse idle gear S/A |
| ㉒ Snap ring | ⑤㉛ Reverse shift arm |
| ㉓ T/M shift lever ball seat | ⑤㉜ Reverse idle gear shaft |
| ㉔ Shift lever retainer S/A | ⑤㉝ 1st gear |
| ㉕ Shift lever outer | ⑤㉞ Needle roller bearing |
| ㉖ Tight plug | ⑤㉟ 1st gear bearing inner race |
| ㉗ T/M case cover | ⑤㊱ 1st gear thrust washer |
| ㉘ Bolt | ⑤㊲ Radial ball bearing |
| ㉙ Shift lock plate | ⑤㊳ 5th gear |
| ㉚ Torsion spring | ⑤㊴ Output shaft gear spacer No. 1 |
| ㉛ Ball | ⑤㊵ Output shaft gear spacer No. 2 |
| ㉜ Spring | ⑤㊶ Transfer oil pump body S/A |
| ㉝ Gasket | ⑤㊷ Transfer input hub |
| ㉞ Bolt | ⑤㊸ Lock nut |
| ㉟ Bolt | ⑤㊹ Counter gear |
| ㊱ "E" ring | ⑤㊺ 5th gear thrust washer |
| ㊲ Tight plug | ⑤㊻ 5th gear bearing inner race |
| ㊳ 1st & 2nd shift fork | ⑤㊼ Needle roller bearing |
| ㊴ 3rd & 4th shift fork | ⑤㊽ Counter shaft 5th gear |
| ㊵ Gear shift head No. 1 | ⑤㊾ Synchronizer ring No. 3 |
| ㊶ 5th & reverse shift fork shaft | ⑤㊿ Synchronesh shifting key No. 2 |
| ㊷ Bolt | ⑥① Synchronesh shifting key spring |
| ㊸ Bearing front retainer | ⑥② Synchronizer hub No. 1 |
| ㊹ Gasket | ⑥③ T/M hub sleeve |
| ㊺ Oil seal | ⑥④ Shifting key retainer |
| ㊻ T/M case assy | ⑥⑤ Conical washer spring |
| ㊼ Bolt | ⑥⑥ 5th shift fork |
| ㊽ Bolt | ⑥⑦ Gear shifting lever shaft |
| ㊾ Radial ball bearing | ⑥⑧ 5th shift arm |
| ㊿ Input shaft | ⑥⑨ 1st & 2nd shift fork shaft |
| ㉑ Needle roller bearing | ⑥⑩ 3rd & 4th shift fork shaft |

WFE90-MT267

INPUT SHAFT-, OUTPUT SHAFT- & TRANSFER INPUT HUB COMPONENTS



WUR90-MT268

MANUAL TRANSMISSION

- | | |
|--|-------------------------------------|
| ① Snap ring | ③④ Oil seal |
| ② Radial ball bearing | ③⑤ Bearing |
| ③ Input shaft | ③⑥ O ring |
| ④ Needle roller bearing | ③⑦ Transfer oil pump body S/A |
| ⑤ Synchronizer ring No. 3 | ③⑧ Transfer input hub |
| ⑥ Snap ring | ③⑨ Lock nut |
| ⑦ Synchronmesh shifting key spring | ③⑩ Snap ring |
| ⑧ Synchronmesh shifting key No. 2 (3 pieces) | ③⑪ Radial ball bearing |
| ⑨ Transmission clutch hub No. 2 | ③⑫ Counter gear |
| ⑩ Transmission hub sleeve No. 1 | ③⑬ Radial ball bearing |
| ⑪ Synchronmesh shifting key spring | ③⑭ 5th gear thrust washer |
| ⑫ Synchronizer ring No. 3 | ③⑮ 5th gear bearing inner race |
| ⑬ 3rd gear | ③⑯ Needle roller bearing |
| ⑭ Needle roller bearing | ③⑰ Counter shaft 5th gear |
| ⑮ Output shaft | ③⑱ Synchronizer ring No. 3 |
| ⑯ 1st gear bearing inner race | ③⑲ Synchronmesh shifting key spring |
| ⑰ Needle roller bearing | ③⑳ Synchronizer No. 1 hub |
| ⑱ 2nd gear | ③㉑ Transmission hub sleeve No. 2 |
| ⑲ Synchronizer ring No. 3 | ③㉒ Synchronmesh shifting key spring |
| ⑳ Synchronmesh shifting key spring | ③㉓ 5th shifting key retainer |
| ㉑ Synchronmesh shifting key No. 1 (3 pieces) | ③㉔ Conical spring washer |
| ㉒ Transmission clutch hub No. 1 | ③㉕ Lock nut |
| ㉓ Reverse gear | ③㉖ Synchronmesh shifting key No. 2 |
| ㉔ Synchronmesh shifting key spring | ③㉗ Slotted pin |
| ㉕ Synchronizer ring No. 2 | ③㉘ 5th shift fork |
| ㉖ 1st gear | ③㉙ Gear shifting lever shaft |
| ㉗ Needle roller bearing | ③㉚ Bolt |
| ㉘ 1st gear bearing inner race | ③㉛ Gasket |
| ㉙ 1st gear bearing inner race No. 2 | ③㉜ 5th shift arm |
| ㉚ 1st gear thrust washer | ③㉝ Reverse idle gear S/A |
| ㉛ Radial ball bearing | ③㉞ Reverse idle gear shaft |
| ㉜ O ring | |

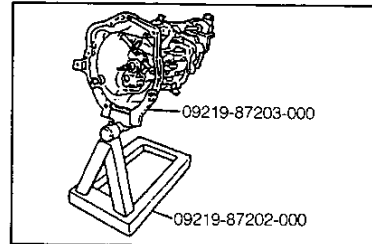
DISASSEMBLY

1. Install the transmission assembly with transfer on the over-haul stand, using the following SST.

SST: 09219-87202-000

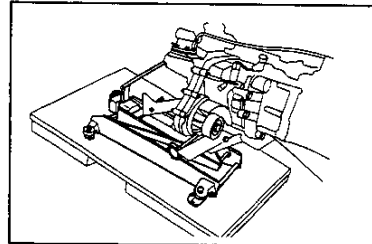
09219-87203-000

(As for the removal of transmission assembly with transfer, see page MT-12 to MT-16.)



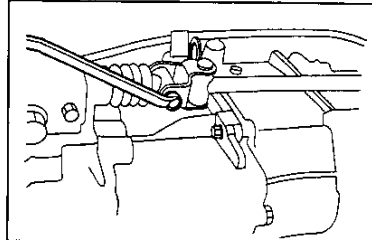
WFE90-MT270

2. Place a wooden plate(s) or any other suitable materials on the overhauling stand, as shown in the diagram at right.
3. Support the transfer front and transfer rear case with a transmission jack.



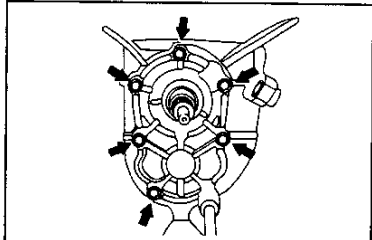
WFE90-MT271

4. Remove the control shaft with installed the shift lever retainer subassembly by removing the hexagon bolt.



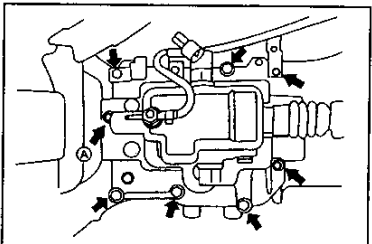
WFE90-MT272

5. Remove the clutch release bearing and related parts (see page CL-sections).
6. Remove the front bearing retainer by removing the seven bolts.



WFE90-MT273

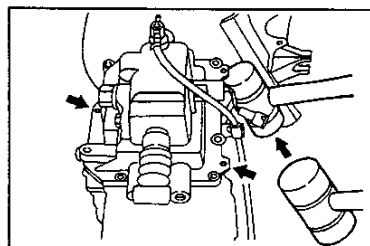
7. Remove the transmission case cover subassembly by removing the seven bolts and a reamer bolt ①.



WFE90-MT274

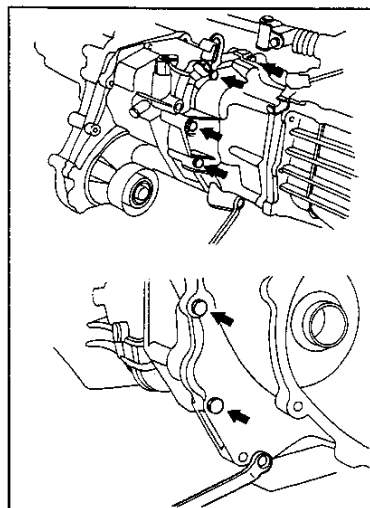
MANUAL TRANSMISSION

8. Disconnect the breather hose by detaching a clip.
9. Remove the transmission case cover subassembly by lightly tapping each of the ribs evenly toward the upper side of the transmission case.



WFE90-MT275

10. Remove the transfer front case by removing the eight bolts from the transfer adapter and pull them toward you carefully.



WFE90-MT276

11. Interlock the 1st gear and the 3rd gear.

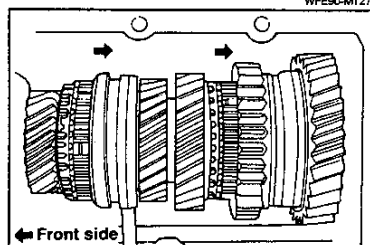
NOTE:

- Measure the following sections, prior to an interlock.

Specified Value:

Unit: mm

	1st	2nd	3rd	4th
Gear backlash	0.05 - 0.18	0.05 - 0.16	0.05 - 0.14	0.05 - 0.13
Thrust clearance	0.17 - 0.30	0.10 - 0.37	0.10 - 0.33	



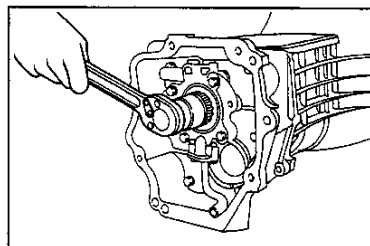
WFE90-MT277

12. Raise the lock section of the lock nut, using the chisel or the like.

CAUTION:

- Never reuse the removed lock nut.

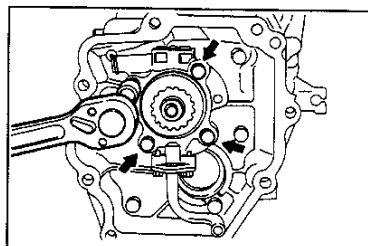
13. Remove the lock nut, using the 32 mm socket wrench box.



WFE90-MT278

MANUAL TRANSMISSION

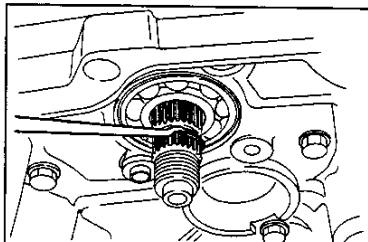
14. Remove the transfer oil pump body subassembly with the transfer oil strainer tube and transfer input hub installed by removing the four bolts.



WFE90-MT279

15. Remove the "O" ring from the transmission output shaft.
CAUTION:

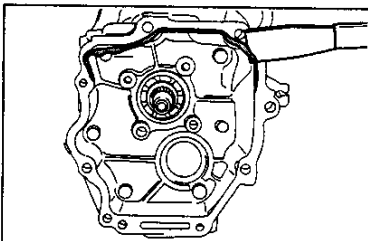
- Never reuse the removed "O" ring.



WFE90-MT280

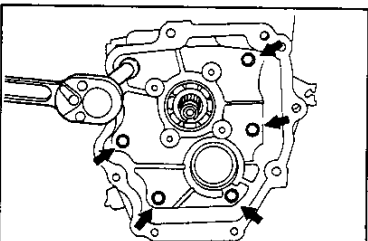
16. Remove the liquid gasket in the attaching surface of the transfer adapter, using the standard tool of gasket scraper.
NOTE:

- Be careful not to damage the mating surface.



WFE90-MT281

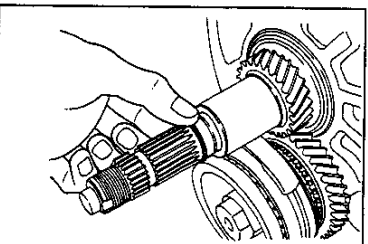
17. Remove the transfer adapter with installed the bearing and output gear spacer No. 2 by removing the six bolts.



WFE90-MT282

18. Remove the "O" ring from the transmission output shaft.
CAUTION:

- Never reuse the removed "O" ring.



WFE90-MT283

MANUAL TRANSMISSION

19. Remove the output gear spacer No. 1 from the transmission output shaft.

NOTE:

- Measure the backlash and the thrust clearance of the 5th gear.

Specified Value:

Unit: mm

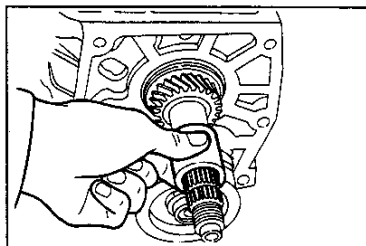
Backlash	0.05 - 0.13
Thrust clearance	0.11 - 0.30

20. Raise the lock section of the lock nut, using the chisel or the like.

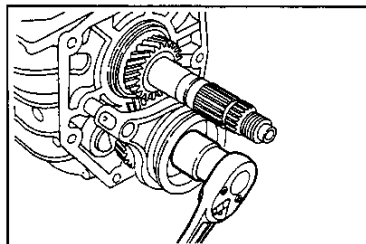
CAUTION:

- Never reuse the removed lock nut.

21. Remove the lock nut of the counter shaft 5th gear.

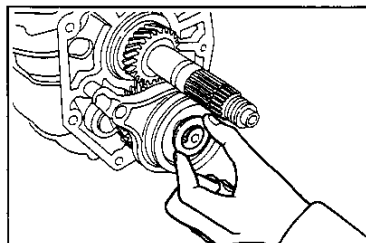


WFE90-MT284



WFE90-MT285

22. Remove the conical spring washer and shifting key retainer.

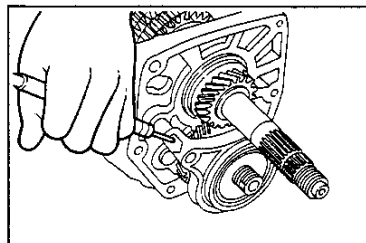


WFE90-MT286

23. Drive off the slotted pin of the 5th shift fork.

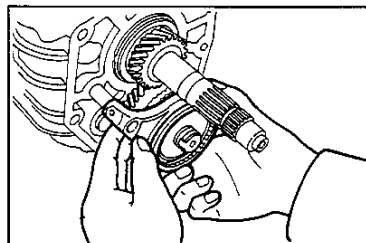
CAUTION:

- Never reuse the removed slotted pin.



WFE90-MT287

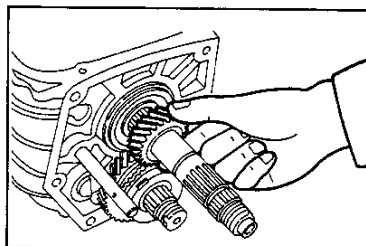
24. Remove the 5th shift fork together with synchronizer hub sleeve in a set.



WFE90-MT288

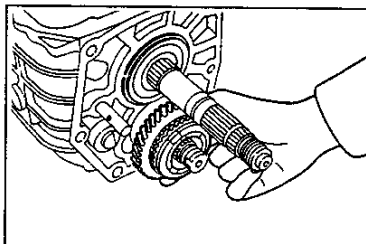
MANUAL TRANSMISSION

25. Remove the 5th gear of the transmission output shaft.



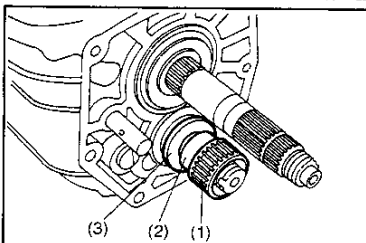
WFE90-MT289

26. Remove the synchronizer ring No. 3 and 5th gear of the countershaft.



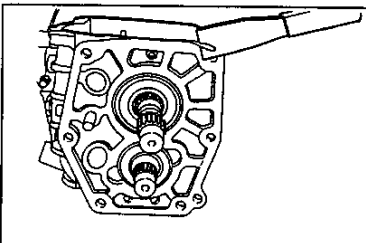
WFE90-MT290

27. Remove the following parts from the countershaft.
(1) Needle roller bearing
(2) 5th gear bearing inner race
(3) 5th gear thrust washer



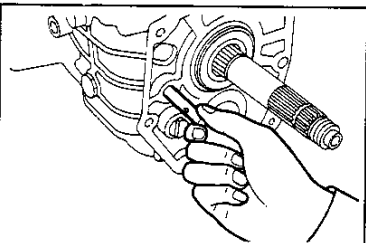
WFE90-MT291

28. Remove the liquid gasket from the transmission case, using the standard tool of gasket scraper.
CAUTION:
• Be very careful not to scratch the transmission case.



WFE90-MT292

29. Remove the gear shifting lever shaft.

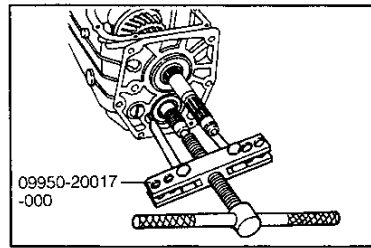


WFE90-MT293

MANUAL TRANSMISSION

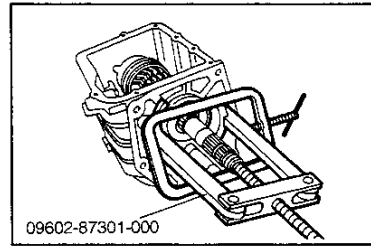
30. Remove the countershaft rear bearing, using the following SST.

SST: 09950-20017-000



31. Detach the snap ring of the output shaft bearing. Remove the output shaft bearing, using the following SST.

SST: 09602-87301-000

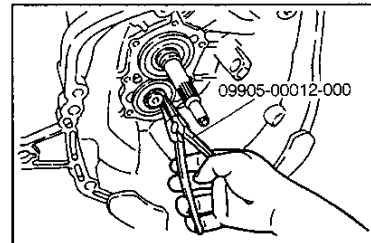


32. Detach the snap ring of the countershaft, using the following SST.

SST: 09905-00012-000

NOTE:

- Never reuse the snap ring.

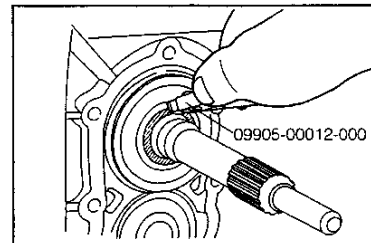


33. Detach the snap ring of the input shaft, using the following SST.

SST: 09905-00012-000

NOTE:

- Never reuse the removed snap ring.

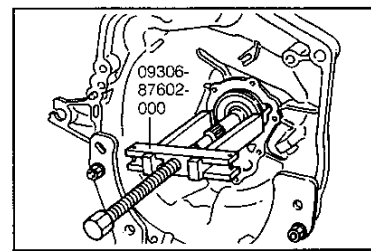


34. Remove the input shaft bearing, using the following SST.

SST: 09306-87602-000

NOTE:

- Detach the stop ring, prior to remove the bearing.



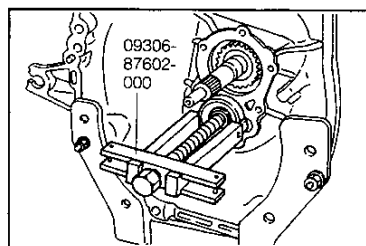
MANUAL TRANSMISSION

35. Remove the bearing of the countershaft at the clutch side, using the following SST.

SST: 09306-87602-000

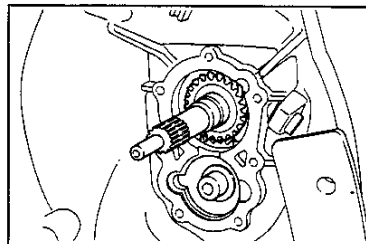
NOTE:

- Push out the bearing by tapping the countershaft at the output shaft side, using a plastic hammer.
- Detach the stop ring, prior to remove the bearing.



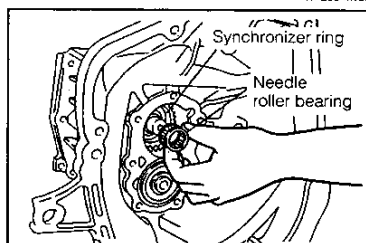
WFE90-MT299

36. Remove the input shaft.



WFE90-MT300

37. Remove the needle roller bearing and synchronizer ring No. 3.



WFE90-MT301

38. Remove the output shaft assembly.
(As for the disassembly, inspection and assembly for the removed parts, see page MT-79.)

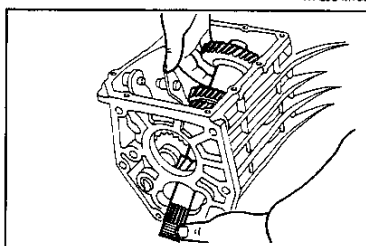
NOTE:

- It is recommended that as shown in the diagram at right, an operation rope (about 3 mm in outside diameter) be used to remove the output shaft assembly from the transmission case.



WFE90-MT302

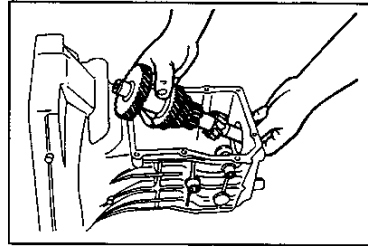
39. Remove the countershaft from the transmission case.



WFE90-MT303

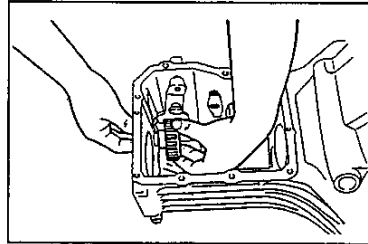
MANUAL TRANSMISSION

40. Remove the countershaft from the transmission case.



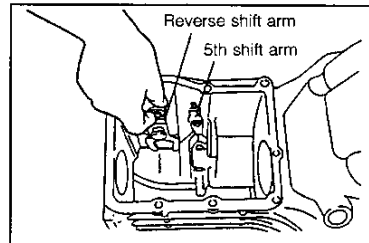
WFE90-MT304

41. Remove the reverse idler gear and reverse idler gear shaft.



WFE90-MT305

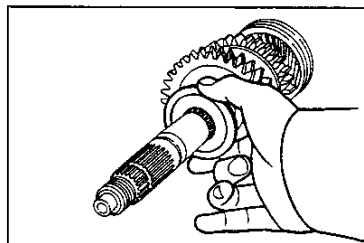
42. Remove the reverse shift arm and 5th shift arm.



WFE90-MT306

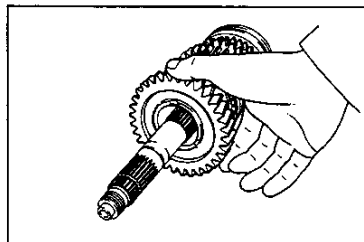
TRANSMISSION OUTPUT SHAFT DISASSEMBLY

1. Remove the 1st gear thrust washer.



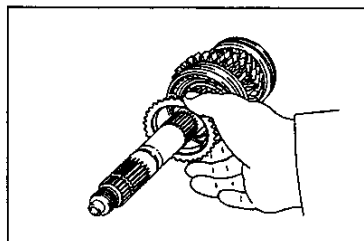
WFE90-MT307

2. Remove the 1st gear.



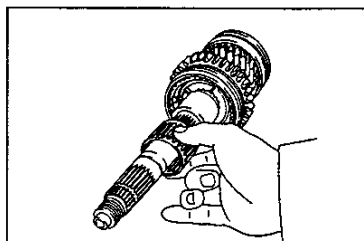
WFE90-MT308

3. Remove the synchronizer ring No. 2



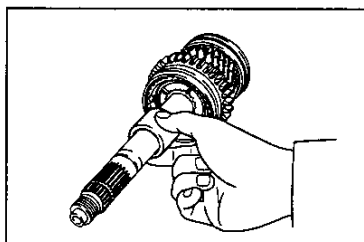
WFE90-MT309

4. Remove the needle roller bearing



WFE90-MT310

5. Remove the 1st gear bearing inner race.

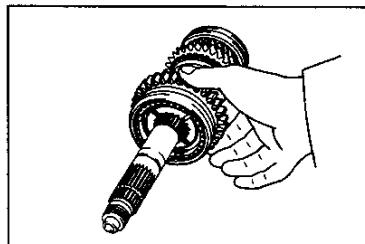


WFE90-MT311

MANUAL TRANSMISSION

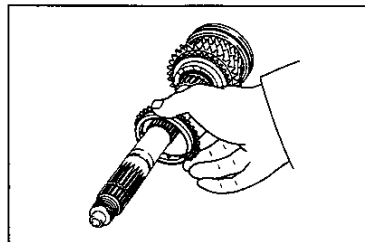
6. Remove the reverse gear with installed the following parts in a set.

- (1) Transmission clutch hub No. 1
- (2) Synchromesh shifting key spring (1 piece)
- (3) Synchromesh shifting key (3 pieces)



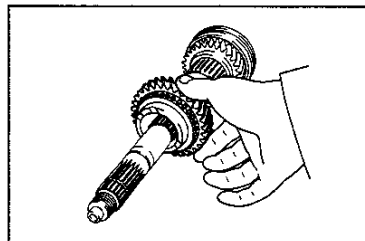
WFE90-MT312

7. Remove the synchronizer ring No. 2.



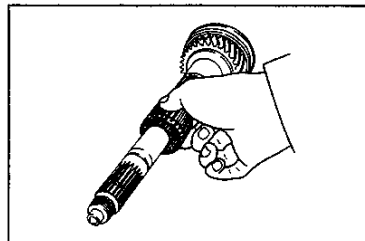
WFE90-MT313

8. Remove the 2nd gear.



WFE90-MT314

9. Remove the needle roller bearing.



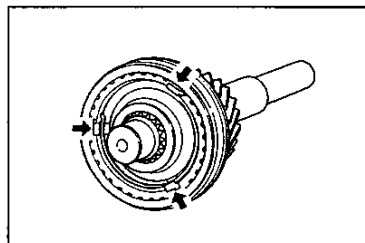
WFE90-MT315

10. Remove the following parts.

- (1) Transmission hub sleeve No. 1
- (2) Synchromesh shifting key spring (1 piece)
- (3) Synchromesh shifting key (3 pieces)

NOTE:

- Measurement of the clearance (in the direction of the output shaft) of transmission clutch hub No. 2 must be performed with the above-listed parts removed. See page MT-90 for the measurement procedure.



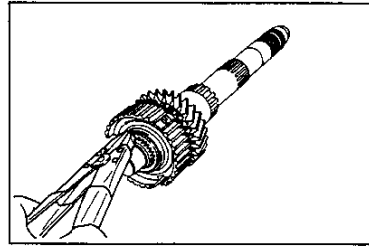
WFE90-MT316

MANUAL TRANSMISSION

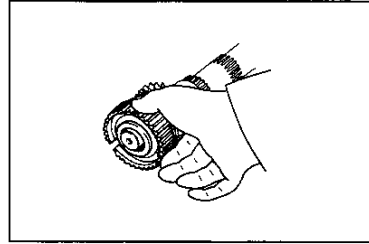
11. Detach the snap ring.

NOTE:

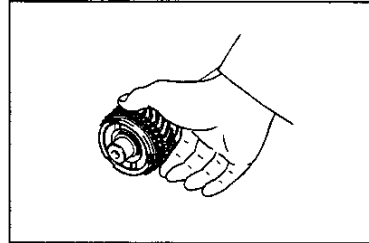
- Never reuse the removed snap ring.



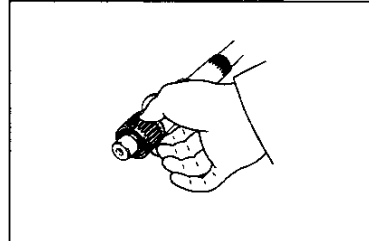
12. Remove the following parts in a set.
- (1) Transmission clutch hub No. 2
 - (2) Synchromesh shifting key spring (1 piece)



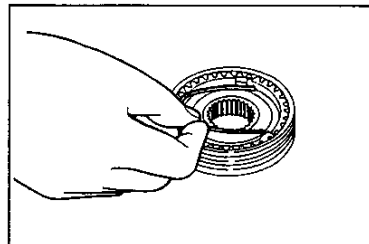
13. Remove the 3rd gear together with synchronizer ring No. 3.



14. Remove the needle roller bearing.



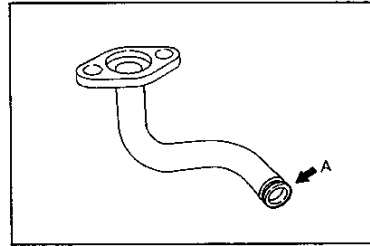
15. Remove the synchromesh shifting key spring. Remove the transmission hub sleeve and synchromesh shifting key of the reverse gear and transmission hub sleeve No. 2.



MANUAL TRANSMISSION

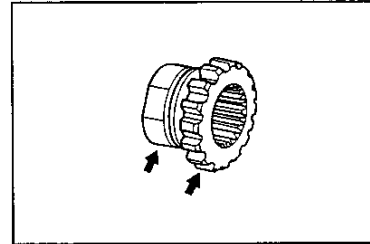
INSPECTION

1. Touch the end (section A) of the transfer oil strainer suction tube to check for burrs or other defects.



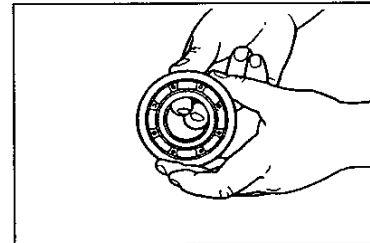
WFE90-MT322

2. Visually check the gear and spline sections of the transfer input hub for damage, or wear.



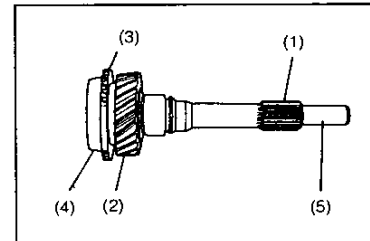
WFE90-MT323

3. Rotate the bearing inner race by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any binding and sticking.



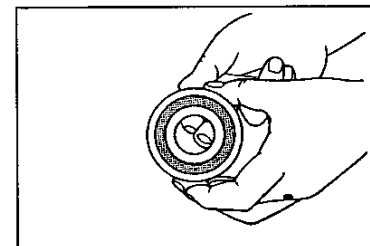
WFE90-MT324

4. Input shaft
Check the input shaft for the following items.
 - (1) Spline section for damage
 - (2) Gear for damage and wear
 - (3) Engaging section of hub sleeve for damage
 - (4) Tapered section for wear or damage
 - (5) Race section of roller bearing for wear or damage



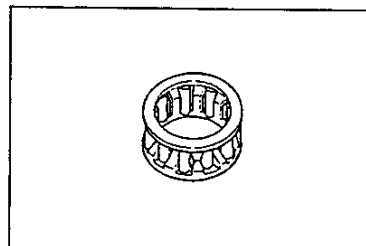
WFE90-MT325

5. Rotate the bearing inner race by applying a force with your finger. Check to see if the bearing inner race rotates smoothly without any sticking.



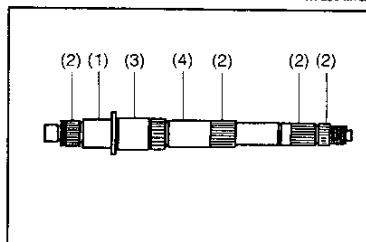
WFE90-MT326

6. Check the needle roller bearing for wear or damage.



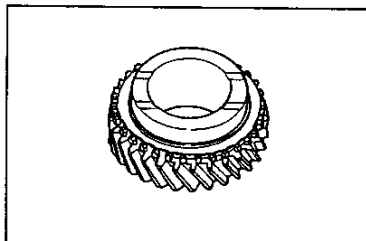
WFE90-MT327

7. Output shaft
Check the output shaft for the following items.
(1) Needle roller bearing race section for wear or damage
(2) Spline section for damage
(3) Fitting section of bearing inner race for wear
(4) Measure the runout of the output shaft, using a dial gauge and V-block.
Allowable Runout Limit: 0.05 mm



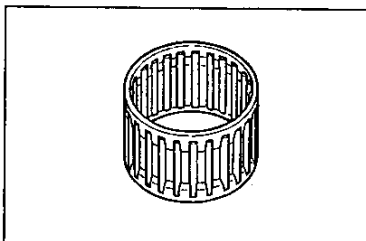
WFE90-MT328

8. Check the gear section of each gear for damage or abnormal wear.



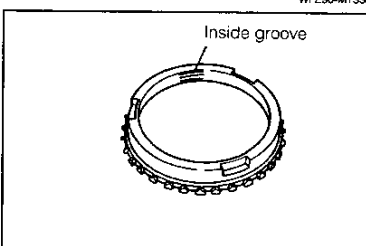
WFE90-MT329

9. Check each needle roller bearing for damage.



WFE90-MT330

10. Check the inside groove of the synchronizer ring for wear or damage.



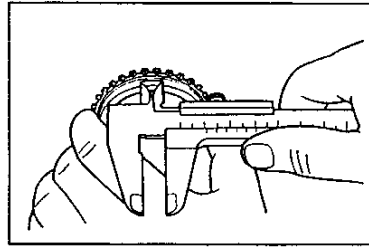
WFE90-MT331

MANUAL TRANSMISSION

11. Measure the contact width of each synchronizer ring with the synchromesh shifting key, using vernier calipers. Replace the synchronizer ring which does not conform to the specifications with a new one.

Unit: mm

Measuring point \ Item	Specified value
1st gear	9.9 - 10.1
2nd gear 3rd gear 4th gear 5th gear	11.3 - 11.5



WFE90-MT332

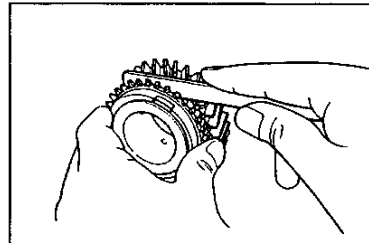
NOTE:

- The measurement should be performed at three points for each synchronizer ring. The maximum value is regarded as the contact width for the said ring.

12. Measure the clearance between each gear and the synchronizer ring, using a thickness gauge.

Unit: mm

Measuring point \ Item	Specified value	Allowable limit
1st gear 2nd gear 3rd gear 4th gear 5th gear	0.85 - 1.45	0.5



WFE90-MT333

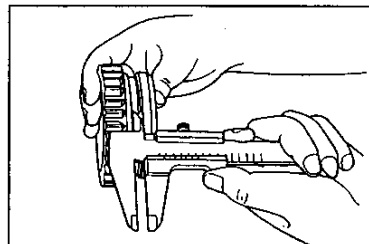
NOTE:

- The measurement should be performed at several points for each gear. The minimum value is regarded as the clearance for the said gear.

13. Measure the contact width of the reverse gear with the shift fork.

Unit: mm

Part name \ Item	Specified value	Allowable limit
Reverse gear	7.05 - 7.12	7.3



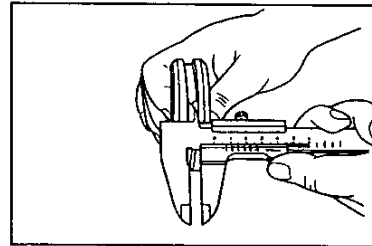
WFE90-MT334

MANUAL TRANSMISSION

14. Measure the contact width of the transmission hub sleeve with the shift fork.

Unit: mm

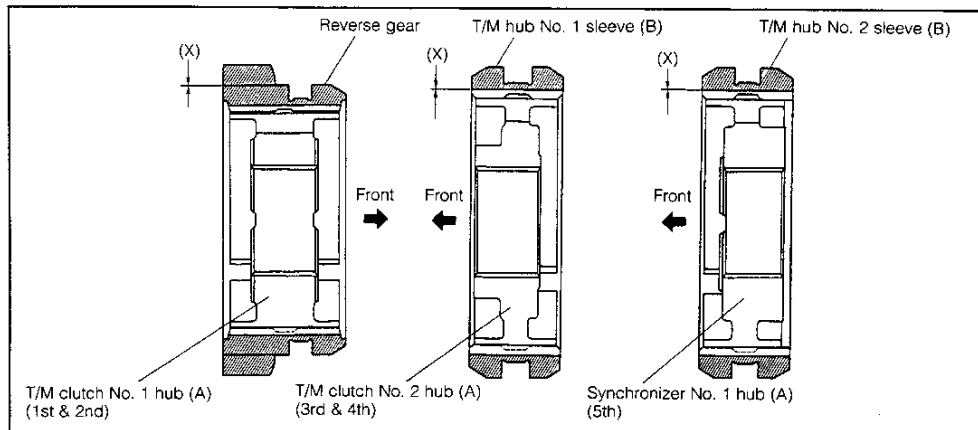
Part name	Item	Specified value	Allowable limit
Transmission hub sleeve		7.05 - 7.12	7.3



WFE90-MT335

15. Measure the dimension (A) and (B) of the followings parts. Make sure that the clearance (X) between this hubs and sleeves may confirm to the specification.

Specified Value: 0.03 - 0.19 mm



WFE90-MT336

16. The outer diameter dimension of the (A) above parts has been machined in accordance with the bore dimension of the (B) parts. If either part exceeds the specified value above, be certain to replace them as a set.

CAUTION:

- If either part which has been exceed the the specified value should be used against this caution, it would cause slipping-out of gear and or emanation of abnormal noise.

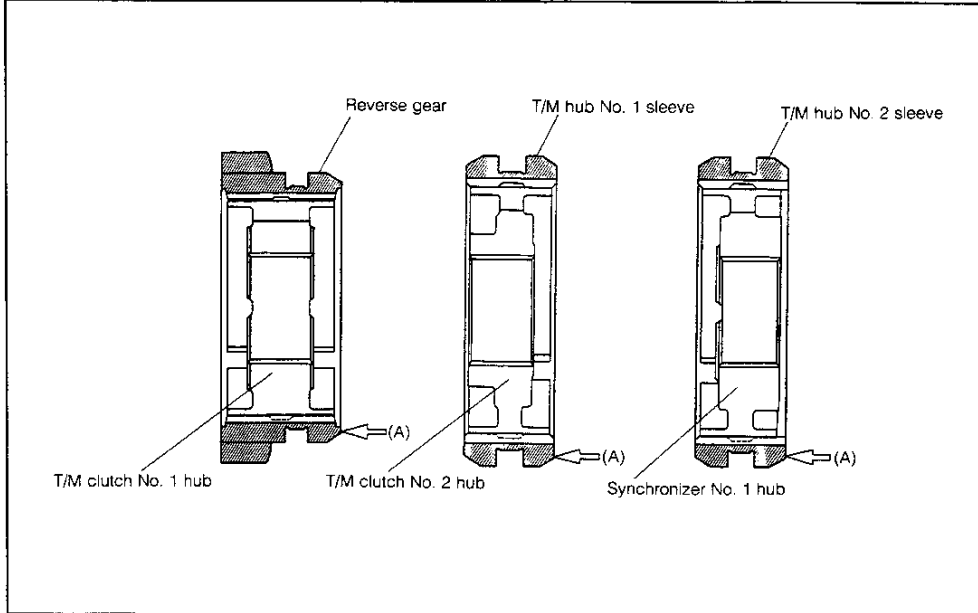
Unit: mm

	Outer dimension	Classification No.		Bore dimension
T/M clutch No. 1 hub	69.78 - 69.84	2	Reverse gear T/M hub No. 1 sleeve T/M hub No. 2 sleeve	69.871 - 69.97
T/M clutch No. 2 hub	69.68 - 69.74	1		69.971 - 69.87
Synchronizer No. 1 hub	69.58 - 69.64	3		69.67 - 69.77

WFE90-MT337

MANUAL TRANSMISSION

17. With the sleeves assembled to the hubs, measure the tilt width at the section (A) of the sleeves.
Specified Value: Not to exceed 0.5 mm



NOTE:

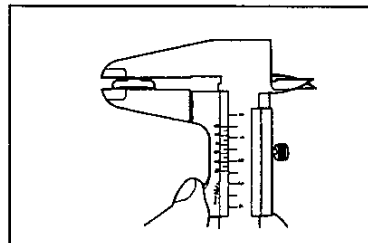
- If the tilt width of the sleeves exceeds the above specified value, be certain to replace those parts as a set.

WFE90-MT338

18. Measure the height of each synchromesh shifting key, using vernier calipers.

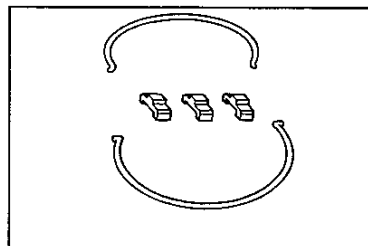
Unit: mm

Measuring point	Item	Specified value	Allowable limit
1st & 2nd gears		5.0 - 5.2	4.7
3rd & 4th gears			
5th gear			



WFE90-MT339

19. Check the synchromesh shifting key and synchromesh shifting key spring for evidence of wear or damage.



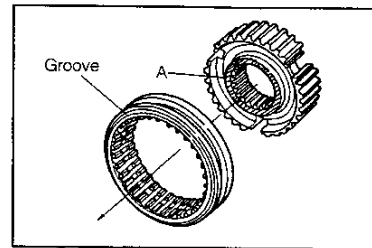
WFE90-MT340

ASSEMBLY

1. The front ends of transmission clutch hub No. 2 and transmission hub sleeve No. 1, which is the sleeve for 3rd-4th speed selection, are as shown in the diagram at right.

NOTES:

- (1) The outer groove in hub sleeve No. 1 is present at the front end.
- (2) Clutch hub sleeve No. 2 (section A) is present at the front end.

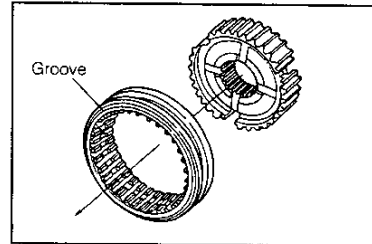


WFE90-MT341

2. The front ends of transmission synchronizer hub assembly No. 1 and transmission hub sleeve No. 2 (5th speed selection) are as shown in the diagram at right.

NOTES:

- (1) The outer groove in hub sleeve No. 2 is present at the front end.
- (2) The notch in the crisscross direction of synchronizer hub assembly No. 1 is present at the front end.



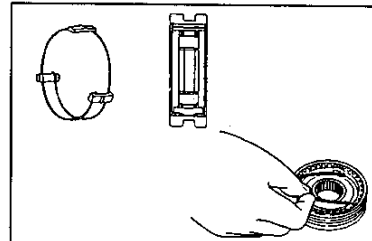
WFE90-MT342

3. Assemble the selected transmission clutch hub to the following parts, using the synchromesh shifting key and synchromesh shifting key spring.

- (1) Reverse gear
- (2) Transmission hub sleeve (5th)

NOTE:

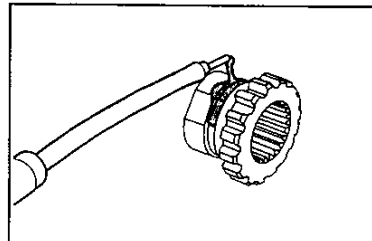
- As for the synchromesh shifting key spring, the bent sections at the front and rear should not come at the same direction, as shown in the right figure.



WFE90-MT343

ASSEMBLY OF TRANSFER OIL PUMP BODY SUBASSEMBLY

1. Apply gear oil to the outer periphery of the transfer input hub.

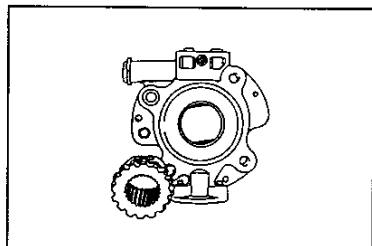


WFE90-MT344

2. Insert the transfer input hub into the transfer oil pump body subassembly lightly pushing with your finger.

NOTE:

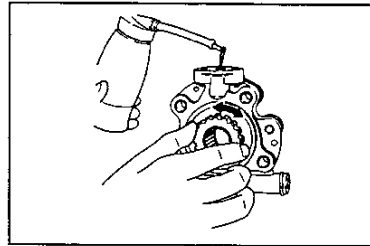
- Apply the gear oil to the outer periphery of the transfer input hub, prior to install.



WFE90-MT345

MANUAL TRANSMISSION

3. Turn the transfer oil pump body subassembly upside down, and then rotating the transfer input hub by hand, apply gear oil into the transfer oil pump body subassembly.

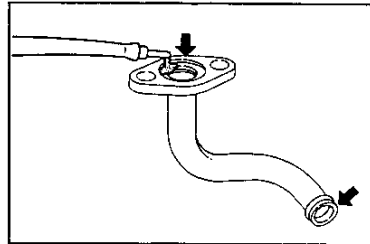


WFE90-MT346

4. Install the two new O-rings to the transfer oil strainer suction tube and apply the gear oil to the O-rings.

NOTE:

- Be careful not to damage the O-rings while installing on the transfer oil strainer suction tube.



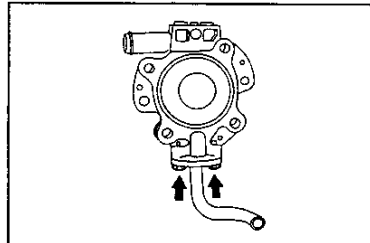
WFE90-MT347

5. Connect the transfer oil strainer suction tube to the transfer oil pump body subassembly using two bolts, and tighten the bolts.

Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf·m)

CAUTION:

- The bend section in the transfer oil strainer tube faces toward right side.



WFE90-MT348

ASSEMBLY OF TRANSFER ADAPTER

1. Press a new oil seal from the bearing side of the transmission output shaft, using the following SST.

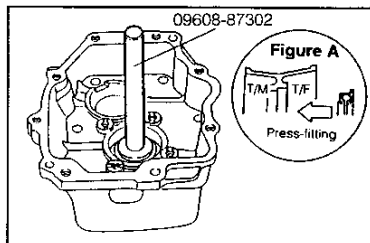
SST: 09608-87302-000

CAUTION:

- Be sure to install the oil seal in the correct direction, as indicated in the right figure A.

NOTE:

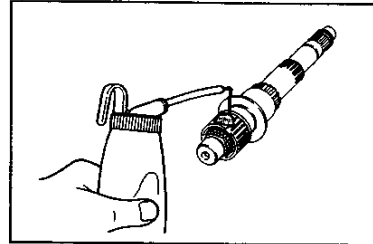
- Make sure that the oil seal exhibits no tilt and the garter spring of the oil seal is not disengaged.



WFE90-MT349

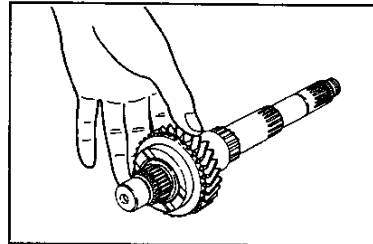
ASSEMBLY OF OUTPUT SHAFT

1. Apply gear oil to the needle roller bearing.



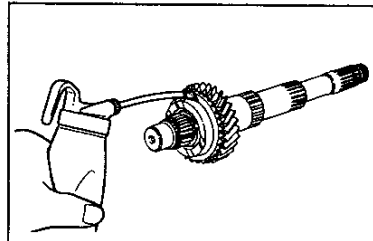
WFE90-MT350

2. Install the 3rd gear to the output shaft.



WFE90-MT351

3. Apply gear oil to the tapered section of the 3rd gear.

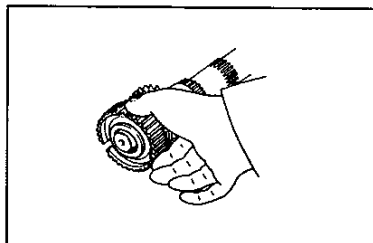


WFE90-MT352

4. Install the transmission clutch hub No. 2 to the output shaft with the synchromesh shifting key (1 piece) and synchronizer ring No. 3 installed.

NOTE:

- For easier installation of the synchromesh shifting key spring, put mark in the surface of clutch hub No. 2 so that the bent sections at the front and rear should not come at the same direction.



WFE90-MT353

MANUAL TRANSMISSION

5. Attach the new snap ring. Ensure that the clearance (A) in the right figure conforms to the specification. If it does not conform to the specification, select a suitable snap ring.

NOTE:

- Never reuse the snap ring.

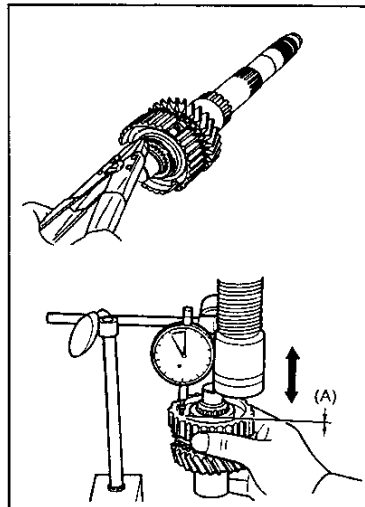
Specification:

Not to exceed 0.1 mm

Snap Ring Availability

Unit: mm

Snap ring thickness:	2.0
	2.1
	2.2



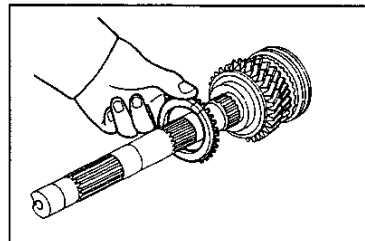
WFE90-MT354

6. Install the following parts to the clutch hub No. 2, and then, install them to the output shaft.

- (1) Synchromesh shifting key (3 pieces)
- (2) Transmission hub sleeve No. 1
- (3) Synchromesh shifting key spring (1 piece)

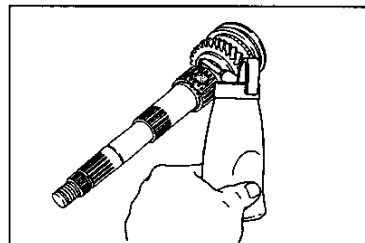
NOTE:

- Ensure that the bent sections at the front and rear of the synchromesh shifting key spring, should not come at the same direction.



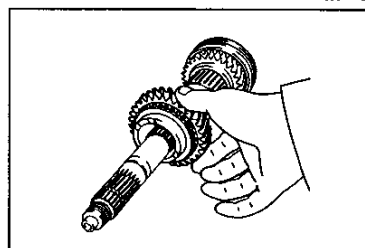
WFE90-MT355

7. Apply gear oil to the needle roller bearing and install to the output shaft.



WFE90-MT356

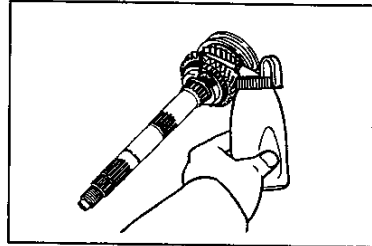
8. Install the 2nd gear.



WFE90-MT357

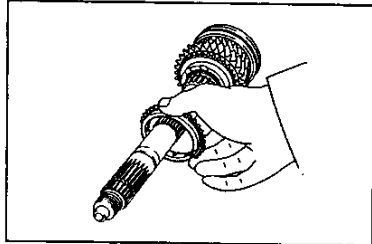
MANUAL TRANSMISSION

9. Apply gear oil to the tapered section of the 2nd gear.



WFES90-MT358

10. Install the synchronizer ring No. 2.

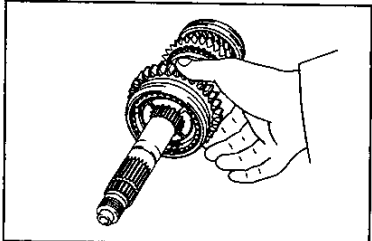


WFES90-MT359

11. Install the reverse gear with the following parts installed.
(1) Synchronesh shifting key spring (2 pieces)
(2) Synchronesh shifting key (3 pieces)
(3) Transmission clutch hub No. 1

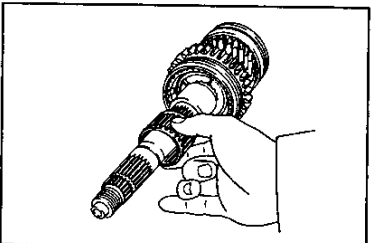
NOTE:

- Ensure that the bent sections at the front and rear of the synchronesh shifting key spring should not come at the same direction.



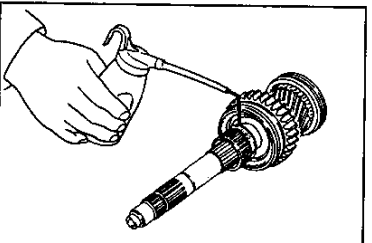
WFES90-MT360

12. Install the 1st gear inner race.



WFES90-MT361

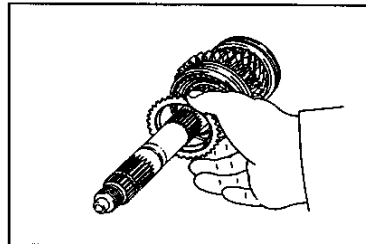
13. Apply gear oil to the outer periphery of the 1st gear inner race and the needle roller bearing.



WFES90-MT362

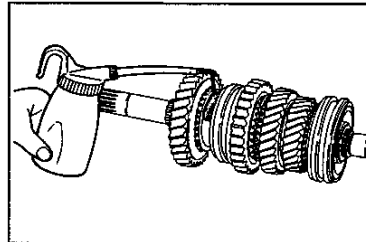
MANUAL TRANSMISSION

14. Install the synchronizer ring No. 2.



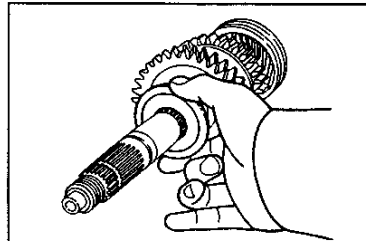
WFE90-MT363

15. Apply gear oil to the tapered section of the 1st gear, and install it.



WFE90-MT364

16. Install the 1st gear thrust washer.

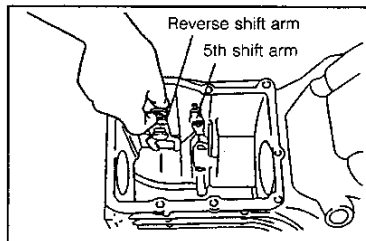


WFE90-MT365

TRANSMISSION ASSEMBLY

PRIOR TO ASSEMBLING THE TRANSMISSION CASE, CLEAN THE TRANSMISSION CASE BY REMOVING ANY DIRT, GAS-KET MATERIALS OR THE LIKE.

1. Install the reverse shift arm and 5th shift arm.

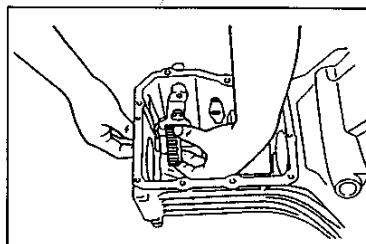


WFE90-MT366

2. Install the reverse idler gear shaft and reverse idler gear.

NOTE:

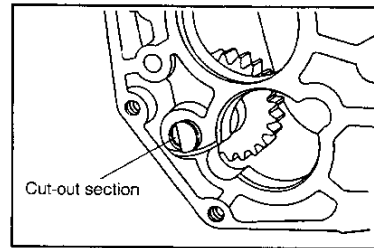
- Be sure to install the reverse idler gear shaft in such a way that the cut-out section of the shaft faces toward the opposite side of the countershaft. If this operation should fail to be observed correctly, there may be a case where the transfer adaptor can not be installed.



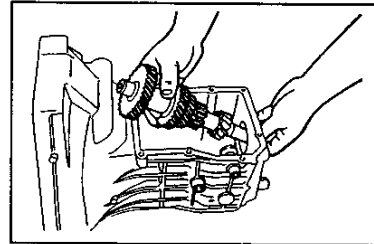
WFE90-MT367

MANUAL TRANSMISSION

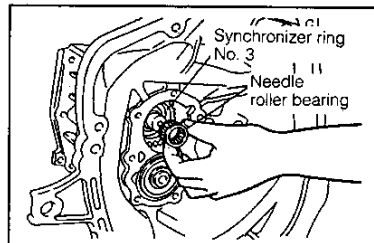
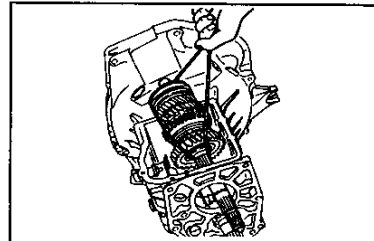
3. Insert the transmission countershaft into the transmission case.



4. Place the output shaft in the transmission case.



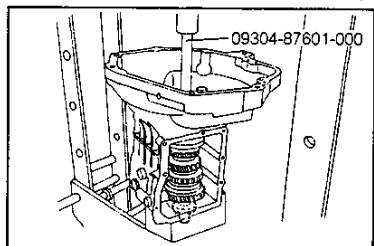
5. Apply the gear oil to the needle roller bearing and then, install to the output shaft.
6. Install the synchronizer ring No. 3.



7. Press the input shaft bearing into position, using the following SSTs.
SST: 09304-87601-000

NOTE:

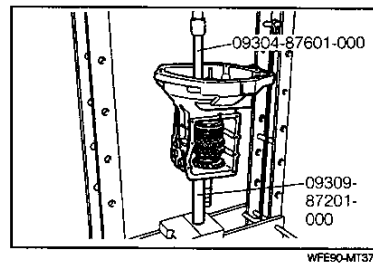
- Prior to install the above bearing, remove the stop ring.



MANUAL TRANSMISSION

8. Press the bearings provided at the front and rear of the transmission countershaft, using the following SSTs at the same time.

SSTs: 09304-87601-000
09309-87201-000



9. Install a new snap ring to the countershaft, using the following SST:

SST: 09306-87601-000

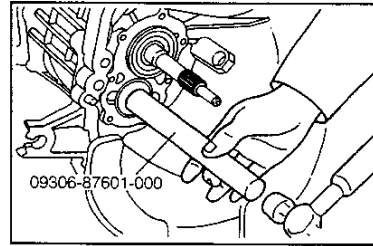
NOTE:

- Make sure that the snap ring is securely installed into the groove section of the countershaft.

10. Install the stop ring of the countershaft front bearing.

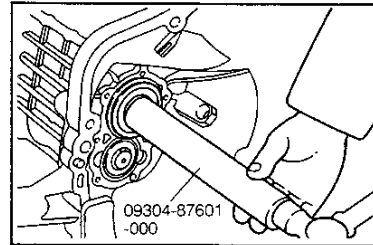
NOTE:

- Lightly tapping the countershaft from the rear side of transmission case with the plastic hammer or the like so that the bearing comes toward front side, prior to install the stop ring.



11. Install a new snap ring to the input shaft, using the following SST:

SST: 09304-87601-000



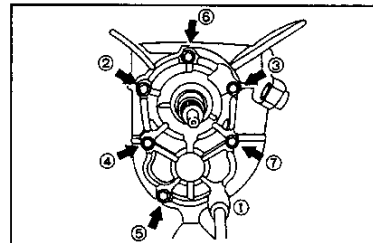
12. Install the stop ring to the input shaft.

13. With a new gasket used, install the front bearing retainer.

NOTE:

- Apply gear oil to the oil seal lip section.
 - Molybdenum disulphide lithium base grease to the clutch hub sliding section of the front bearing retainer.
- Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf·m)

- Be sure to tighten the bolts alternately and diagonally (the right figure illustration indicates a typical example of the tightening sequence.)

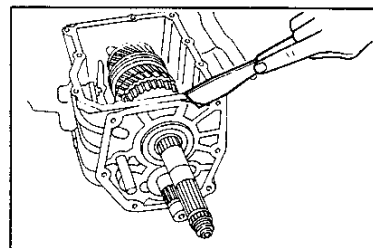


14. Install the clutch related parts (see page CL-sections).

15. Remove any remaining gasket material from the transmission, using a gasket scraper.

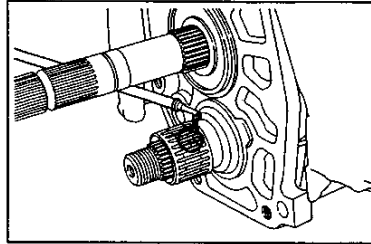
NOTE:

- Be very careful not to scratch the attaching surface.

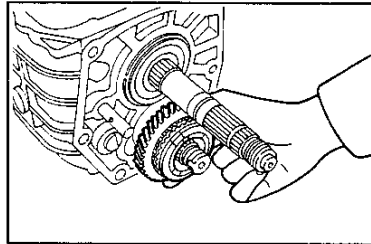


MANUAL TRANSMISSION

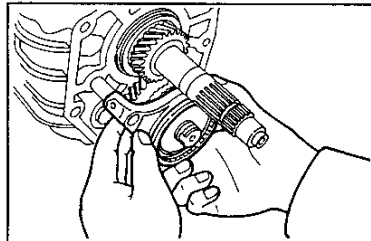
16. Install the 5th gear thrust washer.
17. Install the 5th gear inner race and needle roller bearing to the output shaft and then apply the gear oil to the outer periphery of these parts.



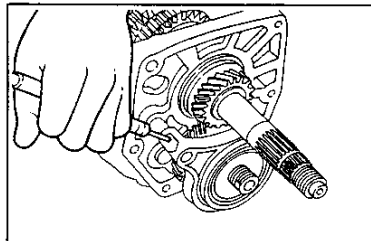
18. Apply gear oil to the tapered section of the 5th gear, and install the 5th gear and the synchronizer ring No. 3 to the counter shaft.



19. Install the 5th gear shift fork and the synchronizer hub sleeve together.

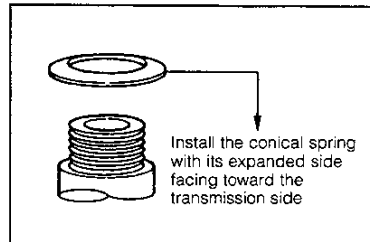
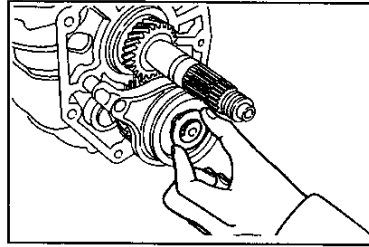


20. Drive the new slotted pin of the 5th shift fork.
NOTE:
 - Never reuse the removed slotted pin.



MANUAL TRANSMISSION

21. Install the shifting key retainer and conical spring washer in this sequence.

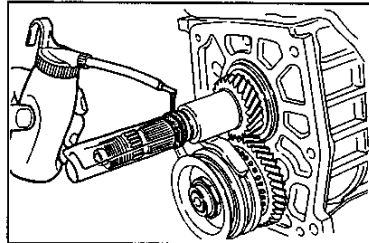


WFE90-MT382

22. Interlock the 1st gear and the 3rd gear.
 23. Install the output gear spacer No. 1 to the output shaft.
 24. Protect the spline section of the output shaft with the suitable vinyl sheets or the like.
 25. Install the O-ring in a place and apply the gear oil to the O-ring.

NOTE:

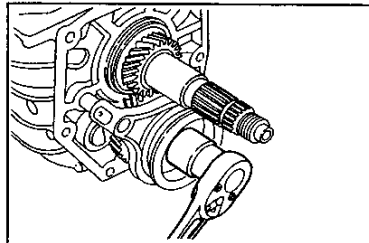
- Be very careful not to damage the new O-ring during installation.



WFE90-MT383

26. Install the new lock nut of the 5th gear countershaft and then, tighten them.

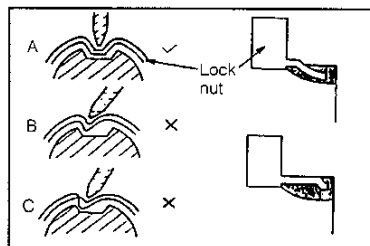
Tightening Torque: 177.0 - 216.0 N·m
 (18.0 - 22.0 kgf·m)



22WFE90-MT384

NOTE:

- When staking the lock nut, point a suitable staking tool toward the counter shaft axis center and stake to lock nut securely as shown in the right figure A.
- Poor staking may cause abnormal noise as shown in the right figure B and C.



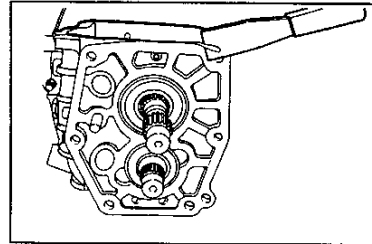
WFE90-MT385

MANUAL TRANSMISSION

27. Remove any remaining gasket material from the transmission, using a gasket scraper.

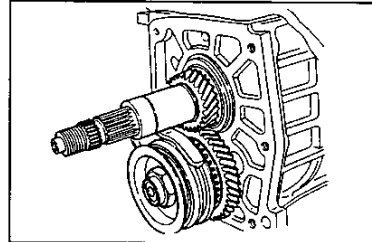
CAUTION:

- Be very careful not to scratch the attaching surface.



WFE90-MT366

28. Place output gear spacer No. 2 on the transmission output shaft.

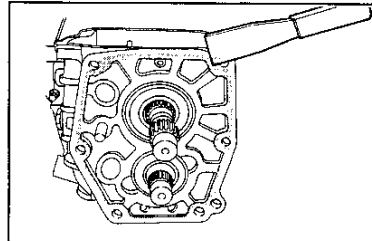


WFE90-MT367

29. Apply the THREE BOND 1216 (made by THREE BOND) to the mating surface between the transfer case and the transmission case.

NOTE:

- Apply the bond to the inside of the bolt hole, as shown in the diagram at right.

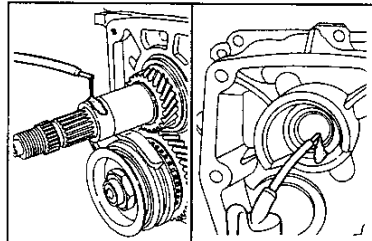


WFE90-MT368

30. Apply gear oil to the outer periphery of the output gear spacer No. 2 and to the lip section of the oil seal, and push the transfer adapter until it has come into firm contact with the transmission case.

NOTE:

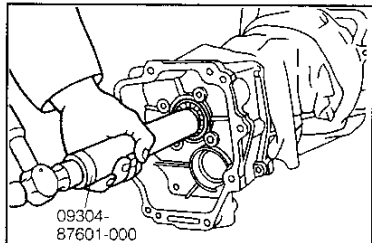
- Be very careful not to turned over the lip section of the oil seal during installation.



WFE90-MT369

31. Install the bearing of the transmission output shaft using the following SST:

SST: 09304-87601-000



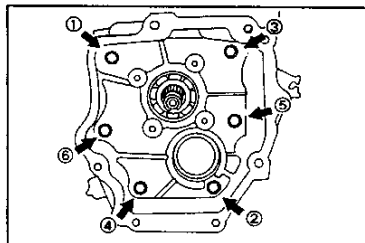
WFE90-MT390

MANUAL TRANSMISSION

32. Apply the THREE BOND 1216 (made by THREE BOND) to the thread sections of the bolts, and tighten those bolts.
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf·m)

NOTE:

- Be sure to tighten the bolts alternately and diagonally (the right figure illustration indicates a typical example of tightening sequence)

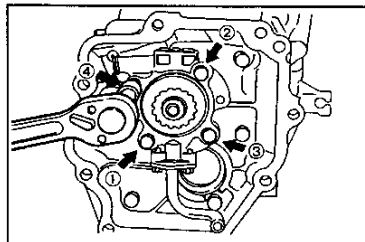


WFE90-MT391

33. Install the transfer oil pump body subassembly to the transfer adapter and then tighten the adapter with four bolts.
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf·m)

NOTE:

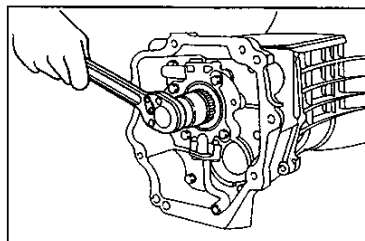
- Be sure to tighten the bolts alternately and diagonally (the right figure illustration is a typical example of tightening sequence)



WFE90-MT392

34. Install the new lock nut of the transmission output shaft and then, tighten it.

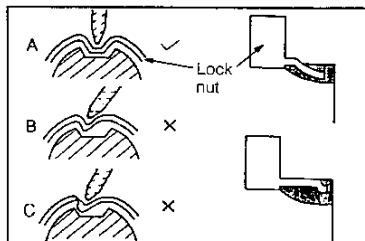
Tightening Torque: 177.0 - 216.0 N·m
(18.0 - 22.0 kgf·m)



WFE90-MT393

NOTE:

- When staking the lock nut, point a suitable staking tool toward the transfer output rear shaft axis center and stake to lock nut securely, as shown in the right figure A.
- Poor staking may cause abnormal noise as shown in the right figure B and C.

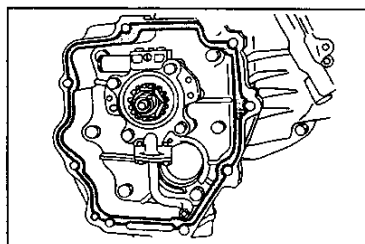


WFE90-MT394

35. Apply the liquid-gasket-use THREE BOND 1216 (made by THREE BOND) to the mating surface between the transfer adapter and the transfer front case.

NOTE:

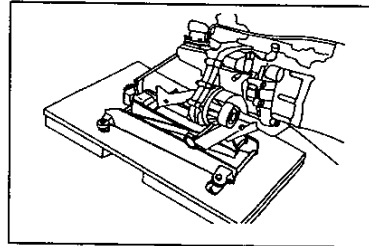
- Apply the bond to the attaching surface of the inside bolt hole.



WFE90-MT395

MANUAL TRANSMISSION

36. Support the transfer front and rear cases with transmission jacks or the like.

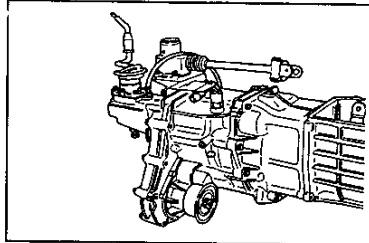


WFEGO-MT396

37. Temporarily install the transfer front case to the transfer adapter, using the eight dummy bolts.

NOTE:

- Apply the gear oil to the O-ring section of the transfer oil strainer tube.

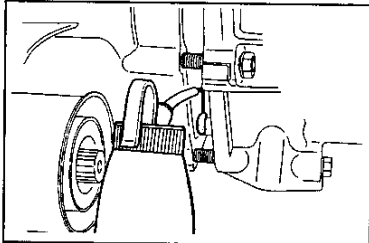


WFEGO-MT397

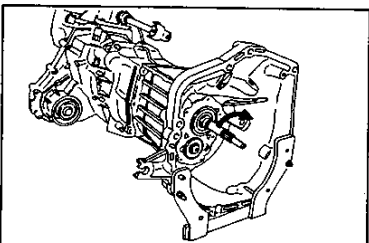
38. Shift the 1st gear into position.
39. Tighten the transfer front case with the eight dummy bolts with rotating the input shaft clockwise.

CAUTION:

- Be careful to tighten the dummy bolts alternately, evenly and diagonally.
- If this operation should fail to be performed, failure to observe this caution may disengagement of gear.



WFEGO-MT398



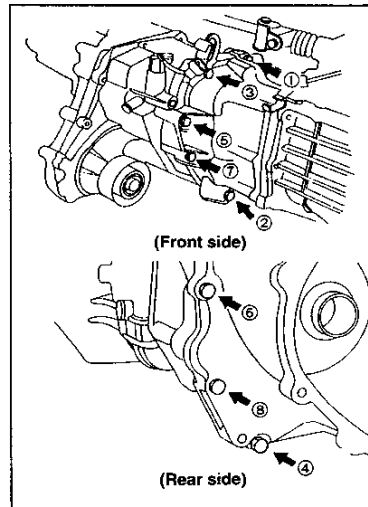
WFEGO-MT399

MANUAL TRANSMISSION

40. Remove the eight dummy bolts.
41. Apply the THREE BOND 1216 (made by THREE BOND) to the thread section of the bolts, and tighten them.
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf·m)

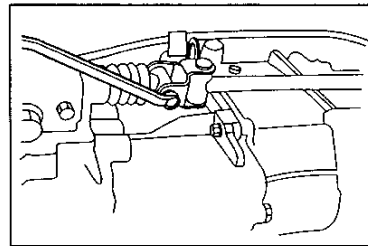
NOTE:

- Be sure to tighten the bolts alternately and diagonally.
(The illustration at the right figure indicates a typical example of tightening sequence.)



WFE90-MT400

42. Install the shift lever retainer subassembly and the control shaft with a hexagon bolt (Use new hexagon bolt).
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf·m)

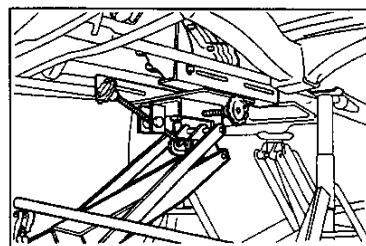


43. Install the transmission case cover subassembly (see page MT-84).
44. Install the transmission and transfer assembly to the vehicle (see pages MT-101 to MT-105).

WFE90-MT402

INSTALLATION

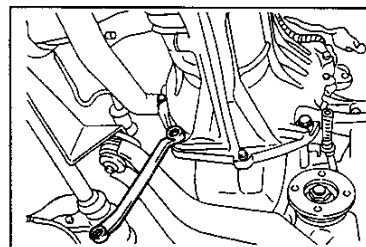
1. Working from the under vehicle
 - (1) Support the transmission with a transmission jack.



WFE90-MT403

- (2) While supporting the transmission assembly with a transmission jack, push in the transmission assembly into the engine.

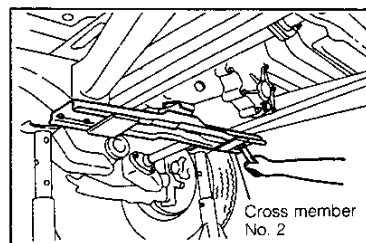
Tightening Torque: 49.0 - 68.6 N-m (5.0 - 7.0 kgf-m)



WFE90-MT404

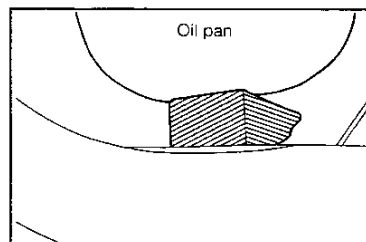
- (3) Tighten the cross member No. 2 with the four bolts on both left and right sides bolts.

Tightening Torque: 39.2 - 53.9 N-m (4.0 - 5.5 kgf-m)



WFE90-MT405

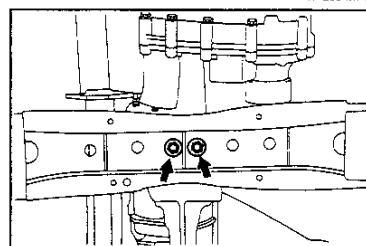
- (4) Remove the wooden pieces between oil pan and differential carrier support front bracket.



WFE90-MT406

- (5) Install the transmission mounting to the crossmember No. 2 with the two nuts and tighten them.

Tightening Torque: 58.8 - 78.5 N-m (6.0 - 8.0 kgf-m)



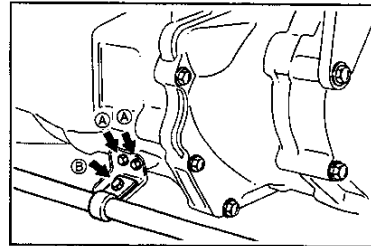
WFE90-MT407

MANUAL TRANSMISSION

- (6) Tighten the exhaust pipe support bracket with the three bolts.

Tightening Torque:

- Ⓐ 14.7 - 21.6 N·m (1.5 - 2.2 kgf·m)
Bracket × Transmission
- Ⓑ 29.4 - 44.1 N·m (3.0 - 4.5 kgf·m)
Bracket × Exhaust pipe



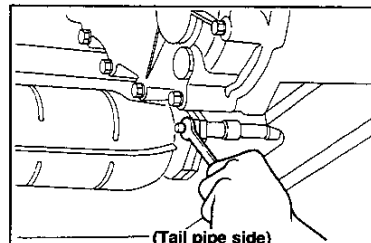
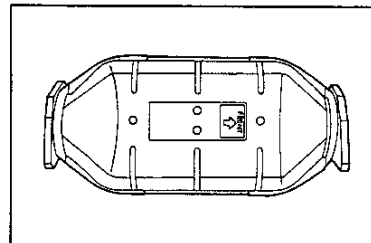
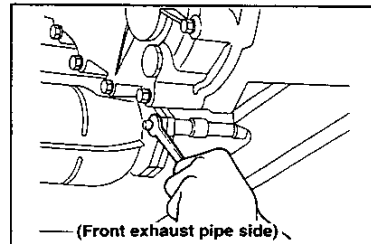
WFE90-MT408

- (7) Tighten the catalyst converter assembly with the two nuts on both front and rear side, using the new gaskets.

Tightening Torque: 36.3 - 51.0 N·m (3.7 - 5.2 kgf·m)

NOTE:

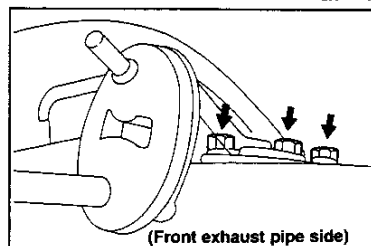
- Install the converter in such a way that.
- Arrow marking facing with ground.
- Toward the front exhaust pipe.



WFE90-MT409

- (8) Tighten the bracket to the crossmember No. 3 with the three bolts.

Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf·m)



WFE90-MT410

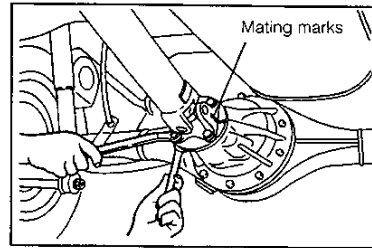
MANUAL TRANSMISSION

- (9) Install the front propeller shaft and rear propeller shaft and tighten with the bolts, spring washer and nuts.

CAUTION:

- Align the mating marks put during the removal with each others. If this operation should fail to be performed correctly, the propeller shaft may emit abnormal noise or vibration during the running.

Tightening Torque: 58.8 - 78.5 N·m (6.0 - 8.0 kgf-m)

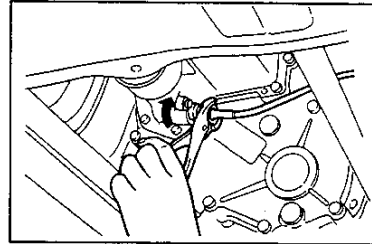


WFE90-MT411

- (10) Connect the speedometer cable with oil seal to the transmission case, using the common tool of plier.

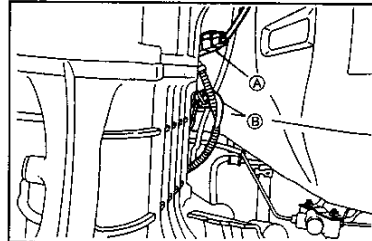
NOTE:

- Make sure that the forward end of the speedometer cable has positively entered into the sleeve.



WFE90-MT412

- (11) Connect the coupler of back up lamp and transmission position detect switch.

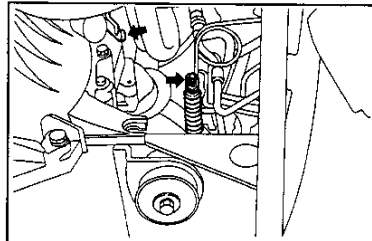


WFE90-MT413

- (12) Connect the clutch release cable subassembly to the release fork.

NOTE:

- Apply the Lithium base multi purpose grease to the connecting sections.



WFE90-MT414

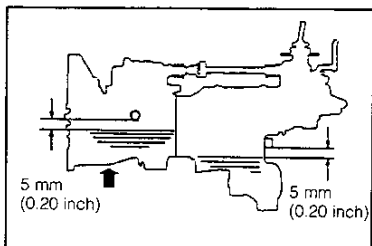
- (13) Fill in the transmission and transfer oil through the oil filler plug holes.

TRANSFER

Oil: API GL-3 or GL-4
SAE 75W-85 or 75W-90
Oil Capacity: 1.4 L

TRANSMISSION

Oil: API GL-3 or GL-4
SAE 75W-85 or 75W-90
Oil Capacity: 1.7 L

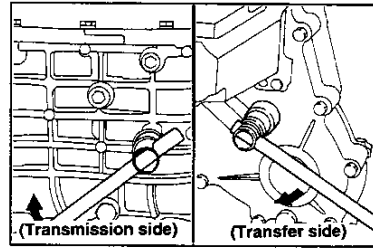


WFE90-MT415

- (14) Check of transmission and transfer checking of oil level and leakage oil should be up to the filler plug hole. Add oil if low and inspect for oil leakage.

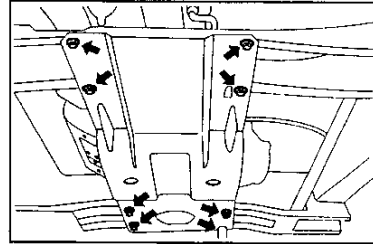
MANUAL TRANSMISSION

- (15) Tighten the filler plugs with new gasket.
Tightening Torque: 29.4 - 49.0 N·m (3.0 - 5.0 kgf·m)



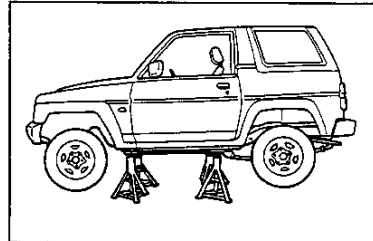
WFE90-MT416

- (16) Tighten the transmission under cover with the eight bolts.
Tightening Torque: 39.2 - 58.8 N·m (4.0 - 6.0 kgf·m)



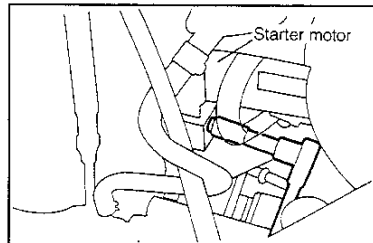
WFE90-MT417

2. Working from the vehicle outside
(1) Jack down the vehicle.



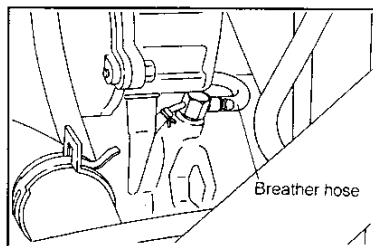
WFE90-MT418

3. Working from the engine compartment room
(1) Install the direct-connecting a bolt and tighten it.
Tightening Torque:
49.0 - 68.6 N·m (5.0 - 7.0 kgf·m)



WFE90-MT419

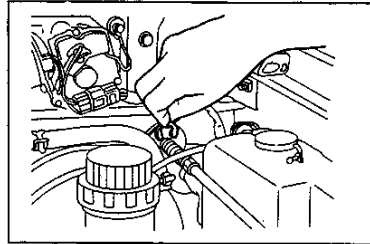
- (2) Install the transmission breather hose with a clip.



WFE90-MT420

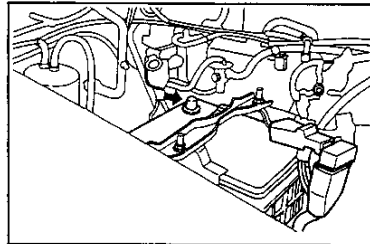
MANUAL TRANSMISSION

- (3) Install the clutch cable to the clutch release fork. Adjust the free travel by means of the E-ring.
Free Travel of Clutch Pedal: 18 - 27 mm



WFE90-MT421

- (4) Connect the battery ground cable to the negative (-) terminal of the battery.



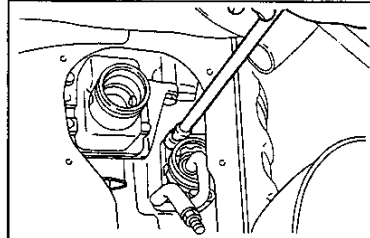
WFE90-MT422

4. Working from the vehicle interior

- (1) Install the transfer control lever with the four bolts, using the new gasket.
Tightening Torque: 314.7 - 21.6 N·m (1.5 - 2.2 kgf·m)

NOTE:

- Apply the Lithium base multi purpose grease to the forward end of the transfer control lever.



WFE90-MT423

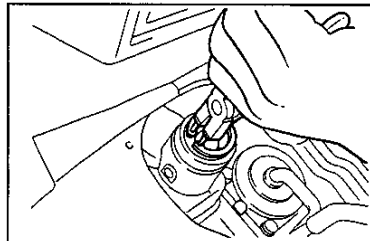
- (2) Install the transmission control lever with a snap ring, using the common tool of snap ring plier.

CAUTION:

- Ensure that the snap ring must be inserted in the groove section of control shift lever retainer.

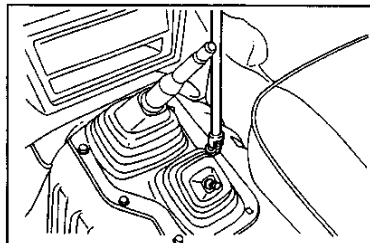
NOTE:

- Apply the Lithium base multi purpose grease to the forward end of the transfer control lever.



WFE90-MT424

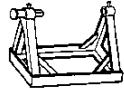
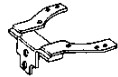
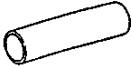
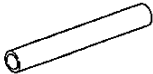
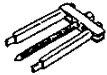
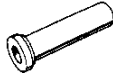
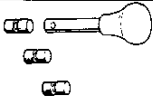
- (3) Install the shift lever boot with the six bolts.
(4) Install the floor carpet in a place.
(5) Install the transmission and transfer shift lever knobs.



WFE90-MT425

MANUAL TRANSMISSION

SSTs

Shape	Parts No.	Parts Name
	09219-87202-000	Engine overhaul stand
	09219-87203-000	Engine overhaul attachment (Commercially-available)
	09304-87601-000	Replacer input shaft bearing
	09306-87601-000	Replacer counter shaft bearing
	09306-87602-000	Puller counter gear front bearing
	09309-87201-000	Transmission bearing replacer
	09339-87301-000	Shift fork shaft guide
	09517-87601-000	Replacer oil seal
	09602-87301-000	Counter gear bearing puller
	09608-87302-000	Axle hub & drive pinion bearing tool set
	09950-20017-000	Universal puller

WFE90-MT426

MANUAL TRANSMISSION

SERVICE SPECIFICATIONS (PART TIME)

Unit: mm

Item		Specified value	Allowable limit	Remarks
Speedometer driver gear shaft diameter		8 ^{+0.013} _{-0.028}	7.96	
Speedometer shaft bore diameter		8 ^{+0.065} _{-0.029}	8.10	
Backlash of each gear	1st gear	0.05 - 0.18	—	
	2nd gear	0.05 - 0.16	—	
	3rd gear	0.05 - 0.14	—	
	Input gear	0.05 - 0.13	—	
	5th gear	0.05 - 0.13	—	
Thrust clearance of each gear	1st gear	0.17 - 0.30	—	
	2nd gear	0.10 - 0.37	—	
	3rd gear	0.10 - 0.33	—	
	5th gear	0.11 - 0.30	—	
Shift fork groove width	Reverse gear	7.05 - 7.12	7.3	
	T/M Hub Sleeve	7.05 - 7.12	7.3	
Synchronizer ring to gear clearance	1st gear	0.85 - 1.45	0.5	
	2th gear			
	3rd gear			
	4th gear			
	5th gear			
T/M clutch No. 1, No. 2 hubs & Synchronizer No.1 hub	Class	2 69.78 - 69.84		Outer diameter
		1 69.68 - 69.74		
		3 69.58 - 69.64		
T/M hub No. 1, No. 2 hubs Sleeves & Reverse gear	Class	2 69.871 - 69.97		Bore diameter
		1 69.971 - 69.87		
		3 69.67 - 69.77		
Each hubs x hub sleeves and reverse gear clearance		0.03 - 0.19	—	
Each hub sleeves and reverse gear tilt width (Assembled to the each hubs)		—	Not to exceed 0.5	
Synchromesh shifting key groove width	1st gear	9.9 - 10.1		
	Except 1st gear	11.3 - 11.5		
Synchromesh shifting key height		5.0 - 5.2	4.7	
Output shaft runout		—	0.05	
Thrust clearance of T/M clutch hub No. 2		—	Not to exceed 0.1	Selected with the snap rings

MANUAL TRANSMISSION

Item		Specified value	Allowable limit	Remarks
Contact width	1st & 2nd shift fork	6.80 - 7.00	6.3	
	3rd & 4th shift fork	6.80 - 7.00		
	Reverse shift fork	15.000 - 15.043	15.1	
	Gear shift head No.1	16.1 - 16.2	16.7	
		12.1 - 12.2	12.7	
	Detent sleeve	18.8 - 19.2	19.5	

WFE90-MT427

(Full Time)

Unit: mm

Item			Specified valve	Allowable limit	Remarks
Backlash of each gear	1st gear		0.05 - 0.18	—	
	2nd gear		0.05 - 0.16	—	
	3rd gear		0.05 - 0.14	—	
	4th gear		0.05 - 0.13	—	
	5th gear		0.05 - 0.13	—	
Thrust clearance of each gear	1st gear		0.17 - 0.30	—	
	2nd gear		0.10 - 0.37	—	
	3rd gear		0.10 - 0.33	—	
	5th gear		0.11 - 0.30	—	
Output shaft runout			—	0.05	
Synchronizer ring to shifting key groove width	1st gear		9.9 - 10.1		
	Except gear		11.3 - 11.5		
Synchronizer ring to gear clearance	1st gear		0.85 - 1.45	0.5	
	2nd gear				
	3rd gear				
	4th gear				
	5th gear				
Synchromesh shifting key height			5.0 - 5.2	4.7	
Thrust clearance of T/M clutch hub No. 2			—	Not to exceed 0.1	Selected with the Snap rings
T/M clutch No. 1, No. 2 hubs & Synchronizer No. 1 hub	Class	2	69.78 - 69.84		
		1	69.68 - 69.74		
		3	69.58 - 69.64		
T/M hub No.1, No. 2 hub sleeves & Reverse gear	Class	2	69.871 - 69.97		
		1	69.971 - 69.87		
		3	69.67 - 69.77		
Each hubs x hub sleeves & reverse gear clearance			0.03 - 0.19		
Each hub sleeves and reverse gear tilt width			—	Not to exceed 0.5	

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MANUAL TRANSMISSION

TRANSMISSION CASE COVER (PART & FULL TIME)

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
T/M case cover × Transmission case	1.5 - 2.0 0.7 - 1.0 (only three bolts)	10.8 - 14.5 5.1 - 7.2	14.7 - 19.6 6.9 - 9.8
Reverse restrict pin holder × T/M case cover	3.0 - 5.0	21.7 - 36.2	29.4 - 49.0
Back up lamp switch × T/M case cover	3.0 - 5.0	21.7 - 36.2	29.4 - 49.0
Set bolt × T/M case cover	3.0 - 4.5	21.7 - 32.5	29.4 - 44.1
Shift lock plate × T/M case cover	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Union × T/M case cover	1.3 - 1.6	9.4 - 11.6	12.7 - 15.7

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TRANSMISSION (PART & FULL TIME)

Tightening component	Tightening torque		
	kgf-m	ft-lb	N-m
Cylinder block × T/M case	5.0 - 7.0	36.2 - 50.6	49.0 - 68.6
Exhaust pipe support bracket × T/M case	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Bolt for 5th shift arm × T/M case	4.0 - 6.0	28.9 - 43.4	39.2 - 58.8
Bolt for reverse shift arm × T/M case	3.5 - 5.5	25.3 - 39.8	34.3 - 53.9
Front bearing retainer × T/M case	1.5 - 2.2	10.8 - 15.9	14.7 - 21.6
Counter shaft 5th gear × Lock nut	10.0 - 14.0	72.0 - 101.0	98.0 - 137.0

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