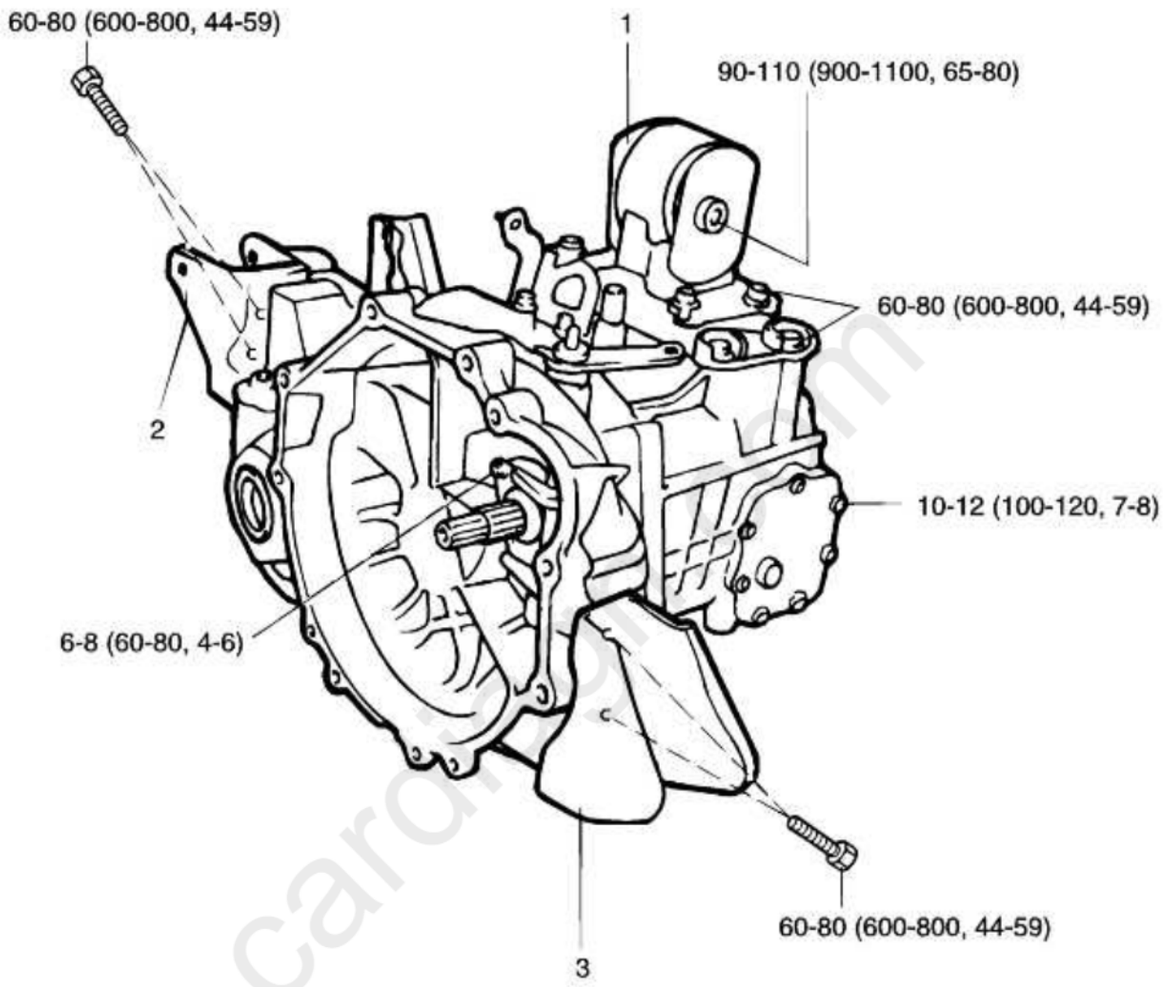
OPTIMA(MS) > 2005 > G 2.7 DOHC > Manual Transaxle System

Manual Transaxle System > Manual Transaxle System > Manual Transaxle > Components and Components Location

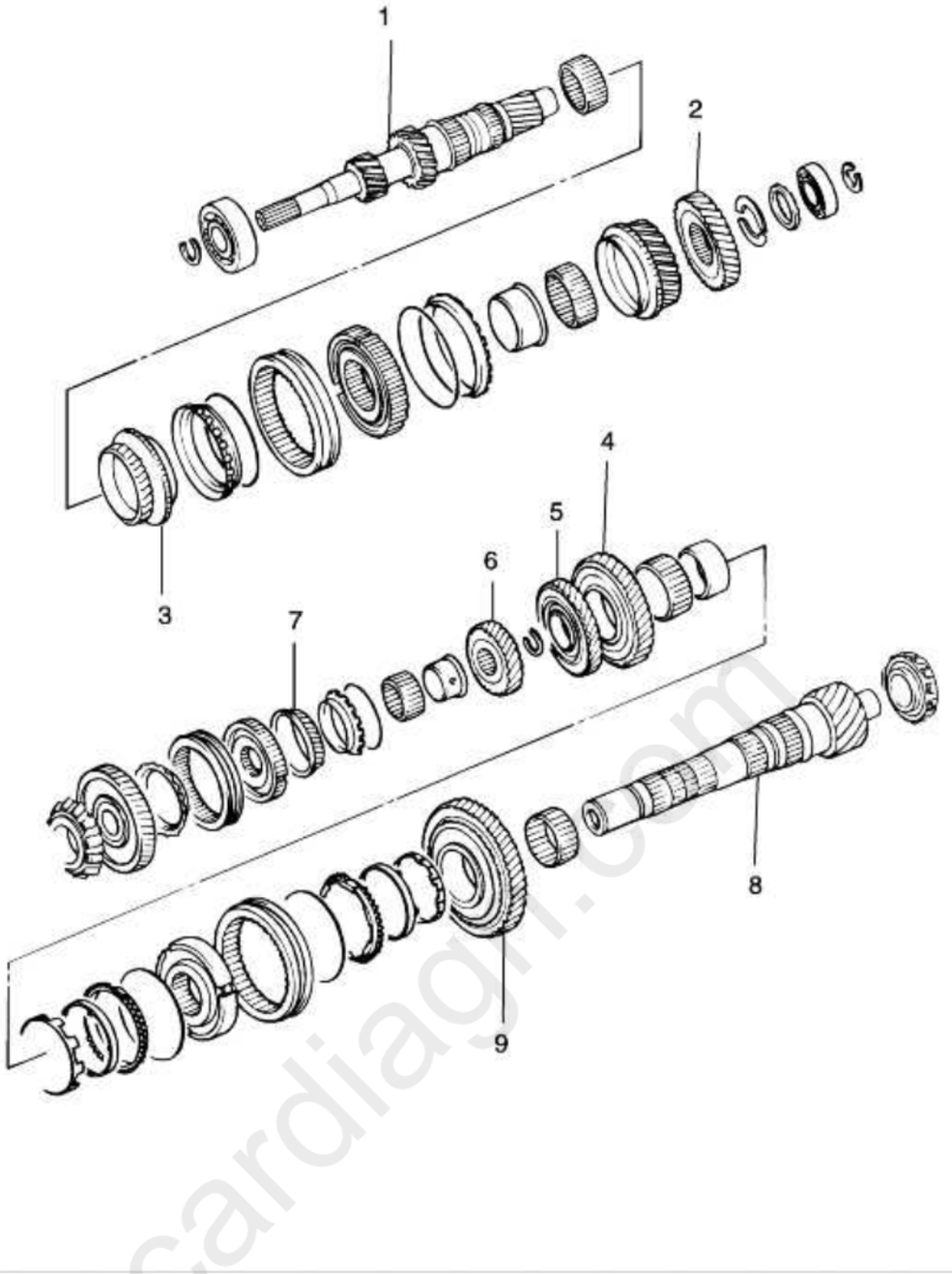
COMPONENTS



TORQUE : Nm (kg·cm, lb·ft)

1. Transmission mounting bracket
2.Rear roll stopper bracket
3. Front roll stopper bracket

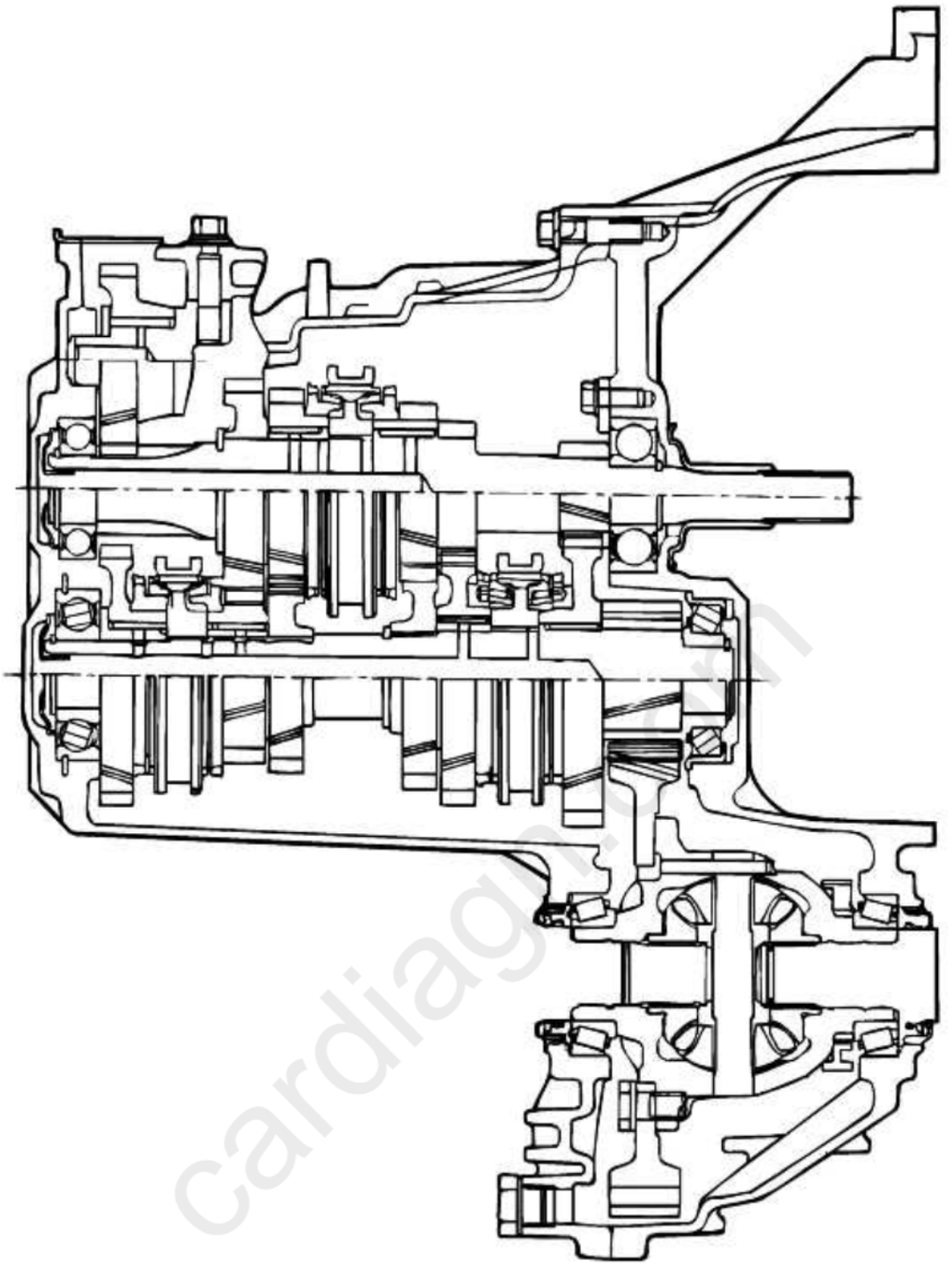
COMPONENTS(CONTINUED)



1. Input shaft
2. 4th speed gear
3. 3rd speed gear
4. 2nd speed gear
5. 3rd speed gear
6. 4th speed gear
7. 5th speed gear
8. Output shaft
9. 1st speed gear

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MANUAL TRANSAXLE DIAGRAM

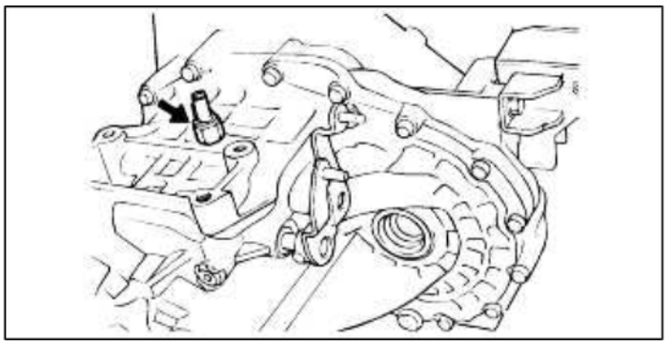


Manual Transaxle System > Manual Transaxle System > Manual Transaxle > Repair procedures

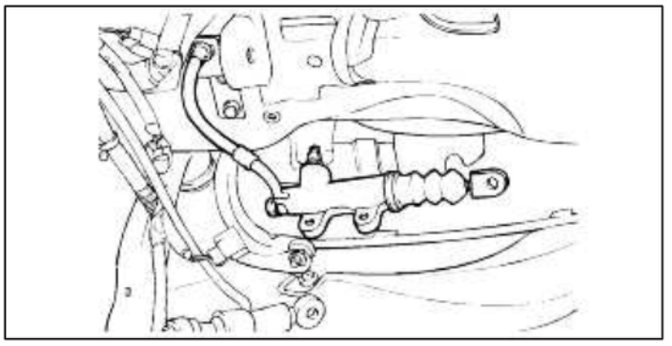
REMOVAL

1. Remove the battery (-) cable.
2. Remove the air duct.
3. Remove the air cleaner and air flow hose assembly.

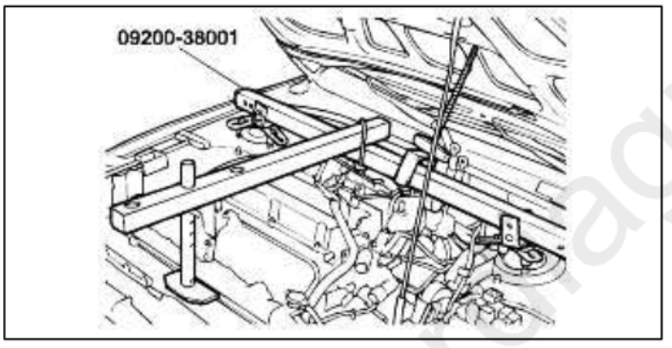
4. Disconnect the backup light switch connector.



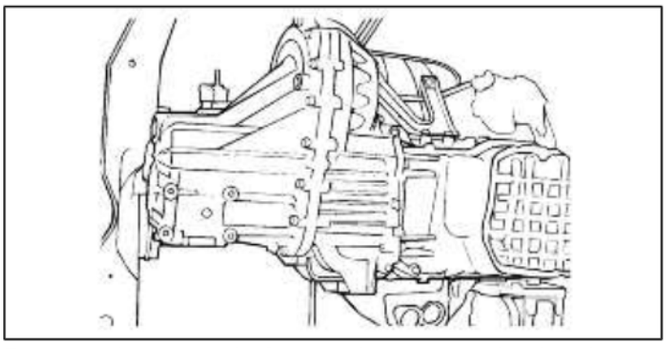
5. Disconnect the clutch tube and clip.
6. Remove the clutch release cylinder (Refer to "CH" Group).



7. Remove the speedometer cable.
8. Remove the select cable and shift cable (Refer to "MT" Group).
9. Remove the starter motor mounting bolts. Remove the transaxle assembly upper connecting bolts.
10. Attach to the engine hooks using special tool (09200-38001).



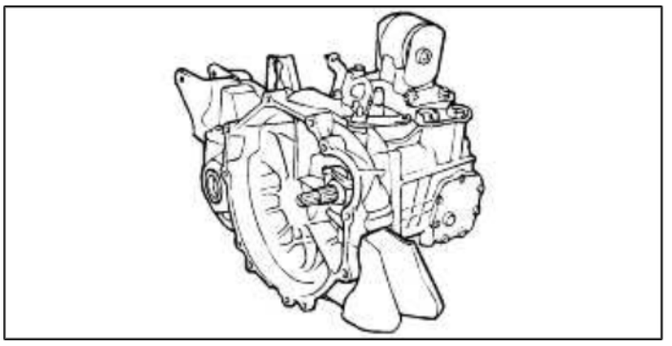
11. Remove the transaxle mounting bracket and insulator.
12. Lift up the vehicle.
13. Remove the front tire.
14. Remove the drain plug and drain the transaxle gear oil.
15. Disconnect the tie rod end, lower arm ball joint and drive shaft. (Refer to "DS" Group).
16. Remove the gear box u-joint bolt and the return tube mounting bolts.
17. Remove the front muffler.
18. Remove the sub-frame mounting bolts and the sub-frame.



19. Remove the transaxle front and rear mounting bracket.
20. Remove the transaxle side mounting bolts.

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21. Remove the transaxle assembly supporting by a jack.



NOTE

When supporting the transaxle assembly, make sure that the lifting force is applied to a wide area, not to a small localized area.

CAUTION

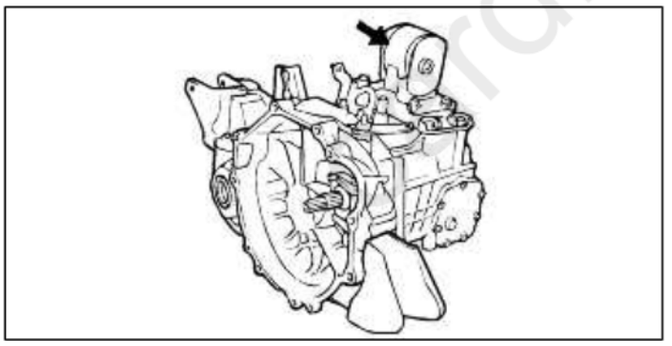
1. Engine and transmission mounting insulators should be installed the specified them.
2. Mounting bracket installation procedures.
   1. Engine mounting bracket.
   2. T/M mounting bracket.
   3. Rear roll stopper mounting bracket.
   4. Front roll stopper mounting bracket.
3. Especially, when installing front roll stopper mounting bracket, be careful not to be crushed the insulator, if being crushed, idle vibration is high.

INSTALLATION

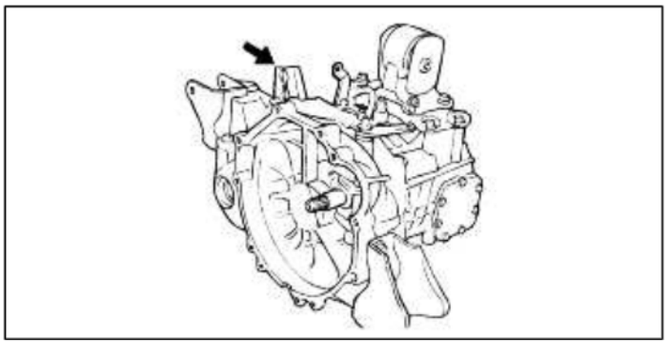
1. Installation is the reverse of removal.

DISASSEMBLY

1. Remove the T/M mounting bracket.

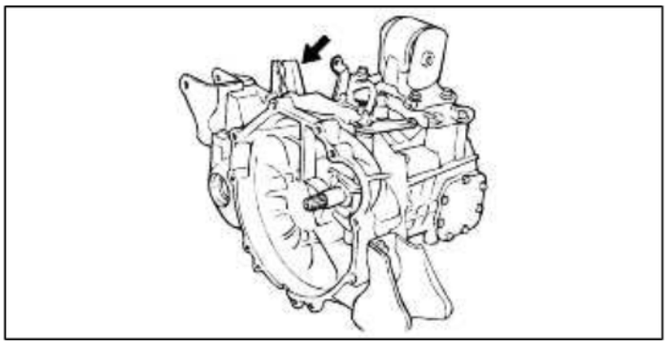


2. Remove the shift control cable bracket.

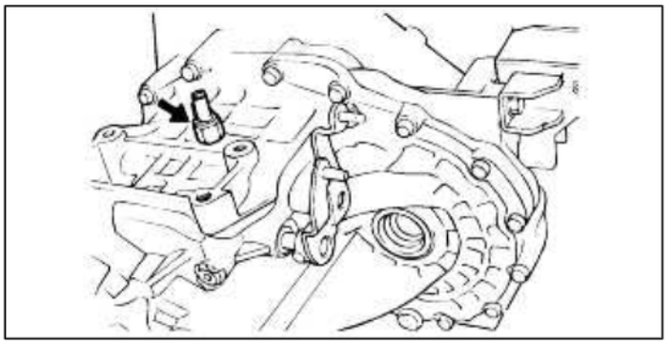


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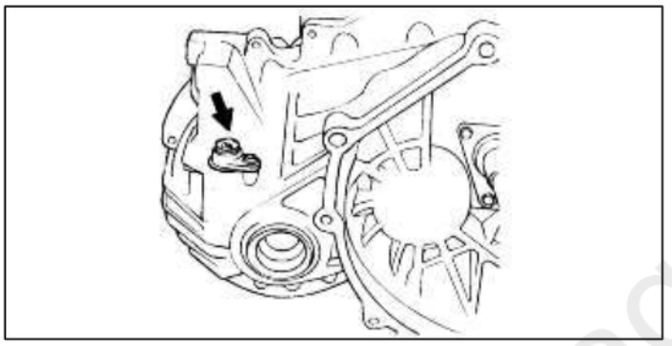
3. Remove the clutch release cylinder.



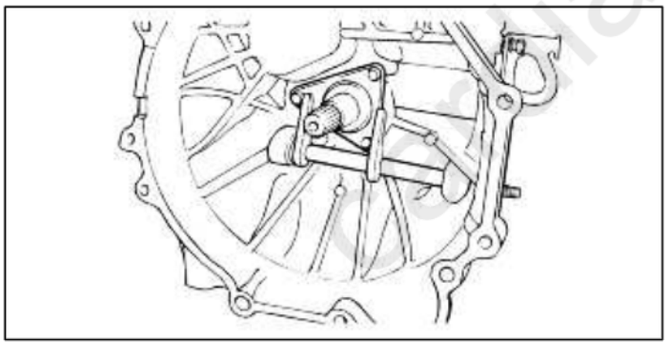
4. Remove the backup lamp switch.



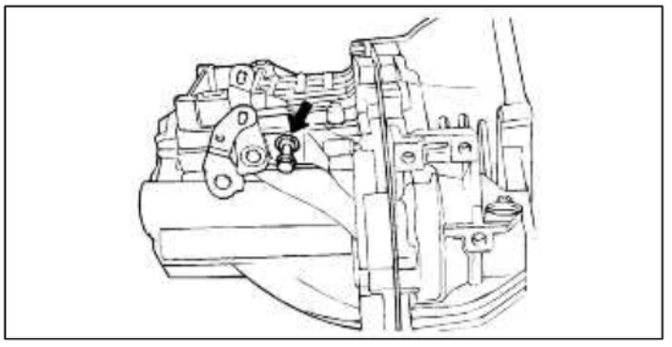
5. Remove the speedometer driven gear.



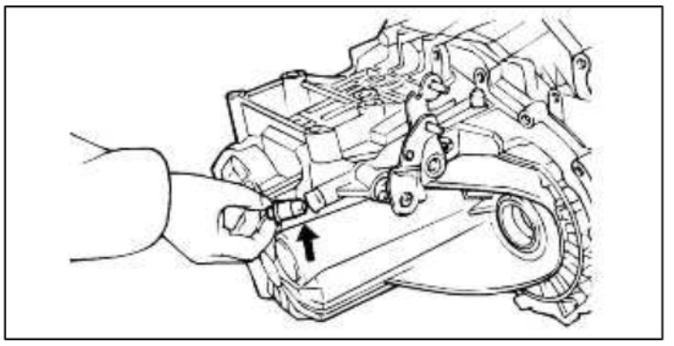
6. Remove the clutch release fork shaft and the release bearing sleeve.



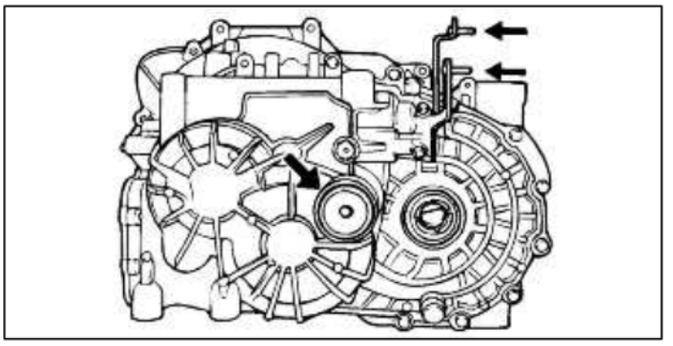
7. Remove the reamer bolt.



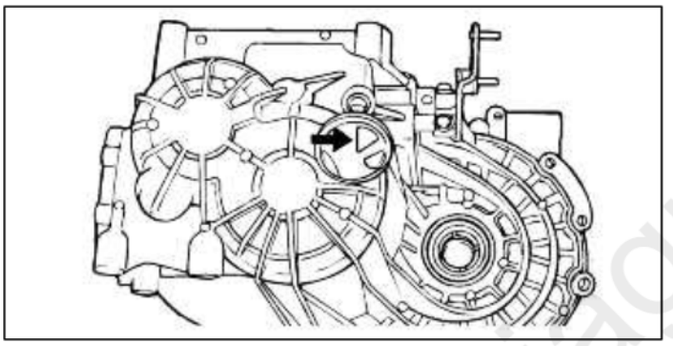
8. Remove the poppet ball assembly.



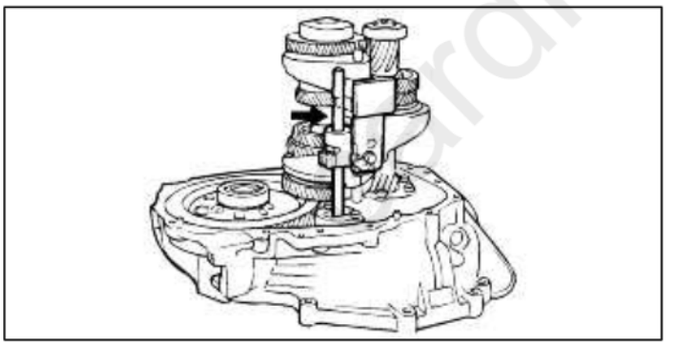
9. Remove the side cover and the reverse idler gear assembly.
10. Remove the select lever, the shift lever and sealing cap.



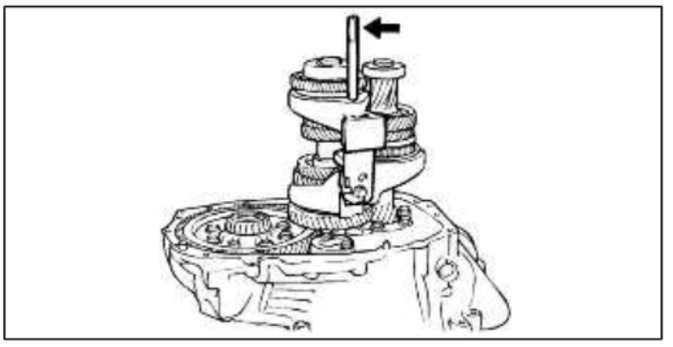
11. Remove the clutch housing from the transmission case with the snap ring extended.



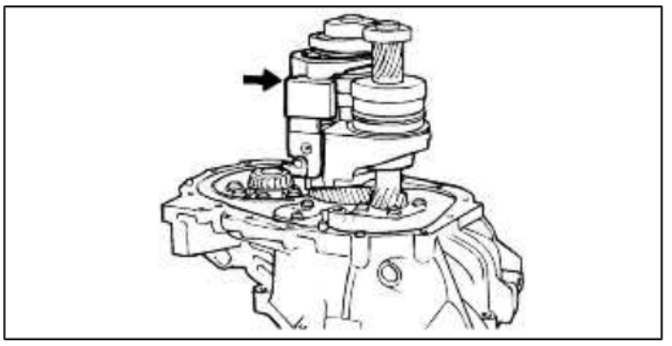
12. Remove the interlock body and the control shaft.



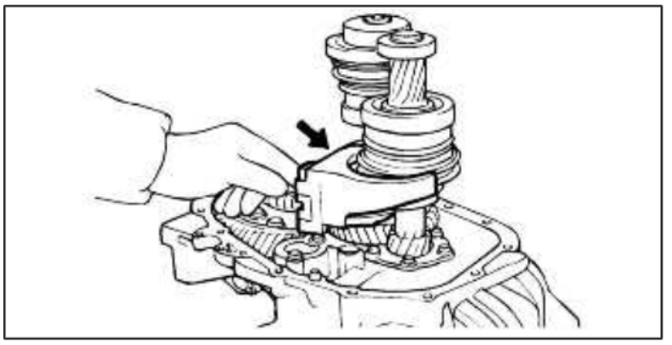
13. Remove the shift rail.



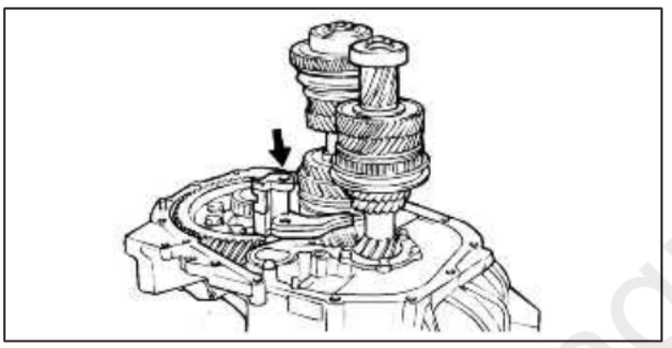
14. Remove the fork shift (5th & Rev).



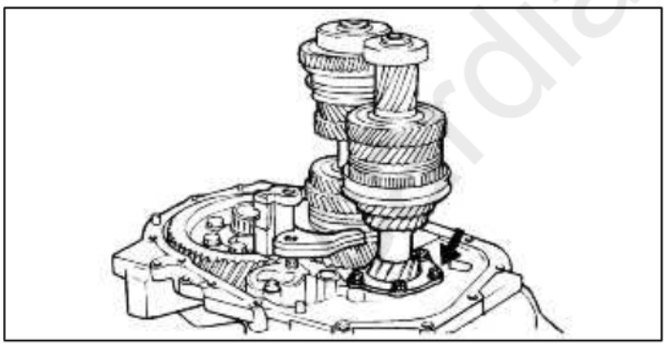
15. Remove the fork shift (3rd & 4th).



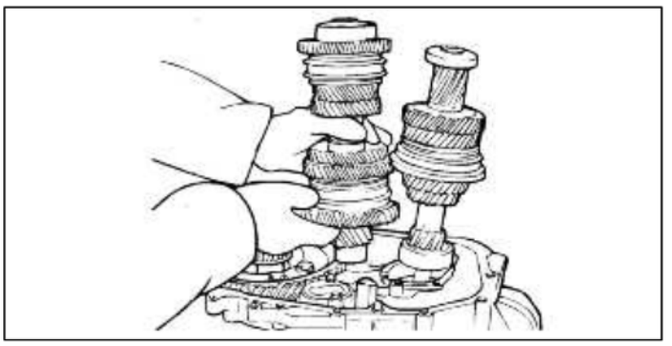
16. Remove the fork shift (1st & 2nd).



17. Remove the bearing retainer.

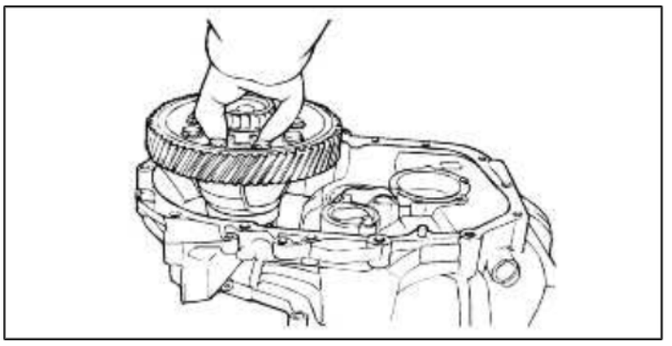


18. Remove the output shaft assembly and the input shaft assembly.

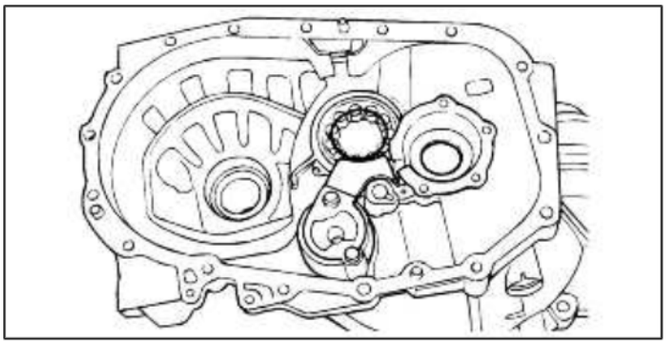


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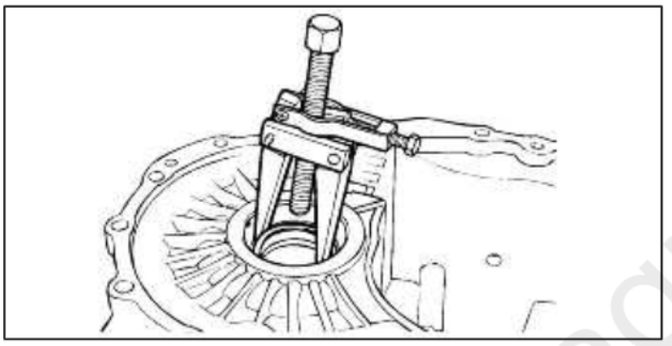
19. Remove the differential assembly.



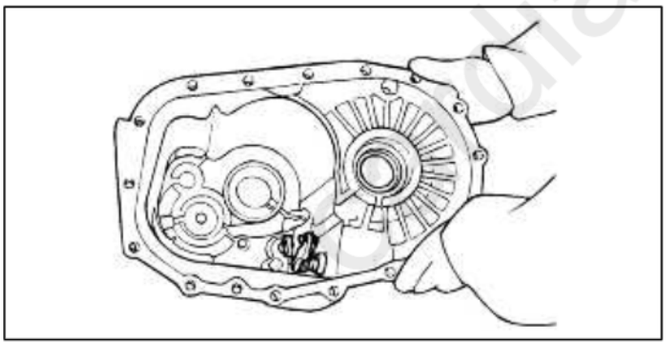
20. Remove the detent body cover and the roller bearing.



21. Remove the differential bearing outer spacer using special tool (09455-33200) and the drive shaft oil seal.



22. Remove the shift arm and the select arm from the transmission case.

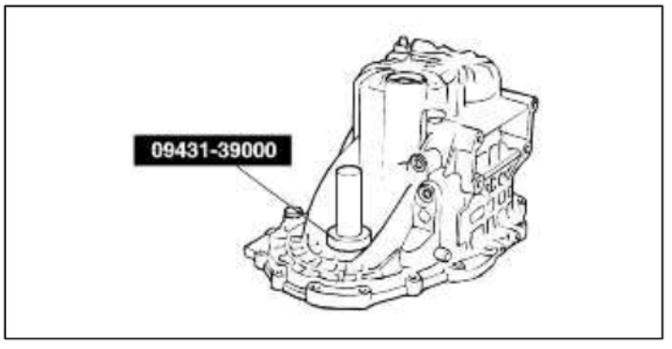


REASSEMBLY

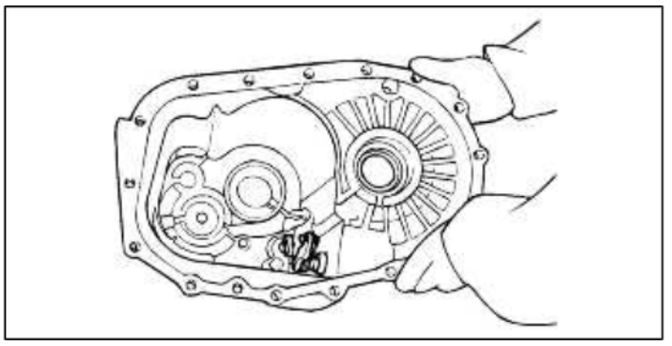
1. Install the drive shaft oil seal using the special tool (09431-21200).

NOTE

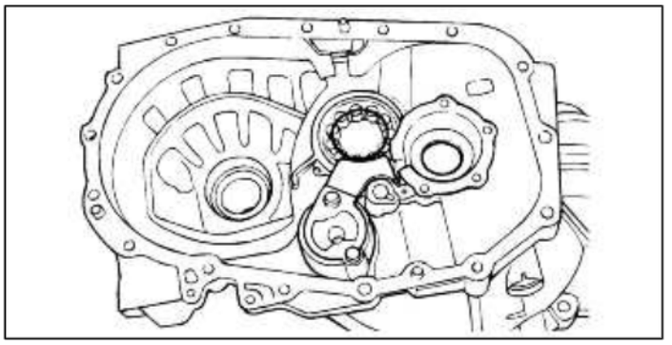
Insert the oil seal straightly.



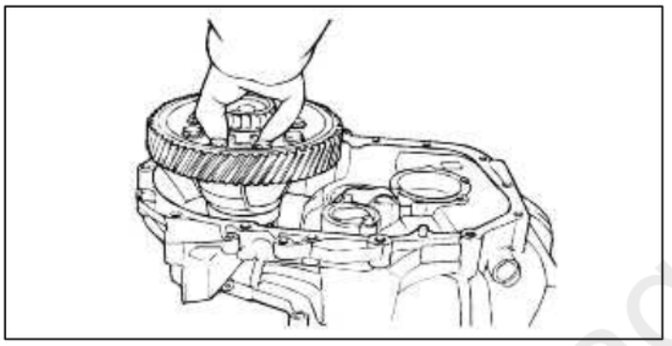
2. Install the shift arm and the select arm in the transmission case.



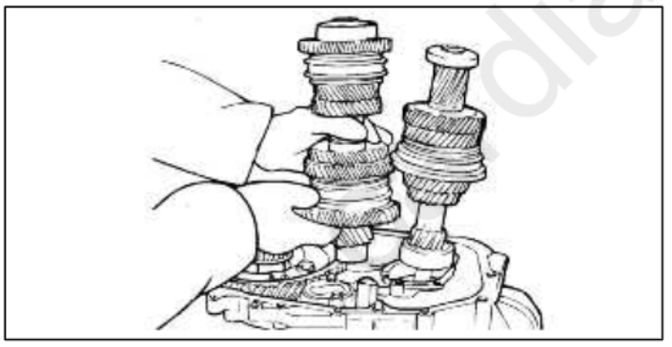
3. Install the detent body cover and the roller bearing.



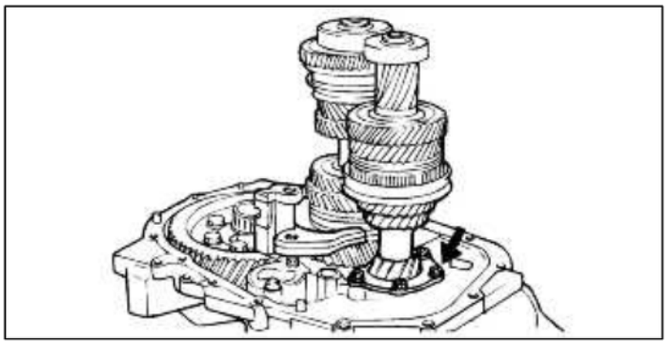
4. Install the differential assembly.



5. Install the output shaft assembly and the input shaft assembly.

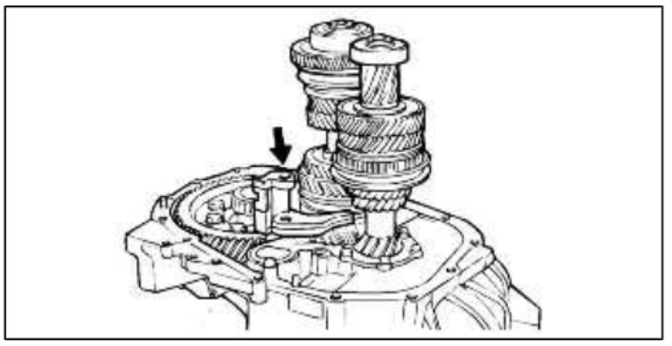


6. Install the retainer bearing.

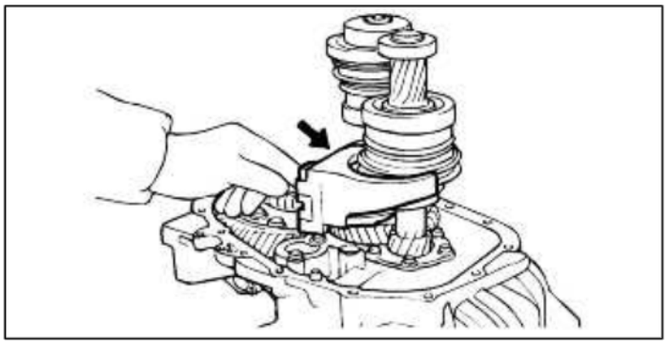


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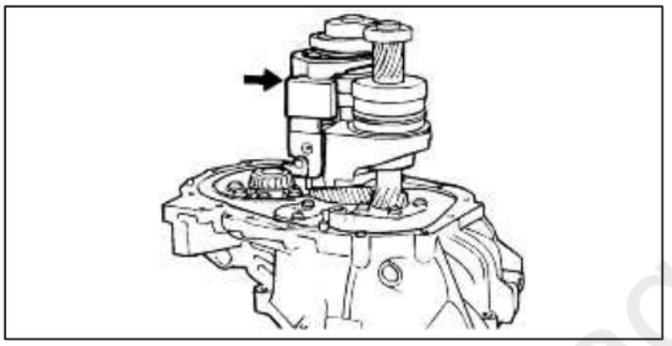
7. Install the fork shift (1st & 2nd).



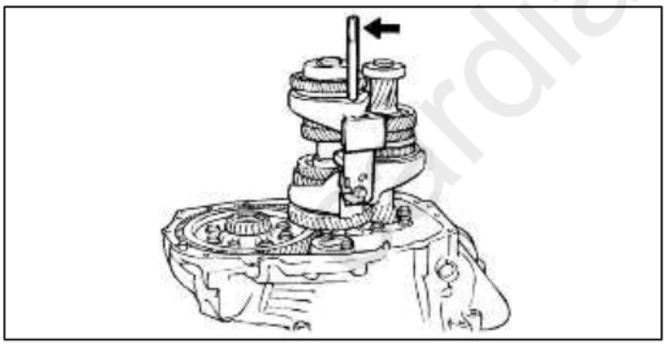
8. Install the fork shift (3rd & 4th).



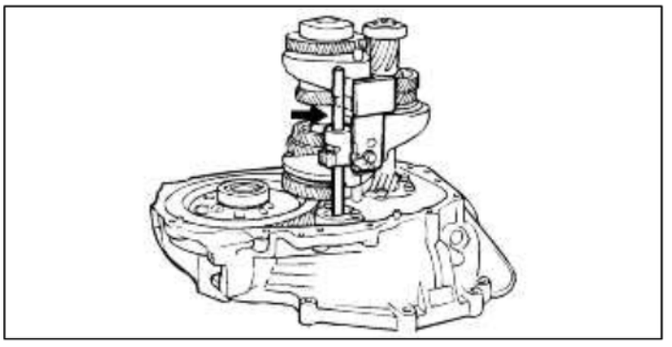
9. Install the fork shift (5th & Rev).



10. Install the shift rail.

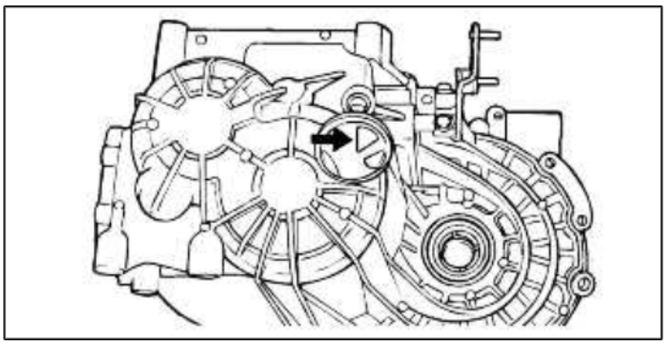


11. Install the interlock body and the control shaft.

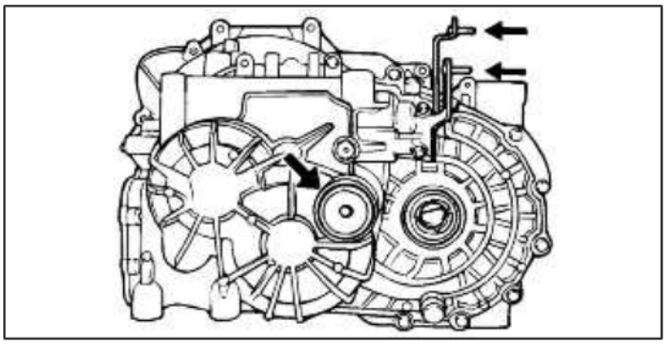


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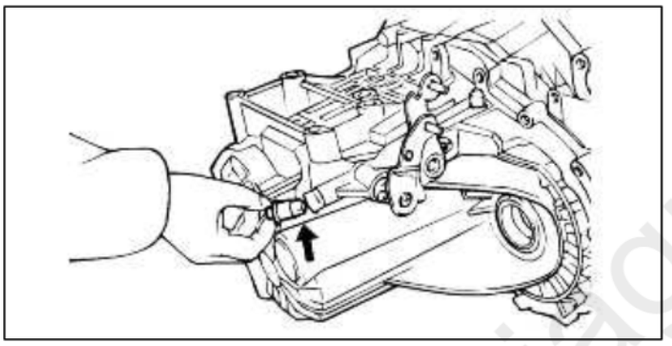
12. Assemble the clutch housing and the transmission case with the snap ring extended.



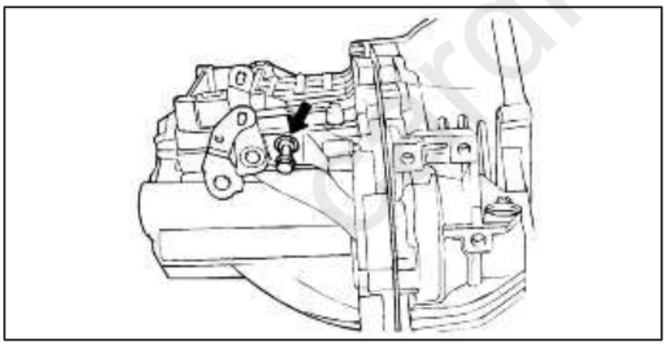
13. Install the select lever, the shift lever and the sealing cap.



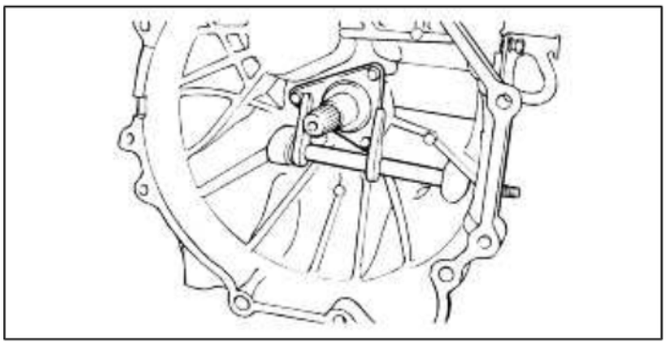
14. Install the side cover and the reverse idler gear assembly.
15. Install the poppet ball assembly.



16. Install the reamer bolt.

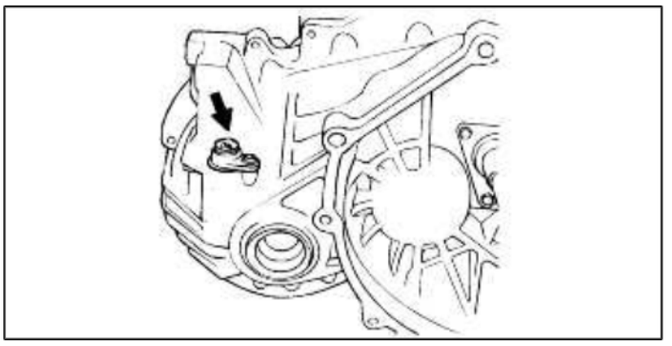


17. Install the clutch release fork shaft and the release bearing sleeve.

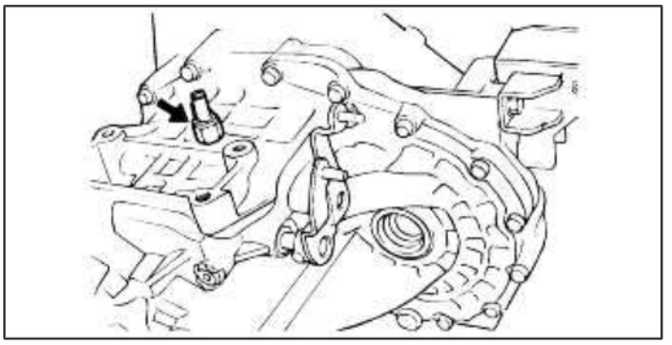


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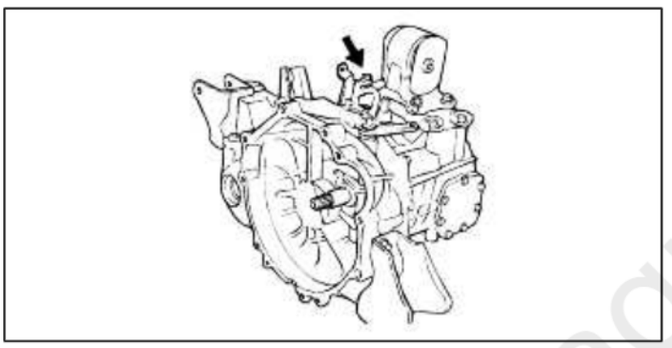
18. Install the speedometer driven gear.



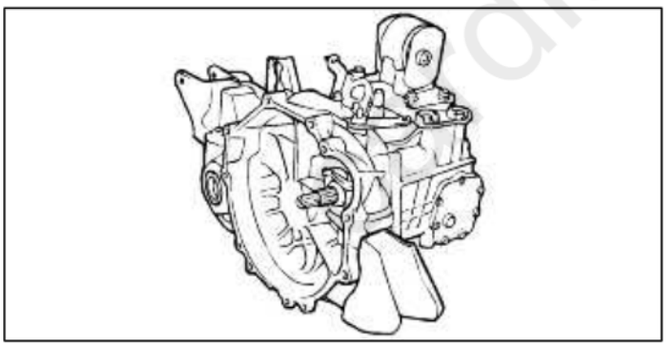
19. Install the backup lamp.



20. Install the clutch release cylinder mounting bracket.



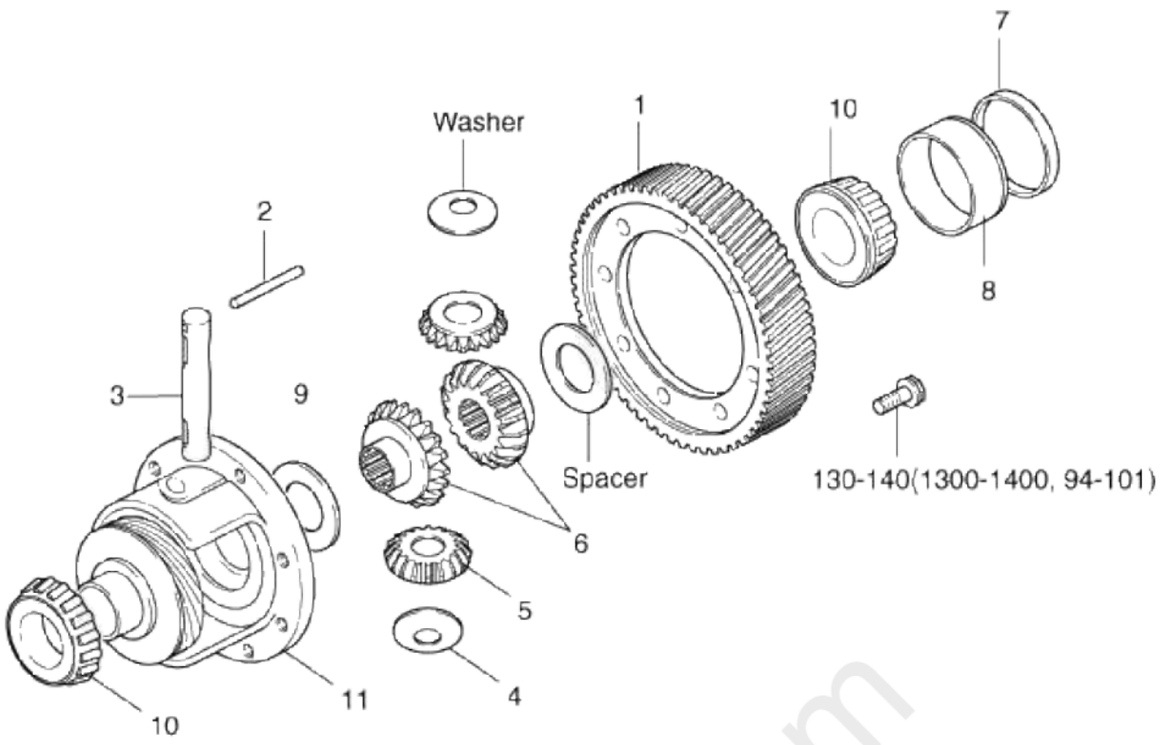
21. Install the shift control mounting bracket.
22. Install the mounting bracket.



Manual Transaxle System > Manual Transaxle Gear System > Differential > Components and Components Location

components

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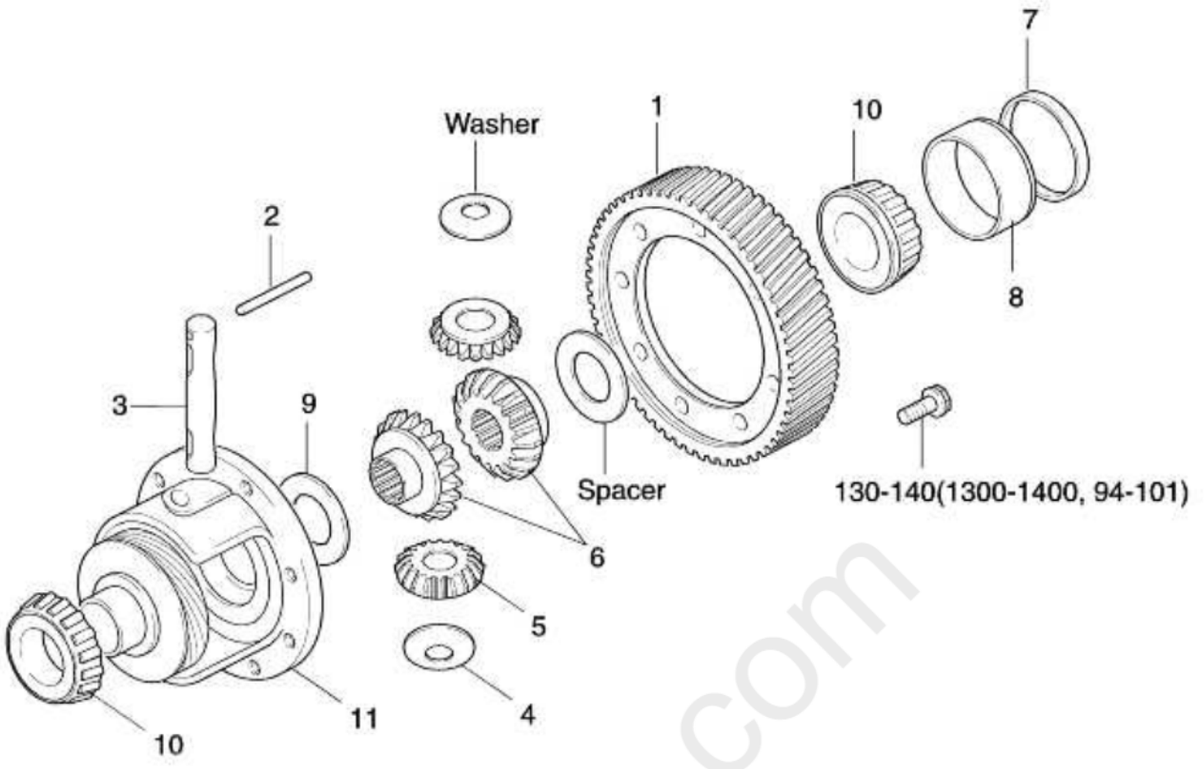


Torque: N-m (kg-cm, lb-ft)

1. Differential drive gear
2. Lock pin
3. Pinion shaft
4. Washer
5. Pinion gear
6. Side gear
7. Spacer
8. Outer race
9. Spacer
10. Taper roller bearing
11. Differential case

COMPONENTS

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Torque: N-m (kg-cm, lb-ft)

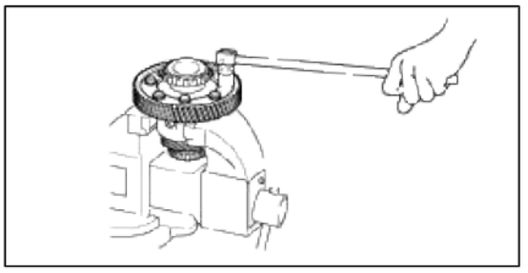
1. Differential drive gear
2. Lock pin
3. Pinion shaft
4. Washer
5. Pinion gear
6. Side gear
7. Spacer
8. Outer race
9. Spacer
10. Taper roller bearing
11. Differential case

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Manual Transaxle System > Manual Transaxle Gear System > Differential > Repair procedures

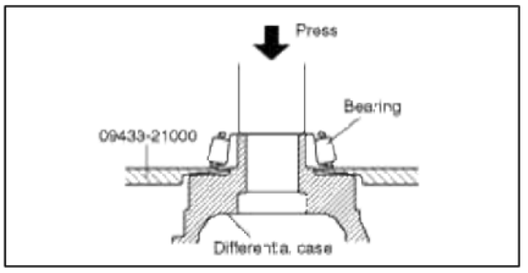
DISASSEMBLY

1. Clamp the differential case in a vise.
2. Remove the differential drive retaining bolts and remove the differential drive gea from the case.

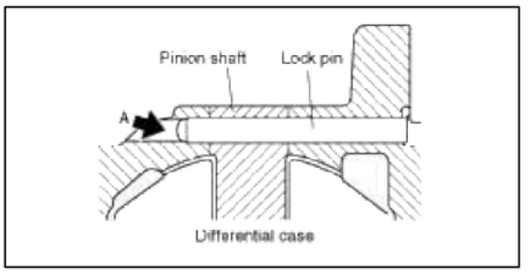


3. Remove the taper bearing using the special tool (09433-21000).

> **CAUTION**
>
> Do not reuse the bearing removed from the shaft.



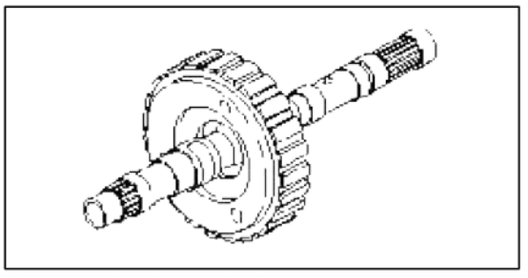
4. Drive out the lock pin from the hole A using a punch.



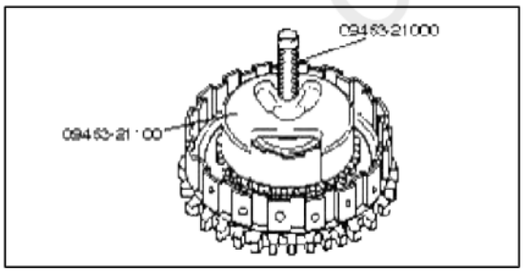
5. Drive out the pinion shaft.

DISASSEMBLY

1. Remove the input shaft snap ring.



2. Remove the input shaft.
3. Remove the 2 seal rings.
4. Remove the clutch reaction plate snap ring.
5. Remove the clutch reaction plate.
6. Remove the 4 clutch discs and 4 clutch plates.
7. Compress the clutch return springs using special tools, 09453-24000 and 09453-21000 then remove the clutch spring retainer snap ring.

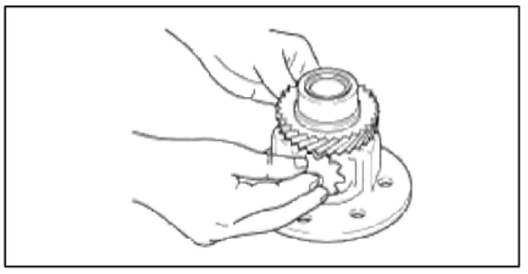


8. Remove the clutch spring retainer.
9. Remove the D-ring seal.
10. Remove the clutch return spring.
11. Remove the underdrive clutch piston using compressed air.
12. Remove the 2 D-ring seals.

REASSEMBLY

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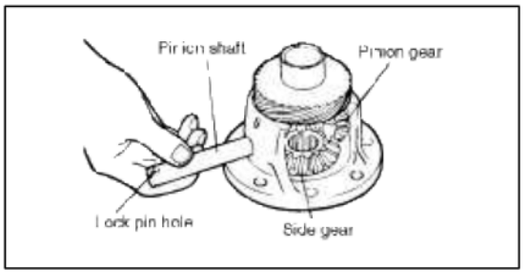
1. Install the spacer on the back of the side gear and then install the gear in the differential case.



CAUTION

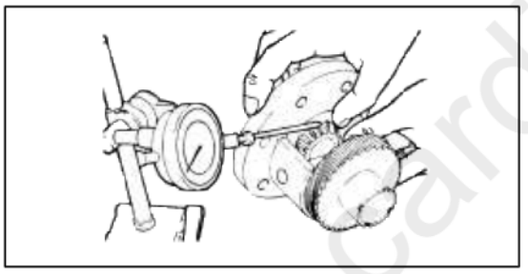
1. When installing a new side gear, use a spacer of medium thickness [0.83-0.92 mm (0.33-0.036 in.)].
2. Do not reuse the lock pin.
3. The lock pin head must be sunk below the flange surface of the differential case.

2. Set the washer on the back of each pinion and insert the two pinions to specified position while engaging them with the side gears by turning them.
3. Insert the pinion shaft.



4. Measure the backlash between the side gears and pinions.

Standard value : 0.025-0.150 mm (0.001-0.006 in.)
0.025-0.0150 mm (0.001-0.006 in.)



5. If the backlash is out of specification, disassemble and install the correct spacer, reassemble and remeasure.

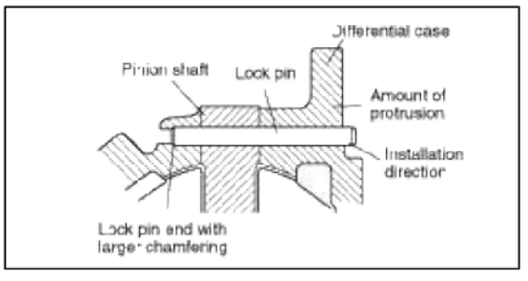
CAUTION

Adjust the backlash of both side gears to the same specification.

6. Align the pinion shaft lock pin hole with the case lock pin hole and insert the lock pin.

CAUTION

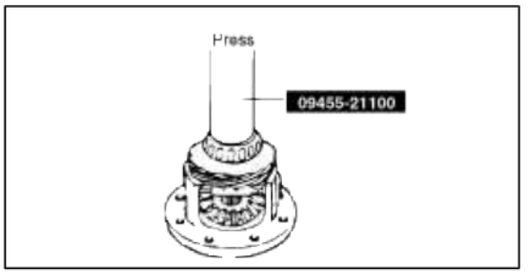
1. Do not reuse the lock pin.
2. The lock pin head must not protrude more than 3 mm (0.0118 in.) gear in the differential case.



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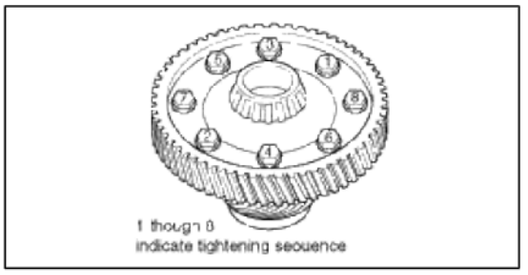
7. Install the tapered roller bearing on both sides of the differential case using the special tool (09455-21100).

> **CAUTION**
>
> When press-fitting the bearing, press on the inner race only.



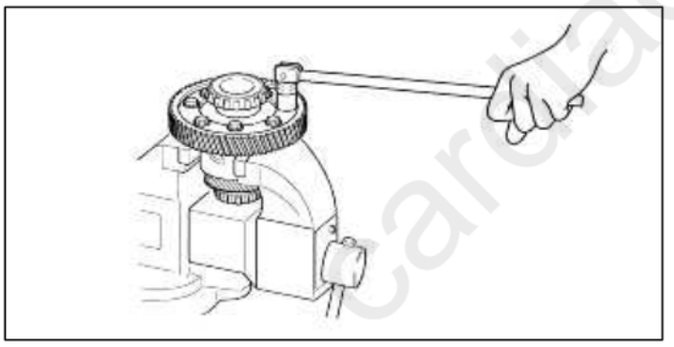
8. Apply specified sealant to the entire threads of the bolts. Tighten to specifications using the sequence shown in the illustration.
   Specified sealant : BM stud locking No.2471

> **CAUTION**
>
> If a bolt is reused, remove the old sealant from the threads.



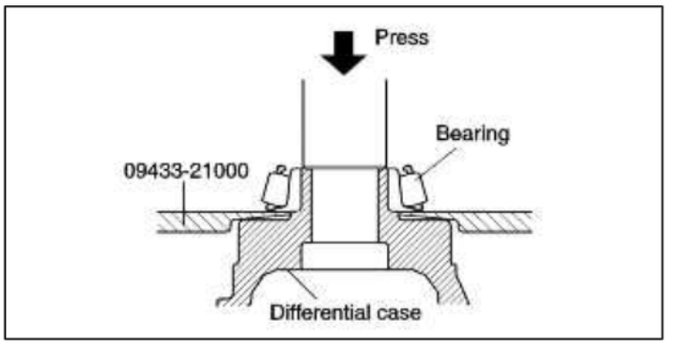
DISASSEMBLY

1. Clamp the differential case in a vise.
2. Remove the differential drive retaining bolts and remove the differential drive gear from the case.



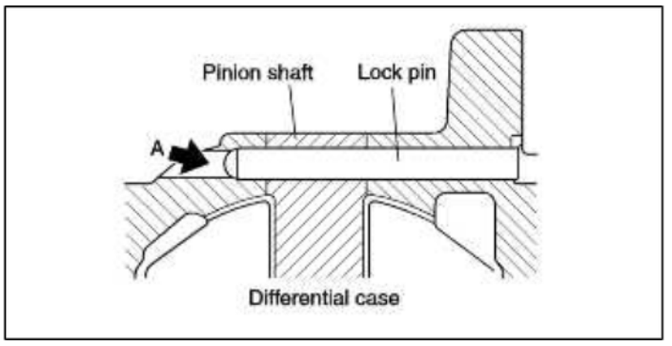
3. Remove the taper bearing using the special tool (09433-21000).

> **CAUTION**
>
> Do not reuse the bearing removed from the shaft.



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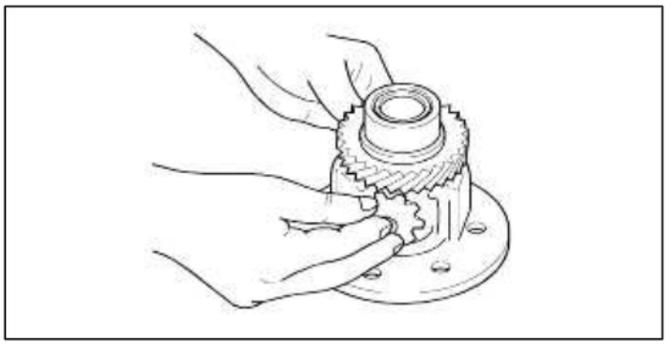
4. Drive out the lock pin from the hole A using a punch.



5. Drive out the pinion shaft.
6. Remove the pinion gears, washers, side gear and spacers.

REASSEMBLY

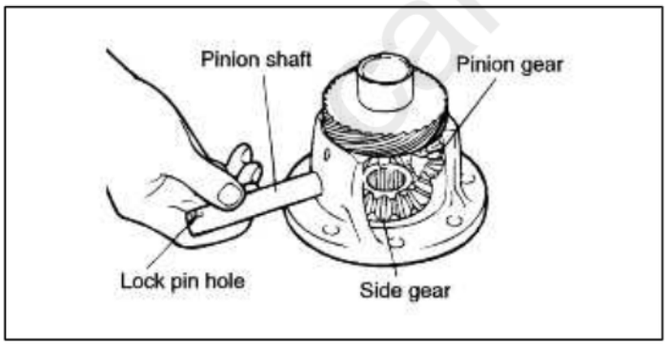
1. Install the spacer on the back of the side gear and then install the gear in the differential case.



CAUTION

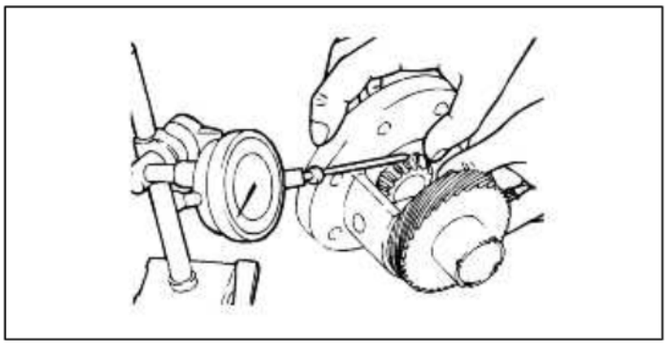
1. When installing a new side gear, use a spacer of medium thickness [0.93-1.00 mm (0.036-0.04 in.)].
2. Do not reuse the lock pin.
3. The lock pin head must be sunk below the flange surface of the differential case.

2. Set the washer on the back of each pinion and insert the two pinions to specified position while engaging them with the side gears by turning them.
3. Insert the pinion shaft.



4. Measure the backlash between the side gears and pinions.

Standard value : 0.02-0.12L mm (0.00079-0.0047L in.)

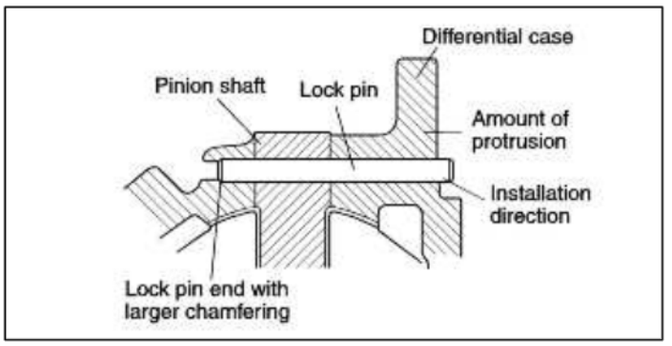


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5. If the backlash is out of specification, disassemble and install the correct spacer, reassemble and remeasure.

> CAUTION
>
> Adjust the backlash of both side gears to the same specification.

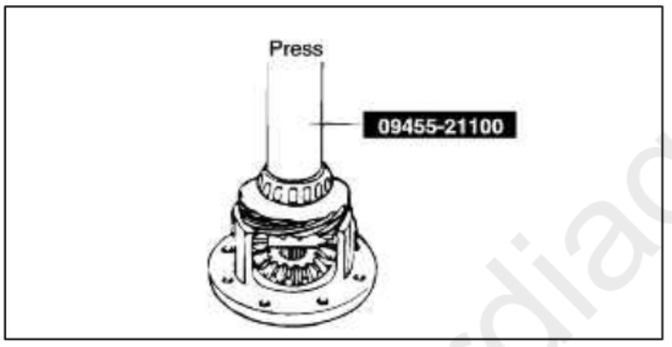
6. Align the pinion shaft lock pin hole with the case lock pin hole and insert the lock pin.



> CAUTION
>
> 1. Do not reuse the lock pin.
> 2. The lock pin head must not protrude more than 3 mm (0.118 in.).

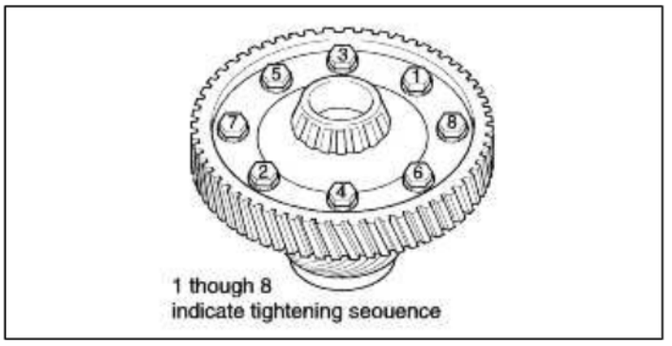
7. Install the tapered roller bearings on both sides of the differential case using the special tool (09455-21100).

> CAUTION
>
> When press-fitting the bearing, press on the inner race only.



8. Apply specified sealant to the entire threads of the bolts. Tighten to specifications using the sequence shown in the illustration.
   Specified sealant : Three bond 1303

> CAUTION
>
> If a bolt is reused, remove the old sealant from the threads.

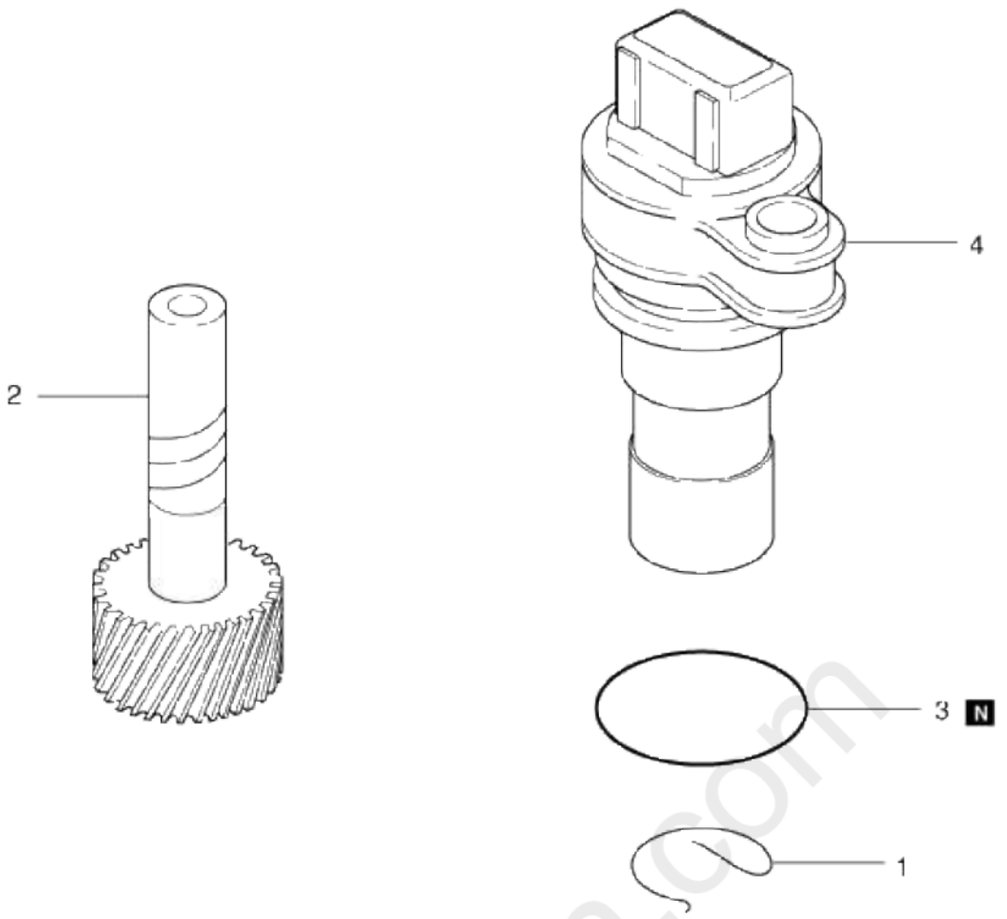


Manual Transaxle System > Manual Transaxle Gear System > Speedometer Driven Gear Assembly > Components and Components Location

VEHICLE SPEED SENSOR

components

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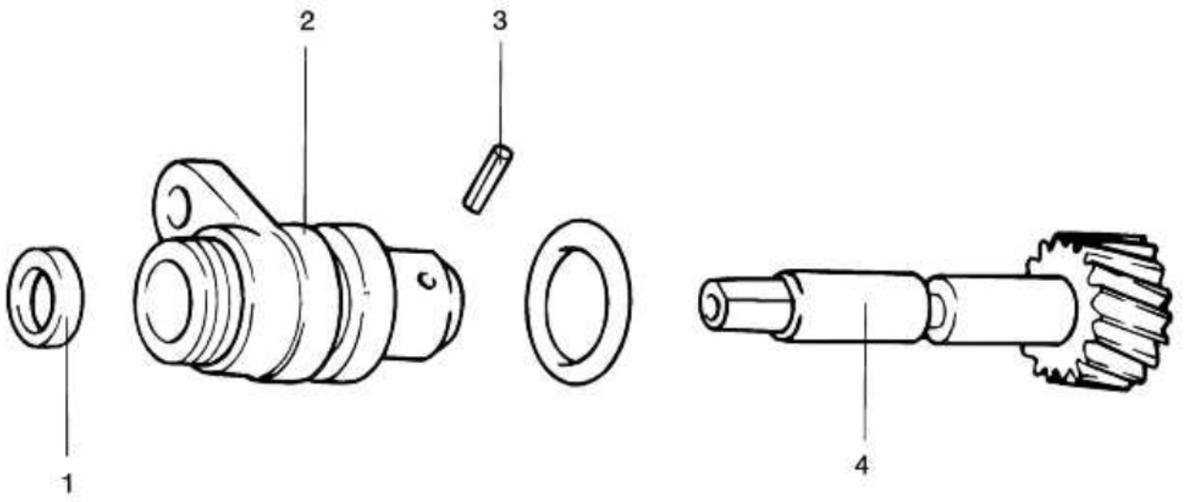


1. E-clip
2. Speedometer driven gear
3. O-ring
4. Sleeve

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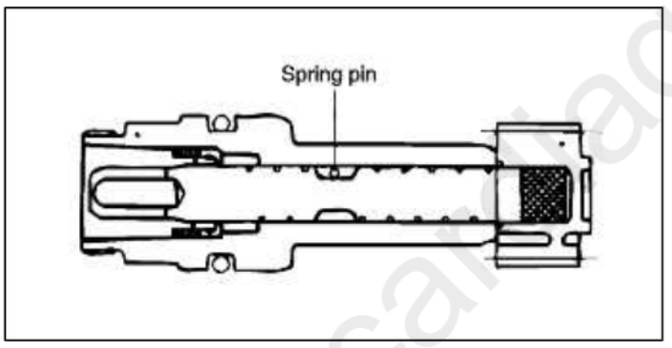
1. Apply gear oil sparingly to the speedometer driven shaft and insert the shaft.

COMPONENTS



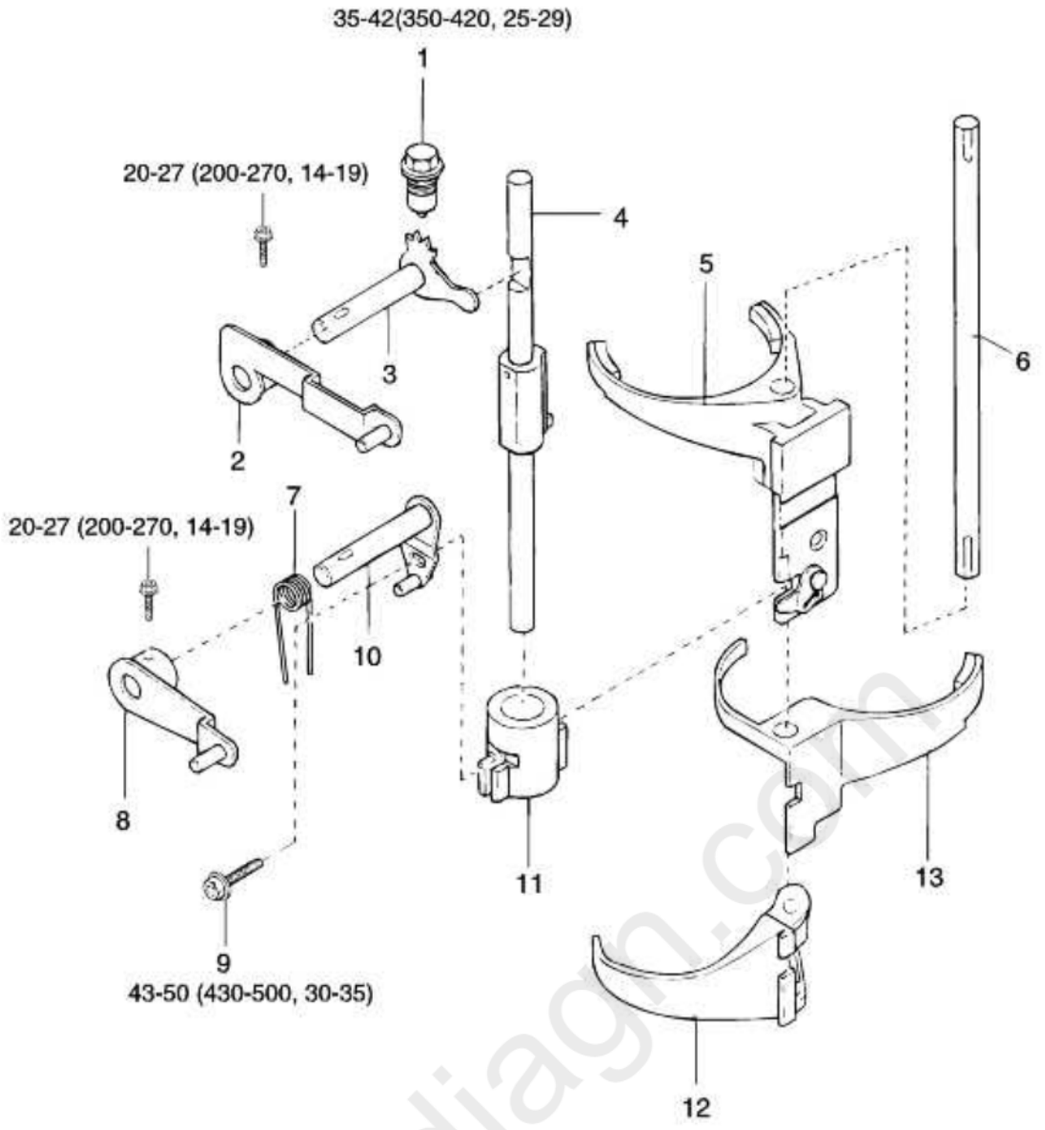
1. Oil seal
2. Sleeve
3. Spring pin
4. Speedometer driven gear

1. Apply gear oil sparingly to the speedometer driven gear shaft and insert the shaft.
2. Install the spring pin in such a way the slit does not face the gear shaft.



Manual Transaxle System > Manual Transaxle Control System > Shift Fork > Components and Components Location

COMPONENTS



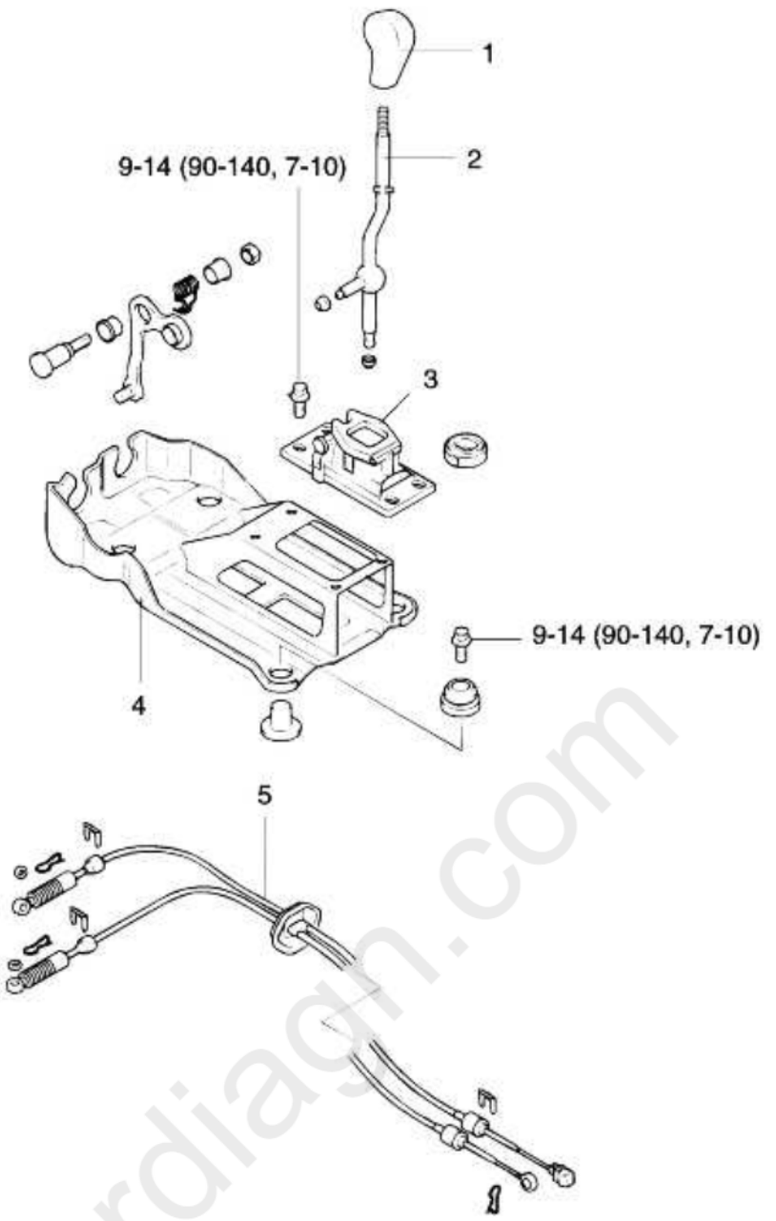
TORQUE : Nm (kg·cm, lb·ft)

1. Poppet ball
2. Shift lever
3. Shift arm
4. Control shaft
5. Shift fork (5th & Rev)
6. Shift rail
7. Return spring
8. Select lever
9. Interlock body bolt
10. Select arm
11. Interlock body
12. Shift fork (1st & 2nd)
13. Shift fork (3rd & 4th)

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Manual Transaxle System > Manual Transaxle Control System > Manual Transaxle Shift Control > Components and Components Location

COMPONENTS

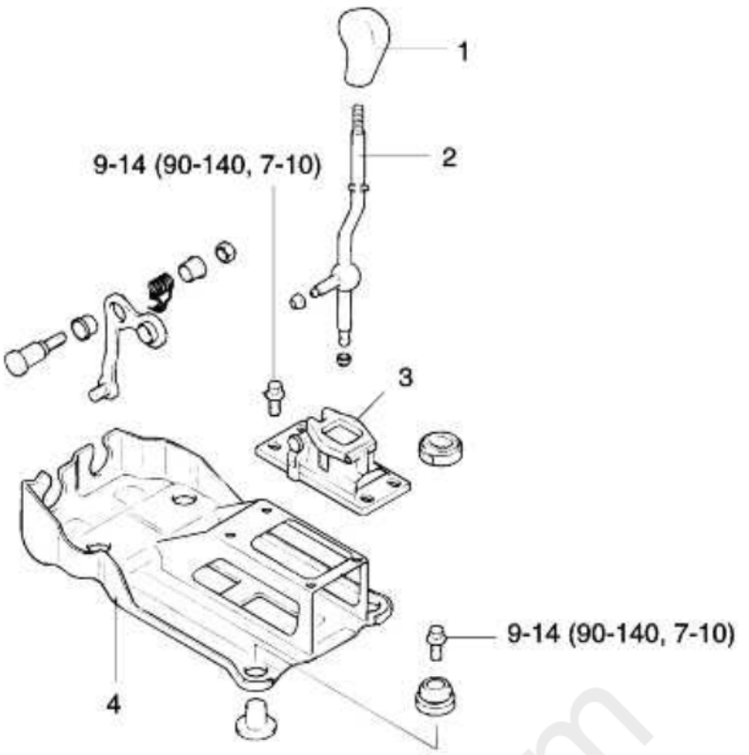


TORQUE : Nm (kg·cm, lb·ft)

1. Knob
2. Shift lever
3. Housing
4. Bracket
5. Cable assembly

COMPONENTS(CONTINUED)

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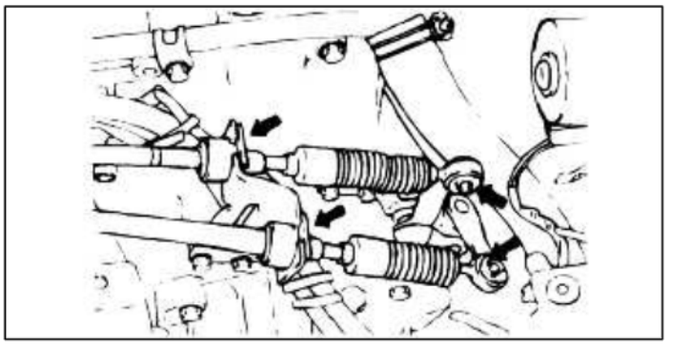
TORQUE : Nm (kg·cm, lb·ft)

1. Knob
2. Shift lever
3. Housing
4. Bracket

Manual Transaxle System > Manual Transaxle Control System > Manual Transaxle Shift Control > Repair procedures

REMOVAL

1. Remove the console assembly (Refer to CONSOLE).
2. Remove the self locking pin and clips (shift lever side).
3. Remove the shift lever assembly.
4. Remove the retainer and bolts.
5. Remove the snap pin and clips (Transaxle side).



6. Remove the shift cable and select cable.

INSPECTION

1. Check the select cable for proper operation and for damage.
2. Check the shift cable for proper operation and for damage.
3. Check the boot for damage.
4. Check each bushing for wear, abrasion, sticking, restricted movement or damage.
5. Check for a weak or damaged spring.

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INSPECTION

1. Inspect the bushing for wear or damage.
2. Inspect the return spring for damage or deterioration.

REASSEMBLY

1. Install the shift lever assembly.
2. Installation of shift lever and select cable.

REASSEMBLY

1. Apply multi-purpose grease to the sliding part of the bushings.
2. Reassembly is reverse of the disassembly.

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