WORKSHOP MANUAL

NKR · NPR · NQR · NPS

MANUAL TRANSMISSION AND CLUTCH

MXA SERIES

SECTION 7

ISUZU

ISUZU

International Service & Parts

Tokyo, Japan

SERVICE STANDARD (CONT.)

TRANSFER

Items		Service Standard	Service Limit
SHIFT ARM			
Shift Arm Thickness			
(2WD–4WD)	mm (in)	10.0 (0.3937)	9.0 (0.3543)
(High–Low)	mm (in)	10.5 (0.4134)	9.5 (0.3740)
DETENT SPRING			
Detent Spring Free Length	mm (in)	31.6 (1.2441)	30.1 (1.1850)
MAIN SHAFT			
Main shaft Run-Out	mm (in)	–	0.1 (0.0039)
GEAR			
Gear Inside Diameter			
Input Shaft High Gear	mm (in)	81.000 (3.1890)	81.100 (3.1929)
Input Shaft Low Gear	mm (in)	58.000 (2.2835)	58.100 (2.2874)
Front Drive Gear	mm (in)	55.000 (2.1654)	55.100 (2.1693)
BALL BEARING			
Ball Bearing Run-Out	mm (in)	–	0.2 (0.008)

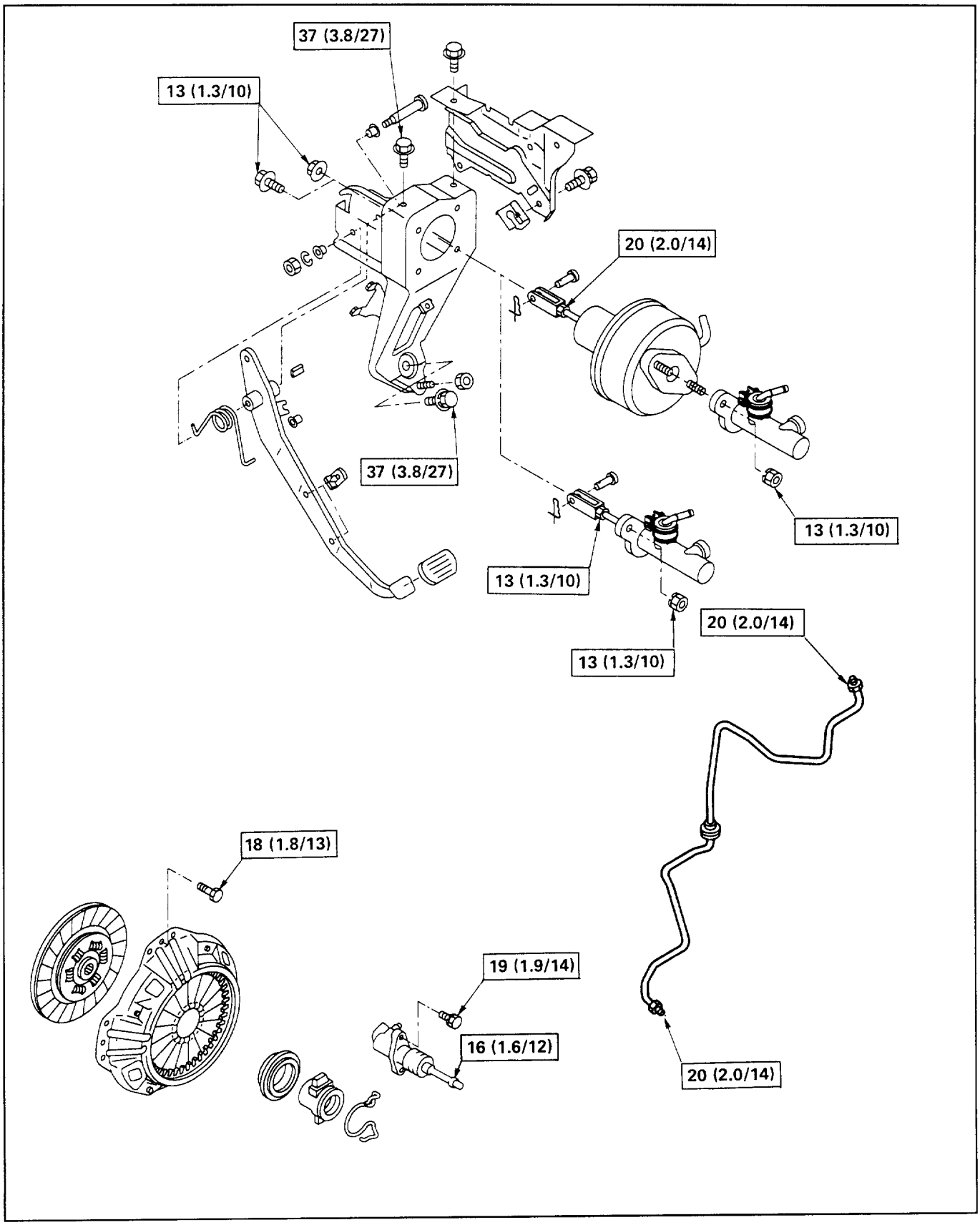
POWER TAKE OFF

Items		Service Standard	Service Limit
BALL BEARING			
Ball Bearing Run-Out	mm (in)	–	0.2 (0.008)
GEAR			
Output Shaft and Output Gear Bushing Clearance	mm (in)	–	0.2 (0.008)
SHIFT ARM			
Shift Arm Thickness	mm (in)	9.0 (0.354)	8.0 (0.315)

FIXING TORQUE (CONT.)

CLUTCH

N·m(kg·m/lb·ft)



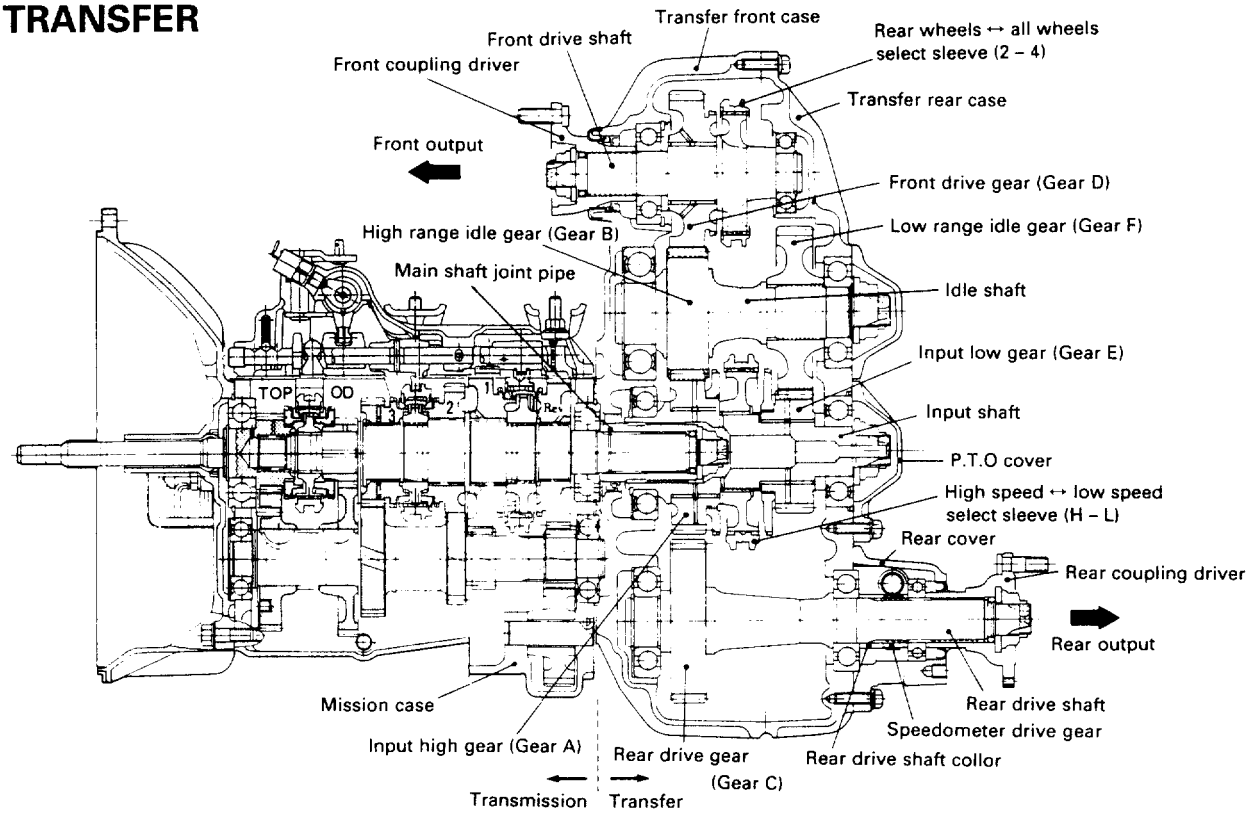
For MXA model transmission, a forward 5 or 6-shift all synchromesh type and a backward 1-shift constant-mesh type transmission are employed. The transmission case is made of a high rigidity cast iron, and the front cover integral with the clutch housing is made of aluminum die-cast. An aluminum die-cast control box containing a gear shift and gear select mechanism is installed on the top of the transmission case. A window for power take-off is also provided on the left side. For all the gears, helical gears are employed to reduce noises.

The synchromesh mechanism that employs balking rings use block rings of special brass to obtain improved synchromesh performance.

With the main shaft screwed up at the rear, ball bearings are employed for the bearings on both sides of the main shaft and the counter shaft, and needle roller bearings employed for the bearings at the tip end of the main shaft and also for those of the 1st gear, 2nd gear, 3rd gear, 5th gear, reverse gear and 6th counter gear to secure improved durability and reduced noises.

Furthermore, with the anti-lash mechanism employed for the engagement of the top gear with the counter gear, fine-pitch gears are also employed for the top gear, the 5th and the 6th gear to reduce noises.

TRANSFER

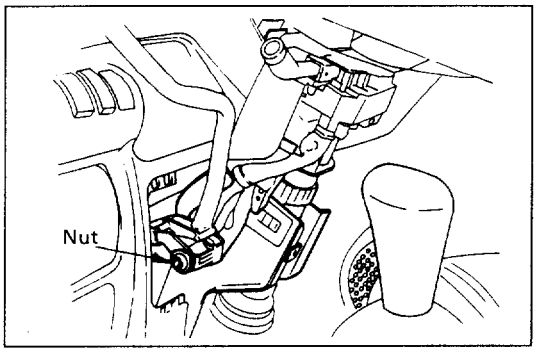


To cope with the 4-wheel drive (4WD), the transmission that contains a sub-transmission (transfer) with a one-step reduction gear for 4WD at the rear of transmission is employed.

The transmission gear ratio employed is the same as that of MXA5R type transmission.

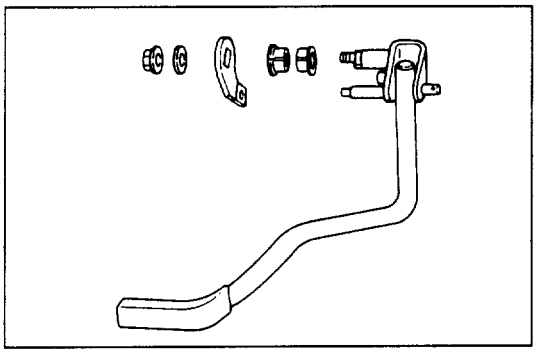
Besides use of M10x1.25 screws to clamp the transmission and transfer, a clutch housing made of cast iron is employed to increase joint rigidity and strength.

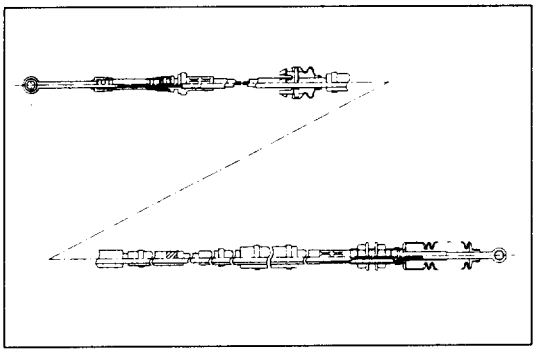
In the transfer, selection of rear drive (2WD) or 4-wheel drive (4WD) is done with vacuum actuator by one-touch switch operation, and selection of 4WD high speed range (4H) or 4WD low speed range (4L) is done with cable by column lever operation. Selection of 4-wheel drive low speed range (4L) during rear drive (2WD) causes a drive system trouble or motor trouble. To avoid this, a mechanical interlock system is employed between rear drive (2WD) 4-wheel drive (4WD) select rod and 4-wheel drive high speed range (4H) low speed range (4L) select rod, so that the 4-wheel drive low speed range (4L) cannot be selected during rear drive (2WD).



- Remove the fulcrum pin nut.
- Remove the control lever assembly with bush.

5. **Clip**
   - Remove the clips from the select bracket (transfer side) and the bracket (control lever side).
6. **Adjust Nut**
   - Loosen the adjust nut.
7. **Split Pin**
   - Remove the fixing bolt.
8. **Clip and Clamp**
   - Remove the clips and the clamp that fix the control cable to the frames.
9. **Control Cable Assembly**

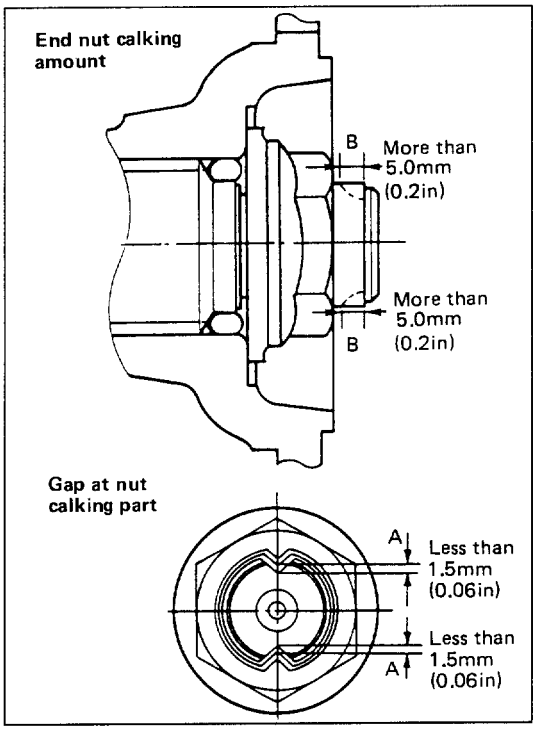




Inspection and Repair

Check the cables for any deformation, damage or rust, and also check the sliding portion for any abnormal condition.

When there is any abnormal condition found, replace it with a new one.



- align the lock nut with the V-shaped groove at the tip of the main shaft, and caulk the nut lip portion by using a chisel.
  (Round edge approximately 1 mm (0.04 in)×60°).
- As shown in the illustration, be sure to caulk the nut lip so that the clearance between the V-shaped groove portion at the tip of the main shaft and the caulked up lip(A) is less than 1.5 mm (0.06 in), and the caulking length(B) is 5 mm (0.2 in) or more.

CAUTION:

Be sure to confirm that there is no crack at the caulked portion of the end nut after caulking.

5. Parking Brake Drum

- Adjust the parking brake after installation.

1) Rotate the brake drum to align the adjust hole with the adjuster.
2) Move the camshaft lever from side to side several times to center the brake shoes.
3) Insert a screwdriver into the hole and rotate the adjuster by pushing it upward until the shoes drag on the drum.
4) Back off the adjuster 30 notches.

- Install the adjust hole cover.

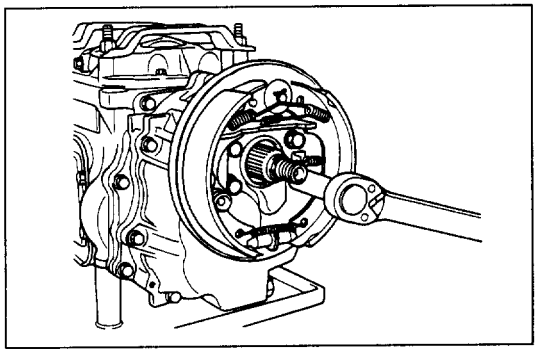
Adjust Cover Hole Bolt Torque	N·m (kg·m/lb·in)
8 (0.8/69)	

6. Propeller Shaft

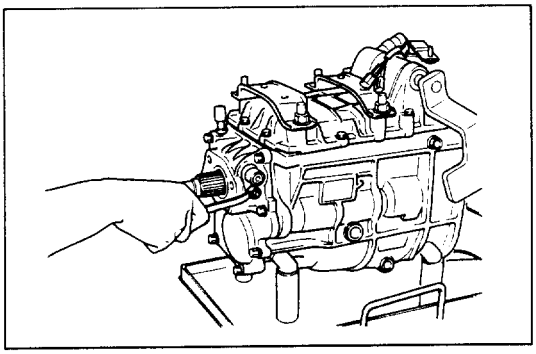
- Align reference marks previously made during removal.

Propeller Shaft Bolt Torque	N·m (kg·m/lb·ft)
103 (10.5/76)	

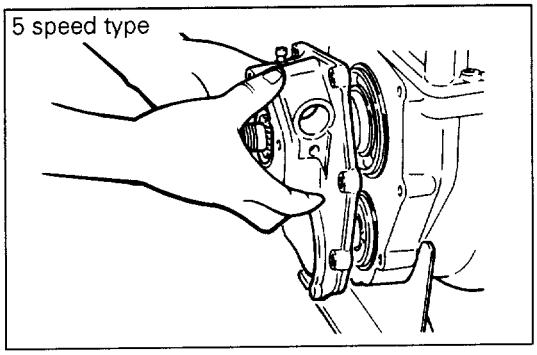
- Remove the safety stands.



4. **Parking Brake Assembly**



5. **Car Speed Sensor Driven Gear Assembly**
   - Remove the car speed sensor with the key rod.
   - Remove the fixing bolt
   - Remove the driven gear assembly.



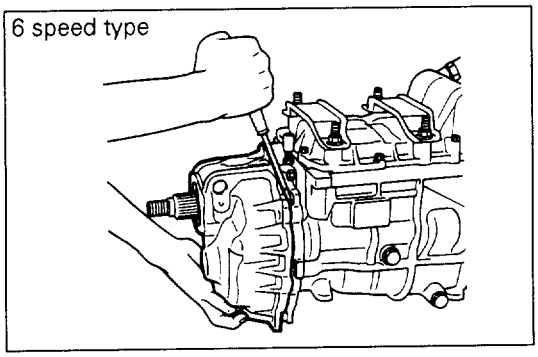
6. **Breather (for 5 speed type only)**
7. **Rear Cover**
   - **5 speed type**

     Remove 7 fixing bolts. Tap the rear cover with a copper or plastic hammer to remove it. The rear cover is provided with lugs for hammering both side.

   - **6 speed type**

     Remove 7 fixing bolts. Prize off the rear cover with a screwdriver.

   - Remove the oil seal using the screwdriver.



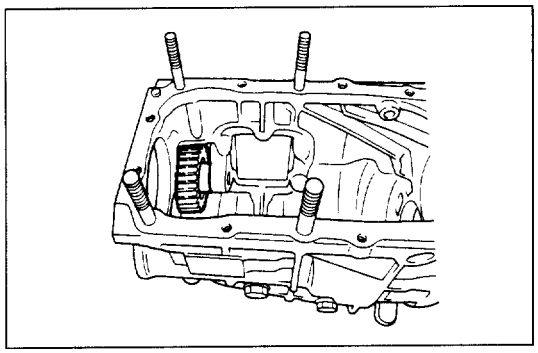
CAUTION:

Take care not to damage the sealing seat of the rear cover with the screwdriver.

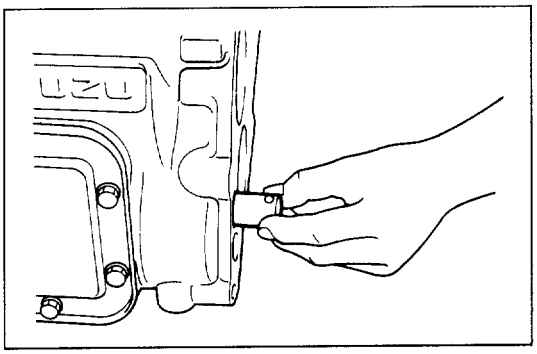
8. **Car Speed Sensor Drive Gear**
   - **6 speed type**

     Remove car speed sensor drive gear together with ball bearing(10).

9. **Spacer (for 5 speed type only)**

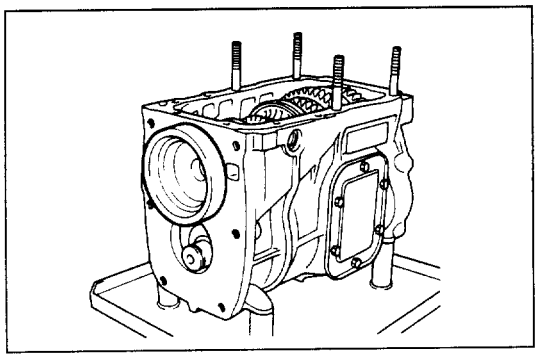


3. **Reverse Idle Gear**
   - The reverse idle gear should be installed with longer boss side turned to the forward

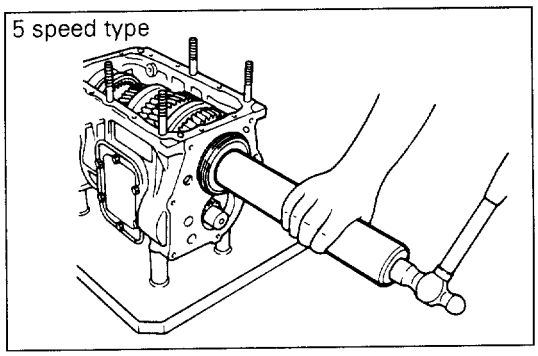


4. **Reverse Idle Gear Shaft**
   - With the ball built in the shaft rear section, install the reverse idle gear shaft from the rear side of the transmission.

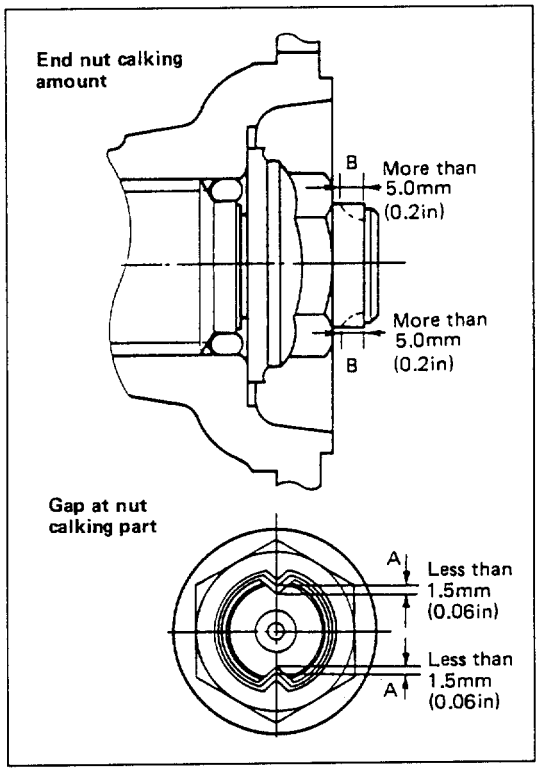
5. **Countershaft Assembly**
   - Place the counter shaft assembly in the bottom of the transmission case.
6. **Mainshaft Assembly**
   - Take care that the thrust washer of the reverse gear does not drop off.
7. **Snap Ring**
   - Install the snap ring to the main shaft rear bearing outer circumference.



8. **Main Shaft Rear Bearing**
   - Apply engine oil to the main shaft front end.
   - Hold the main shaft using the main shaft holder.
     Main Shaft Holder : 5-8840-2347-0



- Install the rear bearing using the bearing installer.
  Bearing Installer : 5-8840-2345-0



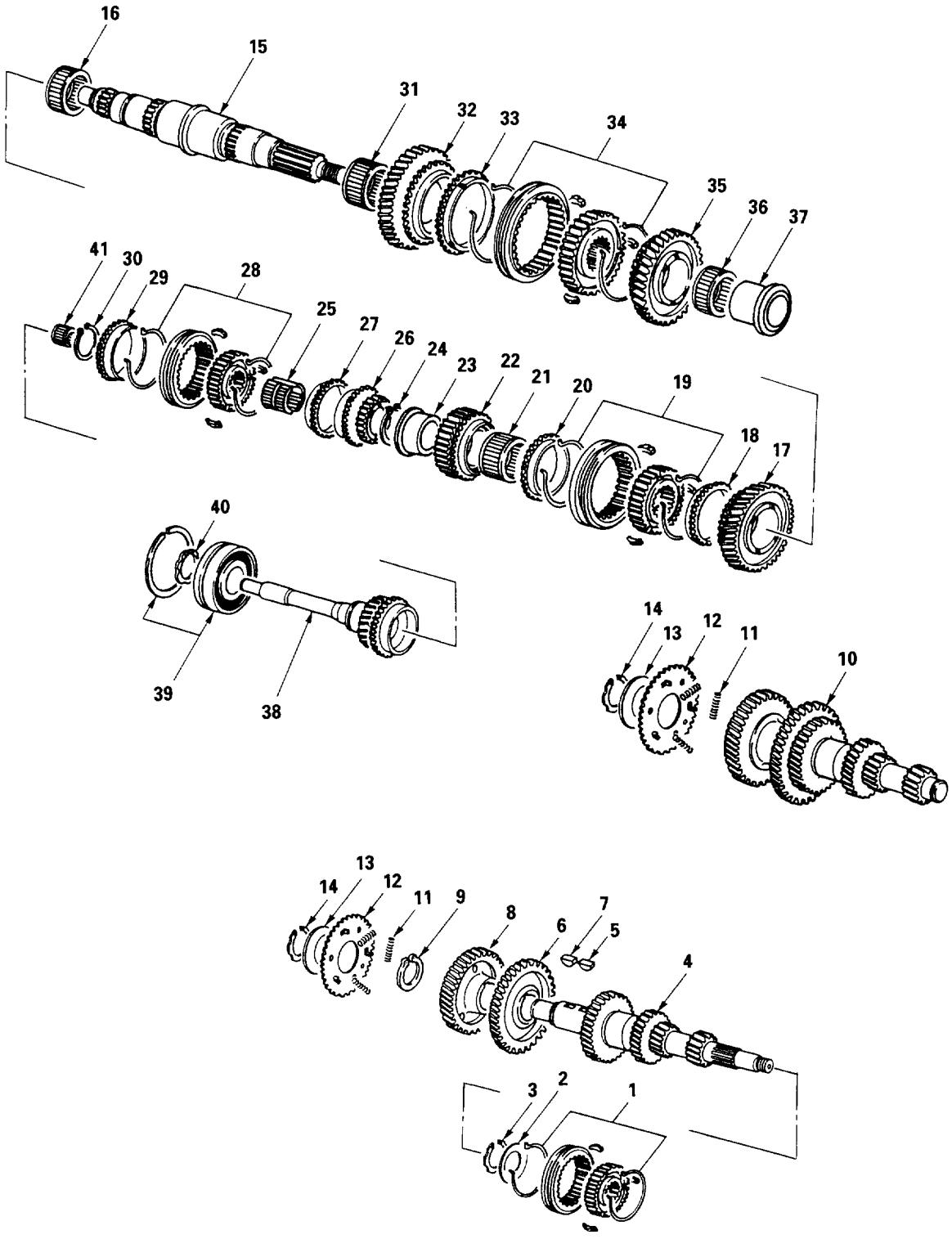
- Align the lock nut with the V-shaped groove at the tip of the main shaft, and caulk the nut lip portion by using a chisel.
  (Round edge approximately 1 mm (0.04 in)×60°).
- As shown in the illustration, be sure to caulk the nut lip so that the clearance between the V-shaped groove portion at the tip of the main shaft and the caulked up lip(A) is less than 1.5 mm (0.06 in), and the caulking length(B) is 5 mm (0.2 in) or more.

CAUTION:

Be sure to confirm that there is no crack at the caulked portion of the end nut after caulking.

42. Parking Brake Drum

REASSEMBLY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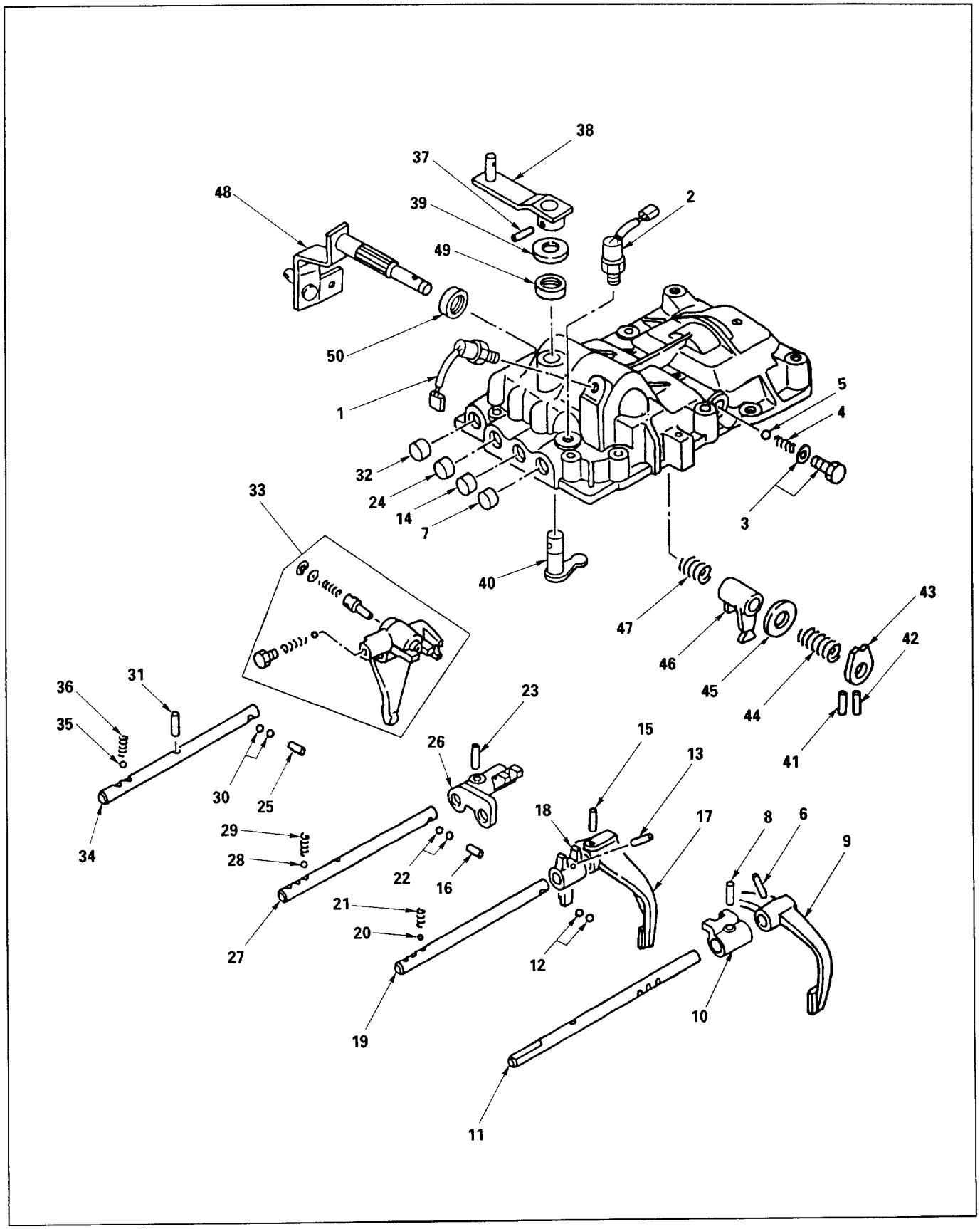
CONTROL BOX
DISASSEMBLY

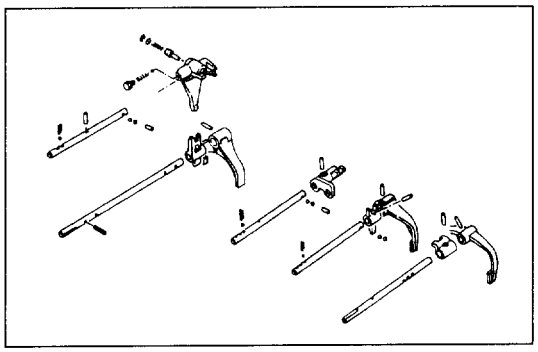


INSPECTION AND REPAIR

Make the necessary adjustments, repairs, and part replacement if excessive wear or damage is discovered during inspection.

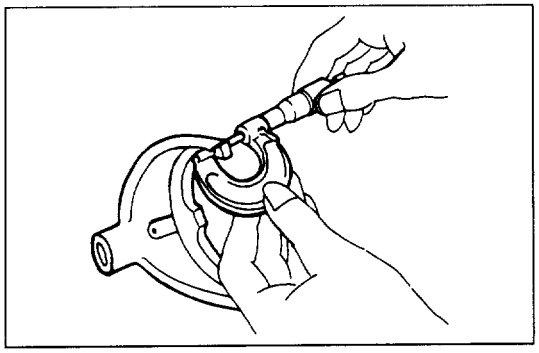
Visual Check

Inspect all disassembled parts for wear, damage or other abnormal conditions.



Shift Rod

Check the shift rod wear, bent and damage.



Shift Arm

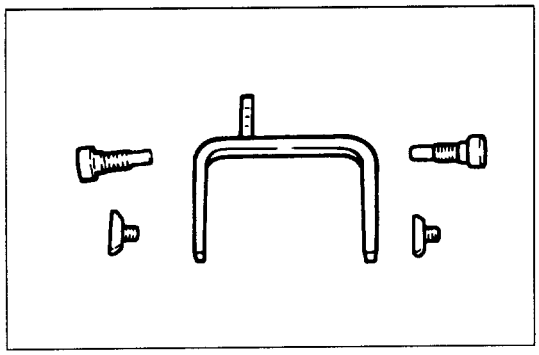
Inspect the shift arms for wear, distortion or scoring.

Replace it these conditions are present.

Shift Arm Thickness

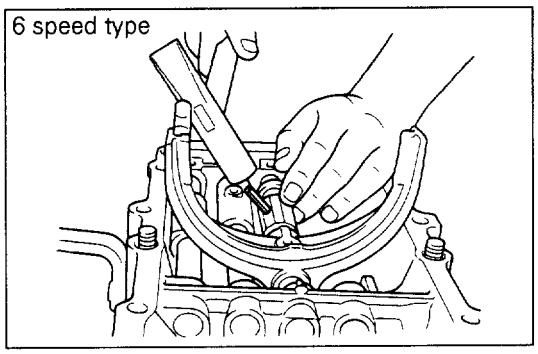
Use a micrometer to measure the shift arm and shift pieces thickness.

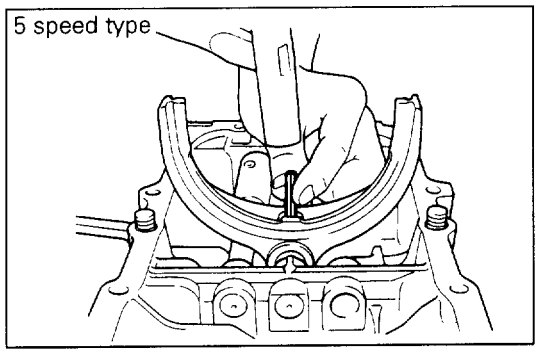
If the measured value is less than the specified limit, the shift arm must be replaced.



Shift Arm Thickness — mm (in)

Nominal	Limit
10.0 (0.394)	9.0 (0.354)



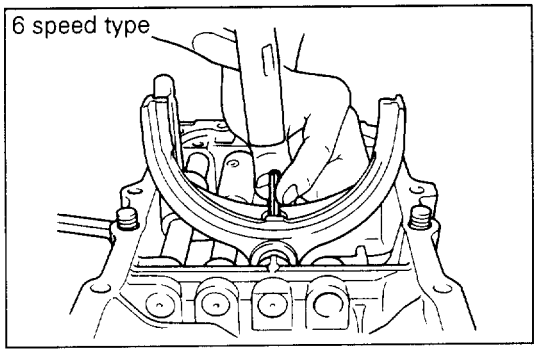


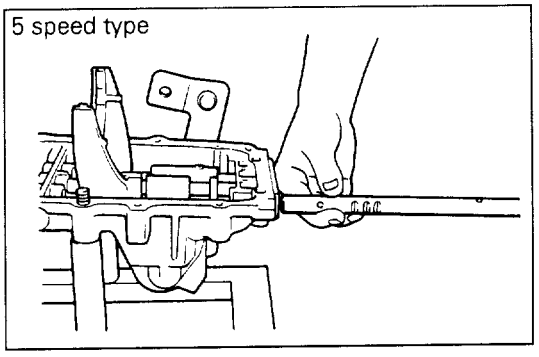
35. Spring Pin

- Setting the hole of the 2nd/3rd shift arm to that of the shift rod, fix them with a new spring pin (32 mm/1.26 in.).

NOTE:

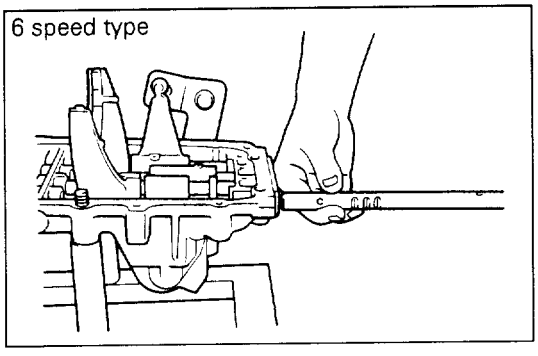
Install spring pin properly with the slit inline with the shaft centerline.



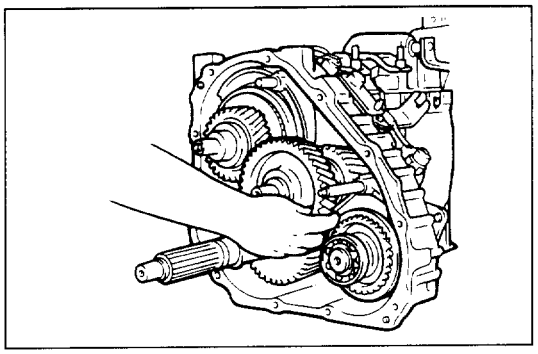


36. 1st/Reverse Shift Rod

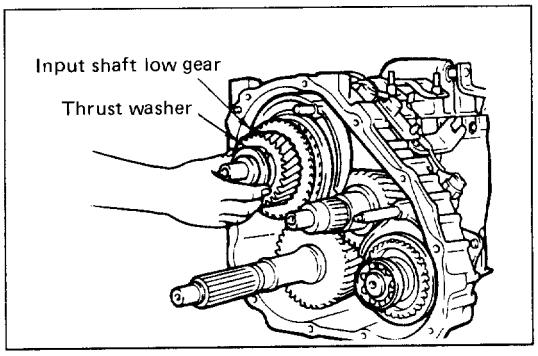
- Before reassembly, set the 4th/5th and 2nd/3rd shift rods already reassembled in neutral position.
- Insert the 1st/reverse shift rod so that the three detent ball grooves comes to the out side.



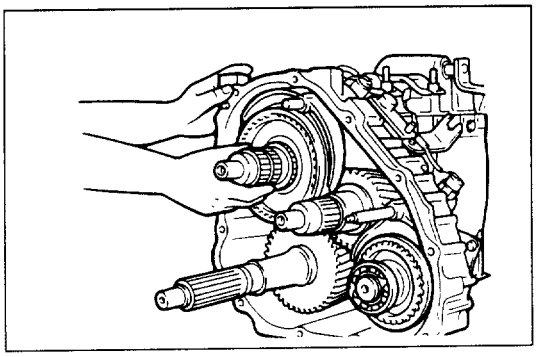
Disassembly Steps



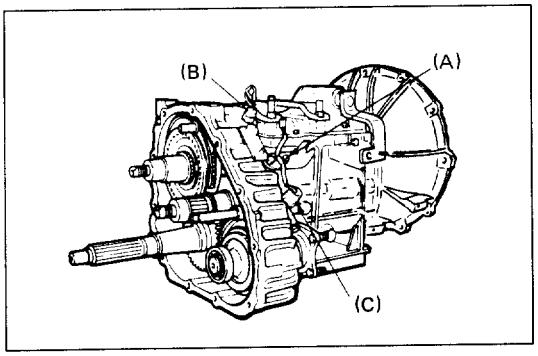
1. **Low Range Idle Gear**
   - Remove the low range idle gear.



2. **Thrust Washer**
3. **Input Shaft Low Gear**
   - Remove a thrust washer. Then, remove the input shaft low gear.



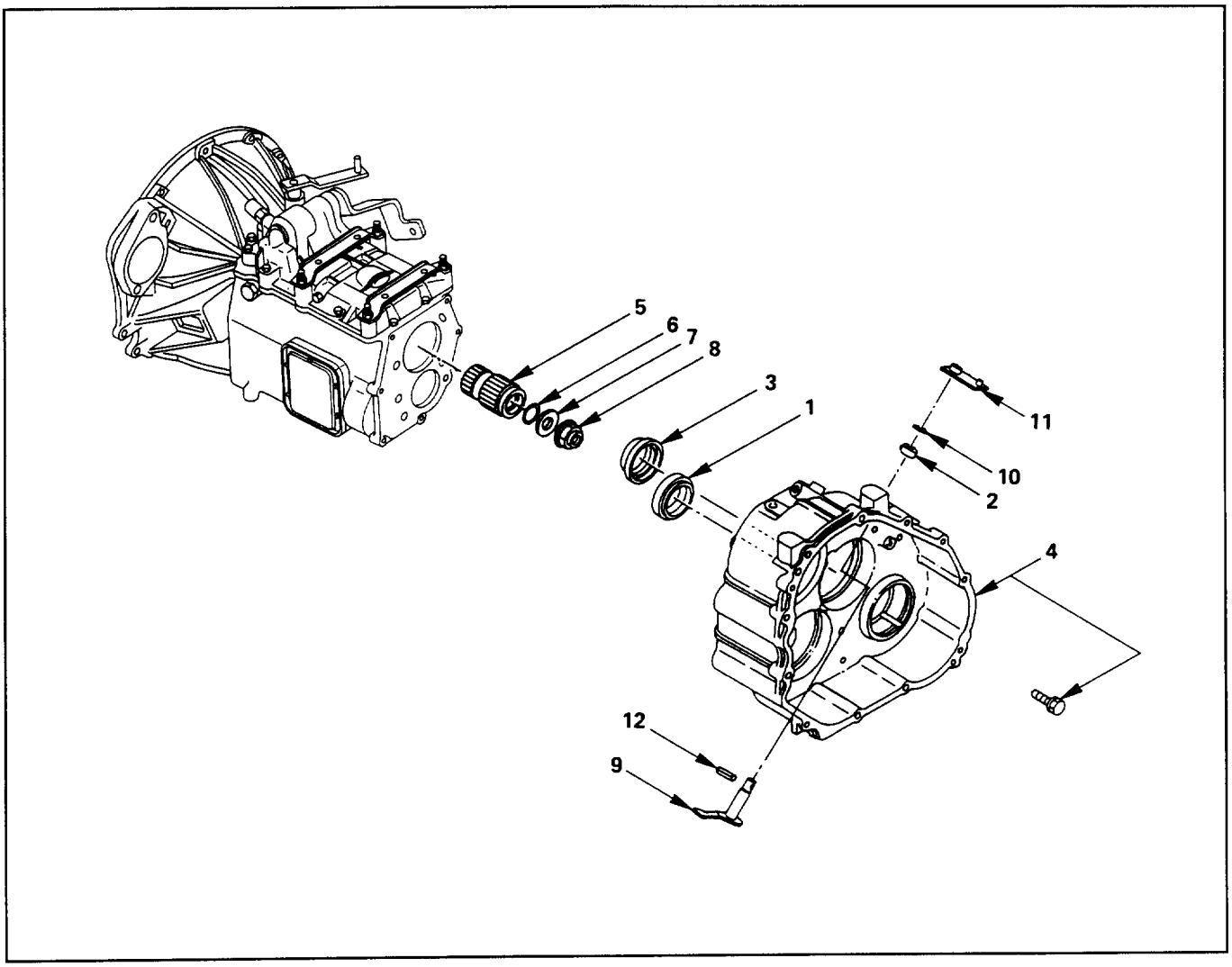
4. **Input Shaft Low Gear Needle Bearing**
   - Remove the input shaft low gear needle bearing.



5. **Bracket Bolt**
6. **Transfer Neutral Switch**
7. **4WD Detective Switch**
   - Remove the bolt (A) to fix the push-pull cable clamping bracket on the transfer front case, transfer neutral switch (B) and 4WD detective switch (C).

TRANSFER FRONT CASE

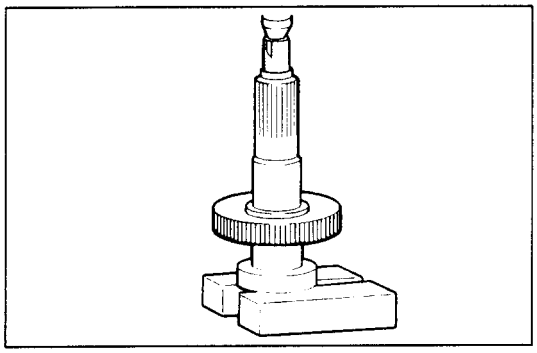
REASSEMBLY



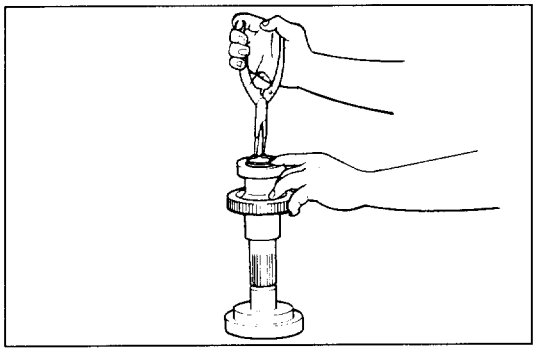
Reassembly Steps

1. Transfer front case oil seal:A
2. Internal shift lever oil seal
3. Transfer front case oil seal:B
4. Transfer front case
5. Main shaft joint pipe
6. O-ring
7. Washer
8. Main shaft end nut
9. Internal shift lever assembly
10. Plane washer
11. External shift lever assembly
12. External shift lever spring pin

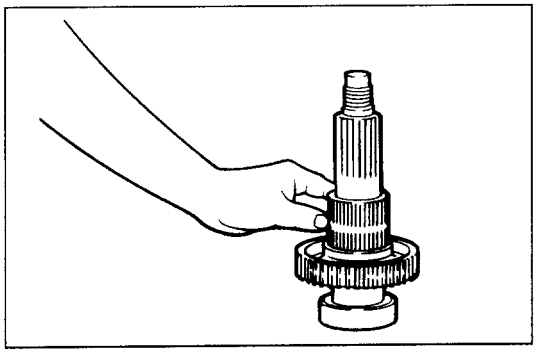
Reassembly Steps



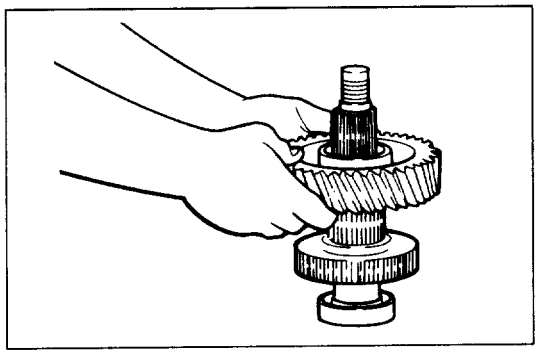
1. **Front Drive Shaft**
2. **Front Drive Shaft Bearing**
   - Fit the front drive shaft bearing (open type bearing) on the front drive shaft using a press.



3. **Snap Ring**
   - Insert a snap ring in the front drive shaft using the snap ring pliers.



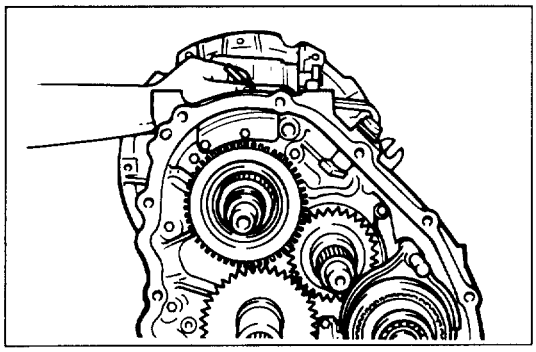
4. **Front Drive Shaft Needle Bearing**
   - Insert a needle bearing into the front drive shaft.
   - Apply engine oil to the front drive shaft bearing part.



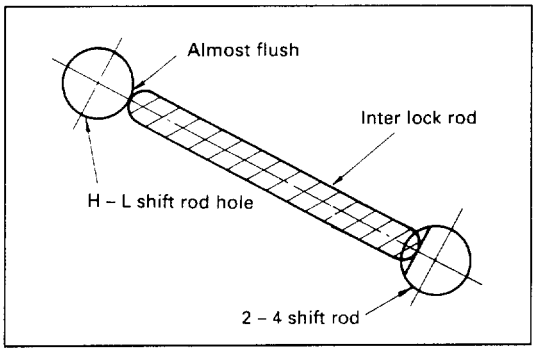
5. **Front Drive Gear**

   Reassemble the front drive gear in the needle bearing part of front drive shaft.
   - In reassembling the front drive gear, its dog teeth must face the needle bearing side.
   - Apply engine oil to the inner diameter of front drive gear.

Reassembly Steps

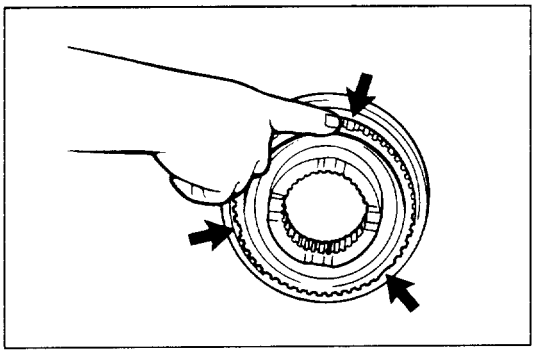


1. **Inter Lock Rod**
   - Insert the inter lock rod into the transfer front case from the top.



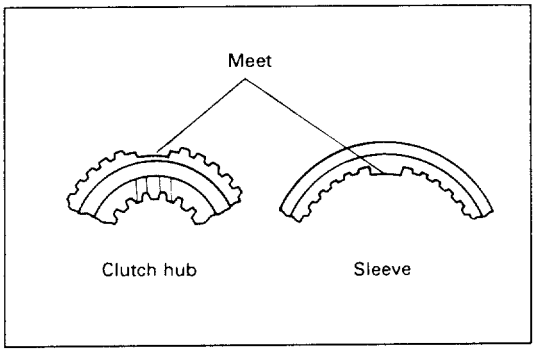
CAUTION:

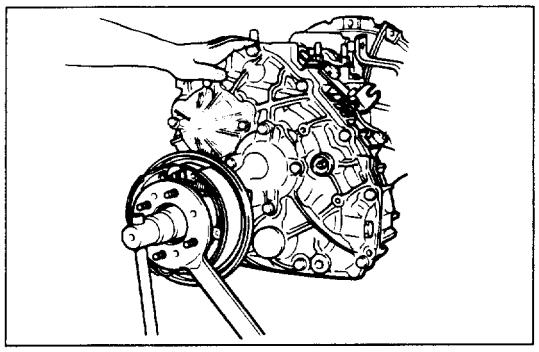
Make sure that the leading end of inter lock rod almost flushes with the outer diameter of 4WD high speed ranged (4H) ↔ low speed range (4L) select shift rod hole.



2. **Clutch Hub**
3. **Sleeve**

   Reassemble the sleeve with the 2WD high speed range (4H) ↔ low speed range (4L) select clutch hub.
   - Meet non-tooth portions (3 places) on the clutch hub outer diameter with stoppers (3 places) on sleeve teeth inner diameter.
   - Make sure that the sleeve moves smoothly in axial direction.





22. **Coupling Driver Washer**
23. **Rear Drive Shaft End Nut**
    1) Insert a coupling driver washer into the rear drive shaft with a marker groove facing the end nut side, and tighten the rear drive shaft end nut by holding the coupling driver with handle ; the main shaft flange.

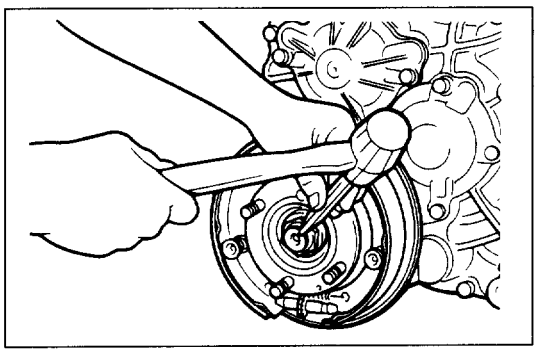
Rear Drive Shaft End Nut Torque	N·m(kg·m/lb·ft)
	221 (22.5/163)

CAUTION:

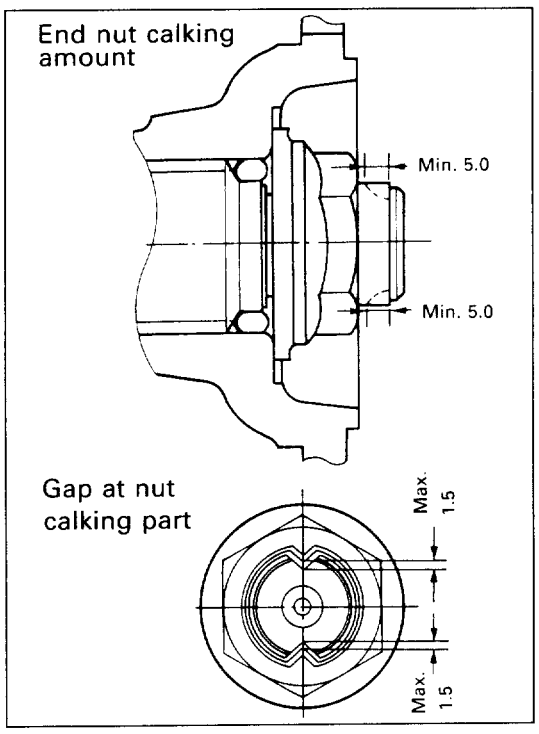
Use new end nut.

- Apply engine oil to the seat face of end nut when tightening the end nut.

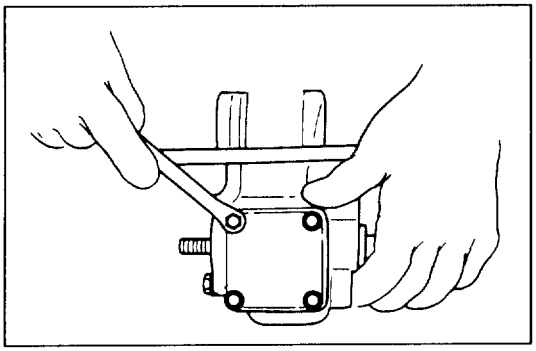
  Handle; main shaft flange : 5-8840-2043-0

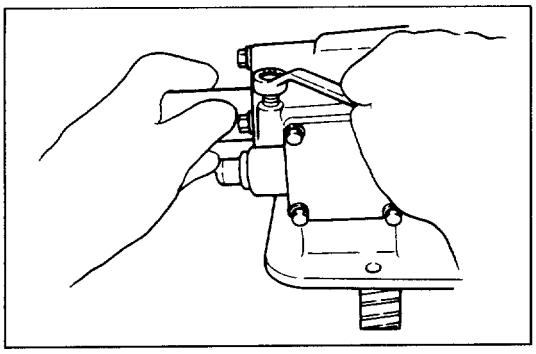


2) Meet the flange of end nut with a V-groove of rear drive shaft end, and calk two points with a chisel (edge form R1x60°) until a gap between shaft groove bottom and nut is below 1.5mm at the calking point. Also, make sure after calking that no crack is found in the calking part of nut.

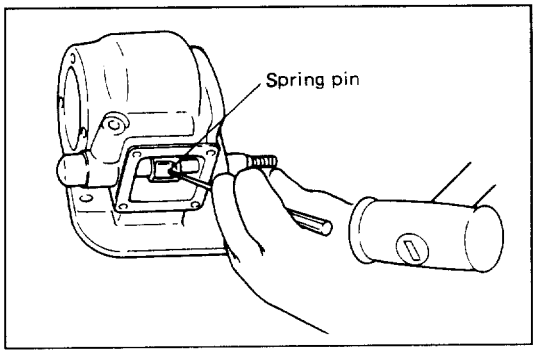


12. Sleeve
13. Output Gear with Bushing
14. Thrust Collar
15. Front Bearing
16. Upper Cover

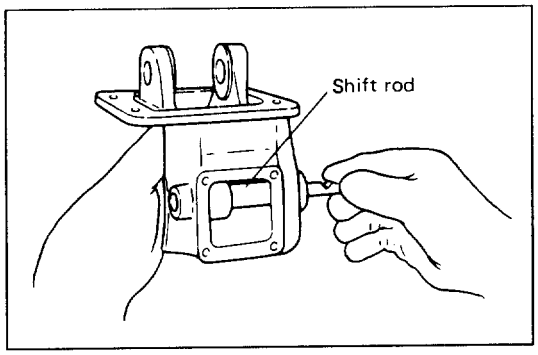




17. Plug and Spring Washer
18. Detent Spring
19. Detent Pin



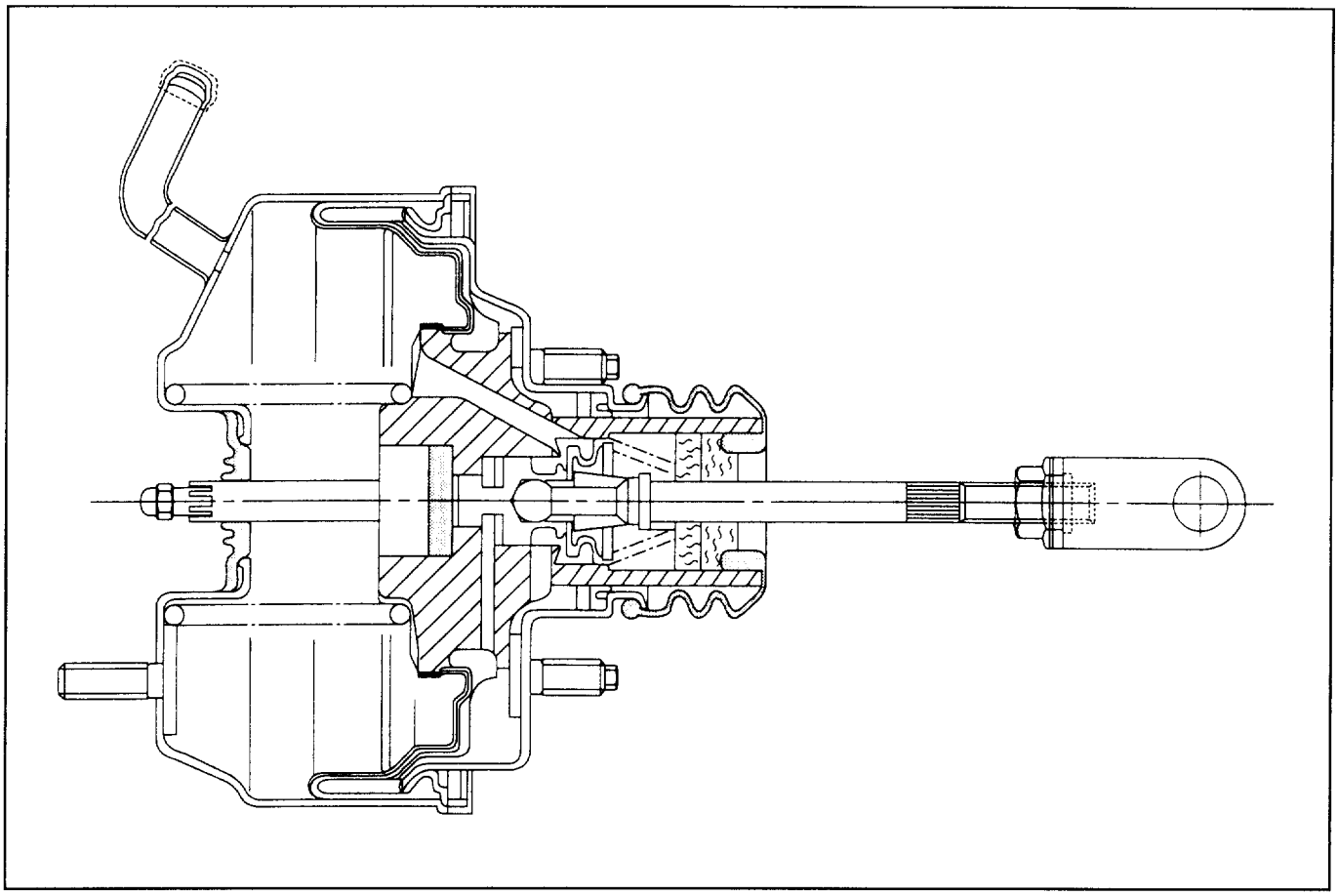
20. Spring Pin
    Spring Pin Remover: 9-8529-2201-0



21. Shift Rod Cap
22. Shift Rod
23. Shift Arm
    - Move the shift rod rearward by tapping on its front end. then, remove the each parts.

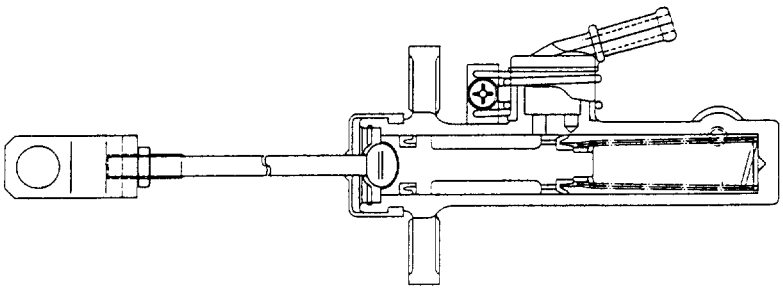
24. Shift Rod Oil Seal
25. Gear Case

CLUTCH BOOSTER

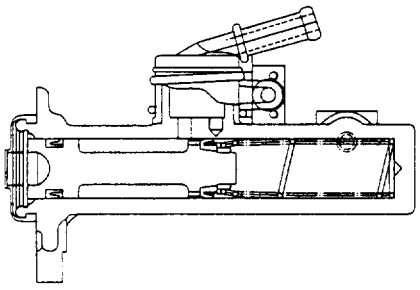


MASTER CYLINDER

Booster less



With Booster



Preparation

1. **Remove Meter Cluster**
   - Pull out the meter cluster and disconnect the harness connectors.
2. **Meter Assembly**
   - Remove the 5 fixing screws, then remove the meter assembly and disconnect the harness connector.

Removal Steps

- Drain the clutch fluid from the clutch hydraulic line.

CAUTION

Do not let clutch fluid remain on a painted surface. Wash it off immediately.

1. **Clutch Pipe and Hose**
2. **Vacuum Hose**
3. **Clutch Pedal and Bracket Assembly**
4. **Clutch Switch or Stopper Bolt**
5. **Shaft**
6. **Clevis Pin**
7. **Return Spring**
8. **Clutch Pedal**
9. **Clutch Booster with Master Cylinder or Master Cylinder**
10. **Flexible Hose**
11. **Slave Cylinder**

INSPECTION AND REPAIR

Make the necessary adjustment, repairs, and part replacement if excessive wear or damage is discovered during inspection.