SECTION 7A-10B

03-72LE AUTOMATIC TRANSMISSION UNIT REPAIR (RPO M41)

NOTICE: Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application. General Motors will call out those fasteners that require a replacement after removal. General Motors will also call out the fasteners that require thread lockers or thread sealant. UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and joint clamping force, and may damage the fastener. When you install fasteners, use the correct sequence and tightening specifications. Following these instructions can help you avoid damage to parts and systems.

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TRANSMISSION DISASSEMBLY

TORQUE CONVERTER AND TRANSMISSION CASE

Figures 1 through 3

NOTICE: Before overhauling the transmission, clean the exterior thoroughly to protect its inner components against dust and dirt during overhaul. The transmission MUST be kept in an upright position with the fluid pan on the bottom until transmission fluid is drained. If the transmission is turned on its side or over before the fluid can be drained, clutch material or other foreign matter may contaminate the valve body and case fluid passages. Failure to follow this precaution may result in otherwise unneeded valve body overhaul.

Inspect

- Seal rings for damage. If any seal rings are damaged, cut or do not rotate freely in their groove, be certain to check the ring groove for debris, burrs, or damage.
- Thrust washer surfaces. The thrust washer and thrust bearing surfaces may appear to be polished. This is a normal condition and should not be considered damaged.

Remove or Disconnect

Tools Required:
J 41626 Holding Fixture
J 3289-20 Holding Fixture Base

NOTICE: It is not recommended to use air powered tools to disassemble or assemble transmission. Improper bolt torques can contribute to transmission repair conditions. This information, vital to diagnosis, can only be detected using hand tools.

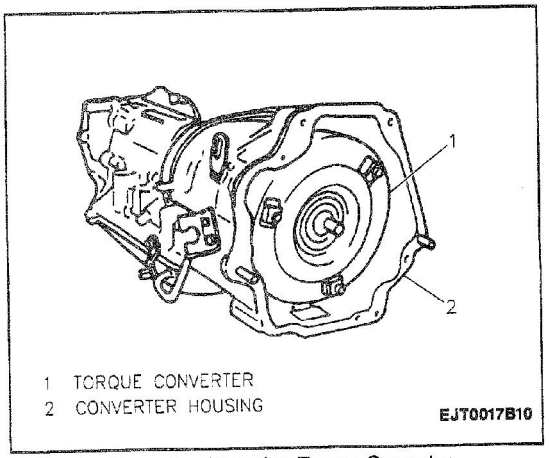


Figure 1—Removing Torque Converter

1. Torque converter assembly (Figure 1).
2. Three bolts from torque converter housing (Figure 2).
3. Tighten the J 41626 onto the transmission case (Figure 3).

CAUTION: To reduce the possibility of personal injury or transmission damage, make sure when following the next step that all bolts for the J 41626 are installed and tightened to 11 N.m (98 lb. in.).

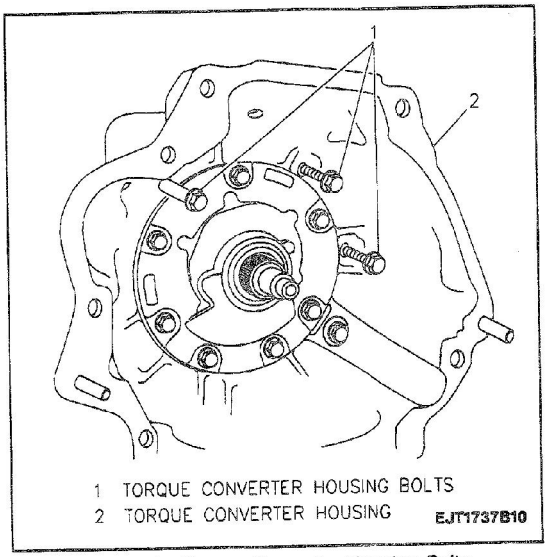


Figure 2—Torque Converter Housing Bolts

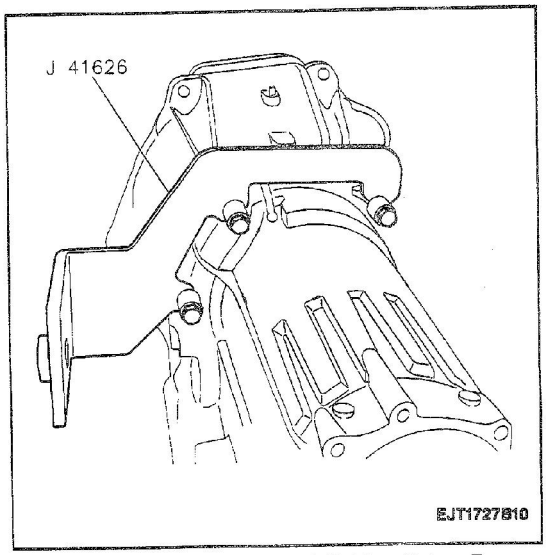


Figure 3—Mounting J 41626 Holding Fixture To Transmission Case.

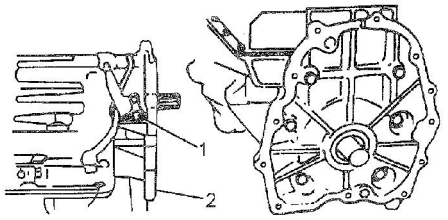
4. Install the transmission assembly with the J 41626 into the J 3289-20.
5. Fluid level indicator and fluid filler tube.
6. One clamp and vent hose from vent elbow at top of transmission case.
7. Drain transmission fluid.

Rear Adapter Case and Vehicle Speed Sensor

Figures 4 and 5

Remove or Disconnect

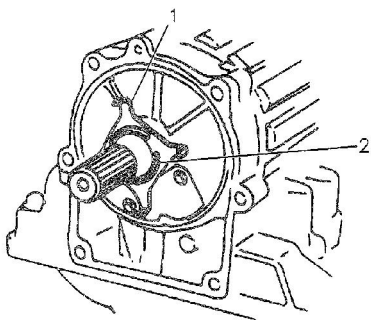
1. One bolt and vehicle speed sensor from adapter case.
2. Six bolts, rear adapter case and gasket from transmission case.
3. One snap-ring, speed sensor rotor and key-way from rear output shaft.



1 VEHICLE SPEED SENSOR (VSS)
2 ADAPTER CASE

EJT0037B10

Figure 4—Rear Adapter Case and Vehicle Speed Sensor



1 SPEED SENSOR ROTOR
2 SNAP RING

EJT0027B10

Figure 5—Speed Sensor Rotor

Transmission Range Switch

Figure 6

Remove or Disconnect

1. One nut, one washer and manual lever from manual shaft.
2. Unstake lock plate behind manual shaft nut.
3. Manual shaft nut and lock plate from transmission range switch.
4. One bolt and transmission range switch from manual shaft (Figure 6).

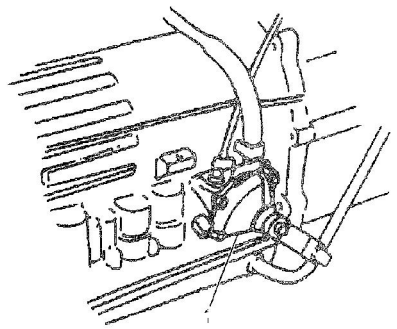
Oil Pump and Torque Converter Housing

Figure 7

Remove or Disconnect

Tool Required:
J 22888-D Side Bearing Remover

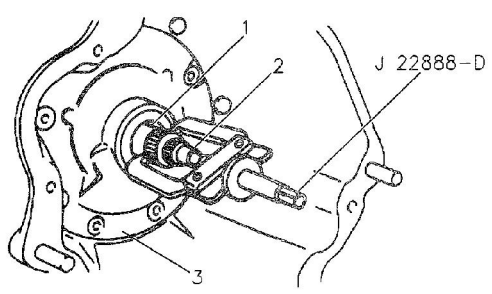
1. Rotate transmission to the upright position.



1 TRANSMISSION RANGE SWITCH

EJT0047B10

Figure 6—Transmission Range Switch



1 SHAFT BUSHING SURFACE
2 INPUT SHAFT
3 OIL PUMP ASSEMBLY

EJT0057B10

Figure 7—Removing Oil Pump

2. Seven bolts securing oil pump assembly to transmission case.
3. Using a J 22888-D remove oil pump assembly (Figure 7).
4. Bearing and race from rear of oil pump assembly.
5. Two bolts remaining from torque converter housing.
6. Holding the overdrive input shaft by hand, remove the torque converter housing and O-ring from the transmission case.

Overdrive Clutch Drum and Overdrive Case Assemblies

Figure 8

Measure

- Dimensions of overdrive case surface and overdrive clutch drum surface for reassembly (Figure 8).

Remove or Disconnect

1. Overdrive clutch drum assembly from transmission case.
2. Overdrive case assembly from transmission case.

Fluid Pan, Filter Screen and Fluid Pipes

Figures 9 and 10

Remove or Disconnect

1. Rotate transmission to fluid pan side.
2. Fourteen fluid pan bolts, fluid pan and gasket from transmission (Figure 9).
3. Four fluid pipes in the following order (Figure 10):
   A. Brake applying fluid pipe.
   B. Reverse brake fluid pipe.
   C. Lube applying fluid pipe.
   D. Forward clutch fluid pipe.
4. Unclip torque clutch (TCC) solenoid and shift solenoid wiring harness from fluid filter screen.
5. Six bolts and filter screen from valve body (Figure 10).

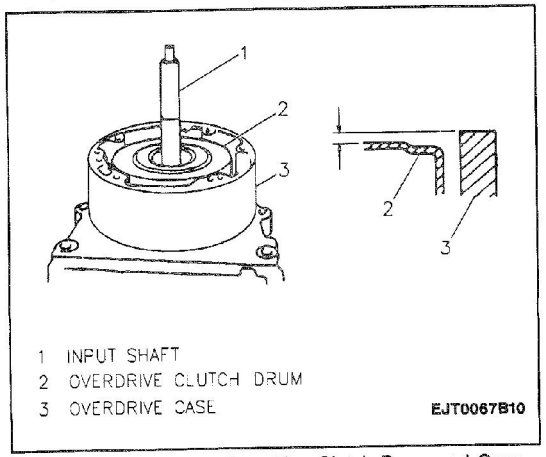


Figure 8—Measuring Overdrive Clutch Drum and Case Surface

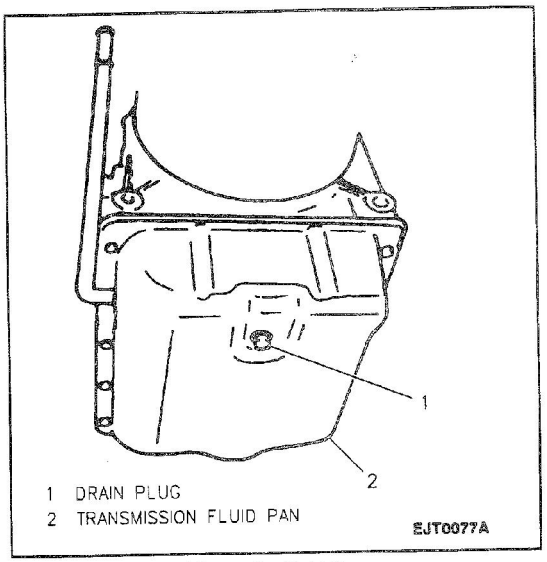


Figure 9—Fluid Pan

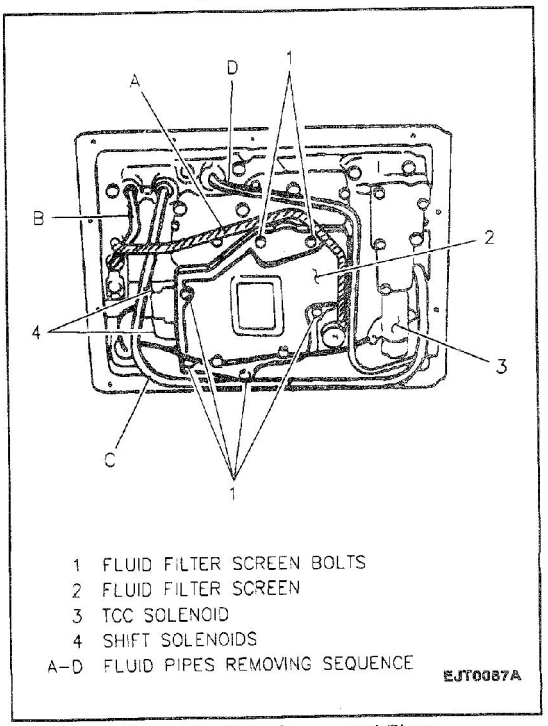


Figure 10—Fluid Screen and Pipes

Inspect

- Filter screen mesh for any particulate matter such as:
  — Clutch material.
  — Steel particles.

Valve Body, Accumulators and Solenoid Wiring Harness

Figures 11 through 13

Remove or Disconnect

1. Electrical connectors from torque converter clutch (TCC) solenoid and shift solenoid assembly.
2. Fifteen bolts retaining valve body and valve body from transmission case by (Figure 11):
   - Lift valve body slowly and disconnect TV cable from TV cable cam and remove valve body from transmission case (Figure 12).
3. One bolt and solenoid wiring harness from transmission case.
4. Cover accumulators with a clean cloth and apply low compressed air slowly to the fluid passages shown in Figure 13 until the air pressure forces the second brake, direct clutch and forward clutch accumulators from out of there respective case bores.

Inspect

- Accumulator pistons for cracks, scarring or damage.
- Accumulator springs for weakness, cracks or damage.
- Piston seals for cuts or damage.
- Accumulator case bores for scars, nicks or pitting.

5. Using a 10 mm nut driver remove TV cable from transmission case.

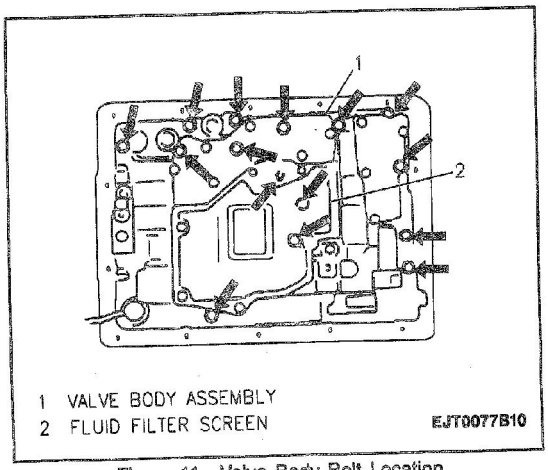


Figure 11—Valve Body Bolt Location

Forward and Direct Clutch Assemblies

Figures 14 and 15

Remove or Disconnect

1. Rotate transmission to upright position.

Measure

- Height of forward clutch assembly against transmission case for reassembly (Figure 14).

NOTICE: Note direction of bearing and bearing race for reassembly.

2. Forward clutch assembly from transmission case (Figure 14).
3. Direct clutch assembly from transmission case (Figure 15).

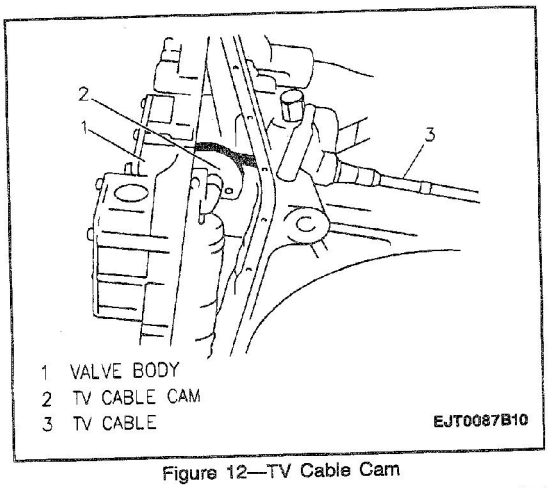


Figure 12—TV Cable Cam

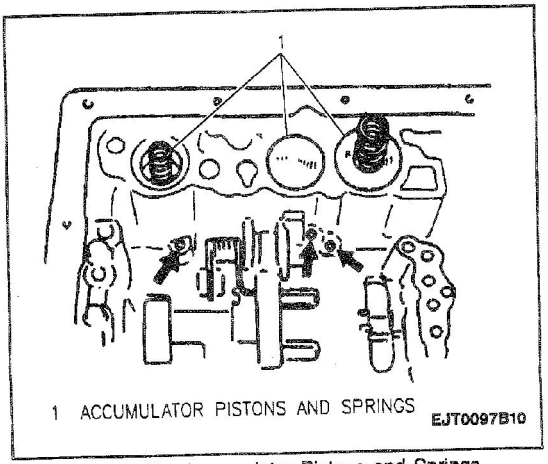


Figure 13—Accumulator Pistons and Springs

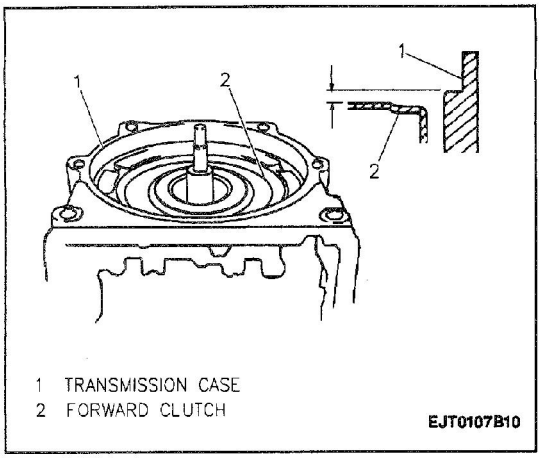


Figure 14—Forward Clutch Assembly

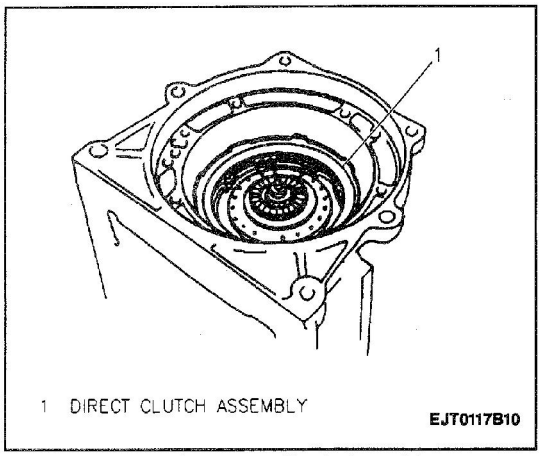


Figure 15—Direct Clutch Assembly

Parking Lock Pawl and Manual Shift Linkage

Figures 16 through 19

Remove or Disconnect

1. Two bolts and parking pawl plate from transmission.
2. Parking pawl torsion spring, pivot pin and parking pawl from transmission case (Figure 16).
3. Parking pawl rod from manual shift shaft (Figure 16).
4. Manual lever hub protection sleeve from the manual detent lever hub using a hammer and chisel (Figure 17).
5. One roll pin from manual detent lever hub using a standard drift punch and hammer (Figure 18).

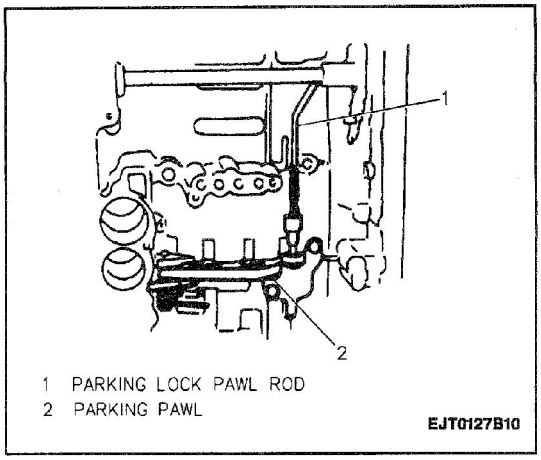


Figure 16—Parking Lock Pawl and Rod

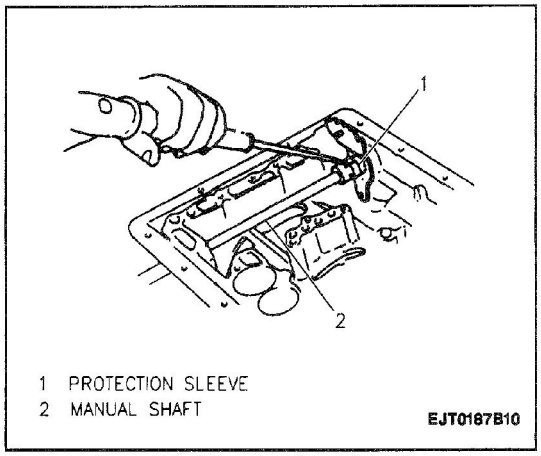


Figure 17—Removing Protection Sleeve

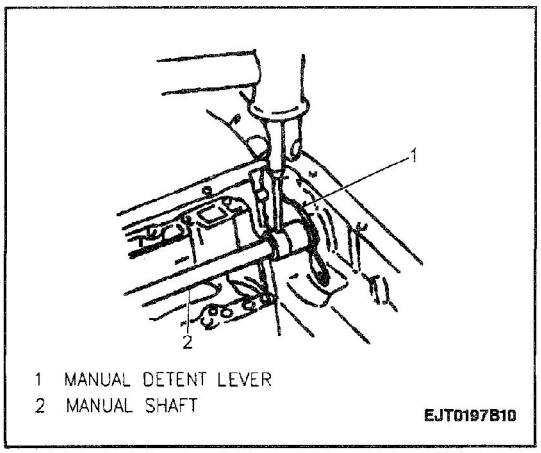


Figure 18—Removing Manual Detent Lever Roll Pin

6. Manual shaft and detent lever from transmission case.
7. Using a flat bladed screw driver remove manual shaft oil seals from both sides of the transmission case (Figure 19).

Center Support Assembly and Planetary Sun Gear Assembly

Figures 20 and 21

Remove or Disconnect

1. Rotate transmission to upright position.
2. Two bolts from valve body side securing center support to transmission case (Figure 20).
3. Center support and planetary sun gear assembly together from transmission case (Figure 21).

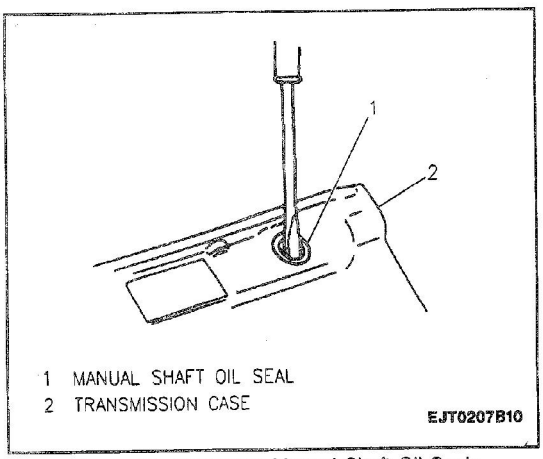


Figure 19—Removing Manual Shaft Oil Seals

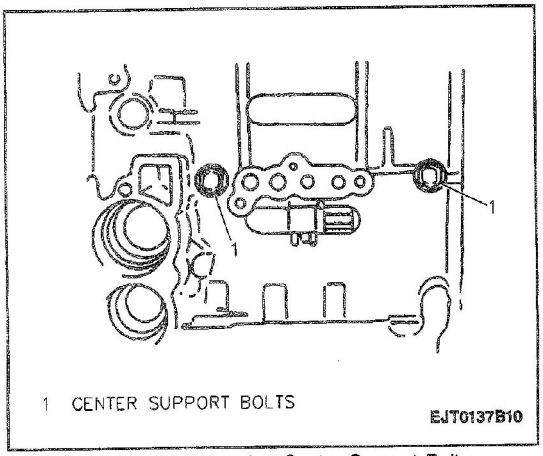


Figure 20—Removing Center Support Bolts

Planetary Gears and Output Shaft

Figure 22

Remove or Disconnect

Important

- Be careful not to cause damage to the transmission case when removing snap ring from planetary gear.

1. Using a flat bladed screw driver remove the snap ring from the front of the planetary gear assembly (Figure 22).
2. Planetary gear assembly and output shaft from transmission case.
3. Leaf spring from transmission case.
4. Brake applying tube from transmission case.
5. Output shaft thrust bearing and race from transmission case.

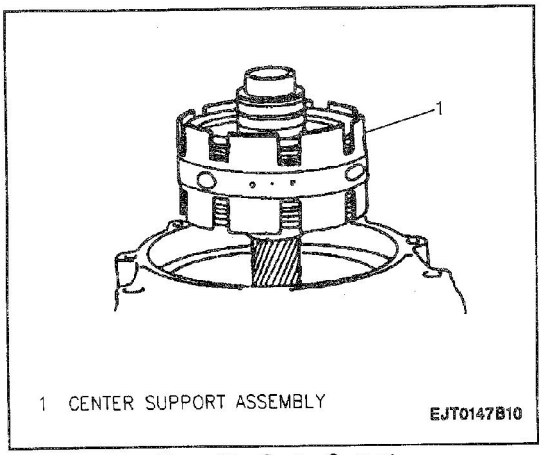


Figure 21—Center Support

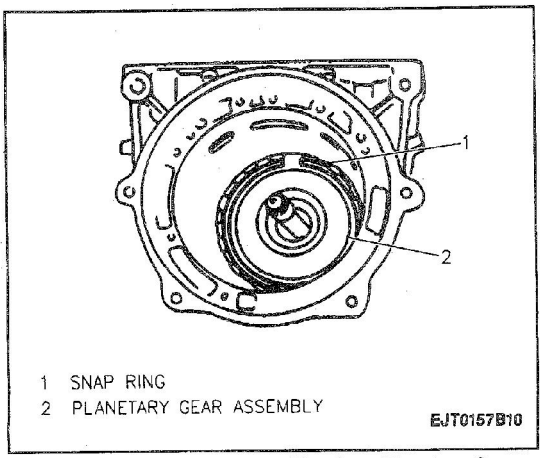


Figure 22—Removing Snap Ring from Planetary Gear Assembly

Reverse Brake Piston

Figures 23, 24 and 25

Remove or Disconnect

Tool Required:
J 41681 Clutch Spring Compressor
J 23327 Clutch spring Compressor

1. Two bolts and brake apply cover from transmission case (Figure 23).
2. Using J 41681 and J 23327 compress reverse brake piston and remove snap ring (Figure 24).
3. Cover reverse brake piston with a clean cloth and apply low compressed air slowly to the fluid passage B shown in Figure 25 while holding fluid passage A closed until the air pressure forces the outer reverse brake piston, reaction sleeve and inner reverse brake piston from the transmission.
4. O-Ring seals from the inner and outer reverse brake pistons.

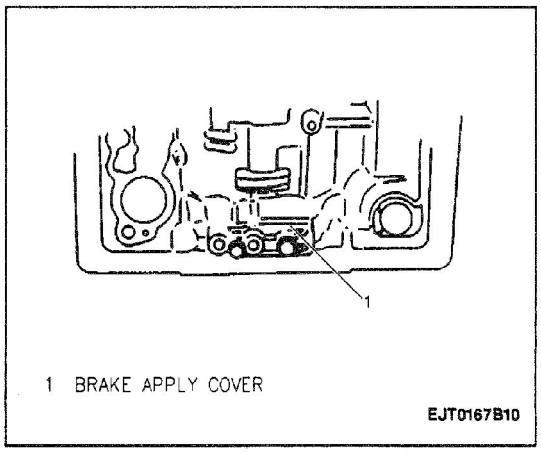


Figure 23—Removing Brake Apply Cover

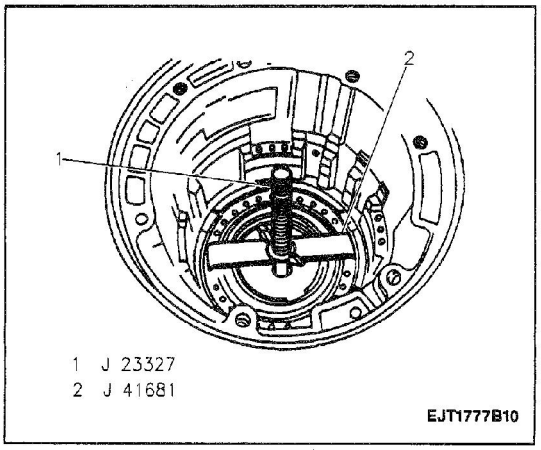


Figure 24—Compressing Reverse Brake Piston

COMPONENT REPAIR AND TRANSMISSION REASSEMBLY

PARTS CLEANING, INSPECTION AND REPLACEMENT

Important

- Keep work areas and tools clean.
- DO NOT use wipe cloths or rags.
- DO NOT use solvents on:
  — Rubber seals.
  — Plastic/Teflon® thrust washers or spacers.
- Make sure all fluid passages in the case and valve body are clear and free of any obstruction.

CAUTION: When using compressed air to clear fluid passages and dry parts, always aim air pressure away from face and eyes. Adequate eye protection MUST be worn to avoid injury from dirt and debris that may adhere to parts.

- Blow out all fluid passages with compressed air.
- Clean out small passages with fine wire.
- Handle all parts carefully to prevent damage.
- All parts must be clean and dry before reassembly.

NOTICE: The assembly of some components will require the use of an assembly lube. It is recommended that J 36850 Transjel® Transmission Assembly Lubricant be used during assembly. DO NOT use any other type of grease to retain parts during assembly of this unit. Lubricants other than the recommended assembly lube will change transmission fluid characteristics and cause undesirable shift conditions and/or fluid pump intake and fluid passage clogging.

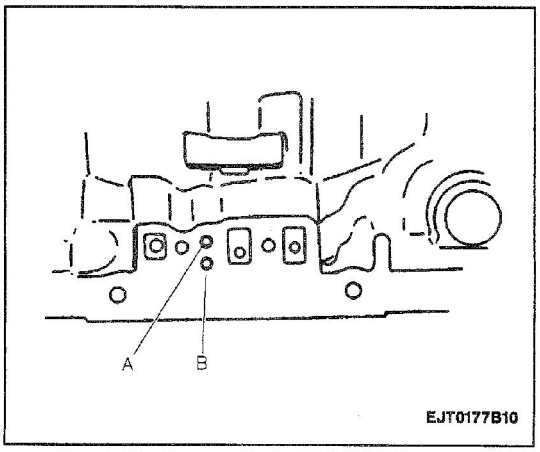


Figure 25—Reverse Brake Piston Oil Passages

Case Assembly

Clean

- Case components thoroughly with solvent.
- Air dry.
- DO NOT wipe with cloths or rags.

Inspect

1. Case interior for cracks or porosity.
2. Case to valve body surfaces for damage.
3. Vent assembly for damage.
4. Check all fluid passages with compressed air.
5. Transmission case bores for:
   A. Damage, porosity or burrs.
   B. Any sharp edges (i.e., fluid passages, snap ring slot edges, etc.) Remove if found with fine emery cloth.
6. All bolt holes for thread damage. If thread damage is found, Refer to SECTION 6A1 for thread repair procedure.
7. Case interior for:
   A. Damaged ring grooves or casting flash.
   B. Clutch plate lugs worn or damaged.
8. Case exterior for:
   A. Scarred or damaged gasket mating surfaces.
   B. Cracks or porosity. For case porosity repair, refer to SECTION 7A.

COMPONENT REPAIR

Oil Pump Assembly

Figures 26 through 33

Remove or Disconnect

1. Oil pump seal from oil pump body (Figure 26).
2. Oil pump thrust washer and bearing from rear of oil pump cover (Figure 26).
3. Two seal rings from oil pump cover (Figure 27).
4. Six bolts and oil pump body from oil pump cover (Figures 28).
5. Input shaft oil seal from oil pump body.

Clean

- All oil pump components and dry thoroughly.

Inspect

1. Oil pump drive gear and driven gear for excessive wear or damage. Replace as necessary.
2. Oil pump cover for excessive wear or damage. Replace as necessary.
3. Oil pump body and stator oil pump cover mating surfaces for distortion or warp. Replace oil pump assembly as necessary.

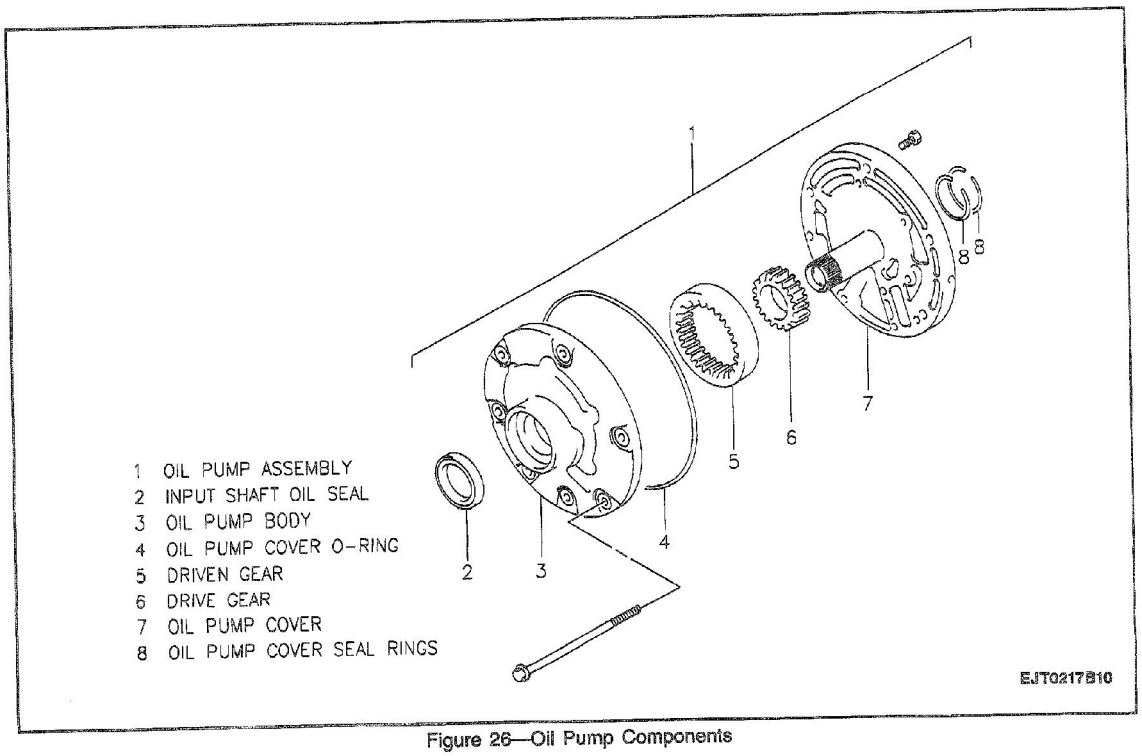


Figure 26—Oil Pump Components

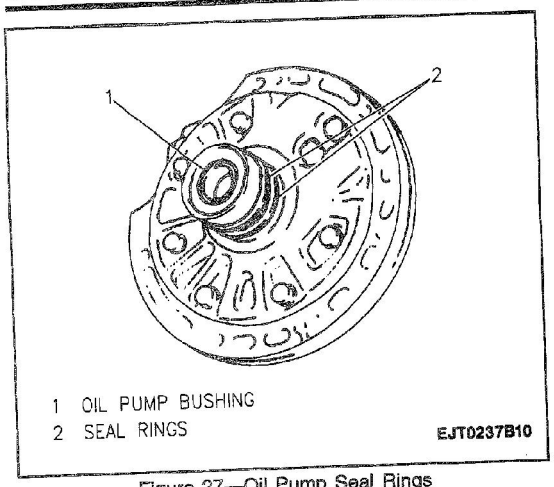


Figure 27—Oil Pump Seal Rings

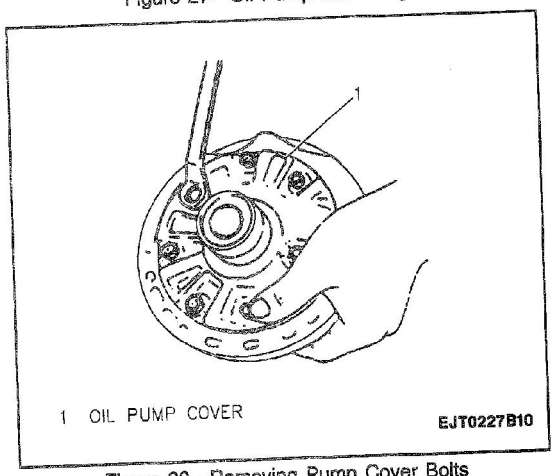


Figure 28—Removing Pump Cover Bolts

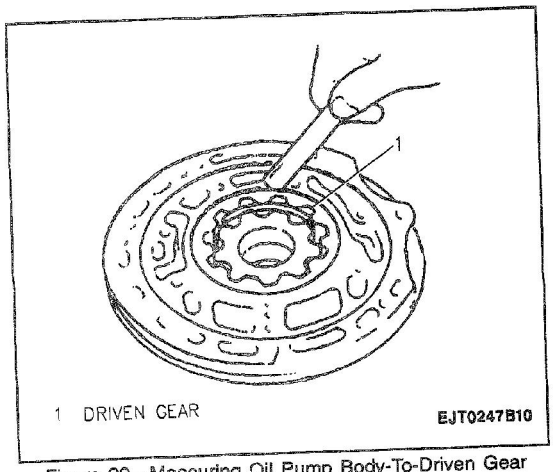


Figure 29—Measuring Oil Pump Body-To-Driven Gear Clearance

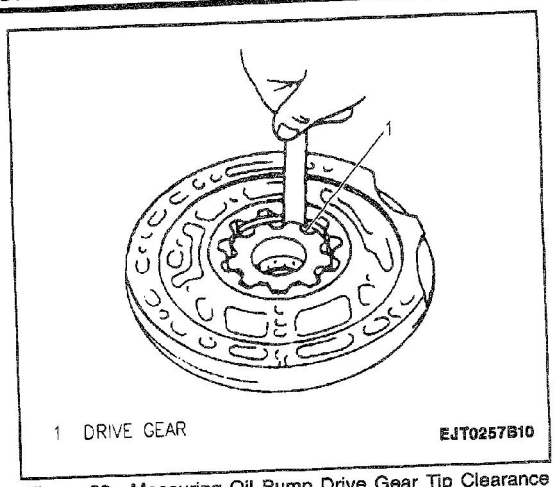


Figure 30—Measuring Oil Pump Drive Gear Tip Clearance

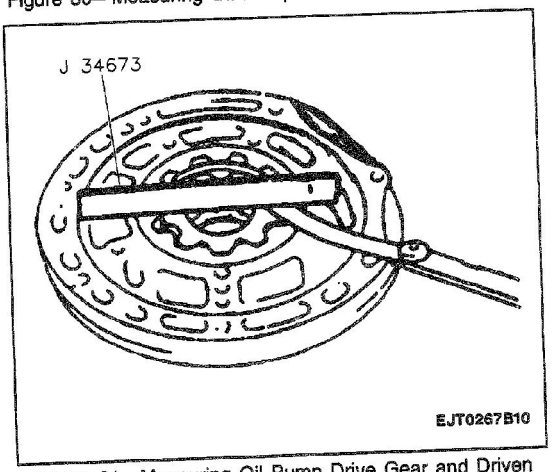


Figure 31—Measuring Oil Pump Drive Gear and Driven Gear Side Clearance

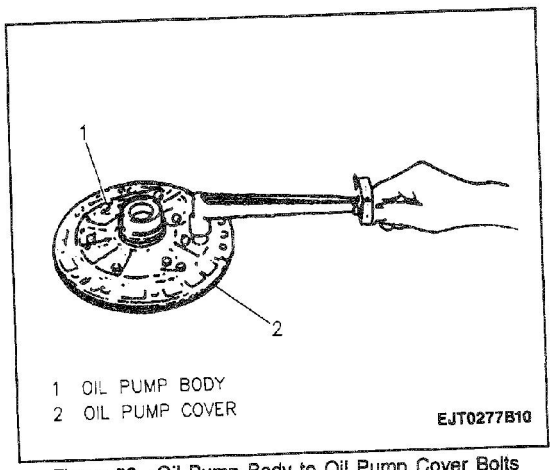


Figure 32—Oil Pump Body to Oil Pump Cover Bolts

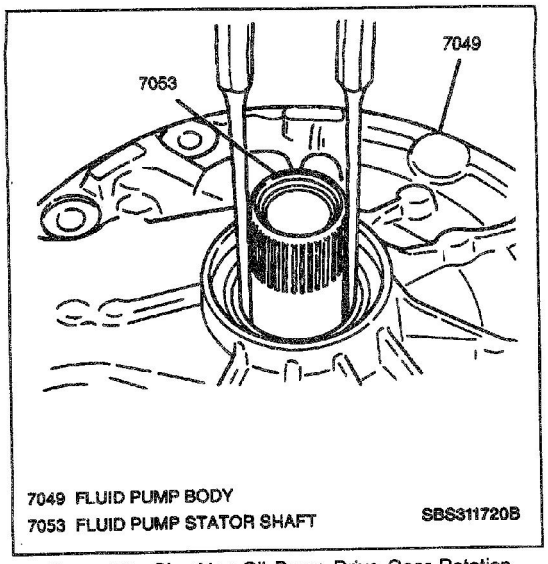


Figure 33—Checking Oil Pump Drive Gear Rotation

Measure

Tool Required:
J 34673 Flat Gage Bar

1. Oil pump body-to-driven gear clearance using a feeler gage (Figure 29). Push the oil pump driven gear to one side of the oil pump body and measure the gap on the opposite side. Standard oil pump body-to-driven gear clearance should fall within 0.07 to 0.15 mm (0.0028 to 0.0059-inch). If oil pump body-to-driven gear clearance exceeds 0.30 mm (0.118-inch), replace the oil pump assembly.
2. Oil pump drive gear tip clearance using a feeler gage (Figure 30). Measure the gap between the oil pump drive gear teeth and the oil pump gear crescent. Standard oil pump drive gear tip clearance should fall within 0.11 to 0.14 mm (0.0044 to 0.0055-inch). If oil pump drive gear tip clearance exceeds 0.30 mm (0.011181-inch), replace the oil pump assembly.
3. Oil pump drive gear and driven gear side clearance using a J 34673 and a feeler gage (Figure 31). Place the J 34673 across the oil pump body and measure the clearance between the oil pump drive gear and driven gear and the oil pump body mating surface. Standard drive gear and driven gear side clearance should fall within 0.02 to 0.05 mm (0.0008 to 0.0019-inch). If drive gear and driven gear side clearance exceeds 0.1 mm (0.0039-inch), replace the oil pump body.

Important

- The oil pump drive gear and driven gear are different sizes. If the thicker of the two gears is not within standard drive gear and driven gear side clearance, replace the oil pump body.

Install or Connect

Tools Required:
J 9617 Pump Seal Installer
J 36850 Transjel® Transmission Assembly Lubricant

1. New input shaft oil seal into oil pump body using a J 9617 and a hammer.
2. Apply J 36850 to the new input shaft oil seal lip.
3. Oil pump cover onto oil pump body; secure with six bolts (Figure 32).

Tighten

- Oil pump cover-to-oil pump body bolts to 9 N.m (80 lb. in.).

4. Apply J 36850 to the oil pump thrust washer and bearing to hold it on the rear of the oil pump cover.
5. Oil pump thrust washer and bearing onto rear of oil pump cover.
6. Two new seal rings onto oil pump cover.
7. New oil pump seal onto fluid pump body.

Inspect

- Oil pump drive gear for smooth rotation by carefully inserting two small drift punches into the oil pump body (Figure 33) and turning the fluid pump drive gear. If oil pump drive gear does not rotate smoothly, oil pump disassembly and inspection is indicated.

Overdrive (Planetary Gear Side)

Figures 34 through 47

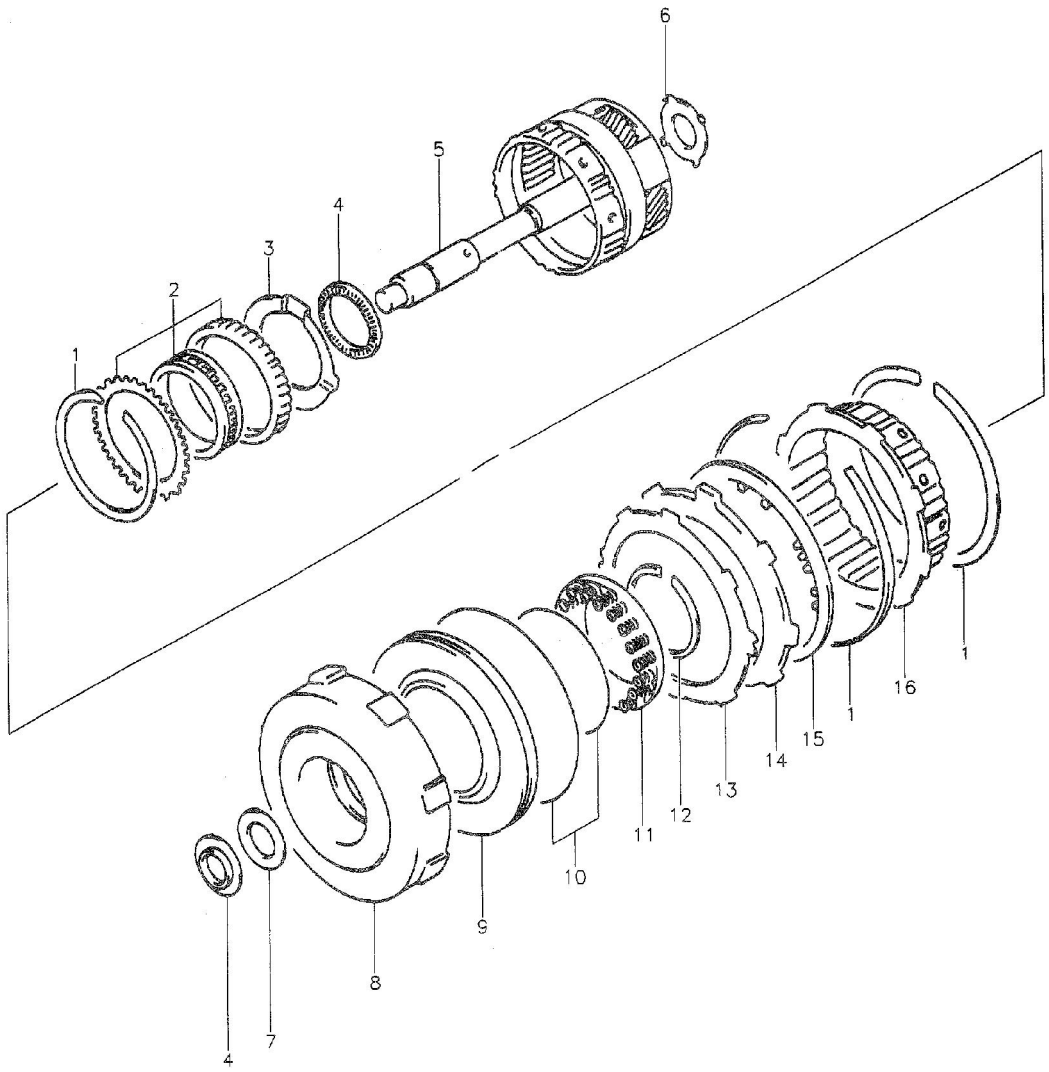
Inspect

- With the overdrive clutch drum held stationary, turn the input shaft clockwise to see that it turns smoothly and counter clockwise to see that it locks (Figure 35).

Remove or Disconnect

Tool Required:
J 41681 Clutch Spring Compressor

1. Overdrive planetary gear from overdrive clutch drum (Figure 36).



1 SNAP RING
2 ONE-WAY CLUTCH
3 THRUST WASHER
4 BEARING
5 OVERDRIVE PLANETARY GEAR
6 THRUST WASHER
7 RACE
8 OVERDRIVE CLUTCH DRUM
10 O-RINGS
11 OVERDRIVE PISTON RETURN SPRING ASSEMBLY
12 OVERDRIVE PISTON RETURN SPRING SNAP RING
13 CUSHION CLUTCH PLATE
14 CLUTCH PLATE
15 CLUTCH DISC
16 BRAKE HUB

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Figure 34—Overdrive (Planetary Gear Side) Components

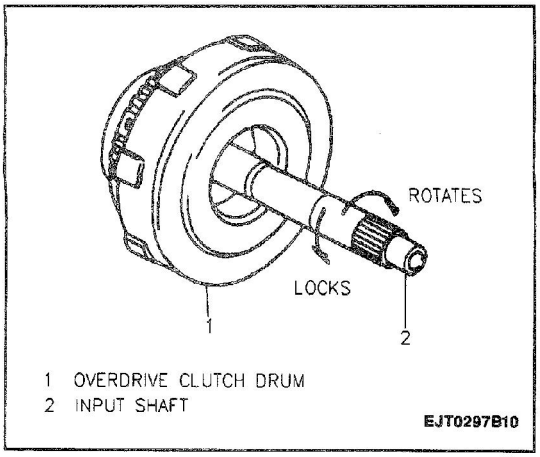


Figure 35—Inspecting Overdrive Clutch Drum

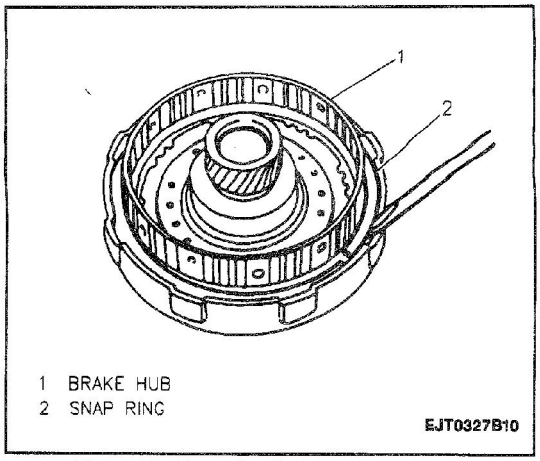


Figure 38—Removing Brake Hub Snap Ring

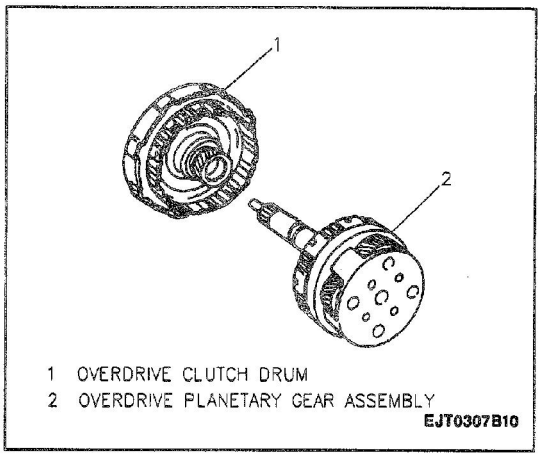


Figure 36—Removing Overdrive Clutch Drum from Overdrive Planetary Gear

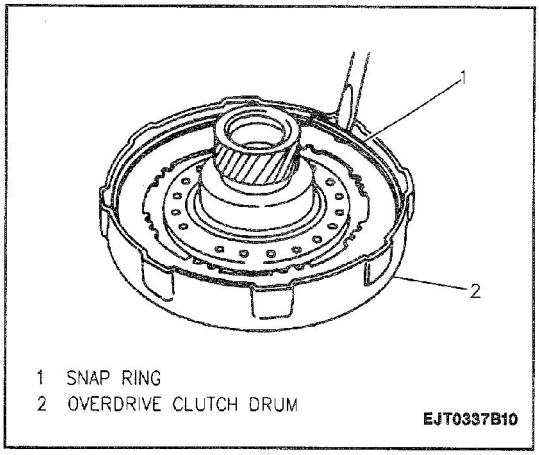


Figure 39—Removing Cushion Plate Snap Ring

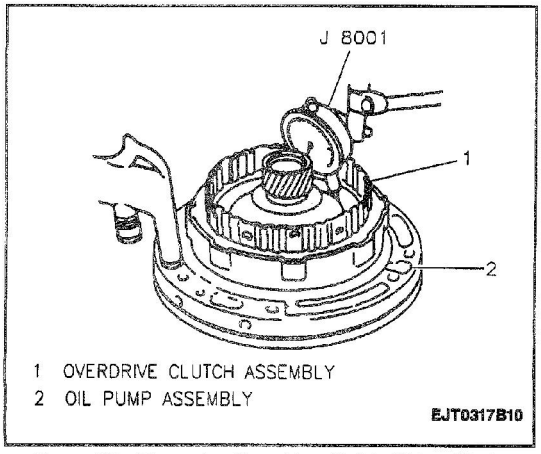


Figure 37—Measuring Overdrive Clutch Piston Stroke

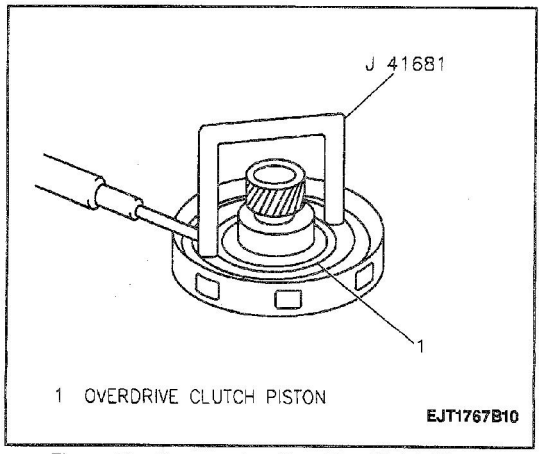


Figure 40—Compressing Overdrive Clutch Piston.

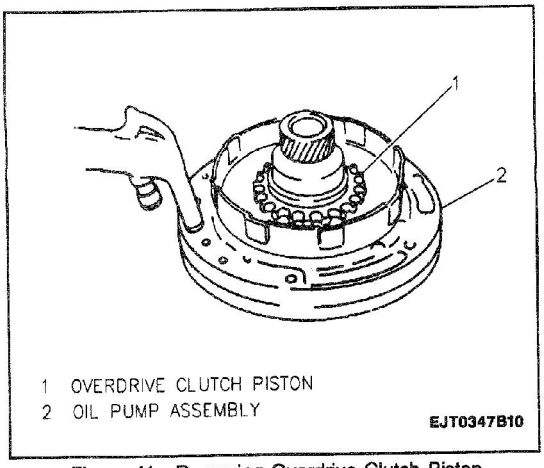


Figure 41—Removing Overdrive Clutch Piston

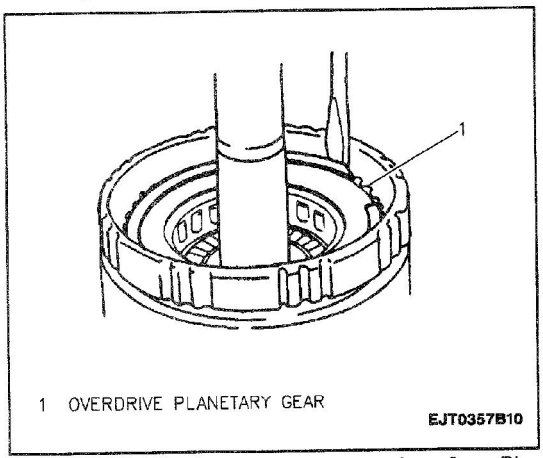


Figure 42—Removing Overdrive Planetary Gear Snap Ring

Measure

Tool Required:
J 8001 Dial Indicator Set

- Temporarily install overdrive clutch drum to oil pump assembly (Figure 37). Place the J 8001 plunger on the overdrive clutch piston and apply 392 to 785 kPa (57 to 114 psi) of compressed air into oil passage indicated in (Figure 37) and measure movement of the overdrive clutch piston. Standard overdrive clutch piston stroke is 1.47-2.28 mm (0.058-0.089 in). If overdrive clutch piston stroke is not within specification, replace cushion clutch plate or clutch disc to adjust to specification.

2. One snap ring retaining brake hub to overdrive clutch drum (Figure 38).
3. Brake hub from over drive clutch drum.
4. One snap ring, cushion plate, backing plate and clutch disc from overdrive clutch drum.
5. Using a J 41681 and a press, compress overdrive clutch piston and remove snap ring (Figure 40).

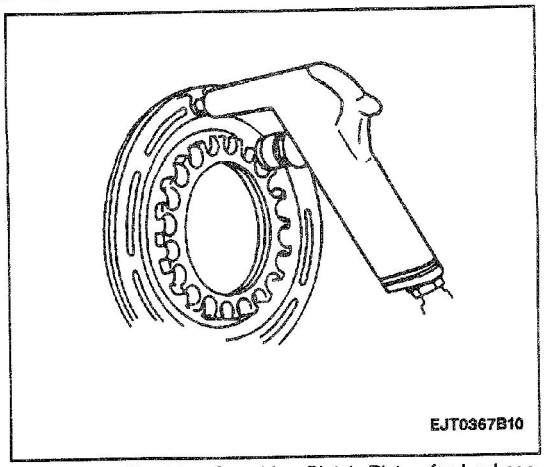


Figure 43—Checking Overdrive Clutch Piston for Leakage

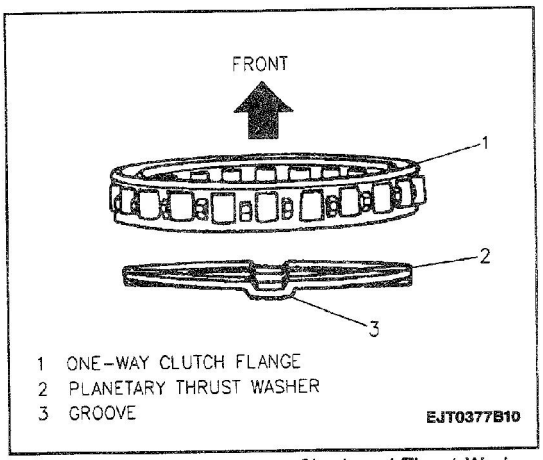


Figure 44—Installing One-Way Clutch and Thrust Washer

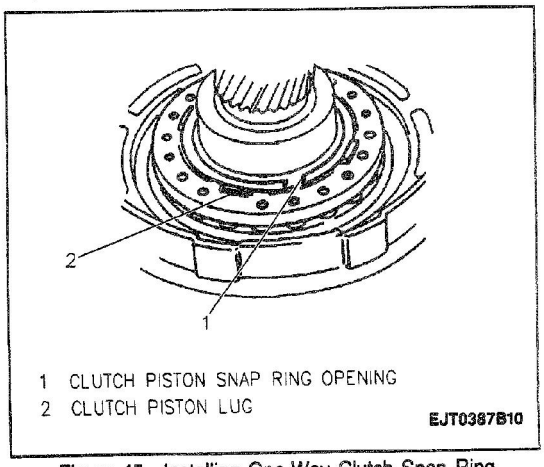


Figure 45—Installing One-Way Clutch Snap Ring

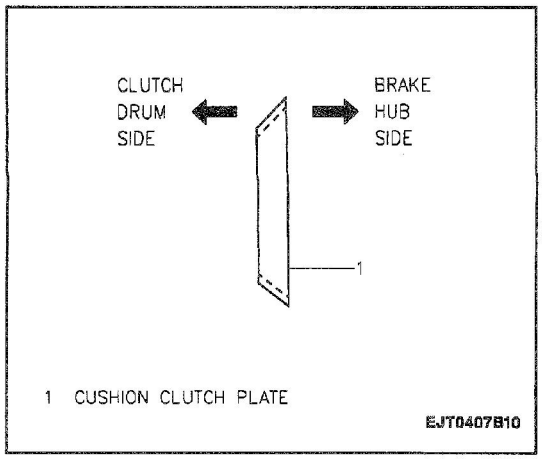


Figure 46—Installing Cushion Plate.

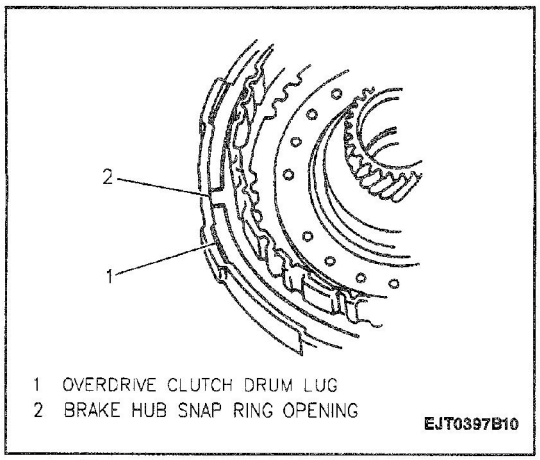


Figure 47—Installing Brake Hub Snap Ring

NOTICE: When using compressed air to remove components, air pressure should not exceed 98 kPa (14 psi).

6. Temporarily install overdrive clutch drum to oil pump assembly (Figure 41). Apply low compressed air into oil passage indicated in (Figure 41) and remove overdrive clutch piston.
7. Inner and outer O-rings from overdrive clutch piston.
8. Using a flat bladed screw driver remove snap ring from overdrive planetary gear (Figure 42).
9. One-way clutch, thrust planetary washer and thrust bearing from overdrive planetary gear.

Clean

- All overdrive clutch components and dry thoroughly.

Inspect

- Overdrive clutch disc for excessive wear or damage. Replace as necessary.
- Overdrive clutch piston for cracks or porosity. Replace as necessary.
- That the check ball is free by shaking the piston.
- Apply low air pressure to check ball opening and check for leakage (Figure 43).
- One-way clutch flange. Replace as necessary.
- Planetary thrust washer. Replace as necessary.

Install or Connect

Tool Required:
J 41681 Clutch Spring Compressor
J 36850 Transjel® Transmission Assembly Lubricant

Important

- When installing thrust planetary washer, install with the oil groove facing the front (Figure 44).
- When installing one-way clutch outer bearing race, install with the flange facing the front (Figure 44).
- When installing one-way clutch snap ring, Do not align opening of snap ring with lug on clutch piston spring retainer (Figure 45).

1. Apply J 36850 to thrust bearing, thrust planetary washer and install into overdrive planetary gear.
2. One-way clutch to overdrive planetary gear.
3. Snap ring to overdrive planetary gear.
4. New O-rings to inner and outer to overdrive clutch piston lubricate with A/T Fluid.
5. Overdrive clutch piston to clutch drum.
6. Overdrive clutch piston return springs to clutch drum.
7. Using a J 41681 compress overdrive clutch piston and install snap ring.

Important

- When installing cushion plate, Refer to (Figure 46).

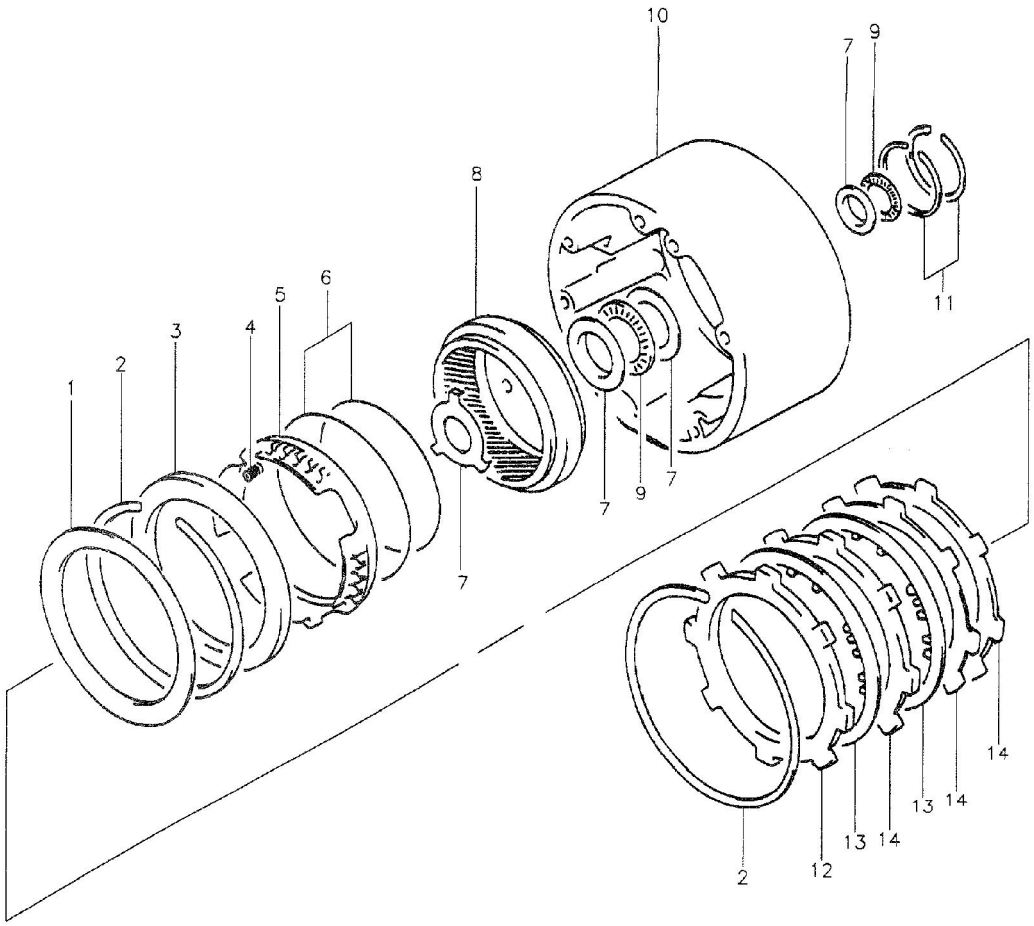
8. Clutch disc, backing plate, cushion plate, and snap ring to overdrive clutch drum
9. Brake hub to over drive clutch drum.
10. One snap ring securing; brake hub to overdrive clutch drum (Figure 47).

Overdrive (Case Side)

Figures 48 through 56

Measure

- Clearance between snap ring and brake flange using feeler gage (Figure 49). Standard clearance should be 0.35-1.91 mm (0.014-0.075 in). If clearance is not within standard range, replace clutch disc or clutch plate.



1 CUSHION PLATE
2 SNAP RING
3 RETAINER
4 CLUTCH PISTON RETURN SPRING
5 CLUTCH PISTON
6 O-RINGS
7 BEARING RACE
8 PLANETARY RING GEAR
9 BEARING
10 OVERDRIVE CASE
11 SEAL RINGS
12 BRAKE FLANGE
13 CLUTCH DISC
14 CLUTCH PLATE

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Figure 48—Overdrive (Case Side) Components

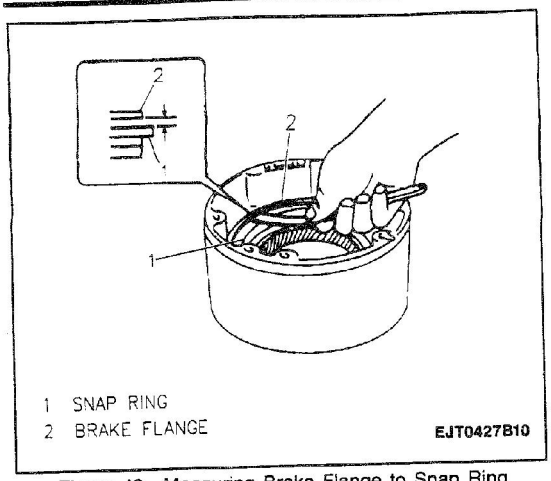


Figure 49—Measuring Brake Flange to Snap Ring Clearance

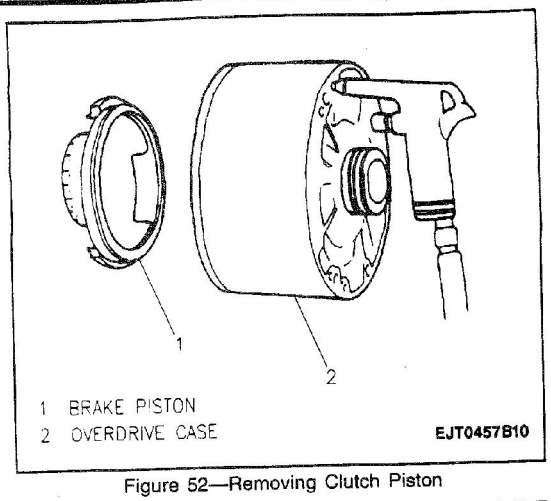


Figure 52—Removing Clutch Piston

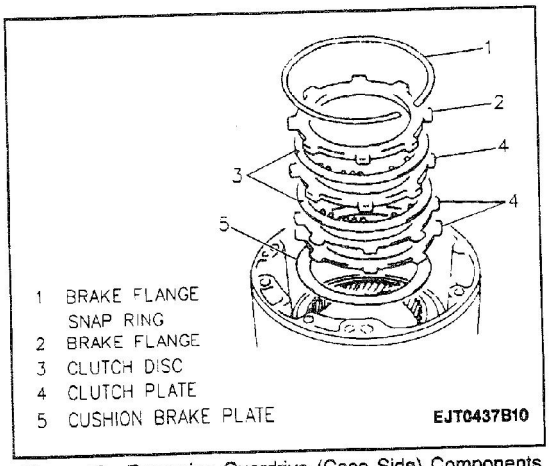


Figure 50—Removing Overdrive (Case Side) Components

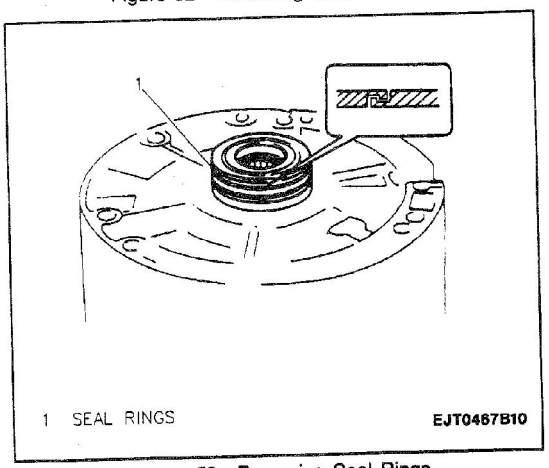


Figure 53—Removing Seal Rings

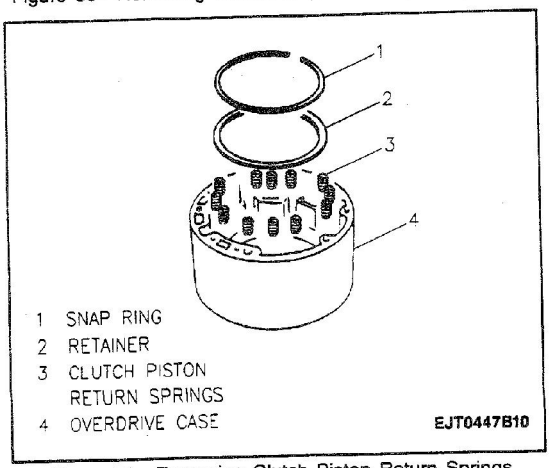


Figure 51—Removing Clutch Piston Return Springs

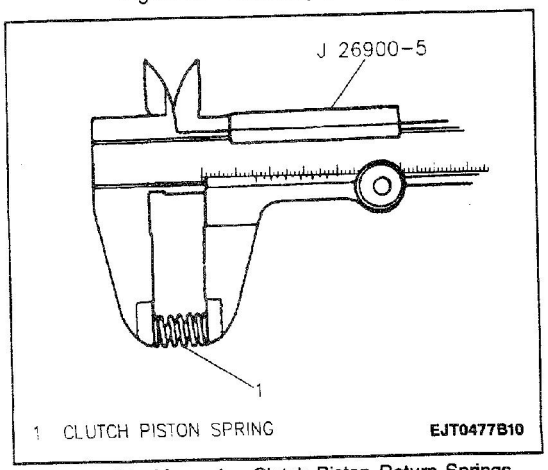


Figure 54—Measuring Clutch Piston Return Springs

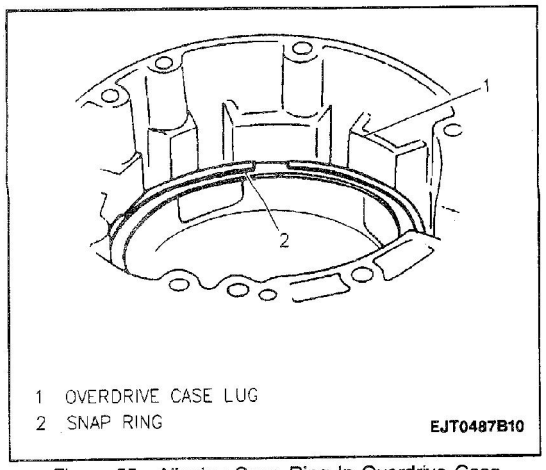


Figure 55—Aligning Snap Ring In Overdrive Case

Remove or Disconnect

1. Brake flange snap ring, and brake flange from overdrive case (Figure 50).
2. Clutch discs, clutch plates and cushion brake plate from overdrive case (Figure 50).
3. Planetary ring gear from overdrive case.
4. Thrust bearing races and thrust bearing from overdrive case.
5. Using a flat bladed screw driver remove snap ring, piston spring retainer and springs (Figure 51).
6. Apply low compressed air into fluid hole in overdrive case and remove brake piston (Figure 52).
7. Two O-rings from brake piston.
8. Two sealing rings from rear of overdrive case (Figure 53).
9. Bearing and race from rear of overdrive case.

Measure

Tool Required:
J 26900-5 Vernier Caliper

- Free length of clutch piston return springs (Figure 54). Standard free length should fall within 15.10 mm (0.594 in). If not within specification, replace piston return springs.

Install or Connect

Tool Required:
J 36850 Transjel® Transmission Assembly Lubricant

1. Apply J 36850 to Race and bearing and install rear of overdrive case.
2. New seal rings to rear of overdrive case. Lubricate with A/T fluid.
3. New O-rings brake piston. Lubricate with A/T fluid.
4. Brake piston into overdrive case.

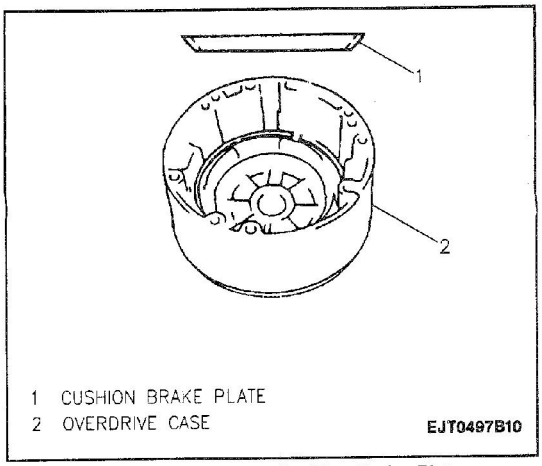


Figure 56—Installing Cushion Brake Plate

5. Twenty piston return springs, piston spring retainer and snap ring to overdrive case. Check that the end gap of snap ring is not aligned with one of the cutouts on overdrive case (Figure 55).
6. Apply J 36850 to bearing race, thrust bearing, thrust bearing race and install to overdrive case in that order.
7. Planetary ring gear to overdrive case.
8. Cushion brake plate, refer to (Figure 56).
9. Overdrive clutch plates and disc in the flowing order:
   A. Plate
   B. Plate
   C. Disc
   D. Plate
   E. Disc
10. Brake plate and snap ring to overdrive case. Check that the end gap of snap ring is not aligned with one of the cutouts on overdrive case.
11. Remeasure clearance between snap ring and brake backing plate with feeler gage. Standard clearance 0.35-1.91 mm (0.014-0.075 in). If it is not within standard clearance, disassemble and inspect.

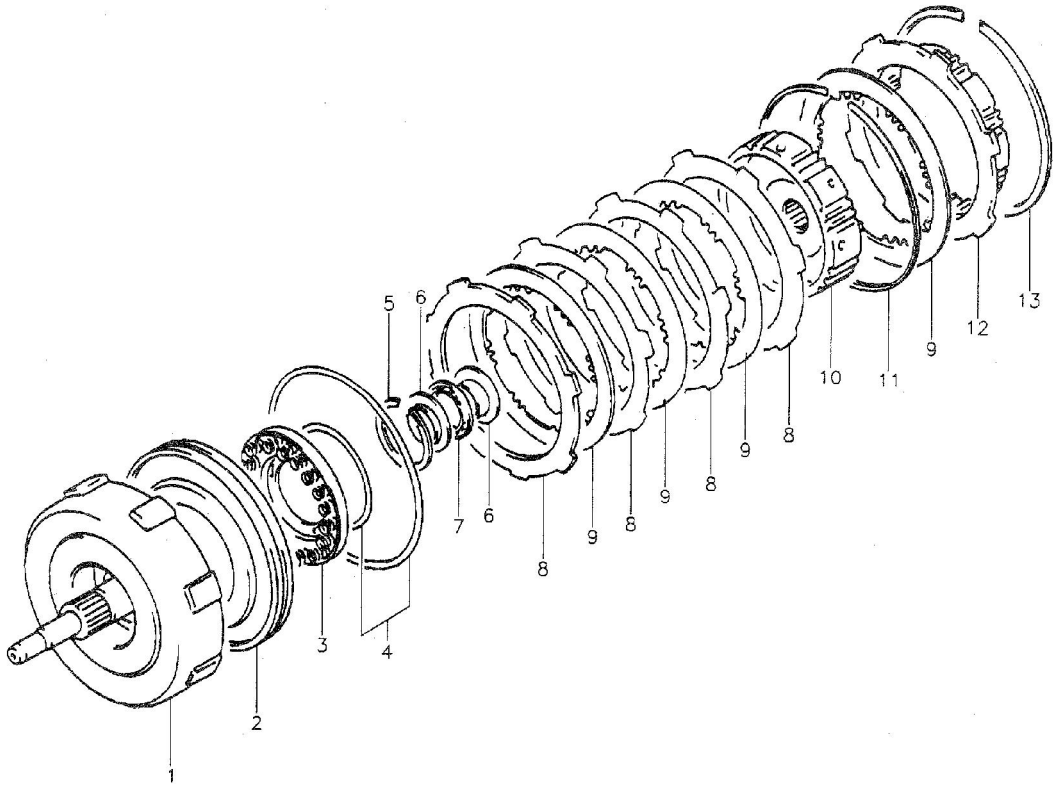
Forward Clutch Assembly

Figures 57 through 66

Remove or Disconnect

Tools Required:
J 41681 Clutch Spring Compressor

1. Snap ring, direct clutch input hub and forward clutch hub from input shaft (Figure 58).
2. Thrust bearing No 2 race, thrust rear bearing race and forward clutch thrust bearing from input shaft (Figure 59).
3. Temporarily install direct clutch input hub and snap ring into forward clutch (Figure 60).



1 INPUT SHAFT
2 CLUTCH PISTON
3 CLUTCH PISTON RETURN SPRING ASSEMBLY
4 CLUTCH PISTON O-RINGS
5 CLUTCH PISTON SNAP RING
6 BEARING RACE
7 BEARING
8 CLUTCH PLATE
9 CLUTCH DISC
10 FORWARD CLUTCH HUB
11 FORWARD CLUTCH HUB SNAP RING
12 DIRECT CLUTCH INPUT HUB
13 DIRECT CLUTCH INPUT HUB SNAP RING

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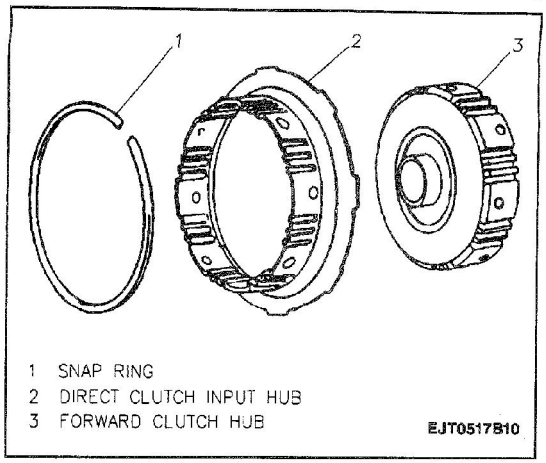
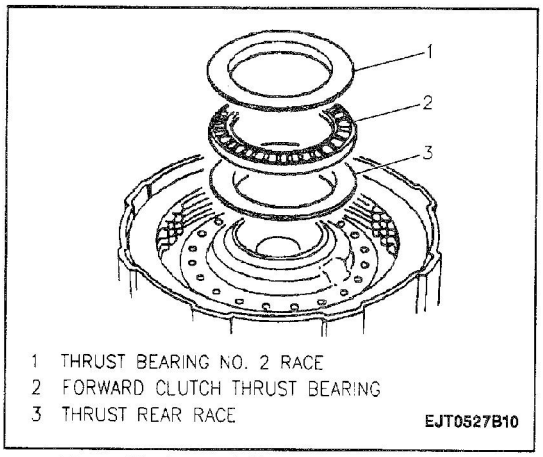
Figure 57—Forward Clutch Components



1 SNAP RING
2 DIRECT CLUTCH INPUT HUB
3 FORWARD CLUTCH HUB

EJT0517B10

Figure 58—Forward Clutch Hub and Direct Clutch Input Hub



1 THRUST BEARING NO. 2 RACE
2 FORWARD CLUTCH THRUST BEARING
3 THRUST REAR RACE

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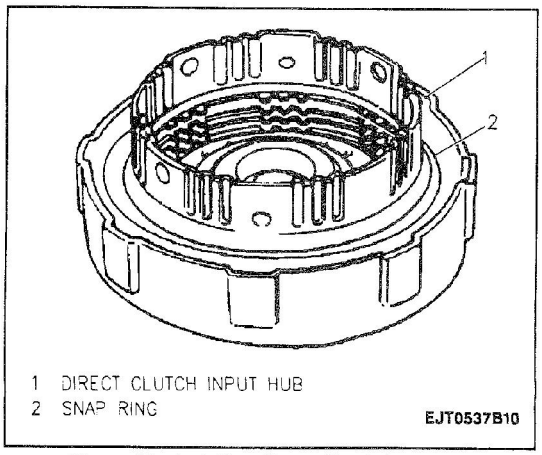
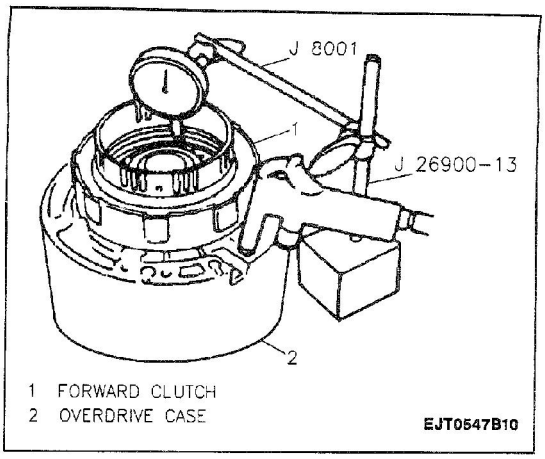
Figure 59—Forward Clutch Bearing and Races



1 DIRECT CLUTCH INPUT HUB
2 SNAP RING

EJT0537B10

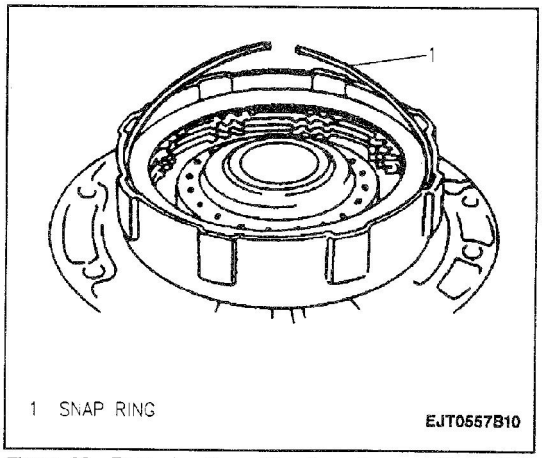
Figure 60—Installing Direct Clutch Input Hub



1 FORWARD CLUTCH
2 OVERDRIVE CASE

EJT0547B10

Figure 61—Measuring Forward Clutch Piston Stroke



1 SNAP RING

EJT0557B10

Figure 62—Removing Snap Ring from Forward Clutch Hub

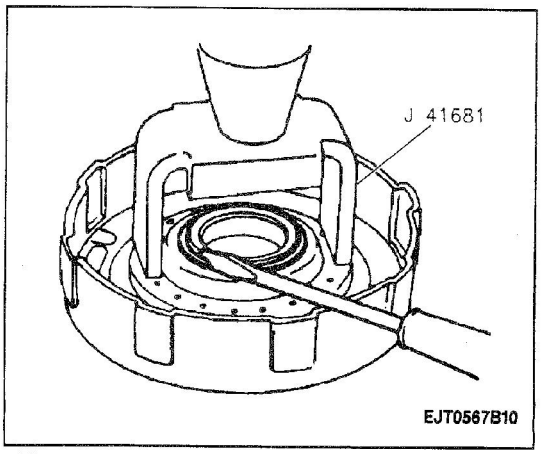


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Figure 63—Removing Forward Clutch Piston Snap Ring

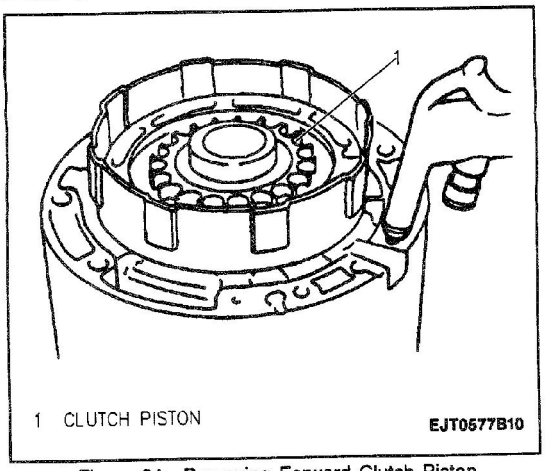


Figure 64—Removing Forward Clutch Piston

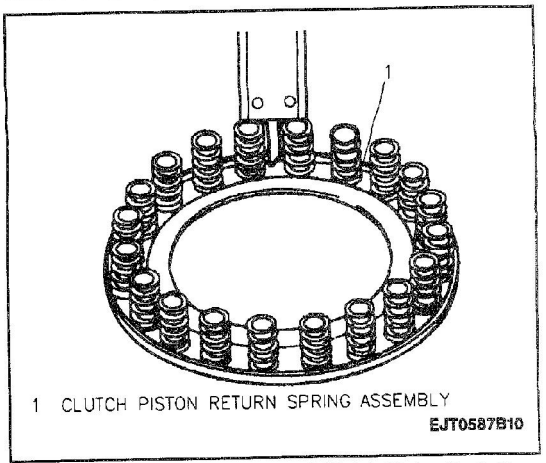


Figure 65—Measuring Forward Clutch Piston Springs

Measure

Tool Required:
J 8001 Dial Indicator Set
J th26900-13 Magnetic Base

- Temporarily install forward clutch into the overdrive case (Figure 61). Using J 26900-13 and J 8001, place the J 8001 plunger on the forward clutch piston and apply 392 to 785 kPa (57 to 114 psi) of compressed air into fluid passage at right of cut in overdrive case and measure movement of forward clutch piston. Standard forward clutch piston stroke is 1.40-2.24 mm (0.056-0.088 in). If forward clutch piston stroke is not within specification, use a 1.8 mm (0.071 in.) or a 2.0 mm (0.079 in.) clutch disc to adjust to specification.

4. Forward clutch from overdrive case.
5. Snap ring and direct clutch input hub from forward clutch hub.
6. Snap ring, clutch plates and discs (Figure 62).
7. Using a J 41681 and a press, compress forward clutch piston return springs and remove snap ring (Figure 63).
8. Forward clutch piston return springs from forward clutch piston.
9. Install forward clutch to overdrive case. Apply low compressed air pressure into fluid passage at right of overdrive case and remove forward clutch piston (Figure 64).
10. Two O-rings from forward clutch piston.

Measure

- Forward clutch piston return springs. Standard free length should fall within 15.10 mm (0.594 in). If not within specification, replace piston return springs (Figure 65).

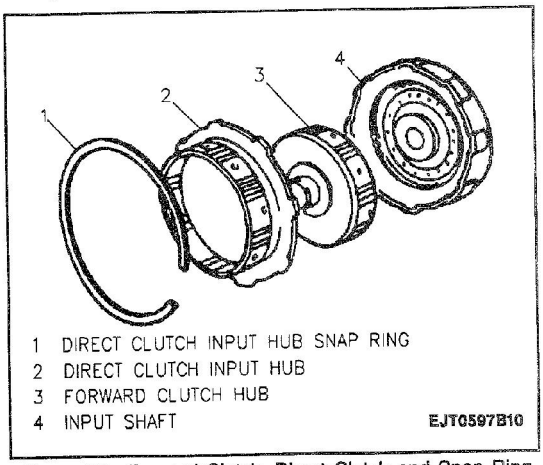


Figure 66—Forward Clutch, Direct Clutch and Snap Ring

Clean

- All forward clutch components and dry thoroughly.

Inspect

- Forward clutch disc for excessive wear or damage. Replace as necessary.
- Forward clutch piston for cracks or porosity. Replace as necessary.
- That the check ball is free by shaking the piston.
- Apply low compressed air pressure to check ball opening and check for leakage.

Remove or Disconnect

Tools Required:
J 41681 Clutch Spring Compressor

1. New O-ring to forward clutch piston. Lubricate with A/T Fluid.
2. Piston to forward clutch drum.

3. Piston return springs and retaining plate.
4. Using a J 41681 and a press, compress forward clutch piston return springs and install snap ring.
5. Forward clutch disc and plates in the flowing order:
   A. Plate
   B. Disc
   C. Plate
   D. Disc
   E. Plate
   F. Disc
   G. Plate
   H. Disc
6. Forward clutch snap ring.
7. Forward clutch thrust bearing, thrust rear bearing race thrust bearing No 2 race. Lubricate with J 36850.
8. Forward clutch hub, direct clutch hub and snap ring in that order (Figure 66).

Direct Clutch

Figures 67 through 75

Measure

Tools Required:
J 8001 Dial Indicator Set
J th26900-13 Magnetic Base

- Direct clutch piston stroke before disassembly using a J 8001 and a J 26900-13 (Figure 68). Temporarily install the direct clutch assembly onto the center support and place the J 8001 plunger on the direct clutch piston. Apply 392 to 785 kPa (57 to 114 psi) of compressed air into the second fluid passage from the left in the overdrive case and measure direct clutch piston stroke. Standard direct clutch piston stroke is 0.19 to 1.75 mm (0.008 to 0.068 in). If direct clutch piston stroke is not within specification, use a 3.6 mm, 3.8 mm, or 4.0 mm (0.141 in, 0.149 in or 0.157 in.) direct clutch flange to adjust direct clutch piston stroke.

Remove or Disconnect

Tool Required:
J 41681 Clutch Spring Compressor

1. Direct clutch assembly from center support.
2. Direct clutch snap ring from direct clutch drum (Figure 69).
3. Direct clutch flange, clutch discs and clutch plates from direct clutch drum (Figure 70).
4. Direct clutch piston return spring snap ring from direct clutch piston retainer using a J 41681 and a press (Figure 71).
5. Direct clutch piston return springs from direct clutch piston.

NOTICE: When using compressed air to remove components, air pressure should not exceed 98 kPa (14 psi).

6. Direct clutch piston from direct clutch drum by temporarily installing the direct clutch drum assembly onto the center support assembly and apply low pressure compressed air into the second fluid passage from the left as shown in (Figure 72).
7. Direct clutch inner piston by applying low compressed air pressure into the fluid passage at the extreme right as shown in (Figure 72).
8. O-rings from inner and outer direct clutch pistons.

Measure

- Direct clutch piston return springs. Standard free length should fall within 15.13 mm (0.595 in). If not within specification, replace direct clutch piston return springs.

Clean

- All Direct clutch components and dry thoroughly.

Inspect

- Direct clutch disc for excessive wear or damage. Replace as necessary.
- Direct clutch pistons for cracks or porosity. Replace as necessary.
- That the check ball is free by shaking the piston.
- Apply low air pressure to check ball opening and check for leakage (Figure 73).

Install or Connect

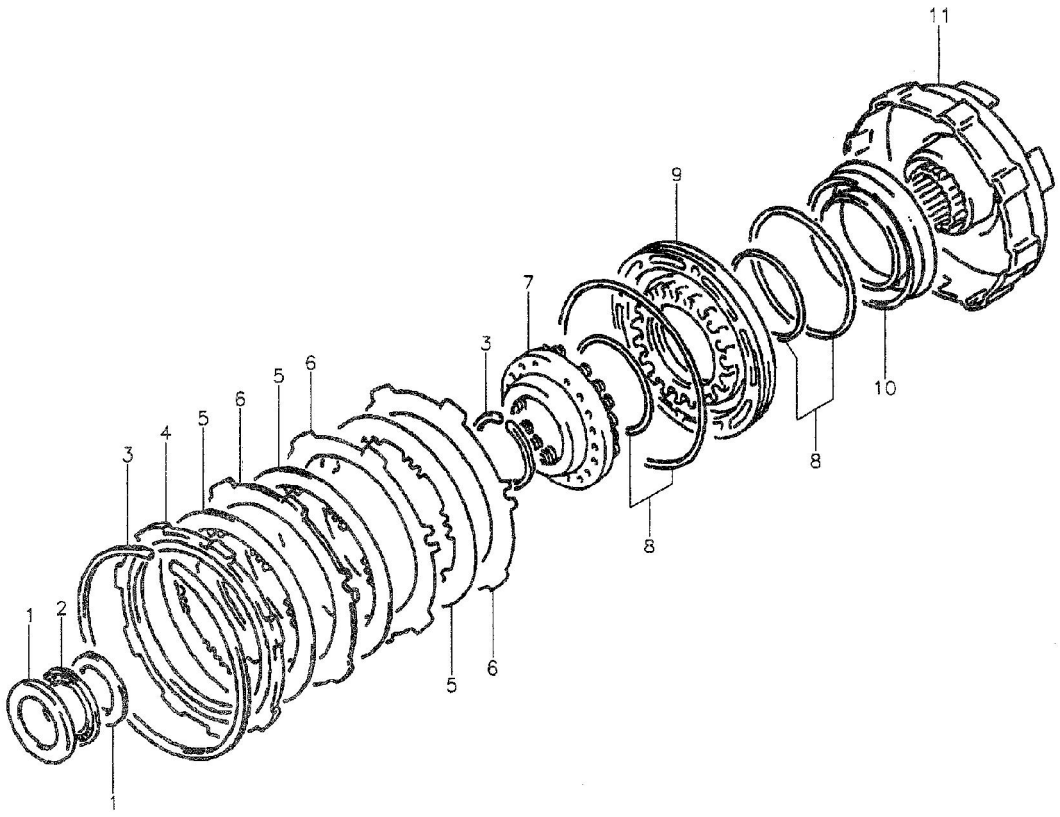
Tool Required:
J 41681 Clutch Spring Compressor

1. New O-rings to direct clutch inner and outer pistons. Lubricate with A/T fluid.
2. Direct clutch inner piston to clutch drum.
3. Direct clutch outer piston to clutch drum.

Important

- When installing return springs, be careful so that the return springs do not tilt or fall out of place.

4. Direct clutch piston return springs onto direct clutch piston.
5. Direct clutch piston return spring snap ring onto direct clutch piston return spring retainer using a J 41681 and a press. Do not align opening of snap ring with cutout in direct drum. (Figure 74).
6. Clutch plates and discs in the following order:
   A. Plate
   B. Disc
   C. Plate
   D. Disc
   E. Plate
   F. Disc
   G. Flange



1 BEARING RACE
2 BEARING
3 SNAP RING
4 CLUTCH FLANGE
5 CLUTCH DISC
6 CLUTCH PLATE
7 CLUTCH PISTON RETURN SPRING ASSEMBLY
8 CLUTCH PISTON O-RINGS
9 DIRECT CLUTCH PISTON
10 DIRECT CLUTCH INNER PISTON
11 DIRECT CLUTCH DRUM

EJT0607B10

Figure 67—Direct Clutch Components

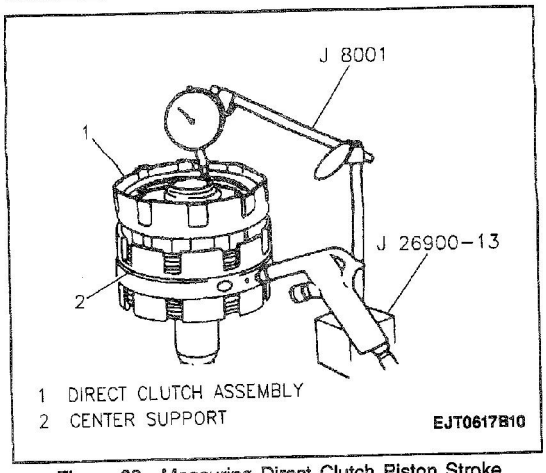
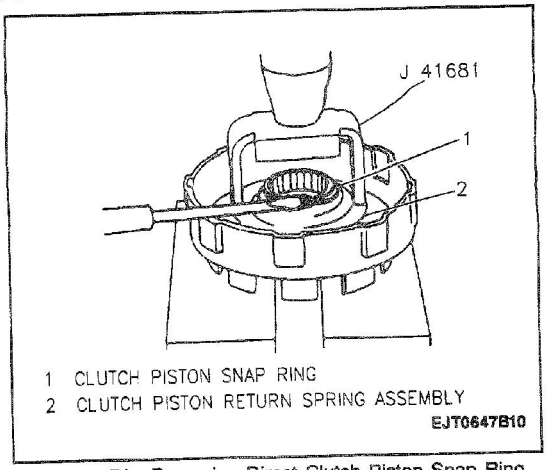


Figure 68—Measuring Direct Clutch Piston Stroke



Figure—71—Removing Direct Clutch Piston Snap Ring

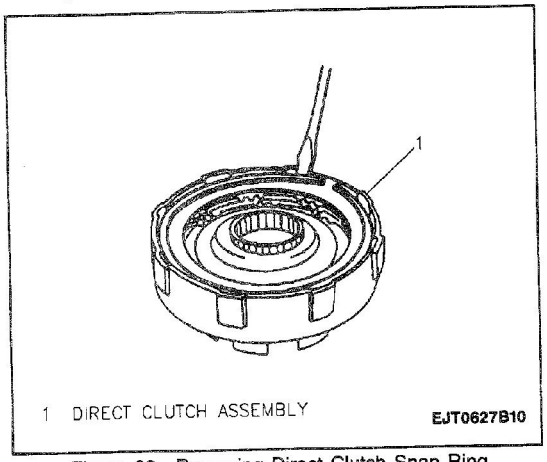


Figure 69—Removing Direct Clutch Snap Ring

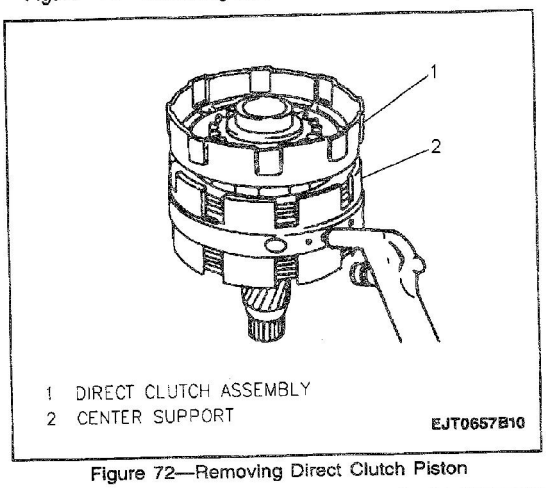


Figure 72—Removing Direct Clutch Piston

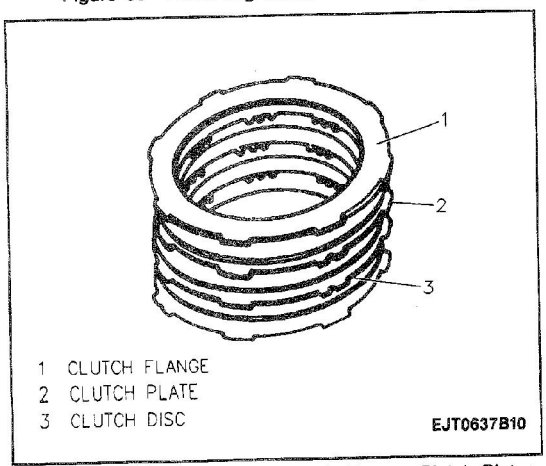


Figure 70—Removing Direct Clutch Flange, Clutch Plates and Clutch Discs

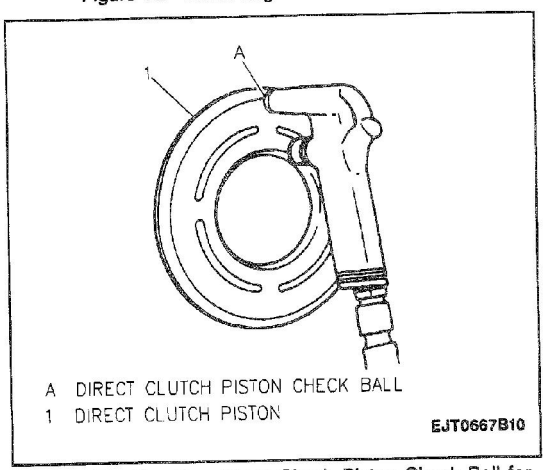
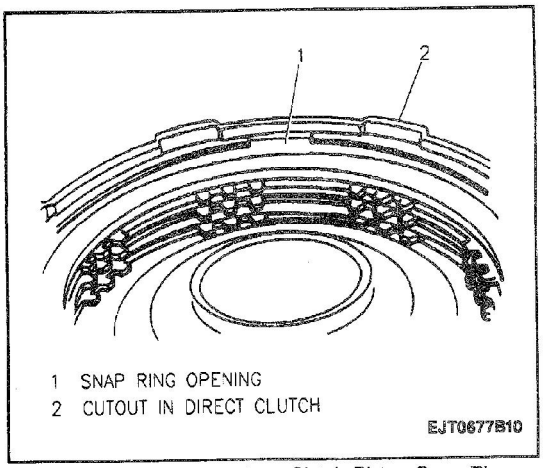


Figure 73—Checking Direct Clutch Piston Check Ball for Leakage



Figure—74 Installing Direct Clutch Piston Snap Ring

Important

- The direct clutch flange must be installed with the flat side facing down and the stepped portion facing upwards (Figure 75).

7. Direct clutch snap ring into direct clutch drum.
8. Race, thrust bearing and race in that order. Lubricate with J 36850.

Center Support, Second Coast Brake, Second Brake and Planetary Gear Assembly

Figures 76 through 93

Remove or Disconnect

Tool Required:
J 8059 Parallel Jaws
J 41681 Clutch Spring Compressor

1. Using J 8059 remove planetary gear snap ring from planetary gear (Figure 77).
2. Planetary gear from center support assembly (Figure 78).

Measure

Tools Required:
J 8001 Dial Indicator Set
J 26900-13 Magnetic Base

- B1 brake (second coast brake) piston stroke before disassembly using a J 8001 and a J 26900-13 (Figure 79). Place the J 8001 plunger on the B1 brake piston and apply 392 to 785 kPa (57 to 114 psi) of compressed air into the fluid passage the extreme left in the overdrive case and measure B1 piston stroke. Standard B1 brake piston stroke is 0.63 to 1.73 mm (0.025 to 0.068 in). If B1 brake piston stroke is not within specification. Replace B1 brake flange or brake disc.

3. Using a flat bladed screw driver remove B1 brake clutch snap ring from center support (Figure 80).

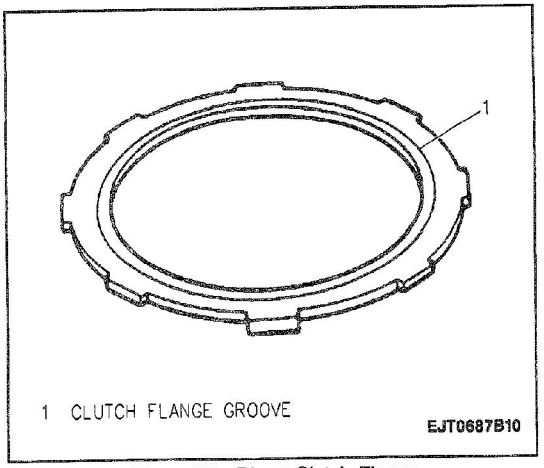


Figure 75—Direct Clutch Flange

4. B1 brake flange, clutch discs and clutch plates from center support (Figure 81).
5. B1 brake piston return spring snap ring from B1 brake piston retainer using a J 41681 and a hydraulic press (Figure 82).
6. B1 brake piston return springs from center support (Figure 83).

NOTICE: When using compressed air to remove components, air pressure should not exceed 98 kPa (14 psi).

7. B1 brake piston by applying low compressed air pressure into the fluid passage at the extreme left as shown in (Figure 84).
8. O-rings B1 brake piston.
9. Three rear sealing rings from center support (Figure 85).

Measure

Tool Required:
J 8001 Dial Indicator Set
J 26900-13 Magnetic Base

- B2 brake (second brake) piston stroke before disassembly using a J 8001 and a J 26900-13 (Figure 86). Place the J 8001 plunger on the B2 brake piston and apply 392 to 785 kPa (57 to 114 psi) of compressed air into the second fluid passage to the left in the overdrive case and measure B2 piston stroke. Standard B2 brake piston stroke is 1.01 to 2.25 mm (0.040 to 0.088 in). If B2 brake piston stroke is not within specification. Replace B2 brake flange or brake disc.

10. B2 brake snap ring from center support.
11. B2 brake flange, clutch discs and clutch plates from center support.
12. B2 brake piston return spring snap ring from B2 brake piston retainer using a J 41681 and a hydraulic press (Figure 87).
13. B2 brake piston return springs from center support.

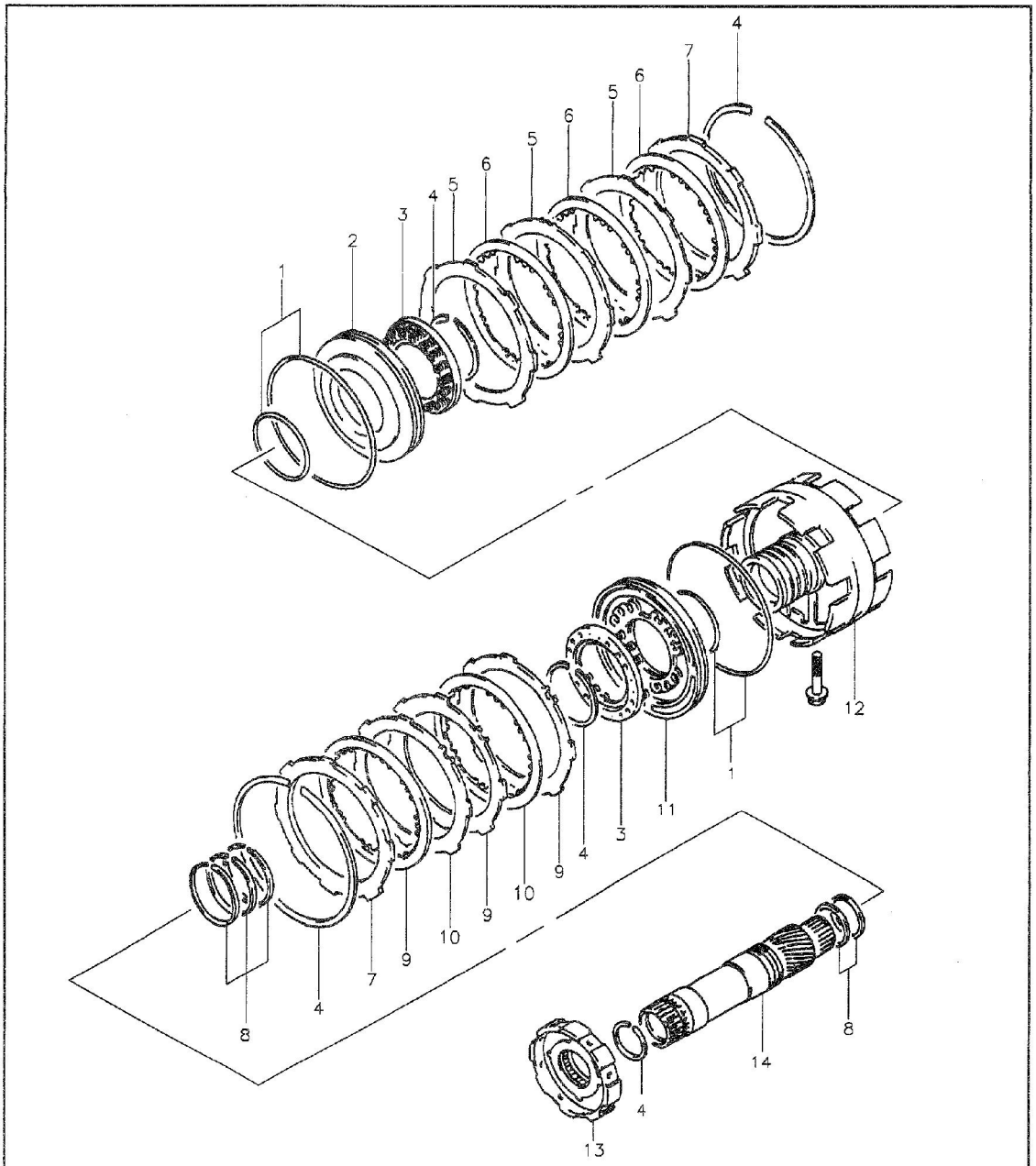


Figure 76—Center Support Components

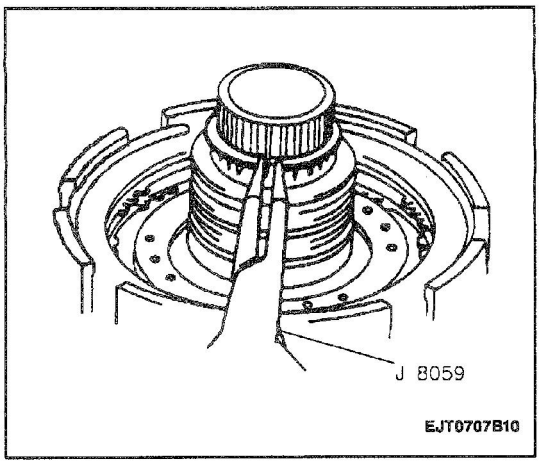


Figure 77—Removing Planetary Snap Ring from Planetary Gear

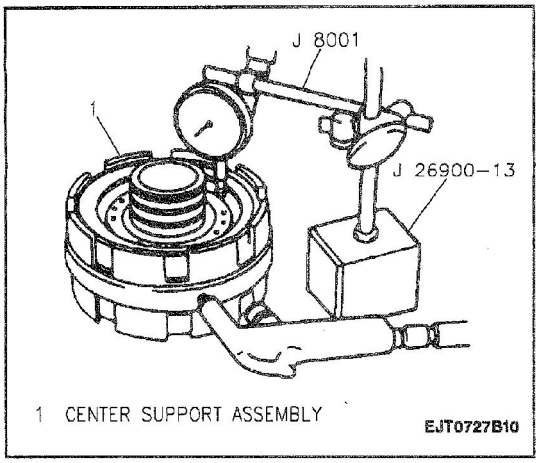


Figure 79—Measuring B1 Brake (Second Coast Brake) Piston Stroke

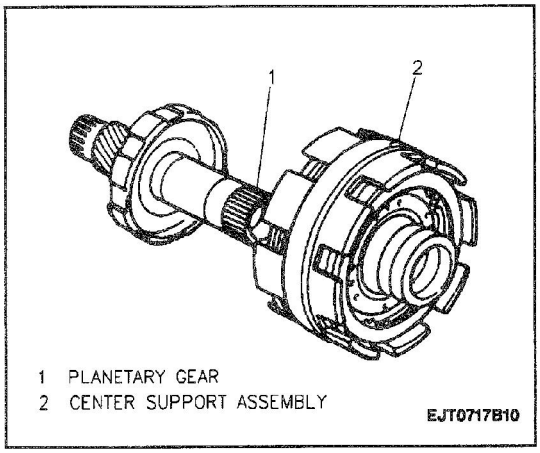


Figure 78—Removing Planetary Gear from Center Support

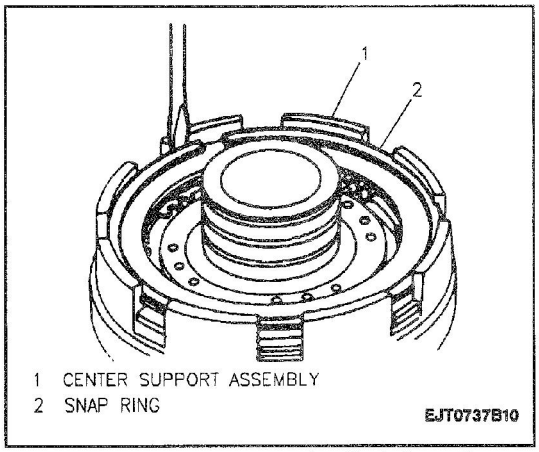


Figure 80—Removing B1 Brake Clutch Snap Ring

NOTICE: When using compressed air to remove components, air pressure should not exceed 98 kPa (14 psi).

14. B2 brake piston by applying low compressed air pressure into the second fluid passage to the left in the overdrive case (Figure 88).
15. O-rings from B2 brake piston.
16. Hold B2 brake hub assembly by hand, turn planetary sun gear clockwise to check that it locks and then counterclockwise to check that it turns smoothly (Figure 89).
17. B2 brake hub assembly from planetary sun gear (Figure 90).
18. Two sun gear sealing rings from planetary sun gear.

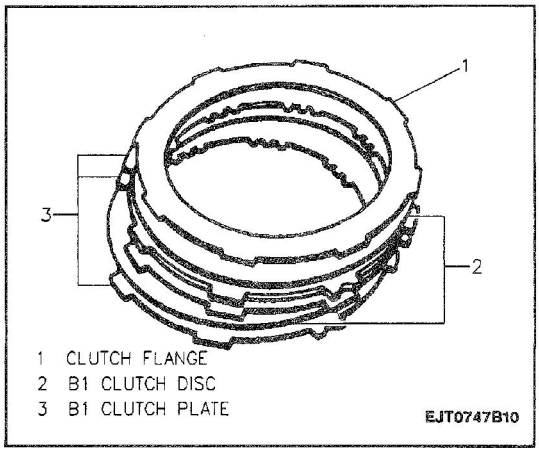


Figure 81—B1 Clutch Discs and Plates

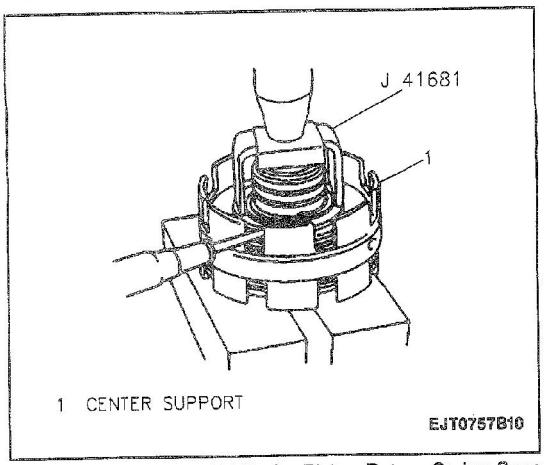


Figure 82—Removing B1 Brake Piston Return Spring Snap Ring

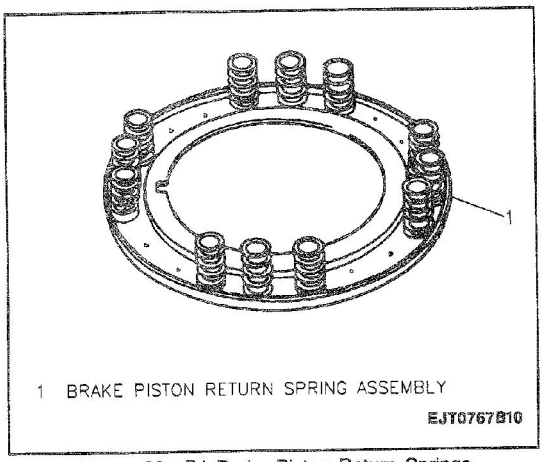


Figure 83—B1 Brake Piston Return Springs

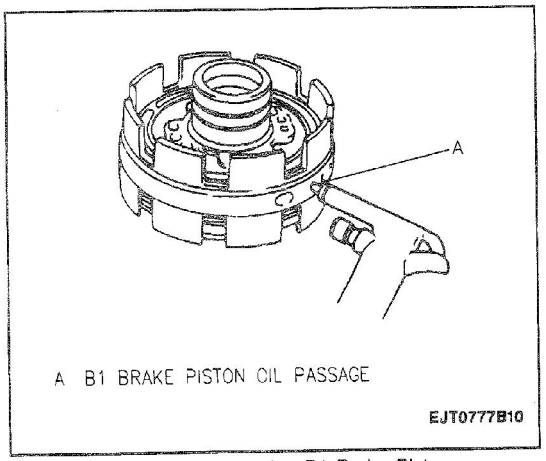


Figure 84—Removing B1 Brake Piston

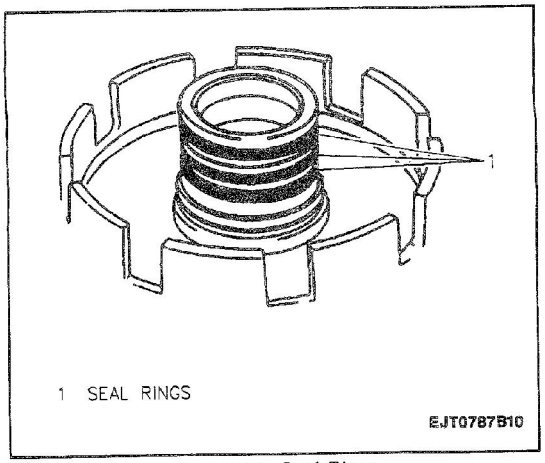


Figure 85—Seal Rings

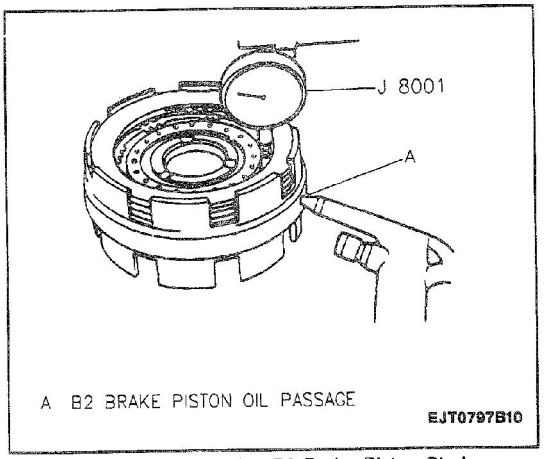


Figure 86—Measuring B2 Brake Piston Stroke

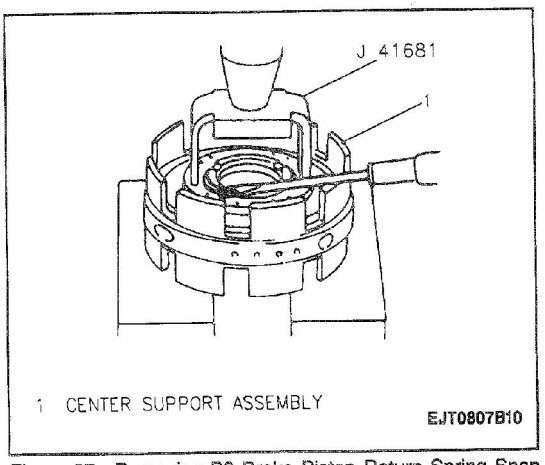
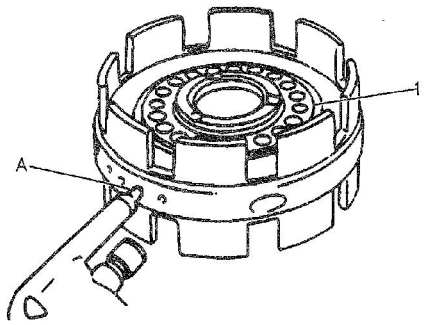
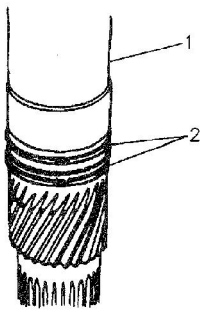


Figure 87—Removing B2 Brake Piston Return Spring Snap Ring



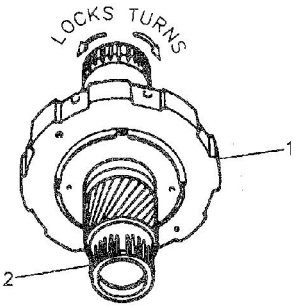
A B2 BRAKE PISTON OIL PASSAGE
1 B2 BRAKE PISTON
EJT0817B10

Figure 88—Removing B2 Brake Piston



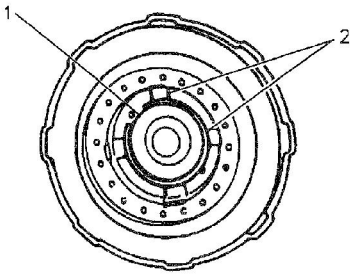
1 PLANETARY SUN GEAR
2 SEAL RINGS
EJT0847B10

Figure 91—Planetary Sun Gear Seal Rings



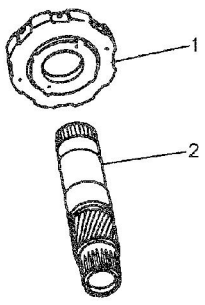
1 B2 BRAKE HUB ASSEMBLY
2 PLANETARY SUN GEAR
EJT0827B10

Figure 89—Inspecting B2 Brake Hub Operation



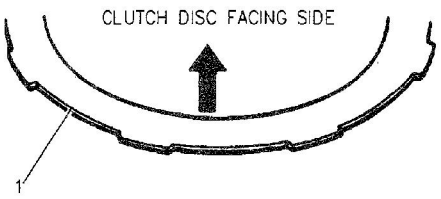
1 OPENING IN SNAP RING
2 LUG
EJT0857B10

Figure 92—B2 Piston Return Spring Alignment



1 B2 BRAKE HUB ASSEMBLY
2 PLANETARY SUN GEAR
EJT0837B10

Figure 90—Removing Planetary Sun Gear from B2 Brake Hub



1 CLUTCH FLANGE WITH CHAMFERED SIDE
EJT0867B10

Figure 93—B2 Clutch Flange

Install or Connect

Tools Required:
J 8059 Parallel Jaws
J 41681 Clutch Spring Compressor

1. Two sun gear seal rings to planetary sun gear. Lubricate with A/T Fluid.
2. B2 brake hub assembly to planetary sun gear.
3. Two new O-rings to B2 brake piston. Lubricate with A/T Fluid.
4. B2 brake piston to center support.
5. B2 brake piston return springs to B2 brake piston.
6. B2 piston return spring snap ring onto B2 piston return spring retainer using a J 41681 and a hydraulic press. Do Not align opening in snap ring with lug on B2 brake piston return spring retainer (Figure 92).
7. B2 brake plates and B2 discs in following order:
   A. Plate
   B. Disc
   C. Plate
   D. Disc
   E. Plate
   F. Disc
8. B2 brake flange with its chamfered side facing disc (Figure 93).
9. B2 snap ring into center support.

Measure

Tools Required:
J 8001 Dial Indicator Set
J 26900-13 Magnetic Base

- B2 brake (second brake) piston stroke before disassembly using a J 8001 and a J 26900-13 (Figure 86). Place the J 8001 plunger on the B2 brake piston and apply 392 to 785 kPa (57 to 114 psi) of compressed air into the second fluid passage to the left in the overdrive case and measure B2 piston stroke. Standard B2 brake piston stroke is 1.01 to 2.25 mm (0.040 to 0.088 in). If B2 brake piston stroke is not within specification. Disassemble and inspect.

10. Three rear seal rings to center support. Lubricate with A/T Fluid.
11. Two new O-rings to B1 brake piston. Lubricate with A/T Fluid.
12. B1 brake piston to center support.
13. B1 brake piston return springs to B1 brake piston.
14. B1 piston return spring snap ring onto B1 piston return spring retainer using a J 41681 and a hydraulic press.
15. B1 brake plates and B1 discs in following order:
   A. Plate
   B. Disc
   C. Plate
   D. Plate
   E. Disc
16. B1 brake flange with its chamfered side facing disc.
17. B1 snap ring into center support.

Measure

Tools Required:
J 8001 Dial Indicator Set
J 26900-13 Magnetic Base

- B1 brake (second coast brake) piston stroke before using a J 8001 and a J 26900-13 (Figure 79). Place the J 8001 plunger on the B1 brake piston and apply 392 to 785 kPa (57 to 114 psi) of compressed air into the fluid passage the extreme left in the overdrive case and measure B1 piston stroke. Standard B1 brake piston stroke is 0.63 to 1.73 mm (0.025 to 0.068 in). If B1 brake piston stroke is not within specification. Disassemble and inspect.

18. Planetary gear to center support assembly
19. Using a J 8059 install planetary gear snap ring.

Planetary Gears and Output Shaft

Figures 94 through 104

Remove or Disconnect

1. Front planetary gear assembly from output shaft assembly (Figure 95).
2. Rear planetary thrust washer from front planetary gear assembly (Figure 96).
3. Reverse brake flange from front planetary gear assembly (Figure 96).
4. Reverse brake plates and discs from front planetary gear (Figure 96).
5. Reverse brake reaction plate from front planetary gear (Figure 97).
6. Snap ring, one-way clutch and one-way clutch rear thrust washer from front planetary gear (Figure 98).
7. Compress snap ring and remove front planetary ring gear, thrust bearing and rear planetary race (Figure 99).
8. Rear planetary thrust washer, rear planetary gear and rear planetary sun gear from rear planetary ring gear (Figure 100).
9. Snap ring from inner shaft and separate inner shaft from rear planetary ring gear (Figure 101).
10. Thrust bearing assembly from rear planetary ring gear.

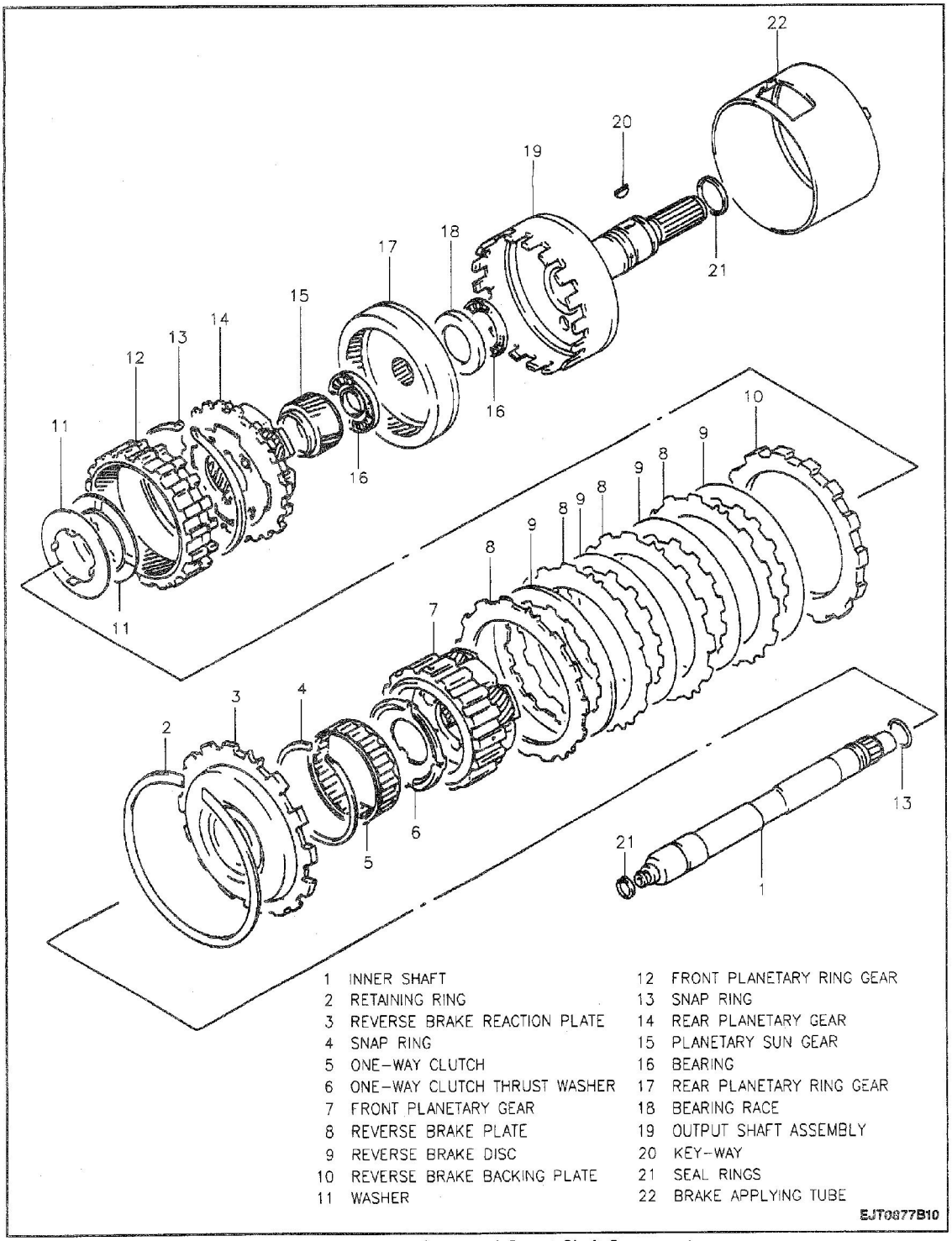
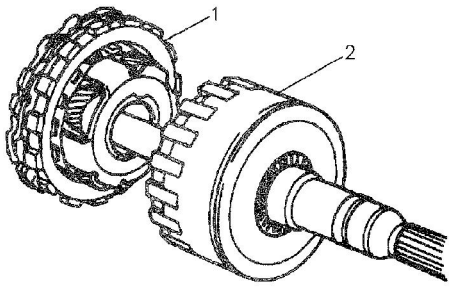


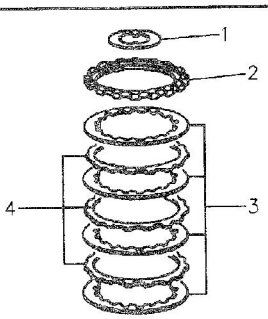
Figure 94—Planetary Gears and Output Shaft Components



1 FRONT PLANETARY GEAR ASSEMBLY
2 OUTPUT SHAFT ASSEMBLY

EJT0887B10

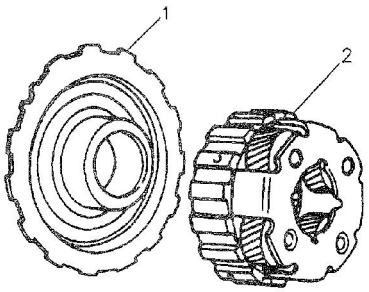
Figure 95—Removing Front Planetary Gear from Output Shaft



1 REAR PLANETARY THRUST WASHER
2 REVERSE BRAKE BACKING PLATE
3 REVERSE BRAKE DISC
4 REVERSE BRAKE PLATE

EJT0897B10

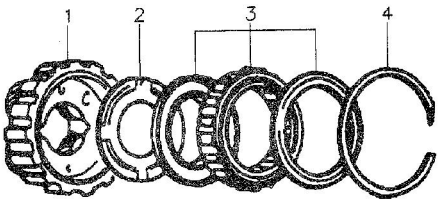
Figure 96—Rear Planetary Gear Components



1 REVERSE BRAKE REACTION PLATE
2 FRONT PLANETARY GEAR

EJT0907B10

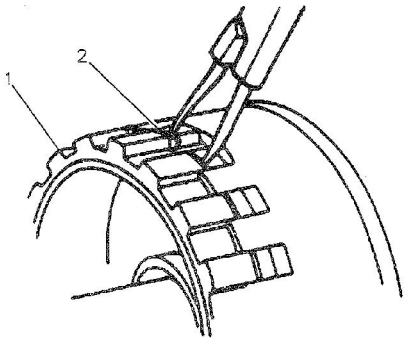
Figure 97—Reverse Brake Reaction Plate and Front Planetary Gear



1 FRONT PLANETARY GEAR
2 ONE-WAY CLUTCH
3 ONE-WAY CLUTCH THRUST WASHER
4 SNAP RING

EJT0917B10

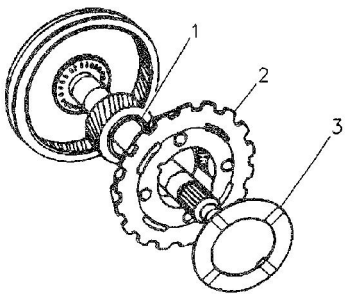
Figure 98—One-Way Clutch Components



1 FRONT PLANETARY RING GEAR
2 SNAP RING

EJT0927B10

Figure 99—Removing Front Planetary Ring Gear



1 REAR PLANETARY SUN GEAR
2 REAR PLANETARY GEAR
3 REAR PLANETARY THRUST WASHER

EJT0937B10

Figure 100—Removing Rear Planetary Thrust Washer, Gear and Sun Gear

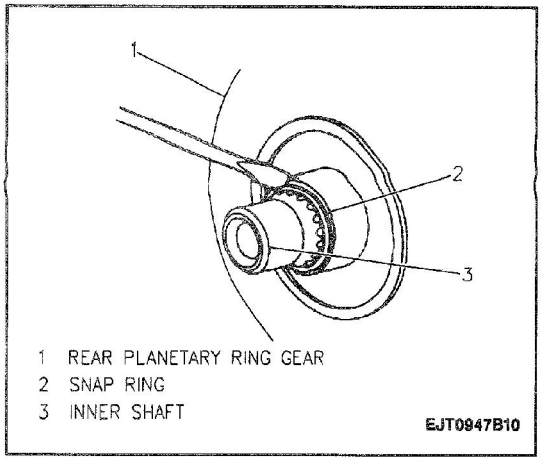


Figure 101—Removing Snap Ring from Inner Shaft

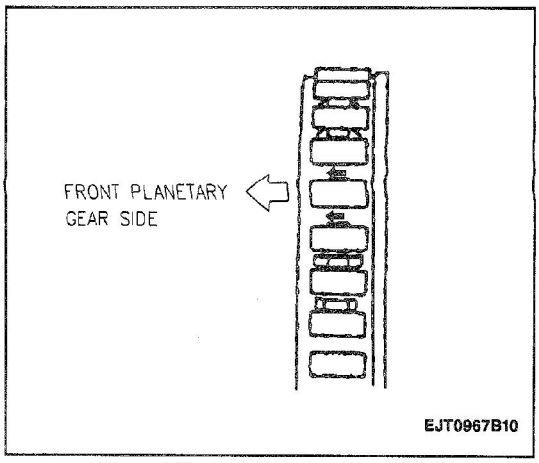


Figure 103—Installing One-Way Clutch

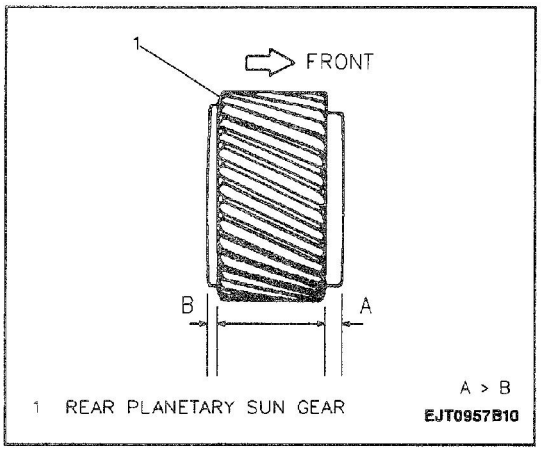


Figure 102—Installing Rear Planetary Sun Gear

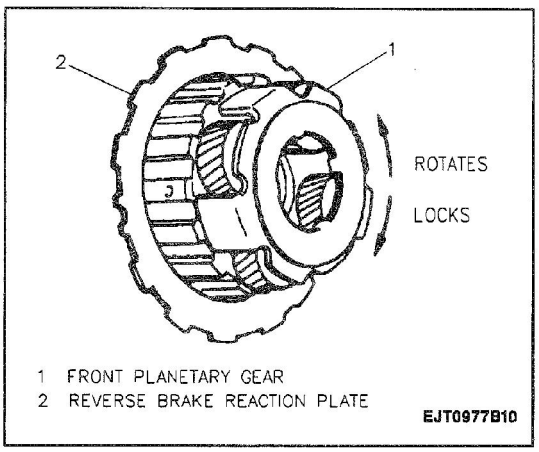


Figure 104—Inspecting One-Way Clutch Operation

Install or Connect

1. Thrust bearing assembly to rear planetary ring gear.
2. Inner shaft to rear planetary ring gear and install snap ring.
3. Thrust bearing to rear planetary ring gear. Lubricate with J 36850.
4. Rear planetary sun gear, rear planetary gear and rear planetary thrust washer to rear planetary ring gear (Figure 102).
5. Rear planetary race and thrust bearing. Lubricate with J 36850.
6. Compress snap ring and install front planetary ring gear.
7. One-way clutch rear thrust washer, one-way clutch and snap ring to from front planetary gear (Figure 103).
8. Reverse brake reaction plate to front planetary gear.

Inspect

- With reverse brake reaction plate held stationary, turn front planetary gear clockwise to check that it locks and then counterclockwise to check that it turns smoothly (Figure 104). If a problem is detected disassemble and inspect.

9. Reverse brake plates and discs to front planetary gear in the following order:
   A. Plate
   B. Disc
   C. Plate
   D. Disc
   E. Plate
   F. Disc
   G. Plate
   H. Disc
10. Reverse brake flange to front planetary gear assembly with beveled side down.
11. Rear planetary thrust washer to front planetary gear assembly. Lubricate with J 36850.
12. Front planetary gear assembly to output shaft assembly.

Valve Body Disassembly

Figures 105 through 112

Remove or Disconnect

1. One bolt and detent spring, plate and manual valve from valve body (Figure 106).
2. Nine bolts from upper valve body side (Figure 107).
3. Six bolts from lower valve body side (Figure 108).
4. Separate upper valve body from lower body while pressing separator plate and gasket against lower valve body to prevent check balls and springs from falling out of lower valve body (Figure 109).

Inspect

1. Front upper valve body for proper location of the valves and check balls.(Figure 110).
2. Rear upper valve body for proper location of the check balls (Figure 111).
3. Lower valve body for proper location of the bypass valve, check balls and primary regulator valve sleeve retainer (Figure 112).

Front Upper Valve Body Disasembly

Figures 113 through 119

Remove or Disconnect

NOTICE: When disassembling the front upper valve body, keep all valve springs, spring seats and plugs with their respective valves. Most valve springs are of different sizes and CANNOT be interchanged. Make sure all parts are clean and dry before assembly.

1. Throttle valve keep plate from valve body (Figure 114).
2. Using flat bladed screwdriver, hold cut back valve plug and remove cut back retainer with a magnet then remove cut back plug, cut back valve and cut back valve spring (Figure 115).
3. One bolt on front valve body end cover and loosen the other to move cover (Figure 116).
4. Secondary regulator valve sub assembly and regulator valve spring (Figure 116).
5. One remaining cover bolt and end cover from valve body.
6. Cam bolt, TV cable cam, cam return spring and cam spacer (Figure 117).

Important

- Note the number of throttle valve compensating ring(s) prior to removal. Line pressure is determined by the number of adjusting rings. The same number of compensating ring(s) that were removed must be installed to ensure proper transmission line pressure. Some valve bodies do not require adjusting rings.

7. Push throttle valve slightly in and remove locating pin with magnet from down shift plug (Figure 118).
8. Down shift plug, throttle valve primary spring, throttle valve, secondary valve spring and throttle valve compensating ring(s) from valve body (Figure 119).

Clean

- All upper valve body components and dry thoroughly.

Inspect

1. All valves for cracks, scoring or other damage. Replace as necessary.
2. All valve springs for damage or distortion. Replace as necessary.
3. Front upper valve body valve bores for scoring or cracks. Replace as necessary.

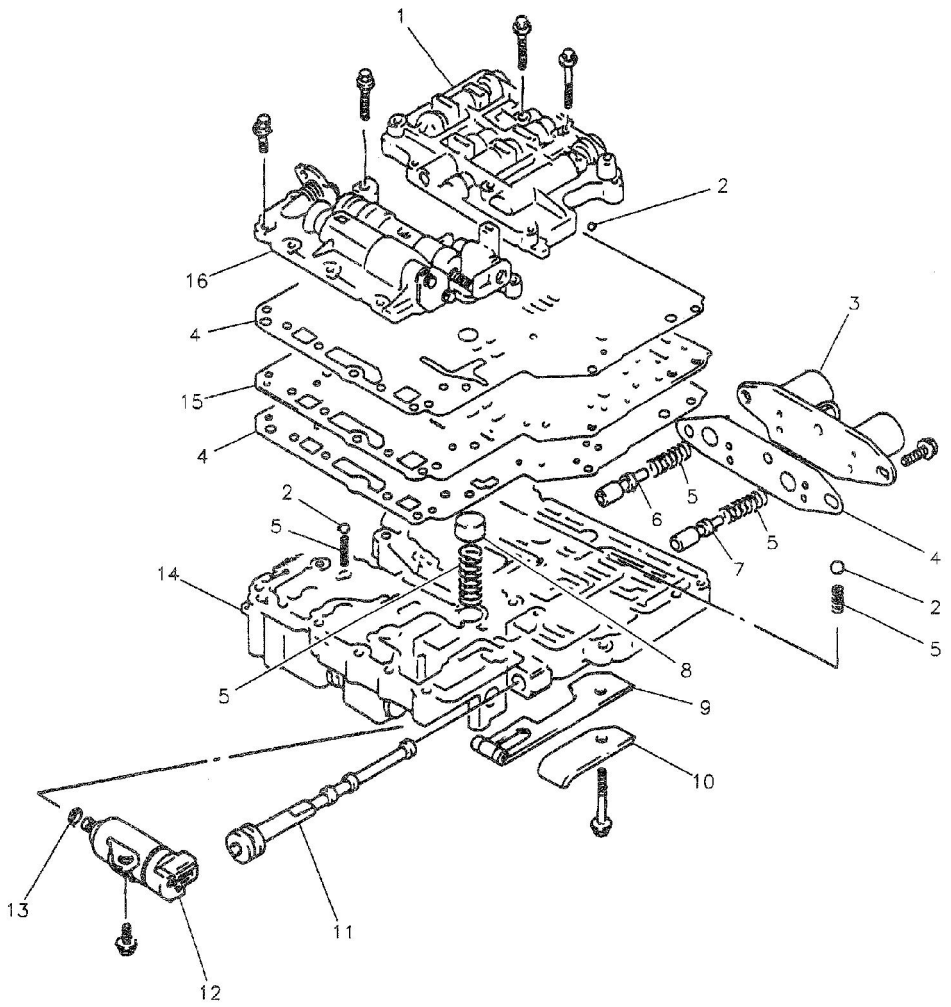
Measure

Tool Required:
J 26900-5 Vernier Caliper

1. Free length and outer coil diameter of all front upper valve body valve springs using a J 26900-5. If spring free length is not as specified in the front upper valve body spring chart, replace as necessary.

REAR UPPER VALVE BODY SPRING CHART

VALVE SPRING	SPRING OUTER DIAMETER	FREE LENGTH
Secondary Regulator Valve Spring	17.43 mm (0.681 in.)	71.23 mm (2.804 in.)
Cut Back Valve Spring	6.85 mm (0.269 in.)	23.00 mm (0.905 in.)
Secondary Valve Spring	8.58 mm (0.337 in.)	19.24 mm (0.757 in.)
Throttle Valve Primary Spring	10.90 mm (0.429 in.)	39.55 mm (1.557 in.)



1 REAR UPPER VALVE BODY
2 BALL
3 SHIFT SOLENOID ASSEMBLY
4 GASKET
5 SPRING
6 INTERMEDIATE COAST MODULATOR VALVE
7 LOW COAST MODULATOR VALVE
8 BY-PASS VALVE
9 DETENT SPRING
10 PLATE
11 MANUAL VALVE
12 TORQUE CONVERTER CLUTCH SOLENOID
13 O-RING
14 LOWER VALVE BODY ASSEMBLY
15 PLATE
16 FRONT UPPER VALVE BODY

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Figure 105—Valve Body Assembly Components

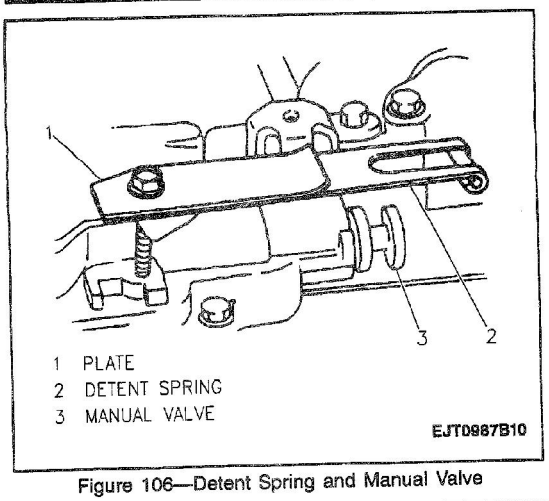


Figure 106—Detent Spring and Manual Valve

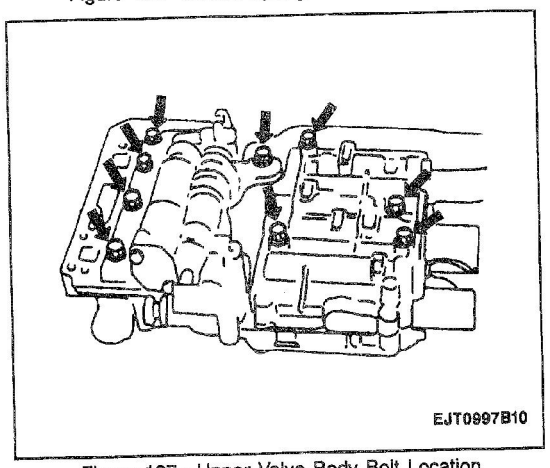


Figure 107—Upper Valve Body Bolt Location

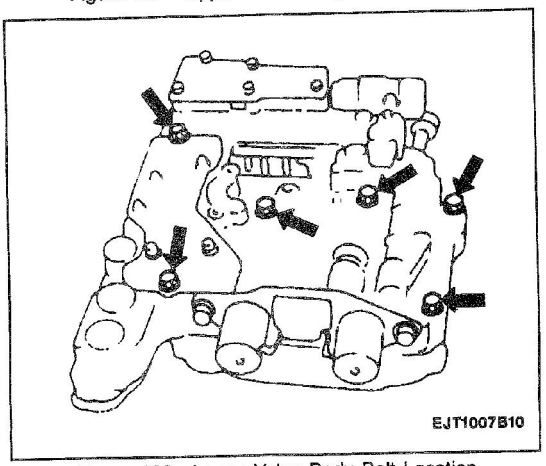


Figure 108—Lower Valve Body Bolt Location

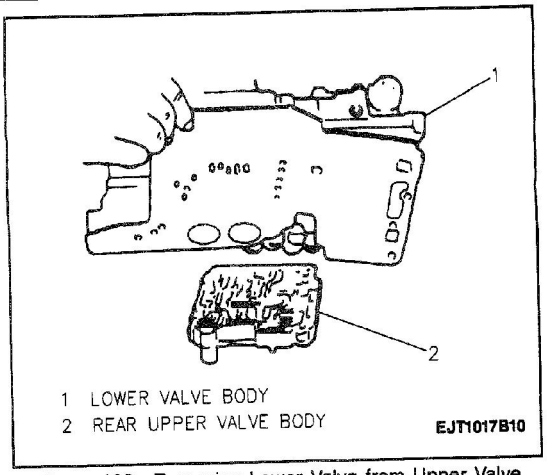


Figure 109—Removing Lower Valve from Upper Valve Body

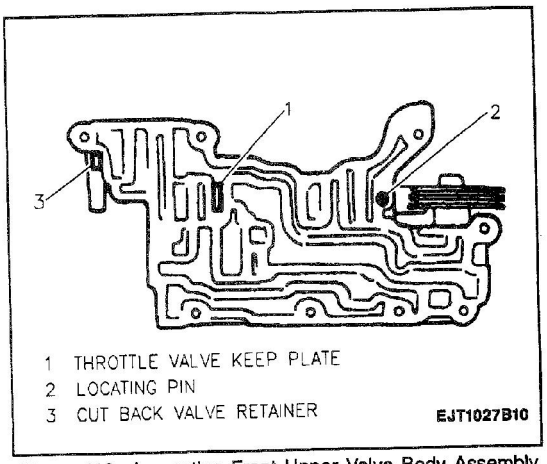


Figure 110—Inspecting Front Upper Valve Body Assembly

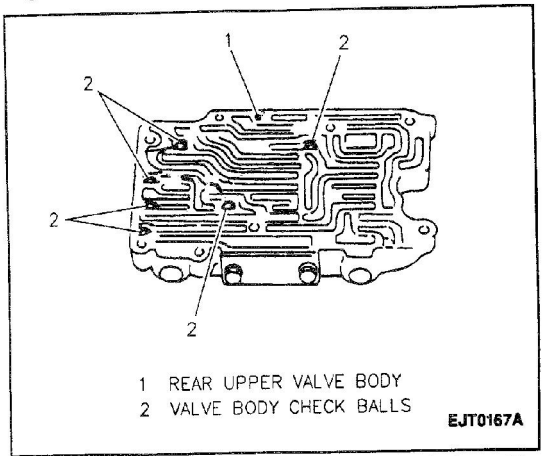


Figure 111—Inspecting Rear Upper Valve Body Assembly

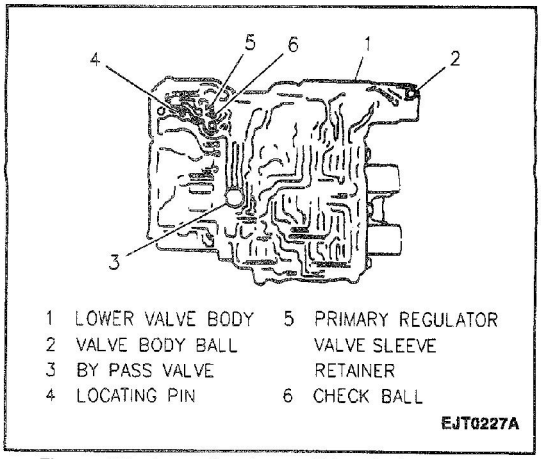


Figure 112—Inspecting Lower Valve Body Assembly

Front Upper Valve Body Assembly

Figures 113 and 120

Install or Connect

1. Secondary valve spring, throttle valve compensating ring(s), throttle valve, throttle valve primary spring and down shift plug to valve body; secure with one locating pin.
2. Cam return spring, cam spacer and TV cam to valve body; secure with one bolt.

Tighten

- TV cable cam bolt to 8 N·m (71 lb. in.)

3. Front valve end cover to valve body; secure with one bolt. Do Not tighten bolt fully.
4. Secondary valve spring, secondary regulator valve to valve body. Rotate end cover over valve; secure with one remaining bolt (Figure 120).

Tighten

- Pressure relief valve bolts to 5 N·m (44 lb. in.).

5. Cut back valve spring, cut back valve and cut back plug to valve body; secure with one valve retainer.
6. Throttle valve keep plate to valve body.

Rear Upper Valve Body Disassembly

Figures 121 through 126

Remove or Disconnect

NOTICE: When disassembling the rear upper valve body, keep all valve springs, spring seats and plugs with their respective valves. Most valve springs are of different sizes and CANNOT be interchanged. Make sure all parts are clean and dry before assembly.

1. Six valve body balls from valve body (Figure 122).
2. Depress 3-2 kickdown control valve plug and remove needle roller with magnet from valve body.
3. 3-2 kickdown control valve plug, clutch sequence valve and reverse brake sequence valve spring from valve body (Figure 123).
4. Depress shift valve plug, and remove shift valve retainer with magnet from valve body (Figure 124).
5. Shift valve plug and 3-4 shift valve spring from valve body.
6. Two plate bolts securing rear upper valve body plate and gasket to valve body (Figure 125).
7. 1-2 shift valve and shift valve spring from valve body.
8. Depress shift valve plug and remove valve retainer with magnet from valve body (Figure 126).
9. Shift valve plug, 2-3 shift valve and shift valve spring from valve body.

Clean

- All upper valve body components and dry thoroughly.

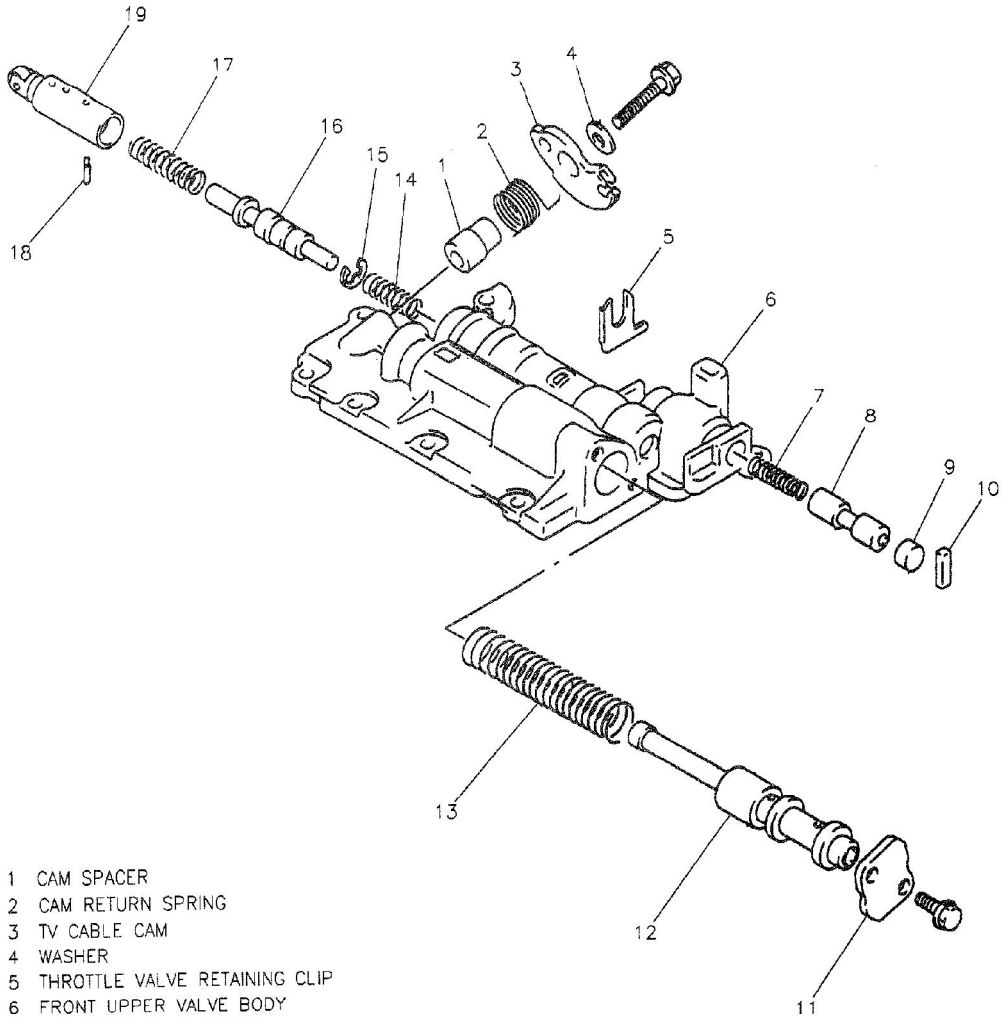
Inspect

1. All valves for cracks, scoring or other damage. Replace as necessary.
2. All valve springs for damage or distortion. Replace as necessary.
3. Rear upper valve body valve bores for scoring or cracks. Replace as necessary.

Measure

Tool Required:
J 26900-5 Vernier Caliper

1. Free length and outer coil diameter of all rear upper valve body valve springs using a J 26900-5. If spring free length is not as specified in the rear upper valve body spring chart, replace as necessary.



1 CAM SPACER
2 CAM RETURN SPRING
3 TV CABLE CAM
4 WASHER
5 THROTTLE VALVE RETAINING CLIP
6 FRONT UPPER VALVE BODY
7 CUT BACK VALVE SPRING
8 CUT BACK VALVE
9 CUT BACK PLUG
10 CUT BACK VALVE RETAINER
11 SECONDARY REGULATOR VALVE COVER
12 SECONDARY REGULATOR VALVE
13 SECONDARY REGULATOR SPRING
14 SECONDARY KICK DOWN SPRING
15 KICK DOWN RETAINING CLIP
16 KICK DOWN VALVE
17 PRIMARY KICK DOWN SPRING
18 LOCATING PIN
19 KICK DOWN PLUG

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Figure 113—Front Upper Valve Body Components

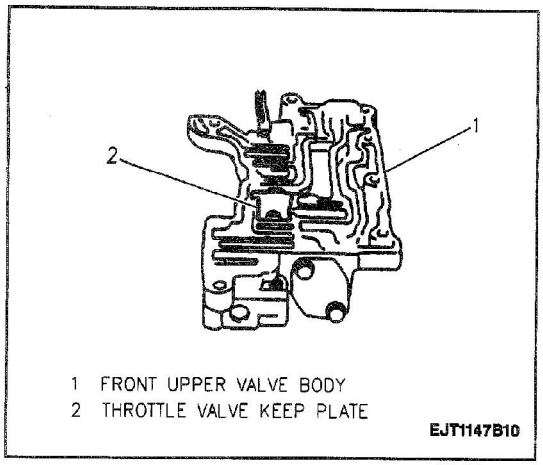


Figure 114—Removing Throttle Valve Keep Plate

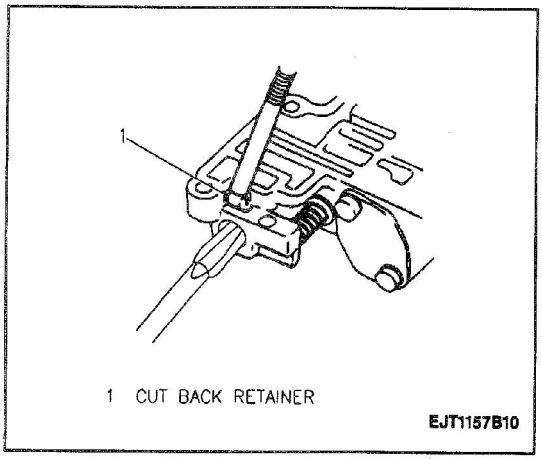


Figure 115—Removing Cut Back Valve

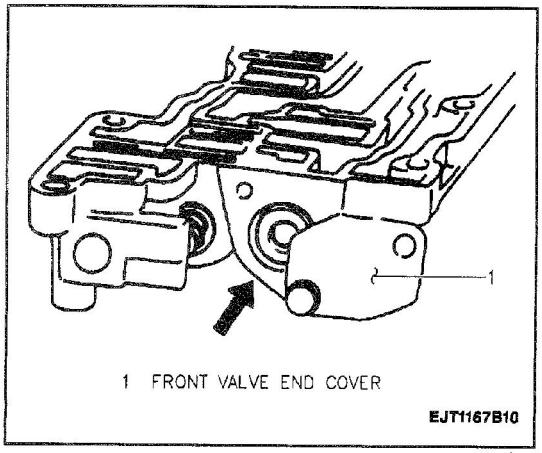


Figure 116—Removing Front Valve Body End Cover

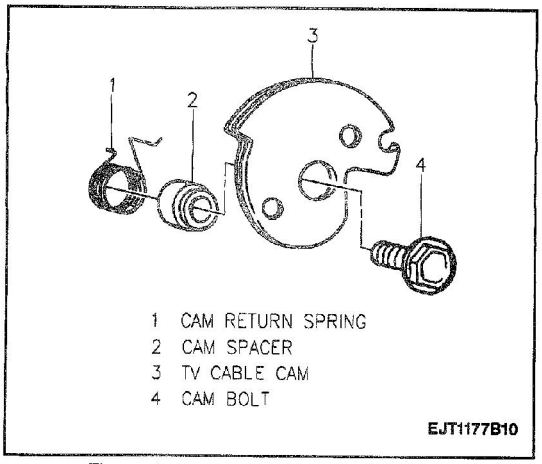


Figure 117—TV Cable Cam Components

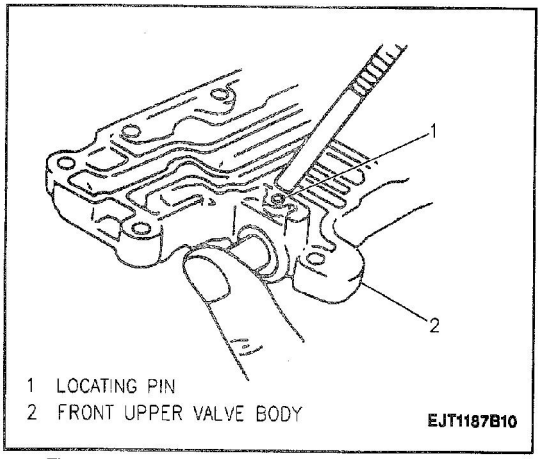


Figure 118—Removing Throttle Valve Locating Pin

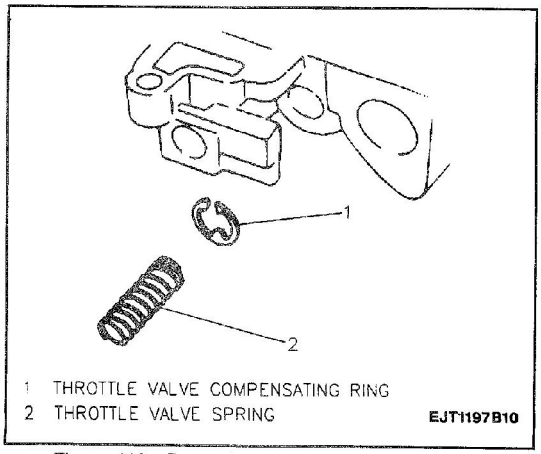


Figure 119—Removing Throttle Valve Spring and Compensating Ring(s)

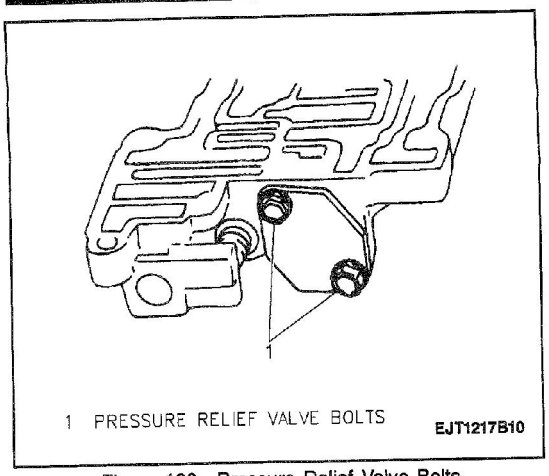


Figure 120—Pressure Relief Valve Bolts

Rear Upper Valve Body Assembly

Figures 121 and 122

Install or Connect

1. 2-3 shift valve spring, shift valve and shift valve plug to valve body; secure with one retainer.
2. 1-2 shift valve spring, shift valve, rear valve body plate gasket and rear valve body plate to valve body plate; secure with two bolts.

Tighten

- Rear valve body plate bolts to 5 N·m (44 lb. in.)

3. 3-4 shift valve spring, shift valve, and shift valve plug to valve body; secure with one retainer.
4. Reverse brake sequence valve spring, clutch sequence valve and 3-2 kickdown control valve plug to valve body; secure with one needle roller pin.
5. Six valve body balls to valve body (Figure 122).

Lower Valve Body Disassembly

Figures 127 through 135

Remove or Disconnect

NOTICE: When disassembling the rear upper valve body, keep all valve springs, spring seats and plugs with their respective valves. Most valve springs are of different sizes and CANNOT be interchanged. Make sure all parts are clean and dry before assembly.

1. Bypass valve, bypass valve spring, check ball, valve damping spring, valve body ball and ball valve spring from valve body (Figure 128).
2. Lower valve body plate and gasket from valve body (Figure 129).
3. TCC (lock-up) control valve plate and gasket from valve body (Figure 129).
4. Depressed pressure relief valve retainer, remove pressure relief valve bolt, pressure relief valve retainer, pressure relief valve spring and pressure relief valve ball (Figure 130).
5. One Bolt, TCC (lock-up) solenoid and O-ring from TCC solenoid (Figure 131).
6. Two bolts, shift solenoid assembly, gasket, low coast modulator valve spring, intercoast modulator valve spring and two intermediate coast modulator valves from valve body (Figure 132).
7. Depressing TCC (lock-up) control sleeve. Using a magnet, remove locating pin and then remove TCC (lock-up) control valve spring (Figure 133).

Important

- There are four step positions on the primary regulator valve sleeve. Note the position of the primary regulator valve sleeve for reassembly (Figure 134).

8. Depress primary regulator valve sleeve. Using a magnet, remove primary regulator valve sleeve retainer, primary regulator valve sleeve, primary regulator valve plunger, primary regulator valve spring and primary regulator valve (Figure 135).

Clean

- All upper valve body components and dry thoroughly.

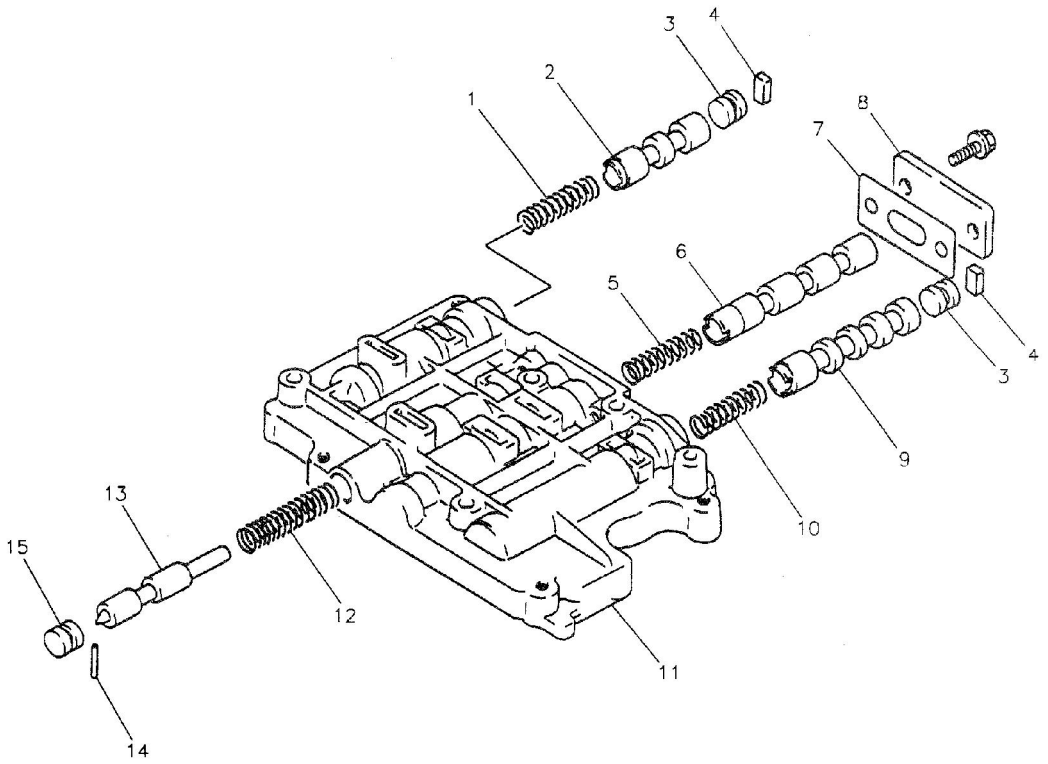
Inspect

1. All valves for cracks, scoring or other damage. Replace as necessary.
2. All valve springs for damage or distortion. Replace as necessary.
3. Lower valve body valve bores for scoring or cracks. Replace as necessary.

Measure

Tool Required:
J 26900-5 Vernier Caliper

1. Free length and outer coil diameter of all lower valve body valve springs using a J 26900-5. If spring free length is not as specified in the lower valve body spring chart, replace as necessary.



1 SHIFT VALVE SPRING
2 3-4 SHIFT VALVE
3 SHIFT VALVE PLUG
4 SHIFT VALVE RETAINING PIN
5 SHIFT VALVE SPRING
6 1-2 SHIFT VALVE
7 GASKET
8 RETAINER PLATE
9 2-3 SHIFT VALVE
10 SHIFT VALVE SPRING
11 REAR UPPER VALVE BODY
12 REVERSE BRAKE SEQUENCE VALVE SPRING
13 CLUTCH SEQUENCE SPRING
14 RETAINING PIN
15 3-2 KICK DOWN CONTROL VALVE PLUG

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Figure 121—Rear Upper Valve Body Components

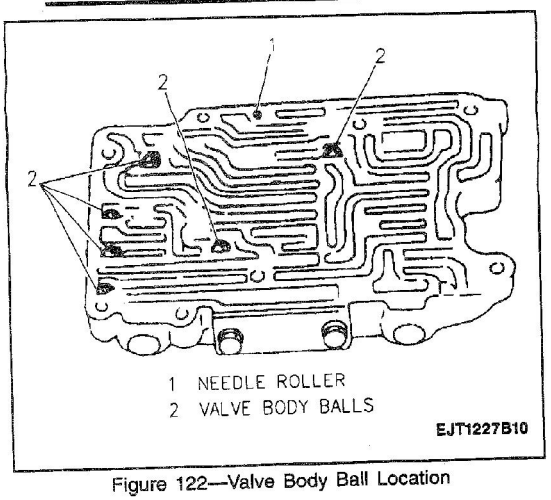


Figure 122—Valve Body Ball Location

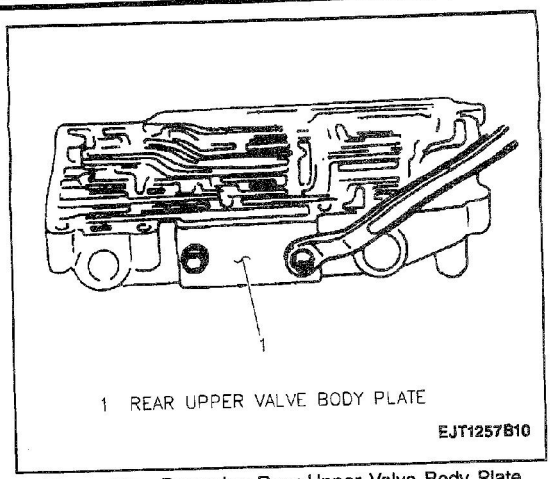


Figure 125—Removing Rear Upper Valve Body Plate

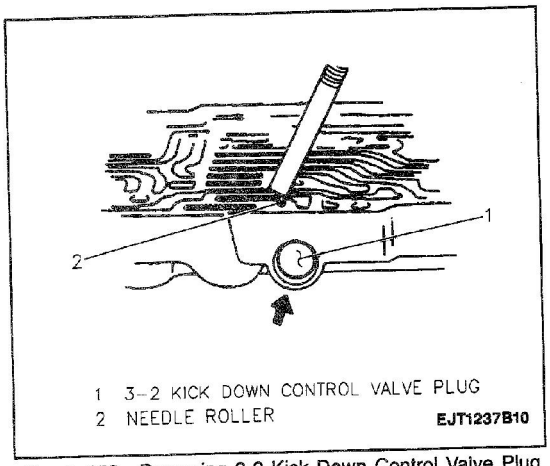


Figure 123—Removing 3-2 Kick Down Control Valve Plug

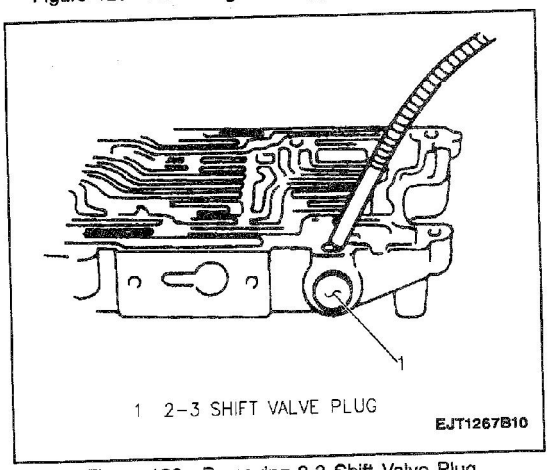


Figure 126—Removing 2-3 Shift Valve Plug

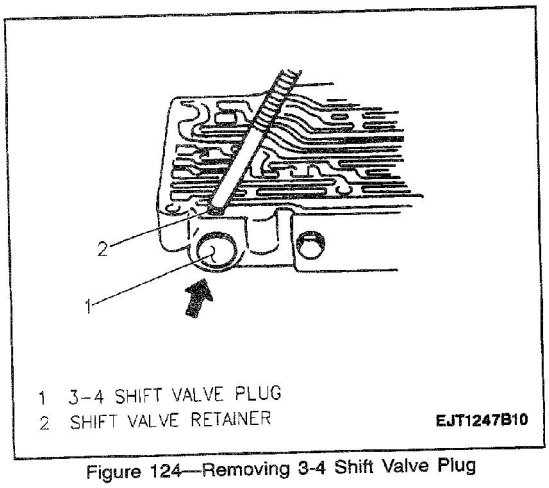


Figure 124—Removing 3-4 Shift Valve Plug

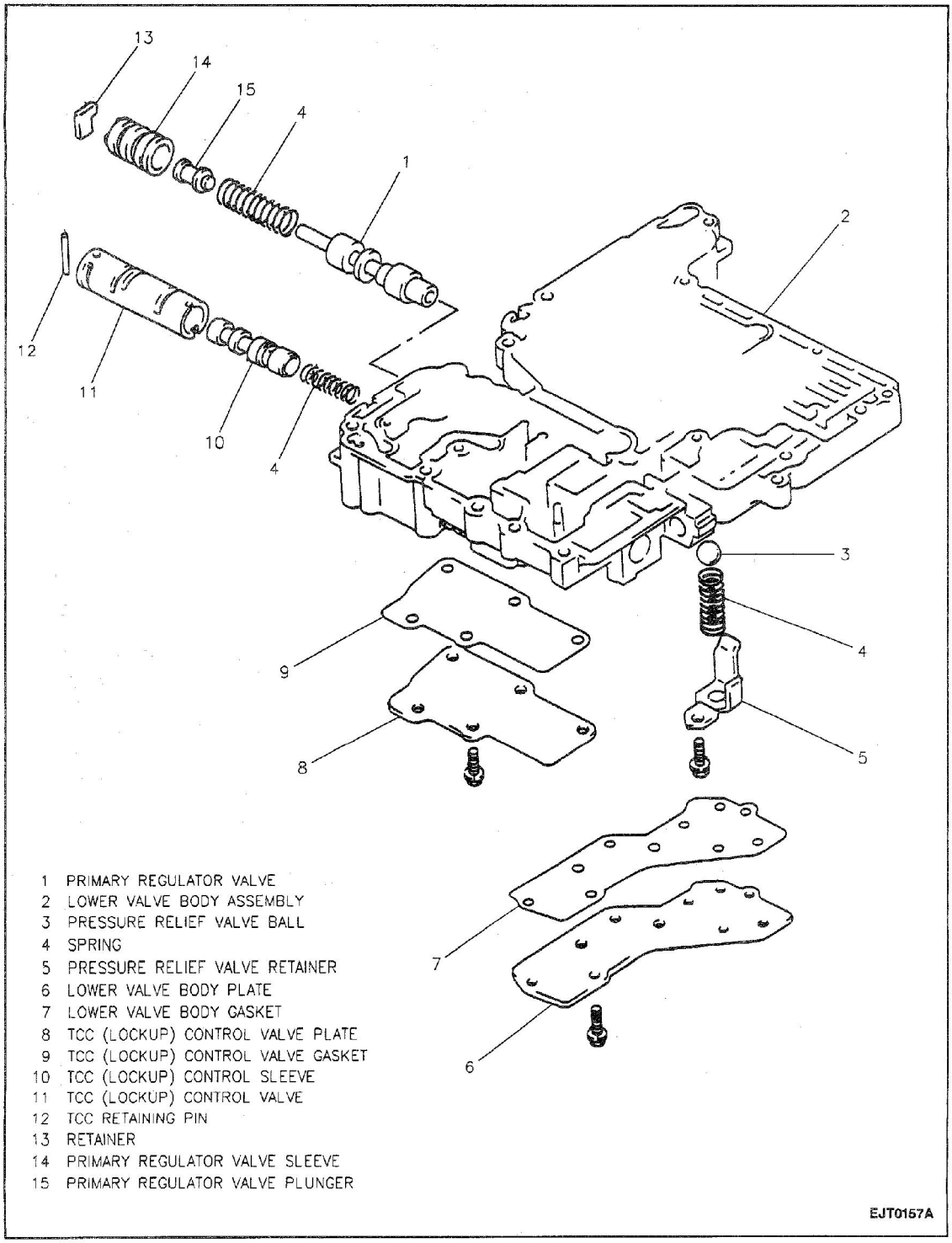


Figure 127—Lower Valve Body Components

REAR UPPER VALVE BODY SPRING CHART

VALVE SPRING	SPRING OUTER DIAMETER	FREE LENGTH
Reverse Brake Sequence Valve Spring	9.20 mm (0.362 in.)	37.55 mm (1.478 in.)
1-2 Shift Valve Spring	8.90 mm (0.350 in.)	29.15 mm (1.147 in.)
2-3 Shift Valve Spring	8.90 mm (0.350 in.)	29.15 mm (1.147 in.)
3-4 Shift Valve Spring	8.90 mm (0.350 in.)	29.15 mm (1.147 in.)

Lower Valve Body Assembly

Figures 128 and 135

Install or Connect

1. Primary regulator valve, primary regulator valve spring, primary regulator valve plunger, primary regulator valve sleeve and primary regulator valve sleeve retainer into valve body.

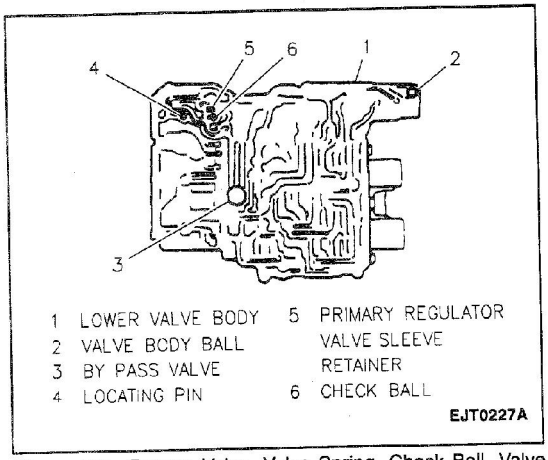


Figure 128—Bypass Valve, Valve Spring, Check Ball, Valve Damping Spring, Valve Body Ball and Ball Valve Spring Location

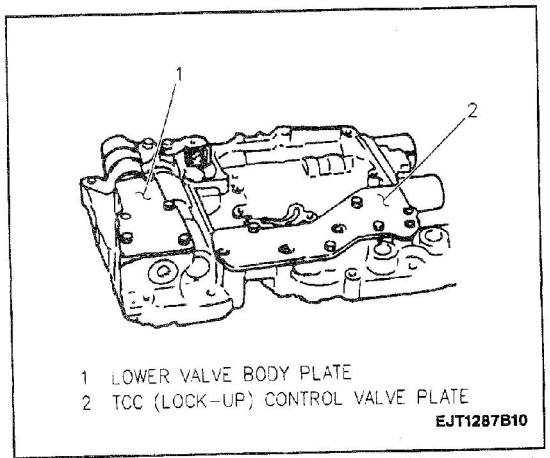


Figure 129—Lower Valve Body Plate and TCC (Lock-Up) Control Valve Plate

2. TCC (lock-up) control valve spring, TCC (lock-up) control sleeve and locating pin into valve body.
3. Two intermediate coast modulator valves, intercoast modulator valve spring, low coast modulator valve spring, gasket, and shift solenoid assembly; secure with two bolts.

Tighten

- Shift solenoid assembly bolts to 10 N.m (89 lb. in.)

4. New O-ring to TCC solenoid. Lubricate with A/T Fluid.

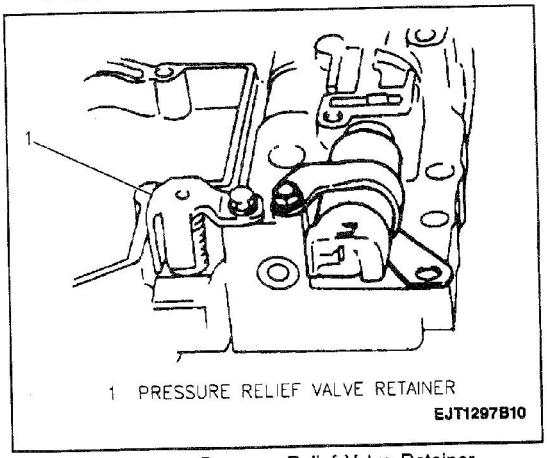


Figure 130—Pressure Relief Valve Retainer

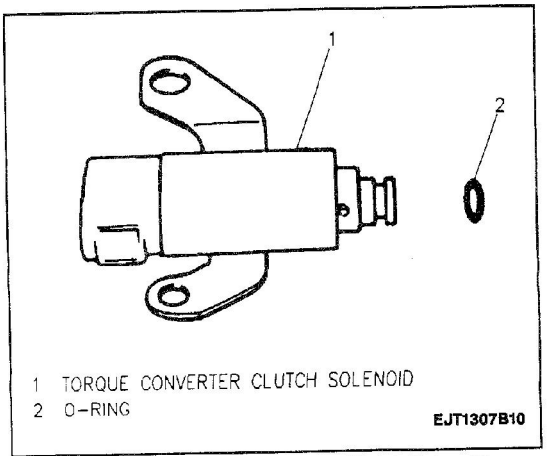


Figure 131—Torque Converter Clutch Solenoid

5. TCC (lock-up) solenoid to valve body; secure with one bolt.
6. Pressure relief valve ball, pressure relief valve spring, pressure relief valve retainer secure; with one bolt.

Tighten

- TCC solenoid bolt to 5 N.m (44 lb. in.)

7. TCC (lock-up) control valve gasket and plate to valve body; secure with six bolts.

Tighten

- TCC control valve plate bolts to 5 N.m (44 lb. in.)

8. Lower valve body gasket and plate to valve body; secure with four bolts.

Tighten

- Lower valve body plate bolts to 5 N.m (44 lb. in.)

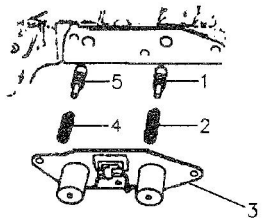
9. Ball valve spring, valve body ball, valve damping spring, check ball, bypass valve spring and bypass valve to valve body (Figure 128).

Valve Body Assembly

Figures 136 through 145

Install or Connect

NOTICE: Torque sequence and specification is very important to valve body operation. If bolts are torqued at random, valve bores may become distorted and inhibit valve operation. DO NOT use air powered tools when assembling the valve bodies.



1 LOW COAST MODULATOR VALVE
2 INTERMEDIATE COAST MODULATOR VALVE SPRING
3 SHIFT SOLENOID ASSEMBLY
4 LOW COAST MODULATOR VALVE SPRING
5 INTERMEDIATE COAST MODULATOR VALVE

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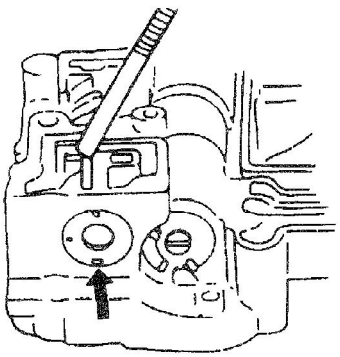
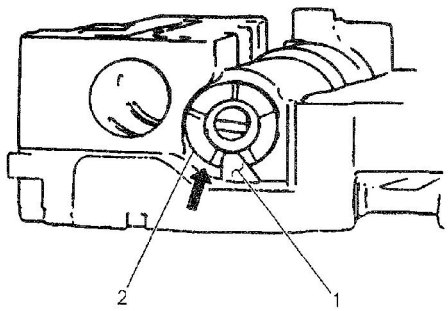
Figure 132—Shift Solenoid Assembly Components



EJT1327B10

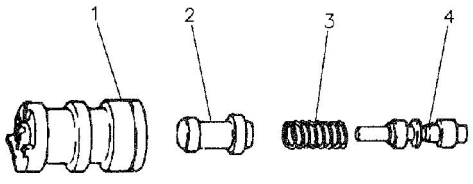
Figure 133—TCC (Lock-Up) Control Valve



1 RETAINER
2 SLEEVE

EJT1337B10

Figure 134—Primary Regulator Valve Retainer and Sleeve



1 PRIMARY REGULATOR VALVE SLEEVE
2 PRIMARY REGULATOR VALVE PLUNGER
3 PRIMARY REGULATOR VALVE SPRING
4 PRIMARY REGULATOR VALVE

EJT1357B10

Figure 135—Primary Regulator Valve Components

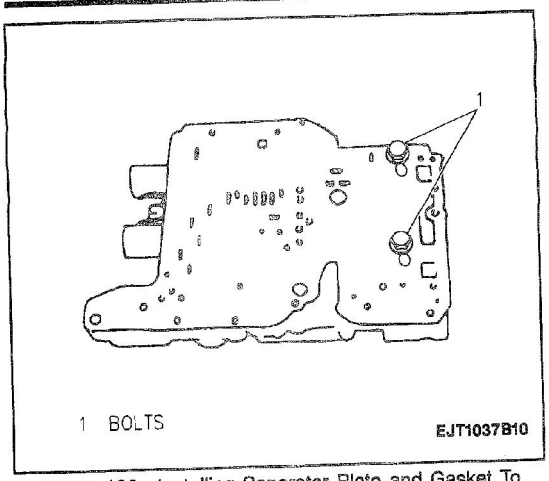


Figure 136—Installing Separator Plate and Gasket To Lower Valve Body

1. Place separator plate and new gasket to lower valve body, temporarily install to bolts (Figure 136).
2. New upper valve body gasket to lower valve body assembly (Figure 137).
3. While holding upper valve body gasket and lower valve body together, install assembly to rear upper valve body assembly.
4. Three bolts to lower valve body (Figure 138).
5. Turn lower valve body assembly upside down and install four bolts to upper valve body side (Figure 139).
6. Remove two bolts previously install in step 1 (Figure 140).
7. Lower valve body assembly to front upper valve body (Figure 141).
8. Three bolts to lower valve body side (Figure 142).
9. Turn valve body assembly over and install five bolts to front upper valve body (Figure 143).
10. Tighten upper valve body side bolts (Figure 144).

Tighten

- Upper valve body side bolts to 5 N.m (44 lb. in.)

11. Tighten lower valve body side bolts (Figure 145).

Tighten

- Lower valve body side bolts to 5 N.m (44 lb. in.)

12. Manual valve, detent spring plate to valve body assembly; secure with one bolt.

Tighten

- Detent spring bolt to 5 N.m (44 lb. in.)

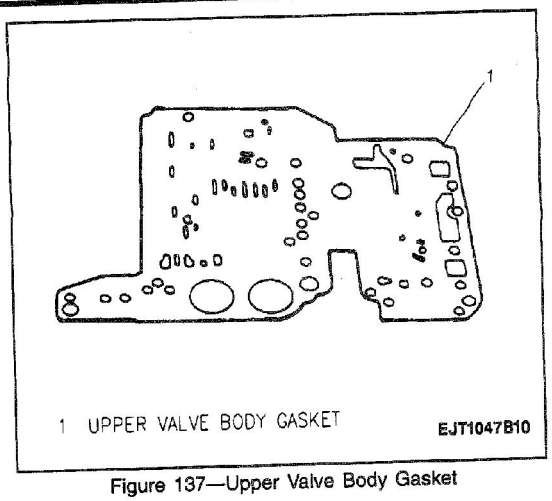


Figure 137—Upper Valve Body Gasket

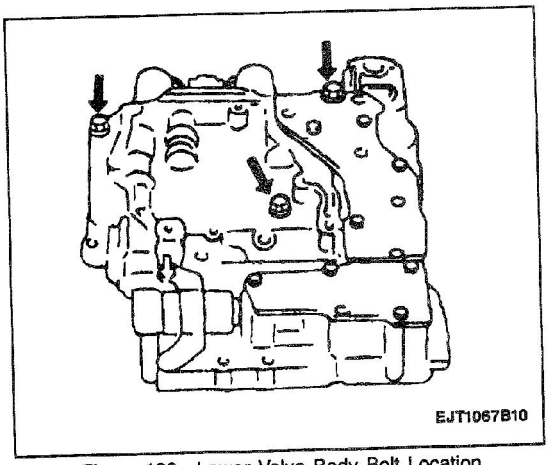


Figure 138—Lower Valve Body Bolt Location

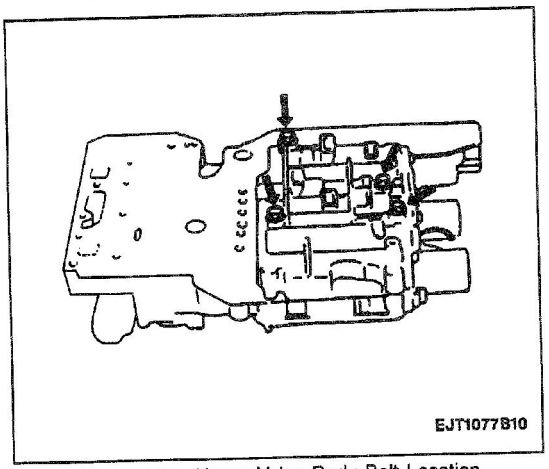


Figure 139—Upper Valve Body Bolt Location

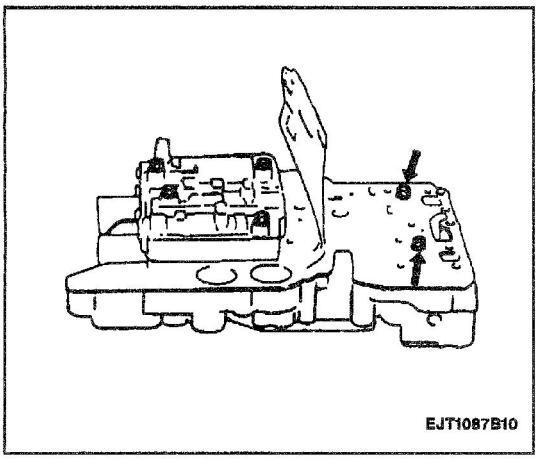


Figure 140—Removing Temporarily Installed Bolts

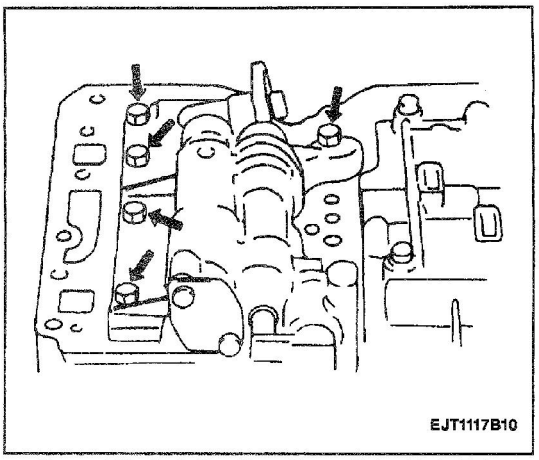


Figure 143—Installing Front Upper Valve Body Bolts

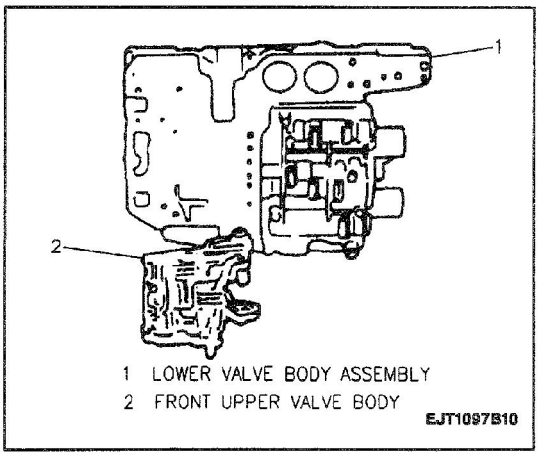


Figure 141—Installing Lower Valve Body to Front Upper Valve Body

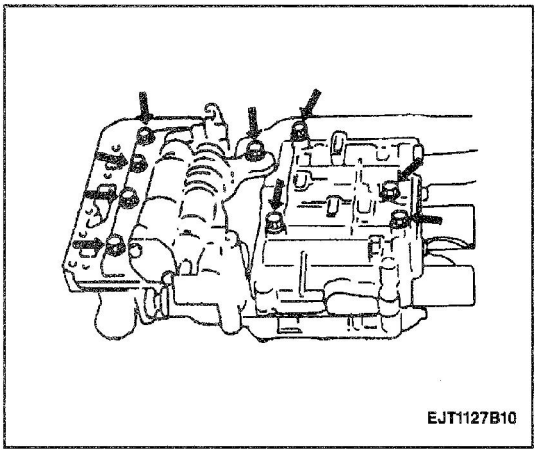


Figure 144—Upper Valve Body Bolt Location

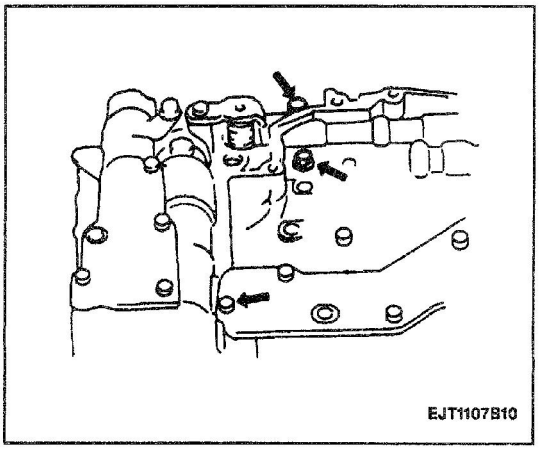


Figure 142—Installing Three Bolts To Lower Valve Body

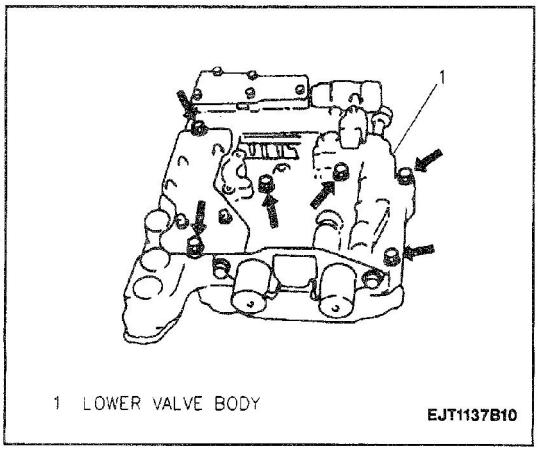


Figure 145—Lower Valve Body Bolt Location

LOWER VALVE BODY SPRING CHART

VALVE SPRING	SPRING OUTER DIAMETER	FREE LENGTH
Pressure Relief Valve Spring	13.14 mm (0.517 in.)	38.14 mm (1.501 in.)
TCC (Lock-Up) Control Valve Spring	11.30 mm (0.445 in.)	34.60 mm (1.362 in.)
Valve Damping Spring	4.95 mm (0.195 in.)	20.00 mm (0.787 in.)
Low Coast Modulator Valve Spring	10.00 mm (0.394 in.)	42.35 mm (1.667 in.)
Inter Coast Modulator Valve Spring	10.00 mm (0.394 in.)	35.43 mm (1.395 in.)
Ball Valve Spring	11.11 mm (0.437 in.)	32.14 mm (1.265 in.)
Bypass Valve Spring	13.82 mm (0.544 in.)	33.32 mm (1.312 in.)
Primary Regulator Valve Spring	17.20 mm (0.677 in.)	56.30 mm (2.216 in.)

TRANSMISSION ASSEMBLY

Reverse Brake Piston

Install or Connect

Tools Required:
J 41681 Clutch Spring Compressor
J 23327 Clutch spring Compressor

1. New O-rings to inner reverse brake, reaction sleeve and outer reverse brake piston. Lubricate with A/T fluid.
2. Outer reverse brake piston, reaction sleeve and inner reverse brake piston to transmission case.
3. Using J 41681 and J 23327 compress reverse brake piston and install snap ring.

Planetary Gears and Output Shaft

Figure 146 through 151

Install or Connect

Tool Required:
J 36850 Transjel® Transmission Assembly Lubricant

1. Output shaft thrust bearing race and thrust bearing to transmission case (Figure 146). Lubricate with J 36850
2. Brake applying tube and leaf spring to transmission case. Align lug on brake applying tube with cut out in transmission case (Figure 147).
3. Planetary gear and output shaft assembly to transmission case (Figure 148).

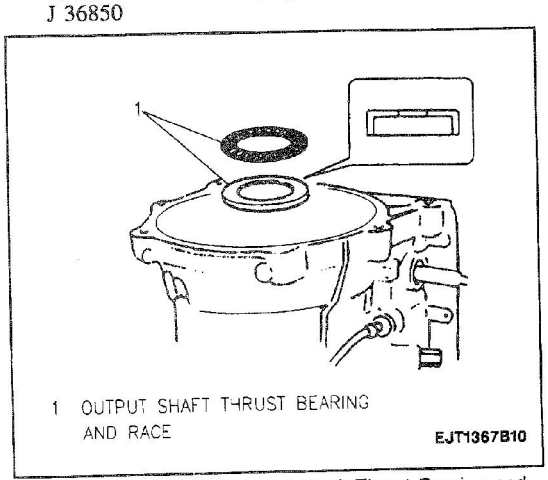


Figure 146—Installing Output Shaft Thrust Bearing and Race

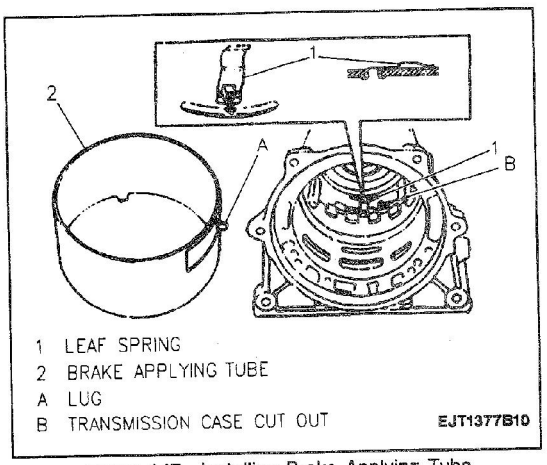


Figure 147—Installing Brake Applying Tube

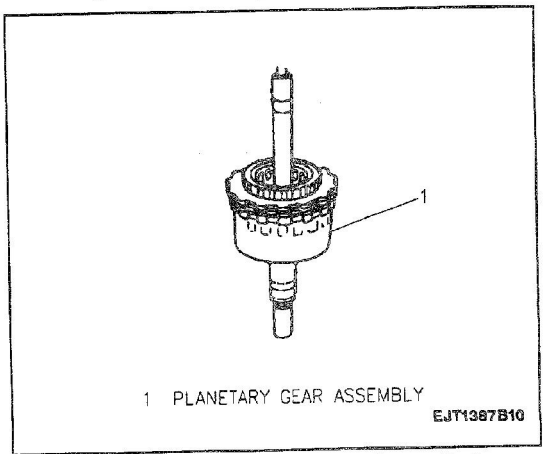


Figure 148—Planetary Gear and Output Shaft

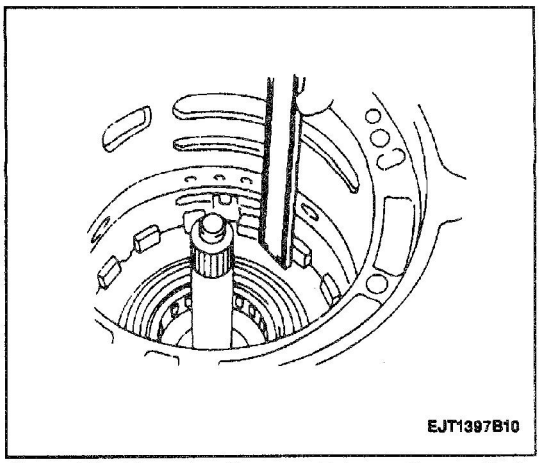


Figure 149—Measuring Clearance Between Reverse Brake Plate and Lugs of Transmission Case

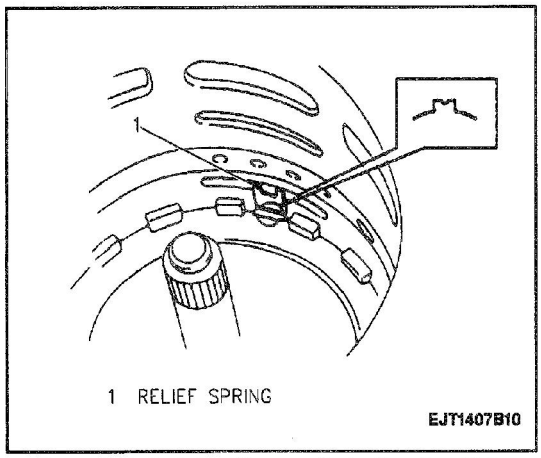


Figure 150—Installing Reverse Brake Reaction Plate.

Measure

- Clearance between reverse brake plate and lugs of transmission case (Figure 149). Standard clearance should be 0.72-2.50 mm (0.029-0.098 in). If clearance is less than standard range, check for improper installation, dust or fluid is on the reverse brake disc. If clearance is more than standard range, replace reverse brake disc, reverse brake plate or reverse backing plate.

4. Reverse brake reaction plate to transmission case. Align notch in reverse brake reaction plate with leaf spring (Figure 150).
5. Snap ring to the front of the reverse brake reaction plate (Figure 151).

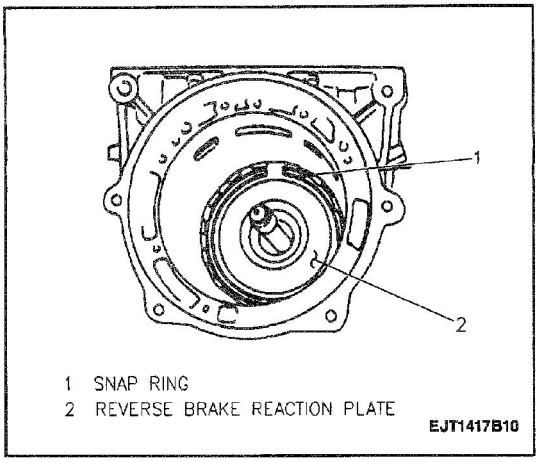


Figure 151—Installing Reverse Reaction Plate Snap Ring

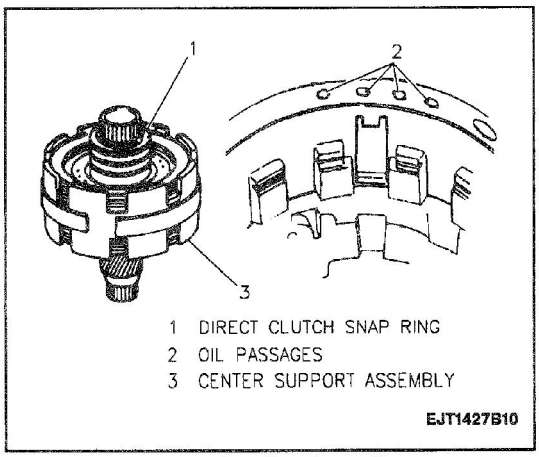


Figure 152—Installing Center Support

Center Support Assembly and Planetary Sun Gear Assembly

Figures 152 and 153

Install or Connect

1. Center support assembly to transmission case. Align oil passages in transmission case with center support mounting holes (Figure 152).
2. Two bolts securing center support (Figure 153).

Tighten

- Center support bolts to 26 N·m (19 lb. ft.).

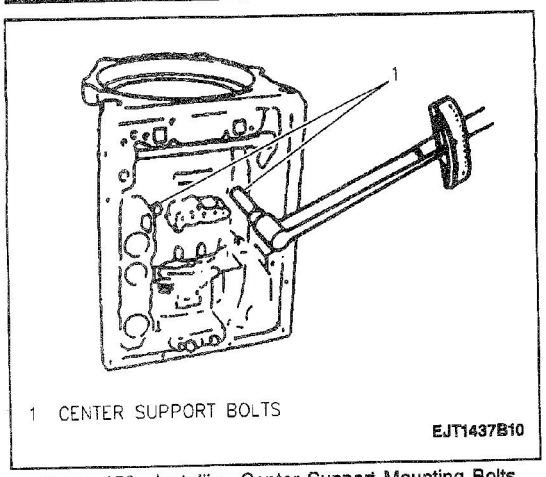


Figure 153—Installing Center Support Mounting Bolts

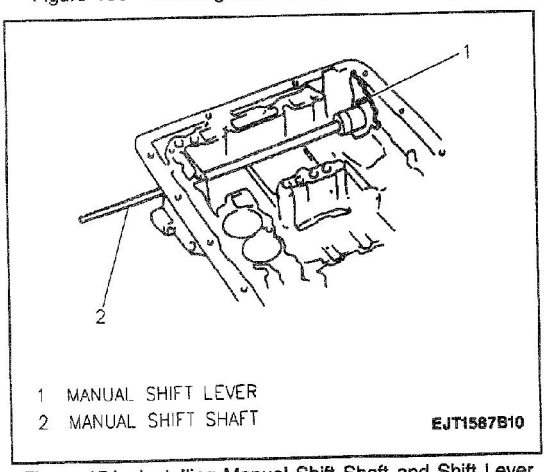


Figure 154—Installing Manual Shift Shaft and Shift Lever

Parking Lock Pawl and Manual Shift Linkage

Figures 154 through 158

Install or Connect

1. Using a socket and hammer, install new manual shaft oil seals to both sides of the transmission case. Lubricate with A/T Fluid.
2. Manual shift shaft and shift lever to transmission case (Figure 154).
3. Manual shift lever pin to manual shift lever hub using a hammer (Figure 155).
4. Slide manual lever hub protection sleeve over the manual detent lever hub using a hammer and chisel (Figure 156).
5. Parking pawl rod to manual shift shaft (Figure 157).
6. Parking pawl, pivot pin and parking pawl torsion spring to transmission case (Figure 158).
7. Parking pawl plate to transmission case; secure with two bolts.

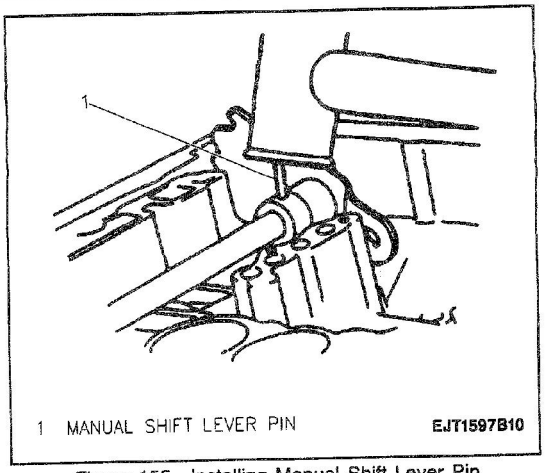


Figure 155—Installing Manual Shift Lever Pin

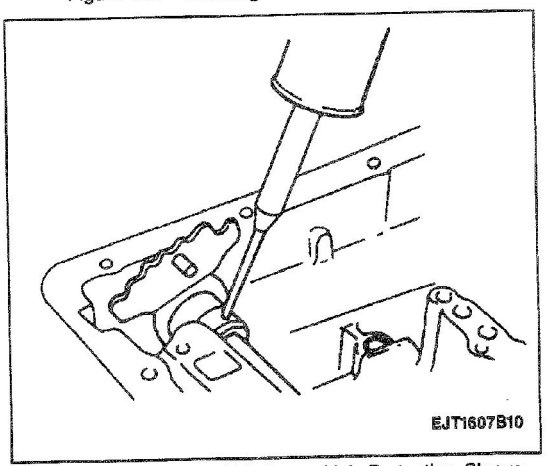


Figure 156—Manual Shift Lever Hub Protection Sleeve

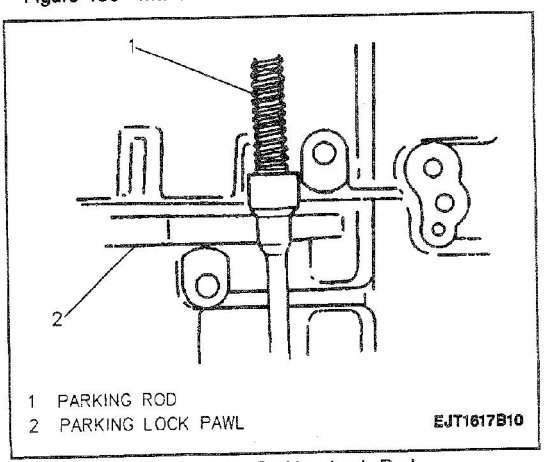


Figure 157—Parking Lock Rod

Tighten

- Parking pawl plate bolts to 7 N·m (62 lb. in.)

Forward and Direct Clutch Assemblies

Figure 159 through 162

Install or Connect

Tools Required:
J 26900-5 Vernier Caliper
J 36850 Transjel® Transmission Assembly Lubricant

1. Direct clutch assembly to transmission case.
2. Apply J 36850 to thrust bearing and races and install in the following order. Race, thrust bearing and race to the forward clutch assembly (Figure 159).
3. Forward clutch assembly into transmission case using care not to drop thrust bearing and races from the forward clutch.

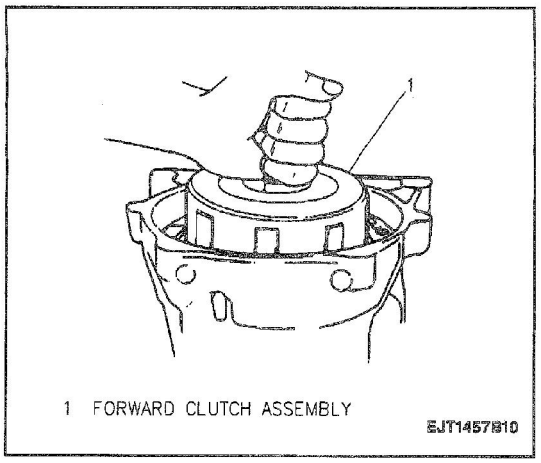


Figure 160—Installing Forward Clutch Assembly

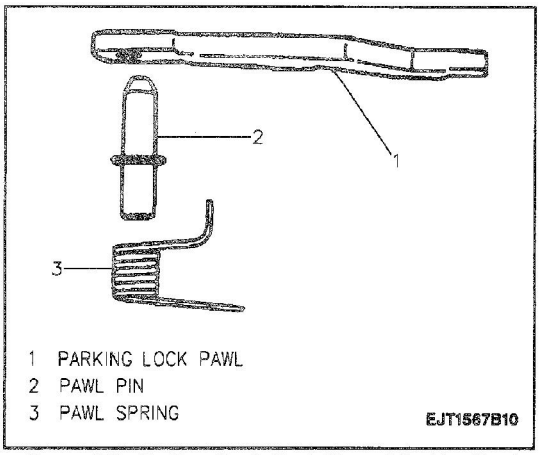


Figure 158—Parking Pawl, Pivot Pin and Parking Pawl Torsion Spring

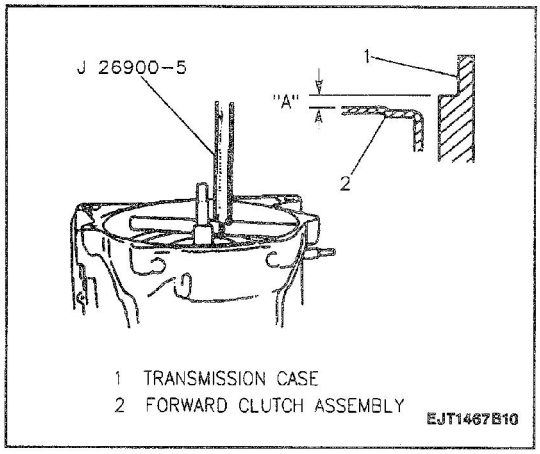


Figure 161—Measuring Forward Clutch

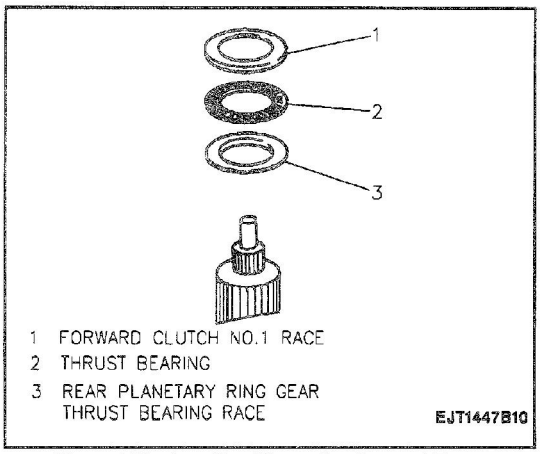


Figure 159—Installing Thrust Bearing and Races

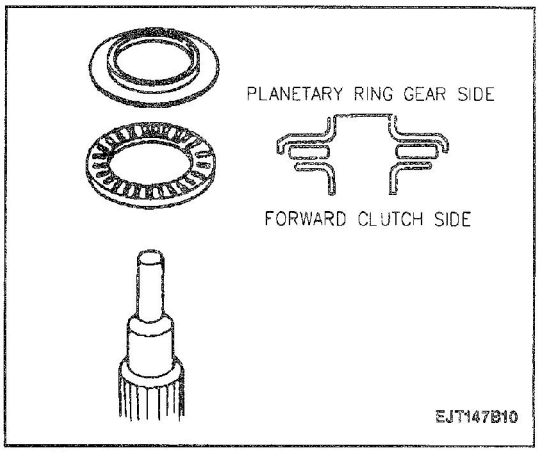


Figure 162—Installing Forward Bearing and Race

Measure

- Measure height difference between forward clutch input shaft and transmission case using a J 26900-5 (Figure 161). Standard height difference is 3.0 mm (0.118 in.). If height difference is less than standard height difference, remove forward clutch assembly and reinstall.

4. Apply J 36850 to thrust bearing and race and install them to front of forward clutch (Figure 162).

Overdrive Clutch Drum and Overdrive Case Assemblies

Figures 163, 164 and 165

Install or Connect

Tools Required:
J 26900-5 Vernier Caliper
J 36850 Transjel® Transmission Assembly Lubricant

1. Apply J 36850 to thrust rear race and install it to rear of overdrive case.
2. Overdrive case assembly to transmission case aligning cutout on overdrive case with cut out in transmission case (Figure 163).
3. Apply J 36850 to thrust planetary rear washer and install it to overdrive planetary gear (Figure 164).
4. Apply J 36850 to thrust planetary ring front race and install it to planetary ring gear (Figure 164).
5. Overdrive clutch and planetary gear assembly into overdrive case.

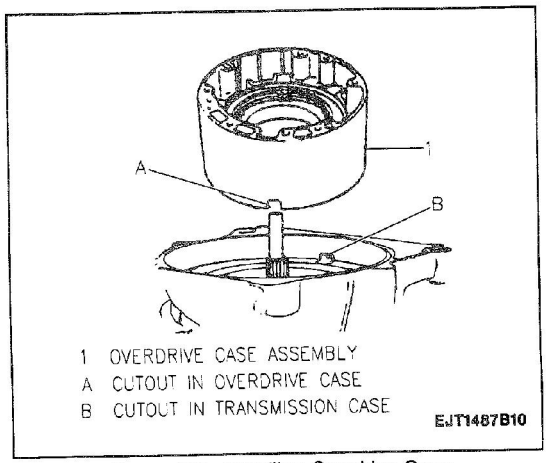


Figure 163—Installing Overdrive Case

Measure

- Measure height difference between overdrive case and overdrive clutch drum using a J 26900-5 (Figure 165). Standard height difference is 2.0 mm (0.078 in.). If height difference is less than standard height difference, remove overdrive clutch assembly and reinstall.

Oil Pump and Torque Converter Housing

Figure 166 through 170

Install or Connect

Tools Required:
J 8001 Dial Indicator Set
J 26900-13 Magnetic Base

1. Apply A/T fluid to new O-ring and O-ring to overdrive case (Figure 166).
2. Torque converter housing to transmission case; secure with three bolts (Figure 166).

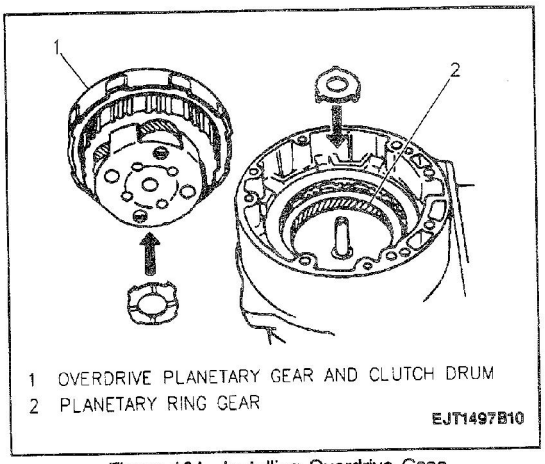


Figure 164—Installing Overdrive Case

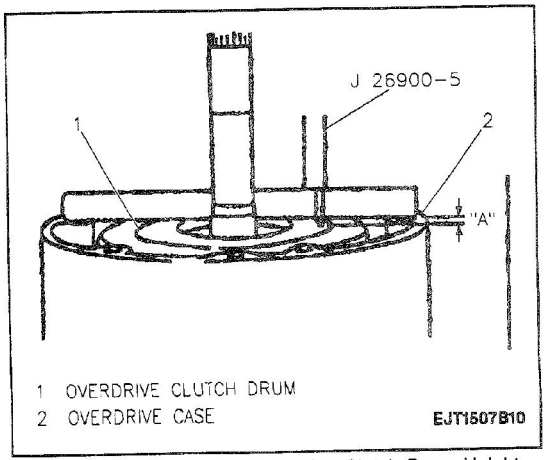


Figure 165—Measuring Overdrive Clutch Drum Height

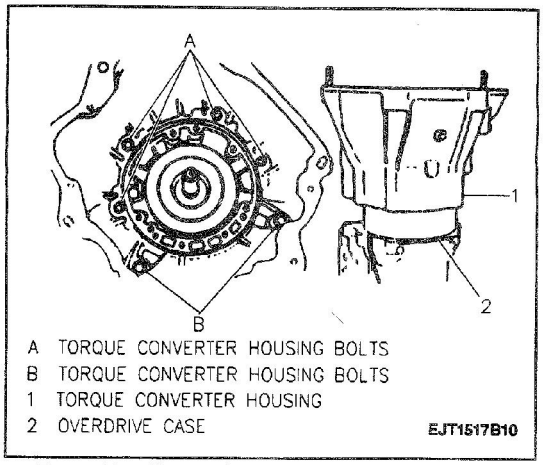


Figure 166—Torque Converter Housing Bolt Location

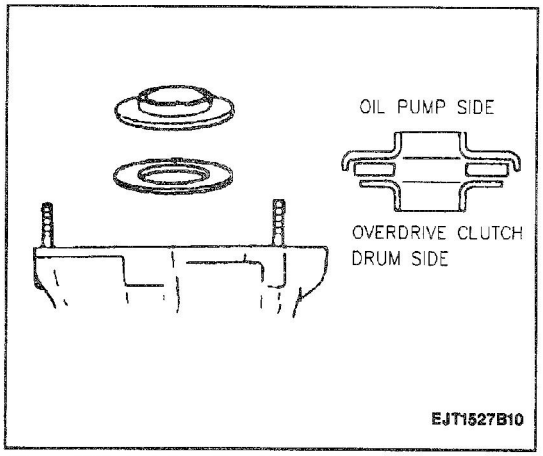


Figure 167—Installing Overdrive Clutch Drum Bearing and Race

Tighten

- Converter housing position (A) bolts to 36 N·m (27 lb. ft.).
- Converter housing position (B) bolts to 58 N·m (43 lb. ft.).

3. Apply J 36850 to thrust front race and install it to overdrive clutch drum (Figure 167).
4. Apply J 36850 to thrust bearing and race and install them to oil pump (Figure 167).
5. Apply A/T fluid to outer O-ring of oil pump and install oil pump to transmission case; secure with seven bolts. Align holes in oil pump with hole in overdrive case (Figure 168).

Tighten

- Oil pump bolts to 22 N·m (16 lb. ft.).

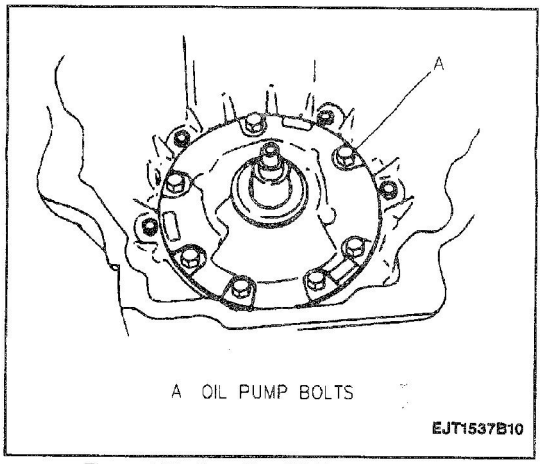


Figure 168—Installing Oil Pump Assembly

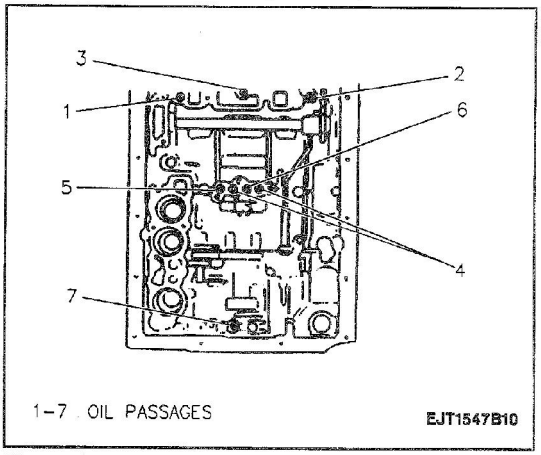


Figure 169—Inspecting Transmission Component Operation

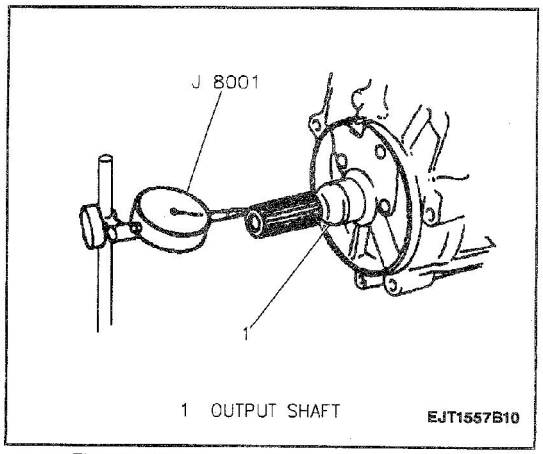


Figure 170—Measure Output Shaft End Play

ACCUMULATOR PISTON AND SPRING CHART

PISTON OR SPRING	PISTON OUTER DIAMETER	SPRING FREE LENGTH
Direct Clutch Accumlator	31.80-31.85 mm (1.252-1.254 in.)	—
Direct Clutch Accumlator Spring	—	55.18 mm (2.172 in.)
Forward Clutch Accumlator	31.80-31.85 mm (1.252-1.254 in.)	—
Forward Clutch Accumlator Upper Spring	—	57.18 mm (2.251 in.)
Forward Clutch Accumlator Lower Spring	—	29.50 mm (1.161 in.)
Second Brake Accumulator	34.80-34.85 mm (1.370-1.372 in.)	—
Second Brake Accumulator Upper Spring	—	55.18 mm (2.172 in.)
Second Brake Accumulator Lower Spring	—	35.13 mm (1.383 in.)

Inspect

- Apply low air pressure to each oil circuit hole and check operation of internal components (Figure 169).
  1. Overdrive clutch.
  2. Overdrive brake.
  3. Forward clutch.
  4. Direct clutch.
  5. B1 brake (Second coast brake).
  6. B2 brake (Second brake).
  7. Reverse brake.

Measure

- Measure output shaft end play using J 8001 and a J 26900-13. Standard clearance is 0.3-0.9 mm (0.012-0.035 in.) (Figure 170).

Valve Body, Accumulators and Solenoid Wiring Harness

Figures 171 through 175

Install or Connect

1. Apply A/T fluid to new TV cable O-ring and O-ring to TV cable.
2. TV cable to transmission case (Figure 171).
3. Apply to A/T fluid to new O-rings, springs and install them to accumulator pistons (Figure 172) and to Accumulator Piston and Spring Chart.
4. Accumulator pistons to transmission case (Figure 173).
5. Valve body to transmission case.
6. Lift valve body slowly and install TV cable to TV cable cam of the valve body.
7. After confirming that accumulator pistons are pushed all the way down, match pin of manual shift lever with groove in manual valve (Figure 174).
8. Fifteen valve body-to-case bolts according to length (Figure 175).

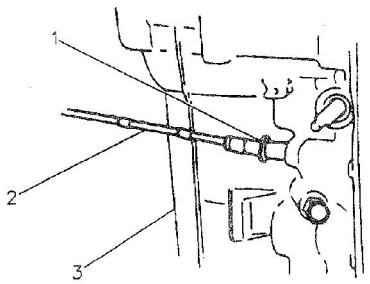


Figure 171—TV Cable and O-Ring

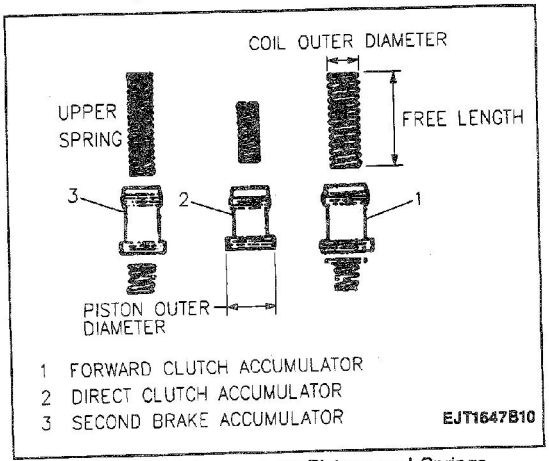


Figure 172—Accumulator Pistons and Springs

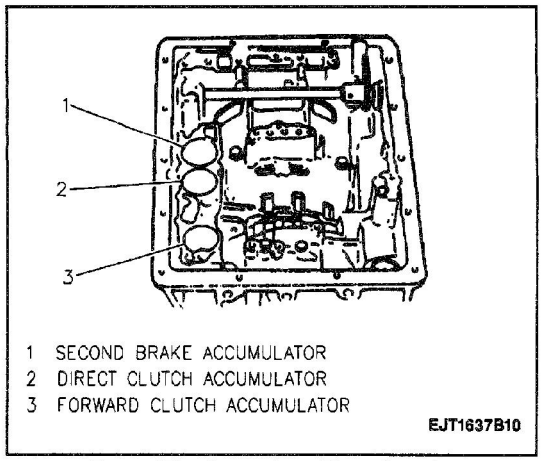


Figure 173—Accumulator Piston Location

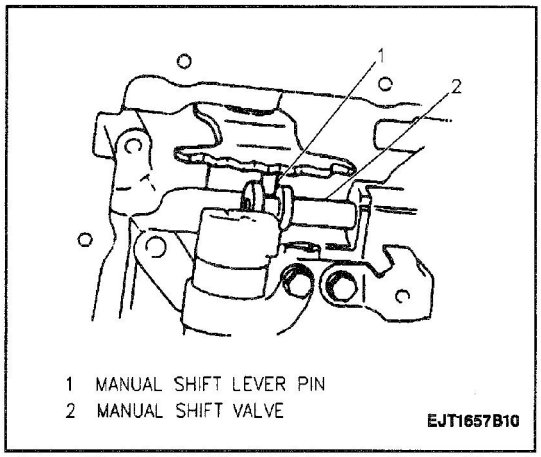


Figure 174—Aligning Manual Shift Lever Pin with Manual Shift Valve

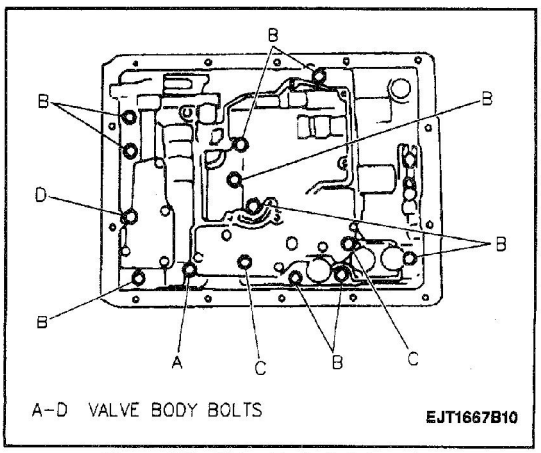


Figure 175—Valve Body Bolt Location

Measure

- Valve body bolt lengths:
  A. 25 mm (0.98 in)
  B. 30 mm (1.18 in)
  C. 47 mm (1.85 in)
  D. 60 mm (2.36 in)

Tighten

- Valve body bolt to 10 N.m (89 lb. in.).

9. Lubricate new O-ring with A/T fluid and install to grommet of solenoid wiring harness.
10. Solenoid wiring harness to transmission case; secure with one bolt.

Fluid Pan, Filter Screen and Fluid Pipes

Figures 176 and 177

Install or Connect

1. New gaskets, filter screen spacer and fluid filter screen to valve body assembly; secure with six bolts.

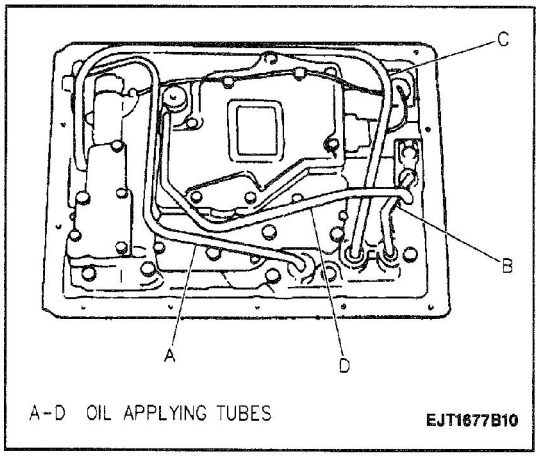


Figure 176—Oil Applying Tubes

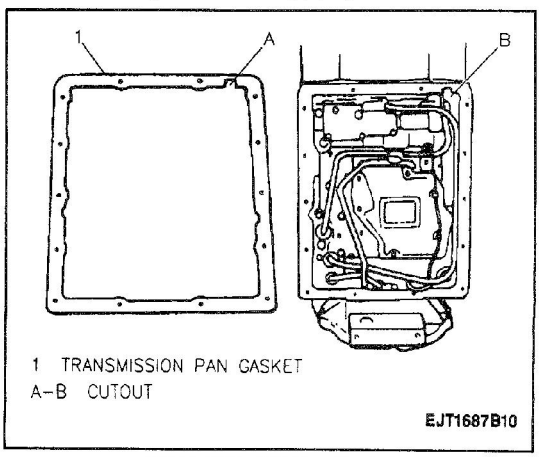


Figure 177—Oil Pan Gasket

Tighten

- Filter screen bolts to 5 N.m (44 lb. in.).

2. Electrical connectors to shift solenoids No.1, No.2 and torque converter clutch (TCC) solenoid.
3. New gasket and brake apply cover to transmission case; secure with two bolts.

Tighten

- Brake apply cover bolts to 10 N.m (89 lb. in.).

4. Four oil applying tubes to valve body in the following order (Figure 176):
   A. Forward applying oil tube.
   B. Lube applying oil tube.
   C. Reverse applying oil tube.
   D. Brake applying oil tube.
5. Two oil pan magnets to oil pan.

Important

- Align cut out in oil pan with cut out in transmission case (Figure 177).

6. New oil pan gasket and oil pan to transmission; secure with fourteen bolts.

Tighten

- Transmission oil pan bolts to 4 N.m (35 lb. in.).

Rear Adapter Case and Vehicle Speed Sensor

Figure 178

Install or Connect

Tool Required:
J 35538 Axle Shaft Seal Installer

1. Key-way to output shaft.
2. Sensor ring to output shaft.
3. Using J 35538 install new oil seal to adapter case.
4. New gasket to adapter case and adapter case to rear of transmission; secure with six bolts (Figure 178).

Tighten

- Adapter case bolts to 36 N.m (27 lb. ft.).

5. Apply A/T fluid to new O-ring and O-ring to speed sensor.
6. Speed sensor to adapter case; secure with one bolt.

Tighten

- Speed sensor bolt to 23 N.m (17 lb. ft.).

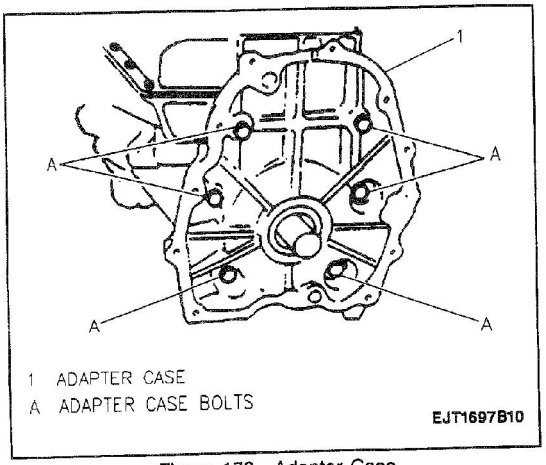


Figure 178—Adapter Case

Transmission Range Switch

Figures 166 and 179

Install or Connect

1. Transmission range switch to transmission by:
   A. Turn manual shaft rearward.
   B. Turn it back two notches and set it to "N" range.
   C. Transmission range switch to transmission securing with one bolt. Do not tighten bolt fully.
   D. Lock washer and set nut.

Tighten

- Transmission range switch set nut to 5 N.m (44 lb. in.).

2. Bend claws of lock washer over set nut.
3. With neutral reference line and cut out in transmission range switch aligned. Tighten transmission range switch retaining bolt (Figure 179).

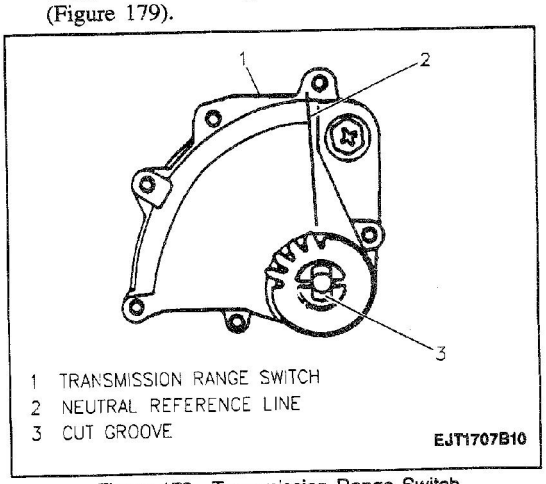


Figure 179—Transmission Range Switch

Tighten

- Transmission Range switch bolt to 5 N·m (44 lb. in.).

4. Manual lever to manual shaft; secure with one washer and one nut.

Tighten

- Manual shaft lever nut to 13 N·m (115 lb. in.).

5. Vent hose to vent elbow at top of transmission case; secure with one clamp.
6. New O-ring to fluid filler and tube to transmission case; secure with one bolt.
7. Fluid level indicator to filler tube.
8. Remove the J 41626 with the transmission case from the J 3289-20.
9. Remove the J 41626 from the transmission case.
10. Install the three remaining bolts into the torque converter housing (Figure 166).

Tighten

- Converter housing position (A) bolts to 36 N·m (27 lb. ft.).
- Converter housing position (B) bolts to 58 N·m (43 lb. ft.).

Torque Converter Assembly

Figure 180

Inspect

- The torque converter must be replaced if any of the following conditions exist:
  - — For evidence of damage to the pump assembly.
  - — For metal particles found after flushing the cooler and cooler pipes.
  - — For external leaks in the hub weld area.
  - — Converter pilot cup for damage or poor fit into crankshaft.
  - — Converter hub for scoring or damage.
  - — For internal damage to stator.
  - — For contamination from engine coolant.
- The torque converter should NOT be replaced if:
  - — The fluid has an odor, discoloration, or no evidence of metal or clutch material.
  - — No external damage exists.
  - — Converter bolt threads are damaged. Refer to SECTION 6A1 for standard thread repair procedures.

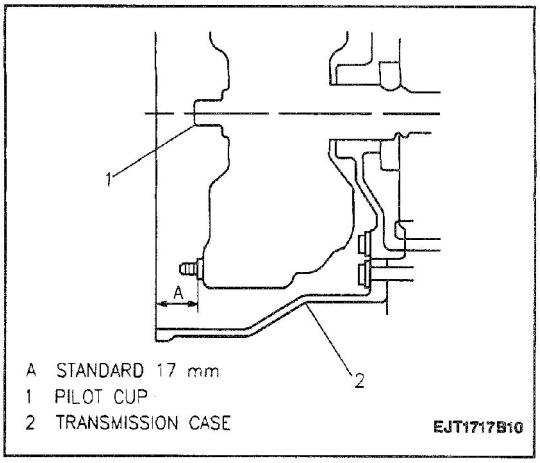


Figure 180—Torque Converter Installation

Important

- Flushing the torque converter is not recommended. Drain out as much fluid as possible before installation.

Install or Connect

1. Torque converter onto input shaft. Use caution not to damage oil pump body fluid seal.

Measure

Tool Required:
J 26900-5 Vernier Caliper

- The distance between the outer edge of the Transmission case housing and the torque converter flange nut by placing a straightedge across the transmission case housing and measuring the distance using a J 26900-5. The distance should be 17 mm or more. If the distance is less than specified, remove the torque converter and reinstall correctly (Figure 180).

Inspect

- Torque converter for smooth rotation.

2. Apply grease to converter pilot cup prior to installation.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Oil Pump Cover-To-Oil Pump Body Bolts	9 N.m (80 lb. in.)
TV Cable Cam Bolt	8 N.m (71 lb. in.)
Pressure Relief Valve Bolts	5 N.m (44 lb. in.)
Rear Valve Body Plate Bolts	5 N.m (44 lb. in.)
Shift Solenoid Bolts	10 N.m (89 lb. in.)
TCC Solenoid Bolt	5 N.m (44 lb. in.)
TCC Control Valve Plate Bolts	5 N.m (44 lb. in.)
Lower Valve Body Plate Bolts	5 N.m (44 lb. in.)
Upper Valve Body Side Bolts	5 N.m (44 lb. in.)
Lower Valve Body Side Bolts	5 N.m (44 lb. in.)
Detent Spring Bolt	5 N.m (44 lb. in.)
Center Support Bolts	26 N.m (19 lb. ft.)
Parking Pawl Plate Bolts	7 N.m (62 lb. in.)
Converter Housing Position:	
(A) Bolts	36 N.m (27 lb. ft.)
(B) Bolts	58 N.m (43 lb. ft.)
Oil Pump Bolts	22 N.m (16 lb. ft.)
Valve Body Bolt	10 N.m (89 lb. in.)
Fluid Filter Screen Bolts	5 N.m (44 lb. in.)
Brake Apply Cover Bolts	10 N.m (89 lb. in.)
Transmission Oil Pan Bolts	4 N.m (35.lb. in.)
Adapter Case Bolts	36 N.m (27 lb. ft.)
Speed Sensor Bolt	23 N.m (17 lb. ft.)
Transmission Range Switch Set Nut	5 N.m (44 lb. in.)
Transmision Range Switch Bolt	5 N.m (44 lb. in.)
Manual Shaft Lever Nut	13 N.m (115 lb. in.)

TRANSMISSION SPECIFICATIONS

Overdrive (Planetary Gear Side)	1.47-2.28 mm (0.058-0.089 in.)
Oil Pump Body-To-Driven Gear Clearance	0.07 to 0.15 mm (0.0028 to 0.0059 in.)
Oil Pump Drive Gear Tip Clearance	0.11 to 0.14 mm (0.0044 to 0.0055 in.)
Oil Pump Drive Gear and Driven Gear Side Clearance	0.02 to 0.05 mm (0.0008 to 0.0019 in.)
Overdrive (Case Side) Between Snap Ring And Brake Flange	0.35-1.91 mm (0.014-0.075 in.)
Overdrive (Case Side) Free Length of Clutch Piston Return Springs	15.10 mm (0.594 in.)
Forward Clutch Piston Stroke	1.40-2.24 mm (0.056-0.088 in.)
Forward Clutch Piston Return Spring Free Length	15.10 mm (0.594 in.)
Direct Clutch Piston Stroke	0.19 to 1.75 mm (0.008 to 0.068 in.)
Direct Clutch Piston Return Springs Free Length	15.13 mm (0.595 in.)
B1 Brake Piston Stroke	0.63 to 1.73 mm (0.025 to 0.068 in.)
B2 Brake Piston Stroke	1.01 to 2.25 mm (0.040 to 0.088 in.)
Output Shaft End Play	0.3-0.9 mm (0.012-0.035.in.)

Front Upper Valve Body Springs

Secondary Regulator Valve Spring	
Coil Outer Diameter	17.43 mm (0.681 in.)
Free Lenght	71.23 mm (2.804 in.)
Cut Back Valve Spring	
Coil Outer Diameter	6.85 mm (0.269 in.)
Free Lenght	23.00 mm (0.905 in.)
Secondary Valve Spring	
Coil Outer Diameter	8.58 mm (0.337 in.)
Free Lenght	19.24 mm (0.757 in.)
Throttle Valve Primary Spring	
Coil Outer Diameter	10.90 mm (0.429 in.)
Free Lenght	39.55 mm (1.557 in.)

Rear Upper Valve Body

Reverse Brake Sequence Valve Spring
- Coil Outer Diameter ..... 9.20 mm (0.362 in.)
- Free Lenght ..... 37.55 mm (1.148 in.)

1-2 Shift Valve Spring
- Coil Outer Diameter ..... 8.90 mm (0.350 in.)
- Free Lenght ..... 29.15 mm (1.147 in.)

2-3 Shift Valve Spring
- Coil Outer Diameter ..... 8.90 mm (0.350 in.)
- Free Lenght ..... 29.15 mm (1.147 in.)

3-4 Shift Valve Spring
- Coil Outer Diameter ..... 8.90 mm (0.350 in.)
- Free Lenght ..... 29.15 mm (1.147 in.)

Lower Valve Body

Pressure Relief Valve Spring
- Coil Outer Diameter ..... 13.14 mm (0.517 in.)
- Free Lenght ..... 38.14 mm (1.501 in.)

TCC (Lock-Up Control Valve Spring
- Coil Outer Diameter ..... 11.30 mm (0.445 in.)
- Free Lenght ..... 34.60 mm (1.362 in.)

Valve Damping Spring
- Coil Outer Diameter ..... 4.95 mm (0.195 in.)
- Free Lenght ..... 20.00 mm (0.787 in.)

Low Coast Modulator Valve Spring
- Coil Outer Diameter ..... 10.00 mm (0.394 in.)
- Free Lenght ..... 42.35 mm (1.667 in.)

Inter Coast Modulator Valve Spring
- Coil Outer Diameter ..... 10.00 mm (0.394 in.)
- Free Lenght ..... 35.43 mm (1.395 in.)

Ball Valve Spring
- Coil Outer Diameter ..... 11.11 mm (0.437 in.)
- Free Lenght ..... 32.14 mm (1.265 in.)

Bypass Valve Spring
- Coil Outer Diameter ..... 13.82 mm (0.554 in.)
- Free Lenght ..... 33.32 mm (1.312 in.)

Primary Regulator Valve Spring
- Coil Outer Diameter ..... 17.20 mm (0.677 in.)
- Free Lenght ..... 56.30 mm (2.216 in.)

Accumulator Piston and Springs

Direct Clutch Accumulator Piston Outer Diameter ..... 31.80-31.85 mm (1.252-1.254 in.)

Direct Clutch Accumulator Piston Upper Spring
- Free Lenght ..... 42.35 mm (1.667 in.)

Forward Clutch Accumulator Piston Outer Diameter ..... 31.80-31.85 mm (1.252-1.254 in.)

Forward Clutch Accumulator Piston Spring
- Upper Spring Free Lenght ..... 57.18 mm (2.251 in.)
- Lower Spring Free Lenght ..... 29.50 mm (1.161 in.)

Second Brake Accumulator Piston Outer Diameter ..... 34.80-34.85 mm (1.370-1.372 in.)

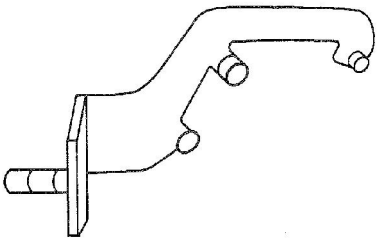
Second Brake Accumulator Piston Spring
- Upper Spring Free Lenght ..... 55.18 mm (2.172 in.)
- Lower Spring Free Lenght ..... 35.13 mm (1.383 in.)

APPROXIMATE FLUID CAPACITIES

- Drain and Refill ..... 2.5 liters (2.64 qt.)
- Overhaul ..... 6.9 liters (7.3 qt.)

SPECIAL TOOLS

1
J 41626



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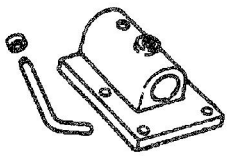
J 3289-20



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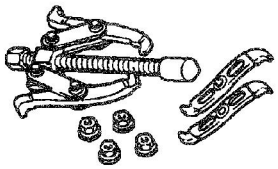
J 22888-D



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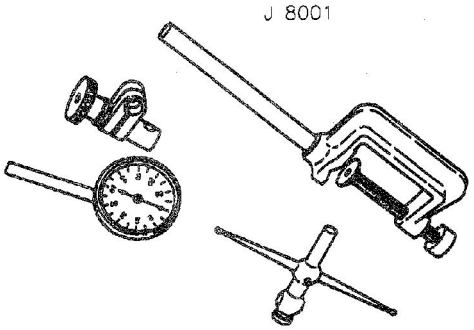

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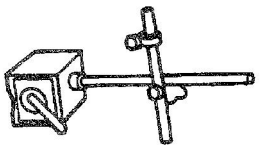

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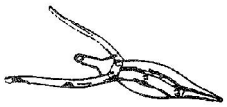


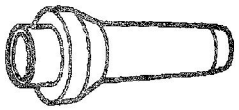
7
J 34673

8
J 26900-5

1 HOLDING FIXTURE
2 HOLDING FIXTURE BASE
3 SIDE BEARING REMOVER
4 DIAL INDICATOR SET
5 MAGNETIC BASE
6 PARALLEL JAWS
7 FLAT GAGE BAR
8 VERNIER CALIPER

EJT1747B10

9
J 9617



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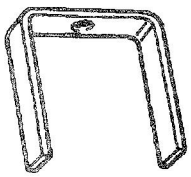

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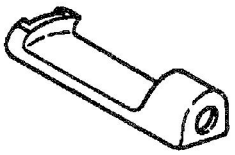

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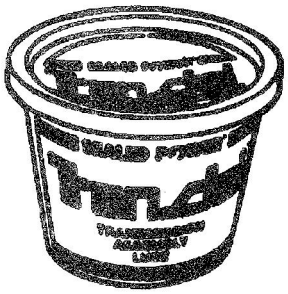

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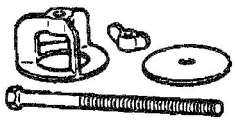

9 PUMP SEAL INSTALLER
10 CLUTCH SPRING COMPRESSOR
11 TRANSJEL® TRANSMISSION ASSEMBLY LUBRICANT
12 ADAPTER CASE SEAL INSTALLER
13 CONVERTER HOUSING SEAL AND ADAPTER CASE OIL SEAL REMOVER
14 SLIDE HAMMER
15 CLUTCH SPRING COMPRESSOR

EJT1757B10

BLANK