

# TRANSMISSION

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## 42/44RE AUTOMATIC TRANSMISSION

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## GENERAL INFORMATION

### 42/44 RE TRANSMISSION

The 42/44RE is a four speed fully automatic transmission (Fig. 1) with an electronic governor. First through third gear ranges are provided by the clutches, bands, overrunning clutch, and planetary gear sets in the transmission. Fourth gear range is provided by the overdrive unit that contains an overdrive clutch, direct clutch, planetary gear set, and overrunning clutch. The overdrive clutch is applied in fourth gear only. The direct clutch is applied in all ranges except fourth gear. The torque converter

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clutch is controlled by the Powertrain Control Module (PCM). The torque converter clutch is hydraulically applied and is released when fluid is vented from the hydraulic circuit by the torque converter control (TCC) solenoid on the valve body. The torque converter clutch engages in fourth gear, and in third gear when the O/D switch is OFF. Engagement occurs when the vehicle is moving at a steady speed after the vehicle has warmed up. The torque converter clutch disengages when the accelerator is applied. The 42/44 RE transmission is cooled by an integral fluid cooler inside the radiator.

GENERAL INFORMATION (Continued)

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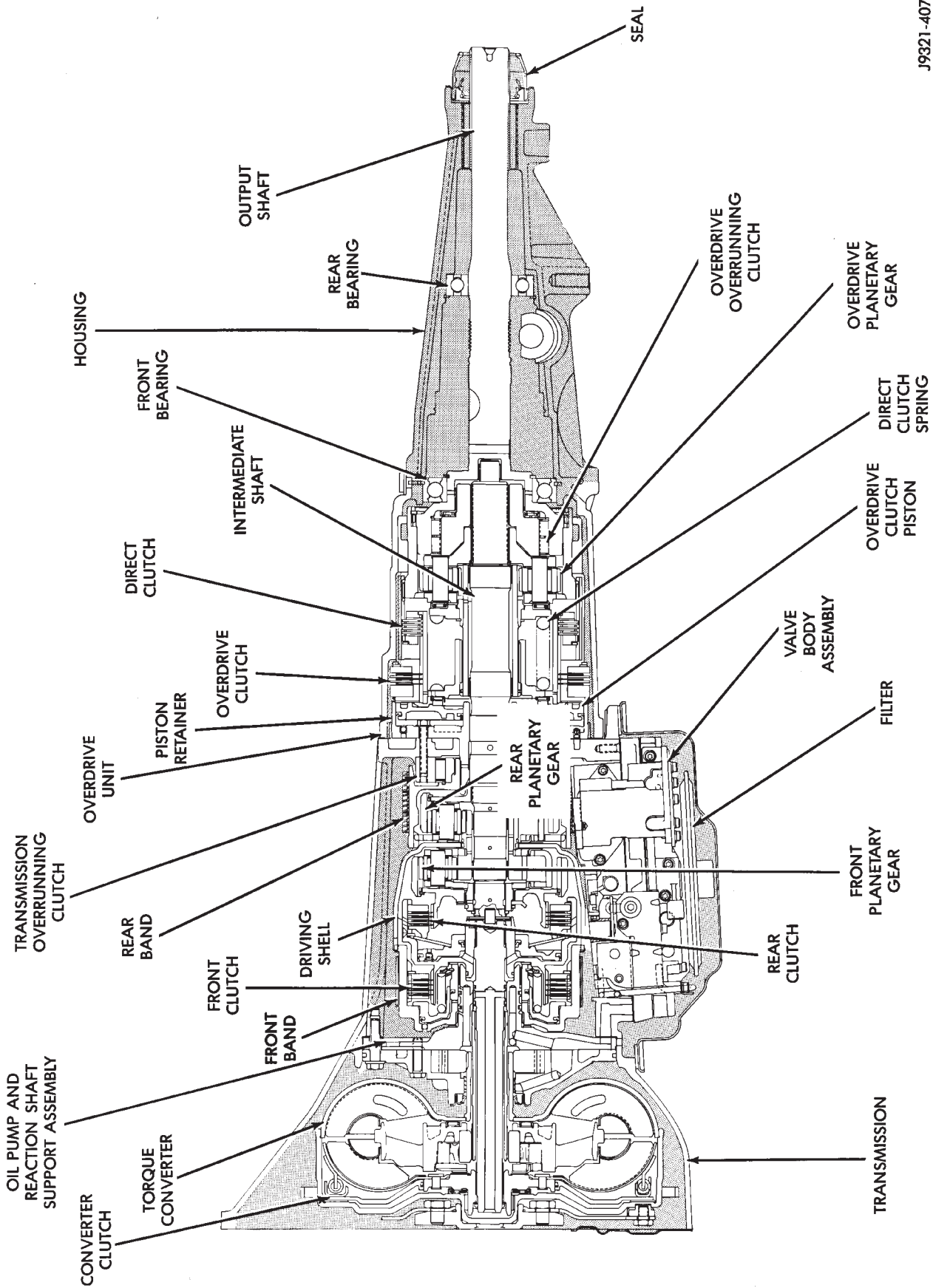
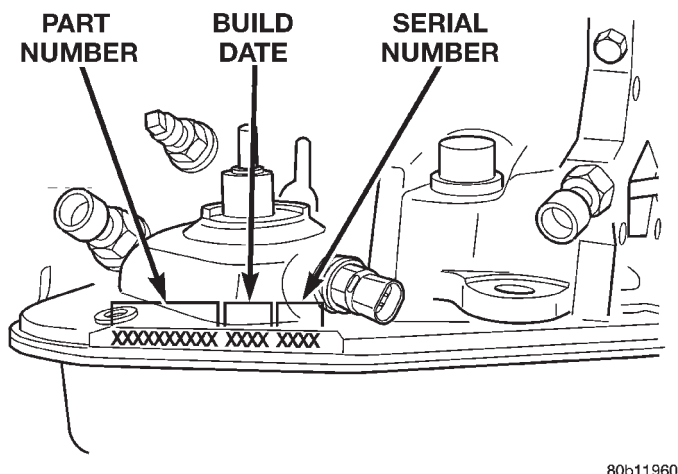


Fig. 1 42/44 RE Transmission

## GENERAL INFORMATION (Continued)

## TRANSMISSION IDENTIFICATION

Transmission identification numbers are stamped on the left side of the case just above the oil pan gasket surface (Fig. 2). Refer to this information when ordering replacement parts.



**Fig. 2 Transmission Part And Serial Number Location**

## RECOMMENDED FLUID

Mopar® ATF Plus 3, Type 7176 automatic transmission fluid is the recommended fluid for Chrysler automatic transmissions.

**Dexron II fluid IS NOT recommended. Clutch chatter can result from the use of improper fluid.**

## EFFECTS OF INCORRECT FLUID LEVEL

A low fluid level allows the pump to take in air along with the fluid. Air in the fluid will cause fluid pressures to be low and develop slower than normal. If the transmission is overfilled, the gears churn the fluid into foam. This aerates the fluid and causing the same conditions occurring with a low level. In either case, air bubbles cause fluid overheating, oxidation and varnish buildup which interferes with valve, clutch and servo operation. Foaming also causes fluid expansion which can result in fluid overflow from the transmission vent or fill tube. Fluid overflow can easily be mistaken for a leak if inspection is not careful.

## CAUSES OF BURNT FLUID

Burnt, discolored fluid is a result of overheating which has two primary causes.

(1) A result of restricted fluid flow through the main and/or auxiliary cooler. This condition is usually the result of a faulty or improperly installed drainback valve, a damaged main cooler, or severe restrictions in the coolers and lines caused by debris or kinked lines.

(2) Heavy duty operation with a vehicle not properly equipped for this type of operation. Trailer towing or similar high load operation will overheat the transmission fluid if the vehicle is improperly equipped. Such vehicles should have an auxiliary transmission fluid cooler, a heavy duty cooling system, and the engine/axle ratio combination needed to handle heavy loads.

## FLUID CONTAMINATION

Transmission fluid contamination is generally a result of:

- adding incorrect fluid
- failure to clean dipstick and fill tube when checking level
- engine coolant entering the fluid
- internal failure that generates debris
- overheat that generates sludge (fluid breakdown)
- failure to reverse flush cooler and lines after repair
- failure to replace contaminated converter after repair

The use of non recommended fluids can result in transmission failure. The usual results are erratic shifts, slippage, abnormal wear and eventual failure due to fluid breakdown and sludge formation. Avoid this condition by using recommended fluids only.

The dipstick cap and fill tube should be wiped clean before checking fluid level. Dirt, grease and other foreign material on the cap and tube could fall into the tube if not removed beforehand. Take the time to wipe the cap and tube clean before withdrawing the dipstick.

Engine coolant in the transmission fluid is generally caused by a cooler malfunction. The only remedy is to replace the radiator as the cooler in the radiator is not a serviceable part. If coolant has circulated through the transmission for some time, an overhaul may also be necessary; especially if shift problems had developed.

The transmission cooler and lines should be reverse flushed whenever a malfunction generates sludge and/or debris. The torque converter should also be replaced at the same time.

Failure to flush the cooler and lines will result in recontamination. Flushing applies to auxiliary coolers as well. The torque converter should also be replaced whenever a failure generates sludge and debris. This is necessary because normal converter flushing procedures will not remove all contaminants.



## GENERAL INFORMATION (Continued)

## ELECTRONIC LOCK-UP TORQUE CONVERTER

The torque converter is a hydraulic device that couples the engine crankshaft to the transmission. The torque converter consists of an outer shell with an internal turbine, a stator, an overrunning clutch, an impeller, and an electronically applied converter clutch. Torque multiplication is created when the stator directs the hydraulic flow from the turbine to rotate the impeller in the direction the engine crankshaft is turning. The turbine transfers power to the planetary gear sets in the transmission. The transfer of power into the impeller assists torque multiplication. At low vehicle-speed, the overrunning clutch holds the stator stationary (during torque multiplication) and allows the stator to freewheel at high vehicle speed. The converter clutch engagement reduces engine speed. Clutch engagement also provides reduced transmission fluid temperatures. The torque converter hub drives the transmission oil (fluid) pump.

The torque converter is a sealed, welded unit that is not repairable and is serviced as an assembly.

**CAUTION:** The torque converter must be replaced if a transmission failure results in large amounts of metal or fiber contamination in the fluid.

## TRANSMISSION GEAR RATIOS

Gear ratios are:

- 1st 2.74:1
- 2nd 1.54:1
- 3rd 1.00:1
- 4th 0.69:1
- Rev. 2.21

## GEARSHIFT MECHANISM

The shift mechanism is cable operated and provides six shift positions. The shift positions are:

- Park (P)
- Reverse (R)
- Neutral (N)
- Drive (D)
- Manual Second (2)
- Manual Low (1)

Manual low (1) range provides first gear only. Overrun braking is also provided in this range. Manual second (2) range provides first and second gear only. Drive range provides first, second, third, and overdrive fourth gear ranges. The shift into overdrive fourth gear range occurs only after the transmission has completed the shift into (D) third gear range. No further movement of the shift mechanism is required to complete the 3-4 shift.

## DESCRIPTION AND OPERATION

## ELECTRONIC GOVERNOR

Governor pressure is controlled electronically. Components used for governor pressure control include:

- Governor body
- Valve body transfer plate
- Governor pressure solenoid valve
- Governor pressure sensor
- Fluid temperature thermistor
- Throttle position sensor (TPS)
- Transmission speed sensor
- Powertrain control module (PCM)

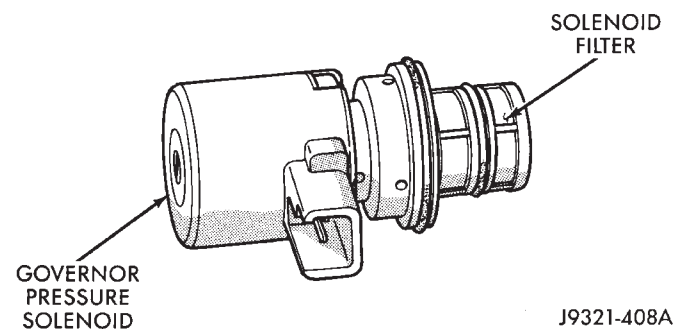
## GOVERNOR PRESSURE SOLENOID VALVE

The solenoid valve is a duty-cycle solenoid which regulates the governor pressure needed for upshifts and downshifts. It is an electro-hydraulic device located in the governor body on the valve body transfer plate (Fig. 3).

The inlet side of the solenoid valve is exposed to normal transmission line pressure. The outlet side of the valve leads to the valve body governor circuit.

The solenoid valve regulates line pressure to produce governor pressure. The average current supplied to the solenoid controls governor pressure. One amp current produces zero kPa/psi governor pressure. Zero amps sets the maximum governor pressure.

The powertrain control module (PCM) turns on the trans control relay which supplies electrical power to the solenoid valve. Operating voltage is 12 volts (DC). The PCM controls the ground side of the solenoid using the governor pressure solenoid control circuit.



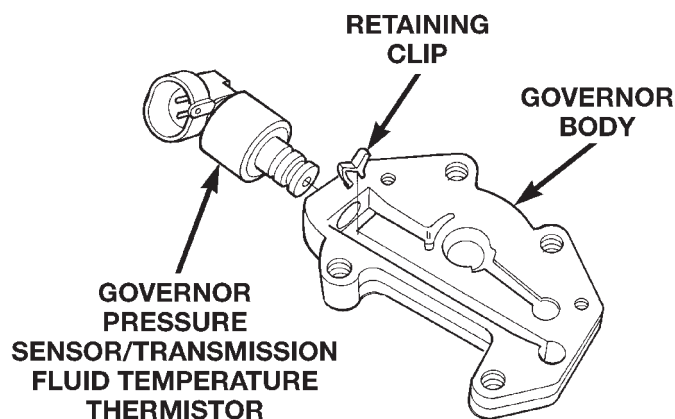
**Fig. 3 Governor Pressure Solenoid Valve**

## GOVERNOR PRESSURE SENSOR

The governor pressure sensor measures output pressure of the governor pressure solenoid valve (Fig. 4).

The sensor output signal provides the necessary feedback to the PCM. This feedback is needed to adequately control governor pressure.

## DESCRIPTION AND OPERATION (Continued)



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**Fig. 4 Governor Pressure Sensor****GOVERNOR BODY AND TRANSFER PLATE**

The transfer plate is designed to supply transmission line pressure to the governor pressure solenoid valve and to return governor pressure.

The governor pressure solenoid valve is mounted in the governor body. The body is bolted to the lower side of the transfer plate (Fig. 4). The transfer plate channels line pressure to the solenoid valve through the governor body. It also channels governor pressure from the solenoid valve to the governor circuit. It is the solenoid valve that develops the necessary governor pressure.

**TRANSMISSION FLUID TEMPERATURE THERMISTOR**

Transmission fluid temperature readings are supplied to the transmission control module by the thermistor. The temperature readings are used to control engagement of the fourth gear overdrive clutch, the converter clutch, and governor pressure. Normal resistance value for the thermistor at room temperature is approximately 1000 ohms.

The PCM prevents engagement of the converter clutch and overdrive clutch, when fluid temperature is below approximately 10°C (50°F).

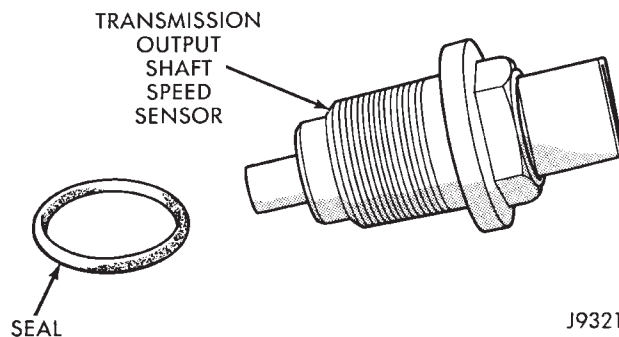
If fluid temperature exceeds 126°C (260°F), the PCM causes a 4-3 downshift and engage the converter clutch. Engagement is according to the third gear converter clutch engagement schedule.

The overdrive OFF lamp in the instrument panel illuminates when the shift back to third occurs. The transmission will not allow fourth gear operation until fluid temperature decreases to approximately 110°C (230°F).

The thermistor is part of the governor pressure sensor assembly and is immersed in transmission fluid at all times.

**TRANSMISSION SPEED SENSOR**

The speed sensor (Fig. 5) is located in the overdrive gear case. The sensor is positioned over the park gear and monitors transmission output shaft rotating speed. Speed sensor signals are triggered by the park gear lugs as they rotate past the sensor pickup face. Input signals from the sensor are sent to the transmission control module for processing. The vehicle speed sensor also serves as a backup for the transmission speed sensor. Signals from this sensor are shared with the powertrain control module.



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**Fig. 5 Transmission Output Speed Sensor****THROTTLE POSITION SENSOR (TPS)**

The TPS provides throttle position input signals to the PCM. This input signal is used to determine overdrive and converter clutch shift schedule and to select the proper governor curve.

**POWERTRAIN CONTROL MODULE (PCM)**

The PCM controls operation of the converter clutch, overdrive clutch, and governor pressure solenoid.

The control module determines transmission shift points based on input signals from the transmission thermistor, transmission output shaft speed sensor, crankshaft position sensor, vehicle speed sensor, throttle position sensor, and battery temperature sensor.

**GOVERNOR PRESSURE CURVES**

There are four governor pressure curves programmed into the transmission control module. The different curves allow the control module to adjust governor pressure for varying conditions. One curve is used for operation when fluid temperature is at, or below, 1°C (30°F). A second curve is used when fluid temperature is at, or above, 10°C (50°F) during normal city or highway driving. A third curve is used during wide-open throttle operation. The fourth curve is used when driving with the transfer case in low range.

## DESCRIPTION AND OPERATION (Continued)

**SHIFT VALVE OPERATION**

The shift valves are moved by a combination of throttle and governor pressure. The governor pressure is generated by electrical components.

The conditions under which a shift to fourth will not occur are:

- Overdrive switch is Off
- Transmission fluid temperature is below 10° C (50° F) or above 121° C (250° F)
- Shift to third not yet completed
- Vehicle speed too low for 3-4 shift to occur
- Battery temperature below -5° F.

**HYDRAULIC CONTROL SYSTEM**

The hydraulic control system provides fully automatic operation. The system performs five basic functions which are: pressure supply, pressure regulation, flow control, clutch/band application, and lubrication.

**PRESSURE REGULATION**

The pressure regulator valve maintains line pressure. The amount of pressure developed is controlled by throttle pressure which is dependent on the degree of throttle opening. The regulator valve is located in the valve body.

The throttle valve determines line pressure and shift speed. Governor pressure increases in proportion to vehicle speed. The throttle valve controls upshift and downshift speeds by regulating pressure according to throttle position.

*Shift Valve Flow Control*

The manual valve is operated by the gearshift linkage and provides the operating range selected by the driver.

The 1-2 shift valve provides 1-2 or 2-1 shifts and the 2-3 shift valve provides 2-3 or 3-2 shifts.

The kickdown valve provides forced 3-2 or 3-1 downshifts depending on vehicle speed. Downshifts occur when the throttle is opened beyond downshift detent position. Detent is reached just before wide open throttle position.

The 2-3 valve throttle pressure plug provides 3-2 downshifts at varying throttle openings depending on vehicle speed.

The 1-2 shift control valve transmits 1-2 shift pressure to the accumulator piston. This controls kickdown band capacity on 1-2 upshifts and 3-2 downshifts.

The 3-4 shift, quick fill, and timing valves plus the 3-4 accumulator, are only actuated when the overdrive solenoid is energized. The solenoid contains a check ball that controls a vent port to the 3-4 valves. The check ball either diverts line pressure away from or directly to the 3-4 valves.

The limit valve determines maximum speed at which a 3-2 part throttle kickdown can be made. On transmissions without a limit valve, maximum speed for a 3-2 kickdown is at detent position.

The 2-3 shuttle valve has two functions. The first is fast front band release and smooth engagement during lift-foot 2-3 upshifts. The second is to regulate front clutch and band application during 3-2 downshifts.

The 3-4 timing valve is moved by line pressure coming through the 3-4 shift valve. The timing valve holds the 2-3 shift valve in an upshift position. The purpose is to prevent the 2-3 valve from up or downshifting before the 3-4 valve.

The 3-4 accumulator is mounted on the overdrive housing and performs the same function as the 2-3 accumulator; it is used to smooth engagement during a 3-4 shift.

The switch valve directs fluid apply pressure to the converter clutch in one position and releases it in the opposite position. It also directs oil to the cooling and lube circuits. The switch valve regulates oil pressure to the torque converter by limiting maximum oil pressure to 130 psi.

**OVERDRIVE OFF SWITCH**

The overdrive OFF (control) switch is located on the gearshift lever. The switch is a momentary contact device that signals the PCM to toggle current status of the overdrive function. At key-on, overdrive operation is allowed. Pressing the switch once causes the overdrive OFF mode to be entered and the overdrive OFF switch lamp to be illuminated. Pressing the switch a second time causes normal overdrive operation to be restored and the overdrive lamp to be turned off. The overdrive OFF mode defaults to ON after the ignition switch is cycled OFF and ON. The normal position for the control switch is the ON position. The switch must be in this position to energize the solenoid and allow a 3-4 upshift. The control switch indicator light illuminates only when the overdrive switch is turned to the OFF position, or when illuminated by the transmission control module.

**3-4 SHIFT SEQUENCE**

The overdrive clutch is applied in fourth gear only. The direct clutch is applied in all ranges except fourth gear. Fourth gear overdrive range is electronically controlled and hydraulically activated. Various sensor inputs are supplied to the powertrain control module to operate the overdrive solenoid on the valve body. The solenoid contains a check ball that opens and closes a vent port in the 3-4 shift valve feed passage. The overdrive solenoid (and check ball) are not energized in first, second, third, or reverse gear. The vent port remains open, diverting line pressure from

## DESCRIPTION AND OPERATION (Continued)

the 2-3 shift valve away from the 3-4 shift valve. The overdrive control switch must be in the ON position to transmit overdrive status to the PCM. A 3-4 upshift occurs only when the overdrive solenoid is energized by the PCM. The PCM energizes the overdrive solenoid during the 3-4 upshift. This causes the solenoid check ball to close the vent port allowing line pressure from the 2-3 shift valve to act directly on the 3-4 upshift valve. Line pressure on the 3-4 shift valve overcomes valve spring pressure moving the valve to the upshift position. This action exposes the feed passages to the 3-4 timing valve, 3-4 quick fill valve, 3-4 accumulator, and ultimately to the overdrive piston. Line pressure through the timing valve moves the overdrive piston into contact with the overdrive clutch. The direct clutch is disengaged before the overdrive clutch is engaged. The boost valve provides increased fluid apply pressure to the overdrive clutch during 3-4 upshifts, and when accelerating in fourth gear. The 3-4 accumulator cushions overdrive clutch engagement to smooth 3-4 upshifts. The accumulator is charged at the same time as apply pressure acts against the overdrive piston.

**CONVERTER CLUTCH ENGAGEMENT**

Converter clutch engagement in third or fourth gear range is controlled by sensor inputs to the powertrain control module. Inputs that determine clutch engagement are: coolant temperature, engine rpm, vehicle speed, throttle position, and manifold vacuum. The torque converter clutch is engaged by the clutch solenoid on the valve body. The clutch can be engaged in third and fourth gear ranges depending on overdrive control switch position. If the overdrive control switch is in the normal ON position, the clutch will engage after the shift to fourth gear, and above approximately 72 km/h (45 mph). If the control switch is in the OFF position, the clutch will engage after the shift to third gear, at approximately 56 km/h (35 mph) at light throttle.

**QUICK FILL VALVE**

The 3-4 quick fill valve provides faster engagement of the overdrive clutch during 3-4 upshifts. The valve temporarily bypasses the clutch piston feed orifice at the start of a 3-4 upshift. This exposes a larger passage into the piston retainer resulting in a much faster clutch fill and apply sequence. The quick fill valve does not bypass the regular clutch feed orifice throughout the 3-4 upshift. Instead, once a predetermined pressure develops within the clutch, the valve closes the bypass. Clutch fill is then completed through the regular feed orifice.

**CONVERTER DRAINBACK VALVE**

The drainback valve is located in the transmission cooler outlet (pressure) line. The valve prevents fluid from draining from the converter into the cooler and lines when the vehicle is shut down for lengthy periods. Production valves have a hose nipple at one end, while the opposite end is threaded for a flare fitting. All valves have an arrow (or similar mark) to indicate direction of flow through the valve.

**DIAGNOSIS AND TESTING****AUTOMATIC TRANSMISSION DIAGNOSIS**

Automatic transmission problems can be a result of poor engine performance, incorrect fluid level, incorrect linkage or cable adjustment, band or hydraulic control pressure adjustments, hydraulic system malfunctions or electrical/mechanical component malfunctions. Begin diagnosis by checking the easily accessible items such as: fluid level and condition, linkage adjustments and electrical connections. A road test will determine if further diagnosis is necessary.

**PRELIMINARY DIAGNOSIS**

Two basic procedures are required. One procedure for vehicles that are drivable and an alternate procedure for disabled vehicles (will not back up or move forward).

**VEHICLE IS DRIVEABLE**

- (1) Check for transmission fault codes using DRB scan tool.
- (2) Check fluid level and condition.
- (3) Adjust throttle and gearshift linkage if complaint was based on delayed, erratic, or harsh shifts.
- (4) Road test and note how transmission upshifts, downshifts, and engages.
- (5) Perform stall test if complaint is based on sluggish acceleration. Or, if abnormal throttle opening is needed to maintain normal speeds with a properly tuned engine.
- (6) Perform hydraulic pressure test if shift problems were noted during road test.
- (7) Perform air-pressure test to check clutch-band operation.

**VEHICLE IS DISABLED**

- (1) Check fluid level and condition.
- (2) Check for broken or disconnected gearshift or throttle linkage.
- (3) Check for cracked, leaking cooler lines, or loose or missing pressure-port plugs.
- (4) Raise and support vehicle on safety stands, start engine, shift transmission into gear, and note following:



## DIAGNOSIS AND TESTING (Continued)

(a) If propeller shaft turns but wheels do not, problem is with differential or axle shafts.

(b) If propeller shaft does not turn and transmission is noisy, stop engine. Remove oil pan, and check for debris. If pan is clear, remove transmission and check for damaged drive plate, converter, oil pump, or input shaft.

(c) If propeller shaft does not turn and transmission is not noisy, perform hydraulic-pressure test to determine if problem is hydraulic or mechanical.

### PARK/NEUTRAL POSITION SWITCH

The center terminal of the park/neutral position switch is the starter-circuit terminal. It provides the ground for the starter solenoid circuit through the selector lever in PARK and NEUTRAL positions only. The outer terminals on the switch are for the backup lamp circuit.

#### SWITCH TEST

To test the switch, remove the wiring connector. Test for continuity between the center terminal and the transmission case. Continuity should exist only when the transmission is in PARK or NEUTRAL.

Shift the transmission into REVERSE and test continuity at the switch outer terminals. Continuity should exist only when the transmission is in REVERSE. Continuity should not exist between the outer terminals and the case.

Check gearshift linkage adjustment before replacing a switch that tests faulty.

### OVERDRIVE ELECTRICAL CONTROLS

The overdrive off switch, valve body solenoid, case connectors and related wiring can all be tested with a 12 volt test lamp or a volt/ohmmeter. Check continuity of each component when diagnosis indicates this is necessary. Refer to Group 8W, Wiring Diagrams, for component locations and circuit information.

Switch and solenoid continuity should be checked whenever the transmission fails to shift into fourth gear range.

### GEARSHIFT CABLE

Gearshift cable adjustment is important because it positions the valve body manual valve. Incorrect adjustment will cause creeping in Neutral, premature clutch wear, delayed engagement in any gear, or a no-start in Park or Neutral position.

Proper operation of the park/neutral position switch will provide a quick check of cable adjustment.

### THROTTLE VALVE CABLE

Transmission throttle valve cable adjustment is extremely important to proper operation. This adjustment positions the throttle valve, which controls shift speed, quality, and part-throttle downshift sensitivity.

If cable setting is too loose, early shifts and slippage between shifts may occur. If the setting is too tight, shifts may be delayed and part throttle downshifts may be very sensitive. Refer to the Adjustments section for the proper adjustment procedure.

### ROAD TESTING

Before road testing, be sure the fluid level and control cable adjustments have been checked and adjusted if necessary. Verify that diagnostic trouble codes have been resolved.

Observe engine performance during the road test. A poorly tuned engine will not allow accurate analysis of transmission operation.

Operate the transmission in all gear ranges. Check for shift variations and engine flare which indicates slippage. Note if shifts are harsh, spongy, delayed, early, or if part throttle downshifts are sensitive.

Slippage indicated by engine flare, usually means clutch, band or overrunning clutch problems. If the condition is advanced, an overhaul will be necessary to restore normal operation.

A slipping clutch or band can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch and Band Application chart provides a basis for analyzing road test results.

## DIAGNOSIS AND TESTING (Continued)

SHIFT LEVER POSITION	TRANSMISSION CLUTCHES AND BANDS					OVERDRIVE CLUTCHES		
	FRONT CLUTCH	FRONT BAND	REAR CLUTCH	REAR BAND	OVERRUN. CLUTCH	OVERDRIVE CLUTCH	DIRECT CLUTCH	OVERRUN. CLUTCH
Reverse	X			X			X	
Drive Range								
First			X		X		X	X
Second		X	X				X	X
Third	X		X				X	X
Fourth	X		X			X		
2-Range (Manual Second)		X	X		X		X	X
1-Range (Manual Low)			X	X	X		X	X

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**Clutch And Band Application Chart****ANALYZING ROAD TEST**

Refer to the Clutch and Band Application chart and note which elements are in use in the various gear ranges.

Note that the rear clutch is applied in all forward ranges (D, 2, 1). The transmission overrunning clutch is applied in first gear (D, 2 and 1 ranges) only. The rear band is applied in 1 and R range only.

Note that the overdrive clutch is applied only in fourth gear and the overdrive direct clutch and overrunning clutch are applied in all ranges except fourth gear.

For example: If slippage occurs in first gear in D and 2 range but not in 1 range, the transmission overrunning clutch is faulty. Similarly, if slippage occurs in any two forward gears, the rear clutch is slipping.

Applying the same method of analysis, note that the front and rear clutches are applied simultaneously only in D range third and fourth gear. If the transmission slips in third gear, either the front clutch or the rear clutch is slipping.

If the transmission slips in fourth gear but not in third gear, the overdrive clutch is slipping. By selecting another gear which does not use these clutches, the slipping unit can be determined. For example, if the transmission also slips in Reverse, the front clutch is slipping. If the transmission does not slip in Reverse, the rear clutch is slipping.

If slippage occurs during the 3-4 shift or only in fourth gear, the overdrive clutch is slipping. Similarly, if the direct clutch were to fail, the transmis-

sion would lose both reverse gear and overrun braking in 2 position (manual second gear).

If the transmission will not shift to fourth gear, the control switch, overdrive solenoid or related wiring may also be the problem cause.

This process of elimination can be used to identify a slipping unit and check operation. Proper use of the Clutch and Band Application Chart is the key.

Although road test analysis will help determine the slipping unit, the actual cause of a malfunction usually cannot be determined until hydraulic and air pressure tests are performed. Practically any condition can be caused by leaking hydraulic circuits or sticking valves.

Unless a malfunction is obvious, such as no drive in D range first gear, do not disassemble the transmission. Perform the hydraulic and air pressure tests to help determine the probable cause.

**HYDRAULIC PRESSURE TEST**

Hydraulic test pressures range from a low of one psi (6.895 kPa) governor pressure, to 300 psi (2068 kPa) at the rear servo pressure port in reverse.

An accurate tachometer and pressure test gauges are required. Test Gauge C-3292 has a 100 psi range and is used at the accumulator, governor, and front servo ports. Test Gauge C-3293-SP has a 300 psi range and is used at the rear servo and overdrive ports where pressures exceed 100 psi.

**Pressure Test Port Locations**

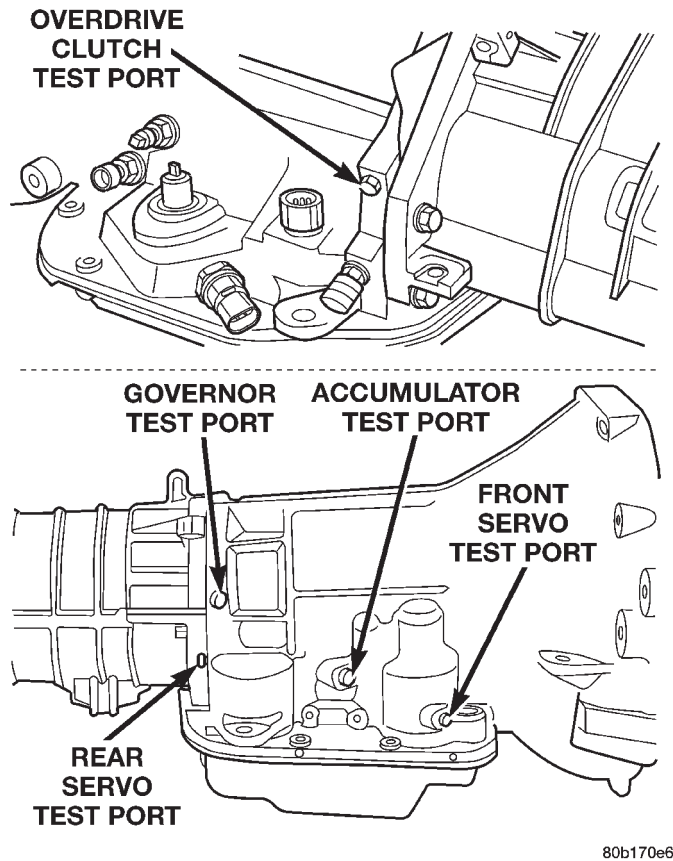
Test ports are located at both sides of the transmission case (Fig. 6).



## DIAGNOSIS AND TESTING (Continued)

Line pressure is checked at the accumulator port on the right side of the case. The front servo pressure port is at the right side of the case just behind the filler tube opening.

The rear servo and governor pressure ports are at the right rear of the transmission case. The overdrive clutch pressure port is at the left rear of the case.



**Fig. 6 Pressure Test Port Locations**

### Test One - Transmission In Manual Low

**NOTE:** This test checks pump output, pressure regulation, and condition of the rear clutch and servo circuit. Both test gauges are required for this test.

- (1) Connect tachometer to engine. Position tachometer so it can be observed from driver seat if helper will be operating engine. Raise vehicle on hoist that will allow rear wheels to rotate freely.
- (2) Connect 100 psi Gauge C-3292 to accumulator port. Then connect 300 psi Gauge C-3293-SP to rear servo port.
- (3) Disconnect throttle and gearshift cables from levers on transmission valve body manual shaft.
- (4) Have helper start and run engine at 1000 rpm.
- (5) Move transmission shift lever fully forward into 1 range.

(6) Gradually move transmission throttle lever from full forward to full rearward position and note pressures on both gauges:

- Line pressure at accumulator port should be 54-60 psi (372-414 kPa) with throttle lever forward and gradually increase to 90-96 psi (621-662 kPa) as throttle lever is moved rearward.
- Rear servo pressure should be same as line pressure within 3 psi (20.68 kPa).

### Test Two—Transmission In 2 Range

**NOTE:** This test checks pump output, line pressure and pressure regulation. Use 100 psi Test Gauge C-3292 for this test.

- (1) Leave vehicle in place on hoist and leave Test Gauge C-3292 connected to accumulator port.
- (2) Have helper start and run engine at 1000 rpm.
- (3) Move transmission shift lever one detent rearward from full forward position. This is 2 range.
- (4) Move transmission throttle lever from full forward to full rearward position and read pressure on gauge.
- (5) Line pressure should be 54-60 psi (372-414 kPa) with throttle lever forward and gradually increase to 90-96 psi (621-662 kPa) as lever is moved rearward.

### Test Three—Transmission In D Range Third Gear

**NOTE:** This test checks pressure regulation and condition of the clutch circuits. Both test gauges are required for this test.

- (1) Turn OD switch off.
- (2) Leave vehicle on hoist and leave Gauge C-3292 in place at accumulator port.
- (3) Move Gauge C-3293-SP over to front servo port for this test.
- (4) Have helper start and run engine at 1600 rpm for this test.
- (5) Move transmission shift lever two detents rearward from full forward position. This is D range.
- (6) Read pressures on both gauges as transmission throttle lever is gradually moved from full forward to full rearward position:
  - Line pressure at accumulator in D range third gear, should be 54-60 psi (372-414 kPa) with throttle lever forward and increase as lever is moved rearward.
  - Front servo pressure in D range third gear, should be within 3 psi (21 kPa) of line pressure up to kickdown point.

## DIAGNOSIS AND TESTING (Continued)

## Test Four—Transmission In Reverse

**NOTE:** This test checks pump output, pressure regulation and the front clutch and rear servo circuits. Use 300 psi Test Gauge C-3293-SP for this test.

- (1) Leave vehicle on hoist and leave gauge C3292 in place at accumulator port.
- (2) Move 300 psi Gauge C-3293-SP back to rear servo port.
- (3) Have helper start and run engine at 1600 rpm for test.
- (4) Move transmission shift lever four detents rearward from full forward position. This is Reverse range.
- (5) Move transmission throttle lever fully forward then fully rearward and note reading at Gauge C-3293-SP.
- (6) Pressure should be 145 - 175 psi (1000-1207 kPa) with throttle lever forward and increase to 230 - 280 psi (1586-1931 kPa) as lever is gradually moved rearward.

## Test Five—Governor Pressure

**NOTE:** This test checks governor operation by measuring governor pressure response to changes in vehicle speed. It is usually not necessary to check governor operation unless shift speeds are incorrect or if the transmission will not downshift. The test should be performed on the road or on a hoist that will allow the rear wheels to rotate freely.

- (1) Move 100 psi Test Gauge C-3292 to governor pressure port.
- (2) Move transmission shift lever two detents rearward from full forward position. This is D range.
- (3) Have helper start and run engine at curb idle speed. Then firmly apply service brakes so wheels will not rotate.
- (4) Note governor pressure:
  - Governor pressure should be no more than 20.6 kPa (3 psi) at curb idle speed and wheels not rotating.

- If pressure exceeds 20.6 kPa (3 psi), a fault exists in governor pressure control system.

(5) Release brakes, slowly increase engine speed, and observe speedometer and pressure test gauge (do not exceed 30 mph on speedometer). Governor pressure should increase in proportion to vehicle speed. Or approximately 6.89 kPa (1 psi) for every 1 mph.

(6) Governor pressure rise should be smooth and drop back to no more than 20.6 kPa (3 psi), after engine returns to curb idle and brakes are applied to prevent wheels from rotating.

(7) Compare results of pressure test with analysis chart.

## Test Six—Transmission In Overdrive Fourth Gear

**NOTE:** This test checks line pressure at the overdrive clutch in fourth gear range. Use 300 psi Test Gauge C-3292 for this test. The test should be performed on the road or on a chassis dyno.

- (1) Remove tachometer; it is not needed for this test.
- (2) Move 300 psi Gauge to overdrive clutch pressure test port. Then remove other gauge and reinstall test port plug.
- (3) Lower vehicle.
- (4) Turn OD switch on.
- (5) Secure test gauge so it can be viewed from drivers seat.
- (6) Start engine and shift into D range.
- (7) Increase vehicle speed gradually until 3-4 shift occurs and note gauge pressure.
- (8) Pressure should be 469-496 kPa (68-72 psi) with closed throttle and increase to 620-827 kPa (90-120 psi) at 1/2 to 3/4 throttle. Note that pressure can increase to around 896 kPa (130 psi) at full throttle.
- (9) Return to shop or move vehicle off chassis dyno.

## DIAGNOSIS AND TESTING (Continued)

### PRESSURE TEST ANALYSIS CHART

TEST CONDITION	INDICATION
Line pressure OK during any one test	Pump and regulator valve OK
Line pressure OK in R but low in D, 2, 1	Leakage in rear clutch area (seal rings, clutch seals)
Pressure low in D Fourth Gear Range	Overdrive clutch piston seal, or check ball problem
Pressure OK in 1, 2 but low in D3 and R	Leakage in front clutch area
Pressure OK in 2 but low in R and 1	Leakage in rear servo
Front servo pressure low in 2	Leakage in servo; broken servo ring or cracked servo piston
Pressure low in all positions	Clogged filter, stuck regulator valve, worn or faulty pump, low oil level
Governor pressure too high at idle speed	Governor pressure solenoid valve system fault. Refer to diagnostic book.
Governor pressure low at all mph figures	Faulty governor pressure solenoid, transmission control module, or governor pressure sensor
Lubrication pressure low at all throttle positions	Clogged fluid cooler or lines, seal rings leaking, worn pump bushings, pump, clutch retainer, or clogged filter.
Line pressure high	Output shaft plugged, sticky regulator valve
Line pressure low	Sticky regulator valve, clogged filter, worn pump

### CONVERTER STALL TEST

Stall testing involves determining maximum engine speed obtainable at full throttle with the rear wheels locked and the transmission in D range. This test checks the holding ability of the converter overrunning and transmission clutches.

**WARNING: NEVER ALLOW ANYONE TO STAND DIRECTLY IN LINE WITH THE VEHICLE FRONT OR REAR DURING A STALL TEST. ALWAYS BLOCK THE WHEELS AND FULLY APPLY THE SERVICE AND PARKING BRAKES DURING THE TEST.**

### STALL TEST PROCEDURE

(1) Connect tachometer to engine. Position tachometer so it can be viewed from driver's seat.

(2) Drive vehicle to bring transmission fluid up to normal operating temperature. Vehicle can be driven on road or on chassis dynamometer, if available.

(3) Check transmission fluid level. Add fluid if necessary.

(4) Block front wheels.

(5) Fully apply service and parking brakes.

(6) Open throttle completely and record maximum engine speed registered on tachometer. It takes 4-10 seconds to reach max rpm. **Once max rpm has been achieved, do not hold wide open throttle for more than 4-5 seconds.**

**CAUTION:** Stalling the converter causes a rapid increase in fluid temperature. To avoid fluid overheating, hold the engine at maximum rpm for no more than 5 seconds. If engine exceeds 2500 rpm during the test, release the accelerator pedal immediately; transmission clutch slippage is occurring.

(7) If a second stall test is required, cool down fluid before proceeding. Shift into NEUTRAL and run engine at 1000 rpm for 20-30 seconds to cool fluid.

### STALL TEST ANALYSIS

#### Stall Speed Too High

If the stall speed exceeds 2500 rpm, transmission clutch slippage is indicated.

#### Stall Speed Low

Low stall speed with a properly tuned engine indicate a torque converter overrunning clutch problem. The condition should be confirmed by road testing. A stall speed 250-350 rpm below normal indicates the converter overrunning clutch is slipping. The vehicle also exhibits poor acceleration but operates normally once highway cruise speeds are reached. Torque converter replacement will be necessary.

#### Stall Speed Normal But Acceleration Poor

If stall speeds are normal (1800-2300 rpm) but abnormal throttle opening is required for acceleration, or to maintain cruise speed, the converter overrunning clutch is seized. The torque converter will have to be replaced.

#### Converter Noise During Test

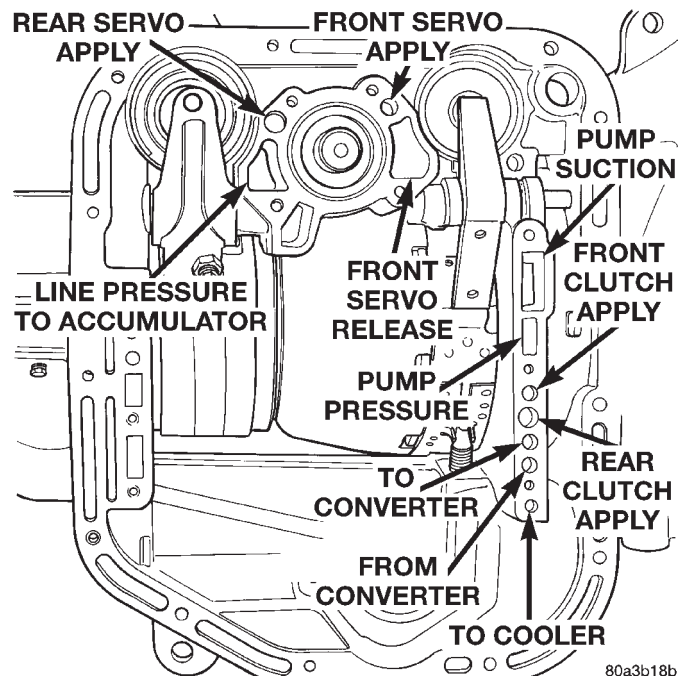
A whining noise caused by fluid flow is normal during a stall test. However, loud metallic noises indicate a damaged converter. To confirm that the noise is originating from the converter, operate the vehicle at light throttle in DRIVE and NEUTRAL on a hoist and listen for noise coming from the converter housing.

## DIAGNOSIS AND TESTING (Continued)

**AIR TESTING TRANSMISSION CLUTCH AND BAND OPERATION**

Air-pressure testing can be used to check transmission front/rear clutch and band operation. The test can be conducted with the transmission either in the vehicle or on the work bench, as a final check, after overhaul.

Air-pressure testing requires that the oil pan and valve body be removed from the transmission. The servo and clutch apply passages are shown (Fig. 7).



**Fig. 7 Air Pressure Test Passages**

**Front Clutch Air Test**

Place one or two fingers on the clutch housing and apply air pressure through front clutch apply passage. Piston movement can be felt and a soft thump heard as the clutch applies.

**Rear Clutch Air Test**

Place one or two fingers on the clutch housing and apply air pressure through rear clutch apply passage. Piston movement can be felt and a soft thump heard as the clutch applies.

**Front Servo Apply Air Test**

Apply air pressure to the front servo apply passage. The servo rod should extend and cause the band to tighten around the drum. Spring pressure should release the servo when air pressure is removed.

**Rear Servo Air Test**

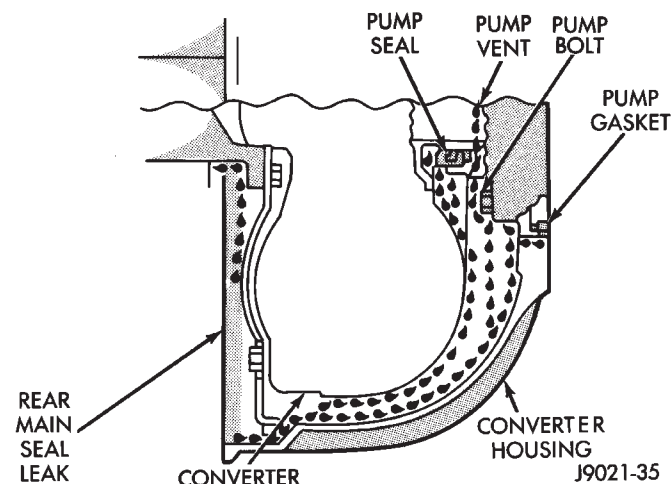
Apply air pressure to the rear servo apply passage. The servo rod should extend and cause the band to tighten around the drum. Spring pressure should release the servo when air pressure is removed.

**CONVERTER HOUSING FLUID LEAK DIAGNOSIS**

When diagnosing converter housing fluid leaks, two items must be established before repair.

- (1) Verify that a leak condition actually exists.
- (2) Determined the true source of the leak.

Some suspected converter housing fluid leaks may not be leaks at all. They may only be the result of residual fluid in the converter housing, or excess fluid spilled during factory fill or fill after repair. Converter housing leaks have several potential sources. Through careful observation, a leak source can be identified before removing the transmission for repair. Pump seal leaks tend to move along the drive hub and onto the rear of the converter. Pump O-ring or pump body leaks follow the same path as a seal leak (Fig. 8). Pump vent or pump attaching bolt leaks are generally deposited on the inside of the converter housing and not on the converter itself (Fig. 8). Pump seal or gasket leaks usually travel down the inside of the converter housing. Front band lever pin plug leaks are generally deposited on the housing and not on the converter.



**Fig. 8 Converter Housing Leak Paths**

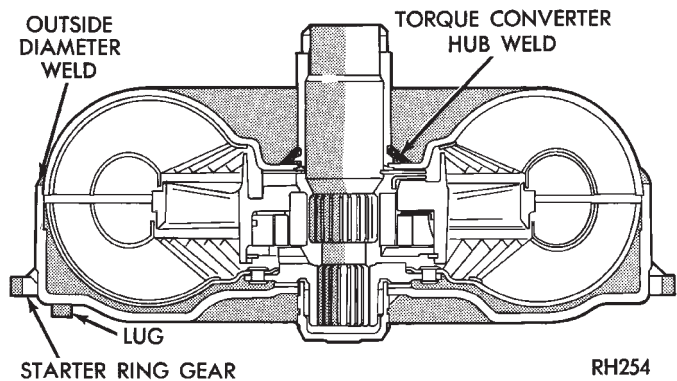
**TORQUE CONVERTER LEAK POINTS**

Possible sources of converter leaks are:

- (1) Leaks at the weld joint around the outside diameter weld (Fig. 9).
- (2) Leaks at the converter hub weld (Fig. 9).



# DIAGNOSIS AND TESTING (Continued)



**Fig. 9 Converter Leak Points—Typical**

## CONVERTER HOUSING AREA LEAK CORRECTION

- (1) Remove converter.
- (2) Tighten front band adjusting screw until band is tight around front clutch retainer. This prevents front/rear clutches from coming out when oil pump is removed.
- (3) Remove oil pump and remove pump seal. Inspect pump housing drainback and vent holes for obstructions. Clear holes with solvent and wire.
- (4) Inspect pump bushing and converter hub. If bushing is scored, replace it. If converter hub is scored, either polish it with crocus cloth or replace converter.
- (5) Install new pump seal, O-ring, and gasket. Replace oil pump if cracked, porous or damaged in

any way. Be sure to loosen the front band before installing the oil pump, damage to the oil pump seal may occur if the band is still tightened to the front clutch retainer.

- (6) Loosen kickdown lever pin access plug three turns. Apply Loctite 592, or Permatex No. 2 to plug threads and tighten plug to 17 N·m (150 in. lbs.) torque.
- (7) Adjust front band.
- (8) Lubricate pump seal and converter hub with transmission fluid or petroleum jelly and install converter.
- (9) Install transmission and converter housing dust shield.
- (10) Lower vehicle.

## DIAGNOSIS TABLES AND CHARTS—RE TRANSMISSION

The diagnosis charts provide additional reference when diagnosing a transmission fault. The charts provide general information on a variety of transmission, overdrive unit and converter clutch fault conditions.

The hydraulic flow charts in the Schematics and Diagrams section of this group, outline fluid flow and hydraulic circuitry. Circuit operation is provided for neutral, third, fourth and reverse gear ranges. Normal working pressures are also supplied for each of the gear ranges.

### DIAGNOSIS CHARTS

CONDITION	POSSIBLE CAUSES	CORRECTION
HARSH ENGAGEMENT (FROM NEUTRAL TO DRIVE OR REVERSE)	1. Fluid Level Low.	1. Add Fluid.
	2. Throttle Linkage Misadjusted.	2. Adjust linkage - setting may be too long.
	3. Mount and Driveline Bolts Loose.	3. Check engine mount, transmission mount, propeller shaft, rear spring to body bolts, rear control arms, crossmember and axle bolt torque. Tighten loose bolts and replace missing bolts.
	4. U-Joint Worn/Broken.	4. Remove propeller shaft and replace U-Joint.
	5. Axle Backlash Incorrect.	5. Check per Service Manual. Correct as needed.
	6. Hydraulic Pressure Incorrect.	6. Check pressure. Remove, overhaul or adjust valve body as needed.
	7. Band Misadjusted.	7. Adjust rear band.
	8. Valve Body Check Balls Missing.	8. Inspect valve body for proper check ball installation.
	9. Axle Pinion Flange Loose.	9. Replace nut and check pinion threads before installing new nut. Replace pinion gear if threads are damaged.
	10. Clutch, band or planetary component damaged.	10. Remove, disassemble and repair transmission as necessary.
	11. Converter Clutch Faulty.	11. Replace converter and flush cooler and line before installing new converter.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
DELAYED ENGAGEMENT (FROM NEUTRAL TO DRIVE OR REVERSE)	1. Fluid Level Low.	1. Correct level and check for leaks.
	2. Filter Clogged.	2. Change filter.
	3. Gearshift Linkage Misadjusted.	3. Adjust linkage and repair linkage if worn or damaged.
	4. Torque Converter Drain Back (Oil drains from torque converter into transmission sump).	4. If vehicle moves normally after 5 seconds after shifting into gear, no repair is necessary. If longer, inspect pump bushing for wear. Replace pump house.
	5. Rear Band Misadjusted.	5. Adjust band.
	6. Valve Body Filter Plugged.	6. Replace fluid and filter. If oil pan and old fluid were full of clutch disc material and/or metal particles, overhaul will be necessary.
	7. Oil Pump Gears Worn/Damaged.	7. Remove transmission and replace oil pump.
	8. Governor Circuit and Solenoid Valve Electrical Fault.	8. Test with DRB scan tool and repair as required.
	9. Hydraulic Pressure Incorrect.	9. Perform pressure test, remove transmission and repair as needed.
	10. Reaction Shaft Seal Rings Worn/Broken.	10. Remove transmission, remove oil pump and replace seal rings.
	11. Rear Clutch/Input Shaft, Rear Clutch Seal Rings Damaged.	11. Remove and disassemble transmission and repair as necessary.
	12. Regulator Valve Stuck.	12. Clean.
	13. Cooler Plugged.	13. Transfer case failure can plug cooler.
NO DRIVE RANGE (REVERSE OK)	1. Fluid Level Low.	1. Add fluid and check for leaks if drive is restored.
	2. Gearshift Linkage/Cable Loose/Misadjusted.	2. Repair or replace linkage components.
	3. Rear Clutch Burnt.	3. Remove and disassemble transmission and rear clutch and seals. Repair/replace worn or damaged parts as needed.
	4. Valve Body Malfunction.	4. Remove and disassemble valve body. Replace assembly if any valves or bores are damaged.
	5. Transmission Overrunning Clutch Broken.	5. Remove and disassemble transmission. Replace overrunning clutch.
	6. Input Shaft Seal Rings Worn/Damaged.	6. Remove and disassemble transmission. Replace seal rings and any other worn or damaged parts.
	7. Front Planetary Failed Broken.	7. Remove and repair.
NO DRIVE OR REVERSE (VEHICLE WILL NOT MOVE)	1. Fluid Level Low.	1. Add fluid and check for leaks if drive is restored.
	2. Gearshift Linkage/Cable Loose/Misadjusted.	2. Inspect, adjust and reassemble linkage as needed. Replace worn/damaged parts.
	3. U-Joint/Axle/Transfer Case Broken.	3. Perform preliminary inspection procedure for vehicle that will not move. Refer to procedure in diagnosis section.
	4. Filter Plugged.	4. Remove and disassemble transmission. Repair or replace failed components as needed. Replace filter. If filter and fluid contained clutch material or metal particles, an overhaul may be necessary. Perform lube flow test. Flush oil. Replace cooler as necessary.
	5. Oil Pump Damaged.	5. Perform pressure test to confirm low pressure. Replace pump body assembly if necessary.



## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	6. Valve Body Malfunctioned.	6. Check and inspect valve body. Replace valve body (as assembly) if any valve or bore is damaged. Clean and reassemble correctly if all parts are in good condition.
	7. Transmission Internal Component Damaged.	7. Remove and disassemble transmission. Repair or replace failed components as needed.
	8. Park Sprag not Releasing - Check Stall Speed, Worn/ Damaged/Stuck.	8. Remove, disassemble, repair.
	9. Torque Converter Damage.	9. Inspect and replace as required.
SHIFTS DELAYED OR ERRATIC (SHIFTS ALSO HARSH AT TIMES)	1. Fluid Level Low/High.	1. Correct fluid level and check for leaks if low.
	2. Fluid Filter Clogged.	2. Replace filter. If filter and fluid contained clutch material or metal particles, an overhaul may be necessary. Perform lube flow test.
	3. Throttle Linkage Misadjusted.	3. Adjust linkage as described in service section.
	4. Throttle Linkage Binding.	4. Check cable for binding. Check for return to closed throttle at transmission.
	5. Gearshift Linkage/Cable Misadjusted.	5. Adjust linkage/cable as described in service section.
	6. Clutch or Servo Failure.	6. Remove valve body and air test clutch, and band servo operation. Disassemble and repair transmission as needed.
	7. Governor Circuit Electrical Fault.	7. Test using DRB scan tool and repair as required.
	8. Front Band Misadjusted.	8. Adjust band.
	9. Pump Suction Passage Leak.	9. Check for excessive foam on dipstick after normal driving. Check for loose pump bolts, defective gasket. Replace pump assembly if needed.
NO REVERSE (D RANGES OK)	1. Gearshift Linkage/Cable Misadjusted/Damaged.	1. Repair or replace linkage parts as needed.
	2. Park Sprag Sticking.	2. Replace overdrive annulus gear.
	3. Rear Band Misadjusted/Worn.	3. Adjust band; replace.
	4. Valve Body Malfunction.	4. Remove and service valve body. Replace valve body if any valves or valve bores are worn or damaged.
	5. Rear Servo Malfunction.	5. Remove and disassemble transmission. Replace worn/damaged servo parts as necessary.
	6. Direct Clutch in Overdrive Worn.	6. Disassemble overdrive. Replace worn or damaged parts.
	7. Front Clutch Burnt.	7. Remove and disassemble transmission. Replace worn, damaged clutch parts as required.
HAS FIRST/ REVERSE ONLY (NO 1-2 OR 2-3 UPSHIFT)	1. Governor Circuit Electrical Fault.	1. Test using DRB scan tool and repair as required.
	2. Valve Body Malfunction.	2. Repair stuck 1-2 shift valve or governor plug.
	3. Front Servo/Kickdown Band Damaged/Burned.	3. Repair/replace.
MOVES IN 2ND OR 3RD GEAR, ABRUPTLY DOWNSHIFTS TO LOW	1. Valve Body Malfunction.	1. Remove, clean and inspect. Look for stuck 1-2 valve or governor plug.
	2. Governor Valve Sticking.	2. Remove, clean and inspect. Replace faulty parts.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO LOW GEAR (MOVES IN 2ND OR 3RD GEAR ONLY)	1. Governor Valve Sticking.	1. Remove governor, clean, inspect and repair as required.
	2. Governor Circuit Electrical Fault.	2. Test with DRB scan tool and repair as required.
	3. Valve Body Malfunction.	3. Remove, clean and inspect. Look for sticking 1-2 shift valve, 2-3 shift valve, governor plug or broken springs.
	4. Front Servo Piston Cocked in Bore.	4. Inspect servo and repair as required.
	5. Front Band Linkage Malfunction.	5. Inspect linkage and look for bind in linkage.
NO KICKDOWN OR NORMAL DOWNSHIFT	1. Throttle Linkage Misadjusted.	1. Adjust linkage.
	2. Accelerator Pedal Travel Restricted.	2. Verify floor mat is not under pedal, repair worn accelerator cable or bent brackets.
	3. Valve Body Hydraulic Pressures Too High or Too Low Due to Valve Body Malfunction or Incorrect Hydraulic Control Pressure Adjustments.	3. Perform hydraulic pressure tests to determine cause and repair as required. Correct valve body pressure adjustments as required.
	4. Governor Circuit Electrical Fault.	4. Test with DRB scan tool and repair as required.
	5. Valve Body Malfunction.	5. Perform hydraulic pressure tests to determine cause and repair as required. Correct valve body pressure adjustments as required.
	6. TPS Malfunction.	6. Replace sensor, check with DRB scan tool.
	7. PCM Malfunction.	7. Check with DRB scan tool and replace if required.
	8. Valve Body Malfunction.	8. Repair sticking 1-2, 2-3 shift valves, governor plugs, 3-4 solenoid, 3-4 shift valve, 3-4 timing valve.
STUCK IN LOW GEAR (WILL NOT UPSHIFT)	1. Throttle Linkage Misadjusted/Stuck.	1. Adjust linkage and repair linkage if worn or damaged. Check for binding cable or missing return spring.
	2. Gearshift Linkage Misadjusted.	2. Adjust linkage and repair linkage if worn or damaged.
	3. Governor Component Electrical Fault.	3. Check operating pressures and test with DRB scan tool, repair faulty component.
	4. Front Band Out of Adjustment.	4. Adjust Band.
	5. Clutch or Servo Malfunction.	5. Air pressure check operation of clutches and bands. Repair faulty component.
CREEPS IN NEUTRAL	1. Gearshift Linkage Misadjusted.	1. Adjust linkage.
	2. Rear Clutch Dragging/Warped.	2. Disassemble and repair.
	3. Valve Body Malfunction.	3. Perform hydraulic pressure test to determine cause and repair as required.
BUZZING NOISE	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Shift Cable Misassembled.	2. Route cable away from engine and bell housing.
	3. Valve Body Misassembled.	3. Remove, disassemble, inspect valve body. Reassemble correctly if necessary. Replace assembly if valves or springs are damaged. Check for loose bolts or screws.
	4. Pump Passages Leaking.	4. Check pump for porous casting, scores on mating surfaces and excess rotor clearance. Repair as required. Loose pump bolts.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
SLIPS IN REVERSE ONLY	5. Cooling System Cooler Plugged.	5. Flow check cooler circuit. Repair as needed.
	6. Overrunning Clutch Damaged.	6. Replace clutch.
	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Gearshift Linkage Misadjusted.	2. Adjust linkage.
	3. Rear Band Misadjusted.	3. Adjust band.
	4. Rear Band Worn.	4. Replace as required.
	5. Overdrive Direct Clutch Worn.	5. Disassemble overdrive. Repair as needed.
	6. Hydraulic Pressure Too Low.	6. Perform hydraulic pressure tests to determine cause.
SLIPS IN FORWARD DRIVE RANGES	7. Rear Servo Leaking.	7. Air pressure check clutch-servo operation and repair as required.
	8. Band Linkage Binding.	8. Inspect and repair as required.
	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Fluid Foaming.	2. Check for high oil level, bad pump gasket or seals, dirt between pump halves and loose pump bolts. Replace pump if necessary.
	3. Throttle Linkage Misadjusted.	3. Adjust linkage.
	4. Gearshift Linkage Misadjusted.	4. Adjust linkage.
	5. Rear Clutch Worn.	5. Inspect and replace as needed.
	6. Low Hydraulic Pressure Due to Worn Pump, Incorrect Control Pressure Adjustments, Valve Body Warpage or Malfunction, Sticking, Leaking Seal Rings, Clutch Seals Leaking, Servo Leaks, Clogged Filter or Cooler Lines.	6. Perform hydraulic and air pressure tests to determine cause.
SLIPS IN LOW GEAR "D" ONLY, BUT NO IN 1 POSITION	7. Rear Clutch Malfunction, Leaking Seals or Worn Plates.	7. Air pressure check clutch-servo operation and repair as required.
	8. Overrunning Clutch Worn, Not Holding (Slips in 1 Only).	8. Replace Clutch.
GROWLING, GRATING OR SCRAPING NOISES	Overrunning Clutch Faulty.	Replace overrunning clutch.
GROWLING, GRATING OR SCRAPING NOISES	1. Drive Plate Broken.	1. Replace.
	2. Torque Converter Bolts Hitting Dust Shield.	2. Dust shield bent. Replace or repair.
	3. Planetary Gear Set Broken/ Seized.	3. Check for debris in oil pan and repair as required.
	4. Overrunning Clutch Worn/ Broken.	4. Inspect and check for debris in oil pan. Repair as required.
	5. Oil Pump Components Scored/Binding.	5. Remove, inspect and repair as required.
	6. Output Shaft Bearing or Bushing Damaged.	6. Remove, inspect and repair as required.
	7. Clutch Operation Faulty.	7. Perform air pressure check and repair as required.
	8. Front and Rear Bands Misadjusted.	8. Adjust bands.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
DRAGS OR LOCKS UP	1. Fluid Level Low.	1. Check and adjust level.
	2. Clutch Dragging/Failed.	2. Air pressure check clutch operation and repair as required.
	3. Front or Rear Band Misadjusted.	3. Adjust bands.
	4. Case Leaks Internally.	4. Check for leakage between passages in case.
	5. Servo Band or Linkage Malfunction.	5. Air pressure check servo operation and repair as required.
	6. Overrunning Clutch Worn.	6. Remove and inspect clutch. Repair as required.
	7. Planetary Gears Broken.	7. Remove, inspect and repair as required (look for debris in oil pan).
	8. Converter Clutch Dragging.	8. Check for plugged cooler. Perform flow check. Inspect pump for excessive side clearance. Replace pump as required.
NO 4-3 DOWNSHIFT	1. Circuit Wiring and/or Connectors Shorted.	1. Test wiring and connectors with test lamp and volt/ohmmeter. Repair wiring as necessary. Replace connectors and/or harnesses as required.
	2. PCM Malfunction.	2. Check PCM operation with DRB scan tool. Replace PCM only if faulty.
	3. TPS Malfunction.	3. Check TPS with DRB scan tool at PCM.
	4. Lockup Solenoid Not Venting.	4. Remove valve body and replace solenoid assembly if plugged or shorted.
	5. Overdrive Solenoid Not Venting.	5. Remove valve body and replace solenoid if plugged or shorted.
	6. Valve Body Valve Sticking.	6. Repair stuck 3-4 shift valve or lockup timing valve.
NO 4-3 DOWNSHIFT WHEN CONTROL SWITCH IS TURNED OFF	1. Control Switch Open/Shorted.	1. Test and replace switch if faulty.
	2. Overdrive Solenoid Connector Shorted.	2. Test solenoids and replace if seized or shorted.
	3. PCM Malfunction.	3. Test with DRB scan tool. Replace PCM if faulty.
	4. Valve Body Stuck Valves.	4. Repair stuck 3-4, lockup or lockup timing valve.
CLUNK NOISE FROM DRIVELINE ON CLOSED THROTTLE 4-3 DOWNSHIFT	1. Transmission Fluid Low.	1. Add Fluid.
	2. Throttle Cable Misadjusted.	2. Adjust cable.
	3. Overdrive Clutch Select Spacer Wrong Spacer.	3. Replace overdrive piston thrust plate spacer.
3-4 UPSHIFT OCCURS IMMEDIATELY AFTER 2-3 SHIFT	1. Overdrive Solenoid Connector or Wiring Shorted.	1. Test connector and wiring for loose connections, shorts or ground and repair as needed.
	2. TPS Malfunction.	2. Test TPS and replace as necessary. Check with DRB scan tool.
	3. PCM Malfunction.	3. Test PCM with DRB scan tool and replace controller if faulty.
	4. Overdrive Solenoid Malfunction.	4. Replace solenoid.
	5. Valve Body Malfunction.	5. Remove, disassemble, clean and inspect valve body components. Make sure all valves and plugs slide freely in bores. Polish valves with crocus cloth if needed.
WHINE/NOISE RELATED TO ENGINE SPEED	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Shift Cable Incorrect Routing.	2. Check shift cable for correct routing. Should not touch engine or bell housing.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO 3-4 UPSHIFT	1. Dash O/D Switch In OFF Position.	1. Turn control switch to ON position.
	2. Overdrive Circuit Fuse Blown.	2. Replace fuse. Determine why fuse failed and repair as necessary (i.e., shorts or grounds in circuit).
	3. O/D Switch Wire Shorted/Open Cut.	3. Check wires/connections with 12V test lamp and voltmeter. Repair damaged or loose wire/connection as necessary.
	4. Distance or Coolant Sensor Malfunction.	4. Check with DRB scan tool and repair or replace as necessary.
	5. TPS Malfunction.	5. Check with DRB scan tool and replace if necessary.
	6. Neutral Switch to PCM Wire Shorted/Cut.	6. Test switch as described in service section and replace if necessary. Engine no start.
	7. PCM Malfunction.	7. Check with DRB scan tool and replace if necessary.
	8. Overdrive Solenoid Shorted/Open.	8. Replace solenoid if shorted or open and repair loose or damaged wires (DRB scan tool).
	9. Solenoid Feed Orifice in Valve Body Blocked.	9. Remove, disassemble, and clean valve body thoroughly. Check feed orifice.
	10. Overdrive Clutch Failed.	10. Disassemble overdrive and repair as needed.
	11. Hydraulic Pressure Low.	11. Pressure test transmission to determine cause.
	12. Valve Body Valve Stuck.	12. Repair stuck 3-4 shift valve, 3-4 timing valve.
	13. O/D Piston Incorrect Spacer.	13. Remove unit, check end play and install correct spacer.
	14. Overdrive Piston Seal Failure.	14. Replace both seals.
	15. O/D Check Valve/Orifice Failed.	15. Check for free movement and secure assembly (in piston retainer). Check ball bleed orifice.
SLIPS IN OVERDRIVE FOURTH GEAR	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Overdrive Clutch Pack Worn.	2. Remove overdrive unit and rebuild clutch pack.
	3. Overdrive Piston Retainer Bleed Orifice Blown Out.	3. Disassemble transmission, remove retainer and replace orifice.
	4. Overdrive Piston or Seal Malfunction.	4. Remove overdrive unit. Replace seals if worn. Replace piston if damaged. If piston retainer is damaged, remove and disassemble the transmission.
	5. 3-4 Shift Valve, Timing Valve or Accumulator Malfunction.	5. Remove and overhaul valve body. Replace accumulator seals. Make sure all valves operate freely in bores and do not bind or stick. Make sure valve body screws are correctly tightened and separator plates are properly positioned.
	6. Overdrive Unit Thrust Bearing Failure.	6. Disassemble overdrive unit and replace thrust bearing (NO. 1 thrust bearing is between overdrive piston and clutch hub; NO. 2 thrust bearing is between the planetary gear and the direct clutch spring plate; NO. 3 thrust bearing is between overrunning clutch hub and output shaft).
	7. O/D Check Valve/Bleed Orifice Failure.	7. Check for function/secure orifice insert in O/D piston retainer.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
DELAYED 3-4 UPSHIFT (SLOW TO ENGAGE)	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Throttle Valve Cable Misadjusted.	2. Adjust throttle valve cable.
	3. Overdrive Clutch Pack Worn/Burnt.	3. Remove unit and rebuild clutch pack.
	4. TPS Faulty.	4. Test with DRB scan tool and replace as necessary.
	5. Overdrive Clutch Bleed Orifice Plugged.	5. Disassemble transmission and replace orifice.
	6. Overdrive Solenoid or Wiring Shorted/Open.	6. Test solenoid and check wiring for loose/corroded connections or shorts/grounds. Replace solenoid if faulty and repair wiring if necessary.
	7. Overdrive Excess Clearance.	7. Remove unit. Measure end play and select proper spacer.
	8. O/D Check Valve Missing or Stuck.	8. Check for presence of check valve. Repair or replace as required.
TORQUE CONVERTER LOCKS UP IN SECOND AND/OR THIRD GEAR	Lockup Solenoid, Relay or Wiring Shorted/Open.	Test solenoid, relay and wiring for continuity, shorts or grounds. Replace solenoid and relay if faulty. Repair wiring and connectors as necessary.
HARSH 1-2, 2-3, 3-4 OR 3-2 SHIFTS	Lockup Solenoid Malfunction.	Remove valve body and replace solenoid assembly.
NO START IN PARK OR NEUTRAL	1. Gearshift Linkage/Cable Misadjusted.	1. Adjust linkage/cable.
	2. Neutral Switch Wire Open/Cut.	2. Check continuity with test lamp. Repair as required.
	3. Neutral Switch Faulty.	3. Refer to service section for test and replacement procedure.
	4. Neutral Switch Connect Faulty.	4. Connectors spread open. Repair.
	5. Valve Body Manual Lever Assembly Bent/Worn/Broken.	5. Inspect lever assembly and replace if damaged.
NO REVERSE (OR SLIPS IN REVERSE)	1. Direct Clutch Pack (front clutch) Worn.	1. Disassemble unit and rebuild clutch pack.
	2. Rear Band Misadjusted.	2. Adjust band.
	3. Front Clutch Malfunctioned/Burned.	3. Air-pressure test clutch operation. Remove and rebuild if necessary.
	4. Overdrive Thrust Bearing Failure.	4. Disassemble geartrain and replace bearings.
	5. Direct Clutch Spring Collapsed/Broken.	5. Remove and disassemble unit. Check clutch position and replace spring.
OIL LEAKS.	1. Fluid Lines and Fittings Loose/Leaks/Damaged.	1. Tighten fittings. If leaks persist, replace fittings and lines if necessary.
	2. Fill Tube (where tube enters case) Leaks/Damaged.	2. Replace tube seal. Inspect tube for cracks in fill tube.
	3. Pressure Port Plug Loose Loose/Damaged.	3. Tighten to correct torque. Replace plug or reseal if leak persists.
	4. Pan Gasket Leaks.	4. Tighten pan screws (150 in. lbs.). If leaks persist, replace gasket.
	5. Valve Body Manual Lever Shaft Seal Leaks/Worn.	5. Replace shaft seal.



## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	6. Rear Bearing Access Plate Leaks.	6. Replace gasket. Tighten screws.
	7. Gasket Damaged or Bolts are Loose.	7. Replace bolts or gasket or tighten both.
	8. Adapter/Extension Gasket Damaged Leaks/Damaged.	8. Replace gasket.
	9. Neutral Switch Leaks/Damaged.	9. Replace switch and gasket.
	10. Converter Housing Area Leaks.	10. Check for leaks at seal caused by worn seal or burr on converter hub (cutting seal), worn bushing, missing oil return, oil in front pump housing or hole plugged. Check for leaks past O-ring seal on pump or past pump-to-case bolts; pump housing porous, oil coming out vent due to overfill or leak past front band shaft access plug.
	11. Pump Seal Leaks/Worn/Damaged.	11. Replace seal.
	12. Torque Converter Weld Leak/Cracked Hub.	12. Replace converter.
	13. Case Porosity Leaks.	13. Replace case.
NOISY OPERATION IN FOURTH GEAR ONLY	1. Overdrive Clutch Discs, Plates or Snap Rings Damaged.	1. Remove unit and rebuild clutch pack.
	2. Overdrive Piston or Planetary Thrust Bearing Damaged.	2. Remove and disassemble unit. Replace either thrust bearing if damaged.
	3. Output Shaft Bearings Scored/Damaged.	3. Remove and disassemble unit. Replace either bearing if damaged.
	4. Planetary Gears Worn/Chipped.	4. Remove and overhaul overdrive unit.
	5. Overdrive Unit Overrunning Clutch Rollers Worn/Scored.	5. Remove and overhaul overdrive unit.

## SERVICE PROCEDURES

### FLUID LEVEL CHECK

Transmission fluid level should be checked monthly under normal operation. If the vehicle is used for trailer towing or similar heavy load hauling, check fluid level and condition weekly. Fluid level is checked with the engine running at curb idle speed, the transmission in NEUTRAL and the transmission fluid at normal operating temperature.

#### FLUID LEVEL CHECK PROCEDURE

(1) Transmission fluid must be at normal operating temperature for accurate fluid level check. Drive vehicle if necessary to bring fluid temperature up to normal hot operating temperature of 82°C (180°F).

- (2) Position vehicle on level surface.
- (3) Start and run engine at curb idle speed.
- (4) Apply parking brakes.

(5) Shift transmission momentarily into all gear ranges. Then shift transmission back to Neutral.

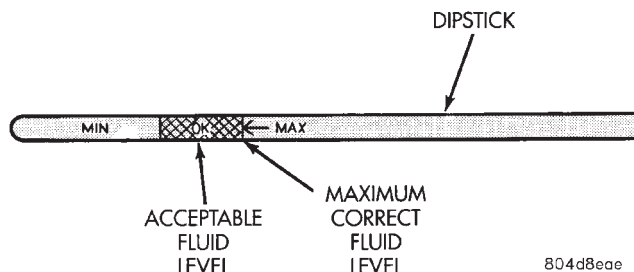
(6) Clean top of filler tube and dipstick to keep dirt from entering tube.

(7) Remove dipstick (Fig. 10) and check fluid level as follows:

- (a) Correct acceptable level is in crosshatch area.
- (b) Correct maximum level is to MAX arrow mark.
- (c) Incorrect level is at or below MIN line.
- (d) If fluid is low, add only enough Mopar® ATF Plus 3 to restore correct level. Do not overfill.

**CAUTION:** Do not overfill the transmission. Overfilling may cause leakage out the pump vent which can be mistaken for a pump seal leak. Overfilling will also cause fluid aeration and foaming as the excess fluid is picked up and churned by the gear train. This will significantly reduce fluid life.

## SERVICE PROCEDURES (Continued)



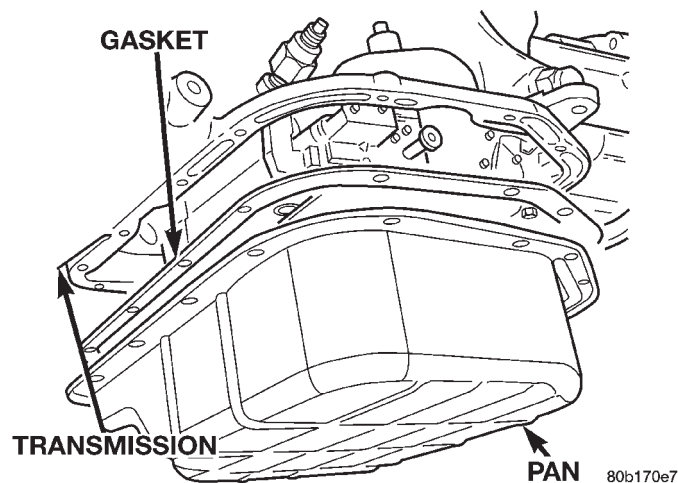
**Fig. 10 Dipstick Fluid Level Marks—Typical**

### FLUID AND FILTER REPLACEMENT

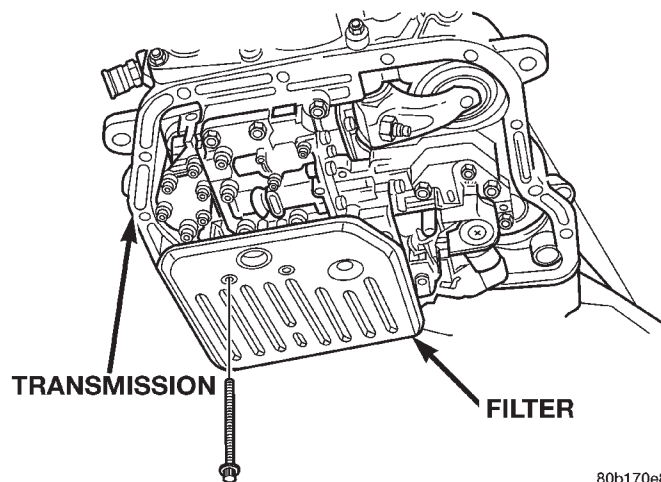
Refer to the Maintenance Schedules in Group 0, Lubrication and Maintenance, for proper service intervals. The service fluid fill after a filter change is approximately 3.8 liters (4.0 quarts).

#### REMOVAL

- (1) Hoist and support vehicle on safety stands.
- (2) Place a large diameter shallow drain pan beneath the transmission pan.
- (3) Remove bolts holding front and sides of pan to transmission (Fig. 11).
- (4) Loosen bolts holding rear of pan to transmission.
- (5) Slowly separate front of pan away from transmission allowing the fluid to drain into drain pan.
- (6) Hold up pan and remove remaining bolt holding pan to transmission.
- (7) While holding pan level, lower pan away from transmission.
- (8) Pour remaining fluid in pan into drain pan.
- (9) Remove screws holding filter to valve body (Fig. 12).
- (10) Separate filter from valve body and pour fluid in filter into drain pan.
- (11) Dispose of used trans fluid and filter properly.



**Fig. 11 Transmission Pan—Typical**



**Fig. 12 Transmission Filter—Typical**

#### INSPECTION

Inspect bottom of pan and magnet for excessive amounts of metal. A light coating of clutch or band material on the bottom of the pan does not indicate a problem unless accompanied by slipping condition or shift lag. If fluid and pan are contaminated with excessive amounts or debris, refer to the diagnosis section of this group.

Check the adjustment of the front and rear bands, adjust if necessary.

#### CLEANING

- (1) Using a suitable solvent, clean pan and magnet.
- (2) Using a suitable gasket scraper, clean gasket material from gasket surface of transmission case and the gasket flange around the pan.

#### INSTALLATION

- (1) Place replacement filter in position on valve body.
- (2) Install screws to hold filter to valve body (Fig. 12). Tighten screws to 4 N·m (35 in. lbs.) torque.
- (3) Place new gasket in position on pan and install pan on transmission.
- (4) Place pan in position on transmission.
- (5) Install screws to hold pan to transmission (Fig. 11). Tighten bolts to 17 N·m (150 in. lbs.) torque.
- (6) Lower vehicle and fill transmission with Mopar® ATF Plus 3, type 7176 fluid.

### TRANSMISSION FILL PROCEDURE

To avoid overfilling transmission after a fluid change or overhaul, perform the following procedure:

- (1) Remove dipstick and insert clean funnel in transmission fill tube.
- (2) Add following initial quantity of Mopar® ATF Plus 3 to transmission:

## SERVICE PROCEDURES (Continued)

- (a) If only fluid and filter were changed, add **3 pints (1-1/2 quarts)** of ATF Plus 3 to transmission.
- (b) If transmission was completely overhauled, torque converter was replaced or drained, and cooler was flushed, add **12 pints (6 quarts)** of ATF Plus 3 to transmission.
- (3) Apply parking brakes.
- (4) Start and run engine at normal curb idle speed.
- (5) Apply service brakes, shift transmission through all gear ranges then back to NEUTRAL, set parking brake, and leave engine running at curb idle speed.
- (6) Remove funnel, insert dipstick and check fluid level. If level is low, **add fluid to bring level to MIN mark on dipstick**. Check to see if the oil level is equal on both sides of the dipstick. If one side is noticeably higher than the other, the dipstick has picked up some oil from the dipstick tube. Allow the oil to drain down the dipstick tube and re-check.
- (7) Drive vehicle until transmission fluid is at normal operating temperature.
- (8) With the engine running at curb idle speed, the gear selector in NEUTRAL, and the parking brake applied, check the transmission fluid level.

**CAUTION:** Do not overfill transmission, fluid foaming and shifting problems can result.

- (9) Add fluid to bring level up to MAX arrow mark.

When fluid level is correct, shut engine off, release park brake, remove funnel, and install dipstick in fill tube.

**CONVERTER DRAINBACK CHECK VALVE SERVICE**

The converter drainback check valve is located in the cooler outlet (pressure) line near the radiator lower tank. The valve prevents fluid drainback when the vehicle is parked for lengthy periods. The valve check ball is spring loaded and has an opening pressure of approximately 2 psi.

The valve is serviced as an assembly; it is not repairable. Do not clean the valve if restricted, or contaminated by sludge, or debris. If the valve fails, or if a transmission malfunction occurs that generates sludge and/or clutch particles and metal shavings, the valve must be replaced.

The valve must be removed whenever the cooler and lines are reverse flushed. The valve can be flow

tested when necessary. The procedure is exactly the same as for flow testing a cooler.

If the valve is restricted, installed backwards, or in the wrong line, it will cause an overheating condition and possible transmission failure.

**CAUTION:** The drainback valve is a one-way flow device. It must be properly oriented in terms of flow direction for the cooler to function properly. The valve must be installed in the pressure line. Otherwise flow will be blocked and would cause an overheating condition and eventual transmission failure.

**OIL PUMP VOLUME CHECK**

After the new or repaired transmission has been installed, fill to the proper level with Mopar® ATF PLUS 3 (Type 7176) automatic transmission fluid. The volume should be checked using the following procedure:

- (1) Disconnect the **From cooler** line at the transmission and place a collecting container under the disconnected line.

**CAUTION:** With the fluid set at the proper level, fluid collection should not exceed (1) quart or internal damage to the transmission may occur.

- (2) Run the engine **at curb idle speed**, with the shift selector in neutral.

- (3) If fluid flow is intermittent or it takes more than 20 seconds to collect one quart of ATF PLUS 3, disconnect the **To Cooler** line at the transaxle.

- (4) Refill the transaxle to proper level and recheck pump volume.

- (5) If flow is found to be within acceptable limits, replace the cooler. Then fill transmission to the proper level, using Mopar® ATF PLUS 3 (Type 7176) automatic transmission fluid.

- (6) If fluid flow is still found to be inadequate, check the line pressure using the Transaxle Hydraulic Pressure Test procedure.

**FLUSHING COOLERS AND TUBES**

When a transmission failure has contaminated the fluid, the oil cooler(s) must be flushed. The cooler bypass valve in the transmission must be replaced also. The torque converter must also be replaced. This will insure that metal particles or sludged oil are not later transferred back into the reconditioned (or replaced) transmission.

## SERVICE PROCEDURES (Continued)

The only recommended procedure for flushing coolers and lines is to use Tool 6906 Cooler Flusher.

**WARNING: WEAR PROTECTIVE EYEWEAR THAT MEETS THE REQUIREMENTS OF OSHA AND ANSI Z87.1-1968. WEAR STANDARD INDUSTRIAL RUBBER GLOVES.**

**KEEP LIGHTED CIGARETTES, SPARKS, FLAMES, AND OTHER IGNITION SOURCES AWAY FROM THE AREA TO PREVENT THE IGNITION OF COMBUSTIBLE LIQUIDS AND GASES. KEEP A CLASS (B) FIRE EXTINGUISHER IN THE AREA WHERE THE FLUSHER WILL BE USED.**

**KEEP THE AREA WELL VENTILATED.**

**DO NOT LET FLUSHING SOLVENT COME IN CONTACT WITH YOUR EYES OR SKIN: IF EYE CONTAMINATION OCCURS, FLUSH EYES WITH WATER FOR 15 TO 20 SECONDS. REMOVE CONTAMINATED CLOTHING AND WASH AFFECTED SKIN WITH SOAP AND WATER. SEEK MEDICAL ATTENTION.**

*COOLER FLUSH USING TOOL 6906*

- (1) Remove cover plate filler plug on Tool 6906. Fill reservoir 1/2 to 3/4 full of fresh flushing solution. Flushing solvents are petroleum based solutions generally used to clean automatic transmission components. **DO NOT** use solvents containing acids, water, gasoline, or any other corrosive liquids.
- (2) Reinstall filler plug on Tool 6906.
- (3) Verify pump power switch is turned OFF. Connect red alligator clip to positive (+) battery post. Connect black (-) alligator clip to a good ground.
- (4) Disconnect the cooler lines at the transmission.

**NOTE: When flushing transmission cooler and lines, ALWAYS reverse flush.**

- (5) Connect the BLUE pressure line to the OUTLET (From) cooler line.
- (6) Connect the CLEAR return line to the INLET (To) cooler line.
- (7) Turn pump ON for two to three minutes to flush cooler(s) and lines. Monitor pressure readings and clear return lines. Pressure readings should stabilize below 20 psi. for vehicles equipped with a single cooler and 30 psi. for vehicles equipped with dual coolers. If flow is intermittent or exceeds these pressures, replace cooler.
- (8) Turn pump OFF.
- (9) Disconnect CLEAR suction line from reservoir at cover plate. Disconnect CLEAR return line at cover plate, and place it in a drain pan.
- (10) Turn pump ON for 30 seconds to purge flushing solution from cooler and lines. Turn pump OFF.

(11) Place CLEAR suction line into a one quart container of Mopar® ATF Plus 3, type 7176 automatic transmission fluid.

(12) Turn pump ON until all transmission fluid is removed from the one quart container and lines. This purges any residual cleaning solvent from the transmission cooler and lines. Turn pump OFF.

(13) Disconnect alligator clips from battery. Reconnect flusher lines to cover plate, and remove flushing adapters from cooler lines.

**ALUMINUM THREAD REPAIR**

Damaged or worn threads in the aluminum transaxle case and valve body can be repaired by the use of Heli-Coils, or equivalent. This repair consists of drilling out the worn-out damaged threads. Then tap the hole with a special Heli-Coil tap, or equivalent, and installing a Heli-Coil insert, or equivalent, into the hole. This brings the hole back to its original thread size.

Heli-Coil, or equivalent, tools and inserts are readily available from most automotive parts suppliers.

**REMOVAL AND INSTALLATION****TRANSMISSION**

The overdrive unit can be removed and serviced separately. It is not necessary to remove the entire transmission assembly to perform overdrive unit repairs.

**CAUTION: The transmission and torque converter must be removed as an assembly to avoid component damage. The converter drive plate, pump bushing, or oil seal can be damaged if the converter is left attached to the driveplate during removal.**

**REMOVAL**

- (1) Disconnect battery negative cable.
- (2) Hoist and support vehicle.
- (3) Remove skid plate, if equipped.
- (4) Remove skid plate support crossmember, if equipped.
- (5) Disconnect and lower or remove necessary exhaust components.
- (6) Remove starter motor.
- (7) Support engine with suitable support stand and wood block.
- (8) Remove bolts attaching engine-to-transmission brackets to transmission.
- (9) Remove bolt and nut attaching each engine-to-transmission bracket to the motor mounts.



## REMOVAL AND INSTALLATION (Continued)

(10) Remove bolts holding the engine-to-transmission brackets to the front axle, if equipped.

(11) Loosen bolts attaching engine-to-transmission brackets to each side of the engine block.

(12) Raise engine slightly.

(13) Remove torque converter access cover.

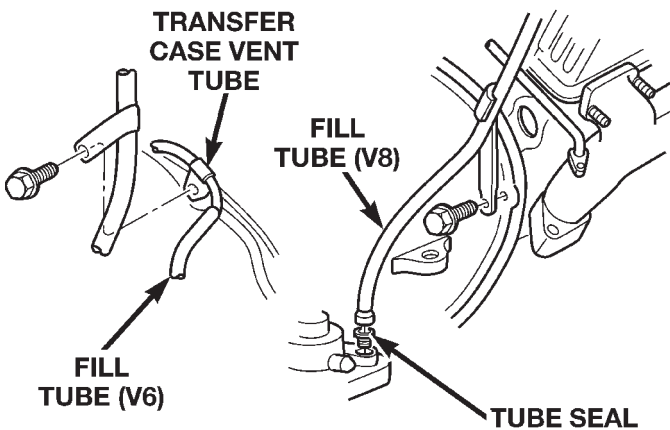
(14) Tighten bolts attaching engine-to-transmission brackets to each side of the engine block.

(15) Lower engine.

(16) Disconnect fluid cooler lines at transmission.

(17) If transmission is being removed for overhaul, remove transmission oil pan, drain fluid and reinstall pan.

(18) Remove fill tube bracket bolts and pull tube out of transmission. Retain fill tube seal. On 4 x 4 models, it will also be necessary to remove bolt attaching transfer case vent tube to converter housing (Fig. 13).



**Fig. 13 Fill Tube Attachment**

(19) Mark torque converter and drive plate for assembly alignment. Note that bolt holes in crankshaft flange, drive plate and torque converter all have one offset hole.

(20) Rotate crankshaft in clockwise direction until converter bolts are accessible. Then remove bolts one at a time. Rotate crankshaft with socket wrench on dampener bolt.

(21) Mark propeller shaft and axle yokes for assembly alignment. Then disconnect and remove propeller shaft.

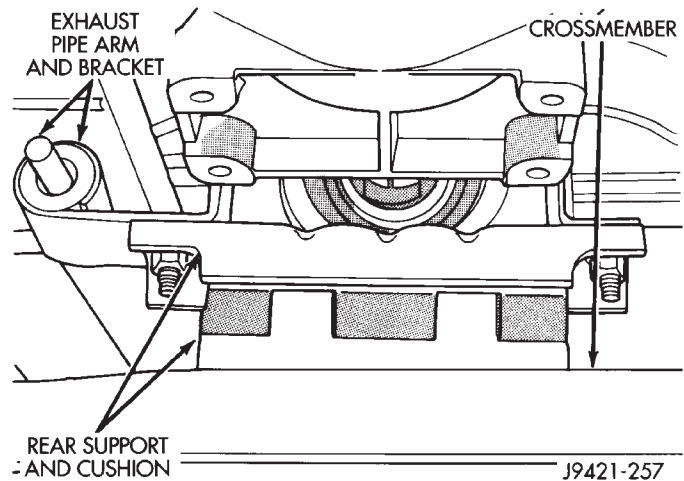
(22) Disconnect wires from park/neutral position switch and transmission solenoid.

(23) Disconnect throttle valve cable from transmission bracket and throttle valve lever.

(24) On 4 x 4 models, disconnect shift rod from transfer case shift lever. Or remove shift lever from transfer case and tie rod and lever to chassis component with wire.

(25) Raise transmission slightly with service jack to relieve load on crossmember and supports.

(26) Remove bolts securing rear support and cushion to transmission and crossmember. Raise transmission slightly, slide exhaust hanger arm from bracket (Fig. 14) and remove rear support.



**Fig. 14 Rear Support Cushion**

(27) Remove bolts attaching crossmember to frame and remove crossmember.

(28) On 4 x 4 models, disconnect vent hose from transfer case. Then remove transfer case with transmission jack or aid of helper.

(29) Remove all converter housing bolts.

(30) Carefully work transmission and torque converter assembly rearward off engine block dowels.

(31) Lower transmission and remove assembly from under the vehicle.

## INSTALLATION

(1) Check torque converter hub and hub drive notches for sharp edges burrs, scratches, or nicks. Polish the hub and notches with 320/400 grit paper and crocus cloth if necessary. The hub must be smooth to avoid damaging pump seal at installation.

(2) Lubricate converter drive hub and oil pump seal lip with transmission fluid.

(3) Lubricate converter pilot hub with transmission fluid.

(4) Align and install converter in oil pump.

(5) Carefully insert converter in oil pump. Then rotate converter back and forth until fully seated in pump gears.

(6) Check converter seating with steel scale and straightedge (Fig. 15). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.

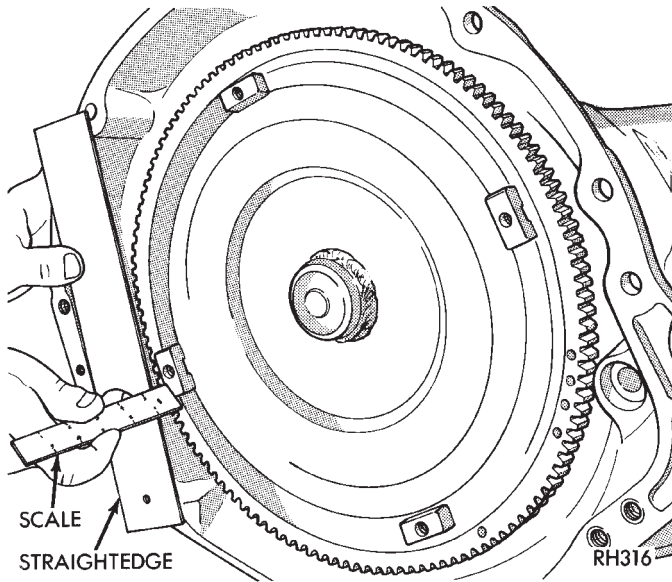
(7) Temporarily secure converter with wedge tool or C-clamp.

(8) Position transmission on jack and secure it with chains.

(9) Check condition of converter driveplate. Replace the plate if cracked, distorted or damaged.



## REMOVAL AND INSTALLATION (Continued)



**Fig. 15 Typical Method Of Checking Converter Seating**

**Also be sure transmission dowel pins are seated in engine block and protrude far enough to held transmission in alignment.**

(10) Raise transmission and align converter with drive plate and converter housing with engine block.

(11) Move transmission forward. Then raise, lower or tilt transmission to align converter housing with engine block dowels.

(12) Rotate converter so alignment marks scribed on converter are aligned with mark on driveplate.

(13) Carefully work transmission forward and over engine block dowels until converter hub is seated in crankshaft.

(14) Install bolts attaching converter housing to engine.

(15) Install rear support. Then lower transmission onto crossmember and install bolts attaching transmission mount to crossmember.

(16) Install new plastic retainer grommet on any shift linkage rod or lever that was disconnected. Grommets should not be reused.

(17) Connect gearshift and throttle cable to transmission.

(18) Connect wires to park/neutral position switch, transmission solenoid(s) and oxygen sensor. Be sure transmission harnesses are properly routed.

**CAUTION:** It is essential that correct length bolts be used to attach the converter to the driveplate. Bolts that are too long will damage the clutch surface inside the converter.

(19) Install torque converter-to-driveplate bolts. Tighten bolts to 31 N·m (270 in. lbs.).

(20) Raise engine slightly.

(21) Loosen bolts attaching engine-to-transmission brackets to each side of the engine block.

(22) Install converter housing access cover.

(23) Install bolts attaching engine-to-transmission brackets to transmission.

(24) Tighten bolts attaching engine-to-transmission brackets to each side of the engine block.

(25) Lower engine.

(26) Install bolt and nut attaching each engine-to-transmission bracket to the motor mounts.

(27) Remove engine support.

(28) Install bolts to hold engine-to-transmission brackets to the front axle, if equipped.

(29) Install starter motor and cooler line bracket.

(30) Connect cooler lines to transmission.

(31) Install transmission fill tube. Install new seal on tube before installation.

(32) Install exhaust components.

(33) Install transfer case, if necessary.

(34) Align and connect propeller shaft(s).

(35) Install rear skid plate, if equipped.

(36) Adjust gearshift linkage and throttle valve cable if necessary.

(37) Install front skid plate, if equipped.

(38) Lower vehicle.

(39) Fill transmission with Mopar® ATF Plus 3, Type 7176 fluid.

## TORQUE CONVERTER

### REMOVAL

(1) Remove transmission and torque converter from vehicle.

(2) Place a suitable drain pan under the converter housing end of the transmission.

**CAUTION:** Verify that transmission is secure on the lifting device or work surface, the center of gravity of the transmission will shift when the torque converter is removed creating an unstable condition.

The torque converter is a heavy unit. Use caution when separating the torque converter from the transmission.

(3) Pull the torque converter forward until the center hub clears the oil pump seal.

(4) Separate the torque converter from the transmission.

### INSTALLATION

Check converter hub and drive notches for sharp edges, burrs, scratches, or nicks. Polish the hub and notches with 320/400 grit paper or crocus cloth if necessary. The hub must be smooth to avoid damaging the pump seal at installation.

(1) Lubricate converter hub and oil pump seal lip with transmission fluid.

## REMOVAL AND INSTALLATION (Continued)

(2) Place torque converter in position on transmission.

**CAUTION:** Do not damage oil pump seal or bushing while inserting torque converter into the front of the transmission.

(3) Align torque converter to oil pump seal opening.

(4) Insert torque converter hub into oil pump.

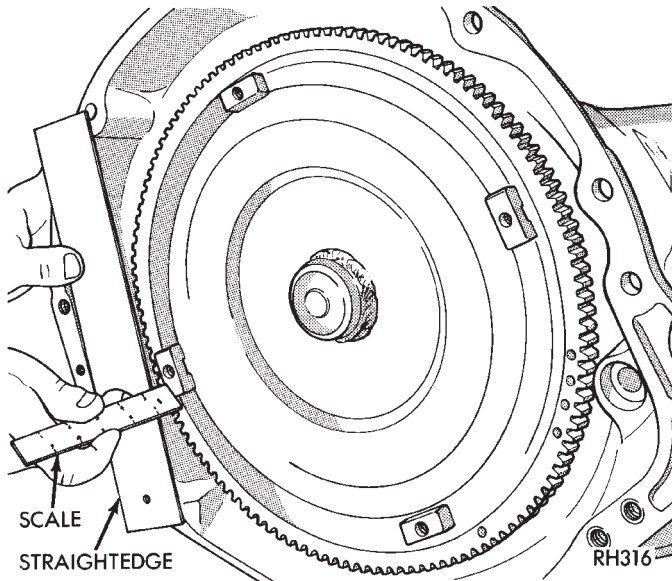
(5) While pushing torque converter inward, rotate converter until converter is fully seated in the oil pump gears.

(6) Check converter seating with a scale and straightedge (Fig. 16). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.

(7) If necessary, temporarily secure converter with C-clamp attached to the converter housing.

(8) Install the transmission in the vehicle.

(9) Fill the transmission with the recommended fluid.



**Fig. 16 Checking Torque Converter Seating**

### YOKE SEAL REPLACEMENT

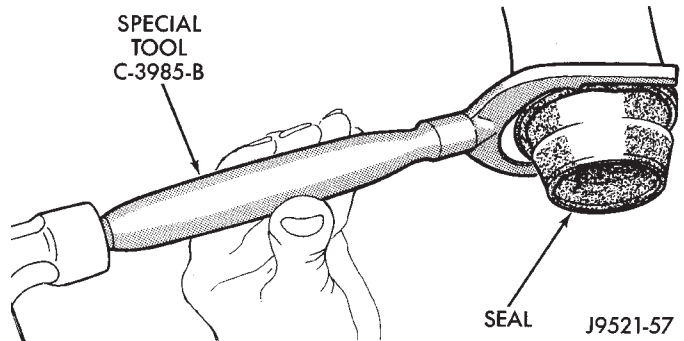
#### REMOVAL

- (1) Raise vehicle.
- (2) Mark propeller shaft and axle yoke for alignment reference.
- (3) Disconnect and remove propeller shaft.
- (4) Remove old seal with Seal Remover C-3985-B (Fig. 17) from overdrive housing.

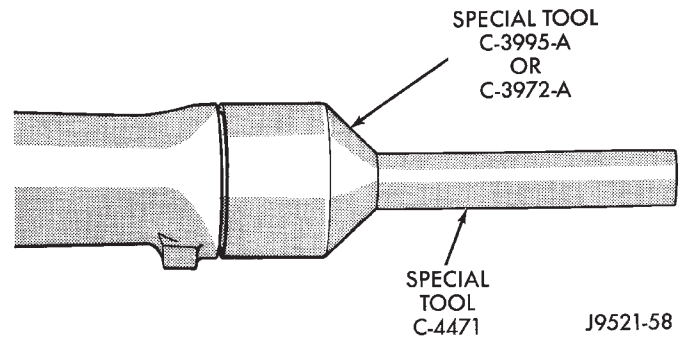
#### INSTALLATION

- (1) Place seal in position on overdrive housing.
- (2) Drive seal into overdrive housing with Seal Installer C-3995-A (Fig. 18).

(3) Carefully guide propeller shaft slip yoke into housing and onto output shaft splines. Align marks made at removal and connect propeller shaft to rear axle pinion yoke.



**Fig. 17 Removing Overdrive Housing Yoke Seal**



**Fig. 18 Installing Overdrive Housing Yoke Seal**

### PARK/NEUTRAL POSITION SWITCH

#### REMOVAL

- (1) Raise vehicle and position drain pan under switch.
- (2) Disconnect switch wires.
- (3) Remove switch from case.

#### INSTALLATION

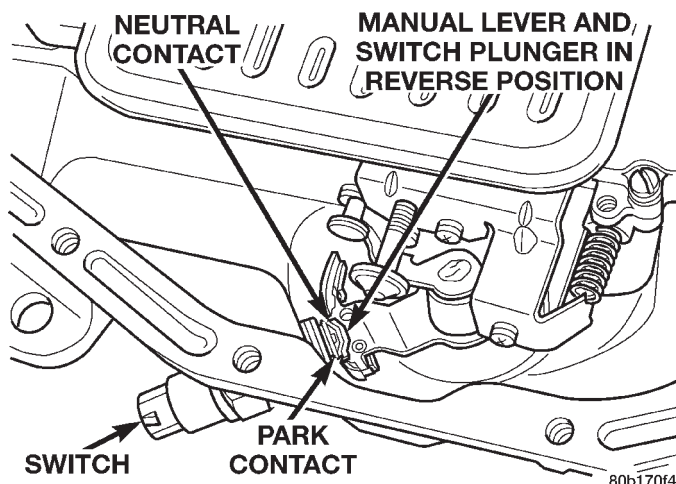
- (1) Move shift lever to Park and Neutral positions. Verify that switch operating lever fingers are centered in switch opening in case (Fig. 19).
- (2) Install new seal on switch and install switch in case. Tighten switch to 34 N-m (25 ft. lbs.) torque.
- (3) Test continuity of new switch with 12V test lamp.
- (4) Connect switch wires and lower vehicle.
- (5) Top off transmission fluid level.

### GEARSHIFT CABLE

#### REMOVAL

- (1) Shift transmission into Park.
- (2) Remove nuts retaining the shift cable housing to the dash panel (Fig. 20).

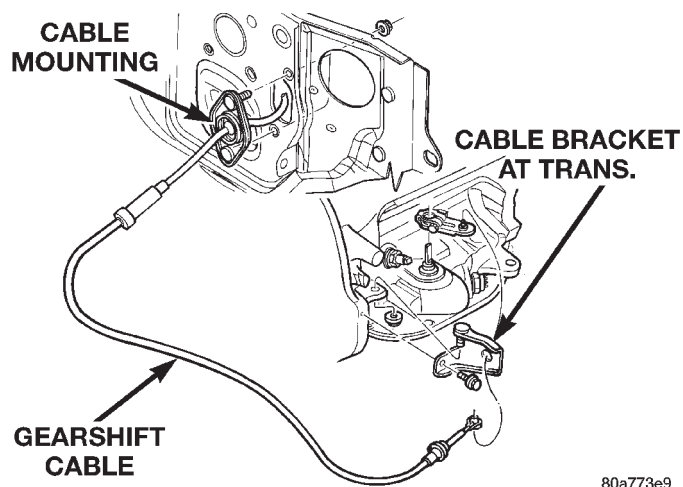
## REMOVAL AND INSTALLATION (Continued)

**Fig. 19 Park/Neutral Position Switch**

(3) Disconnect cable at lower column lever and feed cable through dash panel opening to underside of vehicle (Fig. 21).

(4) Raise vehicle.

(5) Disengage cable eyelet at transmission shift lever and pull cable adjuster out of mounting bracket. Remove old cable from vehicle.

**Fig. 20 Cable Mounting****INSTALLATION**

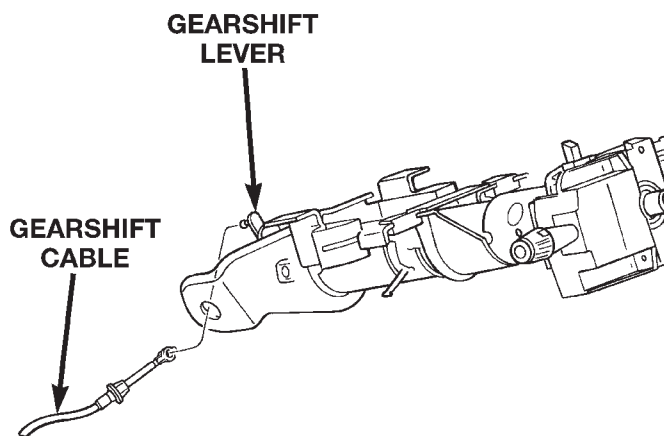
(1) Snap the cable into the transmission bracket so the retaining ears are engaged and connect cable end fitting onto the manual control lever ball stud.

(2) Lower vehicle.

(3) Route cable through hole in dash panel. Seat cable bracket to dash panel. Install retaining nuts to cable housing bracket studs inside the vehicle at the dash panel.

(4) Place the auto transmission manual shift control lever in "Park" detent (rearmost) position and rotate prop shaft to ensure transmission is in park.

(5) Connect shift cable to shifter lever by snapping cable retaining ears into shifter bracket and press cable end fitting into lever.

**Fig. 21 Cable at Gearshift Lever**

(6) Check for proper operation of Park/Neutral switch.

(7) If the gearshift cable is out of adjustment, refer to Adjustments section.

**GOVERNOR SOLENOID AND PRESSURE SENSOR****REMOVAL**

- (1) Hoist and support vehicle on safety stands.
- (2) Remove transmission fluid pan and filter.
- (3) Disengage wire connectors from pressure sensor and solenoid (Fig. 22).
- (4) Remove screws holding pressure solenoid retainer to governor body.
- (5) Separate solenoid retainer from governor (Fig. 23).
- (6) Pull solenoid from governor body (Fig. 24).
- (7) Remove bolts holding governor body to valve body.
- (8) Separate governor body from valve body (Fig. 25).
- (9) Remove governor body gasket.
- (10) Remove retainer holding pressure sensor to governor body.
- (11) Pull pressure sensor from governor body (Fig. 26).

**INSTALLATION**

Before installing the pressure sensor and solenoid in the governor body, replace O-ring seals, clean the gasket surfaces and replace gasket.

(1) Lubricate O-ring on pressure sensor with transmission fluid.

(2) Align pressure sensor to bore in governor body (Fig. 26).

(3) Push pressure sensor into governor body.

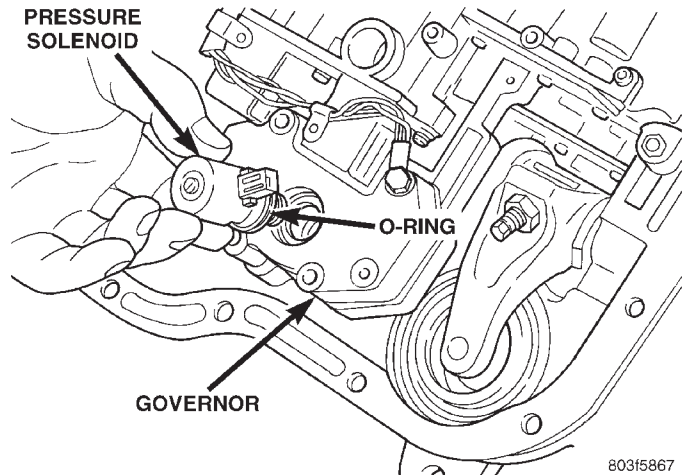
(4) Install retainer to hold pressure sensor to governor body.

(5) Place gasket in position on back of governor body (Fig. 25).

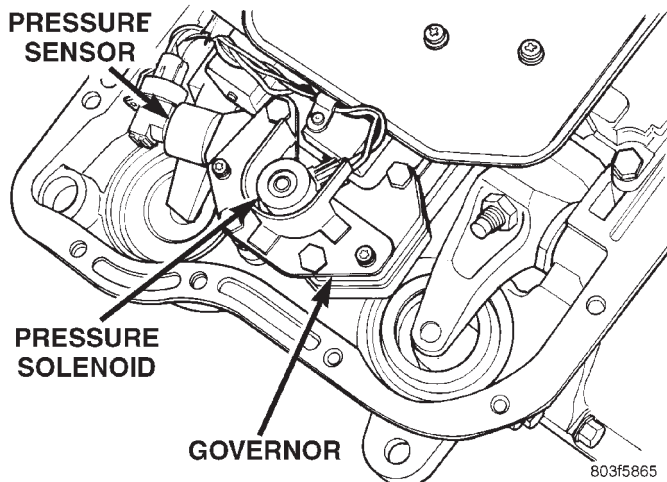


## REMOVAL AND INSTALLATION (Continued)

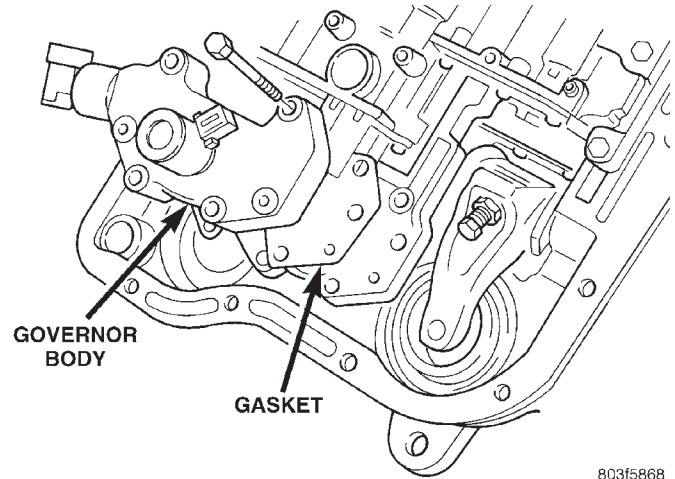
- (6) Place governor body in position on valve body.
- (7) Install bolts to hold governor body to valve body.
- (8) Lubricate O-ring, on pressure solenoid, with transmission fluid.
- (9) Align pressure solenoid to bore in governor body (Fig. 24).
- (10) Push solenoid into governor body.
- (11) Place solenoid retainer in position on governor (Fig. 23).
- (12) Install screws to hold pressure solenoid retainer to governor body.
- (13) Engage wire connectors into pressure sensor and solenoid (Fig. 22).
- (14) Install transmission fluid pan and (new) filter.
- (15) Lower vehicle and road test to verify repair.



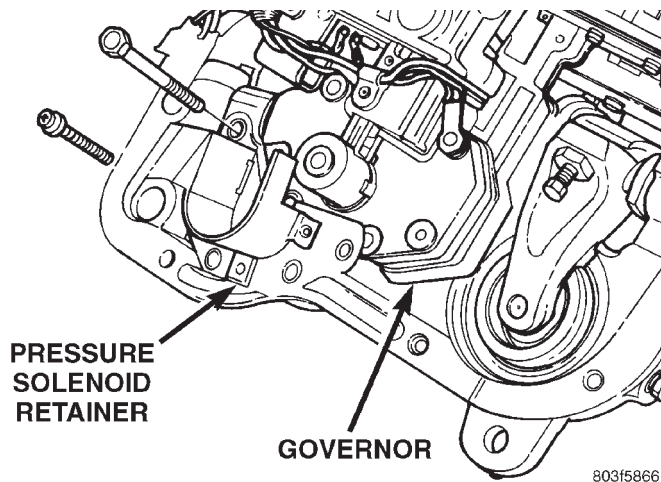
**Fig. 24 Pressure Solenoid and O-ring**



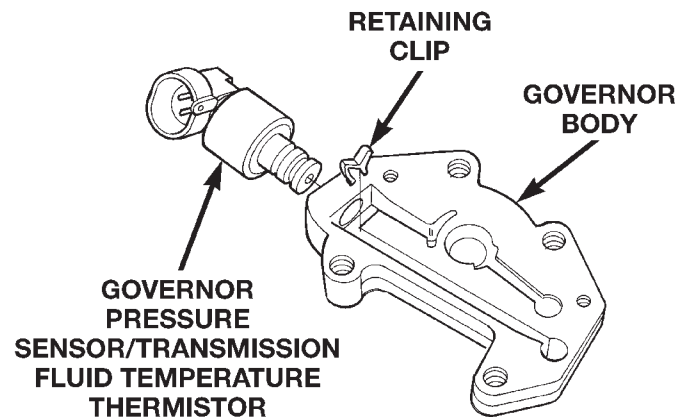
**Fig. 22 Governor Solenoid And Pressure Sensor**



**Fig. 25 Governor Body and Gasket**



**Fig. 23 Pressure Solenoid Retainer**



**Fig. 26 Pressure Sensor and Retainer**

## REMOVAL AND INSTALLATION (Continued)

## VALVE BODY

The valve body can be removed for service without having to remove the transmission assembly.

The valve body can be disassembled for cleaning and inspection of the individual components. Refer to Disassembly and Assembly section for proper procedures.

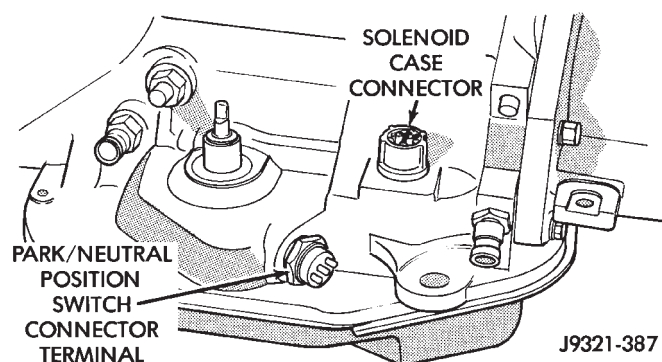
The only replaceable valve body components are:

- Manual lever.
- Manual lever washer, seal, E-clip, and shaft seal.
- Manual lever detent ball.
- Throttle lever.
- Fluid filter.
- Pressure adjusting screw bracket.
- Governor pressure solenoid.
- Governor pressure sensor.
- Converter clutch/overdrive solenoid assembly and harness (includes sump temperature thermistor).
- Governor housing gasket.
- Solenoid case connector O-rings.

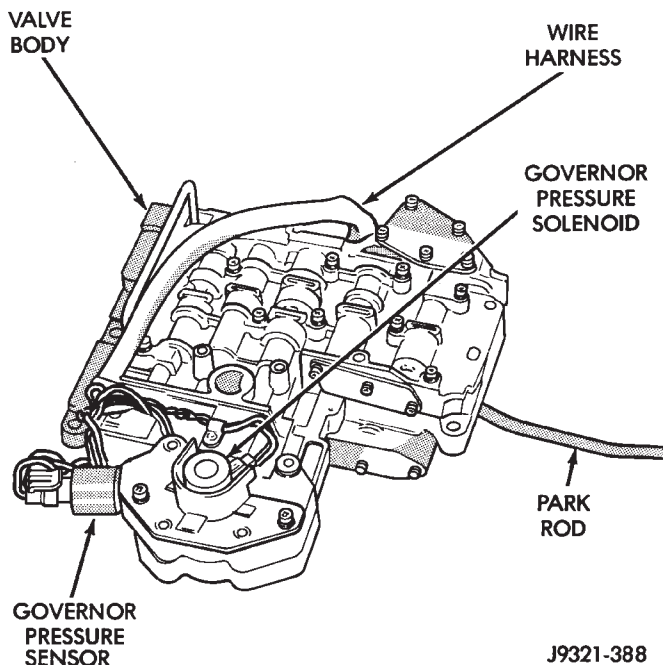
The remaining valve body components are serviced only as part of a complete valve body assembly.

## REMOVAL

- (1) Shift transmission into NEUTRAL.
- (2) Raise vehicle.
- (3) Remove gearshift and throttle levers from shaft of valve body manual lever.
- (4) Disconnect wires at solenoid case connector (Fig. 27).
- (5) Position drain pan under transmission oil pan.
- (6) Remove transmission oil pan and gasket.
- (7) Remove fluid filter from valve body.
- (8) Remove bolts attaching valve body to transmission case.
- (9) Lower valve body enough to remove accumulator piston and springs.
- (10) Work manual lever shaft and electrical connector out of transmission case.
- (11) Lower valve body, rotate valve body away from case, pull park rod out of sprag, and remove valve body (Fig. 28).



**Fig. 27 Transmission Case Connector**



**Fig. 28 Valve Body**

## INSTALLATION

- (1) Check condition of O-ring seals on valve body harness connector (Fig. 29). Replace seals on connector body if cut or worn.
- (2) Check condition of manual lever shaft seal in transmission case. Replace seal if lip is cut or worn. Install new seal with 15/16 deep well socket (Fig. 30).
- (3) Check condition of seals on accumulator piston (Fig. 31). Install new piston seals, if necessary.
- (4) Place valve body manual lever in low (1 position) so ball on park lock rod will be easier to install in sprag.
- (5) Lubricate shaft of manual lever with petroleum jelly. This will ease inserting shaft through seal in case.
- (6) Lubricate seal rings on valve body harness connector with petroleum jelly.
- (7) Position valve body in case and work end of park lock rod into and through pawl sprag. Turn propeller shaft to align sprag and park lock teeth if necessary. The rod will click as it enters pawl. Move rod to check engagement.

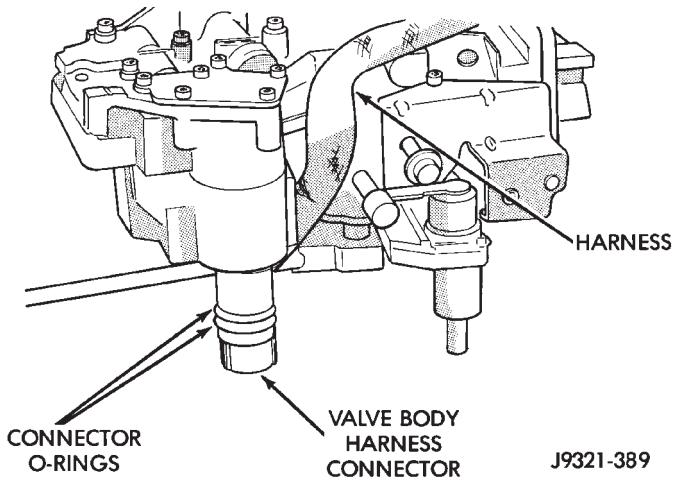
**CAUTION:** It is possible for the park rod to displace into a cavity just above the pawl sprag during installation. Make sure the rod is actually engaged in the pawl and has not displaced into this cavity.

- (8) Install accumulator springs and piston into case. Then swing valve body over piston and outer spring to hold it in place.
- (9) Align accumulator piston and outer spring, manual lever shaft and electrical connector in case.

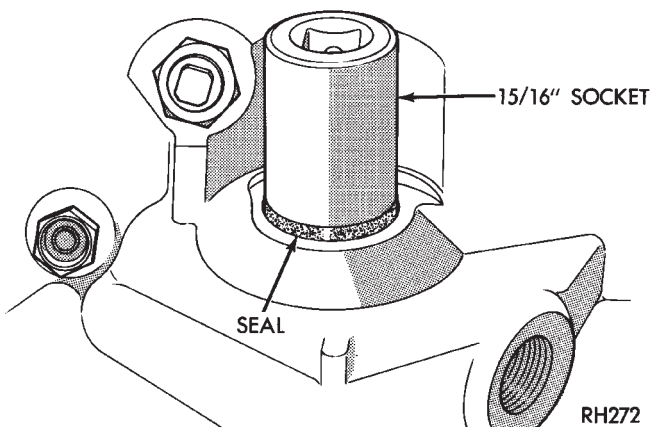


## REMOVAL AND INSTALLATION (Continued)

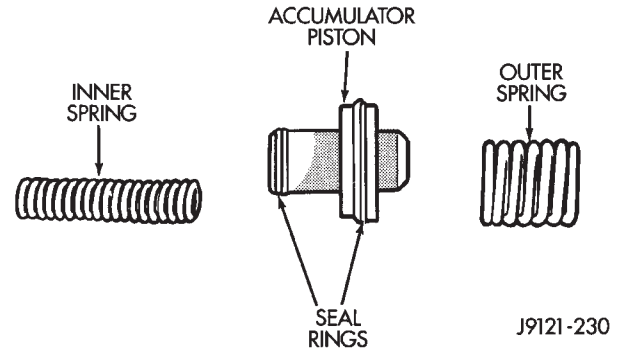
- (10) Then seat valve body in case and install one or two bolts to hold valve body in place.
- (11) Tighten valve body bolts alternately and evenly to 11 N·m (100 in. lbs.) torque.
- (12) Install new fluid filter on valve body. Tighten filter screws to 4 N·m (35 in. lbs.) torque.
- (13) Install throttle and gearshift levers on valve body manual lever shaft.
- (14) Check and adjust front and rear bands if necessary.
- (15) Connect solenoid case connector wires.
- (16) Install oil pan and new gasket. Tighten pan bolts to 17 N·m (13 ft. lbs.) torque.
- (17) Lower vehicle and fill transmission with Mopar® ATF Plus 3, type 7176 fluid.
- (18) Check and adjust gearshift and throttle valve cables, if necessary.



**Fig. 29 Valve Body Harness Connector O-Ring Seal**



**Fig. 30 Manual Lever Shaft Seal**



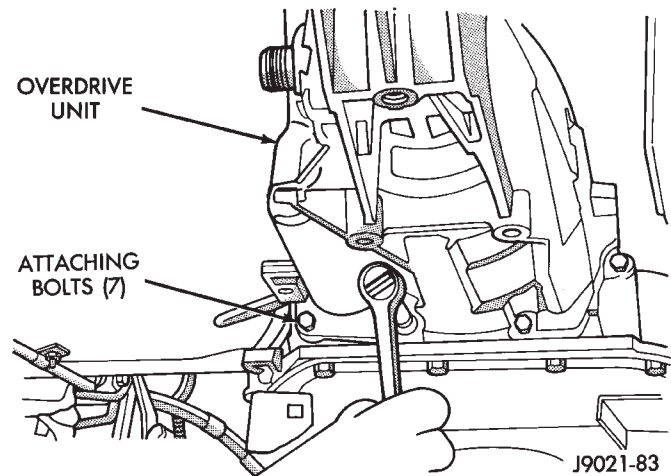
**Fig. 31 Accumulator Piston Components**

## OVERDRIVE UNIT

### REMOVAL

- (1) Shift transmission into Park.
- (2) Raise vehicle.
- (3) Mark propeller shaft universal joint(s) and axle pinion yoke for alignment reference at installation.
- (4) Disconnect and remove propeller shaft(s).
- (5) Remove transmission oil pan, remove gasket, drain oil and reinstall pan.
- (6) If overdrive unit had malfunctioned, or if fluid is contaminated, remove entire transmission. If diagnosis indicated overdrive problems only, remove just the overdrive unit.
- (7) Support transmission with transmission jack.
- (8) Remove bolts attaching overdrive unit to transmission (Fig. 32).

**CAUTION:** Support the overdrive unit with a jack before moving it rearward. This is necessary to prevent damaging the intermediate shaft. Do not allow the shaft to support the entire weight of the overdrive unit.



**Fig. 32 Overdrive Unit Bolts**

## REMOVAL AND INSTALLATION (Continued)

(9) Carefully work overdrive unit off intermediate shaft. Do not tilt unit during removal. Keep it as level as possible.

(10) If overdrive unit does not require service, immediately insert Alignment Tool 6227-2 in splines of planetary gear and overrunning clutch to prevent splines from rotating out of alignment. If misalignment occurs, overdrive unit will have to be disassembled in order to realign splines.

(11) Remove and retain overdrive piston thrust bearing. Bearing may remain on piston or in clutch hub during removal.

(12) Position drain pan on workbench.

(13) Place overdrive unit over drain pan. Tilt unit to drain residual fluid from case.

(14) Examine fluid for clutch material or metal fragments. If fluid contains these items, overhaul will be necessary.

(15) If overdrive unit does not require any service, leave alignment tool in position. Tool will prevent accidental misalignment of planetary gear and overrunning clutch splines.

## INSTALLATION

(1) Be sure overdrive unit Alignment Tool 6227-2 is fully seated before moving unit. If tool is not seated and gear splines rotate out of alignment, overdrive unit will have to be disassembled in order to realign splines.

(2) If overdrive piston retainer was not removed during service and original case gasket is no longer reusable, prepare new gasket by trimming it.

(3) Cut out old case gasket around piston retainer with razor knife (Fig. 33).

(4) Use old gasket as template and trim new gasket to fit.

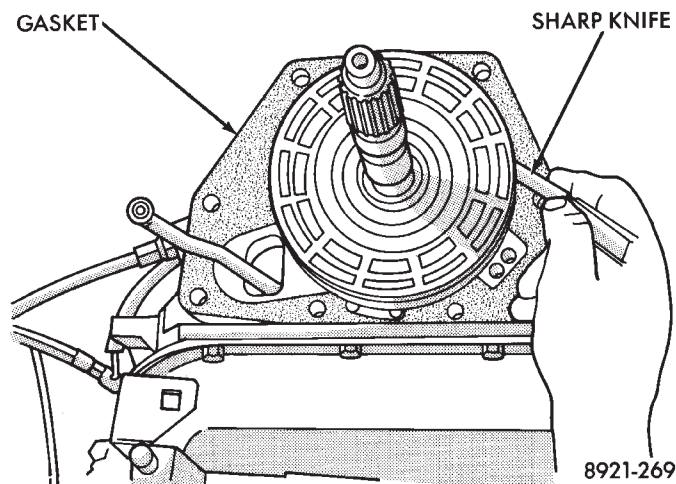
(5) Position new gasket over piston retainer and on transmission case. Use petroleum jelly to hold gasket in place if necessary. Do not use any type of sealer to secure gasket. Use petroleum jelly only.

(6) Install selective spacer on intermediate shaft, if removed. Spacer goes in groove just rearward of shaft rear splines (Fig. 34).

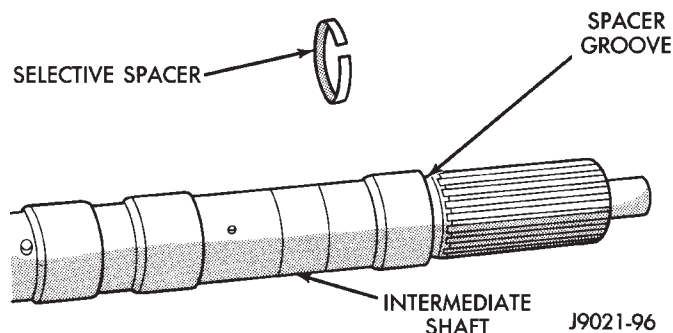
(7) Install thrust bearing in overdrive unit sliding hub. Use petroleum jelly to hold bearing in position.

**CAUTION:** Be sure the shoulder on the inside diameter of the bearing is facing forward.

(8) Verify that splines in overdrive planetary gear and overrunning clutch hub are aligned with Alignment Tool 6227-2. Overdrive unit cannot be installed if splines are not aligned. If splines have rotated out of alignment, unit will have to be disassembled to realign splines.



**Fig. 33 Trimming Overdrive Case Gasket**



**Fig. 34 Intermediate Shaft Selective Spacer Location**

(9) Carefully slide Alignment Tool 6227-2 out of overdrive planetary gear and overrunning clutch splines.

(10) Raise overdrive unit and carefully slide it straight onto intermediate shaft. Insert park rod into park lock reaction plug at same time. Avoid tilting overdrive during installation as this could cause planetary gear and overrunning clutch splines to rotate out of alignment. If this occurs, it will be necessary to remove and disassemble overdrive unit to realign splines.

(11) Work overdrive unit forward on intermediate shaft until seated against transmission case.

(12) Install bolts attaching overdrive unit to transmission unit. Tighten bolts in diagonal pattern to 34 N·m (25 ft-lbs).

(13) Align and install propeller shaft(s).

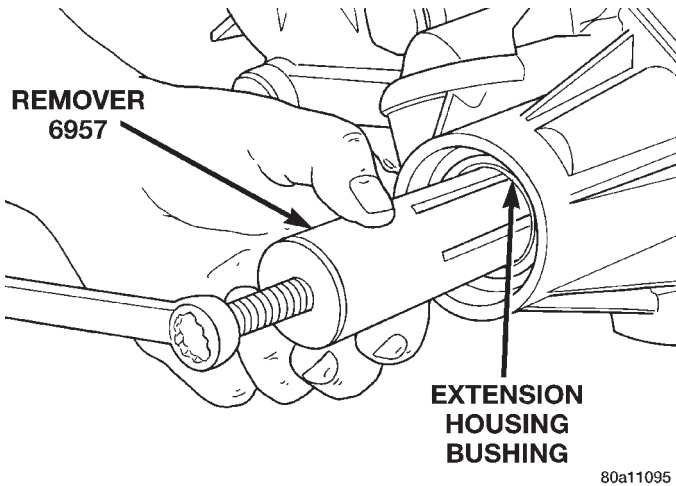
## OVERDRIVE HOUSING BUSHING

## REMOVAL

(1) Remove overdrive housing yoke seal.

(2) Insert Remover 6957 into overdrive housing. Tighten tool to bushing and remove bushing (Fig. 35).

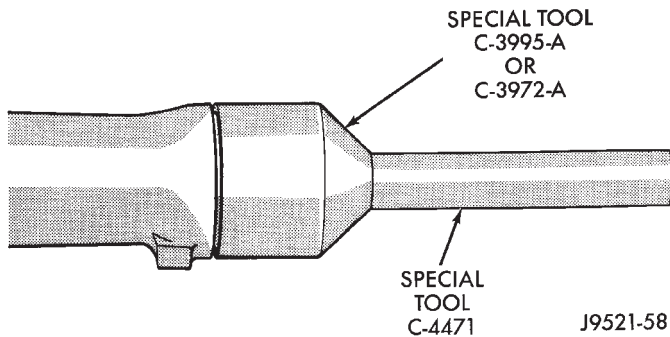
## REMOVAL AND INSTALLATION (Continued)



**Fig. 35 Bushing Removal—Typical**

### INSTALLATION

- (1) Align bushing oil hole with oil slot in overdrive housing.
- (2) Tap bushing into place with Installer 6951 and Handle C-4171.
- (3) Install new oil seal in housing using Seal Installer C-3995-A (Fig. 36).



**Fig. 36 Overdrive Housing Seal Installation**

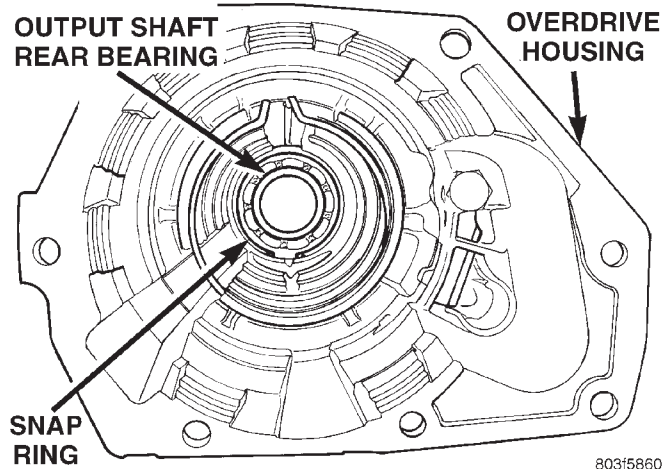
### OUTPUT SHAFT REAR BEARING

#### REMOVAL

- (1) Remove overdrive unit from the vehicle.
- (2) Remove overdrive geartrain from housing.
- (3) Remove snap ring holding output shaft rear bearing into overdrive housing (Fig. 37).
- (4) Using a suitable driver inserted through the rear end of housing, drive bearing from housing.

#### INSTALLATION

- (1) Place replacement bearing in position in housing.
- (2) Using a suitable driver, drive bearing into housing until the snap ring groove is visible.
- (3) Install snap ring to hold bearing into housing (Fig. 37).
- (4) Install overdrive geartrain into housing.
- (5) Install overdrive unit in vehicle.



**Fig. 37 Output Shaft Rear Bearing**

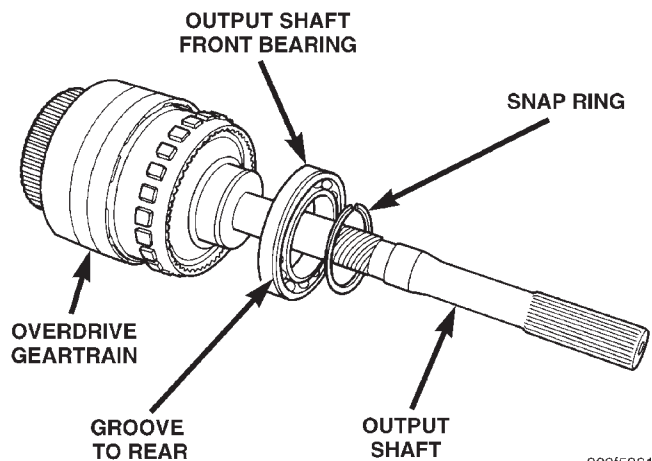
### OUTPUT SHAFT FRONT BEARING

#### REMOVAL

- (1) Remove overdrive unit from the vehicle.
- (2) Remove overdrive geartrain from housing.
- (3) Remove snap ring holding output shaft front bearing to overdrive geartrain. (Fig. 38).
- (4) Pull bearing from output shaft.

#### INSTALLATION

- (1) Place replacement bearing in position on geartrain with locating retainer groove toward the rear.
- (2) Push bearing onto shaft until the snap ring groove is visible.
- (3) Install snap ring to hold bearing onto output shaft (Fig. 38).
- (4) Install overdrive geartrain into housing.
- (5) Install overdrive unit in vehicle.



**Fig. 38 Output Shaft Front Bearing**



## DISASSEMBLY AND ASSEMBLY

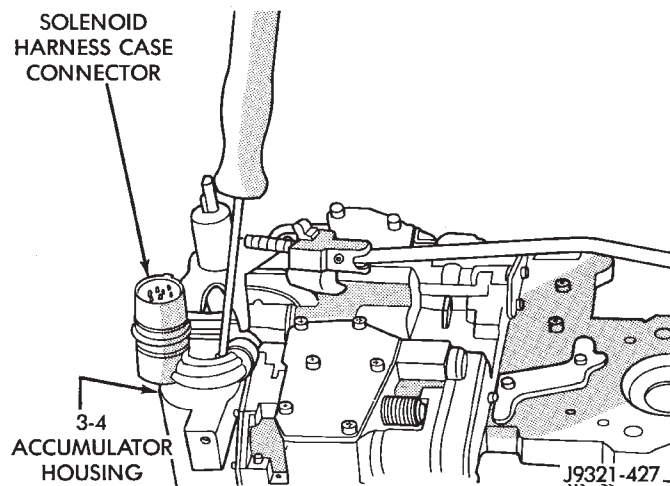
## VALVE BODY

Remove the valve body from the transmission, refer to Removal and Installation procedures section in this group.

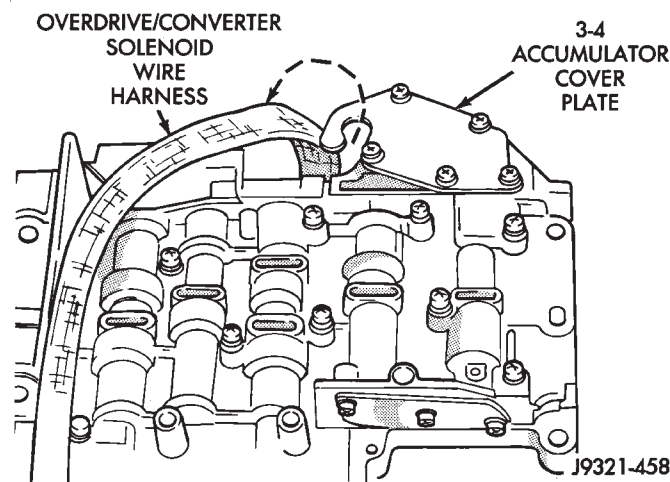
## DISASSEMBLY

**CAUTION:** Do not clamp any valve body component in a vise. This practice can damage the component resulting in unsatisfactory operation after assembly and installation. Do not use pliers to remove any of the valves, plugs or springs and do not force any of the components out or into place. The valves and valve body housings will be damaged if force is used. Tag or mark the valve body springs for reference as they are removed. Do not allow them to become intermixed.

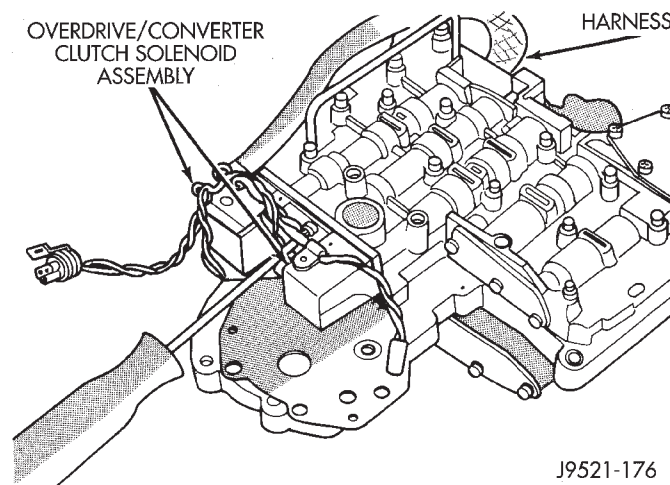
- (1) Remove fluid filter.
- (2) Disconnect wires from governor pressure sensor and solenoid.
- (3) Remove screws attaching governor body and retainer plate to transfer plate.
- (4) Remove retainer plate, governor body and gasket from transfer plate.
- (5) Disconnect wires from governor pressure sensor, if not done previously.
- (6) Remove governor pressure sensor from governor body. Sensor is retained in body with M-shaped spring clip. Remove clip with small pointed tool and slide sensor out of body.
- (7) Remove governor pressure solenoid by pulling it straight out of bore in governor body. Remove and discard solenoid O-rings if worn, cut, or torn.
- (8) Remove small shoulder bolt that secures solenoid harness case connector to 3-4 accumulator housing (Fig. 39). **Retain shoulder bolt. Either tape it to harness or thread it back into accumulator housing after connector removal.**
- (9) Unhook overdrive/converter solenoid harness from 3-4 accumulator cover plate (Fig. 40).
- (10) Turn valve body over and remove screws that attach overdrive/converter solenoid assembly to valve body (Fig. 41).
- (11) Remove solenoid and harness assembly from valve body (Fig. 42).
- (12) Remove boost valve cover (Fig. 43).
- (13) Remove boost valve retainer, valve spring and boost valve (Fig. 44).



**Fig. 39 Solenoid Harness Case Connector Shoulder Bolt**

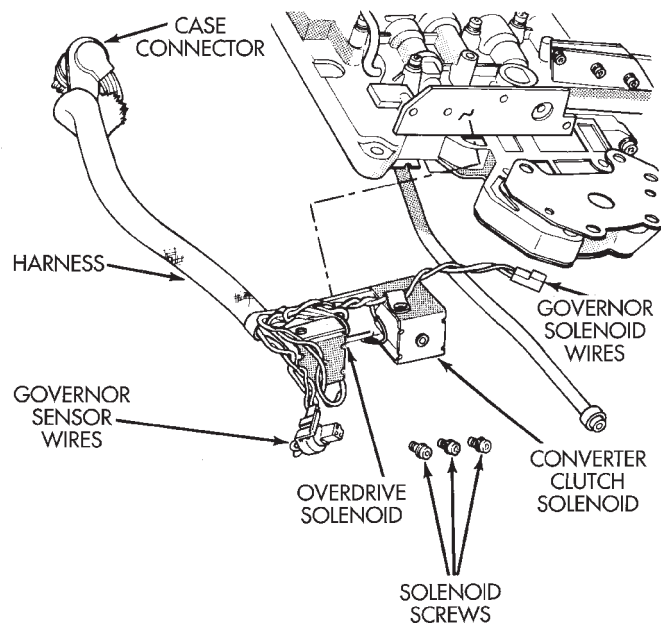


**Fig. 40 Unhooking Solenoid Harness From Accumulator Cover Plate**



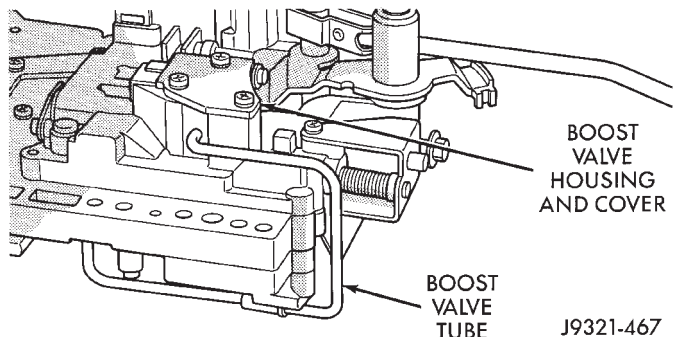
**Fig. 41 Solenoid Assembly Screws**

# DISASSEMBLY AND ASSEMBLY (Continued)

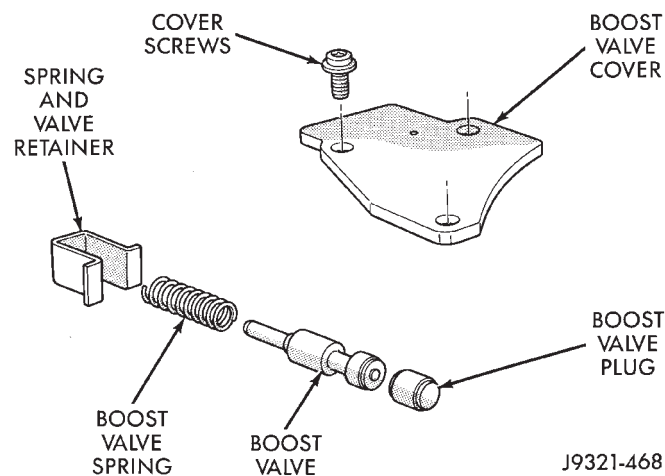


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**Fig. 42 Solenoid Assembly**



**Fig. 43 Boost Valve Cover Location**



J9321-468

**Fig. 44 Boost Valve Components**

(14) Secure detent ball and spring with Retainer Tool 6583 (Fig. 45).

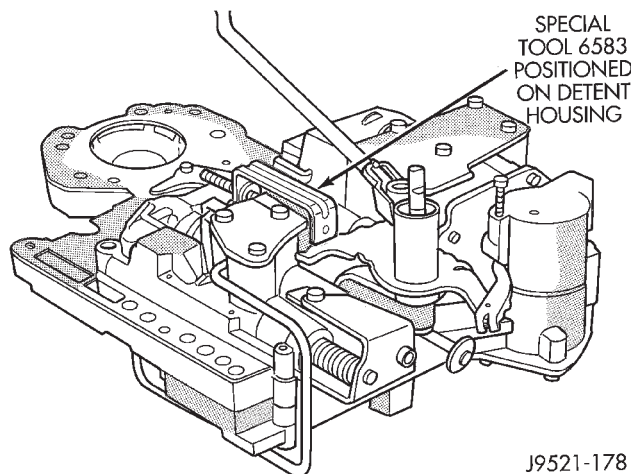
(15) Remove park rod E-clip and separate rod from manual lever (Fig. 46).

(16) Remove E-clip and washer that retains throttle lever shaft in manual lever (Fig. 47).

(17) Remove manual lever and throttle lever (Fig. 48). Rotate and lift manual lever off valve body and throttle lever shaft. Then slide throttle lever out of valve body.

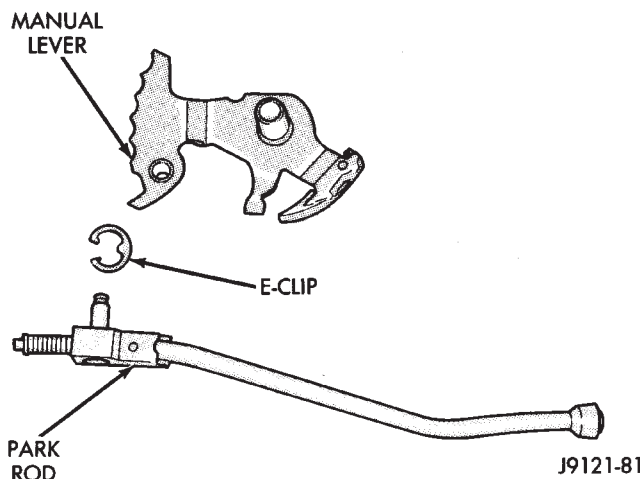
(18) Position pencil magnet next to detent housing to catch detent ball and spring. Then carefully remove Retainer Tool 6583 and remove detent ball and spring (Fig. 49).

(19) Remove screws attaching pressure adjusting screw bracket to valve body and transfer plate (Fig. 50). Hold bracket firmly against spring tension while removing last screw.



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**Fig. 45 Detent Ball And Spring**



**Fig. 46 Park Rod**



## DISASSEMBLY AND ASSEMBLY (Continued)

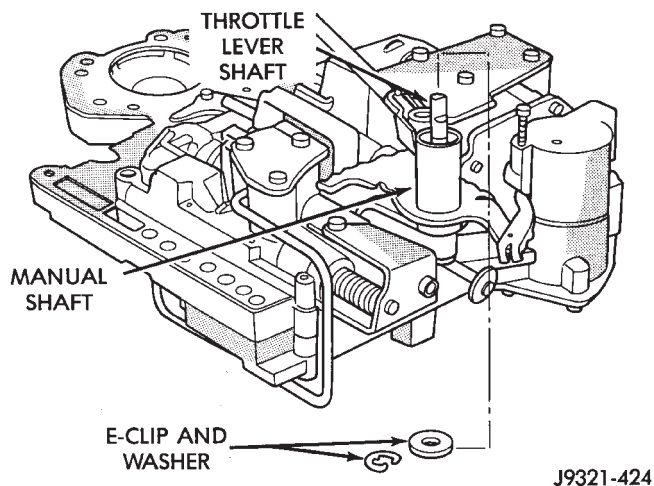


Fig. 47 Throttle Lever E-Clip And Washer

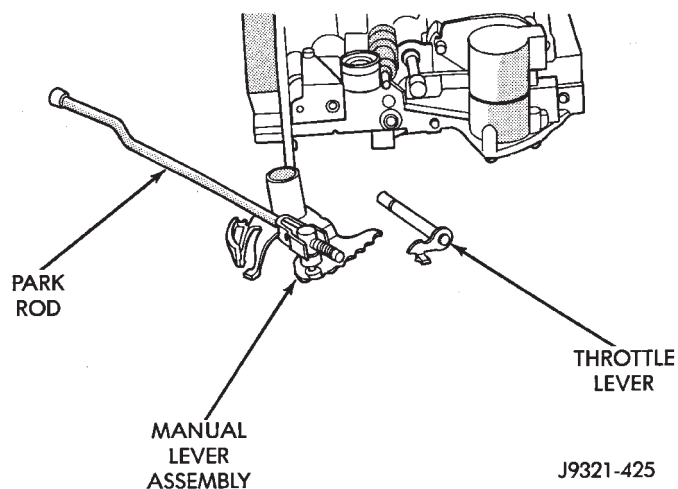


Fig. 48 Manual And Throttle Lever

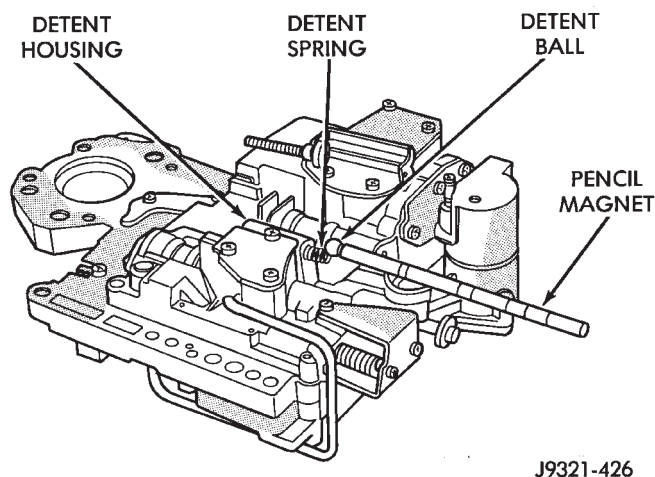


Fig. 49 Detent Ball And Spring

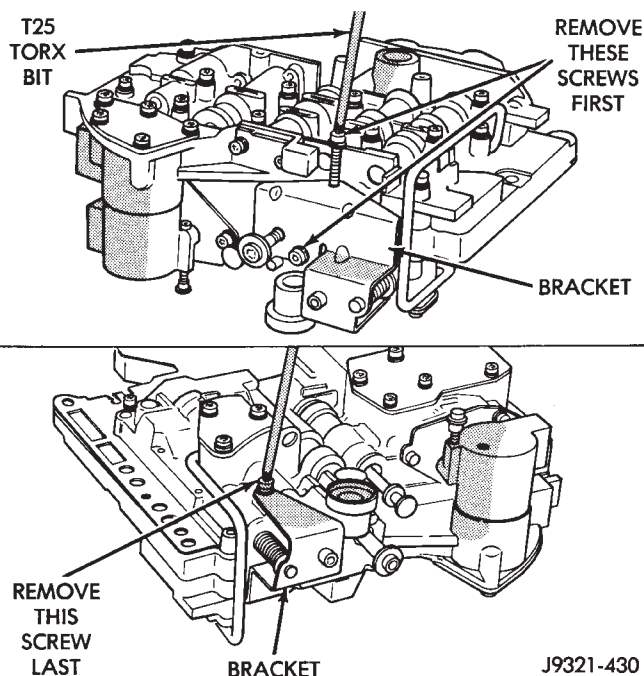


Fig. 50 Adjusting Screw Bracket Fastener

(20) Remove adjusting screw bracket, line pressure adjusting screw, pressure regulator valve spring and switch valve spring (Fig. 51). **Do not remove throttle pressure adjusting screw from bracket and do not disturb setting of either adjusting screw during removal.**

(21) Turn upper housing over and remove switch valve, regulator valve and spring, and manual valve (Fig. 52).

(22) Remove kickdown detent, kickdown valve, and throttle valve and spring (Fig. 52).

(23) Loosen left-side 3-4 accumulator housing attaching screw about 2-3 threads. Then remove center and right-side housing attaching screws (Fig. 53).

(24) Carefully rotate 3-4 accumulator housing upward and remove 3-4 shift valve spring and converter clutch valve plug and spring (Fig. 54).

(25) Remove left-side screw and remove 3-4 accumulator housing from valve body (Fig. 55).

(26) Bend back tabs on boost valve tube brace (Fig. 56).

## DISASSEMBLY AND ASSEMBLY (Continued)

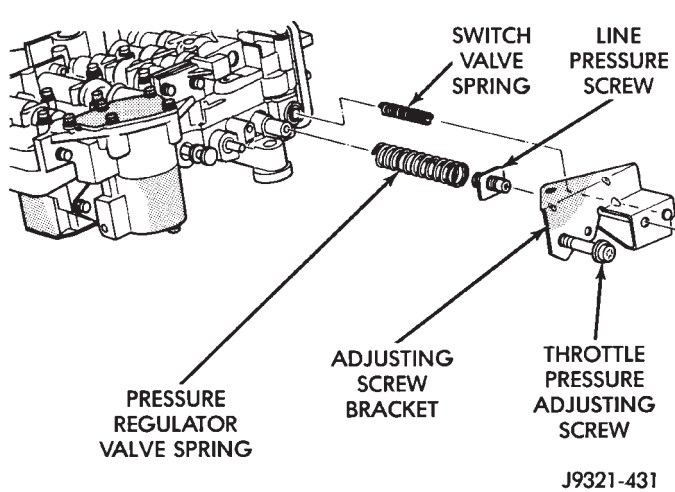


Fig. 51 Adjusting Screw Bracket And Spring

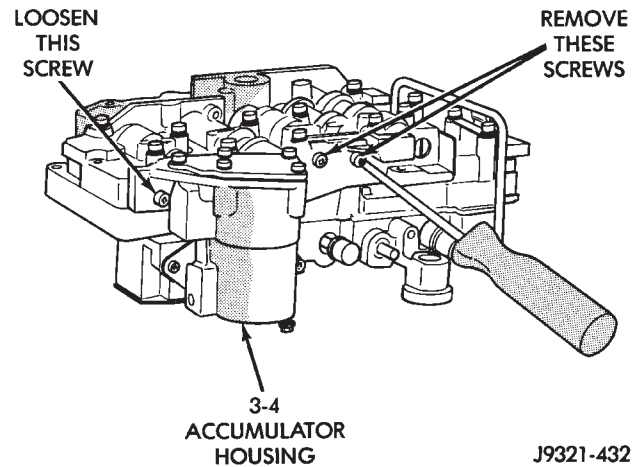


Fig. 53 Accumulator Housing Screw Locations

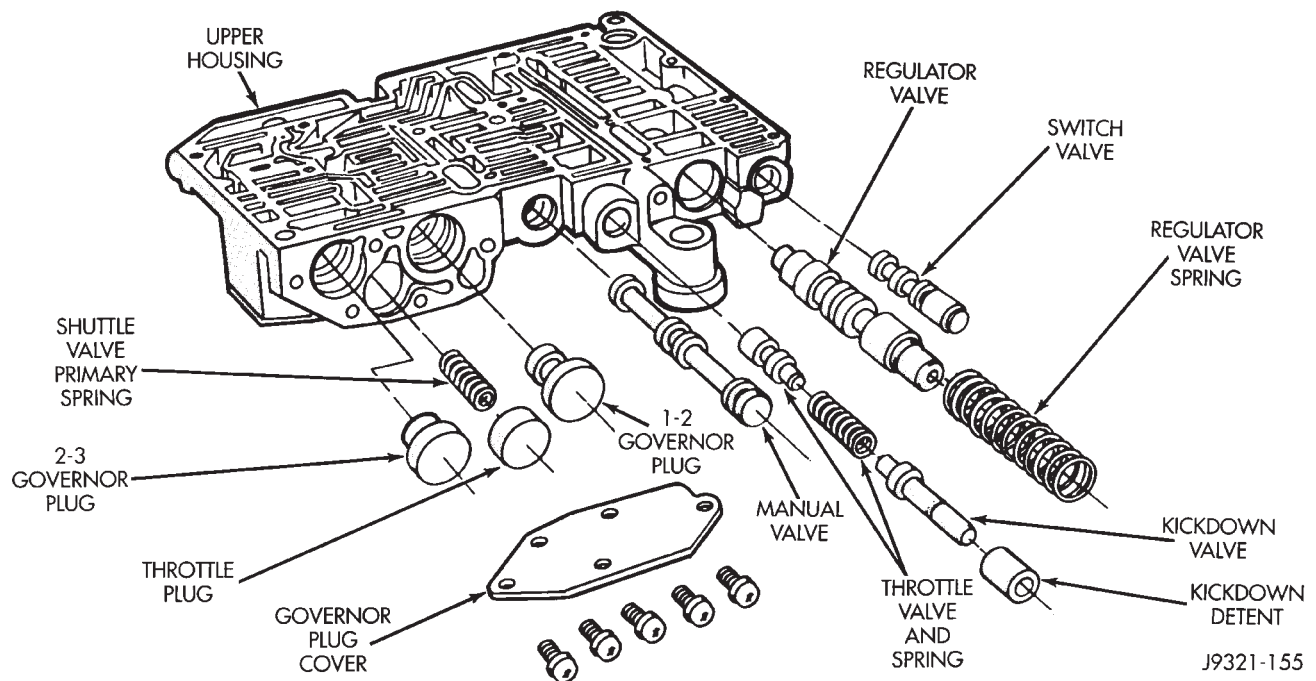
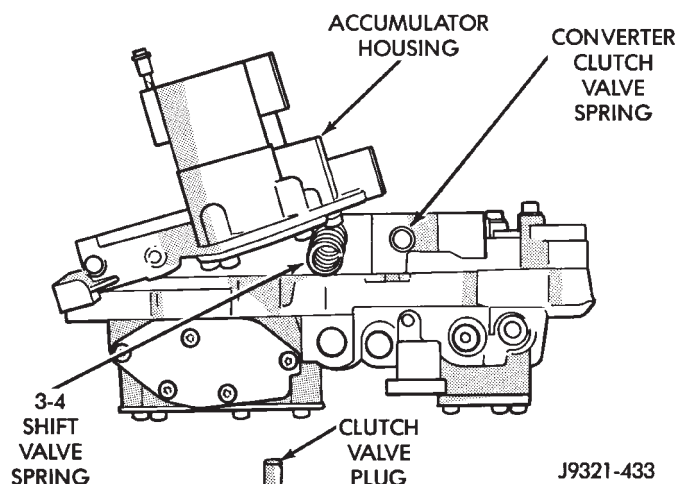
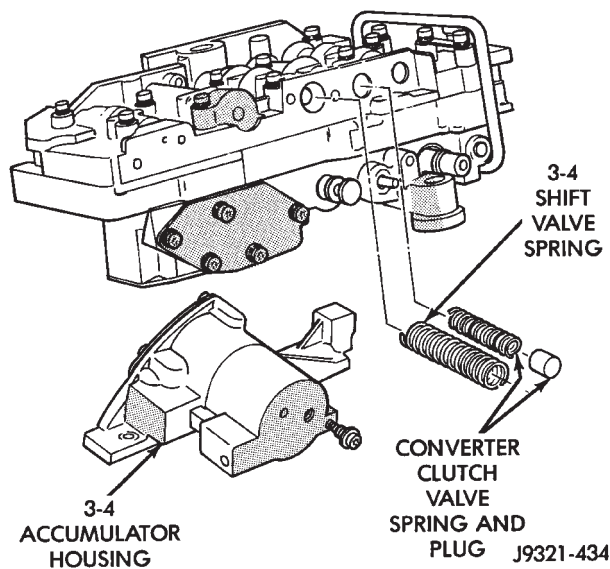


Fig. 52 Upper Housing Control Valve Locations

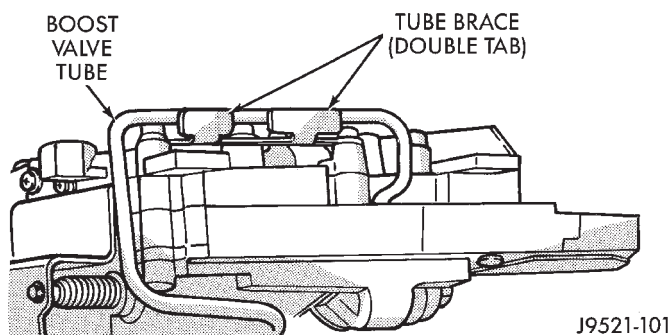
## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 54 3-4 Shift And Converter Clutch Valve Springs And Plug**



**Fig. 55 Accumulator Housing, Valve Springs And Plug**



**Fig. 56 Boost Valve Tube Brace**

(27) Remove boost valve connecting tube (Fig. 57). Disengage tube from upper housing port first. Then rock opposite end of tube back and forth to work it out of lower housing.

**CAUTION:** Do not use tools to loosen or pry the connecting tube out of the valve body housings. Loosen and remove the tube by hand only.

(28) Turn valve body over so lower housing is facing upward (Fig. 58). In this position, the two check balls in upper housing will remain in place and not fall out when lower housing and separator plate are removed.

(29) Remove screws attaching valve body lower housing to upper housing and transfer plate (Fig. 58). **Note position of boost valve tube brace for assembly reference.**

(30) Remove lower housing and overdrive separator plate from transfer plate (Fig. 58).

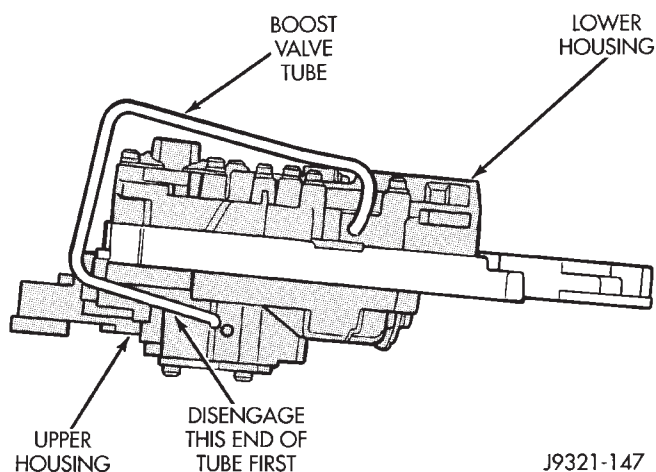
(31) Remove the ECE check ball from the transfer plate (Fig. 59). The ECE check ball is approximately 4.8 mm (3/16 in.) in diameter.

(32) Remove transfer plate from upper housing (Fig. 60).

(33) Turn transfer plate over so upper housing separator plate is facing upward.

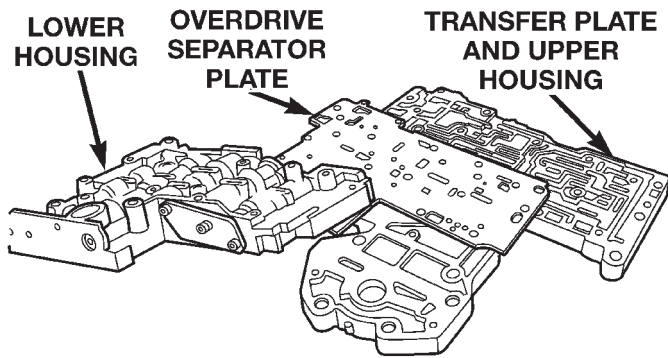
(34) Remove upper housing separator plate from transfer plate (Fig. 61). Note position of filter in separator plate for assembly reference.

(35) Remove rear clutch and rear servo check balls from transfer plate. Note check ball location for assembly reference (Fig. 62).

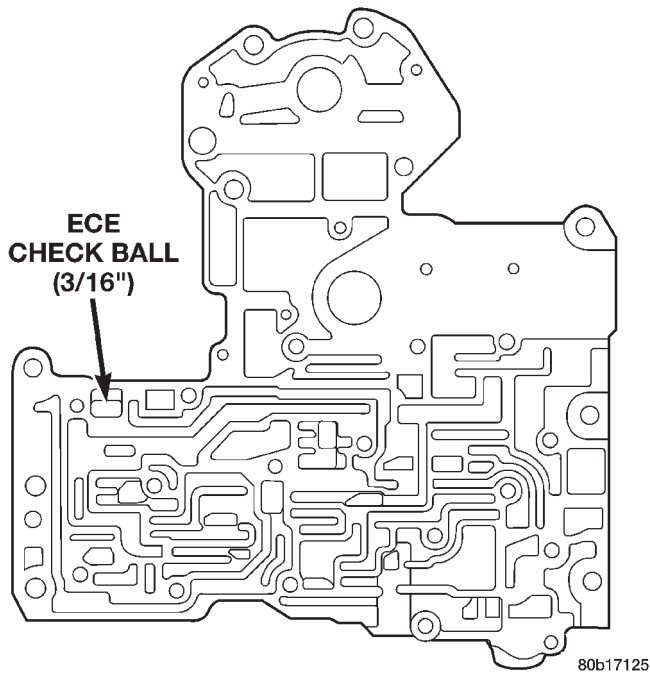


**Fig. 57 Boost Valve Tube**

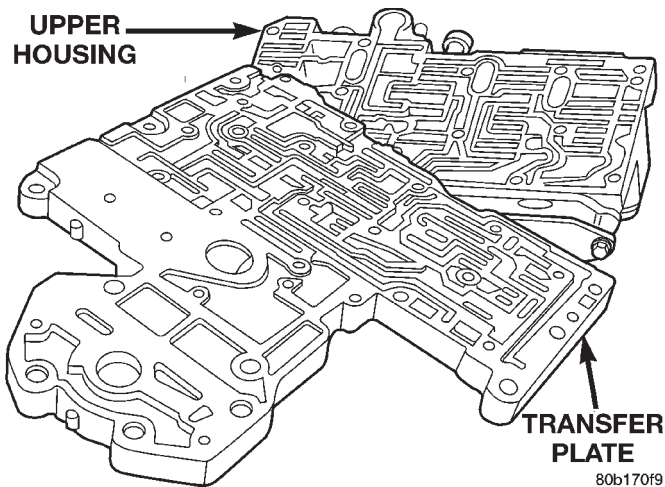
DISASSEMBLY AND ASSEMBLY (Continued)



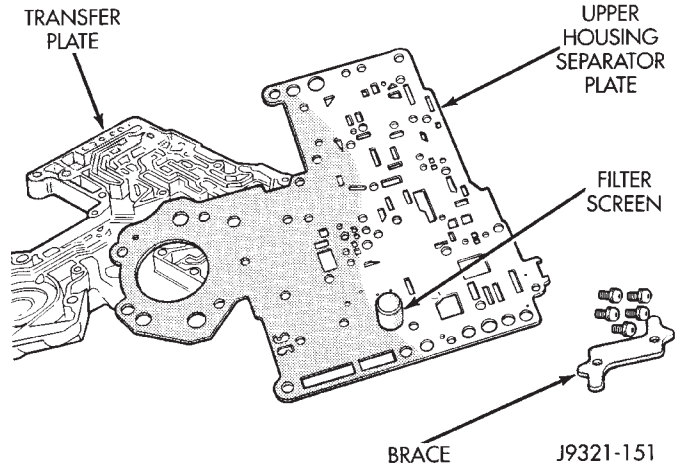
**Fig. 58 Lower Housing**



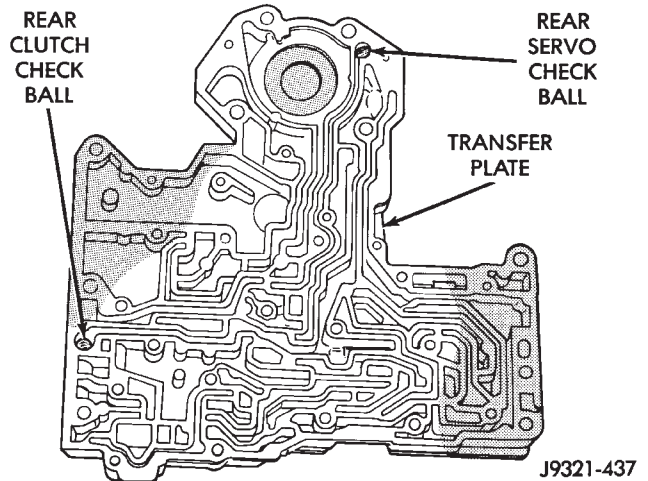
**Fig. 59 ECE Check Ball**



**Fig. 60 Transfer Plate**



**Fig. 61 Upper Housing Separator Plate**



**Fig. 62 Rear Clutch And Rear Servo Check Ball Locations**

**VALVE BODY UPPER HOUSING**

- (1) Note location of check balls in valve body upper housing (Fig. 63). Then remove the one large diameter and the six smaller diameter check balls.
- (2) Remove governor plug and shuttle valve covers (Fig. 65).
- (3) Remove E-clip that secures shuttle valve secondary spring on valve stem (Fig. 64).
- (4) Remove throttle plug, primary spring, shuttle valve, secondary spring, and spring guides (Fig. 65).
- (5) Remove boost valve retainer, spring and valve if not previously removed.
- (6) Remove throttle plug and 1-2 and 2-3 governor plugs (Fig. 52).
- (7) Turn upper housing around and remove limit valve and shift valve covers (Fig. 66).
- (8) Remove limit valve housing. Then remove retainer, spring, limit valve, and 2-3 throttle plug from limit valve housing (Fig. 66).
- (9) Remove 1-2 shift control valve and spring (Fig. 66).
- (10) Remove 1-2 shift valve and spring (Fig. 66).

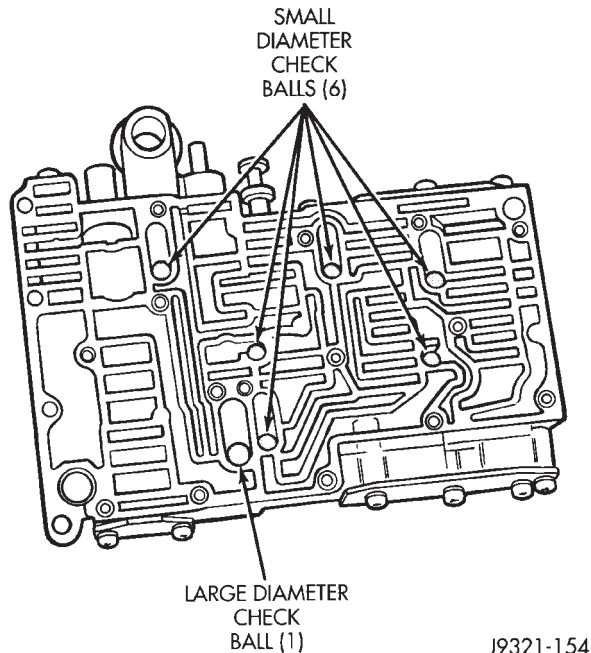


## DISASSEMBLY AND ASSEMBLY (Continued)

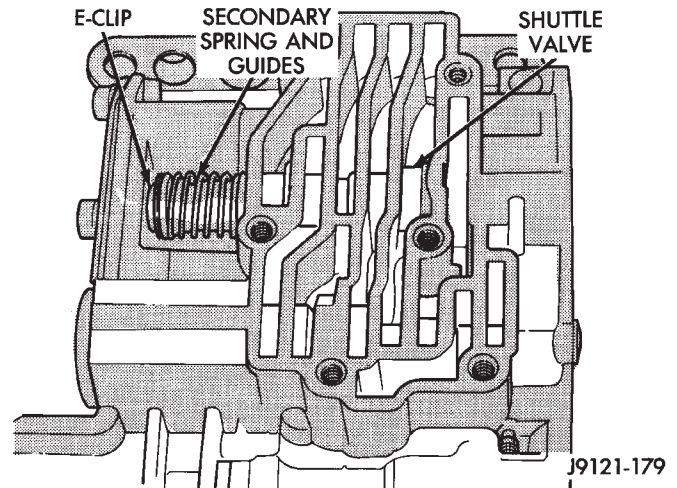
(11) Remove 2-3 shift valve and spring from valve body (Fig. 66).

(12) Remove pressure plug cover (Fig. 66).

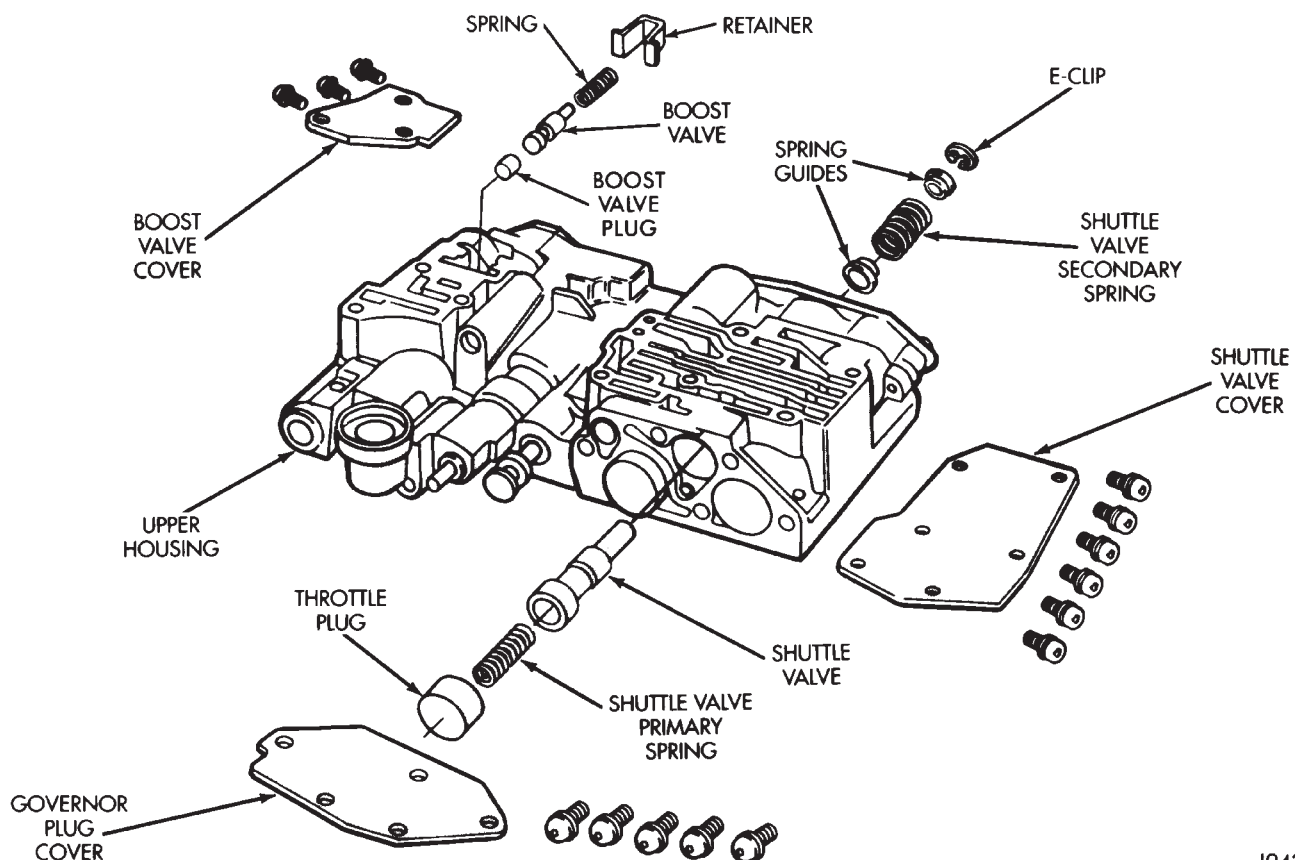
(13) Remove line pressure plug, sleeve, throttle pressure plug and spring (Fig. 66).



**Fig. 63 Check Ball Locations In Upper Housing**



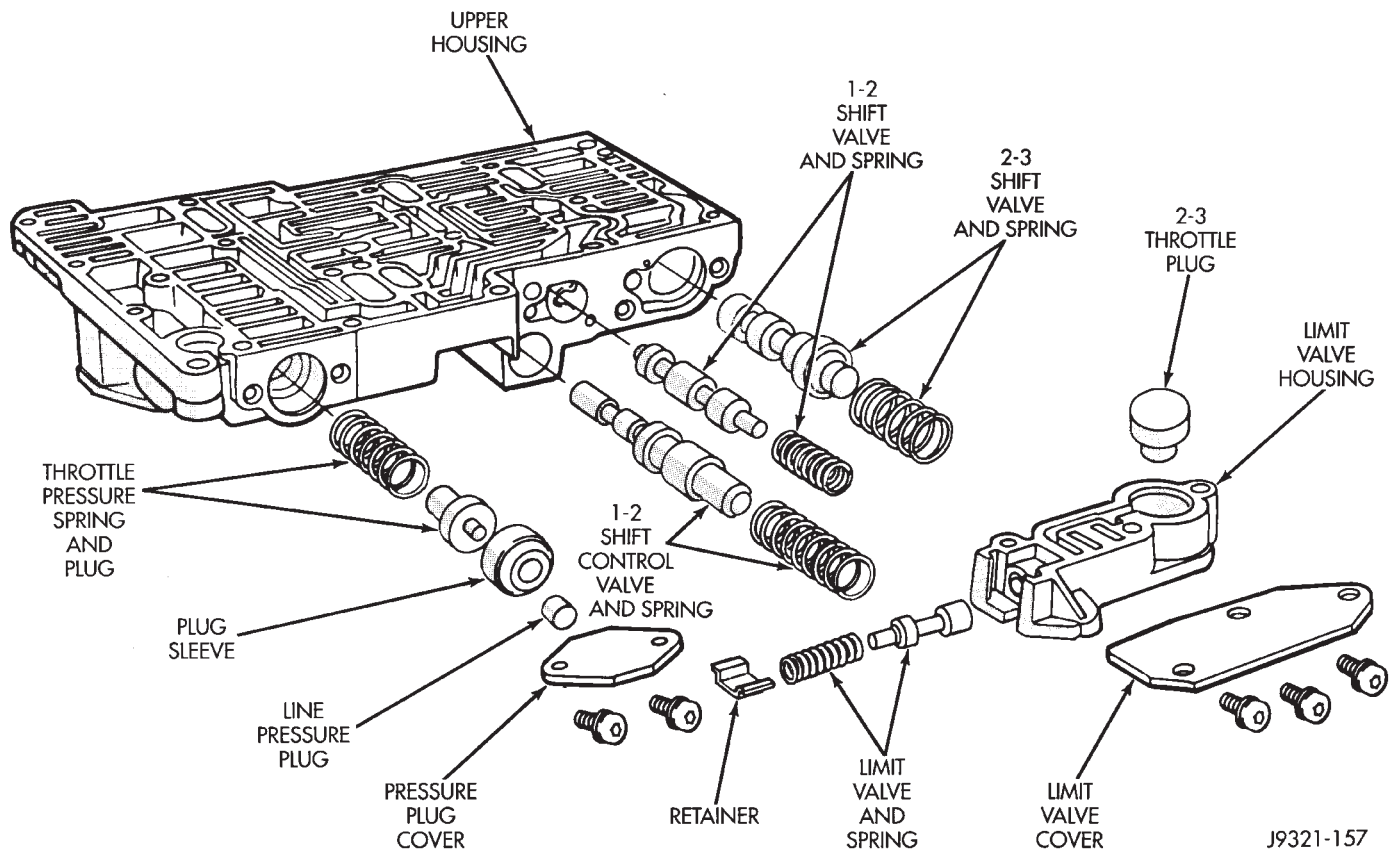
**Fig. 64 Shuttle Valve E-Clip And Secondary Spring Location**



**Fig. 65 Shuttle And Boost Valve Components**



# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 66 Upper Housing Shift Valve And Pressure Plug Locations**

## VALVE BODY LOWER HOUSING

- (1) Remove timing valve cover.
- (2) Remove 3-4 timing valve and spring.
- (3) Remove 3-4 quick fill valve, spring and plug.
- (4) Remove 3-4 shift valve and spring.
- (5) Remove converter clutch valve, spring and plug (Fig. 67).
- (6) Remove converter clutch timing valve, retainer and valve spring.

## 3-4 ACCUMULATOR HOUSING

- (1) Remove end plate from housing.
- (2) Remove piston spring.
- (3) Remove piston. Remove and discard piston seals (Fig. 68).

## ASSEMBLY

**CAUTION:** Do not force valves or plugs into place during reassembly. If the valve body bores, valves and plugs are free of distortion or burrs, the valve body components should all slide into place easily. In addition, do not overtighten the transfer plate

and valve body screws during reassembly. Overtightening can distort the housings resulting in valve sticking, cross leakage and unsatisfactory operation. Tighten valve body screws to recommended torque only.

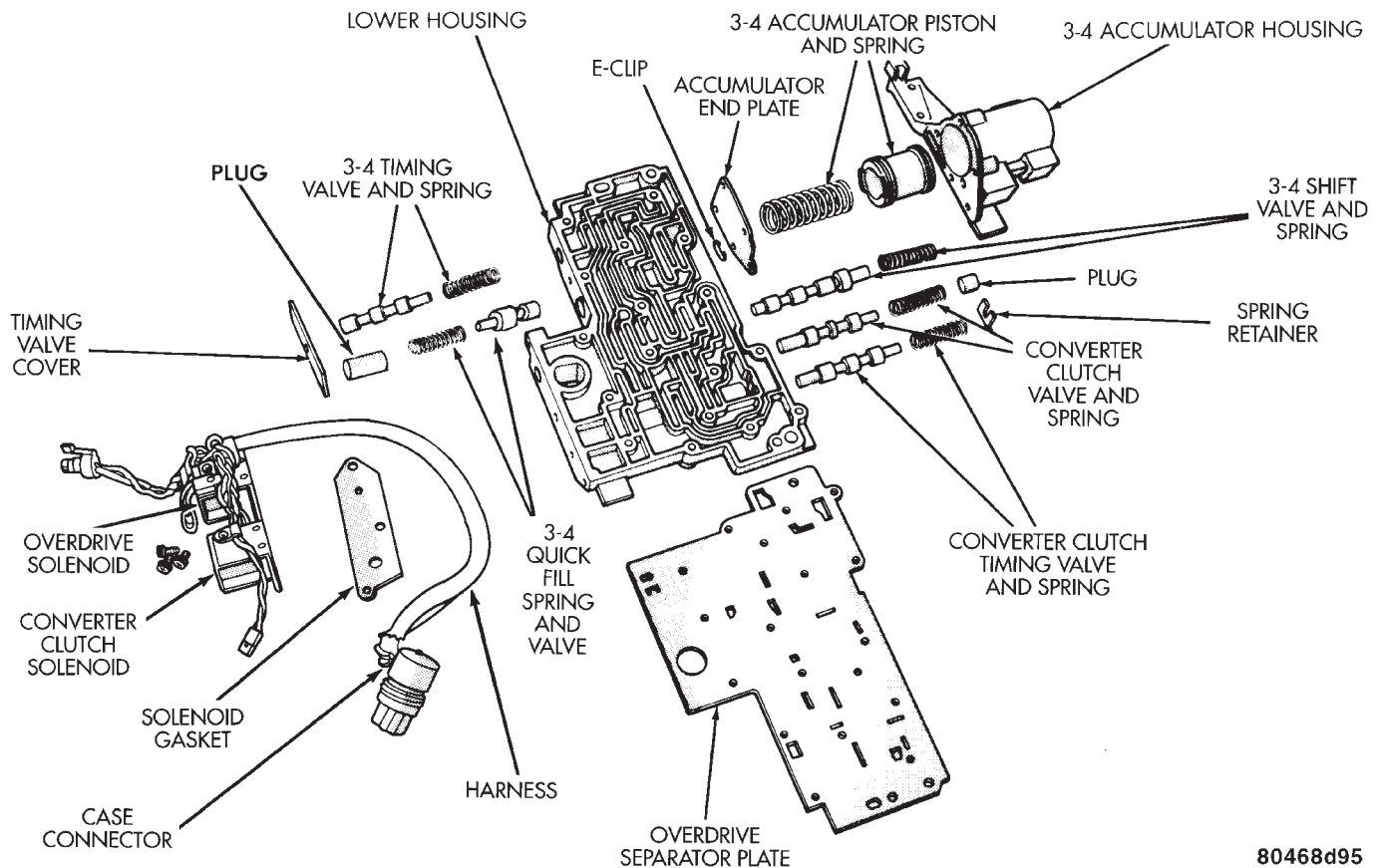
## LOWER HOUSING

- (1) Lubricate valves, springs, and the housing valve and plug bores with clean transmission fluid (Fig. 67).
- (2) Install 3-4 timing valve spring and valve in lower housing.
- (3) Install 3-4 quick fill valve in lower housing.
- (4) Install 3-4 quick fill valve spring and plug in housing.
- (5) Install timing valve end plate. Tighten end plate screws to 4 N·m (35 in. lbs.) torque.

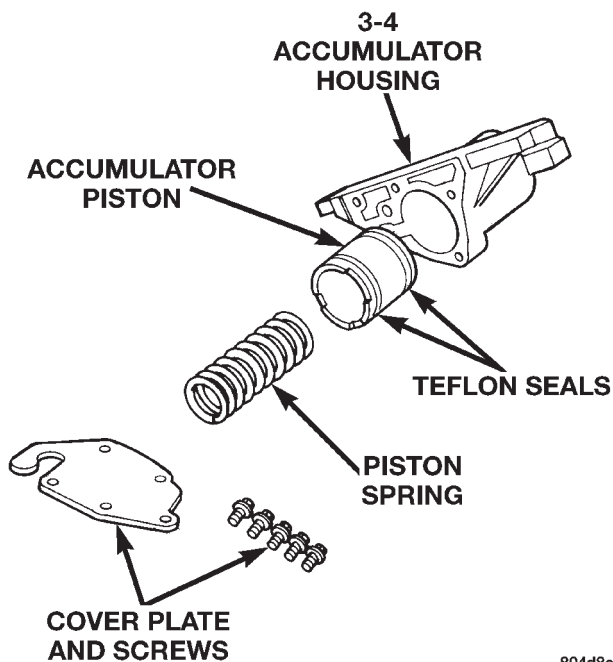
## 3-4 ACCUMULATOR

- (1) Lubricate accumulator piston, seals and housing piston bore with clean transmission fluid (Fig. 68).
- (2) Install new seal rings on accumulator piston.
- (3) Install piston and spring in housing.
- (4) Install end plate on housing.

## DISASSEMBLY AND ASSEMBLY (Continued)



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**Fig. 67 Lower Housing Shift Valves And Springs**

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**Fig. 68 Accumulator Housing Components****TRANSFER PLATE**

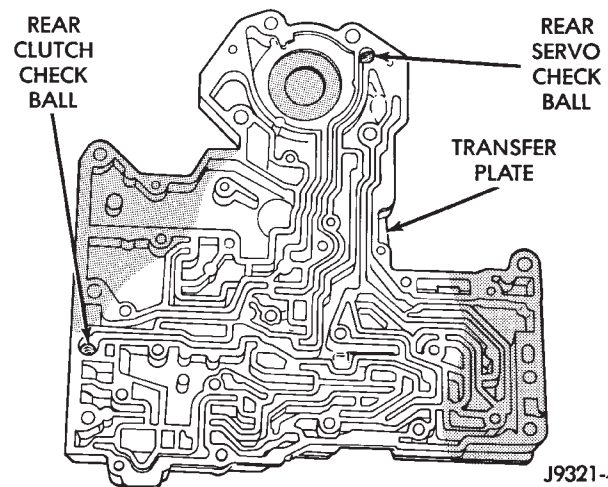
(1) Install rear clutch and rear servo check balls in transfer plate (Fig. 69).

(2) Install filter screen in upper housing separator plate (Fig. 70).

(3) Align and position upper housing separator plate on transfer plate (Fig. 71).

(4) Install brace plate (Fig. 71). Tighten brace attaching screws to 4 N·m (35 in. lbs.) torque.

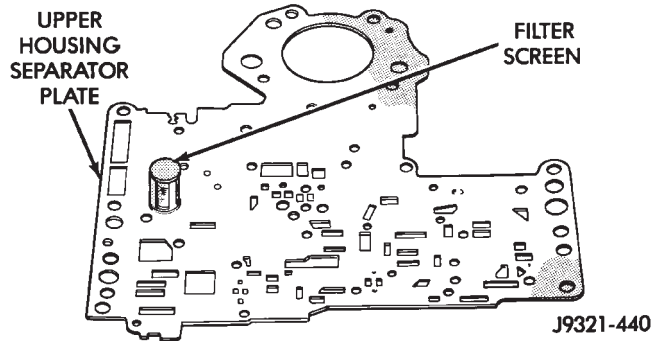
(5) Install remaining separator plate attaching screws. Tighten screws to 4 N·m (35 in. lbs.) torque.



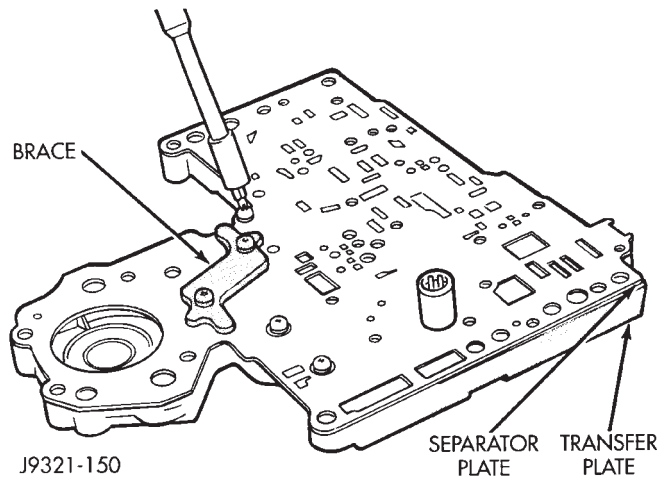
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**Fig. 69 Rear Clutch And Rear Servo Check Ball Locations**

# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 70 Separator Plate Filter Screen Installation**



**Fig. 71 Brace Plate**

## UPPER AND LOWER HOUSING

(1) Position upper housing so internal passages and check ball seats are facing upward. Then install check balls in housing (Fig. 72). Seven check balls are used. The single large check ball is approximately 8.7 mm (11/32 in.) diameter. The single small check ball is approximately 4.8 mm (3/16 in.) in diameter. The remaining 6 check balls are approximately 6.3 mm (1/4 in.) in diameter.

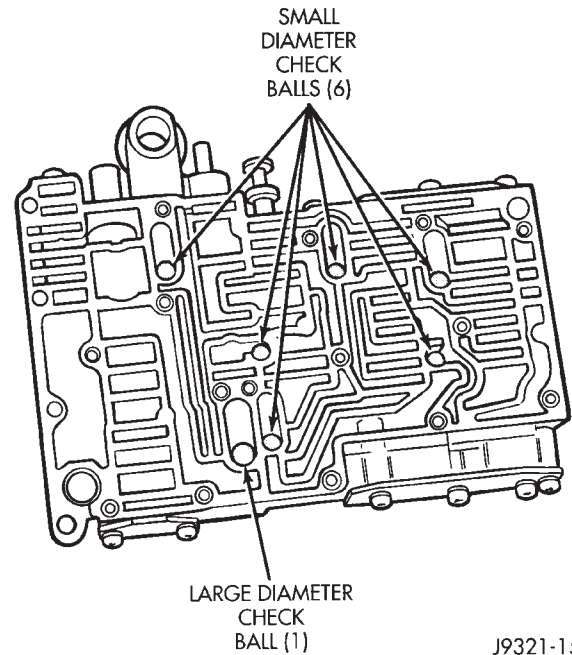
(2) Position assembled transfer plate and upper housing separator plate on upper housing (Fig. 73). Be sure filter screen is seated in proper housing recess.

(3) Install the ECE check ball into the transfer plate (Fig. 59). The ECE check ball is approximately 4.8 mm (3/16 in.) in diameter.

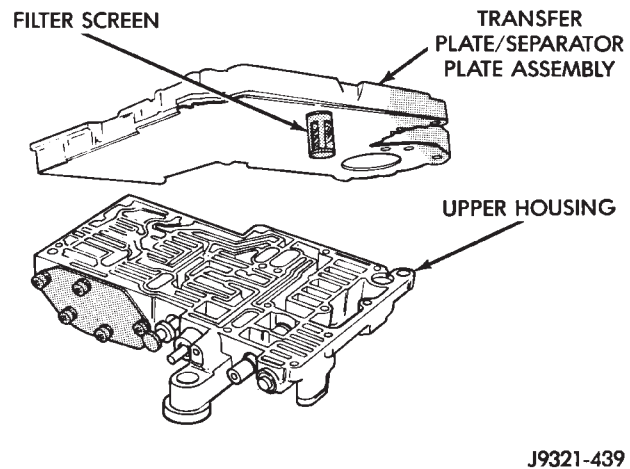
(4) Position lower housing separator plate on transfer plate (Fig. 74).

(5) Install lower housing on assembled transfer plate and upper housing (Fig. 75).

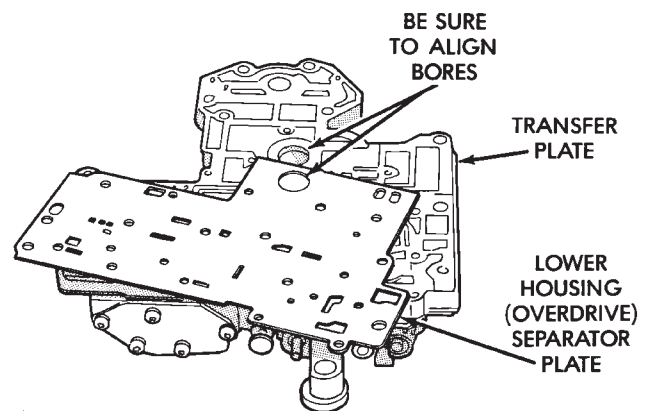
(6) Install and start all valve body screws by hand except for the screws to hold the boost valve tube brace. Save those screws for later installation. Then tighten screws evenly to 4 N·m (35 in. lbs.) torque. Start at center and work out to sides when tightening screws (Fig. 75).



**Fig. 72 Check Ball Locations In Upper Housing**

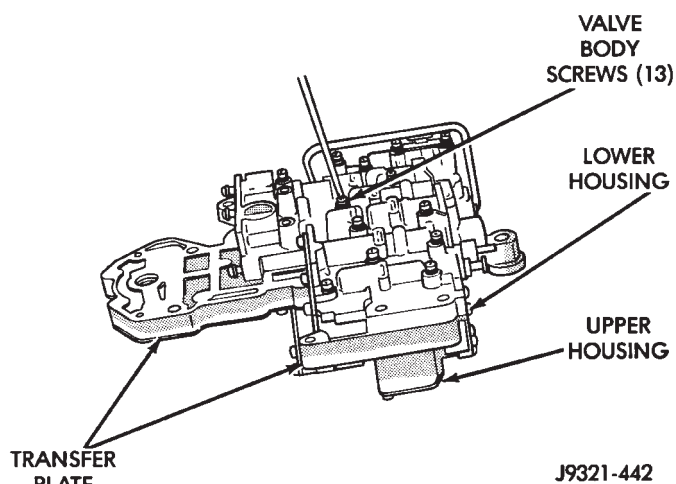


**Fig. 73 Installing Transfer Plate On Upper Housing**



**Fig. 74 Lower Housing Separator Plate**

## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 75 Installing Lower Housing On Transfer Plate And Upper Housing**

## UPPER HOUSING VALVE AND PLUG

Refer to (Fig. 76), (Fig. 77) and (Fig. 78) to perform the following steps.

(1) Lubricate valves, plugs, springs with clean transmission fluid.

(2) Assemble regulator valve line pressure plug, sleeve, throttle plug and spring. Insert assembly in

upper housing and install cover plate. Tighten cover plate screws to 4 N·m (35 in. lbs.) torque.

(3) Install 1-2 and 2-3 shift valves and springs.

(4) Install 1-2 shift control valve and spring.

(5) Install retainer, spring, limit valve, and 2-3 throttle plug from limit valve housing.

(6) Install limit valve housing and cover plate. Tighten screws to 4 N·m (35 in. lbs.).

(7) Install shuttle valve as follows:

(a) Insert plastic guides in shuttle valve secondary spring and install spring on end of valve.

(b) Install shuttle valve into housing.

(c) Hold shuttle valve in place.

(d) Compress secondary spring and install E-clip in groove at end of shuttle valve.

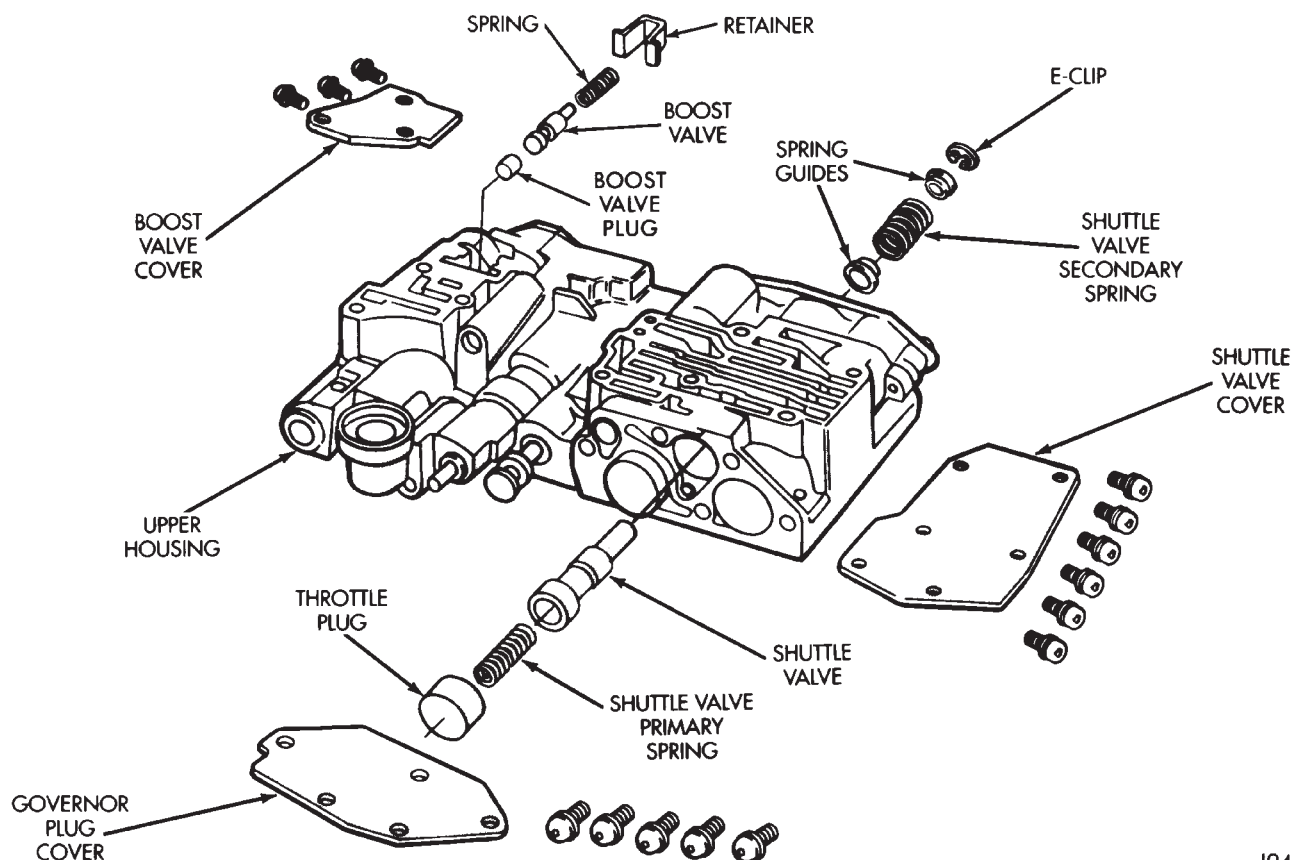
(e) Verify that spring and E-clip are properly seated before proceeding.

(8) Install shuttle valve cover plate. Tighten cover plate screws to 4 N·m (35 in. lbs.) torque.

(9) Install 1-2 and 2-3 valve governor plugs in valve body.

(10) Install shuttle valve primary spring and throttle plug.

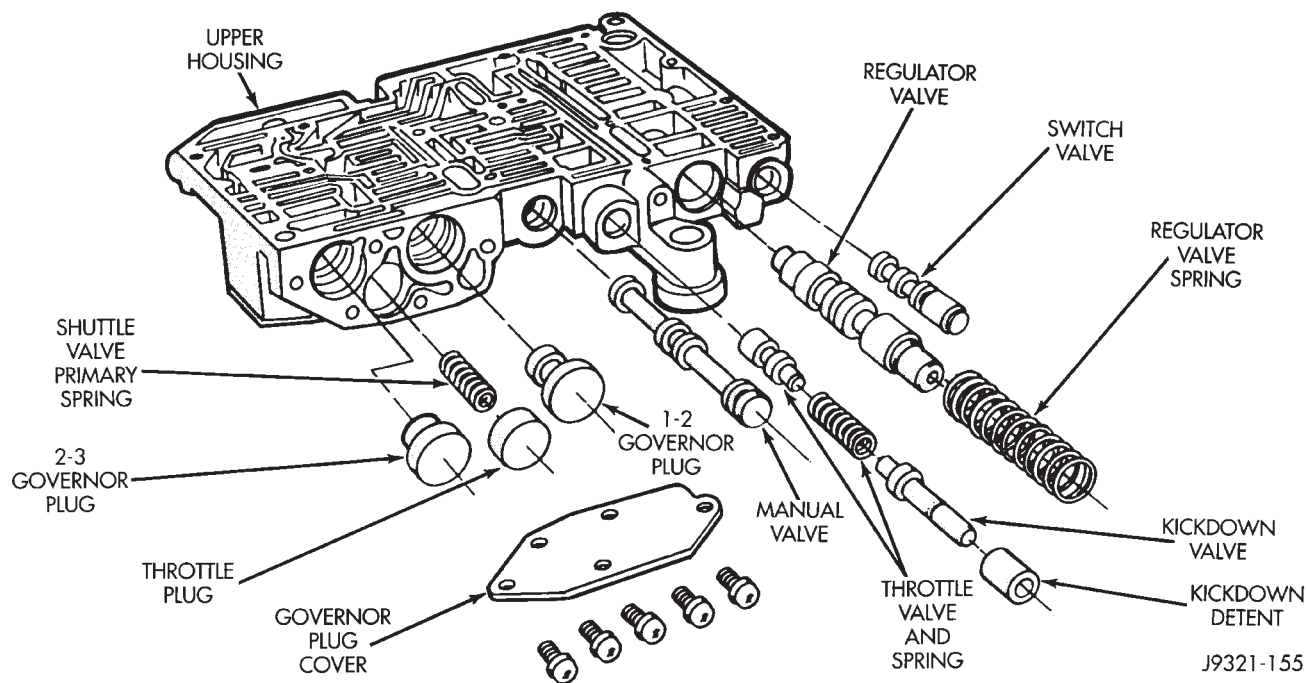
(11) Align and install governor plug cover. Tighten cover screws to 4 N·m (35 in. lbs.) torque.



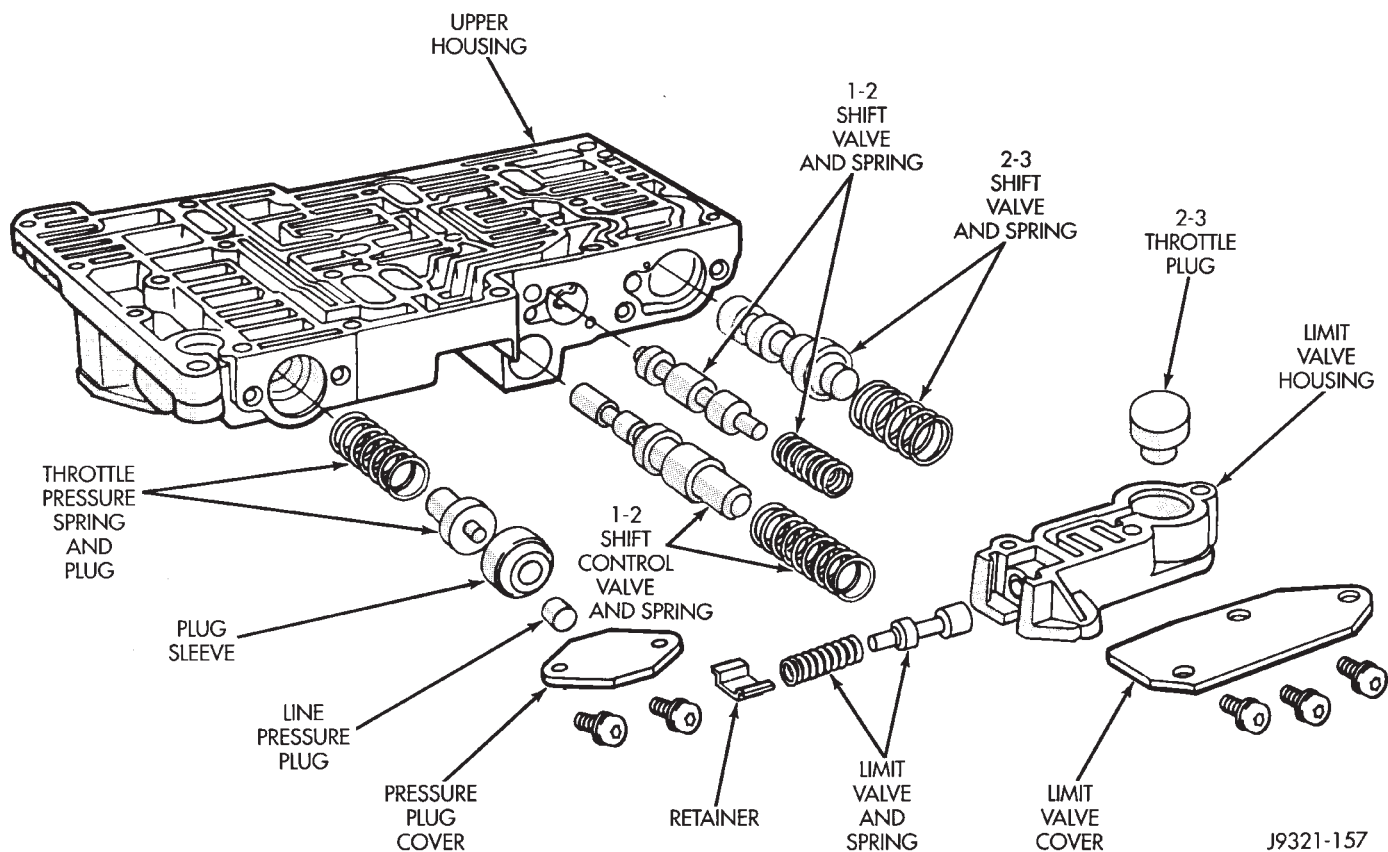
**Fig. 76 Shuttle And Boost Valve Components**



# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 77 Upper Housing Control Valve Locations**



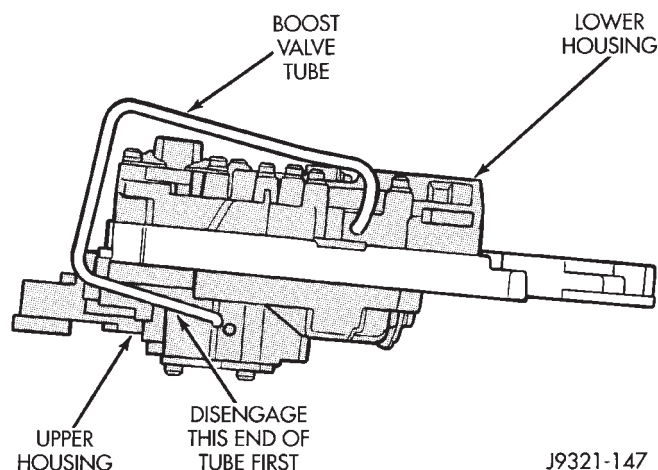
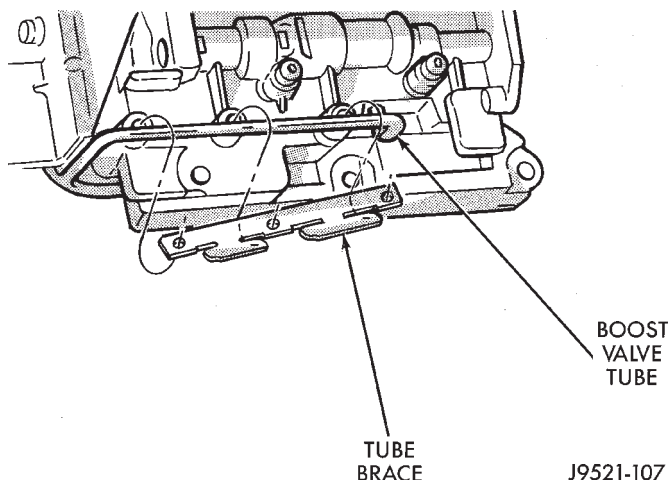
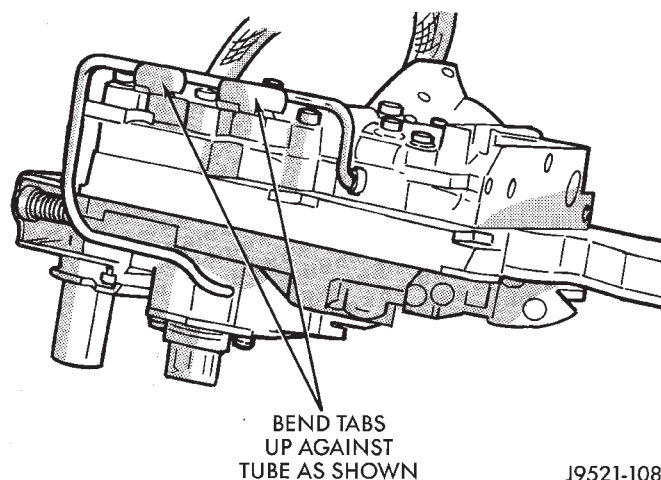
**Fig. 78 Upper Housing Shift Valve And Pressure Plug Locations**



## DISASSEMBLY AND ASSEMBLY (Continued)

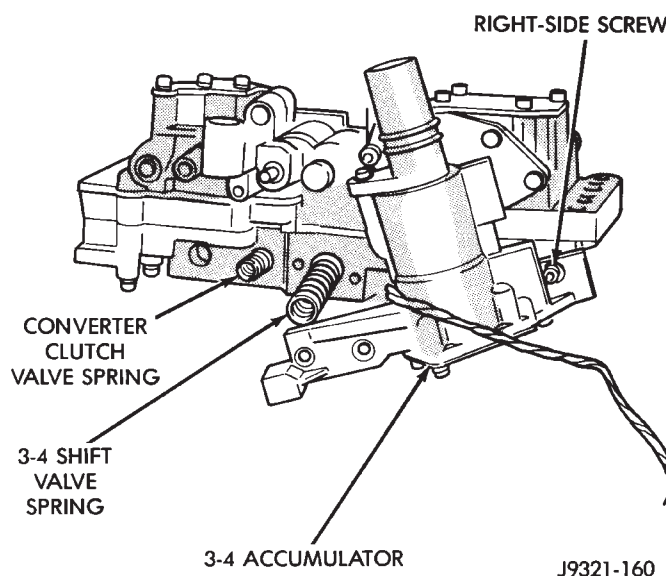
## BOOST VALVE TUBE AND BRACE

- (1) Position valve body assembly so lower housing is facing upward (Fig. 79).
- (2) Lubricate tube ends and housing ports with transmission fluid or petroleum jelly.
- (3) Start tube in lower housing port first. Then swing tube downward and work opposite end of tube into upper housing port (Fig. 79).
- (4) Insert and seat each end of tube in housings.
- (5) Slide tube brace under tube and into alignment with valve body screw holes (Fig. 80).
- (6) Install and finger tighten three screws that secure tube brace to valve body housings (Fig. 80).
- (7) Bend tube brace tabs up and against tube to hold it in position (Fig. 81).
- (8) Tighten all valve body housing screws to 4 N·m (35 in. lbs.) torque after tube and brace are installed. Tighten screws in diagonal pattern starting at center and working outward.

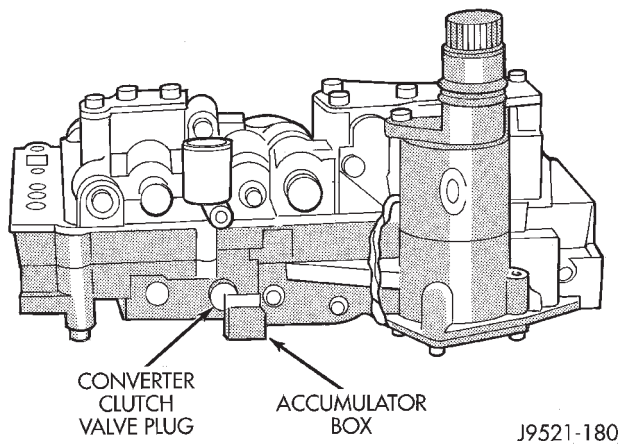
**Fig. 79 Boost Valve Tube****Fig. 80 Boost Valve Tube And Brace****Fig. 81 Securing Boost Valve Tube With Brace Tabs**

## 3-4 ACCUMULATOR

- (1) Position converter clutch valve and 3-4 shift valve springs in housing (Fig. 82).
- (2) Loosely attach accumulator housing with right-side screw (Fig. 82). Install only one screw at this time as accumulator must be free to pivot upward for ease of installation.
- (3) Install 3-4 shift valve and spring.
- (4) Install converter clutch timing valve and spring.
- (5) Position plug on end of converter clutch valve spring. Then compress and hold springs and plug in place with fingers of one hand.
- (6) Swing accumulator housing upward over valve springs and plug.
- (7) Hold accumulator housing firmly in place and install remaining two attaching screws. Be sure springs and clutch valve plug are properly seated (Fig. 83). Tighten screws to 4 N·m (35 in. lbs.).

**Fig. 82 Converter Clutch And 3-4 Shift Valve Springs**

# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 83 Seating 3-4 Accumulator On Lower Housing**  
VALVE BODY FINAL

(1) Install boost valve, valve spring, retainer and cover plate. Tighten cover plate screws to 4 N·m (35 in. lbs.) torque.

(2) Insert manual lever detent spring in upper housing.

(3) Position detent ball on end of spring. Then hold detent ball and spring in detent housing with Retainer Tool 6583 (Fig. 84).

(4) Install throttle lever in upper housing. Then install manual lever over throttle lever and start manual lever into housing.

(5) Align manual lever with detent ball and manual valve. Hold throttle lever upward. Then press down on manual lever until fully seated. Remove detent ball retainer tool after lever is seated.

(6) Then install manual lever seal, washer and E-clip.

(7) Verify that throttle lever is aligned with end of kickdown valve stem and that manual lever arm is engaged in manual valve (Fig. 85).

(8) Position line pressure adjusting screw in adjusting screw bracket.

(9) Install spring on end of line pressure regulator valve.

(10) Install switch valve spring on tang at end of adjusting screw bracket.

(11) Install manual valve.

(12) Install throttle valve and spring.

(13) Install kickdown valve and detent.

(14) Install pressure regulator valve.

(15) Install switch valve.

(16) Position adjusting screw bracket on valve body. Align valve springs and press bracket into place. Install short, upper bracket screws first and long bottom screw last. Verify that valve springs and bracket are properly aligned. Then tighten all three bracket screws to 4 N·m (35 in. lbs.) torque.

(17) Lubricate solenoid case connector O-rings and shaft of manual lever with light coat of petroleum jelly.

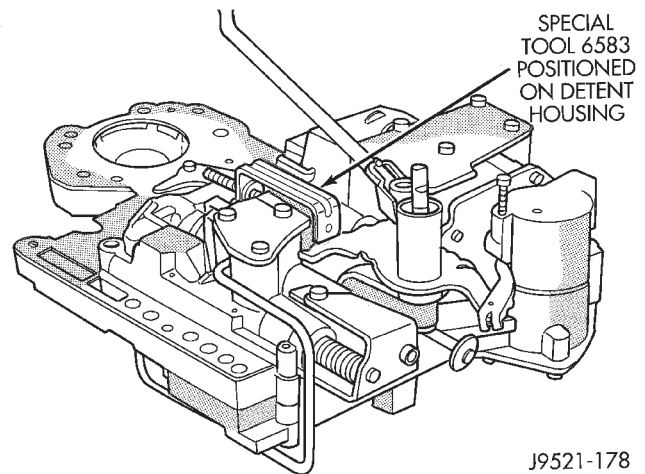
(18) Obtain new fluid filter for valve body but do not install filter at this time.

(19) If line pressure and/or throttle pressure adjustment screw settings were not disturbed, continue with overhaul or reassembly. However, if adjustment screw settings **were** moved or changed, readjust as described in Valve Body Control Pressure Adjustment procedure.

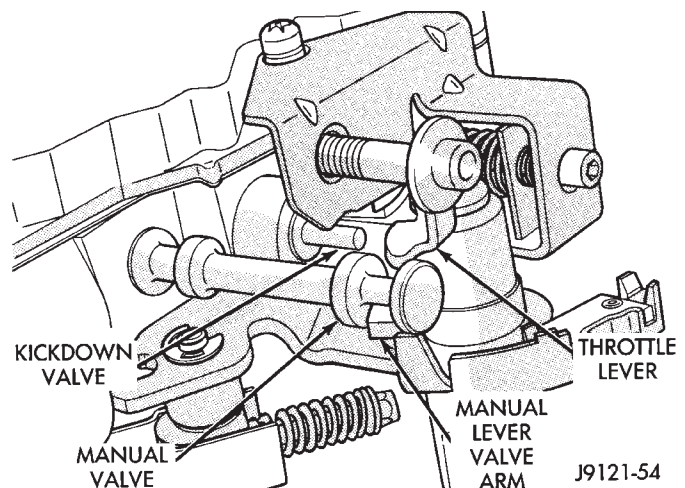
(20) Attach solenoid case connector to 3-4 accumulator with shoulder-type screw. Connector has small locating tang that fits in dimple at top of accumulator housing (Fig. 86). Seat tang in dimple before tightening connector screw.

(21) Install solenoid assembly and gasket. Tighten solenoid attaching screws to 8 N·m (72 in. lbs.) torque.

(22) Verify that solenoid wire harness is properly routed (Fig. 87). **Solenoid harness must be clear of manual lever and park rod and not be pinched between accumulator housing and cover.**

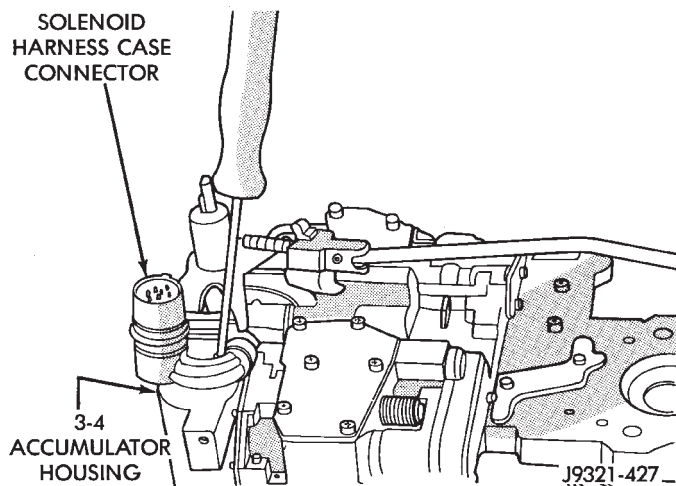


**Fig. 84 Detent Ball Spring**

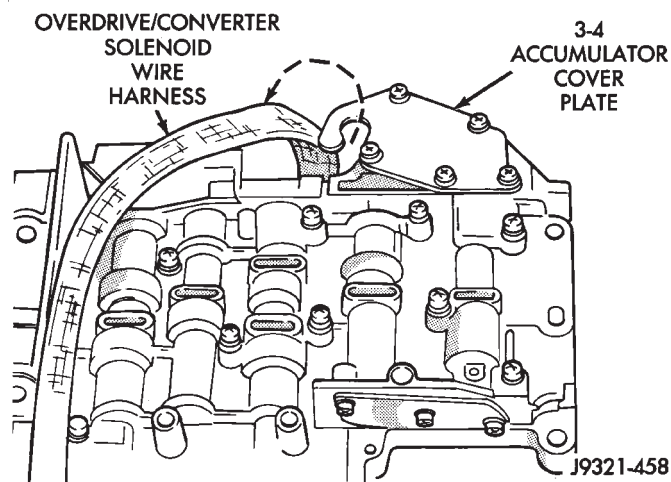


**Fig. 85 Manual And Throttle Lever Alignment**

## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 86 Solenoid Harness Case Connector Shoulder Bolt**



**Fig. 87 Solenoid Harness Routing**

## GOVERNOR BODY, SENSOR AND SOLENOID

- (1) Turn valve body assembly over so accumulator side of transfer plate is facing down.
- (2) Install new O-rings on governor pressure solenoid and sensor.
- (3) Lubricate solenoid and sensor O-rings with clean transmission fluid.
- (4) Install governor pressure sensor in governor body. Then secure sensor with M-shaped retaining clip.
- (5) Install governor pressure solenoid in governor body. Push solenoid in until it snaps into place in body.
- (6) Position governor body gasket on transfer plate.
- (7) Install retainer plate on governor body and around solenoid. Be sure solenoid connector is positioned in retainer cutout.

(8) Align screw holes in governor body and transfer plate. Then install and tighten governor body screws to 4 N·m (35 in. lbs.) torque.

(9) Connect harness wires to governor pressure solenoid and governor pressure sensor.

(10) Perform Line Pressure and Throttle Pressure adjustments. Refer to adjustment section of this group for proper procedures.

(11) Install fluid filter and pan.

(12) Lower vehicle.

(13) Fill transmission with recommended fluid and road test vehicle to verify repair.

## TRANSMISSION

## DISASSEMBLY

(1) Clean transmission exterior with steam gun or with solvent. Wear eye protection during cleaning operations.

(2) Place transmission in a vertical position.

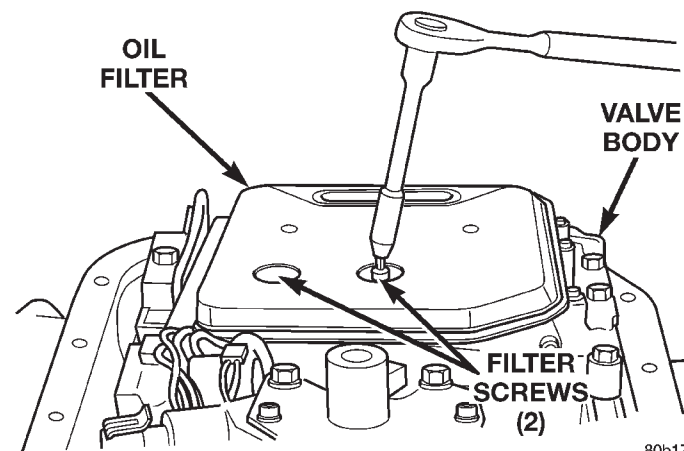
(3) Measure and record input shaft end play readings.

(4) Remove shift and throttle levers from valve body manual lever shaft.

(5) Place transmission in horizontal position.

(6) Remove transmission oil pan and gasket.

(7) Remove filter from valve body (Fig. 88). Keep filter screws separate from other valve body screws. Filter screws are longer and should be kept with filter.



**Fig. 88 Oil Filter Removal**

(8) Remove park/neutral position switch.

(9) Remove hex head bolts attaching valve body to transmission case (Fig. 89). A total of 10 bolts are used. Note different bolt lengths for assembly reference.

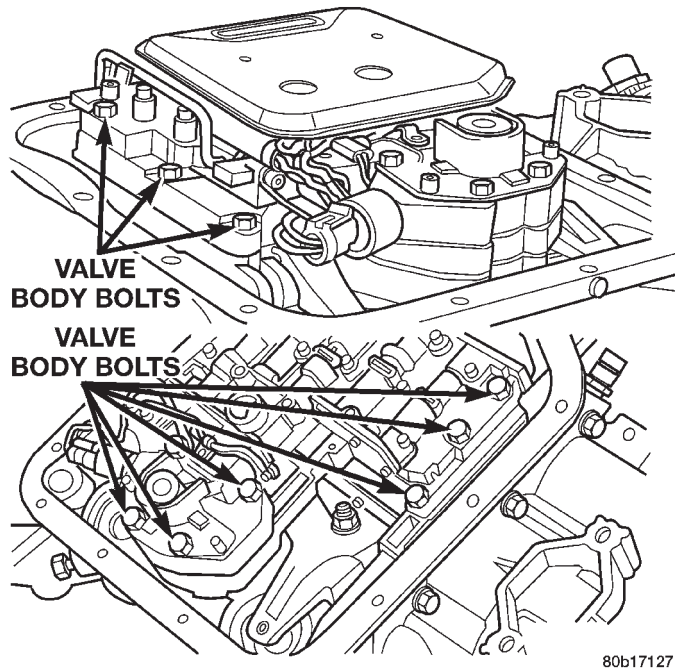
(10) Remove valve body assembly. Push valve body harness connector out of case. Then work park rod and valve body out of case (Fig. 90).

(11) Remove accumulator piston and inner and outer springs (Fig. 91).

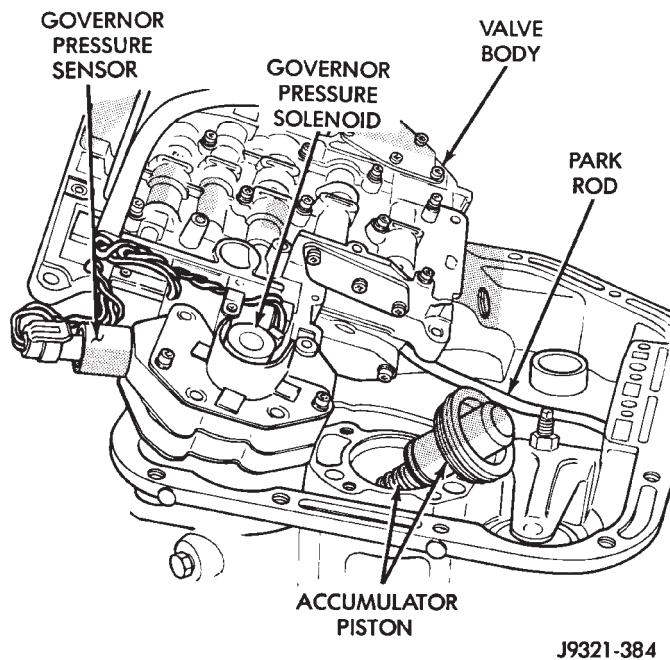


## DISASSEMBLY AND ASSEMBLY (Continued)

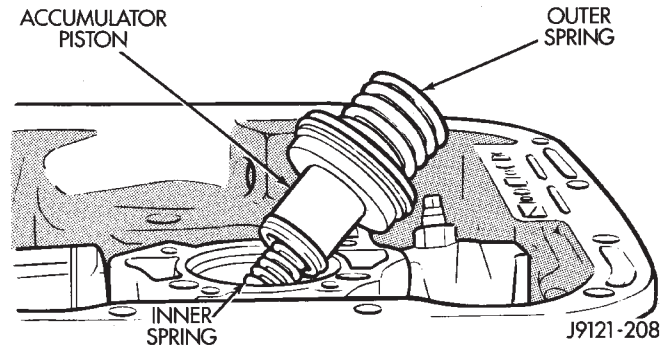
(12) Remove pump oil seal with suitable pry tool or slide-hammer mounted screw.



**Fig. 89 Valve Body Bolt Locations**



**Fig. 90 Valve Body Removal**



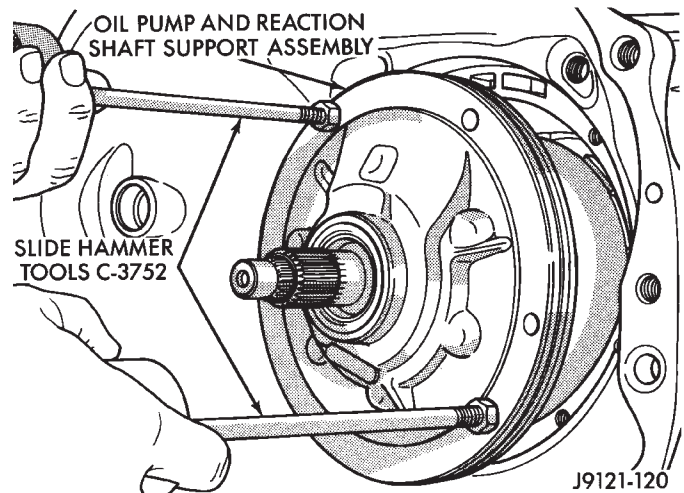
**Fig. 91 Accumulator Piston And Springs**

(13) Loosen front band adjusting screw locknut 4-5 turns. Then tighten band adjusting screw until band is tight around front clutch retainer. This prevents front/rear clutches from coming out with pump and possibly damaging clutch or pump components.

(14) Remove oil pump bolts.

(15) Thread bolts of Slide Hammer Tools C-3752 into threaded holes in pump body flange (Fig. 92).

(16) Bump slide hammer weights outward to remove pump and reaction shaft support assembly from case (Fig. 92).



**Fig. 92 Removing Oil Pump And Reaction Shaft Support Assembly**

(17) Loosen front band adjusting screw until band is completely loose.

(18) Squeeze front band together and remove band strut (Fig. 93).

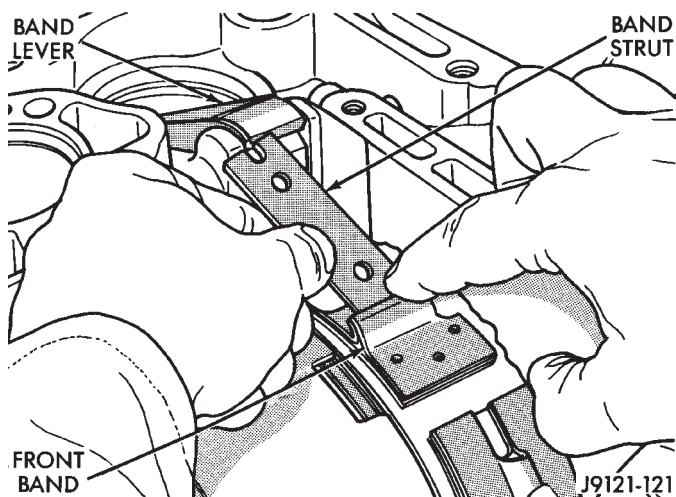
(19) Remove front band lever (Fig. 94).

(20) Remove front band lever shaft plug, if necessary, from converter housing.

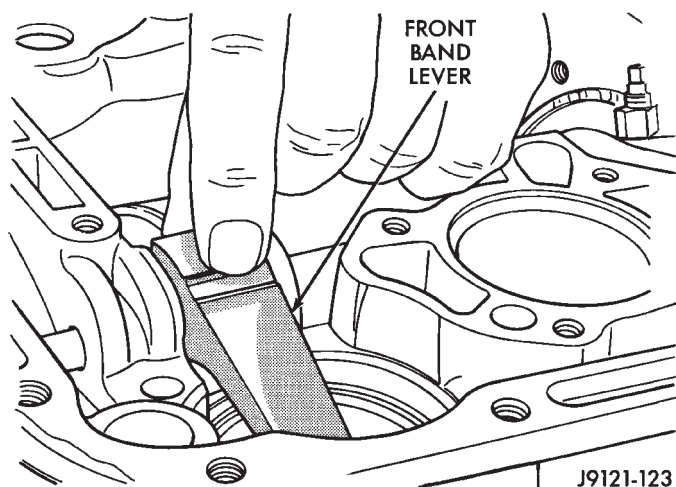
(21) Remove front band lever shaft.



## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 93 Removing/Installing Front Band Strut**



**Fig. 94 Removing/Installing Front Band Lever**

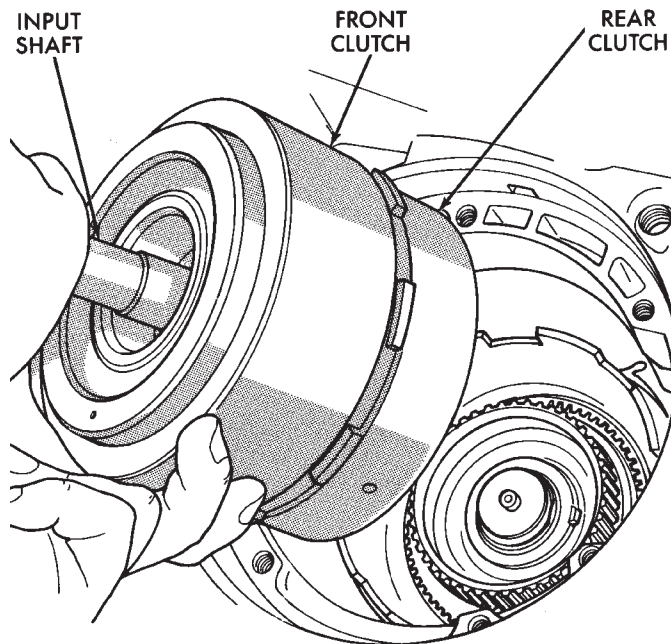
(22) Remove front and rear clutch units as assembly. Grasp input shaft, hold clutch units together and remove them from case (Fig. 95).

(23) Lift front clutch off rear clutch (Fig. 96). Set clutch units aside for overhaul.

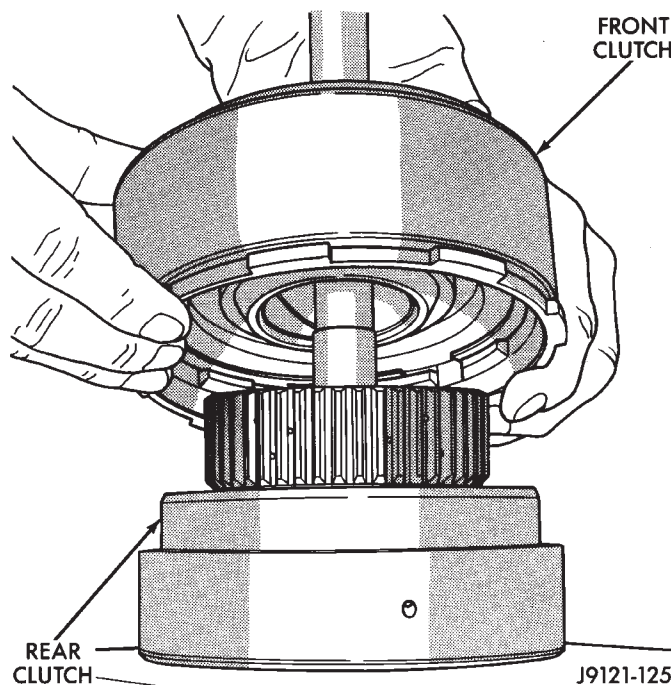
(24) Remove intermediate shaft thrust washer from front end of shaft or from rear clutch hub (Fig. 97).

(25) Remove output shaft thrust plate from intermediate shaft hub (Fig. 98).

(26) Slide front band off driving shell (Fig. 99) and remove band from case.

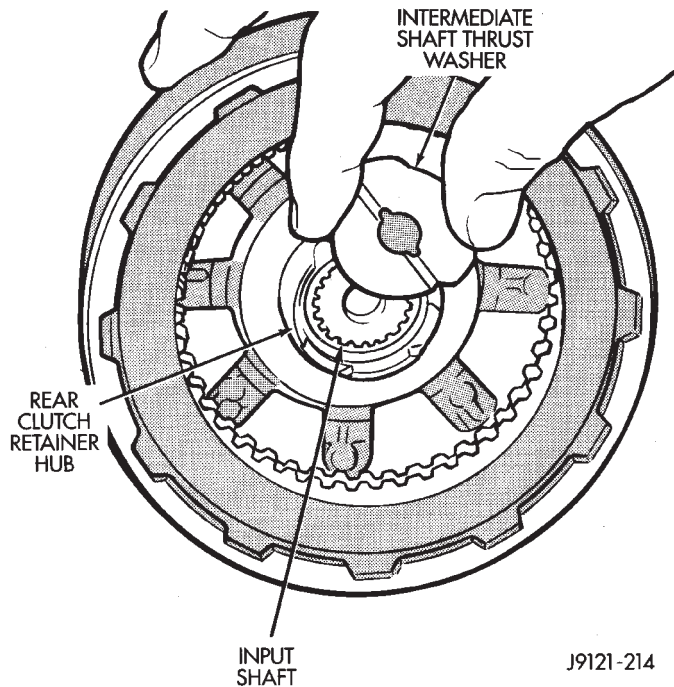


**Fig. 95 Removing Front/Rear Clutch Assemblies**

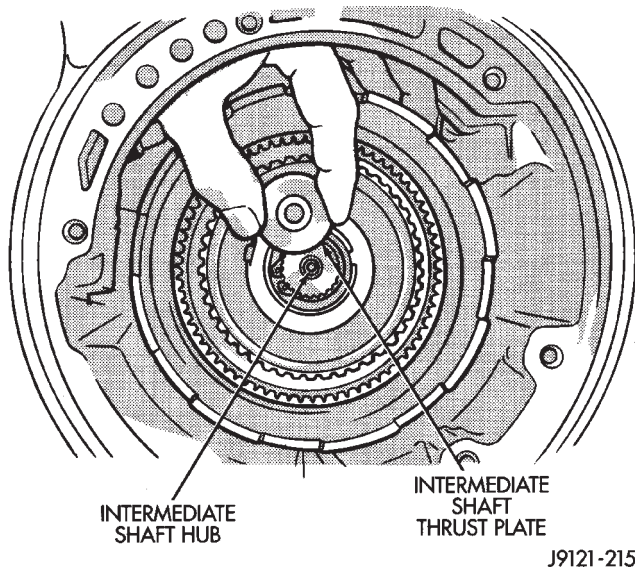


**Fig. 96 Separating Front/Rear Clutch Assemblies**

DISASSEMBLY AND ASSEMBLY (Continued)



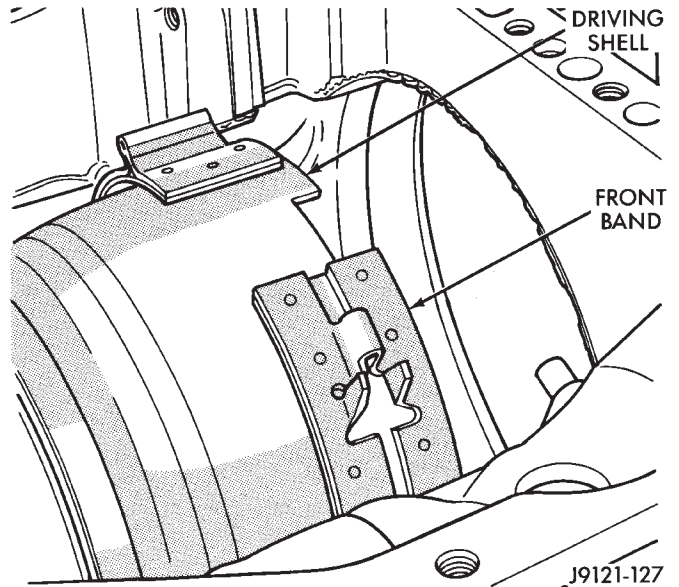
**Fig. 97 Removing Intermediate Shaft Thrust Washer**



**Fig. 98 Removing Intermediate Shaft Thrust Plate**

(27) Remove planetary geartrain as assembly (Fig. 100). Support geartrain with both hands during removal. Do not allow machined surfaces on intermediate shaft or overdrive piston retainer to become nicked or scratched.

(28) If overdrive unit is not to be serviced, install Alignment Shaft 6227-2 into the overdrive unit to

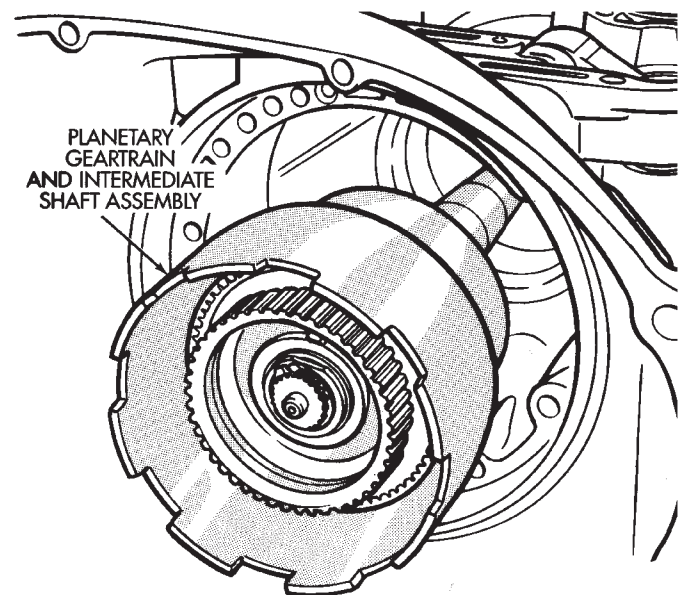


**Fig. 99 Front Band Removal/Installation**

prevent misalignment of the overdrive clutches during service of main transmission components.

(29) Loosen rear band adjusting screw 4-5 turns.

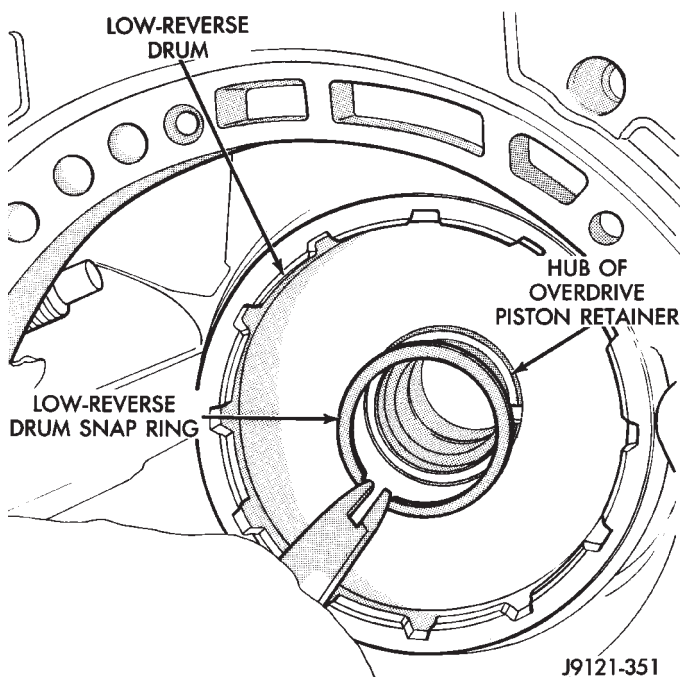
(30) Remove low-reverse drum snap ring (Fig. 101).



**Fig. 100 Removing Planetary Geartrain And Intermediate Shaft Assembly**



## DISASSEMBLY AND ASSEMBLY (Continued)



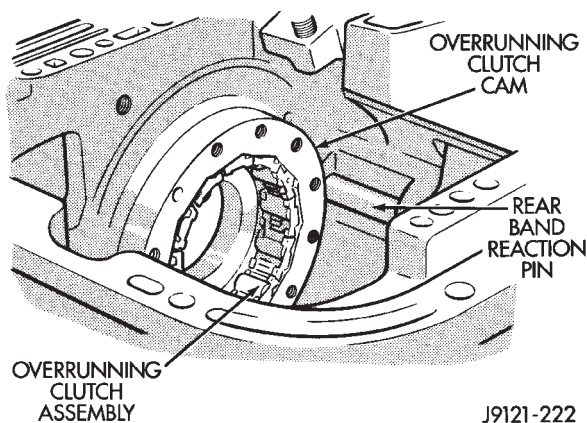
**Fig. 101 Removing Low-Reverse Drum Snap Ring**

(31) Remove low-reverse drum and reverse band.  
 (32) Remove overrunning clutch roller and spring assembly as a unit (Fig. 102).

(33) Compress front servo rod guide about 1/8 inch with Valve Spring Compressor C-3422-B (Fig. 103).

(34) Remove front servo rod guide snap ring. **Exercise caution when removing snap ring. Servo bore can be scratched or nicked if care is not exercised.**

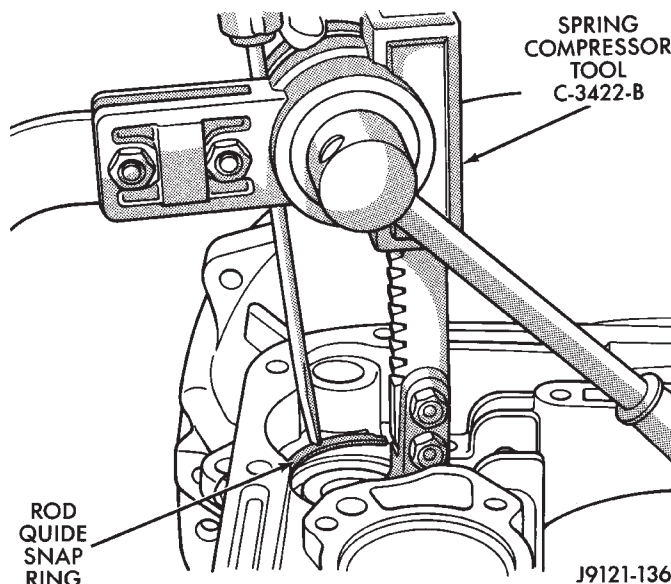
(35) Remove compressor tools and remove front servo rod guide, spring and servo piston.



**Fig. 102 Overrunning Clutch Assembly Removal**

(36) Compress rear servo spring retainer about 1/16 inch with Valve Spring Compressor C-3422-B (Fig. 104).

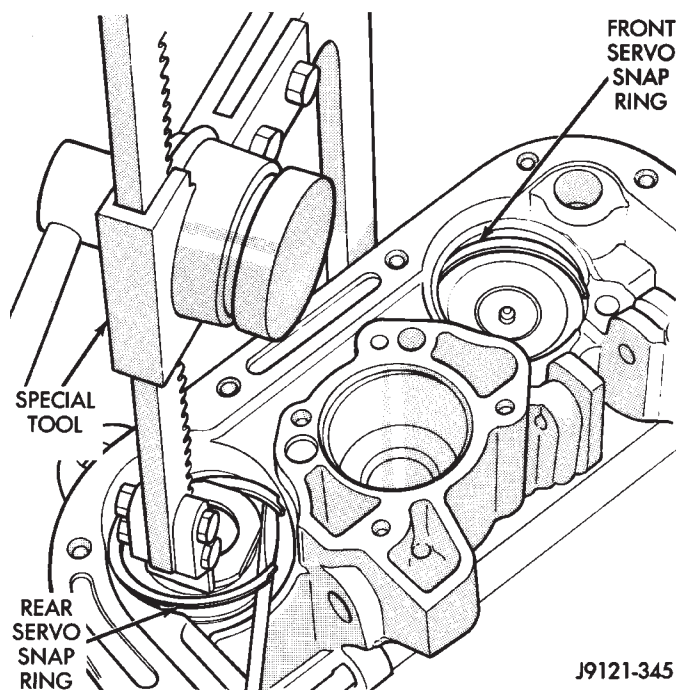
(37) Remove rear servo spring retainer snap ring. Then remove compressor tools and remove rear servo spring and piston.



**Fig. 103 Compressing Front Servo Rod Guide**

(38) Inspect transmission components.

**NOTE: TO SERVICE THE OVERRUNNING CLUTCH CAM OR OVERDRIVE PISTON RETAINER, REFER TO OVERRUNNING CLUTCH CAM SERVICE IN THIS SECTION.**



**Fig. 104 Compressing Rear Servo Spring**

#### ASSEMBLY

Do not allow dirt, grease, or foreign material to enter the case or transmission components during assembly. Keep the transmission case and components clean. Also make sure the tools and workbench area used for assembly operations are equally clean.

## DISASSEMBLY AND ASSEMBLY (Continued)

Shop towels used for wiping off tools and hands must be made from **lint free** material. Lint will stick to transmission parts and could interfere with valve operation, or even restrict fluid passages.

Lubricate the transmission components with Mopar® transmission fluid during reassembly. Use Mopar® Door Ease, or Ru-Glyde on seals and O-rings to ease installation.

Petroleum jelly can also be used to hold thrust washers, thrust plates and gaskets in position during assembly. However, **do not** use chassis grease, bearing grease, white grease, or similar lubricants on any transmission part. These types of lubricants can eventually block or restrict fluid passages and interfere with valve operation. Use petroleum jelly only.

Do not force parts into place. The transmission components and subassemblies are easily installed by hand when properly aligned.

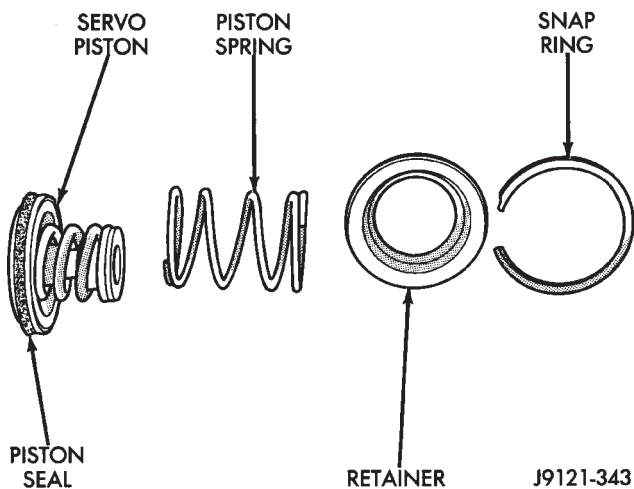
If a part seems extremely difficult to install, it is either misaligned or incorrectly assembled. Also verify that thrust washers, thrust plates and seal rings are correctly positioned before assembly. These parts can interfere with proper assembly if mis-positioned.

The planetary geartrain, front/rear clutch assemblies and oil pump are all much easier to install when the transmission case is upright.

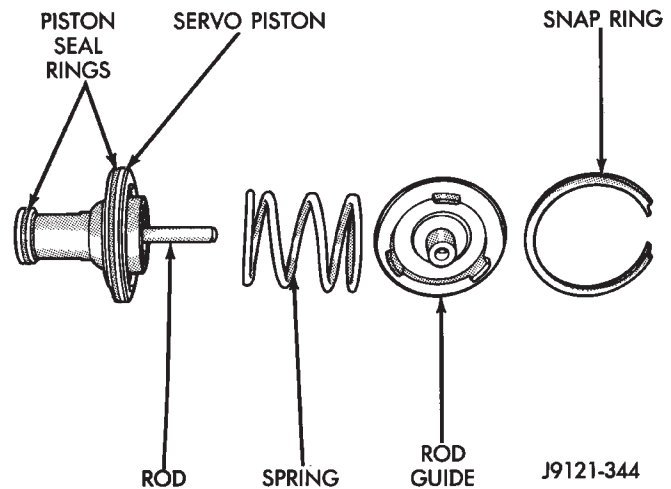
(1) Install rear servo piston, spring and retainer (Fig. 105). Install spring on top of servo piston and install retainer on top of spring.

(2) Install front servo piston assembly, servo spring and rod guide (Fig. 106).

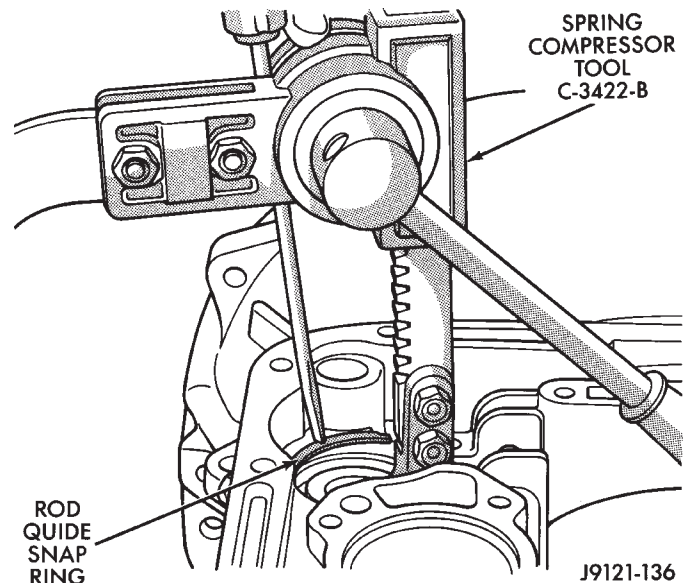
(3) Compress front/rear servo springs with Valve Spring Compressor C-3422-B and install each servo snap ring (Fig. 107).



**Fig. 105 Rear Servo Components**



**Fig. 106 Front Servo Components**



**Fig. 107 Compressing Front/Rear Servo Springs**

(4) Lubricate clutch cam rollers with transmission fluid.

(5) Install rear band in case (Fig. 108). Be sure twin lugs on band are seated against reaction pin.

(6) Install low-reverse drum and check overrunning clutch operation as follows:

(a) Lubricate overrunning clutch race (on drum hub) with transmission fluid.

(b) Guide drum through rear band.

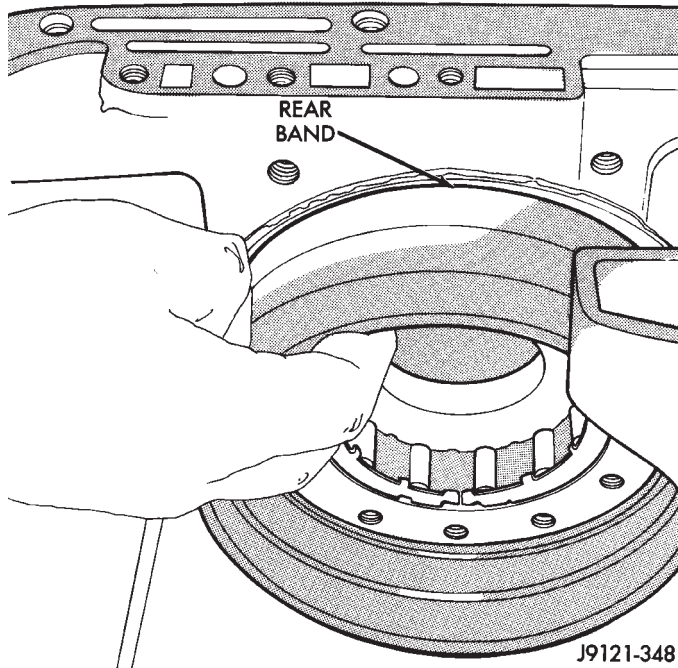
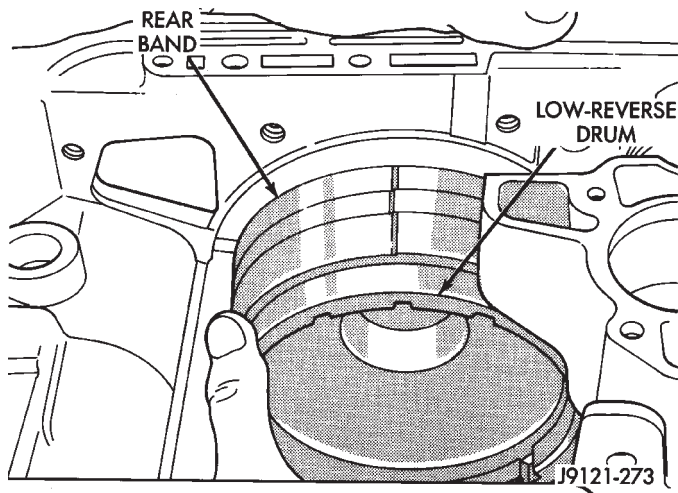
(c) Tilt drum slightly and start race (on drum hub) into overrunning clutch rollers.

(d) Press drum rearward and turn it in clockwise direction until drum seats in overrunning clutch (Fig. 109).

(e) Turn drum back and forth. **Drum should rotate freely in clockwise direction and lock in counterclockwise direction (as viewed from front of case).**



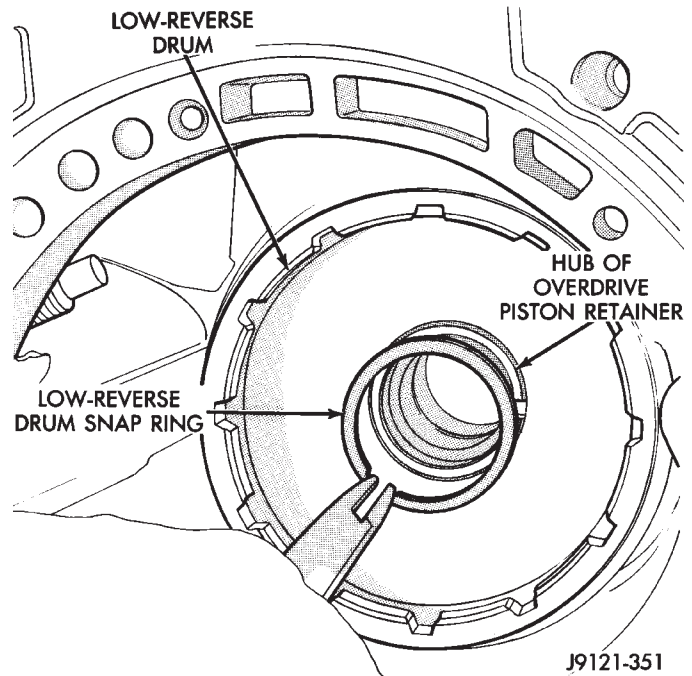
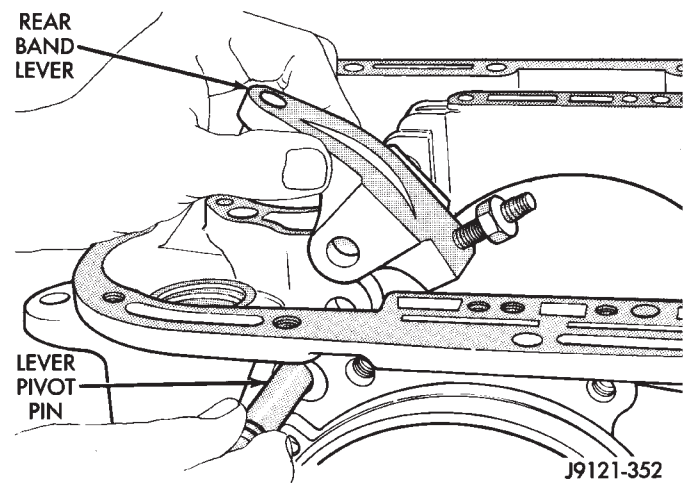
## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 108 Rear Band Installation****Fig. 109 Installing Low-Reverse Drum**

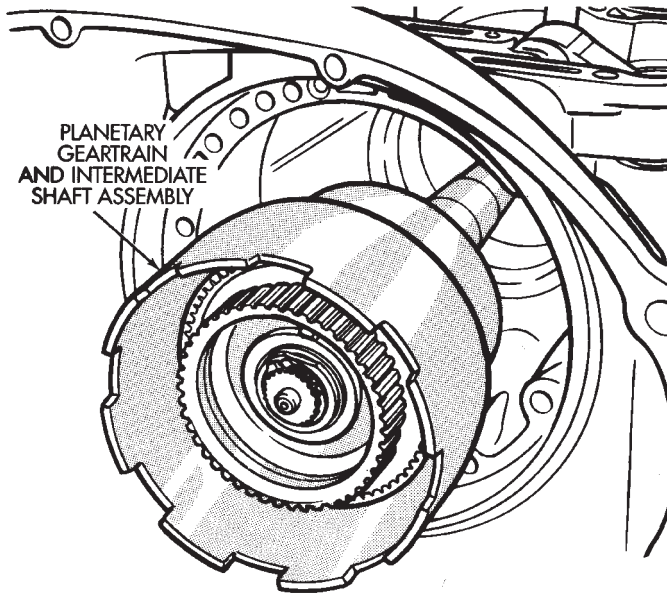
(7) Install snap ring that secures low-reverse drum to hub of overdrive piston retainer (Fig. 110).

(8) Install rear band lever and pivot pin (Fig. 111). Align lever with pin bores in case and push pivot pin into place.

(9) Install planetary geartrain assembly (Fig. 112).

**Fig. 110 Installing Low-Reverse Drum Retaining Snap Ring****Fig. 111 Rear Band Lever And Pivot Pin Installation**

# DISASSEMBLY AND ASSEMBLY (Continued)



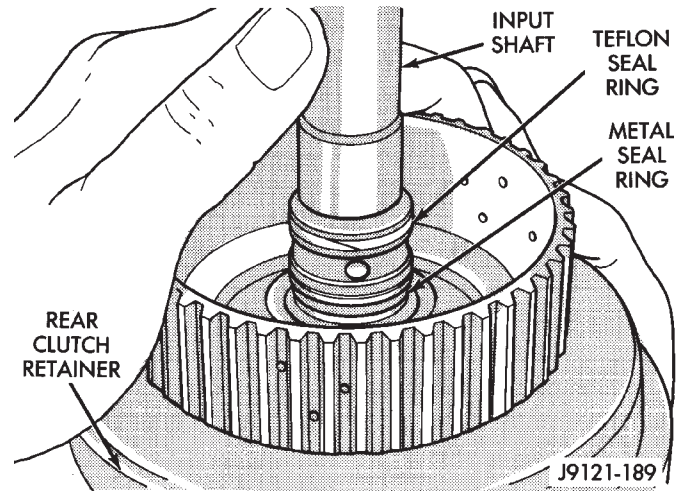
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**Fig. 112 Installing Planetary Geartrain**

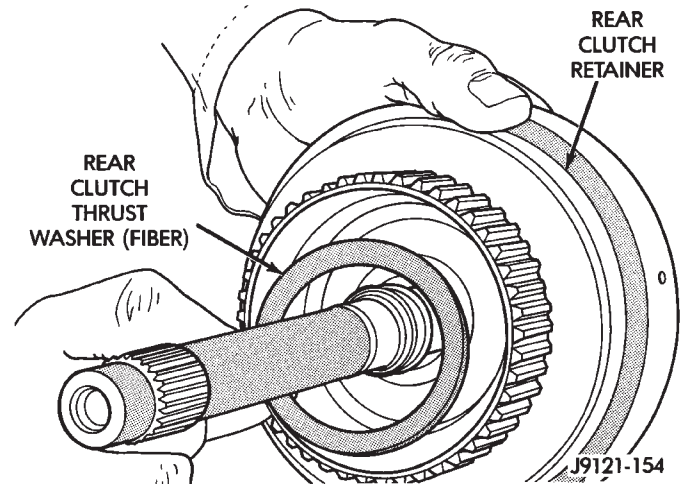
(10) Install thrust plate on intermediate shaft hub (Fig. 113). Use petroleum jelly to hold thrust plate in place.

(11) Check seal ring on rear clutch retainer hub and seal rings on input shaft (Fig. 114). Also verify that shaft seal rings are installed in sequence shown.

(12) Install rear clutch thrust washer (Fig. 115). Use additional petroleum jelly to hold washer in place if necessary.



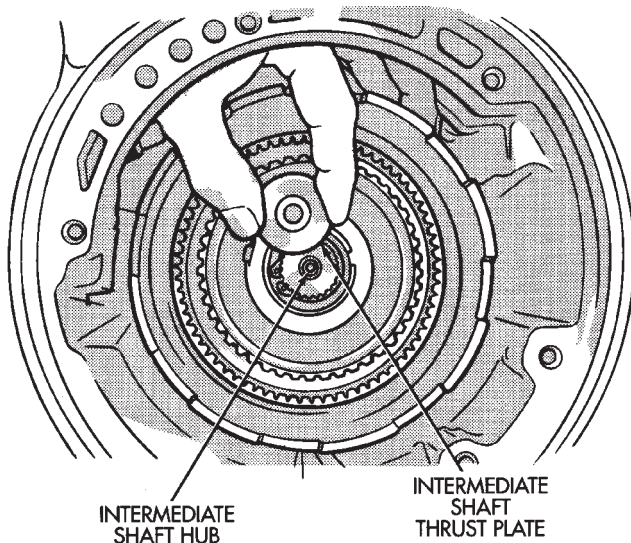
**Fig. 114 Input Shaft Seal Ring Location**



**Fig. 115 Installing Rear Clutch Thrust Washer**

(13) Align clutch discs in front clutch and install front clutch on rear clutch (Fig. 116). Rotate front clutch retainer back and forth until completely seated on rear clutch retainer.

(14) Coat intermediate shaft thrust washer with petroleum jelly. Then install washer in rear clutch hub (Fig. 117). Use enough petroleum jelly to hold washer in place. **Be sure grooved side of washer faces rearward (toward output shaft) as shown. Also note that washer only fits one way in clutch hub.** Note thickness of this washer. It is a select fit part and is used to control transmission end play.

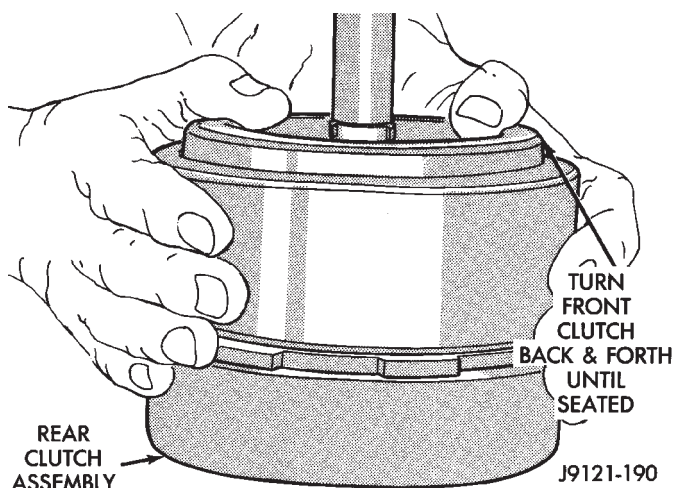


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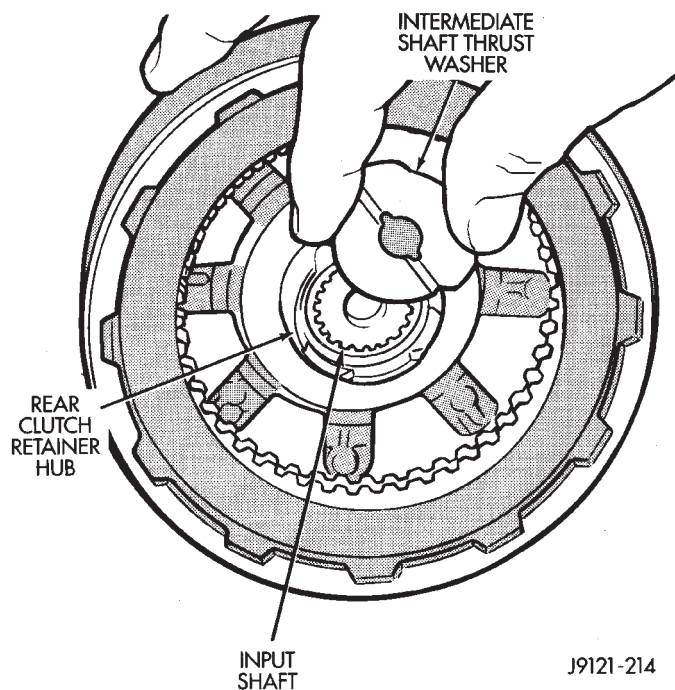
**Fig. 113 Installing Intermediate Shaft Thrust Plate**



## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 116 Assembling Front And Rear Clutch Units**



**Fig. 117 Installing Intermediate Shaft Thrust Plate**

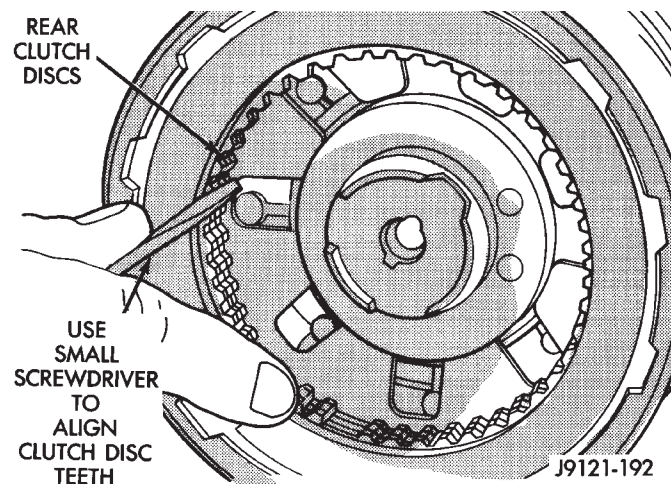
(15) Align drive teeth on rear clutch discs with small screwdriver (Fig. 118). This makes installation on front planetary easier.

(16) Raise front end of transmission upward as far as possible and support case with wood blocks. Front/rear clutch and oil pump assemblies are easier to install if transmission is as close to upright position as possible.

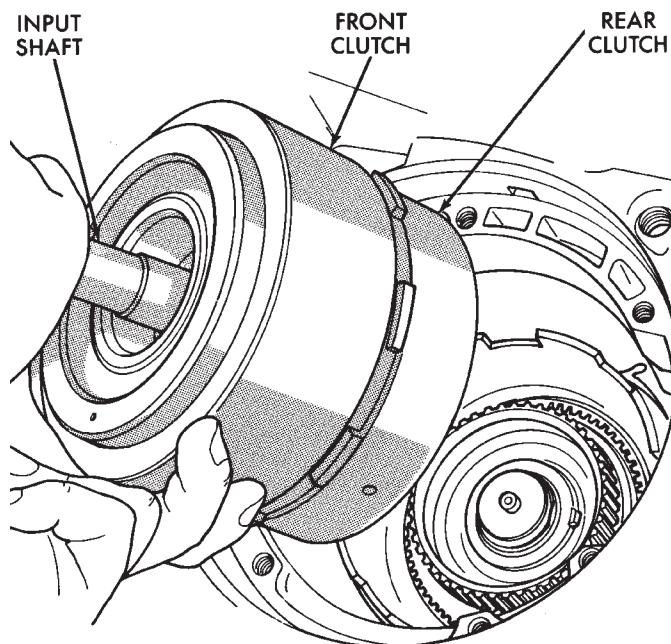
(17) Slide front band into case.

(18) Install front and rear clutch units as assembly (Fig. 119). Align rear clutch with front annulus gear and install assembly in driving shell. **Be sure output shaft thrust washer and thrust plate are not displaced during installation.**

(19) Carefully work assembled clutches back and forth to engage and seat rear clutch discs on front annulus gear. Also be sure front clutch drive lugs are fully engaged in slots of driving shell after installation.



**Fig. 118 Aligning Rear Clutch Disc Lugs**



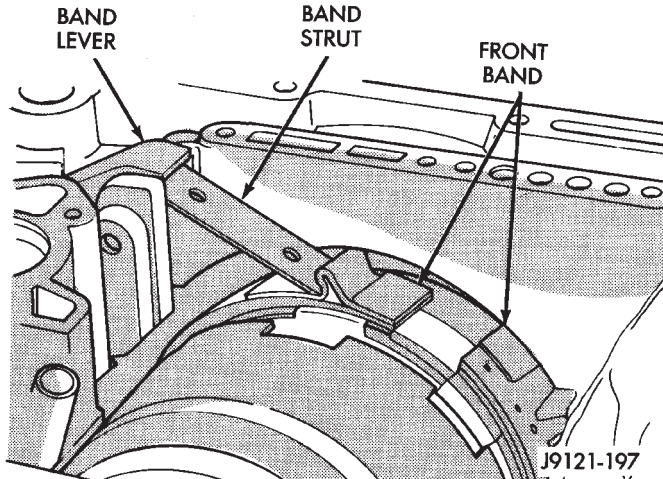
**Fig. 119 Installing Front/Rear Clutch Assemblies**

(20) Assemble front band strut.

(21) Install front band adjuster, strut and adjusting screw (Fig. 120).

(22) Tighten band adjusting screw until band just grips clutch retainer. Verify that front/rear clutches are still seated before continuing.

# DISASSEMBLY AND ASSEMBLY (Continued)



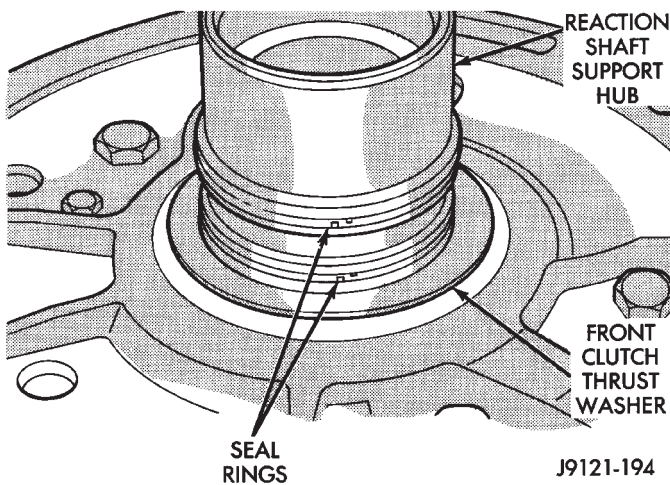
**Fig. 120 Front Band Linkage Installation**

(23) Check seal rings on reaction shaft support hub. Verify that seal rings are hooked together and that front clutch thrust washer is properly positioned (Fig. 121). Use petroleum jelly to hold thrust washer in place if necessary.

(24) Lubricate oil pump body seal with petroleum jelly. Lubricate pump shaft seal lip with petroleum jelly.

(25) Thread two Pilot Stud Tools C-3288-B into bolt holes in oil pump bore flange (Fig. 122).

(26) Align and install oil pump gasket (Fig. 122).

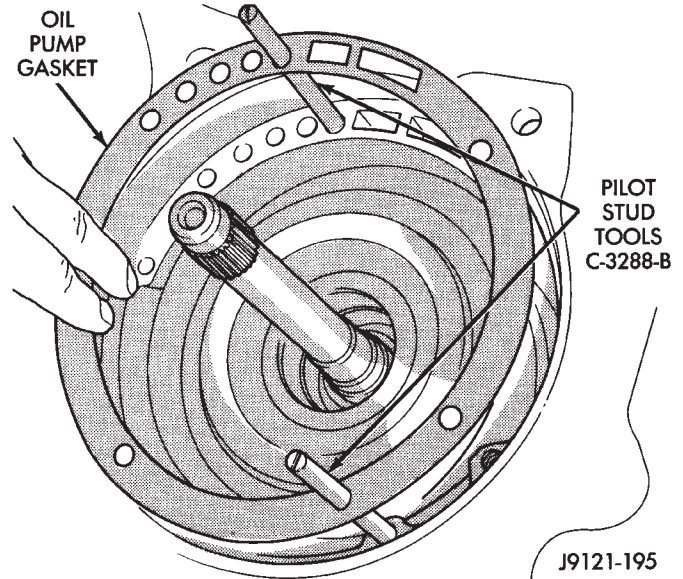


**Fig. 121 Reaction Shaft Support Seal Rings And Front Clutch Thrust Washer**

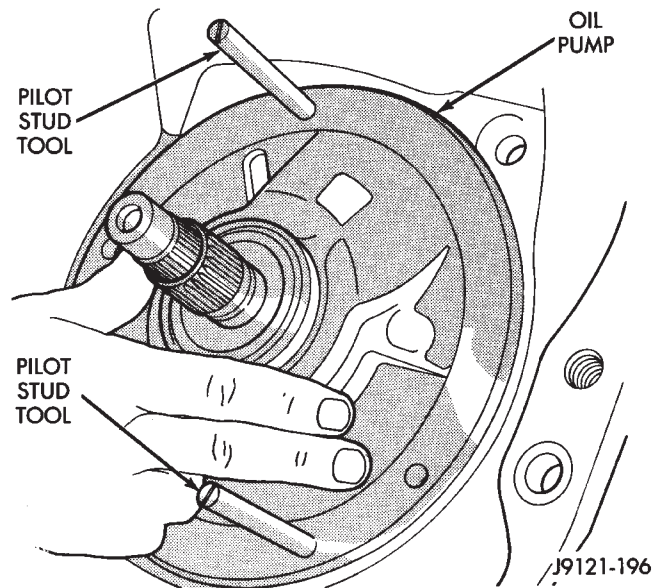
(27) Install oil pump (Fig. 123). Align and position pump on pilot studs. Slide pump down studs and work it into front clutch hub and case by hand. Then install 2 or 3 pump bolts to hold pump in place.

(28) Remove pilot stud tools and install remaining oil pump bolts. Tighten bolts alternately in diagonal pattern to 20 N·m (15 ft. lbs.).

(29) Measure and if necessary, correct input shaft end play as follows (Fig. 124):



**Fig. 122 Installing Pilot Studs And Oil Pump Gasket**



**Fig. 123 Installing Oil Pump Assembly In Case**

(a) Attach dial indicator to converter housing.

(b) Position indicator plunger against input shaft and zero indicator.

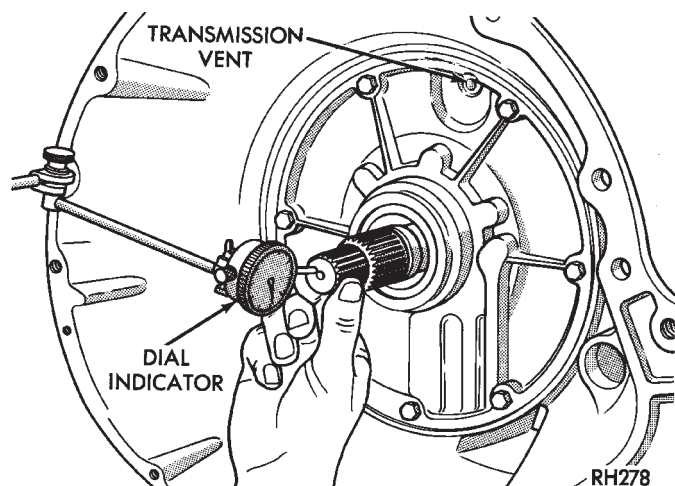
(c) Move input shaft in and out and record reading. End play should be 0.56 - 2.31 mm (0.022 - 0.091 in.). Proceed to next step if end play is not within specified limits.

(d) Intermediate shaft thrust washer (in hub of rear clutch retainer) controls end play. Washer is a select fit part and can be changed to adjust end play. If end play turns out to be incorrect, remove oil pump, and clutches. Then install thinner/thicker thrust washer as necessary.

(30) Install accumulator piston and inner and outer springs (Fig. 125).

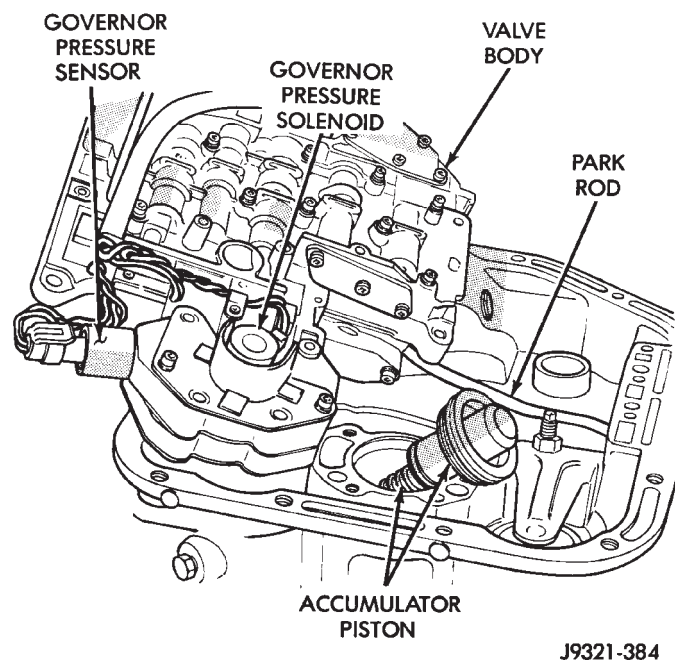


## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 124 Measuring Input Shaft End Play**

(31) Verify that valve body solenoid harness is secured in 3-4 accumulator housing cover plate.



**Fig. 125 Accumulator Piston And Springs**

(32) Install valve body as follows:

(a) Align and carefully insert park rod into pawl. Rod will make click noise as it enters pawl. Move rod slightly to check engagement.

(b) Align and seat valve body on case. Be sure manual lever shaft and overdrive connector are fully seated in case. Also be sure valve body wiring is not pinched or kinked.

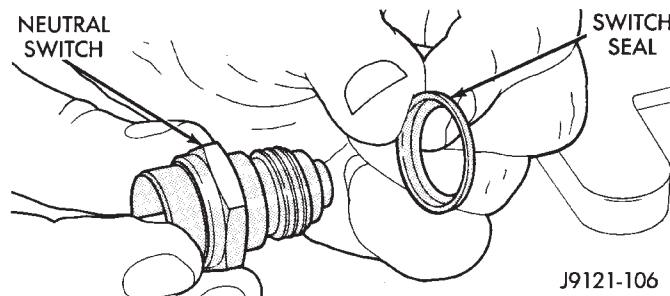
(c) Install and start all valve body attaching bolts by hand. Then tighten bolts evenly, in a diagonal pattern to 12 N·m (105 in. lbs.) torque. **Do not overtighten valve body bolts. This could result in distortion and cross leakage after installation.**

**CAUTION:** It is possible for the park rod to displace into a cavity just above the pawl sprag during installation. Make sure the rod is actually engaged in the pawl and has not displaced into the cavity.

(33) Install new filter on valve body. Tighten filter screws to 4 N·m (35 in. lbs.).

(34) Adjust front and rear bands.

(35) Install seal on park/neutral position switch (Fig. 126). Then install and tighten switch to 34 N·m (25 ft. lbs.).

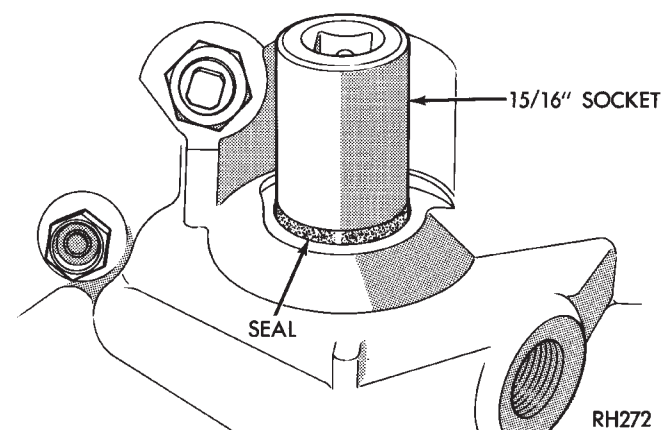


**Fig. 126 Park/Neutral Position Switch Seal Position**

(36) Install magnet in oil pan. Magnet goes on small protrusion at corner of pan.

(37) Position new oil pan gasket on case and install oil pan. Tighten pan bolts to 17 N·m (13 ft. lbs.).

(38) Install new valve body manual shaft seal in case (Fig. 127). Lubricate seal lip and manual shaft with petroleum jelly. Start seal over shaft and into case. Seat seal with 15/16 inch, deep well socket.



**Fig. 127 Installing Manual Lever Shaft Seal**

(39) Install throttle valve and shift selector levers on valve body manual lever shaft.

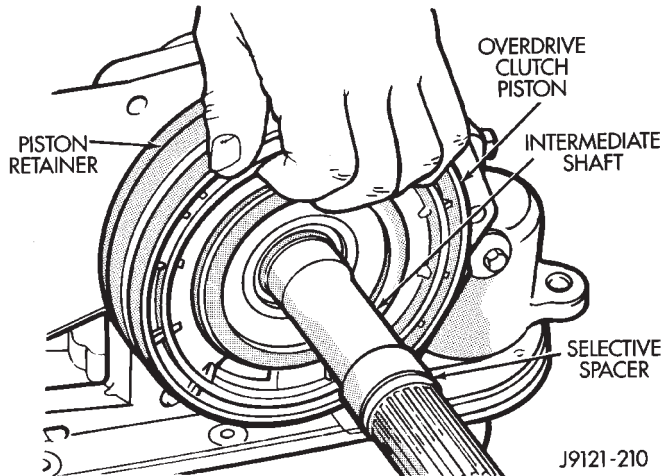
## DISASSEMBLY AND ASSEMBLY (Continued)

### OVERRUNNING CLUTCH CAM/OVERDRIVE PISTON RETAINER

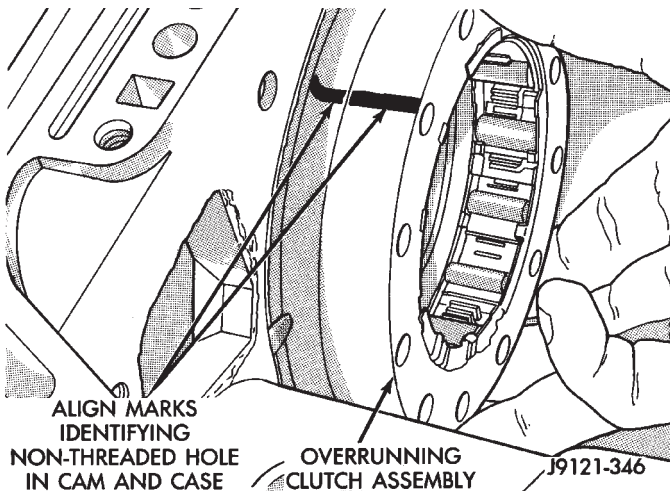
#### DISASSEMBLY

**NOTE: TO SERVICE THE OVERRUNNING CLUTCH CAM AND THE OVERDRIVE PISTON RETAINER, THE TRANSMISSION GEARTRAIN AND OVERDRIVE UNIT MUST BE REMOVED FROM THE TRANSMISSION.**

- (1) Remove the overdrive piston (Fig. 128).
- (2) Remove the overdrive piston retainer bolts.
- (3) Remove overdrive piston retainer.
- (4) Remove case gasket.
- (5) Mark the position of the overrunning clutch cam in the case (Fig. 129).
- (6) Remove the overrunning clutch cam bolts.
- (7) Remove the overrunning clutch cam.



**Fig. 128 Overdrive Piston Removal**



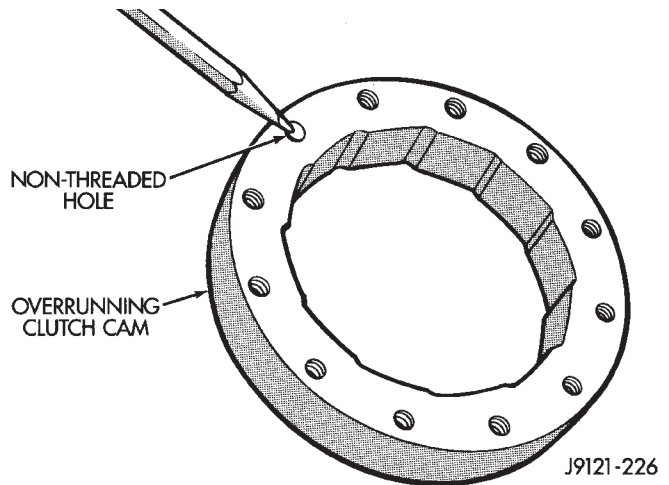
**Fig. 129 Overrunning Clutch Cam Removal**

#### ASSEMBLY

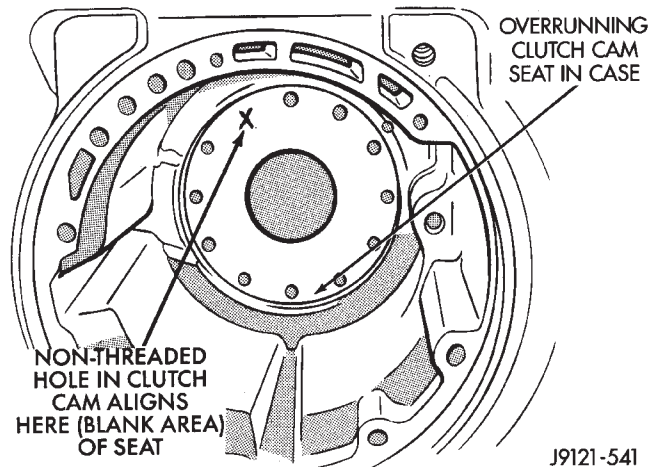
(1) Examine bolt holes in overrunning clutch cam. Note that one hole is **not threaded** (Fig. 130). This hole must align with blank area in clutch cam bolt circle (Fig. 131). Mark hole location on clutch cam and blank area in case with grease pencil, paint stripe, or scribe mark for assembly reference.

(2) Mark location of non-threaded hole in clutch cam and blank area in bolt circle with grease pencil.

(3) Align and install overrunning clutch and cam in case (Fig. 132). **Be sure cam is correctly installed. Bolt holes in cam are slightly counter-sunk on one side. Be sure this side of cam faces rearward (toward piston retainer).**



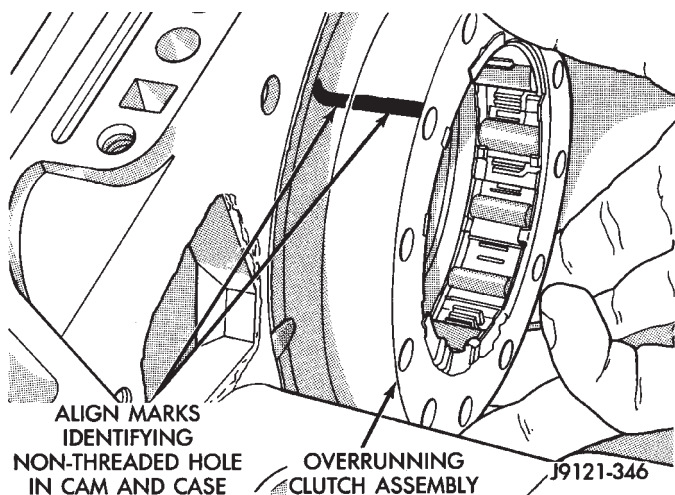
**Fig. 130 Location Of Non-Threaded Hole In Clutch Cam**



**Fig. 131 Location Of Blank Area In Clutch Cam Bolt Circle**

(4) Verify that non-threaded hole in clutch cam is properly aligned. Check alignment by threading a bolt into each bolt hole. Adjust clutch cam position if necessary.

## DISASSEMBLY AND ASSEMBLY (Continued)

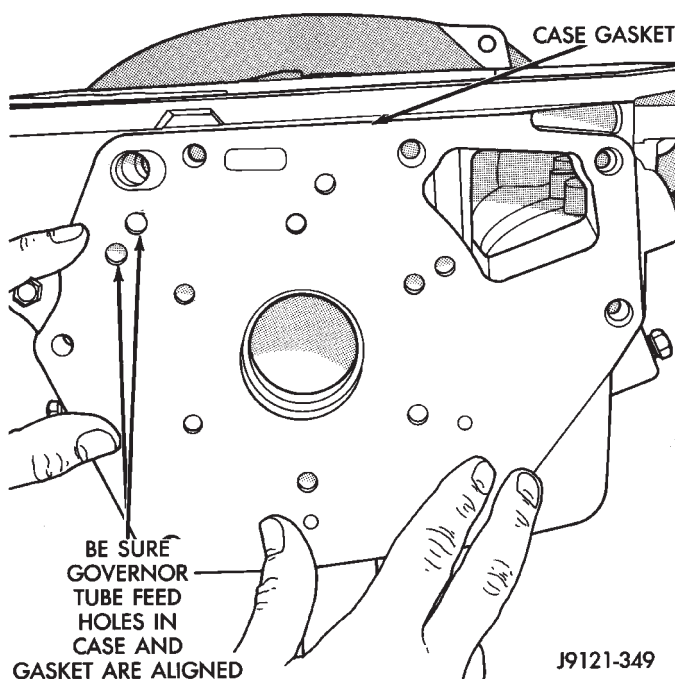


**Fig. 132 Overrunning Clutch Installation**

(5) Install and tighten overrunning clutch cam bolts to 17 N·m (13 ft. lbs.) torque. Note that clutch cam bolts are shorter than piston retainer bolts.

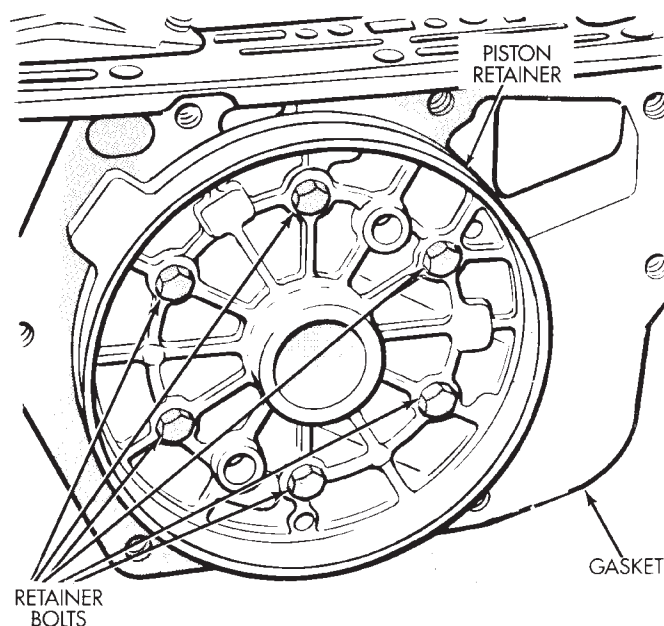
(6) Install new gasket at rear of transmission case. Use petroleum jelly to hold gasket in place. Be sure to align governor feed holes in gasket with feed passages in case (Fig. 133). Also install gasket before overdrive piston retainer. Center hole in gasket is smaller than retainer and cannot be installed over retainer.

(7) Position overdrive piston retainer on transmission case and align bolt holes in retainer, gasket and case (Fig. 134). Then install and tighten retainer bolts to 17 N·m (13 ft. lbs.) torque.



**Fig. 133 Installing/Aligning Case Gasket**

(8) Install new seals on over drive piston.



**Fig. 134 Aligning Overdrive Piston Retainer**

(9) Stand transmission case upright on bellhousing.

(10) Position Guide Ring 8114-1 on outer edge of overdrive piston retainer.

(11) Position Seal Guide 8114-2 on inner edge of overdrive piston retainer.

(12) Install overdrive piston in overdrive piston retainer by: aligning locating lugs on overdrive piston to the two mating holes in retainer.

(a) Aligning locating lugs on overdrive piston to the two mating holes in retainer.

(b) Lubricate overdrive piston seals with Mopar® Door Ease, or equivalent.

(c) Install piston over Seal Guide 8114-2 and inside Guide Ring 8114-1.

(d) Push overdrive piston into position in retainer.

(e) Verify that the locating lugs entered the lug bores in the retainer.

**NOTE: INSTALL THE REMAINING TRANSMISSION COMPONENTS AND OVERDRIVE UNIT.**

## FRONT SERVO PISTON

### DISASSEMBLY

(1) Remove seal ring from rod guide (Fig. 135).

(2) Remove small snap ring from servo piston rod. Then remove piston rod, spring and washer from piston.

(3) Remove and discard servo component O-ring and seal rings.



## DISASSEMBLY AND ASSEMBLY (Continued)

### ASSEMBLY

Clean and inspect front servo components.

(1) Lubricate new O-ring and seal rings with petroleum jelly and install them on piston, guide and rod.

(2) Install rod in piston. Install spring and washer on rod. Compress spring and install snap ring (Fig. 135).

(3) Set servo components aside for installation during transmission reassembly.

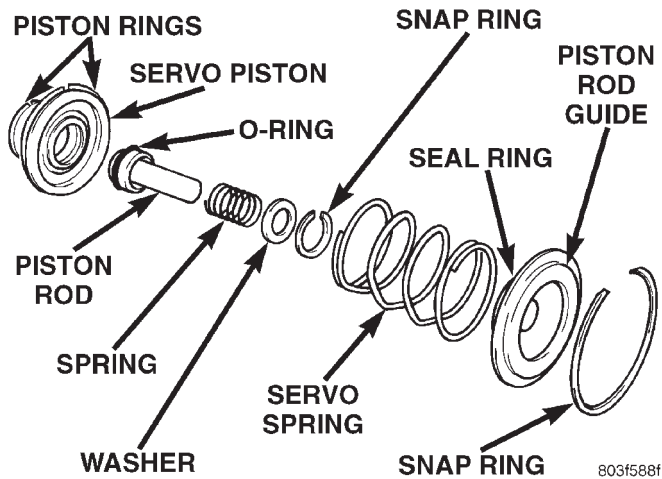


Fig. 135 Front Servo

### REAR SERVO PISTON

#### DISASSEMBLY

(1) Remove small snap ring and remove plug and spring from servo piston (Fig. 136).

(2) Remove and discard servo piston seal ring.

#### ASSEMBLY

(1) Lubricate piston and guide seals with petroleum jelly. Lubricate other servo parts with Mopar® ATF Plus 3, Type 7176, transmission fluid.

(2) Install new seal ring on servo piston.

(3) Assemble piston, plug, spring and new snap ring.

(4) Lubricate piston seal lip with petroleum jelly.

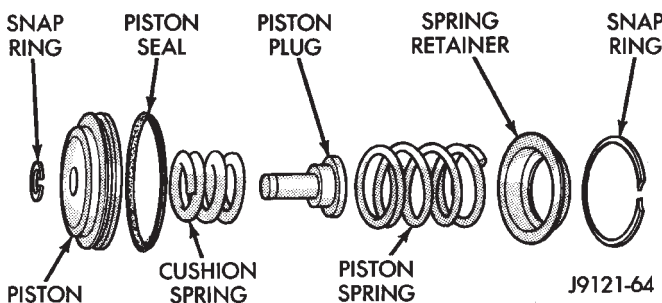


Fig. 136 Rear Servo Components

### OIL PUMP AND REACTION SHAFT SUPPORT

#### DISASSEMBLY

(1) Remove seal ring from housing and reaction shaft support (Fig. 137).

(2) Mark pump housing and support assembly for alignment reference.

(3) Remove bolts attaching pump body to support (Fig. 138).

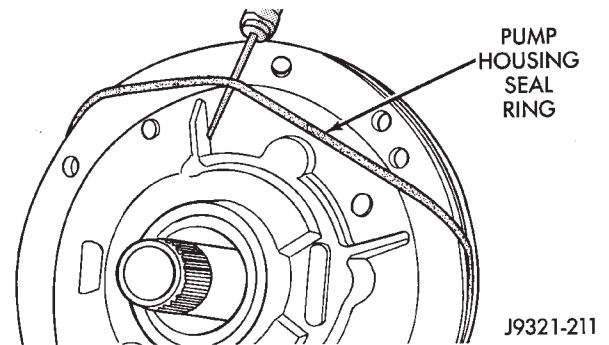


Fig. 137 Removing Pump Seal Ring

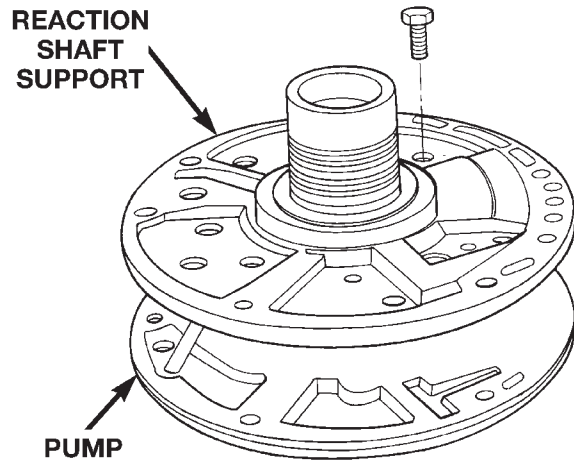


Fig. 138 Pump Support Bolts

(4) Separate support from pump housing (Fig. 139).

(5) Remove inner and outer gears from reaction shaft support (Fig. 140).

(6) If pump seal was not removed during transmission disassembly, remove seal with punch and hammer.

(7) Remove front clutch thrust washer from support hub (Fig. 141).

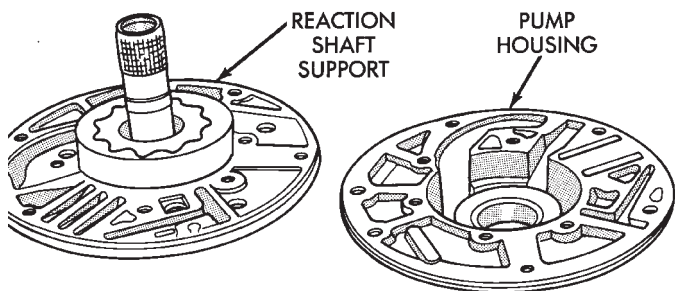
#### OIL PUMP BUSHING REPLACEMENT

(1) Remove pump bushing with Tool Handle C-4171 and Bushing Remover SP-3551 from Tool Set C-3887-J (Fig. 142).

(2) Install new pump bushing with Tool Handle C-4171 and Bushing Installer SP-5117 (Fig. 142). Bushing should be flush with pump housing bore.

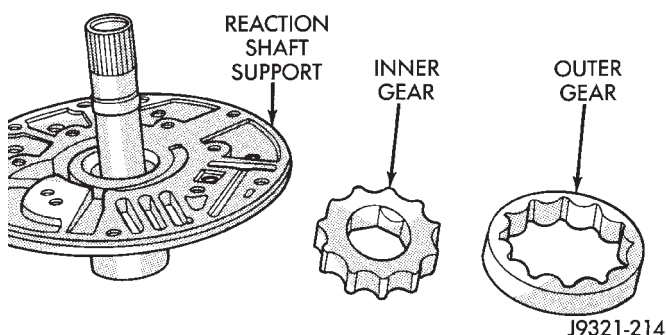


## DISASSEMBLY AND ASSEMBLY (Continued)



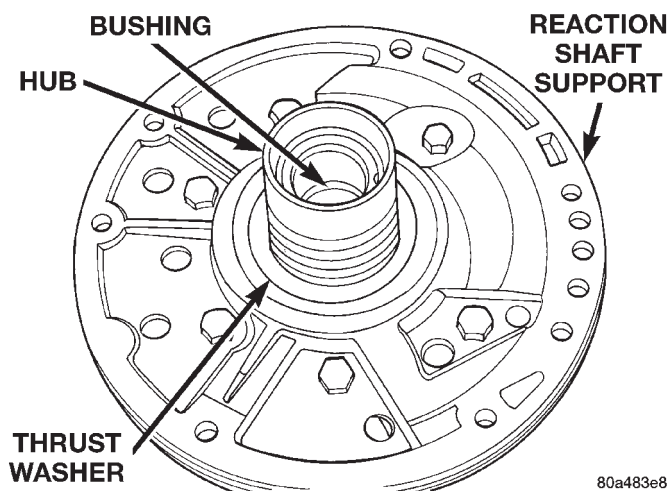
J9321-213

**Fig. 139 Separating Pump Housing From Reaction Shaft Support**



J9321-214

**Fig. 140 Pump Gear Removal**



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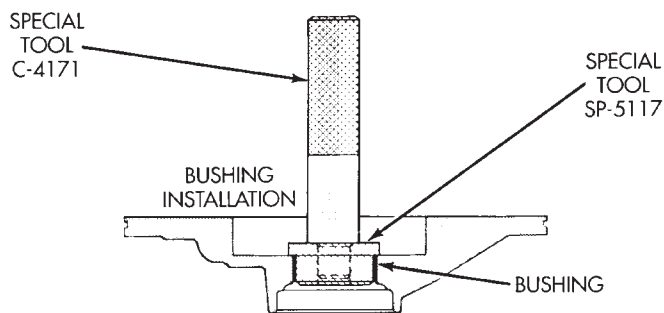
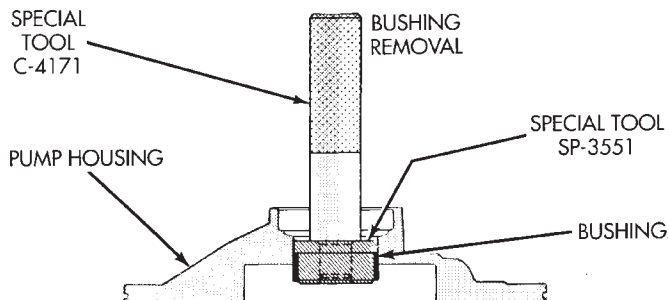
**Fig. 141 Support Hub Thrust Washer**

(3) Stake new pump bushing in two places with blunt punch (Fig. 143). Remove burrs from stake points with knife blade afterward.

#### REACTION SHAFT SUPPORT BUSHING REMOVAL

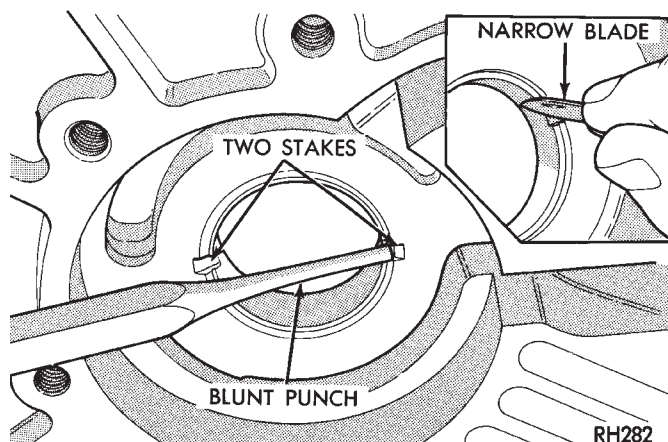
(1) Assemble Bushing Remover Tools SP-1191, 3633 and 5324 (Fig. 144). **Do not clamp any part of reaction shaft or support in vise.**

(2) Hold Cup Tool SP-3633 firmly against reaction shaft and thread remover SP-5324 into bushing as far as possible by hand. Then thread remover tool 3-4 additional turns into bushing with a wrench.



J9221-242

**Fig. 142 Removing Oil Pump Bushing**



**Fig. 143 Staking Oil Pump Bushing**

(3) Turn remover tool hex nut down against remover cup to pull bushing from shaft. Clean all chips from shaft after bushing removal.

(4) Lightly grip old bushing in vise or with pliers and back remover tool out of bushing.

(5) Assemble Bushing Installer Tools C-4171 and SP-5325 (Fig. 144).

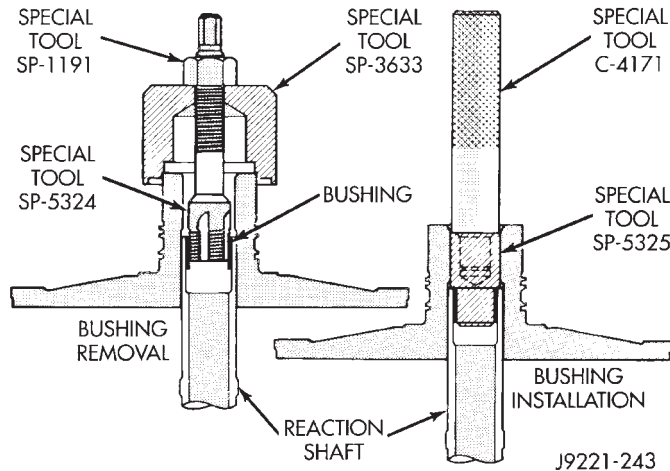
(6) Slide new bushing onto Installer Tool SP-5325.

(7) Position reaction shaft support upright on a clean smooth surface.

(8) Align bushing in bore. Then tap bushing into place until Bushing Installer SP-5325 bottoms.

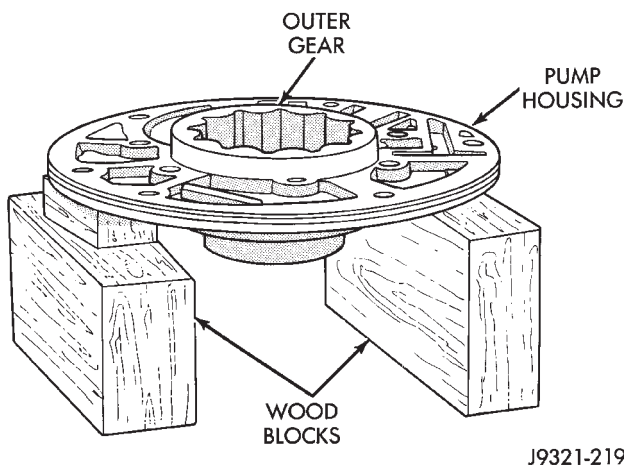
(9) Clean reaction shaft support thoroughly after installing bushing.

## DISASSEMBLY AND ASSEMBLY (Continued)

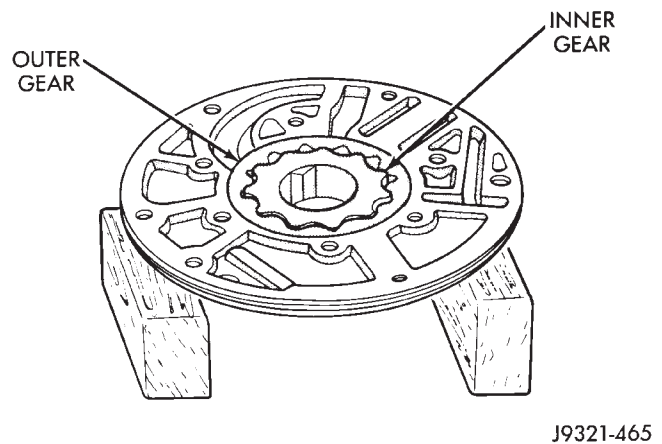
**Fig. 144 Replacing Reaction Shaft Support Bushing****ASSEMBLY**

- (1) Lubricate gear bore in pump housing with transmission fluid.
- (2) Lubricate pump gears with transmission fluid.
- (3) Support pump housing on wood blocks (Fig. 145).
- (4) Install outer gear in pump housing (Fig. 145). Gear can be installed either way (it is not a one-way fit).
- (5) Install pump inner gear (Fig. 146).

**CAUTION:** The pump inner gear is a one way fit. The bore on one side of the gear inside diameter (I.D.) is chamfered. Be sure the chamfered side faces forward (to front of pump).

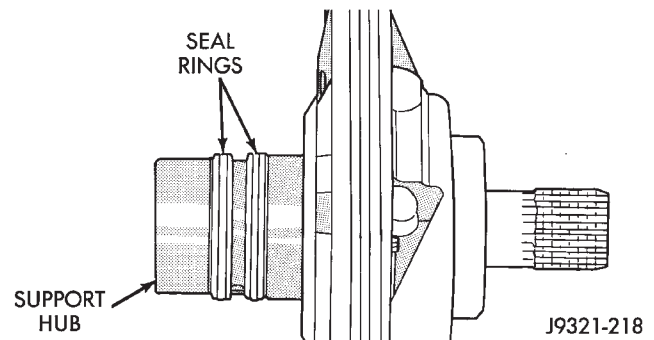
**Fig. 145 Supporting Pump And Installing Outer Gear**

- (6) Install new thrust washer on hub of reaction shaft support. Lubricate washer with transmission fluid or petroleum jelly.
- (7) If reaction shaft seal rings are being replaced, install new seal rings on support hub (Fig. 147). Lubricate seal rings with transmission fluid or petro-

**Fig. 146 Pump Inner Gear Installation**

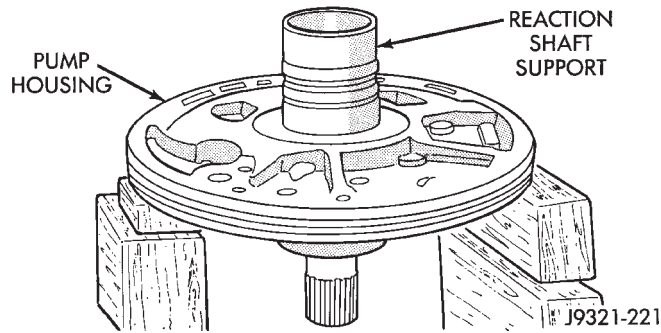
leum jelly after installation. Squeeze each ring until ring ends are securely hooked together.

**CAUTION:** The reaction shaft support seal rings will break if overspread, or twisted. If new rings are being installed, spread them only enough for installation. Also be very sure the ring ends are securely hooked together after installation. Otherwise, the rings will either prevent pump installation, or break during installation.

**Fig. 147 Hub Seal Ring Position**

- (8) Install reaction shaft support on pump housing (Fig. 148).
- (9) Align reaction support on pump housing. Use alignment marks made at disassembly. Or, rotate support until bolt holes in support and pump housing are all aligned (holes are offset for one-way fit).
- (10) Install all bolts that attach support to pump housing. Then tighten bolts finger tight.
- (11) Tighten support-to-pump bolts to required torque as follows:
  - (a) Reverse pump assembly and install it in transmission case. Position pump so bolts are facing out and are accessible.
  - (b) Secure pump assembly in case with 2 or 3 bolts, or with pilot studs.

## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 148 Assembling Reaction Shaft Support And Pump Housing**

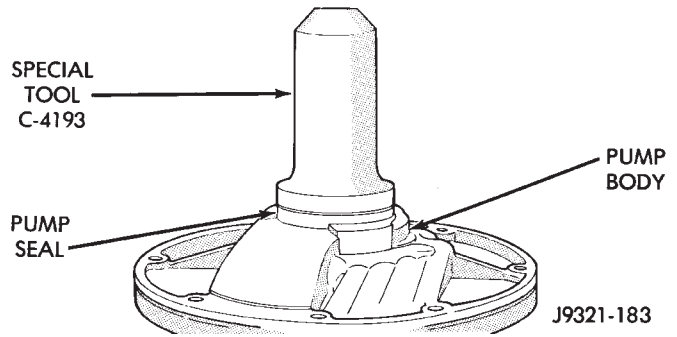
(c) Tighten support-to-pump bolts to 20 N·m (15 ft. lbs.).

(d) Remove pump assembly from transmission case.

(12) Install new oil seal in pump with Special Tool C-4193 and Tool Handle C-4171 (Fig. 149). Be sure seal lip faces inward.

(13) Install new seal ring around pump housing. Be sure seal is properly seated in groove.

(14) Lubricate lip of pump oil seal and O-ring seal with transmission fluid.



**Fig. 149 Pump Oil Seal Installation**

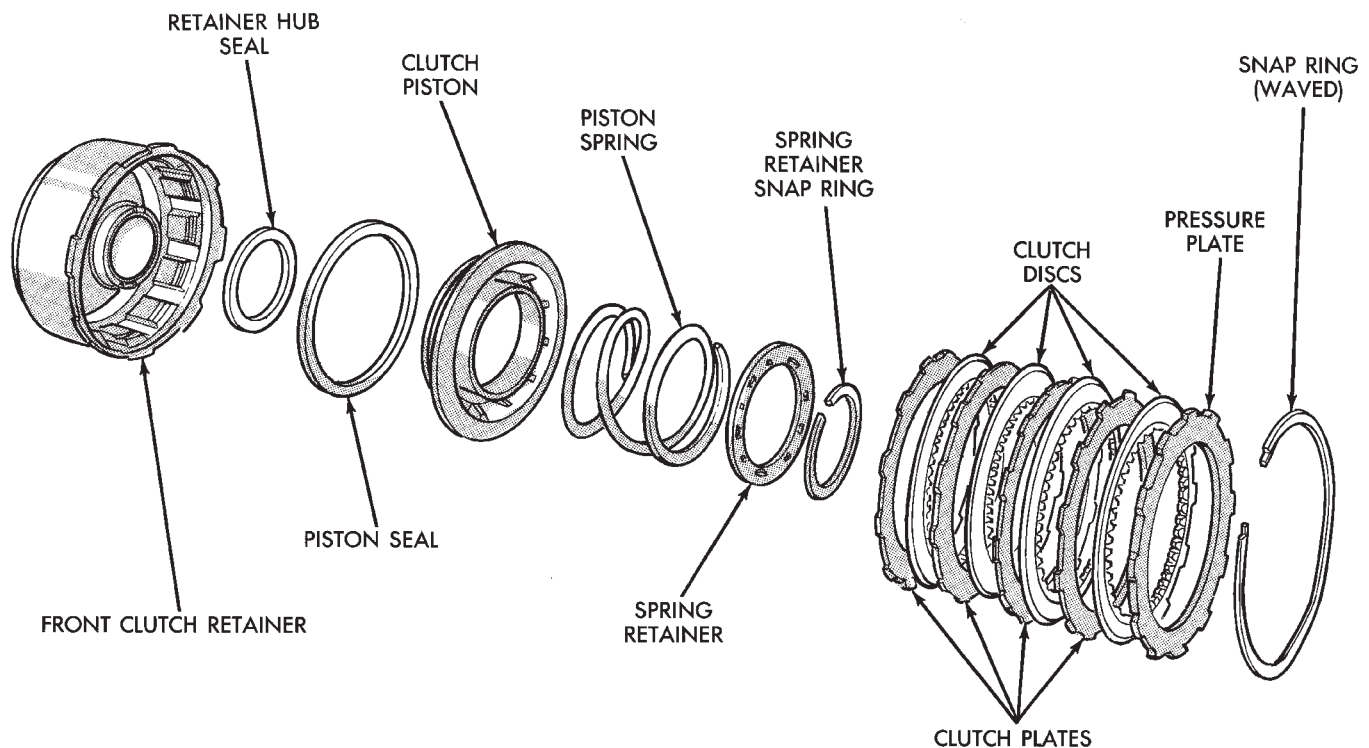
## FRONT CLUTCH

**NOTE:** The 42RE transmission uses four plates and discs for the front clutch. The 44RE uses five plates and discs for the front clutch. The front clutch retainer is not interchangeable between these transmissions.

## DISASSEMBLY

(1) Remove waved snap ring and remove pressure plate, clutch plates and clutch discs (Fig. 150).

(2) Compress clutch piston spring with Compressor Tool C-3575-A (Fig. 151). Be sure legs of tool are



J9321-222

**Fig. 150 42RE Front Clutch Components**



## DISASSEMBLY AND ASSEMBLY (Continued)

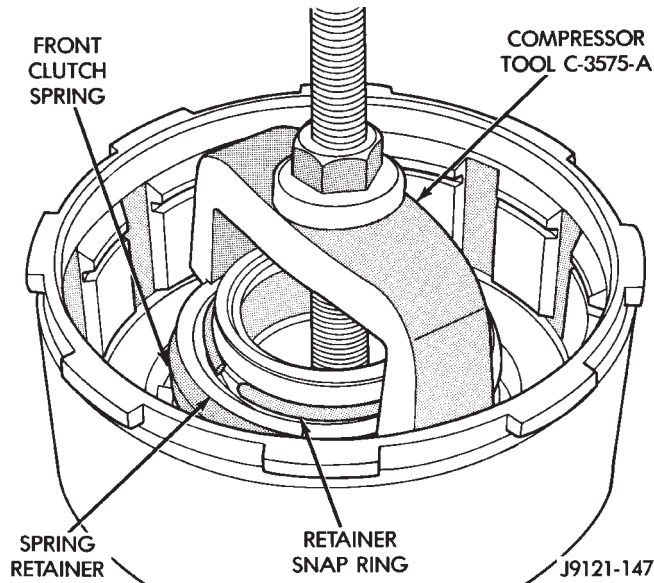
seated squarely on spring retainer before compressing spring.

(3) Remove retainer snap ring and remove compressor tool.

(4) Remove spring retainer and clutch spring. Note position of retainer on spring for assembly reference.

(5) Remove clutch piston from clutch retainer. Remove piston by rotating it up and out of retainer.

(6) Remove seals from clutch piston and clutch retainer hub. Discard both seals as they are not reusable.



**Fig. 151 Compressing Front Clutch Piston Spring**

#### ASSEMBLY

(1) Soak clutch discs in transmission fluid while assembling other clutch parts.

(2) Install new seals on piston and in hub of retainer. Be sure lip of each seal faces interior of clutch retainer.

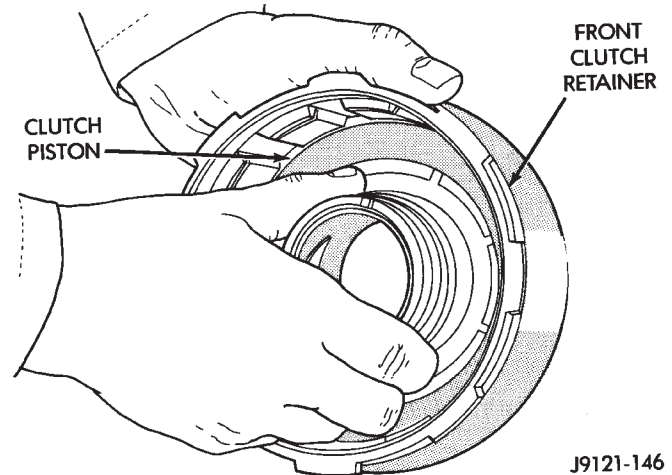
(3) Lubricate lips of piston and retainer seals with liberal quantity of Mopar® Door Ease. Then lubricate retainer hub, bore and piston with light coat of transmission fluid.

(4) Install clutch piston in retainer (Fig. 152). Use twisting motion to seat piston in bottom of retainer.

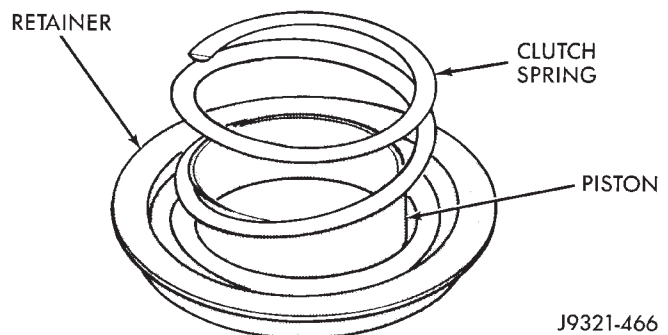
**CAUTION:** Never push the clutch piston straight in. This will fold the seals over causing leakage and clutch slip.

(5) Position spring in clutch piston (Fig. 153).

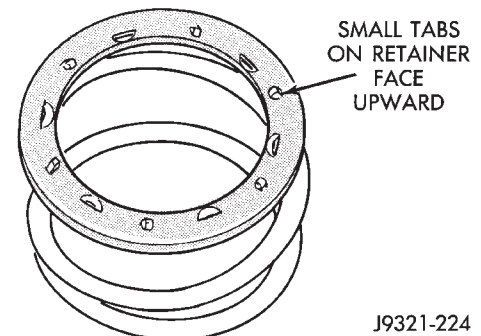
(6) Position spring retainer on top of piston spring (Fig. 154). **Make sure retainer is properly installed. Small raised tabs should be facing upward. Semicircular lugs on underside of retainer are for positioning retainer in spring.**



**Fig. 152 Front Clutch Piston Installation**



**Fig. 153 Clutch Piston Spring Installation**



**Fig. 154 Correct Spring Retainer Installed Position**

(7) Compress piston spring and retainer with Compressor Tool C-3575-A (Fig. 151). Then install new snap ring to secure spring retainer and spring.

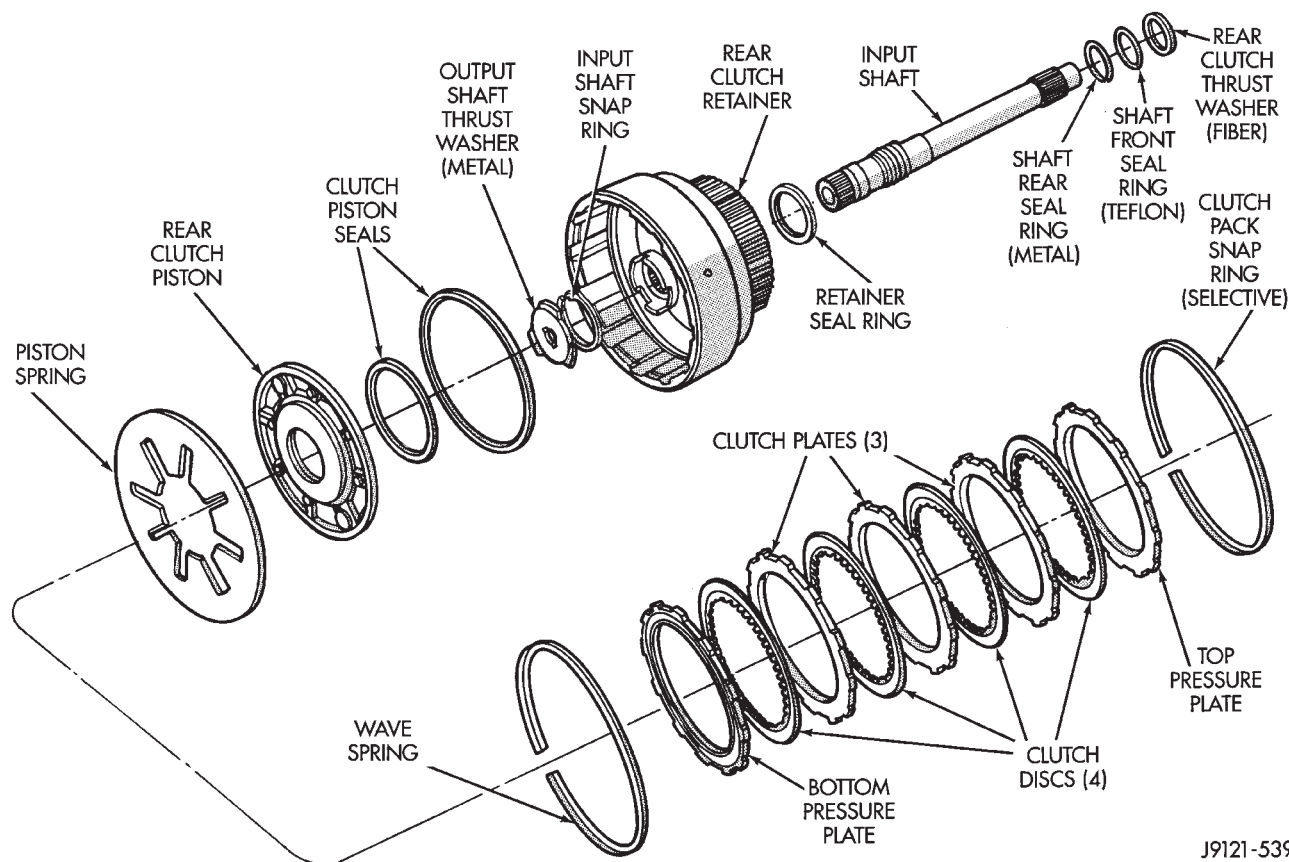
(8) Install clutch plates and discs (Fig. 150). Install steel plate then disc until all plates and discs are installed. The front clutch uses 4 clutch discs and plates in a 42RE transmission. In a 44RE transmission 5 discs and plates are used.

(9) Install pressure plate and waved snap ring (Fig. 150).

Front clutch clearance specifications for the 42RE and 44RE transmission are the same.



## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 155 Rear Clutch Components**

Clearance should be 1.70 to 3.40 mm (0.067 to 0.134 in.). If clearance is incorrect, clutch discs, plates, pressure plates and snap ring may have to be changed.

**REAR CLUTCH****DISASSEMBLY**

(1) Remove fiber thrust washer from forward side of clutch retainer.

(2) Remove input shaft front/rear seal rings.

(3) Remove selective clutch pack snap ring (Fig. 155).

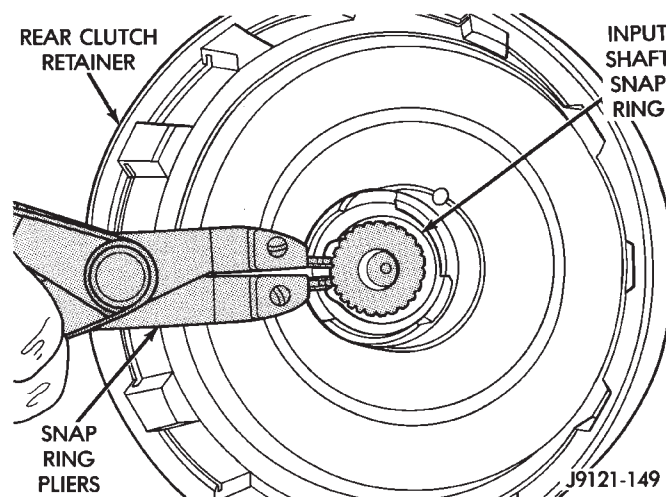
(4) Remove top pressure plate, clutch discs, steel plates, bottom pressure plate and wave snap ring and wave spring (Fig. 155).

(5) Remove clutch piston with rotating motion.

(6) Remove and discard piston seals.

(7) Remove input shaft snap-ring (Fig. 156). It may be necessary to press the input shaft in slightly to relieve tension on the snap-ring.

(8) Press input shaft out of retainer with shop press and suitable size press tool. Use a suitably sized press tool to support the retainer as close to the input shaft as possible.

**Fig. 156 Removing/Installing Input Shaft Snap-Ring****ASSEMBLY**

(1) Soak clutch discs in transmission fluid while assembling other clutch parts.

(2) Install new seal rings on clutch retainer hub and input shaft if necessary (Fig. 157).

(a) Be sure clutch hub seal ring is fully seated in groove and is not twisted.

(3) Lubricate splined end of input shaft and clutch retainer with transmission fluid. Then press input

## DISASSEMBLY AND ASSEMBLY (Continued)

shaft into retainer. Use a suitably sized press tool to support retainer as close to input shaft as possible.

(4) Install input shaft snap-ring (Fig. 156).

(5) Invert retainer and press input shaft in opposite direction until snap-ring is seated.

(6) Install new seals on clutch piston. Be sure lip of each seal faces interior of clutch retainer.

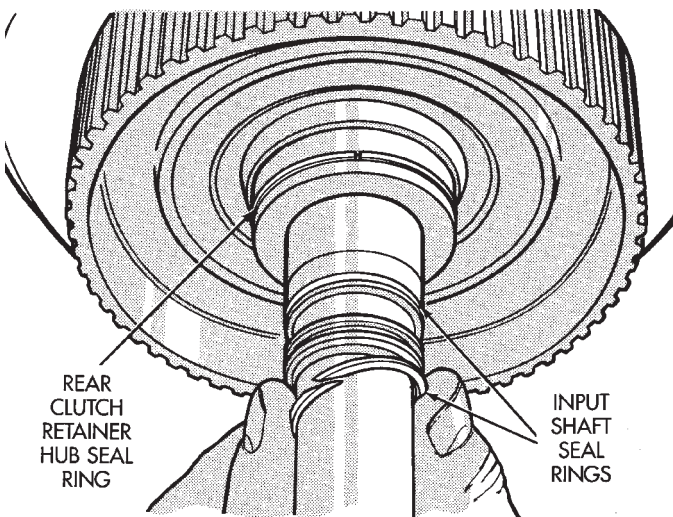
(7) Lubricate lip of piston seals with generous quantity of Mopar® Door Ease. Then lubricate retainer hub and bore with light coat of transmission fluid.

(8) Install clutch piston in retainer. Use twisting motion to seat piston in bottom of retainer. A thin strip of plastic (about 0.020" thick), can be used to guide seals into place if necessary.

**CAUTION:** Never push the clutch piston straight in. This will fold the seals over causing leakage and clutch slip. In addition, never use any type of metal tool to help ease the piston seals into place. Metal tools will cut, shave, or score the seals.

(9) Install piston spring in retainer and on top of piston (Fig. 160). Concave side of spring faces downward (toward piston).

(10) Install wave spring in retainer (Fig. 160). Be sure spring is completely seated in retainer groove.

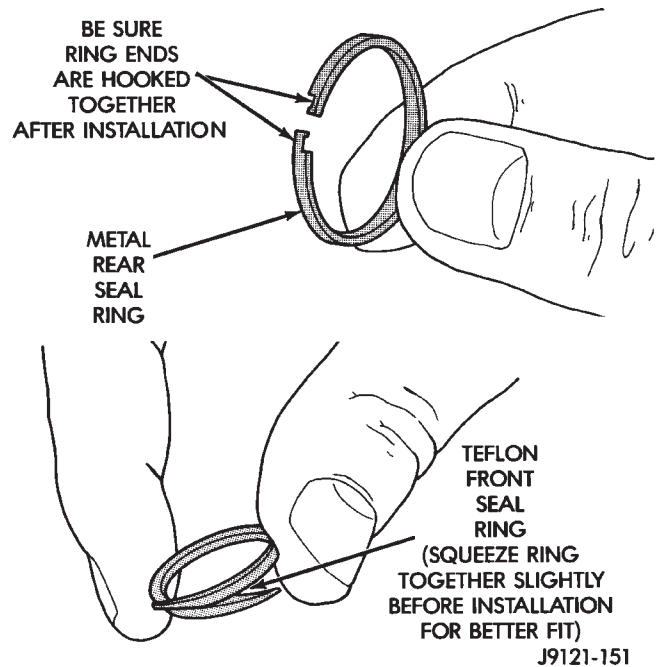


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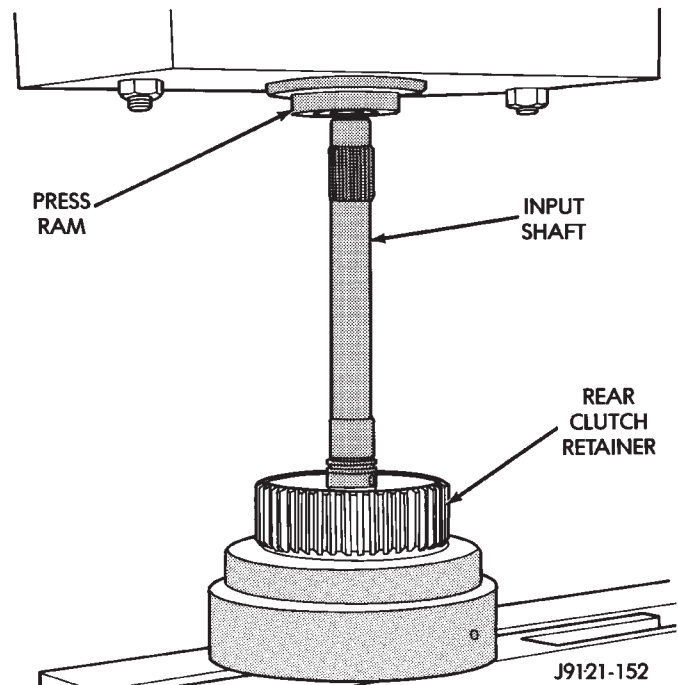
**Fig. 157 Rear Clutch Retainer And Input Shaft Seal Ring Installation**

(11) Install bottom pressure plate (Fig. 155). Ridged side of plate faces downward (toward piston) and flat side toward clutch pack.

(12) Install first clutch disc in retainer on top of bottom pressure plate. Then install a clutch plate followed by a clutch disc until entire clutch pack is



**Fig. 158 Input Shaft Seal Ring Identification**



**Fig. 159 Pressing Input Shaft Into Rear Clutch Retainer**

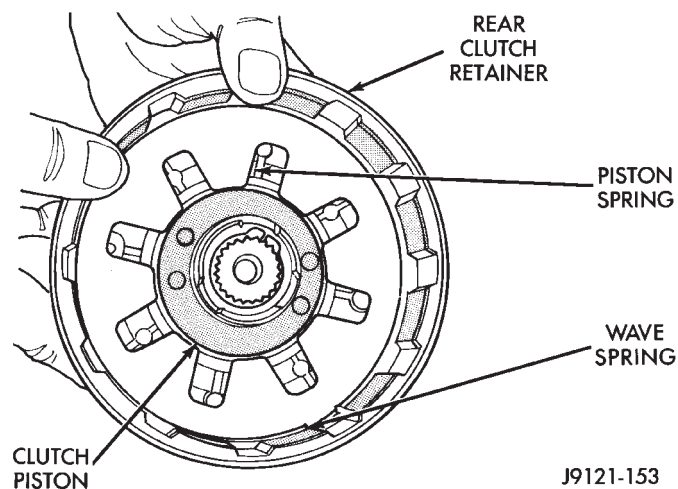
installed (4 discs and 3 plates are required) (Fig. 155).

(13) Install top pressure plate.

(14) Install selective snap ring. Be sure snap ring is fully seated in retainer groove.

(15) Using a suitable gauge bar and dial indicator, measure clutch pack clearance (Fig. 161).

## DISASSEMBLY AND ASSEMBLY (Continued)



J9121-153

**Fig. 160 Piston Spring/Wave Spring Position**

(a) Position gauge bar across the clutch drum with the dial indicator pointer on the pressure plate (Fig. 161).

(b) Using two small screw drivers, lift the pressure plate and release it.

(c) Zero the dial indicator.

(d) Lift the pressure plate until it contacts the snap-ring and record the dial indicator reading.

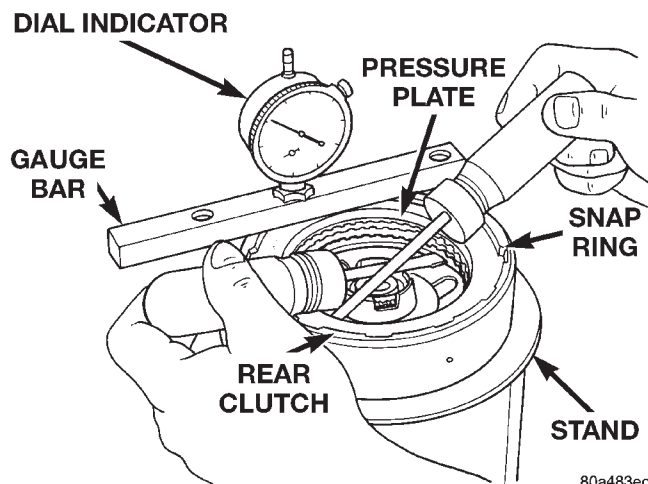
Clearance should be 0.64 - 1.14 mm (0.025 - 0.045 in.). If clearance is incorrect, steel plates, discs, selective snap ring and pressure plates may have to be changed.

The selective snap ring thicknesses are:

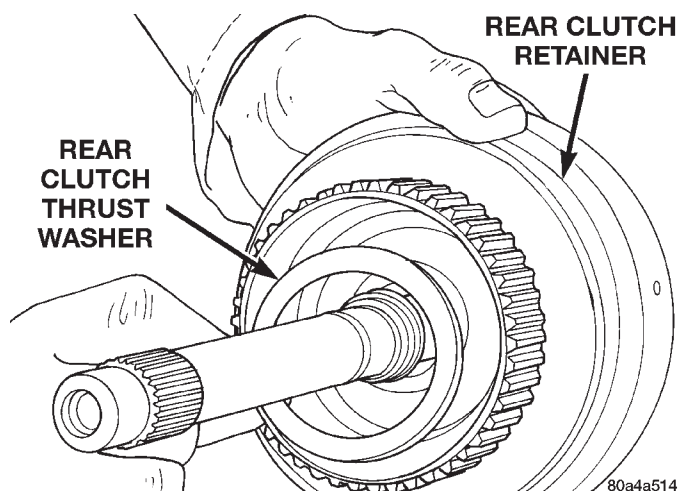
- .107-.109 in.
- .098-.100 in.
- .095-.097 in.
- .083-.085 in.
- .076-.078 in.
- .071-.073 in.
- .060-.062 in.

(16) Coat rear clutch thrust washer with petroleum jelly and install washer over input shaft and into clutch retainer (Fig. 162). Use enough petroleum jelly to hold washer in place.

(17) Set rear clutch aside for installation during final assembly.



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**Fig. 161 Checking Rear Clutch Pack Clearance****PLANETARY GEARTRAIN/OUTPUT SHAFT**

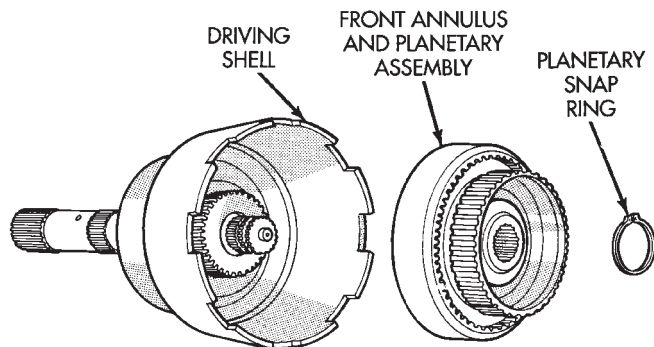
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**Fig. 162 Installing Rear Clutch Thrust Washer****DISASSEMBLY**

- (1) Remove planetary snap ring (Fig. 163).
- (2) Remove front annulus and planetary assembly from driving shell (Fig. 163).
- (3) Remove snap ring that retains front planetary gear in annulus gear (Fig. 164).
- (4) Remove tabbed thrust washer and tabbed thrust plate from hub of front annulus (Fig. 165).
- (5) Separate front annulus and planetary gears (Fig. 165).
- (6) Remove front planetary gear front thrust washer from annulus gear hub.
- (7) Separate and remove driving shell, rear planetary and rear annulus from output shaft (Fig. 166).
- (8) Remove front planetary rear thrust washer from driving shell.
- (9) Remove tabbed thrust washers from rear planetary gear.

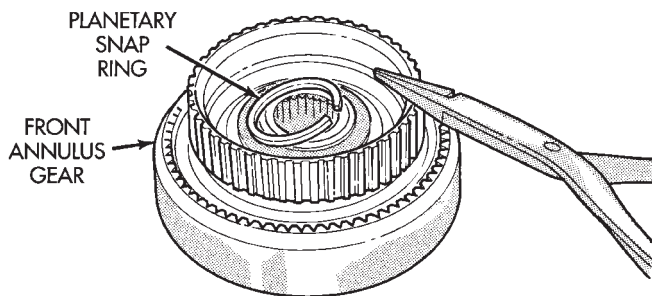
## DISASSEMBLY AND ASSEMBLY (Continued)

(10) Remove lock ring that retains sun gear in driving shell. Then remove sun gear, spacer and thrust plates.



J9421-175

**Fig. 163 Front Annulus And Planetary Assembly Removal**



J9421-176

**Fig. 164 Front Planetary Snap Ring Removal**

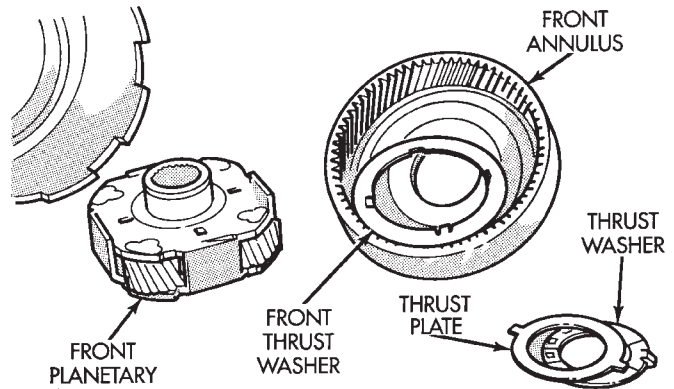
### ASSEMBLY

(1) Lubricate output shaft and planetary components with transmission fluid. Use petroleum jelly to lubricate and hold thrust washers and plates in position.

(2) Assemble rear annulus gear and support if disassembled. Be sure support snap ring is seated and that shoulder-side of support faces rearward (Fig. 167).

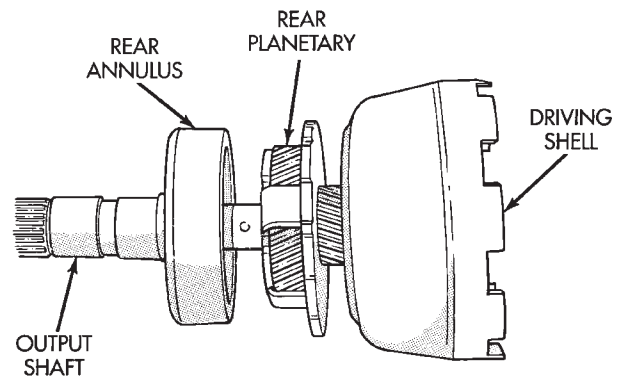
(3) Install rear thrust washer on rear planetary gear. Use enough petroleum jelly to hold washer in place. Also be sure all four washer tabs are properly engaged in gear slots.

(4) Install rear annulus over and onto rear planetary gear (Fig. 167).



J9421-177

**Fig. 165 Front Planetary And Annulus Gear Disassembly**



J9421-178

**Fig. 166 Removing Driving Shell, Rear Planetary And Rear Annulus**

(5) Install assembled rear planetary and annulus gear on output shaft (Fig. 168). Verify that assembly is fully seated on shaft.

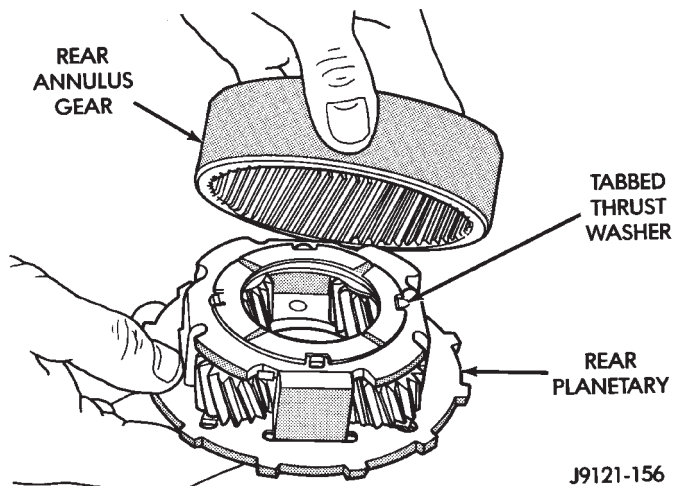
(6) Install front thrust washer on rear planetary gear (Fig. 169). Use enough petroleum jelly to hold washer on gear. Be sure all four washer tabs are seated in slots.

(7) Install spacer on sun gear (Fig. 170).

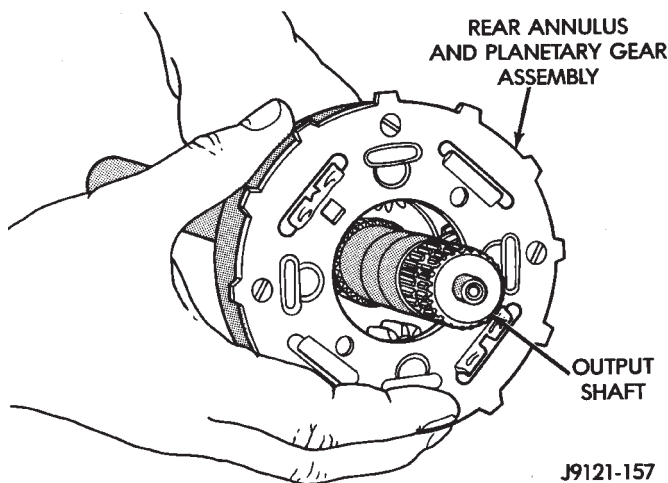
(8) Install thrust plate on sun gear (Fig. 171). Note that driving shell thrust plates are interchangeable. Use either plate on sun gear and at front/rear of shell.



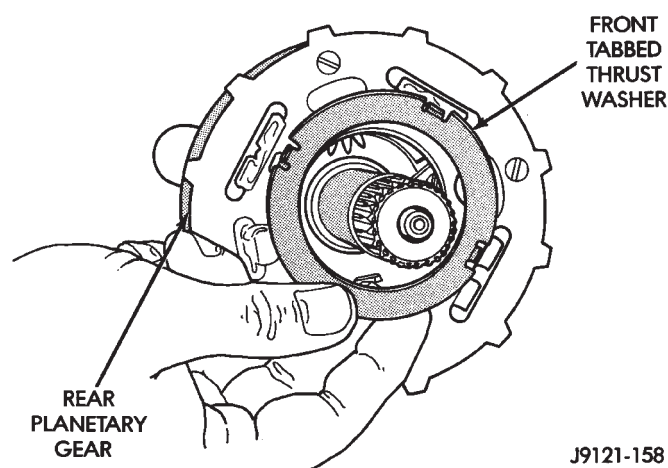
## DISASSEMBLY AND ASSEMBLY (Continued)



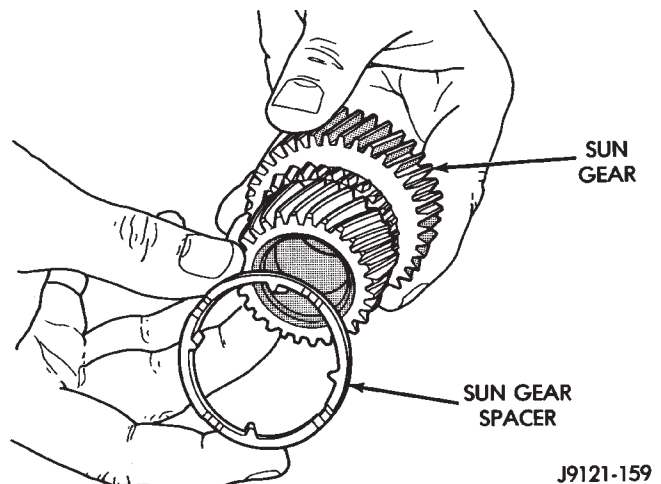
**Fig. 167 Assembling Rear Annulus And Planetary Gear**



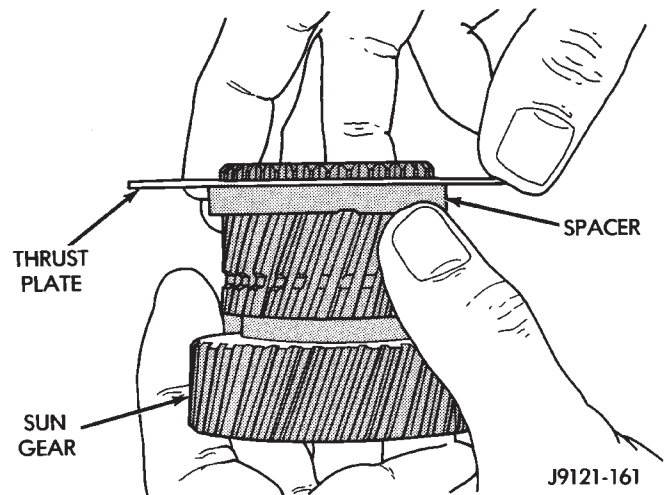
**Fig. 168 Installing Rear Annulus And Planetary On Output Shaft**



**Fig. 169 Installing Rear Planetary Front Thrust Washer**



**Fig. 170 Installing Spacer On Sun Gear**



**Fig. 171 Installing Driving Shell Front Thrust Plate On Sun Gear**

(9) Hold sun gear in place and install thrust plate over sun gear at rear of driving shell (Fig. 172).

(10) Position wood block on bench and support sun gear on block (Fig. 173). This makes it easier to align and install sun gear lock ring. Keep wood block handy as it will also be used for geartrain end play check.

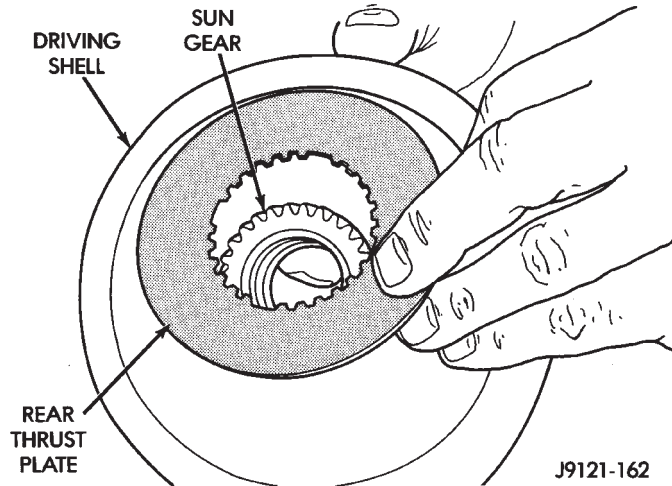
(11) Align rear thrust plate on driving shell and install sun gear lock ring. Be sure ring is fully seated in sun gear ring groove (Fig. 174).

(12) Install assembled driving shell and sun gear on output shaft (Fig. 175).

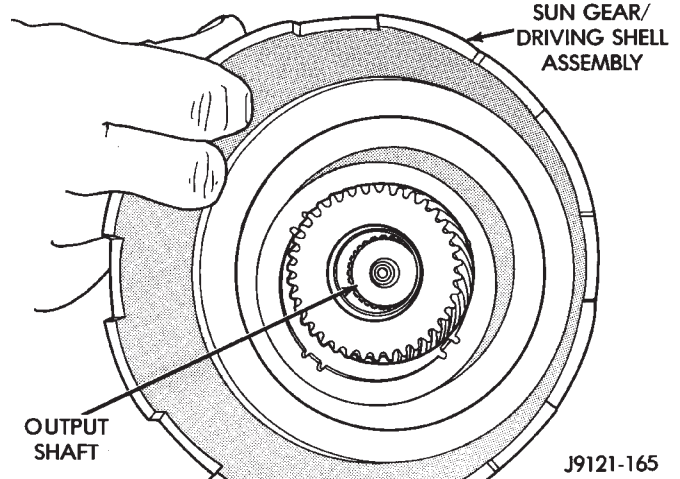
(13) Install rear thrust washer on front planetary gear (Fig. 176). Use enough petroleum jelly to hold washer in place and be sure all four washer tabs are seated.

(14) Install front planetary gear on output shaft and in driving shell (Fig. 177).

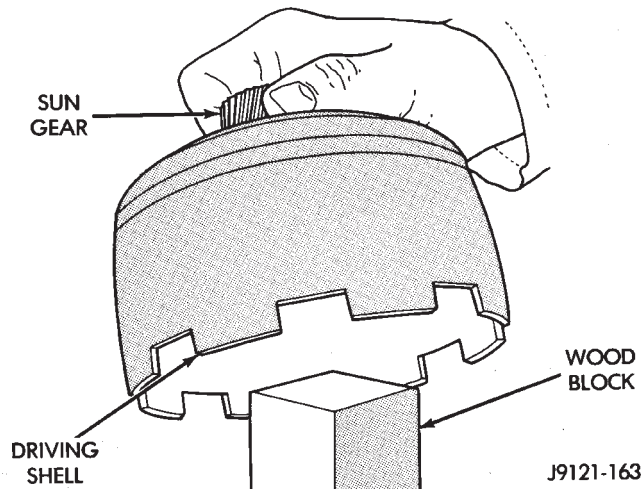
# DISASSEMBLY AND ASSEMBLY (Continued)



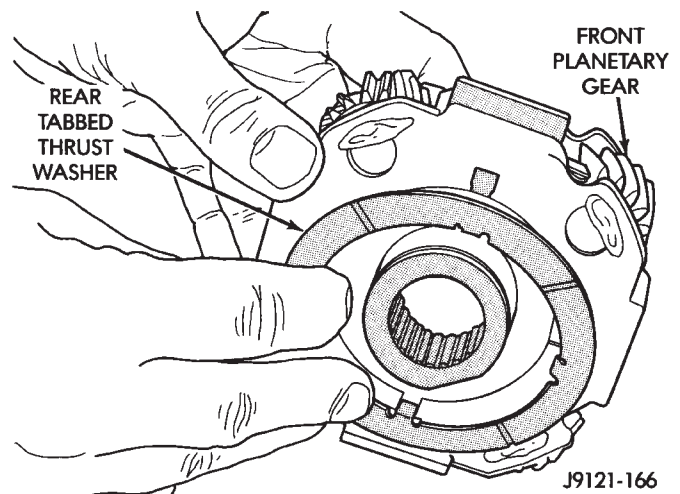
**Fig. 172 Installing Driving Shell Rear Thrust Plate**



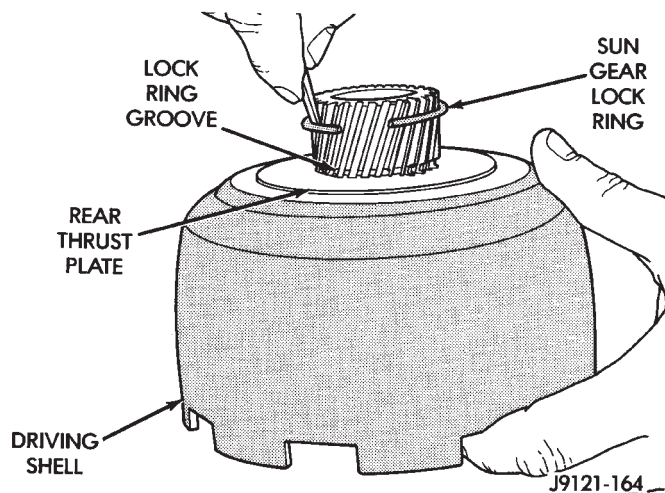
**Fig. 175 Installing Assembled Sun Gear And Driving Shell On Output Shaft**



**Fig. 173 Supporting Sun Gear On Wood Block**



**Fig. 176 Installing Rear Thrust Washer On Front Planetary Gear**



**Fig. 174 Installing Sun Gear Lock Ring**

(15) Install front thrust washer on front planetary gear. Use enough petroleum jelly to hold washer in place and be sure all four washer tabs are seated.

(16) Assemble front annulus gear and support, if necessary. Be sure support snap ring is seated.

(17) Install front annulus on front planetary (Fig. 177).

(18) Position thrust plate on front annulus gear support (Fig. 178). **Note that plate has two tabs on it. These tabs fit in notches of annulus hub.**

(19) Install thrust washer in front annulus (Fig. 179). **Align flat on washer with flat on planetary hub. Also be sure washer tab is facing up.**

(20) Install front annulus snap ring (Fig. 180). Use snap ring pliers to avoid distorting ring during installation. Also be sure ring is fully seated.

(21) Install planetary selective snap ring with snap ring pliers (Fig. 181). Be sure ring is fully seated.

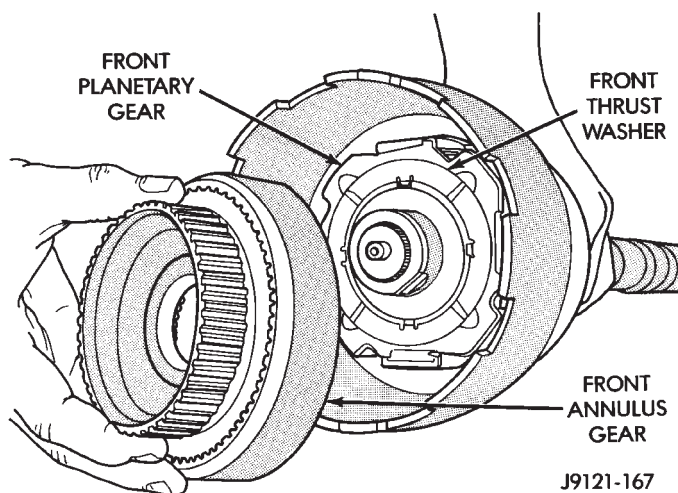
(22) Turn planetary geartrain assembly over so driving shell is facing workbench. Then support geartrain on wood block positioned under forward

## DISASSEMBLY AND ASSEMBLY (Continued)

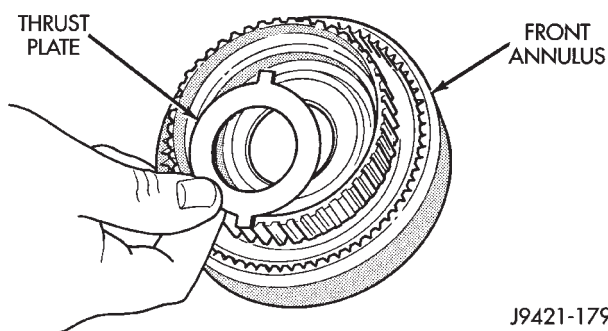
end of output shaft. This allows geartrain components to move forward for accurate end play check.

(23) Check planetary geartrain end play with feeler gauge (Fig. 182). Gauge goes between shoulder on output shaft and end of rear annulus support.

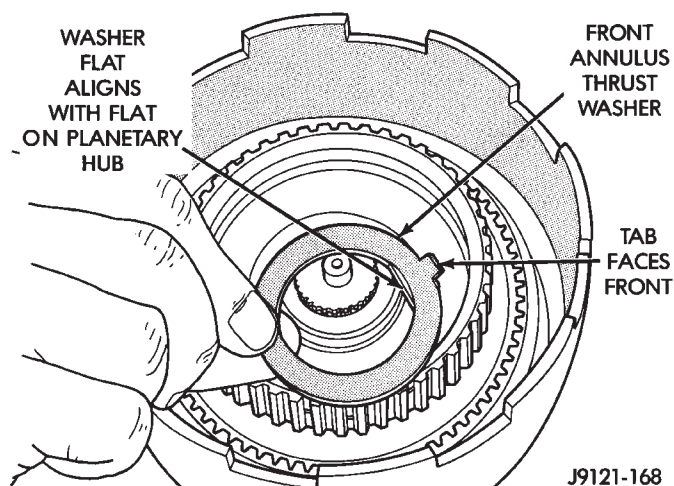
(24) Geartrain end play should be 0.12 to 1.22 mm (0.005 to 0.048 in.). If end play is incorrect, snap ring (or thrust washers) may have to be replaced. Snap ring is available in three different thicknesses for adjustment purposes.



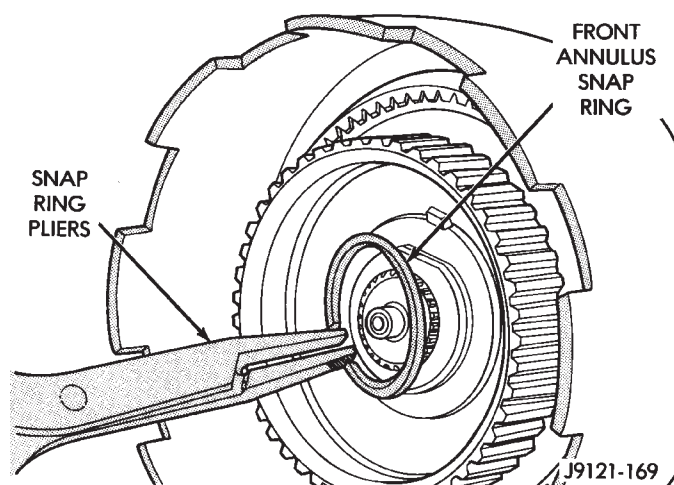
**Fig. 177 Installing Front Planetary And Annulus Gears**



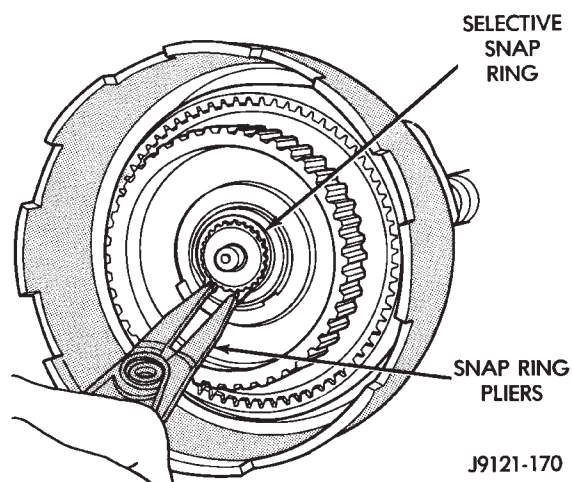
**Fig. 178 Positioning Thrust Plate On Front Annulus Support**



**Fig. 179 Installing Front Annulus Thrust Washer**



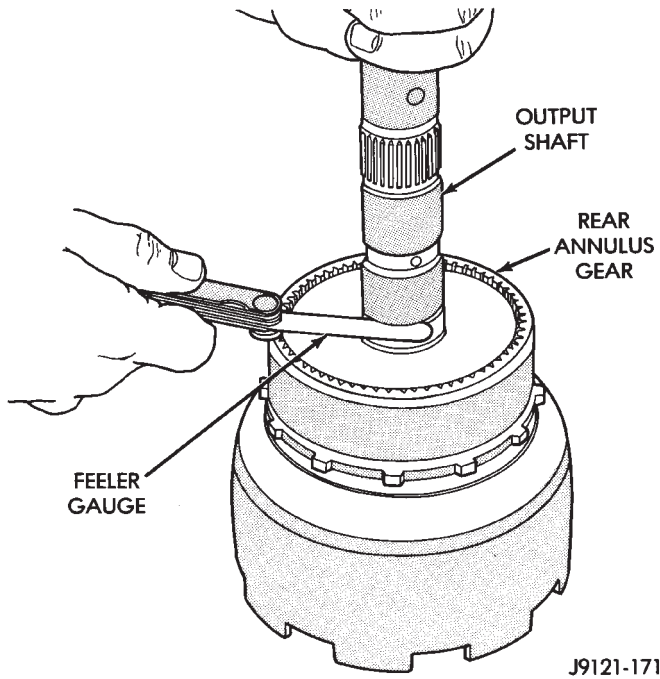
**Fig. 180 Installing Front Annulus Snap Ring**



**Fig. 181 Installing Planetary Selective Snap Ring**



# DISASSEMBLY AND ASSEMBLY (Continued)

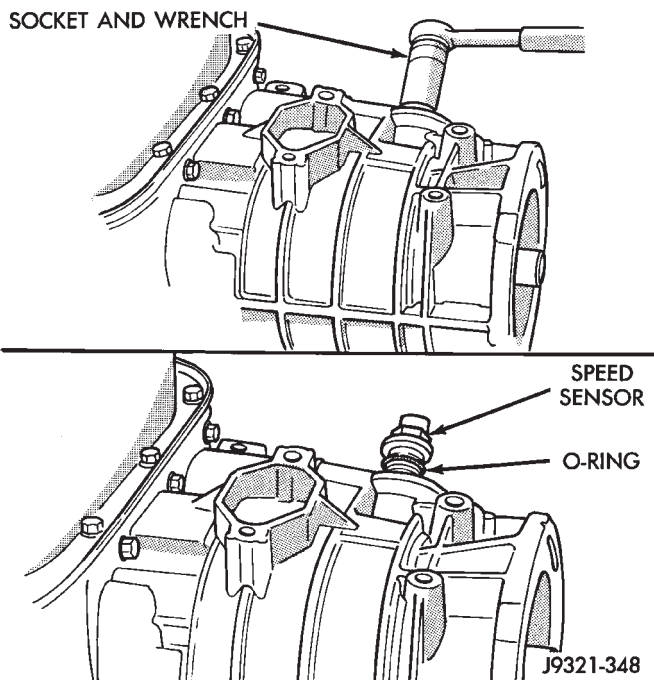


**Fig. 182 Checking Planetary Geartrain End Play**

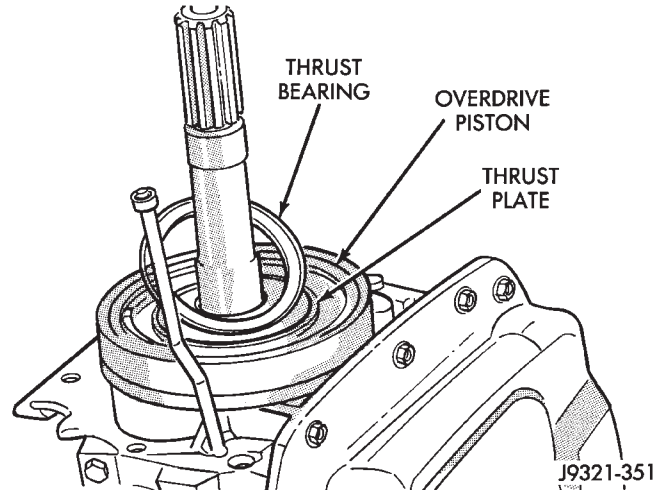
## OVERDRIVE UNIT

### DISASSEMBLY

- (1) Remove transmission speed sensor and O-ring seal from overdrive case (Fig. 183).
- (2) Remove overdrive piston thrust bearing (Fig. 184).



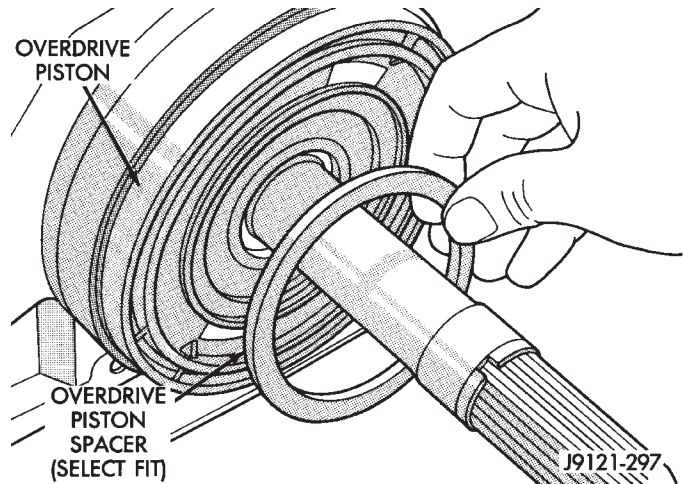
**Fig. 183 Transmission Speed Sensor Removal/Installation**



**Fig. 184 Overdrive Piston Thrust Bearing Removal/Installation**

### OVERDRIVE PISTON DISASSEMBLY

- (1) Remove overdrive piston thrust plate (Fig. 185). Retain thrust plate. It is a select fit part and may possibly be reused.



**Fig. 185 Overdrive Piston Thrust Plate Removal/Installation**

- (2) Remove intermediate shaft spacer (Fig. 186). Retain spacer. It is a select fit part and may possibly be reused.

- (3) Remove overdrive piston from retainer (Fig. 187).

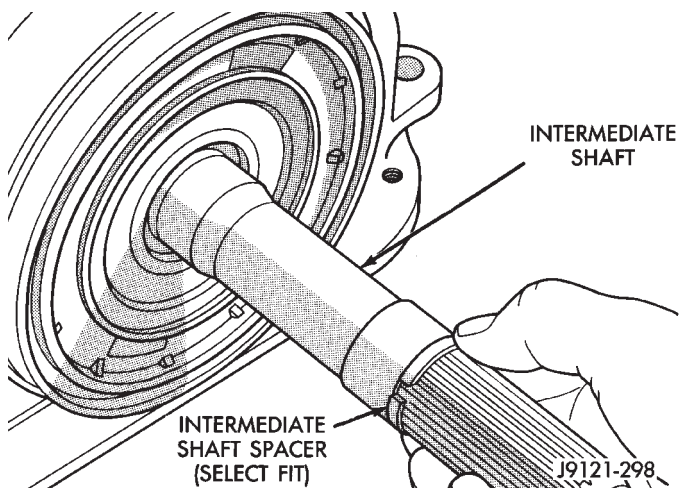
### OVERDRIVE CLUTCH PACK DISASSEMBLY

- (1) Remove overdrive clutch pack wire retaining ring (Fig. 188).
- (2) Remove overdrive clutch pack (Fig. 189).

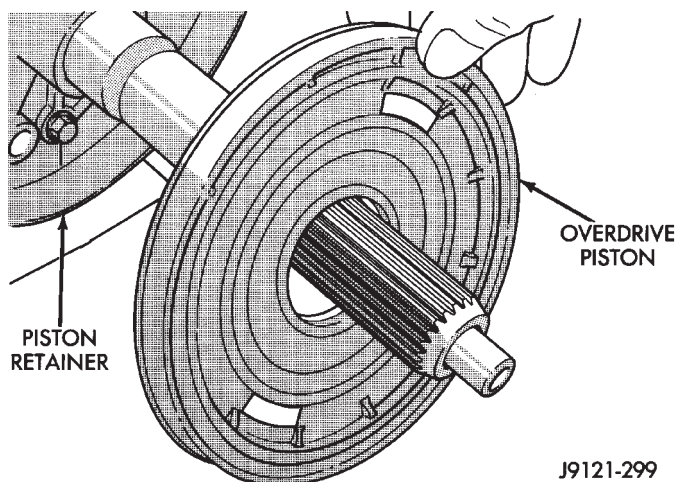
**NOTE:** The 42RE transmission has three clutch discs and two clutch plates. The 44RE transmission has four clutch discs and three clutch plates.



## DISASSEMBLY AND ASSEMBLY (Continued)

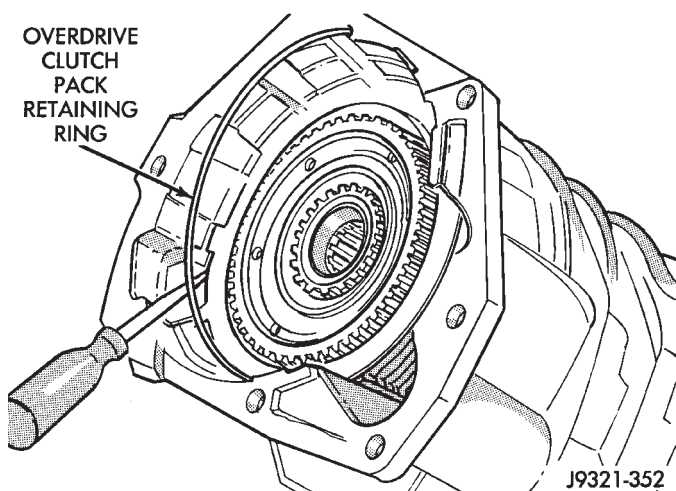


**Fig. 186 Intermediate Shaft Spacer Location**

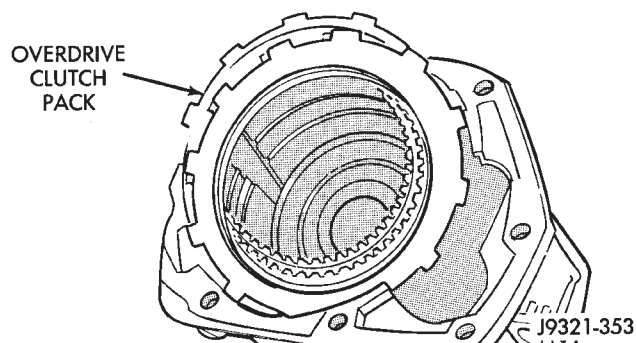


**Fig. 187 Overdrive Piston Removal**

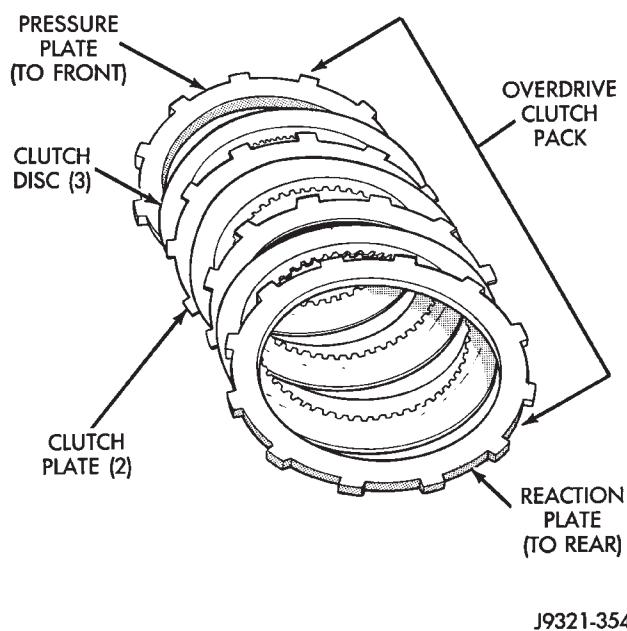
(3) Note position of clutch pack components for assembly reference (Fig. 190).



**Fig. 188 Removing Overdrive Clutch Pack Retaining Ring**



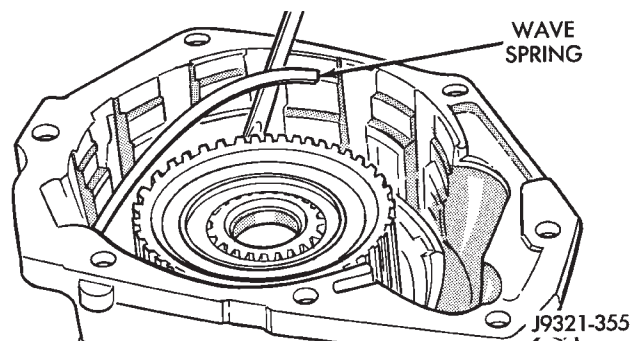
**Fig. 189 Overdrive Clutch Pack Removal**



**Fig. 190 42RE Overdrive Clutch Component Position**

## OVERDRIVE GEARTRAIN DISASSEMBLY

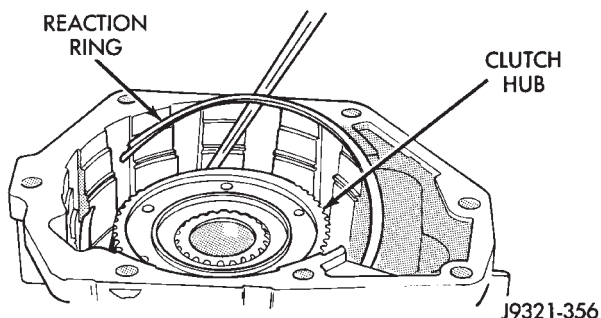
(1) Remove overdrive clutch wave spring (Fig. 191).



**Fig. 191 Overdrive Clutch Wave Spring Removal/Installation**

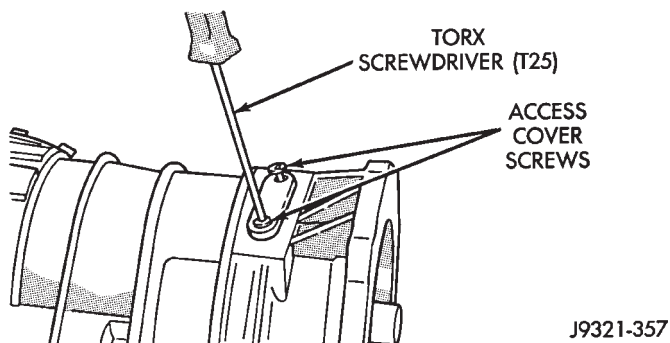
# DISASSEMBLY AND ASSEMBLY (Continued)

(2) Remove overdrive clutch reaction snap ring (Fig. 192). Note that snap ring is located in same groove as wave spring.

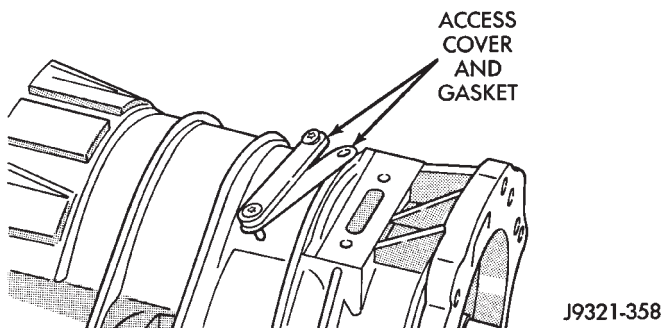


**Fig. 192 Overdrive Clutch Reaction Snap Ring Removal/Installation**

(3) Remove Torx head screws that attach access cover and gasket to overdrive case (Fig. 193).  
 (4) Remove access cover and gasket (Fig. 194).



**Fig. 193 Access Cover Screw Removal/Installation**

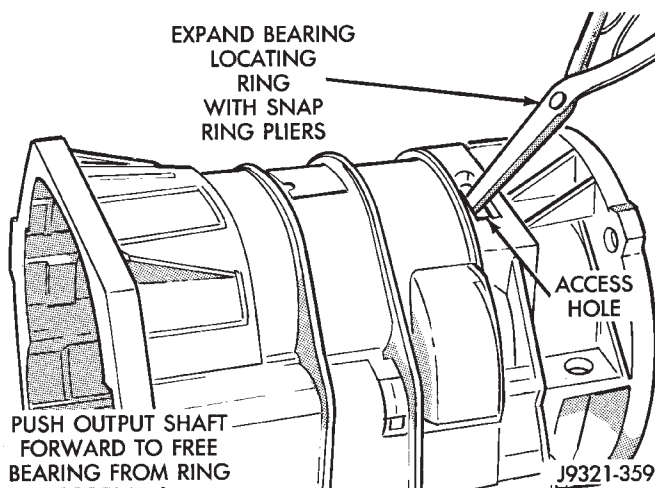


**Fig. 194 Access Cover And Gasket Removal/Installation**

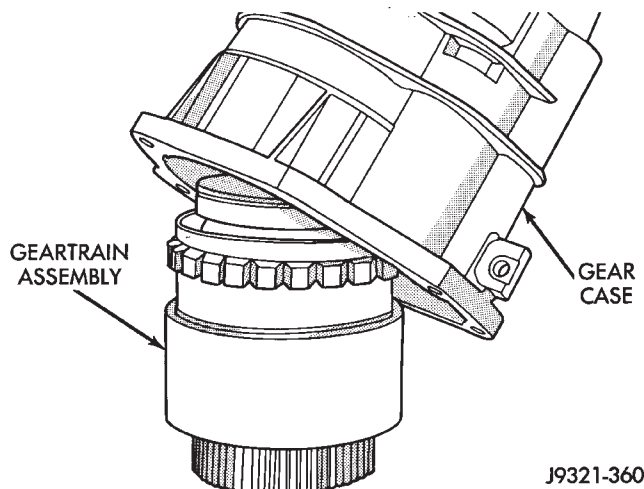
(5) Expand output shaft bearing snap ring with expanding-type snap ring pliers. Then push output shaft forward to release shaft bearing from locating ring (Fig. 195).

(6) Lift gear case up and off geartrain assembly (Fig. 196).

(7) Remove snap ring that retains rear bearing on output shaft.

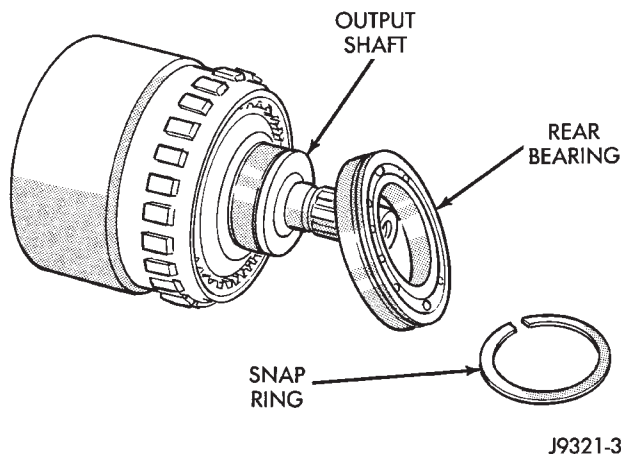


**Fig. 195 Releasing Bearing From Locating Ring**



**Fig. 196 Removing Gear Case From Geartrain Assembly**

(8) Remove rear bearing from output shaft (Fig. 197).



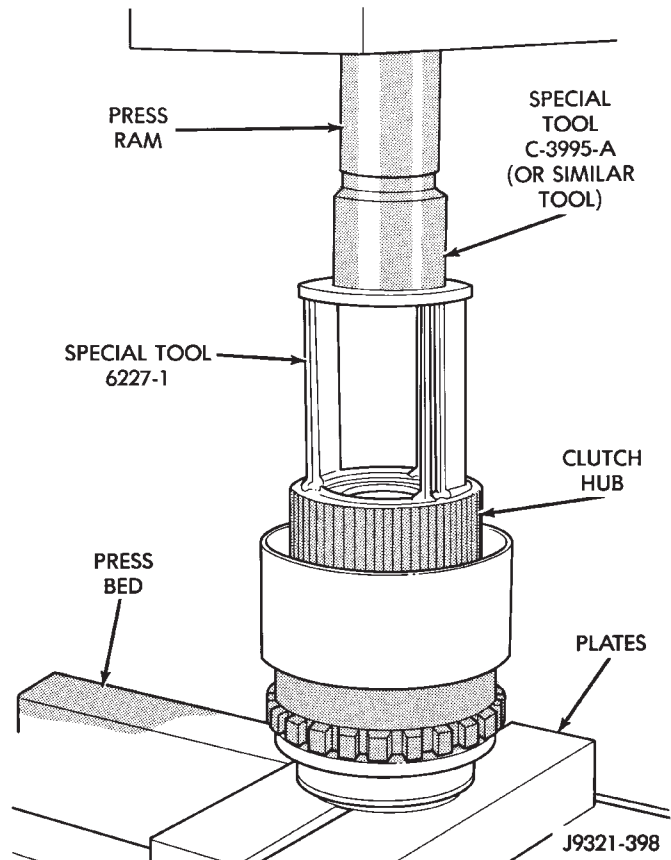
**Fig. 197 Rear Bearing Removal**

## DISASSEMBLY AND ASSEMBLY (Continued)

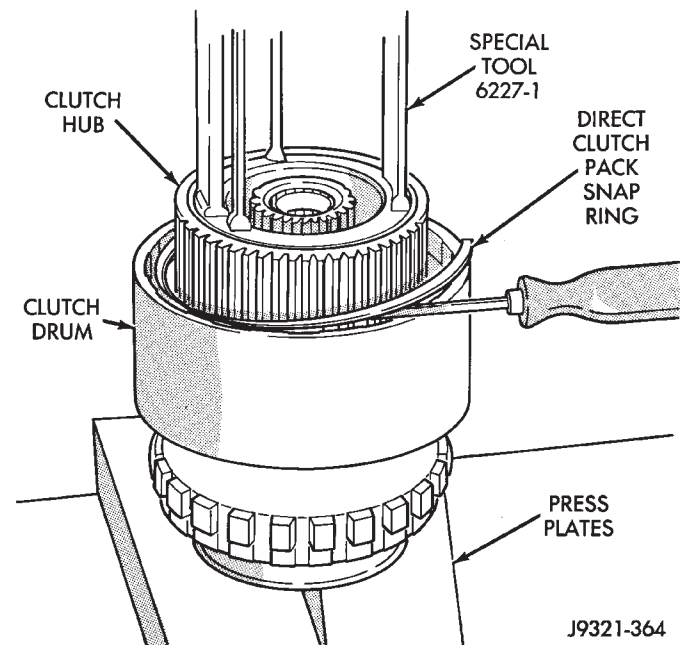
## DIRECT CLUTCH, HUB AND SPRING DISASSEMBLY

**WARNING: THE NEXT STEP IN DISASSEMBLY INVOLVES COMPRESSING THE DIRECT CLUTCH SPRING. IT IS EXTREMELY IMPORTANT THAT PROPER EQUIPMENT BE USED TO COMPRESS THE SPRING AS SPRING FORCE IS APPROXIMATELY 830 POUNDS. USE SPRING COMPRESSOR TOOL 6227-1 AND A HYDRAULIC SHOP PRESS WITH A MINIMUM RAM TRAVEL OF 5-6 INCHES. THE PRESS MUST ALSO HAVE A BED THAT CAN BE ADJUSTED UP OR DOWN AS REQUIRED. RELEASE CLUTCH SPRING TENSION SLOWLY AND COMPLETELY TO AVOID PERSONAL INJURY.**

- (1) Mount geartrain assembly in shop press (Fig. 198).
- (2) Position Compressor Tool 6227-1 on clutch hub (Fig. 198). Support output shaft flange with steel press plates as shown and center assembly under press ram.
- (3) Apply press pressure slowly. Compress hub and spring far enough to expose clutch hub retaining ring and relieve spring pressure on clutch pack snap ring (Fig. 198).
- (4) Remove direct clutch pack snap ring (Fig. 199).
- (5) Remove direct clutch hub retaining ring (Fig. 200).
- (6) Release press load slowly and completely (Fig. 201).
- (7) Remove Special Tool 6227-1. Then remove clutch pack from hub (Fig. 201).



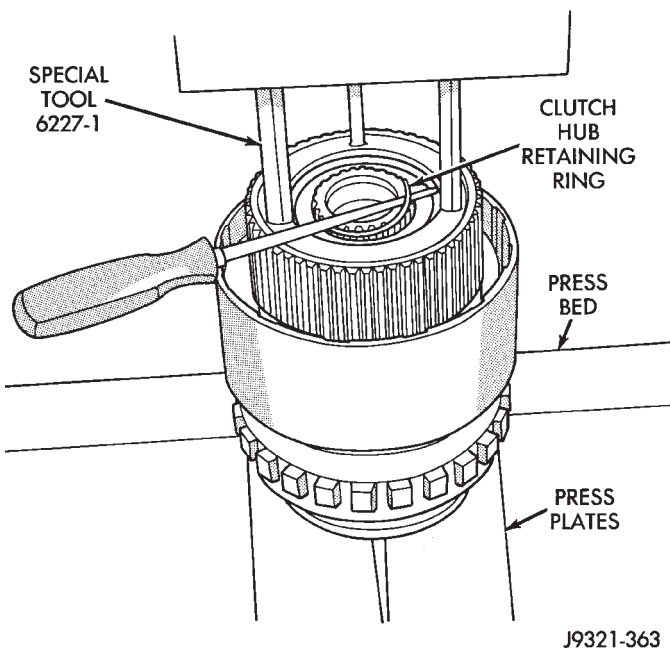
**Fig. 198 Geartrain Mounted In Shop Press**



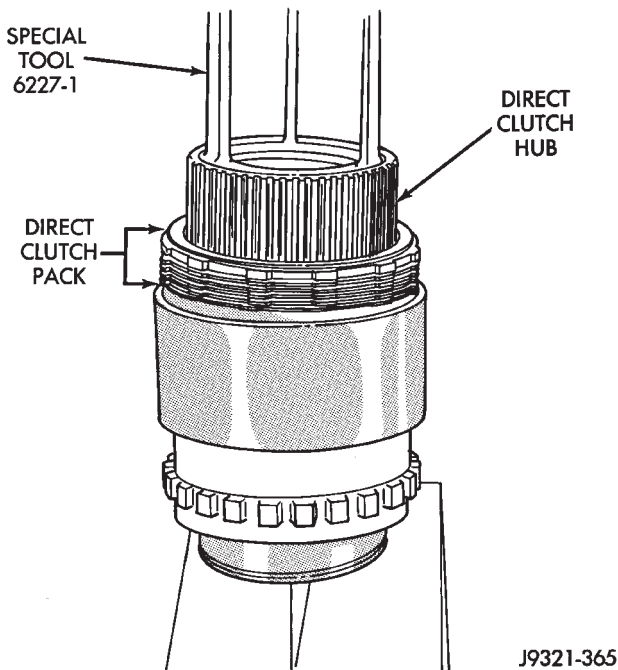
**Fig. 199 Direct Clutch Pack Snap Ring Removal**



# DISASSEMBLY AND ASSEMBLY (Continued)



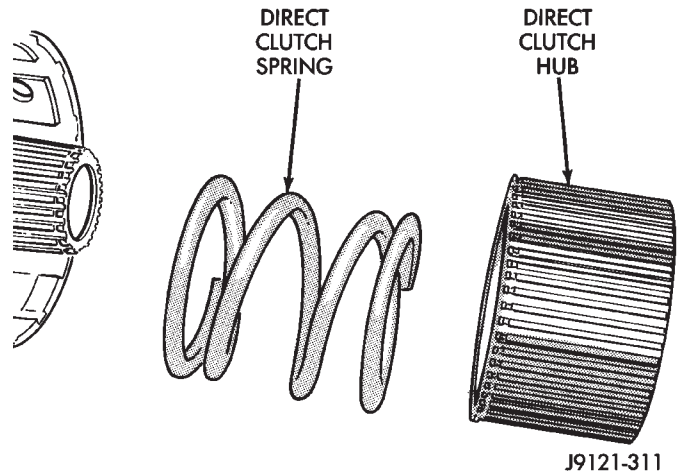
**Fig. 200 Direct Clutch Hub Retaining Ring Removal**



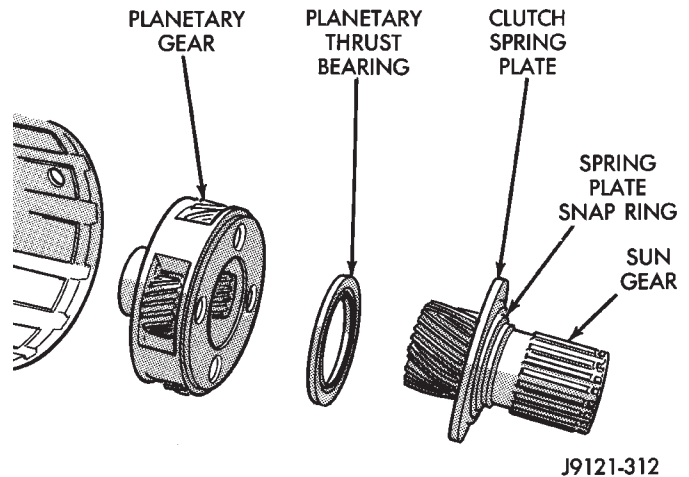
**Fig. 201 Direct Clutch Pack Removal**

## Geartrain Disassembly

- (1) Remove direct clutch hub and spring (Fig. 202).
- (2) Remove sun gear and spring plate. Then remove planetary thrust bearing and planetary gear (Fig. 203).
- (3) Remove overrunning clutch assembly with expanding type snap ring pliers (Fig. 204). Insert



**Fig. 202 Direct Clutch Hub And Spring Removal**



**Fig. 203 Removing Sun Gear, Thrust Bearing And Planetary Gear**

pliers into clutch hub. Expand pliers to grip hub splines and remove clutch with counterclockwise, twisting motion.

(4) Remove thrust bearing from overrunning clutch hub.

(5) Remove overrunning clutch from hub.

(6) Mark position of annulus gear and direct clutch drum for assembly alignment reference (Fig. 205). Use small center punch or scribe to make alignment marks.

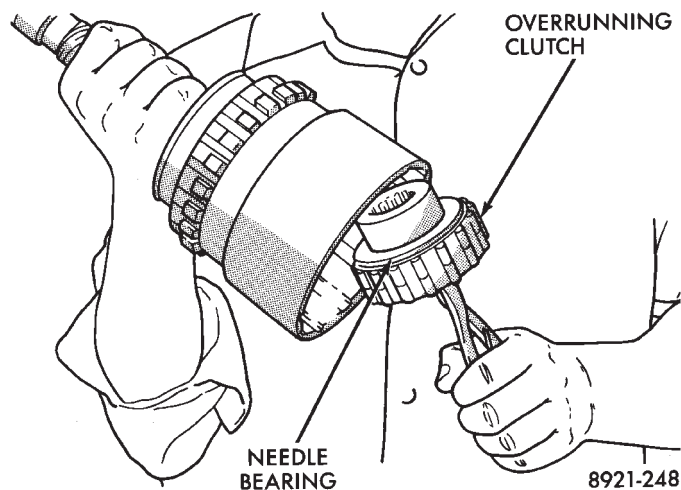
(7) Remove direct clutch drum rear retaining ring (Fig. 206).

(8) Remove direct clutch drum outer retaining ring (Fig. 207).

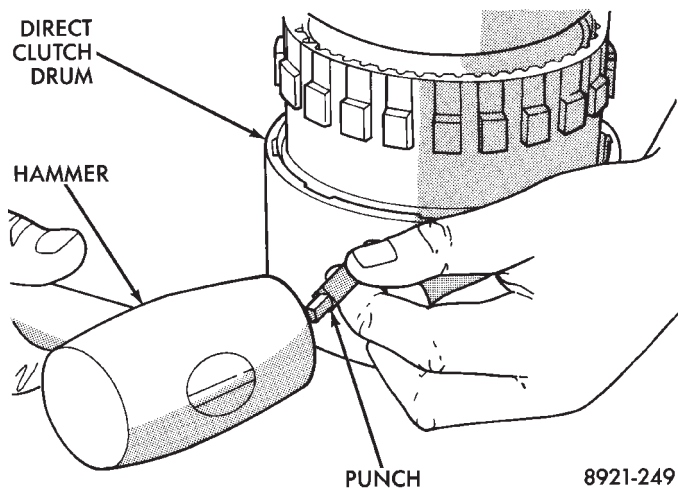
(9) Mark annulus gear and output shaft for assembly alignment reference (Fig. 208). Use punch or scribe to mark gear and shaft.



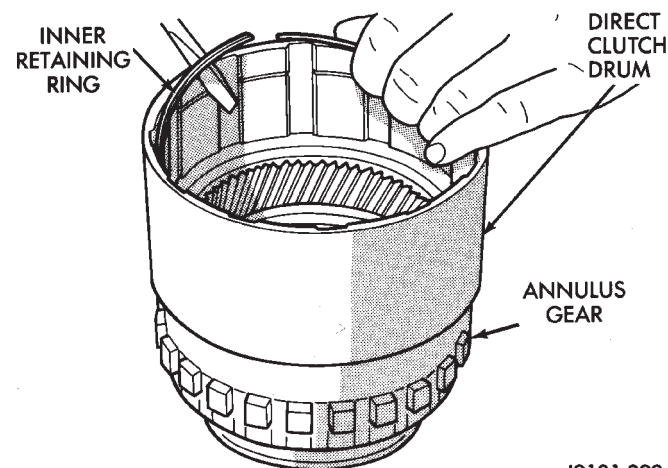
## DISASSEMBLY AND ASSEMBLY (Continued)



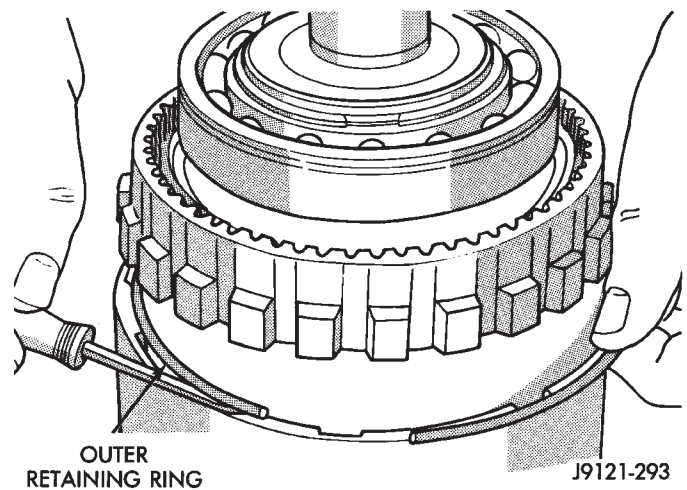
**Fig. 204 Overrunning Clutch Assembly Removal/Installation**



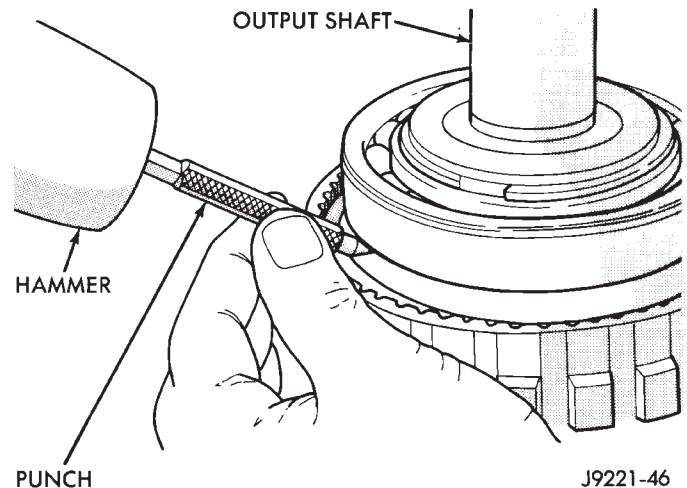
**Fig. 205 Marking Direct Clutch Drum And Annulus Gear For Assembly Alignment**



**Fig. 206 Clutch Drum Inner Retaining Ring Removal**



**Fig. 207 Clutch Drum Outer Retaining Ring Removal**



**Fig. 208 Marking Annulus Gear And Output Shaft For Assembly Alignment**

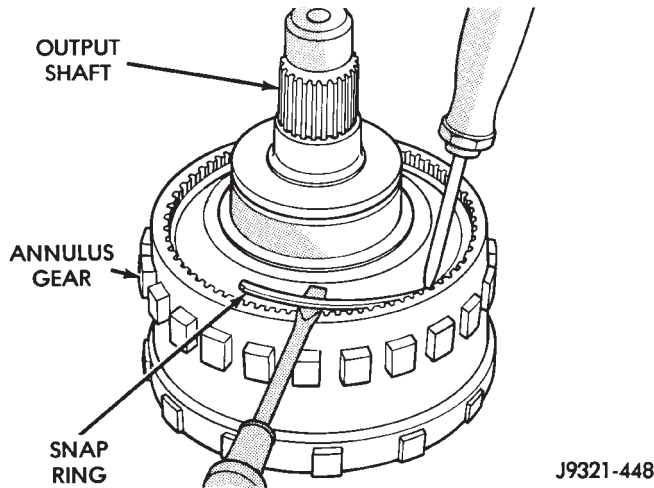
(10) Remove snap ring that secures annulus gear on output shaft (Fig. 209). Use two screwdrivers to unseat and work snap ring out of groove as shown.

(11) Remove annulus gear from output shaft (Fig. 210). Use rawhide or plastic mallet to tap gear off shaft.

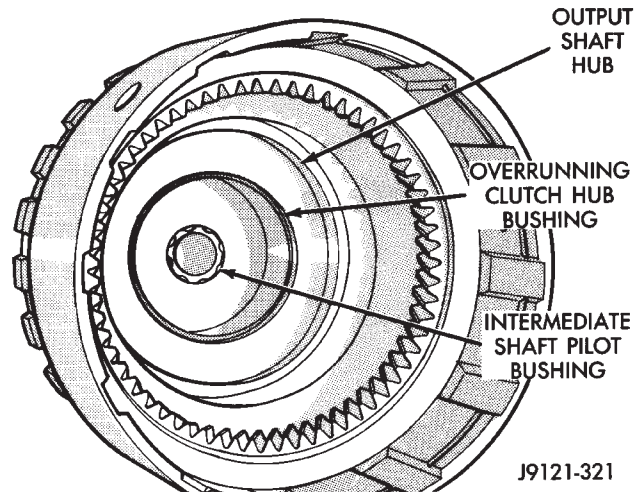
#### GEAR CASE AND PARK LOCK DISASSEMBLY

- (1) Remove locating ring from gear case.
- (2) Remove park pawl shaft retaining bolt and remove shaft, pawl and spring.
- (3) Remove reaction plug snap ring and remove reaction plug.
- (4) Remove output shaft seal.

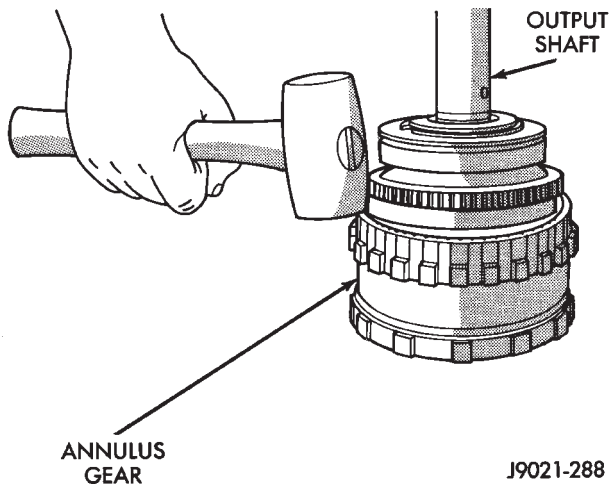
DISASSEMBLY AND ASSEMBLY (Continued)



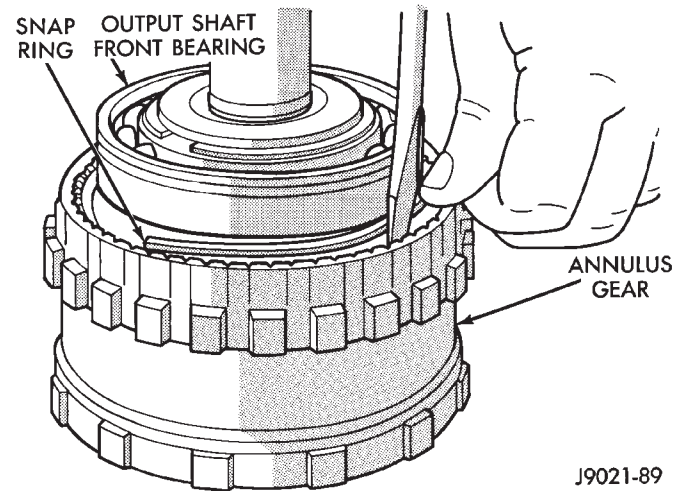
**Fig. 209 Annulus Gear Snap Ring Removal**



**Fig. 211 Output Shaft Pilot Bushing**



**Fig. 210 Annulus Gear Removal**



**Fig. 212 Annulus Gear Installation**

ASSEMBLY

GEARTRAIN AND DIRECT CLUTCH ASSEMBLY

(1) Soak direct clutch and overdrive clutch discs in Mopar® ATF Plus 3, type 7176, transmission fluid. Allow discs to soak for 10-20 minutes.

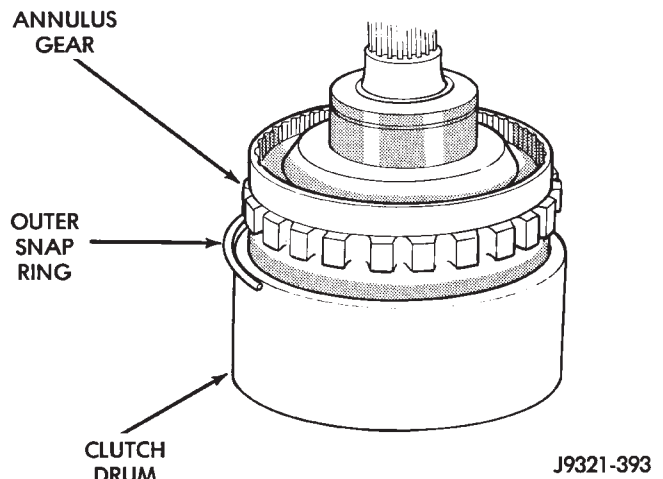
(2) Install new pilot bushing and clutch hub bushing in output shaft if necessary (Fig. 211). Lubricate bushings with petroleum jelly, or transmission fluid.

(3) Install annulus gear on output shaft, if removed. Then install annulus gear retaining snap ring (Fig. 212).

(4) Align and install clutch drum on annulus gear (Fig. 213). Be sure drum is engaged in annulus gear lugs.

(5) Install clutch drum outer retaining ring (Fig. 213).

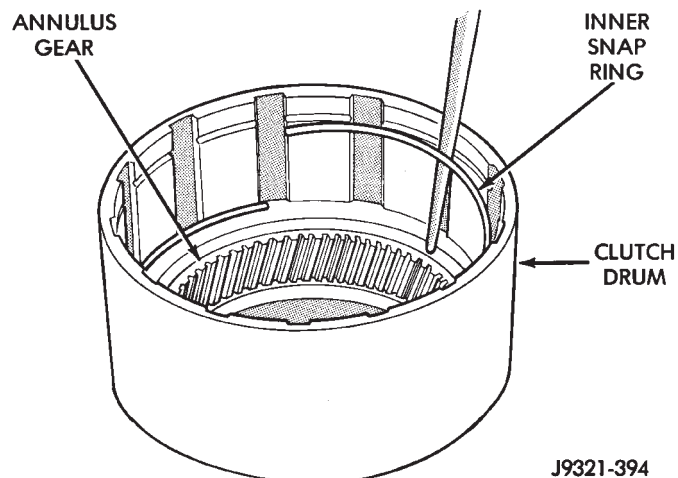
(6) Slide clutch drum forward and install inner retaining ring (Fig. 214).



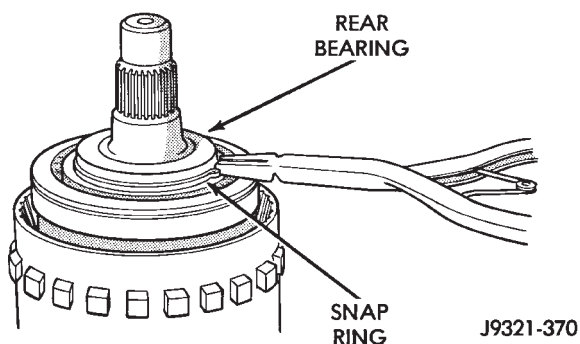
**Fig. 213 Clutch Drum And Outer Retaining Ring Installation**

## DISASSEMBLY AND ASSEMBLY (Continued)

(7) Install rear bearing and snap ring on output shaft (Fig. 215). Be sure locating ring groove in bearing is toward rear.



**Fig. 214 Clutch Drum Inner Retaining Ring Installation**



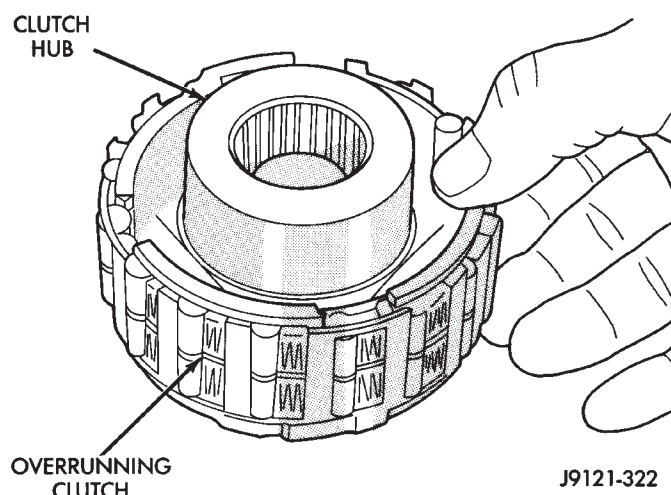
**Fig. 215 Rear Bearing And Snap Ring Installation**

(8) Install overrunning clutch on hub (Fig. 216). **Note that clutch only fits one way. Shoulder on clutch should seat in small recess at edge of hub.**

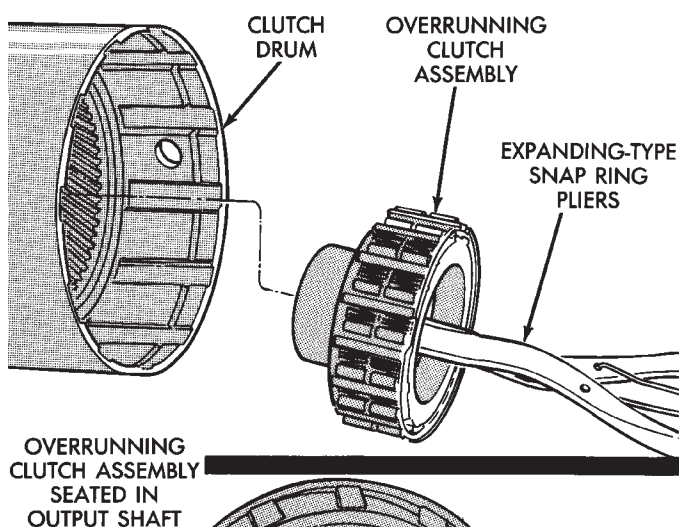
(9) Install thrust bearing on overrunning clutch hub. Use generous amount of petroleum jelly to hold bearing in place for installation. **Bearing fits one way only. Be sure bearing is seated squarely against hub. Reinstall bearing if it does not seat squarely.**

(10) Install overrunning clutch in output shaft (Fig. 217). Insert snap ring pliers in hub splines. Expand pliers to grip hub. Then install assembly with counterclockwise, twisting motion.

(11) Install planetary gear in annulus gear (Fig. 218). **Be sure planetary pinions are fully seated in annulus gear before proceeding.**



**Fig. 216 Assembling Overrunning Clutch And Hub**

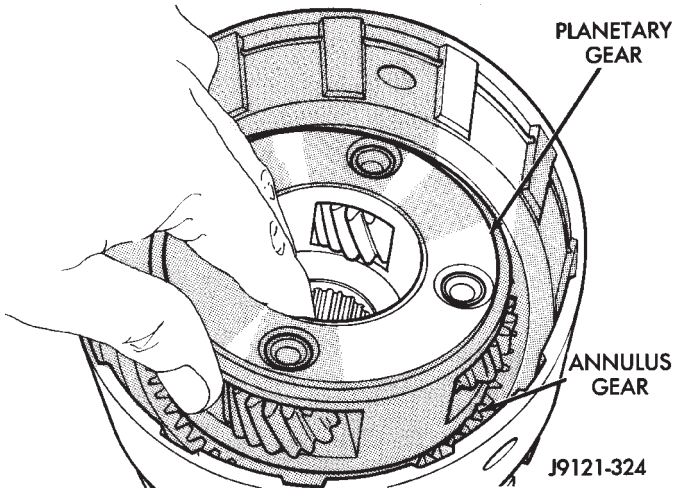


**Fig. 217 Overrunning Clutch Installation**

(12) Coat planetary thrust bearing and bearing contact surface of spring plate with generous amount of petroleum jelly. This will help hold bearing in place during installation.



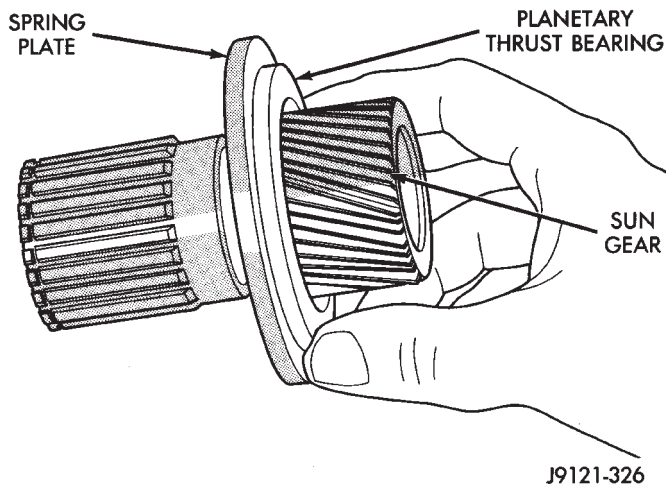
# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 218 Planetary Gear Installation**

(13) Install planetary thrust bearing on sun gear (Fig. 219). Slide bearing onto gear and seat it against spring plate as shown. **Bearing fits one way only. If it does not seat squarely against spring plate, remove and reposition bearing.**

(14) Install assembled sun gear, spring plate and thrust bearing (Fig. 220). Be sure sun gear and thrust bearing are fully seated before proceeding.

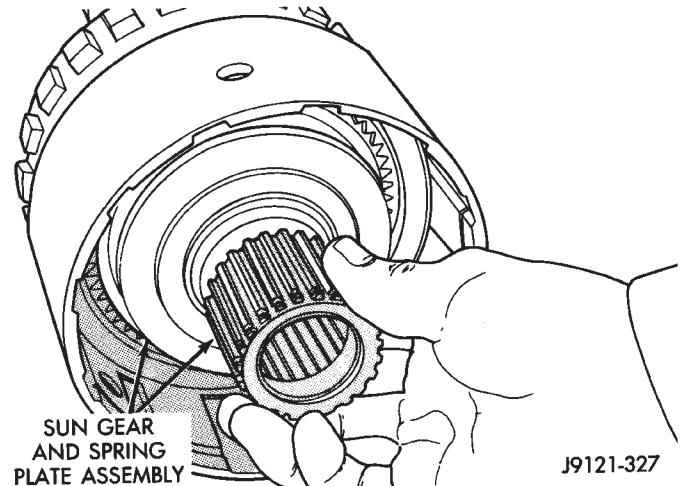


**Fig. 219 Planetary Thrust Bearing Installation**

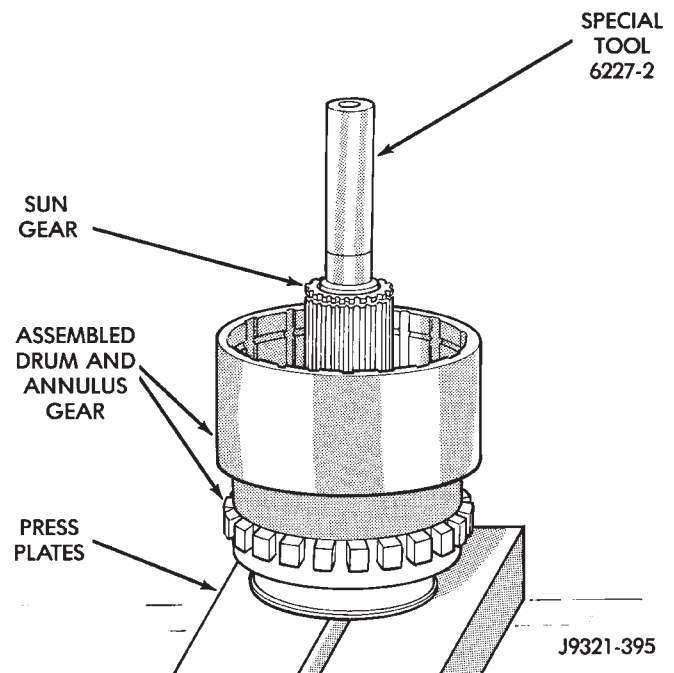
(15) Mount assembled output shaft, annulus gear, and clutch drum in shop press. Direct clutch spring, hub and clutch pack are easier to install with assembly mounted in press.

(16) Align splines in hubs of planetary gear and overrunning clutch with Alignment tool 6227-2 (Fig. 221). Insert tool through sun gear and into splines of both hubs. Be sure alignment tool is fully seated before proceeding.

(17) Install direct clutch spring (Fig. 222). Be sure spring is properly seated on spring plate.



**Fig. 220 Sun Gear Installation**



**Fig. 221 Alignment Tool Installation**

**NOTE:** The 42RE transmission has 6 direct clutch discs and 5 clutch plates. The 44RE transmission has 8 direct clutch discs and 7 clutch plates.

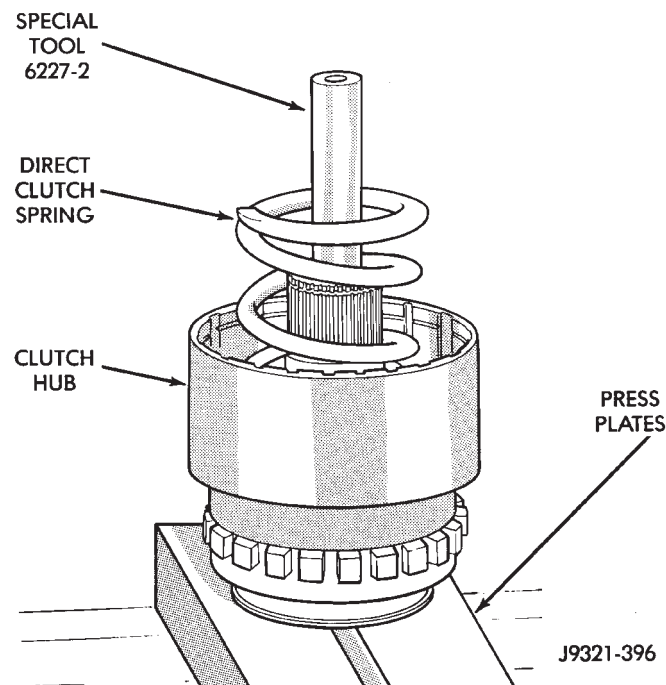
(18) Assemble and install direct clutch pack on hub as follows:

(a) Assemble clutch pack components (Fig. 223) or (Fig. 224).

(b) Install direct clutch reaction plate on clutch hub first. **Note that one side of reaction plate is counterbored. Be sure this side faces rearward. Splines at rear of hub are raised slightly. Counterbore in plate fits over raised splines. Plate should be flush with this end of hub (Fig. 225).**



## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 222 Direct Clutch Spring Installation**

(c) Install first clutch disc followed by a steel plate until all discs and plates have been installed.

(d) Install pressure plate. This is last clutch pack item to be installed. **Be sure plate is installed with shoulder side facing upward (Fig. 226).**

(19) Install clutch hub and clutch pack on direct clutch spring (Fig. 227). **Be sure hub is started on sun gear splines before proceeding.**

**WARNING: THE NEXT STEP IN GEARTRAIN ASSEMBLY INVOLVES COMPRESSING THE DIRECT CLUTCH HUB AND SPRING. IT IS EXTREMELY IMPORTANT THAT PROPER EQUIPMENT BE USED TO COMPRESS THE SPRING AS SPRING FORCE IS APPROXIMATELY 830 POUNDS. USE COMPRESSOR TOOL C-6227-1 AND A HYDRAULIC-TYPE SHOP PRESS WITH A MINIMUM RAM TRAVEL OF 6 INCHES. THE PRESS MUST ALSO HAVE A BED THAT CAN BE ADJUSTED UP OR DOWN AS REQUIRED. RELEASE CLUTCH SPRING TENSION SLOWLY AND COMPLETELY TO AVOID PERSONAL INJURY.**

(20) Position Compressor Tool 6227-1 on clutch hub.

(21) Compress clutch hub and spring just enough to place tension on hub and hold it in place.

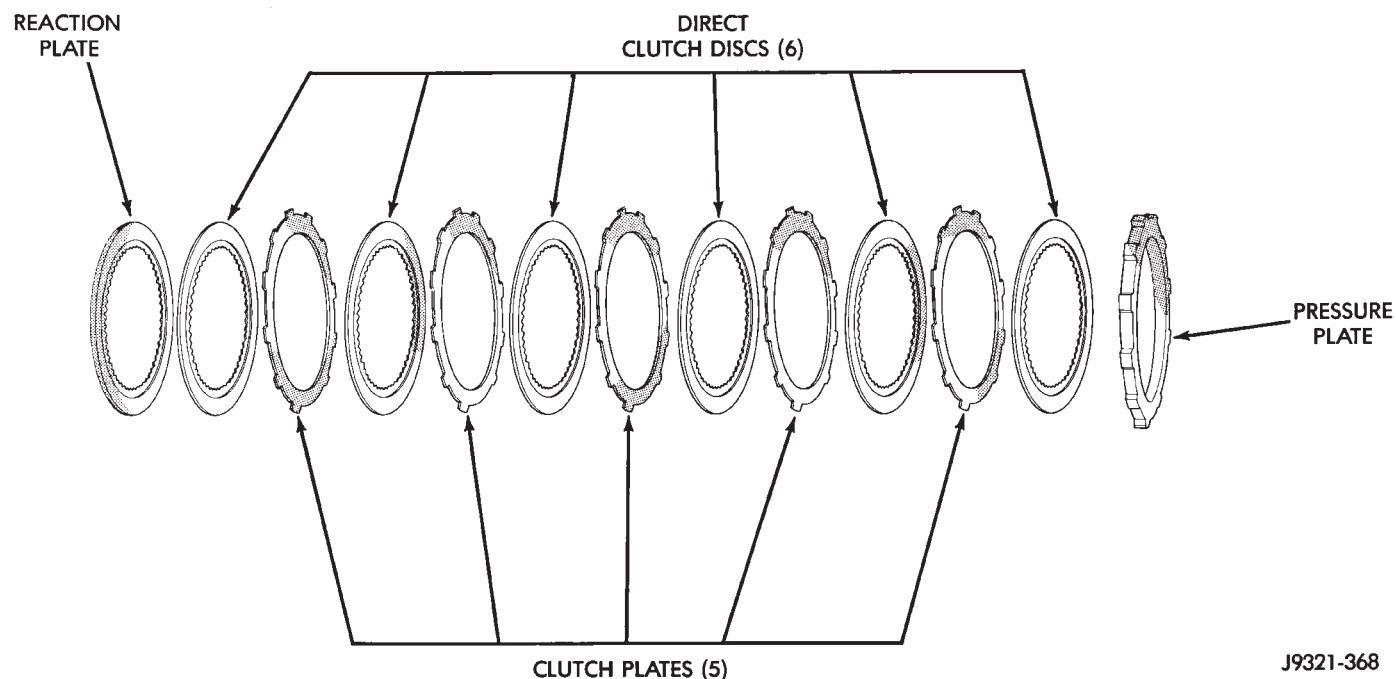
(22) Slowly compress clutch hub and spring. Compress spring and hub only enough to expose ring grooves for clutch pack snap ring and clutch hub retaining ring.

(23) Realign clutch pack on hub and seat clutch discs and plates in clutch drum.

(24) Install direct clutch pack snap ring (Fig. 228). **Be very sure snap ring is fully seated in clutch drum ring groove.**

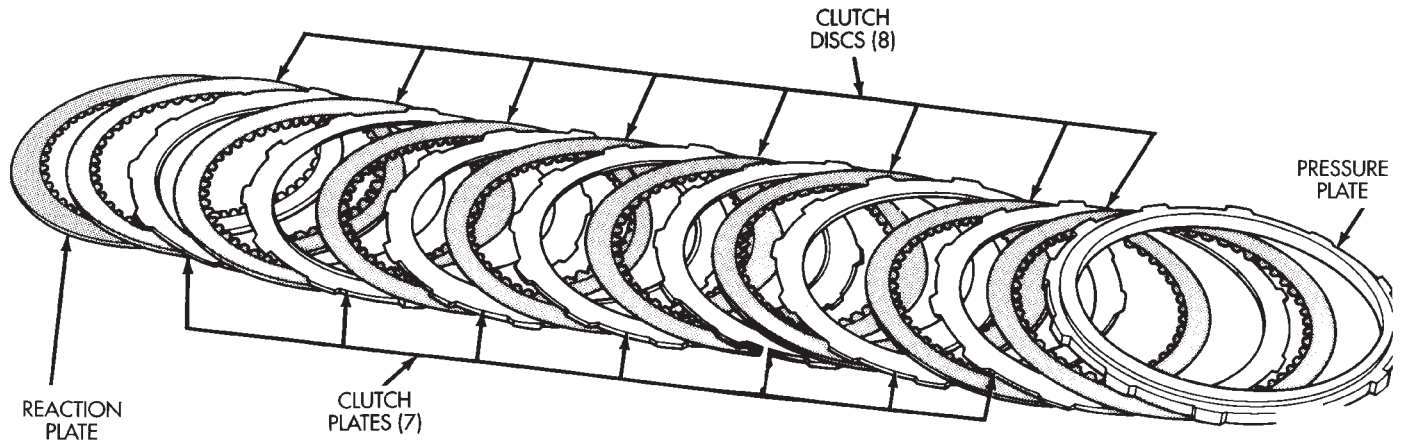
(25) Install clutch hub retaining ring (Fig. 229). **Be very sure retaining ring is fully seated in sun gear ring groove.**

(26) Slowly release press ram, remove compressor tools and remove geartrain assembly.

**Fig. 223 42RE Direct Clutch Pack Components**

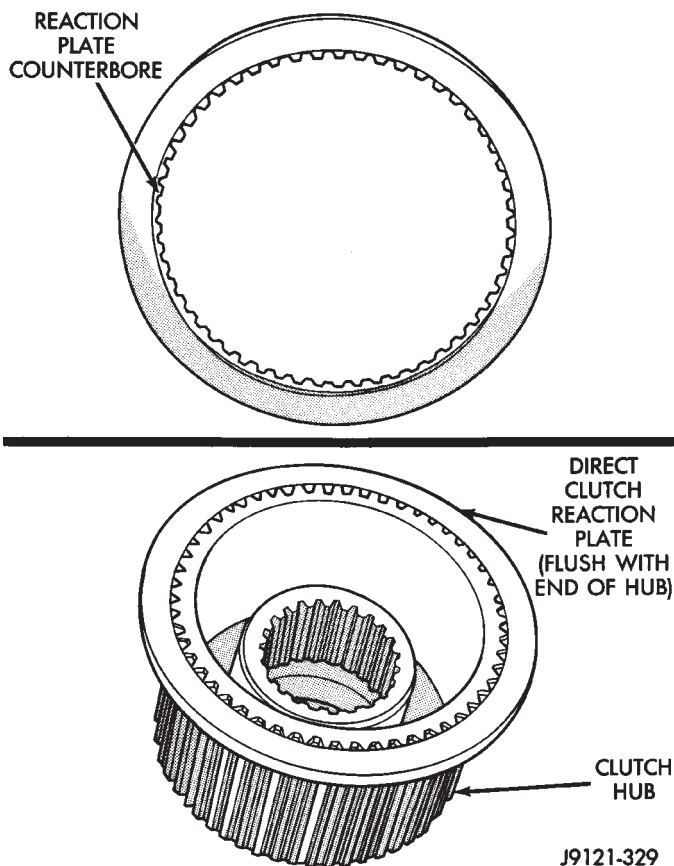
J9321-368

DISASSEMBLY AND ASSEMBLY (Continued)



J9521-50

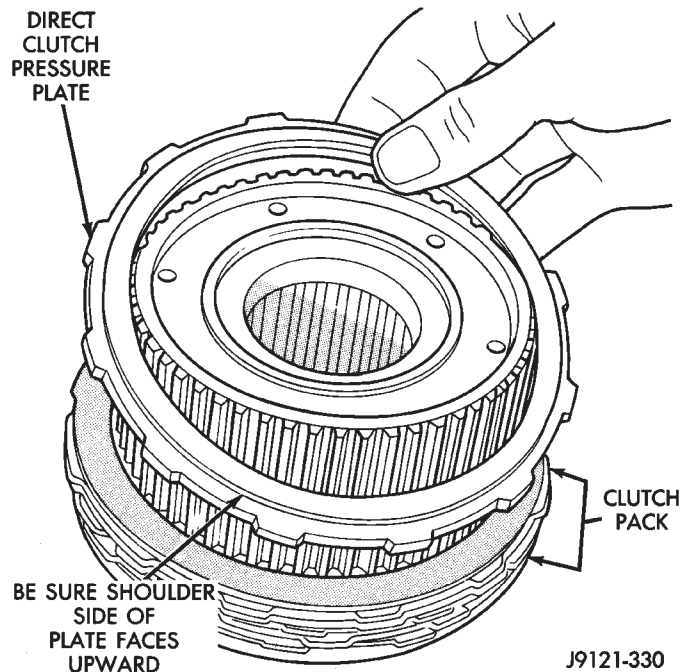
**Fig. 224 44RE Direct Clutch Pack Components**



**Fig. 225 Correct Position Of Direct Clutch Reaction Plate**

GEAR CASE ASSEMBLY

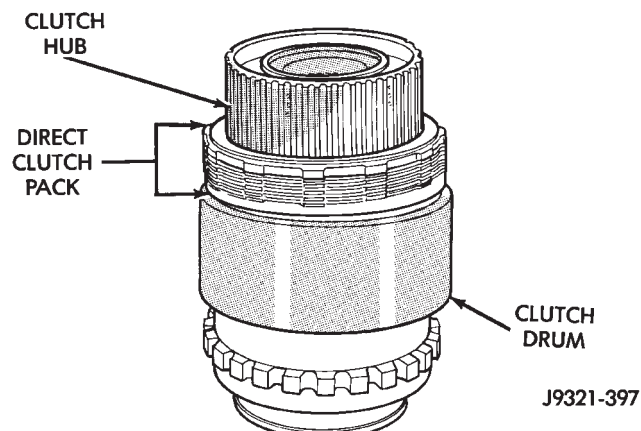
(1) Position park pawl and spring in case and install park pawl shaft. Verify that end of spring with 90° bend is hooked to pawl and straight end of spring is seated against case.



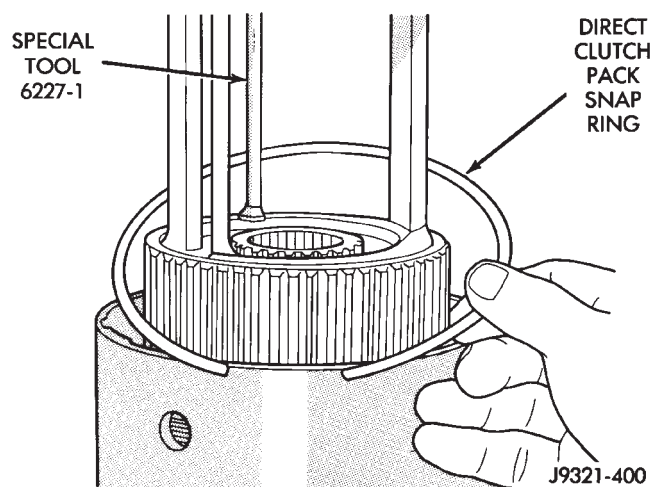
**Fig. 226 Correct Position Of Direct Clutch Pressure Plate**

- (2) Install pawl shaft retaining bolt. Tighten bolt to 27 N·m (20 ft. lbs.) torque.
- (3) Install park lock reaction plug. **Note that plug has locating pin at rear (Fig. 230). Be sure pin is seated in hole in case before installing snap ring.**
- (4) Install reaction plug snap-ring (Fig. 231). **Compress snap ring only enough for installation; do not distort it.**

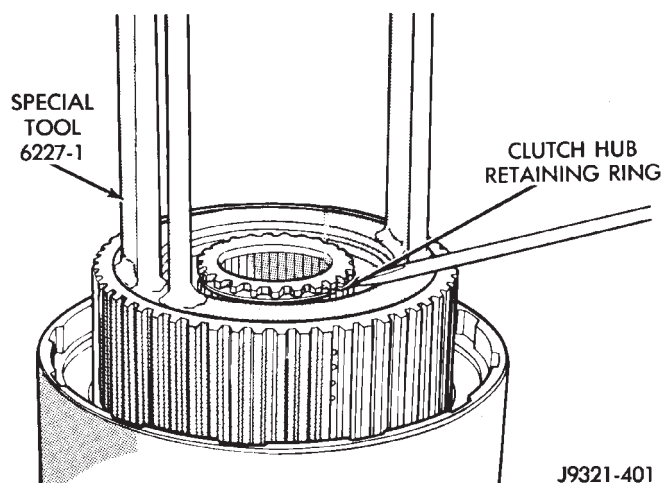
## DISASSEMBLY AND ASSEMBLY (Continued)



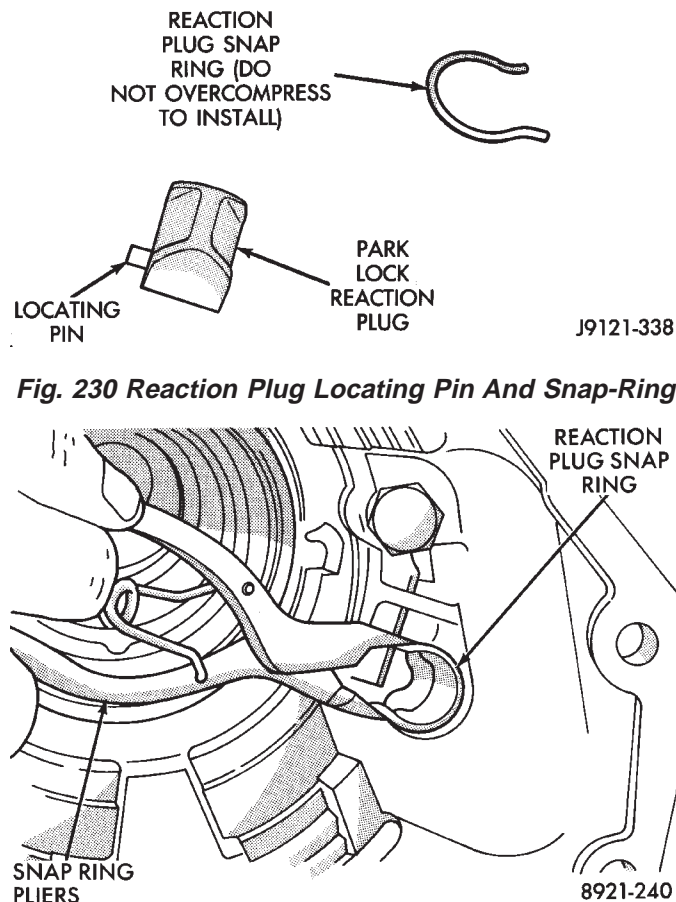
**Fig. 227 Direct Clutch Pack And Clutch Hub Installation**



**Fig. 228 Direct Clutch Pack Snap Ring Installation**



**Fig. 229 Clutch Hub Retaining Ring Installation**



**Fig. 230 Reaction Plug Locating Pin And Snap-Ring**

**Fig. 231 Reaction Plug And Snap-Ring Installation**

(5) Install new seal in gear case. On 4x4 gear case, use Tool Handle C-4171 and Installer C-3860-A to seat seal in case. On 4 x 2 gear case, use same Handle C-4171 and Installer C-3995-A to seat seal in case.

(6) Verify that tab ends of rear bearing locating ring extend into access hole in gear case (Fig. 232).

(7) Support geartrain on Tool 6227-1 (Fig. 233). Be sure tool is securely seated in clutch hub.

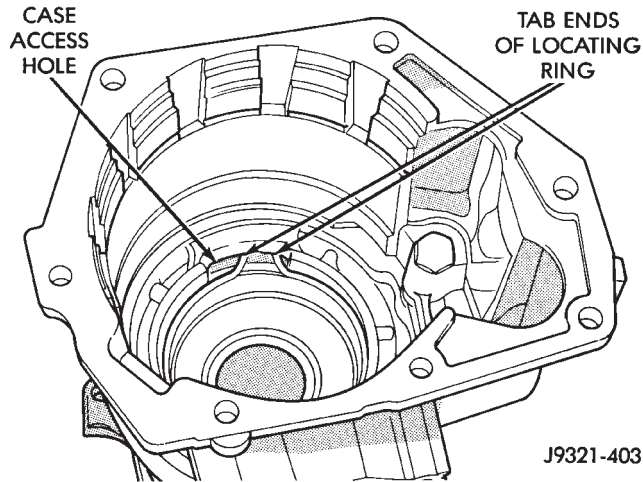
(8) Install overdrive gear case on geartrain (Fig. 233).

(9) Expand front bearing locating ring with snap ring pliers (Fig. 234). Then slide case downward until locating ring locks in bearing groove and release snap ring.

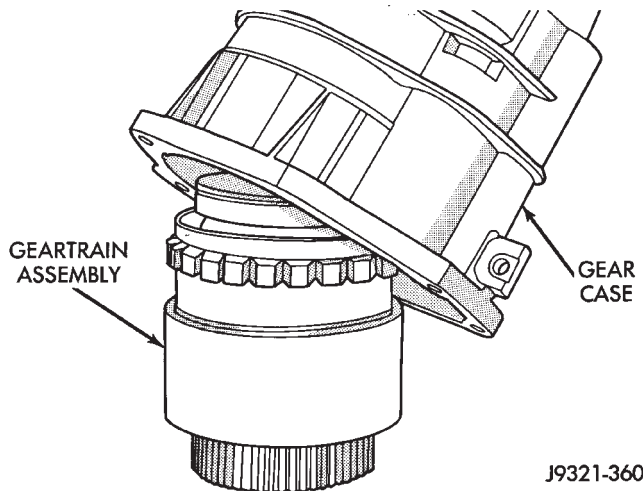
(10) Install locating ring access cover and gasket in overdrive unit case (Fig. 235).



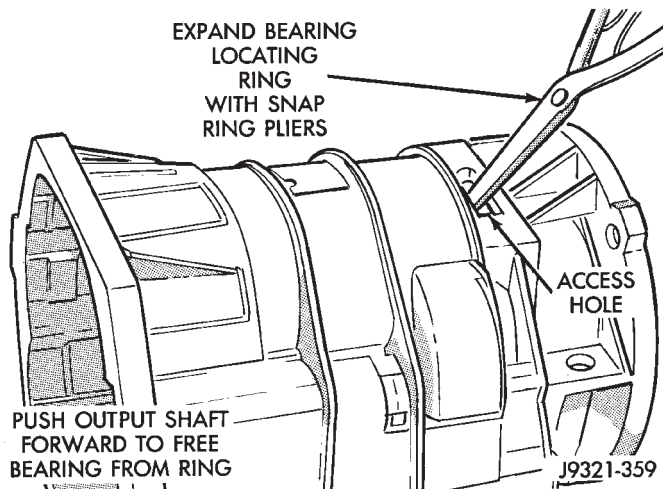
# DISASSEMBLY AND ASSEMBLY (Continued)



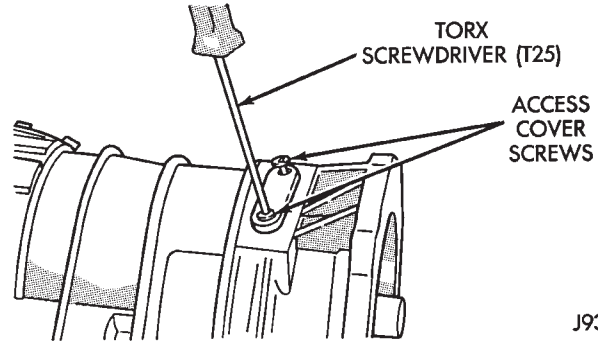
**Fig. 232 Correct Rear Bearing Locating Ring Position**



**Fig. 233 Overdrive Gear Case Installation**



**Fig. 234 Seating Locating Ring In Rear Bearing**



**Fig. 235 Locating Ring Access Cover And Gasket Installation**

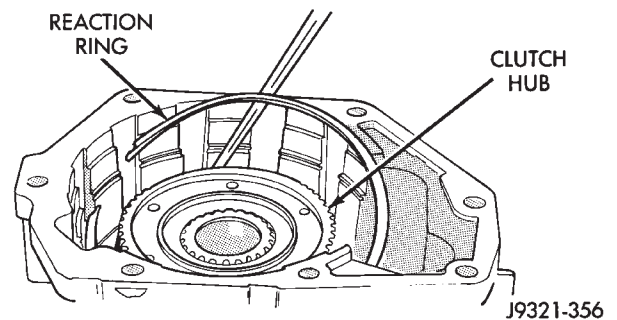
## OVERDRIVE CLUTCH ASSEMBLY

(1) Install overdrive clutch reaction ring first. Reaction ring is flat with notched ends (Fig. 236).

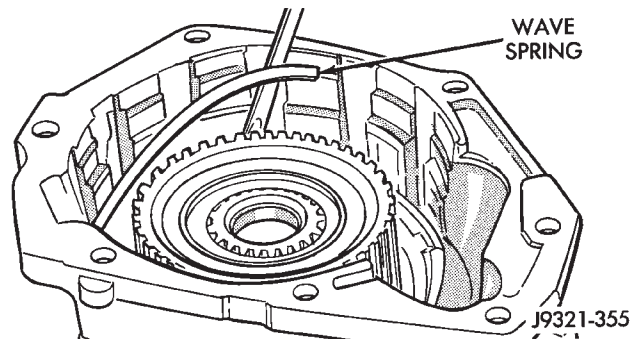
(2) Install wave spring on top of reaction ring (Fig. 237). **Reaction ring and wave ring both fit in same ring groove.** Use screwdriver to seat each ring securely in groove. Also ensure that the ends of the two rings are offset from each other.

**NOTE:** The 42RE transmission has 3 overdrive clutch discs and 2 plates. The 44RE transmission has 4 overdrive clutch discs and 3 plates.

(3) Assemble overdrive clutch pack (Fig. 238).

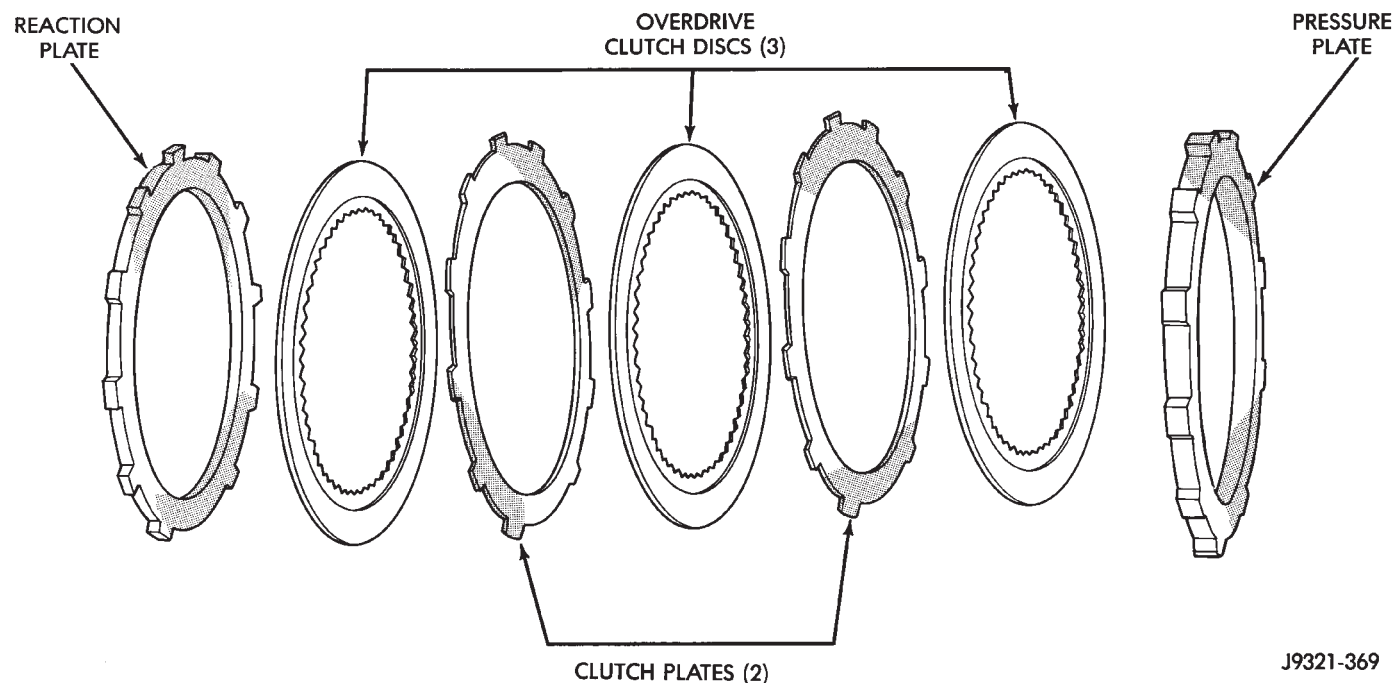


**Fig. 236 Overdrive Clutch Reaction Ring Installation**

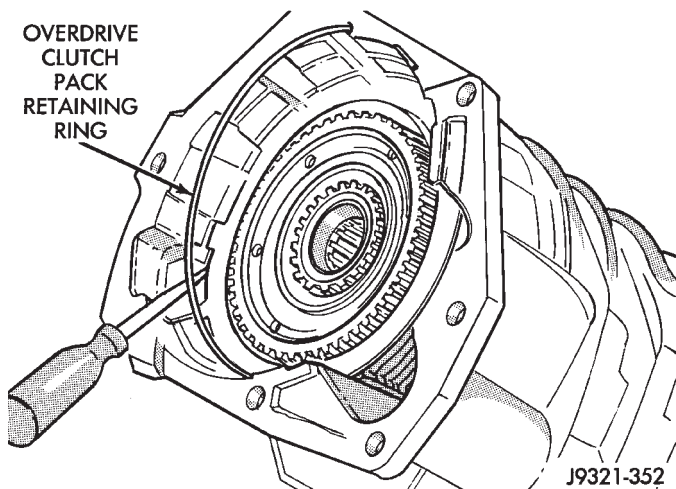


**Fig. 237 Overdrive Clutch Wave Spring Installation**

## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 238 42RE Overdrive Clutch Components**

- (4) Install overdrive clutch reaction plate first.
- (5) Install first clutch disc followed by first clutch plate. Then install remaining clutch discs and plates in same order.
- (6) Install clutch pack pressure plate.
- (7) Install clutch pack wire-type retaining ring (Fig. 239).

**Fig. 239 Overdrive Clutch Pack Retaining Ring Installation****INTERMEDIATE SHAFT SPACER SELECTION**

- (1) Place overdrive unit in vertical position. Mount it on blocks, or in workbench with appropriate size mounting hole cut into it. Be sure unit is facing upward for access to direct clutch hub. Also be sure output shaft is not loaded and internal components are moved rearward for accurate measurement.

- (2) Determine correct thickness intermediate shaft spacer as follows:

- (a) Insert Special Tool 6312 through sun gear, planetary gear and into pilot bushing in output shaft. Be sure tool bottoms against planetary shoulder.

- (b) Position Gauge Tool 6311 across face of overdrive case (Fig. 240). Then position Dial Caliper C-4962 over gauge tool.

- (c) Extend sliding scale of dial caliper downward through gauge tool slot until scale contacts end of Gauge Alignment Tool 6312. Lock scale in place. Remove dial caliper tool and note distance measured (Fig. 240).

- (d) Select proper thickness end play spacer from spacer chart based on distance measured (Fig. 241).

- (e) Remove Gauge Alignment Tool 6312.

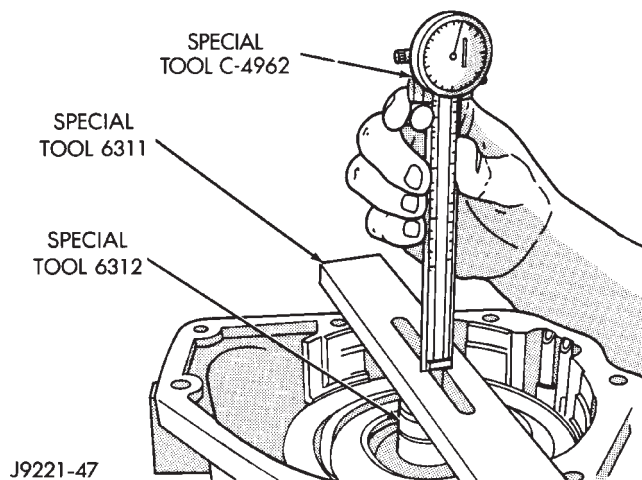
**OD THRUST PLATE SELECTION**

- (1) Place overdrive unit in vertical position. Mount it on blocks, or in workbench with appropriate size mounting hole cut into it. Be sure unit is facing upward for access to direct clutch hub. Also be sure output shaft is not loaded and internal components are moved rearward for accurate measurement.

- (2) Determine correct thickness overdrive piston thrust plate as follows:

- (a) Position Gauge Tool 6311 across face of overdrive case. Then position Dial Caliper C-4962 over gauge tool (Fig. 242).

DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 240 Shaft End Play Measurement**

End Play Measurement (Inches)	Spacer Thickness (Inches)
.7336 - .7505	.158 - .159
.7506 - .7675	.175 - .176
.7676 - .7855	.193 - .194
.7856 - .8011	.211 - .212

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**Fig. 241 Intermediate Shaft End Play Spacer Selection**

(b) Measure distance to clutch hub thrust bearing seat at four points 90° apart. Then average measurements by adding them and dividing by 4.

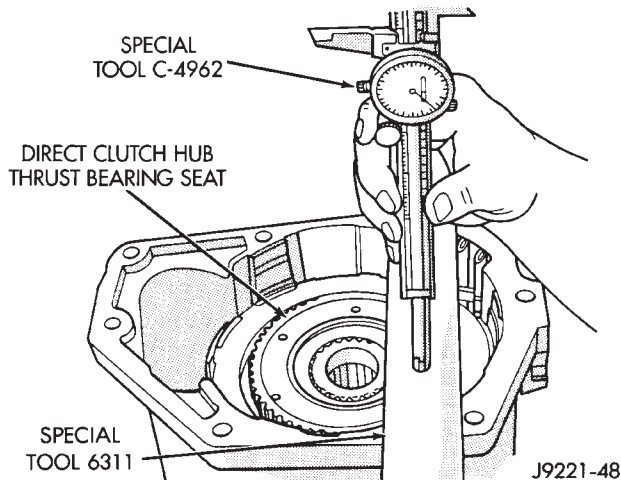
(c) Select and install required thrust plate from information in thrust plate chart (Fig. 243).

(3) Leave Alignment Tool 6227-2 in place. Tool will keep planetary and clutch hub splines in alignment until overdrive unit is ready for installation on transmission.

(4) Transmission speed sensor can be installed at this time if desired. However, it is recommended that sensor not be installed until after overdrive unit is secured to transmission.

**OVERDRIVE PISTON ASSEMBLY**

- (1) Install new seals on over drive piston.
- (2) Stand transmission case upright on bellhousing.
- (3) Position Guide Ring 8114-1 on outer edge of overdrive piston retainer.
- (4) Position Seal Guide 8114-2 on inner edge of overdrive piston retainer.



**Fig. 242 Overdrive Piston Thrust Plate Measurement**

End Play Measurement (Inches)	Spacer Thickness (Inches)
1.7500 - 1.7649	.108 - .110
1.7650 - 1.7799	.123 - .125
1.7800 - 1.7949	.138 - .140
1.7950 - 1.8099	.153 - .155
1.8100 - 1.8249	.168 - .170
1.8250 - 1.8399	.183 - .185
1.8400 - 1.8549	.198 - .200
1.8550 - 1.8699	.213 - .215
1.8700 - 1.8849	.228 - .230
1.8850 - 1.8999	.243 - .245

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**Fig. 243 Overdrive Piston Thrust Plate Selection**

(5) Install overdrive piston in overdrive piston retainer by: aligning locating lugs on overdrive piston to the two mating holes in retainer.

(a) Aligning locating lugs on overdrive piston to the two mating holes in retainer.

(b) Lubricate overdrive piston seals with Mopar® Door Ease, or equivalent.

(c) Install piston over Seal Guide 8114-2 and inside Guide Ring 8114-1.

(d) Push overdrive piston into position in retainer.

(e) Verify that the locating lugs entered the lug bores in the retainer.

(6) Install intermediate shaft spacer on intermediate shaft.

(7) Install overdrive piston thrust plate on overdrive piston.

(8) Install overdrive piston thrust bearing on overdrive piston.

(9) Install transmission speed sensor and O-ring seal in overdrive case (Fig. 183).



## CLEANING AND INSPECTION

### VALVE BODY

Clean the valve housings, valves, plugs, springs, and separator plates with a standard parts cleaning solution only. Do not use gasoline, kerosene, or any type of caustic solution.

Do not immerse any of the electrical components in cleaning solution. Clean the governor solenoid and sensor and the dual solenoid and harness assembly by wiping them off with dry shop towels only.

Dry all except the electrical parts with compressed air. Make sure all passages are clean and free from obstructions. **Do not use rags or shop towels to dry or wipe off valve body components. Lint from these materials can stick to valve body parts, interfere with valve operation, and clog filters and fluid passages.**

Wipe the governor pressure sensor and solenoid valve with dry, lint free shop towels only. The O-rings on the sensor and solenoid valve are the only serviceable components. Be sure the vent ports in the solenoid valve are open and not blocked by dirt or debris. Replace the valve and/or sensor only when DRB scan tool diagnosis indicates this is necessary. Or, if either part has sustained physical damage (dented, deformed, broken, etc.).

**CAUTION:** Do not turn the small screw at the end of the solenoid valve for any reason. Turning the screw in either direction will ruin solenoid calibration and result in solenoid failure. In addition, the filter on the solenoid valve is NOT serviceable. Do not try to remove the filter as this will damage the valve housing.

Inspect the throttle and manual valve levers and shafts. Do not attempt to straighten a bent shaft or correct a loose lever. Replace these components if worn, bent, loose or damaged in any way.

Inspect all of the valve body mating surfaces for scratches, nicks, burrs, or distortion. Use a straight-edge to check surface flatness. Minor scratches may be removed with crocus cloth using only very light pressure.

Minor distortion of a valve body mating surface may be corrected by smoothing the surface with a sheet of crocus cloth. Position the crocus cloth on a surface plate, sheet of plate glass or equally flat surface. If distortion is severe or any surfaces are heavily scored, the valve body will have to be replaced.

**CAUTION:** Many of the valves and plugs, such as the throttle valve, shuttle valve plug, 1-2 shift valve and 1-2 governor plug, are made of coated aluminum. Aluminum components are identified by the

dark color of the special coating applied to the surface (or by testing with a magnet). Do not sand aluminum valves or plugs under any circumstances. This practice could damage the special coating causing the valves/plugs to stick and bind.

Inspect the valves and plugs for scratches, burrs, nicks, or scores. Minor surface scratches on steel valves and plugs can be removed with crocus cloth but **do not round off the edges of the valve or plug lands**. Maintaining sharpness of these edges is vitally important. The edges prevent foreign matter from lodging between the valves and plugs and the bore.

Inspect all the valve and plug bores in the valve body. Use a penlight to view the bore interiors. Replace the valve body if any bores are distorted or scored. Inspect all of the valve body springs. The springs must be free of distortion, warpage or broken coils.

Check the two separator plates for distortion or damage of any kind. Inspect the upper housing, lower housing, 3-4 accumulator housing, and transfer plate carefully. Be sure all fluid passages are clean and clear. Check condition of the upper housing and transfer plate check balls as well. The check balls and ball seats must not be worn or damaged.

Trial fit each valve and plug in its bore to check freedom of operation. When clean and dry, the valves and plugs should drop freely into the bores.

Valve body bores do not change dimensionally with use. If the valve body functioned correctly when new, it will continue to operate properly after cleaning and inspection. It should not be necessary to replace a valve body assembly unless it is damaged in handling.

The only serviceable valve body components are listed below. The remaining valve body components are serviced only as part of a complete valve body assembly. Serviceable parts are:

- dual solenoid and harness assembly
- solenoid gasket
- solenoid case connector O-rings and shoulder bolt
- switch valve and spring
- pressure adjusting screw and bracket assembly
- throttle lever
- manual lever and shaft seal
- throttle lever shaft seal, washer, and E-clip
- fluid filter and screws
- detent ball and spring
- valve body screws
- governor pressure solenoid
- governor pressure sensor and retaining clip
- park lock rod and E-clip

## CLEANING AND INSPECTION (Continued)

## TRANSMISSION

## GENERAL INFORMATION

Inspect the transmission bushings during overhaul. Bushing condition is important as worn, scored bushings contribute to low pressures, clutch slip and accelerated wear of other components. However, do not replace bushings as a matter of course. Replace bushings only when they are actually worn, or scored.

Use recommended tools to replace bushings. The tools are sized and designed to remove, install, and seat bushings correctly. The bushing replacement tools are included in Bushing Tool Set C-3887-B.

Pre-sized service bushings are available for replacement purposes. Only the sun gear bushings are not serviced. Low cost of the sun gear assembly makes it easier to simply replace the gear and bushings as an assembly.

Heli-Coil inserts can be used to repair damaged, stripped or worn threads in aluminum parts. These inserts are available from most automotive parts suppliers. Stainless steel inserts are recommended.

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on shafts, or valves, use extreme care to avoid rounding off sharp edges. Sharp edges are vital as they prevent foreign matter from getting between the valve and valve bore.

Do not reuse oil seals, gaskets, seal rings, or O-rings during overhaul. Replace these parts as a matter of course. Also do not reuse snap rings or E-clips that are bent or distorted. Replace these parts as well.

Lubricate transmission parts with Mopar® ATF Plus 3, Type 7176, transmission fluid during overhaul and assembly. Use petroleum jelly, Mopar® Door Ease, or Ru-Glyde to prelubricate seals, O-rings, and thrust washers. Petroleum jelly can also be used to hold parts in place during reassembly.

## TRANSMISSION CASE CLEANING AND INSPECTION

Clean the case in a solvent tank. Flush the case bores and fluid passages thoroughly with solvent. Dry the case and all fluid passages with compressed air. Be sure all solvent is removed from the case and that all fluid passages are clear.

**NOTE:** Do not use shop towels or rags to dry the case (or any other transmission component) unless they are made from lint-free materials. Lint will stick to case surfaces and transmission components and circulate throughout the transmission after assembly. A sufficient quantity of lint can block fluid passages and interfere with valve body operation.

Inspect the case for cracks, porous spots, worn bores, or damaged threads. Damaged threads can be repaired with Helicoil thread inserts. However, the case will have to be replaced if it exhibits any type of damage or wear.

Lubricate the front band adjusting screw threads with petroleum jelly and thread the screw part-way into the case. Be sure the screw turns freely.

## OVERRUNNING CLUTCH/LOW-REVERSE DRUM/OVERDRIVE PISTON RETAINER

Clean the overrunning clutch assembly, clutch cam, low-reverse drum, and overdrive piston retainer in solvent. Dry them with compressed air after cleaning.

Inspect condition of each clutch part after cleaning. Replace the overrunning clutch roller and spring assembly if any rollers or springs are worn or damaged, or if the roller cage is distorted, or damaged. Replace the cam if worn, cracked or damaged.

Replace the low-reverse drum if the clutch race, roller surface or inside diameter is scored, worn or damaged. **Do not remove the clutch race from the low-reverse drum under any circumstances. Replace the drum and race as an assembly if either component is damaged.**

Examine the overdrive piston retainer carefully for wear, cracks, scoring or other damage. Be sure the retainer hub is a snug fit in the case and drum. Replace the retainer if worn or damaged.

## ACCUMULATOR

Inspect the accumulator piston and seal rings (Fig. 244). Replace the seal rings if worn or cut. Replace the piston if chipped or cracked.

Check condition of the accumulator inner and outer springs (Fig. 244). Replace the springs if the coils are cracked, distorted or collapsed.

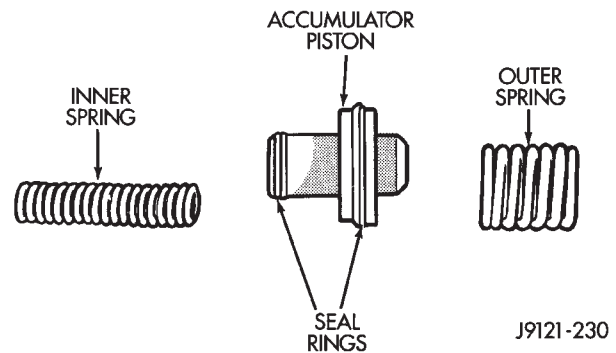


Fig. 244 Accumulator Components

## FRONT SERVO

Clean the servo piston components with solvent and dry them with compressed air. Wipe the band clean with lint free shop towels.

## CLEANING AND INSPECTION (Continued)

Replace the front band if distorted, lining is burned, flaking off, or worn to the point where the grooves in the lining material are no longer visible.

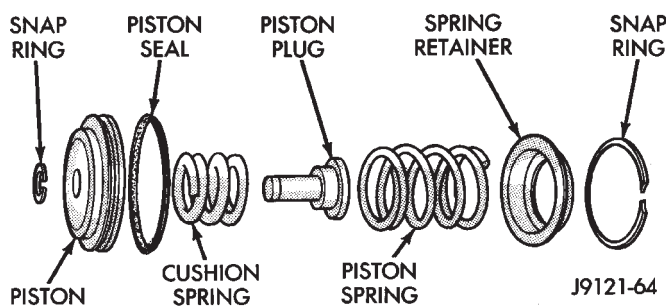
Inspect the servo components. Replace the springs if collapsed, distorted or broken. Replace the guide, rod and piston if cracked, bent, or worn. Discard the servo snap ring if distorted or warped.

Check the servo piston bore for wear. If the bore is severely scored, or damaged, it will be necessary to replace the case.

Replace any servo component if doubt exists about condition. Do not reuse suspect parts.

**REAR SERVO**

Remove and discard the servo piston seal ring (Fig. 245). Then clean the servo components with solvent and dry with compressed air. Replace either spring if collapsed, distorted or broken. Replace the plug and piston if cracked, bent, or worn. Discard the servo snap rings and use a new ones at assembly.



**Fig. 245 Rear Servo Components**

**OIL PUMP AND REACTION SHAFT SUPPORT**

(1) Clean pump and support components with solvent and dry them with compressed air.

(2) Check condition of the seal rings and thrust washer on the reaction shaft support. The seal rings do not need to be replaced unless cracked, broken, or severely worn.

(3) Inspect the pump and support components. Replace the pump or support if the seal ring grooves or machined surfaces are worn, scored, pitted, or damaged. Replace the pump gears if pitted, worn chipped, or damaged.

(4) Inspect the pump bushing. Then check the reaction shaft support bushing. Replace either bushing only if heavily worn, scored or damaged. It is not necessary to replace the bushings unless they are actually damaged.

(5) Install the gears in the pump body and measure pump component clearances as follows:

(a) Clearance between outer gear and reaction shaft housing should be 0.010 to 0.063 mm (0.0004 to 0.0025 in.). Clearance between inner gear and reaction shaft housing should be 0.010 to 0.063 mm (0.0004 to 0.0025 in.). Both clearances can be measured at the same time by:

(I) Installing the pump gears in the pump housing.

(II) Position an appropriate piece of Plastigage<sup>™</sup> across both gears.

(III) Align the plastigage to a flat area on the reaction shaft housing.

(IV) Install the reaction shaft to the pump housing.

(V) Separate the reaction shaft housing from the pump housing and measure the Plastigage<sup>™</sup> following the instructions supplied with it.

(b) Clearance between inner gear tooth and outer gear should be 0.08 to 0.19 mm (0.0035 to 0.0075 in.). Measure clearance with an appropriate feeler gauge.

(c) Clearance between outer gear and pump housing should also be 0.010 to 0.19 mm (0.0035 to 0.0075 in.). Measure clearance with an appropriate feeler gauge.

**FRONT CLUTCH**

Clean and inspect the front clutch components. Replace the clutch discs if warped, worn, scored, burned or charred, or if the facing is flaking off. Replace the steel plates if heavily scored, warped, or broken. Be sure the driving lugs on the plates are in good condition. The lugs must not be bent, cracked or damaged in any way.

Replace the clutch spring and spring retainer if either is distorted, warped or broken.

Check the lug grooves in the clutch retainer. The steel plates should slide freely in the slots. Replace the retainer if the grooves are worn or damaged.

Check action of the check ball in the retainer (Fig. 246). The ball must move freely and not stick.

**NOTE: Inspect the clutch retainer bushings carefully (Fig. 247). The retainer bushings are NOT serviceable. It will be necessary to replace the retainer if either bushing is scored, or worn.**

Inspect the piston and retainer seal surfaces for nicks or scratches. Minor scratches can be removed with crocus cloth. However, replace the piston and/or retainer if the seal surfaces are seriously scored.

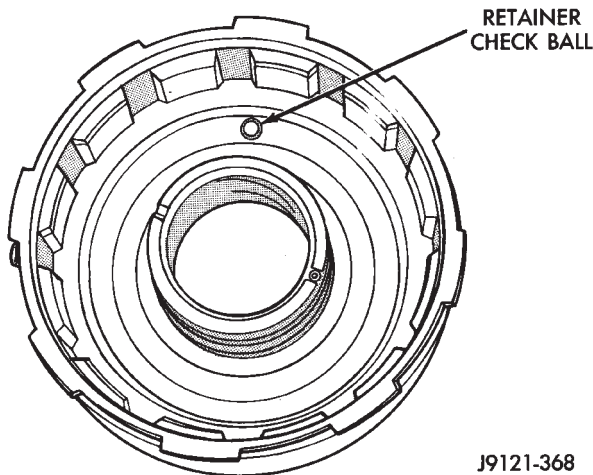
**REAR CLUTCH**

Clean the clutch components with solvent and dry them with compressed air. Do not use rags or shop towels to dry any of the clutch parts. Lint from such materials will adhere to component surfaces and could restrict or block fluid passages after assembly.

Replace the clutch discs if warped, worn, scored, burned/charred, the lugs are damaged, or if the facing is flaking off. Replace the top and bottom pressure plates if scored, warped, or cracked. Be sure the driving lugs on the pressure and clutch plates are

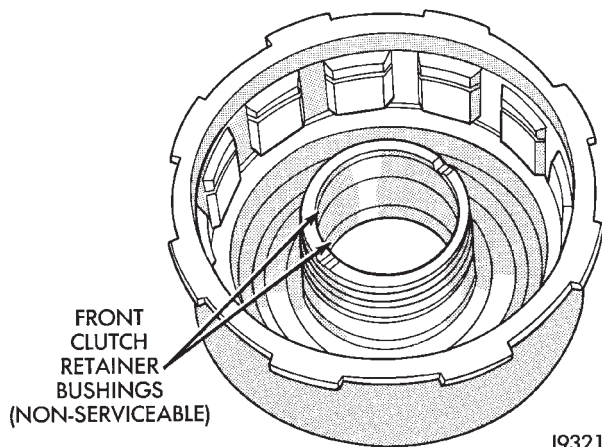


## CLEANING AND INSPECTION (Continued)



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**Fig. 246 Front Clutch Piston Retainer Check Ball Location**



J9321-223

**Fig. 247 Retainer Bushing Location/Inspection**

also in good condition. The lugs must not be bent, cracked or damaged in any way.

Replace the piston spring and wave spring if either part is distorted, warped or broken.

Check the lug grooves in the clutch retainer. The clutch and pressure plates should slide freely in the slots. Replace the retainer if the grooves are worn or damaged. Also check action of the check balls in the retainer and piston. Each check ball must move freely and not stick.

Replace the retainer bushing if worn, scored, or doubt exists about bushing condition.

Inspect the piston and retainer seal surfaces for nicks or scratches. Minor scratches can be removed with crocus cloth. However, replace the piston and/or retainer if the seal surfaces are seriously scored.

Check condition of the fiber thrust washer and metal output shaft thrust washer. Replace either washer if worn or damaged.

Check condition of the seal rings on the input shaft and clutch retainer hub. Replace the seal rings only

if worn, distorted, or damaged. The input shaft front seal ring is teflon with chamfered ends. The rear ring is metal with interlocking ends.

Check the input shaft for wear, or damage. Replace the shaft if worn, scored or damaged in any way.

## PLANETARY GEARTRAIN

Clean the planetary components in solvent and dry them with compressed air.

Check sun gear and driving shell condition. Replace the gear if damaged or if the bushings are scored or worn. The bushings are not serviceable. Replace the driving shell if worn, cracked or damaged.

Replace planetary gear sets if gears, pinion pins, or carrier are damaged in any way. Replace the annulus gears and supports if either component is worn or damaged.

Inspect the geartrain spacers, thrust plates, snap rings, and thrust washers. Replace any of these parts that are worn, distorted or damaged. Do not attempt to reuse these parts.

The planetary gear thrust washers are different sizes. The large diameter washers go on the front planetary and the smaller washers go on the rear planetary. All the washers have four locating tabs on them. These tabs fit in the holes or slots provided in each planetary gear.

Inspect the output shaft carefully. Pay particular attention to the machined bushing/bearing surfaces on the shaft and the governor valve shaft bore at the shaft rear.

Replace the output shaft if the machined surfaces are scored, pitted, or damaged in any way. Also replace the shaft if the splines are damaged, or exhibits cracks at any location (especially at the governor valve shaft bore).

The annulus gears can be removed from their supports if necessary. Just remove the snap rings and separate the two parts when replacement is necessary. In addition, the annulus gear bushings can be replaced if severely worn, or scored. However it is not necessary to replace the bushings if they only exhibit normal wear. Check bushing fit on the output shaft to be sure.

## OVERDRIVE UNIT

Clean the geartrain and case components with solvent. Dry all parts except the bearings with compressed air. Allow bearings to air dry.

Do not use shop towels for wiping parts dry unless the towels are made from a lint-free material. A sufficient quantity of lint (from shop towels, cloths, rags, etc.) could plug the transmission filter and fluid passages.

## CLEANING AND INSPECTION (Continued)

Discard the old case gasket and seals. Do not attempt to salvage these parts. They are not reusable. Replace any of the overdrive unit snap rings if distorted or damaged.

Minor nicks or scratches on components can be smoothed with crocus cloth. However, do not attempt to reduce severe scoring on any components with abrasive materials. Replace severely scored components; do not try to salvage them.

Check condition of the park lock components and the overdrive case.

Replace the case if cracked, scored, or damaged. Replace the park lock pawl, plug, or spring if worn or damaged. Be sure the bullet at the end of the park lock rod is in good condition. Replace the rod if the bullet is worn or the rod itself is bent or distorted. Do not attempt to straighten the rod.

Check the bushings in the overdrive case. Replace the bushings if severely scored or worn. Also replace the case seal if loose, distorted, or damaged.

Examine the overdrive and direct clutch discs and plates. Replace the discs if the facing is worn, severely scored, or burned and flaking off. Replace the clutch plates if worn, heavily scored, or cracked. Check the lugs on the clutch plates for wear. The plates should slide freely in the drum. Replace the plates or drum if binding occurs.

Check condition of the annulus gear, direct clutch hub, clutch drum and clutch spring. Replace the gear, hub and drum if worn or damaged. Replace the spring if collapsed, distorted, or cracked.

Be sure the splines and lugs on the gear, drum and hub are in good condition. The clutch plates and discs should slide freely in these components.

Inspect the thrust bearings and spring plate. Replace the plate if worn or scored. Replace the bearings if rough, noisy, brinnelled, or worn.

Inspect the planetary gear assembly and the sun gear and bushings. If either the sun gear or the bushings are damaged, replace the gear and bushings as an assembly. The gear and bushings are not serviced separately.

The planetary carrier and pinions must be in good condition. Also be sure the pinion pins are secure and in good condition. Replace the carrier if worn or damaged.

Inspect the overrunning clutch and race. The race surface should be smooth and free of scores. Replace the overrunning clutch assembly or the race if either assembly is worn or damaged in any way.

Inspect the output shaft and governor components. Replace the shaft pilot bushing and inner bushing if damaged. Replace either shaft bearing if rough or noisy. Replace the bearing snap rings if distorted or cracked.

Check the machined surfaces on the output shaft. These surfaces should be clean and smooth. Very minor nicks or scratches can be smoothed with crocus cloth. Replace the shaft if worn, scored or damaged in any way.

Inspect the output shaft bushings. The small bushing is the intermediate shaft pilot bushing. The large bushing is the overrunning clutch hub bushing. Replace either bushing if scored, pitted, cracked, or worn.

## ADJUSTMENTS

## TRANSMISSION THROTTLE VALVE CABLE ADJUSTMENT

The transmission throttle valve is operated by a cam on the valve body throttle lever. The throttle lever is actuated by a cable connected to the engine throttle body lever (Fig. 248). A retaining clip at the engine-end of the cable is removed to provide for cable adjustment. The retaining clip is then installed back onto the throttle valve cable to lock in the adjustment.

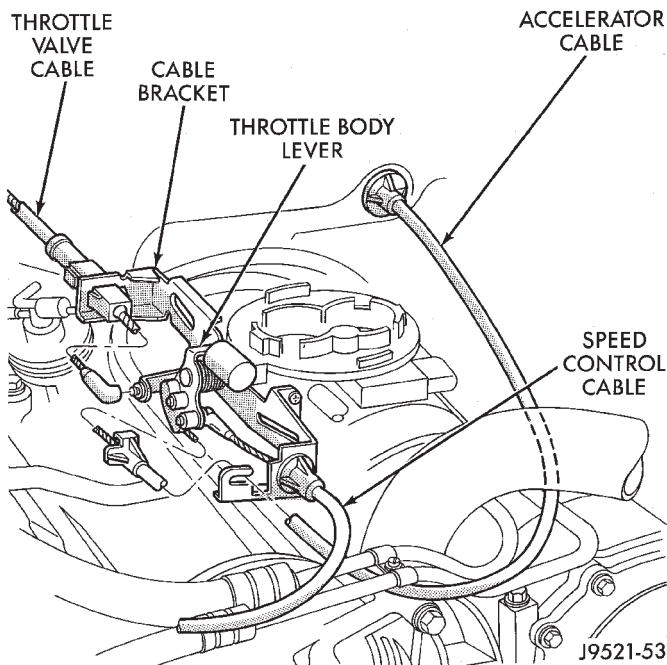
A correctly adjusted throttle valve cable, will cause the throttle lever on the transmission to move simultaneously with the throttle body lever from the idle position. Proper adjustment allows simultaneous movement without causing the transmission throttle lever to move ahead of, or lag behind the throttle body lever.

## THROTTLE VALVE CABLE ADJUSTMENT CHECK

- (1) Turn ignition key to OFF position.
- (2) Remove air cleaner.
- (3) Verify that throttle body lever is at curb idle position. Then verify that transmission throttle lever (Fig. 248) is also at idle (full forward) position.
- (4) Slide cable off attachment stud on throttle body lever (Fig. 248).
- (5) Compare position of cable end to attachment stud on throttle body lever:
  - (a) Cable end and attachment stud should be aligned (or centered on one another) to within 1 mm (0.039 in.) in either direction.
  - (b) If cable end and attachment stud are misaligned (off center), cable will have to be adjusted as described in following procedure.
- (6) Reconnect cable end to attachment stud. Then with aid of a helper, observe movement of transmission throttle lever and lever on throttle body.
  - (a) If both levers move simultaneously from idle to half-throttle and back to idle position, adjustment is correct.
  - (b) If transmission throttle lever moves ahead of, or lags behind throttle body lever, cable adjustment

## ADJUSTMENTS (Continued)

will be necessary. Or, if throttle body lever prevents transmission lever from returning to closed position, cable adjustment will be necessary.



**Fig. 248 Throttle Valve Cable Attachment —At Engine**

## THROTTLE VALVE CABLE ADJUSTMENT PROCEDURE

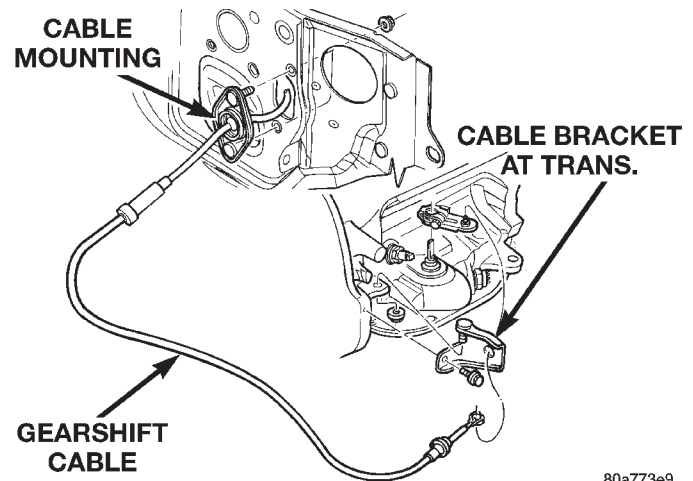
- (1) Turn ignition switch to OFF position and shift into Park.
- (2) Remove air cleaner.
- (3) Disconnect cable end from attachment stud on throttle body. **Carefully slide cable off stud. Do not pull or pry cable off.**
- (4) Verify that transmission throttle lever is in idle (full forward) position. Then be sure lever on throttle body is at curb idle position.
- (5) Insert a small screwdriver under edge of retaining clip and remove retaining clip.
- (6) Center cable end on attachment stud to within 1 mm (0.039 in.).
- (7) Install retaining clip onto cable housing.
- (8) Check cable adjustment. Be sure transmission throttle lever and lever on throttle body move simultaneously and as described in cable adjustment checking procedure.

## GEARSHIFT CABLE

Check adjustment by starting the engine in Park and Neutral. Adjustment is OK if the engine starts only in these positions. Adjustment is incorrect if the engine starts in one but not both positions. If the engine starts in any position other than Park or Neutral, or if the engine will not start at all, the park/neutral position switch may be faulty.

## Gearshift Adjustment Procedure

- (1) Shift transmission into Park.
- (2) Release cable adjuster lock (underneath the power brake booster) (Fig. 249) to unlock cable.
- (3) Raise vehicle.
- (4) Slide cable eyelet off transmission shift lever.
- (5) Verify transmission shift lever is in Park detent by moving lever fully rearward. Last rearward detent is Park position.
- (6) Verify positive engagement of transmission park lock by attempting to rotate propeller shaft. Shaft will not rotate when park lock is engaged.
- (7) Slide cable eyelet onto transmission shift lever.
- (8) Lower vehicle and check engine starting. Engine should start only in Park and Neutral.
- (9) Lock shift cable by pressing cable adjuster clamp down until it snaps into place.



**Fig. 249 Gearshift Cable Routing**

## BAND ADJUSTMENTS

## FRONT BAND ADJUSTMENT

The front (kickdown) band adjusting screw is located on the left side of the transmission case above the manual valve and throttle valve levers.

- (1) Raise vehicle.
- (2) Loosen band adjusting screw locknut (Fig. 250). Then back locknut off 3-5 turns. Be sure adjusting screw turns freely in case. Apply lubricant to screw threads if necessary.
- (3) Tighten band adjusting screw to 8 N·m (72 in. lbs.) torque with Inch Pound Torque Wrench C-3380-A, a 3-in. extension and 5/16 socket.

**CAUTION:** If Adapter C-3705 is needed to reach the adjusting screw (Fig. 251), tighten the screw to only 5 N·m (47-50 in. lbs.) torque.



## ADJUSTMENTS (Continued)

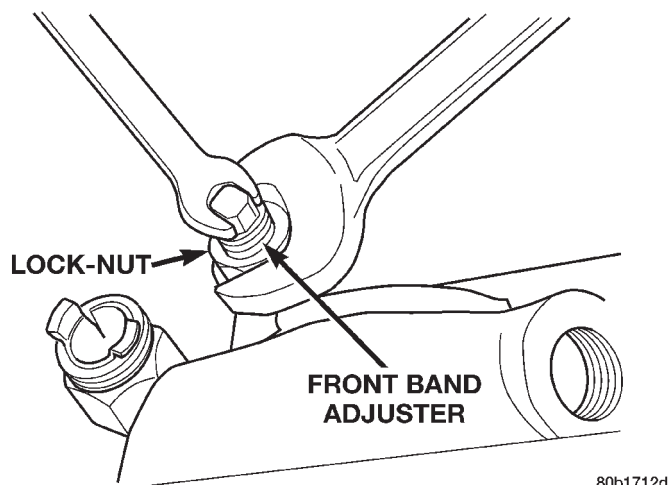
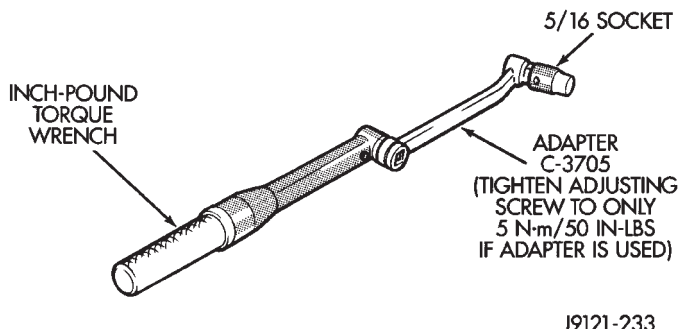
**42RE TRANSMISSION**

- Back off front band adjusting screw 3-5/8 turns.
- Hold adjuster screw in position and tighten locknut to 41 N·m (30 ft. lbs.) torque.

**44RE TRANSMISSION**

- Back off front band adjusting screw 2-1/4 turns.
- Hold adjuster screw in position and tighten locknut to 41 N·m (30 ft. lbs.) torque.

(4) Lower vehicle.

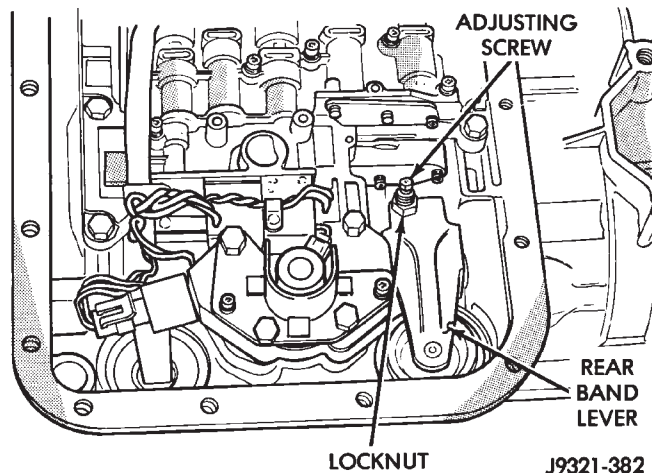
**Fig. 250 Front Band Adjustment Screw Location****Fig. 251 Band Adjustment Adapter Tool****REAR BAND ADJUSTMENT**

The transmission oil pan must be removed for access to the rear band adjusting screw.

- (1) Raise vehicle.
- (2) Remove transmission oil pan and drain fluid.
- (3) Loosen band adjusting screw locknut 5-6 turns (Fig. 252). Be sure adjusting screw turns freely in lever.
- (4) Tighten adjusting screw to 8 N·m (72 in. lbs.) torque.

**42/44RE TRANSMISSION**

- Back off adjusting screw 4 turns.
- Hold adjusting screw in place and tighten locknut to 34 N·m (25 ft. lbs.) torque.

**Fig. 252 Rear Band Adjusting Screw Location**

(5) Position new gasket on oil pan and install pan on transmission. Tighten pan bolts to 17 N·m (13 ft. lbs.) torque.

(6) Lower vehicle and refill transmission with Mopar® ATF Plus 3, Type 7176 fluid.

**VALVE BODY****CONTROL PRESSURE ADJUSTMENTS**

There are two control pressure adjustments on the valve body;

- Line Pressure
- Throttle Pressure

Line and throttle pressures are interdependent because each affects shift quality and timing. As a result, both adjustments must be performed properly and in the correct sequence. Adjust line pressure first and throttle pressure last.

**LINE PRESSURE ADJUSTMENT**

Measure distance from the valve body to the inner edge of the adjusting screw with an accurate steel scale (Fig. 253).

Distance should be 33.4 mm (1-5/16 in.).

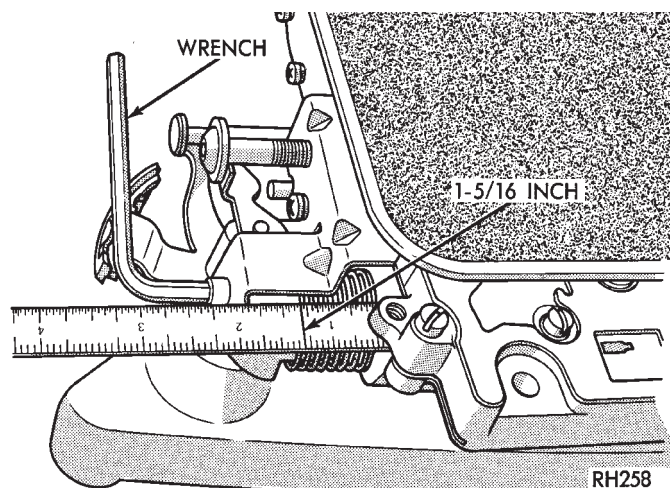
If adjustment is required, turn the adjusting screw in, or out, to obtain required distance setting.

**NOTE:** The 33.4 mm (1-5/16 in.) setting is an approximate setting. Manufacturing tolerances may make it necessary to vary from this dimension to obtain desired pressure.

One complete turn of the adjusting screw changes line pressure approximately 1-2/3 psi (9 kPa).

Turning the adjusting screw counterclockwise increases pressure while turning the screw clockwise decreases pressure.

## ADJUSTMENTS (Continued)

**Fig. 253 Line Pressure Adjustment****THROTTLE PRESSURE ADJUSTMENT**

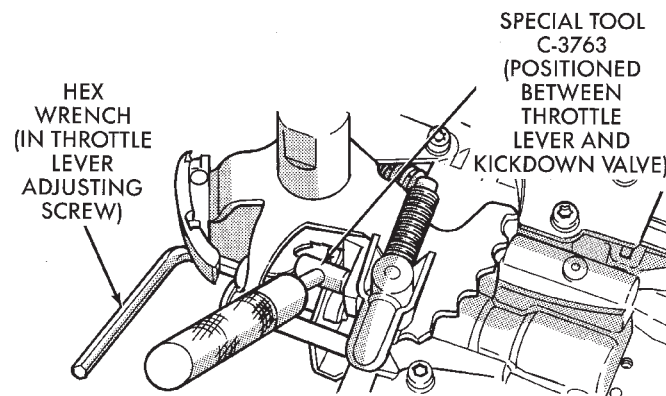
Insert Gauge Tool C-3763 between the throttle lever cam and the kickdown valve stem (Fig. 254).

Push the gauge tool inward to compress the kickdown valve against the spring and bottom the throttle valve.

Maintain pressure against kickdown valve spring. Turn throttle lever stop screw until the screw head

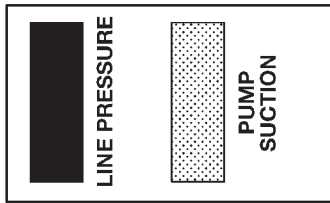
touches throttle lever tang and the throttle lever cam touches gauge tool.

**NOTE:** The kickdown valve spring must be fully compressed and the kickdown valve completely bottomed to obtain correct adjustment.

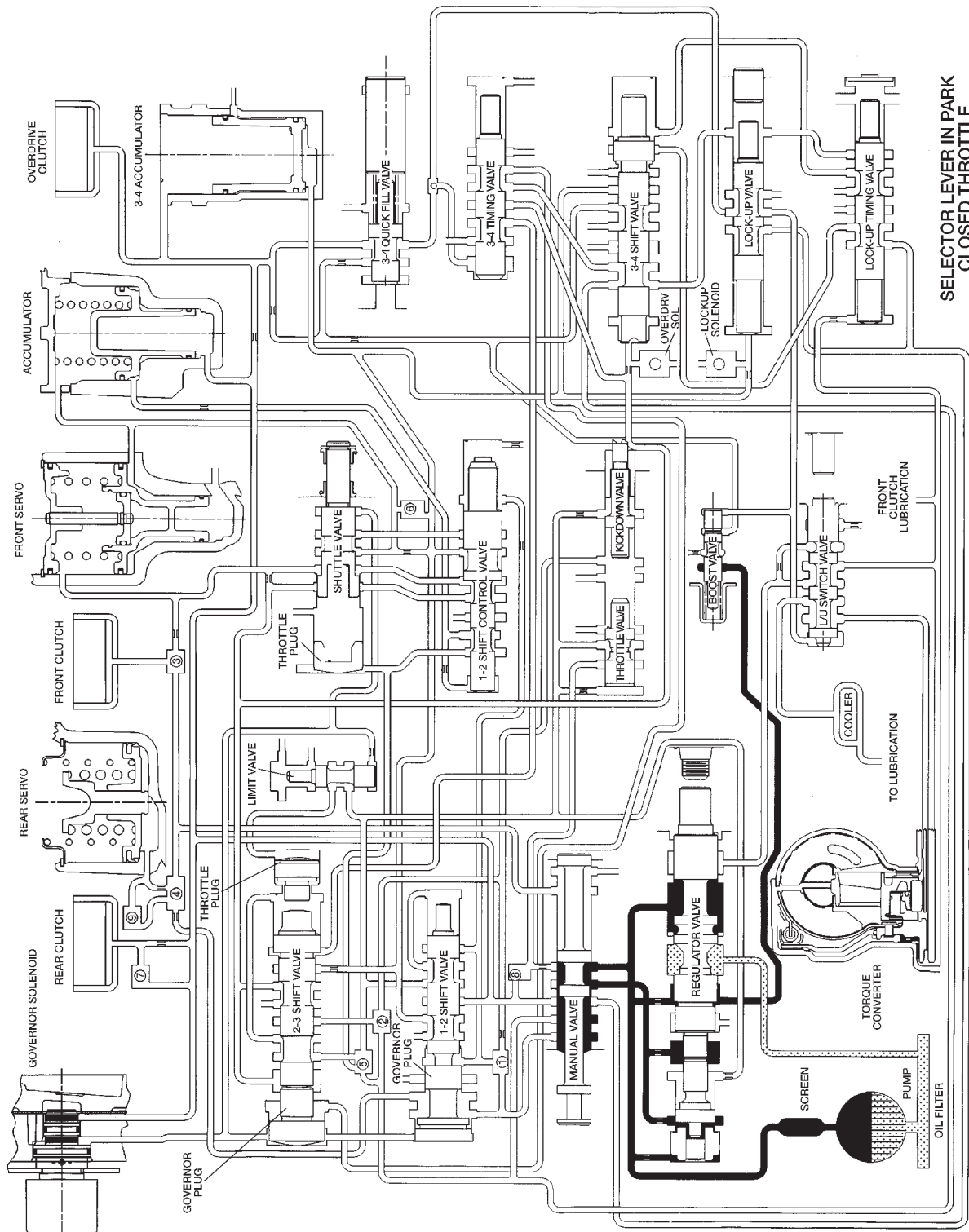
**Fig. 254 Throttle Pressure Adjustment**

# SCHEMATICS AND DIAGRAMS

## HYDRAULIC SCHEMATICS



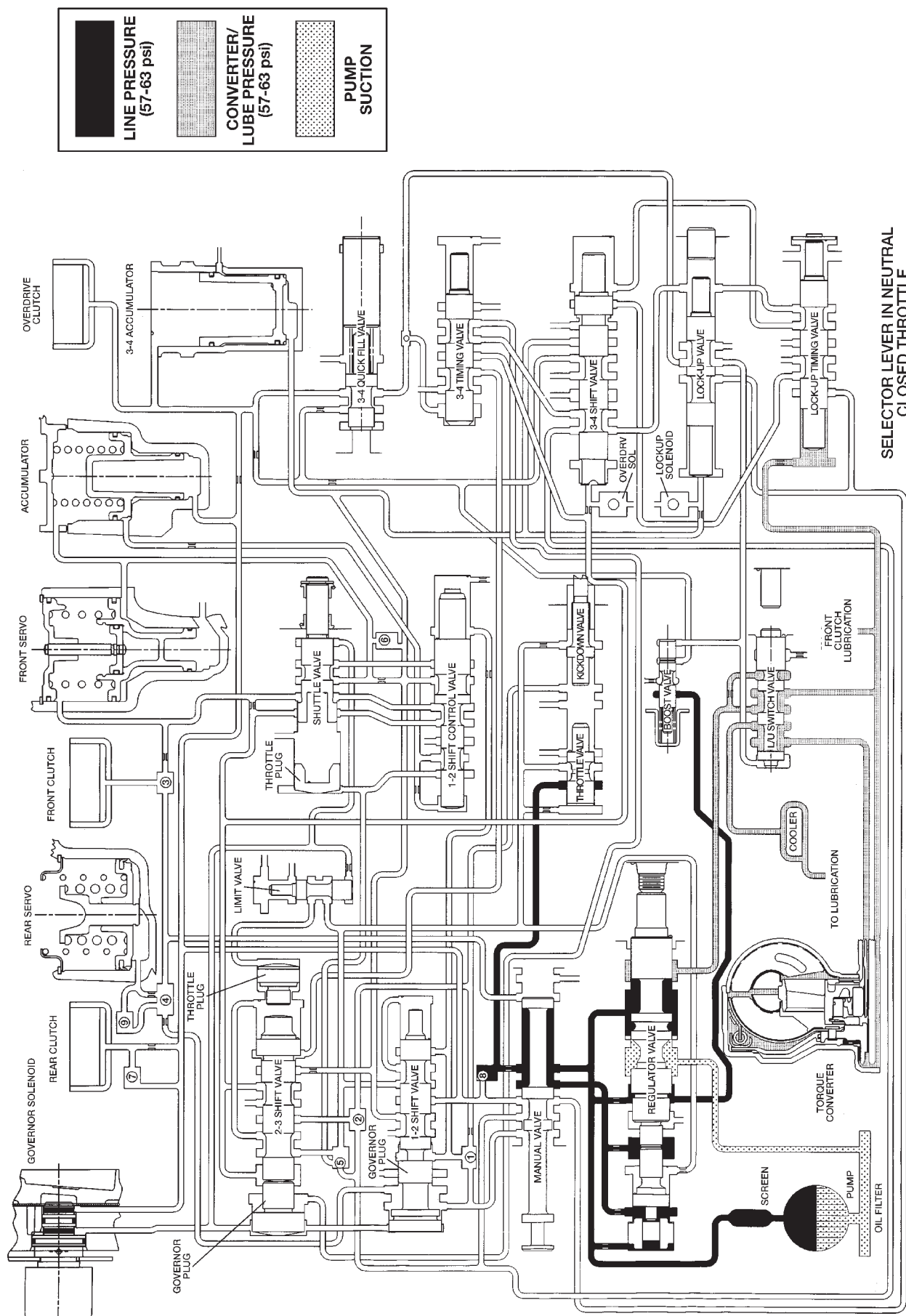
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**HYDRAULIC FLOW IN PARK**

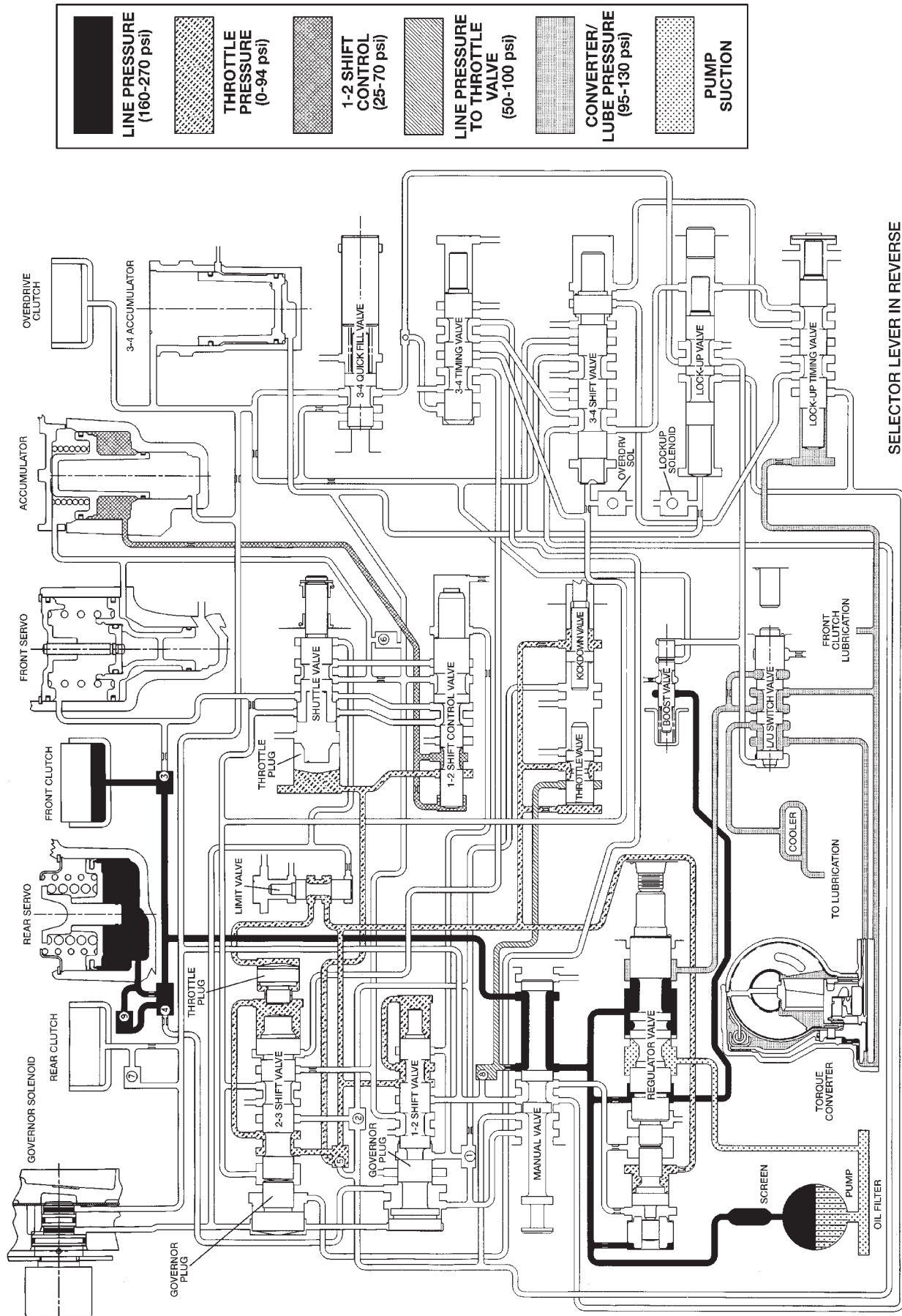


## SCHEMATICS AND DIAGRAMS (Continued)



## SCHEMATICS AND DIAGRAMS (Continued)

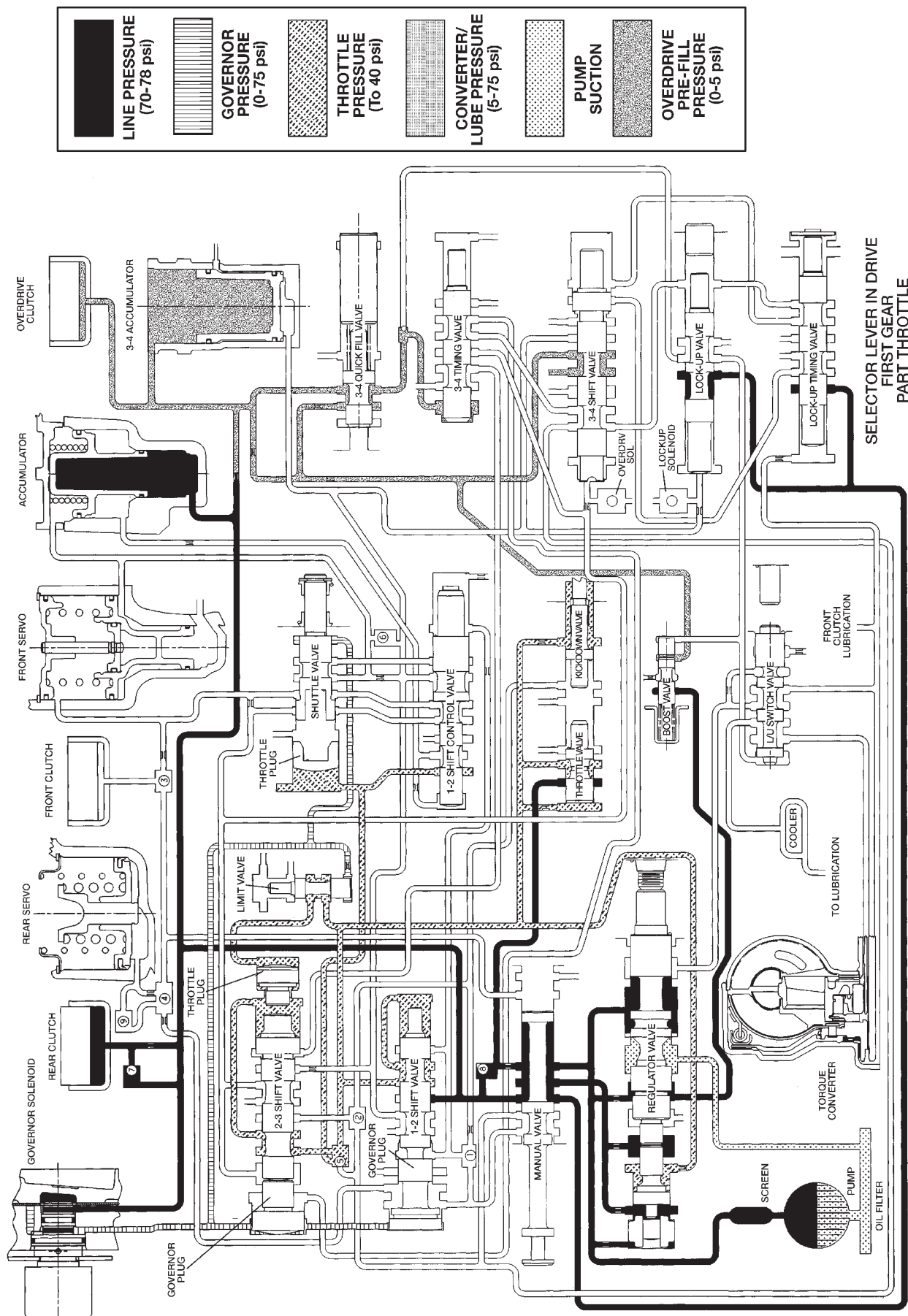
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HYDRAULIC FLOW IN REVERSE

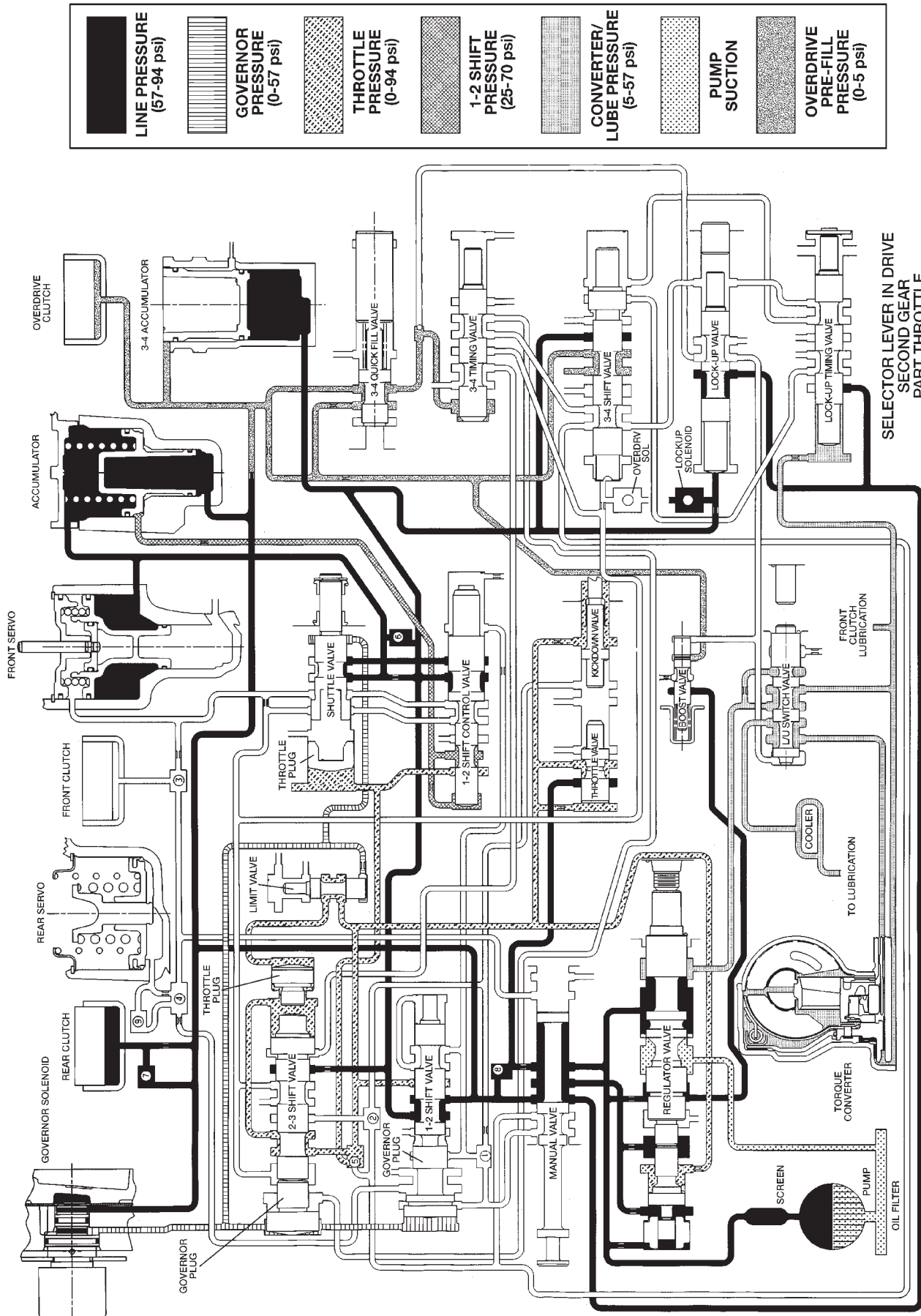
## SCHEMATICS AND DIAGRAMS (Continued)

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HYDRAULIC FLOW IN DRIVE FIRST GEAR

## SCHEMATICS AND DIAGRAMS (Continued)



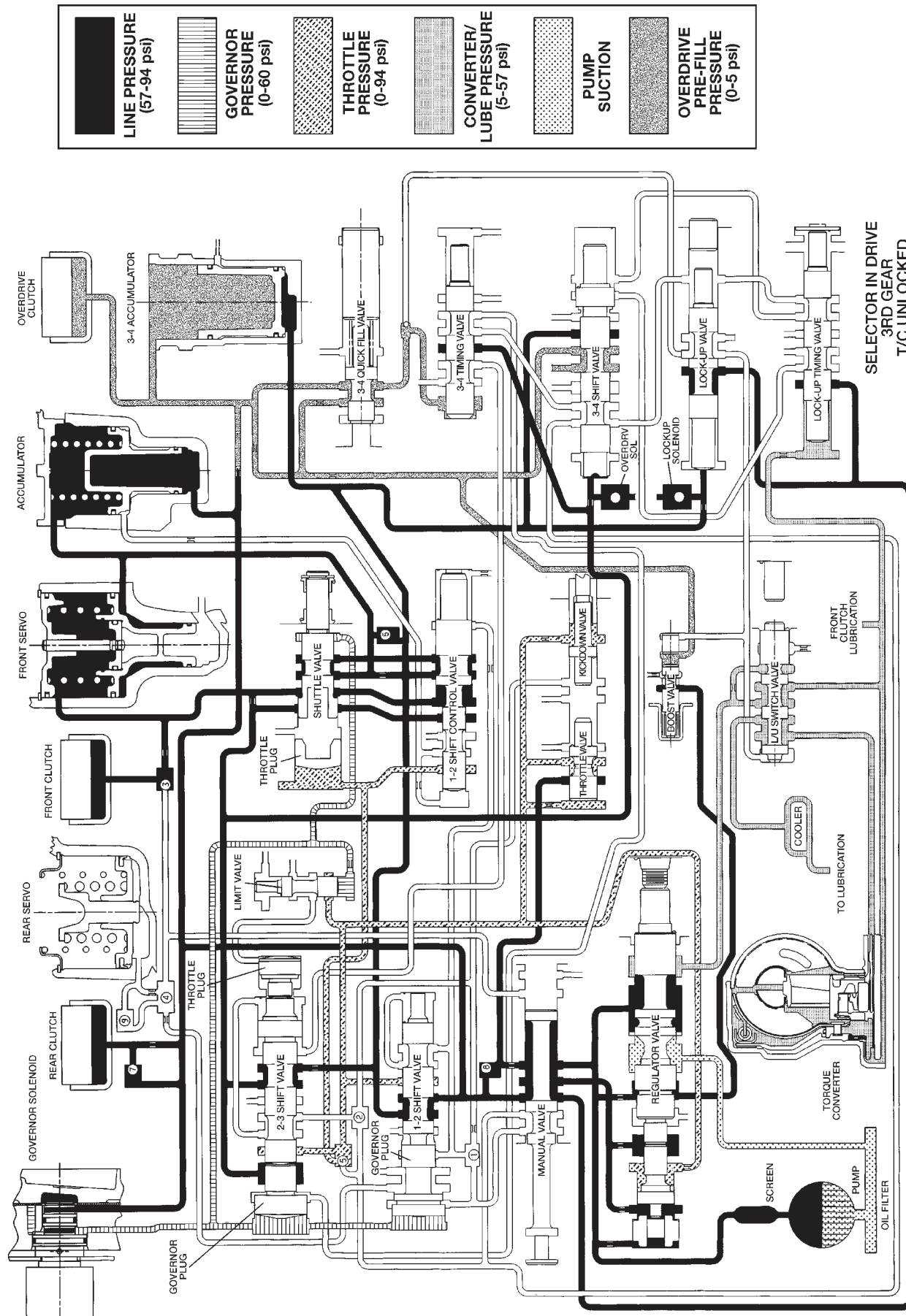
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HYDRAULIC FLOW IN DRIVE SECOND GEAR



## SCHEMATICS AND DIAGRAMS (Continued)

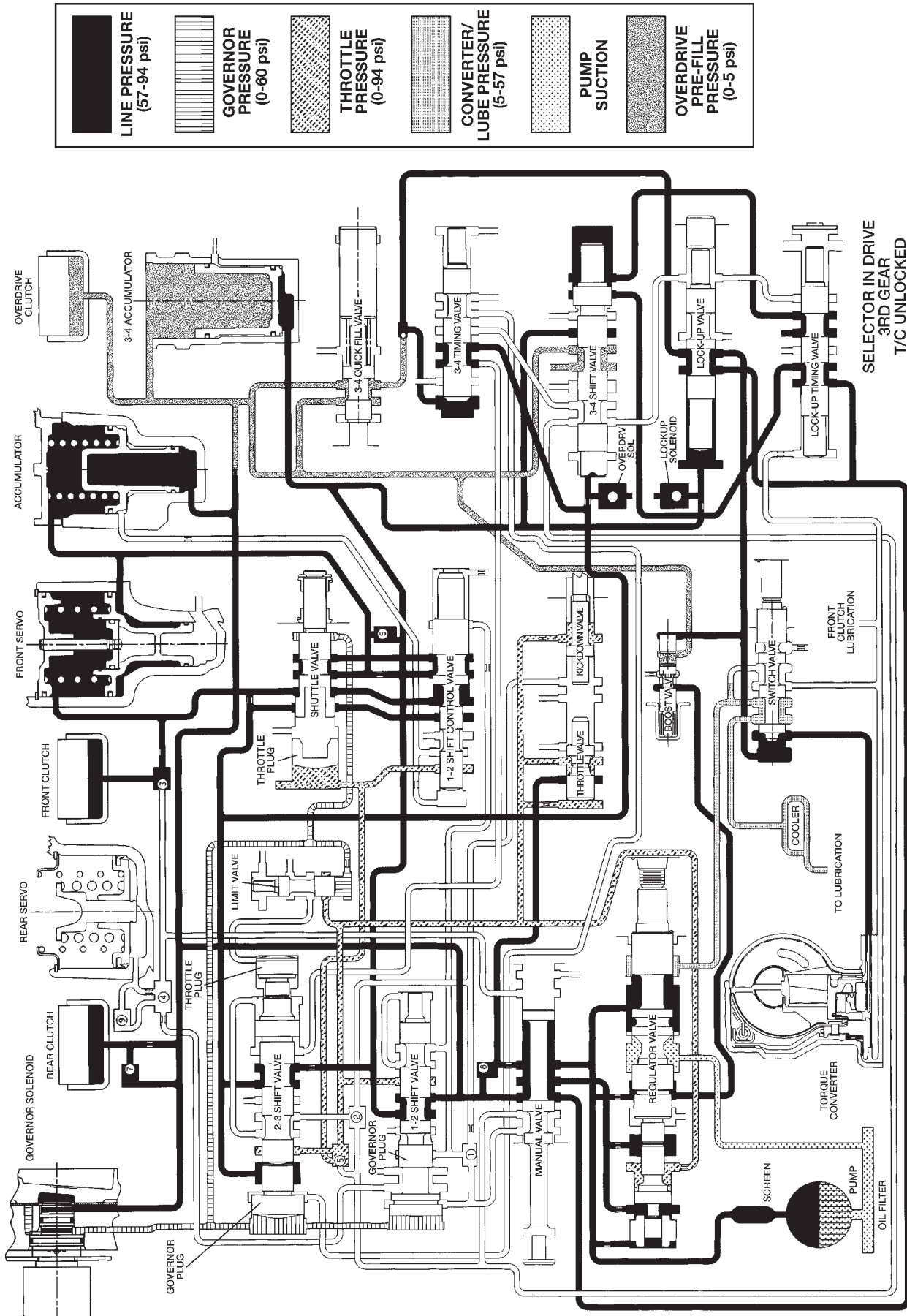
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HYDRAULIC FLOW IN DRIVE THIRD GEAR (CONVERTER CLUTCH NOT APPLIED)

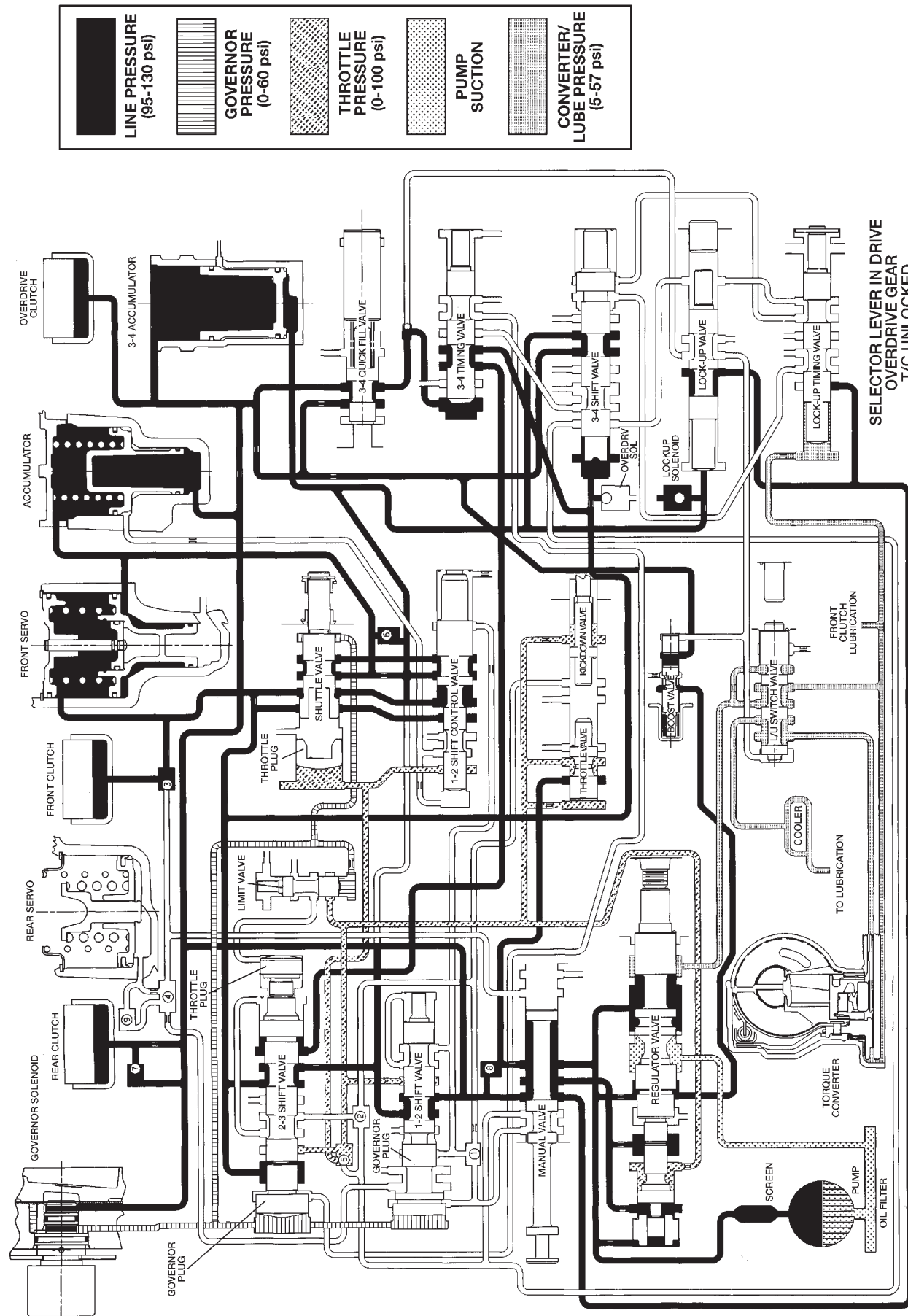
## SCHEMATICS AND DIAGRAMS (Continued)

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HYDRAULIC FLOW IN DRIVE THIRD GEAR (CONVERTER CLUTCH APPLIED)

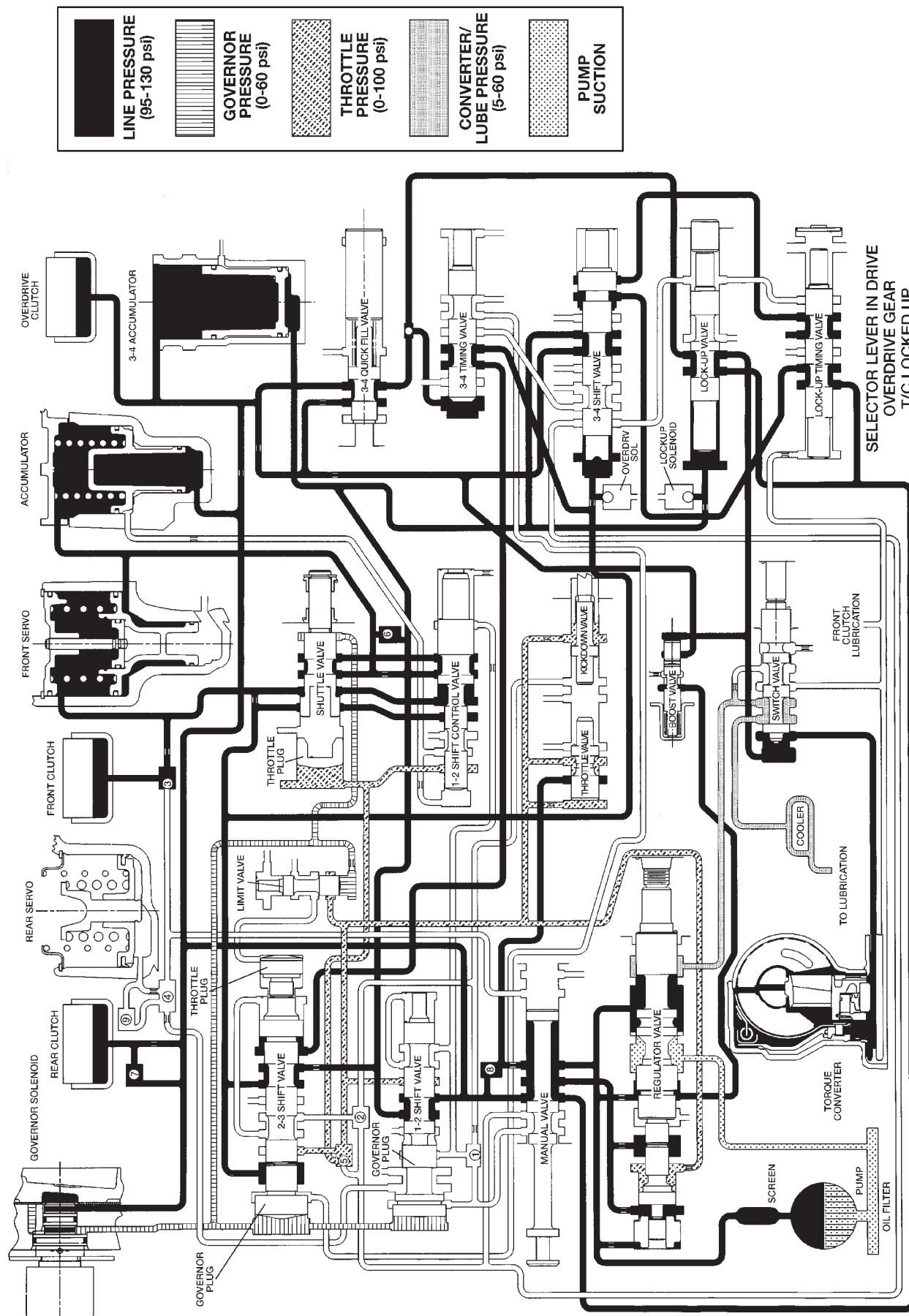
## SCHEMATICS AND DIAGRAMS (Continued)



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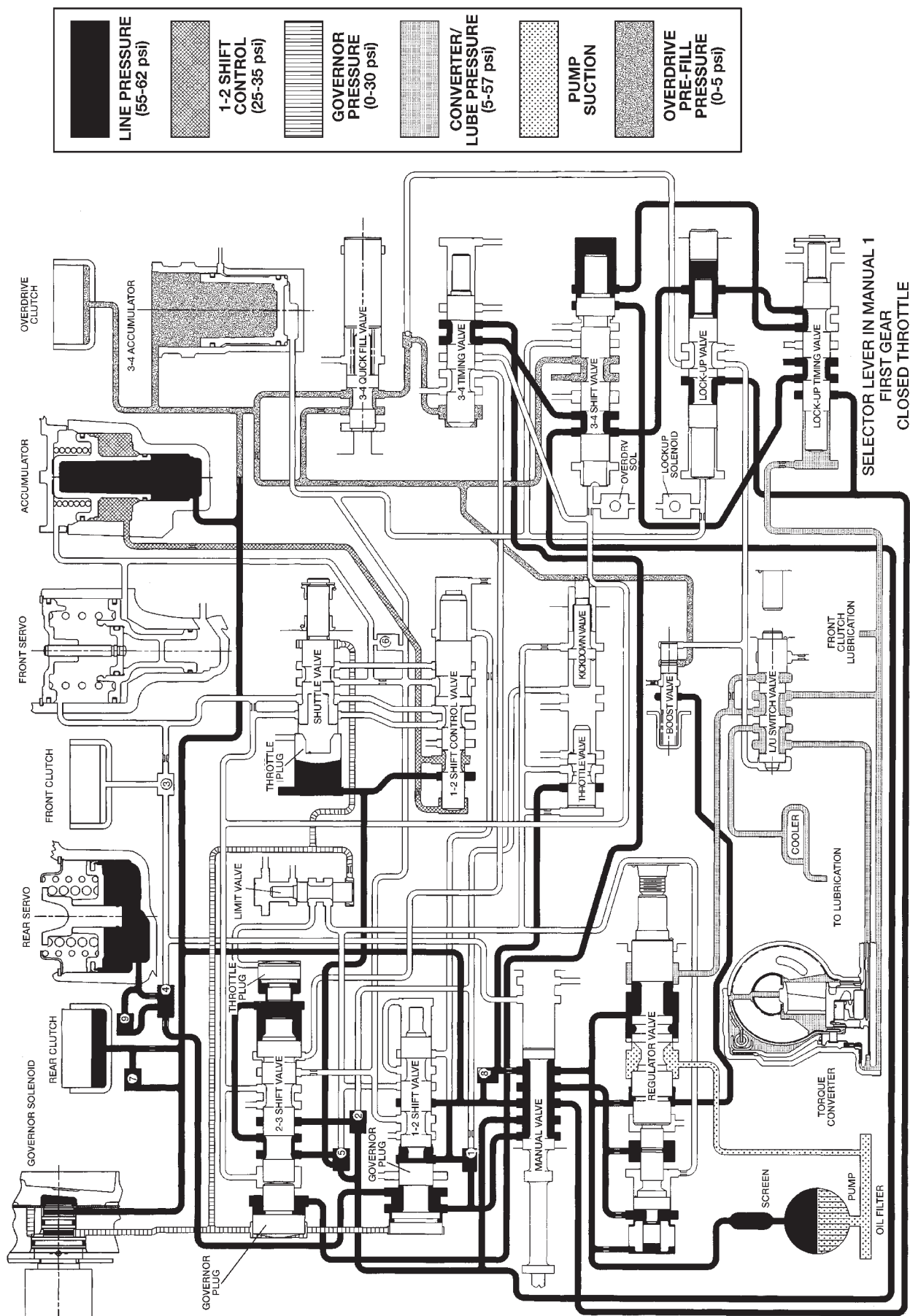
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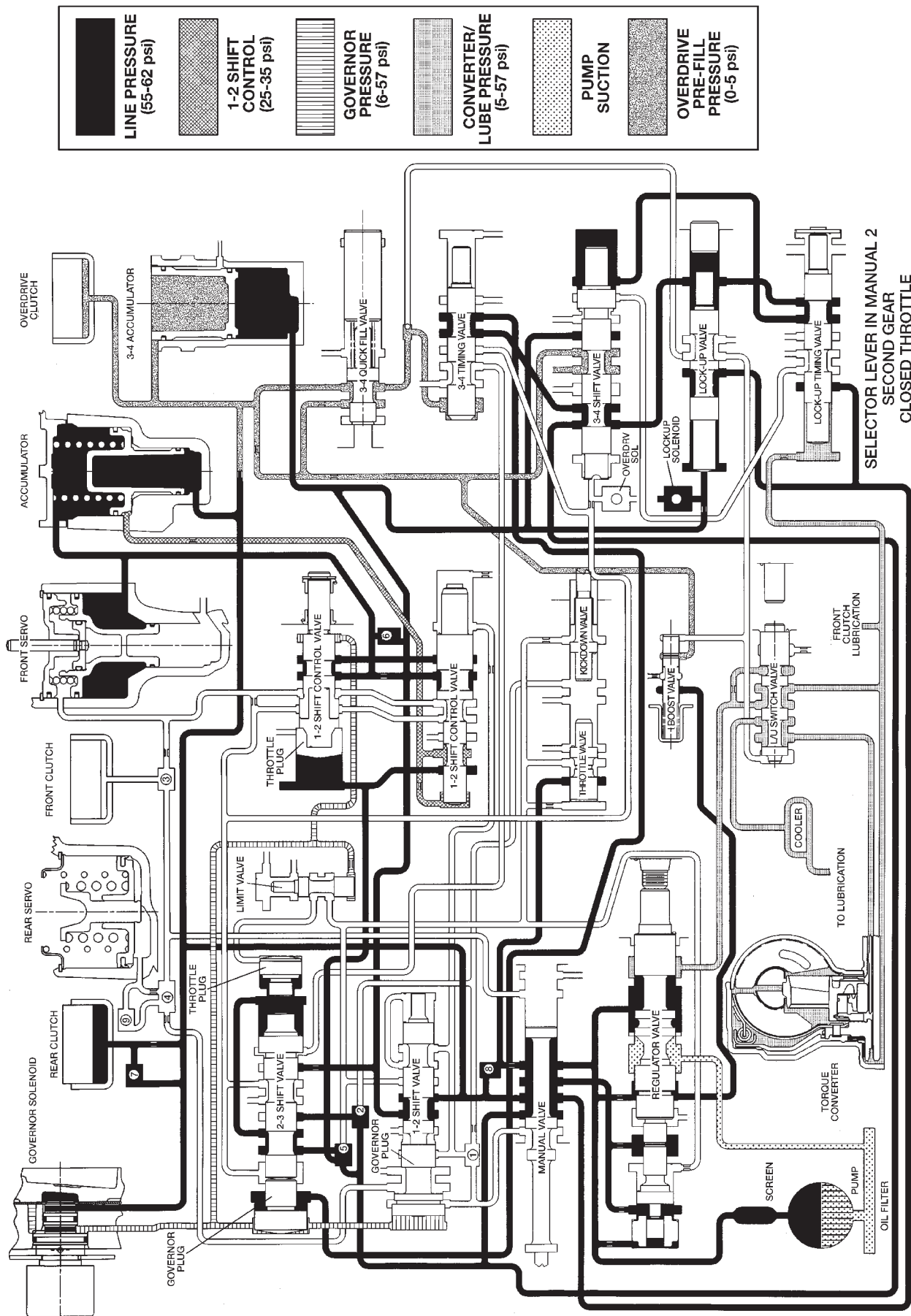
**HYDRAULIC FLOW IN DRIVE FOURTH GEAR (CONVERTER CLUTCH APPLIED)**



## SCHEMATICS AND DIAGRAMS (Continued)

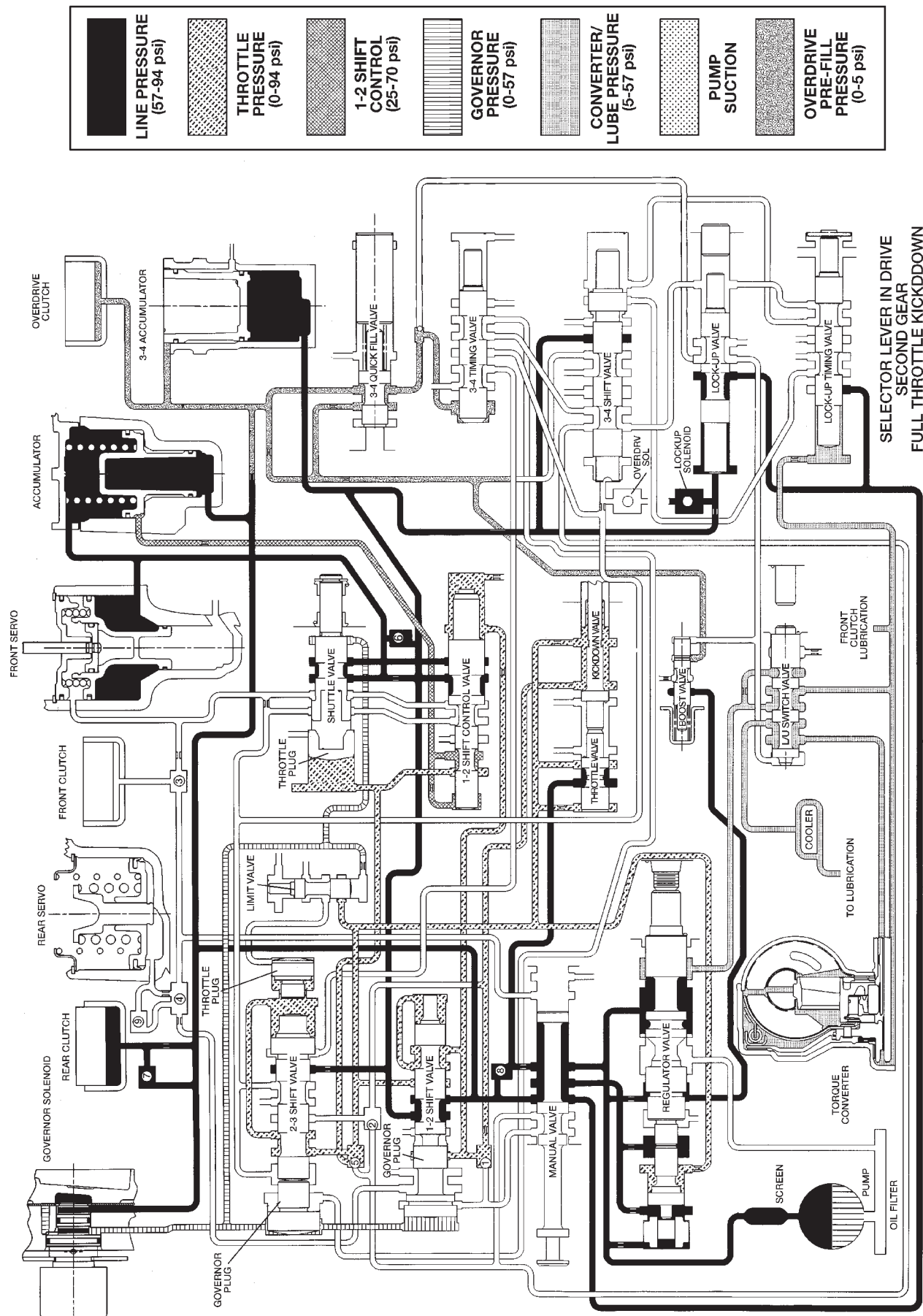


## HYDRAULIC FLOW IN MANUAL SECOND (2)



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## SCHEMATICS AND DIAGRAMS (Continued)



80abfd8a

HYDRAULIC FLOW DURING FULL THROTTLE 3-2 DOWNSHIFT (PASSING GEAR)

## SPECIFICATIONS

## TRANSMISSION

## GENERAL

Component	Metric	Inch
Planetary end play	0.127-1.22 mm	0.005-0.048 in.
Input shaft end play	0.56-2.31 mm	0.022-0.091 in.
Clutch pack clearance/Front.	1.70-3.40 mm	0.067-0.134 in.
Clutch pack clearance/Rear.	0.81-1.40 mm	0.022-0.037 in.
Front Clutch	42RE-4 discs	
	44RE-5 discs	
Rear Clutch	42RE and 44RE-4 discs	
Overdrive clutch disc usage	42RE-3 discs	
	44RE-4 discs	
Direct clutch disc usage	42RE-6 discs	
	44RE-8 discs	
42RE Band adjustment from 72 in. lbs.		
Front band	Back off 3-5/8 turns	
Rear band	Back off 4 turns	
44RE Band adjustment from 72 in. lbs.		
Front band	Back off 2-1/4 turns	
Rear band	Back off 4 turns	
Recommended fluid	Mopar® ATF Plus 3, type 7176	

## GEAR RATIOS

- 1ST GEAR-2.74
- 2ND GEAR-1.54
- 3RD GEAR-1.00
- 4TH GEAR-0.69
- REV.GEAR-2.21

## TORQUE

## DESCRIPTION

## TORQUE

Fitting, cooler line at trans . . . . .	18 N·m (13 ft. lbs.)
Bolt, torque convertor . . . . .	31 N·m (23 ft. lbs.)
Bolt/nut, crossmember . . . . .	68 N·m (50 ft. lbs.)
Bolt, driveplate to crankshaft . . .	75 N·m (55 ft. lbs.)
Plug, front band reaction . . . . .	17 N·m (13 ft. lbs.)
Locknut, front band adj. . . . .	34 N·m (25 ft. lbs.)
Switch, park/neutral . . . . .	34 N·m (25 ft. lbs.)
Bolt, fluid pan . . . . .	17 N·m (13 ft. lbs.)
Screws, fluid filter . . . . .	4 N·m (35 in. lbs.)
Bolt, oil pump . . . . .	20 N·m (15 ft. lbs.)
Bolt, overrunning clutch cam . . .	17 N·m (13 ft. lbs.)
Bolt, O/D to trans. . . . .	34 N·m (25 ft. lbs.)
Bolt, O/D piston retainer . . . . .	17 N·m (13 ft. lbs.)
Plug, pressure test port . . . . .	14 N·m (10 ft. lbs.)
Bolt, reaction shaft support . . . .	20 N·m (15 ft. lbs.)
Locknut, rear band . . . . .	41 N·m (30 ft. lbs.)
Bolt, valve body to case . . . . .	12 N·m (100 in. lbs.)
Screw, solenoid wiring connector .	4 N·m (35 in. lbs.)
Screw, solenoid to transfer plate .	4 N·m (35 in. lbs.)



# SPECIFICATIONS (Continued)

## THRUST WASHER/SPACER/SNAP RING DIMENSIONS

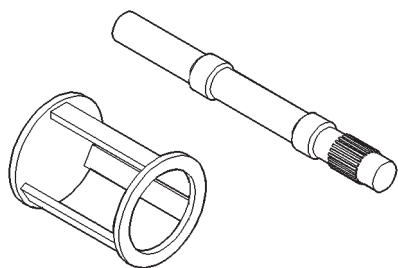
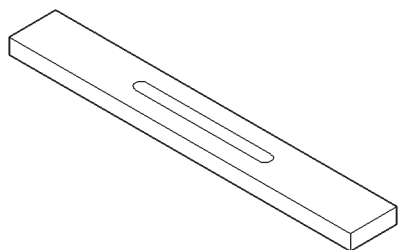
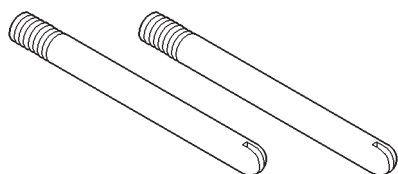
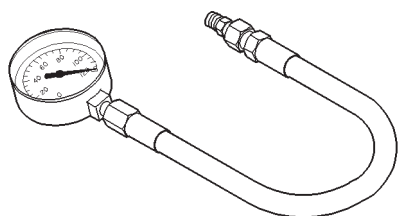
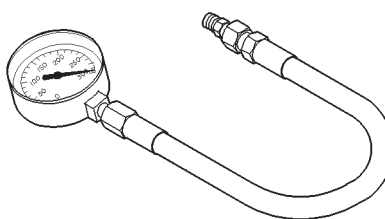
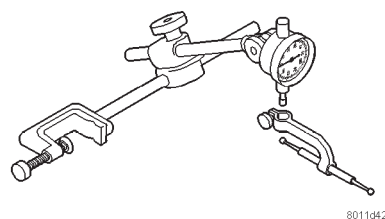
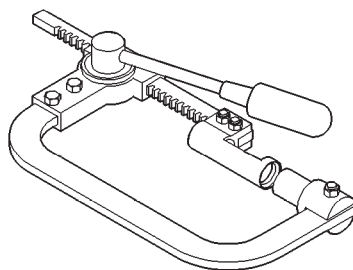
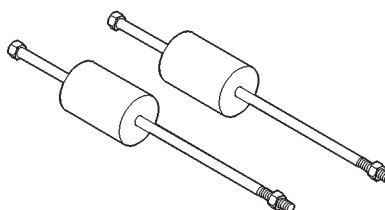
Component	Metric	Inch
Front clutch thrust washer (reaction shaft support hub)	1.55 mm	0.061 in.
Rear clutch thrust washer (clutch retainer)	1.55 mm	0.061 in.
Intermediate shaft thrust plate (shaft hub pilot)	1.5-1.6 mm	0.060-0.063 in.
Output shaft thrust washer (rear clutch hub)	Select fit to set end play	
Rear clutch pack snap ring	1.5 mm	0.060 in.
	1.95 mm	0.076 in.
	2.45 mm	0.098 in.
Planetary geartrain snap ring (at front of output shaft)	Select fit (three thicknesses available)	
Overdrive piston thrust plate	Thrust plate and spacer are select fit. Refer to size charts and selection procedures in Overdrive Unit D&A procedures	
Intermediate shaft spacer		

## PRESSURE TEST

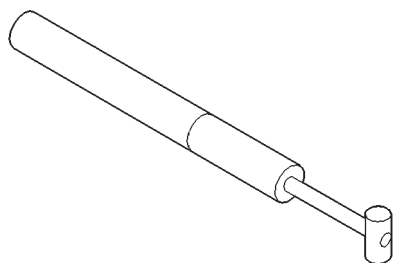
Overdrive clutch	Fourth gear only	Pressure should be 469-496 kPa (68-72 psi) with closed throttle and increase to 620-896 kPa (90-130 psi) at 1/2 to 3/4 throttle.
Line pressure (at accumulator)	Closed throttle	372-414 kPa (54-60 psi).
Front servo	Third gear only	No more than 21 kPa (3 psi) lower than line pressure.
Rear servo	1 range	No more than 21 kPa (3 psi) lower than line pressure.
	R range	1103 kPa (160 psi) at idle, builds to 1862 kPa (270 psi) at 1600 rpm.
Governor	D range closed throttle	Pressure should respond smoothly to changes in mph and return to 0-7 kPa (0-1.5 psi) when stopped with transmission in D, 1, 2. Pressure above 7 kPa (1.5 psi) at stand still will prevent transmission from downshifting.

## SPECIAL TOOLS

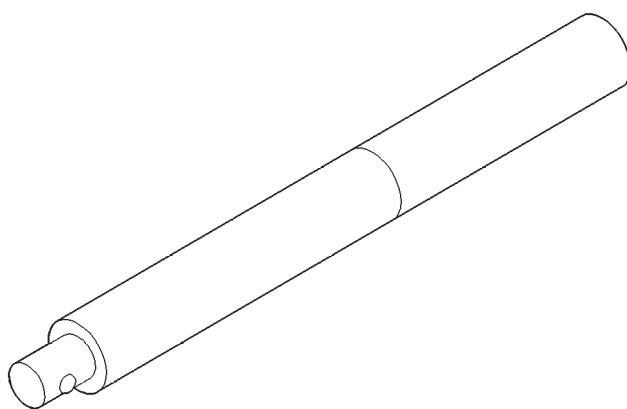
## RE TRANSMISSIONS

**Spring Compressor and Alignment Shaft—6227****Gauge Bar—6311****Extension Housing Pilot—C-3288-B****Pressure Gauge—C-3292****Pressure Gauge—C-3293SP****Dial Indicator—C-3339****Spring Compressor—C-3422-B****Puller, Slide Hammer—C-3752**

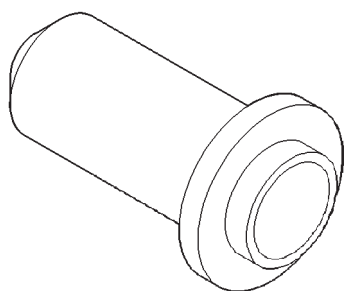
SPECIAL TOOLS (Continued)



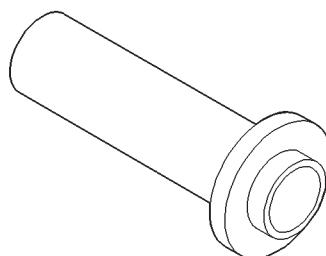
**Gauge, Throttle Setting—C-3763**



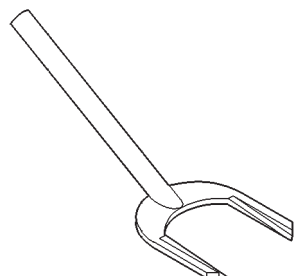
**Universal Handle—C-4171**



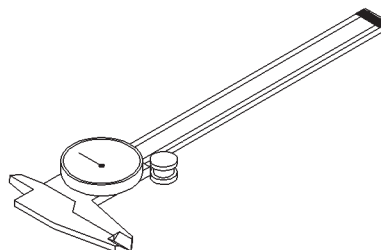
**Seal Installer—C-3860-A**



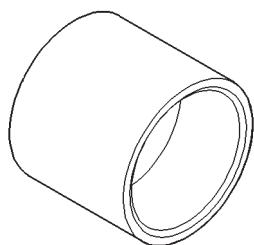
**Seal Installer—C-4193-A**



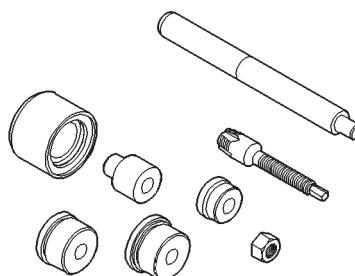
**Seal Remover—C-3985-B**



**Dial Caliper—C-4962**

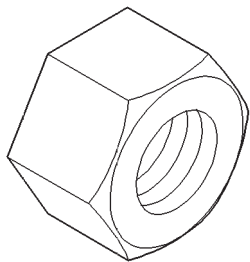


**Installer—C-3995-A**

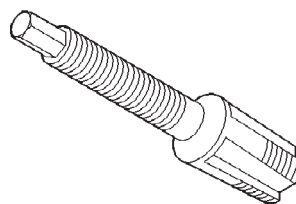


**Bushing Remover/Installer Set—C-3887-J**

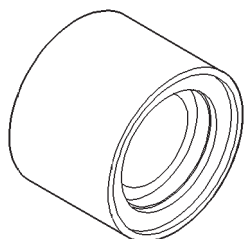
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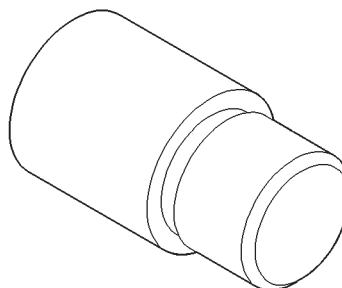
***Nut, Bushing Remover—SP-1191, From kit C-3887-J***



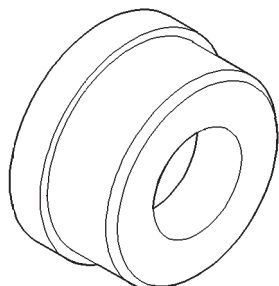
***Remover, Bushing—SP-5324***



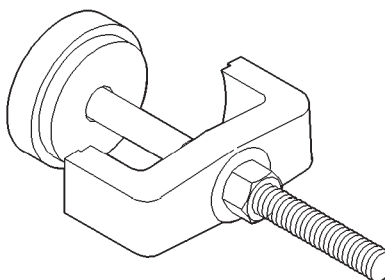
***Cup, Bushing Remover—SP-3633, From kit C-3887-J***



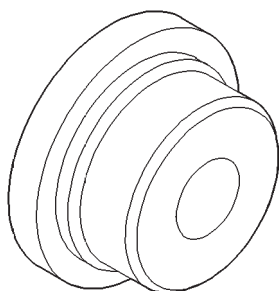
***Installer, Bushing—SP-5325***



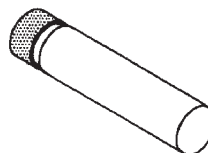
***Remover, Bushing—SP-3551***



***Compressor, Spring—C-3575-A***



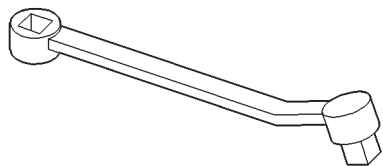
***Installer, Bushing—SP-5117***



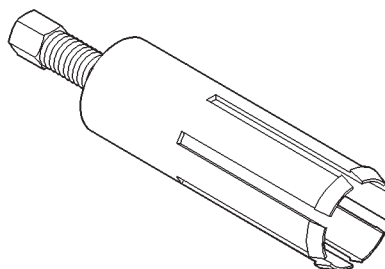
***Gauge—6312***



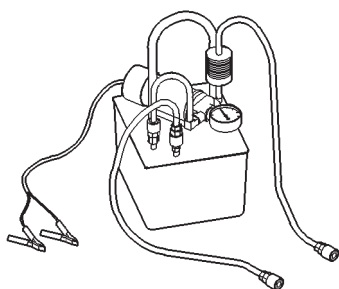
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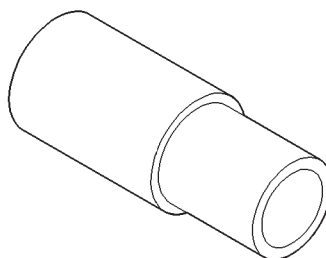
**Adapter—C-3705**



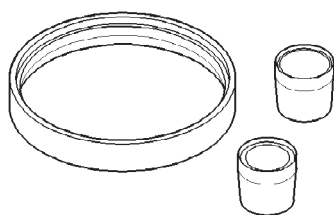
**Remover—6957**



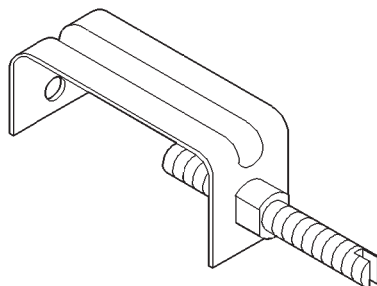
**Flusher—6906**



**Installer—6951**



**Installer—8114**



**Retainer—6583**

## 46RE AUTOMATIC TRANSMISSION

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## GENERAL INFORMATION

### 46RE TRANSMISSION

The 46RE is a four speed fully automatic transmission with an electronic governor (Fig. 1). First through third gear ranges are provided by the clutches, bands, overrunning clutch, and planetary gear sets in the transmission. Fourth gear range is provided by the overdrive unit that contains an overdrive clutch, direct clutch, planetary gear set, and overrunning clutch. The overdrive clutch is applied in fourth gear only. The direct clutch is applied in all ranges except fourth gear. The 46RE is equipped with a lock-up clutch in the torque converter. The torque converter clutch is controlled by the Power-

train Control Module (PCM). The torque converter clutch is hydraulically applied and is released when fluid is vented from the hydraulic circuit by the torque converter control (TCC) solenoid on the valve body. The torque converter clutch engages in fourth gear, and in third gear when the O/D switch is OFF. Engagement occurs when the vehicle is cruising at a steady speed after the vehicle has warmed up. The torque converter clutch disengages when the vehicle begins to go uphill or the accelerator is applied. The torque converter clutch feature increases fuel economy and reduces the transmission fluid temperature. The 46RE transmission is cooled by an integral fluid cooler inside the radiator.

## GENERAL INFORMATION (Continued)

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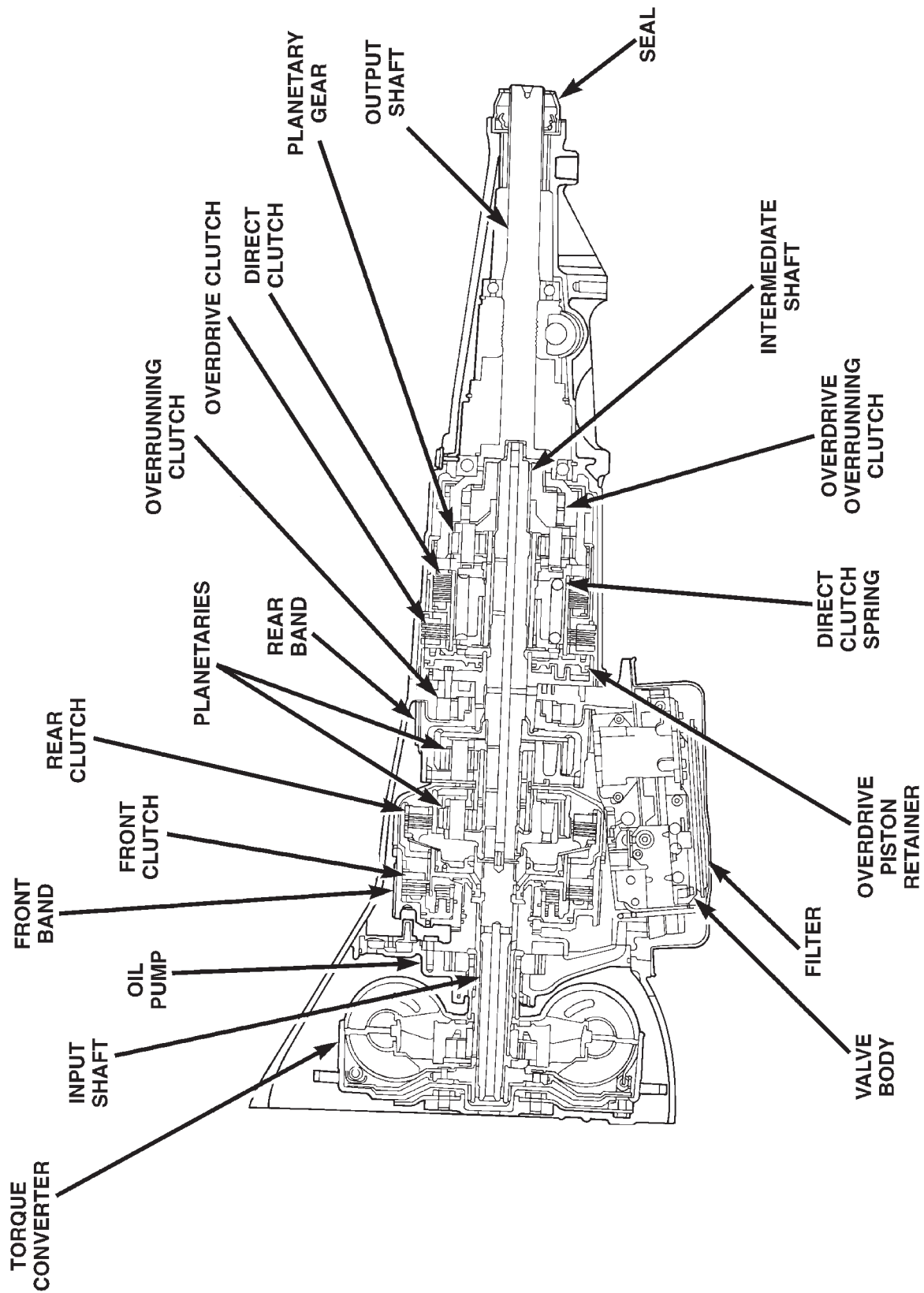


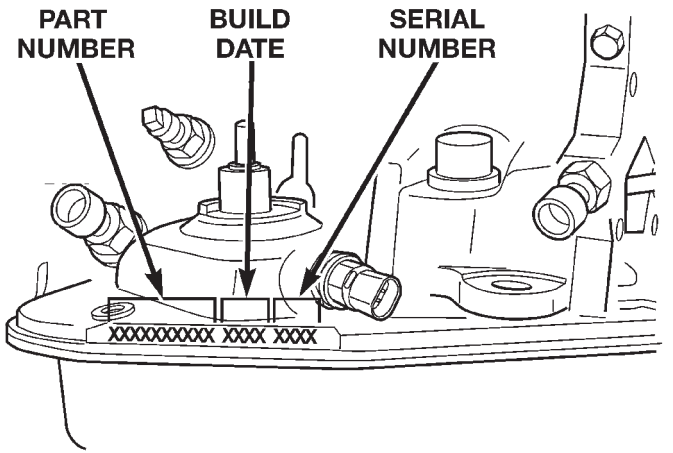
Fig. 1 46RE Transmission



## GENERAL INFORMATION (Continued)

## TRANSMISSION IDENTIFICATION

Transmission identification numbers are stamped on the left side of the case just above the oil pan gasket surface (Fig. 2). Refer to this information when ordering replacement parts.



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*Fig. 2 Transmission Part And Serial Number Location*

## RECOMMENDED FLUID

Mopar® ATF Plus 3, Type 7176 automatic transmission fluid is the recommended fluid for Chrysler automatic transmissions.

**Dexron II fluid IS NOT recommended. Clutch chatter can result from the use of improper fluid.**

## EFFECTS OF INCORRECT FLUID LEVEL

A low fluid level allows the pump to take in air along with the fluid. Air in the fluid will cause fluid pressures to be low and develop slower than normal. If the transmission is overfilled, the gears churn the fluid into foam. This aerates the fluid and causing the same conditions occurring with a low level. In either case, air bubbles cause fluid overheating, oxidation and varnish buildup which interferes with valve, clutch and servo operation. Foaming also causes fluid expansion which can result in fluid overflow from the transmission vent or fill tube. Fluid overflow can easily be mistaken for a leak if inspection is not careful.

## CAUSES OF BURNT FLUID

Burnt, discolored fluid is a result of overheating which has two primary causes.

(1) A result of restricted fluid flow through the main and/or auxiliary cooler. This condition is usually the result of a faulty or improperly installed

drainback valve, a damaged main cooler, or severe restrictions in the coolers and lines caused by debris or kinked lines.

(2) Heavy duty operation with a vehicle not properly equipped for this type of operation. Trailer towing or similar high load operation will overheat the transmission fluid if the vehicle is improperly equipped. Such vehicles should have an auxiliary transmission fluid cooler, a heavy duty cooling system, and the engine/axle ratio combination needed to handle heavy loads.

## FLUID CONTAMINATION

Transmission fluid contamination is generally a result of:

- adding incorrect fluid
- failure to clean dipstick and fill tube when checking level
- engine coolant entering the fluid
- internal failure that generates debris
- overheat that generates sludge (fluid breakdown)
- failure to reverse flush cooler and lines after repair
- failure to replace contaminated converter after repair

The use of non recommended fluids can result in transmission failure. The usual results are erratic shifts, slippage, abnormal wear and eventual failure due to fluid breakdown and sludge formation. Avoid this condition by using recommended fluids only.

The dipstick cap and fill tube should be wiped clean before checking fluid level. Dirt, grease and other foreign material on the cap and tube could fall into the tube if not removed beforehand. Take the time to wipe the cap and tube clean before withdrawing the dipstick.

Engine coolant in the transmission fluid is generally caused by a cooler malfunction. The only remedy is to replace the radiator as the cooler in the radiator is not a serviceable part. If coolant has circulated through the transmission for some time, an overhaul may also be necessary; especially if shift problems had developed.

The transmission cooler and lines should be reverse flushed whenever a malfunction generates sludge and/or debris. The torque converter should also be replaced at the same time.

Failure to flush the cooler and lines will result in recontamination. Flushing applies to auxiliary coolers as well. The torque converter should also be replaced whenever a failure generates sludge and debris. This is necessary because normal converter flushing procedures will not remove all contaminants.

## GENERAL INFORMATION (Continued)

**ELECTRONIC LOCK-UP TORQUE CONVERTER**

The torque converter is a hydraulic device that couples the engine crankshaft to the transmission. The torque converter consists of an outer shell with an internal turbine, a stator, an overrunning clutch, an impeller, and an electronically applied converter clutch. Torque multiplication is created when the stator directs the hydraulic flow from the turbine to rotate the impeller in the direction the engine crankshaft is turning. The turbine transfers power to the planetary gear sets in the transmission. The transfer of power into the impeller assists torque multiplication. At low vehicle-speed, the overrunning clutch holds the stator stationary (during torque multiplication) and allows the stator to freewheel at high vehicle speed. The converter clutch engagement reduces engine speed. Clutch engagement also provides reduced transmission fluid temperatures. The torque converter hub drives the transmission oil (fluid) pump.

The torque converter is a sealed, welded unit that is not repairable and is serviced as an assembly.

**CAUTION:** The torque converter must be replaced if a transmission failure results in large amounts of metal or fiber contamination in the fluid.

**TRANSMISSION GEAR RATIOS**

46RE gear ratios are:

- 2.45:1 (first gear)
- 1.45:1 (second gear)
- 1.00:1 (third gear)
- 0.69:1 (fourth gear)
- 2.21 (reverse)

**GEARSHIFT MECHANISM**

The shift mechanism is cable operated and provides six shift positions. The shift positions are:

- Park (P)
- Reverse (R)
- Neutral (N)
- Drive (D)
- Manual Second (2)
- Manual Low (1)

Manual low (1) range provides first gear only. Overrun braking is also provided in this range. Manual second (2) range provides first and second gear only. Drive range provides first, second, third, and overdrive fourth gear ranges. The shift into overdrive fourth gear range occurs only after the transmission has completed the shift into (D) third gear range. No further movement of the shift mechanism is required to complete the 3-4 shift.

**DESCRIPTION AND OPERATION****ELECTRONIC GOVERNOR**

Governor pressure is controlled electronically. Components used for governor pressure control include:

- Governor body
- Valve body transfer plate
- Governor pressure solenoid valve
- Governor pressure sensor
- Fluid temperature thermistor
- Throttle position sensor (TPS)
- Transmission speed sensor
- Powertrain control module (PCM)

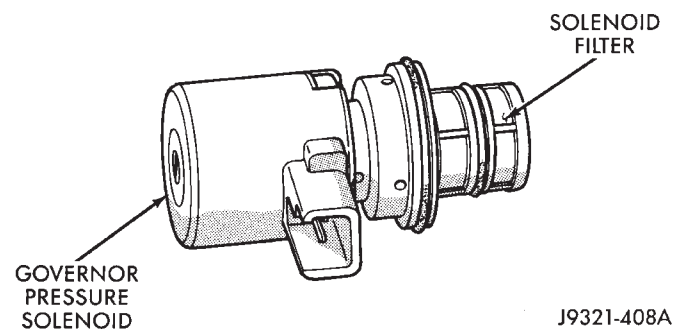
**GOVERNOR PRESSURE SOLENOID VALVE**

The solenoid valve is a duty-cycle solenoid which regulates the governor pressure needed for upshifts and downshifts. It is an electro-hydraulic device located in the governor body on the valve body transfer plate (Fig. 3).

The inlet side of the solenoid valve is exposed to normal transmission line pressure. The outlet side of the valve leads to the valve body governor circuit.

The solenoid valve regulates line pressure to produce governor pressure. The average current supplied to the solenoid controls governor pressure. One amp current produces zero kPa/psi governor pressure. Zero amps sets the maximum governor pressure.

The powertrain control module (PCM) turns on the trans control relay which supplies electrical power to the solenoid valve. Operating voltage is 12 volts (DC). The PCM controls the ground side of the solenoid using the governor pressure solenoid control circuit.



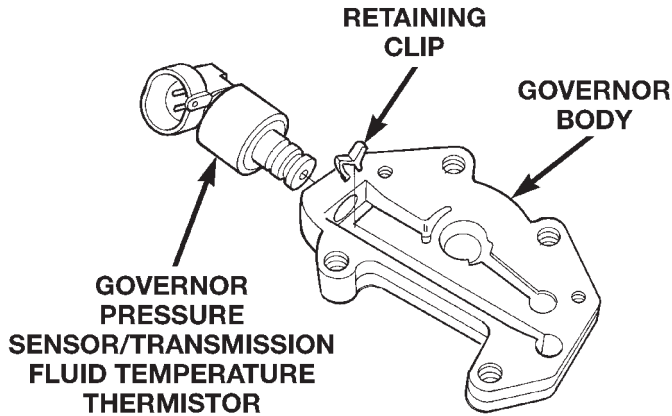
**Fig. 3 Governor Pressure Solenoid Valve**

**GOVERNOR PRESSURE SENSOR**

The governor pressure sensor measures output pressure of the governor pressure solenoid valve (Fig. 4).

The sensor output signal provides the necessary feedback to the PCM. This feedback is needed to adequately control governor pressure.

## DESCRIPTION AND OPERATION (Continued)



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**Fig. 4 Governor Pressure Sensor**

### GOVERNOR BODY AND TRANSFER PLATE

The transfer plate is designed to supply transmission line pressure to the governor pressure solenoid valve and to return governor pressure.

The governor pressure solenoid valve is mounted in the governor body. The body is bolted to the lower side of the transfer plate (Fig. 4). The transfer plate channels line pressure to the solenoid valve through the governor body. It also channels governor pressure from the solenoid valve to the governor circuit. It is the solenoid valve that develops the necessary governor pressure.

### TRANSMISSION FLUID TEMPERATURE THERMISTOR

Transmission fluid temperature readings are supplied to the transmission control module by the thermistor. The temperature readings are used to control engagement of the fourth gear overdrive clutch, the converter clutch, and governor pressure. Normal resistance value for the thermistor at room temperature is approximately 1000 ohms.

The PCM prevents engagement of the converter clutch and overdrive clutch, when fluid temperature is below approximately 10°C (50°F).

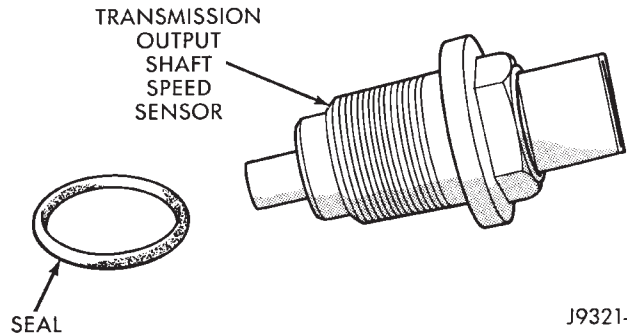
If fluid temperature exceeds 126°C (260°F), the PCM causes a 4-3 downshift and engage the converter clutch. Engagement is according to the third gear converter clutch engagement schedule.

The overdrive OFF lamp in the instrument panel illuminates when the shift back to third occurs. The transmission will not allow fourth gear operation until fluid temperature decreases to approximately 110°C (230°F).

The thermistor is part of the governor pressure sensor assembly and is immersed in transmission fluid at all times.

### TRANSMISSION SPEED SENSOR

The speed sensor (Fig. 5) is located in the overdrive gear case. The sensor is positioned over the park gear and monitors transmission output shaft rotating speed. Speed sensor signals are triggered by the park gear lugs as they rotate past the sensor pickup face. Input signals from the sensor are sent to the transmission control module for processing. The vehicle speed sensor also serves as a backup for the transmission speed sensor. Signals from this sensor are shared with the powertrain control module.



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**Fig. 5 Transmission Output Speed Sensor**

### THROTTLE POSITION SENSOR (TPS)

The TPS provides throttle position input signals to the PCM. This input signal is used to determine overdrive and converter clutch shift schedule and to select the proper governor curve.

### POWERTRAIN CONTROL MODULE (PCM)

The PCM controls operation of the converter clutch, overdrive clutch, and governor pressure solenoid.

The control module determines transmission shift points based on input signals from the transmission thermistor, transmission output shaft speed sensor, crankshaft position sensor, vehicle speed sensor, throttle position sensor, and battery temperature sensor.

### GOVERNOR PRESSURE CURVES

There are four governor pressure curves programmed into the transmission control module. The different curves allow the control module to adjust governor pressure for varying conditions. One curve is used for operation when fluid temperature is at, or below, 1°C (30°F). A second curve is used when fluid temperature is at, or above, 10°C (50°F) during normal city or highway driving. A third curve is used during wide-open throttle operation. The fourth curve is used when driving with the transfer case in low range.

## DESCRIPTION AND OPERATION (Continued)

**SHIFT VALVE OPERATION**

The shift valves are moved by a combination of throttle and governor pressure. The governor pressure is generated by electrical components.

The conditions under which a shift to fourth will not occur are:

- Overdrive switch is Off
- Transmission fluid temperature is below 10° C (50° F) or above 121° C (250° F)
- Shift to third not yet completed
- Vehicle speed too low for 3-4 shift to occur
- Battery temperature below -5° F.

**HYDRAULIC CONTROL SYSTEM**

The hydraulic control system provides fully automatic operation. The system performs five basic functions which are: pressure supply, pressure regulation, flow control, clutch/band application, and lubrication.

**PRESSURE REGULATION**

The pressure regulator valve maintains line pressure. The amount of pressure developed is controlled by throttle pressure which is dependent on the degree of throttle opening. The regulator valve is located in the valve body.

The throttle valve determines line pressure and shift speed. Governor pressure increases in proportion to vehicle speed. The throttle valve controls upshift and downshift speeds by regulating pressure according to throttle position.

*Shift Valve Flow Control*

The manual valve is operated by the gearshift linkage and provides the operating range selected by the driver.

The 1-2 shift valve provides 1-2 or 2-1 shifts and the 2-3 shift valve provides 2-3 or 3-2 shifts.

The kickdown valve provides forced 3-2 or 3-1 downshifts depending on vehicle speed. Downshifts occur when the throttle is opened beyond downshift detent position. Detent is reached just before wide open throttle position.

The 2-3 valve throttle pressure plug provides 3-2 downshifts at varying throttle openings depending on vehicle speed.

The 1-2 shift control valve transmits 1-2 shift pressure to the accumulator piston. This controls kickdown band capacity on 1-2 upshifts and 3-2 downshifts.

The 3-4 shift, quick fill, and timing valves plus the 3-4 accumulator, are only actuated when the overdrive solenoid is energized. The solenoid contains a check ball that controls a vent port to the 3-4 valves. The check ball either diverts line pressure away from or directly to the 3-4 valves.

The limit valve determines maximum speed at which a 3-2 part throttle kickdown can be made. On

transmissions without a limit valve, maximum speed for a 3-2 kickdown is at detent position.

The 2-3 shuttle valve has two functions. The first is fast front band release and smooth engagement during lift-foot 2-3 upshifts. The second is to regulate front clutch and band application during 3-2 downshifts.

The 3-4 timing valve is moved by line pressure coming through the 3-4 shift valve. The timing valve holds the 2-3 shift valve in an upshift position. The purpose is to prevent the 2-3 valve from up or downshifting before the 3-4 valve.

The 3-4 accumulator is mounted on the overdrive housing and performs the same function as the 2-3 accumulator; it is used to smooth engagement during a 3-4 shift.

The switch valve directs fluid apply pressure to the converter clutch in one position and releases it in the opposite position. It also directs oil to the cooling and lube circuits. The switch valve regulates oil pressure to the torque converter by limiting maximum oil pressure to 130 psi.

**OVERDRIVE OFF SWITCH**

The overdrive OFF (control) switch is located on the gearshift lever. The switch is a momentary contact device that signals the PCM to toggle current status of the overdrive function. At key-on, overdrive operation is allowed. Pressing the switch once causes the overdrive OFF mode to be entered and the overdrive OFF switch lamp to be illuminated. Pressing the switch a second time causes normal overdrive operation to be restored and the overdrive lamp to be turned off. The overdrive OFF mode defaults to ON after the ignition switch is cycled OFF and ON. The normal position for the control switch is the ON position. The switch must be in this position to energize the solenoid and allow a 3-4 upshift. The control switch indicator light illuminates only when the overdrive switch is turned to the OFF position, or when illuminated by the transmission control module.

**3-4 SHIFT SEQUENCE**

The overdrive clutch is applied in fourth gear only. The direct clutch is applied in all ranges except fourth gear. Fourth gear overdrive range is electronically controlled and hydraulically activated. Various sensor inputs are supplied to the powertrain control module to operate the overdrive solenoid on the valve body. The solenoid contains a check ball that opens and closes a vent port in the 3-4 shift valve feed passage. The overdrive solenoid (and check ball) are not energized in first, second, third, or reverse gear. The vent port remains open, diverting line pressure from the 2-3 shift valve away from the 3-4 shift valve. The overdrive control switch must be in the ON position



## DESCRIPTION AND OPERATION (Continued)

to transmit overdrive status to the PCM. A 3-4 upshift occurs only when the overdrive solenoid is energized by the PCM. The PCM energizes the overdrive solenoid during the 3-4 upshift. This causes the solenoid check ball to close the vent port allowing line pressure from the 2-3 shift valve to act directly on the 3-4 upshift valve. Line pressure on the 3-4 shift valve overcomes valve spring pressure moving the valve to the upshift position. This action exposes the feed passages to the 3-4 timing valve, 3-4 quick fill valve, 3-4 accumulator, and ultimately to the overdrive piston. Line pressure through the timing valve moves the overdrive piston into contact with the overdrive clutch. The direct clutch is disengaged before the overdrive clutch is engaged. The boost valve provides increased fluid apply pressure to the overdrive clutch during 3-4 upshifts, and when accelerating in fourth gear. The 3-4 accumulator cushions overdrive clutch engagement to smooth 3-4 upshifts. The accumulator is charged at the same time as apply pressure acts against the overdrive piston.

**CONVERTER CLUTCH ENGAGEMENT**

Converter clutch engagement in third or fourth gear range is controlled by sensor inputs to the powertrain control module. Inputs that determine clutch engagement are: coolant temperature, engine rpm, vehicle speed, throttle position, and manifold vacuum. The torque converter clutch is engaged by the clutch solenoid on the valve body. The clutch can be engaged in third and fourth gear ranges depending on overdrive control switch position. If the overdrive control switch is in the normal ON position, the clutch will engage after the shift to fourth gear, and above approximately 72 km/h (45 mph). If the control switch is in the OFF position, the clutch will engage after the shift to third gear, at approximately 56 km/h (35 mph) at light throttle.

**QUICK FILL VALVE**

The 3-4 quick fill valve provides faster engagement of the overdrive clutch during 3-4 upshifts. The valve temporarily bypasses the clutch piston feed orifice at the start of a 3-4 upshift. This exposes a larger passage into the piston retainer resulting in a much faster clutch fill and apply sequence. The quick fill valve does not bypass the regular clutch feed orifice throughout the 3-4 upshift. Instead, once a predetermined pressure develops within the clutch, the valve closes the bypass. Clutch fill is then completed through the regular feed orifice.

**CONVERTER DRAINBACK VALVE**

The drainback valve is located in the transmission cooler outlet (pressure) line. The valve prevents fluid from draining from the converter into the cooler and

lines when the vehicle is shut down for lengthy periods. Production valves have a hose nipple at one end, while the opposite end is threaded for a flare fitting. All valves have an arrow (or similar mark) to indicate direction of flow through the valve.

**DIAGNOSIS AND TESTING****AUTOMATIC TRANSMISSION DIAGNOSIS**

Automatic transmission problems can be a result of poor engine performance, incorrect fluid level, incorrect linkage or cable adjustment, band or hydraulic control pressure adjustments, hydraulic system malfunctions or electrical/mechanical component malfunctions. Begin diagnosis by checking the easily accessible items such as: fluid level and condition, linkage adjustments and electrical connections. A road test will determine if further diagnosis is necessary.

**PRELIMINARY DIAGNOSIS**

Two basic procedures are required. One procedure for vehicles that are drivable and an alternate procedure for disabled vehicles (will not back up or move forward).

**VEHICLE IS DRIVEABLE**

- (1) Check for transmission fault codes using DRB scan tool.
- (2) Check fluid level and condition.
- (3) Adjust throttle and gearshift linkage if complaint was based on delayed, erratic, or harsh shifts.
- (4) Road test and note how transmission upshifts, downshifts, and engages.
- (5) Perform stall test if complaint is based on sluggish acceleration. Or, if abnormal throttle opening is needed to maintain normal speeds with a properly tuned engine.
- (6) Perform hydraulic pressure test if shift problems were noted during road test.
- (7) Perform air-pressure test to check clutch-band operation.

**VEHICLE IS DISABLED**

- (1) Check fluid level and condition.
- (2) Check for broken or disconnected gearshift or throttle linkage.
- (3) Check for cracked, leaking cooler lines, or loose or missing pressure-port plugs.
- (4) Raise and support vehicle on safety stands, start engine, shift transmission into gear, and note following:
  - (a) If propeller shaft turns but wheels do not, problem is with differential or axle shafts.
  - (b) If propeller shaft does not turn and transmission is noisy, stop engine. Remove oil pan, and

## DIAGNOSIS AND TESTING (Continued)

check for debris. If pan is clear, remove transmission and check for damaged drive plate, converter, oil pump, or input shaft.

(c) If propeller shaft does not turn and transmission is not noisy, perform hydraulic-pressure test to determine if problem is hydraulic or mechanical.

**PARK/NEUTRAL POSITION SWITCH**

The center terminal of the park/neutral position switch is the starter-circuit terminal. It provides the ground for the starter solenoid circuit through the selector lever in PARK and NEUTRAL positions only. The outer terminals on the switch are for the backup lamp circuit.

**SWITCH TEST**

To test the switch, remove the wiring connector. Test for continuity between the center terminal and the transmission case. Continuity should exist only when the transmission is in PARK or NEUTRAL.

Shift the transmission into REVERSE and test continuity at the switch outer terminals. Continuity should exist only when the transmission is in REVERSE. Continuity should not exist between the outer terminals and the case.

Check gearshift linkage adjustment before replacing a switch that tests faulty.

**OVERDRIVE ELECTRICAL CONTROLS**

The overdrive off switch, valve body solenoid, case connectors and related wiring can all be tested with a 12 volt test lamp or a volt/ohmmeter. Check continuity of each component when diagnosis indicates this is necessary. Refer to Group 8W, Wiring Diagrams, for component locations and circuit information.

Switch and solenoid continuity should be checked whenever the transmission fails to shift into fourth gear range.

**GEARSHIFT CABLE**

Gearshift cable adjustment is important because it positions the valve body manual valve. Incorrect adjustment will cause creeping in Neutral, premature clutch wear, delayed engagement in any gear, or a no-start in Park or Neutral position.

Proper operation of the park/neutral position switch will provide a quick check of cable adjustment.

**THROTTLE VALVE CABLE**

Transmission throttle valve cable adjustment is extremely important to proper operation. This adjustment positions the throttle valve, which controls shift speed, quality, and part-throttle downshift sensitivity.

If cable setting is too loose, early shifts and slippage between shifts may occur. If the setting is too

tight, shifts may be delayed and part throttle downshifts may be very sensitive. Refer to the Adjustments section for the proper adjustment procedure.

**ROAD TESTING**

Before road testing, be sure the fluid level and control cable adjustments have been checked and adjusted if necessary. Verify that diagnostic trouble codes have been resolved.

Observe engine performance during the road test. A poorly tuned engine will not allow accurate analysis of transmission operation.

Operate the transmission in all gear ranges. Check for shift variations and engine flare which indicates slippage. Note if shifts are harsh, spongy, delayed, early, or if part throttle downshifts are sensitive.

Slippage indicated by engine flare, usually means clutch, band or overrunning clutch problems. If the condition is advanced, an overhaul will be necessary to restore normal operation.

A slipping clutch or band can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch and Band Application chart provides a basis for analyzing road test results.

**ANALYZING ROAD TEST**

Refer to the Clutch and Band Application chart and note which elements are in use in the various gear ranges.

Note that the rear clutch is applied in all forward ranges (D, 2, 1). The transmission overrunning clutch is applied in first gear (D, 2 and 1 ranges) only. The rear band is applied in 1 and R range only.

Note that the overdrive clutch is applied only in fourth gear and the overdrive direct clutch and overrunning clutch are applied in all ranges except fourth gear.

For example: If slippage occurs in first gear in D and 2 range but not in 1 range, the transmission overrunning clutch is faulty. Similarly, if slippage occurs in any two forward gears, the rear clutch is slipping.

Applying the same method of analysis, note that the front and rear clutches are applied simultaneously only in D range third and fourth gear. If the transmission slips in third gear, either the front clutch or the rear clutch is slipping.

If the transmission slips in fourth gear but not in third gear, the overdrive clutch is slipping. By selecting another gear which does not use these clutches, the slipping unit can be determined. For example, if the transmission also slips in Reverse, the front clutch is slipping. If the transmission does not slip in Reverse, the rear clutch is slipping.

## DIAGNOSIS AND TESTING (Continued)

SHIFT LEVER POSITION	TRANSMISSION CLUTCHES AND BANDS					OVERDRIVE CLUTCHES		
	FRONT CLUTCH	FRONT BAND	REAR CLUTCH	REAR BAND	OVERRUN. CLUTCH	OVERDRIVE CLUTCH	DIRECT CLUTCH	OVERRUN. CLUTCH
Reverse	X			X			X	
Drive Range								
First			X		X		X	X
Second		X	X				X	X
Third	X		X				X	X
Fourth	X		X			X		
2-Range (Manual Second)		X	X		X		X	X
1-Range (Manual Low)			X	X	X		X	X

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**Clutch And Band Application Chart**

If slippage occurs during the 3-4 shift or only in fourth gear, the overdrive clutch is slipping. Similarly, if the direct clutch were to fail, the transmission would lose both reverse gear and overrun braking in 2 position (manual second gear).

If the transmission will not shift to fourth gear, the control switch, overdrive solenoid or related wiring may also be the problem cause.

This process of elimination can be used to identify a slipping unit and check operation. Proper use of the Clutch and Band Application Chart is the key.

Although road test analysis will help determine the slipping unit, the actual cause of a malfunction usually cannot be determined until hydraulic and air pressure tests are performed. Practically any condition can be caused by leaking hydraulic circuits or sticking valves.

Unless a malfunction is obvious, such as no drive in D range first gear, do not disassemble the transmission. Perform the hydraulic and air pressure tests to help determine the probable cause.

**HYDRAULIC PRESSURE TEST**

Hydraulic test pressures range from a low of one psi (6.895 kPa) governor pressure, to 300 psi (2068 kPa) at the rear servo pressure port in reverse.

An accurate tachometer and pressure test gauges are required. Test Gauge C-3292 has a 100 psi range and is used at the accumulator, governor, and front servo ports. Test Gauge C-3293-SP has a 300 psi range and is used at the rear servo and overdrive ports where pressures exceed 100 psi.

**Pressure Test Port Locations**

Test ports are located at both sides of the transmission case (Fig. 6).

Line pressure is checked at the accumulator port on the right side of the case. The front servo pressure port is at the right side of the case just behind the filler tube opening.

The rear servo and governor pressure ports are at the right rear of the transmission case. The overdrive clutch pressure port is at the left rear of the case.

**Test One - Transmission In Manual Low**

**NOTE: This test checks pump output, pressure regulation, and condition of the rear clutch and servo circuit. Both test gauges are required for this test.**

(1) Connect tachometer to engine. Position tachometer so it can be observed from driver seat if helper will be operating engine. Raise vehicle on hoist that will allow rear wheels to rotate freely.

(2) Connect 100 psi Gauge C-3292 to accumulator port. Then connect 300 psi Gauge C-3293-SP to rear servo port.

(3) Disconnect throttle and gearshift cables from levers on transmission valve body manual shaft.

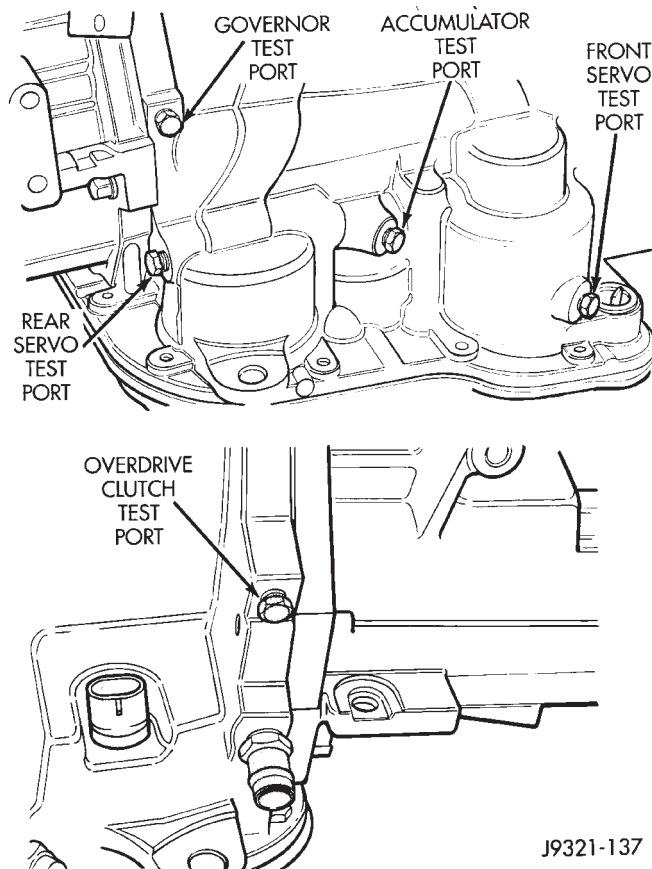
(4) Have helper start and run engine at 1000 rpm.

(5) Move transmission shift lever fully forward into 1 range.

(6) Gradually move transmission throttle lever from full forward to full rearward position and note pressures on both gauges:

- Line pressure at accumulator port should be 54-60 psi (372-414 kPa) with throttle lever forward

## DIAGNOSIS AND TESTING (Continued)



**Fig. 6 Pressure Test Port Locations**

and gradually increase to 90-96 psi (621-662 kPa) as throttle lever is moved rearward.

- Rear servo pressure should be same as line pressure within 3 psi (20.68 kPa).

#### Test Two—Transmission In 2 Range

**NOTE:** This test checks pump output, line pressure and pressure regulation. Use 100 psi Test Gauge C-3292 for this test.

- (1) Leave vehicle in place on hoist and leave Test Gauge C-3292 connected to accumulator port.
- (2) Have helper start and run engine at 1000 rpm.
- (3) Move transmission shift lever one detent rearward from full forward position. This is 2 range.
- (4) Move transmission throttle lever from full forward to full rearward position and read pressure on gauge.
- (5) Line pressure should be 54-60 psi (372-414 kPa) with throttle lever forward and gradually increase to 90-96 psi (621-662 kPa) as lever is moved rearward.

#### Test Three—Transmission In D Range Third Gear

**NOTE:** This test checks pressure regulation and condition of the clutch circuits. Both test gauges are required for this test.

- (1) Turn OD switch off.
- (2) Leave vehicle on hoist and leave Gauge C-3292 in place at accumulator port.
- (3) Move Gauge C-3293-SP over to front servo port for this test.
- (4) Have helper start and run engine at 1600 rpm for this test.
- (5) Move transmission shift lever two detents rearward from full forward position. This is D range.
- (6) Read pressures on both gauges as transmission throttle lever is gradually moved from full forward to full rearward position:
  - Line pressure at accumulator in D range third gear, should be 54-60 psi (372-414 kPa) with throttle lever forward and increase as lever is moved rearward.
  - Front servo pressure in D range third gear, should be within 3 psi (21 kPa) of line pressure up to kickdown point.

#### Test Four—Transmission In Reverse

**NOTE:** This test checks pump output, pressure regulation and the front clutch and rear servo circuits. Use 300 psi Test Gauge C-3293-SP for this test.

- (1) Leave vehicle on hoist and leave gauge C3292 in place at accumulator port.
- (2) Move 300 psi Gauge C-3293-SP back to rear servo port.
- (3) Have helper start and run engine at 1600 rpm for test.
- (4) Move transmission shift lever four detents rearward from full forward position. This is Reverse range.
- (5) Move transmission throttle lever fully forward then fully rearward and note reading at Gauge C-3293-SP.
- (6) Pressure should be 145 - 175 psi (1000-1207 kPa) with throttle lever forward and increase to 230 - 280 psi (1586-1931 kPa) as lever is gradually moved rearward.



## DIAGNOSIS AND TESTING (Continued)

### Test Five—Governor Pressure

**NOTE:** This test checks governor operation by measuring governor pressure response to changes in vehicle speed. It is usually not necessary to check governor operation unless shift speeds are incorrect or if the transmission will not downshift. The test should be performed on the road or on a hoist that will allow the rear wheels to rotate freely.

(1) Move 100 psi Test Gauge C-3292 to governor pressure port.

(2) Move transmission shift lever two detents rearward from full forward position. This is D range.

(3) Have helper start and run engine at curb idle speed. Then firmly apply service brakes so wheels will not rotate.

(4) Note governor pressure:

- Governor pressure should be no more than 20.6 kPa (3 psi) at curb idle speed and wheels not rotating.

- If pressure exceeds 20.6 kPa (3 psi), a fault exists in governor pressure control system.

(5) Release brakes, slowly increase engine speed, and observe speedometer and pressure test gauge (do not exceed 30 mph on speedometer). Governor pressure should increase in proportion to vehicle speed. Or approximately 6.89 kPa (1 psi) for every 1 mph.

(6) Governor pressure rise should be smooth and drop back to no more than 20.6 kPa (3 psi), after engine returns to curb idle and brakes are applied to prevent wheels from rotating.

(7) Compare results of pressure test with analysis chart.

### Test Six—Transmission In Overdrive Fourth Gear

**NOTE:** This test checks line pressure at the overdrive clutch in fourth gear range. Use 300 psi Test Gauge C-3292 for this test. The test should be performed on the road or on a chassis dyno.

(1) Remove tachometer; it is not needed for this test.

(2) Move 300 psi Gauge to overdrive clutch pressure test port. Then remove other gauge and reinstall test port plug.

(3) Lower vehicle.

(4) Turn OD switch on.

(5) Secure test gauge so it can be viewed from drivers seat.

(6) Start engine and shift into D range.

(7) Increase vehicle speed gradually until 3-4 shift occurs and note gauge pressure.

(8) Pressure should be 469-496 kPa (68-72 psi) with closed throttle and increase to 620-827 kPa (90-120 psi) at 1/2 to 3/4 throttle. Note that pressure can increase to around 896 kPa (130 psi) at full throttle.

(9) Return to shop or move vehicle off chassis dyno.

### PRESSURE TEST ANALYSIS CHART

TEST CONDITION	INDICATION
Line pressure OK during any one test	Pump and regulator valve OK
Line pressure OK in R but low in D, 2, 1	Leakage in rear clutch area (seal rings, clutch seals)
Pressure low in D Fourth Gear Range	Overdrive clutch piston seal, or check ball problem
Pressure OK in 1, 2 but low in D3 and R	Leakage in front clutch area
Pressure OK in 2 but low in R and 1	Leakage in rear servo
Front servo pressure low in 2	Leakage in servo; broken servo ring or cracked servo piston
Pressure low in all positions	Clogged filter, stuck regulator valve, worn or faulty pump, low oil level
Governor pressure too high at idle speed	Governor pressure solenoid valve system fault. Refer to diagnostic book.
Governor pressure low at all mph figures	Faulty governor pressure solenoid, transmission control module, or governor pressure sensor
Lubrication pressure low at all throttle positions	Clogged fluid cooler or lines, seal rings leaking, worn pump bushings, pump, clutch retainer, or clogged filter.
Line pressure high	Output shaft plugged, sticky regulator valve
Line pressure low	Sticky regulator valve, clogged filter, worn pump

### CONVERTER STALL TEST

Stall testing involves determining maximum engine speed obtainable at full throttle with the rear wheels locked and the transmission in D range. This test checks the holding ability of the converter overrunning and transmission clutches.

## DIAGNOSIS AND TESTING (Continued)

**WARNING: NEVER ALLOW ANYONE TO STAND DIRECTLY IN LINE WITH THE VEHICLE FRONT OR REAR DURING A STALL TEST. ALWAYS BLOCK THE WHEELS AND FULLY APPLY THE SERVICE AND PARKING BRAKES DURING THE TEST.**

## STALL TEST PROCEDURE

- (1) Connect tachometer to engine. Position tachometer so it can be viewed from driver's seat.
- (2) Drive vehicle to bring transmission fluid up to normal operating temperature. Vehicle can be driven on road or on chassis dynamometer, if available.
- (3) Check transmission fluid level. Add fluid if necessary.
- (4) Block front wheels.
- (5) Fully apply service and parking brakes.
- (6) Open throttle completely and record maximum engine speed registered on tachometer. It takes 4-10 seconds to reach max rpm. **Once max rpm has been achieved, do not hold wide open throttle for more than 4-5 seconds.**

**CAUTION:** Stalling the converter causes a rapid increase in fluid temperature. To avoid fluid overheating, hold the engine at maximum rpm for no more than 5 seconds. If engine exceeds 2500 rpm during the test, release the accelerator pedal immediately; transmission clutch slippage is occurring.

- (7) If a second stall test is required, cool down fluid before proceeding. Shift into NEUTRAL and run engine at 1000 rpm for 20-30 seconds to cool fluid.

## STALL TEST ANALYSIS

*Stall Speed Too High*

If the stall speed exceeds 2500 rpm, transmission clutch slippage is indicated.

*Stall Speed Low*

Low stall speed with a properly tuned engine indicate a torque converter overrunning clutch problem. The condition should be confirmed by road testing. A stall speed 250-350 rpm below normal indicates the converter overrunning clutch is slipping. The vehicle also exhibits poor acceleration but operates normally once highway cruise speeds are reached. Torque converter replacement will be necessary.

*Stall Speed Normal But Acceleration Poor*

If stall speeds are normal (1800-2300 rpm) but abnormal throttle opening is required for acceleration, or to maintain cruise speed, the converter overrunning clutch is seized. The torque converter will have to be replaced.

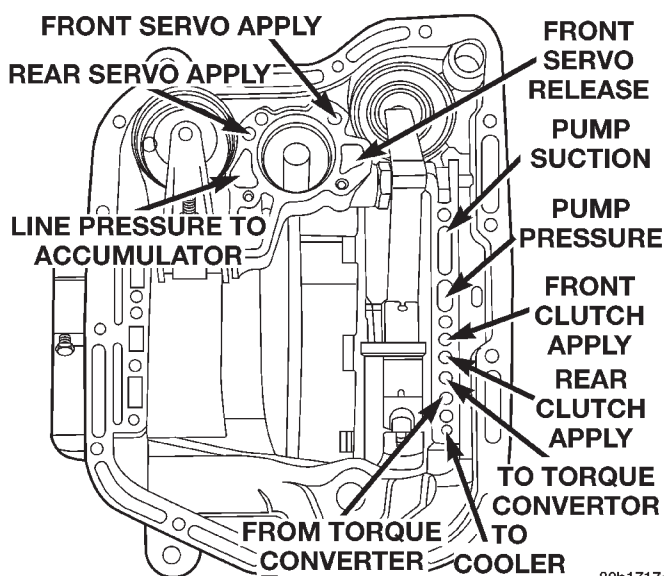
*Converter Noise During Test*

A whining noise caused by fluid flow is normal during a stall test. However, loud metallic noises indicate a damaged converter. To confirm that the noise is originating from the converter, operate the vehicle at light throttle in DRIVE and NEUTRAL on a hoist and listen for noise coming from the converter housing.

## AIR TESTING TRANSMISSION CLUTCH AND BAND OPERATION

Air-pressure testing can be used to check transmission front/rear clutch and band operation. The test can be conducted with the transmission either in the vehicle or on the work bench, as a final check, after overhaul.

Air-pressure testing requires that the oil pan and valve body be removed from the transmission. The servo and clutch apply passages are shown (Fig. 7).



**Fig. 7 Air Pressure Test Passages**

*Front Clutch Air Test*

Place one or two fingers on the clutch housing and apply air pressure through front clutch apply passage. Piston movement can be felt and a soft thump heard as the clutch applies.

*Rear Clutch Air Test*

Place one or two fingers on the clutch housing and apply air pressure through rear clutch apply passage. Piston movement can be felt and a soft thump heard as the clutch applies.

*Front Servo Air Test*

Apply air pressure to the front servo apply passage. The servo rod should extend and cause the band to tighten around the drum. Spring pressure should release the servo when air pressure is removed.

## DIAGNOSIS AND TESTING (Continued)

*Rear Servo Air Test*

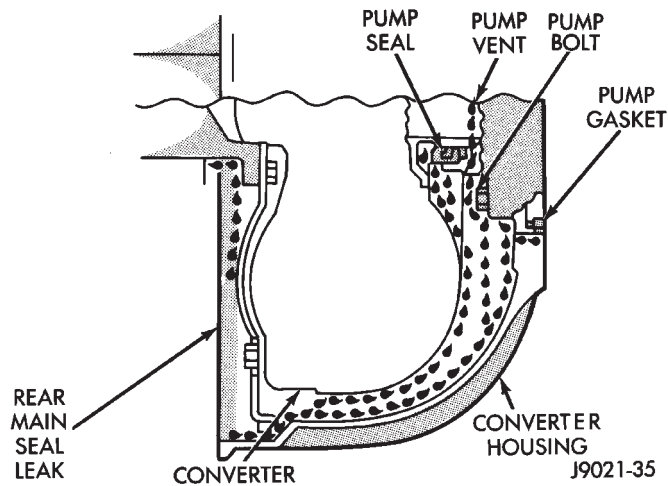
Apply air pressure to the rear servo apply passage. The servo rod should extend and cause the band to tighten around the drum. Spring pressure should release the servo when air pressure is removed.

**CONVERTER HOUSING FLUID LEAK DIAGNOSIS**

When diagnosing converter housing fluid leaks, two items must be established before repair.

- (1) Verify that a leak condition actually exists.
- (2) Determined the true source of the leak.

Some suspected converter housing fluid leaks may not be leaks at all. They may only be the result of residual fluid in the converter housing, or excess fluid spilled during factory fill or fill after repair. Converter housing leaks have several potential sources. Through careful observation, a leak source can be identified before removing the transmission for repair. Pump seal leaks tend to move along the drive hub and onto the rear of the converter. Pump O-ring or pump body leaks follow the same path as a seal leak (Fig. 8). Pump vent or pump attaching bolt leaks are generally deposited on the inside of the converter housing and not on the converter itself (Fig. 8). Pump seal or gasket leaks usually travel down the inside of the converter housing. Front band lever pin plug leaks are generally deposited on the housing and not on the converter.



**Fig. 8 Converter Housing Leak Paths**

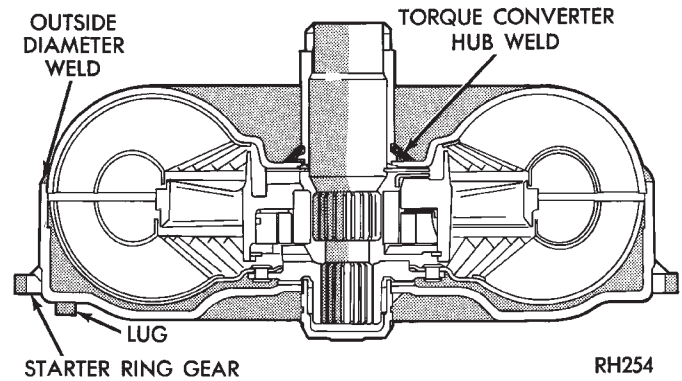
**TORQUE CONVERTER LEAK POINTS**

Possible sources of converter leaks are:

- (1) Leaks at the weld joint around the outside diameter weld (Fig. 9).
- (2) Leaks at the converter hub weld (Fig. 9).

**CONVERTER HOUSING AREA LEAK CORRECTION**

- (1) Remove converter.
- (2) Tighten front band adjusting screw until band is tight around front clutch retainer. This prevents



**Fig. 9 Converter Leak Points—Typical**

front/rear clutches from coming out when oil pump is removed.

(3) Remove oil pump and remove pump seal. Inspect pump housing drainback and vent holes for obstructions. Clear holes with solvent and wire.

(4) Inspect pump bushing and converter hub. If bushing is scored, replace it. If converter hub is scored, either polish it with crocus cloth or replace converter.

(5) Install new pump seal, O-ring, and gasket. Replace oil pump if cracked, porous or damaged in any way. Be sure to loosen the front band before installing the oil pump, damage to the oil pump seal may occur if the band is still tightened to the front clutch retainer.

(6) Loosen kickdown lever pin access plug three turns. Apply Loctite 592, or Permatex No. 2 to plug threads and tighten plug to 17 N·m (150 in. lbs.) torque.

(7) Adjust front band.

(8) Lubricate pump seal and converter hub with transmission fluid or petroleum jelly and install converter.

(9) Install transmission and converter housing dust shield.

(10) Lower vehicle.

**DIAGNOSIS TABLES AND CHARTS—RE TRANSMISSION**

The diagnosis charts provide additional reference when diagnosing a transmission fault. The charts provide general information on a variety of transmission, overdrive unit and converter clutch fault conditions.

The hydraulic flow charts in the Schematics and Diagrams section of this group, outline fluid flow and hydraulic circuitry. Circuit operation is provided for neutral, third, fourth and reverse gear ranges. Normal working pressures are also supplied for each of the gear ranges.

## DIAGNOSIS AND TESTING (Continued)

## DIAGNOSIS CHARTS

CONDITION	POSSIBLE CAUSES	CORRECTION
HARSH ENGAGEMENT (FROM NEUTRAL TO DRIVE OR REVERSE)	1. Fluid Level Low.	1. Add Fluid.
	2. Throttle Linkage Misadjusted.	2. Adjust linkage - setting may be too long.
	3. Mount and Driveline Bolts Loose.	3. Check engine mount, transmission mount, propeller shaft, rear spring to body bolts, rear control arms, crossmember and axle bolt torque. Tighten loose bolts and replace missing bolts.
	4. U-Joint Worn/Broken.	4. Remove propeller shaft and replace U-Joint.
	5. Axle Backlash Incorrect.	5. Check per Service Manual. Correct as needed.
	6. Hydraulic Pressure Incorrect.	6. Check pressure. Remove, overhaul or adjust valve body as needed.
	7. Band Misadjusted.	7. Adjust rear band.
	8. Valve Body Check Balls Missing.	8. Inspect valve body for proper check ball installation.
	9. Axle Pinion Flange Loose.	9. Replace nut and check pinion threads before installing new nut. Replace pinion gear if threads are damaged.
	10. Clutch, band or planetary component damaged.	10. Remove, disassemble and repair transmission as necessary.
	11. Converter Clutch Faulty.	11. Replace converter and flush cooler and line before installing new converter.



## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
DELAYED ENGAGEMENT (FROM NEUTRAL TO DRIVE OR REVERSE)	1. Fluid Level Low.	1. Correct level and check for leaks.
	2. Filter Clogged.	2. Change filter.
	3. Gearshift Linkage Misadjusted.	3. Adjust linkage and repair linkage if worn or damaged.
	4. Torque Converter Drain Back (Oil drains from torque converter into transmission sump)	4. If vehicle moves normally after 5 seconds after shifting into gear, no repair is necessary. If longer, inspect pump bushing for wear. Replace pump house.
	5. Rear Band Misadjusted.	5. Adjust band.
	6. Valve Body Filter Plugged.	6. Replace fluid and filter. If oil pan and old fluid were full of clutch disc material and/or metal particles, overhaul will be necessary.
	7. Oil Pump Gears Worn/Damaged.	7. Remove transmission and replace oil pump.
	8. Governor Circuit and Solenoid Valve Electrical Fault.	8. Test with DRB scan tool and repair as required.
	9. Hydraulic Pressure Incorrect.	9. Perform pressure test, remove transmission and repair as needed.
	10. Reaction Shaft Seal Rings Worn/Broken.	10. Remove transmission, remove oil pump and replace seal rings.
	11. Rear Clutch/Input Shaft, Rear Clutch Seal Rings Damaged.	11. Remove and disassemble transmission and repair as necessary.
	12. Regulator Valve Stuck.	12. Clean.
	13. Cooler Plugged.	13. Transfer case failure can plug cooler.
NO DRIVE RANGE (REVERSE OK)	1. Fluid Level Low.	1. Add fluid and check for leaks if drive is restored.
	2. Gearshift Linkage/Cable Loose/Misadjusted.	2. Repair or replace linkage components.
	3. Rear Clutch Burnt.	3. Remove and disassemble transmission and rear clutch and seals. Repair/replace worn or damaged parts as needed.
	4. Valve Body Malfunction.	4. Remove and disassemble valve body. Replace assembly if any valves or bores are damaged.
	5. Transmission Overrunning Clutch Broken.	5. Remove and disassemble transmission. Replace overrunning clutch.
	6. Input Shaft Seal Rings Worn/Damaged.	6. Remove and disassemble transmission. Replace seal rings and any other worn or damaged parts.
	7. Front Planetary Failed Broken.	7. Remove and repair.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO DRIVE OR REVERSE (VEHICLE WILL NOT MOVE)	1. Fluid Level Low.	1. Add fluid and check for leaks if drive is restored.
	2. Gearshift Linkage/Cable Loose/Misadjusted.	2. Inspect, adjust and reassemble linkage as needed. Replace worn/damaged parts.
	3. U-Joint/Axle/Transfer Case Broken.	3. Perform preliminary inspection procedure for vehicle that will not move. Refer to procedure in diagnosis section.
	4. Filter Plugged.	4. Remove and disassemble transmission. Repair or replace failed components as needed. Replace filter. If filter and fluid contained clutch material or metal particles, an overhaul may be necessary. Perform lube flow test. Flush oil. Replace cooler as necessary.
	5. Oil Pump Damaged.	5. Perform pressure test to confirm low pressure. Replace pump body assembly if necessary.
	6. Valve Body Malfunctioned.	6. Check and inspect valve body. Replace valve body (as assembly) if any valve or bore is damaged. Clean and reassemble correctly if all parts are in good condition.
	7. Transmission Internal Component Damaged.	7. Remove and disassemble transmission. Repair or replace failed components as needed.
	8. Park Sprag not Releasing - Check Stall Speed, Worn/Damaged/Stuck.	8. Remove, disassemble, repair.
	9. Torque Converter Damage.	9. Inspect and replace as required.
SHIFTS DELAYED OR ERRATIC (SHIFTS ALSO HARSH AT TIMES)	1. Fluid Level Low/High.	1. Correct fluid level and check for leaks if low.
	2. Fluid Filter Clogged.	2. Replace filter. If filter and fluid contained clutch material or metal particles, an overhaul may be necessary. Perform lube flow test.
	3. Throttle Linkage Misadjusted.	3. Adjust linkage as described in service section.
	4. Throttle Linkage Binding.	4. Check cable for binding. Check for return to closed throttle at transmission.
	5. Gearshift Linkage/Cable Misadjusted.	5. Adjust linkage/cable as described in service section.
	6. Clutch or Servo Failure.	6. Remove valve body and air test clutch, and band servo operation. Disassemble and repair transmission as needed.
	7. Governor Circuit Electrical Fault.	7. Test using DRB scan tool and repair as required.
	8. Front Band Misadjusted.	8. Adjust band.
	9. Pump Suction Passage Leak.	9. Check for excessive foam on dipstick after normal driving. Check for loose pump bolts, defective gasket. Replace pump assembly if needed.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO REVERSE (D RANGES OK)	1. Gearshift Linkage/Cable Misadjusted/Damaged.	1. Repair or replace linkage parts as needed.
	2. Park Sprag Sticking.	2. Replace overdrive annulus gear.
	3. Rear Band Misadjusted/Worn.	3. Adjust band; replace.
	4. Valve Body Malfunction.	4. Remove and service valve body. Replace valve body if any valves or valve bores are worn or damaged.
	5. Rear Servo Malfunction.	5. Remove and disassemble transmission. Replace worn/damaged servo parts as necessary.
	6. Direct Clutch in Overdrive Worn	6. Disassemble overdrive. Replace worn or damaged parts.
	7. Front Clutch Burnt.	7. Remove and disassemble transmission. Replace worn, damaged clutch parts as required.
HAS FIRST/REVERSE ONLY (NO 1-2 OR 2-3 UPSHIFT)	1. Governor Circuit Electrical Fault.	1. Test using DRB scan tool and repair as required.
	2. Valve Body Malfunction.	2. Repair stuck 1-2 shift valve or governor plug.
	3. Front Servo/Kickdown Band Damaged/Burned.	3. Repair/replace.
MOVES IN 2ND OR 3RD GEAR, ABRUPTLY DOWNSHIFTS TO LOW	1. Valve Body Malfunction.	1. Remove, clean and inspect. Look for stuck 1-2 valve or governor plug.
	2. Governor Valve Sticking.	2. Remove, clean and inspect. Replace faulty parts.
NO LOW GEAR (MOVES IN 2ND OR 3RD GEAR ONLY)	1. Governor Valve Sticking.	1. Remove governor, clean, inspect and repair as required.
	2. Governor Circuit Electrical Fault.	2. Test with DRB scan tool and repair as required.
	3. Valve Body Malfunction.	3. Remove, clean and inspect. Look for sticking 1-2 shift valve, 2-3 shift valve, governor plug or broken springs.
	4. Front Servo Piston Cocked in Bore.	4. Inspect servo and repair as required.
	5. Front Band Linkage Malfunction.	5. Inspect linkage and look for bind in linkage.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO KICKDOWN OR NORMAL DOWNSHIFT	1. Throttle Linkage Misadjusted.	1. Adjust linkage.
	2. Accelerator Pedal Travel Restricted.	2. Verify floor mat is not under pedal, repair worn accelerator cable or bent brackets.
	3. Valve Body Hydraulic Pressures Too High or Too Low Due to Valve Body Malfunction or Incorrect Hydraulic Control Pressure Adjustments.	3. Perform hydraulic pressure tests to determine cause and repair as required. Correct valve body pressure adjustments as required.
	4. Governor Circuit Electrical Fault.	4. Test with DRB scan tool and repair as required.
	5. Valve Body Malfunction.	5. Perform hydraulic pressure tests to determine cause and repair as required. Correct valve body pressure adjustments as required.
	6. TPS Malfunction.	6. Replace sensor, check with DRB scan tool.
	7. PCM Malfunction.	7. Check with DRB scan tool and replace if required.
	8. Valve Body Malfunction.	8. Repair sticking 1-2, 2-3 shift valves, governor plugs, 3-4 solenoid, 3-4 shift valve, 3-4 timing valve.
STUCK IN LOW GEAR (WILL NOT UPSHIFT)	1. Throttle Linkage Misadjusted/Stuck.	1. Adjust linkage and repair linkage if worn or damaged. Check for binding cable or missing return spring.
	2. Gearshift Linkage Misadjusted.	2. Adjust linkage and repair linkage if worn or damaged.
	3. Governor Component Electrical Fault.	3. Check operating pressures and test with DRB scan tool, repair faulty component.
	4. Front Band Out of Adjustment.	4. Adjust Band.
	5. Clutch or Servo Malfunction.	5. Air pressure check operation of clutches and bands. Repair faulty component.
CREEPS IN NEUTRAL	1. Gearshift Linkage Misadjusted.	1. Adjust linkage.
	2. Rear Clutch Dragging/Warped.	2. Disassemble and repair.
	3. Valve Body Malfunction.	3. Perform hydraulic pressure test to determine cause and repair as required.



## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
BUZZING NOISE	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Shift Cable Misassembled.	2. Route cable away from engine and bell housing.
	3. Valve Body Misassembled.	3. Remove, disassemble, inspect valve body. Reassemble correctly if necessary. Replace assembly if valves or springs are damaged. Check for loose bolts or screws.
	4. Pump Passages Leaking.	4. Check pump for porous casting, scores on mating surfaces and excess rotor clearance. Repair as required. Loose pump bolts.
	5. Cooling System Cooler Plugged.	5. Flow check cooler circuit. Repair as needed.
	6. Overrunning Clutch Damaged.	6. Replace clutch.
SLIPS IN REVERSE ONLY	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Gearshift Linkage Misadjusted.	2. Adjust linkage.
	3. Rear Band Misadjusted.	3. Adjust band.
	4. Rear Band Worn.	4. Replace as required.
	5. Overdrive Direct Clutch Worn.	5. Disassemble overdrive. Repair as needed.
	6. Hydraulic Pressure Too Low.	6. Perform hydraulic pressure tests to determine cause.
	7. Rear Servo Leaking.	7. Air pressure check clutch-servo operation and repair as required.
	8. Band Linkage Binding.	8. Inspect and repair as required.
SLIPS IN FORWARD DRIVE RANGES	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Fluid Foaming.	2. Check for high oil level, bad pump gasket or seals, dirt between pump halves and loose pump bolts. Replace pump if necessary.
	3. Throttle Linkage Misadjusted.	3. Adjust linkage.
	4. Gearshift Linkage Misadjusted.	4. Adjust linkage.
	5. Rear Clutch Worn.	5. Inspect and replace as needed.
	6. Low Hydraulic Pressure Due to Worn Pump, Incorrect Control Pressure Adjustments, Valve Body Warpage or Malfunction, Sticking, Leaking Seal Rings, Clutch Seals Leaking, Servo Leaks, Clogged Filter or Cooler Lines.	6. Perform hydraulic and air pressure tests to determine cause.
	7. Rear Clutch Malfunction, Leaking Seals or Worn Plates.	7. Air pressure check clutch-servo operation and repair as required.
	8. Overrunning Clutch Worn, Not Holding (Slips in 1 Only).	8. Replace Clutch.
SLIPS IN LOW GEAR "D" ONLY, BUT NO IN 1 POSITION	Overrunning Clutch Faulty.	Replace overrunning clutch.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
GROWLING, GRATING OR SCRAPING NOISES	1. Drive Plate Broken.	1. Replace.
	2. Torque Converter Bolts Hitting Dust Shield.	2. Dust shield bent. Replace or repair.
	3. Planetary Gear Set Broken/ Seized.	3. Check for debris in oil pan and repair as required.
	4. Overrunning Clutch Worn/Broken.	4. Inspect and check for debris in oil pan. Repair as required.
	5. Oil Pump Components Scored/ Binding.	5. Remove, inspect and repair as required.
	6. Output Shaft Bearing or Bushing Damaged.	6. Remove, inspect and repair as required.
	7. Clutch Operation Faulty.	7. Perform air pressure check and repair as required.
	8. Front and Rear Bands Misadjusted.	8. Adjust bands.
DRAGS OR LOCKS UP	1. Fluid Level Low.	1. Check and adjust level.
	2. Clutch Dragging/Failed.	2. Air pressure check clutch operation and repair as required.
	3. Front or Rear Band Misadjusted.	3. Adjust bands.
	4. Case Leaks Internally.	4. Check for leakage between passages in case.
	5. Servo Band or Linkage Malfunction.	5. Air pressure check servo operation and repair as required.
	6. Overrunning Clutch Worn.	6. Remove and inspect clutch. Repair as required.
	7. Planetary Gears Broken.	7. Remove, inspect and repair as required (look for debris in oil pan).
	8. Converter Clutch Dragging.	8. Check for plugged cooler. Perform flow check. Inspect pump for excessive side clearance. Replace pump as required.
NO 4-3 DOWNSHIFT	1. Circuit Wiring and/or Connectors Shorted.	1. Test wiring and connectors with test lamp and volt/ohmmeter. Repair wiring as necessary. Replace connectors and/or harnesses as required.
	2. PCM Malfunction.	2. Check PCM operation with DRB scan tool. Replace PCM only if faulty.
	3. TPS Malfunction.	3. Check TPS with DRB scan tool at PCM.
	4. Lockup Solenoid Not Venting.	4. Remove valve body and replace solenoid assembly if plugged or shorted.
	5. Overdrive Solenoid Not Venting.	5. Remove valve body and replace solenoid if plugged or shorted.
	6. Valve Body Valve Sticking.	6. Repair stuck 3-4 shift valve or lockup timing valve.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO 4-3 DOWNSHIFT WHEN CONTROL SWITCH IS TURNED OFF	1. Control Switch Open/Shorted.	1. Test and replace switch if faulty.
	2. Overdrive Solenoid Connector Shorted.	2. Test solenoids and replace if seized or shorted.
	3. PCM Malfunction.	3. Test with DRB scan tool. Replace PCM if faulty.
	4. Valve Body Stuck Valves.	4. Repair stuck 3-4, lockup or lockup timing valve.
CLUNK NOISE FROM DRIVELINE ON CLOSED THROTTLE 4-3 DOWNSHIFT	1. Transmission Fluid Low.	1. Add Fluid.
	2. Throttle Cable Misadjusted.	2. Adjust cable.
	3. Overdrive Clutch Select Spacer Wrong Spacer.	3. Replace overdrive piston thrust plate spacer.
3-4 UPSHIFT OCCURS IMMEDIATELY AFTER 2-3 SHIFT	1. Overdrive Solenoid Connector or Wiring Shorted.	1. Test connector and wiring for loose connections, shorts or ground and repair as needed.
	2. TPS Malfunction.	2. Test TPS and replace as necessary. Check with DRB scan tool.
	3. PCM Malfunction.	3. Test PCM with DRB scan tool and replace controller if faulty.
	4. Overdrive Solenoid Malfunction.	4. Replace solenoid.
	5. Valve Body Malfunction.	5. Remove, disassemble, clean and inspect valve body components. Make sure all valves and plugs slide freely in bores. Polish valves with crocus cloth if needed.
WHINE/NOISE RELATED TO ENGINE SPEED	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Shift Cable Incorrect Routing.	2. Check shift cable for correct routing. Should not touch engine or bell housing.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO 3-4 UPSHIFT	1. Dash O/D Switch In OFF Position.	1. Turn control switch to ON position.
	2. Overdrive Circuit Fuse Blown.	2. Replace fuse. Determine why fuse failed and repair as necessary (i.e., shorts or grounds in circuit).
	3. O/D Switch Wire Shorted/Open Cut.	3. Check wires/connections with 12V test lamp and voltmeter. Repair damaged or loose wire/connection as necessary.
	4. Distance or Coolant Sensor Malfunction.	4. Check with DRB scan tool and repair or replace as necessary.
	5. TPS Malfunction.	5. Check with DRB scan tool and replace if necessary.
	6. Neutral Switch to PCM Wire Shorted/Cut.	6. Test switch as described in service section and replace if necessary. Engine no start.
	7. PCM Malfunction.	7. Check with DRB scan tool and replace if necessary.
	8. Overdrive Solenoid Shorted/Open.	8. Replace solenoid if shorted or open and repair loose or damaged wires (DRB scan tool).
	9. Solenoid Feed Orifice in Valve Body Blocked.	9. Remove, disassemble, and clean valve body thoroughly. Check feed orifice.
	10. Overdrive Clutch Failed.	10. Disassemble overdrive and repair as needed.
	11. Hydraulic Pressure Low.	11. Pressure test transmission to determine cause.
	12. Valve Body Valve Stuck.	12. Repair stuck 3-4 shift valve, 3-4 timing valve.
	13. O/D Piston Incorrect Spacer.	13. Remove unit, check end play and install correct spacer.
	14. Overdrive Piston Seal Failure.	14. Replace both seals.
	15. O/D Check Valve/Orifice Failed.	15. Check for free movement and secure assembly (in piston retainer). Check ball bleed orifice.



## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
SLIPS IN OVERDRIVE FOURTH GEAR	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Overdrive Clutch Pack Worn.	2. Remove overdrive unit and rebuild clutch pack.
	3. Overdrive Piston Retainer Bleed Orifice Blown Out.	3. Disassemble transmission, remove retainer and replace orifice.
	4. Overdrive Piston or Seal Malfunction.	4. Remove overdrive unit. Replace seals if worn. Replace piston if damaged. If piston retainer is damaged, remove and disassemble the transmission.
	5. 3-4 Shift Valve, Timing Valve or Accumulator Malfunction.	5. Remove and overhaul valve body. Replace accumulator seals. Make sure all valves operate freely in bores and do not bind or stick. Make sure valve body screws are correctly tightened and separator plates are properly positioned.
	6. Overdrive Unit Thrust Bearing Failure.	6. Disassemble overdrive unit and replace thrust bearing (NO. 1 thrust bearing is between overdrive piston and clutch hub; NO. 2 thrust bearing is between the planetary gear and the direct clutch spring plate; NO. 3 thrust bearing is between overrunning clutch hub and output shaft).
	7. O/D Check Valve/Bleed Orifice Failure.	7. Check for function/secure orifice insert in O/D piston retainer.
DELAYED 3-4 UPSHIFT (SLOW TO ENGAGE)	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Throttle Valve Cable Misadjusted.	2. Adjust throttle valve cable.
	3. Overdrive Clutch Pack Worn/ Burnt.	3. Remove unit and rebuild clutch pack.
	4. TPS Faulty.	4. Test with DRB scan tool and replace as necessary.
	5. Overdrive Clutch Bleed Orifice Plugged.	5. Disassemble transmission and replace orifice.
	6. Overdrive Solenoid or Wiring Shorted/Open.	6. Test solenoid and check wiring for loose/corroded connections or shorts/grounds. Replace solenoid if faulty and repair wiring if necessary.
	7. Overdrive Excess Clearance.	7. Remove unit. Measure end play and select proper spacer.
	8. O/D Check Valve Missing or Stuck.	8. Check for presence of check valve. Repair or replace as required.
TORQUE CONVERTER LOCKS UP IN SECOND AND/OR THIRD GEAR	Lockup Solenoid, Relay or Wiring Shorted/Open.	Test solenoid, relay and wiring for continuity, shorts or grounds. Replace solenoid and relay if faulty. Repair wiring and connectors as necessary.
HARSH 1-2, 2-3, 3-4 OR 3-2 SHIFTS	Lockup Solenoid Malfunction.	Remove valve body and replace solenoid assembly.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO START IN PARK OR NEUTRAL	1. Gearshift Linkage/Cable Misadjusted.	1. Adjust linkage/cable.
	2. Neutral Switch Wire Open/Cut.	2. Check continuity with test lamp. Repair as required.
	3. Neutral Switch Faulty.	3. Refer to service section for test and replacement procedure.
	4. Neutral Switch Connect Faulty.	4. Connectors spread open. Repair.
	5. Valve Body Manual Lever Assembly Bent/Worn/Broken.	5. Inspect lever assembly and replace if damaged.
NO REVERSE (OR SLIPS IN REVERSE)	1. Direct Clutch Pack (front clutch) Worn.	1. Disassemble unit and rebuild clutch pack.
	2. Rear Band Misadjusted.	2. Adjust band.
	3. Front Clutch Malfunctioned/ Burned.	3. Air-pressure test clutch operation. Remove and rebuild if necessary.
	4. Overdrive Thrust Bearing Failure.	4. Disassemble geartrain and replace bearings.
	5. Direct Clutch Spring Collapsed/ Broken.	5. Remove and disassemble unit. Check clutch position and replace spring.
OIL LEAKS.	1. Fluid Lines and Fittings Loose/ Leaks/Damaged.	1. Tighten fittings. If leaks persist, replace fittings and lines if necessary.
	2. Fill Tube (where tube enters case) Leaks/Damaged.	2. Replace tube seal. Inspect tube for cracks in fill tube.
	3. Pressure Port Plug Loose Loose/Damaged.	3. Tighten to correct torque. Replace plug or reseal if leak persists.
	4. Pan Gasket Leaks.	4. Tighten pan screws (150 in. lbs.). If leaks persist, replace gasket.
	5. Valve Body Manual Lever Shaft Seal Leaks/Worn.	5. Replace shaft seal.
	6. Rear Bearing Access Plate Leaks.	6. Replace gasket. Tighten screws.
	7. Gasket Damaged or Bolts are Loose.	7. Replace bolts or gasket or tighten both.
	8. Adapter/Extension Gasket Damaged Leaks/Damaged.	8. Replace gasket.
	9. Neutral Switch Leaks/Damaged.	9. Replace switch and gasket.
	10. Converter Housing Area Leaks.	10. Check for leaks at seal caused by worn seal or burr on converter hub (cutting seal), worn bushing, missing oil return, oil in front pump housing or hole plugged. Check for leaks past O-ring seal on pump or past pump-to-case bolts; pump housing porous, oil coming out vent due to overfill or leak past front band shaft access plug.
	11. Pump Seal Leaks/Worn/ Damaged.	11. Replace seal.
	12. Torque Converter Weld Leak/Cracked Hub.	12. Replace converter.
	13. Case Porosity Leaks.	13. Replace case.

## DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NOISY OPERATION IN FOURTH GEAR ONLY	1. Overdrive Clutch Discs, Plates or Snap Rings Damaged.	1. Remove unit and rebuild clutch pack.
	2. Overdrive Piston or Planetary Thrust Bearing Damaged.	2. Remove and disassemble unit. Replace either thrust bearing if damaged.
	3. Output Shaft Bearings Scored/Damaged.	3. Remove and disassemble unit. Replace either bearing if damaged.
	4. Planetary Gears Worn/Chipped.	4. Remove and overhaul overdrive unit.
	5. Overdrive Unit Overrunning Clutch Rollers Worn/Scored.	5. Remove and overhaul overdrive unit.

## SERVICE PROCEDURES

### FLUID LEVEL CHECK

Transmission fluid level should be checked monthly under normal operation. If the vehicle is used for trailer towing or similar heavy load hauling, check fluid level and condition weekly. Fluid level is checked with the engine running at curb idle speed, the transmission in NEUTRAL and the transmission fluid at normal operating temperature.

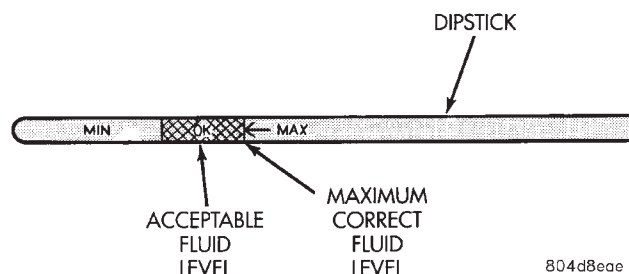
#### FLUID LEVEL CHECK PROCEDURE

- (1) Transmission fluid must be at normal operating temperature for accurate fluid level check. Drive vehicle if necessary to bring fluid temperature up to normal hot operating temperature of 82°C (180°F).
- (2) Position vehicle on level surface.
- (3) Start and run engine at curb idle speed.
- (4) Apply parking brakes.
- (5) Shift transmission momentarily into all gear ranges. Then shift transmission back to Neutral.
- (6) Clean top of filler tube and dipstick to keep dirt from entering tube.
- (7) Remove dipstick (Fig. 10) and check fluid level as follows:
  - (a) Correct acceptable level is in crosshatch area.
  - (b) Correct maximum level is to MAX arrow mark.
  - (c) Incorrect level is at or below MIN line.
  - (d) If fluid is low, add only enough Mopar® ATF Plus 3 to restore correct level. Do not overfill.

**CAUTION:** Do not overfill the transmission. Overfilling may cause leakage out the pump vent which can be mistaken for a pump seal leak. Overfilling will also cause fluid aeration and foaming as the excess fluid is picked up and churned by the gear train. This will significantly reduce fluid life.

### FLUID AND FILTER REPLACEMENT

Refer to the Maintenance Schedules in Group 0, Lubrication and Maintenance, for proper service



**Fig. 10 Dipstick Fluid Level Marks—Typical**

intervals. The service fluid fill after a filter change is approximately 3.8 liters (4.0 quarts).

#### REMOVAL

- (1) Hoist and support vehicle on safety stands.
- (2) Place a large diameter shallow drain pan beneath the transmission pan.
- (3) Remove bolts holding front and sides of pan to transmission (Fig. 11).
- (4) Loosen bolts holding rear of pan to transmission.
- (5) Slowly separate front of pan away from transmission allowing the fluid to drain into drain pan.
- (6) Hold up pan and remove remaining bolt holding pan to transmission.
- (7) While holding pan level, lower pan away from transmission.
- (8) Pour remaining fluid in pan into drain pan.
- (9) Remove screws holding filter to valve body (Fig. 12).
- (10) Separate filter from valve body and pour fluid in filter into drain pan.
- (11) Dispose of used trans fluid and filter properly.

#### INSPECTION

Inspect bottom of pan and magnet for excessive amounts of metal or fiber contamination. A light coating of clutch or band material on the bottom of the pan does not indicate a problem unless accompanied by slipping condition or shift lag. If fluid and pan are contaminated with excessive amounts or debris, refer to the diagnosis section of this group.

## SERVICE PROCEDURES (Continued)

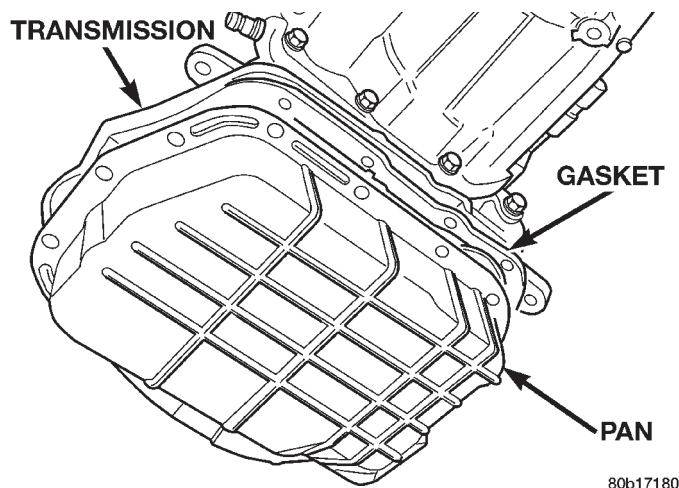


Fig. 11 Transmission Pan

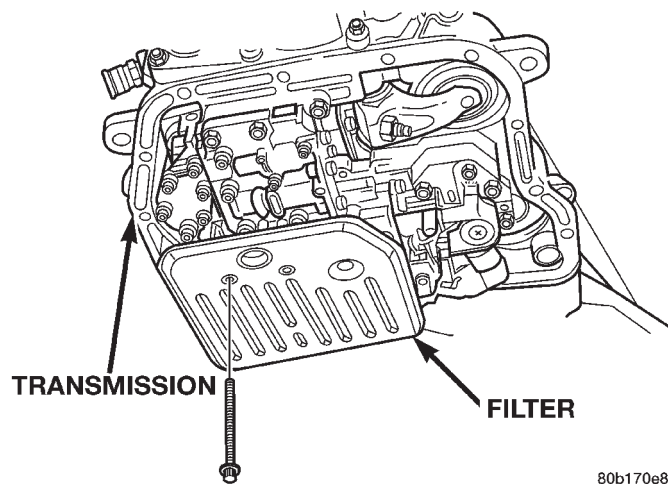


Fig. 12 Transmission Filter

Check the adjustment of the front and rear bands, adjust if necessary.

## CLEANING

- (1) Using a suitable solvent, clean pan and magnet.
- (2) Using a suitable gasket scraper, clean gasket material from gasket surface of transmission case and the gasket flange around the pan.

## INSTALLATION

- (1) Place replacement filter in position on valve body.
- (2) Install screws to hold filter to valve body (Fig. 12). Tighten screws to 4 N·m (35 in. lbs.) torque.
- (3) Place new gasket in position on pan and install pan on transmission.
- (4) Place pan in position on transmission.
- (5) Install screws to hold pan to transmission (Fig. 11). Tighten bolts to 17 N·m (150 in. lbs.) torque.
- (6) Lower vehicle and fill transmission with Mopar® ATF Plus 3, type 7176 fluid.

## TRANSMISSION FILL PROCEDURE

To avoid overfilling transmission after a fluid change or overhaul, perform the following procedure:

- (1) Remove dipstick and insert clean funnel in transmission fill tube.
- (2) Add following initial quantity of Mopar® ATF Plus 3 to transmission:
  - (a) If only fluid and filter were changed, add **3 pints (1-1/2 quarts)** of ATF Plus 3 to transmission.
  - (b) If transmission was completely overhauled, torque converter was replaced or drained, and cooler was flushed, add **12 pints (6 quarts)** of ATF Plus 3 to transmission.
- (3) Apply parking brakes.
- (4) Start and run engine at normal curb idle speed.
- (5) Apply service brakes, shift transmission through all gear ranges then back to NEUTRAL, set parking brake, and leave engine running at curb idle speed.
- (6) Remove funnel, insert dipstick and check fluid level. If level is low, **add fluid to bring level to MIN mark on dipstick**. Check to see if the oil level is equal on both sides of the dipstick. If one side is noticeably higher than the other, the dipstick has picked up some oil from the dipstick tube. Allow the oil to drain down the dipstick tube and re-check.
- (7) Drive vehicle until transmission fluid is at normal operating temperature.
- (8) With the engine running at curb idle speed, the gear selector in NEUTRAL, and the parking brake applied, check the transmission fluid level.

**CAUTION: Do not overfill transmission, fluid foaming and shifting problems can result.**

- (9) Add fluid to bring level up to MAX arrow mark.

When fluid level is correct, shut engine off, release park brake, remove funnel, and install dipstick in fill tube.

## CONVERTER DRAINBACK CHECK VALVE SERVICE

The converter drainback check valve is located in the cooler outlet (pressure) line near the radiator lower tank. The valve prevents fluid drainback when the vehicle is parked for lengthy periods. The valve check ball is spring loaded and has an opening pressure of approximately 2 psi.

The valve is serviced as an assembly; it is not repairable. Do not clean the valve if restricted, or contaminated by sludge, or debris. If the valve fails, or if a transmission malfunction occurs that generates sludge and/or clutch particles and metal shavings, the valve must be replaced.



## SERVICE PROCEDURES (Continued)

The valve must be removed whenever the cooler and lines are reverse flushed. The valve can be flow tested when necessary. The procedure is exactly the same as for flow testing a cooler.

If the valve is restricted, installed backwards, or in the wrong line, it will cause an overheating condition and possible transmission failure.

**CAUTION:** The drainback valve is a one-way flow device. It must be properly oriented in terms of flow direction for the cooler to function properly. The valve must be installed in the pressure line. Otherwise flow will be blocked and would cause an overheating condition and eventual transmission failure.

## OIL PUMP VOLUME CHECK

After the new or repaired transmission has been installed, fill to the proper level with Mopar® ATF PLUS 3 (Type 7176) automatic transmission fluid. The volume should be checked using the following procedure:

(1) Disconnect the **From cooler** line at the transmission and place a collecting container under the disconnected line.

**CAUTION:** With the fluid set at the proper level, fluid collection should not exceed (1) quart or internal damage to the transmission may occur.

(2) Run the engine **at curb idle speed**, with the shift selector in neutral.

(3) If fluid flow is intermittent or it takes more than 20 seconds to collect one quart of ATF PLUS 3, disconnect the **To Cooler** line at the transaxle.

(4) Refill the transaxle to proper level and recheck pump volume.

(5) If flow is found to be within acceptable limits, replace the cooler. Then fill transmission to the proper level, using Mopar® ATF PLUS 3 (Type 7176) automatic transmission fluid.

(6) If fluid flow is still found to be inadequate, check the line pressure using the Transaxle Hydraulic Pressure Test procedure.

## FLUSHING COOLERS AND TUBES

When a transmission failure has contaminated the fluid, the oil cooler(s) must be flushed. The cooler bypass valve in the transmission must be replaced also. The torque converter must also be replaced. This will insure that metal particles or sludged oil are not later transferred back into the reconditioned (or replaced) transmission.

The only recommended procedure for flushing coolers and lines is to use Tool 6906 Cooler Flusher.

**WARNING: WEAR PROTECTIVE EYEWEAR THAT MEETS THE REQUIREMENTS OF OSHA AND ANSI Z87.1-1968. WEAR STANDARD INDUSTRIAL RUBBER GLOVES.**

**KEEP LIGHTED CIGARETTES, SPARKS, FLAMES, AND OTHER IGNITION SOURCES AWAY FROM THE AREA TO PREVENT THE IGNITION OF COMBUSTIBLE LIQUIDS AND GASES. KEEP A CLASS (B) FIRE EXTINGUISHER IN THE AREA WHERE THE FLUSHER WILL BE USED.**

**KEEP THE AREA WELL VENTILATED.**

**DO NOT LET FLUSHING SOLVENT COME IN CONTACT WITH YOUR EYES OR SKIN: IF EYE CONTAMINATION OCCURS, FLUSH EYES WITH WATER FOR 15 TO 20 SECONDS. REMOVE CONTAMINATED CLOTHING AND WASH AFFECTED SKIN WITH SOAP AND WATER. SEEK MEDICAL ATTENTION.**

## COOLER FLUSH USING TOOL 6906

(1) Remove cover plate filler plug on Tool 6906. Fill reservoir 1/2 to 3/4 full of fresh flushing solution. Flushing solvents are petroleum based solutions generally used to clean automatic transmission components. **DO NOT** use solvents containing acids, water, gasoline, or any other corrosive liquids.

(2) Reinstall filler plug on Tool 6906.

(3) Verify pump power switch is turned OFF. Connect red alligator clip to positive (+) battery post. Connect black (-) alligator clip to a good ground.

(4) Disconnect the cooler lines at the transmission.

**NOTE: When flushing transmission cooler and lines, ALWAYS reverse flush.**

(5) Connect the BLUE pressure line to the OUTLET (From) cooler line.

(6) Connect the CLEAR return line to the INLET (To) cooler line.

(7) Turn pump ON for two to three minutes to flush cooler(s) and lines. Monitor pressure readings and clear return lines. Pressure readings should stabilize below 20 psi. for vehicles equipped with a single cooler and 30 psi. for vehicles equipped with dual coolers. If flow is intermittent or exceeds these pressures, replace cooler.

(8) Turn pump OFF.

(9) Disconnect CLEAR suction line from reservoir at cover plate. Disconnect CLEAR return line at cover plate, and place it in a drain pan.

(10) Turn pump ON for 30 seconds to purge flushing solution from cooler and lines. Turn pump OFF.

(11) Place CLEAR suction line into a one quart container of Mopar® ATF Plus 3, type 7176 automatic transmission fluid.

## SERVICE PROCEDURES (Continued)

(12) Turn pump ON until all transmission fluid is removed from the one quart container and lines. This purges any residual cleaning solvent from the transmission cooler and lines. Turn pump OFF.

(13) Disconnect alligator clips from battery. Reconnect flusher lines to cover plate, and remove flushing adapters from cooler lines.

**ALUMINUM THREAD REPAIR**

Damaged or worn threads in the aluminum transaxle case and valve body can be repaired by the use of Heli-Coils, or equivalent. This repair consists of drilling out the worn-out damaged threads. Then tap the hole with a special Heli-Coil tap, or equivalent, and installing a Heli-Coil insert, or equivalent, into the hole. This brings the hole back to its original thread size.

Heli-Coil, or equivalent, tools and inserts are readily available from most automotive parts suppliers.

**REMOVAL AND INSTALLATION****TRANSMISSION**

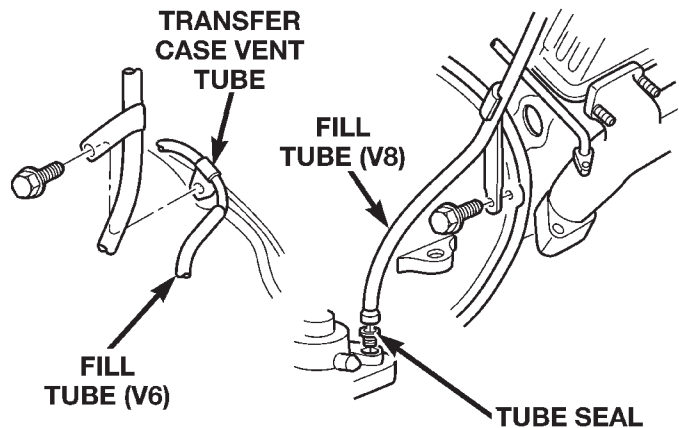
The overdrive unit can be removed and serviced separately. It is not necessary to remove the entire transmission assembly to perform overdrive unit repairs.

**CAUTION:** The transmission and torque converter must be removed as an assembly to avoid component damage. The converter drive plate, pump bushing, or oil seal can be damaged if the converter is left attached to the driveplate during removal.

**REMOVAL**

- (1) Disconnect battery negative cable.
- (2) Hoist and support vehicle.
- (3) Remove skid plate, if equipped.
- (4) Remove skid plate support crossmember, if equipped.
- (5) Disconnect and lower or remove necessary exhaust components.
- (6) Remove starter motor.
- (7) Support engine with suitable support stand and wood block.
- (8) Remove bolts attaching engine-to-transmission brackets to transmission.
- (9) Remove bolt and nut attaching each engine-to-transmission bracket to the motor mounts.
- (10) Remove bolts holding the engine-to-transmission brackets to the front axle, if equipped.
- (11) Loosen bolts attaching engine-to-transmission brackets to each side of the engine block.

- (12) Raise engine slightly.
- (13) Remove torque converter access cover.
- (14) Tighten bolts attaching engine-to-transmission brackets to each side of the engine block.
- (15) Lower engine.
- (16) Disconnect fluid cooler lines at transmission.
- (17) If transmission is being removed for overhaul, remove transmission oil pan, drain fluid and reinstall pan.
- (18) Remove fill tube bracket bolts and pull tube out of transmission. Retain fill tube seal. On 4 x 4 models, it will also be necessary to remove bolt attaching transfer case vent tube to converter housing (Fig. 13).



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**Fig. 13 Fill Tube Attachment**

(19) Mark torque converter and drive plate for assembly alignment. Note that bolt holes in crankshaft flange, drive plate and torque converter all have one offset hole.

(20) Rotate crankshaft in clockwise direction until converter bolts are accessible. Then remove bolts one at a time. Rotate crankshaft with socket wrench on dampener bolt.

(21) Mark propeller shaft and axle yokes for assembly alignment. Then disconnect and remove propeller shaft.

(22) Disconnect wires from park/neutral position switch and transmission solenoid.

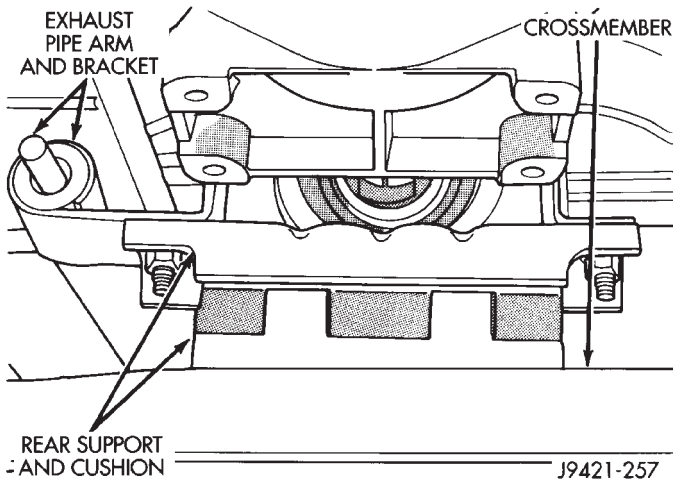
(23) Disconnect throttle valve cable from transmission bracket and throttle valve lever.

(24) On 4 x 4 models, disconnect shift rod from transfer case shift lever. Or remove shift lever from transfer case and tie rod and lever to chassis component with wire.

(25) Raise transmission slightly with service jack to relieve load on crossmember and supports.

(26) Remove bolts securing rear support and cushion to transmission and crossmember. Raise transmission slightly, slide exhaust hanger arm from bracket (Fig. 14) and remove rear support.

## REMOVAL AND INSTALLATION (Continued)

**Fig. 14 Rear Support Cushion**

(27) Remove bolts attaching crossmember to frame and remove crossmember.

(28) On 4 x 4 models, disconnect vent hose from transfer case. Then remove transfer case with transmission jack or aid of helper.

(29) Remove all converter housing bolts.

(30) Carefully work transmission and torque converter assembly rearward off engine block dowels.

(31) Lower transmission and remove assembly from under the vehicle.

**INSTALLATION**

(1) Check torque converter hub and hub drive notches for sharp edges burrs, scratches, or nicks. Polish the hub and notches with 320/400 grit paper and crocus cloth if necessary. The hub must be smooth to avoid damaging pump seal at installation.

(2) Lubricate converter drive hub and oil pump seal lip with transmission fluid.

(3) Lubricate converter pilot hub with transmission fluid.

(4) Align and install converter in oil pump.

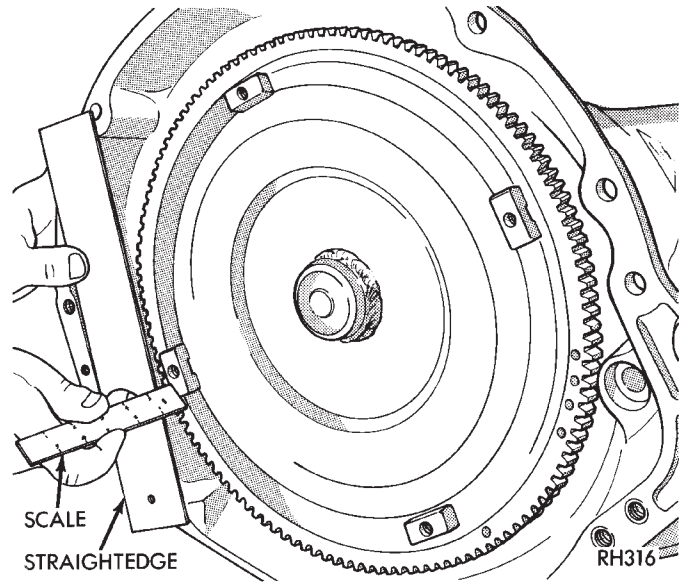
(5) Carefully insert converter in oil pump. Then rotate converter back and forth until fully seated in pump gears.

(6) Check converter seating with steel scale and straightedge (Fig. 15). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.

(7) Temporarily secure converter with wedge tool or C-clamp.

(8) Position transmission on jack and secure it with chains.

(9) Check condition of converter driveplate. Replace the plate if cracked, distorted or damaged. **Also be sure transmission dowel pins are seated in engine block and protrude far enough to held transmission in alignment.**

**Fig. 15 Typical Method Of Checking Converter Seating**

(10) Raise transmission and align converter with drive plate and converter housing with engine block.

(11) Move transmission forward. Then raise, lower or tilt transmission to align converter housing with engine block dowels.

(12) Rotate converter so alignment marks scribed on converter are aligned with mark on driveplate.

(13) Carefully work transmission forward and over engine block dowels until converter hub is seated in crankshaft.

(14) Install bolts attaching converter housing to engine.

(15) Install rear support. Then lower transmission onto crossmember and install bolts attaching transmission mount to crossmember.

(16) Install new plastic retainer grommet on any shift linkage rod or lever that was disconnected. Grommets should not be reused.

(17) Connect gearshift and throttle cable to transmission.

(18) Connect wires to park/neutral position switch, transmission solenoid(s) and oxygen sensor. Be sure transmission harnesses are properly routed.

**CAUTION:** It is essential that correct length bolts be used to attach the converter to the driveplate. Bolts that are too long will damage the clutch surface inside the converter.

(19) Install torque converter-to-driveplate bolts. Tighten bolts to 31 N·m (270 in. lbs.).

(20) Raise engine slightly.

(21) Loosen bolts attaching engine-to-transmission brackets to each side of the engine block.

(22) Install converter housing access cover.



## REMOVAL AND INSTALLATION (Continued)

(23) Install bolts attaching engine-to-transmission brackets to transmission.

(24) Tighten bolts attaching engine-to-transmission brackets to each side of the engine block.

(25) Lower engine.

(26) Install bolt and nut attaching each engine-to-transmission bracket to the motor mounts.

(27) Remove engine support.

(28) Install bolts to hold engine-to-transmission brackets to the front axle, if equipped.

(29) Install starter motor and cooler line bracket.

(30) Connect cooler lines to transmission.

(31) Install transmission fill tube. Install new seal on tube before installation.

(32) Install exhaust components.

(33) Install transfer case, if necessary.

(34) Align and connect propeller shaft(s).

(35) Install rear skid plate, if equipped.

(36) Adjust gearshift linkage and throttle valve cable if necessary.

(37) Install front skid plate, if equipped.

(38) Lower vehicle.

(39) Fill transmission with Mopar® ATF Plus 3, Type 7176 fluid.

## TORQUE CONVERTER

## REMOVAL

(1) Remove transmission and torque converter from vehicle.

(2) Place a suitable drain pan under the converter housing end of the transmission.

**CAUTION:** Verify that transmission is secure on the lifting device or work surface, the center of gravity of the transmission will shift when the torque converter is removed creating an unstable condition.

The torque converter is a heavy unit. Use caution when separating the torque converter from the transmission.

(3) Pull the torque converter forward until the center hub clears the oil pump seal.

(4) Separate the torque converter from the transmission.

## INSTALLATION

Check converter hub and drive notches for sharp edges, burrs, scratches, or nicks. Polish the hub and notches with 320/400 grit paper or crocus cloth if necessary. The hub must be smooth to avoid damaging the pump seal at installation.

(1) Lubricate converter hub and oil pump seal lip with transmission fluid.

(2) Place torque converter in position on transmission.

**CAUTION:** Do not damage oil pump seal or bushing while inserting torque converter into the front of the transmission.

(3) Align torque converter to oil pump seal opening.

(4) Insert torque converter hub into oil pump.

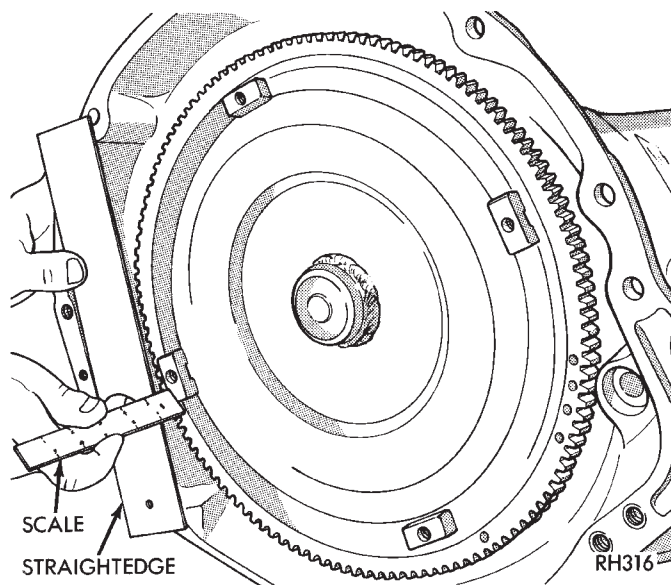
(5) While pushing torque converter inward, rotate converter until converter is fully seated in the oil pump gears.

(6) Check converter seating with a scale and straightedge (Fig. 16). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.

(7) If necessary, temporarily secure converter with C-clamp attached to the converter housing.

(8) Install the transmission in the vehicle.

(9) Fill the transmission with the recommended fluid.



**Fig. 16 Checking Torque Converter Seating**  
**YOKE SEAL REPLACEMENT**

## REMOVAL

(1) Raise vehicle.

(2) Mark propeller shaft and axle yoke for alignment reference.

(3) Disconnect and remove propeller shaft.

(4) Remove old seal with Seal Remover C-3985-B (Fig. 17) from overdrive housing.

## INSTALLATION

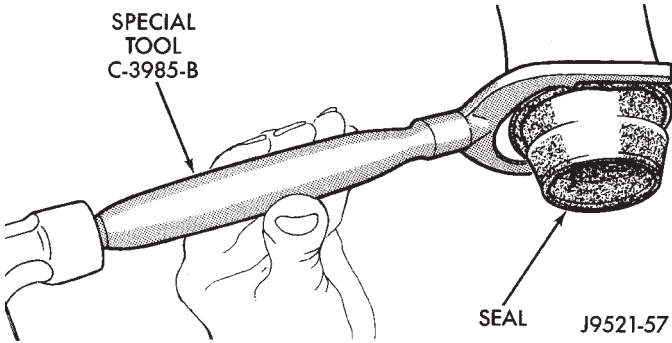
(1) Place seal in position on overdrive housing.

(2) Drive seal into overdrive housing with Seal Installer C-3995-A (Fig. 18).

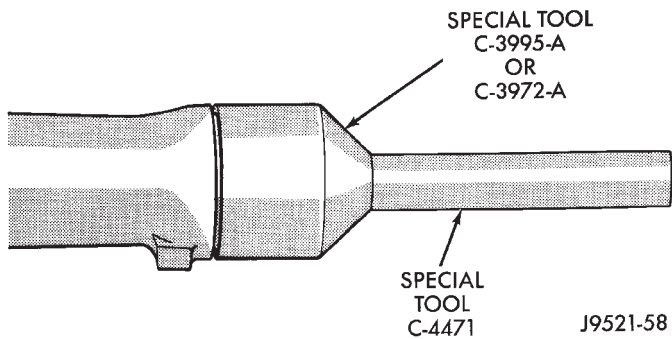
(3) Carefully guide propeller shaft slip yoke into housing and onto output shaft splines. Align marks made at removal and connect propeller shaft to rear axle pinion yoke.



## REMOVAL AND INSTALLATION (Continued)



**Fig. 17 Removing Overdrive Housing Yoke Seal**



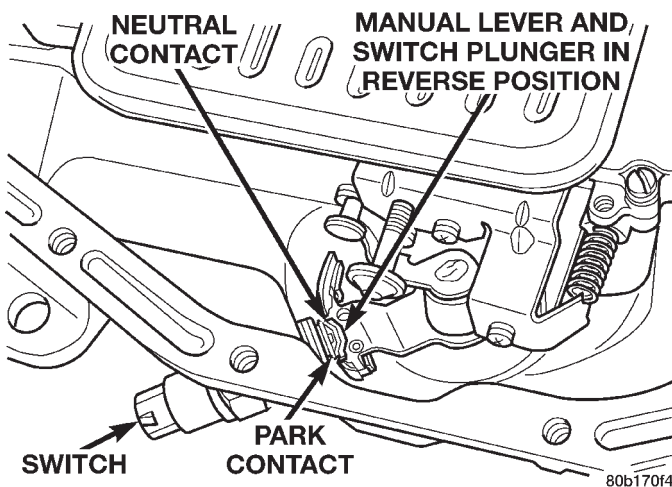
**Fig. 18 Installing Overdrive Housing Yoke Seal**

### REMOVAL

- (1) Raise vehicle and position drain pan under switch.
- (2) Disconnect switch wires.
- (3) Remove switch from case.

### INSTALLATION

- (1) Move shift lever to Park and Neutral positions. Verify that switch operating lever fingers are centered in switch opening in case (Fig. 19).



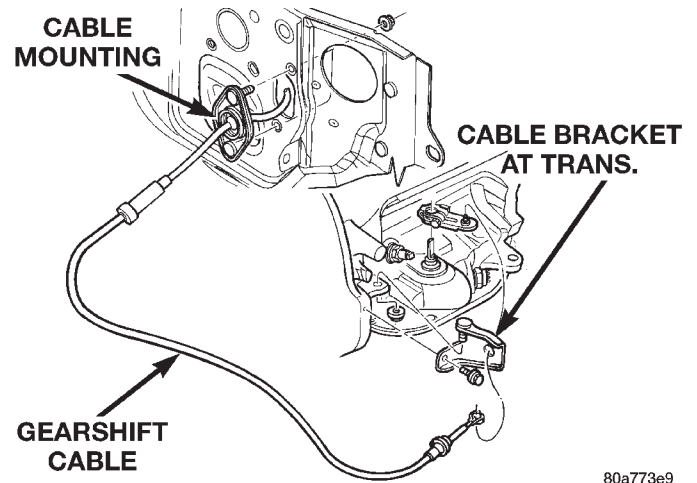
**Fig. 19 Park/Neutral Position Switch**

- (2) Install new seal on switch and install switch in case. Tighten switch to 34 N·m (25 ft. lbs.) torque.
- (3) Test continuity of new switch with 12V test lamp.
- (4) Connect switch wires and lower vehicle.
- (5) Top off transmission fluid level.

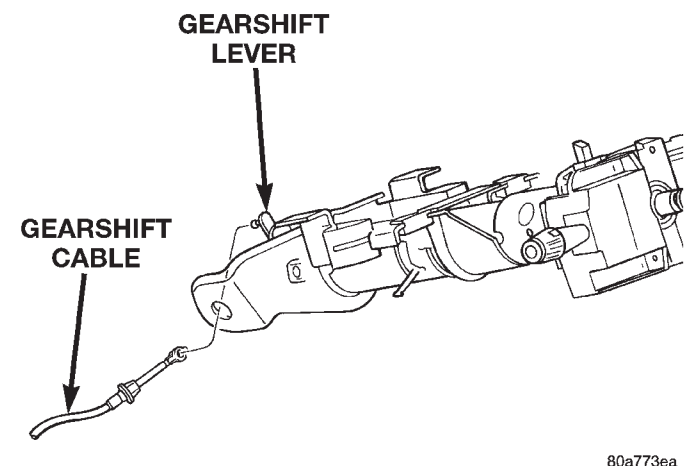
## GEARSHIFT CABLE

### REMOVAL

- (1) Shift transmission into Park.
- (2) Remove nuts retaining the shift cable housing to the dash panel (Fig. 20).
- (3) Disconnect cable at lower column lever and feed cable through dash panel opening to underside of vehicle (Fig. 21).
- (4) Raise vehicle.
- (5) Disengage cable eyelet at transmission shift lever and pull cable adjuster out of mounting bracket. Remove old cable from vehicle.



**Fig. 20 Cable Mounting**



**Fig. 21 Cable at Gearshift Lever**

## REMOVAL AND INSTALLATION (Continued)

## INSTALLATION

- (1) Snap the cable into the transmission bracket so the retaining ears are engaged and connect cable end fitting onto the manual control lever ball stud.
- (2) Lower vehicle.
- (3) Route cable through hole in dash panel. Seat cable bracket to dash panel. Install retaining nuts to cable housing bracket studs inside the vehicle at the dash panel.
- (4) Place the auto transmission manual shift control lever in "Park" detent (rearmost) position and rotate prop shaft to ensure transmission is in park.
- (5) Connect shift cable to shifter lever by snapping cable retaining ears into shifter bracket and press cable end fitting into lever.
- (6) Check for proper operation of Park/Neutral switch.
- (7) If the gearshift cable is out of adjustment, refer to Adjustments section.

## GOVERNOR SOLENOID AND PRESSURE SENSOR

## REMOVAL

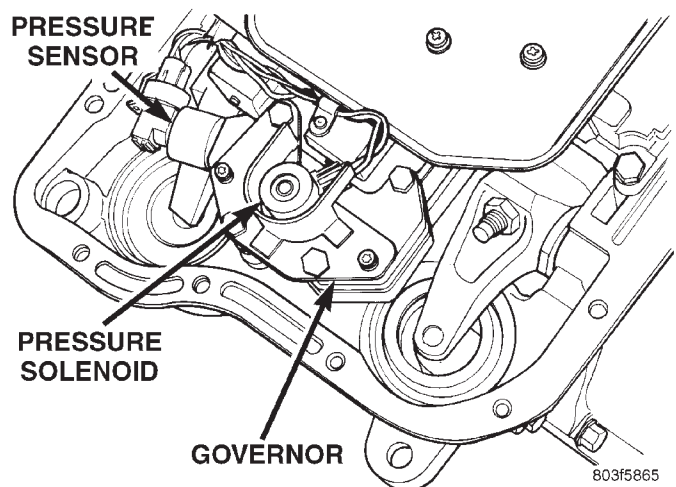
- (1) Hoist and support vehicle on safety stands.
- (2) Remove transmission fluid pan and filter.
- (3) Disengage wire connectors from pressure sensor and solenoid (Fig. 22).
- (4) Remove screws holding pressure solenoid retainer to governor body.
- (5) Separate solenoid retainer from governor (Fig. 23).
- (6) Pull solenoid from governor body (Fig. 24).
- (7) Remove bolts holding governor body to valve body.
- (8) Separate governor body from valve body (Fig. 25).
- (9) Remove governor body gasket.
- (10) Remove retainer holding pressure sensor to governor body.
- (11) Pull pressure sensor from governor body (Fig. 26).

## INSTALLATION

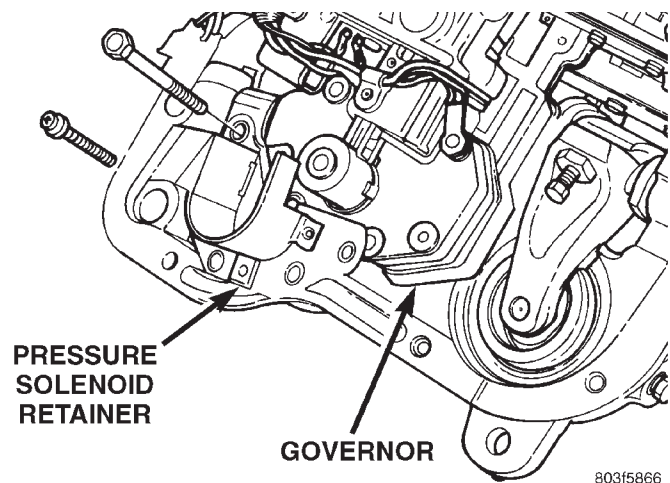
Before installing the pressure sensor and solenoid in the governor body, replace O-ring seals, clean the gasket surfaces and replace gasket.

- (1) Lubricate O-ring on pressure sensor with transmission fluid.
- (2) Align pressure sensor to bore in governor body (Fig. 26).
- (3) Push pressure sensor into governor body.
- (4) Install retainer to hold pressure sensor to governor body.
- (5) Place gasket in position on back of governor body (Fig. 25).
- (6) Place governor body in position on valve body.

- (7) Install bolts to hold governor body to valve body.
- (8) Lubricate O-ring, on pressure solenoid, with transmission fluid.
- (9) Align pressure solenoid to bore in governor body (Fig. 24).
- (10) Push solenoid into governor body.
- (11) Place solenoid retainer in position on governor (Fig. 23).
- (12) Install screws to hold pressure solenoid retainer to governor body.
- (13) Engage wire connectors into pressure sensor and solenoid (Fig. 22).
- (14) Install transmission fluid pan and (new) filter.
- (15) Lower vehicle and road test to verify repair.



**Fig. 22 Governor Solenoid And Pressure Sensor**



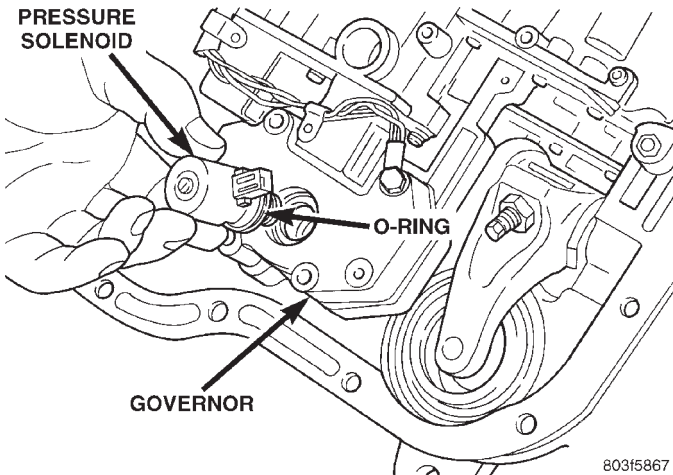
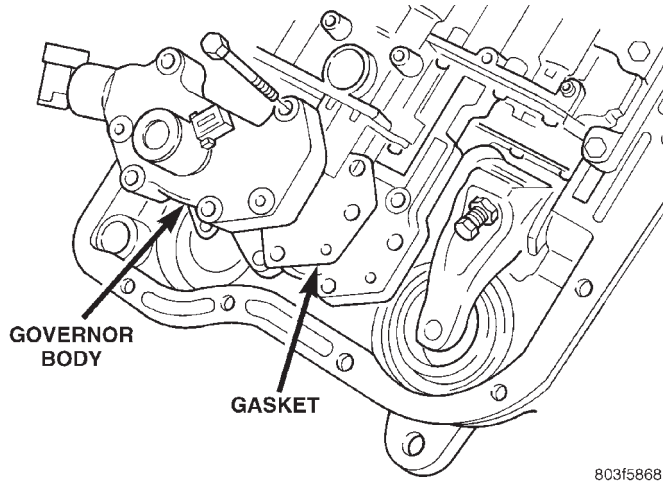
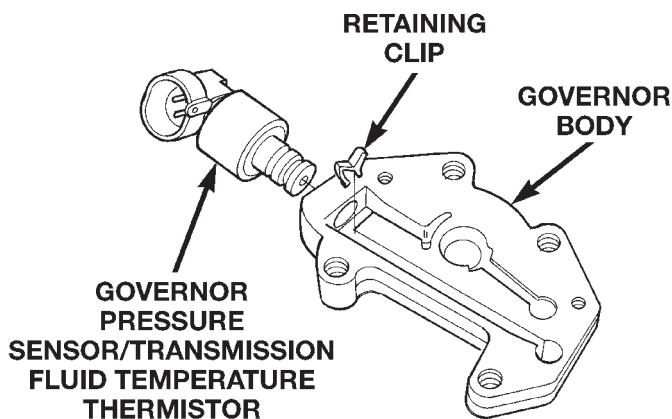
**Fig. 23 Pressure Solenoid Retainer**

## VALVE BODY

The valve body can be removed for service without having to remove the transmission assembly.

The valve body can be disassembled for cleaning and inspection of the individual components. Refer to Disassembly and Assembly section for proper procedures.

## REMOVAL AND INSTALLATION (Continued)

**Fig. 24 Pressure Solenoid and O-ring****Fig. 25 Governor Body and Gasket****Fig. 26 Pressure Sensor and Retainer**

The only replaceable valve body components are:

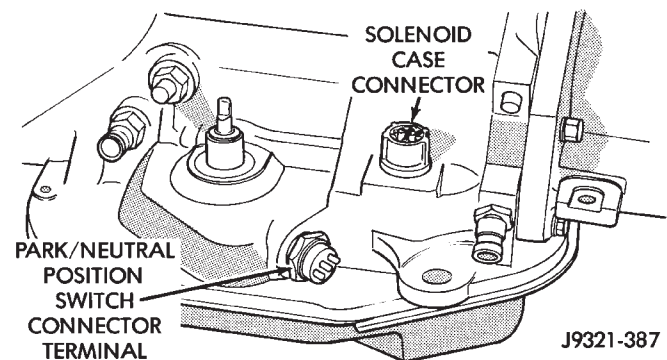
- Manual lever.
- Manual lever washer, seal, E-clip, and shaft seal.

- Manual lever detent ball.
- Throttle lever.
- Fluid filter.
- Pressure adjusting screw bracket.
- Governor pressure solenoid.
- Governor pressure sensor.
- Converter clutch/overdrive solenoid assembly and harness (includes sump temperature thermistor).
- Governor housing gasket.
- Solenoid case connector O-rings.

The remaining valve body components are serviced only as part of a complete valve body assembly.

**REMOVAL**

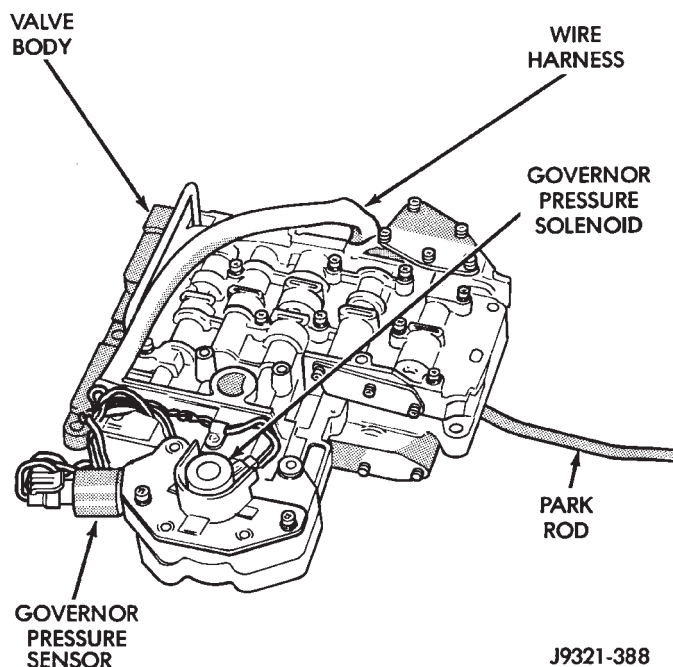
- (1) Shift transmission into NEUTRAL.
- (2) Raise vehicle.
- (3) Remove gearshift and throttle levers from shaft of valve body manual lever.
- (4) Disconnect wires at solenoid case connector (Fig. 27).
- (5) Position drain pan under transmission oil pan.
- (6) Remove transmission oil pan and gasket.
- (7) Remove fluid filter from valve body.
- (8) Remove bolts attaching valve body to transmission case.
- (9) Lower valve body enough to remove accumulator piston and springs.
- (10) Work manual lever shaft and electrical connector out of transmission case.
- (11) Lower valve body, rotate valve body away from case, pull park rod out of sprag, and remove valve body (Fig. 28).

**Fig. 27 Transmission Case Connector****INSTALLATION**

- (1) Check condition of O-ring seals on valve body harness connector (Fig. 29). Replace seals on connector body if cut or worn.
- (2) Check condition of manual lever shaft seal in transmission case. Replace seal if lip is cut or worn. Install new seal with 15/16 deep well socket (Fig. 30).
- (3) Check condition of seals on accumulator piston (Fig. 31). Install new piston seals, if necessary.



## REMOVAL AND INSTALLATION (Continued)

**Fig. 28 Valve Body**

(4) Place valve body manual lever in low (1 position) so ball on park lock rod will be easier to install in sprag.

(5) Lubricate shaft of manual lever with petroleum jelly. This will ease inserting shaft through seal in case.

(6) Lubricate seal rings on valve body harness connector with petroleum jelly.

(7) Position valve body in case and work end of park lock rod into and through pawl sprag. Turn propeller shaft to align sprag and park lock teeth if necessary. The rod will click as it enters pawl. Move rod to check engagement.

**CAUTION:** It is possible for the park rod to displace into a cavity just above the pawl sprag during installation. Make sure the rod is actually engaged in the pawl and has not displaced into this cavity.

(8) Install accumulator springs and piston into case. Then swing valve body over piston and outer spring to hold it in place.

(9) Align accumulator piston and outer spring, manual lever shaft and electrical connector in case.

(10) Then seat valve body in case and install one or two bolts to hold valve body in place.

(11) Tighten valve body bolts alternately and evenly to 11 N·m (100 in. lbs.) torque.

(12) Install new fluid filter on valve body. Tighten filter screws to 4 N·m (35 in. lbs.) torque.

(13) Install throttle and gearshift levers on valve body manual lever shaft.

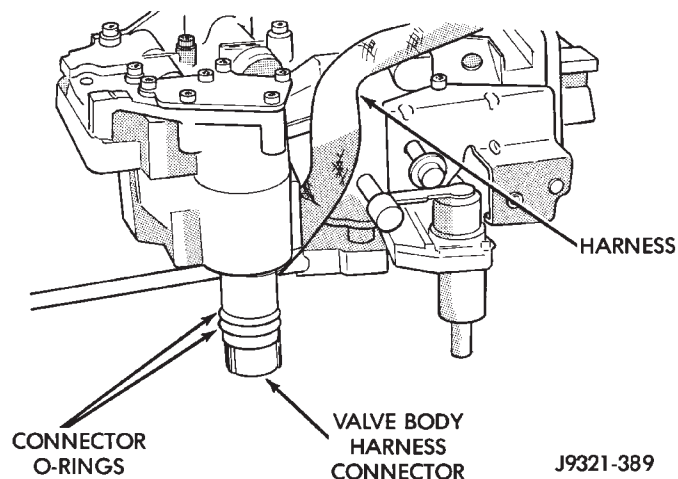
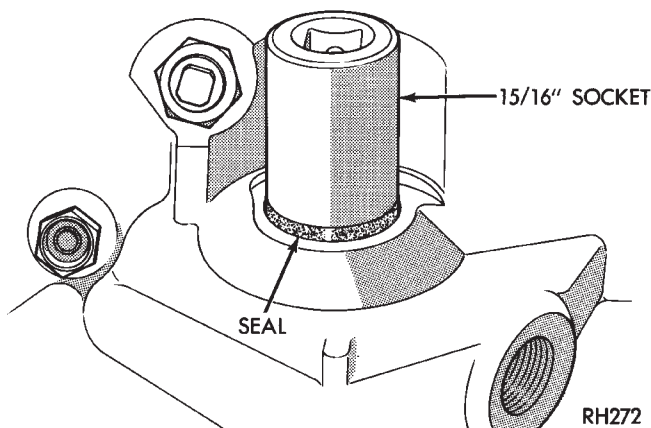
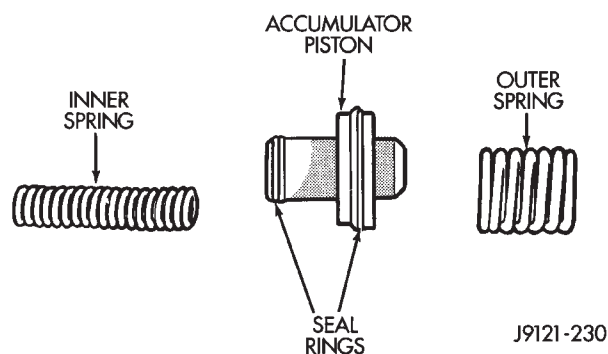
(14) Check and adjust front and rear bands if necessary.

(15) Connect solenoid case connector wires.

(16) Install oil pan and new gasket. Tighten pan bolts to 17 N·m (13 ft. lbs.) torque.

(17) Lower vehicle and fill transmission with Mopar® ATF Plus 3, type 7176 fluid.

(18) Check and adjust gearshift and throttle valve cables, if necessary.

**Fig. 29 Valve Body Harness Connector O-Ring Seal****Fig. 30 Manual Lever Shaft Seal****Fig. 31 Accumulator Piston Components**



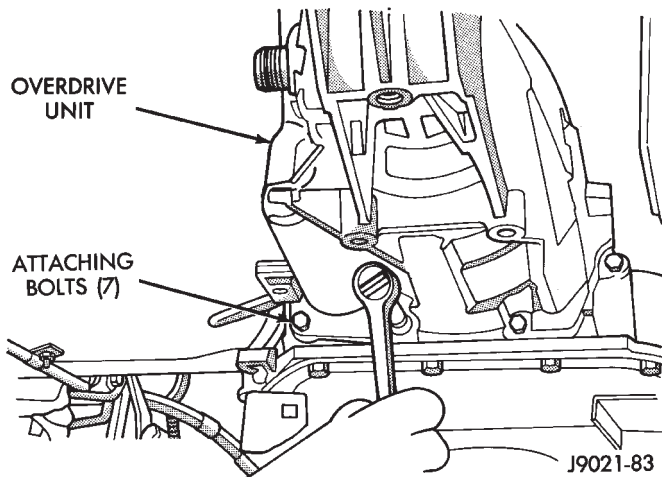
## REMOVAL AND INSTALLATION (Continued)

## OVERDRIVE UNIT

## REMOVAL

- (1) Shift transmission into Park.
- (2) Raise vehicle.
- (3) Mark propeller shaft universal joint(s) and axle pinion yoke for alignment reference at installation.
- (4) Disconnect and remove propeller shaft(s).
- (5) Remove transmission oil pan, remove gasket, drain oil and reinstall pan.
- (6) If overdrive unit had malfunctioned, or if fluid is contaminated, remove entire transmission. If diagnosis indicated overdrive problems only, remove just the overdrive unit.
- (7) Support transmission with transmission jack.
- (8) Remove bolts attaching overdrive unit to transmission (Fig. 32).

**CAUTION:** Support the overdrive unit with a jack before moving it rearward. This is necessary to prevent damaging the intermediate shaft. Do not allow the shaft to support the entire weight of the overdrive unit.



**Fig. 32 Overdrive Unit Bolts**

(9) Carefully work overdrive unit off intermediate shaft. Do not tilt unit during removal. Keep it as level as possible.

(10) If overdrive unit does not require service, immediately insert Alignment Tool 6227-2 in splines of planetary gear and overrunning clutch to prevent splines from rotating out of alignment. If misalignment occurs, overdrive unit will have to be disassembled in order to realign splines.

(11) Remove and retain overdrive piston thrust bearing. Bearing may remain on piston or in clutch hub during removal.

(12) Position drain pan on workbench.

(13) Place overdrive unit over drain pan. Tilt unit to drain residual fluid from case.

(14) Examine fluid for clutch material or metal fragments. If fluid contains these items, overhaul will be necessary.

(15) If overdrive unit does not require any service, leave alignment tool in position. Tool will prevent accidental misalignment of planetary gear and overrunning clutch splines.

## INSTALLATION

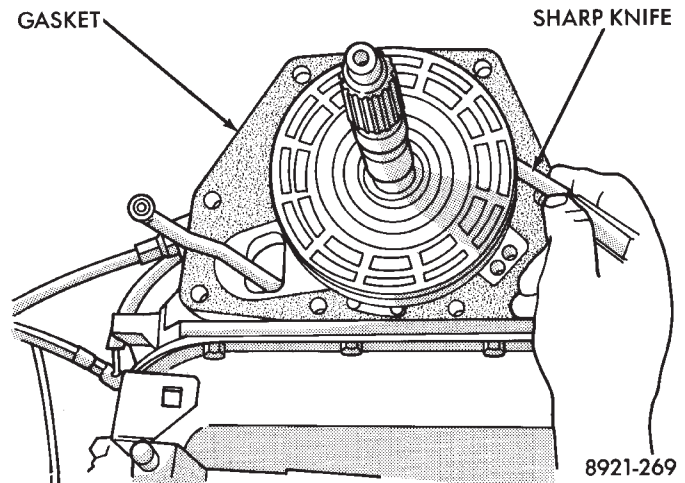
(1) Be sure overdrive unit Alignment Tool 6227-2 is fully seated before moving unit. If tool is not seated and gear splines rotate out of alignment, overdrive unit will have to be disassembled in order to realign splines.

(2) If overdrive piston retainer was not removed during service and original case gasket is no longer reusable, prepare new gasket by trimming it.

(3) Cut out old case gasket around piston retainer with razor knife (Fig. 33).

(4) Use old gasket as template and trim new gasket to fit.

(5) Position new gasket over piston retainer and on transmission case. Use petroleum jelly to hold gasket in place if necessary. Do not use any type of sealer to secure gasket. Use petroleum jelly only.



**Fig. 33 Trimming Overdrive Case Gasket**

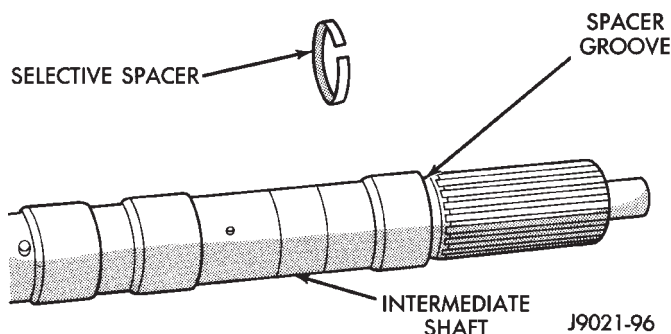
(6) Install selective spacer on intermediate shaft, if removed. Spacer goes in groove just rearward of shaft rear splines (Fig. 34).

(7) Install thrust bearing in overdrive unit sliding hub. Use petroleum jelly to hold bearing in position.

**CAUTION:** Be sure the shoulder on the inside diameter of the bearing is facing forward.

(8) Verify that splines in overdrive planetary gear and overrunning clutch hub are aligned with Alignment Tool 6227-2. Overdrive unit cannot be installed if splines are not aligned. If splines have rotated out

## REMOVAL AND INSTALLATION (Continued)



**Fig. 34 Intermediate Shaft Selective Spacer Location**  
of alignment, unit will have to be disassembled to realign splines.

(9) Carefully slide Alignment Tool 6227-2 out of overdrive planetary gear and overrunning clutch splines.

(10) Raise overdrive unit and carefully slide it straight onto intermediate shaft. Insert park rod into park lock reaction plug at same time. Avoid tilting overdrive during installation as this could cause planetary gear and overrunning clutch splines to rotate out of alignment. If this occurs, it will be necessary to remove and disassemble overdrive unit to realign splines.

(11) Work overdrive unit forward on intermediate shaft until seated against transmission case.

(12) Install bolts attaching overdrive unit to transmission unit. Tighten bolts in diagonal pattern to 34 N·m (25 ft-lbs).

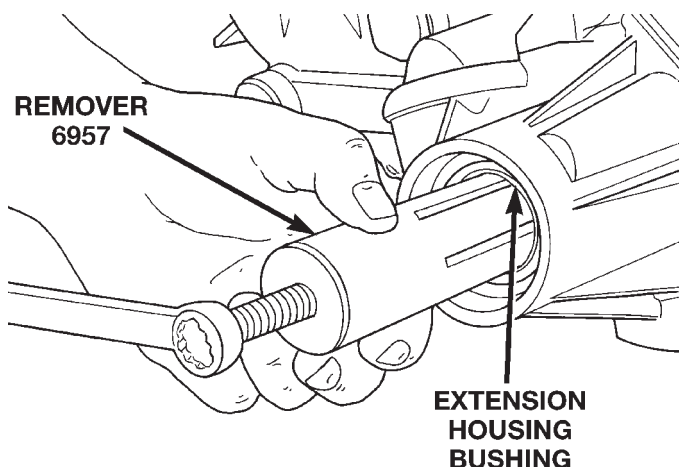
(13) Align and install propeller shaft(s).

## OVERDRIVE HOUSING BUSHING

## REMOVAL

(1) Remove overdrive housing yoke seal.

(2) Insert Remover 6957 into overdrive housing. Tighten tool to bushing and remove bushing (Fig. 35).



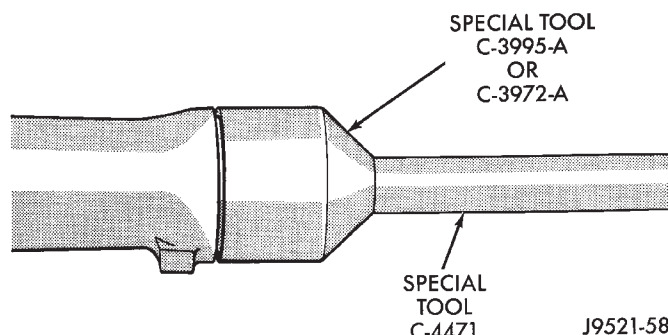
**Fig. 35 Bushing Removal—Typical**

## INSTALLATION

(1) Align bushing oil hole with oil slot in overdrive housing.

(2) Tap bushing into place with Installer 6951 and Handle C-4171.

(3) Install new oil seal in housing using Seal Installer C-3995-A (Fig. 36).



**Fig. 36 Overdrive Housing Seal Installation**

## OUTPUT SHAFT REAR BEARING

## REMOVAL

(1) Remove overdrive unit from the vehicle.

(2) Remove overdrive geartrain from housing.

(3) Remove snap ring holding output shaft rear bearing into overdrive housing (Fig. 37).

(4) Using a suitable driver inserted through the rear end of housing, drive bearing from housing.

## INSTALLATION

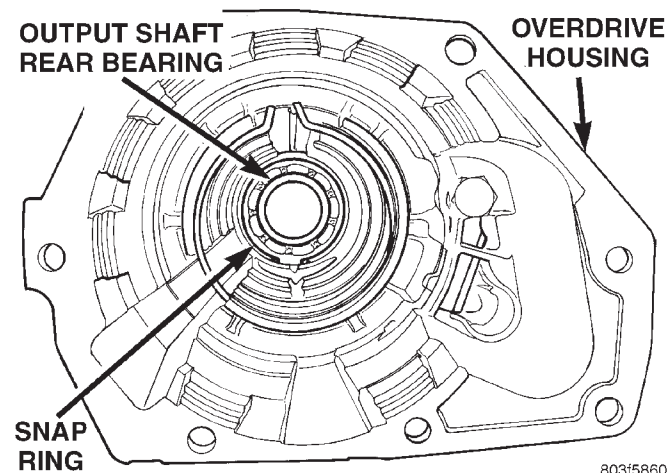
(1) Place replacement bearing in position in housing.

(2) Using a suitable driver, drive bearing into housing until the snap ring groove is visible.

(3) Install snap ring to hold bearing into housing (Fig. 37).

(4) Install overdrive geartrain into housing.

(5) Install overdrive unit in vehicle.



**Fig. 37 Output Shaft Rear Bearing**

## REMOVAL AND INSTALLATION (Continued)

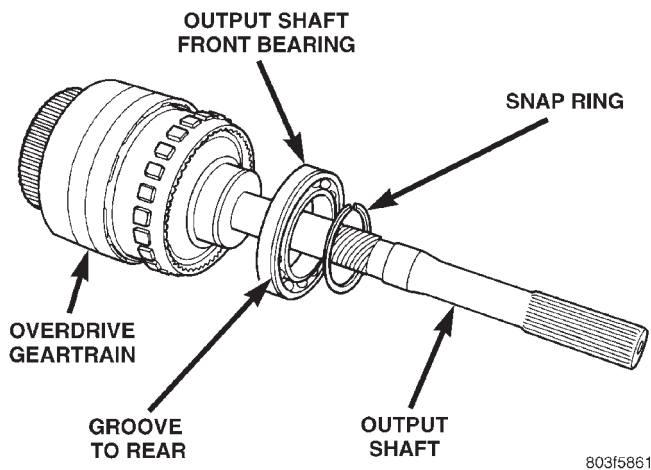
### OUTPUT SHAFT FRONT BEARING

#### REMOVAL

- (1) Remove overdrive unit from the vehicle.
- (2) Remove overdrive geartrain from housing.
- (3) Remove snap ring holding output shaft front bearing to overdrive geartrain. (Fig. 38).
- (4) Pull bearing from output shaft.

#### INSTALLATION

- (1) Place replacement bearing in position on geartrain with locating retainer groove toward the rear.
- (2) Push bearing onto shaft until the snap ring groove is visible.
- (3) Install snap ring to hold bearing onto output shaft (Fig. 38).
- (4) Install overdrive geartrain into housing.
- (5) Install overdrive unit in vehicle.



**Fig. 38 Output Shaft Front Bearing**

### DISASSEMBLY AND ASSEMBLY

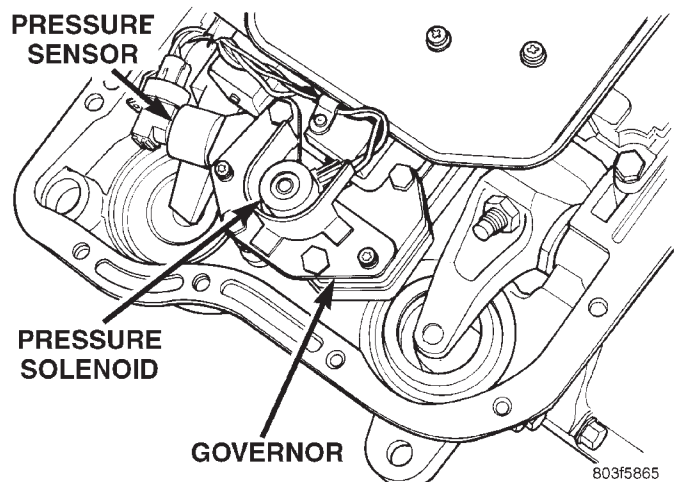
#### VALVE BODY

Remove the valve body from the transmission, refer to Removal and Installation procedures section in this group.

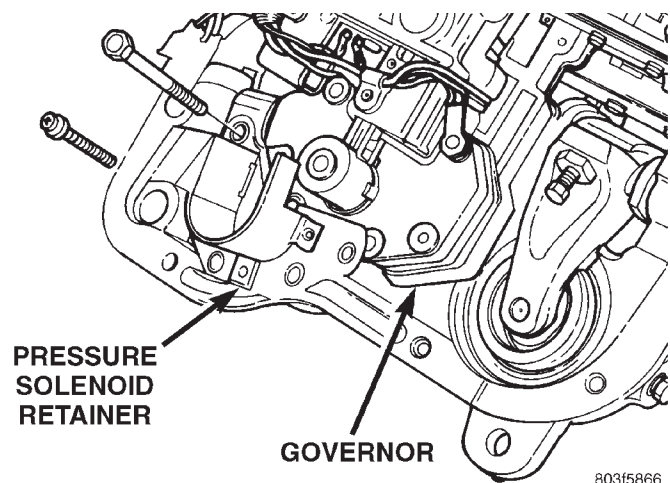
#### DISASSEMBLY

**CAUTION:** Do not clamp any valve body component in a vise. This practice can damage the component resulting in unsatisfactory operation after assembly and installation. Do not use pliers to remove any of the valves, plugs or springs and do not force any of the components out or into place. The valves and valve body housings will be damaged if force is used. Tag or mark the valve body springs for reference as they are removed. Do not allow them to become intermixed.

- (1) Remove fluid filter.
- (2) Disconnect wires from governor pressure sensor and solenoid (Fig. 39).
- (3) Remove screws attaching governor body and retainer plate to transfer plate (Fig. 40).
- (4) Remove retainer plate, governor body and gasket from transfer plate (Fig. 41).
- (5) Disconnect wires from governor pressure sensor, if not done previously.
- (6) Remove governor pressure sensor from governor body. Sensor is retained in body with M-shaped spring clip (Fig. 42). Remove clip with small pointed tool and slide sensor out of body.
- (7) Remove governor pressure solenoid by pulling it straight out of bore in governor body (Fig. 43). Remove and discard solenoid O-rings if worn, cut, or torn.



**Fig. 39 Governor Pressure Solenoid And Sensor Wire Locations**

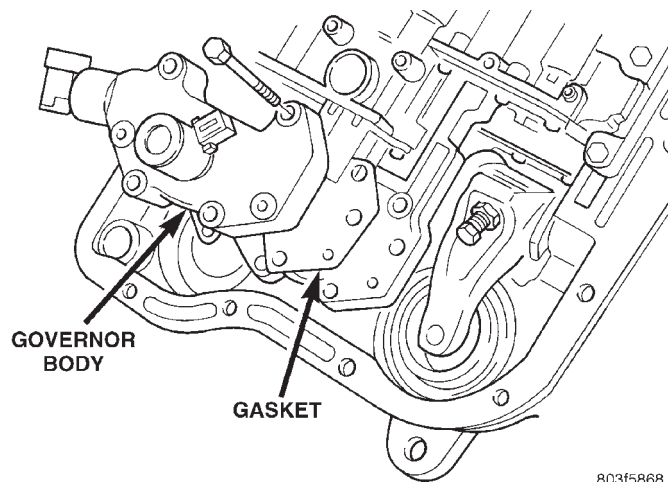
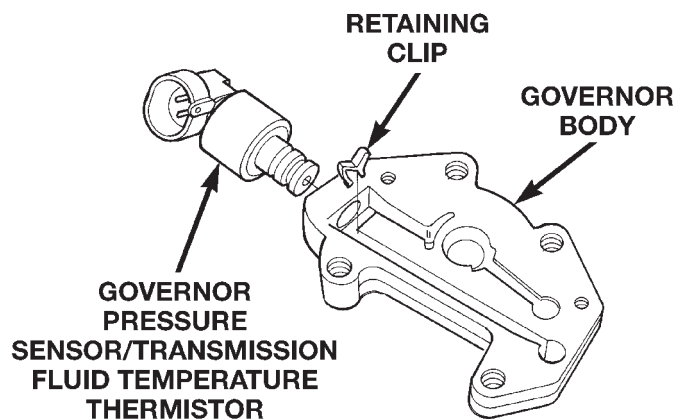
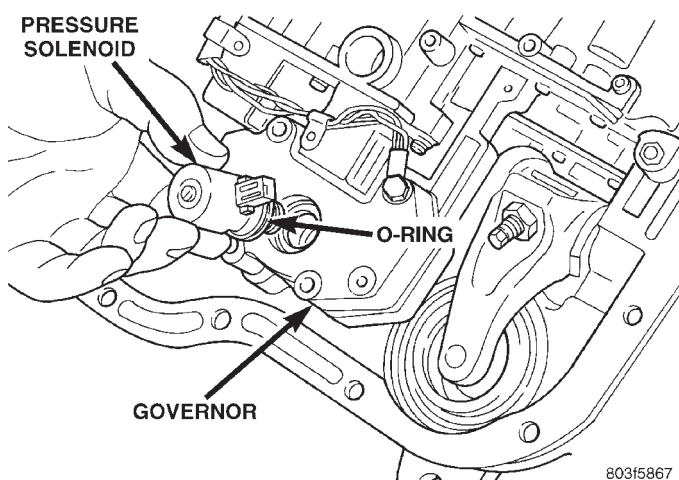


**Fig. 40 Governor Body And Retainer Plate Attaching Screw**

- (8) Remove transmission fluid filter.



## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 41 Governor Body And Gasket****Fig. 42 Governor Pressure Sensor****Fig. 43 Governor Pressure Solenoid**

(9) Remove small shoulder bolt that secures solenoid harness case connector to 3-4 accumulator housing

(Fig. 44). **Retain shoulder bolt. Either tape it to harness or thread it back into accumulator housing after connector removal.**

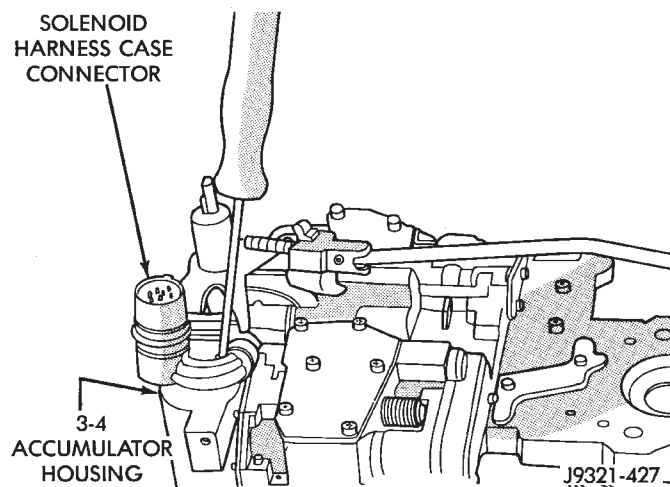
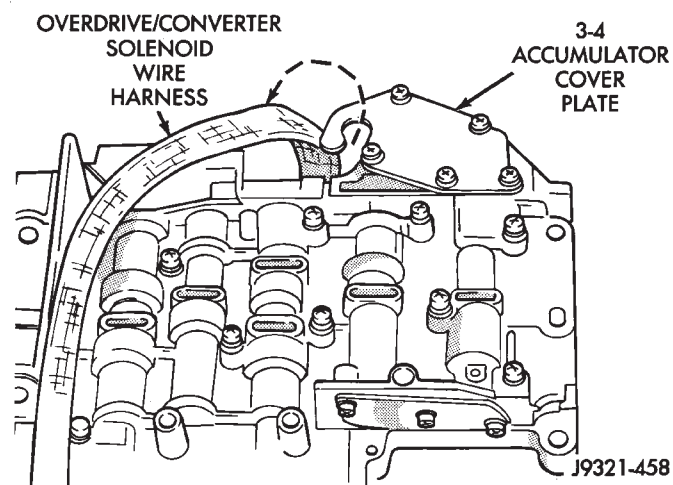
(10) Unhook overdrive/converter solenoid harness from 3-4 accumulator cover plate (Fig. 45).

(11) Turn valve body over and remove screws that attach overdrive/converter solenoid assembly to valve body (Fig. 46).

(12) Remove solenoid and harness assembly from valve body (Fig. 47).

(13) Remove boost valve cover (Fig. 48).

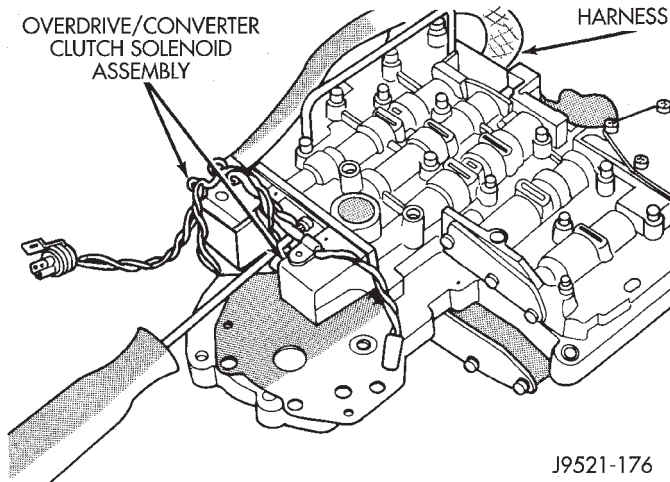
(14) Remove boost valve retainer, valve spring and boost valve (Fig. 49).

**Fig. 44 Solenoid Harness Case Connector Shoulder Bolt****Fig. 45 Unhooking Solenoid Harness From Accumulator Cover Plate**

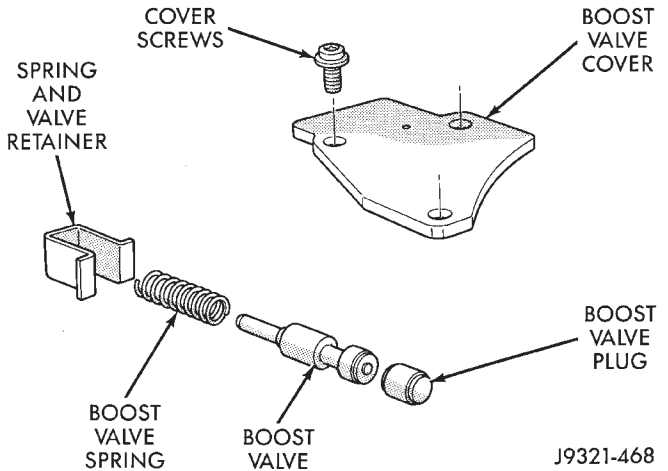
(15) Secure detent ball and spring with Retainer Tool 6583 (Fig. 50).



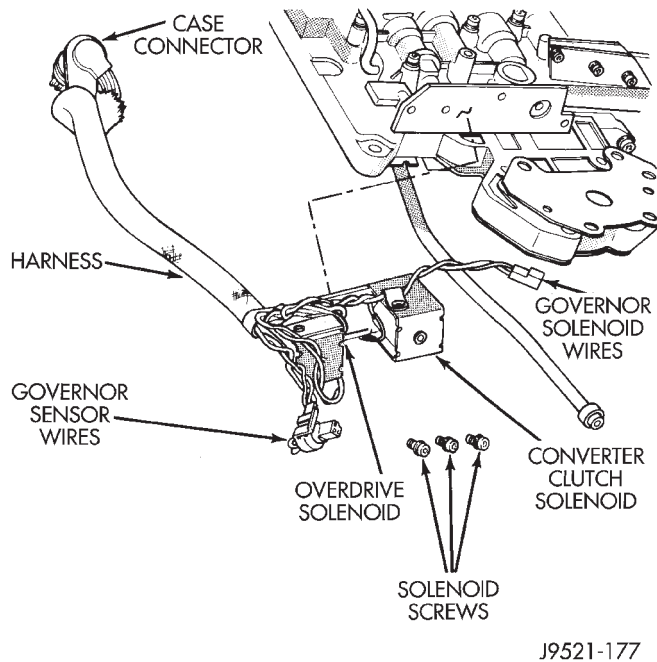
DISASSEMBLY AND ASSEMBLY (Continued)



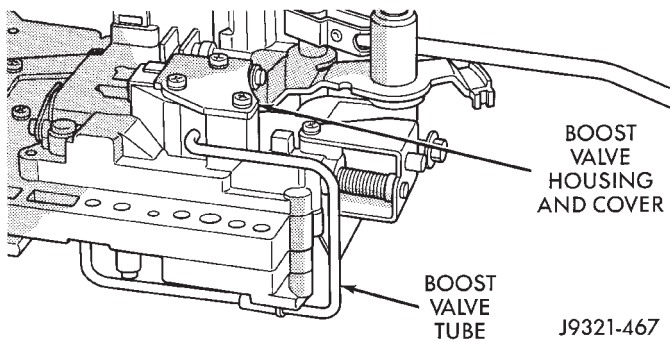
**Fig. 46 Solenoid Assembly Screws**



**Fig. 49 Boost Valve Components**



**Fig. 47 Solenoid Assembly**



**Fig. 48 Boost Valve Cover Location**

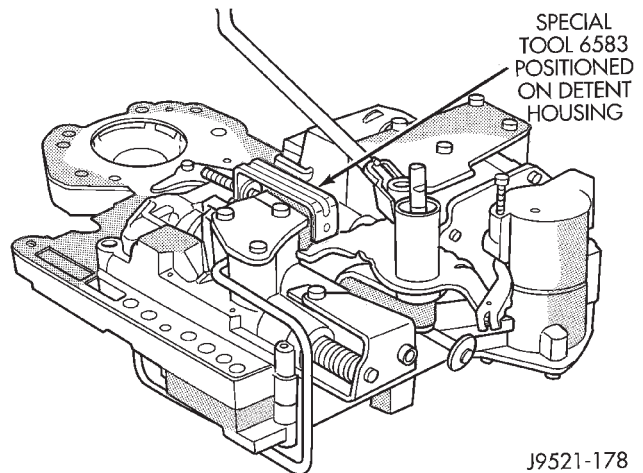
(16) Remove park rod E-clip and separate rod from manual lever (Fig. 51).

(17) Remove E-clip and washer that retains throttle lever shaft in manual lever (Fig. 52).

(18) Remove manual lever and throttle lever (Fig. 53). Rotate and lift manual lever off valve body and throttle lever shaft. Then slide throttle lever out of valve body.

(19) Position pencil magnet next to detent housing to catch detent ball and spring. Then carefully remove Retainer Tool 6583 and remove detent ball and spring (Fig. 54).

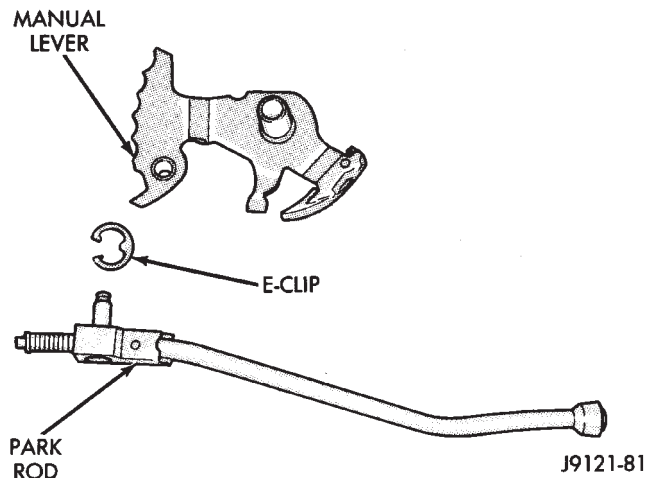
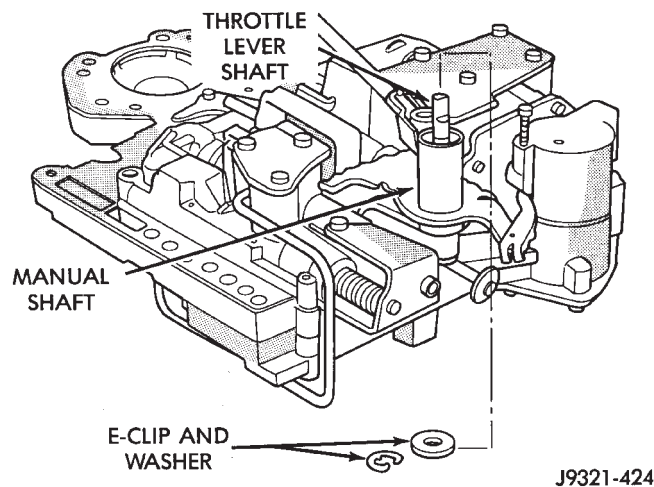
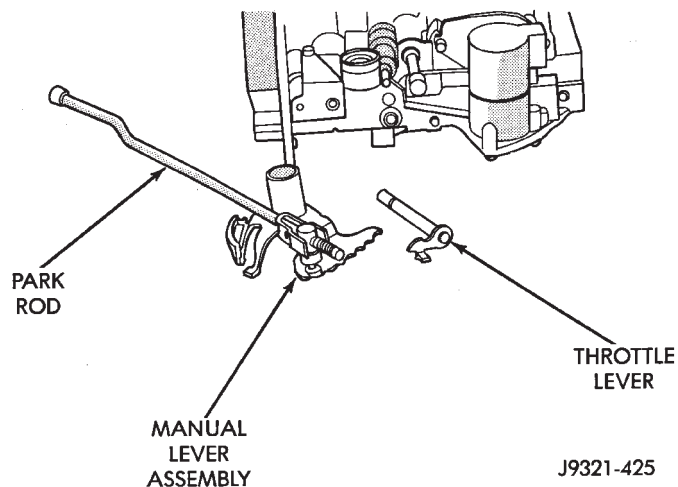
(20) Remove screws attaching pressure adjusting screw bracket to valve body and transfer plate (Fig. 55). Hold bracket firmly against spring tension while removing last screw.



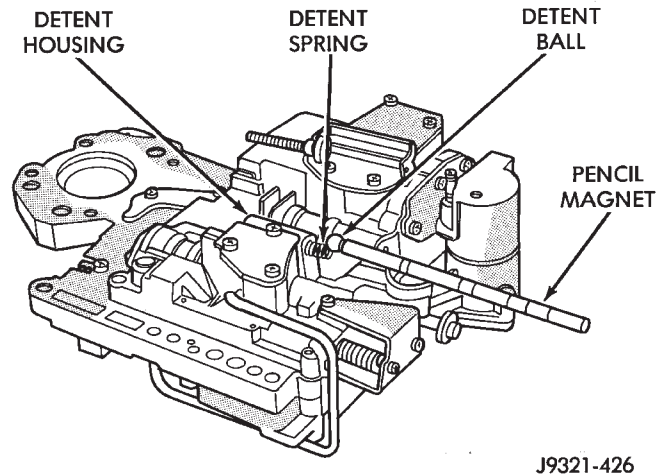
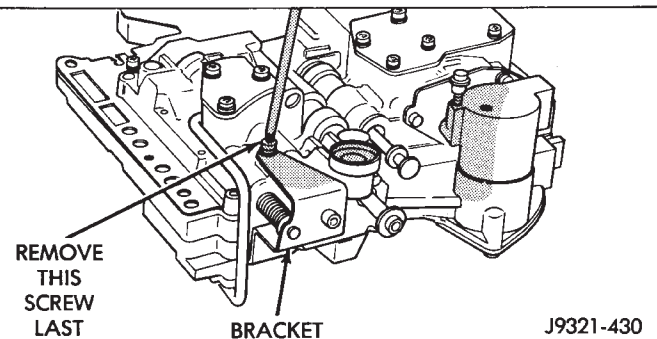
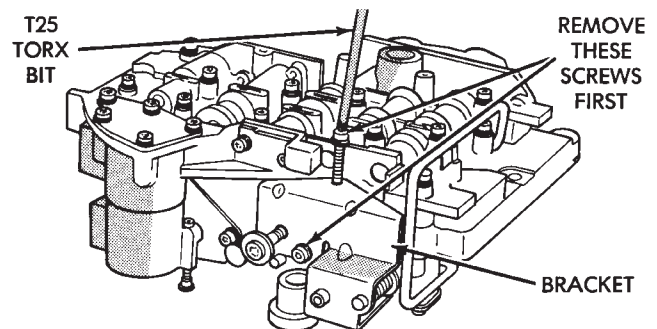
**Fig. 50 Detent Ball And Spring**

(21) Remove adjusting screw bracket, line pressure adjusting screw, pressure regulator valve spring and switch valve spring (Fig. 56). **Do not remove throttle pressure adjusting screw from bracket and do not disturb setting of either adjusting screw during removal.**

## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 51 Park Rod****Fig. 52 Throttle Lever E-Clip And Washer****Fig. 53 Manual And Throttle Lever**

(22) Turn upper housing over and remove switch valve, regulator valve and spring, and manual valve (Fig. 57).

**Fig. 54 Detent Ball And Spring****Fig. 55 Adjusting Screw Bracket Fastener**

(23) Remove kickdown detent, kickdown valve, and throttle valve and spring (Fig. 57).

(24) Loosen left-side 3-4 accumulator housing attaching screw about 2-3 threads. Then remove center and right-side housing attaching screws (Fig. 58).

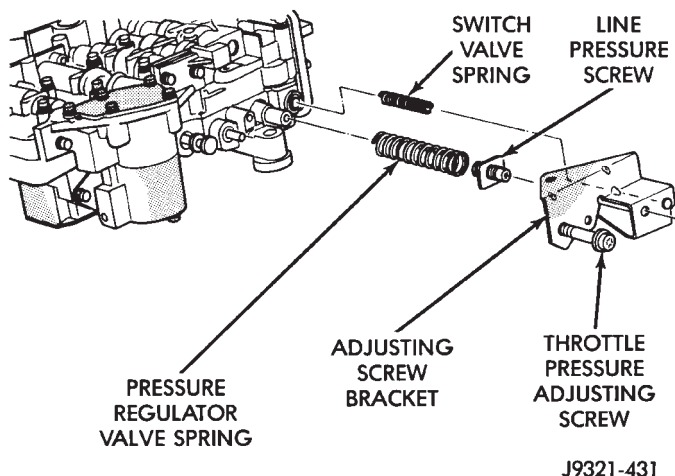
(25) Carefully rotate 3-4 accumulator housing upward and remove 3-4 shift valve spring and converter clutch valve plug and spring (Fig. 59).

(26) Remove left-side screw and remove 3-4 accumulator housing from valve body (Fig. 60).

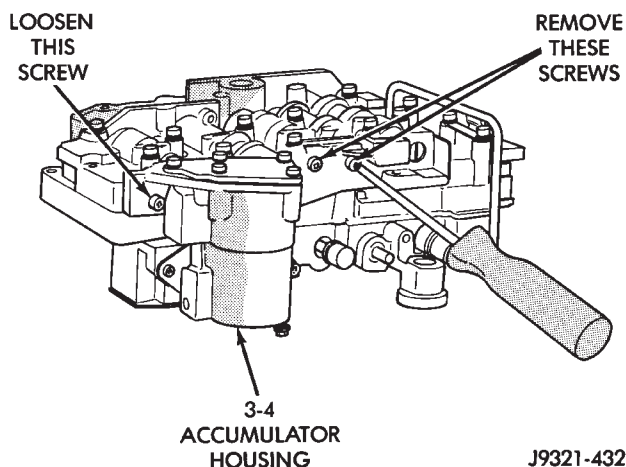
(27) Bend back tabs on boost valve tube brace (Fig. 61).

(28) Remove boost valve connecting tube (Fig. 62). Disengage tube from upper housing port first. Then

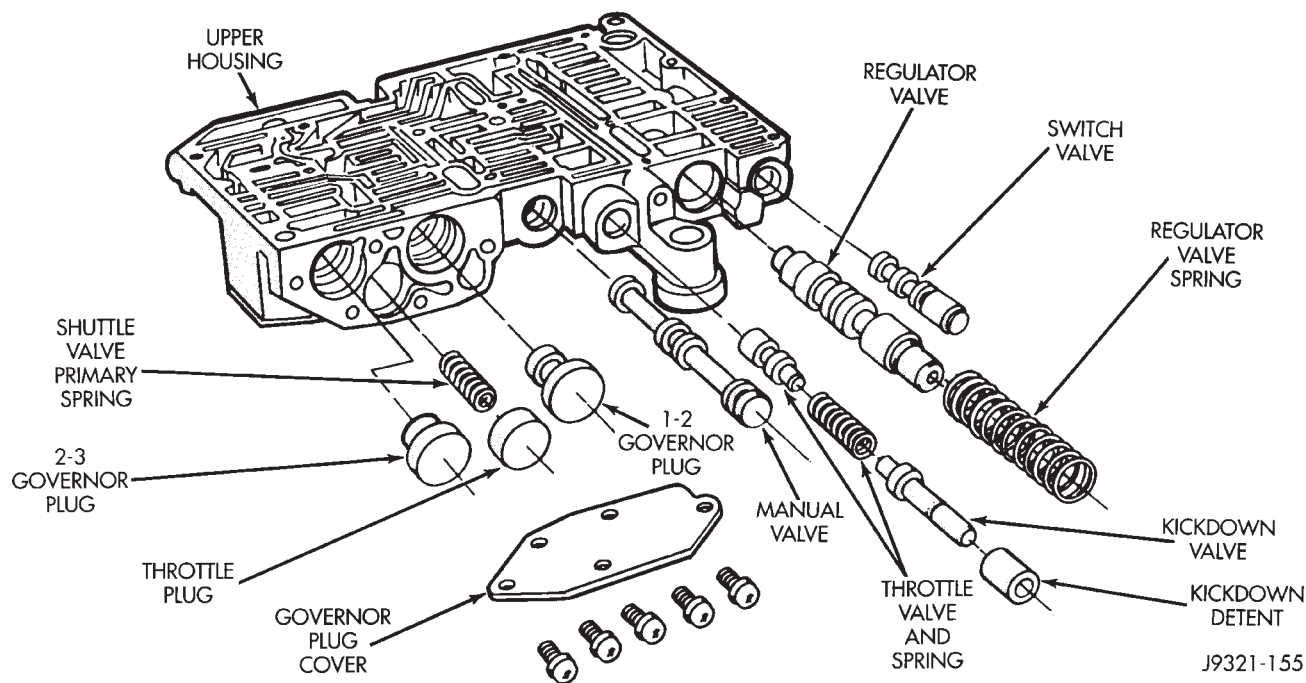
# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 56 Adjusting Screw Bracket And Spring**



**Fig. 58 Accumulator Housing Screw Locations**



**Fig. 57 Upper Housing Control Valve Locations**

rock opposite end of tube back and forth to work it out of lower housing.

**CAUTION:** Do not use tools to loosen or pry the connecting tube out of the valve body housings. Loosen and remove the tube by hand only.

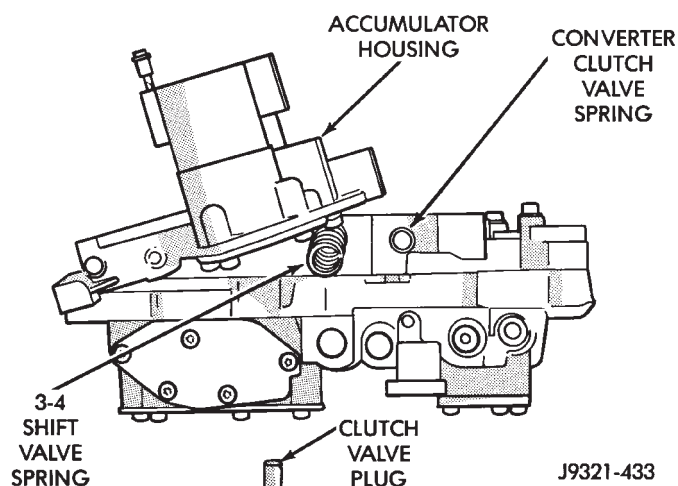
(29) Turn valve body over so lower housing is facing upward (Fig. 63). In this position, the two check

balls in upper housing will remain in place and not fall out when lower housing and separator plate are removed.

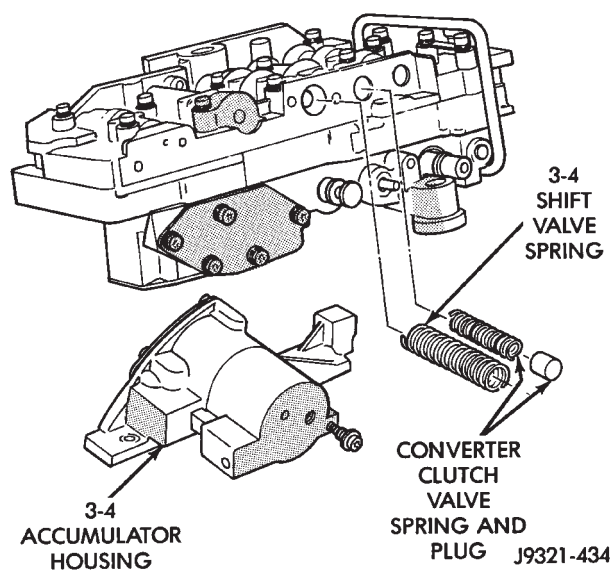
(30) Remove screws attaching valve body lower housing to upper housing and transfer plate (Fig. 63). **Note position of boost valve tube brace for assembly reference.**



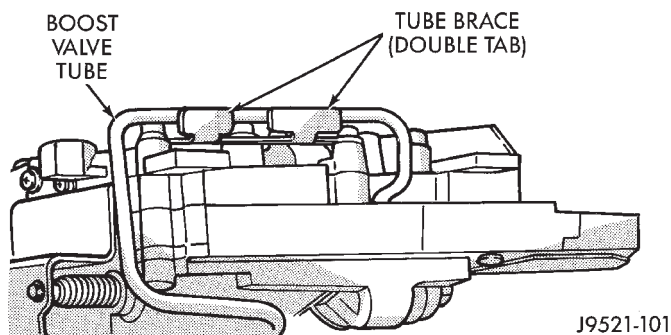
## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 59 3-4 Shift And Converter Clutch Valve Springs And Plug**



**Fig. 60 Accumulator Housing, Valve Springs And Plug**



**Fig. 61 Boost Valve Tube Brace**

(31) Remove lower housing and overdrive separator plate from transfer plate (Fig. 63).

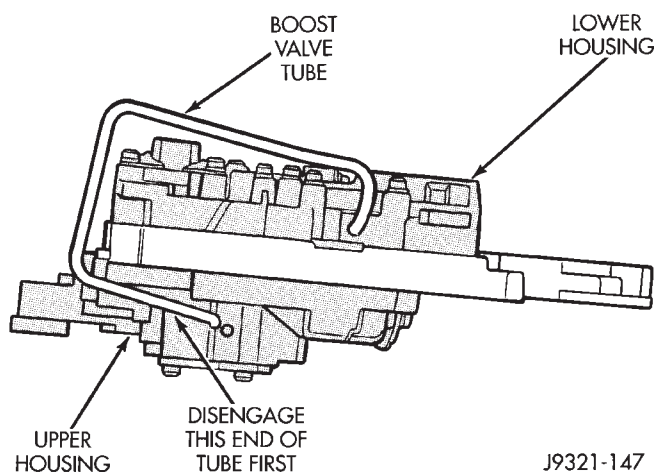
(32) Remove the ECE check ball from the transfer plate (Fig. 64). The ECE check ball is approximately 4.8 mm (3/16 in.) in diameter.

(33) Remove transfer plate from upper housing (Fig. 65).

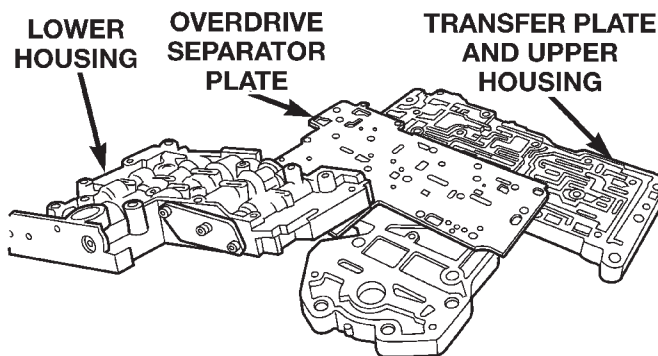
(34) Turn transfer plate over so upper housing separator plate is facing upward.

(35) Remove upper housing separator plate from transfer plate (Fig. 66). Note position of filter in separator plate for assembly reference.

(36) Remove rear clutch and rear servo check balls from transfer plate. Note check ball location for assembly reference (Fig. 67).



**Fig. 62 Boost Valve Tube**



**Fig. 63 Lower Housing**

## VALVE BODY UPPER HOUSING

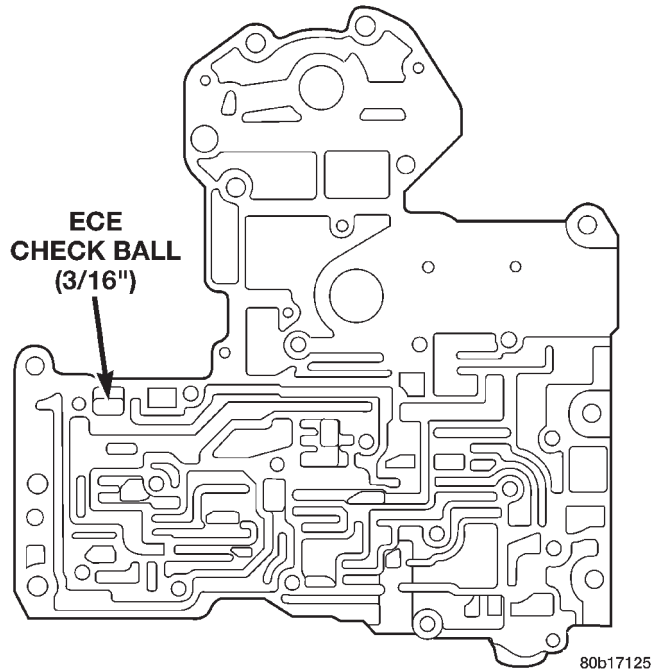
(1) Note location of check balls in valve body upper housing (Fig. 68). Then remove the one large diameter and the six smaller diameter check balls.

(2) Remove governor plug and shuttle valve covers (Fig. 70).

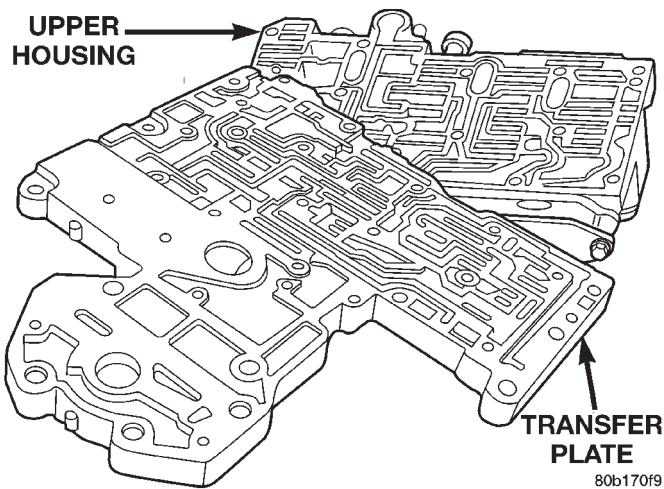
(3) Remove E-clip that secures shuttle valve secondary spring on valve stem (Fig. 69).



DISASSEMBLY AND ASSEMBLY (Continued)

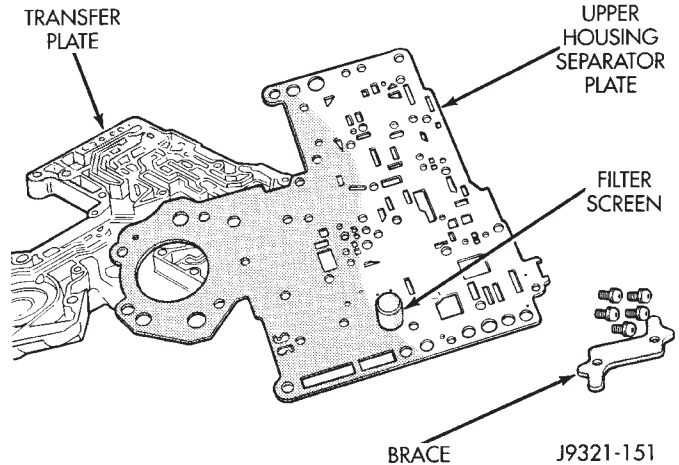


**Fig. 64 ECE Check Ball**

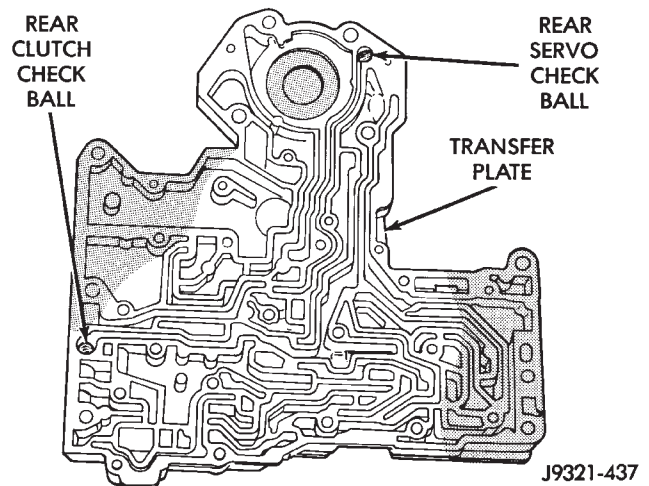


**Fig. 65 Transfer Plate**

- (4) Remove throttle plug, primary spring, shuttle valve, secondary spring, and spring guides (Fig. 70).
- (5) Remove boost valve retainer, spring and valve if not previously removed.
- (6) Remove throttle plug and 1-2 and 2-3 governor plugs (Fig. 57).
- (7) Turn upper housing around and remove limit valve and shift valve covers (Fig. 71).



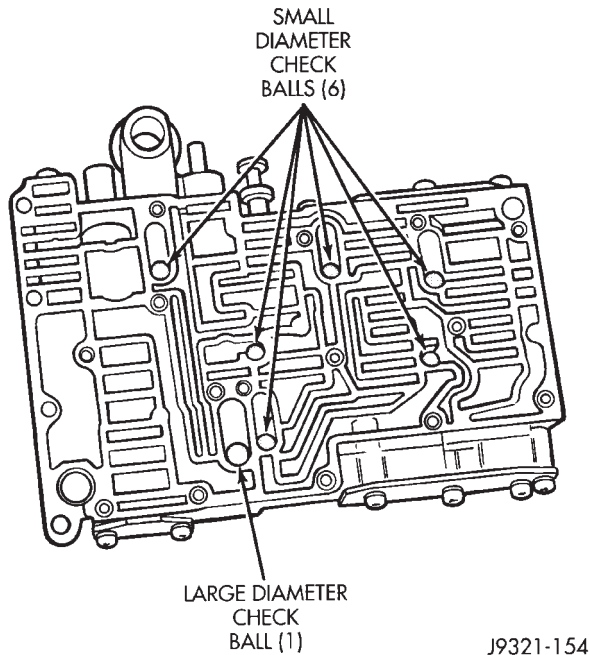
**Fig. 66 Upper Housing Separator Plate**



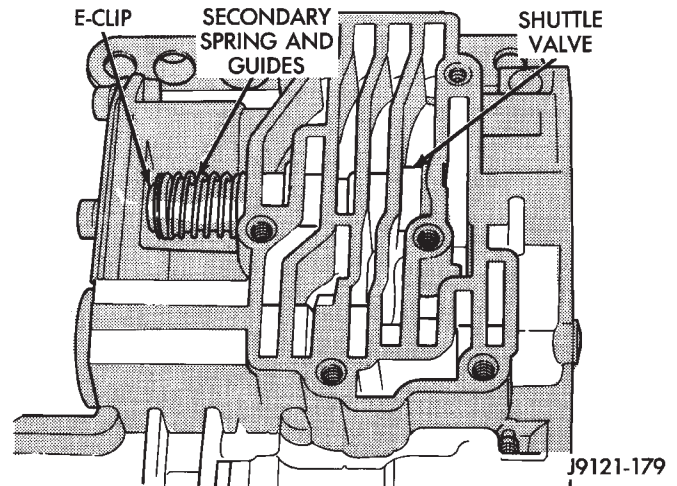
**Fig. 67 Rear Clutch And Rear Servo Check Ball Locations**

- (8) Remove limit valve housing. Then remove retainer, spring, limit valve, and 2-3 throttle plug from limit valve housing (Fig. 71).
- (9) Remove 1-2 shift control valve and spring (Fig. 71).
- (10) Remove 1-2 shift valve and spring (Fig. 71).
- (11) Remove 2-3 shift valve and spring from valve body (Fig. 71).
- (12) Remove pressure plug cover (Fig. 71).
- (13) Remove line pressure plug, sleeve, throttle pressure plug and spring (Fig. 71).

## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 68 Check Ball Locations In Upper Housing****VALVE BODY LOWER HOUSING**

- (1) Remove timing valve cover.
- (2) Remove 3-4 timing valve and spring.
- (3) Remove 3-4 quick fill valve, spring and plug.
- (4) Remove 3-4 shift valve and spring.

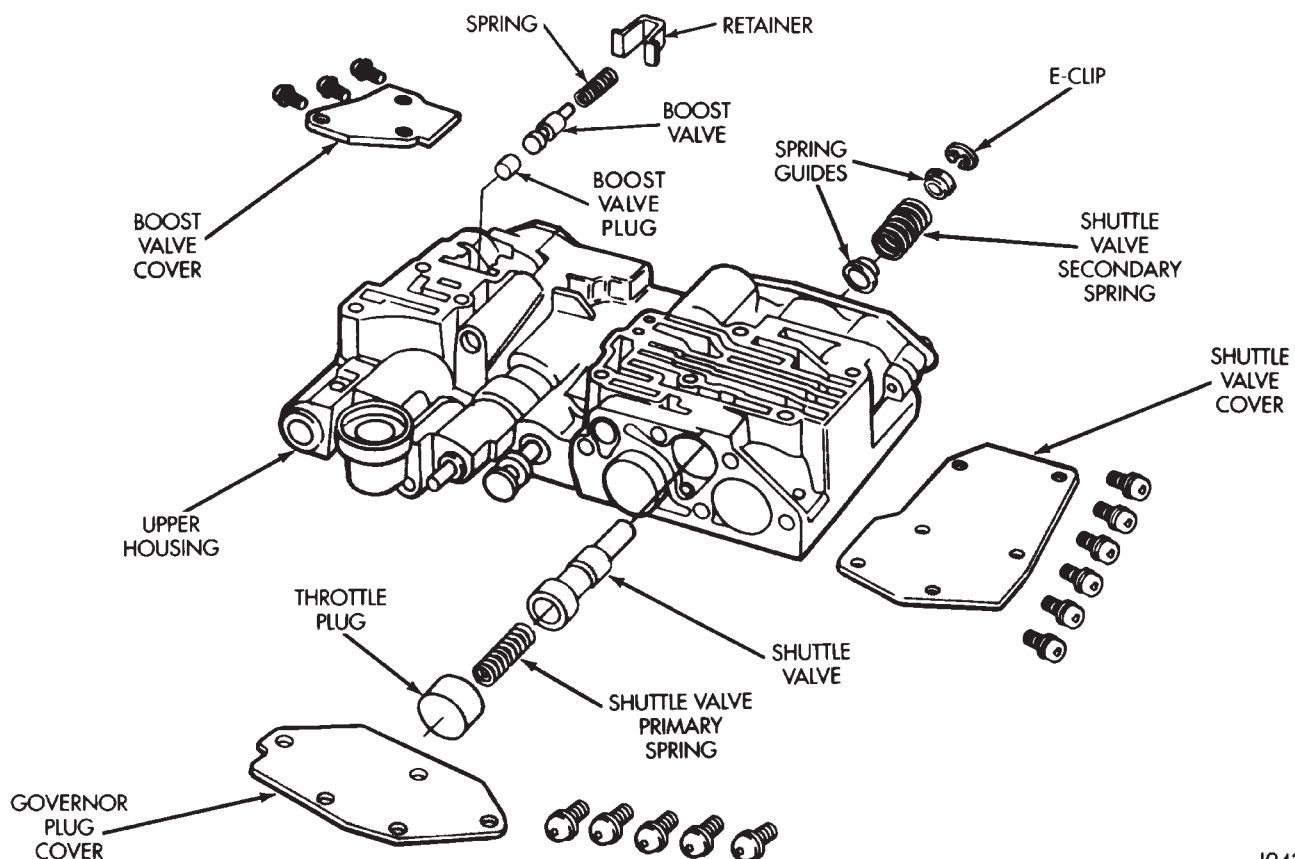
**Fig. 69 Shuttle Valve E-Clip And Secondary Spring Location**

(5) Remove converter clutch valve, spring and plug (Fig. 72).

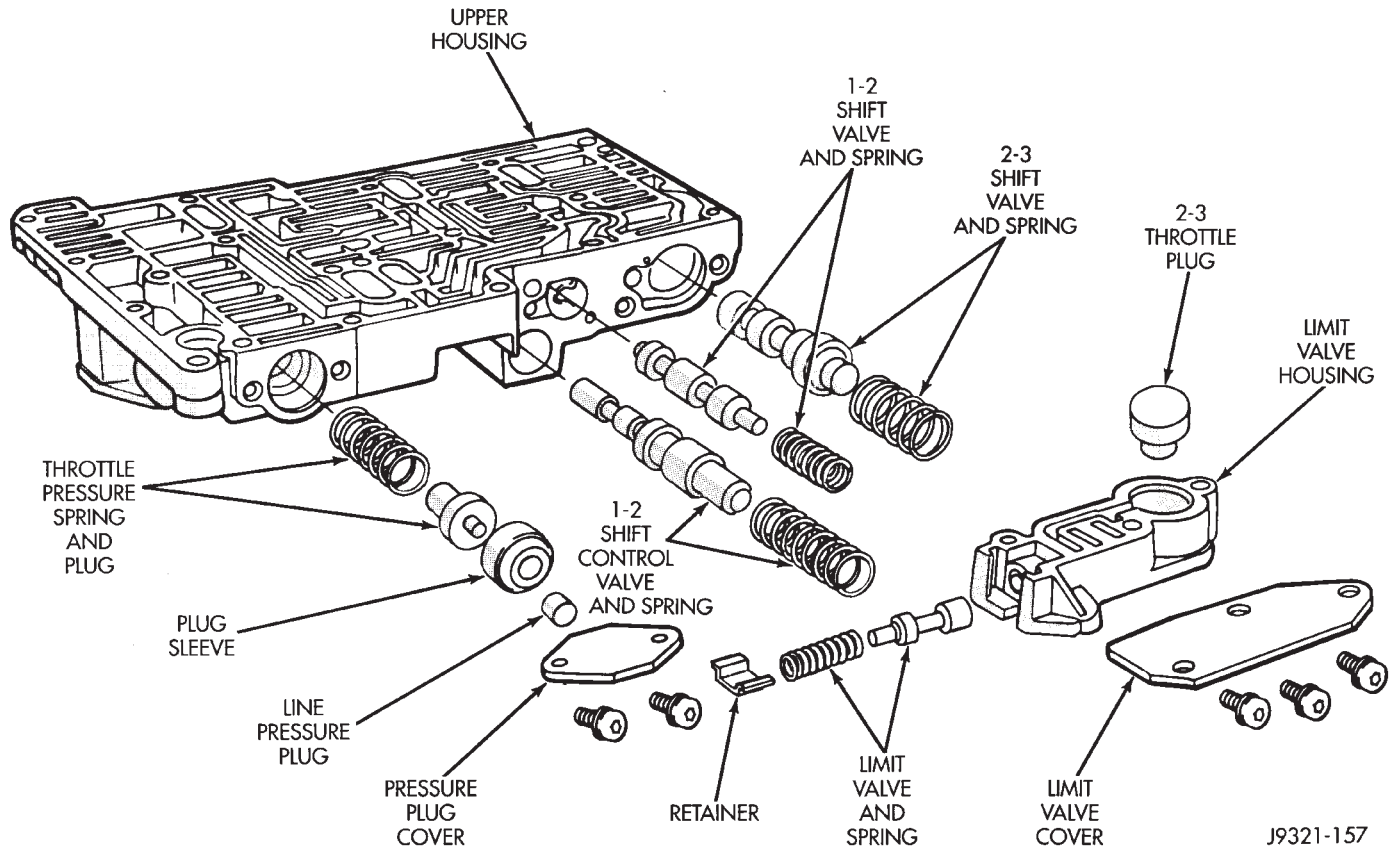
(6) Remove converter clutch timing valve, retainer and valve spring.

**3-4 ACCUMULATOR HOUSING**

- (1) Remove end plate from housing.
- (2) Remove piston spring.
- (3) Remove piston. Remove and discard piston seals (Fig. 73).

**Fig. 70 Shuttle And Boost Valve Components**

# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 71 Upper Housing Shift Valve And Pressure Plug Locations**

## ASSEMBLY

**CAUTION:** Do not force valves or plugs into place during reassembly. If the valve body bores, valves and plugs are free of distortion or burrs, the valve body components should all slide into place easily. In addition, do not overtighten the transfer plate and valve body screws during reassembly. Overtightening can distort the housings resulting in valve sticking, cross leakage and unsatisfactory operation. Tighten valve body screws to recommended torque only.

## LOWER HOUSING

- (1) Lubricate valves, springs, and the housing valve and plug bores with clean transmission fluid (Fig. 72).
- (2) Install 3-4 timing valve spring and valve in lower housing.
- (3) Install 3-4 quick fill valve in lower housing.
- (4) Install 3-4 quick fill valve spring and plug in housing.

- (5) Install timing valve end plate. Tighten end plate screws to 4 N·m (35 in. lbs.) torque.

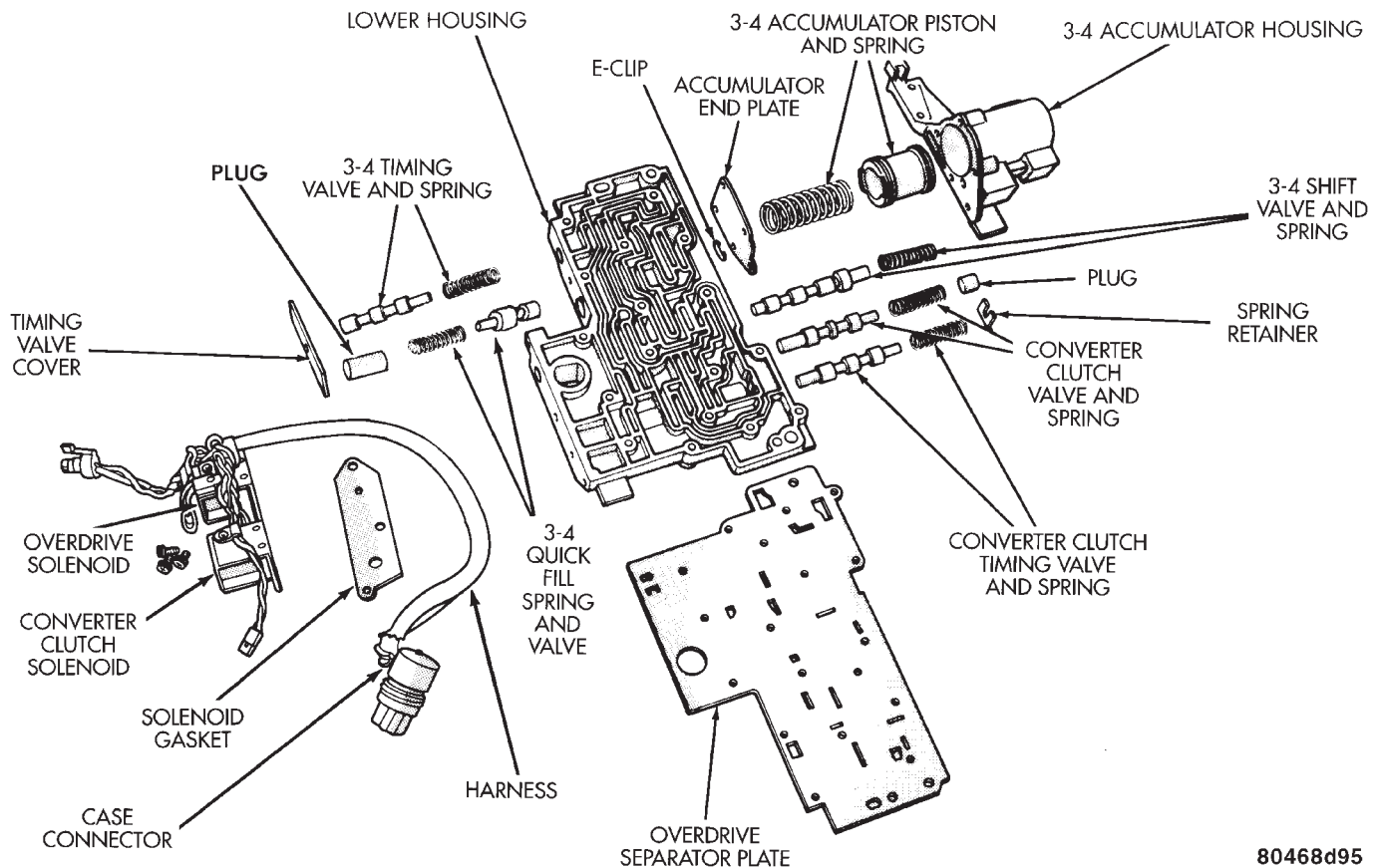
## 3-4 ACCUMULATOR

- (1) Lubricate accumulator piston, seals and housing piston bore with clean transmission fluid (Fig. 73).
- (2) Install new seal rings on accumulator piston.
- (3) Install piston and spring in housing.
- (4) Install end plate on housing.

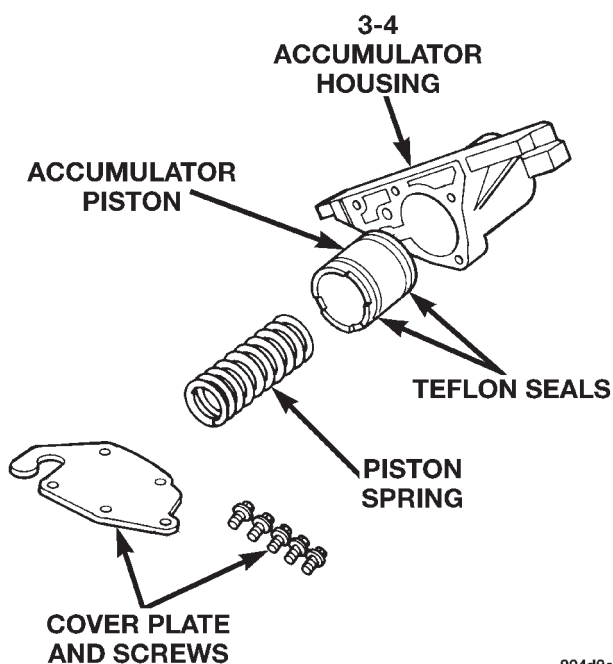
## TRANSFER PLATE

- (1) Install rear clutch and rear servo check balls in transfer plate (Fig. 74).
- (2) Install filter screen in upper housing separator plate (Fig. 75).
- (3) Align and position upper housing separator plate on transfer plate (Fig. 76).
- (4) Install brace plate (Fig. 76). Tighten brace attaching screws to 4 N·m (35 in. lbs.) torque.
- (5) Install remaining separator plate attaching screws. Tighten screws to 4 N·m (35 in. lbs.) torque.

## DISASSEMBLY AND ASSEMBLY (Continued)



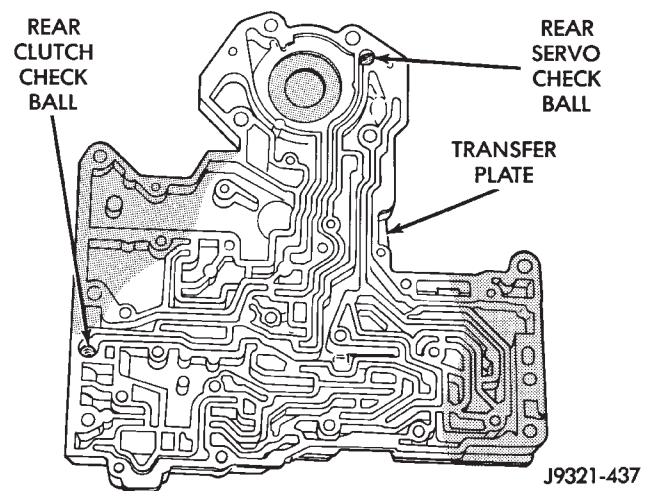
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**Fig. 72 Lower Housing Shift Valves And Springs**

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**Fig. 73 Accumulator Housing Components****UPPER AND LOWER HOUSING**

(1) Position upper housing so internal passages and check ball seats are facing upward. Then install check balls in housing (Fig. 77). Eight check balls are used. The single large check ball is approximately 8.7



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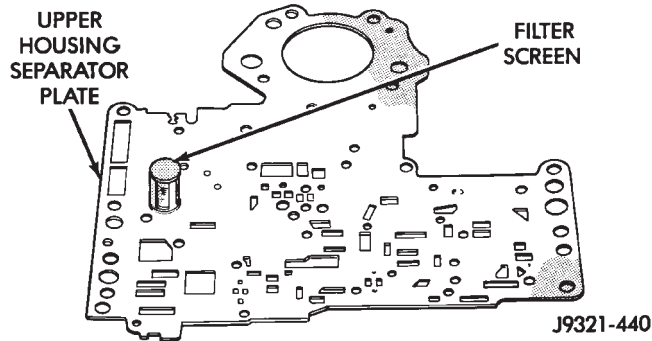
**Fig. 74 Rear Clutch And Rear Servo Check Ball Locations**

mm (11/32 in.) diameter. The single small check ball is approximately 4.8 mm (3/16 in.) in diameter. The remaining 6 check balls are approximately 6.3 mm (1/4 in.) in diameter.

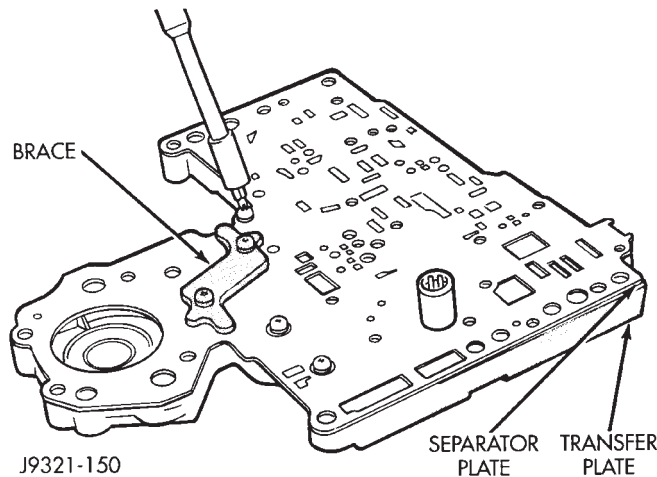
(2) Position assembled transfer plate and upper housing separator plate on upper housing (Fig. 78). Be sure filter screen is seated in proper housing recess.



# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 75 Separator Plate Filter Screen Installation**



**Fig. 76 Brace Plate**

(3) Install the ECE check ball into the transfer plate (Fig. 64). The ECE check ball is approximately 4.8 mm (3/16 in.) in diameter.

(4) Position lower housing separator plate on transfer plate (Fig. 79).

(5) Install lower housing on assembled transfer plate and upper housing (Fig. 80).

(6) Install and start all valve body screws by hand except for the screws to hold the boost valve tube brace. Save those screws for later installation. Then tighten screws evenly to 4 N·m (35 in. lbs.) torque. Start at center and work out to sides when tightening screws (Fig. 80).

## UPPER HOUSING VALVE AND PLUG

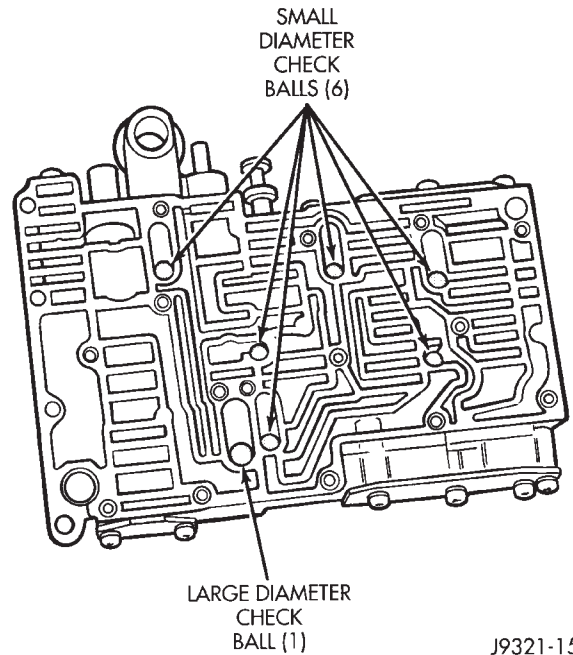
Refer to (Fig. 81), (Fig. 82) and (Fig. 83) to perform the following steps.

(1) Lubricate valves, plugs, springs with clean transmission fluid.

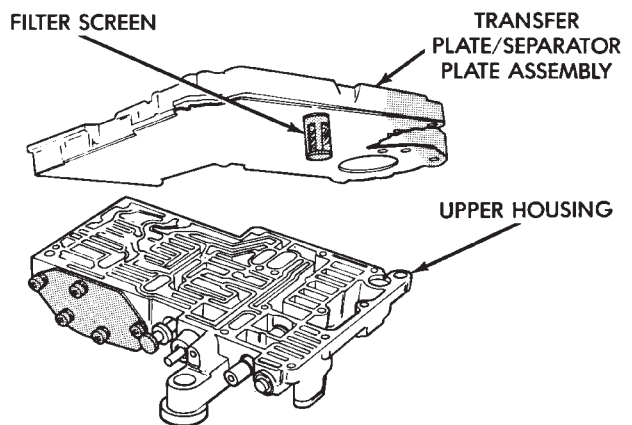
(2) Assemble regulator valve line pressure plug, sleeve, throttle plug and spring. Insert assembly in upper housing and install cover plate. Tighten cover plate screws to 4 N·m (35 in. lbs.) torque.

(3) Install 1-2 and 2-3 shift valves and springs.

(4) Install 1-2 shift control valve and spring.



**Fig. 77 Check Ball Locations In Upper Housing**



**Fig. 78 Installing Transfer Plate On Upper Housing**

(5) Install retainer, spring, limit valve, and 2-3 throttle plug from limit valve housing.

(6) Install limit valve housing and cover plate. Tighten screws to 4 N·m (35 in. lbs.).

(7) Install shuttle valve as follows:

(a) Insert plastic guides in shuttle valve secondary spring and install spring on end of valve.

(b) Install shuttle valve into housing.

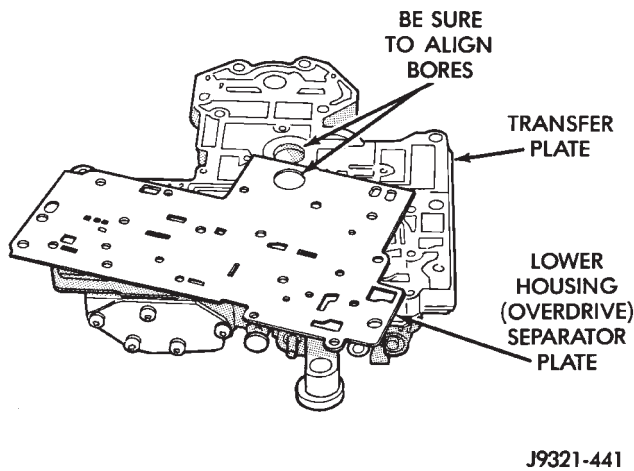
(c) Hold shuttle valve in place.

(d) Compress secondary spring and install E-clip in groove at end of shuttle valve.

(e) Verify that spring and E-clip are properly seated before proceeding.

(8) Install shuttle valve cover plate. Tighten cover plate screws to 4 N·m (35 in. lbs.) torque.

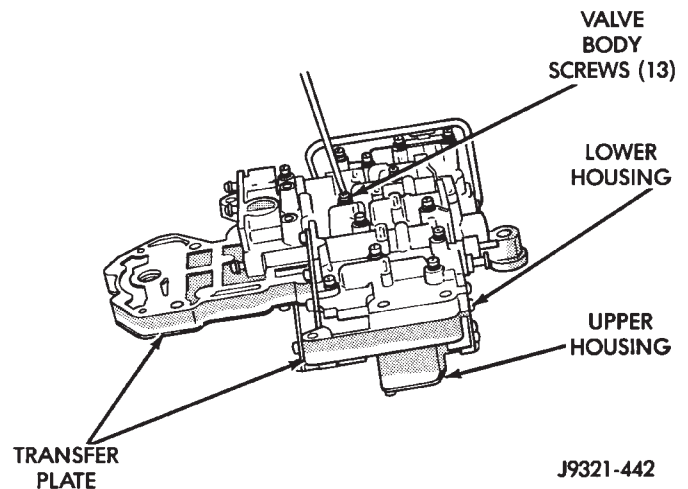
## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 79 Lower Housing Separator Plate**

(9) Install 1-2 and 2-3 valve governor plugs in valve body.

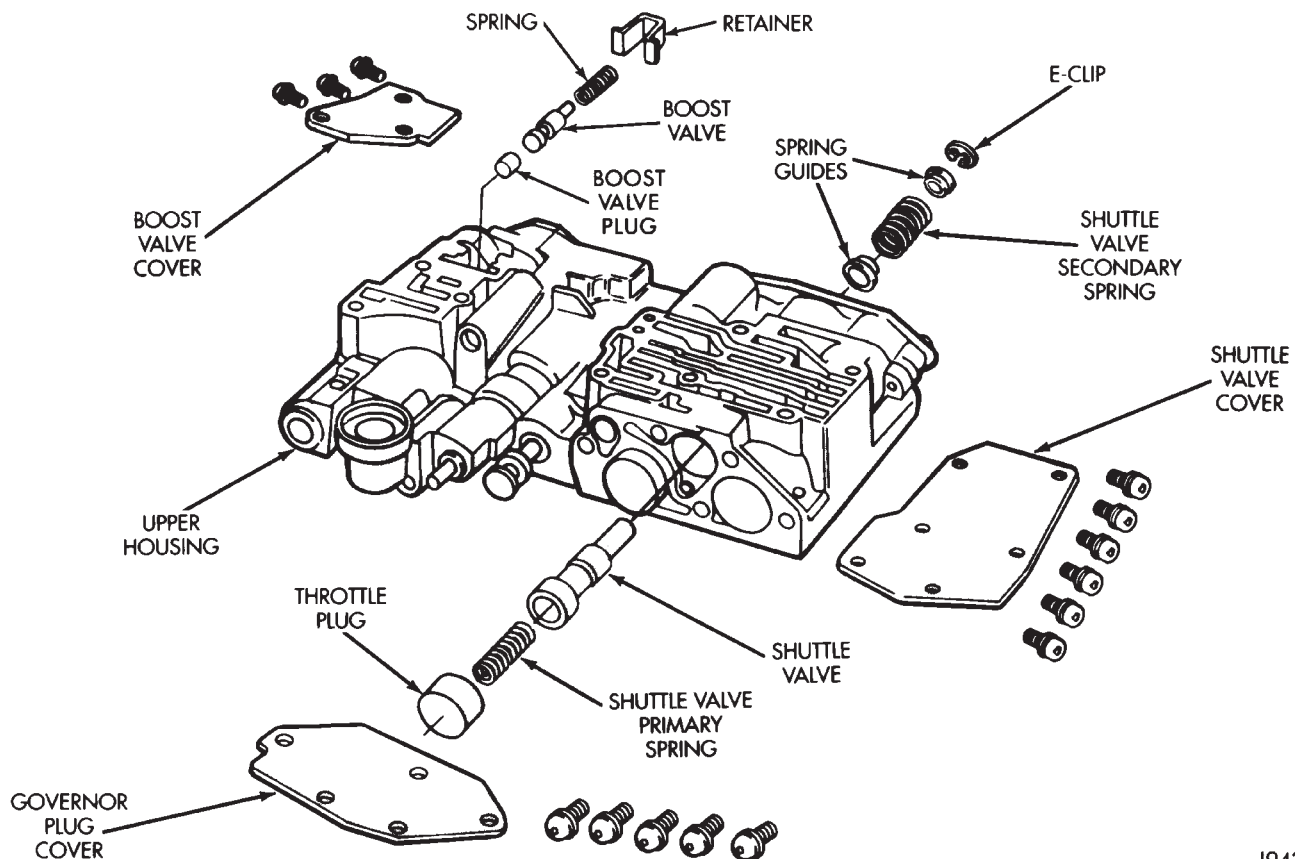
(10) Install shuttle valve primary spring and throttle plug.

(11) Align and install governor plug cover. Tighten cover screws to 4 N·m (35 in. lbs.) torque.

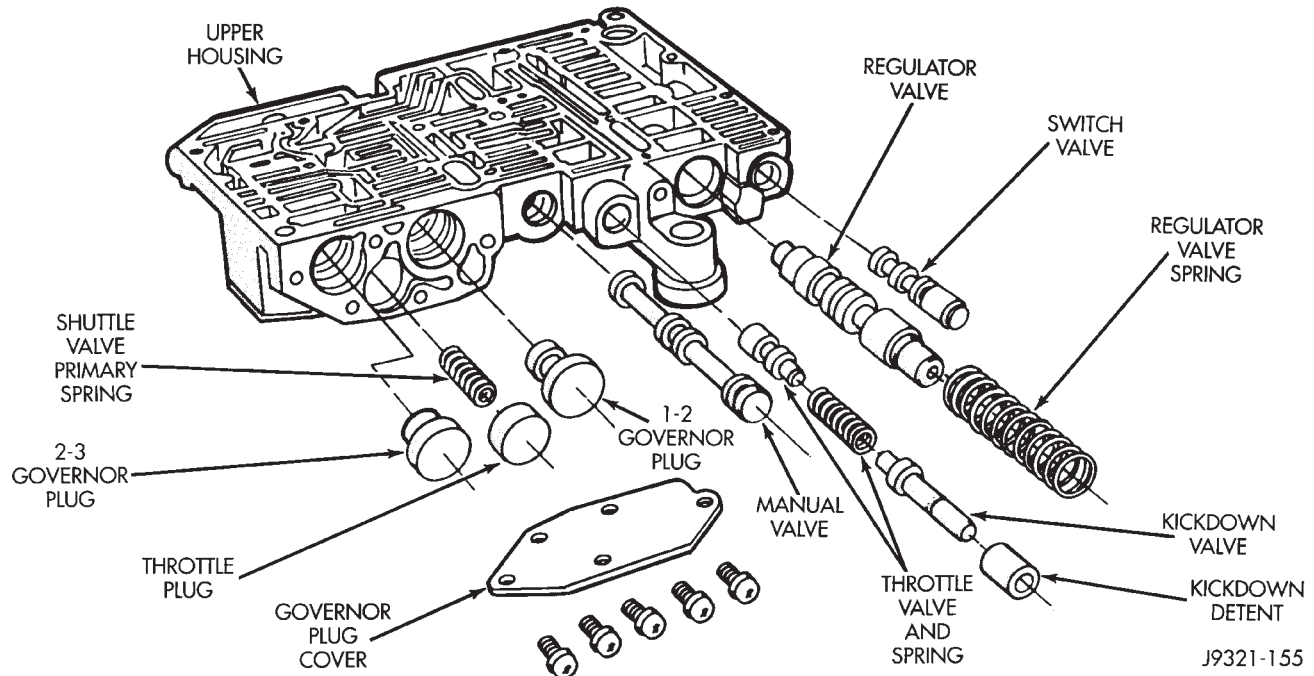
**Fig. 80 Installing Lower Housing On Transfer Plate And Upper Housing****BOOST VALVE TUBE AND BRACE**

(1) Position valve body assembly so lower housing is facing upward (Fig. 84).

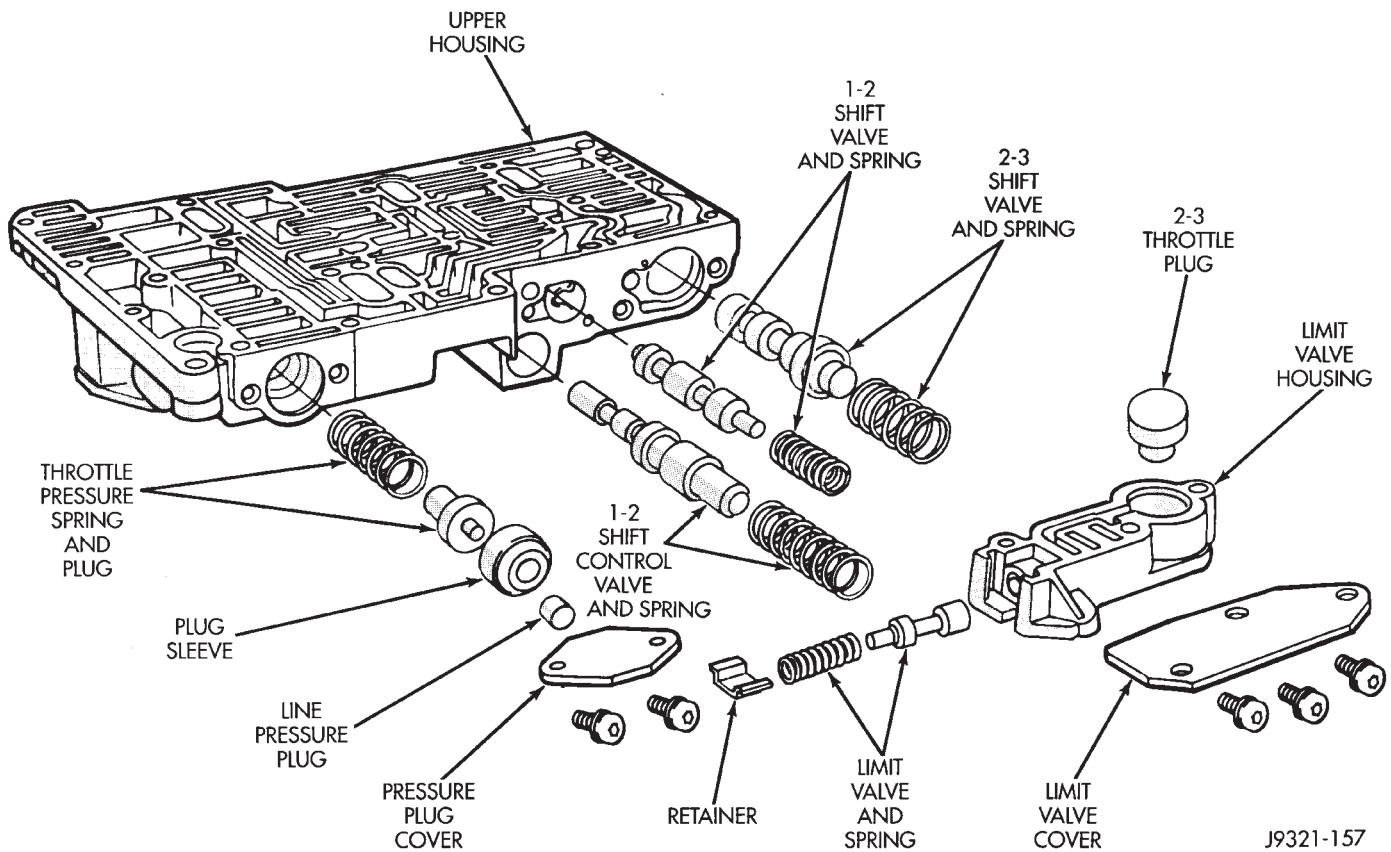
(2) Lubricate tube ends and housing ports with transmission fluid or petroleum jelly.

**Fig. 81 Shuttle And Boost Valve Components**

DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 82 Upper Housing Control Valve Locations**



**Fig. 83 Upper Housing Shift Valve And Pressure Plug Locations**

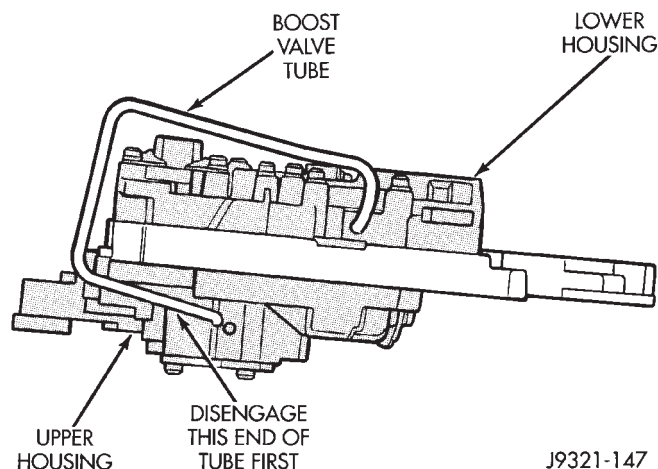
- (3) Start tube in lower housing port first. Then swing tube downward and work opposite end of tube into upper housing port (Fig. 84).
- (4) Insert and seat each end of tube in housings.

- (5) Slide tube brace under tube and into alignment with valve body screw holes (Fig. 85).
- (6) Install and finger tighten three screws that secure tube brace to valve body housings (Fig. 85).

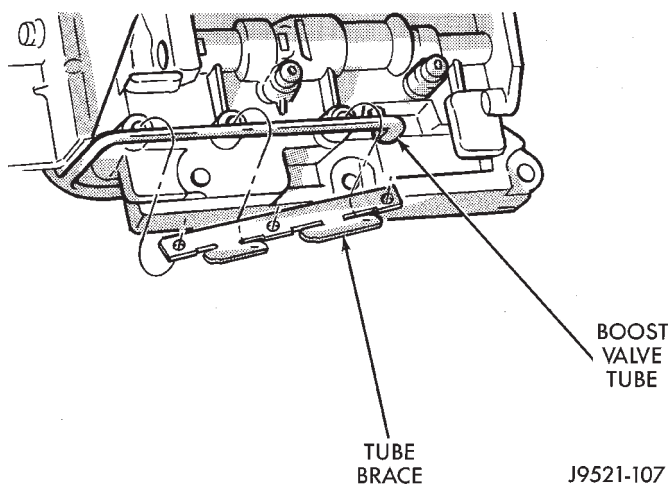
## DISASSEMBLY AND ASSEMBLY (Continued)

(7) Bend tube brace tabs up and against tube to hold it in position (Fig. 86).

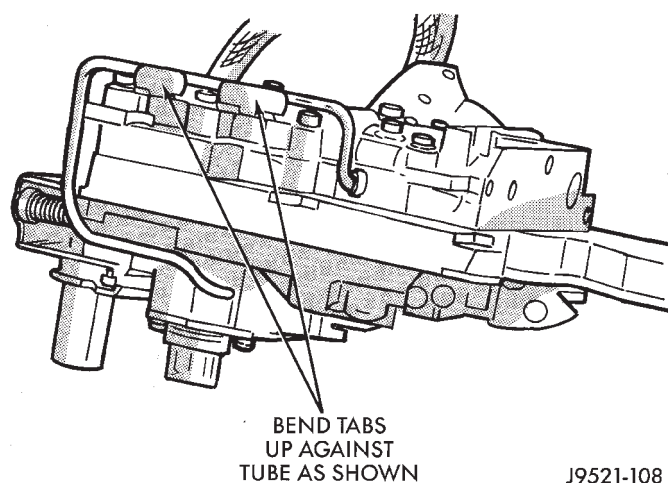
(8) Tighten all valve body housing screws to 4 N·m (35 in. lbs.) torque after tube and brace are installed. Tighten screws in diagonal pattern starting at center and working outward.



**Fig. 84 Boost Valve Tube**



**Fig. 85 Boost Valve Tube And Brace**



**Fig. 86 Securing Boost Valve Tube With Brace Tabs**

## 3-4 ACCUMULATOR

(1) Position converter clutch valve and 3-4 shift valve springs in housing (Fig. 87).

(2) Loosely attach accumulator housing with right-side screw (Fig. 87). Install only one screw at this time as accumulator must be free to pivot upward for ease of installation.

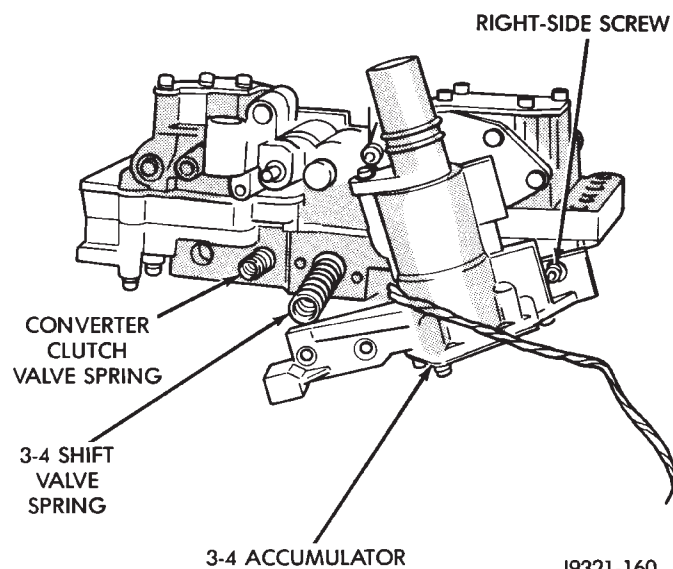
(3) Install 3-4 shift valve and spring.

(4) Install converter clutch timing valve and spring.

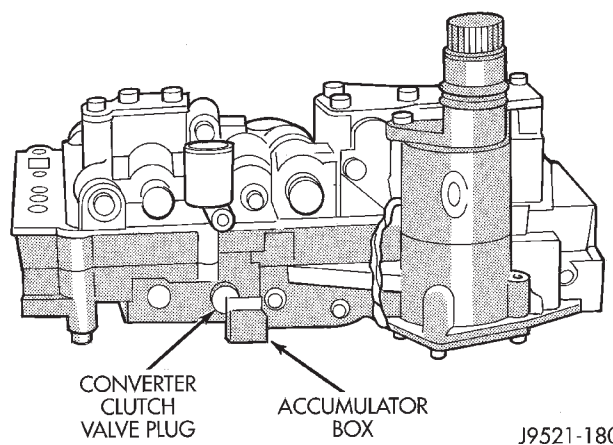
(5) Position plug on end of converter clutch valve spring. Then compress and hold springs and plug in place with fingers of one hand.

(6) Swing accumulator housing upward over valve springs and plug.

(7) Hold accumulator housing firmly in place and install remaining two attaching screws. Be sure springs and clutch valve plug are properly seated (Fig. 88). Tighten screws to 4 N·m (35 in. lbs.).



**Fig. 87 Converter Clutch And 3-4 Shift Valve Springs**



**Fig. 88 Seating 3-4 Accumulator On Lower Housing**



## DISASSEMBLY AND ASSEMBLY (Continued)

## VALVE BODY FINAL

(1) Install boost valve, valve spring, retainer and cover plate. Tighten cover plate screws to 4 N·m (35 in. lbs.) torque.

(2) Insert manual lever detent spring in upper housing.

(3) Position detent ball on end of spring. Then hold detent ball and spring in detent housing with Retainer Tool 6583 (Fig. 89).

(4) Install throttle lever in upper housing. Then install manual lever over throttle lever and start manual lever into housing.

(5) Align manual lever with detent ball and manual valve. Hold throttle lever upward. Then press down on manual lever until fully seated. Remove detent ball retainer tool after lever is seated.

(6) Then install manual lever seal, washer and E-clip.

(7) Verify that throttle lever is aligned with end of kickdown valve stem and that manual lever arm is engaged in manual valve (Fig. 90).

(8) Position line pressure adjusting screw in adjusting screw bracket.

(9) Install spring on end of line pressure regulator valve.

(10) Install switch valve spring on tang at end of adjusting screw bracket.

(11) Install manual valve.

(12) Install throttle valve and spring.

(13) Install kickdown valve and detent.

(14) Install pressure regulator valve.

(15) Install switch valve.

(16) Position adjusting screw bracket on valve body. Align valve springs and press bracket into place. Install short, upper bracket screws first and long bottom screw last. Verify that valve springs and bracket are properly aligned. Then tighten all three bracket screws to 4 N·m (35 in. lbs.) torque.

(17) Lubricate solenoid case connector O-rings and shaft of manual lever with light coat of petroleum jelly.

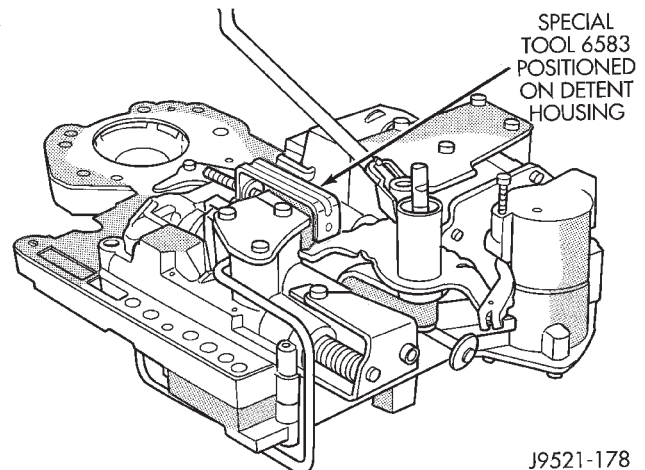
(18) Obtain new fluid filter for valve body but do not install filter at this time.

(19) If line pressure and/or throttle pressure adjustment screw settings were not disturbed, continue with overhaul or reassembly. However, if adjustment screw settings **were** moved or changed, readjust as described in Valve Body Control Pressure Adjustment procedure.

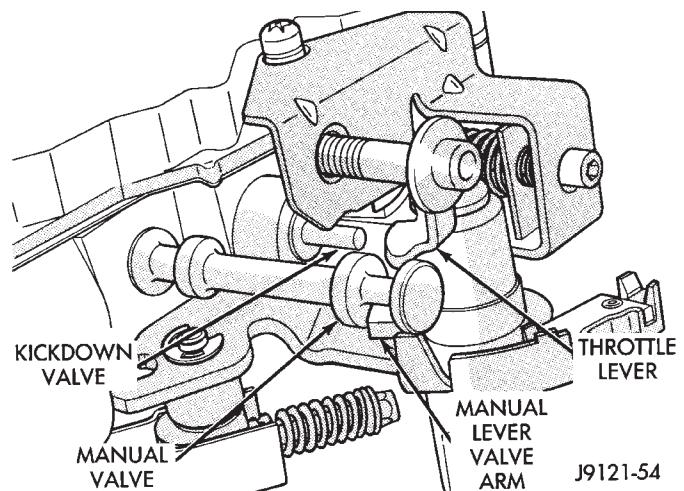
(20) Attach solenoid case connector to 3-4 accumulator with shoulder-type screw. Connector has small locating tang that fits in dimple at top of accumulator housing (Fig. 91). Seat tang in dimple before tightening connector screw.

(21) Install solenoid assembly and gasket. Tighten solenoid attaching screws to 8 N·m (72 in. lbs.) torque.

(22) Verify that solenoid wire harness is properly routed (Fig. 92). **Solenoid harness must be clear of manual lever and park rod and not be pinched between accumulator housing and cover.**



**Fig. 89 Detent Ball Spring**



**Fig. 90 Manual And Throttle Lever Alignment**

## GOVERNOR BODY, SENSOR AND SOLENOID

(1) Turn valve body assembly over so accumulator side of transfer plate is facing down.

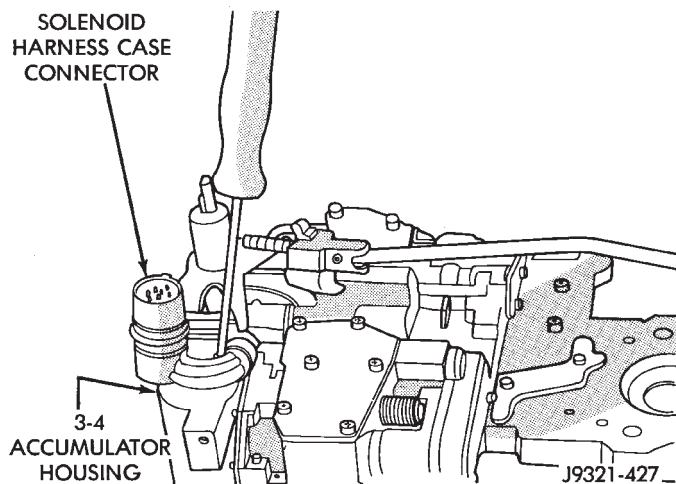
(2) Install new O-rings on governor pressure solenoid and sensor (Fig. 93).

(3) Lubricate solenoid and sensor O-rings with clean transmission fluid.

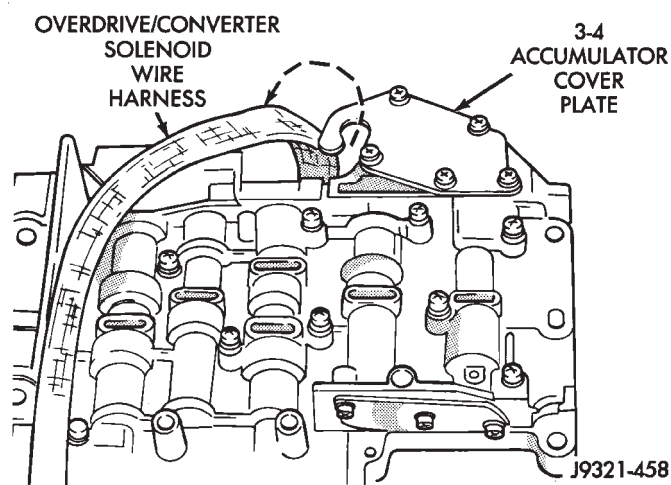
(4) Install governor pressure sensor in governor body. Then secure sensor with M-shaped retaining clip (Fig. 93).

(5) Install governor pressure solenoid in governor body (Fig. 94). Push solenoid in until it snaps into place in body.

## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 91 Solenoid Harness Case Connector Shoulder Bolt**



**Fig. 92 Solenoid Harness Routing**

(6) Position governor body gasket on transfer plate (Fig. 95).

(7) Install retainer plate on governor body and around solenoid (Fig. 96). Be sure solenoid connector is positioned in retainer cutout.

(8) Align screw holes in governor body and transfer plate. Then install and tighten governor body screws to 4 N·m (35 in. lbs.) torque.

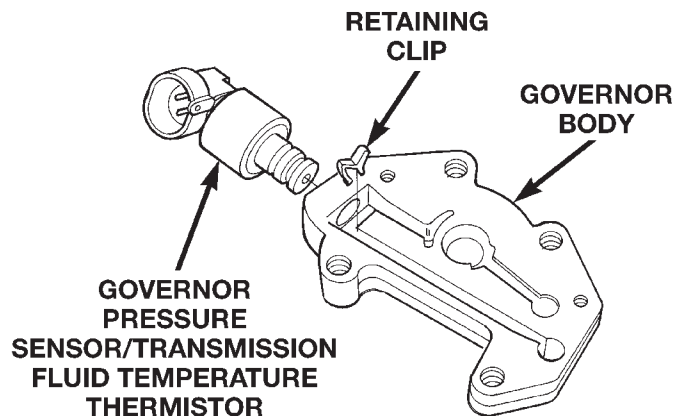
(9) Connect harness wires to governor pressure solenoid and governor pressure sensor (Fig. 97).

(10) Perform Line Pressure and Throttle Pressure adjustments, refer to adjustment section of this group for proper procedures.

(11) Install fluid filter and pan.

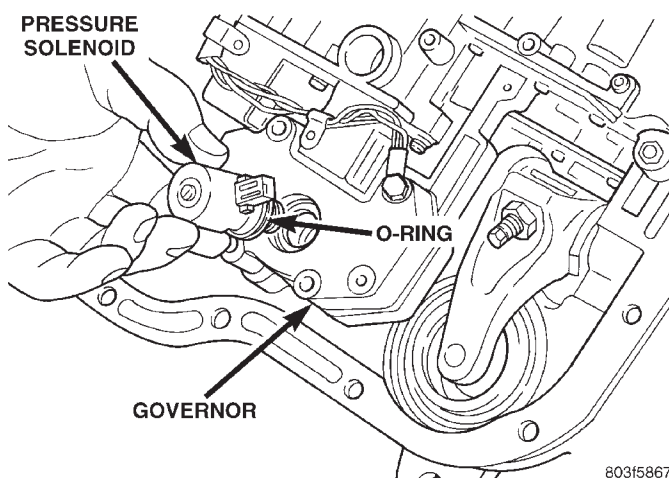
(12) Lower vehicle.

(13) Fill transmission with recommended fluid and road test vehicle to verify repair.



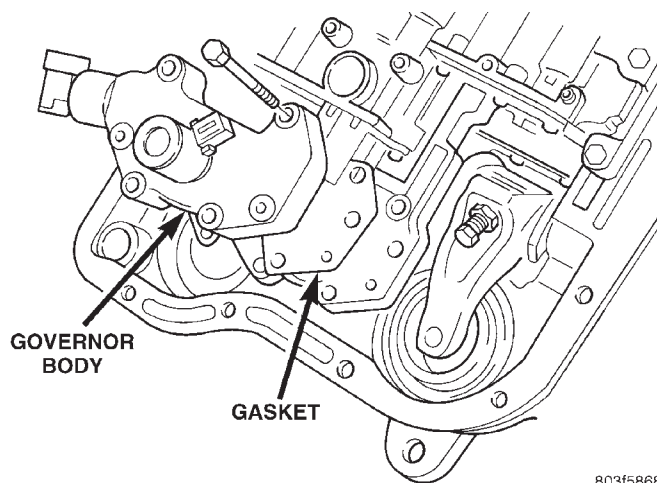
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**Fig. 93 Governor Pressure Sensor**



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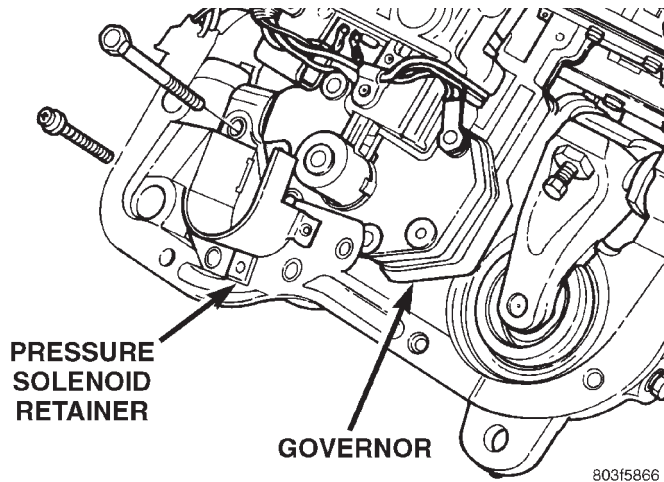
**Fig. 94 Governor Pressure Solenoid**



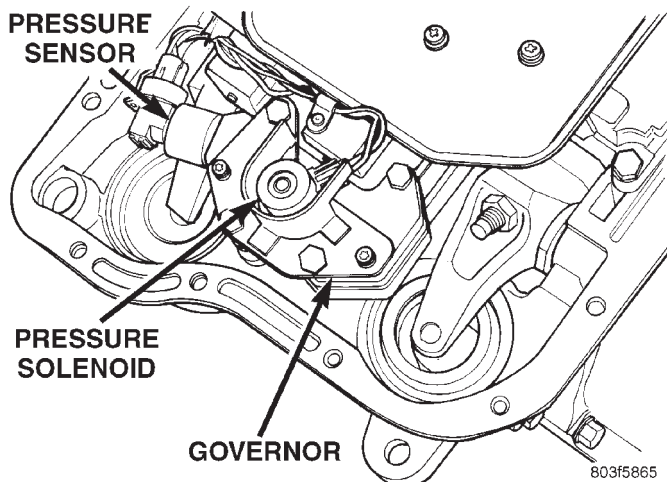
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**Fig. 95 Governor Body And Gasket**

## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 96 Pressure Solenoid Retainer**

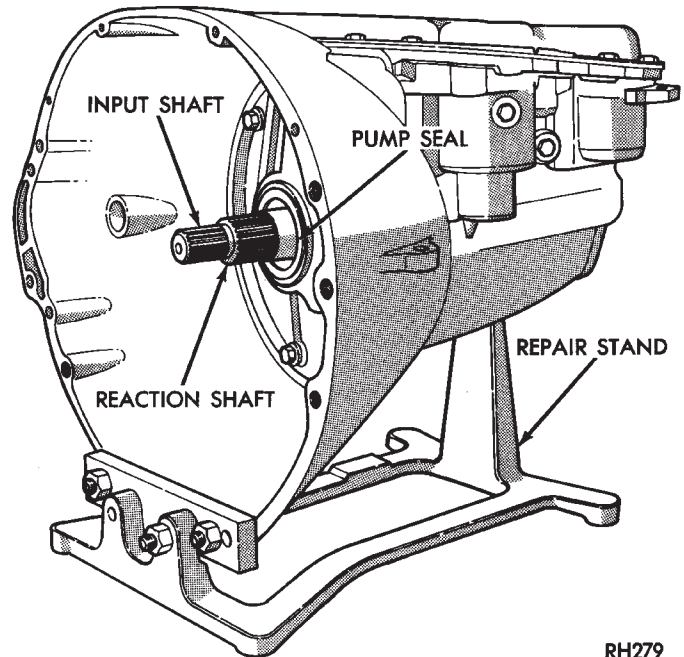


**Fig. 97 Governor Pressure Sensor And Solenoid Connectors**

## TRANSMISSION

### DISASSEMBLY

- (1) Drain fluid from transmission.
- (2) Clean exterior of transmission with suitable solvent or pressure washer.
- (3) Remove torque converter from front of transmission.
- (4) Remove throttle and shift levers from valve body manual shaft and throttle lever shaft.
- (5) Place transmission in vertical position.
- (6) Measure and record the input shaft end-play measurement.
- (7) Mount transmission in repair stand C-3750-B or similar type stand (Fig. 98).
- (8) Remove fluid pan and filter.
- (9) Remove park/neutral position switch and seal (Fig. 99).
- (10) Remove valve body and electronic governor.
- (11) Remove accumulator outer spring, piston and inner spring (Fig. 100). Note position of piston and

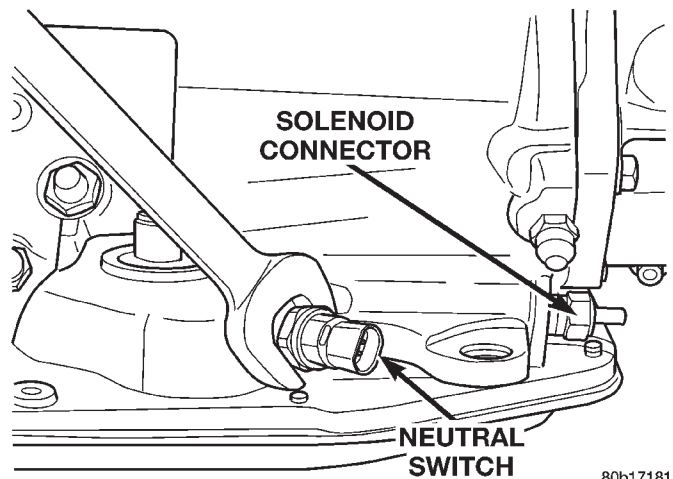


**Fig. 98 Repair Stand**

springs for assembly reference. Remove and discard piston seals if worn or cut.

(12) Remove pump oil seal with suitable pry tool or slide-hammer mounted screw.

(13) Remove front band lever pin access plug (Fig. 101). Use square end of 1/4 in. drive extension to remove plug as shown.



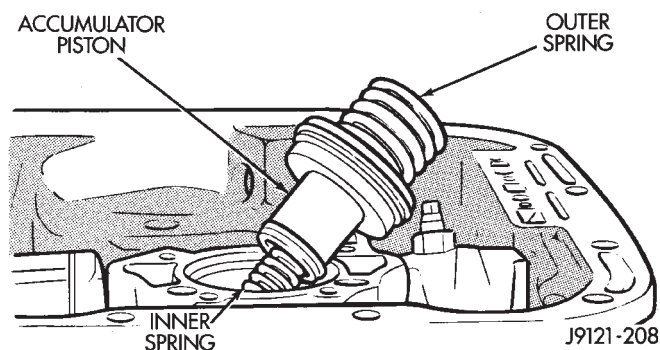
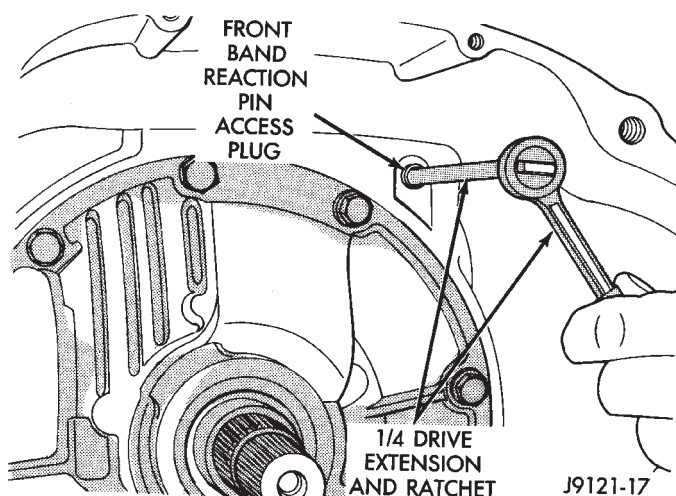
**Fig. 99 Park/Neutral Position Switch**

(14) Remove oil pump and reaction shaft support assembly as follows:

- (a) Tighten front band adjusting screw until band is tight around front clutch retainer (Fig. 102). This will prevent retainer from coming out with pump and possibly damaging clutch or pump components.
- (b) Remove oil pump bolts.



## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 100 Accumulator Component Removal****Fig. 101 Front Band Lever Pin Access Plug**

(c) Thread Slide Hammer Tools C-3752 into threaded holes in flange of oil pump housing (Fig. 103).

(d) Remove oil pump and reaction shaft support by bumping slide hammers outward alternately to pull pump from case (Fig. 104).

(15) Remove oil pump gasket (Fig. 105). Note gasket position in case for assembly reference.

(16) Loosen front band adjusting screw until band is completely loose.

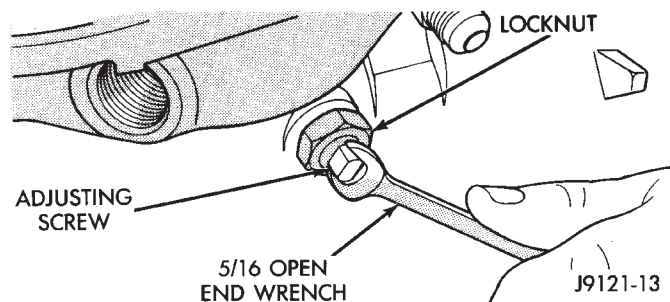
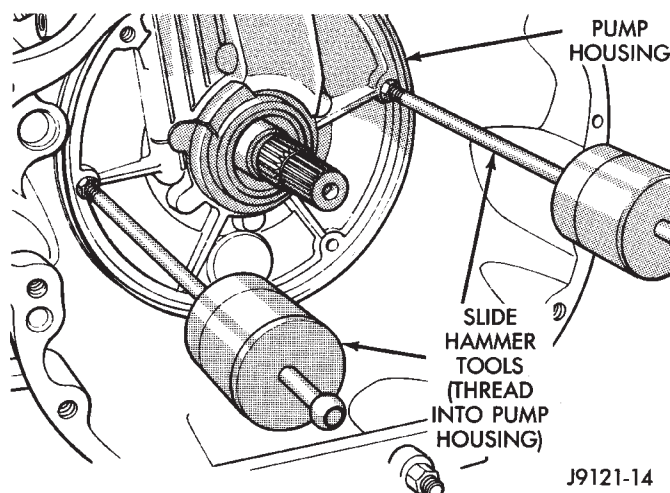
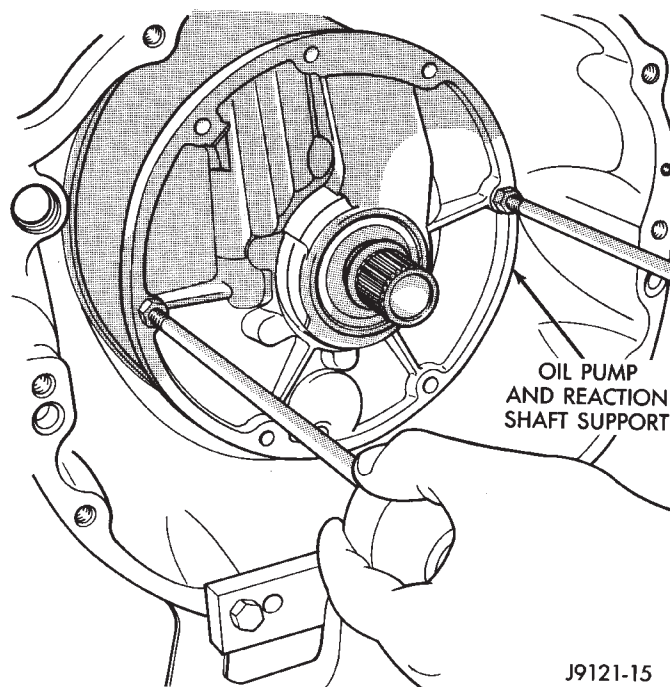
(17) Remove front band strut and anchor (Fig. 106).

(18) Squeeze front band together slightly and slide band over front clutch retainer and out of case (Fig. 107).

(19) Remove front and rear clutch assemblies as a unit (Fig. 108).

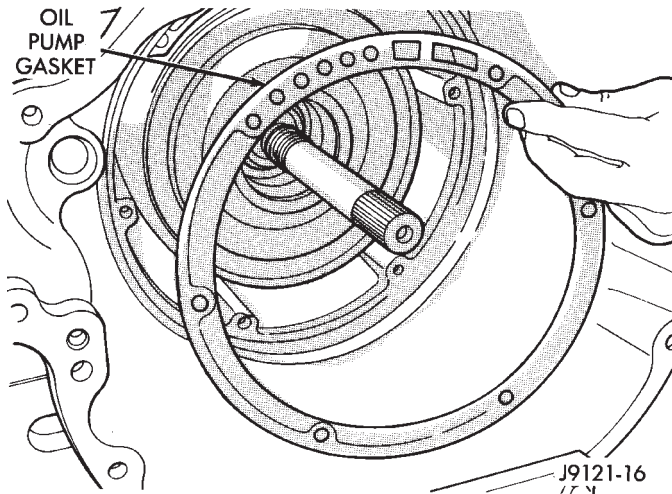
(20) Remove front band reaction pin and lever. Start pin through lever and out of case bore with drift or punch. Then use pencil magnet to withdraw pin completely (Fig. 109).

(21) Remove intermediate shaft thrust washer. Triangular shaped washer will either be on shaft pilot hub or in rear clutch retainer (Fig. 110).

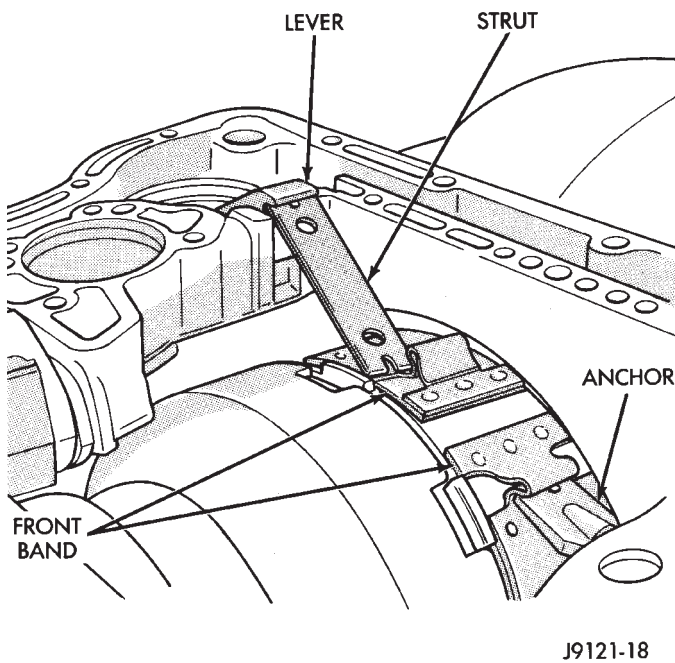
**Fig. 102 Tightening Front Band To Hold Front Clutch In Place****Fig. 103 Oil Pump Removal Tools****Fig. 104 Oil Pump Removal**



# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 105 Oil Pump Gasket**

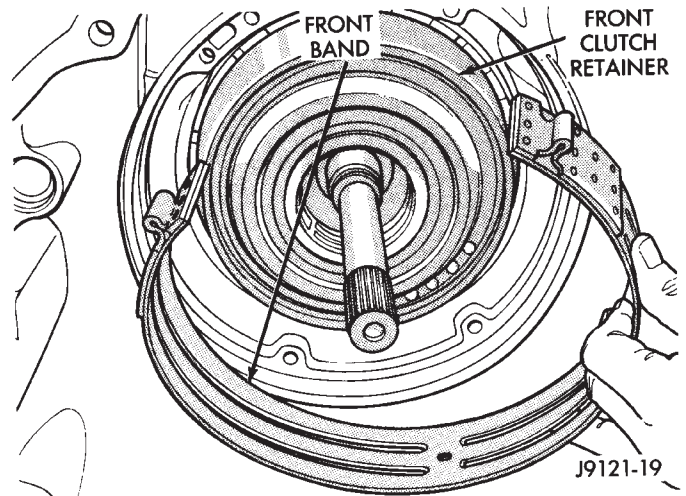


**Fig. 106 Front Band Linkage**

(22) Remove thrust plate from intermediate shaft hub (Fig. 111).

(23) Remove intermediate shaft-planetary geartrain assembly (Fig. 112).

(24) If overdrive unit is not to be serviced, install Alignment Shaft 6227-2 into the overdrive unit to

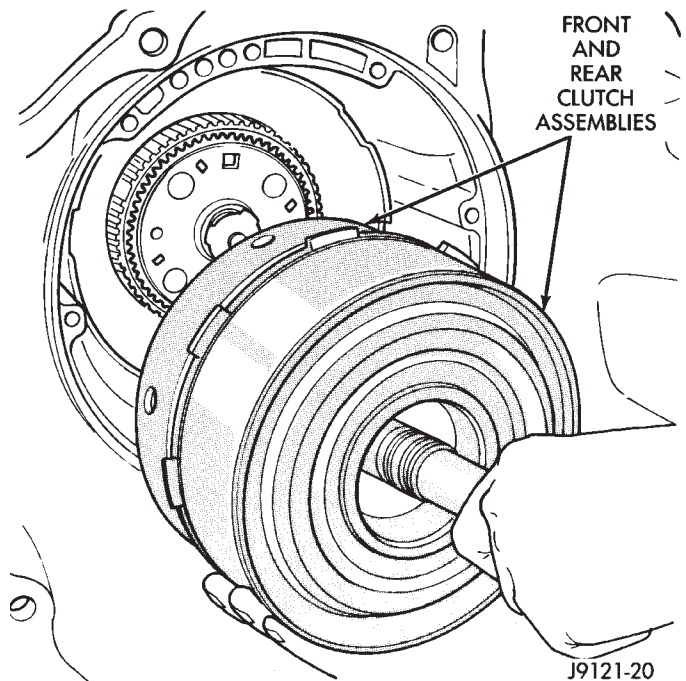


**Fig. 107 Front Band**

prevent misalignment of the overdrive clutches during service of main transmission components.

(25) Loosen rear band locknut and loosen adjusting screw 3-4 turns.

(26) Remove snap ring that retains low-reverse drum on overdrive piston retainer hub (Fig. 113).



**Fig. 108 Removing Front/Rear Clutch Assemblies**

## DISASSEMBLY AND ASSEMBLY (Continued)

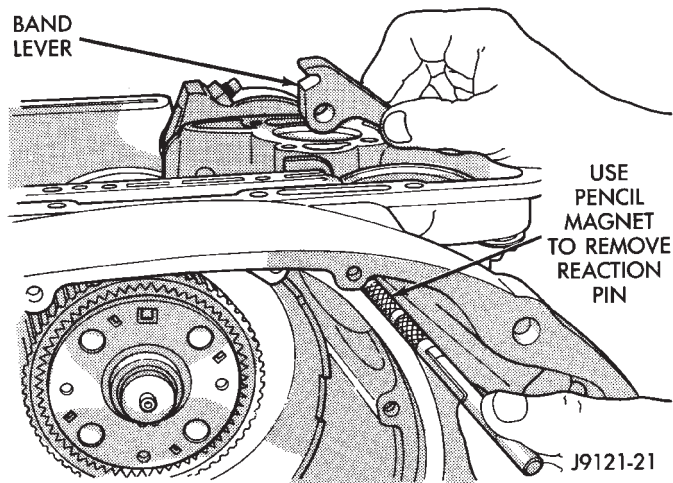


Fig. 109 Front Band Lever And Pin

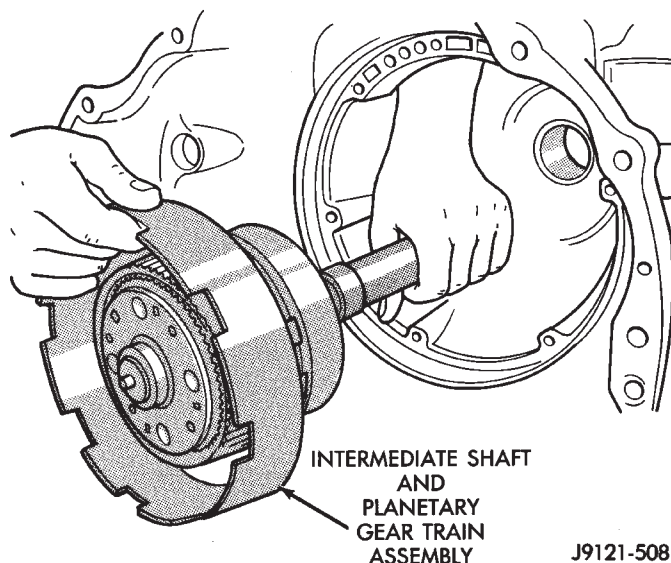


Fig. 112 Intermediate Shaft And Planetary Geartrain

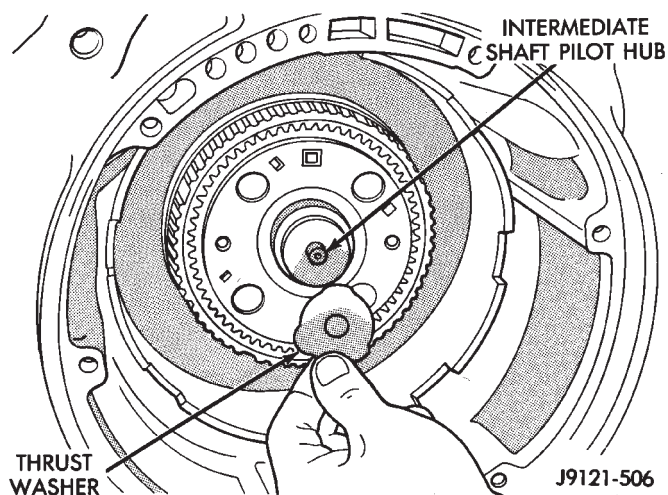


Fig. 110 Intermediate Shaft Thrust Washer

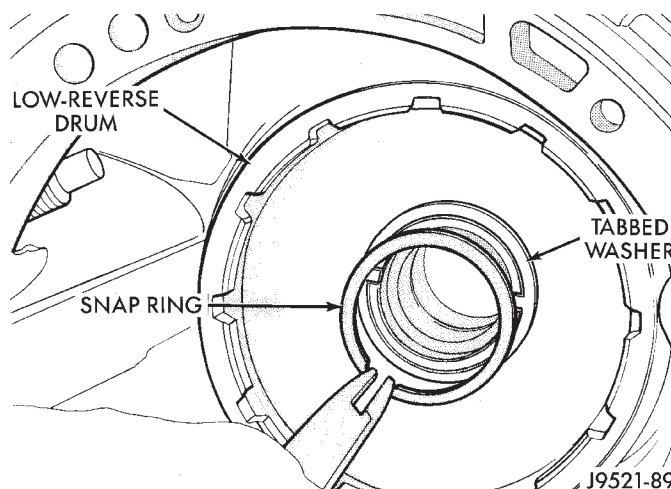


Fig. 113 Low-Reverse Drum Snap Ring

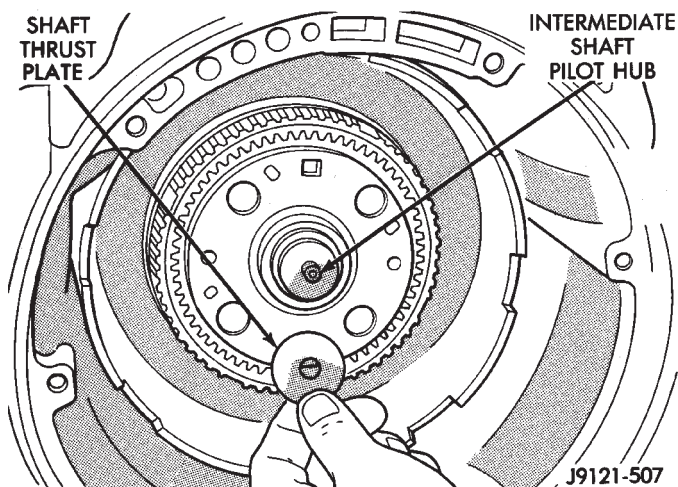


Fig. 111 Intermediate Shaft Thrust Plate

(27) Slide low-reverse drum and thrust washer off piston retainer hub and out of rear band (Fig. 114).

(28) Note that overrunning clutch race will remain on splines of low-reverse drum after removal (Fig. 115). **The race is a permanent press fit on the hub splines. Do not attempt to remove the race.**

(29) Remove overrunning clutch assembly (Fig. 116). Assembly can be removed without displacing rollers and springs if care is exercised. Note position of rollers and springs for assembly reference.

(30) Remove rear band adjusting lever, reaction lever and pin (Fig. 117).

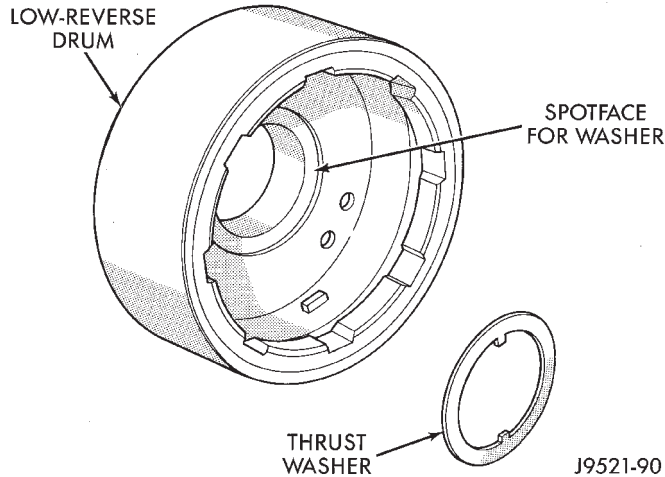
(31) Remove strut from rear band. Keep strut with levers and pin for cleaning, inspection and assembly reference.

(32) Remove rear band and link (Fig. 118).

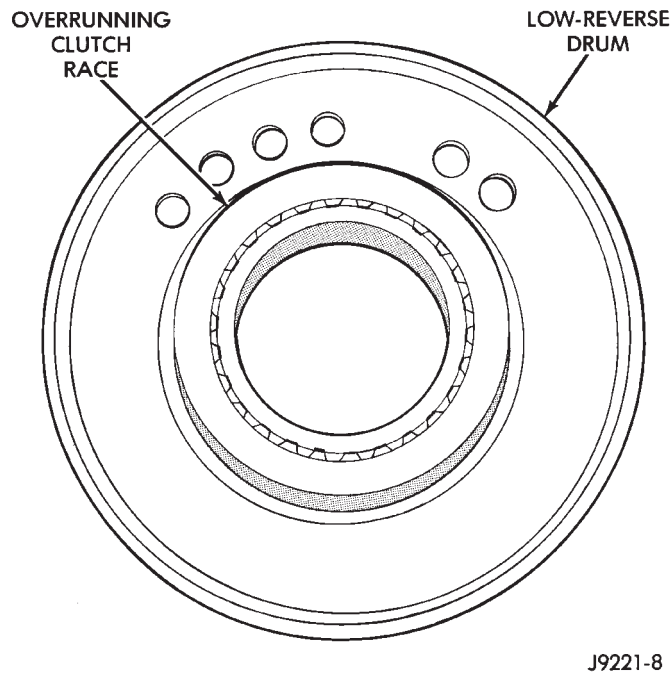
(33) Compress front servo rod guide with large C-clamp and Tool C-4470, or Compressor Tool C-3422-B (Fig. 119). Compress guide only enough to permit snap ring removal (about 1/8 in.).



# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 114 Low-Reverse Drum And Thrust Washer**



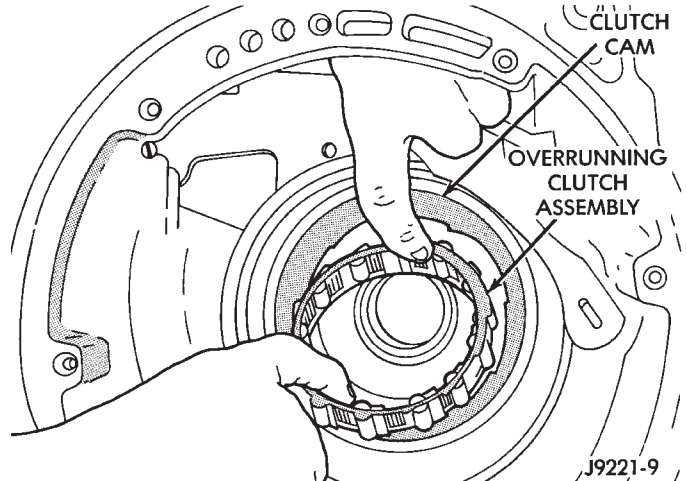
**Fig. 115 Overrunning Clutch Race Position On Low-Reverse Drum**

(34) Remove servo piston snap ring (Fig. 119). Unseat one end of ring. Then carefully work removal tool around back of ring until free of ring groove. **Exercise caution when removing snap ring. Servo bore can be scratched or nicked if care is not exercised.**

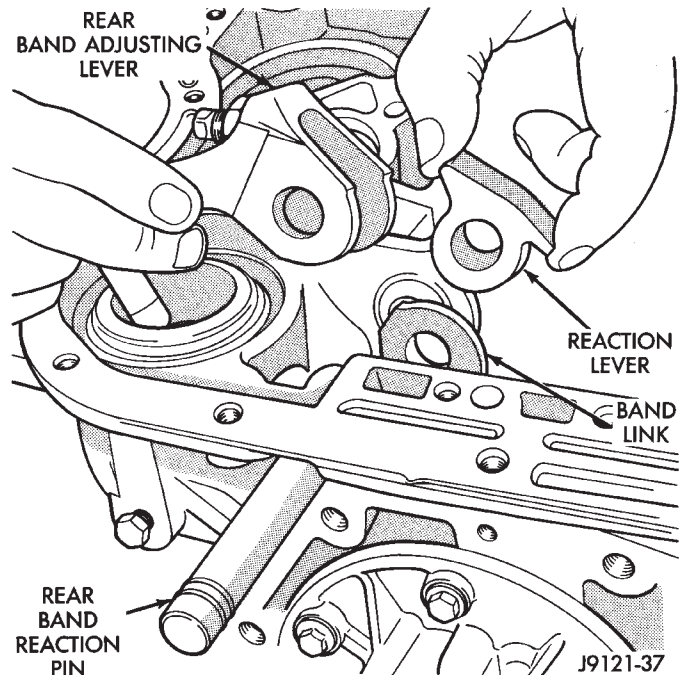
(35) Remove tools and remove servo piston and spring.

(36) Compress rear servo piston with C-clamp and Tool C-4470, or Valve Spring Compressor C-3422-B (Fig. 120). Compress servo spring retainer only enough to permit snap ring removal.

(37) Remove servo piston snap ring (Fig. 120). Start one end of ring out of bore. Then carefully work



**Fig. 116 Overrunning Clutch**



**Fig. 117 Rear Band Levers And Pins**

removal tool around back of snap ring until free of ring groove. **Exercise caution when removing snap ring. Servo bore can be scratched or nicked if care is not exercised.**

(38) Remove tools and remove rear servo retainer, spring and piston assembly.

## ASSEMBLY

Do not allow dirt, grease, or foreign material to enter the case or transmission components during assembly. Keep the transmission case and components clean. Also make sure the tools and workbench area used for reassembly operations are equally clean.

Shop towels used for wiping off tools and your hands must be made from **lint free** materials. Lint

## DISASSEMBLY AND ASSEMBLY (Continued)

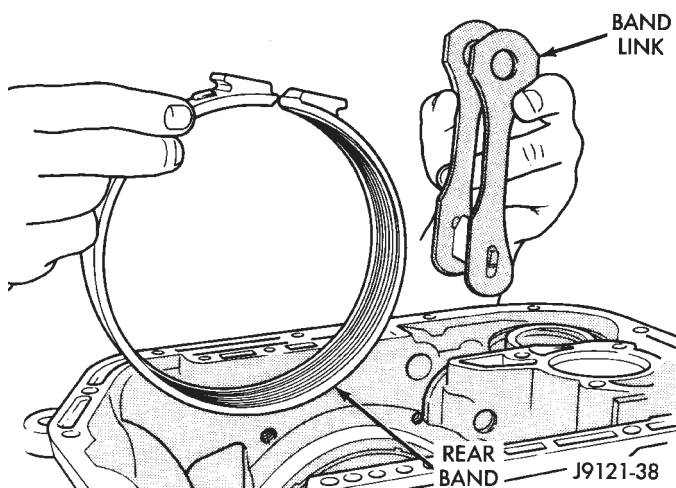


Fig. 118 Rear Band And Link

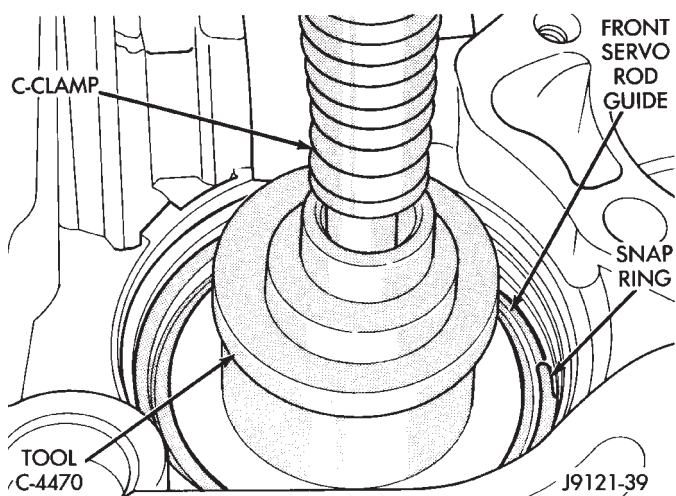


Fig. 119 Front Servo Retaining Snap Ring

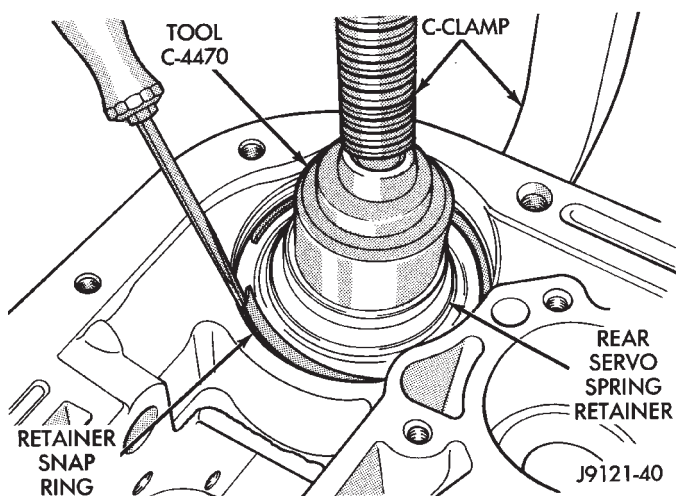


Fig. 120 Rear Servo Retaining Snap Ring

will stick to transmission parts and could interfere with valve operation or even restrict fluid passages.

Lubricate transmission clutch and gear components with Mopar® ATF Plus 3, type 7176, during reassembly. Soak clutch discs in transmission fluid before installation.

Use Mopar® Door Ease, or Ru-Glyde on piston seals and O-rings to ease installation. Petroleum jelly can also be used to lubricate and hold thrust washers and plates in position during assembly.

**Do not use chassis grease, bearing grease, white grease, or similar lubricants on any part.** These types of lubricants can eventually block or restrict fluid passages and valve operation. Use petroleum jelly only.

Do not force parts into place. The transmission components and sub-assemblies are easily installed by hand when properly aligned. If a part seems difficult to install, it is either misaligned or incorrectly assembled. Verify that thrust washers, thrust plates and seal rings are correctly positioned.

The planetary geartrain, front/rear clutch assemblies and oil pump are all much easier to install when the transmission case is upright. Either tilt the case upward with wood blocks, or cut a hole in the bench large enough for the intermediate shaft and rear support. Then lower the shaft and support into the hole and support the rear of the case directly on the bench.

## FRONT/REAR SERVO

(1) Lubricate rear servo piston seal with Mopar® Door Ease or ATF Plus 3. Lubricate servo bore in case with ATF Plus 3.

(2) Install rear servo piston in case. Position piston at slight angle to bore and insert piston with twisting motion (Fig. 121).

(3) Install rear servo spring and retainer in case bore (Fig. 122). Be sure spring is seated on piston.

(4) Compress rear servo piston with C-clamp or Valve Spring Compressor C-3422-B and install servo piston snap ring (Fig. 123).

(5) Lubricate front servo piston components and servo bore in case with transmission fluid.

(6) Install front servo piston in bore. Carefully "run" small, suitable tool around piston ring to press it back into groove and ease installation (Fig. 124). Rotate piston into bore at same time. Rock piston slightly to ease piston ring past snap ring groove and into bore.

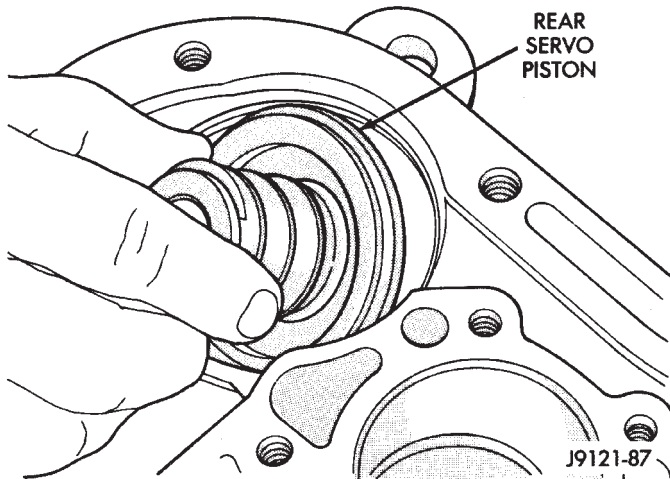
(7) Bottom front servo piston in bore and install servo spring.

(8) Install front servo piston rod guide as follows:

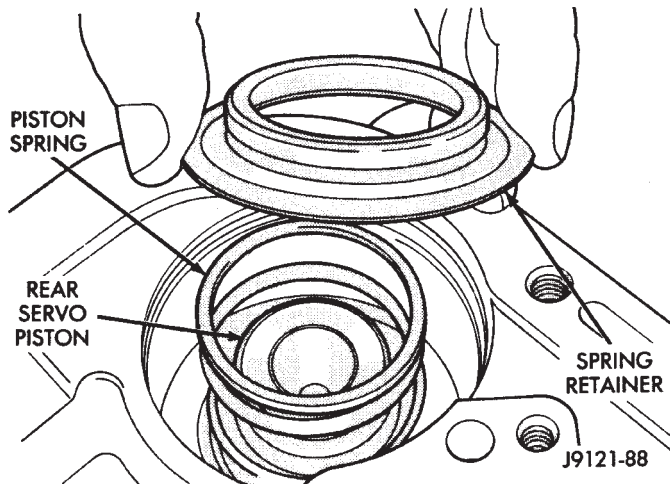
(a) Place Tool SP-5560 (or similar size tool) on guide and position C-clamp on tool and case (Fig. 125).



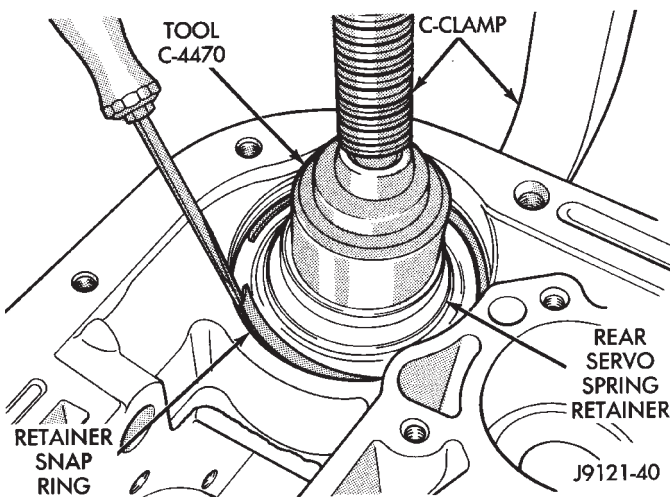
# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 121 Rear Servo Piston**

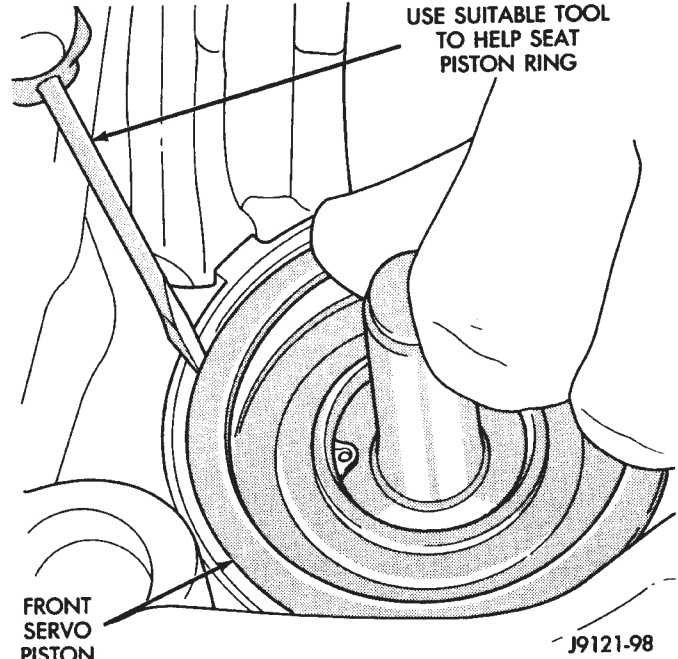


**Fig. 122 Rear Servo Piston Spring And Retainer**

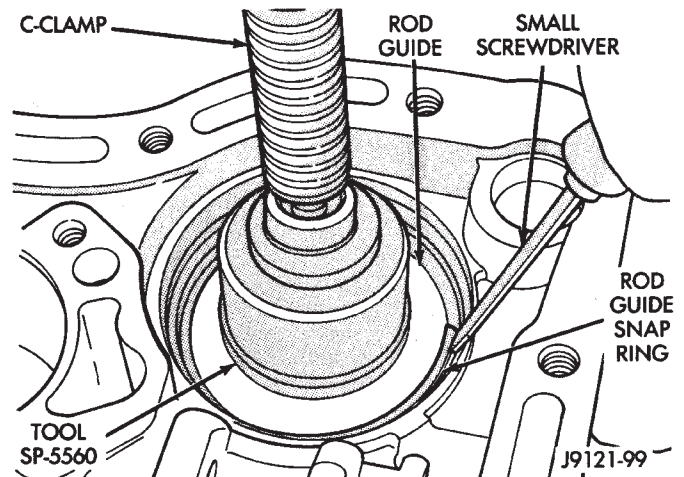


**Fig. 123 Rear Servo Snap Ring**

- (b) Slowly compress rod guide while simultaneously easing seal ring into bore with suitable tool.
- (9) Install rod guide snap ring (Fig. 125).



**Fig. 124 Front Servo Piston**



**Fig. 125 Front Servo Rod Guide And Snap Ring**

## OVERRUNNING CLUTCH, REAR BAND, AND LOW-REVERSE DRUM

- (1) Install overrunning clutch components if not yet installed.
- (2) Position rear band and link in case (Fig. 126).
- (3) Install low-reverse drum (Fig. 127). Slide drum through rear band, onto piston retainer hub and into engagement with overrunning clutch and race.
- (4) Install thrust washer in low-reverse drum spot-face (Fig. 128). Use petroleum jelly to hold washer in place.
- (5) Install snap ring that secures low-reverse drum to piston retainer hub (Fig. 128).
- (6) Insert band reaction pin part way into case and band link (Fig. 129).
- (7) Install rear band adjusting lever, reaction lever, and strut (Fig. 130). Be sure levers and strut are

## DISASSEMBLY AND ASSEMBLY (Continued)

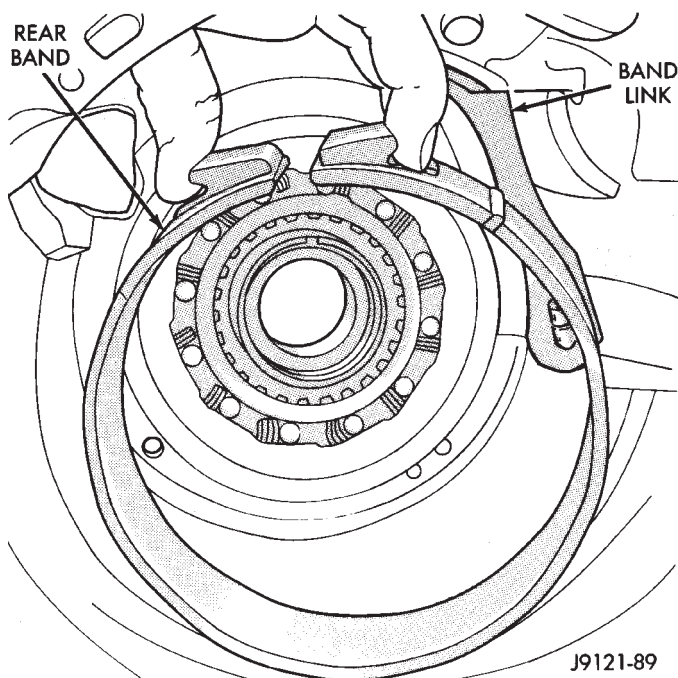


Fig. 126 Rear Band And Link

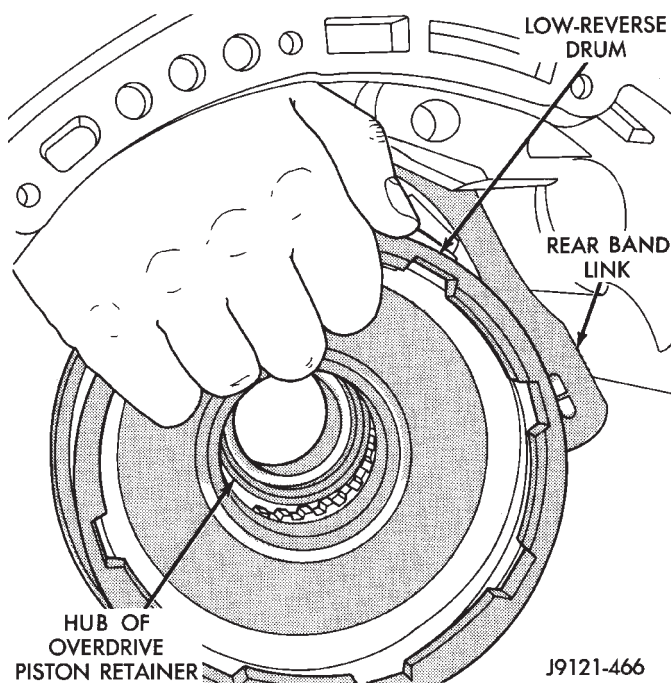


Fig. 127 Low-Reverse Drum

aligned and engaged before seating band reaction pin in case.

#### PLANETARY GEARTRAIN, FRONT/REAR CLUTCH, AND FRONT BAND

(1) Remove Alignment Shaft 6227-2, if installed previously.

(2) Install assembled intermediate shaft and planetary geartrain (Fig. 131). **Support shaft carefully during installation. Do not allow shaft bearing/**

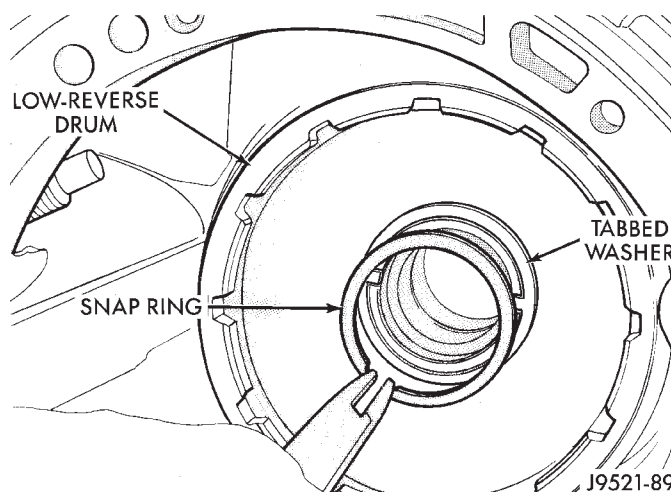


Fig. 128 Low-Reverse Drum Snap Ring

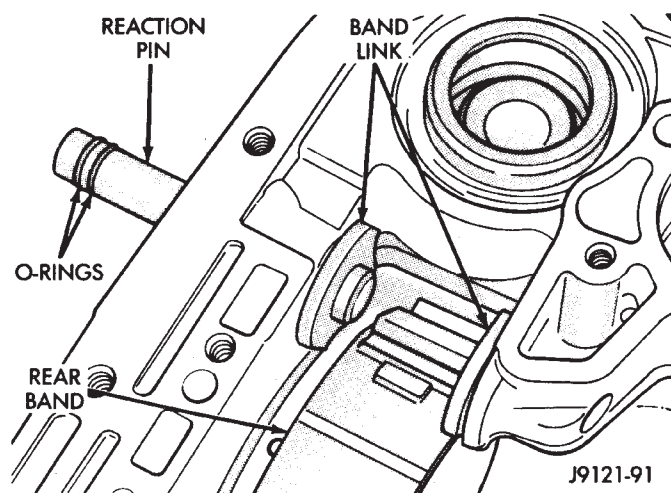


Fig. 129 Rear Band Reaction Pin

**bushing surfaces to become nicked or scratched.**

(3) Lubricate intermediate shaft thrust plate with petroleum jelly and install plate on shaft pilot hub (Fig. 132).

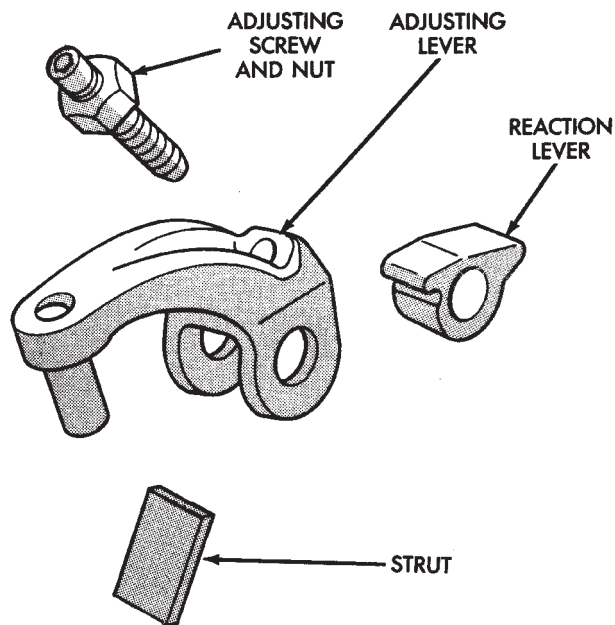
(4) Check input shaft front seal rings, fiber thrust washer and rear seal ring (Fig. 133). Be ends of rear seal ring are hooked together and diagonal cut ends of front seal rings are firmly seated against each other as shown. Lubricate seal rings with petroleum jelly after checking them.

(5) Assemble front and rear clutches (Fig. 134). Align lugs on front clutch discs. Mount front clutch on rear clutch. Turn front clutch retainer back and forth until front clutch discs are fully seated on rear clutch splined hub.

(6) Install intermediate shaft thrust washer in hub of rear clutch retainer (Fig. 135). Use petroleum jelly to hold washer in place. Position washer so grooves are facing outward. **Washer only fits one way in clutch retainer hub.**

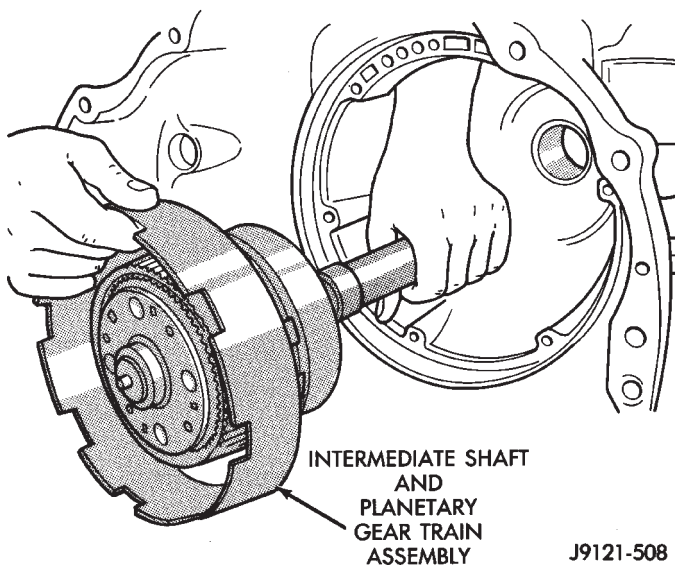


# DISASSEMBLY AND ASSEMBLY (Continued)



J9121-92

**Fig. 130 Rear Band Levers And Strut**



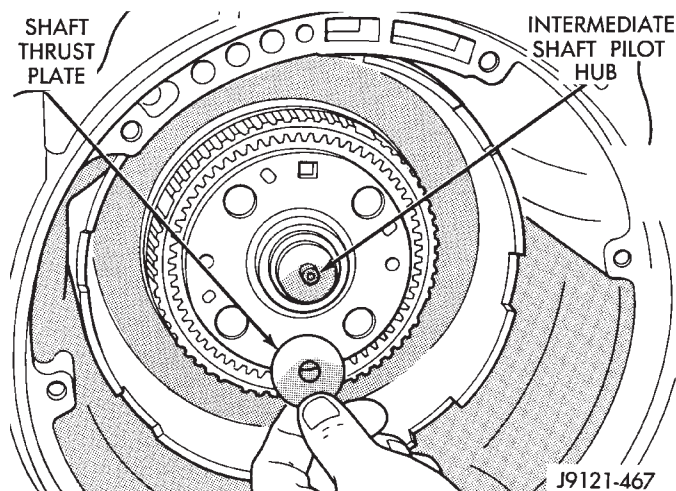
J9121-508

**Fig. 131 Intermediate Shaft And Planetary Geartrain**

(7) Place transmission case in upright position, or place blocks under front end of transmission repair stand to tilt case rearward. This makes it easier to install front/rear clutch assembly.

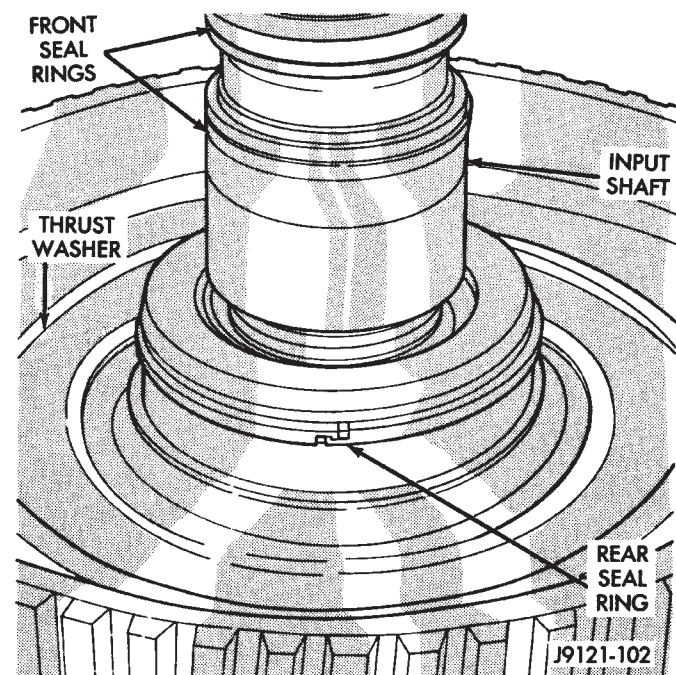
(8) Align discs in rear clutch. Then install and engage assembly in front planetary and driving shell (Fig. 136). Turn clutch retainers back and forth until both clutches are seated.

(9) Position front band lever in case and over servo rod guide. Then install front band lever pin in case and slide it through lever.



J9121-467

**Fig. 132 Intermediate Shaft Thrust Plate**



J9121-102

**Fig. 133 Input Shaft Seal Ring And Thrust Washer**

(10) Coat threads of front band pin access plug with sealer and install it in case. Tighten plug to 17 N·m (13 ft. lbs.) torque.

(11) Slide front band over front clutch retainer and install front band strut and anchor (Fig. 137).

(12) Tighten front band adjusting screw until band is tight on clutch retainer. This will hold clutches in place while oil pump is being installed. **Verify that front/rear clutch assembly is still properly seated before tightening band.**

## OIL PUMP

(1) Install oil pump Pilot Studs C-3288-B in case (Fig. 138).

## DISASSEMBLY AND ASSEMBLY (Continued)

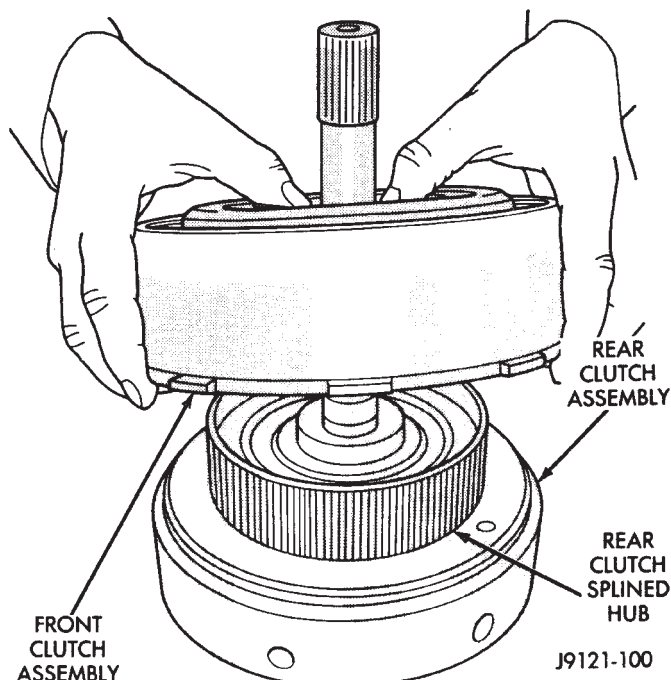


Fig. 134 Assembling Front And Rear Clutches

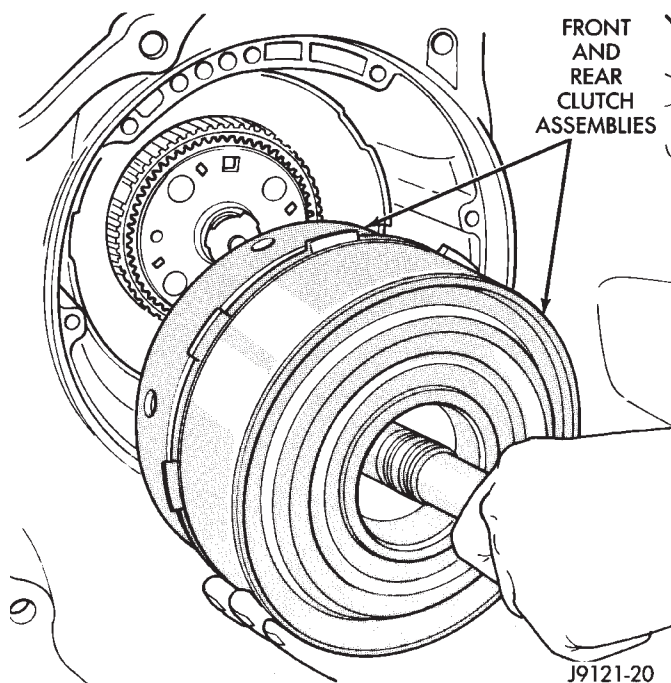


Fig. 136 Front/Rear Clutch Assemblies

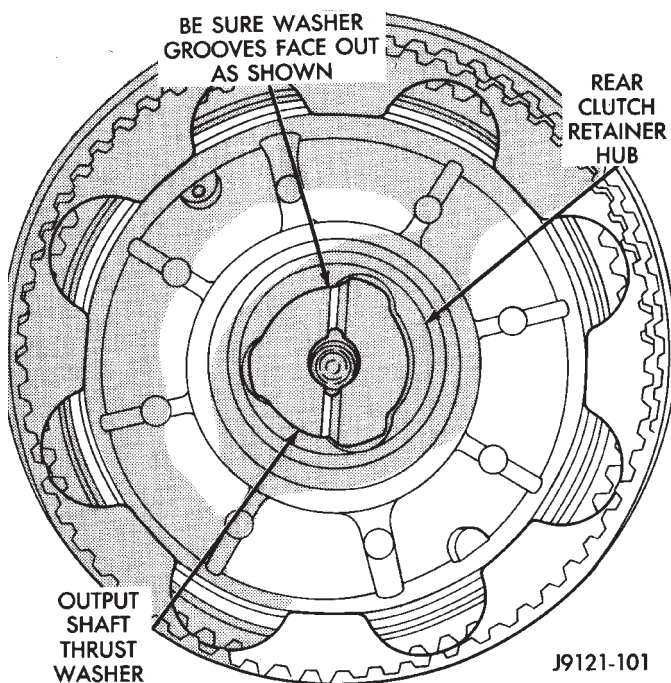


Fig. 135 Intermediate Shaft Thrust Washer

(2) Install new oil pump gasket on pilot studs and seat it in case. Be sure gasket is properly aligned with fluid passages in case (Fig. 138).

(3) Coat front clutch thrust washer with petroleum jelly to hold it in place. Then install washer over reaction shaft hub and seat it on pump (Fig. 139).

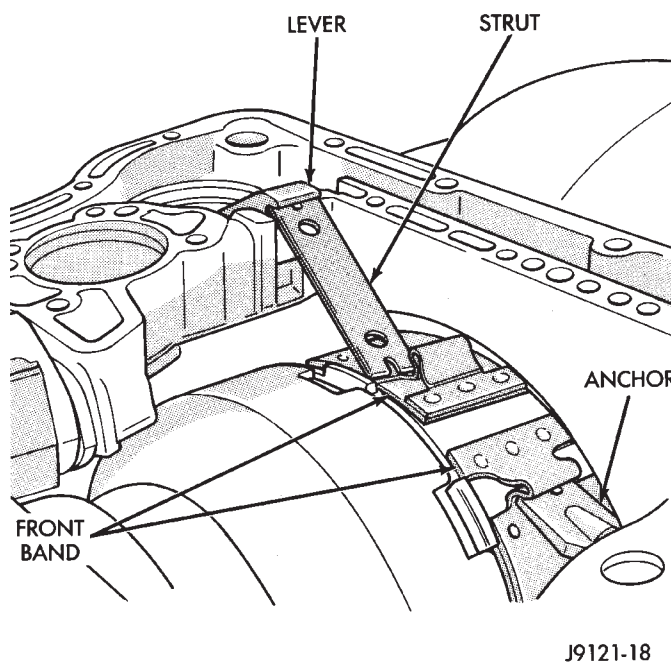


Fig. 137 Front Band And Linkage

**CAUTION:** The thrust washer bore (I.D.), is chamfered on one side. Make sure the chamfered side is installed so it faces the pump.

(4) Check seal rings on reaction shaft support. Be sure rings are hooked together correctly. Also be sure fiber thrust washer is in position (Fig. 140). Use extra petroleum jelly to hold washer in place if necessary.



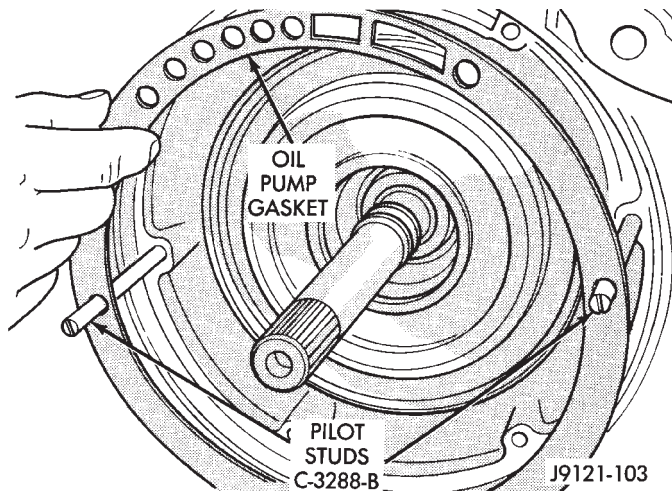
# DISASSEMBLY AND ASSEMBLY (Continued)

(5) Lubricate oil pump seals with petroleum Mopar® ATF Plus 3, type 7176.

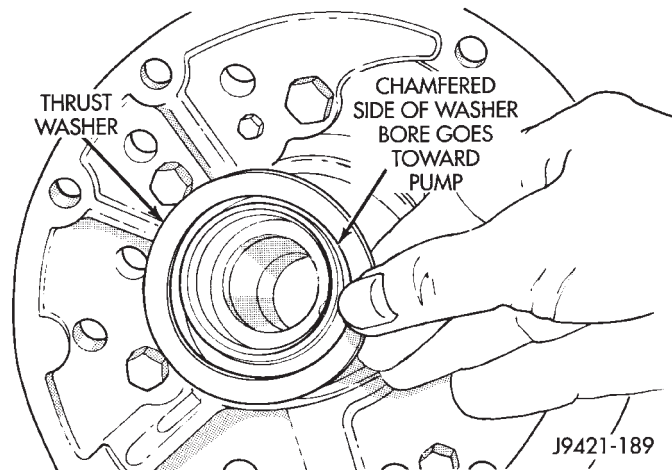
(6) Mount oil pump on pilot studs and slide pump into case opening (Fig. 141). **Work pump into case by hand. Do not use a mallet or similar tools to seat pump.**

(7) Remove pilot studs and install oil pump bolts. Tighten pump bolts alternately and evenly to fully seat pump in case. Then final-tighten pump bolts to 20 N·m (15 ft. lbs.) torque.

(8) Verify correct installation. Rotate input and intermediate shafts and check for bind. If bind exists, components are either mis-assembled, or not seated. Disassemble and correct as necessary before proceeding.



**Fig. 138 Oil Pump Gasket And Pilot Studs**

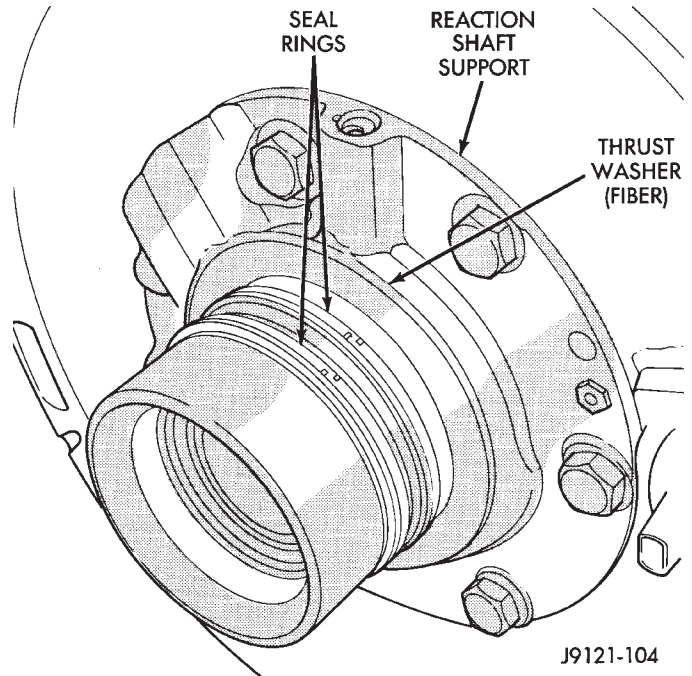


**Fig. 139 Front Clutch Thrust Washer**

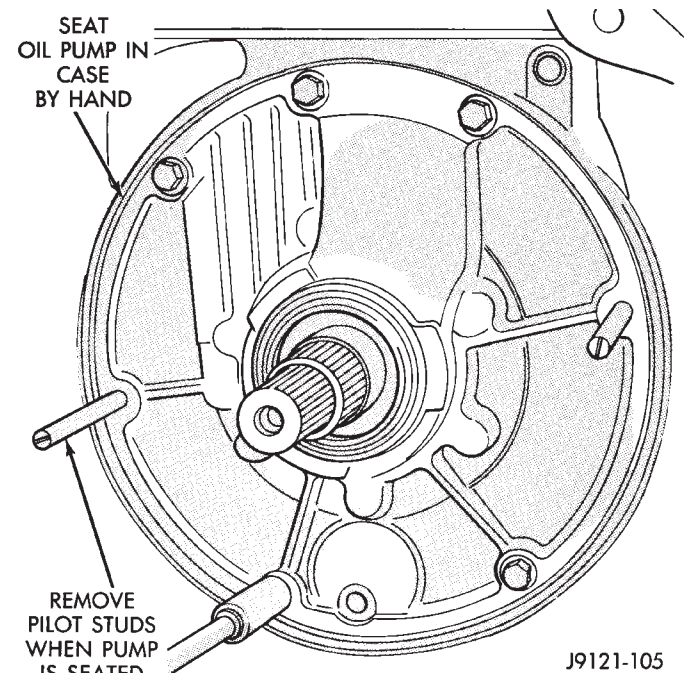
## INPUT SHAFT END PLAY CHECK

**NOTE:** Overdrive unit must be installed in order to correctly measure the input shaft end-play.

- (1) Check input shaft end play as follows.
- (2) Attach dial indicator to converter housing (Fig. 142). Position indicator plunger against input shaft and zero indicator.



**Fig. 140 Reaction Shaft Seal Ring And Thrust Washer**



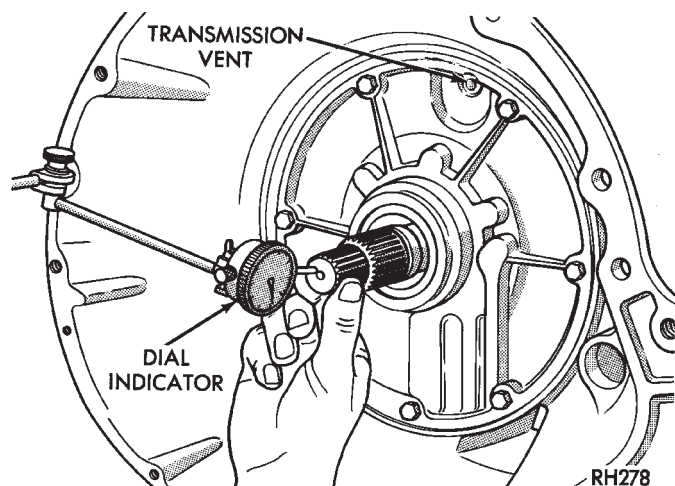
**Fig. 141 Oil Pump**

(3) Move input shaft in and out and record reading.

(4) End play should be 0.86 - 2.13 mm (0.034 - 0.084 in.).

(5) If end play is incorrect, change intermediate shaft thrust washer. The thrust washer controls end play and is available in three thicknesses for adjustment purposes.

## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 142 Checking Input Shaft End Play**

#### ACCUMULATOR, VALVE BODY, OIL PAN, AND TORQUE CONVERTER

(1) Install accumulator inner spring, piston and outer spring (Fig. 143).

(2) Verify that park/neutral position switch has **not** been installed in case. Valve body can not be installed if switch is in position.

(3) Install new valve body manual shaft seal in case (Fig. 144). Lubricate seal lip and manual shaft with petroleum jelly. Start seal over shaft and into case. Seat seal with 15/16 inch, deep well socket.

(4) Install valve body as follows:

(a) Start park rod into park pawl. If rod will not slide past park pawl, pawl is engaged in park gear. Rotate overdrive output shaft with suitable size 12 point socket; this will free pawl and allow rod to engage.

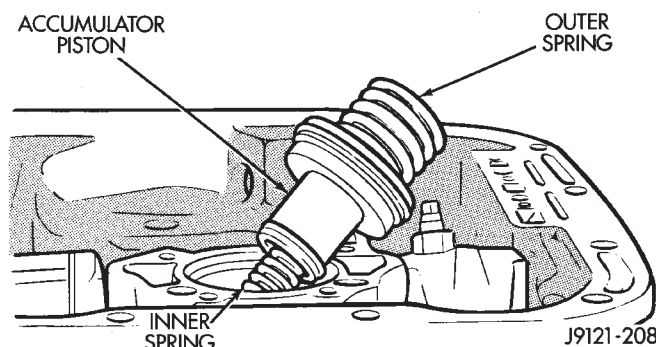
(b) Align and seat valve body on case. Be sure manual lever shaft and overdrive connector are fully seated in case.

(c) Install and start all valve body attaching bolts by hand. Then tighten bolts evenly, in a diagonal pattern to 12 N·m (105 in. lbs.) torque. **Do not overtighten valve body bolts. This could result in distortion and cross leakage after installation.**

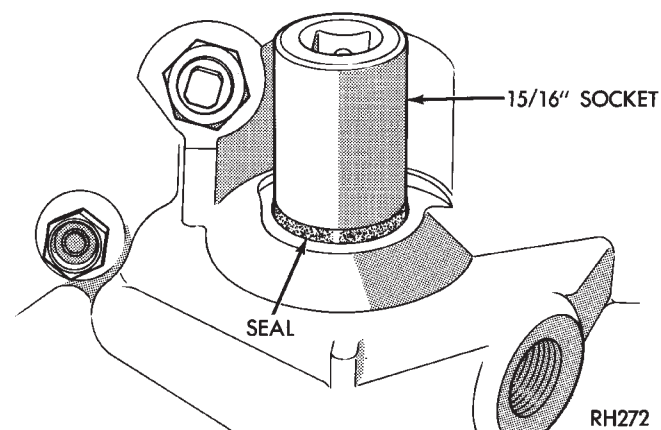
(5) Install new filter on valve body. Tighten filter screws to 4 N·m (35 in. lbs.).

(6) Install seal on park/neutral position switch. Then install and tighten switch to 34 N·m (25 ft. lbs.).

**CAUTION:** If the condition of the transmission before the overhaul procedure caused excessive metallic or fiber contamination in the fluid, replace the torque converter and reverse flush the cooler(s) and cooler lines. Fluid contamination and transmission failure can result if not done.



**Fig. 143 Accumulator Piston And Springs**



**Fig. 144 Manual Lever Shaft Seal**

(7) Install torque converter. Use C-clamp or metal strap to hold converter in place for installation.

#### BAND ADJUSTMENT AND FINAL

(1) Adjust front and rear bands as follows:

(a) Loosen locknut on each band adjusting screw 4-5 turns.

(b) Tighten both adjusting screws to 8 N·m (72 in. lbs.).

(c) Back off front band adjusting screw 2-7/8 turns.

(d) Back off rear band adjusting screw 2 turns.

(e) Hold each adjusting screw in position and tighten locknut to 34 N·m (25 ft. lbs.) torque.

(2) Install magnet in oil pan. Magnet seats on small protrusion at corner of pan.

(3) Position new oil pan gasket on case and install oil pan. Tighten pan bolts to 17 N·m (13 ft. lbs.).

(4) Install throttle valve and shift selector levers on valve body manual lever shaft.

(5) Apply small quantity of dielectric grease to terminal pins of solenoid case connector and neutral switch.

(6) Fill transmission with recommended fluid. Refer to Service Procedures section of this group.

(7) Road test vehicle to verify repair.

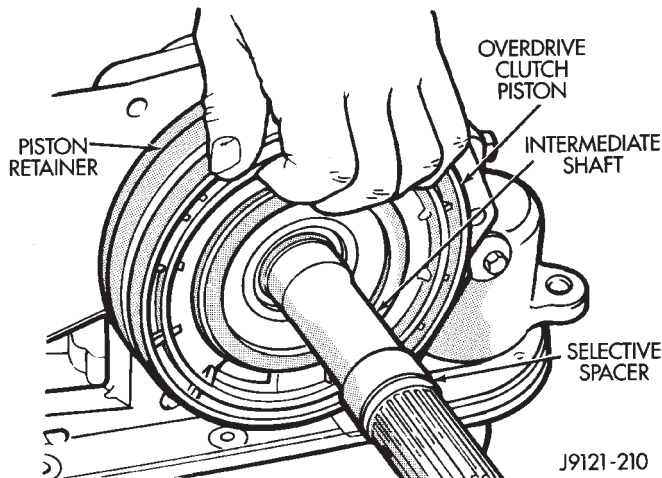
## DISASSEMBLY AND ASSEMBLY (Continued)

### OVERRUNNING CLUTCH CAM/OVERDRIVE PISTON RETAINER

**NOTE: TO SERVICE THE OVERRUNNING CLUTCH CAM AND THE OVERDRIVE PISTON RETAINER, THE TRANSMISSION GEARTRAIN AND OVERDRIVE UNIT MUST BE REMOVED FROM THE TRANSMISSION.**

#### DISASSEMBLY

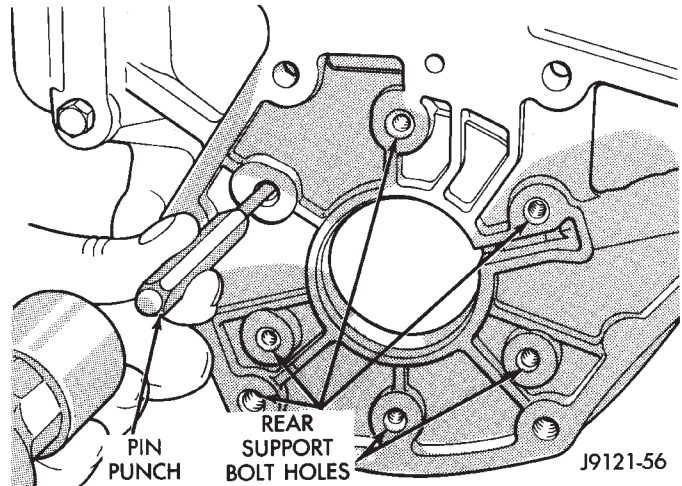
- (1) Remove the overdrive piston (Fig. 145).
- (2) Remove the overdrive piston retainer bolts.
- (3) Remove overdrive piston retainer.
- (4) Remove case gasket.
- (5) Tap old cam out of case with pin punch. Insert punch through bolt holes at rear of case (Fig. 146). Alternate position of punch to avoid cocking cam during removal.
- (6) Clean clutch cam bore and case. Be sure to remove all chips/shavings generated during cam removal.



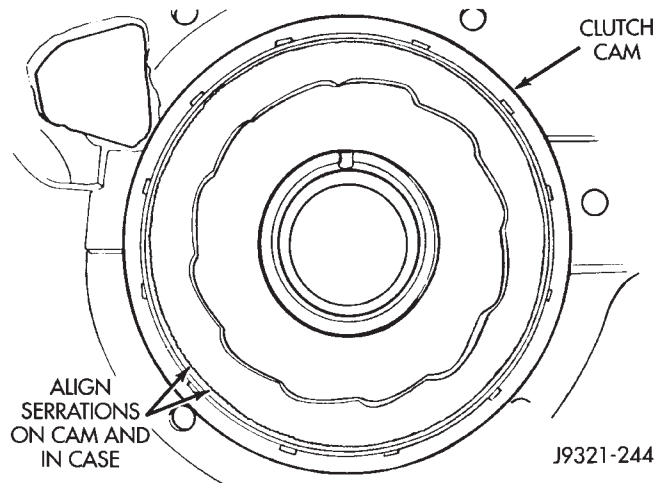
**Fig. 145 Overdrive Piston Removal**

#### ASSEMBLY

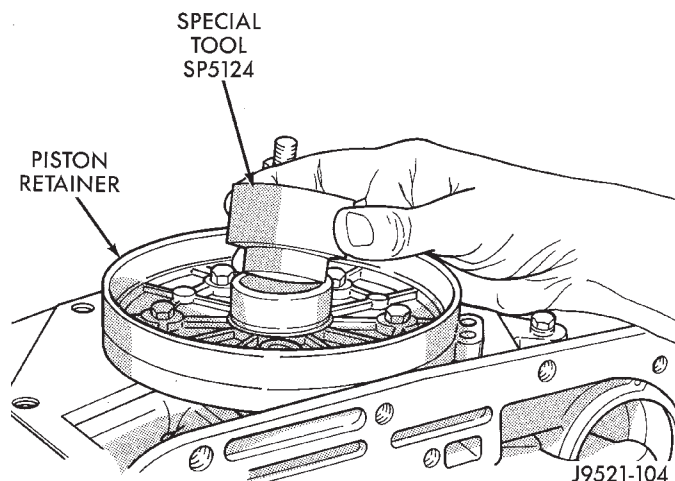
- (1) Temporarily install overdrive piston retainer in case. Use 3-4 bolts to secure retainer.
- (2) Align and start new clutch cam and spring retainer in case. Be sure serrations on cam and in case are aligned (Fig. 147). Then tap cam into case just enough to hold it in place.
- (3) **Verify that cam is correctly positioned before proceeding any further. Narrow ends of cam ramps should be to left when cam is viewed from front end of case (Fig. 147).**
- (4) Insert Adapter Tool SP-5124 into piston retainer (Fig. 148).
- (5) Assemble Puller Bolt SP-3701 and Press Plate SP-3583-A (Fig. 149).



**Fig. 146 Overrunning Clutch Cam**



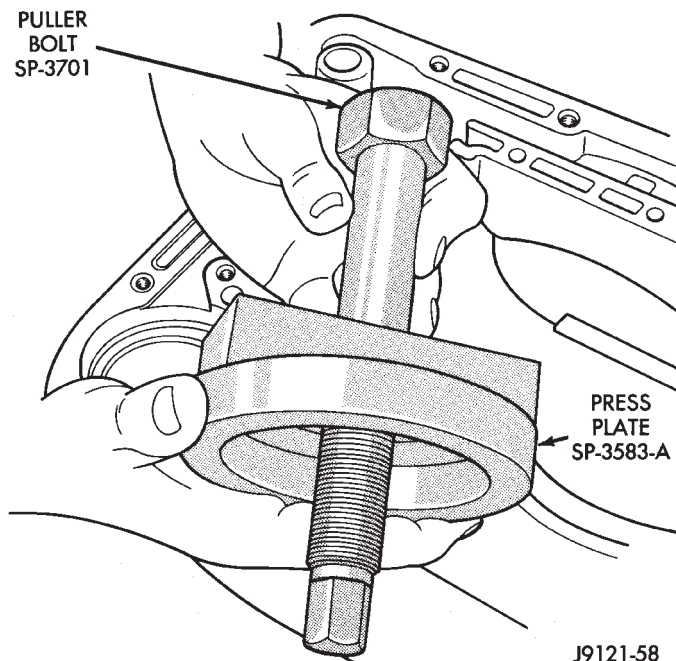
**Fig. 147 Positioning Replacement Clutch Cam In Case**



**Fig. 148 Positioning Adapter Tool In Overdrive Piston Retainer**



## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 149 Assembling Clutch Cam Puller Bolt And Press Plate**

(6) Install assembled puller plate and bolt (Fig. 150). Insert bolt through cam, case and adapter tool. Be sure plate is seated squarely on cam.

(7) Hold puller plate and bolt in place and install puller nut SP-3701 on puller bolt (Fig. 151).

(8) Tighten puller nut to press clutch cam into case (Fig. 151). **Be sure cam is pressed into case evenly and does not become cocked.**

(9) Remove clutch cam installer tools.

(10) **Stake case in 12 places around clutch cam to help secure cam in case. Use blunt punch or chisel to stake case.**

(11) Remove piston retainer from case. Cover retainer with plastic sheeting, or paper to keep it dust free.

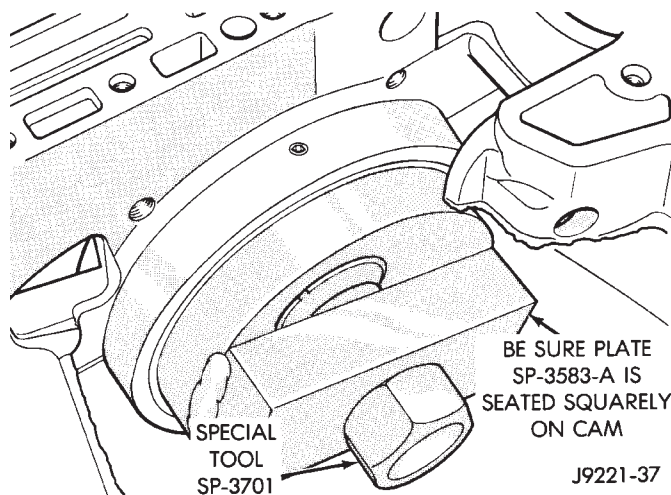
(12) Clean case and cam thoroughly. Be sure any chips/shavings generated during cam installation are removed from case.

(13) Install new gasket at rear of transmission case. Use petroleum jelly to hold gasket in place. Be sure to align governor feed holes in gasket with feed passages in case (Fig. 152). Also install gasket before overdrive piston retainer. Center hole in gasket is smaller than retainer and cannot be installed over retainer.

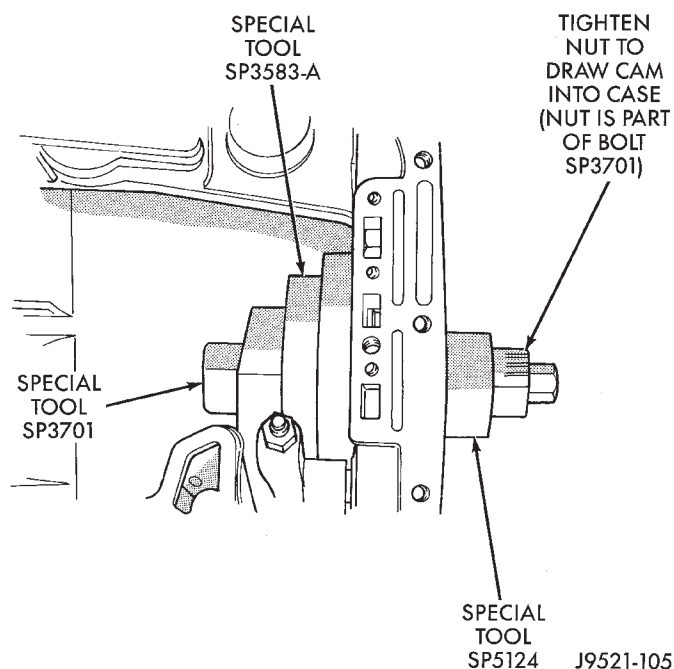
(14) Position overdrive piston retainer on transmission case and align bolt holes in retainer, gasket and case (Fig. 153). Then install and tighten retainer bolts to 17 N·m (13 ft. lbs.) torque.

(15) Install new seals on overdrive piston.

(16) Stand transmission case upright on bellhousing.



**Fig. 150 Positioning Puller Plate On Clutch Cam**



**Fig. 151 Pressing Overrunning Clutch Cam Into Case**

(17) Position Guide Ring 8114-1 on outer edge of overdrive piston retainer.

(18) Position Seal Guide 8114-3 on inner edge of overdrive piston retainer.

(19) Install overdrive piston in overdrive piston retainer by: aligning locating lugs on overdrive piston to the two mating holes in retainer.

(a) Aligning locating lugs on overdrive piston to the two mating holes in retainer.

(b) Lubricate overdrive piston seals with Mopar® Door Ease, or equivalent.

(c) Install piston over Seal Guide 8114-3 and inside Guide Ring 8114-1.



## DISASSEMBLY AND ASSEMBLY (Continued)

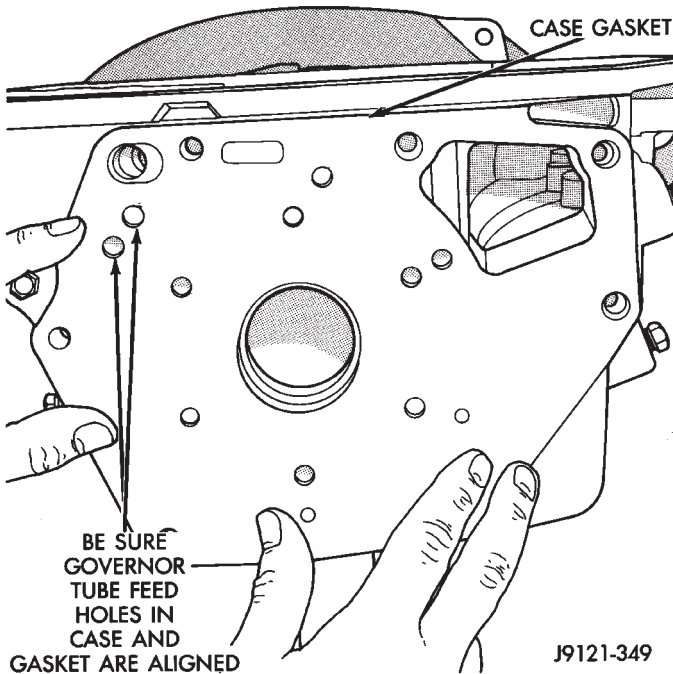


Fig. 152 Installing/Aligning Case Gasket

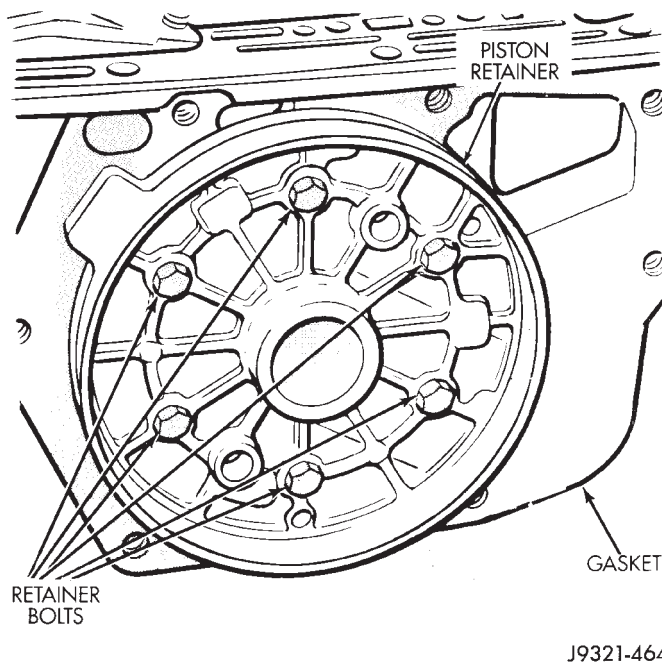


Fig. 153 Aligning Overdrive Piston Retainer

(d) Push overdrive piston into position in retainer.

(e) Verify that the locating lugs entered the lug bores in the retainer.

**NOTE: INSTALL THE REMAINING TRANSMISSION COMPONENTS AND OVERDRIVE UNIT.**

## FRONT SERVO PISTON

## DISASSEMBLY

- (1) Remove seal ring from rod guide (Fig. 154).
- (2) Remove small snap ring from servo piston rod. Then remove piston rod, spring and washer from piston.
- (3) Remove and discard servo component O-ring and seal rings.

## ASSEMBLY

Clean and inspect front servo components.

(1) Lubricate new O-ring and seal rings with petroleum jelly and install them on piston, guide and rod.

(2) Install rod in piston. Install spring and washer on rod. Compress spring and install snap ring (Fig. 154).

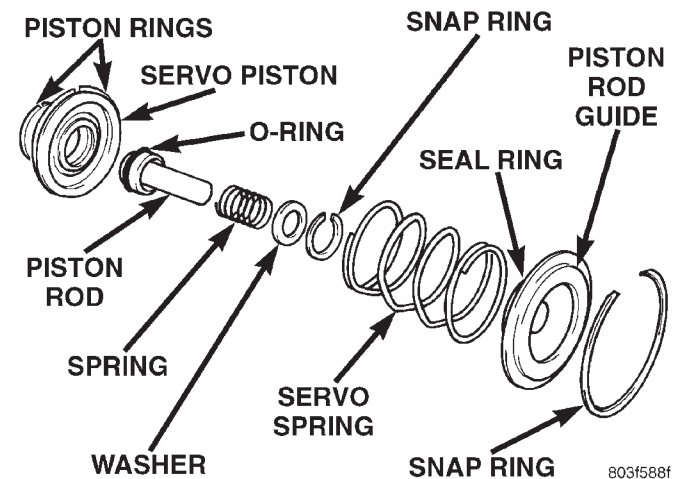


Fig. 154 Front Servo

## REAR SERVO PISTON

## DISASSEMBLY

- (1) Remove small snap ring and remove plug and spring from servo piston (Fig. 155).
- (2) Remove and discard servo piston seal ring.

## ASSEMBLY

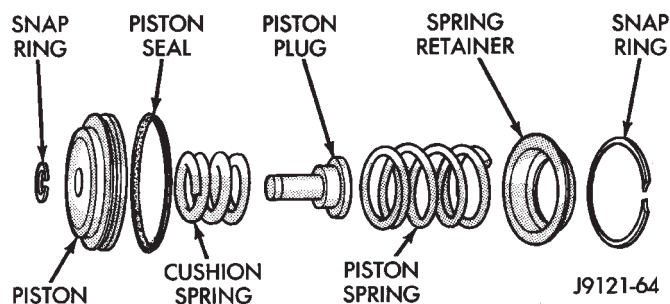
(1) Lubricate piston and guide seals with petroleum jelly. Lubricate other servo parts with Mopar® ATF Plus 3, Type 7176, transmission fluid.

(2) Install new seal ring on servo piston.

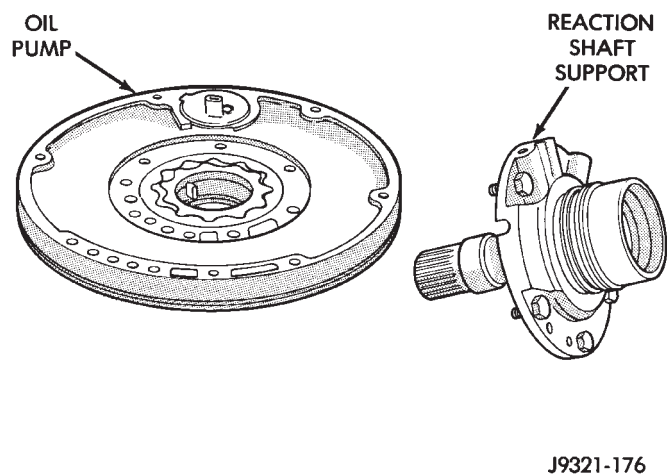
(3) Assemble piston, plug, spring and new snap ring.

(4) Lubricate piston seal lip with petroleum jelly.

## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 155 Rear Servo Components****OIL PUMP AND REACTION SHAFT SUPPORT****DISASSEMBLY**

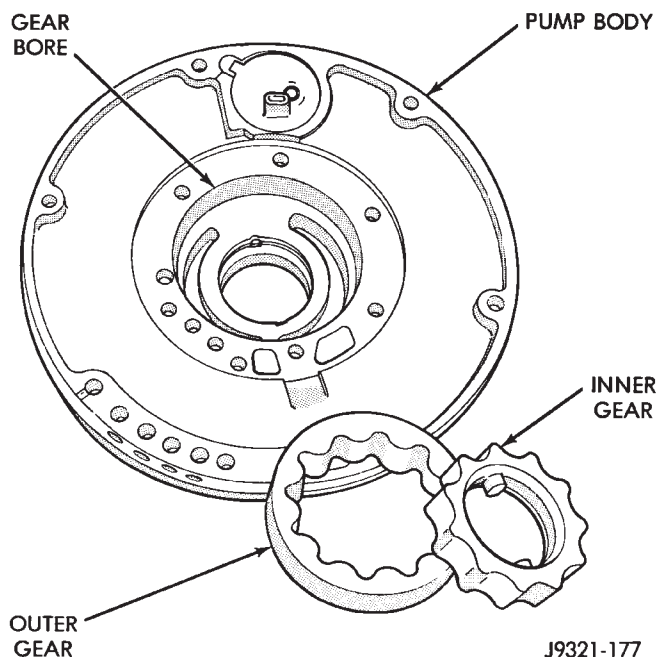
- (1) Mark position of support in oil pump body for assembly alignment reference. Use scribe or paint to make alignment marks.
- (2) Place pump body on two wood blocks.
- (3) Remove reaction shaft support bolts and separate support from pump body (Fig. 156).
- (4) Remove pump inner and outer gears (Fig. 157).
- (5) Remove O-ring seal from pump body (Fig. 158). Discard seal after removal.
- (6) Remove oil pump seal with Remover Tool C-3981. Discard seal after removal.

**Fig. 156 Reaction Shaft Support****OIL PUMP BUSHING REMOVAL**

- (1) Position pump housing on clean, smooth surface with gear cavity facing down.
- (2) Remove bushing with Tool Handle C-4171 and Bushing Remover SP-3550 (Fig. 159).

**REACTION SHAFT SUPPORT BUSHING REMOVAL**

- (1) Assemble Cup Tool SP-3633, Nut SP-1191 and Bushing Remover SP-5301 (Fig. 161).
- (2) Hold cup tool firmly against reaction shaft. Thread remover tool into bushing as far as possible by hand.

**Fig. 157 Pump Gear**

- (3) Using wrench, thread remover tool an additional 3-4 turns into bushing to firmly engage tool.
- (4) Tighten tool hex nut against cup tool to pull bushing from shaft. Clean all chips from shaft and support after bushing removal.

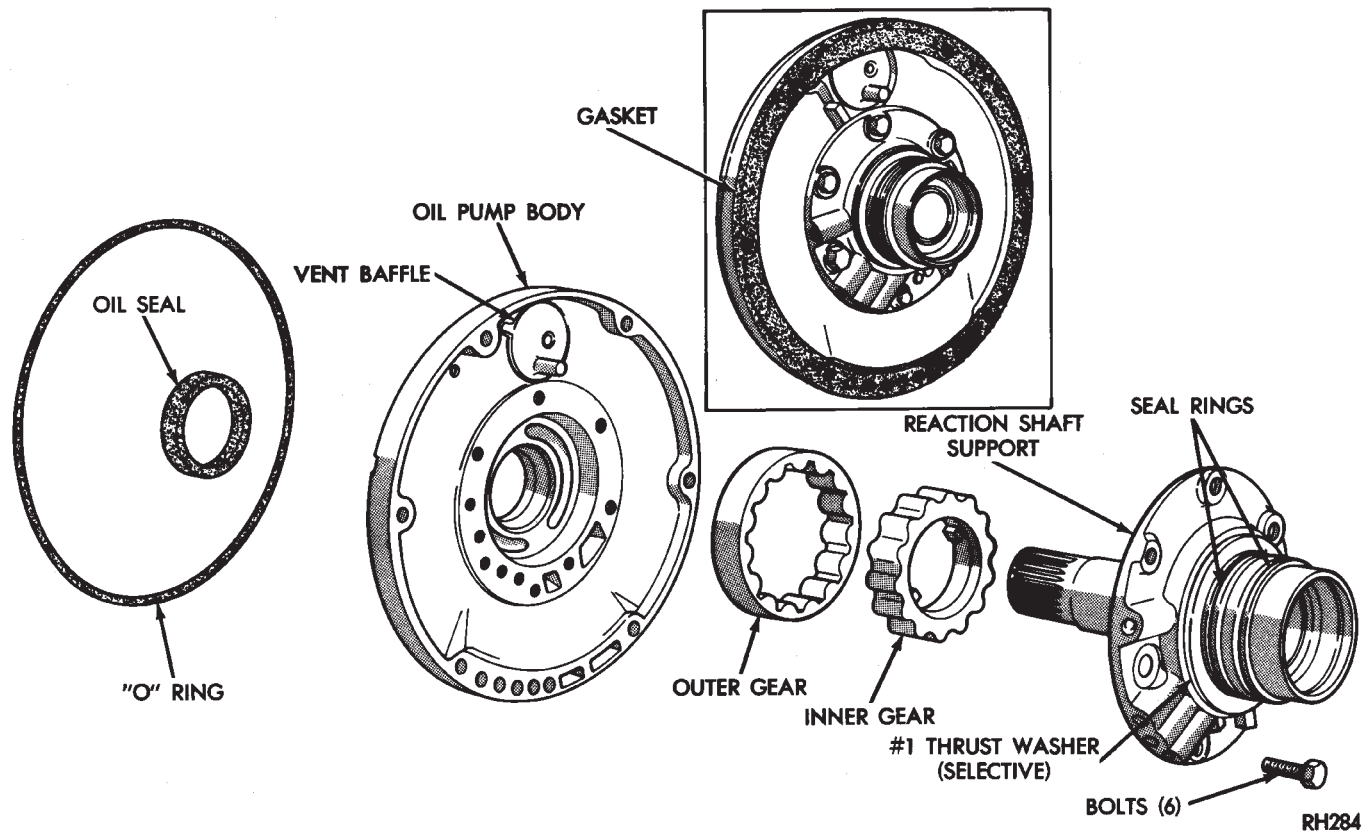
**ASSEMBLY****OIL PUMP BUSHING INSTALLATION**

- (1) Assemble Tool Handle C-4171 and Bushing Installer SP-5118.
- (2) Place bushing on installer tool and start bushing into shaft.
- (3) Tap bushing into place until Installer Tool SP-5118 bottoms in pump cavity. Keep tool and bushing square with bore. Do not allow bushing to become cocked during installation.
- (4) Stake pump bushing in two places with blunt punch. Remove burrs from stake points with knife blade (Fig. 160).

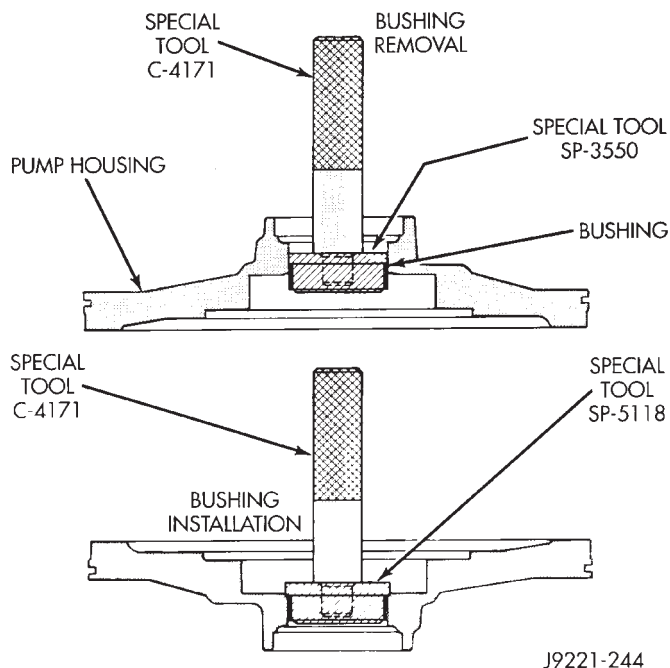
**REACTION SHAFT SUPPORT BUSHING INSTALLATION**

- (1) Place reaction shaft support upright on a clean, smooth surface.
- (2) Assemble Bushing Installer Tools C-4171 and SP-5302. Then slide new bushing onto installer tool (Fig. 161).
- (3) Start bushing in shaft. Tap bushing into shaft until installer tool bottoms against support flange.
- (4) Clean reaction shaft support thoroughly after bushing replacement (to remove any chips).
- (1) Lubricate pump gears with transmission fluid and install them in pump body.

DISASSEMBLY AND ASSEMBLY (Continued)

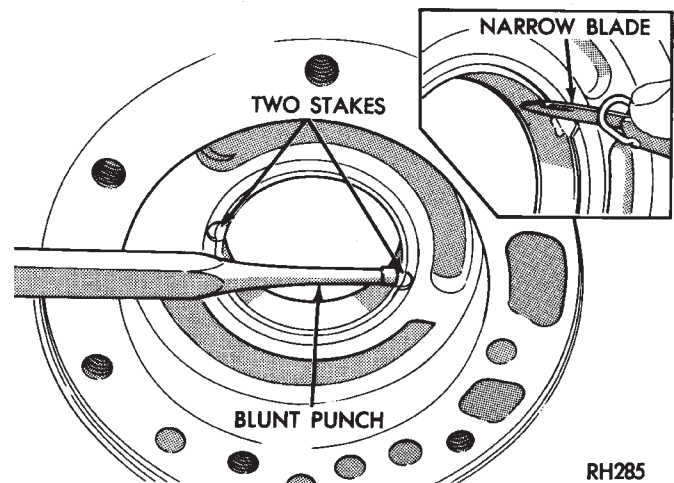


**Fig. 158 Oil Pump And Reaction Shaft Components**



**Fig. 159 Oil Pump Bushing**

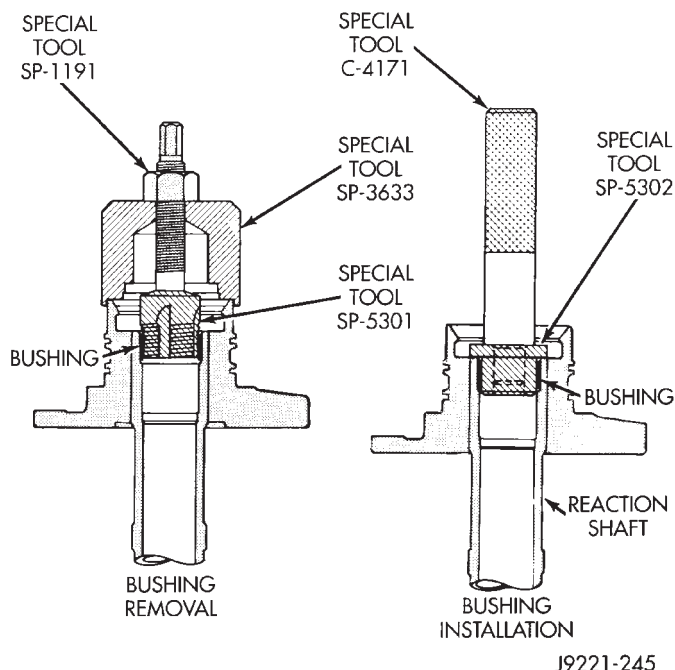
(2) Install thrust washer on reaction shaft support hub. Lubricate washer with petroleum jelly or transmission fluid before installation.



**Fig. 160 Staking-Deburring Oil Pump Bushing**

(3) If reaction shaft seal rings are being replaced, install new seal rings on support hub. Lubricate seal rings with transmission fluid or petroleum jelly after installation. Squeeze each ring until ring ends are securely hooked together.

## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 161 Reaction Shaft Bushing**

**CAUTION:** The reaction shaft support seal rings will break if overspread, or twisted. If new rings are being installed, spread them only enough for installation. Also be very sure the ring ends are securely hooked together after installation. Otherwise, the rings will either prevent pump installation, or break during installation.

(4) Align and install reaction shaft support on pump body.

(5) Install bolts attaching reaction shaft support to pump. Tighten bolts to 20 N·m (175 in. lbs.) torque.

(6) Install new pump seal with Installer Tool C-3860-A (Fig. 162). Use hammer or mallet to tap seal into place.

(7) Install new O-ring on pump body. Lubricate oil seal and O-ring with petroleum jelly.

(8) Cover pump assembly to prevent dust entry and set aside for assembly installation.

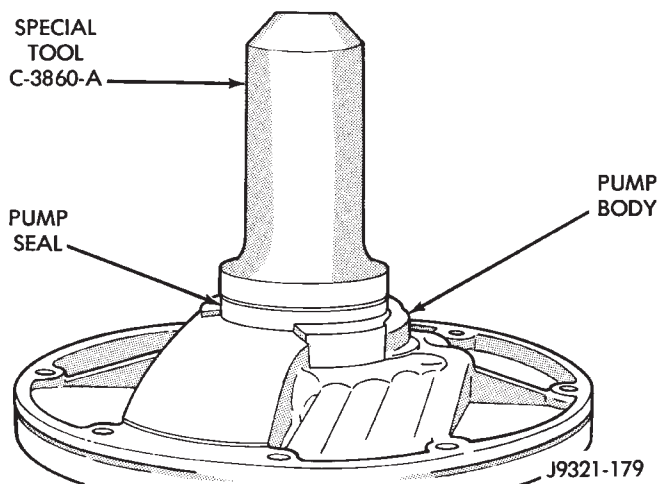
**FRONT CLUTCH****DISASSEMBLY**

(1) Remove waved snap ring and remove reaction plate, clutch plates and clutch discs.

(2) Compress clutch piston retainer and piston springs with Compressor Tool C-3863-A (Fig. 163).

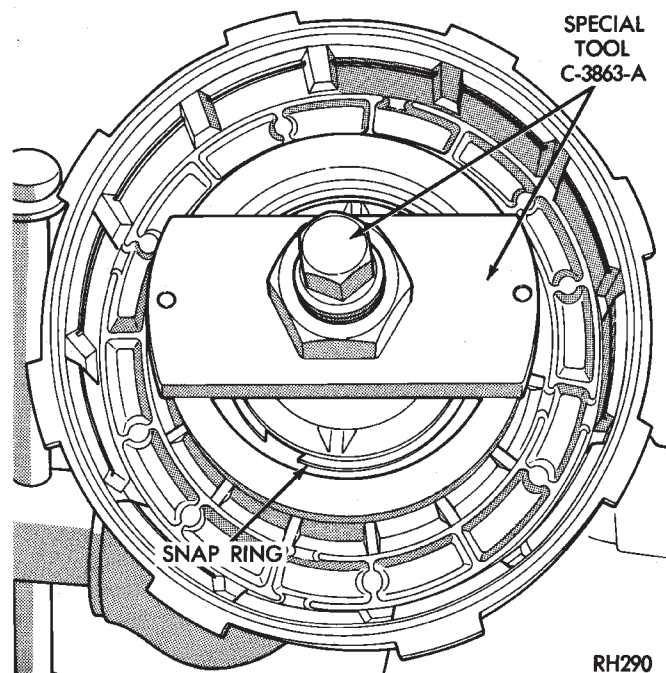
(3) Remove retainer snap ring and remove compressor tool.

(4) Remove clutch piston springs (Fig. 164). **Note position of piston springs for assembly reference.**

**Fig. 162 Oil Pump Seal**

(5) Remove clutch piston from retainer with a twisting motion.

(6) Remove and discard clutch piston inner and outer seals.

**Fig. 163 Removing Front Clutch Spring Retainer Snap Ring**

(7) Assemble Tool Handle C-4171 and Bushing Remover SP-3629 (Fig. 165).

(8) Insert remover tool in bushing and drive bushing straight out of clutch retainer.

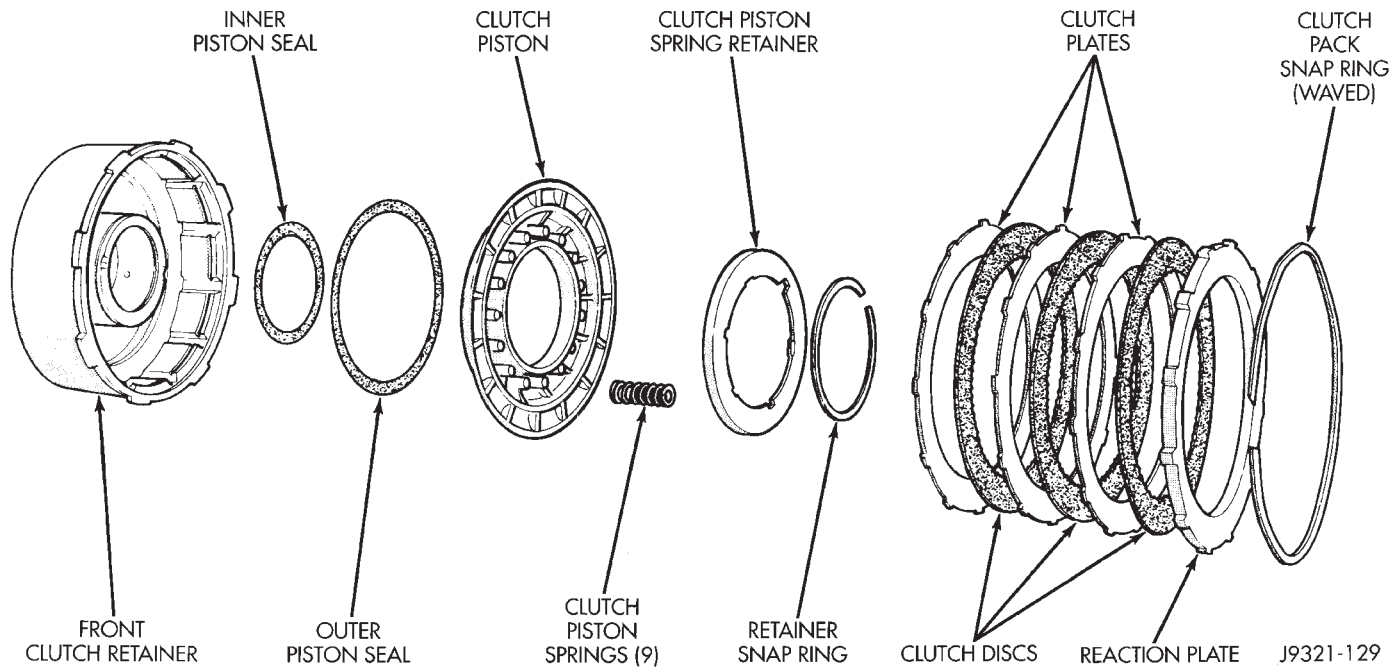
**ASSEMBLY**

(1) Mount Bushing Installer SP-5511 on tool handle (Fig. 165).

(2) Slide new bushing onto installer tool and start bushing into retainer.



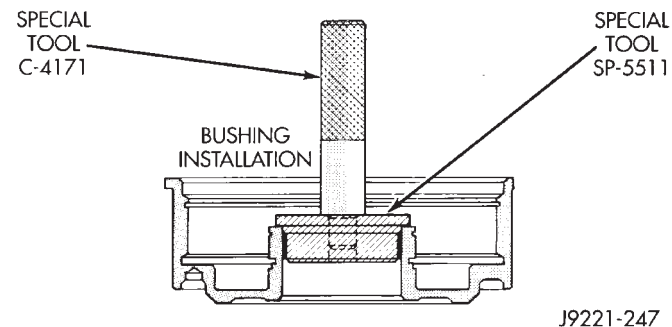
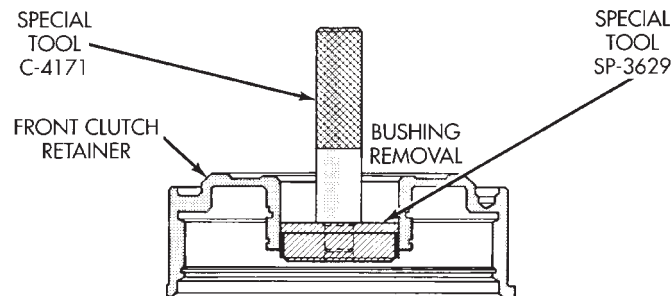
DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 164 Front Clutch Components**

(3) Tap new bushing into place until installer tool bottoms against clutch retainer.

(4) Remove installer tools and clean retainer thoroughly.



J9221-247

**Fig. 165 Front Clutch Retainer Bushing Replacement Tools**

(5) Soak clutch discs in transmission fluid.

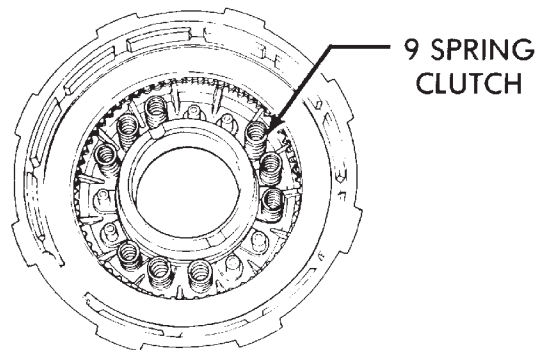
(6) Install new inner and outer seals on clutch piston. Be sure seal lips face interior of retainer.

(7) Lubricate new inner and outer piston seals with Ru-Glyde, or Mopar® Door Ease.

(8) Install clutch piston in retainer. Use twisting motion to seat piston in bottom of retainer. A thin strip of plastic (about 0.015 - 0.020 in. thick), can be used to guide seals into place if necessary.

**CAUTION:** Never push the clutch piston straight in. This will fold the seals over causing leakage and clutch slip. In addition, never use any type of metal tool to help ease the piston seals into place. Metal tools will cut, shave, or score the seals.

(9) Install and position nine clutch piston springs (Fig. 166).



**Fig. 166 Front Clutch Spring Position**

(10) Install spring retainer on top of piston springs.

## DISASSEMBLY AND ASSEMBLY (Continued)

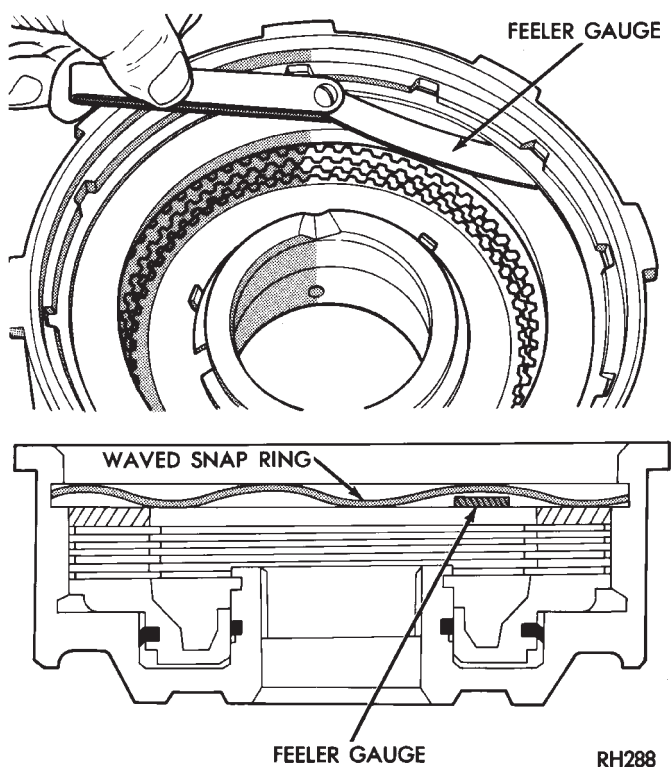
(11) Compress spring retainer and piston springs with Tool C-3863-A.

(12) Install spring retainer snap ring and remove compressor tool.

(13) Install clutch plates and discs (Fig. 164). Three clutch discs, three steel plates and one reaction plate are required.

(14) Install reaction plate followed by waved snap ring.

(15) Check clutch pack clearance with feeler gauge (Fig. 167). Clearance between waved spring and pressure plate should 1.78 - 3.28 mm (0.070 - 0.129 in.). If clearance is incorrect, clutch plates, clutch discs, snap ring, or pressure plate may have to be changed.



**Fig. 167 Typical Method Of Measuring Front Clutch Pack Clearance**

## REAR CLUTCH

### DISASSEMBLY

- (1) Remove clutch pack select fit snap ring.
- (2) Remove reaction plate and remove clutch plates and discs (Fig. 168).
- (3) Remove pressure plate, wave spring, spacer ring and piston spring from clutch retainer.
- (4) Remove clutch piston from piston retainer with a twisting motion.
- (5) Remove input shaft thrust washer, if washer remained in piston retainer hub during removal.
- (6) Remove seals from clutch piston. Discard seals after removal.

If the input shaft must be replaced, first remove the retaining ring that secures the shaft in the piston retainer hub. Then press the old shaft out of the retainer with a shop press using suitable press tools to press on the shaft and to support the retainer hub as close to the shaft as possible.

### ASSEMBLY

(1) Lubricate the splines of the new shaft with petroleum jelly or Mopar® ATF Plus 3, type 7176. Then align the shaft in the piston retainer and carefully press it into place using suitable press tools to press the shaft and to support the retainer hub as close to the shaft as possible. Do not allow the shaft to become cocked during installation. The retainer can be cracked if misalignment occurs.

(2) Install the shaft retaining ring after pressing the shaft into place. Be sure the ring is fully seated before proceeding with clutch assembly.

(3) Invert the input shaft in the press and using the same tools as in removal, press on shaft enough to seat the snap-ring into the retainer.

(4) Soak clutch discs in transmission fluid before assembly.

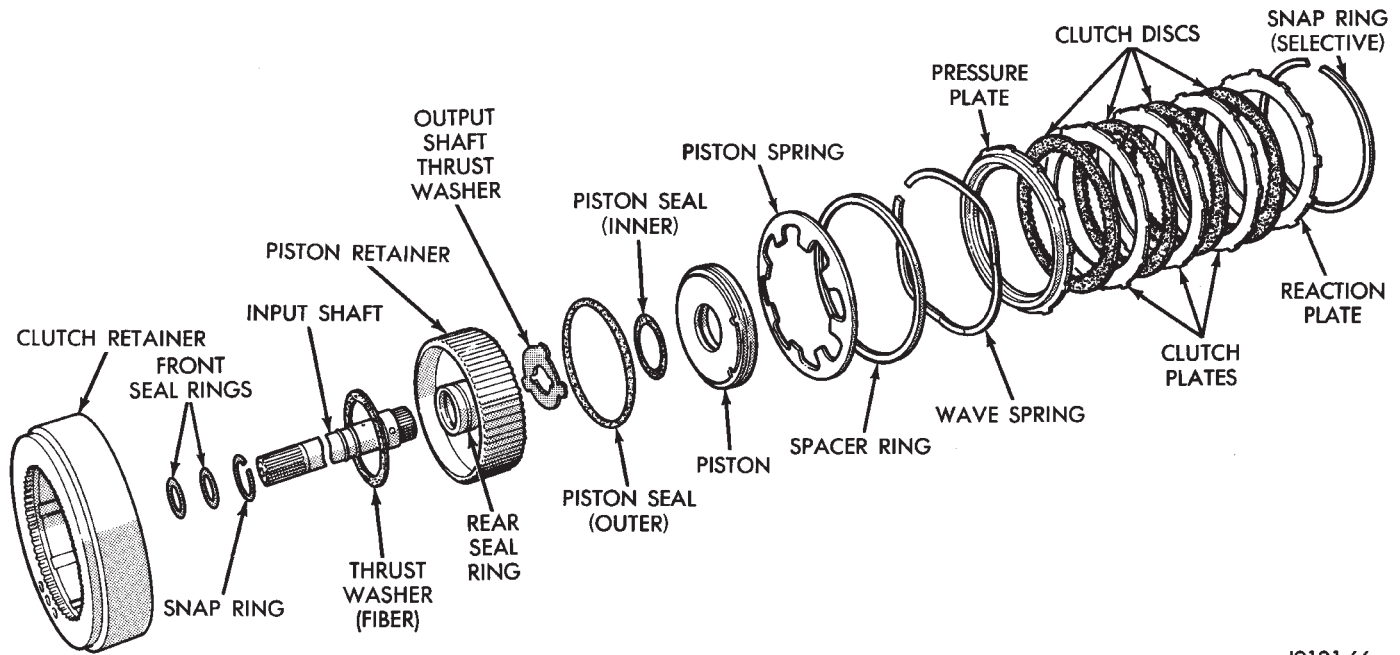
(5) Install new seals on clutch piston. Lubricate piston seals with Mopar® Door Ease, or Ru-Glyde to ease installation. **Be sure seal lips face input shaft.**

(6) Install clutch piston in retainer. Use twisting motion to seat piston in bottom of retainer. A thin strip of plastic (about 0.020" thick), can be used to guide seals into place if necessary.

**CAUTION:** Never push the clutch piston straight in. This will fold the seals over causing leakage and clutch slip. In addition, never use any type of metal tool to help ease the piston seals into place. Metal tools will cut, shave, or score the seals.

- (7) Assemble piston retainer and clutch retainer.
- (8) Support clutch retainer with wood blocks, or insert input shaft through pre-drilled hole in workbench. Clutch pack components are easier to install if retainers are properly supported.
- (9) Install piston spring in clutch retainer. Concave side of spring faces upward and away from clutch piston.
- (10) Install spacer ring on top of piston spring.
- (11) Install wave spring on top of spacer ring. Then seat wave spring in retainer groove. **If wave spring will not seat properly, spacer ring has probably shifted over and into wave spring groove in retainer. Use small screwdriver to realign spacer ring if necessary.**
- (12) Install inner pressure plate in clutch retainer.

# DISASSEMBLY AND ASSEMBLY (Continued)



J9121-66

**Fig. 168 Rear Clutch Components**

(13) Install first clutch disc followed by steel plate until all discs and plates are installed. 4 clutch discs and steel plates are required (Fig. 168).

(14) Install reaction plate on top of last clutch disc.

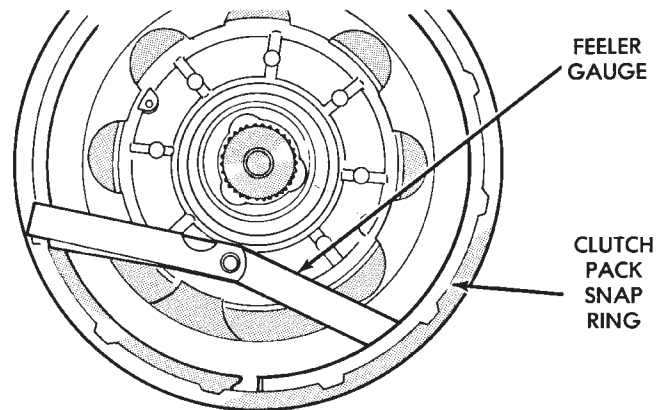
(15) Install selective snap ring to secure clutch pack in retainer.

(16) Install new seal rings on input shaft if necessary (Fig. 169). Be very sure ring ends are all securely hooked together before proceeding.

(17) Check clutch pack clearance with feeler gauge (Fig. 170). Clearance should be 0.63 to 1.14 mm (0.025 to 0.045 in.).

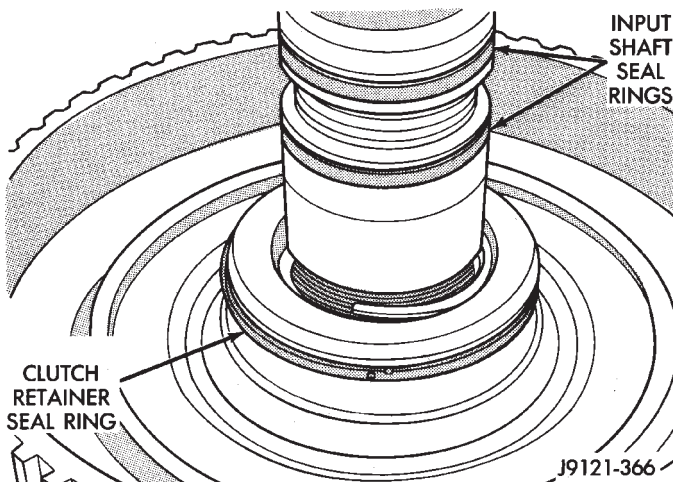
(18) If clutch pack clearance is incorrect, clutch pack snap ring, may have to be replaced.

(19) Install thrust washer on piston retainer hub. Use petroleum jelly to hold thrust washer in place.



J9321-167

**Fig. 170 Measuring Rear Clutch Pack Clearance**  
**PLANETARY GEARTRAIN/OUTPUT SHAFT**



J9121-366

**Fig. 169 Input Shaft Seal Ring Locations**

## DISASSEMBLY

(1) Remove planetary snap ring from intermediate shaft (Fig. 171). Discard snap ring as it is not reusable.

(2) Remove front planetary gear and front annulus gear as assembly (Fig. 172).

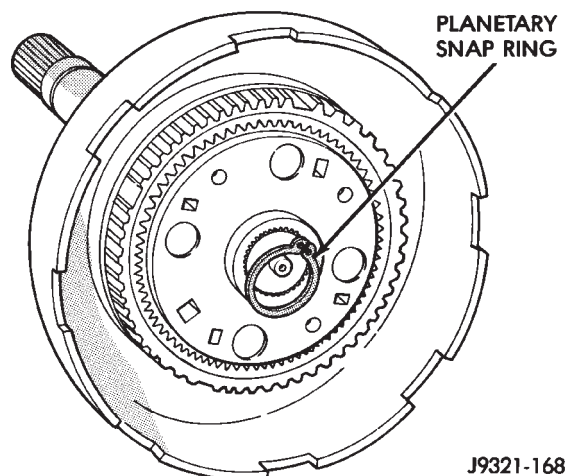
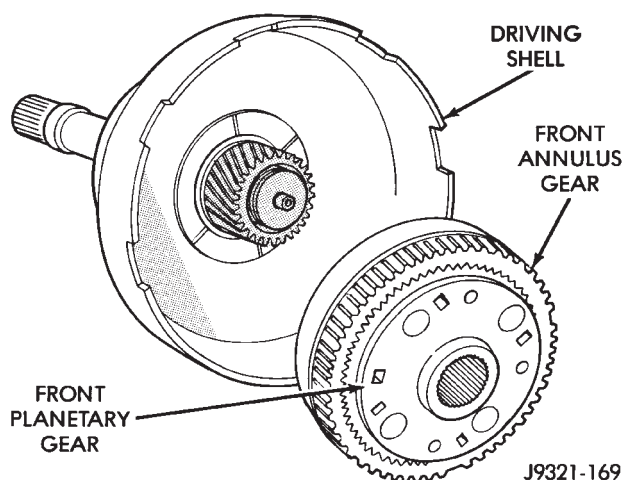
(3) Remove front planetary gear and thrust washer from front annulus gear (Fig. 173). Note thrust washer position for assembly reference.

(4) Remove tabbed thrust washer from driving shell (Fig. 174). Note washer position for assembly reference.

(5) Remove sun gear and driving shell as assembly (Fig. 175).



## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 171 Removing Planetary Snap Ring****Fig. 172 Removing Front Planetary And Annulus Gears**

(6) Remove tabbed thrust washer from rear planetary gear (Fig. 176). Note washer position on gear for assembly reference.

(7) Remove rear planetary gear and rear annulus gear from intermediate shaft (Fig. 177).

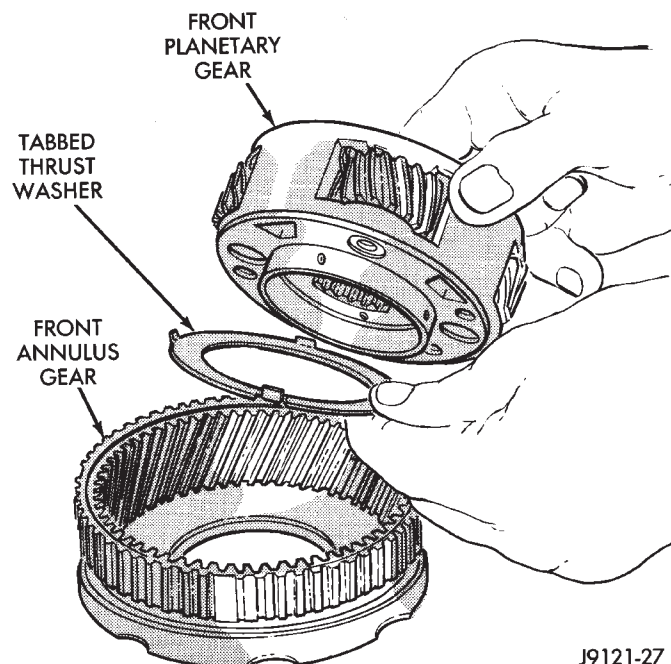
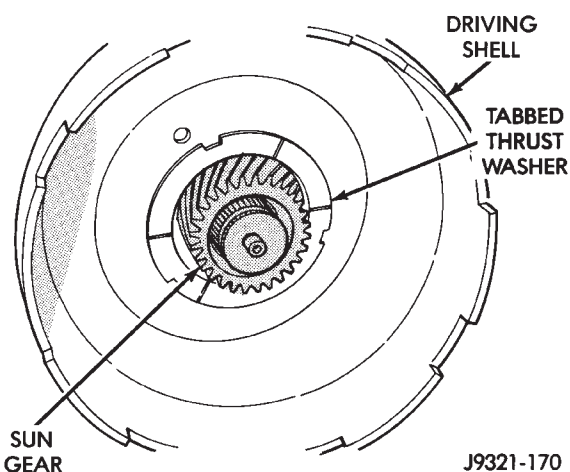
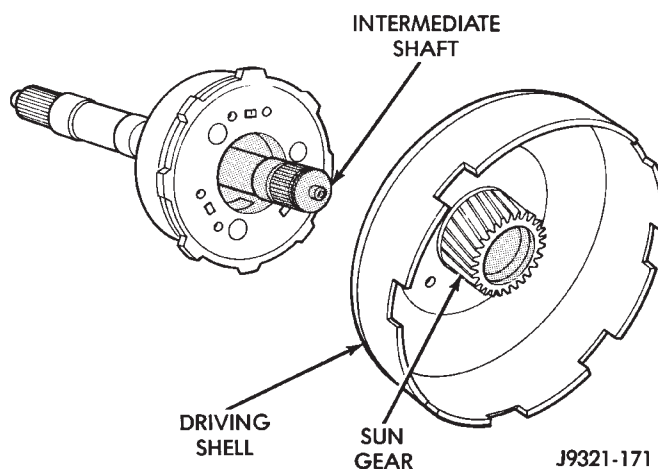
(8) Remove thrust plate from rear annulus gear (Fig. 178).

**ASSEMBLY**

(1) Lubricate sun gear and planetary gears with transmission fluid during assembly. Use petroleum jelly to lubricate intermediate shaft bushing surfaces, thrust washers and thrust plates and to hold these parts in place during assembly.

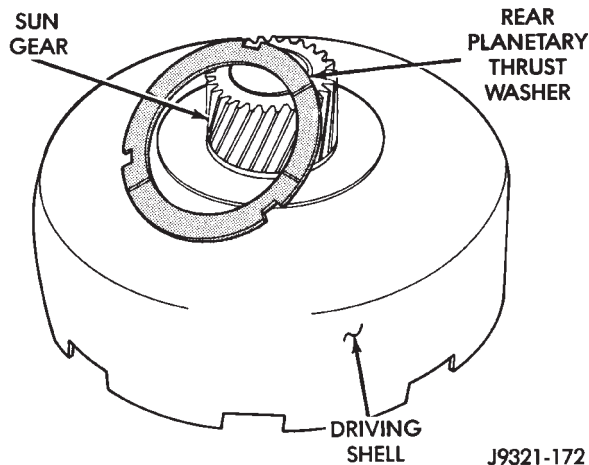
(2) Install front snap ring on sun gear and install gear in driving shell. Then install thrust plate over sun gear and against rear side of driving shell (Fig. 179). Install rear snap ring to secure sun gear and thrust plate in driving shell.

(3) Install rear annulus gear on intermediate shaft (Fig. 180).

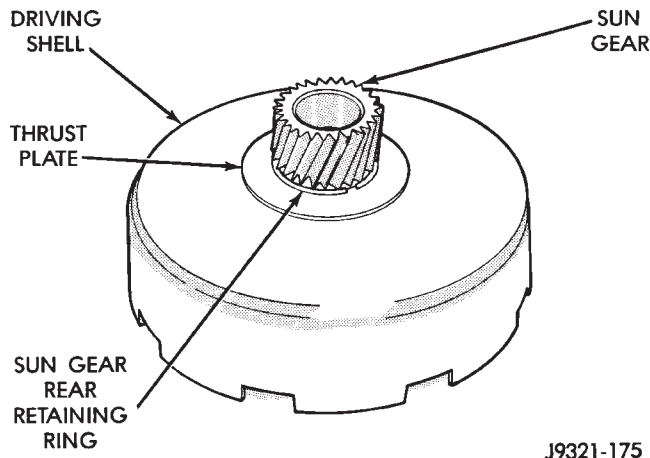
**Fig. 173 Disassembling Front Planetary And Annulus Gears****Fig. 174 Driving Shell Thrust Washer Removal****Fig. 175 Sun Gear And Driving Shell Removal**



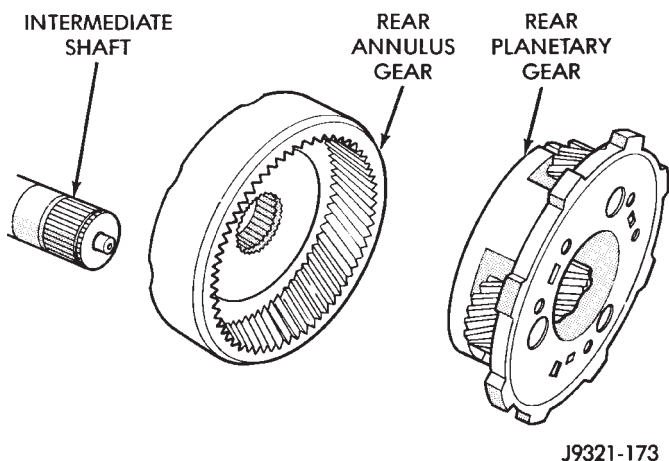
DISASSEMBLY AND ASSEMBLY (Continued)



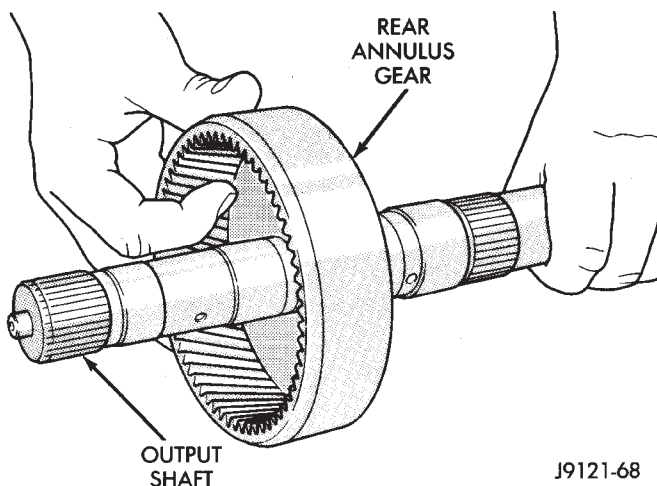
**Fig. 176 Rear Planetary Thrust Washer Removal**



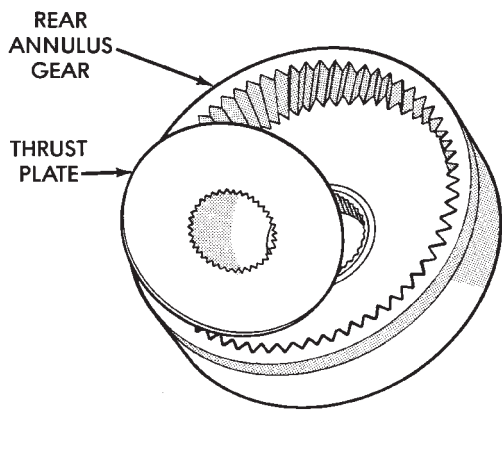
**Fig. 179 Sun Gear Installation**



**Fig. 177 Rear Planetary And Annulus Gear Removal**



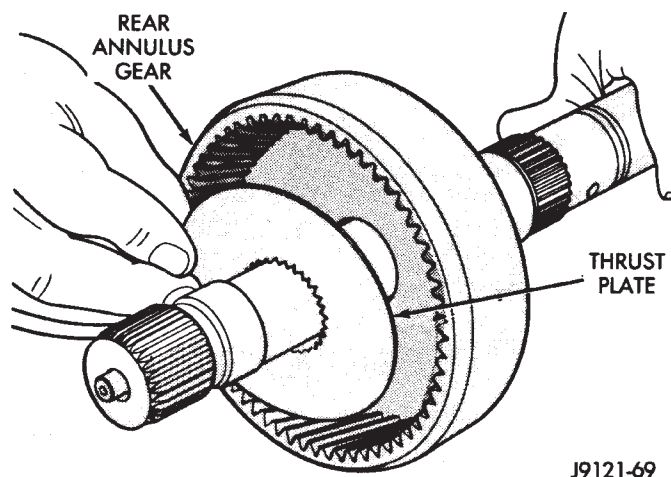
**Fig. 180 Installing Rear Annulus Gear On Intermediate Shaft**



**Fig. 178 Rear Annulus Thrust Plate Removal**

(4) Install thrust plate in annulus gear (Fig. 181). Be sure plate is seated on shaft splines and against gear.

(5) Install rear planetary gear in rear annulus gear (Fig. 182). Be sure planetary carrier is seated against annulus gear.



**Fig. 181 Installing Rear Annulus Thrust Plate**

(6) Install tabbed thrust washer on front face of rear planetary gear (Fig. 183). Seat washer tabs in matching slots in face of gear carrier. Use extra petroleum jelly to hold washer in place if desired.

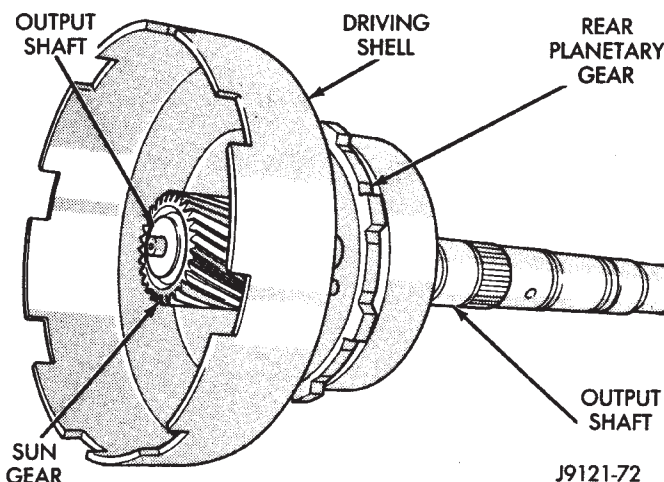
## DISASSEMBLY AND ASSEMBLY (Continued)

(7) Lubricate sun gear bushings with petroleum jelly or transmission fluid.

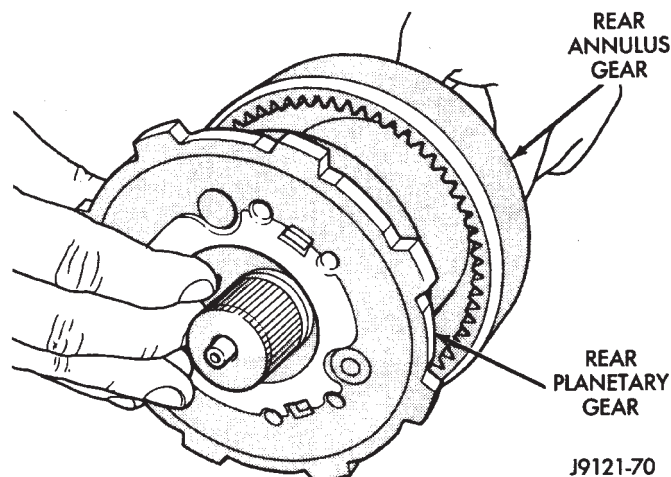
(8) Install sun gear and driving shell on intermediate shaft (Fig. 184). Seat shell against rear planetary gear. Verify that thrust washer on planetary gear was not displaced during installation.

(9) Install tabbed thrust washer in driving shell (Fig. 185), be sure washer tabs are seated in tab slots of driving shell. Use extra petroleum jelly to hold washer in place if desired.

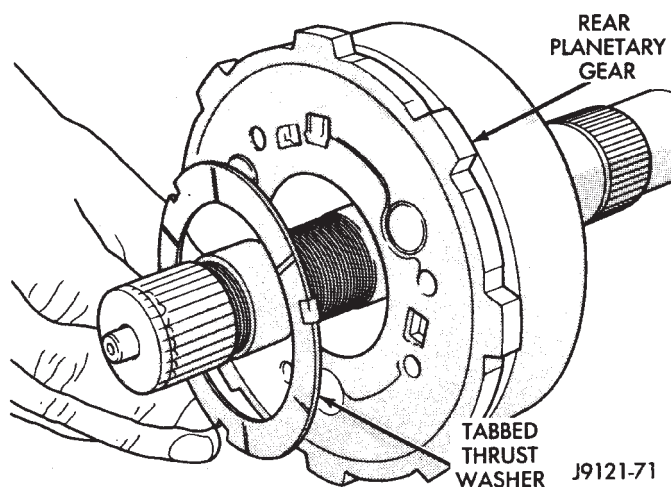
(10) Install tabbed thrust washer on front planetary gear (Fig. 186). Seat washer tabs in matching slots in face of gear carrier. Use extra petroleum jelly to hold washer in place if desired.



**Fig. 184 Installing Sun Gear And Driving Shell**



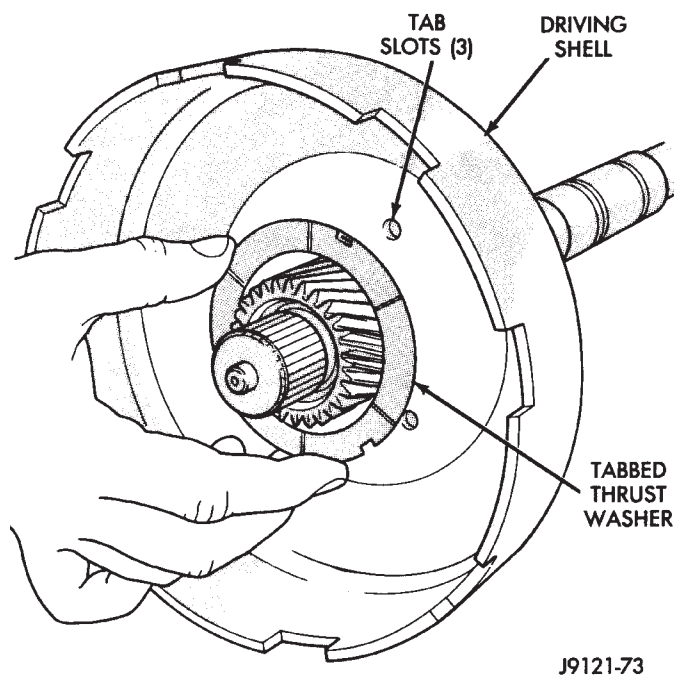
**Fig. 182 Installing Rear Planetary Gear**



**Fig. 183 Installing Rear Planetary Thrust Washer**

(11) Install front annulus gear over and onto front planetary gear (Fig. 187). Be sure gears are fully meshed and seated.

(12) Install front planetary and annulus gear assembly (Fig. 188). Hold gears together and slide them onto shaft. Be sure planetary pinions are



**Fig. 185 Installing Driving Shell Thrust Washer**

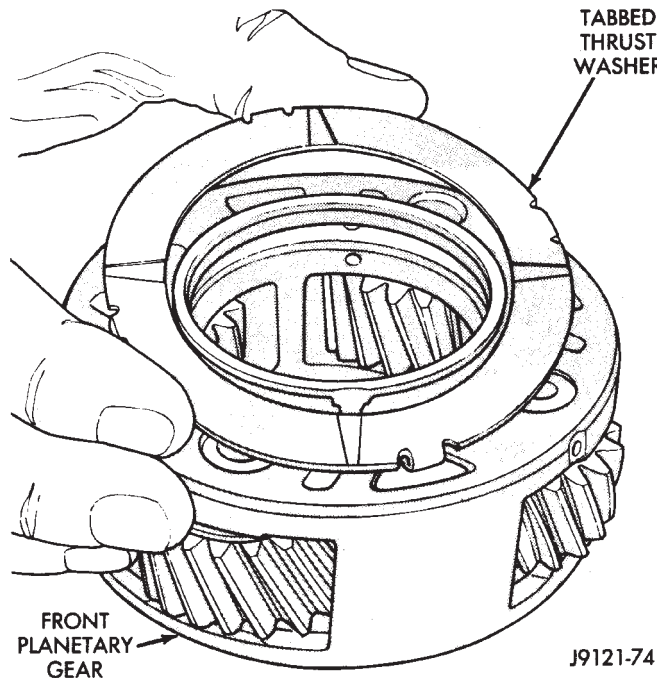
seated on sun gear and that planetary carrier is seated on intermediate shaft.

(13) Place geartrain in upright position. Rotate gears to be sure all components are seated and properly assembled. Snap ring groove at forward end of intermediate shaft will be completely exposed when components are assembled correctly.

(14) Install new planetary snap ring in groove at end of intermediate shaft (Fig. 189).

(15) Turn planetary geartrain over. Position wood block under front end of intermediate shaft and support geartrain on shaft. Be sure all geartrain parts have moved forward against planetary snap ring. This is important for accurate end play check.

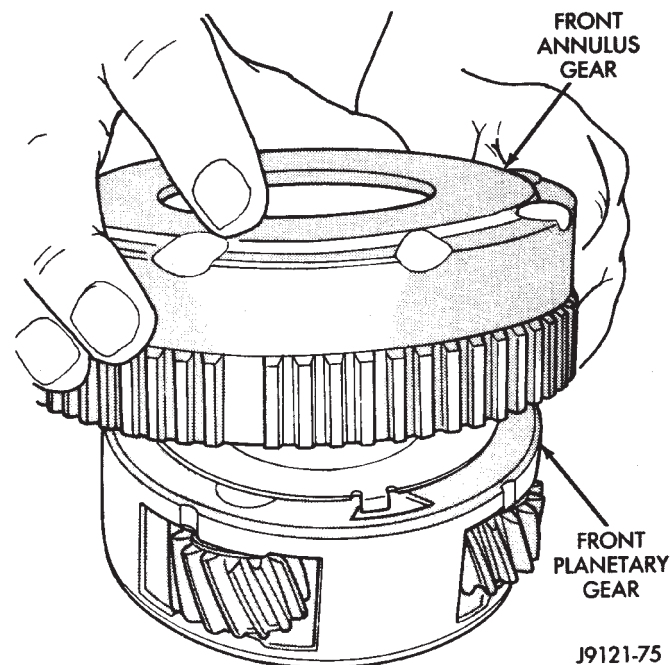
# DISASSEMBLY AND ASSEMBLY (Continued)



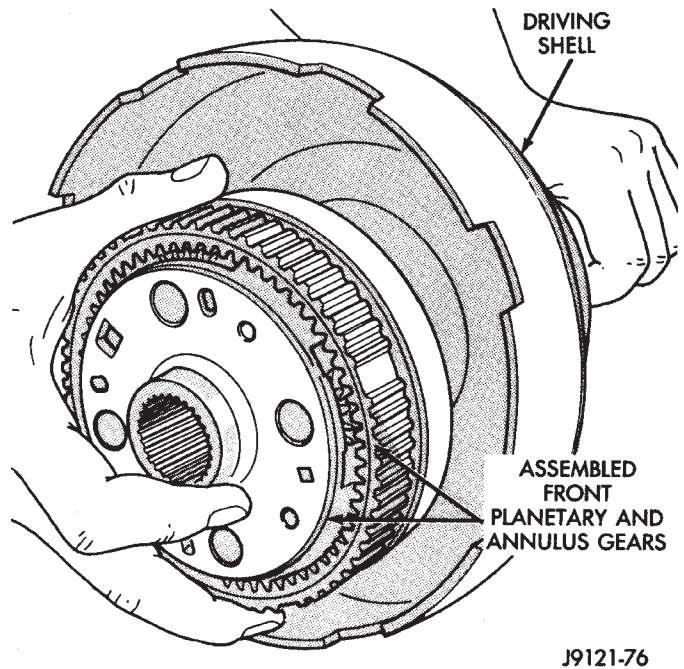
**Fig. 186 Installing Thrust Washer On Front Planetary Gear**

(16) Check planetary geartrain end play with feeler gauge (Fig. 190). Insert gauge between rear annulus gear and shoulder on intermediate shaft as shown. End play should be 0.15 to 1.22 mm (0.006 to 0.048 in.).

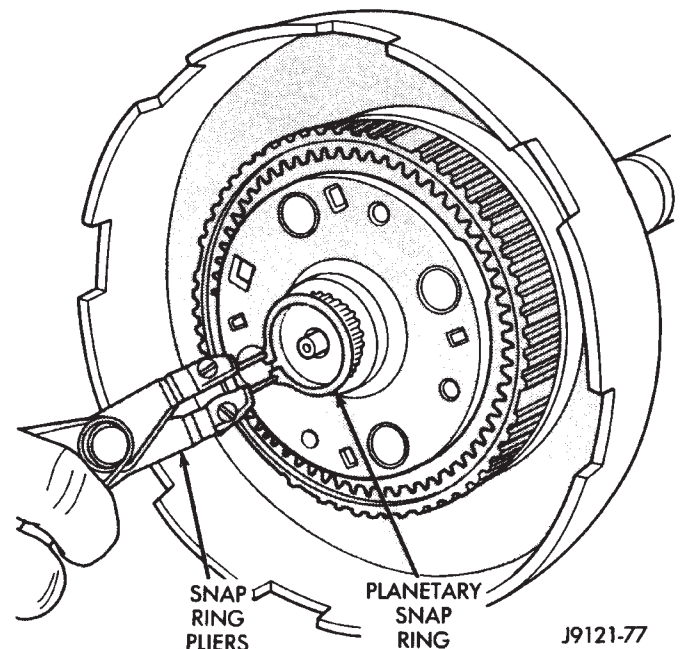
(17) If end play is incorrect, install thinner/thicker planetary snap ring as needed.



**Fig. 187 Assembling Front Planetary And Annulus Gears**



**Fig. 188 Installing Front Planetary And Annulus Gear Assembly**



**Fig. 189 Installing Planetary Snap Ring**  
**OVERDRIVE UNIT**

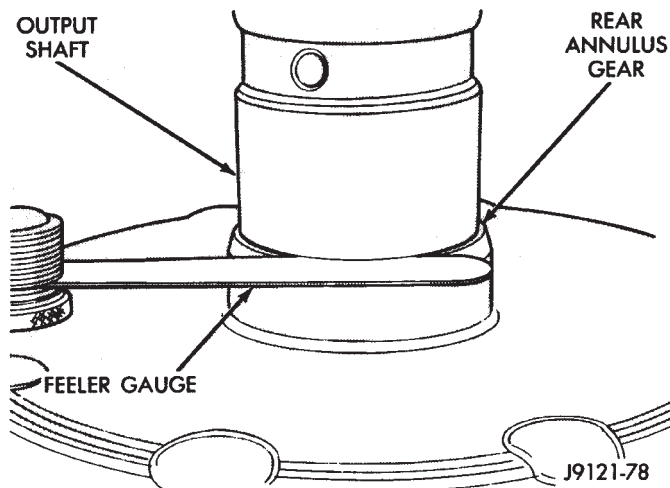
## DISASSEMBLY

(1) Remove transmission speed sensor and O-ring seal from overdrive case (Fig. 191).

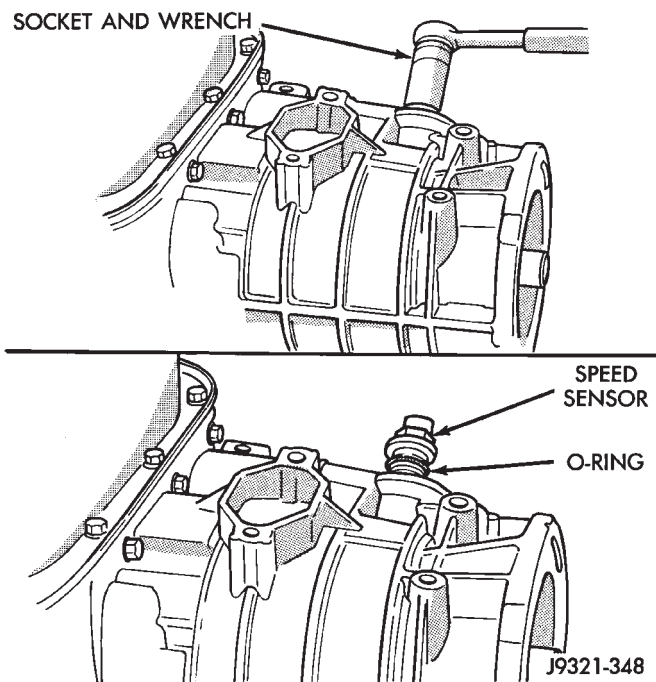
(2) Remove overdrive piston thrust bearing (Fig. 192).



## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 190 Checking Planetary Geartrain End Play**



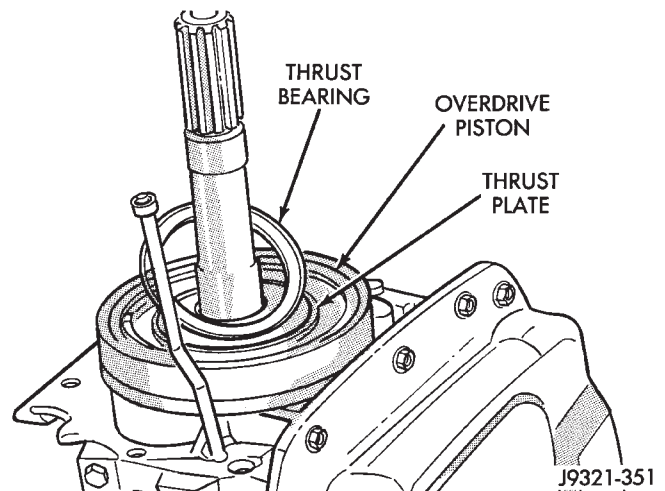
**Fig. 191 Transmission Speed Sensor Removal/Installation**

## OVERDRIVE PISTON

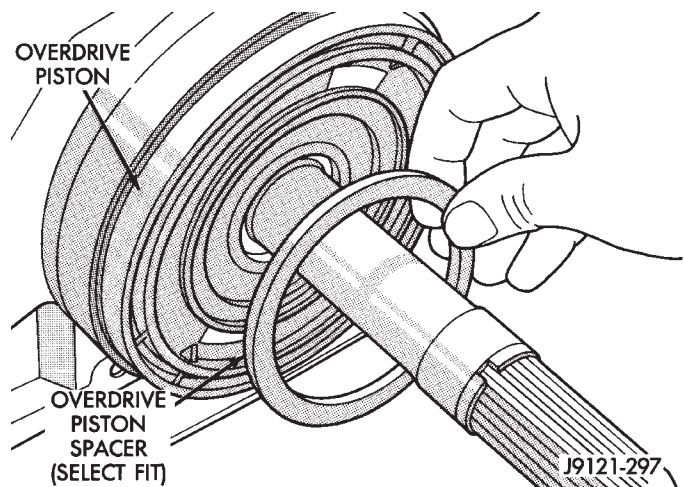
(1) Remove overdrive piston thrust plate (Fig. 193). Retain thrust plate. It is a select fit part and may possibly be reused.

(2) Remove intermediate shaft spacer (Fig. 194). Retain spacer. It is a select fit part and may possibly be reused.

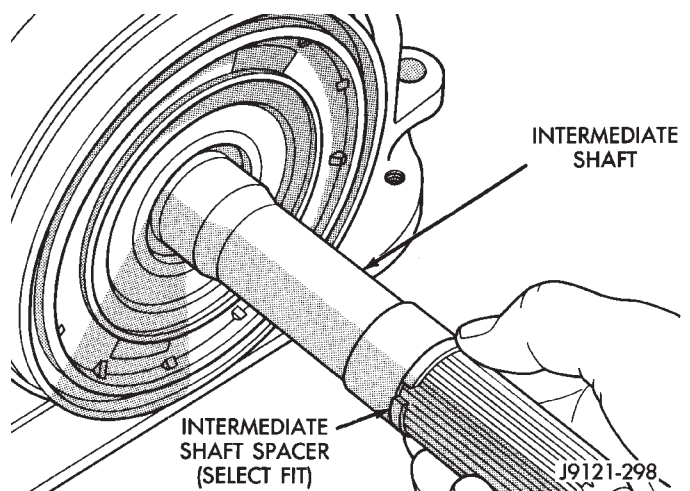
(3) Remove overdrive piston from retainer (Fig. 195).



**Fig. 192 Overdrive Piston Thrust Bearing Removal/Installation**



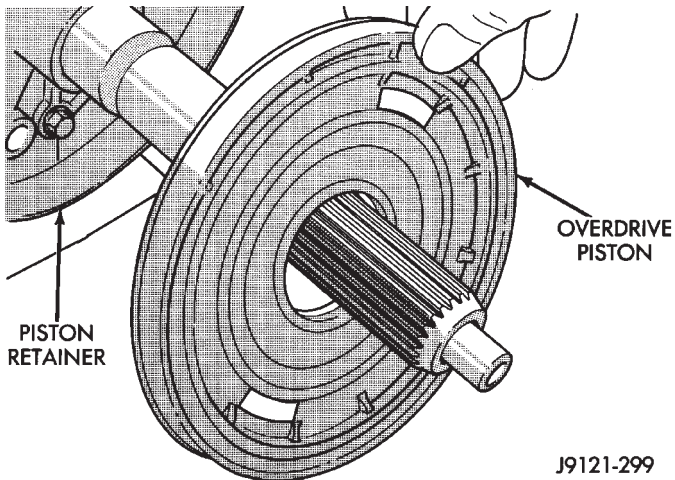
**Fig. 193 Overdrive Piston Thrust Plate Removal/Installation**



**Fig. 194 Intermediate Shaft Spacer Location**



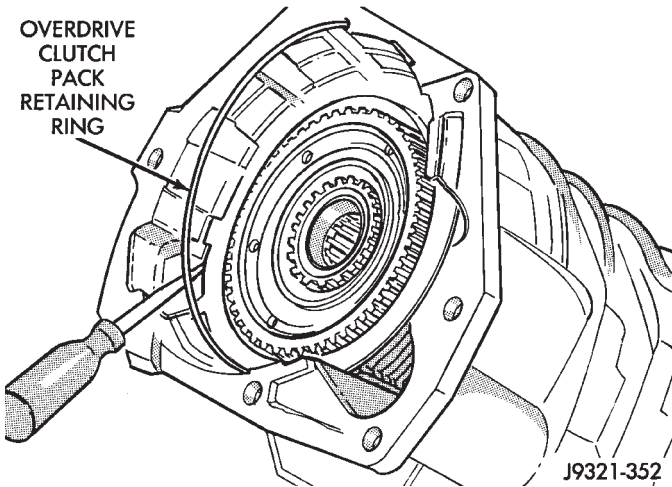
DISASSEMBLY AND ASSEMBLY (Continued)



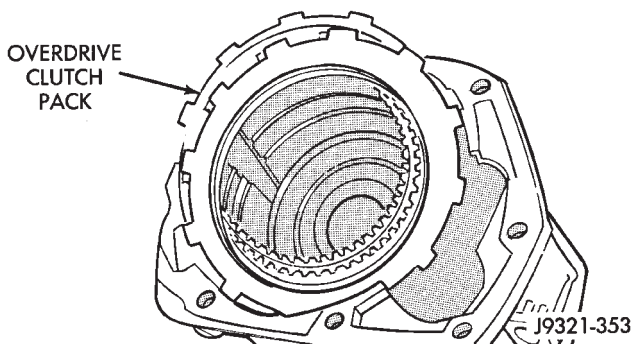
**Fig. 195 Overdrive Piston Removal**

**OVERDRIVE CLUTCH PACK**

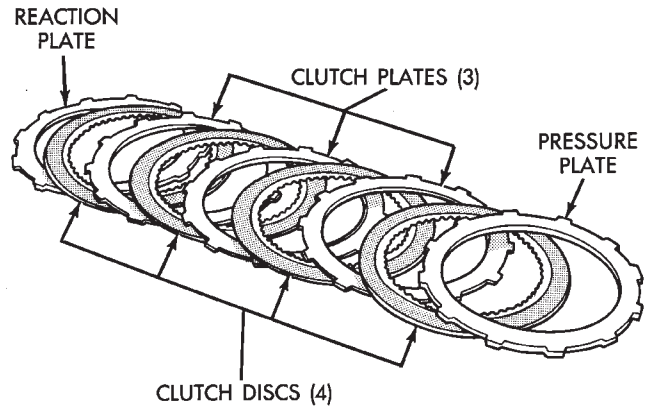
- (1) Remove overdrive clutch pack wire retaining ring (Fig. 196).
- (2) Remove overdrive clutch pack (Fig. 197).
- (3) Note position of clutch pack components for assembly reference (Fig. 198).



**Fig. 196 Removing Overdrive Clutch Pack Retaining Ring**



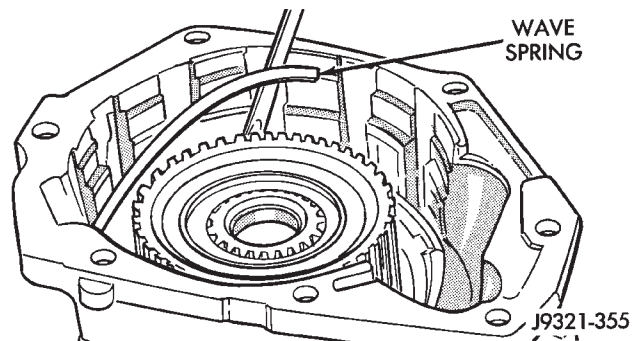
**Fig. 197 Overdrive Clutch Pack Removal**



**Fig. 198 46RE Overdrive Clutch Component Position**

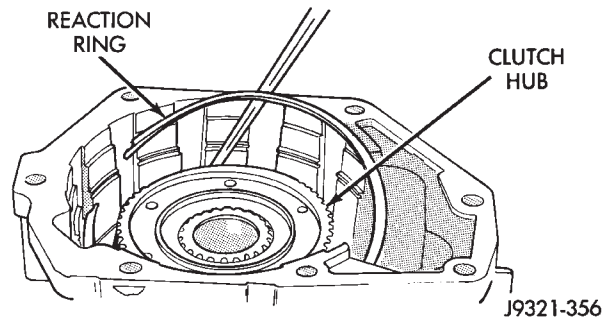
**OVERDRIVE GEARTRAIN**

- (1) Remove overdrive clutch wave spring (Fig. 199).



**Fig. 199 Overdrive Clutch Wave Spring Removal/Installation**

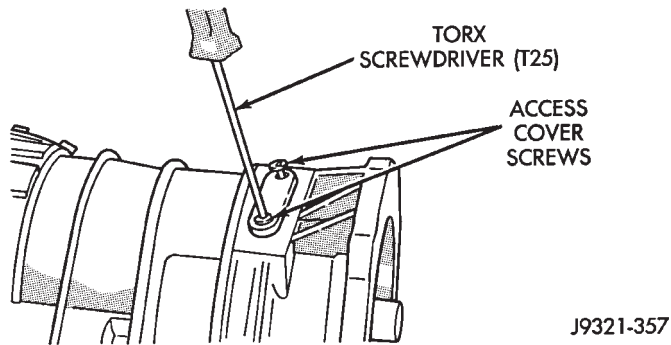
- (2) Remove overdrive clutch reaction snap ring (Fig. 200). Note that snap ring is located in same groove as wave spring.



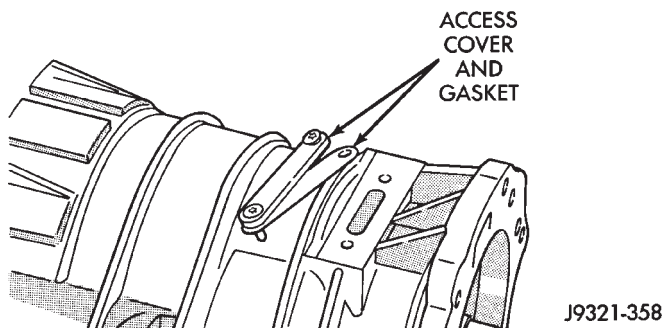
**Fig. 200 Overdrive Clutch Reaction Snap Ring Removal/Installation**

- (3) Remove Torx head screws that attach access cover and gasket to overdrive case (Fig. 201).
- (4) Remove access cover and gasket (Fig. 202).

## DISASSEMBLY AND ASSEMBLY (Continued)

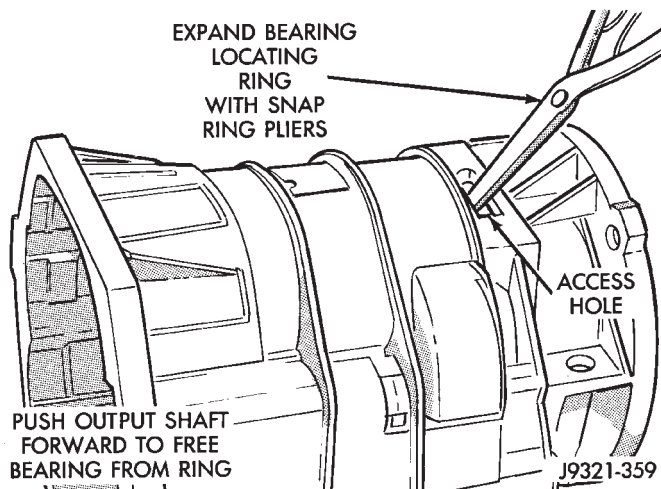


**Fig. 201 Access Cover Screw Removal/Installation**



**Fig. 202 Access Cover And Gasket Removal/Installation**

(5) Expand output shaft bearing snap ring with expanding-type snap ring pliers. Then push output shaft forward to release shaft bearing from locating ring (Fig. 203).

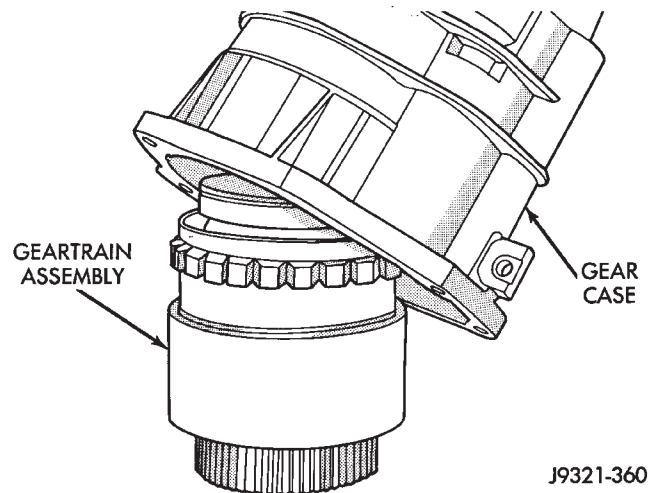


**Fig. 203 Releasing Bearing From Locating Ring**

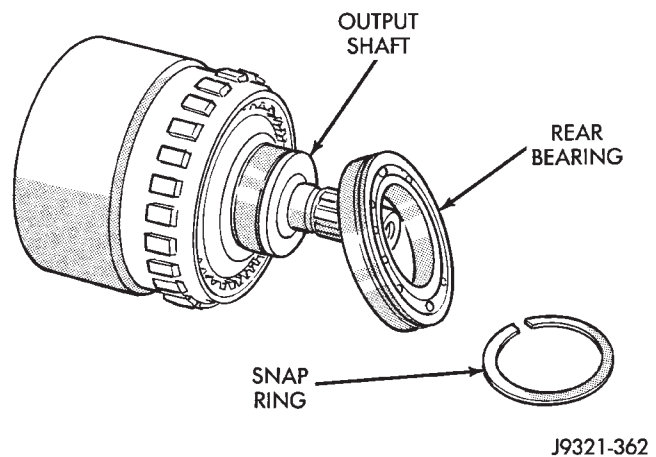
(6) Lift gear case up and off geartrain assembly (Fig. 204).

(7) Remove snap ring that retains rear bearing on output shaft.

(8) Remove rear bearing from output shaft (Fig. 205).



**Fig. 204 Removing Gear Case From Geartrain Assembly**



**Fig. 205 Rear Bearing Removal**

#### DIRECT CLUTCH, HUB AND SPRING

**WARNING:** THE NEXT STEP IN DISASSEMBLY INVOLVES COMPRESSING THE DIRECT CLUTCH SPRING. IT IS EXTREMELY IMPORTANT THAT PROPER EQUIPMENT BE USED TO COMPRESS THE SPRING AS SPRING FORCE IS APPROXIMATELY 830 POUNDS. USE SPRING COMPRESSOR TOOL 6227-1 AND A HYDRAULIC SHOP PRESS WITH A MINIMUM RAM TRAVEL OF 5-6 INCHES. THE PRESS MUST ALSO HAVE A BED THAT CAN BE ADJUSTED UP OR DOWN AS REQUIRED. RELEASE CLUTCH SPRING TENSION SLOWLY AND COMPLETELY TO AVOID PERSONAL INJURY.

(1) Mount geartrain assembly in shop press (Fig. 206).

(2) Position Compressor Tool 6227-1 on clutch hub (Fig. 206). Support output shaft flange with steel

# DISASSEMBLY AND ASSEMBLY (Continued)

press plates as shown and center assembly under press ram.

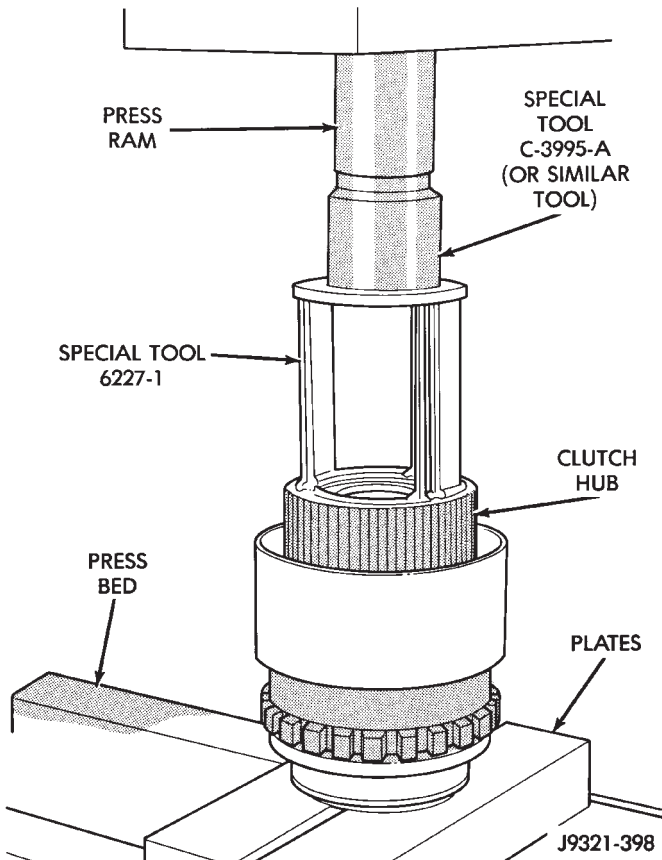
(3) Apply press pressure slowly. Compress hub and spring far enough to expose clutch hub retaining ring and relieve spring pressure on clutch pack snap ring (Fig. 206).

(4) Remove direct clutch pack snap ring (Fig. 207).

(5) Remove direct clutch hub retaining ring (Fig. 208).

(6) Release press load slowly and completely (Fig. 209).

(7) Remove Special Tool 6227-1. Then remove clutch pack from hub (Fig. 209).



**Fig. 206 Geartrain Mounted In Shop Press**

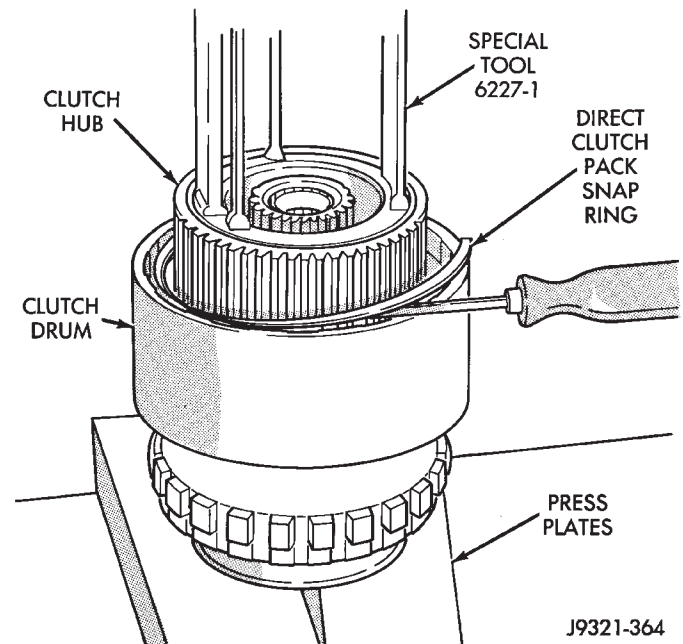
## Geartrain

(1) Remove direct clutch hub and spring (Fig. 210).  
(2) Remove sun gear and spring plate. Then remove planetary thrust bearing and planetary gear (Fig. 211).

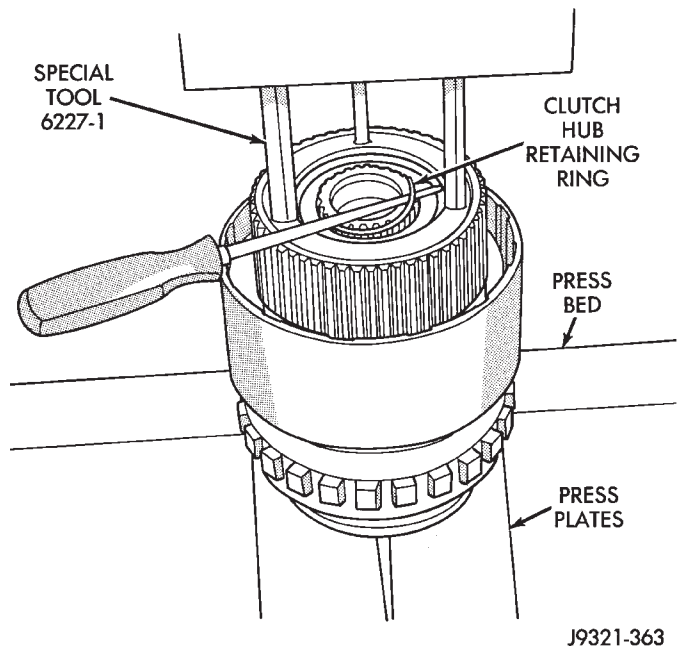
(3) Remove overrunning clutch assembly with expanding type snap ring pliers (Fig. 212). Insert pliers into clutch hub. Expand pliers to grip hub splines and remove clutch with counterclockwise, twisting motion.

(4) Remove thrust bearing from overrunning clutch hub.

(5) Remove overrunning clutch from hub.



**Fig. 207 Direct Clutch Pack Snap Ring Removal**



**Fig. 208 Direct Clutch Hub Retaining Ring Removal**

(6) Mark position of annulus gear and direct clutch drum for assembly alignment reference (Fig. 213). Use small center punch or scribe to make alignment marks.

(7) Remove direct clutch drum rear retaining ring (Fig. 214).

(8) Remove direct clutch drum outer retaining ring (Fig. 215).



## DISASSEMBLY AND ASSEMBLY (Continued)

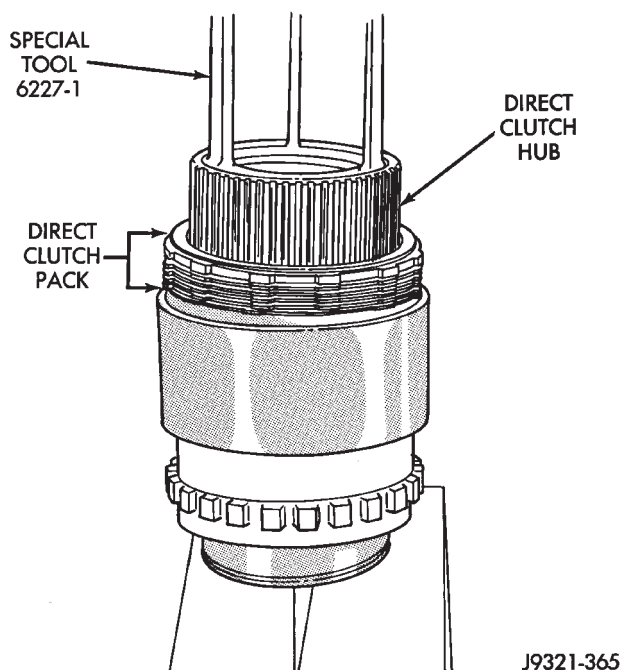


Fig. 209 Direct Clutch Pack Removal

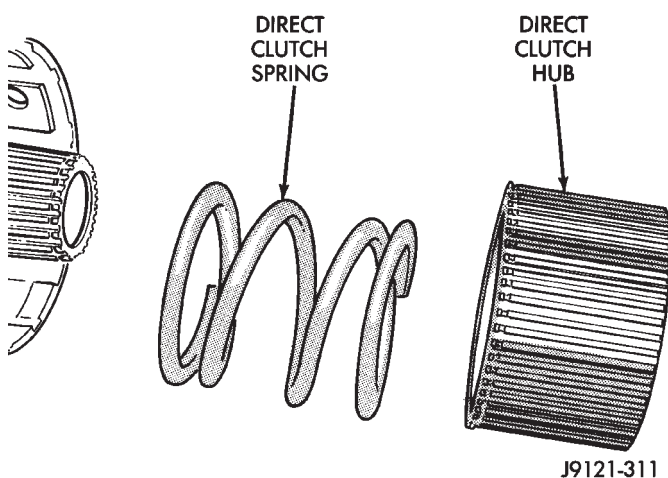


Fig. 210 Direct Clutch Hub And Spring Removal

(9) Mark annulus gear and output shaft for assembly alignment reference (Fig. 216). Use punch or scriber to mark gear and shaft.

(10) Remove snap ring that secures annulus gear on output shaft (Fig. 217). Use two screwdrivers to unseat and work snap ring out of groove as shown.

(11) Remove annulus gear from output shaft (Fig. 218). Use rawhide or plastic mallet to tap gear off shaft.

## GEAR CASE AND PARK LOCK

- (1) Remove locating ring from gear case.
- (2) Remove park pawl shaft retaining bolt and remove shaft, pawl and spring.
- (3) Remove reaction plug snap ring and remove reaction plug.

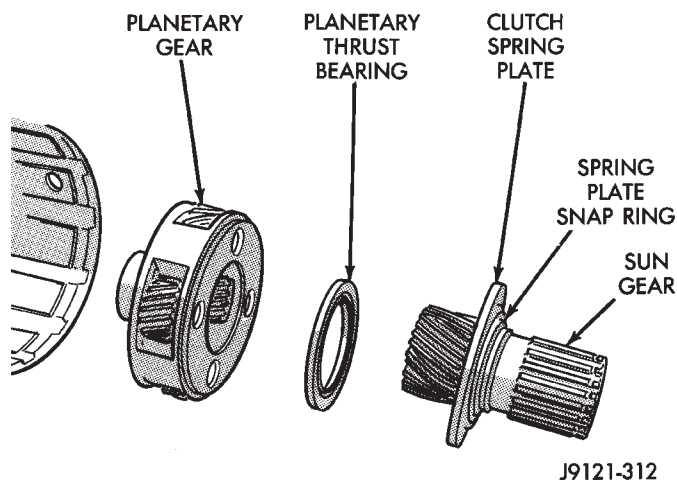


Fig. 211 Removing Sun Gear, Thrust Bearing And Planetary Gear

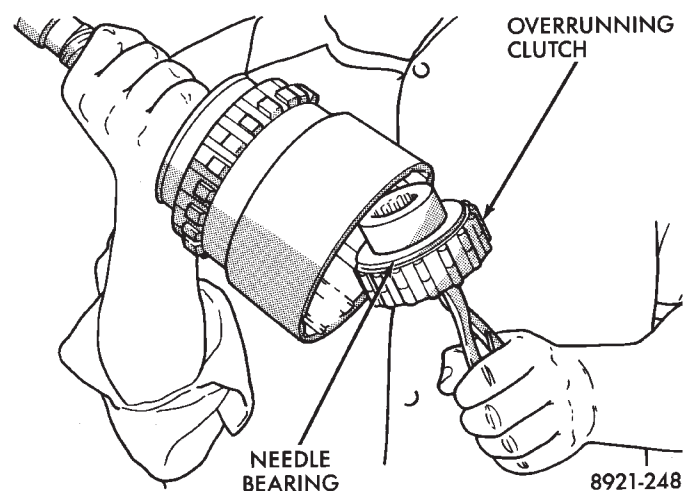


Fig. 212 Overrunning Clutch Assembly Removal/Installation

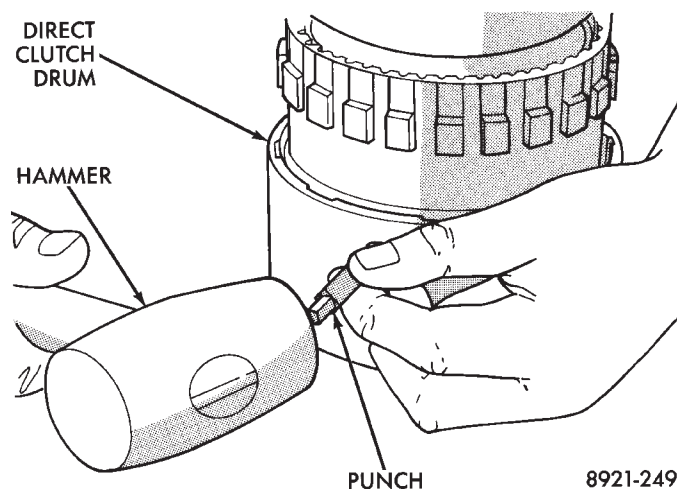
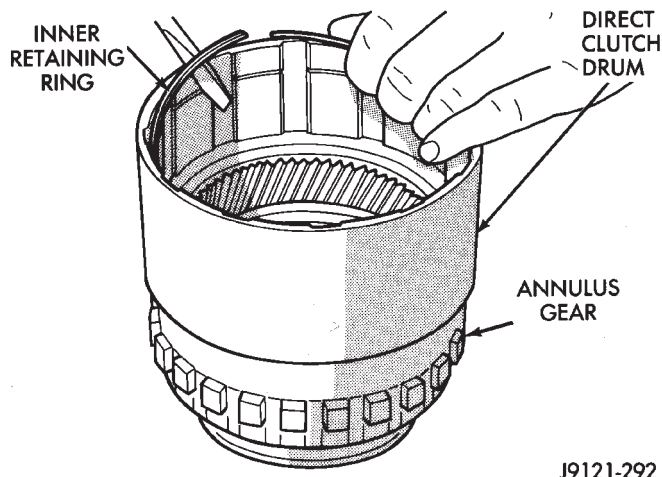


Fig. 213 Marking Direct Clutch Drum And Annulus Gear For Assembly Alignment

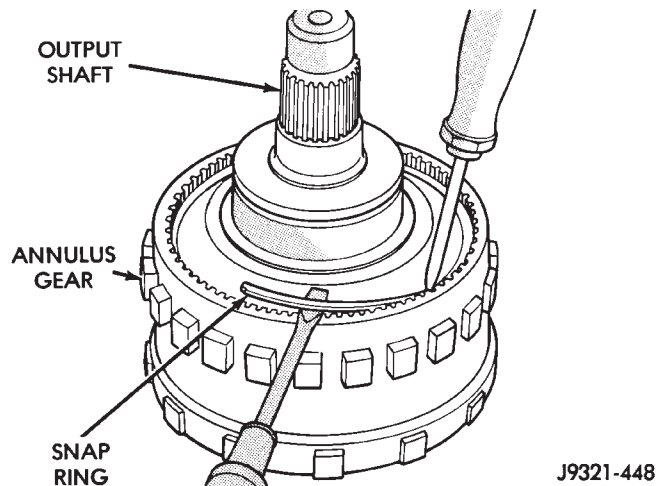
- (4) Remove output shaft seal.



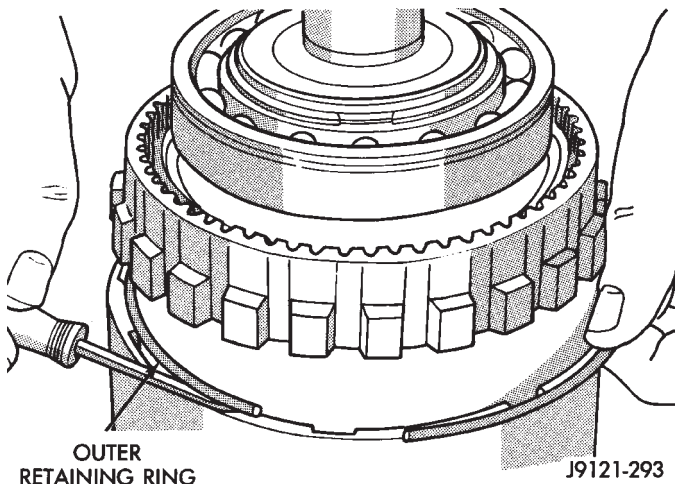
# DISASSEMBLY AND ASSEMBLY (Continued)



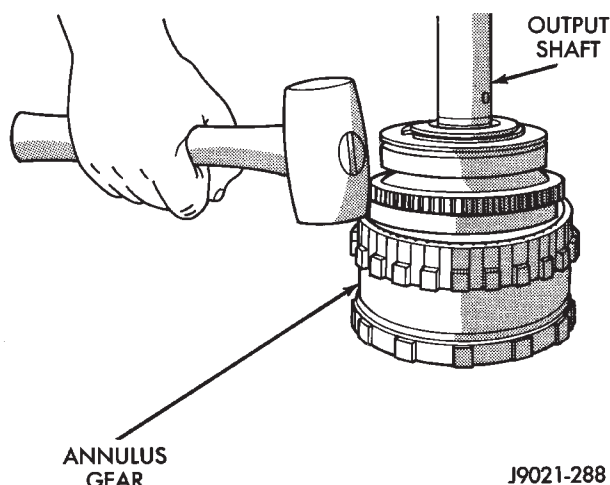
**Fig. 214 Clutch Drum Inner Retaining Ring Removal**



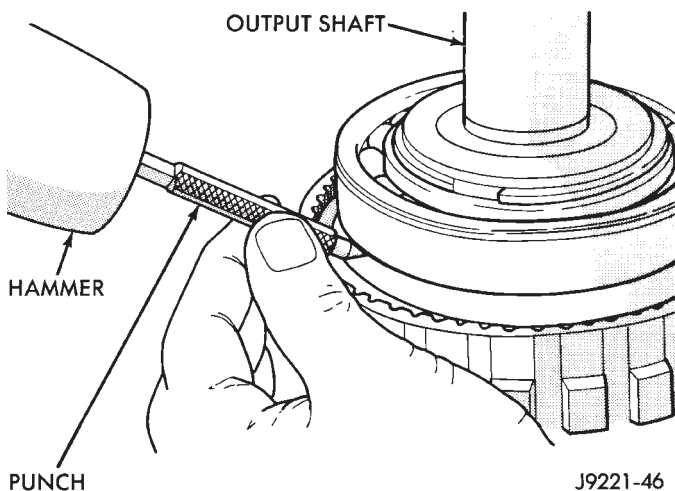
**Fig. 217 Annulus Gear Snap Ring Removal**



**Fig. 215 Clutch Drum Outer Retaining Ring Removal**



**Fig. 218 Annulus Gear Removal**



**Fig. 216 Marking Annulus Gear And Output Shaft For Assembly Alignment**

## ASSEMBLY

### GEARTRAIN AND DIRECT CLUTCH

- (1) Soak direct clutch and overdrive clutch discs in Mopar® ATF Plus 3, type 7176, transmission fluid. Allow discs to soak for 10-20 minutes.
- (2) Install new pilot bushing and clutch hub bushing in output shaft if necessary (Fig. 219). Lubricate bushings with petroleum jelly, or transmission fluid.
- (3) Install annulus gear on output shaft, if removed. Then install annulus gear retaining snap ring (Fig. 220).
- (4) Align and install clutch drum on annulus gear (Fig. 221). Be sure drum is engaged in annulus gear lugs.
- (5) Install clutch drum outer retaining ring (Fig. 221).
- (6) Slide clutch drum forward and install inner retaining ring (Fig. 222).

## DISASSEMBLY AND ASSEMBLY (Continued)

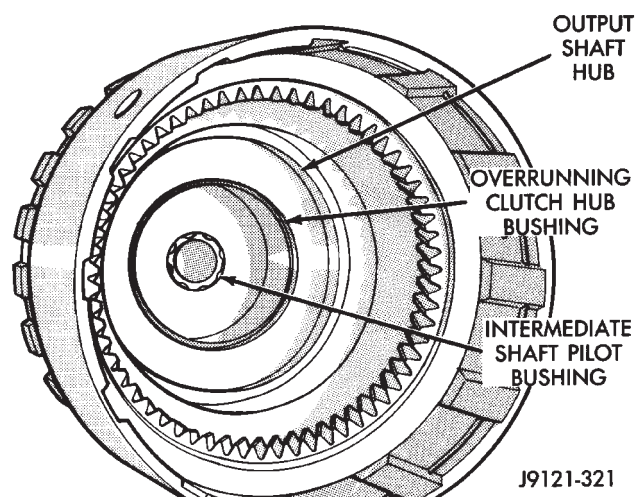


Fig. 219 Output Shaft Pilot Bushing

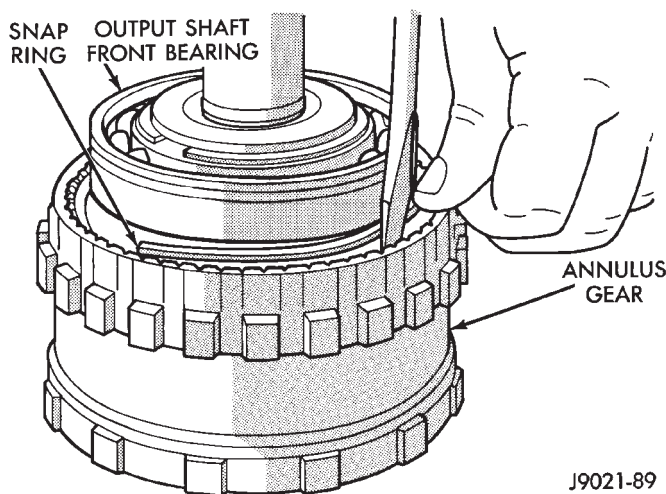


Fig. 220 Annulus Gear Installation

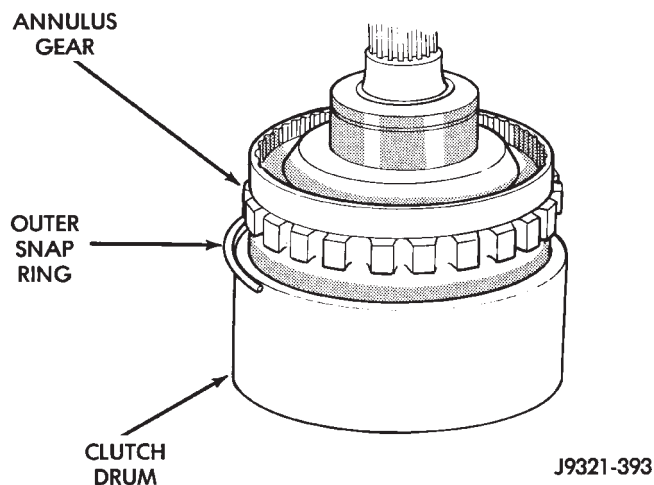


Fig. 221 Clutch Drum And Outer Retaining Ring Installation

(7) Install rear bearing and snap ring on output shaft (Fig. 223). Be sure locating ring groove in bearing is toward rear.

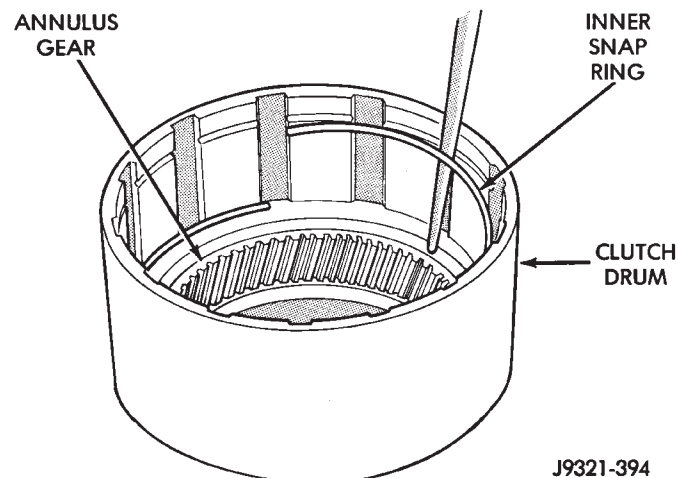


Fig. 222 Clutch Drum Inner Retaining Ring Installation

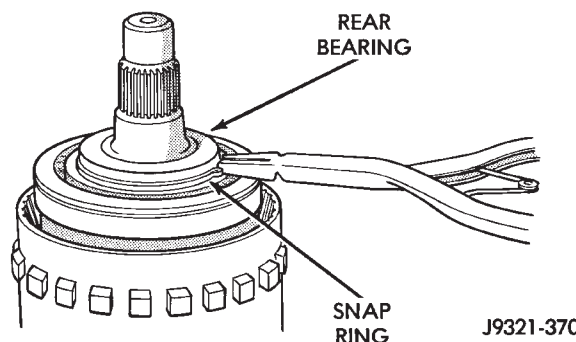


Fig. 223 Rear Bearing And Snap Ring Installation

(8) Install overrunning clutch on hub (Fig. 224). **Note that clutch only fits one way. Shoulder on clutch should seat in small recess at edge of hub.**

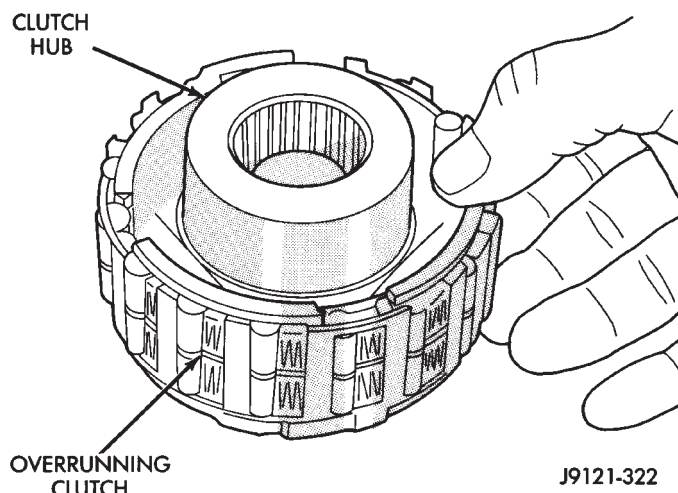
(9) Install thrust bearing on overrunning clutch hub. Use generous amount of petroleum jelly to hold bearing in place for installation. **Bearing fits one way only. Be sure bearing is seated squarely against hub. Reinstall bearing if it does not seat squarely.**

(10) Install overrunning clutch in output shaft (Fig. 225). Insert snap ring pliers in hub splines. Expand pliers to grip hub. Then install assembly with counterclockwise, twisting motion.

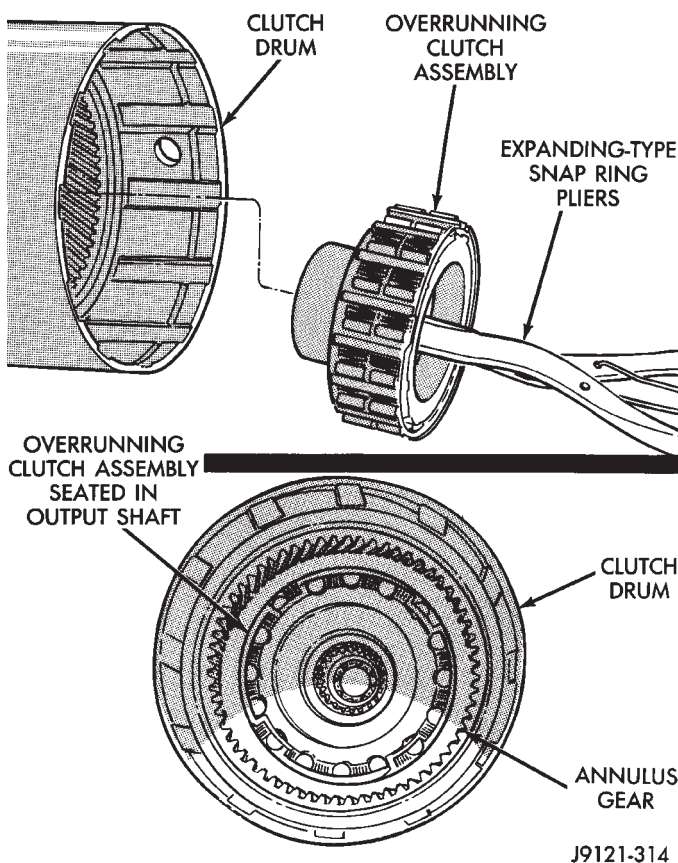
(11) Install planetary gear in annulus gear (Fig. 226). **Be sure planetary pinions are fully seated in annulus gear before proceeding.**

(12) Coat planetary thrust bearing and bearing contact surface of spring plate with generous amount of petroleum jelly. This will help hold bearing in place during installation.

# DISASSEMBLY AND ASSEMBLY (Continued)



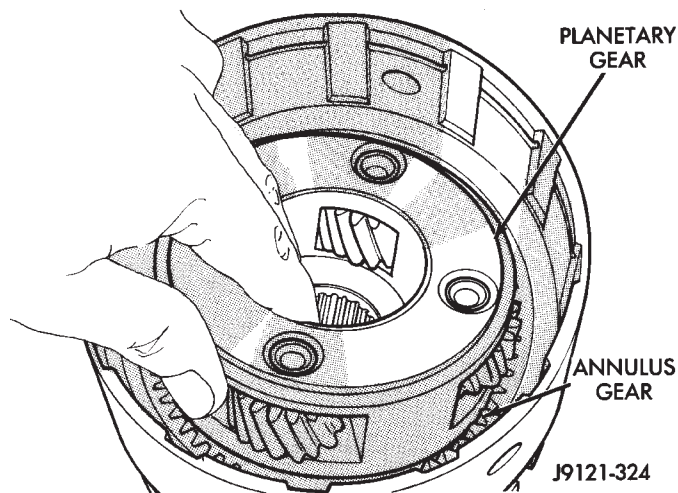
**Fig. 224 Assembling Overrunning Clutch And Hub**



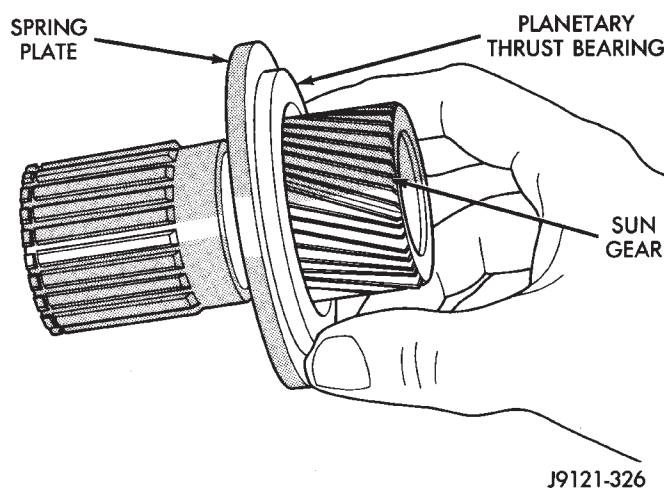
**Fig. 225 Overrunning Clutch Installation**

(13) Install planetary thrust bearing on sun gear (Fig. 227). Slide bearing onto gear and seat it against spring plate as shown. **Bearing fits one way only. If it does not seat squarely against spring plate, remove and reposition bearing.**

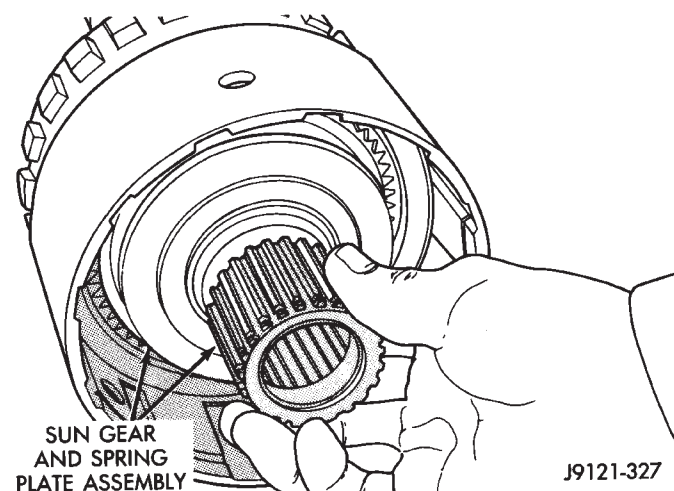
(14) Install assembled sun gear, spring plate and thrust bearing (Fig. 228). Be sure sun gear and thrust bearing are fully seated before proceeding.



**Fig. 226 Planetary Gear Installation**



**Fig. 227 Planetary Thrust Bearing Installation**



**Fig. 228 Sun Gear Installation**

(15) Mount assembled output shaft, annulus gear, and clutch drum in shop press. Direct clutch spring, hub and clutch pack are easier to install with assembly mounted in press.



## DISASSEMBLY AND ASSEMBLY (Continued)

(16) Align splines in hubs of planetary gear and overrunning clutch with Alignment tool 6227-2 (Fig. 229). Insert tool through sun gear and into splines of both hubs. Be sure alignment tool is fully seated before proceeding.

(17) Install direct clutch spring (Fig. 230). Be sure spring is properly seated on spring plate.

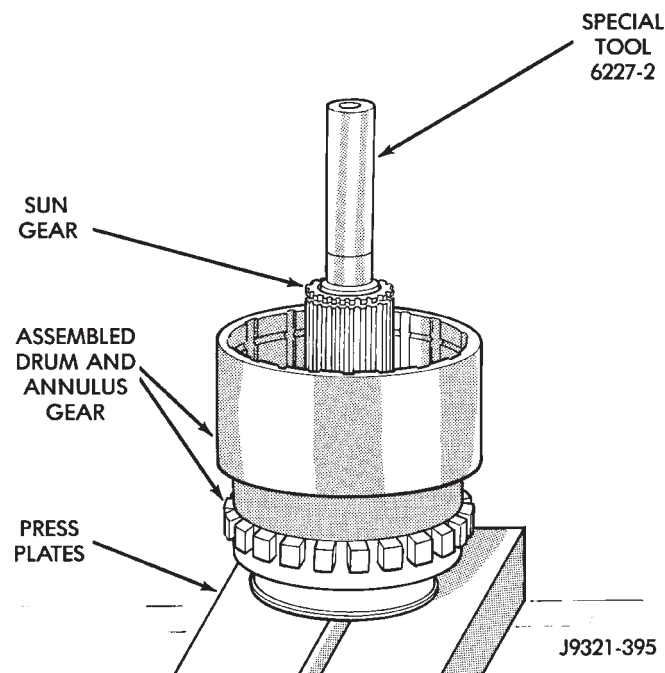


Fig. 229 Alignment Tool Installation

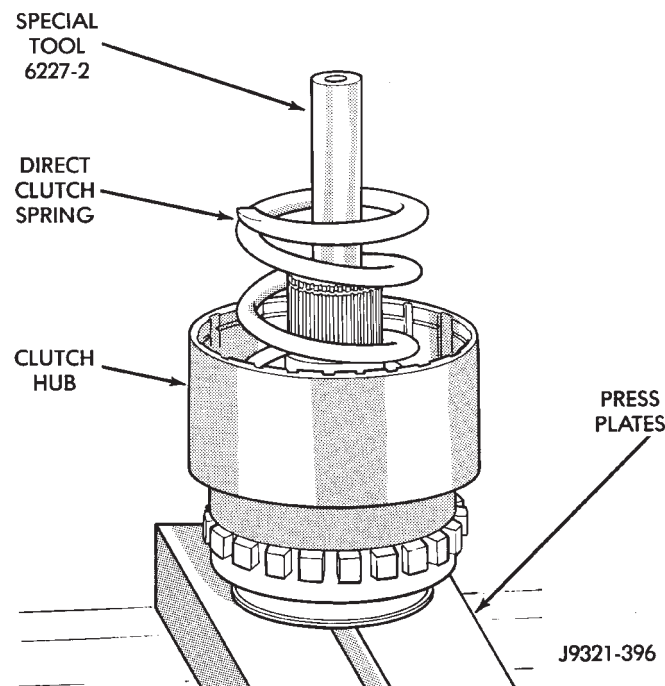


Fig. 230 Direct Clutch Spring Installation

(18) Assemble and install direct clutch pack on hub as follows:

(a) Assemble clutch pack components (Fig. 231).

(b) Install direct clutch reaction plate on clutch hub first. **Note that one side of reaction plate is counterbored. Be sure this side faces rearward. Splines at rear of hub are raised slightly. Counterbore in plate fits over raised splines. Plate should be flush with this end of hub (Fig. 232).**

(c) Install first clutch disc followed by a steel plate until all discs and plates have been installed.

(d) Install pressure plate. This is last clutch pack item to be installed. **Be sure plate is installed with shoulder side facing upward (Fig. 233).**

(19) Install clutch hub and clutch pack on direct clutch spring (Fig. 234). **Be sure hub is started on sun gear splines before proceeding.**

**WARNING: THE NEXT STEP IN GEARTRAIN ASSEMBLY INVOLVES COMPRESSING THE DIRECT CLUTCH HUB AND SPRING. IT IS EXTREMELY IMPORTANT THAT PROPER EQUIPMENT BE USED TO COMPRESS THE SPRING AS SPRING FORCE IS APPROXIMATELY 830 POUNDS. USE COMPRESSOR TOOL C-6227-1 AND A HYDRAULIC-TYPE SHOP PRESS WITH A MINIMUM RAM TRAVEL OF 6 INCHES. THE PRESS MUST ALSO HAVE A BED THAT CAN BE ADJUSTED UP OR DOWN AS REQUIRED. RELEASE CLUTCH SPRING TENSION SLOWLY AND COMPLETELY TO AVOID PERSONAL INJURY.**

(20) Position Compressor Tool 6227-1 on clutch hub.

(21) Compress clutch hub and spring just enough to place tension on hub and hold it in place.

(22) Slowly compress clutch hub and spring. Compress spring and hub only enough to expose ring grooves for clutch pack snap ring and clutch hub retaining ring.

(23) Realign clutch pack on hub and seat clutch discs and plates in clutch drum.

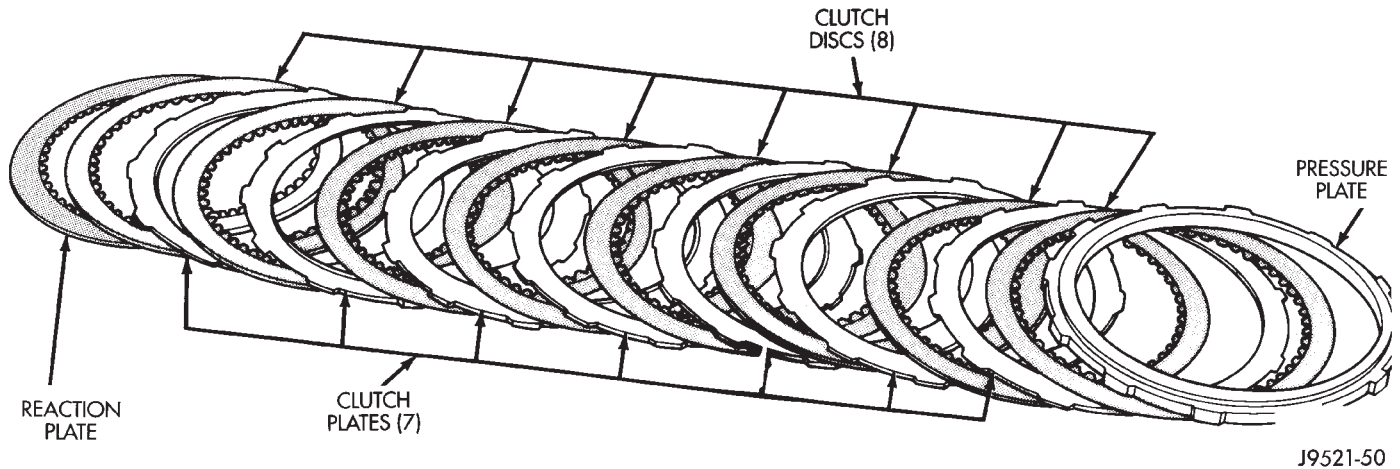
(24) Install direct clutch pack snap ring (Fig. 235). **Be very sure snap ring is fully seated in clutch drum ring groove.**

(25) Install clutch hub retaining ring (Fig. 236). **Be very sure retaining ring is fully seated in sun gear ring groove.**

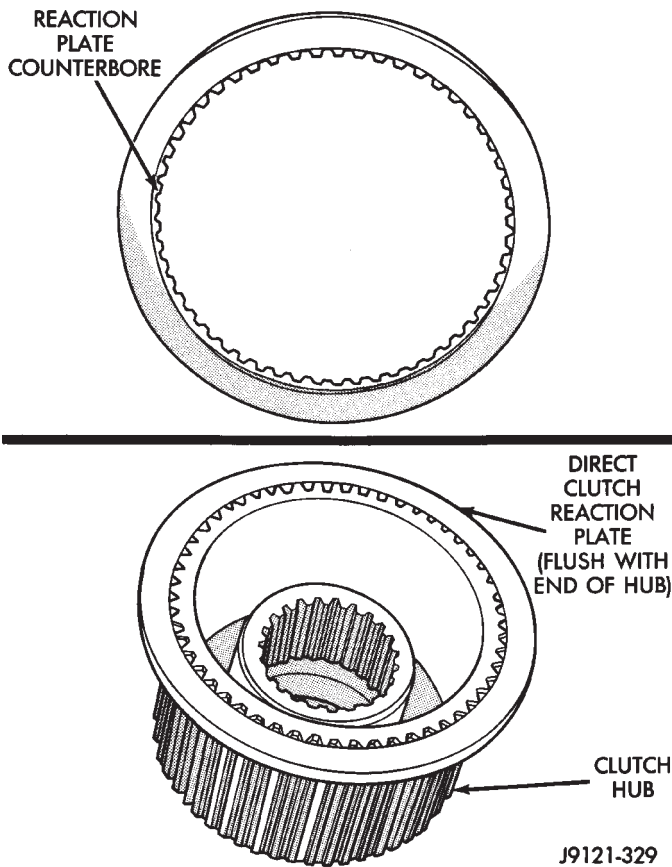
(26) Slowly release press ram, remove compressor tools and remove geartrain assembly.



# DISASSEMBLY AND ASSEMBLY (Continued)



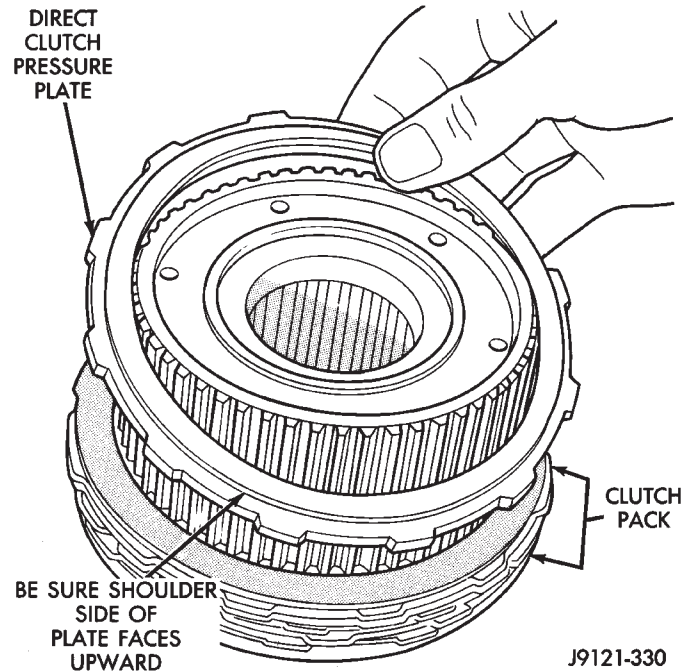
**Fig. 231 46RE Direct Clutch Pack Components**



**Fig. 232 Correct Position Of Direct Clutch Reaction Plate**

## GEAR CASE

(1) Position park pawl and spring in case and install park pawl shaft. Verify that end of spring with 90° bend is hooked to pawl and straight end of spring is seated against case.



**Fig. 233 Correct Position Of Direct Clutch Pressure Plate**

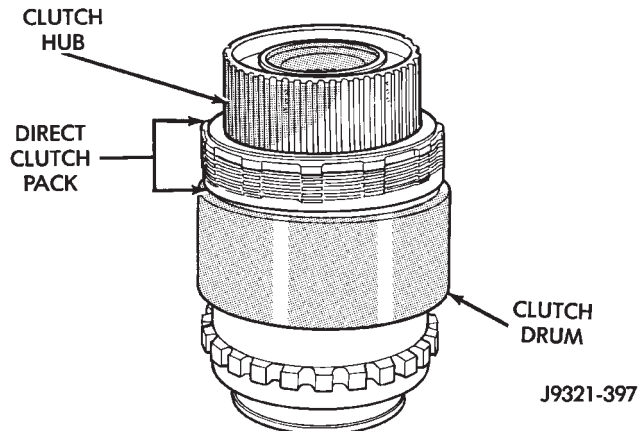
(2) Install pawl shaft retaining bolt. Tighten bolt to 27 N·m (20 ft. lbs.) torque.

(3) Install park lock reaction plug. **Note that plug has locating pin at rear (Fig. 237). Be sure pin is seated in hole in case before installing snap ring.**

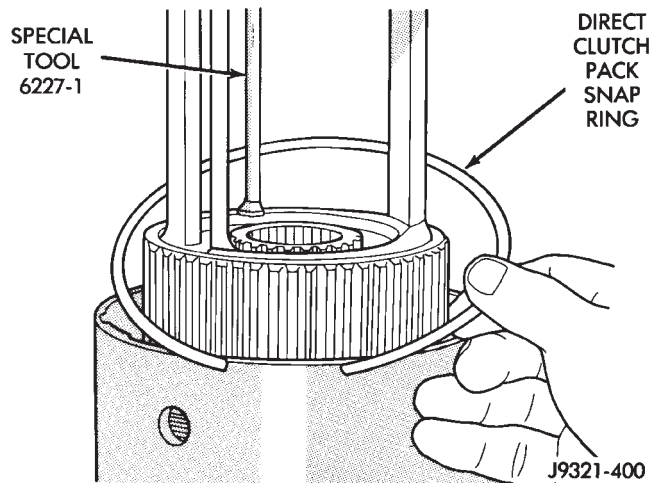
(4) Install reaction plug snap-ring (Fig. 238). **Compress snap ring only enough for installation; do not distort it.**

(5) Install new seal in gear case. Use Handle C-4171 and Installer C-3995-A to seat seal in case.

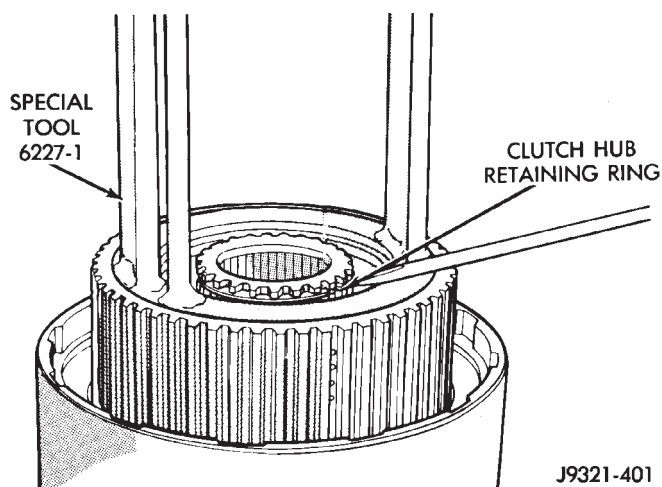
## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 234 Direct Clutch Pack And Clutch Hub Installation**

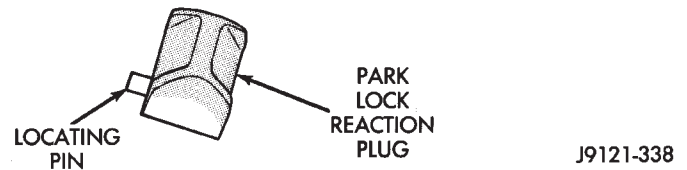


**Fig. 235 Direct Clutch Pack Snap Ring Installation**

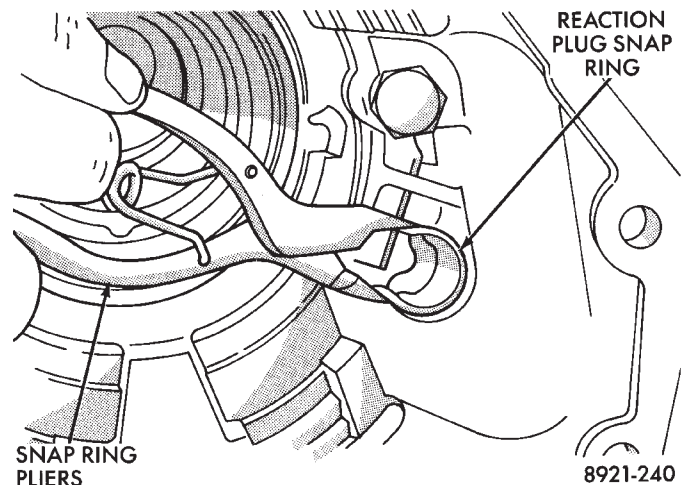


**Fig. 236 Clutch Hub Retaining Ring Installation**

(6) Verify that tab ends of rear bearing locating ring extend into access hole in gear case (Fig. 239).



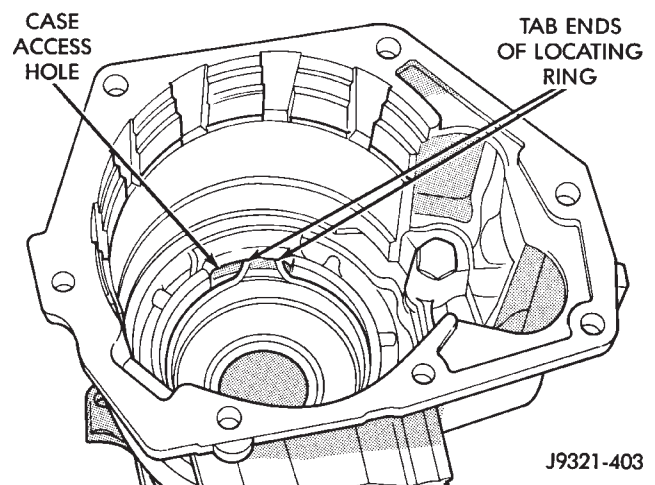
**Fig. 237 Reaction Plug Locating Pin And Snap-Ring**



**Fig. 238 Reaction Plug And Snap-Ring Installation**

(7) Support geartrain on Tool 6227-1 (Fig. 240). Be sure tool is securely seated in clutch hub.

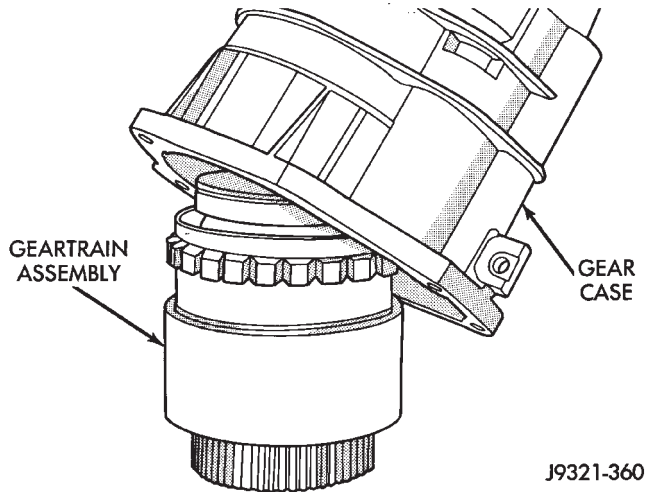
(8) Install overdrive gear case on geartrain (Fig. 240).



**Fig. 239 Correct Rear Bearing Locating Ring Position**

(9) Expand front bearing locating ring with snap ring pliers (Fig. 241). Then slide case downward until

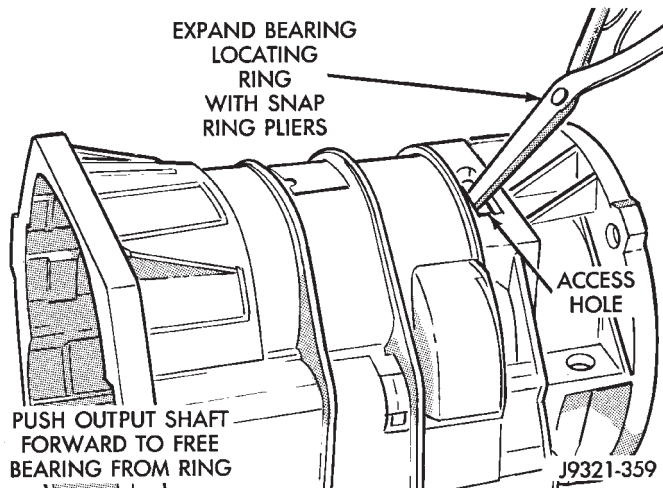
## DISASSEMBLY AND ASSEMBLY (Continued)



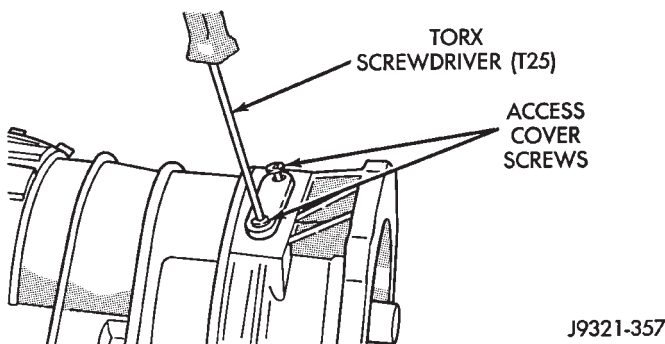
**Fig. 240 Overdrive Gear Case Installation**

locating ring locks in bearing groove and release snap ring.

(10) Install locating ring access cover and gasket in overdrive unit case (Fig. 242).



**Fig. 241 Seating Locating Ring In Rear Bearing**



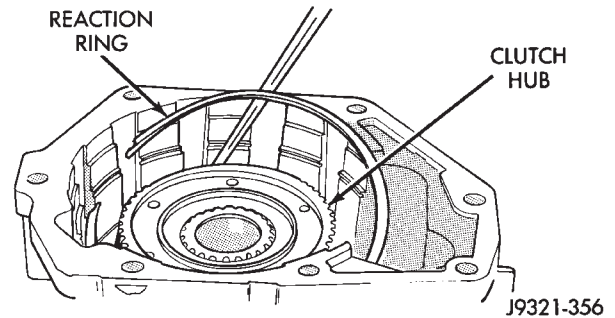
**Fig. 242 Locating Ring Access Cover And Gasket Installation**

### OVERDRIVE CLUTCH

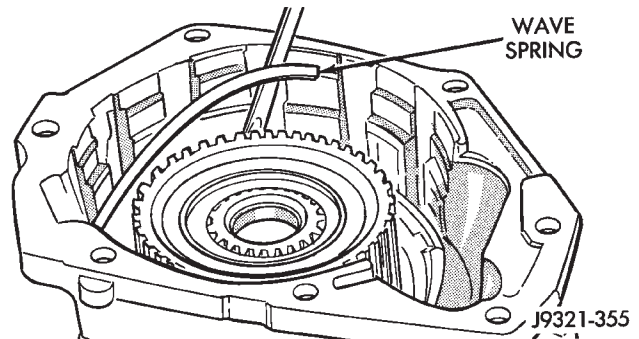
(1) Install overdrive clutch reaction ring first. Reaction ring is flat with notched ends (Fig. 243).

(2) Install wave spring on top of reaction ring (Fig. 244). **Reaction ring and wave ring both fit in same ring groove.** Use screwdriver to seat each ring securely in groove. Also ensure that the ends of the two rings are offset from each other.

(3) Assemble overdrive clutch pack (Fig. 245).



**Fig. 243 Overdrive Clutch Reaction Ring Installation**



**Fig. 244 Overdrive Clutch Wave Spring Installation**

(4) Install overdrive clutch reaction plate first.

(5) Install first clutch disc followed by first clutch plate. Then install remaining clutch discs and plates in same order.

(6) Install clutch pack pressure plate.

(7) Install clutch pack wire-type retaining ring (Fig. 246).

### INTERMEDIATE SHAFT SPACER SELECTION

(1) Place overdrive unit in vertical position. Mount it on blocks, or in workbench with appropriate size mounting hole cut into it. Be sure unit is facing upward for access to direct clutch hub. Also be sure output shaft is not loaded and internal components are moved rearward for accurate measurement.

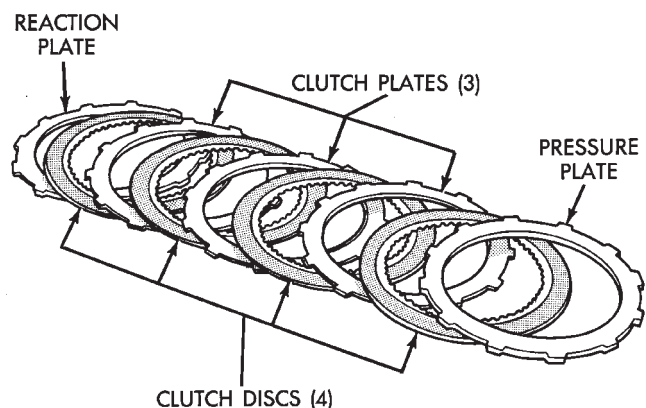
(2) Determine correct thickness intermediate shaft spacer as follows:

(a) Insert Special Tool 6312 through sun gear, planetary gear and into pilot bushing in output shaft. Be sure tool bottoms against planetary shoulder.

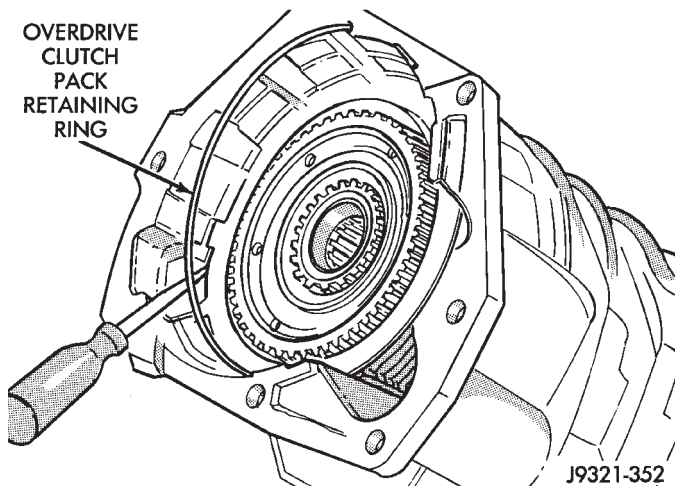
(b) Position Gauge Tool 6311 across face of overdrive case (Fig. 247). Then position Dial Caliper C-4962 over gauge tool.



## DISASSEMBLY AND ASSEMBLY (Continued)



J9321-227

**Fig. 245 46RE Overdrive Clutch Components**

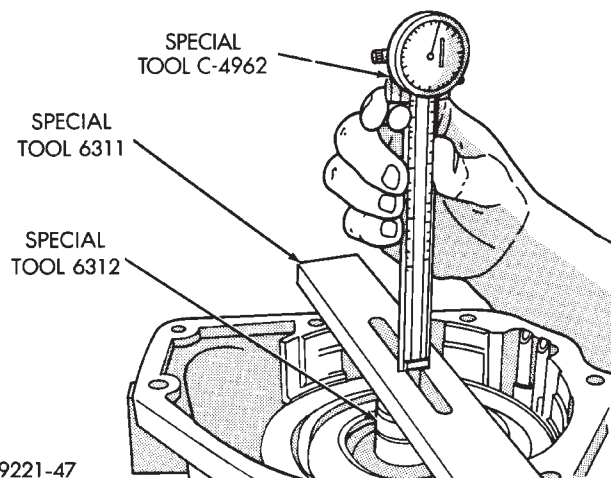
J9321-352

**Fig. 246 Overdrive Clutch Pack Retaining Ring Installation**

(c) Extend sliding scale of dial caliper downward through gauge tool slot until scale contacts end of Gauge Alignment Tool 6312. Lock scale in place. Remove dial caliper tool and note distance measured (Fig. 247).

(d) Select proper thickness end play spacer from spacer chart based on distance measured (Fig. 248).

(e) Remove Gauge Alignment Tool 6312.



J9221-47

**Fig. 247 Shaft End Play Measurement**

End Play Measurement (Inches)	Spacer Thickness (Inches)
.7336 - .7505	.158 - .159
.7506 - .7675	.175 - .176
.7676 - .7855	.193 - .194
.7856 - .8011	.211 - .212

J9121-341

**Fig. 248 Intermediate Shaft End Play Spacer Selection****OD THRUST PLATE SELECTION**

(1) Place overdrive unit in vertical position. Mount it on blocks, or in workbench with appropriate size mounting hole cut into it. Be sure unit is facing upward for access to direct clutch hub. Also be sure output shaft is not loaded and internal components are moved rearward for accurate measurement.

(2) Determine correct thickness overdrive piston thrust plate as follows:

(a) Position Gauge Tool 6311 across face of overdrive case. Then position Dial Caliper C-4962 over gauge tool (Fig. 249).

(b) Measure distance to clutch hub thrust bearing seat at four points 90° apart. Then average measurements by adding them and dividing by 4.

(c) Select and install required thrust plate from information in thrust plate chart (Fig. 250).



DISASSEMBLY AND ASSEMBLY (Continued)

- (3) Leave Alignment Tool 6227-2 in place. Tool will keep planetary and clutch hub splines in alignment until overdrive unit is ready for installation on transmission.
- (4) Transmission speed sensor can be installed at this time if desired. However, it is recommended that sensor not be installed until after overdrive unit is secured to transmission.

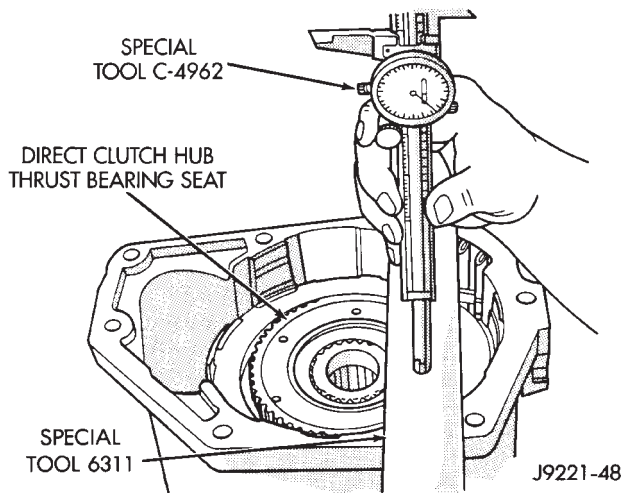


Fig. 249 Overdrive Piston Thrust Plate Measurement

End Play Measurement (Inches)	Spacer Thickness (Inches)
1.7500 - 1.7649	.108 - .110
1.7650 - 1.7799	.123 - .125
1.7800 - 1.7949	.138 - .140
1.7950 - 1.8099	.153 - .155
1.8100 - 1.8249	.168 - .170
1.8250 - 1.8399	.183 - .185
1.8400 - 1.8549	.198 - .200
1.8550 - 1.8699	.213 - .215
1.8700 - 1.8849	.228 - .230
1.8850 - 1.8999	.243 - .245

J9121-342

Fig. 250 Overdrive Piston Thrust Plate Selection

OVERDRIVE PISTON

- Install new seals on overdrive piston.
- Stand transmission case upright on bellhousing.
- Position Guide Ring 8114-1 on outer edge of overdrive piston retainer.
- Position Seal Guide 8114-3 on inner edge of overdrive piston retainer.
- Install overdrive piston in overdrive piston retainer by:
  - Aligning locating lugs on overdrive piston to the two mating holes in retainer.

- Lubricate overdrive piston seals with Mopar® Door Ease, or equivalent.
- Install piston over Seal Guide 8114-3 and inside Guide Ring 8114-1.
- Push overdrive piston into position in retainer.
- Verify that the locating lugs entered the lug bores in the retainer.
- Install intermediate shaft spacer on intermediate shaft.
- Install overdrive piston thrust plate on overdrive piston.
- Install overdrive piston thrust bearing on overdrive piston.
- Install transmission speed sensor and O-ring seal in overdrive case (Fig. 191).

CLEANING AND INSPECTION

VALVE BODY

- Clean the valve housings, valves, plugs, springs, and separator plates with a standard parts cleaning solution only. Do not use gasoline, kerosene, or any type of caustic solution.
- Do not immerse any of the electrical components in cleaning solution. Clean the governor solenoid and sensor and the dual solenoid and harness assembly by wiping them off with dry shop towels only.
- Dry all except the electrical parts with compressed air. Make sure all passages are clean and free from obstructions. **Do not use rags or shop towels to dry or wipe off valve body components. Lint from these materials can stick to valve body parts, interfere with valve operation, and clog filters and fluid passages.**
- Wipe the governor pressure sensor and solenoid valve with dry, lint free shop towels only. The O-rings on the sensor and solenoid valve are the only serviceable components. Be sure the vent ports in the solenoid valve are open and not blocked by dirt or debris. Replace the valve and/or sensor only when DRB scan tool diagnosis indicates this is necessary. Or, if either part has sustained physical damage (dented, deformed, broken, etc.).

**CAUTION:** Do not turn the small screw at the end of the solenoid valve for any reason. Turning the screw in either direction will ruin solenoid calibration and result in solenoid failure. In addition, the filter on the solenoid valve is NOT serviceable. Do not try to remove the filter as this will damage the valve housing.

Inspect the throttle and manual valve levers and shafts (Fig. 251). Do not attempt to straighten a bent

## CLEANING AND INSPECTION (Continued)

shaft or correct a loose lever. Replace these components if worn, bent, loose or damaged in any way.

Inspect all of the valve body mating surfaces for scratches, nicks, burrs, or distortion. Use a straight-edge to check surface flatness. Minor scratches may be removed with crocus cloth using only very light pressure.

Minor distortion of a valve body mating surface may be corrected by smoothing the surface with a sheet of crocus cloth. Position the crocus cloth on a surface plate, sheet of plate glass or equally flat surface. If distortion is severe or any surfaces are heavily scored, the valve body will have to be replaced.

**CAUTION:** Many of the valves and plugs, such as the throttle valve, shuttle valve plug, 1-2 shift valve and 1-2 governor plug, are made of coated aluminum. Aluminum components are identified by the dark color of the special coating applied to the surface (or by testing with a magnet). Do not sand aluminum valves or plugs under any circumstances. This practice could damage the special coating causing the valves/plugs to stick and bind.

Inspect the valves and plugs for scratches, burrs, nicks, or scores. Minor surface scratches on steel valves and plugs can be removed with crocus cloth but **do not round off the edges of the valve or plug lands**. Maintaining sharpness of these edges is vitally important. The edges prevent foreign matter from lodging between the valves and plugs and the bore.

Inspect all the valve and plug bores in the valve body. Use a penlight to view the bore interiors. Replace the valve body if any bores are distorted or scored. Inspect all of the valve body springs. The springs must be free of distortion, warpage or broken coils.

Check the two separator plates for distortion or damage of any kind. Inspect the upper housing, lower housing, 3-4 accumulator housing, and transfer plate carefully. Be sure all fluid passages are clean and clear. Check condition of the upper housing and transfer plate check balls as well. The check balls and ball seats must not be worn or damaged.

Trial fit each valve and plug in its bore to check freedom of operation. When clean and dry, the valves and plugs should drop freely into the bores.

Valve body bores do not change dimensionally with use. If the valve body functioned correctly when new, it will continue to operate properly after cleaning and inspection. It should not be necessary to replace a valve body assembly unless it is damaged in handling.

The only serviceable valve body components are listed below. The remaining valve body components are serviced only as part of a complete valve body assembly. Serviceable parts are:

- dual solenoid and harness assembly
- solenoid gasket
- solenoid case connector O-rings and shoulder bolt
- switch valve and spring
- pressure adjusting screw and bracket assembly
- throttle lever
- manual lever and shaft seal
- throttle lever shaft seal, washer, and E-clip
- fluid filter and screws
- detent ball and spring
- valve body screws
- governor pressure solenoid
- governor pressure sensor and retaining clip
- park lock rod and E-clip



## CLEANING AND INSPECTION (Continued)

## TRANSMISSION

## GENERAL INFORMATION

Inspect the transmission bushings during overhaul. Bushing condition is important as worn, scored bushings contribute to low pressures, clutch slip and accelerated wear of other components. However, do not replace bushings as a matter of course. Replace bushings only when they are actually worn, or scored.

Use recommended tools to replace bushings. The tools are sized and designed to remove, install, and seat bushings correctly. The bushing replacement tools are included in Bushing Tool Set C-3887-B.

Pre-sized service bushings are available for replacement purposes. Only the sun gear bushings are not serviced. Low cost of the sun gear assembly makes it easier to simply replace the gear and bushings as an assembly.

Heli-Coil inserts can be used to repair damaged, stripped or worn threads in aluminum parts. These inserts are available from most automotive parts suppliers. Stainless steel inserts are recommended.

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on shafts, or valves, use extreme care to avoid rounding off sharp edges. Sharp edges are vital as they prevent foreign matter from getting between the valve and valve bore.

Do not reuse oil seals, gaskets, seal rings, or O-rings during overhaul. Replace these parts as a matter of course. Also do not reuse snap rings or E-clips that are bent or distorted. Replace these parts as well.

Lubricate transmission parts with Mopar® ATF Plus 3, Type 7176, transmission fluid during overhaul and assembly. Use petroleum jelly, Mopar® Door Ease, or Ru-Glyde to prelubricate seals, O-rings, and thrust washers. Petroleum jelly can also be used to hold parts in place during reassembly.

## TRANSMISSION CASE CLEANING AND INSPECTION

Clean the case in a solvent tank. Flush the case bores and fluid passages thoroughly with solvent. Dry the case and all fluid passages with compressed air. Be sure all solvent is removed from the case and that all fluid passages are clear.

**NOTE:** Do not use shop towels or rags to dry the case (or any other transmission component) unless they are made from lint-free materials. Lint will stick to case surfaces and transmission components and circulate throughout the transmission after assembly. A sufficient quantity of lint can block fluid passages and interfere with valve body operation.

Inspect the case for cracks, porous spots, worn bores, or damaged threads. Damaged threads can be repaired with Helicoil thread inserts. However, the case will have to be replaced if it exhibits any type of damage or wear.

Lubricate the front band adjusting screw threads with petroleum jelly and thread the screw part-way into the case. Be sure the screw turns freely.

## OVERRUNNING CLUTCH/LOW-REVERSE DRUM/OVERDRIVE PISTON RETAINER

Clean the overrunning clutch assembly, clutch cam, low-reverse drum, and overdrive piston retainer in solvent. Dry them with compressed air after cleaning.

Inspect condition of each clutch part after cleaning. Replace the overrunning clutch roller and spring assembly if any rollers or springs are worn or damaged, or if the roller cage is distorted, or damaged. Replace the cam if worn, cracked or damaged.

Replace the low-reverse drum if the clutch race, roller surface or inside diameter is scored, worn or damaged. **Do not remove the clutch race from the low-reverse drum under any circumstances. Replace the drum and race as an assembly if either component is damaged.**

Examine the overdrive piston retainer carefully for wear, cracks, scoring or other damage. Be sure the retainer hub is a snug fit in the case and drum. Replace the retainer if worn or damaged.

## ACCUMULATOR

Inspect the accumulator piston and seal rings (Fig. 252). Replace the seal rings if worn or cut. Replace the piston if chipped or cracked.

Check condition of the accumulator inner and outer springs (Fig. 252). Replace the springs if the coils are cracked, distorted or collapsed.

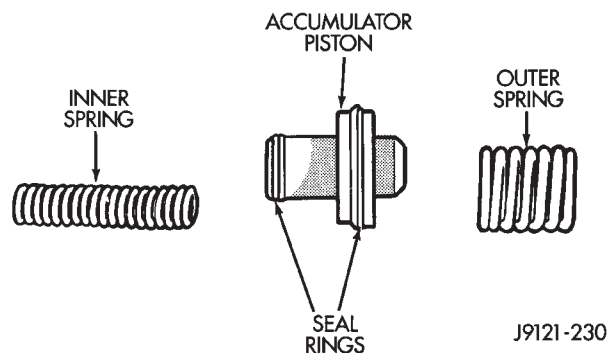


Fig. 252 Accumulator Components

## FRONT SERVO

Clean the servo piston components with solvent and dry them with compressed air. Wipe the band clean with lint free shop towels.



## CLEANING AND INSPECTION (Continued)

Replace the front band if distorted, lining is burned, flaking off, or worn to the point where the grooves in the lining material are no longer visible.

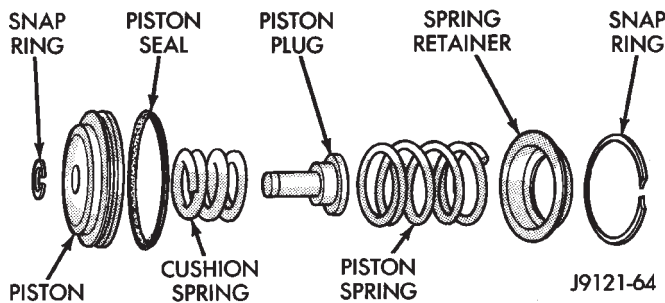
Inspect the servo components. Replace the springs if collapsed, distorted or broken. Replace the guide, rod and piston if cracked, bent, or worn. Discard the servo snap ring if distorted or warped.

Check the servo piston bore for wear. If the bore is severely scored, or damaged, it will be necessary to replace the case.

Replace any servo component if doubt exists about condition. Do not reuse suspect parts.

**REAR SERVO**

Remove and discard the servo piston seal ring (Fig. 253). Then clean the servo components with solvent and dry with compressed air. Replace either spring if collapsed, distorted or broken. Replace the plug and piston if cracked, bent, or worn. Discard the servo snap rings and use a new ones at assembly.



*Fig. 253 Rear Servo Components*

**OIL PUMP AND REACTION SHAFT SUPPORT**

Clean pump and support components with solvent and dry them with compressed air.

Check condition of the seal rings and thrust washer on the reaction shaft support. The seal rings do not need to be replaced unless cracked, broken, or severely worn.

Inspect the pump and support components. Replace the pump or support if the seal ring grooves or machined surfaces are worn, scored, pitted, or damaged. Replace the pump gears if pitted, worn chipped, or damaged.

Check the pump vent. The vent must be secure. Replace the pump body if the vent is cracked, broken, or loose.

Inspect the pump bushing. Then check the reaction shaft support bushing. Replace either bushing only if heavily worn, scored or damaged. It is not necessary to replace the bushings unless they are actually damaged.

(1) Install the gears in the pump body and measure pump component clearances as follows:

(a) Clearance between outer gear and reaction shaft housing should be 0.010 to 0.063 mm (0.0004

to 0.0025 in.). Clearance between inner gear and reaction shaft housing should be 0.010 to 0.063 mm (0.0004 to 0.0025 in.). Both clearances can be measured at the same time by:

(I) Installing the pump gears in the pump housing.

(II) Position an appropriate piece of Plastigage™ across both gears.

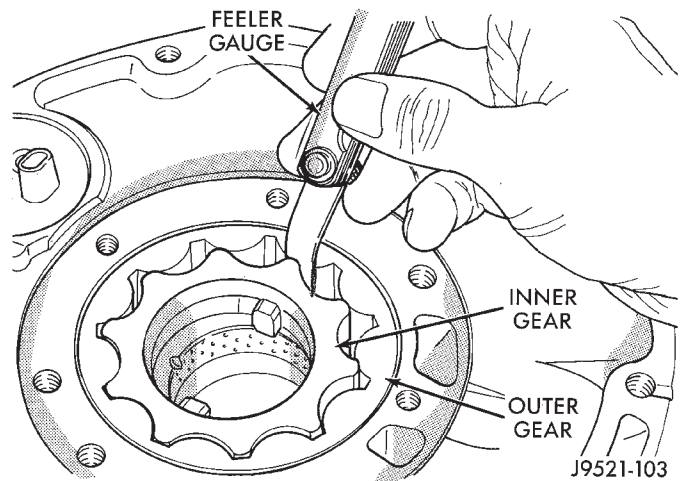
(III) Align the plastigage to a flat area on the reaction shaft housing.

(IV) Install the reaction shaft to the pump housing.

(V) Separate the reaction shaft housing from the pump housing and measure the Plastigage™ following the instructions supplied with it.

(b) Clearance between inner gear tooth and outer gear should be 0.08 to 0.19 mm (0.0035 to 0.0075 in.). Measure clearance with an appropriate feeler gauge (Fig. 254).

(c) Clearance between outer gear and pump housing should also be 0.010 to 0.19 mm (0.0035 to 0.0075 in.). Measure clearance with an appropriate feeler gauge.



*Fig. 254 Checking Pump Gear Tip Clearance*

**FRONT CLUTCH**

Clean and inspect the front clutch components. Replace the clutch discs if warped, worn, scored, burned or charred, the lugs are damaged, or if the facing is flaking off. Replace the steel plates and reaction plate if heavily scored, warped, or broken. Be sure the driving lugs on the discs and plate are also in good condition. The lugs must not be bent, cracked or damaged in any way.

Replace the piston springs and spring retainer if either are distorted, warped or broken.

Check the lug grooves in the clutch piston retainer. The steel plates should slide freely in the slots. Replace the piston retainer if the grooves are worn or damaged. Also check action of the check ball in the piston retainer. The ball must move freely and not stick.

## CLEANING AND INSPECTION (Continued)

Replace the retainer bushing if worn, scored, or there is any doubt about bushing condition.

Inspect the piston and retainer seal surfaces for nicks or scratches. Minor scratches can be removed with crocus cloth. However, replace the piston and/or retainer if the seal surfaces are seriously scored.

Check the clutch piston check ball. The ball should be securely in place. Replace the piston if the ball is missing, or seized in place.

**REAR CLUTCH**

Clean the clutch components with solvent and dry them with compressed air.

Check condition of the input shaft seal rings. It is not necessary to remove or replace rings unless they are broken, cracked, or no longer securely hooked together.

Inspect the input shaft splines and machined surfaces. Very minor nicks or scratches can be smoothed off with crocus cloth. Replace the shaft if the splines are damaged, or any of the machined surfaces are severely scored.

Replace the clutch discs if warped, worn, scored, burned/charred, the lugs are damaged, or if the facing is flaking off.

Replace the steel plates and the pressure plate if heavily scored, warped, or broken. Be sure the driving lugs on the discs and plates are also in good condition. The lugs must not be bent, cracked or damaged in any way.

Replace the piston spring and wave spring if either part is distorted, warped or broken.

Check the lug grooves in the clutch retainer. The steel plates should slide freely in the slots. Replace the retainer if the grooves are worn or damaged. Also check action of the retainer check ball. The ball must move freely and not stick.

Inspect the piston and retainer seal surfaces for nicks or scratches. Minor scratches can be removed with crocus cloth. However, replace the piston and/or retainer if the seal surfaces are seriously damaged.

Check thrust washer condition. Washer thickness should be 1.55 to 1.60 mm (0.061 to 0.063 in.). Replace the washer if worn or damaged.

Check condition of the two seal rings on the input shaft and the single seal ring on the piston retainer hub. Replace the seal rings only if severely worn, cracked, or cannot be hooked together.

**PLANETARY GEARTRAIN/OUTPUT SHAFT**

Clean the intermediate shaft and planetary components in solvent and dry them with compressed air.

Inspect the planetary gear sets and annulus gears. The planetary pinions, shafts, washers, and retaining pins are serviceable. However, if a pinion carrier is

damaged, the entire planetary gear set must be replaced as an assembly.

Replace the annulus gears if the teeth are chipped, broken, or worn, or the gear is cracked. Replace the planetary thrust plates and the tabbed thrust washers if cracked, scored or worn.

Inspect the machined surfaces of the intermediate shaft. Be sure the oil passages are open and clear. Replace the shaft if scored, pitted, or damaged.

Inspect the sun gear and driving shell. If either component is worn or damaged, remove the sun gear rear retaining ring and separate the sun gear and thrust plate from the driving shell. Then replace the necessary component.

Replace the sun gear as an assembly if the gear teeth are chipped or worn. Also replace the gear as an assembly if the bushings are scored or worn. The sun gear bushings are not serviceable. Replace the thrust plate if worn, or severely scored. Replace the driving shell if distorted, cracked, or damaged in any way.

Replace all snap rings during geartrain assembly. Reusing snap rings is not recommended.

**OVERDRIVE UNIT**

Clean the geartrain and case components with solvent. Dry all parts except the bearings with compressed air. Allow bearings to air dry.

Do not use shop towels for wiping parts dry unless the towels are made from a lint-free material. A sufficient quantity of lint (from shop towels, cloths, rags, etc.) could plug the transmission filter and fluid passages.

Discard the old case gasket and seals. Do not attempt to salvage these parts. They are not reusable. Replace any of the overdrive unit snap rings if distorted or damaged.

Minor nicks or scratches on components can be smoothed with crocus cloth. However, do not attempt to reduce severe scoring on any components with abrasive materials. Replace severely scored components; do not try to salvage them.

Check condition of the park lock components and the overdrive case.

Replace the case if cracked, scored, or damaged. Replace the park lock pawl, plug, or spring if worn or damaged. Be sure the bullet at the end of the park lock rod is in good condition. Replace the rod if the bullet is worn or the rod itself is bent or distorted. Do not attempt to straighten the rod.

Check the bushings in the overdrive case. Replace the bushings if severely scored or worn. Also replace the case seal if loose, distorted, or damaged.

Examine the overdrive and direct clutch discs and plates. Replace the discs if the facing is worn, severely scored, or burned and flaking off. Replace the clutch plates if worn, heavily scored, or cracked.

## CLEANING AND INSPECTION (Continued)

Check the lugs on the clutch plates for wear. The plates should slide freely in the drum. Replace the plates or drum if binding occurs.

Check condition of the annulus gear, direct clutch hub, clutch drum and clutch spring. Replace the gear, hub and drum if worn or damaged. Replace the spring if collapsed, distorted, or cracked.

Be sure the splines and lugs on the gear, drum and hub are in good condition. The clutch plates and discs should slide freely in these components.

Inspect the thrust bearings and spring plate. Replace the plate if worn or scored. Replace the bearings if rough, noisy, brinnelled, or worn.

Inspect the planetary gear assembly and the sun gear and bushings. If either the sun gear or the bushings are damaged, replace the gear and bushings as an assembly. The gear and bushings are not serviced separately.

The planetary carrier and pinions must be in good condition. Also be sure the pinion pins are secure and in good condition. Replace the carrier if worn or damaged.

Inspect the overrunning clutch and race. The race surface should be smooth and free of scores. Replace the overrunning clutch assembly or the race if either assembly is worn or damaged in any way.

Inspect the output shaft and governor components. Replace the shaft pilot bushing and inner bushing if damaged. Replace either shaft bearing if rough or noisy. Replace the bearing snap rings if distorted or cracked.

Check the machined surfaces on the output shaft. These surfaces should be clean and smooth. Very minor nicks or scratches can be smoothed with crocus cloth. Replace the shaft if worn, scored or damaged in any way.

Inspect the output shaft bushings. The small bushing is the intermediate shaft pilot bushing. The large bushing is the overrunning clutch hub bushing. Replace either bushing if scored, pitted, cracked, or worn.

## ADJUSTMENTS

## TRANSMISSION THROTTLE VALVE CABLE ADJUSTMENT

The transmission throttle valve is operated by a cam on the valve body throttle lever. The throttle lever is actuated by a cable connected to the engine throttle body lever (Fig. 255). A retaining clip at the engine-end of the cable is removed to provide for cable adjustment. The retaining clip is then installed back onto the throttle valve cable to lock in the adjustment.

A correctly adjusted throttle valve cable, will cause the throttle lever on the transmission to move simultaneously with the throttle body lever from the idle position. Proper adjustment allows simultaneous movement without causing the transmission throttle lever to move ahead of, or lag behind the throttle body lever.

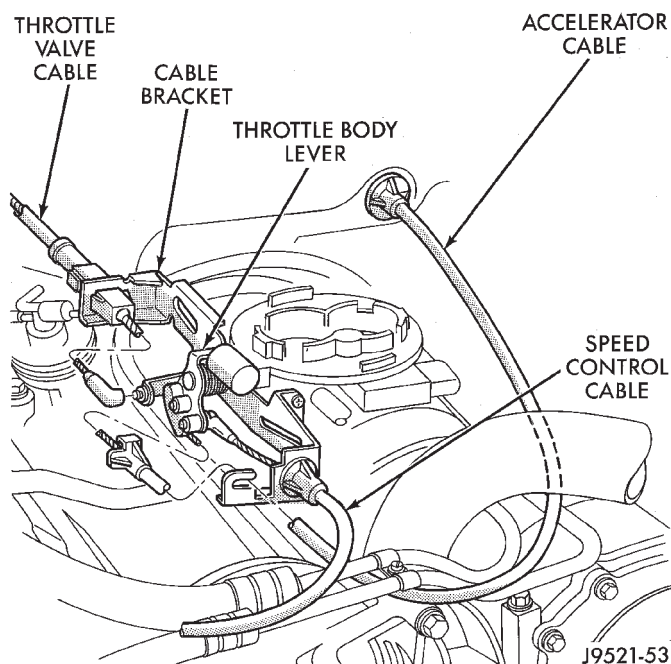
## THROTTLE VALVE CABLE ADJUSTMENT CHECK

- (1) Turn ignition key to OFF position.
- (2) Remove air cleaner.
- (3) Verify that throttle body lever is at curb idle position. Then verify that transmission throttle lever (Fig. 255) is also at idle (full forward) position.
- (4) Slide cable off attachment stud on throttle body lever (Fig. 255).
- (5) Compare position of cable end to attachment stud on throttle body lever:
  - (a) Cable end and attachment stud should be aligned (or centered on one another) to within 1 mm (0.039 in.) in either direction.
  - (b) If cable end and attachment stud are misaligned (off center), cable will have to be adjusted as described in following procedure.
- (6) Reconnect cable end to attachment stud. Then with aid of a helper, observe movement of transmission throttle lever and lever on throttle body.
  - (a) If both levers move simultaneously from idle to half-throttle and back to idle position, adjustment is correct.
  - (b) If transmission throttle lever moves ahead of, or lags behind throttle body lever, cable adjustment will be necessary. Or, if throttle body lever prevents transmission lever from returning to closed position, cable adjustment will be necessary.

## THROTTLE VALVE CABLE ADJUSTMENT PROCEDURE

- (1) Turn ignition switch to OFF position and shift into Park.
- (2) Remove air cleaner.
- (3) Disconnect cable end from attachment stud on throttle body. **Carefully slide cable off stud. Do not pull or pry cable off.**
- (4) Verify that transmission throttle lever is in idle (full forward) position. Then be sure lever on throttle body is at curb idle position.
- (5) Insert a small screwdriver under edge of retaining clip and remove retaining clip.
- (6) Center cable end on attachment stud to within 1 mm (0.039 in.).
- (7) Install retaining clip onto cable housing.
- (8) Check cable adjustment. Be sure transmission throttle lever and lever on throttle body move simultaneously and as described in cable adjustment checking procedure.

## ADJUSTMENTS (Continued)



**Fig. 255 Throttle Valve Cable Attachment —At Engine**

## GEARSHIFT CABLE

Check adjustment by starting the engine in Park and Neutral. Adjustment is OK if the engine starts only in these positions. Adjustment is incorrect if the engine starts in one but not both positions. If the engine starts in any position other than Park or Neutral, or if the engine will not start at all, the park/neutral position switch may be faulty.

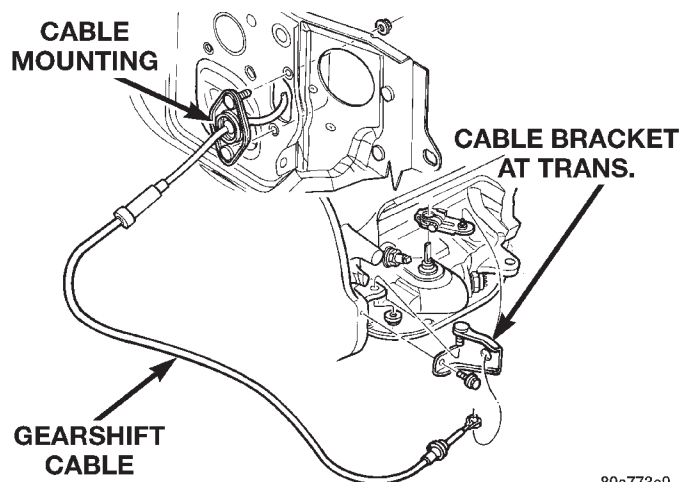
## Gearshift Adjustment Procedure

- (1) Shift transmission into Park.
- (2) Release cable adjuster lock (underneath the power brake booster) (Fig. 256) to unlock cable.
- (3) Raise vehicle.
- (4) Slide cable eyelet off transmission shift lever.
- (5) Verify transmission shift lever is in Park detent by moving lever fully rearward. Last rearward detent is Park position.
- (6) Verify positive engagement of transmission park lock by attempting to rotate propeller shaft. Shaft will not rotate when park lock is engaged.
- (7) Slide cable eyelet onto transmission shift lever.
- (8) Lower vehicle and check engine starting. Engine should start only in Park and Neutral.
- (9) Lock shift cable by pressing cable adjuster clamp down until it snaps into place.

## FRONT BAND ADJUSTMENT

The front (kickdown) band adjusting screw is located on the left side of the transmission case above the manual valve and throttle valve levers.

- (1) Raise vehicle.



**Fig. 256 Gearshift Cable Routing**

(2) Loosen band adjusting screw locknut (Fig. 257). Then back locknut off 3-5 turns. Be sure adjusting screw turns freely in case. Apply lubricant to screw threads if necessary.

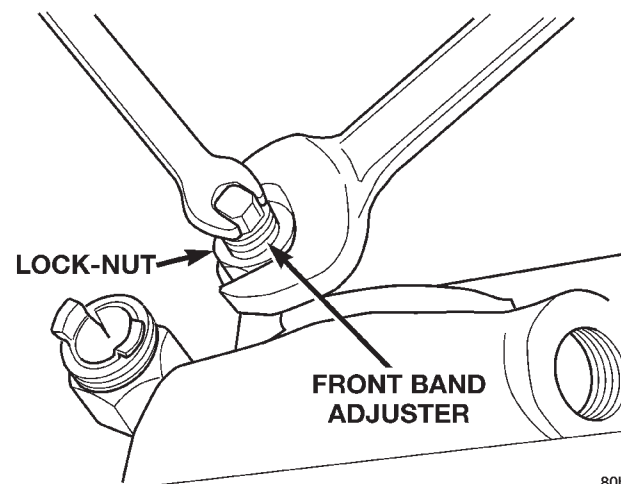
(3) Tighten band adjusting screw to 8 N·m (72 in. lbs.) torque with Inch Pound Torque Wrench C-3380-A, a 3-in. extension and 5/16 socket.

**CAUTION:** If Adapter C-3705 is needed to reach the adjusting screw (Fig. 258), tighten the screw to only 5 N·m (47-50 in. lbs.) torque.

(4) Back off front band adjusting screw 2-7/8 turns.

(5) Hold adjuster screw in position and tighten locknut to 41 N·m (30 ft. lbs.) torque.

(6) Lower vehicle.



**Fig. 257 Front Band Adjustment Screw Location**

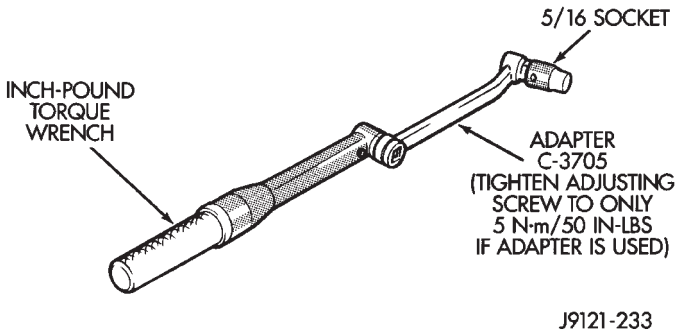
## REAR BAND ADJUSTMENT

The transmission oil pan must be removed for access to the rear band adjusting screw.

- (1) Raise vehicle.
- (2) Remove transmission oil pan and drain fluid.

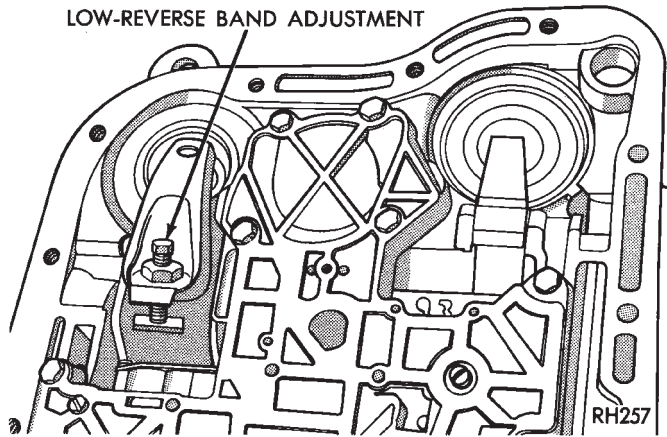


## ADJUSTMENTS (Continued)



**Fig. 258 Band Adjustment Adapter Tool**

- (3) Loosen band adjusting screw locknut 5-6 turns. Be sure adjusting screw turns freely in lever.
- (4) Tighten adjusting screw to 8 N·m (72 in. lbs.) torque (Fig. 259).
- (5) Back off adjusting screw 2 turns.
- (6) Hold adjusting screw in place and tighten locknut to 34 N·m (25 ft. lbs.) torque.
- (7) Position new gasket on oil pan and install pan on transmission. Tighten pan bolts to 17 N·m (13 ft. lbs.) torque.
- (8) Lower vehicle and refill transmission with Mopar® ATF Plus, Type 7176 fluid.



**Fig. 259 Rear Band Adjustment Screw Location**

### VALVE BODY

#### CONTROL PRESSURE ADJUSTMENTS

There are two control pressure adjustments on the valve body;

- Line Pressure
- Throttle Pressure

Line and throttle pressures are interdependent because each affects shift quality and timing. As a

result, both adjustments must be performed properly and in the correct sequence. Adjust line pressure first and throttle pressure last.

#### LINE PRESSURE ADJUSTMENT

Measure distance from the valve body to the inner edge of the adjusting screw with an accurate steel scale (Fig. 260).

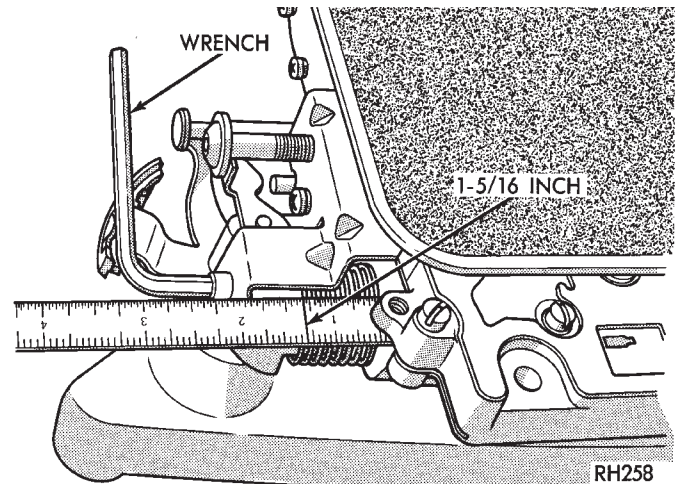
Distance should be 33.4 mm (1-5/16 in.).

If adjustment is required, turn the adjusting screw in, or out, to obtain required distance setting.

**NOTE:** The 33.4 mm (1-5/16 in.) setting is an approximate setting. Manufacturing tolerances may make it necessary to vary from this dimension to obtain desired pressure.

One complete turn of the adjusting screw changes line pressure approximately 1-2/3 psi (9 kPa).

Turning the adjusting screw counterclockwise increases pressure while turning the screw clockwise decreases pressure.



**Fig. 260 Line Pressure Adjustment**

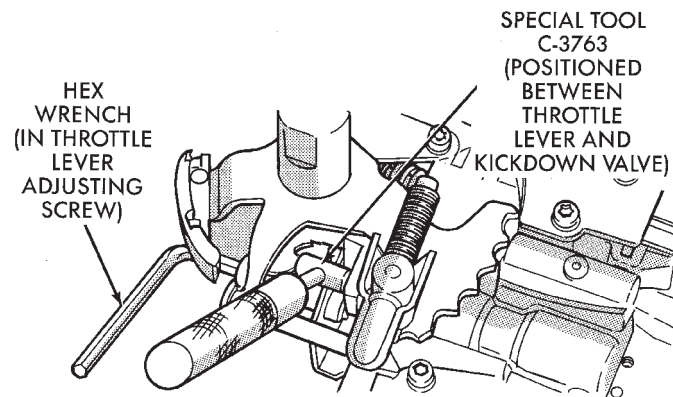
#### THROTTLE PRESSURE ADJUSTMENT

Insert Gauge Tool C-3763 between the throttle lever cam and the kickdown valve stem (Fig. 261).

Push the gauge tool inward to compress the kickdown valve against the spring and bottom the throttle valve.

Maintain pressure against kickdown valve spring. Turn throttle lever stop screw until the screw head touches throttle lever tang and the throttle lever cam touches gauge tool.

## ADJUSTMENTS (Continued)



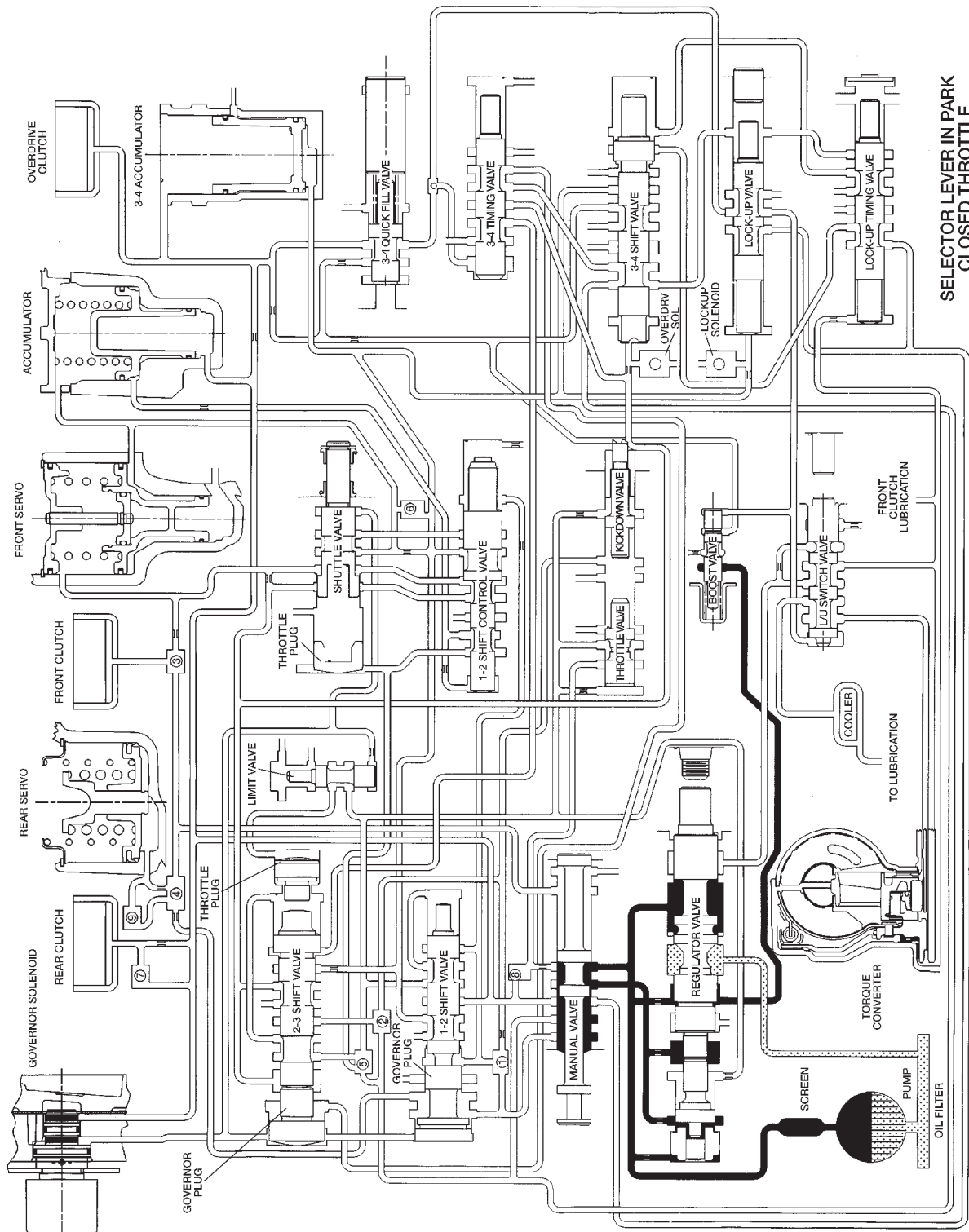
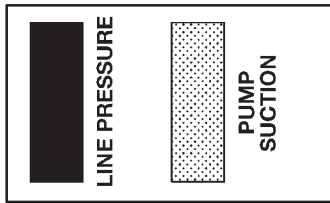
J9521-109

**Fig. 261 Throttle Pressure Adjustment**

**NOTE:** The kickdown valve spring must be fully compressed and the kickdown valve completely bottomed to obtain correct adjustment.

# SCHEMATICS AND DIAGRAMS

## HYDRAULIC SCHEMATICS

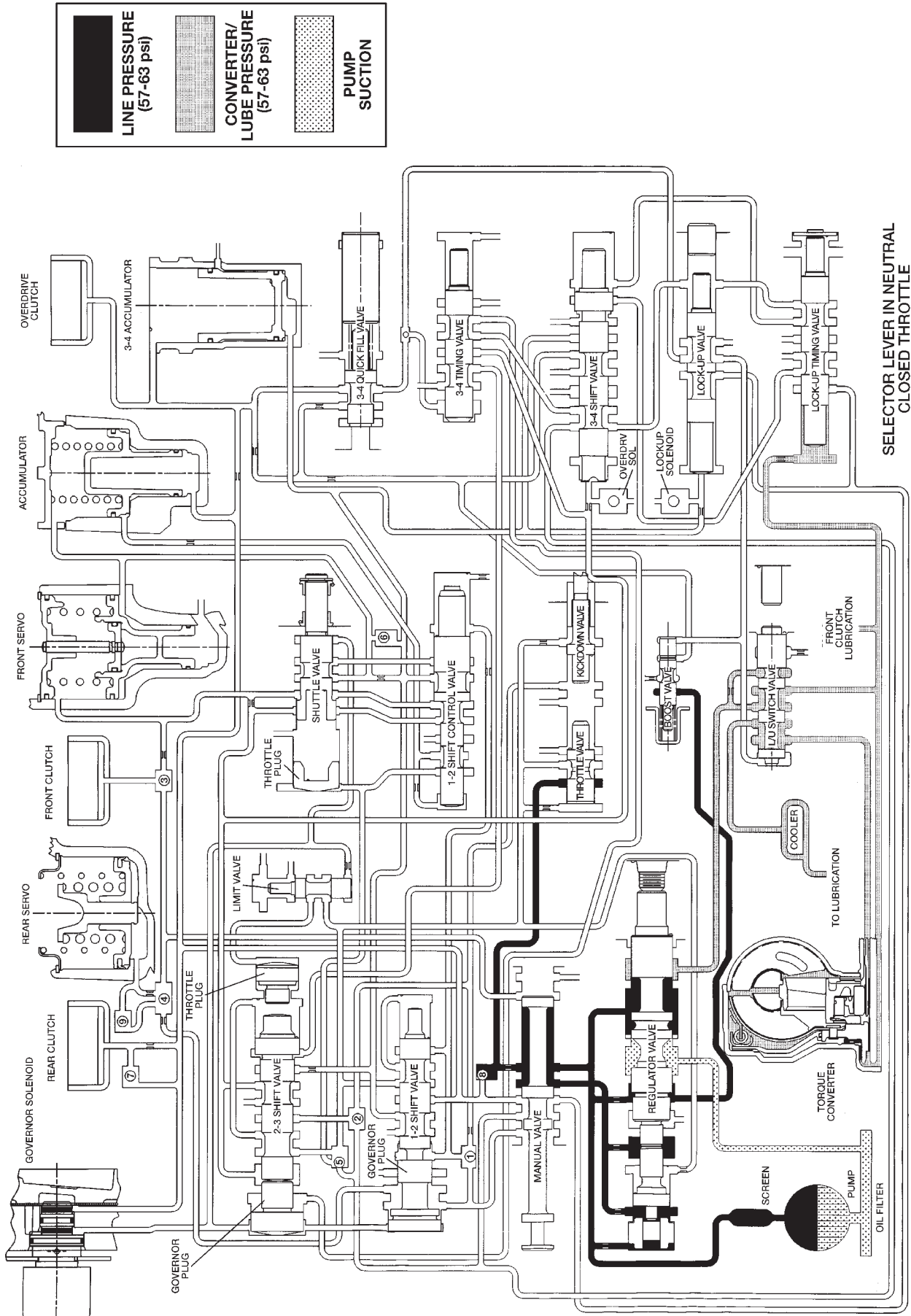


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**HYDRAULIC FLOW IN PARK**

## SCHEMATICS AND DIAGRAMS (Continued)

80abfd7f

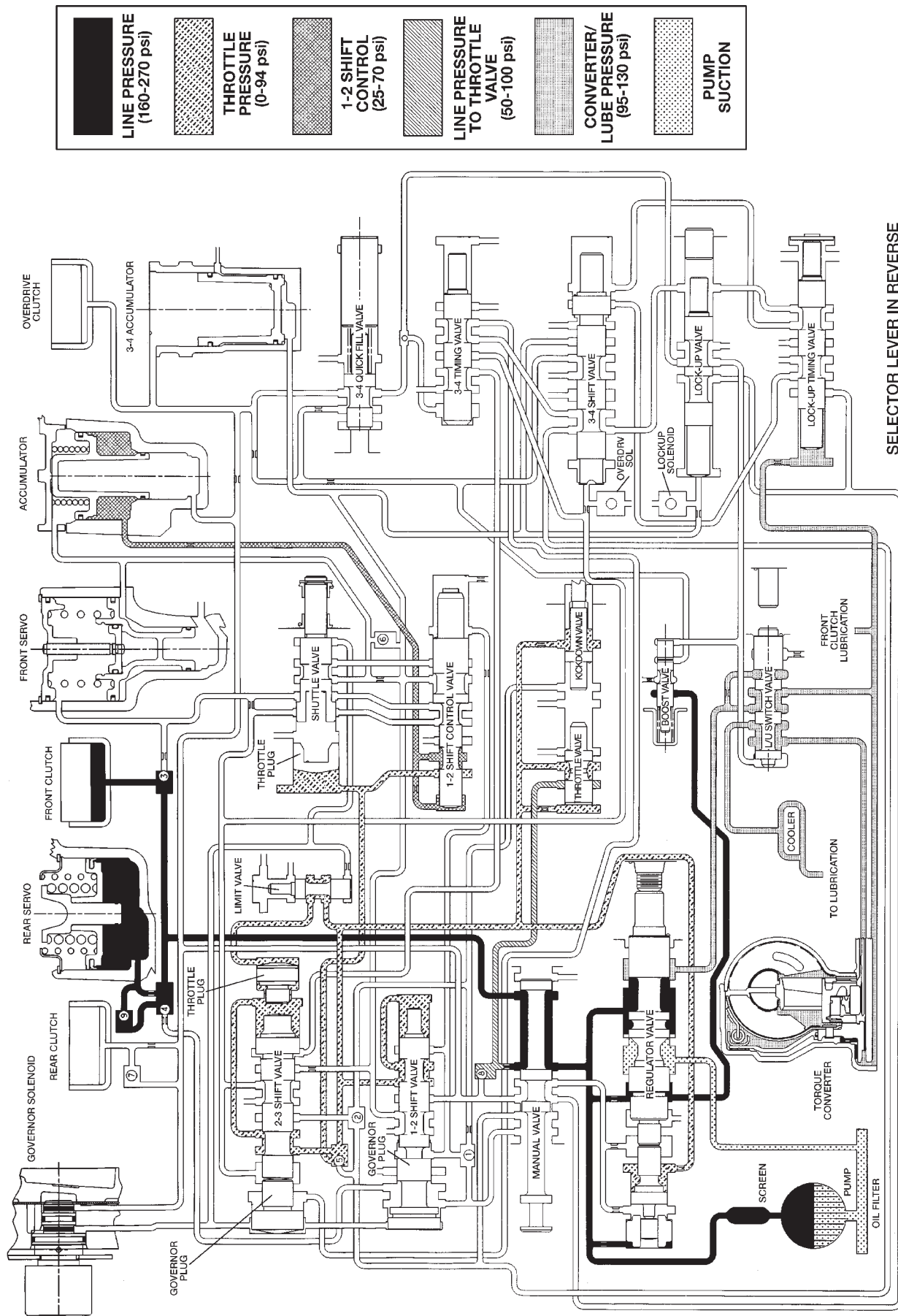


HYDRAULIC FLOW IN NEUTRAL



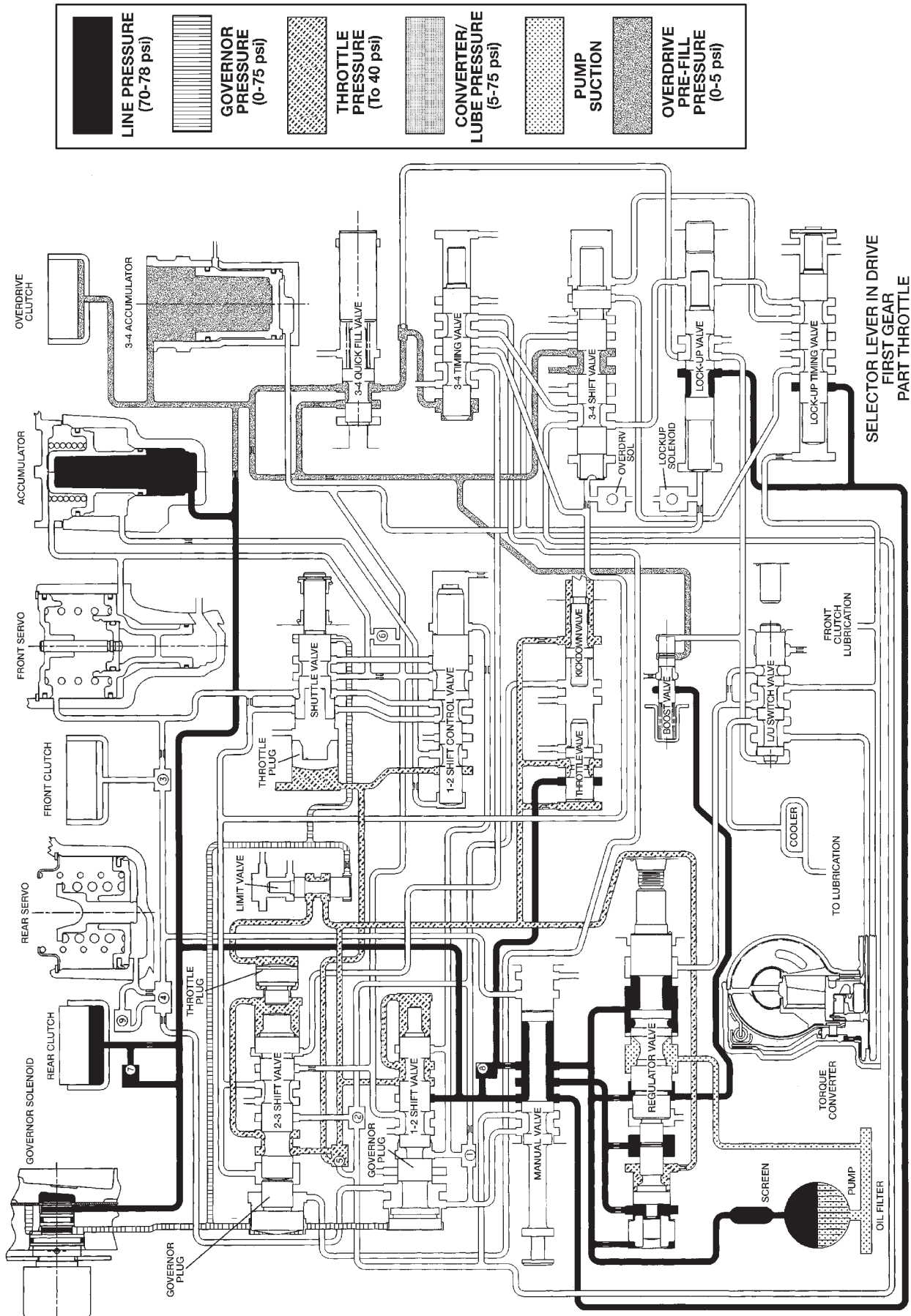
SCHEMATICS AND DIAGRAMS (Continued)

80abfd80



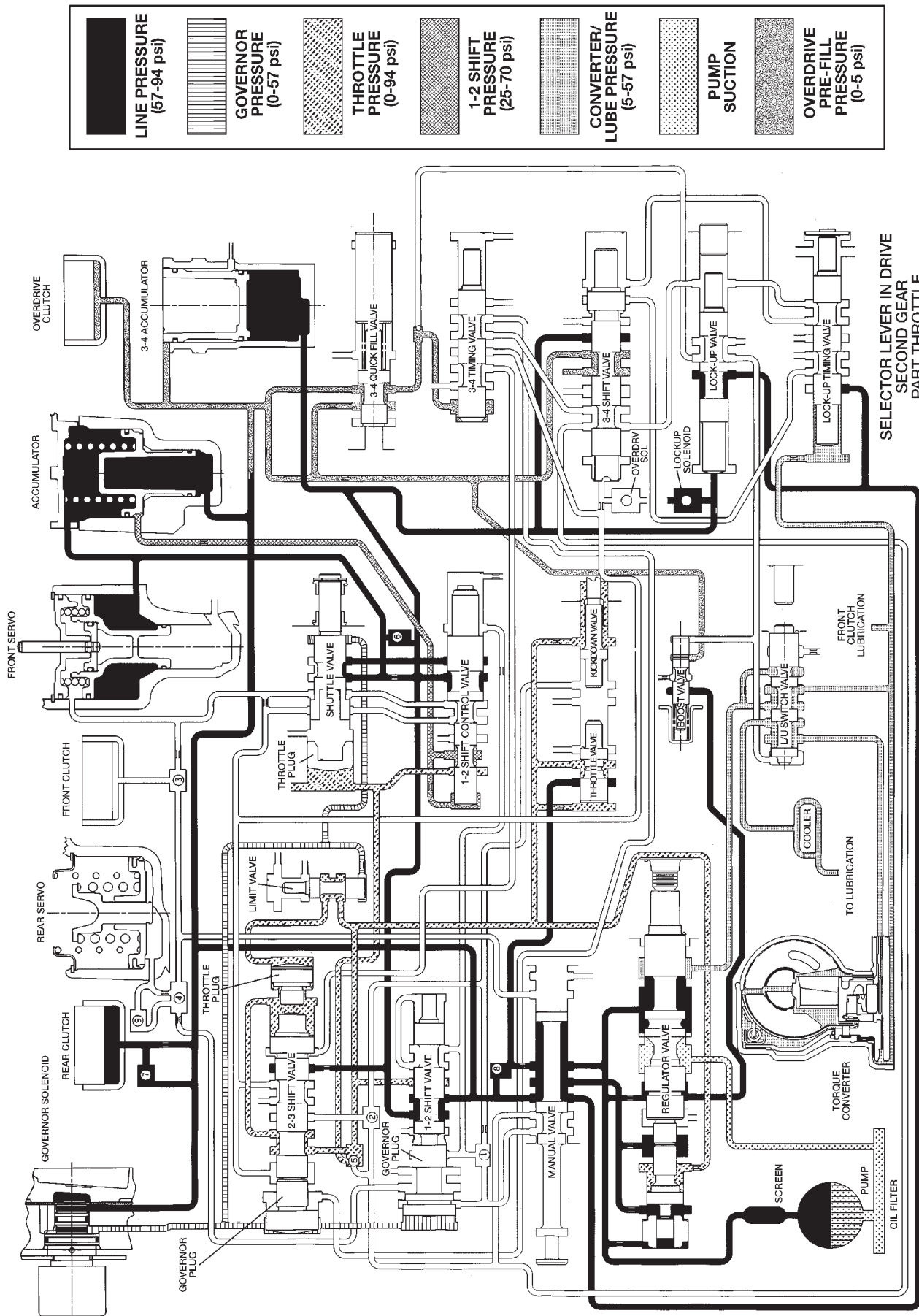
## SCHEMATICS AND DIAGRAMS (Continued)

80abrd83



HYDRAULIC FLOW IN DRIVE FIRST GEAR

## SCHEMATICS AND DIAGRAMS (Continued)

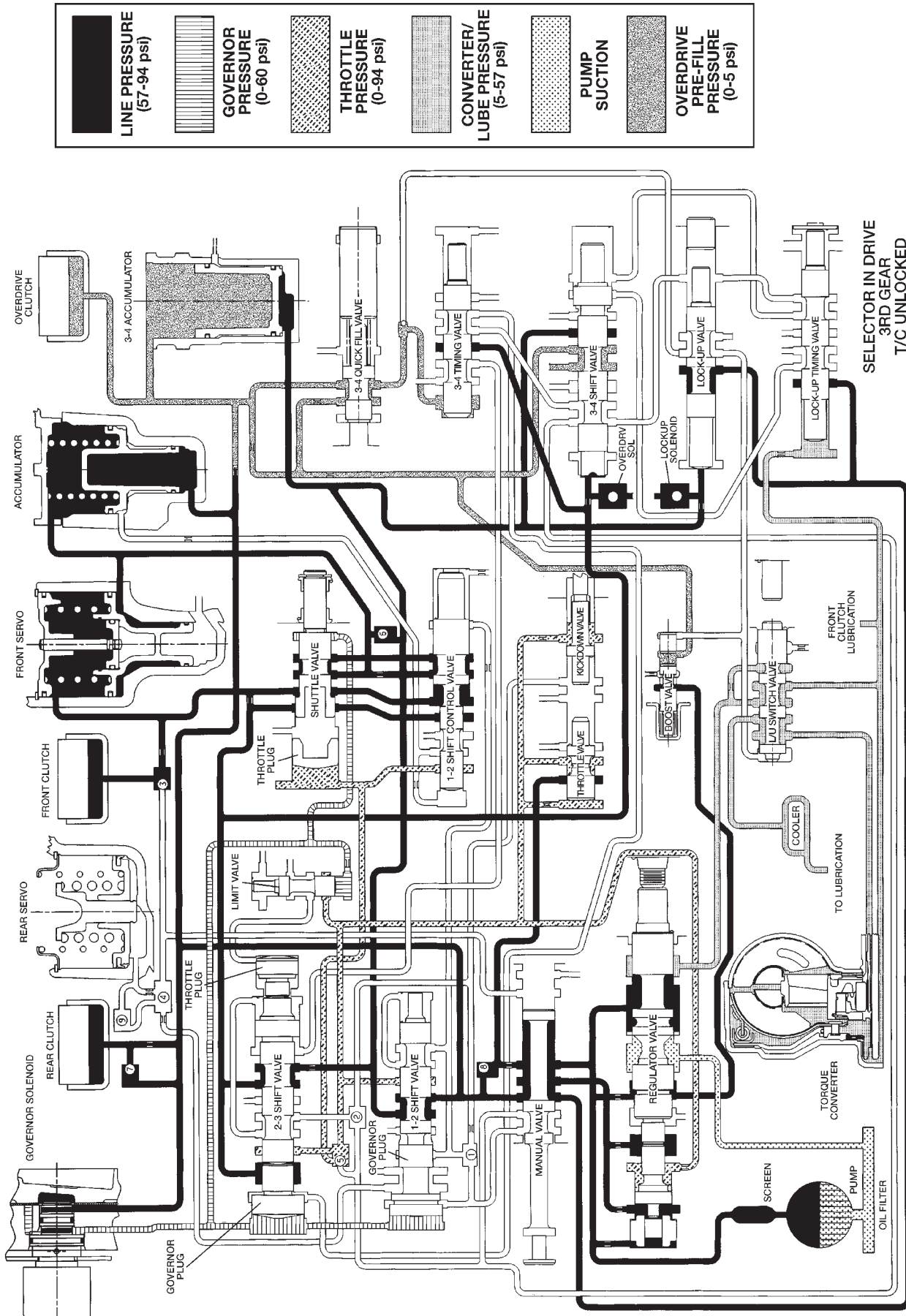


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HYDRAULIC FLOW IN DRIVE SECOND GEAR

## SCHEMATICS AND DIAGRAMS (Continued)

80abfd85

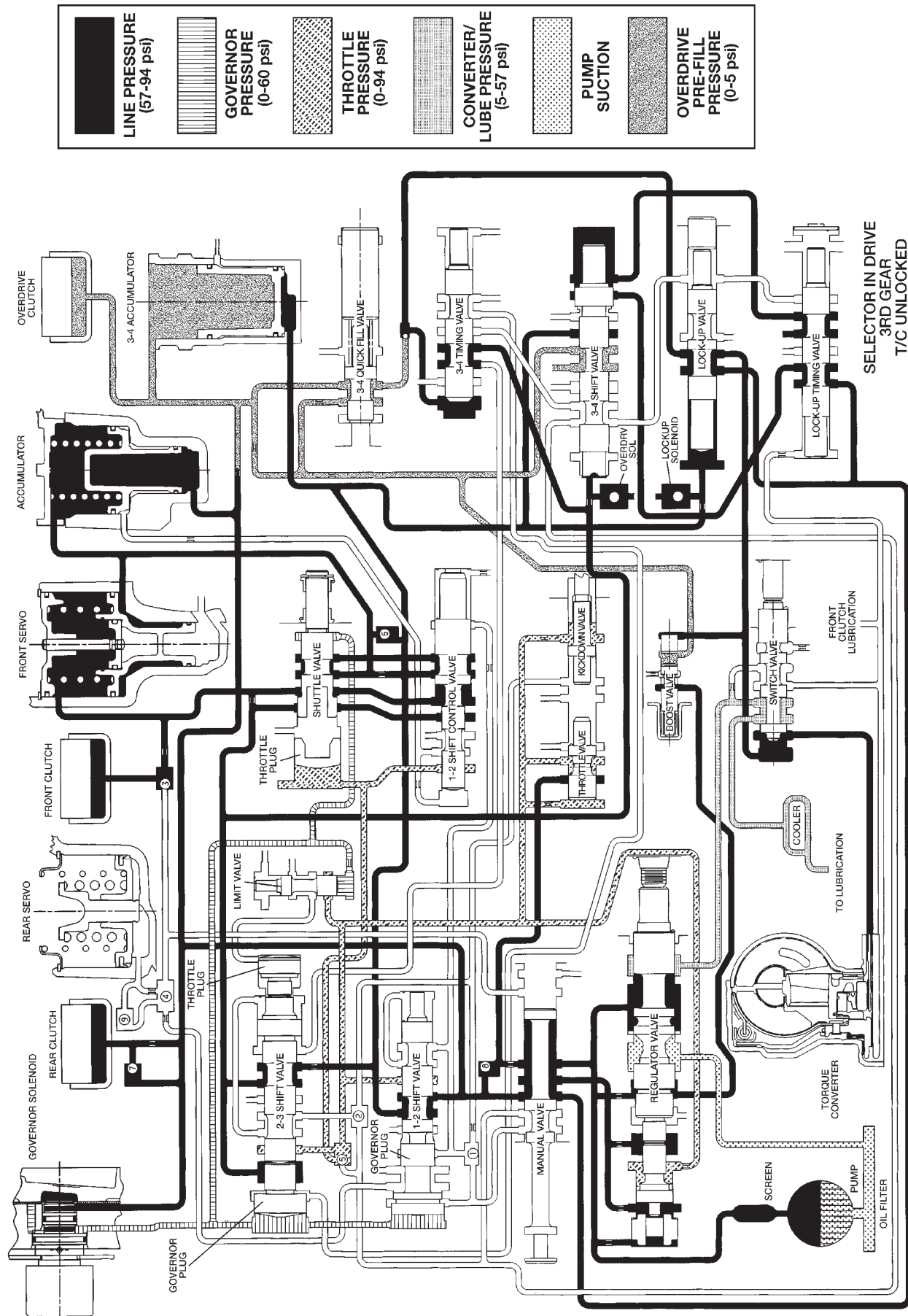


HYDRAULIC FLOW IN DRIVE THIRD GEAR (CONVERTER CLUTCH NOT APPLIED)



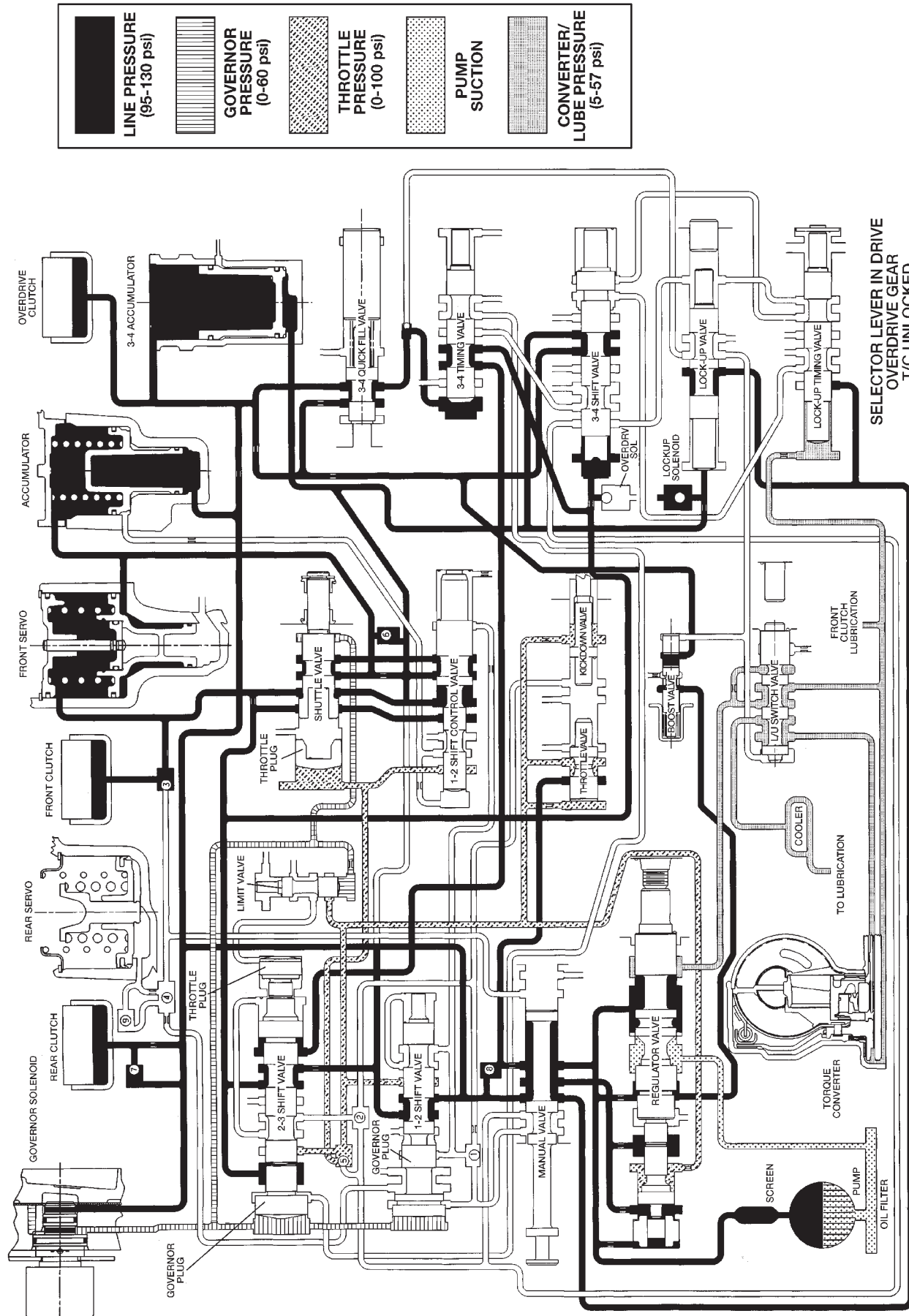
## SCHEMATICS AND DIAGRAMS (Continued)

80abrd8c



HYDRAULIC FLOW IN DRIVE THIRD GEAR (CONVERTER CLUTCH APPLIED)

## SCHEMATICS AND DIAGRAMS (Continued)

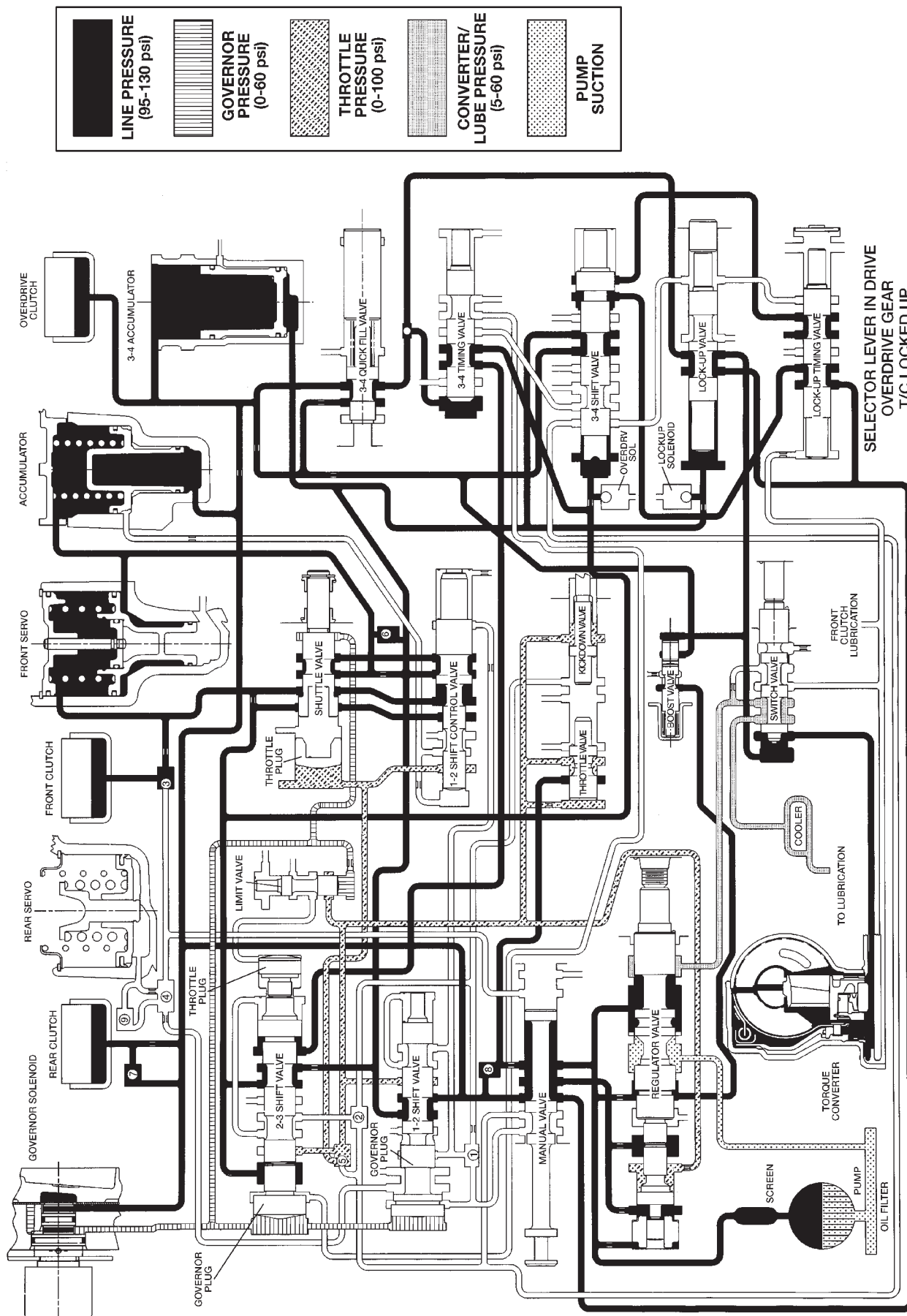


80abfd68

HYDRAULIC FLOW IN DRIVE FOURTH GEAR (CONVERTER CLUTCH NOT APPLIED)

SELECTOR LEVER IN DRIVE  
OVERDRIVE GEAR  
T/C UNLOCKED

## SCHEMATICS AND DIAGRAMS (Continued)



80abfd87

HYDRAULIC FLOW IN DRIVE FOURTH GEAR (CONVERTER CLUTCH APPLIED)

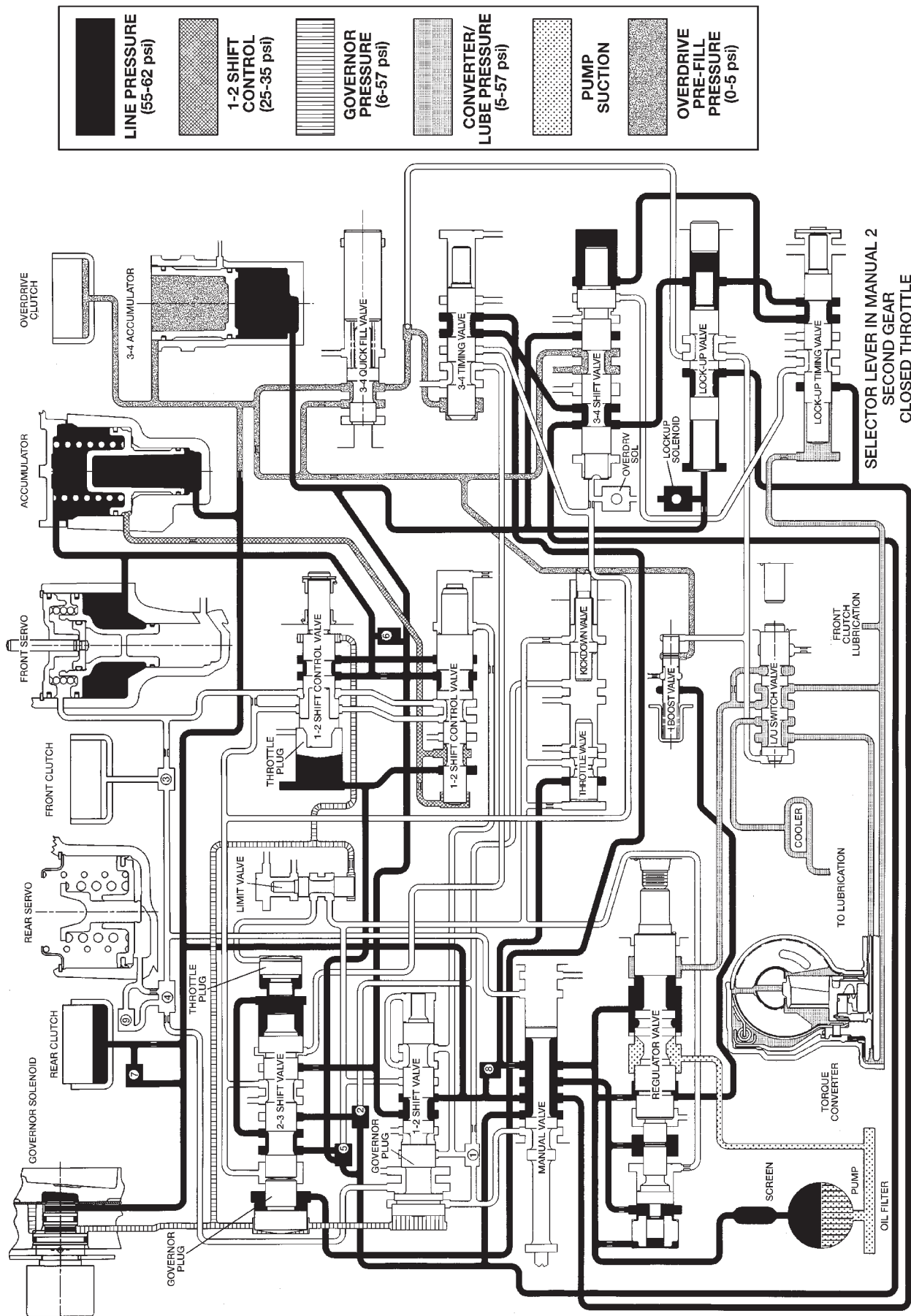
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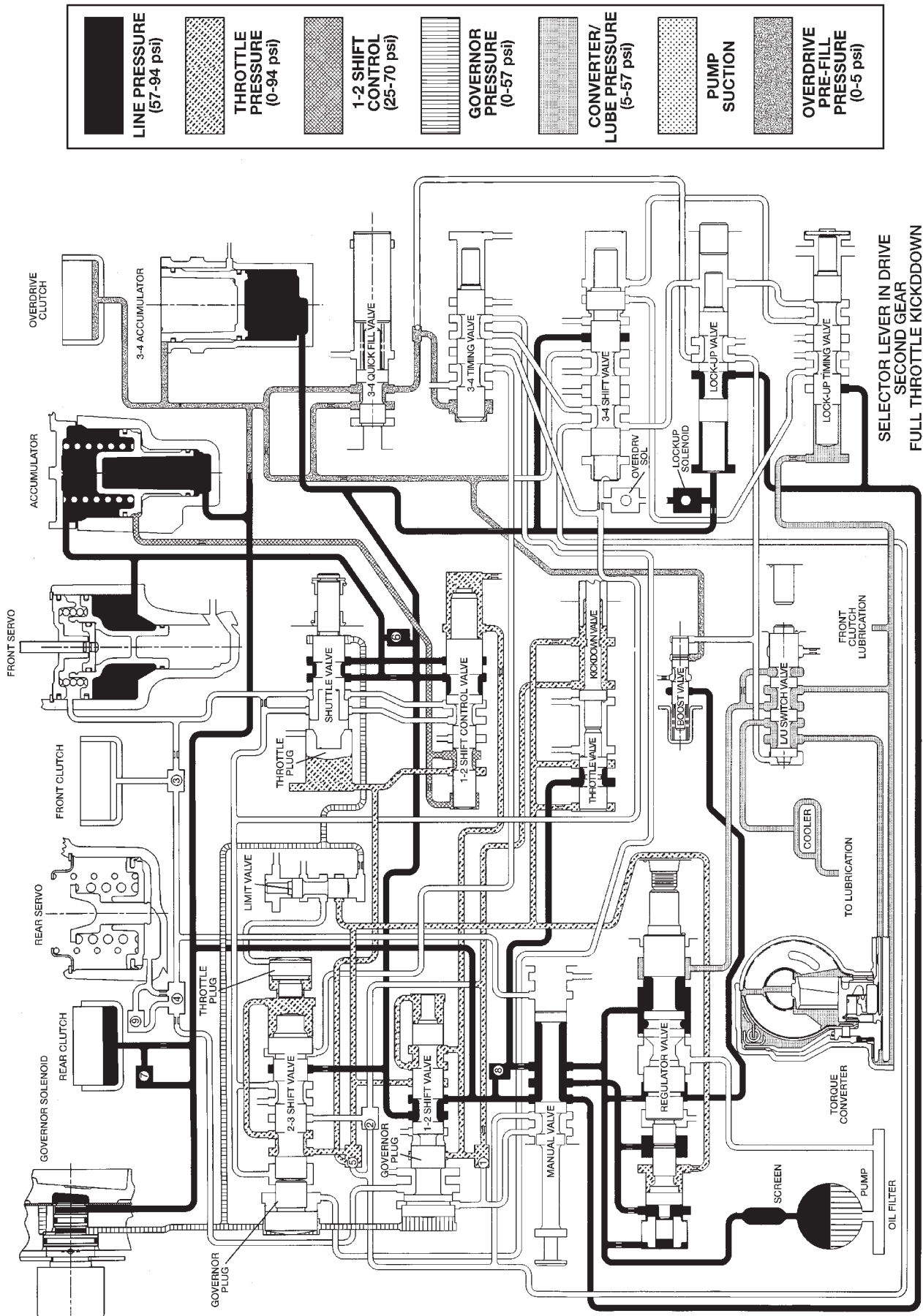
## SCHEMATICS AND DIAGRAMS (Continued)

80abfd89



HYDRAULIC FLOW IN MANUAL SECOND (2)

## SCHEMATICS AND DIAGRAMS (Continued)



80abfd8a

HYDRAULIC FLOW DURING FULL THROTTLE 3-2 DOWNSHIFT (PASSING GEAR)

SPECIFICATIONS

RE TRANSMISSION

GENERAL

Oil pump gear tip clearance	0.089-0.190 mm	0.004-0.008 in.
Planetary end play	0.150-1.22 mm	0.006-0.048 in.
Input shaft end play	0.86-2.13 mm	0.034-0.084 in.
Clutch pack clearance/ Front 3-disc.	1.78-3.28 mm	0.070-0.129 in.
Clutch pack clearance/ Rear 4-disc.	0.64-1.14 mm	0.025-0.045 in.
Overdrive clutch disc usage	4 discs	
Direct clutch disc usage	8 discs	
Front clutch spring usage	9 spring	
Band adjustment from 72 in. lbs.		
Front band	Back off 2-7/8 turns	
Rear band	Back off 2 turns	
Recommended fluid	Mopar® ATF Plus, type 7176	

TORQUE

DESCRIPTION	TORQUE
Bolt, torque convertor . . . . .	31 N·m (23 ft. lbs.)
Bolt/nut, crossmember . . . . .	68 N·m (50 ft. lbs.)
Bolt, driveplate to crankshaft . . .	75 N·m (55 ft. lbs.)
Plug, front band reaction . . . . .	17 N·m (13 ft. lbs.)
Locknut, front band adj. . . . .	34 N·m (25 ft. lbs.)
Switch, park/neutral . . . . .	34 N·m (25 ft. lbs.)
Bolt, fluid pan . . . . .	17 N·m (13 ft. lbs.)
Bolt, oil pump . . . . .	20 N·m (15 ft. lbs.)
Bolt, overrunning clutch cam . . .	17 N·m (13 ft. lbs.)
Bolt, O/D to trans. . . . .	34 N·m (25 ft. lbs.)
Bolt, O/D piston retainer . . . . .	17 N·m (13 ft. lbs.)
Plug, pressure test port . . . . .	14 N·m (10 ft. lbs.)
Bolt, reaction shaft support . . . .	20 N·m (15 ft. lbs.)
Locknut, rear band . . . . .	41 N·m (30 ft. lbs.)
Screw, fluid filter . . . . .	4 N·m (35 in. lbs.)
Bolt, valve body to case . . . . .	12 N·m (100 in. lbs.)

THRUST WASHER/SPACER/SNAP RING DIMENSIONS

Front clutch thrust washer (reaction shaft support hub)	1.55 mm	0.061 in.
	2.15 mm	0.084 in.
		0.102 in.
Rear clutch thrust washer (clutch retainer)	1.55 mm	0.061 in.
Output shaft thrust plate (output shaft pilot hub)	1.5-1.6 mm	0.060-0.063 in.
Output shaft thrust washer (rear clutch hub)	1.3-1.4 mm	0.052-0.054 in.
	1.75-1.8 mm	0.068-0.070 in.
	2.1-2.2 mm	0.083-0.085 in.
Rear clutch pack snap ring	1.5-1.6 mm	0.060-0.062 in.
	1.9-1.95 mm	0.074-0.076 in.
Planetary geartrain snap ring (at front of output shaft)	1.4-1.5 mm	0.055-0.059 in.
	1.6-1.7 mm	0.062-0.066 in.

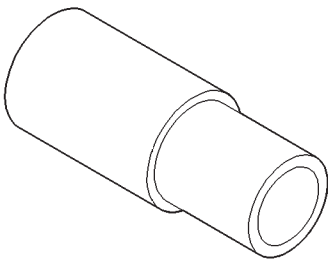
Overdrive piston thrust plate	Thrust plate and spacer are select fit components. Refer to size charts and selection procedures in Overdrive Unit disassembly and assembly section.
Intermediate shaft spacer	

PRESSURE TEST

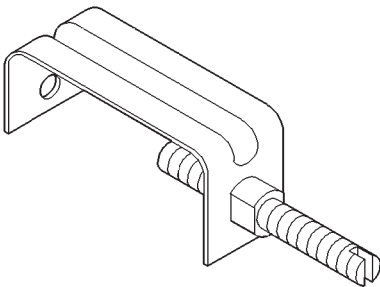
Overdrive clutch	Fourth gear only	Pressure should be 469-496 kPa (68-72 psi) with closed throttle and increase to 620-896 kPa (90-130 psi) at 1/2 to 3/4 throttle.
Line pressure (at accumulator)	Closed throttle	372-414 kPa (54-60 psi).
Front servo	Third gear only	No more than 21 kPa (3 psi) lower than line pressure.

SPECIFICATIONS (Continued)

Overdrive clutch	Fourth gear only	Pressure should be 469-496 kPa (68-72 psi) with closed throttle and increase to 620-896 kPa (90-130 psi) at 1/2 to 3/4 throttle.
Rear servo	1 range	No more than 21 kPa (3 psi) lower than line pressure.
	R range	1103 kPa (160 psi) at idle, builds to 1862 kPa (270 psi) at 1600 rpm.
Governor	D range closed throttle	Pressure should respond smoothly to changes in mph and return to 0-7 kPa (0-1.5 psi) when stopped with transmission in D, 1, 2. Pressure above 7 kPa (1.5 psi) at stand still will prevent transmission from downshifting.



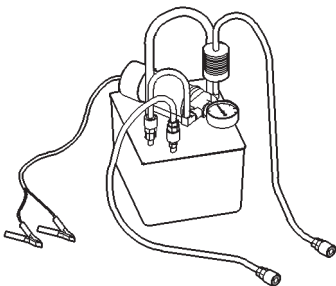
Installer—6951



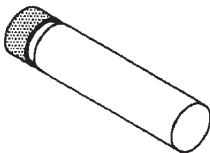
Retainer, Detent Ball and Spring—6583

SPECIAL TOOLS

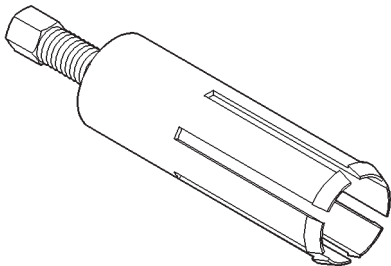
RE TRANSMISSION



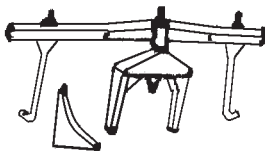
Oil Cooler Flusher—6906



Gauge Block—6312



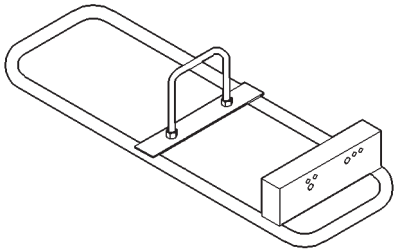
Remover—6957



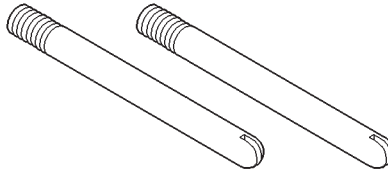
Fixture, Engine Support—C-3487-A



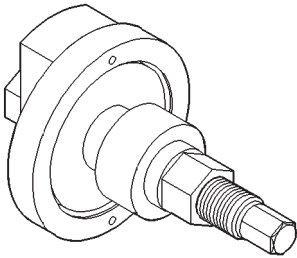
SPECIAL TOOLS (Continued)



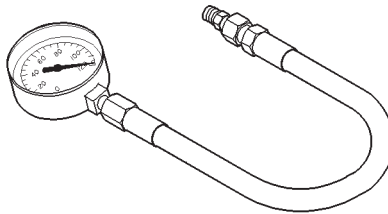
***Transmission Repair Stand—C-3750-B***



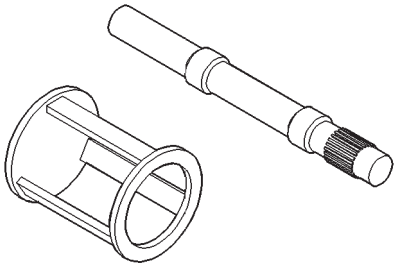
***Extension Housing Pilot—C-3288-B***



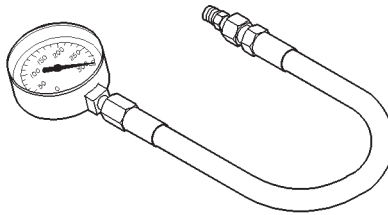
***Spring Compressor—C-3863-A***



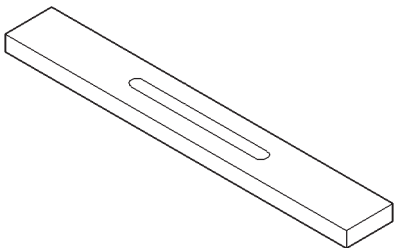
***Pressure Gauge—C-3292***



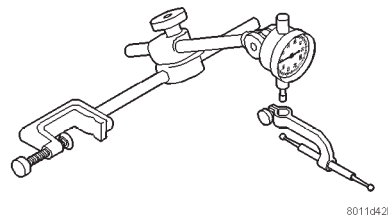
***Spring Compressor and Alignment Shaft—6227***



***Pressure Gauge—C-3293SP***



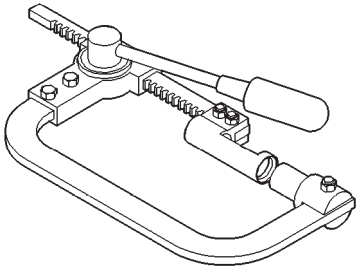
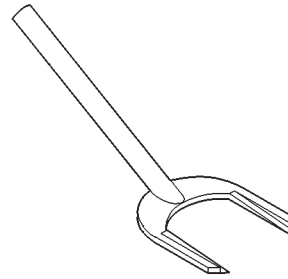
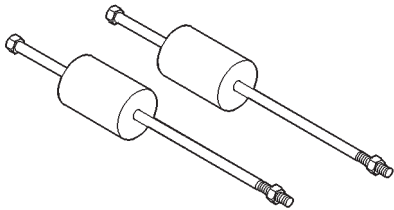
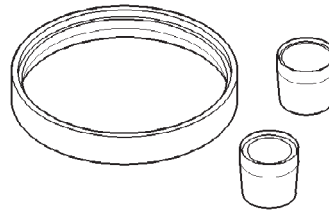
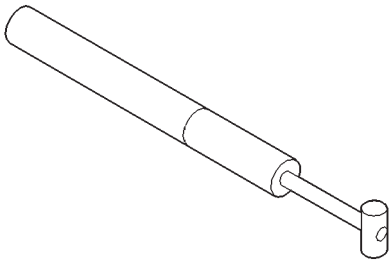
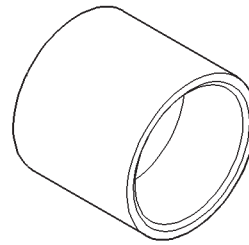
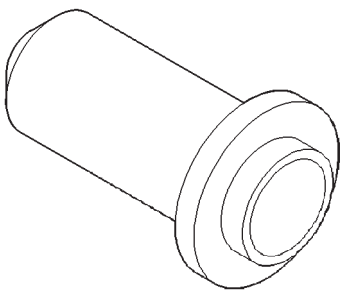
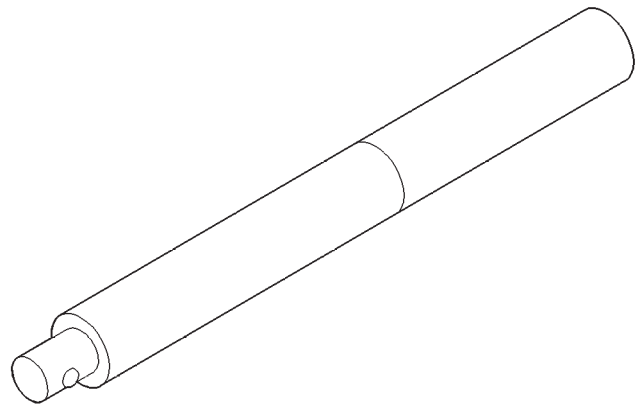
***Gauge Bar—6311***



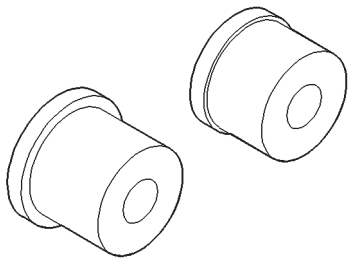
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***Dial Indicator—C-3339***

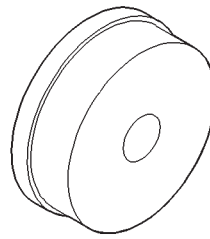
## SPECIAL TOOLS (Continued)

**Spring Compressor—C-3422-B****Seal Remover—C-3985-B****Puller, Slide Hammer—C-3752****Overdrive Piston Seal Installer—8114****Gauge, Throttle Setting—C-3763****Installer—C-3995-A****Seal Installer—C-3860-A****Universal Handle—C-4171**

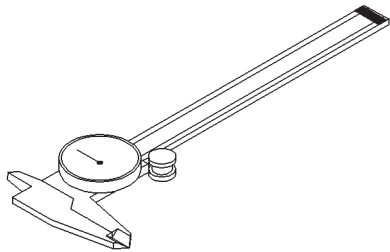
SPECIAL TOOLS (Continued)



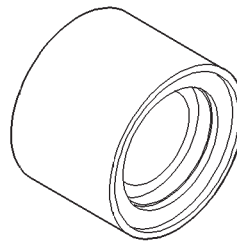
***Remover/Installer—C-4470***



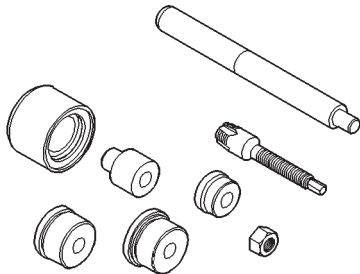
***Remover, Front Clutch Bushing—SP-3629, From kit C-3887-J***



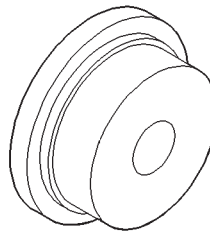
***Dial Caliper—C-4962***



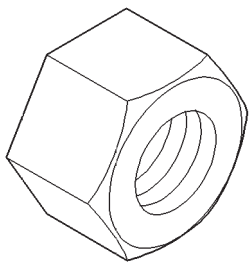
***Cup, Bushing Remover—SP-3633, From kit C-3887-J***



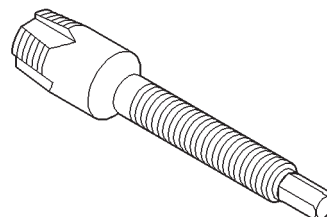
***Bushing Remover/Installer Set—C-3887-J***



***Installer, Oil Pump Bushing—SP-5118, From kit C-3887-J***

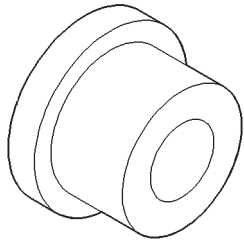


***Nut, Bushing Remover—SP-1191, From kit C-3887-J***

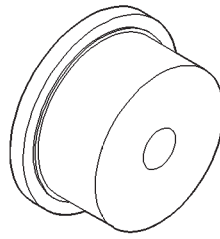


***Remover, Reaction Shaft Bushing—SP-5301, From kit C-3887-J***

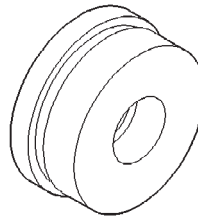
## SPECIAL TOOLS (Continued)



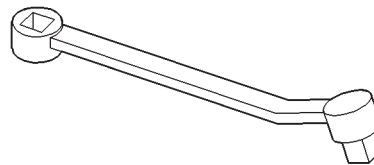
***Installer, Reaction Shaft Bushing—SP-5302, From kit C-3887-J***



***Installer, Front Clutch Bushing—SP-5511, From kit C-3887-J***



***Remover, Bushing—SP-3550, From kit C-3887-J***



***Adapter, Band Adjuster—C-3705***



NV231 TRANSFER CASE

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GENERAL INFORMATION

NV231 TRANSFER CASE

The NV231 is a part-time transfer case with a low range reduction gear system. The NV231 has three operating ranges plus a Neutral position. A low range system provides a reduction ratio for increased low speed torque capability.

The input gear is splined to the transmission output shaft. The input gear drives the mainshaft through the planetary assembly and range hub. The front output shaft is operated by a drive chain that connects the shaft to a drive sprocket on the mainshaft. The drive sprocket is engaged/disengaged by the mode fork, which operates the mode sleeve and hub. The sleeve and hub are not equipped with a synchronizer mechanism for shifting.

The geartrain is mounted in two aluminum case halves attached with bolts. The mainshaft front and rear bearings are mounted in aluminum retainer housings bolted to the case halves.

OPERATING RANGES

Transfer case operating ranges are:

- 2WD (2-wheel drive)
- 4x4 (4-wheel drive)
- 4 Lo (4-wheel drive low range)

The 2WD range is for use on any road surface at any time.

The 4x4 and 4 Lo ranges are for off road use only. They are not for use on hard surface roads. The only exception being when the road surface is wet or slippery or covered by ice and snow.

The low range reduction gear system is operative in 4 Lo range only. This range is for extra pulling power in off road situations. Low range reduction ratio is 2.72:1.

SHIFT MECHANISM

Operating ranges are selected with a floor mounted shift lever. The shift lever is connected to the transfer case range lever by an adjustable linkage rod. A straight line shift pattern is used. Range positions are marked on the shifter bezel cover plate.

TRANSFER CASE IDENTIFICATION

A circular ID tag is attached to the rear case of each transfer case (Fig. 1). The ID tag provides the transfer case model number, assembly number, serial number, and low range ratio.

The transfer case serial number also represents the date of build.

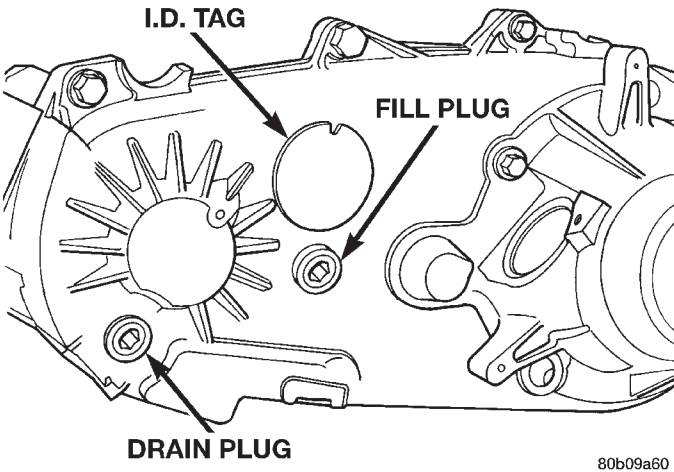


Fig. 1 Fill/Drain Plug And I.D. Tag Locations

RECOMMENDED LUBRICANT AND FILL LEVEL

Recommended lubricant for the NV231 transfer case is Mopar® Dexron II, or ATF Plus 3, type 7176. Approximate lubricant fill capacity is 1.2 liters (2.5 pints).

## GENERAL INFORMATION (Continued)

The fill and drain plugs are both in the rear case (Fig. 1). Correct fill level is to the bottom edge of the fill plug hole. Be sure the vehicle is level to ensure an accurate fluid level check.

## DIAGNOSIS AND TESTING

## NV231 DIAGNOSIS

## DIAGNOSIS CHART

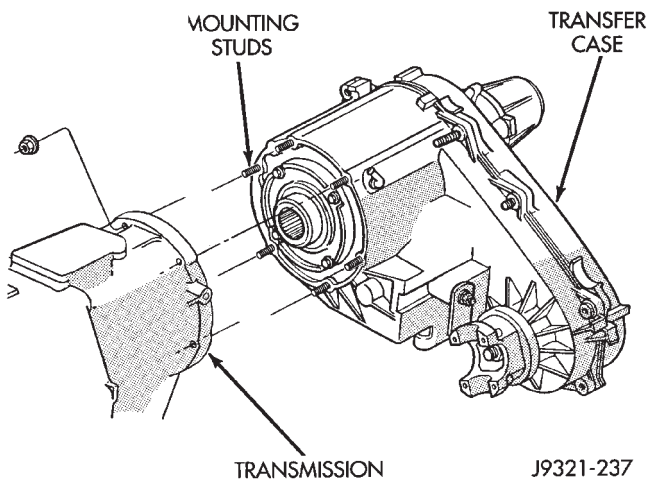
Condition	Possible Cause	Correction
Transfer case difficult to shift or will not shift into desired range.	1) Vehicle speed too great to permit shifting.	1) Slow vehicle and shift into desired range.
	2) If vehicle was operated for an extended period in 4H mode on dry surface, driveline torque load may cause difficulty.	2) Stop vehicle and shift transfer case to Neutral position. Transfer case can then be shifted to the desired mode.
	3) Transfer case shift linkage binding.	3) Repair or replace linkage as necessary.
	4) Insufficient or incorrect lubricant.	4) Drain and refill transfer case with the correct type and quantity of lubricant.
	5) Internal transfer case components binding, worn, or damaged.	5) Repair or replace components as necessary.
Transfer case noisy in all drive modes.	1) Insufficient or incorrect lubricant.	1) Drain and refill transfer case with the correct type and quantity of lubricant.
Transfer case noisy while in, or jumps out of, 4L mode.	1) Transfer case not completely engaged in 4L position.	1) Slow vehicle, shift transfer case to the Neutral position, and then shift into the 4L mode.
	2) Transfer case shift linkage out of adjustment.	2) Adjust linkage as necessary.
	3) Transfer case shift linkage loose or binding.	3) Repair, replace, or tighten linkage components as necessary.
	4) Range fork damaged, inserts worn, or fork is binding on the shift rail.	4) Repair or replace components as necessary.
	5) Low range gear worn or damaged.	5) Repair or replace components as necessary.
Lubricant leaking from transfer case seals or vent.	1) Transfer case overfilled.	1) Drain lubricant to the correct level.
	2) Transfer case vent closed or restricted.	2) Clean or replace vent as necessary.
	3) Transfer case seals damaged or installed incorrectly.	3) Replace suspect seal.
Abnormal tire wear.	1) Extended operation in 4H mode on dry surfaces,	1) Operate vehicle in 2H mode on dry surfaces.

## REMOVAL AND INSTALLATION

### TRANSFER CASE

#### REMOVAL

- (1) Shift transfer case into Neutral.
- (2) Raise vehicle.
- (3) Drain transfer case lubricant.
- (4) Mark front and rear propeller shaft yokes for alignment reference.
- (5) Support transmission with jack stand.
- (6) Remove rear crossmember and skid plate, if equipped.
- (7) Disconnect front/rear propeller shafts at transfer case.
- (8) Disconnect transfer case linkage rod from range lever.
- (9) Disconnect transfer case vent hose (Fig. 2) and indicator switch harness, if necessary.
- (10) Support transfer case with transmission jack.
- (11) Secure transfer case to jack with chains.
- (12) Remove nuts attaching transfer case to transmission.
- (13) Pull transfer case and jack rearward to disengage transfer case.
- (14) Remove transfer case from under vehicle.



**Fig. 2 Transfer Case Mounting—Typical**

#### INSTALLATION

- (1) Mount transfer case on a transmission jack.
- (2) Secure transfer case to jack with chains.
- (3) Position transfer case under vehicle.
- (4) Align transfer case and transmission shafts and install transfer case on transmission.
- (5) Install and tighten transfer case attaching nuts to 35 N·m (26 ft. lbs.) torque (Fig. 2).
- (6) Connect vent hose.
- (7) Connect indicator switch harness to transfer case switch, if necessary. Secure wire harness to clips on transfer case.

(8) Align and connect propeller shafts. Tighten shaft attaching bolts to 19 N·m (170 in. lbs.) torque.

(9) Fill transfer case with correct fluid. Refer to Recommended Lubricant And Fill Level section for proper fluid and capacity.

(10) Install rear crossmember and skid plate, if equipped. Tighten crossmember bolts to 41 N·m (30 ft. lbs.) torque.

(11) Remove transmission jack and support stand.

(12) Connect shift rod to transfer case range lever.

(13) Adjust transfer case shift linkage.

(14) Lower vehicle and verify transfer case shift operation.

### SHIFT LEVER

#### REMOVAL

- (1) Shift transfer case into 4L.
- (2) Remove transfer case shifter knob cap.
- (3) Remove nut holding shifter knob to shift lever.
- (4) Remove shifter knob.
- (5) Raise and support vehicle.
- (6) Loosen adjusting trunnion lock bolt and slide shift rod out of trunnion (Fig. 3). If rod lacks enough travel to come out of trunnion, push trunnion out of shift lever.
- (7) Remove bolts holding shift lever to transmission.
- (8) Separate shift lever from vehicle.

#### INSTALLATION

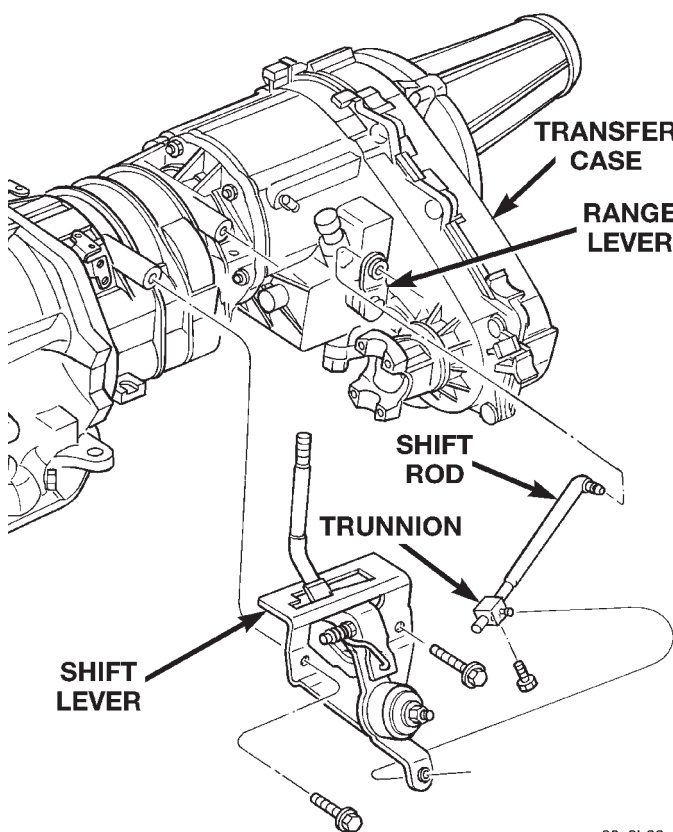
- (1) Position shift lever on transmission. Use care when passing the shift lever through the shifter boot to prevent damage to the shifter boot.
- (2) Install bolts to hold shift lever to transmission.
- (3) Install trunnion to shift lever, if necessary.
- (4) Install shift rod to trunnion, if necessary.
- (5) Move shift lever and transfer case to 4L position.
- (6) Tighten trunnion lock bolt.
- (7) Lower vehicle.
- (8) Install shift knob on shift lever.
- (9) Install nut to hold shifter knob to shift lever.
- (10) Install shifter knob cap.
- (11) Verify transfer case operation.

### FRONT OUTPUT SHAFT SEAL

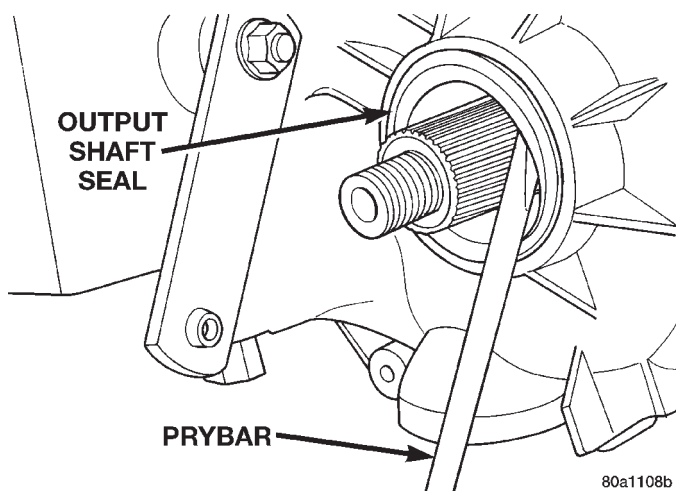
#### REMOVAL

- (1) Raise vehicle.
- (2) Remove front propeller shaft. Refer to Group 3, Differential and Driveline, for proper procedure.
- (3) Remove front output shaft yoke.
- (4) Remove seal from front case with pry tool (Fig. 4).

## REMOVAL AND INSTALLATION (Continued)



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**Fig. 3 Shift Lever**

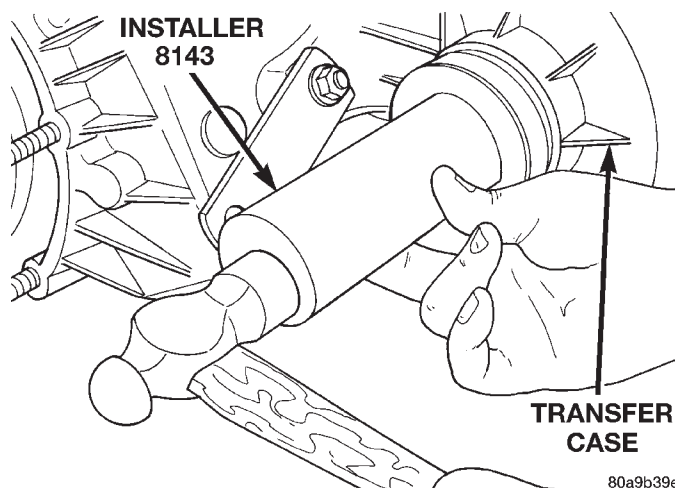
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**Fig. 4 Remove Front Output Shaft Seal****INSTALLATION**

(1) Install new front output seal in front case with Installer Tool 8143 as follows:

(a) Place new seal on tool. Garter spring on seal goes toward interior of case.

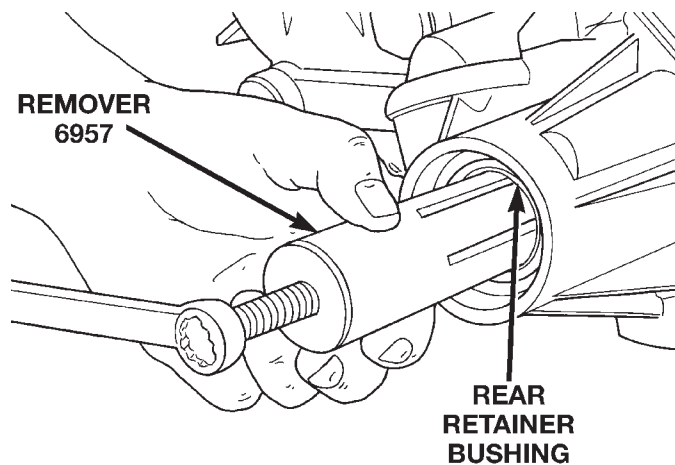
(b) Start seal in bore with light taps from hammer (Fig. 5). Once seal is started, continue tapping seal into bore until installer tool seats against case.



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**Fig. 5 Front Output Seal Installation****REAR RETAINER BUSHING AND SEAL****REMOVAL**

- (1) Raise vehicle.
- (2) Remove rear propeller shaft. Refer to Group 3, Differential and Driveline, for proper procedure.
- (3) Using a suitable pry tool or slide-hammer mounted screw, remove the rear retainer seal.
- (4) Using Remover 6957, remove bushing from rear retainer (Fig. 6).



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**Fig. 6 Rear Retainer Bushing Removal****INSTALLATION**

(1) Clean fluid residue from sealing surface and inspect for defects.

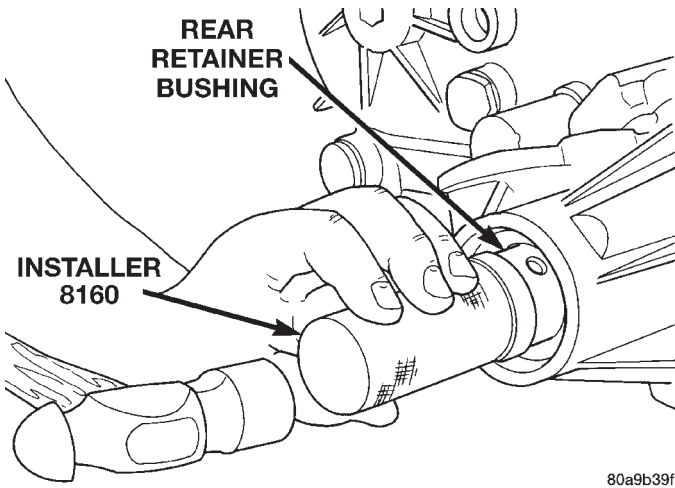
(2) Position replacement bushing in rear retainer with fluid port in bushing aligned with slot in retainer.

(3) Using Installer 8160, drive bushing into retainer until installer seats against case (Fig. 7).

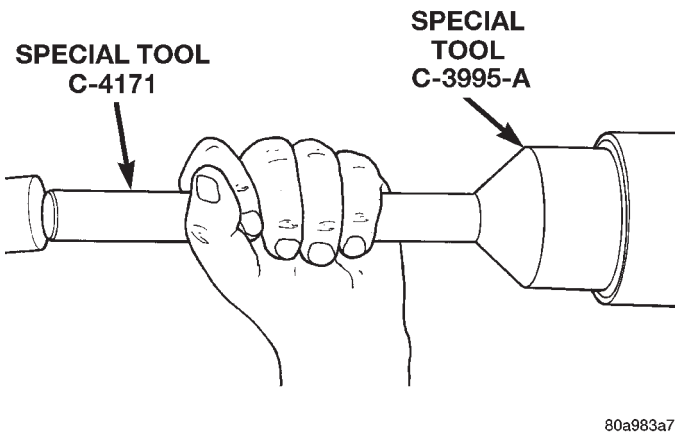
(4) Using Installer C-3995-A, install seal in rear retainer (Fig. 8).



## REMOVAL AND INSTALLATION (Continued)



**Fig. 7 Rear Retainer Bushing Install**



**Fig. 8 Install Rear Retainer Seal**

- (5) Install propeller shaft.
- (6) Verify proper fluid level.
- (7) Lower vehicle.

## DISASSEMBLY AND ASSEMBLY

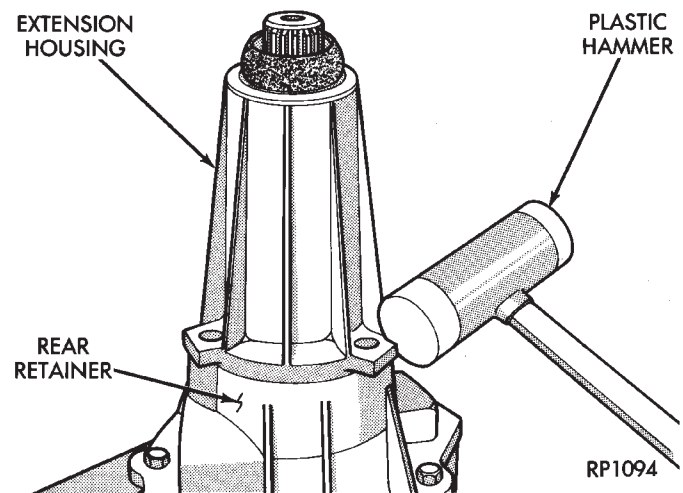
### NV231 TRANSFER CASE

#### DISASSEMBLY

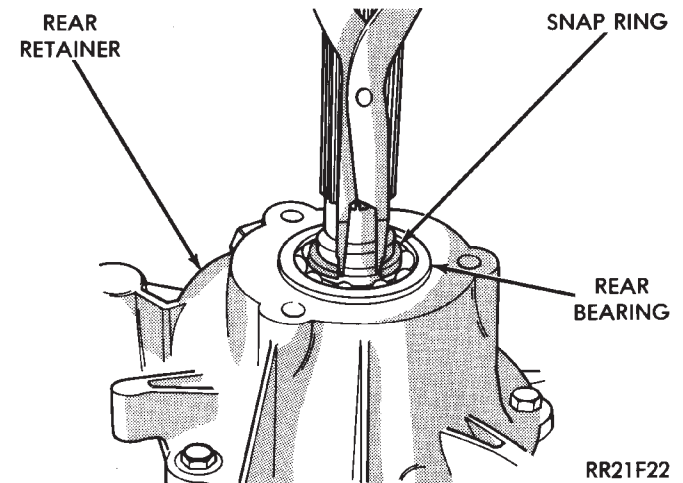
Position transfer case on shallow drain pan. Remove drain plug and drain lubricant remaining in case.

#### REAR RETAINER AND OIL PUMP REMOVAL

- (1) Remove extension housing bolts.
- (2) Tap extension housing with plastic or rawhide mallet to loosen sealer (Fig. 9).
- (3) Separate extension housing from rear retainer.
- (4) Remove rear bearing snap-ring (Fig. 10).
- (5) Remove bolts holding rear retainer to rear case half.

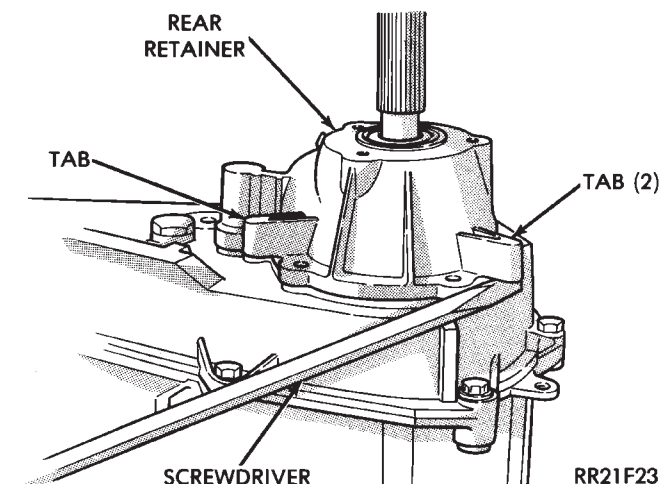


**Fig. 9 Remove Extension Housing**



**Fig. 10 Remove Rear Bearing Snap-ring**

- (6) Loosen rear retainer with pry tool to break sealer bead. Pry only against retainer boss as shown (Fig. 11).

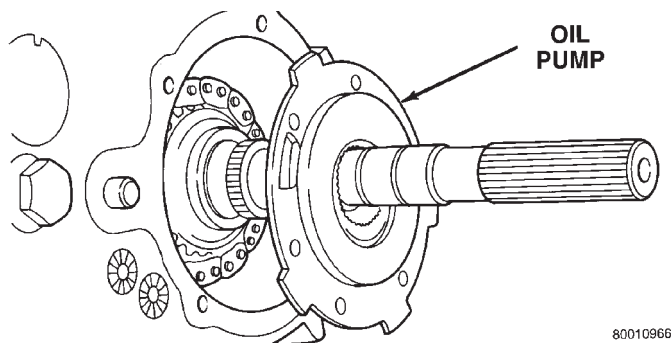


**Fig. 11 Loosening Rear Retainer**

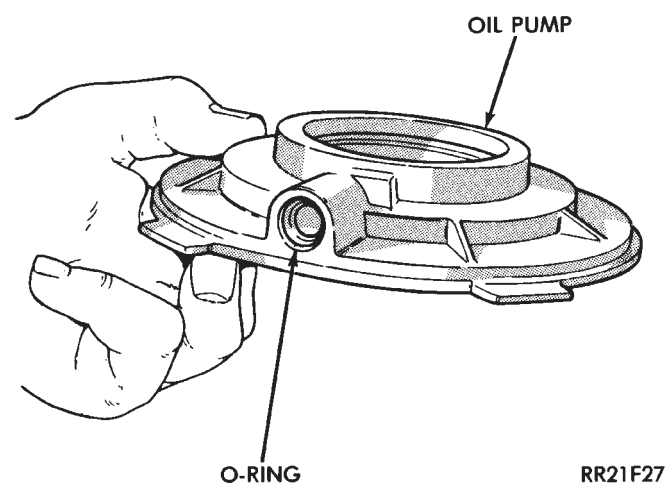
## DISASSEMBLY AND ASSEMBLY (Continued)

(7) Disengage oil pickup tube from oil pump and remove oil pump assembly (Fig. 12).

(8) Remove pick-up tube o-ring from oil pump (Fig. 13), if necessary. Do not disassemble the oil pump, it is not serviceable.



**Fig. 12 Oil Pump Removal**



**Fig. 13 Pick-up Tube O-ring Location**

## YOKE AND RANGE LEVER REMOVAL

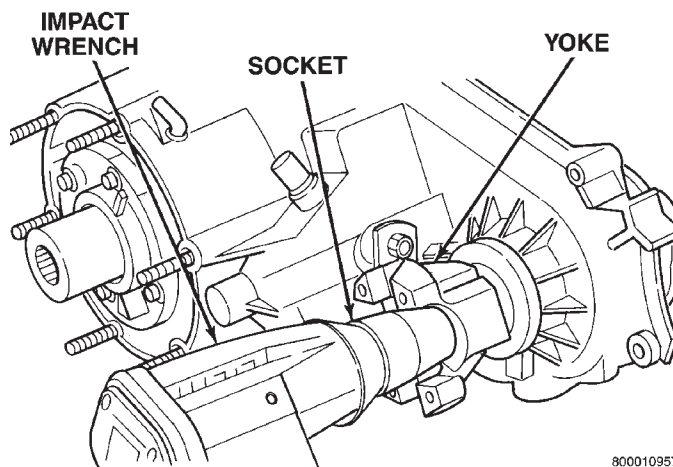
- (1) Remove transfer case indicator switch.
- (2) Remove front yoke nut as follows:
  - (a) Move range lever to 4L position.
  - (b) Then remove nut with socket and impact wrench (Fig. 14).
- (3) Remove yoke. If yoke is difficult to remove by hand, remove it with bearing splitter, or with standard two jaw puller (Fig. 15). Be sure puller tool is positioned on yoke and not on slinger as slinger will be damaged.

(4) Remove seal washer from front output shaft. Discard washer as it should not be reused.

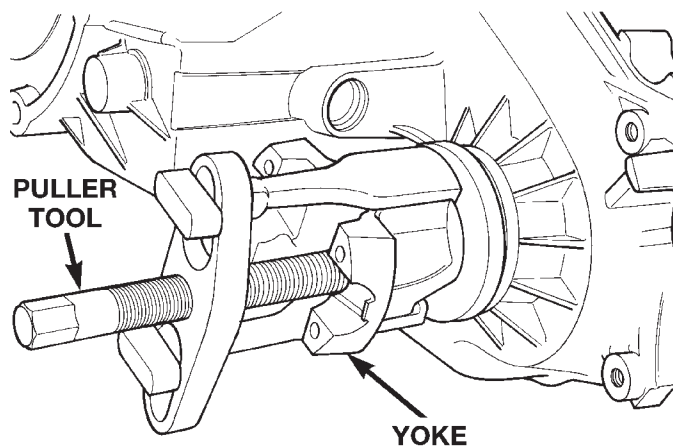
(5) Remove nut and washer that attach range lever to sector shaft. Then move sector to neutral position and remove range lever from shaft (Fig. 16).

## FRONT OUTPUT SHAFT AND DRIVE CHAIN REMOVAL

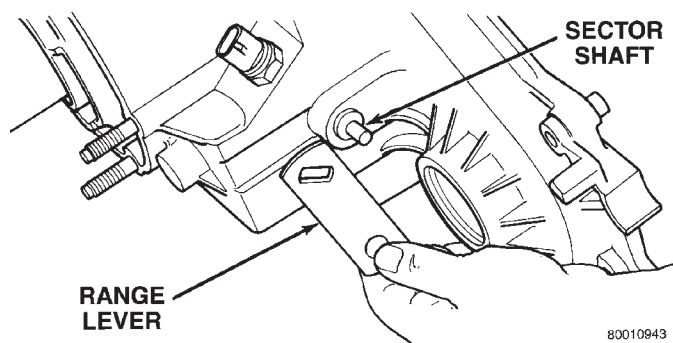
- (1) Support transfer case so rear case is facing upward.



**Fig. 14 Yoke Nut Removal**



**Fig. 15 Yoke Removal**



**Fig. 16 Range Lever Removal**

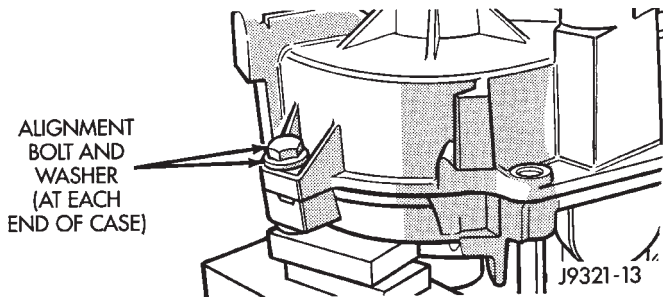
(2) Remove bolts holding front case to rear case. The case alignment bolts require flat washers (Fig. 17).

(3) Loosen rear case with flat blade screwdriver to break sealer bead. Insert pry tool blade only into notches provided at each end of case (Fig. 18).

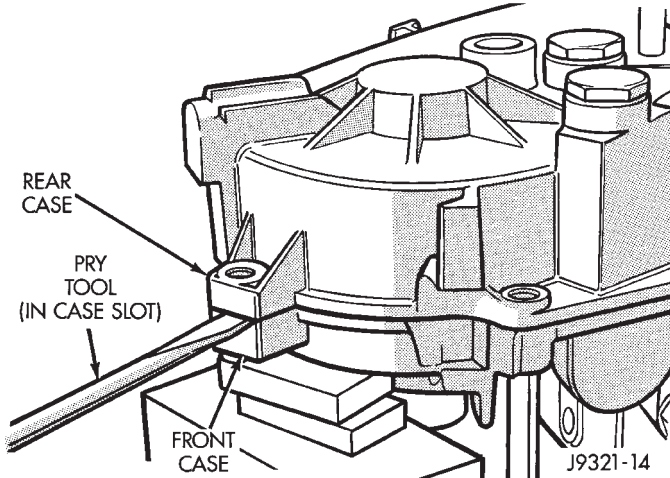
(4) Remove rear case from front case.

(5) Remove oil pickup tube from rear case (Fig. 19).

DISASSEMBLY AND ASSEMBLY (Continued)

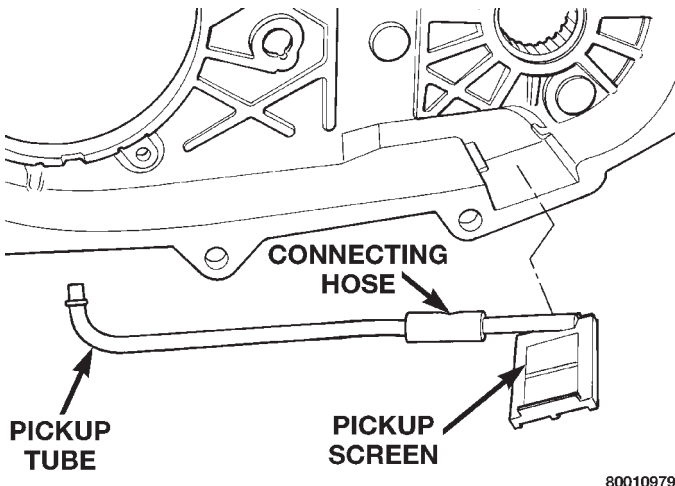


**Fig. 17 Rear Case Alignment Bolt Locations**



**Fig. 18 Loosening Rear Case**

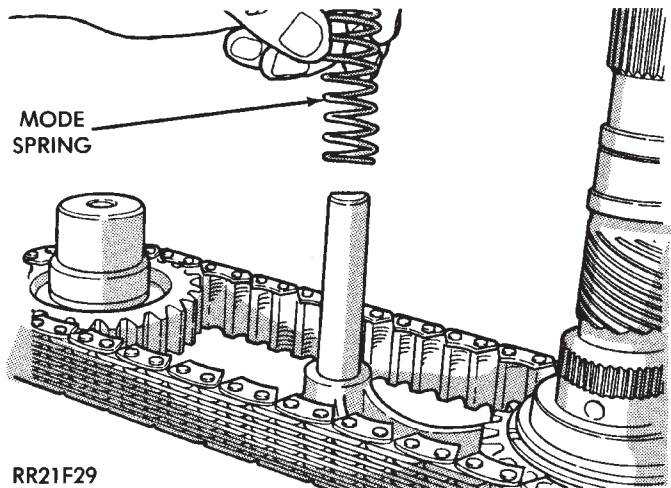
- (6) Remove mode fork spring (Fig. 20).
- (7) Pull front output shaft upward and out of front output shaft bearing (Fig. 21).
- (8) Remove front output shaft and chain.



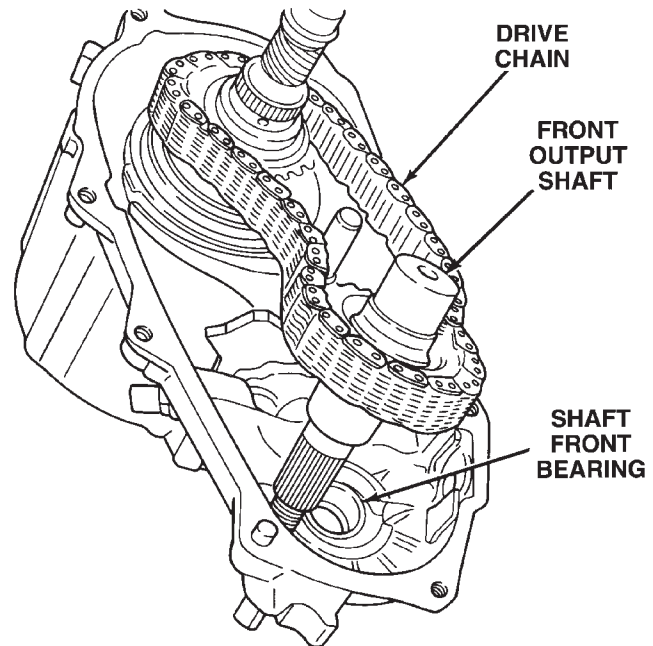
**Fig. 19 Oil Pickup Tube Removal**

**SHIFT FORKS AND MAINSHAFT REMOVAL**

- (1) Remove detent plug, O-ring, detent spring and detent plunger (Fig. 22).
- (2) Remove mainshaft from mode sleeve and input gear pilot bearing.



**Fig. 20 Mode Fork Spring Removal**



**Fig. 21 Remove Front Output Shaft And Chain**

- (3) Remove mode fork and sleeve as an assembly (Fig. 23). Note position of sleeve for assembly reference. The short side of the sleeve faces upward.
- (4) Remove range fork and hub as an assembly (Fig. 24). Note fork position for installation reference.
- (5) Remove shift sector from front case (Fig. 25).
- (6) Remove shift sector bushing and O-ring (Fig. 26).

**MAINSHAFT DISASSEMBLY**

- (1) Remove mode hub retaining ring with heavy duty snap-ring pliers (Fig. 27).
- (2) Slide mode hub off mainshaft (Fig. 28).
- (3) Slide drive sprocket off mainshaft (Fig. 29).



## DISASSEMBLY AND ASSEMBLY (Continued)

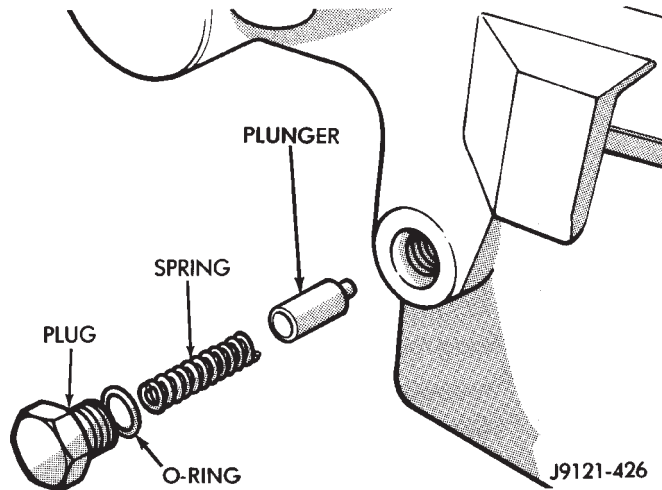


Fig. 22 Detent Plug, Spring And Plunger Removal

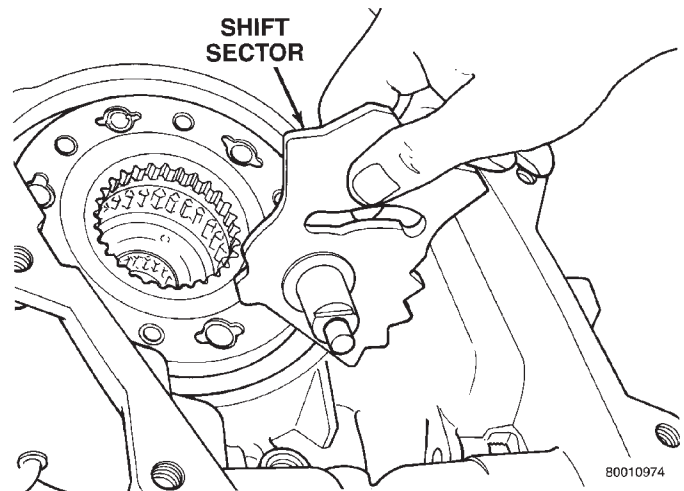


Fig. 25 Shift Sector Removal

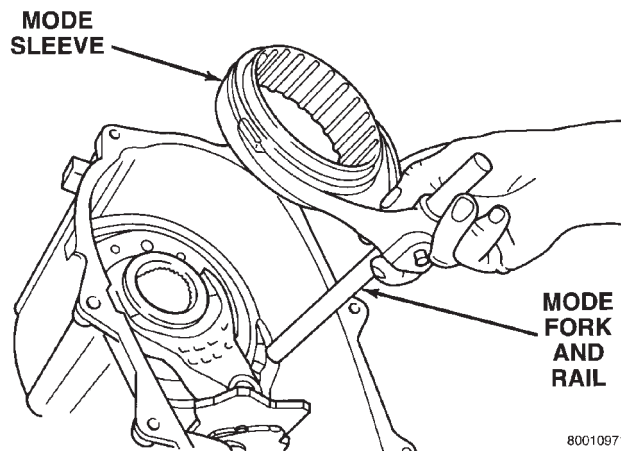


Fig. 23 Mode Fork And Sleeve Removal

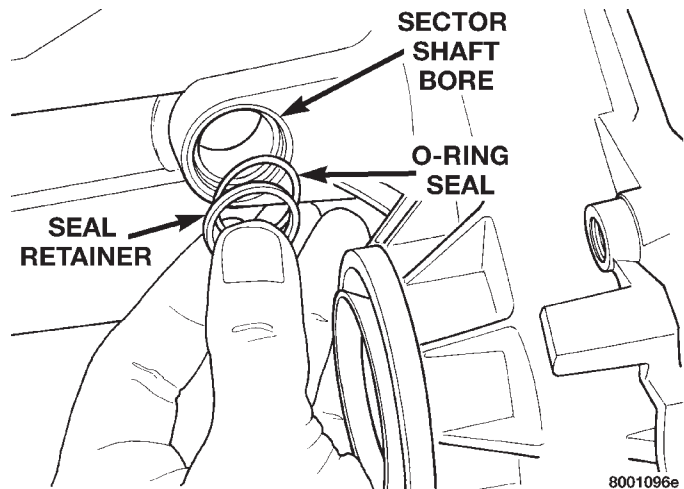


Fig. 26 Sector Bushing And O-Ring Removal

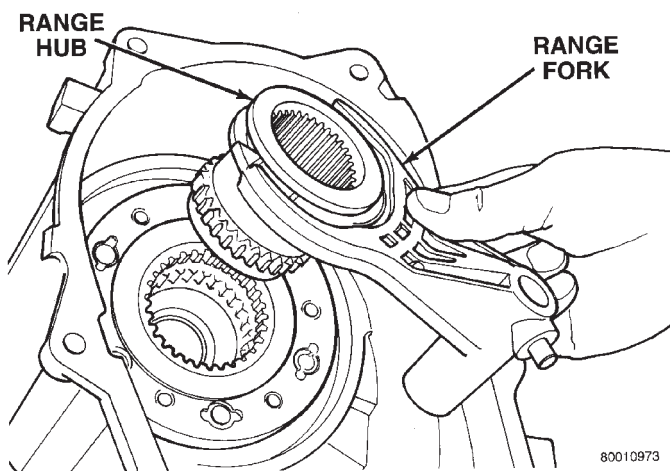


Fig. 24 Range Fork And Hub Removal

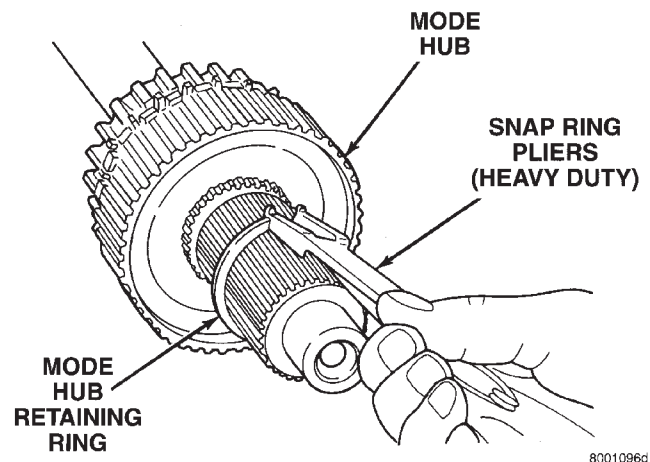


Fig. 27 Mode Hub Retaining Ring Removal

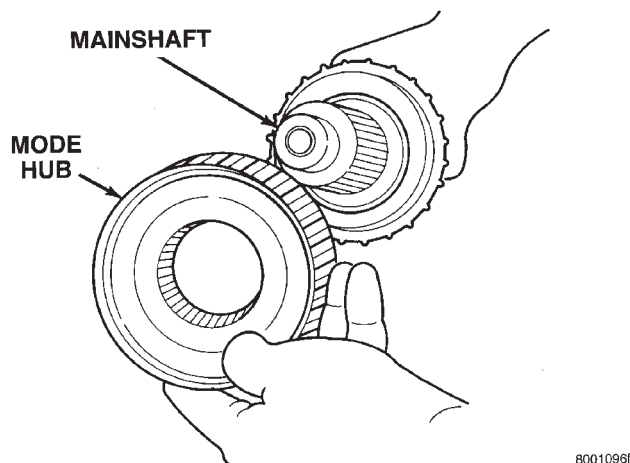
## INPUT GEAR AND LOW RANGE GEAR REMOVAL

(1) Remove front bearing retainer attaching bolts (Fig. 30).

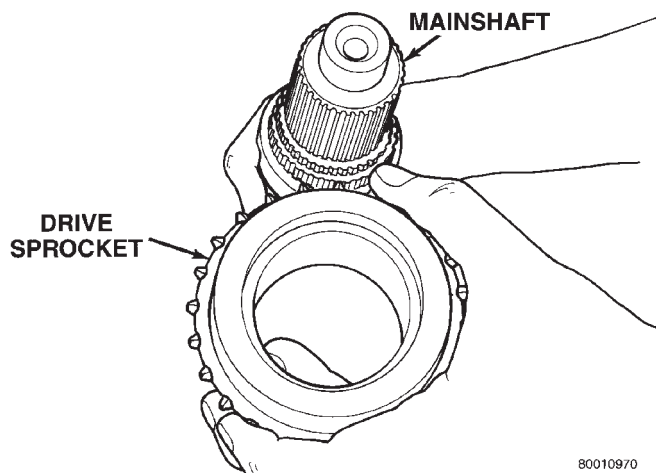
(2) Remove front bearing retainer. Pry retainer loose with pry tool positioned in slots at each end of retainer (Fig. 31).



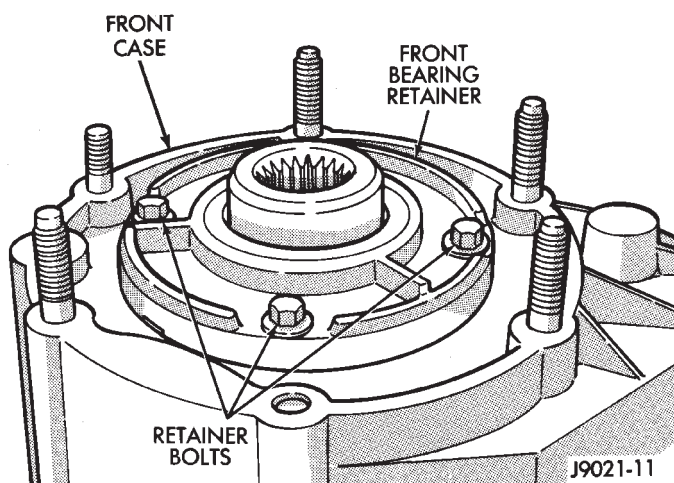
# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 28 Mode Hub Removal**

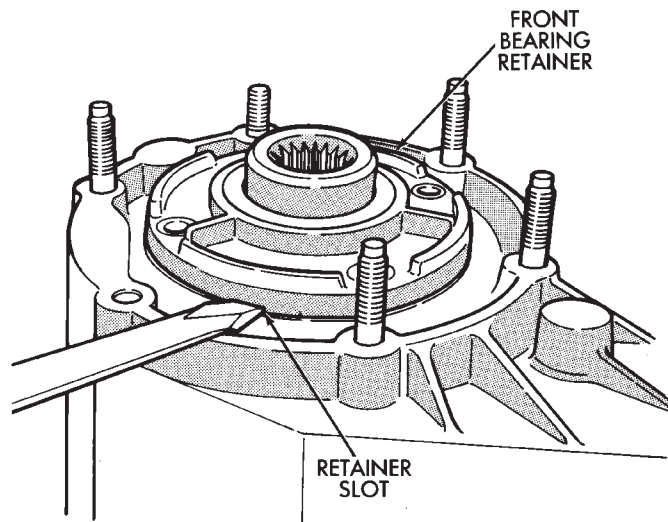


**Fig. 29 Drive Sprocket Removal**



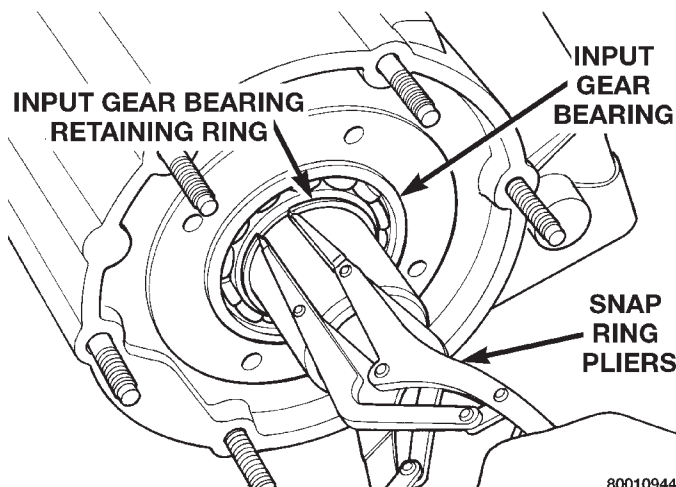
**Fig. 30 Front Bearing Retainer Bolts**

(3) Remove front bearing retainer seal. Tap seal out with drift and hammer.



**Fig. 31 Front Bearing Retainer Removal**

(4) Remove input gear retaining ring with heavy duty snap ring pliers (Fig. 32).



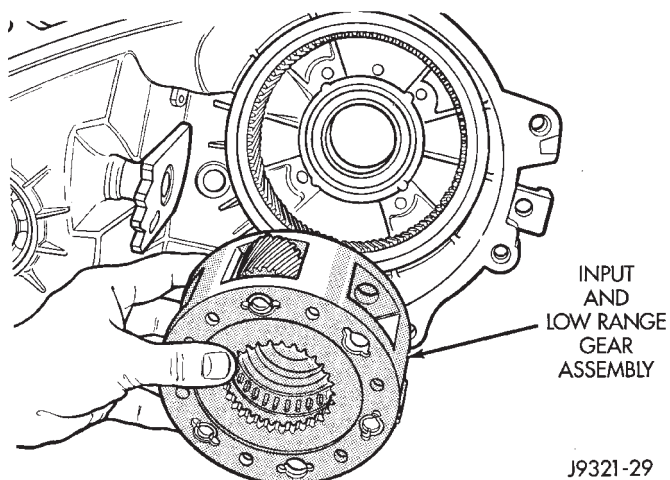
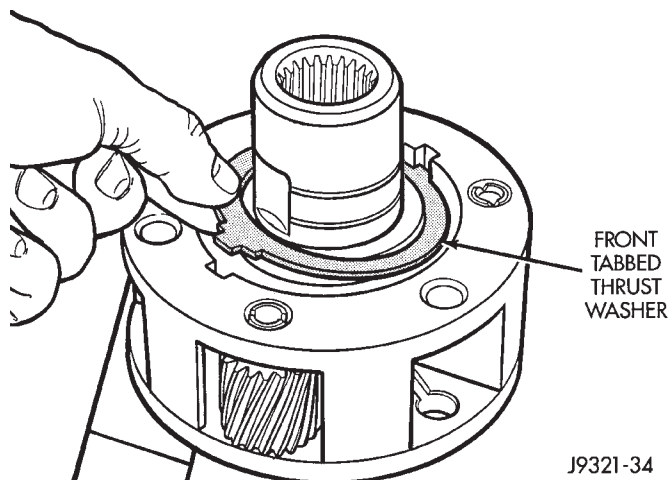
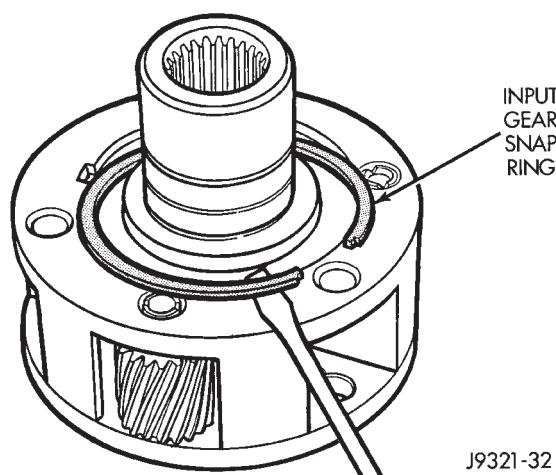
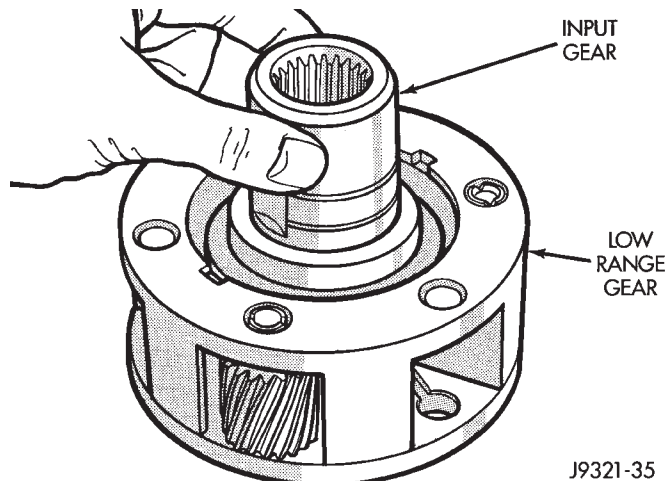
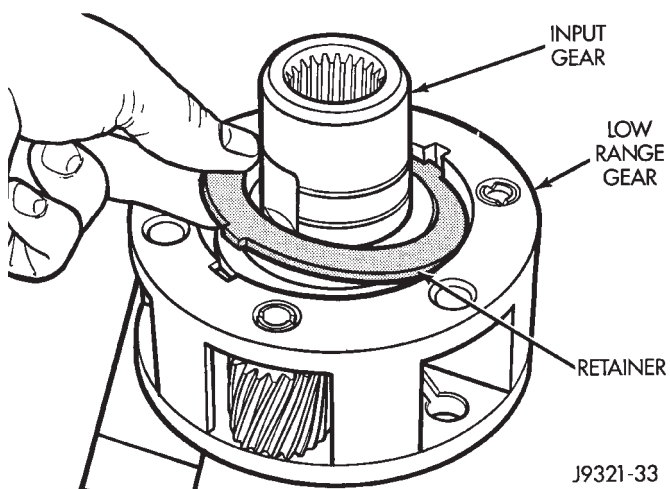
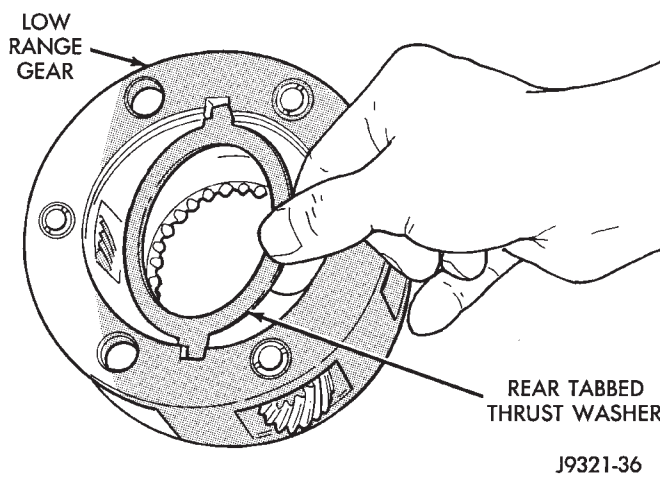
**Fig. 32 Removing Input Gear Retaining ring**

(5) Place front case in horizontal position. Then remove input gear and low range gear as an assembly (Fig. 33). Tap gear out of bearing with plastic mallet if necessary.

## INPUT AND LOW RANGE GEAR DISASSEMBLY

- (1) Remove snap-ring that retains input gear in low range gear (Fig. 34).
- (2) Remove retainer (Fig. 35).
- (3) Remove front tabbed thrust washer (Fig. 36).
- (4) Remove input gear (Fig. 37).
- (5) Remove rear tabbed thrust washer from low range gear (Fig. 38).

## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 33 Input Gear And Planetary Carrier Removal****Fig. 36 Front Tabbed Thrust Washer Removal****Fig. 34 Input Gear Snap-Ring Removal****Fig. 37 Input Gear Removal****Fig. 35 Input Gear Retainer Removal****Fig. 38 Rear Tabbed Thrust Washer Removal****ASSEMBLY**

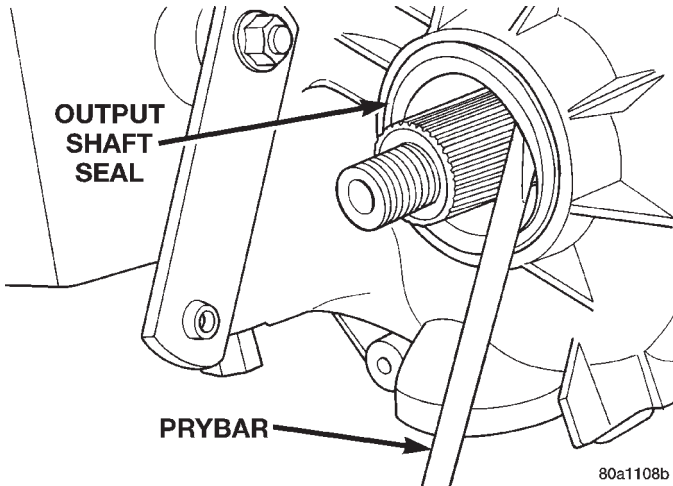
Lubricate transfer case components with Mopar® Dexron II automatic transmission fluid or petroleum jelly (where indicated) during assembly.

# DISASSEMBLY AND ASSEMBLY (Continued)

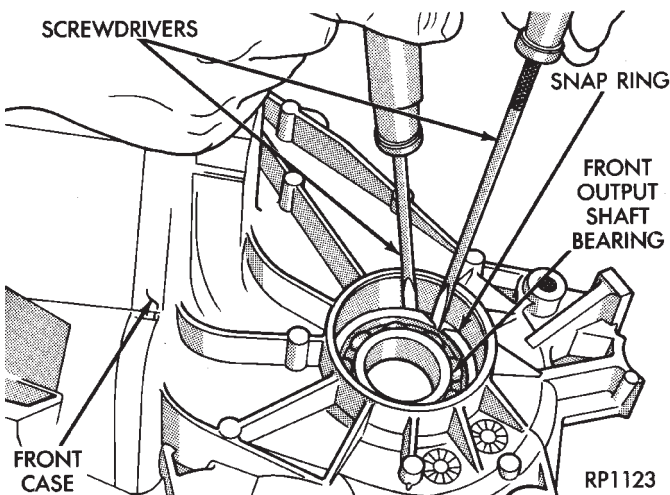
## BEARING AND SEAL INSTALLATION

**CAUTION:** The bearing bores in various transfer case components contain oil feed holes. Make sure replacement bearings do not block the holes.

- (1) Remove seal from case with pry tool (Fig. 39).
- (2) Remove bearing retaining ring with screwdriver (Fig. 40).
- (3) Remove bearing with Tool Handle C-4171 and Tool 5065 (Fig. 41).

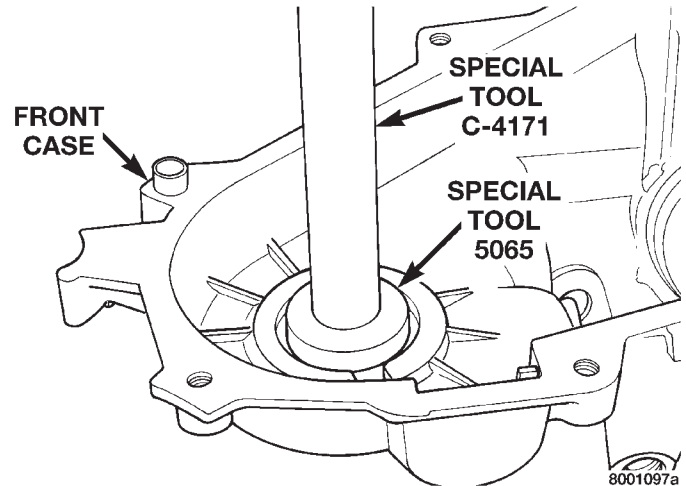


**Fig. 39 Front Output Seal Removal**

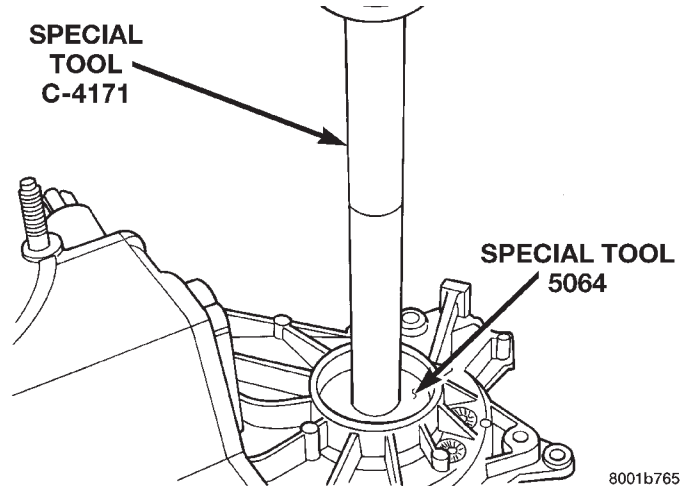


**Fig. 40 Front Output Shaft Bearing Retaining Ring Removal**

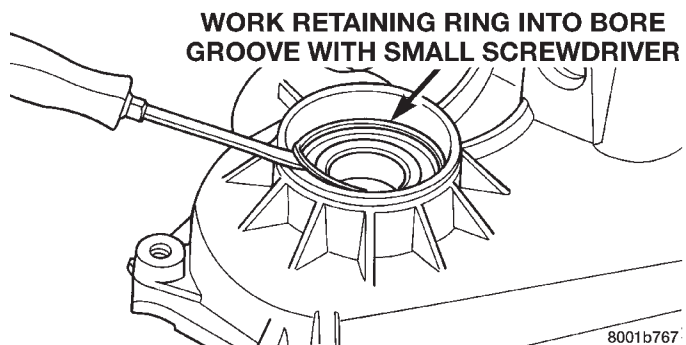
- (4) Install front output shaft front bearing in case with Tool Handle C-4171 and Installer 5064 (Fig. 42).
- (5) Install output shaft front bearing retaining ring (Fig. 43). Start ring into place by hand. Then use small screwdriver to work ring into case groove. Be sure ring is fully seated before proceeding.
- (6) Install new front output seal in front case with Installer Tool 8143 as follows:



**Fig. 41 Front Output Shaft Bearing Removal**



**Fig. 42 Front Output Shaft Bearing Installation**

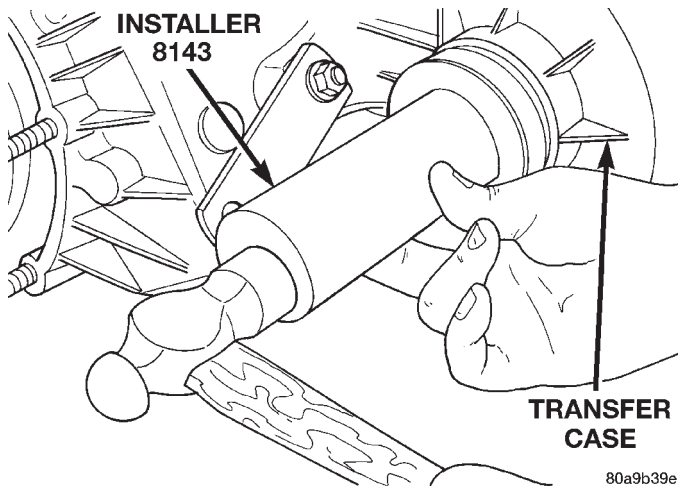


**Fig. 43 Installing Output Shaft Front Bearing Retaining Ring**

- (a) Place new seal on tool. **Garter spring on seal goes toward interior of case.**
- (b) Start seal in bore with light taps from hammer (Fig. 44). Once seal is started, continue tapping seal into bore until installer tool bottoms against case.



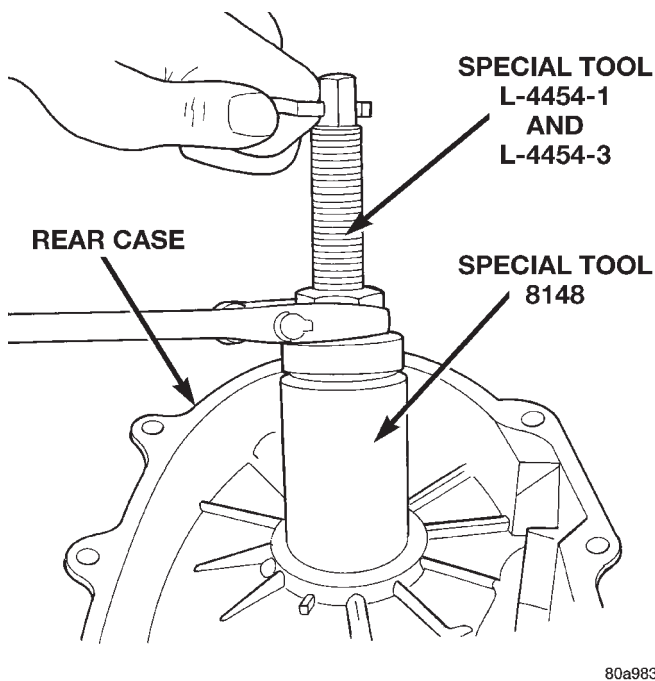
## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 44 Front Output Seal Installation**

(7) Remove the output shaft rear bearing with the screw and jaws from Remover L-4454 and Cup 8148 (Fig. 45).

(8) Install new bearing with Tool Handle C-4171 and Installer 5066 (Fig. 46). The bearing bore is chamfered at the top. Install the bearing so it is flush with the lower edge of this chamfer (Fig. 47).



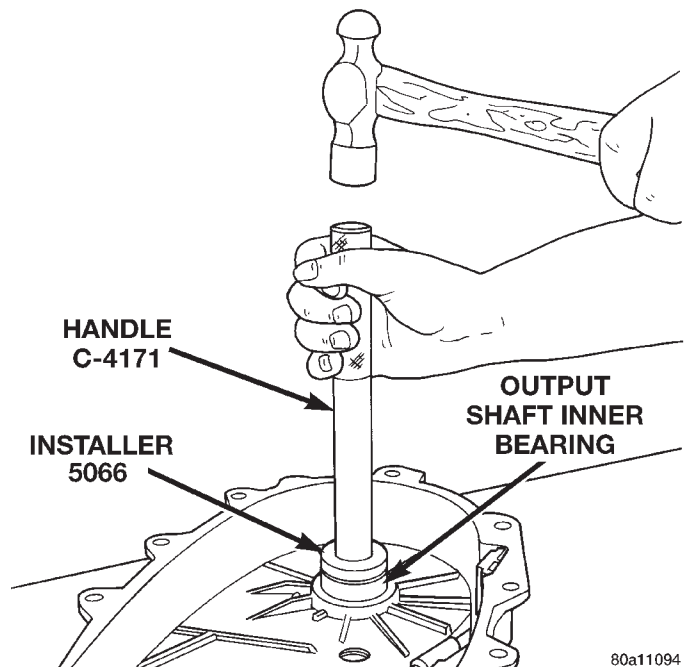
**Fig. 45 Output Shaft Rear Bearing Removal**

(9) Using Remover C-4210 and Handle C-4171, drive input shaft bearing from inside the annulus gear opening in the case. (Fig. 48).

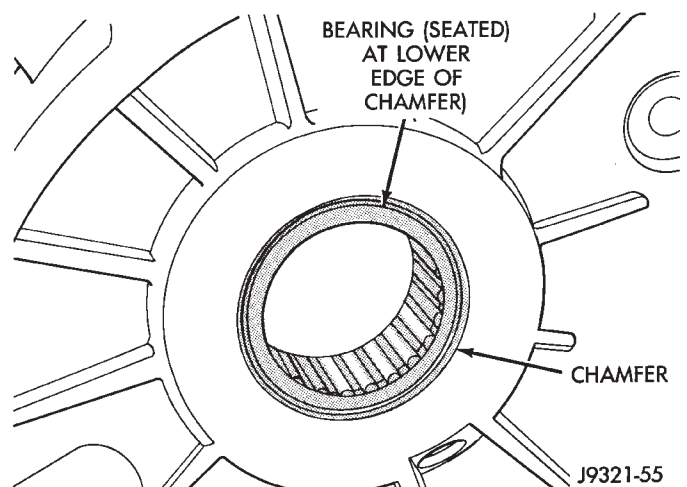
(10) Install locating ring on new bearing.

(11) Position case so forward end is facing upward.

(12) Using Remover C-4210 and Handle C-4171, drive input shaft bearing into case. The bearing



**Fig. 46 Output Shaft Rear Bearing Installation**



**Fig. 47 Output Shaft Rear Bearing Installation Depth**  
locating ring must be fully seated against case surface (Fig. 49).

(13) Remove input gear pilot bearing by inserting a suitably sized drift into the splined end of the input gear and driving the bearing out with the drift and a hammer (Fig. 50).

(14) Install new pilot bearing with Installer 5065 and Handle C-4171 (Fig. 51).

(15) Remove front bearing retainer seal with suitable pry tool.

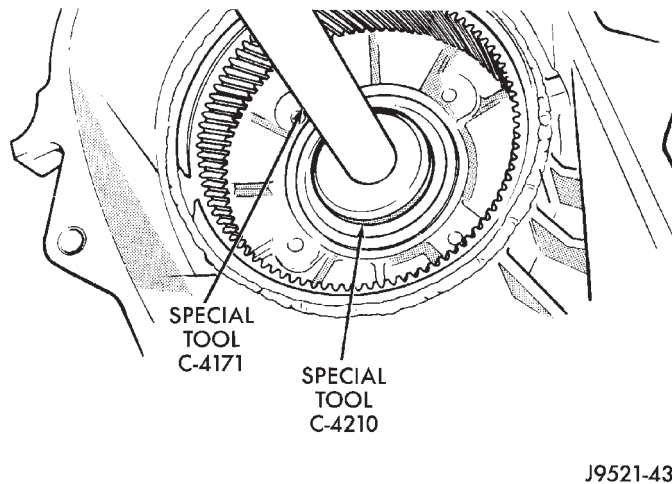
(16) Install new front bearing retainer with Installer 7884 (Fig. 52).

(17) Remove seal from oil pump housing with a suitable pry tool.

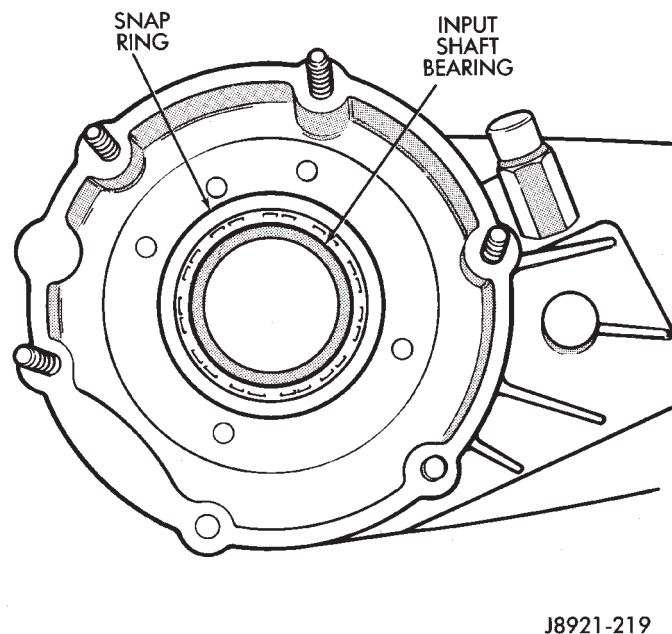
(18) Install new seal in oil pump housing with Installer 7888 (Fig. 53).



# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 48 Input Shaft Bearing Removal**



**Fig. 49 Seating Input Shaft Bearing**

(19) Remove rear retainer bearing with Installer 8128 and Handle C-4171.

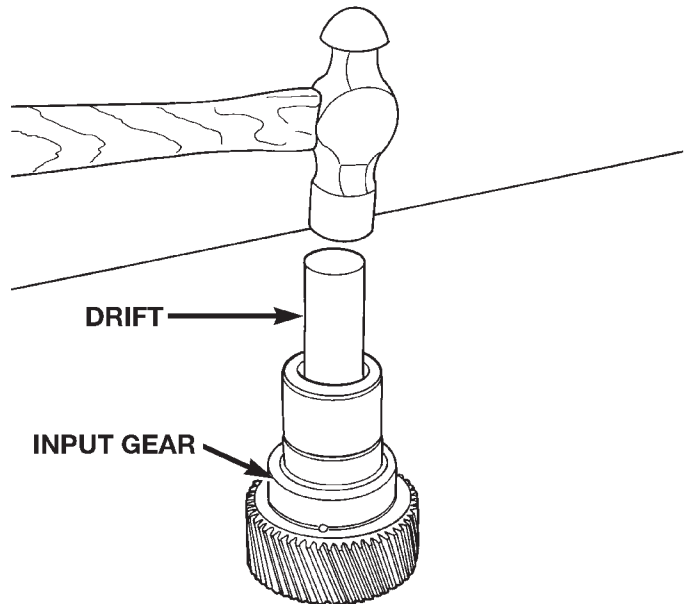
(20) Install rear bearing in retainer with Handle C-4171 and Installer 5064 (Fig. 54).

## INPUT AND LOW RANGE GEAR ASSEMBLY

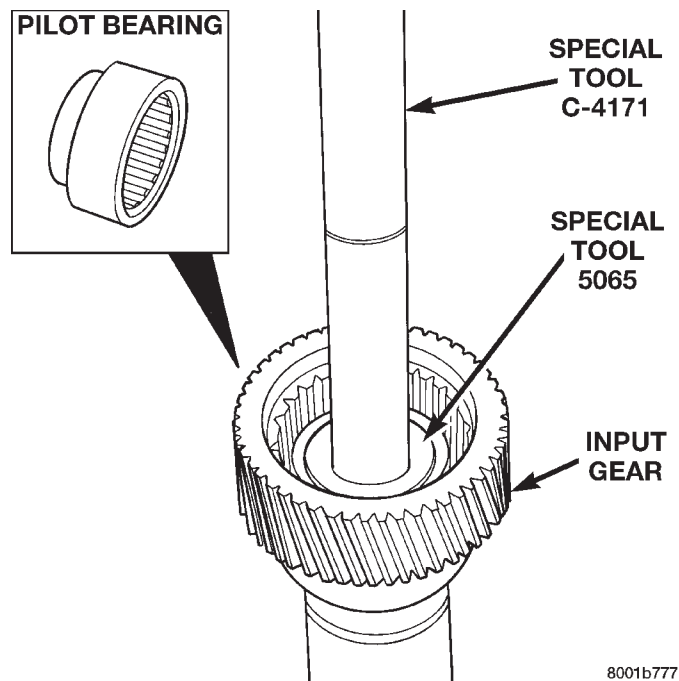
(1) Lubricate gears and thrust washers (Fig. 55) with recommended transmission fluid.

(2) Install first thrust washer in low range gear (Fig. 55). Be sure washer tabs are properly aligned in gear notches.

(3) Install input gear in low range gear. Be sure input gear is fully seated.



**Fig. 50 Remove Input Gear Pilot Bearing**



**Fig. 51 Install Input Gear Pilot Bearing**

(4) Install remaining thrust washer in low range gear and on top of input gear. Be sure washer tabs are properly aligned in gear notches.

(5) Install retainer on input gear and install snap-ring.

## DISASSEMBLY AND ASSEMBLY (Continued)

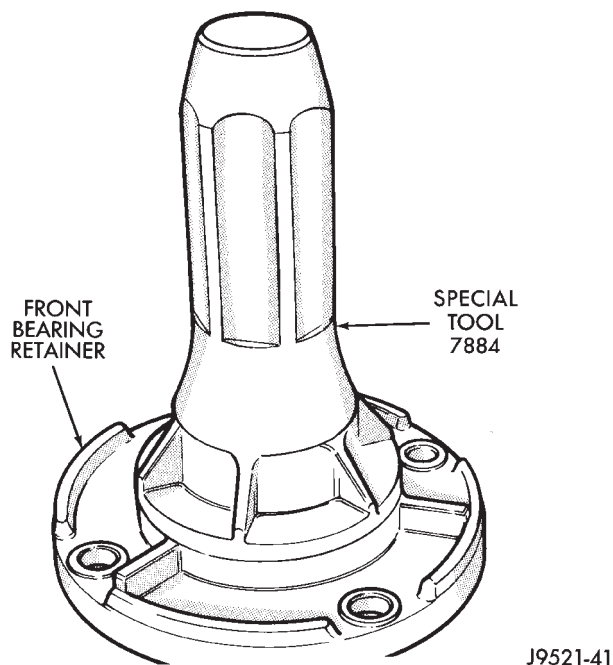


Fig. 52 Install Front Bearing Retainer Seal

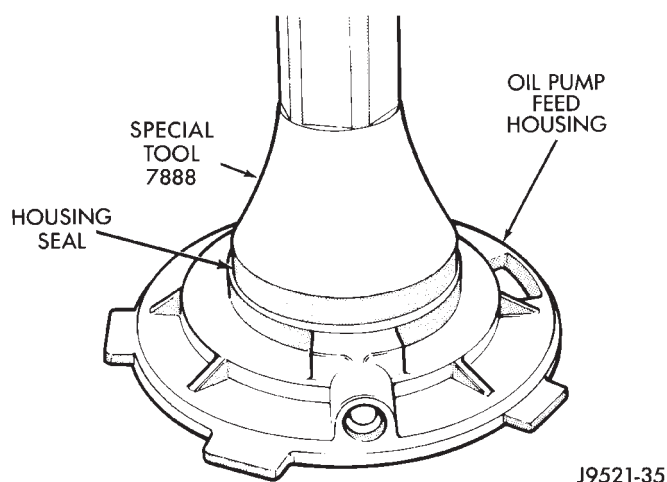


Fig. 53 Oil Pump Seal Installation

## INPUT GEAR AND LOW RANGE GEAR INSTALLATION

(1) Align and install low range/input gear assembly in front case (Fig. 56). Be sure low range gear pinions are engaged in annulus gear and that input gear shaft is fully seated in front bearing.

(2) Install snap-ring to hold input/low range gear into front bearing (Fig. 57).

(3) Clean gasket sealer residue from retainer and inspect retainer for cracks or other damage.

(4) Apply a 3 mm (1/8 in.) bead of Mopar® gasket maker or silicone adhesive to sealing surface of retainer.

(5) Align cavity in seal retainer with fluid return hole in front of case.

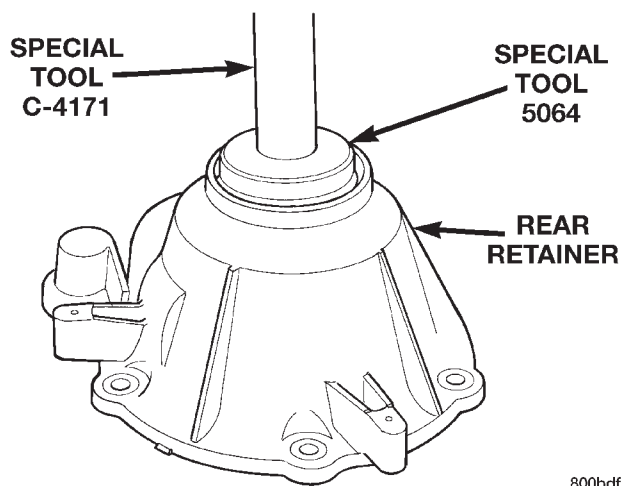


Fig. 54 Installing Rear Bearing In Retainer

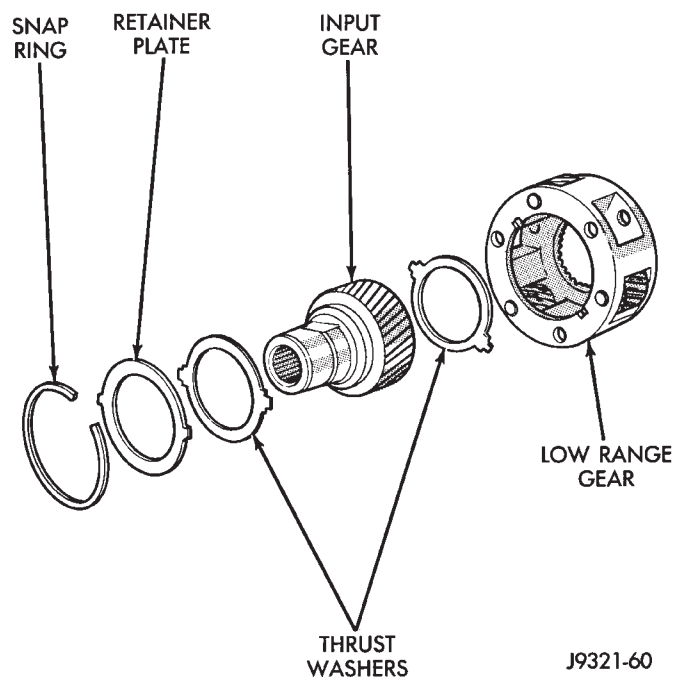


Fig. 55 Input/Low Range Gear Components

**CAUTION:** Do not block fluid return cavity on sealing surface of retainer when applying Mopar® gasket maker or silicone adhesive sealer. Seal failure and fluid leak can result.

(6) Install bolts to hold retainer to transfer case (Fig. 58). Tighten to 21 N·m (16 ft. lbs.) of torque.

## MAINSHAFT ASSEMBLY

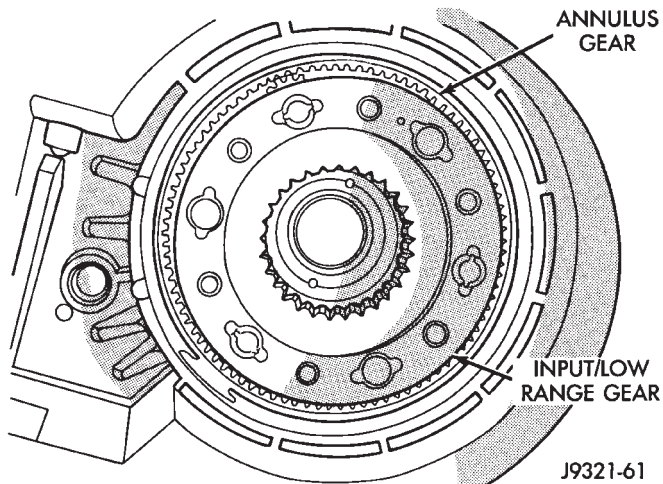
(1) Lubricate mainshaft splines with recommended transmission fluid.

(2) Slide drive sprocket onto mainshaft.

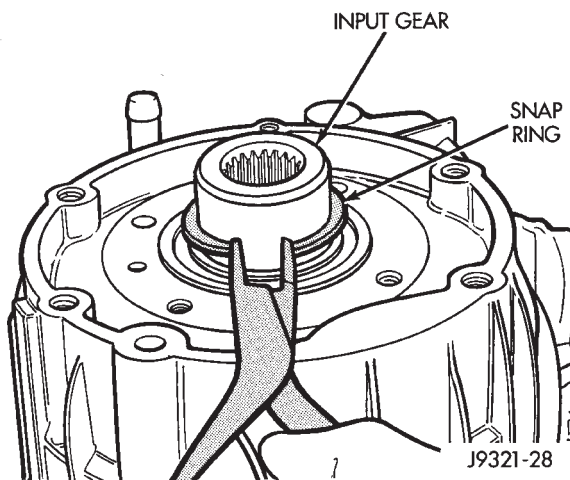
(3) Slide mode hub onto mainshaft.

(4) Install mode hub retaining ring. Verify that the retaining ring is fully seated in mainshaft groove.

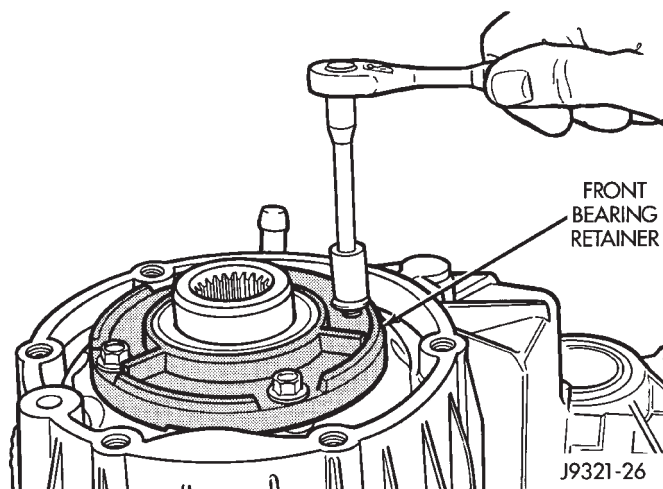
# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 56 Input/Low Range Gear Installation**



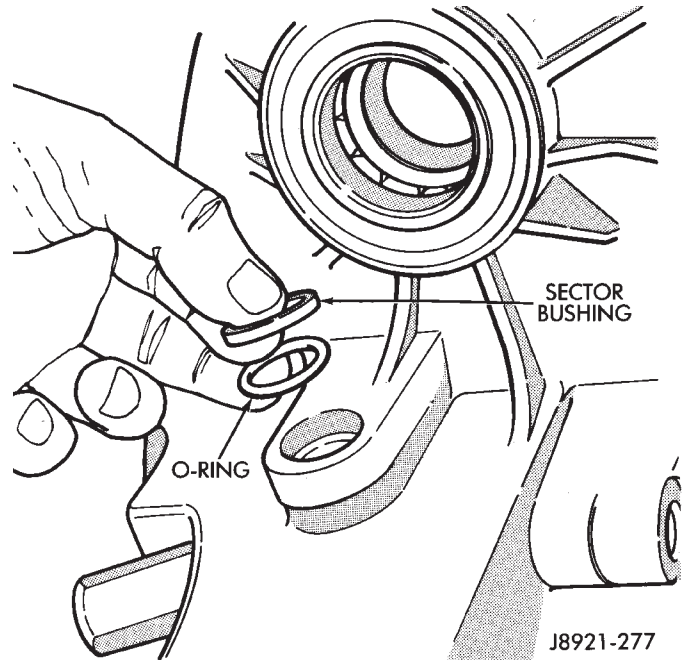
**Fig. 57 Install Snap-Ring**



**Fig. 58 Install Front Bearing Retainer**

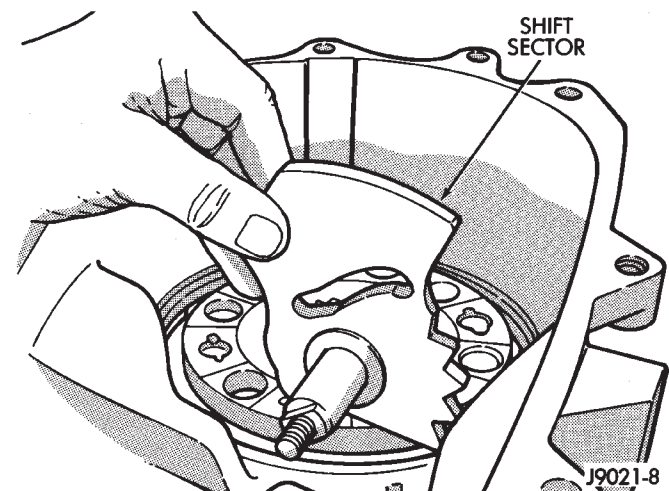
## SHIFT FORKS AND MAINSHAFT INSTALLATION

(1) Install new sector shaft O-ring and bushing (Fig. 59).



**Fig. 59 Sector O-Ring And Bushing Installation**

(2) Install shift sector in case (Fig. 60). Lubricate sector shaft with transmission fluid before installation.



**Fig. 60 Shift Sector Installation**

(3) Install range lever, washer, and nut on sector shaft (Fig. 61). Tighten range lever nut to 27–34 N.m (20–25 ft. lbs.) torque.

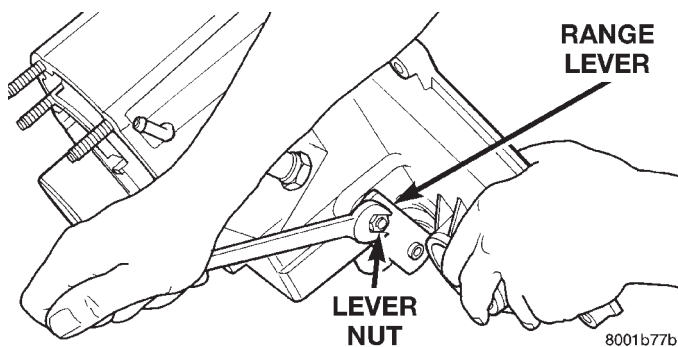
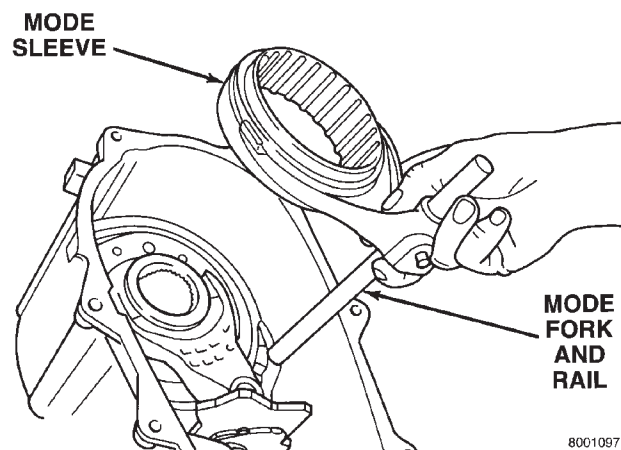
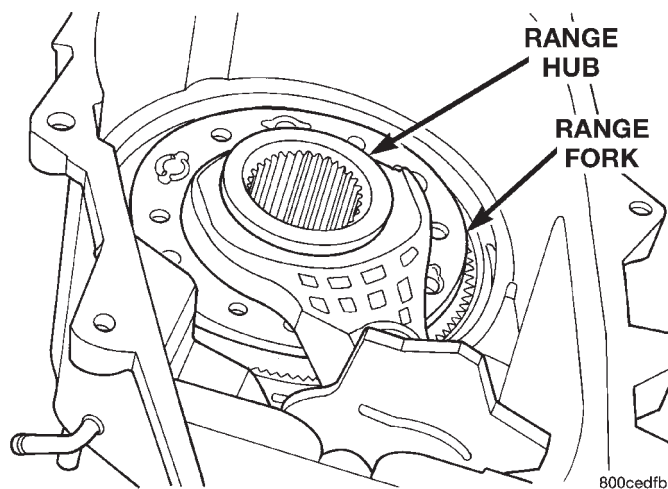
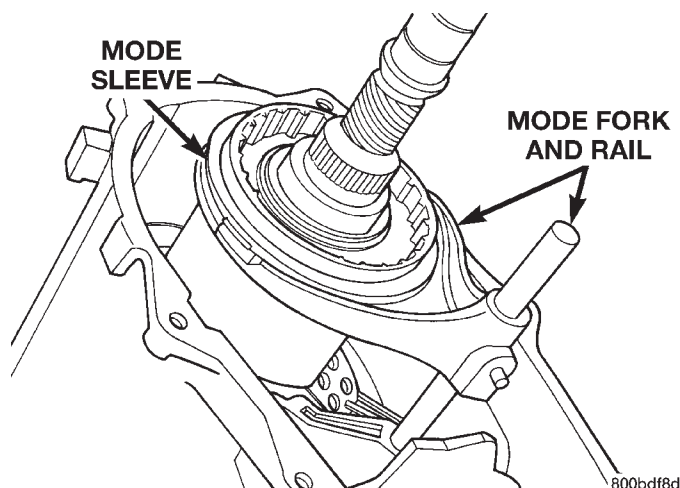
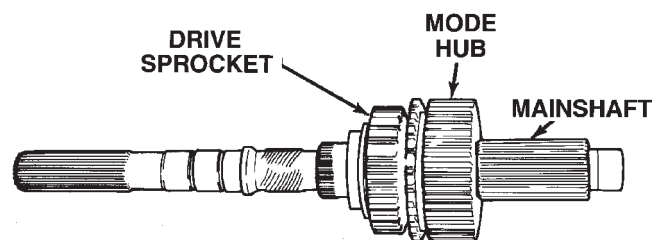
(4) Assemble and install range fork and hub (Fig. 62). Be sure hub is properly seated in low range gear and engaged to the input gear.

(5) Align and insert range fork pin in shift sector slot.

(6) Install assembled mainshaft (Fig. 63). Be sure shaft is seated in pilot bearing and input gear.

(7) Install new pads on mode fork if necessary.

## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 61 Range Lever Installation****Fig. 64 Assembling Mode Fork And Sleeve****Fig. 62 Install Range Fork And Hub Assembly****Fig. 65 Mode Fork And Sleeve Installation****Fig. 63 Mainshaft Assembly Installation**

(8) Insert mode sleeve in mode fork mode fork. Be sure long side of sleeve is toward long end of shift rail (Fig. 64).

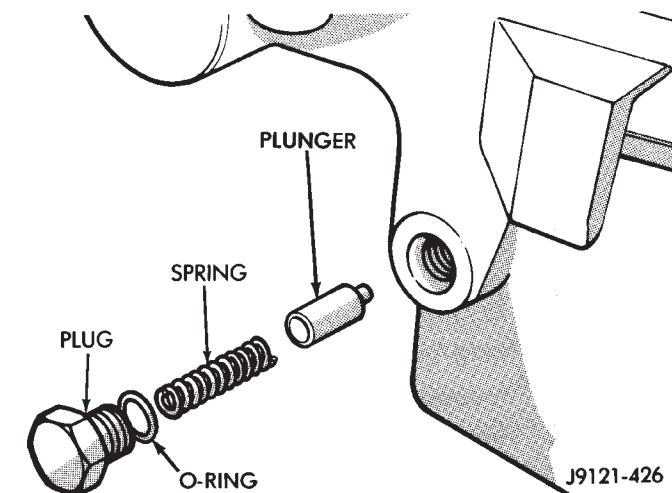
(9) Install assembled mode fork and sleeve (Fig. 65). Be sure fork rail goes through range fork and into case bore. Also be sure sleeve is aligned and seated on mainshaft hub.

(10) Rotate sector to Neutral position.

(11) Install new O-ring on detent plug (Fig. 66).

(12) Lubricate detent plunger with transmission fluid or light coat of petroleum jelly.

(13) Install detent plunger, spring and plug (Fig. 66).

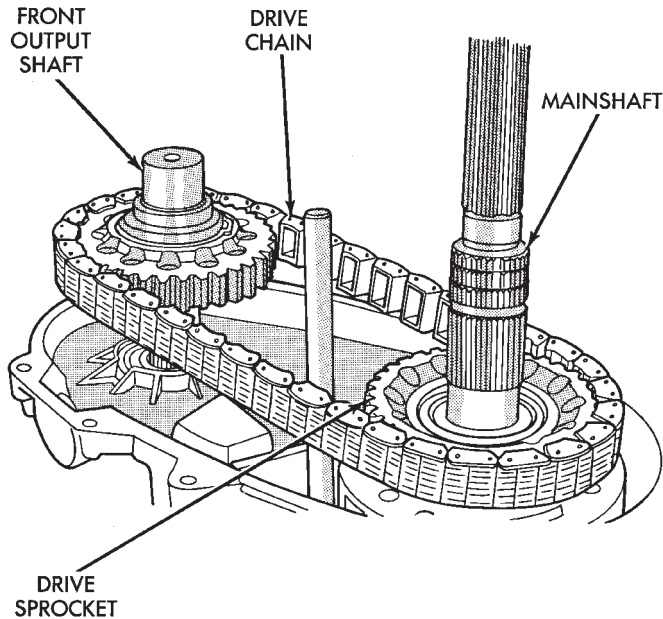
**Fig. 66 Shift Detent Components**



## DISASSEMBLY AND ASSEMBLY (Continued)

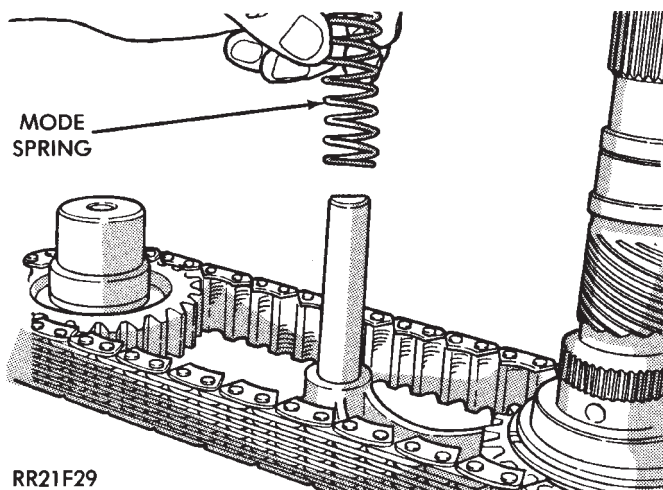
### FRONT OUTPUT SHAFT AND DRIVE CHAIN INSTALLATION

- (1) Lubricate front output shaft-sprocket assembly, drive chain and drive sprocket with transmission fluid.
- (2) Assemble drive chain and front output shaft (Fig. 67).
- (3) Start chain on mainshaft drive sprocket.
- (4) Guide front shaft into bearing and drive sprocket onto mainshaft drive gear (Fig. 67).
- (5) Install mode spring on upper end of mode fork shift rail (Fig. 68).



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**Fig. 67 Installing Drive Chain And Front Output Shaft**

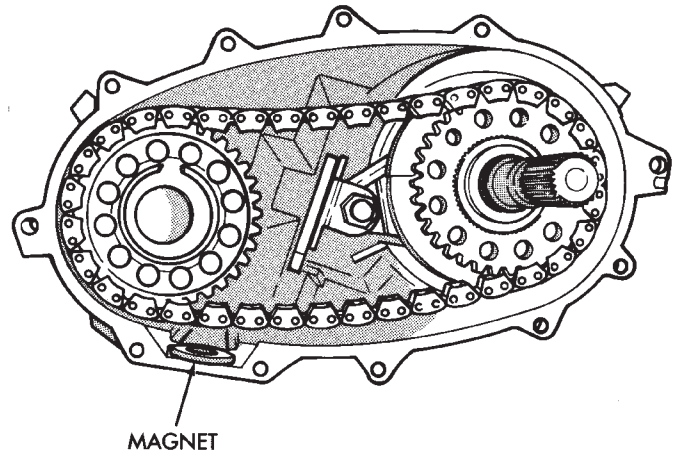


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**Fig. 68 Install Mode Fork Spring**

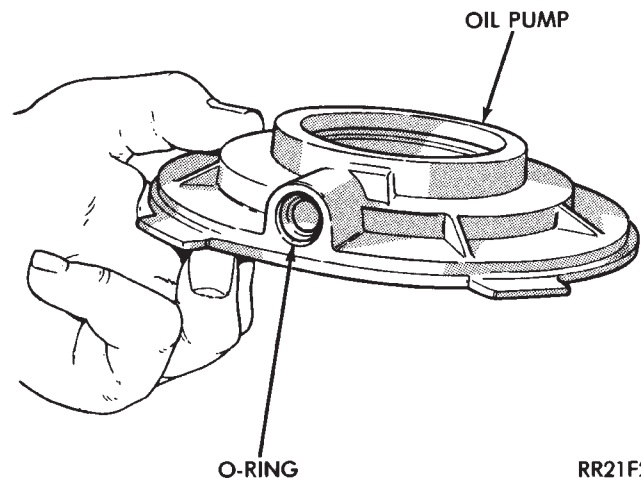
### OIL PUMP AND REAR CASE ASSEMBLY/INSTALLATION

- (1) Install magnet in front case pocket (Fig. 69).
- (2) Assemble oil pickup screen, connecting hose, and tube.
- (3) Install new pickup tube O-ring in oil pump (Fig. 70).



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**Fig. 69 Installing Case Magnet**

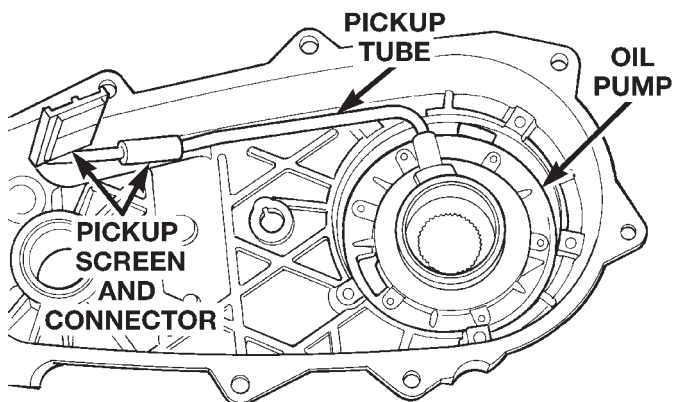


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**Fig. 70 Pickup Tube O-Ring Position**

- (4) Insert oil pickup tube in oil pump inlet.
- (5) Position assembled oil pump and pickup tube in rear case. Be sure pickup screen is securely seated in case slot. Also be sure oil pump locating tabs are outside rear case (Fig. 71).
- (6) Apply 3 mm (1/8 in.) wide bead of Mopar® gasket maker or silicone adhesive sealer to mounting flange of front case. Work sealer bead around bolt holes.

## DISASSEMBLY AND ASSEMBLY (Continued)



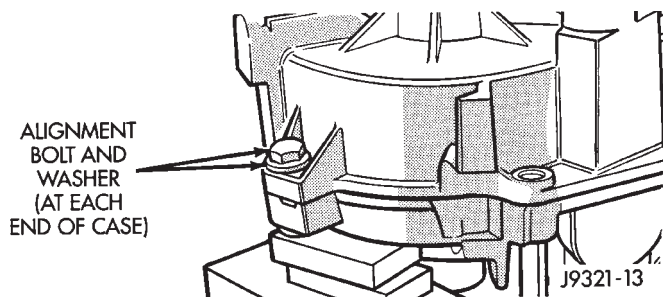
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**Fig. 71 Oil Pump And Pickup Tube Installation**

(7) Lift rear case and oil pump and carefully position assembly on front case. Be sure case dowels are aligned and that mode fork rail extends through rear case before seating rear case on front case.

(8) Install case attaching bolts. Alignment bolts at each end of case are only ones requiring washers (Fig. 72).

(9) Tighten case bolts to 27-34 N·m (20-25 ft. lbs.) torque.

**Fig. 72 Alignment Bolt Location****YOKE AND RANGE LEVER INSTALLATION**

(1) Install indicator switch in front case. Tighten switch to 20-34 N·m (15-25 ft. lbs.) torque.

(2) Install range lever, washer and locknut on sector shaft (Fig. 73). Tighten locknut to 27-34 N·m (20-25 ft. lbs.) torque.

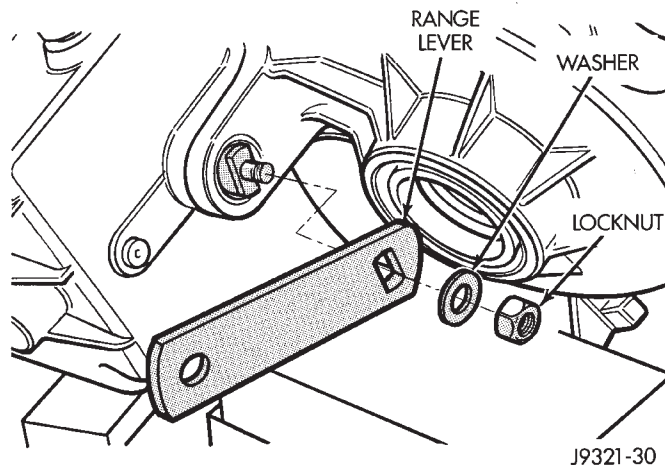
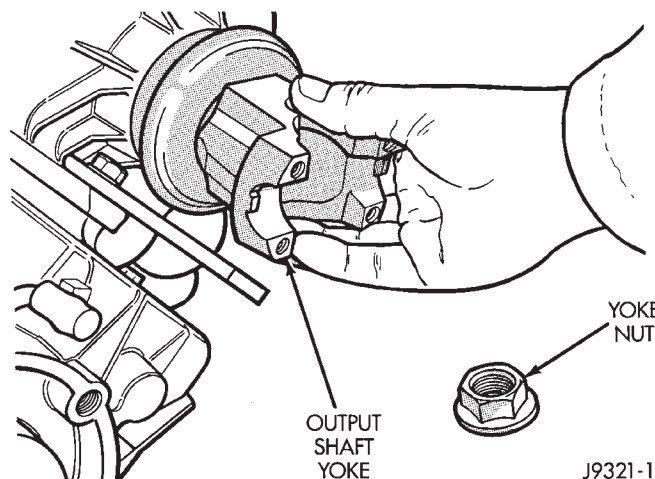
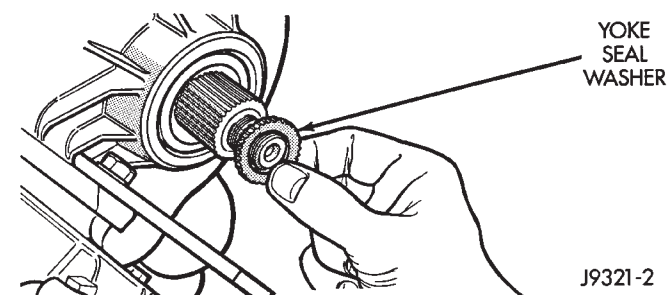
(3) Install new seal washer on front output shaft (Fig. 75).

(4) Lubricate yoke hub with transmission fluid and install yoke on front shaft.

(5) Install new seal washer on front shaft.

(6) Install yoke and new yoke nut on front output shaft (Fig. 74).

(7) Tighten yoke nut to 122-176 N·m (90-130 ft. lbs.) torque. Use Tool C-3281, or similar tool to hold yoke while tightening yoke nut.

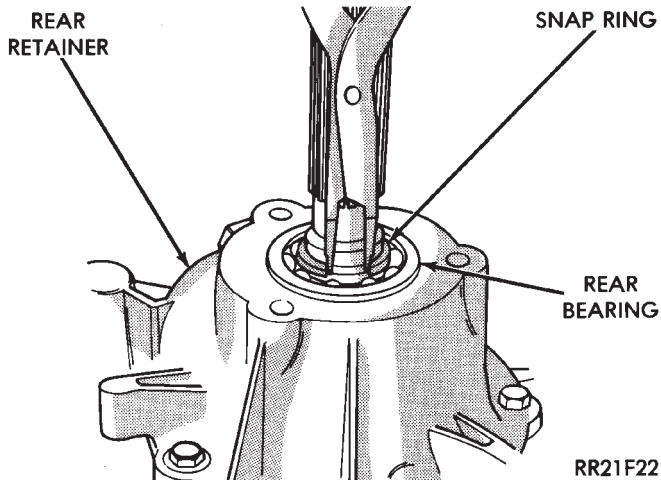
**Fig. 73 Range Lever Installation****Fig. 74 Output Shaft Yoke Installation****Fig. 75 Yoke Seal Washer Installation****REAR RETAINER ASSEMBLY AND INSTALLATION**

(1) Apply 3 mm (1/8 in.) wide bead of Mopar® gasket maker or silicone adhesive sealer to mounting surface of rear retainer. Allow sealer to set-up slightly before proceeding.

(2) Install rear retainer on rear case. Tighten retainer bolts to 35-46 N·m (26-34 ft. lbs.).

(3) Install new output shaft bearing snap-ring (Fig. 76). Lift mainshaft slightly to seat snap-ring in shaft groove, if necessary.

## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 76 Install Output Bearing Snap-ring**

- (4) Apply 3 mm (1/8 in.) wide bead of Mopar® gasket maker or silicone adhesive sealer to mounting surface of extension housing. Allow sealer to set-up slightly before proceeding.
- (5) Install extension housing on rear retainer.
- (6) Install extension housing bolts and tighten to 35–46 N·m (26–34 ft. lbs.).

## CLEANING AND INSPECTION

### NV231 TRANSFER CASE

Clean the transfer case parts with a standard parts cleaning solvent. Remove all traces of sealer from the cases and retainers with a scraper and 3M all purpose cleaner. Use compressed air to remove solvent residue from oil feed passages in the case halves, retainers, gears, and shafts.

The oil pickup screen can be cleaned with solvent. Shake excess solvent from the screen after cleaning and allow it to air dry. Do not use compressed air.

### MAINSHAFT/SPROCKET/HUB INSPECTION

Inspect the splines on the hub and shaft and the teeth on the sprocket (Fig. 77). Minor nicks and scratches can be smoothed with an oilstone. However, replace any part that is damaged.

Check the contact surfaces in the sprocket bore and on the mainshaft. Minor nicks and scratches can be smoothed with 320–400 grit emery cloth but do not try to salvage the shaft if nicks or wear is severe.

### INPUT GEAR AND PLANETARY CARRIER

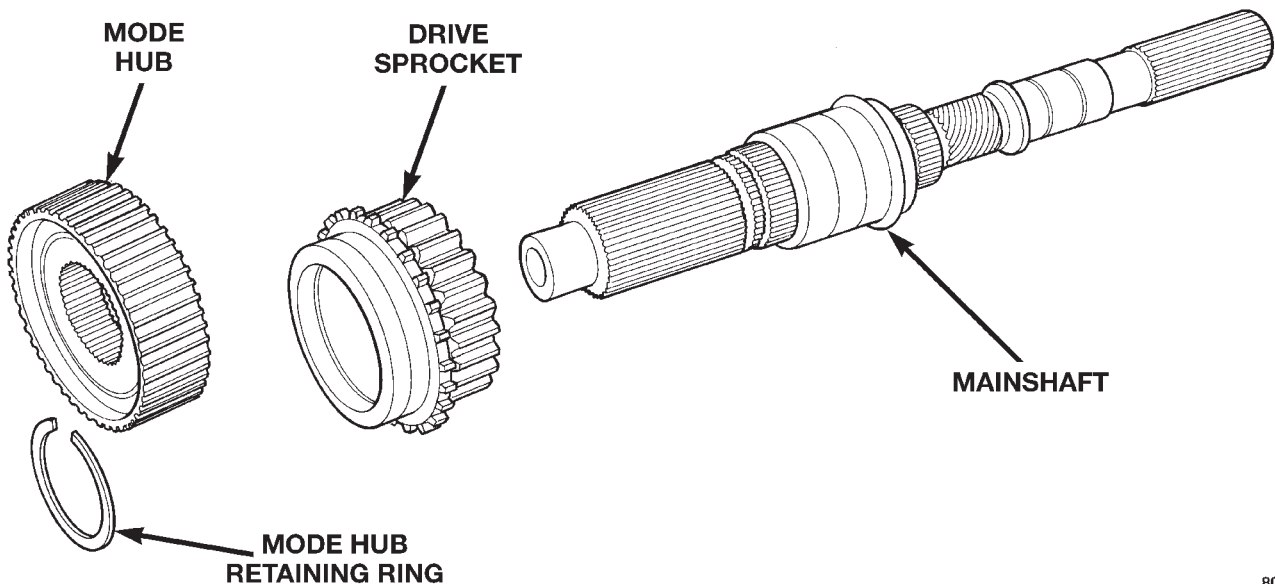
Check the teeth on the gear (Fig. 78). Minor nicks can be dressed off with an oilstone but replace the gear if any teeth are broken, cracked, or chipped. The bearing surface on the gear can be smoothed with 300–400 grit emery cloth if necessary.

Examine the carrier body and pinion gears for wear or damage. The carrier will have to be replaced as an assembly if the body, pinion pins, or pinion gears are damaged.

Check the lock ring and both thrust washers for wear or cracks. Replace them if necessary. Also replace the lock retaining ring if bent, distorted, or broken.

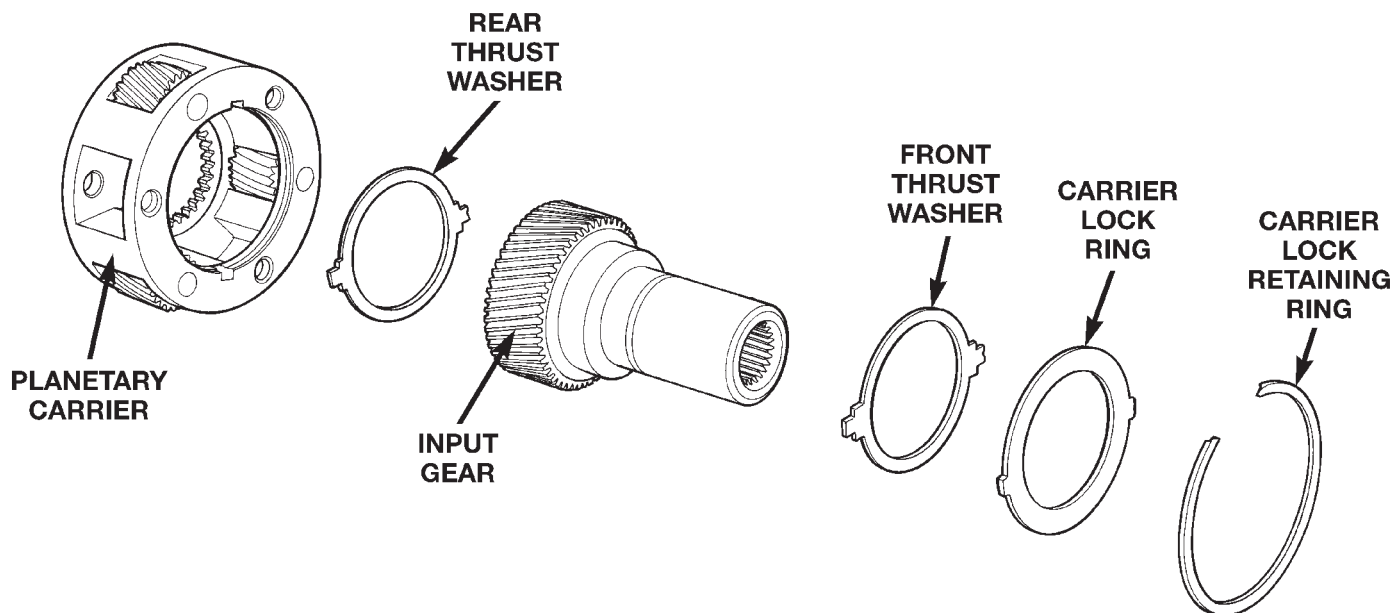
### SHIFT FORKS/HUBS/SLEEVES

Check condition of the shift forks and mode fork shift rail (Fig. 79). Minor nicks on the shift rail can be smoothed with 320–400 grit emery cloth.

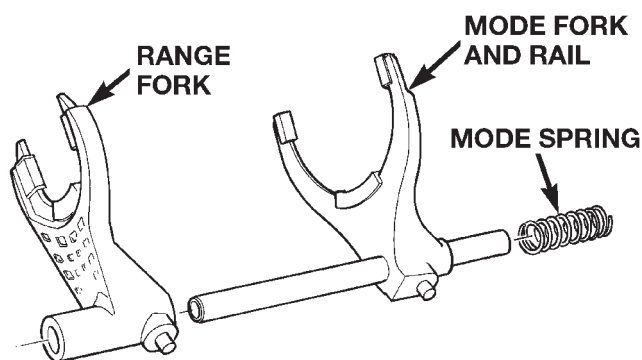


**Fig. 77 Mainshaft, Mode Hub, And Drive Sprocket**

## CLEANING AND INSPECTION (Continued)



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**Fig. 78 Input Gear And Carrier Components**

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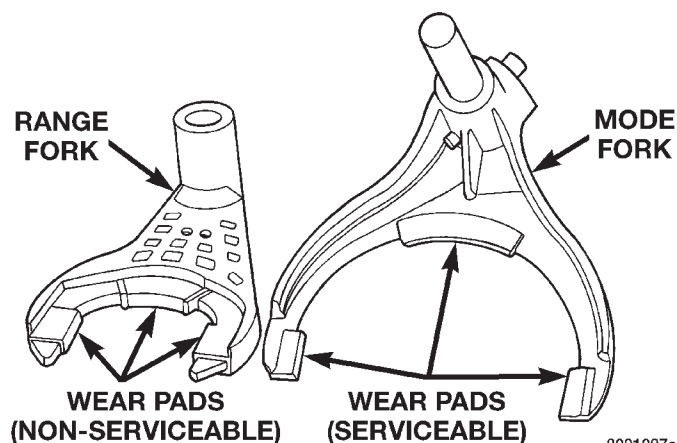
**Fig. 79 Shift forks**

Inspect the shift fork wear pads (Fig. 80). The mode fork pads are serviceable and can be replaced if necessary. The range fork pads are not serviceable. The fork must be replaced as an assembly if the pads are worn or damaged.

Check both of the sleeves for wear or damage, especially on the interior teeth. Replace the sleeves if wear or damage is evident.

**REAR RETAINER AND EXTENSION HOUSING**

Inspect the retainer components. Replace the bearing if rough or noisy. Check the retainer for cracks or wear in the bearing bore. Clean the retainer sealing surfaces with a scraper and 3M all purpose cleaner. This will ensure proper adhesion of the sealer during reassembly.



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**Fig. 80 Shift Fork And Wear Pad Locations**

Inspect the retaining rings and washers. Replace any part if distorted, bent, or broken. Reuse is not recommended.

Inspect the extension housing seal and bushing. Replace both components if either shows any sign of wear or damage.

**FRONT OUTPUT SHAFT/YOKE/DRIVE CHAIN**

Check condition of the seal contact surfaces of the yoke slinger (Fig. 81). This surface must be clean and smooth to ensure proper seal life. Replace the yoke nut and seal washer as neither part should be reused.

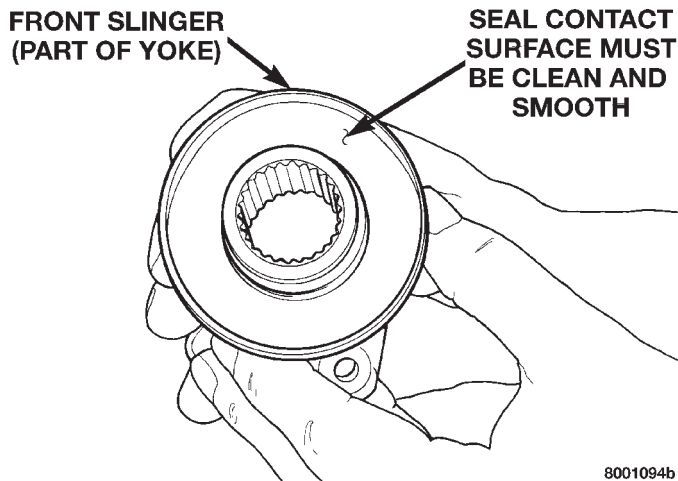
Inspect the shaft threads, sprocket teeth, and bearing surfaces. Minor nicks on the teeth can be smoothed with an oilstone. Use 320-400 grit emery



## CLEANING AND INSPECTION (Continued)

to smooth minor scratches on the shaft bearing surfaces. Rough threads on the shaft can be chased if necessary. Replace the shaft if the threads are damaged, bearing surfaces are scored, or if any sprocket teeth are cracked or broken.

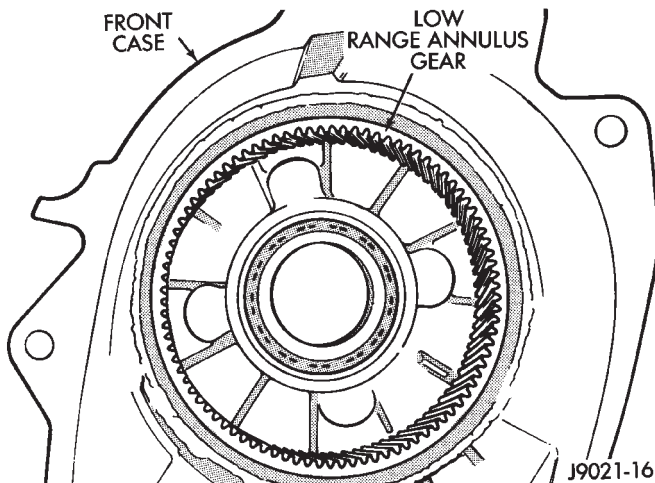
Examine the drive chain and shaft bearings. Replace the chain and both sprockets if the chain is stretched, distorted, or if any of the links bind. Replace the bearings if rough, or noisy.



**Fig. 81 Seal Contact Surface Of Yoke Slinger**

## LOW RANGE ANNULUS GEAR

Inspect annulus gear condition carefully. The gear is only serviced as part of the front case. If the gear is damaged, it will be necessary to replace the gear and front case as an assembly. Do not attempt to remove the gear (Fig. 82).



**Fig. 82 Low Range Annulus Gear**

## FRONT-REAR CASES AND FRONT RETAINER

Inspect the cases and retainer for wear and damage. Clean the sealing surfaces with a scraper and 3M all purpose cleaner. This will ensure proper sealer adhesion at assembly. Replace the input retainer seal; do not reuse it.

Check case condition. If leaks were a problem, look for gouges and severe scoring of case sealing surfaces. Also make sure the front case mounting studs are in good condition.

Check the front case mounting studs and vent tube. The tube can be secured with Loctite 271 or 680 if loose. The stud threads can be cleaned up with a die if necessary. Also check condition of the fill/drain plug threads in the rear case. The threads can be repaired with a thread chaser or tap if necessary. Or the threads can be repaired with Helicoil stainless steel inserts if required.

## OIL PUMP/OIL PICKUP

Examine the oil pump pickup parts. Replace the pump if any part appears to be worn or damaged. Do not disassemble the pump as individual parts are not available. The pump is only available as a complete assembly. The pickup screen, hose, and tube are the only serviceable parts and are available separately.

## ADJUSTMENTS

## SHIFT LINKAGE ADJUSTMENT

- (1) Shift transfer case into 4L position.
- (2) Secure shift lever in 4L position. Use wire, or tape to hold lever in place if necessary.
- (3) Raise vehicle.
- (4) Loosen lock bolt that secures shift rod in adjusting swivel (Fig. 83).
- (5) Make sure shift rod slides freely in adjusting swivel. Lube rod and swivel if necessary.
- (6) Verify that transfer case range lever is in 4L detent.
- (7) Center pin on adjusting swivel in shift arm and tighten lock bolt to 10 N·m (90 in. lbs.) torque.
- (8) Lower vehicle just enough to enter vehicle. Be sure all wheels are off shop floor. Then start engine, shift transmission into gear, and shift transfer case through all ranges to verify correct adjustment.

## ADJUSTMENTS (Continued)

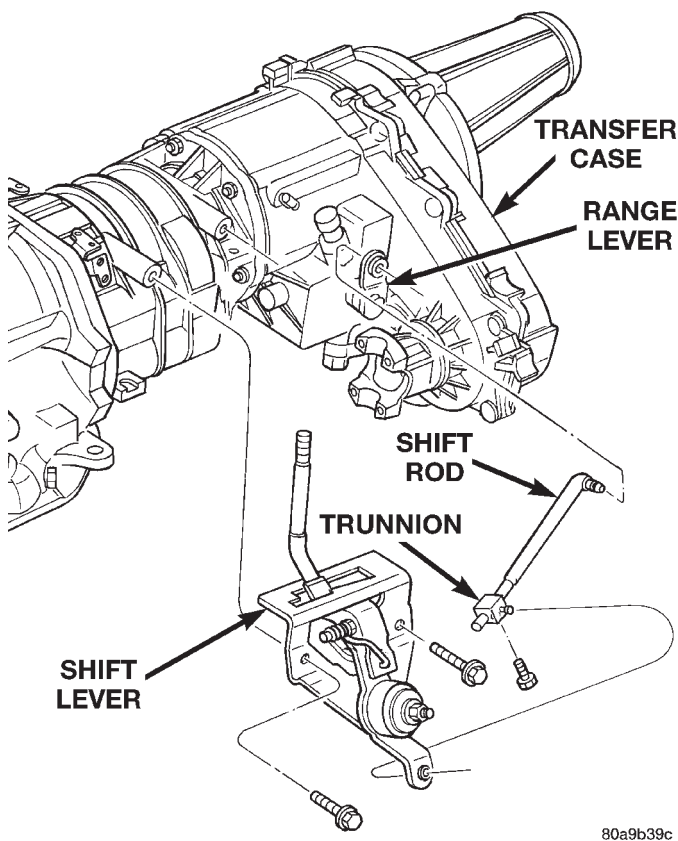
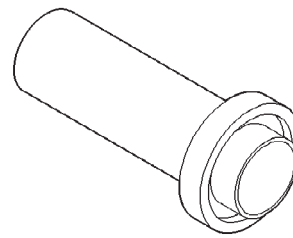
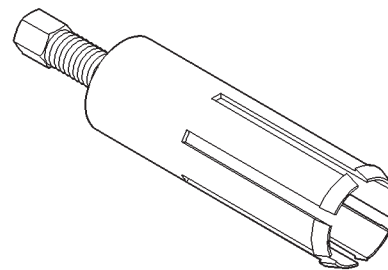
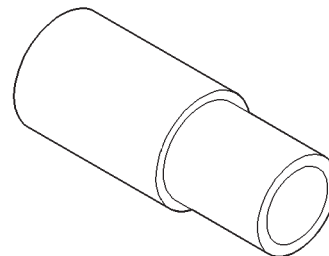
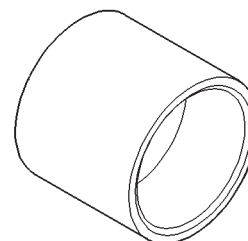


Fig. 83 Transfer Case Shift Linkage

## SPECIAL TOOLS

NV231

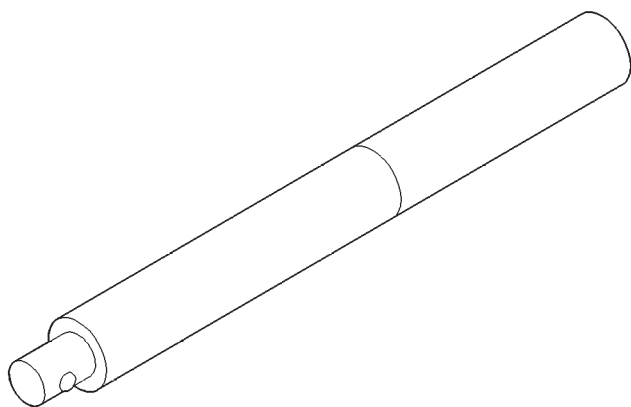
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## SPECIFICATIONS

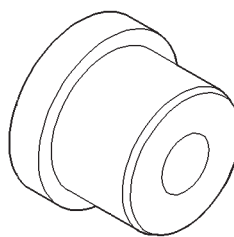
## TORQUE

DESCRIPTION	TORQUE
Plug, Detent . . . . .	16–24 N·m (12–18 ft. lbs.)
Plug, Drain/Fill . . . . .	20–34 N·m (15–25 ft. lbs.)
Bolt, Front Brg. Retainer . . . . .	21 N·m (16 ft. lbs.)
Bolt, Front Brg. Retainer . . . . .	21 N·m (16 ft. lbs.)
Bolt, Case Half . . . . .	27–34 N·m (20–25 ft. lbs.)
Nut, Front Yoke . . . . .	122–176 N·m (90–130 ft. lbs.)
Nut, Range Lever . . . . .	27–34 N·m (20–25 ft. lbs.)
Bolt, Rear Retainer . . . . .	35–46 N·m (26–34 ft. lbs.)
Nuts, Mounting . . . . .	35–47 N·m (26–35 ft. lbs.)
Switch, Indicator . . . . .	20–34 N·m (15–25 ft. lbs.)

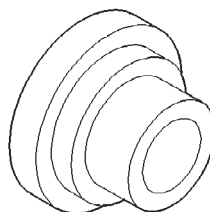
SPECIAL TOOLS (Continued)



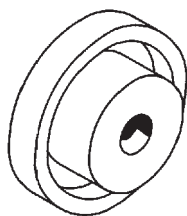
***Handle, Universal—C-4171***



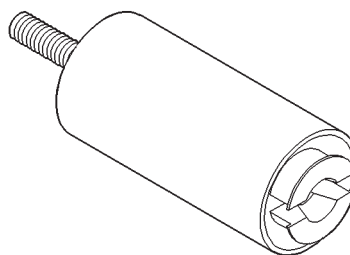
***Installer, Bushing—5066***



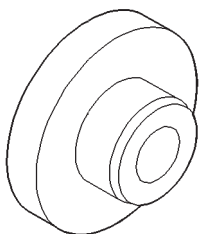
***Installer, Bearing—8128***



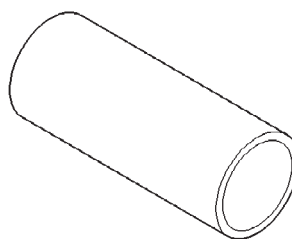
***Installer, Seal—C-4210***



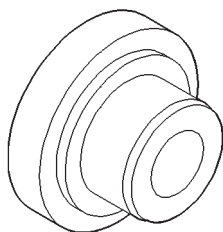
***Remover—L-4454***



***Installer, Bearing—5064***

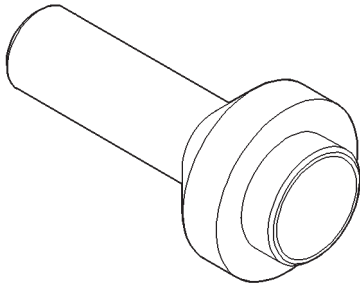
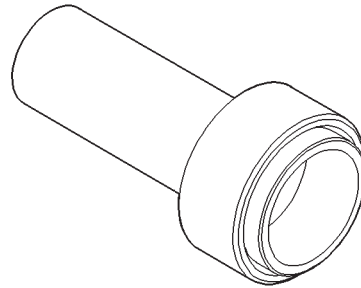
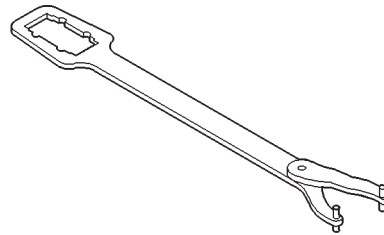


***Cup—8148***



***Installer, Bearing—5065***

## SPECIAL TOOLS (Continued)

***Installer, Seal—7884******Installer, Pump Housing Seal—7888******Holder, Yoke—C-3281***



# NV242 TRANSFER CASE

## INDEX

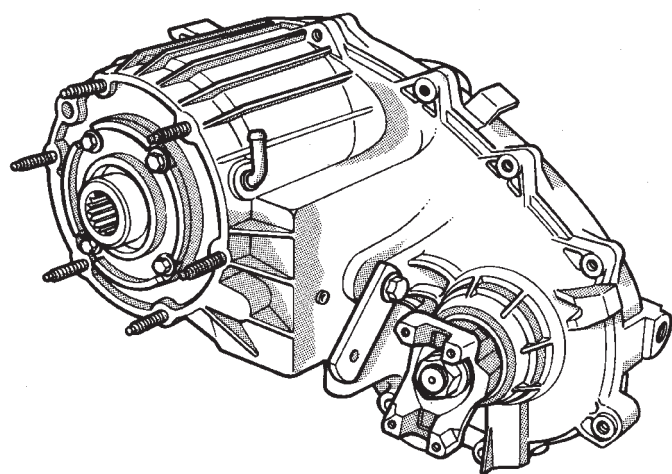
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## GENERAL INFORMATION

### NV242 TRANSFER CASE

The NV242 is a full and part-time transfer case (Fig. 1). It provides full time 2-wheel, or 4-wheel drive operation.

A differential in the transfer case is used to control torque transfer to the front and rear axles. A low range gear provides increased low speed torque capability for off road operation. The low range provides a 2.72:1 reduction ratio.



J8921-243

**Fig. 1 NV242 Transfer Case**

The input gear is splined to the transmission output shaft. It drives the mainshaft through the planetary gear and range hub. The front output shaft is

operated by a drive chain that connects the shaft to a drive sprocket on the mainshaft. The drive sprocket is engaged/disengaged by the mode fork, which operates the mode sleeve and hub. The sleeve and hub are not equipped with a synchro mechanism for shifting.

The geartrain is mounted in two aluminum case halves attached with bolts. The mainshaft front and rear bearings are mounted in aluminum retainer housings bolted to the case halves.

### OPERATING RANGES

NV242 operating ranges are 2WD (2-wheel drive), 4x4 part-time, 4x4 full time, and 4 Lo.

The 2WD and 4x4 full time ranges can be used at any time and on any road surface.

The 4x4 part-time and 4 Lo ranges are for off road use only. The only time these ranges can be used on hard surface roads, is when the surface is covered with snow and ice.

### SHIFT MECHANISM

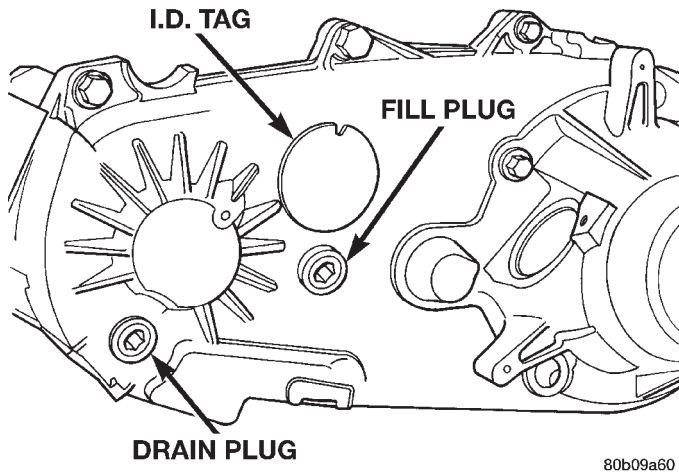
Operating ranges are selected with a floor mounted shift lever. The shift lever is connected to the transfer case range lever by an adjustable linkage rod. A straight line shift pattern is used. Range positions are marked on the shifter bezel cover plate, or on the shift knob.

### TRANSFER CASE IDENTIFICATION

A circular ID tag is attached to the rear case of each transfer case (Fig. 2). The ID tag provides the transfer case model number, assembly number, serial number, and low range ratio.

The transfer case serial number also represents the date of build.

## GENERAL INFORMATION (Continued)



**Fig. 2 Fill/Drain Plug And I.D. Tag Locations**

**RECOMMENDED LUBRICANT AND FILL LEVEL**

Recommended lubricant for the NV242 transfer case is Mopar® Dexron II, or ATF Plus, type 7176. Approximate lubricant fill capacity is 1.35 liters (2.85 pints).

The fill and drain plugs are both in the rear case (Fig. 1). Correct fill level is to the bottom edge of the fill plug hole. Be sure the vehicle is level to ensure an accurate fluid level check.

## DIAGNOSIS AND TESTING

## NV242 DIAGNOSIS

## DIAGNOSIS CHART

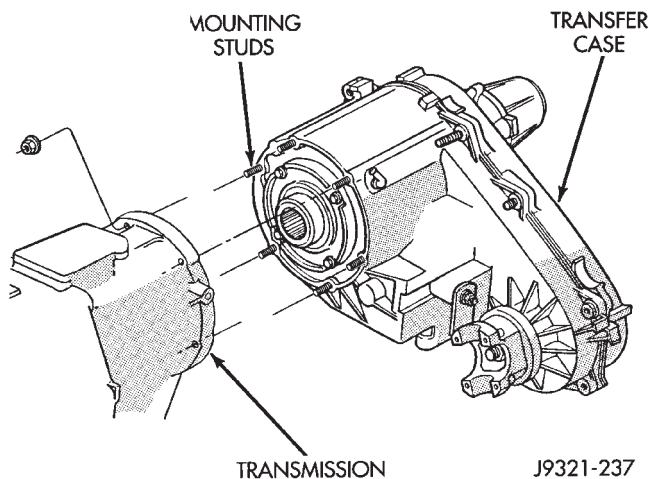
Condition	Possible Cause	Correction
Transfer case difficult to shift or will not shift into desired range.	1) Transfer case shift linkage binding.	1) Repair or replace linkage as necessary.
	2) Insufficient or incorrect lubricant.	3) Drain and refill transfer case with the correct type and quantity of lubricant.
	3) Internal transfer case components binding, worn, or damaged.	3) Repair or replace components as necessary.
Transfer case noisy in all drive modes.	1) Insufficient or incorrect lubricant.	1) Drain and refill transfer case with the correct type and quantity of lubricant.
Lubricant leaking from transfer case seals or vent.	1) Transfer case overfilled.	1) Drain lubricant to the correct level.
	2) Transfer case vent closed or restricted.	2) Clean or replace vent as necessary.
	3) Transfer case seals damaged or installed incorrectly.	3) Replace suspect seal.
Transfer case will not shift through 4X4 part time range (light remains on).	1) Incomplete shift due to drivetrain torque load.	1) Momentarily release the accelerator pedal to complete the shift.
	2) Incorrect tire pressure.	2) Correct tire pressure as necessary.
	3) Excessive Tire wear.	3) Correct tire condition as necessary.
	4) Excessive vehicle loading.	4) Correct as necessary.

## REMOVAL AND INSTALLATION

### TRANSFER CASE

#### REMOVAL

- (1) Shift transfer case into Neutral.
- (2) Raise vehicle.
- (3) Drain transfer case lubricant.
- (4) Mark front and rear propeller shaft yokes for alignment reference.
- (5) Support transmission with jack stand.
- (6) Remove rear crossmember and skid plate, if equipped.
- (7) Disconnect front/rear propeller shafts at transfer case.
- (8) Disconnect transfer case linkage rod from range lever.
- (9) Disconnect transfer case vent hose (Fig. 3) and indicator switch harness, if necessary.
- (10) Support transfer case with transmission jack.
- (11) Secure transfer case to jack with chains.
- (12) Remove nuts attaching transfer case to transmission.
- (13) Pull transfer case and jack rearward to disengage transfer case.
- (14) Remove transfer case from under vehicle.



**Fig. 3 Transfer Case Mounting—Typical**

#### INSTALLATION

- (1) Mount transfer case on a transmission jack.
- (2) Secure transfer case to jack with chains.
- (3) Position transfer case under vehicle.
- (4) Align transfer case and transmission shafts and install transfer case on transmission.
- (5) Install and tighten transfer case attaching nuts to 35 N·m (26 ft. lbs.) torque (Fig. 3).
- (6) Connect vent hose.
- (7) Connect indicator switch harness to transfer case switch, if necessary. Secure wire harness to clips on transfer case.

(8) Align and connect propeller shafts. Tighten shaft attaching bolts to 19 N·m (170 in. lbs.) torque.

(9) Fill transfer case with correct fluid. Refer to Recommended Lubricant And Fill Level section for proper fluid and capacity.

(10) Install rear crossmember and skid plate, if equipped. Tighten crossmember bolts to 41 N·m (30 ft. lbs.) torque.

(11) Remove transmission jack and support stand.

(12) Connect shift rod to transfer case range lever.

(13) Adjust transfer case shift linkage.

(14) Lower vehicle and verify transfer case shift operation.

### SHIFT LEVER

#### REMOVAL

- (1) Shift transfer case into 4L.
- (2) Remove transfer case shifter knob cap.
- (3) Remove nut holding shifter knob to shift lever.
- (4) Remove shifter knob.
- (5) Raise and support vehicle.
- (6) Loosen adjusting trunnion lock bolt and slide shift rod out of trunnion (Fig. 4). If rod lacks enough travel to come out of trunnion, push trunnion out of shift lever.
- (7) Remove bolts holding shift lever to transmission.
- (8) Separate shift lever from vehicle.

#### INSTALLATION

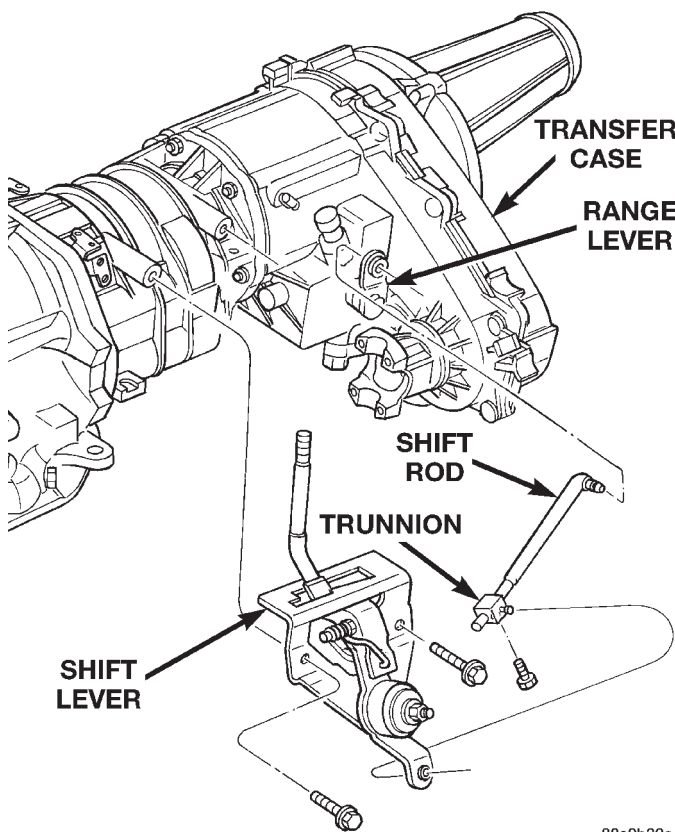
- (1) Position shift lever on transmission. Use care when passing the shift lever through the shifter boot to prevent damage to the shifter boot.
- (2) Install bolts to hold shift lever to transmission.
- (3) Install trunnion to shift lever, if necessary.
- (4) Install shift rod to trunnion, if necessary.
- (5) Move shift lever and transfer case to 4L position.
- (6) Tighten trunnion lock bolt.
- (7) Lower vehicle.
- (8) Install shift knob on shift lever.
- (9) Install nut to hold shifter knob to shift lever.
- (10) Install shifter knob cap.
- (11) Verify transfer case operation.

### FRONT OUTPUT SHAFT SEAL

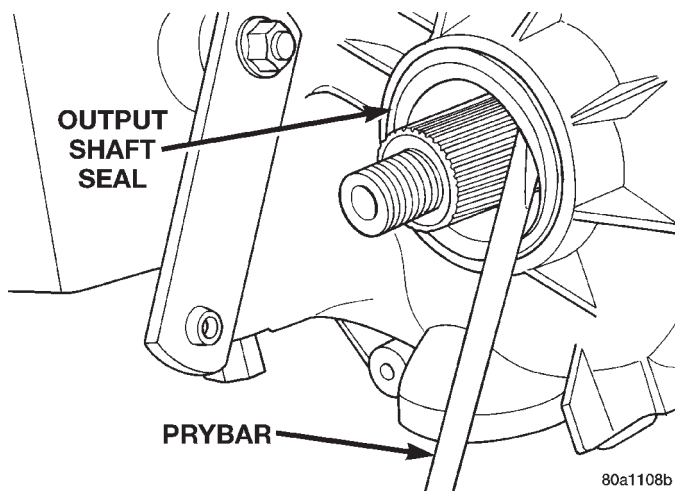
#### REMOVAL

- (1) Raise vehicle.
- (2) Remove front propeller shaft. Refer to Group 3, Differential and Driveline, for proper procedure.
- (3) Remove front output shaft yoke.
- (4) Remove seal from front case with pry tool (Fig. 5).

## REMOVAL AND INSTALLATION (Continued)



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**Fig. 4 Shift Lever**

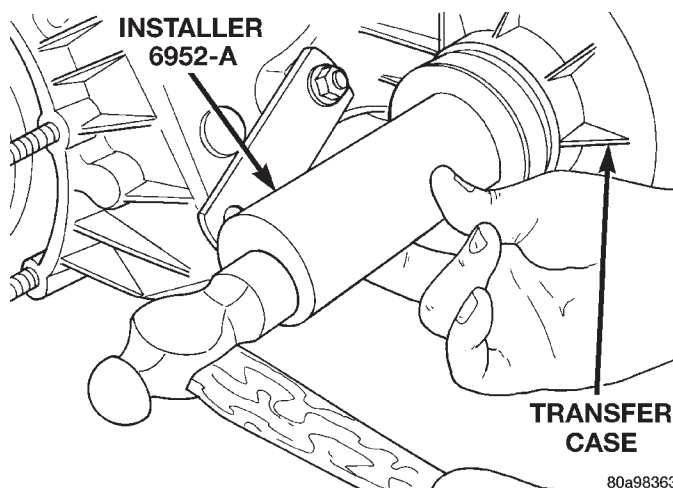
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**Fig. 5 Remove Front Output Shaft Seal****INSTALLATION**

(1) Install new front output seal in front case with Installer Tool 6952-A as follows:

(a) Place new seal on tool. Garter spring on seal goes toward interior of case.

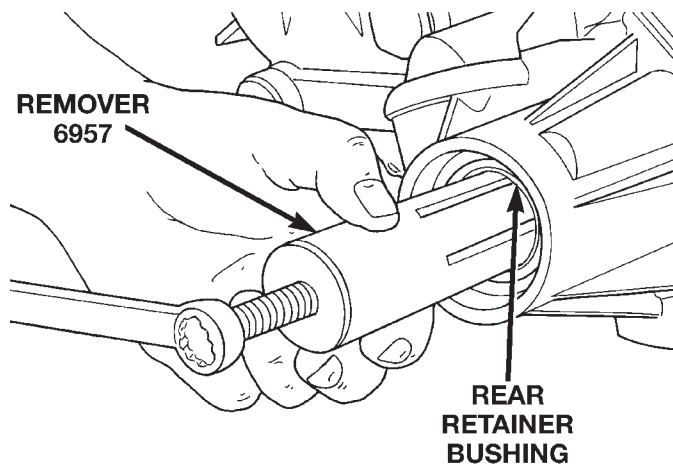
(b) Start seal in bore with light taps from hammer (Fig. 6). Once seal is started, continue tapping seal into bore until installer tool seats against case.



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**Fig. 6 Front Output Seal Installation****REAR RETAINER BUSHING AND SEAL****REMOVAL**

- (1) Raise vehicle.
- (2) Remove rear propeller shaft. Refer to Group 3, Differential and Driveline, for proper procedure.
- (3) Using a suitable pry tool or slide-hammer mounted screw, remove the rear retainer seal.
- (4) Using Remover 6957, remove bushing from rear retainer (Fig. 7).



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**Fig. 7 Rear Retainer Bushing Removal****INSTALLATION**

(1) Clean fluid residue from sealing surface and inspect for defects.

(2) Position replacement bushing in rear retainer with fluid port in bushing aligned with slot in retainer.

(3) Using Installer 8160, drive bushing into retainer until installer seats against case (Fig. 8).

(4) Using Installer C-3995-A, install seal in rear retainer (Fig. 9).

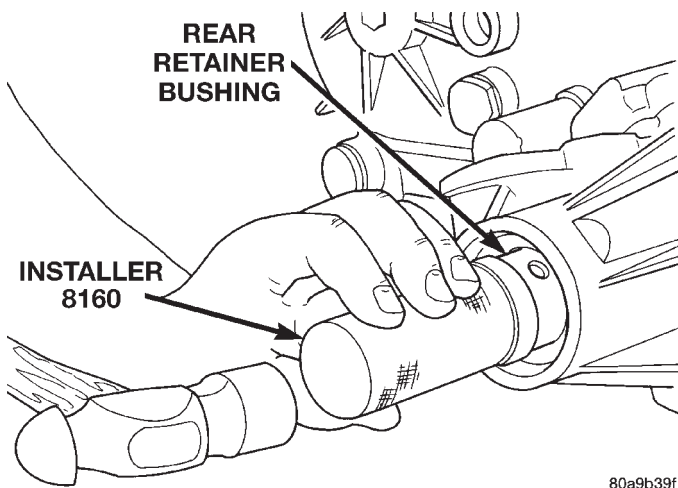
(5) Install propeller shaft.

(6) Verify proper fluid level.

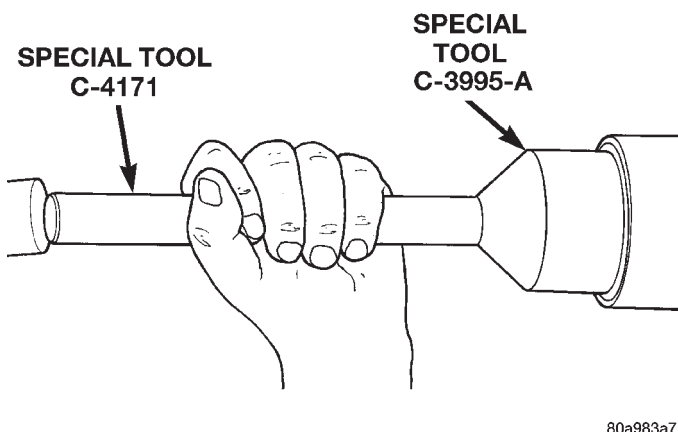
(7) Lower vehicle.



# REMOVAL AND INSTALLATION (Continued)



**Fig. 8 Rear Retainer Bushing Install**



**Fig. 9 Install Rear Retainer Seal**

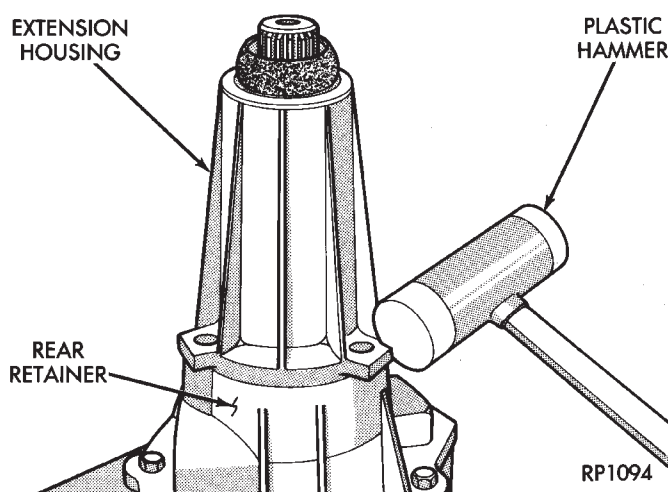
## DISASSEMBLY AND ASSEMBLY

### NV242 TRANSFER CASE

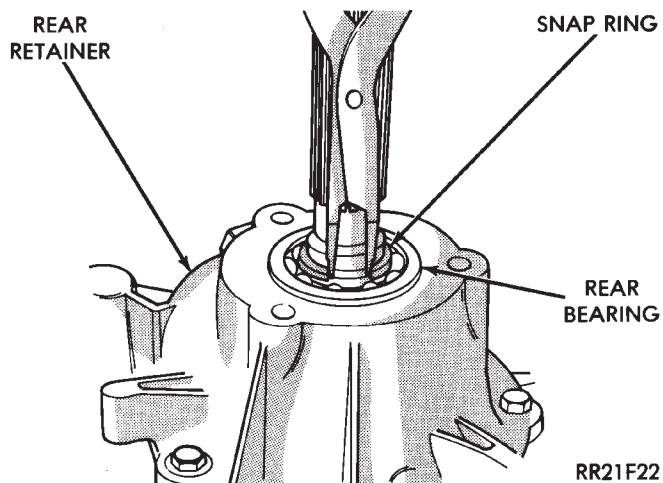
#### DISASSEMBLY

##### REAR RETAINER

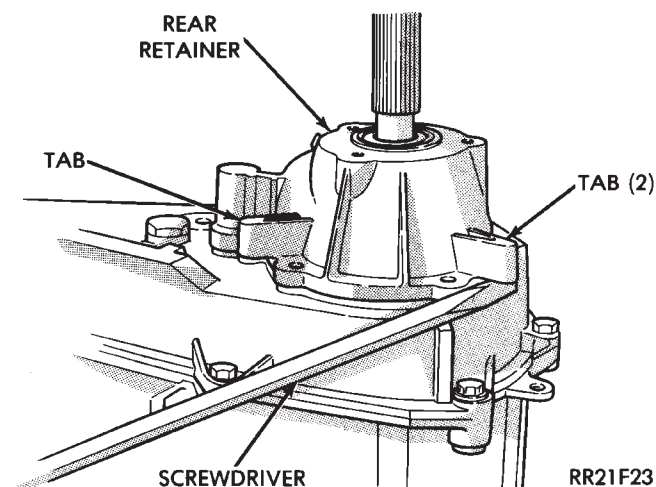
- (1) Remove extension housing bolts.
- (2) Tap extension housing with plastic or rawhide mallet to loosen sealer (Fig. 10).
- (3) Separate extension housing from rear retainer.
- (4) Remove rear bearing snap-ring (Fig. 11).
- (5) Remove bolts holding rear retainer to rear case half.
- (6) Loosen rear retainer with pry tool to break sealer bead. Pry only against retainer boss as shown (Fig. 12).
- (7) Remove rear bearing O.D. retaining ring with snap ring pliers. Then tilt pump and slide it off output shaft (Fig. 13).
- (8) Remove pickup tube O-ring from pump (Fig. 14) but do not disassemble pump; it is not a repairable part.



**Fig. 10 Remove Extension Housing**



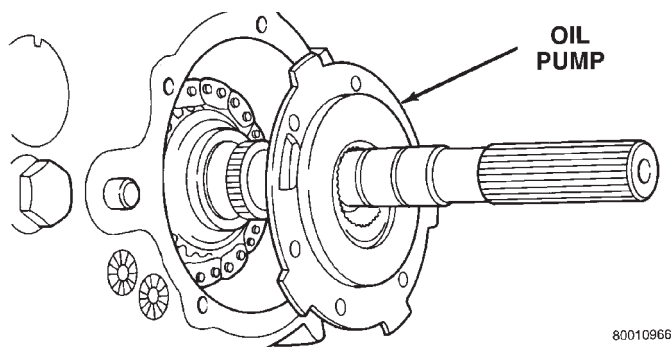
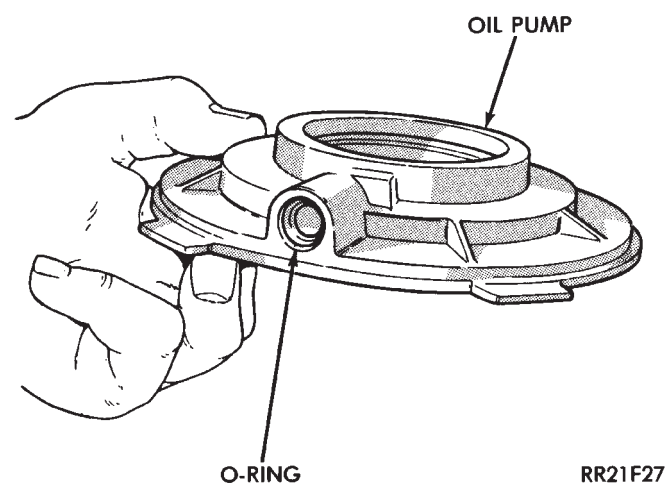
**Fig. 11 Remove Rear Bearing Snap-ring**



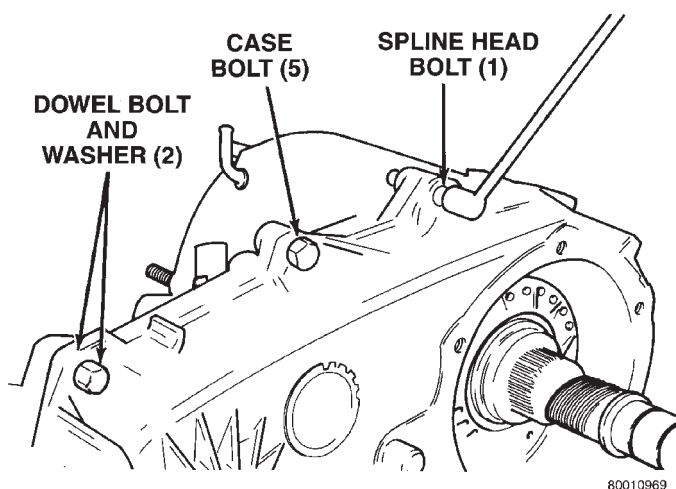
**Fig. 12 Loosening Rear Retainer**

- (9) Remove seal from oil pump with pry tool.
- (10) Remove bolts attaching rear case to front case (Fig. 15). Note position of the two black finish bolts at each end of the case. These bolts go through the

## DISASSEMBLY AND ASSEMBLY (Continued)

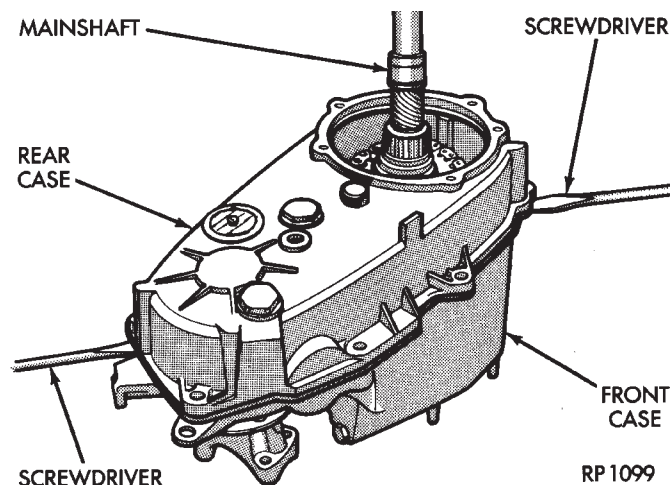
**Fig. 13 Oil Pump Removal****Fig. 14 Pickup Tube O-Ring Location**

case dowels and require a washer under the bolt head.

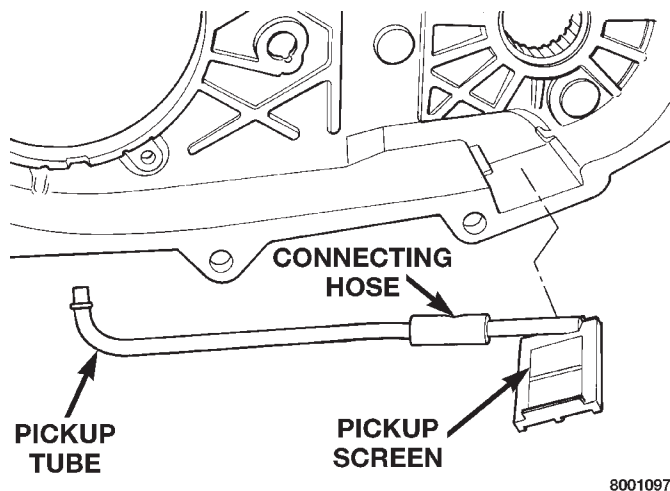
**Fig. 15 Spline And Dowel Bolt Locations**

(11) Remove rear case from front case (Fig. 16). Insert screwdrivers into slots cast into each end of case. Then pry upward to break sealer bead and remove rear case.

**CAUTION:** Do not pry on the sealing surface of either case half as the surfaces will become damaged.

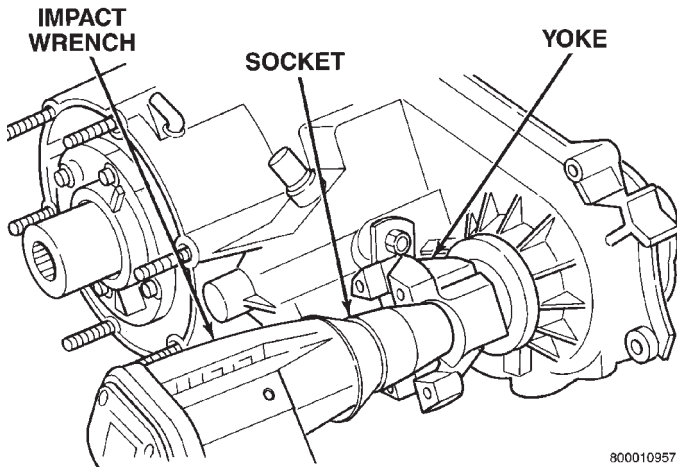
**Fig. 16 Loosening/Removing Rear case**

(12) Remove oil pickup tube and screen from rear case (Fig. 17).

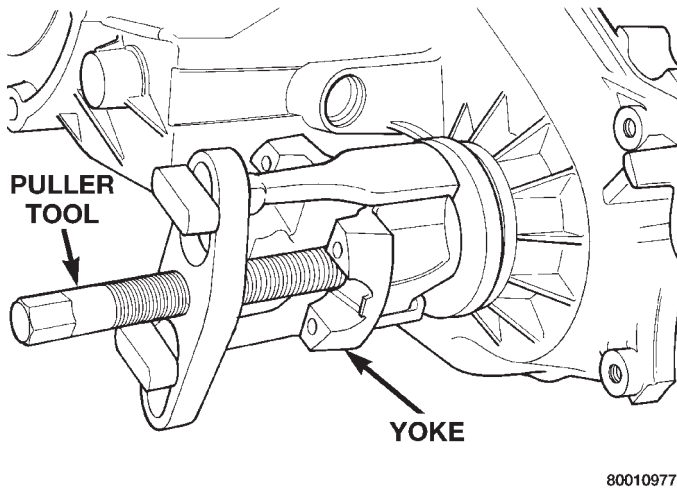
**Fig. 17 Oil Pickup Screen, Hose And Tube Removal**

- YOKE AND RANGE LEVER**
- (1) Remove front yoke nut:
    - (a) Move range lever to 4L position.
    - (b) Remove nut with socket and impact wrench (Fig. 18).
  - (2) Remove yoke. If yoke is difficult to remove by hand, remove it with bearing splitter, or with standard two jaw puller (Fig. 19). Be sure puller tool is positioned on yoke and not on slinger as slinger will be damaged.
  - (3) Remove seal washer from front output shaft. Discard washer as it should not be reused.
  - (4) Remove nut and washer that attach range lever to sector shaft. Then move sector to neutral position and remove range lever from shaft (Fig. 20).

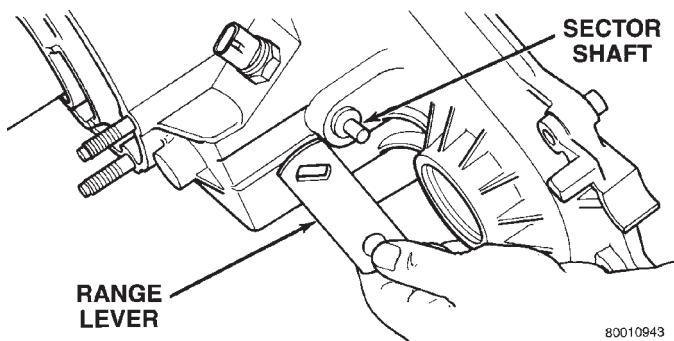
# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 18 Yoke Nut Removal**



**Fig. 19 Yoke Removal**



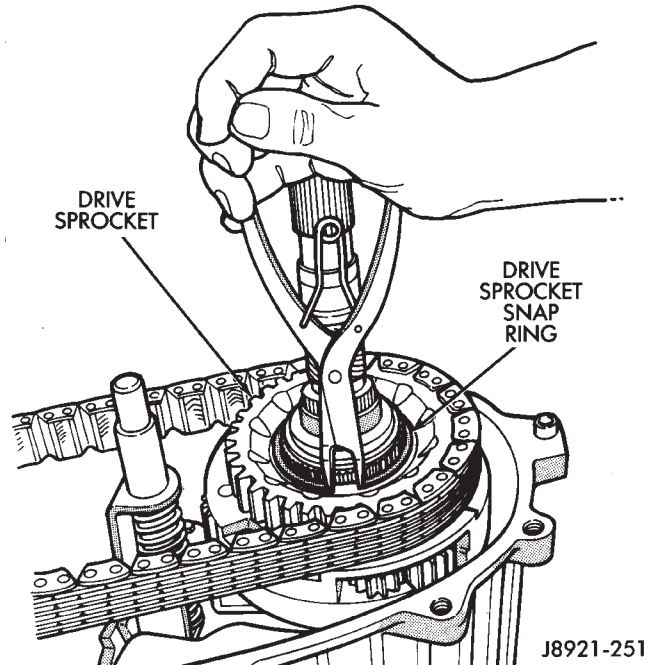
**Fig. 20 Range Lever Removal**

## FRONT OUTPUT SHAFT AND DRIVE CHAIN

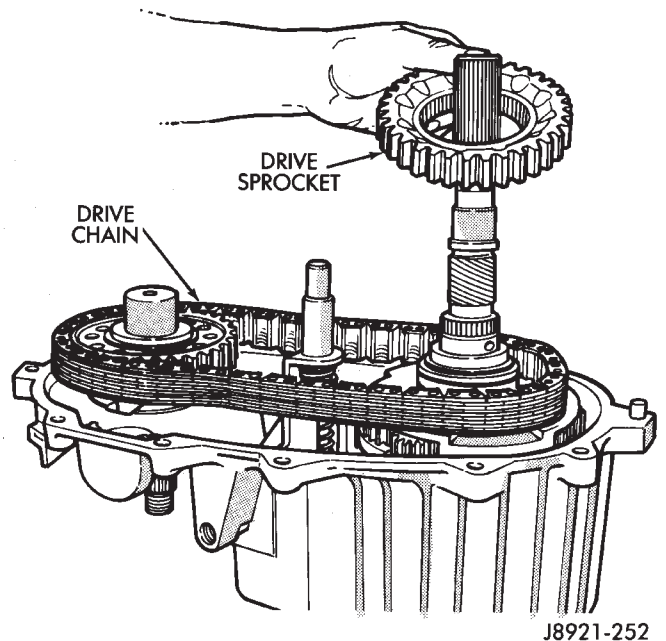
- (1) Remove drive sprocket snap-ring (Fig. 21).
- (2) Remove drive sprocket and chain (Fig. 22).
- (3) Remove front output shaft (Fig. 23).

## SHIFT FORKS AND MAINSHAFT

- (1) Remove shift detent plug, spring and pin (Fig. 24).



**Fig. 21 Drive Sprocket Snap-Ring Removal**



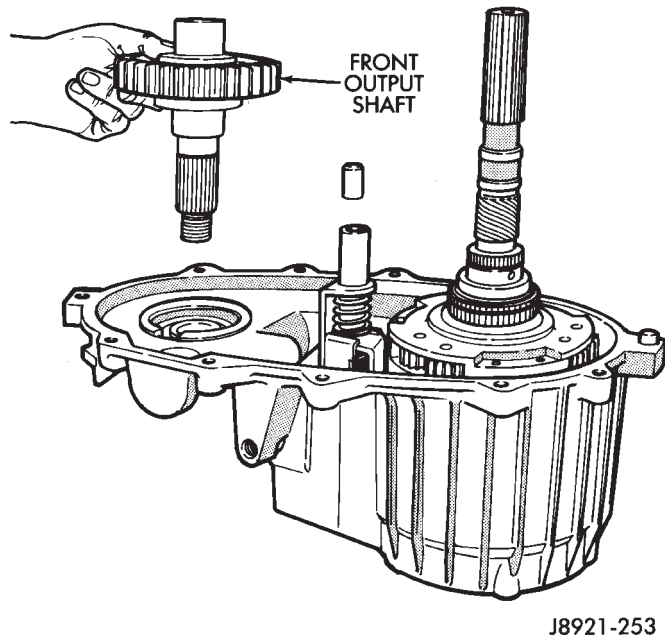
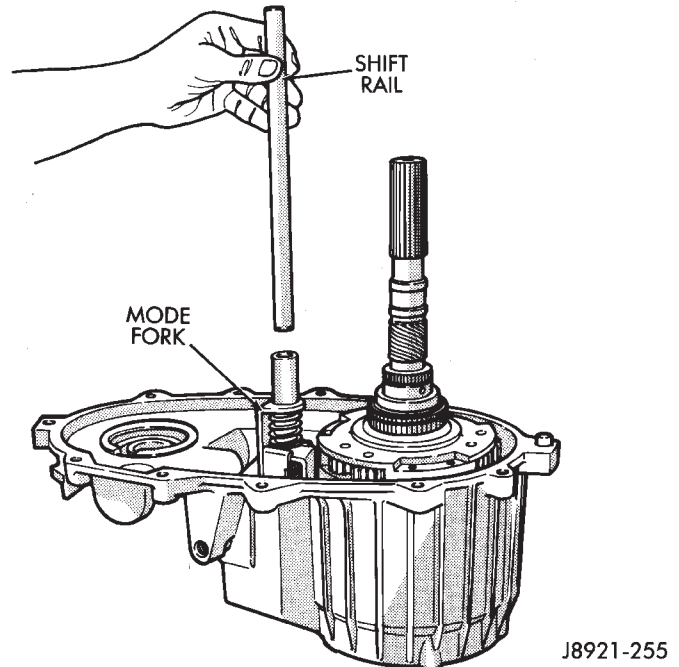
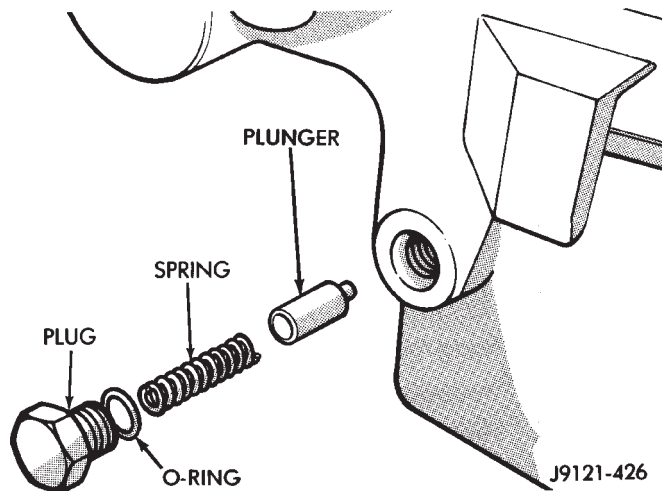
**Fig. 22 Drive Sprocket And Chain Removal**

(2) Remove seal plug from low range fork lockpin access hole. Then move shift sector to align low range fork lockpin with access hole.

(3) Remove range fork lockpin with size number one easy-out tool as follows:

- (a) Insert easy-out tool through access hole in side of transfer case and into lock-pin.
- (b) Tap easy-out tool into lock-pin with hammer until tool is securely engaged into the lock-pin.
- (c) Install a t-handle, such as from a tap and die set, onto the easy-out tool.

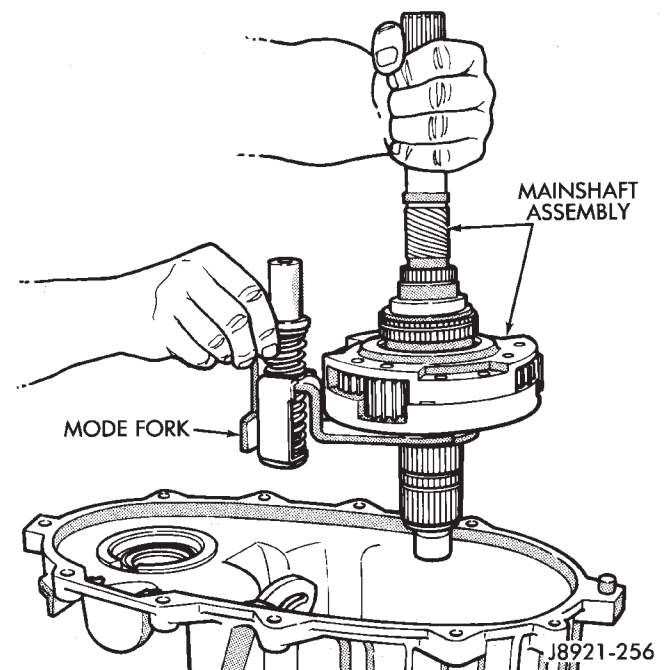
## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 23 Removing Front Output Shaft****Fig. 25 Shift Rail Removal****Fig. 24 Detent Component Removal**

- (d) Securely tighten the t-handle onto the tool.  
 (e) In one motion, pull upward and turn the t-handle counter-clockwise to remove the lock-pin.  
 (4) Remove shift rail by pulling it straight up and out of fork (Fig. 25).

(5) Remove mode fork and mainshaft as assembly (Fig. 26).

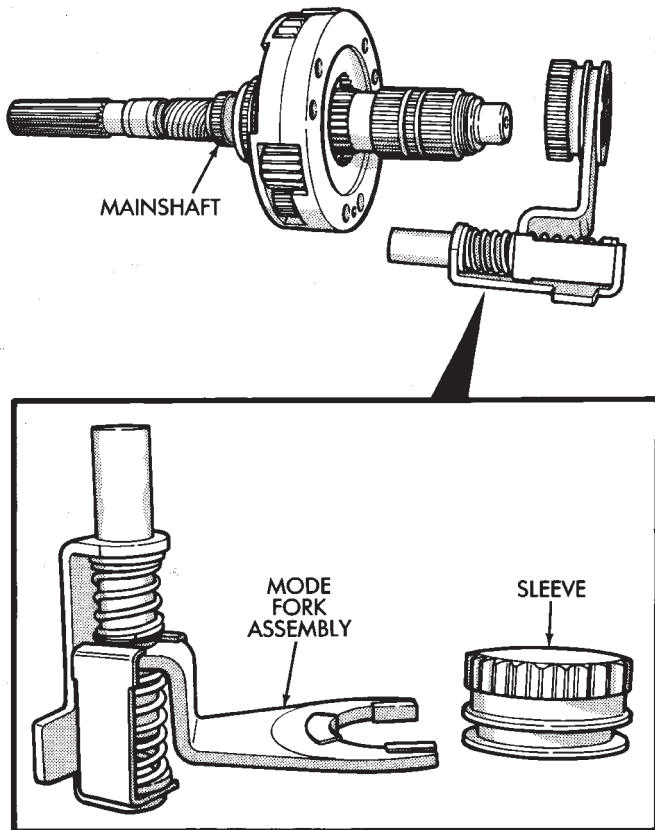
(6) Remove mode shift sleeve and mode fork assembly from mainshaft (Fig. 27). Note position of mode sleeve in fork and remove sleeve.

**Fig. 26 Mode Fork And Mainshaft Removal**

- (7) Remove intermediate clutch shaft snap-ring (Fig. 28).  
 (8) Remove clutch shaft thrust ring (Fig. 29).  
 (9) Remove intermediate clutch shaft (Fig. 30).

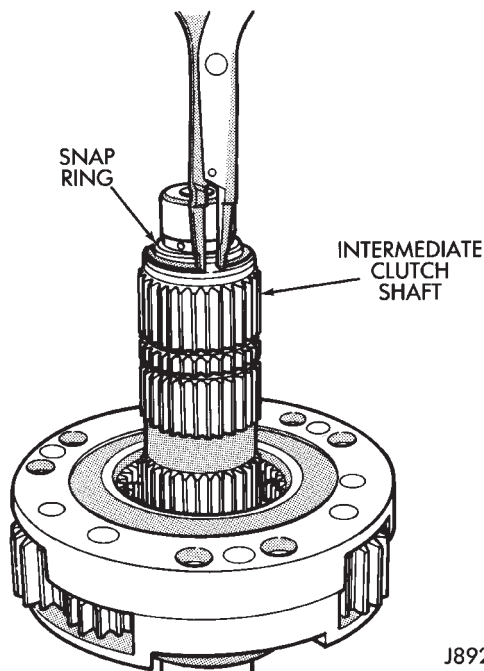


DISASSEMBLY AND ASSEMBLY (Continued)



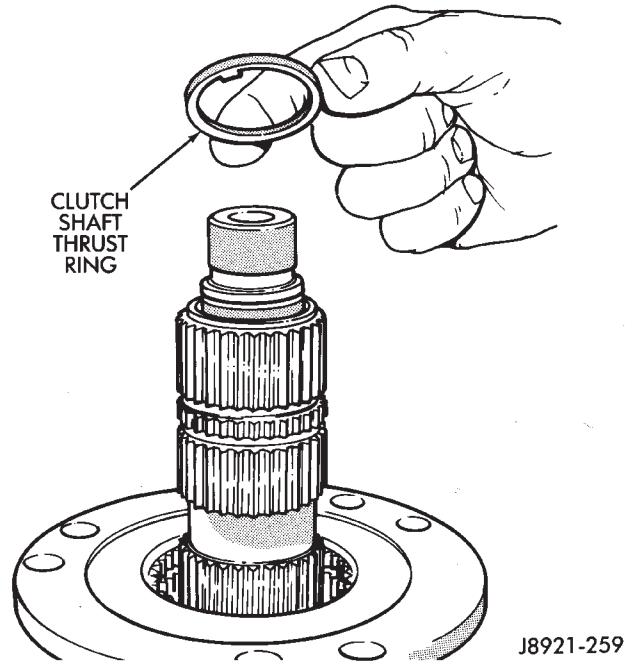
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**Fig. 27 Mode Fork And Sleeve Removal**

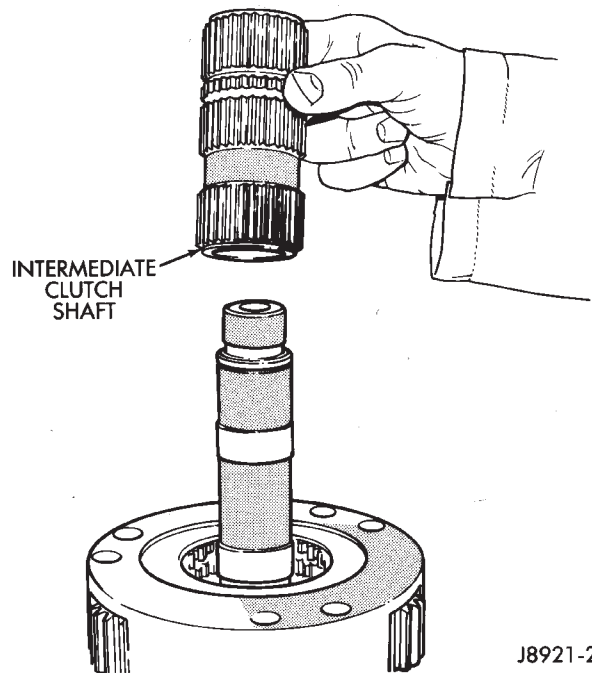


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**Fig. 28 Intermediate Clutch Shaft Snap-Ring Removal**



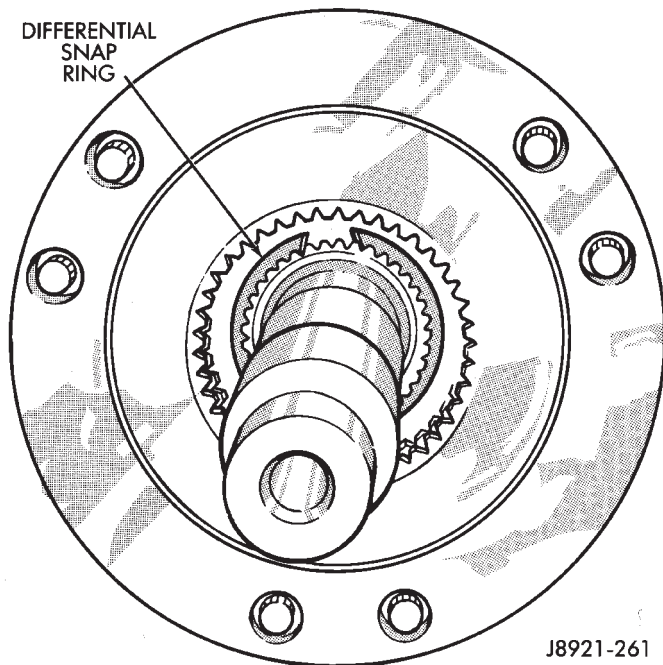
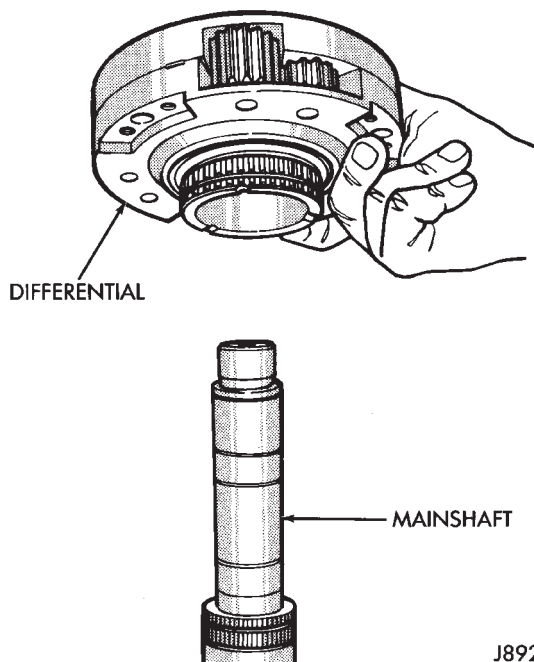
**Fig. 29 Clutch Shaft Thrust Ring Removal**



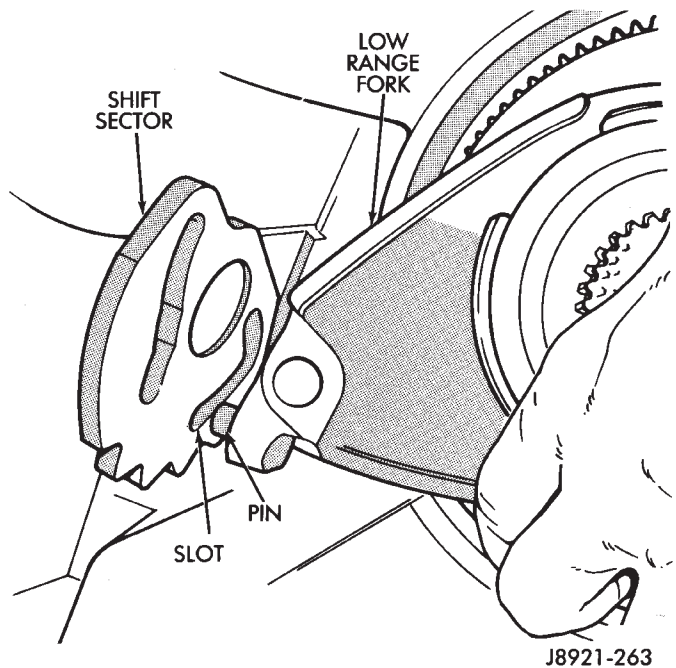
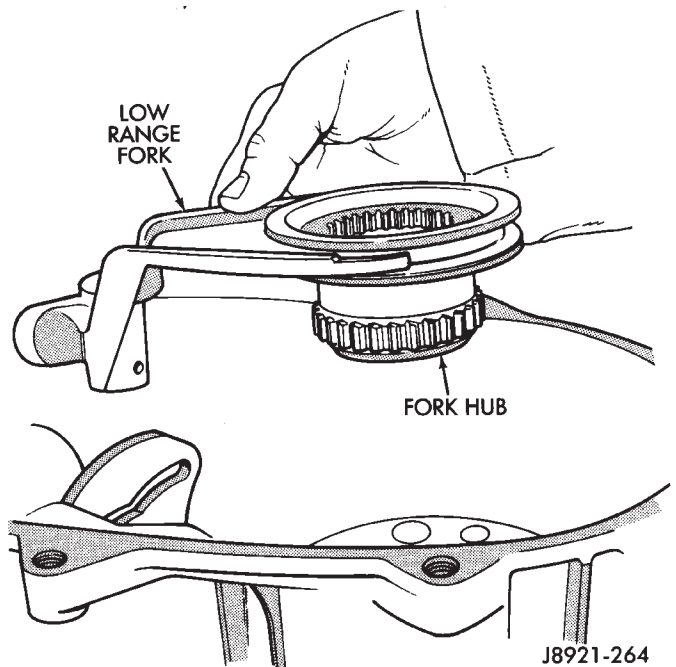
**Fig. 30 Intermediate Clutch Shaft Removal**

- (10) Remove differential snap-ring (Fig. 31).
- (11) Remove differential (Fig. 32).
- (12) Remove differential needle bearings and both needle bearing thrust washers from mainshaft.
- (13) Slide low range fork pin out of shift sector slot (Fig. 33).

## DISASSEMBLY AND ASSEMBLY (Continued)

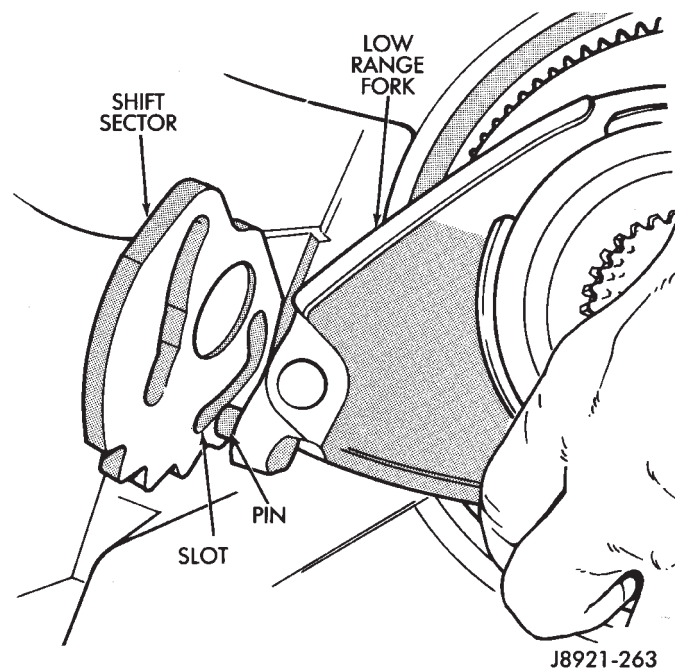
**Fig. 31 Differential Snap-Ring Removal****Fig. 32 Differential Removal**

- (14) Remove low range fork and hub (Fig. 34).
- (15) Remove shift sector (Fig. 35).
- (16) Remove shift sector bushing and O-ring (Fig. 36).

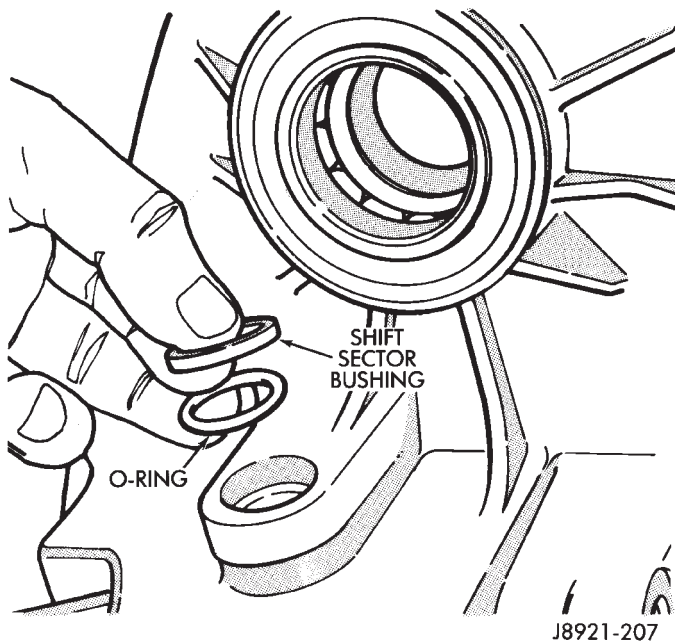
**Fig. 33 Disengaging Low Range Fork****Fig. 34 Low Range Fork And Hub Removal****INPUT GEAR/LOW RANGE ASSEMBLY**

- (1) Remove front bearing retainer bolts.
- (2) Remove front bearing retainer. Carefully pry retainer loose with screwdriver (Fig. 37). Position screwdriver in slots cast into retainer.

# DISASSEMBLY AND ASSEMBLY (Continued)

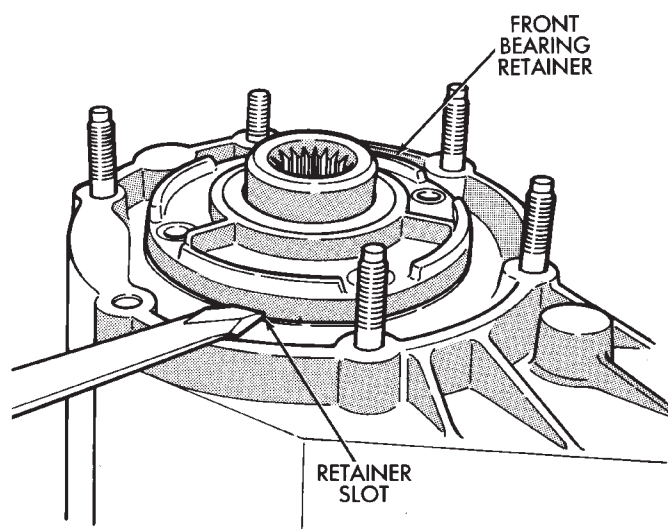


**Fig. 35 Shift Sector Position**

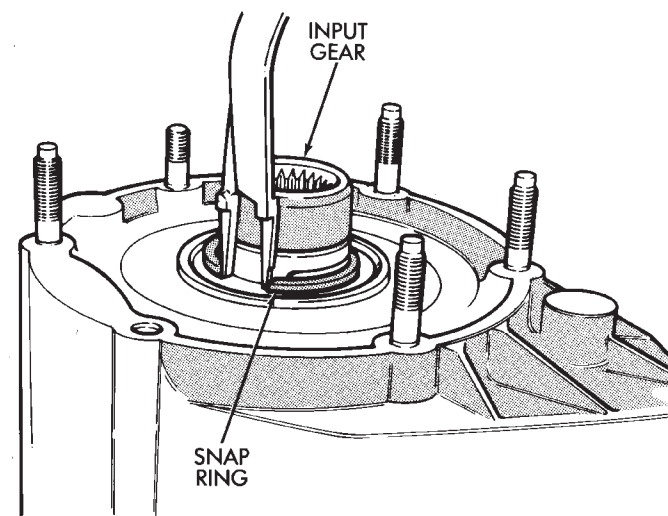


**Fig. 36 Sector Bushing And O-Ring Removal**

- (3) Remove input gear snap-ring (Fig. 38).
- (4) Remove input/low range gear assembly from bearing with Tool Handle C-4171 and Tool 7829A (Fig. 39).
- (5) Remove low range gear snap-ring (Fig. 40).
- (6) Remove input gear retainer, thrust washers and input gear from low range gear (Fig. 41).



**Fig. 37 Front Bearing Retainer Removal**



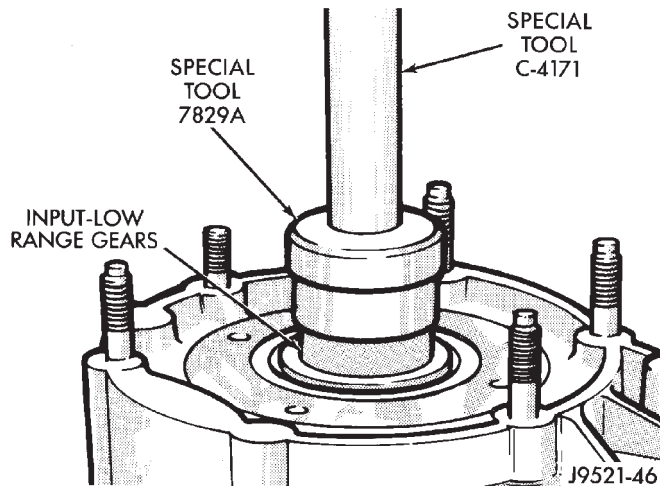
**Fig. 38 Input Gear Snap-Ring Removal**

(7) Inspect low range annulus gear (Fig. 42). **Gear is not a serviceable component. If damaged, replace gear and front case as assembly.**

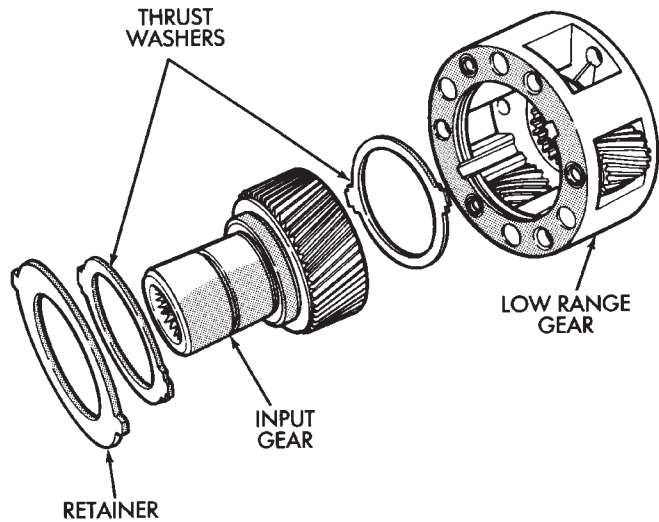
(8) Remove oil seals from following components:

- front bearing retainer.
- rear retainer.
- oil pump.
- case halves.

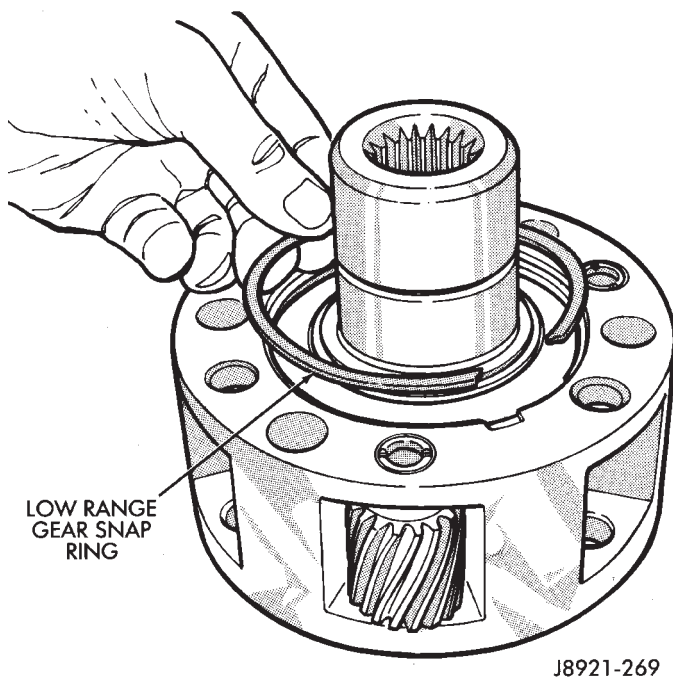
## DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 39 Input And Low Range Gear Assembly Removal**



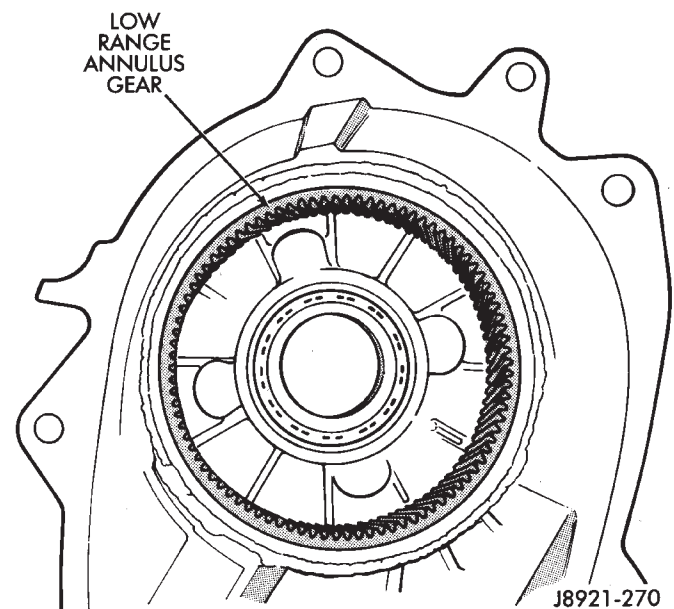
**Fig. 41 Low Range Gear Disassembly**



**Fig. 40 Low Range Gear Snap-Ring Removal/Installation**

## DIFFERENTIAL

- (1) Mark differential case halves for reference.
- (2) Remove differential case bolts.
- (3) Invert differential on workbench.
- (4) Separate top case from bottom case. Use slots in case halves to pry them apart (Fig. 43).
- (5) Remove thrust washers and planet gears from case pins (Fig. 44).



**Fig. 42 Inspecting Low Range Annulus Gear**

- (6) Remove mainshaft and sprocket gears from bottom case (Fig. 45). Note gear position for reference before separating them.

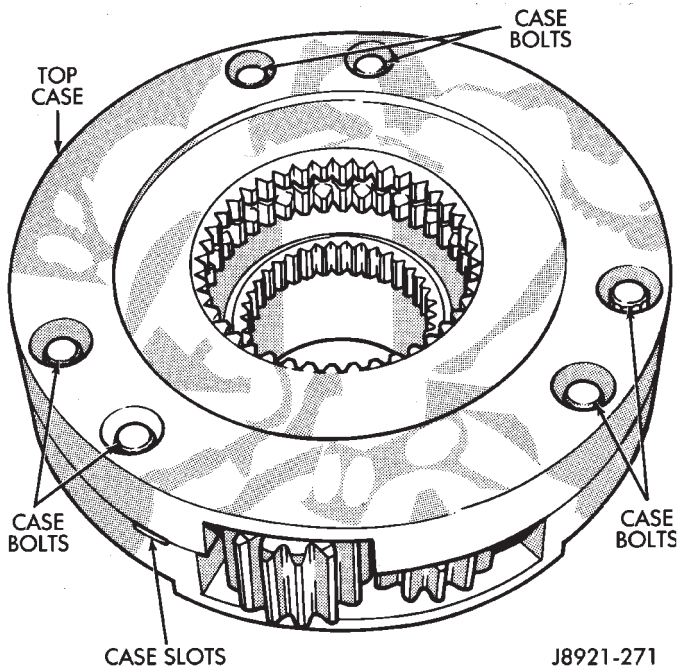
## ASSEMBLY

Lubricate transfer case components with automatic transmission fluid or petroleum jelly (where indicated) during assembly.

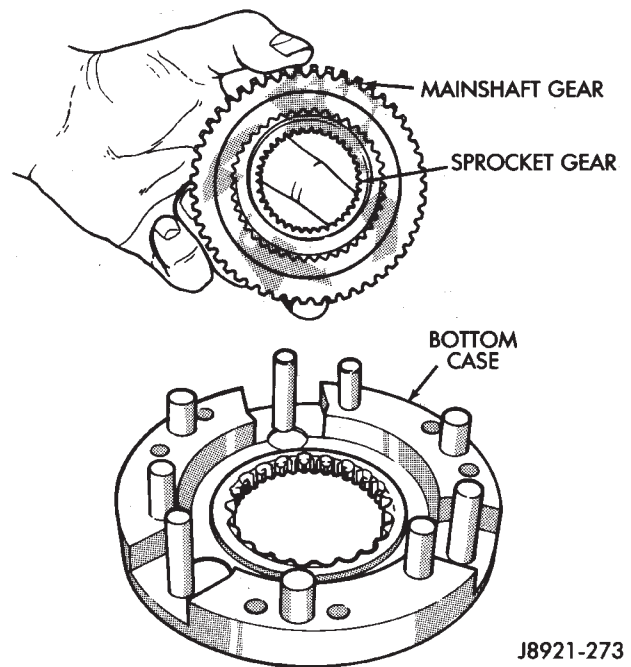
**CAUTION:** The bearing bores in various transfer case components contain oil feed holes. Make sure replacement bearings do not block the holes.



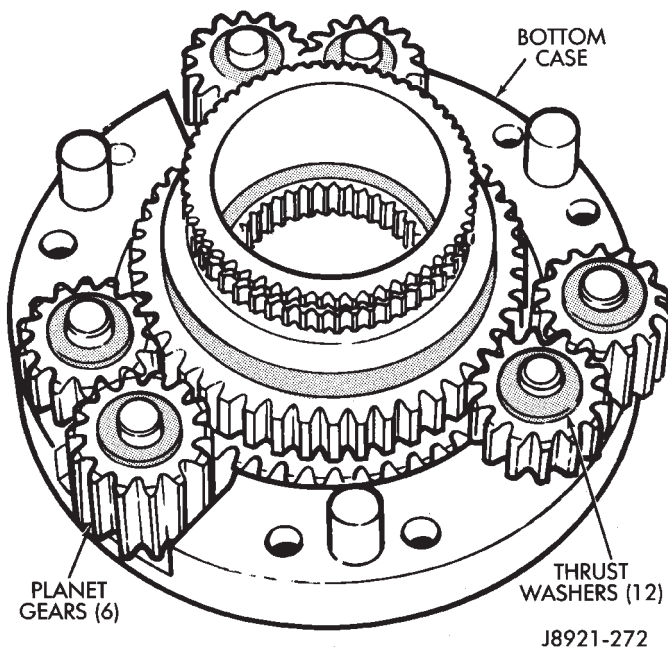
DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 43 Separating Differential Case Halves**



**Fig. 45 Mainshaft And Sprocket Gear Removal**



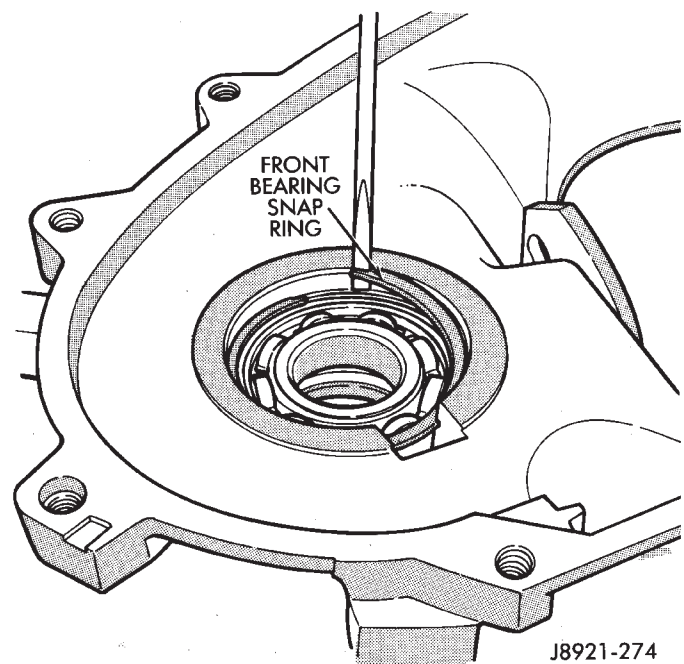
**Fig. 44 Planet Gears And Thrust Washer Removal**

BEARING AND SEAL

(1) Remove snap-ring that retains front output shaft front bearing in case (Fig. 46). Then remove bearing. Use hammer handle, or hammer and brass punch to tap bearing out of case.

(2) Install new front output shaft front bearing with Tool Handle C-4171 and Installer 8033A with the tapered cone upward (Fig. 47).

(3) Install front bearing snap-ring (Fig. 46).



**Fig. 46 Front Output Shaft Front Bearing Snap-Ring Removal**

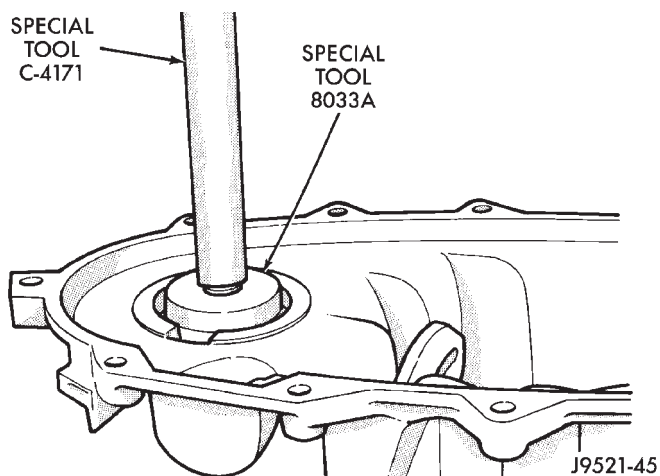
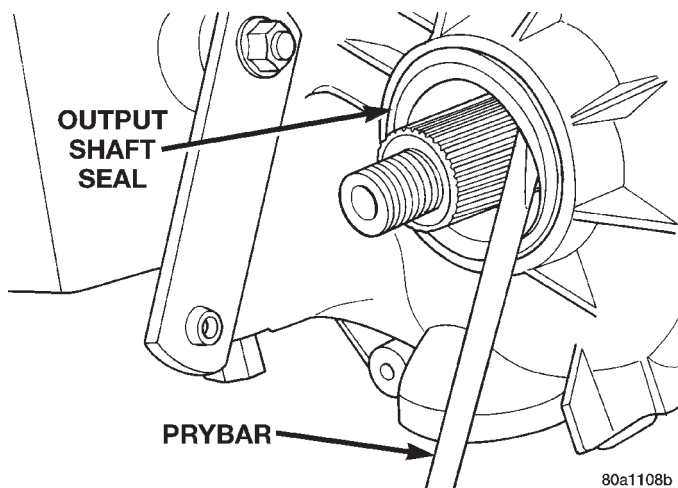
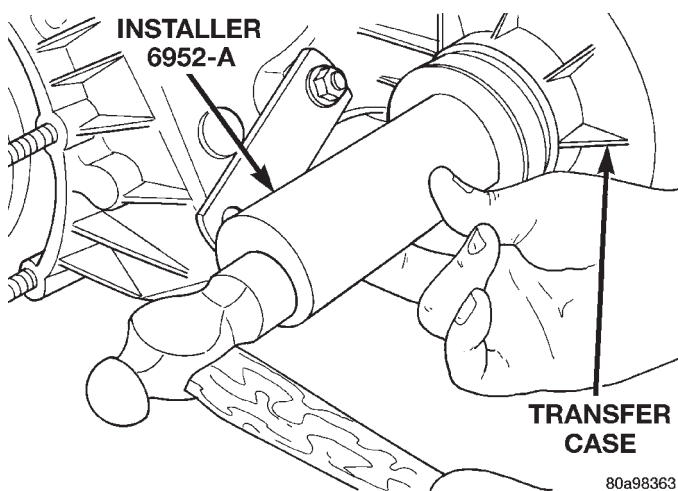
(4) Remove front output shaft seal using an appropriate pry tool (Fig. 48) or slide-hammer mounted screw.

(5) Install new front output shaft oil seal with Installer 6952-A (Fig. 49).

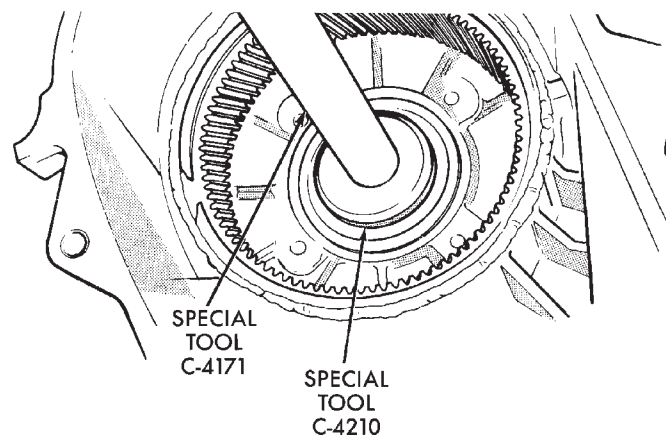
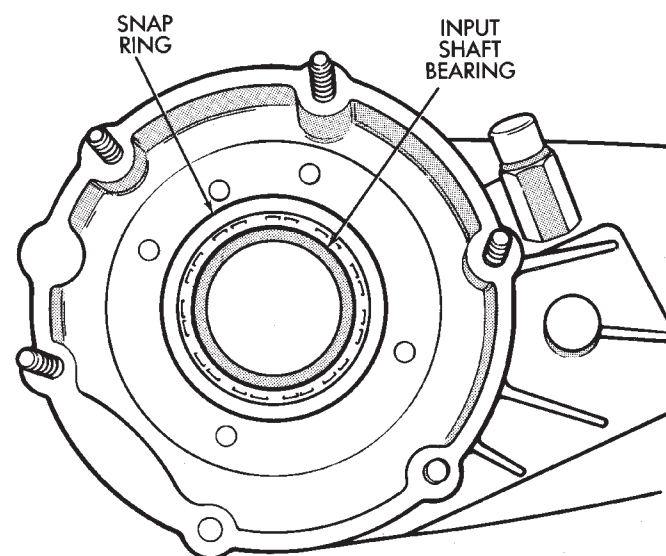
(6) Remove input gear bearing with Tool Handle C-4171 and Remover C-4210 (Fig. 50).

(7) Install snap-ring on new input gear bearing.

## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 47 Front Output Shaft Front Bearing Installation****Fig. 48 Remove Front Output Shaft Seal****Fig. 49 Install Front Output Shaft Seal**

(8) Install new input gear bearing with Tool Handle C-4171 and Remover C-4210. Install bearing far enough to seat snap-ring against case (Fig. 51).

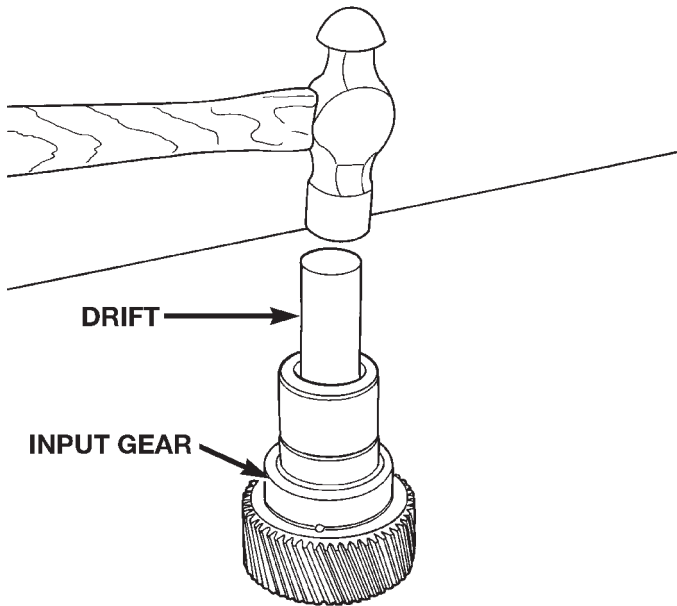
**Fig. 50 Input Gear Bearing Removal****Fig. 51 Seating Input Gear Bearing**

(9) Remove the input gear pilot bearing by inserting a suitably sized drift into the splined end of the input gear and driving the bearing out with the drift and a hammer (Fig. 52).

(10) Install new pilot bearing with Installer 8128 and Handle C-4171 (Fig. 53).

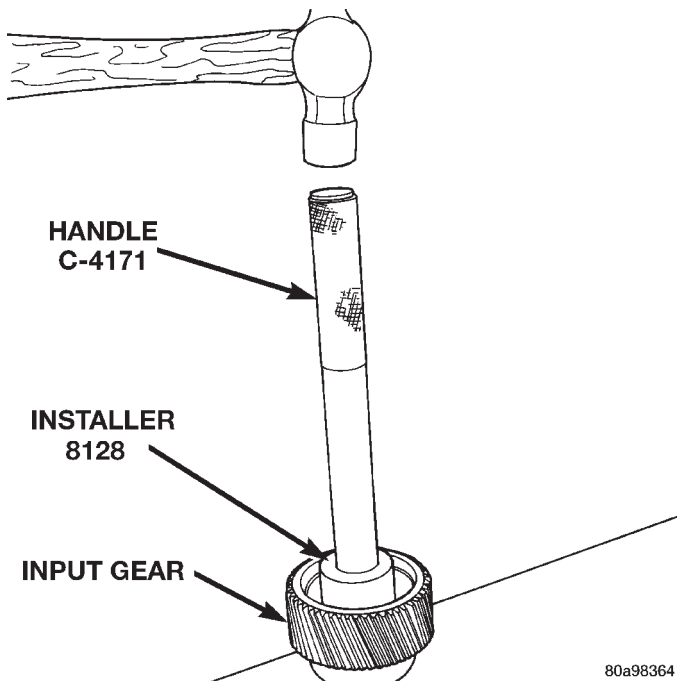
(11) Install new seal in front bearing retainer with Installer 7884 (Fig. 54).

# DISASSEMBLY AND ASSEMBLY (Continued)



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**Fig. 52 Remove Input Gear Pilot Bearing**



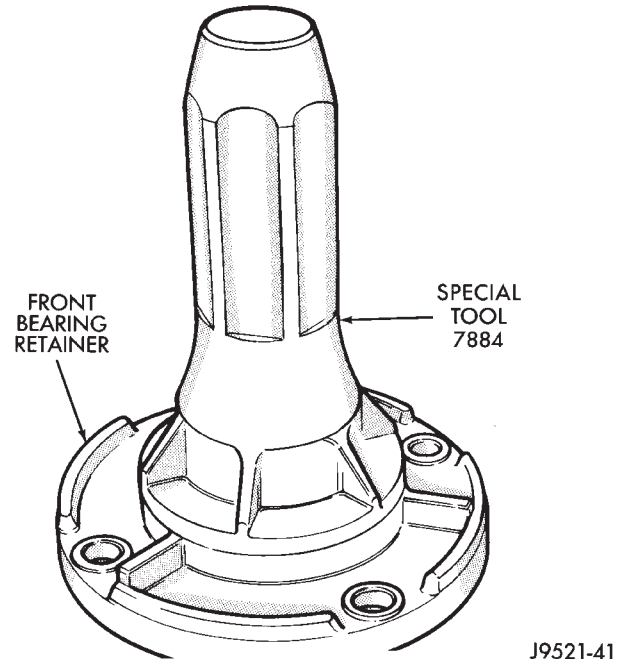
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**Fig. 53 Install Input Gear Pilot Bearing**

(12) Remove output shaft rear bearing with the screw and jaws from Remover L-4454 and Cup 8148 (Fig. 55).

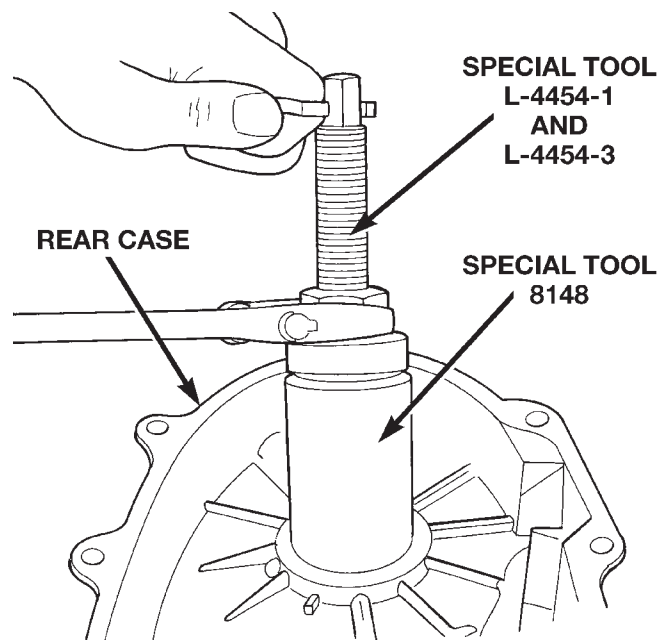
(13) Install new bearing with Tool Handle C-4171 and Installer 5066 (Fig. 56). Lubricate bearing after installation.

(14) Install new seal in oil pump feed housing with Special Tool 7888 (Fig. 57).



J9521-41

**Fig. 54 Front Bearing Retainer Seal Installation**



80a98366

**Fig. 55 Remove Front Output Shaft Rear Bearing**

(15) Install new pickup tube O-ring in oil pump (Fig. 58).

(16) Remove rear retainer bearing with Installer 8128 and Handle C-4171.

(17) Install rear bearing in retainer with Handle C-4171 and Installer 5064 (Fig. 59).

## DISASSEMBLY AND ASSEMBLY (Continued)

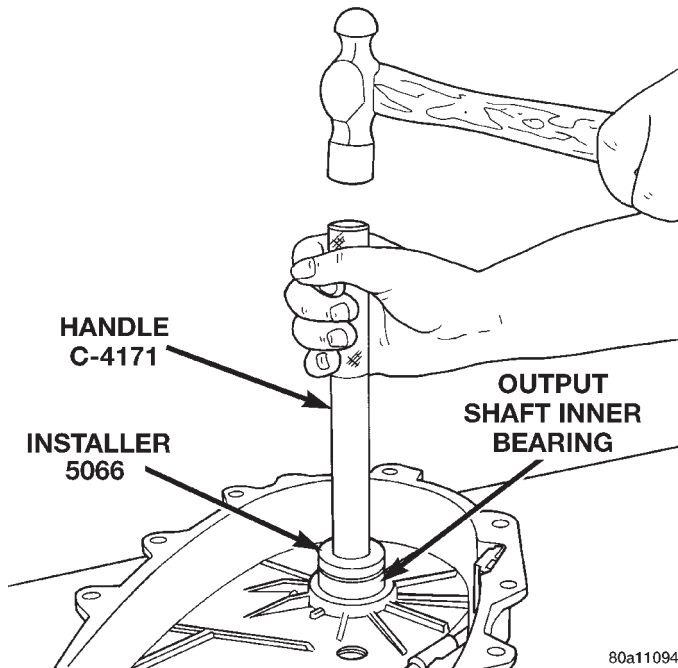


Fig. 56 Install Front Output Shaft Rear Bearing

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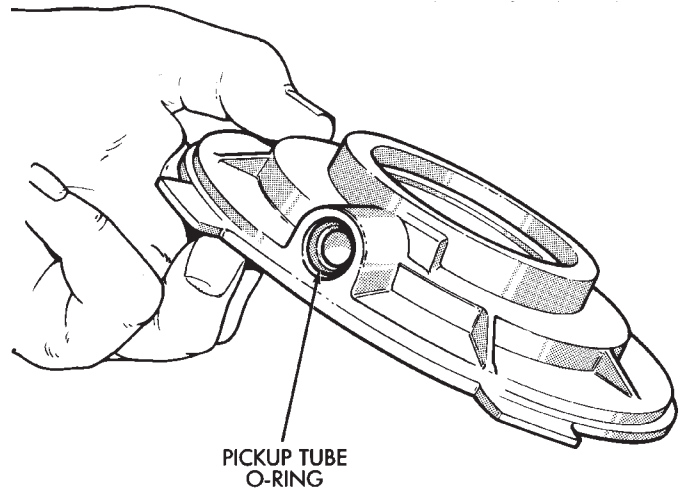


Fig. 58 Pickup Tube O-Ring Installation

J8921-286

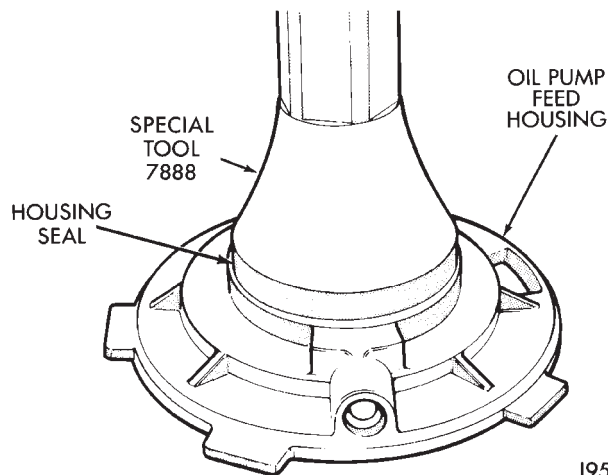


Fig. 57 Oil Pump Seal Installation

J9521-35

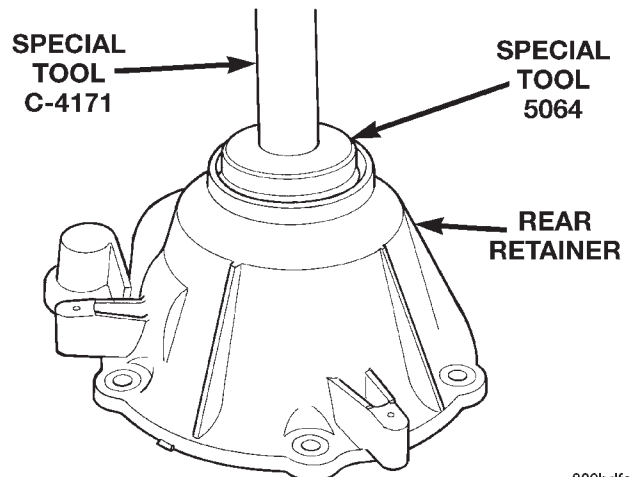


Fig. 59 Installing Rear Bearing In Retainer

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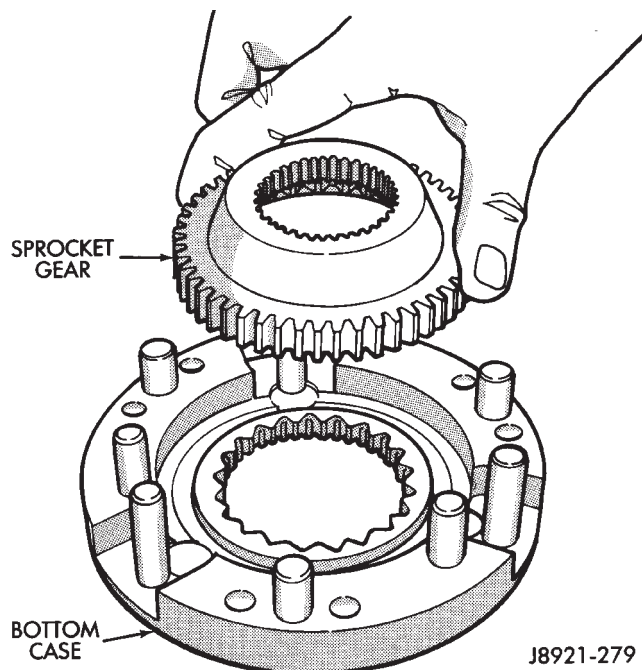
## DIFFERENTIAL

- (1) Lubricate differential components with automatic transmission fluid.
- (2) Install sprocket gear in differential bottom case (Fig. 60).

- (3) Install differential planet gears and new thrust washers (Fig. 61). **Be sure thrust washers are installed at top and bottom of each planet gear.**
- (4) Install differential mainshaft gear (Fig. 61).



# DISASSEMBLY AND ASSEMBLY (Continued)

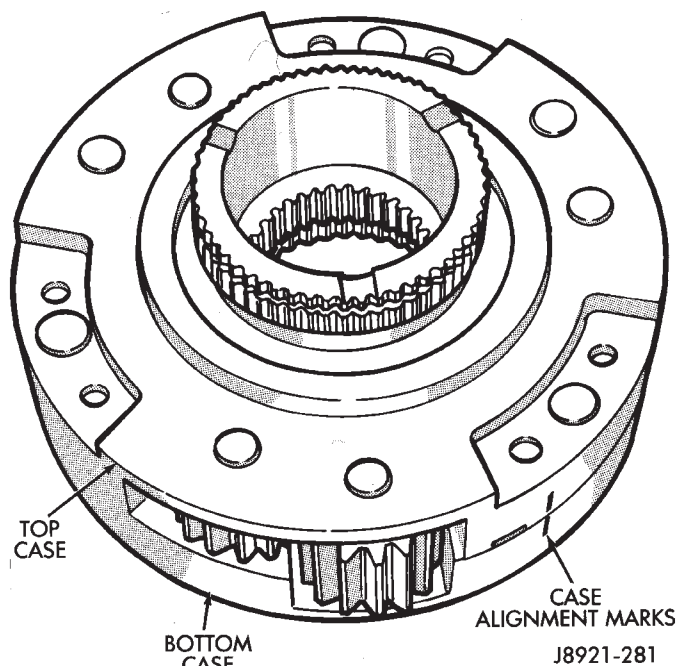


**Fig. 60 Installing Differential Sprocket Gear**

(5) Align and position differential top case on bottom case (Fig. 62). Align using scribe marks made at disassembly.

(6) While holding differential case halves together, invert the differential and start the differential case bolts.

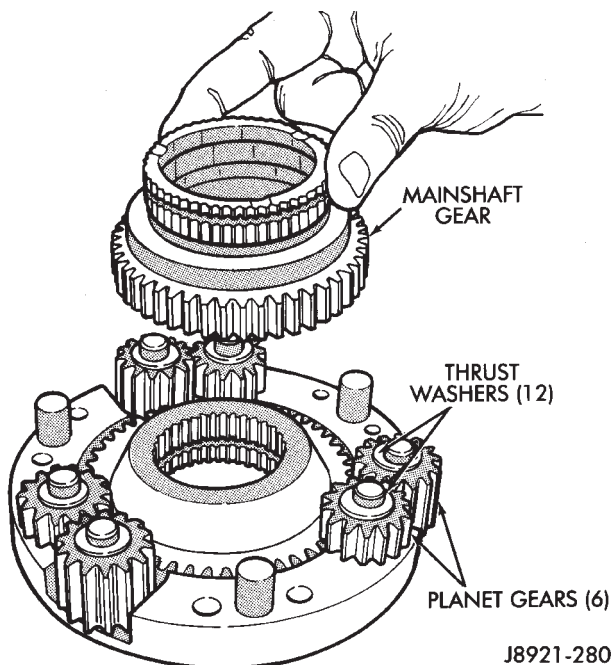
(7) Tighten differential case bolts to specified torque.



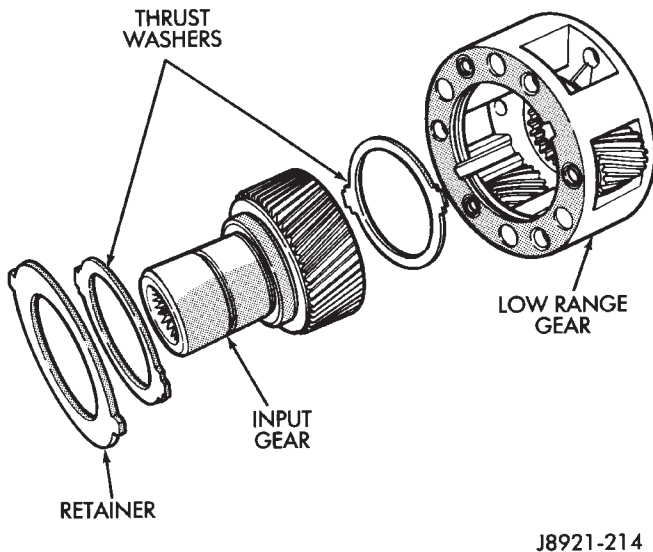
**Fig. 62 Differential Case Assembly**

## INPUT GEAR/LOW RANGE

- (1) Assemble low range gear, input gear thrust washers, input gear and input gear retainer (Fig. 63).
- (2) Install low range gear snap ring (Fig. 64).



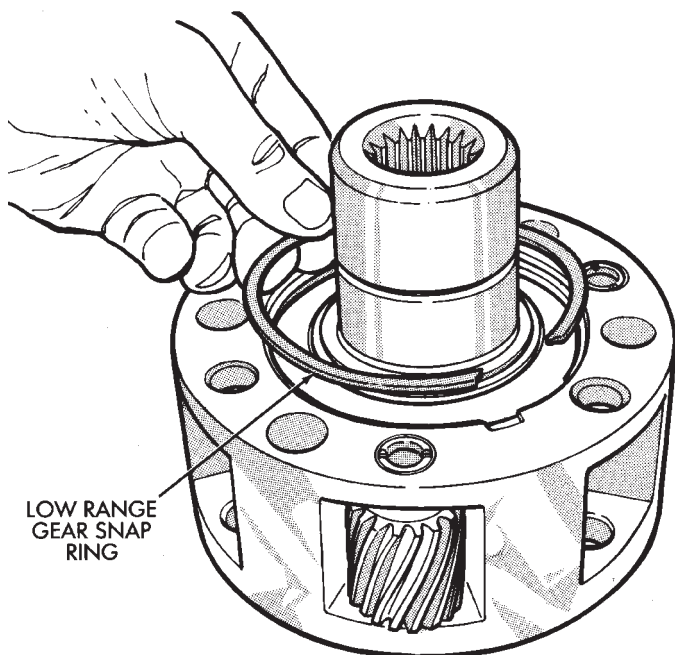
**Fig. 61 Installing Mainshaft And Planet Gears**



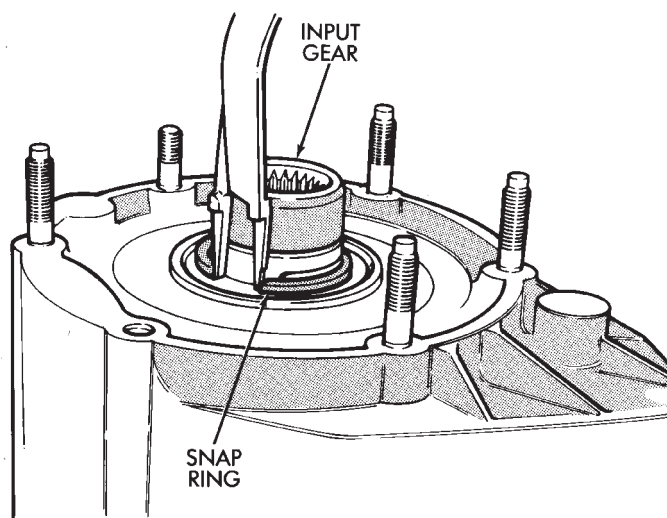
**Fig. 63 Low Range And Input Gear Assembly**

- (3) Lubricate input gear and low range gears with automatic transmission fluid.
- (4) Start input gear shaft into front case bearing.
- (5) Press input gear shaft into front bearing.
- (6) Install new input gear snap ring (Fig. 65).

## DISASSEMBLY AND ASSEMBLY (Continued)



J8921-269

**Fig. 64 Install Low Range Gear Snap Ring**

J8921-267

**Fig. 65 Input Gear Snap Ring Installation**

(7) Apply 3 mm (1/8 in.) wide bead of Mopar® gasket maker or silicone adhesive sealer to seal surface of front bearing retainer.

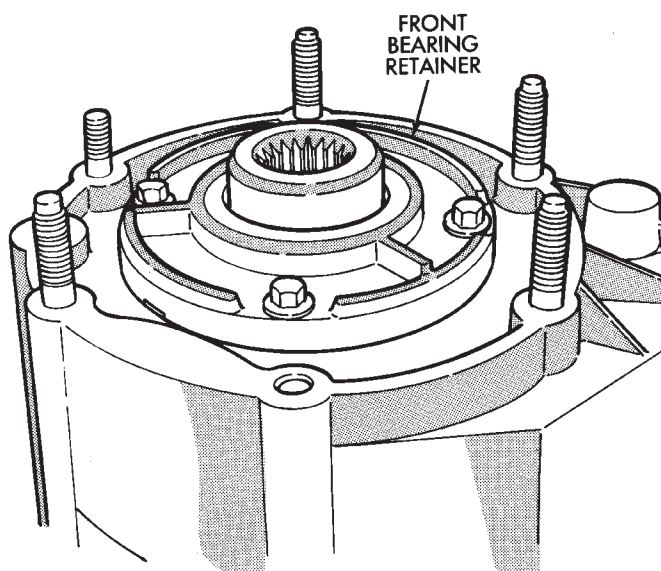
(8) Install front bearing retainer (Fig. 66). Tighten retainer bolts to 16 ft. lbs. (21 N-m) torque.

**SHIFT FORKS AND MAINSHAFT**

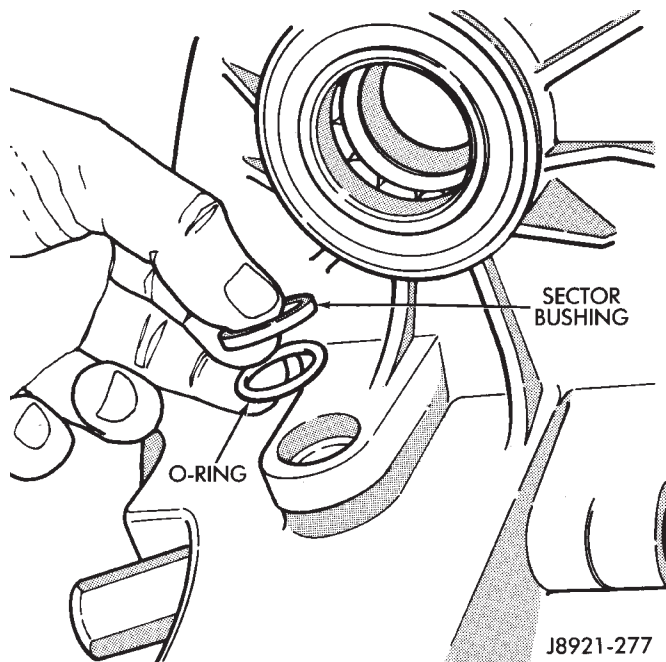
(1) Install new sector shaft O-ring and bushing (Fig. 67).

(2) Install shift sector.

(3) Install new pads on low range fork, if necessary, (Fig. 68).



J8921-276

**Fig. 66 Installing Front Bearing Retainer**

J8921-277

**Fig. 67 Sector O-Ring And Bushing Installation**

(4) Assemble low range fork and hub (Fig. 68).

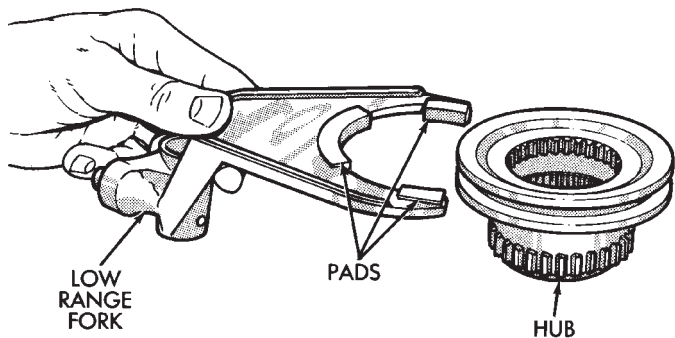
(5) Position low range fork and hub in case. Be sure low range fork pin is engaged in shift sector slot (Fig. 69).

(6) Install first mainshaft bearing spacer on mainshaft (Fig. 70).

(7) Install bearing rollers on mainshaft (Fig. 70). **Coat bearing rollers with generous quantity of petroleum jelly to hold them in place.**

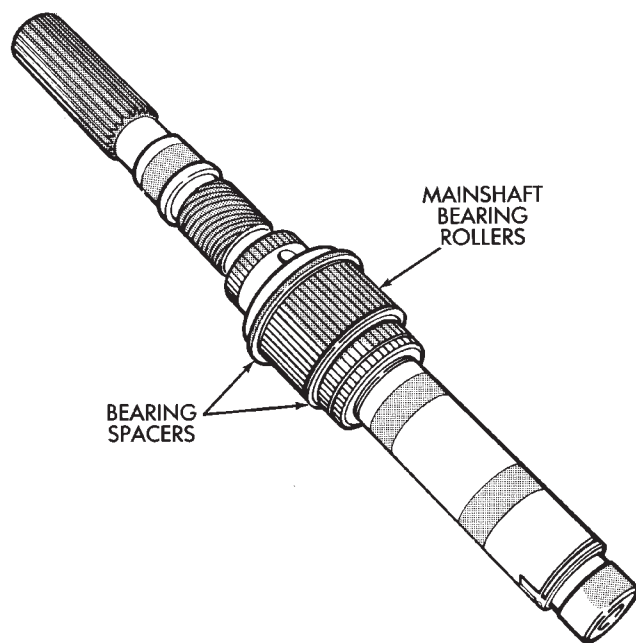
(8) Install remaining bearing spacer on mainshaft (Fig. 70). Do not displace any bearings while installing spacer.

# DISASSEMBLY AND ASSEMBLY (Continued)



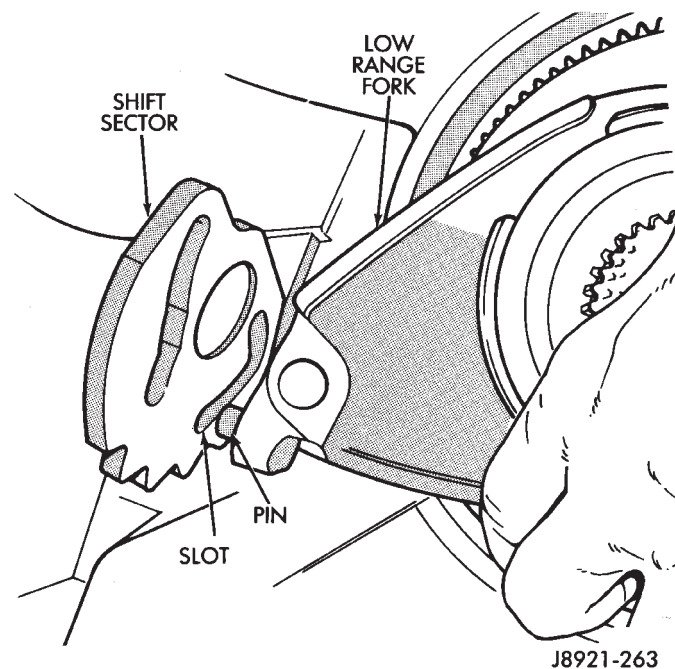
J8921-278

**Fig. 68 Assembling Low Range Fork And Hub**



J8921-282

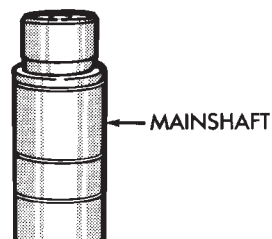
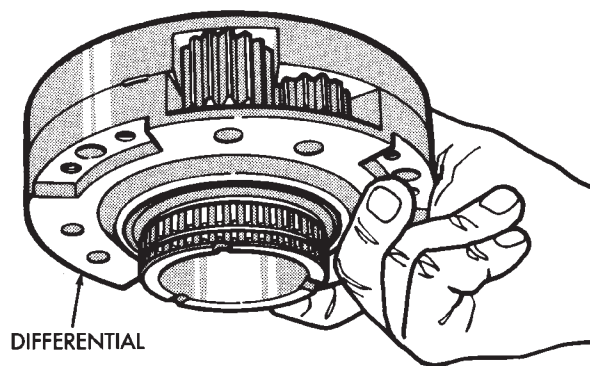
**Fig. 70 Installing Mainshaft Bearing Rollers and Spacers**



J8921-263

**Fig. 69 Positioning Low Range Fork**

- (9) Install differential (Fig. 71). **Do not displace mainshaft bearings when installing differential.**
- (10) Install differential snap-ring (Fig. 72).
- (11) Install intermediate clutch shaft (Fig. 73).
- (12) Install clutch shaft thrust washer (Fig. 74).

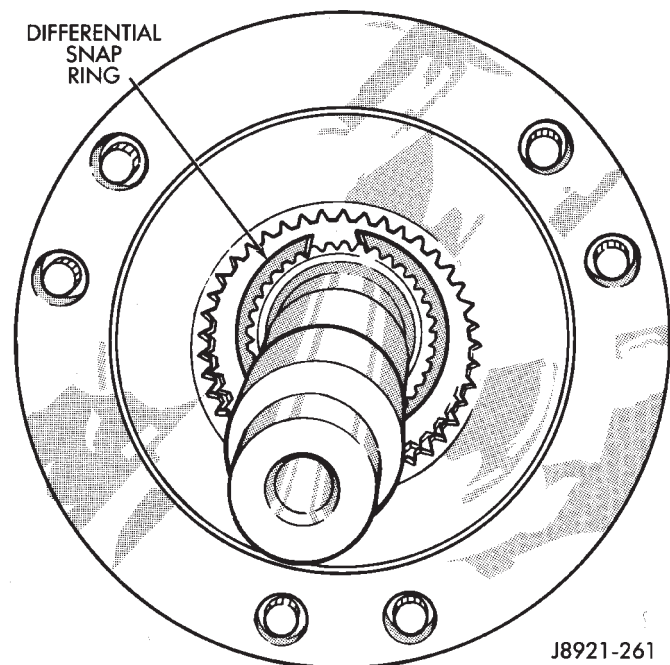


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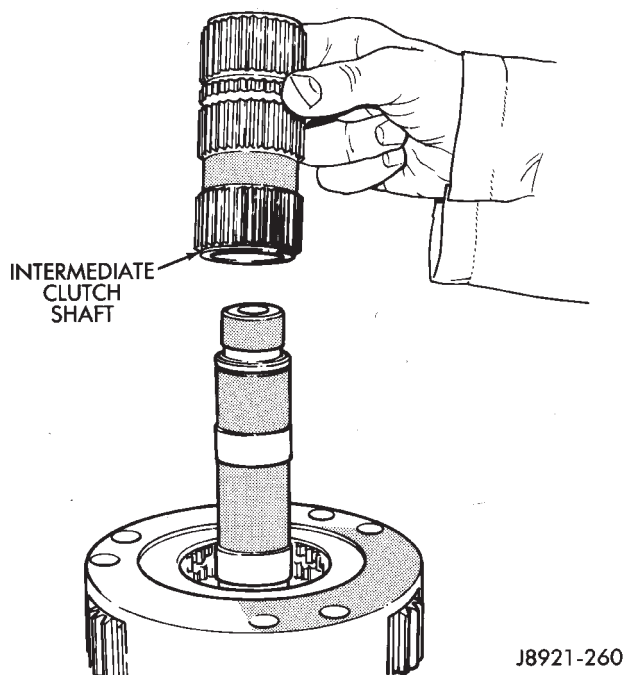
**Fig. 71 Differential Installation**



## DISASSEMBLY AND ASSEMBLY (Continued)

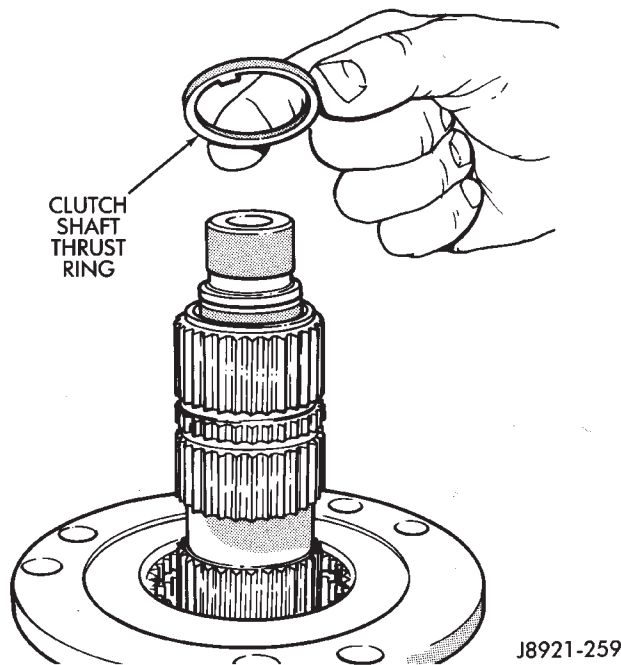


**Fig. 72 Installing Differential Snap-Ring**

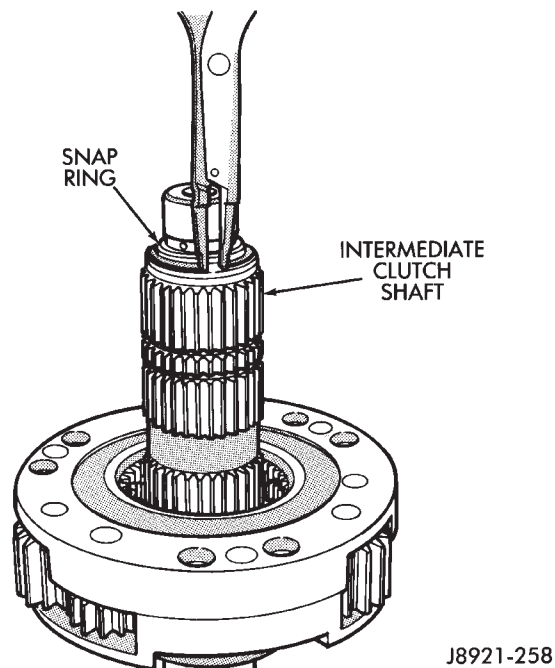


**Fig. 73 Installing Intermediate Clutch Shaft**

- (13) Install clutch shaft snap-ring (Fig. 75).  
 (14) Inspect mode fork assembly (Fig. 76). Replace pads and bushing if necessary. Replace fork tube if bushings inside tube are worn or damaged. Also check springs and slider bracket (Fig. 76). Replace worn, damaged components.



**Fig. 74 Installing Clutch Shaft Thrust Washer**



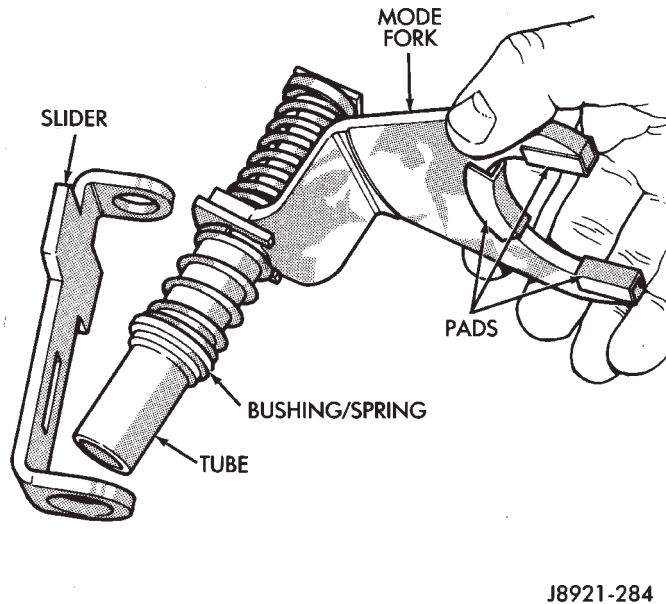
**Fig. 75 Installing Clutch Shaft Snap-Ring**

- (15) Install mode sleeve in mode fork (Fig. 77). Then install assembled sleeve and fork on mainshaft. Be sure mode sleeve splines are engaged in differential splines.

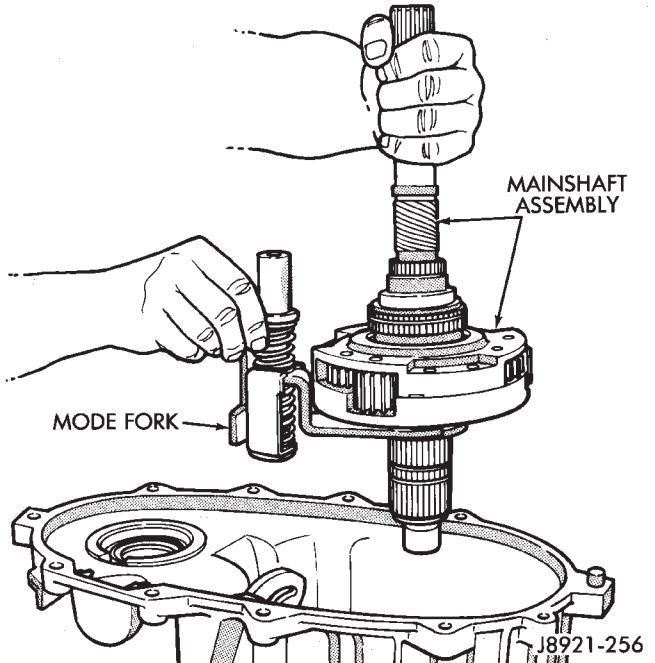
- (16) Install mode fork and mainshaft assembly in case (Fig. 78). Rotate mainshaft slightly to engage shaft with low range gears.



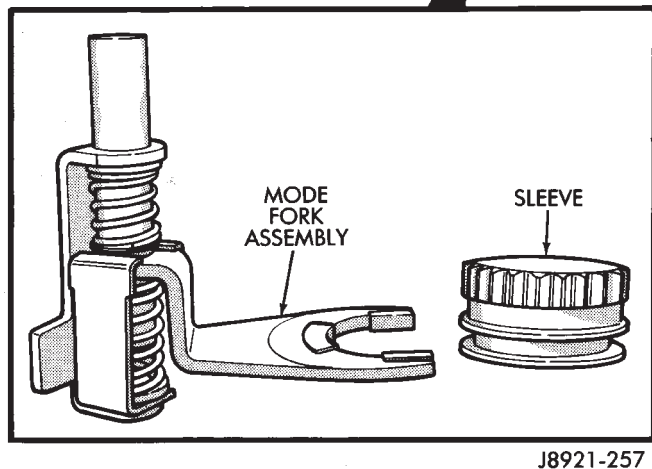
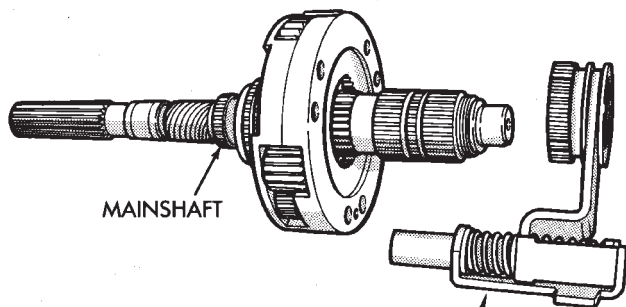
# DISASSEMBLY AND ASSEMBLY (Continued)



**Fig. 76 Mode Fork Assembly Inspection**

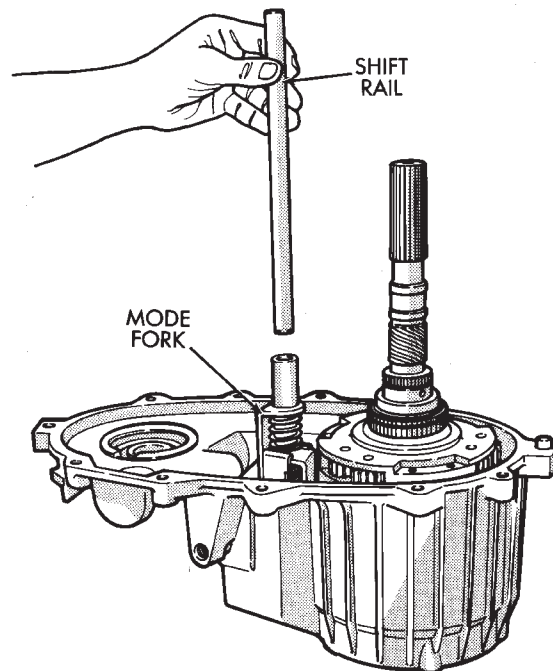


**Fig. 78 Assembled Mainshaft And Mode Fork Installation**



**Fig. 77 Installing Mode Fork And Sleeve**

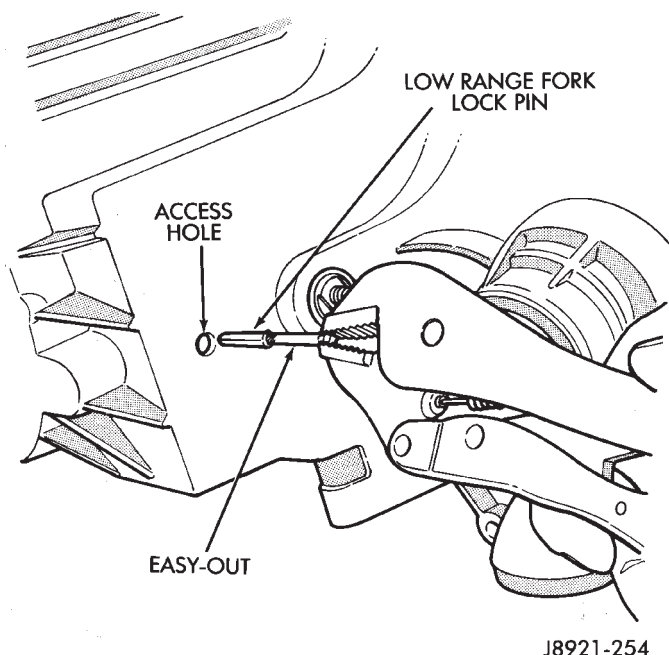
- (17) Rotate mode fork pin into shift sector slot.
- (18) Install shift rail (Fig. 79). **Be sure rail is seated in both shift forks.**
- (19) Rotate shift sector to align lockpin hole in low range fork with access hole in case.



**Fig. 79 Shift Rail Installation**

- (22) Install plug in lockpin access hole.

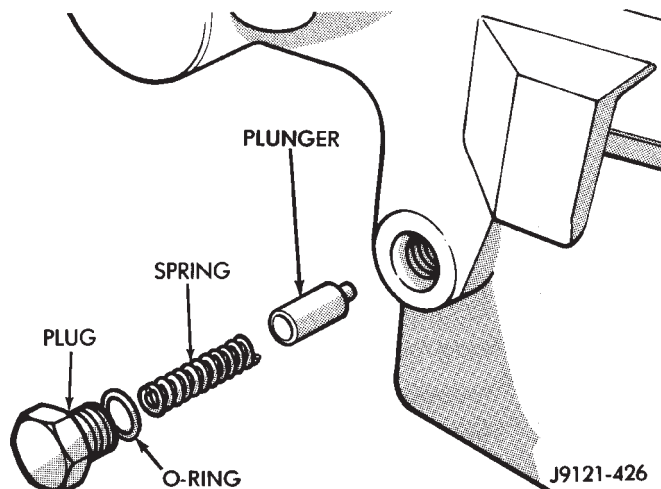
## DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 80 Installing Low Range Fork Lockpin**

(23) Install detent plunger, detent spring and detent plug in case (Fig. 81).

**FRONT OUTPUT SHAFT AND DRIVE CHAIN**

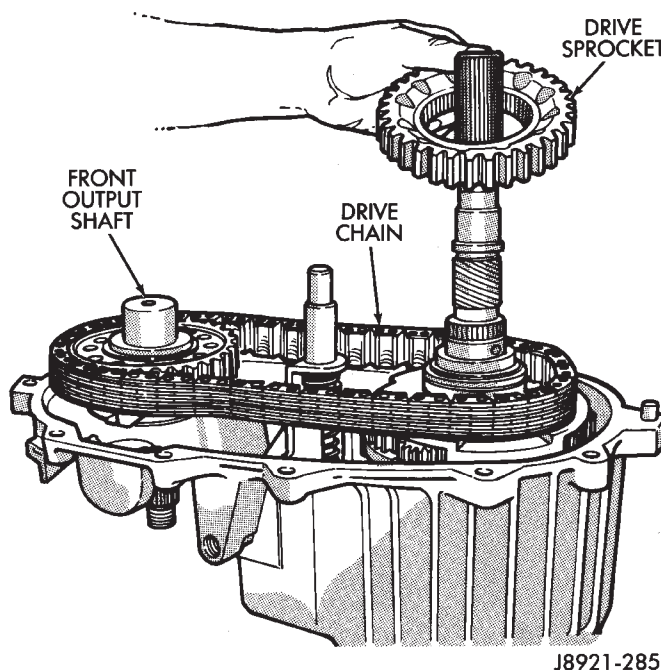
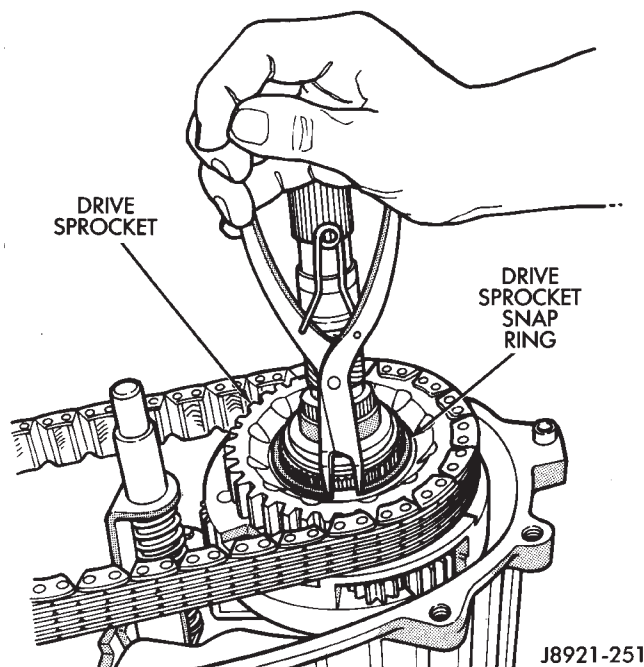
- (1) Install front output shaft (Fig. 82).
- (2) Install drive chain (Fig. 82). Engage chain with front output shaft sprocket teeth.
- (3) Install drive sprocket (Fig. 82). Engage drive sprocket teeth with chain. Then engage sprocket splines with mainshaft splines.

**Fig. 81 Detent Pin, Spring And Plug Installation**

- (4) Install drive sprocket snap-ring (Fig. 83).

**OIL PUMP AND REAR CASE**

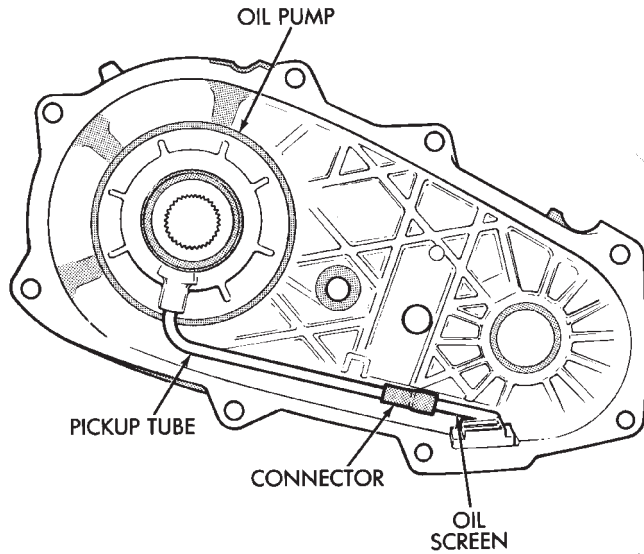
- (1) Insert oil pickup tube in oil pump and attach oil screen and connector hose to pickup tube. Then install assembled pump, tube and screen in rear case

**Fig. 82 Drive Chain And Sprocket Installation****Fig. 83 Drive Sprocket Snap-Ring Installation**

(Fig. 84). Be sure screen is seated in case slot as shown.

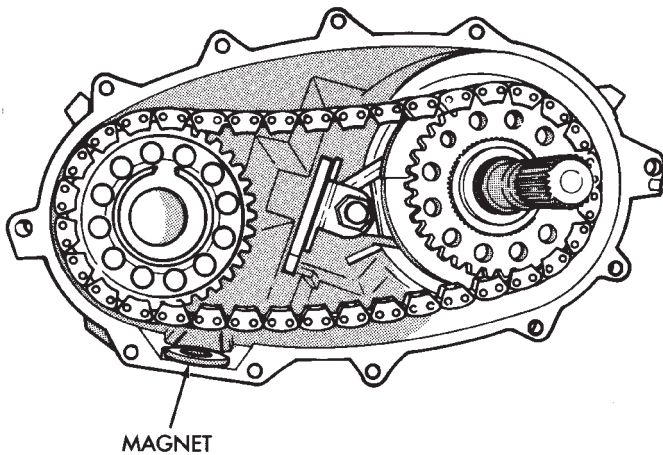
- (2) Install magnet in front case pocket (Fig. 85).
- (3) Apply 3 mm (1/8 in.) wide bead of Mopar gasket maker or silicone adhesive sealer to seal surface of front case.
- (4) Align and install rear case on front case. Be sure case locating dowels are in place and that mainshaft splines are engaged in oil pump inner gear.

# DISASSEMBLY AND ASSEMBLY (Continued)



J8921-287

**Fig. 84 Oil Screen And Pickup Tube Installation**



J8921-288

**Fig. 85 Installing Case Magnet**

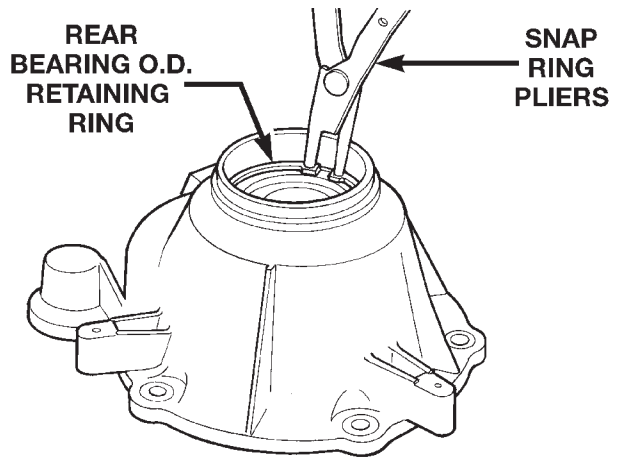
(5) Install and tighten front case-to-rear case bolts to 41 N·m (30 ft. lbs.) torque. **Be sure to install a washer under each bolt used at case dowel locations.**

## REAR RETAINER

(1) Install rear bearing O.D. retaining ring with snap-ring pliers (Fig. 86). Be sure retaining ring is fully seated in retainer groove.

(2) Apply bead of Mopar® Sealer P/N 82300234, or Loctite® Ultra Gray, to mating surface of rear retainer. Sealer bead should be a maximum of 3/16 in.

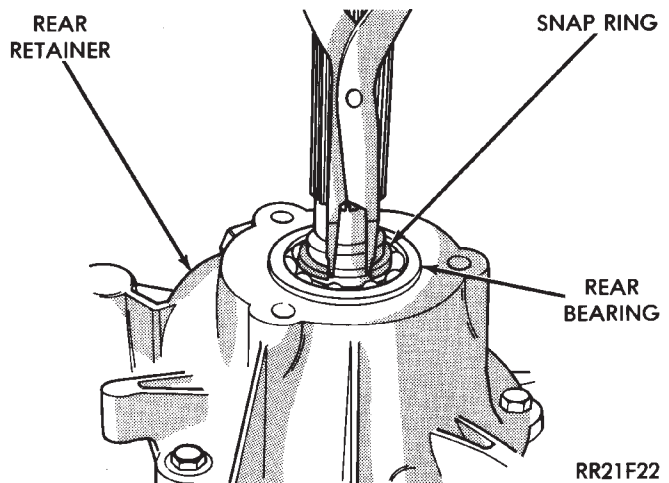
(3) Install rear retainer on rear case. Tighten retainer bolts to 20–27 N·m (15–20 ft. lbs.) torque.



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**Fig. 86 Rear Bearing Retaining Ring Installation**

(4) Install new output shaft bearing snap-ring (Fig. 87). Lift mainshaft slightly to seat snap-ring in shaft groove, if necessary.



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**Fig. 87 Install Output Bearing Snap-ring**

(5) Apply 3 mm (1/8 in.) wide bead of Mopar® gasket maker or silicone adhesive sealer to mounting surface of extension housing. Allow sealer to set-up slightly before proceeding.

(6) Install extension housing on rear retainer.

(7) Install extension housing bolts and tighten to 35–46 N·m (26–34 ft. lbs.).

## FRONT YOKE AND SWITCH

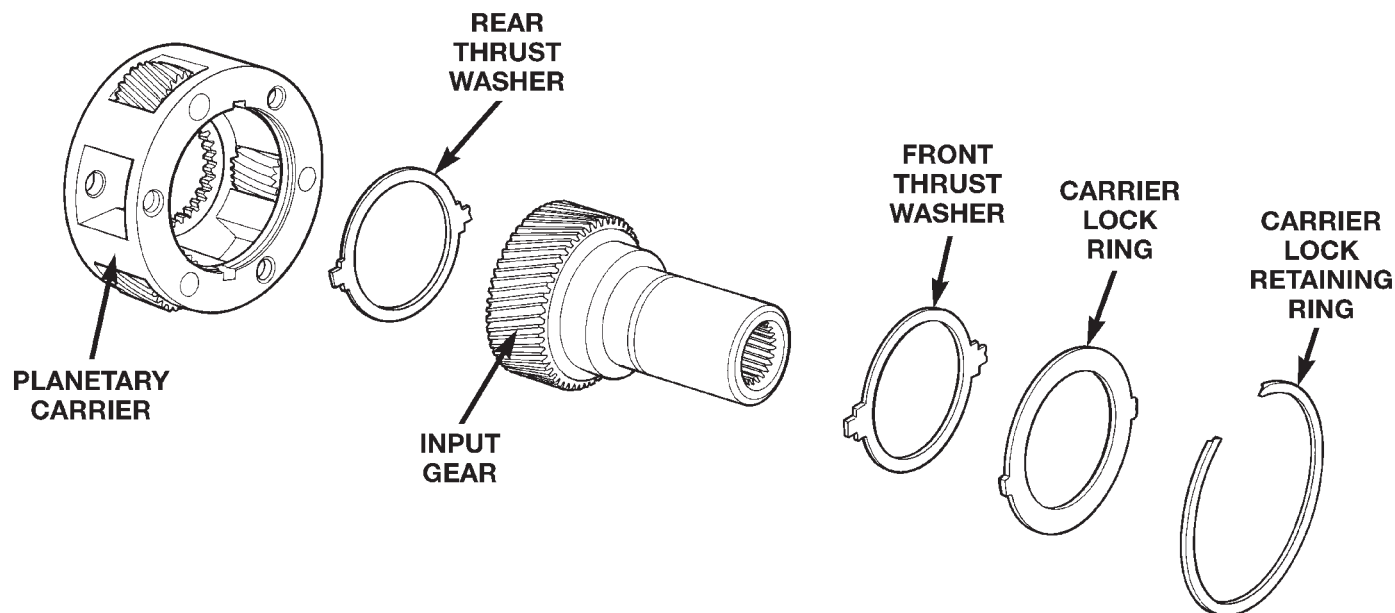
(1) Install indicator switch in front case. Tighten switch to 20–34 N·m (15–25 ft. lbs.) torque.

(2) Lubricate yoke hub with transmission fluid and install yoke on front shaft.

(3) Install new seal washer on front shaft.

(4) Install yoke on front shaft. Secure yoke with new nut.

## DISASSEMBLY AND ASSEMBLY (Continued)



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**Fig. 88 Input Gear And Carrier Components****CLEANING AND INSPECTION****NV242 TRANSFER CASE**

Clean the transfer case parts with a standard parts cleaning solvent. Remove all traces of sealer from the cases and retainers with a scraper and all purpose cleaner. Use compressed air to remove solvent residue from oil feed passages in the case halves, retainers, gears, and shafts.

The oil pickup screen can be cleaned with solvent. Shake excess solvent from the screen after cleaning and allow it to air dry. Do not use compressed air.

**MAINSHAFT/SPROCKET/HUB INSPECTION**

Inspect the splines on the hub and shaft and the teeth on the sprocket. Minor nicks and scratches can be smoothed with an oilstone. However, replace any part is damaged.

Check the contact surfaces in the sprocket bore and on the mainshaft. Minor nicks and scratches can be smoothed with 320–400 grit emery cloth but do not try to salvage the shaft if nicks or wear is severe.

**INPUT GEAR AND PLANETARY CARRIER**

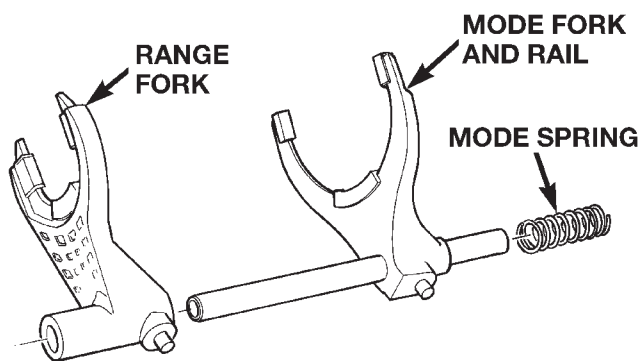
Check the teeth on the gear (Fig. 88). Minor nicks can be dressed off with an oilstone but replace the gear if any teeth are broken, cracked, or chipped. The bearing surface on the gear can be smoothed with 300–400 grit emery cloth if necessary.

Examine the carrier body and pinion gears for wear or damage. The carrier will have to be replaced as an assembly if the body, pinion pins, or pinion gears are damaged.

Check the lock ring and both thrust washers for wear or cracks. Replace them if necessary. Also replace the lock retaining ring if bent, distorted, or broken.

**SHIFT FORKS/HUBS/SLEEVES**

Check condition of the shift forks and mode fork shift rail (Fig. 89). Minor nicks on the shift rail can be smoothed with 320–400 grit emery cloth.



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**Fig. 89 Shift forks**

Inspect the shift fork wear pads. The mode fork pads are serviceable and can be replaced if necessary. The range fork pads are also serviceable.

Check both of the sleeves for wear or damage, especially on the interior teeth. Replace the sleeves if wear or damage is evident.



## CLEANING AND INSPECTION (Continued)

**REAR RETAINER AND EXTENSION HOUSING**

Inspect the retainer components. Replace the bearing if rough or noisy. Check the retainer for cracks or wear in the bearing bore. Clean the retainer sealing surfaces with a scraper and all purpose cleaner. This will ensure proper adhesion of the sealer during reassembly.

Inspect the retaining rings and washers. Replace any part if distorted, bent, or broken. Reuse is not recommended.

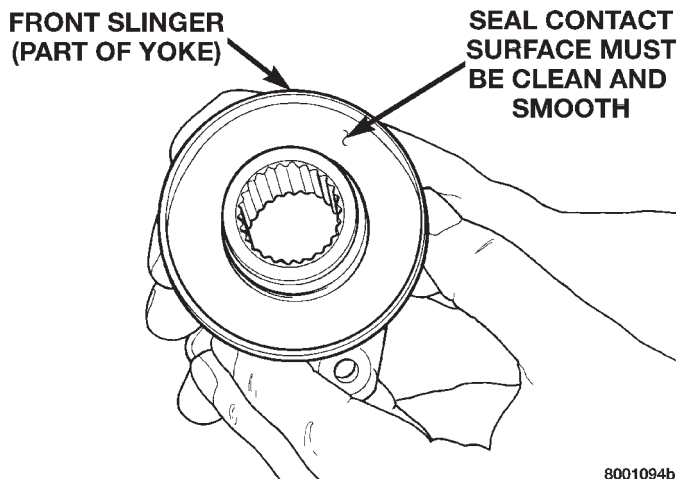
Inspect the extension housing seal and bushing. Replace both components if either show any sign of wear or damage.

**FRONT OUTPUT SHAFT/YOKE/DRIVE CHAIN**

Check condition of the seal contact surfaces of the yoke slinger (Fig. 90). This surface must be clean and smooth to ensure proper seal life. Replace the yoke nut and seal washer as neither part should be reused.

Inspect the shaft threads, sprocket teeth, and bearing surfaces. Minor nicks on the teeth can be smoothed with an oilstone. Use 320–400 grit emery to smooth minor scratches on the shaft bearing surfaces. Rough threads on the shaft can be chased if necessary. Replace the shaft if the threads are damaged, bearing surfaces are scored, or if any sprocket teeth are cracked or broken.

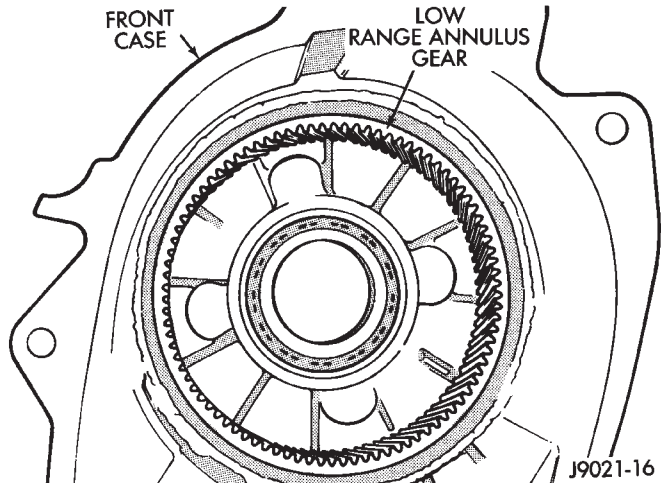
Examine the drive chain and shaft bearings. Replace the chain and both sprockets if the chain is stretched, distorted, or if any of the links bind. Replace the bearings if rough, or noisy.



**Fig. 90 Seal Contact Surface Of Yoke Slinger**

**LOW RANGE ANNULUS GEAR**

Inspect annulus gear condition carefully. The gear is only serviced as part of the front case. If the gear is damaged, it will be necessary to replace the gear and front case as an assembly. Do not attempt to remove the gear (Fig. 91).



**Fig. 91 Low Range Annulus Gear**

**FRONT-REAR CASES AND FRONT RETAINER**

Inspect the cases and retainer for wear and damage. Clean the sealing surfaces with a scraper and all purpose cleaner. This will ensure proper sealer adhesion at assembly. Replace the input retainer seal; do not reuse it.

Check case condition. If leaks were a problem, look for gouges and severe scoring of case sealing surfaces. Also make sure the front case mounting studs are in good condition.

Check the front case mounting studs and vent tube. The tube can be secured with Loctite<sup>™</sup> 271 or 680 if loose. The stud threads can be cleaned up with a die if necessary. Also check condition of the fill/drain plug threads in the rear case. The threads can be repaired with a thread chaser or tap if necessary. Or the threads can be repaired with Helicoil stainless steel inserts if required.

**OIL PUMP/OIL PICKUP**

Examine the oil pump pickup parts. Replace the pump if any part appears to be worn or damaged. Do not disassemble the pump as individual parts are not available. The pump is only available as a complete assembly. The pickup screen, hose, and tube are the only serviceable parts and are available separately.

**ADJUSTMENTS****SHIFT LINKAGE ADJUSTMENT**

- (1) Shift transfer case into 4L position.
- (2) Secure shift lever in 4L position. Use wire, or tape to hold lever in place if necessary.
- (3) Raise vehicle.
- (4) Loosen lock bolt that secures shift rod in adjusting swivel (Fig. 92).
- (5) Make sure shift rod slides freely in adjusting swivel. Lube rod and swivel if necessary.

ADJUSTMENTS (Continued)

- (6) Verify that transfer case range lever is in 4L detent.
- (7) Center pin on adjusting swivel in shift arm and tighten lock bolt to 10 N·m (90 in. lbs.) torque.
- (8) Lower vehicle just enough to enter vehicle. Be sure all wheels are off shop floor. Then start engine, shift transmission into gear, and shift transfer case through all ranges to verify correct adjustment.

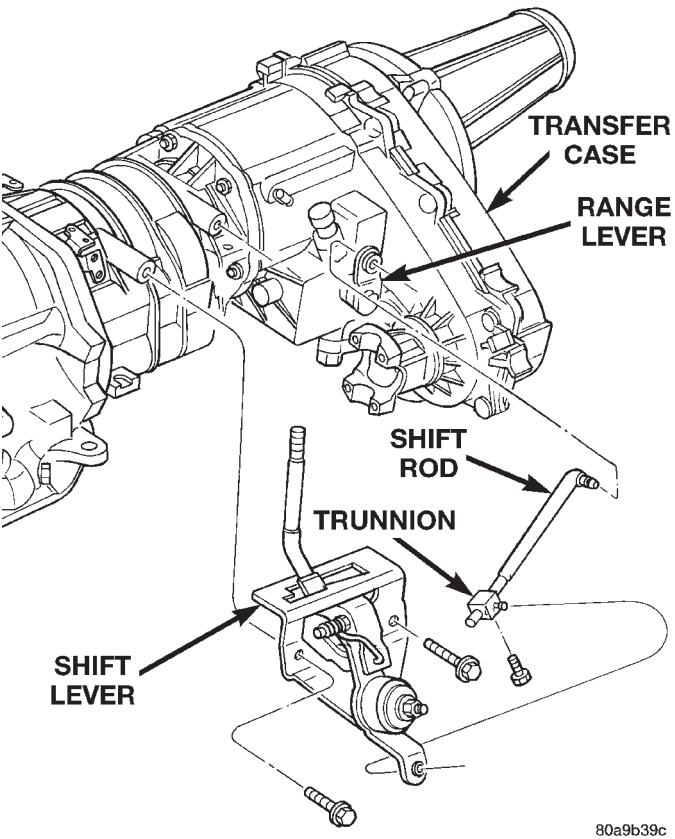


Fig. 92 Transfer Case Shift Linkage

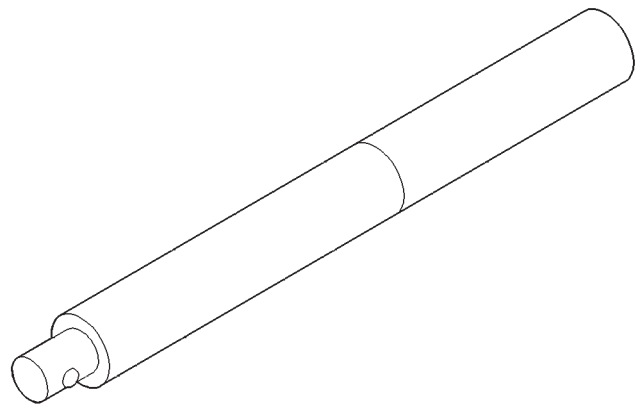
SPECIFICATIONS

TORQUE

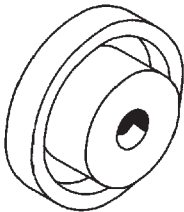
DESCRIPTION	TORQUE
Plug, Detent . . . . .	16–24 N·m (12–18 ft. lbs.)
Bolt, Diff. Case . . . . .	17–27 N·m (15–24 ft. lbs.)
Plug, Drain/Fill . . . . .	20–25 N·m (15–25 ft. lbs.)
Bolt, Front Brg. Retainer . . . . .	16–27 N·m (12–20 ft. lbs.)
Bolt, Case Half . . . . .	35–46 N·m (26–34 ft. lbs.)
Nut, Front Yoke . . . . .	122–176 N·m (90–130 ft. lbs.)
Screw, Oil Pump . . . . .	1.2–1.8 N·m (12–15 in. lbs.)
Nut, Range Lever . . . . .	27–34 N·m (20–25 ft. lbs.)
Bolt, Rear Retainer . . . . .	35–46 N·m (26–34 ft. lbs.)
Nuts, Mounting . . . . .	35 N·m (26 ft. lbs.)
Bolts, U-Joint . . . . .	19 N·m (17 ft. lbs.)

SPECIAL TOOLS

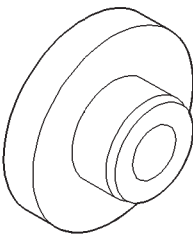
NV242



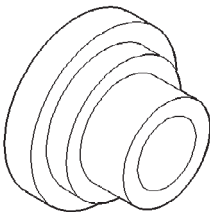
Handle, Universal—C-4171



Remover—C-4210

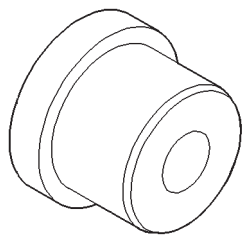


Installer, Bearing—5064

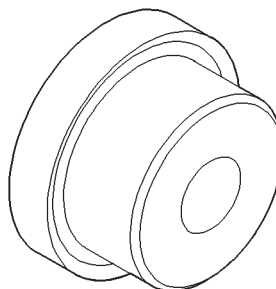


Installer—8128

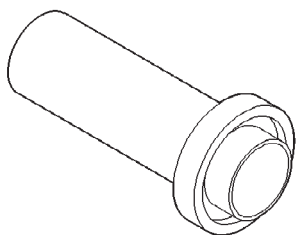
SPECIAL TOOLS (Continued)



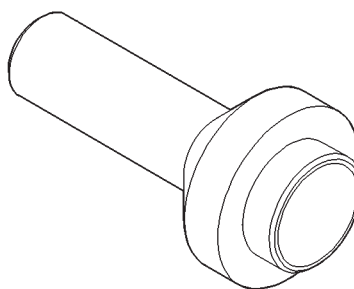
***Installer—5066***



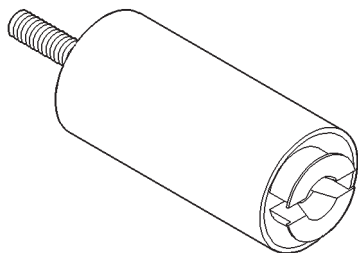
***Installer, Input Gear Bearing—7829-A***



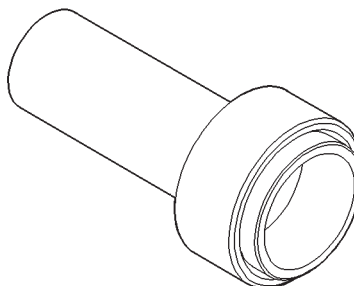
***Installer—6952-A***



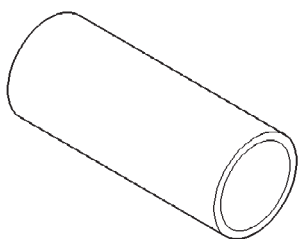
***Installer, Seal—7884***



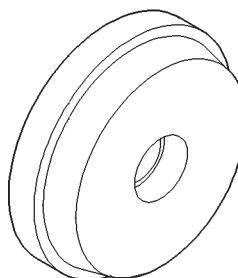
***Remover—L-4454***



***Installer, Pump Housing Seal—7888***

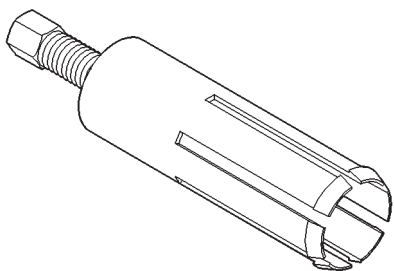
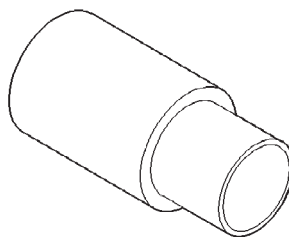


***Cup—8148***



***Installer, Bearing—8033-A***

## SPECIAL TOOLS (Continued)

***Remover, Bushing—6957******Installer, Bushing—8160***