# TRANSMISSION AND TRANSFER CASE

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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 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)

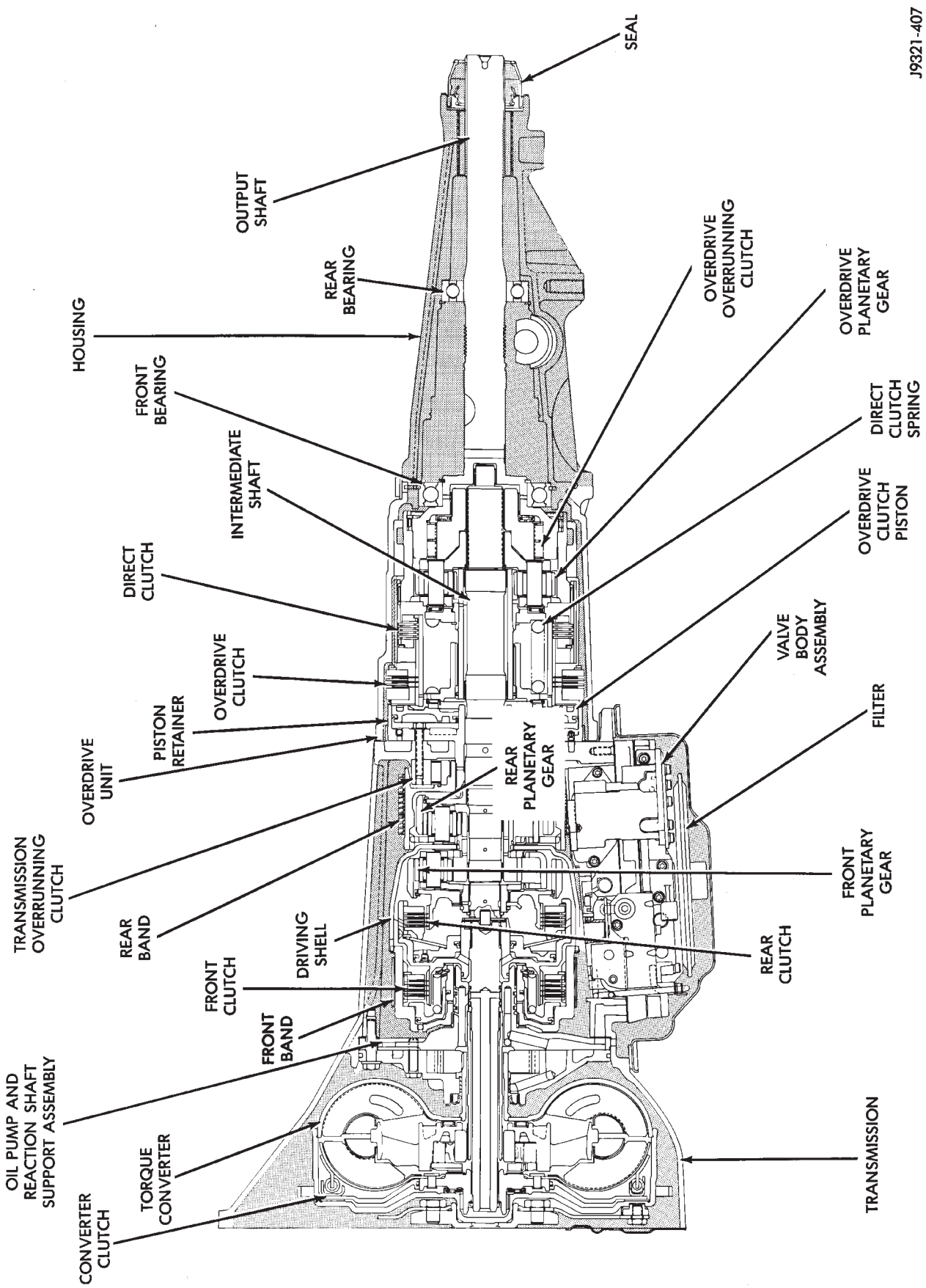


*Fig. 1 42/44 RE Transmission*

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.

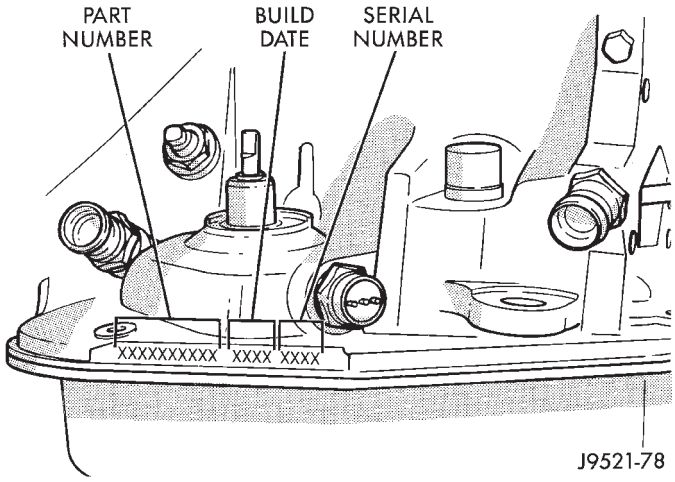


*Fig. 2 Transmission Part And Serial NumberLocation*

## RECOMMENDED FLUID

Mopar® ATF Plus, 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.**

## 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.

DESCRIPTION AND OPERATION (Continued)

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.

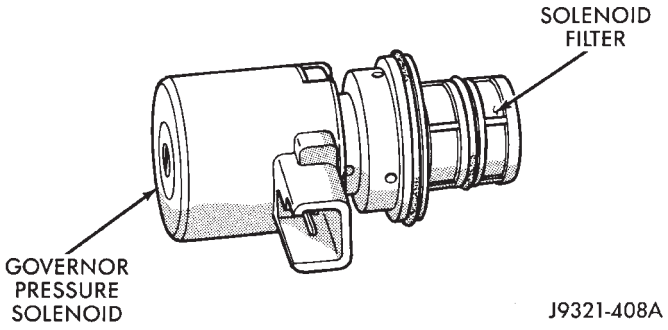


***Fig. 3 Governor Pressure Solenoid Valve***

### 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.

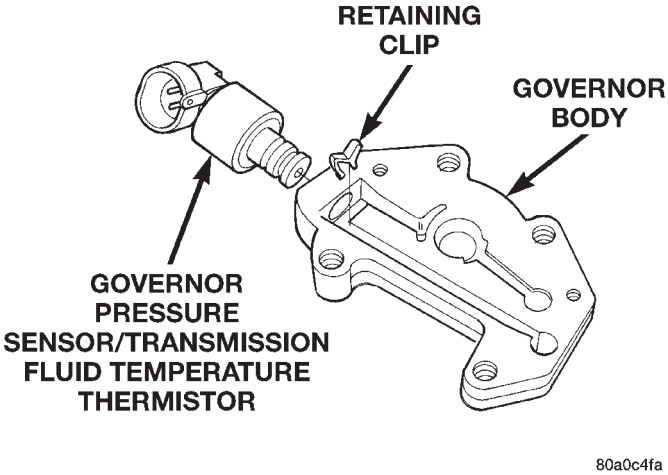


***Fig. 4 Governor Pressure Sensor***

### 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.

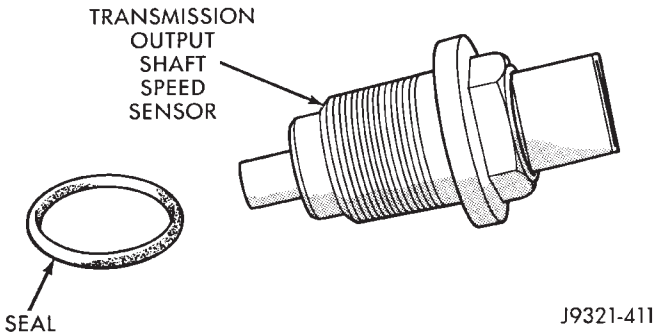


***Fig. 5 Transmission Output Speed Sensor***

DESCRIPTION AND OPERATION (Continued)

*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.

## 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 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.

DESCRIPTION AND OPERATION (Continued)

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 in the instrument panel. 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 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.

### 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.

### BRAKE TRANSMISSION SHIFT INTERLOCK MECHANISM

The Brake Transmission Shifter/Ignition Interlock (BTSI), is a cable and solenoid operated system. It interconnects the automatic transmission floor mounted shifter to the steering column ignition switch (Fig. 6). The system locks the shifter into the PARK position. The Interlock system is engaged whenever the ignition switch is in the LOCK or ACCESSORY position. An additional electrically activated feature will prevent shifting out of the PARK position unless the brake pedal is depressed at least one-half an inch. A magnetic holding device in line with the park lock cable is enegized in PARK when the ignition is in the OFF-LOCK position.When the key is in the OFF or RUN position and the brake pedal is depressed, the shifter is unlocked and will move into any position. The interlock system also prevents the ignition switch from being turned to the LOCK or ACCESSORY position (Fig. 7). Unless the shifter is fully locked into the PARK position.

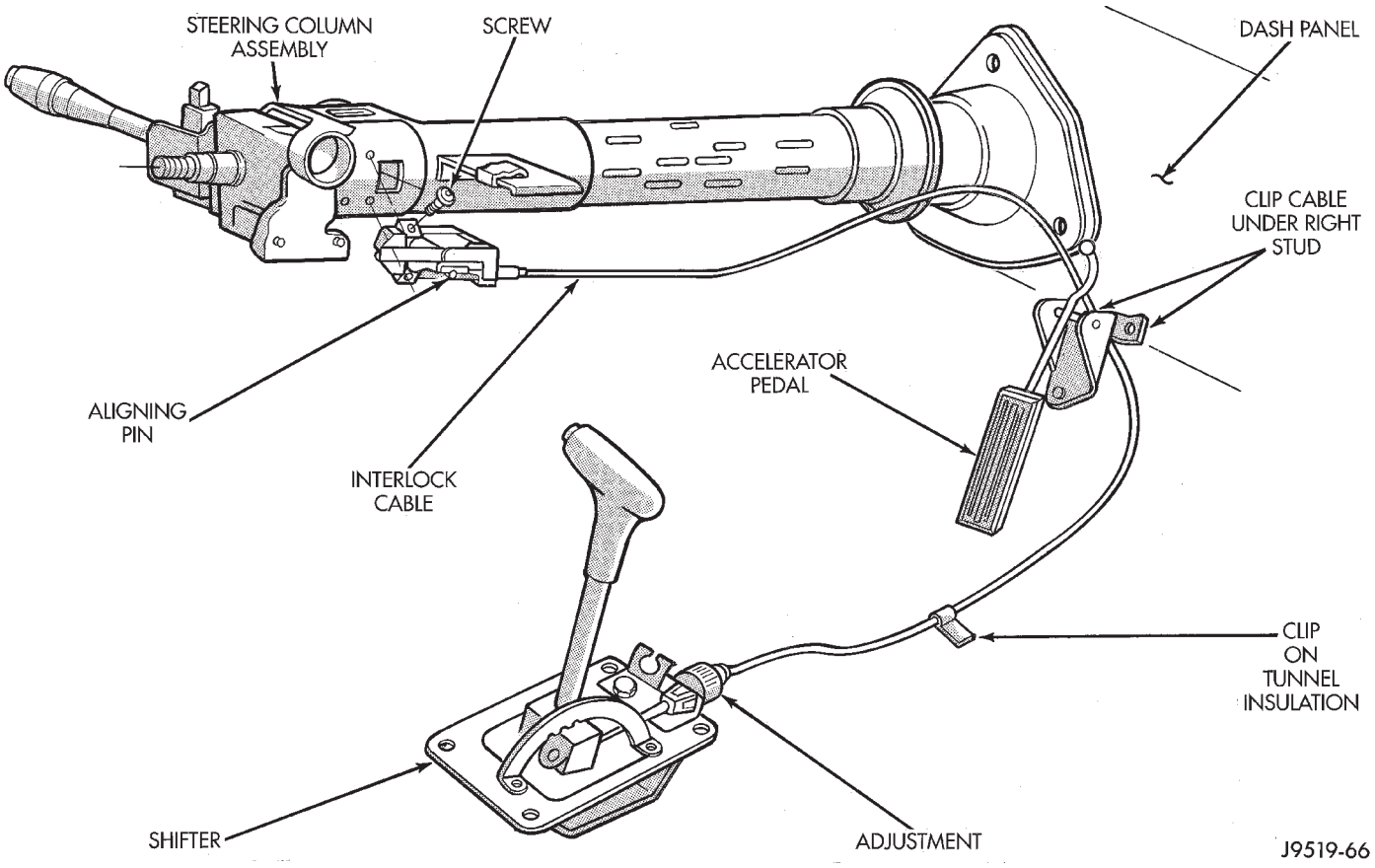


*Fig. 6 Ignition Interlock Cable Routing*

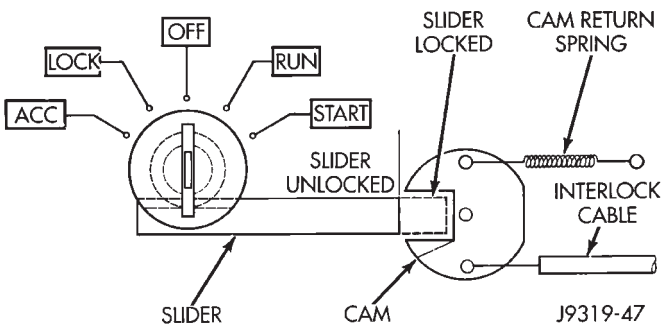


*Fig. 7 Ignition Key Cylinder Actuation*

## 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.

DIAGNOSIS AND TESTING (Continued)

(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 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.

## BRAKE TRANSMISSION SHIFT INTERLOCK

(1) Verify that the key can only be removed in the PARK position

(2) When the shift lever is in PARK And the shift handle pushbutton is in the “OUT” position, the ignition key cylinder should rotate freely from OFF to LOCK. When the shifter is in any other gear or neutral position, the ignition key cylinder should not rotate to the LOCK position.

(3) Shifting out of PARK should be possible when the ignition key cylinder is in the OFF position.

(4) Shifting out of PARK should not be possible while applying 25 lb. maximum handle pushbutton force and ignition key cylinder is in the RUN or START positions unless the foot brake pedal is depressed approximately 1/2 inch (12mm).

(5) Shifting out of PARK should not be possible when the ignition key cylinder is in the ACCESSORY or LOCK positions.

(6) Shifting between any gears, NEUTRAL or into PARK may be done without depressing foot brake pedal with ignition switch in RUN or START positions and vehicle stationary or in motion.

## GEARSHIFT CABLE

(1) The floor shifter lever and gate positions should be in alignment with all transmission PARK, NEUTRAL, and gear detent positions.

(2) Engine starts must be possible with floor shift lever in PARK or NEUTRAL gate positions only. Engine starts must not be possible in any other gear position.

(3) With floor shift lever handle push-button not depressed and lever in:

(a) PARK position—Apply forward force on center of handle and remove pressure. Engine starts must be possible.

(b) PARK position—Apply rearward force on center of handle and remove pressure. Engine starts must be possible.

(c) NEUTRAL position—Normal position. Engine starts must be possible.

(d) NEUTRAL position—Engine running and brakes applied, apply forward force on center of shift handle. Transmission shall not be able to shift from neutral to reverse.

## 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 adjustment procedure.

Shift-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 the engine will not crank in PARK or NEUTRAL position.

DIAGNOSIS AND TESTING (Continued)

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

## 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.

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

| SHIFT LEVER POSITION | TRANSMISSION CLUTCHES AND BANDS | | | | | OVERDRIVE CLUTCHES | | |
|---|---|---|---|---|---|---|---|---|
| | FRONT CLUTCH | FRONT BAND | REAR CLUTCH | REAR BAND | OVERRUN CLUTCH | OVER-DRIVE CLUTCH | DIRECT CLUTCH | OVERRUN CLUTCH |
| Reverse | | | | 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 |

***Clutch And Band Application Chart***

DIAGNOSIS AND TESTING (Continued)

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. 8).

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.

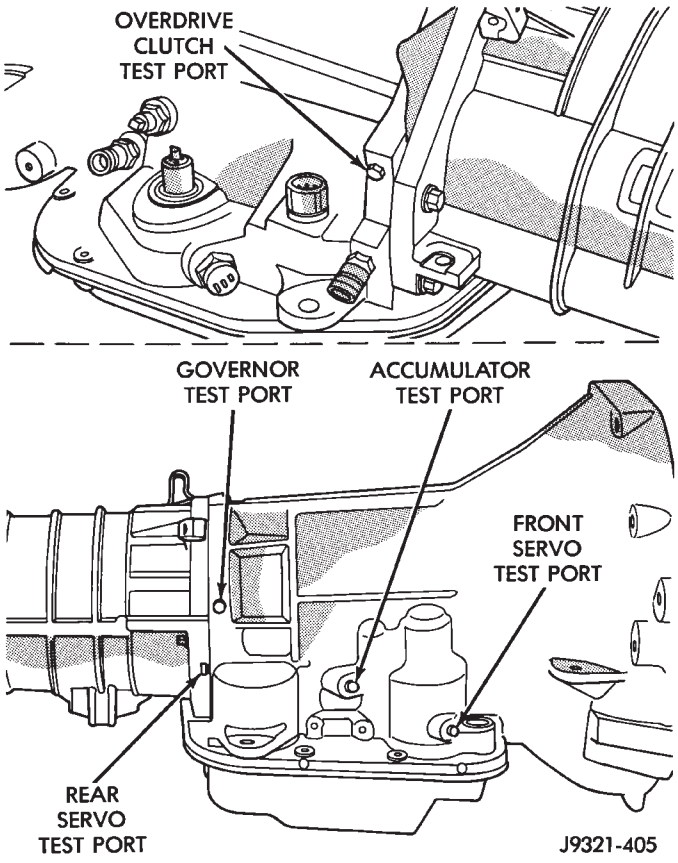


***Fig. 8 Pressure Test Port Locations***

#### 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.

DIAGNOSIS AND TESTING (Continued)

(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.

#### 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.

### 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.**

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 |

*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

DIAGNOSIS AND TESTING (Continued)

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. 9).

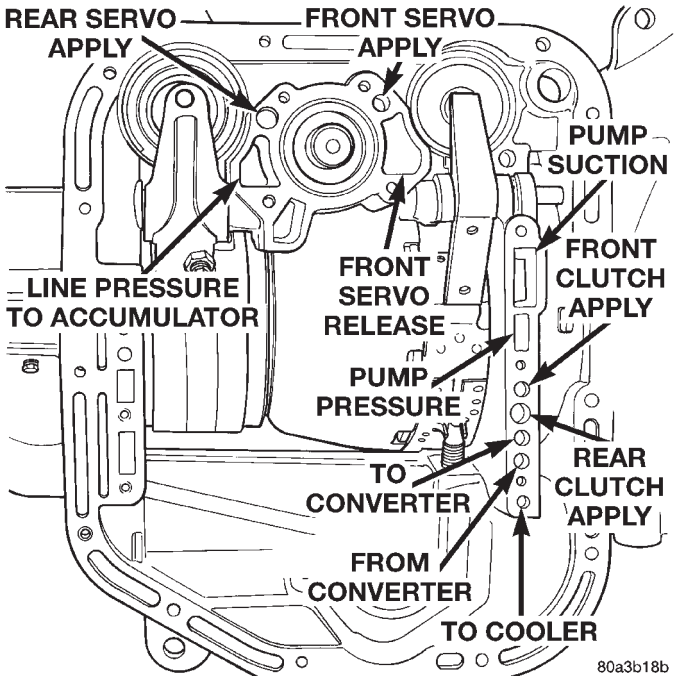


***Fig. 9 Air Pressure Test Passages***

### *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.

### *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. 10). Pump vent or pump attaching bolt leaks are generally deposited on the inside of the converter housing and not on the converter itself (Fig. 10). 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.

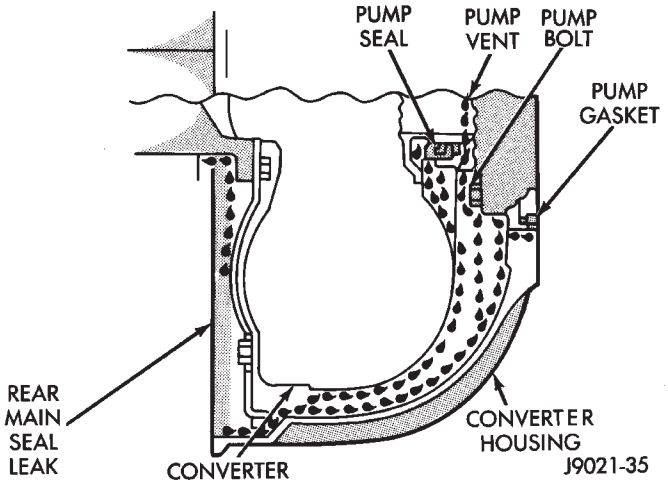


***Fig. 10 Converter Housing Leak Paths***

### *TORQUE CONVERTER LEAK POINTS*

Possible sources of converter leaks are:

(1) Leaks at the weld joint around the outside diameter weld (Fig. 11).

(2) Leaks at the converter hub weld (Fig. 11).

### *CONVERTER HOUSING AREA LEAK CORRECTION*

(1) Remove converter.

(2) Tighten front band adjusting screw until band is tight around front clutch retainer. This prevents

DIAGNOSIS AND TESTING (Continued)

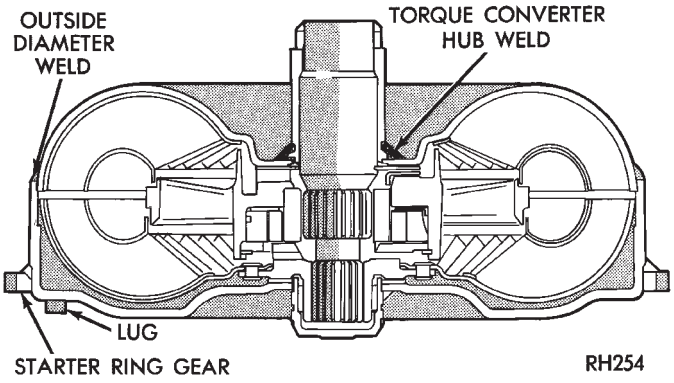


*Fig. 11 Converter Leak Points—Typical*

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.

(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)

| 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. |
| 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 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. |

DIAGNOSIS AND TESTING (Continued)

| CONDITION | POSSIBLE CAUSES | CORRECTION |
|---|---|---|
| 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. |
| | 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. |

DIAGNOSIS AND TESTING (Continued)

| CONDITION | POSSIBLE CAUSES | CORRECTION |
|---|---|---|
| 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 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 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 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 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 II 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. |
| 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. |

DIAGNOSIS AND TESTING (Continued)

| CONDITION | POSSIBLE CAUSES | CORRECTION |
|---|---|---|
| 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. |
| 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. Test both sensors with test lamp or volt/ohmmeter and replace faulty sensor. |
| | 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 TPS. |
| | 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. |

DIAGNOSIS AND TESTING (Continued)

| CONDITION | POSSIBLE CAUSES | CORRECTION |
|---|---|---|
| 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. Speedometer Adapter Leaks. | 1. Replace both adapter seals. |
| | 2. Fluid Lines and Fittings Loose/Leaks/ Damaged. | 2. Tighten fittings. If leaks persist, replace fittings and lines if necessary. |
| | 3. Fill Tube (where tube enters case) Leaks/Damaged. | 3. Replace O-ring seal. Inspect tube for cracks in fill tube. |
| | 4. Pressure Port Plug Loose Loose/ Damaged. | 4. Tighten to correct torque. Replace plug or reseal if leak persists. |
| | 5. Pan Gasket Leaks. | 5. Tighten pan screws (150 in. lbs.). If leaks persist, replace gasket. |
| | 6. Valve Body Manual Lever Shaft Seal Leaks/Worn. | 6. Replace shaft seal. |
| | 7. Rear Bearing Access Plate Leaks. | 7. Replace gasket. Tighten screws. |
| | 8. Gasket Damaged or Bolts are Loose. | 8. Replace bolts or gasket or tighten both. |
| | 9. Adapter/Extension Gasket Damaged Leaks/Damaged. | 9. Replace gasket. |
| | 10. Neutral Switch Leaks/Damaged. | 10. Replace switch and gasket. |
| | 11. Converter Housing Area Leaks. | 11. 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. |
| | 12. Pump Seal Leaks/Worn/Damaged. | 12. Replace seal. |
| | 13. Torque Converter Weld Leak/ Cracked Hub. | 13. Replace converter. |
| | 14. Case Porosity Leaks. | 14. 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. 12) 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 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.**

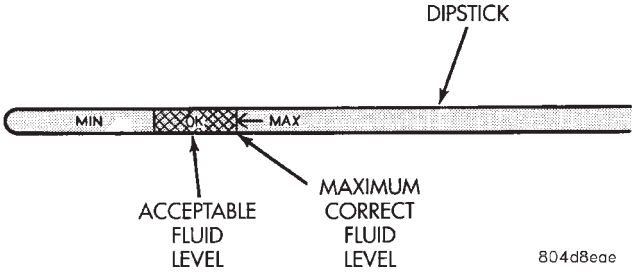


***Fig. 12 Dipstick Fluid Level Marks—Typical***

### 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. 13).

(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. 14).

(10) Separate filter from valve body and pour fluid in filter into drain pan.

(11) Dispose of used trans fluid and filter properly.

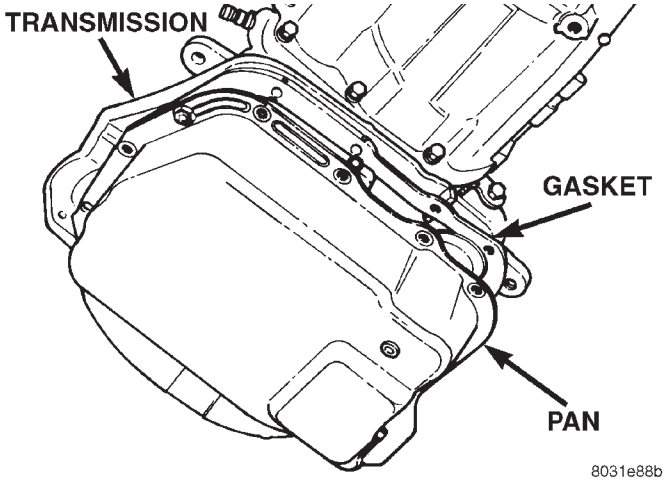


***Fig. 13 Transmission Pan—Typical***

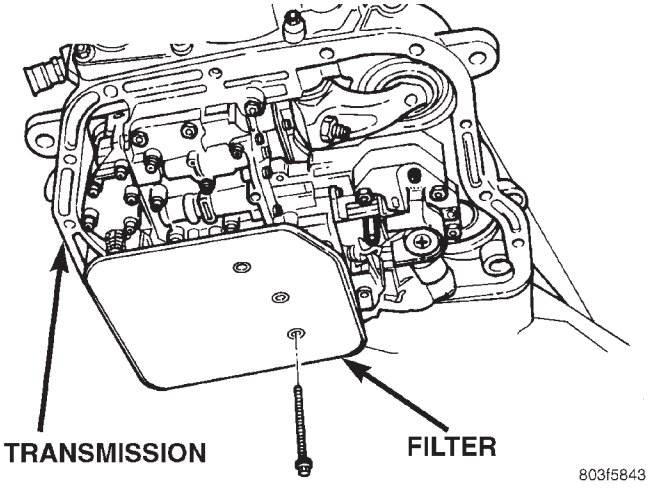


***Fig. 14 Transmission Filter—Typical***

SERVICE PROCEDURES (Continued)

*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.

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

*CLEANING*

(1) Using a suitable solvent, clean pan and magnet (Fig. 15).

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

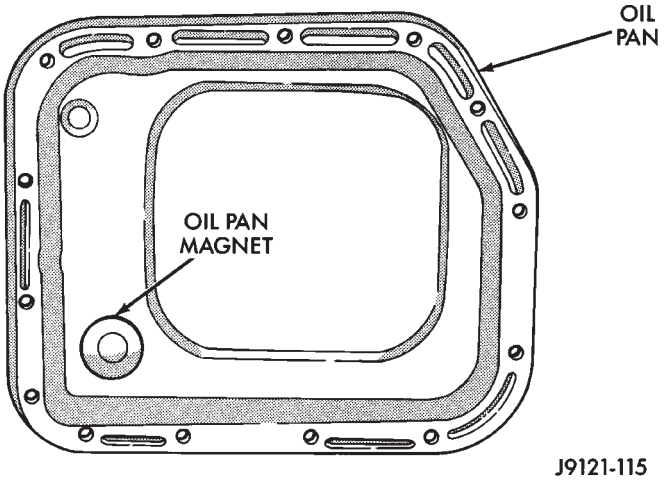


***Fig. 15 Pan and Magnet***

*INSTALLATION*

(1) Place replacement filter in position on valve body.

(2) Install screws to hold filter to valve body (Fig. 14). 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. 13). Tighten bolts to 17 N·m (150 in. lbs.) torque.

(6) Lower vehicle and fill transmission with Mopar® ATF Plus, 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 to transmission:

(a) If only fluid and filter were changed, add **3 pints (1-1/2 quarts)** of ATF Plus 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 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.**

(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 COOLER FLOW CHECK

After the new or repaired transmission has been installed and filled, the oil cooler flow should be checked using the following procedure:

SERVICE PROCEDURES (Continued)

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

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

(3) If the fluid flow is intermittent or takes more than 20 seconds to collect one quart, the cooler should be replaced.

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

(4) If flow is found to be within acceptable limits, reconnect the cooler line. Then fill transaxle to the proper level, using the approved type of automatic transmission fluid.

## 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.

There are two different procedures for flushing coolers and lines. The recommended procedure is to use Tool 6906 Cooler Flusher. The other procedure is to use a hand suction gun and mineral spirits.

**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® 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.

### *COOLER FLUSH USING SUCTION GUN AND MINERAL SPIRITS*

(1) Disconnect the cooler lines at the transmission.

(2) Using a hand suction gun filled with mineral spirits, reverse flush the cooler. Force mineral spirits into the **From Cooler** line of the cooler and catch the exiting spirits from the **To Cooler** line. Observe for the presence of debris in the exiting fluid. Continue until fluid exiting is clear and free from debris.

(3) Using compressed air (under 40 psi.) in intermittent spurts, blow any remaining mineral spirits from the cooler, again in the reverse direction.

(4) Pump one (1) quart of automatic transmission fluid through the cooler before reconnecting.

(5) If at any stage of the cleaning process, the cooler does not freely pass fluid, the cooler must be replaced.

SERVICE PROCEDURES (Continued)

## 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.

If only the overdrive unit requires service, refer to the overdrive unit removal and installation procedures.

**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. Be sure to remove the transmission and converter as an assembly.**

### *REMOVAL*

(1) Disconnect battery negative cable.

(2) Disconnect and lower or remove necessary exhaust components.

(3) Remove engine-to-transmission bending braces.

(4) Disconnect fluid cooler lines at transmission.

(5) Remove starter motor.

(6) Disconnect and remove crankshaft position sensor. Retain sensor attaching bolts.

**CAUTION: The crankshaft position sensor will be damaged if the transmission is removed, or installed, while the sensor is still bolted to the engine block, or transmission (4.0L only). To avoid damage, be sure to remove the sensor before removing the transmission.**

(7) Remove torque converter access cover.

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

(9) Remove fill tube bracket bolts and pull tube out of transmission. Retain fill tube O-ring. On 4 x 4 models, it will also be necessary to remove bolt attaching transfer case vent tube to converter housing (Fig. 16).

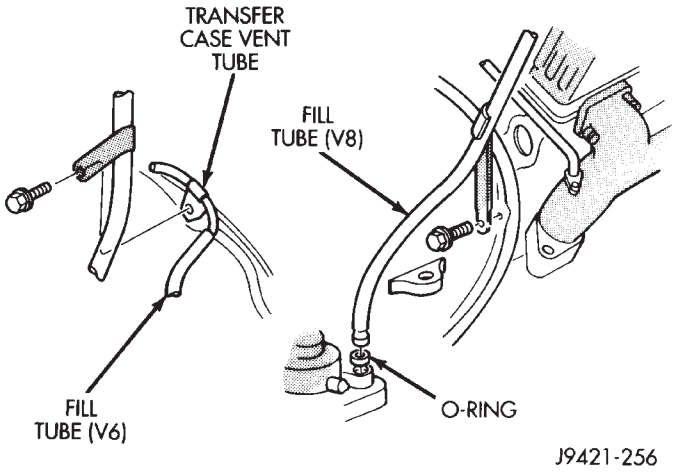


***Fig. 16 Fill Tube Attachment***

(10) 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.

(11) 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.

(12) Mark propeller shaft and axle yokes for assembly alignment. Then disconnect and remove propeller shaft. On 4 x 4 models, remove both propeller shafts.

(13) Disconnect wires from park/neutral position switch, transmission solenoid, and vehicle speed sensor.

(14) Disconnect gearshift cable from transmission manual valve lever.

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

(16) On 4 x 4 models, disconnect shift rod from transfer case shift lever or remove shift lever from transfer case.

(17) Disconnect transmission fluid cooler lines at transmission fittings and clips.

(18) Support rear of engine with safety stand or jack.

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

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

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

(22) On 4 x 4 models, remove transfer case.

(23) Remove all converter housing bolts.

REMOVAL AND INSTALLATION (Continued)

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

(25) Hold torque converter in place during transmission removal.

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

(27) To remove torque converter, carefully slide torque converter out of the transmission.

*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 converter and 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. 17). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.

(7) Temporarily secure converter with C-clamp.

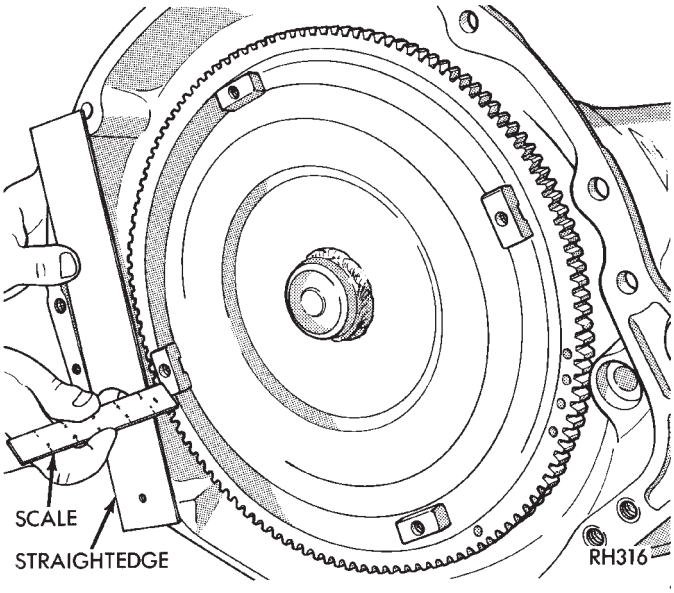


***Fig. 17 Typical Method Of Checking ConverterSeating***

(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 hold 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) Remove engine support fixture.

(17) Install crankshaft position sensor.

(18) Install vehicle speed sensor and speedometer adapter.

(19) Install new plastic retainer grommet on any shift linkage rod or lever that was disconnected. Grommets should not be reused. Use pry tool to remove rod from grommet and cut away old grommet. Use pliers to snap new grommet into lever and to snap rod into grommet at assembly.

(20) Connect gearshift and throttle valve cable to transmission.

(21) 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.**

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

(23) Install converter housing access cover.

(24) Install starter motor and cooler line bracket.

(25) Connect cooler lines to transmission.

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

(27) Install exhaust components.

(28) Install transfer case.

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

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

(31) Lower vehicle.

(32) Fill transmission with Mopar ATF Plus, Type 7176 fluid.

## TORQUE CONVERTER

*REMOVAL*

(1) Remove transmission and torque converter from vehicle.

REMOVAL AND INSTALLATION (Continued)

(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. 18). 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.

## 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. 19) from overdrive housing.

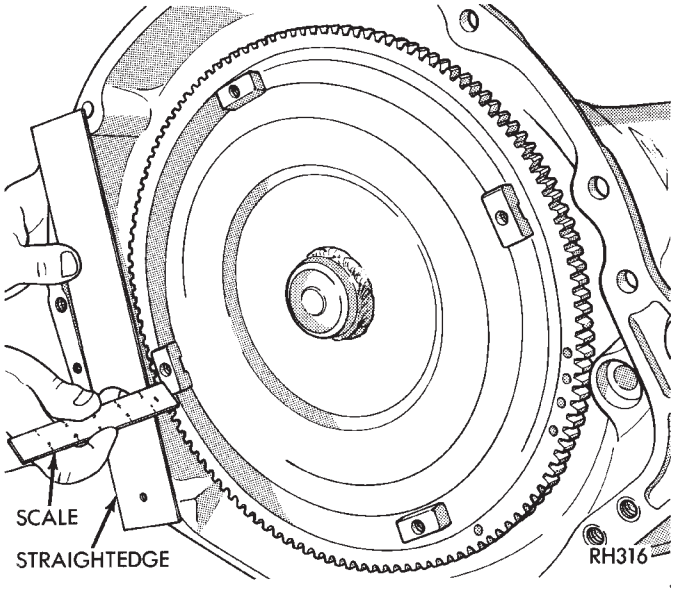


***Fig. 18 Checking Torque Converter Seating***

*INSTALLATION*

(1) Place seal in position on overdrive housing.

(2) Drive seal into overdrive housing with Seal Installer C-3995-A (Fig. 20).

(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.

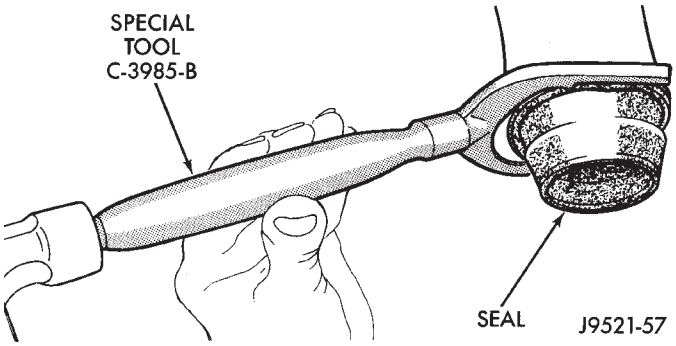


***Fig. 19 Removing Overdrive Housing Yoke Seal***

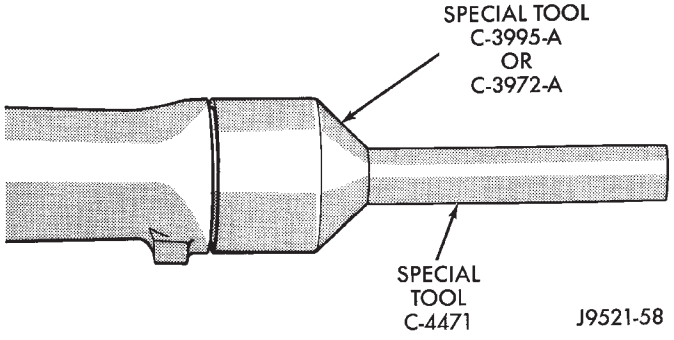


***Fig. 20 Installing Overdrive Housing YokeSeal***

REMOVAL AND INSTALLATION (Continued)

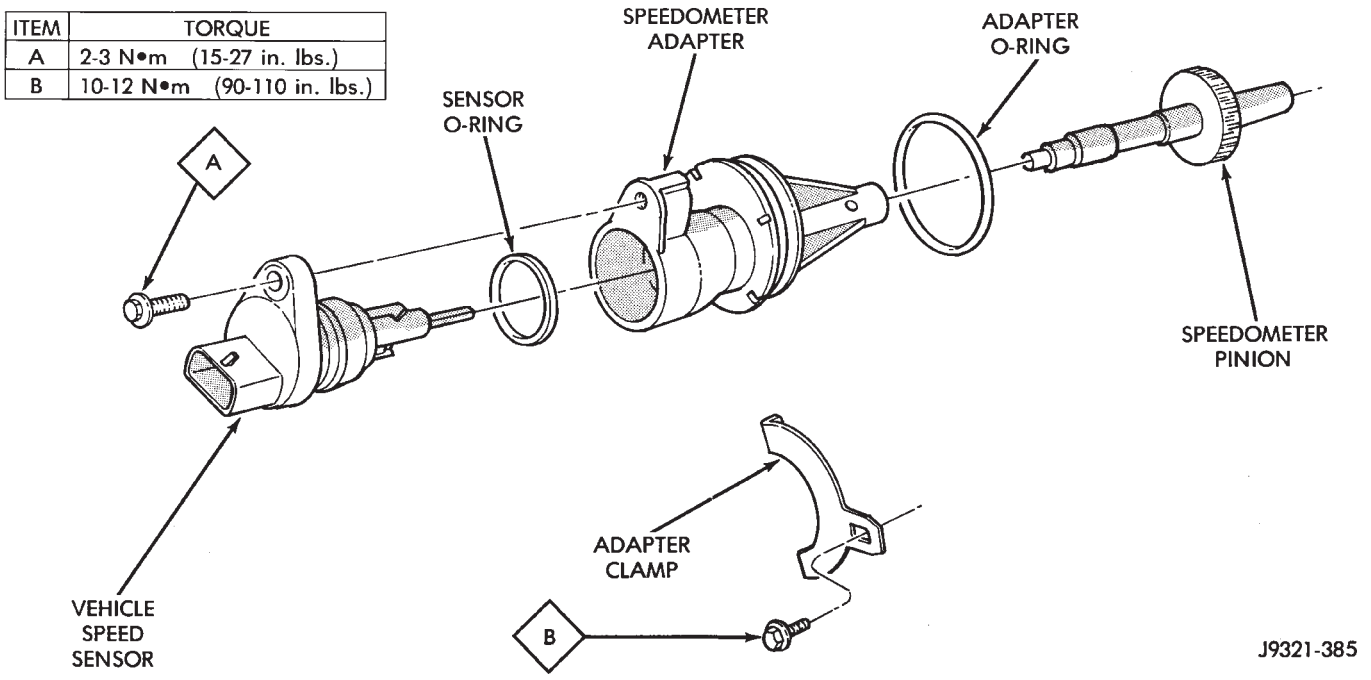


*Fig. 21 Speedometer Pinion Adapter Components*

## SPEEDOMETER ADAPTER

Rear axle gear ratio and tire size determine speedometer pinion requirements.

### *REMOVAL*

(1) Raise vehicle.
(2) Disconnect wires from vehicle speed sensor.
(3) Remove adapter clamp and screw (Fig. 21).
(4) Remove speed sensor and speedometer adapter as assembly.
(5) Remove speed sensor retaining screw and remove sensor from adapter.
(6) Remove speedometer pinion from adapter.
(7) Inspect sensor and adapter O-rings (Fig. 21). Remove and discard O-rings if worn or damaged.
(8) Inspect terminal pins in speed sensor. Clean pins with Mopar electrical spray cleaner if dirty or oxidized. Replace sensor if faulty, or pins are loose, severely corroded, or damaged.

### *INSTALLATION*

(1) Thoroughly clean adapter flange and adapter mounting surface in housing. Surfaces must be clean for proper adapter alignment and speedometer operation.
(2) Install new O-rings on speed sensor and speedometer adapter if necessary (Fig. 21).
(3) Lubricate sensor and adapter O-rings with transmission fluid.
(4) Install vehicle speed sensor in speedometer adapter. Tighten sensor attaching screw to 2-3 N·m (15-27 in. lbs.) torque.
(5) Install speedometer pinion in adapter.
(6) Count number of teeth on speedometer pinion. Do this before installing assembly in housing. Then lubricate pinion teeth with transmission fluid.
(7) Note index numbers on adapter body (Fig. 22). These numbers will correspond to number of teeth on pinion.
(8) Install speedometer assembly in housing.
(9) Rotate adapter until required range numbers are at 6 o'clock position. Be sure range index numbers correspond to number of teeth on pinion gear.
(10) Install speedometer adapter clamp and retaining screw. Tighten clamp screw to 10-12 N·m (90-110 in. lbs.) torque.
(11) Connect wires to vehicle speed sensor.
(12) Lower vehicle and top off transmission fluid level if necessary.

## PARK/NEUTRAL POSITION SWITCH

### *Switch Replacement*

(1) Raise vehicle and position drain pan under switch.
(2) Disconnect switch wires.
(3) Remove switch from case.
(4) Move shift lever to Park and Neutral positions. Verify that switch operating lever fingers are centered in switch opening in case (Fig. 23).
(5) Install new seal on switch and install switch in case. Tighten switch to 34 N·m (25 ft. lbs.) torque.
(6) Test continuity of new switch with 12V test lamp.
(7) Connect switch wires and lower vehicle.
(8) Top off transmission fluid level.

REMOVAL AND INSTALLATION (Continued)

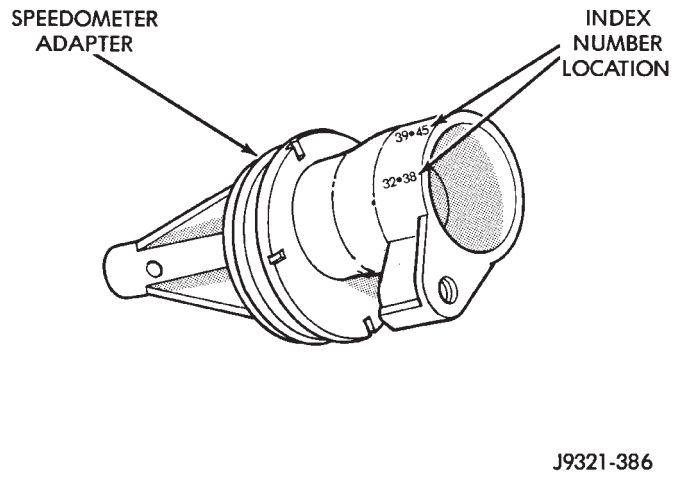


***Fig. 22 Index Numbers On Speedometer PinionAdapter***

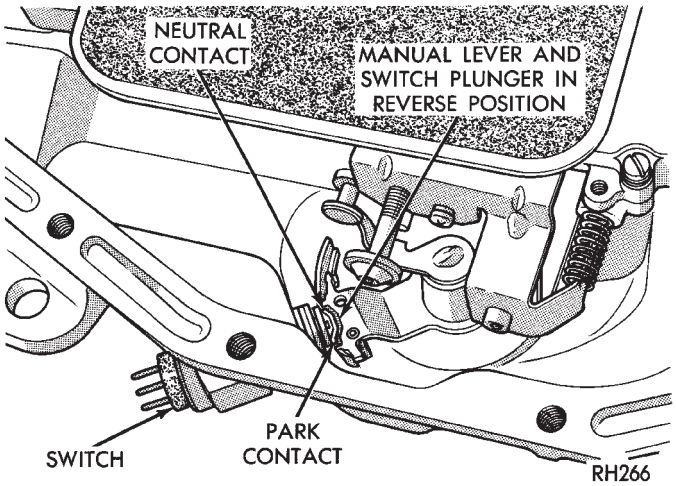


***Fig. 23 Park/Neutral Position Switch***

## GEARSHIFT CABLE

*REMOVAL*

(1) Shift transmission into Park.

(2) Remove shift lever bezel and necessary console parts for access to shift lever assembly.

(3) Disconnect cable at shift lever and feed cable through dash panel opening to underside of vehicle.

(4) Raise vehicle.

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

*INSTALLATION*

(1) Route cable through hole in dash panel. Fully seat cable grommet into dash panel.

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

(3) Connect shift cable to shifter mechanism by snapping cable retaining ears into shifter bracket and press cable end fitting onto lever ball stud.

(4) Place the floor shifter lever in park position. Ensure that the pawl is seated within the confines of the adjustment gauge clip.

(5) 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.

(6) Lock shift cable into position by pushing upward on the adjusting lock button.

(7) Remove and discard the shift cable adjustment gauge clip from the park gate of the shifter.

## BRAKE TRANSMISSION SHIFT INTERLOCK

*REMOVAL*

(1) Lower the steering column.

(2) Remove two screws retaining the interlock mechanism to the column (Fig. 24). Unsnap the mechanism from column.

(3) Remove the center console and related trim. Refer to Group 23, Body, for proper procedures.

(4) Disconnect and remove the cable from the shift bracket.

(5) Remove the wire connector at the solenoid on the cable

(6) Remove the accelerator pedal (the cable routes under the pedal). Refer to Group 14, Fuel Systems, for proper procedures.

(7) Release the cable from the accelerator pedal clip.

(8) Remove the carpet as necessary to remove the cable.

*INSTALLATION*

**NOTE: The gearshift cable must be secured into position and properly adjusted before the installation of the Brake Transmission Interlock Cable (BTSI).**

(1) Snap the cable base assembly into the large square opening in the steering column.

(2) Secure the plastic base with two (2) self tapping screws (tighten upper screw first).

REMOVAL AND INSTALLATION (Continued)

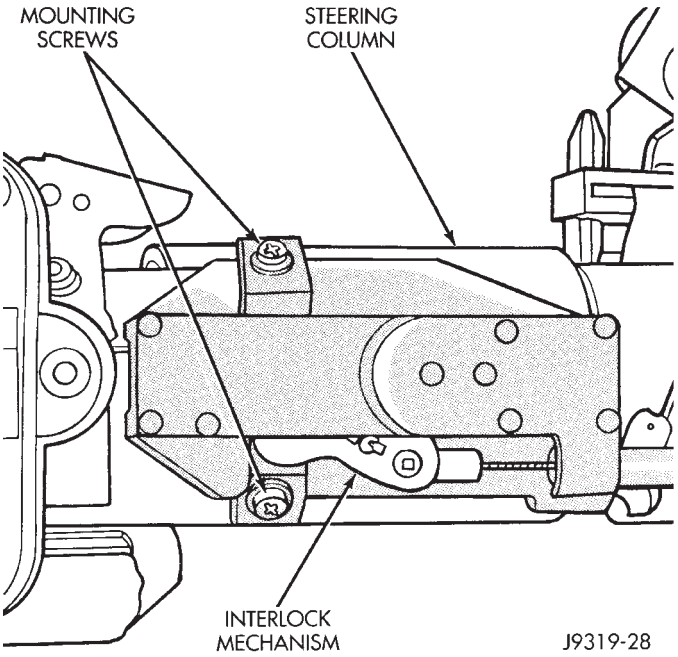


***Fig. 24 Interlock Mechanism on Column***

(3) Snap BTSI cable solenoid tie strap into hole in steering column tube.

(4) Route BTSI cable into two clips on carpet pad.

(5) Snap electrical connector from brake light switch into BTSI cable solenoid housing.

(6) Snap BTSI cable adjuster ears into floor shifter bracket and attach cable end fitting onto floor shifter interlock lever stud.

(7) Remove shipping pin from plastic base. Then place floor shifter in Park position.

(8) Place the ignition key cylinder in the ACCESSORY position.

(9) Push the cable adjuster lock clamp downward to lock it.

(10) Remove and discard the BTSI cable nail head lockpin at steering column.

(11) Install the center console and related trim. Refer to Group 23, Body, for proper procedures.

(12) Test the BTSI cable operation.

## 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. 25).

(4) Remove screws holding pressure solenoid retainer to governor body.

(5) Separate solenoid retainer from governor (Fig. 26).

(6) Pull solenoid from governor body (Fig. 27).

(7) Remove bolts holding governor body to valve body.

(8) Separate governor body from valve body (Fig. 28).

(9) Remove governor body gasket.

(10) Remove retainer holding pressure sensor to governor body.

(11) Pull pressure sensor from governor body (Fig. 29).

*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. 29).

(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. 28).

(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. 27).

(10) Push solenoid into governor body.

(11) Place solenoid retainer in position on governor (Fig. 26).

(12) Install screws to hold pressure solenoid retainer to governor body.

(13) Engage wire connectors into pressure sensor and solenoid (Fig. 25).

(14) Install transmission fluid pan and (new) filter.

(15) Lower vehicle and road test to verify repair.

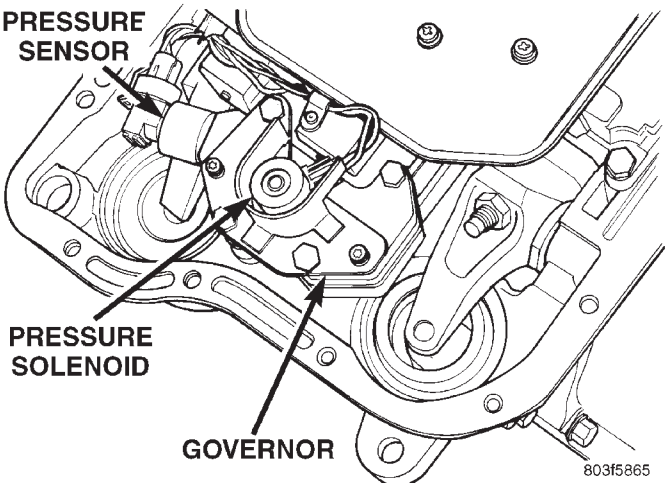


***Fig. 25 Governor Solenoid And Pressure Sensor***

REMOVAL AND INSTALLATION (Continued)

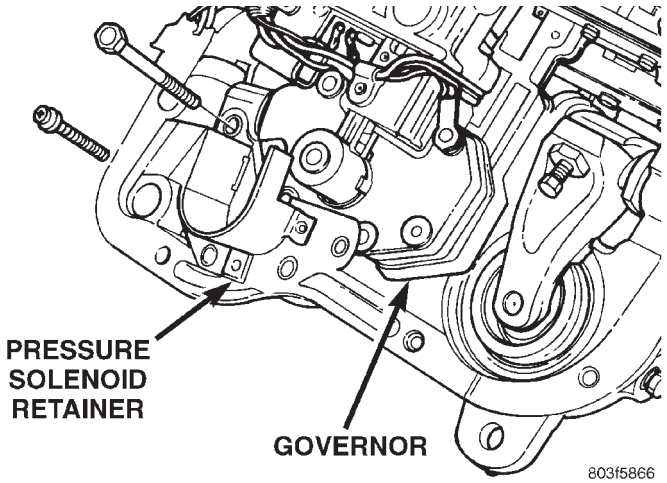


*Fig. 26 Pressure Solenoid Retainer*

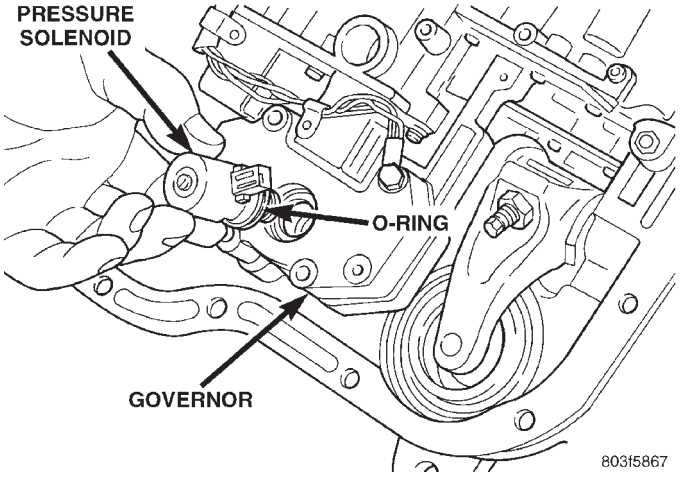


*Fig. 27 Pressure Solenoid and O-ring*

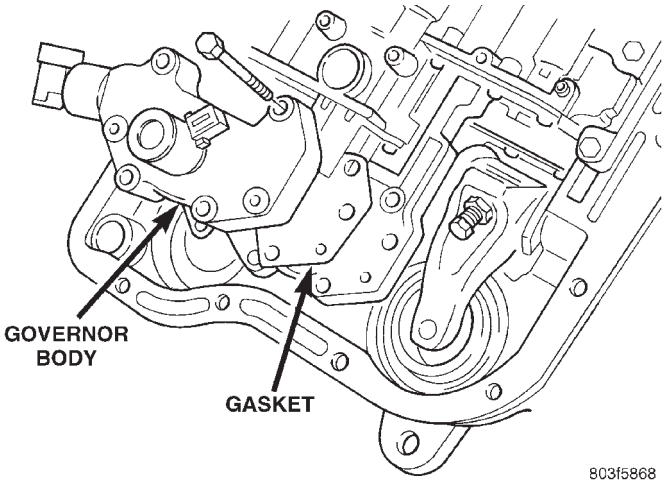


*Fig. 28 Governor Body and Gasket*

## VALVE BODY

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

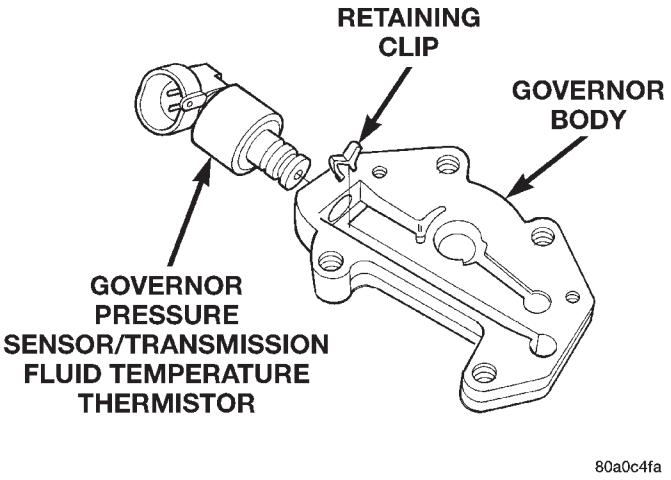


*Fig. 29 Pressure Sensor and Retainer*

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. 30).

(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.

REMOVAL AND INSTALLATION (Continued)

(11) Lower valve body, rotate valve body away from case, pull park rod out of sprag, and remove valve body (Fig. 31).

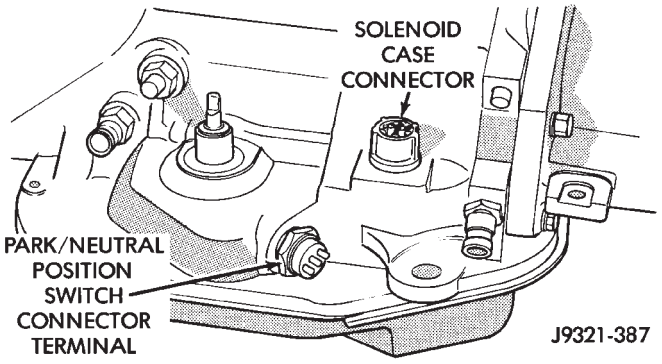


*Fig. 30 Transmission Case Connector*

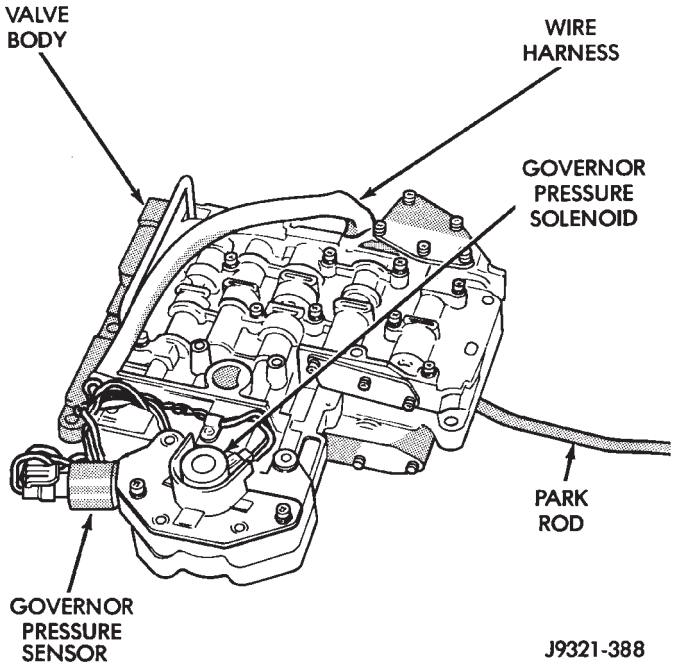


*Fig. 31 Valve Body*

*INSTALLATION*

(1) Check condition of O-ring seals on valve body harness connector (Fig. 32). 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. 33).

(3) Check condition of seals on accumulator piston (Fig. 34). 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.

(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, type 7176 fluid.

(18) Check and adjust gearshift and throttle valve cables, if necessary.

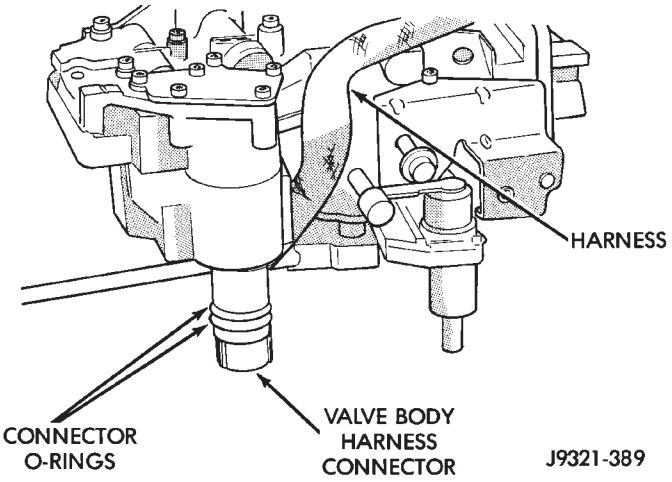


*Fig. 32 Valve Body Harness Connector O-RingSeal*

## TRANSMISSION COOLER LINE AND FITTINGS

The transmission cooler lines are attached with quick connect fittings (Fig. 35).

REMOVAL AND INSTALLATION (Continued)

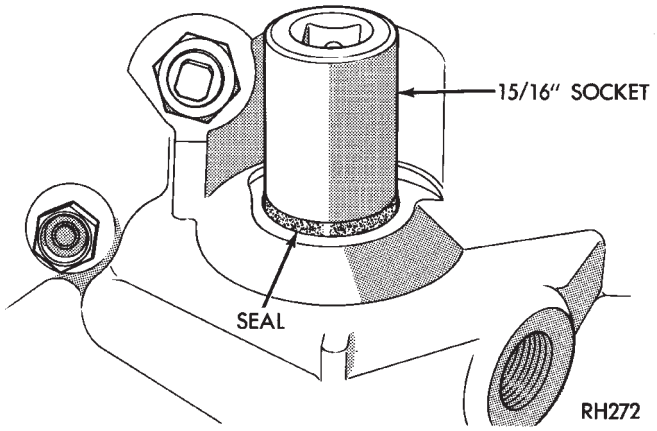


*Fig. 33 Manual Lever Shaft Seal*

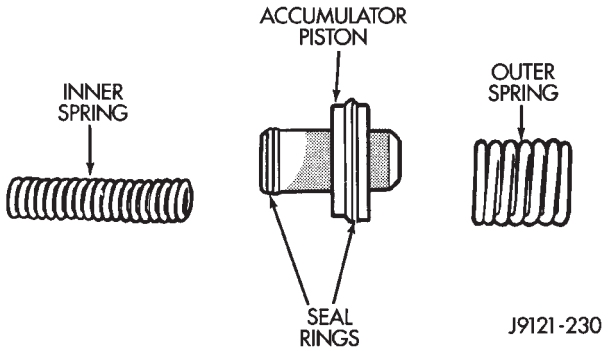


*Fig. 34 Accumulator Piston Components*

The cooler lines and fittings are NOT serviceable. Damaged fittings or cooler lines are to be replaced as assemblies.

*REMOVAL*

(1) If fitting and cooler line are covered with dirt, mud, or grease, clean fitting and cooler line with Mopar® spray type carburetor or brake cleaner.

(2) Disengage retainer on fitting and pull cooler line out of fitting.

(3) Cover open ends of cooler lines and fittings to prevent dirt entry.

(4) Inspect condition of fitting. Replace transmission fitting as an assembly if fitting body or retainer clip is damaged.

*INSTALLATION*

(1) If transmission or radiator fittings require replacement, apply Mopar® Lock N' Seal, or equivalent, to fitting threads before installation.

(2) Wipe off cooler line and fitting with clean, dry cloth.

(3) Insert cooler line into fitting. Then push line inward until retainer secures line. A snap or click will be heard and felt through the line when the retainer seats behind the cooler line flange.

(4) Pull outward on cooler lines to verify that they are properly secured.

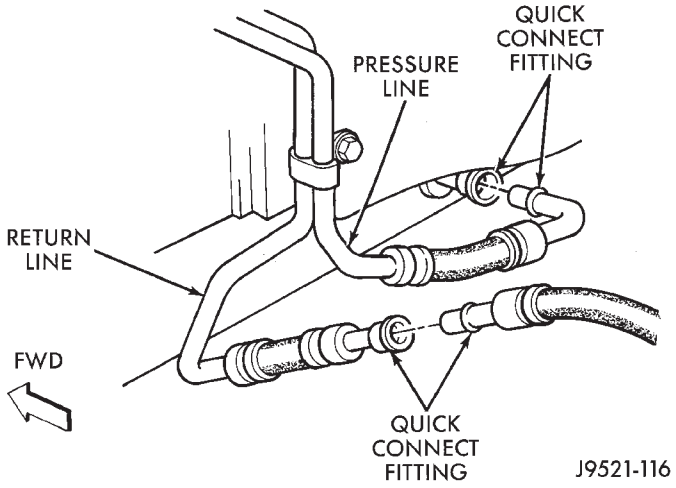


*Fig. 35 Cooler Line Fitting*

## 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 rear crossmember.

(9) Remove vehicle speed sensor and speedometer adapter, if necessary.

(10) Remove bolts attaching overdrive unit to transmission (Fig. 36).

**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.**

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

(a) 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.

(b) If overdrive unit requires service, refer to Disassemble and Assemble section of this group for proper procedures.

REMOVAL AND INSTALLATION (Continued)

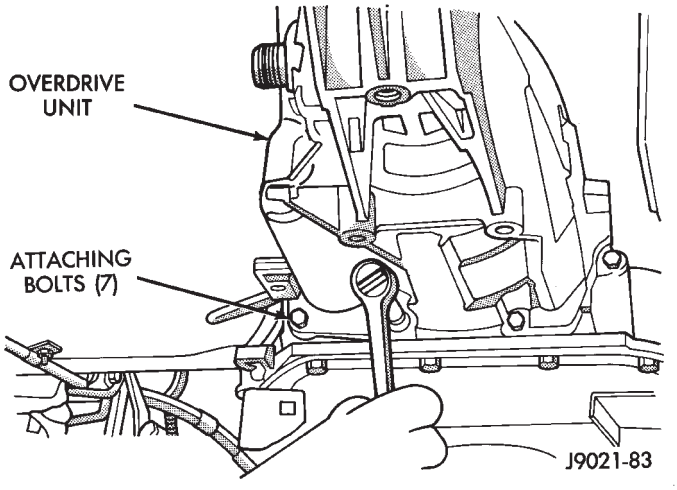


*Fig. 36 Overdrive Unit Bolts*

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

(13) Position drain pan on workbench.

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

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

(16) 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. 37).

(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. 38).

(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.**

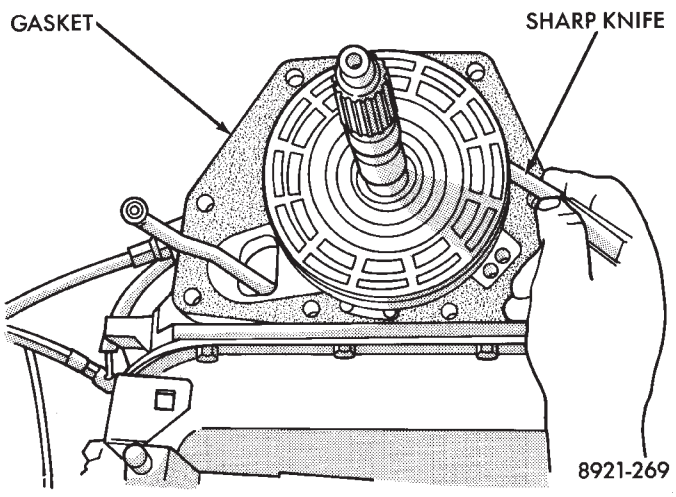


*Fig. 37 Trimming Overdrive Case Gasket*

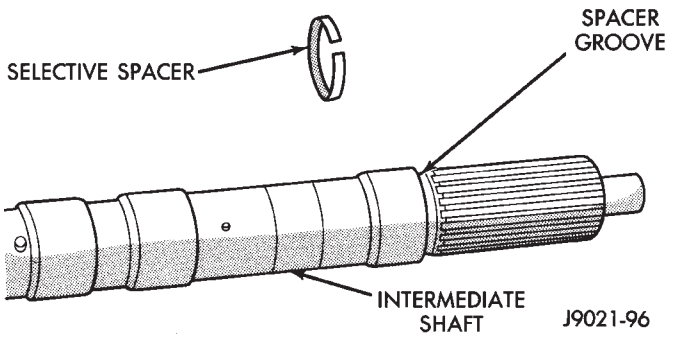


*Fig. 38 Intermediate Shaft Selective SpacerLocation*

(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.

(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) Align slip-fit governor tubes and 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) Install crossmember.

(14) Install speed sensor and speedometer adapter. Be sure to index adapter.

REMOVAL AND INSTALLATION (Continued)

(15) Connect speed sensor and overdrive wires.
(16) Align and install propeller shaft.
(17) If valve body was also removed, adjust bands, install valve body and install transmission oil pan and gasket.

## 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. 39).

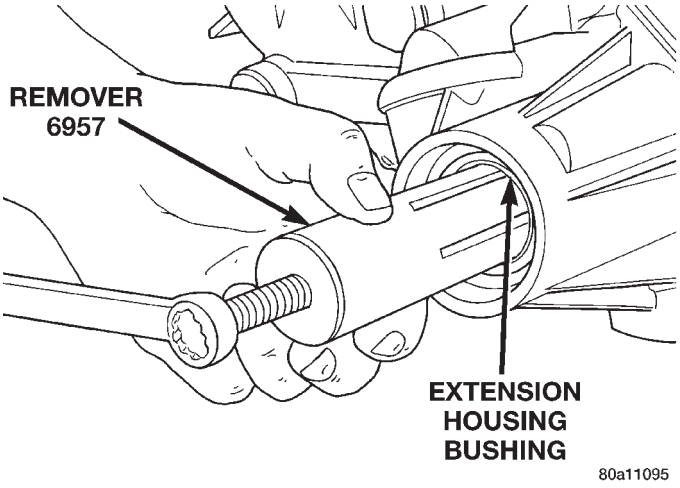


***Fig. 39 Bushing Removal—Typical***

*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. 40).

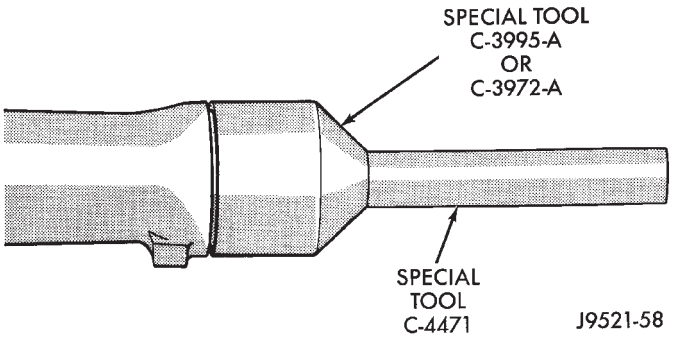


***Fig. 40 Overdrive Housing Seal Installation***

## 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. 41).
(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. 41).
(4) Install overdrive geartrain into housing.
(5) Install overdrive unit in vehicle.

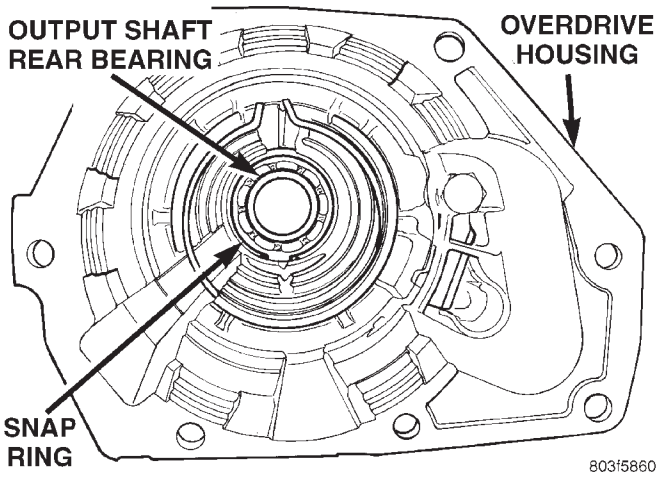


***Fig. 41 Output Shaft Rear Bearing***

## 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. 42).
(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. 42).
(4) Install overdrive geartrain into housing.
(5) Install overdrive unit in vehicle.

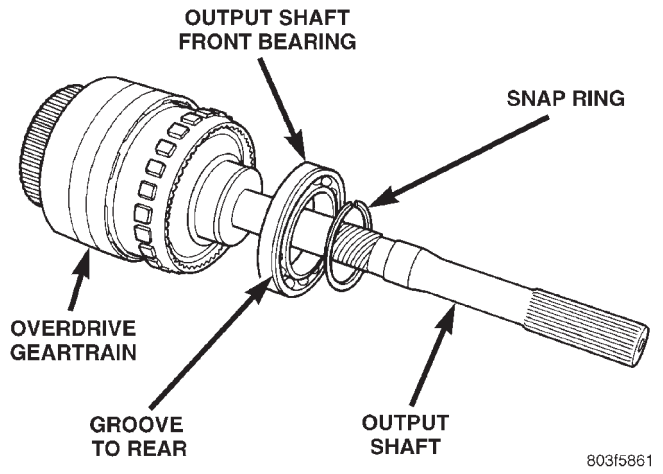


*Fig. 42 Output Shaft Front Bearing*

## DISASSEMBLY AND ASSEMBLY

### VALVE BODY

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

*VALVE BODY MAIN COMPONENT 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. 43).

(3) Remove screws attaching governor body and retainer plate to transfer plate (Fig. 44).

(4) Remove retainer plate, governor body and gasket from transfer plate (Fig. 45).

(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. 46). 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. 47). Remove and discard solenoid O-rings if worn, cut, or torn.

(8) Remove transmission fluid filter.

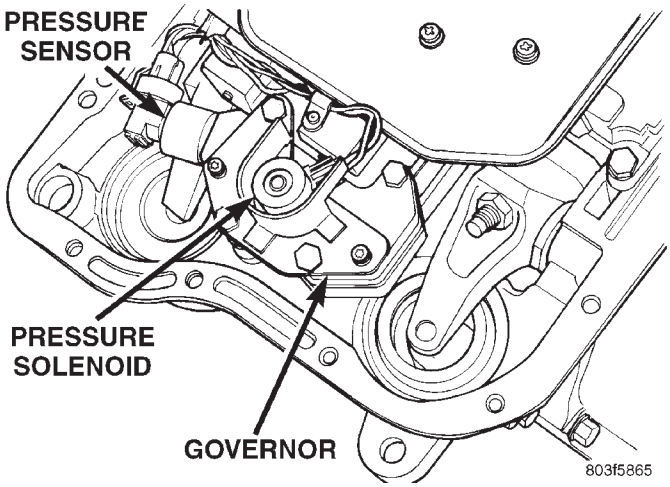


*Fig. 43 Governor Pressure Solenoid And SensorWire Locations*

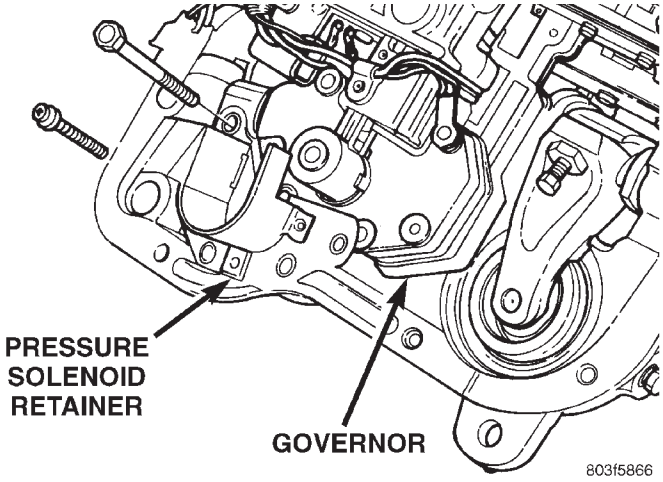


*Fig. 44 Governor Body And Retainer PlateAttaching Screw*

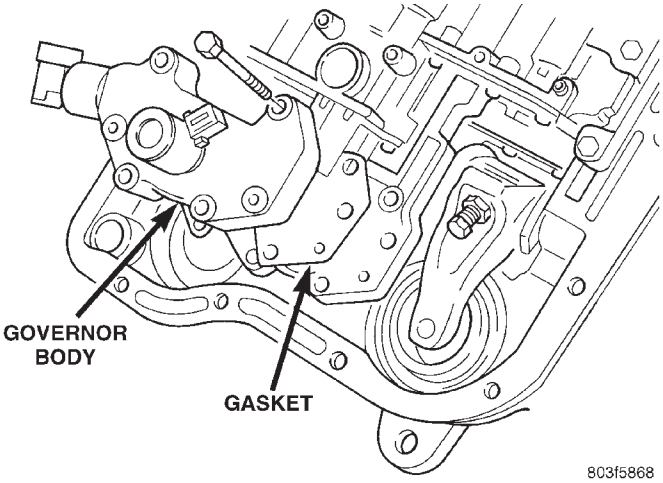


*Fig. 45 Governor Body And Gasket*

(9) Remove small shoulder bolt that secures solenoid harness case connector to 3-4 accumulator hous-

DISASSEMBLY AND ASSEMBLY (Continued)

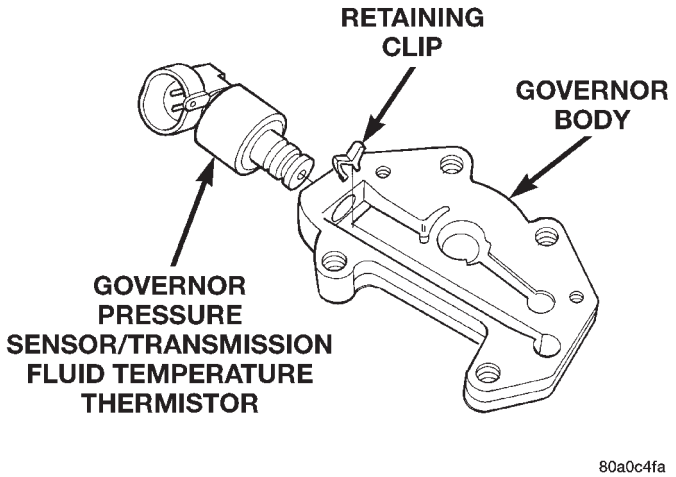


*Fig. 46 Governor Pressure Sensor*

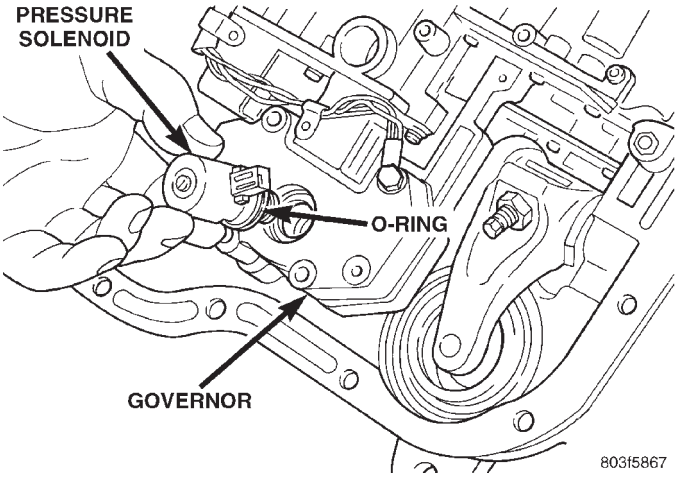


*Fig. 47 Governor Pressure Solenoid*

ing (Fig. 48). **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. 49).

(11) Turn valve body over and remove screws that attach overdrive/converter solenoid assembly to valve body (Fig. 50).

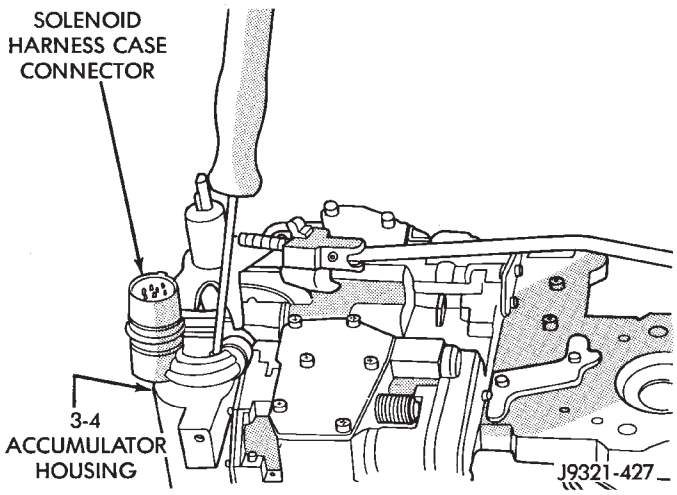


*Fig. 48 Solenoid Harness Case Connector ShoulderBolt*

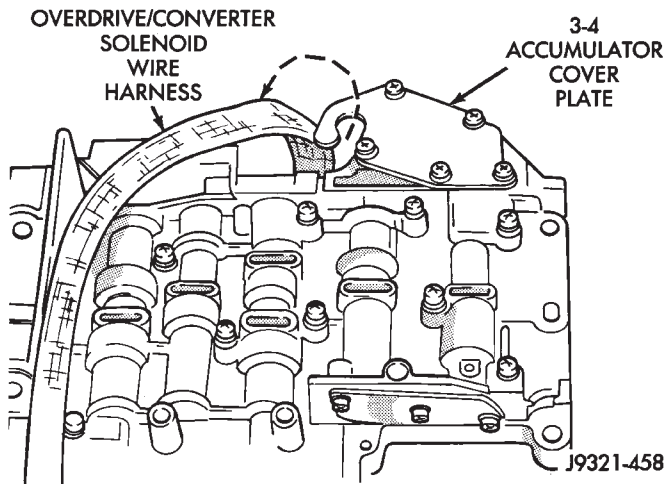


*Fig. 49 Unhooking Solenoid Harness From AccumulatorCover Plate*

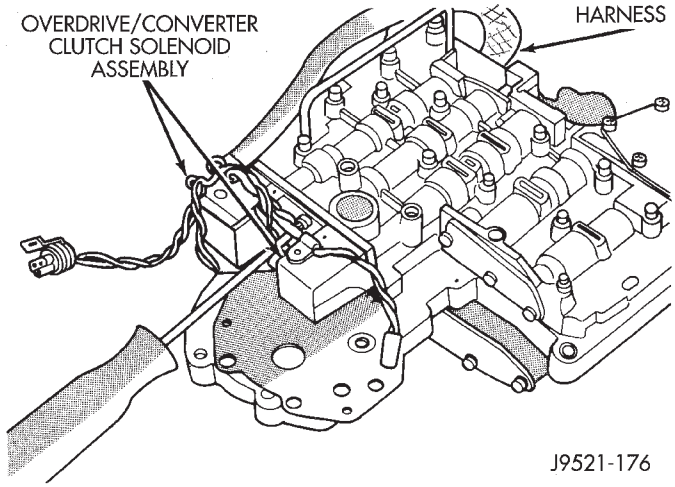


*Fig. 50 Solenoid Assembly Screws*

DISASSEMBLY AND ASSEMBLY (Continued)

(12) Remove solenoid and harness assembly from valve body (Fig. 51).

(13) Remove boost valve cover (Fig. 52).

(14) Remove boost valve retainer, valve spring and boost valve (Fig. 53).

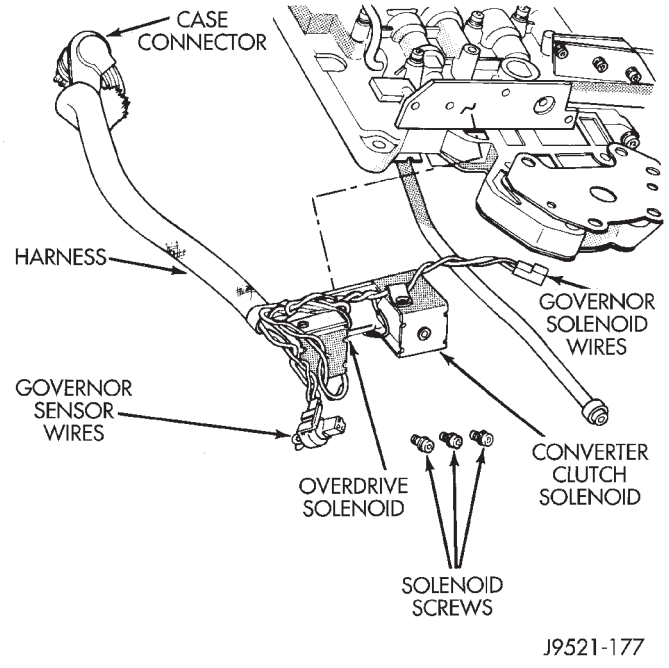


*Fig. 51 Solenoid Assembly*

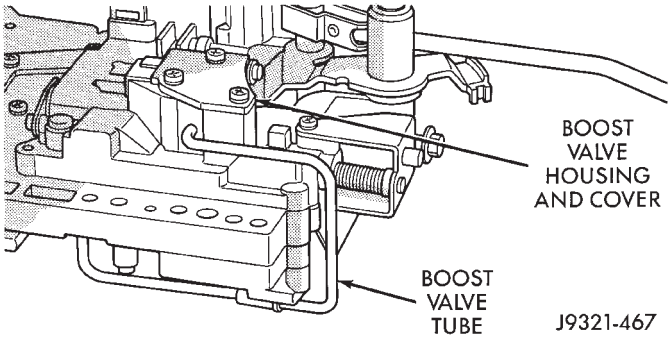


*Fig. 52 Boost Valve Cover Location*

(15) Secure detent ball and spring with Retainer Tool 6583 (Fig. 54).

(16) Remove park rod E-clip and separate rod from manual lever (Fig. 55).

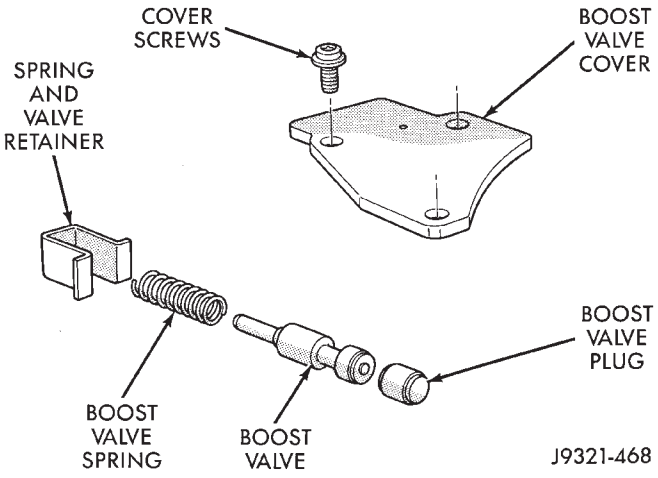


*Fig. 53 Boost Valve Components*

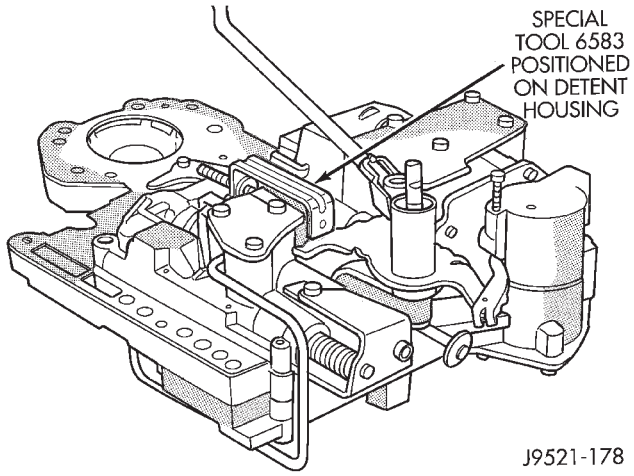


*Fig. 54 Detent Ball And Spring*

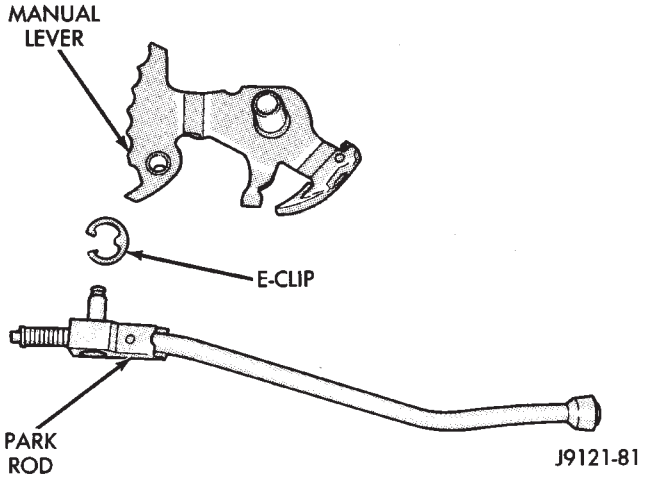


*Fig. 55 Park Rod*

DISASSEMBLY AND ASSEMBLY (Continued)

(17) Remove E-clip and washer that retains throttle lever shaft in manual lever (Fig. 56).

(18) Remove manual lever and throttle lever (Fig. 57). 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. 58).

(20) Remove screws attaching pressure adjusting screw bracket to valve body and transfer plate (Fig. 59). Hold bracket firmly against spring tension while removing last screw.

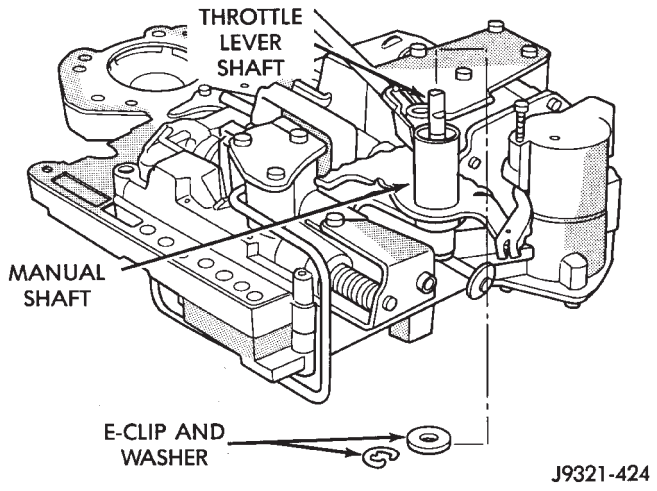


*Fig. 56 Throttle Lever E-Clip And Washer*

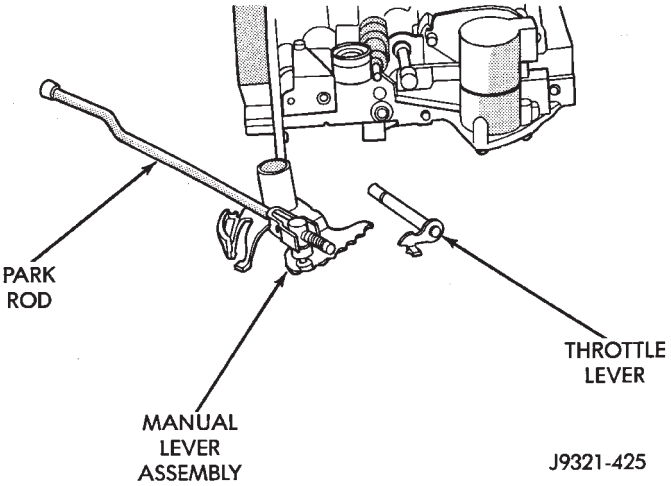


*Fig. 57 Manual And Throttle Lever*

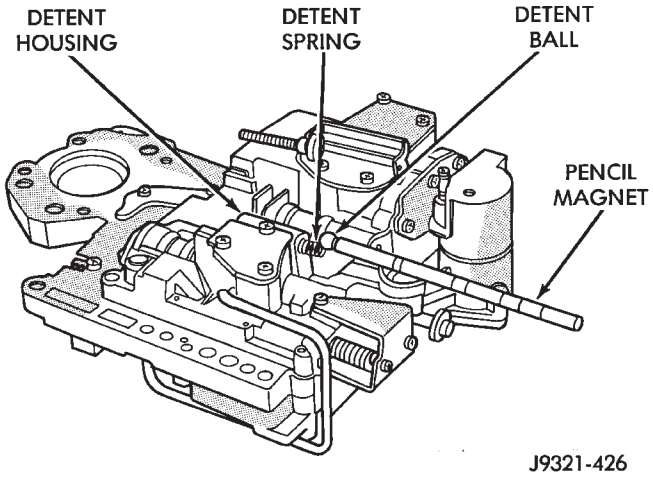


*Fig. 58 Detent Ball And Spring*

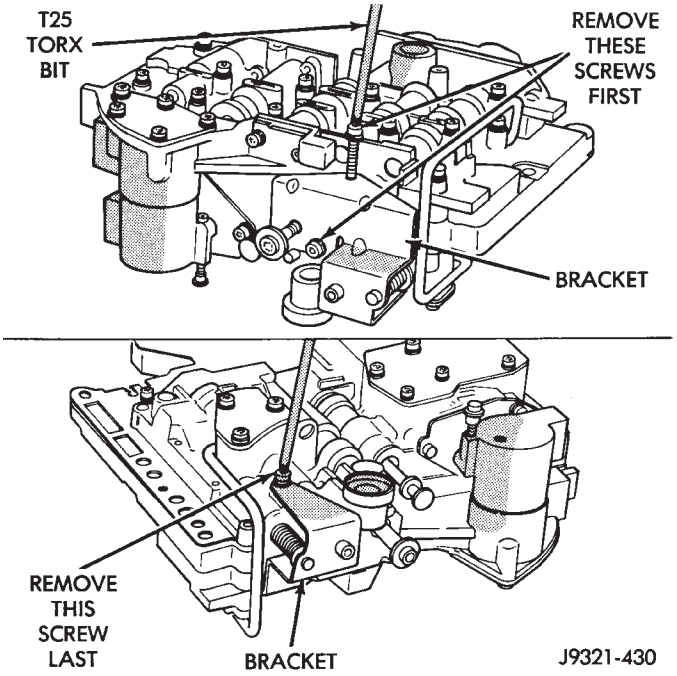


*Fig. 59 Adjusting Screw Bracket Fastener*

DISASSEMBLY AND ASSEMBLY (Continued)

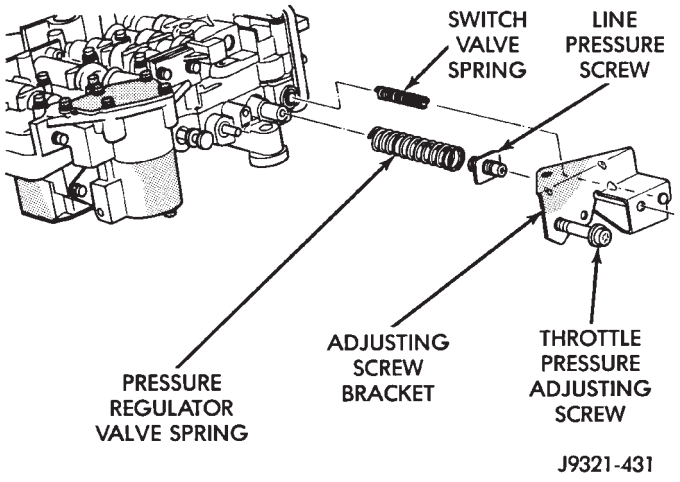


*Fig. 60 Adjusting Screw Bracket And Spring*

(21) Remove adjusting screw bracket, line pressure adjusting screw, pressure regulator valve spring and switch valve spring (Fig. 60). **Do not remove throttle pressure adjusting screw from bracket and do not disturb setting of either adjusting screw during removal.**

(22) Turn upper housing over and remove switch valve, regulator valve and spring, and manual valve (Fig. 61).

(23) Remove kickdown detent, kickdown valve, and throttle valve and spring (Fig. 61).

(24) Loosen left-side 3-4 accumulator housing attaching screw about 2-3 threads. Then remove center and right-side housing attaching screws (Fig. 62).

(25) Carefully rotate 3-4 accumulator housing upward and remove 3-4 shift valve spring and converter clutch valve plug and spring (Fig. 63).

(26) Remove left-side screw and remove 3-4 accumulator housing from valve body (Fig. 64).

(27) Bend back tabs on boost valve tube brace (Fig. 65).

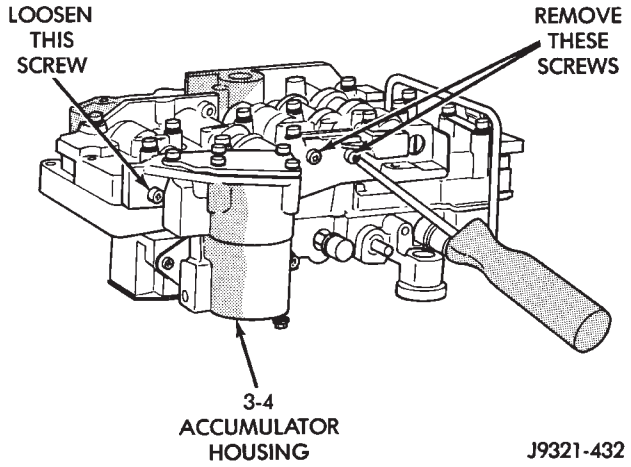


*Fig. 62 Accumulator Housing Screw Locations*

(28) Remove boost valve connecting tube (Fig. 66). 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.**

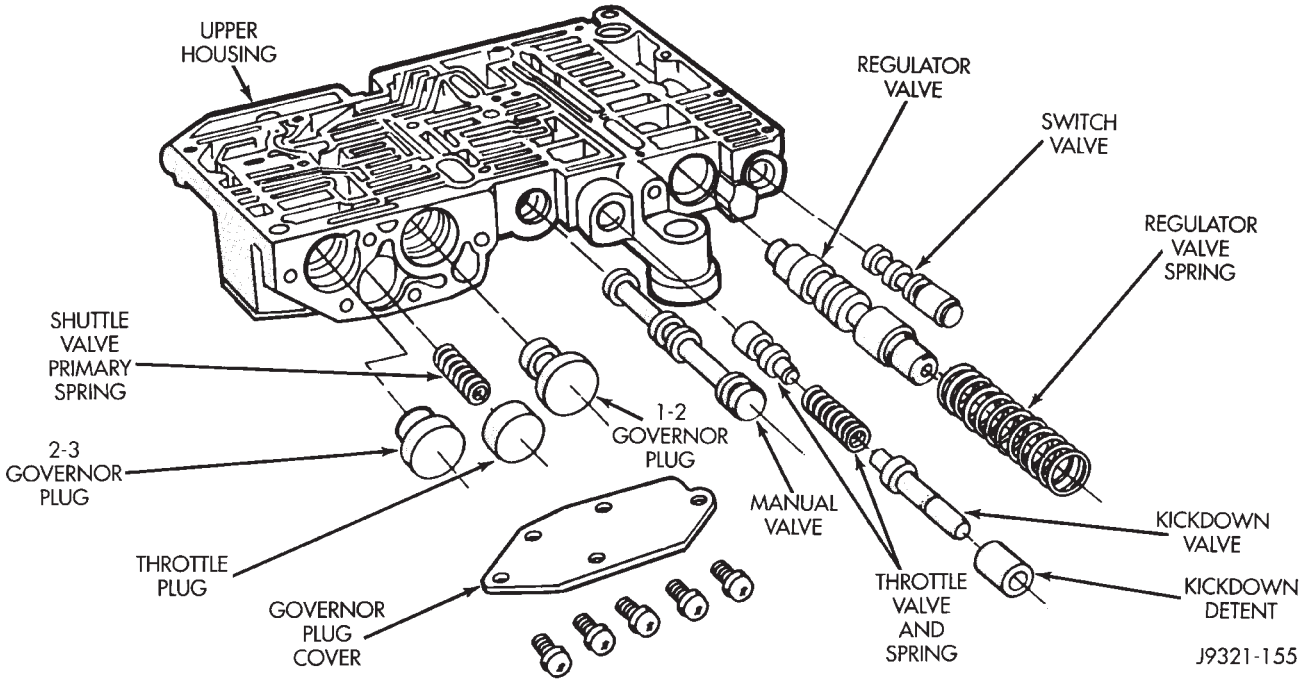


*Fig. 61 Upper Housing Control Valve Locations*

DISASSEMBLY AND ASSEMBLY (Continued)

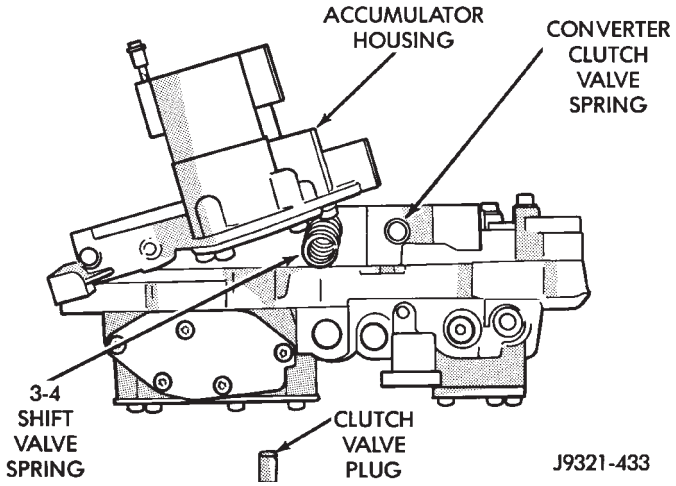


*Fig. 63 3-4 Shift And Converter Clutch ValveSprings And Plug*

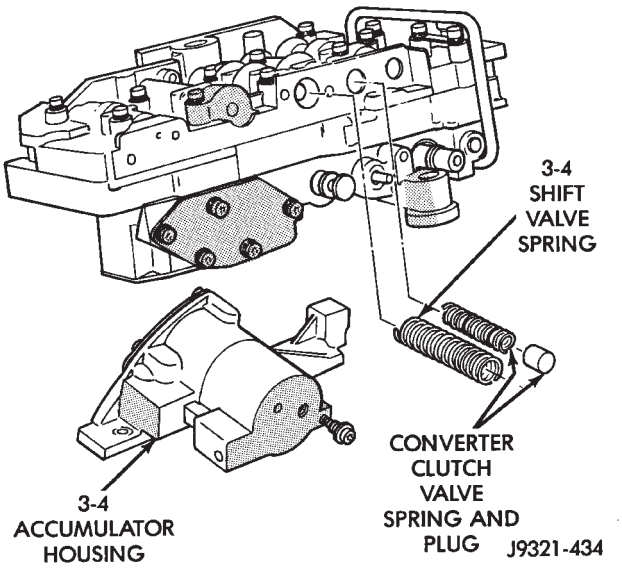


*Fig. 64 Accumulator Housing, Valve SpringsAnd Plug*

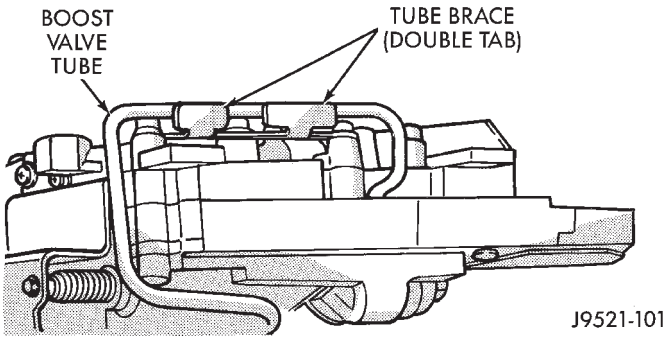


*Fig. 65 Boost Valve Tube Brace*

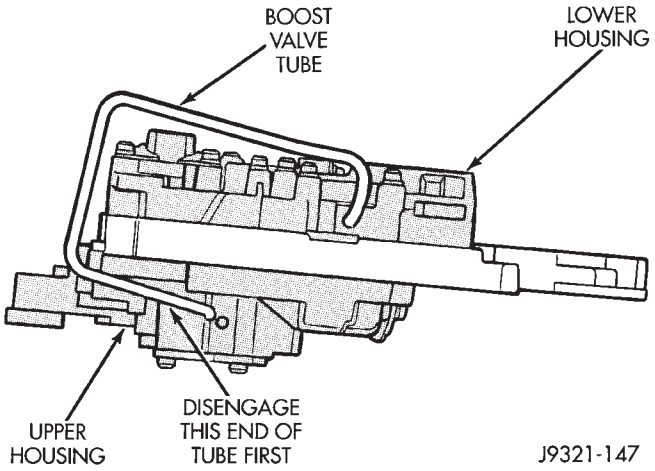


*Fig. 66 Boost Valve Tube*

(29) Turn valve body over so lower housing is facing upward (Fig. 67). 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.

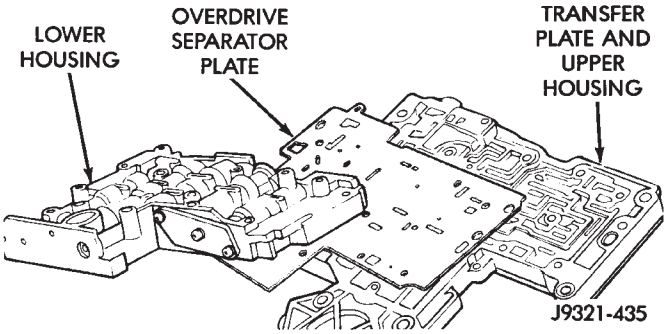


*Fig. 67 Lower Housing*

(30) Remove screws attaching valve body lower housing to upper housing and transfer plate (Fig. 67). **Note position of boost valve tube brace for assembly reference.**

(31) Remove lower housing and overdrive separator plate from transfer plate (Fig. 67).

(32) Remove transfer plate from upper housing (Fig. 68).

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

(34) Remove upper housing separator plate from transfer plate (Fig. 69). 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. 70).

### VALVE BODY UPPER HOUSING DISASSEMBLY

(1) Note location of check balls in valve body upper housing (Fig. 71). Then remove the one large diameter and the six smaller diameter check balls.

(2) Remove governor plug and shuttle valve covers (Fig. 73).

DISASSEMBLY AND ASSEMBLY (Continued)

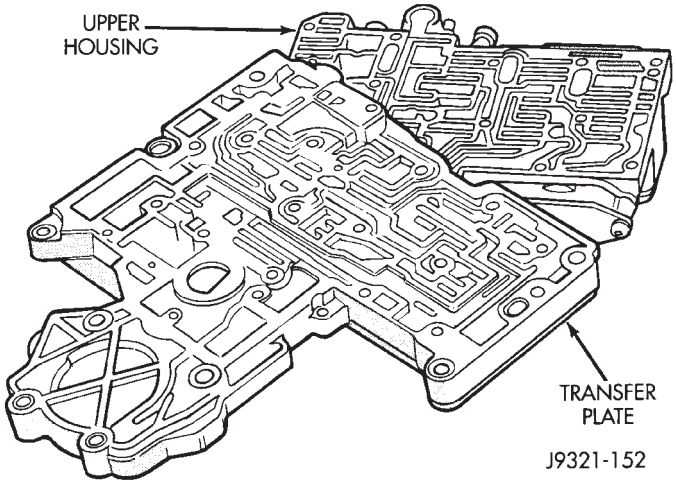


*Fig. 68 Transfer Plate*

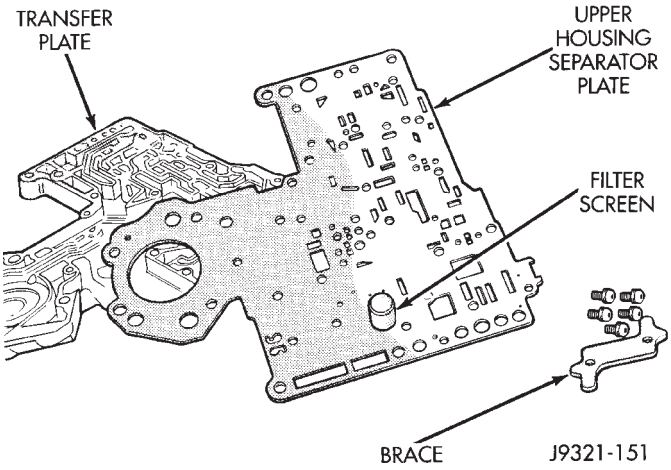


*Fig. 69 Upper Housing Separator Plate*

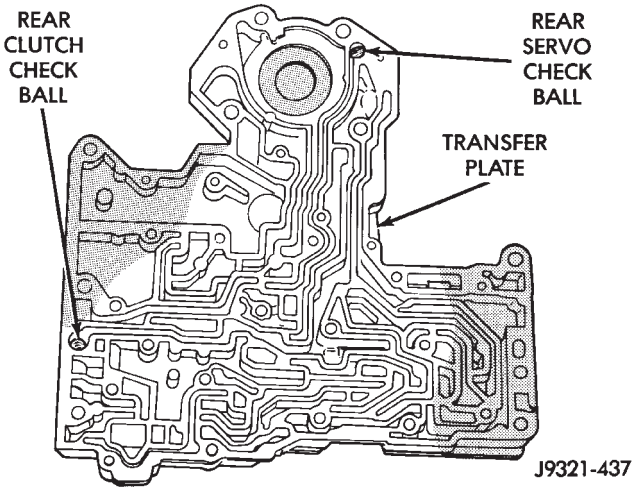


*Fig. 70 Rear Clutch And Rear Servo CheckBall Locations*

(3) Remove E-clip that secures shuttle valve secondary spring on valve stem (Fig. 72).

(4) Remove throttle plug, primary spring, shuttle valve, secondary spring, and spring guides (Fig. 73).

(5) Remove boost valve retainer, spring and valve if not previously removed.

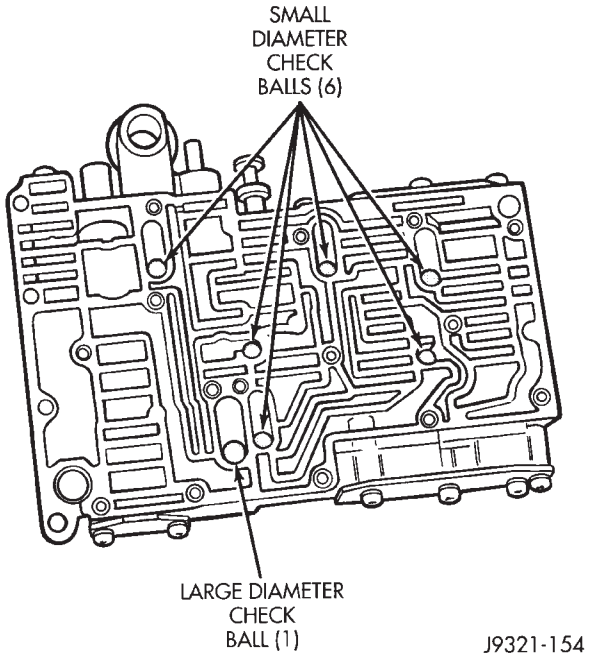


*Fig. 71 Check Ball Locations In Upper Housing*

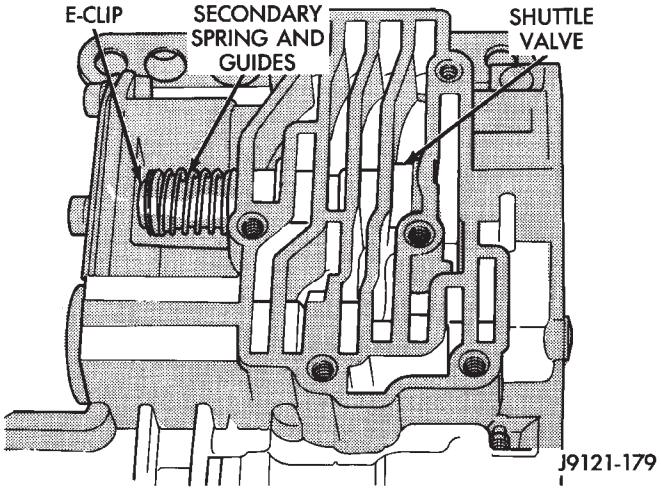


*Fig. 72 Shuttle Valve E-Clip And SecondarySpring Location*

(6) Remove throttle plug and 1-2 and 2-3 governor plugs (Fig. 61).

(7) Turn upper housing around and remove limit valve and shift valve covers (Fig. 74).

(8) Remove limit valve housing. Then remove retainer, spring, limit valve, and 2-3 throttle plug from limit valve housing (Fig. 74).

(9) Remove 1-2 shift control valve and spring (Fig. 74).

(10) Remove 1-2 shift valve and spring (Fig. 74).

(11) Remove 2-3 shift valve and spring from valve body (Fig. 74).

(12) Remove pressure plug cover (Fig. 74).

(13) Remove line pressure plug, sleeve, throttle pressure plug and spring (Fig. 74).

DISASSEMBLY AND ASSEMBLY (Continued)

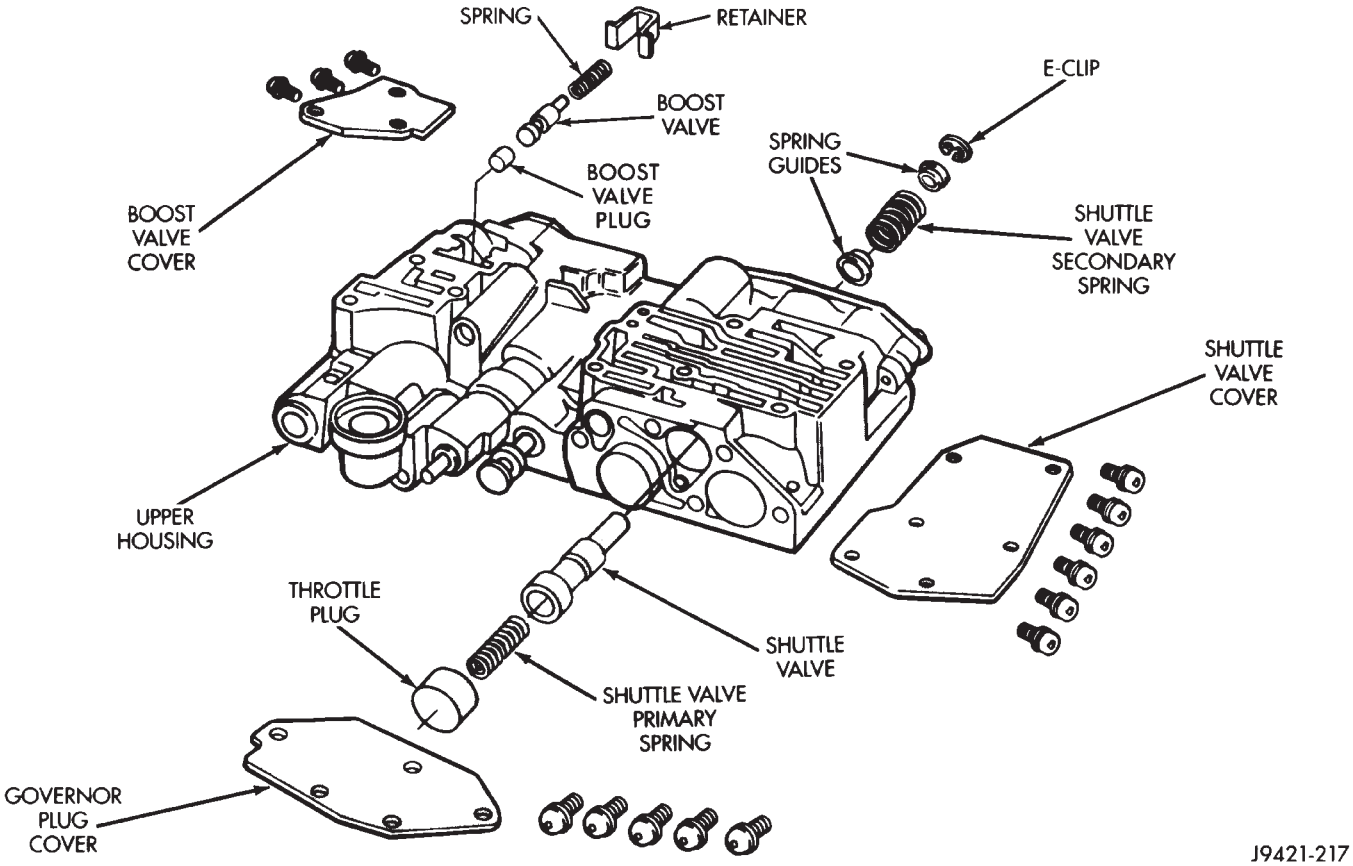


*Fig. 73 Shuttle And Boost Valve Components*

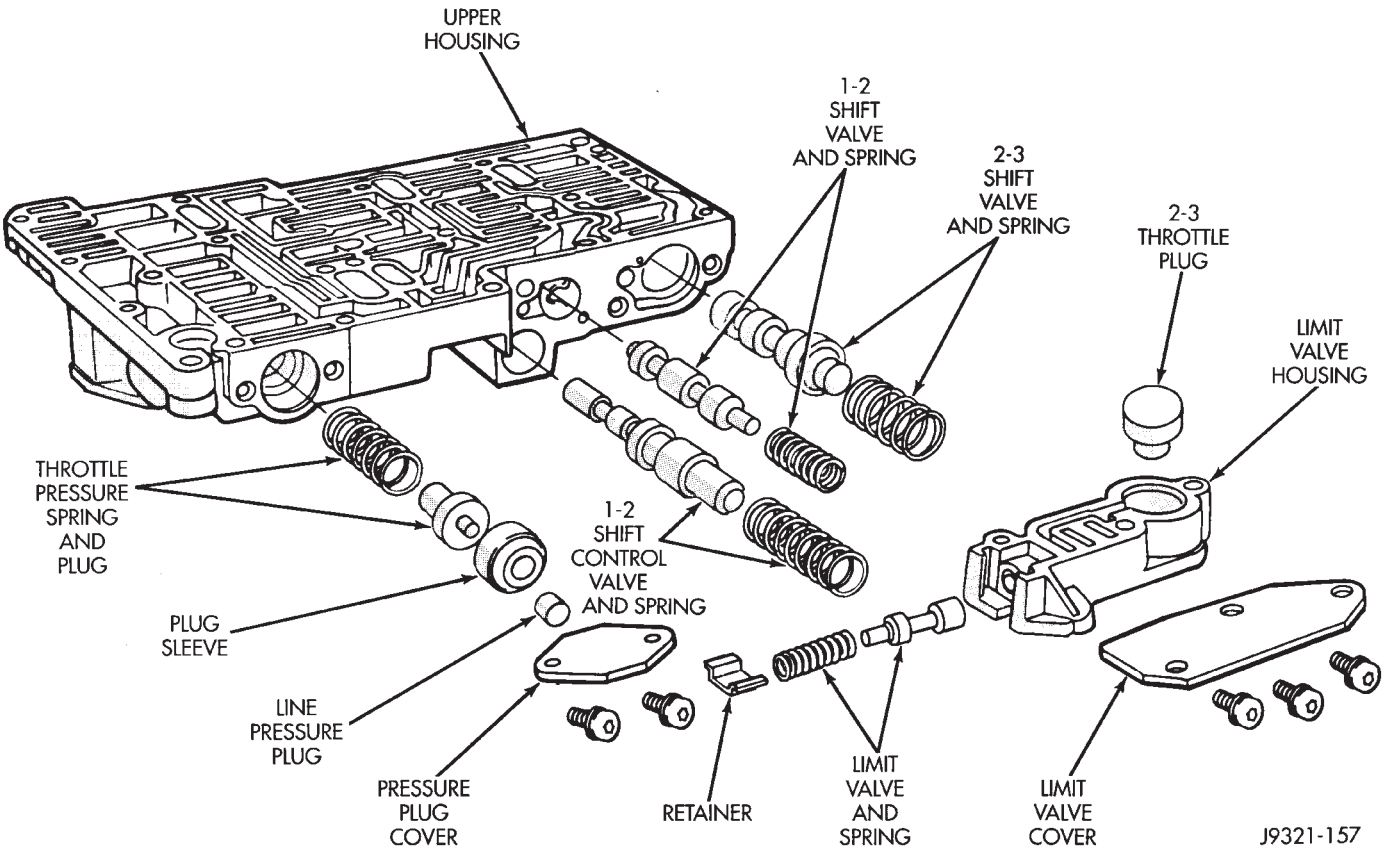


*Fig. 74 Upper Housing Shift Valve And PressurePlug Locations*

DISASSEMBLY AND ASSEMBLY (Continued)

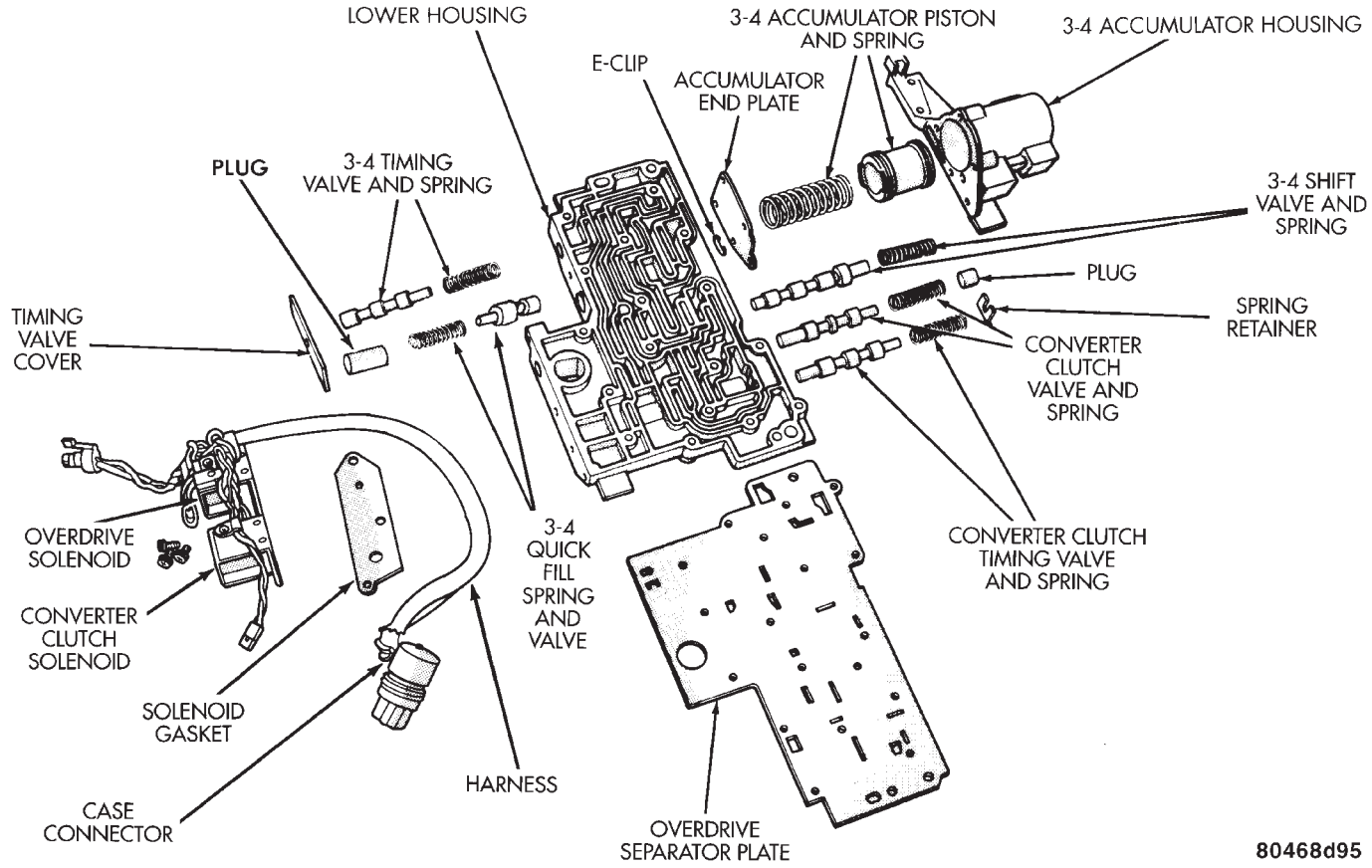


*Fig. 75 Lower Housing Shift Valves And Springs*

**VALVE BODY LOWER HOUSING DISASSEMBLY**

(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. 75).
(6) Remove converter clutch timing valve, retainer and valve spring.

**3-4 ACCUMULATOR HOUSING DISASSEMBLY**

(1) Remove end plate from housing.
(2) Remove piston spring.
(3) Remove piston. Remove and discard piston seals (Fig. 76).

*VALVE BODY 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.**

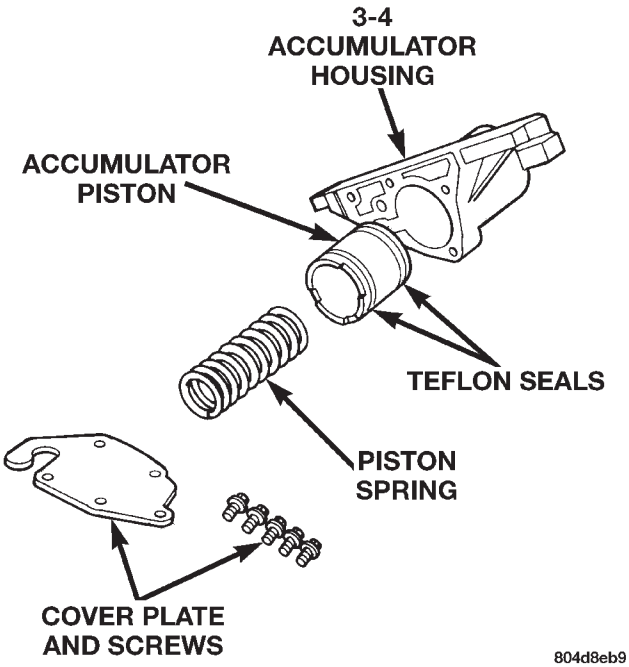


*Fig. 76 Accumulator Housing Components*

DISASSEMBLY AND ASSEMBLY (Continued)

**LOWER HOUSING ASSEMBLY**

(1) Lubricate valves, springs, and the housing valve and plug bores with clean transmission fluid (Fig. 75).

(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 ASSEMBLY**

(1) Lubricate accumulator piston, seals and housing piston bore with clean transmission fluid (Fig. 76).

(2) Install new seal rings on accumulator piston.

(3) Install piston and spring in housing.

(4) Install end plate on housing.

**TRANSFER PLATE ASSEMBLY**

(1) Install rear clutch and rear servo check balls in transfer plate (Fig. 77).

(2) Install filter screen in upper housing separator plate (Fig. 78).

(3) Align and position upper housing separator plate on transfer plate (Fig. 79).

(4) Install brace plate (Fig. 79). 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.

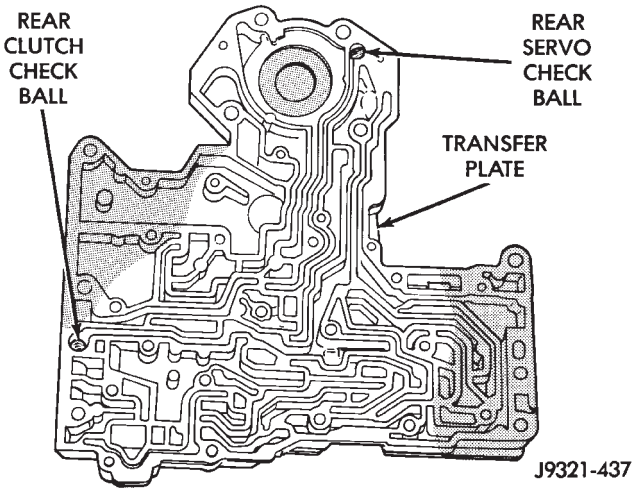


***Fig. 77 Rear Clutch And Rear Servo CheckBall Locations***

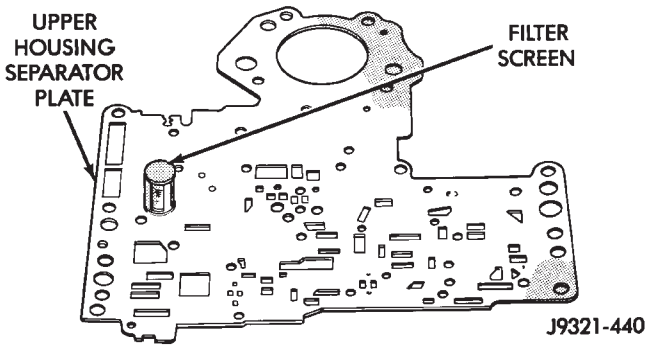


***Fig. 78 Separator Plate Filter Screen Installation***

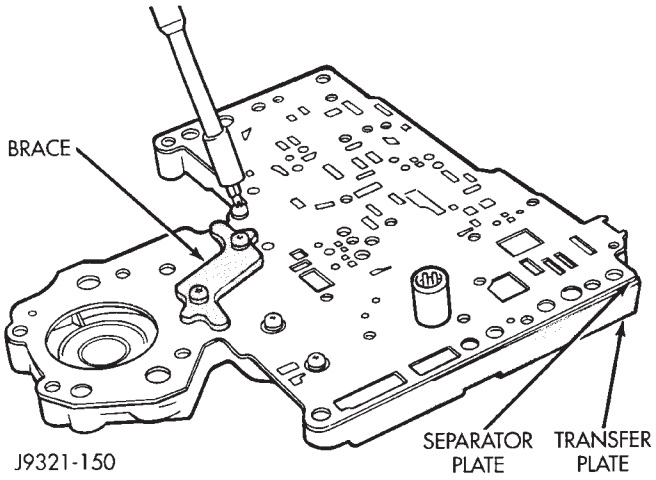


***Fig. 79 Brace Plate***

DISASSEMBLY AND ASSEMBLY (Continued)

**UPPER AND LOWER HOUSING ASSEMBLY**

(1) Position upper housing so internal passages and check ball seats are facing upward. Then install check balls in housing (Fig. 80). Seven check balls are used. The single large check ball is approximately 8.7 mm (11/32 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. 81). Be sure filter screen is seated in proper housing recess.

(3) Position lower housing separator plate on transfer plate (Fig. 82).

(4) Install lower housing on assembled transfer plate and upper housing (Fig. 83).

(5) 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. 83).

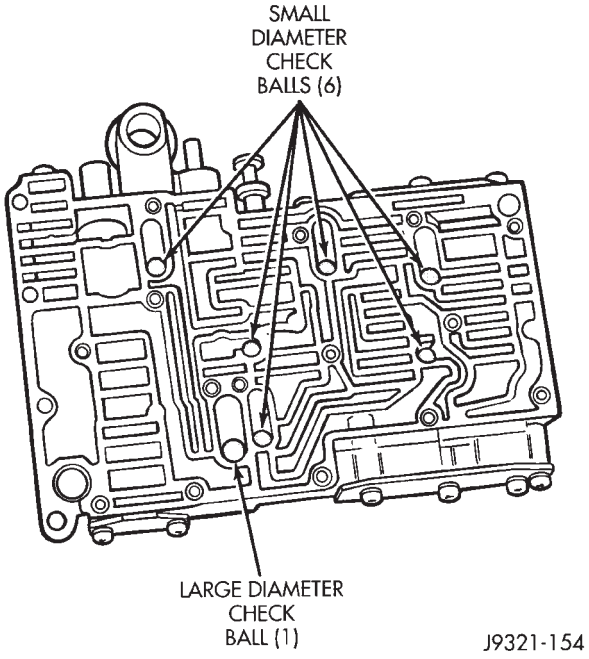


***Fig. 80 Check Ball Locations In Upper Housing***

**UPPER HOUSING VALVE AND PLUG ASSEMBLY**

Refer to (Fig. 84), (Fig. 85) and (Fig. 86) 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.

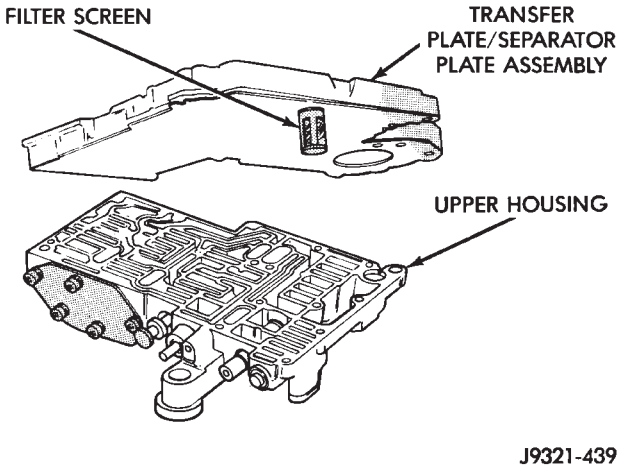


***Fig. 81 Installing Transfer Plate On UpperHousing***

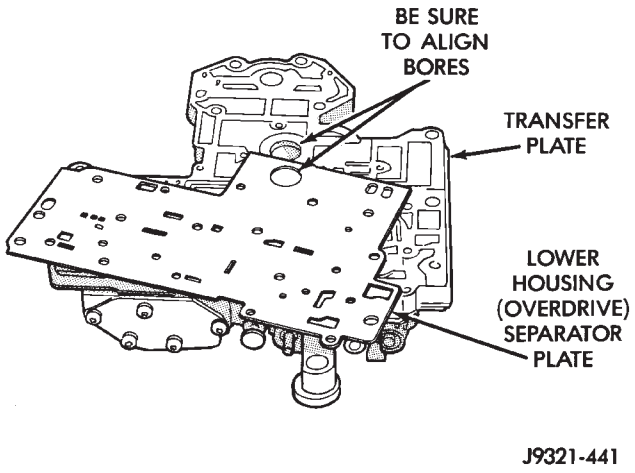


***Fig. 82 Lower Housing Separator Plate***

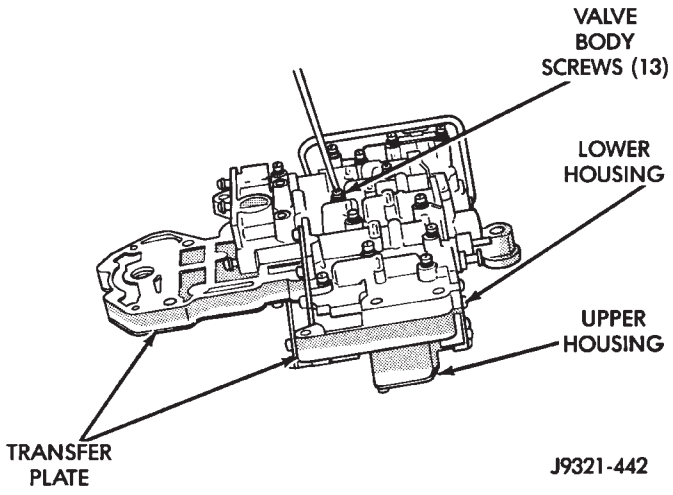


***Fig. 83 Installing Lower Housing On TransferPlate And Upper Housing***

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

DISASSEMBLY AND ASSEMBLY (Continued)

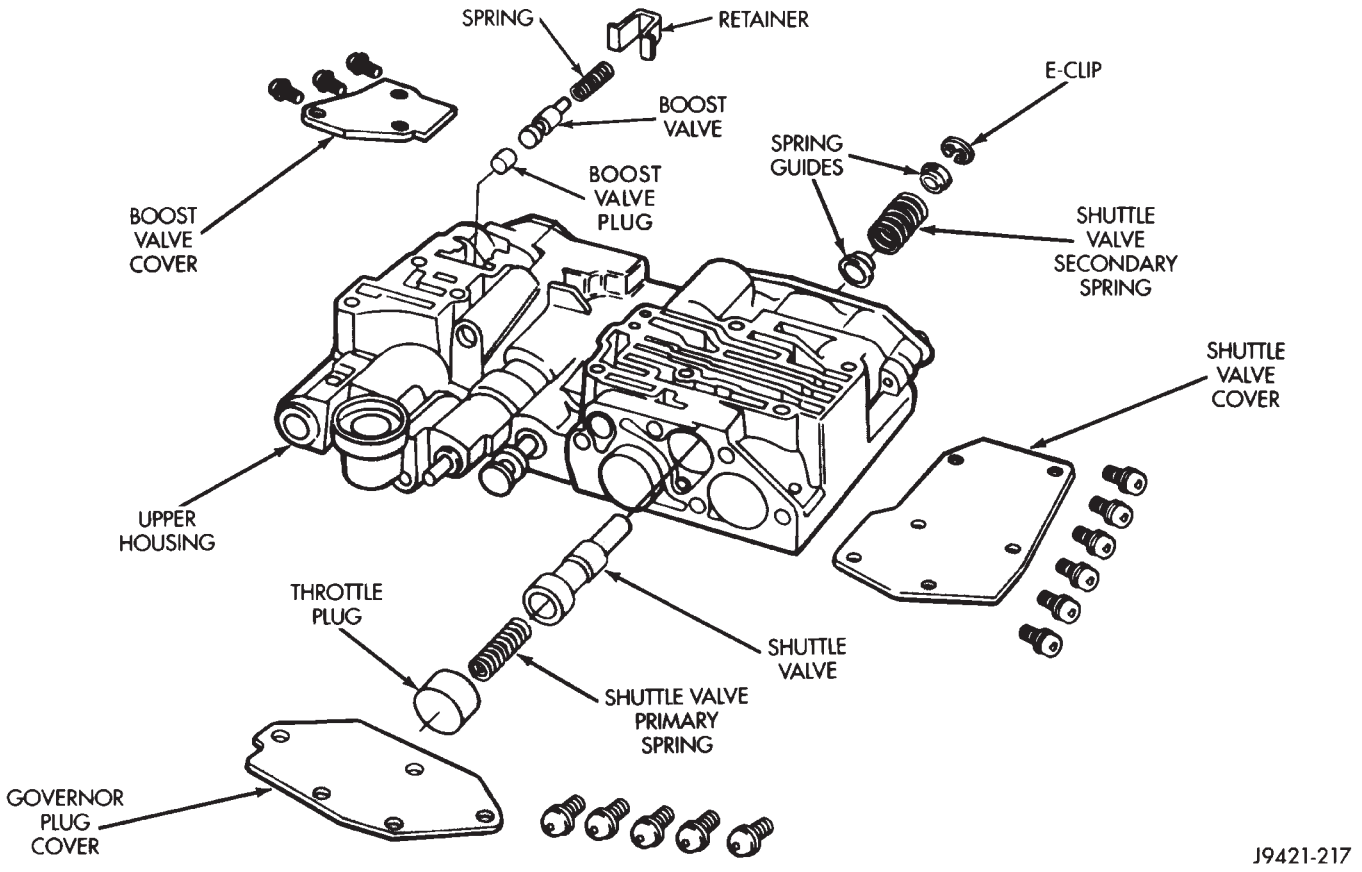


***Fig. 84 Shuttle And Boost Valve Components***

(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.

DISASSEMBLY AND ASSEMBLY (Continued)

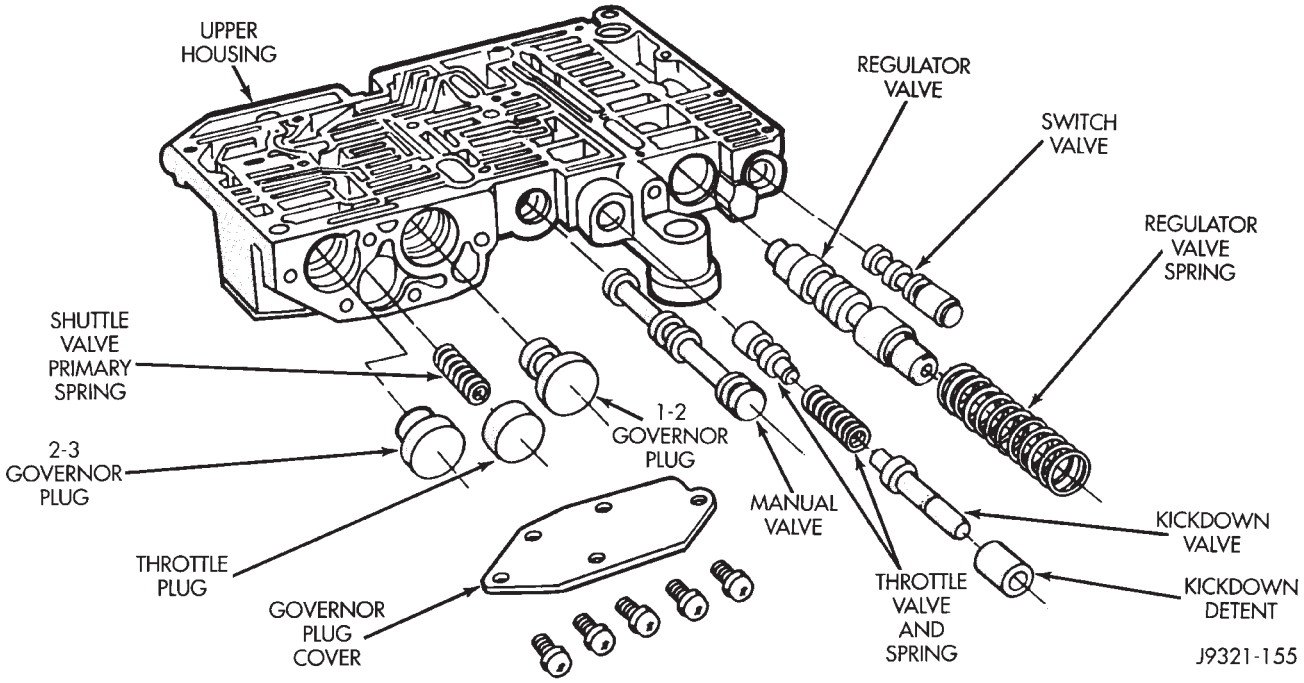


*Fig. 85 Upper Housing Control Valve Locations*

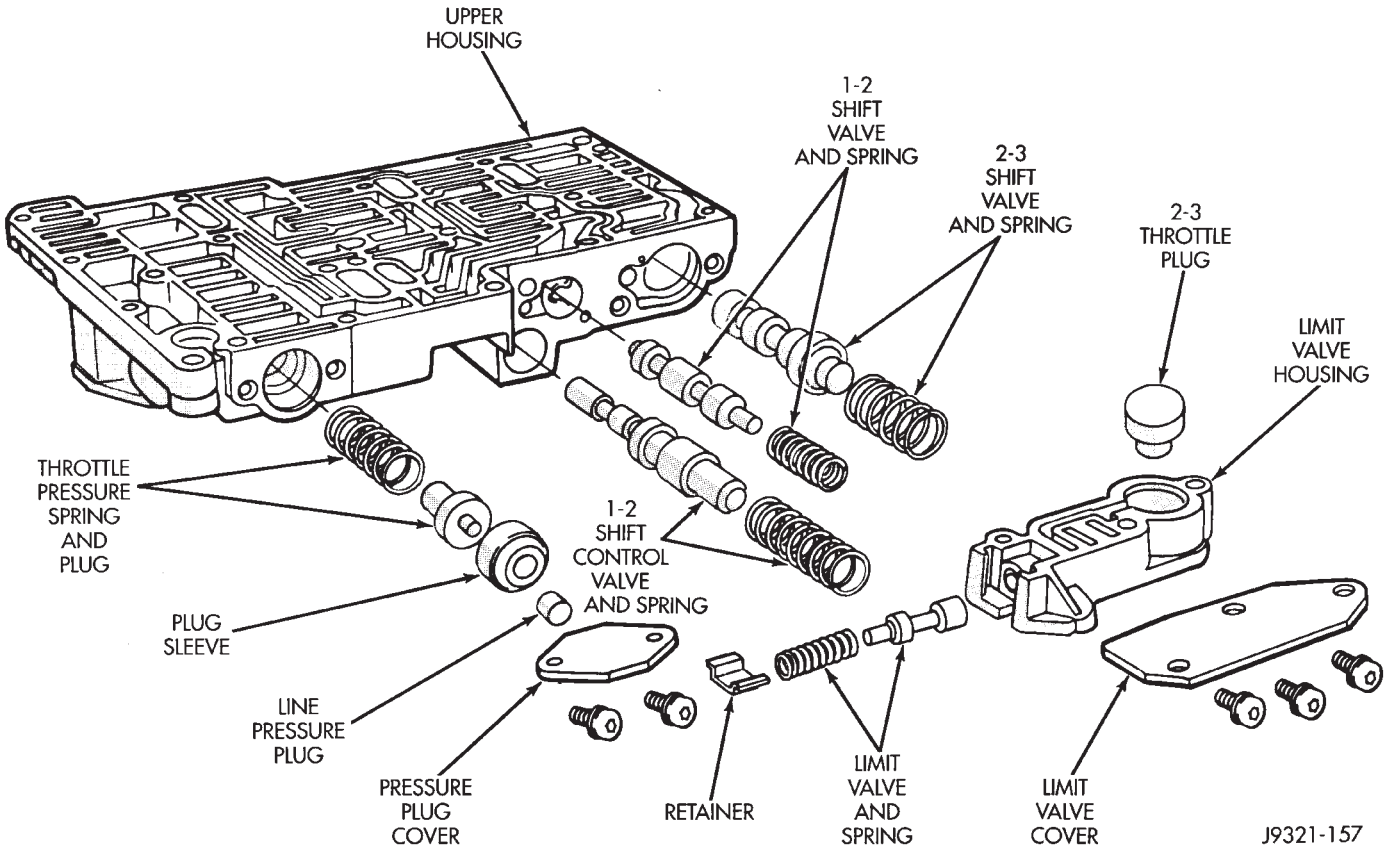


*Fig. 86 Upper Housing Shift Valve And PressurePlug Locations*

DISASSEMBLY AND ASSEMBLY (Continued)

**BOOST VALVE TUBE AND BRACE ASSEMBLY**

(1) Position valve body assembly so lower housing is facing upward (Fig. 87).

(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. 87).

(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. 88).

(6) Install and finger tighten three screws that secure tube brace to valve body housings (Fig. 88).

(7) Bend tube brace tabs up and against tube to hold it in position (Fig. 89).

(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.

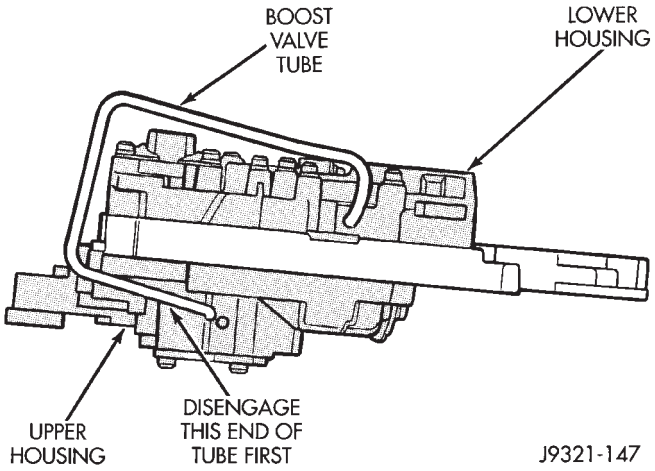


*Fig. 87 Boost Valve Tube*

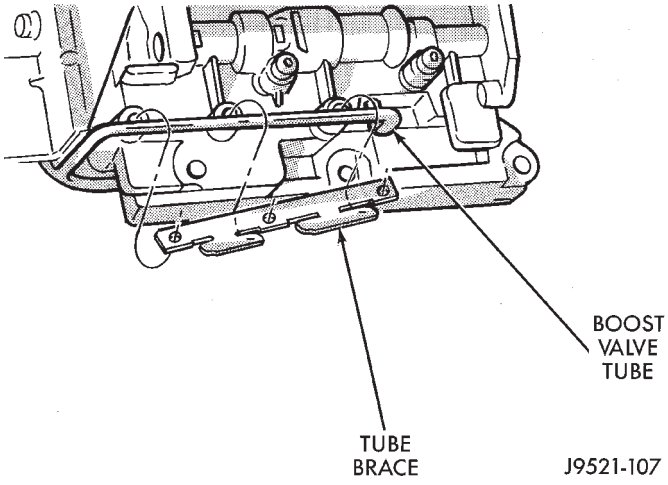


*Fig. 88 Boost Valve Tube And Brace*

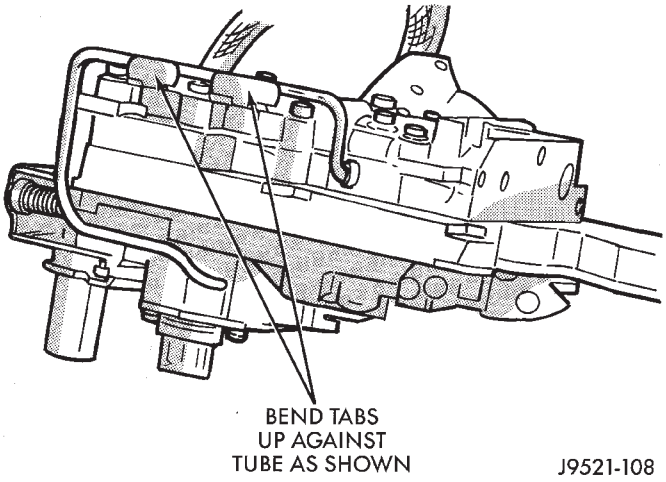


*Fig. 89 Securing Boost Valve Tube With BraceTabs*

**3-4 ACCUMULATOR ASSEMBLY**

(1) Position converter clutch valve and 3-4 shift valve springs in housing (Fig. 90).

(2) Loosely attach accumulator housing with right-side screw (Fig. 90). 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. 91). Tighten screws to 4 N·m (35 in. lbs.).

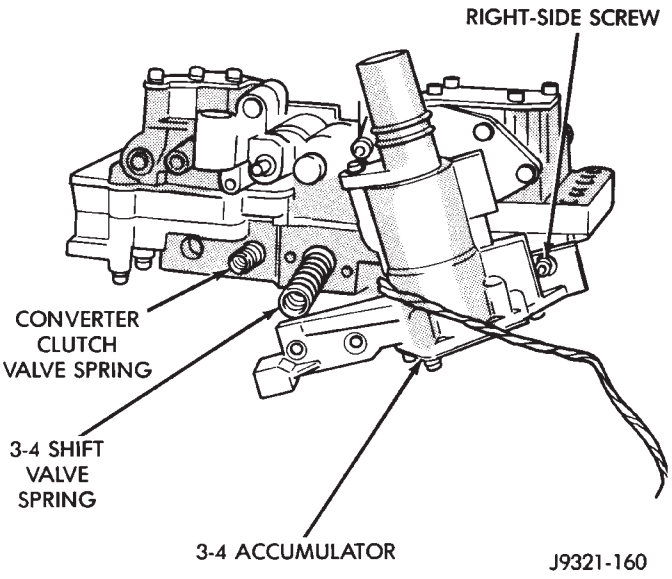


*Fig. 90 Converter Clutch And 3-4 Shift ValveSprings*

DISASSEMBLY AND ASSEMBLY (Continued)

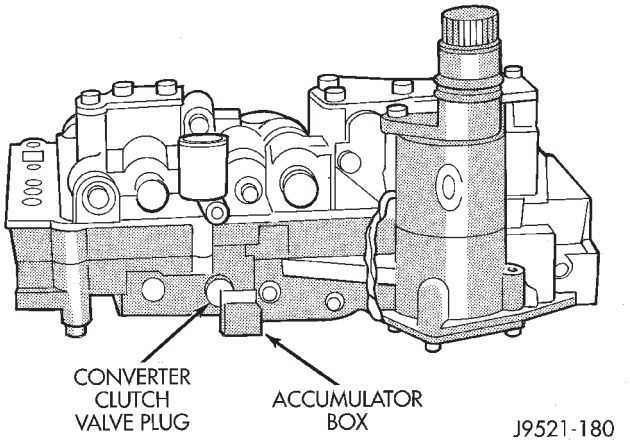


***Fig. 91 Seating 3-4 Accumulator On LowerHousing***

**VALVE BODY FINAL ASSEMBLY AND ADJUSTMENT**

(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. 92).

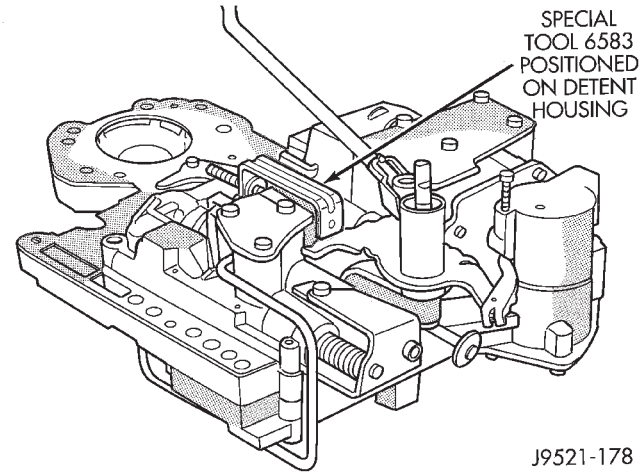


***Fig. 92 Detent Ball Spring***

(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. 93).

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

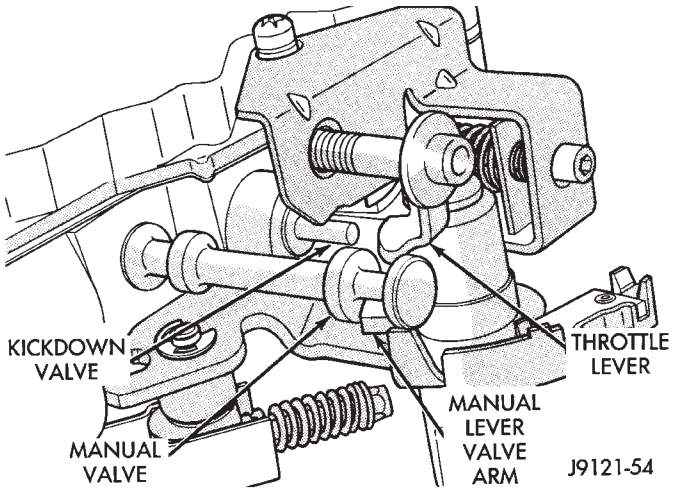


***Fig. 93 Manual And Throttle Lever Alignment***

(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. 94). 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. 95). **Solenoid harness must be clear of manual lever and park rod and not be pinched between accumulator housing and cover.**

DISASSEMBLY AND ASSEMBLY (Continued)

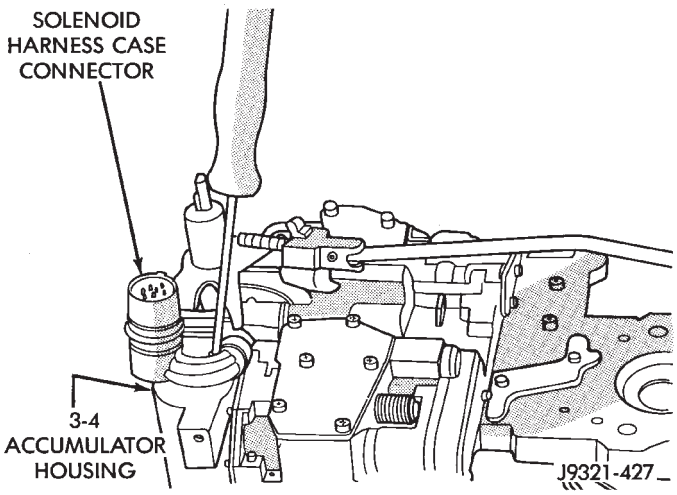


*Fig. 94 Solenoid Harness Case Connector ShoulderBolt*

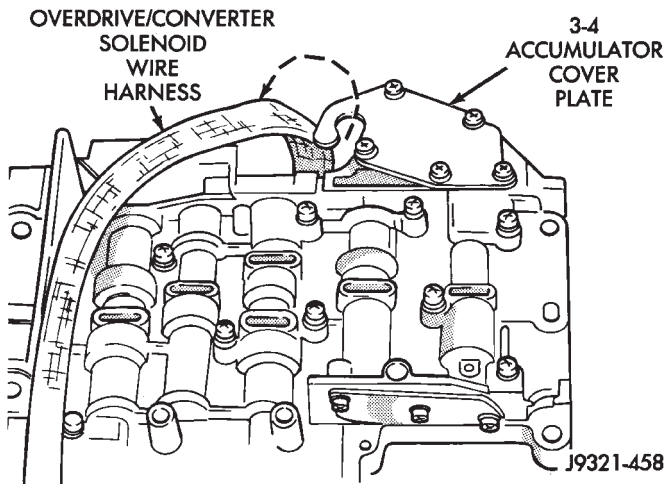


*Fig. 95 Solenoid Harness Routing*

**GOVERNOR BODY, SENSOR AND SOLENOID ASSEMBLY**

(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. 96).

(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. 96).

(5) Install governor pressure solenoid in governor body (Fig. 97). Push solenoid in until it snaps into place in body.

(6) Position governor body gasket on transfer plate (Fig. 98).

(7) Install retainer plate on governor body and around solenoid (Fig. 99). 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. 100).

(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.

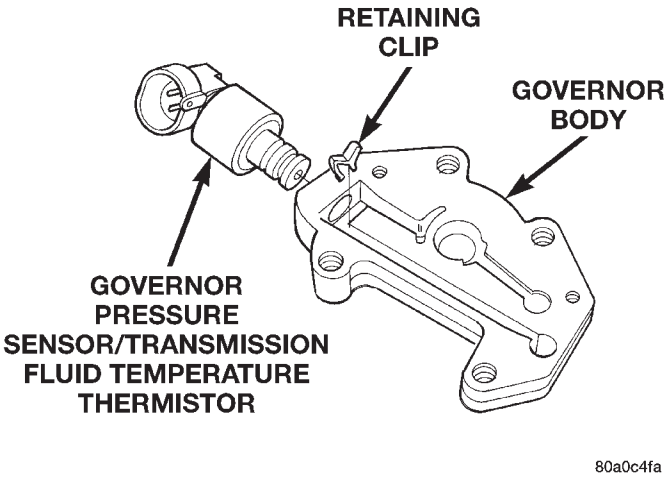


*Fig. 96 Governor Pressure Sensor*

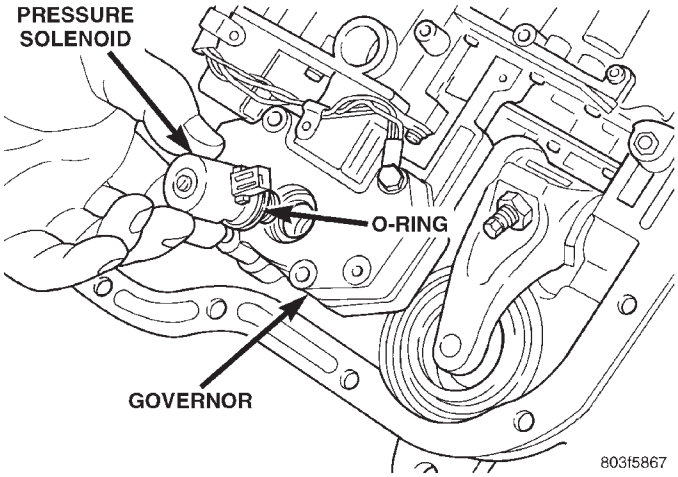


*Fig. 97 Governor Pressure Solenoid*

## 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.

DISASSEMBLY AND ASSEMBLY (Continued)

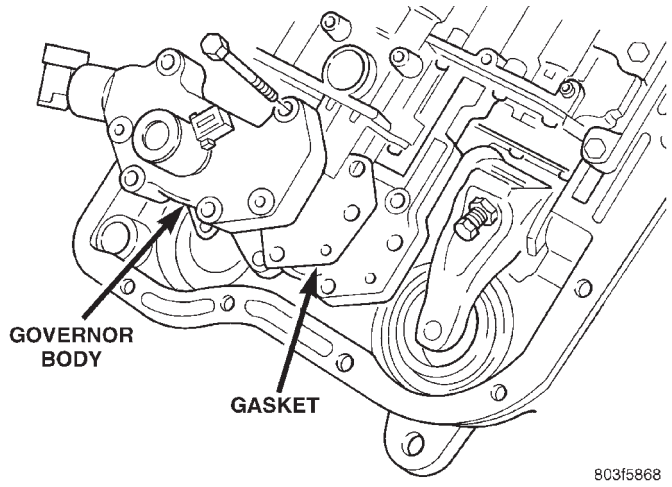


*Fig. 98 Governor Body And Gasket*

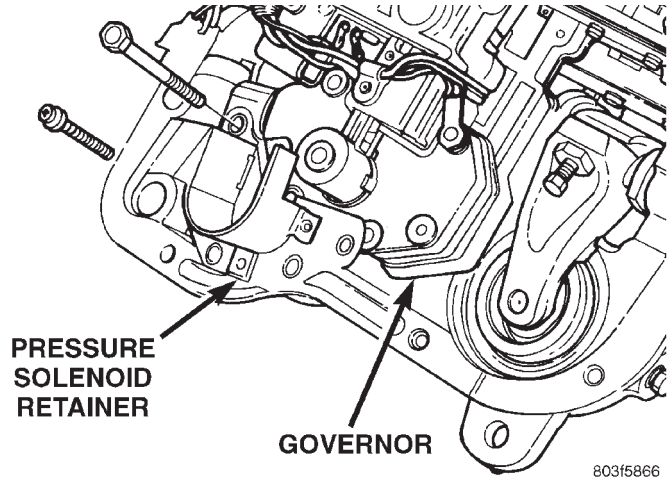


*Fig. 99 Pressure Solenoid Retainer*

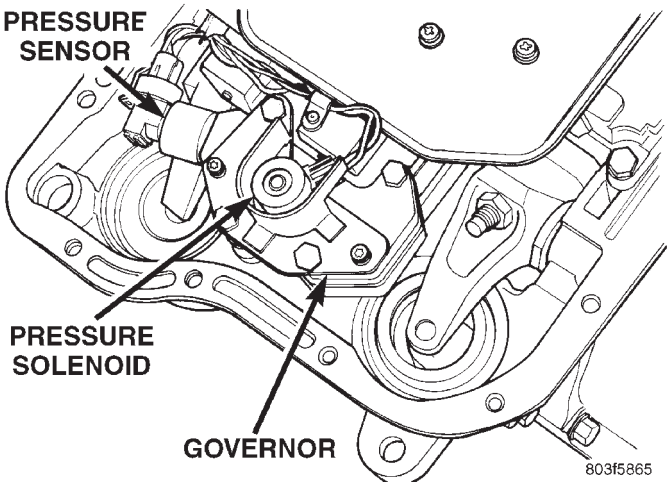


*Fig. 100 Governor Pressure Sensor And SolenoidConnectors*

(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. 101). Keep filter screws separate from other valve body screws. Filter screws are longer and should be kept with filter.

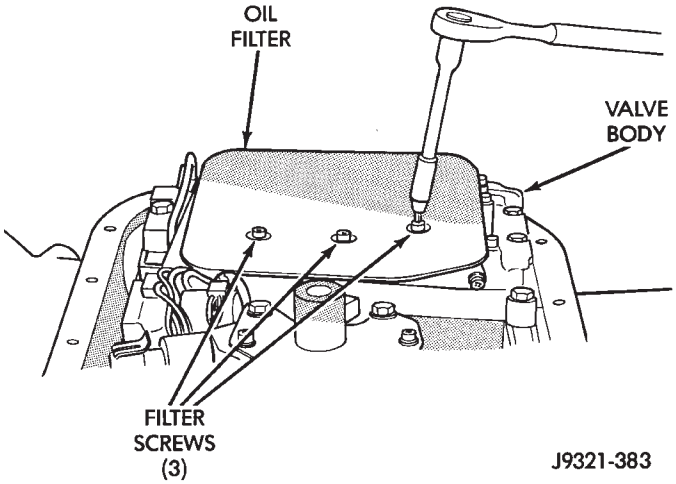


*Fig. 101 Oil Filter Removal*

(8) Remove park/neutral position switch.

(9) Remove hex head bolts attaching valve body to transmission case (Fig. 102). A total of 10 bolts are used. Note different bolt lengths for assembly reference.

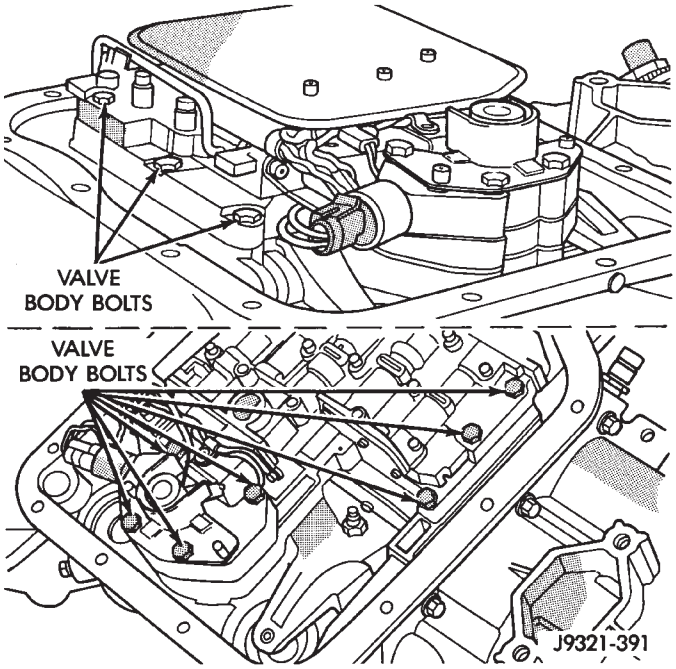


*Fig. 102 Valve Body Bolt Locations*

(10) Remove valve body assembly. Push valve body harness connector out of case. Then work park rod and valve body out of case (Fig. 103).

DISASSEMBLY AND ASSEMBLY (Continued)

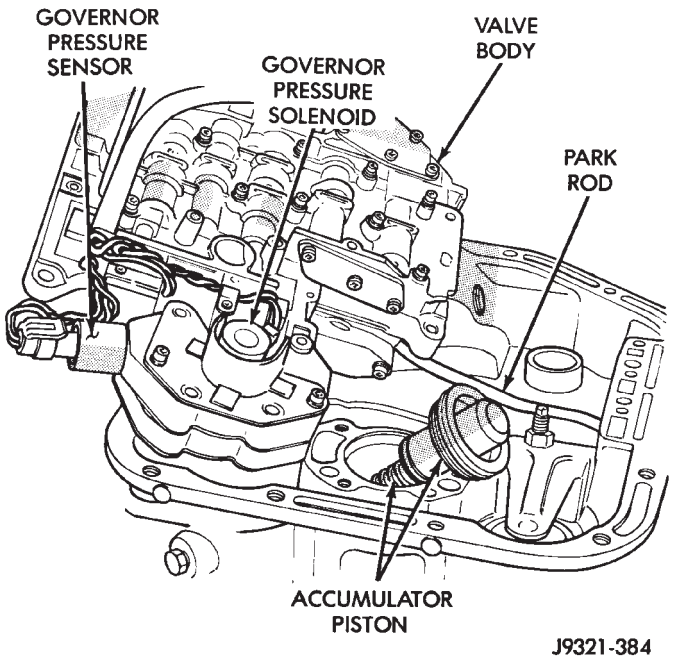


*Fig. 103 Valve Body Removal*

(11) Remove accumulator piston and inner and outer springs (Fig. 104).

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

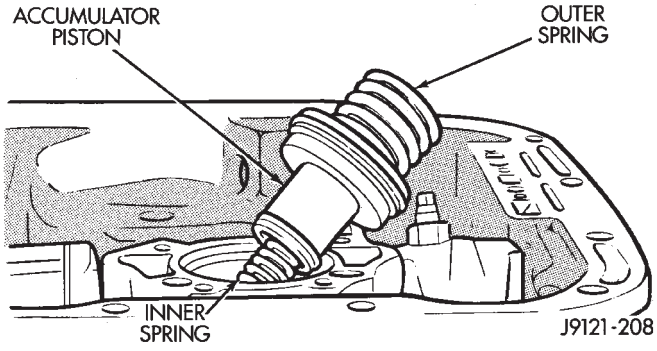


*Fig. 104 Accumulator Piston And Springs*

(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. 105).

(16) Bump slide hammer weights outward to remove pump and reaction shaft support assembly from case (Fig. 105).

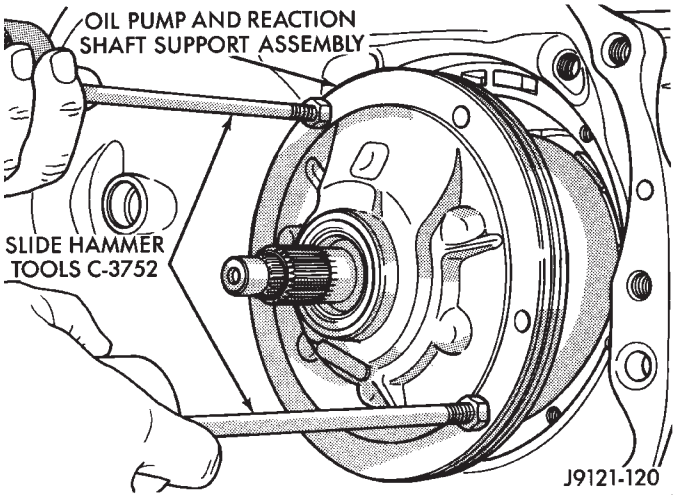


*Fig. 105 Removing Oil Pump And Reaction ShaftSupport Assembly*

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

(18) Squeeze front band together and remove band strut (Fig. 106).

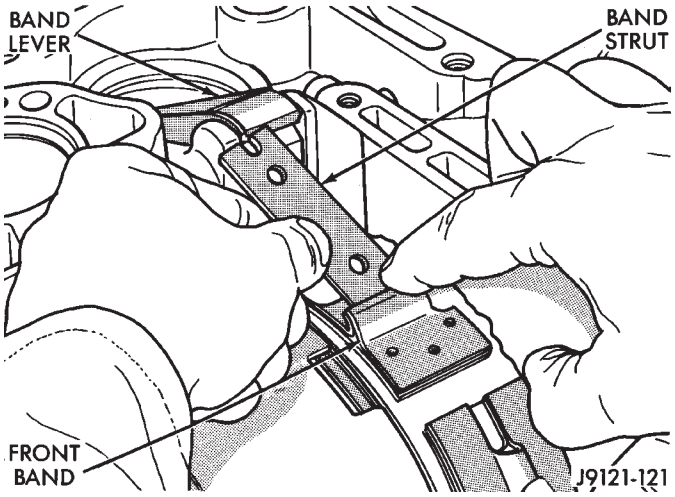


*Fig. 106 Removing/Installing Front Band Strut*

DISASSEMBLY AND ASSEMBLY (Continued)

(19) Remove front band lever (Fig. 107).

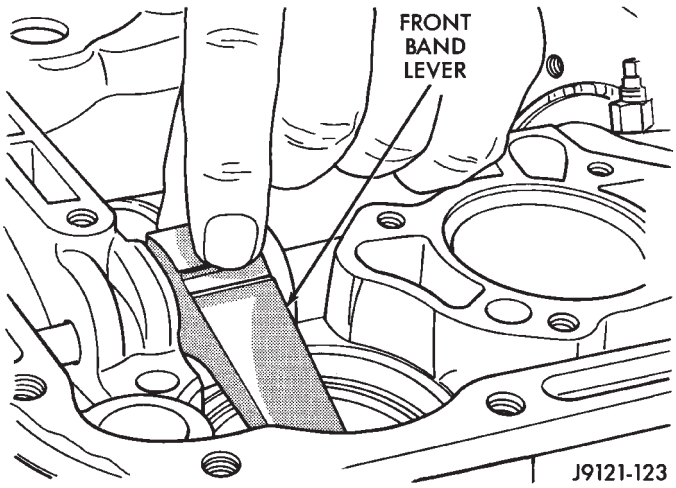


***Fig. 107 Removing/Installing Front Band Lever***

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

(21) Remove front band lever shaft.

(22) Remove front and rear clutch units as assembly. Grasp input shaft, hold clutch units together and remove them from case (Fig. 108).

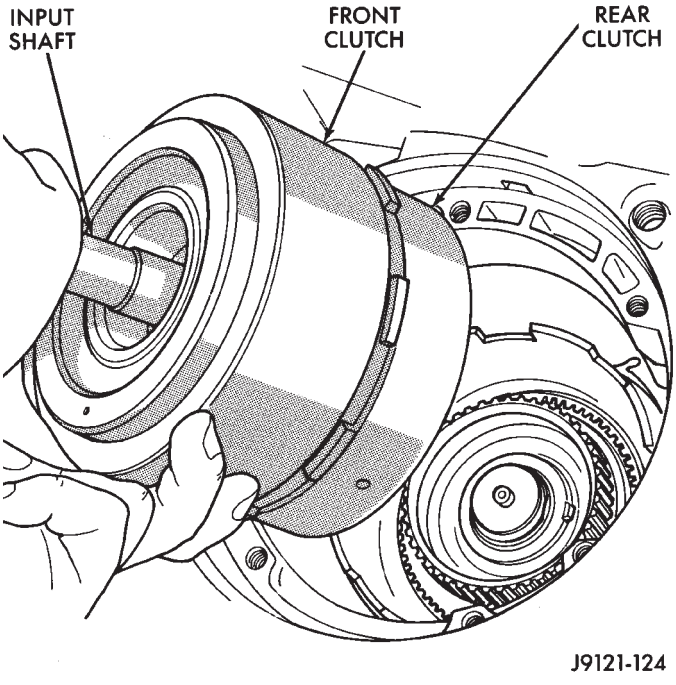


***Fig. 108 Removing Front/Rear Clutch Assemblies***

(23) Lift front clutch off rear clutch (Fig. 109). Set clutch units aside for overhaul.

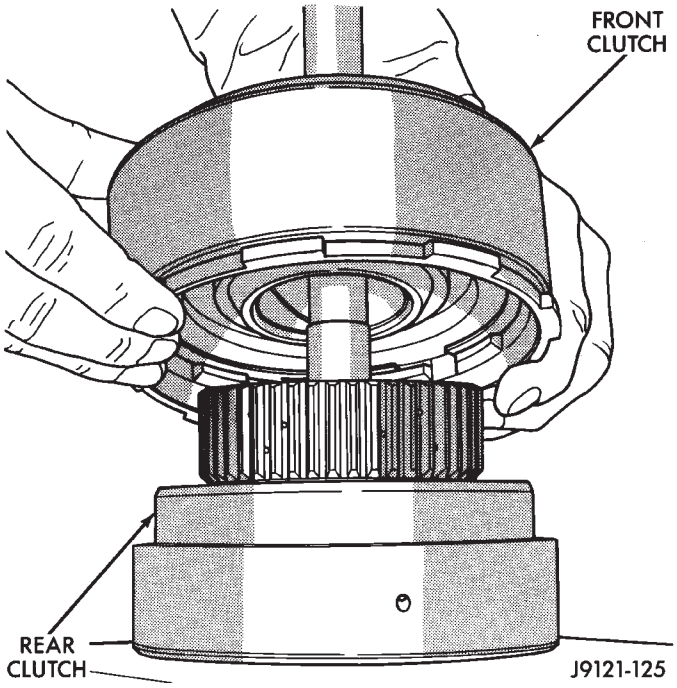


***Fig. 109 Separating Front/Rear Clutch Assemblies***

(24) Remove intermediate shaft thrust washer from front end of shaft or from rear clutch hub (Fig. 110).

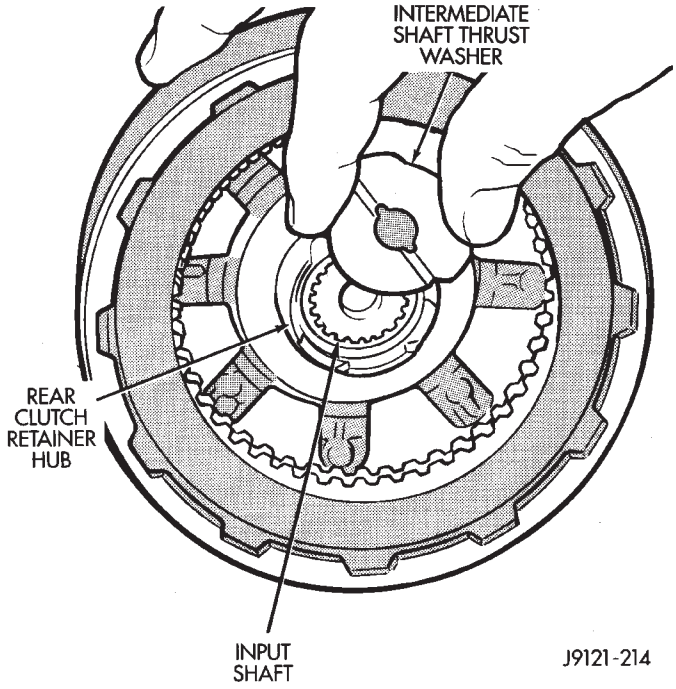


***Fig. 110 Removing Intermediate Shaft ThrustWasher***

DISASSEMBLY AND ASSEMBLY (Continued)

(25) Remove output shaft thrust plate from intermediate shaft hub (Fig. 111).

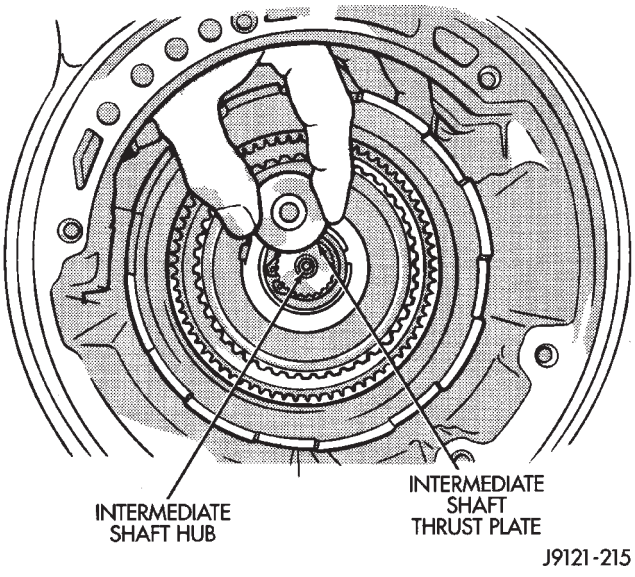


***Fig. 111 Removing Intermediate Shaft ThrustPlate***

(26) Slide front band off driving shell (Fig. 112) and remove band from case.

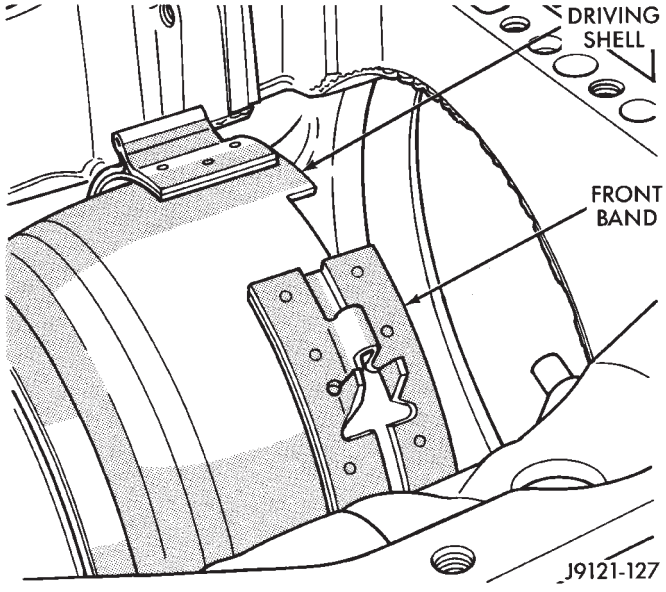


***Fig. 112 Front Band Removal/Installation***

(27) Remove planetary geartrain as assembly (Fig. 113). 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 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. 114).

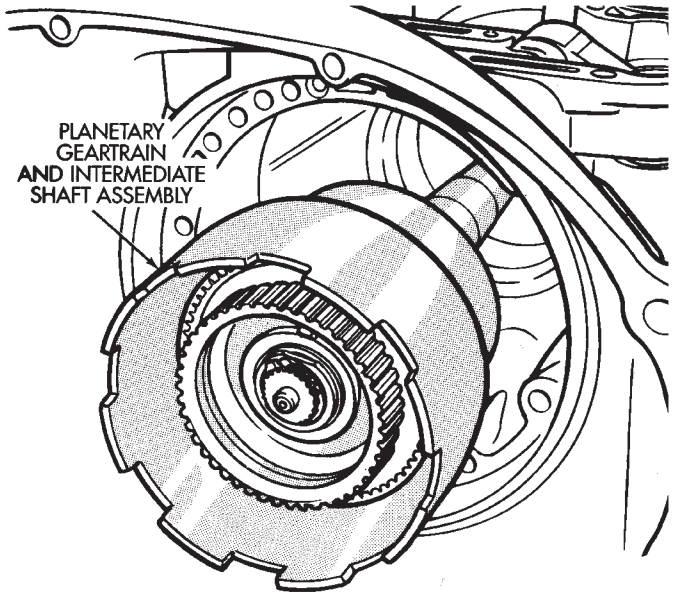


***Fig. 113 Removing Planetary Geartrain AndIntermediate Shaft Assembly***

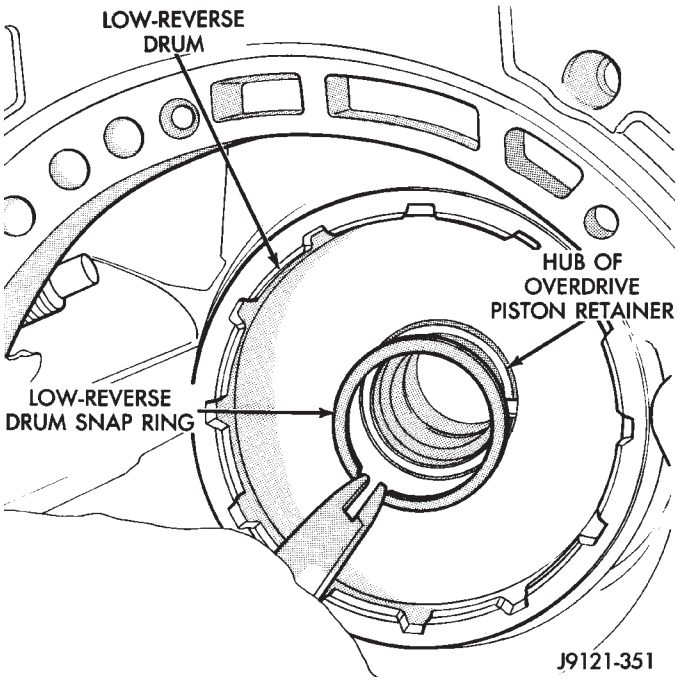


***Fig. 114 Removing Low-Reverse Drum Snap Ring***

(31) Remove low-reverse drum and reverse band.

(32) Remove overrunning clutch roller and spring assembly as a unit (Fig. 115).

(33) Compress front servo rod guide about 1/8 inch with Valve Spring Compressor C-3422-B (Fig. 116).

(34) Remove front servo rod guide snap ring. **Exercise caution when removing snap ring.**

DISASSEMBLY AND ASSEMBLY (Continued)

**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.

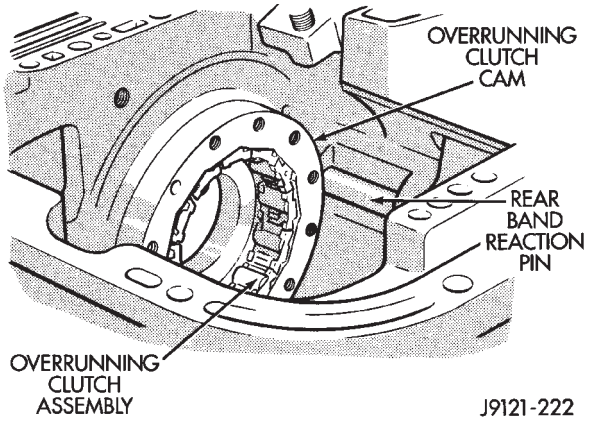


*Fig. 115 Overrunning Clutch Assembly Removal*

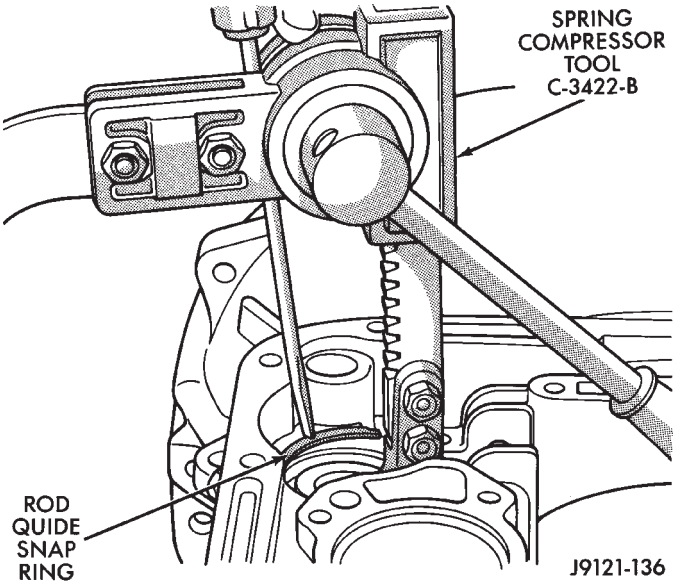


*Fig. 116 Compressing Front Servo Rod Guide*

(36) Compress rear servo spring retainer about 1/16 inch with Valve Spring Compressor C-3422-B (Fig. 117).

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

(38) Inspect transmission components.

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

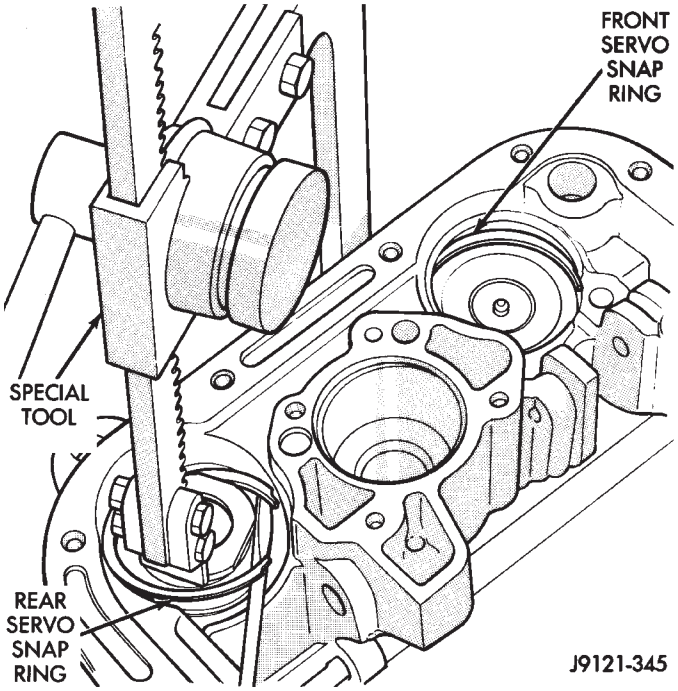


*Fig. 117 Compressing Rear Servo Spring*

*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.

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.

DISASSEMBLY AND ASSEMBLY (Continued)

(1) Install rear servo piston, spring and retainer (Fig. 118). Install spring on top of servo piston and install retainer on top of spring.

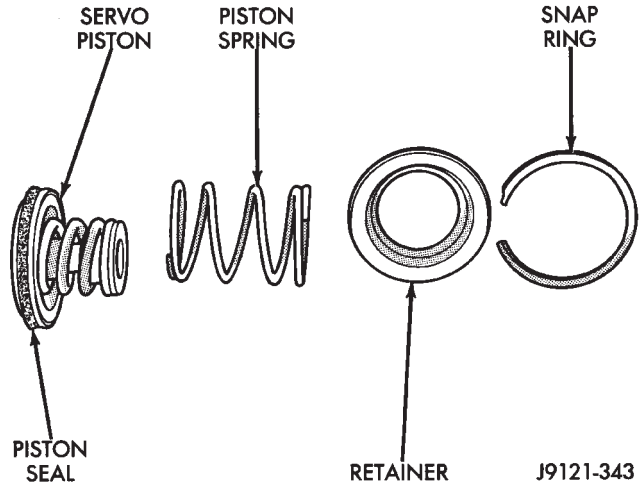


*Fig. 118 Rear Servo Components*

(2) Install front servo piston assembly, servo spring and rod guide (Fig. 119).

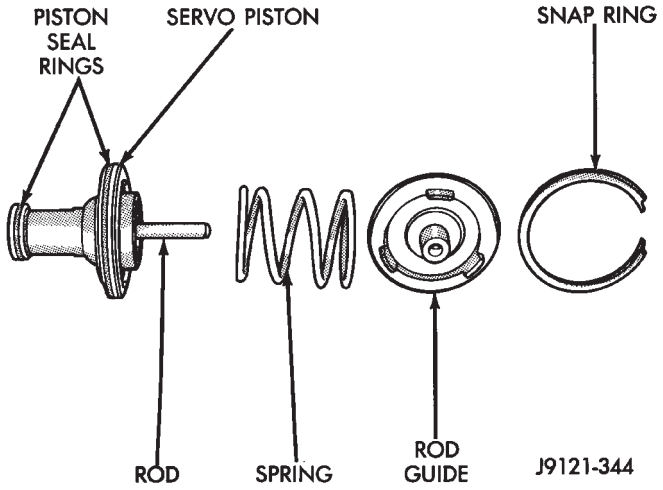


*Fig. 119 Front Servo Components*

(3) Compress front/rear servo springs with Valve Spring Compressor C-3422-B and install each servo snap ring (Fig. 120).

(4) Lubricate clutch cam rollers with transmission fluid.

(5) Install rear band in case (Fig. 121). 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.

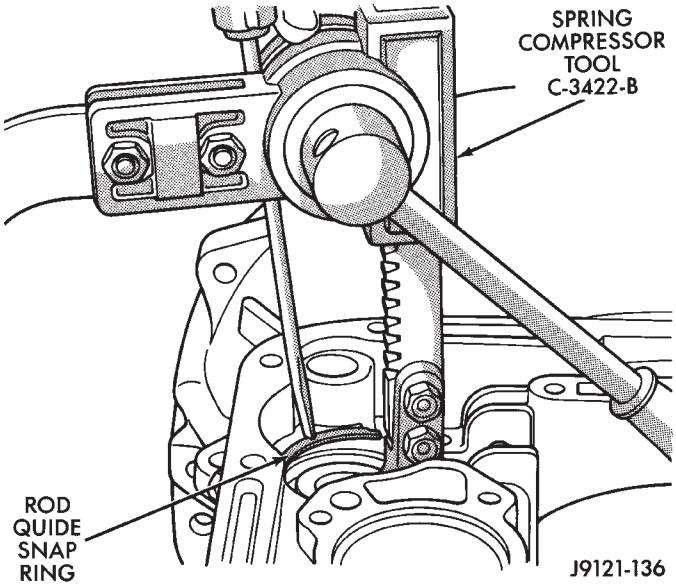


*Fig. 120 Compressing Front/Rear Servo Springs*

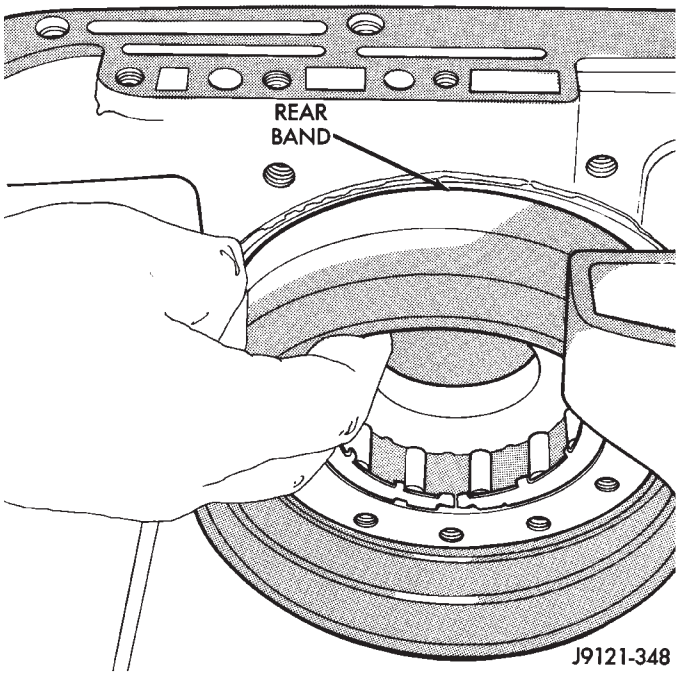


*Fig. 121 Rear Band Installation*

(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. 122).

(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)

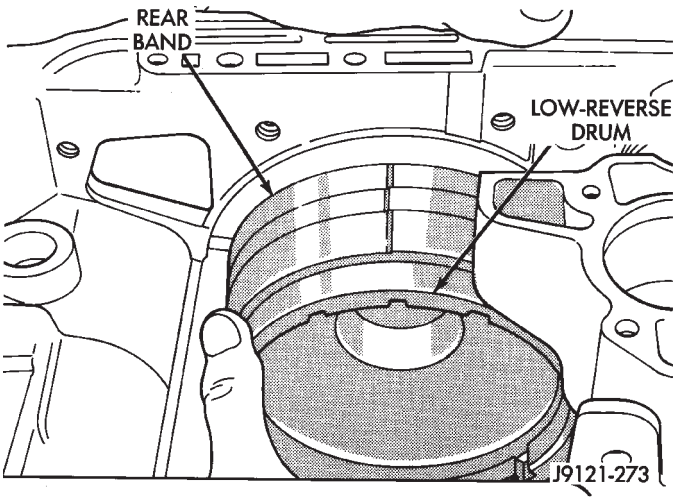


***Fig. 122 Installing Low-Reverse Drum***

(7) Install snap ring that secures low-reverse drum to hub of overdrive piston retainer (Fig. 123).

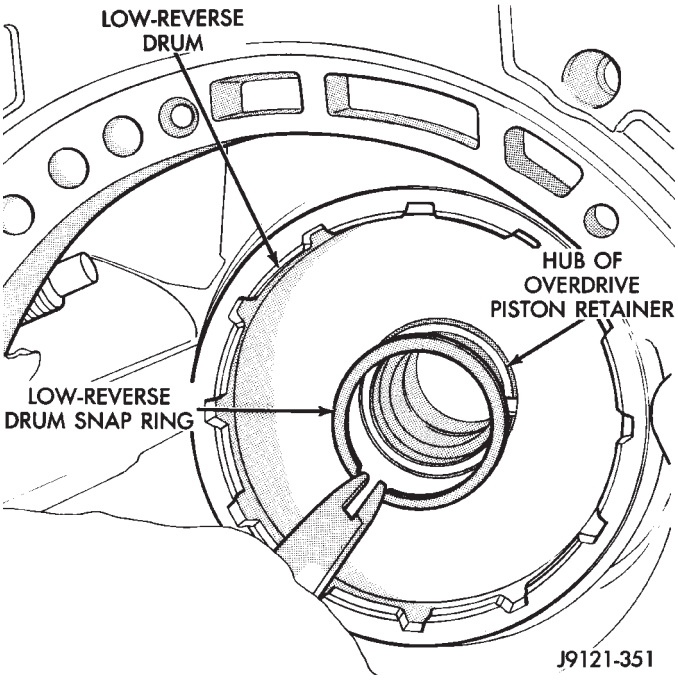


***Fig. 123 Installing Low-Reverse Drum RetainingSnap Ring***

(8) Install rear band lever and pivot pin (Fig. 124).

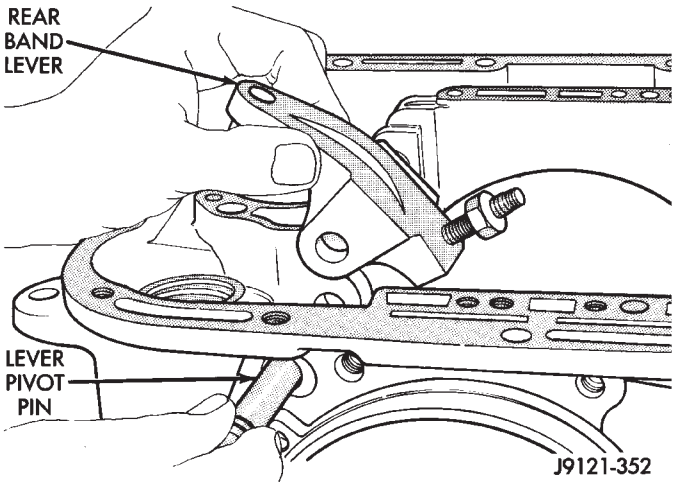


***Fig. 124 Rear Band Lever And Pivot Pin Installation***

Align lever with pin bores in case and push pivot pin into place.

(9) Install planetary geartrain assembly (Fig. 125.)

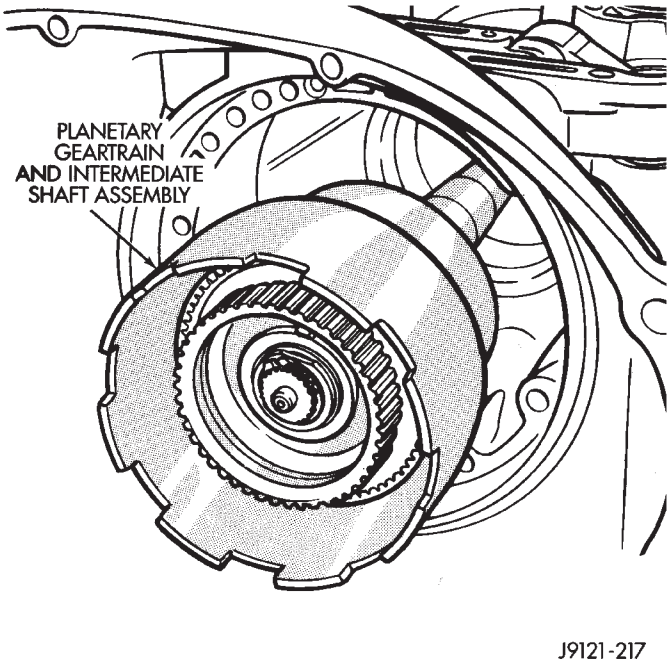


***Fig. 125 Installing Planetary Geartrain***

DISASSEMBLY AND ASSEMBLY (Continued)

(10) Install thrust plate on intermediate shaft hub (Fig. 126). Use petroleum jelly to hold thrust plate in place.

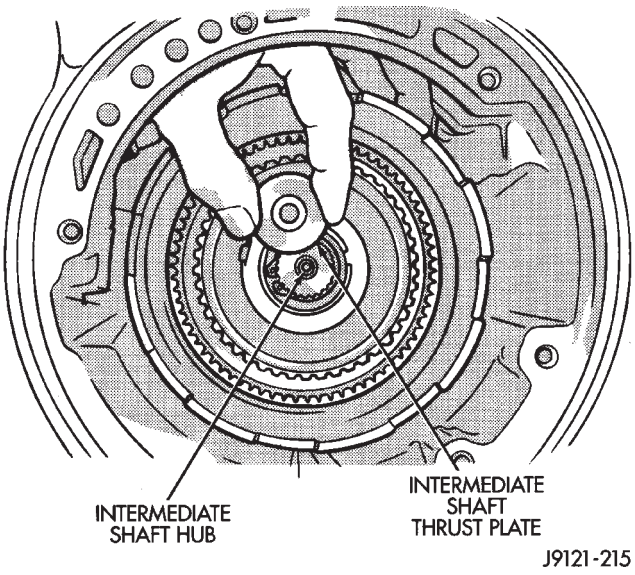


***Fig. 126 Installing Intermediate Shaft ThrustPlate***

(11) Check seal ring on rear clutch retainer hub and seal rings on input shaft (Fig. 127). Also verify that shaft seal rings are installed in sequence shown.

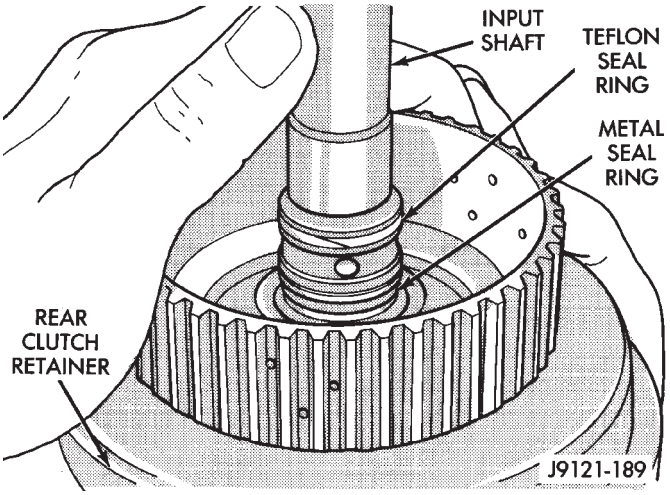


***Fig. 127 Input Shaft Seal Ring Location***

(12) Install rear clutch thrust washer (Fig. 128). Use additional petroleum jelly to hold washer in place if necessary.

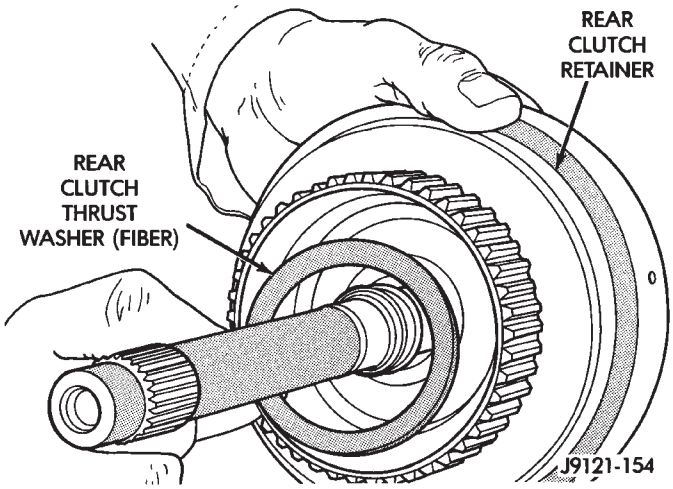


***Fig. 128 Installing Rear Clutch Thrust Washer***

(13) Align clutch discs in front clutch and install front clutch on rear clutch (Fig. 129). Rotate front clutch retainer back and forth until completely seated on rear clutch retainer.

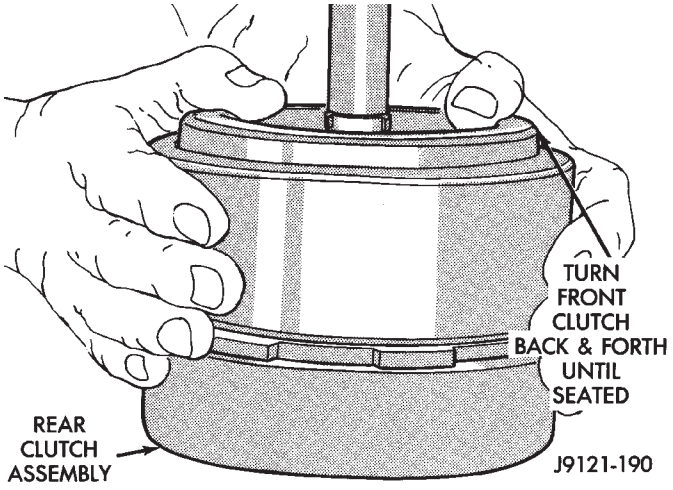


***Fig. 129 Assembling Front And Rear ClutchUnits***

DISASSEMBLY AND ASSEMBLY (Continued)

(14) Coat intermediate shaft thrust washer with petroleum jelly. Then install washer in rear clutch hub (Fig. 130). 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.

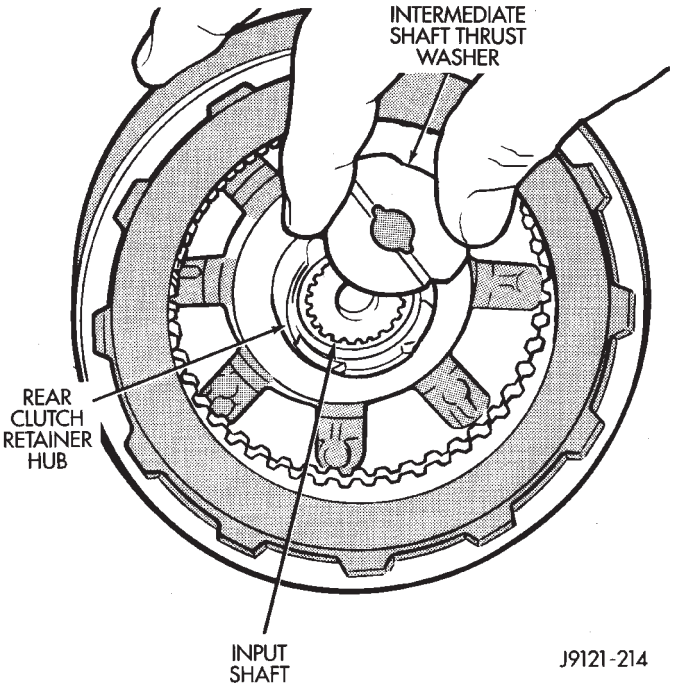


*Fig. 130 Installing Intermediate Shaft ThrustPlate*

(15) Align drive teeth on rear clutch discs with small screwdriver (Fig. 131). This makes installation on front planetary easier.

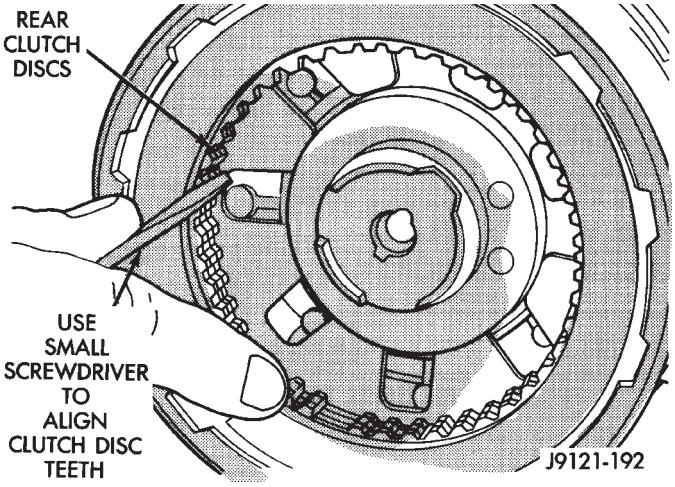


*Fig. 131 Aligning Rear Clutch Disc Lugs*

(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. 132). 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.

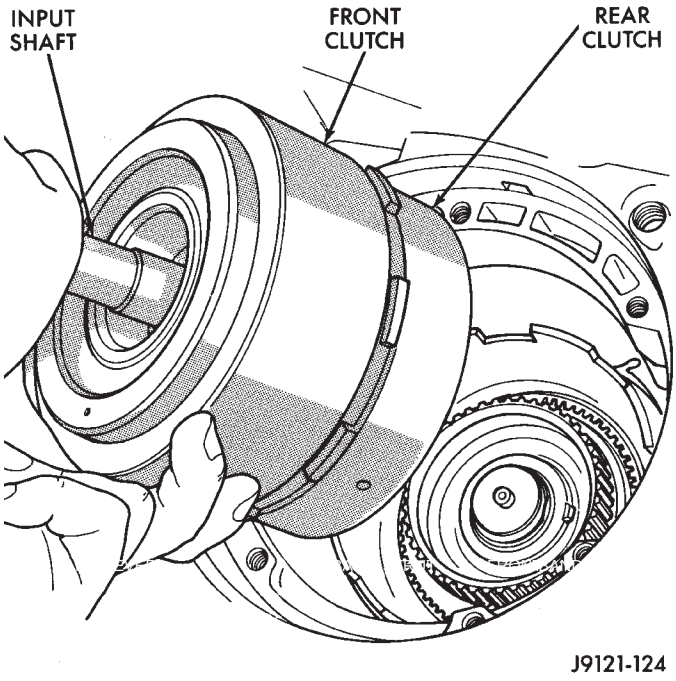


*Fig. 132 Installing Front/Rear Clutch Assemblies*

(20) Assemble front band strut.

(21) Install front band adjuster, strut and adjusting screw (Fig. 133).

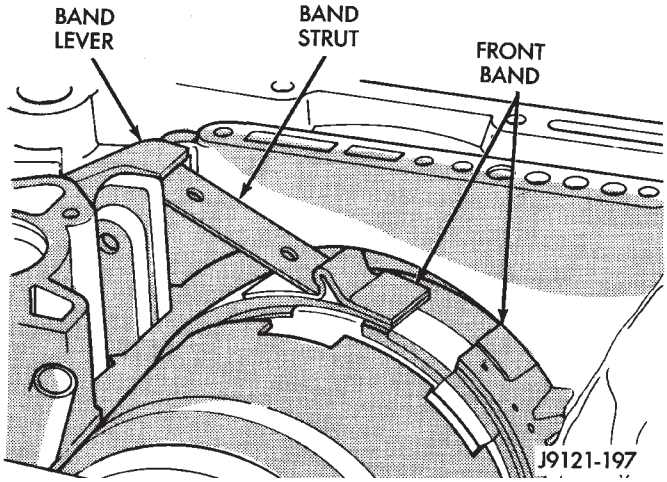


*Fig. 133 Front Band Linkage Installation*

DISASSEMBLY AND ASSEMBLY (Continued)

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

(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. 134). 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. 135).

(26) Align and install oil pump gasket (Fig. 135).

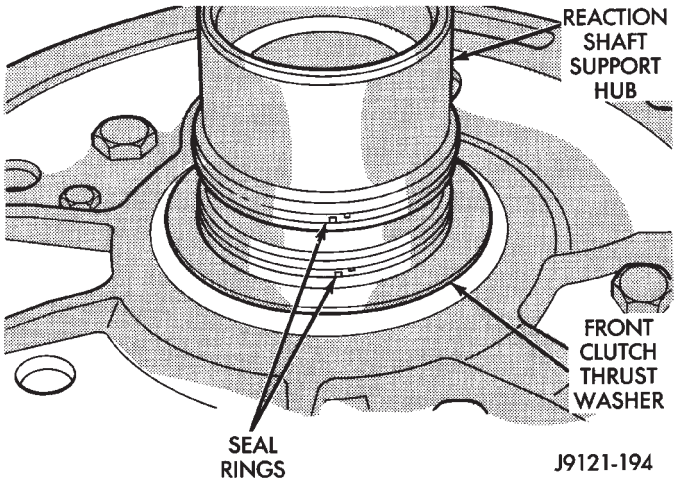


***Fig. 134 Reaction Shaft Support Seal RingsAnd Front Clutch Thrust Washer***

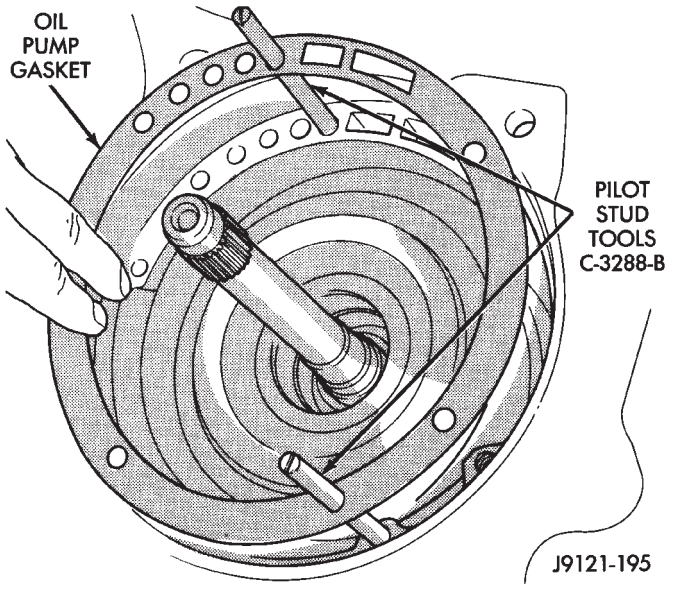


***Fig. 135 Installing Pilot Studs And Oil PumpGasket***

(27) Install oil pump (Fig. 136). 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.).

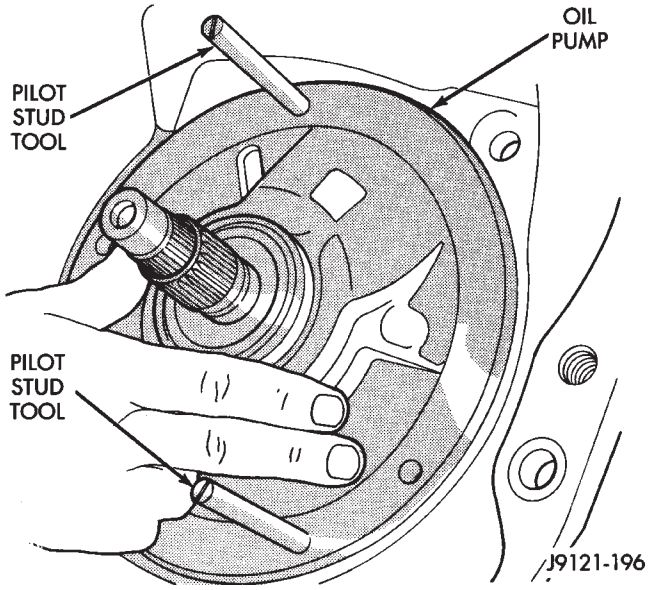


***Fig. 136 Installing Oil Pump Assembly In Case***

(29) Measure and if necessary, correct input shaft end play as follows (Fig. 137):

(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. 138).

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

(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**

DISASSEMBLY AND ASSEMBLY (Continued)

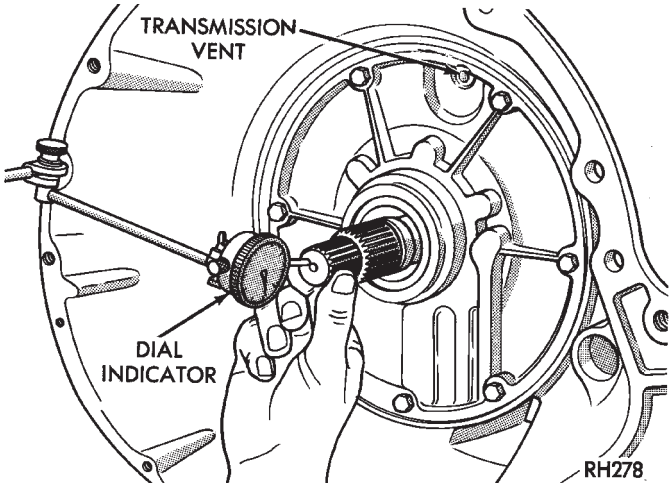


*Fig. 137 Measuring Input Shaft End Play*

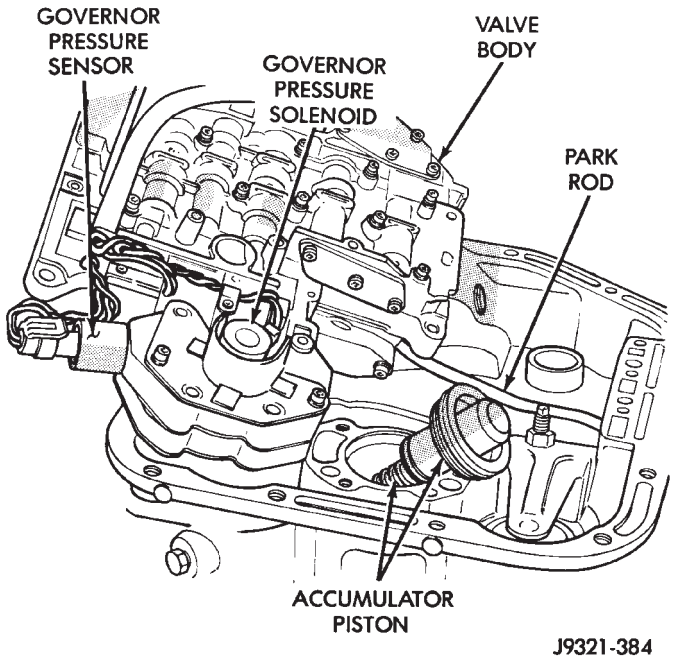


*Fig. 138 Accumulator Piston And Springs*

**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. 139). Then install and tighten switch to 34 N·m (25 ft. lbs.).

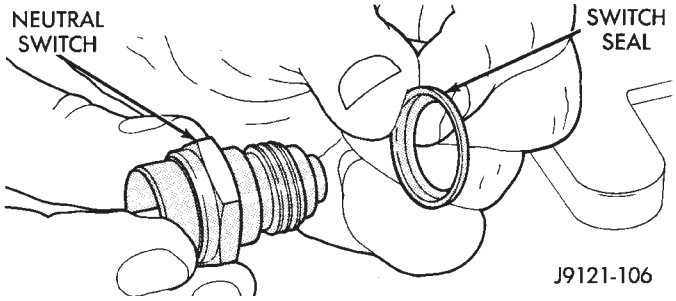


*Fig. 139 Park/Neutral Position Switch SealPosition*

(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. 140). 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.

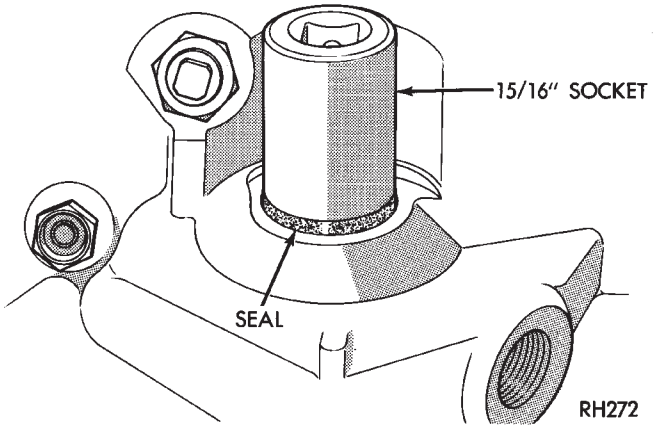


*Fig. 140 Installing Manual Lever Shaft Seal*

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

(40) Cap or cover transmission openings (cooler line fittings, filler tube bore, etc.) to prevent dirt entry.

(41) Install torque converter. Use C-clamp or metal strap to hold converter in place for installation.

## 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. 141).

DISASSEMBLY AND ASSEMBLY (Continued)

(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. 142).
(6) Remove the overrunning clutch cam bolts.
(7) Remove the overrunning clutch cam.

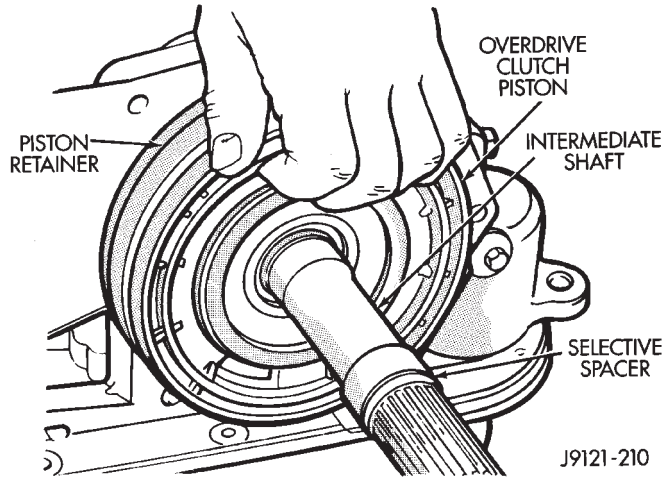


*Fig. 141 Overdrive Piston Removal*

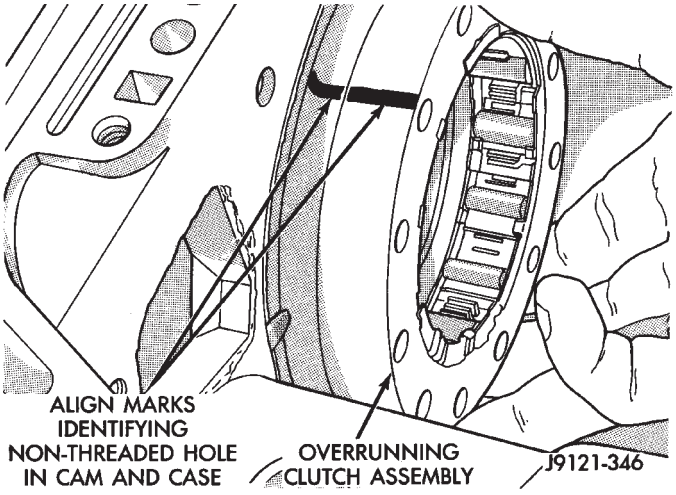


*Fig. 142 Overrunning Clutch Cam Removal*

ASSEMBLY

(1) Examine bolt holes in overrunning clutch cam. Note that one hole is **not threaded** (Fig. 143). This hole must align with blank area in clutch cam bolt circle (Fig. 144). 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. 145). **Be sure cam is correctly installed. Bolt holes in cam are slightly countersunk on one side. Be sure this side of cam faces rearward (toward piston retainer).**

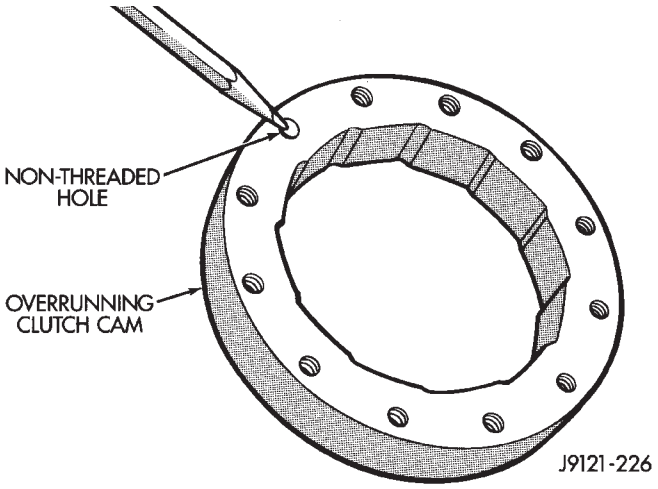


*Fig. 143 Location Of Non-Threaded Hole InClutch Cam*

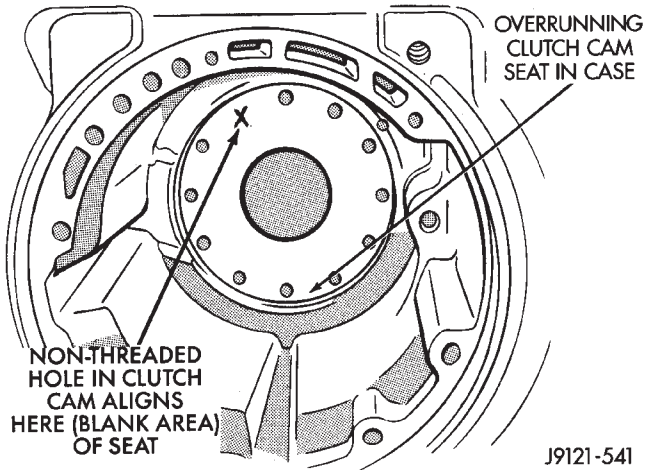


*Fig. 144 Location Of Blank Area In ClutchCam Bolt Circle*

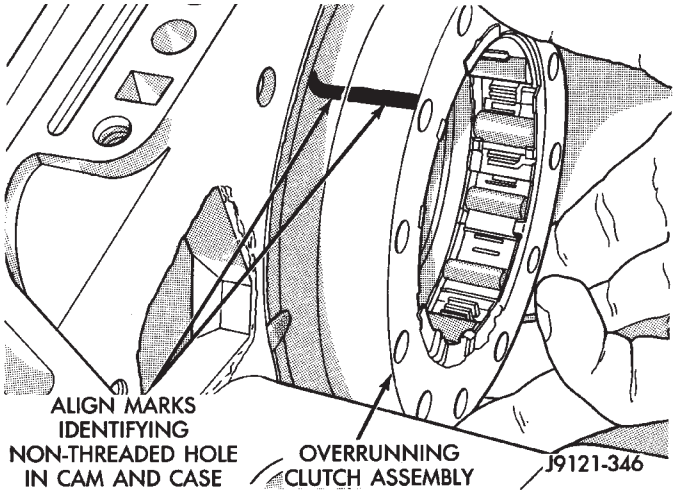


*Fig. 145 Overrunning Clutch Installation*

(4) Verify that non-threaded hole in clutch cam is properly aligned. Check alignment by threading a

DISASSEMBLY AND ASSEMBLY (Continued)

bolt into each bolt hole. Adjust clutch cam position if necessary.

(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. 146). 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. 147). Then install and tighten retainer bolts to 17 N·m (13 ft. lbs.) torque.

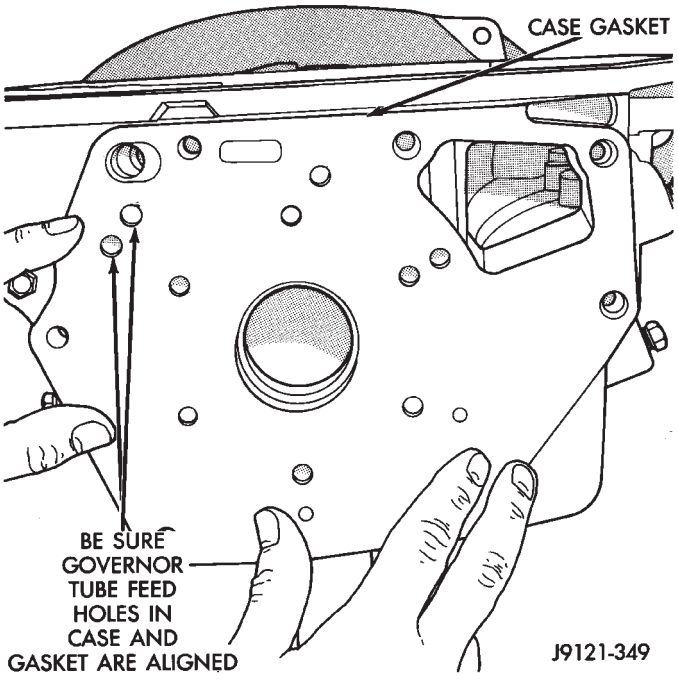


***Fig. 146 Installing/Aligning Case Gasket***

(8) Install new seals on over drive piston.

(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.

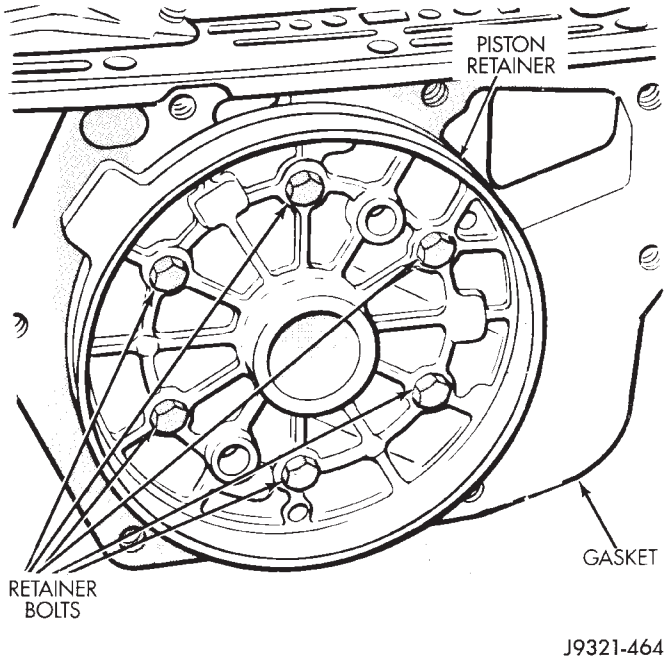


***Fig. 147 Aligning Overdrive Piston Retainer***

(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. 148).

(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. 148).

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

DISASSEMBLY AND ASSEMBLY (Continued)

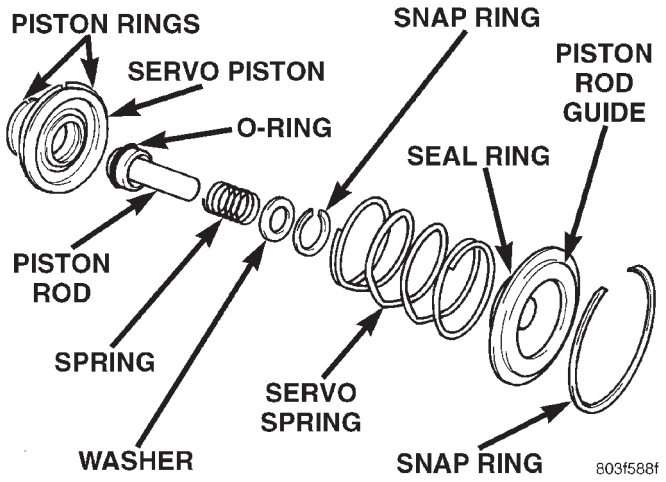


*Fig. 148 Front Servo*

## REAR SERVO PISTON

*DISASSEMBLY*

(1) Remove small snap ring and remove plug and spring from servo piston (Fig. 149).

(2) Remove and discard servo piston seal ring.

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

*ASSEMBLY*

(1) Install new seal ring on servo piston.

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

(3) Lubricate piston seal lip with petroleum jelly.

(4) Set servo components aside for assembly installation.

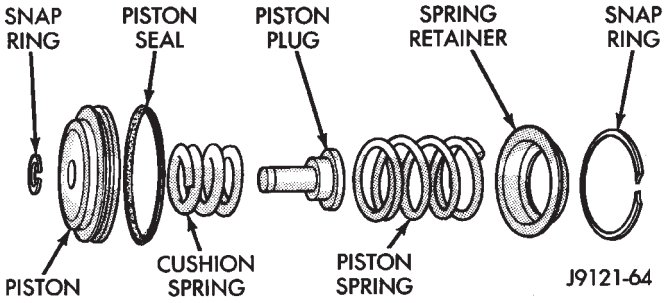


*Fig. 149 Rear Servo Components*

## OIL PUMP AND REACTION SHAFT SUPPORT

*DISASSEMBLY*

(1) Remove seal ring from housing and reaction shaft support (Fig. 150).

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

(3) Remove bolts attaching pump body to support (Fig. 151).

(4) Separate support from pump housing (Fig. 152).

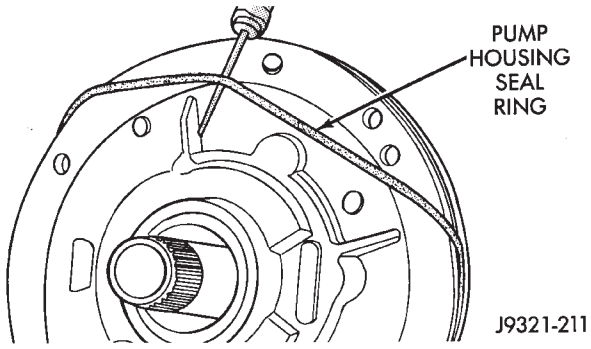


*Fig. 150 Removing Pump Seal Ring*

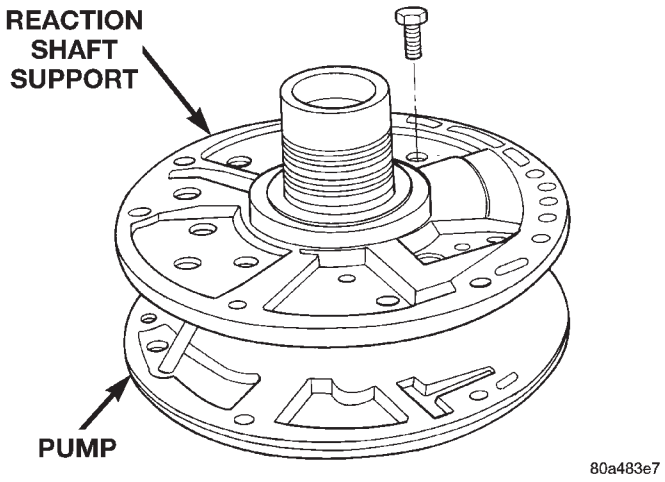


*Fig. 151 Pump Support Bolts*

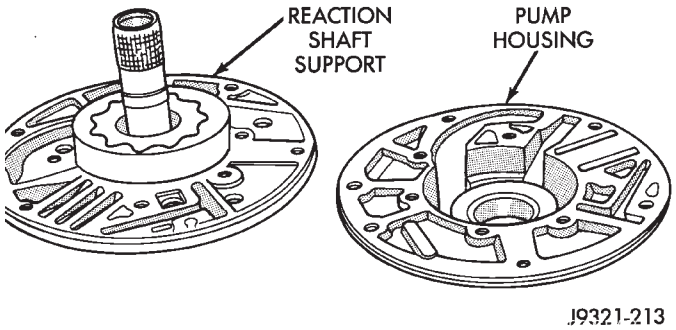


*Fig. 152 Separating Pump Housing From ReactionShaft Support*

(5) Remove inner and outer gears from reaction shaft support (Fig. 153).

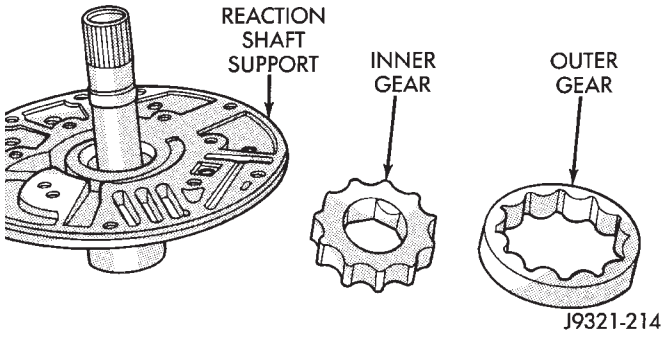


*Fig. 153 Pump Gear Removal*

DISASSEMBLY AND ASSEMBLY (Continued)

(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. 154).

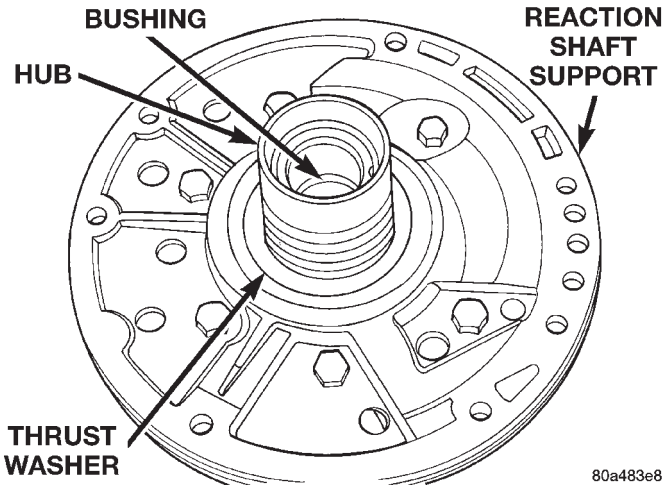


*Fig. 154 Support Hub Thrust Washer*

**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. 155).

(2) Install new pump bushing with Tool Handle C-4171 and Bushing Installer SP-5117 (Fig. 155). Bushing should be flush with pump housing bore.

(3) Stake new pump bushing in two places with blunt punch (Fig. 156). Remove burrs from stake points with knife blade afterward.

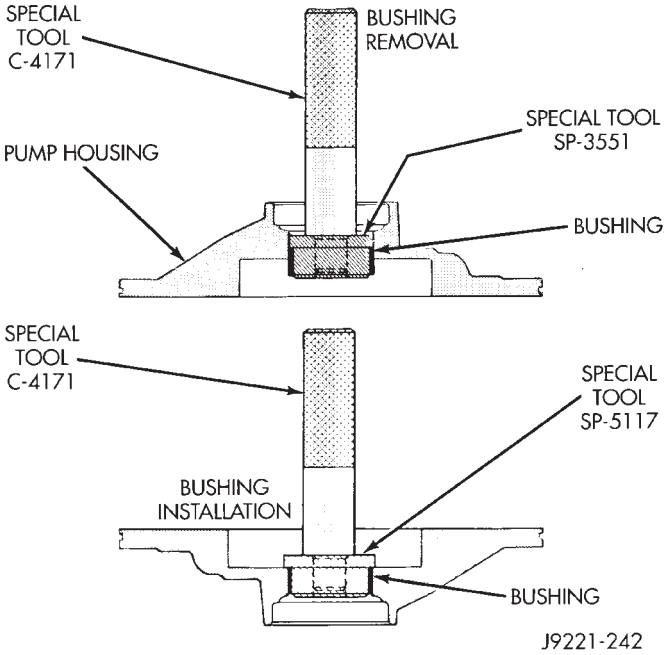


*Fig. 155 Removing Oil Pump Bushing*

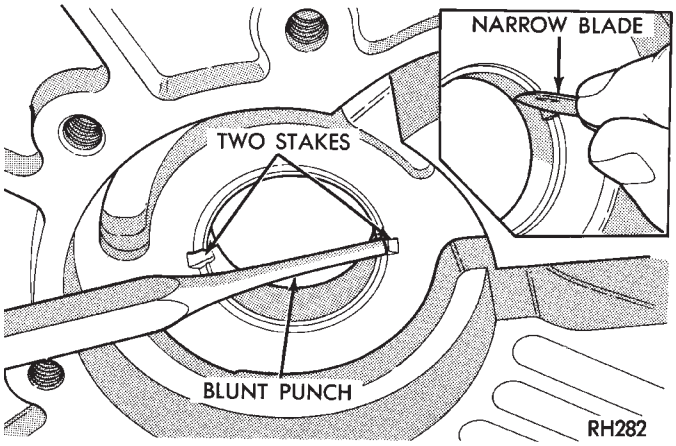


*Fig. 156 Staking Oil Pump Bushing*

**REACTION SHAFT SUPPORT BUSHING REMOVAL**

(1) Assemble Bushing Remover Tools SP-1191, 3633 and 5324 (Fig. 157). **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.

(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. 157).

(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.

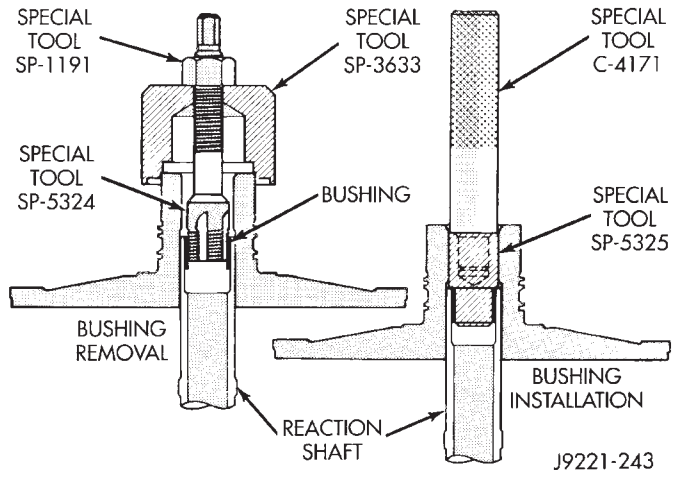


*Fig. 157 Replacing Reaction Shaft SupportBushing*

DISASSEMBLY AND ASSEMBLY (Continued)

*INSPECTION*

(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 0.025 to 0.177 mm (0.001 to 0.007 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.

(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.

*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. 158).

(4) Install outer gear in pump housing (Fig. 158). Gear can be installed either way (it is not a one-way fit).

(5) Install pump inner gear (Fig. 159).

**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).**

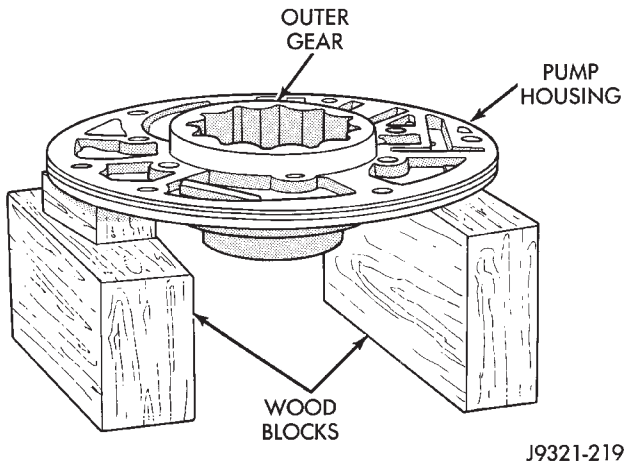


***Fig. 158 Supporting Pump And Installing OuterGear***

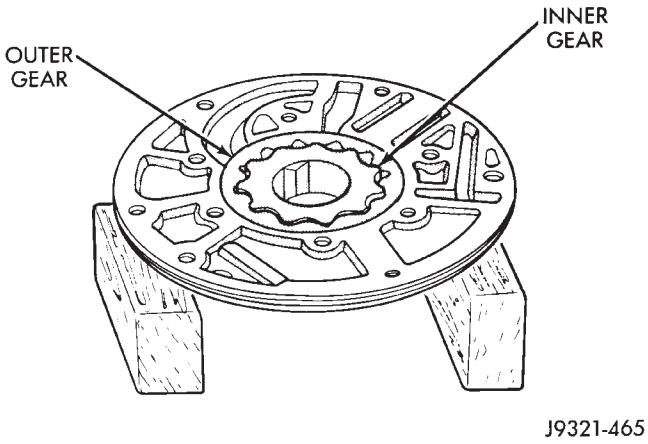


***Fig. 159 Pump Inner Gear Installation***

(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. 160). Lubricate seal rings with transmission fluid or petroleum 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.**

(8) Install reaction shaft support on pump housing (Fig. 161).

DISASSEMBLY AND ASSEMBLY (Continued)

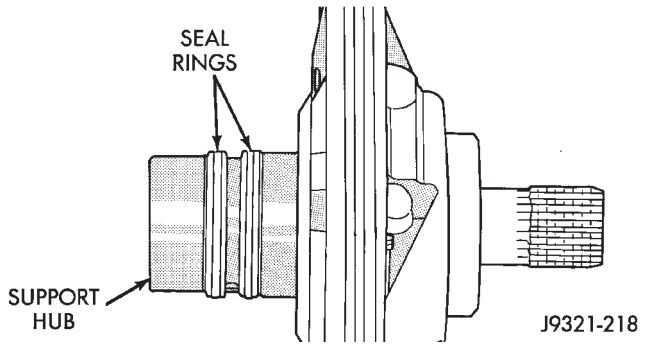


*Fig. 160 Hub Seal Ring Position*

(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).

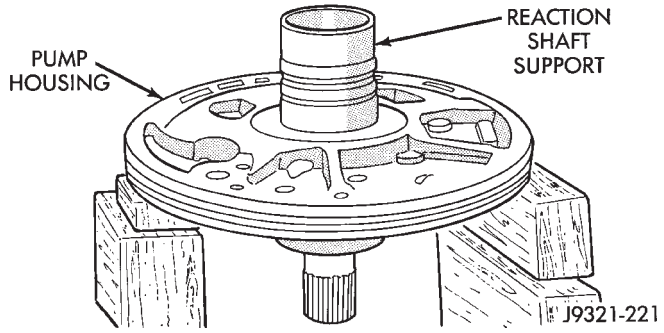


*Fig. 161 Assembling Reaction Shaft SupportAnd Pump Housing*

(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.

(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. 162). 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.

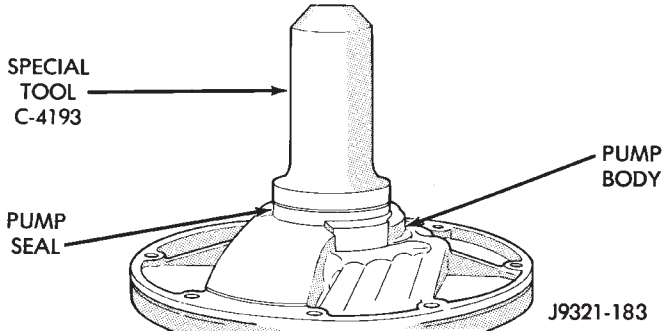


*Fig. 162 Pump Oil Seal Installation*

## 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 AND ASSEMBLY (Continued)

### *DISASSEMBLY*

(1) Remove waved snap ring and remove pressure plate, clutch plates and clutch discs (Fig. 163).

(2) Compress clutch piston spring with Compressor Tool C-3575-A (Fig. 164). Be sure legs of tool are 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.

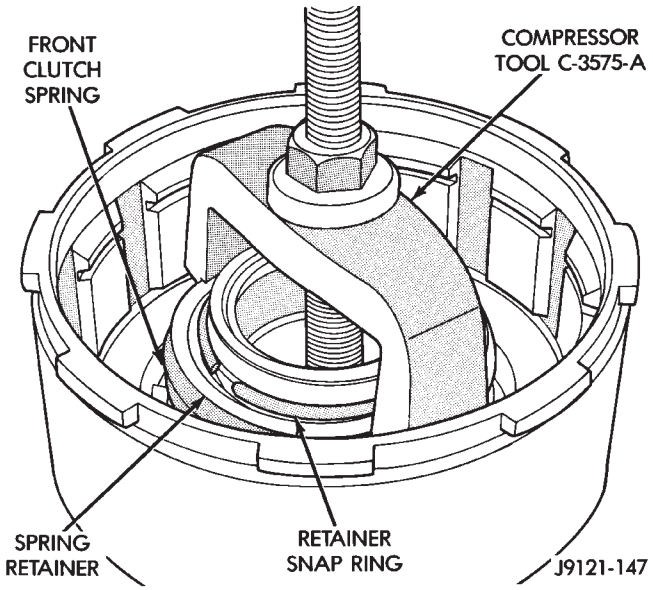


***Fig. 164 Compressing Front Clutch Piston Spring***

### *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. 165). Use twisting motion to seat piston in bottom of retainer.

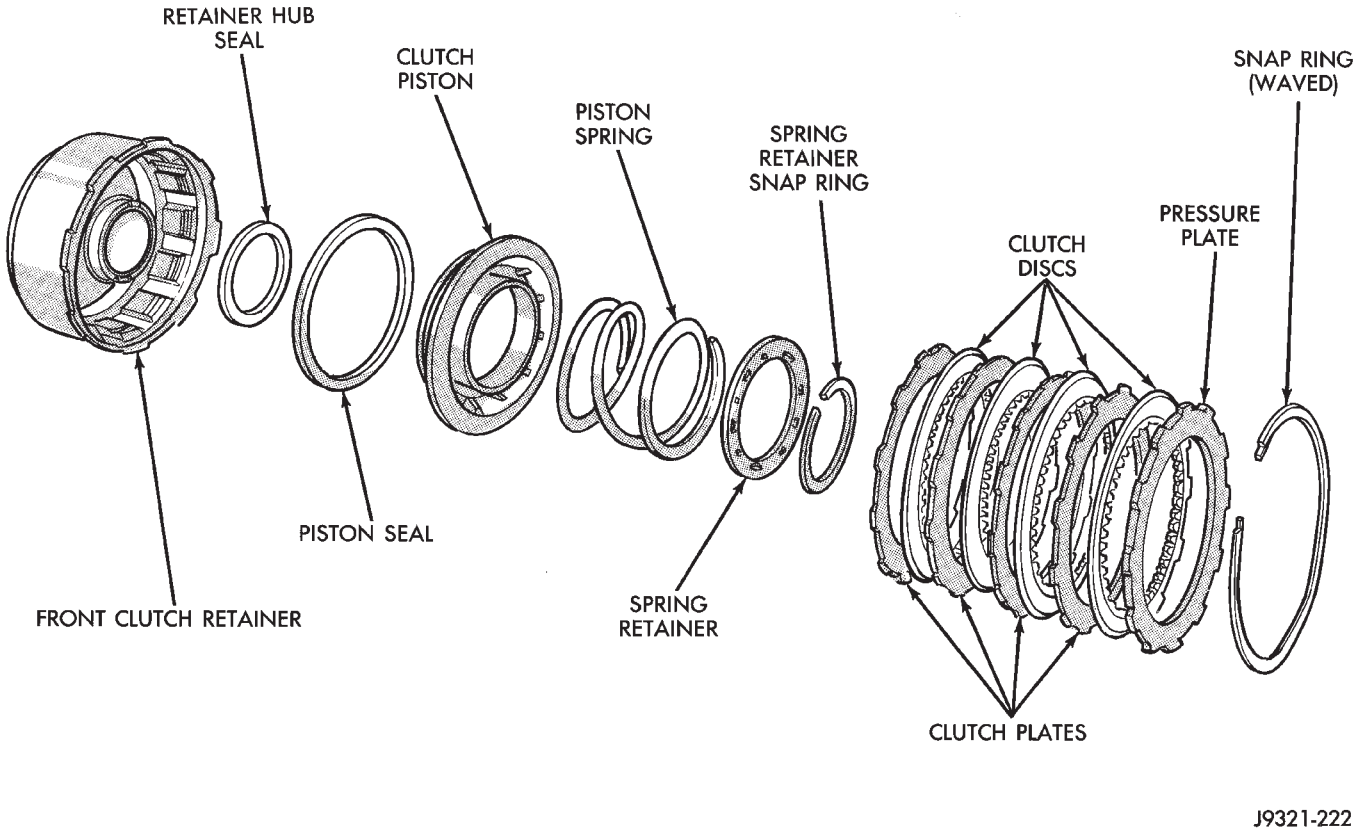


***Fig. 163 42RE Front Clutch Components***

DISASSEMBLY AND ASSEMBLY (Continued)

**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. 166).

(6) Position spring retainer on top of piston spring (Fig. 167). **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.**

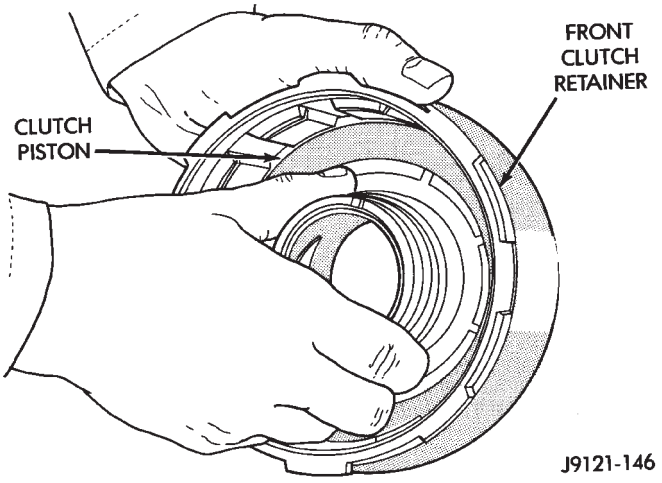


*Fig. 165 Front Clutch Piston Installation*

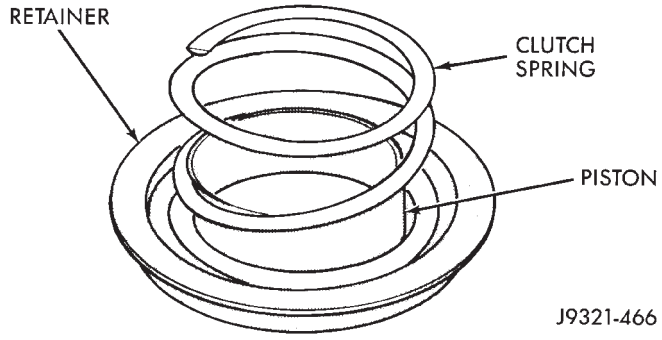


*Fig. 166 Clutch Piston Spring Installation*

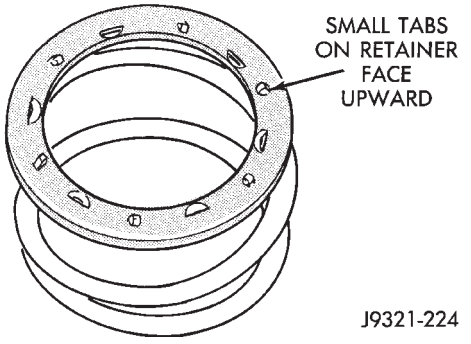


*Fig. 167 Correct Spring RetainerInstalled Position*

(7) Compress piston spring and retainer with Compressor Tool C-3575-A (Fig. 164). Then install new snap ring to secure spring retainer and spring.

(8) Install clutch plates and discs (Fig. 163). 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. 163).

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

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.

DISASSEMBLY AND ASSEMBLY (Continued)

## 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. 168).

(4) Remove top pressure plate, clutch discs, steel plates, bottom pressure plate and wave snap ring and wave spring (Fig. 168).

(5) Remove clutch piston with rotating motion.

(6) Remove and discard piston seals.

(7) Remove input shaft snap-ring (Fig. 169). 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.

*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. 170).

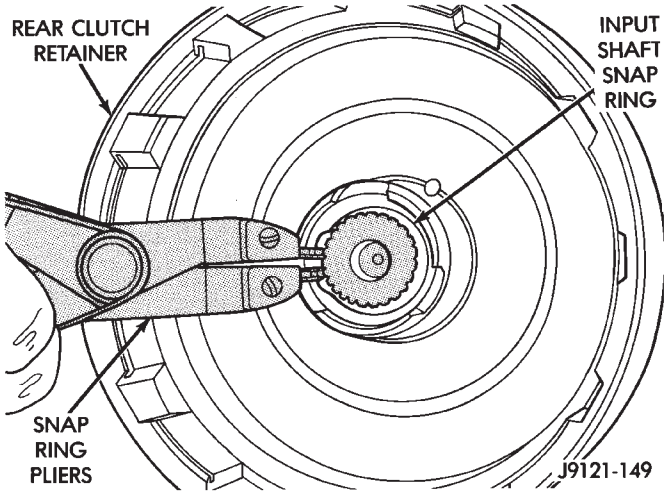


***Fig. 169 Removing/Installing Input Shaft Snap-Ring***

(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 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. 169).

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

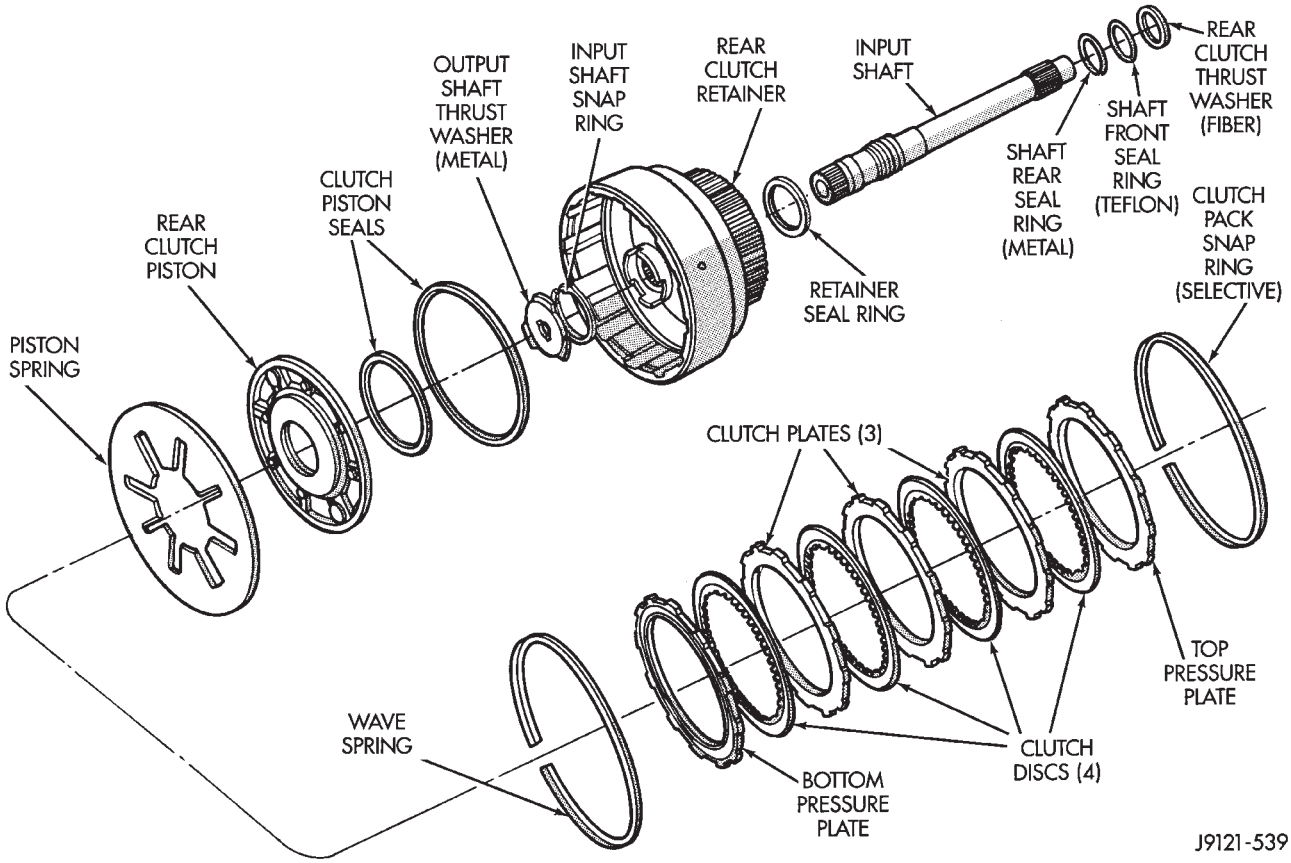


***Fig. 168 Rear Clutch Components***

DISASSEMBLY AND ASSEMBLY (Continued)

(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. 173). Concave side of spring faces downward (toward piston).

(10) Install wave spring in retainer (Fig. 173). Be sure spring is completely seated in retainer groove.

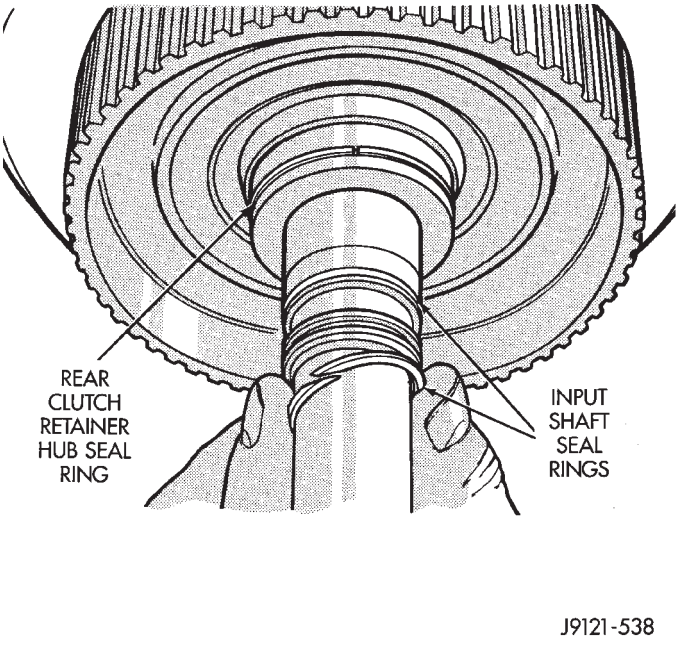


***Fig. 170 Rear Clutch Retainer And Input ShaftSeal Ring Installation***

(11) Install bottom pressure plate (Fig. 168). 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 installed (4 discs and 3 plates are required) (Fig. 168).

(13) Install top pressure plate.

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

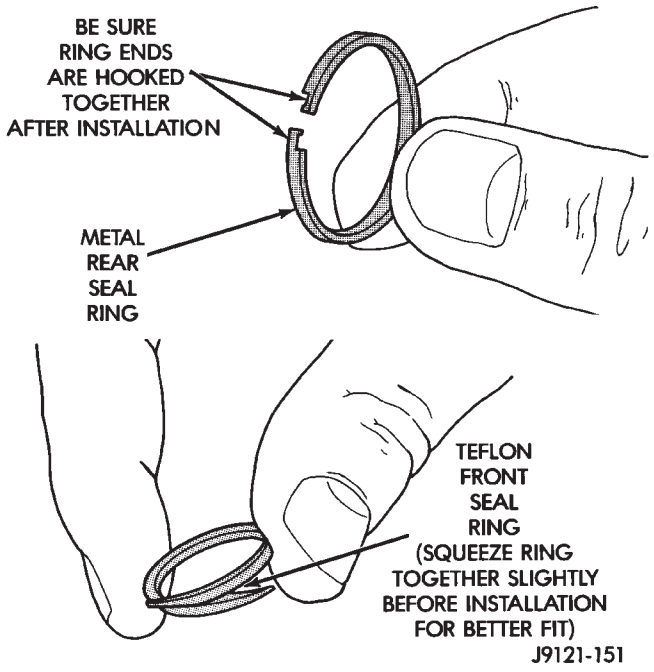


***Fig. 171 Input Shaft Seal Ring Identification***

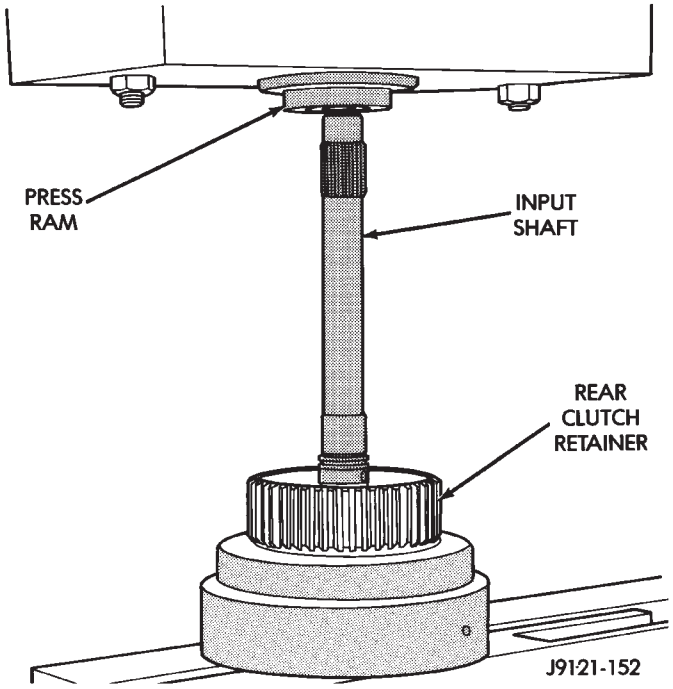


***Fig. 172 Pressing Input Shaft Into Rear ClutchRetainer***

(15) Using a suitable gauge bar and dial indicator, measure clutch pack clearance (Fig. 174).

(a) Position gauge bar across the clutch drum with the dial indicator pointer on the pressure plate (Fig. 174).

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

(c) Zero the dial indicator.

DISASSEMBLY AND ASSEMBLY (Continued)

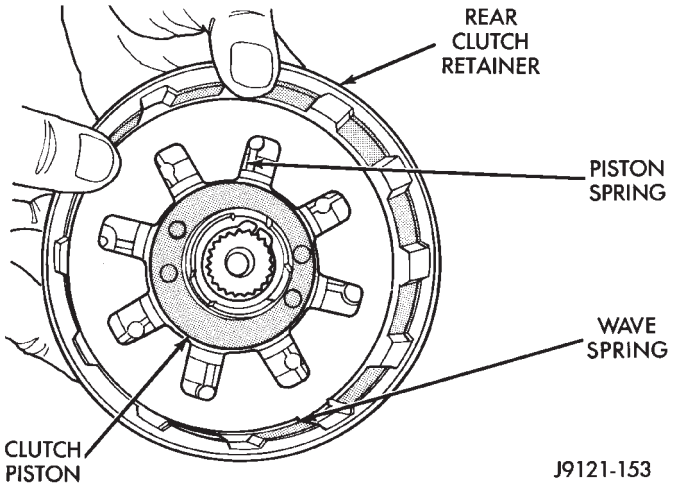


*Fig. 173 Piston Spring/Wave Spring Position*

(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. 175). Use enough petroleum jelly to hold washer in place.

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

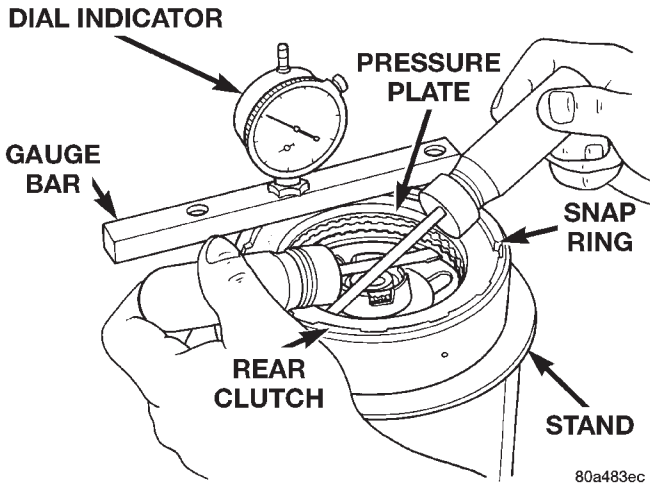


*Fig. 174 Checking Rear Clutch Pack Clearance*

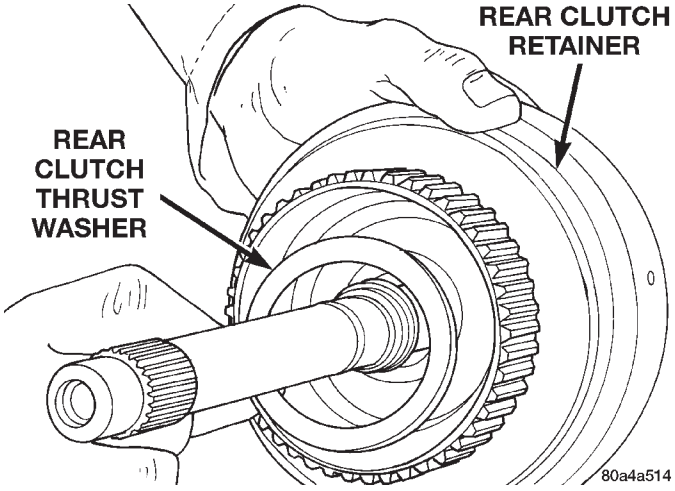


*Fig. 175 Installing Rear Clutch Thrust Washer*

DISASSEMBLY AND ASSEMBLY (Continued)

## PLANETARY GEARTRAIN/OUTPUT SHAFT

*DISASSEMBLY*

(1) Remove planetary snap ring (Fig. 176).

(2) Remove front annulus and planetary assembly from driving shell (Fig. 176).

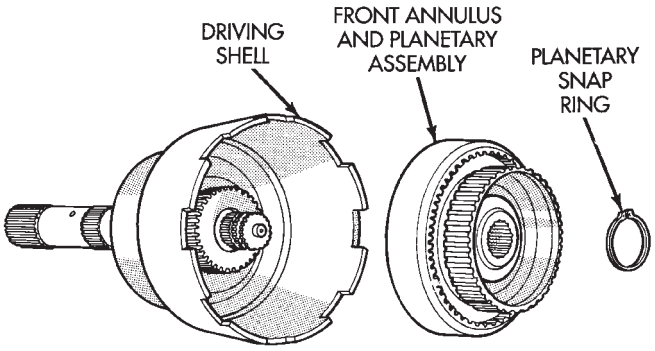


***Fig. 176 Front Annulus And Planetary AssemblyRemoval***

(3) Remove snap ring that retains front planetary gear in annulus gear (Fig. 177).

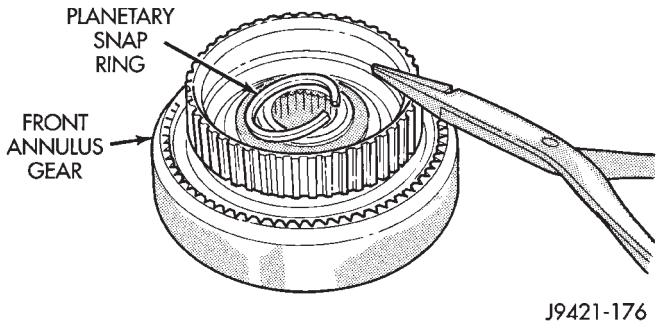


***Fig. 177 Front Planetary Snap Ring Removal***

(4) Remove tabbed thrust washer and tabbed thrust plate from hub of front annulus (Fig. 178).

(5) Separate front annulus and planetary gears (Fig. 178).

(6) Remove front planetary gear front thrust washer from annulus gear hub.

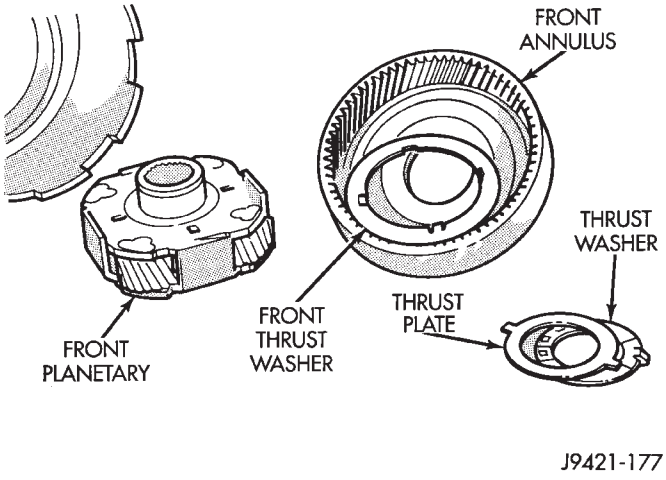


***Fig. 178 Front Planetary And Annulus GearDisassembly***

(7) Separate and remove driving shell, rear planetary and rear annulus from output shaft (Fig. 179).

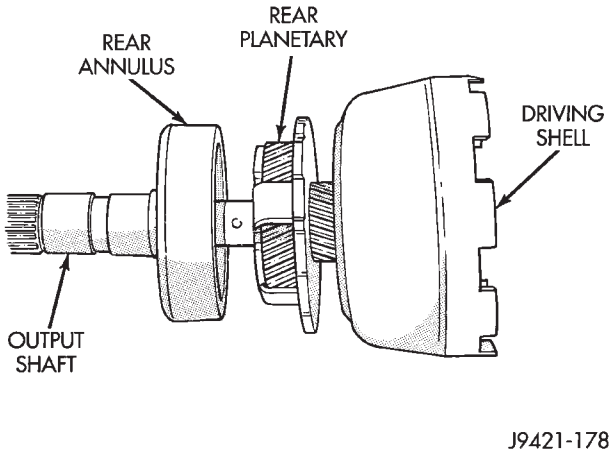


***Fig. 179 Removing Driving Shell, Rear PlanetaryAnd Rear Annulus***

(8) Remove front planetary rear thrust washer from driving shell.

(9) Remove tabbed thrust washers from rear planetary gear.

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

DISASSEMBLY AND ASSEMBLY (Continued)

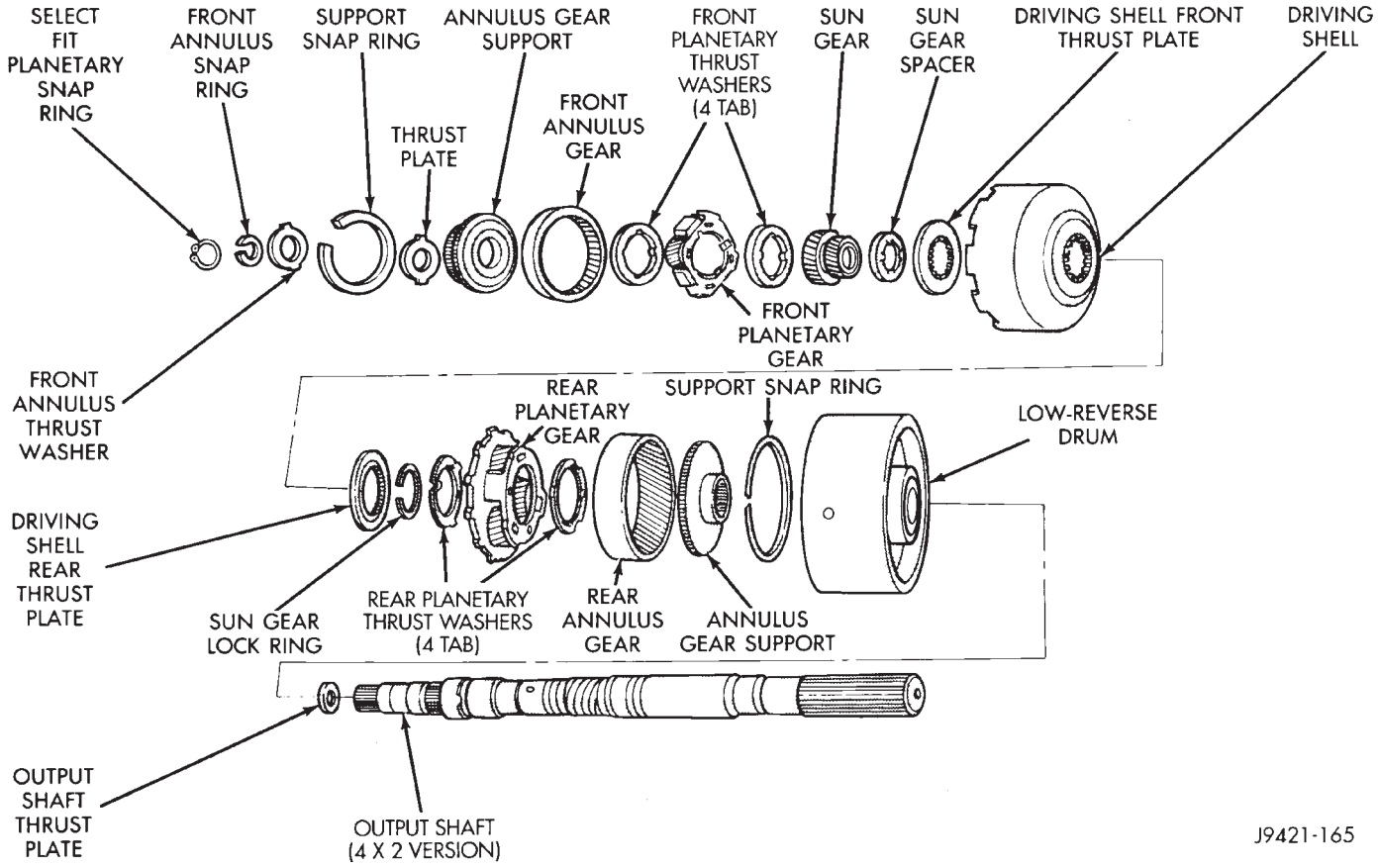


***Fig. 180 Planetary Geartrain Components***

*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. 181).

(3) Install rear thrust washer on rear planetary gear (Fig. 180). 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. 181).

(5) Install assembled rear planetary and annulus gear on output shaft (Fig. 182). Verify that assembly is fully seated on shaft.

(6) Install front thrust washer on rear planetary gear (Fig. 183). 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. 184).

(8) Install thrust plate on sun gear (Fig. 185). Note that driving shell thrust plates are interchangeable. Use either plate on sun gear and at front/rear of shell.

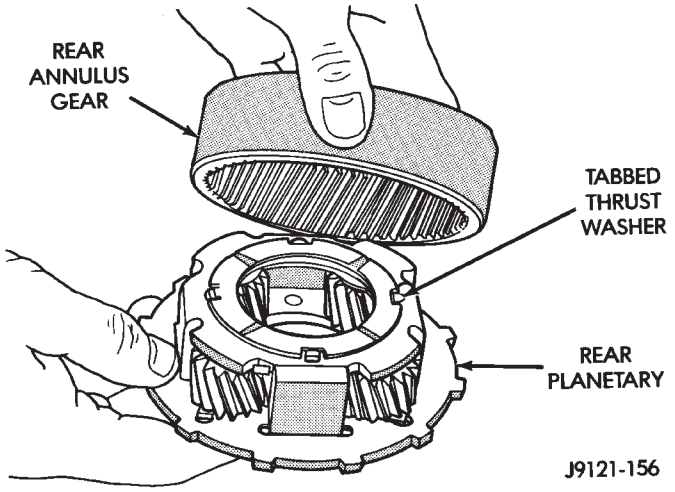


***Fig. 181 Assembling Rear Annulus And PlanetaryGear***

(9) Hold sun gear in place and install thrust plate over sun gear at rear of driving shell (Fig. 186).

(10) Position wood block on bench and support sun gear on block (Fig. 187). 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.

DISASSEMBLY AND ASSEMBLY (Continued)

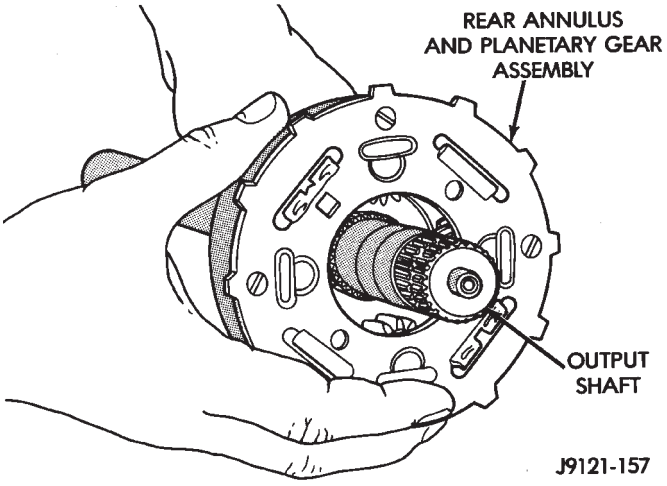


*Fig. 182 Installing Rear Annulus And PlanetaryOn Output Shaft*

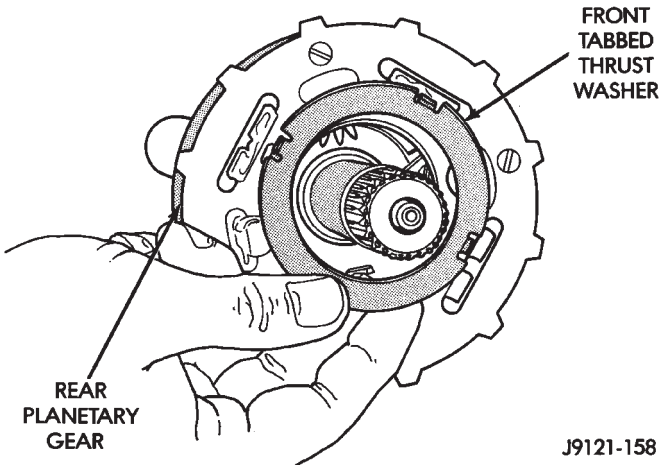


*Fig. 183 Installing Rear Planetary Front ThrustWasher*

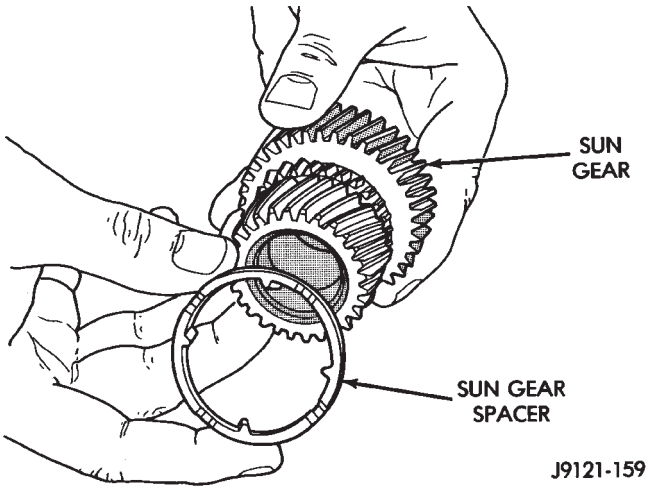


*Fig. 184 Installing Spacer On Sun Gear*

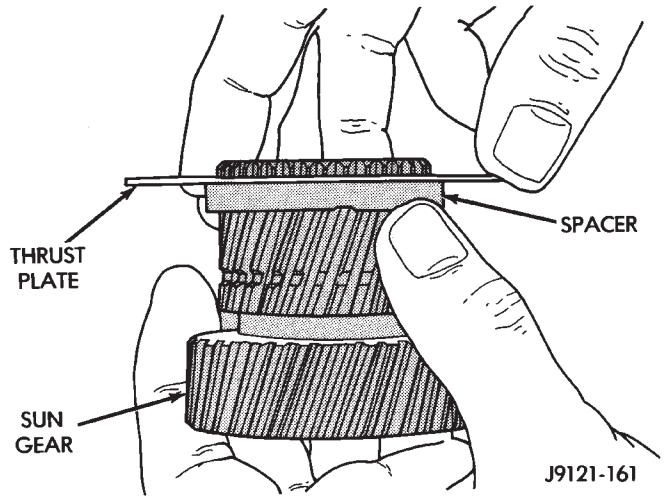


*Fig. 185 Installing Driving Shell Front ThrustPlate On Sun Gear*

(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. 188).

(12) Install assembled driving shell and sun gear on output shaft (Fig. 189).

(13) Install rear thrust washer on front planetary gear (Fig. 190). Use enough petroleum jelly to hold washer in place and be sure all four washer tabs are seated.

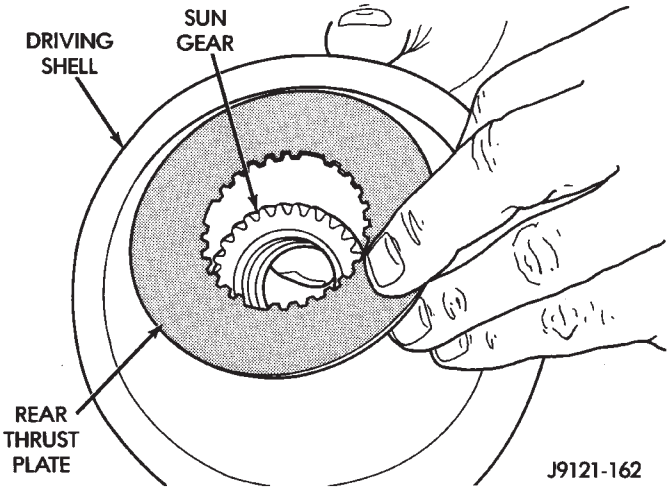


*Fig. 186 Installing Driving Shell Rear ThrustPlate*

DISASSEMBLY AND ASSEMBLY (Continued)

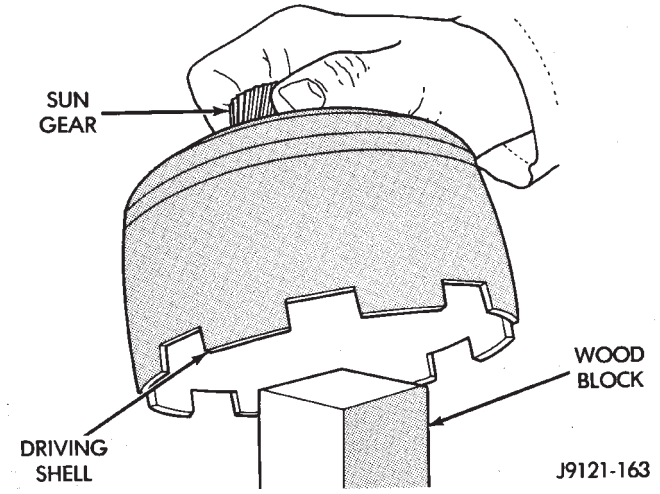


*Fig. 187 Supporting Sun Gear On Wood Block*

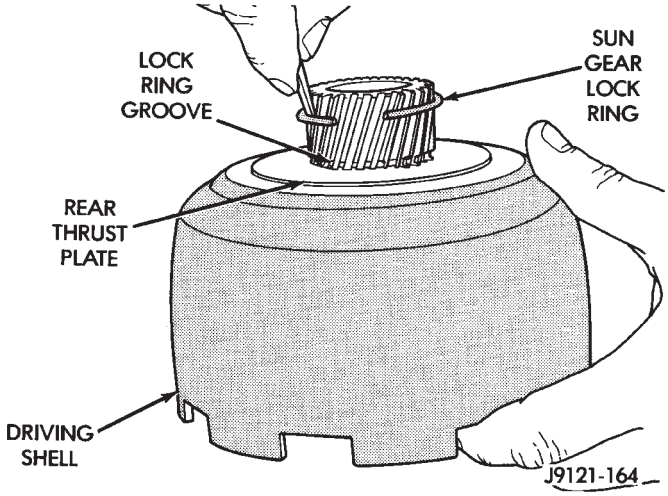


*Fig. 188 Installing Sun Gear Lock Ring*

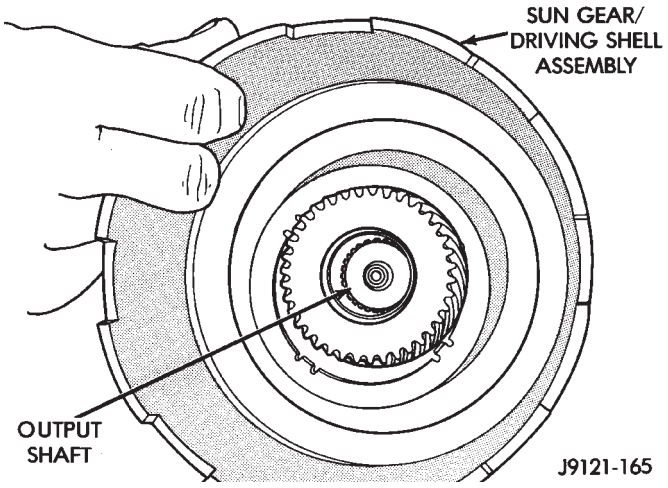


*Fig. 189 Installing Assembled Sun Gear AndDriving Shell On Output Shaft*

(14) Install front planetary gear on output shaft and in driving shell (Fig. 191).

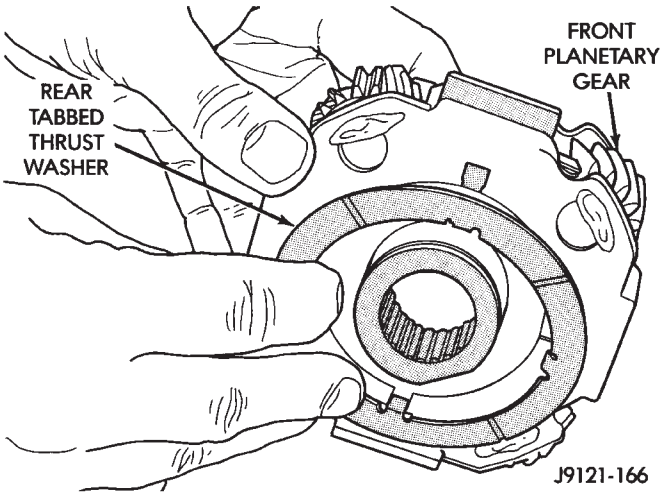


*Fig. 190 Installing Rear Thrust Washer OnFront Planetary Gear*

(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. 191).

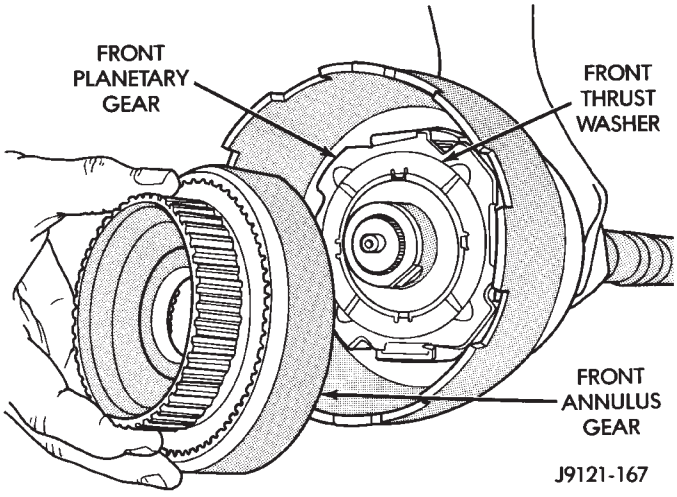


*Fig. 191 Installing Front Planetary And AnnulusGears*

(18) Position thrust plate on front annulus gear support (Fig. 192). **Note that plate has two tabs on it. These tabs fit in notches of annulus hub.**

(19) Install thrust washer in front annulus (Fig. 193). **Align flat on washer with flat on planetary hub. Also be sure washer tab is facing up.**

(20) Install front annulus snap ring (Fig. 194). Use snap ring pliers to avoid distorting ring during installation. Also be sure ring is fully seated.

DISASSEMBLY AND ASSEMBLY (Continued)

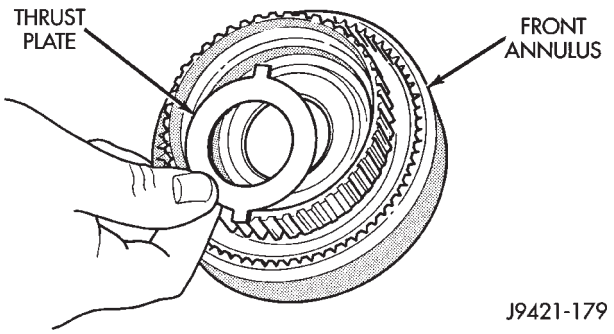


***Fig. 192 Positioning Thrust Plate On FrontAnnulus Support***

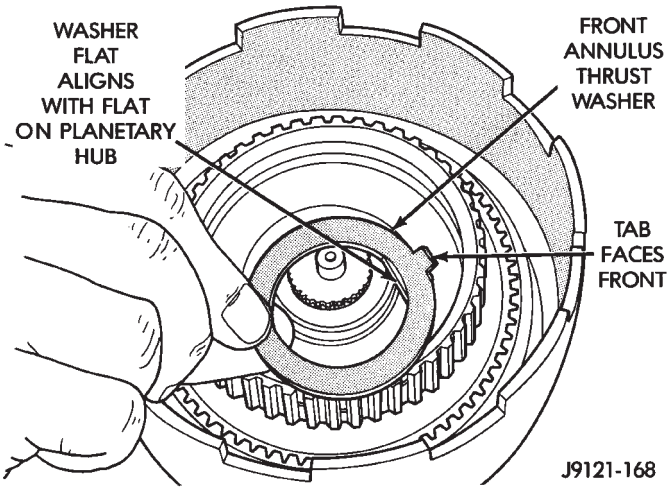


***Fig. 193 Installing Front Annulus Thrust Washer***

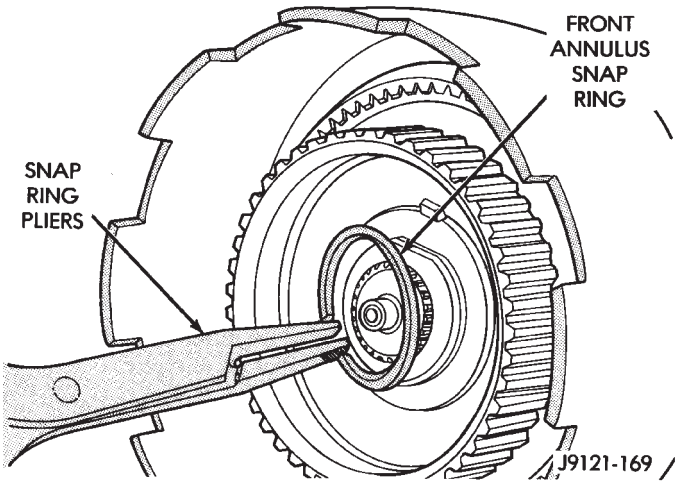


***Fig. 194 Installing Front Annulus Snap Ring***

(21) Install planetary selective snap ring with snap ring pliers (Fig. 195). 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

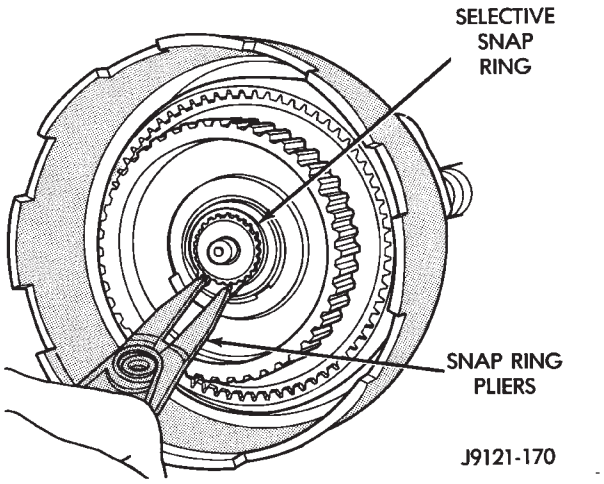


***Fig. 195 Installing Planetary Selective SnapRing***

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. 196). 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.

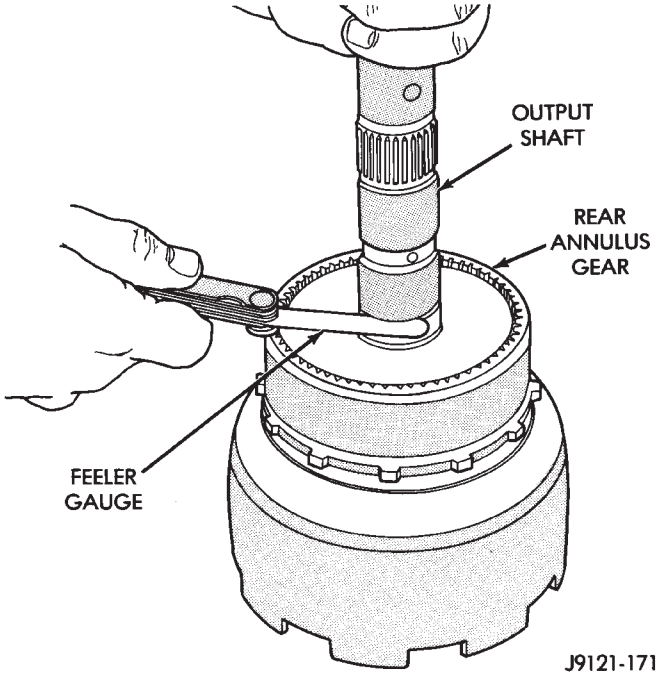


***Fig. 196 Checking Planetary Geartrain EndPlay***

## OVERDRIVE UNIT

### *DISASSEMBLY*

(1) Remove transmission speed sensor and O-ring seal from overdrive case (Fig. 197).

DISASSEMBLY AND ASSEMBLY (Continued)

(2) Remove overdrive piston thrust bearing (Fig. 198).

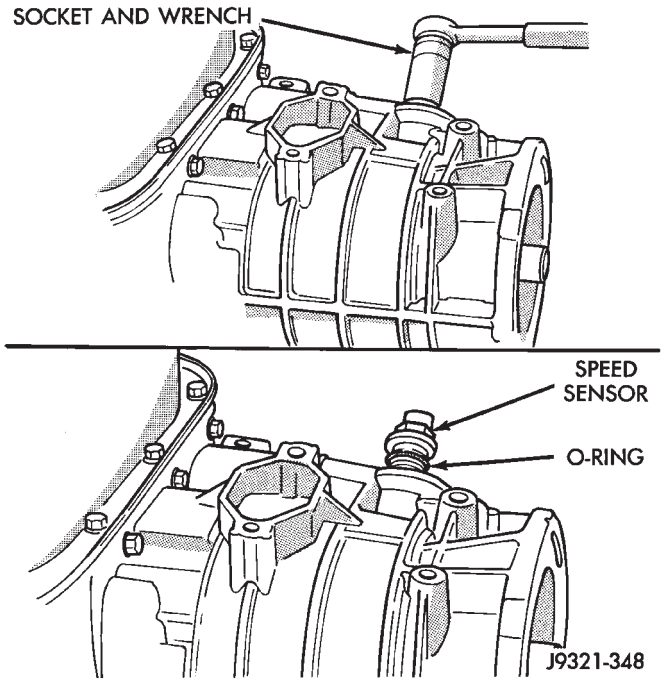


*Fig. 197 Transmission Speed Sensor Removal/ Installation*

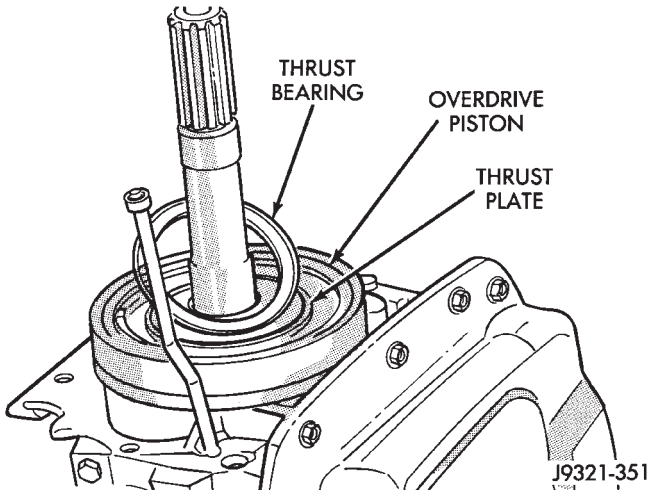


*Fig. 198 Overdrive Piston Thrust Bearing Removal/ Installation*

**OVERDRIVE PISTON DISASSEMBLY**

(1) Remove overdrive piston thrust plate (Fig. 199). Retain thrust plate. It is a select fit part and may possibly be reused.

(2) Remove intermediate shaft spacer (Fig. 200). Retain spacer. It is a select fit part and may possibly be reused.

(3) Remove overdrive piston from retainer (Fig. 201).

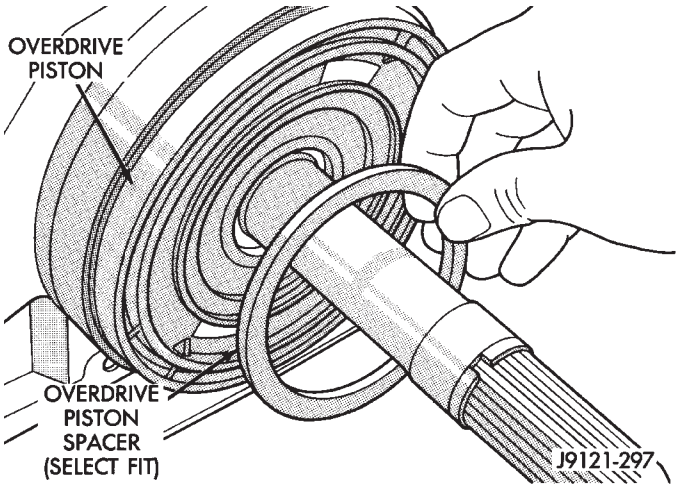


*Fig. 199 Overdrive Piston Thrust Plate Removal/ Installation*

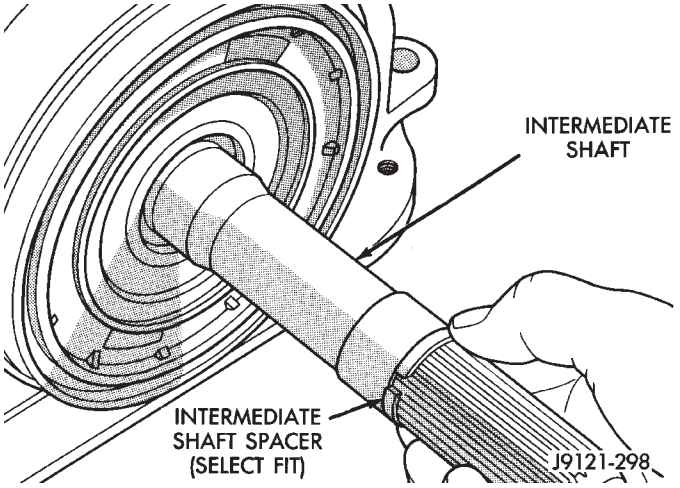


*Fig. 200 Intermediate Shaft Spacer Location*

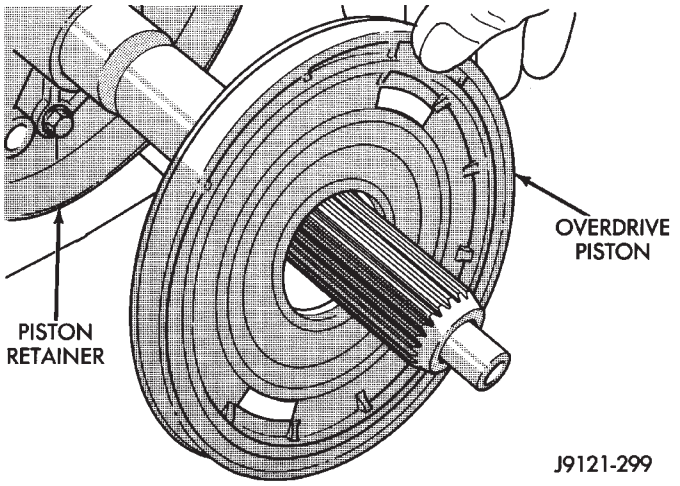


*Fig. 201 Overdrive Piston Removal*

**OVERDRIVE CLUTCH PACK DISASSEMBLY**

(1) Remove overdrive clutch pack wire retaining ring (Fig. 202).

DISASSEMBLY AND ASSEMBLY (Continued)

(2) Remove overdrive clutch pack (Fig. 203).

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

(3) Note position of clutch pack components for assembly reference (Fig. 204).

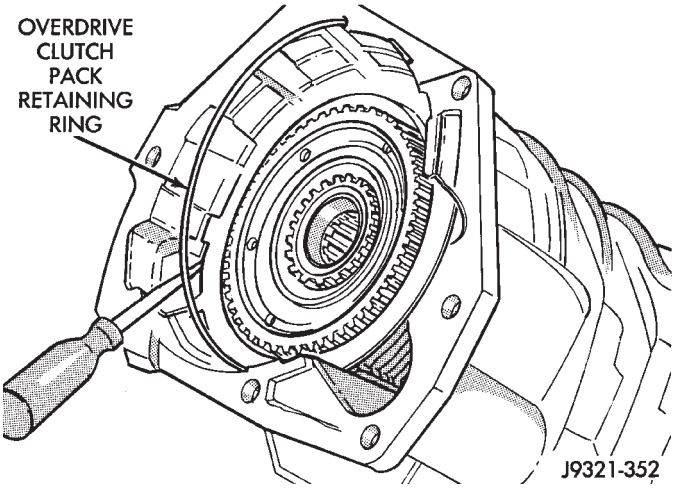


*Fig. 202 Removing Overdrive Clutch Pack RetainingRing*

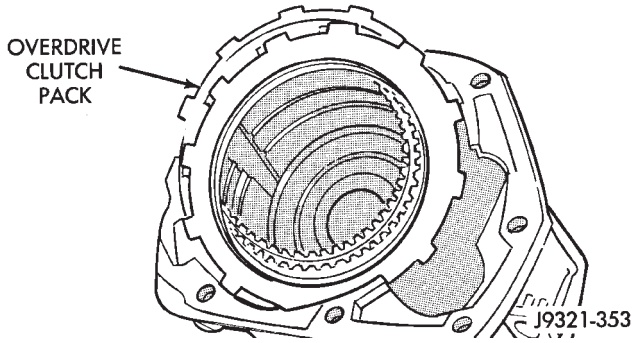


*Fig. 203 Overdrive Clutch Pack Removal*

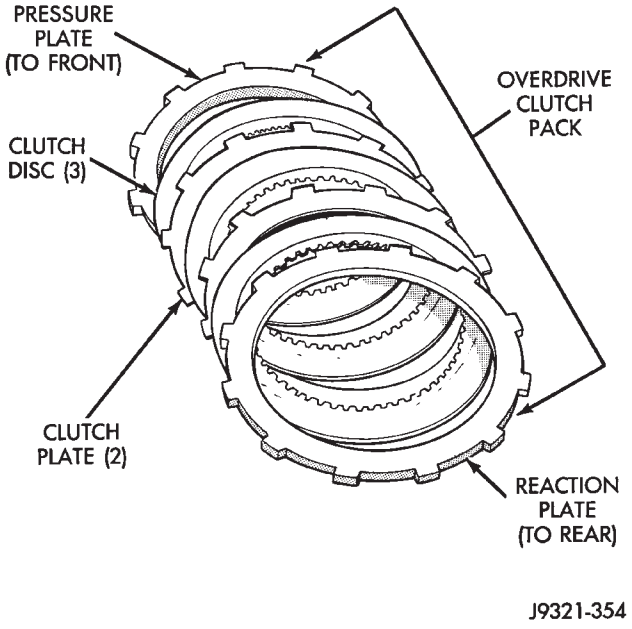


*Fig. 204 42RE Overdrive Clutch Component Position*

**OVERDRIVE GEARTRAIN DISASSEMBLY**

(1) Remove overdrive clutch wave spring (Fig. 205).

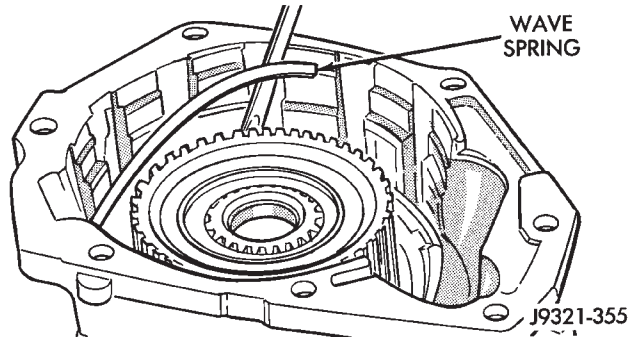


*Fig. 205 Overdrive Clutch Wave Spring Removal/ Installation*

DISASSEMBLY AND ASSEMBLY (Continued)

(2) Remove overdrive clutch reaction snap ring (Fig. 206). Note that snap ring is located in same groove as wave spring.

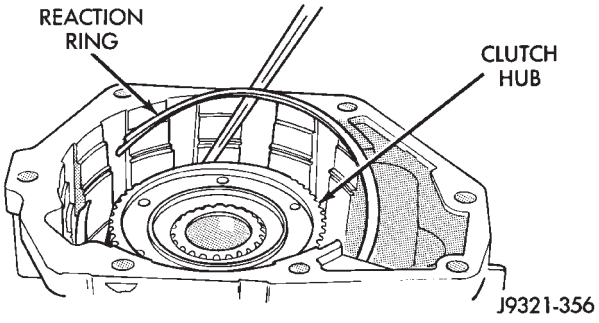


***Fig. 206 Overdrive Clutch Reaction Snap RingRemoval/Installation***

(3) Remove Torx head screws that attach access cover and gasket to overdrive case (Fig. 207).

(4) Remove access cover and gasket (Fig. 208).

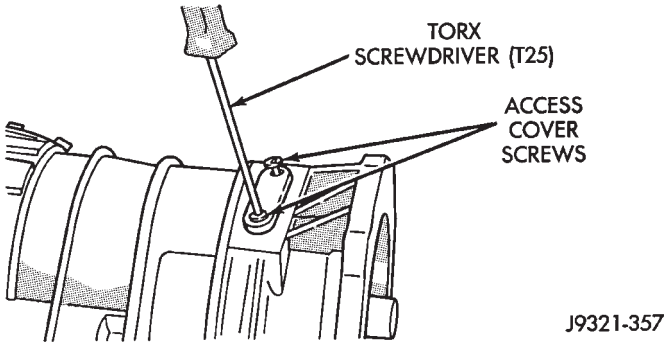


***Fig. 207 Access Cover Screw Removal/Installation***

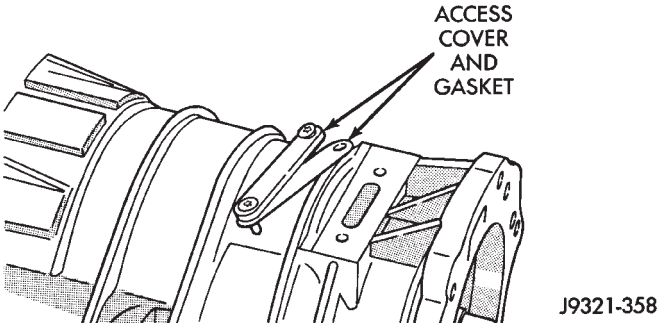


***Fig. 208 Access Cover And Gasket Removal/ Installation***

(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. 209).

(6) Lift gear case up and off geartrain assembly (Fig. 210).

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

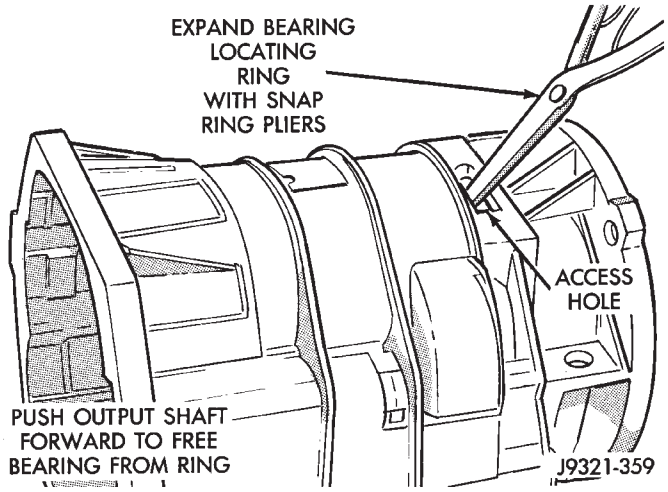


***Fig. 209 Releasing Bearing From Locating Ring***

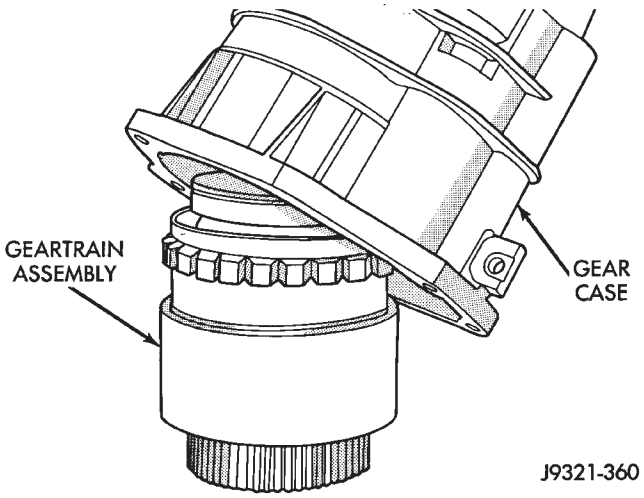


***Fig. 210 Removing Gear Case From GeartrainAssembly***

(8) Remove rear bearing from output shaft (Fig. 211).

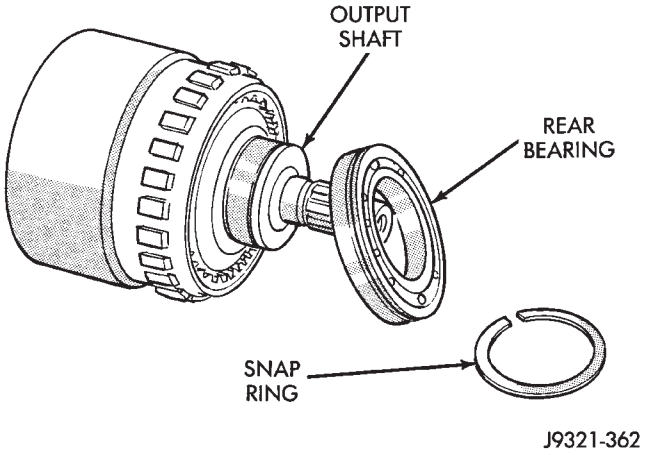


***Fig. 211 Rear Bearing Removal***

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. 212).

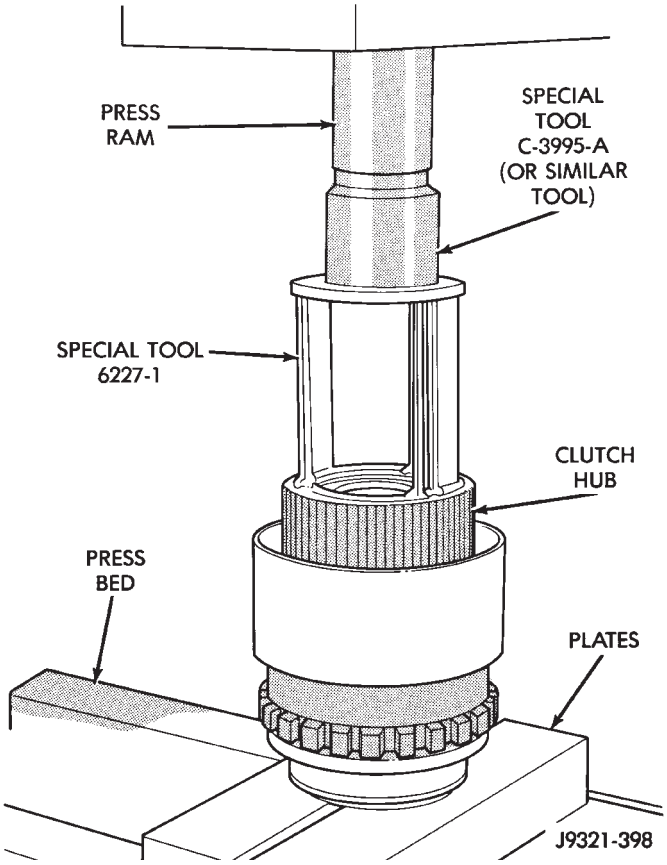


*Fig. 212 Geartrain Mounted In Shop Press*

(2) Position Compressor Tool 6227-1 on clutch hub (Fig. 212). 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. 212).

(4) Remove direct clutch pack snap ring (Fig. 213).

(5) Remove direct clutch hub retaining ring (Fig. 214).

(6) Release press load slowly and completely (Fig. 215).

(7) Remove Special Tool 6227-1. Then remove clutch pack from hub (Fig. 215).

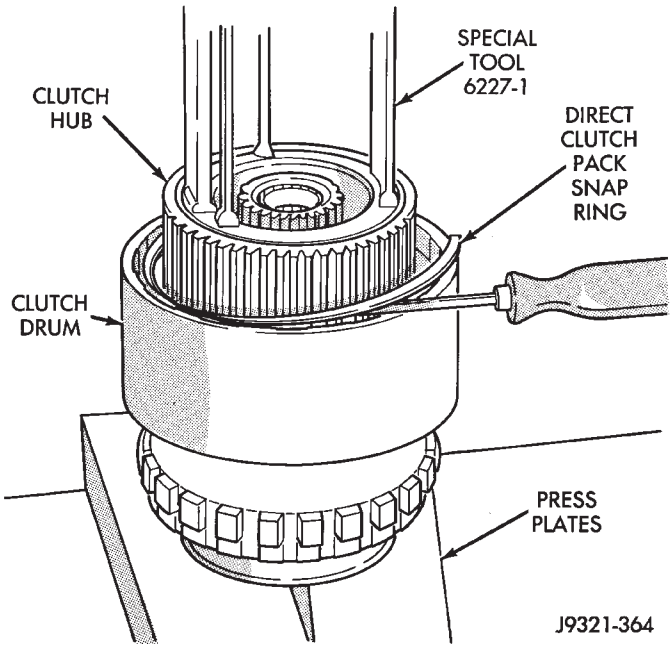


*Fig. 213 Direct Clutch Pack Snap Ring Removal*

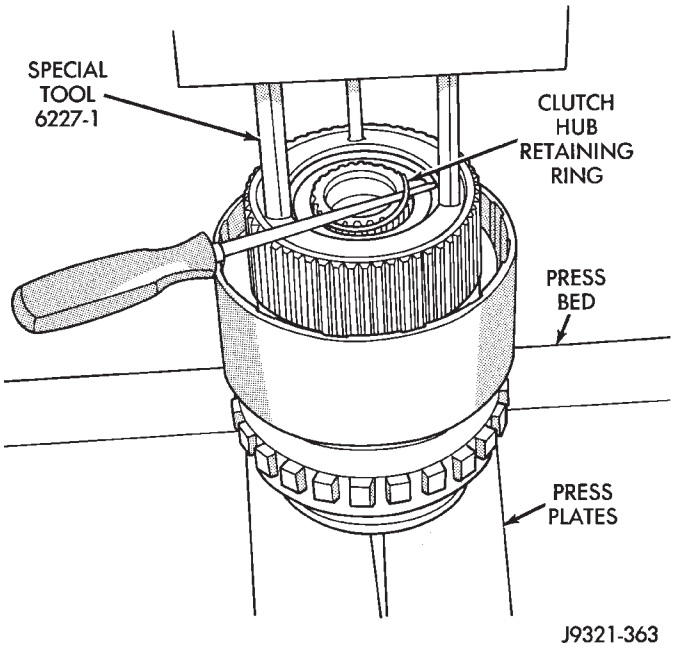


*Fig. 214 Direct Clutch Hub Retaining RingRemoval*

**Geartrain Disassembly**

(1) Remove direct clutch hub and spring (Fig. 216).

DISASSEMBLY AND ASSEMBLY (Continued)

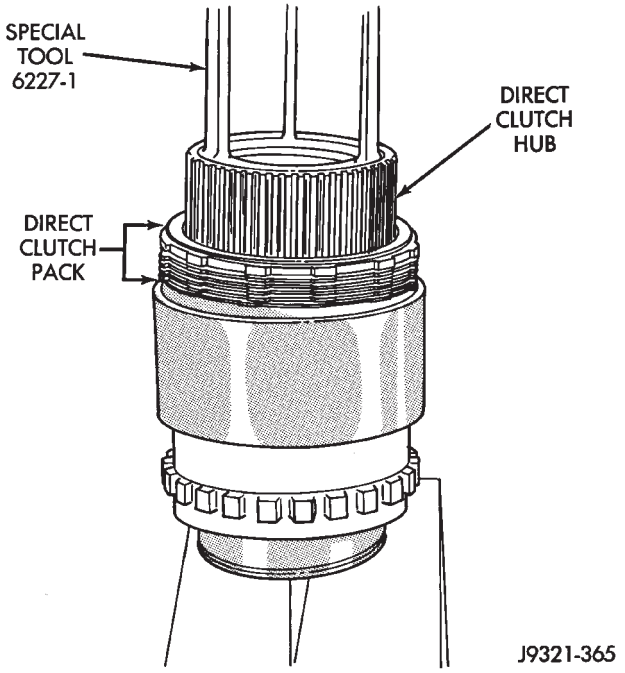


*Fig. 215 Direct Clutch Pack Removal*

(2) Remove sun gear and spring plate. Then remove planetary thrust bearing and planetary gear (Fig. 217).

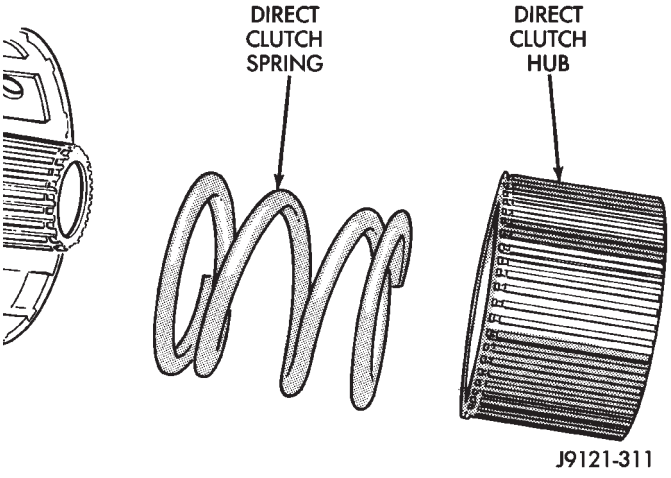


*Fig. 216 Direct Clutch Hub And Spring Removal*

(3) Remove overrunning clutch assembly with expanding type snap ring pliers (Fig. 218). 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.

(6) Mark position of annulus gear and direct clutch drum for assembly alignment reference (Fig. 219). Use small center punch or scriber to make alignment marks.

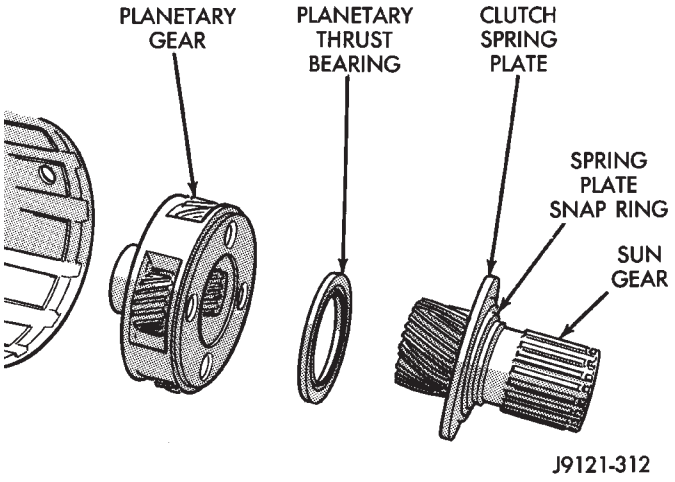


*Fig. 217 Removing Sun Gear, Thrust BearingAnd Planetary Gear*

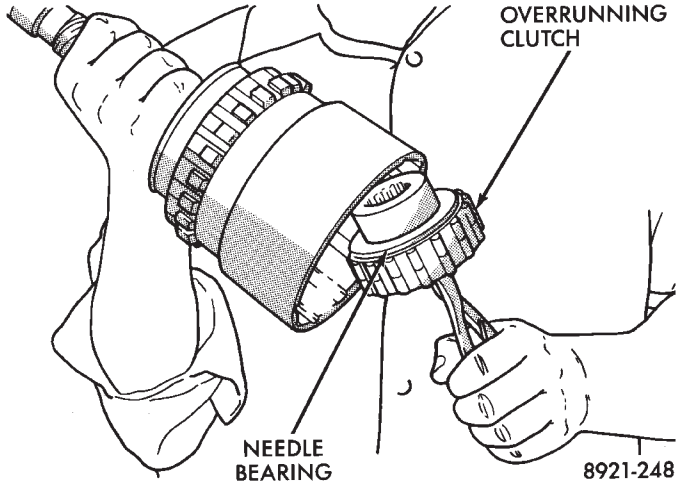


*Fig. 218 Overrunning Clutch Assembly Removal/ Installation*

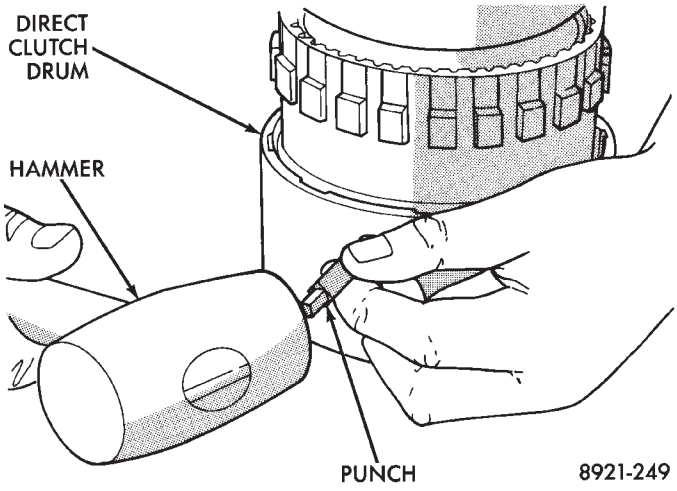


*Fig. 219 Marking Direct Clutch Drum And AnnulusGear For Assembly Alignment*

DISASSEMBLY AND ASSEMBLY (Continued)

(7) Remove direct clutch drum rear retaining ring (Fig. 220).

(8) Remove direct clutch drum outer retaining ring (Fig. 221).

(9) Mark annulus gear and output shaft for assembly alignment reference (Fig. 222). Use punch or scriber to mark gear and shaft.

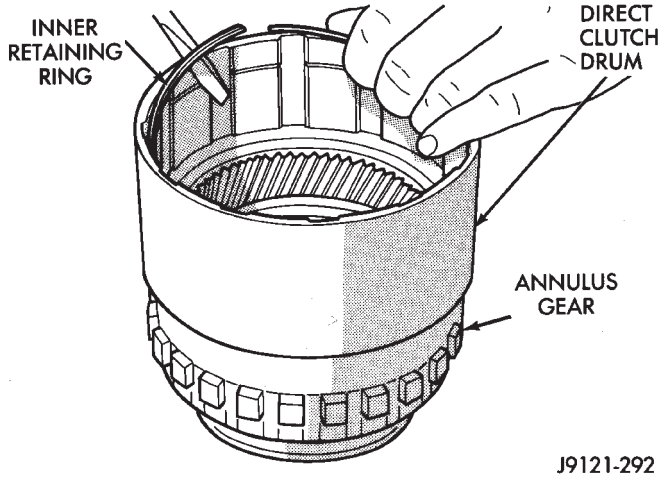


***Fig. 220 Clutch Drum Inner Retaining RingRemoval***

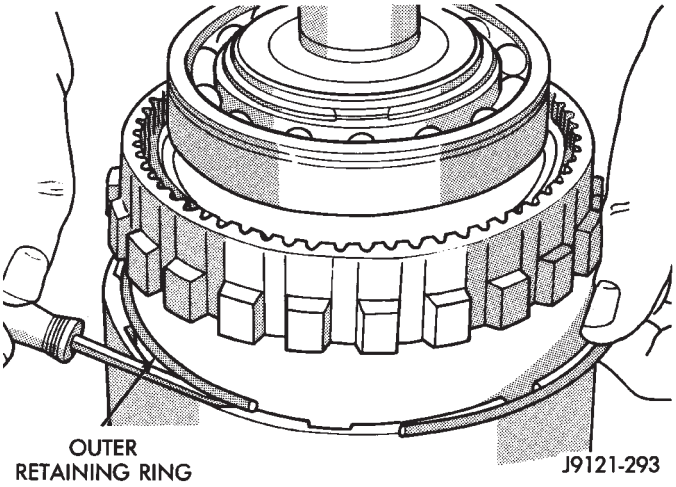


***Fig. 221 Clutch Drum Outer Retaining RingRemoval***

(10) Remove snap ring that secures annulus gear on output shaft (Fig. 223). Use two screwdrivers to unseat and work snap ring out of groove as shown.

(11) Remove annulus gear from output shaft (Fig. 224). 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.

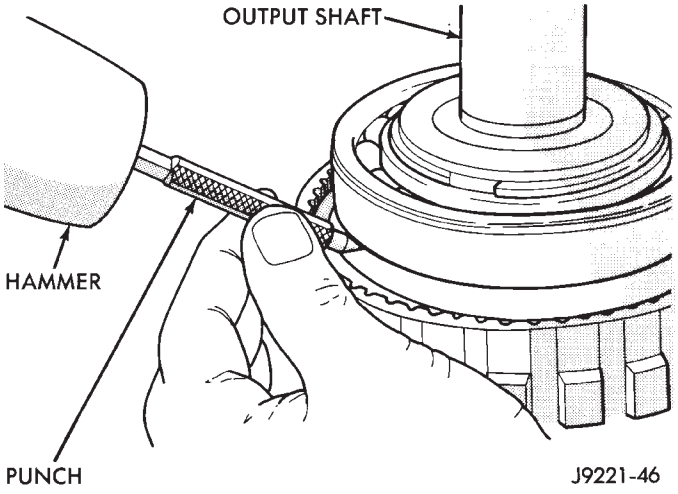


***Fig. 222 Marking Annulus Gear And Output ShaftFor Assembly Alignment***

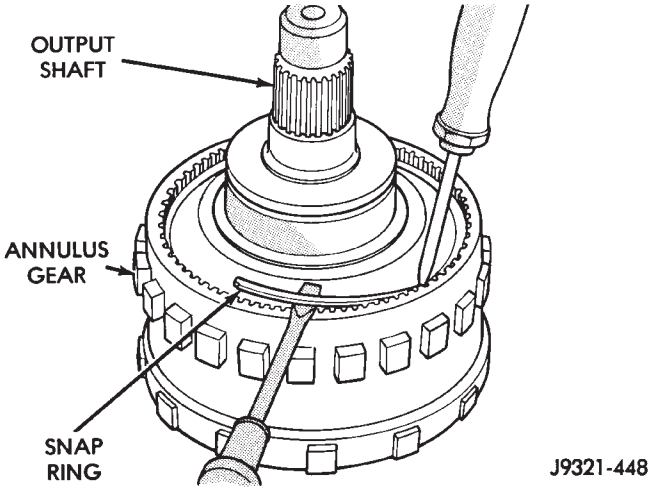


***Fig. 223 Annulus Gear Snap Ring Removal***

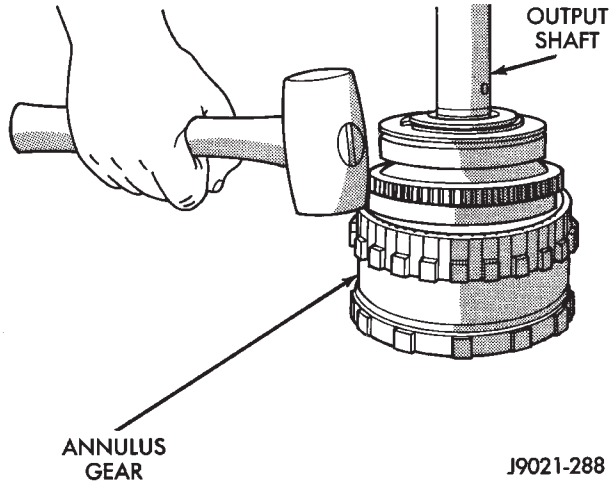


***Fig. 224 Annulus Gear Removal***

DISASSEMBLY AND ASSEMBLY (Continued)

*OVERDRIVE UNIT ASSEMBLY*

**GEARTRAIN AND DIRECT CLUTCH ASSEMBLY**

(1) Soak direct clutch and overdrive clutch discs in Mopar® ATF Plus 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. 225). Lubricate bushings with petroleum jelly, or transmission fluid.

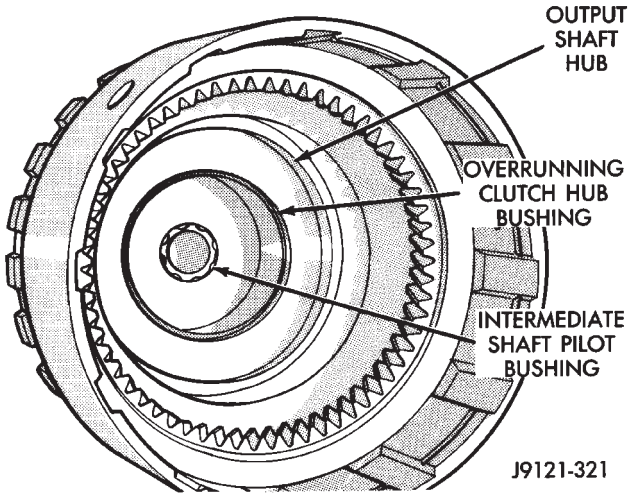


***Fig. 225 Output Shaft Pilot Bushing***

(3) Install annulus gear on output shaft, if removed. Then install annulus gear retaining snap ring (Fig. 226).

(4) Align and install clutch drum on annulus gear (Fig. 227). Be sure drum is engaged in annulus gear lugs.

(5) Install clutch drum outer retaining ring (Fig. 227).

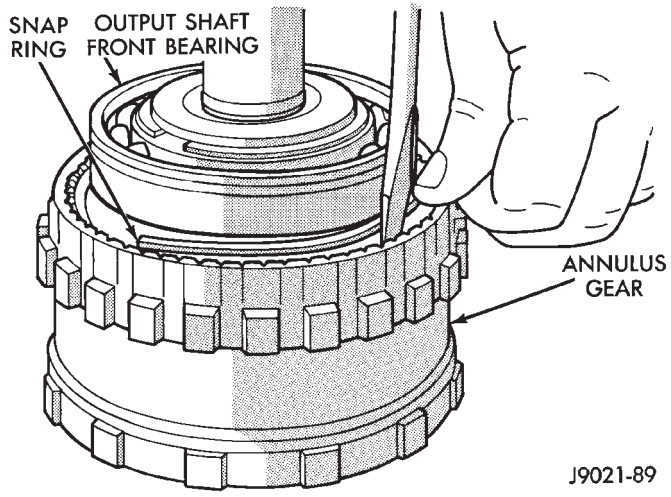


***Fig. 226 Annulus Gear Installation***

(6) Slide clutch drum forward and install inner retaining ring (Fig. 228).

(7) Install rear bearing and snap ring on output shaft (Fig. 229). Be sure locating ring groove in bearing is toward rear.

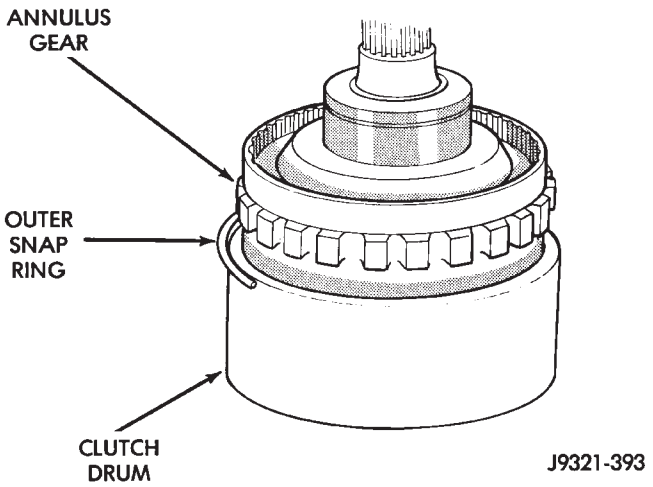


***Fig. 227 Clutch Drum And Outer Retaining RingInstallation***

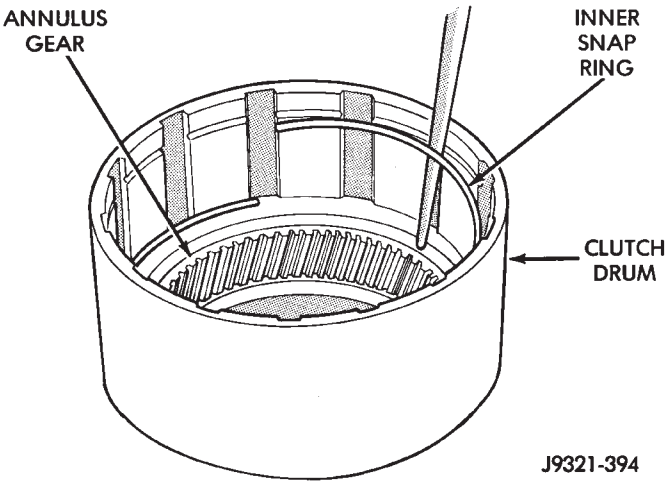


***Fig. 228 Clutch Drum Inner Retaining RingInstallation***

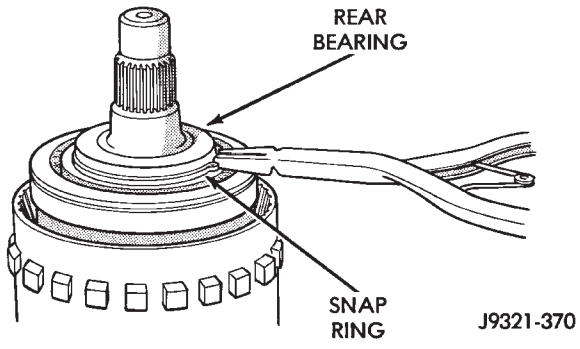


***Fig. 229 Rear Bearing And Snap Ring Installation***

(8) Install overrunning clutch on hub (Fig. 230). **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**

DISASSEMBLY AND ASSEMBLY (Continued)

**way only. Be sure bearing is seated squarely against hub. Reinstall bearing if it does not seat squarely.**

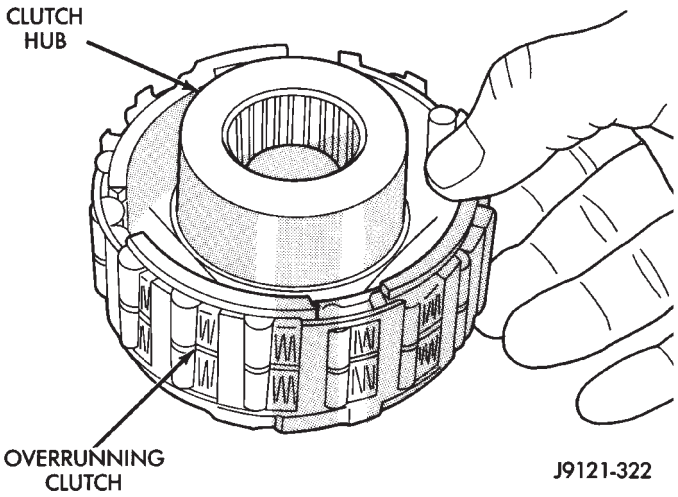


*Fig. 230 Assembling Overrunning Clutch AndHub*

(10) Install overrunning clutch in output shaft (Fig. 231). Insert snap ring pliers in hub splines. Expand pliers to grip hub. Then install assembly with counterclockwise, twisting motion.

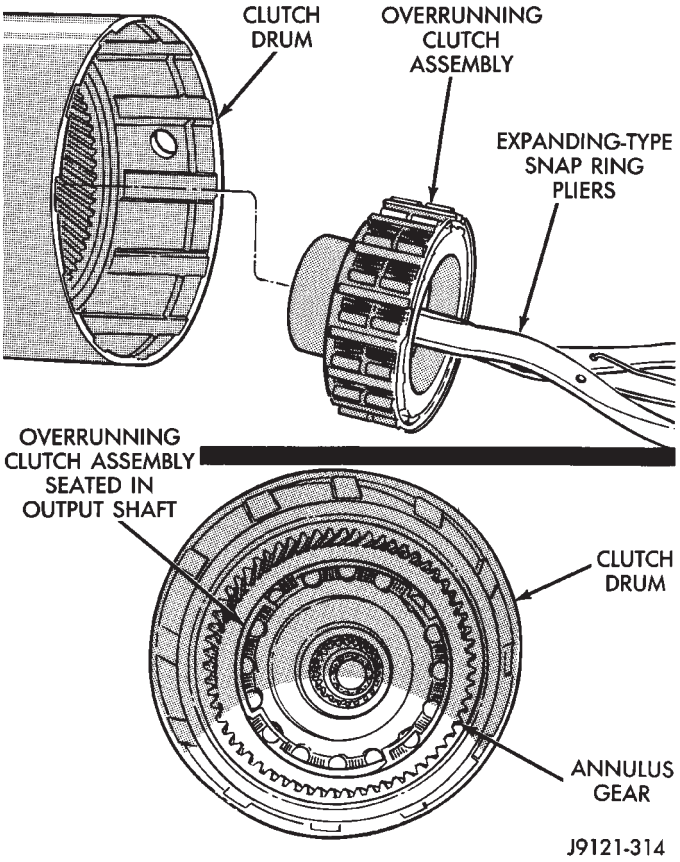


*Fig. 231 Overrunning Clutch Installation*

(11) Install planetary gear in annulus gear (Fig. 232). **Be sure planetary pinions are fully seated in annulus gear before proceeding.**

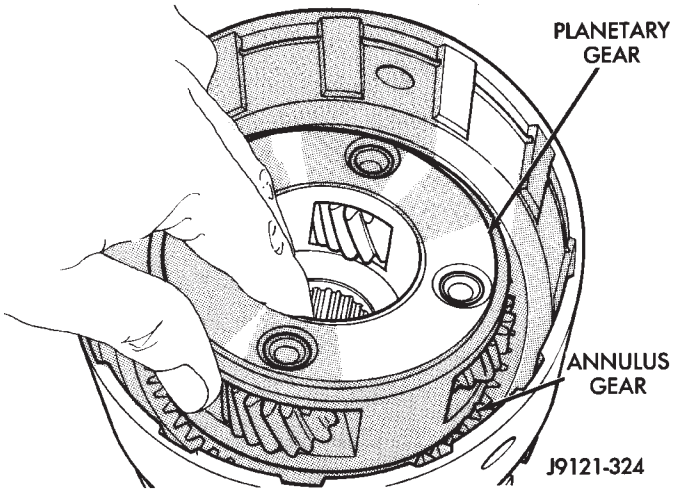


*Fig. 232 Planetary Gear Installation*

(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.

(13) Install planetary thrust bearing on sun gear (Fig. 233). 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.**

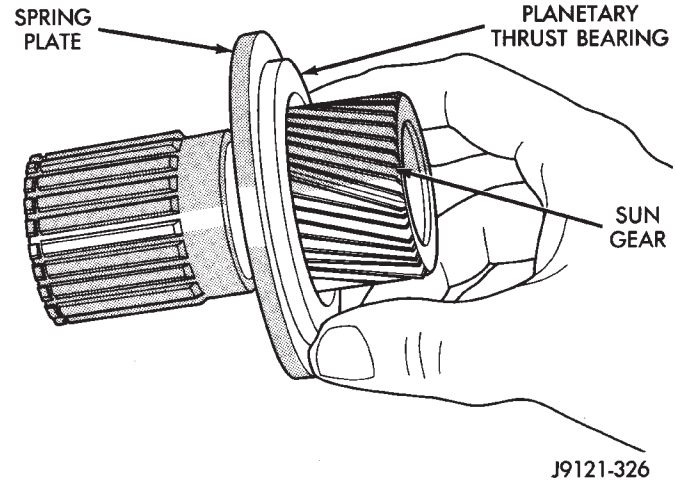


*Fig. 233 Planetary Thrust Bearing Installation*

DISASSEMBLY AND ASSEMBLY (Continued)

(14) Install assembled sun gear, spring plate and thrust bearing (Fig. 234). Be sure sun gear and thrust bearing are fully seated before proceeding.

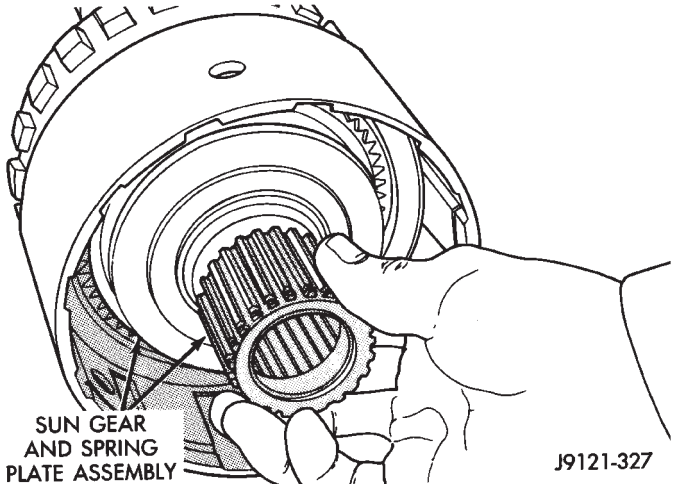


*Fig. 234 Sun Gear Installation*

(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.

(16) Align splines in hubs of planetary gear and overrunning clutch with Alignment tool 6227-2 (Fig. 235). 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. 236). Be sure spring is properly seated on spring plate.

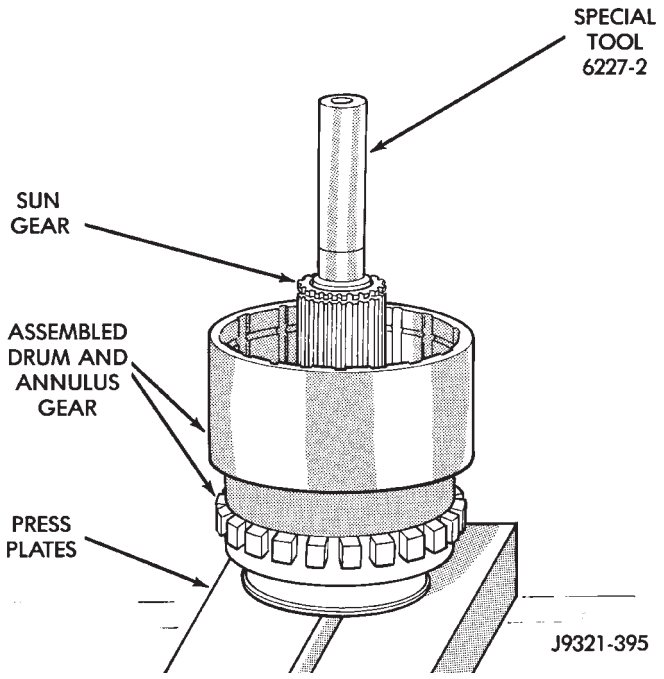


*Fig. 235 Alignment Tool Installation*

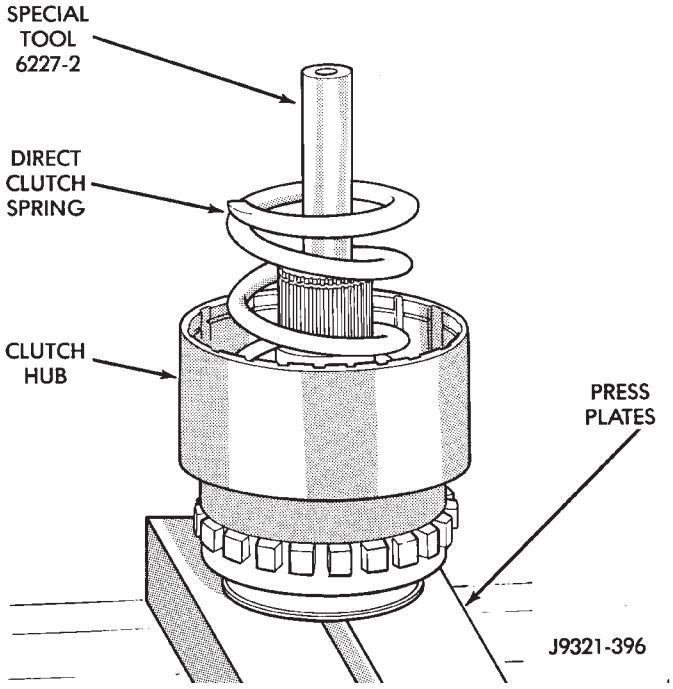


*Fig. 236 Direct Clutch Spring Installation*

**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. 237) or (Fig. 238).

(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. 239).**

(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. 240).**

(19) Install clutch hub and clutch pack on direct clutch spring (Fig. 241). **Be sure hub is started on sun gear splines before proceeding.**

DISASSEMBLY AND ASSEMBLY (Continued)

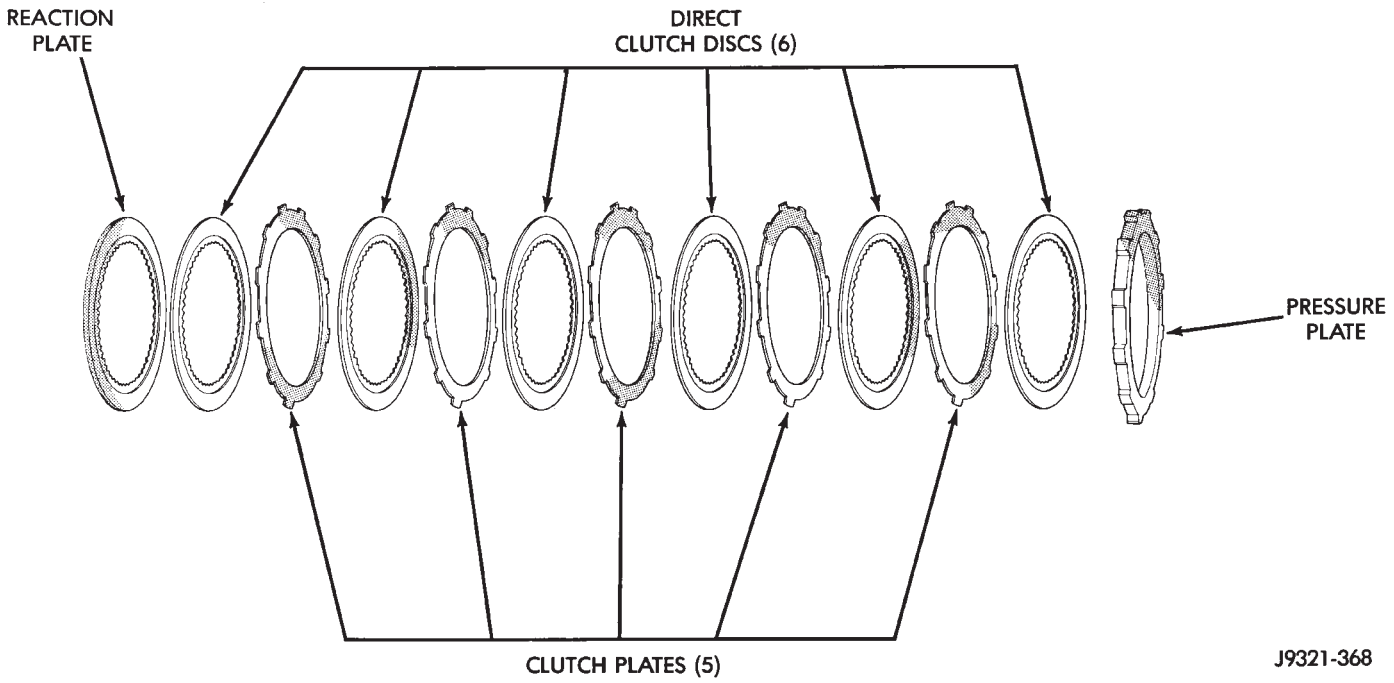


*Fig. 237 42RE Direct Clutch Pack Components*

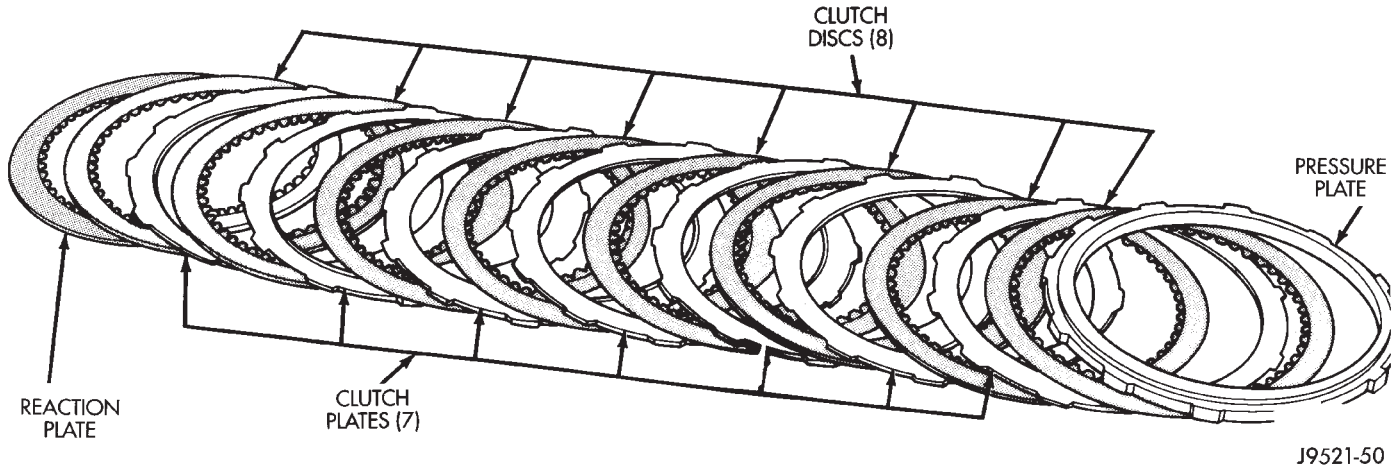


*Fig. 238 44RE Direct Clutch Pack Components*

**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. 242). **Be very sure snap ring is fully seated in clutch drum ring groove.**

(25) Install clutch hub retaining ring (Fig. 243). **Be very sure retaining ring is fully seated in sun gear ring groove.**

DISASSEMBLY AND ASSEMBLY (Continued)

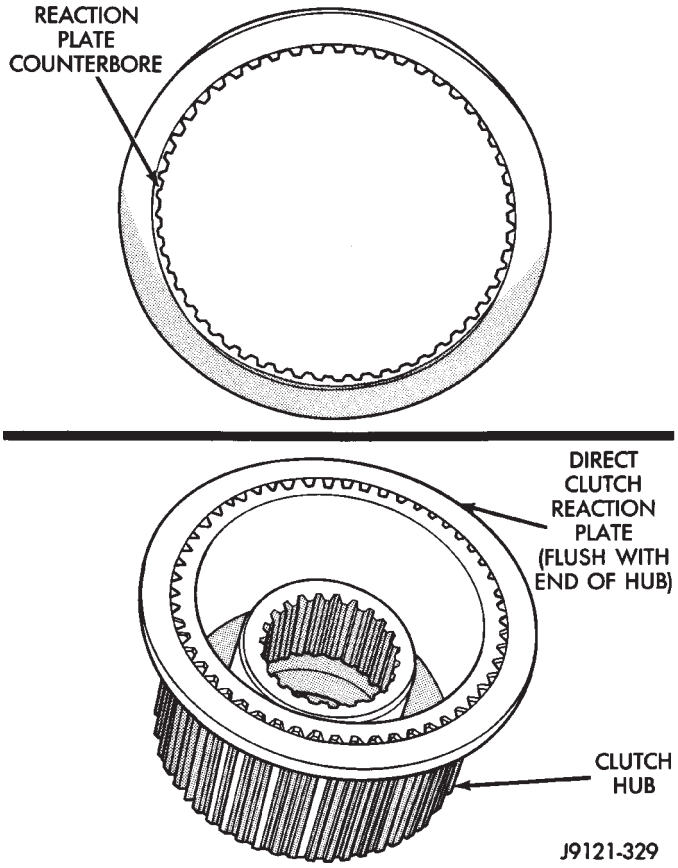


*Fig. 239 Correct Position Of Direct ClutchReaction Plate*

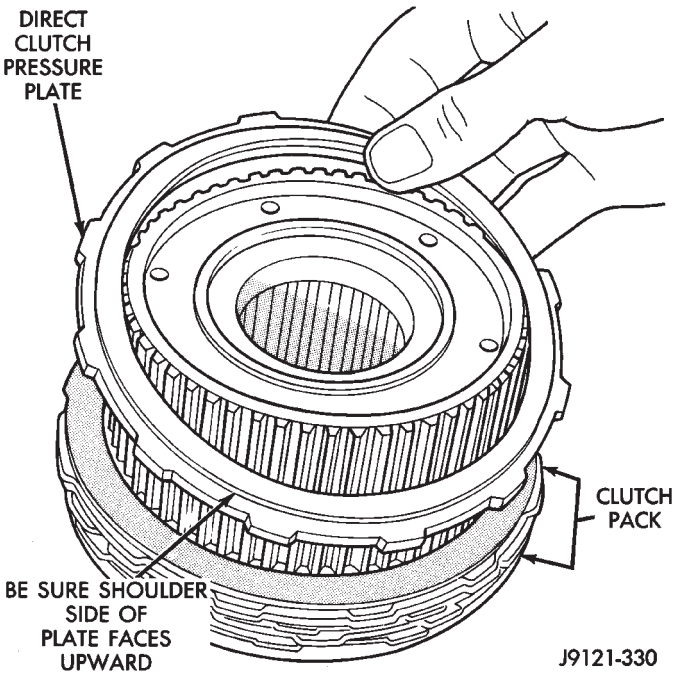


*Fig. 240 Correct Position Of Direct ClutchPressure Plate*

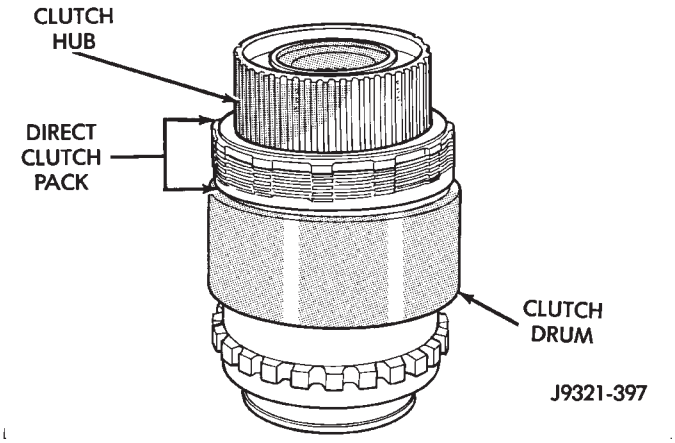


*Fig. 241 Direct Clutch Pack And Clutch HubInstallation*

(26) Slowly release press ram, remove compressor tools and remove geartrain assembly.

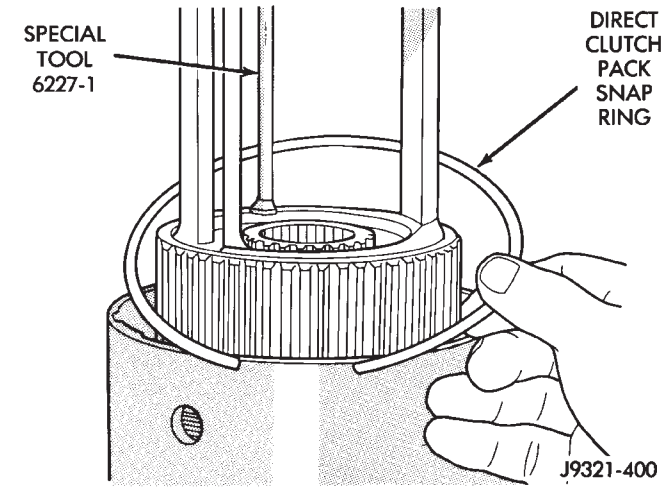


*Fig. 242 Direct Clutch Pack Snap Ring Installation*

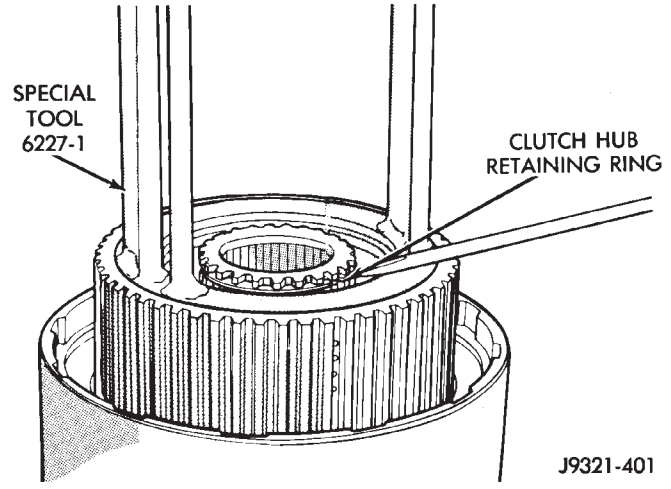


*Fig. 243 Clutch Hub Retaining Ring Installation*

DISASSEMBLY AND ASSEMBLY (Continued)

**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.

(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. 244). Be sure pin is seated in hole in case before installing snap ring.**

(4) Install reaction plug snap-ring (Fig. 245). **Compress snap ring only enough for installation; do not distort it.**

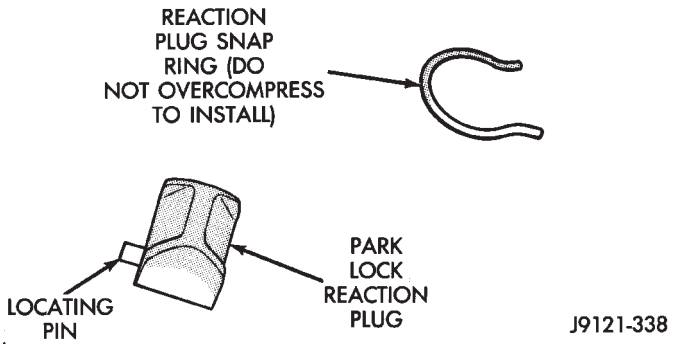


*Fig. 244 Reaction Plug Locating Pin And Snap-Ring*

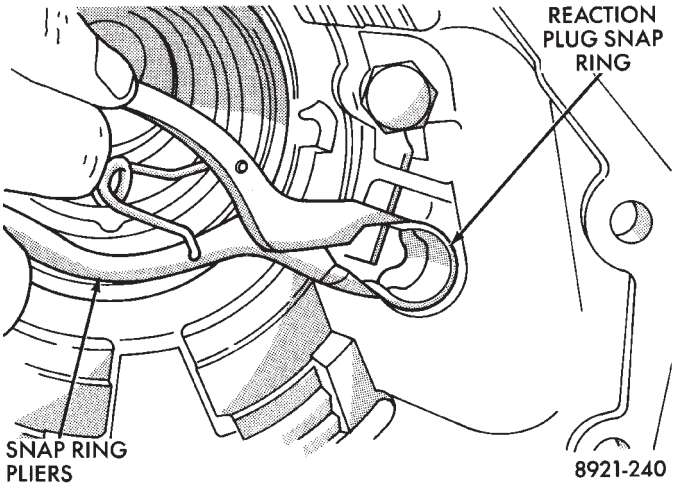


*Fig. 245 Reaction Plug And Snap-Ring Installation*

(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. 246).

(7) Support geartrain on Tool 6227-1 (Fig. 247). Be sure tool is securely seated in clutch hub.

(8) Install overdrive gear case on geartrain (Fig. 247).

(9) Expand front bearing locating ring with snap ring pliers (Fig. 248). Then slide case downward until

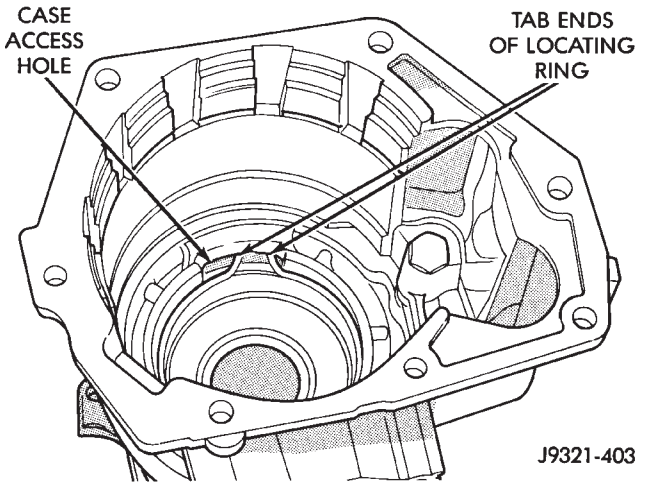


*Fig. 246 Correct Rear Bearing Locating RingPosition*

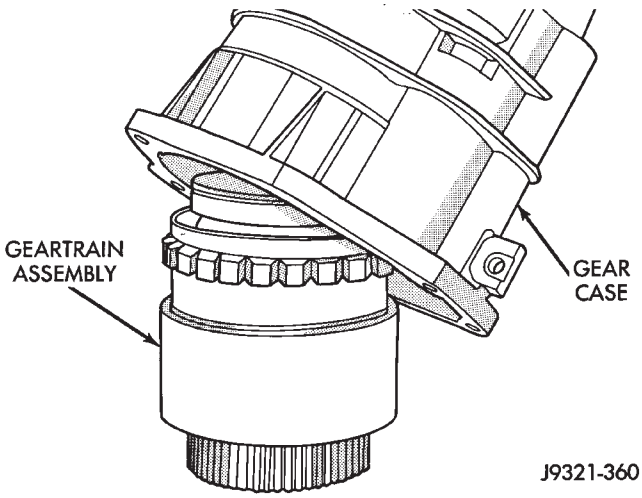


*Fig. 247 Overdrive Gear Case Installation*

locating ring locks in bearing groove and release snap ring.

(10) Install locating ring access cover and gasket in overdrive unit case (Fig. 249).

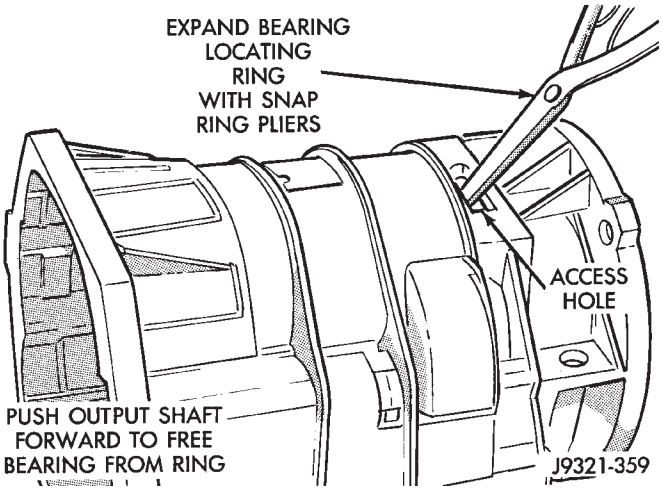


*Fig. 248 Seating Locating Ring In Rear Bearing*

DISASSEMBLY AND ASSEMBLY (Continued)

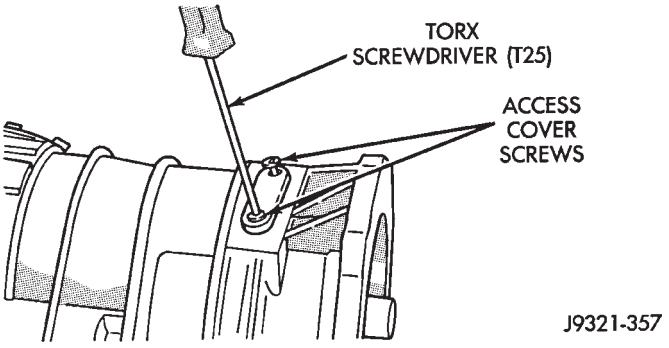


*Fig. 249 Locating Ring Access Cover And GasketInstallation*

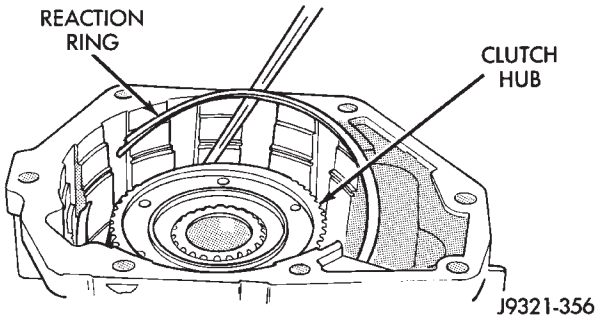


*Fig. 250 Overdrive Clutch Reaction Ring Installation*

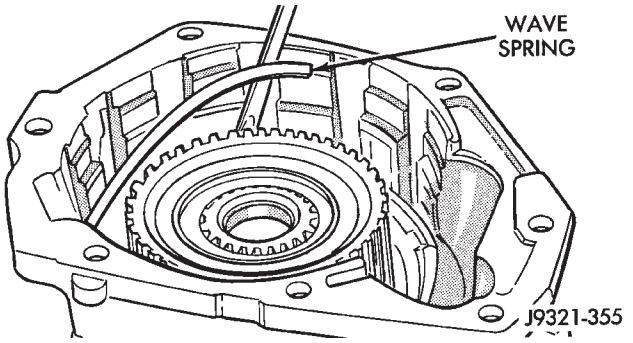


*Fig. 251 Overdrive Clutch Wave Spring Installation*

**OVERDRIVE CLUTCH ASSEMBLY**

(1) Install overdrive clutch reaction ring first. Reaction ring is flat with notched ends (Fig. 250).

(2) Install wave spring on top of reaction ring (Fig. 251). **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. 252).

(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. 253).

**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

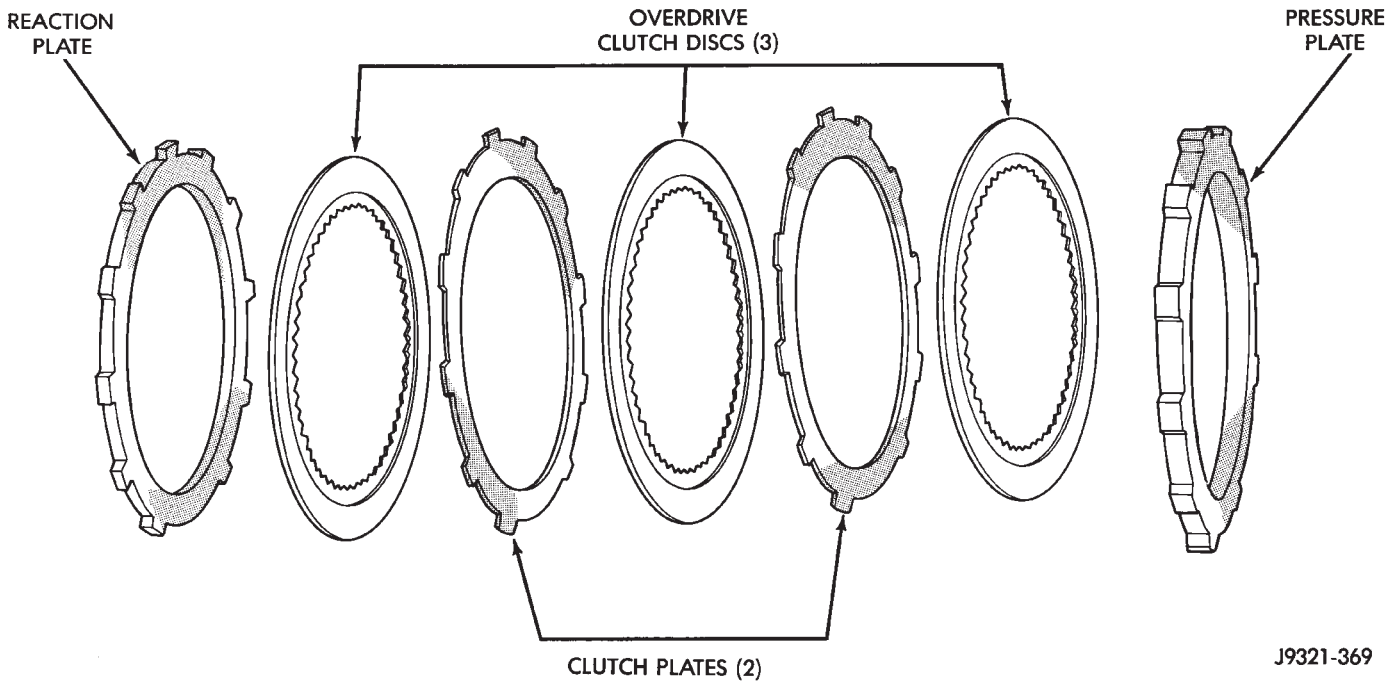


*Fig. 252 42RE Overdrive Clutch Components*

DISASSEMBLY AND ASSEMBLY (Continued)

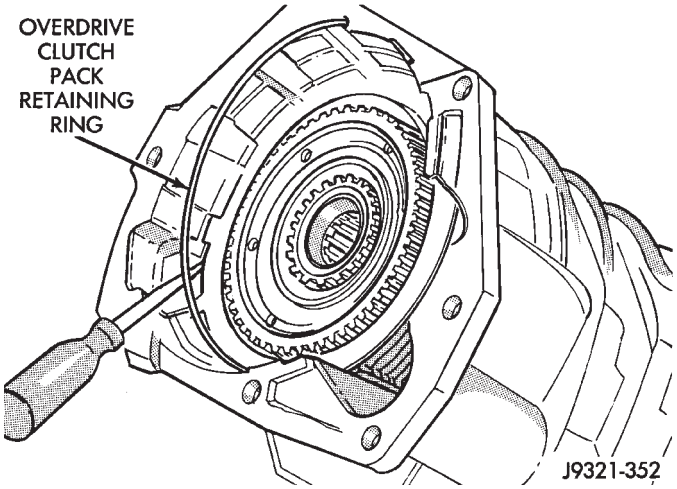


*Fig. 253 Overdrive Clutch Pack Retaining RingInstallation*

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. 254). 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. 254).

(d) Select proper thickness end play spacer from spacer chart based on distance measured (Fig. 255).

(e) Remove Gauge Alignment Tool 6312.

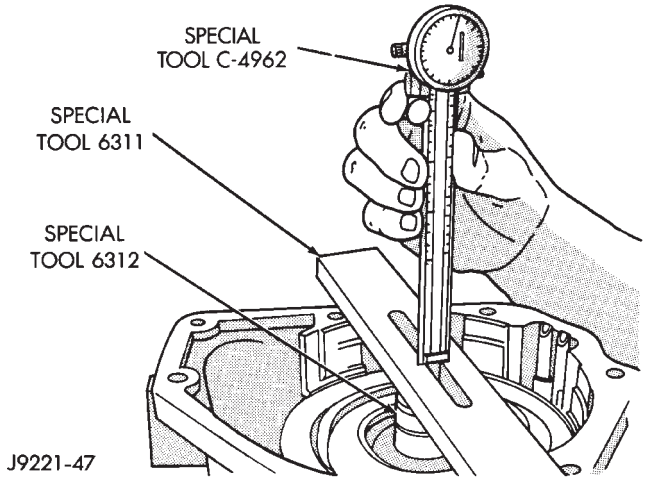


*Fig. 254 Shaft End Play Measurement*

| 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. 255 Intermediate Shaft End Play SpacerSelection*

**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. 256).

(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. 257).

(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.

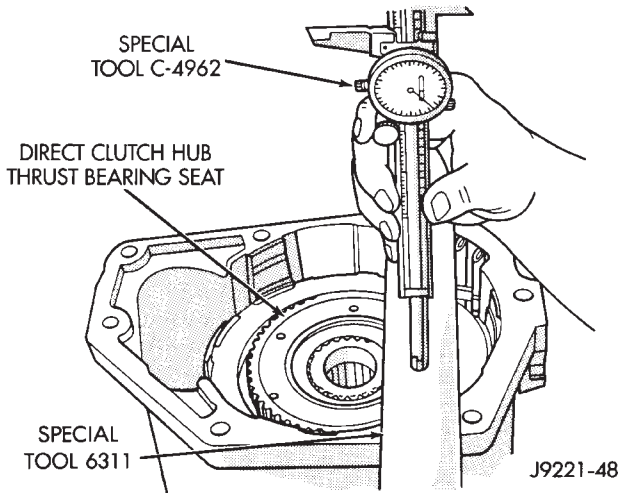



*Fig. 256 Overdrive Piston Thrust Plate Measurement*

DISASSEMBLY AND ASSEMBLY (Continued)

| 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. 257 Overdrive Piston Thrust Plate Selection*

**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.

(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. 197).

## 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. 258). 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 straightedge 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.**

CLEANING AND INSPECTION (Continued)

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)

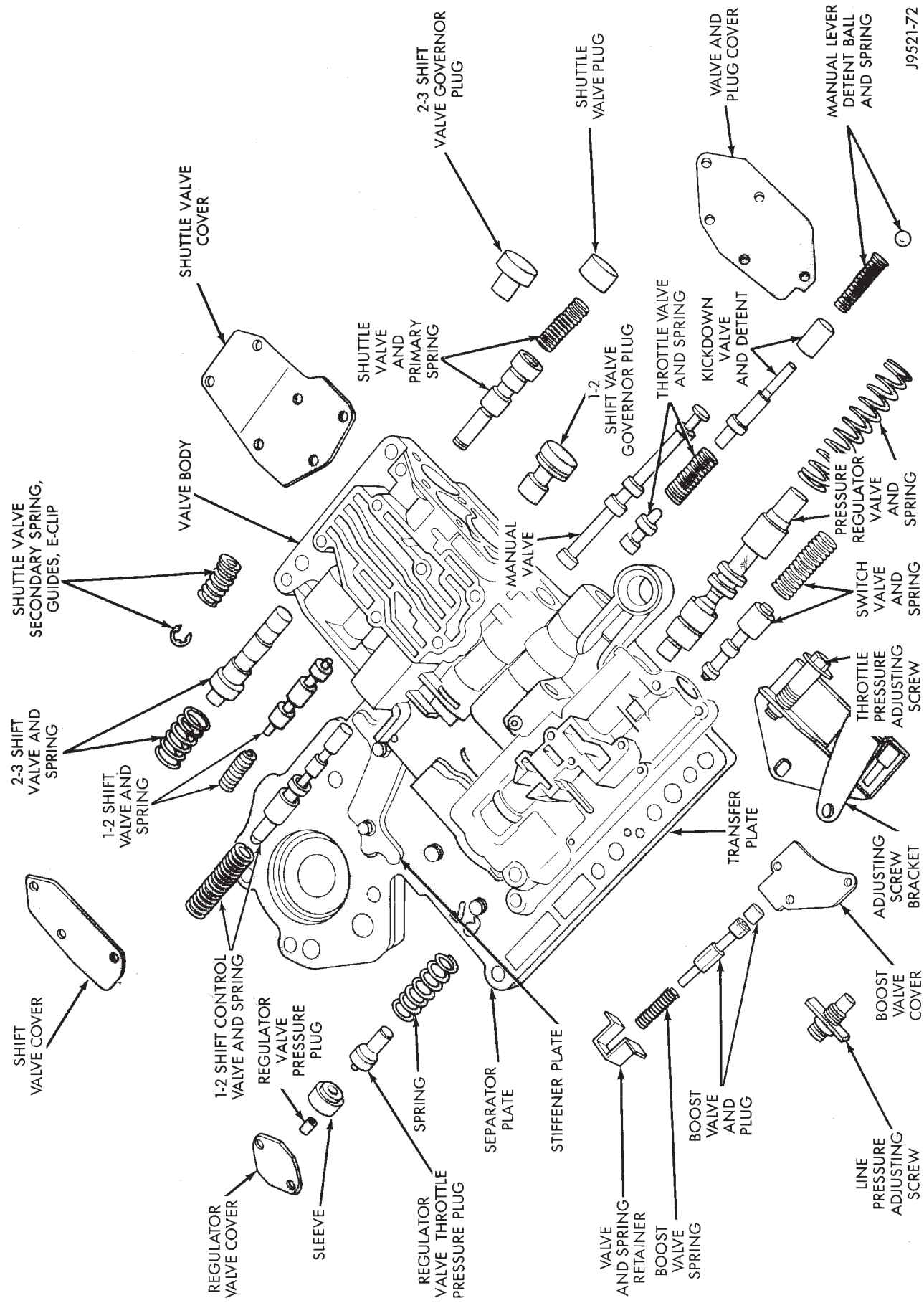



*Fig. 258 Upper Housing Valves, Plug, SpringsAnd Brackets*

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, 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. 259). 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. 259). Replace the springs if the coils are cracked, distorted or collapsed.

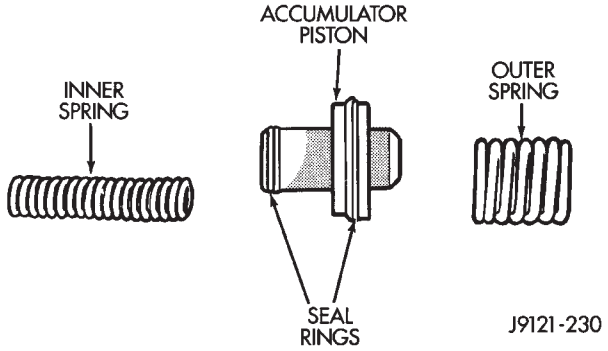



***Fig. 259 Accumulator Components***

## 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. 260). 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.

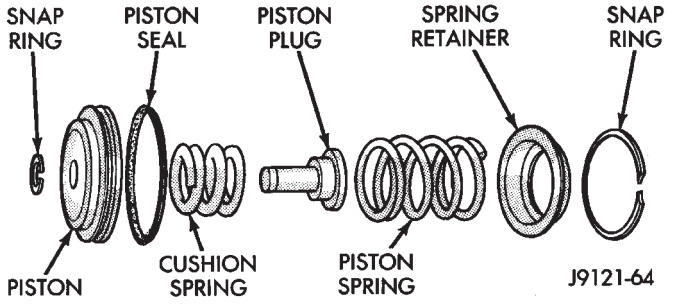



*Fig. 260 Rear Servo Components*

## FRONT CLUTCH

Clean the front clutch components in solvent and dry them with compressed air only. Do not use rags or shop towels to dry any of the clutch parts. Lint from such materials will adhere to the component surfaces and could restrict or block fluid passages after assembly.

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. 261). The ball must move freely and not stick.

**NOTE: Inspect the clutch retainer bushings carefully (Fig. 262). 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.

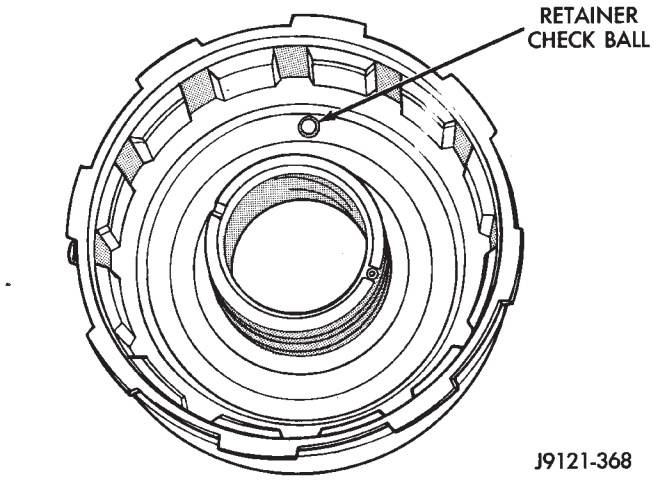



*Fig. 261 Front Clutch Piston Retainer CheckBall Location*

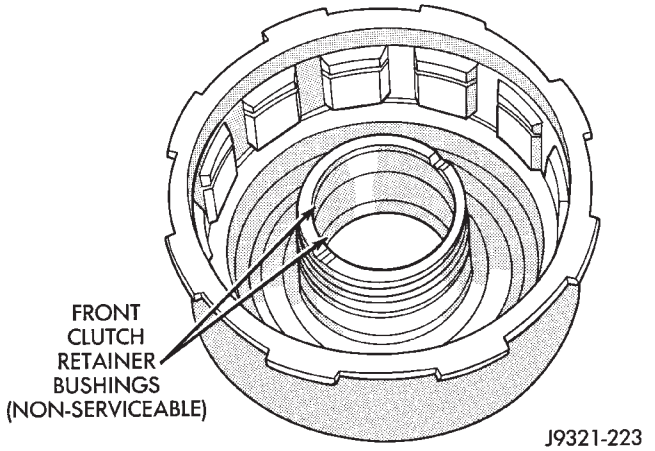



*Fig. 262 Retainer Bushing Location/Inspection*

## 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 also in good condition. The lugs must not be bent, cracked or damaged in any way.

CLEANING AND INSPECTION (Continued)

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.

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.

## CLEANING AND INSPECTION (Continued)

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 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

### BRAKE TRANSMISSION SHIFT INTERLOCK

The park interlock cable is part of the brake/shift lever interlock system. Correct cable adjustment is important to proper interlock operation. The gear shift and park lock cables must both be correctly adjusted in order to shift out of Park.

*Park Interlock Cable Adjustment Procedure*

(1) Shift into Park position.

(2) Turn ignition switch to Accessory position. **Be sure ignition key cylinder is in Accessory position. Cable will not adjust correctly in any other position.**

(3) Remove shift lever bezel and console screws. Raise bezel and console for access to park interlock cable.

(4) Pull cable lock button up to release cable (Fig. 263).

(5) Pull cable forward. Then release cable and press lock button down until it snaps in place.

*BTSI FUNCTION CHECK*

(1) Verify removal of ignition key allowed in park position only.

(2) When the shift lever is in park, and the shift handle push-button is in the out position, the ignition key cylinder should rotate freely from off to lock.

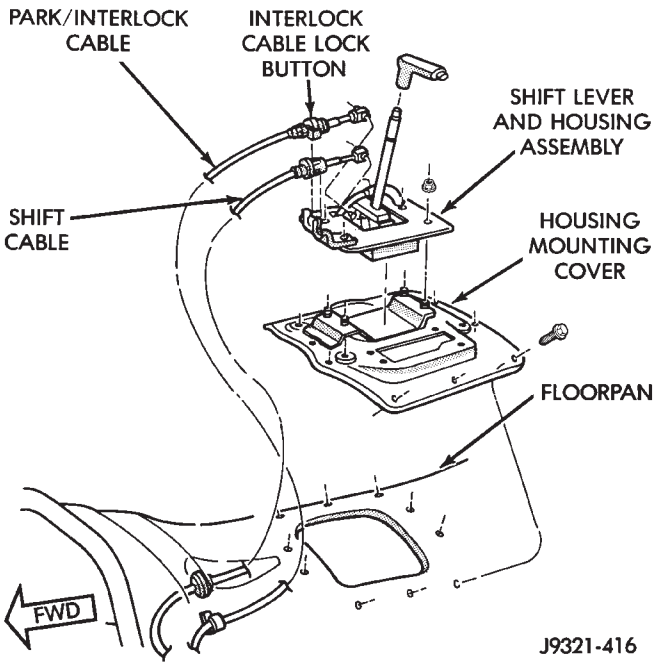



***Fig. 263 Shift And Park Lock Cables***

When the shifter is in any other position, the ignition key should not rotate from off to lock.

(3) Shifting out of park should be possible when the ignition key cylinder is in the off position.

(4) Shifting out of park should not be possible while applying 25 lb. max. handle push-button force, and ignition key cylinder is in the run or start positions, unless the foot brake pedal is depressed approximately 1/2 inch (12mm).

(5) Shifting out of park should not be possible when the ignition key cylinder is in the accessory or lock position.

(6) Shifting between any gears neutral or park may be done without depressing foot brake with ignition switch in run or start positions and vehicle stationary or in motion.

(7) The floorshifter lever and gate positions should be in alignment with all transmission detent positions.

(8) Engine starts must be possible with floorshift lever in park or neutral gate positions only. Engine starts must not be possible in any other gate positions other than park or neutral.

(9) With floorshift lever handle push-button not depressed and lever detent in:

- PARK POSITION- apply forward force on center of handle and remove pressure. Engine start must be possible.
- PARK POSITION- apply rearward force on center of handle and remove pressure. Engine start must be possible.
- NEUTRAL POSITION- engine start must be possible.

ADJUSTMENTS (Continued)

• NEUTRAL POSITION, ENGINE RUNNING AND BRAKES APPLIED- Apply forward force on center of shift handle. Transmission should not be able to shift into reverse detent.

## TRANSMISSION THROTTLE VALVE CABLE ADJUSTMENT

The transmission throttle valve is operated by a cam on the throttle lever. The throttle lever is operated by an adjustable cable (Fig. 264). The cable is attached to an arm mounted on the throttle lever shaft. A lock button at the engine-end of the cable is provided for cable 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 will allow simultaneous movement without causing the transmission throttle lever to either move ahead of, or lag behind the lever on the throttle body.

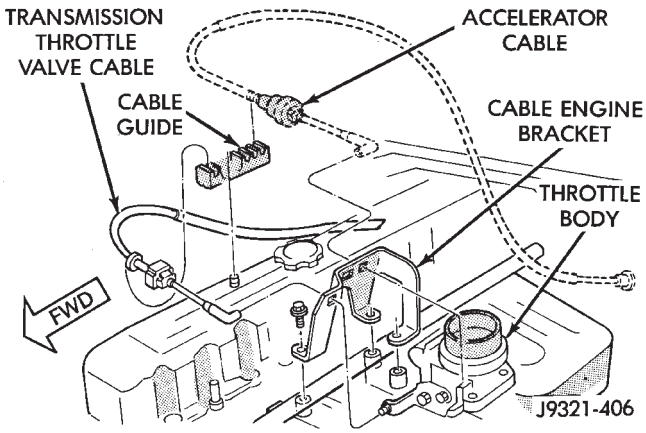



***Fig. 264 Throttle Cable Attachment At Engine***

*Checking Throttle Valve Cable Adjustment*

(1) Turn ignition key to OFF position.

(2) Remove air cleaner.

(3) Verify that lever on throttle body is at curb idle position. Then verify that transmission throttle lever (Fig. 265) is also at idle (fully forward) position.

(4) Slide cable off attachment stud on throttle body lever.

(5) Compare position of cable end to attachment stud on throttle body lever:

• Cable end and attachment stud should be aligned (or centered on one another) to within 1 mm (0.039 in.) in either direction.

• If cable end and attachment stud are misaligned (off center), cable will have to be adjusted as described in Throttle Valve Cable Adjustment 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.

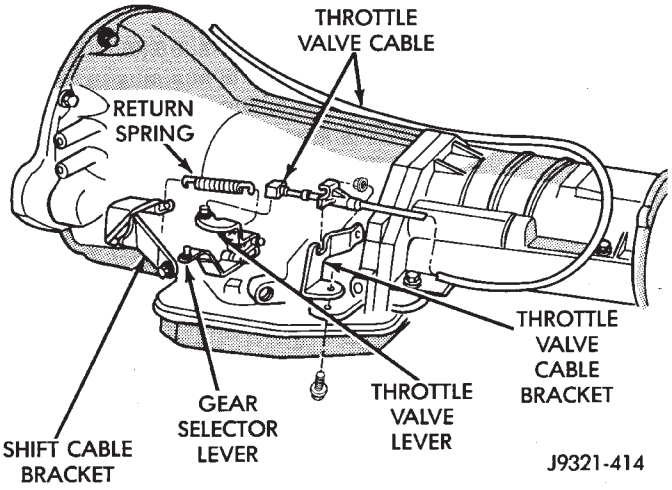



***Fig. 265 Throttle Cable Attachment At Transmission***

• If both levers move simultaneously from idle to half-throttle and back to idle position, adjustment is correct.

• 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.

(2) Remove air cleaner if necessary.

(3) Disconnect cable end from attachment stud. **Carefully slide cable off stud. Do not pry or pull cable off.**

(4) Verify that transmission throttle lever is in fully closed 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. Verify transmission throttle lever and lever on throttle body move simultaneously.

## 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) Raise vehicle.

ADJUSTMENTS (Continued)

(3) Release cable adjuster clamp (at transmission end of cable) to unlock cable.

(4) Unsnap cable from cable mounting bracket on transmission (Fig. 266).

(5) Slide cable eyelet off transmission shift lever.

(6) Verify transmission shift lever is in Park detent by moving lever fully rearward. Last rearward detent is Park position.

(7) Verify positive engagement of transmission park lock by attempting to rotate propeller shaft. Shaft will not rotate when park lock is engaged.

(8) Slide cable eyelt onto transmission shift lever.

(9) Snap shift cable adjuster into mounting bracket on transmission.

(10) Lock shift cable by pressing cable adjuster clamp down until it snaps into place.

(11) Lower vehicle and check engine starting. Engine should start only in Park and Neutral.

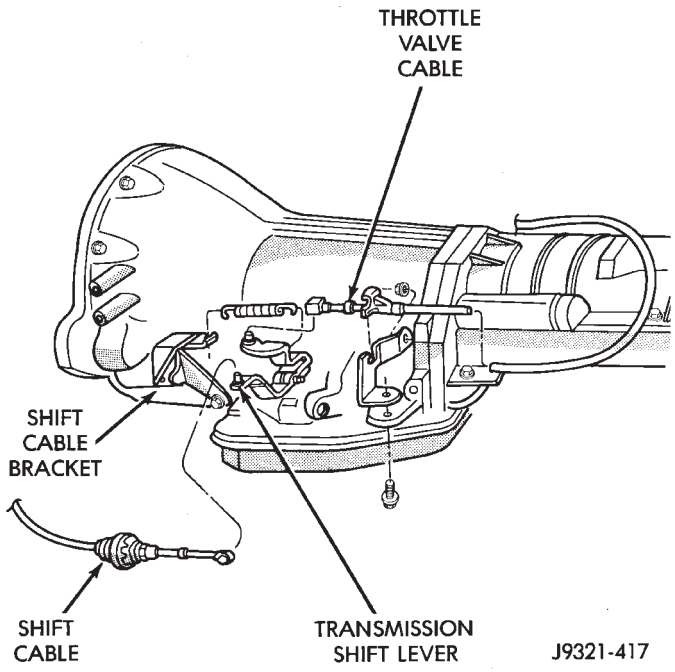



*Fig. 266 Shift Cable Attachment At Transmission*

## 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. 267). 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. 268), tighten the screw to only 5 N·m (47-50 in. lbs.) torque.**

#### *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.

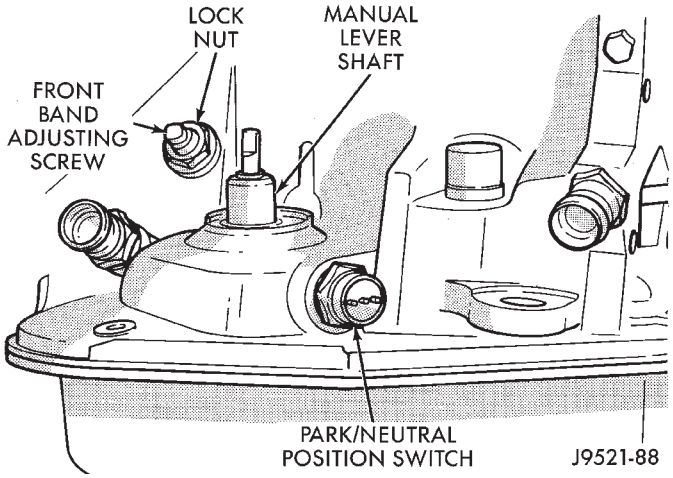



*Fig. 267 Front Band Adjustment Screw Location*

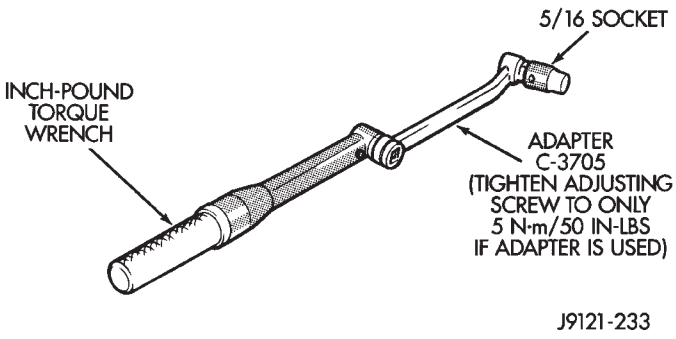



*Fig. 268 Band Adjustment Adapter Tool*

### 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. 269). Be sure adjusting screw turns freely in lever.

(4) Tighten adjusting screw to 8 N·m (72 in. lbs.) torque.

#### *42RE TRANSMISSION*

- Back off adjusting screw 4 turns.

ADJUSTMENTS (Continued)

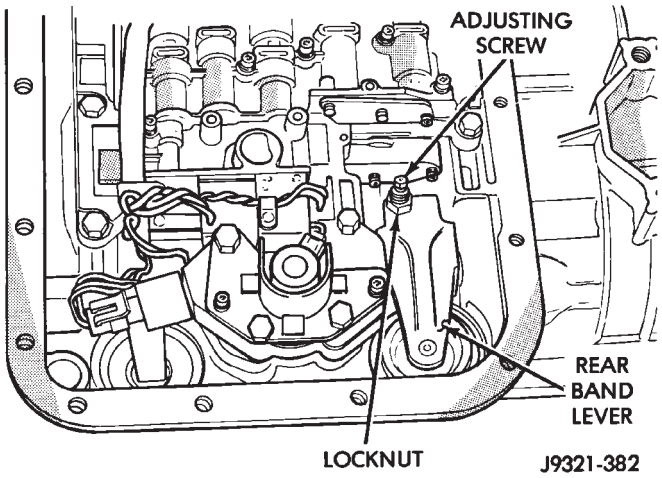



*Fig. 269 Rear Band Adjusting Screw Location*

- Hold adjusting screw in place and tighten locknut to 34 N·m (25 ft. lbs.) torque.

***44RE TRANSMISSION***

- Back off adjusting screw 4 turns.
- Hold adjusting screw in place and tighten locknut to 34 N·m (25 ft. lbs.) torque.

(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, 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. 270).

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.

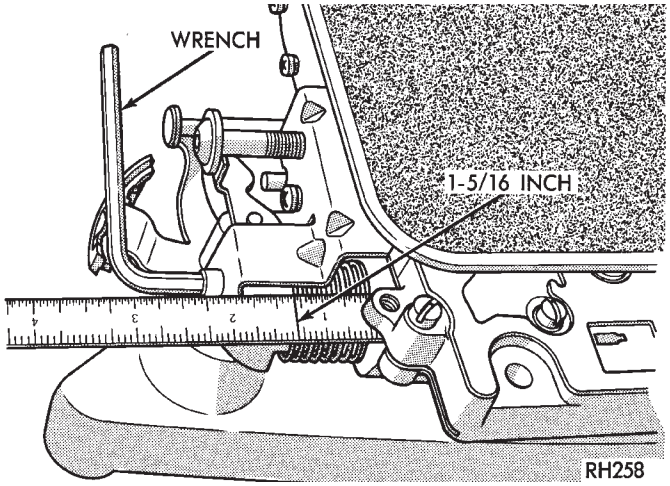



*Fig. 270 Line Pressure Adjustment*

**THROTTLE PRESSURE ADJUSTMENT**

Insert Gauge Tool C-3763 between the throttle lever cam and the kickdown valve stem (Fig. 271).

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.**

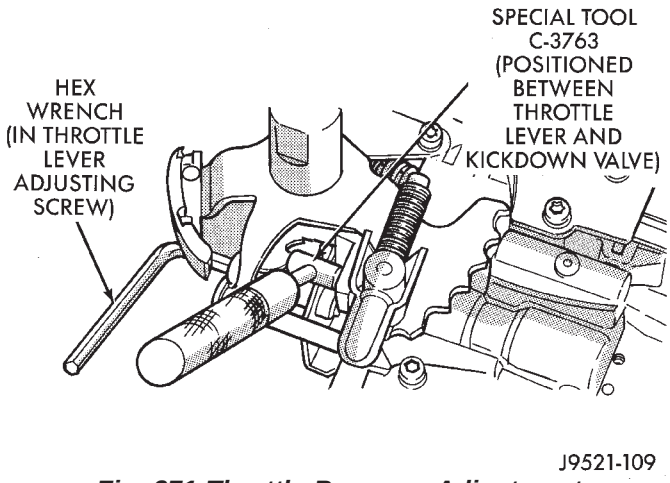
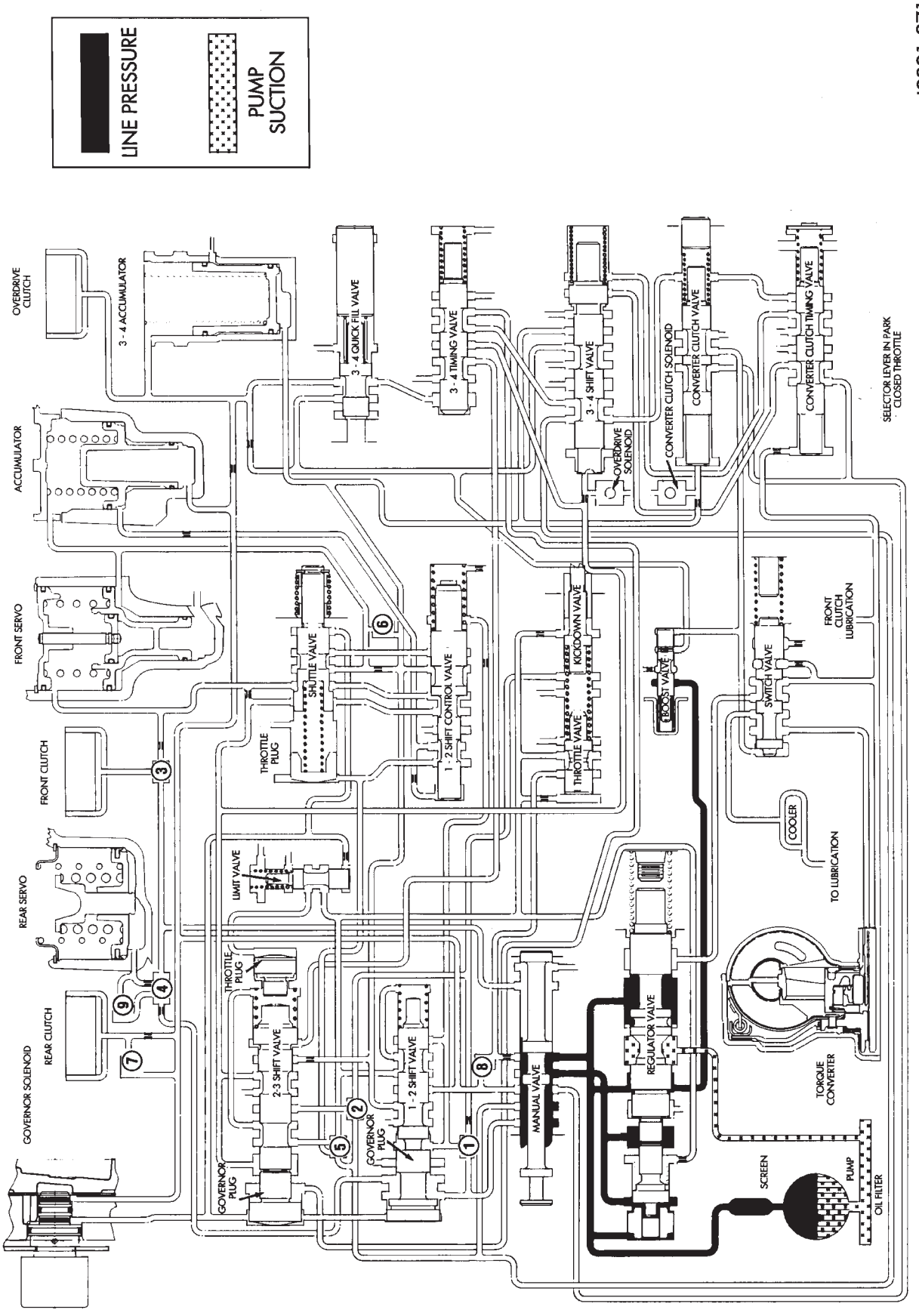



*Fig. 271 Throttle Pressure Adjustment*

## SCHEMATICS AND DIAGRAMS

**HYDRAULIC SCHEMATICS**

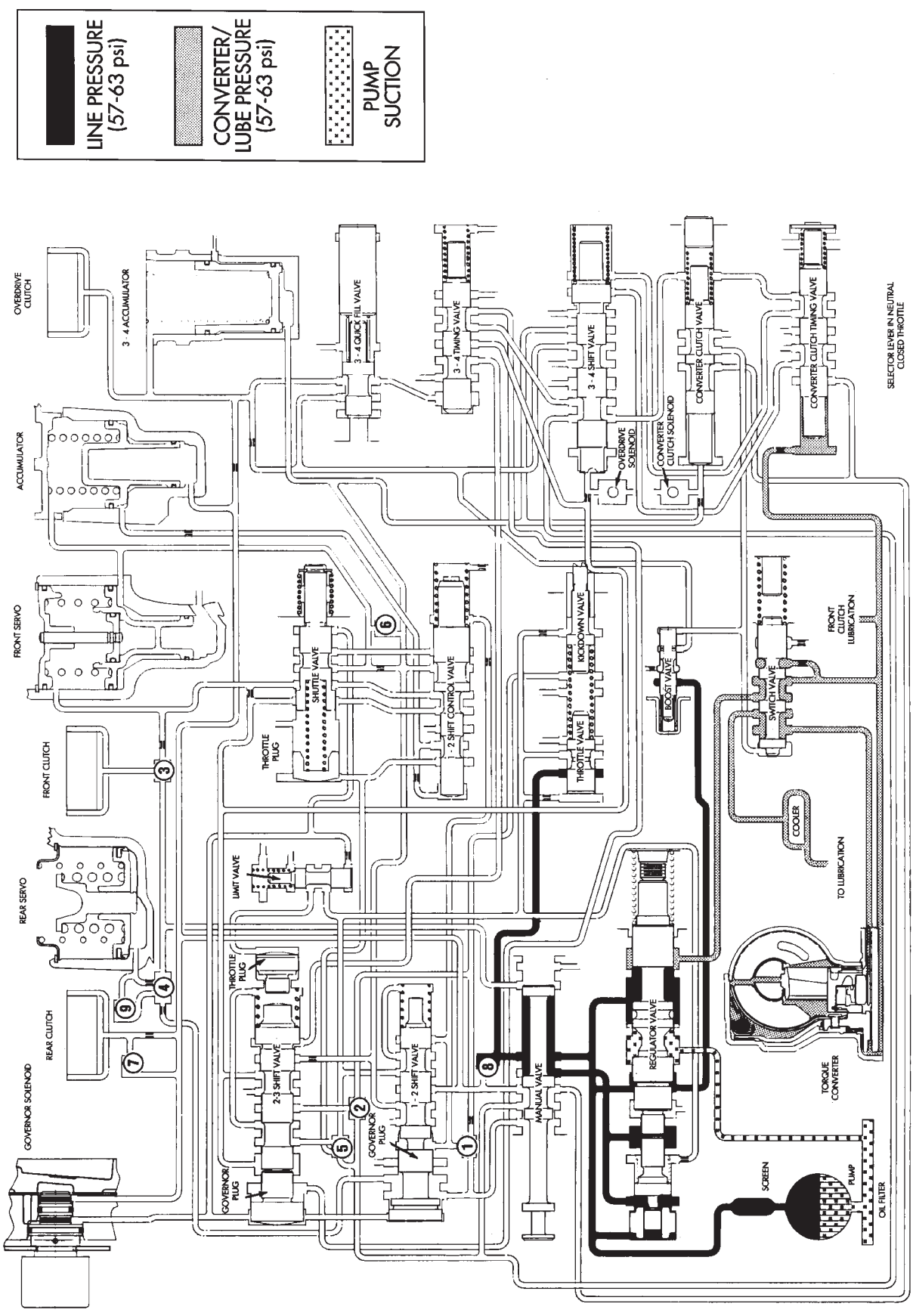
SCHEMATICS AND DIAGRAMS (Continued)




J9321-371

***HYDRAULIC FLOW IN PARK***

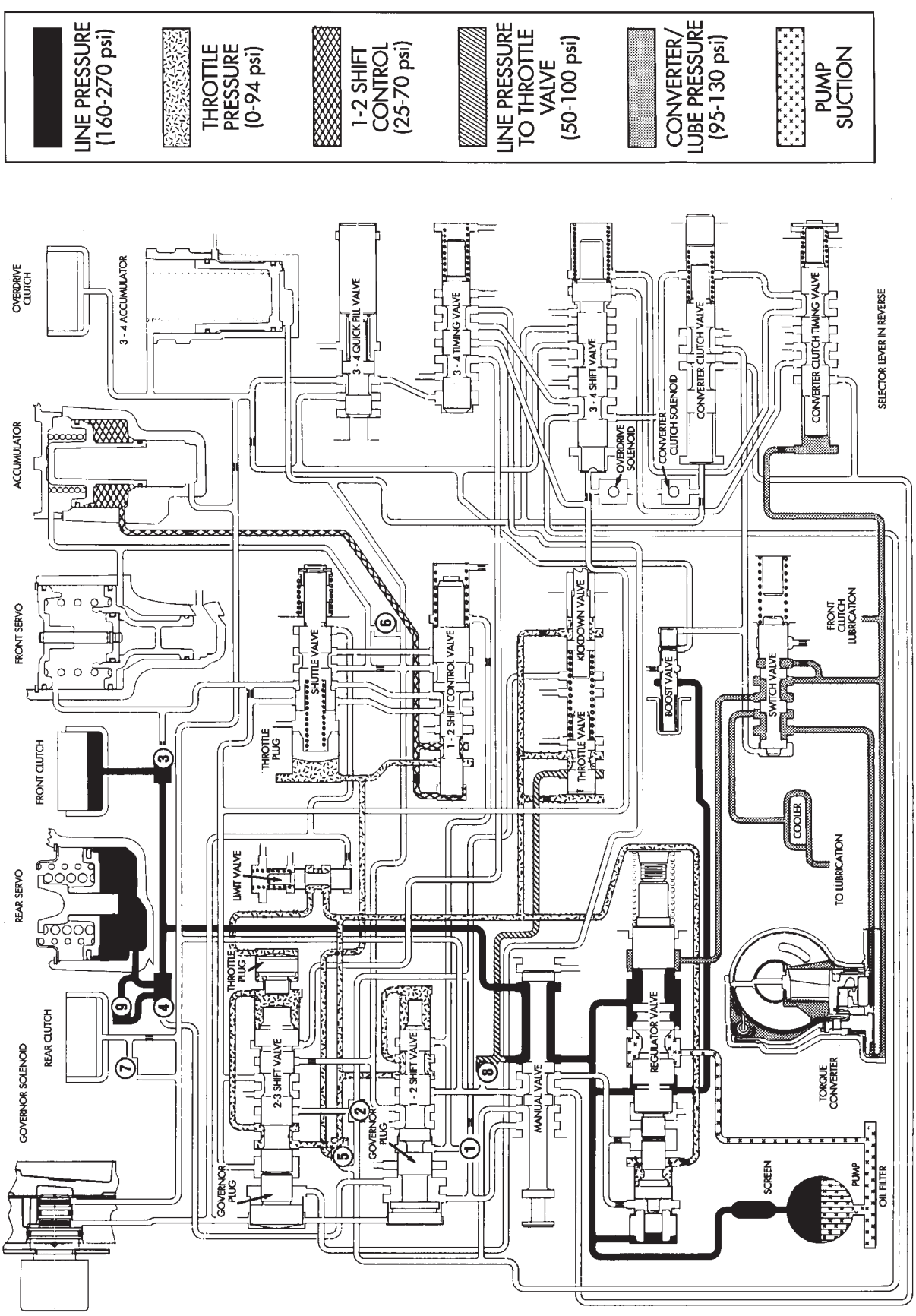
SCHEMATICS AND DIAGRAMS (Continued)




J9321-372

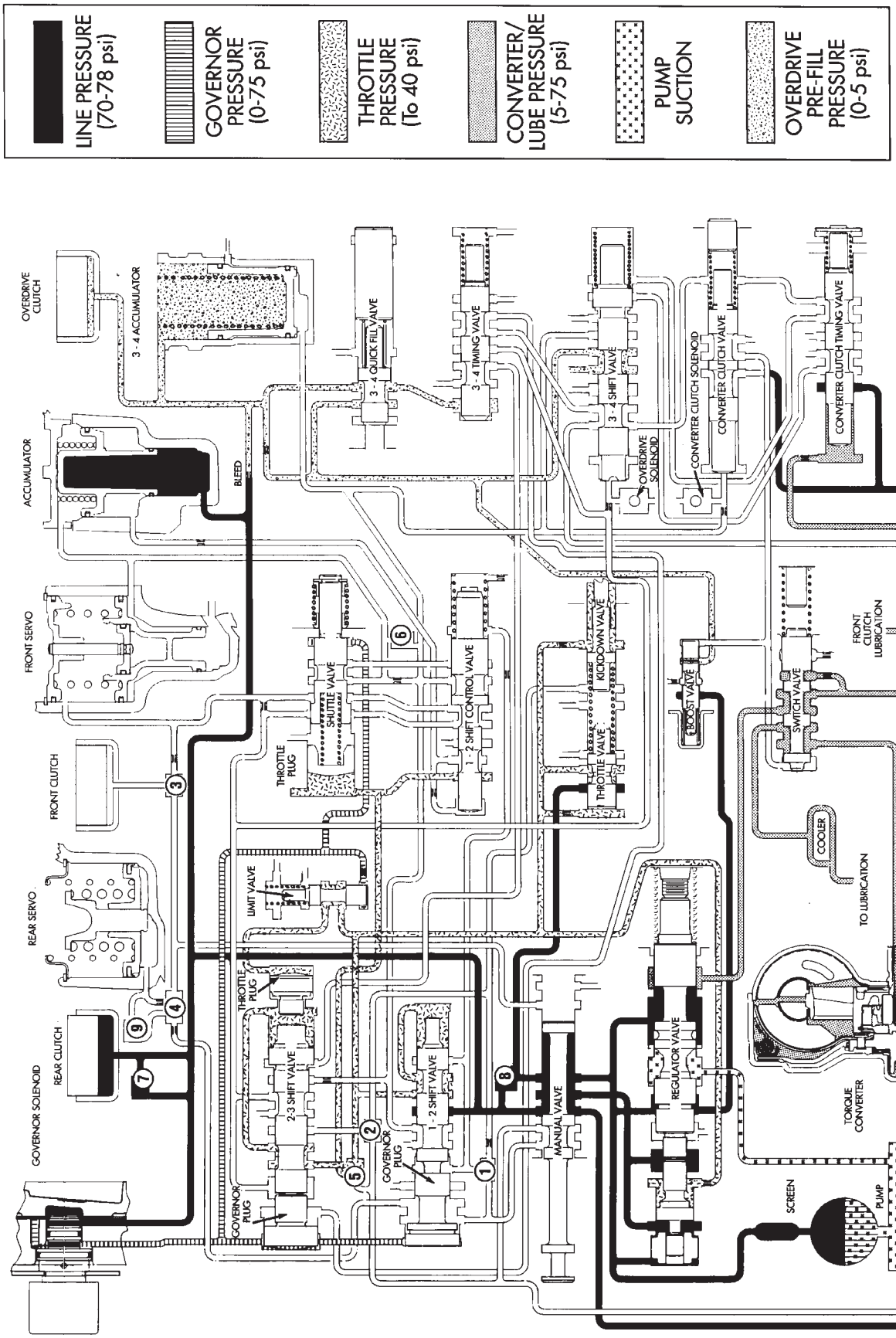
*HYDRAULIC FLOW IN NEUTRAL*

SCHEMATICS AND DIAGRAMS (Continued)



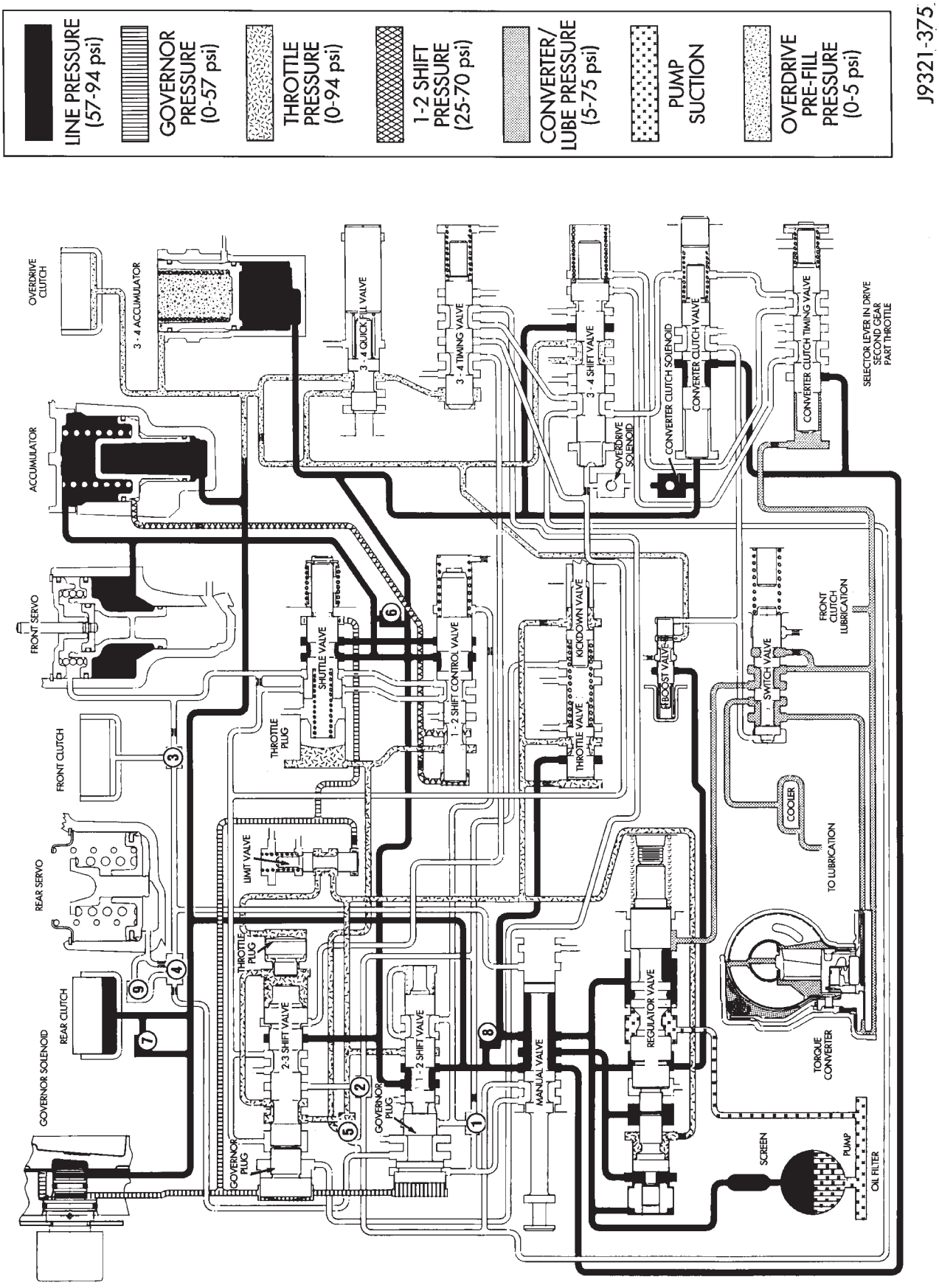

*HYDRAULIC FLOW IN REVERSE*

SCHEMATICS AND DIAGRAMS (Continued)



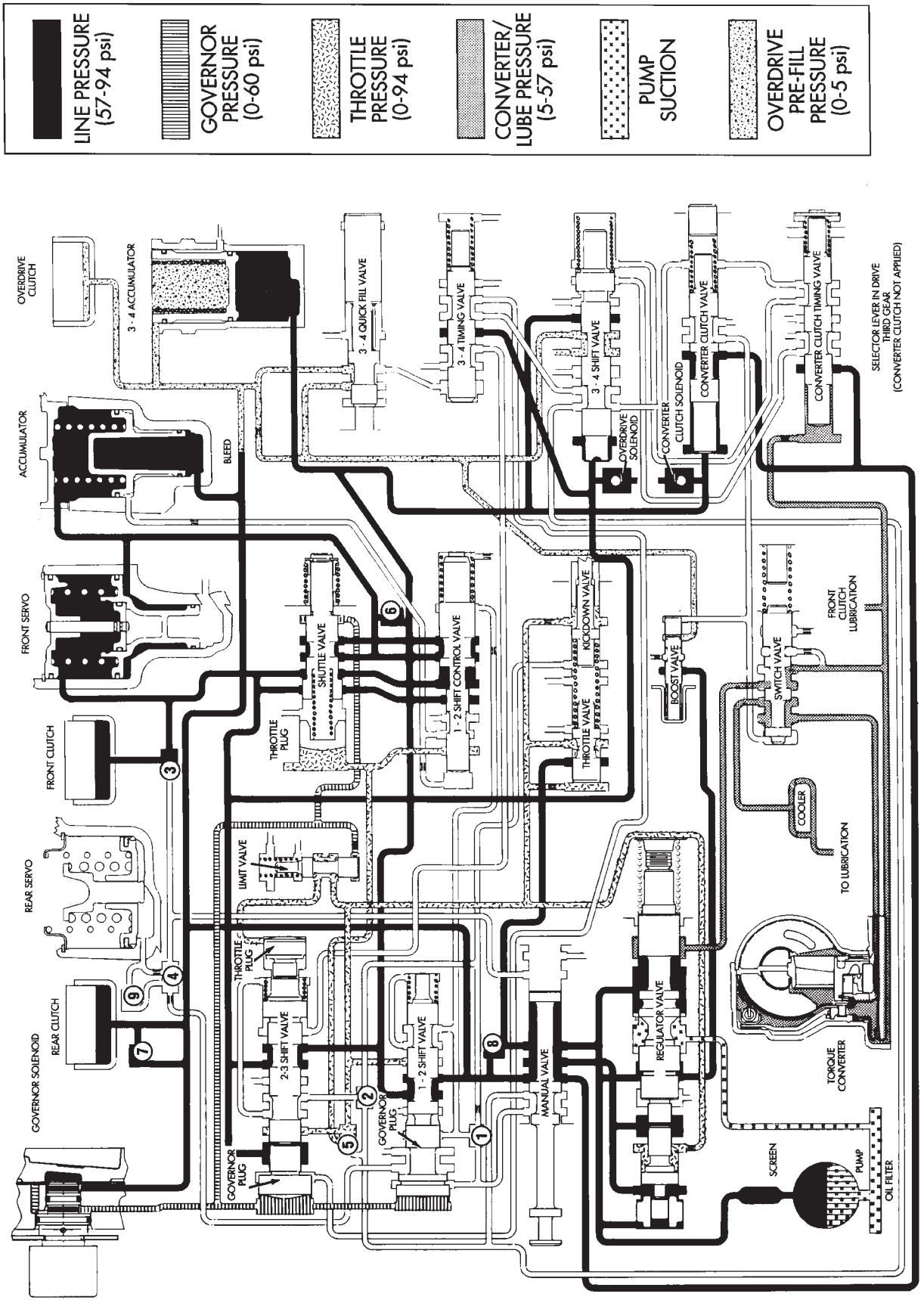

*HYDRAULIC FLOW IN DRIVE FIRST GEAR*

SCHEMATICS AND DIAGRAMS (Continued)



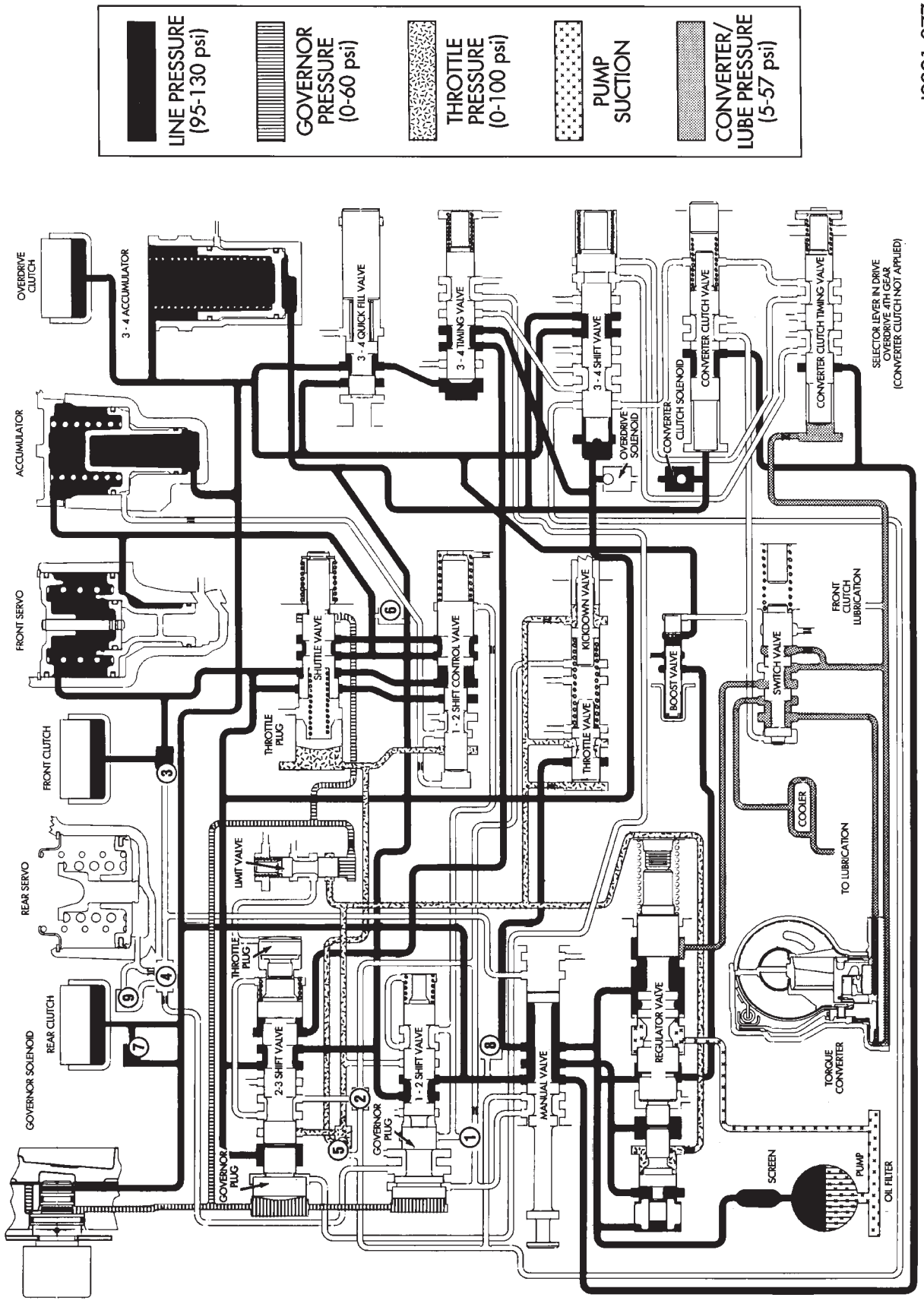

*HYDRAULIC FLOW IN DRIVE SECOND GEAR*

SCHEMATICS AND DIAGRAMS (Continued)



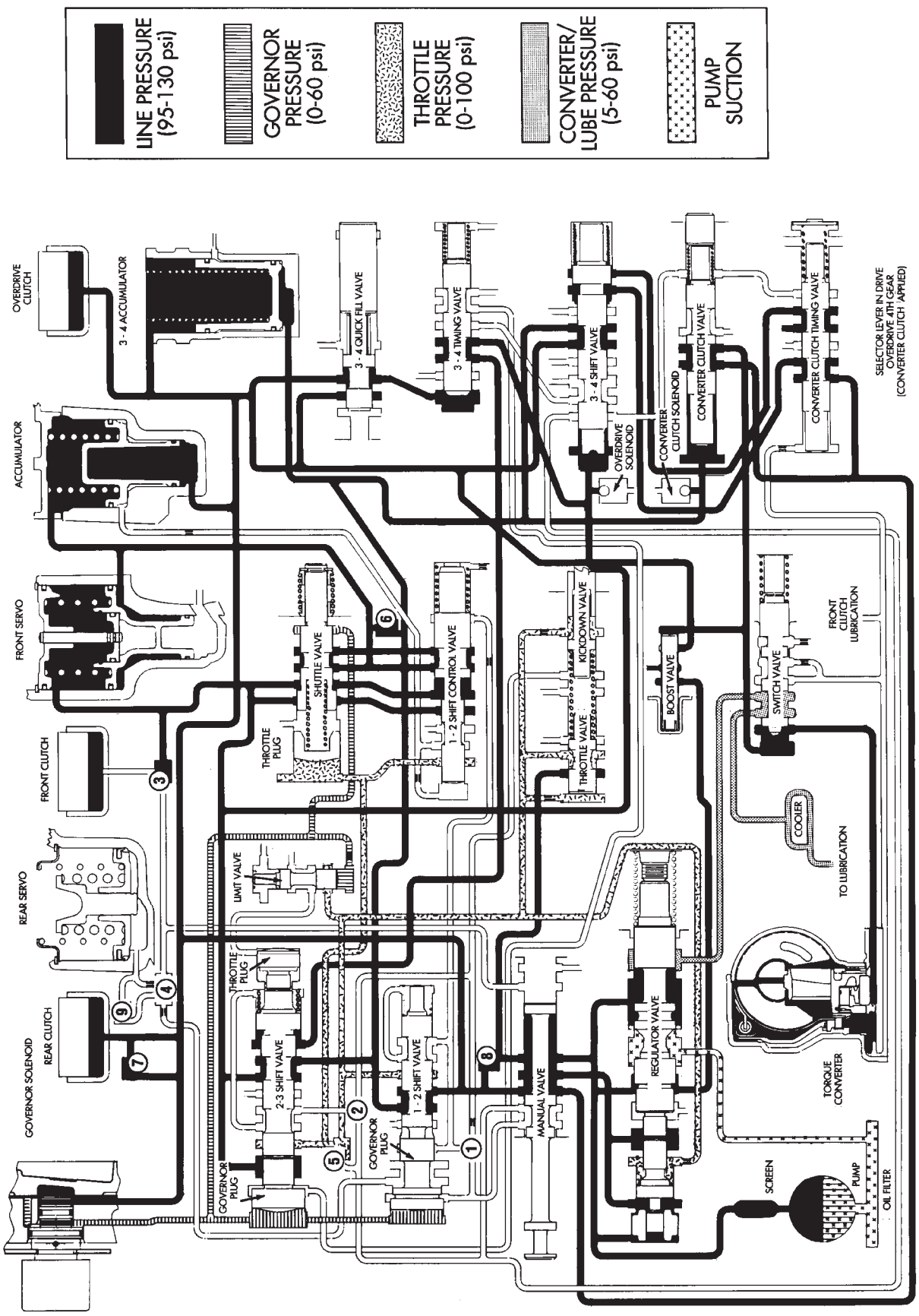

*HYDRAULIC FLOW IN DRIVE THIRD GEAR*

SCHEMATICS AND DIAGRAMS (Continued)



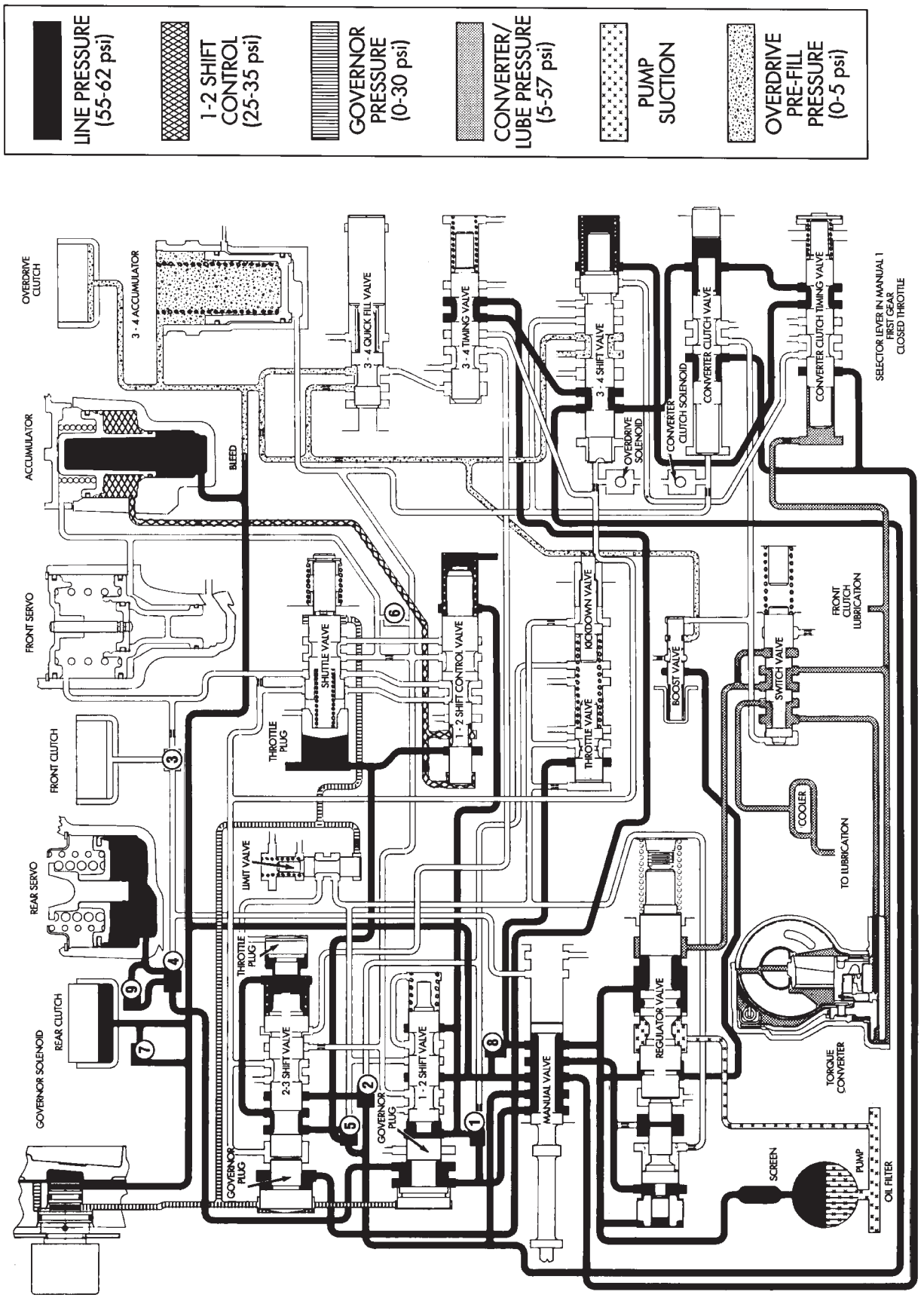

*HYDRAULIC FLOW IN DRIVE FOURTH GEAR(CONVERTER CLUTCH NOT APPLIED)*

SCHEMATICS AND DIAGRAMS (Continued)



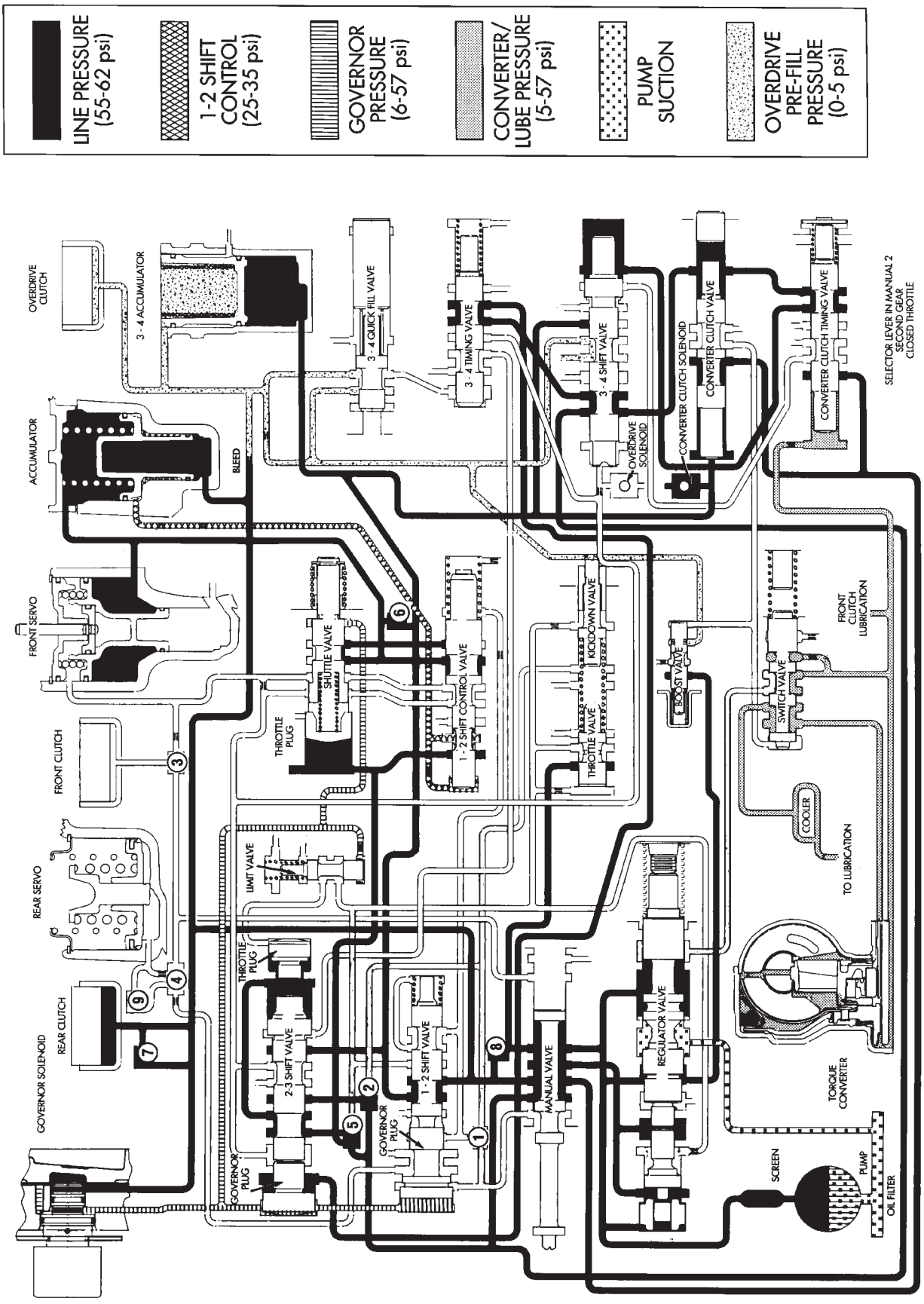

***HYDRAULIC FLOW IN DRIVE FOURTH GEAR(CONVERTER CLUTCH APPLIED)***

SCHEMATICS AND DIAGRAMS (Continued)



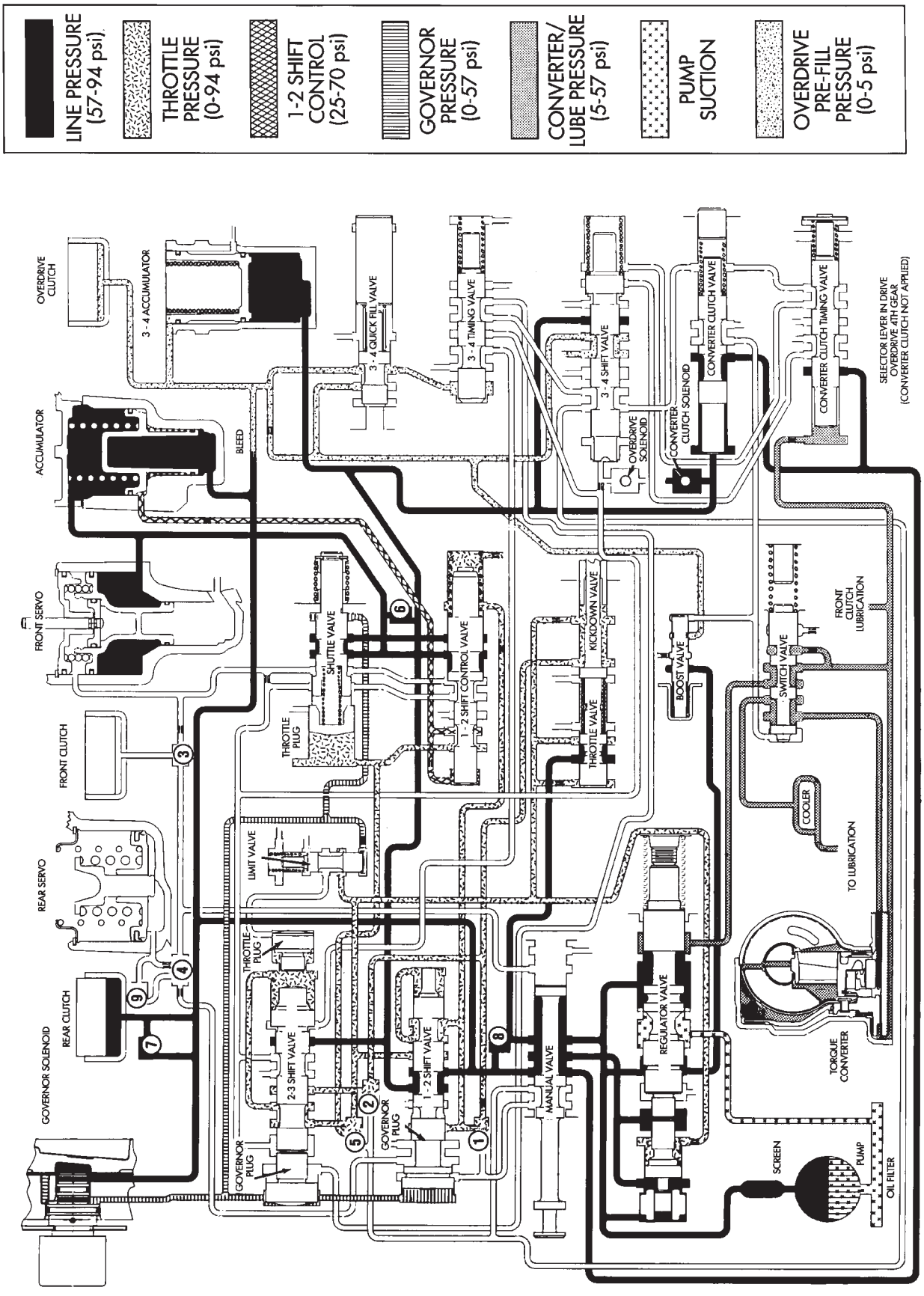

*HYDRAULIC FLOW IN MANUAL LOW (1)*

SCHEMATICS AND DIAGRAMS (Continued)




*HYDRAULIC FLOW IN MANUAL SECOND (2)*

SCHEMATICS AND DIAGRAMS (Continued)




*HYDRAULIC FLOW DURING FULL THROTTLE3–2 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. | 1.70-3.40mm | 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 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. speedometer adapter | 11 N·m (8 ft. lbs.) |
| Bolt, valve body to case | 12 N·m (100 in. lbs.) |
| Sensor, trans speed | 27 N·m (20 ft. 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*

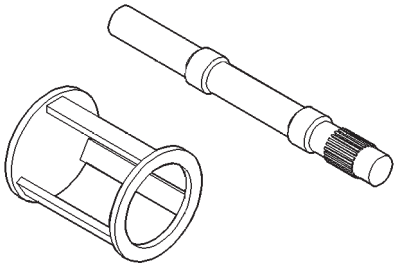
| Component | Metric | Inch |
|---|---|---|
| Front clutch thrust washer (reaction shaft support hub) | 1.55 mm | 0.061 in. |
| Rear clutch thrust washer (clutch retainer) | 1.55 mm | 0.061 in. |
| Intermediate shaft thrust plate (shaft hub pilot) | 1.5-1.6 mm | 0.060-0.063 in. |
| Output shaft thrust 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 avalible) | |
| Overdrive piston thrust plate | Thrust plate and spacer are select fit. Refer to size charts and selection procedures in Overdrive Unit D&A procedures | |
| Intermiediate shaft spacer | | |

*PRESSURE TEST*

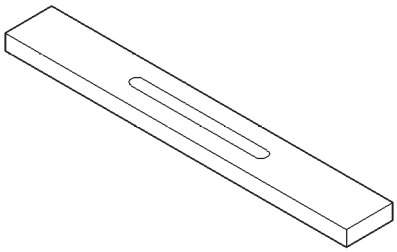
| | | |
|---|---|---|
| Overdrive clutch | Fourth gear only | Pressure should be 469-496 kPa (68-72 psi) with closed throttle and increase to 620-896 kPa (90-130 psi) at 1/2 to 3/4 throttle. |
| Line pressure (at accumulator) | Closed throttle | 372-414 kPa (54-60 psi). |
| Front servo | Third gear only | 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

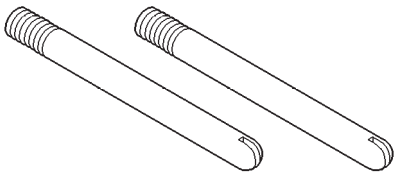
### RE TRANSMISSIONS



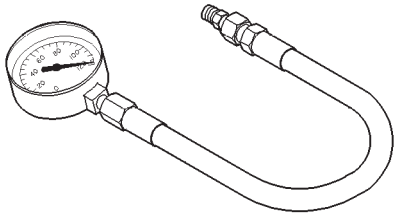
***Spring Compressor and Alignment Shaft—6227***



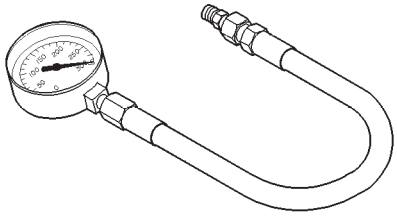
***Gauge Bar—6311***



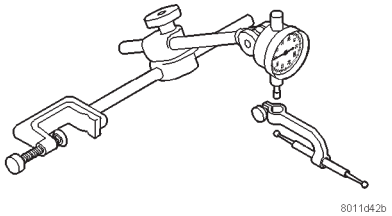
***Extension Housing Pilot—C-3288-B***



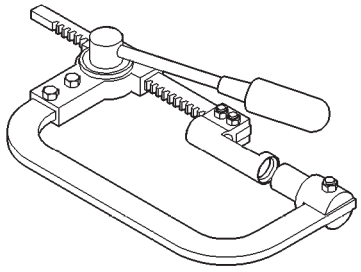
***Pressure Gauge—C-3292***



***Pressure Gauge—C-3293SP***

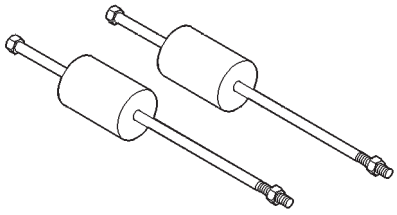



***Dial Indicator—C-3339***

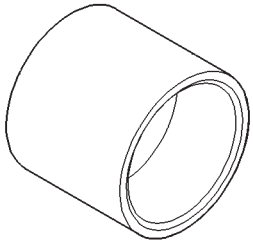


***Spring Compressor—C-3422-B***

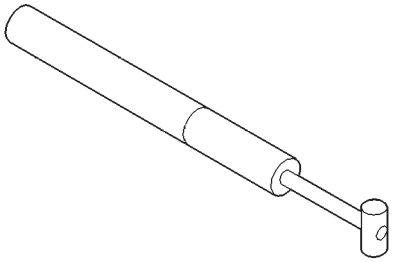
SPECIAL TOOLS (Continued)



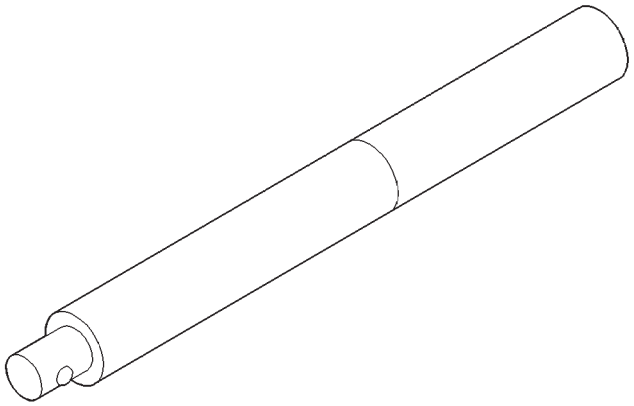
***Puller, Slide Hammer—C-3752***



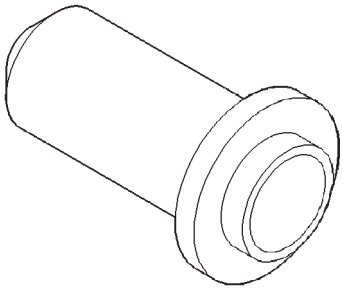
***Installer—C-3995-A***



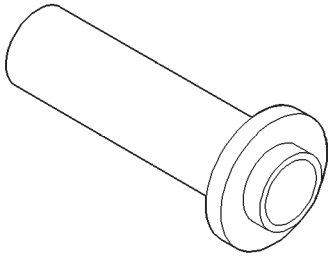
***Gauge, Throttle Setting—C-3763***



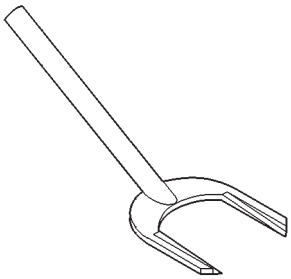
***Universal Handle—C-4171***



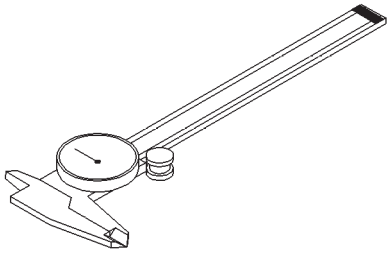
***Seal Installer—C-3860–A***



***Seal Installer—C-4193-A***

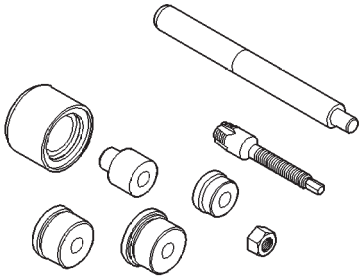


***Seal Remover—C-3985-B***

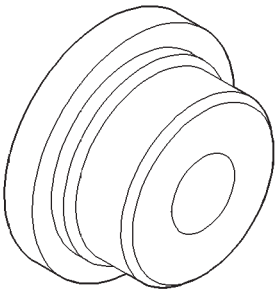


***Dial Caliper—C-4962***

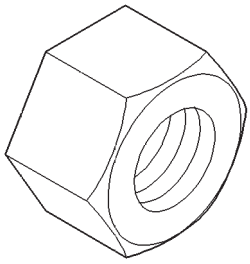
SPECIAL TOOLS (Continued)



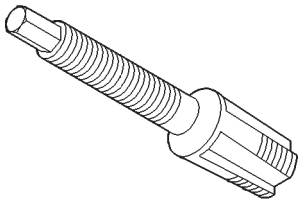
***Bushing Remover/Installer Set—C-3887-J***



***Installer, Bushing—SP-5117***



***Nut, Bushing Remover—SP-1191,From kit C-3887-J***



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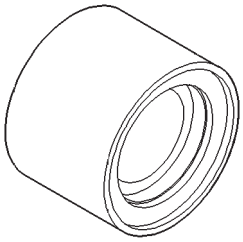

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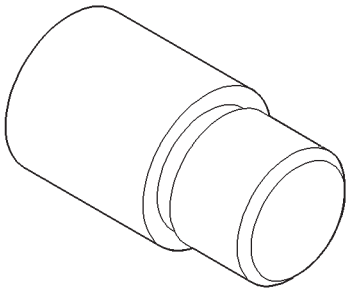

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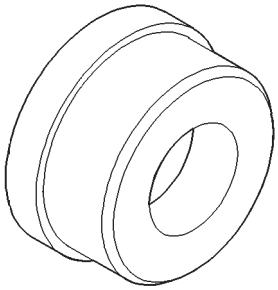

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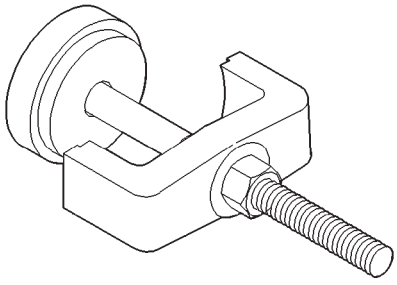
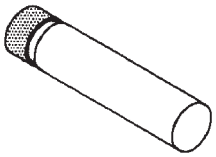


***Compressor, Spring—C-3575-A***

SPECIAL TOOLS (Continued)



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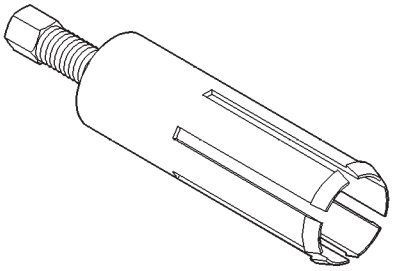

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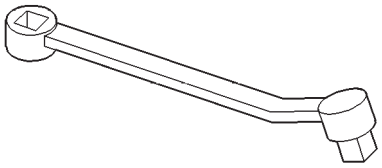
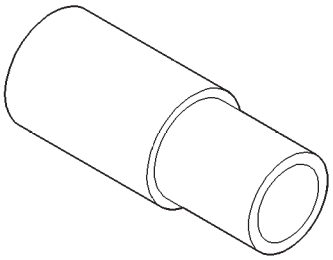


***Adapter—C-3705***



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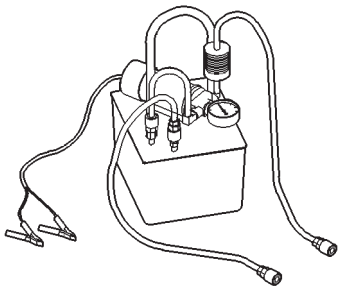

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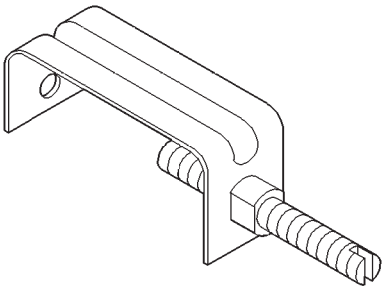

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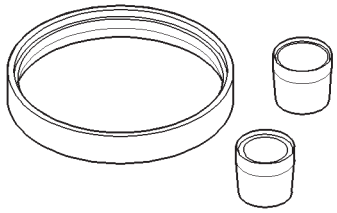

***Installer—8114***

# NV242 TRANSFER CASE

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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.

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.

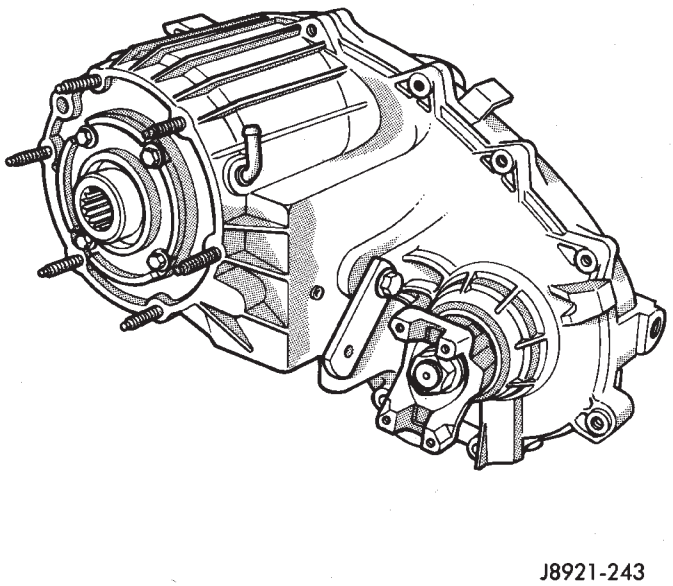



***Fig. 1 NV242 Transfer Case***

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.

GENERAL INFORMATION (Continued)

*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.

## RECOMMENDED LUBRICANT AND FILL LEVEL

Recommended lubricant for the NV242 transfer case is Mopar® Dexron II, or ATF Plus. Approximate lubricant fill capacity is 1.35 liters (2.85 pints).

The fill and drain plugs are both in the rear case (Fig. 2). 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.

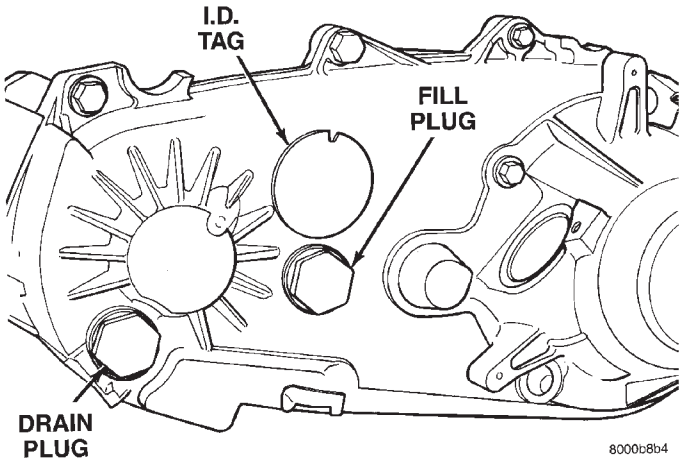



***Fig. 2 Fill/Drain Plug And I.D. Tag Locations***

## DIAGNOSIS AND TESTING

### NV242 DIAGNOSIS

| Condition | Possible Cause | Correction |
|---|---|---|
| TRANSFER CASE DIFFICULT TO SHIFT OR WILL NOT SHIFT INTO DESIRED RANGE | (1) Transfer case external shift linkage binding.<br>(2) Insufficient or incorrect lubricant.<br>(3) Internal components binding, worn or damaged. | (1) Lubricate, repair or replace linkage, or tighten loose components as necessary.<br>(2) Drain and refill to edge of fill hole with DEXRONII® or MOPAR-MERCON® Automatic Transmissin Fluid.<br>(3) Disassemble unit and replace worn or damaged components as necessary. |
| TRANSFER CASE NOISY IN ALL DRIVE POSITIONS | (1) Insufficient or incorrect lubricant. | (1) Drain and refill to edge of fill hole with DEXRONII® or MOPAR-MERCON® Automatic Transmissin Fluid. Check for leaks and repair if necessary. **Note: If unit is still noisy after drain and refill, disassembly and inspection may be required to locate source of noise.** |
| LUBRICANT LEAKING FROM OUTPUT SHAFT SEALS OR FROM VENT | (1) Transfer case overfilled.<br>(2) Vent closed or restricted.<br>(3) Output shaft seals damaged or installed incorrectly. | (1) Drain to correct level.<br>(2) Clear or replace vent if necessary.<br>(3) Replace seals. Be sure seal lip faces interior of case when installed. Also be sure yoke seal surfaces are not scored or nicked. Remove scores and nicks with fine sandpaper or replace yoke(s) if necessary. |
| TRANSFER CASE WILL NOT SHIFT THROUGH 4 X 4 PART-TIME RANGE (Light Remains On) | (1) Incomplete shift due to drivetrain torque load.<br>(2) Incorrect tire pressure(s).<br>(3) Excessive tire wear.<br>(4) Excessive vehicle loading. | (1) Driver must momentarily release the accelerator pedal to complete the shift.<br>(2) Inflate all tires equally to correct pressure.<br>(3) Switch tires—Install the two tires with the most wear (one on the front axle and one on the rear axle).<br>(4) Check vehicle loading— **Do not exceed the vehicle's GVW.** |

## 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, or skid plate.
(7) Disconnect front/rear propeller shafts at transfer case.
(8) Disconnect vehicle speed sensor wires.
(9) Disconnect transfer case linkage rod from range lever.
(10) Disconnect transfer case vent hose (Fig. 3) and indicator switch harness, if necessary.
(11) Support transfer case with transmission jack.
(12) Secure transfer case to jack with chains.
(13) Remove nuts attaching transfer case to transmission.
(14) Pull transfer case and jack rearward to disengage transfer case.
(15) Remove transfer case from under vehicle.

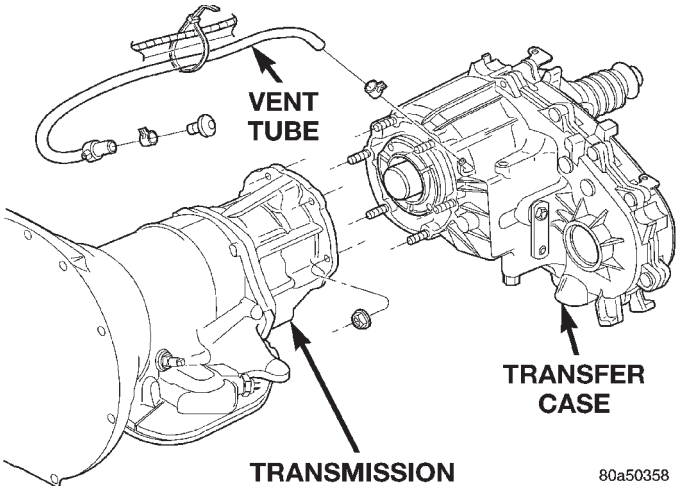



***Fig. 3 Transfer Case Mounting***

*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 vehicle speed sensor wires, and 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.

REMOVAL AND INSTALLATION (Continued)

(10) Install rear crossmember, or skid plate. 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) Raise vehicle.

(3) Loosen adjusting trunnion locknut and slide shift rod out of trunnion (Fig. 4). If rod lacks enough travel to come out of trunnion, push trunnion out of torque shaft.

(4) Lower vehicle.

(5) Remove console. Refer to Group 23, Body, for proper procedures.

(6) Remove screws attaching lever assembly to floorpan and remove assembly and shift rod (if left attached).

*INSTALLATION*

(1) If shift rod was not removed from lever assembly, work rod down through floorpan opening. Then position lever assembly on floorpan and install assembly attaching screws.

(2) Install console. Refer to Group 23, Body, for proper procedures.

(3) Raise vehicle.

(4) Connect trunnion to torque shaft arm. Or, slide shift rod into trunnion on range lever. Be sure shift rod slides freely in trunnion.

(5) Verify that range lever is in 4L position. Then tighten trunnion lock bolt.

(6) Lower vehicle and check transfer case shift operation.

## SPEEDOMETER

*REMOVAL*

(1) Raise vehicle.

(2) Disconnect wires from vehicle speed sensor.

(3) Remove adapter clamp and screw (Fig. 5).

(4) Remove speed sensor and speedometer adapter as an assembly.

(5) Remove speed sensor retaining screw and remove sensor from adapter.

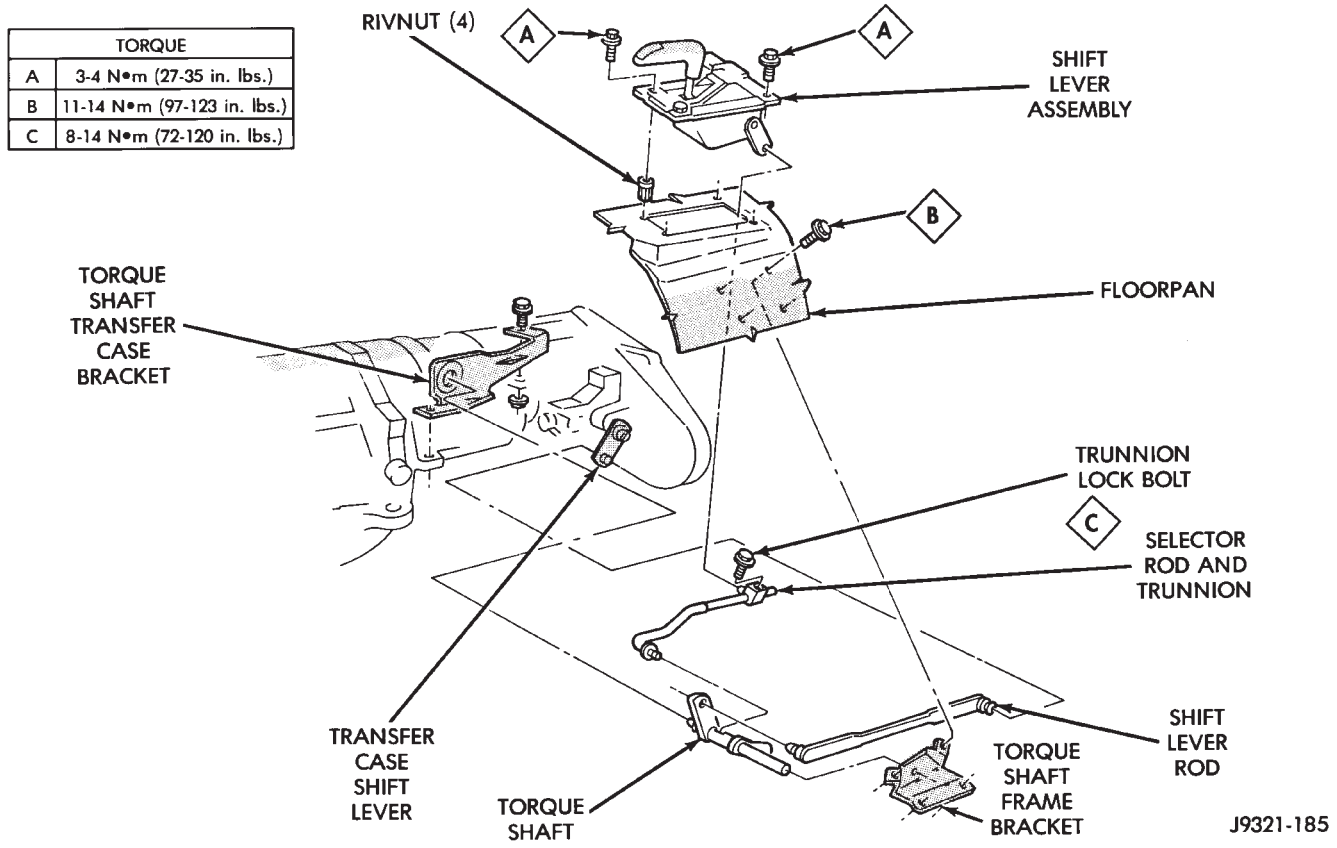



***Fig. 4 Shift Linkage***

REMOVAL AND INSTALLATION (Continued)

(6) Remove speedometer pinion from adapter. Replace pinion if chipped, cracked, or worn.

(7) Inspect sensor and adapter O-rings (Fig. 5). Remove and discard O-rings if worn or damaged.

(8) Inspect terminal pins in speed sensor. Clean pins with Mopar® electrical spray cleaner if dirty or oxidized. Replace sensor if faulty, or if pins are loose, severely corroded, or damaged.

*INSTALLATION AND INDEXING*

(1) Thoroughly clean adapter flange and adapter mounting surface in housing. Surfaces must be clean for proper adapter alignment and speedometer operation.

(2) Install new O-rings on speed sensor and speedometer adapter (Fig. 5), if necessary.

(3) Lubricate sensor and adapter O-rings with transmission fluid.

(4) Install vehicle speed sensor in speedometer adapter. Tighten sensor attaching screw to 2-3 N·m (15-27 in. lbs.) torque.

(5) Install speedometer pinion in adapter.

(6) Count number of teeth on speedometer pinion. Do this before installing assembly in housing. Then lubricate pinion teeth with transmission fluid.

(7) Note index numbers on adapter body (Fig. 6). These numbers will correspond to number of teeth on pinion.

(8) Install speedometer assembly in housing.

(9) Rotate adapter until required range numbers are at 6 o-clock position. Be sure range index numbers correspond to number of teeth on pinion gear.

(10) Install speedometer adapter clamp and retaining screw. Tighten clamp screw to 10-12 N·m (90-110 in. lbs.) torque.

(11) Connect wires to vehicle speed sensor.

(12) Lower vehicle and top off transmission fluid level if necessary.

## FRONT OUTPUT SHAFT SEAL

*REMOVAL*

(1) Raise vehicle.

(2) Remove front propeller shaft. Refer to Group 3, Differential and Driveline, for proper procedure.

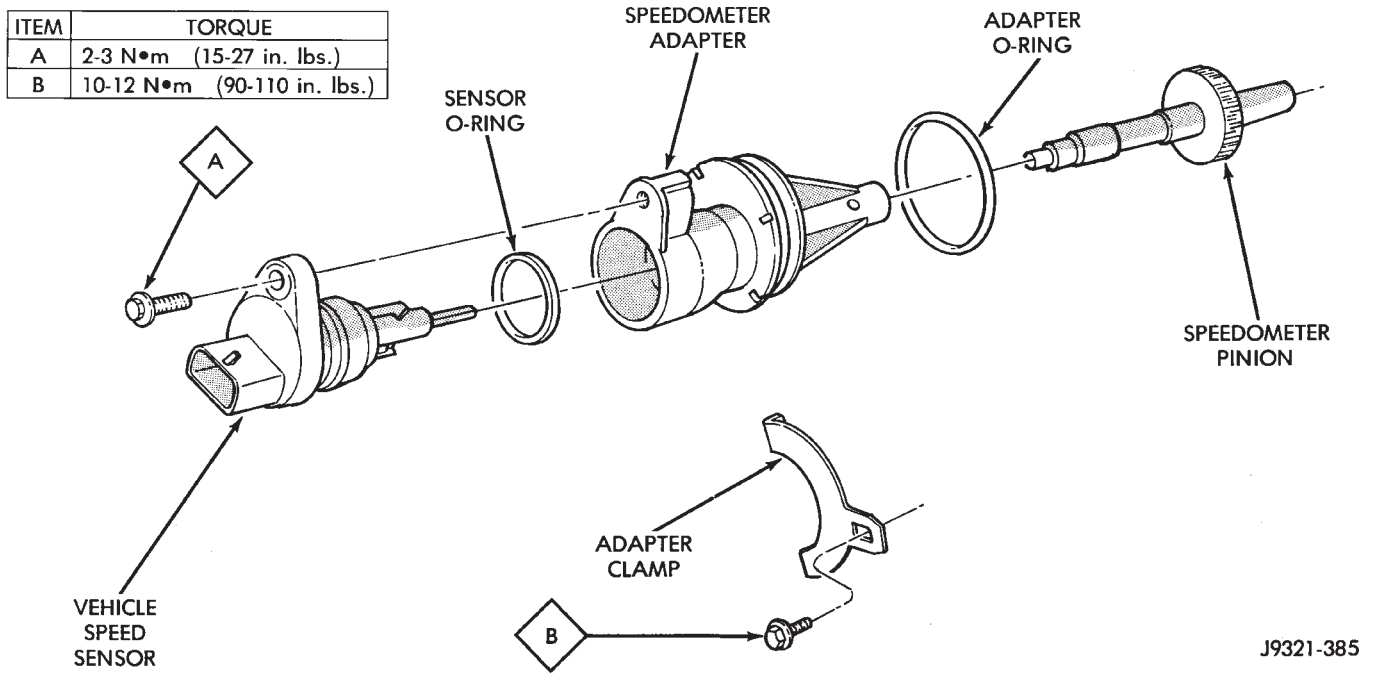
(3) Remove front output shaft yoke.

(4) Remove seal from front case with pry tool (Fig. 7).

*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.




| ITEM | TORQUE |
|---|---|
| A | 2-3 N·m (15-27 in. lbs.) |
| B | 10-12 N·m (90-110 in. lbs.) |

***Fig. 5 Speedometer Components***

REMOVAL AND INSTALLATION (Continued)

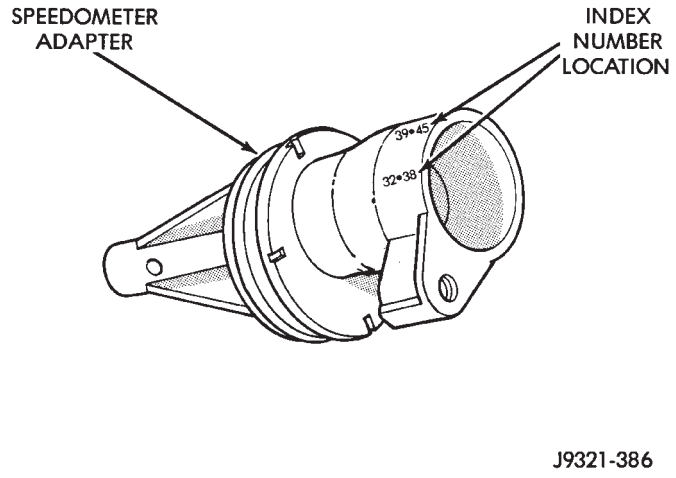



*Fig. 6 Location Of Index Numbers On SpeedometerAdapter*

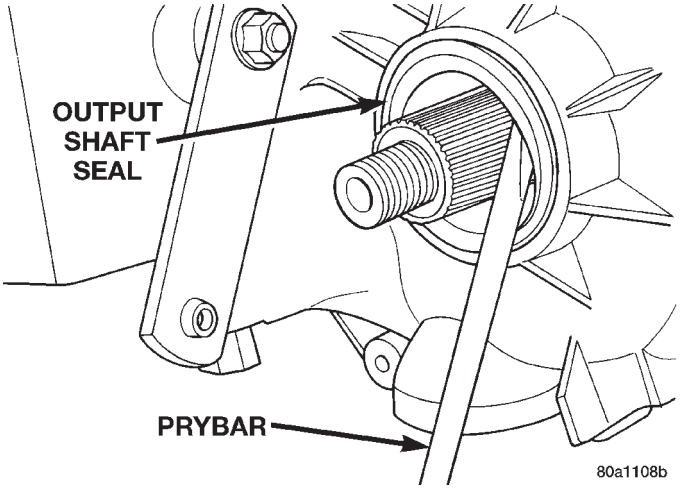



*Fig. 7 Remove Front Output Shaft Seal*

(b) Start seal in bore with light taps from hammer (Fig. 8). Once seal is started, continue tapping seal into bore until installer tool seats against case.

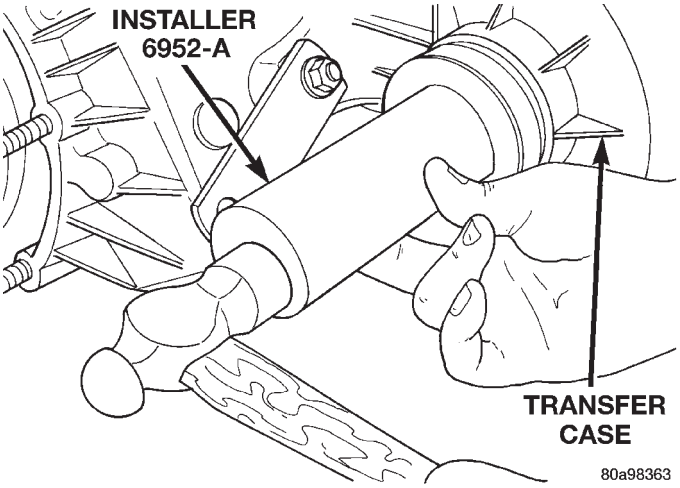



*Fig. 8 Front Output Seal Installation*

## DISASSEMBLY AND ASSEMBLY

### NV242 TRANSFER CASE

*DISASSEMBLY*

**REAR RETAINER REMOVAL**

(1) Remove output shaft boot. Spread band clamp that secures boot on slinger with a suitable awl. Then slide boot off shaft (Fig. 9).

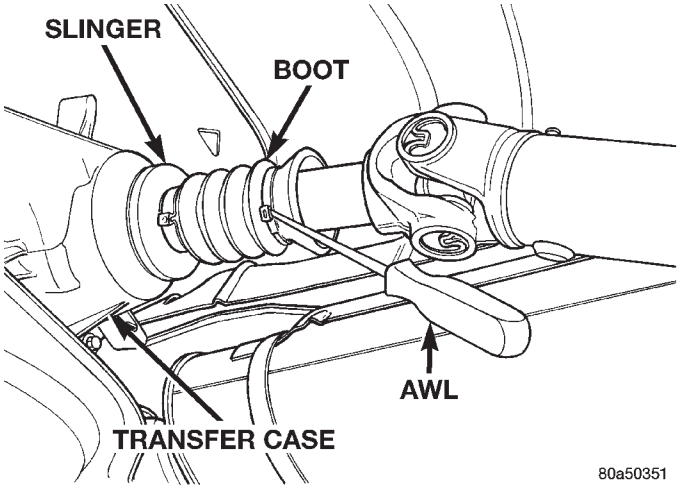



*Fig. 9 Output Boot—Typical*

(2) Using puller MD-998056-A, remove rear slinger (Fig. 10).

(3) Remove slinger stop spacer and snap-ring from output shaft (Fig. 11).

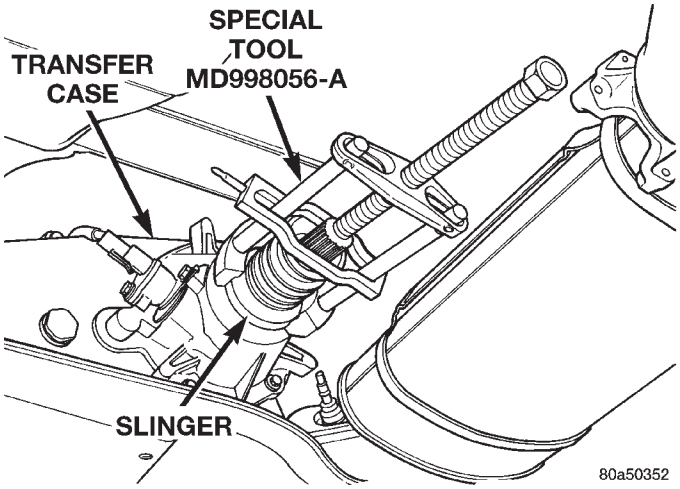



*Fig. 10 Rear Slinger Removal*

(4) Remove rear seal from retainer (Fig. 12). Use pry tool, or collapse seal with punch to remove it.

(5) Remove rear output bearing I.D. retaining ring (Fig. 13).

(6) Remove speedometer adapter.

(7) Remove rear retainer bolts.

DISASSEMBLY AND ASSEMBLY (Continued)

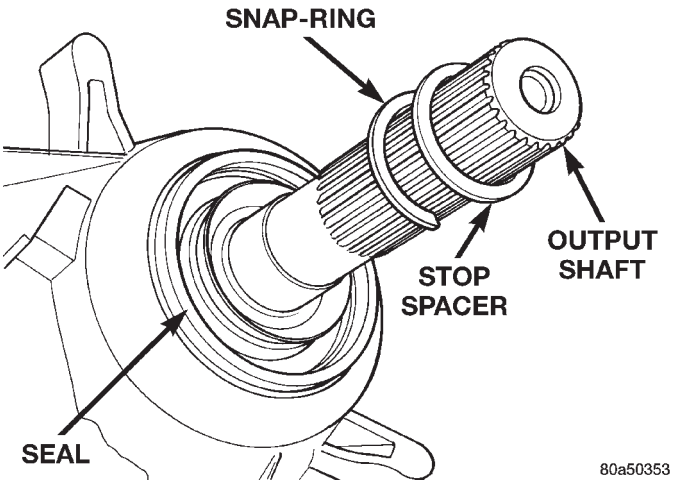



*Fig. 11 Slinger Stop Spacer and Snap-ring*

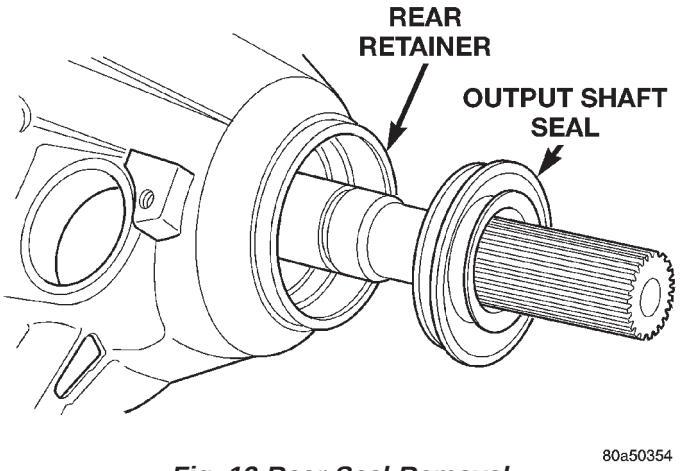



*Fig. 12 Rear Seal Removal*

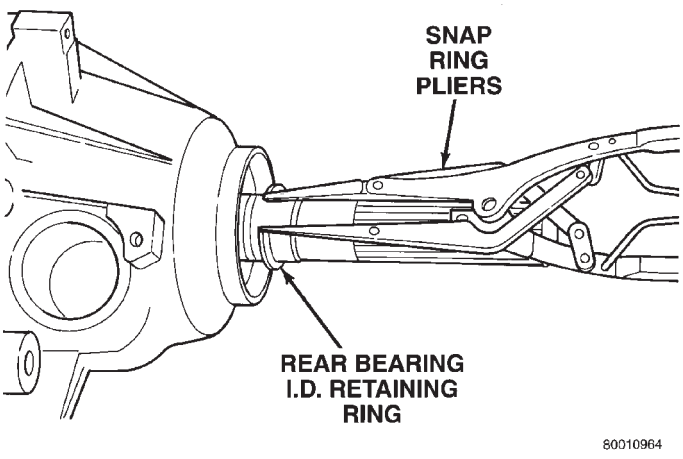



*Fig. 13 Rear Bearing I.D. Retaining RingRemoval*

(8) Remove rear retainer. Tap retainer with mallet and pry upward to break sealer bead. Then slide retainer off case and output shaft (Fig. 14).

(9) Remove rear bearing O.D. retaining ring with snap ring pliers. Then tilt pump and slide it off output shaft (Fig. 15)

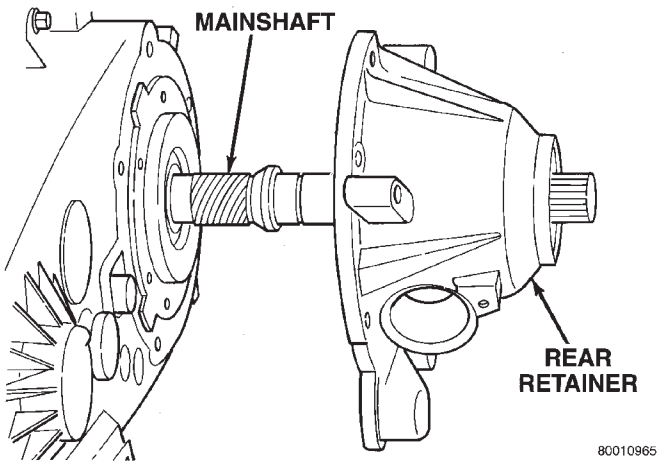



*Fig. 14 Rear Retainer Removal*

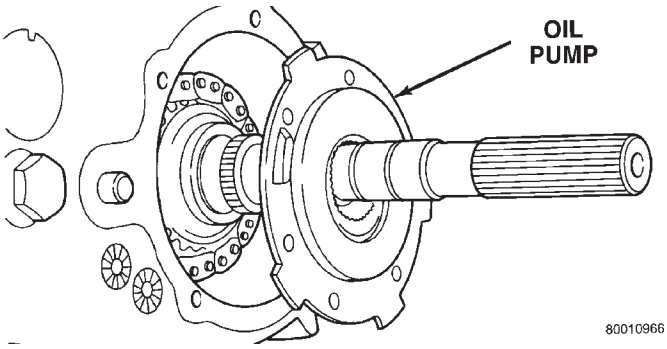



*Fig. 15 Oil Pump Removal*

(10) Remove pickup tube O-ring from pump (Fig. 16) but do not disassemble pump; it is not a repairable part.

(11) Remove seal from oil pump with pry tool.

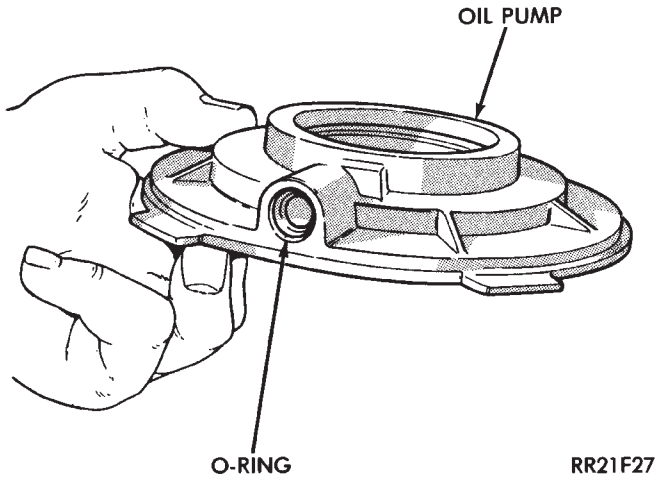



*Fig. 16 Pickup Tube O-Ring Location*

(12) Remove bolts attaching rear case to front case (Fig. 17). Note position of the two black finish bolts at each end of the case. These bolts go through the case dowels and require a washer under the bolt head.

(13) Remove rear case from front case (Fig. 18). Insert screwdrivers into slots cast into each end of

DISASSEMBLY AND ASSEMBLY (Continued)

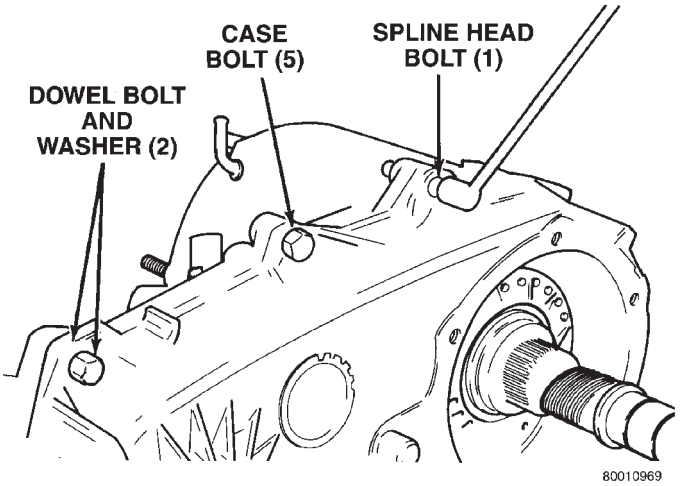



*Fig. 17 Spline And Dowel Bolt Locations*

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.**

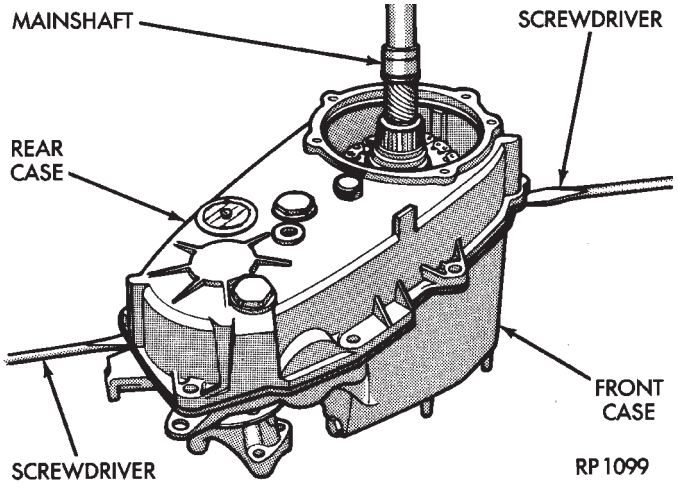



*Fig. 18 Loosening/Removing Rear case*

(14) Remove oil pickup tube and screen from rear case (Fig. 19).

**YOKE AND RANGE LEVER REMOVAL**

(1) Remove front yoke nut:

(a) Move range lever to 4L position.

(b) Remove nut with socket and impact wrench (Fig. 20).

(2) Remove yoke. If yoke is difficult to remove by hand, remove it with bearing splitter, or with standard two jaw puller (Fig. 21). 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. 22).

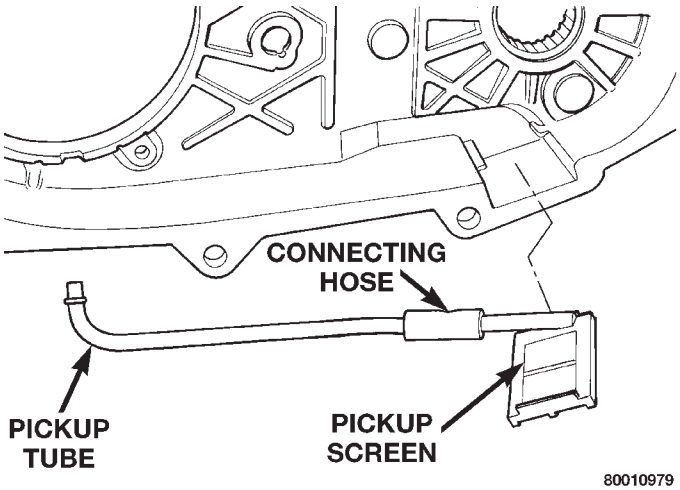



*Fig. 19 Oil Pickup Screen, Hose And TubeRemoval*

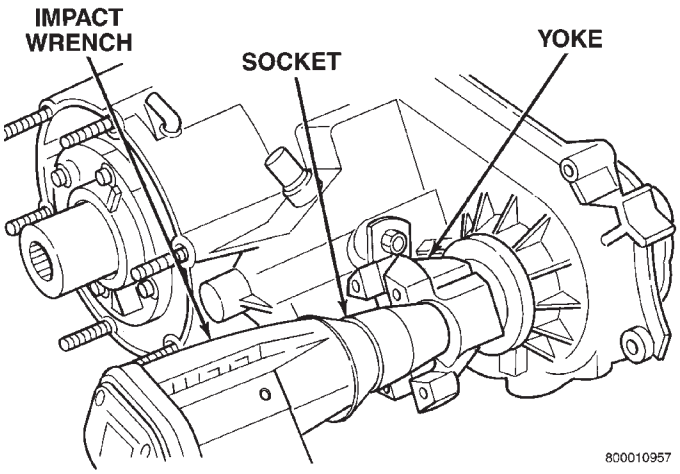



*Fig. 20 Yoke Nut Removal*

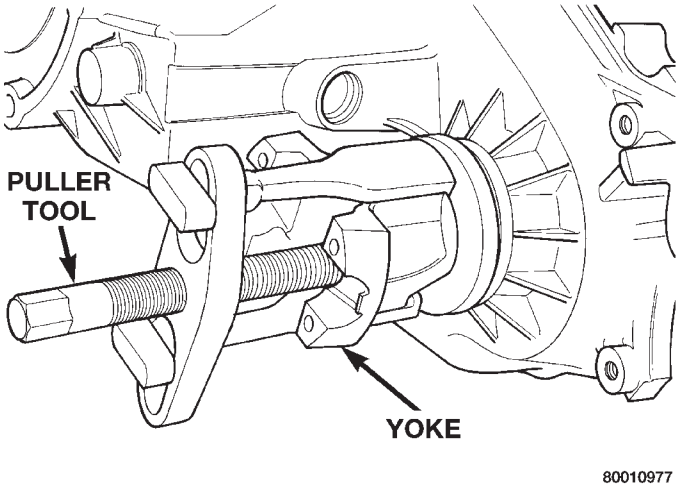



*Fig. 21 Yoke Removal*

**FRONT OUTPUT SHAFT AND DRIVE CHAIN REMOVAL**

(1) Remove drive sprocket snap-ring (Fig. 23).

(2) Remove drive sprocket and chain (Fig. 24).

(3) Remove front output shaft (Fig. 25).

DISASSEMBLY AND ASSEMBLY (Continued)

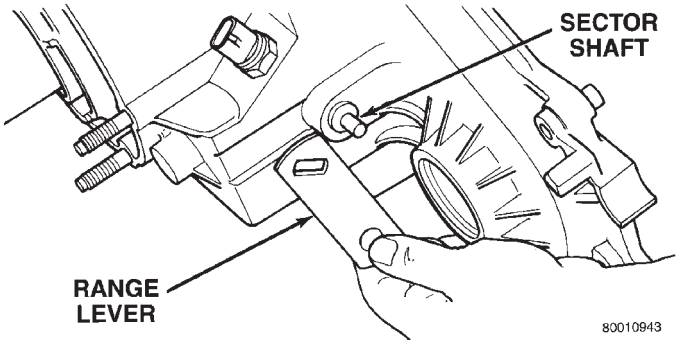



*Fig. 22 Range Lever Removal*

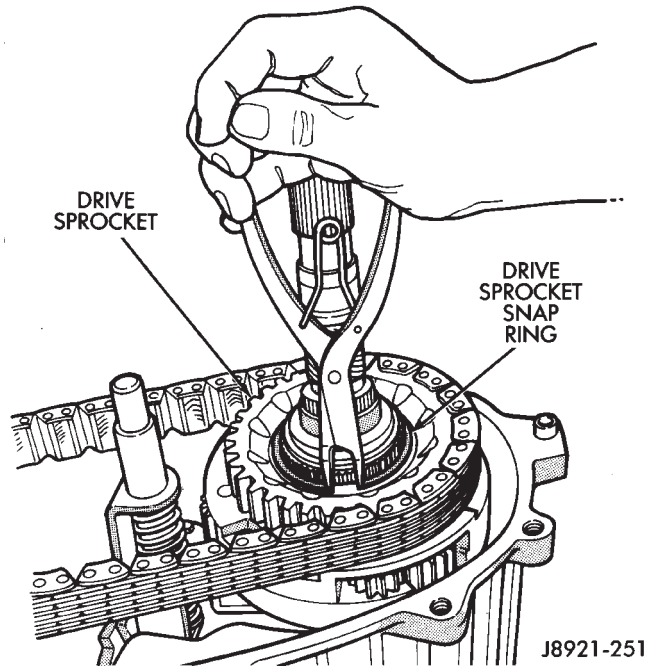



*Fig. 23 Drive Sprocket Snap-Ring Removal*

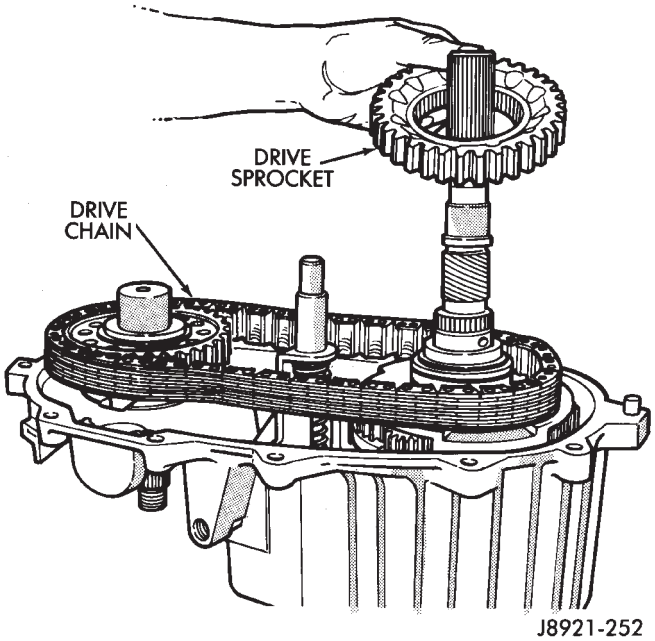



*Fig. 24 Drive Sprocket And Chain Removal*

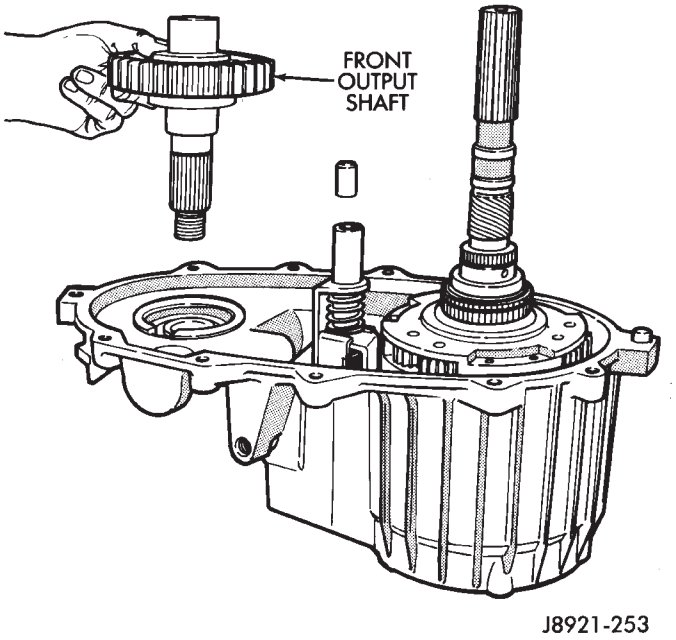



*Fig. 25 Removing Front Output Shaft*

**SHIFT FORKS AND MAINSHAFT REMOVAL AND DISASSEMBLY**

(1) Remove shift detent plug, spring and pin (Fig. 26).

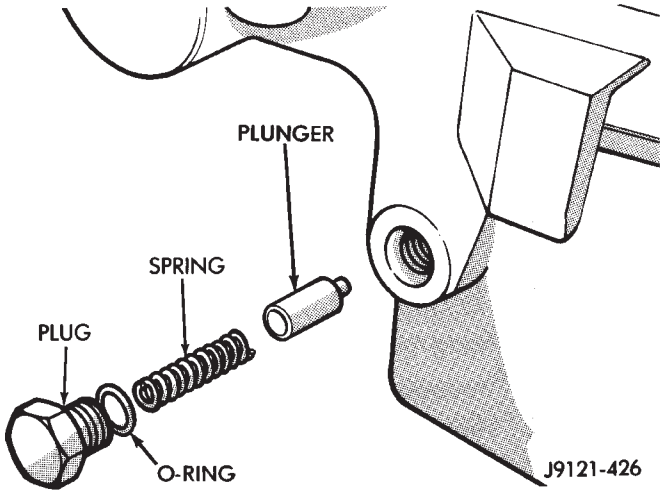



*Fig. 26 Detent Component Removal*

(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.

(d) Securely tighten the t-handle onto the tool.

DISASSEMBLY AND ASSEMBLY (Continued)

(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. 27).

(5) Remove mode fork and mainshaft as assembly (Fig. 28).

(6) Remove mode shift sleeve and mode fork assembly from mainshaft (Fig. 29). Note position of mode sleeve in fork and remove sleeve.

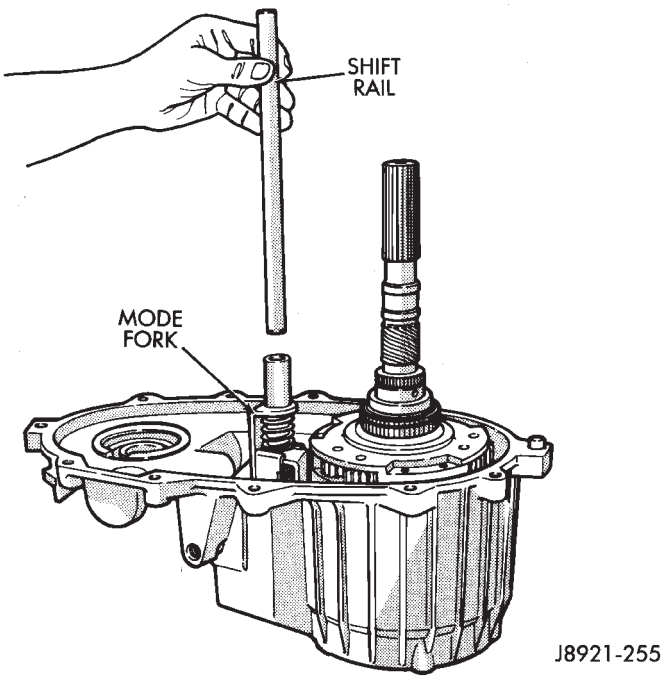



*Fig. 27 Shift Rail Removal*

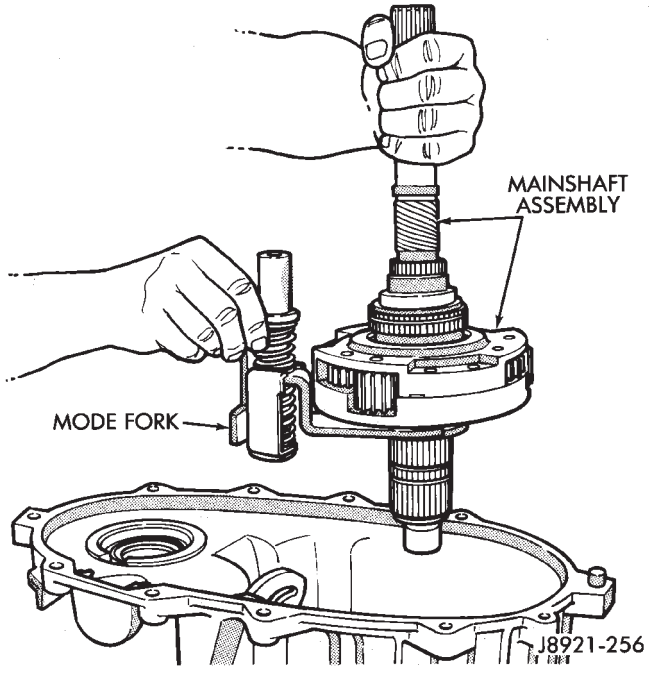



*Fig. 28 Mode Fork And Mainshaft Removal*

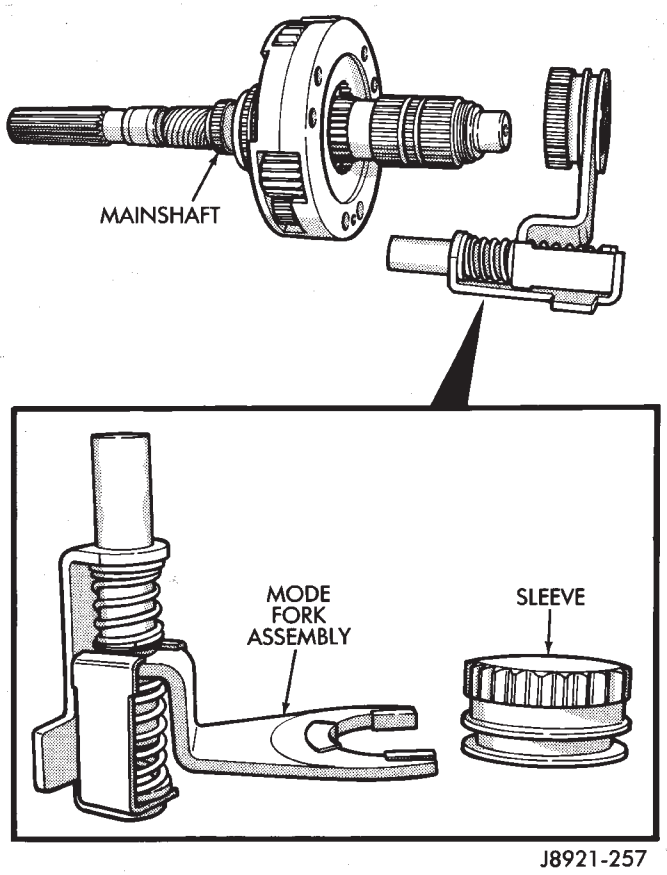



*Fig. 29 Mode Fork And Sleeve Removal*

(7) Remove intermediate clutch shaft snap-ring (Fig. 30).

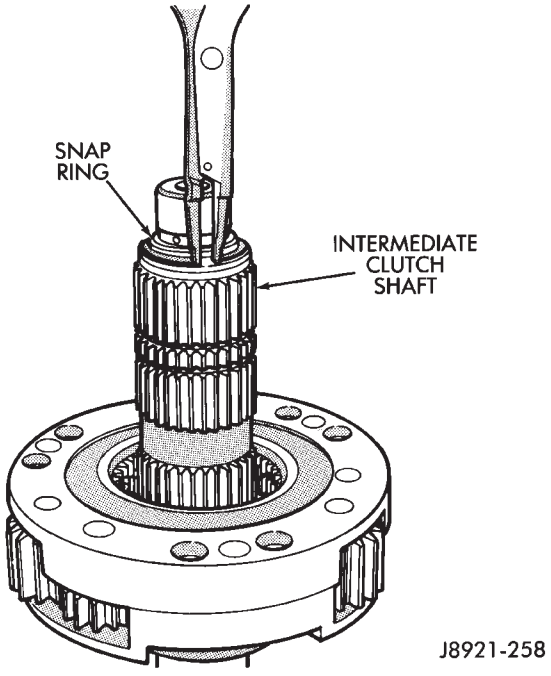



*Fig. 30 Intermediate Clutch Shaft Snap-RingRemoval*

DISASSEMBLY AND ASSEMBLY (Continued)

(8) Remove clutch shaft thrust ring (Fig. 31).
(9) Remove intermediate clutch shaft (Fig. 32).

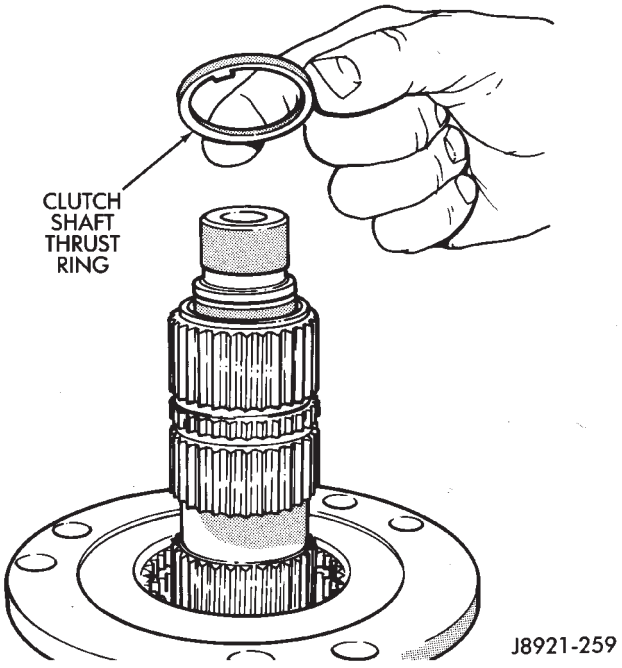



*Fig. 31 Clutch Shaft Thrust Ring Removal*

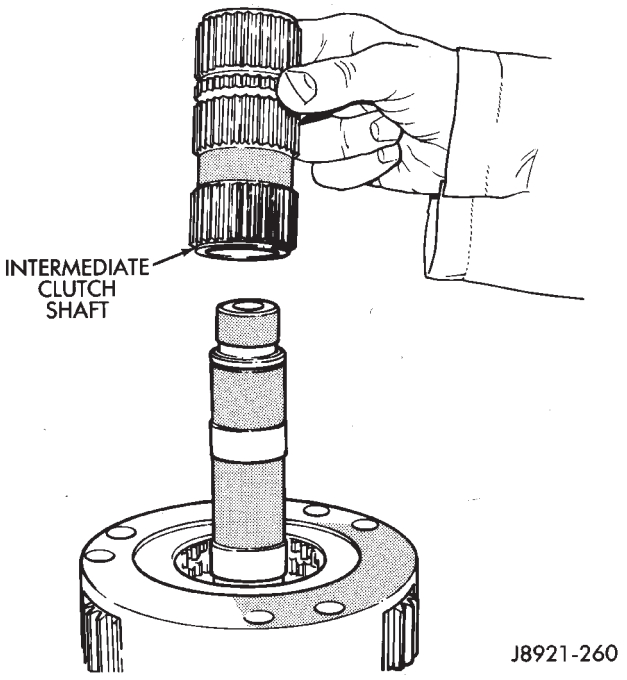



*Fig. 32 Intermediate Clutch Shaft Removal*

(10) Remove differential snap-ring (Fig. 33).
(11) Remove differential (Fig. 34).
(12) Remove differential needle bearings and both needle bearing thrust washers from mainshaft.

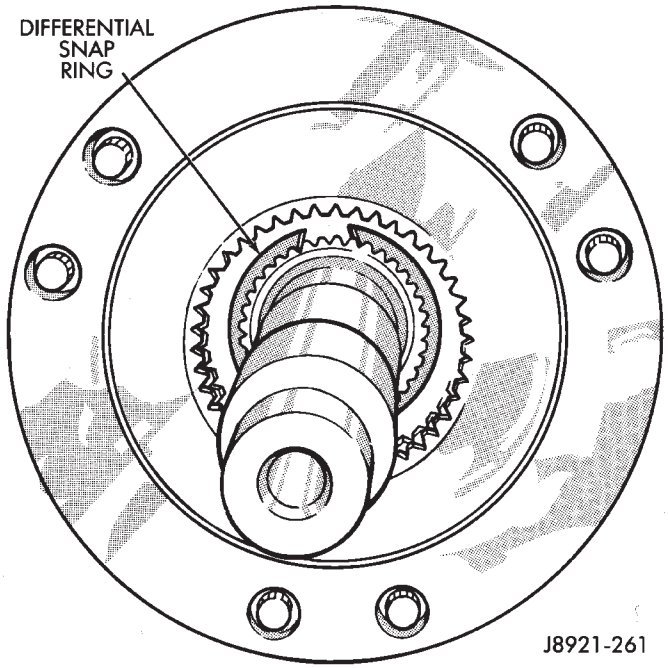



*Fig. 33 Differential Snap-Ring Removal*

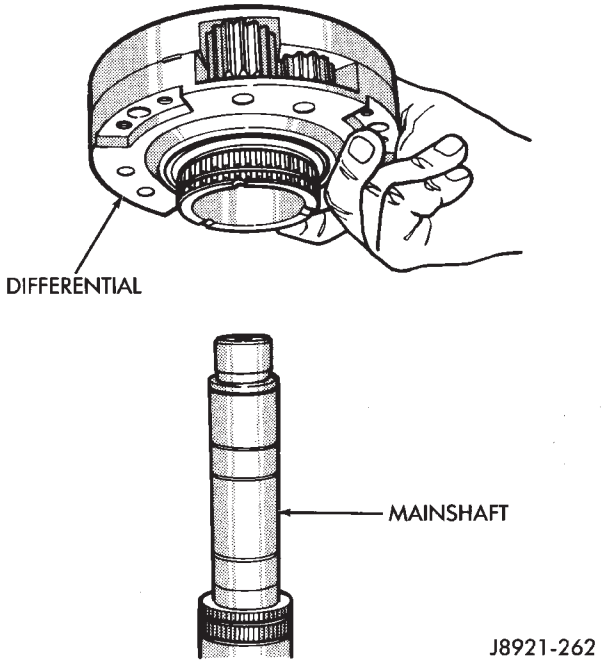



*Fig. 34 Differential Removal*

DISASSEMBLY AND ASSEMBLY (Continued)

(13) Slide low range fork pin out of shift sector slot (Fig. 35).

(14) Remove low range fork and hub (Fig. 36).

(15) Remove shift sector (Fig. 37).

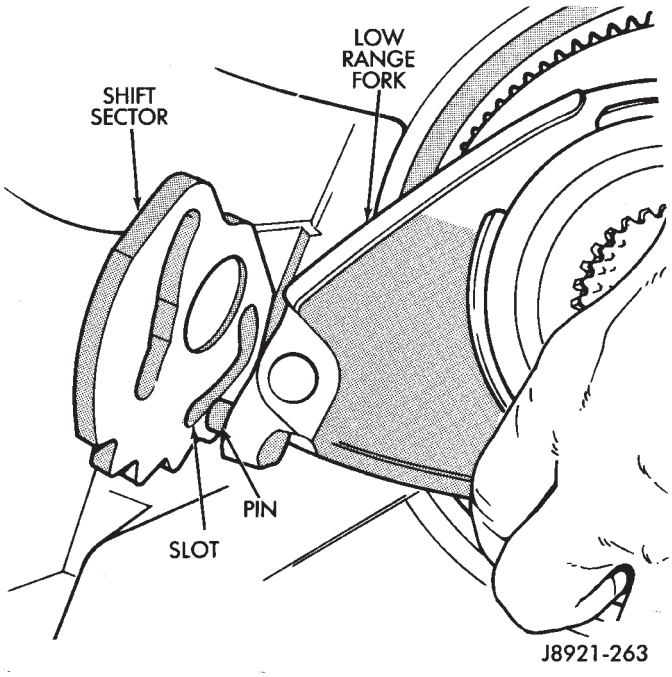



*Fig. 35 Disengaging Low Range Fork*

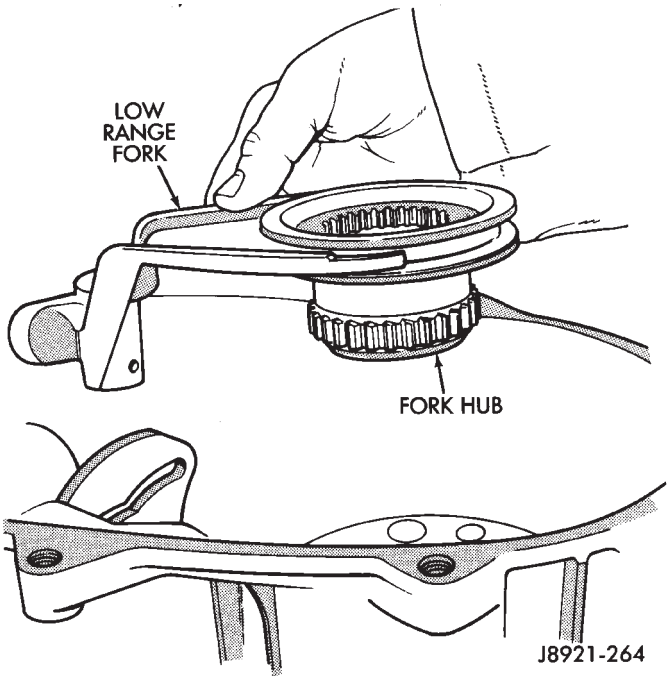



*Fig. 36 Low Range Fork And Hub Removal*

(16) Remove shift sector bushing and O-ring (Fig. 38).

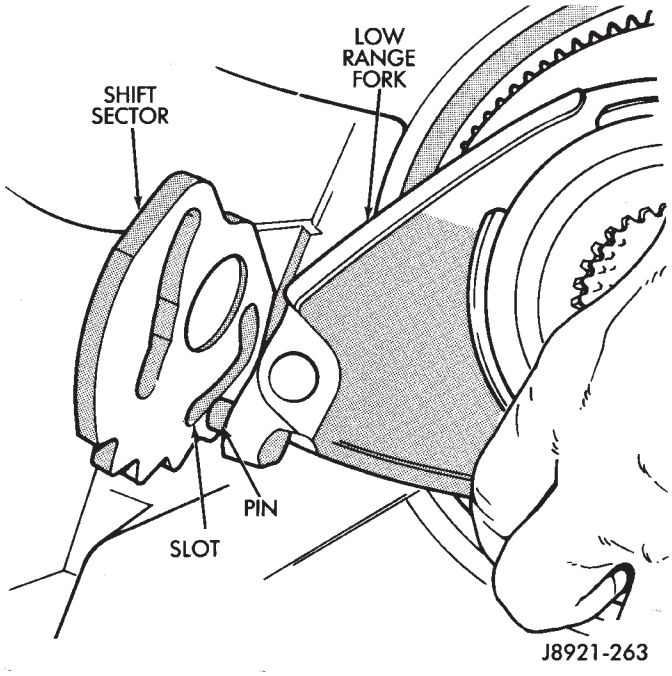



*Fig. 37 Shift Sector Position*

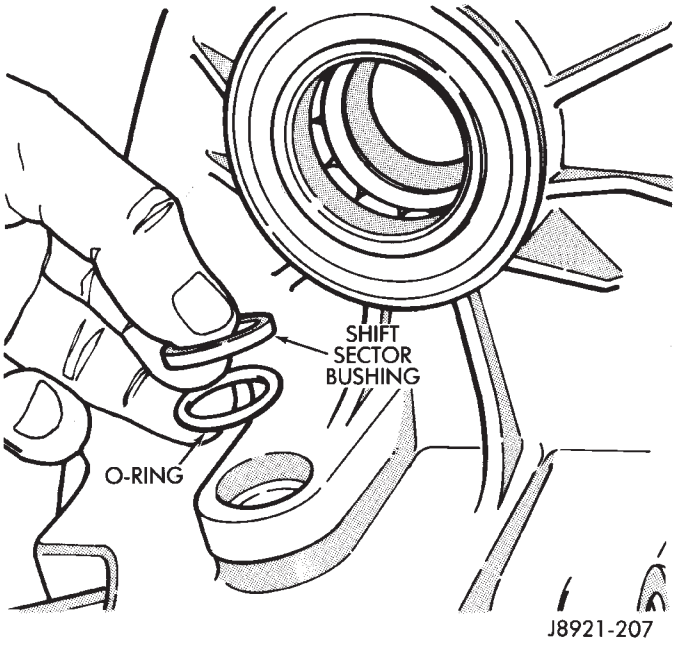



*Fig. 38 Sector Bushing And O-Ring Removal*

**INPUT GEAR/LOW RANGE ASSEMBLY REMOVAL AND DISASSEMBLY**

(1) Remove front bearing retainer bolts.

(2) Remove front bearing retainer. Carefully pry retainer loose with screwdriver (Fig. 39). Position screwdriver in slots cast into retainer.

(3) Remove input gear snap-ring (Fig. 40).

(4) Remove input/low range gear assembly from bearing with Tool Handle C-4171 and Tool 7829A (Fig. 41).

(5) Remove low range gear snap-ring (Fig. 42).

DISASSEMBLY AND ASSEMBLY (Continued)

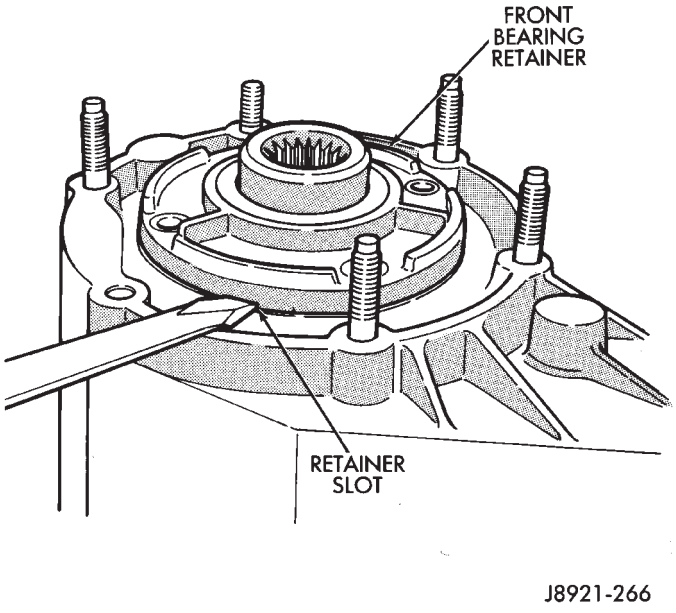



*Fig. 39 Front Bearing Retainer Removal*

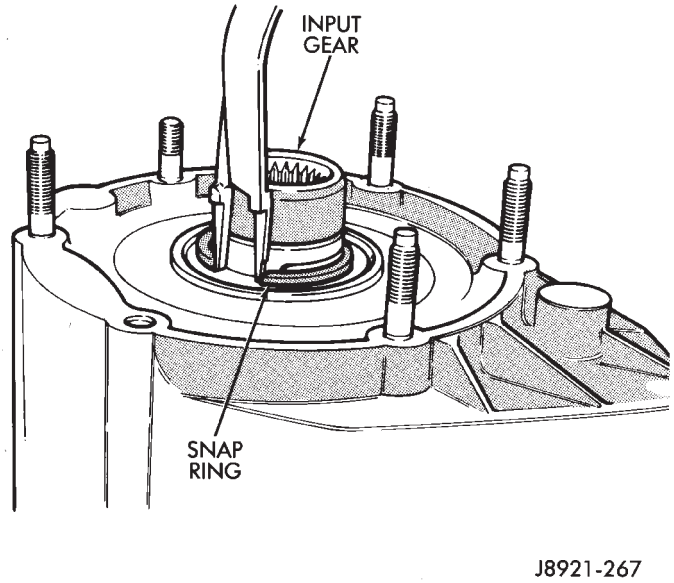



*Fig. 40 Input Gear Snap-Ring Removal*

(6) Remove input gear retainer, thrust washers and input gear from low range gear (Fig. 43).

(7) Inspect low range annulus gear (Fig. 44). **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.

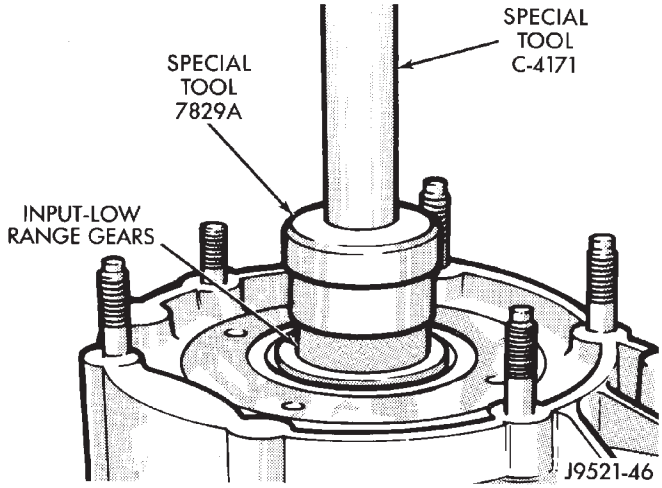



*Fig. 41 Input And Low Range Gear AssemblyRemoval*

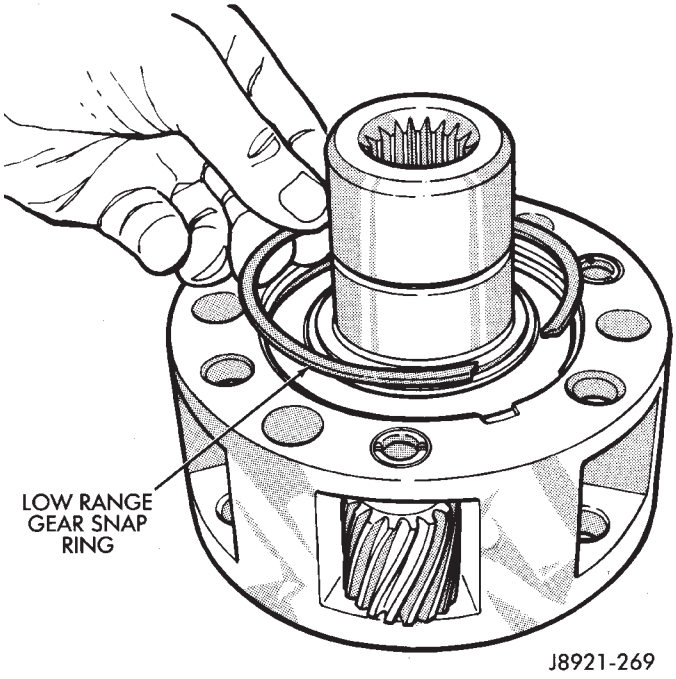



*Fig. 42 Low Range Gear Snap-Ring Removal/ Installation*

**DIFFERENTIAL DISASSEMBLY**

(1) Mark differential case halves for reference.

(2) Remove differential case bolts.

(3) Invert differential on workbench.

DISASSEMBLY AND ASSEMBLY (Continued)

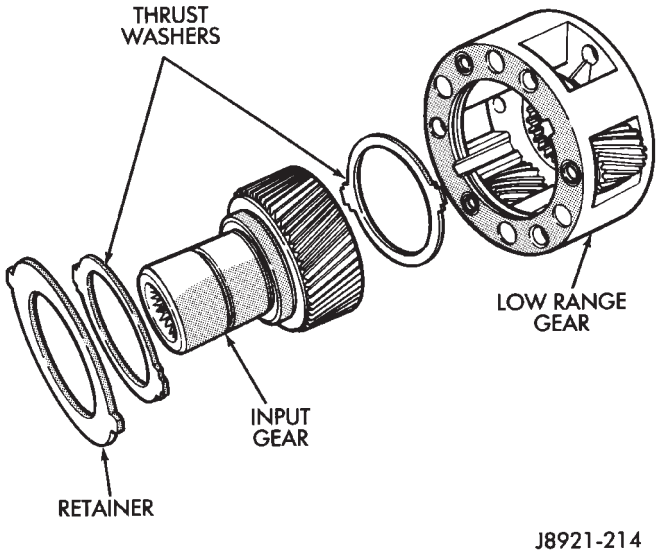



*Fig. 43 Low Range Gear Disassembly*

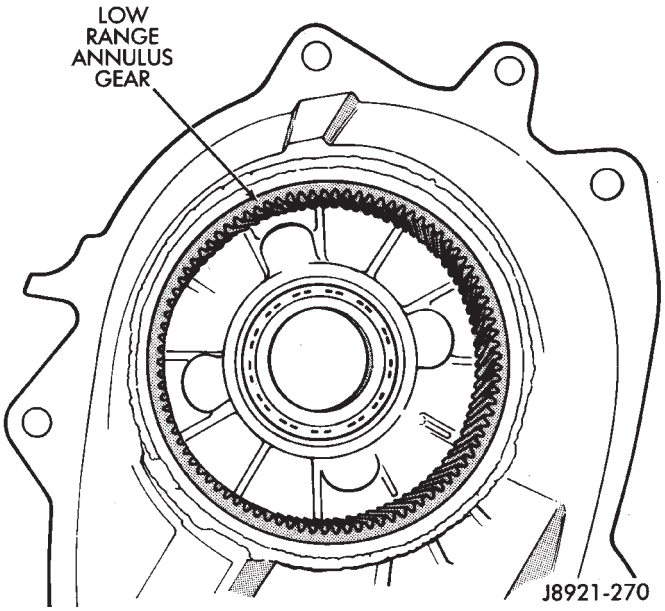



*Fig. 44 Inspecting Low Range Annulus Gear*

(4) Separate top case from bottom case. Use slots in case halves to pry them apart (Fig. 45).

(5) Remove thrust washers and planet gears from case pins (Fig. 46).

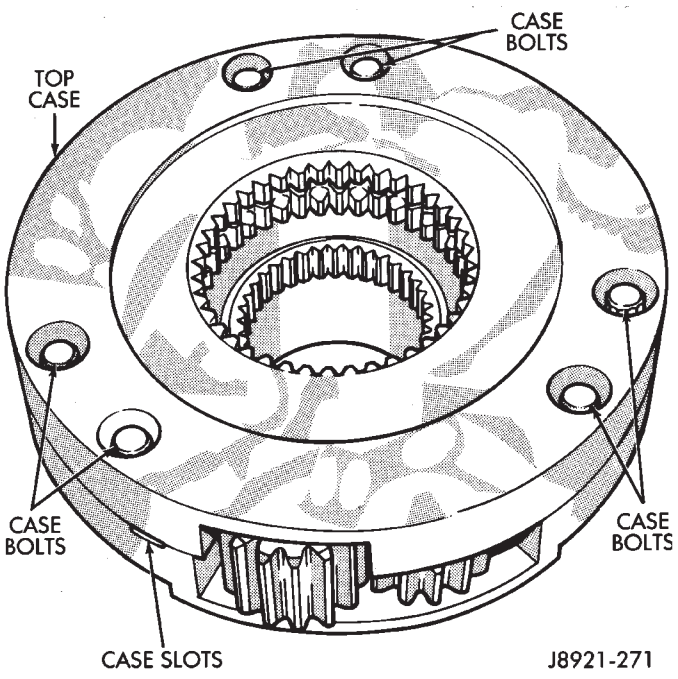



*Fig. 45 Separating Differential Case Halves*

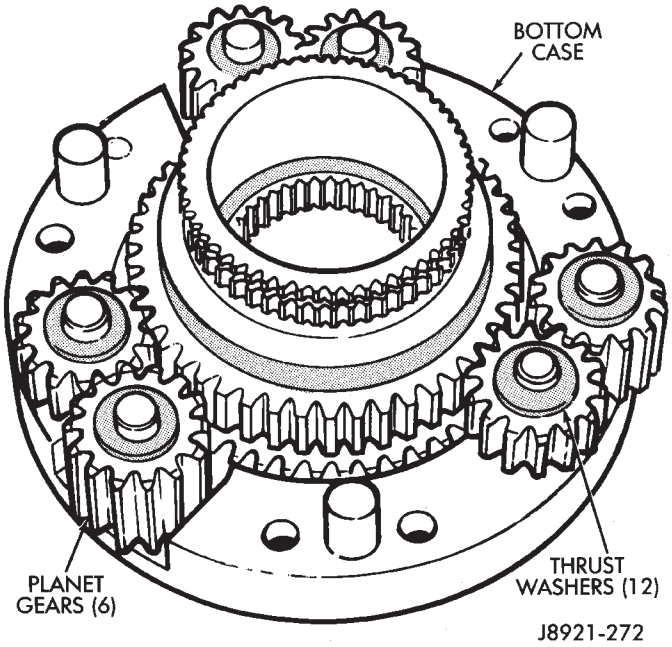



*Fig. 46 Planet Gears And Thrust Washer Removal*

DISASSEMBLY AND ASSEMBLY (Continued)

(6) Remove mainshaft and sprocket gears from bottom case (Fig. 47). Note gear position for reference before separating them.

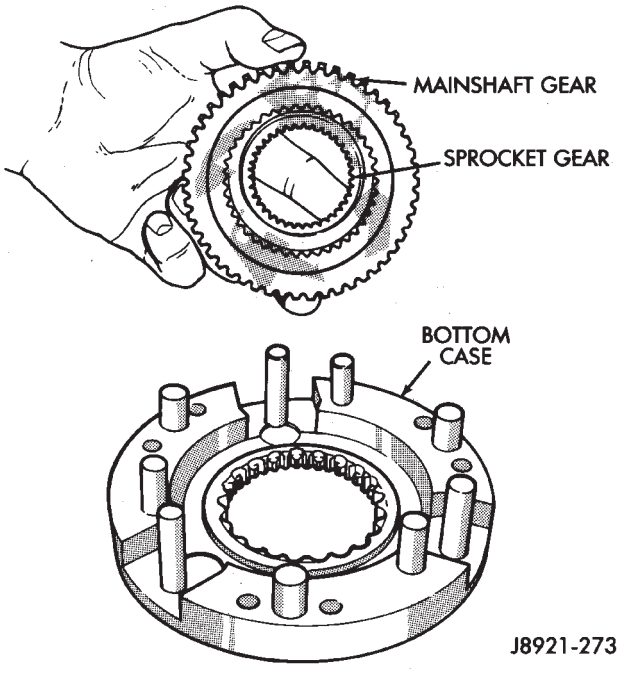



***Fig. 47 Mainshaft And Sprocket Gear Removal***

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.**

**BEARING AND SEAL INSTALLATION**

(1) Remove snap-ring that retains front output shaft front bearing in case (Fig. 48). 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. 49).

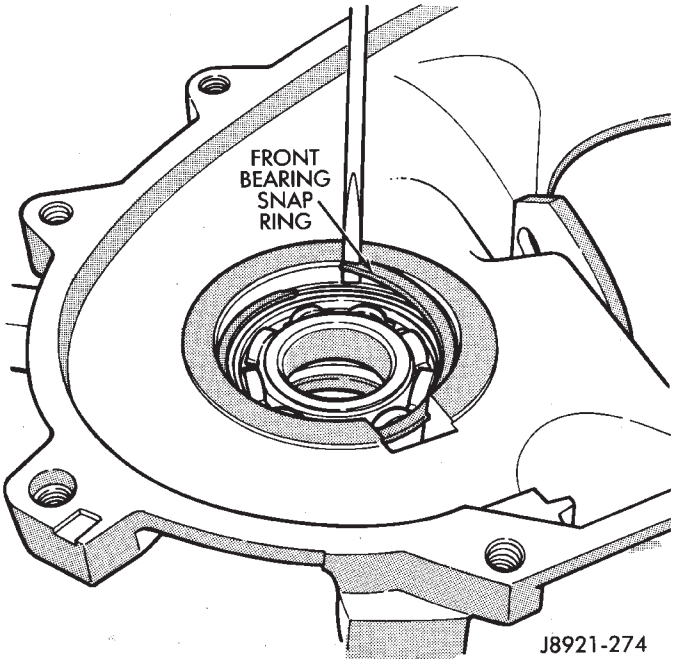



***Fig. 48 Front Output Shaft Front BearingSnap-Ring Removal***

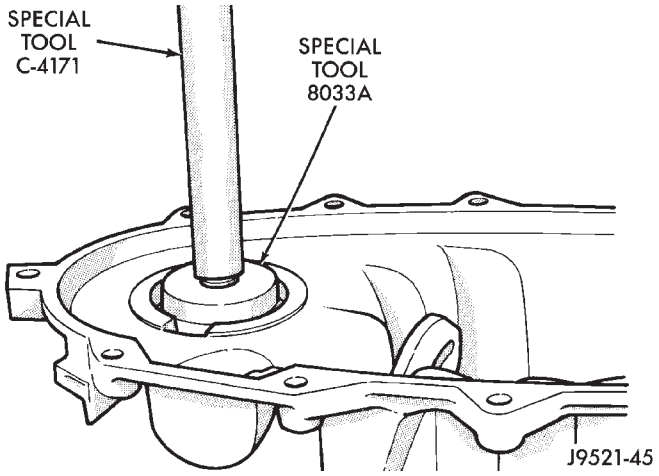



***Fig. 49 Front Output Shaft Front BearingInstallation***

(3) Install front bearing snap-ring (Fig. 48).

(4) Remove front output shaft seal using an appropriate pry tool (Fig. 50) or slide-hammer mounted screw.

DISASSEMBLY AND ASSEMBLY (Continued)

(5) Install new front output shaft oil seal with Installer 6952-A (Fig. 51).

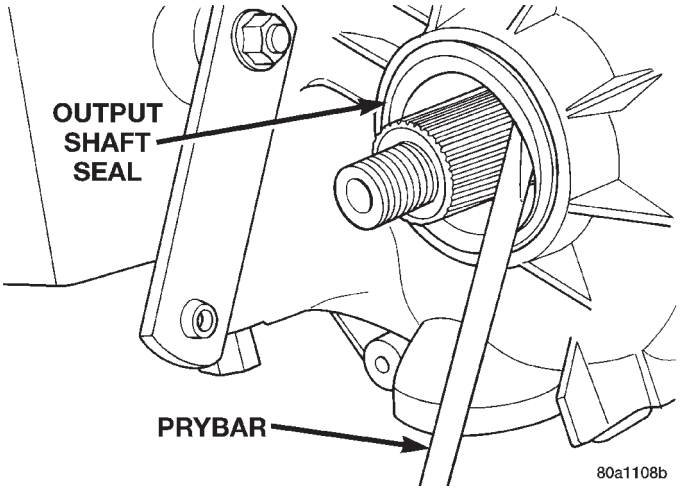



*Fig. 50 Remove Front Output Shaft Seal*

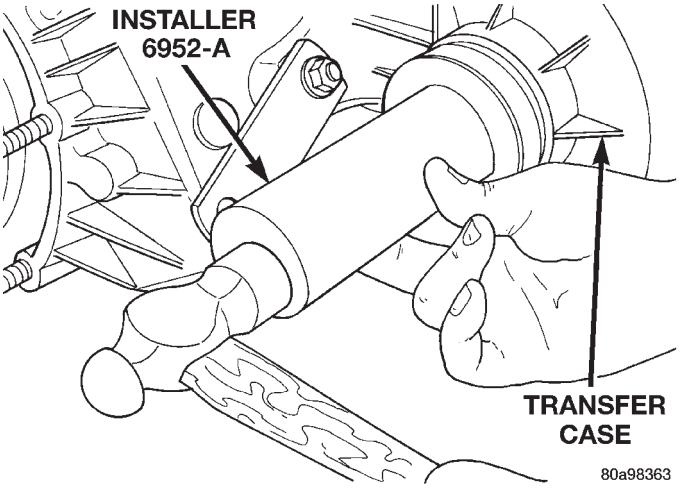



*Fig. 51 Install Front Output Shaft Seal*

(6) Remove input gear bearing with Tool Handle C-4171 and Remover C-4210 (Fig. 52).

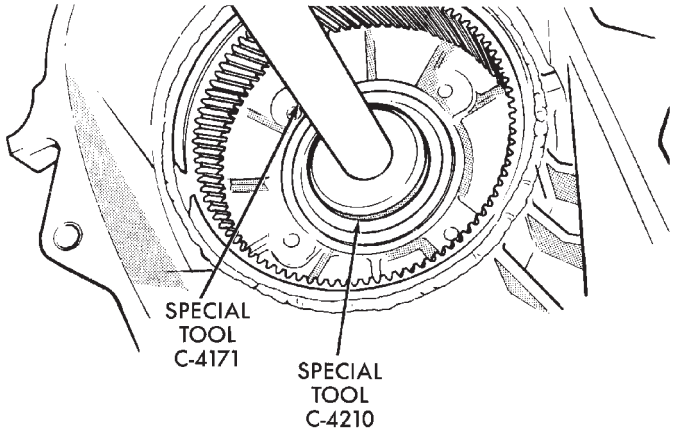



*Fig. 52 Input Gear Bearing Removal*

(7) Install snap-ring on new input gear bearing.

(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. 53).

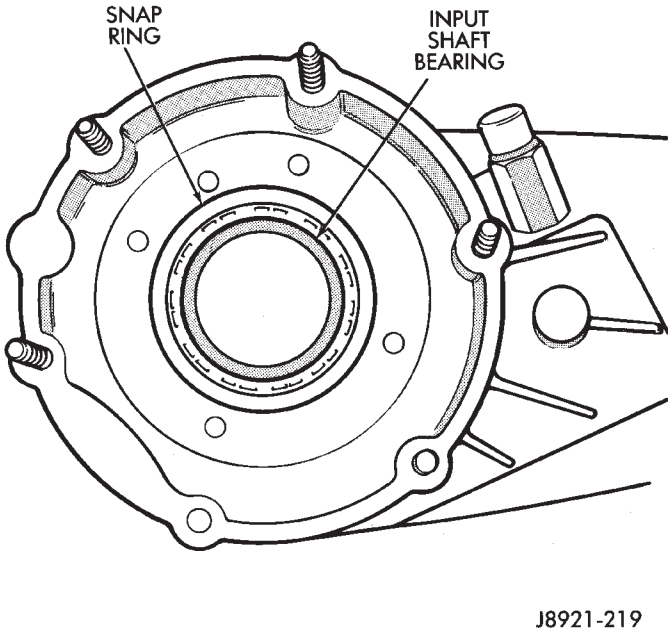



*Fig. 53 Seating Input Gear Bearing*

(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. 54).

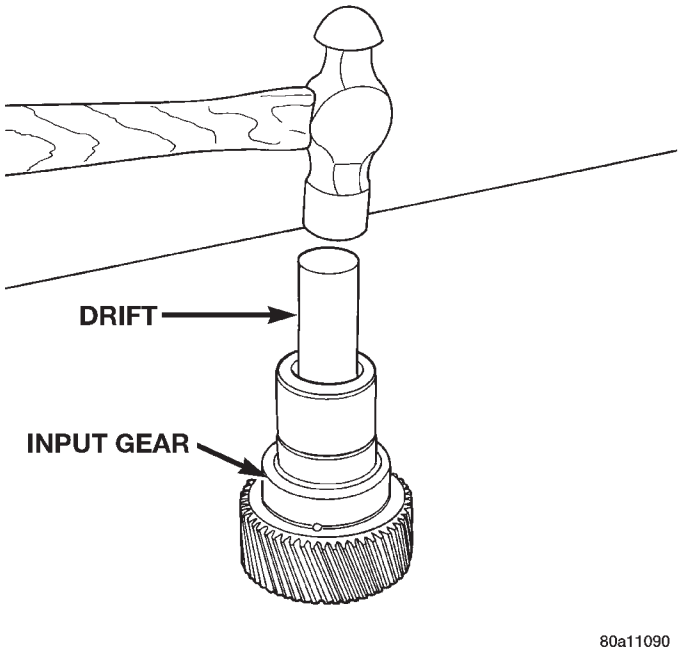



*Fig. 54 Remove Input Gear Pilot Bearing*

DISASSEMBLY AND ASSEMBLY (Continued)

(10) Install new pilot bearing with Installer 8128 and Handle C-4171 (Fig. 55).

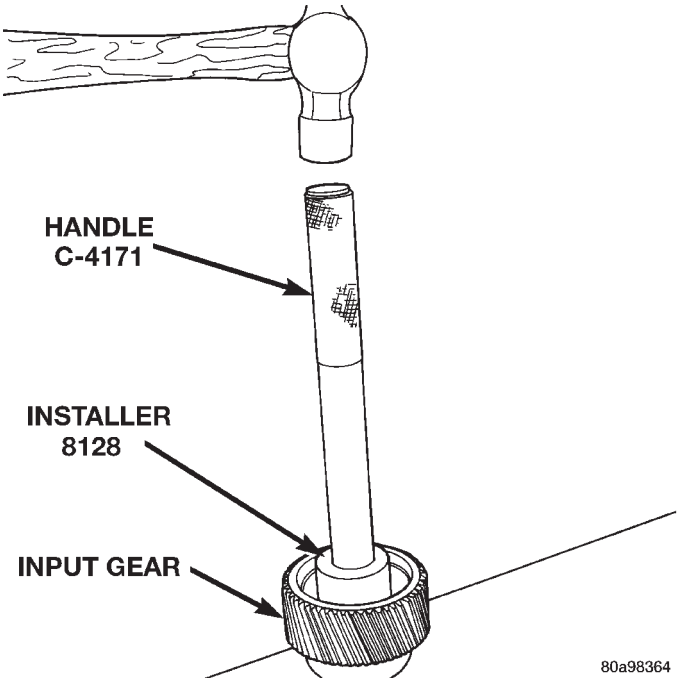



*Fig. 55 Install Input Gear Pilot Bearing*

(11) Install new seal in front bearing retainer with Installer 7884 (Fig. 56).

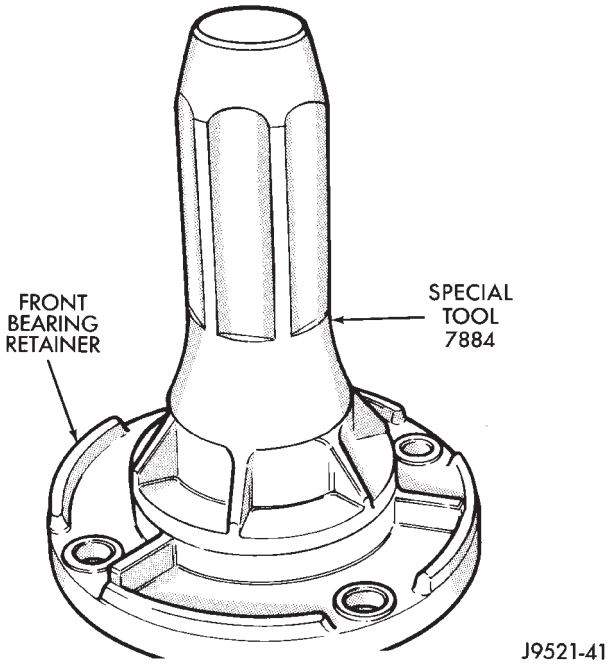



*Fig. 56 Front Bearing Retainer Seal Installation*

(12) Remove output shaft rear bearing with the screw and jaws from Remover L-4454 and Cup 8148 (Fig. 57).

(13) Install new bearing with Tool Handle C-4171 and Installer 5066 (Fig. 58). Lubricate bearing after installation.

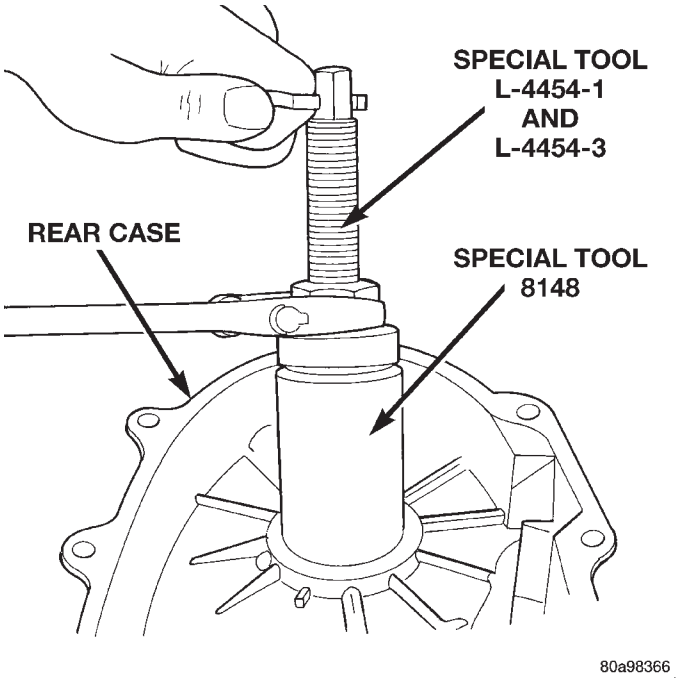



*Fig. 57 Remove Front Output Shaft Rear Bearing*

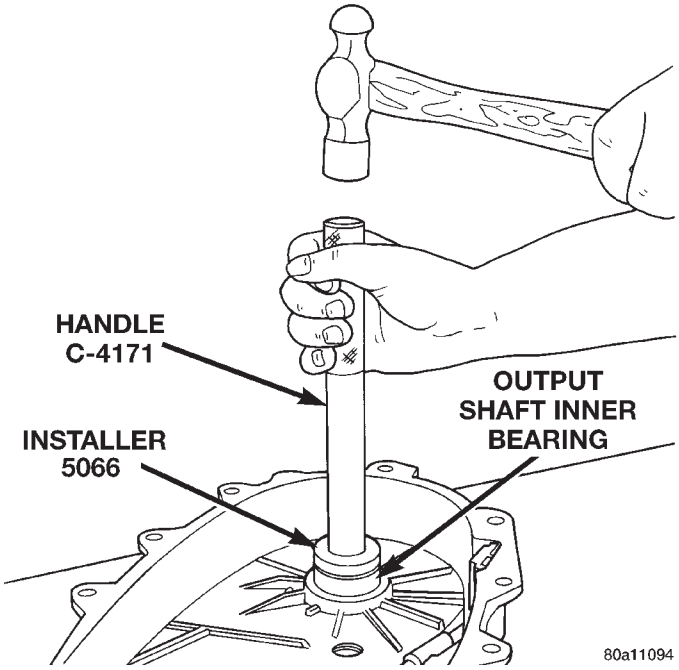



*Fig. 58 Install Front Putput Shaft Rear Bearing*

DISASSEMBLY AND ASSEMBLY (Continued)

(14) Install new seal in oil pump feed housing with Special Tool 7888 (Fig. 59).

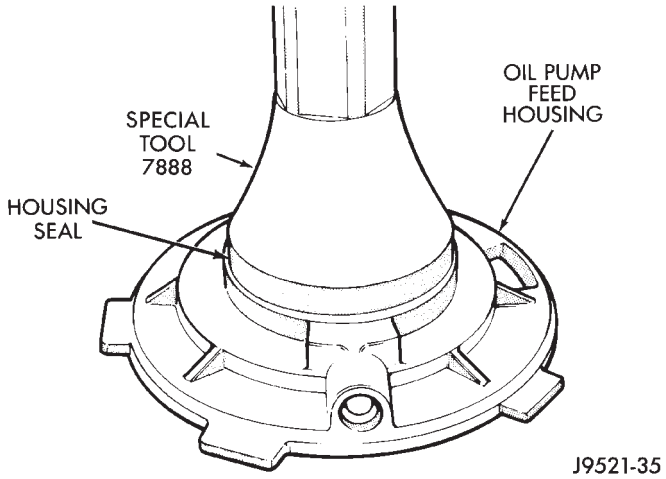



*Fig. 59 Oil Pump Seal Installation*

(15) Install new pickup tube O-ring in oil pump (Fig. 60).

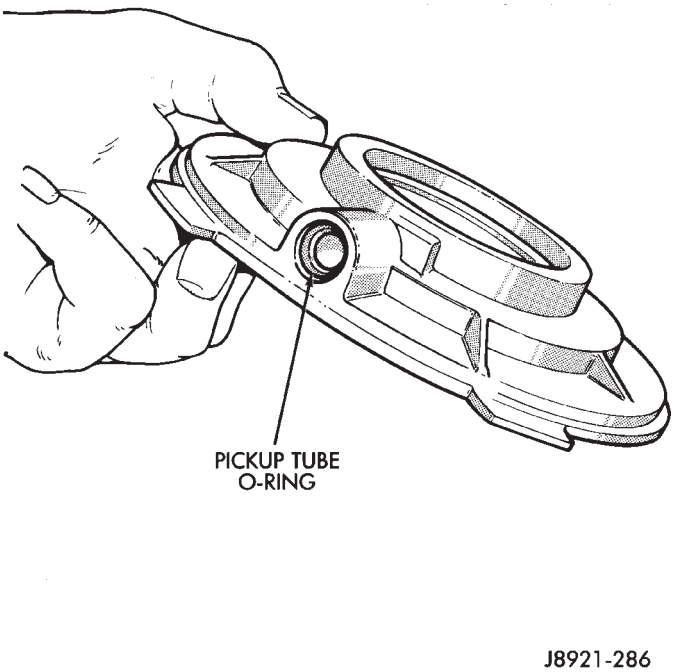



*Fig. 60 Pickup Tube O-Ring Installation*

**DIFFERENTIAL ASSEMBLY**

(1) Lubricate differential components with automatic transmission fluid.

(2) Install sprocket gear in differential bottom case (Fig. 61).

(3) Install differential planet gears and new thrust washers (Fig. 62). **Be sure thrust washers are installed at top and bottom of each planet gear.**

(4) Install differential mainshaft gear (Fig. 62).

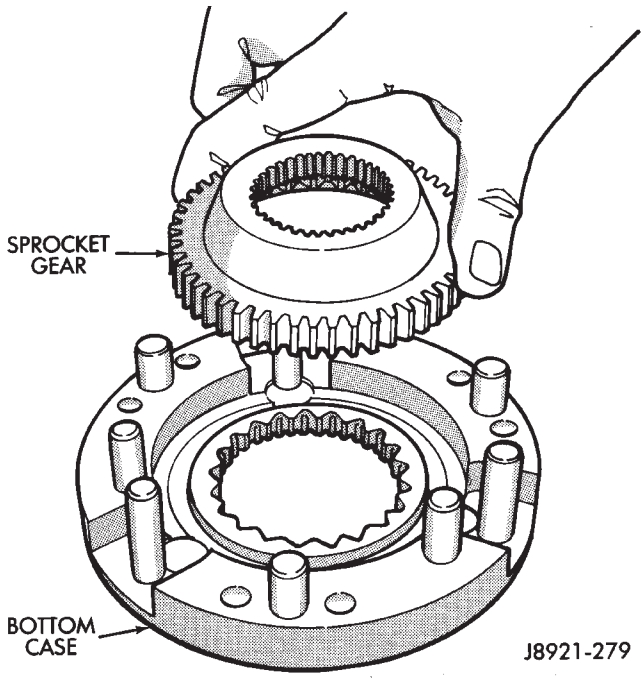



*Fig. 61 Installing Differential SprocketGear*

(5) Align and position differential top case on bottom case (Fig. 63). 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.

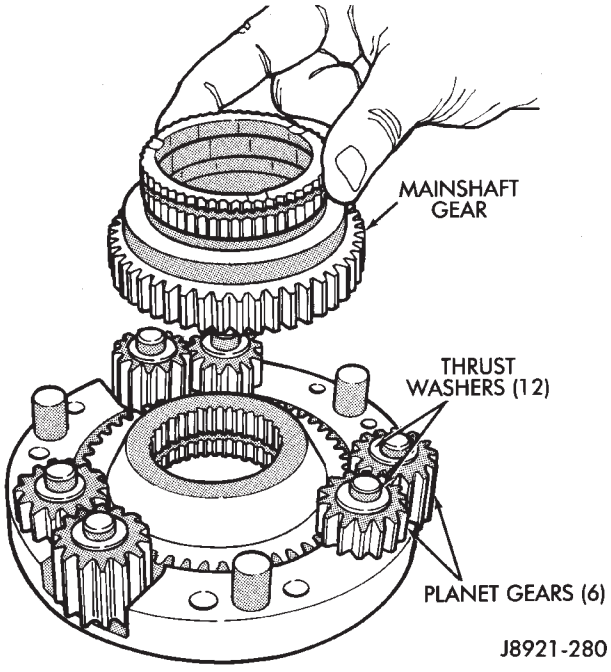



*Fig. 62 Installing Mainshaft And Planet Gears*

DISASSEMBLY AND ASSEMBLY (Continued)

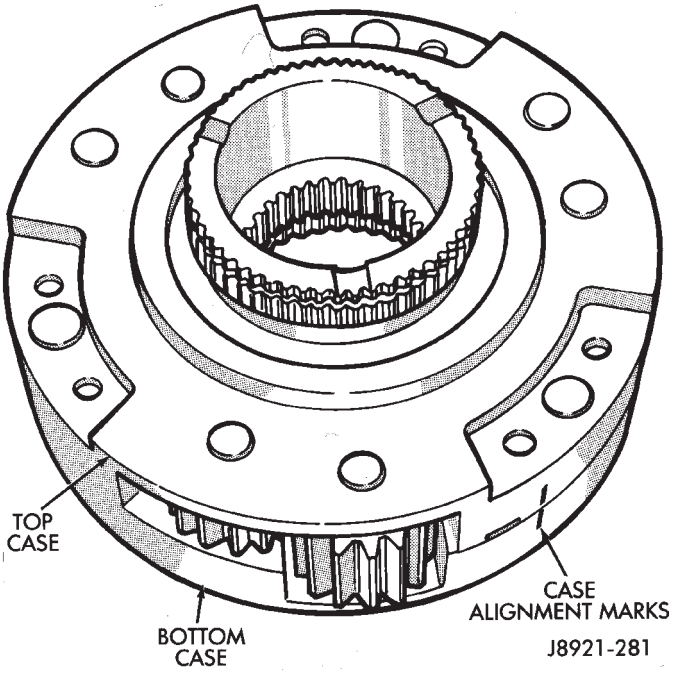



*Fig. 63 Differential Case Assembly*

**INPUT GEAR/LOW RANGE ASSEMBLY**

(1) Assemble low range gear, input gear thrust washers, input gear and input gear retainer (Fig. 64).

(2) Install low range gear snap ring (Fig. 65).

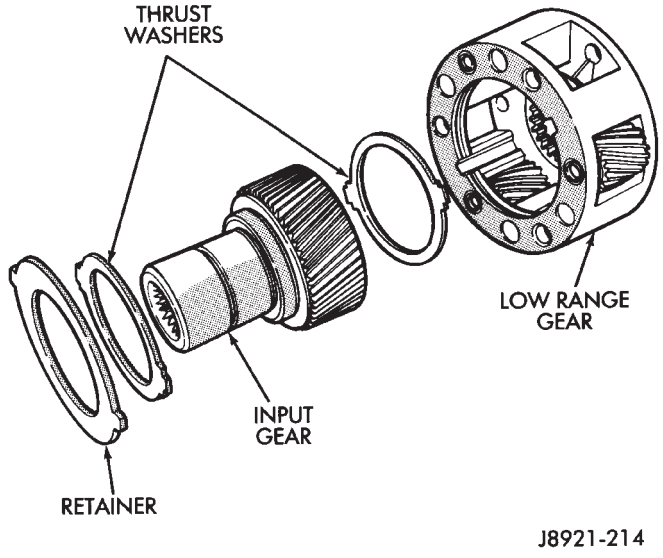



*Fig. 64 Low Range And Input Gear Assembly*

(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.

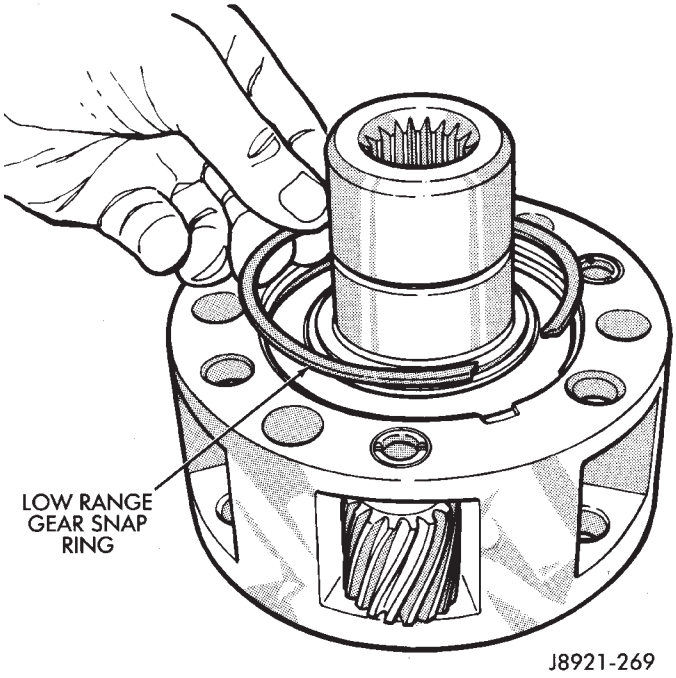



*Fig. 65 Install Low Range Gear Snap Ring*

(6) Install new input gear snap ring (Fig. 66).

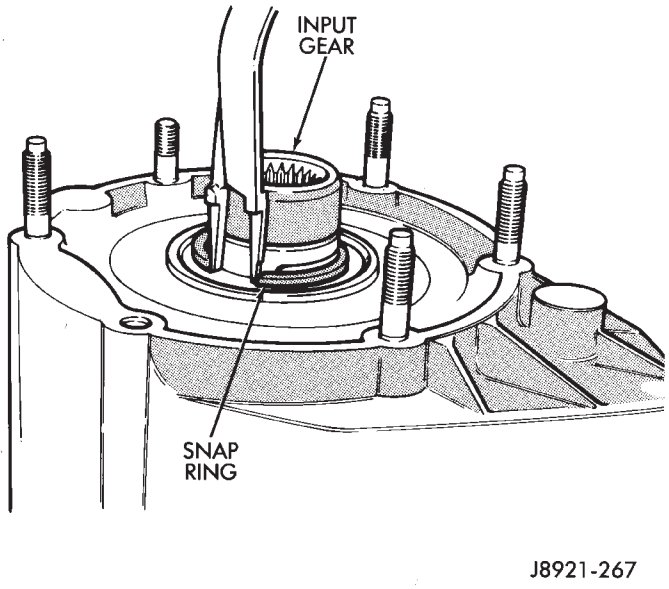



*Fig. 66 Input Gear Snap Ring Installation*

(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. 67). Tighten retainer bolts to 16 ft. lbs. (21 N·m) torque.

DISASSEMBLY AND ASSEMBLY (Continued)

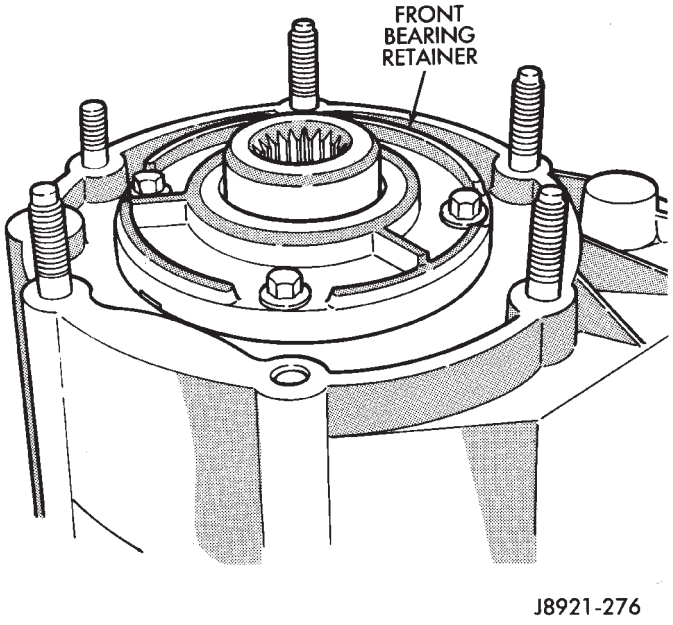



*Fig. 67 Installing Front Bearing Retainer*

**SHIFT FORKS AND MAINSHAFT INSTALLATION**

(1) Install new sector shaft O-ring and bushing (Fig. 68).

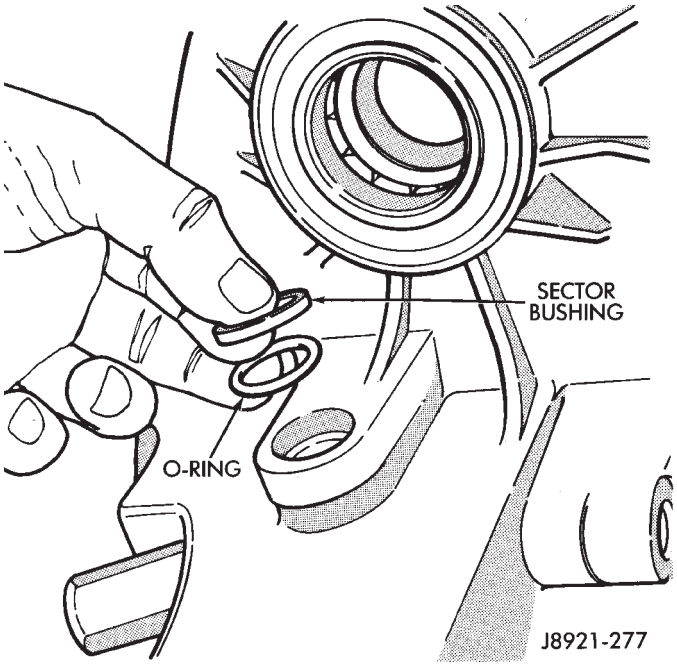



*Fig. 68 Sector O-Ring And Bushing Installation*

(2) Install shift sector.

(3) Install new pads on low range fork, if necessary, (Fig. 69).

(4) Assemble low range fork and hub (Fig. 69).

(5) Position low range fork and hub in case. Be sure low range fork pin is engaged in shift sector slot (Fig. 70).

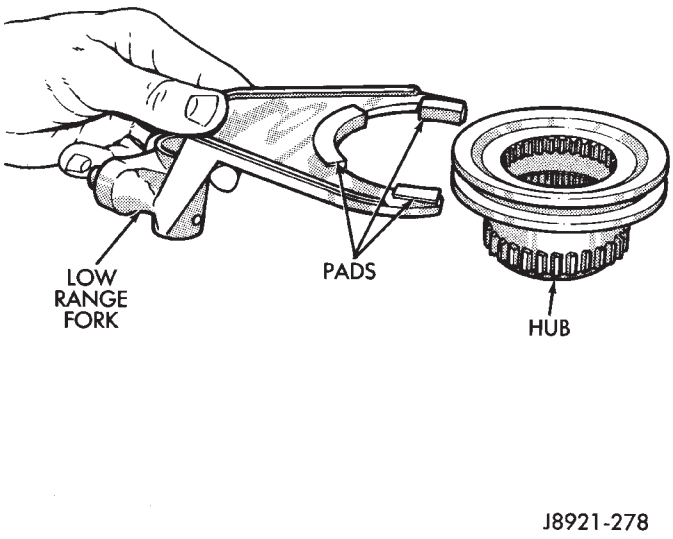



*Fig. 69 Assembling Low Range Fork And Hub*

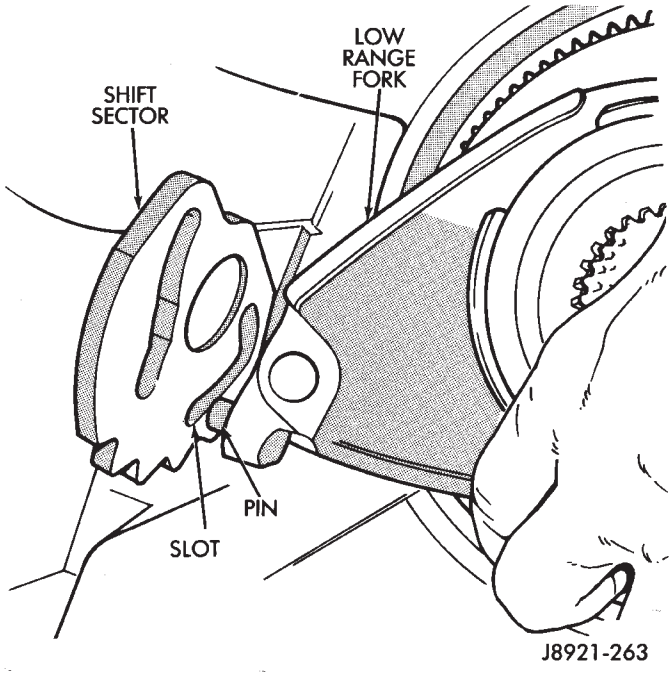



*Fig. 70 Positioning Low Range Fork*

DISASSEMBLY AND ASSEMBLY (Continued)

(6) Install first mainshaft bearing spacer on mainshaft (Fig. 71).

(7) Install bearing rollers on mainshaft (Fig. 71). **Coat bearing rollers with generous quantity of petroleum jelly to hold them in place.**

(8) Install remaining bearing spacer on mainshaft (Fig. 71). Do not displace any bearings while installing spacer.

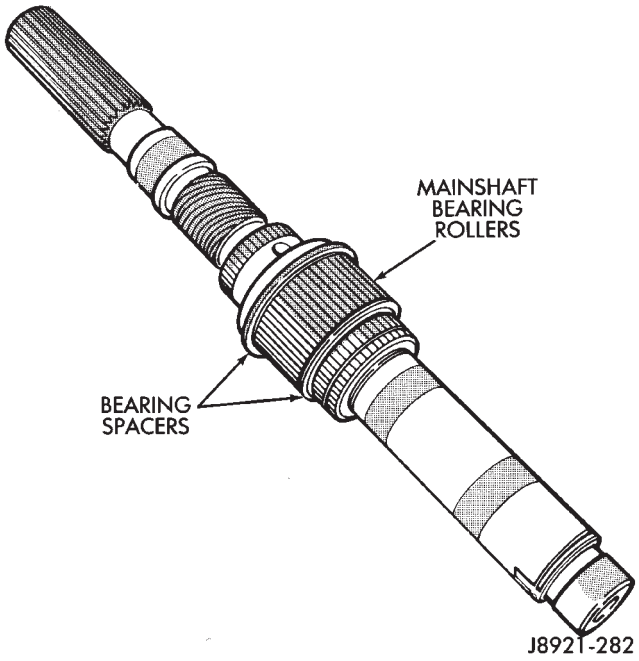



***Fig. 71 Installing Mainshaft Bearing Rollersand Spacers***

(9) Install differential (Fig. 72). **Do not displace mainshaft bearings when installing differential.**

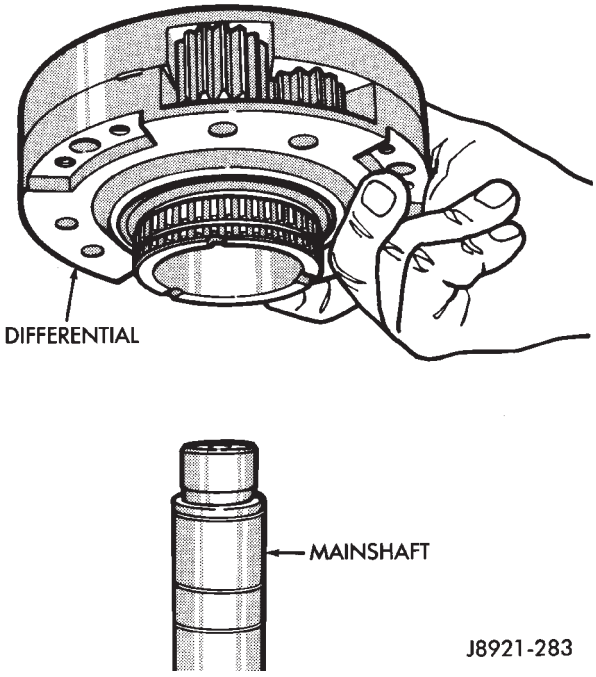



***Fig. 72 Differential Installation***

(10) Install differential snap-ring (Fig. 73).

(11) Install intermediate clutch shaft (Fig. 74).

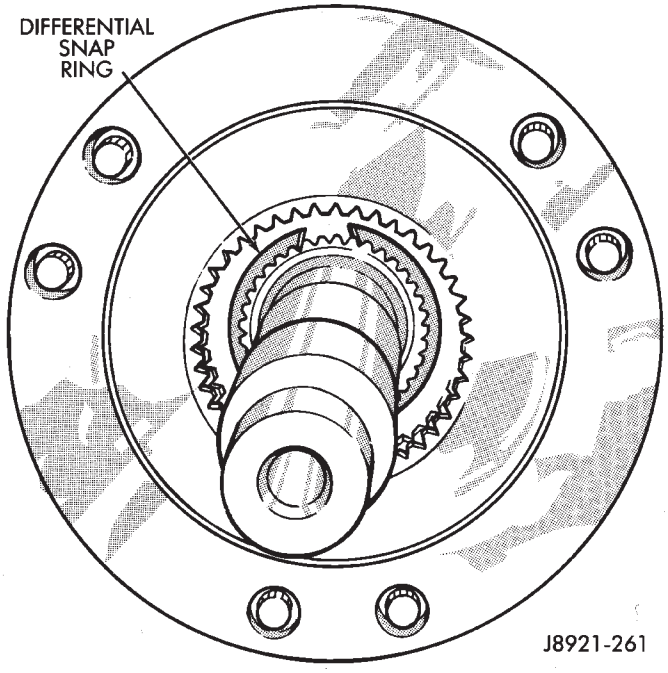



***Fig. 73 Installing Differential Snap-Ring***

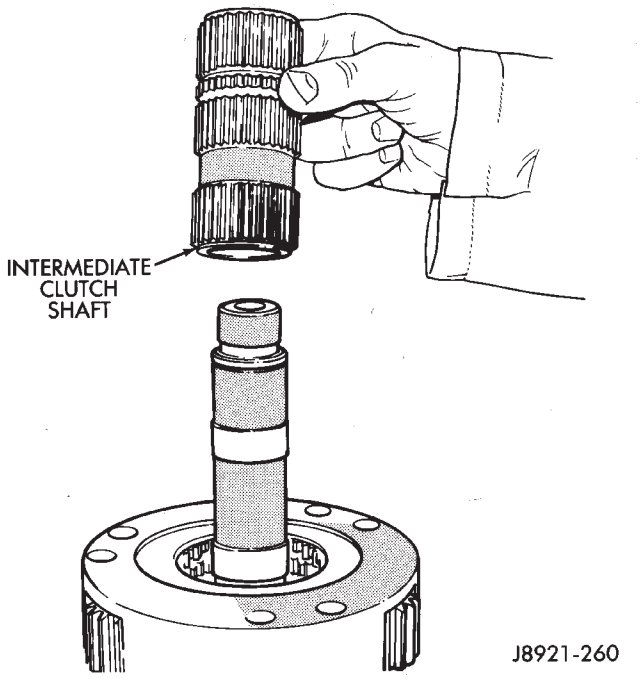



***Fig. 74 Installing Intermediate Clutch Shaft***

DISASSEMBLY AND ASSEMBLY (Continued)

(12) Install clutch shaft thrust washer (Fig. 75).
(13) Install clutch shaft snap-ring (Fig. 76).
(14) Inspect mode fork assembly (Fig. 77). Replace pads and bushing if necessary. Replace fork tube if bushings inside tube are worn or damaged. Also check springs and slider bracket (Fig. 77). Replace worn, damaged components.

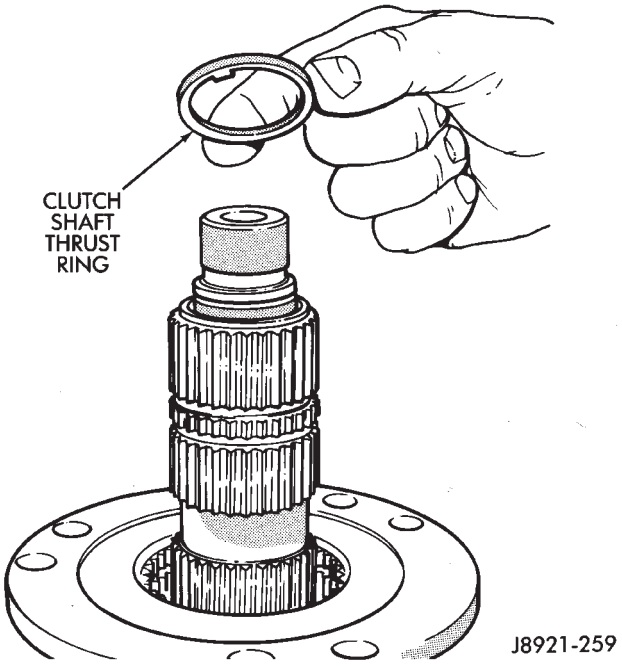



*Fig. 75 Installing Clutch Shaft Thrust Washer*

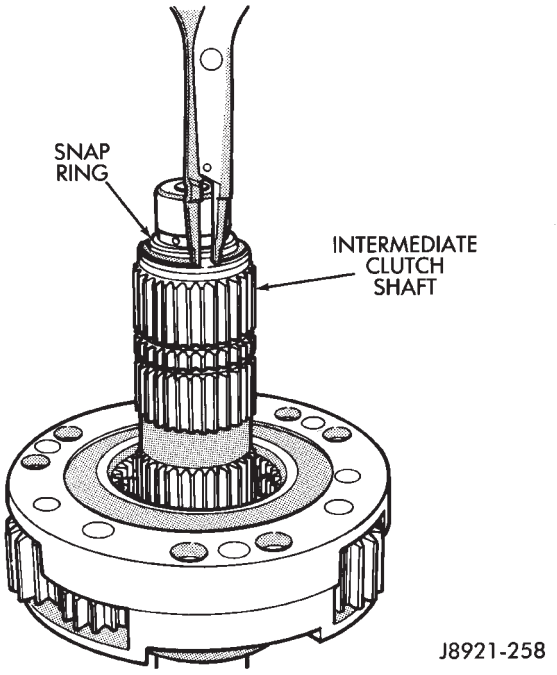



*Fig. 76 Installing Clutch Shaft Snap-Ring*

(15) Install mode sleeve in mode fork (Fig. 78). Then install assembled sleeve and fork on mainshaft.

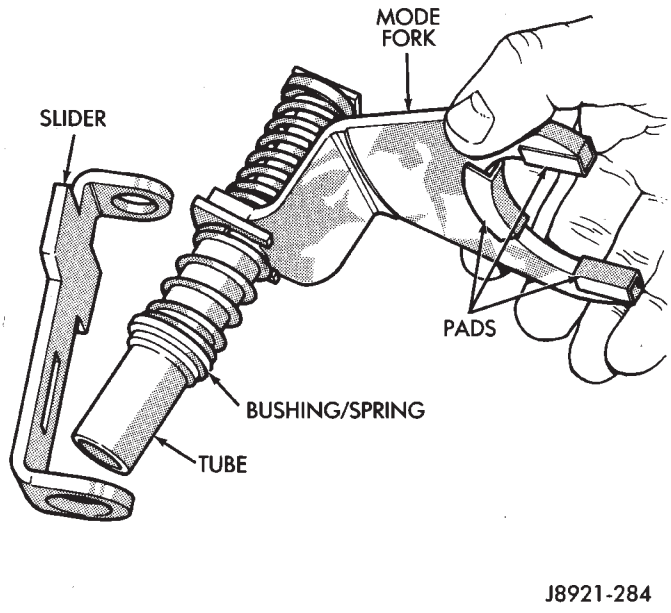



*Fig. 77 Mode Fork Assembly Inspection*

Be sure mode sleeve splines are engaged in differential splines.
(16) Install mode fork and mainshaft assembly in case (Fig. 79). Rotate mainshaft slightly to engage shaft with low range gears.

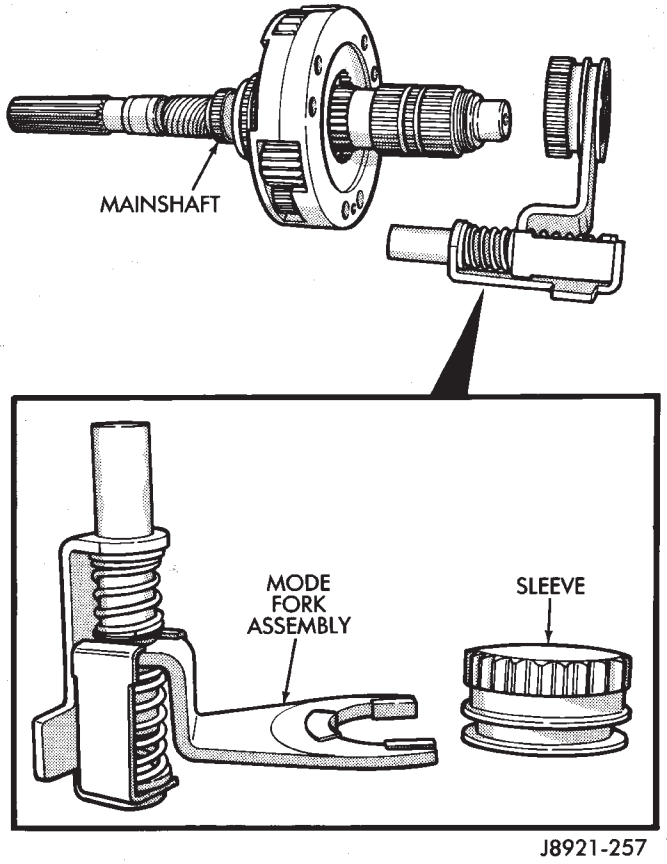



*Fig. 78 Installing Mode Fork And Sleeve*

DISASSEMBLY AND ASSEMBLY (Continued)

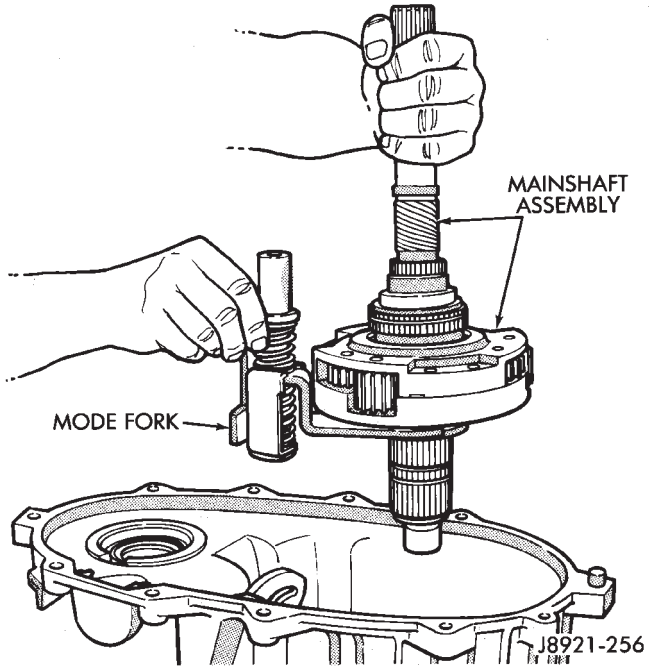



*Fig. 79 Assembled Mainshaft And Mode ForkInstallation*

(17) Rotate mode fork pin into shift sector slot.

(18) Install shift rail (Fig. 80). **Be sure rail is seated in both shift forks.**

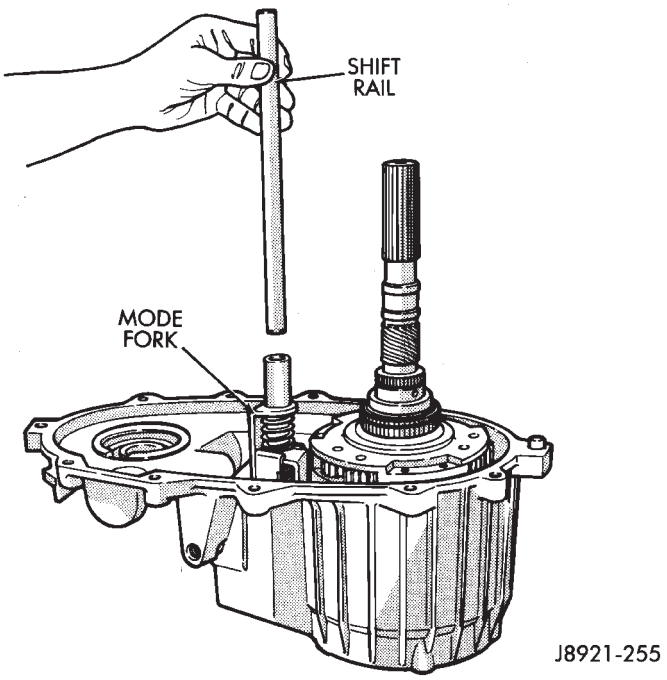



*Fig. 80 Shift Rail Installation*

(19) Rotate shift sector to align lockpin hole in low range fork with access hole in case.

(20) Insert an easy-out in range fork lockpin to hold it securely for installation (Fig. 81). **Lockpin is slightly tapered on one end. Insert tapered end into fork and rail.**

(21) Insert lockpin through access hole and into shift fork (Fig. 81). Then remove easy-out and seat the pin with pin punch.

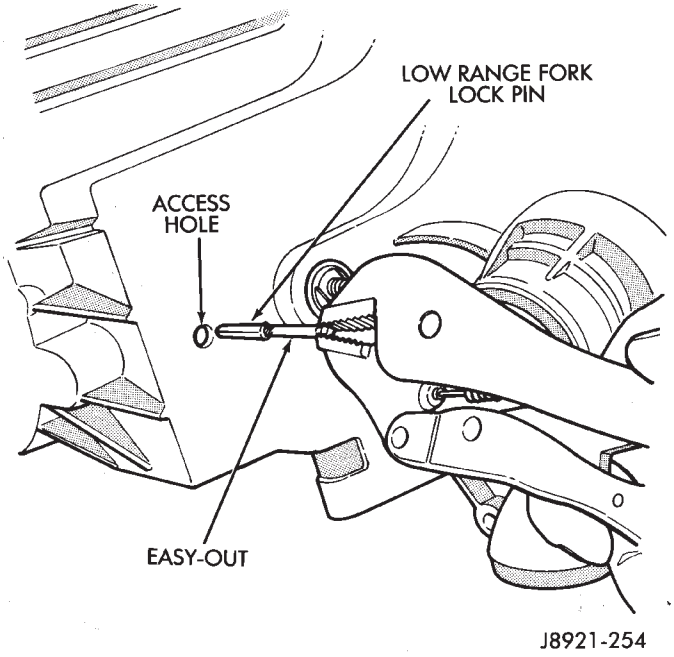



*Fig. 81 Installing Low Range Fork Lockpin*

(22) Install plug in lockpin access hole.

(23) Install detent plunger, detent spring and detent plug in case (Fig. 82).

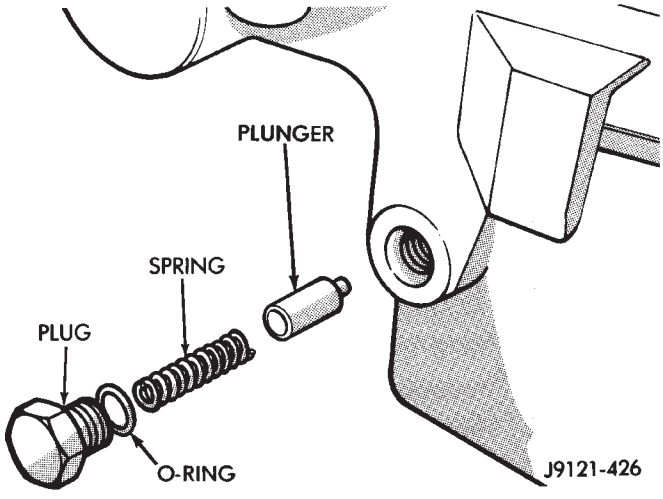



*Fig. 82 Detent Pin, Spring And Plug Installation*

DISASSEMBLY AND ASSEMBLY (Continued)

**FRONT OUTPUT SHAFT AND DRIVE CHAIN INSTALLATION**

(1) Install front output shaft (Fig. 83).

(2) Install drive chain (Fig. 83). Engage chain with front output shaft sprocket teeth.

(3) Install drive sprocket (Fig. 83). Engage drive sprocket teeth with chain. Then engage sprocket splines with mainshaft splines.

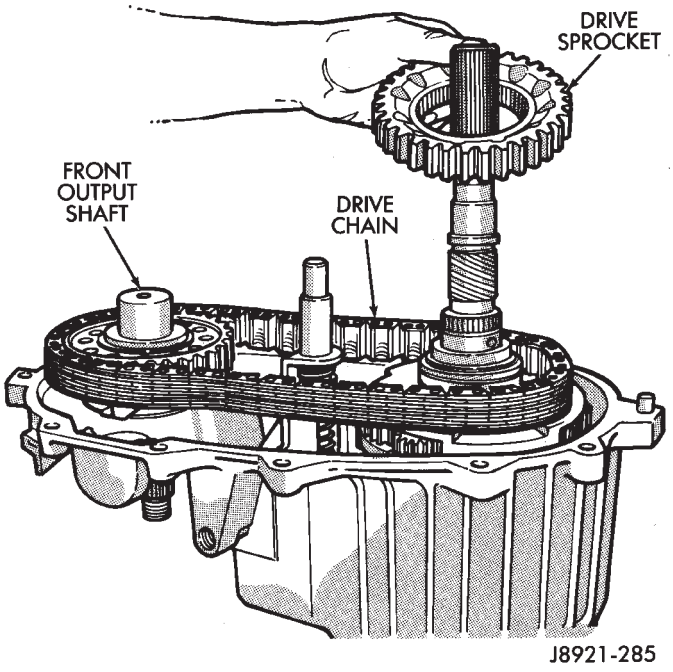



*Fig. 83 Drive Chain And Sprocket Installation*

(4) Install drive sprocket snap-ring (Fig. 84).

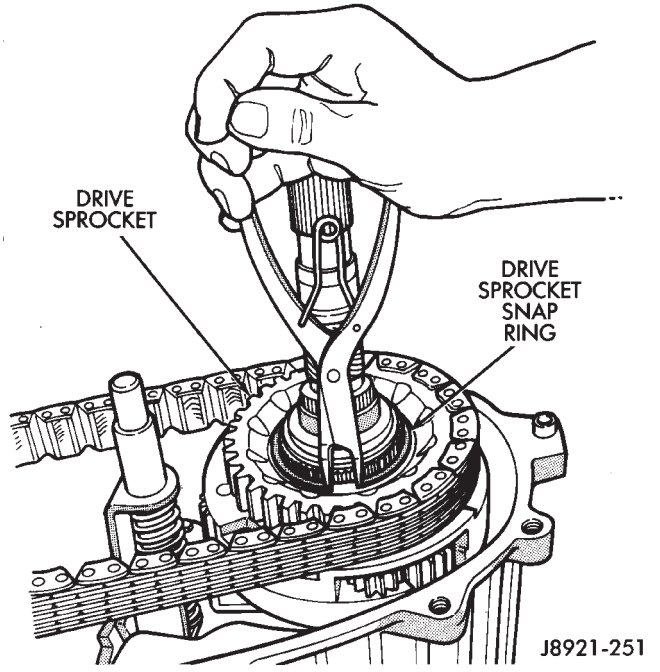



*Fig. 84 Drive Sprocket Snap-Ring Installation*

**OIL PUMP AND REAR CASE INSTALLATION**

(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. 85). Be sure screen is seated in case slot as shown.

(2) Install magnet in front case pocket (Fig. 86).

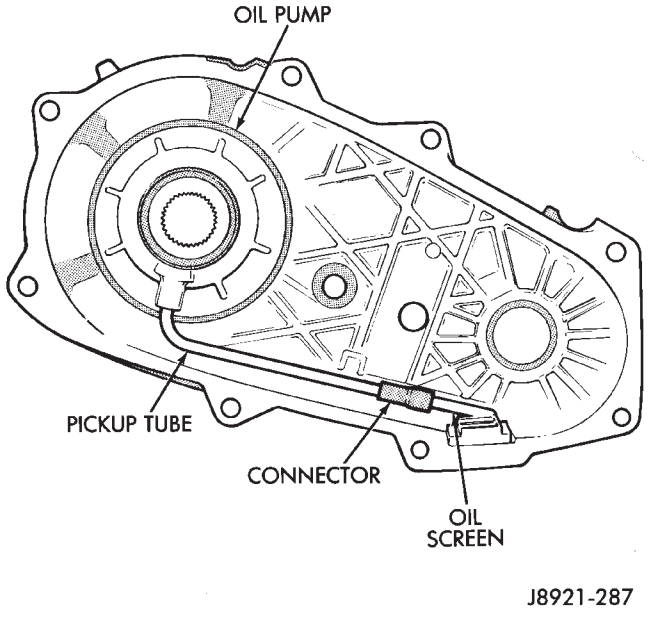



*Fig. 85 Oil Screen And Pickup Tube Installation*

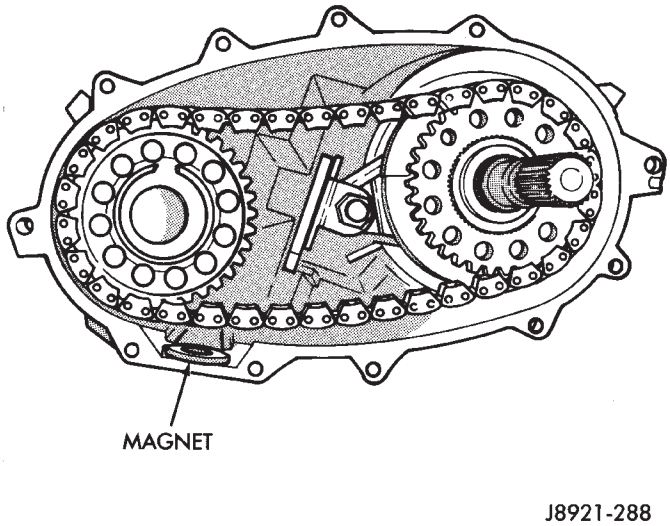



*Fig. 86 Installing Case Magnet*

(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.

(5) Install and tighten front case-to-rear case bolts to 41 N·m (30 ft. lbs.) torque. **Be sure to install a**

DISASSEMBLY AND ASSEMBLY (Continued)

**washer under each bolt used at case dowel locations.**

#### REAR RETAINER INSTALLATION

(1) Remove rear bearing in retainer using Installer 8128 and Handle C-4171.

(2) Install rear bearing in retainer with Tools C-4171 and 5064 (Fig. 87).

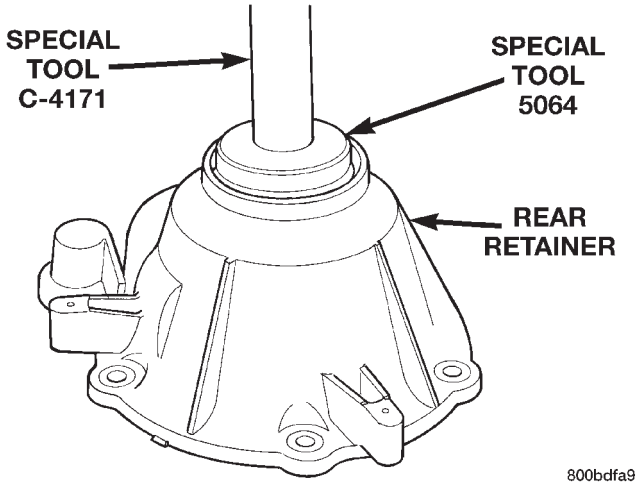



*Fig. 87 Installing Rear Bearing In Retainer*

(3) Install rear bearing O.D. retaining ring with snap-ring pliers (Fig. 88). Be sure retaining ring is fully seated in retainer groove.

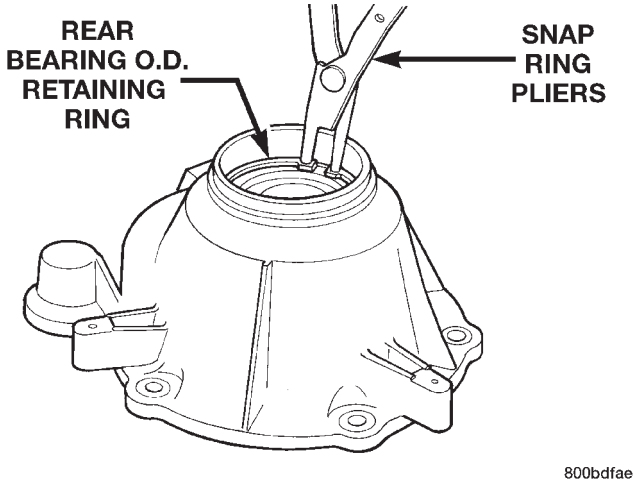



*Fig. 88 Rear Bearing Retaining Ring Installation*

(4) 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.

(5) Install rear retainer on rear case. Tighten retainer bolts to 20–27 N·m (15–20 ft. lbs.) torque.

(6) Install rear bearing I.D. retaining ring and spacer on output shaft.

(7) Apply liberal quantity of petroleum jelly to new rear seal and to output shaft. Petroleum jelly is needed to protect seal lips during installation.

(8) Slide seal onto Seal Protector 6992 (Fig. 89). Slide seal protector and seal onto output shaft.

(9) Slide Installer C-4076-B onto seal protector with the recessed side of the tool toward the seal. Drive seal into rear bearing retainer with installer C-4076-B and handle MD-998323 (Fig. 90).

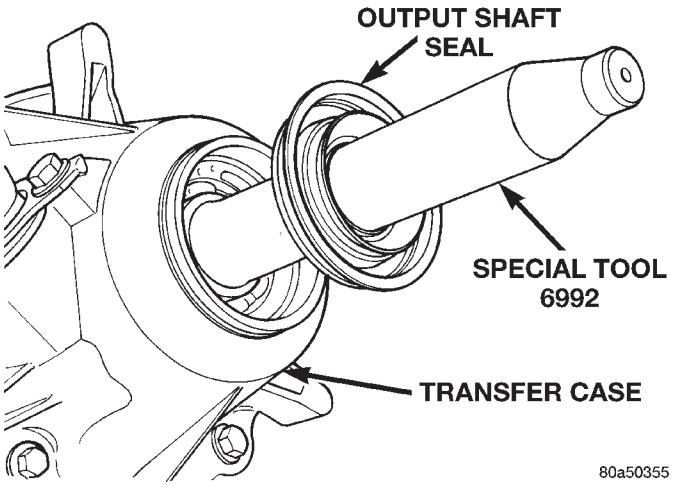



*Fig. 89 Output Shaft Seal and Protector*

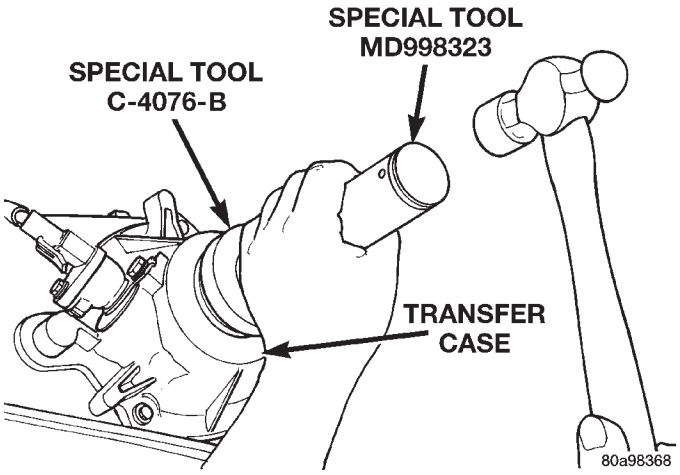



*Fig. 90 Rear Seal Installation*

(10) Install rear slinger with installer C-4076-A and handle MD-998323 (Fig. 90).

(11) Install boot on output shaft slinger and crimp retaining clamp with tool C-4975-A (Fig. 91).

#### FRONT YOKE AND SWITCH INSTALLATION

(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.

DISASSEMBLY AND ASSEMBLY (Continued)

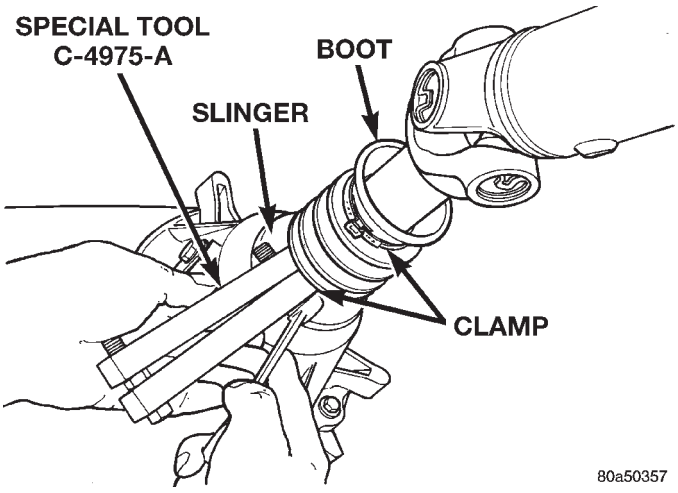



*Fig. 91 Slinger Boot Installation*

(4) Install yoke on front shaft. Secure yoke with new nut.

## 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. 92). 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. 93). Minor nicks on the shift rail can be smoothed with 320–400 grit emery cloth.

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.

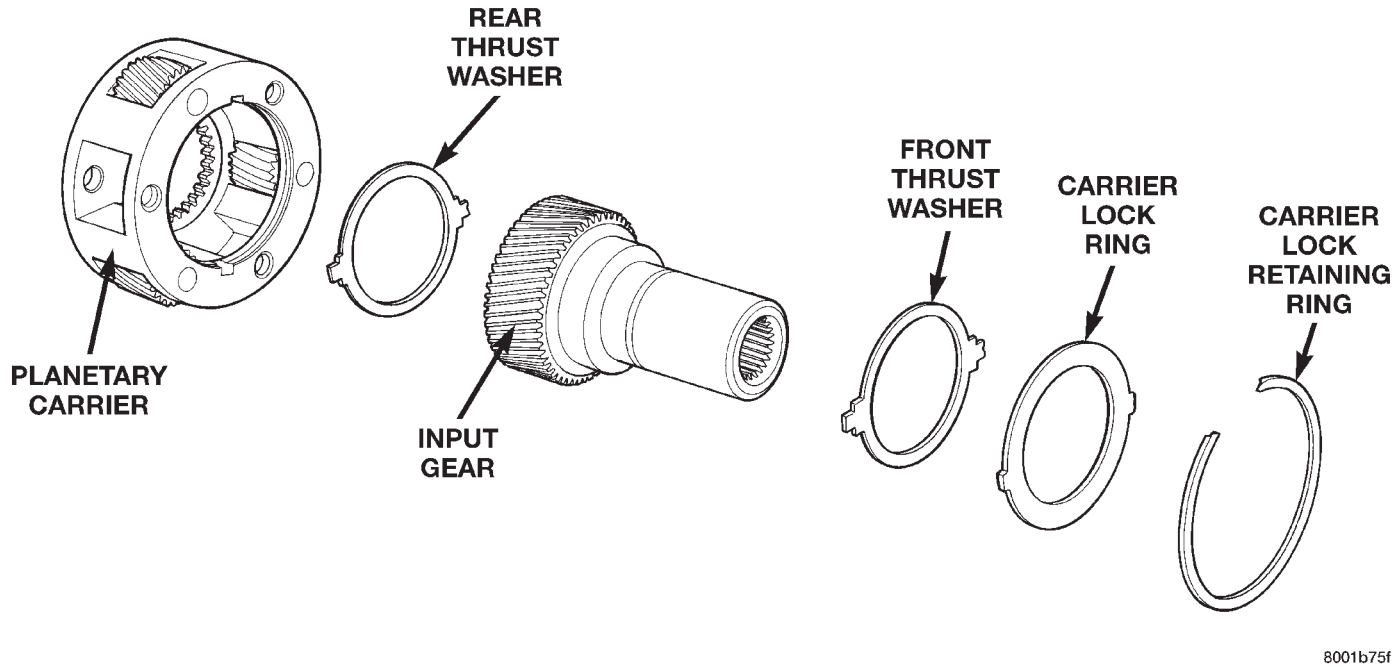



*Fig. 92 Input Gear And Carrier Components*

CLEANING AND INSPECTION (Continued)

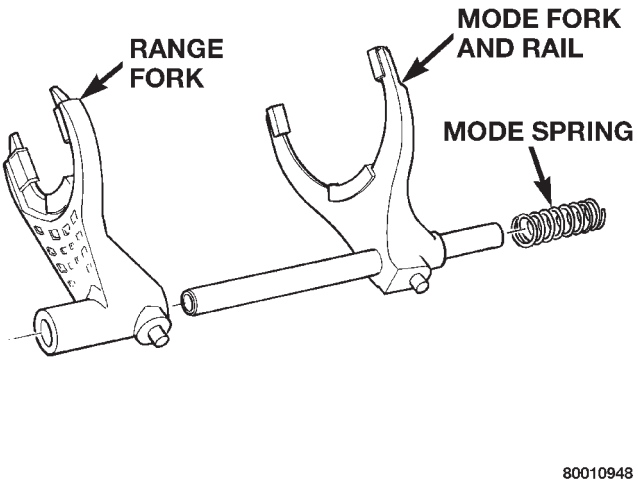



*Fig. 93 Shift forks*

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/BEARING/ SEAL/SLINGER/ BOOT*

Inspect the retainer components (Fig. 94). 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.

Replace the slinger and seal outright; do not reuse either part.

Inspect the retaining rings and washers. Replace any part if distorted, bent, or broken. Reuse is not recommended. Also replace the boot if cut or torn. Replace the boot band clamps, do not reuse them.

*REAR OUTPUT SHAFT/YOKE/DRIVE CHAIN*

Check condition of the seal contact surfaces of the yoke slinger (Fig. 95). 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 if stretched, distorted, or if any of the links bind. Replace the bearings if rough, or noisy.

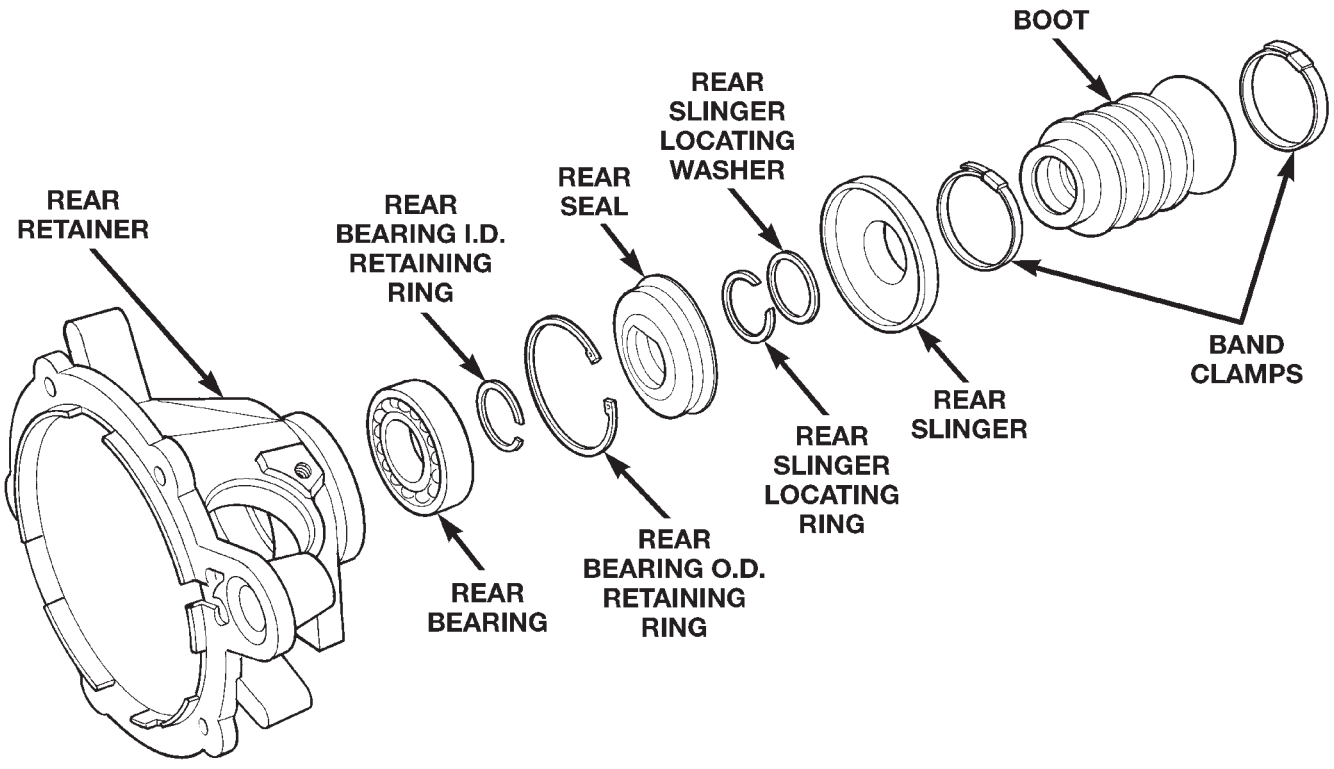



*Fig. 94 Rear Retainer Components*

CLEANING AND INSPECTION (Continued)

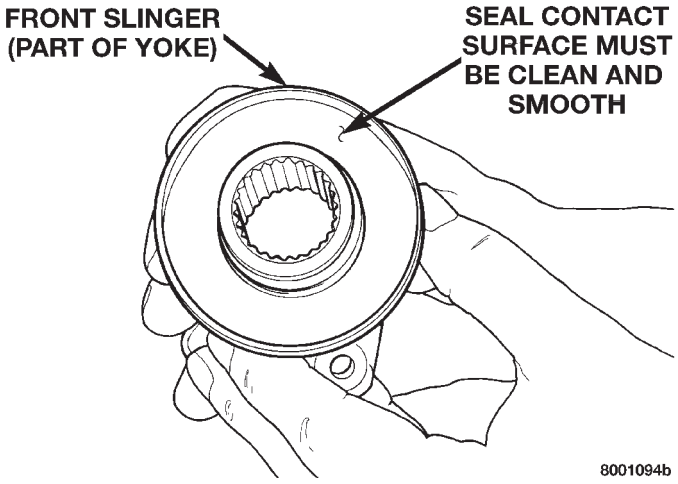



*Fig. 95 Seal Contact Surface Of Yoke Slinger*

*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. 96).

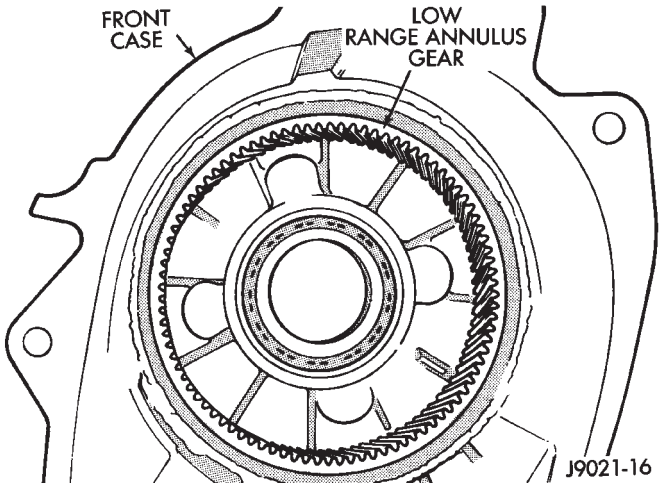



*Fig. 96 Low Range Annulus Gear*

*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(FM) 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) Raise vehicle.
(3) Loosen lock bolt on adjusting trunnion (Fig. 97).
(4) Be sure linkage rod slides freely in trunnion. Clean rod and apply spray lube if necessary.
(5) Verify that transfer case range lever is fully engaged in 4L position.
(6) Tighten adjusting trunnion lock bolt.
(7) Lower vehicle.

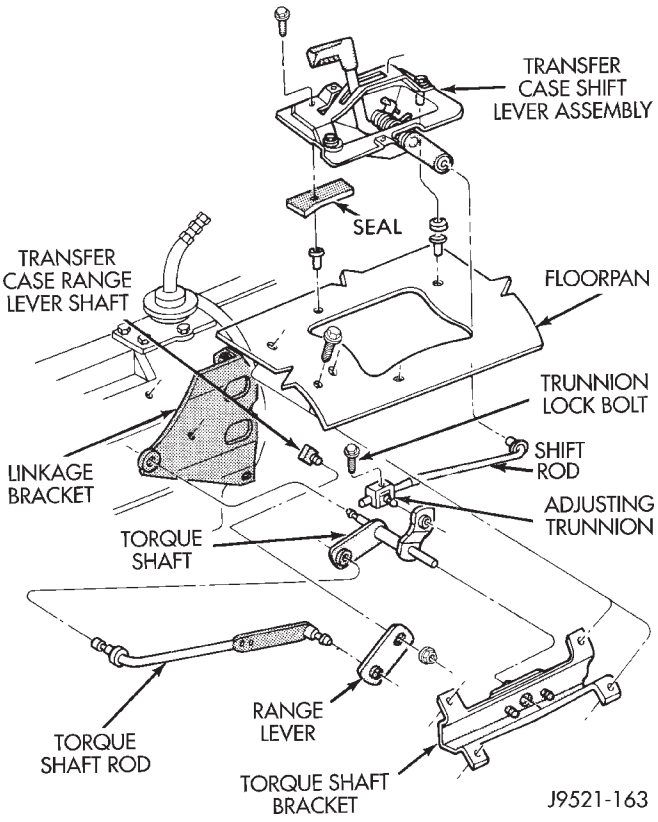



*Fig. 97 Shift Linkage*

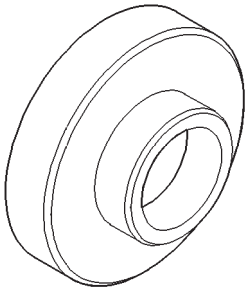
## SPECIFICATIONS

### TORQUE

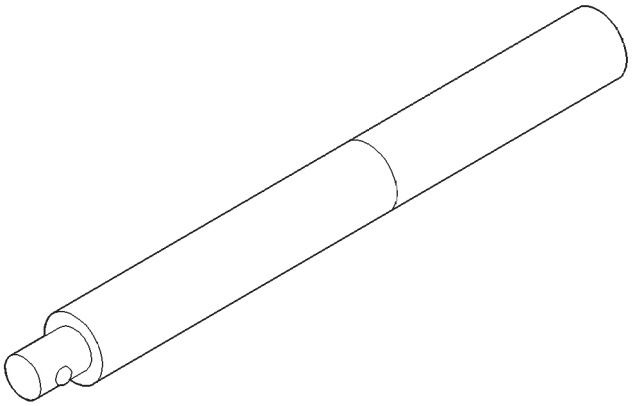
| DESCRIPTION | TORQUE |
|---|---|
| Plug, Detent | 16–24 N·m (12–18 ft. lbs.) |
| Bolt, Diff. Case | 17–27 N·m (15–24 ft. lbs.) |
| Plug, Drain/Fill | 40–45 N·m (30–40 ft. lbs.) |
| Bolt, Front Brg. Retainer | 16–27 N·m (12–20 ft. lbs.) |
| Bolt, Case Half | 35–46 N·m (26–34 ft. lbs.) |
| Nut, Front 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 | 35–47 N·m (26–35 ft. lbs.) |
| Bolts, U-Joint | 19 N·m (17 ft. lbs.) |

## SPECIAL TOOLS

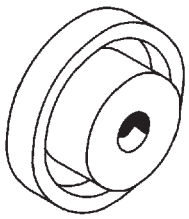
### SPECIAL TOOLS—NV242



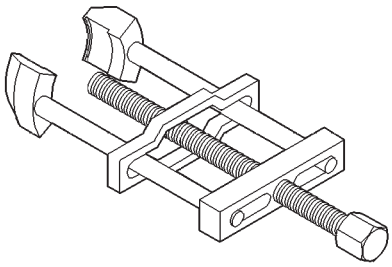
*Installer—C-4076-B*



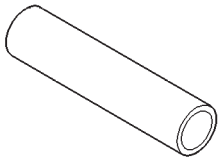
*Handle, Universal—C-4171*



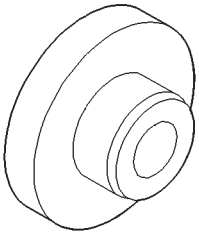
*Remover—C-4210*



*Puller, Slinger—MD-998056–A*

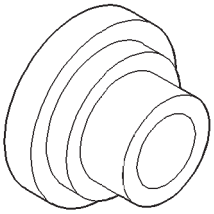


*Installer—MD-998323*



*Installer, Bearing—5064*

SPECIAL TOOLS (Continued)



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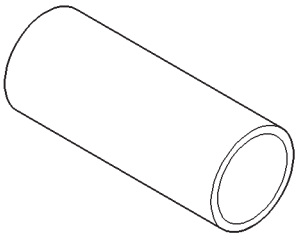
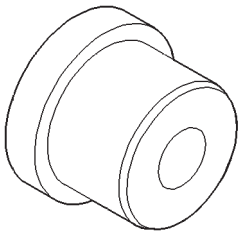


***Cup—8148***



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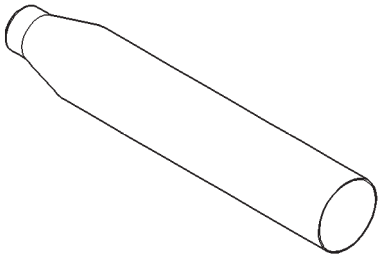
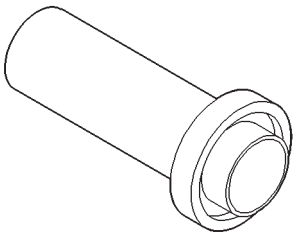
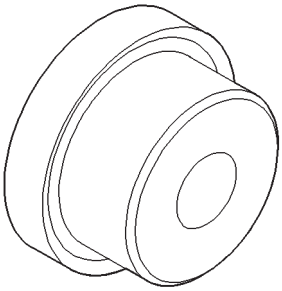


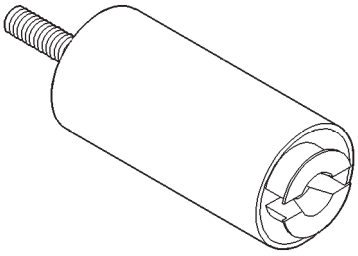
***Seal Protector—6992***



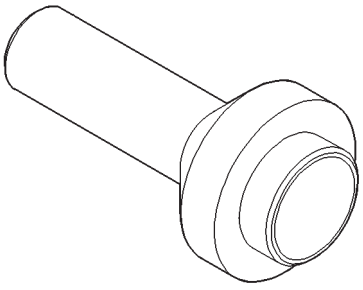
***Installer—6952-A***



***Installer, Input Gear Bearing—7829-A***

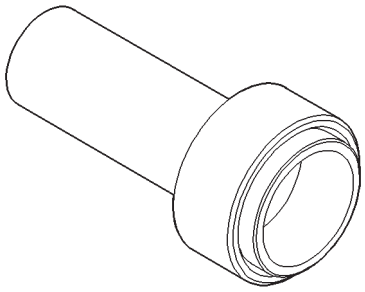


***Remover—L-4454***

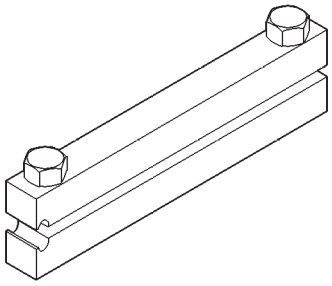


***Installer, Seal—7884***

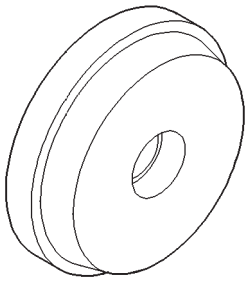
SPECIAL TOOLS (Continued)



***Installer, Pump Housing Seal—7888***



***Installer, Boot Clamp—C-4975-A***



***Installer, Bearing—8033-A***

# NV249 TRANSFER CASE

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## GENERAL INFORMATION

### GENERAL INFORMATION

The NV249 (Fig. 1) is a full time 4-wheel drive transfer case with two operating ranges and a neutral position.

Operating ranges are 4-high and 4-low. The 4-low range is used for extra pulling power in off-road situations.

Engine torque is distributed to the front and rear axles through a viscous coupling. The NV249 low range is provided by a gear reduction system for increased low speed, off-road torque capability.

Transfer case 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. Range positions are marked on the shifter bezel plate.

### TRANSFER CASE IDENTIFICATION

A circular I.D. tag is attached to the rear case of each NV249 transfer case (Fig. 2). The 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.

### RECOMMENDED LUBRICANT AND FILL LEVEL

Mopar® Dexron II, or ATF Plus are the only lubricants recommended for the NV249 transfer case. Approximate fluid refill capacity is approximately 1.18 liters (2.50 pints).

The fill and drain plugs are both in the rear case. Correct fill level is to the bottom edge of the fill plug hole. Be sure that the vehicle is level to ensure an accurate fluid level check.

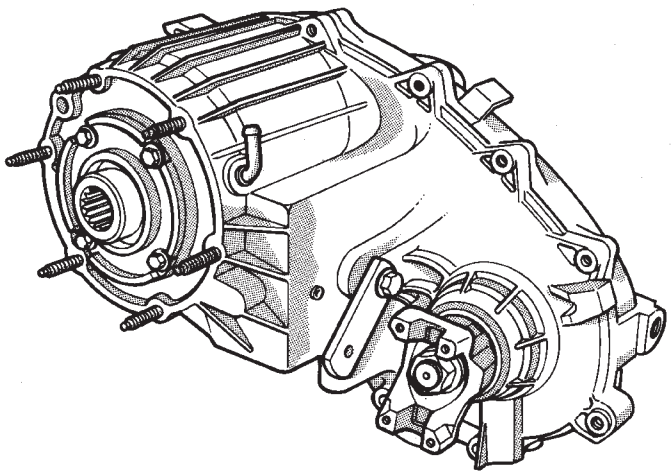

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*Fig. 1 NV249 Transfer Case*

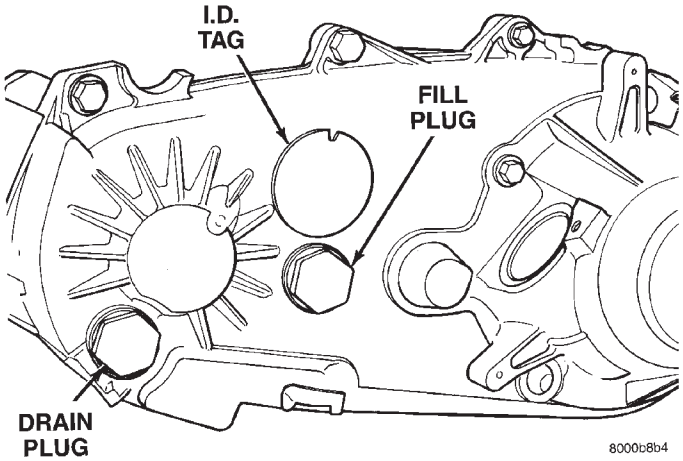



*Fig. 2 Transfer Case I.D. Tag*

## DIAGNOSIS AND TESTING

### NV249 DIAGNOSIS

| Condition | Possible Cause | Correction |
|---|---|---|
| **TRANSFER CASE DIFFICULT TO SHIFT OR WILL NOT SHIFT INTO DESIRED RANGE** | (a) Vehicle speed too great to permit shifting. | (a) Stop vehicle and shift into desired range. Or reduce speed to 3-4 km/h (2-3 mph) before attempting to shift. |
| | (b) If vehicle was operated for extended period in 4H mode on dry paved surface, driveline torque load may cause difficulty. | (b) Stop vehicle, shift transmission to neutral, shift transfer case to 2H mode and operate vehicle on 2H on dry paved surface. |
| | (c) Transfer case external shift linkage binding. | (c) Lubricate, repair or replace linkage, or tighten loose components as necessary. |
| | (d) Insufficient or incorrect lubricant. | (d) Drain and refill to edge of fill hole with MOPAR ATF PLUS (Type 7176) or DEXRON II Automatic Transmission Fluid. |
| | (e) Internal components binding, worn or damaged. | (e) Disassemble unit and replace worn or damaged components as necessary. |
| **TRANSFER CASE NOISY IN ALL DRIVE MODES** | (a) Insufficient or incorrect lubricant. | (a) Drain and refill to edge of fill hole with MOPAR ATF PLUS (Type 7176) or DEXRON II Automatic Transmission Fluid. Check for leaks and repair if necessary. **If unit is still noisy after drain and refill, disassembly and inspection may be required to locate source of noise.** |
| **NOISY IN-OR JUMPS OUT OF FOUR-WHEEL-DRIVE LOW RANGE** | (a) Transfer case not completely engaged in 4L position. | (a) Stop vehicle, shift transfer case to Neutral, then shift back into 4L position. |
| | (b) Shift linkage loose or binding. | (b) Tighten, lubricate, or repair linkage as necessary. |
| | (c) Range fork cracked, inserts worn, or fork is binding on shift rail. | (c) Disassemble unit and repair as necessary. |
| | (d) Annulus gear or lockplate worn or damaged. | (d) Disassemble unit and repair as necessary. |
| **LUBRICANT LEAKING FROM OUTPUT SHAFT SEALS OR FROM VENT** | (a) Transfer case overfilled. | (a) Drain to correct level. |
| | (b) Vent closed or restricted. | (b) Clear or replace vent if necessary. |
| | (c) Output shaft seals damaged or installed correctly. | (c) Replace seals. Be sure seal lip faces interior of case when installed. Also be sure yoke seal surfaces are not scored or nicked. Remove scores and nicks with fine sandpaper or replace yoke(s) if necessary. |
| **ABNORMAL TIRE WEAR** | (a) Extended operation on dry hard surface (paved) roads in 4H range. | (a) Operate in 2H on hard surface (paved) roads. |

## 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, or skid plate.
(7) Disconnect front/rear propeller shafts at transfer case.
(8) Disconnect vehicle speed sensor wires.
(9) Disconnect transfer case linkage rod from range lever.
(10) Disconnect transfer case vent hose (Fig. 3) and indicator switch harness, if necessary.
(11) Support transfer case with transmission jack.
(12) Secure transfer case to jack with chains.
(13) Remove nuts attaching transfer case to transmission.
(14) Pull transfer case and jack rearward to disengage transfer case.
(15) Remove transfer case from under vehicle.

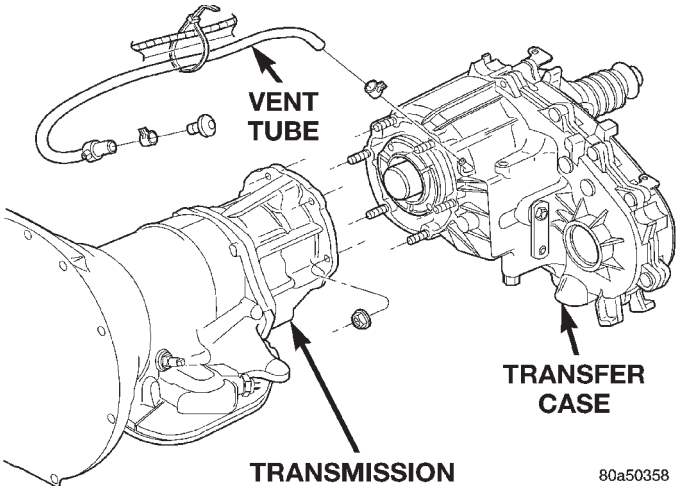



***Fig. 3 Transfer Case Mounting***

*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 vehicle speed sensor wires, and 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, or skid plate. 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.

REMOVAL AND INSTALLATION (Continued)

## SHIFT LEVER

*REMOVAL*

(1) Shift transfer case into 4L.
(2) Raise vehicle.
(3) Loosen adjusting trunnion locknut and slide shift rod out of trunnion (Fig. 4). If rod lacks enough travel to come out of trunnion, push trunnion out of torque shaft.
(4) Lower vehicle.
(5) Remove console. Refer to Group 23, Body, for proper procedures.
(6) Remove screws attaching lever assembly to floorpan and remove assembly and shift rod (if left attached).

*INSTALLATION*

(1) If shift rod was not removed from lever assembly, work rod down through floorpan opening. Then position lever assembly on floorpan and install assembly attaching screws.
(2) Install console. Refer to Group 23, Body, for proper procedures.
(3) Raise vehicle.
(4) Connect trunnion to torque shaft arm. Or, slide shift rod into trunnion on range lever. Be sure shift rod slides freely in trunnion.
(5) Verify that range lever is in 4L position. Then tighten trunnion lock bolt.
(6) Lower vehicle and check transfer case shift operation.

## SPEEDOMETER

*REMOVAL*

(1) Raise vehicle.
(2) Disconnect wires from vehicle speed sensor.
(3) Remove adapter clamp and screw (Fig. 5).
(4) Remove speed sensor and speedometer adapter as an assembly.
(5) Remove speed sensor retaining screw and remove sensor from adapter.
(6) Remove speedometer pinion from adapter. Replace pinion if chipped, cracked, or worn.
(7) Inspect sensor and adapter O-rings (Fig. 5). Remove and discard O-rings if worn or damaged.
(8) Inspect terminal pins in speed sensor. Clean pins with Mopar® electrical spray cleaner if dirty or oxidized. Replace sensor if faulty, or if pins are loose, severely corroded, or damaged.

| TORQUE | |
|---|---|
| A | 3-4 N•m (27-35 in. lbs.) |
| B | 11-14 N•m (97-123 in. lbs.) |
| C | 8-14 N•m (72-120 in. lbs.) |

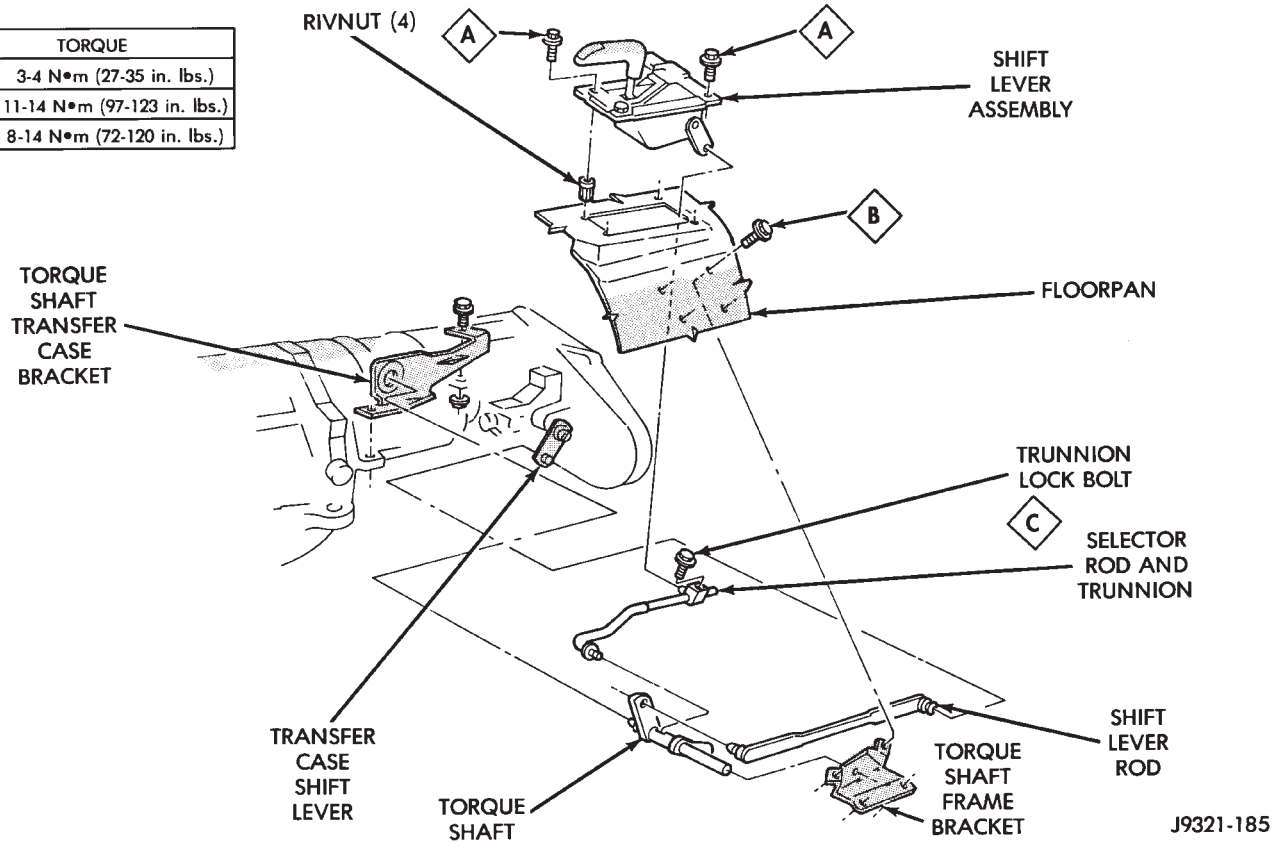
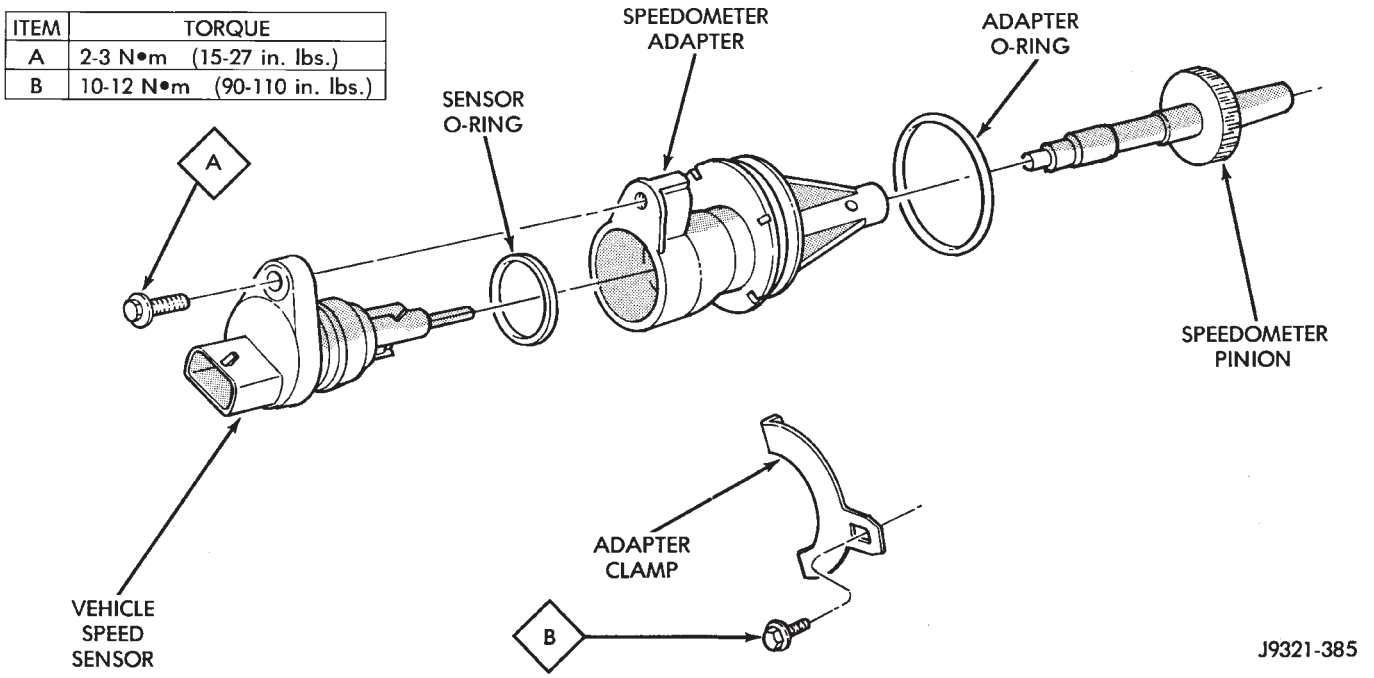



*Fig. 4 Shift Linkage*

REMOVAL AND INSTALLATION (Continued)




| ITEM | TORQUE |
|---|---|
| A | 2-3 N·m (15-27 in. lbs.) |
| B | 10-12 N·m (90-110 in. lbs.) |

***Fig. 5 Speedometer Components***

*INSTALLATION AND INDEXING*

(1) Thoroughly clean adapter flange and adapter mounting surface in housing. Surfaces must be clean for proper adapter alignment and speedometer operation.

(2) Install new O-rings on speed sensor and speedometer adapter (Fig. 5), if necessary.

(3) Lubricate sensor and adapter O-rings with transmission fluid.

(4) Install vehicle speed sensor in speedometer adapter. Tighten sensor attaching screw to 2-3 N·m (15-27 in. lbs.) torque.

(5) Install speedometer pinion in adapter.

(6) Count number of teeth on speedometer pinion. Do this before installing assembly in housing. Then lubricate pinion teeth with transmission fluid.

(7) Note index numbers on adapter body (Fig. 6). These numbers will correspond to number of teeth on pinion.

(8) Install speedometer assembly in housing.

(9) Rotate adapter until required range numbers are at 6 o-clock position. Be sure range index numbers correspond to number of teeth on pinion gear.

(10) Install speedometer adapter clamp and retaining screw. Tighten clamp screw to 10-12 N·m (90-110 in. lbs.) torque.

(11) Connect wires to vehicle speed sensor.

(12) Lower vehicle and top off transmission fluid level if necessary.

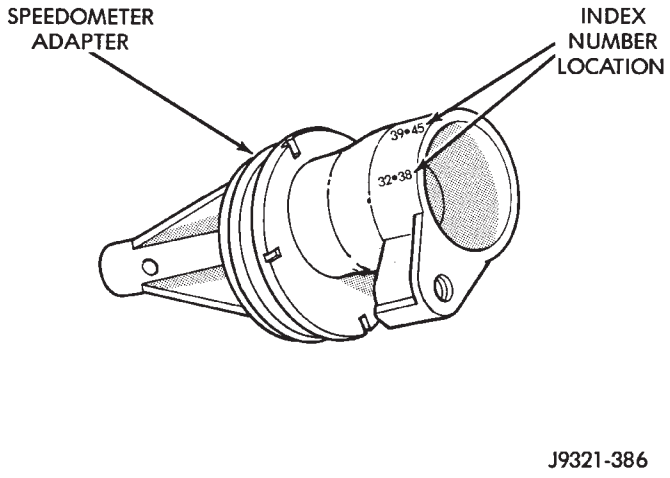



***Fig. 6 Location Of Index Numbers On SpeedometerAdapter***

REMOVAL AND INSTALLATION (Continued)

## 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. 7).

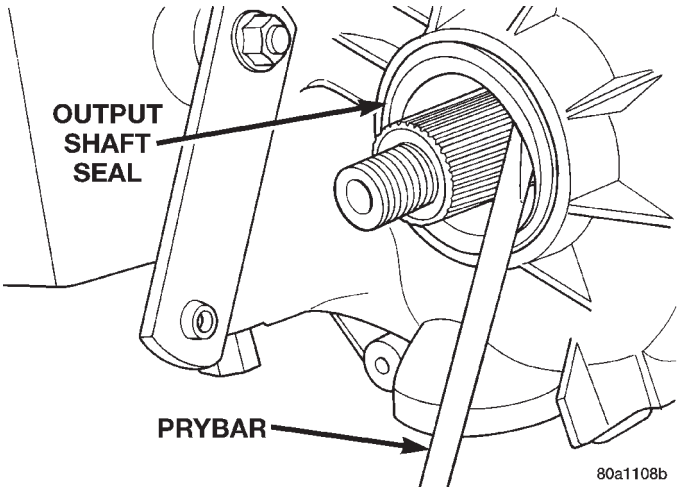



***Fig. 7 Remove Front Output Shaft Seal***

*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. 8). Once seal is started, continue tapping seal into bore until installer tool seats against case.

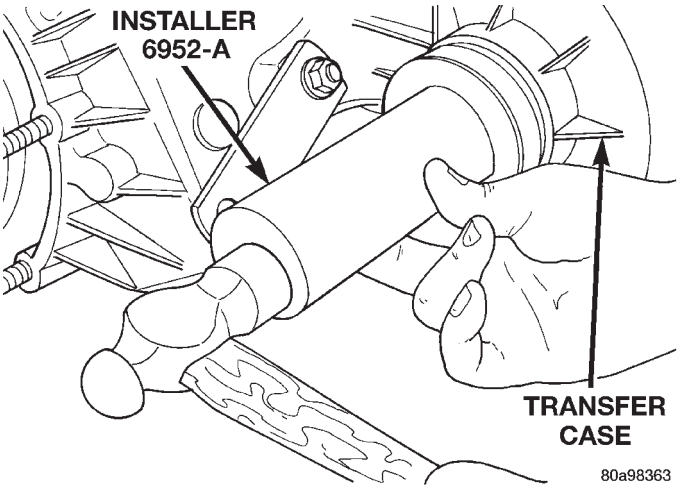



***Fig. 8 Front Output Seal Installation***

## 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. 9).

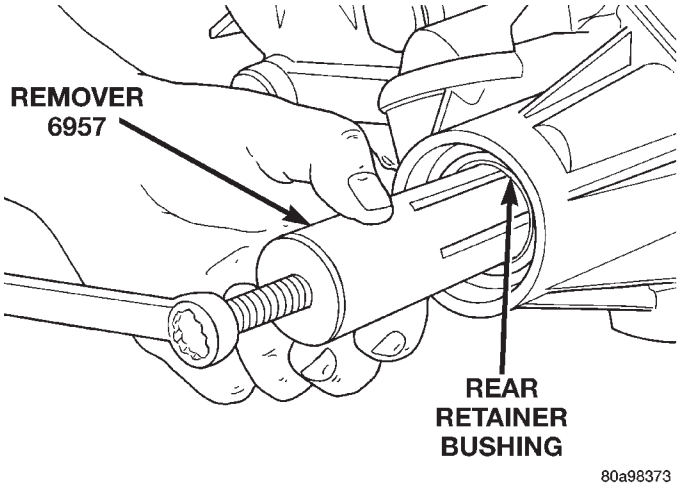



***Fig. 9 Rear Retainer Bushing Removal***

*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 8145, drive bushing into retainer until installer seats against case (Fig. 10).

(4) Using Installer C-3995-A, install seal in rear retainer (Fig. 11).

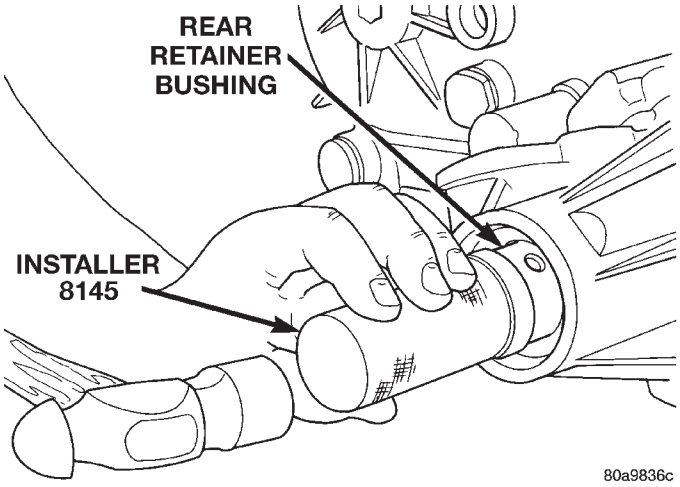



***Fig. 10 Rear Retainer Bushing Install***

(5) Install propeller shaft.

(6) Verify proper fluid level.

(7) Lower vehicle.

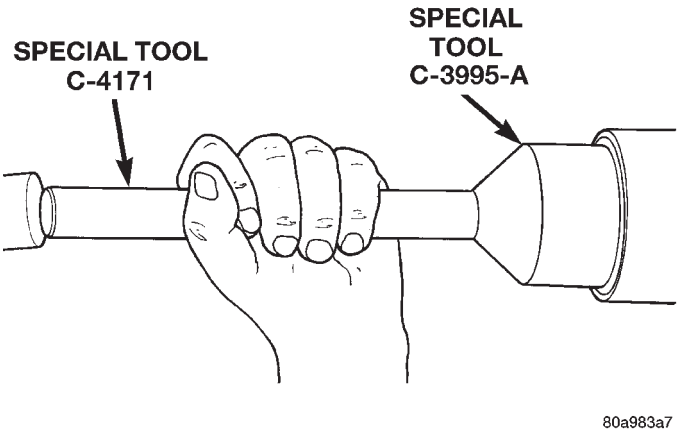



*Fig. 11 Install Rear Retainer Seal*

## DISASSEMBLY AND ASSEMBLY

### NV249 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 the speedometer adapter.

(2) Remove rear retainer bolts (Fig. 12).

(3) Remove rear bearing locating ring access cover screws, cover and gasket (Fig. 13).

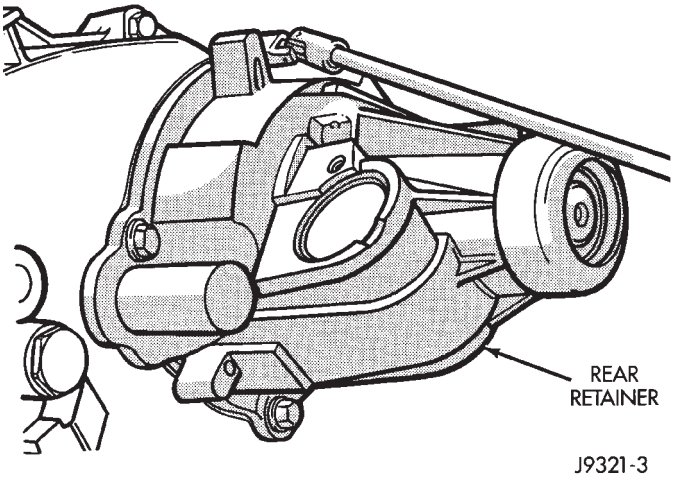



*Fig. 12 Rear Retainer Bolt Removal*

(4) Loosen rear retainer with pry tool to break sealer bead. Pry only against retainer boss as shown (Fig. 14).

(5) Remove rear retainer as follows:

(a) Spread rear bearing locating ring with snap ring pliers (Fig. 15).

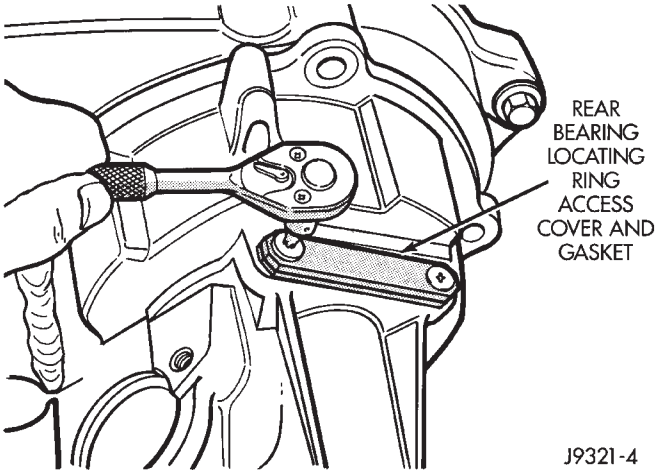



*Fig. 13 Locating Ring Access Cover And GasketRemoval*

(b) Then slide retainer off mainshaft and rear bearing (Fig. 16).

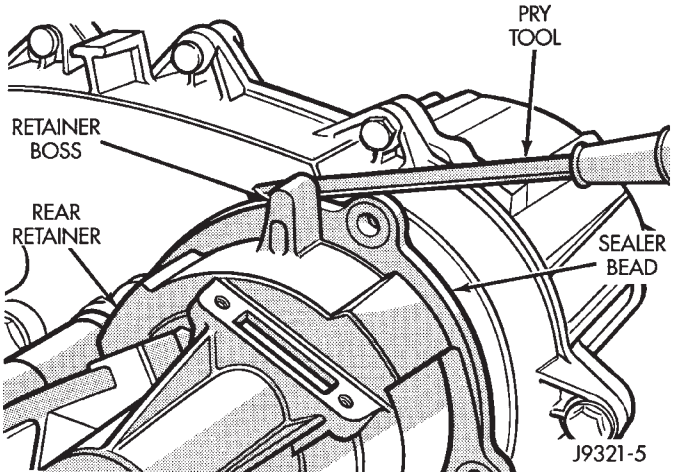



*Fig. 14 Loosening Rear Retainer*

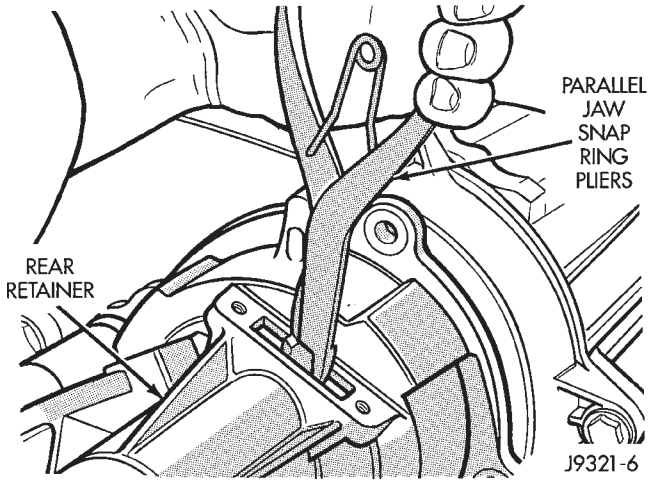



*Fig. 15 Disengaging Rear Bearing LocatingRing*

(6) Remove speedometer drive gear (Fig. 17).

DISASSEMBLY AND ASSEMBLY (Continued)

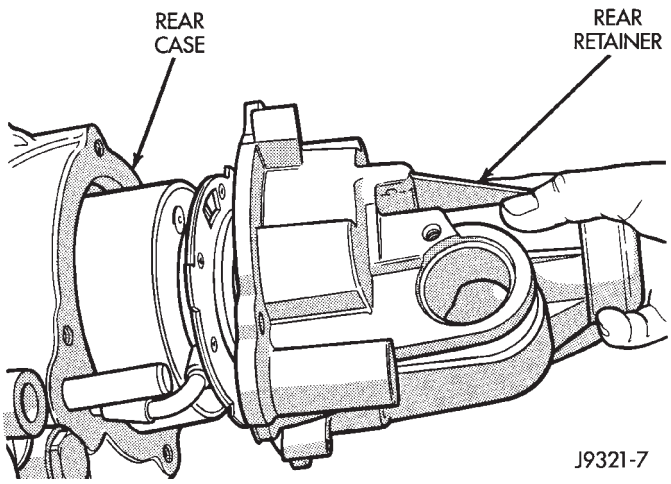



*Fig. 16 Rear Retainer Removal*

(7) Remove rear bearing snap-ring.

(8) Remove rear bearing. Note position of bearing locating ring groove for assembly reference.

(9) Disengage oil pickup tube from oil pump and remove oil pump assembly (Fig. 18).

(10) Remove pick-up tube o-ring from oil pump (Fig. 19), if necessary. Do not disassemble the oil pump, it is not serviceable.

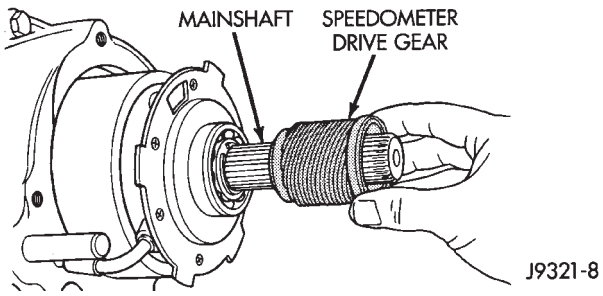



*Fig. 17 Speedometer Drive Gear Removal*

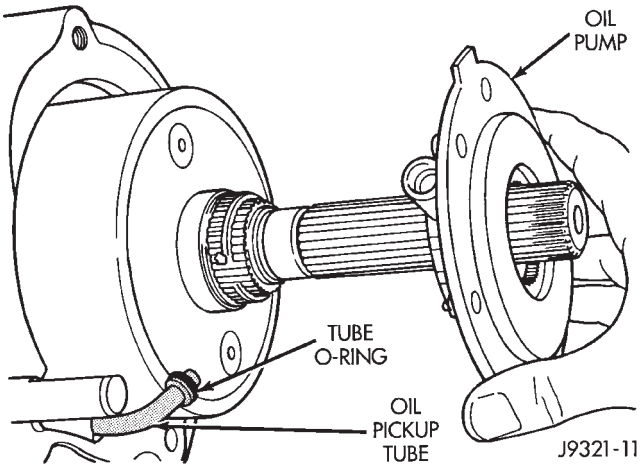



*Fig. 18 Rear Bearing and Oil Pump Removal*

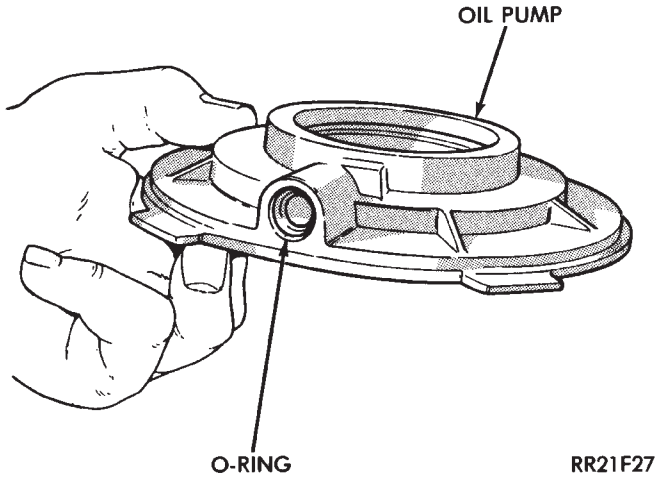



*Fig. 19 Pick-up Tube O-ring Location*

**VISCOUS COUPLER REMOVAL**

(1) Remove oil pump locating snap-ring and viscous coupling snap-ring from mainshaft (Fig. 20).

(2) Remove viscous coupling from mainshaft (Fig. 20).

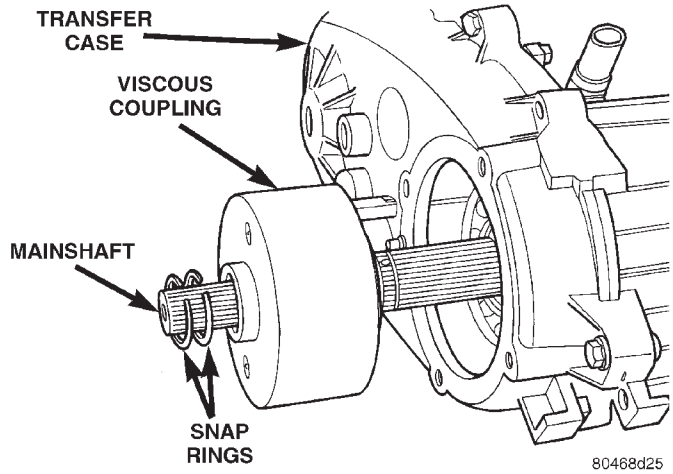



*Fig. 20 Viscous Coupling Removal*

**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) Remove nut with socket and impact wrench (Fig. 21).

(3) Remove yoke. If yoke is difficult to remove by hand, remove it with bearing splitter, or with standard two jaw puller (Fig. 22). Be sure puller tool is positioned on yoke and not on slinger as slinger will be damaged.

DISASSEMBLY AND ASSEMBLY (Continued)

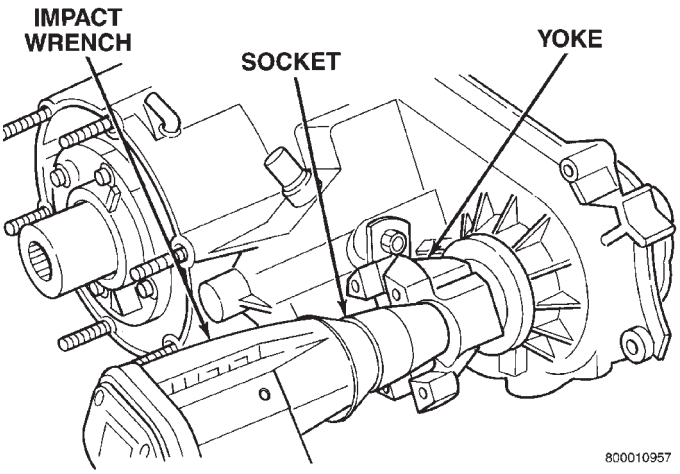



*Fig. 21 Yoke Nut Removal*

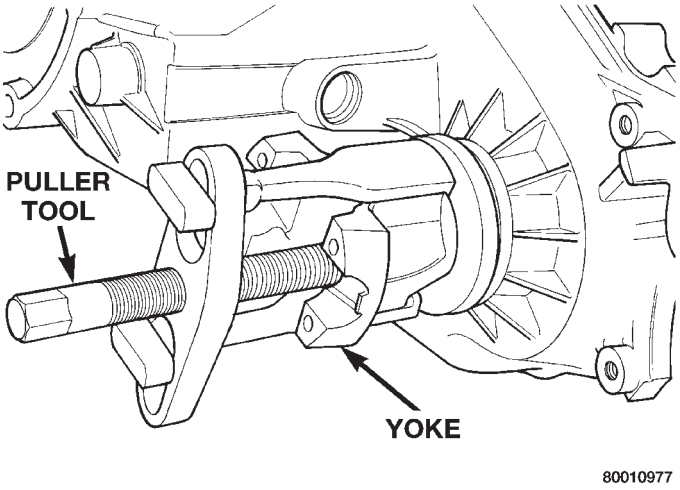



*Fig. 22 Yoke Removal*

(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. 23).

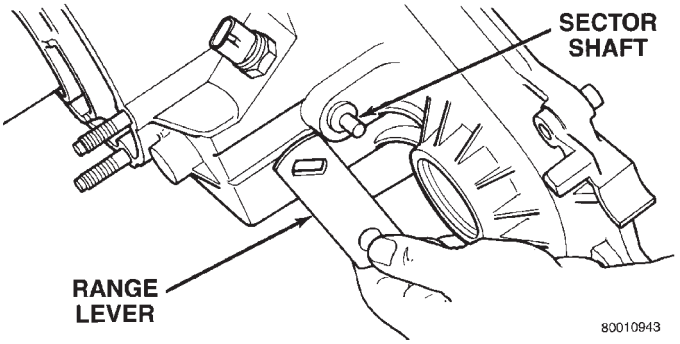



*Fig. 23 Range Lever Removal*

**FRONT OUTPUT SHAFT AND DRIVE CHAIN REMOVAL**

(1) Support transfer case so rear case is facing upward.

(2) Remove bolts holding front case to rear case. The case alignment bolt require flat washers (Fig. 24).

(3) Loosen rear case with flat blade screwdriver to break sealer bead. Insert screwdriver blade only into notches provided at each end of case (Fig. 25).

(4) Remove rear case (Fig. 26).

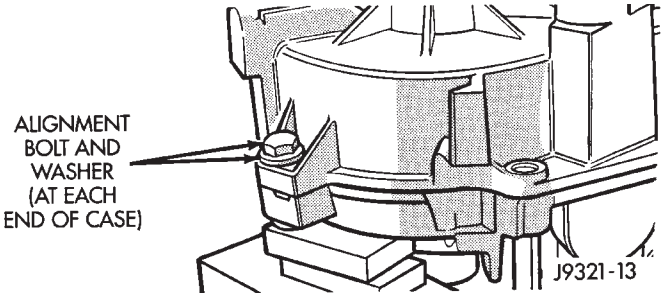



*Fig. 24 Rear Case Alignment Bolt Locations*

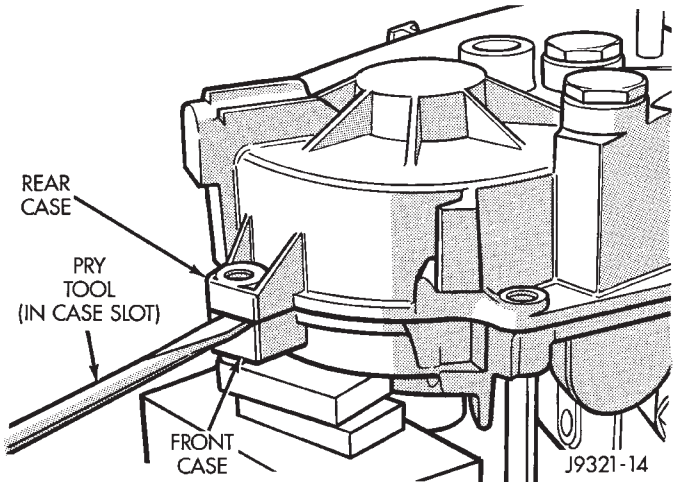



*Fig. 25 Loosening Rear Case*

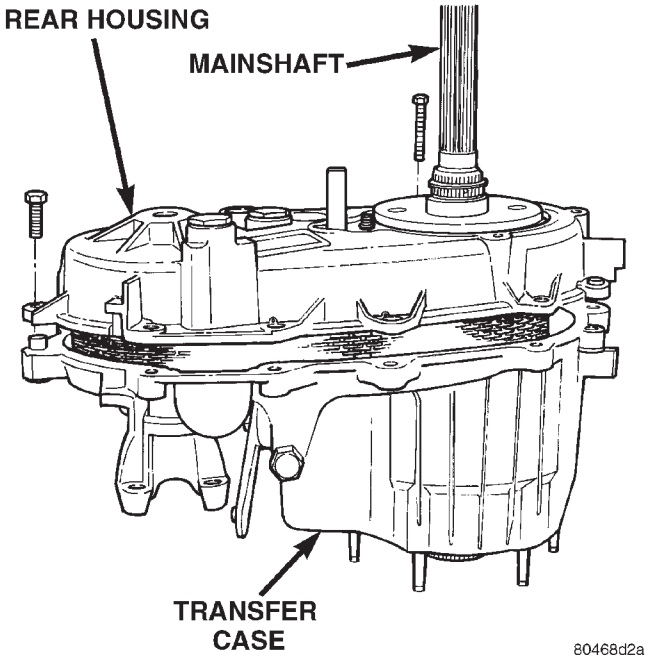



*Fig. 26 Rear Case Removal*

DISASSEMBLY AND ASSEMBLY (Continued)

(5) Remove oil pickup tube from rear case (Fig. 27).

(6) Remove drive gear snap-ring (Fig. 28).

(7) Disengage drive gear (Fig. 28). Pry gear upward and off mainshaft as shown.

(8) Remove front output shaft, drive chain and drive gear as assembly (Fig. 28).

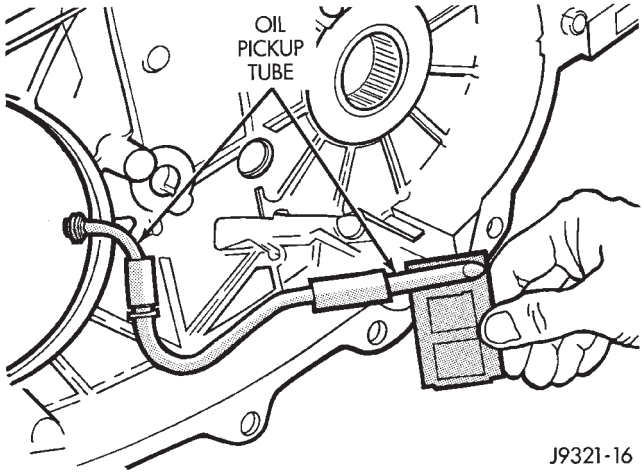



*Fig. 27 Oil Pickup Tube Removal*

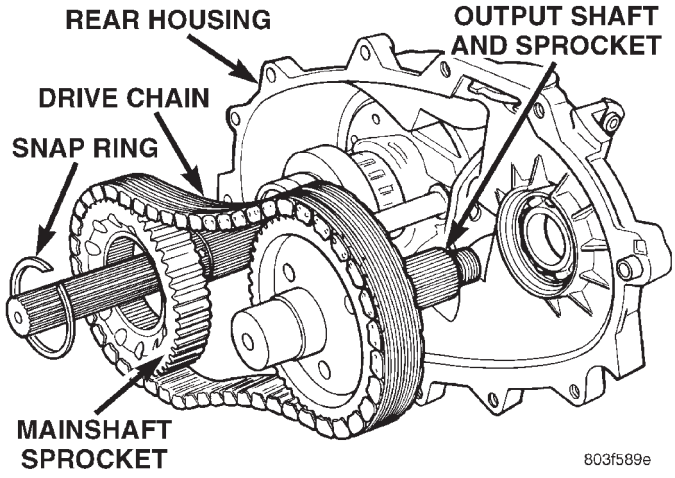



*Fig. 28 Front Output Shaft, Drive Gear AndChain Removal*

**SHIFT FORKS AND MAINSHAFT REMOVAL**

(1) Remove detent plug, O-ring, detent spring and detent plunger (Fig. 29).

(2) Remove mainshaft from clutch sleeve and input gear pilot bearing.

(3) Rotate shift sector so sector teeth face upward (Fig. 30).

(4) Remove range fork, rail and clutch sleeve as assembly (Fig. 31). Lift shift rail upward, rotate fork out of shift sector and remove assembly.

(5) Remove shift sector. Rotate and tilt sector as needed to remove it (Fig. 32).

(6) Remove shift sector bushing and O-ring (Fig. 33).

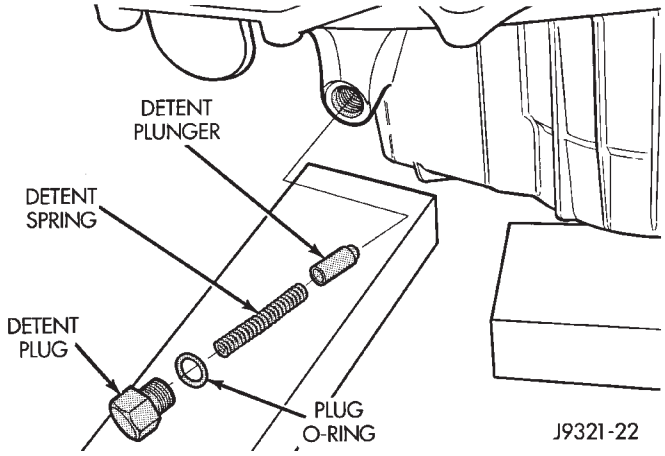



*Fig. 29 Detent Plug, Spring And Plunger Removal*

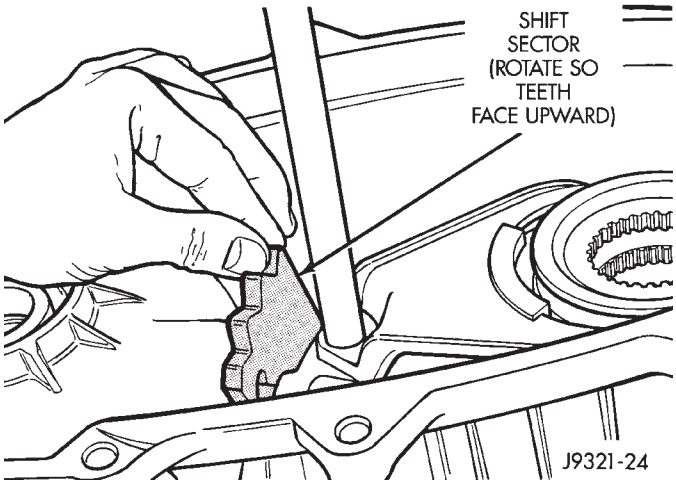



*Fig. 30 Rotating Shift Sector*

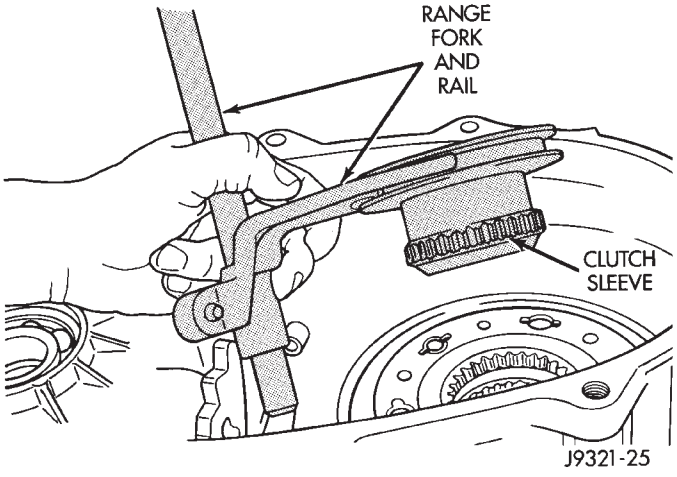



*Fig. 31 Range Fork And Clutch Sleeve Removal*

DISASSEMBLY AND ASSEMBLY (Continued)

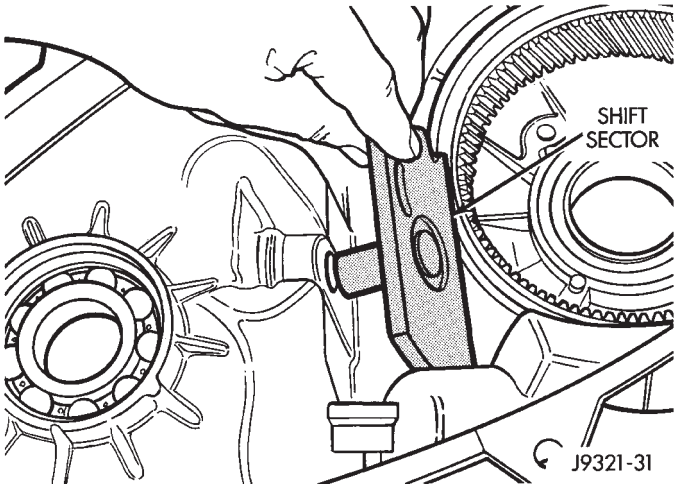



*Fig. 32 Shift Sector Removal*

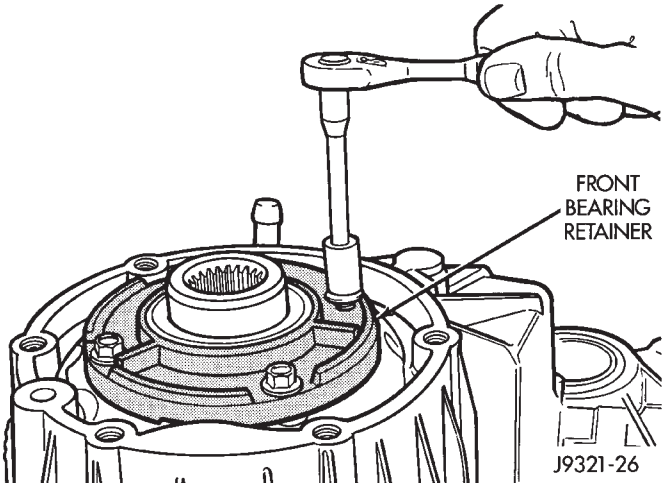



*Fig. 34 Front Bearing Retainer Bolt Removal*

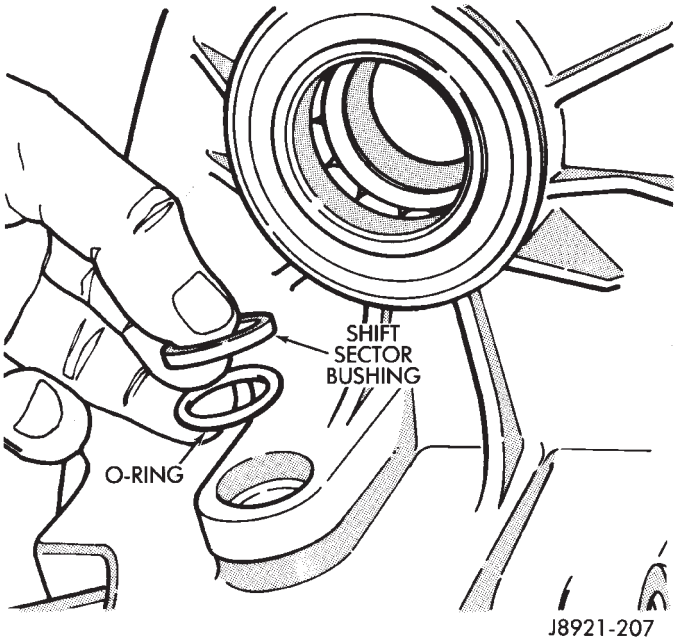



*Fig. 33 Sector Bushing And O-Ring Removal*

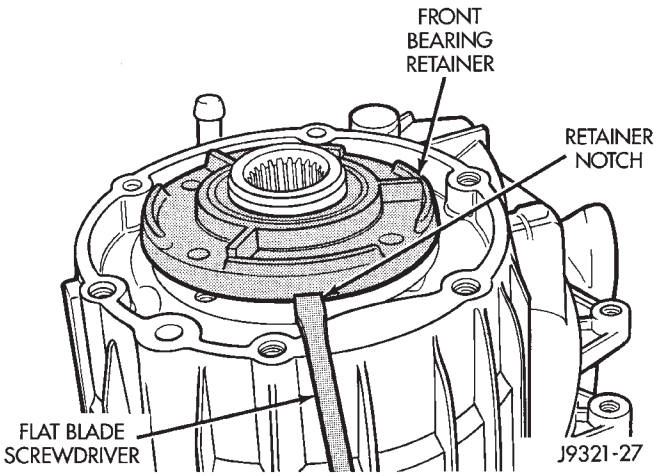



*Fig. 35 Front Bearing Retainer Removal*

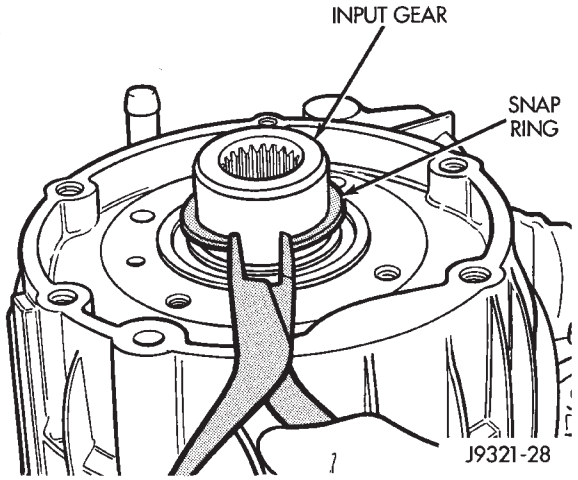



*Fig. 36 Input Gear Snap-Ring Removal*

**INPUT GEAR/LOW RANGE ASSEMBLY REMOVAL**

(1) Turn front case on side so front bearing retainer is accessible.

(2) Remove front bearing retainer bolts (Fig. 34).

(3) Remove front bearing retainer as follows:

(a) Loosen retainer with flat blade screwdriver to break sealer bead. **To avoid damaging case and retainer, position screwdriver blade only in slots provided in retainer (Fig. 35).**

(b) Then remove retainer from case and gear.

(4) Remove snap-ring that retains input gear shaft in front bearing (Fig. 36).

(5) Remove input and low range gear assembly (Fig. 37).

(6) Remove oil seals from following components:

- front bearing retainer.
- rear retainer.
- case halves.

DISASSEMBLY AND ASSEMBLY (Continued)

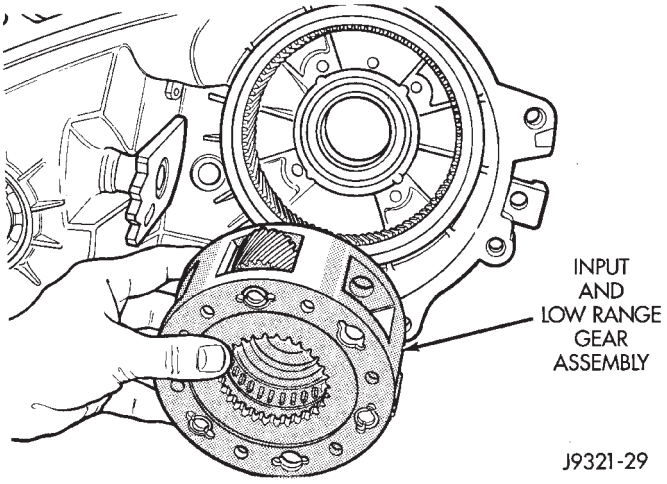



***Fig. 37 Input And Low Range Gear AssemblyRemoval***

**INPUT AND LOW RANGE GEAR DISASSEMBLY**

(1) Remove snap-ring that retains input gear in low range gear (Fig. 38).
(2) Remove retainer (Fig. 39).
(3) Remove front tabbed thrust washer (Fig. 40).
(4) Remove input gear (Fig. 41).
(5) Remove rear tabbed thrust washer from low range gear (Fig. 42).

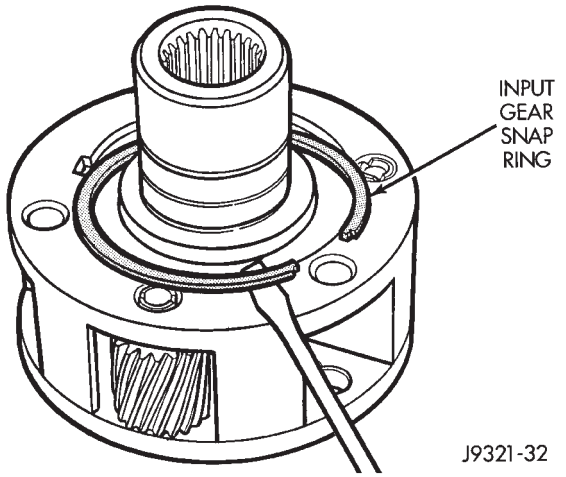



***Fig. 38 Input Gear Snap-Ring Removal***

*ASSEMBLY*

Lubricate transfer case components with Mopar® Dexron II 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.**

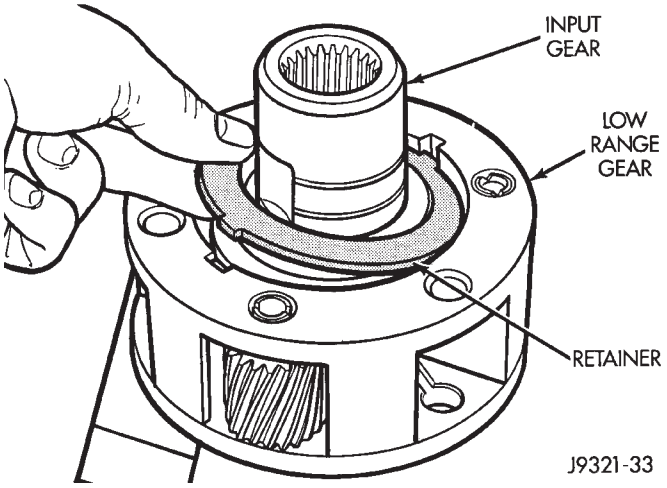



***Fig. 39 Input Gear Retainer Removal***

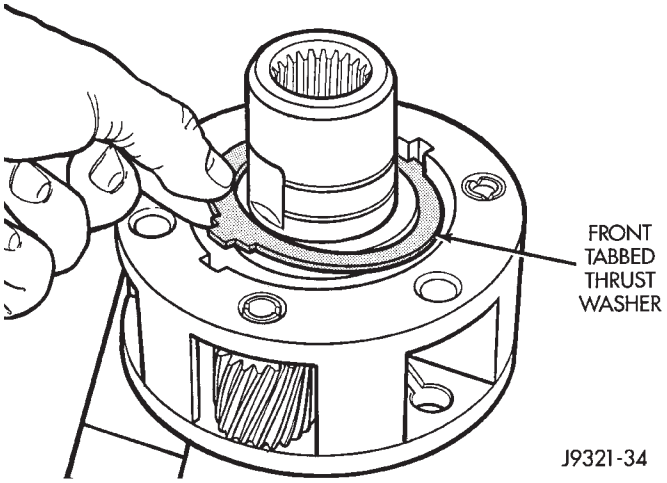



***Fig. 40 Front Tabbed Thrust Washer Removal***

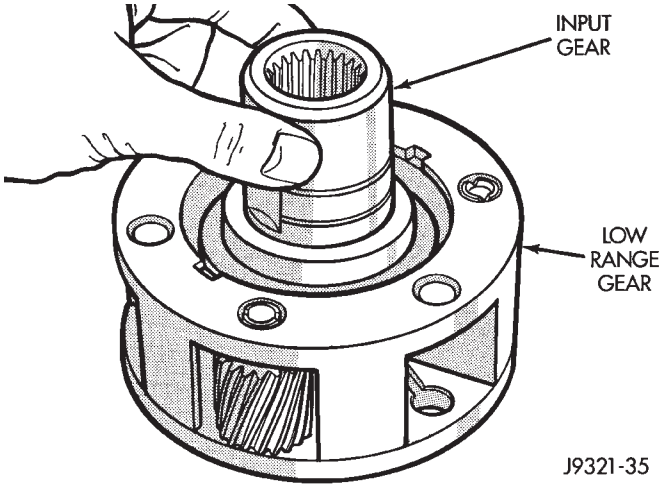



***Fig. 41 Input Gear Removal***

DISASSEMBLY AND ASSEMBLY (Continued)

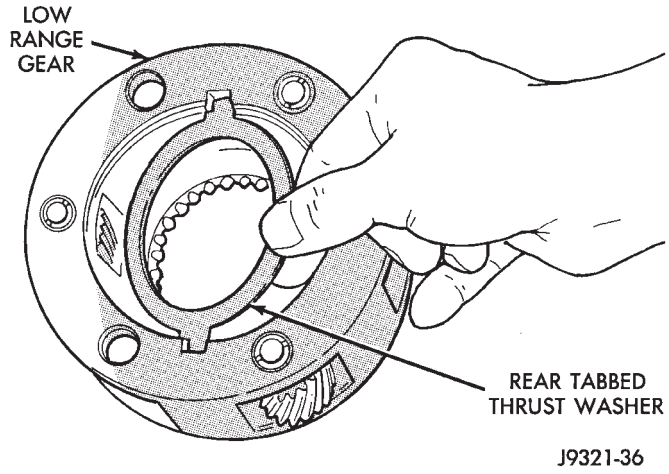



*Fig. 42 Rear Tabbed Thrust Washer Removal*

**BEARING AND SEAL INSTALLATION**

(1) Remove front output shaft seal from front case with pry tool (Fig. 43).

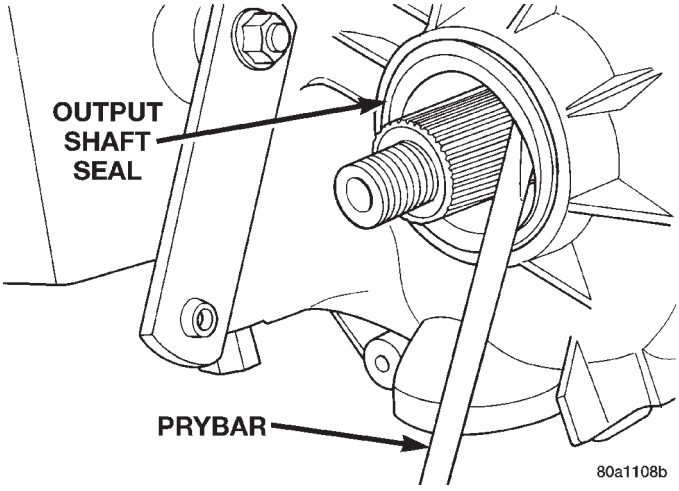



*Fig. 43 Remove Front Output Shaft Seal*

(2) Remove snap-ring that retains front output shaft bearing in front case (Fig. 44).

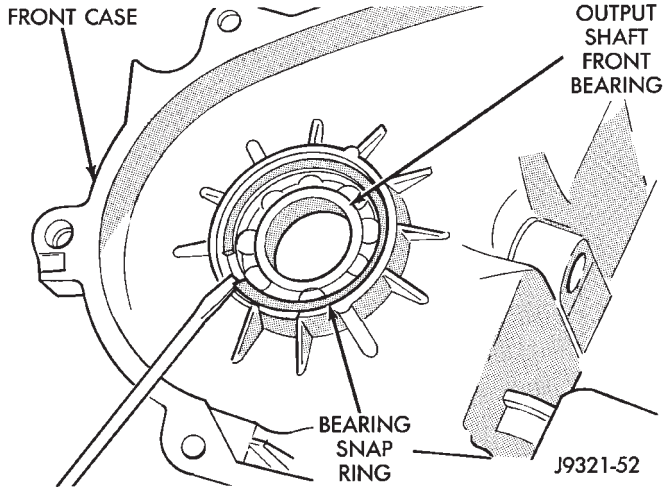



*Fig. 44 Output Shaft Front Bearing Snap-RingRemoval*

(3) Using tool 6953, remove bearing from front case (Fig. 45).

(4) Using tool 6953, install new bearing.

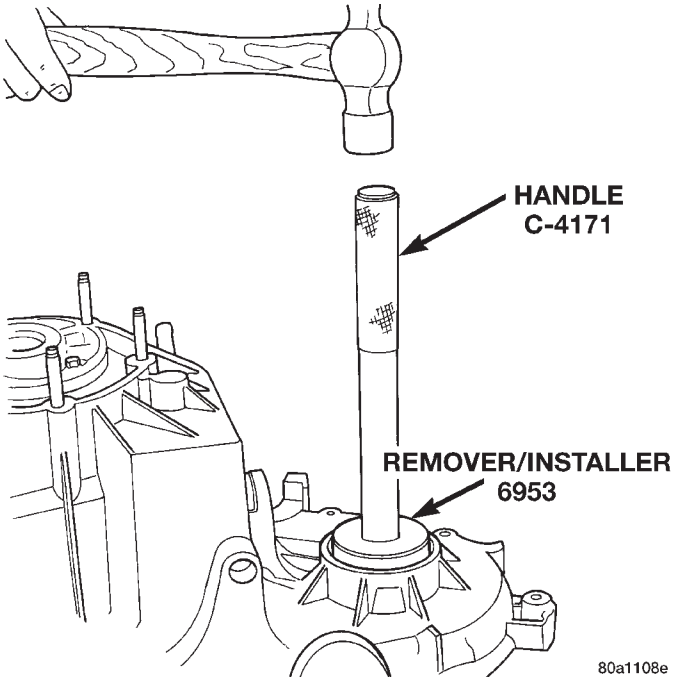



*Fig. 45 Remove Output Shaft Front Bearing*

(5) Install snap-ring to hold bearing into case.

(6) 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. 46). Once seal is started, continue tapping seal into bore until installer tool bottoms against case.

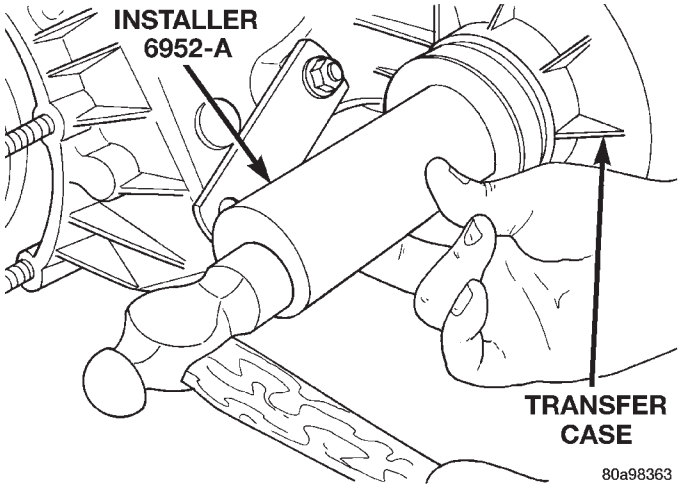



*Fig. 46 Front Output Seal Installation*

(7) Remove the output shaft rear bearing with the screw and jaws from Remover L-4454 and Cup 8148 (Fig. 47).

DISASSEMBLY AND ASSEMBLY (Continued)

(8) Install new bearing with Tool Handle C-4171 and Installer 5066 (Fig. 48). **The bearing bore is chamfered at the top. Install the bearing so it is flush with the lower edge of this chamfer (Fig. 49).**

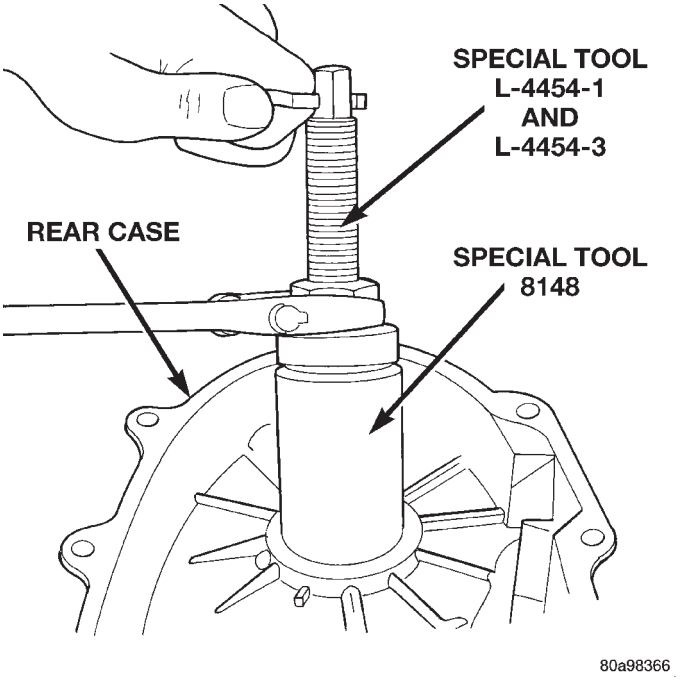



*Fig. 47 Output Shaft Rear Bearing Removal*

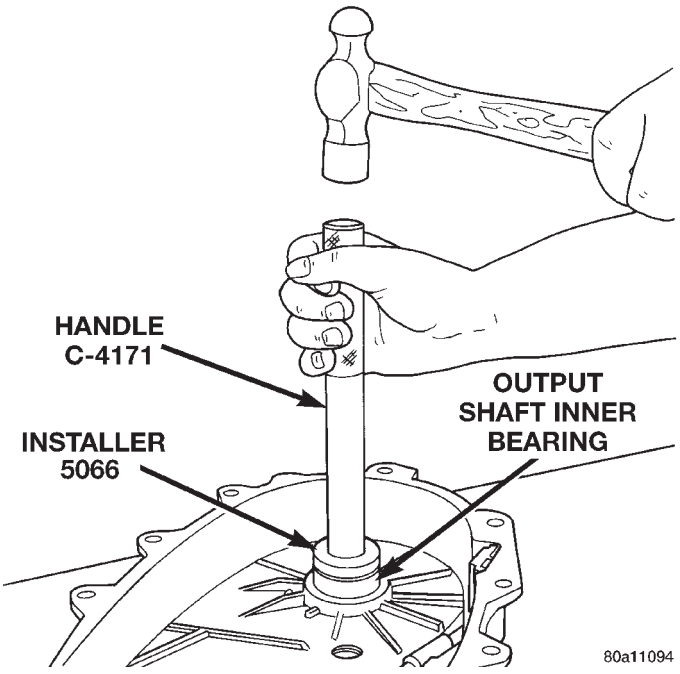



*Fig. 48 Output Shaft Rear Bearing Installation*

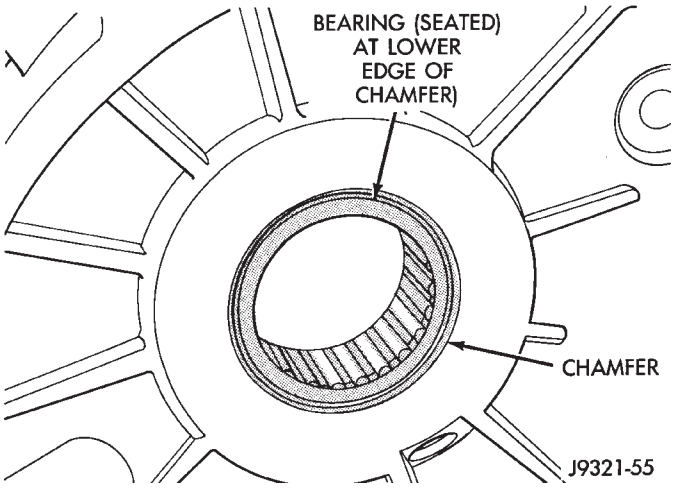



*Fig. 49 Output Shaft Rear Bearing InstallationDepth*

(9) Using Remover C-4210 and Handle C-4171, drive input shaft bearing from inside the annulus gear opening in the case. (Fig. 50).

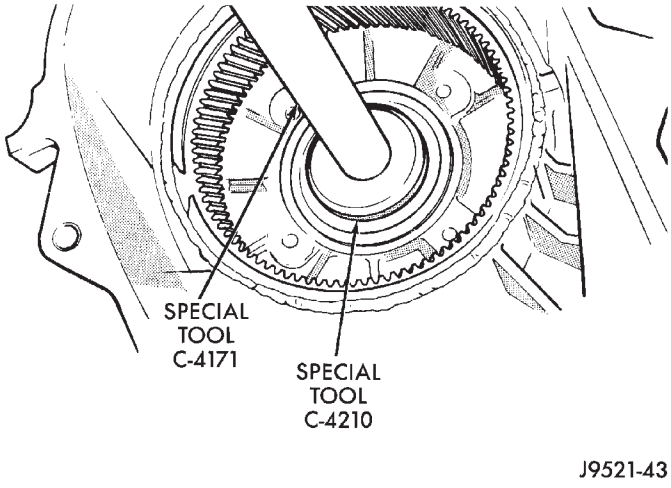



*Fig. 50 Input Shaft Bearing Removal*

(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 locating ring must be fully seated against case surface (Fig. 51).

DISASSEMBLY AND ASSEMBLY (Continued)

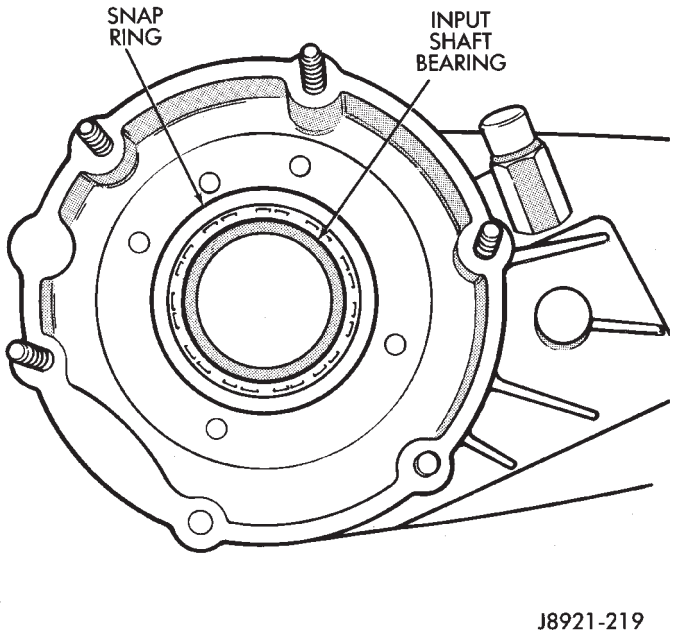



*Fig. 51 Seating Input Shaft Bearing*

(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. 52).

(14) Install new pilot bearing with Installer 8128 and Handle C-4171 (Fig. 53).

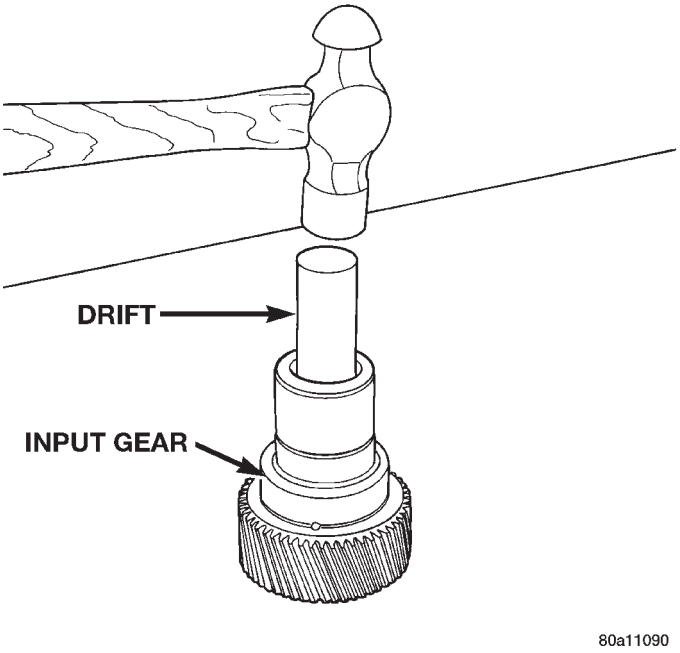



*Fig. 52 Remove Input Gear Pilot Bearing*

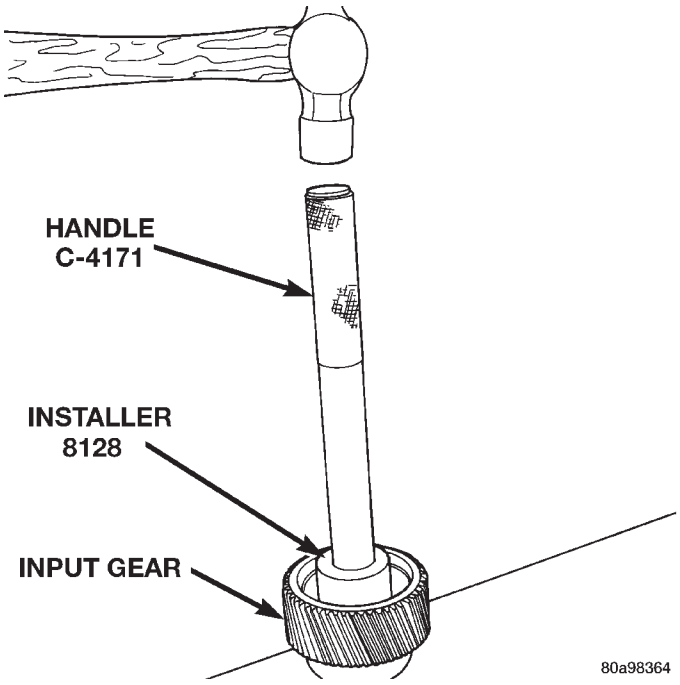



*Fig. 53 Install Input Gear Pilot Bearing*

(15) Remove front bearing retainer seal with suitable pry tool.

(16) Install new front bearing retainer with Installer 7884 (Fig. 54).

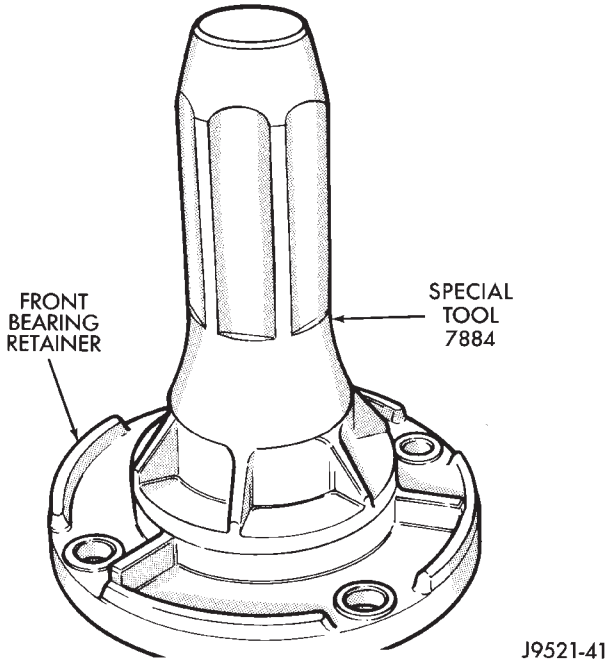



*Fig. 54 Install Front Bearing Retainer Seal*

DISASSEMBLY AND ASSEMBLY (Continued)

**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.

(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.

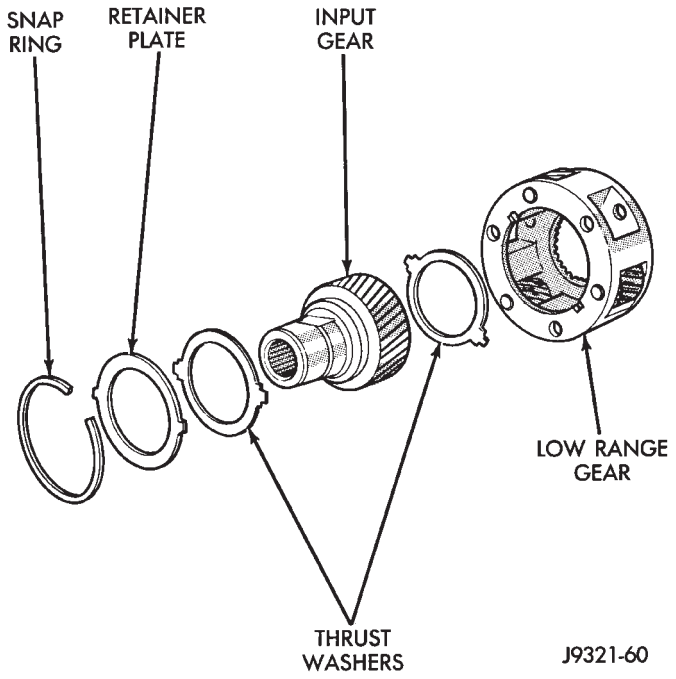



*Fig. 55 Input/Low Range Gear Components*

**INPUT GEAR/LOW RANGE 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.

**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.**

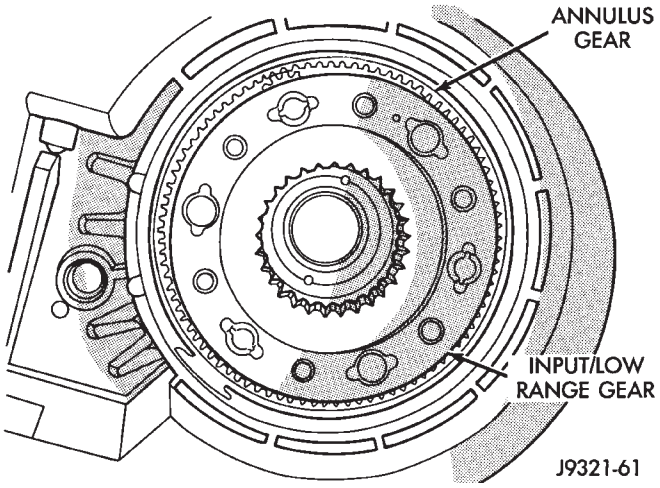



*Fig. 56 Input/Low Range Gear Installation*

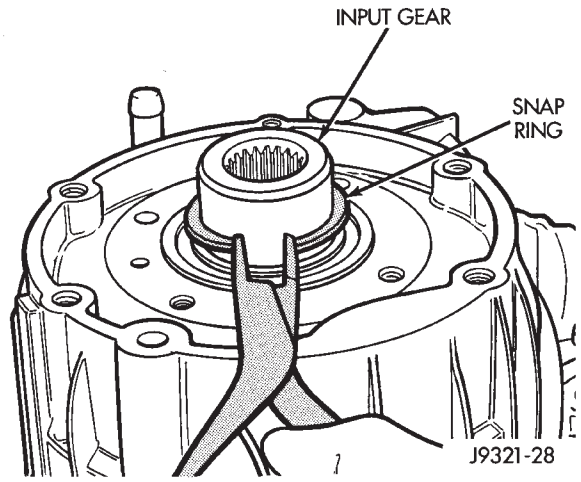



*Fig. 57 Install Snap-Ring*

(6) Install bolts to hold retainer to transfer case (Fig. 58). Tighten to 21 N·m (16 ft. lbs.) of torque.

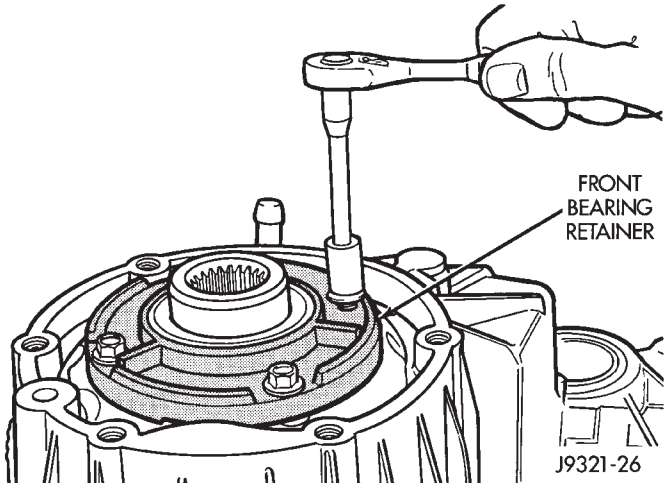



*Fig. 58 Install Front Bearing Retainer*

DISASSEMBLY AND ASSEMBLY (Continued)

**SHIFT FORKS AND MAINSHAFT INSTALLATION**

(1) Install new sector shaft O-ring and bushing (Fig. 59).

(2) Install shift sector (Fig. 60).

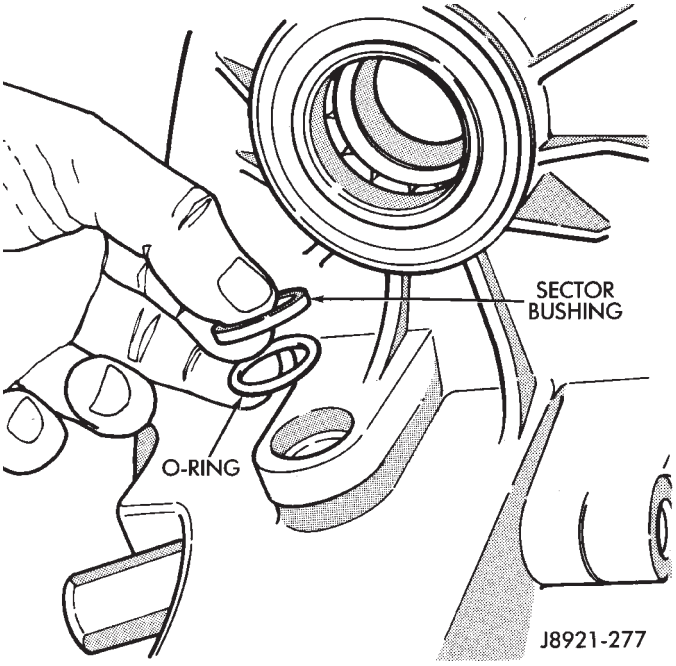



*Fig. 59 Sector O-Ring And Bushing Installation*

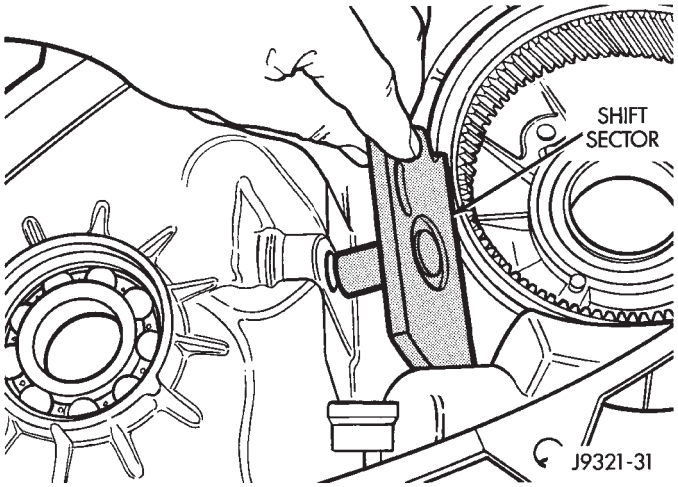



*Fig. 60 Shift Sector Installation*

(3) Install new pads on range fork (Fig. 61), if necessary.

(4) Install clutch sleeve in range fork (Fig. 61).

(5) Install assembled range fork and clutch sleeve (Fig. 62).

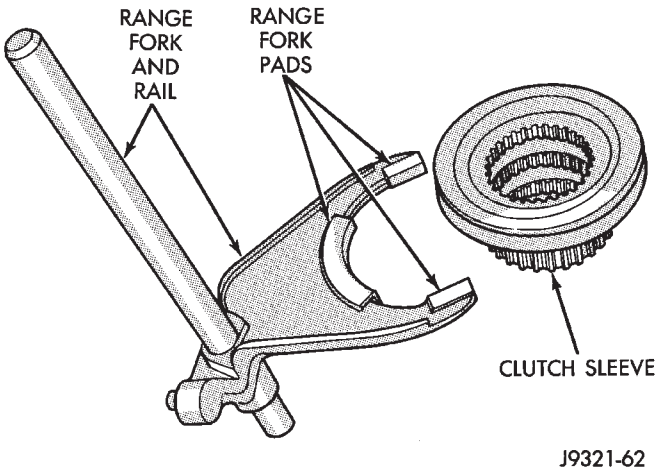



*Fig. 61 Assembling Range Fork And ClutchSleeve*

(6) Insert range fork pin in sector. Then rotate sector and seat clutch gear in low range gear.

(7) Verify that range fork rail is seated in case bushing and that clutch sleeve is properly engaged in low range gear.

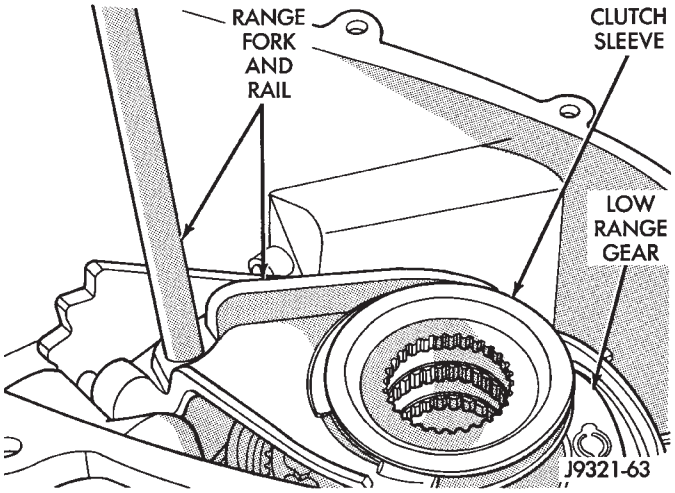



*Fig. 62 Range Fork And Clutch Sleeve Installation*

(8) Rotate sector to Neutral position.

(9) Install new O-ring on detent plug (Fig. 63).

(10) Lubricate detent plunger with transmission fluid or light coat of petroleum jelly.

(11) Install detent plunger, spring and plug (Fig. 63).

(12) Verify that plunger is properly engaged in sector.

(13) Insert mainshaft into input gear pilot bearing.

DISASSEMBLY AND ASSEMBLY (Continued)

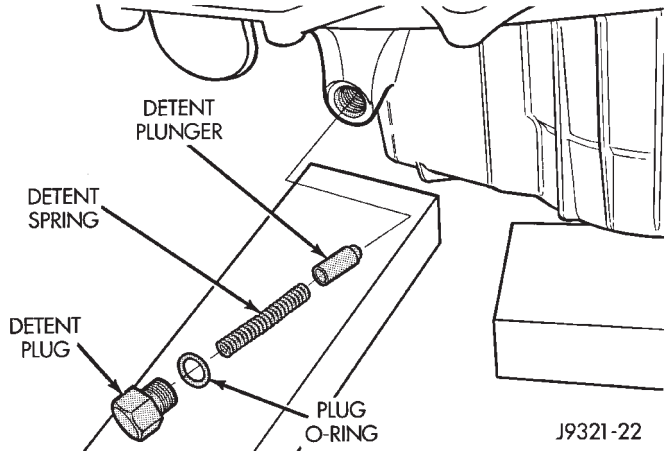



*Fig. 63 Shift Detent Components*

**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, drive sprocket and front output shaft (Fig. 64).

(3) Start drive sprocket on mainshaft.

(4) Guide front shaft into bearing and drive sprocket onto mainshaft drive gear (Fig. 64).

(5) Install drive sprocket snap-ring (Fig. 65).

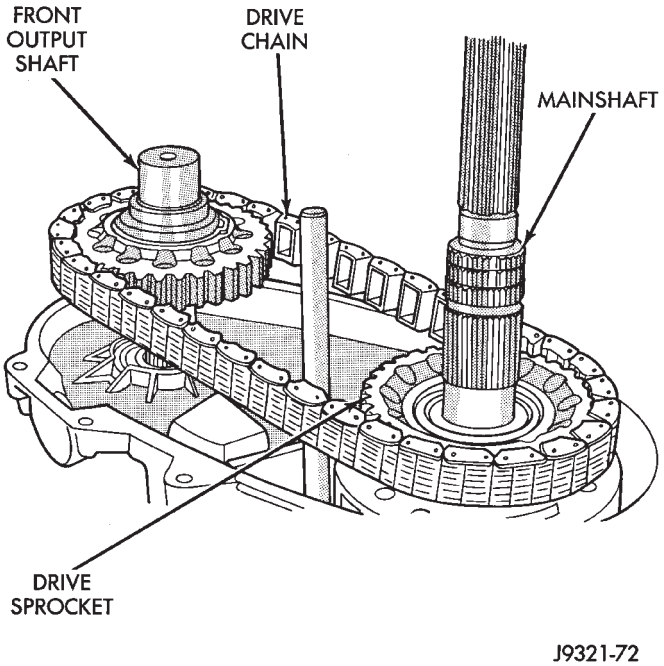



*Fig. 64 Installing Drive Chain, Front OutputShaft And Drive Sprocket*

(6) Clean sealing flanges of front case and rear case with a wax and grease remover.

(7) 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 as shown (Fig. 66).

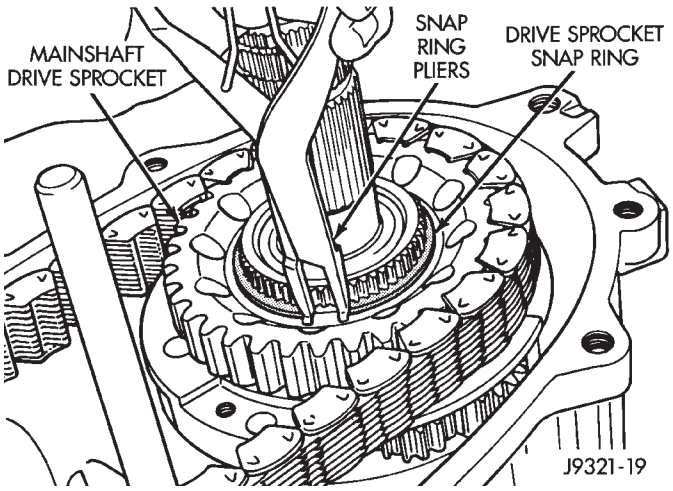



*Fig. 65 Installing Drive Sprocket Snap-Ring*

(8) Install oil pickup tube in rear case. Be sure tube is seated in case notch as shown (Fig. 67).

(9) Install magnet in front case pocket (Fig. 68).

(10) Align and install rear case on front case (Fig. 69).

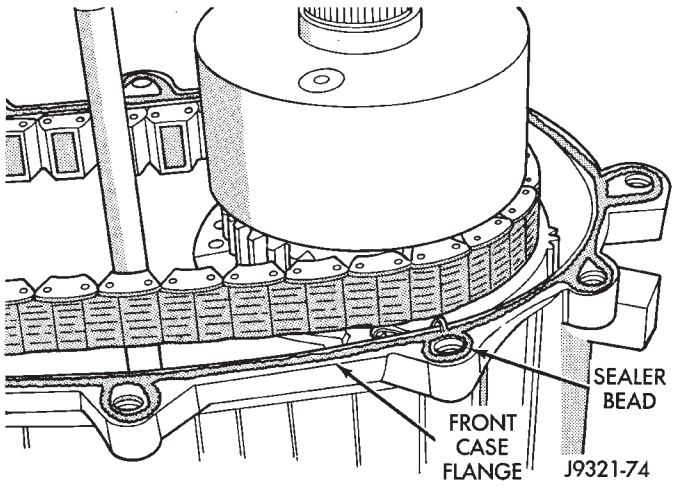



*Fig. 66 Applying Sealer To Front Case Flange*

(11) Verify that oil pickup tube is still seated in case notch and tube end is pointed toward mainshaft (Fig. 70).

(12) Install case attaching bolts. Alignment bolts at each end of case are only ones requiring washers (Fig. 71).

(13) Tighten case bolts to 27-34 N·m (20-25 ft. lbs.) torque.

**YOKE AND RANGE LEVER INSTALLATION**

(1) Install indicator switch in front case. Tighten switch to 20–34 N·m (15–25 ft. lbs.) torque.

DISASSEMBLY AND ASSEMBLY (Continued)

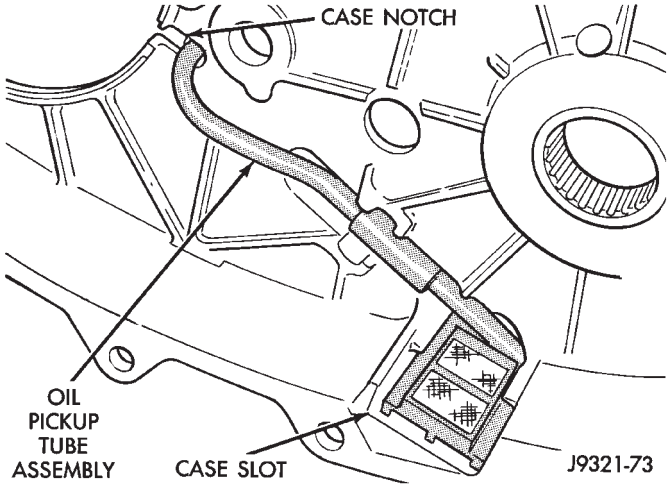



*Fig. 67 Oil Pickup Tube Installation*

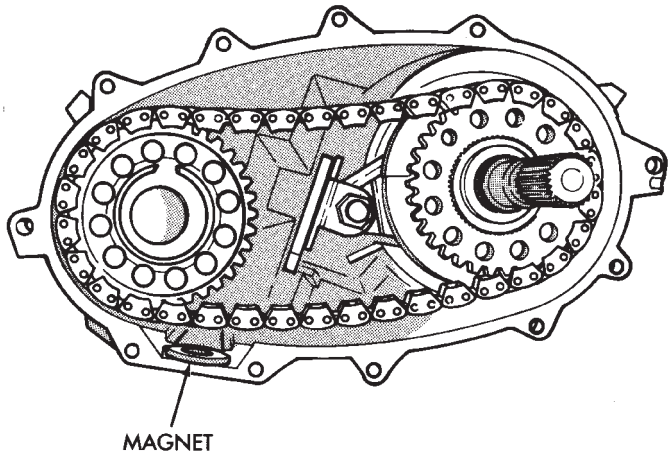



*Fig. 68 Installing Case Magnet*

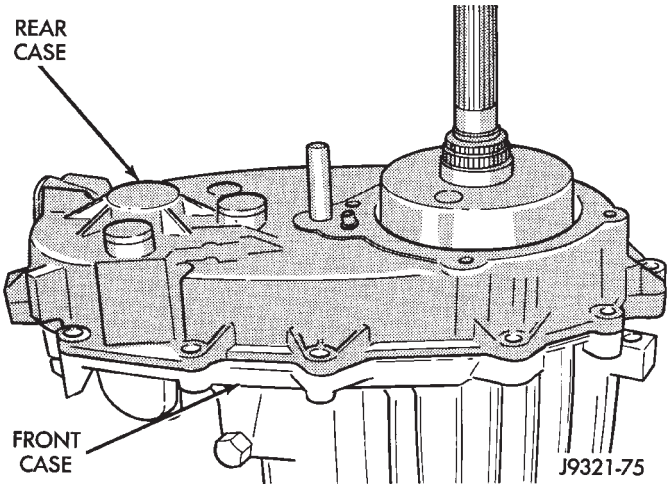



*Fig. 69 Rear Case Installation*

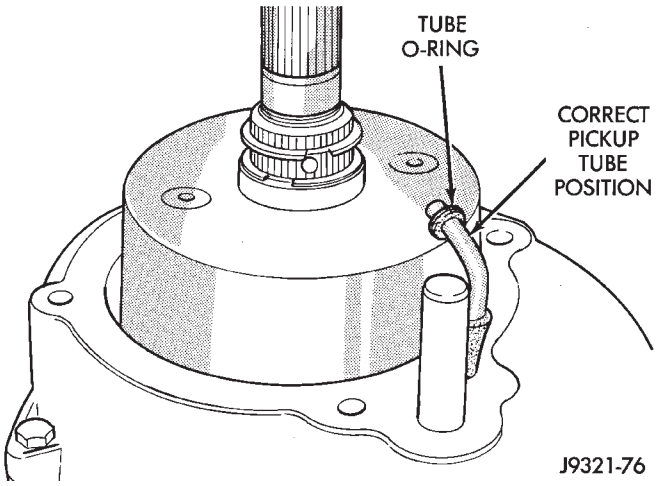



*Fig. 70 Checking Position Of Oil Pickup Tube*

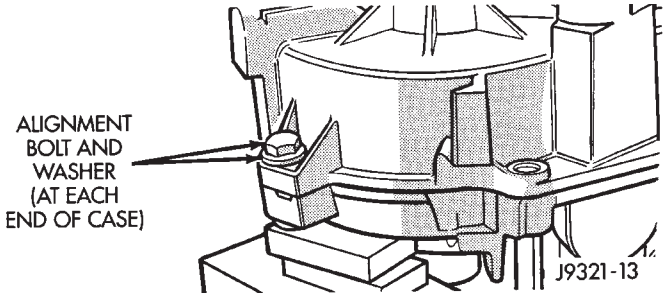



*Fig. 71 Alignment Bolt Location*

(2) Install range lever, washer and locknut on sector shaft (Fig. 72). Tighten locknut to 27-34 N·m (20-25 ft. lbs.) torque.

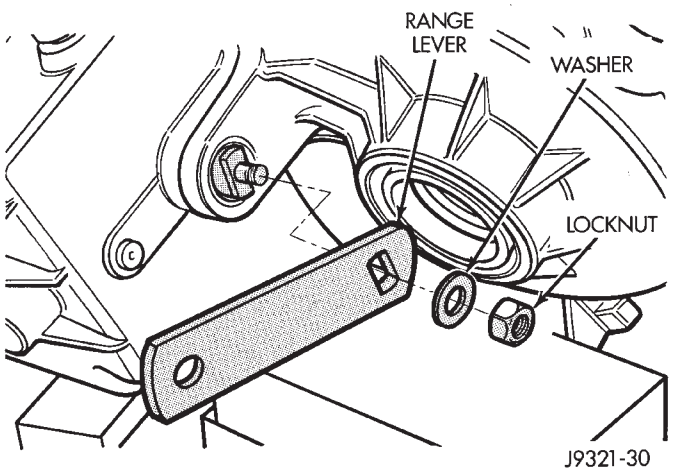



*Fig. 72 Range Lever Installation*

(3) Install new seal washer on front output shaft (Fig. 74).

(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. 73).

DISASSEMBLY AND ASSEMBLY (Continued)

(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.

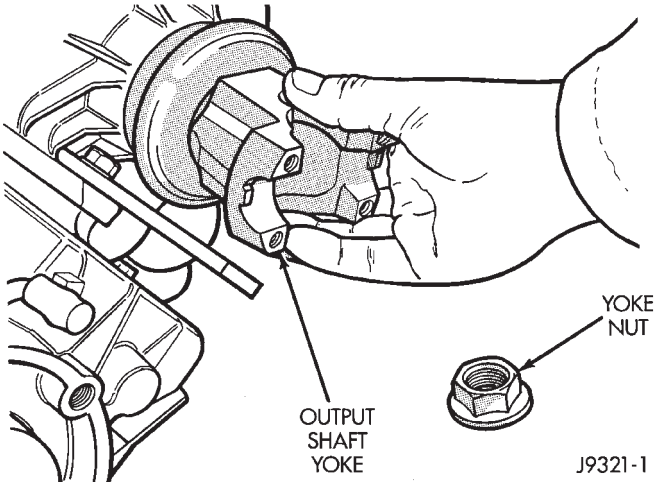



*Fig. 73 Output Shaft Yoke Installation*

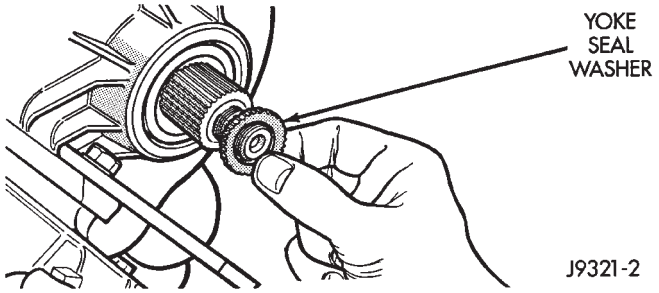



*Fig. 74 Yoke Seal Washer Installation*

**VISCOUS COUPLER**

(1) Install coupling on mainshaft (Fig. 75).

(2) Install coupling retaining snap-ring first (Fig. 75). Be sure snap ring is fully seated before proceeding.

(3) Install oil pump locating snap-ring on mainshaft (Fig. 75).

**REAR RETAINER AND OIL PUMP INSTALLATION**

(1) Install new O-ring on flanged end of oil pickup tube.

(2) Install oil pump (Fig. 76).

(3) Insert oil pickup tube in pump (Fig. 77).

(4) Install rear bearing on mainshaft (Fig. 77). Locating ring groove in bearing goes toward end of mainshaft.

(5) Install rear bearing retaining snap-ring (Fig. 78).

(6) Install speedometer drive gear (Fig. 79).

(7) Install rear bearing locating ring in rear retainer, if ring was removed during overhaul.

(8) 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.

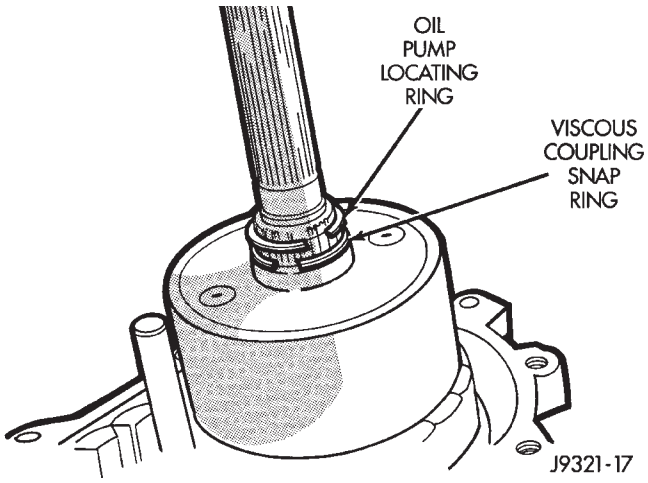



*Fig. 75 Viscous Coupling And Oil Pump Snap-RingInstallation*

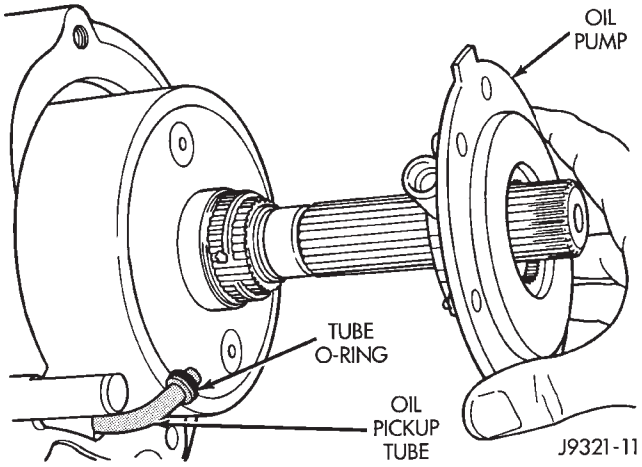



*Fig. 76 Installing Oil Pump*

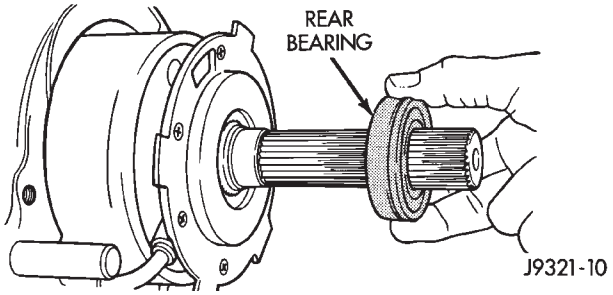



*Fig. 77 Rear Bearing Installation*

(9) Slide rear retainer onto mainshaft (Fig. 80).

(10) Spread rear bearing locating ring and slide rear retainer into place on rear case (Fig. 81).

(11) Install and tighten rear retainer bolts to 27-34 N·m (20-25 ft. lbs.).

(12) Install locating ring access cover and gasket (Fig. 82). Tighten plate attaching screws to 10 N·m (85 in. lbs.) torque.

DISASSEMBLY AND ASSEMBLY (Continued)

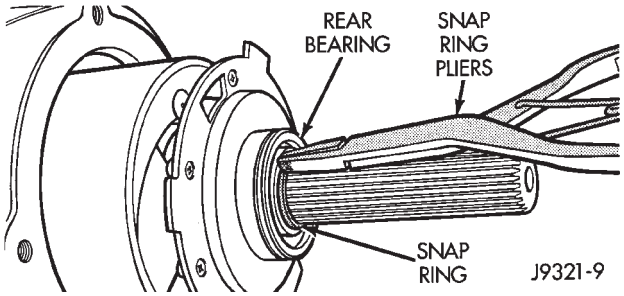



*Fig. 78 Rear Bearing Snap-Ring Installation*

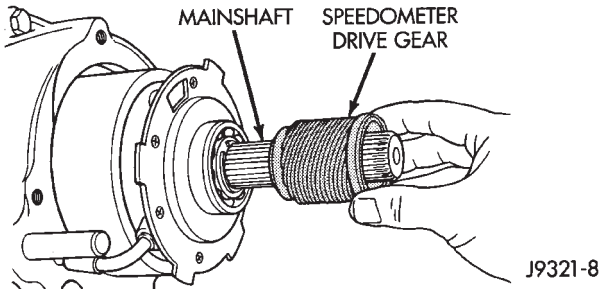



*Fig. 79 Speedometer Drive Gear Installation*

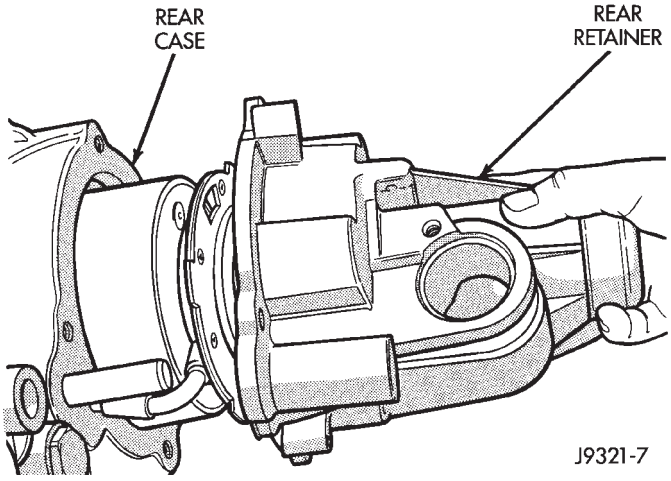



*Fig. 80 Rear Retainer Installation*

**FINAL ASSEMBLY**

(1) Install drain plug. Tighten plug to 41-54 N·m (30-40 ft. lbs.) torque.

(2) Level transfer case and fill it with Mopar Dexron II automatic transmission fluid. Correct fill level is to bottom edge of fill plug hole.

(3) Install and tighten fill plug to 41-54 N·m (30-40 ft. lbs.) torque.

## CLEANING AND INSPECTION

### NV249 COMPONENTS

*GENERAL*

Clean the transfer case components with parts cleaning solvent. Flush the oil passages in the cases and drivetrain components with solvent. This will help remove dirt and particles from these passages.

Dry the transfer case components with compressed air or allow them to air dry on clean shop towels.

Apply compressed air through all oil passages in the cases and gear components to clear them of any residue.

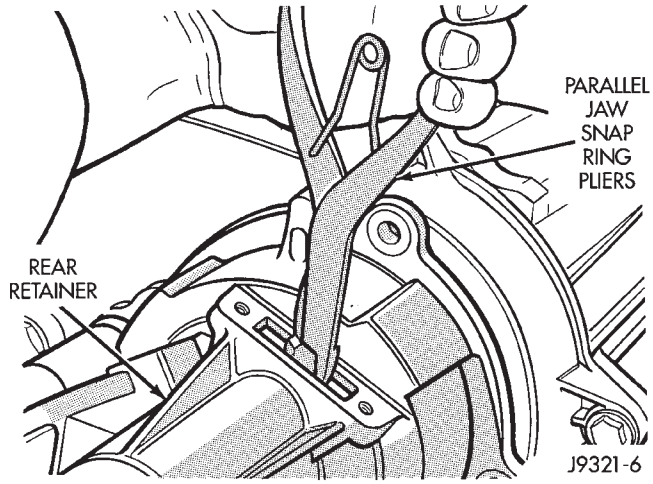



*Fig. 81 Engaging Rear Bearing Locating Ring*

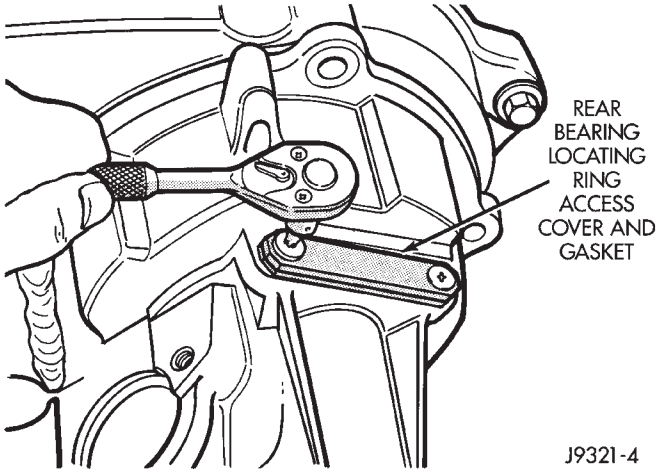



*Fig. 82 Installing Locating Ring Access CoverAnd Gasket*

*MAINSHAFT*

Examine the mainshaft components carefully for evidence of wear or damage.

Replace the thrust washers if worn or damaged.

Replace the mainshaft and sprocket gears if the teeth or gear bores are worn or damaged.

Replace the mainshaft bearings if worn, flat spotted, brinelled, or damaged in any way.

Replace the mainshaft if it exhibits wear or damage to the bearing surfaces, splines or gear teeth.

## CLEANING AND INSPECTION (Continued)

### *INPUT AND LOW RANGE GEARS*

Inspect the low range gear pinions and pinion pins. Replace the low range gear if any of the pins or pinions are worn or damaged.

Inspect the thrust washers, retainer, and snap-ring. Replace the snap-ring if bent, or distorted. Replace the thrust washers and retainer if worn, cracked or damaged in any way.

Examine the input gear carefully. Be sure the gear teeth and bearing surfaces are in good condition. Replace the gear if wear or damage is evident.

Check the input gear pilot bearing. Rotate the bearing and check for roughness or noise. Also check bearing position in the bore. The bearing should be recessed approximately 2.5 mm (0.100 in.) below the top edge of the bore. The bearing should not be seated at the bottom of the bore. Replace the bearing if worn, or roughness is evident. Replace both the gear and bearing if the bearing is a loose fit in the bore.

### *GEAR CASE AND RETAINERS*

Examine both case halves and retainers carefully. Replace any retainer or case half if wear, cracks, or other damage is evident.

Check condition of the low range annulus gear and the shift rail bushing in the front case (Fig. 83). The low range annulus gear is not a serviceable part. Replace the gear and case as an assembly if the gear is loose, worn, or damaged. The shift rail bushing is a serviceable part and can be replaced if necessary.

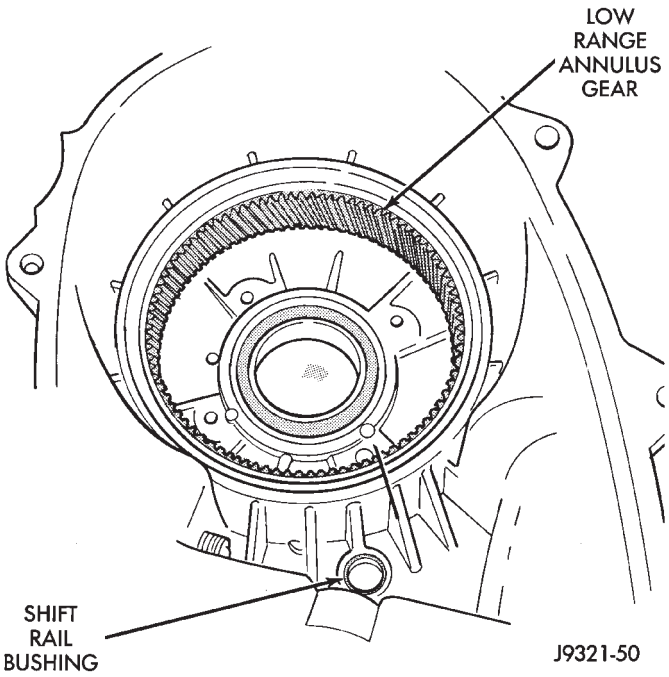



***Fig. 83 Low Range Annulus Gear Location***

Check the bushing in the rear retainer. Replace the bushing if worn or scored.

Examine the sealing surfaces of both case halves and retainers. Small burrs, or scratches on these surfaces can be reduced with crocus cloth or a fine tooth file.

Examine condition of the shift rail bushing in the front case. If the bushing is worn or damaged, it can be removed with a blind hole type puller. A replacement bushing can be installed with a suitable size driver. Recess the bushing slightly below the edge of the bore but do not seat it all the into the case.

### *GEARTRAIN*

Inspect the mainshaft splines, gear teeth and bearing surfaces carefully for evidence of wear, or damage. Replace the shaft if necessary. do not attempt to salvage it if damaged.

The shift rail and range fork are an assembly. Replace both parts if either is damaged. However, the nylon pads in the fork can be replaced if worn, or cracked.

Inspect the transfer case snap rings closely. Do not attempt to salvage a distorted snap ring by straightening or reshaping it. Replace any snap ring that is distorted, or worn.

Inspect the low range gear, input gear and the gear thrust washers retainer, and snap ring. The low range gear is serviced as an assembly only. Replace the gear if the case or pinions are damaged.

During inspection, also make sure the seal surface of the input gear is in good condition. Minor nicks on this surface can be reduced with crocus cloth. However, replace the gear if the seal surface is severely scored or worn.

The speedometer gear should be replaced if worn, cracked, or if the small spline teeth are worn.

### *OIL PUMP AND VISCOUS COUPLING*

The oil pump and viscous coupling are not serviceable components. Replace the coupling as an assembly if it is leaking or damaged. Replace the oil pump as an assembly if the gear teeth are worn, or if the pump has become damaged.

### *BEARINGS AND SEALS*

The transfer case seals should be replaced during overhaul. Use new seals in the input gear bearing retainer, front case and rear retainer. Also replace the yoke seal washer and the detent plug O-ring.

Check condition of each transfer case bearing. Replace any bearing exhibiting signs of roughness, wear, or damage.

## ADJUSTMENTS

### SHIFT LINKAGE ADJUSTMENT

(1) Shift transfer case into Neutral position.

ADJUSTMENTS (Continued)

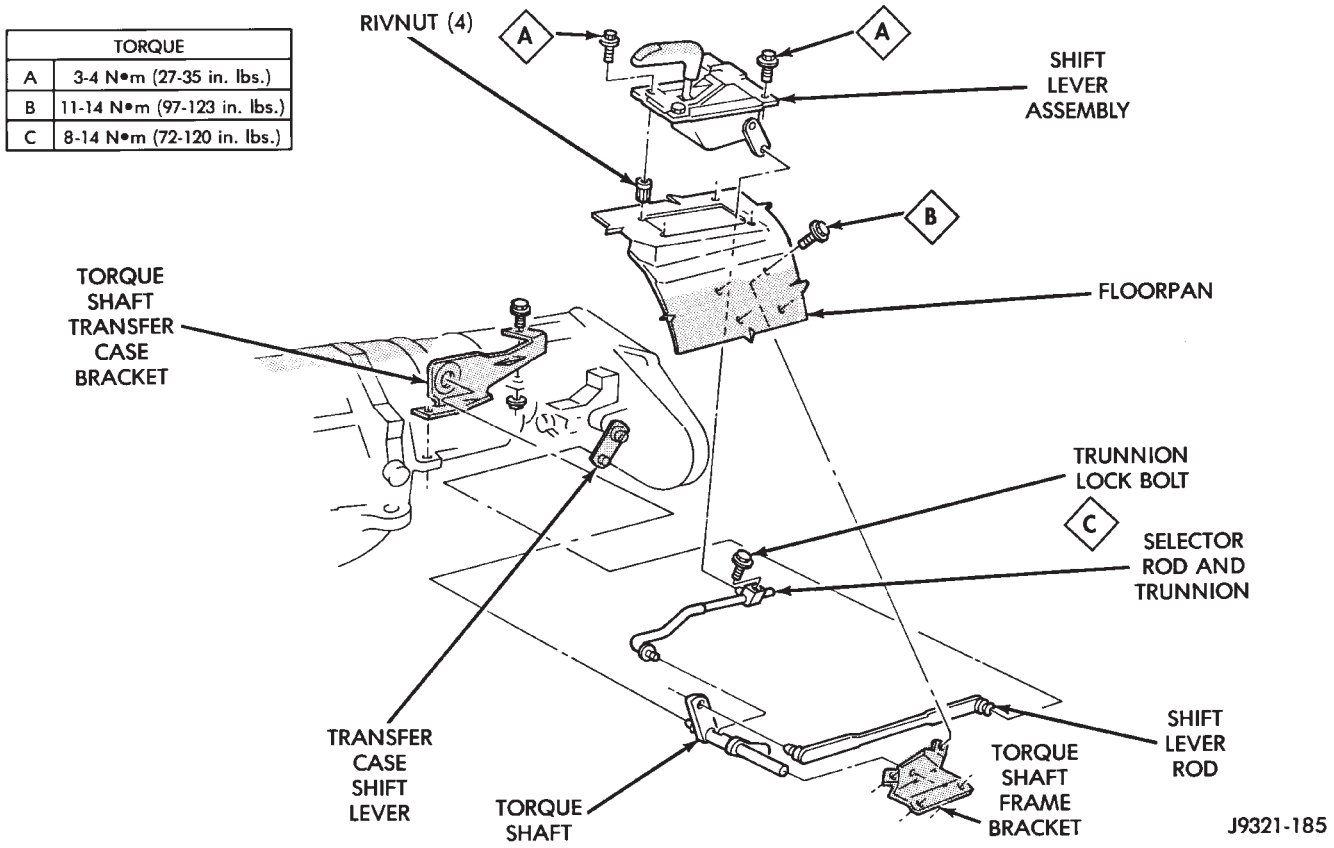



***Fig. 84 Transfer Case Shift Linkage***

(2) Raise vehicle on hoist that will allow all four wheels to rotate freely.

(3) Loosen trunnion lock bolt (Fig. 84). Loosen bolt enough so selector rod slides freely in trunnion.

(4) Verify that shift lever on transfer case is in Neutral position.

(5) Tighten trunnion lock bolt to 11-20 N·m (96-180 in. lbs.) torque.

(6) Lower vehicle enough for entry into driver seat but keep all wheels off shop floor.

(7) Verify correct linkage adjustment. Start engine, shift transmission into gear and shift transfer case into all ranges. Be sure transfer case is fully engaged in high and low range. Readjust linkage if necessary.

(8) Shut engine off and lower vehicle completely.

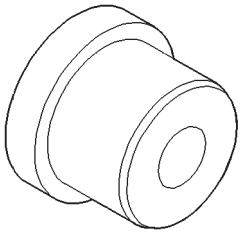
## SPECIFICATIONS

### TORQUE

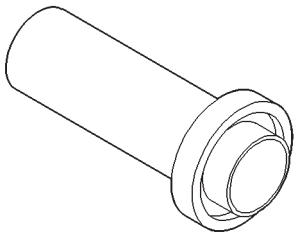
| DESCRIPTION | TORQUE |
|---|---|
| **Bolt, crossmember** | 41-47 N·m (30-35 ft. lbs.) |
| **Plug, Detent** | 16-24 N·m (12-18 ft. lbs.) |
| **Plugs, drain/fill** | 41-54 N·m (30-40 ft. lbs.) |
| **Switch, Electric** | 20-34 N·m (15-25 ft. lbs.) |
| **Bolts, front brg. retainer** | 16-24 N·m (12-18 ft. lbs.) |
| **Bolts, case half** | 27-34 N·m (20-25 ft. lbs.) |
| **Nut, output yoke** | 122–176 N·m (90-130 ft. lbs.) |
| **Bolts, rear extension** | 27-34 N·m (20-25 ft. lbs.) |
| **Lock-nut, shift** | 27-34 N·m (20-25 ft. lbs.) |
| **Bolt, shift rod** | 11-20 N·m (96-180 in. lbs.) |
| **Nuts, T-case mount stud** | 33-41 N·m (24-30 ft. lbs.) |
| **Bolt, U-joint clamp** | 16-22 N·m (12-16 ft. lbs.) |

## SPECIAL TOOLS

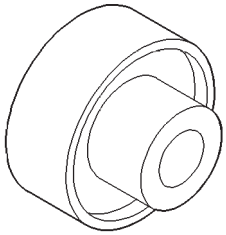
### NV249 TRANSFER CASE



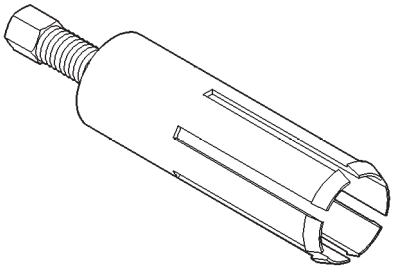
*Installer—5066*



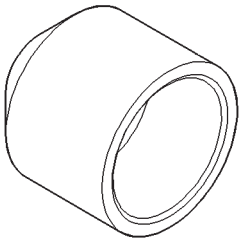
*Installer—6952-A*



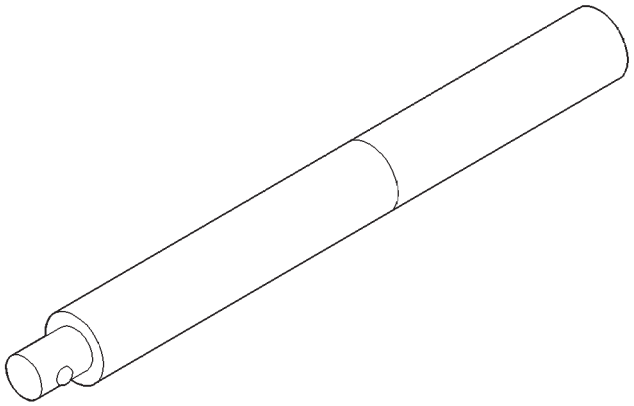
*Installer—6953*



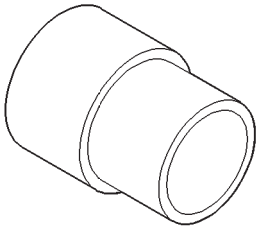
*Remover—6957*



*Installer—C-3995-A*



*Handle—C-4171*



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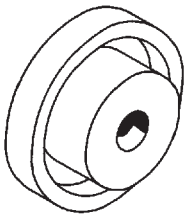
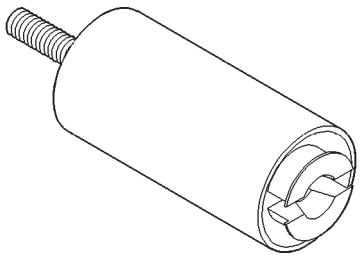


*Remover—C-4210*

SPECIAL TOOLS (Continued)



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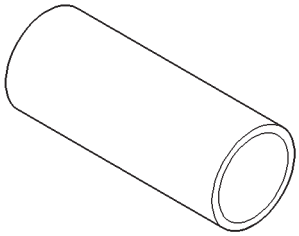
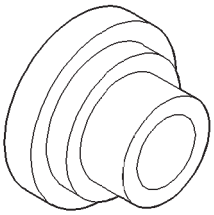


***Cup—8148***



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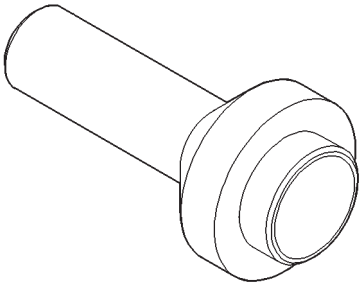

***Installer—7884***

# TRANSMISSION AND TRANSFER CASE

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## AX15 MANUAL TRANSMISSION

### GENERAL INFORMATION

#### AX 15 MANUAL TRANSMISSION

The AX 15 is a 5–speed, synchromesh, manual transmission. Fifth gear is an overdrive range with a ratio of 0.79:1. The shift mechanism is integral and mounted in the shift tower portion of the adapter housing (Fig. 1).

#### TRANSMISSION IDENTIFICATION

The AX 15 identification code numbers are on the bottom surface of the transmission gear case (Fig. 2).

The first number is year of manufacture. The second and third numbers indicate month of manufacture. The next series of numbers is the transmission serial number.

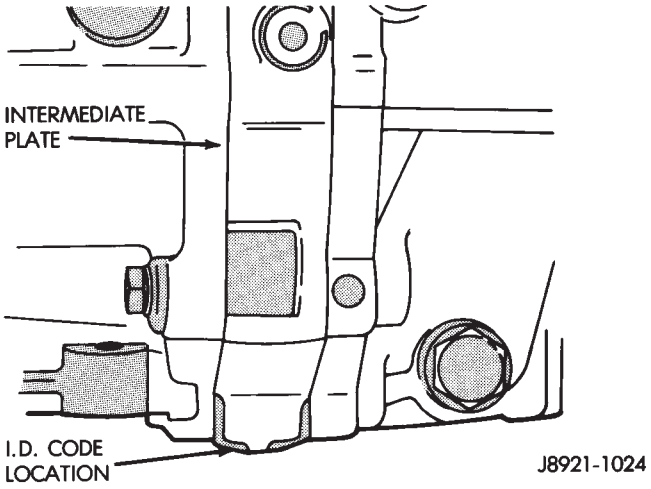


*Fig. 2 Identification Code Number Location*

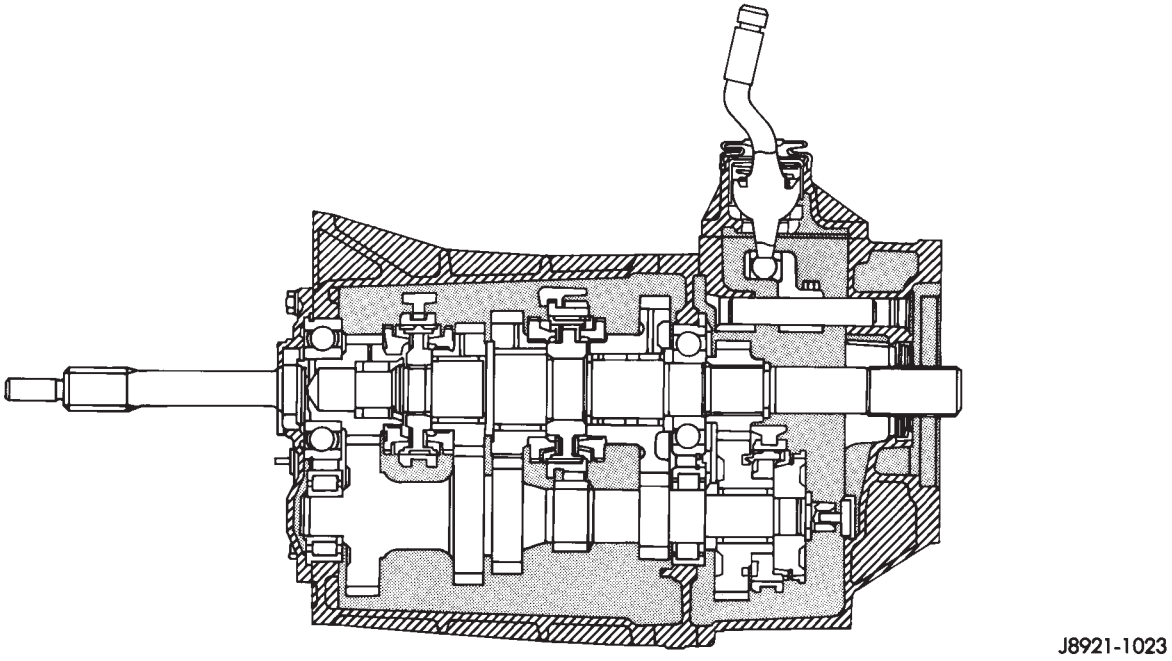


*Fig. 1 AX 15 Manual Transmission*

GENERAL INFORMATION (Continued)

### TRANSMISSION SHIFT PATTERN

The AX 15 shift pattern is shown in (Fig. 3). First and second and third and fourth gear ranges are in line for improved shifting. Fifth and reverse gear ranges are also in line at the extreme right of the pattern (Fig. 3).

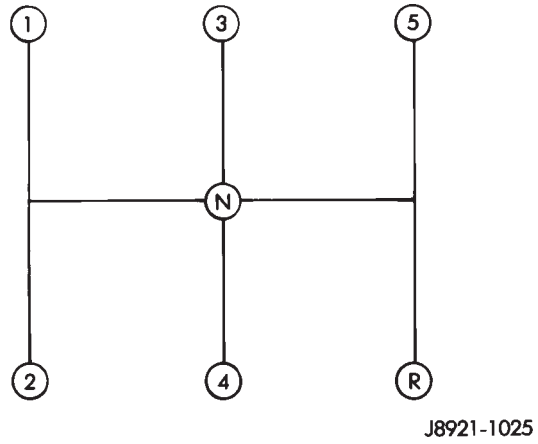


*Fig. 3 AX 15 Shift Pattern*

The AX 15 is equipped with a reverse lockout mechanism. The shift lever must be moved through the Neutral detent before making a shift to reverse.

### TRANSMISSION LUBRICANT

Recommended lubricant for AX 15 transmissions is Mopar 75W–90, API Grade GL–5 gear lubricant, or equivalent.

Correct lubricant level is from the bottom edge, to no more than 6 mm (1/4 in.) below the bottom edge of the fill plug hole.

Approximate dry fill lubricant capacity is:

- 3.10 liters (3.27 qts.) in 4–wheel drive models

### TRANSMISSION SWITCH AND PLUG LOCATIONS

The fill plug is at the driver side of the gear case (Fig. 4).

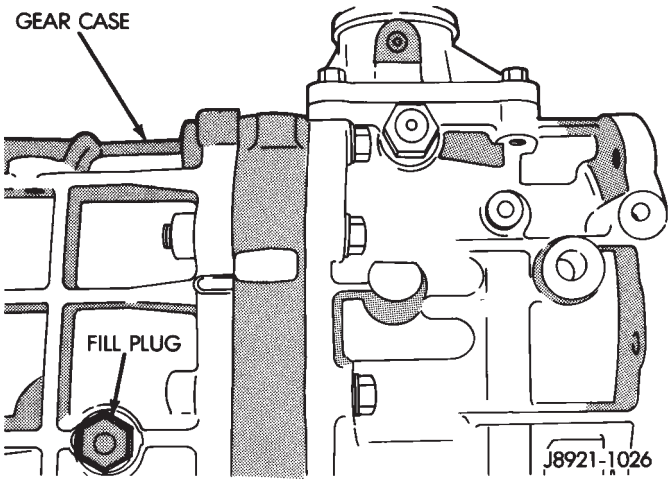


*Fig. 4 Fill Plug Location*

The drain plug and backup light switch are on the passenger side of the gear case (Fig. 5).

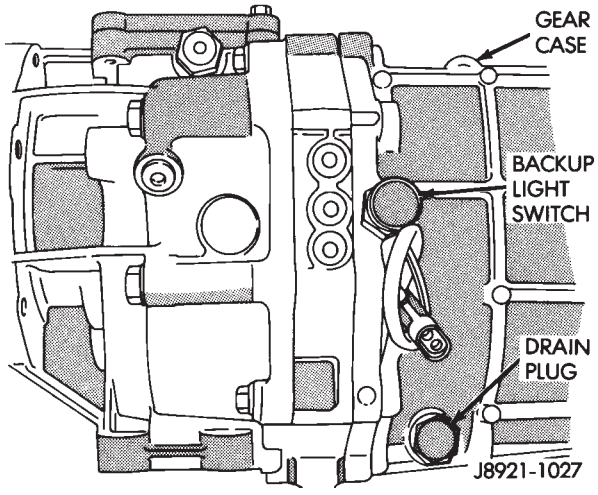


*Fig. 5 Drain Plug/Backup Light Switch Location*

### TRANSMISSION GEAR RATIOS

AX 15 gear ratios are:

| | |
|---|---|
| First gear | 3.83:1 |
| Second gear | 2.33:1 |
| Third gear | 1.44:1 |
| Fourth gear | 1.00:1 |
| Fifth gear | 0.79:1 |
| Reverse | 4.22:1 |

### TRANSMISSION ASSEMBLY INFORMATION

Lubricate the transmission components with gear lubricant during assembly. Use petroleum jelly to lubricate seal lips and/or hold parts in place during installation.

## DIAGNOSIS AND TESTING

### LOW LUBRICANT LEVEL

A low transmission lubricant level is generally the result of a leak, inadequate lubricant fill, or an incorrect lubricant level check.

Leaks can occur at the mating surfaces of the gear case, intermediate plate and adapter or extension housing, or from the front/rear seals. A suspected leak could also be the result of an overfill condition.

Leaks at the rear of the extension or adapter housing will be from the housing oil seals. Leaks at component mating surfaces will usually be the result of inadequate sealer, gaps in the sealer, incorrect bolt tightening, or use of a non–recommended sealer.

A leak at the front of the transmission will be from either the front bearing retainer or retainer seal. Lubricant may be seen dripping from the clutch housing after extended operation. If the leak is

DIAGNOSIS AND TESTING (Continued)

severe, it may also contaminate the clutch disc causing slip, grab and chatter.

Transmissions filled from air or electrically powered lubricant containers can be under filled. This generally happens when the container delivery mechanism is improperly calibrated. Always check the lubricant level after filling to avoid an under fill condition.

A correct lubricant level check can only be made when the vehicle is level; use a drive–on hoist to ensure this. Also allow the lubricant to settle for a minute or so before checking. These recommendations will ensure an accurate check and avoid an under–or–over fill condition.

### HARD SHIFTING

Hard shifting is usually caused by a low lubricant level, improper or contaminated lubricants, component damage, incorrect clutch adjustment, or by a damaged clutch pressure plate or disc.

Substantial lubricant leaks can result in gear, shift rail, synchro and bearing damage. If a leak goes undetected for an extended period, the first indications of a problem are usually hard shifting and noise.

Incorrect or contaminated lubricants can also contribute to hard shifting. The consequence of using non–recommended lubricants is noise, excessive wear, internal bind and hard shifting.

Improper clutch release is a frequent cause of hard shifting. Incorrect adjustment or a worn, damaged pressure plate or disc can cause incorrect release. If the clutch problem is advanced, gear clash during shifts can result.

Worn or damaged synchro rings can cause gear clash when shifting into any forward gear. In some new or rebuilt transmissions, new synchro rings may tend to stick slightly causing hard or noisy shifts. In most cases, this condition will decline as the rings wear–in.

### TRANSMISSION NOISE

Most manual transmissions make some noise during normal operation. Rotating gears can generate a mild whine that may only be audible at extreme speeds.

Severe, obviously audible transmission noise is generally the result of a lubricant problem. Insufficient, improper, or contaminated lubricant can promote rapid wear of gears, synchros, shift rails, forks and bearings. The overheating caused by a lubricant problem, can also lead to gear breakage.

## REMOVAL AND INSTALLATION

### TRANSMISSION

*REMOVAL*

1. Disconnect the battery negative cable.
2. Remove the shifter boot and shifter.
3. Raise the vehicle on a hoist.
4. Drain the transmission fluid (Fig. 6).

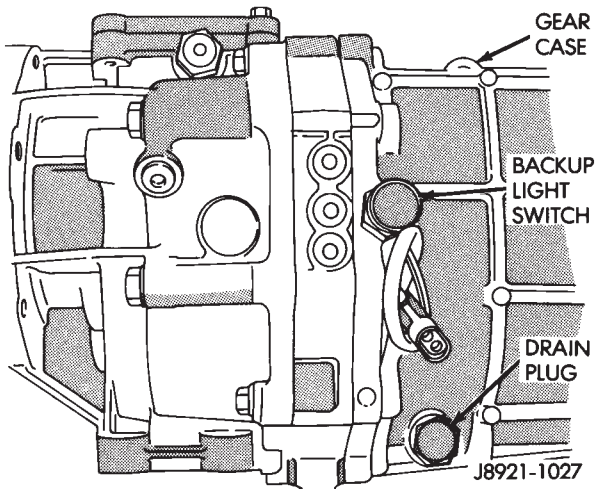


***Fig. 6 Drain Plug and Backup Light Switch Location***

5. Support the engine and transmission with an adjustable jack stand.
6. Remove exhaust pipe and heat shield.
7. Mark the front and rear propeller shafts for installation alignment (Fig. 7).

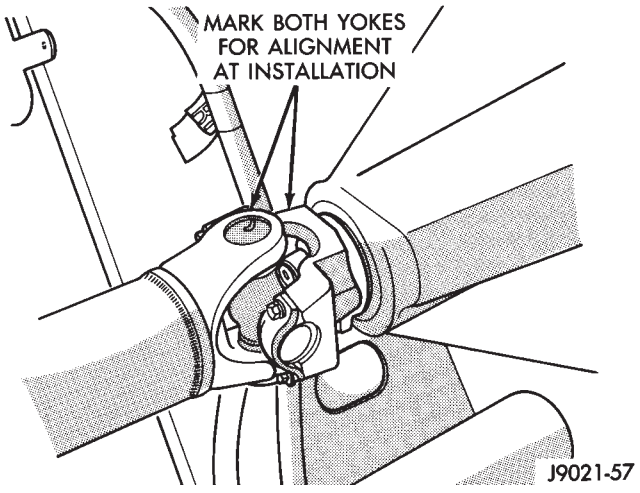


***Fig. 7 Marking Propeller Shaft and Axle Yoke***

8. Remove the front propeller shaft.
9. Remove the rear propeller shaft.
10. Remove the transmission skid plate.

REMOVAL AND INSTALLATION (Continued)

11. Disconnect the transfer case linkage and vehicle speed sensor electrical connector and vent tube hose (Fig. 8).

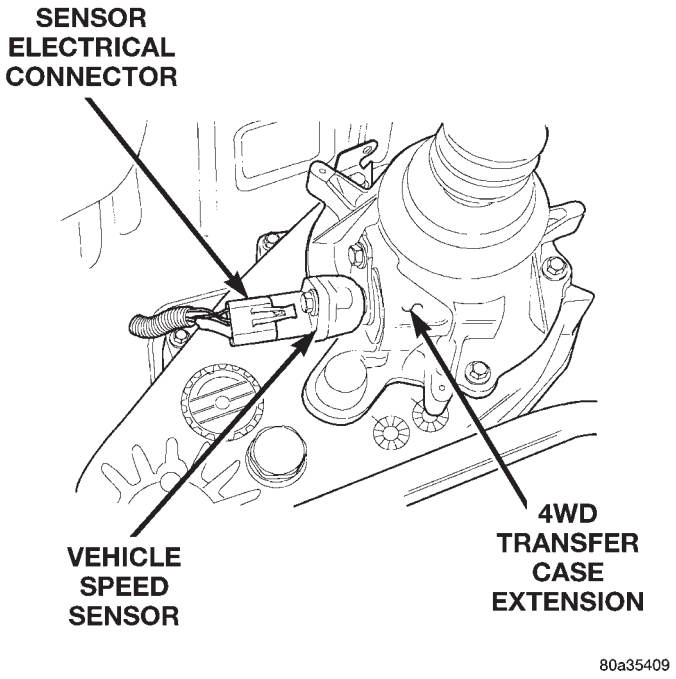


***Fig. 8 Vehicle Speed Sensor***

12. Reposition the adjustable jackstand under the engine.
13. Place a transmission jack under the transmission and secure the transmission with safety chains.
14. Remove the rear transmission mount.
15. Remove the rear crossmember.
16. Remove the transfer case assembly. Refer to Transfer Case removal later in this Group.
17. Lower the engine and transmission no more than 7.6 cm.
18. Remove the two (2) upper and two (2) mid clutch housing to engine bolts.
19. Remove the engine speed sensor (crankshaft position sensor) (Fig. 9).
20. Remove the clutch slave cylinder from the clutch housing.
21. Remove the lower transmission bolts.
22. Remove the transmission assembly from the vehicle.

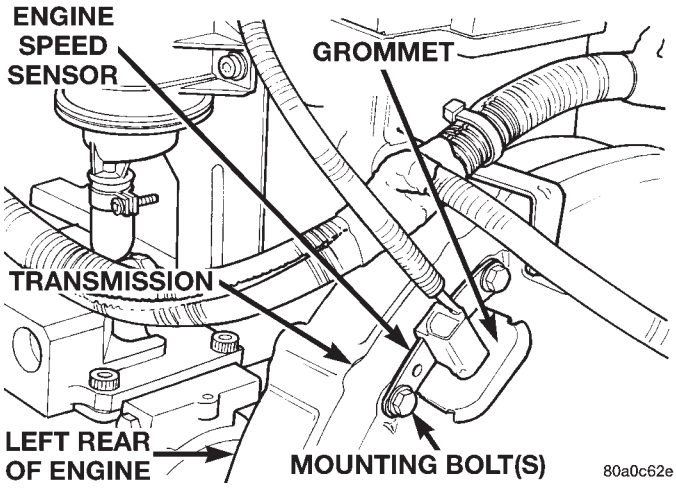


***Fig. 9 Engine Speed Sensor***

*INSTALLATION*

1. Mount the transmission on a transmission jack and secure the transmission with safety chains.
2. Install the transmission to the vehicle (Fig. 10).
3. Install the two (2) lower transmission bolts. Tighten the bolts to 74.6 N·m.
4. Install the clutch slave cylinder to the clutch housing.
5. Install the engine speed sensor (crankshaft position sensor) to the vehicle (Fig. 9).
6. Install the two (2) upper clutch housing to engine bolts. Tighten the bolts to 36.6 N·m.
7. Install the two (2) mid clutch housing to engine bolts. Tighten the bolts to 58.3 N·m.
8. Raise the engine and transmission with the adjustable jackstand.
9. Install the transfer case assembly. Refer to Transfer Case installation later in this Group.
10. Install the rear crossmember.
11. Install the rear transmission mount.
12. Connect the transfer case linkage and vehicle speed sensor electrical connector and vent tube (Fig. 8).
13. Install the transmission skid plate.
14. Align and install the front and rear propeller shafts.
15. Install the exhaust pipe and heat shield.
16. Remove the transmission jack.
17. Fill the transmission with the proper fluid (Fig. 12).
18. Remove the adjustable jackstand from under the engine.
19. Lower the vehicle from the hoist.
20. Install the shifter boot and shifter.
21. Reconnect the battery negative cable.

REMOVAL AND INSTALLATION (Continued)

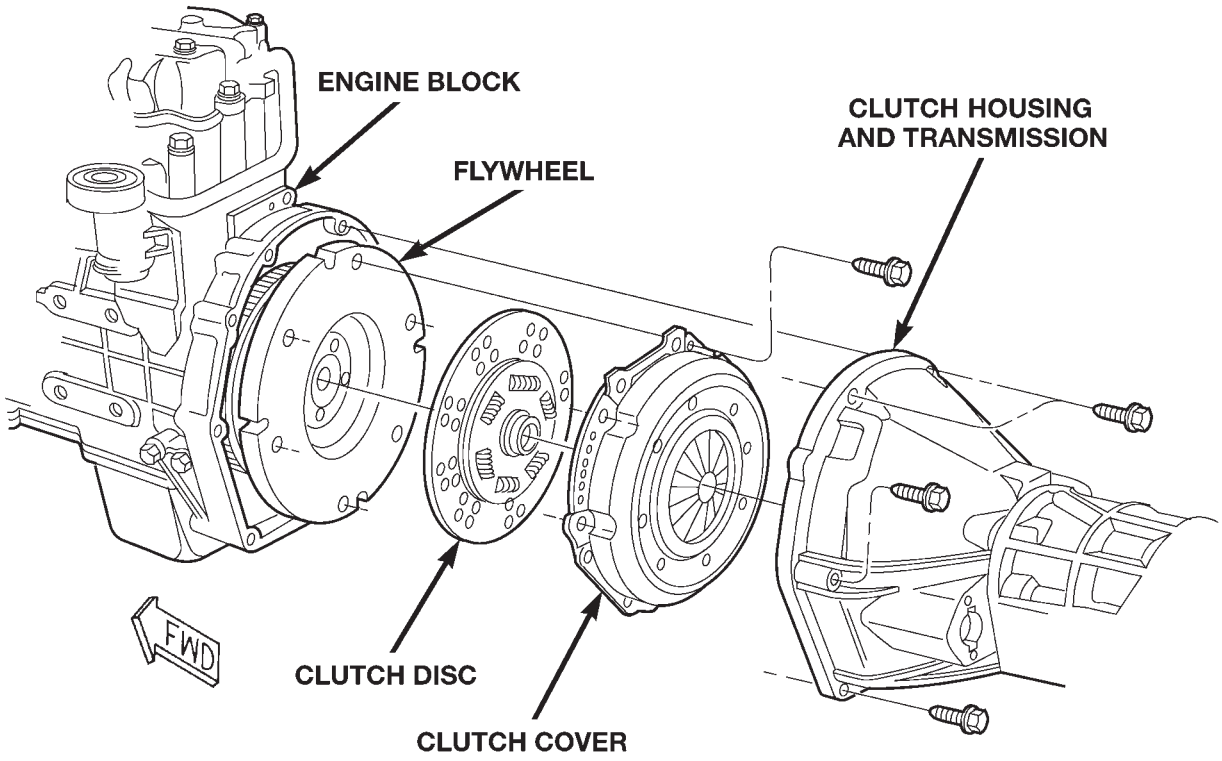


*Fig. 10 Transmission to Engine Mounting*

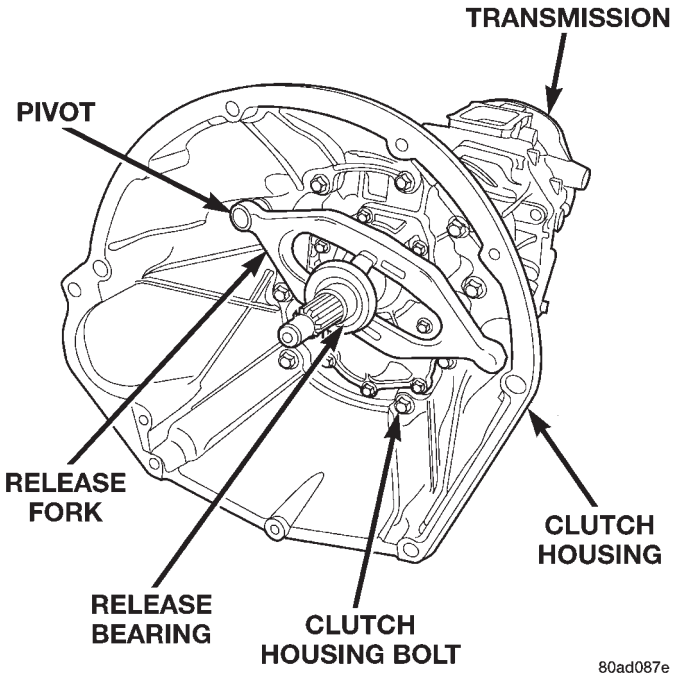


*Fig. 11 Clutch Housing to Transmission*

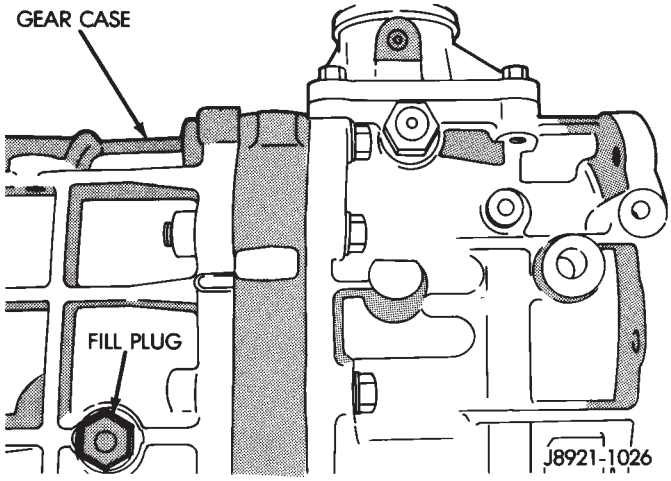


*Fig. 12 Fill Plug Location*

## SPECIFICATIONS

### TORQUE

| DESCRIPTION | TORQUE |
|---|---|
| Clutch Housing to Engine Top (2) Bolts | 36.6 N·m (27 ft. lbs.) |
| Clutch Housing to Engine Mid-Point (2) Bolts | 58.3 N·m (43 ft. lbs.) |
| Clutch Housing to Engine Bottom (2) Bolts | 74.6 N·m (55 ft. lbs.) |
| Clutch Housing to Transmission bolts | 38.0 N·m (28 ft. lbs.) |
| Transfer Case to Transmission Attaching Nuts | 35 N·m (26 ft. lbs.) |
| Propeller Shaft Bolts | 26.5 N·m (19.5 ft. lbs.) |

# NV231 TRANSFER CASE

## 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 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.

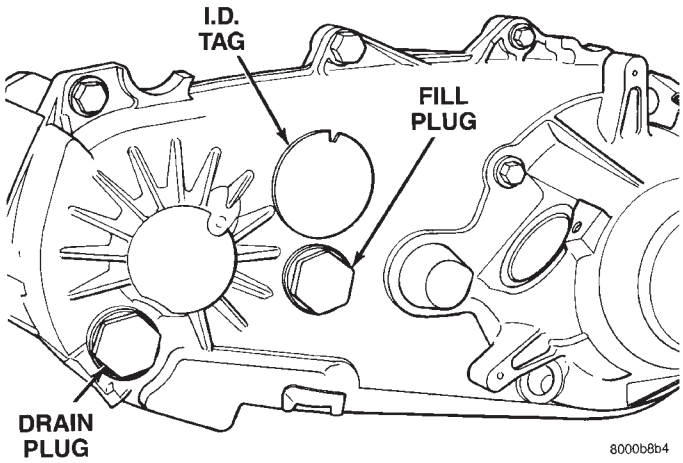


***Fig. 1 Fill/Drain Plug And I.D. Tag Locations***

### RECOMMENDED LUBRICANT AND FILL LEVEL

Recommended lubricant for the NV231 transfer case is Mopar® Dexron II, or ATF Plus. Approximate lubricant fill capacity is 1.2 liters (2.5 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
### NV231 DIAGNOSIS

| 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) Stop vehicle and shift into desired range. Or reduce speed to 3-4 km/h (2-3 mph) before attempting to shift. |
| | (2) If vehicle was operated for extended period in 4H mode on dry paved surface, driveline torque load may cause difficulty. | (2) Stop vehicle, shift transmission to Neutral, shift transfer case to 2H mode and operate vehicle in 2H on dry paved surfaces. |
| | (3) Transfer case external shift linkage binding. | (3) Lubricate, repair or replace linkage bushings or tighten loose components as necessary. |
| | (4) Insufficient or incorrect lubricant. | (4) Drain and refill to edge of fill hole with DEXRON II® or MOPAR-MERCON® Automatic Transmission Fluid. |
| | (5) Internal components binding, worn or damaged. | (5) Disassemble unit and replace worn or damaged components as necessary. |
| TRANSFER CASE NOISY IN ALL DRIVE MODES | (1) Insufficient or incorrect lubricant. | (1) Drain and refill to edge of fill hole with DEXRON II® or MOPAR-MERCON® Automatic Transmission Fluid. Check for leaks and repair if necessary. **Note: If unit is still noisy after drain and refill, disassembly and inspection may be required to locate source of noise.** |
| NOISY IN – OR JUMPS OUT OF – FOUR WHEEL DRIVE LOW RANGE | (1) Transfer case not completely engaged in 4L position. | (1) Stop vehicle, shift transfer case to Neutral, then shift back into 4L position. |
| | (2) Shift linkage out of adjustment. | (2) Adjust linkage. |
| | (3) Shift linkage loose or binding. | (3) Tighten, lubricate or repair linkage as necessary. |
| | (4) Range fork damaged, inserts worn, or fork is binding on shift rail. | (4) Disassemble unit and repair as necessary. |
| | (5) Low range gear worn or damaged. | (5) Disassemble and repair as necessary. |
| LUBRICANT LEAKING FROM OUTPUT SHAFT SEALS OR FROM VENT | (1) Transfer case overfilled. | (1) Drain to correct level. |
| | (2) Vent closed or restricted. | (2) Clear or replace vent if necessary. |
| | (3) Output shaft seals damaged or installed incorrectly. | (3) Replace seals. Be sure seal lip faces interior of case when installed. Also be sure yoke seal surfaces are not scored or nicked. Remove scores and nicks with fine sandpaper or replace yoke(s) if necessary. |
| ABNORMAL TIRE WEAR | (1) Extended operation on dry hard surface (paved) roads in 4H range. | (1) Operate in 2H on hard surface (paved) roads. |

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## 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 vehicle speed sensor wires.
(9) Disconnect transfer case linkage rod from range lever.
(10) Disconnect transfer case vent hose (Fig. 2) and indicator switch harness, if necessary.
(11) Support transfer case with transmission jack.
(12) Secure transfer case to jack with chains.
(13) Remove nuts attaching transfer case to transmission.
(14) Pull transfer case and jack rearward to disengage transfer case.
(15) Remove transfer case from under vehicle.

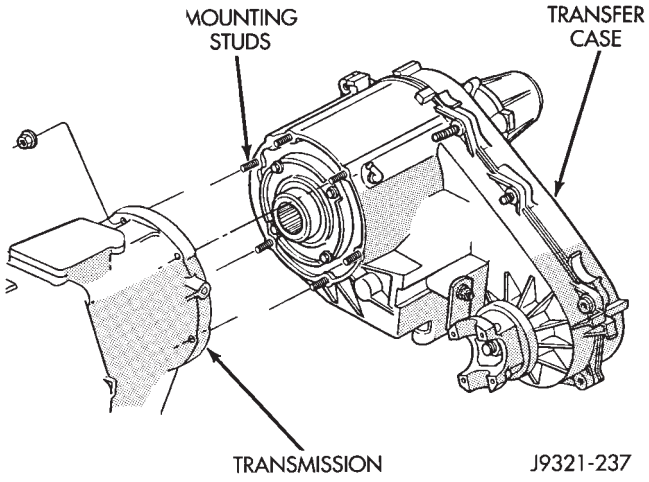



***Fig. 2 Transfer Case Mounting***

*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 (Fig. 2).
(6) Connect vehicle speed sensor wires, and 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 26.5 N·m 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.
(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.

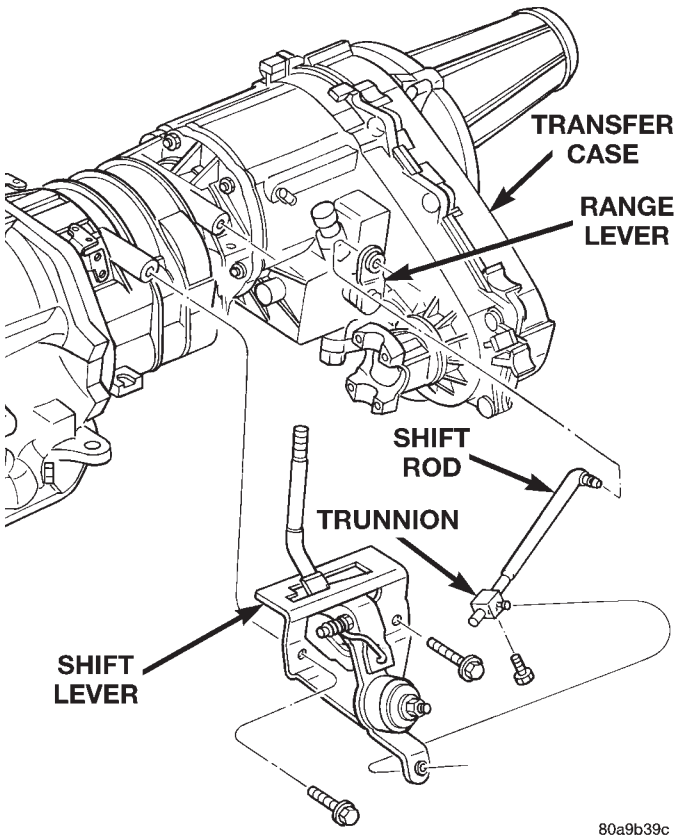



***Fig. 3 Shift Lever***

REMOVAL AND INSTALLATION (Continued)

*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.

## SPEEDOMETER

*REMOVAL*

(1) Raise vehicle.
(2) Disconnect wires from vehicle speed sensor.
(3) Remove adapter clamp and screw (Fig. 4).
(4) Remove speed sensor and speedometer adapter as an assembly.
(5) Remove speed sensor retaining screw and remove sensor from adapter.
(6) Remove speedometer pinion from adapter. Replace pinion if chipped, cracked, or worn.
(7) Inspect sensor and adapter O-rings (Fig. 4). Remove and discard O-rings if worn or damaged.
(8) Inspect terminal pins in speed sensor. Clean pins with Mopar® electrical spray cleaner if dirty oroxidized. Replace sensor if faulty, or if pins are loose, severely corroded, or damaged.

*INSTALLATION AND INDEXING*

(1) Thoroughly clean adapter flange and adapter mounting surface in housing. Surfaces must be clean for proper adapter alignment and speedometer operation.
(2) Install new O-rings on speed sensor and speedometer adapter (Fig. 4), if necessary.
(3) Lubricate sensor and adapter O-rings with transmission fluid.
(4) Install vehicle speed sensor in speedometer adapter. Tighten sensor attaching screw to 2-3 N·m (15-27 in. lbs.) torque.
(5) Install speedometer pinion in adapter.
(6) Count number of teeth on speedometer pinion. Do this before installing assembly in housing. Then lubricate pinion teeth with transmission fluid.
(7) Note index numbers on adapter body (Fig. 5). These numbers will correspond to number of teeth on pinion.
(8) Install speedometer assembly in housing.
(9) Rotate adapter until required range numbers are at 6 o-clock position. Be sure range index numbers correspond to number of teeth on pinion gear.
(10) Install speedometer adapter clamp and retaining screw. Tighten clamp screw to 10-12 N·m (90-110 in. lbs.) torque.
(11) Connect wires to vehicle speed sensor.
(12) Lower vehicle and top off transmission fluid level if necessary.

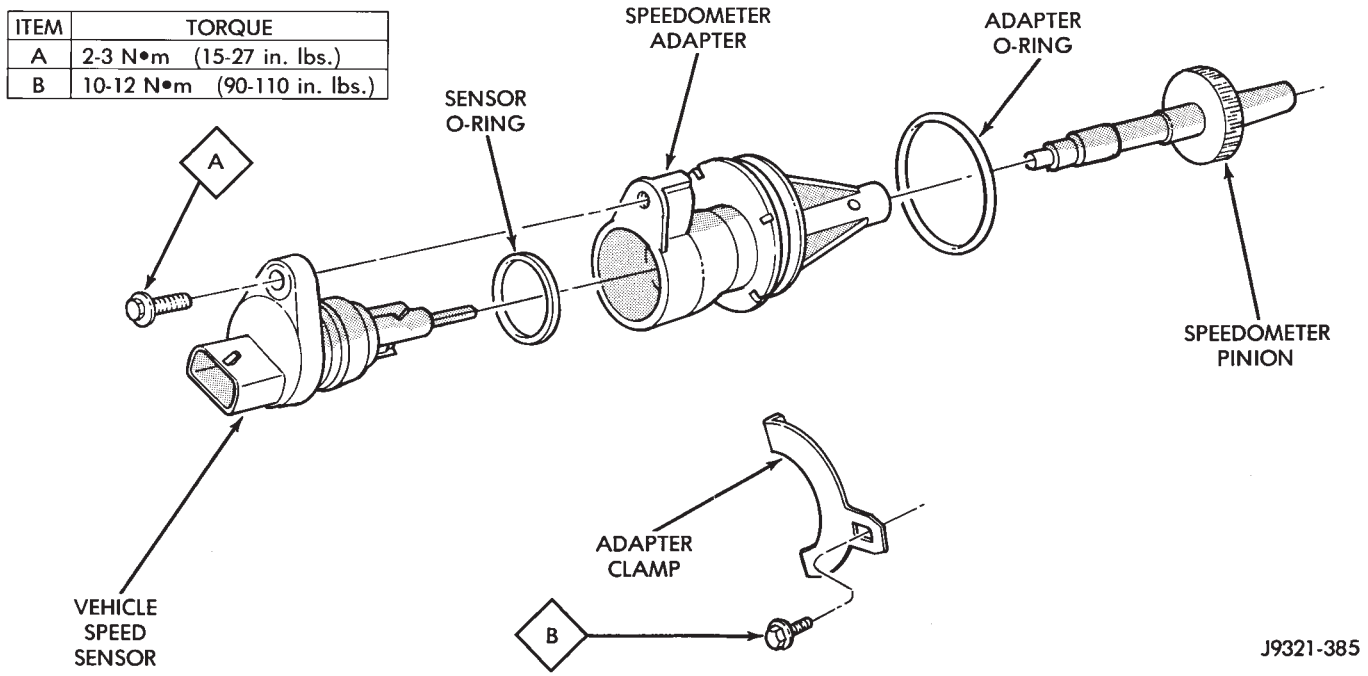



***Fig. 4 Speedometer Components***

REMOVAL AND INSTALLATION (Continued)

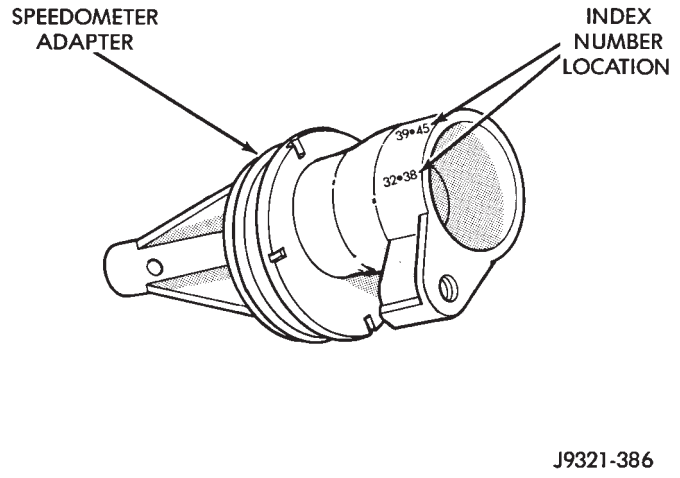



***Fig. 5 Location Of Index Numbers On Speedometer Adapter***

## 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. 6).

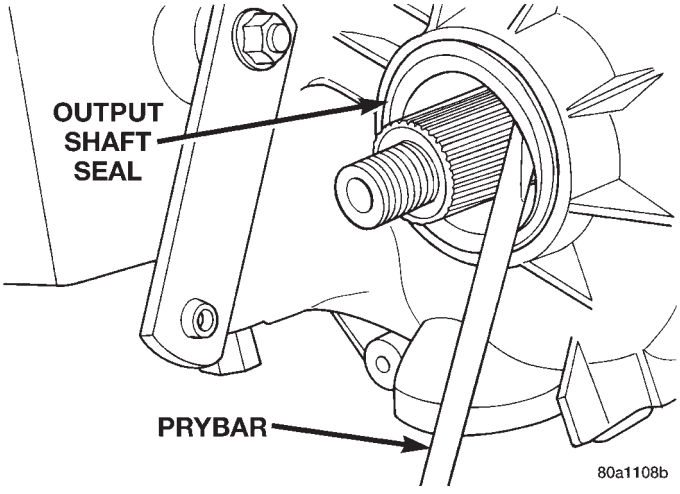



***Fig. 6 Remove Front Output Shaft Seal***

*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. 7). Once seal is started, continue tapping seal into bore until installer tool seats against case.

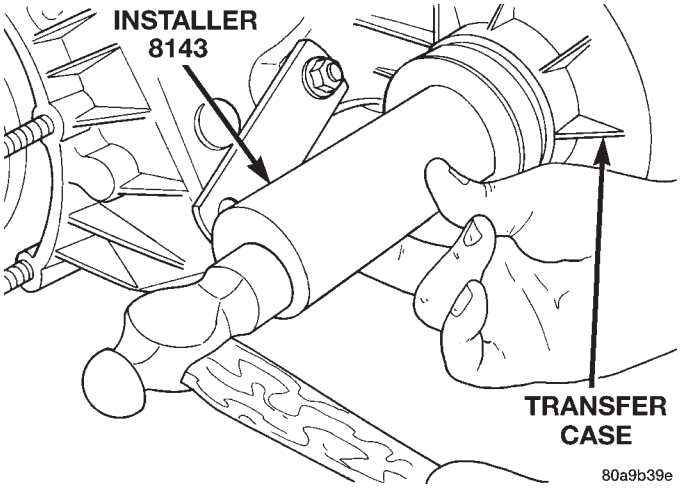



***Fig. 7 Front Output Seal Installation***

## 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. 8).

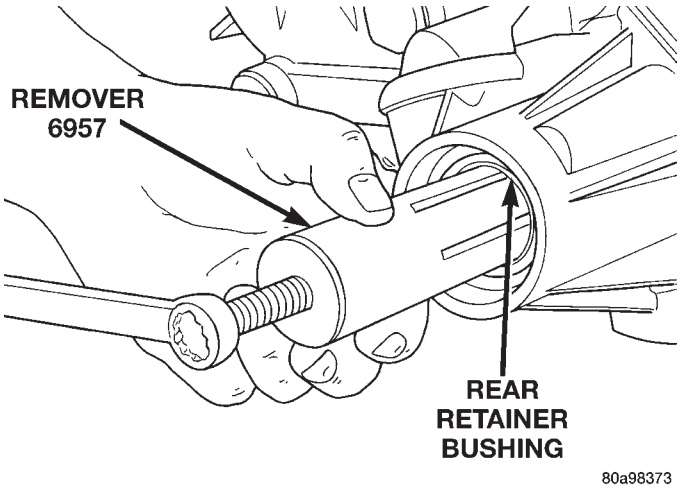



***Fig. 8 Rear Retainer Bushing Removal***

*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.

REMOVAL AND INSTALLATION (Continued)

(3) Using Installer 8160, drive bushing into retainer until installer seats against case (Fig. 9).

(4) Using Installer C-3995-A, install seal in rear retainer (Fig. 10).

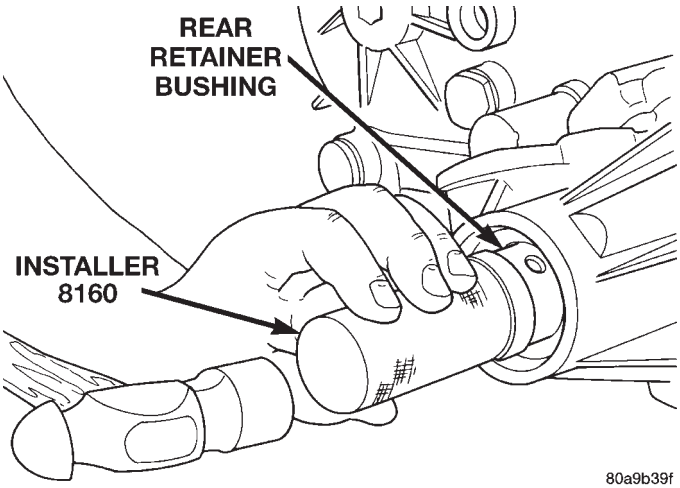



*Fig. 9 Rear Retainer Bushing Install*

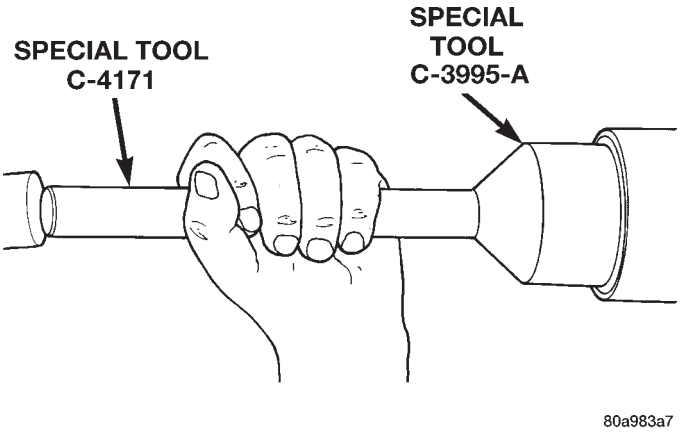



*Fig. 10 Install Rear Retainer Seal*

(5) Install propeller shaft.

(6) Verify proper fluid level.

(7) Lower vehicle.

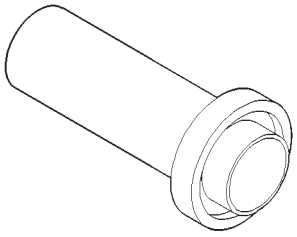
## SPECIFICATIONS

### TORQUE

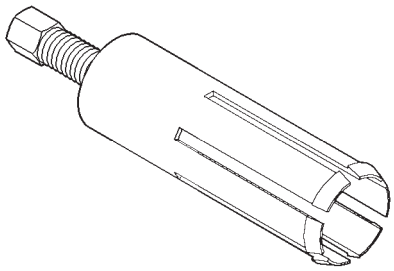
| DESCRIPTION | TORQUE |
|---|---|
| Plug, Drain/Fill | 40 N·m |
| Nuts, Mounting | 35 N·m |
| Switch, Indicator | 26 N·m |

## SPECIAL TOOLS

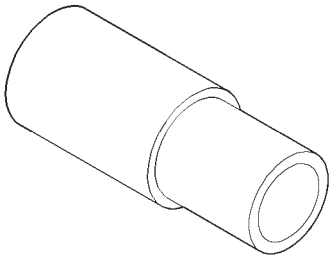
### SPECIAL TOOLS—NV231



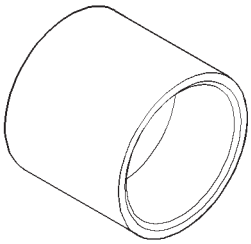
*Installer, Seal—8143*



*Remover, Bushing—6957*



*Installer, Bushing—8160*



*Installer, Seal—C-3995-A*