

# AUTOMATIC TRANSMISSION—42RE

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## GENERAL INFORMATION

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### TRANSMISSION DESCRIPTION

The Chrysler 42RE is a 4-speed automatic transmission. Mechanical and hydraulic components in the 42RE are similar to those in Chrysler 42RH transmissions. The major difference between them involves the method of producing governor pressure for shift speed control. The 42RE uses electronic components to develop governor pressure. A mechanical governor is used to generate governor pressure in the 42RH.

First through third gear ranges in the 42RE are provided by the clutches, bands, overrunning clutch and planetary gear sets in the transmission unit. Fourth gear range is provided by the overdrive unit which 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 42RE valve body transfer plate is completely new. It is redesigned to accept a new governor body and different hydraulic circuitry. The governor pressure solenoid valve and sensor are mounted in this body. The new 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 necessary governor pressure.

The 42RE overdrive unit is quite different from previous overdrive units. It is shorter in length as a result of eliminating the mechanical governor mechanism, governor tubes and governor support.

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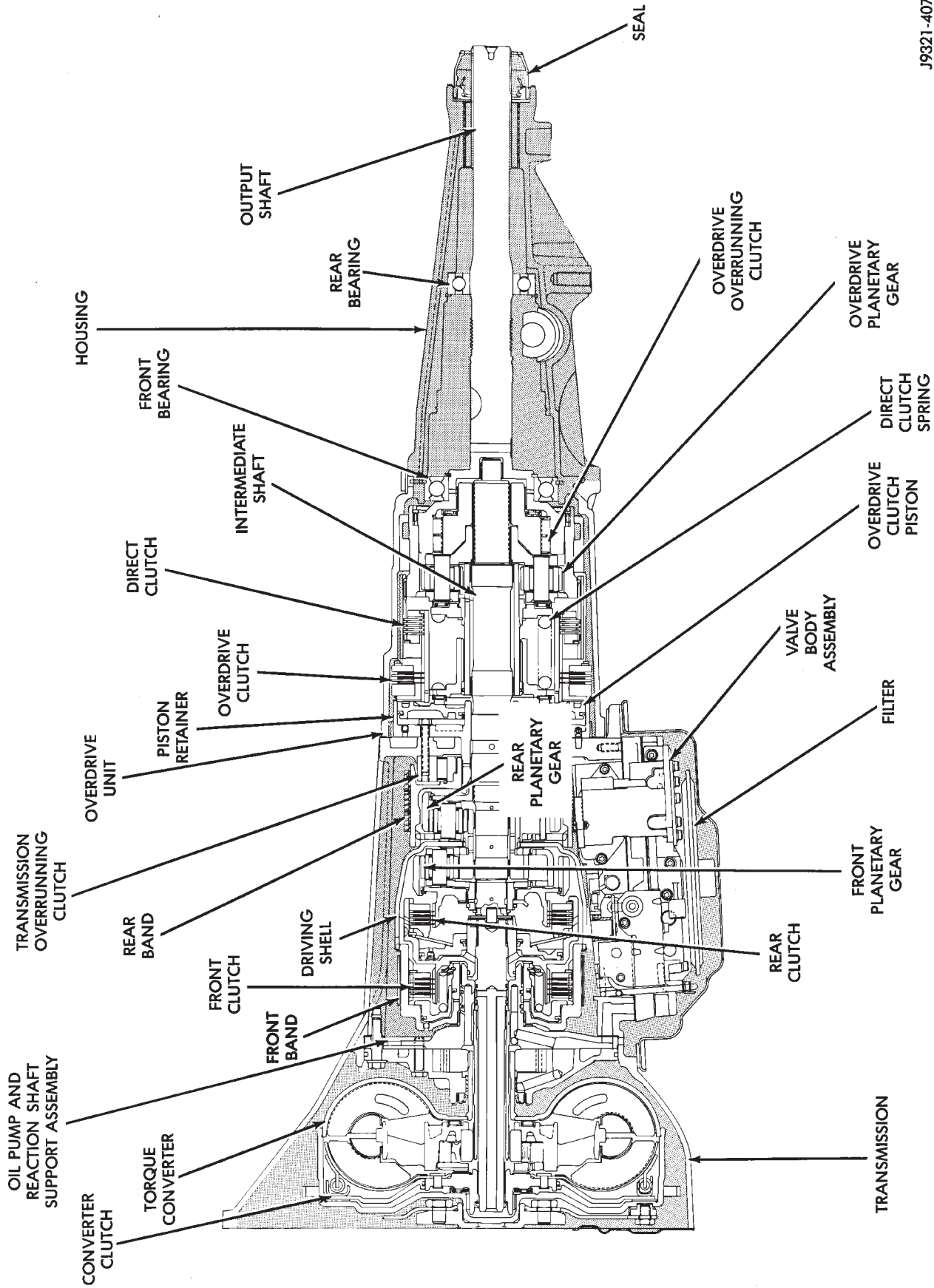


Fig. 1 42RE Automatic Transmission (4 x 2 Model)

## TORQUE CONVERTER

A three element torque converter is used for all applications (Fig. 1). Converter elements consist of the turbine, stator and impeller. The converter also contains an overrunning clutch and a converter clutch mechanism.

The converter clutch is an electronically controlled mechanism. The clutch provides reduced engine speed and greater fuel economy when engaged. Clutch engagement also provides reduced transmission fluid temperatures.

The converter clutch is engaged in fourth gear and in third gear when the overdrive control switch is in the OFF position.

The overrunning clutch is mounted in the stator hub. This one-way clutch prevents the stator from rotating in a direction opposite to engine rotation. This retains the torque multiplication feature of the converter.

The torque converter is not a serviceable component. It should be replaced as an assembly when: diagnosis indicates a malfunction has occurred, or when a major malfunction allows debris to enter the converter.

## GEAR RATIOS

Forward Gear ratios for the 42RE transmission are:

- First gear = 2.74:1
- Second gear = 1.54:1
- Third gear = 1.00:1
- Fourth gear = 0.69:1.

## RECOMMENDED FLUID

The only fluid recommended for the 42RE transmission is Mopar ATF Plus, type 7176. Do not use Dexron II except in an emergency or if ATF Plus is not available.

## TRANSMISSION IDENTIFICATION

The transmission part/identification numbers and codes are stamped on the left side of the case just above the oil pan gasket surface (Fig. 2).

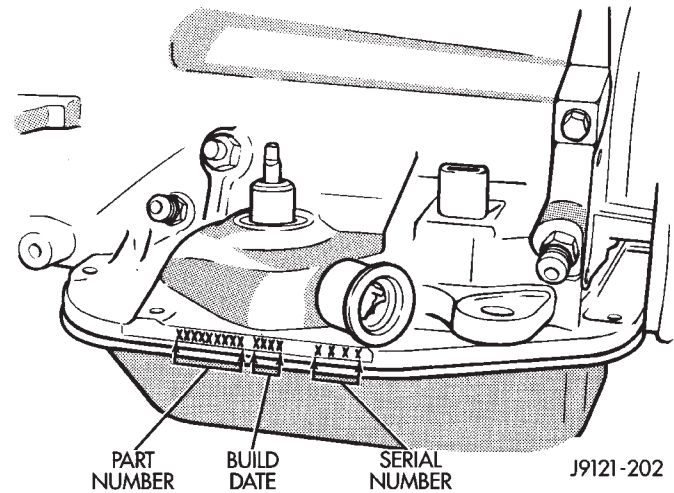
The first letter/number group is the assembly part number. The next number group the transmission build date. The last number group is the transmission serial number. Refer to this information when ordering replacement parts.

## FRONT BAND ADJUSTMENT

The front band adjustment for 42RE transmissions is considerably different from prior 4-speed models.

On 42RE transmissions, the front band is **backed off 3-5/8 turns** after tightening the adjusting screw to specified torque.

Refer to the front band adjustment procedure in the In-vehicle Service section when band adjustment is necessary.



**Fig. 2 Transmission Identification Number And Code Location**

## ELECTRONIC GOVERNOR COMPONENTS

Governor pressure is developed and controlled electronically in the 42RE transmission. Components used for development and control of governor pressure include:

- governor body
- new design valve body transfer plate
- governor pressure solenoid valve
- governor pressure sensor
- fluid temperature thermister
- transmission speed sensor
- throttle position sensor
- transmission control module (TCM)

### Governor Pressure Solenoid Valve

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

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

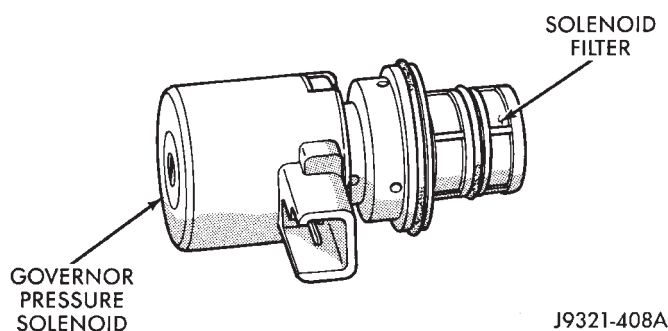
The solenoid valve regulates line pressure to produce governor pressure. The average current supplied to the solenoid controls governor pressure. One amp current produces zero kPa/psi governor pressure. Zero amps sets the maximum governor pressure.

The transmission control module (TCM) supplies electrical power to the solenoid valve. Operating voltage is 12 volts (DC) and is provided through the battery terminal on the module.

The solenoid is polarity sensitive. The TCM energizes the solenoid by grounding it through the power ground terminal on the transmission control module.

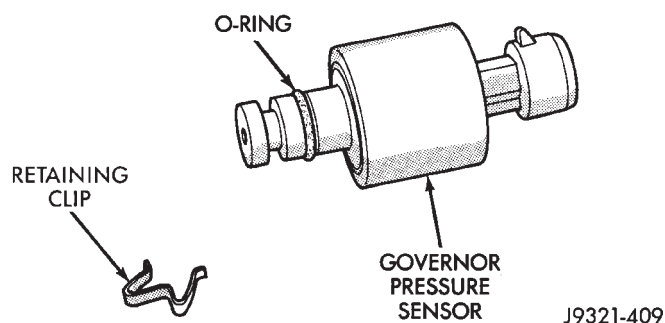
### Governor Pressure Sensor

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



**Fig. 3 Governor Pressure Solenoid Valve**

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

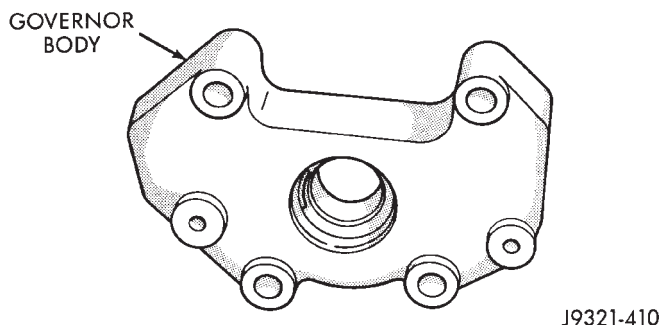


**Fig. 4 Governor Pressure Sensor**

#### Governor Body And Transfer Plate

A new transfer plate is used with the 42RE valve body. The transfer plate is designed to: (a) supply transmission line pressure to the governor pressure solenoid valve and (b) 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. 5).



**Fig. 5 Governor Body**

#### Transmission Fluid Temperature Thermister

Transmission fluid temperature readings are supplied to the transmission control module by the thermister (Fig. 6). The temperature readings are used to control engagement of the fourth gear overdrive clutch,

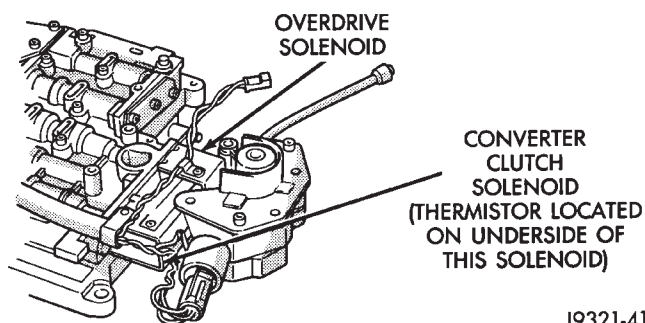
the converter clutch, and governor pressure. Normal resistance value for the thermister at room temperature is approximately 1000 ohms.

The transmission control module (TCM) prevents engagement of the converter clutch and overdrive clutch, when fluid temperature is below approximately 1°C (30°F).

If fluid temperature exceeds 126°C (260°F), the transmission control module will cause 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, also 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 mounted on the underside of the converter clutch solenoid (Fig. 6). It is immersed in transmission fluid at all times.



**Fig. 6 Converter Clutch Solenoid And Thermistor Location**

#### Transmission Speed Sensor

The speed sensor (Fig. 7), is located in the overdrive gear case. The sensor is positioned over the park gear and monitors transmission output shaft rotating speed. The sensor used with the 42RE transmission is the same as is used in Chrysler 41TE and 42LE

front drive automatic transmissions.

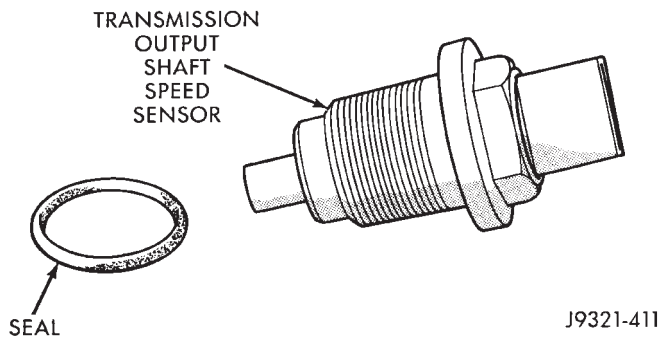
Speed sensor signals are triggered by the park gear lugs as they rotate past the sensor pickup face. Input signals from the sensor are sent to the transmission control module for processing.

The vehicle speed sensor also serves as backup to the transmission speed sensor. Signals from this sensor are shared with the powertrain control module.

#### Throttle Position Sensor (TPS)

The TPS provides throttle position input signals to both the transmission control module and powertrain controller. This input signal is used to determine overdrive and converter clutch shift schedule and to select the proper governor curve.





**Fig. 7 Transmission Speed Sensor**

#### Transmission Control Module (TCM)

The TCM 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 and throttle position sensor.

Operating voltage is supplied through the battery terminal on the control module. The ignition voltage signal is supplied through a terminal on the ABS control module.

The DRB II scan tool can be used to check operation of the control module and transmission electrical components. The diagnostic connector (for the scan tool) is located under the driver side of the instrument panel. The connector has a 6-way terminal and is blue in color.

#### 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 -0.5°C (31°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.

#### TRANSMISSION SHIFTING

Shift valve operation in 42RE transmissions with the electronic governor mechanism is basically unchanged. The 1-2 and 2-3 upshift sequence occurs exactly the same as in non-electronic governor transmission.

The valve body shift valves are still moved by a combination of throttle and governor pressure. The only real difference is that governor pressure is generated by electrical components instead of a mechanical valve and weight assembly.

The conditions under which a shift to fourth will not occur, also remain the same. These being:

- shift to third not yet completed
- overdrive switch is in OFF position
- throttle is at 3/4 to wide open position
- vehicle speed too low for 3-4 shift to occur
- transmission fluid temperature is below 1°C (30°F) or above 121°C (250°F).

#### CONVERTER CLUTCH ENGAGEMENT

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.

#### OVERDRIVE OFF SWITCH

The overdrive Off switch is located in the instrument panel. The switch is a momentary contact device that signals the TCM 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 normal position for the control switch is the ON position. The switch must be in this position to energize the solenoid and allow a fourth gear upshift.

The control switch has an indicator light. The light illuminates when the overdrive switch is turned to the OFF position, or when illuminated by the transmission control module.

The control switch indicator light is also used to signal fault flash codes for diagnostic purposes.

#### QUICK FILL VALVE

The 3-4 shuttle valve is replaced by a 3-4 quick fill valve in the 42RE valve body. The valve maintains a prefill pressure of approximately 5 psi in the overdrive clutch. Prefill pressure is maintained in all drive (D) ranges. The purpose of the valve is faster engagement of the overdrive clutch during 3-4 upshifts.

In operation, 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 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.

## SERVICE MANUAL UPDATES

### *NEW THROTTLE VALVE CABLE*

A different throttle valve cable is used on ZJ models with the 42RE transmission and 4.0L engine. The cable is similar to the one used on V8 models with the 46RH transmission.

### *NEW THROTTLE VALVE CABLE ADJUSTMENT PROCEDURE*

A new throttle valve cable adjustment procedure has been developed for the 42RE and 46RH throttle valve cable.

The adjustment procedure is new for the 1993 model year and applies to 42RE and 46RH transmissions equally. Make a note on page 21-92, Group 21, of your 1993 Grand Cherokee Service Manual and refer to the procedure in this manual when adjustment is necessary.

The new adjustment procedure is described in the In-Vehicle Service section.

### *TRANSMISSION SHIFT MECHANISM*

A floor shift linkage mechanism is used on all ZJ models with the 42RE and 46RH automatic transmission. A column type gearshift linkage was **not** released. Make a note of this information on page 21-191 of your 1993 Grand Cherokee/Grand Wagoneer service manual. The correct floorshift cable mechanism and adjustment procedures are provided in the transmission In-Vehicle Service section.

## 42RE TRANSMISSION DIAGNOSIS

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**DIAGNOSIS PROCEDURES**

Begin diagnosis by checking the easily accessible items such as fluid level, fluid condition and throttle cable/shift linkage adjustments. A road test will determine if further diagnosis is necessary.

Procedures outlined in this section should be performed in the following sequence to realize the most accurate results:

- (1) Preliminary diagnosis
- (2) Fluid Level and condition
- (3) Leak tests (if fluid level is low)
- (4) Linkage Adjustment
- (5) Overdrive control switch test
- (6) Road test
- (7) Stall test
- (8) Hydraulic pressure test
- (9) Air pressure tests
- (10) Analyze test results and consult diagnosis charts

**PRELIMINARY DIAGNOSIS**

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

**VEHICLE IS DRIVEABLE**

- (1) Check for TCM fault codes with DRB II scan tool, or with fault flash codes at lamp in overdrive Off switch.
- (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, disconnected throttle valve cable or lever.
- (3) Check for cracked, leaking cooler lines, or loose, missing pressure port plugs.
- (4) Raise vehicle, start engine, shift transmission into gear and note following:
  - (a) If propeller shafts turn but wheels do not, problem is with differential or axle shafts.
  - (b) If propeller shafts do 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 shafts do not turn and transmission is not noisy, perform hydraulic pressure test to determine if problem is a hydraulic or mechanical.

**CHECKING FLUID LEVEL AND CONDITION**

- (1) Place vehicle on level surface. This is important for an accurate reading.
- (2) Do not check level until fluid is at normal hot operating temperature of approximately 180°F. This is necessary to avoid false readings which could produce under or over fill condition.
- (3) Start and run engine at curb idle speed and apply parking brakes.
- (4) Shift transmission through all gear ranges and back to Neutral.
- (5) Clean top of filler tube and dipstick to keep dirt out of tube.
- (6) Remove dipstick and check fluid level as follows:
  - (a) Dipstick has three fluid level indicating marks which are a MIN dot mark, an OK mark and a MAX fill arrow mark:
  - (b) Correct level is to Full, or MAX arrow mark on dipstick. This is correct maximum hot fluid level. Acceptable level is between OK mark and max arrow mark on dipstick.

(c) If level is at, or below MIN level dot on dipstick, add only enough fluid to restore correct level. Mopar ATF Plus, type 7176 is the preferred fluid. Mopar Dexron II can be used if ATF Plus is not readily available.

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

(7) Check fluid condition. Fluid should be dark to light red in color and free of particles and sludge.

(a) If fluid is discolored or smells burned but transmission operation was OK, flush cooler and lines and change fluid and filter. Then road test again to confirm proper operation.

(b) If fluid is black, dark brown, turned to sludge, contains extensive amount of metal or friction material particles, transmission will probably need overhaul (especially if shift problems were evident during road test).

#### EFFECTS OF INCORRECT FLUID LEVEL

A low fluid level allows the pump to take in air along with the fluid. Air in the fluid will cause fluid pressures to be low and develop slower than normal.

If the transmission is overfilled, the gears churn the fluid

into foam, aerating the fluid and causing the same conditions that occur with a low level. In either case, air bubbles cause fluid overheating, oxidation and varnish buildup which interferes with valve, clutch and servo operation.

Foaming also causes fluid expansion which can result in fluid overflow from the transmission vent or fill tube. Fluid overflow can easily be mistaken for a leak if inspection is not careful.

#### OVERDRIVE ELECTRICAL CONTROLS

The electrical controls governing the shift into fourth gear consist of the overdrive off switch in the instrument panel and the overdrive solenoid on the valve body.

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.

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

#### DIAGNOSTIC TROUBLE FLASH CODES

Diagnostic trouble flash codes are provided for diagnosis purposes. The lamp in the overdrive off switch is used to signal the various flash codes.

The flash codes and type of fault indicated are outlined in the Flash Code Chart (Fig. 1).

To view flash codes, proceed as follows:

(a) Turn ignition key on and off three times. Then leave overdrive off switch in normal overdrive (on) position.

(b) Immediately begin counting number of flashes displayed by overdrive off switch indicator lamp.

(c) Flash codes will correspond to powertrain control module in duration and spacing.

(d) A code 55 identifies end of flash code transmission

FAULT CODE	FAULT DESCRIPTION
11	Engine RPM input
12	Output shaft sensor input
13	Vehicle speed input
14	Governor pressure sensor input
15	Throttle position sensor input
16	Transmission fluid temperature input
17	Overdrive override (control) switch input
18	System voltage
19	Internal fault in module
21	Governor pressure solenoid output
22	Overdrive solenoid output
23	Converter clutch solenoid output
24	Overdrive override (control switch) lamp output
25	Internal fault in module
26	Governor pressure sensor offset drift
55	End of code transmission

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**Fig. 1 DIAGNOSTIC TROUBLE FLASH CODE CHART—42RE**

#### TRANSMISSION THROTTLE VALVE CABLE AND SHIFT CABLE ADJUSTMENT

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

If cable setting is too short, early shifts and slippage between shifts may occur. If the setting is too long, shifts may be delayed and part throttle down-



shifts may be very sensitive. Refer to the In-Vehicle Service section for adjustment procedure.

Shift cable adjustment is important because it positions the valve body manual valve. Incorrect adjustment will cause creep in Neutral, premature clutch wear, delayed engagement in all gear ranges, or a no-start in Park or Neutral.

Proper operation of the park/neutral position switch will provide a quick check of linkage adjustment. Refer to the In-Vehicle Service section for linkage adjustment procedure.

## ROAD TESTING

Before road testing, be sure the fluid level and all cable adjustments have been checked and adjusted if necessary. Observe engine performance during the road test. A poorly tuned engine will not allow an 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 may 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 (Fig. 2) provides a basis for analyzing road test results.

## ANALYZING THE ROAD TEST

Refer to the Clutch and Band Application chart (Fig. 2) 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

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

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Fig. 2 Clutch And Band Application Chart

braking in 2 position (manual second gear). If the transmission slips in any other two forward gears, the transmission rear clutch is probably slipping.

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

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

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

**Unless a malfunction is obvious, such as no drive in D range first gear, do not disassemble the transmission. Perform the hydraulic and air pressure tests to help pinpoint the problem 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. Use 100 psi Gauge C-3292 to check pressure at the accumulator, front servo and governor. Use 300 psi Gauge C-3293 to check pressure at the rear servo.

#### PRESSURE TEST PORT LOCATIONS

There are pressure test ports at the accumulator, front servo, and rear servo. Governor and overdrive clutch pressure test ports are located at the left and right rear sides of the case (Fig. 3).

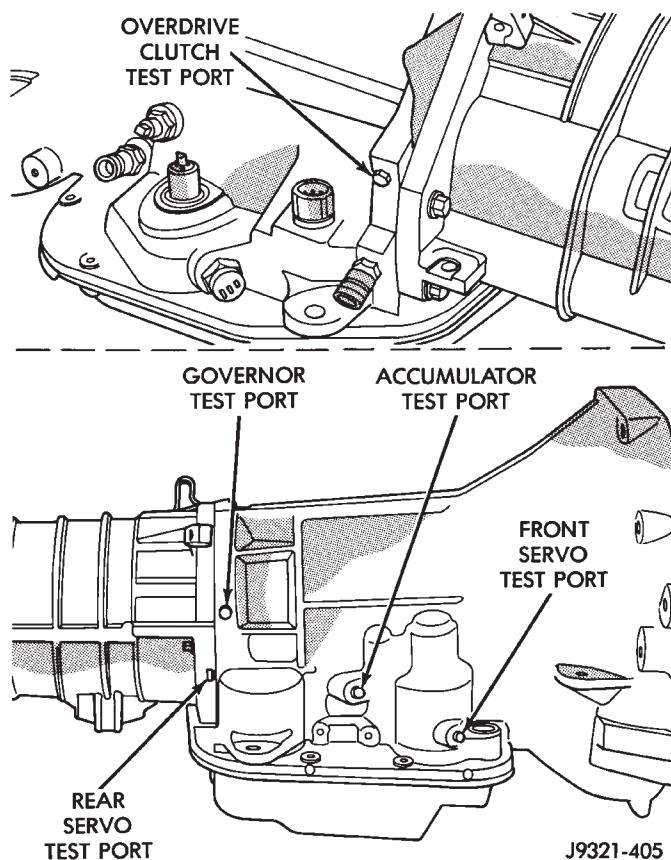
Line pressure is checked at the accumulator port on the right side of the case. The front servo pressure port is at the right side of the case just behind the filler tube opening.

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. 3).

An accurate tachometer and two test gauges are required for the pressure test. Test Gauge C-3292 has a 100 psi range and is used at the accumulator, governor, front servo, and overdrive pressure ports. Test Gauge C-3293 has a 300 psi range and is used at the rear servo port where pressures range from 250 to 290 psi. In cases where two test gauges are required, the 300 psi gauge can be used at any of the other test ports.

#### HYDRAULIC PRESSURE TEST PROCEDURE

Connect a tachometer to the engine. Position the tachometer so it can be observed from under the vehicle. Raise the vehicle on hoist that will allow the wheels to rotate freely.



**Fig. 3 Pressure Test Port Locations**

#### Test One—Transmission In 1 Range

**This test checks pump output, pressure regulation, and condition of the rear clutch and servo circuit. Test Gauges C-3292 and C-3293 are required for this test. Gauge C-3292 has a 100 psi range. Gauge C-3293 has a 300 psi range.**

- (1) Connect 100 psi Gauge C-3292 to accumulator port.
- (2) Connect 300 psi Gauge C-3293 to rear servo port (Fig. 3).
- (3) Disconnect throttle and gearshift cables from transmission levers.
- (4) Start and run engine at 1000 rpm.
- (5) Move shift lever (on manual lever shaft) all the way forward into 1 range.
- (6) Move transmission throttle lever from full forward to full rearward position and note pressures on both gauges.
- (7) 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 lever is moved rearward.
- (8) Rear servo pressure should be same as line pressure within 3 psi (20.68 kPa).

**Test Two—Transmission In 2 Range**

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

- (1) Connect test gauge to accumulator pressure port (Fig. 3).
- (2) 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 at both gauges.
- (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**

**This test checks pressure regulation and condition of the clutch circuits. Use both pressure Test Gauges C-3292 and C-3293 for this test.**

- (1) Connect test gauges to accumulator and front servo ports (Fig. 3). Use either test gauge at the two ports.
- (2) Start and run engine at 1600 rpm for this test.
- (3) Move shift lever two detents rearward from full forward position. This is D range.
- (4) Read pressures on both gauges as transmission throttle lever is moved from full forward to full rearward position.
- (5) Line pressure should be 54-60 psi (372-414 kPa) with throttle lever forward and gradually increase as lever is moved rearward.
- (6) Front servo is pressurized only in D range and should be same as line pressure within 3 psi (21 kPa) up to downshift point.

**Test Four—Transmission In Reverse**

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

- (1) Connect 300 psi gauge to rear servo port (Fig. 3).
- (2) Start and run engine at 1600 rpm for test.
- (3) Move transmission shift lever four detents rearward from the full forward position. This is Reverse range.
- (4) Move throttle lever all way forward then all way rearward and note gauge readings.
- (5) Pressure should be 145 - 175 psi (1000-1207 kPa) with lever forward and increase to 230 - 280 psi (1586-1931 kPa) as lever is moved rearward.

**Test Five—Governor Pressure**

**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 a hoist that will allow the rear wheels to rotate freely.

- (1) Connect 100 psi Test Gauge C-3292 to governor pressure port (Fig. 3).
- (2) Move transmission shift lever to D range.
- (3) Start and run engine at curb idle speed and note pressure. At idle and with vehicle stopped, pressure should be zero to 1-1/2 psi maximum. If pressure exceeds this figure, a fault exists in the governor pressure control system.
- (4) Slowly increase engine speed and observe speedometer and pressure test gauge. Governor pressure should increase in proportion to vehicle speed. Or approximately 1 psi for every 1 mph.
- (5) Pressure rise should be smooth and drop back to 0 to 1-1/2 psi when wheels stop rotating.
- (6) Compare results of pressure tests with analysis chart (Fig. 4).

**Test Six—Transmission In Overdrive Fourth Gear**

**This test checks line pressure at the overdrive clutch in fourth gear range. Use 300 psi Test Gauge C-3292 for this test.**

- (1) Raise vehicle and connect test gauge to overdrive clutch pressure port (Fig. 4).
- (2) Lower vehicle to enough to allow entry into drivers seat. Leave vehicle wheels approximately one foot off shop floor.
- (3) Secure test gauge where it can be viewed from drivers seat.
- (4) Verify that overdrive control switch is in ON position.
- (5) Start engine and shift into D range.
- (6) Increase engine rpm gradually until 3-4 shift occurs and note gauge pressure.
- (7) 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.

(5.0H x 3.5W) Fig. 4 Pressure Test Analysis Chart

**CONVERTER STALL TEST**

Stall testing involves determining maximum engine rpm 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 clutch and both of the transmission clutches. When stall testing is completed, refer to the Stall Speed Specifications chart and Stall Speed Diagnosis guides.

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 (servo, clutch seals, governor support seal rings)
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 (servo, clutch seals, retainer bore, pump seal rings)
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, plugged fluid cooler
Governor pressure too high at idle speed	Governor pressure solenoid valve faulty
Governor pressure low at all mph figures	Faulty governor pressure solenoid, transmission control module, or governor pressure sensor
Lubrication/line pressure low at all throttle positions	Clogged fluid cooler or lines, seal rings leaking, output shaft plugged with debris, worn bushings in pump or clutch retainer

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

#### STALL TEST PROCEDURE

- (1) Connect tachometer to engine. Position tachometer so it can be viewed from driver seat.
- (2) Check transmission fluid level. Add fluid if necessary.
- (3) Start and run engine until transmission fluid reaches normal operating temperature.
- (4) Block front wheels.
- (5) Fully apply service and parking brakes.
- (6) Open throttle completely for no more than five seconds and record maximum engine rpm registered on tachometer.

**CAUTION:** Stall testing causes a rapid increase in transmission fluid temperature. Do not hold the throttle open any longer than five seconds. If more than one stall test is required, run the engine at 1000 rpm with the transmission in Neutral for at least 20 seconds to cool the fluid.

(7) If engine speed exceeds maximum shown in stall speed chart, release accelerator immediately. This indicates that transmission clutch slippage is occurring.

(8) Shift transmission into Neutral. Operate engine for 20 seconds. Stop engine, shift transmission into Park and release brakes.

(9) Stall speeds should be in 1800-2100 rpm range.

#### STALL TEST ANALYSIS

##### STALL SPEED TOO HIGH

If the stall speed exceeds specifications by more than 200 rpm, transmission clutch slippage is indicated.

##### STALL SPEED TOO LOW

Low stall speeds with a properly tuned engine indicate a torque converter overrunning clutch problem. The condition should be confirmed by road testing prior to converter replacement.

The converter overrunning clutch is slipping when: Stall speeds are 250 to 350 rpm below specified minimum and the vehicle operates properly at highway speeds but has poor low speed acceleration.

##### STALL SPEED NORMAL

If stall speeds are normal but abnormal throttle opening is required to maintain highway speeds, the converter overrunning clutch is seized and the torque converter must 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 noise is originating from the converter, operate the vehicle at light throttle in Drive and Neutral on a hoist and listen for noise coming from the converter housing.

#### AIR TESTING TRANSMISSION CLUTCH AND BAND OPERATION

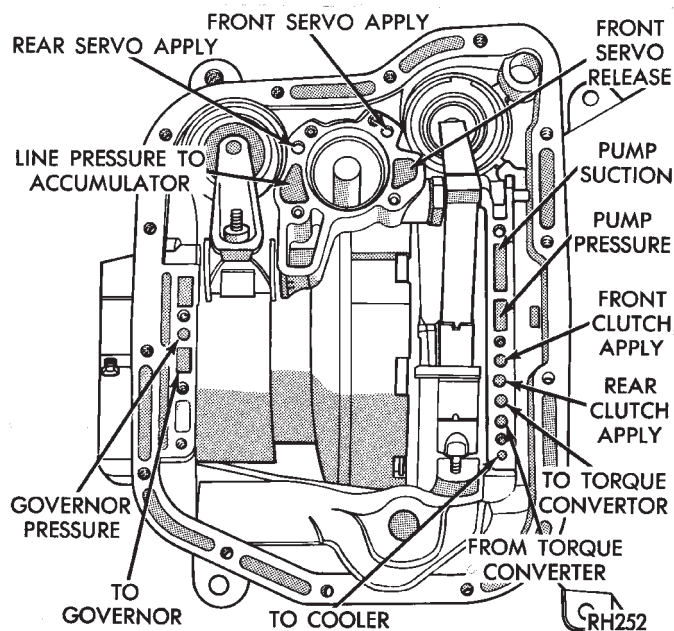
Air pressure testing can be used to check transmission front/rear clutch and band operation with the transmission either in the vehicle, or on the work bench as a final check after overhaul.

Air pressure testing requires that the oil pan and valve body be removed from the transmission. The servo and clutch apply passages are shown in Figure 5.

##### FRONT CLUTCH AIR TEST

Place one or two fingers on the clutch housing and apply air pressure through front clutch apply passage (Fig. 5). Piston movement can be felt and a soft thud heard as the clutch applies.





**Fig. 5 Air Pressure Test Passages**

#### 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 thud 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 tension 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 tension 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. First, it must be verified that a leak condition actually exists. And second, the true source of the leak must be determined.

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 refill after repair.

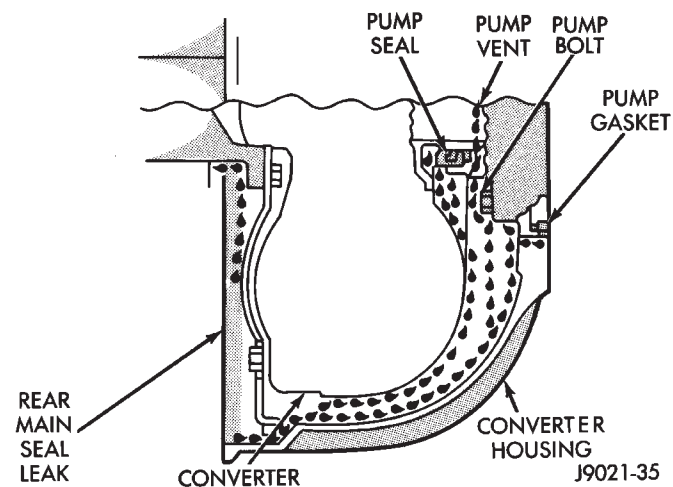
Converter housing leaks have several potential sources. Through careful observation, a leak source can be identified before removing the transmission for repair.

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. 6).

Pump vent or pump attaching bolt leaks are generally deposited on the inside of the converter housing and not on the converter itself (Fig. 6).

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. 6 Converter Housing Leak Paths**

#### LEAK DIAGNOSIS PROCEDURE

(1) Raise rear of vehicle and allow accumulated fluid to drain out of converter housing.

(2) Check and adjust transmission fluid level.

(3) Raise vehicle. Remove converter housing dust cover and wipe as much fluid as possible from converter housing.

(4) Fabricate test probe (Fig. 7). Attach probe to converter housing with a dust shield bolt.

(5) Have a helper run engine at 2500 rpm (with transmission in Neutral) for two minutes; then stop engine.

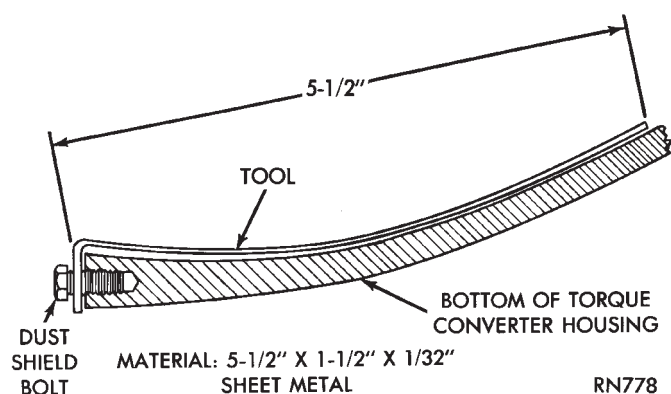
(6) Inspect test probe and converter housing. If a leak is evident, note color of fluid. Transmission fluid is red. Engine oil ranges in color from brown to green, or to black when oil is dirty.

(7) If probe upper surface is wet with fluid, converter and seal are not at fault. A path of fluid across probe upper surface indicates a converter or seal leak. Fluid leaking **under** the probe is coming from pump housing area (Fig. 8).

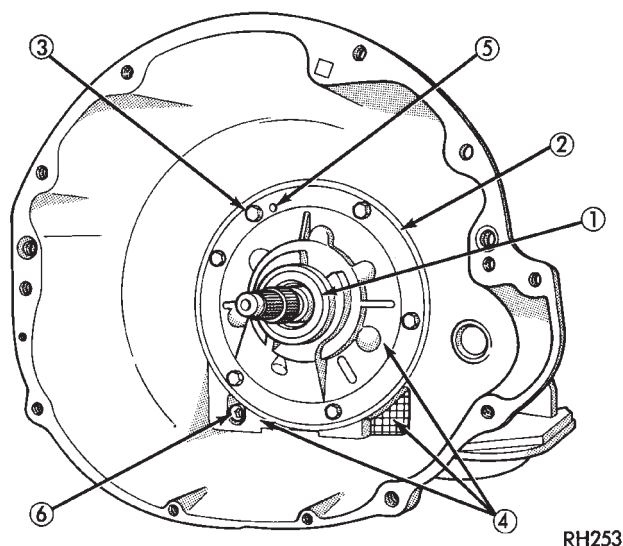
(8) Fluid leaking under the probe could be from: pump seal and/or bushing, pump vent, kickdown lever shaft access plug, pump bolts, or porous spots in pump body or transmission case (Fig. 8).

(9) If porous spots in the transmission case or pump body are the suspected leak source, pressurize transmission as described in Leak Testing With Air Pressure.





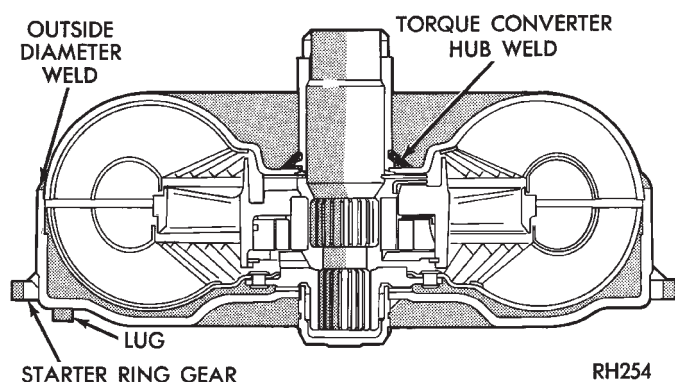
**Fig. 7 Converter Housing Leak Test Probe**



**Fig. 8 Pump Area Inspection Points**

#### TORQUE CONVERTER LEAK POINTS

Possible sources of converter leaks are: (a) leaks at the weld joint around the outside diameter weld and (b) leaks at the converter hub weld (Fig. 9).



**Fig. 9 Converter Potential Leak Points**

#### LEAK TESTING WITH AIR PRESSURE

This test involves closing off all openings and pressurizing the transmission to 8 psi with Air Pump 7700.

A soapy water solution is applied to suspected leak points before and during the pressure test. Leaks will be indicated by the presence of air bubbles coming through the solution.

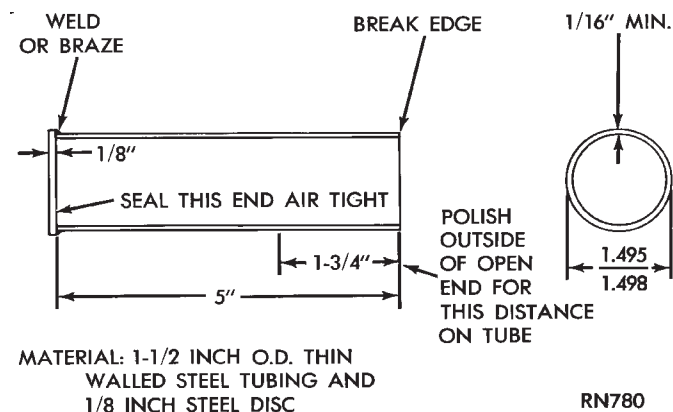
Some transmission openings such as the fill tube and front cooler line fitting can be closed off with a rubber plug or similar device. Plugs can be secured with wire or duct tape.

The transmission rear output shaft opening is closed off simply by leaving the transfer case bolted in place. However, if the transfer case has been removed, a shipping plug can be used to close off this opening.

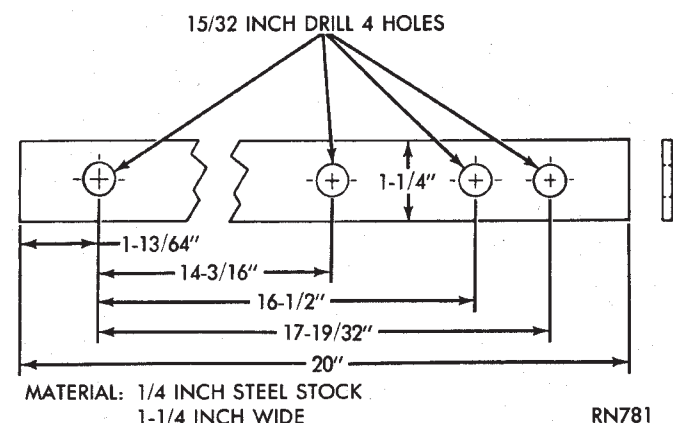
The torque converter hub opening in the pump and the pump vent require special tools to close them off. The converter hub seal cap is made from thin wall tube and a 3.17 mm (1/8 in.) thick disc (Fig. 10). A retaining strap is needed to secure the seal cup for testing. The strap can be made from 31.75 mm (1-1/4 in.) wide stock (Fig. 11). The strap attaching hole positions are approximate only. Measure hole position on the converter housing before drilling.

The pump vent tool is made from 6.35 mm (1/4 in.) rod and 4.76 mm (3/16 in.) plate (Fig. 12).

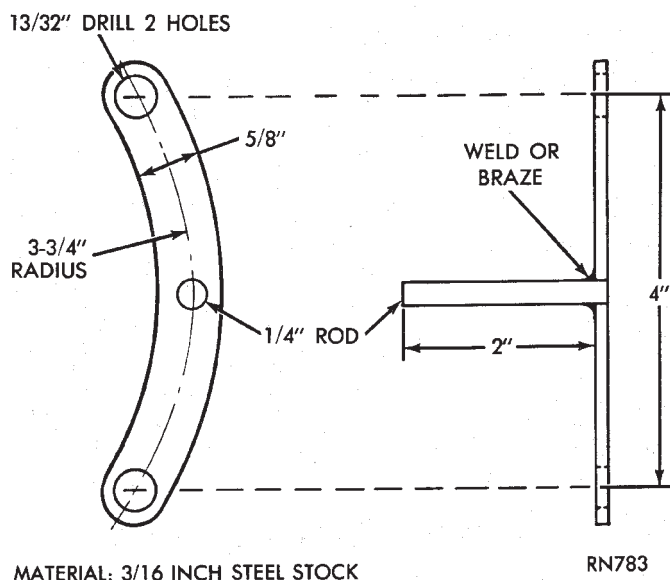
The fabricated tools can all be made from mild steel or aluminum stock.



**Fig. 10 Converter Hub Seal Cup**



**Fig. 11 Seal Cup Retaining Strap**



**Fig. 12 Pump Vent Plug**

#### AIR PRESSURE LEAK TEST PROCEDURE

(1) Install vent plug, converter hub seal cup and cup retaining strap (Fig. 13).

**CAUTION:** Be sure the surfaces of the hub seal cup are smooth and free of nicks, scratches, or burrs. Surface irregularities on the cup will damage the pump seal if not removed. Sand and/polish the cup with 400 grit sandpaper or crocus cloth to smooth the surface if necessary.

(2) Close off remaining transmission openings with rubber plugs, or stoppers or similar devices. **Do not close off rear cooler line fitting. Hand operated air pump will be attached to this fitting.**

(3) Attach Air Pump 7700 to rear cooler line fitting. Connect a length of copper tube to fitting. Then attach pump hose to tube with hose clamp (Fig. 14).

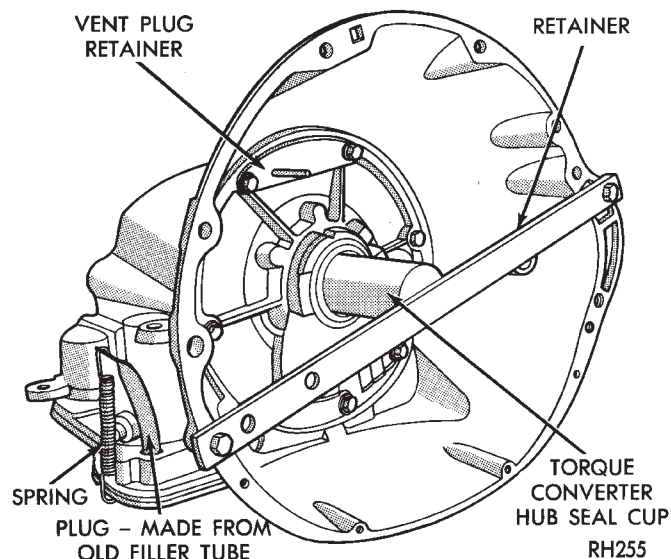
(4) Apply a thick soapy water solution to suspected leak areas.

**CAUTION:** The recommended test pressure is 8 psi. The maximum allowable test pressure is 10 psi. Do not exceed specified pressure.

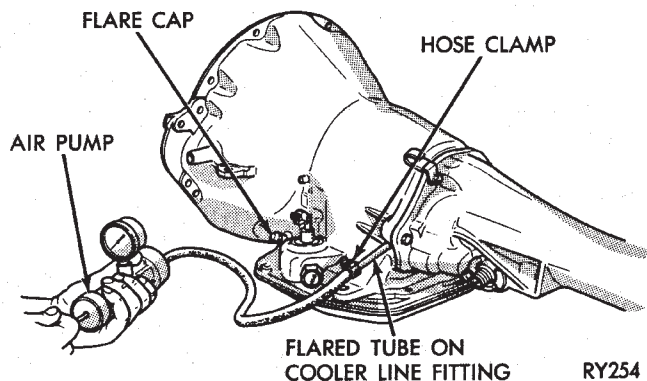
- (5) Pressurize transmission to 8 psi with air pump.
- (6) Observe suspected leak areas. Air bubbles appearing in soapy water solution indicate leak points.
- (7) Remove test tools and plugs after test completion and make necessary repairs as described in Leak Correction procedure.

#### CONVERTER HOUSING AREA LEAK CORRECTION

- (1) Remove converter.



**Fig. 13 Vent Plug And Hub Seal Cup Installation**



**Fig. 14 Typical Method Of Pressurizing Transmission**

(2) Tighten front band adjusting screw until band is tight around front clutch retainer. This prevents front/rear clutches from coming out when oil pump is removed.

(3) Remove oil pump and remove pump seal. Inspect pump housing drainback and vent holes for obstructions. Clear holes with solvent and wire.

(4) Inspect pump bushing and converter hub. If bushing is scored, replace it. If converter hub is scored, either polish it with crocus cloth or replace converter if scoring is severe.

(5) Install new pump seal, O-ring, gasket, bushing. Replace oil pump if cracked, porous or damaged in any way.

(6) Loosen kickdown lever pin access plug three turns. Apply Permatex No. 2 or equivalent 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 AND HYDRAULIC FLOW CHARTS

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

The hydraulic flow charts outline fluid flow and hydraulic circuitry. Circuit flow is outlined for all gear ranges including park and neutral. Circuit flow for converter clutch application in fourth gear is also provided.

## TRANSMISSION CONTROL MODULE (TCM) SERVICE

### TCM Diagnosis

Use the DRB II scan tool to diagnose TCM function whenever a fault is suspected. Replace the module only when scan tool diagnosis indicates a fault has actually occurred.

### TCM Location

The TCM is located on the driver side of the dash adjacent to the steering column. The module and harness connector are accessible from under the instrument panel (Fig. 15).

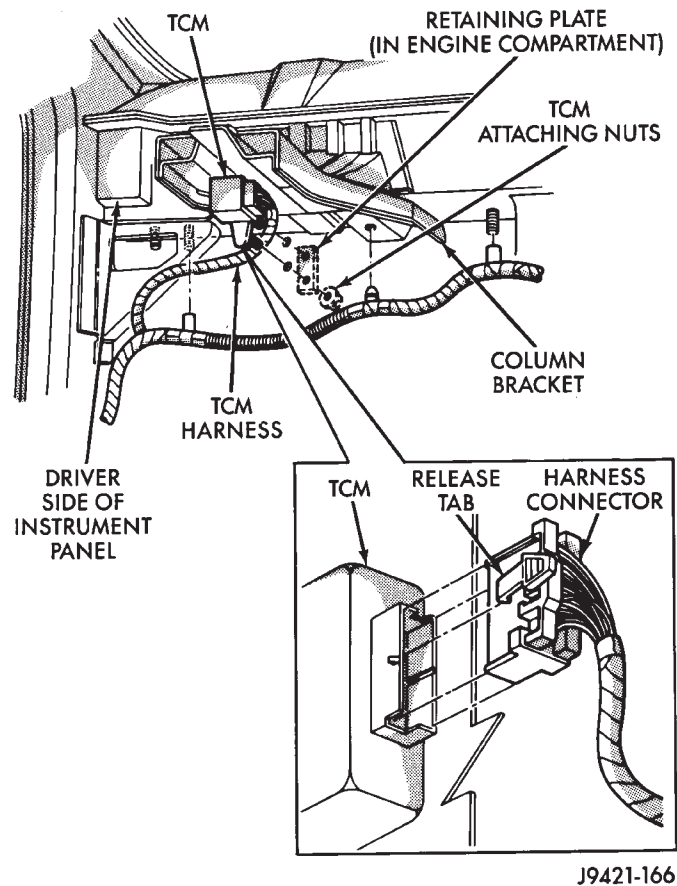
### TCM Mounting

The module has integral mounting studs for attachment to the dash panel. A retaining plate and two locknuts secure the module to the dash (Fig. 15). Although the module is inside the vehicle, the retaining plate and locknuts are on the engine compartment side of the dash panel.

### TCM Removal

(1) In engine compartment, remove module locknuts and remove module retaining plate. **Locknuts and retaining plate are on driver side of engine compartment near brake booster.**

(2) In vehicle interior, reach up under instrument panel and slide module out of dash.



**Fig. 15 TCM Location And Mounting (42RE)**

(3) Work module downward until module harness connector is accessible.

(4) Lift release tab on harness connector (Fig. 15). Pull connector out of module and remove module from vehicle.

### TCM Installation

(1) Carefully align and plug harness connector into module. Verify that connector is fully seated before proceeding.

(2) Work module upward into position on dash. Then slide module studs into mounting holes in dash.

(3) In engine compartment, install retaining plate on module studs. Then install and tighten locknuts to 14-16 N·m (129-144 in. lbs.) torque.

## TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
<b>HARSH ENGAGEMENT (FROM NEUTRAL TO DRIVE OR NEUTRAL TO REVERSE)</b>  Note: The shift from neutral to reverse is normally quite firm. Hydraulic pressure at the rear servo can approach 300 psi in reverse gear. Do not confuse a firm engagement with a truly harsh engagement	<ol style="list-style-type: none"> <li>1. Engine idle speed too high</li> <li>2. Driver "riding" accelerator pedal during shift</li> <li>3. Throttle cable misadjusted or binding (reverse only)</li> <li>4. Band adjustment needed</li> <li>5. Loose mounting bolts</li> <li>6. Worn or damaged U-joints</li> <li>7. Loose axle pinion nut</li> <li>8. Hydraulic pressure is incorrect</li> <li>9. Engine/transmission mounts worn or damaged</li> <li>10. Faulty converter lockup clutch (if equipped)</li> <li>11. Clutch, band, or planetary component is damaged</li> </ol>	<ol style="list-style-type: none"> <li>1. Check/adjust idle speed</li> <li>2. Advise owner/operator</li> <li>3. Adjust cable setting</li> <li>4. Adjust rear band</li> <li>5. Check engine, transmission, propeller shaft, crossmember, and axle bolt torque; tighten loose bolts and replace missing bolts</li> <li>6. Remove propeller shaft and replace U-joints</li> <li>7. Replace nut and check pinion threads before installing new nut; replace pinion gear if threads are damaged</li> <li>8. Check pressures; remove, overhaul, or adjust valve body as needed; repair oil pump if necessary</li> <li>9. Replace as necessary</li> <li>10. Replace converter and flush cooler and lines before installing new converter</li> <li>11. Remove, disassemble, and repair transmission as necessary</li> </ol>
<b>DELAYED ENGAGEMENT (FROM NEUTRAL TO DRIVE OR REVERSE)</b>	<ol style="list-style-type: none"> <li>1. Engine idle speed too low</li> <li>2. Low fluid level</li> <li>3. Gearshift linkage out of adjustment</li> <li>4. Rear band out of adjustment</li> <li>5. Valve body filter plugged</li> <li>6. Oil pump gears worn or damaged or pump body or seal is damaged, allowing pump to take in air, causing fluid aeration</li> <li>7. Reaction shaft seal rings worn or broken</li> <li>8. Governor pressure solenoid valve or electrical circuit fault</li> <li>9. Low hydraulic pressure</li> <li>10. Clutch, band, or servo damaged</li> <li>11. Torque converter drain down after several days out of service</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust idle speed</li> <li>2. Correct level and check for leaks</li> <li>3. Adjust linkage and repair linkage if worn or damaged</li> <li>4. Adjust band</li> <li>5. Replace fluid and filter. If oil pan and old fluid were full of clutch disc material and/or metal particles, overhaul will be necessary</li> <li>6. Remove transmission and replace oil pump</li> <li>7. Remove transmission, remove oil pump, and replace seal rings</li> <li>8. Check electrical functions with DRB scan tool or flash codes and repair as necessary</li> <li>9. Perform pressure test, remove transmission, and repair as needed</li> <li>10. Remove and disassemble transmission and repair as necessary</li> <li>11. No repair required</li> </ol>

## TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
SHIFTS DELAYED OR ERRATIC (SHIFTS ALSO HARSH AT TIMES)	<ol style="list-style-type: none"> <li>1. Low fluid level</li> <li>2. Throttle cable out of adjustment</li> <li>3. Throttle cable binding</li> <li>4. Gearshift linkage out of adjustment</li> <li>5. Fluid filter partially clogged</li> <li>6. Air in fluid due to overfill condition or air leakage into pump suction passages</li> <li>7. Clutch or servo problem</li> <li>8. Front band out of adjustment (may cause harsh 1-2 shift)</li> <li>9. Accumulator springs/seals worn or damaged</li> <li>10. Governor pressure control system fault</li> </ol>	<ol style="list-style-type: none"> <li>1. Correct fluid level and check for leaks</li> <li>2. Adjust cable as described in service section</li> <li>3. Adjust cable, replace if worn or damaged</li> <li>4. Adjust linkage as described in service section</li> <li>5. Replace filter. If filter and fluid contained clutch material or metal particles, an overhaul may be necessary</li> <li>6. Drain fluid to correct level if overfilled. If fluid is highly aerated (full of bubbles and foamy), oil pump gasket or seal may have failed, or pump body is porous or cracked</li> <li>7. Remove valve body and air test clutch, band and servo operation; disassemble and repair transmission as needed</li> <li>8. Adjust band</li> <li>9. Inspect/replace as required</li> <li>10. Check with DRB II scan tool or flash codes and repair as necessary</li> </ol>
NO REVERSE (D RANGES OK)	<ol style="list-style-type: none"> <li>1. Gearshift linkage is either out of adjustment or damaged</li> <li>2. Rear band is out of adjustment</li> <li>3. Valve body malfunction (stuck/damaged manual valve, regulator valve, or check ball)</li> <li>4. Rear servo or front clutch malfunction</li> <li>5. Overdrive unit direct clutch malfunction</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair or replace linkage parts as needed</li> <li>2. Adjust band</li> <li>3. Remove and service valve body; replace valve body if any valves or valve bores are worn or damaged</li> <li>4. Remove and disassemble transmission; replace worn, damaged servo and clutch parts as necessary</li> <li>5. Remove and disassemble overdrive unit. Repair direct clutch as needed</li> </ol>
HAS FIRST-REVERSE ONLY (NO 1-2 OR 2-3 UPSHIFT)	<ol style="list-style-type: none"> <li>1. Governor component fault</li> <li>2. Front servo problem</li> </ol>	<ol style="list-style-type: none"> <li>1. Test electrical components with DRB II scan tool or flash codes and repair as needed</li> <li>2. Pressure check and repair as needed</li> </ol>



## TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
NO DRIVE RANGE (REVERSE OK)	<ol style="list-style-type: none"> <li>1. Gearshift linkage either loose, damaged or out of adjustment</li> <li>2. Low fluid level</li> <li>3. Valve body malfunction (manual valve or shaft damaged or 1-2 shift valve stuck)</li> <li>4. Rear clutch failure</li> <li>5. Transmission overrunning clutch failure</li> <li>6. Input shaft seal rings worn or damaged</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair or replace linkage components</li> <li>2. Correct fluid level and check for leaks</li> <li>3. Remove and disassemble valve body; replace as assembly if any valves or bores are damaged</li> <li>4. Remove and disassemble transmission and rear clutch; repair/replace worn, damaged parts as needed</li> <li>5. Remove and disassemble transmission; replace overrunning clutch</li> <li>6. Remove and disassemble transmission; replace seal rings and any other worn or damaged parts</li> </ol>
NO DRIVE OR REVERSE (VEHICLE WILL NOT MOVE)	<ol style="list-style-type: none"> <li>1. Low fluid level</li> <li>2. Gearshift linkage loose, damaged, or misassembled</li> <li>3. Failure of driveline component, such as U-joint, axle shaft, transfer case component, etc.</li> <li>4. Low fluid pressure due to worn or damaged oil pump</li> <li>5. Transmission internal component damaged</li> <li>6. Valve body malfunction (seized valve, damaged manual lever, valve body screws loose or overtightened causing distortion and bind)</li> </ol>	<ol style="list-style-type: none"> <li>1. Add fluid and check for leaks if drive is restored</li> <li>2. Inspect, adjust, and reassemble linkage as needed; replace worn, damaged parts</li> <li>3. Perform preliminary inspection procedure for vehicle that will not move; refer to procedure in diagnosis section</li> <li>4. Perform pressure test to confirm low pressure; replace pump body and/or gears if necessary</li> <li>5. Remove and disassemble transmission; repair or replace failed components as needed</li> <li>6. Remove, disassemble, 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</li> </ol>

## TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
MOVES IN 2ND OR 3RD GEAR, ABRUPTLY DOWNSHIFTS TO LOW	<ol style="list-style-type: none"> <li>1. Governor circuit fault</li> <li>2. Valve body malfunction</li> </ol>	<ol style="list-style-type: none"> <li>1. Test governor components with DRB II scan tool</li> <li>2. Remove, clean, and inspect; look for stuck 1-2 valve or governor plug</li> </ol>
SLIPS IN LOW GEAR D ONLY, BUT NOT IN 1 POSITION	<ol style="list-style-type: none"> <li>1. Transmission overrunning clutch faulty, not holding</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace overrunning clutch</li> </ol>
SLIPS FORWARD DRIVE RANGES	<ol style="list-style-type: none"> <li>1. Low fluid level</li> <li>2. Air in fluid (fluid is foamy, full of bubbles), shifts are spongy, caused by air getting into pump suction passages</li> <li>3. Gearshift linkage or throttle cable out of adjustment</li> <li>4. Low hydraulic pressure due to worn pump, incorrect control pressure adjustment, valve body warpage or malfunction, sticking governor, leaking seal rings, clutch seals leaking, servo leaks, clogged filter, or cooler lines</li> <li>5. Accumulator piston cracked, spring broken or seal worn</li> <li>6. Clutch or servo malfunction, leaking seals or worn plates</li> <li>7. Overrunning clutch worn, not holding (slips in 1 only)</li> </ol>	<ol style="list-style-type: none"> <li>1. Add fluid and check for leaks</li> <li>2. Check for bad pump gasket or seals, dirt between pump halves, and loose pump bolts or defective O-ring at filler tube</li> <li>3. Adjust as needed</li> <li>4. Perform hydraulic and air pressure tests to determine cause</li> <li>5. Inspect and repair as necessary</li> <li>6. Air pressure check clutch-servo operation and repair as required</li> <li>7. Replace clutch</li> </ol>
SLIPS IN REVERSE ONLY	<ol style="list-style-type: none"> <li>1. Low fluid level</li> <li>2. Aerated fluid; see Slips in forward Drive Ranges</li> <li>3. Gearshift linkage out of adjustment</li> <li>4. Rear band out of adjustment</li> <li>5. Hydraulic pressure too low due to worn pump, worn seal rings, clutch or servo seal leakage</li> <li>6. Worn front clutch, leaking rear servo, or worn rear band</li> <li>7. Band-linkage binding</li> <li>8. Overdrive unit direct clutch slipping</li> </ol>	<ol style="list-style-type: none"> <li>1. Add fluid and check for leaks</li> <li>2. See Slips in Forward Drive Ranges</li> <li>3. Adjust linkage</li> <li>4. Adjust band</li> <li>5. Perform hydraulic pressure tests to determine cause</li> <li>6. Air pressure check clutch-servo operation and repair as required</li> <li>7. Inspect and repair as required</li> <li>8. Remove and disassemble overdrive unit. Repair clutch as needed</li> </ol>

## TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
NO KICKDOWN OR NORMAL DOWNSHIFT	<ol style="list-style-type: none"> <li>1. Incorrect throttle cable adjustment</li> <li>2. Incorrect gear shift linkage adjustment</li> <li>3. Front band out of adjustment</li> <li>4. Hydraulic pressure too high or too low due to valve body malfunction, or incorrect hydraulic control pressure adjustment</li> <li>5. Front servo, band, or linkage malfunction</li> <li>6. Clutch or servo malfunction</li> <li>7. Governor fault</li> <li>8. TPS fault</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust cable</li> <li>2. Adjust linkage</li> <li>3. Adjust band</li> <li>4. Perform hydraulic pressure tests to determine cause and repair as required. Correct valve body pressure adjustments as required</li> <li>5. Air pressure test operation and repair as necessary</li> <li>6. Air pressure test operation and repair as necessary</li> <li>7. Check with DRB II scan tool or flash codes and repair as needed</li> <li>8. Check for TPS fault at transmission control module with DRB II scan tool or flash codes</li> </ol>
STUCK IN LOW GEAR (WILL NOT UPSHIFT)	<ol style="list-style-type: none"> <li>1. Gearshift linkage or throttle cable out of adjustment.</li> <li>2. Front band out of adjustment</li> <li>3. Governor component fault, loose output shaft support, worn pump, leaking seal rings, or valve body problem (i.e., stuck 1-2 shift valve or governor plug)</li> <li>4. Clutch or servo malfunction</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust and repair linkage or cable if worn or damaged</li> <li>2. Adjust band</li> <li>3. Check operating pressures, and test governor component with DRB II scan tool or flash codes. Repair as needed</li> <li>4. Air pressure check operation of clutches and bands; repair faulty component</li> </ol>
NO LOW GEAR (MOVES IN 2ND OR 3RD GEAR ONLY)	<ol style="list-style-type: none"> <li>1. Governor circuit fault</li> <li>2. Valve body malfunction</li> <li>3. Front servo piston cocked in bore</li> <li>4. Front band linkage malfunction</li> <li>5. Incorrect throttle or gearshift linkage adjustment</li> </ol>	<ol style="list-style-type: none"> <li>1. Test governor components with DRB II scan tool</li> <li>2. Remove, clean, and inspect. Look for sticking 1-2 valve, 2-3 valve, governor plug, or broken springs</li> <li>3. Inspect servo and repair as required</li> <li>4. Inspect linkage and look for bind in linkage</li> <li>5. Adjust linkage</li> </ol>

## TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
CREEPS IN NEUTRAL	<ol style="list-style-type: none"> <li>1. Gearshift linkage out of adjustment</li> <li>2. Valve body malfunction (warped body, cross leakage, loose screws)</li> <li>3. Clutch dragging</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust linkage</li> <li>2. Perform hydraulic pressure test to determine cause and repair as required</li> <li>3. Air pressure check operation of clutches and repair as required</li> </ol>
DRAGS OR LOCKS UP	<ol style="list-style-type: none"> <li>1. Front or rear band out of adjustment</li> <li>2. Servo band or linkage malfunction (i.e., binding linkage, warped band, servo piston stuck)</li> <li>3. Dragging clutch (does not release fully)</li> <li>4. Broken or seized planetary gears</li> <li>5. Overrunning clutch worn, broken, or seized</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust bands</li> <li>2. Air pressure check servo operation and repair as required</li> <li>3. Air pressure check clutch operation and repair as required</li> <li>4. Remove, inspect, and repair as required (look for debris in oil pan)</li> <li>5. Remove and inspect clutch, repair as required</li> </ol>
GROWLING, GRATING OR SCRAPING NOISES	<ol style="list-style-type: none"> <li>1. Planetary gear set broken or seized</li> <li>2. Overrunning clutch worn, seized, or broken</li> <li>3. Oil pump components scored, binding, or broken</li> <li>4. Output shaft bearing or bushing damaged</li> <li>5. Faulty clutch operation</li> <li>6. Front and rear bands out of adjustment</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for debris in oil pan and repair as required</li> <li>2. Inspect and check for debris in oil pan; repair as required</li> <li>3. Remove, inspect, and repair as required</li> <li>4. Remove, inspect, and repair as required</li> <li>5. Perform air pressure check and repair as required</li> <li>6. Adjust bands</li> </ol>
BUZZING NOISE	<ol style="list-style-type: none"> <li>1. Low fluid level</li> <li>2. Air being drawn into pump suction passages</li> <li>3. Overrunning clutch damaged</li> <li>4. Valve body misassembled, bolts loose, weak spring, or mispositioned valve or check ball</li> </ol>	<ol style="list-style-type: none"> <li>1. Add fluid and check for leaks</li> <li>2. Check pump for porous casting, scores on mating surfaces, and excess rotor clearance; repair as required</li> <li>3. Replace clutch</li> <li>4. Remove, disassemble, inspect valve body; reassemble correctly if necessary; replace assembly if valves or springs are damaged</li> </ol>

## TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
OIL COMES OUT FILLER TUBE	<ol style="list-style-type: none"> <li>1. Transmission overfilled</li> <li>2. Breather vent in oil pump blocked</li> <li>3. Fluid cooler or cooler lines plugged</li> <li>4. Air in fluid (aerated)</li> <li>5. Oil filter clogged</li> <li>6. Rear servo piston or seal failure</li> <li>7. Valve body switch valve sticking</li> </ol>	<ol style="list-style-type: none"> <li>1. Drive fluid to correct level; remove neutral switch and drain through switch hole with suction gun</li> <li>2. Inspect and clear blockage</li> <li>3. Flush cooler and lines</li> <li>4. See "Slips In Forward Drive Ranges"</li> <li>5. Replace filter; determine the reason for clogged condition and repair</li> <li>6. Check hydraulic pressure of servo in reverse (will register low or fluctuate rapidly). Repair/replace servo piston and seal. Replace case if servo bore is damaged</li> <li>7. Remove and clean valve</li> </ol>
OIL LEAKS (ITEMS LISTED REPRESENT POSSIBLE LEAK POINTS AND SHOULD ALL BE CHECKED)	<ol style="list-style-type: none"> <li>1. Speedometer adapter</li> <li>2. Pan gasket</li> <li>3. Filler tube (where tube enters case)</li> <li>4. Fluid lines and fittings</li> <li>5. Valve body manual lever shaft seal</li> <li>6. Pressure port plug loose</li> <li>7. Rear bearing access plate</li> <li>8. Gasket damaged or bolts are loose</li> <li>9. Adapter/extension gasket damaged</li> <li>10. Neutral switch</li> <li>11. Converter housing area</li> <li>12. Cooler line fittings and hoses</li> <li>13. Pump seal</li> <li>14. Torque converter</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace both adapter seals</li> <li>2. Tighten pan screws to 150 inch-pounds; if leaks persist, replace gasket; <b>do not overtighten screws</b></li> <li>3. Replace O-ring seal</li> <li>4. Tighten fittings; if leaks persist, replace fittings and lines if necessary</li> <li>5. Replace shaft seal</li> <li>6. Tighten to correct torque; replace plug if leak persists</li> <li>7. Replace gasket</li> <li>8. Replace bolts or gasket or tighten bolts</li> <li>9. Replace gasket</li> <li>10. Replace switch and gasket</li> <li>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</li> <li>12. Replace fittings and hoses</li> <li>13. Replace seal</li> <li>14. Replace converter</li> </ol>



## TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
OVERHEAT DURING COMMERCIAL OPERATION OR WHILE TRAILER TOWING (FLUID DARK AND BURNED WITH SOME SLUDGE FORMATION)	<ol style="list-style-type: none"> <li>1. Vehicle not properly equipped for trailer towing or commercial use</li> <li>2. Vehicle not equipped with auxiliary fluid cooler</li> <li>3. Extensive idling time or operation in heavy traffic in hot weather</li> <li>4. Tow vehicle overloaded (exceeding vehicle tow capacity)</li> <li>5. Air flow to auxiliary cooler blocked by snow plow, front mounted spare tire, bug screen, or similar item</li> </ol>	<ol style="list-style-type: none"> <li>1. Be sure vehicle is equipped with recommended optional components (i.e., HD springs, transmission, axle, larger CID engine, auxiliary cooler, correct axle ratio, etc.). If vehicle is not so equipped, it should not be used for severe service operation</li> <li>2. Drain fluid, change filter, and install auxiliary cooler</li> <li>3. Cut down on idling time; shift into neutral every so often and run engine at 1000 rpm to help circulate fluid through cooler</li> <li>4. Be sure vehicle is properly equipped to handle load; do not tow Class III-type loads with a vehicle that is only rated for Class I or II operation</li> <li>5. Remove or reposition item causing air flow blockage</li> </ol>
OVERHEAT DURING NORMAL OPERATION (FLUID DISCOLORED, SMELLS BURNED)	<ol style="list-style-type: none"> <li>1. Low fluid level</li> <li>2. Fluid cooler, lines blocked, or cooler cracked (oil in engine coolant)</li> <li>3. Switch valve sticking</li> <li>4. Clutch pack clearance incorrect (too tight)</li> <li>5. Bands too tight</li> </ol>	<ol style="list-style-type: none"> <li>1. Add fluid and check for leaks</li> <li>2. Flush cooler and lines and replace radiator if transmission fluid has entered coolant</li> <li>3. Remove, disassemble, clean valve body</li> <li>4. Check and correct as required</li> <li>5. Adjust bands</li> </ol>

## TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
NO START IN PARK OR NEUTRAL	<ol style="list-style-type: none"> <li>1. Gearshift linkage out of adjustment</li> <li>2. Park/neutral position switch wire broken or open</li> <li>3. Faulty park/neutral position switch</li> <li>4. Valve body manual lever assembly bent, worn, broken, or not aligned with switch</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust linkage</li> <li>2. Check continuity with test lamp; repair as required</li> <li>3. Refer to service section for test and replacement procedure</li> <li>4. Inspect lever assembly and replace if damaged</li> </ol>
SLUGGISH ACCELERATION AT LOW SPEEDS OR REQUIRES EXCESSIVE THROTTLE OPENING TO MAINTAIN HIGHWAY SPEEDS	<ol style="list-style-type: none"> <li>1. Poor engine performance</li> <li>2. Gearshift linkage or throttle cable out of adjustment</li> <li>3. Transmission clutches slipping</li> <li>4. Overrunning clutch in converter stator not holding</li> <li>5. Converter stator overrunning clutch seized</li> </ol>	<ol style="list-style-type: none"> <li>1. Check engine and repair as required</li> <li>2. Adjust as needed</li> <li>3. Perform stall test and repair as required</li> <li>4. Perform stall test and replace converter if clutch has failed</li> <li>5. Replace converter as assembly</li> </ol>
FLUID CONTAMINATED (DISCOLORED, FULL OF SLUDGE AND/OR METAL AND FRICTION MATERIAL PARTICULAR)	<ol style="list-style-type: none"> <li>1. If contamination occurred shortly after overhaul, fluid cooler and lines were not flushed and flow tested. This is especially true when original overhaul was to correct a problem that generated a large amount of debris, such as a gear failure or a clutch pack failure  Note: Flushing the cooler and lines is mandatory after a failure of the converter clutch</li> <li>2. Incorrect fluid used in transmission</li> <li>3. Main cooler in radiator is cracked, allowing engine coolant to enter transmission</li> <li>4. Severe overload results in overheat, fluid breakdown, and accelerated wear, especially in high ambient temperatures. Most frequent causes are: <ul style="list-style-type: none"> <li>• Vehicle is not properly equipped for heavy duty service</li> <li>• Tow vehicle and boat or trailer are both overloaded</li> <li>• Trailer or boat are too large for tow vehicle (load exceeds rated capacity of tow vehicle)</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. If contamination is severe, cooler flushing, converter replacement, and another overhaul may be necessary; particularly if shift problems were also present.</li> <li>2. If transmission is operating properly, drain fluid, reverse flush cooler and lines, and change fluid and filter. However, if shift problem has developed, converter replacement and transmission overhaul may be required.</li> <li>3. Replace radiator (and cooler) and flush lines. If problem was diagnosed early enough, fluid and filter change may only be necessary. If contamination period was prolonged, overhaul and converter replacement may be required</li> <li>4. Repair transmission, flush cooler, and lines. Replace converter if necessary. Install auxiliary cooler if needed. Also install HD cooling system if needed. If tow vehicle and unit being towed are both overloaded, the only repair is to reduce the load to rated limits. However, if trailer or boat is too large for tow vehicle, the only option is for the owner to move up to properly-equipped and load-rated tow vehicle</li> </ol>

## OVERDRIVE DIAGNOSIS

Condition	Possible Cause	Correction
NO 3-4 UPSHIFT	<ol style="list-style-type: none"> <li>1. Fourth gear overdrive switch (in dash) in OFF position</li> <li>3. Fourth gear overdrive switch shorted, open, wires loose</li> <li>4. Overdrive solenoid or circuit wire loose, shorted, open</li> <li>5. Solenoid feed orifice in valve body is blocked or blown out</li> <li>6. Fourth gear overdrive solenoid failure</li> <li>7. Sensor or fluid temperature thermister fault</li> <li>8. Overdrive piston seal failure</li> <li>9. Wrong overdrive piston spacer</li> <li>10. Low hydraulic pressure</li> <li>11. Transmission fluid overheat (over 260 °F)</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn control switch to ON position</li> <li>3. Replace switch if shorted or open and repair loose or damaged wires</li> <li>4. Check wires/connections with 12V test lamp and voltmeter; repair damaged or loose wires/connections as necessary</li> <li>5. Remove, disassemble, clean valve body thoroughly</li> <li>6. Verify solenoid failure with test lamp and replace solenoid</li> <li>7. Test with DRB II scan tool or ohmmeter. Replace sensor or thermister as needed</li> <li>8. Replace both seals</li> <li>9. Remove unit, check end play, and install correct spacer</li> <li>10. Pressure test transmission to determine cause</li> <li>11. See overheat information in transmission diagnosis charts</li> </ol>
SLIPS IN OVERDRIVE FOURTH GEAR	<ol style="list-style-type: none"> <li>1. Low fluid level</li> <li>2. Overdrive piston or seal malfunction</li> <li>3. Overdrive clutch pack worn</li> <li>4. 3-4 shift valve, timing valve, or accumulator malfunction</li> <li>5. Overdrive piston retainer bleed orifice blown out</li> <li>6. Overdrive unit thrust bearing failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Add fluid and check for leaks</li> <li>2. Remove overdrive unit; replace piston seals if worn; replace piston if damaged; if piston retainer is damaged, it will be necessary to remove and disassemble the transmission</li> <li>3. Remove overdrive unit and rebuild clutch pack</li> <li>4. 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.</li> <li>5. Disassemble transmission, remove retainer, and replace orifice</li> <li>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)</li> </ol>

## OVERDRIVE DIAGNOSIS

Condition	Possible Cause	Correction
DELAYED 3-4 UPSHIFT (SLOW TO ENGAGE)	<ol style="list-style-type: none"> <li>1. Low fluid level</li> <li>2. Overdrive solenoid or wiring is faulty</li> <li>3. Overdrive piston spacer too thin</li> <li>4. Overdrive clutch pack worn</li> <li>5. T.P.S. faulty</li> <li>6. Overdrive clutch bleed orifice in retainer plugged or blown out</li> </ol>	<ol style="list-style-type: none"> <li>1. Add fluid and check for leaks</li> <li>2. Test solenoid and check wiring for loose/corroded connections, or shorts/ground; replace solenoid if faulty and repair wiring if necessary</li> <li>3. Remove unit; measure end play and select proper spacer</li> <li>4. Remove unit and rebuild clutch pack</li> <li>5. Replace T.P.S.</li> <li>6. Disassemble transmission and replace orifice</li> </ol>
3-4 UPSHIFT OCCURS BEFORE COMPLETION OF 2-3 UPSHIFT	<ol style="list-style-type: none"> <li>1. Overdrive solenoid connector or wiring problem</li> <li>2. Overdrive solenoid malfunction</li> <li>3. Coolant temperature or T.P.S. malfunction</li> <li>4. Valve body malfunction</li> <li>5. Transmission control module malfunction</li> </ol>	<ol style="list-style-type: none"> <li>1. Test connector and wiring for loose connections, shorts, or ground, and repair as needed</li> <li>2. Replace solenoid</li> <li>3. Test sensor at TCM with DRB II scan tool and replace as necessary</li> <li>4. 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</li> <li>5. Test module with DRB II scan tool and replace if faulty</li> </ol>

## OVERDRIVE DIAGNOSIS

Condition	Possible Cause	Correction
NO 4-3 DOWNSHIFT	<ol style="list-style-type: none"> <li>1. Circuit wiring and/or connectors shorted</li> <li>2. Converter clutch solenoid not venting</li> <li>3. Overdrive solenoid not venting</li> <li>4. 3-4 shift or accumulator malfunction</li> <li>5. Transmission control module malfunction</li> <li>6. T.P.S. malfunction</li> </ol>	<ol style="list-style-type: none"> <li>1. Test wiring and connectors with test lamp and volt/ohmmeter; repair wiring as necessary; replace connectors and/or harness as required</li> <li>2. Remove valve body and replace solenoid if seized or shorted</li> <li>3. Remove valve body and replace solenoid if seized or shorted</li> <li>4. Remove valve body; remove and disassemble lower housing and 3-4 accumulator housing; replace seals and clean valves as necessary; be sure all valves slide freely in bores</li> <li>5. Check operation with DRB II scan tool, replace module only if faulty</li> <li>6. Check operation with DRB II scan tool. Replace TPS only if faulty</li> </ol>
NO 4-3 DOWNSHIFT WHEN CONTROL SWITCH IS TURNED OFF (OVERDRIVE OFF AND LAMP IS ILLUMINATED)	<ol style="list-style-type: none"> <li>1. Overdrive solenoid wiring or connectors faulty</li> <li>2. Overdrive or lockup solenoid not venting</li> <li>3. Transmission control module</li> </ol>	<ol style="list-style-type: none"> <li>1. Check solenoid wiring and connections for shorts/grounds; repair as necessary</li> <li>2. Test solenoids and replace if seized or shorted</li> <li>3. Test with DRB II scan tool, replace controller if faulty</li> </ol>
NO 4-3 DOWNSHIFT WHEN OVERDRIVE OFF SWITCH IS TURNED OFF (OVERDRIVE OFF AND LAMP NOT ILLUMINATED)	<ol style="list-style-type: none"> <li>1. Overdrive off switch (in dash) open, shorted, or wiring is open, or shorted</li> </ol>	<ol style="list-style-type: none"> <li>1. Test switch function with DRB II scan tool connected to TCM. Replace switch or repair wiring as necessary</li> </ol>



## OVERDRIVE DIAGNOSIS

Condition	Possible Cause	Correction
HARSH 1-2, 2-3, OR 3-2 SHIFTS. MAY STALL WHEN GEAR SHIFT LEVER IS PLACED IN D POSITION ONLY	1. Converter clutch solenoid failure	1. Remove valve body and replace solenoid
TORQUE CONVERTER CLUTCH ENGAGES IN SECOND AND/OR THIRD GEAR	1. Converter clutch solenoid or wiring problem	1. Test solenoid and wiring for continuity, shorts, or grounds; replace solenoid and relay if faulty; repair wiring and connectors as necessary
NOISY OPERATION IN FOURTH GEAR ONLY	1. Overdrive clutch discs, plates, or snap rings damaged 2. Overdrive piston or planetary thrust bearing brinnelled, installed wrong, or damaged 3. Output shaft bearings brinnelled, scored, damaged 4. Planetary gears worn, chipped, damaged 5. Overdrive unit overrunning clutch rollers rough, scored, or output bushings are worn	1. Remove unit and rebuild clutch pack 2. Remove and disassemble unit; replace either thrust bearing if damaged 3. Remove and disassemble unit; replace either bearing if damaged 4. Remove and overhaul overdrive unit 5. Remove and overhaul overdrive unit

## OVERDRIVE DIAGNOSIS

Condition	Possible Cause	Correction
NO REVERSE (OR SLIPS IN REVERSE)	<ol style="list-style-type: none"><li>1. Direct clutch spring collapsed or broken</li><li>2. Direct clutch pack worn</li><li>3. Rear band out of adjustment</li><li>4. Front clutch malfunction</li><li>5. Overdrive thrust bearing failure</li></ol>	<ol style="list-style-type: none"><li>1. Remove and disassemble unit; check clutch pack and replace spring</li><li>2. Disassemble unit and rebuild clutch pack</li><li>3. Adjust band</li><li>4. Air pressure test clutch operation; remove and rebuild if necessary</li><li>5. Disassemble geartrain and replace bearings</li></ol>
NO 1-2 OR 2-3 UPSHIFT (HAS LOW AND REVERSE ONLY)	<ol style="list-style-type: none"><li>1. Governor fault</li></ol>	<ol style="list-style-type: none"><li>1. Test governor components with DRB II scan tool and repair as needed</li></ol> <p>J9321-345</p>

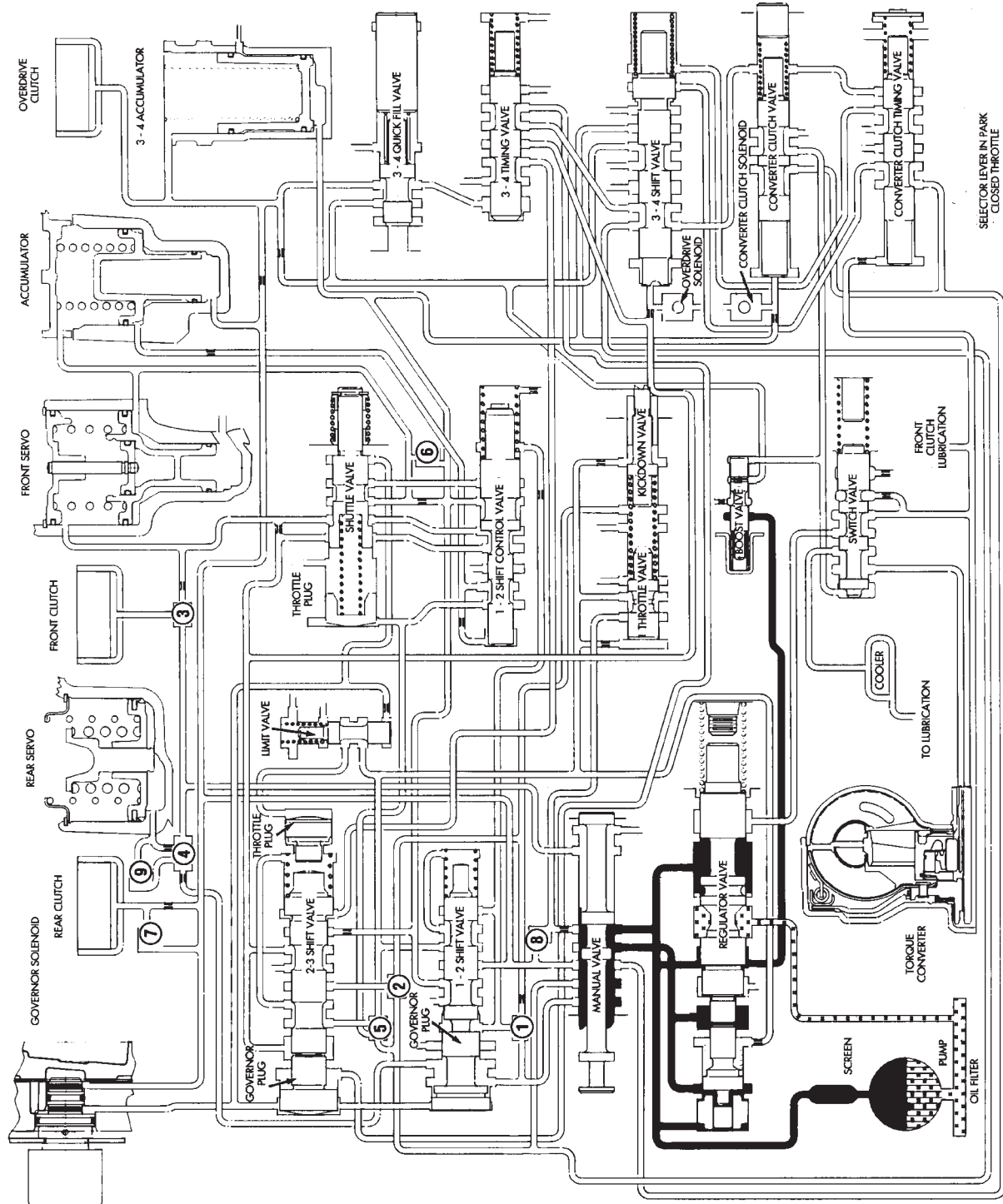
## TORQUE CONVERTER CLUTCH DIAGNOSIS

**POSSIBLE CAUSE**

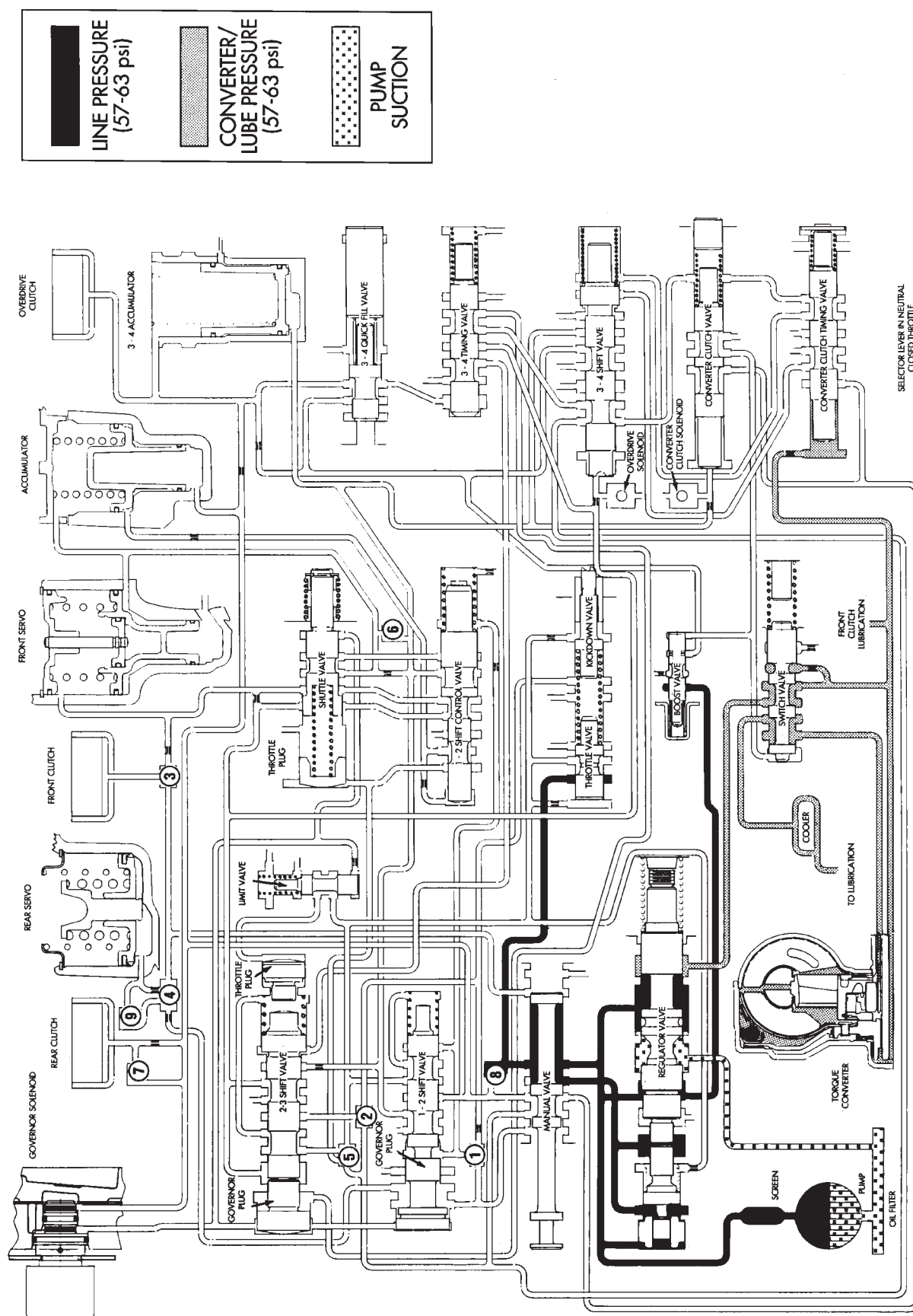
FAULTY OIL PUMP	X			X	X		X				X
STICKING GOVERNOR VALVE	X	X	X								
PLUGGED COOLER, LINES OR FITTINGS					X					X	X
VALVE BODY MALFUNCTION	X	X	X	X	X		X				X
STUCK SWITCH VALVE	X	X	X	X	X					X	
STUCK CONVERTER CLUTCH VALVE	X	X	X								
STUCK CONVERTER CLUTCH SOLENOID	X		X								
SOLENOID WIRING DISCONNECTED	X										
FAILED CONVERTER CLUTCH SOLENOID	X										
FAILED CONVERTER CLUTCH RELAY	X		X								
FAULTY TORQUE CONVERTER:	X					X	X	X			X
OUT OF BALANCE									X		
FAILED CONVERTER CLUTCH	X					X					X
LEAKING TURBINE HUB SEAL	X					X					
ALIGN EXHAUST SYSTEM								X			X
TUNE ENGINE							X	X			X
FAULTY INPUT SHAFT OR SEAL RING	X				X						
THROTTLE CABLE MISADJUSTED								X			X
<b>CONDITION</b>	CONVERTER CLUTCH WILL NOT ENGAGE	CLUTCH WILL NOT DISENGAGE	STAYS ENGAGED AT TOO LOW A SPEED IN 4th GEAR	LOCKS UP OR DRAGS IN LOW OR SECOND	STALLS OR IS SLUGGISH IN REVERSE	CHATTER DURING CLUTCH ENGAGEMENT--(COLD)	VIBRATION OR SHUDDER DURING CLUTCH ENGAGEMENT	VIBRATION AFTER CLUTCH ENGAGEMENT	VIBRATION WHEN "REVVED" IN NEUTRAL	OVERHEATING: OIL COMING OUT OF FILL TUBE OR PUMP SEAL	SHUDDER AFTER CLUTCH ENGAGEMENT

J9321-371

# HYDRAULIC FLOW IN PARK



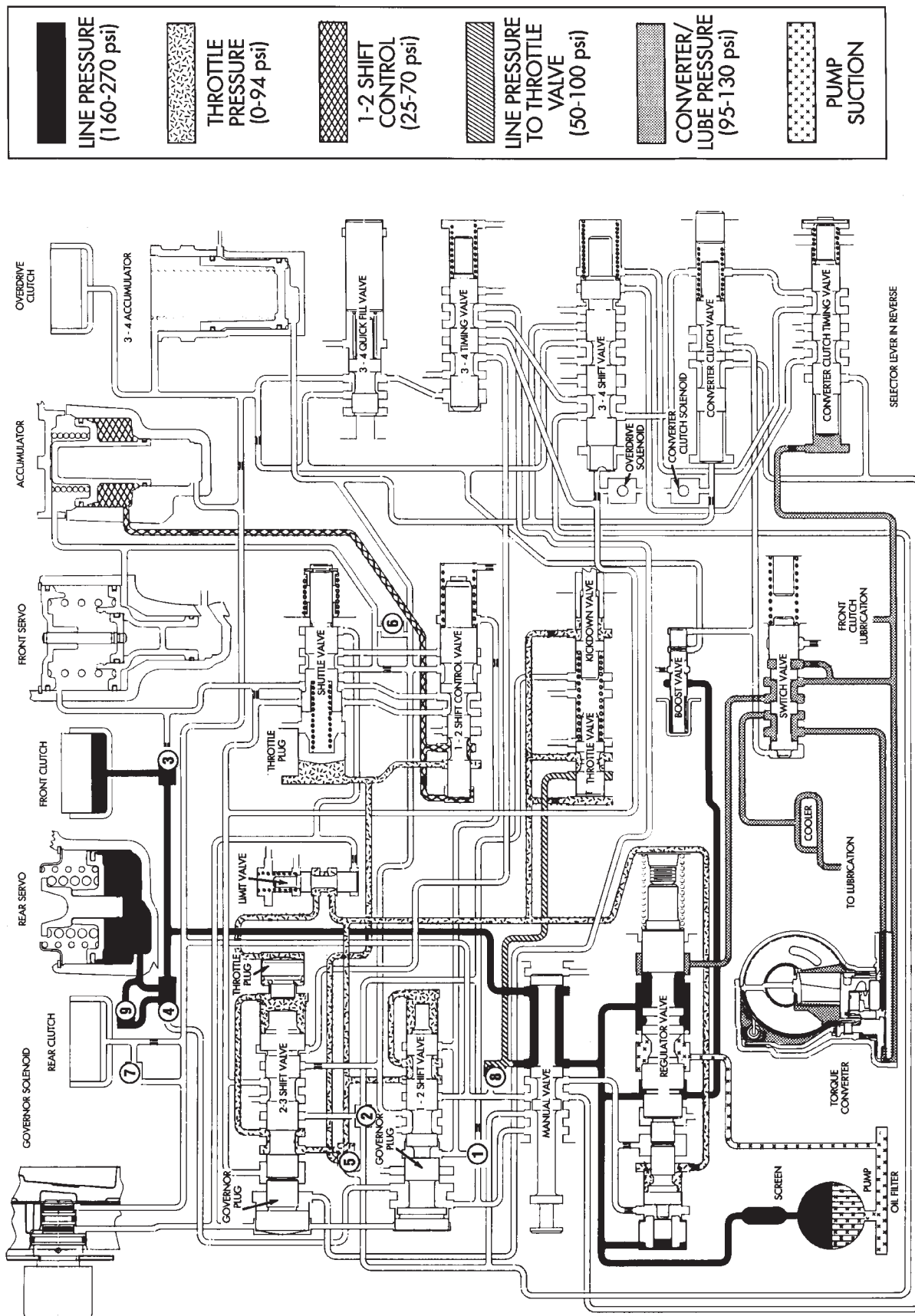
## HYDRAULIC FLOW IN NEUTRAL



J9321-372



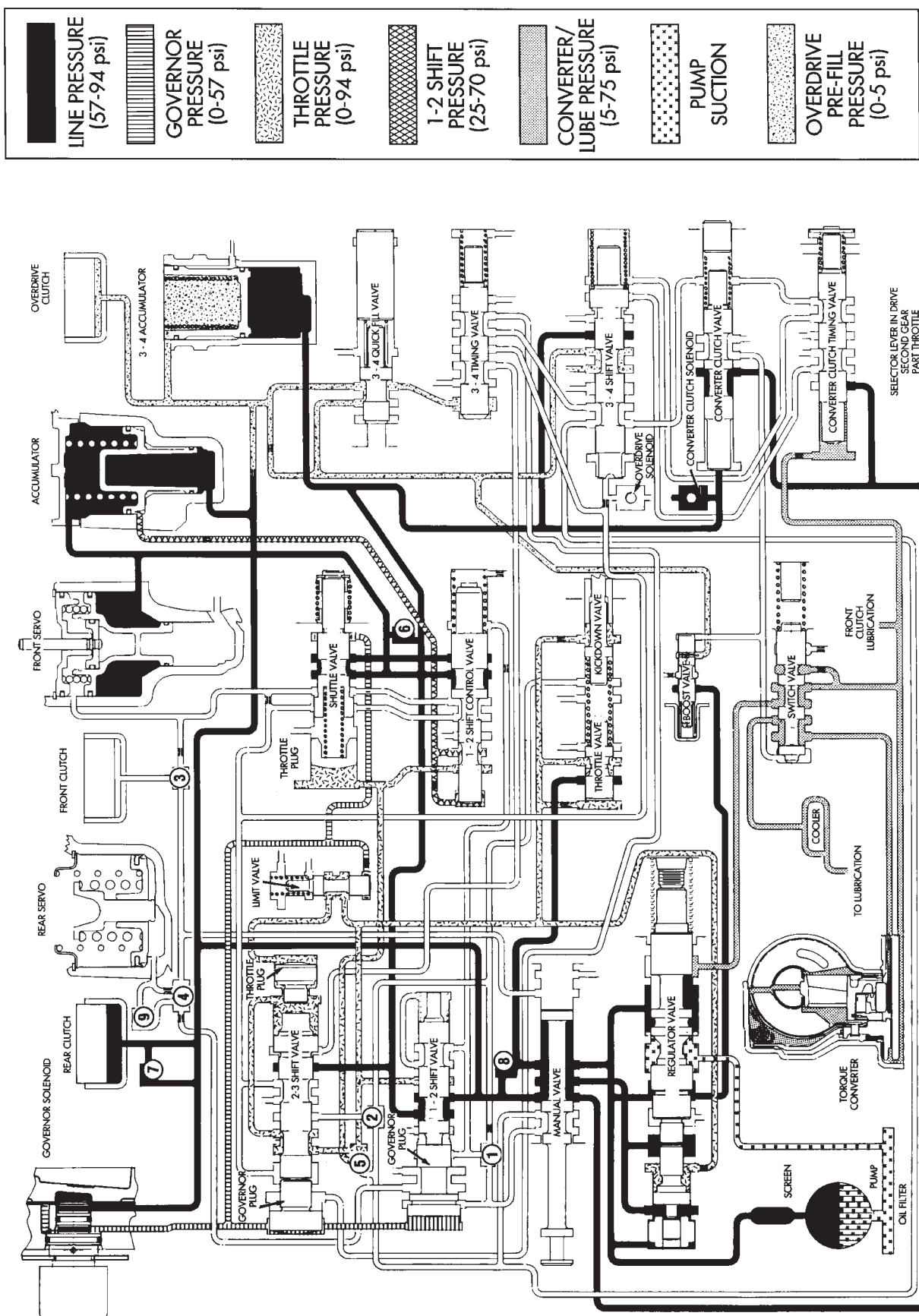
HYDRAULIC FLOW IN REVERSE



J9321-373

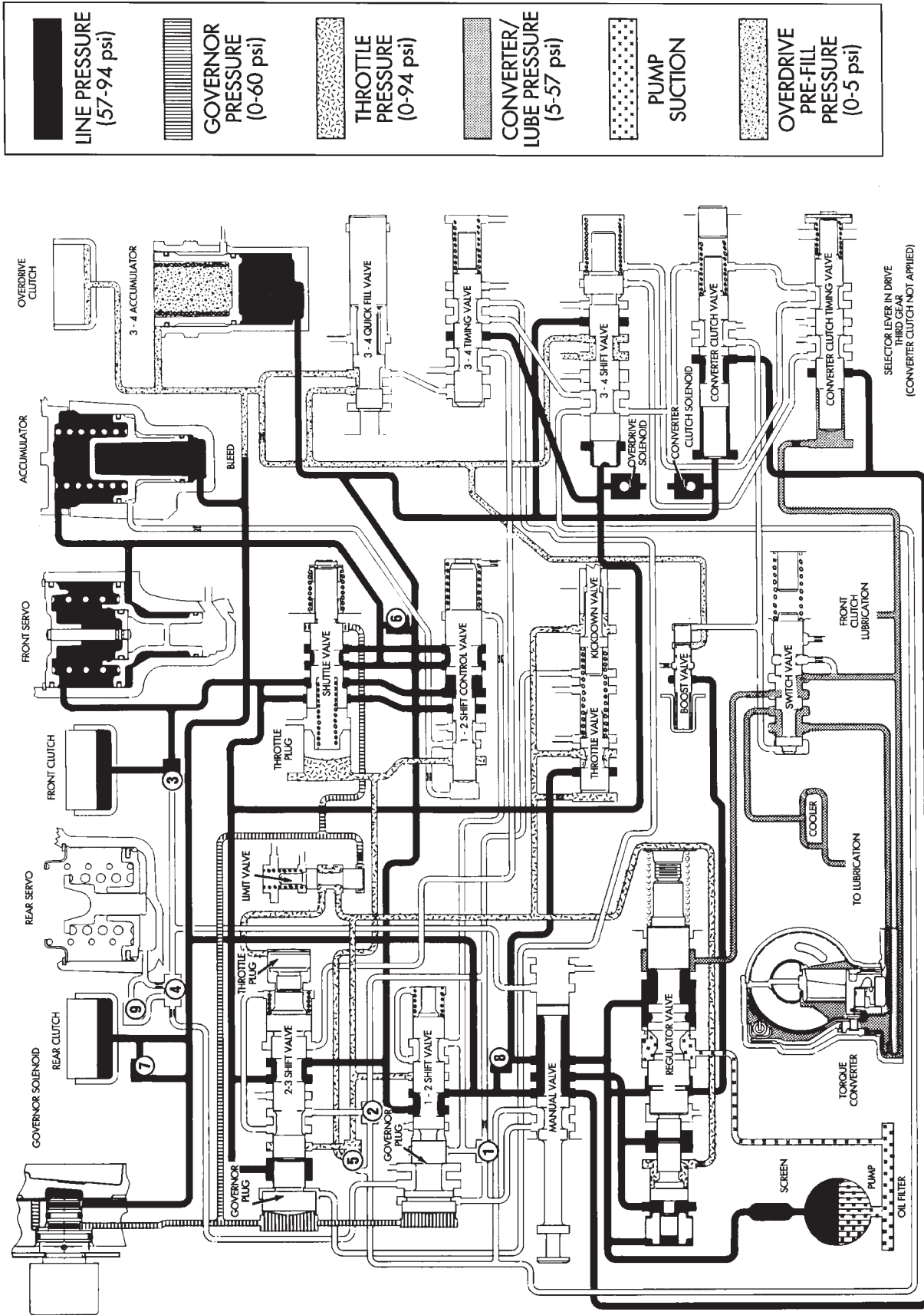
J9321-374

## HYDRAULIC FLOW IN DRIVE SECOND GEAR



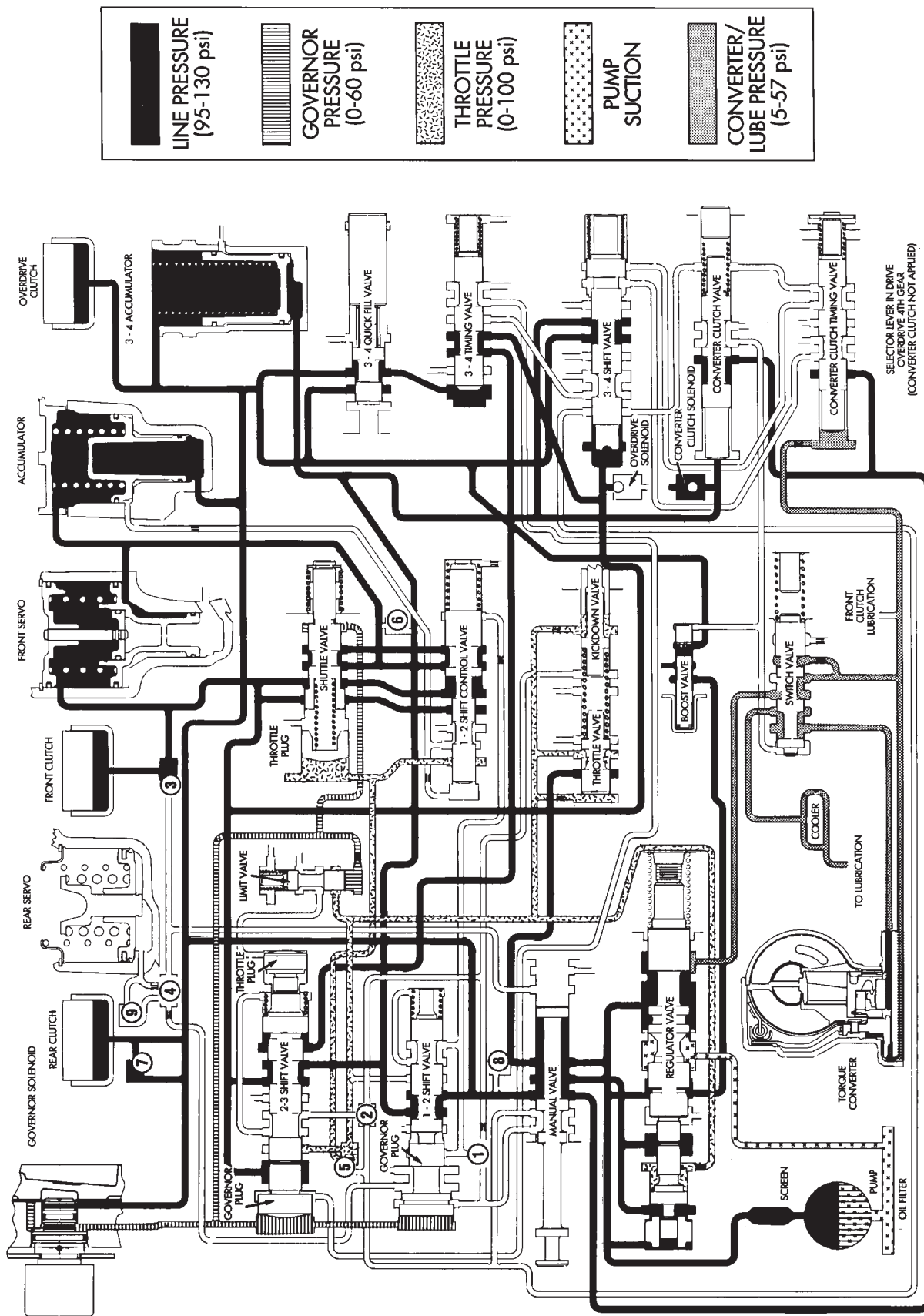
J9321-375

## HYDRAULIC FLOW IN DRIVE THIRD GEAR



J9321-376

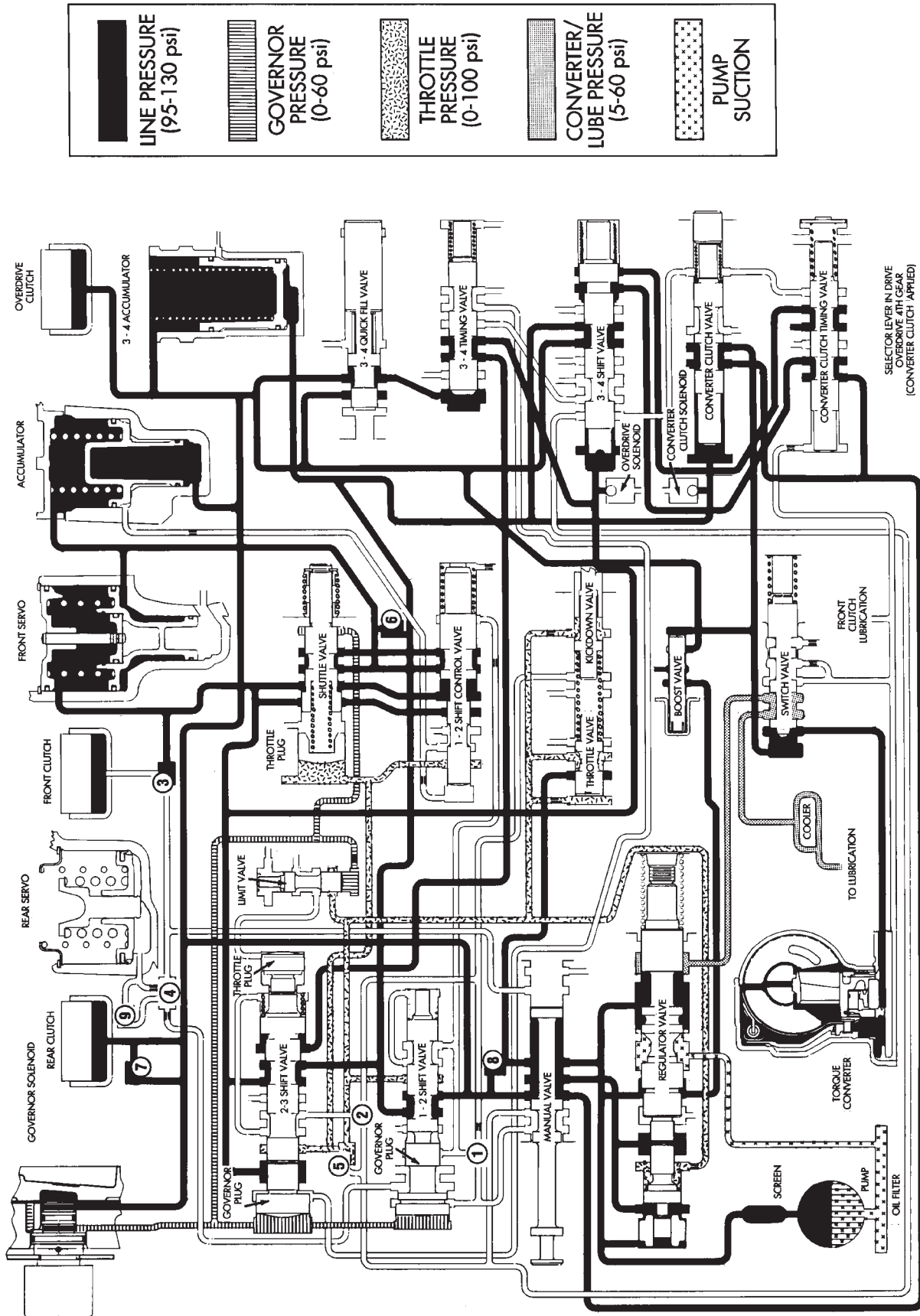
HYDRAULIC FLOW IN DRIVE FOURTH GEAR (CONVERTER CLUTCH NOT APPLIED)



J9321-377



HYDRAULIC FLOW IN DRIVE FOURTH GEAR (CONVERTER CLUTCH APPLIED)

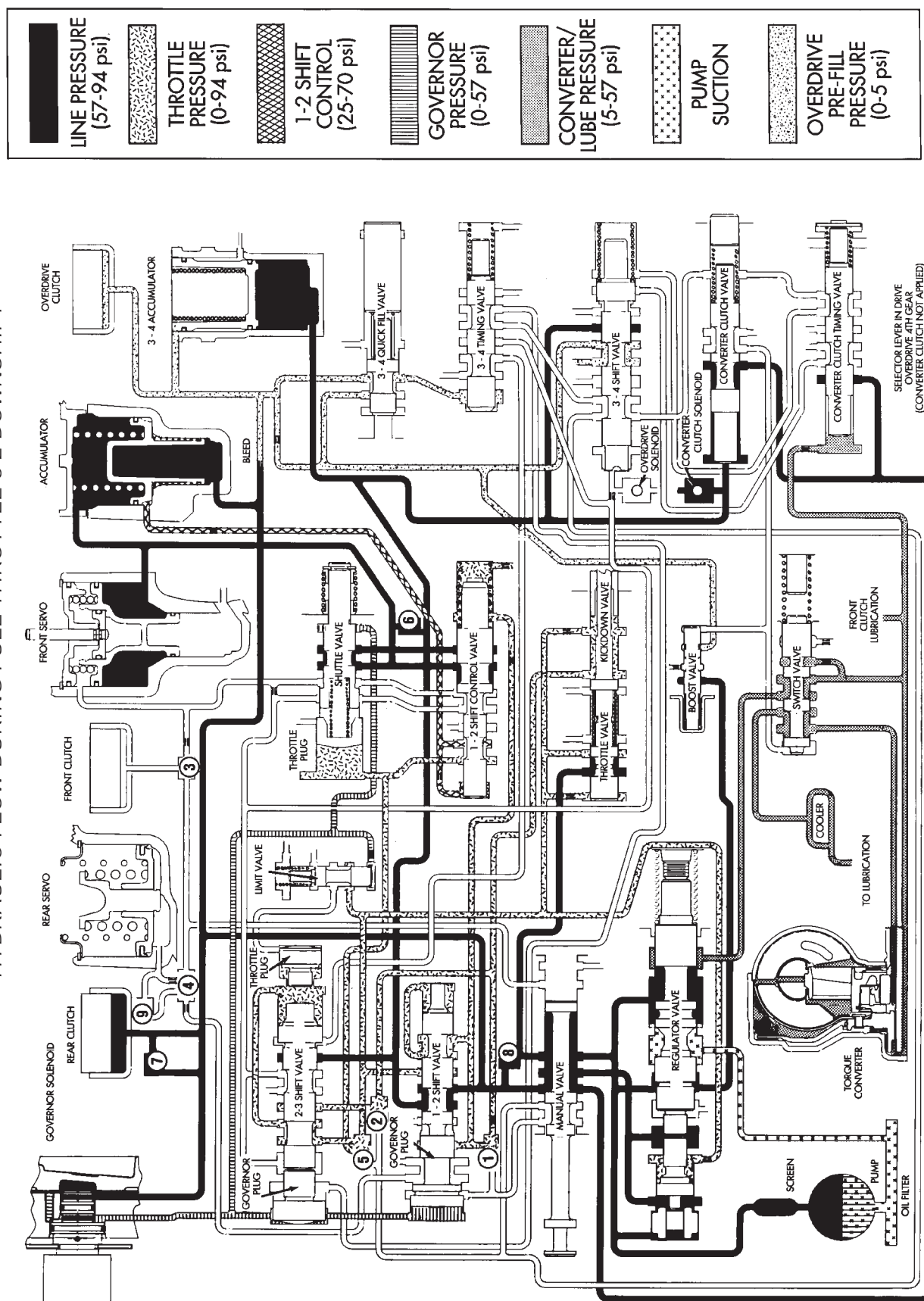


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## IN-VEHICLE SERVICE—42RE

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**PARK LOCK SERVICE**

The park lock components are located within the overdrive unit and cannot be serviced in the vehicle. The overdrive unit must be removed and disassembled for access to the park lock components.

Refer to the sections dealing with transmission/overdrive removal, installation and overhaul sections for overdrive unit repair procedures.

**OIL PUMP SEAL**

The transmission and torque converter must be removed for access to the oil pump seal. Oil pump seal replacement procedures are described in the Transmission Removal/Installation section.

**RECOMMENDED FLUID**

Recommended fluid for the 42RE is Mopar ATF Plus, type 7176. Mopar Dexron II fluid should only be used when ATF plus is not available.

**TRANSMISSION FLUID LEVEL CHECK**

Transmission fluid level should be checked a minimum of four times per year under normal operation. If the vehicle is used for trailer towing or similar heavy load hauling, check fluid level **and condition** at least once a week.

Fluid level is checked with the engine running at curb idle speed, the transmission in Neutral and the transmission fluid at normal operating temperature (hot).

**The 42RE transmission dipstick is on the driver side of the engine compartment at the rear of the engine. The dipstick handle has the universal symbol for a gear imprinted on it for identification.**

**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. This is extremely important for accurate fluid level check.

(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 and check fluid level as follows:

(a) Dipstick has three fluid level indicating marks which are a MIN dot mark, an OK mark and a MAX fill arrow mark:

(b) Correct level is to MAX arrow mark on dipstick. This is correct maximum hot fluid level. Acceptable level is between OK mark and max arrow mark on dipstick.

(c) If level is at, or below MIN level dot on dipstick, add only enough fluid to restore correct level. Mopar ATF Plus, type 7176 is the preferred fluid. Mopar Dexron II should only be used when ATF Plus is not available.

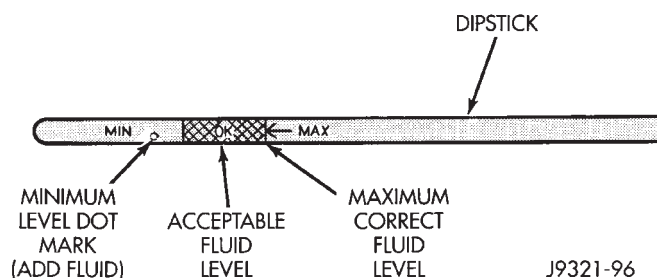
**CAUTION: Do not overfill the transmission. Overfilling may cause leakage out the pump vent which can be mistaken for a pump seal leak. Overfilling will also cause fluid aeration and foaming as the excess fluid is picked up and churned by the gear train. This will significantly reduce fluid life.**

(8) If transmission is overfilled, fluid can be removed with 1/8 to 3/16 in. diameter tubing and suction gun. Tubing will have to be adapted to nozzle of gun and be long enough to extend down fill tube and into transmission oil pan.

**FLUID AND FILTER CHANGE****NORMAL CHANGE INTERVAL**

The fluid and filter should be changed (and the bands adjusted) at recommended maintenance intervals, or whenever the transmission has been disassembled for any reason.





**Fig. 1 Typical Dipstick Fluid Level Marks**

Refer to the Driveline section in Group O, Lubrication and Maintenance for recommended change intervals. Refer to the fluid/filter replacement and band adjustment procedures in this section.

#### SEVERE USAGE CHANGE INTERVAL

Under severe usage, the fluid and filter should be changed and the bands adjusted at 12,000 mile (19 000 Km) intervals.

Severe usage is defined as:

- (a) More than half of vehicle operation occurs in heavy city traffic during hot weather (above 90° F).
- (b) Vehicle is used for taxi, police, limousine, or similar commercial operation.
- (c) Vehicle is used for trailer towing or heavy load hauling.

When the factory fluid is drained, refill the transmission with Mopar ATF Plus, type 7176 fluid. Mopar Dexron II should only be used when ATF Plus is not available.

#### FLUID/FILTER REPLACEMENT PROCEDURE

- (1) Raise vehicle.
- (2) Remove oil pan and drain fluid.
- (3) Clean oil pan and pan magnet. Then clean remaining gasket material from gasket surface of transmission case.
- (4) Remove fluid filter screws and remove filter.
- (5) Position new filter on valve body and install filter screws. Tighten screws to 4 N•m (35 in. lbs.) torque.
- (6) Position new gasket on oil pan and install pan on transmission. Tighten pan bolts to 150 in. lbs. (17 N•m) torque.
- (7) Lower vehicle and refill transmission with Mopar ATF Plus, type 7176 fluid.

#### 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. 2). 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

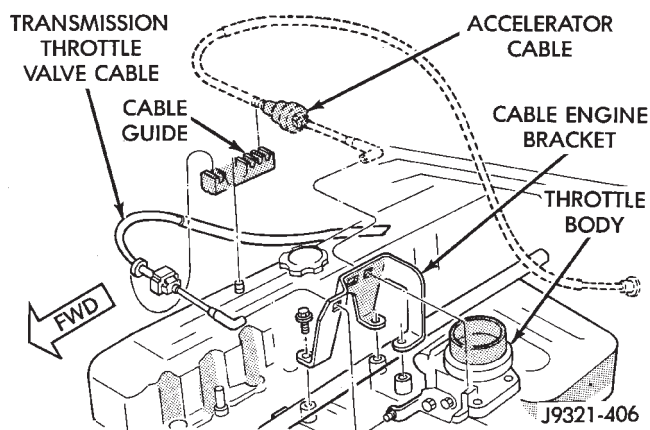
position. Proper adjustment will allow simultaneous movement without causing the transmission throttle lever to either move ahead of, or lag behind the lever on the throttle body.

#### CHECKING THROTTLE VALVE CABLE ADJUSTMENT

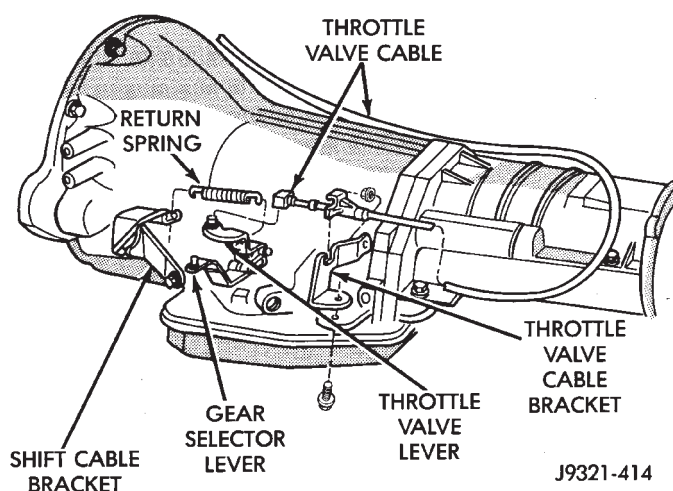
- (1) Turn ignition key to OFF position.
- (2) Remove air cleaner.
- (3) Verify that lever on throttle body is at curb idle position. Then verify that transmission throttle lever (Fig. 3) is also at idle (fully forward) position.
- (4) Slide cable off attachment stud on throttle body lever (Fig. 4).
- (5) Compare position of cable end to attachment stud on throttle body lever (Fig. 4):
  - (a) Cable end and attachment stud should be aligned (or centered on one another) to within 1 mm (0.039 in.) in either direction.
  - (b) If cable end and attachment stud are misaligned (off center), cable will have to be adjusted as described in 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.
  - (a) If both levers move simultaneously from idle to half-throttle and back to idle position, adjustment is correct.
  - (b) If transmission throttle lever moves ahead of, or lags behind throttle body lever, cable adjustment will be necessary. Or, if throttle body lever prevents transmission lever from returning to closed position, cable adjustment will be necessary.

#### THROTTLE VALVE CABLE ADJUSTMENT PROCEDURE

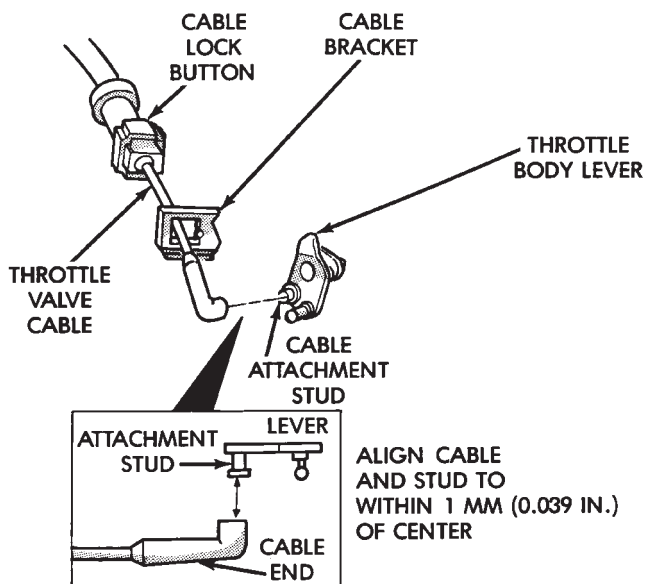
- (1) Turn ignition switch to OFF position.
- (2) Remove air cleaner if necessary.
- (3) Disconnect cable end from attachment stud. **Carefully slide cable off stud. Do not pry or pull cable off.**
- (4) Verify that transmission throttle lever is in fully closed position. Then be sure lever on throttle body is at curb idle position.
- (5) Press cable lock button inward to release cable (Fig. 4). Lock button only has to move about 2 mm (0.070 in.) to release cable in adjuster head.
- (6) Center cable end on attachment stud to within 1 mm (0.039 in.) and release lock button.
- (7) Check cable adjustment. Be sure transmission throttle lever and lever on throttle body move simultaneously as described in cable adjustment checking procedure.



**Fig. 2 Throttle Cable Attachment At Engine**



**Fig. 3 Throttle Cable Attachment At Transmission**



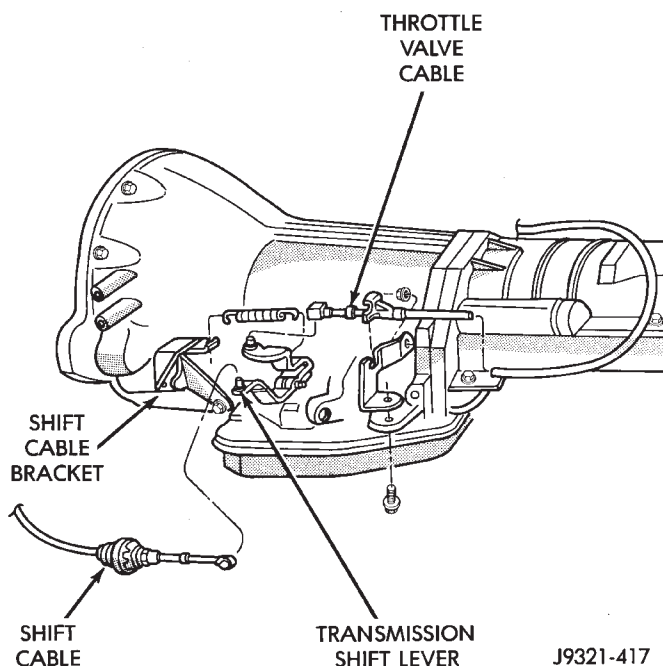
**Fig. 4 Throttle Cable Adjustment Components**

## GEARSHIFT CABLE ADJUSTMENT

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.
- (3) Release cable adjuster clamp (at transmission end of cable) to unlock cable (Fig. 5).
- (4) Unsnap cable from cable bracket (Fig. 5).
- (5) Check transmission shift lever position by moving it all the way rearward into Park detent.
- (6) Verify positive engagement of park lock by attempting to rotate propeller shaft. Shaft will not rotate when park lock is engaged.
- (7) Snap cable into cable bracket on transmission.
- (8) Lock shift cable by pressing cable adjuster clamp down until it snaps into place.
- (9) Check engine starting. Engine should start only in Park and Neutral.
- (10) Lower vehicle.



**Fig. 5 Shift Cable Attachment At Transmission**

## PARK INTERLOCK CABLE ADJUSTMENT

- (1) Shift transmission into Park.
- (2) Turn ignition switch to Accessory position.

**CAUTION:** Be sure the ignition switch is in the Accessory position for cable adjustment. The cable and lever mechanism will not adjust correctly if the switch lock cylinder is in Park position.

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

(4) Pull cable lock button up to release cable (Fig. 6).

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

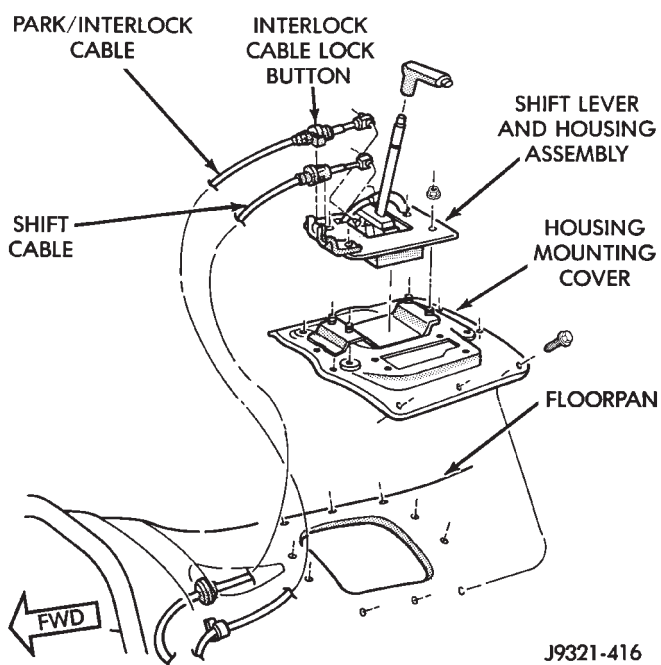
(6) Check cable adjustment as follows:

(a) Place shift lever in Park.

(b) Check shift handle release button and ignition lock cylinder operation. Release button should be in released (out) position and lock cylinder should rotate freely from Off to Lock.

(c) Next, place shift lever in D or R position and check lock cylinder operation again. Cylinder should not rotate from Off to Lock position.

(d) Check shift lever operation. Shifting out of Park position should only be possible when ignition lock cylinder is in Off, Run, or Start positions. Shift lever should be locked in when lock cylinder is in Accessory and Lock positions.



**Fig. 6 Shift And Park Interlock Cables**

### FRONT BAND ADJUSTMENT

The front band adjusting screw is located on the driver side of the transmission case above the manual valve and throttle valve levers.

#### ADJUSTMENT PROCEDURE

(1) Raise vehicle.

(2) Loosen band adjusting screw locknut. Then back locknut off 4-5 turns. Be sure adjusting screw turns freely in case. Lubricate screw threads if necessary.

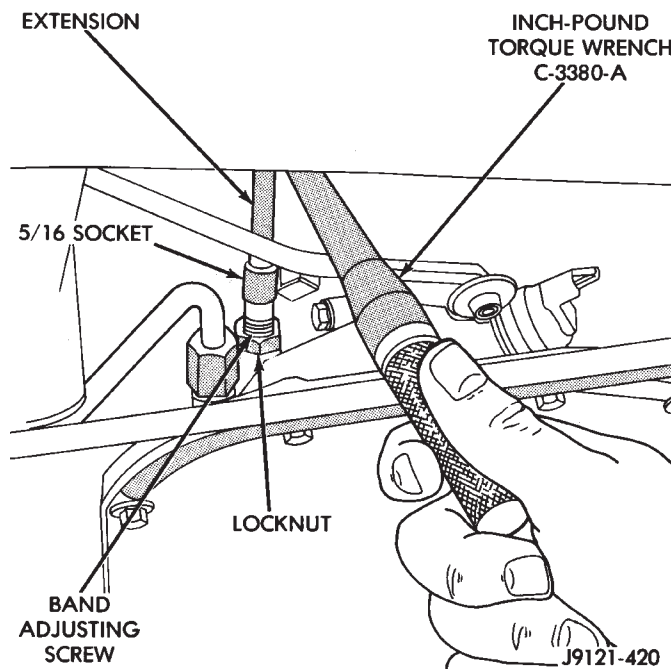
(3) Tighten band adjusting screw to 8 N•m (72 in. lbs.) torque with inch pound Torque Wrench C-3380-A, a 3-in. extension and 5/16 socket (Fig. 7).

**CAUTION:** If Adapter C-3705 is needed to reach the adjusting screw (Fig. 8), tighten the screw to only 5 N•m (47-50 in. lbs.) torque.

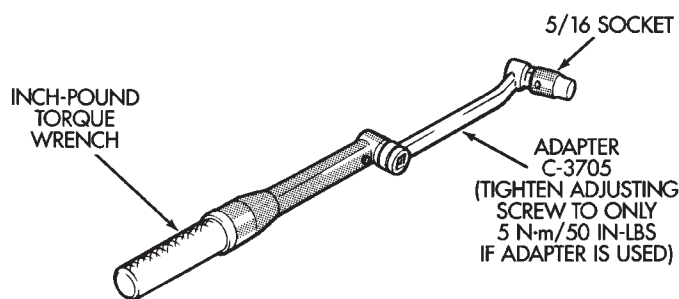
(4) **Back off band adjusting screw 3-5/8 turns.**

(5) Hold adjuster screw in position and tighten locknut to 41 N•m (30 ft. lbs.) torque.

(6) Lower vehicle.



**Fig. 7 Front Band Adjustment**



**Fig. 8 Using Band Adjustment Adapter Tool C-3705**

### 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. Be sure adjusting screw turns freely in lever. Lubricate screw threads if necessary.

(4) Tighten adjusting screw to 8 N•m (72 in. lbs.) torque (Fig. 9). Use inch-pound Torque Wrench C-3380-A for adjustment.

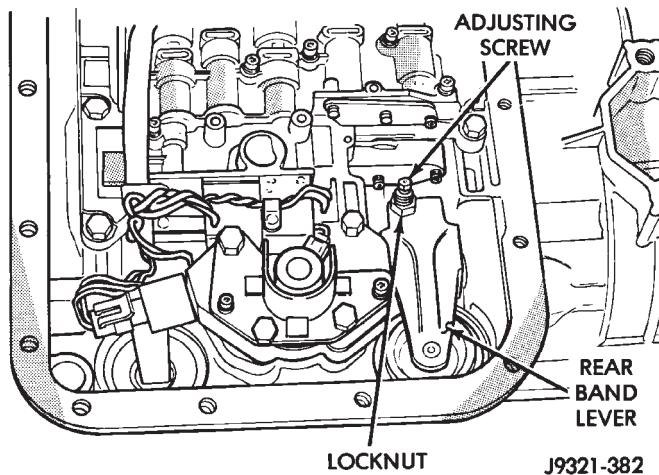
(5) Back off band adjusting screw 4 turns.

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

(7) Clean oil pan, pan magnet and gasket surface of case. Also inspect and replace fluid filter if necessary.

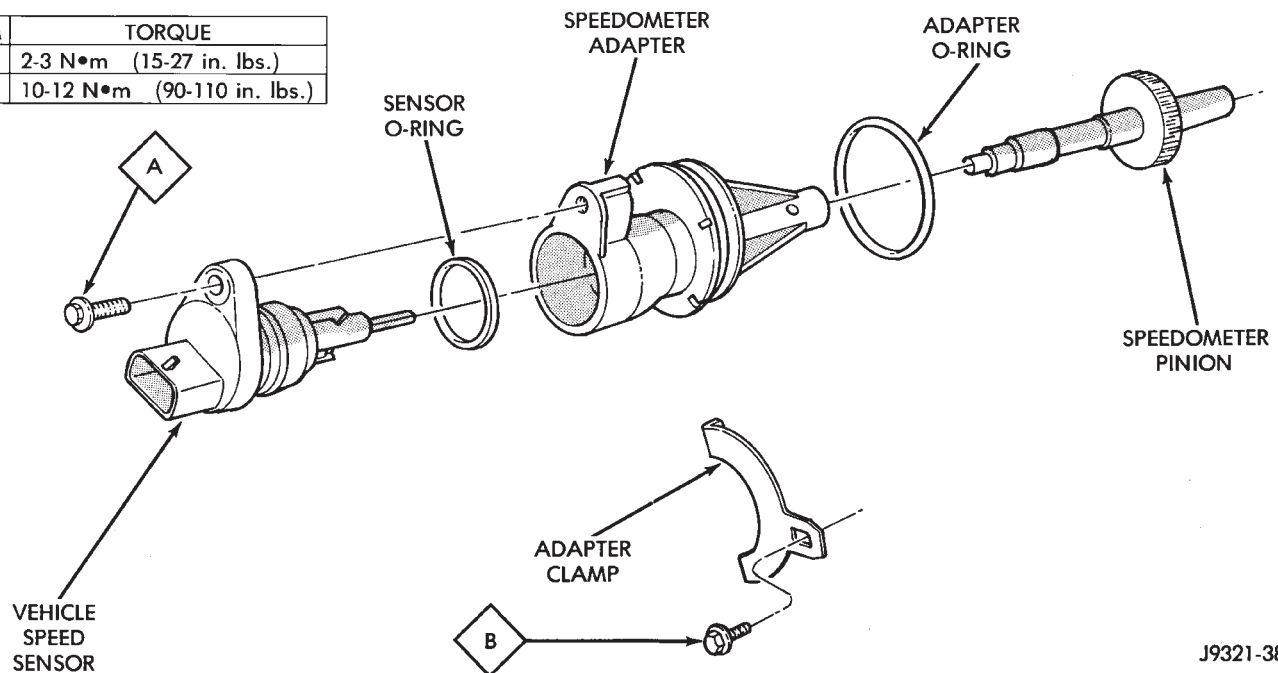
(8) Position new gasket on oil pan and install pan on transmission. Tighten pan bolts to 17 N•m (150 in. lbs.) torque.

(9) Lower vehicle and refill transmission with recommended fluid.



**Fig. 9 Rear Band Adjusting Screw Location**

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



**Fig. 10 Speedometer Components**

## SPEEDOMETER SERVICE

Rear axle gear ratio and tire size determine speedometer pinion requirements. If the pinion must be replaced, refer to the parts catalogue information for the correct part.

### SPEEDOMETER ASSEMBLY REMOVAL

- (1) Raise vehicle.
- (2) Disconnect wires from vehicle speed sensor.
- (3) Remove adapter clamp and screw (Fig. 10).
- (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. 9). 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.

### SPEEDOMETER 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 if necessary (Fig. 10).
- (3) Lubricate sensor and adapter O-rings with transmission fluid.

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(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. 11). These numbers will correspond to number of teeth on pinion.

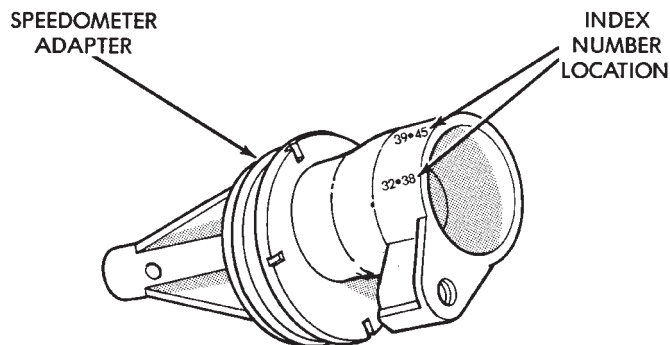
(8) Install speedometer assembly in housing.

(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.



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**Fig. 11 Location Of Index Numbers On Speedometer Adapter**

### PARK/NEUTRAL POSITION SWITCH

The center terminal of the 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

(1) Verify that gearshift linkage is correctly adjusted before testing. Switch will not operate properly if linkage adjustment is incorrect.

(2) To test switch, remove wiring connector. Then test continuity between center terminal and transmission case. Continuity should exist only when transmission is in Park or Neutral.

(3) Shift transmission into reverse and test continuity at switch outer terminals.

(a) Continuity should exist only when transmission is in Reverse.

(b) Continuity should not exist between outer terminals and case.

### PARK/NEUTRAL POSITION SWITCH REPLACEMENT

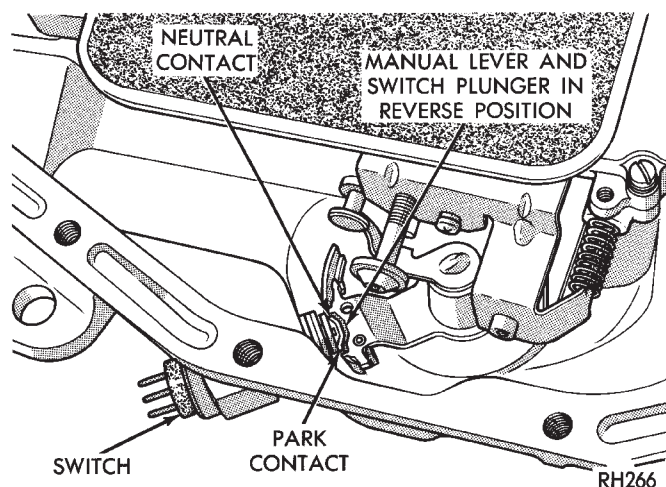
(1) Raise vehicle and position drain pan under switch.

(2) Disconnect switch wires and remove switch from case.

(3) Move shift lever to Park and Neutral positions. Verify that switch operating lever fingers are centered in switch opening in case (Fig. 12).

(4) Install new seal on switch and install switch in case. Tighten switch to 34 N•m (25 ft. lbs.) torque.

(5) Connect switch wires, lower vehicle and top off transmission fluid level.



**Fig. 12 Park/Neutral Position Switch Contacts**

### VALVE BODY SERVICE

#### GENERAL SERVICE INFORMATION

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

The valve body can be disassembled for cleaning and inspection of the individual components. Refer to the procedures in the Transmission Unit Subassembly Overhaul section.

The only replaceable valve body components are:

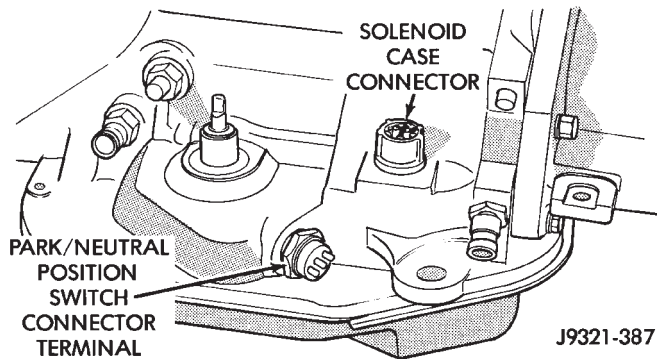
- manual lever
- manual lever washer, seal, E-clip and shaft seal
- manual lever detent ball
- throttle lever
- fluid filter
- switch valve and spring
- pressure adjusting screw bracket
- governor pressure solenoid
- governor pressure sensor
- converter clutch/overdrive solenoid assembly and harness
- governor housing gasket
- solenoid case connector O-rings



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

#### VALVE BODY 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 park/neutral position switch.
- (5) Disconnect wires at park/neutral position switch and solenoid case connector (Fig. 13).

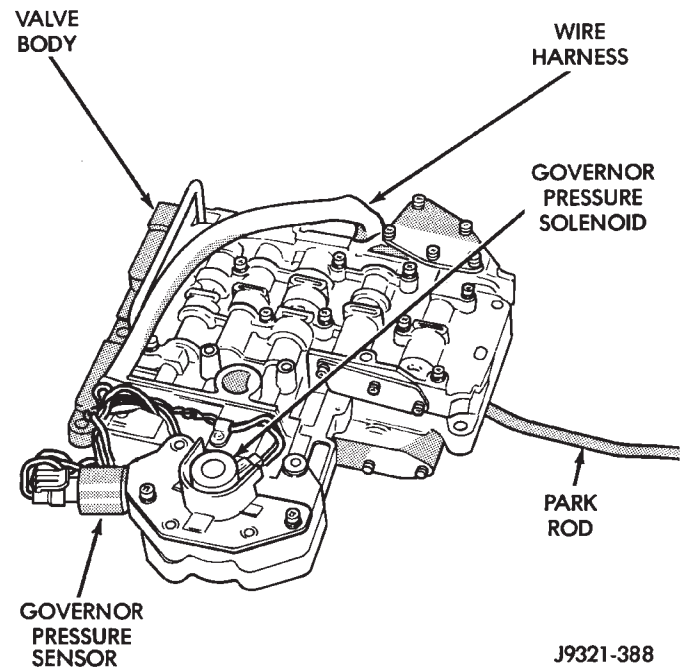


**Fig. 13 Transmission Case Electrical Connector Locations**

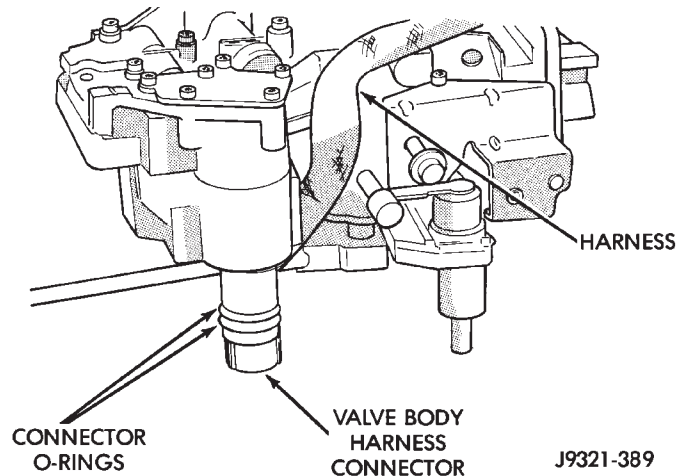
- (6) Position drain pan under transmission oil pan.
- (7) Remove transmission oil pan and gasket.
- (8) Remove fluid filter from valve body.
- (9) Remove bolts attaching valve body to transmission case.
- (10) Lower valve body enough to remove accumulator piston and springs.
- (11) Work manual lever shaft and electrical connector out of transmission case. Then lower valve body, rotate it away from case, pull park rod out of sprag and remove valve body (Fig. 14).

#### VALVE BODY INSTALLATION

- (1) Verify that park/neutral position switch has NOT been installed in case. Valve body cannot be installed if switch is in place.
- (2) Check condition of O-ring seals on valve body harness connector (Fig. 15). Replace seals on connector body if cut or worn.
- (3) 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. 16).
- (4) Check condition of seals on accumulator piston (Fig. 17). Install new piston seals if necessary.
- (5) Place valve body manual lever in low (1 position) so ball on park lock rod will be easier to install in sprag.
- (6) Lubricate shaft of manual lever with petroleum jelly. This will ease inserting shaft through seal in case.
- (7) Lubricate seal rings on valve body harness connector with Ru-Glyde, or petroleum jelly.
- (8) Position valve body on case and work end of park lock rod into and through pawl sprag. Turn propeller



**Fig. 14 42RE Valve Body**



**Fig. 15 Valve Body Harness Connector O-Ring Seal Locations**

shaft to align sprag and park lock teeth if necessary. Rod will make click noise 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. If the rod enters the cavity during installation, it will become bent when the overdrive bolts are tightened. The rod will then have to be replaced because it is not repairable.

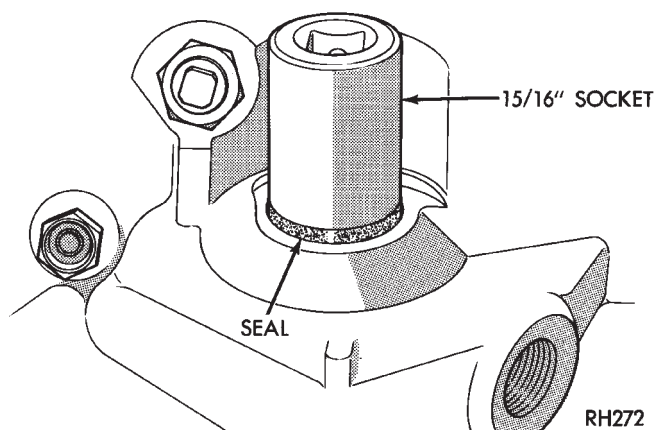


Fig. 16 Manual Lever Shaft Seal Installation

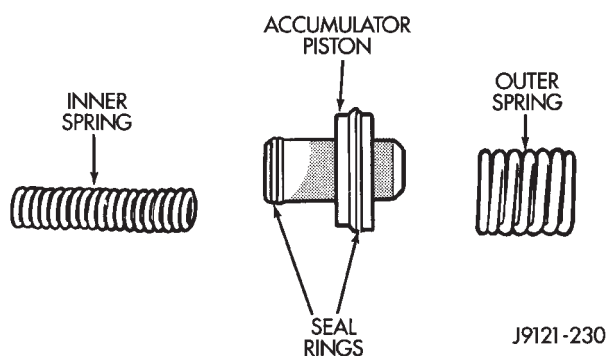


Fig. 17 Accumulator Piston Components

(9) Install accumulator springs and piston in case. Then swing valve body over piston and outer spring to hold it in place.

(10) Align accumulator piston and outer spring, manual lever shaft and electrical connector in case. Then seat valve body on 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 and connect park/neutral position switch in case.

(14) Install throttle and gearshift levers on valve body manual lever shaft.

(15) Check and adjust front and rear bands if necessary.

(16) Connect valve body overdrive and converter clutch solenoid wires to case connector.

(17) Install oil pan and new gasket. Tighten pan bolts to 17 N•m (13 ft. lbs.) torque.

(18) Lower vehicle and fill transmission with Mopar ATF Plus, type 7176 fluid.

(19) Check and adjust gearshift and throttle linkage if necessary.

## SERVICING TRANSMISSION COOLER LINE FITTINGS

The transmission cooler lines are attached to the transmission and radiator main cooler with quick disconnect fittings (Fig. 18).

The transmission case fitting consists of a fitting body, a plastic insert and a wire retainer clip (Fig. 19).

There are two fitting styles that will be used. Current production (type I), fittings have the retainer clip exposed as shown in Figures 18 and 19. Future production (type II), fittings will have the fitting body and wire retainer clip covered by a shrink wrap material (Fig. 20). A tool is needed with the type II fittings to spread the retainer clip for cooler line removal. A small plastic removal tool will be attached to each type II fitting for this purpose. Special service tools are not required.

The fitting in some cooler line hoses is swedged into the hose. Only the insert and retainer clip are serviceable on this fitting.

A flange on the cooler line serves as the sealing mechanism. The wire retainer clip holds the cooler line in the fitting. The clip fits behind the cooler line flange to hold the line in place. The plastic insert is not a seating or sealing device. The insert is used to indicate when the cooler line is properly seated in the fitting.

## QUICK DISCONNECT FITTING SERVICE

The type I transmission fitting, wire retainer clip and plastic insert are serviceable individually, or as an assembly. The fittings in the cooler line hoses are serviced only as part of the cooler line. Only the retaining clip and insert are serviceable.

On type I fittings, the wire retainer clip is not a reusable part. It must be replaced if removed from the fitting for any reason. In addition, the plastic insert should be replaced if cut, torn, or damaged in any way. A damaged insert could prevent the cooler line from seating properly.

Type II fittings are not serviceable. The fitting or cooler line must be replaced as an assembly when necessary.

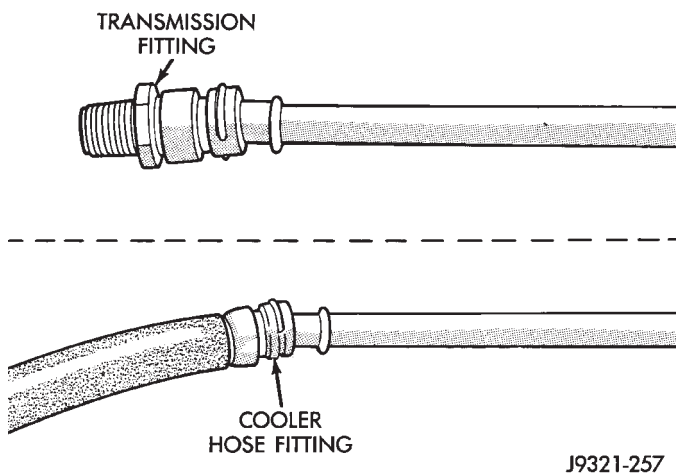
## DISCONNECTING COOLER LINE (TYPE I FITTING)

(1) If cooler lines will be disconnected at main cooler in radiator, remove splash shield under radiator for access to fittings.

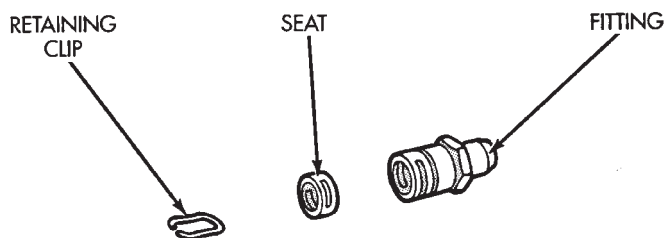
(2) Pry wire retainer clips off fittings with small screwdriver (Fig. 21). **Discard clips as they are NOT reusable after being removed.**

(3) Pull cooler line out of fitting.

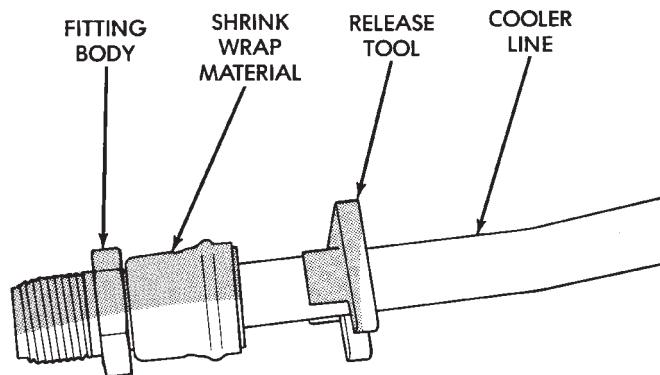
(4) Remove and retain plastic insert from each fitting.



**Fig. 18 Type I Quick Disconnect Fitting**



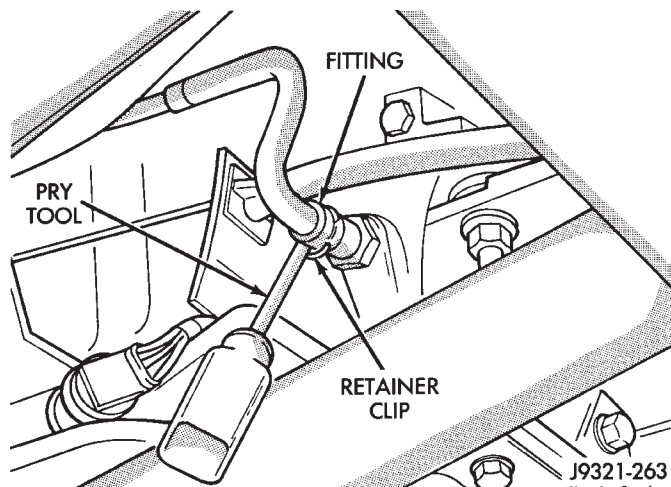
**Fig. 19 Type I Quick Disconnect Fitting Components**



**Fig. 20 Type II Quick Disconnect Fitting And Release Tool**

(5) Cover open ends of line and fitting to prevent dirt entry.

(6) Inspect condition of each plastic insert. Replace any insert that is cut, torn, or damaged in any way. Replace the transmission fitting as an assembly if the fitting body is damaged. Replace the cooler line as an assembly, if the fitting swaged into the cooler line hose, is damaged.



**Fig. 21 Removing Retainer Clip To Release Cooler Line**

#### RECONNECTING COOLER LINES (TYPE I FITTING)

(1) If transmission or radiator fittings will be replaced, apply Mopar Lock N' Seal, or Loctite 242 to fitting threads before installation.

(2) Wipe off fittings and cooler lines with lint free cloth or shop towels.

(2) Install plastic inserts in fittings. Use new inserts if originals were damaged in any way, or if doubt exists about insert condition.

(3) Install new clips on fittings as follows:

(a) Start retainer clip in slot on one side of fitting (Fig. 22).

(b) Swing retainer clip across and over fitting. Then carefully seat clip in slot on opposite side of fitting (Fig. 23). **It is not necessary to overspread a new clip in order to install it. Clip will easily slip into opposite fitting slot if care is exercised.**

**CAUTION:** Do not attempt to salvage a retainer clip if it becomes, bent, or distorted. A salvaged clip will not properly secure the cooler line in the fitting.

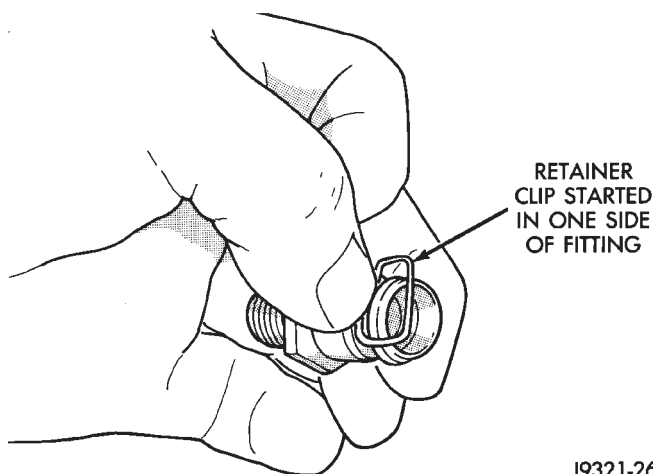
(4) Wipe end of each cooler line clean with lint free cloth, or shop towel.

(5) Start cooler line into fitting. Then push cooler line inward until wire retainer clip snaps into place behind cooler line flange.

(6) **Note position of plastic insert. When cooler line is fully seated, insert will no longer extend beyond end of fitting.**

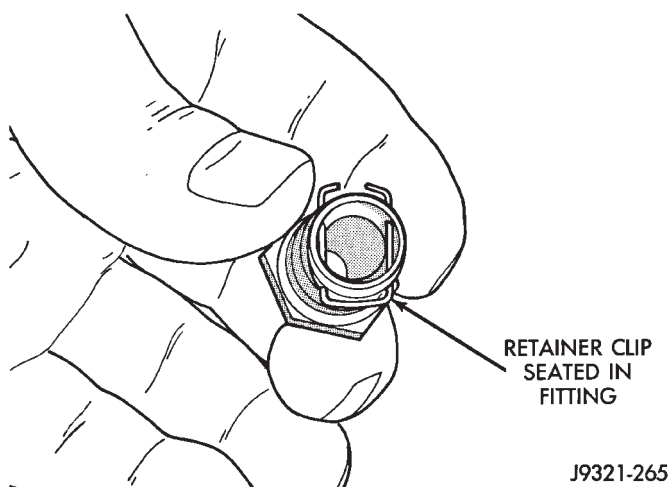
(7) Verify that both sides of wire retainer clip are seated **behind** flange on cooler line (Fig. 24).

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



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**Fig. 22 Starting New Retainer Clip On Type I Fitting**



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**Fig. 23 Seating New Retainer Clip In Type I Fitting**

**CAUTION:** The retainer clips must secure the cooler lines in the fittings. If the clips are deformed, or distorted, normal fluid pressure could unseat the cooler lines resulting in fluid loss and transmission damage. Be very sure the clips are in good condition and firmly seated behind the cooler line flanges (Fig. 24).

(9) Reinstall splash shield under radiator, if removed.

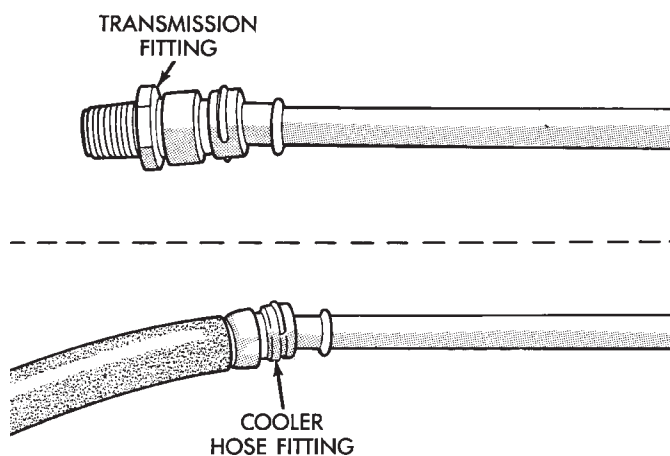
#### DISCONNECTING COOLER LINES (TYPE II FITTING)

(1) Remove splash shield for access if cooler lines will be disconnected at radiator cooler.

(2) If fitting and cooler line are encrusted with dirt, mud, or grease, clean out fitting and line with Mopar spray type brake cleaner. Plastic release tool will not fit into retainer clip if fitting is full of foreign material.

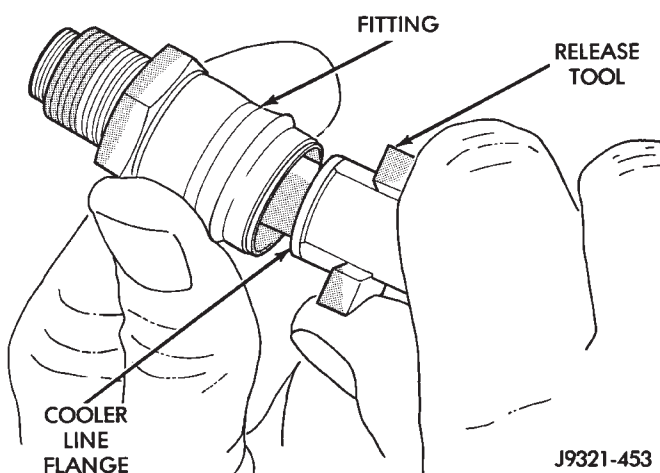
(3) Slide small plastic release tool into fitting.

(4) Push and turn tool to spread retainer clip and disconnect cooler line and/or fitting (Fig. 25).



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**Fig. 24 Correct Seating Of Cooler Lines In Type I Fitting**



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**Fig. 25 Disconnecting Type II Fitting**

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

(6) Inspect condition of fitting. Replace transmission fitting as an assembly if fitting body or retainer clip is damaged. Replace cooler line as assembly, if fitting swedged into cooler line hose, is damaged.

#### RECONNECTING COOLER LINES (TYPE II FITTING)

(1) If transmission or radiator fittings require replacement, apply Mopar Lock N' Seal, or Loctite 242 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 clip secures line. A snap or click sound will be heard and felt through the line when the retainer clip seats behind the cooler line flange.

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



**CAUTION:** The retainer clips must secure the cooler lines in the fittings. If the clips are deformed, or distorted, normal fluid pressure could unseat the cooler lines resulting in fluid loss and transmission damage. Be very sure the cooler lines are firmly secured as described in step (4) above.

(5) Install splash shield, if removed.

### TRANSMISSION COOLER TESTING AND FLUSHING

If a transmission malfunction contaminates the fluid, the cooler and lines must be reverse flushed thoroughly. Flushing will prevent sludge and particles from flowing back into the transmission after repair.

**The flushing procedure applies to standard and auxiliary coolers alike.**

Pressure equipment is preferred for reverse flushing. However, reverse flushing can be performed with hand operated equipment as follows.

### COOLER REVERSE FLUSHING PROCEDURE

(1) Identify and disconnect cooler pressure and return lines at transmission. Rear line is return line from cooler. Front line is pressure line to cooler (Fig. 26).

(2) Position drain pan under cooler pressure line to catch material flushed through cooler and lines.

(3) Reverse flush cooler using hand operated suction gun filled with mineral spirits. Insert gun nozzle (or

hose) into cooler return line. Then force mineral spirits into line and through cooler.

(4) Continue reverse flushing until fluid exiting cooler pressure line is clear and free from debris. **Replace cooler if fluid cannot be pumped through it.**

(5) Clear flushing materials from cooler and lines with short pulses of compressed air. Insert air gun nozzle into cooler return line and continue short air pulses until all fluid is cleared from cooler and lines.

(6) Pump one quart of fresh automatic transmission fluid through cooler and lines before reconnecting lines.

### TESTING COOLER FLUID FLOW

Cooler flow is tested by measuring the amount of fluid pumped through the cooler in a specified time by the transmission oil pump.

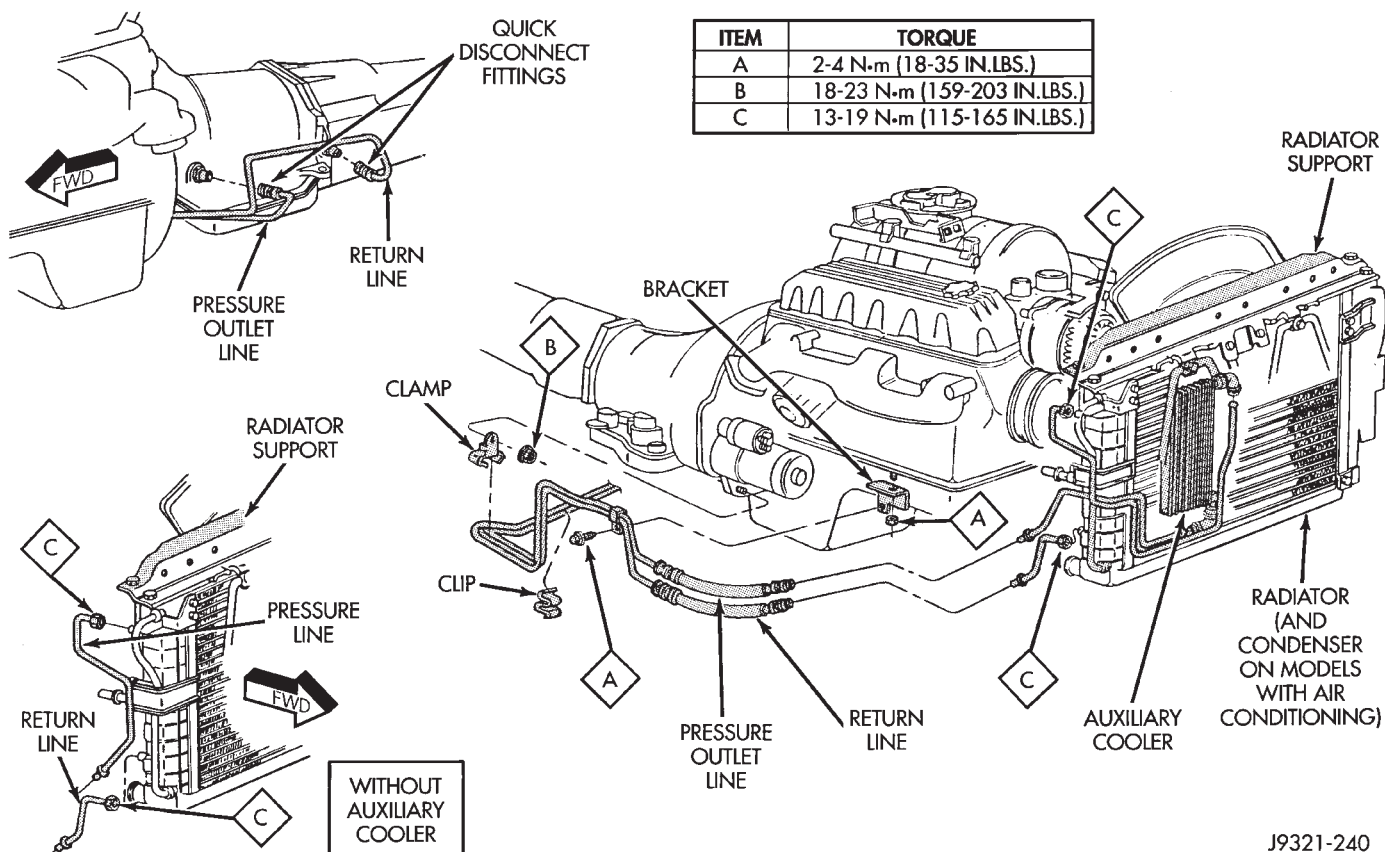
(1) Disconnect cooler return (rear) line at transmission and place it in one quart test container.

(2) Add extra quart of fluid to transmission.

(3) Use stopwatch to check test time.

(4) Shift into Neutral.

(5) Start and run engine at curb idle speed and note cooler flow. Approximately 1 quart (0.9 liter) of fluid should flow into test container in 20 seconds.



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**Fig. 26 Transmission Cooler Line Identification**

(6) If fluid flow is intermittent, or flows less than one quart in 20 seconds, or fails to allow flow at all, cooler is plugged and should be replaced.

#### MAIN COOLER REPLACEMENT

The main transmission cooler is located in the radiator lower tank. The cooler is not a serviceable component. If the cooler is damaged in any way, the radiator will have to be replaced.

#### AUXILIARY COOLER REPLACEMENT

(1) Remove grille and air conditioning condenser if equipped.

(2) Remove screws and U-nuts securing cooler to radiator and support.

(3) Tag cooler hoses for installation reference.

(4) Position drain pan under cooler hoses.

(5) Loosen cooler connecting hose clamps and disconnect hoses.

(6) Remove auxiliary cooler.

(7) Connect cooler hoses.

(8) Position cooler on radiator and install cooler attaching U-nuts and screws.

(9) Tighten cooler hose clamps securely.

(10) Install grille and air conditioning condenser.

(11) Check and adjust transmission fluid level.

(12) If air conditioning condenser lines were disconnected during service, evacuate and recharge system.

#### ALUMINUM THREAD REPAIR

Damaged or worn threads in the aluminum transmission case and in the valve body can be repaired with Heli-Coil or similar quality thread inserts. Essentially, repair consists of drilling out the worn or damaged threads, tapping the hole with a special tap and installing the thread insert into the tapped hole. This procedure returns the hole threads to original size. Heli-Coil, or equivalent, tools and inserts are readily available from most automotive parts suppliers. Stainless steel inserts are recommended.



## TRANSMISSION/OVERDRIVE REMOVAL AND INSTALLATION—42RE

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## GENERAL INFORMATION

The overdrive unit can be removed for service without having to remove the entire transmission assembly. However if the transmission, torque converter, converter driveplate, or oil pump requires service, the complete transmission assembly must be removed for access to these components.

If only the overdrive unit must be removed, refer to the Overdrive Unit Removal/Installation procedures. If the complete transmission assembly must be removed, refer to the Transmission Removal/Installation procedures.

## TRANSMISSION REMOVAL (2-WHEEL DRIVE)

- (1) Disconnect battery negative cable.
- (2) Raise vehicle on hoist.
- (3) Remove skid plate if equipped.
- (4) If transmission is being removed for repair, remove oil pan, drain fluid and reinstall pan on case.
- (5) Mark propeller shaft for installation reference. Then disconnect and remove propeller shaft.
- (6) Disconnect vehicle speed sensor wires, transmission solenoid wires and park/neutral position switch wires.
- (7) Disconnect wires from transmission speed sensor at rear of overdrive unit.
- (8) Remove exhaust system Y-pipe for working clearance.
- (9) Unclip wire harnesses from transmission clips.
- (10) Disconnect throttle valve and gearshift cables from levers on valve body manual shaft. Move cables aside and secure them to underbody.
- (11) Remove dust cover from transmission converter housing.
- (12) Disconnect and remove starter motor.
- (13) Remove bolts attaching converter to driveplate.
- (14) Disconnect cooler lines at transmission fittings. Refer to In-Vehicle Service section for procedures.
- (15) Support transmission with transmission jack.
- (16) Remove bolts/nuts attaching rear insulator to rear crossmember. Then remove rear crossmember.
- (17) Lower transmission for access to converter housing upper bolts and crankshaft position sensor.

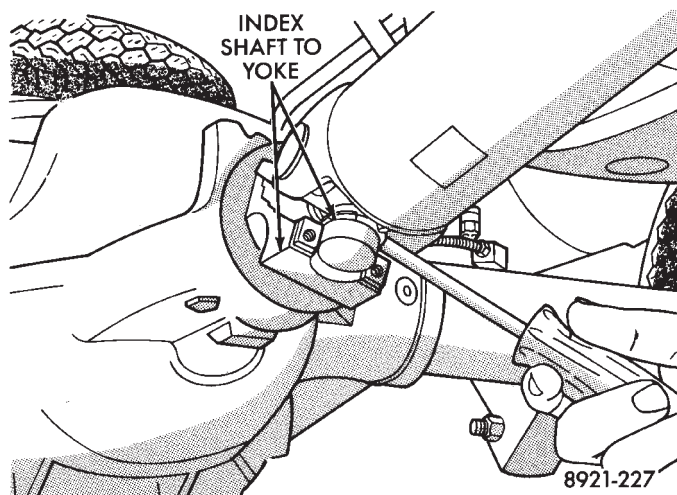
- (18) Remove crankshaft position sensor. Retain sensor attaching screws.

**CAUTION:** The crankshaft position sensor can be damaged if the transmission is removed (or installed) with the sensor still bolted to the engine block. To avoid damage, remove the sensor before removing the transmission.

- (19) Remove transmission fill tube and tube O-ring seal.
- (20) Remove bolts attaching transmission to engine block.
- (21) Slide transmission away from engine and install C-clamp on converter housing to hold converter in place.
- (22) Lower transmission and move from under vehicle.
- (23) If transmission is to be serviced, remove it from jack and position it on bench.

## TRANSMISSION REMOVAL (4-WHEEL DRIVE)

- (1) Raise vehicle on hoist.
- (2) Remove skid plate, if equipped.
- (3) Mark front and rear propeller shafts and U-joints for alignment reference (Fig. 1).
- (4) Disconnect and remove both propeller shafts.
- (5) Disconnect vehicle speed sensor and transmission output shaft speed sensor wires.
- (6) Disconnect electrical wires from clips on transmission and transfer case.
- (7) Disconnect transfer case shift linkage at transfer case range lever. Then remove linkage bracket bolts and remove linkage and bracket from transfer case. Move linkage aside for clearance.
- (8) Remove nuts attaching transfer case to overdrive unit gear case.
- (9) Remove transfer case. Support transfer case with transmission jack. Secure transfer case to jack with safety chains. Then move transfer case rearward and off transmission.
- (10) Remove transfer case from transmission jack and place transfer case on bench.
- (11) Support transmission with transmission jack.



**Fig. 1 Marking Propeller Shaft And Yoke For Alignment Reference**

- (12) Remove nuts and bolts attaching transmission mount to crossmember.
- (13) Remove bolts and nuts attaching crossmember to frame rails.
- (14) Rotate crossmember diagonally to clear frame rails and remove crossmember.
- (15) Disconnect exhaust pipes at manifold and at converter and/or muffler connections as needed. Then remove Y-pipe from vehicle and move remaining pipes aside for working clearance.
- (16) Disconnect and remove crankshaft position sensor. Retain sensor attaching bolts.

**CAUTION:** The crankshaft position sensor can be damaged if the transmission is removed (or installed) with the sensor still bolted to the engine block. To avoid damage, remove the sensor before removing the transmission.

- (17) Disconnect transmission shift linkage at shift lever on transmission.
- (18) Remove transmission shift linkage torque shaft assembly from retainers on transmission and frame rail. Move linkage aside for working clearance.
- (19) Remove brackets that attach transmission to engine block, if equipped.
- (20) Remove dust shield cover from front side of transmission converter housing.
- (21) Remove starter motor bolts. Pull starter rearward until clear of housing and position it out of way on nearby component. Starter does not have to be removed from vehicle nor does cable have to be disconnected.
- (22) Remove bolts attaching torque converter to drive plate.
- (23) Disconnect cooler lines at quick disconnect fittings in transmission. Refer to In-Vehicle Service section for procedures.

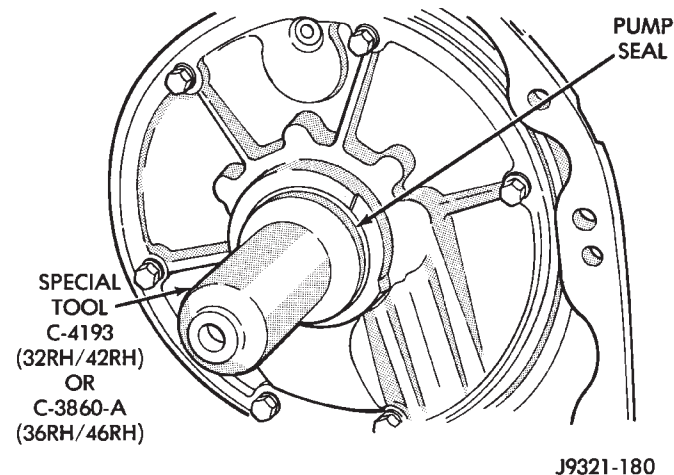
- (24) Disconnect solenoid and park/neutral position switch wires at transmission.
- (25) Remove transmission fill tube and dipstick.
- (26) Lower transmission for access to converter housing upper bolts.
- (27) Remove bolts attaching transmission converter housing to engine. Note that some bolts may be accessible only from front (engine) side of housing.
- (28) Move transmission rearward until clear of engine block dowels. On some models, part of hem flange joining vehicle cab and dash panel may interfere with transmission removal. Peen this part of flange over with a mallet if necessary.
- (29) Secure torque converter in housing with small C-clamp.
- (30) Lower transmission and remove it from under vehicle.
- (31) Remove C-clamp and remove converter from transmission. Place converter on workbench for inspection or reassembly. Cover converter hub with clean, lint free cloth.
- (32) Oil pump, converter and driveplate can now be serviced if necessary. Refer to information in this section.

## OIL PUMP SEAL REPLACEMENT

The pump oil seal can be replaced without removing the pump and reaction shaft support assembly from the transmission case.

### Seal Removal

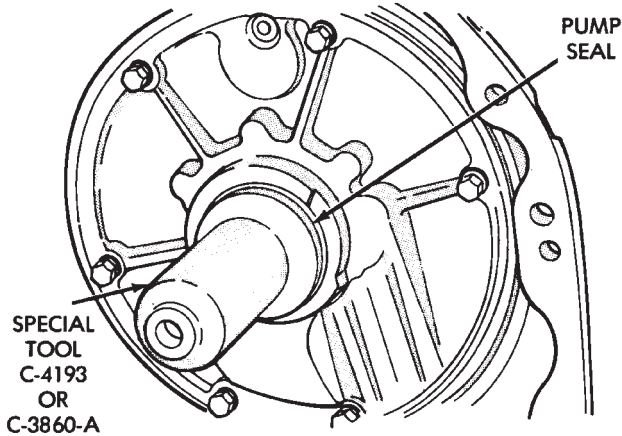
Remove the seal with Special Tool C-3861 (Fig. 2). To use the remover tool, First start the tool into the seal by hand. Next, thread the tool into the seal as far as it will go. Use a wrench on the tool hex to turn the tool. Continue tightening until all the tool threads firmly grip the metal part of the seal. Then tighten the tool puller screw to withdraw the seal from the pump body.



**Fig. 2 Oil Pump Seal Removal**

### Seal Installation

Use Installer Tool C-3860-A (Fig. 3). To use the tool, place the seal in the pump opening with the seal lip facing inward. Then tap the seal into place with the installer tool. Tool Handle C-4171 may be used with the installer tool if desired.



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**Fig. 3 Oil Pump Seal Installation**

### TORQUE CONVERTER AND DRIVE PLATE SERVICE

After the transmission has been removed, the drive plate and torque converter can be replaced or removed for service access.

The torque converter is not a serviceable part. If the converter is contaminated by a transmission malfunction, or damaged in any way, it must be replaced as an assembly. **Do not attempt to flush a converter contaminated by metal or clutch facing particles. Flushing will not remove these contaminants.**

### TRANSMISSION INSTALLATION (2-WHEEL DRIVE)

**CAUTION:** The transmission cooler and lines must be flushed if repair was to correct a problem that generated sludge, metal particles, or clutch friction material. The torque converter should also be replaced when contaminated by a malfunction. The transmission, fluid and converter will be contaminated again if residue/debris is not flushed from the cooler and lines beforehand.

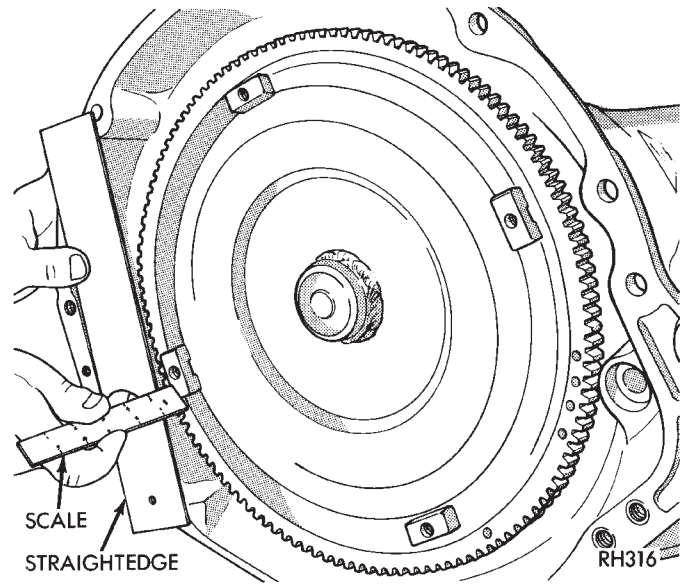
(1) Mount transmission on jack. Secure transmission to jack with safety chains.

(2) Check torque converter hub and hub drive notches for sharp edges, burrs, scratches, or nicks. Polish hub and notches with crocus cloth or 400 grit paper if necessary. Hub must be smooth to avoid damaging pump seal.

(3) Lubricate converter hub and pump seal lip with Mopar high temperature wheel bearing grease.

(4) Verify that converter is fully seated. Use straight edge and steel ruler to check seating (Fig. 4). Surface of

converter lugs should be 12.7 mm (1/2 in.) to rear of straight edge when converter is fully seated.



**Fig. 4 Checking Torque Converter Seating**

(5) Temporarily secure converter with C-clamp attached to housing or with metal strap attached across converter housing.

(6) Check condition of converter driveplate. Replace driveplate if cracked, distorted or damaged.

(7) Verify that transmission dowel pins are seated in engine block and protrude far enough to hold transmission in alignment.

(8) Coat torque converter pilot hub of crankshaft with light coat of Mopar high temperature wheel bearing grease.

(9) Move transmission under vehicle and position it at rear of engine. Remove C-clamp or strap used to secure converter in housing.

(10) Align transmission with engine dowels and align converter with driveplate. Offset holes in driveplate are next to 1/8 inch hole in inner circle of plate (Fig. 5).

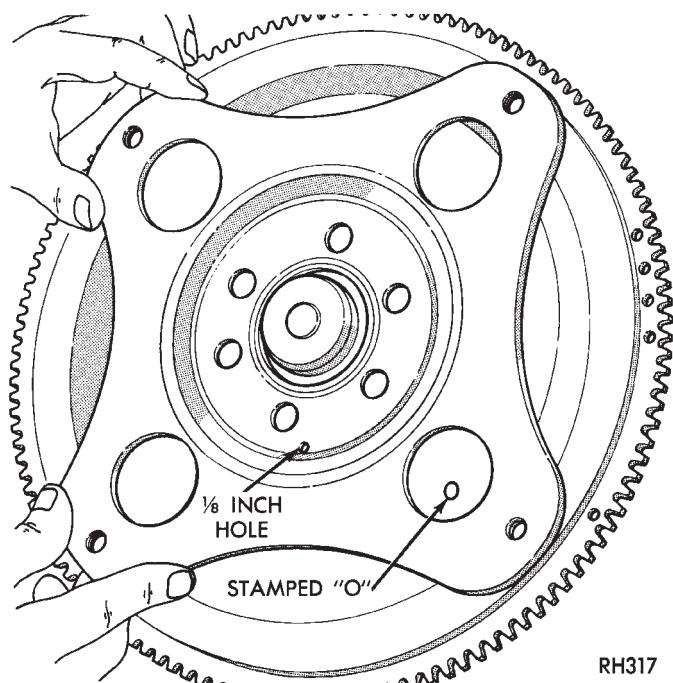
(11) Move transmission forward until seated on engine block dowels. Then install one or two transmission attaching bolts to hold transmission in place (Fig. 6).

**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 modulated clutch surfaces in the converter. If new bolts are required, use the bolts specified in the parts catalogue only.

(12) Verify converter bolt length. Bolt measurement is from bottom (underside) of bolt head to end of bolt threads.

- On 9.5 in., 3-lug converter, bolts should be 11.7 mm (0.46 in.) long.





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**Fig. 5 Torque Converter And Driveplate Markings**

- On 10.75 in., 4-lug converter, bolts should be 11.2 mm (0.44 in.) long.

(13) Install torque converter bolts. Tighten bolts as follows:

- On models with 9.5 in., 3-lug converter, tighten bolts to 54 N•m (40 ft. lbs.).
- On models with 10.75 in., 4-lug converter, tighten bolts to 31 N•m (270 in. lbs.).

(14) Install and tighten remaining transmission attaching bolts (Fig. 6).

(15) Install and connect crankshaft position sensor.

(16) Install dust cover on transmission converter housing. Two small vise grip pliers can be used to hold and align cover during installation.

(17) Install and connect starter motor.

(18) Connect transmission shift and throttle valve cables to valve body manual shaft and transmission brackets.

(19) Fasten wire harnesses in clips on transmission case.

(20) Connect wires to solenoids, park/neutral position switch, transmission speed sensor and vehicle speed sensor.

(21) Install transmission fill tube and O-ring.

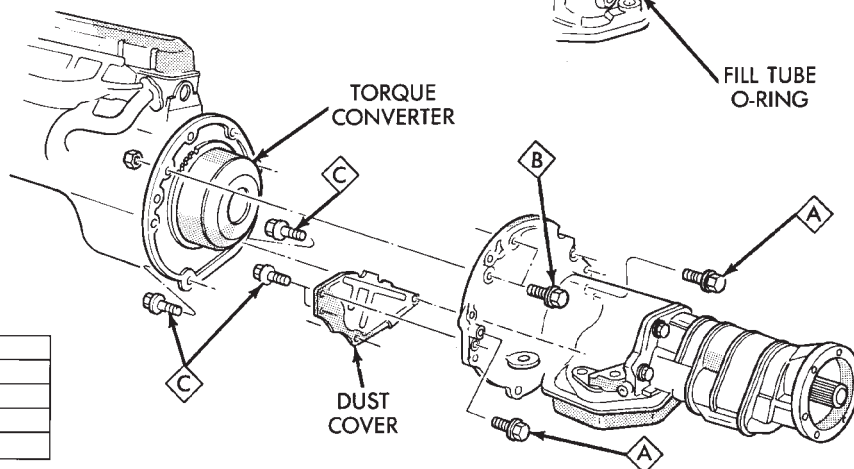
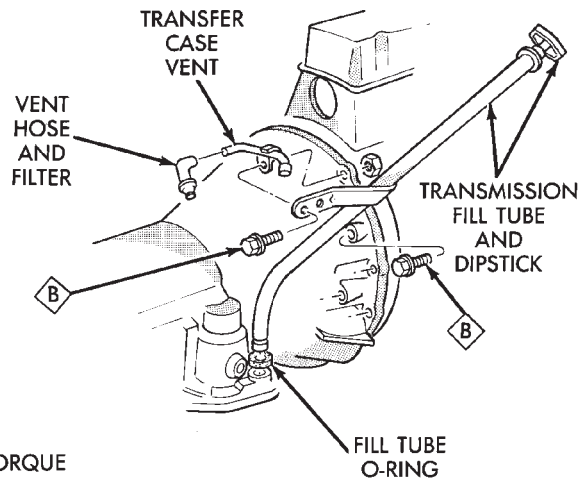
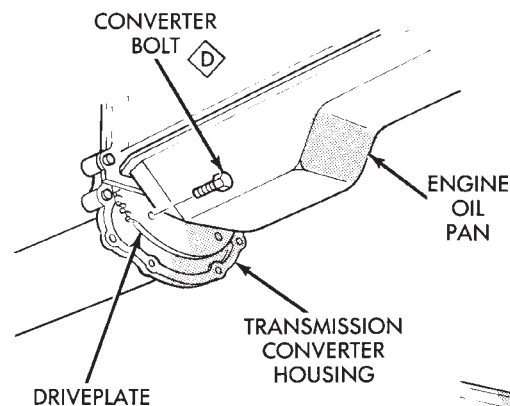
(22) Install rear crossmember and attach rear insulator to transmission and crossmember.

(23) Connect cooler lines to transmission case fittings. Pull lines outward to verify that they are securely seated and retained by wire retainer clips.

(24) Align and install propeller shaft. **Clean and lubricate slip yoke before installation.**

(25) Install exhaust system components.

(26) Lower vehicle.



ITEM	TORQUE
A	50-64 N•m (37-47 ft. lbs.)
B	30-35 N•m (22-26 ft. lbs.)
C	11-20 N•m (96-180 in. lbs.)
D	47-61 N•m (35-40 ft. lbs.)

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**Fig. 6 Transmission And Fill Tube Mounting**

- (27) Connect battery negative cable.
- (28) Fill or top off transmission fluid level with Mopar ATF Plus, type 7176.
- (29) Check transmission control cable adjustments. Readjust cables if necessary.

## TRANSMISSION INSTALLATION—4-WHEEL DRIVE

**CAUTION:** The transmission cooler and lines must be flushed if repair was to correct a problem that generated sludge, metal particles, or clutch friction material. The torque converter should also be replaced when contaminated by a malfunction. The transmission, fluid and converter will be contaminated again if residue/debris is not flushed from the cooler and lines beforehand.

- (1) Mount transmission on jack. Secure transmission to jack with safety chains.
- (2) Check torque converter hub and hub drive notches for sharp edges burrs, scratches, or nicks. Polish hub and notches with crocus cloth or 400 grit paper if necessary. Hub must be smooth to avoid damaging pump seal.
- (3) Lubricate converter hub and pump seal lip with Mopar high temperature wheel bearing grease.
- (4) Verify that converter is fully seated. Use straight edge and steel ruler to check seating (Fig. 4). Surface of converter lugs should be 12.7 mm (1/2 in.) to rear of straight edge when converter is fully seated.
- (5) Temporarily secure converter with C-clamp attached to housing or with metal strap attached across converter housing.
- (6) Check condition of converter driveplate. Replace driveplate if cracked, distorted or damaged.
- (7) Verify that transmission dowel pins are seated in engine block and protrude far enough to hold transmission in alignment.
- (8) Coat torque converter pilot hub of crankshaft with light coat of Mopar high temperature wheel bearing grease.
- (9) Move transmission under vehicle and position it at rear of engine. Remove C-clamp or strap used to secure converter in housing.
- (10) Align transmission with engine dowels and align converter with driveplate. Offset holes in driveplate are next to 1/8 inch hole in inner circle of plate (Fig. 4).
- (11) Move transmission forward until seated on engine block dowels. Then install one or two transmission attaching bolts to hold transmission in place (Fig. 6).

**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 modulated clutch surfaces in the converter. If new bolts are required, use the bolts specified in the parts catalogue only.

(12) Verify converter bolt length. Bolt measurement is from bottom (underside) of bolt head to end of bolt threads.

- On 9.5 in., 3-lug converter, bolts should be 11.7 mm (0.46 in.) long.
- On 10.75 in., 4-lug converter, bolts should be 11.2 mm (0.44 in.) long.

(13) Install torque converter bolts. Tighten bolts as follows:

- On models with 9.5 in., 3-lug converter, tighten bolts to 54 N•m (40 ft. lbs.).
- On models with 10.75 in., 4-lug converter, tighten bolts to 31 N•m (270 in. lbs.).

(14) Install and tighten remaining transmission attaching bolts (Fig. 6).

(15) Install dust cover on transmission converter housing. Two small vise grip pliers can be used to hold and align cover during installation.

(16) Install starter motor.

(17) Install strut brackets that secure transmission to engine block and front axle.

(18) Install and connect crankshaft position sensor. Be sure sensor grommet is securely in place.

(19) Install transmission fill tube. Install new O-ring seal on tube before installation (Fig. 6).

(20) Connect exhaust Y-pipe to engine exhaust manifolds.

(21) Install shift linkage torque bracket.

(22) Connect shift linkage to transmission.

(23) Connect solenoid and park/neutral position switch wires.

(24) Connect wires to transmission speed sensor and vehicle speed sensor.

(25) Install crossmember on frame rails. Place crossmember at 45° angle to rails. Insert crossmember between rails and rotate crossmember into place.

(26) Install bolts/nuts attaching transmission to rear mount.

(27) Install bolts/nuts attaching crossmember to frame rails.

(28) Remove transmission jack.

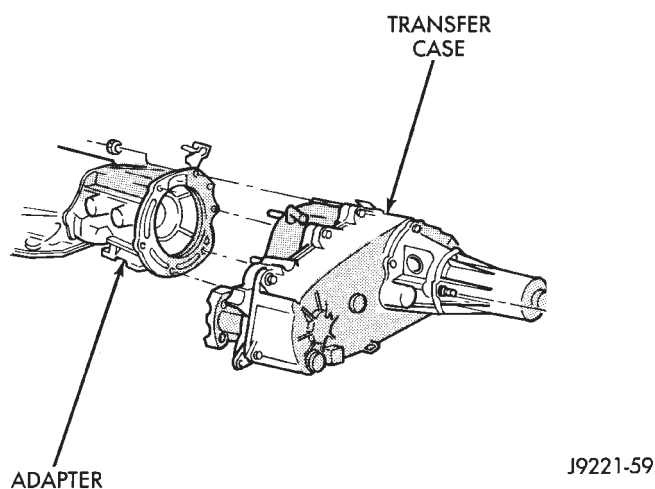
(29) Install transfer case (Fig. 7). Align and position transfer case with transmission jack or with aid of helper. Tilt case upward and work into position on transmission mounting studs.

(30) Install and tighten transfer case attaching nuts to 47 N•m (35 ft. lbs.) torque.

(31) Install damper on transfer case rear retainer if removed. Tighten damper nuts to 54 N•m (40 ft. lbs.) torque.

(32) Install and connect transfer case shift linkage.

(33) Connect transmission cooler lines to quick disconnect fittings on transmission case. Refer to In-Vehicle service section for procedures.



**Fig. 7 Transfer Case Attachment**

(34) Align and install remaining exhaust components. Tighten all clamp and bracket bolts and nuts securely. Be sure exhaust components are clear of all chassis and driveline components.

(35) Align and install front and rear propeller shafts. Tighten U-joint clamp bolts to 19 N•m (170 in. lbs.) torque.

(36) Verify that all linkage components, hoses and electrical wires have been connected.

(37) Check transfer case fluid level. Add Mopar ATF Plus, or Dexron II fluid if necessary. Correct level is to edge of fill plug hole. Be sure transfer case is level before checking or adding fluid.

(38) Install transfer case skid plate, if equipped.

(39) Lower vehicle.

(40) Connect battery negative cable.

(41) Refill transmission with Mopar ATF Plus, type 7176 fluid.

(42) Check and adjust engine oil level as necessary.

(43) Check and adjust transmission and transfer case shift linkage if necessary.

(44) Check and adjust transmission shift and throttle valve cables if necessary.

### OVERDRIVE UNIT REMOVAL (4-WHEEL DRIVE)

(1) Disconnect battery negative cable.

(2) Raise vehicle on hoist.

(3) Remove transfer case skid plate, if equipped.

(4) Mark front and rear propeller shafts and U-joints for alignment reference (Fig. 1).

(5) Disconnect and remove both propeller shafts.

(6) Disconnect vehicle speed sensor and transmission speed sensor wires.

(7) Disconnect vacuum switch hoses at transfer case, if equipped.

(8) Disconnect transfer case shift linkage at transfer case range lever. Then remove linkage bracket bolts and remove linkage and bracket from transfer case. Move linkage aside for clearance.

(9) Remove nuts attaching transfer case to overdrive unit.

(10) Remove transfer case. Support transfer case with transmission jack (secure transfer case to jack with safety chains). Then move transfer case rearward and off overdrive case.

(11) Remove transfer case from jack and position it on bench.

(12) Support transmission with adjustable jack stand. Position wood block between jack and transmission case.

(13) Remove nuts and bolts attaching transmission mount to center crossmember.

(14) Remove nuts and bolts attaching crossmember to frame rails.

(15) Rotate crossmember diagonally to clear frame rails and remove crossmember.

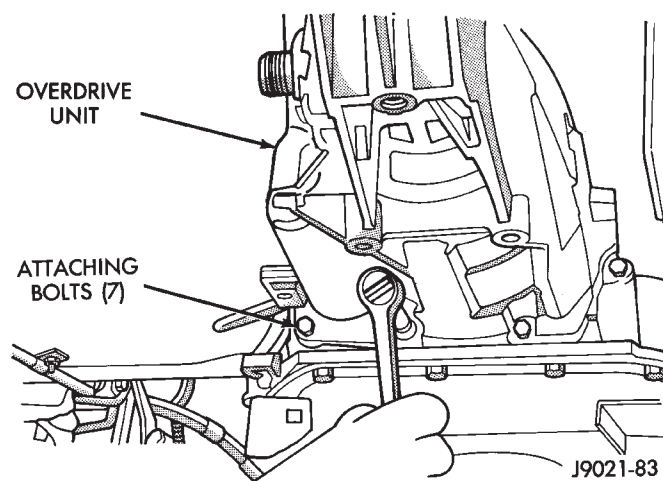
(16) Support overdrive unit with transmission jack.

(17) Remove bolts attaching overdrive unit to transmission (Fig. 8).

**CAUTION:** The overdrive unit must be fully supported during removal. This is necessary to prevent damaging the intermediate shaft. Do not allow the shaft to support the entire weight of the overdrive unit.

(18) Carefully slide overdrive unit off intermediate shaft. Do not tilt overdrive 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 (Fig. 9). If misalignment occurs, overdrive unit may have to be disassembled in order to realign splines.**



**Fig. 8 Removing/Installing Overdrive Unit Attaching Bolts**

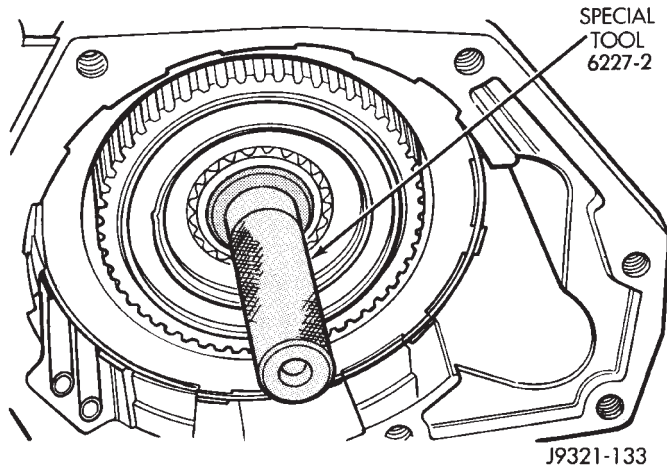
(b) If overdrive unit requires service, refer to Overdrive Unit Overhaul procedures.

(19) Remove and retain bearing and select fit spacer. These parts may remain on overdrive piston, rear of transmission case, sliding hub, or intermediate shaft during removal.



(20) Place several clean shop towels on a bench. Then position unit on towels to absorb spilled fluid.

(21) Position overdrive unit over drain pan and tilt unit to drain residual fluid from case. Examine fluid for clutch material or metal fragments. If fluid contains these items, overhaul will be necessary.



**Fig. 9 Overdrive Spline Alignment Tool Installation**

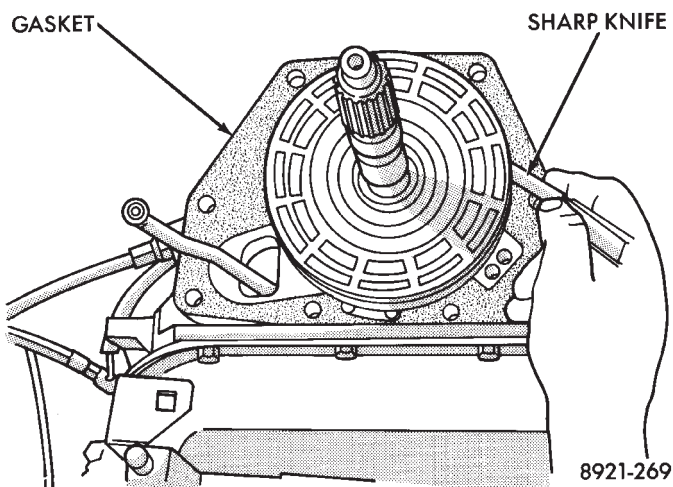
#### OVERDRIVE UNIT INSTALLATION (4-WHEEL DRIVE)

(1) Be sure Alignment Tool 6227-2 is still fully seated in splines of overdrive planetary gear and overrunning clutch. If misalignment occurs, overdrive will have to be disassembled in order to realign splines.

(2) If original case gasket is in good condition, proceed to step (6). If overdrive piston retainer was not removed during service and original case gasket is not reusable, prepare new gasket as described in steps (3) through (5).

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

(4) Use old gasket as template and trim new gasket to fit (Fig. 10).

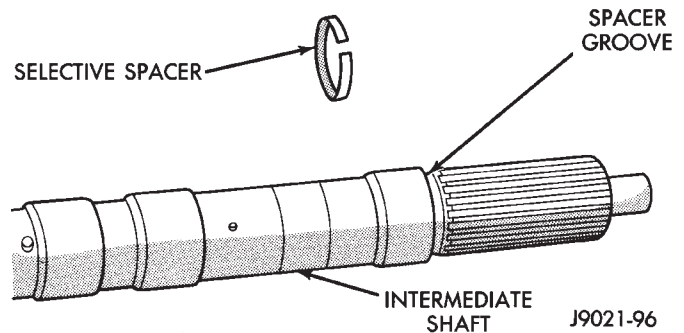


**Fig. 10 Trimming Replacement Overdrive Case Gasket**

(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. 11).



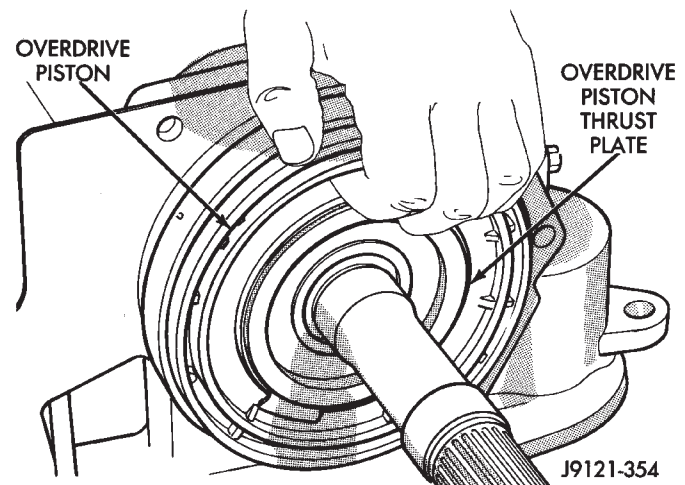
**Fig. 11 Intermediate Shaft Selective Spacer Location**

(7) Install overdrive piston in retainer, if removed. Lubricate piston seals with Ru-Glyde, Door-Eze or petroleum jelly to ease installation. Be sure piston locating lugs are aligned in piston retainer.

(8) Install thrust bearing in overdrive clutch hub. Use liberal quantity of petroleum jelly to hold bearing in position.

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

(9) Install thrust plate in overdrive piston hub (Fig. 12). Use liberal amount of petroleum jelly to hold thrust plate in position.



**Fig. 12 Installing Overdrive Piston Thrust Plate**

(10) Verify that splines in overdrive planetary gear and overrunning clutch hub are aligned with Tool 6227-2 (Fig. 8). **Overdrive unit cannot be fully installed if splines have rotated out of alignment. If misaligned has occurred, overdrive will have to be disassembled in order to realign splines.**

(11) Install overdrive unit as follows:

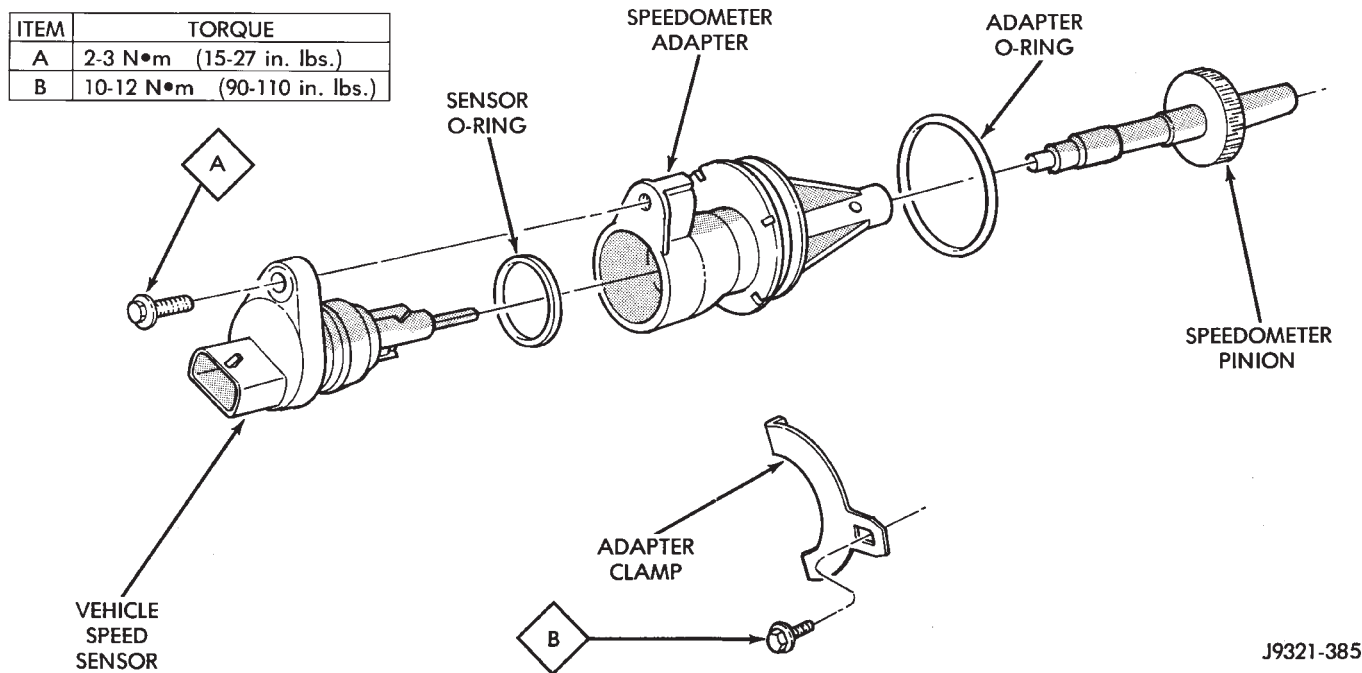


Fig. 13 Speedometer Components

J9321-385

(a) Raise overdrive unit and carefully slide it straight onto intermediate shaft. **Avoid tilting overdrive unit during installation as planetary gear and overrunning clutch splines could rotate out of alignment. If misalignment occurs, overdrive will have to be disassembled in order to realign splines.**

(b) Align and carefully insert park rod into park pawl. Rod will make click noise as it enters pawl. Move rod rearward slightly

**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. If the rod enters the cavity during installation, it will become bent when the overdrive bolts are tightened. The rod will then have to be replaced because it is not repairable.

(c) Work overdrive unit forward on intermediate shaft until seated against transmission case. If unit is not fully seated, tighten overdrive bolts to draw unit against transmission case.

(12) Apply Mopar Lock N' Seal or Loctite 242 to threads of overdrive attaching bolts.

(13) Install and tighten overdrive unit attaching bolts to 34 N•m (25 ft. lbs.).

(14) Install transfer case. Tighten attaching nuts to 41 N•m (30 ft. lbs.) torque.

(15) Connect transmission throttle valve and gear shift cables and connect transfer case shift linkage.

(16) Install crossmember and rear mount.

(17) Connect all necessary electrical wires.

(18) Install and index speedometer adapter and pinion if removed. Refer to In-Vehicle Service section for indexing procedure.

(19) Align and connect propeller shafts. Tighten U-joint clamp bolts to 19 N•m (170 in. lbs.) torque.

(20) Check and adjust fluid level in transfer case. Use Mopar ATF Plus, type 7176. Mopar Dexron II can be used if ATF Plus is not readily available.

(21) Install skid plate, if equipped.

(22) Check and adjust transmission and transfer case shift linkage if necessary.

(23) Lower vehicle.

(24) Check and adjust transmission fluid level. Use Mopar ATF Plus, type 7176 fluid. Do not use Mopar Dexron II unless ATF Plus is not available.

## OVERDRIVE UNIT REMOVAL (2-WHEEL DRIVE)

(1) Disconnect battery negative cable.

(2) Raise vehicle on hoist.

(3) Remove exhaust Y-pipe, catalytic converter and tailpipe.

(4) Mark propeller shaft and U-joint for alignment reference (Fig. 1).

(5) Disconnect and remove propeller shaft.

(6) Disconnect vehicle speed sensor and transmission speed sensor wires.

(7) Support transmission with adjustable jack stand and wood block.

(8) Remove nuts and bolts attaching transmission mount to center crossmember.

(9) Remove nuts and bolts attaching crossmember to frame rails.

(10) Rotate crossmember diagonally to clear frame rails and remove crossmember.

- (11) Support overdrive unit with transmission jack.
- (12) Remove bolts attaching overdrive unit to transmission (Fig. 8).

**CAUTION:** The overdrive unit must be fully supported during removal. This is necessary to prevent damaging the intermediate shaft. Do not allow the shaft to support the entire weight of the overdrive unit.

- (13) Carefully slide overdrive unit off intermediate shaft. Do not tilt overdrive 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 (Fig. 9). If misalignment occurs, overdrive unit may have to be disassembled in order to realign splines.**

(b) If overdrive unit requires service, refer to Overdrive Unit Overhaul procedures.

- (14) Remove and retain bearing and select fit spacer. These parts may remain on overdrive piston, rear of transmission case, sliding hub, or intermediate shaft during removal.

(15) Place several clean shop towels on a bench. Then position unit on towels to absorb spilled fluid.

(16) Position overdrive unit over drain pan and tilt unit to drain residual fluid from case. Examine fluid for clutch material or metal fragments. If fluid contains these items, overhaul will be necessary.

#### OVERDRIVE UNIT INSTALLATION (2-WHEEL DRIVE)

(1) Be sure Alignment Tool 6227-2 is still fully seated in splines of overdrive planetary gear and overrunning clutch. If misalignment occurs, overdrive will have to be disassembled in order to realign splines.

(2) If original case gasket is in good condition, proceed to step (6). If overdrive piston retainer was not removed during service and original case gasket is not reusable, prepare new gasket as described in steps (3) through (5).

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

(4) Use old gasket as template and trim new gasket to fit (Fig. 10).

(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. 11).

(7) Install overdrive piston in retainer, if removed. Lubricate piston seals with Ru-Glyde, Door-Eze or petroleum jelly to ease installation. Be sure piston locating lugs are aligned in piston retainer.

(8) Install thrust bearing in overdrive clutch hub. Use liberal quantity of petroleum jelly to hold bearing in position.

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

(9) Install thrust plate in overdrive piston hub (Fig. 12). Use liberal amount of petroleum jelly to hold thrust plate in position.

(10) Verify that splines in overdrive planetary gear and overrunning clutch hub are aligned with Tool 6227-2 (Fig. 8). **Overdrive unit cannot be fully installed if splines have rotated out of alignment. If misaligned has occurred, overdrive will have to be disassembled in order to realign splines.**

(11) Install overdrive unit as follows:

(a) Raise overdrive unit and carefully slide it straight onto intermediate shaft. **Avoid tilting overdrive unit during installation as planetary gear and overrunning clutch splines could rotate out of alignment. If misalignment occurs, overdrive will have to be disassembled in order to realign splines.**

(b) Align and carefully insert park rod into park pawl. Rod will make click noise as it enters pawl. Move rod slightly 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 case cavity. If the rod enters the cavity during installation, it will become bent when the overdrive bolts are tightened. If this occurs, the rod will have to be replaced because it is not repairable.

(c) Work overdrive unit forward on intermediate shaft until seated against transmission case. If unit is not fully seated, tighten overdrive bolts to draw it up against transmission case.

(12) Apply Mopar Lock N' Seal or Loctite 242 to threads of overdrive attaching bolts.

(13) Install and tighten overdrive unit attaching bolts to 34 N•m (25 ft. lbs.).

(14) Install transfer case. Tighten attaching nuts to 41 N•m (30 ft. lbs.) torque.

(15) Connect transmission throttle valve and gear shift cables.

(16) Install crossmember and rear mount.

(17) Connect all necessary electrical wires.

(18) Install and index speedometer adapter and pinion (Fig. 13). Refer to In-Vehicle Service section for indexing procedure.

(19) Align and connect propeller shaft. Tighten U-joint clamp bolts to 19 N•m (170 in. lbs.) torque.

(20) Install exhaust system components.

(21) Lower vehicle.

(22) Connect battery negative cable.

(23) Check and adjust transmission shift and throttle valve cables if necessary.

(24) Check and adjust transmission fluid level. Use Mopar ATF Plus, type 7176 fluid.



## TRANSMISSION OVERHAUL—42RE

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## TRANSMISSION DISASSEMBLY

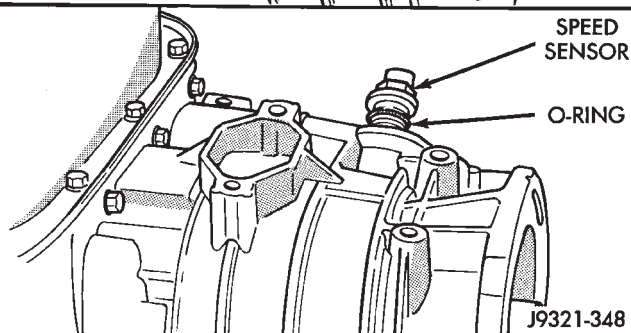
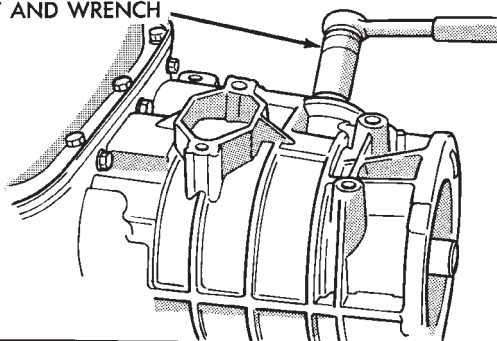
(1) Remove torque converter if not previously removed.

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

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

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

SOCKET AND WRENCH



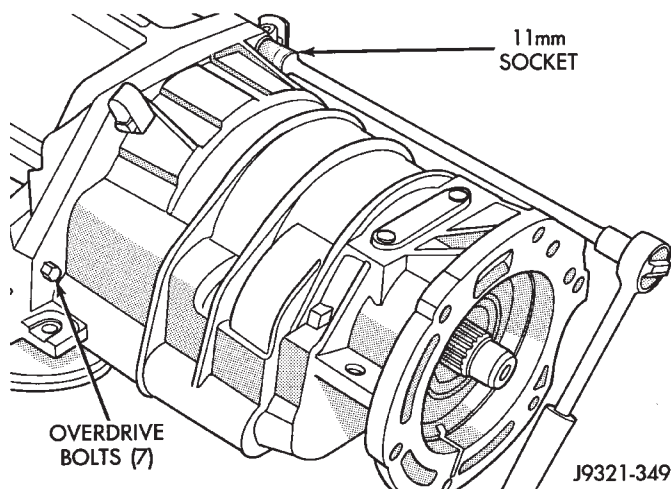
**Fig. 1 Transmission Speed Sensor Removal/Installation**

(5) Place transmission in upright position (Fig. 2).

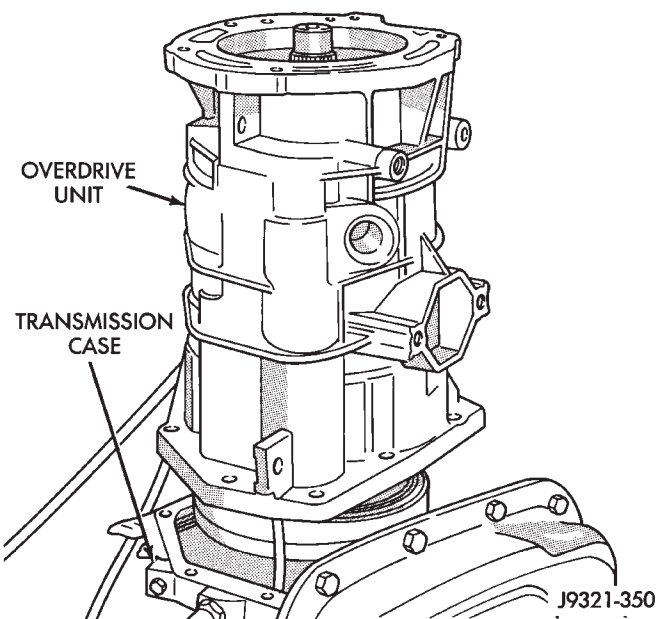
(6) Remove bolts attaching overdrive unit to transmission case (Fig. 2). An 11 mm socket is required. Note position of all wiring clips for installation reference.

(7) Lift overdrive unit up and off transmission intermediate shaft (Fig. 3).

(a) If overdrive unit does not require service, insert Alignment Tool 6227-2 in overrunning clutch



**Fig. 2 Removing/Installing Overdrive Unit Attaching Bolts**

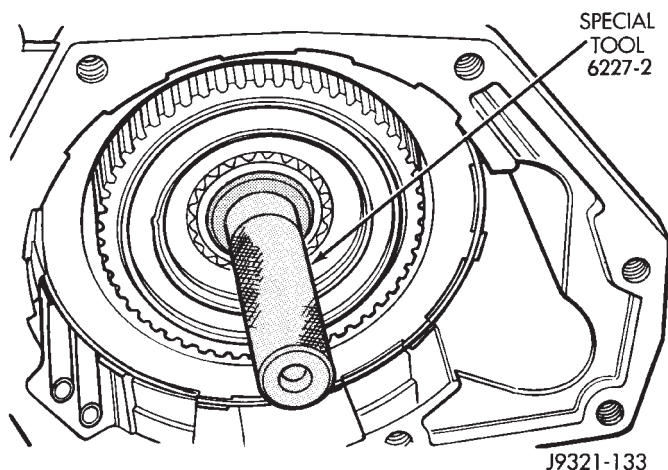


**Fig. 3 Overdrive Unit Removal**

and planetary gear splines to maintain alignment (Fig. 4). If clutch and gear splines rotate out of

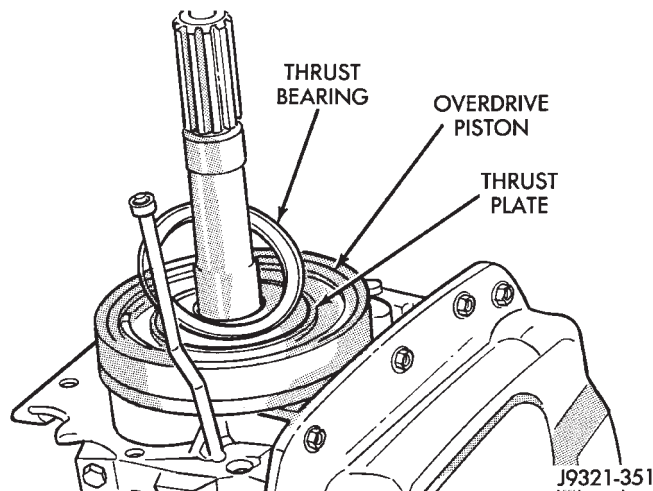
**alignment, overdrive unit may have to be disassembled in order to realign splines.**

(b) If overdrive unit **does** requires service, refer to Overdrive Unit Overhaul section.



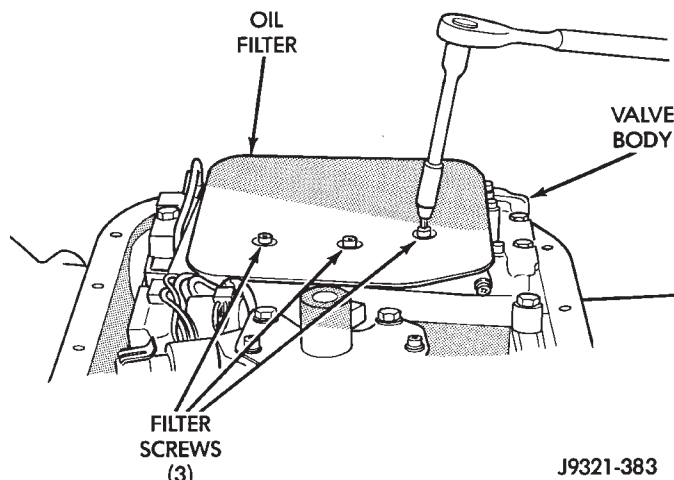
**Fig. 4 Overdrive Spline Alignment Tool Installation**

(8) Remove thrust bearing and thrust plate from overdrive piston (Fig. 5).

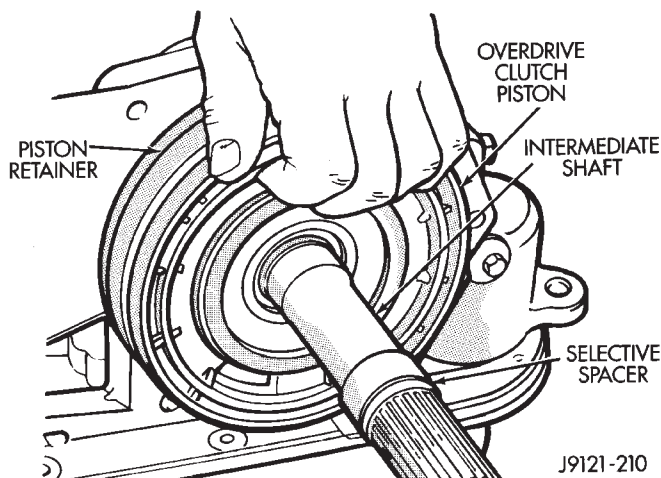


**Fig. 5 Thrust Bearing And Plate Removal**

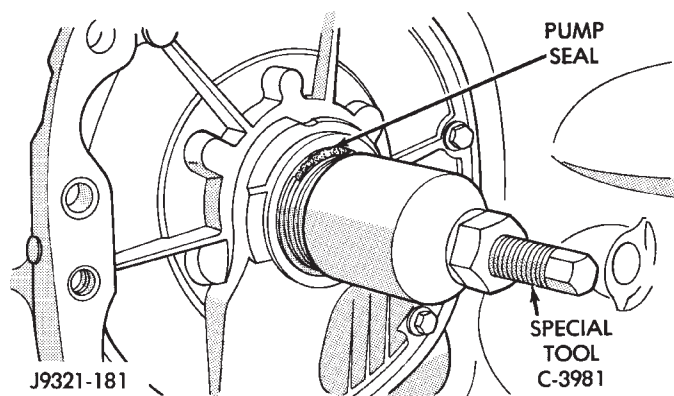
- (9) Place transmission in horizontal position.
- (10) Remove transmission oil pan and gasket.
- (11) Remove oil filter from valve body (Fig. 6). Keep filter screws separate from other valve body screws. Filter screws are longer and should be kept with filter.
- (12) Remove overdrive piston from retainer (Fig. 7).
- (13) Remove pump oil seal with Special Tool C-3981 (Fig. 8). Be sure to tighten tool threads completely into seal before using puller bolt to withdraw seal.
- (14) Remove park/neutral position switch (Fig. 9).
- (15) Remove hex head bolts attaching valve body to transmission case (Fig. 10). A total of 10 bolts are used. Note different bolt lengths for assembly reference.
- (16) Remove valve body assembly. Push valve body harness connector out of case. Then work park rod and valve body out of case (Fig. 11). **Exercise care**



**Fig. 6 Oil Filter Removal/Installation**

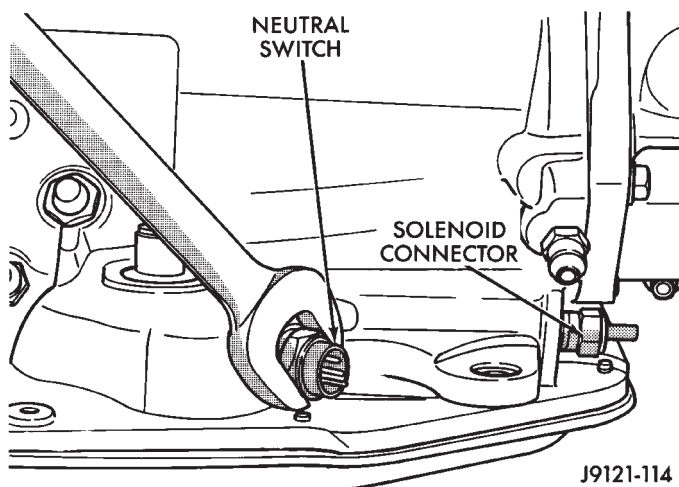


**Fig. 7 Overdrive Piston Removal**

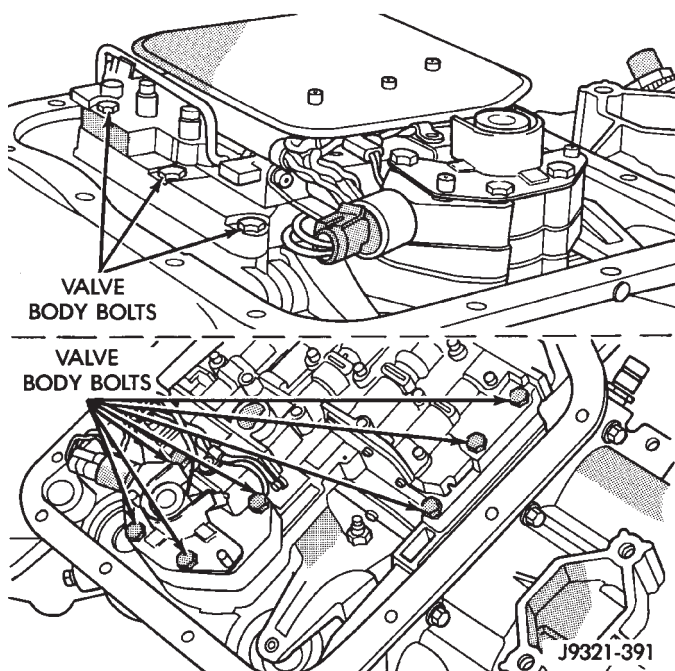


**Fig. 8 Oil Pump Seal Removal**





**Fig. 9 Park/Neutral Position Switch Removal/Installation**



**Fig. 10 Valve Body Bolt Locations**

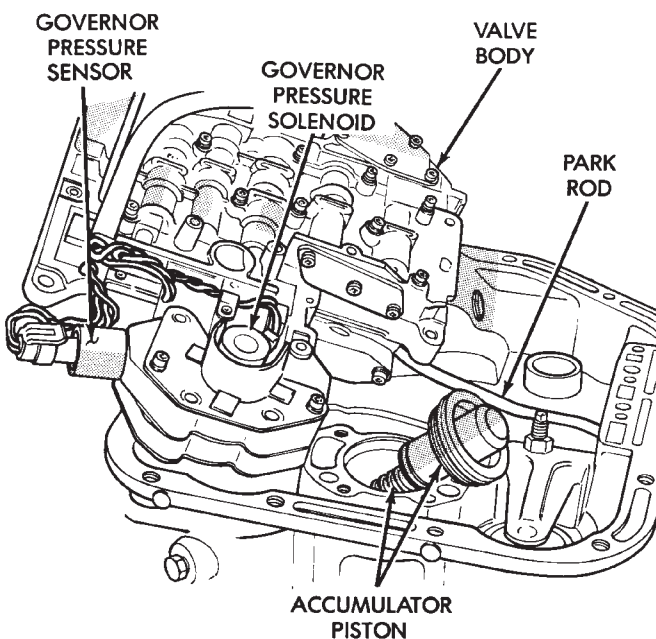
during removal as governor pressure solenoid and transducer can both be damaged by rough handling.

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

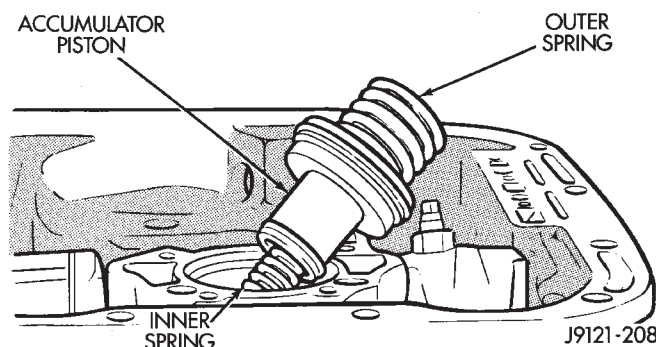
(18) Remove front band lever shaft access plug (Fig. 13). Plug is accessible through converter housing. Use 1/4 inch drive extension to remove plug as shown.

(19) 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.

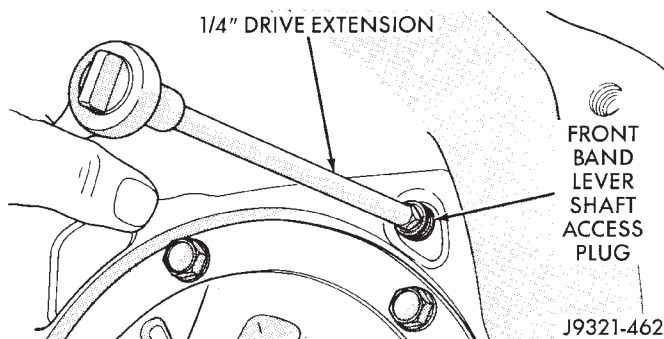
(20) Remove oil pump bolts.



**Fig. 11 Valve Body Removal**



**Fig. 12 Accumulator Piston And Springs**

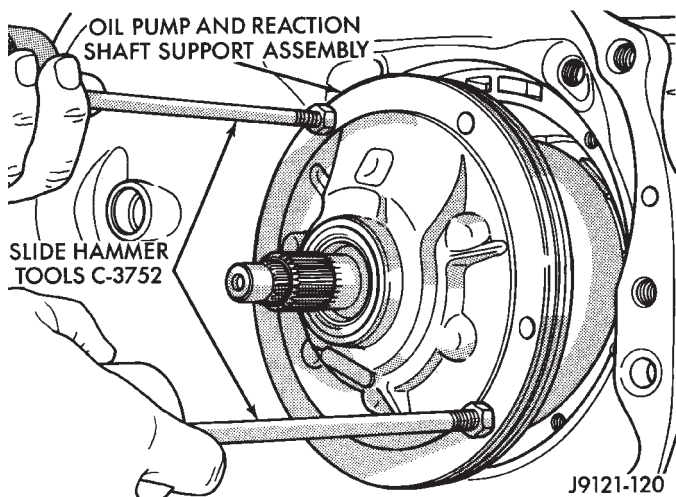


**Fig. 13 Removing/Installing Front Band Lever Shaft Access Plug**

(21) Thread bolts of Slide Hammer Tools C-3752 into threaded holes in pump body flange (Fig. 14).

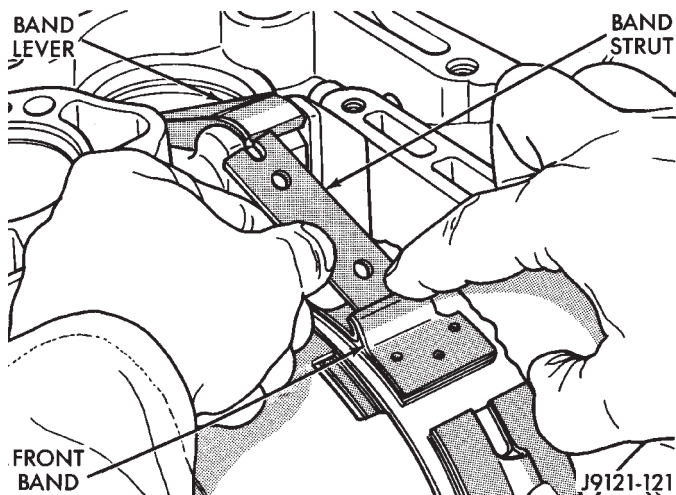
(22) Bump slide hammer weights outward to remove pump and reaction shaft support assembly from case (Fig. 14).

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



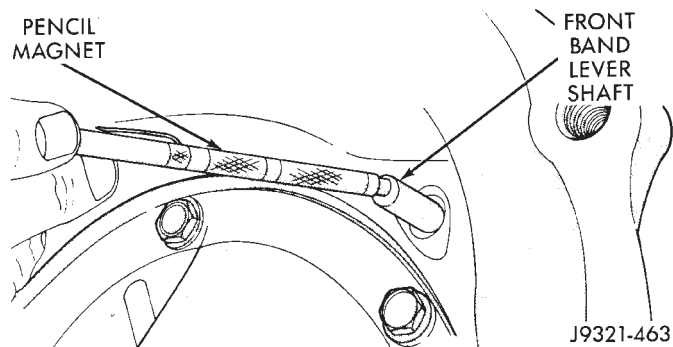
**Fig. 14 Removing Oil Pump And Reaction Shaft Support Assembly**

(24) Squeeze front band together and remove band strut (Fig. 15).



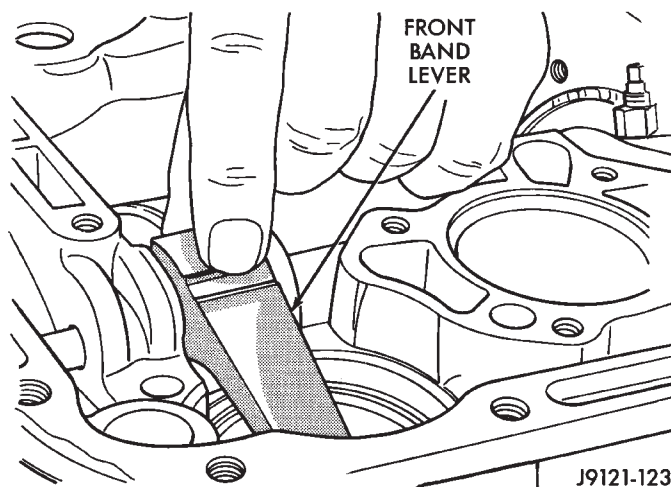
**Fig. 15 Removing/Installing Front Band Strut**

(25) Remove front band lever shaft with pencil magnet. Pin is accessible from converter housing side of case (Fig. 16).



**Fig. 16 Removing Front Band Lever Shaft**

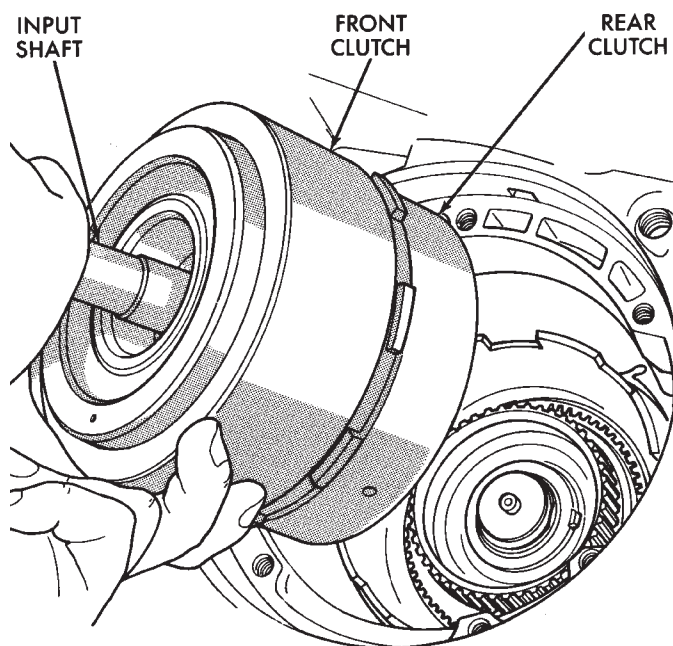
(26) Remove front band lever (Fig. 17)



**Fig. 17 Removing/Installing Front Band Lever**

(27) Slide front band rearward and onto driving shell. Band will not be removed until after front/rear clutch removal.

(28) Remove front and rear clutch units as assembly. Grasp input shaft, hold clutch units together and remove them from case (Fig. 18).



**Fig. 18 Removing Front/Rear Clutch Assemblies**

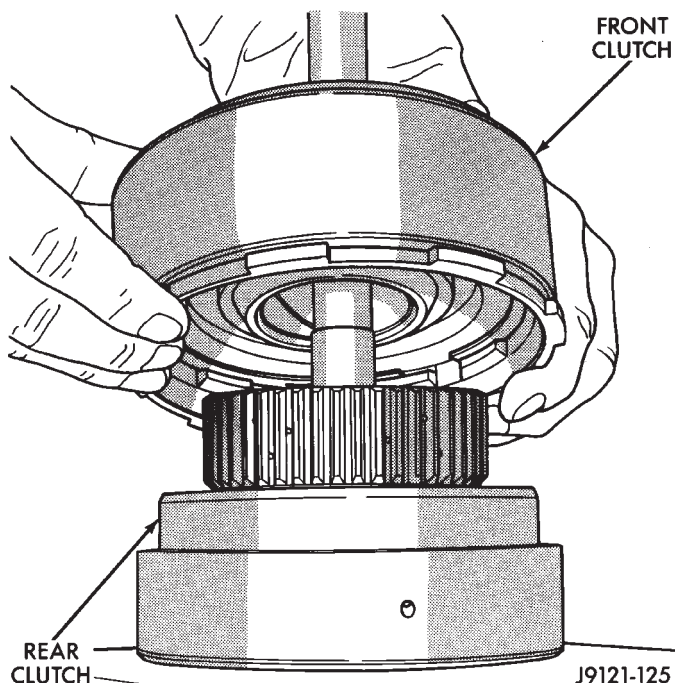
(29) Lift front clutch off rear clutch (Fig. 19). Set clutch units aside for overhaul.

(30) Remove intermediate shaft thrust washer from front end of shaft or from rear clutch hub (Fig. 20).

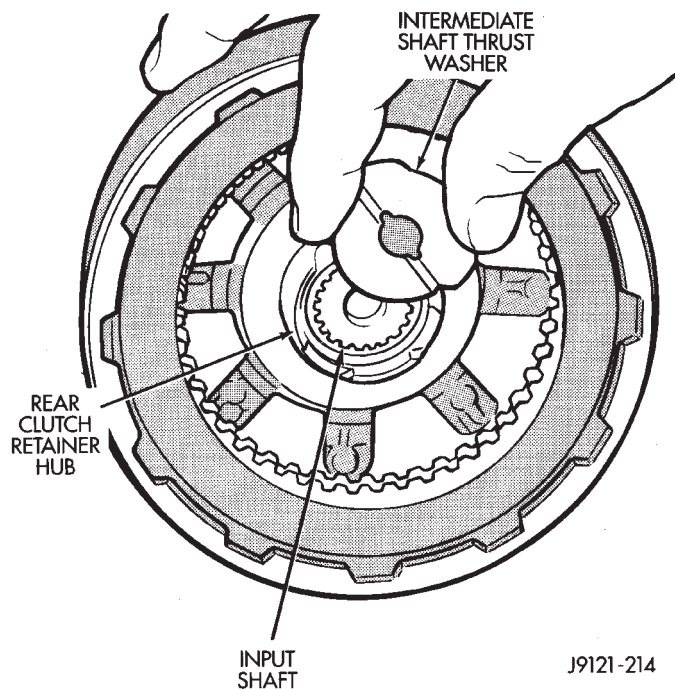
(31) Remove output shaft thrust plate from intermediate shaft hub (Fig. 21).

(32) Slide front band off driving shell (Fig. 22) and remove band from case.





**Fig. 19 Separating Front/Rear Clutch Assemblies**



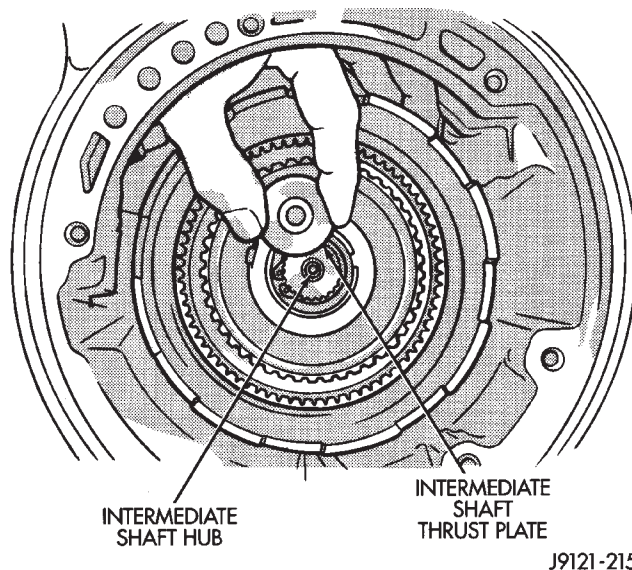
**Fig. 20 Removing Intermediate Shaft Thrust Washer**

(33) Remove planetary geartrain as assembly (Fig. 23). Support geartrain with both hands during removal. Do not allow machined surfaces on intermediate shaft or overdrive piston retainer to become nicked or scratched.

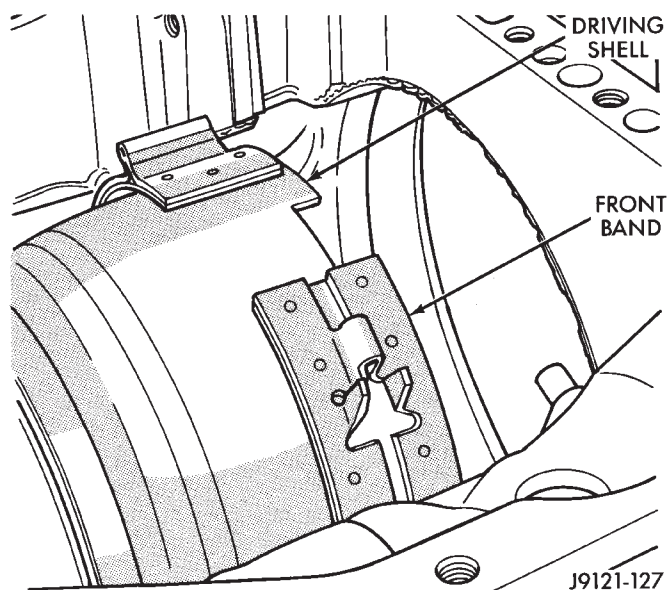
(34) Loosen rear band adjusting screw 4-5 turns.

(35) Remove low-reverse drum snap ring (Fig. 24).

(36) Remove bolts attaching overdrive piston retainer to rear of case (Fig. 25). Then remove piston retainer and gasket.



**Fig. 21 Removing Intermediate Shaft Thrust Plate**



**Fig. 22 Front Band Removal/Installation**

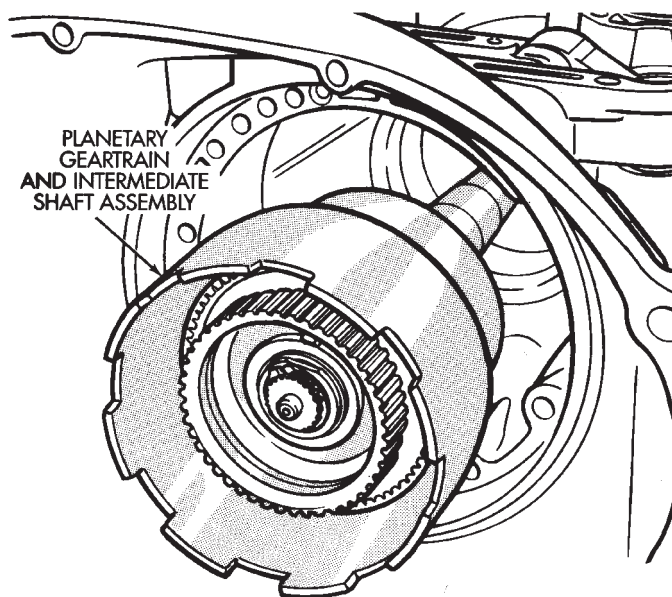
(37) Remove rear band pivot and reaction pins (Fig. 26). Use parallel jaw snap ring pliers to remove pins. Insert and spread plier jaws in pin bore to grip pin. Then twist and pull pins to remove them.

(38) Remove rear band lever.

(39) Remove low-reverse drum and rear band as assembly. Turn drum clockwise and pull outward to remove it from overrunning clutch (Fig. 27).

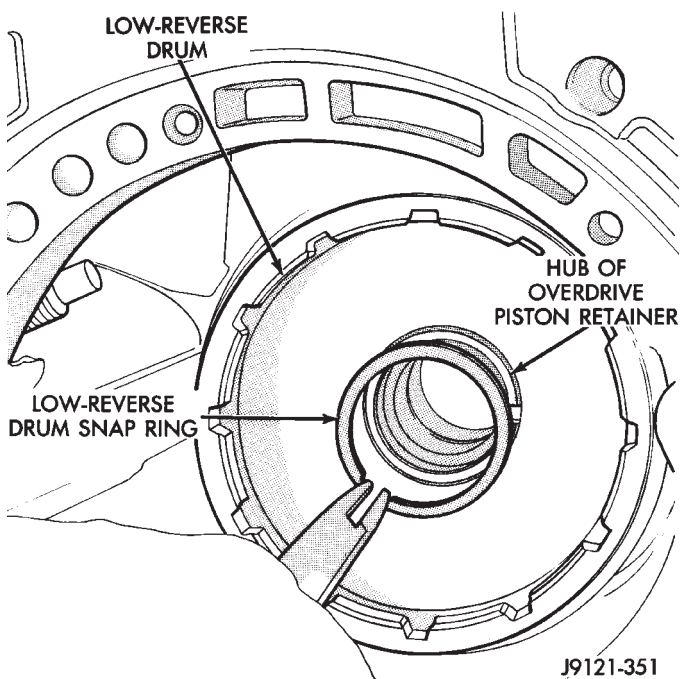
(40) Remove bolts attaching overrunning clutch cam to case (Fig. 28).

(41) Remove overrunning clutch cam and roller clutch assembly as a unit (Fig. 29). Turn cam back and forth and tilt it inward to remove it from case.



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**Fig. 23 Removing Planetary Geartrain And Intermediate Shaft Assembly**



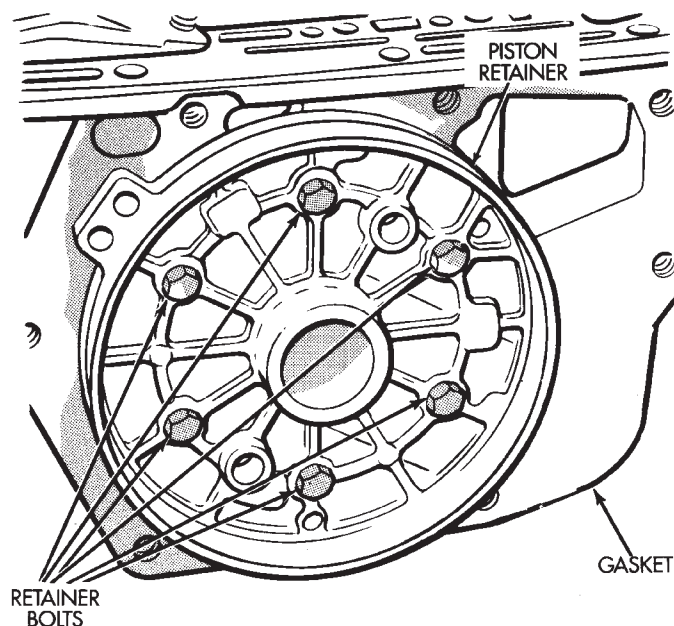
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**Fig. 24 Removing Low-Reverse Drum Snap Ring**

(42) Compress front servo rod guide about 1/8 inch with Valve Spring Compressor C-3422-B (Fig. 30). A C-clamp and Special Tool C-4470 can also be used to compress rod guide.

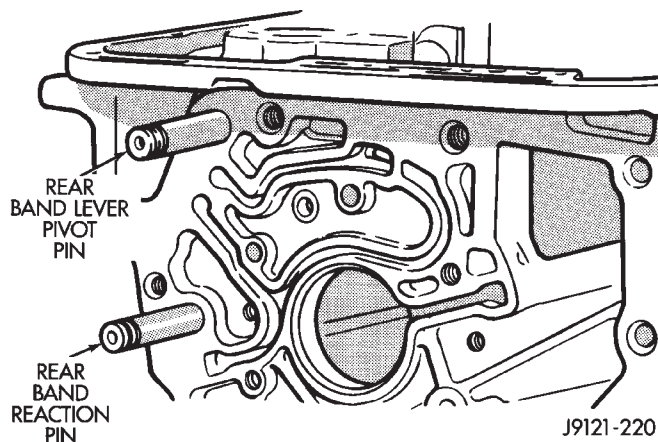
(43) Remove front servo rod guide snap ring. **Exercise caution when removing snap ring. Servo bore can be scratched or nicked if care is not exercised.**

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



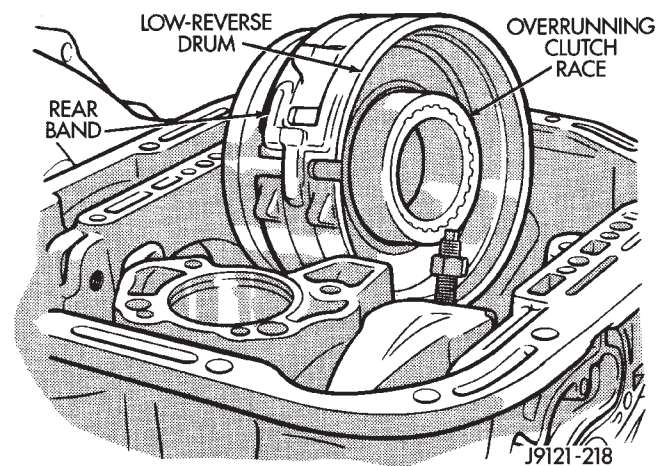
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**Fig. 25 Overdrive Piston Retainer Bolt Location**



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**Fig. 26 Rear Band And Lever Pin Location**

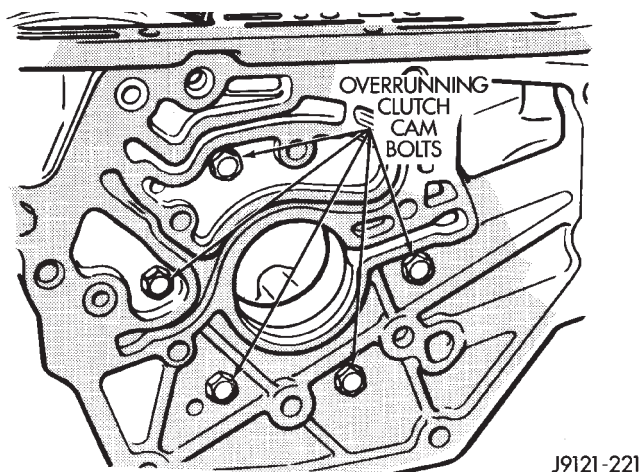


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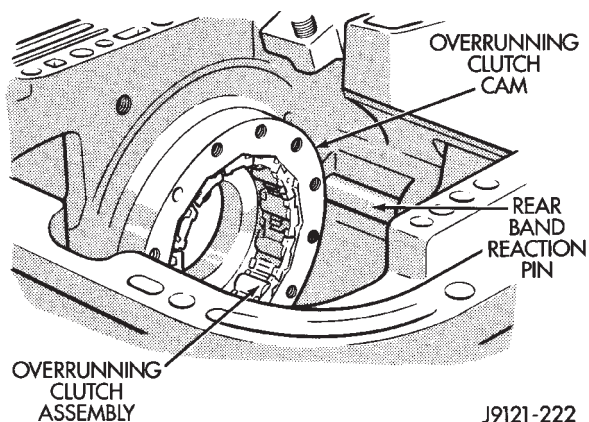
**Fig. 27 Low-Reverse Drum And Rear Band Removal**

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

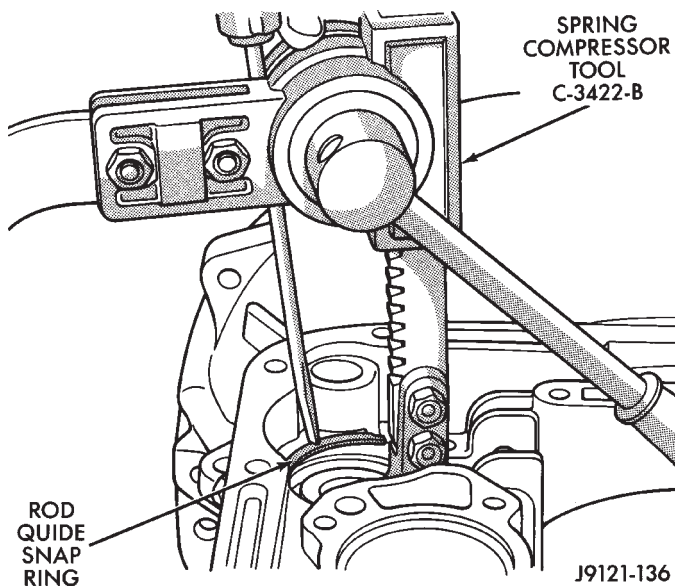




**Fig. 28 Overrunning Clutch Cam Bolt Locations**



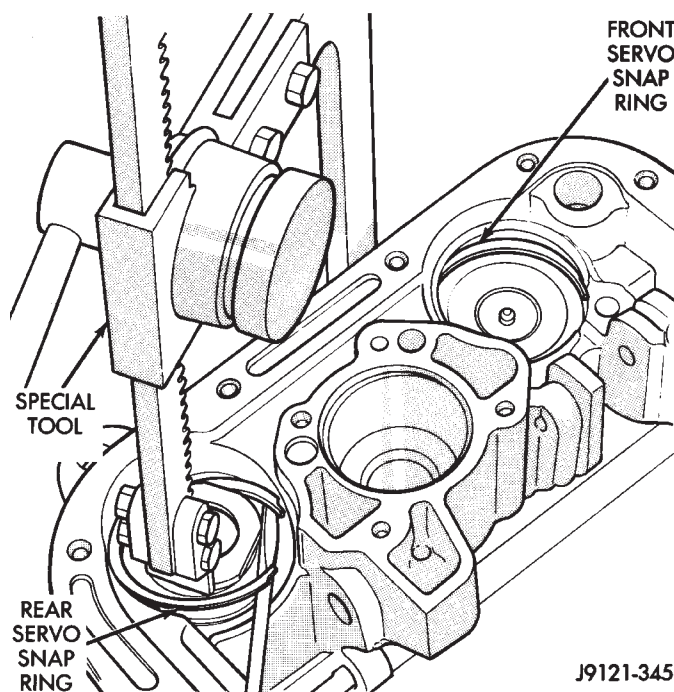
**Fig. 29 Overrunning Clutch Assembly Removal**



**Fig. 30 Compressing Front Servo Rod Guide**

(Fig. 31). A C-clamp and Tool C-4470 or SP-5560 can also be used to compress spring retainer.

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



**Fig. 31 Compressing Rear Servo Spring**

(47) Inspect transmission and overdrive components. **If major components such as the overdrive unit, front clutch, or oil pump require service, refer to appropriate overhaul procedure.**

## OVERHAUL SERVICE 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. The sun gear is replaced as an assembly if the bushings are damaged.

Heli-Coil inserts can be used to repair damaged, stripped or worn threads in aluminum parts. These inserts are available from most automotive jobbers. 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, or Dexron II™ transmission fluid during overhaul and assembly. Use Ru-Glyde, Door-Eze or similar products to prelubricate seals, O-rings, and thrust washers. Petroleum jelly can also be used to lubricate and 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.

**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 AND OVERDRIVE PISTON RETAINER INSPECTION AND OVERHAUL

If the overrunning clutch and cam came out with the low-reverse drum, remove the cam and clutch from the drum as follows: Thread two clutch cam bolts into the cam. Then lift the clutch and cam out of the drum with the bolts (Fig. 32). Rotate the cam back and forth to ease removal if necessary.

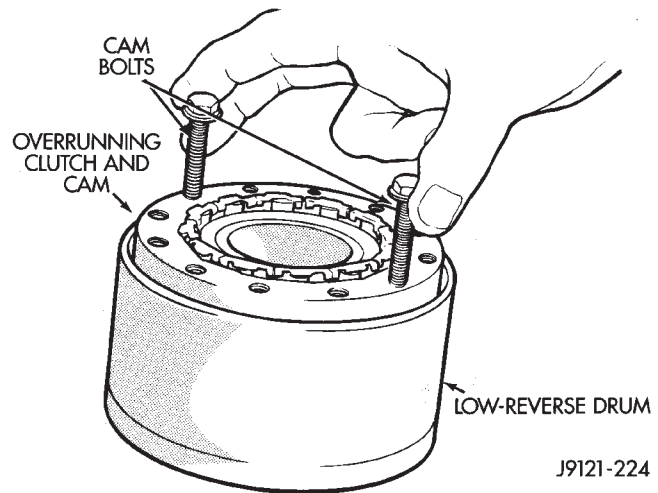
### CLEANING AND INSPECTION

Clean the clutch rollers, springs and retainer, clutch cam, low-reverse drum and overdrive piston retainer in solvent. Air dry the rollers after cleaning.

Inspect condition of each clutch part after cleaning. Replace the rollers and the retainer and spring assembly if the rollers, springs or spring retainer are worn or damaged. Replace the clutch cam if worn, cracked or damaged.

Inspect the overrunning clutch race and low-reverse drum. Replace the drum and race as an assembly if either part is worn, scored or damaged.

Examine the overdrive piston retainer carefully for wear, cracks, scoring or other damage. Be sure the

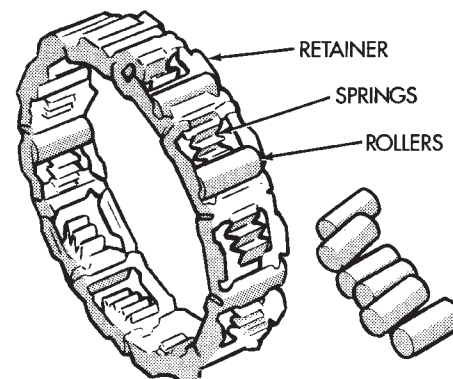


**Fig. 32 Removing Overrunning Clutch From Low-Reverse Drum**

retainer hub is a snug fit in the case and low-reverse drum. Replace the retainer if worn or damaged.

### OVERRUNNING CLUTCH ASSEMBLY

(1) Install clutch rollers in spring retainer (Fig. 33). Be sure springs are seated squarely against rollers.



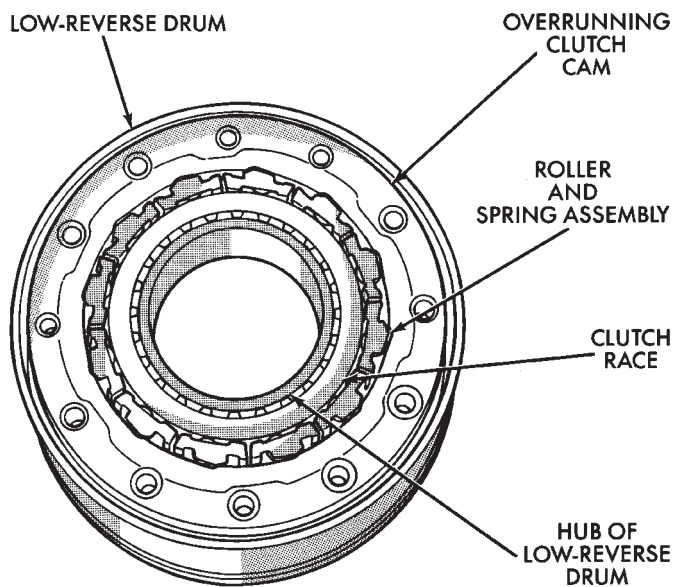
**Fig. 33 Installing Overrunning Clutch Rollers In Retainer**

(2) Install roller and spring assembly in clutch cam (Fig. 34).

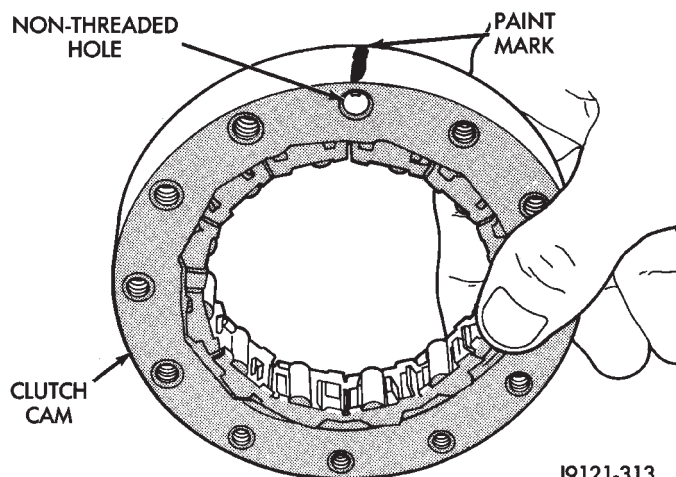
(3) Lubricate overrunning clutch rollers, springs cam and race with transmission fluid. Verify component installation before proceeding. Bolt holes in clutch cam are countersunk on one side. Be sure this side of cam will face rearward as shown (Fig. 34).

(4) Inspect bolt holes in overrunning clutch cam. Note that one hole is **not** threaded. Identify location of non threaded hole with paint mark for assembly reference (Fig. 35).

(5) Set assembly aside for final installation after overhaul is complete.



J9121-140

**Fig. 34 Checking Overrunning Clutch Installation**

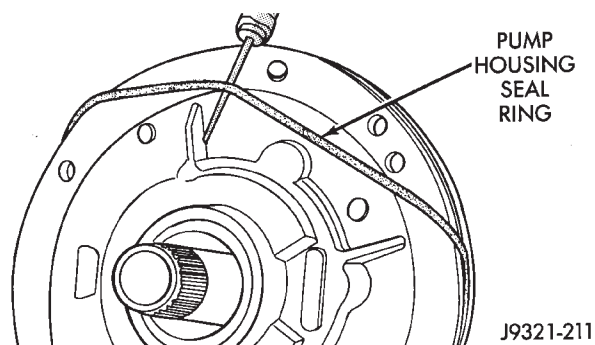
J9121-313

**Fig. 35 Marking Location Of Non-Threaded Hole In Clutch Cam**

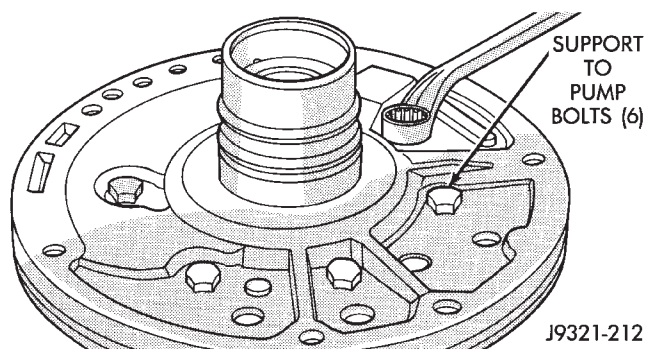
## OIL PUMP AND REACTION SHAFT SUPPORT OVERHAUL

### PUMP AND SUPPORT DISASSEMBLY

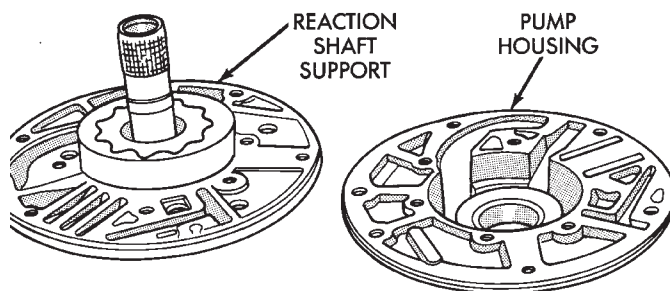
- (1) Remove seal from around pump housing (Fig. 36).
- (2) Loosen bolts that attach pump body to support (Fig. 37).
- (3) Remove pump-to-support bolts and separate support from pump housing (Fig. 38).
- (4) Remove inner and outer gears from reaction shaft support (Fig. 39).
- (5) If pump seal was not removed during transmission disassembly, remove seal with punch and hammer.
- (6) Remove front clutch thrust washer from support



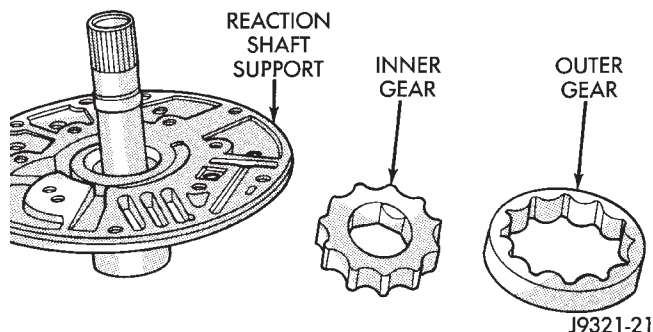
J9321-211

**Fig. 36 Removing Pump Housing Seal**

J9321-212

**Fig. 37 Loosening Pump Support Bolts**

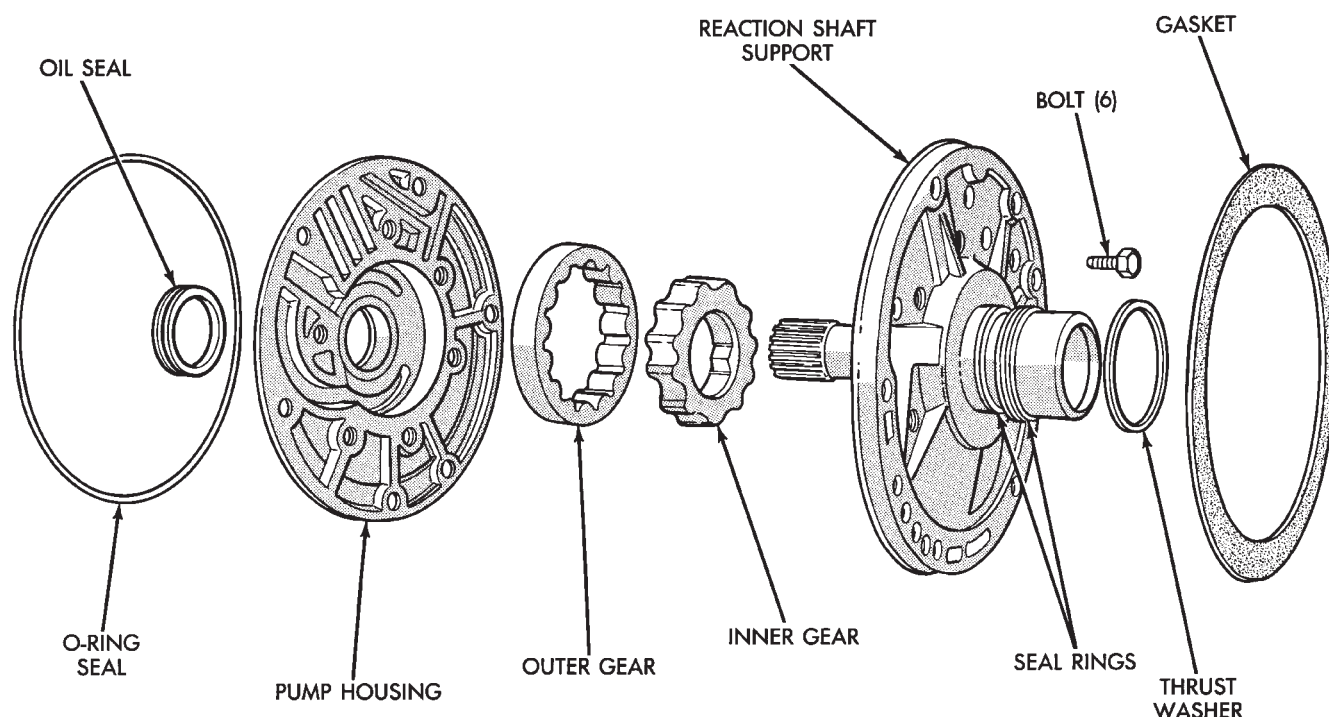
J9321-213

**Fig. 38 Separating Pump Housing From Reaction Shaft Support**

J9321-214

**Fig. 39 Pump Gear Removal**

hub (Fig. 40). Note position of chamfer on washer inside diameter for installation reference. Chamfer side faces pump.



J9321-207

**Fig. 40 Oil Pump And Reaction Shaft Support Components**

#### OIL PUMP AND REACTION SHAFT SUPPORT CLEANING AND INSPECTION

Clean pump and reaction shaft support components with solvent and dry them with compressed air.

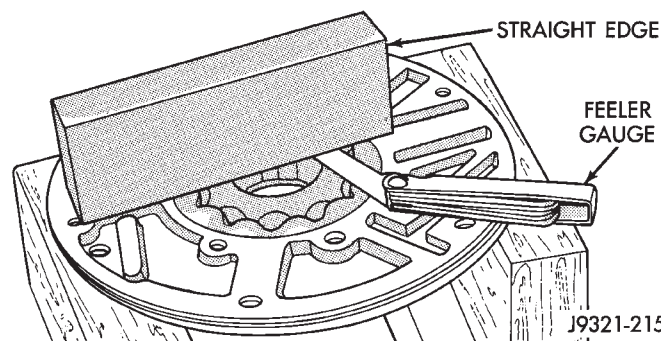
Inspect the pump housing and support components. Replace the housing or support if the seal ring grooves or machined surfaces are worn, scored, pitted, or damaged.

Replace the pump gears if pitted, worn chipped, or damaged. Inspect the thrust washer for wear or damage. Replace the washer if necessary. **Note that the inner gear used in 1993 42RE oil pumps has a new design drive lug. The new design incorporates drive flats instead of the square lug used previously. The 1993 torque converter hub has also been redesigned to accept the new drive. If pump gear replacement is necessary, be very sure to order and install the new style gears.**

Inspect the pump and reaction shaft support bushings. Minor bushing wear is acceptable. Replace the bushings only if scored, or severely worn.

Install the gears in the pump housing and measure end clearance with a feeler gauge and straightedge (Fig. 41). Clearance should be 0.010 - 0.06 mm (0.0004 - 0.0025 in.).

Measure clearance between the outer gear and the pump body (Fig. 42). Clearance should be 0.08 - 0.19 mm (0.0035 - 0.0075 in.).



J9321-215

**Fig. 41 Measuring Pump Gear End Clearance**

Measure gear tooth clearance with a feeler gauge. Align one tooth of the outer gear in inner gear and measure clearance (Fig. 43). Clearance should be 0.08 - 0.19 mm (0.0035 - 0.0075 in.).

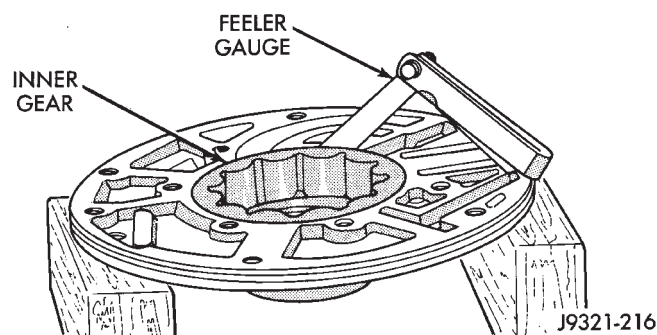
#### REPLACING OIL PUMP BUSHING

(1) Remove pump bushing with Tool Handle C-4171 and Bushing Remover SP-3551 (Fig. 44).

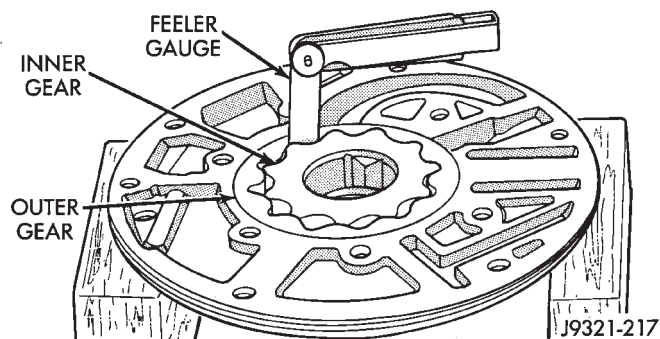
(2) Install new pump bushing with Tool Handle C-4171 and Bushing Installer SP-5117 (Fig. 44). Bushing should be flush with pump housing bore.

(3) Stake new pump bushing in two places with blunt punch (Fig. 45). Remove burrs from stake points with knife blade afterward.

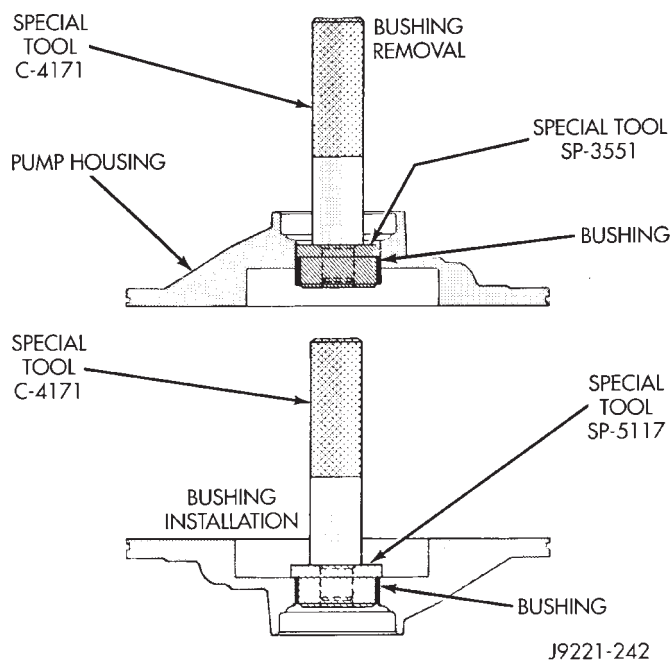




**Fig. 42 Measuring Pump Housing-To-Inner Gear Clearances**



**Fig. 43 Measuring Pump Gear Tooth Clearance**

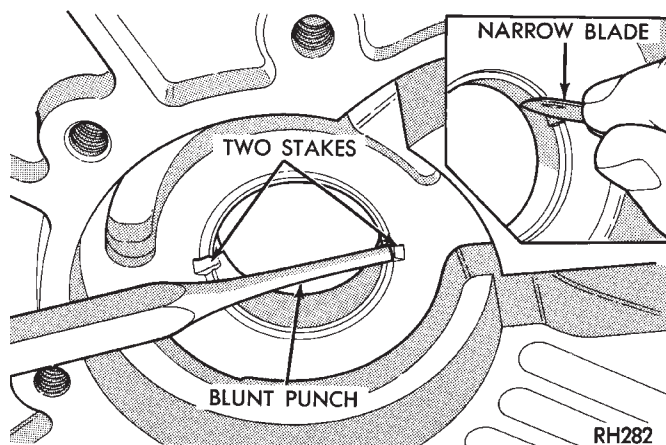


**Fig. 44 Removing Oil Pump Bushing**

#### REPLACING REACTION SHAFT SUPPORT BUSHING

(1) Assemble Bushing Remover Tools SP-1191, 3633 and 5324 (Fig. 46). **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



**Fig. 45 Staking Oil Pump Bushing**

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.

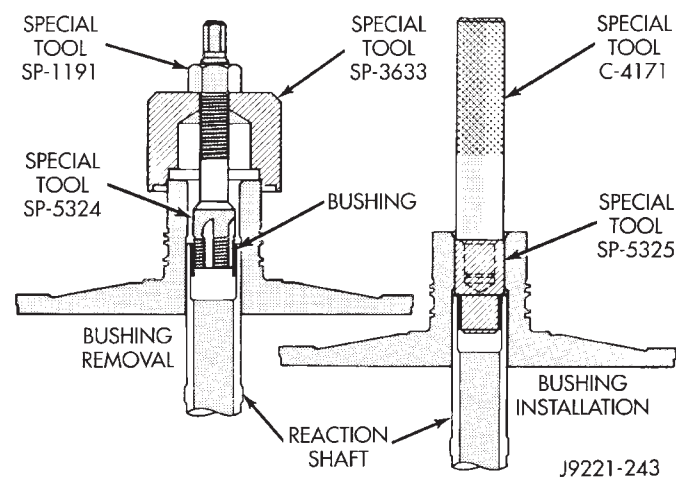
(5) Assemble Bushing Installer Tools C-4171 and SP-5325 (Fig. 46).

(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. 46 Replacing Reaction Shaft Support Bushing**

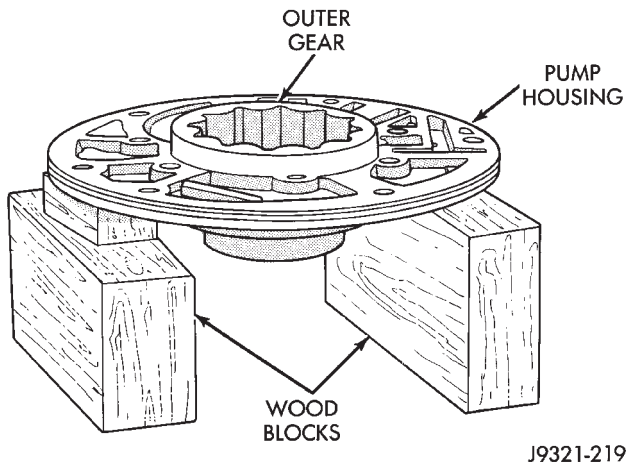
#### ASSEMBLING OIL PUMP AND REACTION SHAFT SUPPORT

(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. 47).

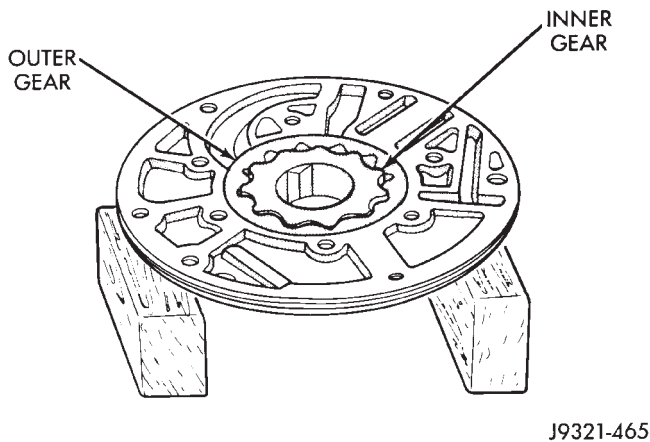
(4) Install outer gear in pump housing (Fig. 47). Gear can be installed either way (it is not a one-way fit).



**Fig. 47 Supporting Pump And Installing Outer Gear**

(5) Install pump inner gear (Fig. 48).

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



**Fig. 48 Pump Inner Gear Installation**

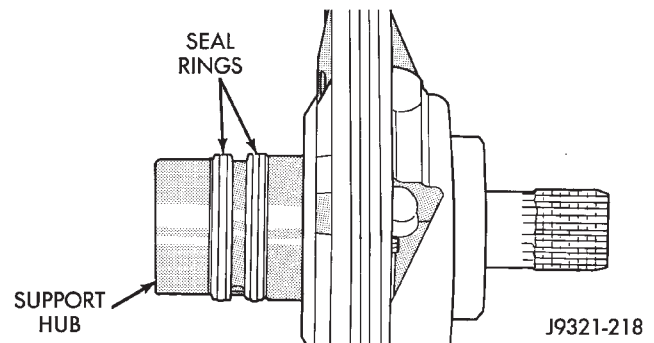
(6) Install new thrust washer on hub of reaction shaft support. Lubricate washer with transmission fluid or petroleum jelly.

**CAUTION:** The thrust washer is a one-way fit. The washer inside diameter is chamfered on one side. Be sure the washer is installed with the chamfered side facing forward.

(7) If reaction shaft seal rings are being replaced, install new seal rings on support hub (Fig. 49). Lubricate seal rings with transmission fluid or petroleum

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

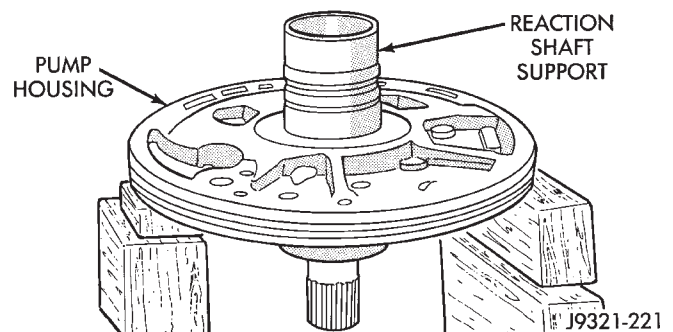
**CAUTION:** The reaction shaft support seal rings will break if overspread, or twisted. If new rings are being installed, spread them only enough for installation. Also be very sure the ring ends are securely hooked together after installation. Otherwise, the rings will either prevent pump installation,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



**Fig. 49 Hub Seal Ring Position**

(8) Install reaction shaft support on pump housing (Fig. 50).

(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. 50 Assembling Reaction Shaft Support And 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.).

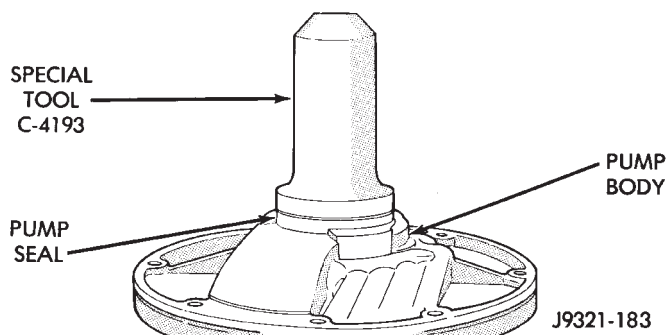
(d) Remove pump assembly from transmission case.



(12) Install new oil seal in pump with Special Tool C-4193 and Tool Handle C-4171 (Fig. 51). 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 with petroleum jelly. Lubricate pump seal with Ru-Glyde or petroleum jelly.



**Fig. 51 Pump Oil Seal Installation**

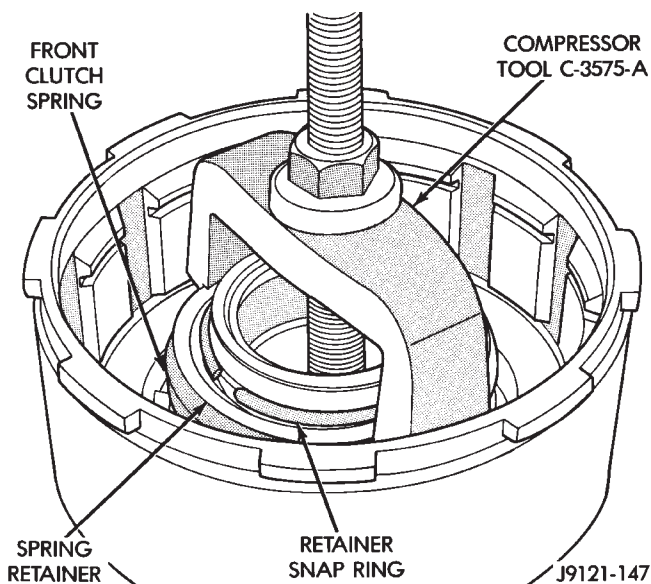
## FRONT CLUTCH OVERHAUL

### FRONT CLUTCH DISASSEMBLY

(1) Remove waved snap ring and remove pressure plate, clutch plates and clutch discs (Fig. 52).

(2) Compress clutch piston spring with Compressor Tool C-3575-A (Fig. 53). Be sure legs of tool are seated squarely on spring retainer before compressing spring.

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



**Fig. 53 Compressing Front Clutch Piston Spring**

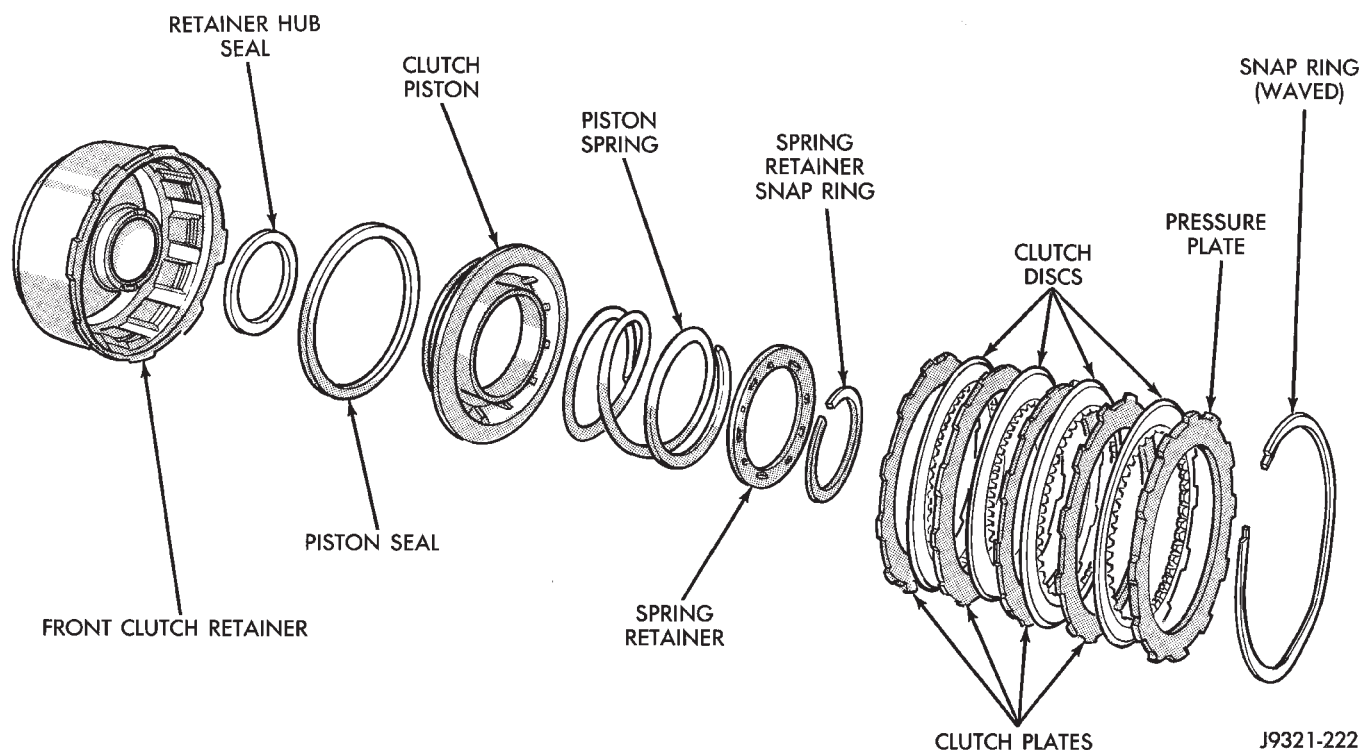
(4) Remove spring retainer and clutch spring. Note position of retainer on spring for assembly reference.

(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.

### FRONT CLUTCH INSPECTION

Clean the front clutch components in solvent and dry them with compressed air only. Do not use rags



**Fig. 52 Front Clutch Components**

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.

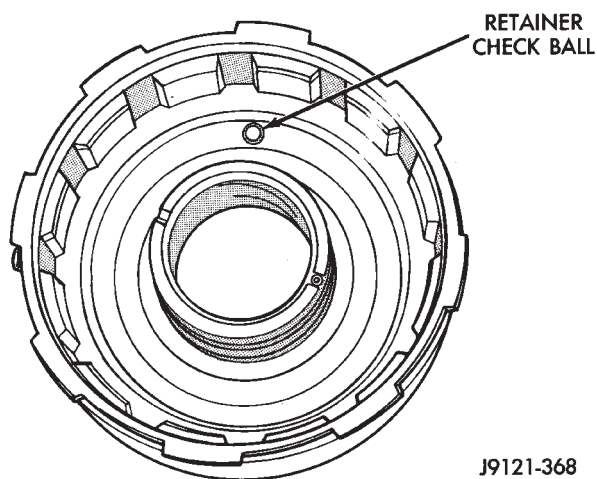
Replace the clutch spring and spring retainer if either is distorted, warped or broken.

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

**Inspect the clutch retainer bushings carefully (Fig. 55). 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. 54 Front Clutch Piston Retainer Check Ball Location**

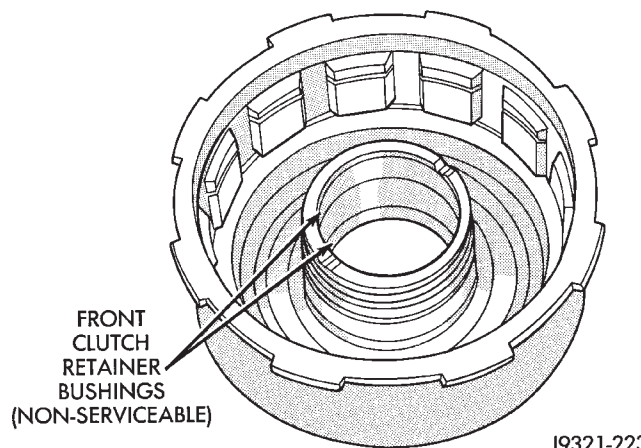
#### FRONT CLUTCH ASSEMBLY

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

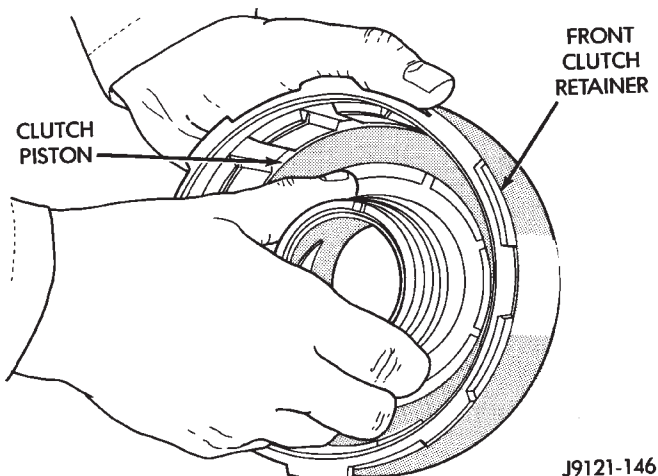
(2) Install new seals on piston and in hub of retainer. Be sure lip of each seal faces interior of clutch retainer.

(3) Lubricate lips of piston and retainer seals with liberal quantity of Door Eze, or petroleum jelly. Then lubricate retainer hub, bore and piston with transmission fluid.

(4) Install clutch piston in retainer (Fig. 56). Use twisting motion to seat piston in bottom of retainer. **Do not attempt to push the piston straight in. This could fold the seals over causing leakage and clutch slip.**

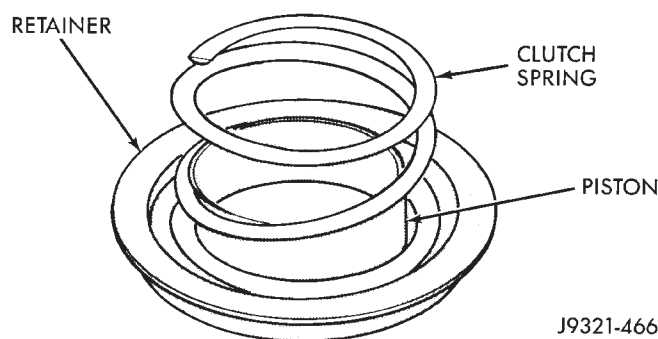


**Fig. 55 Retainer Bushing Locations**



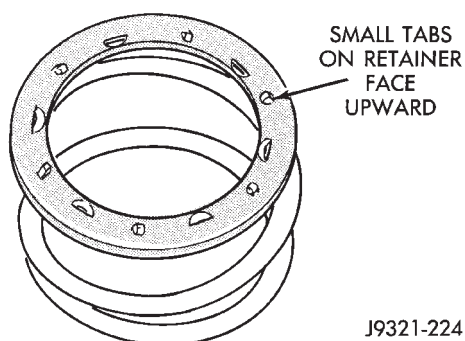
**Fig. 56 Front Clutch Piston Installation**

(5) Position spring in clutch piston (Fig. 57).



**Fig. 57 Clutch Spring Installation**

(6) Position spring retainer on top of piston spring (Fig. 58). **Make sure retainer is properly installed. Small raised tabs should be facing upward. Semi-circular lugs on underside of retainer are for positioning retainer in spring.**



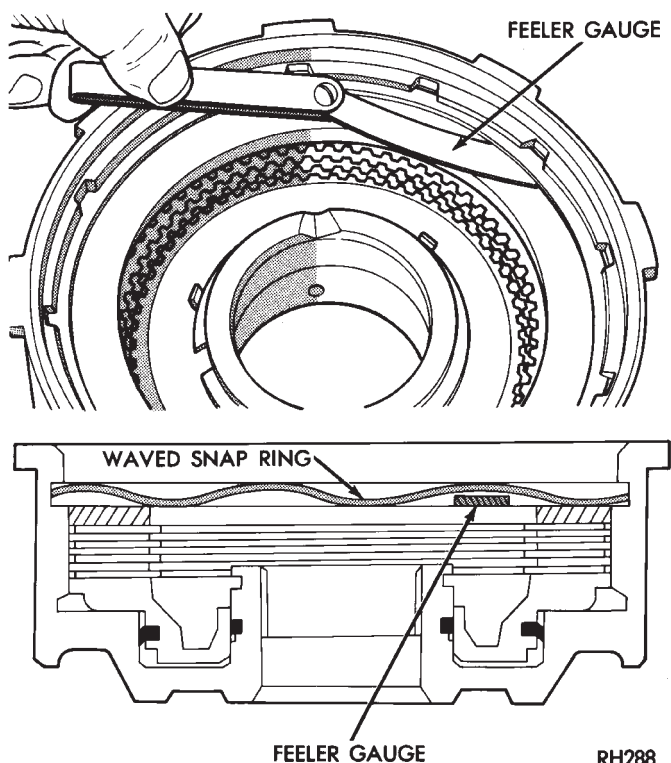
**Fig. 58 Correct Spring Retainer Installed Position**

(7) Compress piston spring and retainer with Compressor Tool C-3575-A (Fig. 53). Then install new snap ring to secure spring retainer and spring.

(8) Install clutch plates and discs (Fig. 52). Install steel plate then disc until all plates and discs are installed.

(9) Install pressure plate and waved snap ring (Fig. 52).

(10) Check clutch plate clearance (Fig. 59). 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.



**Fig. 59 Measuring Front Clutch Pack Clearance**

## REAR CLUTCH OVERHAUL

### REAR CLUTCH DISASSEMBLY

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

(2) Remove selective clutch pack snap ring (Fig. 60).

(3) Remove top pressure plate, clutch discs, steel plates, bottom pressure plate and wave spring (Fig. 60).

(4) Remove clutch piston. Grasp piston and rotate piston up and out of retainer.

(5) Remove and discard piston seals.

(6) Remove input shaft snap ring (Fig. 61).

(7) Press input shaft out of retainer with shop press and suitable size press tool (Fig. 62).

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

### REAR CLUTCH INSPECTION

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.

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 ball in the piston. The 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 obviously 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.

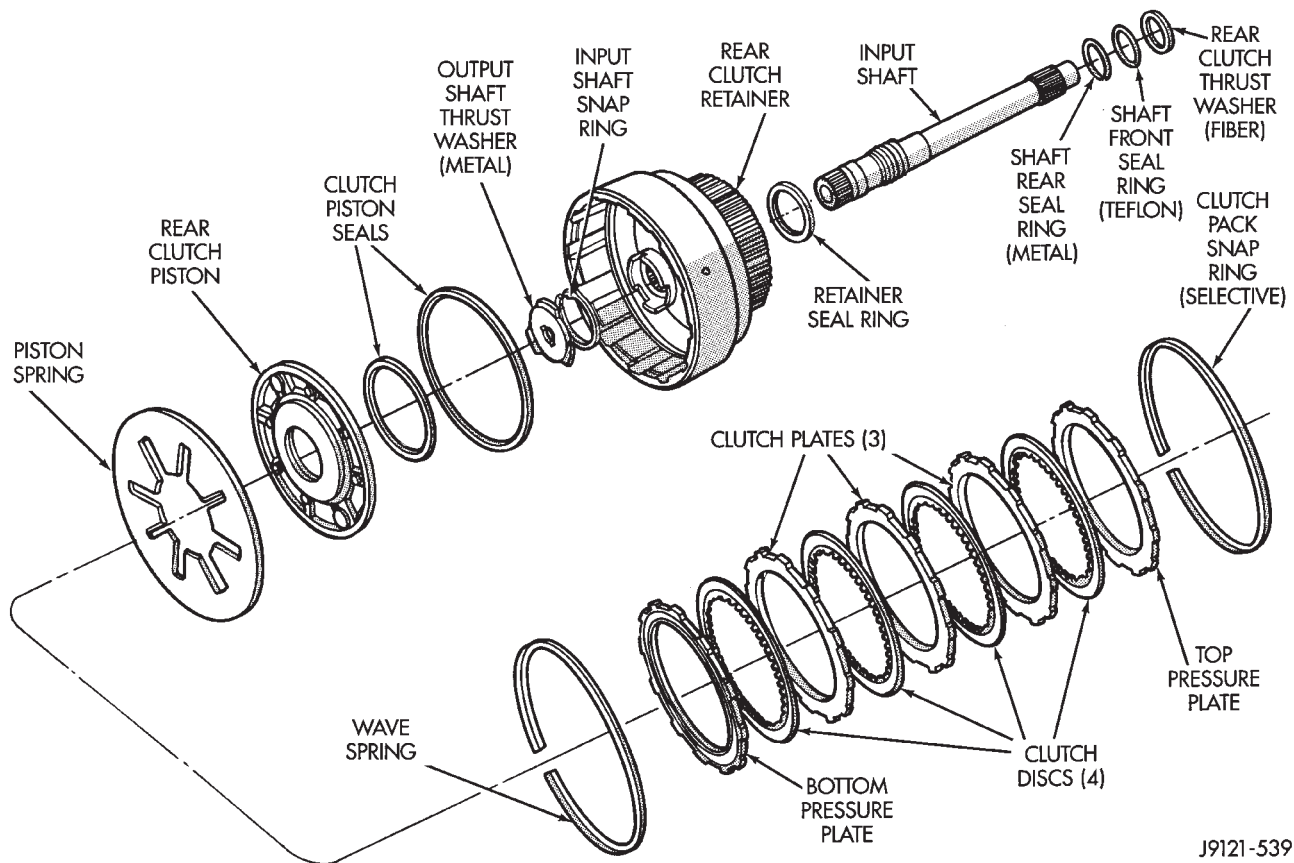
### REAR CLUTCH ASSEMBLY

(1) Soak clutch discs in transmission fluid.

(2) Install new seal rings on clutch retainer hub and input shaft (Figs. 63 and 64).

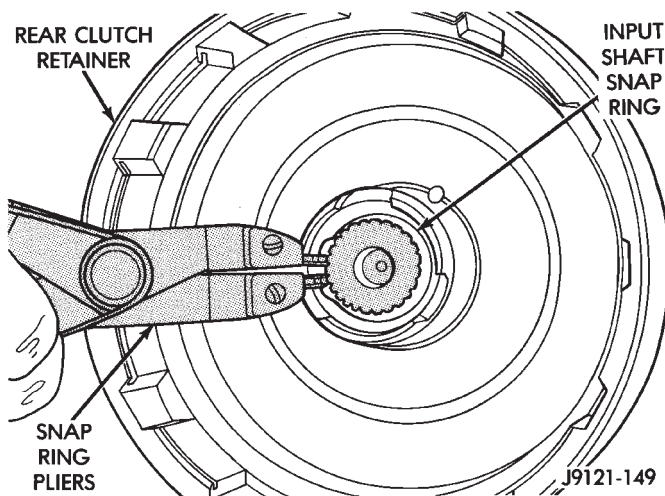
(a) Be sure clutch hub retainer seal ring is fully seated in groove (Fig. 63). Ring must not be twisted, or distorted.





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**Fig. 60 Rear Clutch Components**



J9121-149

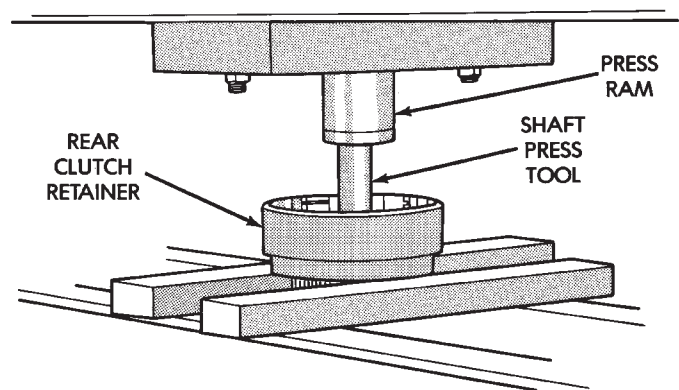
**Fig. 61 Removing/Installing Input Shaft Snap Ring**

(b) Note that input shaft front seal ring is teflon and rear seal ring is metal (Fig. 64). Be sure chamfered ends of teflon ring are properly joined and that ends of rear ring are securely hooked together.

(c) Lubricate retainer and shaft seal rings with light coat of petroleum jelly after installation.

(3) Lubricate splined end of input shaft and clutch retainer with transmission fluid. Then press input shaft into retainer (Fig. 65).

(4) Install input shaft retaining ring (Fig. 61).



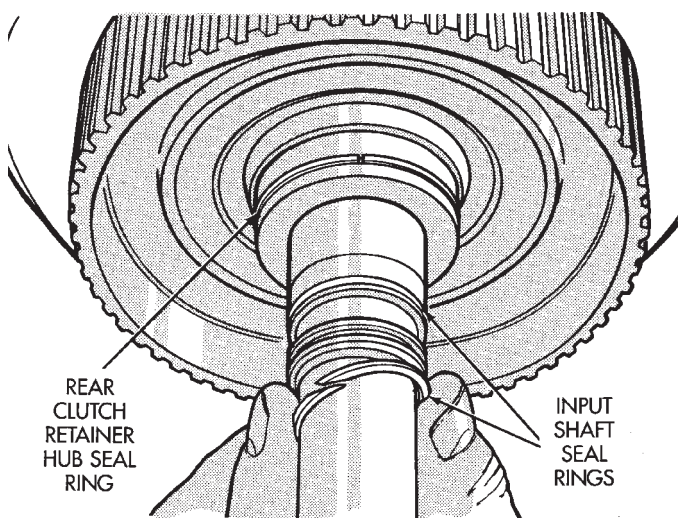
J9121-150

**Fig. 62 Removing Input Shaft From Rear Clutch Retainer**

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

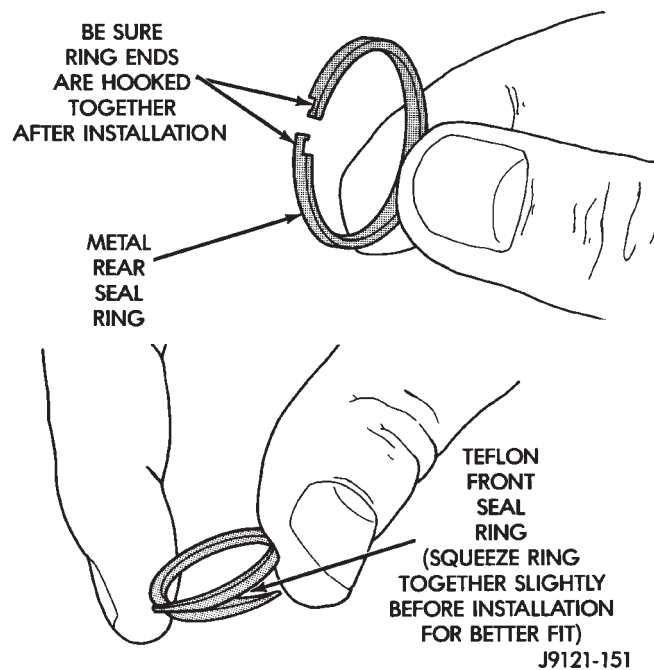
(6) Lubricate lip of piston seals with liberal quantity of Door Eze, or petroleum jelly. Then lubricate retainer hub and bore with transmission fluid.

(7) Install clutch piston in retainer. Use twisting motion to seat piston in bottom of retainer. **Do not attempt to push the piston straight in. This could fold the seals over causing leakage and clutch slip.**



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**Fig. 63 Installing Rear Clutch Retainer And Input Shaft Seal Rings**



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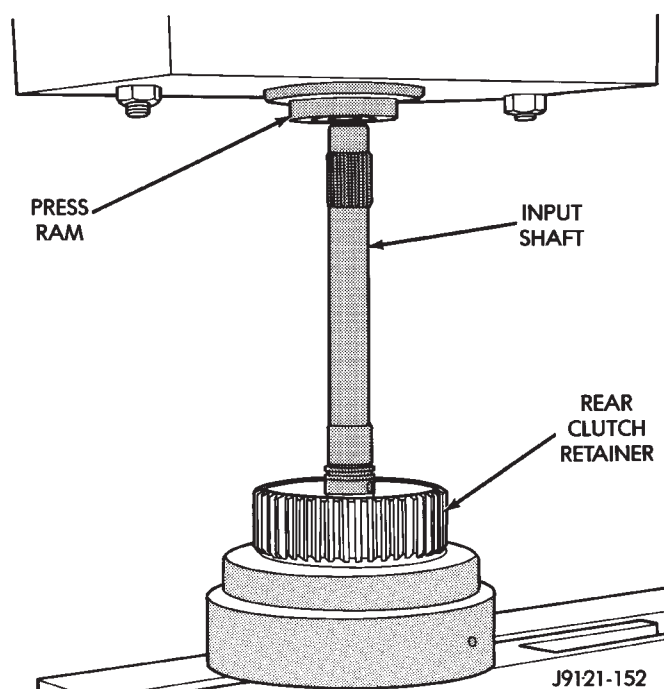
**Fig. 64 Input Shaft Seal Ring Identification**

(8) Install piston spring in retainer and on top of piston (Fig. 56). Concave side of spring faces up as shown.

(9) Install wave spring in retainer (Fig. 66). Be sure spring is completely seated in retainer groove.

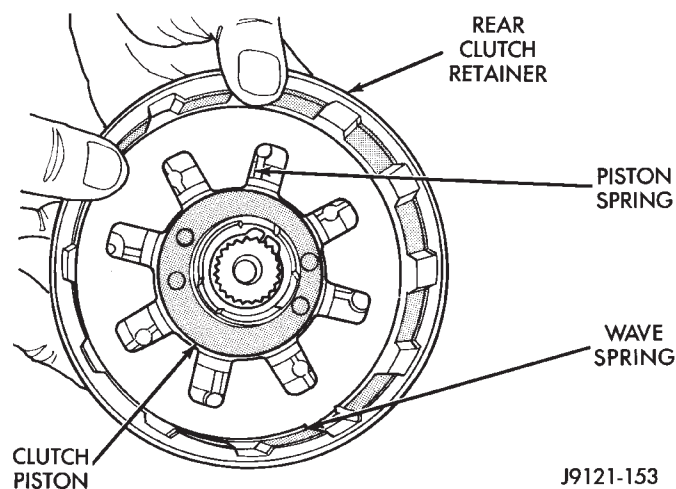
(10) Install bottom pressure plate (Fig. 60). Ridged side of plate faces downward (toward piston) and flat side toward clutch pack.

(11) Install first clutch disc in retainer on top of bottom pressure plate. Then install a clutch plate



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**Fig. 65 Pressing Input Shaft Into Rear Clutch Retainer**



J9121-153

**Fig. 66 Piston And Wave Spring Position**

followed by a clutch disc until entire clutch pack is installed. 4 clutch discs and 3 metal plates are required.

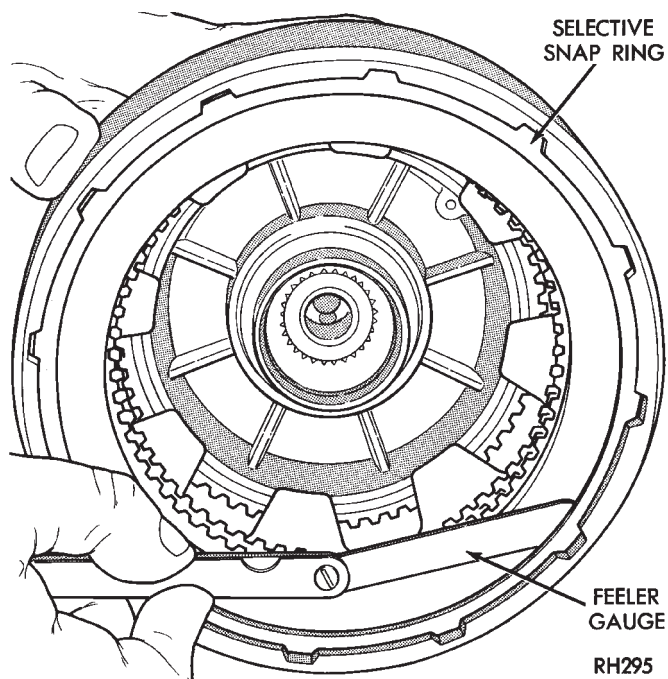
(12) Install top pressure plate (Fig. 60).

(13) Install selective snap ring (Fig. 60). Be sure snap ring is fully seated in retainer groove.

(14) Measure clutch pack clearance (Fig. 67). Clearance should be 0.64 to 1.14 mm (0.025 to 0.045 in.). If clearance is incorrect, adjust clearance with select fit snap ring.

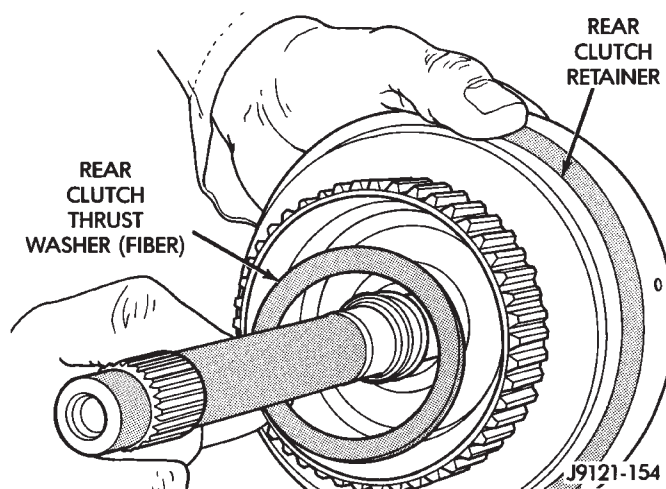
(15) Coat rear clutch thrust washer with petroleum jelly and install washer over input shaft and into clutch retainer (Fig. 68). Use enough petroleum jelly to hold washer in place.





**Fig. 67 Checking Rear Clutch Pack Clearance**

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

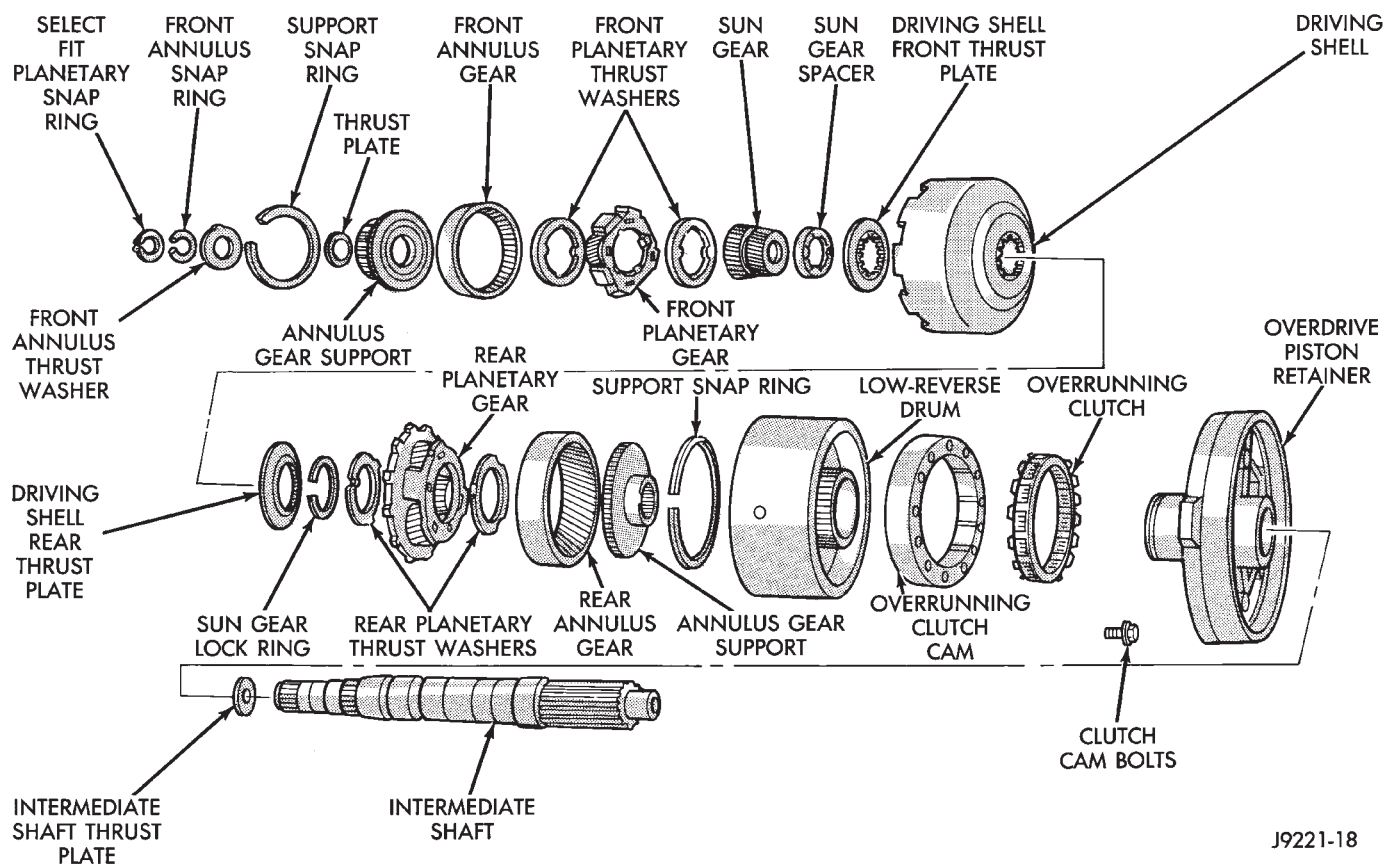


**Fig. 68 Installing Rear Clutch Thrust Washer**

### PLANETARY GEAR TRAIN AND INTERMEDIATE SHAFT OVERHAUL

#### GEARTRAIN DISASSEMBLY (FIG. 69)

- (1) Remove snap ring, tabbed thrust washer and thrust plate from front of output shaft.
- (2) Remove front annulus gear and support assembly.
- (3) Remove front planetary front thrust washer.
- (4) Remove front planetary gear.



**Fig. 69 Transmission Planetary Gear Train**

J9221-18

- (5) Remove front planetary rear thrust washer.
- (6) Remove sun gear and driving shell.
- (7) Remove snap ring that retains sun gear in driving shell and remove sun gear and thrust plates. Note thrust plate position for assembly reference.
- (8) Remove tabbed thrust washer from rear planetary gear.
- (9) Remove rear planetary gear from rear annulus gear and remove annulus gear from intermediate shaft.
- (10) Remove snap rings securing annulus gears to supports. Then separate each gear from support.

#### PLANETARY GEARTRAIN INSPECTION

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 part that is worn or damaged. Do not attempt to reuse these parts.

Inspect the intermediate shaft carefully. Pay particular attention to the machined bushing/bearing surfaces on the shaft.

Replace the intermediate shaft if any 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. Be sure the select spacer groove on the shaft is in good condition. Trial fit the spacer if necessary.

#### PLANETARY GEARTRAIN ASSEMBLY

(1) Lubricate intermediate 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.

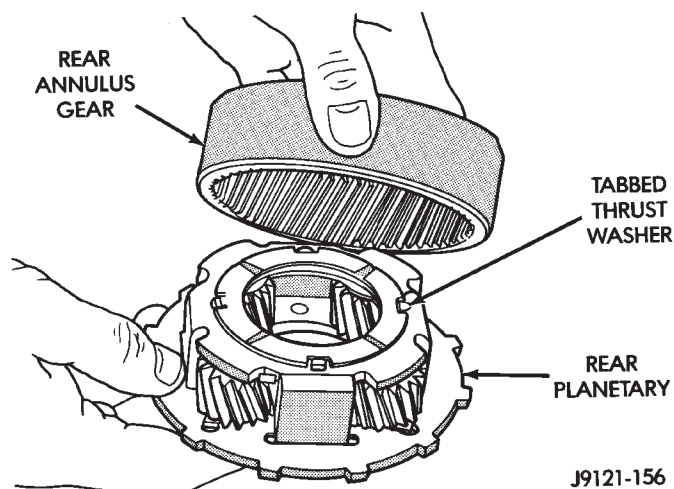
(3) Install rear thrust washer on rear planetary gear (Fig. 70). Use enough petroleum jelly to hold washer in place. Also be sure washer tabs are properly engaged in gear slots.

(4) Install rear annulus over and onto rear planetary gear (Fig. 70).

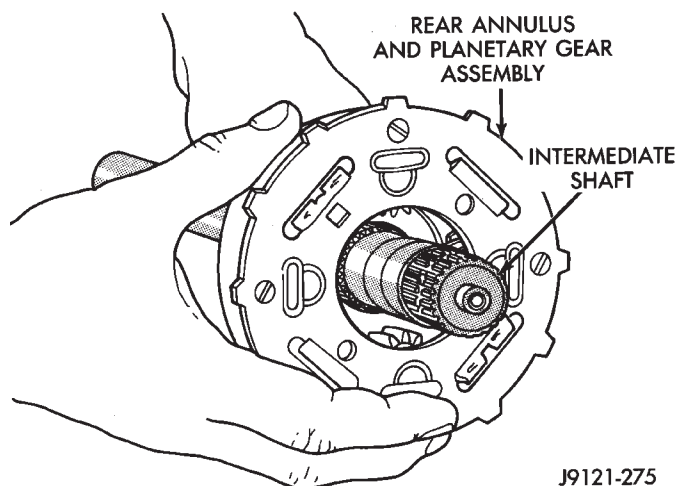
(5) Install assembled rear planetary and annulus gear on intermediate shaft (Fig. 71). Verify that assembly is fully seated on shaft.

(6) Install front thrust washer on rear planetary gear (Fig. 72). Use enough petroleum jelly to hold washer on gear.

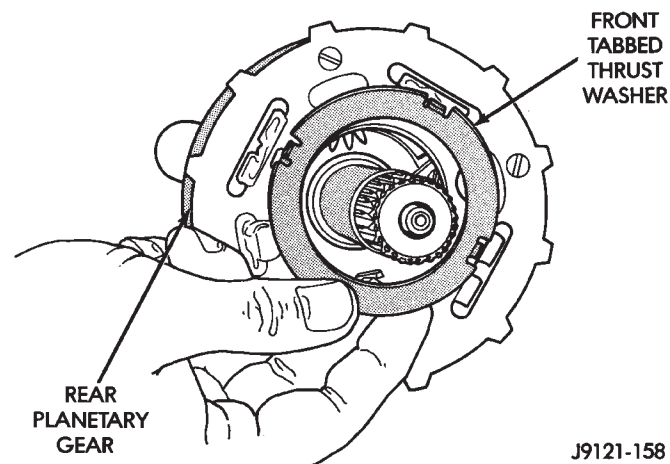
(7) Install spacer on sun gear (Fig. 73).



**Fig. 70 Assembling Rear Annulus And Planetary Gear**

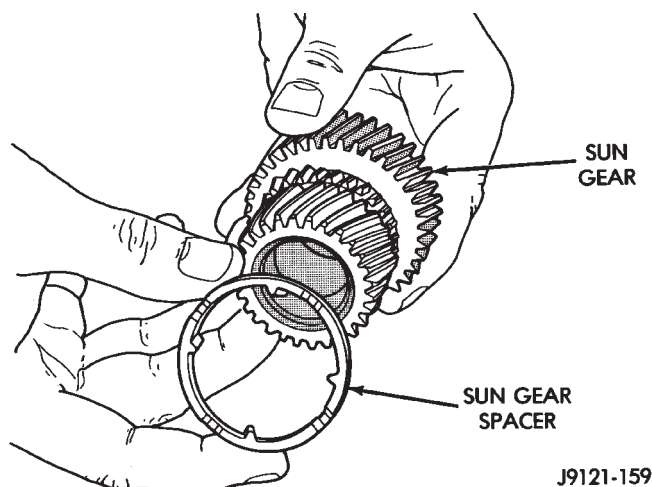


**Fig. 71 Installing Assembled Rear Annulus And Planetary Gear On Intermediate Shaft**

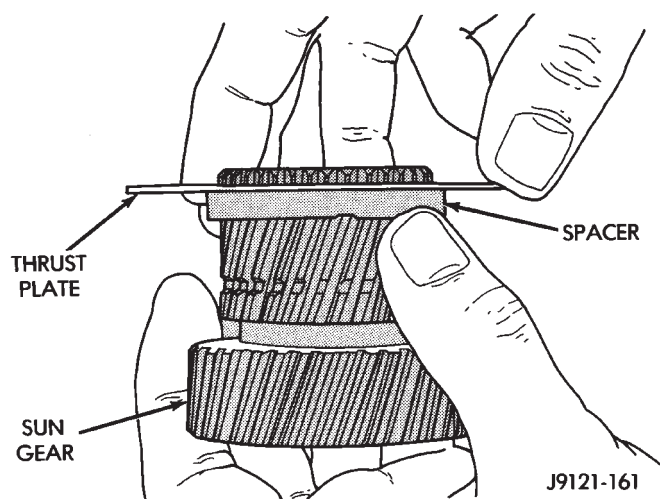


**Fig. 72 Installing Rear Planetary Front Thrust Washer**

(8) Install thrust plate over sun gear and on top of spacer (Fig. 74). Note that thrust plates are interchangeable. Use either plate on sun gear and rear of driving shell.



**Fig. 73 Installing Sun Gear Spacer**



**Fig. 74 Installing Spacer And Thrust Plate On Sun Gear**

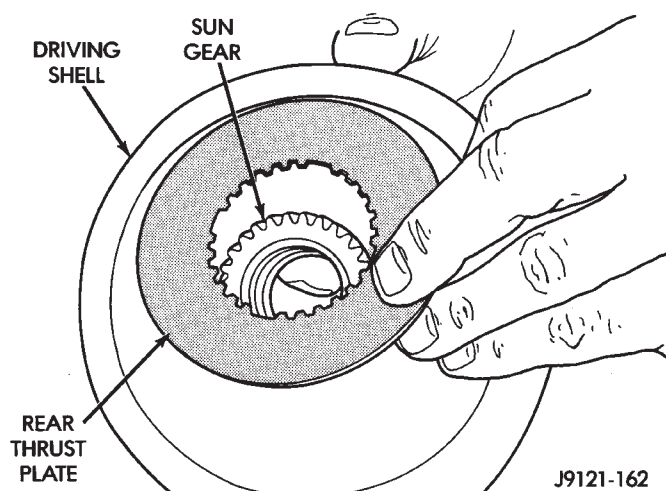
(9) Insert sun gear into driving shell (Fig. 75).

(10) Hold sun gear in position and install rear thrust plate. Plate goes over sun gear at rear of driving shell (Fig. 75).

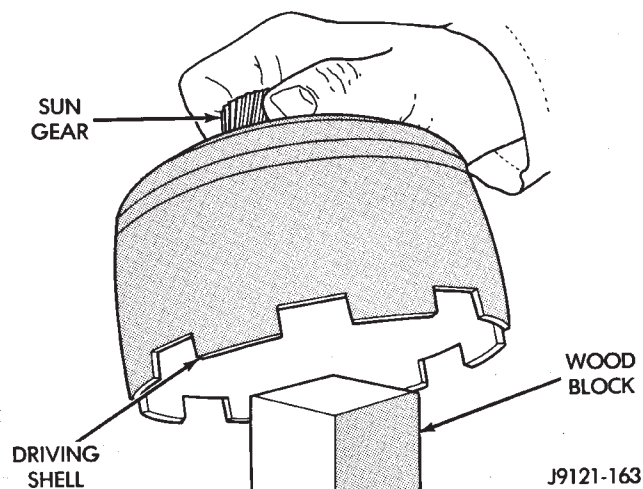
(11) Position wood block on bench and support sun gear on block (Fig. 76). This makes it easier to align and install sun gear lock ring. Keep wood block handy as it will also be used for geartrain end play check.

(12) 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. 77).

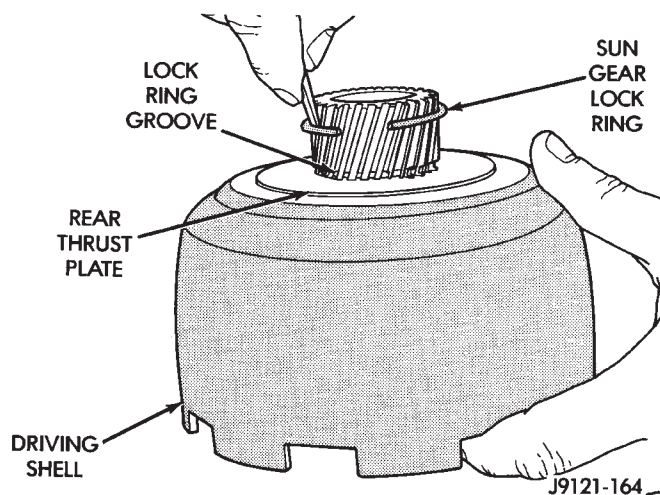
(13) Install assembled driving shell and sun gear on intermediate shaft (Fig. 78).



**Fig. 75 Installing Sun Gear And Rear Thrust Plate In Driving Shell**

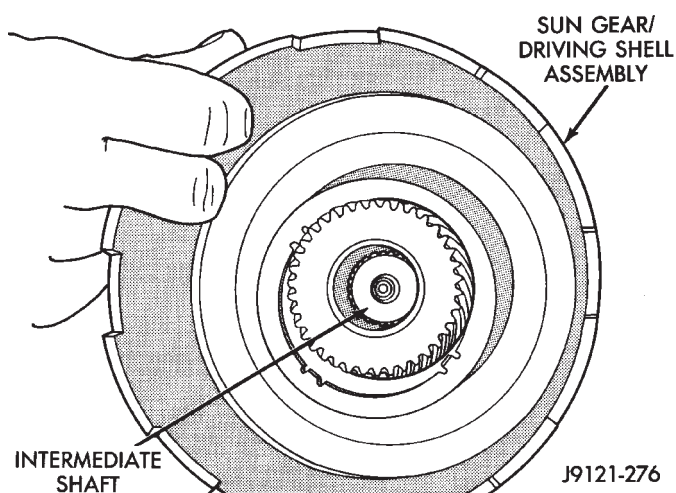


**Fig. 76 Supporting Sun Gear On Wood Block**



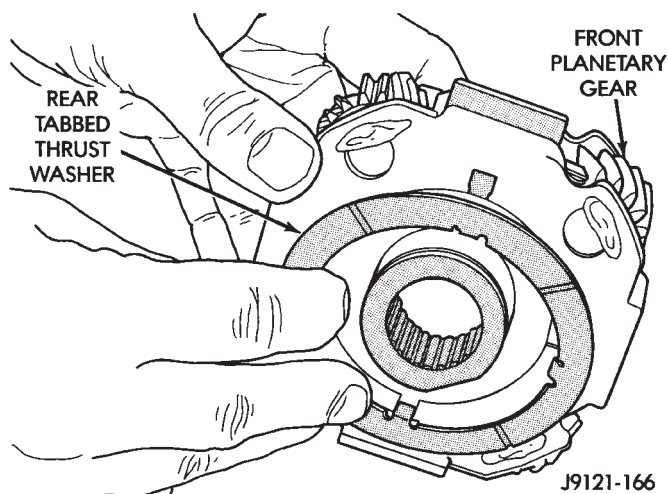
**Fig. 77 Installing Sun Gear Lock Ring**





**Fig. 78 Installing Assembled Sun Gear And Driving Shell On Intermediate Shaft**

(14) Install rear thrust washer on front planetary gear (Fig. 79). Use enough petroleum jelly to hold washer on gear and be sure washer tabs are all properly seated.



**Fig. 79 Installing Rear Thrust Washer On Front Planetary Gear**

(15) Assemble front annulus gear and support if necessary.

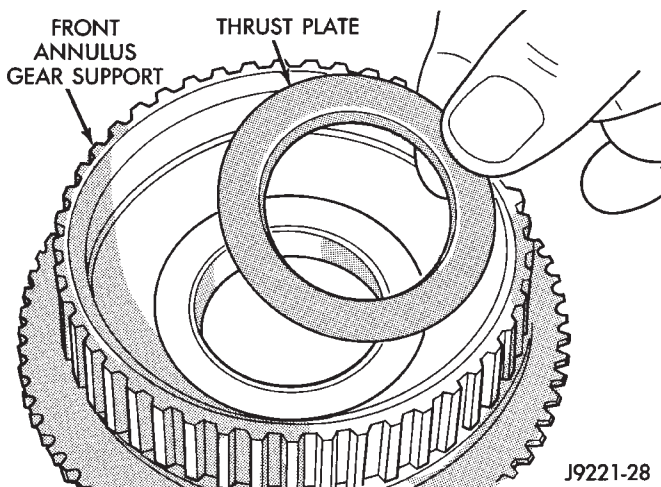
(16) Position thrust plate on front annulus gear support (Fig. 80). Use liberal quantity of petroleum jelly to hold plate in place.

(17) Install front planetary gear on intermediate shaft and in driving shell (Fig. 81).

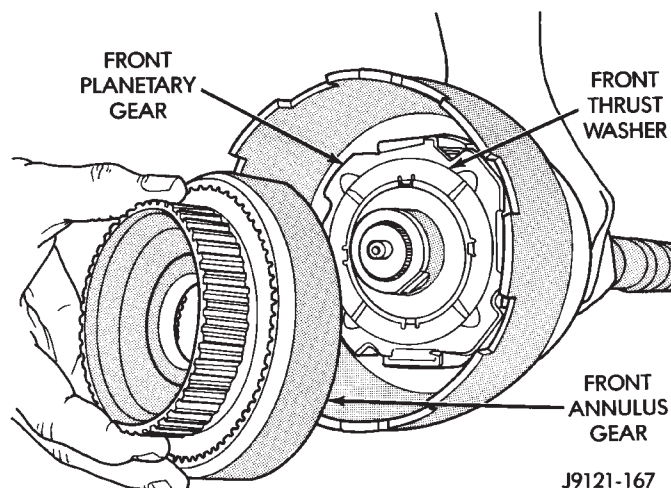
(18) Install front thrust washer on front planetary gear (Fig. 81). Use enough petroleum jelly to hold washer in place on gear and be sure washer tabs are seated.

(19) Assemble front annulus gear and support. Be sure support snap ring is seated.

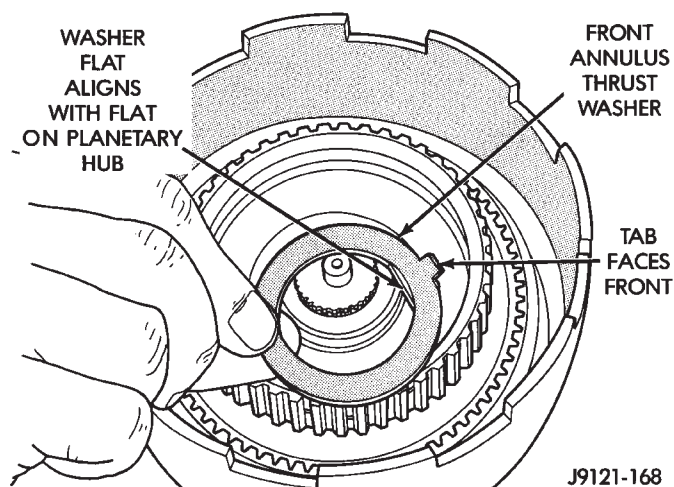
(20) Install front annulus thrust washer (Fig. 82). Align flat on washer with flat on planetary hub. Also be sure washer tab is facing forward.



**Fig. 80 Installing Thrust Plate On Front Annulus Support**

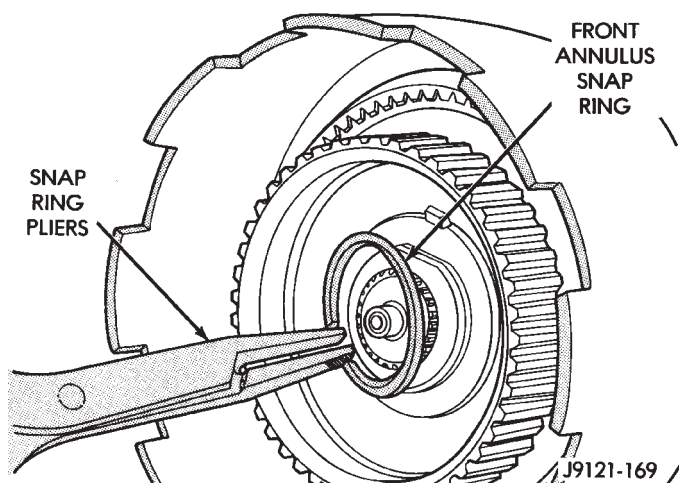


**Fig. 81 Installing Front Planetary And Annulus Gears**



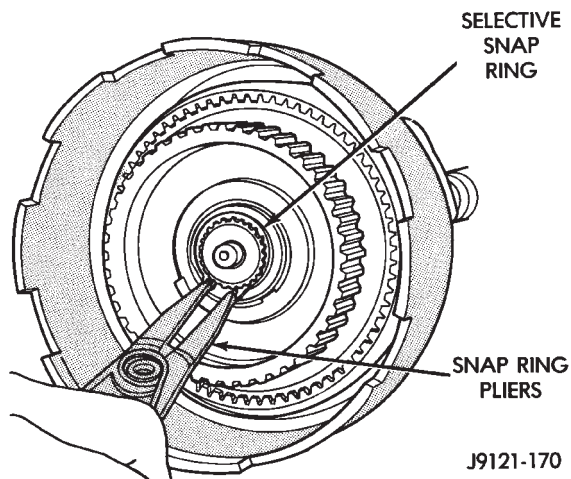
**Fig. 82 Installing Front Annulus Thrust Washer**

(21) Install front annulus snap ring (Fig. 83). Use snap ring pliers to avoid distorting ring during installation. Also be sure ring is fully seated.



**Fig. 83 Installing Front Annulus Snap Ring**

(22) Install planetary selective snap ring with snap ring pliers (Fig. 84). Be sure ring is fully seated.

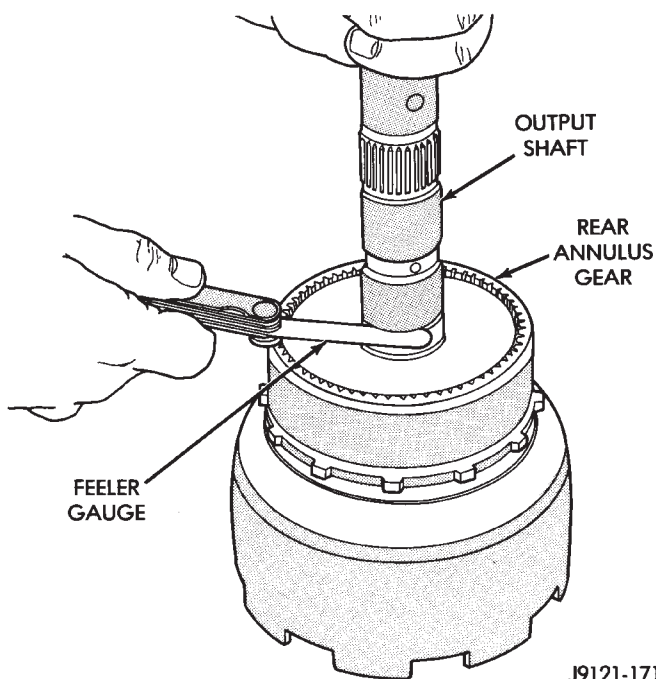


**Fig. 84 Installing Planetary Selective Snap Ring**

(23) Turn planetary geartrain assembly over so driving shell is facing workbench. Then support geartrain on wood block positioned under forward end of output shaft. This is necessary so geartrain components will move forward for accurate end play check.

(24) Check planetary geartrain end play with feeler gauge (Fig. 85). Gauge goes between shoulder on intermediate shaft and end of rear annulus support.

(25) 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. 85 Checking Planetary Geartrain End Play**

## FRONT SERVO AND BAND OVERHAUL

### FRONT SERVO DISASSEMBLY (FIG. 86)

- (1) Remove small snap ring from servo piston.
- (2) Remove piston, rod, springs and guide.
- (3) Remove and discard servo piston rings and O-ring.

### FRONT BAND AND SERVO INSPECTION

Clean the servo components with solvent and dry them with compressed air.

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.

Replace the front band if distorted, the lining is burned or flaking off, or excessively worn.

Check the servo piston bore for wear. Replace the piston and rod as an assembly if either part is worn or damaged.

Replace any servo component if doubt exists about its condition. Do not reuse suspect parts.

### ASSEMBLING FRONT SERVO PISTON

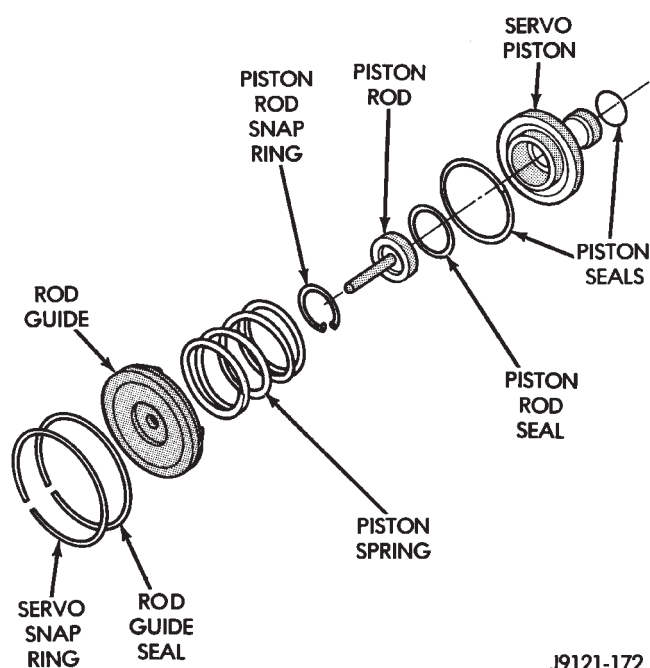
(1) Lubricate seal rings and O-rings with petroleum jelly. Lubricate other servo parts with transmission fluid.

(2) Install new O-ring on servo piston rod.

(3) Install new seal on piston rod guide and install new seal rings on piston.

(4) Assemble rod, piston, servo springs and snap ring (Fig. 86).

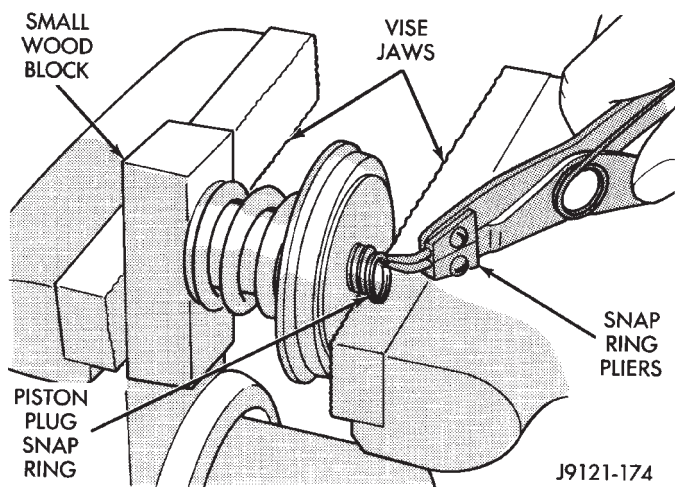




J9121-172

**Fig. 86 Front Servo Components****REAR SERVO AND BAND OVERHAUL****REAR SERVO PISTON DISASSEMBLY**

- (1) Remove seal from servo piston. Note which way seal lip faces for assembly reference.
- (2) Compress cushion spring in vise only enough to allow piston plug snap ring removal (Fig. 87). Use wood block between vise jaws and end of piston plug to keep plug aligned and in position.
- (3) Remove snap ring from end of piston plug (Fig. 87).
- (4) Open vise and remove wood block, piston plug, cushion spring and servo piston.



J9121-174

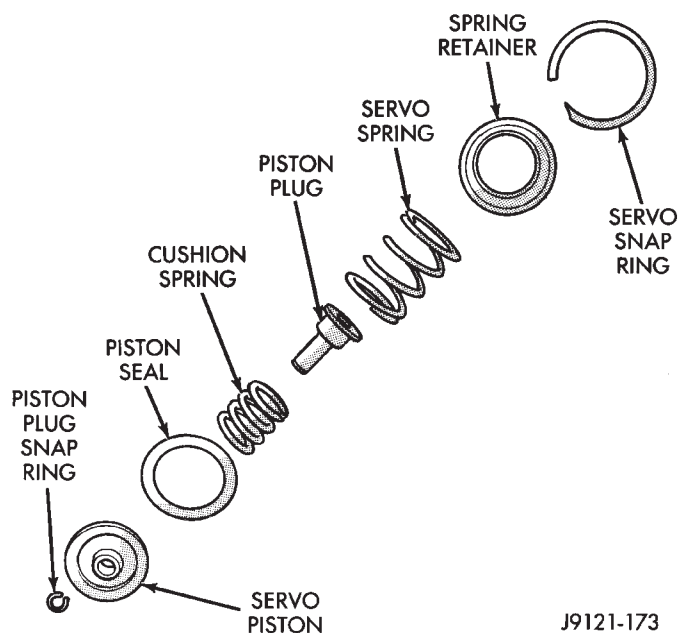
**Fig. 87 Removing/Installing Servo Piston Plug Snap Ring****REAR SERVO INSPECTION**

Clean the servo components (Fig. 88) with solvent and dry them with compressed air.

Check rear band condition. Replace the band if distorted, the lining is burned or flaking off, or the lining is excessively worn. Check the band pivot and reaction pins. Minor pin scoring can be cleaned up with crocus cloth. However, replace the pins if worn, severely scored, or cracked. Replace the pin O-rings.

Inspect the servo components. Replace the servo and cushion springs if collapsed, distorted or broken. Replace the plug or piston if cracked, bent, or worn. Discard the servo snap ring and spring retainer if distorted or warped.

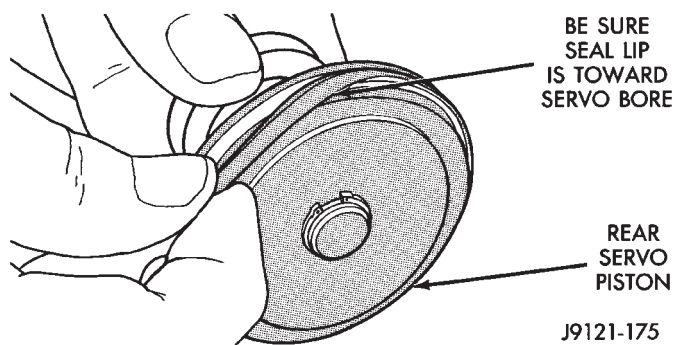
If doubt exists about the condition of any servo component, replace it. Do not reuse suspect parts.



J9121-173

**Fig. 88 Rear Servo Components****ASSEMBLING REAR SERVO PISTON**

- (1) Assemble piston plug, cushion spring and piston (Fig. 88).
- (2) Compress cushion spring in vise and install piston plug snap ring (Fig. 87).
- (3) Install new seal on piston. Be sure seal lip is toward servo bore (Fig. 89).
- (4) Lubricate piston seal with petroleum jelly. Lubricate other servo parts with transmission fluid.



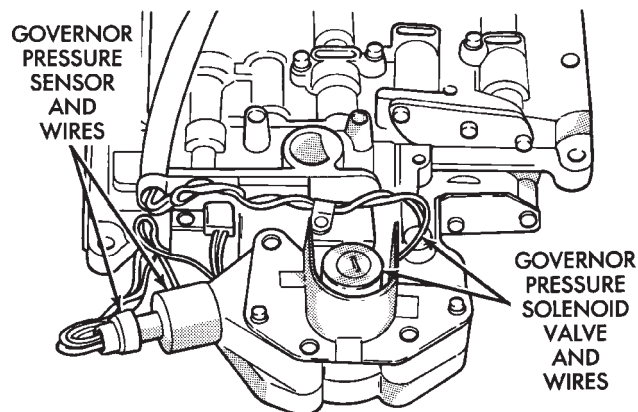
**Fig. 89 Installing Rear Servo Piston Seal**

## VALVE BODY SERVICE AND ADJUSTMENT

### VALVE BODY MAIN COMPONENT DISASSEMBLY

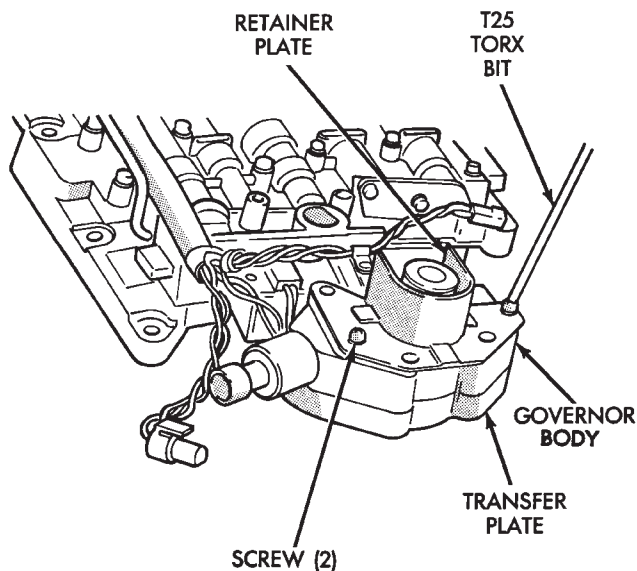
**CAUTION:** Do not clamp any valve body component in a vise. This practice can damage the component resulting in unsatisfactory operation after assembly and installation. Do not use pliers to remove any of the valves, plugs or springs and do not force any of the components out or into place. The valves 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) Disconnect wires from governor pressure sensor and solenoid (Fig. 90).

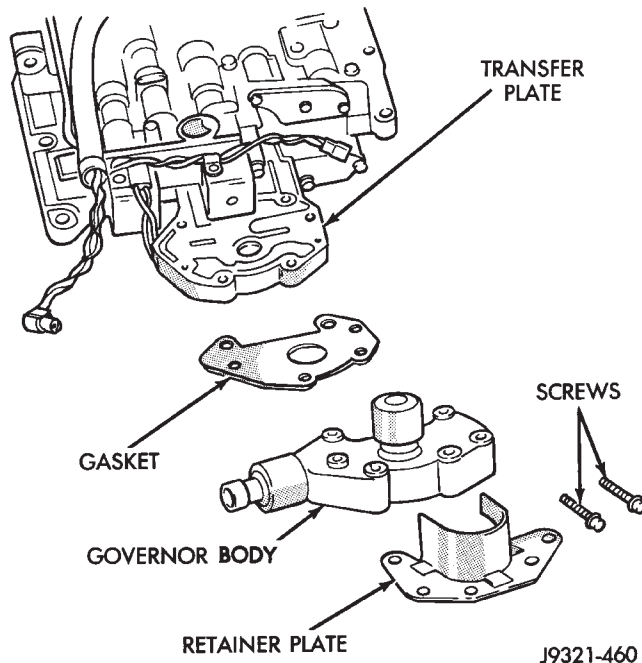


**Fig. 90 Governor Pressure Solenoid And Sensor Wire Locations**

- (2) Remove screws attaching governor body and retainer plate to transfer plate (Fig. 91).
- (3) Remove retainer plate, governor body and gasket from transfer plate (Fig. 92).
- (4) Disconnect wires from governor pressure sensor, if not done previously (Fig. 93).

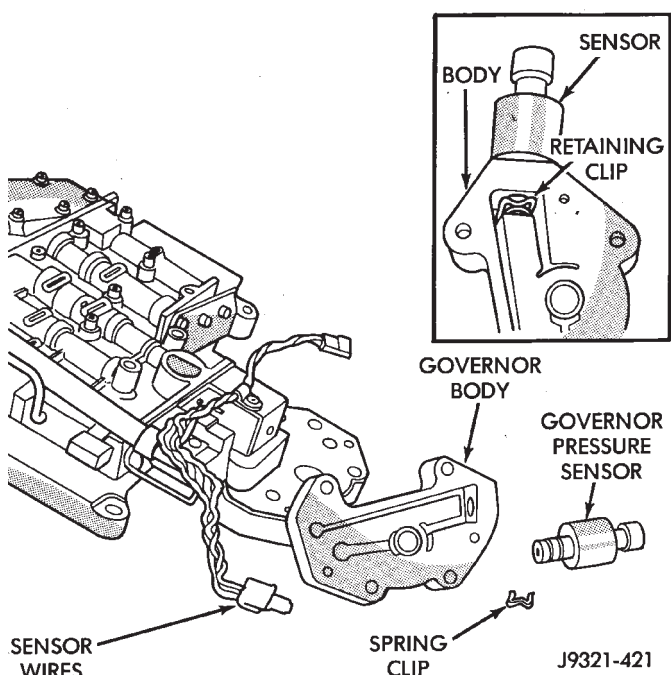


**Fig. 91 Governor Body And Retainer Plate Attaching Screw Removal/Installation**

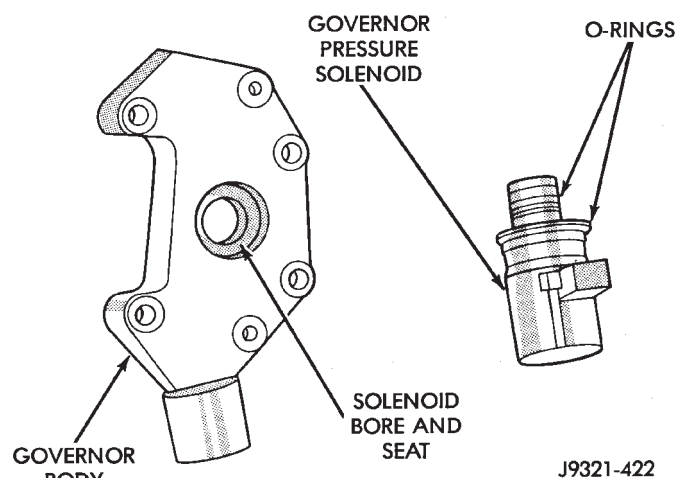


**Fig. 92 Governor Body, Retainer Plate And Gasket Removal**

- (5) Remove governor pressure sensor from governor body. Sensor is retained in body with M-shaped spring clip (Fig. 93). Remove clip with small pointed tool and slide sensor out of body.
- (6) Remove governor pressure solenoid by pulling it straight out of bore in governor body (Fig. 94). Remove and discard solenoid O-rings if worn, cut, or torn.
- (7) Remove small shoulder bolt that secures solenoid harness case connector to 3-4 accumulator housing (Fig. 95). **Retain shoulder bolt. Either tape it**



**Fig. 93 Governor Pressure Sensor Removal**



**Fig. 94 Governor Pressure Solenoid Removal**

**to harness or thread it back into accumulator housing after connector removal.**

(8) Unhook overdrive/converter solenoid harness from 3-4 accumulator cover plate (Fig. 96).

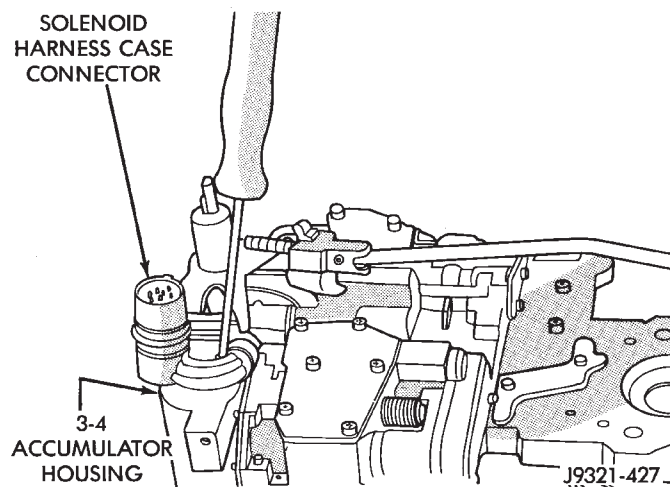
(9) Turn valve body over and remove screws that attach overdrive/converter solenoid assembly to valve body (Fig. 97).

(10) Remove solenoid and harness assembly from valve body (Fig. 98).

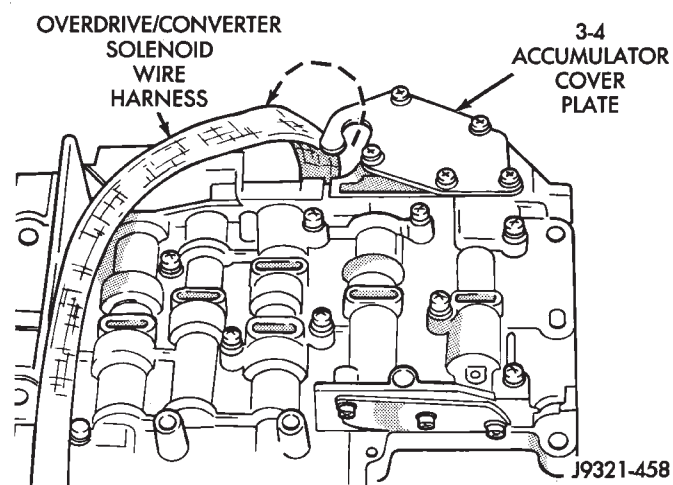
(11) Remove boost valve cover (Fig. 99).

(12) Remove boost valve retainer, valve spring and boost valve (Fig. 100).

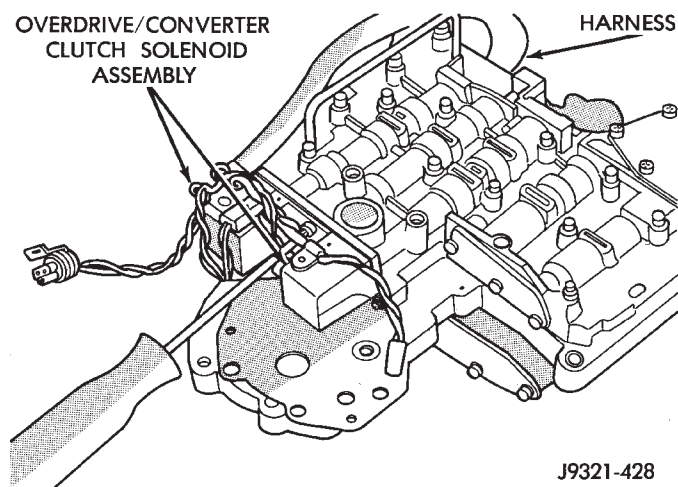
(13) Secure detent ball and spring with Retainer Tool 6583 (Fig. 101).



**Fig. 95 Removing/Installing Solenoid Harness Case Connector Shoulder Bolt**

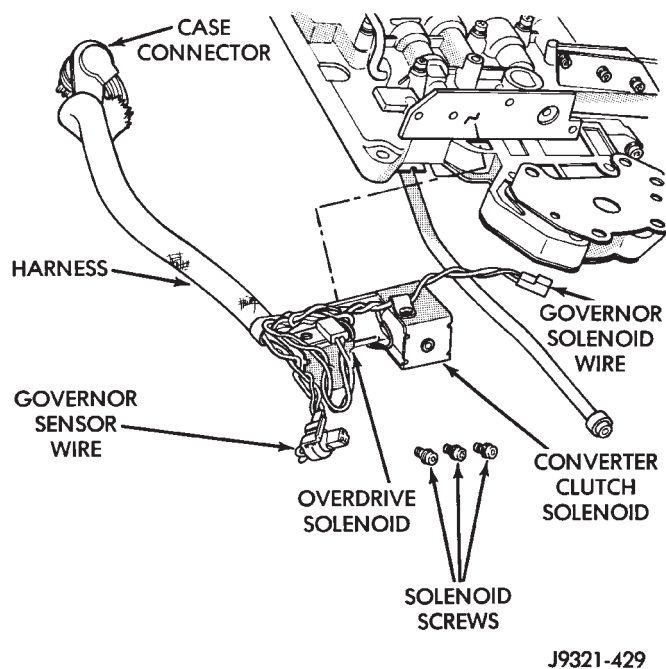


**Fig. 96 Unhooking Solenoid Harness From Accumulator Cover Plate**

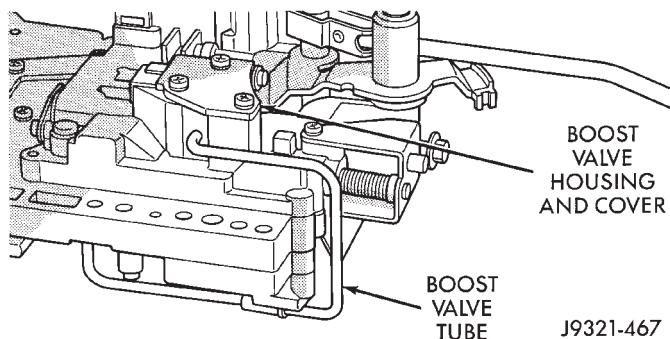


**Fig. 97 Removing Overdrive/Converter Solenoid Assembly Screws**

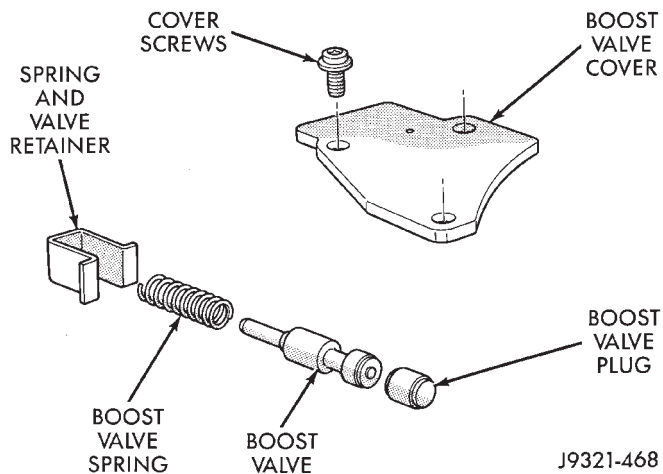




**Fig. 98 Overdrive/Converter Clutch Solenoid Assembly Removal**

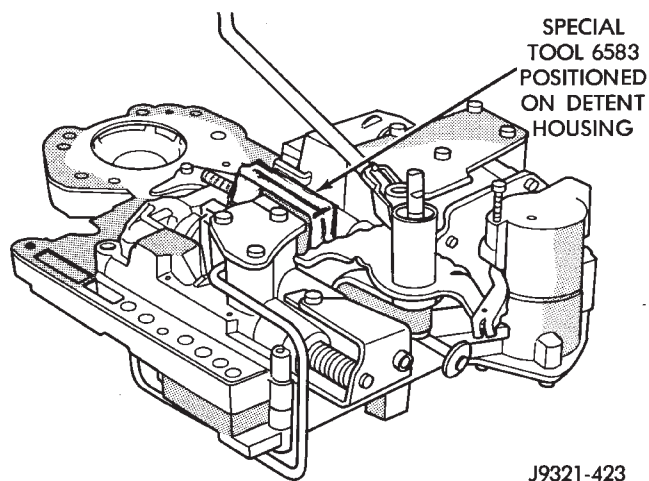


**Fig. 99 Boost Valve Cover Location**

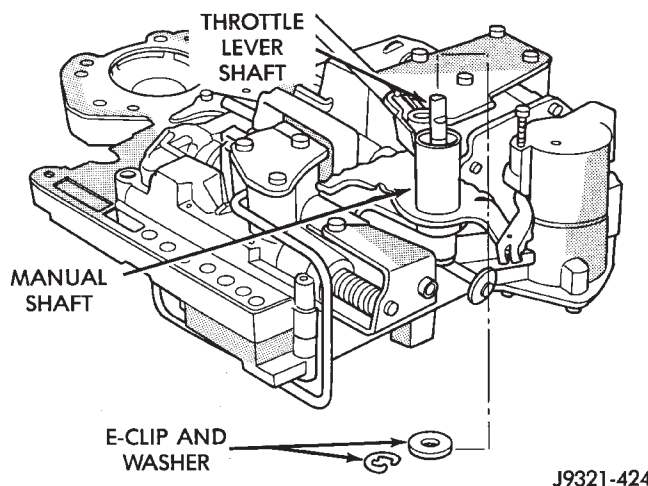


**Fig. 100 Boost Valve Components**

(14) Remove E-clip and washer that retains throttle lever shaft in manual lever (Fig. 102).

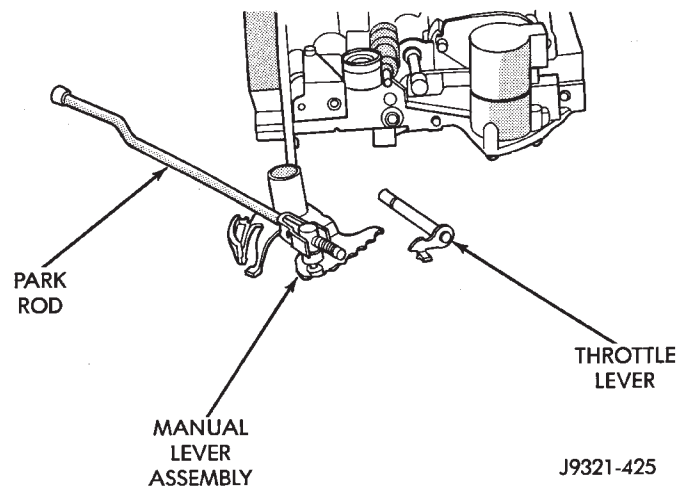


**Fig. 101 Securing Detent Ball And Spring**



**Fig. 102 Throttle Lever E-Clip And Washer Removal**

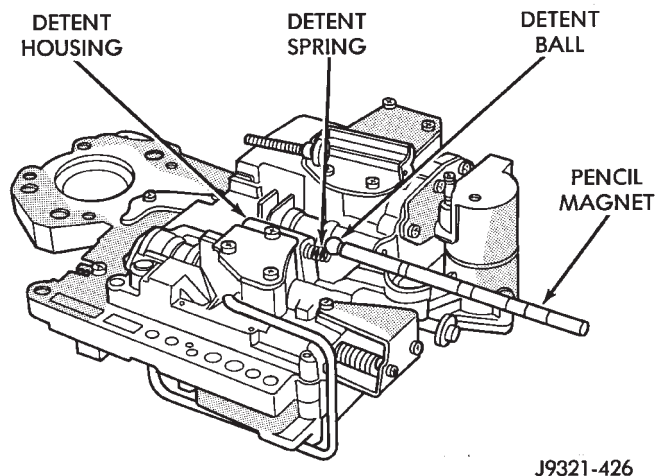
(15) Remove manual lever and throttle lever (Fig. 103). Rotate and lift manual lever off valve body and throttle lever shaft. Then slide throttle lever out of valve body.



**Fig. 103 Manual And Throttle Lever Removal**

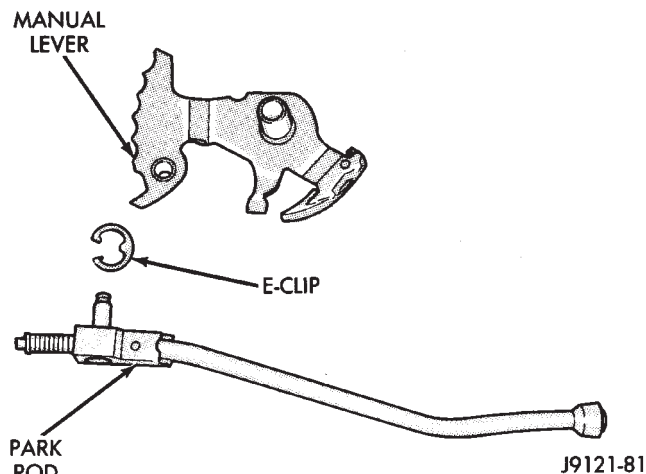


(16) Position pencil magnet next to detent housing to catch detent ball and spring. Then carefully remove Retainer Tool 6583 and remove detent ball and spring (Fig. 104).



**Fig. 104 Detent Ball And Spring Removal**

(17) Remove park rod E-clip and separate rod from manual lever (Fig. 105).



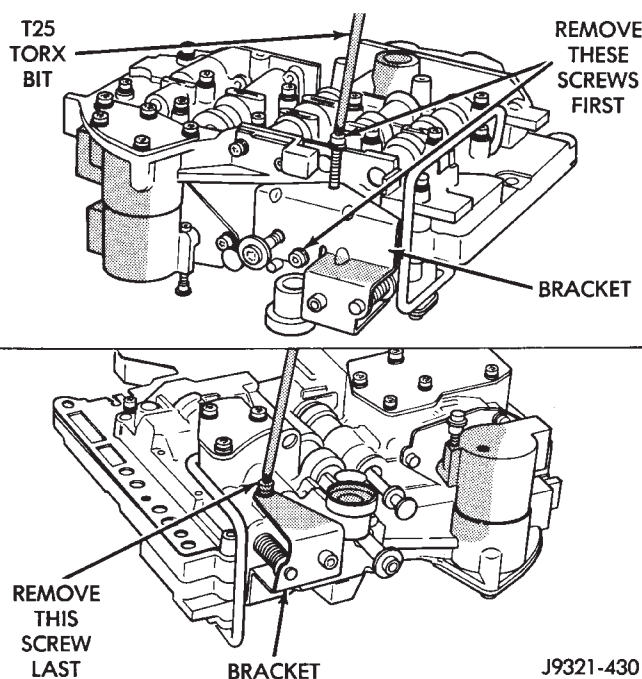
**Fig. 105 Park Rod Removal**

(18) Remove screws attaching pressure adjusting screw bracket to valve body and transfer plate (Fig. 106). Hold bracket firmly against spring tension while removing last screw.

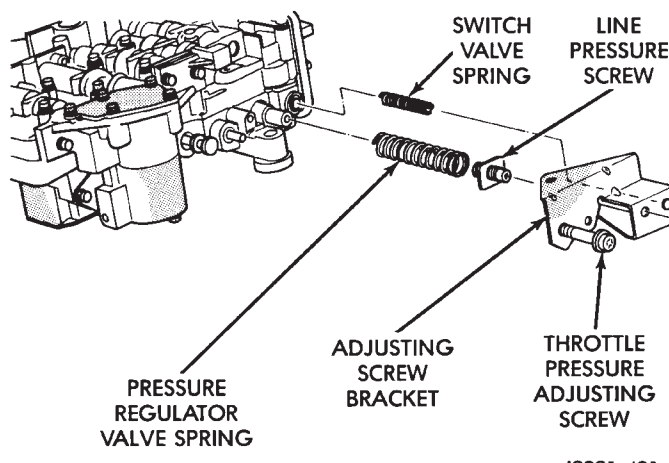
(19) Remove adjusting screw bracket, line pressure adjusting screw, pressure regulator valve spring and switch valve spring (Fig. 107). **Do not remove throttle pressure adjusting screw from bracket and do not disturb setting of either adjusting screw during removal.**

(20) Loosen left-side 3-4 accumulator housing attaching screw about 2-3 threads. Then remove center and right-side housing attaching screws (Fig. 108).

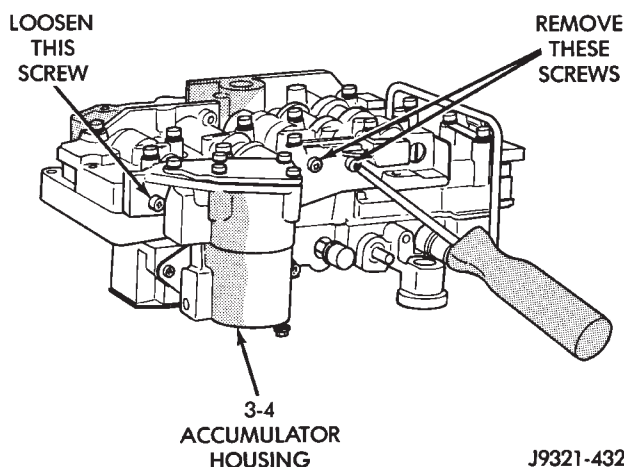
(21) Carefully rotate 3-4 accumulator housing upward and remove 3-4 shift valve spring and converter clutch valve plug and spring (Fig. 109).



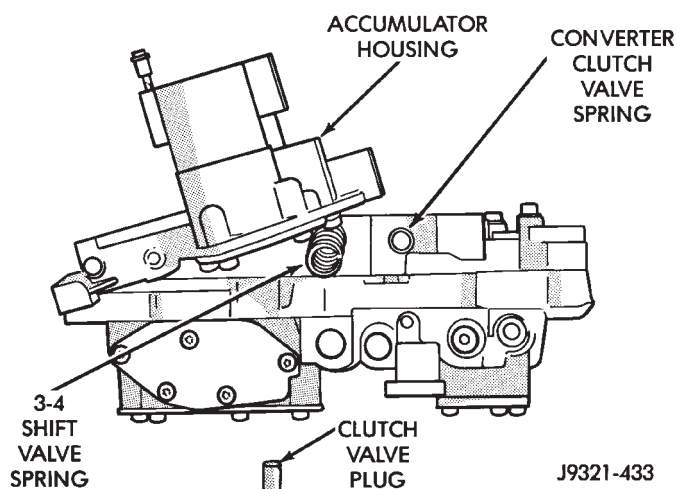
**Fig. 106 Removing/Installing Adjusting Screw Bracket Fasteners**



**Fig. 107 Adjusting Screw Bracket And Spring Removal**

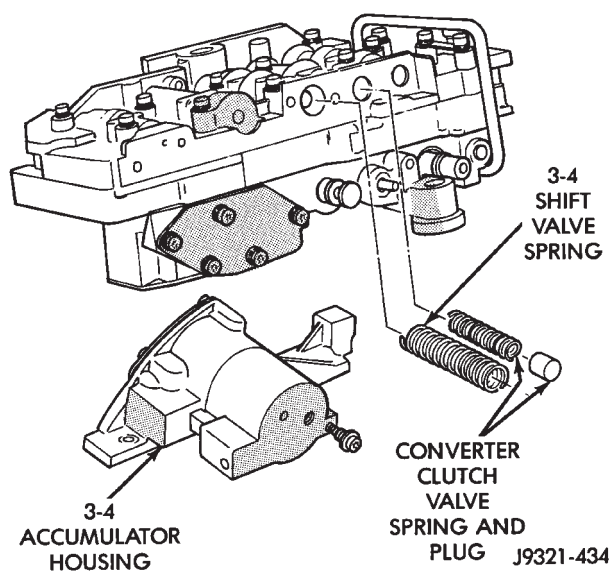


**Fig. 108 Accumulator Housing Screw Locations**



**Fig. 109 Removing 3-4 Shift And Converter Clutch Valve Springs And Plug**

(22) Remove left-side screw and remove 3-4 accumulator housing from valve body (Fig. 110).



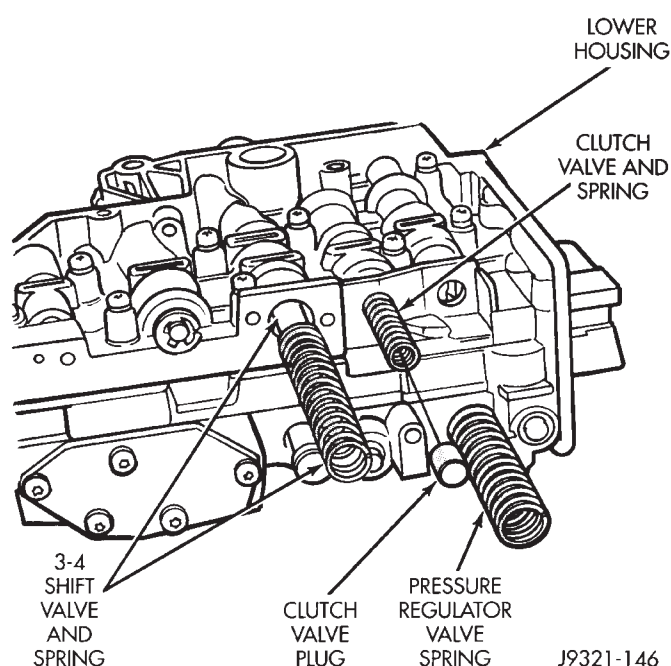
**Fig. 110 3-4 Accumulator Housing, Valve Springs And Plug Removal**

(23) Remove pressure regulator valve spring from lower housing (Fig. 111).

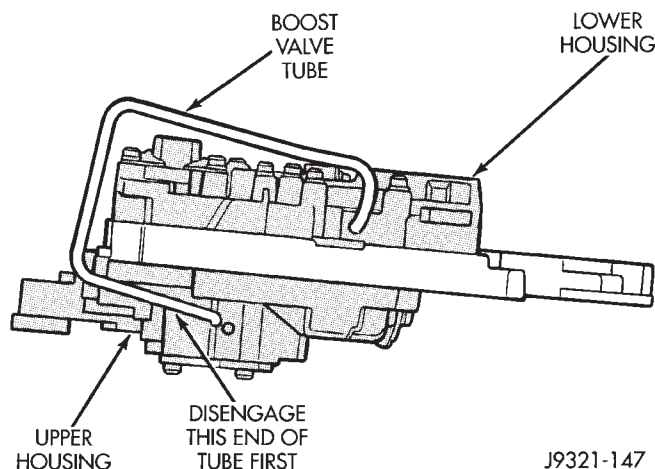
(24) Remove boost valve connecting tube (Fig. 112). Disengage tube from upper housing port first. Then rock opposite end of tube back and forth to work it out of lower housing.

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

(25) Turn valve body over so lower housing is facing upward (Fig. 113). In this position, the two check balls



**Fig. 111 Lower Housing Valve Spring Locations**



**Fig. 112 Boost Valve Tube Removal**

in upper housing will remain in place and not fall out when lower housing and separator plate are removed.

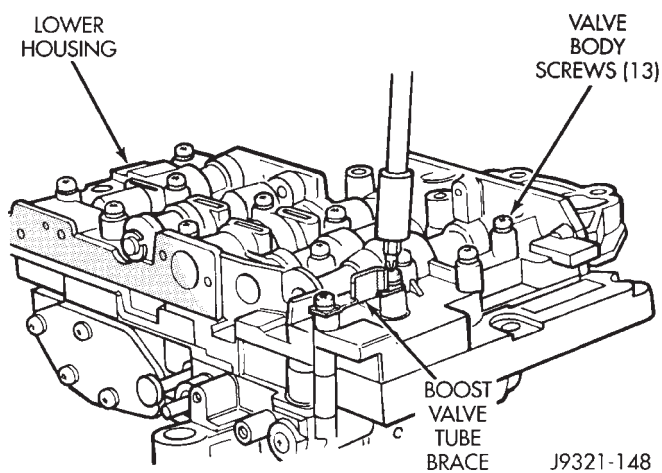
(26) Remove screws attaching valve body lower housing to upper housing and transfer plate (Fig. 113). **Note position of boost valve tube brace for assembly reference.**

(27) Remove lower housing and overdrive separator plate from transfer plate (Fig. 114).

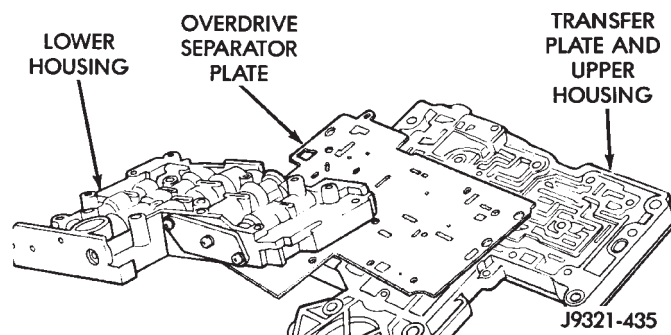
(28) Remove transfer plate from upper housing (Fig. 115).

(29) Turn transfer plate over so upper housing separator plate is facing upward (Fig. 116).

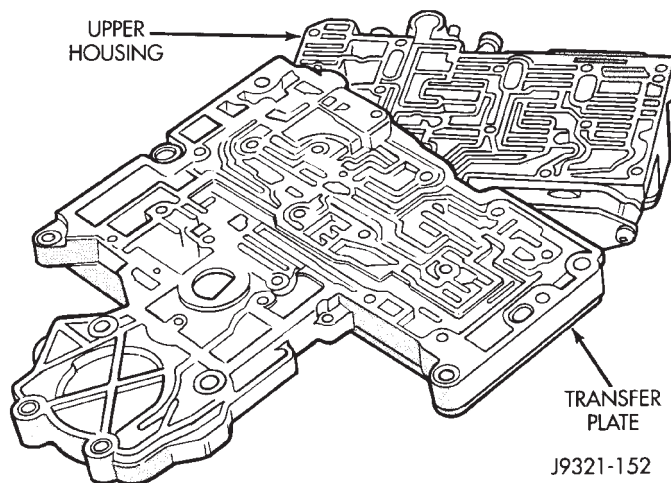
(30) Remove brace plate from lower housing separator plate and transfer plate (Fig. 116).



**Fig. 113 Valve Body Screw And Tube Brace Location**



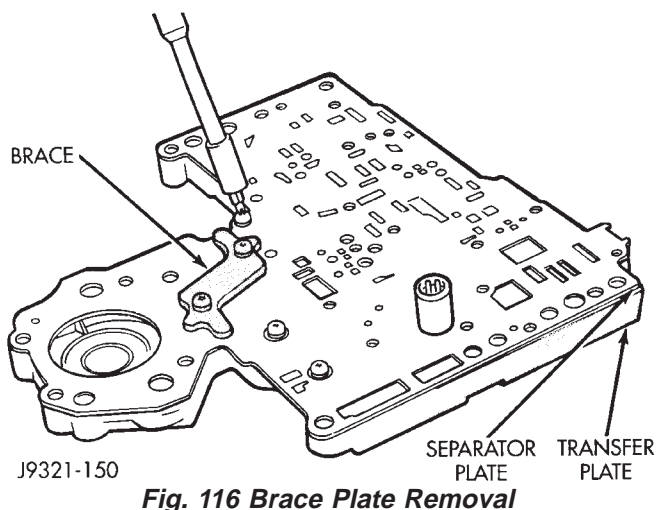
**Fig. 114 Lower Housing Removal**



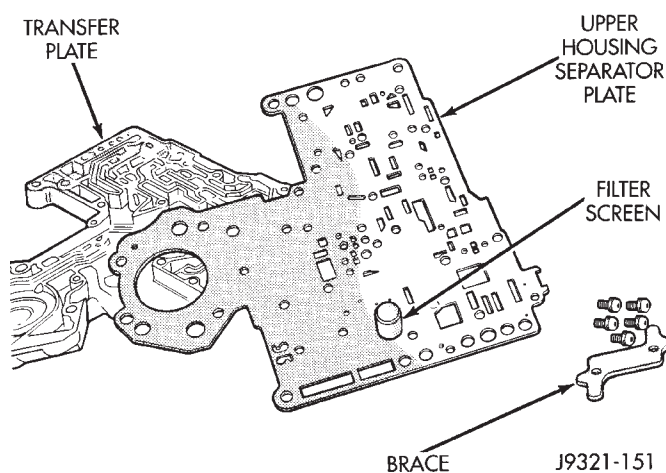
**Fig. 115 Removing Transfer Plate From Upper Housing**

(31) Remove upper housing separator plate from transfer plate (Fig. 117). Note position of filter in separator plate for assembly reference.

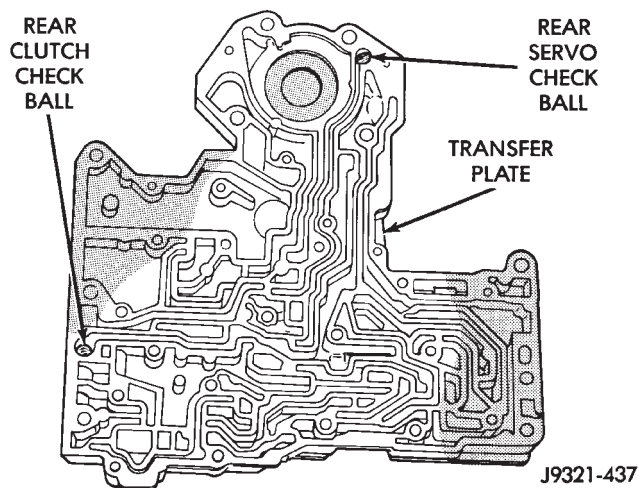
(32) Remove rear clutch and rear servo check balls from transfer plate. **Note check ball location for assembly reference before removing it (Fig. 118).**



**Fig. 116 Brace Plate Removal**

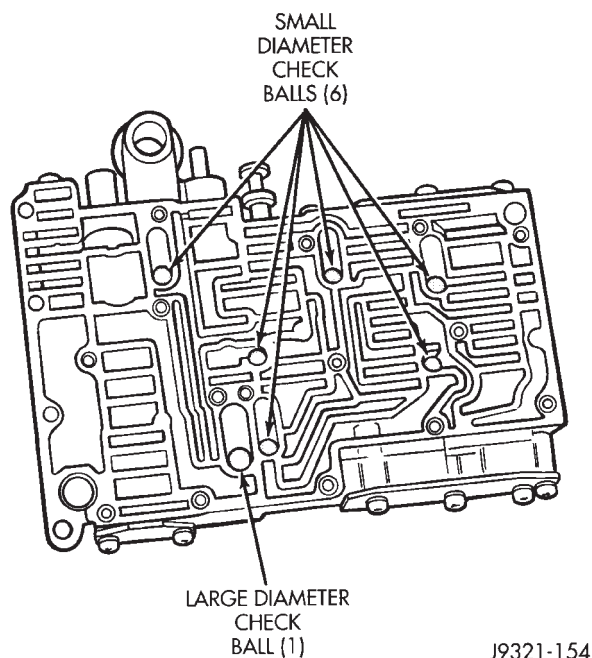


**Fig. 117 Upper Housing Separator Plate Removal**



**Fig. 118 Rear Clutch And Rear Servo Check Ball Locations**

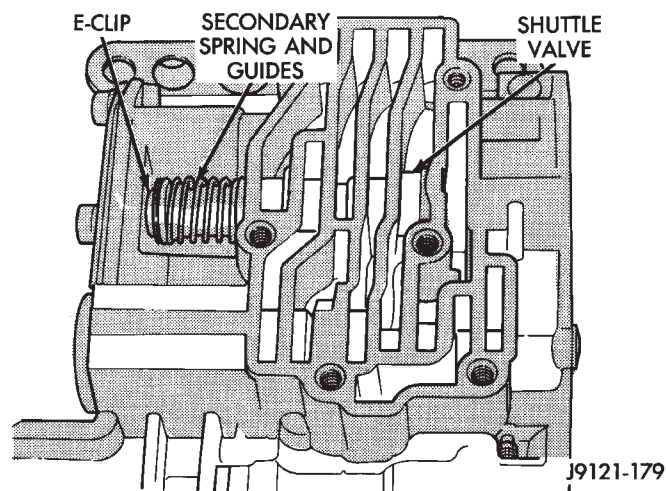




**Fig. 119 Check Ball Locations In Upper Housing**

#### VALVE BODY UPPER HOUSING DISASSEMBLY

(1) Note location of check balls in valve body upper housing (Fig. 119). Then remove the one large diameter and the six smaller diameter check balls with pencil magnet.



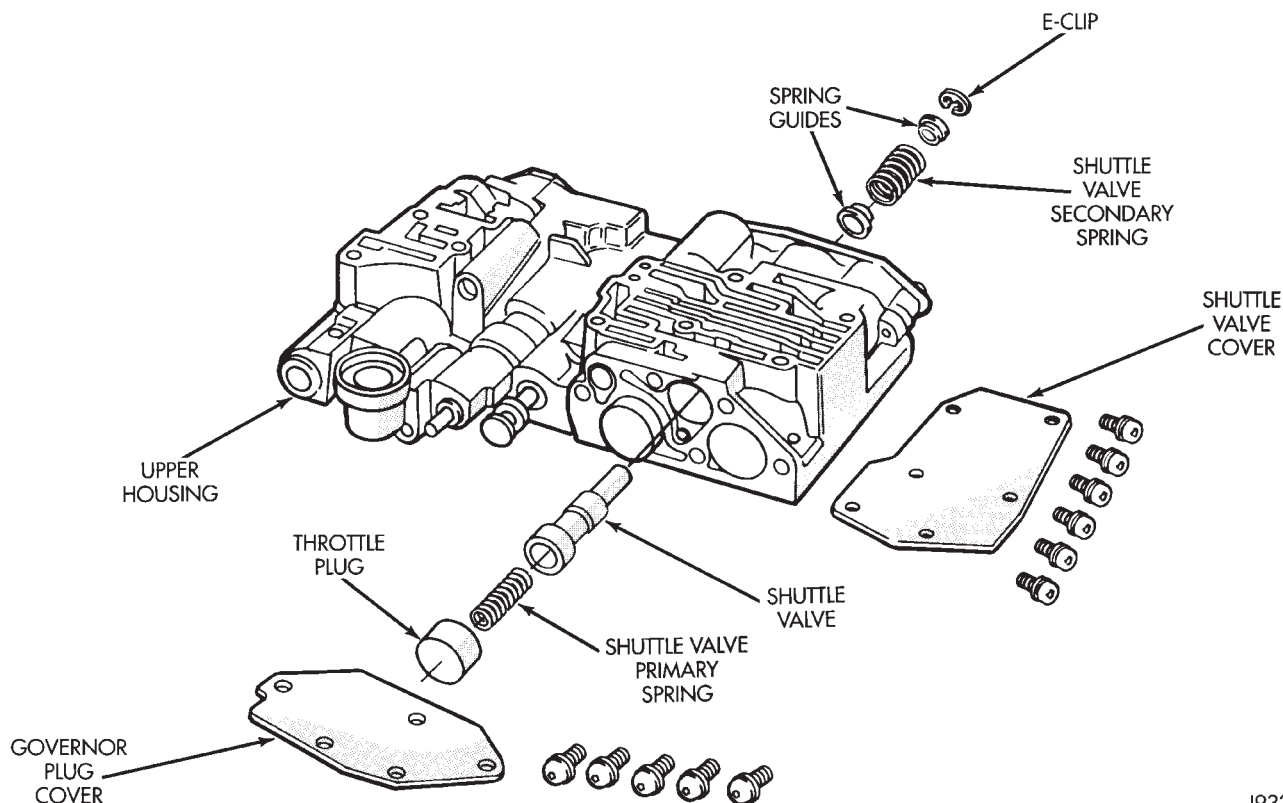
**Fig. 120 Shuttle Valve E-Clip And Secondary Spring Location**

(2) Remove E-clip that secure shuttle valve secondary spring on valve stem (Fig. 120).

(3) Remove governor plug and shuttle valve covers (Fig. 121).

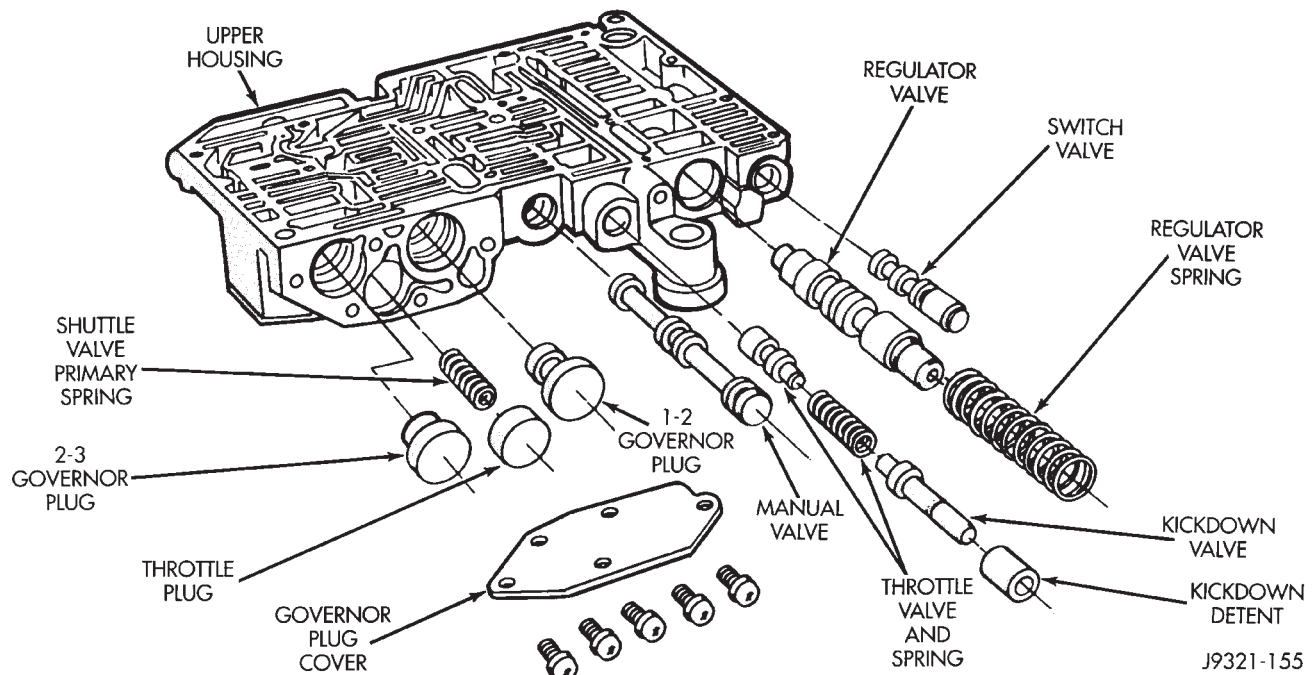
(4) Remove throttle plug, primary spring, shuttle valve, secondary spring, and spring guides (Fig. 121).

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



**Fig. 121 Shuttle And Boost Valve Components**





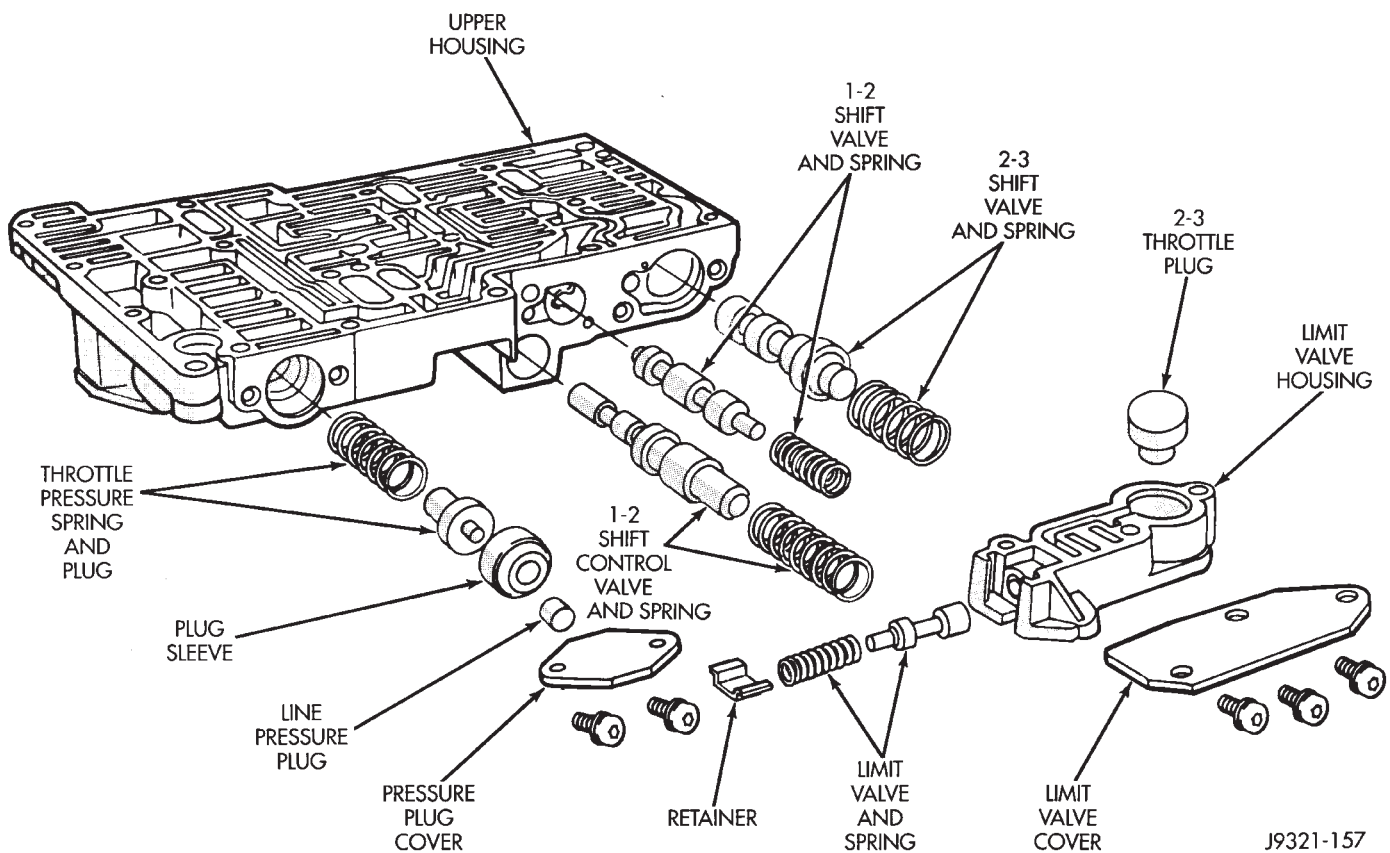
**Fig. 122 Control Valve Locations In Upper Housing**

(6) Turn upper housing over and remove switch valve, regulator valve and spring, and manual valve (Fig. 122).

(7) Remove kickdown detent, kickdown valve, and throttle valve and spring (Fig. 122).

(8) Remove throttle plug and 1-2 and 2-3 governor plugs (Fig. 122). Also remove shuttle valve primary spring if not removed in prior step.

(9) Turn upper housing around and remove limit valve and shift valve covers (Fig. 123).



**Fig. 123 Shift Valve And Pressure Plug Locations In Upper Housing**

(10) Remove limit valve housing. Then remove retainer, spring, limit valve, and 2-3 throttle plug from limit valve housing (Fig. 123).

(11) Remove 1-2 shift control valve and spring (Fig. 123).

(12) Remove 1-2 shift valve and spring (Fig. 123).

(13) Remove 2-3 shift valve and spring from valve body (Fig. 123).

(14) Remove pressure plug cover (Fig. 123).

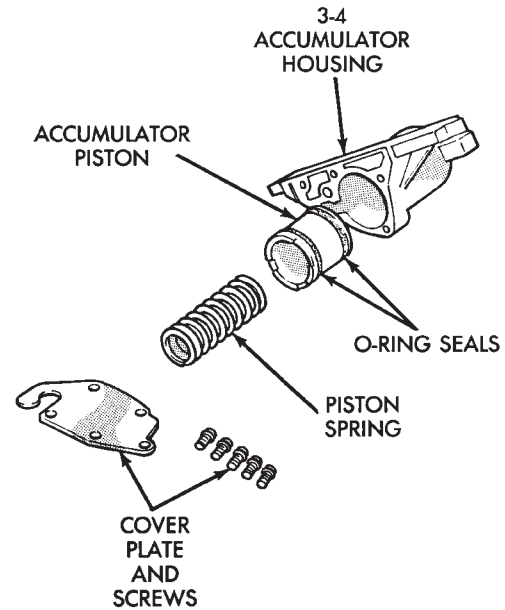
(15) Remove line pressure plug, sleeve, throttle pressure plug and spring (Fig. 123).

#### VALVE BODY LOWER HOUSING DISASSEMBLY (FIG. 124)

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

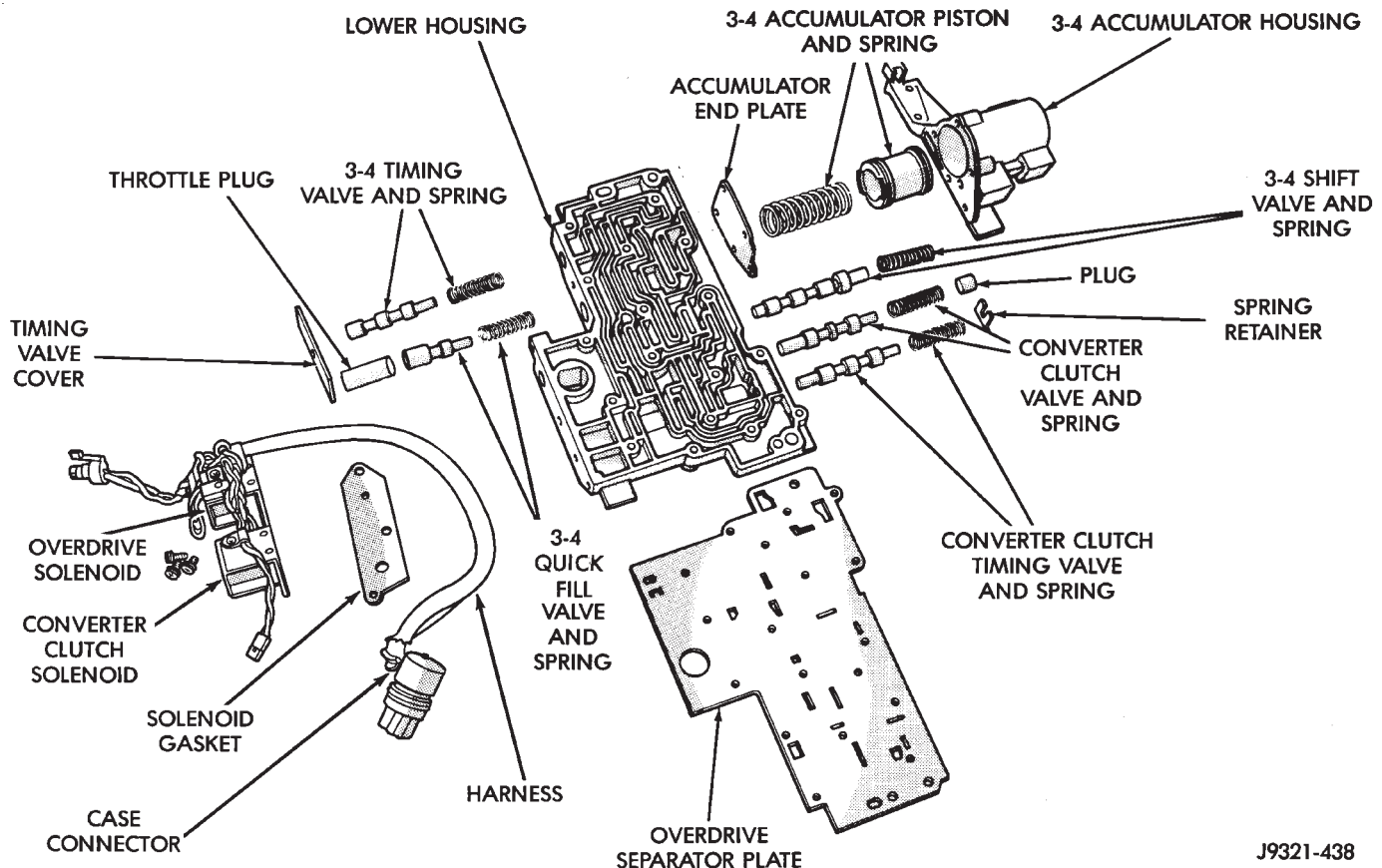
#### 3-4 ACCUMULATOR HOUSING DISASSEMBLY (FIG. 125)

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



J9321-456

Fig. 125 3-4 Accumulator Housing Components



J9321-438

Fig. 124 Location Of 3-4 Shift Valves And Springs In Lower Housing

## VALVE BODY CLEANING AND INSPECTION

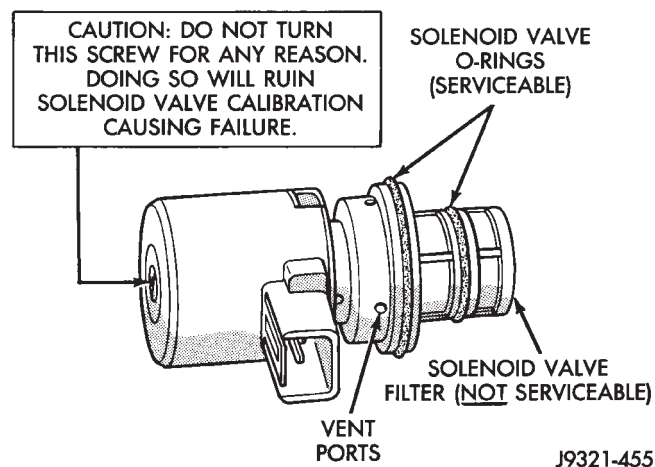
Clean the valve housings, valves, plugs, springs, and separator plates with a standard parts cleaning solution only. Do not use gasoline, kerosene, or any type of caustic solution.

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 the 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 will adhere to the valve body components. Lint will interfere with valve operation and may 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 (Figs. 126 and 127). 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 II scan tool diagnosis indicates this is necessary. Or, if either part has sustained physical damage (dented, deformed, broken, etc.).

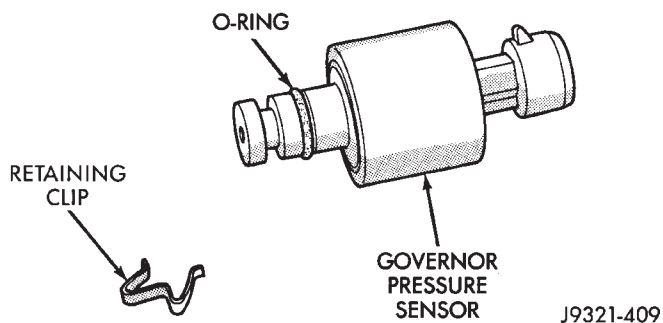
**CAUTION:** Do not turn the small screw at the end of the solenoid valve for any reason. Turning the screw in either direction will ruin solenoid calibration and result in solenoid failure. In addition, the filter on the solenoid valve is **NOT** serviceable. Do not try to remove the filter as this will damage the valve housing.



**Fig. 126 Governor Pressure Solenoid Valve O-Ring And Vent Location**

Inspect the throttle and manual valve levers and shafts. Do not attempt to straighten a bent shaft or correct a loose lever. Replace these components if worn, bent, loose or damaged in any way.

Inspect all of the valve body mating surfaces for scratches, nicks, burrs, or distortion. Use a straight-



**Fig. 127 Governor Pressure Sensor O-Ring Location**

edge to check surface flatness. Minor scratches may be removed with crocus cloth using only very light pressure.

Minor distortion of a valve body mating surface may be corrected by smoothing the surface with a sheet of crocus cloth. Position the crocus cloth on a surface plate, sheet of plate glass or equally flat surface. If distortion is severe or any surfaces are heavily scored, the valve body will have to be replaced.

**CAUTION:** Many of the valves and plugs, such as the throttle valve, shuttle valve plug, 1-2 shift valve and 1-2 governor plug, are made of coated aluminum (Fig. 128). Aluminum components are identified by the dark color of the special coating applied to the surface (or by testing with a magnet). **DO NOT** polish or sand aluminum valves or plugs under any circumstances. This practice could damage the special coating.

Inspect the valves and plugs for scratches, burrs, nicks, or scores. Minor surface scratches 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



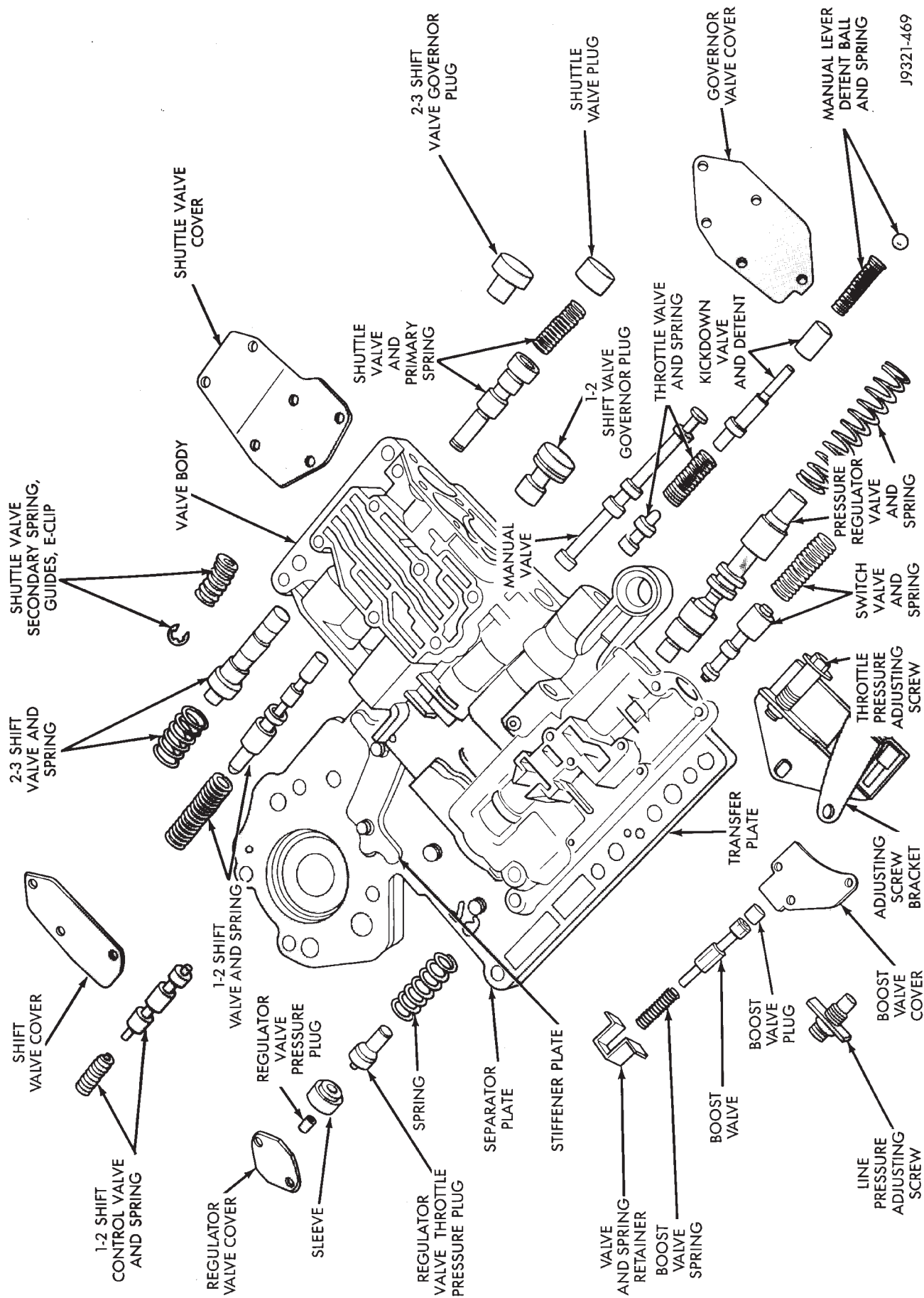


Fig. 128 Upper Housing Valves, Plug, Springs And Brackets

## VALVE BODY REASSEMBLY

**CAUTION:** Do not force valves or plugs into place during reassembly. If the valve body bores, valves and plugs are free of distortion or burrs, the valve body components should all slide into place easily. In addition, do not overtighten the transfer plate and valve body screws during reassembly. Overtightening can distort the housings resulting in valve sticking, cross leakage and unsatisfactory operation. Tighten valve body screws to recommended torque only.

## Lower Housing Assembly (Fig. 124)

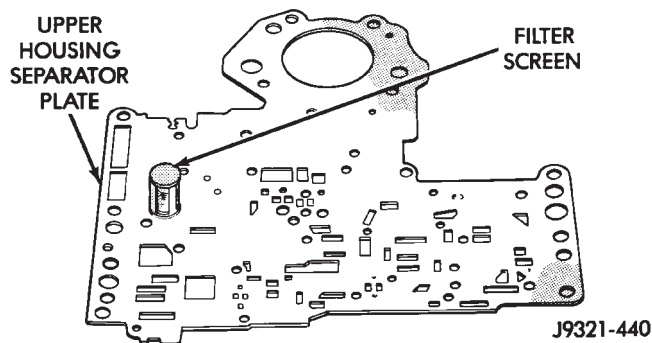
- (1) Lubricate valves, springs, and the housing valve and plug bores with clean transmission fluid.
- (2) Install 3-4 timing valve spring and valve in lower housing.
- (3) Install 3-4 quick fill valve in lower housing.
- (4) Install 3-4 quick fill valve spring and plug in housing.
- (5) Install timing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

## 3-4 Accumulator Assembly (Fig. 125)

- (1) Lubricate accumulator piston, seals and housing piston bore with clean transmission fluid.
- (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. 118).
- (2) Install filter screen in upper housing separator plate (Fig. 129).



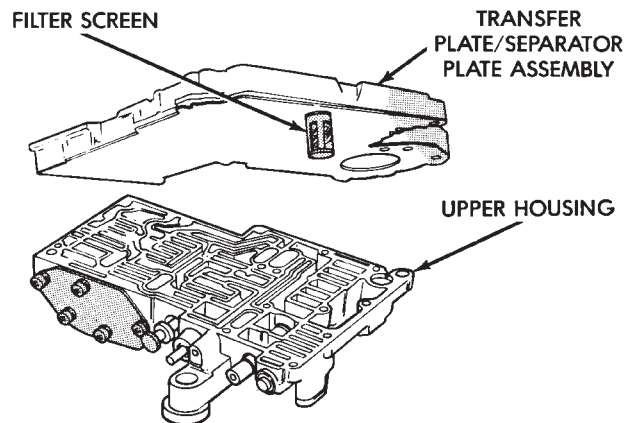
**Fig. 129 Separator Plate Filter Screen Installation**

- (3) Align and position upper housing separator plate on transfer plate (Fig. 116).
- (4) Install brace plate (Fig. 116). 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.

## Assembling Upper And Lower Housings

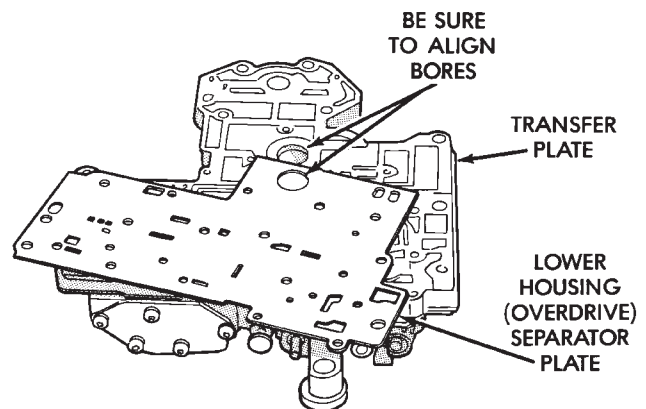
- (1) Position upper housing so internal passages and check ball seats are facing upward. Then install check balls in housing (Fig. 119). Seven check balls are used. The single large check ball is approximately 8.7 mm (11/32 in.) diameter. The remaining 6 check balls are approximately 6.3 mm (1/4 in.) in diameter.
- (2) Position assembled transfer plate and upper housing separator plate on upper housing (Fig. 130). Be sure filter screen is seated in proper housing recess.



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**Fig. 130 Installing Transfer Plate On Upper Housing**

- (3) Position lower housing separator plate on transfer plate (Fig. 131).

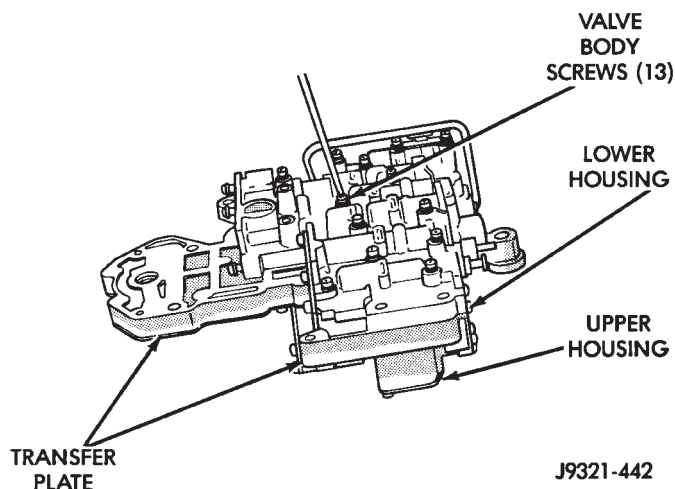


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**Fig. 131 Lower Housing Separator Plate Installation**

- (4) Install lower housing on assembled transfer plate and upper housing (Fig. 132).
- (5) Install and start valve body screws by hand.

Then tighten screws evenly to 4 N•m (35 in. lbs.) torque. Start at center and work out to sides when tightening screws (Fig. 132).



**Fig. 132 Installing Lower Housing On Transfer Plate And Upper Housing**

Upper Housing Valve And Plug Installation (Figs. 122, 123, 124)

- (1) Lubricate valves, plugs, springs with clean transmission fluid.
- (2) Assemble regulator valve line pressure plug, sleeve, throttle plug and spring. Insert assembly in upper housing and install cover plate. Tighten cover plate screws to 4 N•m (35 in. lbs.) torque.
- (3) Install 1-2 and 2-3 shift valves and springs.
- (4) Install 1-2 shift control valve and spring.
- (5) Install shift valve cover plate.
- (6) Install shuttle valve as follows:
  - (a) Insert plastic guides in shuttle valve secondary spring and install spring on end of valve.
  - (b) Hold shuttle valve in place.
  - (c) Compress secondary spring and install E-clip in groove at end of shuttle valve.
  - (d) Verify that spring and E-clip are properly seated before proceeding.
- (7) Install shuttle valve cover plate. Tighten cover plate screws to 4 N•m (35 in. lbs.) torque.
- (8) Install 1-2 and 2-3 valve governor plugs in valve body.
- (9) Install shuttle valve primary spring and throttle plug.
- (10) Align and install governor plug cover. Tighten cover screws to 4 N•m (35 in. lbs.) torque.
- (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.

#### Boost Valve Tube Installation (Fig. 133)

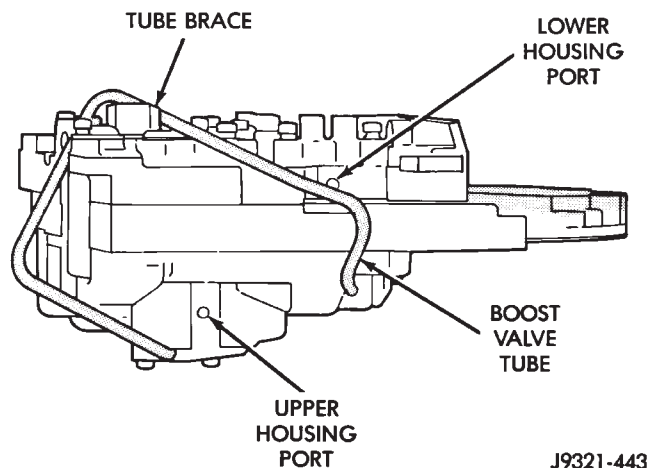
- (1) Position valve body assembly so lower housing is facing upward.

(2) Lubricate tube ends and housing ports with transmission fluid or petroleum jelly.

(3) Position tube behind tube brace.

(4) Start tube in lower housing port first. Then swing tube downward and work opposite end of tube into upper housing port.

(5) Seat both ends of tube once they are in position. Note that tube brace may be bent slightly to ease installation and secure tube lower connection.



**Fig. 133 Boost Valve Tube Installation**

#### 3-4 Accumulator Installation

(1) Position converter clutch valve and 3-4 shift valve springs in housing (Fig. 134).

(2) Loosely attach accumulator housing with right-side screw (Fig. 134). Install only one screw at this time as accumulator must be free to pivot upward for ease of installation.

(3) Position plug on end of converter clutch valve spring. Then compress and hold springs and plug in place with fingers of one hand.

(4) Swing accumulator housing upward over valve springs and plug.

(5) Hold accumulator housing firmly in place and install remaining two attaching screws. Be sure springs and clutch valve plug are properly seated (Fig. 135).

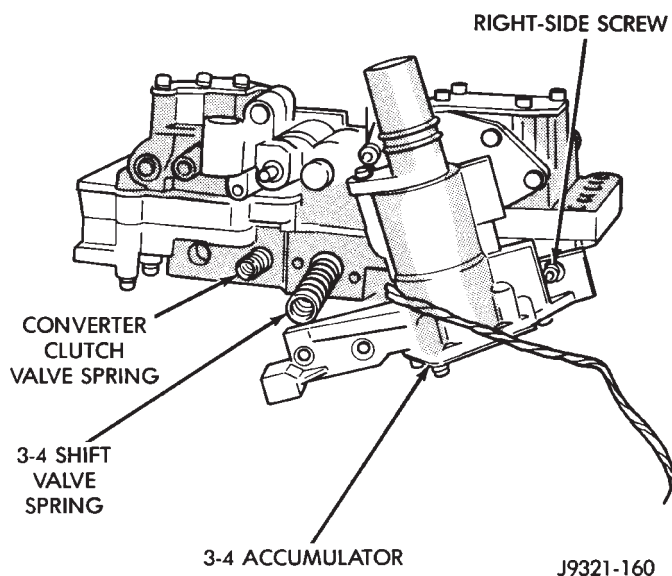
(6) Attach solenoid case connector to 3-4 accumulator with shoulder-type screw. Connector has small locating tang that fits in dimple at top of accumulator housing (Fig. 95). Seat tang in dimple before tightening connector screw.

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

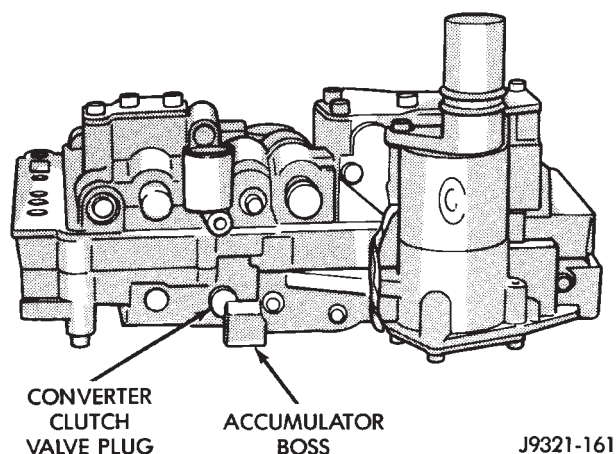
(8) Verify that solenoid wires are properly routed (Figs. 95 and 96). **Solenoid wires must be clear of manual lever and park rod.**

#### Valve Body Final Assembly And Adjustment

- (1) Insert manual lever detent spring in upper housing.



**Fig. 134 Installing Converter Clutch And 3-4 Shift Valve Springs**



**Fig. 135 Seating 3-4 Accumulator On Lower Housing**

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

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

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

(5) 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.

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

(7) Position detent ball on end of spring. Then hold detent ball and spring in detent housing with Retainer Tool 6583 (Fig. 101).

(8) 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.

(9) Then Install manual lever seal, washer and E-clip.

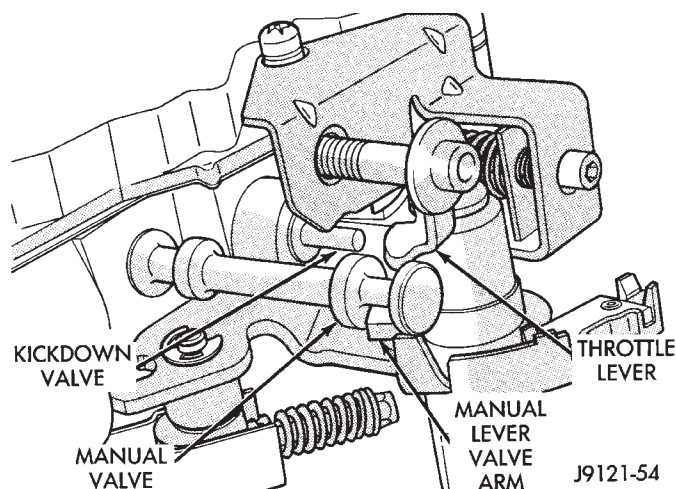
(10) Lubricate solenoid case connector O-rings and shaft of manual lever with light coat of petroleum jelly.

(11) Verify that throttle lever is aligned with end of kickdown valve stem and that manual lever arm is engaged in manual valve (Fig. 136).

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

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

(14) 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.



**Fig. 136 Manual And Throttle Lever Alignment**

#### GOVERNOR BODY, SENSOR AND SOLENOID INSTALLATION

**CAUTION:** Do not turn the small screw at the end of the governor pressure solenoid valve for any reason (Fig. 126). 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 solenoid valve housing.

(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 (Figs. 126 and 127).

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



(4) Install governor pressure sensor in governor body. Then secure sensor with M-shaped retaining clip (Fig. 93).

(5) Install governor pressure solenoid in governor body (Fig. 94). Push solenoid in until it snaps into place in body.

(6) Position governor body gasket on transfer plate (Fig. 92).

(7) Install retainer plate on governor body and around solenoid (Fig. 90). 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. 90).

#### VALVE BODY CONTROL PRESSURE ADJUSTMENTS

There are two control pressure adjustments on the valve body which are, line pressure and throttle pressure.

Line and throttle pressure work together as each affects shift quality and timing. Both adjustments must be performed properly and in the correct sequence. Line pressure is adjusted first and throttle pressure is adjusted last.

##### Line Pressure Adjustment

Measure distance from the valve body to the inner edge of the adjusting screw with an accurate steel scale (Fig. 137).

Distance should be 33.4 mm (1-5/16 inch).

If adjustment is required, turn the adjusting screw in, or out, to obtain required distance setting.

**The 33.4 mm (1-5/16 inch) setting is an approximate setting. Because of manufacturing tolerances, it may be 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.

##### Throttle Pressure Adjustment

Insert Gauge C-3763 between the throttle lever cam and the kickdown valve stem (Fig. 138).

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.

**The kickdown valve spring must be fully compressed and the kickdown valve completely bottomed to obtain correct adjustment.**

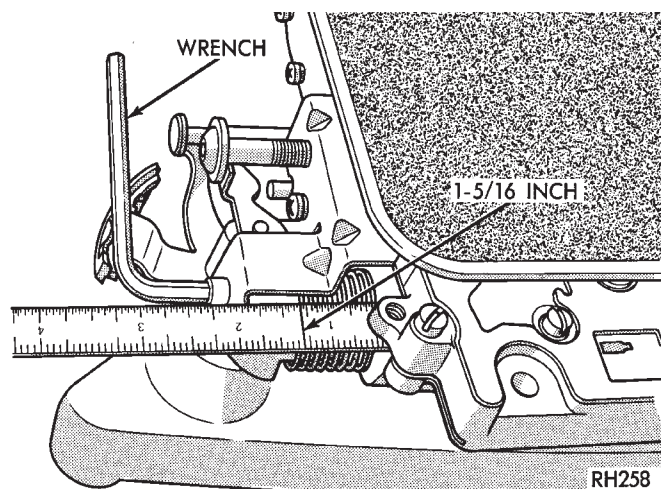


Fig. 137 Line Pressure Adjustment

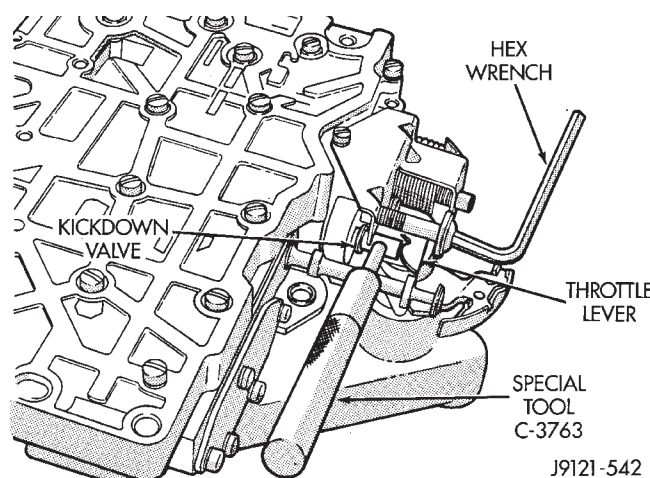


Fig. 138 Throttle Pressure Adjustment

#### TRANSMISSION ASSEMBLY AND ADJUSTMENT

##### Assembly Tips

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 petroleum jelly, Door Eze, 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.

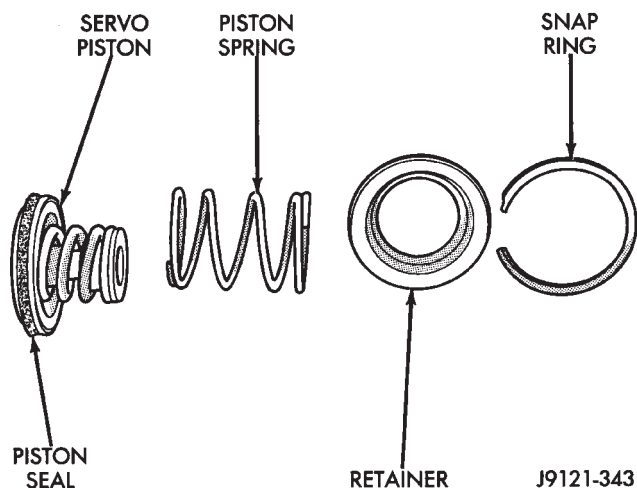
Do not force parts into place. The transmission components and sub-assemblies are easily installed by hand when properly aligned.

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 mispositioned (or "left out" by accident).

The planetary geartrain, front/rear clutch assemblies and oil pump are all much easier to install when the transmission case is upright or as close to this position as possible. Either tilt the case upward with wood blocks, or cut a hole in the bench large enough for the output shaft. Then lower the shaft through the hole and support the transmission case directly on the bench.

#### TRANSMISSION ASSEMBLY PROCEDURE

(1) Install rear servo piston, spring and retainer (Fig. 139). Install spring on top of servo piston and install retainer on top of spring.



**Fig. 139 Rear Servo Components**

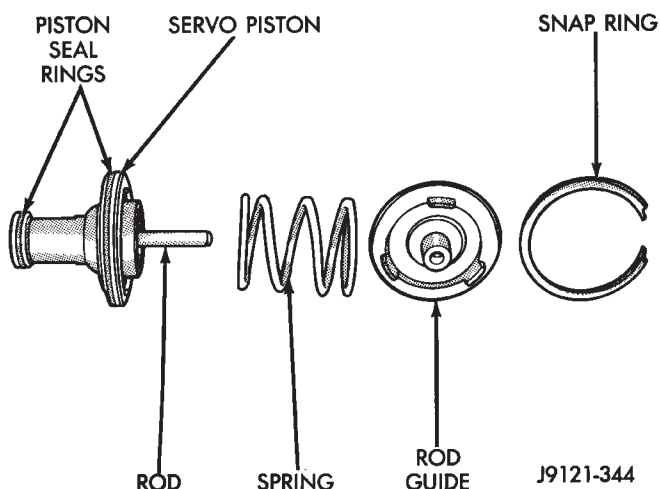
(2) Install front servo piston assembly, servo spring and rod guide (Fig. 140).

(3) Compress front/rear servo springs with Valve Spring Compressor C-3422-B and install each servo snap ring (Fig. 141).

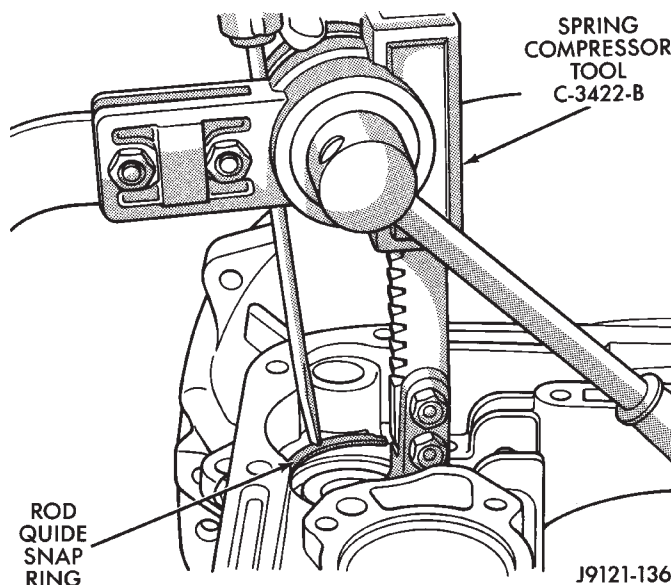
(4) Examine bolt holes in overrunning clutch cam. Note that one hole is **not threaded** (Fig. 142). This hole must align with blank area in clutch cam bolt circle (Fig. 143). Mark hole location on clutch cam and blank area in case with grease pencil, paint stripe, or scribe mark for assembly reference.

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

(6) Align and install overrunning clutch and cam in case (Fig. 144). **Be sure cam is correctly installed. Bolt holes in cam are slightly countersunk on one**



**Fig. 140 Front Servo Components**



**Fig. 141 Compressing Front/Rear Servo Springs side. Be sure this side of cam faces rearward (toward piston retainer).**

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

(8) 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.

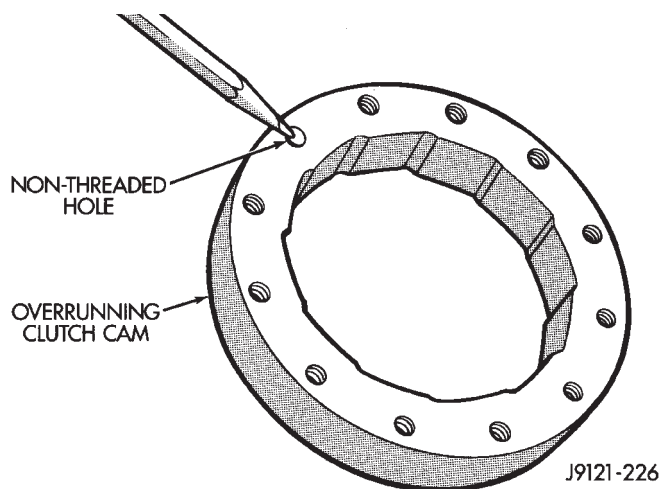
(9) Lubricate clutch cam rollers with transmission fluid.

(10) Install rear band reaction pin (Fig. 145). Be sure pin is fully seated in case.

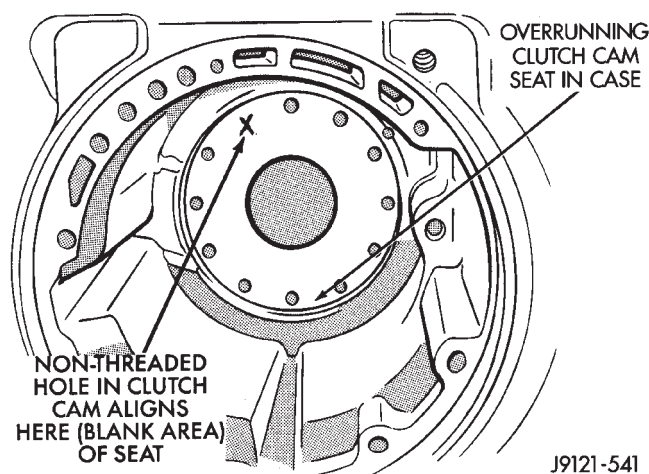
(11) Install rear band in case (Fig. 146). Be sure twin lugs on band are seated against reaction pin.

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

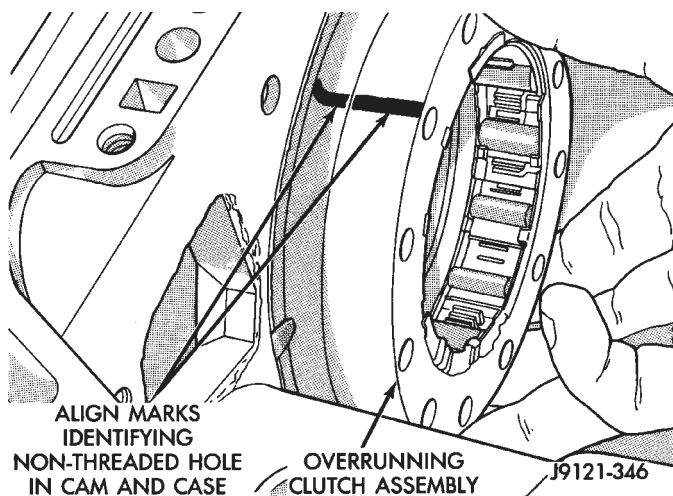
(a) Lubricate overrunning clutch race (on drum hub) with transmission fluid.



**Fig. 142 Location Of Non-Threaded Hole In Clutch Cam**

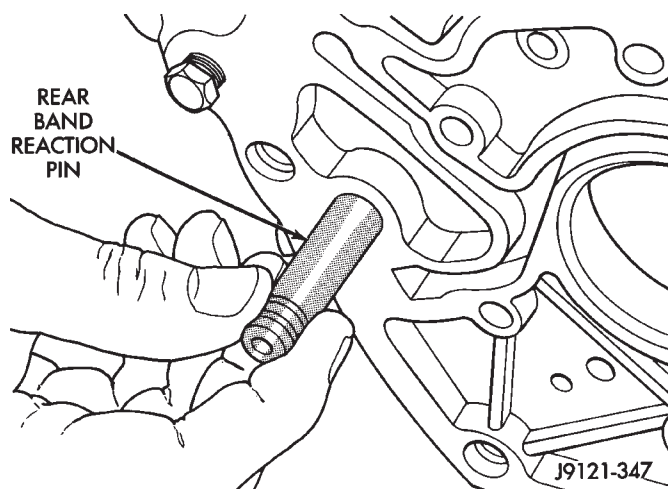


**Fig. 143 Location Of Blank Area In Clutch Cam Bolt Circle**

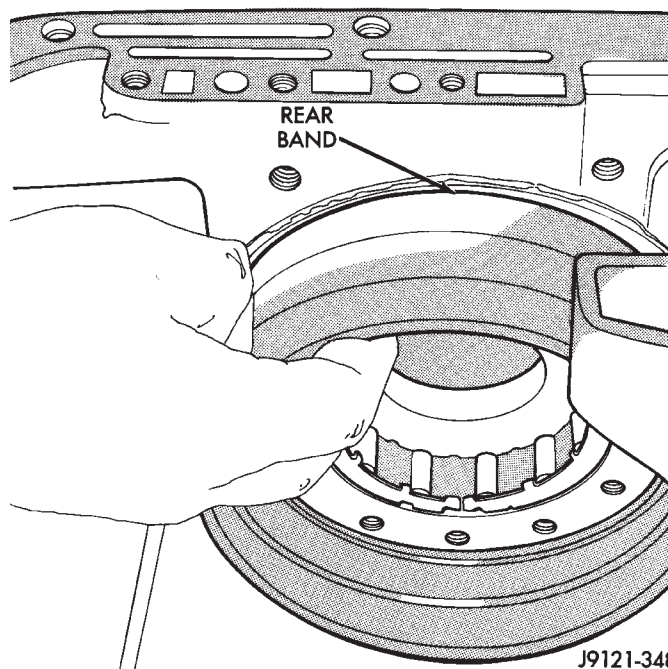


**Fig. 144 Overrunning Clutch Installation**

- (b) Guide drum through rear band.
- (c) Tilt drum slightly and start race (on drum hub) into overrunning clutch rollers.



**Fig. 145 Installing Rear Band Reaction Pin**



**Fig. 146 Rear Band Installation**

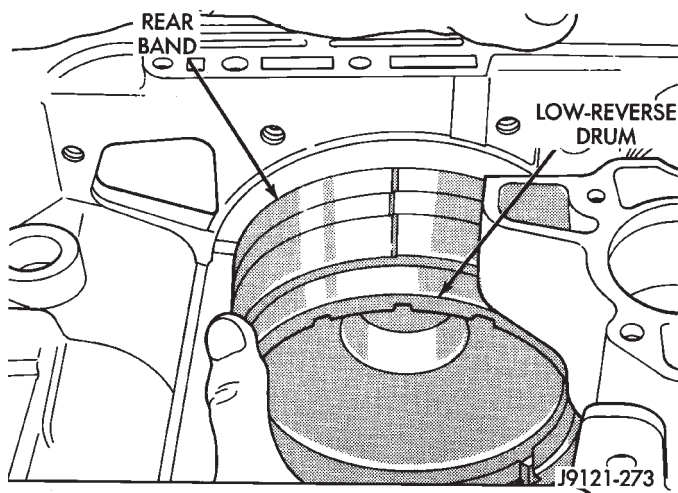
(d) Press drum rearward and turn it in clockwise direction until drum seats in overrunning clutch (Fig. 147).

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

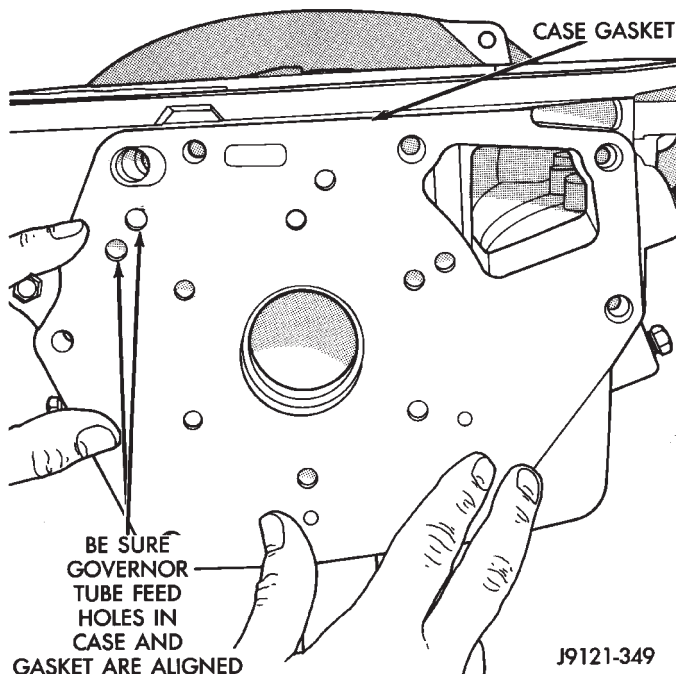
(13) Install new gasket at rear of transmission case. Use petroleum jelly to hold gasket in place. Be sure to align governor feed holes in gasket with feed passages in case (Fig. 148). Also install gasket before overdrive piston retainer. Center hole in gasket is smaller than retainer and cannot be installed over retainer.

(14) Position overdrive piston retainer on transmission case and align bolt holes in retainer, gasket





**Fig. 147 Installing Low-Reverse Drum**



**Fig. 148 Installing/Aligning Case Gasket**

and case (Fig. 149). Then install and tighten retainer bolts to 17 N•m (13 ft. lbs.) torque.

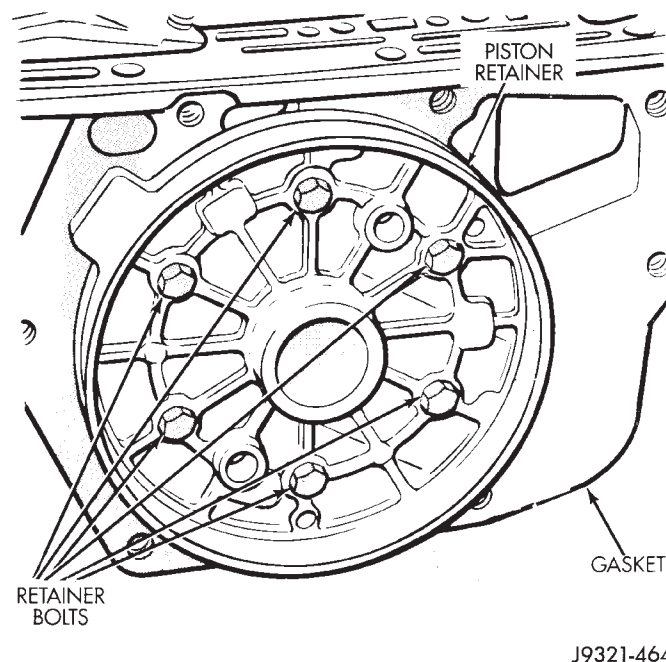
(15) Install snap ring that secures low-reverse drum to hub of piston retainer (Fig. 150).

(16) Install rear band lever and pivot pin (Fig. 151). Align lever with pin bores in case and push pivot pin into place.

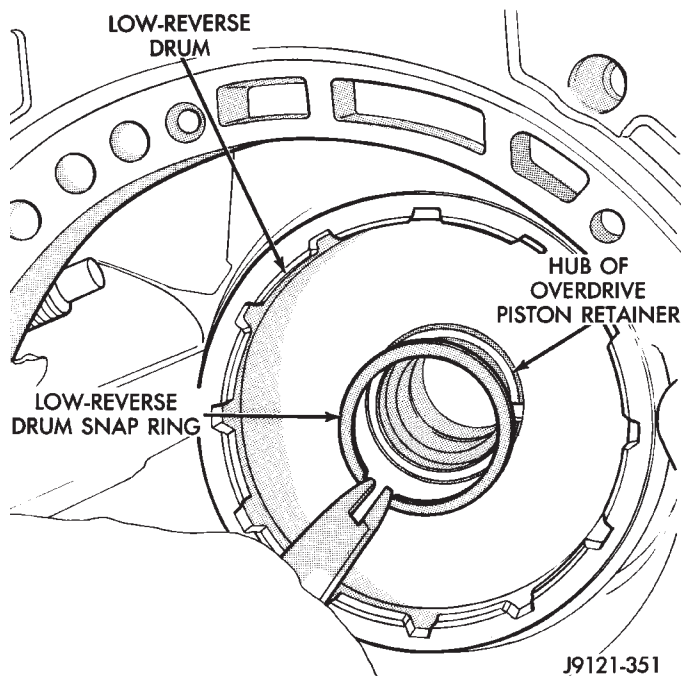
(17) Install planetary geartrain assembly (Fig. 152)

(18) Install thrust plate on intermediate shaft hub (Fig. 153). Use petroleum jelly to hold thrust plate in place.

(19) Check seal ring on rear clutch retainer hub (Fig. 49) and seal rings on input shaft (Fig. 154). Verify that diagonal-cut ends of teflon seal rings are properly



**Fig. 149 Aligning Overdrive Piston Retainer**



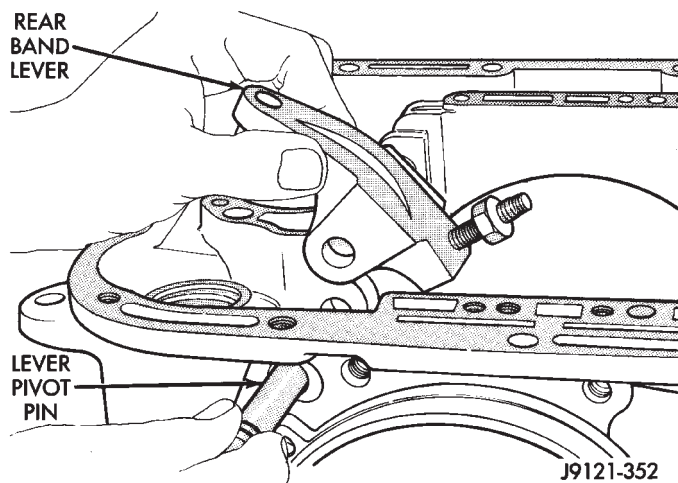
**Fig. 150 Installing Low-Reverse Drum Retaining Snap Ring**

joined and ends of metal ring are correctly hooked together. Also verify that shaft seal rings are installed in sequence shown.

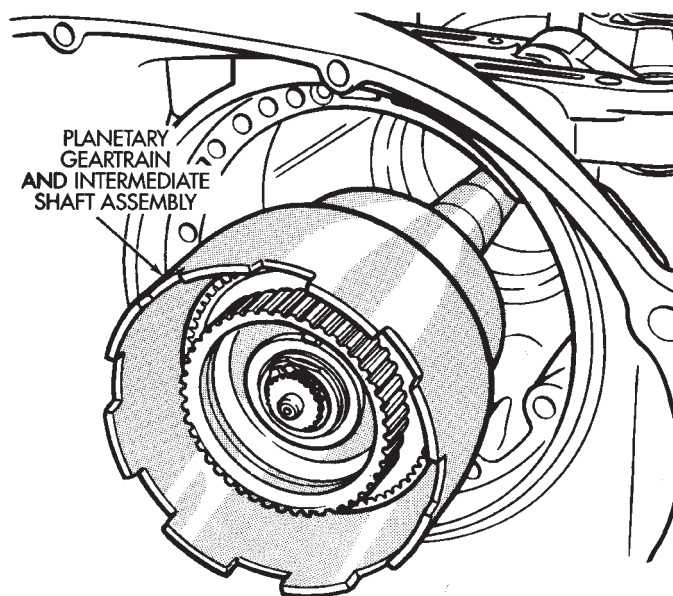
(20) Check rear clutch thrust washer (Fig. 155). Use additional petroleum jelly to hold washer in place if necessary.

(21) Align clutch discs in front clutch and install front clutch on rear clutch (Fig. 156). Rotate front clutch retainer back and forth until completely seated on rear clutch.





**Fig. 151 Rear Band Lever And Pivot Pin Installation**

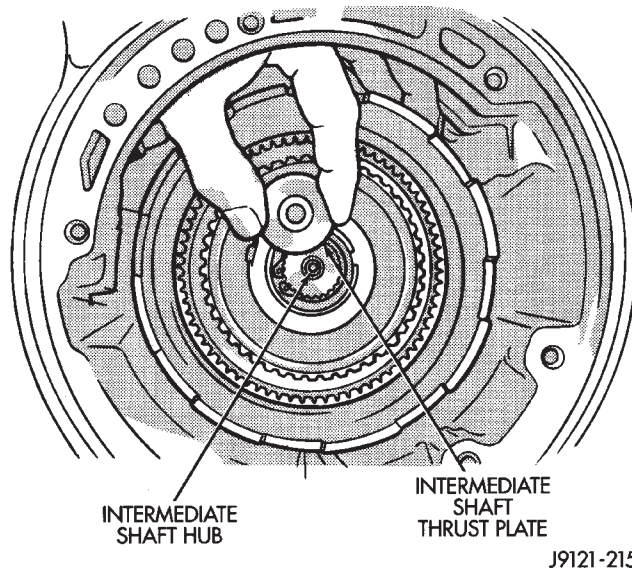


**Fig. 152 Installing Planetary Geartrain**

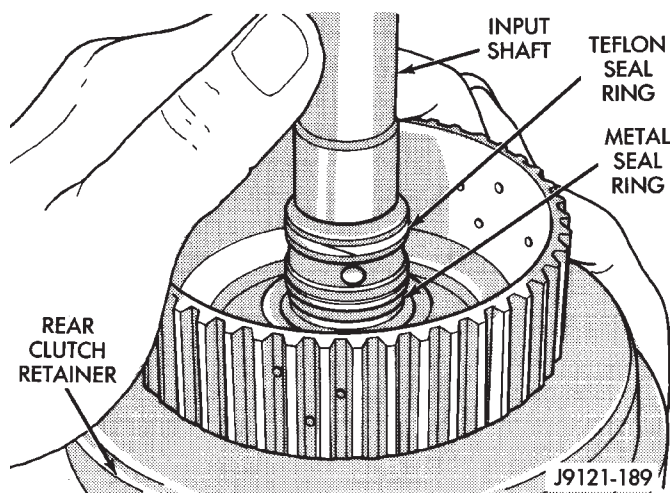
(22) Coat intermediate shaft thrust washer with petroleum jelly. Then install washer in rear clutch hub (Fig. 157). Use enough petroleum jelly to hold washer in place. **Be sure grooved side of washer faces rearward (toward output shaft) as shown. Also note that washer only fits one way in clutch hub.** Note thickness of this washer. It is a select fit part and is used to control transmission end play.

(23) Align drive teeth on rear clutch discs with small screwdriver (Fig. 158). This makes installation on front planetary easier.

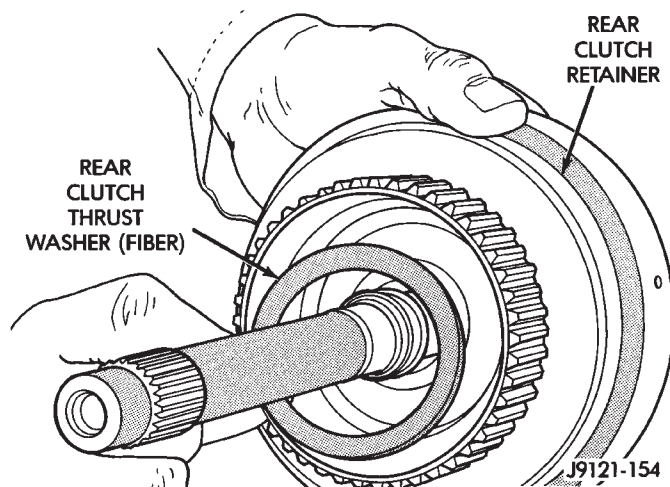
(24) Raise front end of transmission upward as far as possible and support case with wood blocks. Front/rear clutch and oil pump assemblies are easier to install if transmission is as close to upright position as possible.



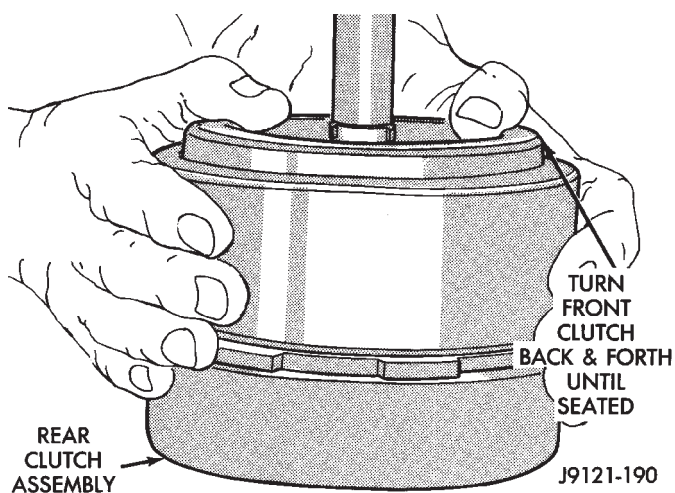
**Fig. 153 Installing Intermediate Shaft Thrust Plate**



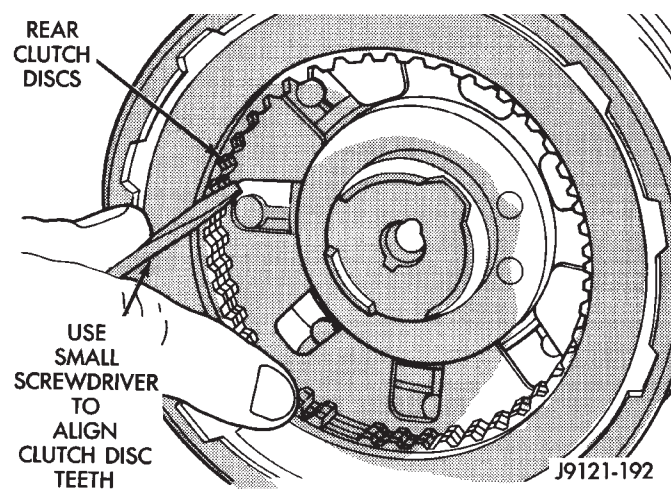
**Fig. 154 Input Shaft Seal Ring Location**



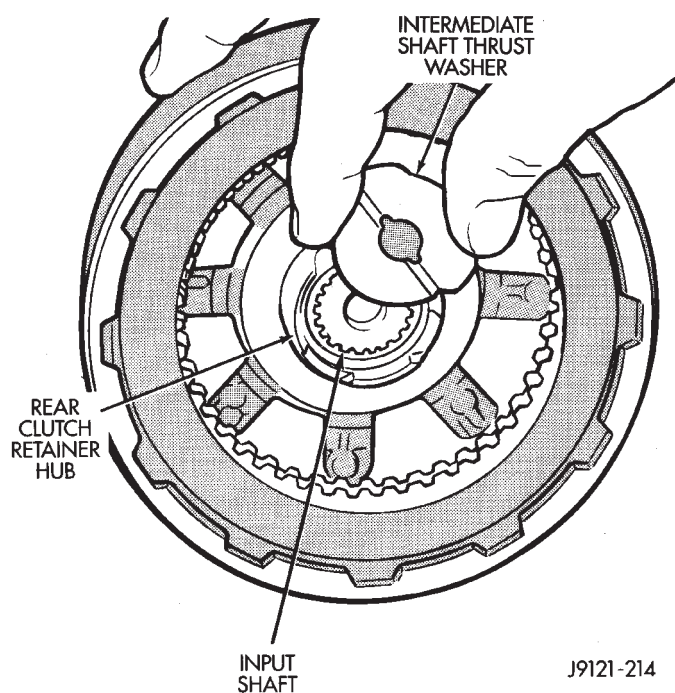
**Fig. 155 Installing Rear Clutch Thrust Washer**



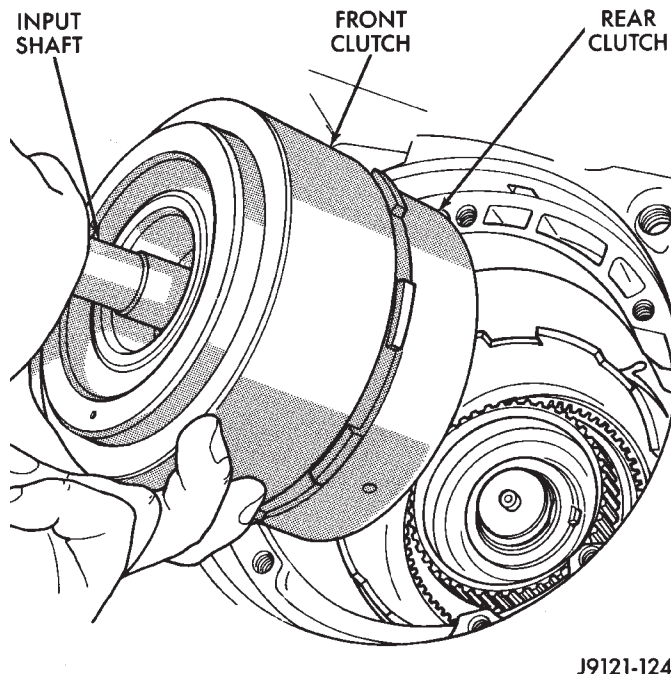
**Fig. 156 Assembling Front And Rear Clutch Units**



**Fig. 158 Aligning Rear Clutch Disc Lugs**



**Fig. 157 Installing Intermediate Shaft Thrust Washer**



**Fig. 159 Installing Front/Rear Clutch Assemblies**

(25) Install front and rear clutch units as assembly (Fig. 159). 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.**

(26) 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.

(27) Slide front band over front clutch retainer (Fig. 160).

(28) Insert front band lever pivot shaft part way into case (Fig. 160).

(29) Install front band lever, strut and adjusting screw (Fig. 161).

(30) Push front band lever shaft completely into place. Then tighten band adjusting screw until band just grips clutch retainer. Verify that front/rear clutches are still seated before continuing.

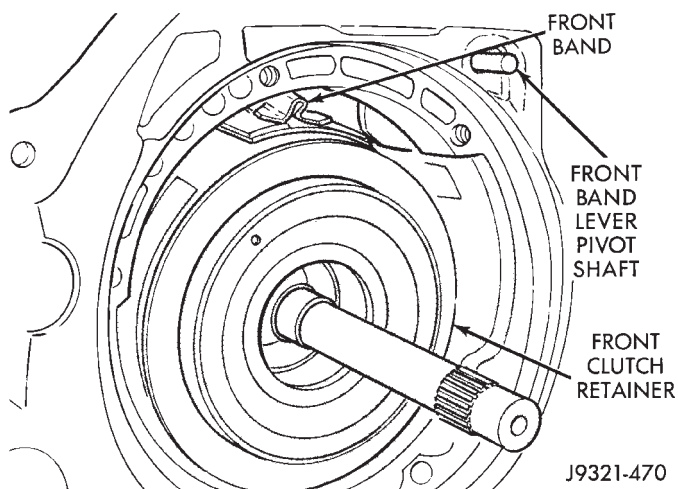
(31) Coat band reaction pin access plug with sealer and install plug in converter housing.

(32) 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. 162). Use extra petroleum jelly to hold thrust washer in place if necessary.

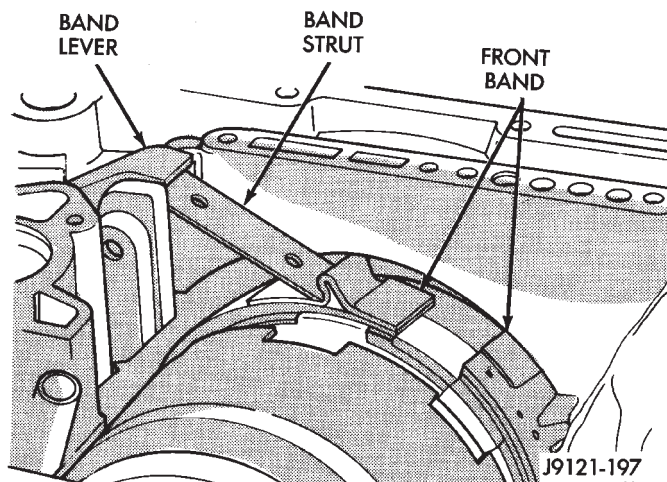
**CAUTION: The thrust washer bore ID is chamfered on one side. Make sure this side of the washer is facing toward the front of the transmission.**

(33) Thread two Pilot Stud Tools C-3288-B into

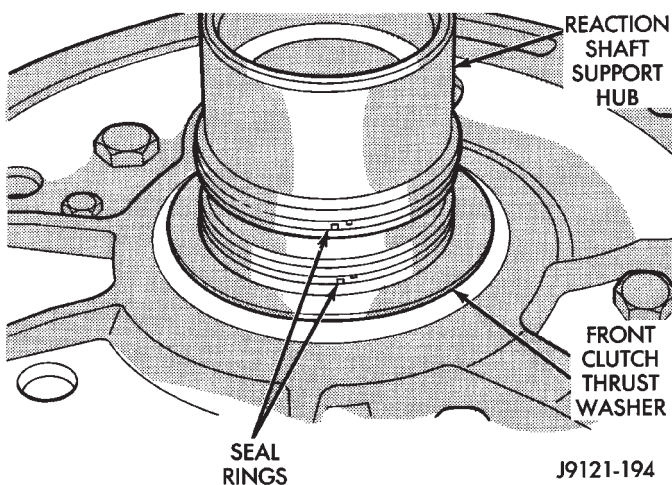




**Fig. 160 Installing Front Band And Reaction Pin**



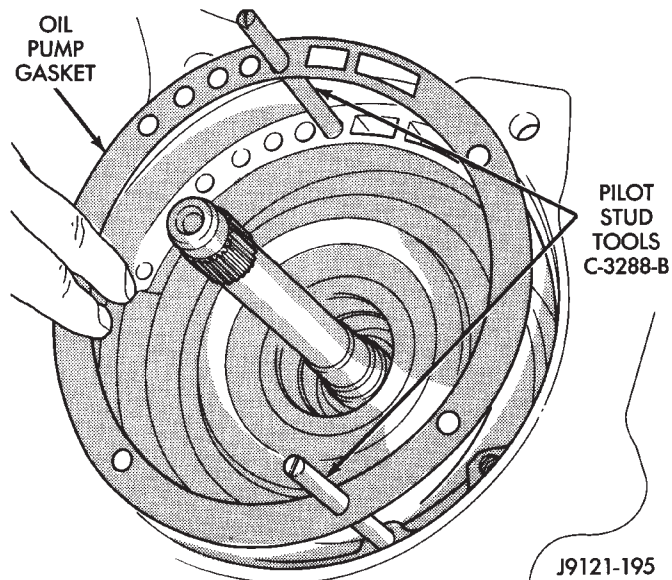
**Fig. 161 Front Band Linkage Installation**



**Fig. 162 Reaction Shaft Support Seal Rings And Front Clutch Thrust Washer Position**

bolt holes in oil pump flange (Fig. 163).

(34) Align and install oil pump gasket (Fig. 163).

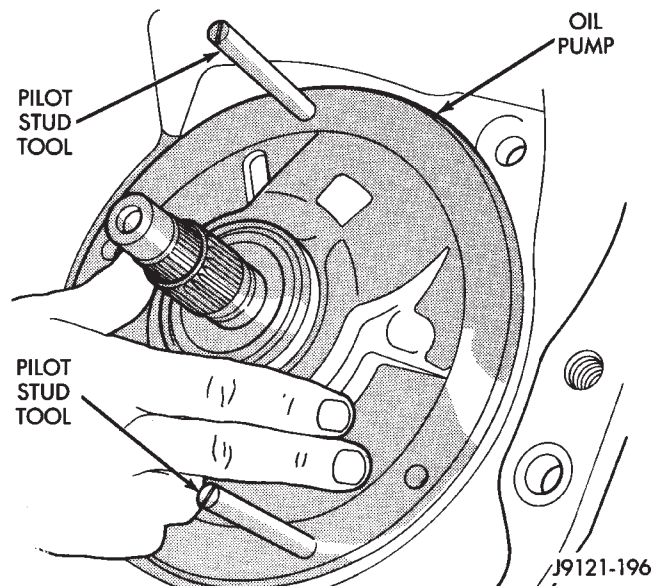


**Fig. 163 Installing Pilot Studs And Oil Pump Gasket**

(35) Lubricate oil pump body seal with Ru-Glyde, or petroleum jelly. Lubricate pump shaft seal lip with petroleum jelly.

(36) Install oil pump (Fig. 164). 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.

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

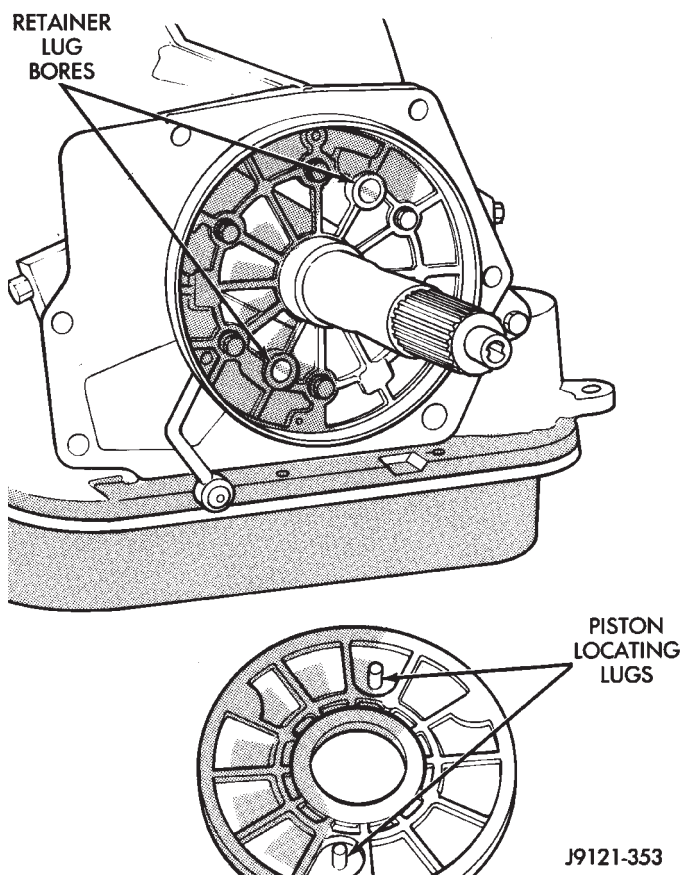


**Fig. 164 Installing Oil Pump Assembly In Case**

(38) Install new seals on overdrive piston. Then lubricate seals with Ru-Glyde, Door-Eze or petroleum jelly.

(39) Install overdrive piston in retainer. **Align locating lugs on piston in locating bores in re-**

**tainer** (Fig. 165). Use thin plastic strip or feeler gauge to help guide piston outer seal into retainer.



**Fig. 165 Overdrive Piston Alignment**

(40) Install spacer on intermediate shaft, if not previously installed.

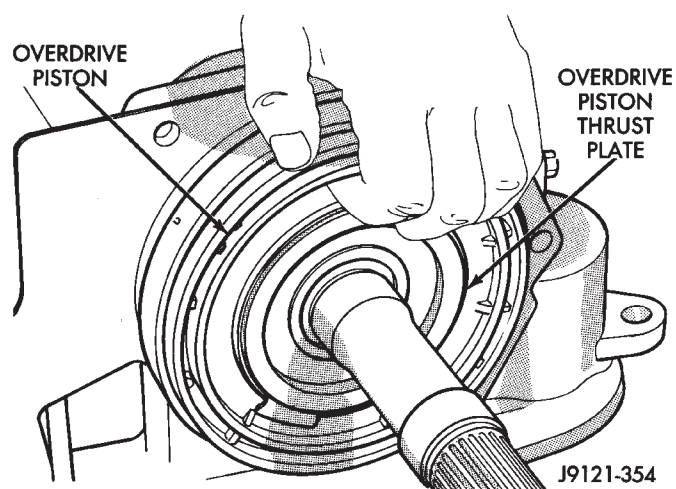
(41) Install overdrive piston thrust plate (Fig. 166). Use liberal quantity of petroleum jelly to hold thrust plate in position on piston.

(42) Install overdrive piston thrust bearing in direct clutch hub (Fig. 167). Use liberal quantity of petroleum jelly to hold thrust bearing in place. **Note that one side of bearing has dark coated surface. This surface faces overdrive piston. Also be sure raised shoulder on inside diameter of bearing faces forward as well.**

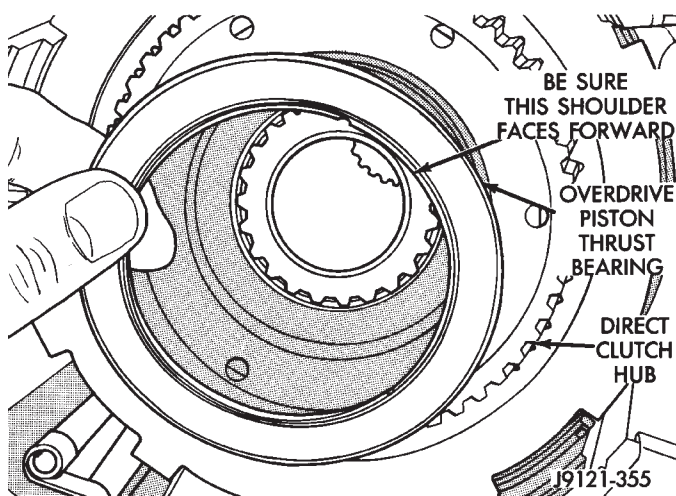
(43) Apply small amount of petroleum jelly to pilot hub of intermediate shaft.

(44) Verify alignment of splines in overdrive unit planetary gear and overrunning clutch. Be sure Alignment Tool 6227-2 is still fully seated (Fig. 168). **If planetary gear and overrunning clutch splines become misaligned, overdrive unit cannot be fully installed on intermediate shaft. Overdrive unit may have to be disassembled in order to realign splines.**

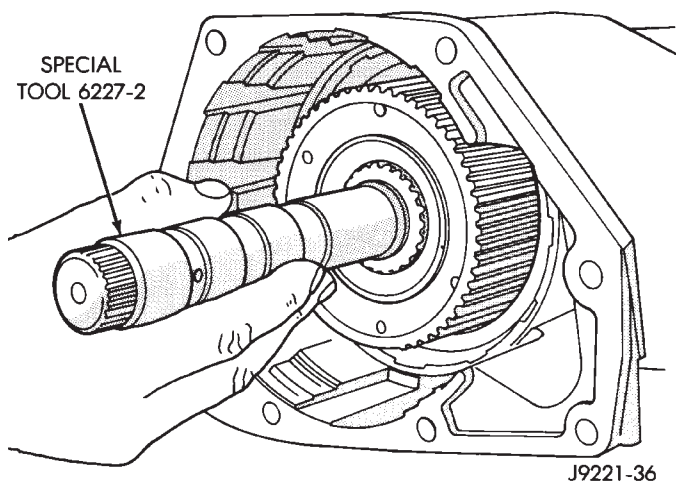
(45) Carefully withdraw alignment tool from overdrive unit.



**Fig. 166 Installing Overdrive Piston Thrust Plate**



**Fig. 167 Installing Overdrive Piston Thrust Bearing**



**Fig. 168 Checking Alignment Of Overdrive Planetary Gear And Overrunning Clutch Splines**

(46) Lubricate intermediate shaft splines and bushing surfaces with transmission fluid or petroleum jelly.



(47) Install overdrive unit. Note that intermediate shaft is snug fit in overdrive planetary gear and overrunning clutch. If overdrive unit will not seat fully, use overdrive attaching bolts to draw gear case down and seat it against transmission.

(48) Apply 1-2 drops of Mopar thread adhesive (or Loctite 242) to overdrive unit attaching bolts. Then install and tighten bolts to 34 N•m (25 ft. lbs.) torque. **Be sure wire harness clips are placed on appropriate overdrive bolts beforehand.**

(49) Measure and if necessary, correct input shaft end play as follows (Fig. 169):

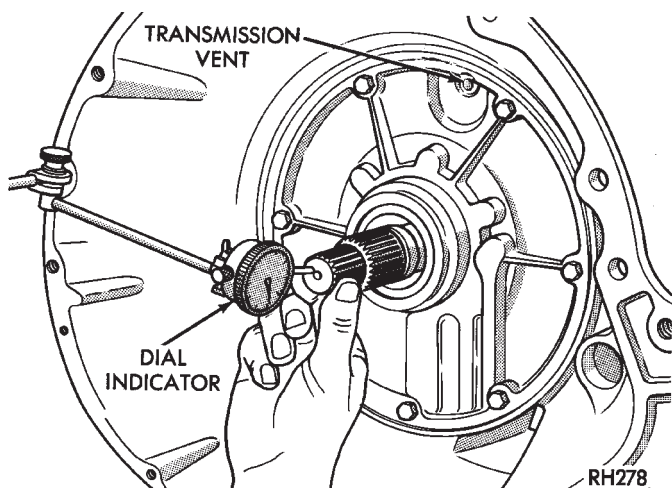
(a) Be sure overdrive unit is installed on transmission. **End play cannot be properly checked with overdrive unit off transmission.**

(b) Attach dial indicator to converter housing.

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

(d) 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 step (e) if end play is not within specified limits.

(e) 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.



**Fig. 169 Measuring Input Shaft End Play**

(50) Install accumulator piston and inner and outer springs (Fig. 11).

(51) Verify that park/neutral position switch has **not** been installed in case. Valve body can not be installed if switch is in position.

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

(53) 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.

**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. If the rod enters the cavity during installation, it will become bent when the overdrive bolts are tightened. If this occurs, the rod will have to be removed and replaced.

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

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

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

(55) Adjust front and rear bands as follows:

(a) Loosen band adjusting screw locknuts.

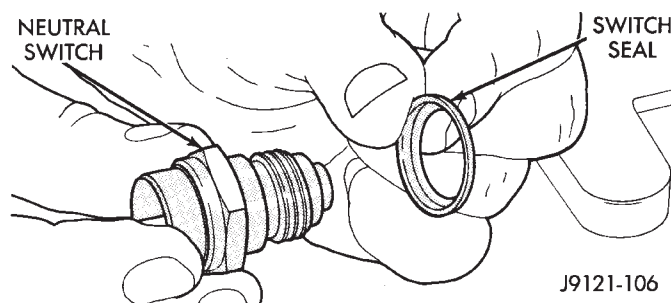
(b) Tighten each band adjusting screw to 5 N•m (72 in. lbs.) with torque wrench.

(c) **Back off front band adjusting screw 3-5/8 turns.**

(d) Back off rear band screw 4 turns.

(e) Tighten each adjusting screw locknut. Hold adjusting screws with wrench to prevent turning when tightening locknut.

(56) Install seal on park/neutral position switch (Fig. 170). Then install and tighten switch to 34 N•m (25 ft. lbs.).



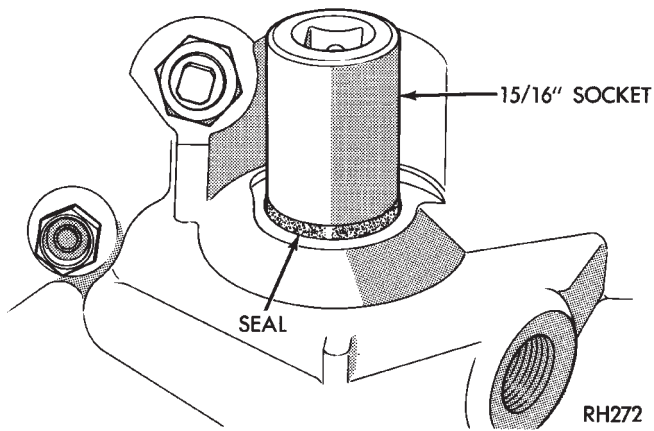
**Fig. 170 Park/Neutral Position Switch Seal Position**

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

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

(59) Install new valve body manual shaft seal in case (Fig. 171). 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.

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



**Fig. 171 Installing Manual Lever Shaft Seal**

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

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

(63) Install transmission speed sensor in overdrive case (Fig. 1).

(64) Mount transmission on jack for installation in vehicle.

(65) Apply dielectric grease to terminal pins of solenoid case connector and neutral switch.

**CAUTION:** The transmission cooler and lines must be reverse flushed if overhaul corrected a malfunction that generated sludge, metal particles, or clutch friction material. The torque converter should also be replaced if contaminated by the same malfunction. Debris and residue not flushed from the cooler and lines will flow back into the transmission and converter. The result could be a repeat failure and shop comeback.

## OVERDRIVE UNIT OVERHAUL-42RE

## INDEX

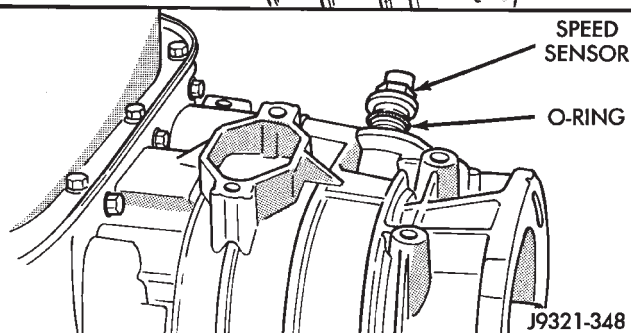
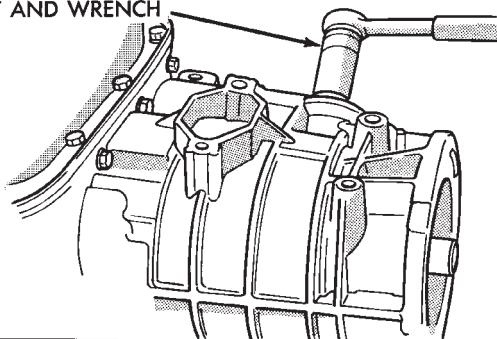
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Overdrive Component Cleaning and Inspection . . .	118	Overdrive Unit Disassembly . . . . .	112
Overdrive Unit Assembly and Adjustment . . . . .	120		

## OVERDRIVE UNIT DISASSEMBLY

## OVERDRIVE REMOVAL

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

SOCKET AND WRENCH

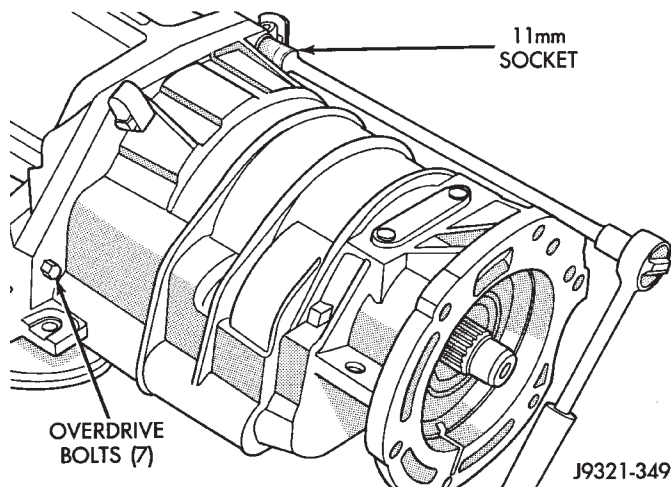


**Fig. 1 Transmission Speed Sensor Removal/Installation**

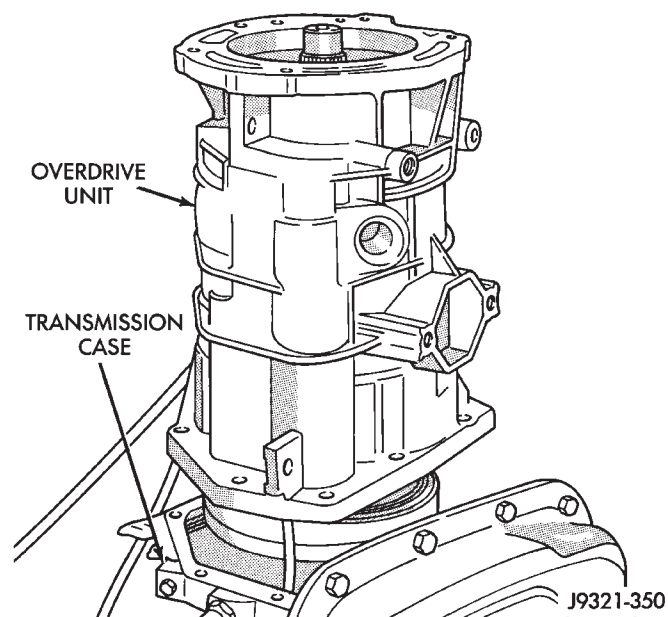
- (2) Place transmission in upright position (Fig. 2).
- (3) Remove bolts attaching overdrive unit to transmission case (Fig. 2). An 11 mm socket is required. Note position of wire harness clips for installation reference.
- (4) Lift overdrive unit up and off transmission case and intermediate shaft (Fig. 3).
- (5) Remove overdrive piston thrust bearing (Fig. 4).

## OVERDRIVE PISTON REMOVAL

- (1) Remove overdrive piston thrust plate (Fig. 5). Retain thrust plate. It is a select fit part and may possibly be reused.
- (2) Remove intermediate shaft spacer (Fig. 6). Retain spacer. It is a select fit part and may possibly be reused.



**Fig. 2 Removing/Installing Overdrive Unit Attaching Bolts**



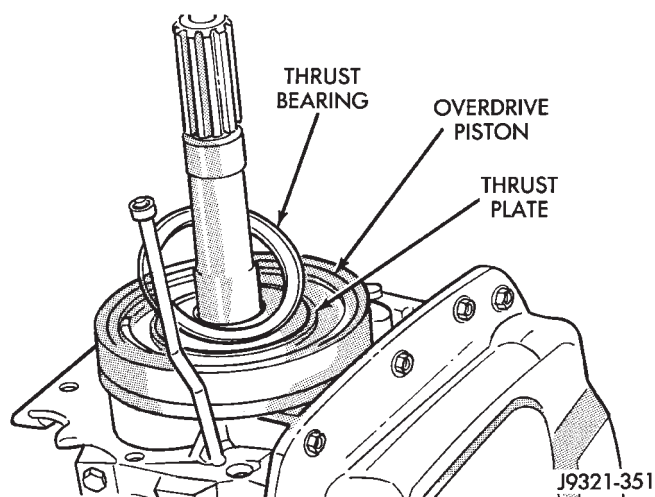
**Fig. 3 Overdrive Unit Removal/Installation**

- (3) Remove overdrive piston from retainer (Fig. 7).

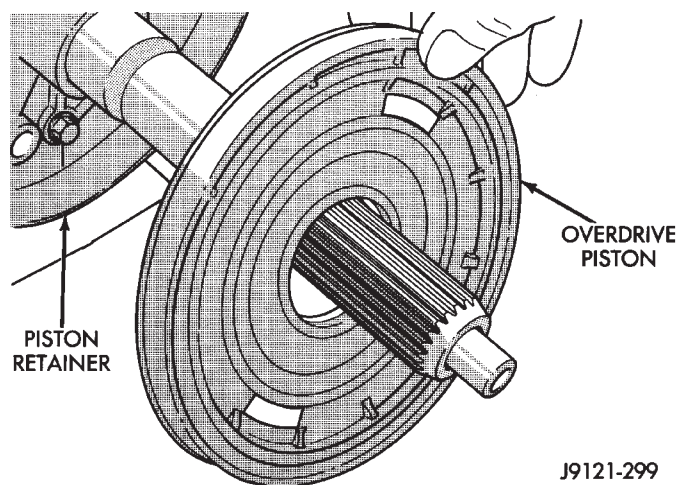
## OVERDRIVE CLUTCH PACK REMOVAL

- (1) Remove overdrive clutch pack wire retaining ring (Fig. 8).
- (2) Remove overdrive clutch pack (Fig. 9).

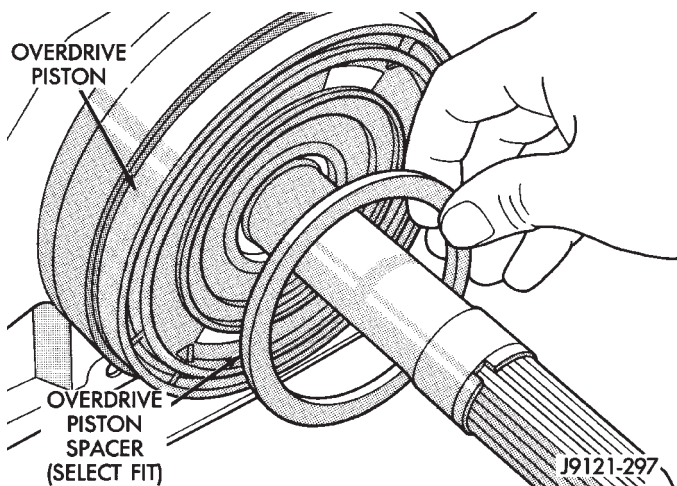




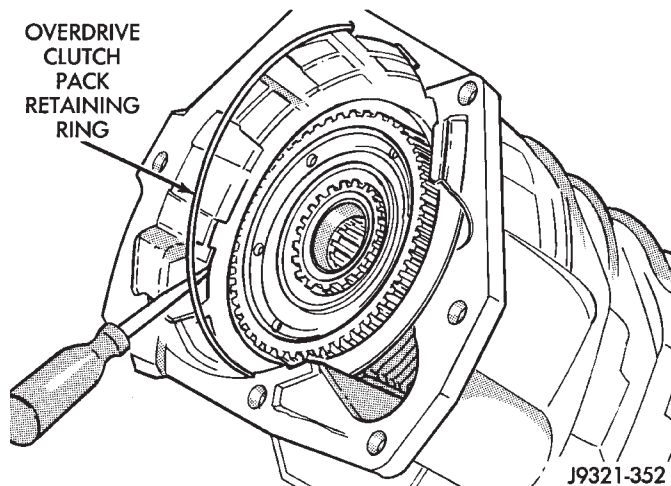
**Fig. 4 Overdrive Piston Thrust Bearing Removal/Installation**



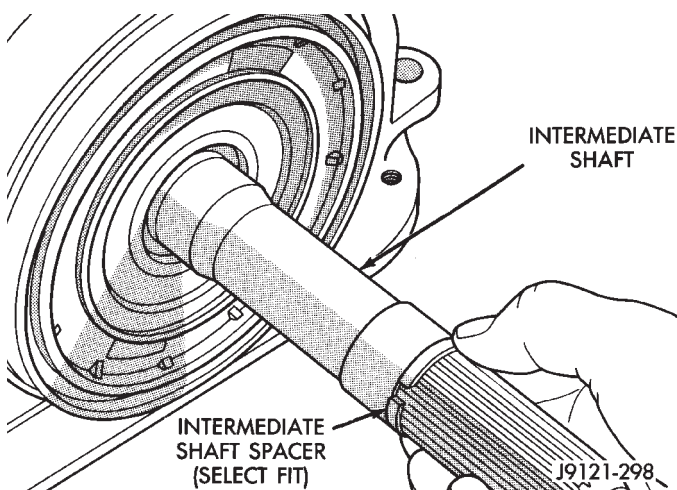
**Fig. 7 Overdrive Piston Removal**



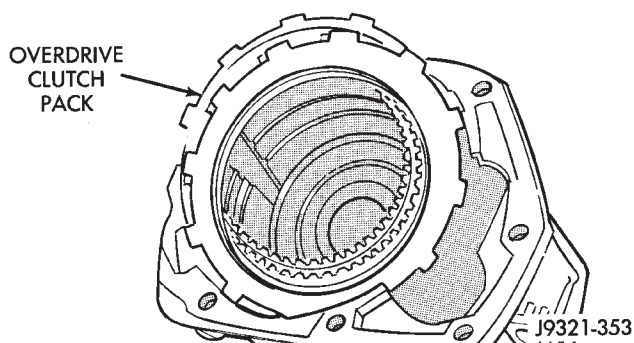
**Fig. 5 Overdrive Piston Thrust Plate Removal/Installation**



**Fig. 8 Removing Overdrive Clutch Pack Retaining Ring**



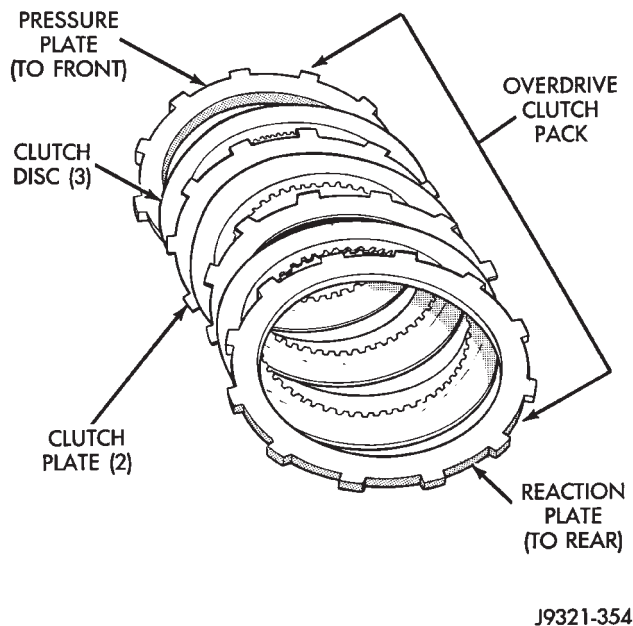
**Fig. 6 Intermediate Shaft Spacer Location**



**Fig. 9 Overdrive Clutch Pack Removal**



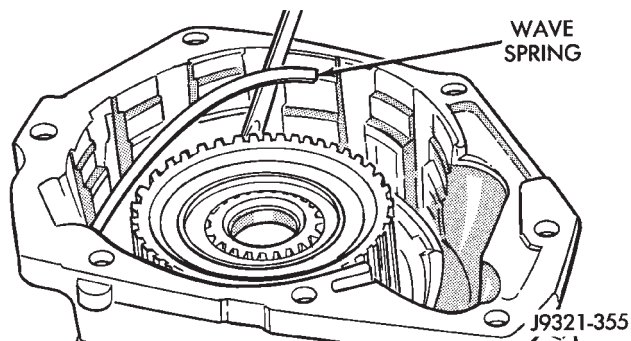
(3) Note position of clutch pack components for assembly reference (Fig. 10). Thick reaction plate goes to front as shown.



**Fig. 10 Overdrive Clutch Component Position**

#### OVERDRIVE GEARTRAIN REMOVAL

(1) Remove overdrive clutch wave spring (Fig. 11).



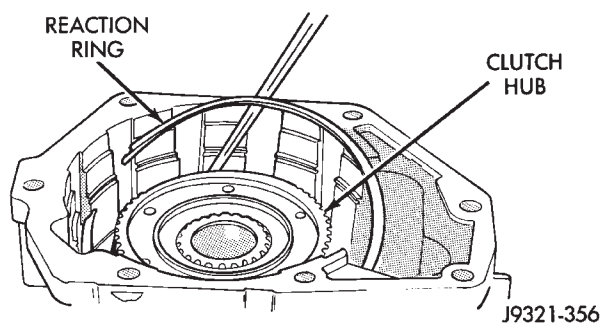
**Fig. 11 Overdrive Clutch Wave Spring Removal/Installation**

(2) Remove overdrive clutch reaction snap ring (Fig. 12). Note that snap ring is located in same groove as wave spring.

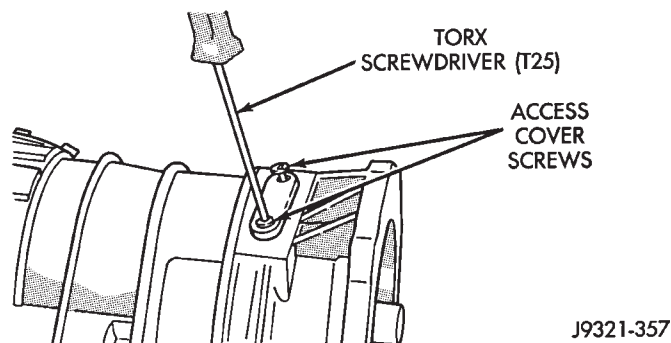
(3) Remove Torx head screws that attach access cover and gasket to overdrive case (Fig. 13). A T25 size Torx head bit is required.

(4) Remove access cover and gasket (Fig. 14).

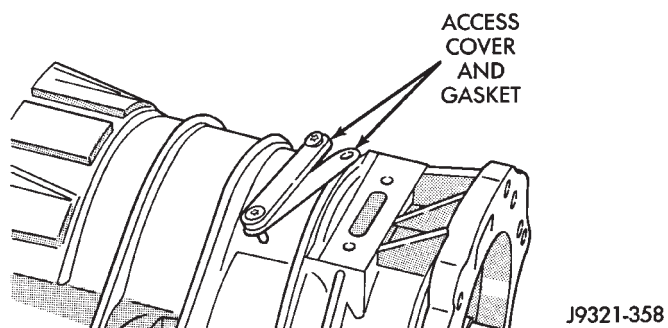
(5) Expand output shaft bearing snap ring with expanding-type snap ring pliers. Then push output shaft forward to release shaft bearing from locating ring (Fig. 15).



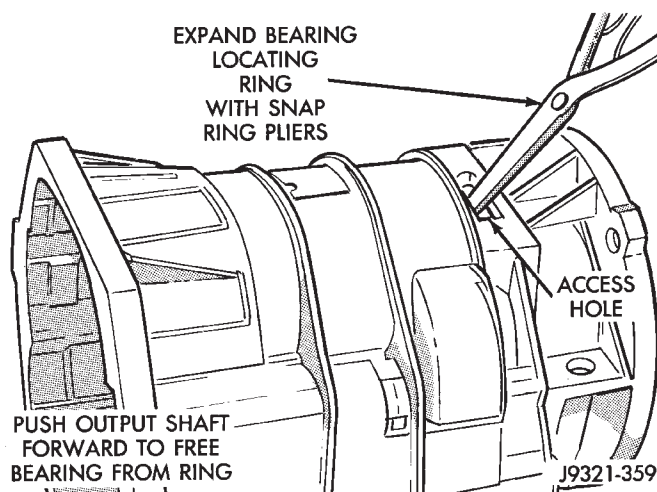
**Fig. 12 Removing/Installing Overdrive Clutch Reaction Snap Ring**



**Fig. 13 Removing/Installing Access Cover Screws**

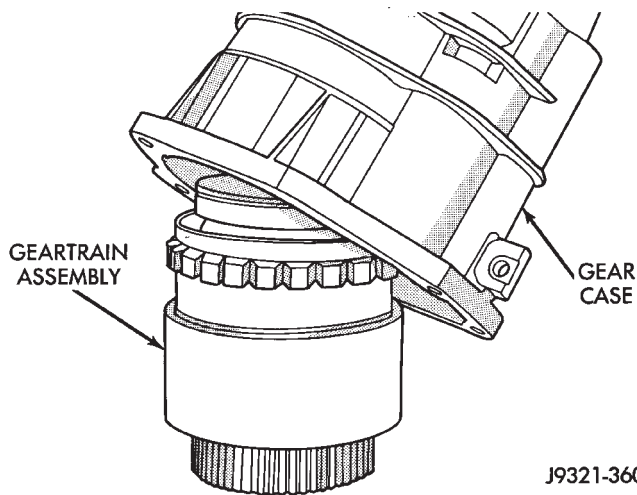


**Fig. 14 Removing/Installing Access Cover And Gasket**



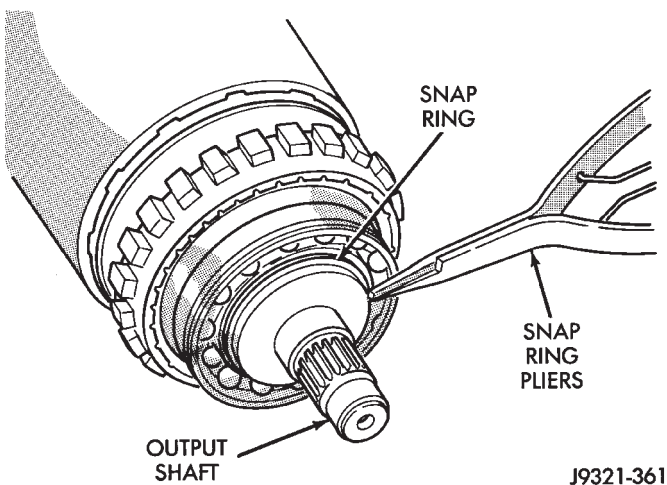
**Fig. 15 Releasing Bearing From Locating Ring**

- (6) Lift gear case up and off geartrain assembly (Fig. 16).



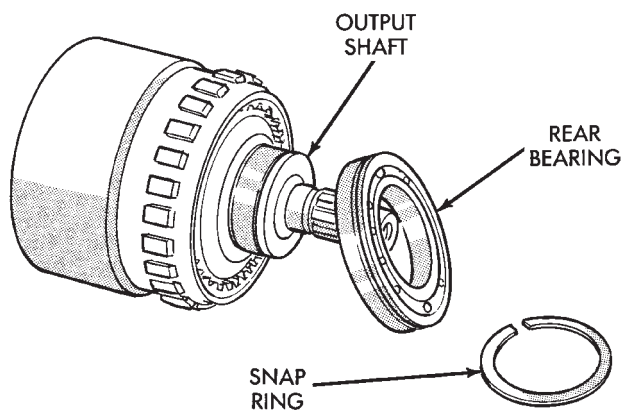
**Fig. 16 Removing Gear Case From Geartrain Assembly**

- (7) Remove snap ring that retains rear bearing on output shaft (Fig. 17).



**Fig. 17 Rear Bearing Snap Ring Removal/Installation**

- (8) Remove rear bearing from output shaft (Fig. 18).

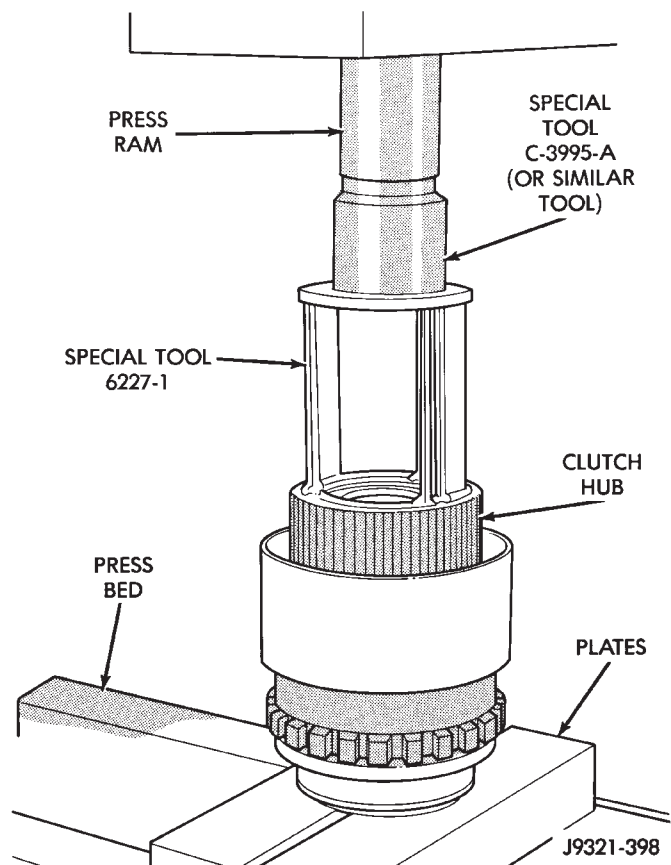


**Fig. 18 Rear Bearing Removal**

#### *DIRECT CLUTCH, HUB AND SPRING REMOVAL*

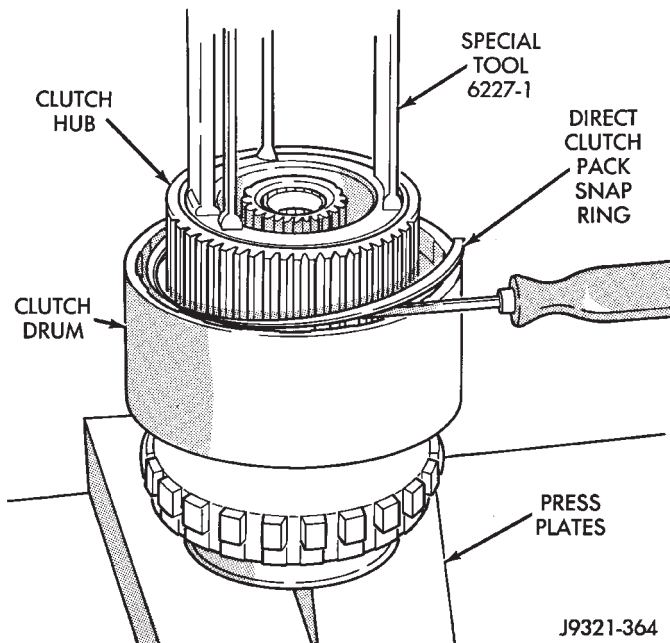
**WARNING: THE NEXT STEP IN DISASSEMBLY INVOLVES COMPRESSING THE DIRECT CLUTCH SPRING. IT IS EXTREMELY IMPORTANT THAT PROPER EQUIPMENT BE USED TO COMPRESS THE SPRING AS SPRING FORCE IS APPROXIMATELY 830 POUNDS. USE SPRING COMPRESSOR TOOL 6227-1 AND A HYDRAULIC SHOP PRESS WITH A MINIMUM RAM TRAVEL OF 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. 19).
- (2) Position Compressor Tool 6227-1 on clutch hub (Fig. 19). Support output shaft flange with steel press plates as shown and center assembly under press ram.
- (3) Use Special Tool C-3995-A (or similar size tool) at top of Tool 6227-1 to help distribute load and provide needed extra press length (Fig. 19).
- (4) 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. 19).

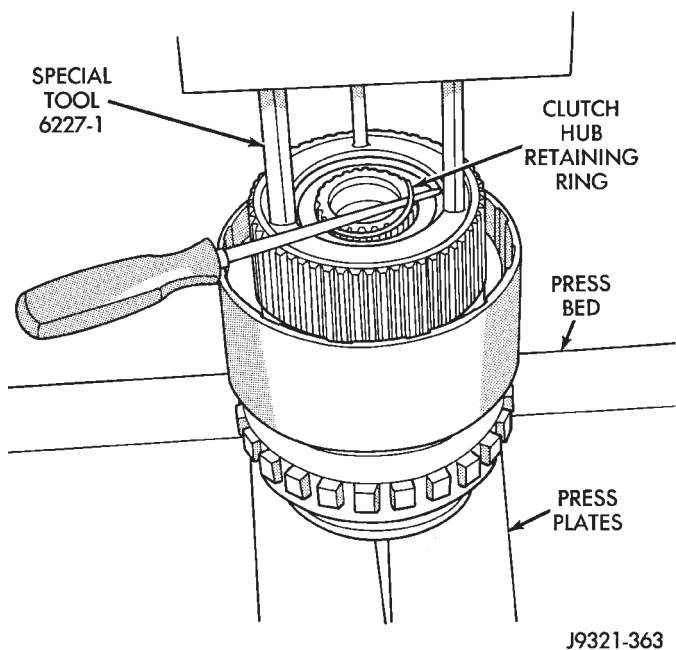


**Fig. 19 Geartrain Mounted In Shop Press**

- (5) Remove direct clutch pack snap ring (Fig. 20).
- (6) Remove direct clutch hub retaining ring (Fig. 21).



**Fig. 20 Direct Clutch Pack Snap Ring Removal**

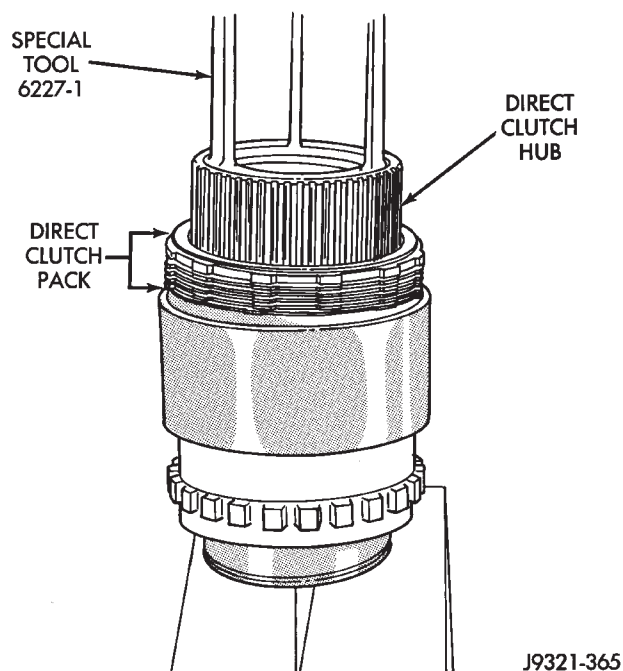


**Fig. 21 Direct Clutch Hub Retaining Ring Removal**

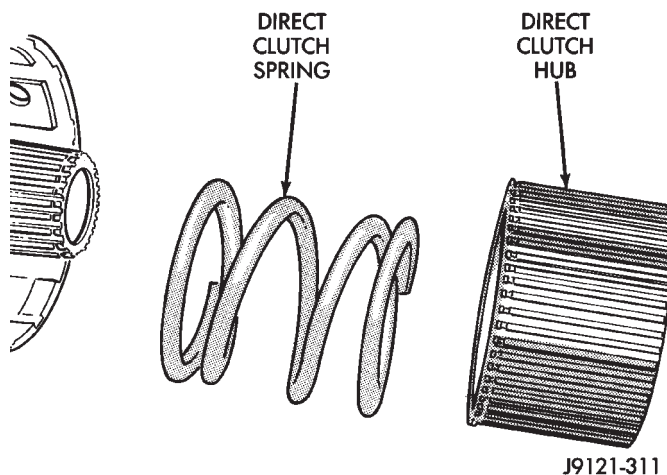
- (7) Release press load **slowly and completely** (Fig. 22).
- (8) Remove Special Tool 6227-1. Then remove clutch pack from hub (Fig. 22).

#### GEARTRAIN DISASSEMBLY

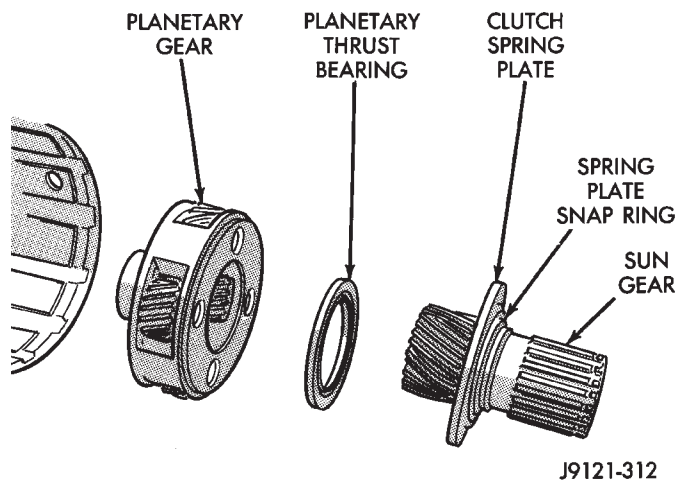
- (1) Remove direct clutch hub and spring (Fig. 23).
- (2) Remove sun gear and spring plate. Then remove planetary thrust bearing and planetary gear (Fig. 24).



**Fig. 22 Direct Clutch Pack Removal**



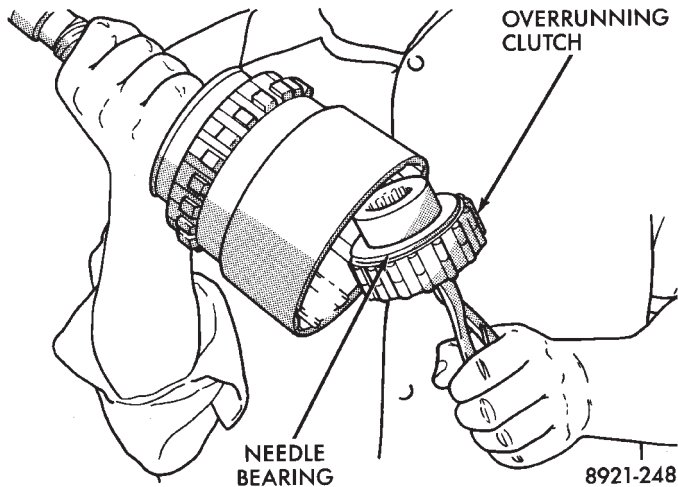
**Fig. 23 Direct Clutch Hub And Spring Removal**



**Fig. 24 Removing Sun Gear, Thrust Bearing And Planetary Gear**



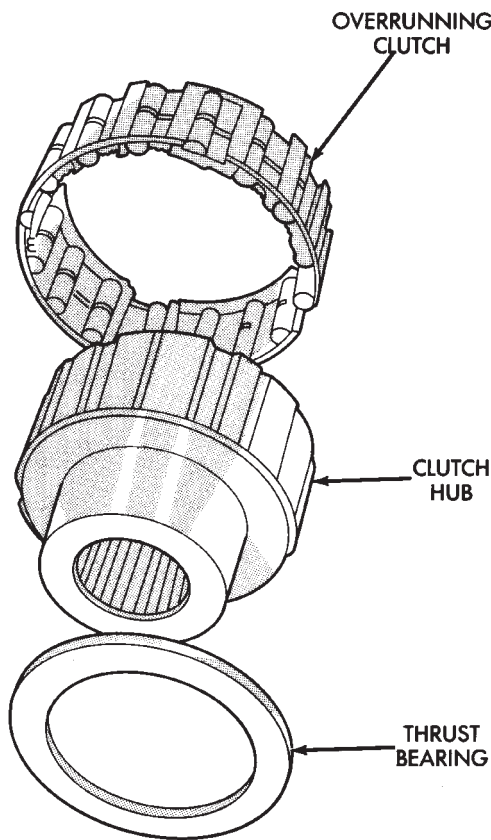
(3) Remove overrunning clutch assembly with expanding type snap ring pliers (Fig. 25). Insert pliers into clutch hub. Expand pliers to grip hub splines and remove clutch with counterclockwise, twisting motion.



**Fig. 25 Overrunning Clutch Assembly Removal/Installation**

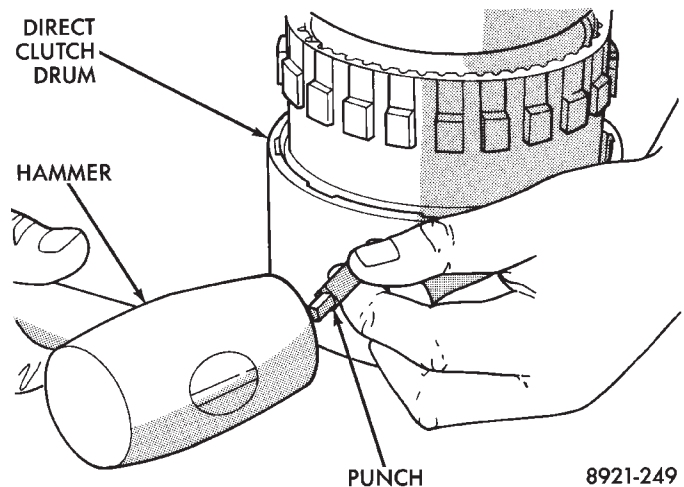
(4) Remove thrust bearing from overrunning clutch hub (Fig. 26).

(5) Remove overrunning clutch from hub (Fig. 26).



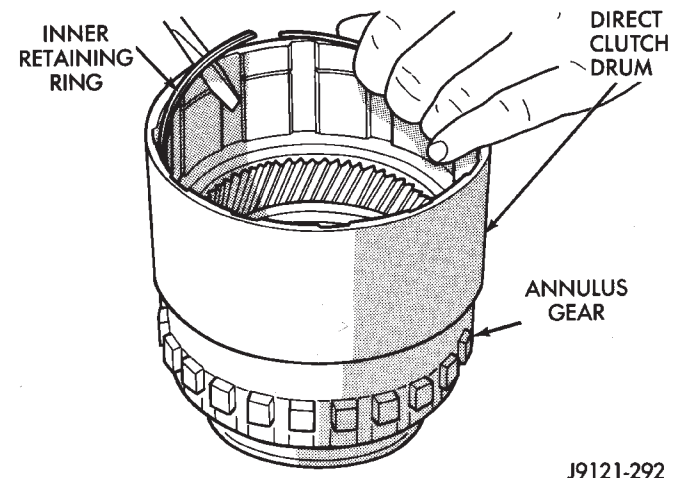
**Fig. 26 Overrunning Clutch Components**

(6) Mark position of annulus gear and direct clutch drum for assembly alignment reference (Fig. 27). Use small center punch or scriber to make alignment marks.



**Fig. 27 Marking Direct Clutch Drum And Annulus Gear For Assembly Alignment**

(7) Remove direct clutch drum rear retaining ring (Fig. 28).



**Fig. 28 Clutch Drum Inner Retaining Ring Removal**

(8) Remove direct clutch drum outer retaining ring (Fig. 29).

(9) Mark annulus gear and output shaft for assembly alignment reference (Fig. 30). Use punch or scriber to mark gear and shaft.

(10) Remove snap ring that secures annulus gear on output shaft (Fig. 31). Use two screwdrivers to unseat and work snap ring out of groove as shown.

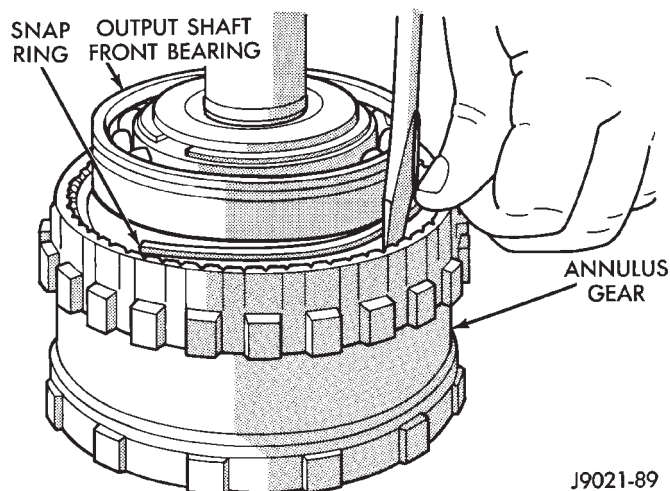
(11) Remove annulus gear from output shaft (Fig. 32). Use rawhide or plastic mallet to tap gear off shaft.

#### GEAR CASE AND PARK LOCK DISASSEMBLY

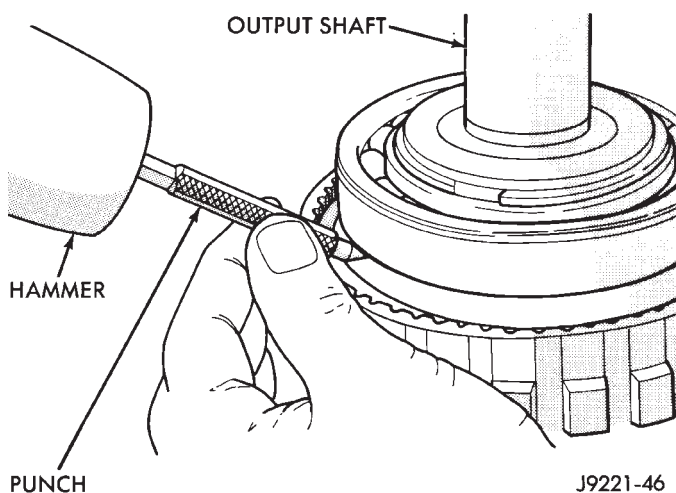
(1) Remove locating ring from gear case.

(2) Remove park pawl shaft retaining bolt and remove shaft, pawl and spring.

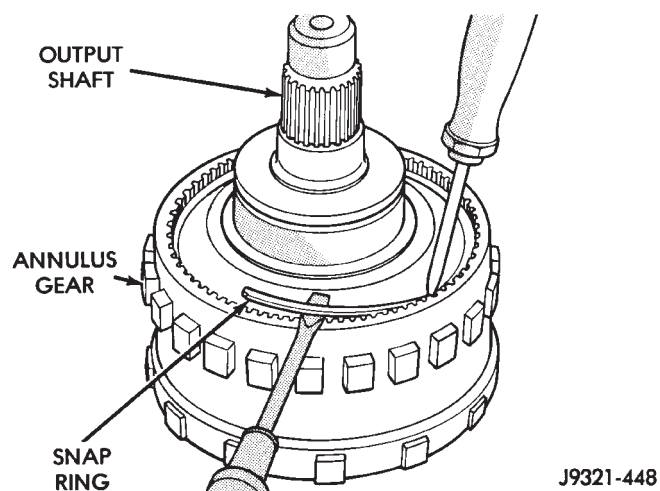




**Fig. 29 Clutch Drum Outer Retaining Ring Removal**

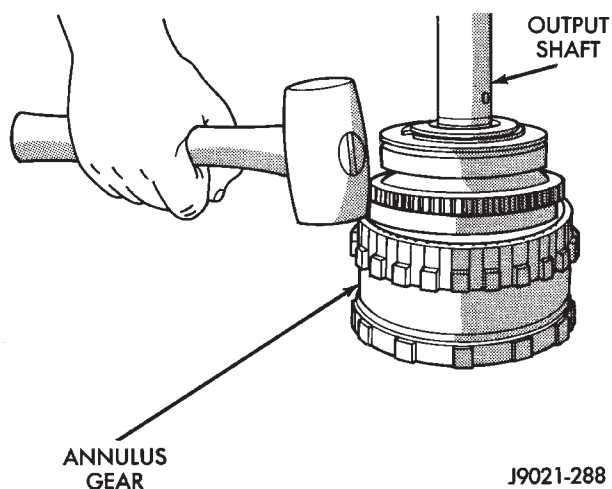


**Fig. 30 Marking Annulus Gear And Output Shaft For Assembly Alignment**



**Fig. 31 Removing Annulus Gear Snap Ring**

(3) Remove reaction plug snap ring and remove reaction plug.



**Fig. 32 Annulus Gear Removal**

(4) Remove output shaft seal. Use punch or tool similar to Seal Remover C-3981.

### OVERDRIVE COMPONENT CLEANING AND INSPECTION

Clean the geartrain (Fig. 33) and case components (Fig. 34) 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.

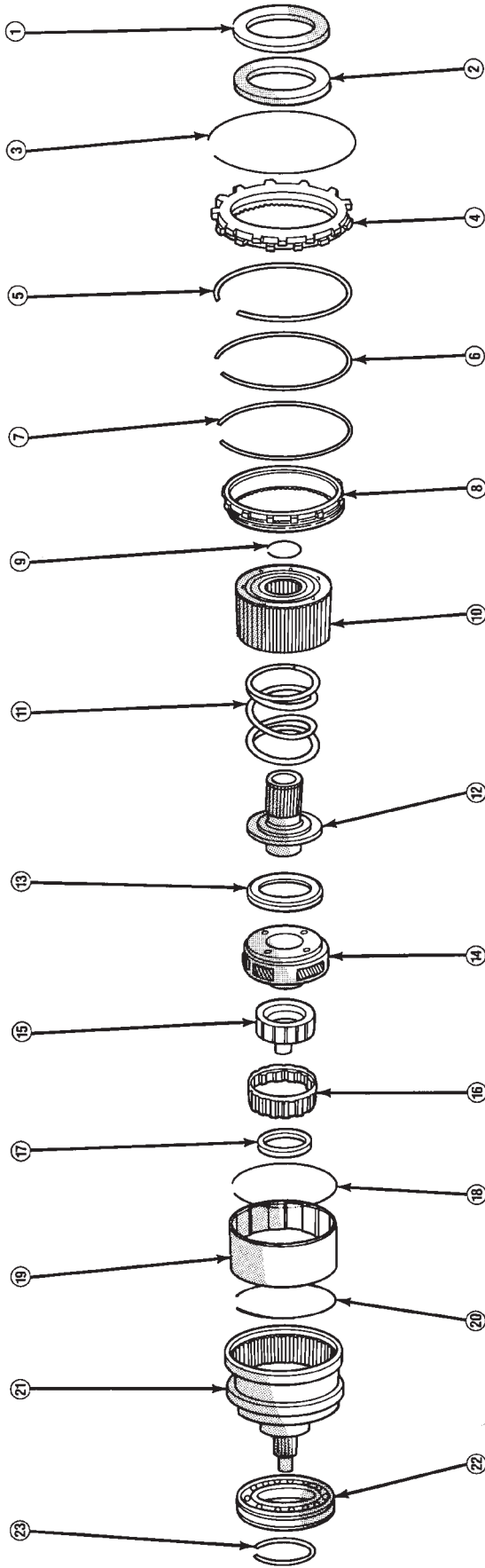
Discard the old case gasket and seals. Do not attempt to salvage these parts. They are not reusable. Replace any of the overdrive unit snap rings if distorted or damaged.

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 gear case (Fig. 34).

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.

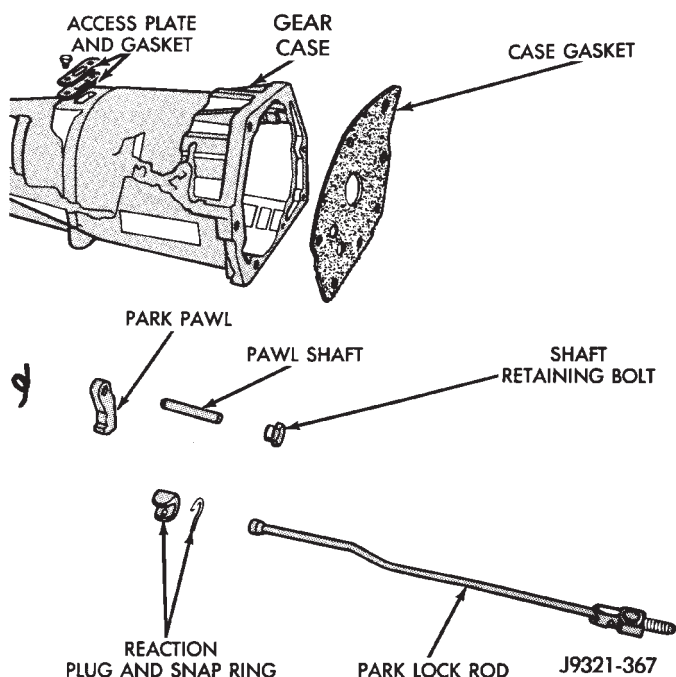
Check the bushings in the overdrive case. Replace the bushings if severely scored or worn. Also replace the case seal if loose, distorted, or damaged.



- |   |                                      |   |                                    |   |  |
|---|--------------------------------------|---|------------------------------------|---|--|
| ① | OVERDRIVE PISTON THRUST PLATE        | ⑨ | CLUTCH HUB RETAINING RING          | ⑰ | OVERRUNNING CLUTCH THRUST BEARING                  |
| ② | OVERDRIVE PISTON THRUST BEARING      | ⑩ | DIRECT CLUTCH HUB                  | ⑱ | RETAINING RING (CLUTCH DRUM INNER)                 |
| ③ | OVERDRIVE CLUTCH PACK RETAINING RING | ⑪ | DIRECT CLUTCH SPRING               | ⑲ | DIRECT CLUTCH DRUM                                 |
| ④ | OVERDRIVE CLUTCH PACK                | ⑫ | SUN GEAR AND SPRING PLATE ASSEMBLY | ⑳ | RETAINING RING (CLUTCH DRUM OUTER)                 |
| ⑤ | OVERDRIVE CLUTCH REACTION RING       | ⑬ | PLANETARY THRUST BEARING           | ㉑ | ANNULUS GEAR, OUTPUT SHAFT, AND SNAP RING ASSEMBLY |
| ⑥ | OVERDRIVE CLUTCH SNAP RING           | ⑭ | PLANETARY GEAR                     | ㉒ | REAR BEARING                                       |
| ⑦ | DIRECT CLUTCH PACK SNAP RING         | ⑮ | OVERRUNNING CLUTCH HUB             | ㉓ | REAR BEARING SNAP RING                             |
| ⑧ | DIRECT CLUTCH PACK                   | ⑯ | OVERRUNNING CLUTCH                 |   |  |

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Fig. 33 Overdrive Geartrain Components



**Fig. 34 Overdrive Gear Case And Park Lock Components**

Examine the overdrive and direct clutch discs and plates (Fig. 32). 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 (Fig. 32). 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 (Fig. 33). Replace the plate if worn or scored. Replace the bearings if rough, noisy, brinnelled, or worn.

Inspect the planetary gear assembly and the sun gear and bushings (Fig. 34). 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.

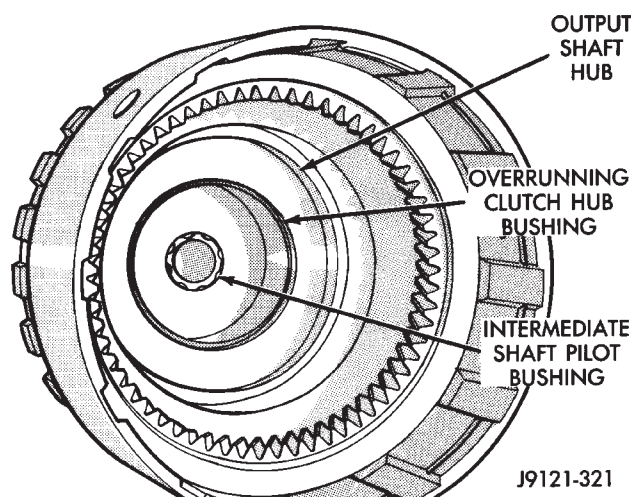
Inspect the overrunning clutch and race. The race surface should be smooth and free of scores. Replace the overrunning clutch assembly or the race if either assembly is worn or damaged in any way.

Check the machined surfaces on the output shaft. These surfaces should be clean and smooth. Very minor

nicks or scratches can be polished down with crocus cloth. Replace the shaft if worn, severely scored, or damaged in any way.

Inspect the output shaft bushings (Fig. 35). 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. Remove the annulus gear from the output shaft if bushing replacement is required. This will provide more working room and make bushing replacement easier.

The bushings can be removed with "blind hole puller tools" such as Snap-On set CG40CB for small bushings and set CG46 for large bushings. New bushings can be installed with tools from an all purpose installer kit such as the Snap-On A257 bushing driver set.



**Fig. 35 Output Shaft Bushing Location**

## OVERDRIVE UNIT ASSEMBLY AND ADJUSTMENT

### 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.

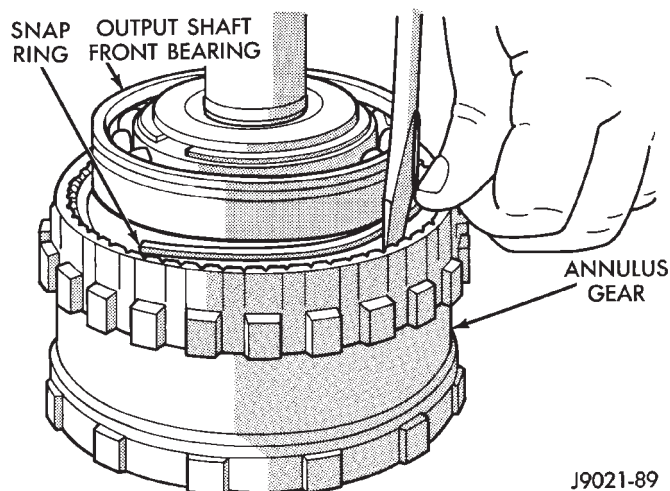
(2) Install new pilot bushing and clutch hub bushing in output shaft if necessary (Fig. 34). Lubricate new (or old) bushings with petroleum jelly, or transmission fluid.

(3) Install annulus gear on output shaft, if removed. Then install annulus gear retaining snap ring (Fig. 36).

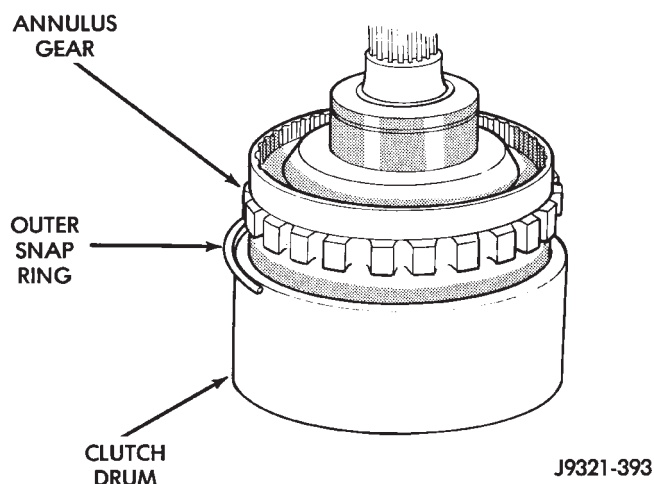
(4) Align and install clutch drum on annulus gear (Fig. 37). Be sure drum is engaged in annulus gear lugs.

(5) Install clutch drum outer retaining ring (Fig. 37).

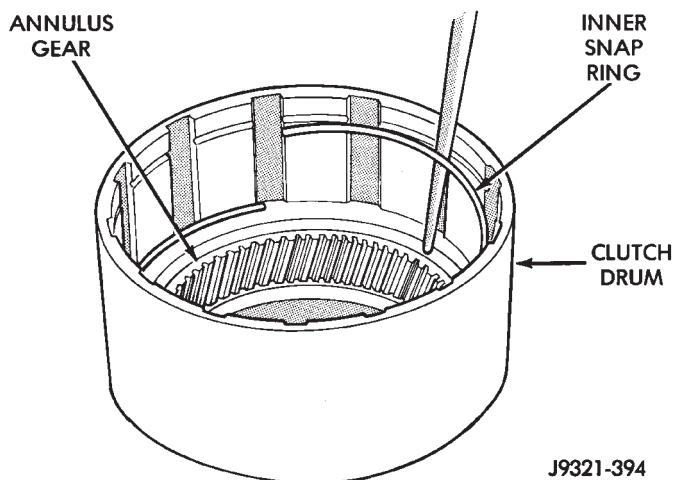
(6) Slide clutch drum forward and install inner retaining ring (Fig. 38).



**Fig. 36 Annulus Gear Installation**

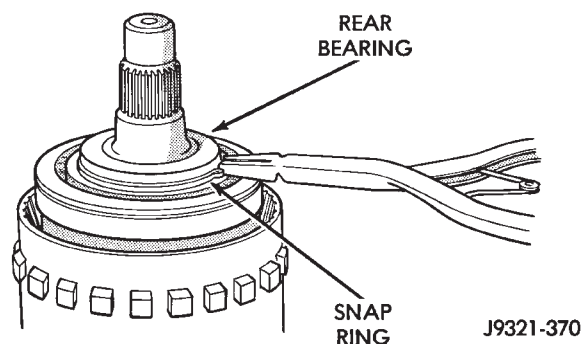


**Fig. 37 Installing Clutch Drum And Outer Retaining Ring**



**Fig. 38 Installing Clutch Drum Inner Retaining Ring**

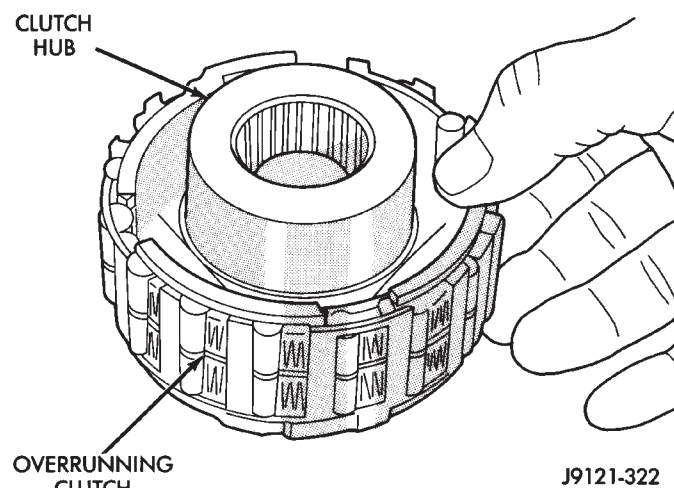
(7) Install rear bearing and snap ring on output shaft (Fig. 39). Be sure locating ring groove in bearing is toward rear.



**Fig. 39 Rear Bearing And Snap Ring Installation**

(8) Install overrunning clutch on hub (Fig. 40). **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 (Fig. 41). Use generous amount of petroleum jelly to hold bearing in place for installation. **Bearing fits one way only. Be sure bearing is seated squarely against hub. Reinstall bearing if it does not seat squarely.**



**Fig. 40 Assembling Overrunning Clutch And Hub**

(10) Install overrunning clutch in output shaft (Fig. 42). Insert snap ring pliers in hub splines. Expand pliers to grip hub. Then install assembly with counter-clockwise, twisting motion.

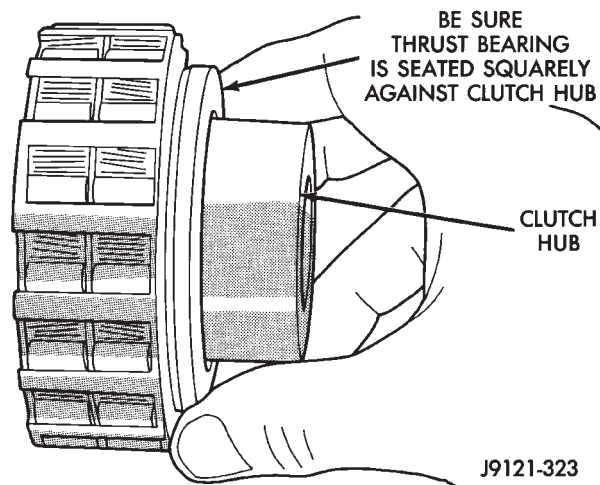
(11) Install planetary gear in annulus gear (Fig. 43). **Be sure planetary pinions are fully seated in annulus gear before proceeding.**

(12) Install direct clutch spring plate on sun gear. Shoulder side of plate should face outward and toward front. Then secure plate to sun gear with snap ring (Fig. 44).

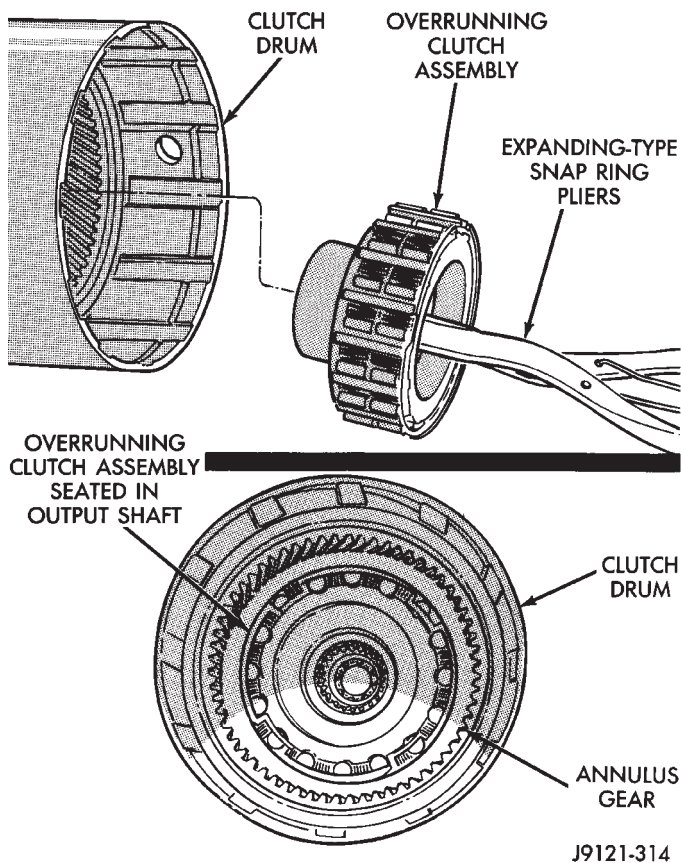
(13) Coat planetary thrust bearing and bearing contact surface of spring plate with generous amount of petroleum jelly. This will help hold bearing in place during installation.

(14) Install planetary thrust bearing on sun gear





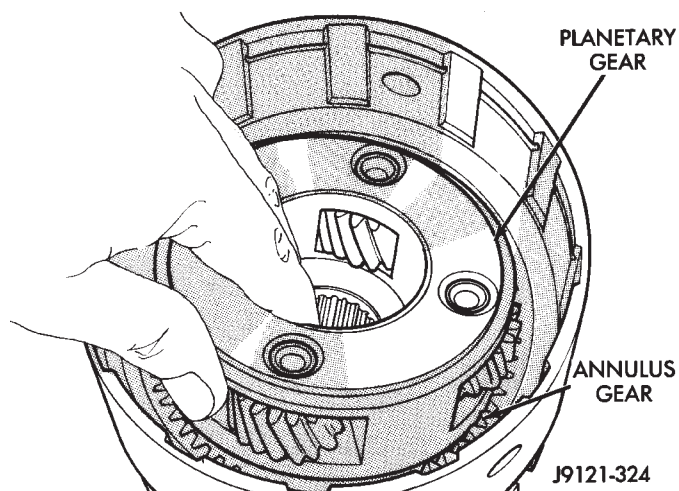
**Fig. 41 Installing Overrunning Clutch Thrust Bearing**



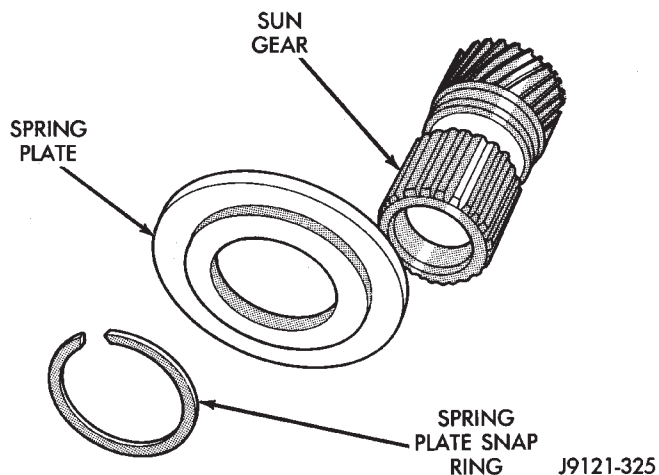
**Fig. 42 Installing Overrunning Clutch**

(Fig. 45). 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.**

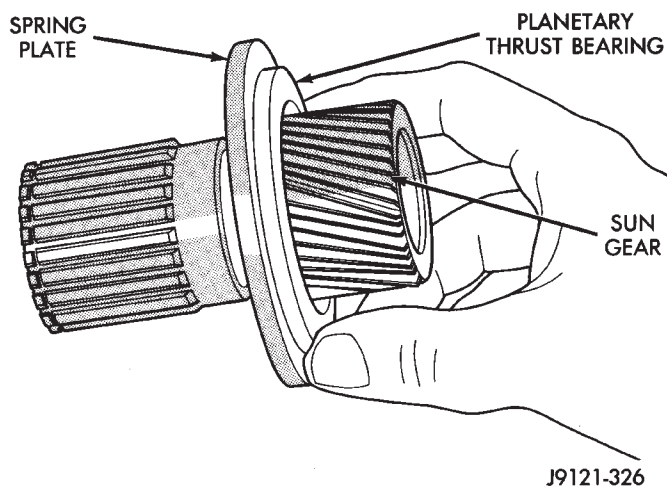
(15) Install assembled sun gear, spring plate and thrust bearing (Fig. 46). Be sure sun gear and thrust bearing are fully seated before proceeding.



**Fig. 43 Installing Planetary Gear**

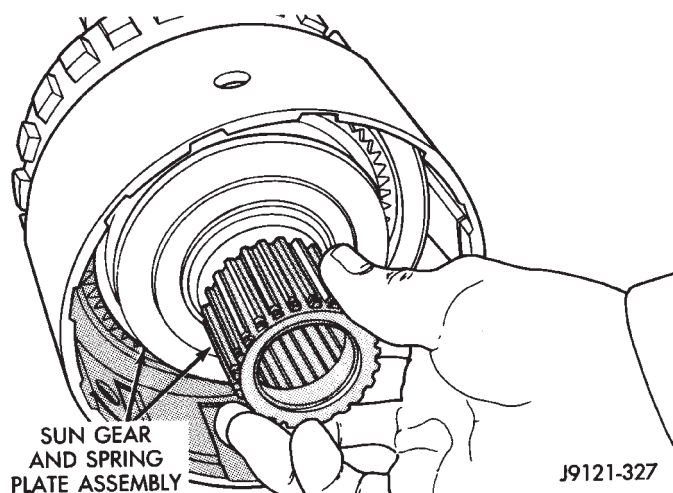


**Fig. 44 Sun Gear And Spring Plate Assembly**



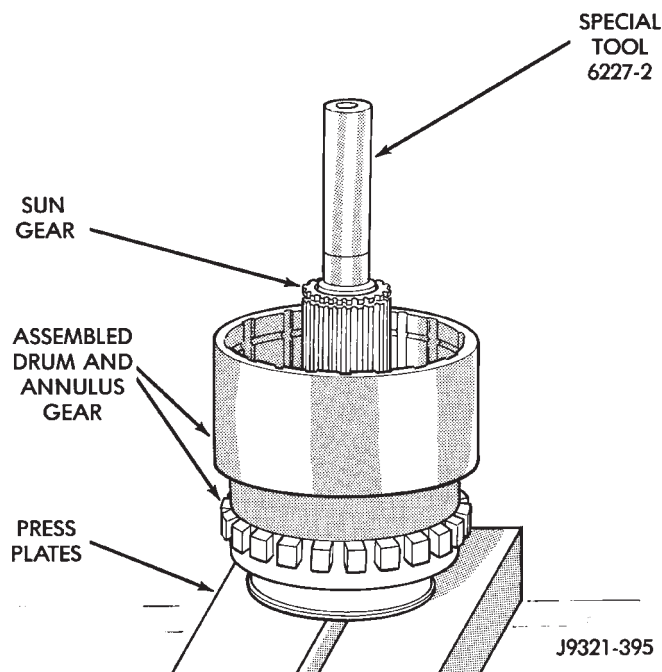
**Fig. 45 Installing Planetary Thrust Bearing**

(16) 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.



**Fig. 46 Sun Gear Installation**

(17) Align splines in hubs of planetary gear and overrunning clutch with Alignment tool 6227-2 (Fig. 47). Insert tool through sun gear and into splines of both hubs. Be sure alignment tool is fully seated before proceeding.



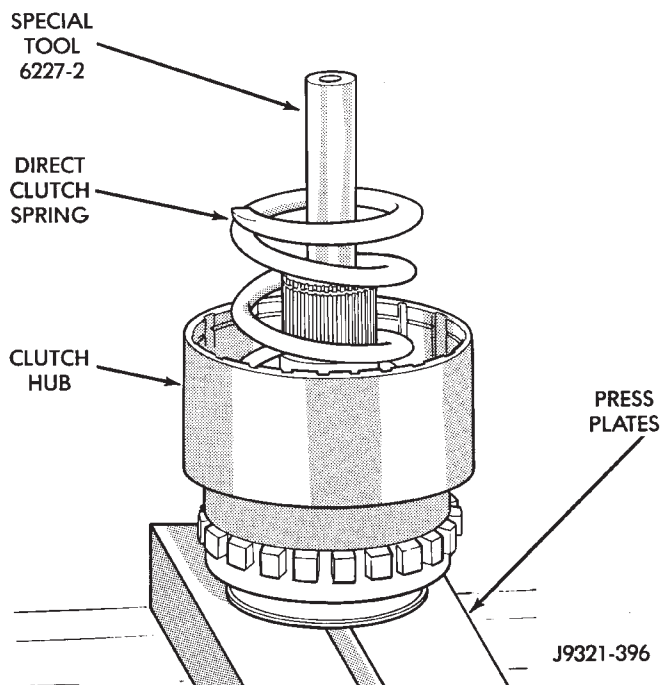
**Fig. 47 Alignment Tool Installation**

(18) Install direct clutch spring (Fig. 48). Be sure spring is properly seated on spring plate.

(19) Assemble and install direct clutch pack on hub as follows:

(a) Assemble clutch pack components (Fig. 49).

(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. 50).**



**Fig. 48 Direct Clutch Spring Installation**

(c) Install first clutch disc followed by a steel plate until 6 discs and 5 plates have been installed.

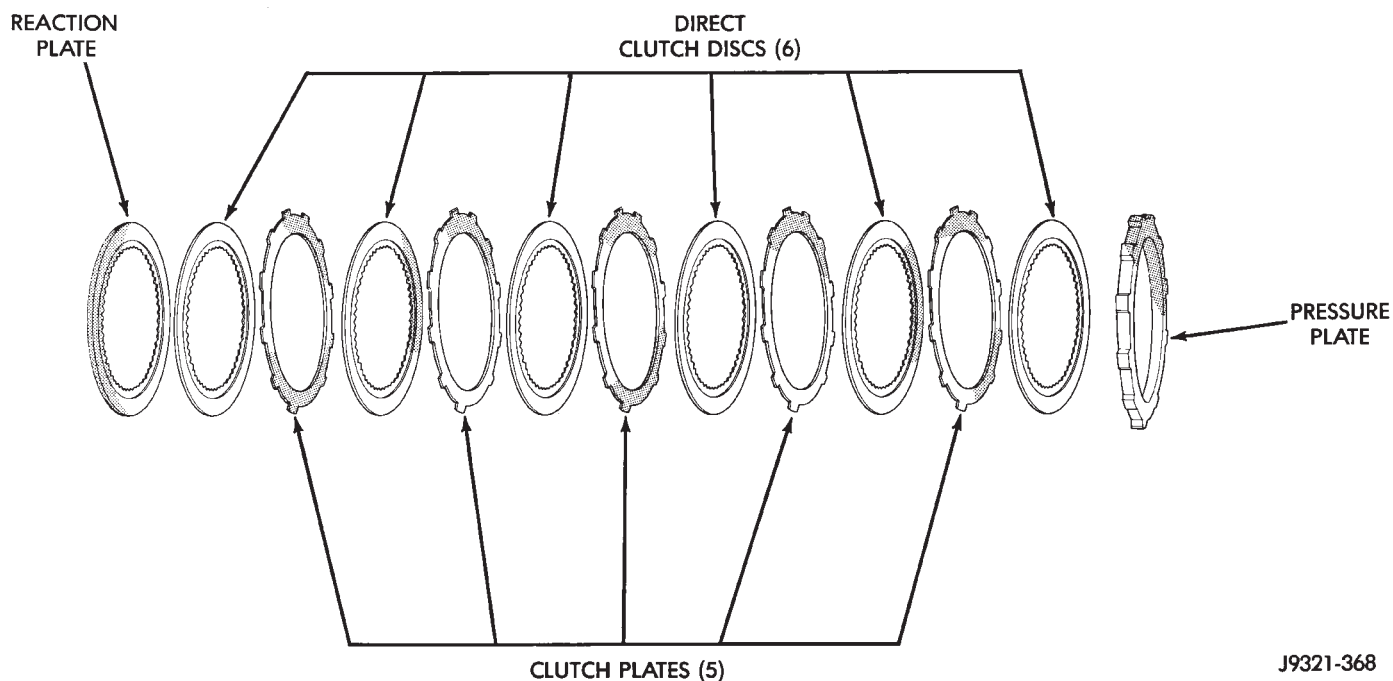
(d) Install pressure plate. This is last clutch pack item to be installed. **Be sure plate is installed with shoulder side facing upward (Fig. 51).**

(20) Install clutch hub and clutch pack on direct clutch spring (Fig. 52). **Be sure hub is started on sun gear splines before proceeding.**

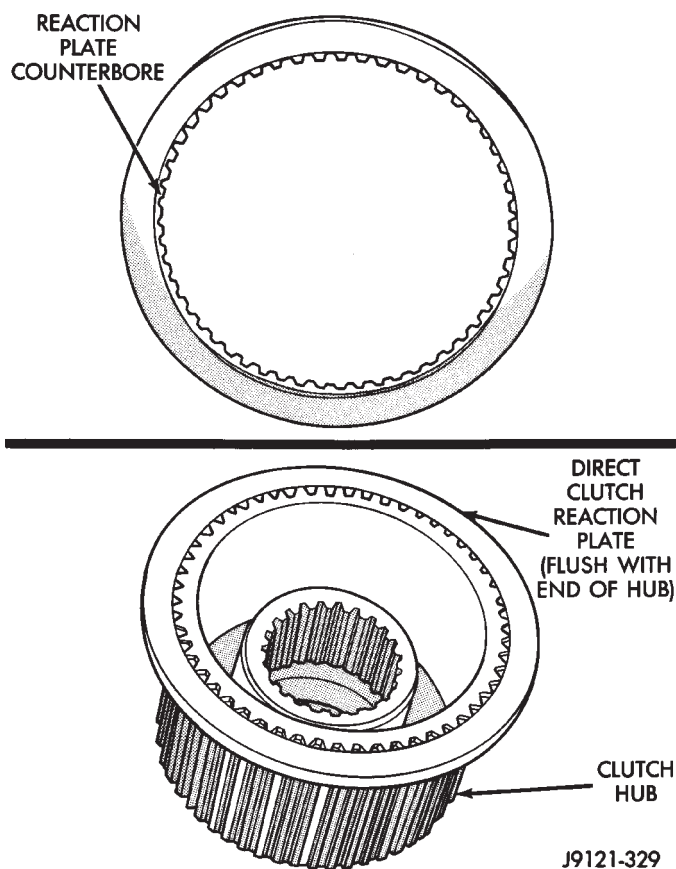
**WARNING: THE NEXT STEP IN GEARTRAIN ASSEMBLY INVOLVES COMPRESSING THE DIRECT CLUTCH HUB AND SPRING. IT IS EXTREMELY IMPORTANT THAT PROPER EQUIPMENT BE USED TO COMPRESS THE SPRING AS SPRING FORCE IS APPROXIMATELY 830 POUNDS. USE COMPRESSOR TOOL C-6227-1 AND A HYDRAULIC-TYPE SHOP PRESS WITH A MINIMUM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

(21) Carefully **remove** Alignment Tool 6227-2 from clutch and hub splines. Withdraw tool slowly to avoid spline misalignment. Tool must be removed at this point to provide room for compressor tool movement.

(22) Position Compressor Tool 6227-1 on clutch hub (Fig. 53).

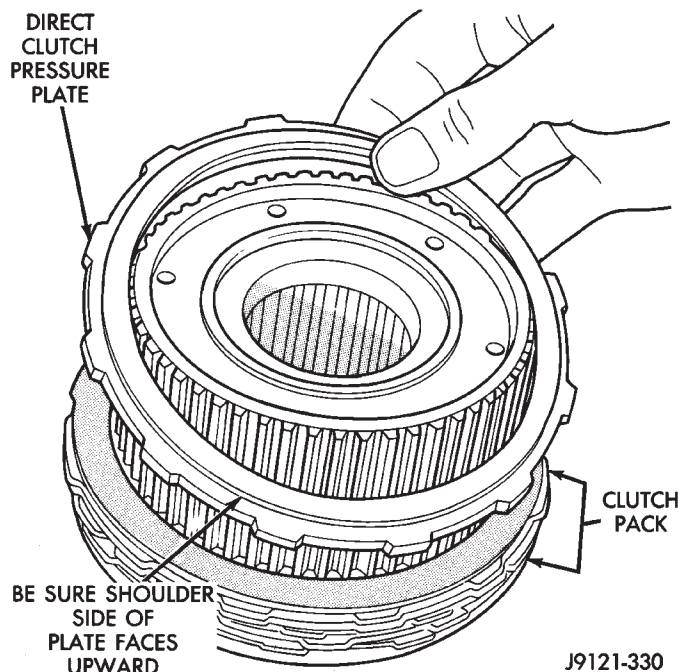


**Fig. 49 Direct Clutch Pack Components**



**Fig. 50 Correct Position Of Direct Clutch Reaction Plate**

(23) Position Special Tool C-3995-A or similar type tool on top of Tool 6227-1 (Fig. 19).



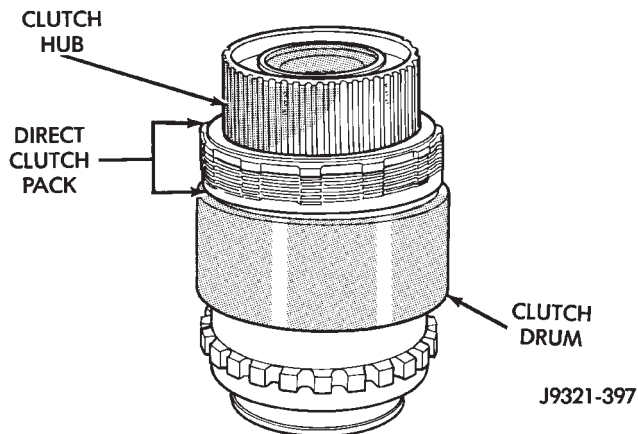
**Fig. 51 Correct Position Of Direct Clutch Pressure Plate**

(24) Compress clutch hub and spring just enough to place tension on hub and hold it in place.

(25) Slide direct clutch pack upwards on hub (Fig. 53). Then set clutch pack on edge of clutch hub and compressor tool as shown.

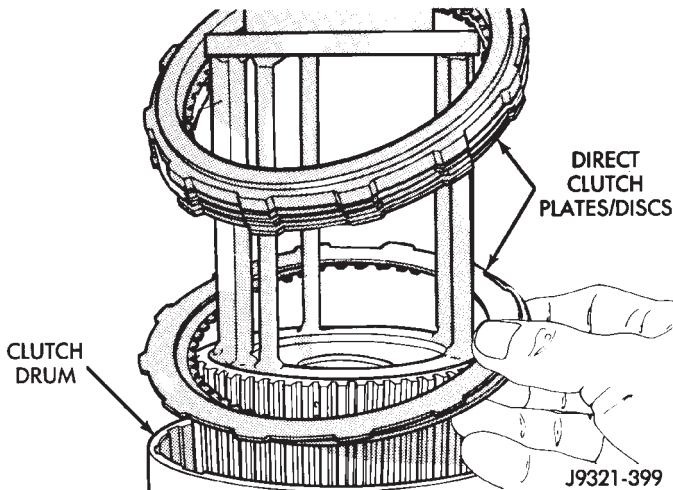
(26) Slowly compress clutch hub and spring (Fig. 53). Compress spring and hub only enough to expose ring grooves for clutch pack snap ring and clutch hub retaining ring.





**Fig. 52 Installing Direct Clutch Pack And Clutch Hub**

(27) Realign clutch pack on hub and seat clutch discs and plates in clutch drum (Fig. 53).



**Fig. 53 Seating Clutch Pack In Drum**

(28) Install direct clutch pack snap ring (Fig. 54). **Be very sure snap ring is fully seated in clutch drum ring groove.**

(29) Install clutch hub retaining ring (Fig. 55). **Be very sure retaining ring is fully seated in sun gear ring groove.**

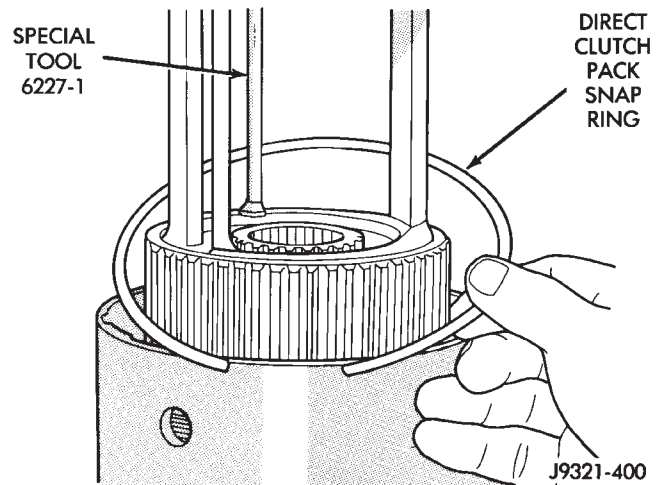
(30) Slowly release press ram, remove compressor tools and remove geartrain assembly.

#### GEAR CASE ASSEMBLY AND INSTALLATION

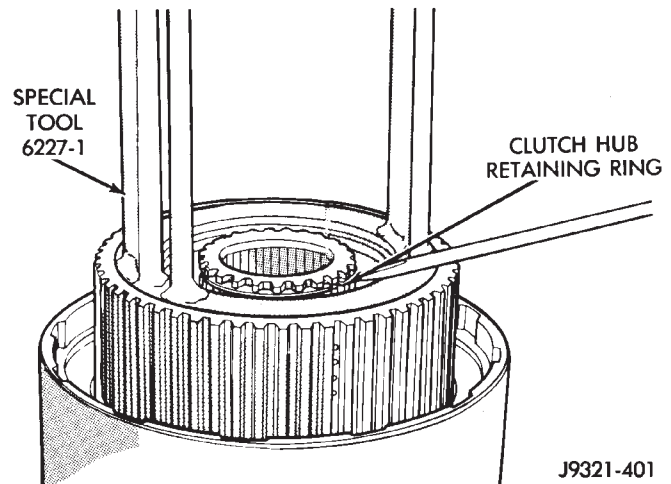
(1) Position park pawl and spring in case and install park pawl shaft (Fig. 34). Verify that end of spring with 90° bend is hooked to pawl and straight end of spring is seated against case.

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

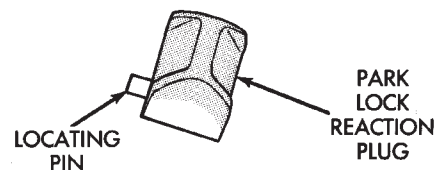


**Fig. 54 Installing Direct Clutch Pack Snap Ring**



**Fig. 55 Installing Clutch Hub Retaining Ring**

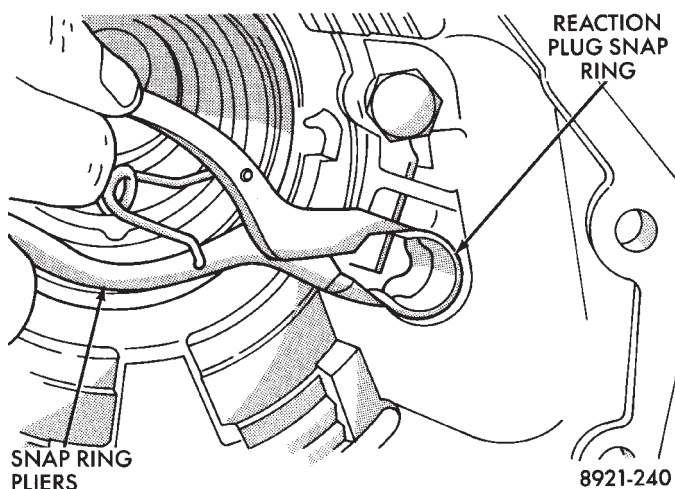
(4) Install reaction plug snap ring (Fig. 57). **Compress snap ring only enough for installation; do not distort it.**



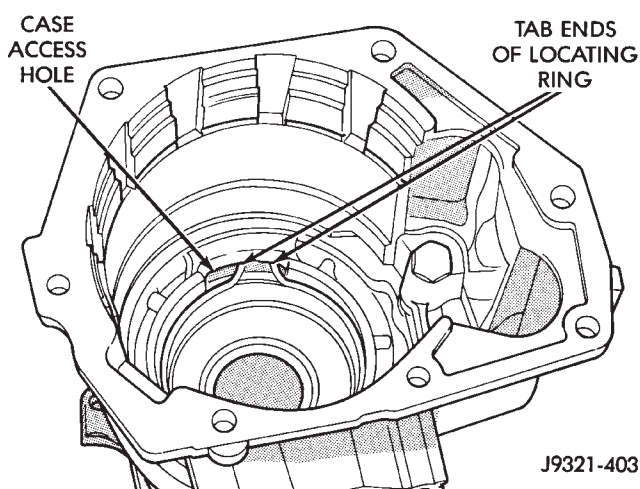
**Fig. 56 Reaction Plug Locating Pin And Snap Ring**

(5) Install new seal in gear case (Fig. 58). On 4 x 4 gear case, use Tool Handle C-4171 and Installer 5062

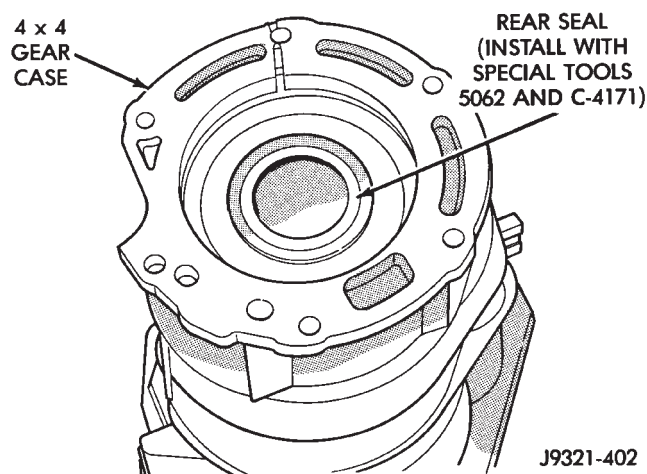




**Fig. 57 Reaction Plug And Snap Ring Installation**  
(or similar size tool) to seat seal in case. On 4 x 2 gear case, use same tool handle and suitable size installer to seat seal in case.



**Fig. 59 Correct Rear Bearing Locating Ring Position**



**Fig. 58 Rear Seal Installation (In 4 x 4 Gear Case)**

(6) Verify that tab ends of rear bearing locating ring extend into access hole in gear case (Fig. 59).

(7) Support geartrain on Tool 6227-1 (Fig. 60). Be sure tool is securely seated in clutch hub.

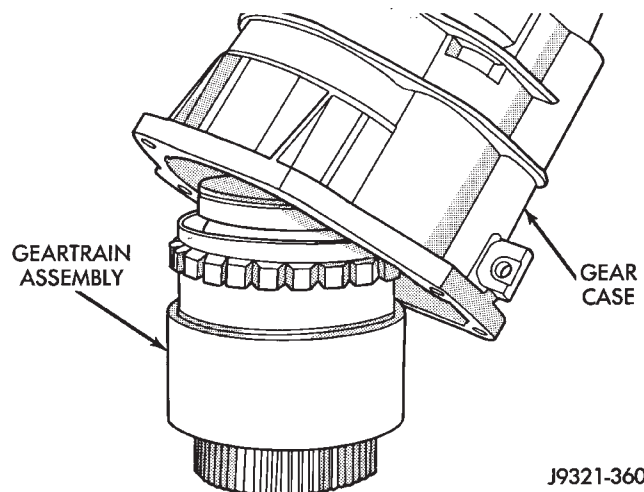
(8) Install overdrive gear case on geartrain (Fig. 60).

(9) Expand front bearing locating ring with snap ring pliers (Fig. 61). Then slide case downward until locating ring locks in bearing groove and release snap ring.

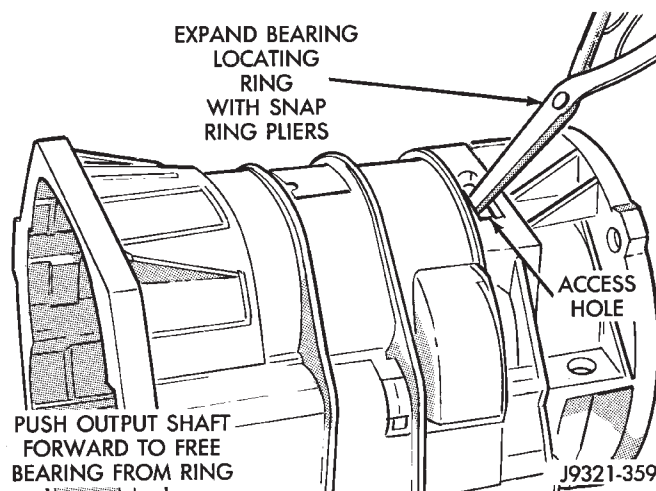
(10) Install locating ring access cover and gasket in overdrive unit case (Fig. 62).

#### OVERDRIVE CLUTCH INSTALLATION

(1) Install overdrive clutch reaction ring first. Reaction ring is flat with notched ends (Fig. 63).

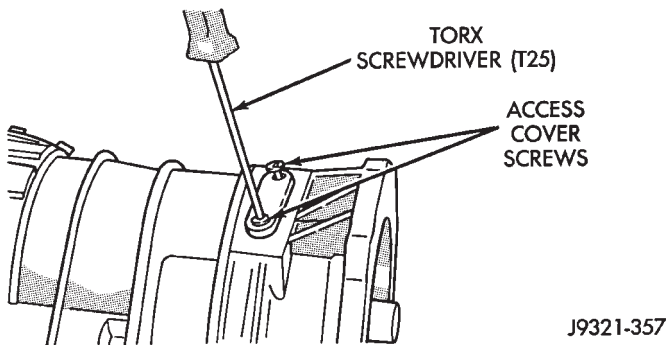


**Fig. 60 Overdrive Gear Case Installation**

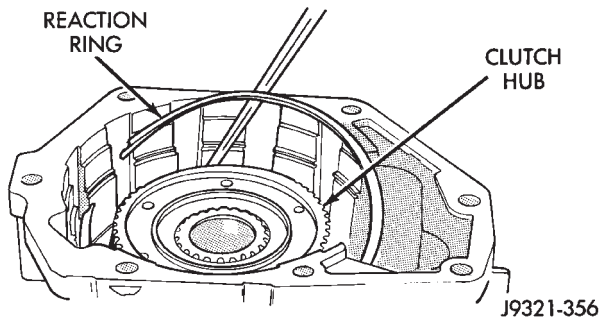


**Fig. 61 Seating Locating Ring In Rear Bearing**

(2) Install wave spring on top of reaction ring (Fig. 64). **Reaction ring and wave ring both fit in same ring groove.** Use screwdriver to seat each ring securely in groove.

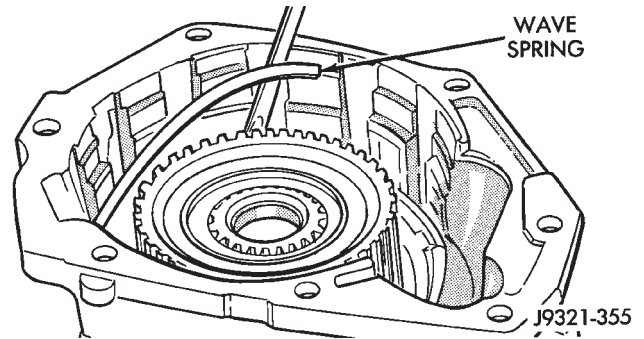


**Fig. 62 Installing Locating Ring Access Cover And Gasket**



**Fig. 63 Overdrive Clutch Reaction Ring Installation**

- (3) Assemble overdrive clutch pack (Fig. 65).
- (4) Install overdrive clutch reaction plate first. **Note that reaction plate is thinner than pressure plate.**
- (5) Install first clutch disc followed by first clutch plate. Then install remaining clutch discs and plates in same order.

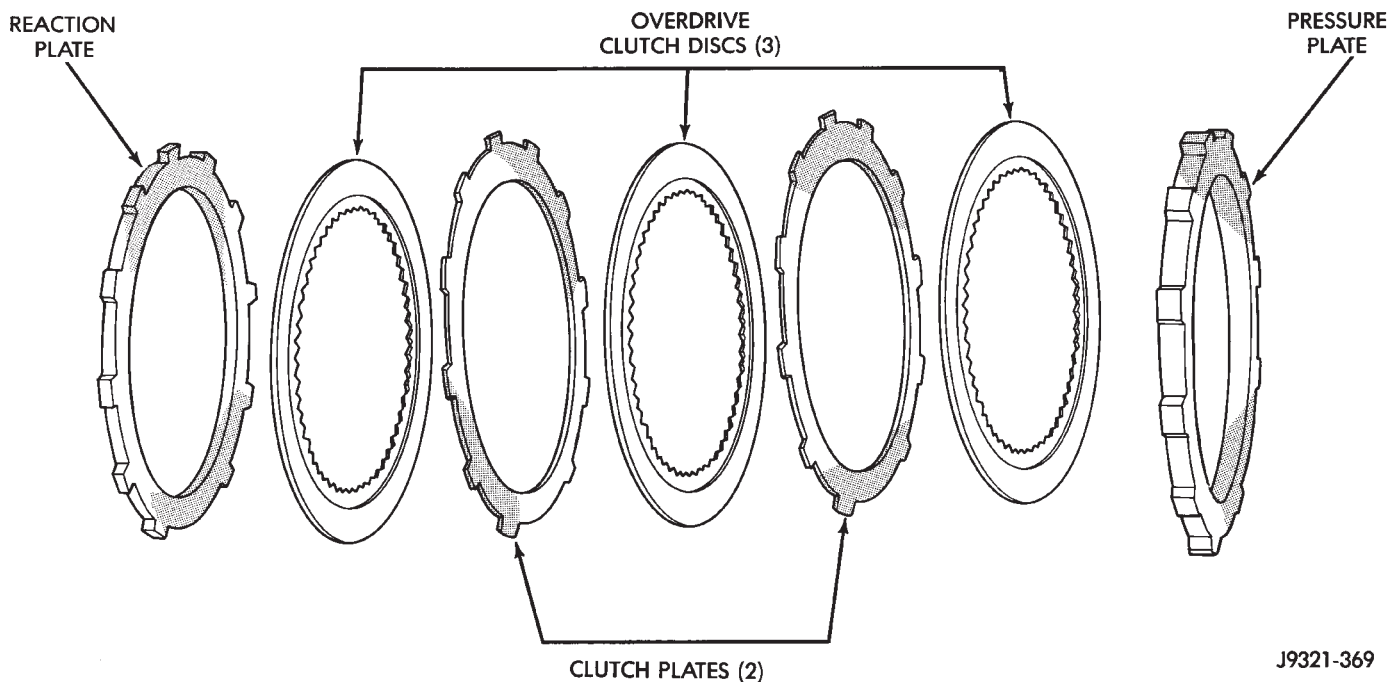


**Fig. 64 Overdrive Clutch Wave Spring Installation**

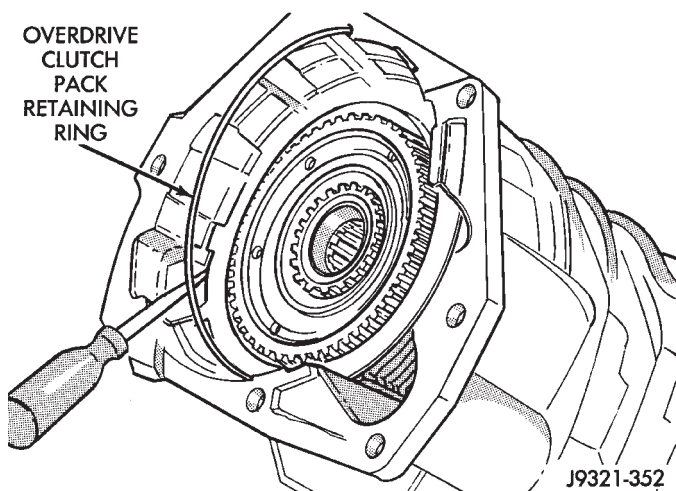
- (6) Verify clutch pack. 4 clutch discs, 3 steel plates, 1 reaction plate and 1 pressure plate are required.
- (7) Install clutch pack pressure plate. Note that pressure plate is thickest plate in clutch pack.
- (8) Install clutch pack wire-type retaining ring (Fig. 66).

#### SHAFT END PLAY ADJUSTMENT

- (1) Place overdrive unit in vertical position and mount unit in vise or in workbench with appropriate size mounting hole cut into it. Be sure unit is facing upward for access to direct clutch hub.
- (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.



**Fig. 65 Overdrive Clutch Components**



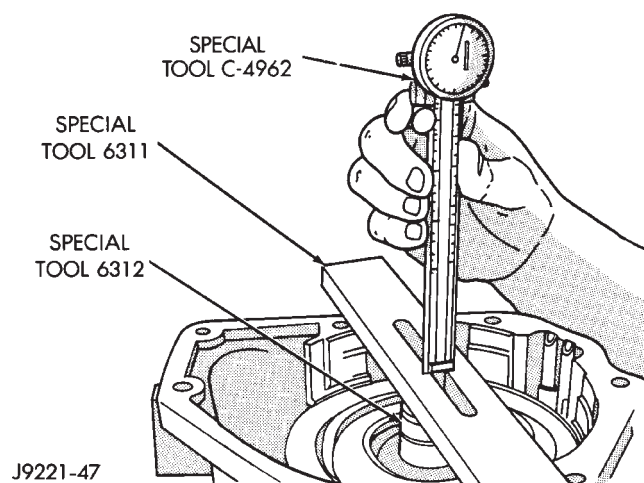
**Fig. 66 Installing Overdrive Clutch Pack Retaining Ring**

(b) Position Gauge Tool 6311 across face of overdrive case (Fig. 67). 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. 67).

(d) Select proper thickness end play spacer from spacer chart based on distance measured (Fig. 68).

(e) Remove Gauge Alignment Tool 6312.



**Fig. 67 Shaft End Play Measurement**

(3) 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. 69).

(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. 70).

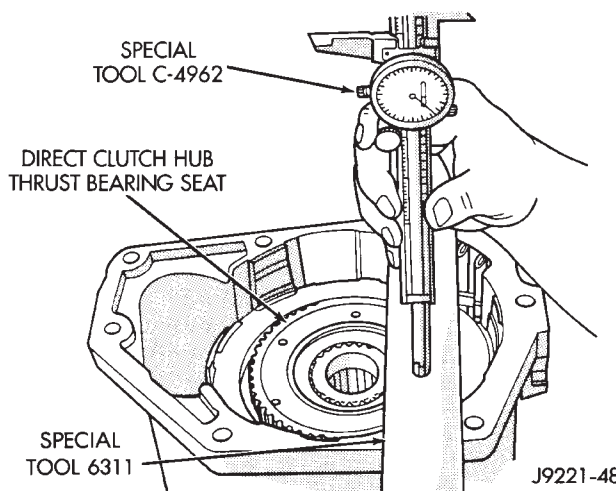
End Play Measurement (Inches)	Spacer Thickness (Inches)
.7336 - .7505	.158 - .159
.7506 - .7675	.175 - .176
.7676 - .7855	.193 - .194
.7856 - .8011	.211 - .212

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**Fig. 68 Intermediate Shaft End Play Spacer Selection**

(4) 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.

(5) 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. 69 Overdrive Piston Thrust Plate Measurement**

End Play Measurement (Inches)	Spacer Thickness (Inches)
1.7500 - 1.7649	.108 - .110
1.7650 - 1.7799	.123 - .125
1.7800 - 1.7949	.138 - .140
1.7950 - 1.8099	.153 - .155
1.8100 - 1.8249	.168 - .170
1.8250 - 1.8399	.183 - .185
1.8400 - 1.8549	.198 - .200
1.8550 - 1.8699	.213 - .215
1.8700 - 1.8849	.228 - .230
1.8850 - 1.8999	.243 - .245

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**Fig. 70 Overdrive Piston Thrust Plate Selection**

## SPECIFICATIONS

## 42RE GENERAL SPECIFICATIONS

TRANSMISSION MODEL	42 RE
Oil Pump Clearances (all)	0.089-0.190 mm (0.0035-0.0075 in)
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 Clutch (4 Disc)	1.70-3.40 mm (0.067-0.134 in)
Rear Clutch (4 Disc)	0.81-1.40 mm (0.032-0.055 in)
Clutch Disc Usage: Front Clutch Rear Clutch Overdrive Clutch Direct Clutch	4 4 3 6
Band Adjustments: (backed off from 72 in. lbs.) Front Band Rear Band	3-5/8 Turns 4 Turns
Recommended (and preferred) Fluid	MOPAR ATF Plus, Type 7176 Automatic Transmission Fluid J9321-449

## 42RE THRUST WASHER/SPACER/SNAP RING DIMENSIONS

TRANSMISSION MODEL	42 RE
Front Clutch Thrust Washer (on reaction shaft support hub)	0.061 in.
Rear Clutch Thrust Washer (on clutch retainer)	0.061 in.
Intermediate Shaft Thrust Plate (on shaft pilot hub)	0.060-0.063 in.
Intermediate Shaft Thrust Washer (in rear clutch hub)	Select fit to set overall end play
Rear Clutch Pack Snap Ring	0.060 in. 0.076 in. 0.098 in.
Planetary Geartrain Snap Ring (at front end of intermediate shaft)	Select fit (3 thicknesses available)
Overdrive Piston Thrust Plate	Thrust plate and spacer are select fit components. Refer to size charts and selection procedures in "Overdrive Unit Assembly and Adjustment." J9321-450
Intermediate Shaft Spacer	

## 42RE PRESSURE SPECIFICATIONS

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 R Range	No more than 21 kPa (3 psi) lower than line pressure. 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 (0-1½ psi) when stopped with transmission in D, 1, 2. <b>Pressure above 7 kPa (1½ psi) at standstill will prevent transmission from downshifting.</b>



## 42RE TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Cooler Line Fittings (at transmission) .....	18 N•m (13 ft. lbs.)
Converter Bolts:	
10.75 in., 4-lug converter.....	31 N•m (270 in. lbs.)
Crossmember Bolts/Nuts .....	68 N•m (50 ft. lbs.)
Driveplate Bolts .....	75 N•m (55 ft. lbs.)
Front Band Lever Pivot Shaft	
Access Plug .....	17 N•m (13 ft. lbs.)
Front Band Adjusting Screw Locknut .....	34 N•m (25 ft. lbs.)
Park/Neutral Position Switch.....	34 N•m (25 ft. lbs.)
Oil Filter Screws.....	4 N•m (35 in. lbs.)
Oil Pan Bolt .....	17 N•m (13 ft. lbs.)
Oil Pump Bolt.....	20 N•m (15 ft. lbs.)
Overrunning Clutch Cam Bolts .....	17 N•m (150 in. lbs.)

DESCRIPTION	TORQUE
Overdrive-to-Transmission	
Case Bolts.....	34 N•m (25 ft. lbs.)
Overdrive Piston Retainer Bolts.....	17 N•m (150 in. lbs.)
Pressure Test Port Plugs.....	14 N•m (10 ft. lbs.)
Propeller Shaft Clamp Bolts .....	19 N•m (170 in. lbs.)
Reaction Shaft Support Bolts.....	20 N•m (15 ft. lbs.)
Rear Band Adjusting Screw Locknut.....	41 N•m (30 ft. lbs.)
Solenoid Wiring Connector Screw.....	4 N•m (35 in. lbs.)
Solenoid-to-Transfer Plate Screw .....	4 N•m (35 in. lbs.)
Speedometer Adapter Bolt .....	11 N•m (8 ft. lbs.)
Valve Body/Governor Body Screws.....	4 N•m (35 in. lbs.)
Valve Body-to-Case Bolts .....	12 N•m (100 in. lbs.)
Transmission speed sensor .....	27 N•m (20 ft. lbs.)

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