

TRANSMISSION AND TRANSFER CASE

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42/44RE AUTOMATIC TRANSMISSION

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GENERAL INFORMATION**42/44 RE TRANSMISSION**

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

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

GENERAL INFORMATION (Continued)

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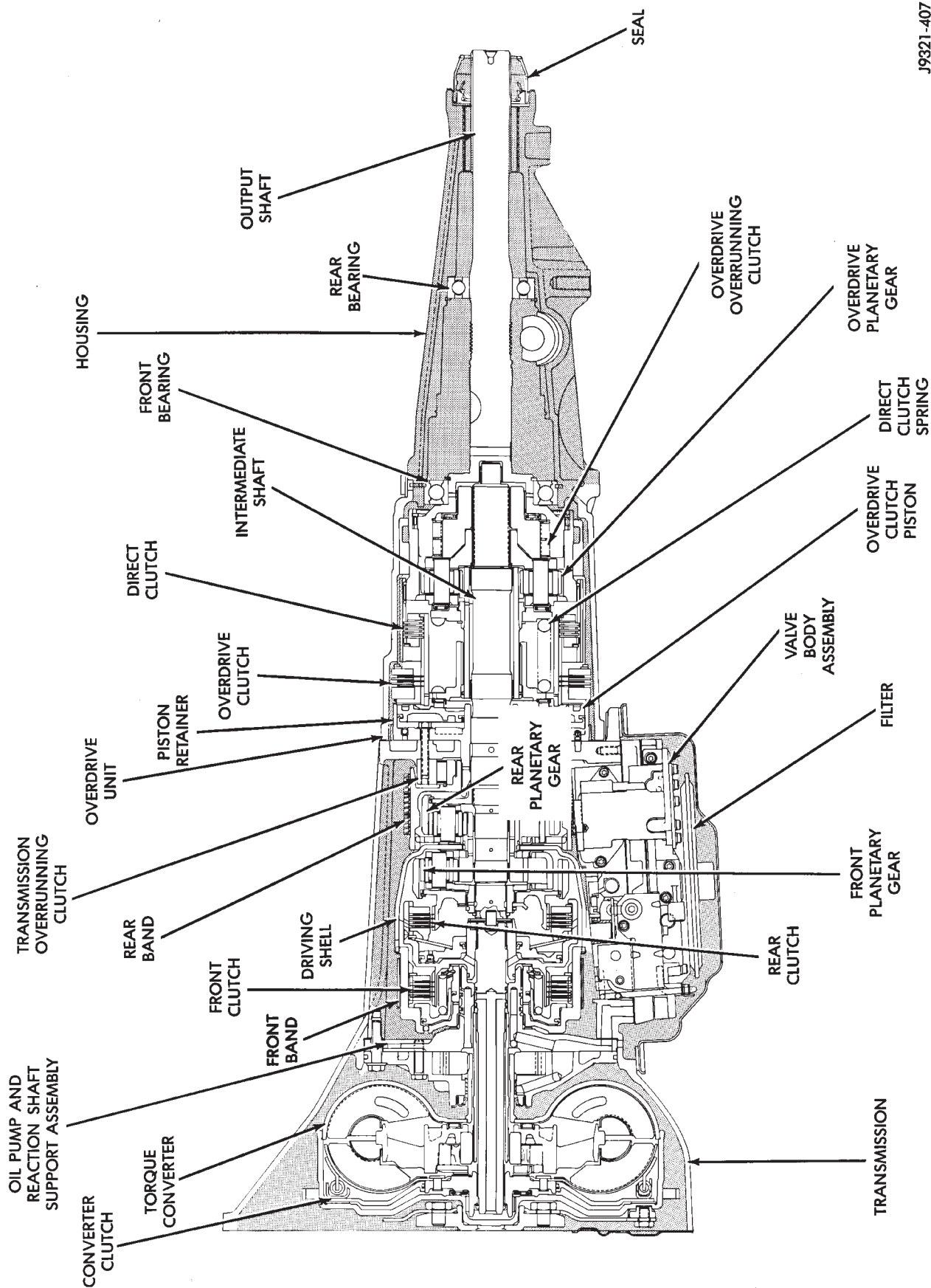


Fig. 1 42/44 RE Transmission

GENERAL INFORMATION (Continued)

TRANSMISSION IDENTIFICATION

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

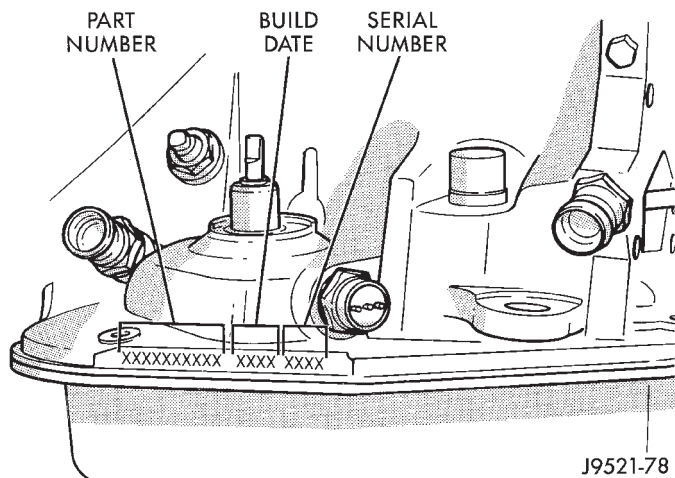


Fig. 2 Transmission Part And Serial Number Location

RECOMMENDED FLUID

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

Dexron II fluid IS NOT recommended. Clutch chatter can result from the use of improper fluid. If Mopar ATF Plus is not available, Dexron II can be used as a supplement if the vehicle must be driven.

TORQUE CONVERTER—ELECTRONIC CLUTCH

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

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

CAUTION: The torque converter must be replaced if a transmission failure resulted in large amounts of metal or fiber contamination in the fluid. If the fluid is contaminated, flush the fluid cooler and lines.

TRANSMISSION GEAR RATIOS

42/44 RE forward gear ratios are:

- 2.74:1 (first gear)
- 1.54:1 (second gear)
- 1.00:1 (third gear)
- 0.69:1 (fourth gear)
- 2.21 (reverse)

GEARSHIFT MECHANISM

The shift mechanism is cable operated and provides six shift positions. The shift indicator is located on the steering column forward of the steering wheel. The shift positions are:

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

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

DESCRIPTION AND OPERATION

ELECTRONIC GOVERNOR

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

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

GOVERNOR PRESSURE SOLENOID VALVE

The solenoid valve regulates the governor pressure needed for upshifts and downshifts. It is an electro-

DESCRIPTION AND OPERATION (Continued)

hydraulic device located in the governor body on the valve body transfer plate (Fig. 3).

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

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

The powertrain control module (PCM) 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 PCM energizes the solenoid by grounding it through the power ground terminal on the PCM.

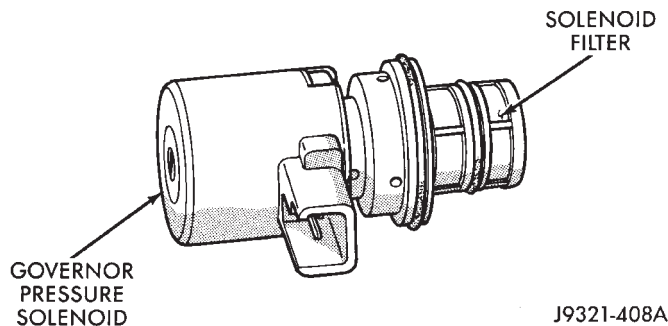


Fig. 3 Governor Pressure Solenoid Valve

GOVERNOR PRESSURE SENSOR

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

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

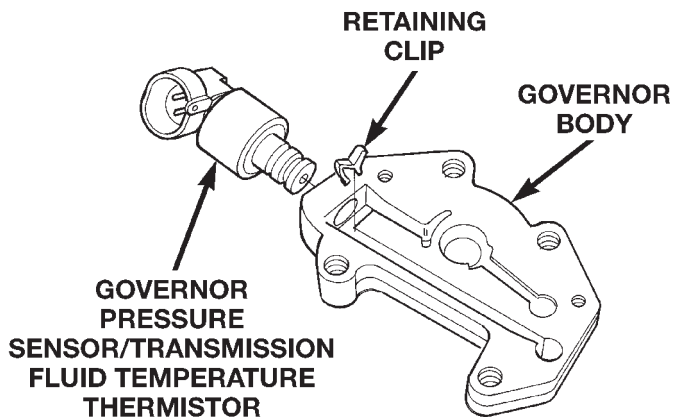


Fig. 4 Governor Pressure Sensor

GOVERNOR BODY AND TRANSFER PLATE

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

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

TRANSMISSION FLUID TEMPERATURE THERMISTOR

Transmission fluid temperature readings are supplied to the transmission control module by the thermistor (Fig. 5). The temperature readings are used to control engagement of the fourth gear overdrive clutch, the converter clutch, and governor pressure. Normal resistance value for the thermistor at room temperature is approximately 1000 ohms.

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

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

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

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

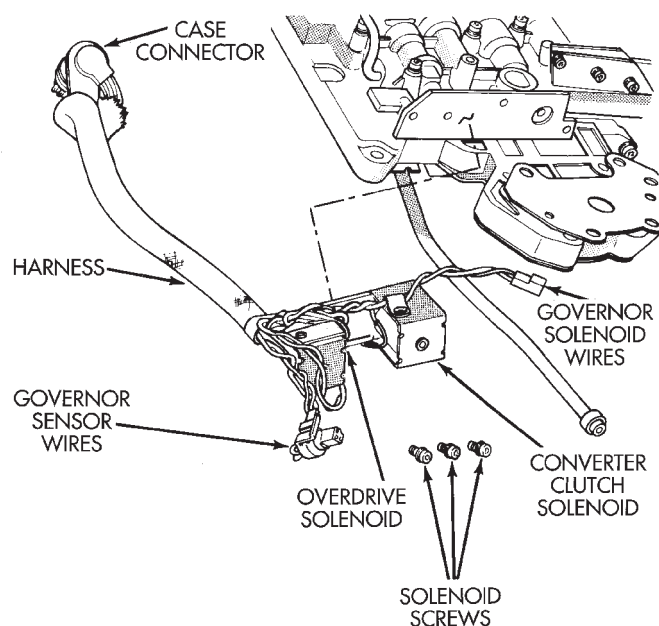
TRANSMISSION SPEED SENSOR

The speed sensor (Fig. 6) is located in the overdrive gear case. The sensor is positioned over the park gear and monitors transmission output shaft rotating speed. Speed sensor signals are triggered by the park gear lugs as they rotate past the sensor pickup face. Input signals from the sensor are sent to the transmission control module for processing. The vehicle speed sensor also serves as a backup for the transmission speed sensor. Signals from this sensor are shared with the powertrain control module.

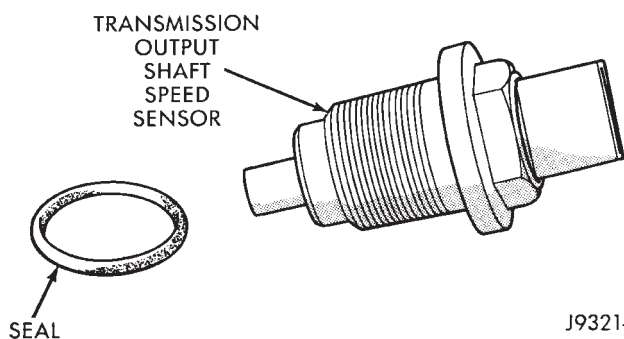
THROTTLE POSITION SENSOR (TPS)

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

DESCRIPTION AND OPERATION (Continued)



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Fig. 5 Thermistor Location

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Fig. 6 Transmission Speed Sensor**POWERTRAIN CONTROL MODULE (PCM)**

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

The control module determines transmission shift points based on input signals from the transmission thermistor, transmission output shaft speed sensor, crankshaft position sensor, vehicle speed sensor, 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 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 instrument panel near the steering column. 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, 10°C (50°F) during normal city or highway driving. A third curve is used during wide-open throttle operation. The fourth curve is used when driving with the transfer case in low range.

SHIFT VALVE OPERATION

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

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

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

HYDRAULIC CONTROL SYSTEM

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

PRESSURE REGULATION

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

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

Shift Valve Flow Control

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

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

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

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

DESCRIPTION AND OPERATION (Continued)

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

The 3-4 shift, quick fill, and timing valves plus the 3-4 accumulator, are only actuated when the overdrive solenoid is energized.

The solenoid contains a check ball that controls a vent port to the 3-4 valves. The check ball either diverts line pressure away from or directly to the 3-4 valves.

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

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

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

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

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

OVERDRIVE OFF SWITCH

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

3-4 SHIFT SEQUENCE

The overdrive clutch is applied in fourth gear only. The direct clutch is applied in all ranges except fourth gear. Fourth gear overdrive range is electron-

ically controlled and hydraulically activated. Various sensor inputs are supplied to the powertrain control module to operate the overdrive solenoid on the valve body. The solenoid contains a check ball that opens and closes a vent port in the 3-4 shift valve feed passage. The overdrive solenoid (and check ball) are not energized in first, second, third, or reverse gear. The vent port remains open, diverting line pressure from the 2-3 shift valve away from the 3-4 shift valve. The overdrive control switch must be in the ON position to transmit overdrive status to the PCM. A 3-4 upshift occurs only when the overdrive solenoid is energized by the PCM. The PCM energizes the overdrive solenoid during the 3-4 upshift. This causes the solenoid check ball to close the vent port allowing line pressure from the 2-3 shift valve to act directly on the 3-4 upshift valve. Line pressure on the 3-4 shift valve overcomes valve spring pressure moving the valve to the upshift position. This action exposes the feed passages to the 3-4 timing valve, 3-4 quick fill valve, 3-4 accumulator, and ultimately to the overdrive piston. Line pressure through the timing valve moves the overdrive piston into contact with the overdrive clutch. The direct clutch is disengaged before the overdrive clutch is engaged. The boost valve provides increased fluid apply pressure to the overdrive clutch during 3-4 upshifts, and when accelerating in fourth gear. The 3-4 accumulator cushions overdrive clutch engagement to smooth 3-4 upshifts. The accumulator is charged at the same time as apply pressure acts against the overdrive piston.

CONVERTER CLUTCH ENGAGEMENT

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

QUICK FILL VALVE

The 3-4 quick fill valve provides faster engagement of the overdrive clutch during 3-4 upshifts. The valve temporarily bypasses the clutch piston feed orifice at the start of a 3-4 upshift. This exposes a larger passage into the piston retainer resulting in a much faster clutch fill and apply sequence. The quick fill

DESCRIPTION AND OPERATION (Continued)

valve does not bypass the regular clutch feed orifice throughout the 3-4 upshift. Instead, once a predetermined pressure develops within the clutch, the valve closes the bypass. Clutch fill is then completed through the regular feed orifice.

CONVERTER DRAINBACK VALVE

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

BRAKE TRANSMISSION SHIFTER INTERLOCK MECHANISM

The Brake Transmission Shifter/Ignition Interlock (BTSI), is a cable and solenoid operated system. It interconnects the automatic transmission floor mounted shifter to the steering column ignition switch (Fig. 7). The system locks the shifter into the PARK position. The Interlock system is engaged whenever the ignition switch is in the LOCK or ACCESSORY position. An additional electrically activated feature will prevent shifting out of the PARK

position unless the brake pedal is depressed at least one-half an inch. A magnetic holding device in line with the park lock cable is energized in PARK when the ignition is in the OFF-LOCK position. When the key is in the OFF or RUN position and the brake pedal is depressed, the shifter is unlocked and will move into any position. The interlock system also prevents the ignition switch from being turned to the LOCK or ACCESSORY position (Fig. 8). Unless the shifter is fully locked into the PARK position.

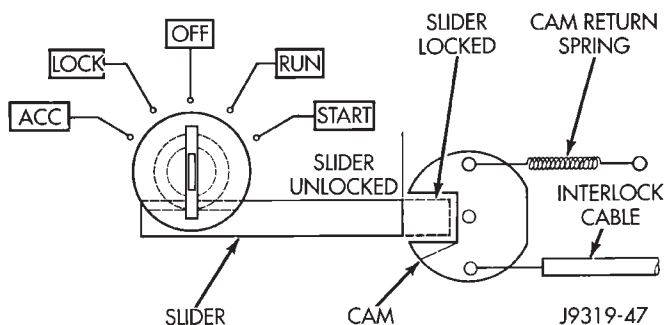


Fig. 8 Ignition Key Cylinder Actuation

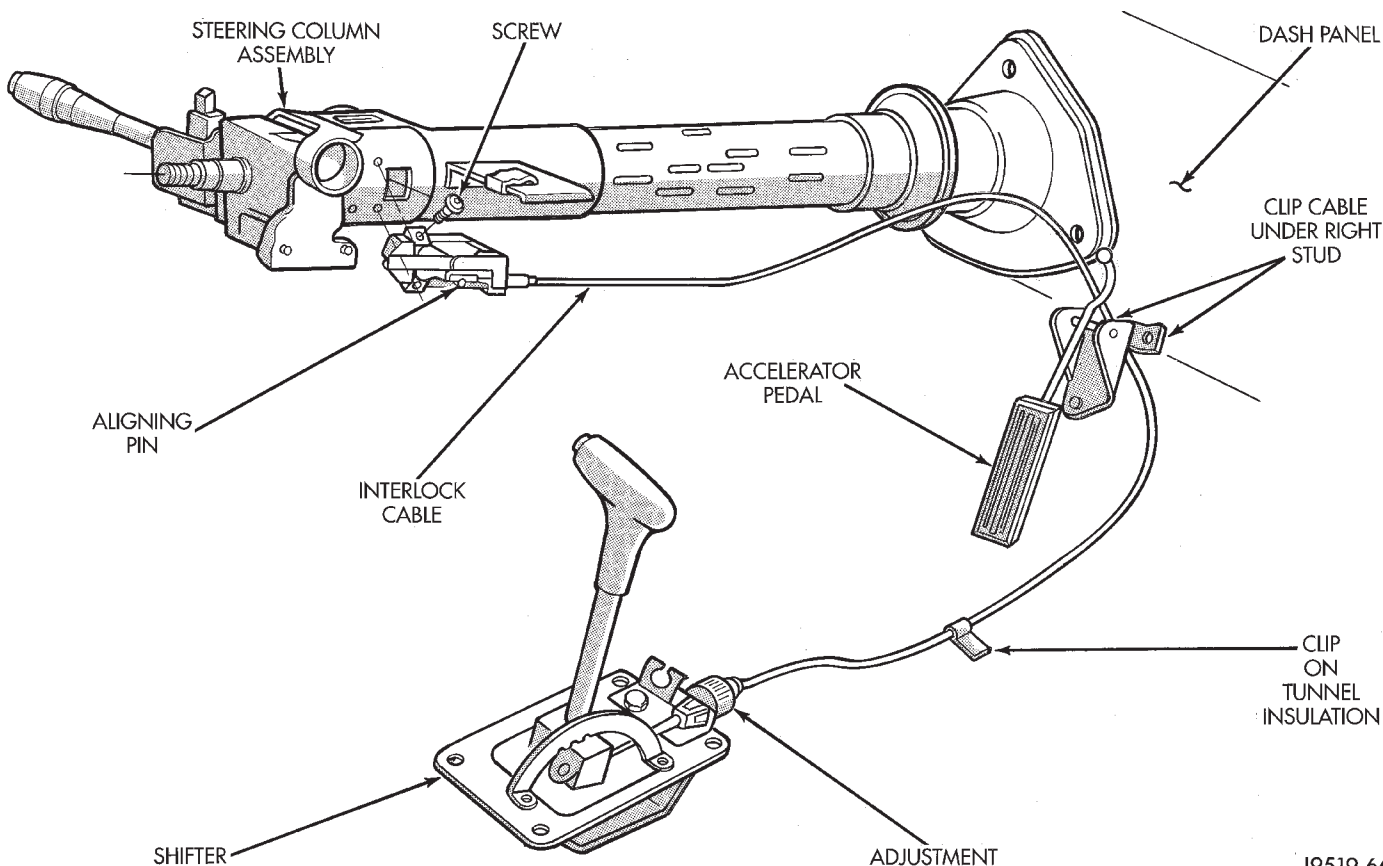


Fig. 7 Ignition Interlock Cable Routing

DIAGNOSIS AND TESTING

AUTOMATIC TRANSMISSION DIAGNOSIS

Automatic transmission problems can be a result of poor engine performance, incorrect fluid level, incorrect linkage or cable adjustment, band or hydraulic control pressure adjustments, hydraulic system malfunctions or electrical/mechanical component malfunctions. Begin diagnosis by checking the easily accessible items such as: fluid level and condition, linkage adjustments and electrical connections on 4-speed models. A road test will determine if further diagnosis is necessary.

PRELIMINARY DIAGNOSIS

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

VEHICLE IS DRIVEABLE

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

VEHICLE IS DISABLED

- (1) Check fluid level and condition.
- (2) Check for broken or disconnected gearshift or throttle linkage.
- (3) Check for cracked, leaking cooler lines, or loose or missing pressure-port plugs.
- (4) Raise and support vehicle on safety stands, start engine, shift transmission into gear, and note following:
 - (a) If propeller shaft turns but wheels do not, problem is with differential or axle shafts.
 - (b) If propeller shaft does not turn and transmission is noisy, stop engine. Remove oil pan, and check for debris. If pan is clear, remove transmission and check for damaged drive plate, converter, oil pump, or input shaft.
 - (c) If propeller shaft does not turn and transmission is not noisy, perform hydraulic-pressure test to determine if problem is hydraulic or mechanical.

PARK/NEUTRAL POSITION SWITCH

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

SWITCH TEST

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

Shift the transmission into REVERSE and test continuity at the switch outer terminals (Fig. 9). Continuity should exist only when the transmission is in REVERSE. Continuity should not exist between the outer terminals and the case.

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

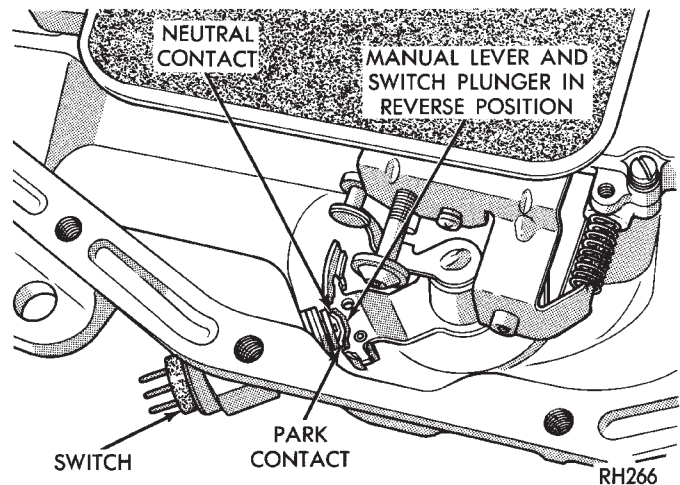


Fig. 9 Park/Neutral Switch Terminals

CHECKING FLUID LEVEL AND CONDITION

Transmission fluid level and condition should be checked a minimum of six times per year under normal operation. If the vehicle is used for commercial operation, trailer towing, or similar high load operation, fluid level and condition should be checked weekly.

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

- (1) Transmission fluid must be at normal operating temperature for accurate fluid level check. Drive

DIAGNOSIS AND TESTING (Continued)

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 indicator levels (Fig. 10) which are a MIN dot, an OK crosshatch area, and a MAX fill arrow.

(b) Correct maximum level is to MAX arrow mark. Correct acceptable level is to OK mark in crosshatch area. Incorrect level is at or below MIN dot.

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.

(c) If fluid is low, add only enough Mopar ATF Plus to restore correct level. Do not overfill.

(d) 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.

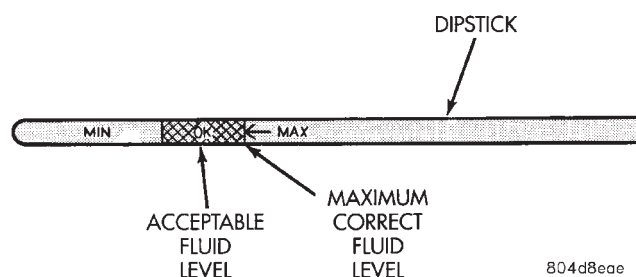


Fig. 10 Dipstick Fluid Level Marks

(8) Check **fluid condition** as follows:

(a) Fluid color should range from dark red to pink and be free of particles and sludge.

(b) If fluid is orange, brown, or smells burned but shifts were OK, flow test and reverse flush cooler and lines. Then change fluid and filter and road test again to confirm proper operation.

(c) If fluid is black, dark brown, turned to sludge, contains extensive amount of metal or friction material particles, transmission will need

overhaul. Main and auxiliary coolers will have to be flow tested and reverse flushed as well.

EFFECTS OF INCORRECT FLUID LEVEL

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

CAUSES OF BURNED FLUID

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

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

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

FLUID CONTAMINATION

Transmission fluid contamination is generally a result of:

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

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

DIAGNOSIS AND TESTING (Continued)

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

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

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

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

OIL COOLER FLOW CHECK

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

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

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

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

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

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

OVERDRIVE ELECTRICAL CONTROLS

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

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

BRAKE TRANSMISSION SHIFT INTERLOCK

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

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

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

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

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

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

(7) If additional cable adjustment is required, slide the adjuster forward or rearward to obtain the correct position.

GEARSHIFT CABLE

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

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

With floorshift lever handle pushbutton not depressed and lever in:

- PARK position- Apply forward force on center of handle and remove pressure. Engine start must be possible.

- PARK position- Apply rearward force on center of handle and remove pressure. Engine start must be possible.

- NEUTRAL position- Normal position. Engine start must be possible.

- NEUTRAL position- Engine running and brakes applied. Apply forward force on center of shift handle. Transmission shall not be able to shift from neutral to reverse

(3) If additional cable adjustment is required, slide the adjuster forward or rearward to obtain the correct position.

DIAGNOSIS AND TESTING (Continued)

TRANSMISSION CONTROL CABLE ADJUSTMENT

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

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

Shift-cable adjustment is important because it positions the valve body manual valve. Incorrect adjustment will cause creeping in NEUTRAL, premature clutch wear, delayed engagement in any gear, or the engine will not crank in PARK or NEUTRAL position.

Proper operation of the park/neutral position switch will provide a quick check of shift cable adjustment. Refer to the Adjustments section for adjustment procedure.

ROAD TESTING

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

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

Operate the transmission in all gear ranges. Check for shift variations and engine flare which indicates

slippage. Note if shifts are harsh, spongy, delayed, early, or if part throttle downshifts are sensitive.

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

A slipping clutch or band can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch and Band Application charts (Fig. 11) provide a basis for analyzing road test results.

ANALYZING ROAD TEST

Refer to the Clutch and Band Application chart (Fig. 11) 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

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

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Fig. 11 Clutch And Band Application

DIAGNOSIS AND TESTING (Continued)

transmission slips in third gear, either the front clutch or the rear clutch is slipping.

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

If slippage occurs during the 3-4 shift or only in fourth gear, the overdrive clutch is slipping. Similarly, if the direct clutch were to fail, the transmission would lose both reverse gear and overrun braking in 2 position (manual second gear). If the transmission 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 the probable cause.

HYDRAULIC PRESSURE TEST

Hydraulic test pressures range from a low of one psi (6.895 kPa) governor pressure, to 300 psi (2068 kPa) at the rear servo pressure port in reverse. Use 100 psi Gauge C-3292 to check pressure at the accumulator, front servo and governor. Use 300 psi Gauge C-3293-SP to check pressure at the rear servo and overdrive port.

Pressure Test Port Locations

Pressure test ports locations are provided at the accumulator, front servo, and rear servo, governor passage, and overdrive clutch pressure passage (Fig. 12).

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, and front servo pressure ports. Test Gauge C-3293-SP has a 300 psi range and is used at the rear servo port and overdrive test ports where pressures are higher. In cases where two test gauges are required, the 300 psi gauge can be used at any of the other test ports.

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. 12).

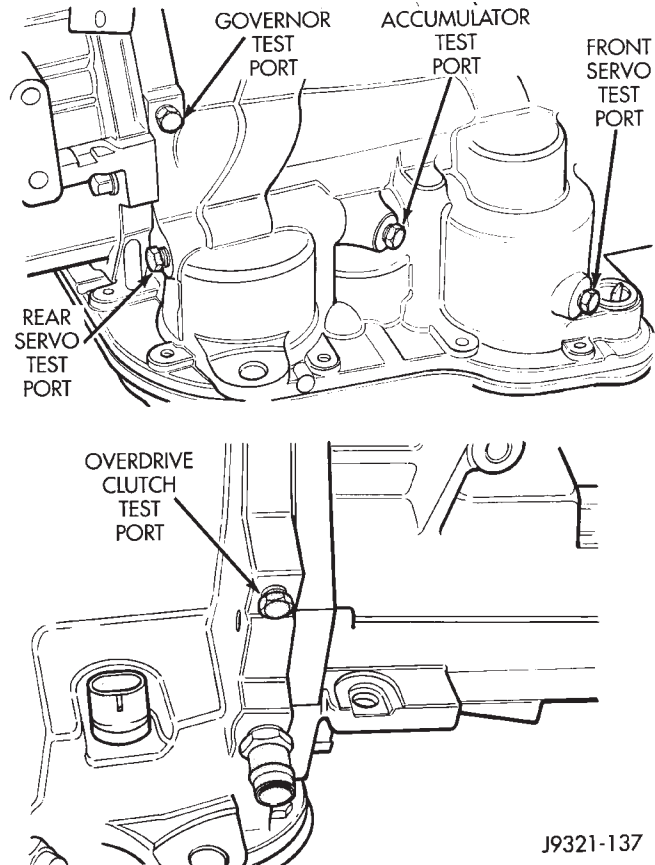


Fig. 12 Pressure Test Ports

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 a hoist that will allow the wheels to rotate freely.

Test One - Transmission In Manual Low

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

(1) Connect 100 psi Gauge C-3292 to accumulator port.

(2) Connect 300 psi Gauge C-3293-SP to rear servo port (Fig. 12).

(3) Disconnect throttle and gearshift rods from manual and throttle levers.

(4) Start and run engine at 1000 rpm.

DIAGNOSIS AND TESTING (Continued)

(5) Move shift lever (on manual lever shaft) all the way forward into manual low.

(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 Manual Second

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

(1) Connect test gauge to accumulator pressure port (Fig. 12).

(2) Start and run engine at 1000 rpm.

(3) Move shift lever on valve body manual lever shaft, one detent rearward from full forward position. This is manual second.

(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-SP for this test.

(1) Connect test gauges to accumulator and front servo ports (Fig. 12). Use either test gauge at the two ports.

(2) Start and run engine at 1600 rpm for this test.

(3) Move selector lever to D range. This is two detents rearward from full forward position.

(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-SP for this test.

(1) Connect 300 psi gauge to rear servo port (Fig. 12).

(2) Start and run engine at 1600 rpm for test.

(3) Move valve body selector 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 engine speed. It is usually not necessary to check governor operation unless shift speeds are incorrect or if the transmission will not downshift.

(1) Connect 100 psi Test Gauge C-3292 to governor pressure port (Fig. 12).

(2) Move 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 1.5 psi maximum. If pressure exceeds this figure, governor valve or weights are sticking open.

(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 1.5 psi when wheels stop rotating.

(6) Compare results of pressure tests with analysis charts (Fig. 13).

Test Six - Overdrive Fourth Gear

This test checks line pressure at the overdrive clutch in fourth gear range. The test should be performed on the road or on a chassis dynamometer. Do not perform this test on a hoist. Use 300 psi Test Gauge C-3292 for this test.

(1) Remove tachometer; it is not needed for this test.

(2) Move 300 psi Gauge to overdrive clutch pressure test port. Then remove other gauge and reinstall test port plug.

(3) Lower vehicle.

(4) Turn on OD switch.

(5) Secure test gauge so it can be viewed from driver's seat.

(6) Start engine and shift into D range.

(7) Increase vehicle speed gradually until 3-4 shift occurs and note gauge pressure.

(8) Pressure should be 469-496 kPa (68-72 psi) with closed throttle and increase to 620-827 kPa (90-120 psi) at 1/2 to 3/4 throttle. Note that pressure can increase to around 896 kPa (130 psi) at full throttle.

(9) Return to shop or move vehicle off chassis dynamometer.

DIAGNOSIS AND TESTING (Continued)

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, or 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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Fig. 13 Pressure Test Analysis

CONVERTER STALL TEST

Stall testing involves determining maximum engine speed obtainable at full throttle with the rear wheels locked and the transmission in D range. This test checks the holding ability of the converter overrunning and transmission clutches. When stall testing is completed, refer to the stall speed chart and diagnosis guides.

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

STALL TEST PROCEDURE

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

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

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

(4) Block front wheels.

(5) Fully apply service and parking brakes.

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

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

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

(8) Refer to Stall Test Analysis.

STALL TEST ANALYSIS

Stall Speed Too High

If the stall speed exceeds 1800-2300 rpm by more than 200 rpm, transmission clutch slippage is indicated.

Stall Speed Low

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

Stall Speed Normal But Acceleration Poor

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

Converter Noise During Test

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

DIAGNOSIS AND TESTING (Continued)

AIR TESTING TRANSMISSION CLUTCH AND BAND OPERATION

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

Air-pressure testing requires that the oil pan and valve body be removed from the transmission. The servo and clutch apply passages are shown (Fig. 14).

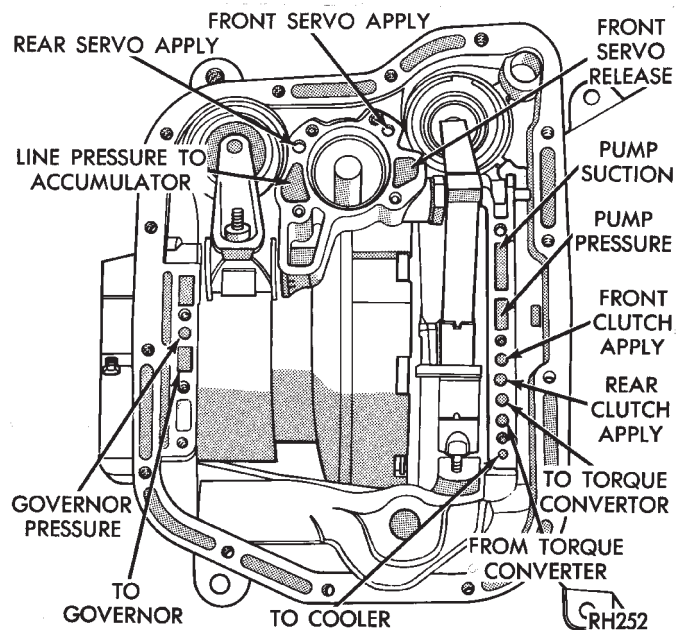


Fig. 14 Air Pressure Test Passages—Typical

Front Clutch Air Test

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

Rear Clutch Air Test

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

Front Servo Air Test

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

Rear Servo Air Test

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

CONVERTER HOUSING FLUID LEAK DIAGNOSIS

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

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

Some suspected converter housing fluid leaks may not be leaks at all. They may only be the result of residual fluid in the converter housing, or excess fluid spilled during factory fill or fill after repair. Converter housing leaks have several potential sources. Through careful observation, a leak source can be identified before removing the transmission for repair. Pump seal leaks tend to move along the drive hub and onto the rear of the converter. Pump O-ring or pump body leaks follow the same path as a seal leak (Fig. 15). Pump vent or pump attaching bolt leaks are generally deposited on the inside of the converter housing and not on the converter itself (Fig. 15). 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.

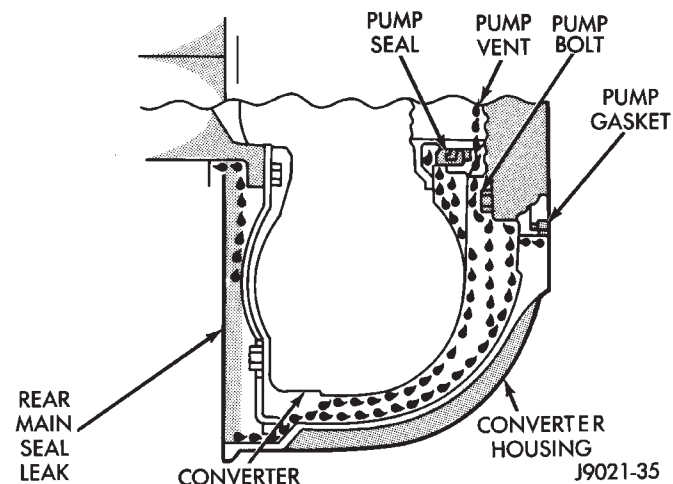


Fig. 15 Converter Housing Leak Paths

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. 16). 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.

DIAGNOSIS AND TESTING (Continued)

(7) Check probe **upper surface**. If upper surface is dry, converter and seal are OK. If probe upper surface is wet, converter and/or seal is leaking.

(8) Fluid leaking **under** the probe is coming from pump housing area. Leak 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. 17).

(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.

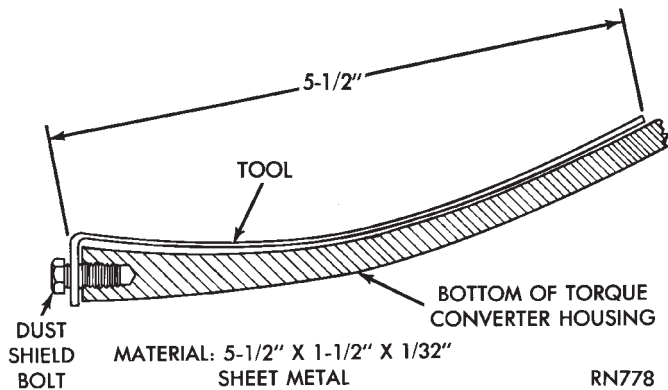


Fig. 16 Leak Test Probe

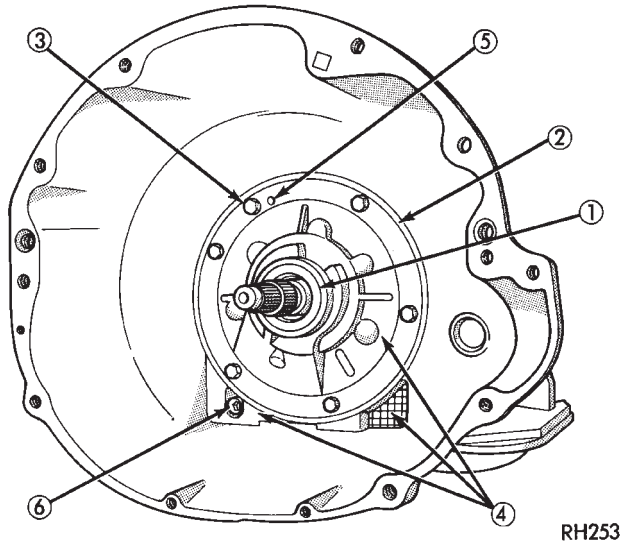


Fig. 17 Pump Area Inspection Points

TORQUE CONVERTER LEAK POINTS

Possible sources of converter leaks are:

(1) Leaks at the weld joint around the outside diameter weld (Fig. 17).

(2) Leaks at the converter hub weld (Fig. 18).

LEAK TESTING WITH AIR PRESSURE

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

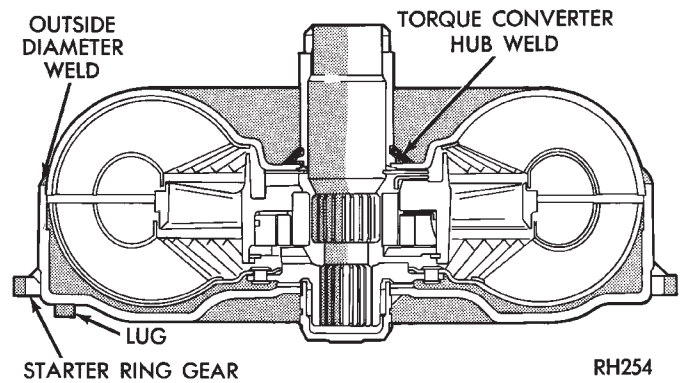


Fig. 18 Converter Leak Points—Typical

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 cup is made from thin wall tube and a 3.17 mm (1/8 in.) thick disc (Fig. 19).

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. 20). 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. 21).

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

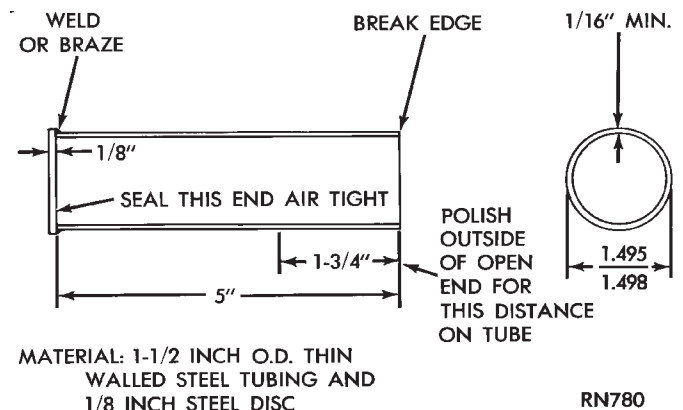


Fig. 19 Converter Hub Seal Cup

DIAGNOSIS AND TESTING (Continued)

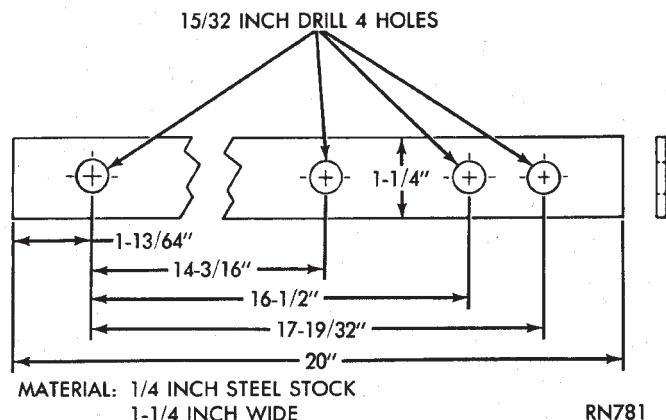


Fig. 20 Seal Cup Retaining Strap

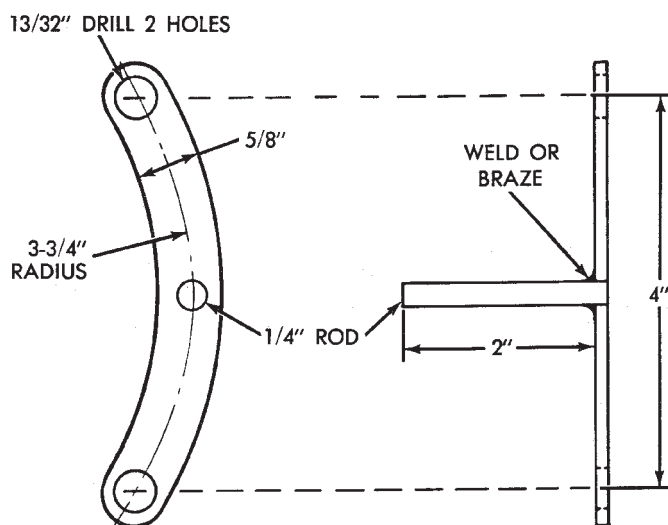


Fig. 21 Pump Vent Plug

AIR PRESSURE LEAK TEST PROCEDURE

(1) Install vent plug, converter hub seal cup and cup retaining strap (Fig. 22).

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. 23).

(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.

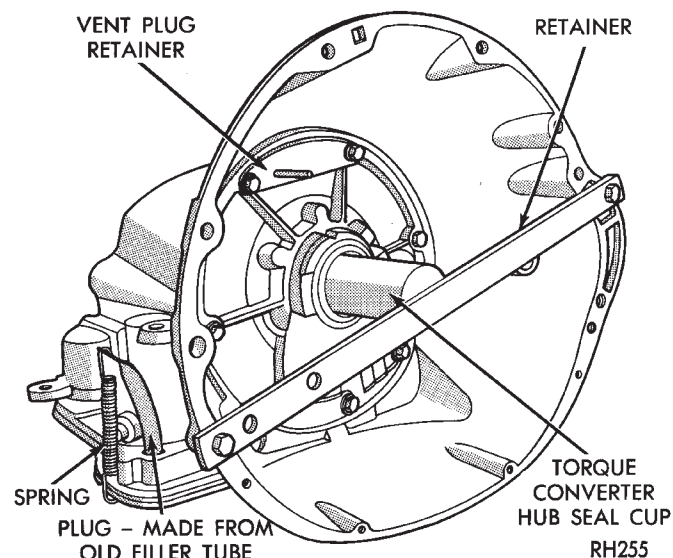


Fig. 22 Vent Plug And Hub Seal Cup Installation

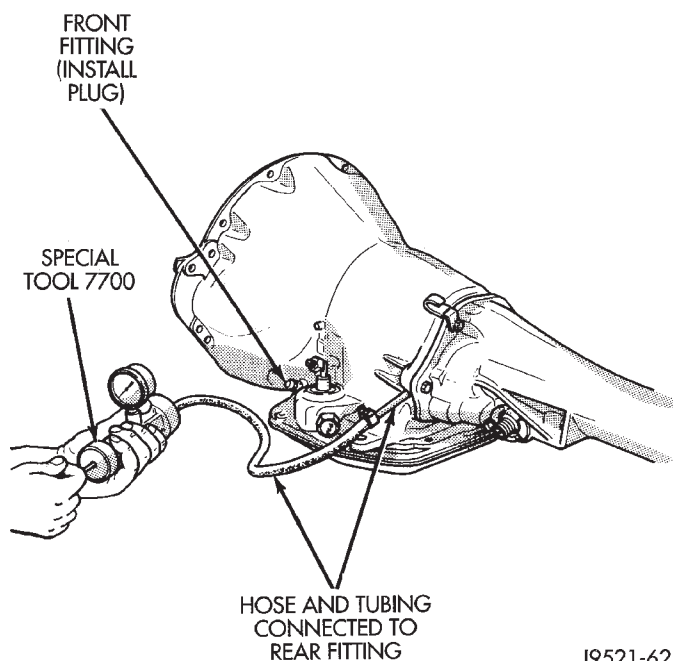


Fig. 23 Pressurizing Transmission With Tool 7700

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DIAGNOSIS AND TESTING (Continued)**CONVERTER HOUSING AREA LEAK****CORRECTION**

- (1) Remove converter.
- (2) Tighten front band adjusting screw until band is tight around front clutch retainer. This prevents front/rear clutches from coming out when oil pump is removed.
- (3) Remove oil pump and remove pump seal. Inspect pump housing drainback and vent holes for obstructions. Clear holes with solvent and wire.
- (4) Inspect pump bushing and converter hub. If bushing is scored, replace it. If converter hub is scored, either polish it with crocus cloth or replace converter 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 Loctite 592, or Permatex No. 2 to plug threads and tighten plug to 17 N·m (150 in. lbs.) torque.
- (7) Adjust front band.

(8) Lubricate pump seal and converter hub with transmission fluid or petroleum jelly and install converter.

(9) Install transmission and converter housing dust shield.

(10) Lower vehicle.

**DIAGNOSIS TABLES AND CHARTS—RE
TRANSMISSION**

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

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

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

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	2. Filter Clogged.	2. Change filter.
	3. Gearshift Linkage Misadjusted.	3. Adjust linkage and repair linkage if worn or damaged.
	4. Torque Converter Drain Back (Oil drains from torque converter into transmission sump)	4. If vehicle moves normally after 5 seconds after shifting into gear, no repair is necessary. If longer, inspect pump bushing for wear. Replace pump house.
	5. Rear Band Misadjusted.	5. Adjust band.
	6. Valve Body Filter Plugged.	6. Replace fluid and filter. If oil pan and old fluid were full of clutch disc material and/or metal particles, overhaul will be necessary.
	7. Oil Pump Gears Worn/Damaged.	7. Remove transmission and replace oil pump.
	8. Governor Circuit and Solenoid Valve (RE Only) Electrical Fault.	8. Test with DRB and repair as required.
	9. Hydraulic Pressure Incorrect.	9. Perform pressure test, remove transmission and repair as needed.
	10. Reaction Shaft Seal Rings Worn/Broken.	10. Remove transmission, remove oil pump and replace seal rings.
	11. Rear Clutch/Input Shaft, Rear Clutch Seal Rings Damaged.	11. Remove and disassemble transmission and repair as necessary.
	12. Governor Valve Stuck.	12. Remove and inspect governor components. Replace worn or damaged parts.
	13. Regulator Valve Stuck.	13. Clean.
	14. Cooler Plugged.	14. Transfer case failure can plug cooler.
NO DRIVE RANGE (REVERSE OK)	1. Fluid Level Low.	1. Add fluid and check for leaks if drive is restored.
	2. Gearshift Linkage/Cable Loose/Misadjusted.	2. Repair or replace linkage components.
	3. Rear Clutch Burnt.	3. Remove and disassemble transmission and rear clutch and seals. Repair/replace worn or damaged parts as needed.
	4. Valve Body Malfunction.	4. Remove and disassemble valve body. Replace assembly if any valves or bores are damaged.
	5. Transmission Overrunning Clutch Broken.	5. Remove and disassemble transmission. Replace overrunning clutch.
	6. Input Shaft Seal Rings Worn/Damaged.	6. Remove and disassemble transmission. Replace seal rings and any other worn or damaged parts.
	7. Front Planetary Failed Broken.	7. Remove and repair.
NO DRIVE OR REVERSE (VEHICLE WILL NOT MOVE)	1. Fluid Level Low.	1. Add fluid and check for leaks if drive is restored.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	2. Gearshift Linkage/Cable Loose/Misadjusted.	2. Inspect, adjust and reassemble linkage as needed. Replace worn/damaged parts.
	3. U-Joint/Axle/Transfer Case Broken.	3. Perform preliminary inspection procedure for vehicle that will not move. Refer to procedure in diagnosis section.
	4. Filter Plugged.	4. Remove and disassemble transmission. Repair or replace failed components as needed. Replace filter. If filter and fluid contained clutch material or metal particles, an overhaul may be necessary. Perform lube flow test. Flush oil. Replace cooler as necessary.
	5. Oil Pump Damaged.	5. Perform pressure test to confirm low pressure. Replace pump body assembly if necessary.
	6. Valve Body Malfunctioned.	6. Check press and inspect valve body. Replace valve body (as assembly) if any valve or bore is damaged. Clean and reassemble correctly if all parts are in good condition.
	7. Transmission Internal Component Damaged.	7. Remove and disassemble transmission. Repair or replace failed components as needed.
	8. Park Sprag not Releasing - Check Stall Speed, Worn/Damaged/Stuck.	8. Remove, disassemble, repair.
	9. Torque Converter Damage.	9. Inspect and replace as required.
SHIFTS DELAYED OR ERRATIC (SHIFTS ALSO HARSH AT TIMES)	1. Fluid Level Low/High.	1. Correct fluid level and check for leaks if low.
	2. Fluid Filter Clogged.	2. Replace filter. If filter and fluid contained clutch material or metal particles, an overhaul may be necessary. Perform lube flow test.
	3. Throttle Linkage Misadjusted.	3. Adjust linkage as described in service section.
	4. Throttle Linkage Binding.	4. Check cable for binding. Check for return to closed throttle at transmission.
	5. Gearshift Linkage/Cable Misadjusted.	5. Adjust linkage/cable as described in service section.
	6. Governor Valve Sticking.	6. Inspect, clean or repair.
	7. Governor Seal Rings Worn/Damaged.	7. Inspect/replace.
	8. Clutch or Servo Failure.	8. Remove valve body and air test clutch, and band servo operation. Disassemble and repair transmission as needed.
	9. Governor Circuit (RE Only) Electrical Fault.	9. Test using DRB and repair as required.
	10. Front Band Misadjusted.	10. Adjust band.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	11. Pump Suction Passage Leak.	11. Check for excessive foam on dipstick after normal driving. Check for loose pump bolts, defective gasket. Replace pump assembly if needed.
NO REVERSE (D RANGES OK)	1. Gearshift Linkage/Cable Misadjusted/Damaged.	1. Repair or replace linkage parts as needed.
	2. Park Sprag Sticking.	2. Replace overdrive annulus gear.
	3. Rear Band Misadjusted/Worn.	3. Adjust band; replace.
	4. Valve Body Malfunction.	4. Remove and service valve body. Replace valve body if any valves or valve bores are worn or damaged.
	5. Rear Servo Malfunction.	5. Remove and disassemble transmission. Replace worn/damaged servo parts as necessary.
	6. Direct Clutch in Overdrive Worn	6. Disassemble overdrive. Replace worn or damaged parts.
	7. Front Clutch Burnt.	7. Remove and disassemble transmission. Replace worn, damaged clutch parts as required.
HAS FIRST/REVERSE ONLY (NO 1-2 OR 2-3 UPSHIFT)	1. Governor Valve, Shaft, Weights or Body Damaged/Stuck.	1. Remove governor assembly and clean or repair as necessary.
	2. Valve Body Malfunction.	2. Repair stuck 1-2 shift valve or governor plug.
	3. Front Servo/Kickdown Band Damaged/Burned.	3. Repair/replace.
MOVES IN 2ND OR 3RD GEAR, ABRUPTLY DOWNSHIFTS TO LOW	1. Valve Body Malfunction.	1. Remove, clean and inspect. Look for stuck 1-2 valve or governor plug.
	2. Governor Valve Sticking.	2. Remove, clean and inspect. Replace faulty parts.
	3. Governor Circuit (RE Only) Electrical Fault.	3. Test using DRB and repair as required.
NO LOW GEAR (MOVES IN 2ND OR 3RD GEAR ONLY)	1. Governor Valve Sticking.	1. Remove governor, clean, inspect and repair as required.
	2. Governor Circuit (RE Only) Electrical Fault.	2. Test with DRB and repair as required.
	3. Valve Body Malfunction.	3. Remove, clean and inspect. Look for sticking 1-2 shift valve, 2-3 shift valve, governor plug or broken springs.
	4. Front Servo Piston Cocked in Bore.	4. Inspect servo and repair as required.
	5. Front Band Linkage Malfunction	5. Inspect linkage and look for bind in linkage.
NO KICKDOWN OR NORMAL DOWNSHIFT	1. Throttle Linkage Misadjusted.	1. Adjust linkage.
	2. Accelerator Pedal Travel Restricted.	2. Verify floor mat is not under pedal, repair worn accelerator cable or bent brackets.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	3. Governor/Valve Body Hydraulic Pressures Too High or Too Low Due to Sticking Governor, Valve Body Malfunction or Incorrect Hydraulic Control Pressure Adjustments.	3. Perform hydraulic pressure tests to determine cause and repair as required. Correct valve body pressure adjustments as required.
	4. Governor Circuit (RE Only) Electrical Fault.	4. Test with DRB and repair as required.
	5. Valve Body Malfunction.	5. Perform hydraulic pressure tests to determine cause and repair as required. Correct valve body pressure adjustments as required.
	6. TPS Malfunction.	6. Replace sensor, check with DRB scan tool.
	7. PCM Malfunction.	7. Check with DRB II and replace if required.
	8. Valve Body Malfunction.	8. Repair sticking 1-2, 2-3 shift valves, governor plugs, 3-4 solenoid, 3-4 shift valve, 3-4 timing valve.
STUCK IN LOW GEAR (WILL NOT UPSHIFT)	1. Throttle Linkage Misadjusted/Stuck.	1. Adjust linkage and repair linkage if worn or damaged. Check for binding cable or missing return spring.
	2. Gearshift Linkage Misadjusted.	2. Adjust linkage and repair linkage if worn or damaged.
	3. Governor/Valve Body, Governor Valve Stuck Closed; Loose Output Shaft Support or Governor Housing Bolts, Leaking Seal Rings or Valve Body Problem (i.e., Stuck 1- 2 Shift Valve/ Gov. Plug).	3. Check line and governor pressures to determine cause. Correct as required.
	4. Governor Component (RE Only) Electrical Fault.	4. Check operating pressures and test with DRB scan tool, repair faulty component.
	5. Front Band Out of Adjustment.	5. Adjust Band.
	6. Clutch or Servo Malfunction.	6. Air pressure check operation of clutches and bands. Repair faulty component.
CREEPS IN NEUTRAL	1. Gearshift Linkage Misadjusted.	1. Adjust linkage.
	2. Rear Clutch Dragging/Warped.	2. Disassemble and repair.
	3. Valve Body Malfunction.	3. Perform hydraulic pressure test to determine cause and repair as required.
BUZZING NOISE	1. Fluid Level Low	1. Add fluid and check for leaks.
	2. Shift Cable Misassembled.	2. Route cable away from engine and bell housing.
	3. Valve Body Misassembled.	3. Remove, disassemble, inspect valve body. Reassemble correctly if necessary. Replace assembly if valves or springs are damaged. Check for loose bolts or screws.

DIAGNOSIS AND TESTING (Continued)

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

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	4. Overrunning Clutch Worn/Broken.	4. Inspect and check for debris in oil pan. Repair as required.
	5. Oil Pump Components Scored/Binding.	5. Remove, inspect and repair as required.
	6. Output Shaft Bearing or Bushing Damaged.	6. Remove, inspect and repair as required.
	7. Clutch Operation Faulty.	7. Perform air pressure check and repair as required.
	8. Front and Rear Bands Misadjusted.	8. Adjust bands.
DRAGS OR LOCKS UP	1. Fluid Level Low.	1. Check and adjust level.
	2. Clutch Dragging/Failed	2. Air pressure check clutch operation and repair as required.
	3. Front or Rear Band Misadjusted.	3. Adjust bands.
	4. Case Leaks Internally.	4. Check for leakage between passages in case.
	5. Servo Band or Linkage Malfunction.	5. Air pressure check servo operation and repair as required.
	6. Overrunning Clutch Worn.	6. Remove and inspect clutch. Repair as required.
	7. Planetary Gears Broken.	7. Remove, inspect and repair as required (look for debris in oil pan).
	8. Converter Clutch Dragging.	8. Check for plugged cooler. Perform flow check. Inspect pump for excessive side clearance. Replace pump as required.
NO 4-3 DOWNSHIFT	1. Circuit Wiring and/or Connectors Shorted.	1. Test wiring and connectors with test lamp and volt/ohmmeter. Repair wiring as necessary. Replace connectors and/or harnesses as required.
	2. PCM Malfunction.	2. Check PCM operation with DRB scan tool. Replace PCM only if faulty.
	3. TPS Malfunction	3. Check TPS with DRB scan tool at PCM.
	4. Lockup Solenoid Not Venting.	4. Remove valve body and replace solenoid assembly if plugged or shorted.
	5. Overdrive Solenoid Not Venting.	5. Remove valve body and replace solenoid if plugged or shorted.
	6. Valve Body Valve Sticking.	6. Repair stuck 3-4 shift valve or lockup timing valve.
NO 4-3 DOWNSHIFT WHEN CONTROL SWITCH IS TURNED OFF	1. Control Switch Open/Shorted.	1. Test and replace switch if faulty.
	2. Overdrive Solenoid Connector Shorted.	2. Test solenoids and replace if seized or shorted.
	3. PCM Malfunction.	3. Test with DRB scan tool. Replace PCM if faulty.
	4. Valve Body Stuck Valves.	4. Repair stuck 3-4, lockup or lockup timing valve.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
CLUNK NOISE FROM DRIVELINE ON CLOSED THROTTLE 4-3 DOWNSHIFT	1. Transmission Fluid Low.	1. Add Fluid.
	2. Throttle Cable Misadjusted.	2. Adjust cable.
	3. Overdrive Clutch Select Spacer Wrong Spacer.	3. Replace overdrive piston thrust plate spacer.
3-4 UPSHIFT OCCURS IMMEDIATELY AFTER 2-3 SHIFT	1. Overdrive Solenoid Connector or Wiring Shorted.	1. Test connector and wiring for loose connections, shorts or ground and repair as needed.
	2. TPS Malfunction.	2. Test TPS and replace as necessary. Check with DRB scan tool.
	3. PCM Malfunction.	3. Test PCM with DRB scan tool and replace controller if faulty.
	4. Overdrive Solenoid Malfunction.	4. Replace solenoid.
	5. Valve Body Malfunction.	5. Remove, disassemble, clean and inspect valve body components. Make sure all valves and plugs slide freely in bores. Polish valves with crocus cloth if needed.
WHINE/NOISE RELATED TO ENGINE SPEED	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Shift Cable Incorrect Routing.	2. Check shift cable for correct routing. Should not touch engine or bell housing.
NO 3-4 UPSHIFT	1. Dash O/D Switch In OFF Position.	1. Turn control switch to ON position.
	2. Overdrive Circuit Fuse Blown.	2. Replace fuse. Determine why fuse failed and repair as necessary (i.e., shorts or grounds in circuit).
	3. O/D Switch Wire Shorted/Open Cut.	3. Check wires/connections with 12V test lamp and voltmeter. Repair damaged or loose wire/connection as necessary.
	4. Distance or Coolant Sensor Malfunction.	4. Test both sensors with test lamp or volt/ohmmeter and replace faulty sensor.
	5. TPS Malfunction.	5. Check with DRB scan tool and replace if necessary.
	6. Neutral Switch to PCM Wire Shorted/Cut.	6. Test switch as described in service section and replace if necessary. Engine no start.
	7. PCM Malfunction.	7. Check with DRB scan tool and replace if necessary.
	8. Overdrive Solenoid Shorted/Open.	8. Replace solenoid if shorted or open and repair loose or damaged wires (DRB scan tool).
	9. Solenoid Feed Orifice in Valve Body Blocked.	9. Remove, disassemble, and clean valve body thoroughly. Check feed orifice.
	10. Overdrive Clutch Failed.	10. Disassemble overdrive and repair as needed.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	11. Hydraulic Pressure Low.	11. Pressure test transmission to determine cause.
	12. Valve Body Valve Stuck.	12. Repair stuck 3-4 shift valve, 3-4 timing valve.
	13. O/D Piston Incorrect Spacer.	13. Remove unit, check end play and install correct spacer.
	14. Overdrive Piston Seal Failure.	14. Replace both seals.
	15. O/D Check Valve/Orifice Failed.	15. Check for free movement and secure assembly (in piston retainer). Check ball bleed orifice.
SLIPS IN OVERDRIVE FOURTH GEAR	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Overdrive Clutch Pack Worn.	2. Remove overdrive unit and rebuild clutch pack.
	3. Overdrive Piston Retainer Bleed Orifice Blown Out.	3. Disassemble transmission, remove retainer and replace orifice.
	4. Overdrive Piston or Seal Malfunction.	4. Remove overdrive unit. Replace seals if worn. Replace piston if damaged. If piston retainer is damaged, remove and disassemble the transmission.
	5. 3-4 Shift Valve, Timing Valve or Accumulator Malfunction.	5. Remove and overhaul valve body. Replace accumulator seals. Make sure all valves operate freely in bores and do not bind or stick. Make sure valve body screws are correctly tightened and separator plates are properly positioned.
	6. Overdrive Unit Thrust Bearing Failure.	6. Disassemble overdrive unit and replace thrust bearing (NO. 1 thrust bearing is between overdrive piston and clutch hub; NO. 2 thrust bearing is between the planetary gear and the direct clutch spring plate; NO. 3 thrust bearing is between overrunning clutch hub and output shaft).
DELAYED 3-4 UPSHIFT (SLOW TO ENGAGE)	7. O/D Check Valve/Bleed Orifice Failure.	7. Check for function/secure orifice insert in O/D piston retainer.
	1. Fluid Level Low.	1. Add fluid and check for leaks.
	2. Throttle Valve Cable Misadjusted.	2. Adjust throttle valve cable.
	3. Overdrive Clutch Pack Worn/Burnt.	3. Remove unit and rebuild clutch pack.
	4. TPS Faulty.	4. Test with DRB scan tool and replace TPS.
	5. Overdrive Clutch Bleed Orifice Plugged.	5. Disassemble transmission and replace orifice.
	6. Overdrive Solenoid or Wiring Shorted/Open.	6. Test solenoid and check wiring for loose/corroded connections or shorts/grounds. Replace solenoid if faulty and repair wiring if necessary.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
	7. Overdrive Excess Clearance	7. Remove unit. Measure end play and select proper spacer.
	8. O/D Check Valve Missing or Stuck.	8. Check for presence of check valve. Repair or replace as required.
TORQUE CONVERTER LOCKS UP IN SECOND AND/OR THIRD GEAR	Lockup Solenoid, Relay or Wiring Shorted/Open.	Test solenoid, relay and wiring for continuity, shorts or grounds. Replace solenoid and relay if faulty. Repair wiring and connectors as necessary.
HARSH 1-2, 2-3, 3-4 OR 3-2 SHIFTS	Lockup Solenoid Malfunction.	Remove valve body and replace solenoid assembly.
NO START IN PARK OR NEUTRAL	1. Gearshift Linkage/Cable Misadjusted.	1. Adjust linkage/cable.
	2. Neutral Switch Wire Open/Cut.	2. Check continuity with test lamp. Repair as required.
	3. Neutral Switch Faulty.	3. Refer to service section for test and replacement procedure.
	4. Neutral Switch Connect Faulty.	4. Connectors spread open. Repair.
	5. Valve Body Manual Lever Assembly Bent/Worn/Broken.	5. Inspect lever assembly and replace if damaged.
NO REVERSE (OR SLIPS IN REVERSE)	1. Direct Clutch Pack (front clutch) Worn.	1. Disassemble unit and rebuild clutch pack.
	2. Rear Band Misadjusted.	2. Adjust band.
	3. Front Clutch Malfunctioned/Burned.	3. Air-pressure test clutch operation. Remove and rebuild if necessary.
	4. Overdrive Thrust Bearing Failure.	4. Disassemble geartrain and replace bearings.
	5. Direct Clutch Spring Collapsed/Broken.	5. Remove and disassemble unit. Check clutch position and replace spring.
OIL LEAKS (ITEMS LISTED REPRESENT POSSIBLE LEAK POINTS AND SHOULD ALL BE CHECKED).	1. Speedometer Adapter Leaks.	1. Replace both adapter seals.
	2. Fluid Lines and Fittings Loose/Leaks/Damaged.	2. Tighten fittings. If leaks persist, replace fittings and lines if necessary.
	3. Fill Tube (where tube enters case) Leaks/Damaged.	3. Replace O-ring seal. Inspect tube for cracks in fill tube.
	4. Pressure Port Plug Loose/Damaged.	4. Tighten to correct torque. Replace plug or reseal if leak persists.
	5. Pan Gasket Leaks.	5. Tighten pan screws (150 in. lbs.). If leaks persist, replace gasket.
	6. Valve Body Manual Lever Shaft Seal Leaks/Worn.	6. Replace shaft seal.
	7. Rear Bearing Access Plate Leaks.	7. Replace gasket. Tighten screws.
	8. Gasket Damaged or Bolts are Loose.	8. Replace bolts or gasket or tighten both.
	9. Adapter/Extension Gasket Damaged Leaks/Damaged.	9. Replace gasket.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NOISY OPERATION IN FOURTH GEAR ONLY	10. Neutral Switch Leaks/Damaged.	10. Replace switch and gasket.
	11. Converter Housing Area Leaks.	11. Check for leaks at seal caused by worn seal or burr on converter hub (cutting seal), worn bushing, missing oil return, oil in front pump housing or hole plugged. Check for leaks past O-ring seal on pump or past pump-to-case bolts; pump housing porous, oil coming out vent due to overfill or leak past front band shaft access plug.
	12. Pump Seal Leaks/Worn/Damaged.	12. Replace seal.
	13. Torque Converter Weld Leak/Cracked Hub.	13. Replace converter.
	14. Case Porosity Leaks.	14. Replace case.
	1. Overdrive Clutch Discs, Plates or Snap Rings Damaged.	1. Remove unit and rebuild clutch pack.
	2. Overdrive Piston or Planetary Thrust Bearing Damaged.	2. Remove and disassemble unit. Replace either thrust bearing if damaged.
	3. Output Shaft Bearings Scored/Damaged.	3. Remove and disassemble unit. Replace either bearing if damaged.
	4. Planetary Gears Worn/Chipped.	4. Remove and overhaul overdrive unit.
	5. Overdrive Unit Overrunning Clutch Rollers Worn/Scored.	5. Remove and overhaul overdrive unit.

SERVICE PROCEDURES

FLUID LEVEL CHECK

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

FLUID LEVEL CHECK PROCEDURE

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

(2) Position vehicle on level surface.

(3) Start and run engine at curb idle speed.

(4) Apply parking brakes.

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

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

(7) Remove dipstick (Fig. 24) and check fluid level as follows:

(a) Correct maximum level is to MAX arrow mark. Correct acceptable level is to OK mark in crosshatch area.

(b) Incorrect level is at or below MIN line.

(c) If fluid is low, add only enough Mopar ATF Plus to restore correct level. Do not overfill.

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

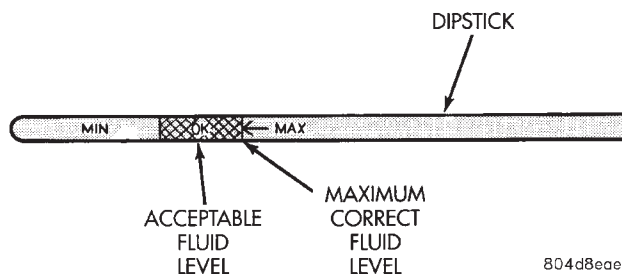


Fig. 24 Dipstick Fluid Level Marks—Typical

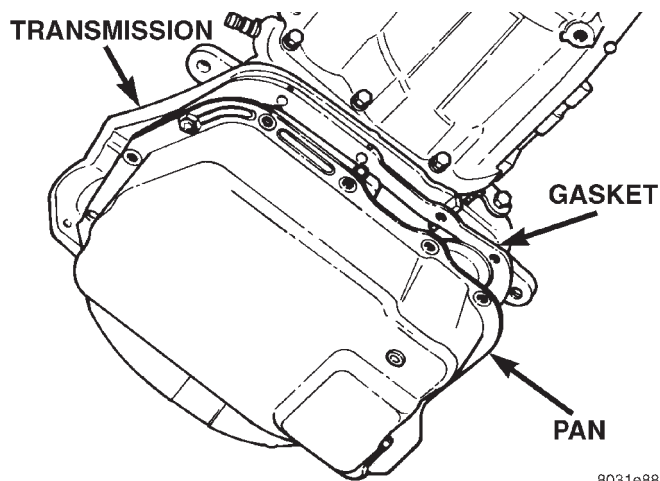
SERVICE PROCEDURES (Continued)

FLUID AND FILTER REPLACEMENT

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

PAN AND FILTER REMOVAL

- (1) Hoist and support vehicle on safety stands.
- (2) Place a large diameter shallow drain pan beneath the transmission pan.
- (3) Remove bolts holding front and sides of pan to transmission (Fig. 25).
- (4) Loosen bolts holding rear of pan to transmission.
- (5) Slowly separate front of pan away from transmission allowing the fluid to drain into drain pan.
- (6) Hold up pan and remove remaining bolt holding pan to transmission.
- (7) While holding pan level, lower pan away from transmission.
- (8) Pour remaining fluid in pan into drain pan.
- (9) Remove screws holding filter to valve body (Fig. 26).
- (10) Separate filter from valve body and pour fluid in filter into drain pan.
- (11) Dispose used trans fluid and filter properly.

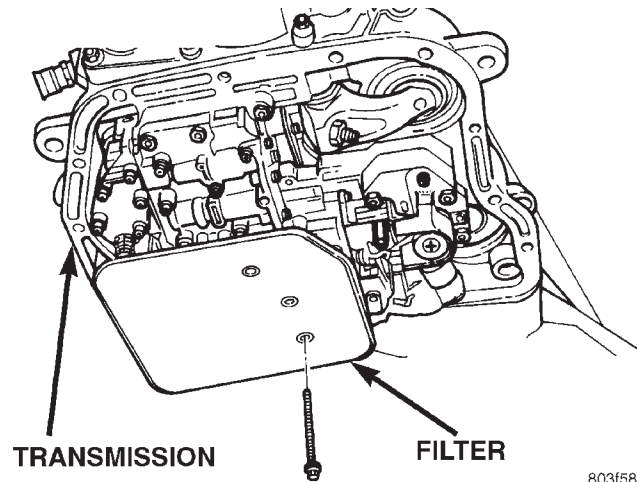


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Fig. 25 Transmission Pan—Typical**INSPECTION AND CLEANING****INSPECTION**

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

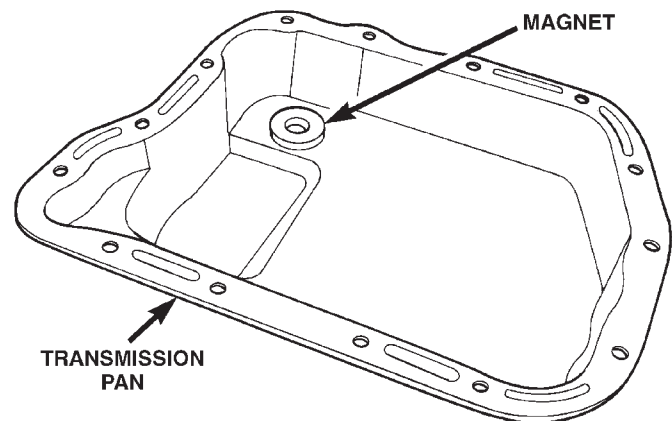
Check the adjustment of the front and rear bands, adjust if necessary. Refer to Adjustment section of this group for proper procedure.



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Fig. 26 Transmission Filter—Typical**CLEANING**

- (1) Using a suitable solvent, clean pan and magnet (Fig. 27).
- (2) Using a suitable gasket scraper, clean gasket material from gasket surface of transmission case and the gasket flange around the pan.



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Fig. 27 Pan and Magnet**FILTER AND PAN INSTALLATION**

- (1) Place replacement filter in position on valve body.
- (2) Install screws to hold filter to valve body (Fig. 26). Tighten screws to 4 N·m (35 in. lbs.) torque.
- (3) Place new gasket in position on pan, and install pan on transmission.
- (4) Place pan in position on transmission.
- (5) Install screws to hold pan to transmission (Fig. 25). Tighten bolts to 17 N·m (150 in. lbs.) torque.
- (6) Lower vehicle and fill transmission with Mopar ATF Plus, type 7176 fluid.

SERVICE PROCEDURES (Continued)

TRANSMISSION FILL PROCEDURE

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

- (1) Remove dipstick and insert clean funnel in transmission fill tube.
- (2) Add following initial quantity of Mopar ATF Plus to transmission:
 - (a) If only fluid and filter were changed, add **3 pints (1-1/2 quarts)** of ATF Plus to transmission.
 - (b) If transmission was completely overhauled, torque converter was replaced or drained, and cooler was flushed, add **12 pints (6 quarts)** of ATF Plus to transmission.
- (3) Apply parking brakes.
- (4) Start and run engine at normal curb idle speed.
- (5) Apply service brakes, shift transmission through all gear ranges then back to NEUTRAL, set parking brake, and leave engine running at curb idle speed.
- (6) Remove funnel, insert dipstick and check fluid level. If level is low, **add fluid to bring level to MIN mark on dipstick.**
- (7) Drive vehicle until transmission fluid is at normal operating temperature.
- (8) With the engine running at curb idle speed, the gear selector in NEUTRAL, and the parking brake applied, check the transmission fluid level.

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

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

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

CONVERTER DRAINBACK CHECK VALVE SERVICE

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

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

The valve must be removed whenever the cooler and lines are reverse flushed. The valve can be flow tested when necessary. The procedure is exactly the same as for flow testing a cooler.

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

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

ALUMINUM THREAD REPAIR

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

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

FLUSHING COOLERS AND TUBES

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

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

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

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

KEEP THE AREA WELL VENTILATED.

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

SERVICE PROCEDURES (Continued)

COOLER FLUSH USING TOOL 6906

(1) Remove cover plate filler plug on Tool 6906. Fill reservoir 1/2 to 3/4 full of fresh flushing solution. Flushing solvents are petroleum based solutions generally used to clean automatic transmission components. **DO NOT** use solvents containing acids, water, gasoline, or any other corrosive liquids.

(2) Reinstall filler plug on Tool 6906.

(3) Verify pump power switch is turned OFF. Connect red alligator clip to positive (+) battery post. Connect black (-) alligator clip to a good ground.

(4) Disconnect the cooler lines at the transmission.

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

(5) Connect the BLUE pressure line to the OUTLET (From) cooler line.

(6) Connect the CLEAR return line to the INLET (To) cooler line

(7) Turn pump ON for two to three minutes to flush cooler(s) and lines. Monitor pressure readings and clear return lines. Pressure readings should stabilize below 20 psi. for vehicles equipped with a single cooler and 30 psi. for vehicles equipped with dual coolers. If flow is intermittent or exceeds these pressures, replace cooler.

(8) Turn pump OFF.

(9) Disconnect CLEAR suction line from reservoir at cover plate. Disconnect CLEAR return line at cover plate, and place it in a drain pan.

(10) Turn pump ON for 30 seconds to purge flushing solution from cooler and lines. Turn pump OFF.

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

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

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

COOLER FLUSH USING SUCTION GUN AND MINERAL SPIRITS

(1) Disconnect the cooler lines at the transmission.

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

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

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

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

REMOVAL AND INSTALLATION**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. 28).

(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. 28). 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. 28).

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

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

(5) Install speedometer pinion in adapter.

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

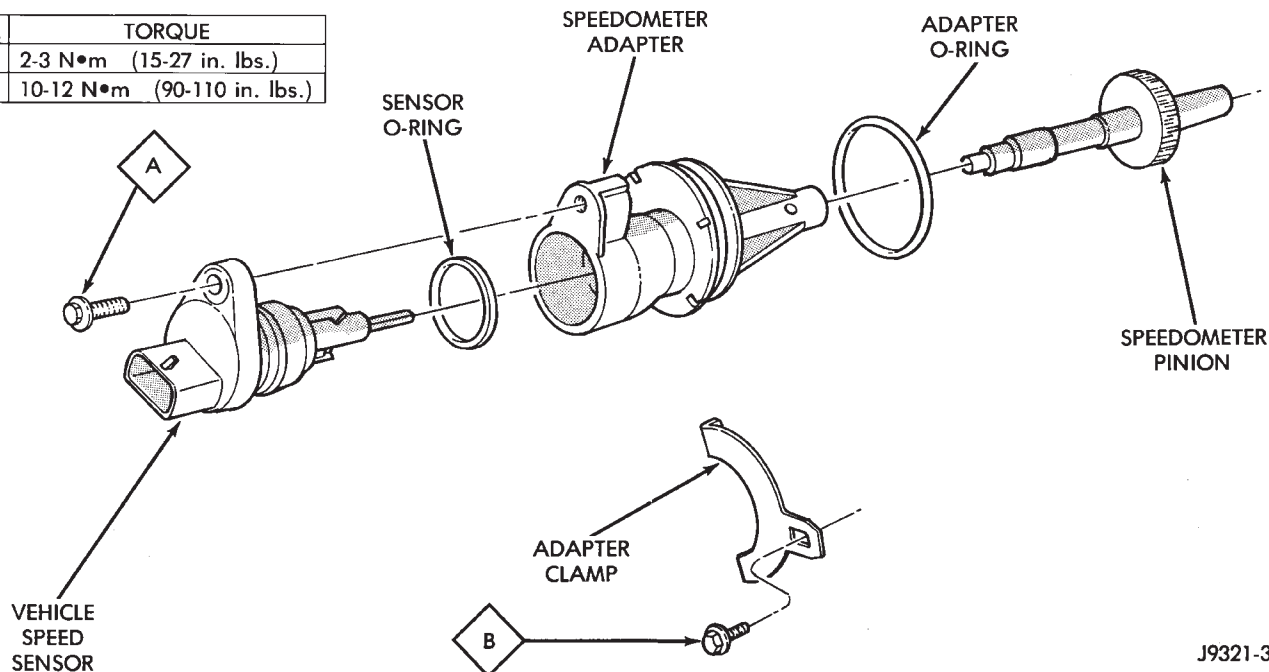
(7) Note index numbers on adapter body (Fig. 29). These numbers will correspond to number of teeth on pinion.

(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.

REMOVAL AND INSTALLATION (Continued)

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



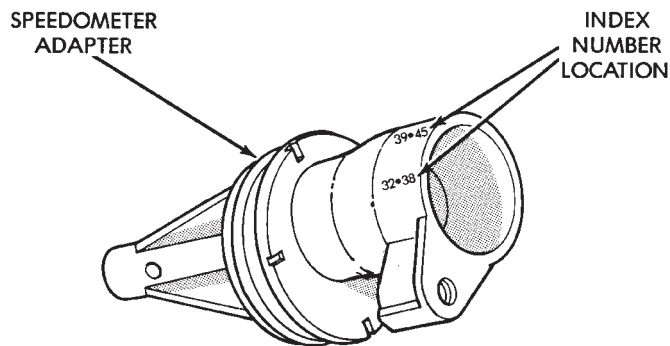
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Fig. 28 Speedometer Pinion Adapter Components

(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. 29 Index Numbers On Speedometer Pinion Adapter**PARK/NEUTRAL POSITION SWITCH****Switch Replacement**

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

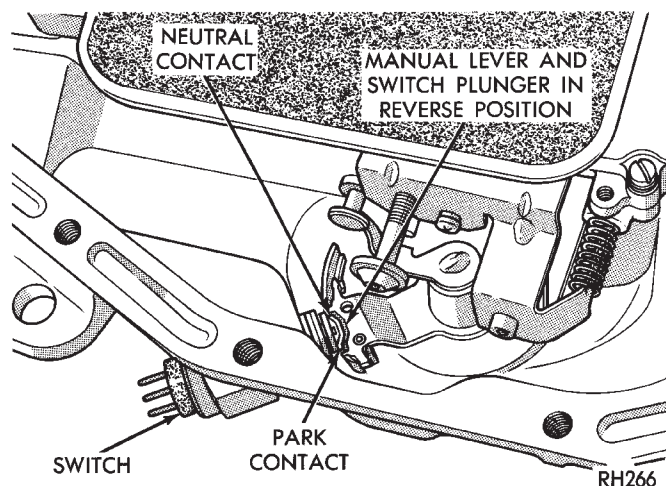
(4) Move shift lever to Park and Neutral positions. Verify that switch operating lever fingers are centered in switch opening in case (Fig. 30).

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

(6) Test continuity of new switch with 12V test lamp.

(7) Connect switch wires and lower vehicle.

(8) Top off transmission fluid level.

**Fig. 30 Park/Neutral Position Switch****YOKE SEAL REPLACEMENT****REMOVAL**

- (1) Raise vehicle.
- (2) Mark propeller shaft and axle yoke for alignment reference.

REMOVAL AND INSTALLATION (Continued)

- (3) Disconnect and remove propeller shaft.
- (4) Remove old seal with Seal Remover C-3985-B (Fig. 31) from overdrive housing.

INSTALLATION

- (1) Place seal in position on overdrive housing.
- (2) Drive seal into overdrive housing with Seal Installer C-3995-A or C-3972 (Fig. 32).
- (3) Carefully guide propeller shaft slip yoke into housing and onto output shaft splines. Align marks made at removal and connect propeller shaft to rear axle pinion yoke.

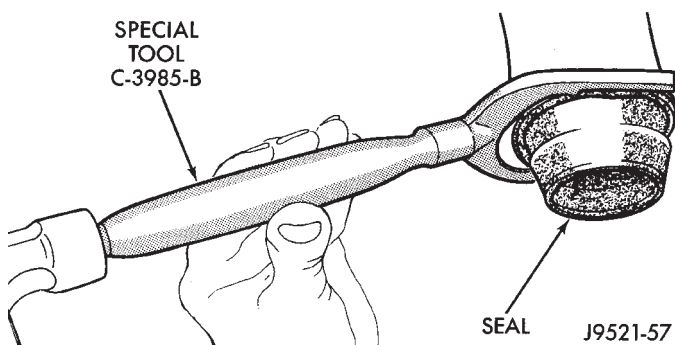


Fig. 31 Removing Overdrive Housing Yoke Seal

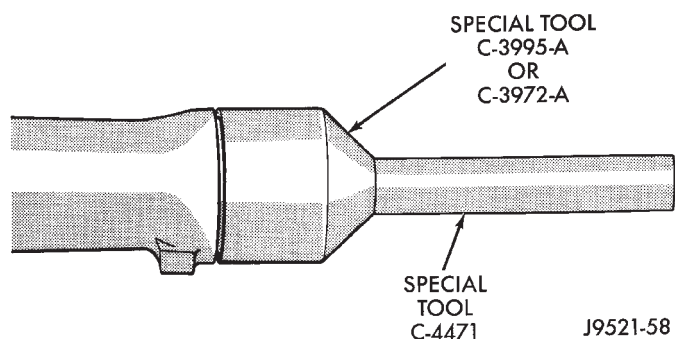


Fig. 32 Installing Overdrive Housing Yoke Seal

OVERDRIVE HOUSING BUSHING

REMOVAL

- (1) Remove overdrive housing yoke seal.
- (2) Remove housing bushing as follows:
 - (a) If overdrive housing was not removed, drive tapered, round pointed tool between bushing and housing to upset and collapse bushing. Then remove bushing with pry tool or vise grip pliers.
 - (b) If overdrive housing has been removed and disassembled, drive old bushing out with Driver Handle C-4171 and Removal Tool C-4470.

INSTALLATION

- (1) Align bushing oil hole with oil slot in overdrive housing.
- (2) Tap bushing into place with driver handle and Tool C-4171 and C-4469 (Fig. 33).

- (3) Install new oil seal in housing using Seal Installer C-3972-A.

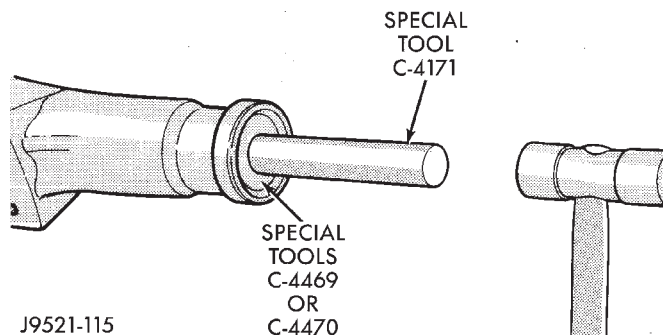


Fig. 33 Overdrive Housing Bushing Installation

OUTPUT SHAFT REAR BEARING

REMOVAL

- (1) Remove overdrive unit from the vehicle.
- (2) Remove overdrive geartrain from housing.
- (3) Remove snap ring holding output shaft rear bearing into overdrive housing (Fig. 34).
- (4) Using a suitable driver inserted through the rear end of housing, drive bearing from housing.

INSTALLATION

- (1) Place replacement bearing in position in housing.
- (2) Using a suitable driver, drive bearing into housing until the snap ring groove is visible.
- (3) Install snap ring to hold bearing into housing (Fig. 34).
- (4) Install overdrive geartrain into housing.
- (5) Install overdrive unit in vehicle.

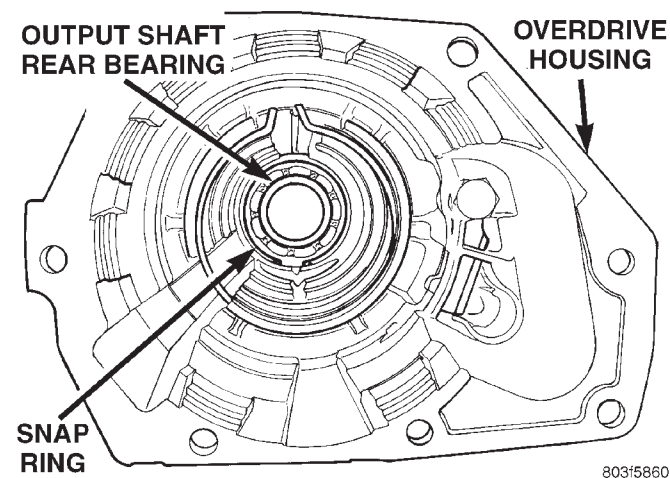


Fig. 34 Output Shaft Rear Bearing

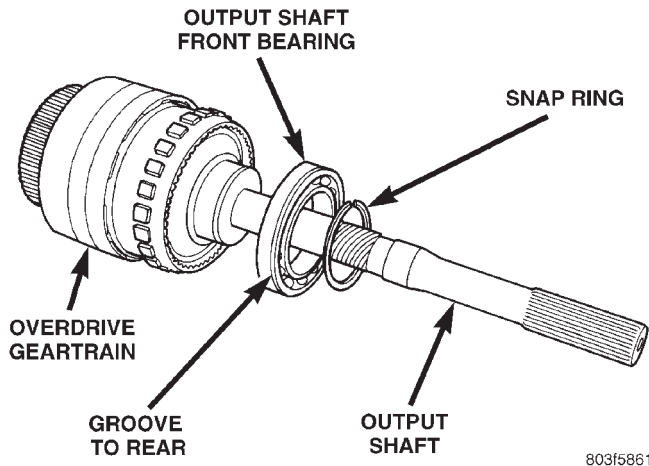
REMOVAL AND INSTALLATION (Continued)

OUTPUT SHAFT FRONT BEARING**REMOVAL**

- (1) Remove overdrive unit from the vehicle.
- (2) Remove overdrive geartrain from housing.
- (3) Remove snap ring holding output shaft front bearing to overdrive geartrain. (Fig. 35).
- (4) Pull bearing from output shaft.

INSTALLATION

- (1) Place replacement bearing in position on geartrain with locating retainer groove toward the rear.
- (2) Push bearing onto shaft until the snap ring groove is visible.
- (3) Install snap ring to hold bearing onto output shaft (Fig. 35).
- (4) Install overdrive geartrain into housing.
- (5) Install overdrive unit in vehicle.

**Fig. 35 Output Shaft Front Bearing****GEARSHIFT CABLE****REMOVAL**

- (1) Shift transmission into Park.
- (2) Remove shift lever bezel and necessary console parts for access to shift lever assembly.
- (3) Disconnect cable at shift lever and feed cable through floorpan opening to underside of vehicle.
- (4) Raise vehicle.
- (5) Disengage cable eyelet at transmission shift lever and pull cable adjuster out of mounting bracket. Then remove old cable from vehicle.

INSTALLATION

- (1) Verify that transmission shift lever is in Park detent (this is last detent position to rear).
- (2) Feed new cable into passenger compartment through floorpan opening. Then snap cable adjuster into transmission bracket but do not lock adjuster at this time.

(3) Lower vehicle enough to permit access to shift lever.

(4) Connect new cable to shift lever. Be sure lever is still in Park position before proceeding. Also be sure cable is not kinked, or twisted.

(5) Raise vehicle and connect cable eyelet to transmission shift lever. Then lock cable by pressing adjuster lock button inward until it snaps into place.

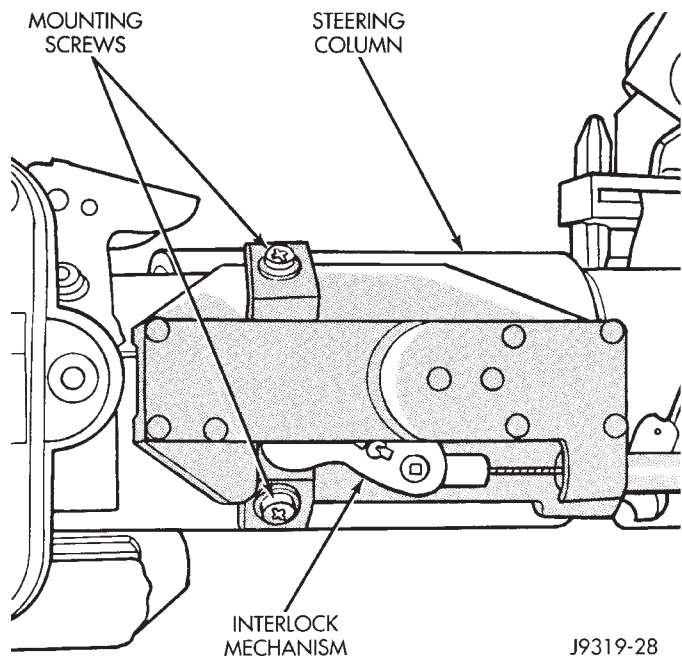
(6) Lower vehicle and verify correct operation of shift and park lock cables.

(7) Install console components and shift bezel.

BRAKE TRANSMISSION SHIFT INTERLOCK**REMOVAL**

(1) Lower the steering column. Refer to Column Assembly Replacement in this group.

(2) Remove two screws retaining the interlock mechanism to the column (Fig. 36). Unsnap the mechanism from column.

**Fig. 36 Interlock Mechanism on Column**

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

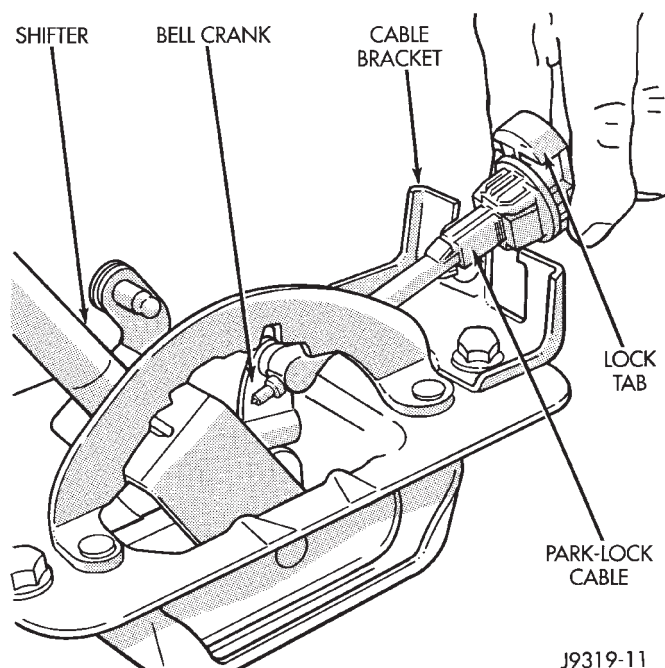
(4) Disconnect the cable eyelet from the bellcrank (Fig. 37).

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

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

(7) Remove the accelerator pedal (the cable routes under the pedal), refer to Group 14, Fuel Systems. Release the cable from the accelerator pedal clip. Move the carpet as necessary to remove the cable.

REMOVAL AND INSTALLATION (Continued)

**Fig. 37 Cable and Shifter****INSTALLATION**

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

(2) Secure the plastic base with two (2) self tapping screws.

CAUTION: Interlock cable must be clipped to the **RIGHT HAND STUD** under the throttle pedal. This is to prevent interference with the throttle pedal.

(3) Route the cable between the accelerator pedal mounting studs and secure with clip. Be sure clip is on right hand stud.

(4) Place the ignition key cylinder in the **ACCESSORY** position.

(5) Remove shipping pin from plastic base.

(6) Connect the cable eyelet to the bellcrank pin.

(7) Place gear selector in **PARK**.

(8) Push the spring-loaded cable adjuster forward and snap cable into bracket.

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

(10) Install the center console and related trim. Refer to Group 23, Body.

(11) Test the park-lock cable operation.

(12) Load the steering column up to the bracket. Refer to Column Assembly Replacement in this group.

PARK LOCK**REMOVAL**

(1) Remove overdrive unit from vehicle.

(2) Remove overdrive geartrain from housing.

(3) Remove bolt holding park pawl in overdrive housing.

CAUTION: Do not over stress snap ring during removal, snap ring distortion can result.

(4) Remove snap ring holding reaction plug in overdrive housing.

(5) Pull park pawl shaft from housing.

(6) Separate park pawl, park pawl spring, and reaction plug from overdrive housing (Fig. 38).

INSTALLATION

(1) Place park pawl, park pawl spring, and reaction plug in position in overdrive housing.

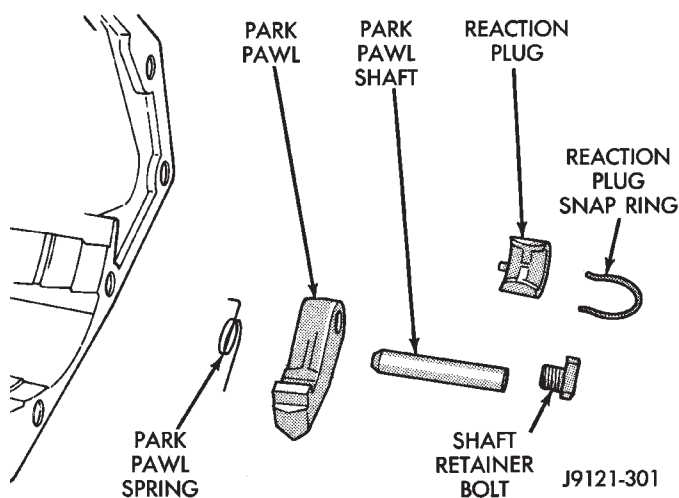
(2) Insert park pawl shaft into housing through the park pawl, park pawl spring, and reaction plug (Fig. 38).

(3) Install snap ring to hold reaction plug in overdrive housing.

(4) Install bolt to hold park pawl in overdrive housing.

(5) Install overdrive geartrain into housing.

(6) Install overdrive unit in vehicle.

**Fig. 38 Park Lock****GOVERNOR SOLENOID AND PRESSURE SENSOR**

The governor is electronically controlled. It consists of a pressure sensor, a pressure solenoid, and the governor body (Fig. 39).

REMOVAL

(1) Hoist and support vehicle on safety stands.

(2) Remove transmission fluid pan and filter.

(3) Disengage wire connectors from pressure sensor and solenoid (Fig. 39).

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

(5) Separate solenoid retainer from governor (Fig. 40).

(6) Pull solenoid from governor body (Fig. 41).

REMOVAL AND INSTALLATION (Continued)

- (7) Remove bolts holding governor body to valve body.
- (8) Separate governor body from valve body (Fig. 42).
- (9) Separate gasket from back of governor body.
- (10) Remove retainer holding pressure sensor to governor body.
- (11) Pull pressure sensor from governor body (Fig. 43).

INSTALLATION

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

- (1) Lubricate O-ring on pressure sensor with transmission fluid.
- (2) Align pressure sensor to bore in governor body (Fig. 43).
- (3) Push pressure sensor into governor body.
- (4) Install retainer to hold pressure sensor to governor body.
- (5) Place gasket in position on back of governor body (Fig. 42).
- (6) Place governor body in position on valve body.
- (7) Install bolts to hold governor body to valve body.
- (8) Lubricate O-ring, on pressure solenoid, with transmission fluid.
- (9) Align pressure solenoid to bore in governor body (Fig. 41).
- (10) Push solenoid into governor body.
- (11) Place solenoid retainer in position on governor (Fig. 40).
- (12) Install screws to hold pressure solenoid retainer to governor body.
- (13) Engage wire connectors into pressure sensor and solenoid (Fig. 39).
- (14) Install transmission fluid pan and (new) filter.
- (15) Lower vehicle and road test to verify repair.

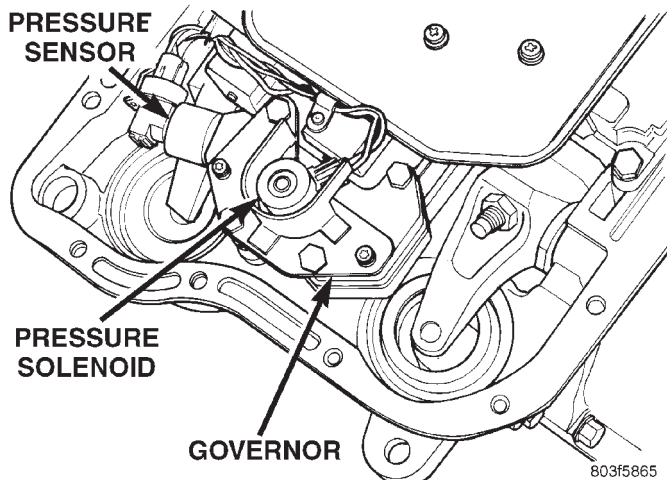


Fig. 39 Governor Solenoid And Pressure Sensor

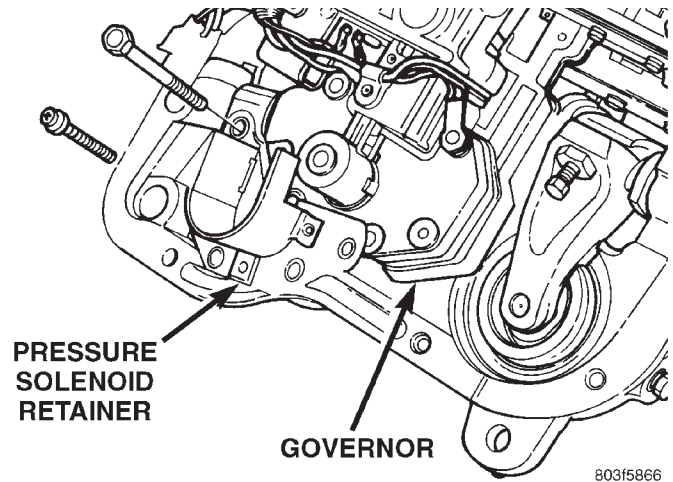


Fig. 40 Pressure Solenoid Retainer

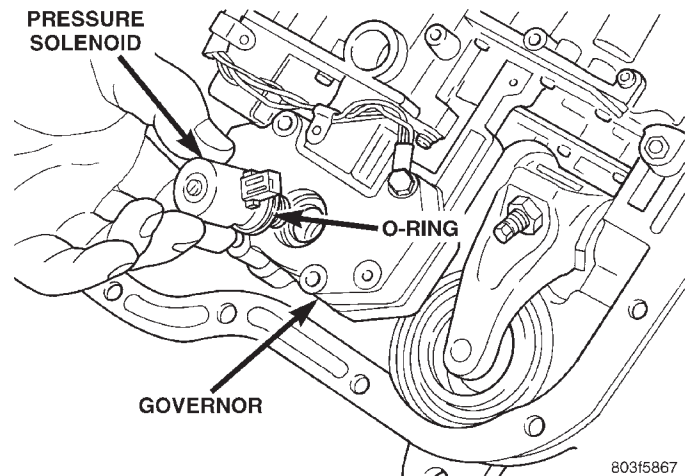


Fig. 41 Pressure Solenoid and O-ring

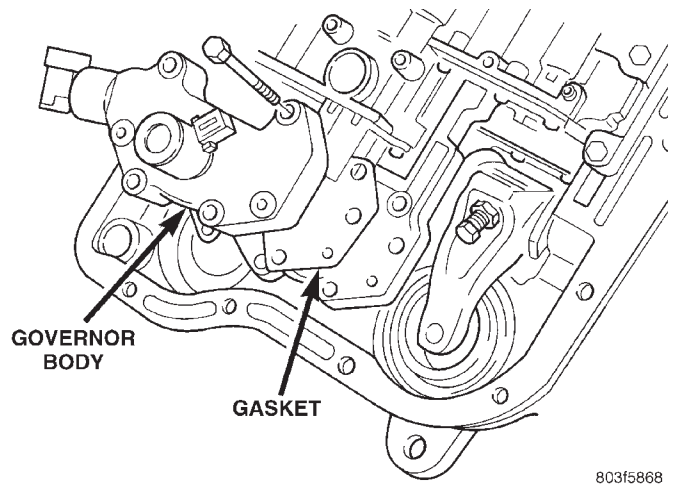
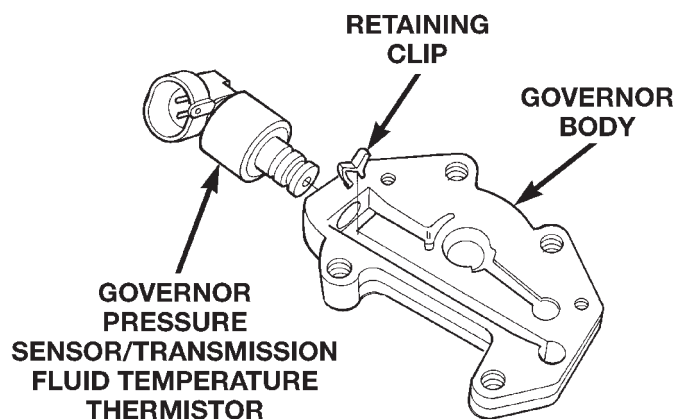


Fig. 42 Governor Body and Gasket

REMOVAL AND INSTALLATION (Continued)



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Fig. 43 Pressure Sensor and Retainer**VALVE BODY**

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 Disassemble and Assemble section.

The only replaceable valve body components are:

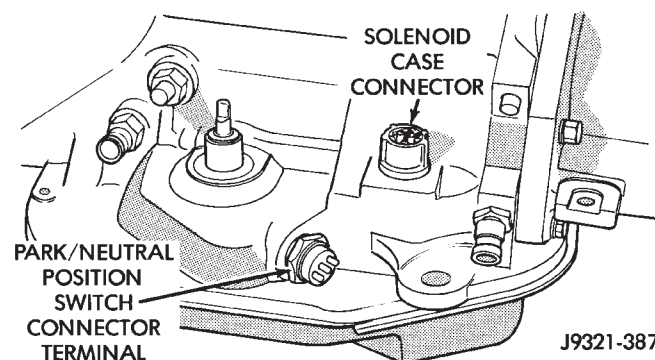
- Manual lever
- Manual lever washer, seal, E-clip, and shaft seal
- Manual lever detent ball
- Throttle lever
- Fluid filter
- Pressure adjusting screw bracket
- Governor pressure solenoid
- Governor pressure sensor
- Converter clutch/overdrive solenoid assembly and harness (includes sump temperature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

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

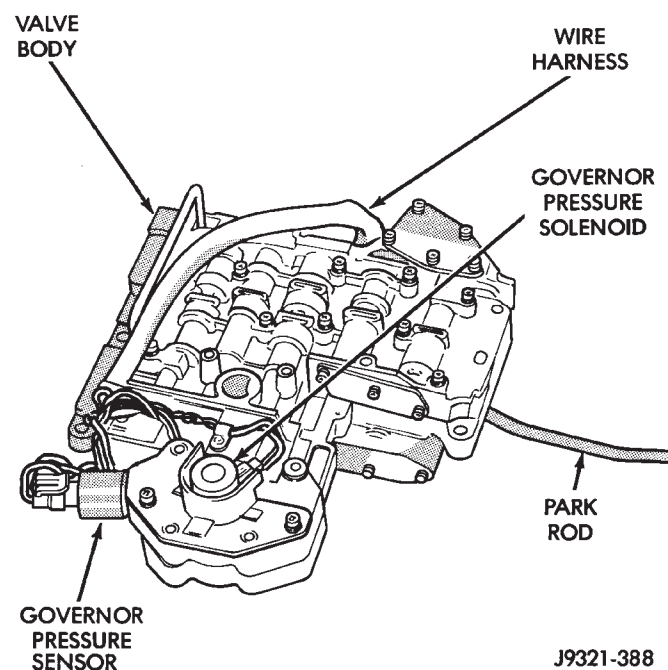
REMOVAL

- (1) Shift transmission into NEUTRAL.
- (2) Raise vehicle.
- (3) Remove gearshift and throttle levers from shaft of valve body manual lever.
- (4) Disconnect wires at park/neutral position switch.
- (5) Disconnect wires at park/neutral position switch and solenoid case connector (Fig. 44).
- (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. 45).



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Fig. 44 Transmission Case Connector

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Fig. 45 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. 46). 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. 47).

(4) Check condition of seals on accumulator piston (Fig. 48). 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.

REMOVAL AND INSTALLATION (Continued)

(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 shaft to align sprag and park lock teeth if necessary. The rod will click as it enters pawl. Move rod to check engagement.

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

(9) Install accumulator springs and piston into 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 valve cables, if necessary.

TRANSMISSION COOLER LINE AND FITTINGS

The transmission cooler lines are attached with quick connect fittings (Fig. 49).

COOLER LINE AND FITTING SERVICE

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

Fittings swaged into cooler line hoses are serviced only as part of the entire cooler line.

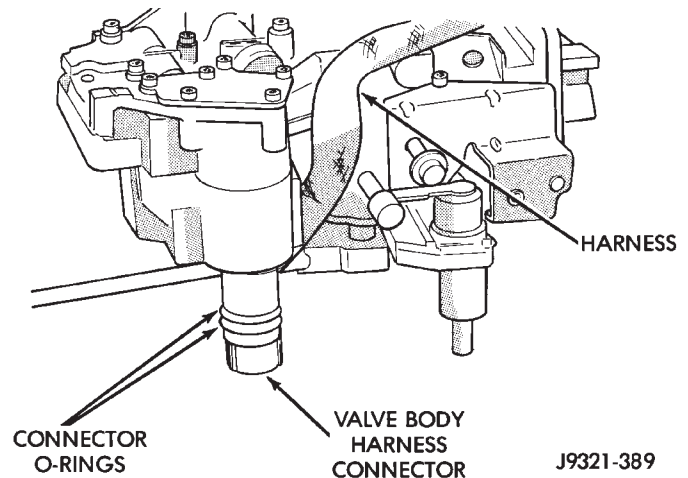


Fig. 46 Valve Body Harness Connector O-Ring Seal

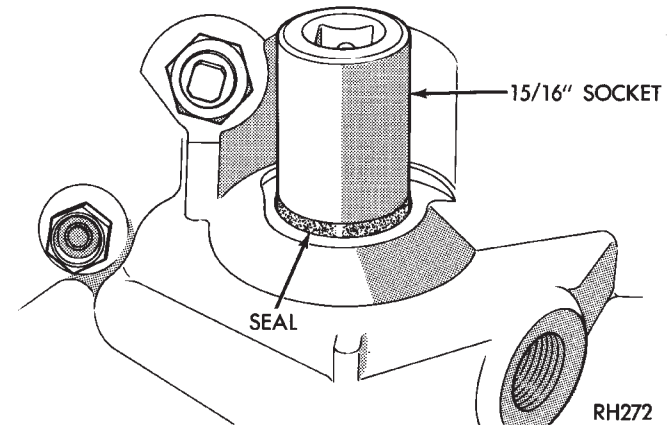


Fig. 47 Manual Lever Shaft Seal

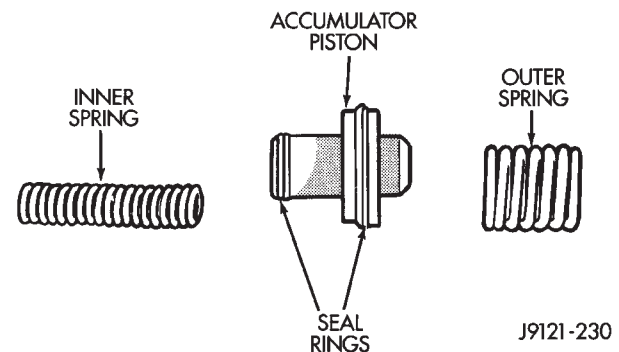


Fig. 48 Accumulator Piston Components

DISCONNECTING COOLER LINES

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

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

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

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

REMOVAL AND INSTALLATION (Continued)

clip is damaged. Replace cooler line as assembly, if fitting swedged into cooler line hose, is damaged.

CONNECTING COOLER LINES

(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 secures line. A snap or click will be heard and felt through the line when the retainer seats behind the cooler line flange.

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

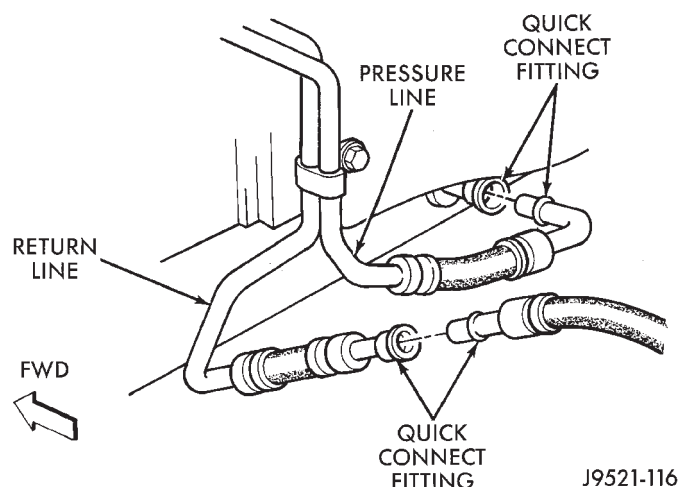


Fig. 49 Cooler Line Fitting

TRANSMISSION COOLER

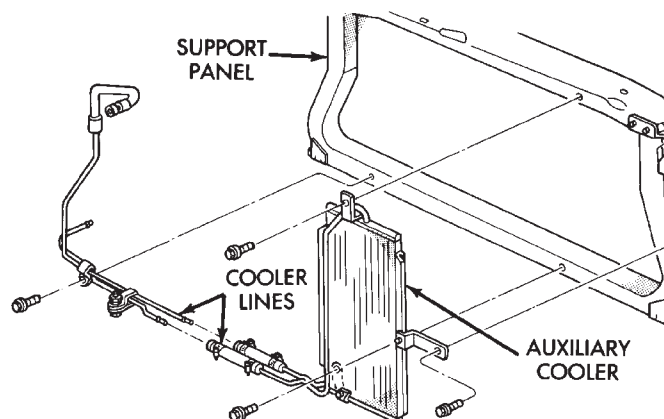
MAIN COOLER REPLACEMENT

The main transmission cooler is located in the radiator lower tank. The cooler is not serviceable. If the cooler is damaged, the radiator must be replaced.

AUXILIARY COOLER REPLACEMENT

- (1) Remove front bumper assembly.
- (2) If equipped, remove the air conditioning condenser and receiver-drier.
- (3) Remove brackets securing cooler to radiator and radiator support (Fig. 50).
- (4) Mark or tag cooler hoses for installation reference (Fig. 50).
- (5) Position drain pan under cooler lines.
- (6) Loosen cooler lines and remove auxiliary cooler
- (7) Connect cooler lines to replacement auxiliary cooler and position cooler on radiator, or support. Then install cooler brackets and attaching fasteners. Tighten cooler line fittings and hose clamps securely.
- (8) If condenser was removed, install condenser and evacuate and recharge air conditioning system.

- (9) Install bumper assembly.
- (10) Add transmission fluid as necessary.



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Fig. 50 Auxiliary Transmission Fluid Cooler

OVERDRIVE UNIT

REMOVAL

- (1) Shift transmission into Park.
- (2) Raise vehicle.
- (3) Remove transmission oil pan, remove gasket, drain oil and reinstall pan.
- (4) If overdrive unit had malfunctioned, or if fluid is contaminated, remove entire transmission. If diagnosis indicated overdrive clutch or governor problems only, remove overdrive unit only.
- (5) Mark propeller shaft universal joint and axle pinion yoke for alignment reference at installation (Fig. 51).

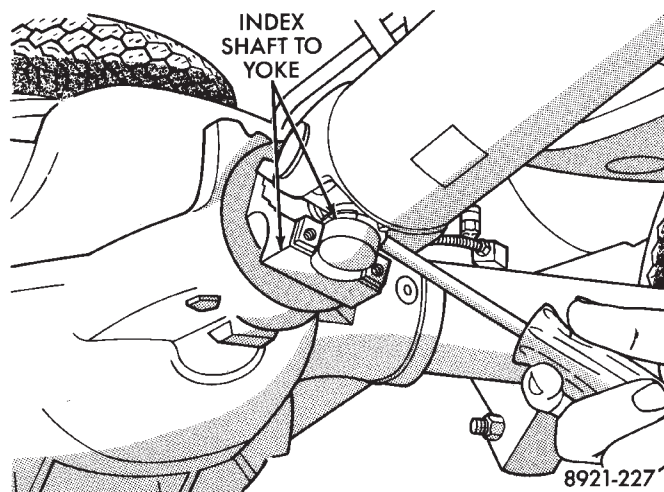


Fig. 51 Mark Propeller Shaft And Yoke For Alignment Reference

- (6) Disconnect and remove propeller shaft.
- (7) Support transmission with transmission jack.
- (8) Remove rear crossmember.

REMOVAL AND INSTALLATION (Continued)

(9) Remove vehicle speed sensor and speedometer adapter.

(10) Remove bolts attaching overdrive unit to transmission (Fig. 52).

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

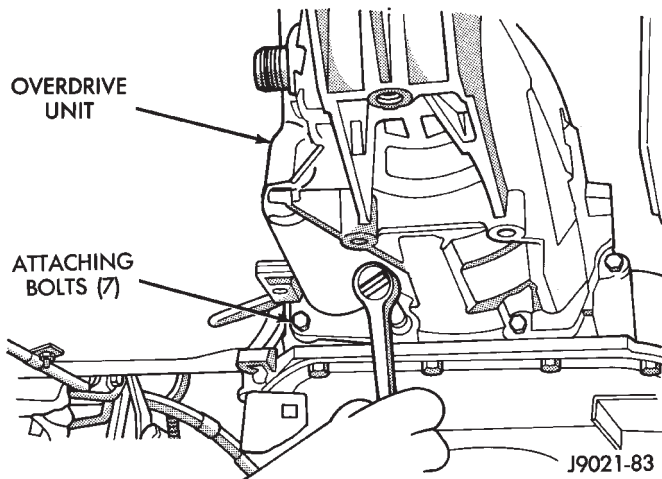


Fig. 52 Removing/Installing Overdrive Unit Attaching Bolts

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

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

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

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

(13) Position drain pan on workbench.

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

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

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

INSTALLATION

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

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

(3) Cut out old case gasket around piston retainer with razor knife (Fig. 53).

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

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

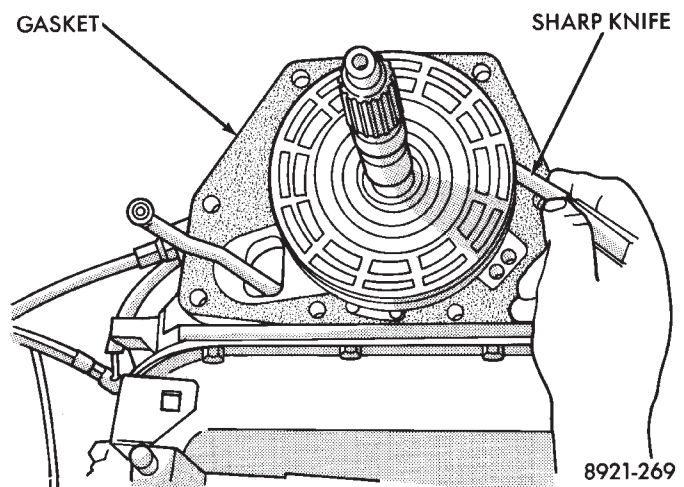


Fig. 53 Trimming Overdrive Case Gasket

(6) Install selective spacer on intermediate shaft, if removed. Spacer goes in groove just rearward of shaft rear splines (Fig. 54).

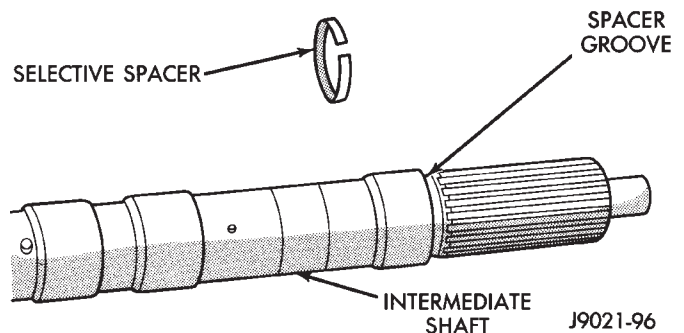


Fig. 54 Intermediate Shaft Selective Spacer Location

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

REMOVAL AND INSTALLATION (Continued)

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

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

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

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

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

(12) Align slip-fit governor tubes and work overdrive unit forward on intermediate shaft until seated against transmission case.

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

(14) Install crossmember.

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

(16) Connect speed sensor and overdrive wires.

(17) Align and install propeller shaft.

(18) If valve body was also removed, adjust bands, install valve body and install transmission oil pan and gasket.

TRANSMISSION/OVERDRIVE

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

The entire transmission assembly must be removed in order to service the torque converter, driveplate, ring gear and oil pump. Refer to the transmission removal and installation procedures in this section.

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

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

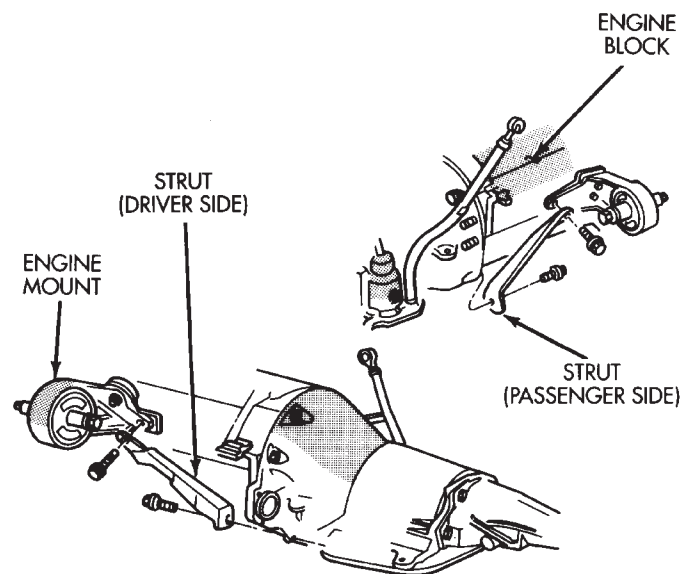
removal. Be sure to remove the transmission and converter as an assembly.

REMOVAL

(1) Disconnect battery negative cable.

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

(3) Remove engine-to-transmission struts, if equipped (Fig. 55).



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Fig. 55 Transmission-To-Engine Strut Attachment

(4) Disconnect fluid cooler lines at transmission.

(5) Remove starter motor.

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

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

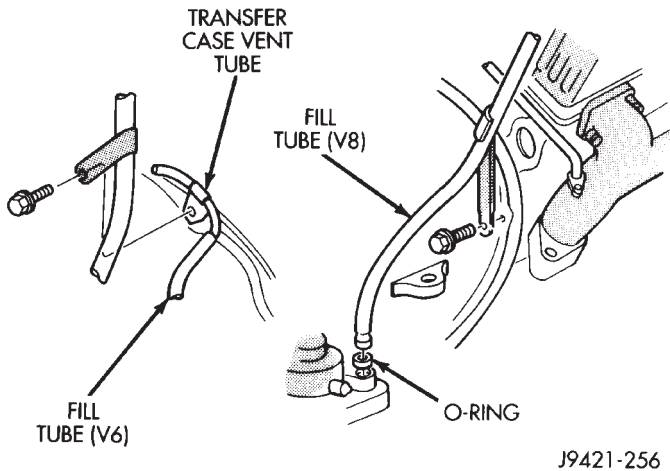
(7) Remove torque converter access cover.

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

(9) Remove fill tube bracket bolts and pull tube out of transmission. Retain fill tube O-ring (Fig. 55). On 4 x 4 models, it will also be necessary to remove bolt attaching transfer case vent tube to converter housing (Fig. 56).

(10) Mark torque converter and drive plate for assembly alignment. Note that bolt holes in crank-

REMOVAL AND INSTALLATION (Continued)

**Fig. 56 Fill Tube Attachment**

shaft flange, drive plate and torque converter all have one offset hole.

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

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

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

(14) Disconnect gearshift rod and torque shaft assembly from transmission.

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

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

(17) Disconnect transmission fluid cooler lines at transmission fittings. Remove lines from retaining clips and tie lines to chassis with wire.

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

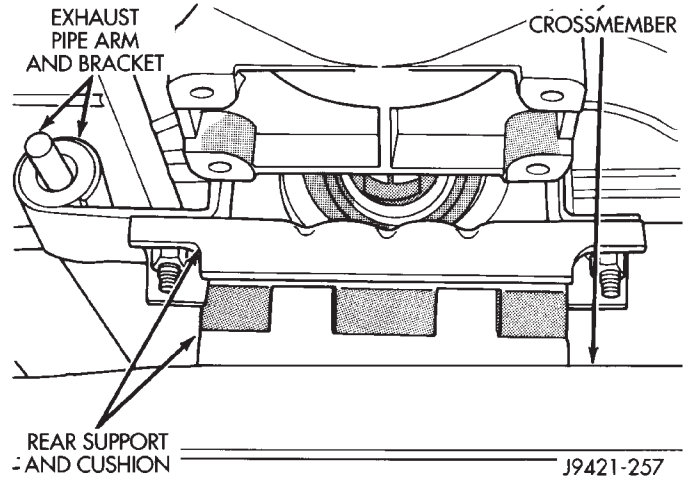
(19) Raise transmission slightly with service jack to relieve load on crossmember and supports.

(20) Remove bolts securing rear support and cushion to transmission and crossmember. Raise transmission slightly, slide exhaust hanger arm from bracket (Fig. 57) and (Fig. 58) and remove rear support.

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

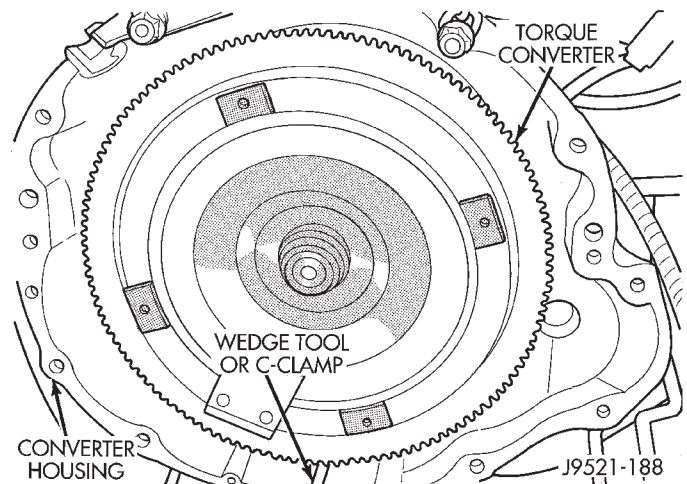
(22) On 4 x 4 models, disconnect speed sensor wires and vent hose from transfer case. Then remove transfer case with transmission jack or aid of helper.

(23) Remove all converter housing bolts.

**Fig. 57 Rear Support Cushion**

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

(25) Use wedge tool (Fig. 58), or C-clamp to hold torque converter in place during transmission removal.

**Fig. 58 Holding Converter In Place With Wedge Tool**

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

(27) To remove torque converter, remove C-clamp from edge of bell housing and carefully slide torque converter out of the transmission.

TRANSMISSION/OVERDRIVE INSTALLATION

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

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

(3) Lubricate converter pilot hub with transmission fluid.

REMOVAL AND INSTALLATION (Continued)

- (4) Align and install converter in oil pump.
- (5) Carefully insert converter in oil pump. Then rotate converter back and forth until fully seated in pump gears.
- (6) Check converter seating with steel scale and straightedge (Fig. 59). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.
- (7) Temporarily secure converter with wedge tool or C-clamp.

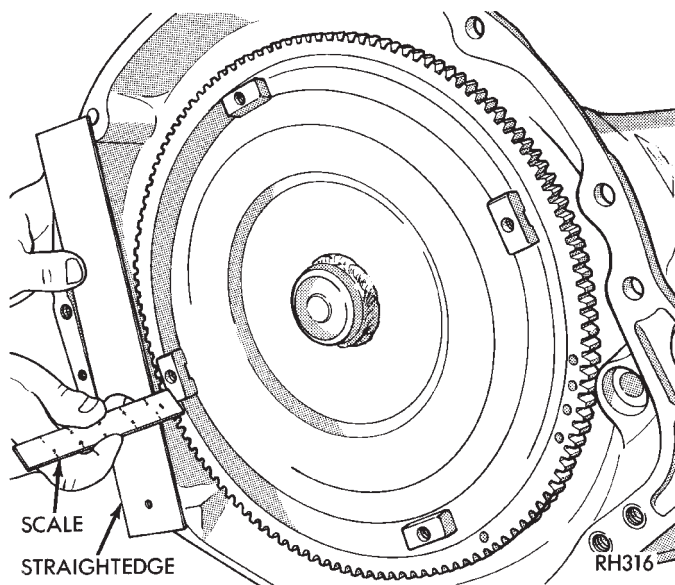


Fig. 59 Typical Method Of Checking Converter Seating

- (8) Position transmission on jack and secure it with chains.
- (9) Check condition of converter driveplate. Replace the plate if cracked, distorted or damaged. **Also be sure transmission dowel pins are seated in engine block and protrude far enough to held transmission in alignment.**
- (10) Raise transmission and align converter with drive plate and converter housing with engine block.
- (11) Move transmission forward. Then raise, lower or tilt transmission to align converter housing with engine block dowels.
- (12) Rotate converter so alignment marks scribed on converter are aligned with mark on driveplate.
- (13) Carefully work transmission forward and over engine block dowels until converter hub is seated in crankshaft.
- (14) Install bolts attaching converter housing to engine.
- (15) Install rear support. Then lower transmission onto crossmember and install bolts attaching transmission mount to crossmember.
- (16) Remove engine support fixture.
- (17) Install crankshaft position sensor.

- (18) Install vehicle speed sensor and speedometer adapter.

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

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

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

CAUTION: It is essential that correct length bolts be used to attach the converter to the driveplate. Bolts that are too long will damage the clutch surface inside the converter. If new bolts are required, use the bolts specified in the parts catalog only.

- (22) Install torque converter-to-driveplate bolts. On models with 10.75 in. converter, tighten bolts to 31 N·m (270 in. lbs.). On models with 12.2 in. converter, tighten bolts to 47 N·m (35 ft. lbs.).

- (23) Install converter housing access cover.
- (24) Install starter motor and cooler line bracket.
- (25) Connect cooler lines to transmission.
- (26) Install transmission fill tube. Install new seal on tube before installation.
- (27) Install exhaust components.
- (28) Align and connect propeller shaft.
- (29) Adjust gearshift linkage and throttle valve cable if necessary.
- (30) Lower vehicle.
- (31) Fill transmission with Mopar ATF Plus, Type 7176 fluid.

TORQUE CONVERTER

REMOVAL

- (1) Remove transmission and torque converter from vehicle.
- (2) Place a suitable drain pan under the converter housing end of the transmission.

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

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

- (3) Pull the torque converter forward until the center hub clears the oil pump seal.
- (4) Separate the torque converter from the transmission.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

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

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

(2) Place torque converter in position on transmission.

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

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

(4) Insert torque converter hub into oil pump.

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

(6) Check converter seating with a scale and straightedge (Fig. 60). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.

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

(8) Install the transmission in the vehicle.

(9) Fill the transmission with the recommended fluid.

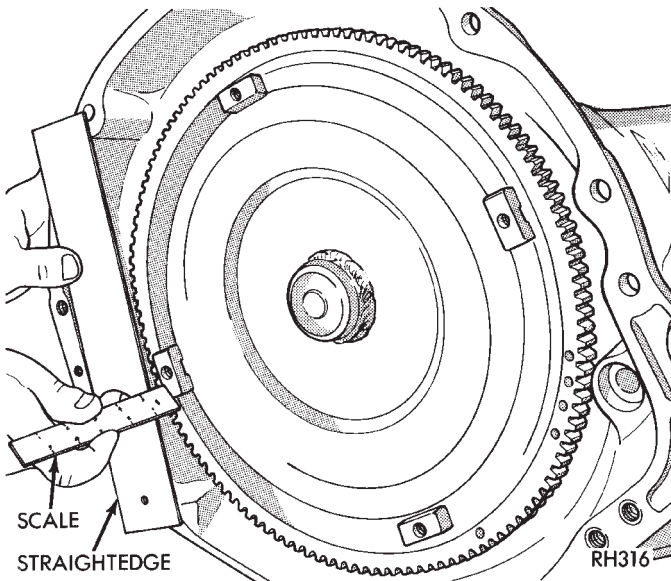


Fig. 60 Checking Torque Converter Seating
DISASSEMBLY AND ASSEMBLY

VALVE BODY

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

VALVE BODY MAIN COMPONENT
DISASSEMBLE

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. 61).

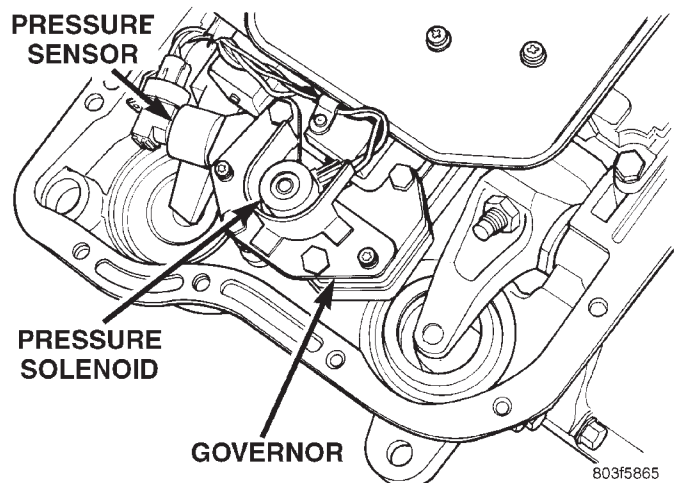


Fig. 61 Governor Pressure Solenoid And Sensor
Wire Locations

(2) Remove screws attaching governor body and retainer plate to transfer plate (Fig. 62).

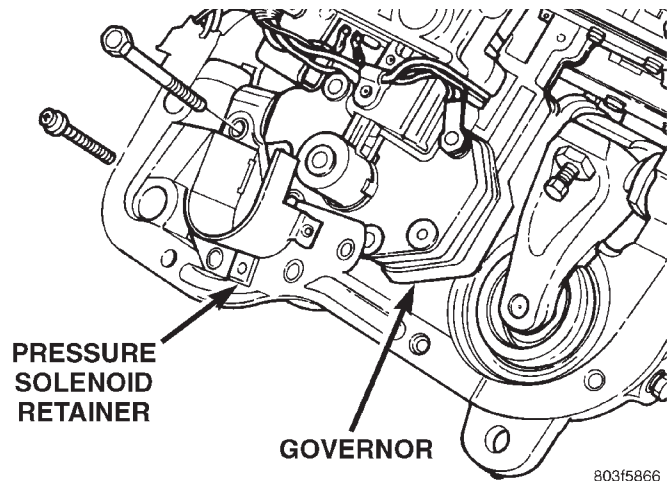


Fig. 62 Governor Body And Retainer Plate Attaching
Screw

DISASSEMBLY AND ASSEMBLY (Continued)

(3) Remove retainer plate, governor body and gasket from transfer plate (Fig. 63).

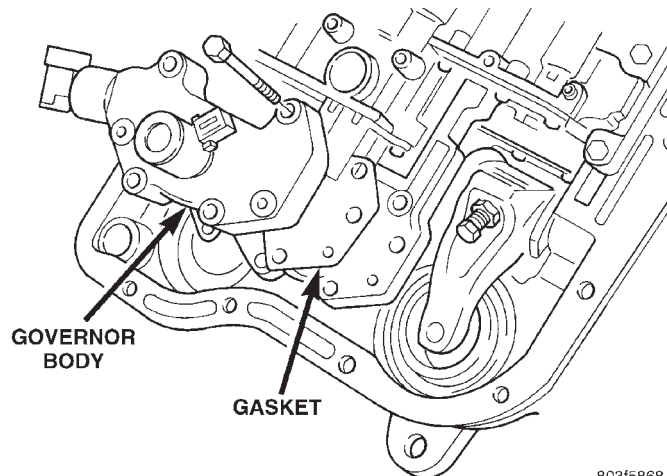


Fig. 63 Governor Body And Gasket

(4) Disconnect wires from governor pressure sensor, if not done previously.

(5) Remove governor pressure sensor from governor body. Sensor is retained in body with M-shaped spring clip (Fig. 64). Remove clip with small pointed tool and slide sensor out of body.

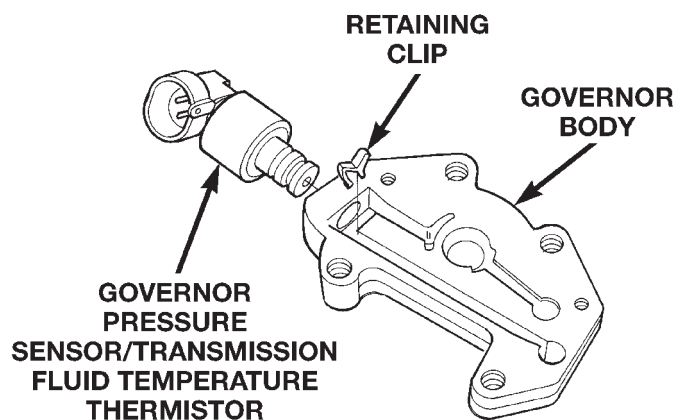


Fig. 64 Governor Pressure Sensor

(6) Remove governor pressure solenoid by pulling it straight out of bore in governor body (Fig. 65). 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. 66). **Retain shoulder bolt. Either tape it 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. 67).

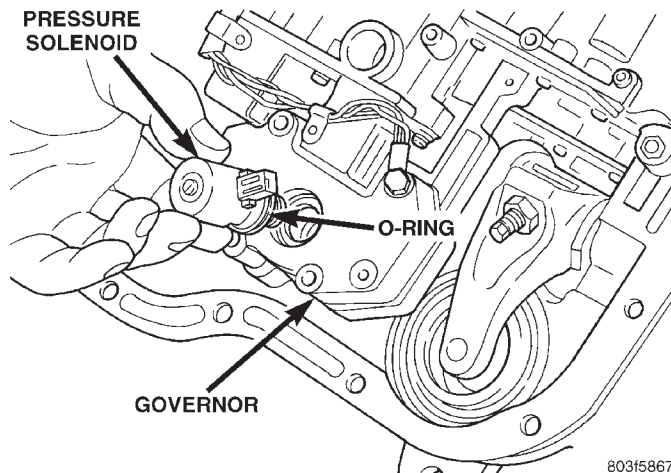


Fig. 65 Governor Pressure Solenoid

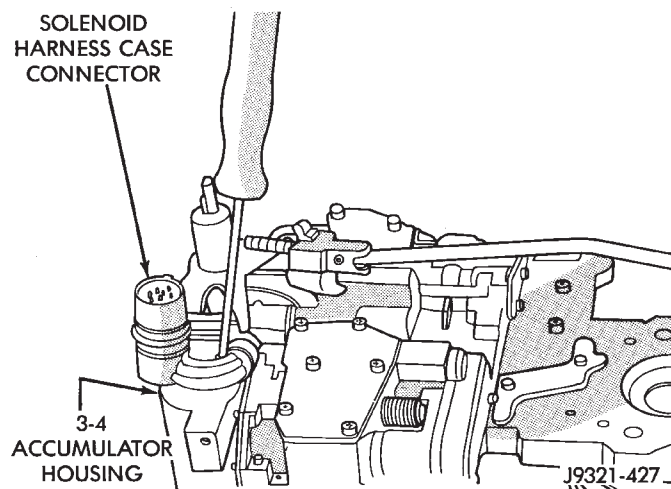


Fig. 66 Solenoid Harness Case Connector Shoulder Bolt

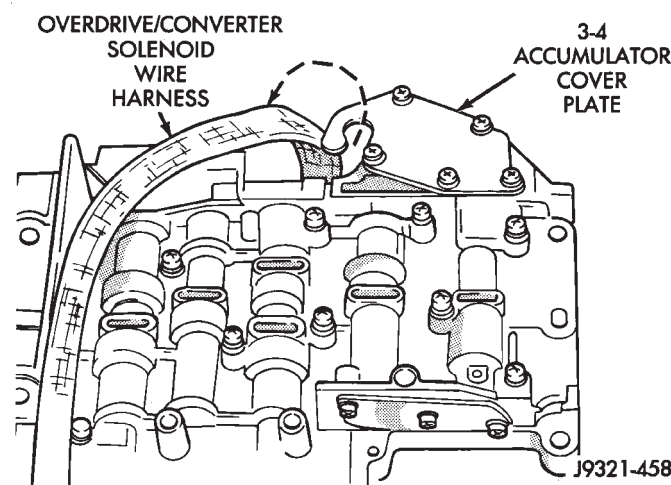


Fig. 67 Unhooking Solenoid Harness From Accumulator Cover Plate

DISASSEMBLY AND ASSEMBLY (Continued)

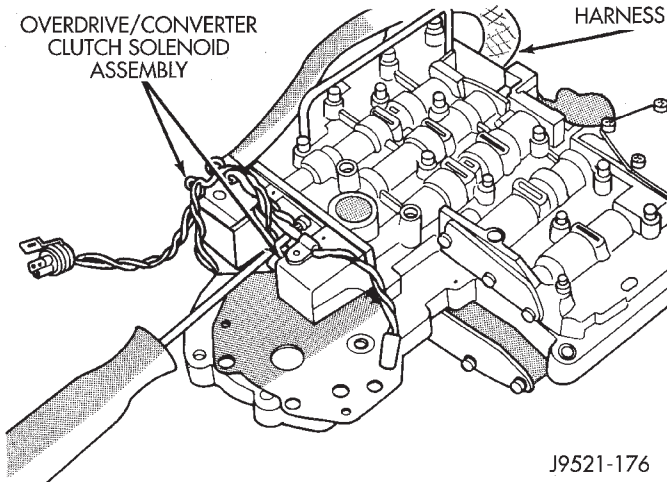


Fig. 68 Solenoid Assembly Screws

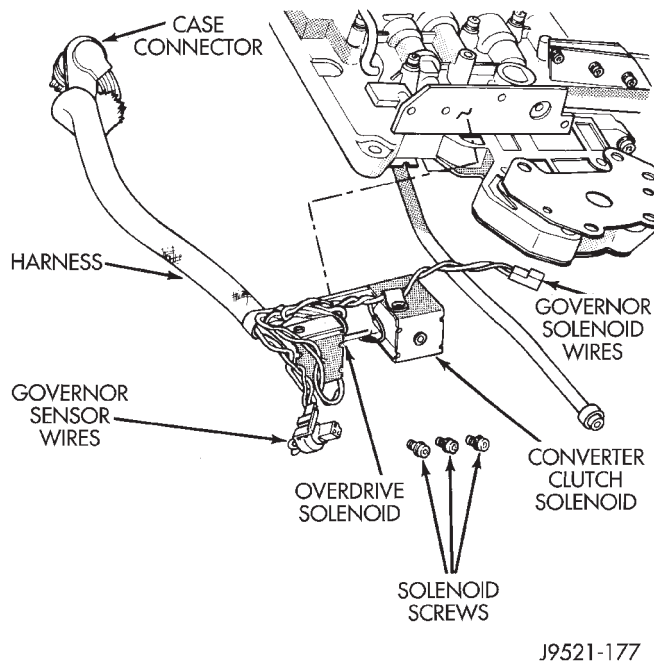


Fig. 69 Solenoid Assembly

(9) Turn valve body over and remove screws that attach overdrive/converter solenoid assembly to valve body (Fig. 68).

(10) Remove solenoid and harness assembly from valve body (Fig. 69).

(11) Remove boost valve cover (Fig. 70).

(12) Remove boost valve retainer, valve spring and boost valve (Fig. 71).

(13) Secure detent ball and spring with Retainer Tool 6583 (Fig. 72).

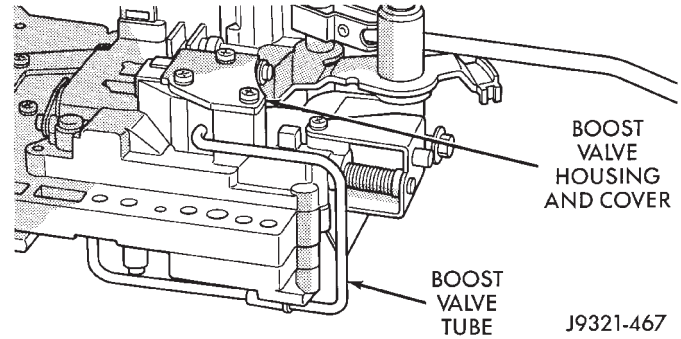


Fig. 70 Boost Valve Cover Location

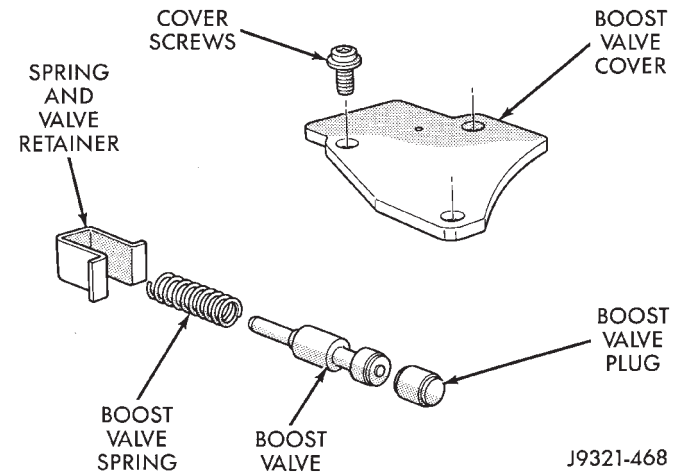


Fig. 71 Boost Valve Components

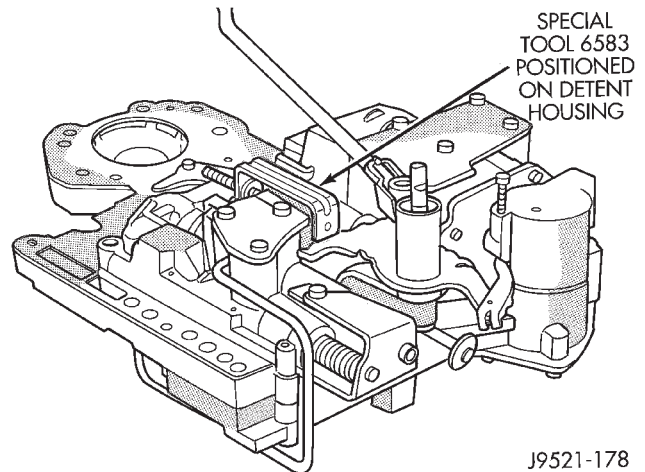


Fig. 72 Detent Ball And Spring

DISASSEMBLY AND ASSEMBLY (Continued)

(14) Remove E-clip and washer that retains throttle lever shaft in manual lever (Fig. 73).

(15) Remove manual lever and throttle lever (Fig. 74). Rotate and lift manual lever off valve body and

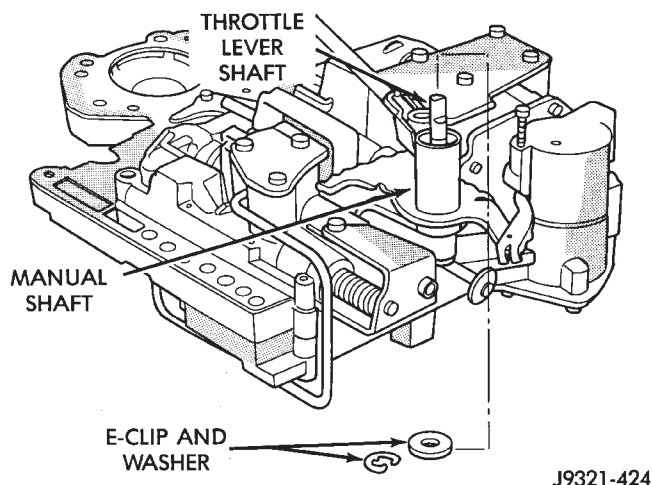


Fig. 73 Throttle Lever E-Clip And Washer

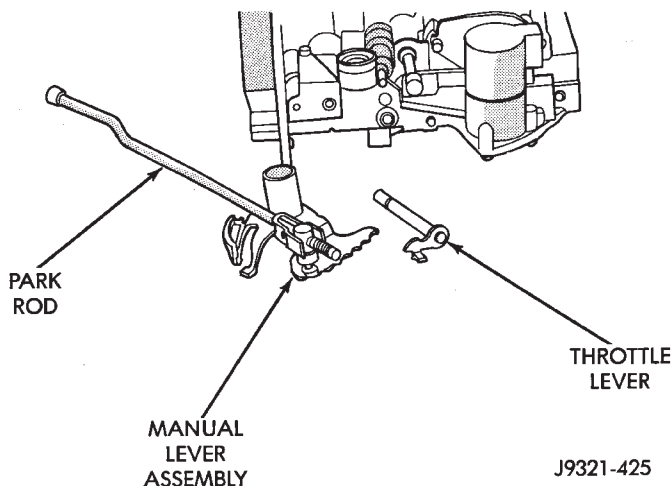


Fig. 74 Manual And Throttle Lever

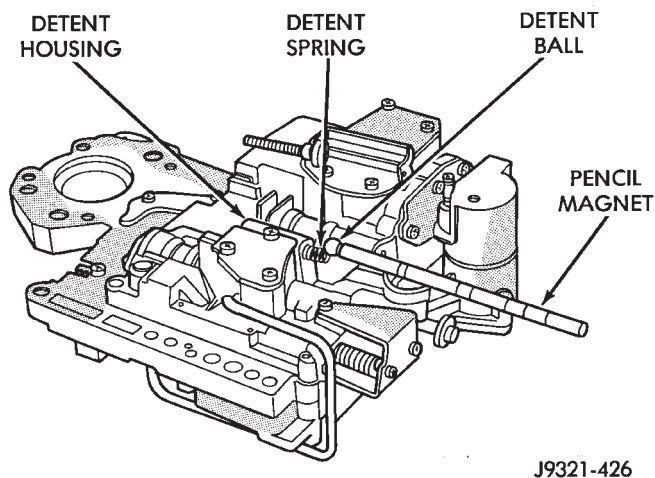


Fig. 75 Detent Ball And Spring

throttle lever shaft. Then slide throttle lever out of valve body.

(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. 75).

(17) Remove park rod E-clip and separate rod from manual lever (Fig. 76).

(18) Remove screws attaching pressure adjusting screw bracket to valve body and transfer plate (Fig. 77). Hold bracket firmly against spring tension while removing last screw.

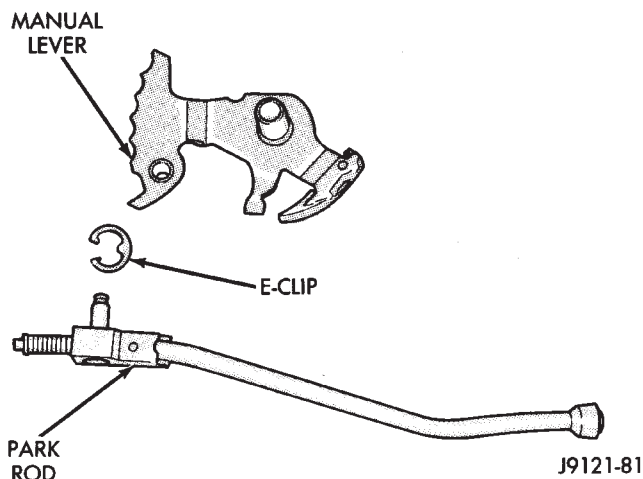


Fig. 76 Park Rod

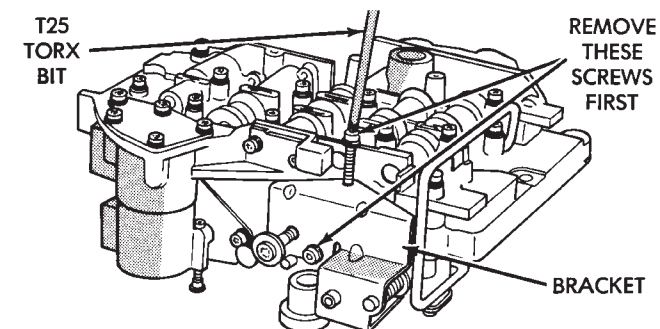


Fig. 77 Adjusting Screw Bracket Fastener

DISASSEMBLY AND ASSEMBLY (Continued)

(19) Remove adjusting screw bracket, line pressure adjusting screw, pressure regulator valve spring and switch valve spring (Fig. 78). **Do not remove throttle pressure adjusting screw from bracket and do not disturb setting of either adjusting screw during removal.**

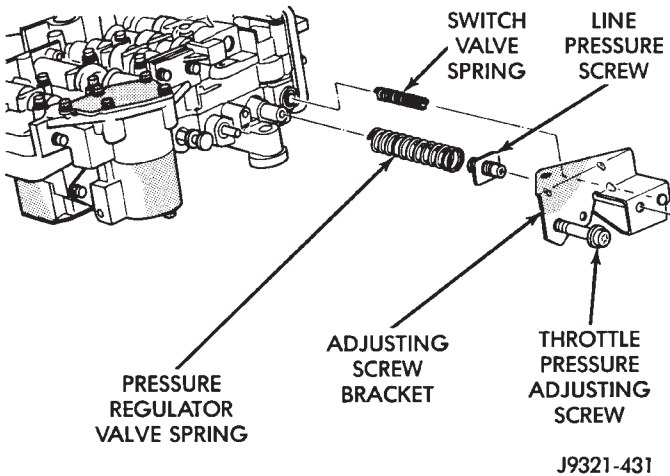


Fig. 78 Adjusting Screw Bracket And Spring

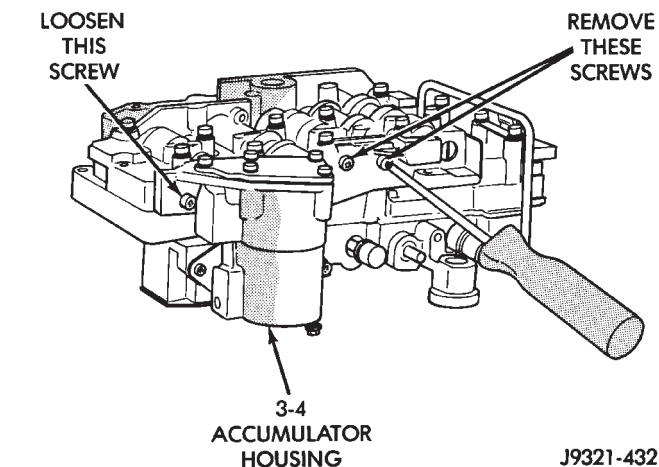


Fig. 79 Accumulator Housing Screw Locations

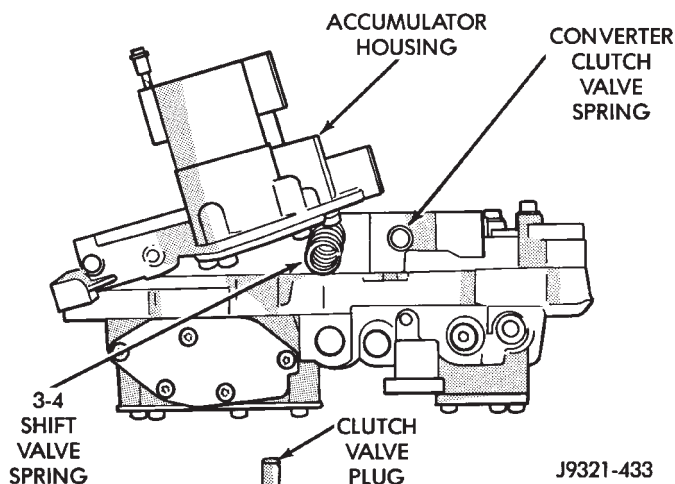


Fig. 80 3-4 Shift And Converter Clutch Valve Springs And Plug

(20) Loosen left-side 3-4 accumulator housing attaching screw about 2-3 threads. Then remove center and right-side housing attaching screws (Fig. 79).

(21) Carefully rotate 3-4 accumulator housing upward and remove 3-4 shift valve spring and converter clutch valve plug and spring (Fig. 80).

(22) Remove left-side screw and remove 3-4 accumulator housing from valve body (Fig. 81).

(23) Remove pressure regulator valve spring from lower housing (Fig. 82).

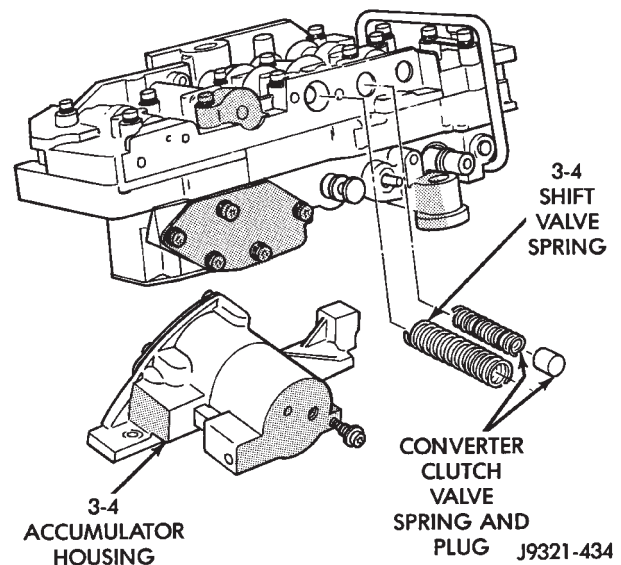


Fig. 81 Accumulator Housing, Valve Springs And Plug

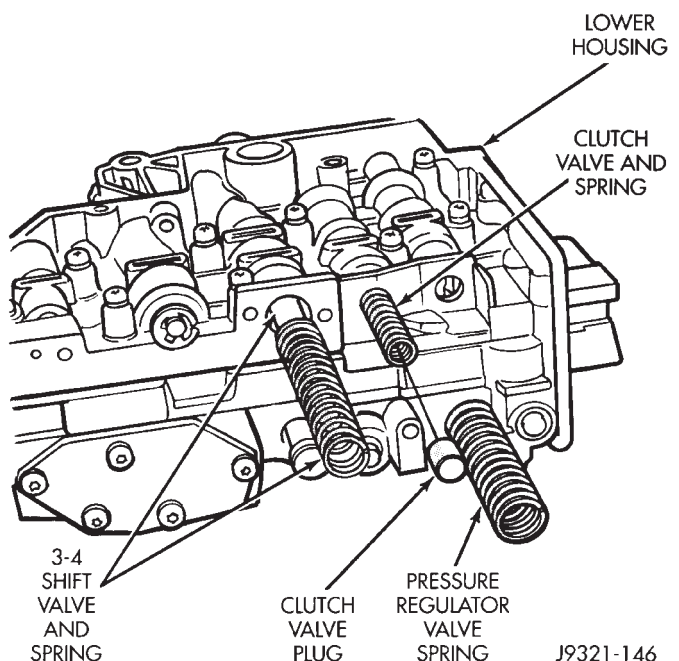
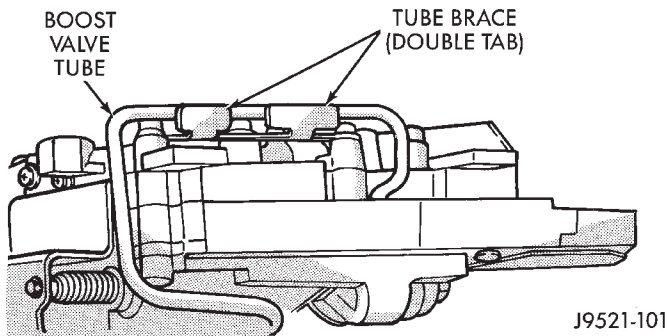
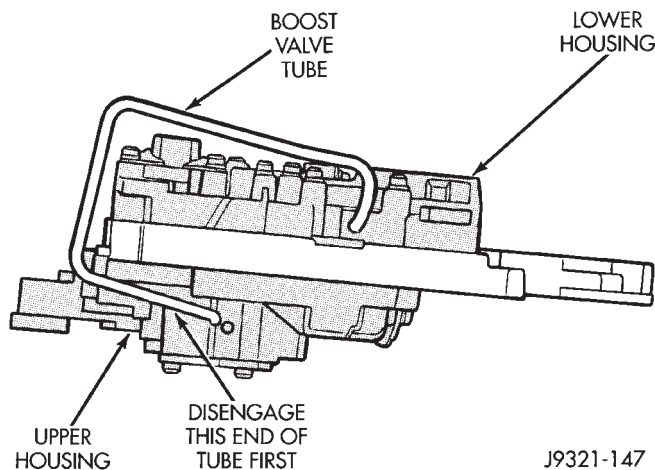
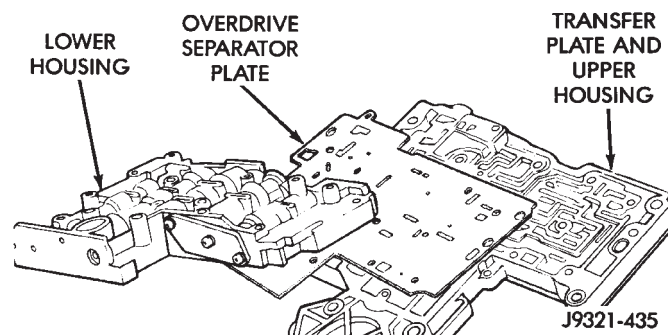


Fig. 82 Lower Housing Valve Spring Locations

DISASSEMBLY AND ASSEMBLY (Continued)

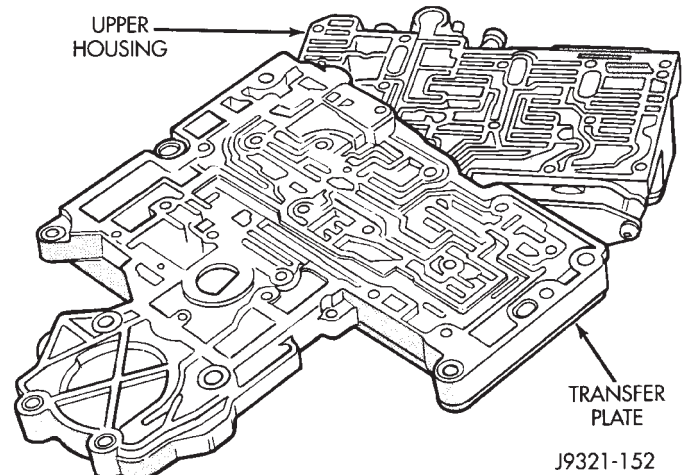
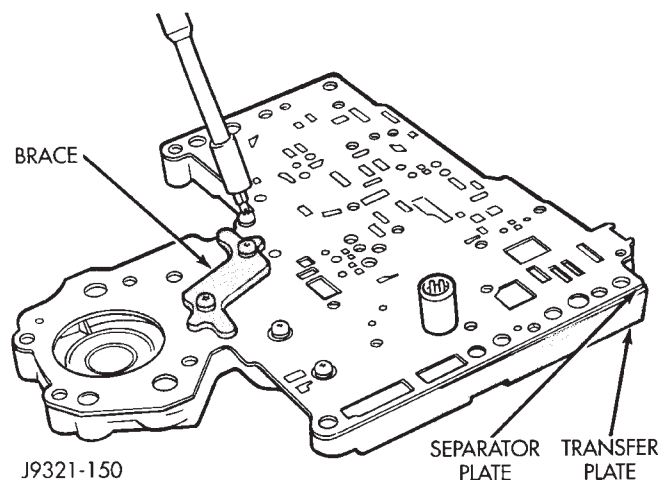
**Fig. 83 Boost Valve Tube Brace****Fig. 84 Boost Valve Tube****Fig. 85 Lower Housing**

(24) Bend back tabs on boost valve tube brace (Fig. 83).

(25) Remove boost valve connecting tube (Fig. 84). Disengage tube from upper housing port first. Then rock opposite end of tube back and forth to work it out of lower housing.

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

(26) Turn valve body over so lower housing is facing upward (Fig. 85). In this position, the two check balls in upper housing will remain in place and not

**Fig. 86 Transfer Plate****Fig. 87 Brace Plate**

fall out when lower housing and separator plate are removed.

(27) Remove screws attaching valve body lower housing to upper housing and transfer plate (Fig. 85). **Note position of boost valve tube brace for assembly reference.**

(28) Remove lower housing and overdrive separator plate from transfer plate (Fig. 85).

(29) Remove transfer plate from upper housing (Fig. 86).

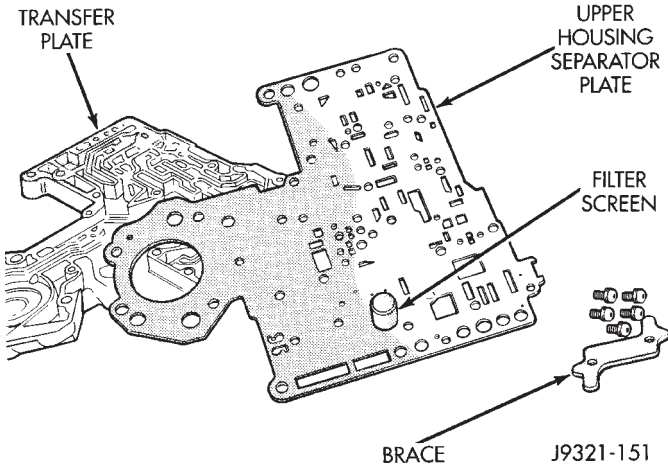
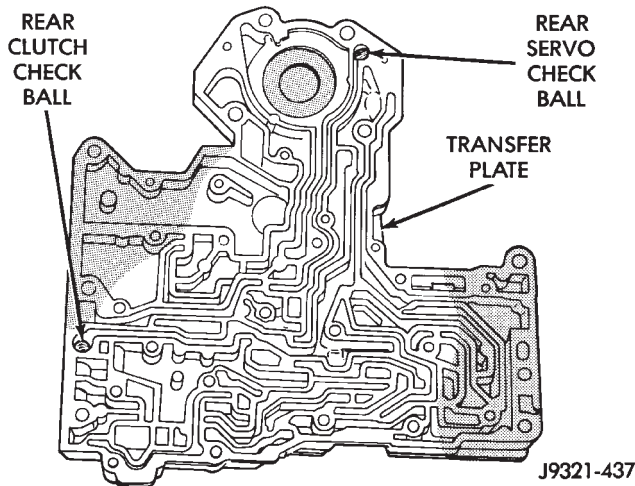
(30) Turn transfer plate over so upper housing separator plate is facing upward.

(31) Remove brace plate from lower housing separator plate and transfer plate (Fig. 87).

(32) Remove upper housing separator plate from transfer plate (Fig. 88). Note position of filter in separator plate for assembly reference.

(33) Remove rear clutch and rear servo check balls from transfer plate. Note check ball location for assembly reference (Fig. 89).

DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 88 Upper Housing Separator Plate****Fig. 89 Rear Clutch And Rear Servo Check Ball Locations****VALVE BODY UPPER HOUSING DISASSEMBLE**

(1) Note location of check balls in valve body upper housing (Fig. 90). Then remove the one large diameter and the six smaller diameter check balls.

(2) Remove E-clip that secure shuttle valve secondary spring on valve stem (Fig. 91).

(3) Remove governor plug and shuttle valve covers (Fig. 92).

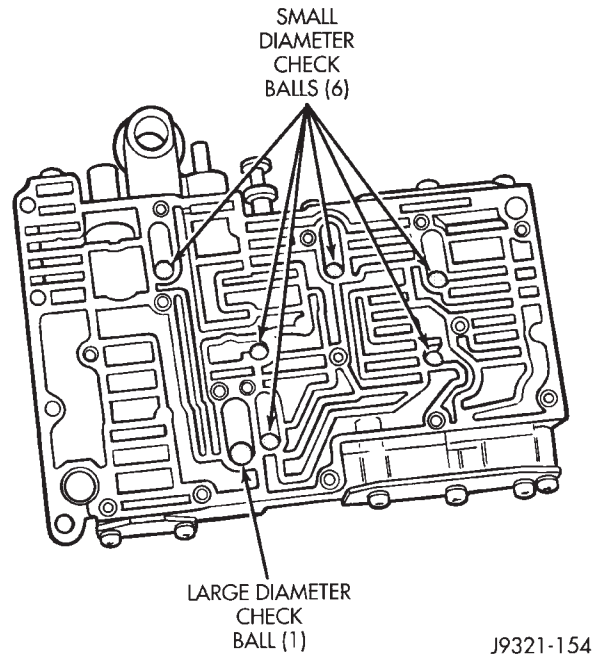
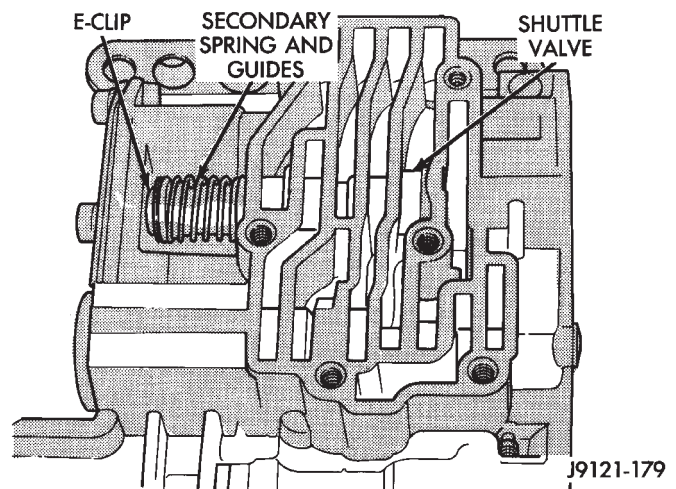
(4) Remove throttle plug, primary spring, shuttle valve, secondary spring, and spring guides (Fig. 92).

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

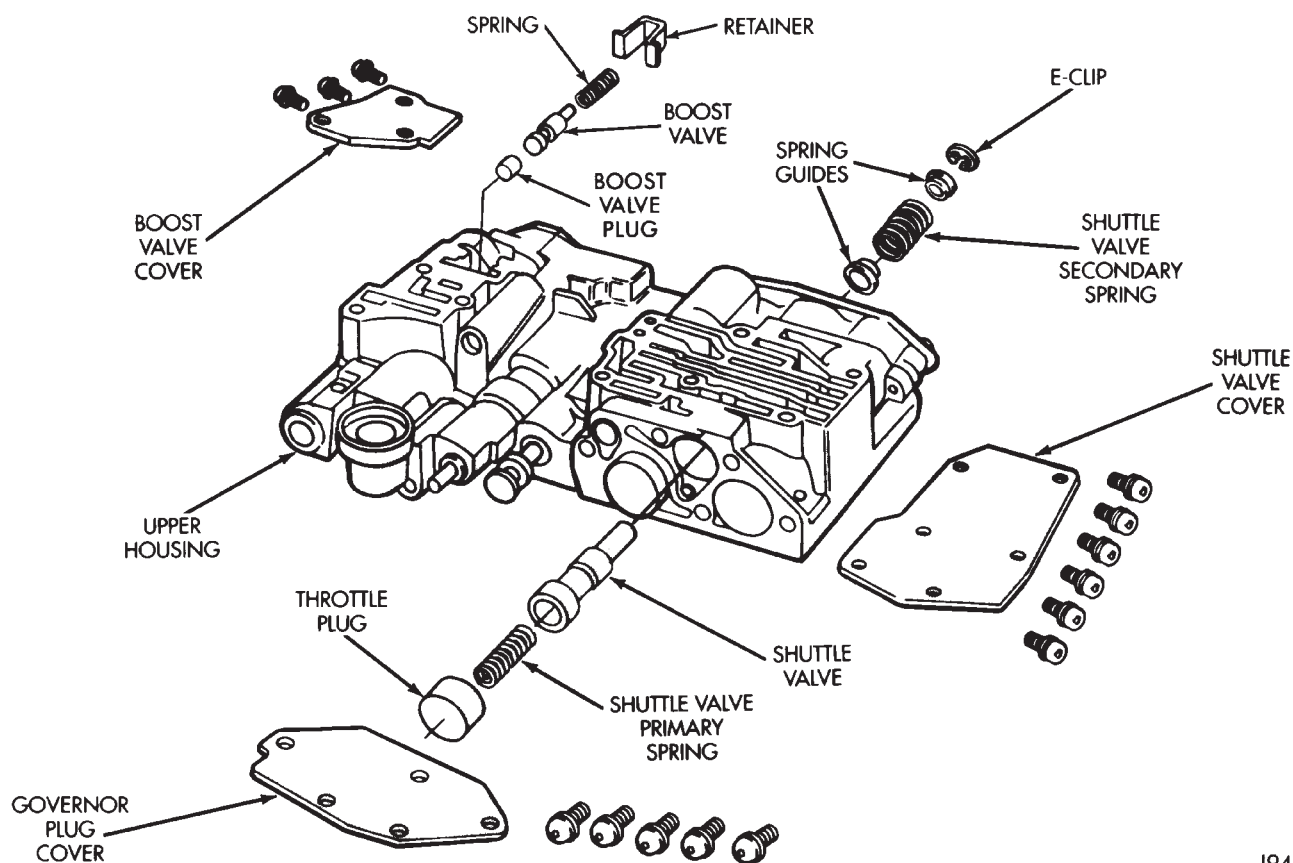
(6) Turn upper housing over and remove switch valve, regulator valve and spring, and manual valve (Fig. 93).

(7) Remove kickdown detent, kickdown valve, and throttle valve and spring (Fig. 93).

(8) Remove throttle plug and 1-2 and 2-3 governor plugs (Fig. 93). Also remove shuttle valve primary spring if not removed in prior step.

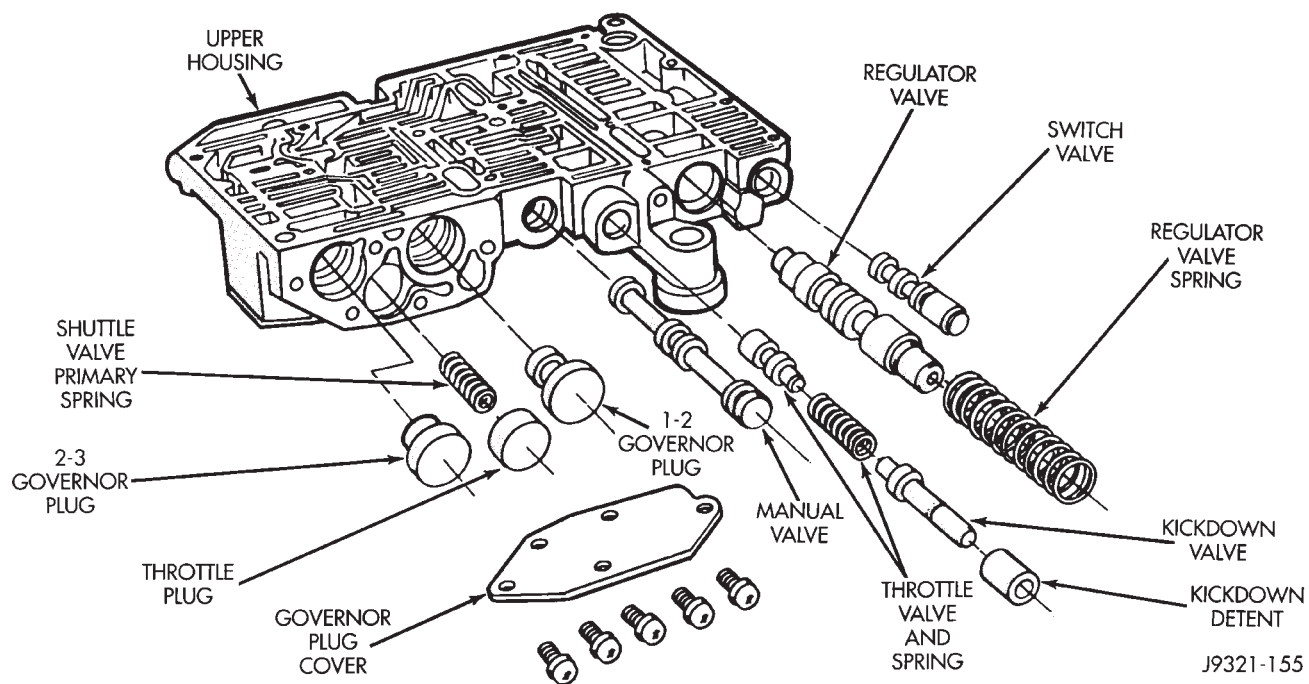
**Fig. 90 Check Ball Locations In Upper Housing****Fig. 91 Shuttle Valve E-Clip And Secondary Spring Location**

DISASSEMBLY AND ASSEMBLY (Continued)



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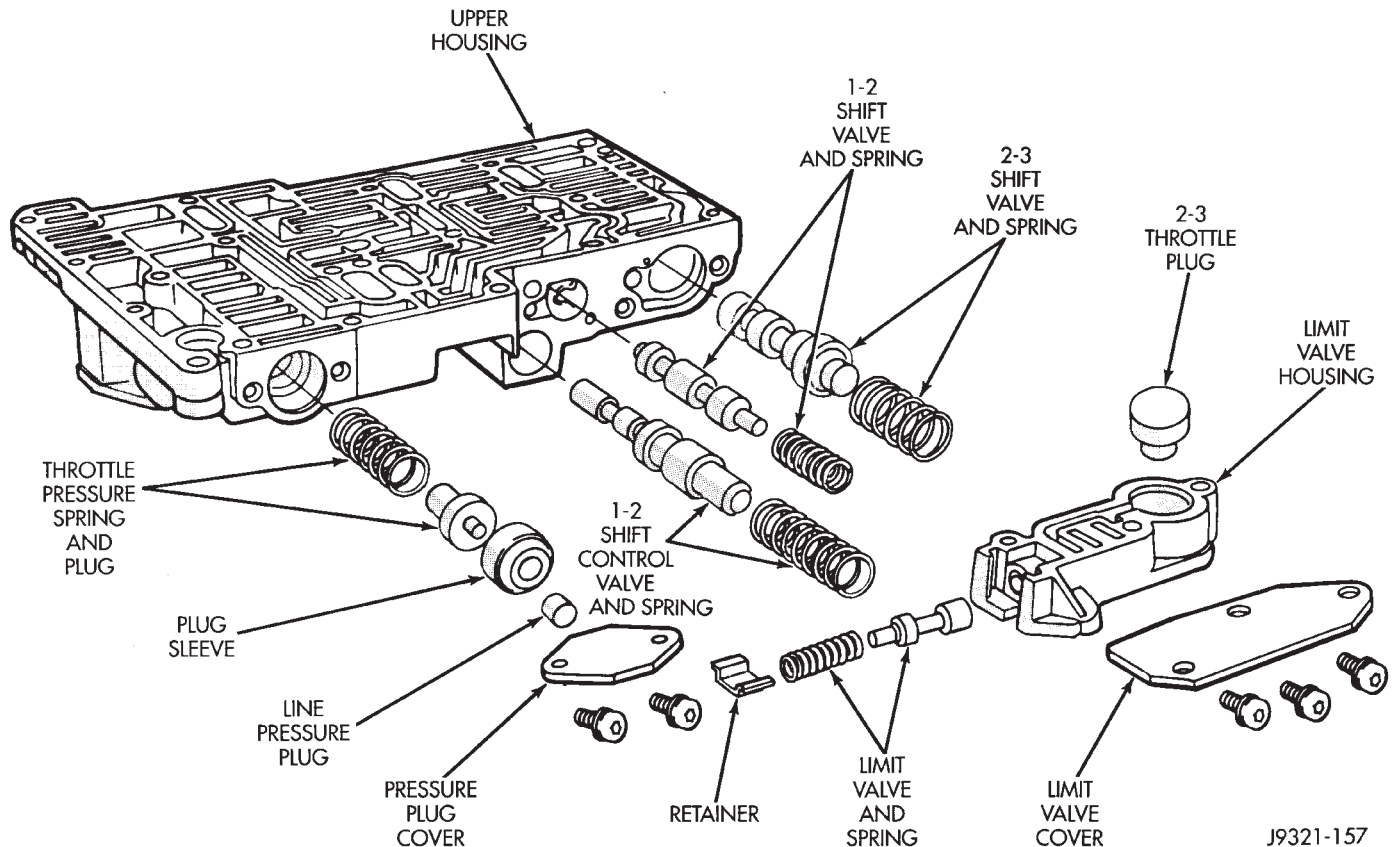
Fig. 92 Shuttle And Boost Valve Components



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Fig. 93 Upper Housing Control Valve Locations

DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 94 Upper Housing Shift Valve And Pressure Plug Locations**

(9) Turn upper housing around and remove limit valve and shift valve covers (Fig. 94).

(10) Remove limit valve housing. Then remove retainer, spring, limit valve, and 2-3 throttle plug from limit valve housing (Fig. 94).

(11) Remove 1-2 shift control valve and spring (Fig. 94).

(12) Remove 1-2 shift valve and spring (Fig. 94).

(13) Remove 2-3 shift valve and spring from valve body (Fig. 94).

(14) Remove pressure plug cover (Fig. 94).

(15) Remove line pressure plug, sleeve, throttle pressure plug and spring (Fig. 94).

VALVE BODY LOWER HOUSING DISASSEMBLY

(1) Remove timing valve cover.

(2) Remove 3-4 timing valve and spring.

(3) Remove 3-4 quick fill valve, spring and plug.

(4) Remove 3-4 shift valve and spring.

(5) Remove converter clutch valve, spring and plug (Fig. 95).

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

3-4 ACCUMULATOR HOUSING DISASSEMBLY

(1) Remove end plate from housing.

(2) Remove piston spring.

(3) Remove piston. Remove and discard piston seals (Fig. 96).

VALVE BODY ASSEMBLY

CAUTION: Do not force valves or plugs into place during reassembly. If the valve body bores, valves and plugs are free of distortion or burrs, the valve body components should all slide into place easily. In addition, do not overtighten the transfer plate and valve body screws during reassembly. Overtightening can distort the housings resulting in valve sticking, cross leakage and unsatisfactory operation. Tighten valve body screws to recommended torque only.

LOWER HOUSING ASSEMBLY

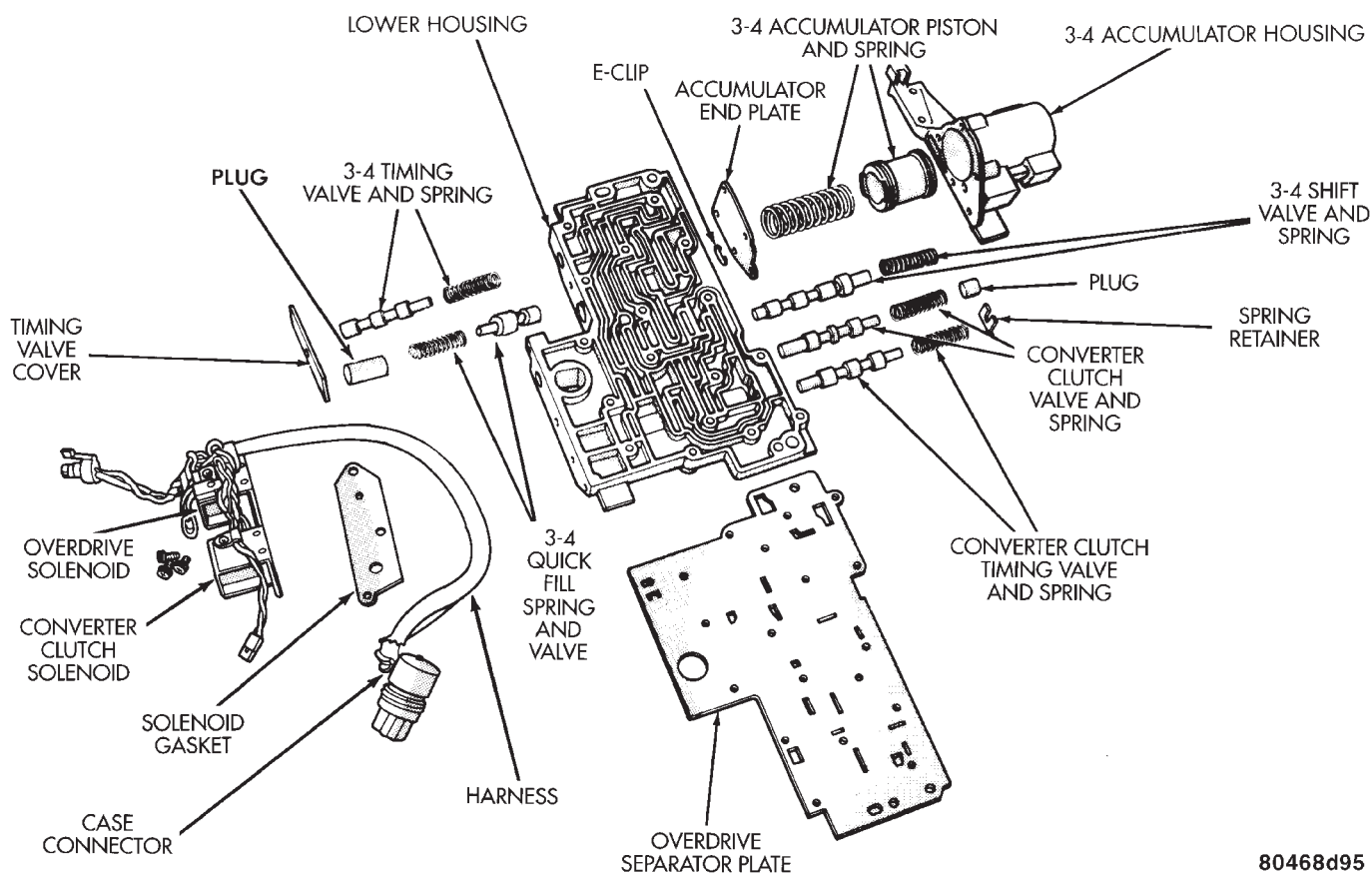
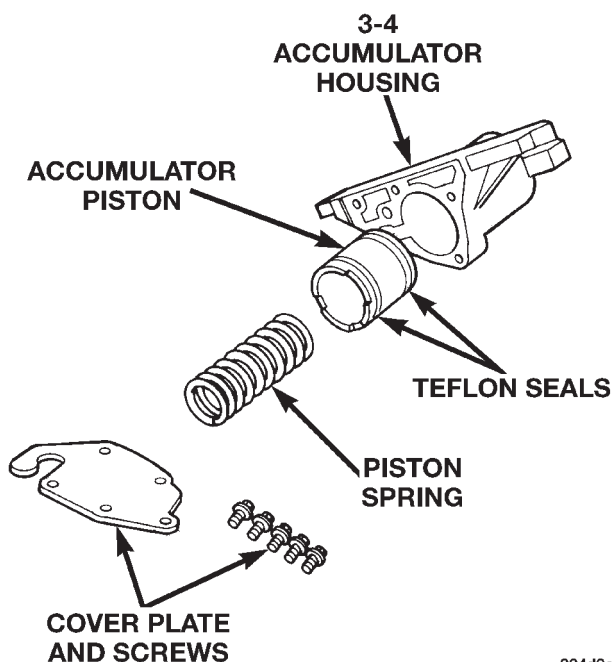
(1) Lubricate valves, springs, and the housing valve and plug bores with clean transmission fluid (Fig. 95).

(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.

DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 95 Lower Housing Shift Valves And Springs****Fig. 96 Accumulator Housing Components**

- (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

- (1) Lubricate accumulator piston, seals and housing piston bore with clean transmission fluid (Fig. 96).
- (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. 97).
- (2) Install filter screen in upper housing separator plate (Fig. 98).
- (3) Align and position upper housing separator plate on transfer plate (Fig. 99).
- (4) Install brace plate (Fig. 99). 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

DISASSEMBLY AND ASSEMBLY (Continued)

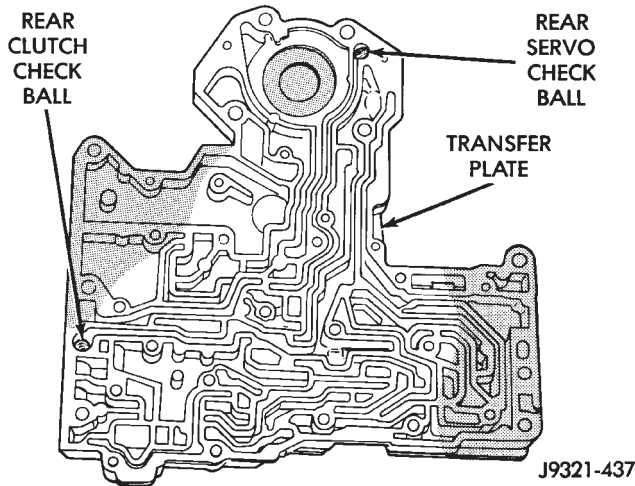


Fig. 97 Rear Clutch And Rear Servo Check Ball Locations

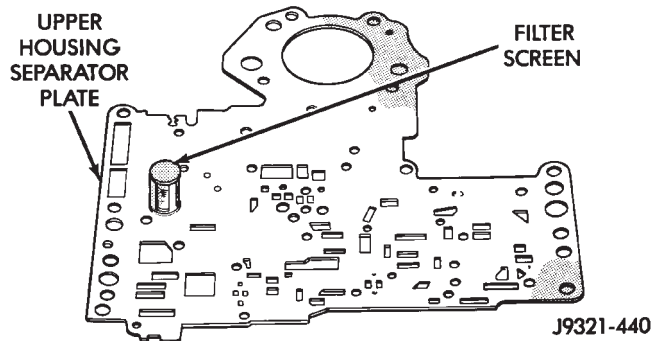


Fig. 98 Separator Plate Filter Screen Installation

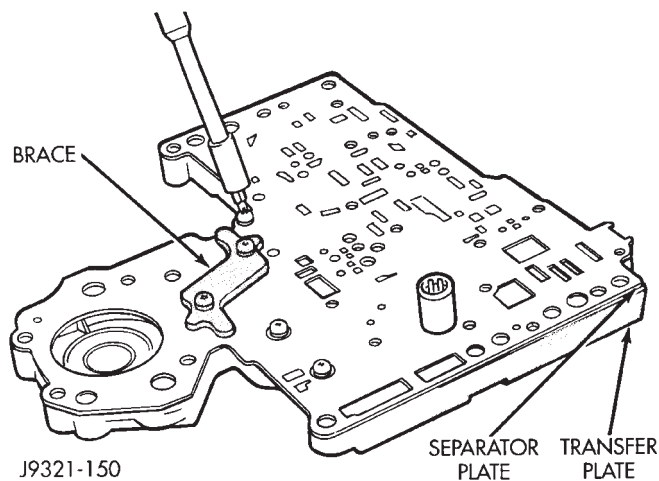


Fig. 99 Brace Plate

check balls in housing (Fig. 100). 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. 101).

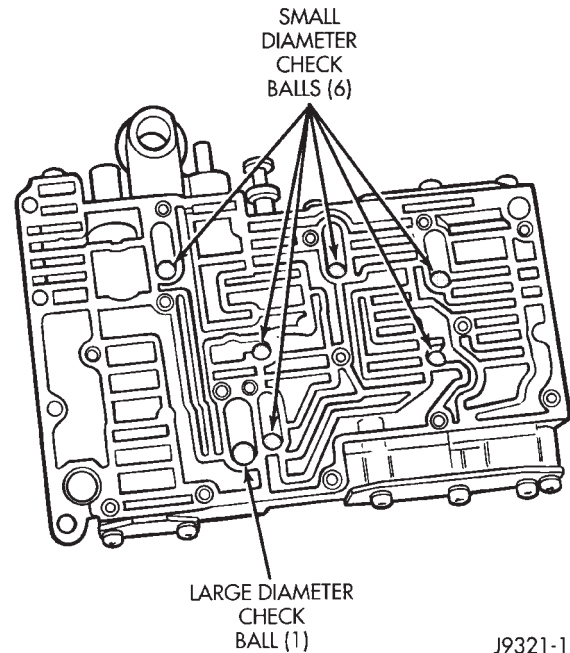


Fig. 100 Check Ball Locations In Upper Housing

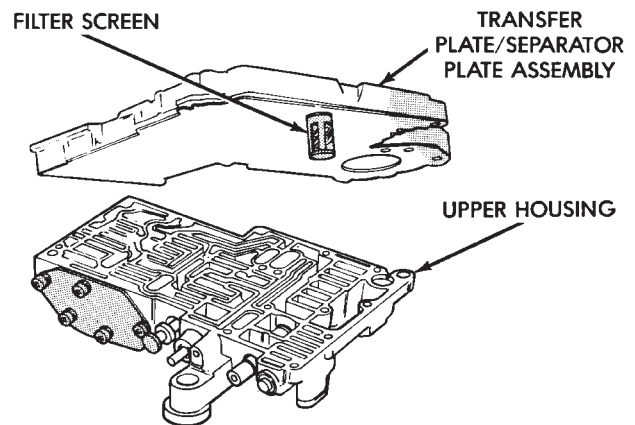


Fig. 101 Installing Transfer Plate On Upper Housing

Be sure filter screen is seated in proper housing recess.

(3) Position lower housing separator plate on transfer plate (Fig. 102).

(4) Install lower housing on assembled transfer plate and upper housing (Fig. 103).

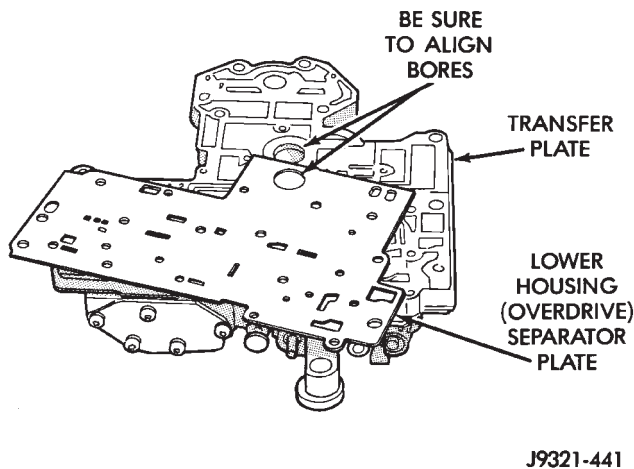
(5) Install and start valve body screws by hand. Then tighten screws evenly to 4 N·m (35 in. lbs.) torque. Start at center and work out to sides when tightening screws (Fig. 103).

UPPER HOUSING VALVE AND PLUG INSTALLATION

Refer to (Fig. 104), (Fig. 105) and (Fig. 106) to perform the following steps.

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

DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 102 Lower Housing Separator Plate**

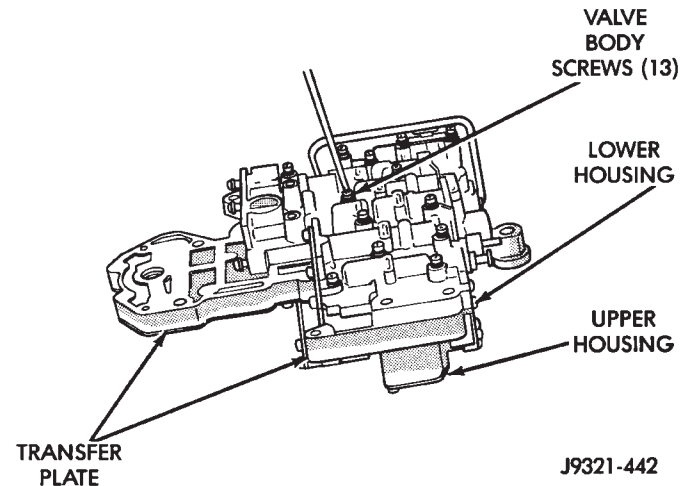
(2) Assemble regulator valve line pressure plug, sleeve, throttle plug and spring. Insert assembly in upper housing and install cover plate. Tighten cover plate screws to 4 N·m (35 in. lbs.) torque.

(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:

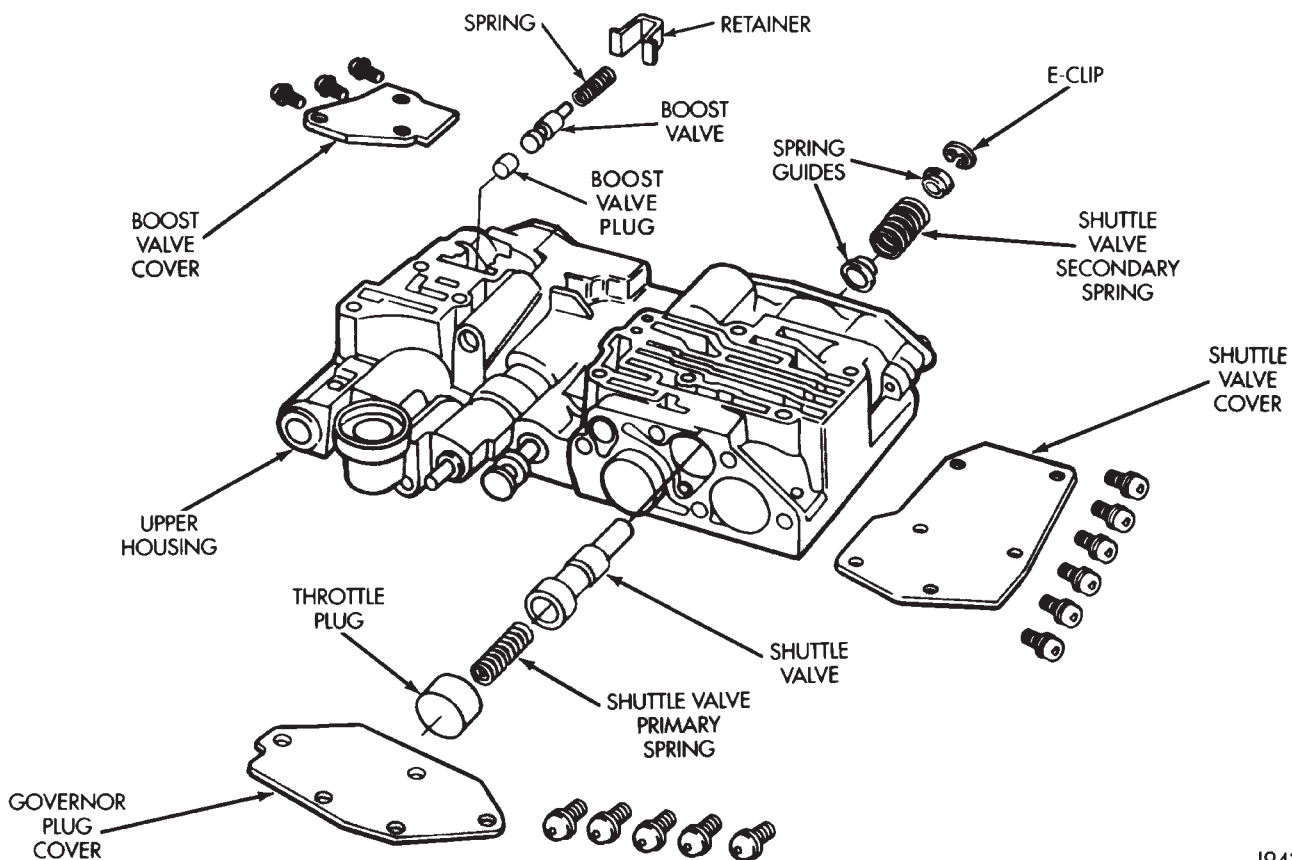
**Fig. 103 Installing Lower Housing On Transfer Plate And Upper Housing**

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

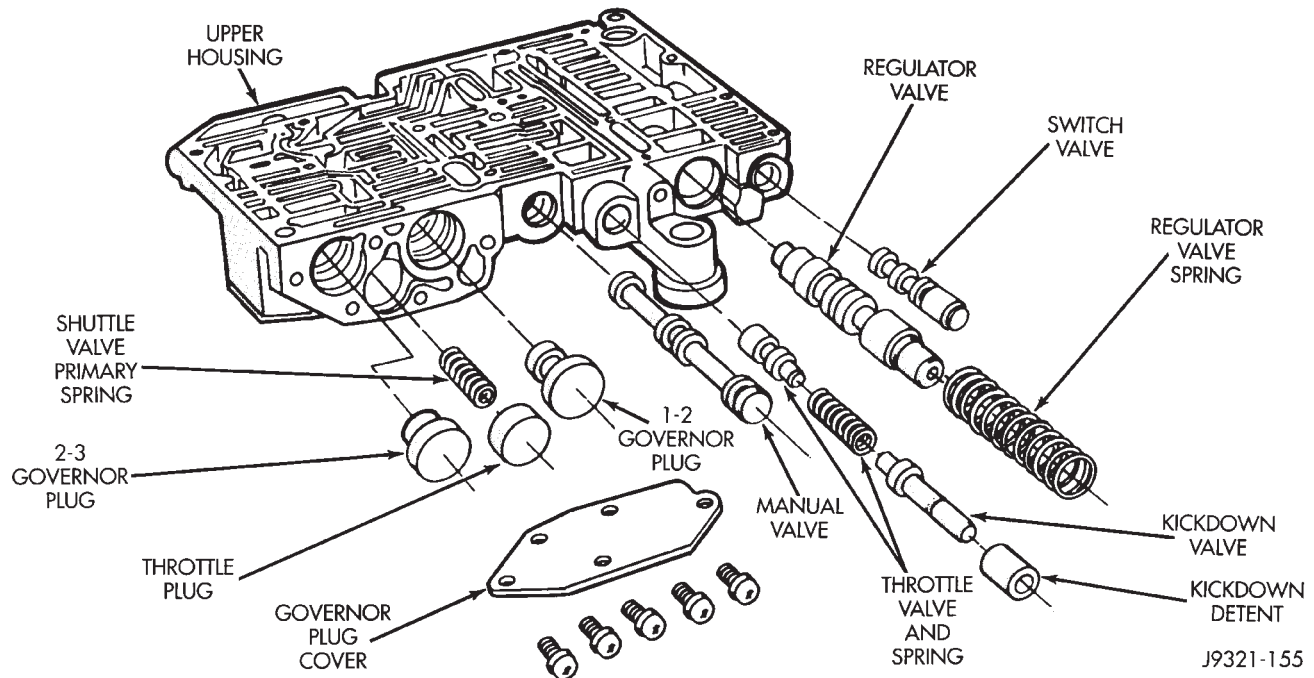
(b) Hold shuttle valve in place.

(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.

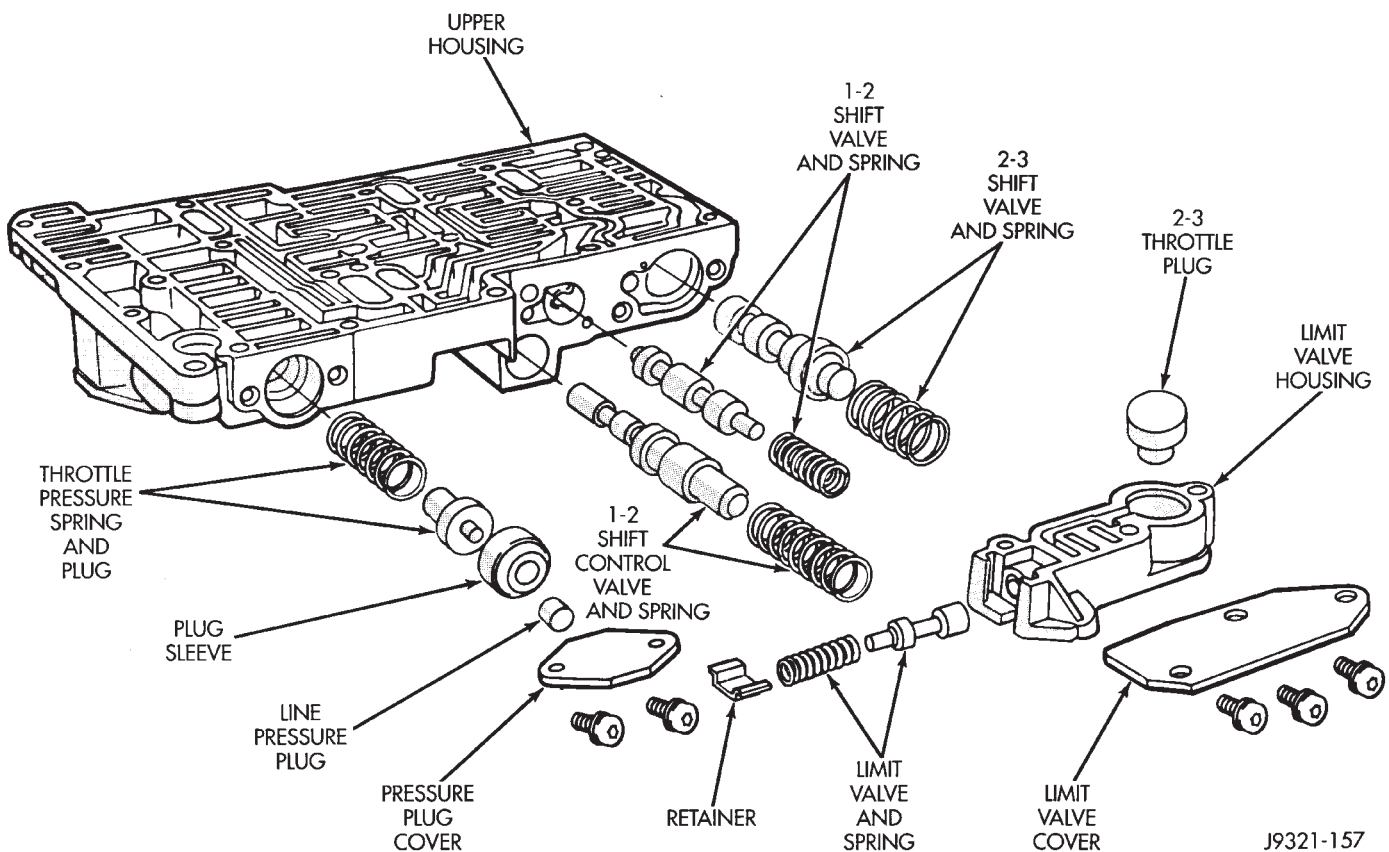
**Fig. 104 Shuttle And Boost Valve Components**

DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 105 Upper Housing Control Valve Locations**

(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.

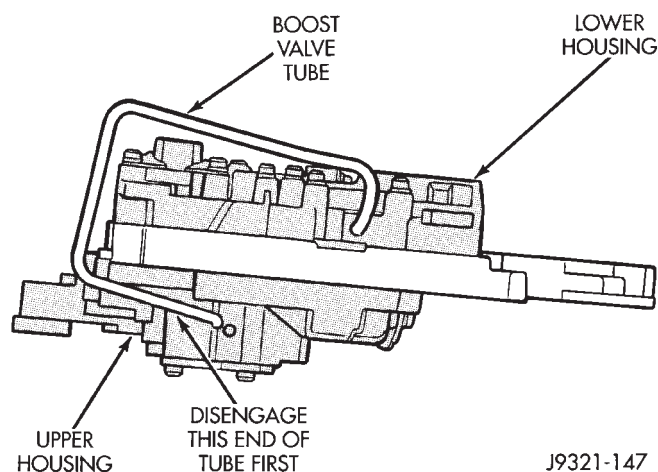
**Fig. 106 Upper Housing Shift Valve And Pressure Plug Locations**

DISASSEMBLY AND ASSEMBLY (Continued)

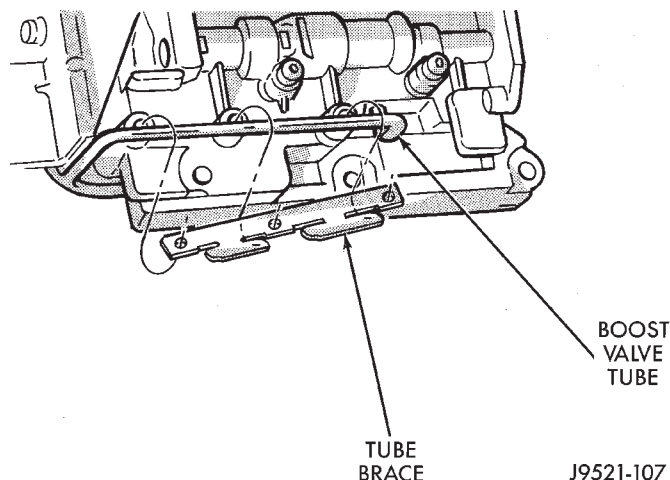
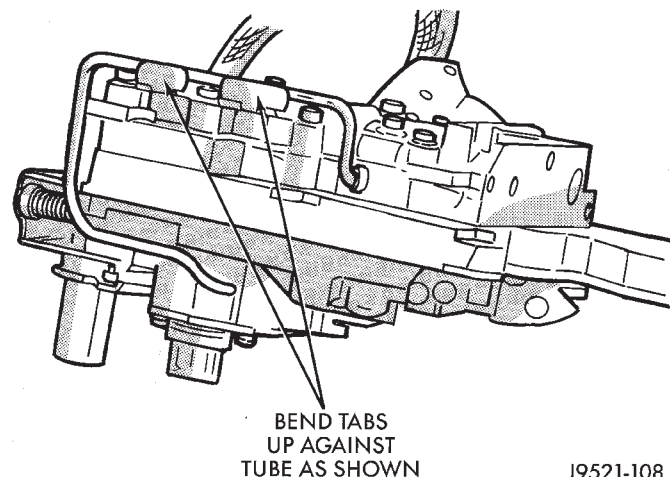
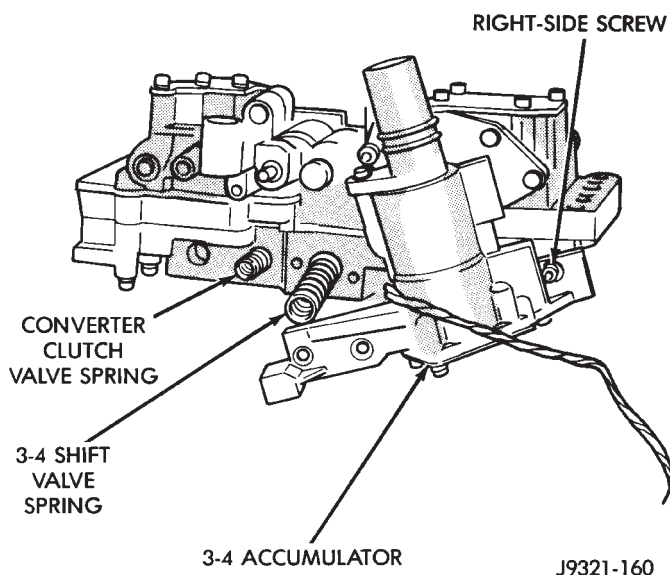
- (9) Install shuttle valve primary spring and throttle plug.
- (10) Align and install governor plug cover. Tighten cover screws to 4 N·m (35 in. lbs.) torque.
- (11) Install manual valve.
- (12) Install throttle valve and spring.
- (13) Install kickdown valve and detent.
- (14) Install pressure regulator valve.
- (15) Install switch valve.

BOOST VALVE TUBE AND BRACE INSTALLATION

- (1) Position valve body assembly so lower housing is facing upward (Fig. 107).
- (2) Lubricate tube ends and housing ports with transmission fluid or petroleum jelly.
- (3) Start tube in lower housing port first. Then swing tube downward and work opposite end of tube into upper housing port (Fig. 107).
- (4) Insert and seat each end of tube in housings.
- (5) Slide tube brace under tube and into alignment with valve body screw holes (Fig. 108).
- (6) Install and finger tighten three screws that secure tube brace to valve body housings (Fig. 108).
- (7) Bend tube brace tabs up and against tube to hold it in position (Fig. 109).
- (8) **Tighten all valve body housing screws to 4 N·m (35 in. lbs.) torque after tube and brace are installed. Tighten screws in diagonal pattern starting at center and working outward.**

**Fig. 107 Boost Valve Tube****3-4 ACCUMULATOR INSTALLATION**

- (1) Position converter clutch valve and 3-4 shift valve springs in housing (Fig. 110).
- (2) Loosely attach accumulator housing with right-side screw (Fig. 110). 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.

**Fig. 108 Boost Valve Tube And Brace****Fig. 109 Securing Boost Valve Tube With Brace Tabs****Fig. 110 Converter Clutch And 3-4 Shift Valve Springs**

DISASSEMBLY AND ASSEMBLY (Continued)

(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. 111).

(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. 112). 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 wire harness is properly routed (Fig. 113). **Solenoid harness must be clear of manual lever and park rod and not be pinched between accumulator housing and cover.**

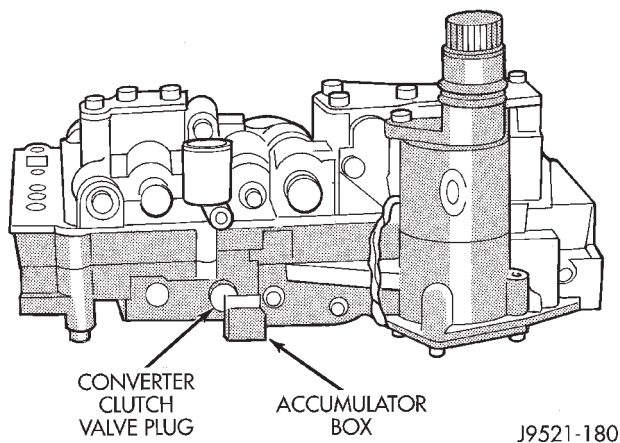


Fig. 111 Seating 3-4 Accumulator On Lower Housing

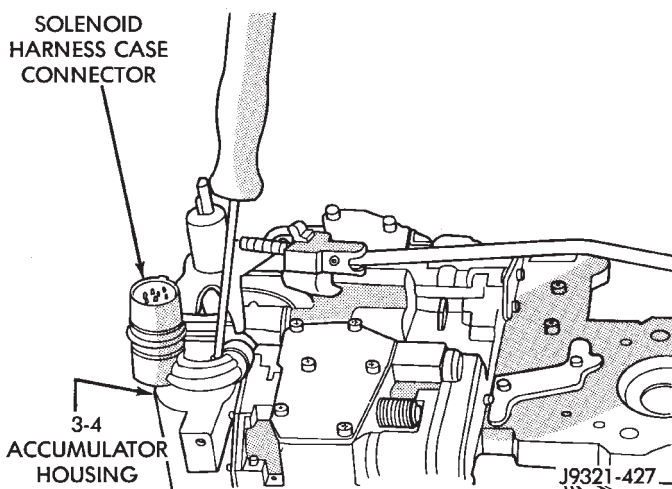


Fig. 112 Solenoid Harness Case Connector Shoulder Bolt

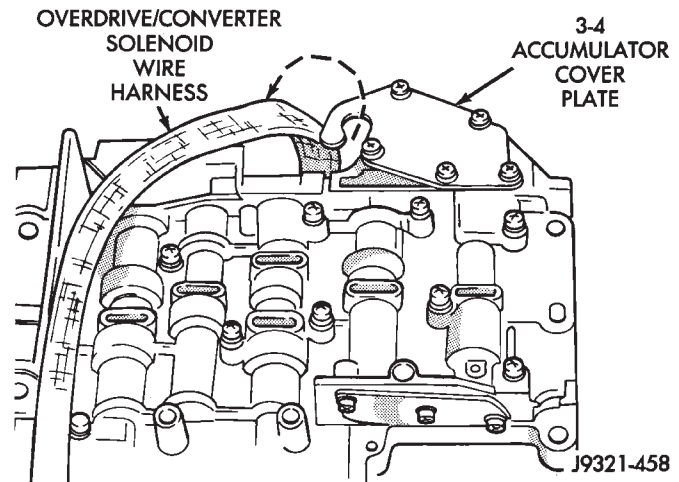


Fig. 113 Solenoid Harness Routing

VALVE BODY FINAL ASSEMBLY AND ADJUSTMENT

(1) Insert manual lever detent spring in upper 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. 114).

(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. 115).

(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.

DISASSEMBLY AND ASSEMBLY (Continued)

(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.

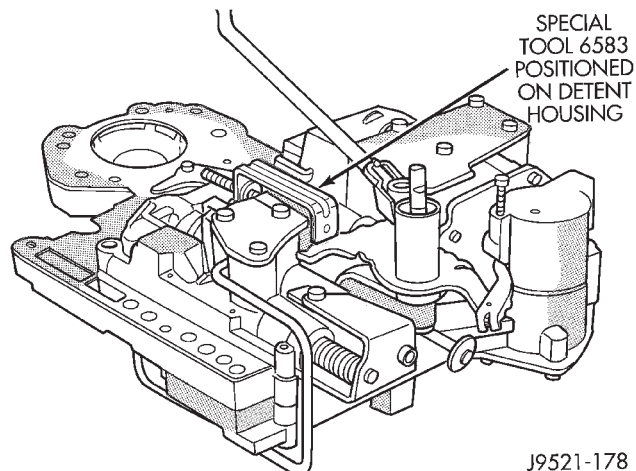


Fig. 114 Detent Ball Spring

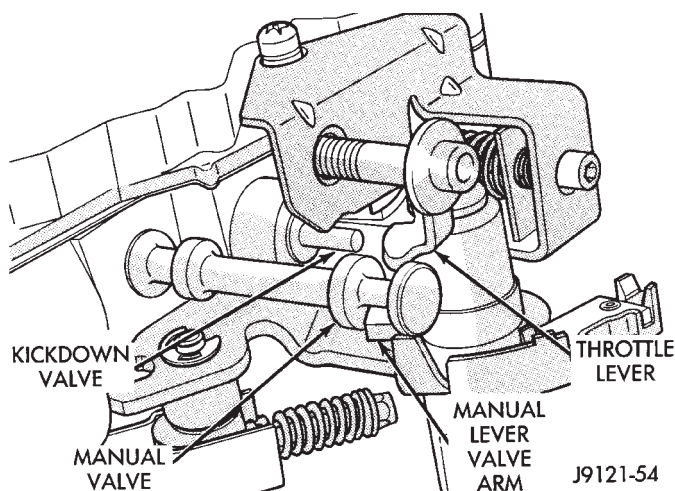


Fig. 115 Manual And Throttle Lever Alignment
GOVERNOR BODY, SENSOR AND SOLENOID INSTALLATION

CAUTION: Do not turn the small screw at the end of the governor pressure solenoid valve for any reason (Fig. 116). 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 (Fig. 116) and (Fig. 117).
- (3) Lubricate solenoid and sensor O-rings with clean transmission fluid.

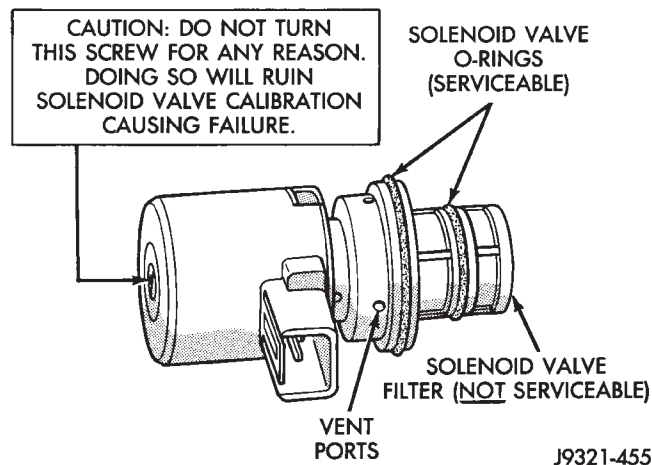


Fig. 116 Governor Pressure Solenoid

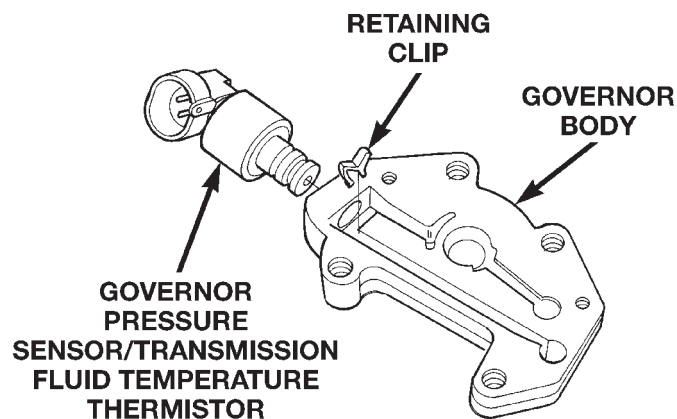


Fig. 117 Governor Pressure Sensor

- (4) Install governor pressure sensor in governor body. Then secure sensor with M-shaped retaining clip (Fig. 117).
- (5) Install governor pressure solenoid in governor body (Fig. 118). Push solenoid in until it snaps into place in body.
- (6) Position governor body gasket on transfer plate (Fig. 119).
- (7) Install retainer plate on governor body and around solenoid (Fig. 120). 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. 121).
- (10) Perform Line Pressure and Throttle Pressure adjustments, refer to adjustment section of this group for proper procedures.
- (11) Install fluid filter and pan.
- (12) Lower vehicle.