30RH/32RH AUTOMATIC TRANSMISSION

INDEX

GENERAL INFORMATION

TRANSMISSION APPLICATION

Chrysler 30RH and 32RH automatic transmissions are used in XJ/YJ models. Both transmissions are three speed, automatics with a gear-type oil pump, two clutches and bands and a planetary gear system (Fig. 1). The 30RH is used with 2.5L engines and the 32RH is used with 4.0L engines.

TORQUE CONVERTER

A three element, torque converter is used for all applications. The converter consists of the impeller, stator, and turbine.

The converter used with all 30RH/32RH transmissions is equipped with a converter clutch. The clutch is engaged by an electrical solenoid and mechanical clutch module on the valve body. The solenoid is operated by the powertrain control module.

The impeller is connected to the engine crankshaft through the front cover which is welded to the impeller. The turbine is splined to the transmission input shaft and the stator is splined to the transmission reaction shaft.

The torque converter is a welded assembly and is not a repairable component. The converter is serviced as an assembly.

RECOMMENDED FLUID

The recommended (and preferred) fluid for 30RH/32RH transmissions is Mopar ATF Plus, Type 7176.

Mopar Dexron II can be used but only if ATF Plus is not available.

Transmission fluid capacity is approximately 17 pints (7.9 liters). This is the approximate amount of fluid required to fill the transmission and torque converter after overhaul.

TRANSMISSION IDENTIFICATION

The transmission identification numbers are stamped on the left side of the case just above the oil pan gasket surface (Fig. 2). The first set of numbers is the transmission part number. The next set of code numbers set is the date of build. The final set of code numbers represents the transmission serial number.

SPECIFICATIONS AND BAND ADJUSTMENTS

Service specifications and torque values are located at the end of this group. Refer to the specifications during service operations.

The band adjustment specifications for 1994 transmissions are different. Refer to the front and rear band adjustment procedures in the In-Vehicle Service section for details.

PARTS INTERCHANGEABILITY

The 1994 version of the 30RH (A904) transmission is similar to previous models in appearance only. The current 30RH is quite different and interchanging new/old parts is definitely not recommended. Different component dimensions, fluid passages, input/output shafts, cases, bands, valve bodies and governor assemblies are just a few of the changed items. The 32RH transmission is also different from previous models and the same recommendations apply here as well.

CAUTION: On YJ models with a 2.5L engine and 30RH transmission, special bolts are used to attach the driveplate to the crankshaft. These bolts have a smaller hex head for torque converter clearance. DO NOT interchange these bolts with similar size bolts for any reason.

TRANSMISSION CONTROLS AND COMPONENTS

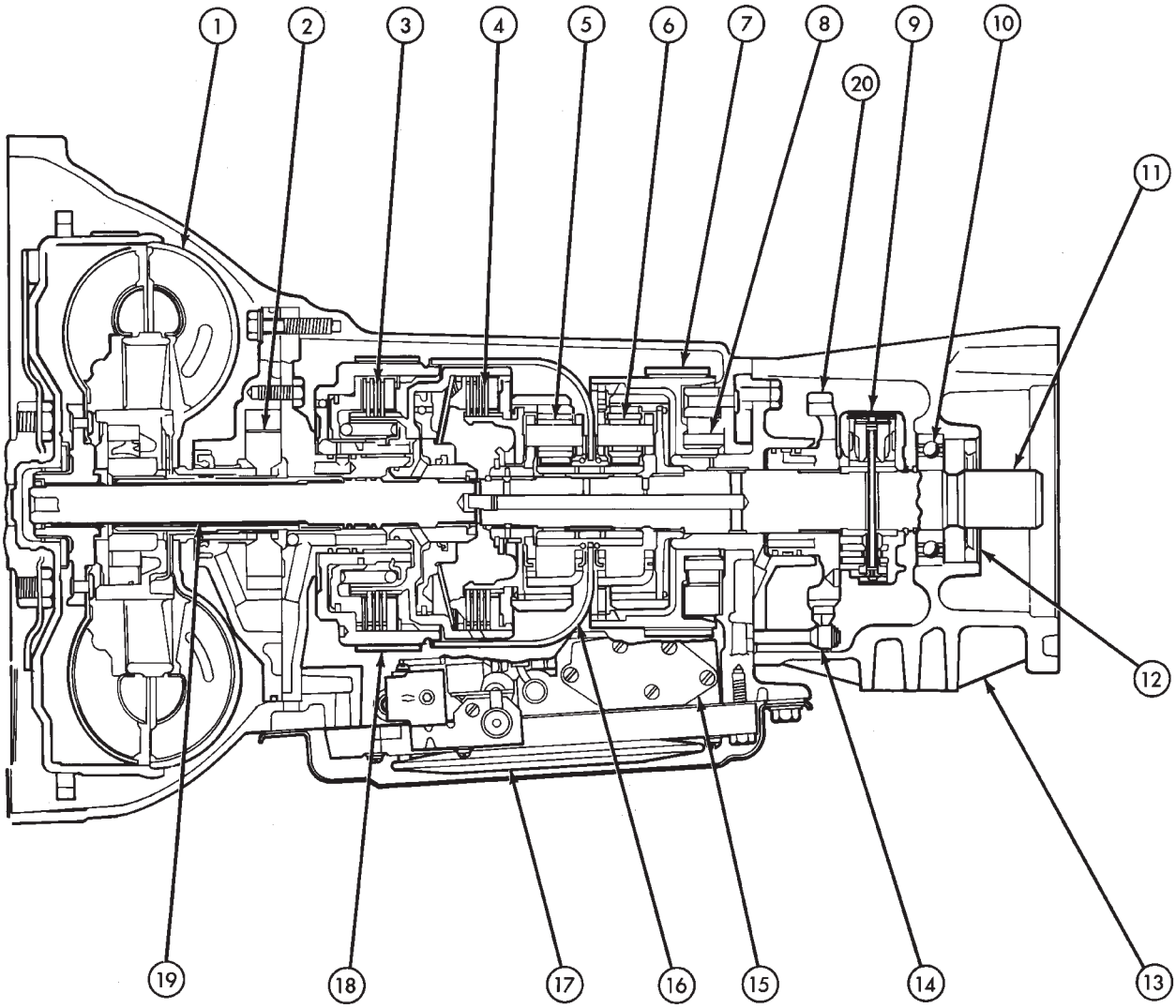
The transmission hydraulic control system performs five basic functions, which are:

- pressure supply
- pressure regulation
- flow control
- clutch/band apply and release
- lubrication

Pressure Supply And Regulation

The oil pump generates the fluid working pressure needed for operation and lubrication. The pump is driven by the torque converter. The converter is connected to the engine crankshaft through the driveplate.

The pressure regulator valve maintains operating (line) pressure. The regulator valve is located in the valve body. The amount of line pressure developed is



1. CONVERTER
2. OIL PUMP
3. FRONT CLUTCH
4. REAR CLUTCH
5. FRONT PLANETARY GEAR SET
6. REAR PLANETARY GEAR SET
7. LOW AND REVERSE (REAR) BAND
8. OVERRUNNING CLUTCH
9. GOVERNOR
10. BEARING
11. OUTPUT SHAFT
12. SEAL
13. ADAPTER HOUSING
14. PARK LOCK ROD
15. VALVE BODY
16. SUN GEAR DRIVING SHELL
17. OIL FILTER
18. KICK DOWN (FRONT) BAND
19. INPUT SHAFT
20. PARK GEAR

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Fig. 1 30RH/32RH Automatic Transmission

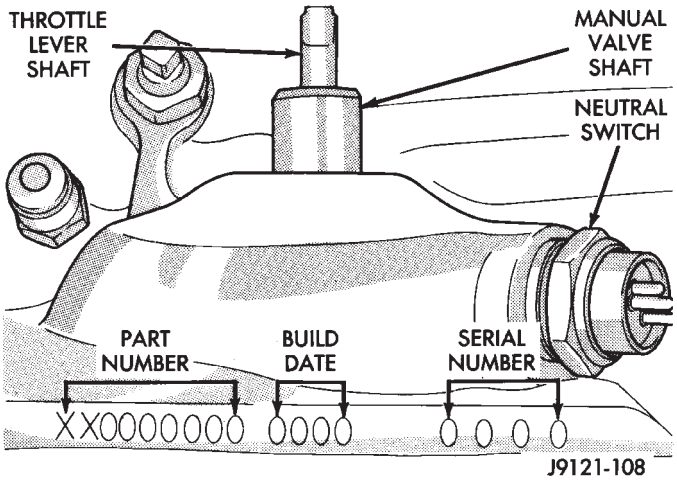

Fig. 2 Transmission Identification

controlled by throttle pressure, which is dependent on the degree of throttle opening.

The governor valve is operated by the transmission output shaft. Governor pressure increases in proportion to vehicle speed.

The throttle valve determines line pressure and shift speed. The throttle valve also controls upshift and downshift speeds by regulating pressure in conjunction with throttle position.

Shift Valves

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

The 1-2 shift valve provides automatic 1-2 or 2-1 shifts and the 2-3 shift valve provides automatic 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 which is just before wide open throttle.

The 2-3 valve throttle pressure plug provides 3-2 downshifts with varying throttle openings and depending on vehicle speed. The 1-2 shift control valve transmits 1-2 shift pressure to the accumulator piston to control kickdown band capacity on 1-2 upshifts and 3-2 downshifts.

The 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.

Clutches-Bands-Servos-Accumulator

The front/rear clutch pistons and servo pistons are actuated by line pressure. When line pressure is removed, the pistons are released by spring tension.

On 2-3 upshifts, the front servo piston is released by spring tension and hydraulic pressure. The accumulator controls hydraulic pressure on the apply side of the front servo during 1-2 upshifts and at all throttle openings.

Converter Clutch Controls

Converter clutch operation is controlled by the power train control module, and by the solenoid and clutch module on the valve body. The solenoid is operated by a relay on the engine compartment side of the dash panel.

Activating the solenoid opens a vent allowing fluid to flow into the clutch module. When line pressure exceeds tension of the module valve springs, the module valves open. This allows fluid to be channeled to the converter clutch through the reaction shaft support and transmission shaft.

Gearshift And Parking Lock Controls

The gearshift lever provides six operating positions: Park (P), Reverse (R), Neutral (N), and the D, 2 and 1 forward drive ranges.

Manual 1 position provides first gear only. Overrun braking occurs in 1 range when the throttle is released. Upshifts are not provided in 1 range.

Manual 2 range provides first and second gear. A 1-2 upshift will take place but a 2-3 upshift will not occur.

D position provides 1-2, 2-3 upshifts and 3-2 and 3-1 downshifts.

Park position allows the park rod to move the park pawl into engagement with the park gear. This prevents rotation of the transmission output shaft. The park lock mechanism is only engaged when the shift lever is in the Park detent.

A park/neutral position switch controls engine starting. The switch is designed to allow engine starts only in park or neutral positions.

30RH/32RH TRANSMISSION DIAGNOSIS

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GENERAL INFORMATION

Automatic transmission problems are generally the result of:

- poor engine performance
- incorrect fluid level
- incorrect cable/linkage adjustment
- incorrect band adjustment
- incorrect hydraulic control pressure adjustments
- hydraulic component malfunctions
- mechanical component malfunctions.

Begin diagnosis by checking the easily accessible items such as fluid level, fluid condition and control linkage adjustment. A road test will determine if further diagnosis is necessary.

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

- Preliminary diagnosis
- Check fluid Level and condition
- Check control linkage Adjustment
- Road test
- Stall test
- Hydraulic pressure test
- Air pressure tests
- Leak Tests
- Analyze test results and consult diagnosis charts

PRELIMINARY DIAGNOSIS

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

Vehicle Is Driveable

(1) Check fluid level and condition.

(2) Adjust throttle cable and gearshift linkage if complaint was based on delayed, erratic, or harsh shifts.

(3) Road test vehicle and note transmission operating characteristics.

(4) Perform stall test if complaint is based on sluggish, low speed acceleration or abnormal throttle opening needed to maintain normal speeds with properly tuned engine.

(5) Perform hydraulic pressure tests.

(6) Perform air pressure test to check clutch-band operation.

Vehicle Is Disabled

(1) Check fluid level and condition.

(2) Check for broken, disconnected throttle linkage.

(3) Check for cracked, leaking cooler lines, or loose, missing pressure port plugs.

(4) Raise vehicle, start engine, shift transmission into gear and note following:

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

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

(c) If propeller shafts do not turn and transmission is not noisy, perform hydraulic pressure test to determine if problem is a hydraulic or mechanical.

FLUID LEVEL AND CONDITION

(1) Position vehicle on level surface. This is important in obtaining an accurate fluid level check.

(2) To avoid false readings, which could produce under or over fill condition, do not check level until fluid is at normal operating temperature.

(3) Shift transmission into Neutral.

(4) Apply parking brakes.

(5) Operate engine at curb idle speed.

WARNING: WHEN PERFORMING UNDERHOOD OPERATIONS WITH THE ENGINE RUNNING, KEEP YOUR HANDS WELL AWAY FROM HOT OR ROTATING ENGINE COMPONENTS. DO NOT WEAR LOOSE ARTICLES OF CLOTHING WHICH COULD BECOME ENTANGLED IN ENGINE COMPONENTS OR ACCESSORIES.

(6) Clean dipstick filler cap and tube before removing dipstick.

(7) Remove dipstick and inspect fluid level.

- Correct level is to FULL mark
- Acceptable level is between ADD and FULL marks

(8) Check fluid condition. Fluid should be dark to light red in color and free of dirt or debris.

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

(10) If fluid is black or dark brown, burned/turned to sludge, contains large quantities of metal or friction material particles, transmission will need overhaul. Especially if problems were evident during road test and preliminary diagnosis. Fluid cooler should also be flow tested and flushed if necessary.

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 causing the same conditions that occur with a low level.

In either case, air bubbles cause fluid overheating, oxidation and varnish buildup which interferes with valve, clutch and servo operation. Foaming also causes fluid expansion which can result in fluid overflow from the transmission vent or fill tube. Fluid overflow can easily be mistaken for a leak if inspection is not careful.

TRANSMISSION THROTTLE VALVE CABLE ADJUSTMENT

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

If cable adjustment setting is too short, early shifts and slippage between shifts may occur. If the setting is too long, shifts may be delayed and part throttle downshifts may be very sensitive. Refer to the In-Vehicle Service section for adjustment procedure.

GEARSHIFT LINKAGE

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

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

ROAD TEST

Before road testing, be sure the fluid level and all linkage adjustments have been checked and adjusted if necessary.

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

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

Watch closely for slippage or engine flare which usually indicates clutch, band or overrunning clutch problems. If the condition is advanced, an overhaul may be necessary to restore normal operation.

A slipping clutch or band can often be determined by comparing which internal units are applied in the various gear ranges. The Clutch and Band Application chart (Fig. 3) provides a basis for analyzing road test results.

DRIVE ELEMENTS	Gearshift Lever Position								
	P	R	N	D			2		1
				1	2	3	1	2	
FRONT CLUTCH		•				•			
FRONT BAND (KICKDOWN)					•			•	
REAR CLUTCH				•	•	•	•	•	•
REAR BAND (LOW-REV.)		•							•
OVER-RUNNING CLUTCH				•			•		•

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Fig. 3 Clutch And Band Application Chart

ANALYZING THE ROAD TEST

Refer to the Clutch and Band Application chart (Fig. 3) and note which elements are in use in the various gear ranges.

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

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

Applying the same method of analysis, note that both clutches are applied in D range third gear only. If the transmission slips in third gear, either the front clutch or the rear clutch is slipping. By selecting another gear which does not use one of these units, the slipping clutch can be determined.

Although road test analysis will help determine the slipping unit, the actual cause of a malfunction may not be determined until hydraulic and air pressure tests are performed. Practically any condition

can be caused by leaking hydraulic circuits or sticking valves. Unless the problem is an obvious one, do not remove and disassemble the transmission until hydraulic and air pressure tests have been performed.

HYDRAULIC PRESSURE TEST

Hydraulic test pressures range from a low of one psi (6.895 kPa) governor pressure, to 300 psi (2068.5 kPa) at the rear servo pressure port in reverse.

Use 100 psi Pressure Gauge C-3292 to check pressure at the accumulator, front servo, governor and fluid cooler line. Use 300 psi Gauge C-3293 to check pressure at the rear servo. The 300 psi gauge can be used at any other port when more than one gauge is required for testing.

PRESSURE TEST PORT LOCATIONS

There are pressure test ports at the accumulator, front servo, rear servo and governor.

Line pressure is checked at the accumulator port on the right side of the case (Fig. 4). The front servo release pressure port is at the right side of the case just behind the filler tube opening (Fig. 4).

The rear servo pressure port is at the right rear of the transmission case (Fig. 5).

On 4 x 2 models, the governor pressure port is at the left side of case at the transmission rear (Fig. 5). On 4 x 4 transmissions, the test port is in the driver side of the adapter housing (Fig. 6).

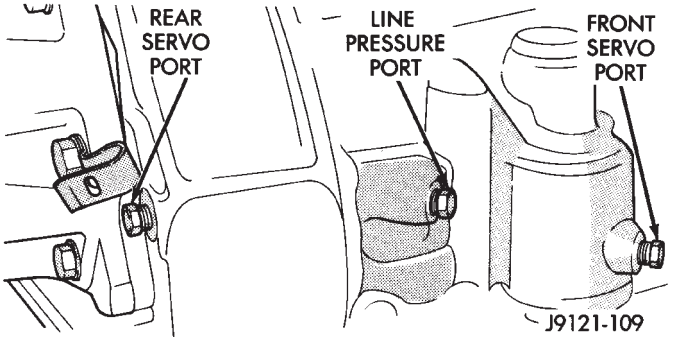

Fig. 4 Front Servo And Line Pressure Test Ports

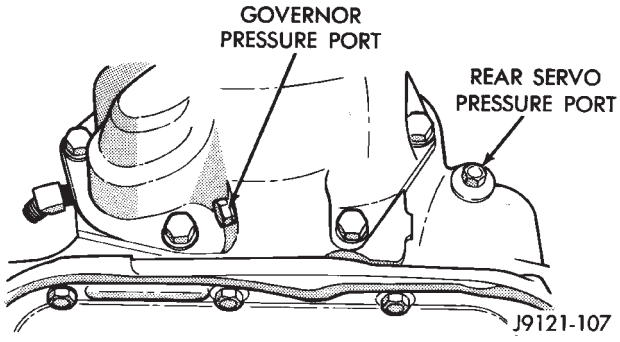

Fig. 5 Rear Servo And Governor Pressure Test Ports (4 x 2 Transmission)

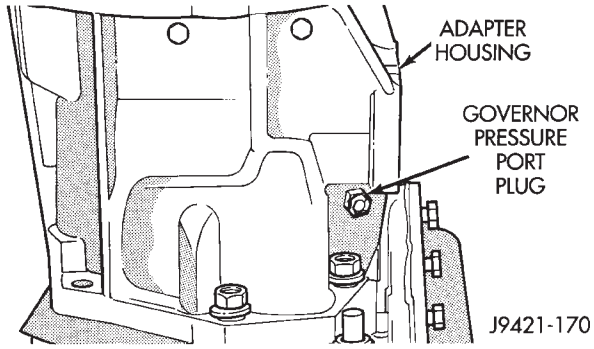

Fig. 6 Governor Pressure Test Port (4 x 4 Transmission)

PRESSURE TEST PROCEDURE

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

Test One-Transmission In 1 Range

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

(1) Connect test gauges to line pressure and rear servo ports (Figs. 4-6). **Be sure pressure test gauge is connected to rear servo port.**

(2) Disconnect throttle and gearshift rods at transmission.

(3) Start and run engine at 1000 rpm.

(4) Move valve body selector lever forward into 1 range.

(5) Read pressures on both gauges as transmission throttle lever is moved from full forward to full rearward position.

(6) Line pressure should be 54-60 psi (372-414 kPa) with throttle lever forward and gradually increase to 90-96 psi (620-662 kPa) as lever is moved rearward.

(7) Rear servo pressure should be same as line pressure within 3 psi.

Test Two-Transmission In 2 Range

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

(1) Connect test gauge to line pressure port (Fig. 4).

(2) Start and run engine at 1000 rpm.

(3) Move valve body selector lever one detent rearward from full forward position. This is 2 range.

(4) Move transmission throttle lever from full forward to full rearward position and read pressure at both gauges.

(5) Line pressure should be 54-60 psi (372-414 kPa) with throttle lever forward and gradually increase to 90-96 psi (620-662 kPa) as lever is moved rearward.

Test Three-Transmission In D Range

This test checks pressure regulation and condition of the front and rear clutch circuits. Both test gauges are required for this test.

(1) Connect one test gauge to line pressure port and other gauge to front servo pressure port (Fig. 4). Either gauge can be used at either port.

(2) Start and run engine at 1600 rpm.

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

(4) Read pressures on both gauges as transmission throttle lever is moved from full forward to full rearward position.

(5) Line pressure should be 54-60 psi (372-414 kPa) with throttle lever forward and gradually increase as lever is moved rearward.

(6) Front servo is pressurized only in D range and should be same as line pressure within 3 psi (21 kPa), up to downshift point.

Test Four-Transmission In Reverse

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

(1) Connect pressure test gauge to rear servo port (Fig. 5).

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

(3) Move valve body selector lever four detents rearward from full forward position. This is Reverse range.

(4) Move throttle lever all way forward then all the 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 shift up or down. Use 100 psi Pressure Test Gauge C-3292 for this test.

(1) Connect test gauge to governor pressure port (Figs. 5 and 6).

(2) Move selector lever to D range.

(3) Apply service brakes. Start and run engine at curb idle speed and note pressure. At idle and with wheels stopped, pressure should be zero to 1-1/2 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 (approximately 1 psi for every 1 mph shown on speedometer).

(5) Governor pressure rise should be smooth and drop back to 0 to 1-1/2 psi when throttle is closed and wheels are stopped.

(6) Compare results of pressure tests with analysis chart (Fig. 7).

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 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 in 2	Leakage in servo; broken servo ring or cracked servo piston
Pressure low in all positions	Clogged filter, stuck pressure regulator valve, worn or defective pump
Governor pressure too high at idle speed:	Governor valve sticking open
Governor pressure low at all mph figures	Governor valve sticking closed
Lubrication pressure low at all throttle positions	Clogged oil cooler or lines, seal rings leaking, output shaft plugged with debris, worn bushings in pump or clutch retainer

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Fig. 7 Pressure Test Analysis Chart

CONVERTER STALL TEST

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

WARNING: NEVER ALLOW ANYONE TO STAND IN FRONT OF THE VEHICLE DURING A STALL TEST. ALWAYS BLOCK THE FRONT WHEELS AND APPLY THE SERVICE AND PARKING BRAKES DURING THE TEST.

STALL TEST PROCEDURE

(1) Connect tachometer to engine.
(2) Check and adjust transmission fluid level.
(3) Start and run engine until transmission fluid reaches normal operating temperature.
(4) Block front wheels.
(5) Fully apply service and parking brakes.
(6) Open throttle completely for no more than five seconds and record maximum engine rpm registered on tachometer.

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

(7) If engine speed exceeds maximum shown in stall speed chart, release accelerator immediately. This indicates that transmission clutch slippage is occurring.
(8) Shift transmission into Neutral. Run engine for 20 seconds to cool fluid. Then stop engine, shift transmission into Park and release brakes.
(9) Stall speeds should be in 1700-2000 rpm range.
(10) Refer to Stall Test Diagnosis.

STALL TEST DIAGNOSIS

Stall Speed Too High

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

Stall Speed Too Low

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

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

Stall Speed Normal

If stall speeds are normal but abnormal throttle opening is required to maintain highway speeds, the converter overrunning clutch is seized and the torque converter must be replaced.

Converter Noise During Test

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

AIR PRESSURE TEST

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

Air pressure testing requires that the oil pan and valve body be removed from the transmission.

The servo and clutch apply passages are shown in Figure 8.

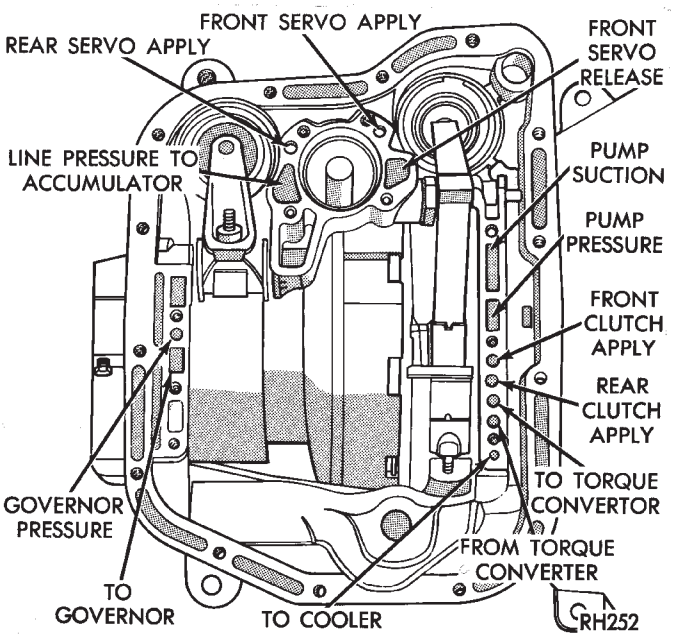


Fig. 8 Air Pressure Test Passages

Air Test Procedure

(1) Place one or two fingers on the clutch housing and apply air pressure through front clutch apply passage (Fig. 8). Piston movement can be felt and a soft thud heard as the clutch applies.
(2) Place one or two fingers on the clutch housing and apply air pressure through rear clutch apply passage (Fig. 8). Piston movement can be felt and a soft thud heard as the clutch applies.
(3) Apply air pressure to the front servo apply passage. The servo rod should extend and cause the band to tighten around the drum. Spring tension should release the servo when air pressure is removed.
(4) Apply air pressure to the rear servo apply passage. The servo rod should extend and cause the band to tighten around the drum. Spring tension should release the servo when air pressure is removed.

CONVERTER HOUSING LEAK DIAGNOSIS

Two items must be established when diagnosing leaks from the converter housing area. First, it must be verified that a leak condition actually exists. And second, the true source of the leak must be determined.

Some suspected converter housing fluid leaks may not be leaks at all. Residual fluid in the housing, or excess fluid spilled during factory fill or refill after repair can be mistaken for a leak. In addition, a rear main seal leak can also be mistaken for a pump seal leak if care is exercised.

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. 9).

Pump vent or pump attaching bolt leaks are generally deposited on the inside of the converter housing and not on the converter itself (Fig. 9).

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.

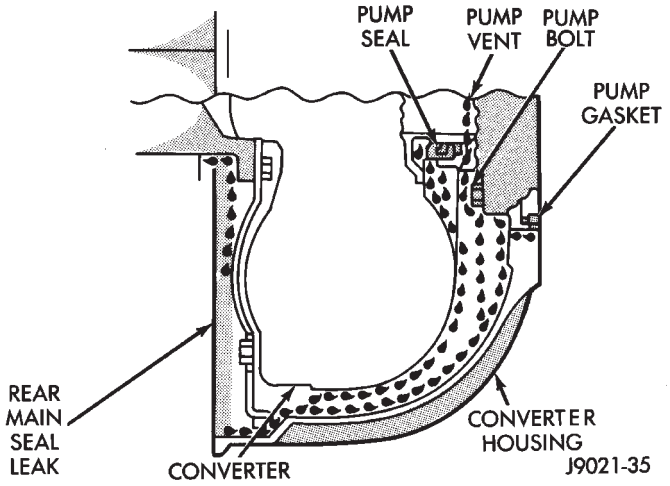


Fig. 9 Typical Converter Housing Leak Paths

LEAK DIAGNOSIS PROCEDURE

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

(2) Check and adjust the transmission fluid level.

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

(4) Fabricate a test probe (Fig. 10). Then attach the probe to the converter housing with one of the dust shield bolts (Fig. 10).

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

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

(7) If the probe upper surface is dry, the converter and seal are not at fault. A path of fluid across the probe upper surface indicates a converter or seal leak. Fluid leaking **under** the probe is coming from the pump housing area (Fig. 11).

(8) Fluid leaking under the probe could be from the: pump seal and/or bushing, pump vent, kickdown lever shaft access plug, pump bolts, or porous spots in the pump body or transmission case (Fig. 11).

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

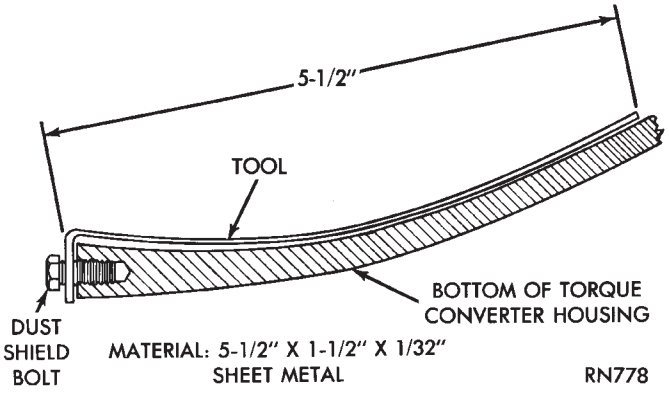


Fig. 10 Leak Test Probe

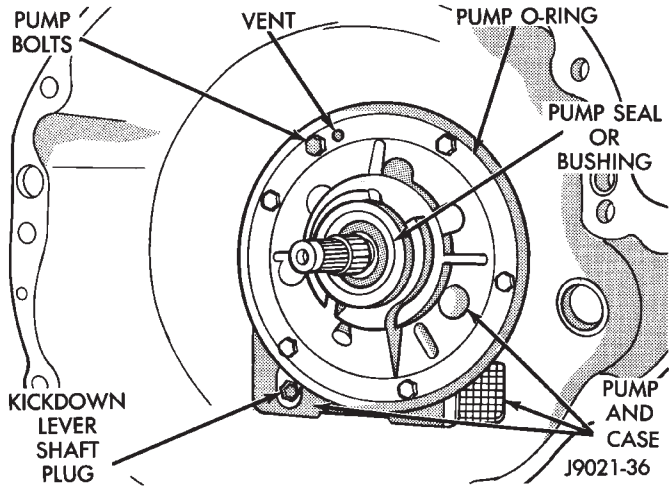


Fig. 11 Pump Area Inspection Points

LEAK TESTING WITH AIR PRESSURE

This test involves closing off the transmission openings and pressurizing the transmission to 8 psi with Air Pump Tool 7700. A soapy water solution is applied to suspected leak points before and during the pressure test. Leaks will be indicated by the presence of air bubbles coming through the solution.

Some transmission openings such as the fill tube and front cooler line fitting can be closed off with a rubber plug or similar device. Plugs can 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 used to close off this opening.

The torque converter hub opening in the pump and the pump vent require special tools to close them off. The converter hub seal cap is made from thin wall tube and a 3 mm (1/8 in.) thick disc (Fig. 12). A retaining strap is needed to secure the seal cup for testing. The strap can be made from 32 mm (1-1/4 in.) wide stock (Fig. 13). 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 mm (1/4 in.) rod and 5 mm (3/16 in.) plate (Fig. 14). The fabricated tools can all be made from mild steel or aluminum stock.

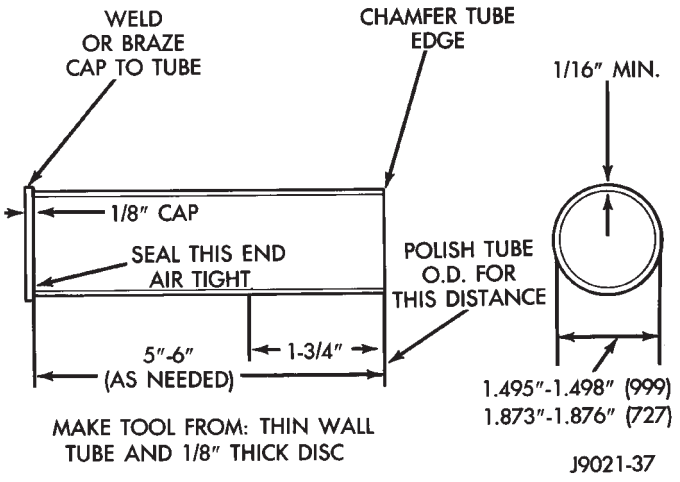


Fig. 12 Converter Hub Seal Cup

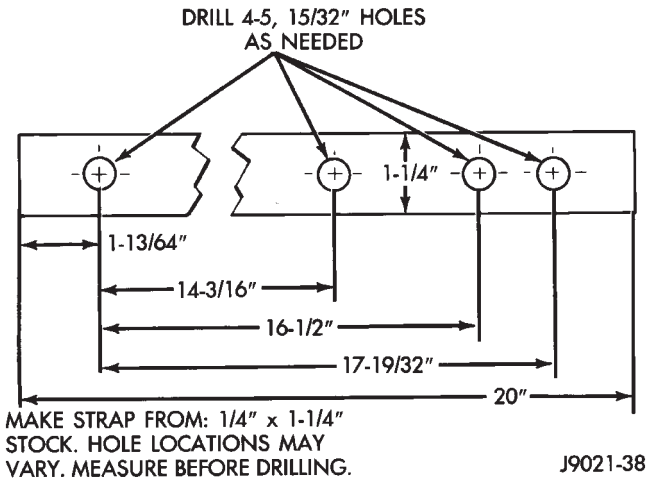


Fig. 13 Seal Cup Retaining Strap

AIR PRESSURE LEAK TEST PROCEDURE

(1) Install vent plug, converter hub seal cup and cup retaining strap (Fig. 15).

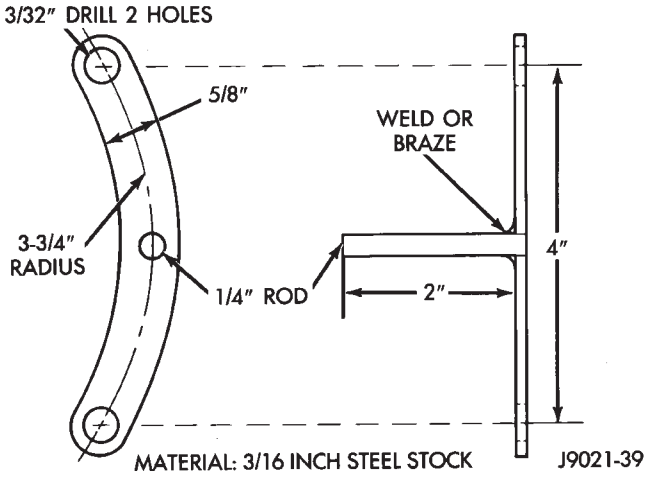


Fig. 14 Pump Vent Plug

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

(3) Attach Air Pump 7700 to rear cooler line fitting. Connect length of copper tube to fitting. Then attach air pump hose to tube with hose clamp (Fig. 16).

(4) Apply 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 test 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.

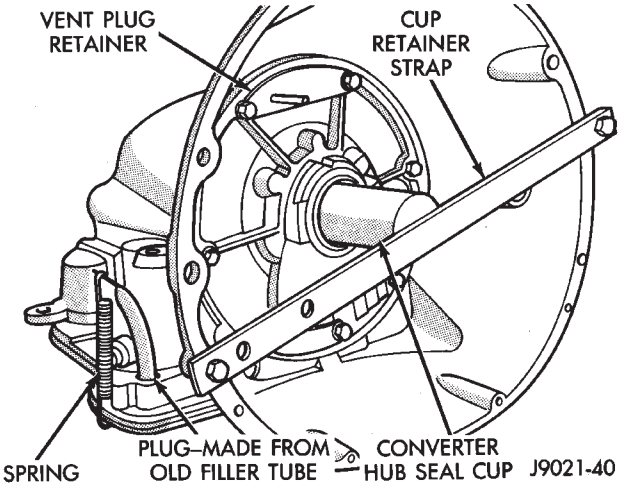


Fig. 15 Vent Plug And Hub Seal Cup Installation

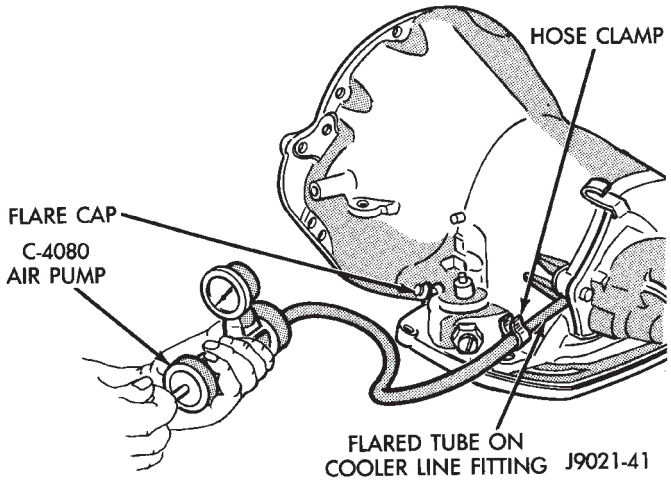


Fig. 16 Pressurizing Transmission

CONVERTER HOUSING AREA LEAK CORRECTION

(1) Remove converter.

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

(3) Remove oil pump and 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 plug two turns. Apply Permatex No. 2 or equivalent to plug threads and tighten plug to 17 N·m (150 in-lbs) torque.

(7) Adjust front band.

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

(9) Install transmission.

(10) Install converter housing dust shield and lower vehicle.

DIAGNOSIS GUIDES AND CHARTS

The diagnosis charts provide additional reference for transmission diagnosis.

The hydraulic flow charts outline fluid flow and hydraulic circuitry. Circuit operation is provided for all gear ranges. Normal working pressures are also supplied for each of the various gear ranges.

30RH/32RH TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
HARSH ENGAGEMENT (FROM NEUTRAL TO DRIVE OR REVERSE) Note: The shift from neutral to reverse is normally quite firm. Hydraulic pressure at the rear servo can approach 300 psi in reverse gear. Do not confuse a firm engagement with a truly harsh engagement	1. Engine idle speed too high 2. Driver "riding" accelerator pedal during shift 3. Throttle cable or linkage misadjusted 4. Band adjustment needed 5. Loose mounting bolts 6 Worn or damaged U-joints 7. Loose axle pinion nut 8. Hydraulic pressure is incorrect 9. Accumulator piston spring, or seal worn or damaged 10. Faulty converter clutch (if equipped) 11. Clutch, band, or planetary component is damaged	1. Check/adjust idle speed 2. Advise owner/operator 3. Adjust cable or linkage; setting is either too long or too short 4. Adjust front/rear bands 5. Check engine, transmission, propeller shaft, crossmember, and axle bolt torque; tighten loose bolts and replace missing bolts 6. Remove propeller shaft and replace U-joints 7. Replace nut and check pinion threads before installing new nut; replace pinion gear if threads are damaged 8. Check pressures; remove, overhaul, or adjust valve body as needed; repair oil pump if necessary 9. Remove valve body and replace piston, seal, or spring as needed 10. Replace converter and flush cooler and lines before installing new converter 11. Remove, disassemble, and repair transmission as necessary
DELAYED ENGAGEMENT (FROM NEUTRAL TO DRIVE OR REVERSE)	1. Engine idle speed too low 2. Low fluid level 3. Gearshift linkage out of adjustment 4. Rear band out of adjustment 5. Valve body filter plugged 6. Oil pump gears worn or damaged or pump body or seal is damaged, allowing pump to take in air, causing fluid aeration 7. Reaction shaft seal rings worn or broken 8. Governor valve stuck or valve shaft is loose or damaged 9. Low hydraulic pressure 10. Clutch, band, or servo damage	1. Adjust idle speed 2. Correct level and check for leaks 3. Adjust cable or linkage and repair linkage if worn or damaged 4. Adjust band 5. Replace fluid and filter. If oil pan and old fluid were full of clutch disc material and/or metal particles, overhaul will be necessary 6. Remove transmission and replace oil pump 7. Remove transmission, remove oil pump, and replace seal rings 8. Remove and inspect governor components; replace worn or damaged parts 9. Perform pressure test, remove transmission, and repair as needed 10. Remove and disassemble transmission and repair as necessary

J9321-255

30RH/32RH TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
SHIFTS DELAYED OR ERRATIC (SHIFTS ALSO HARSH AT TIMES)	1. Low fluid level 2. Throttle linkage out of adjustment 3. Throttle linkage is binding 4. Gearshift linkage out of adjustment 5. Fluid filter partially clogged 6. Air in fluid due to overfill condition or air leakage into pump suction passages 7. Clutch or servo problem 8. Front band out of adjustment (may cause harsh 1-2 shift)	1. Correct fluid level and check for leaks 2. Adjust linkage as described in service section 3. Disassemble, clean, and adjust linkage; replace linkage grommets if removed or if worn or cracked 4. Adjust linkage as described in service section 5. Replace filter. If filter and fluid contained clutch material or metal particles, an overhaul may be necessary 6. Drain fluid to correct level if overfilled. If fluid is highly aerated (full of bubbles and foamy), oil pump gasket or seal may have failed, or pump body is porous or cracked 7. Remove valve body and air test clutch, band and servo operation; disassemble and repair transmission as needed 8. Adjust band
NO REVERSE (D RANGES OK)	1. Gearshift linkage is either out of adjustment or damaged 2. Rear band is out of adjustment 3. Valve body malfunction (stuck/damaged manual valve, regulator valve, or check ball) 4. Rear servo or front clutch malfunction	1. Repair or replace linkage parts as needed 2. Adjust band 3. Remove and service valve body; replace valve body if any valves or valve bores are worn or damaged 4. Remove and disassemble transmission; replace worn, damaged servo and clutch parts as necessary
HAS FIRST-REVERSE ONLY (NO 1-2 OR 2-3 UPSHIFT)	1. Governor valve, shaft, weights, or body damaged	1. Remove governor assembly and repair as necessary

J9121-440

30RH/32RH TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
NO DRIVE RANGE (REVERSE OK)	1. Gearshift linkage either loose, damaged or out of adjustment 2. Low fluid level 3. Valve body malfunction (manual valve or shaft damaged or 1-2 shift valve stuck) 4. Rear clutch failure 5. Transmission overrunning clutch failure 6. Input shaft seal rings worn or damaged	1. Repair or replace linkage components 2. Correct fluid level and check for leaks 3. Remove and disassemble valve body; replace as assembly if any valves or bores are damaged 4. Remove and disassemble transmission and rear clutch; repair/replace worn, damaged parts as needed 5. Remove and disassemble transmission; replace overrunning clutch 6. Remove and disassemble transmission; replace seal rings and any other worn or damaged parts
NO DRIVE *OR* REVERSE (VEHICLE WILL NOT MOVE)	1. Low fluid level 2. Gearshift linkage loose, damaged, or misassembled 3. Failure of driveline component, such as U-joint, axle shaft, transfer case component, etc. 4. Low fluid pressure due to worn or damaged oil pump 5. Transmission internal component damaged 6. Valve body malfunction (seized valve, damaged manual lever, valve body screws loose or overtightened causing distortion and bind)	1. Add fluid and check for leaks if drive is restored 2. Inspect, adjust, and reassemble linkage as needed; replace worn, damaged parts 3. Perform preliminary inspection procedure for vehicle that will not move; refer to procedure in diagnosis section 4. Perform pressure test to confirm low pressure; replace pump body and/or gears if necessary 5. Remove and disassemble transmission; repair or replace failed components as needed 6. Remove, disassemble, and inspect valve body; replace valve body (as assembly) if any valve or bore is damaged; clean and reassemble correctly if all parts are in good condition

J9121-443

30RH/32RH TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
MOVES IN 2ND OR 3RD GEAR, ABRUPTLY DOWNSHIFTS TO LOW	1. Governor valve sticking 2. Valve body malfunction	1. Remove, clean, and inspect; replace faulty parts 2. Remove, clean, and inspect; look for stuck 1-2 valve or governor plug
SLIPS IN LOW GEAR D ONLY, BUT NOT IN 1 POSITION	1. Overrunning clutch faulty, not holding	1. Replace overrunning clutch
SLIPS IN FORWARD DRIVE RANGES	1. Low fluid level 2. Air in fluid (fluid is foamy, full of bubbles), shifts are spongy, caused by air getting into pump suction passages 3. Gearshift or throttle linkage out of adjustment 4. Low hydraulic pressures 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 5. Accumulator piston cracked, spring broken or seal worn 6. Clutch or servo malfunction, leaking seals or worn plates 7. Overrunning clutch worn, not holding (slips in 1 only)	1. Add fluid and check for leaks 2. Check for bad pump gasket or seals, dirt between pump halves, and loose pump bolts or defective O-ring at filler tube 3. Adjust linkage 4. Perform hydraulic and air pressure tests to determine cause 5. Inspect and repair as necessary 6. Air pressure check clutch-servo operation and repair as required 7. Replace clutch
SLIPS IN REVERSE ONLY	1. Low fluid level 2. Aerated fluid; see Slips in Forward Drive Ranges 3. Gearshift linkage out of adjustment 4. Rear band out of adjustment 5. Hydraulic pressure too low due to worn pump, worn seal rings, clutch or servo seal leakage 6. Worn front clutch, leaking rear servo, or worn rear band 7. Band-linkage binding	1. Add fluid and check for leaks 2. See Slips in Forward Drive Ranges 3. Adjust linkage 4. Adjust band 5. Perform hydraulic pressure tests to determine cause 6. Air pressure check clutch-servo operation and repair as required 7. Inspect and repair as required

J9121-444

30RH/32RH TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
NO KICKDOWN OR NORMAL DOWNSHIFT	1. Incorrect throttle linkage or cable adjustment 2. Incorrect gear shift linkage or cable adjustment 3. Front band out of adjustment 4. Hydraulic pressures too high or too low due to sticking governor, valve body malfunction, or incorrect hydraulic control pressure adjustments 5. Front servo, band, or linkage malfunction 6. Clutch or servo malfunction	1. Adjust linkage or cable 2. Adjust linkage or cable 3. Adjust band 4. Perform hydraulic pressure tests to determine cause and repair as required. Correct valve body pressure adjustments as required 5. Air pressure test operation and repair as necessary 6. Air pressure test operation and repair as necessary
STUCK IN LOW GEAR (WILL NOT UPSHIFT)	1. Gearshift or throttle linkage or cable out of adjustment 2. Front band out of adjustment 3. Governor valve stuck closed; loose output shaft support or governor housing bolts, worn pump, leaking seal rings, or valve body problem (i.e., stuck 1-2 shift valve or governor plug) 4. Clutch or servo malfunction	1. Adjust linkage or cable. Repair linkage of worn or damaged. Relace damaged cable. 2. Adjust band 3. Check line and governor pressures to determine cause; correct as required 4. Air pressure check operation of clutches and bands; repair faulty component
NO LOW GEAR (MOVES IN 2ND OR 3RD GEAR ONLY)	1. Governor valve sticking in partially open position 2. Valve body malfunction 3. Front servo piston cocked in bore 4. Front band linkage malfunction 5. Incorrect throttle or gearshift linkage or cable adjustment	1. Remove governor; clean, inspect, and repair as required 2. Remove, clean, and inspect. Look for sticking 1-2 valve, 2-3 valve, governor plug, or broken springs 3. Inspect servo and repair as required 4. Inspect linkage and look for bind in linkage 5. Adjust linkage or cable

J9321-256

30RH/32RH TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
CREEPS IN NEUTRAL	1. Gearshift linkage out of adjustment 2. Valve body malfunction (warped body, cross leakage) 3. Clutch dragging 4. Converter lockup clutch dragging	1. Adjust linkage 2. Perform hydraulic pressure test to determine cause and repair as required 3. Air pressure check operation of clutches and repair as required 4. Oil pump worn; replace pump
DRAGS OR LOCKS UP	1. Front or rear band out of adjustment 2. Servo band or linkage malfunction (i.e., binding linkage, warped band, servo piston stuck) 3. Dragging clutch (does not release fully) 4. Broken or seized planetary gears 5. Overrunning clutch worn, broken, or seized	1. Adjust bands 2. Air pressure check servo operation and repair as required 3. Air pressure check clutch operation and repair as required 4. Remove, inspect, and repair as required (look for debris in oil pan) 5. Remove and inspect clutch, repair as required
GROWLING, GRATING, OR SCRAPING NOISES	1. Planetary gear set broken or seized 2. Overrunning clutch worn, seized, or broken 3. Oil pump components scored, binding, or broken 4. Output shaft bearing or bushing damaged 5. Faulty clutch operation 6. Governor support (park gear) binding or seal rings broken 7. Front and rear bands out of adjustment	1. Check for debris in oil pan and repair as required 2. Inspect and check for debris in oil pan; repair as required 3. Remove, inspect, and repair as required 4. Remove, inspect, and repair as required 5. Perform air pressure check and repair as required 6. Remove, inspect, and repair as required 7. Adjust bands
BUZZING NOISE	1. Low fluid level 2. Air being drawn into pump suction passages 3. Overrunning clutch damaged 4. Valve body misassembled, bolts loose, weak spring, or mispositioned valve or check ball	1. Add fluid and check for leaks 2. Check pump for porous casting, scores on mating surfaces, and excess rotor clearance; repair as required 3. Replace clutch 4. Remove, disassemble, inspect valve body; reassemble correctly if necessary; replace assembly if valves or springs are damaged

J9121-446

30RH/32RH TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
OIL COMES OUT FILLER TUBE	1. Transmission overfilled	1. Drain fluid to correct level; remove neutral switch and drain through switch hole with suction gun
	2. Breather vent in oil pump blocked	2. Inspect and clear blockage
	3. Fluid cooler or cooler lines plugged	3. Flush cooler and lines
	4. Air in fluid (aerated)	4. See "Slips In Forward Drive Ranges"
	5. Oil filter clogged	5. Replace filter; determine the reason for clogged condition and repair
	6. Rear servo piston or seal failure	6. Check hydraulic pressure at servo in reverse (will register low or fluctuate rapidly)
	7. Valve body switch valve sticking	7. Remove and clean valve
OIL LEAKS (ITEMS LISTED REPRESENT POSSIBLE LEAK POINTS AND SHOULD ALL BE CHECKED)	1. Speedometer adapter	1. Replace both adapter seals
	2. Pan gasket	2. Tighten pan screws to 150 inch-pounds; if leaks persist, replace gasket; **do not overtighten screws**
	3. Filler tube (where tube enters case)	3. Replace O-ring seal
	4. Fluid lines and fittings	4. Tighten fittings; if leaks persist, replace fittings and lines if necessary
	5. Valve body manual lever shaft seal	5. Replace shaft seal
	6. Pressure port plug loose	6. Tighten to correct torque; replace plug if leak persists
	7. Rear bearing access plate	7. Replace gasket
	8. Gasket damaged or bolts are loose	8. Replace bolts or gasket or tighten bolts
	9. Adapter/extension gasket damaged	9. Replace gasket
	10. Neutral switch	10. Replace switch and gasket
	11. Converter housing area	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. Cooler line fittings and hoses	12. Replace fittings and hoses
	13. Pump seal	13. Replace seal
	14. Torque converter	14. Replace converter

J9121-448

30RH/32RH TRANSMISSION DIAGNOSIS

Condition	Possible Cause	Correction
OVERHEAT DURING COMMERCIAL OPERATION OR WHILE TRAILER TOWING (FLUID DARK AND BURNED WITH SOME SLUDGE FORMATION)	1. Vehicle not properly equipped for trailer towing or commercial use	1. Be sure vehicle is equipped with recommended optional components (i.e., HD springs, transmission, axle, larger CID engine, auxiliary cooler, correct axle ratio, etc.). If vehicle is not so equipped, it should not be used for severe service operation
	2. Vehicle not equipped with auxiliary fluid cooler	2. Drain fluid, change filter, and install auxiliary cooler
	3. Extensive idling time or operation in heavy traffic in hot weather	3. Cut down on idling time; shift into neutral every so often and run engine at 1000 rpm to help circulate fluid through cooler
	4. Tow vehicle overloaded (exceeding vehicle tow capacity)	4. Be sure vehicle is properly equipped to handle load; do not tow Class III-type loads with a vehicle that is only rated for Class I or II operation
	5. Air flow to auxiliary cooler blocked by snow plow, front mounted spare tire, bug screen, or similar item	5. Remove or reposition item causing air flow blockage
OVERHEAT DURING NORMAL OPERATION (FLUID DISCOLORED, SMELLS BURNED)	1. Low fluid level	1. Add fluid and check for leaks
	2. Fluid cooler, lines blocked, or cooler cracked (oil in engine coolant)	2. Flush cooler and lines and replace radiator if transmission fluid has entered coolant
	3. Switch valve sticking	3. Remove, disassemble, clean valve body
	4. Clutch pack clearance incorrect (too tight)	4. Check and correct as required
	5. Bands too tight	5. Adjust bands

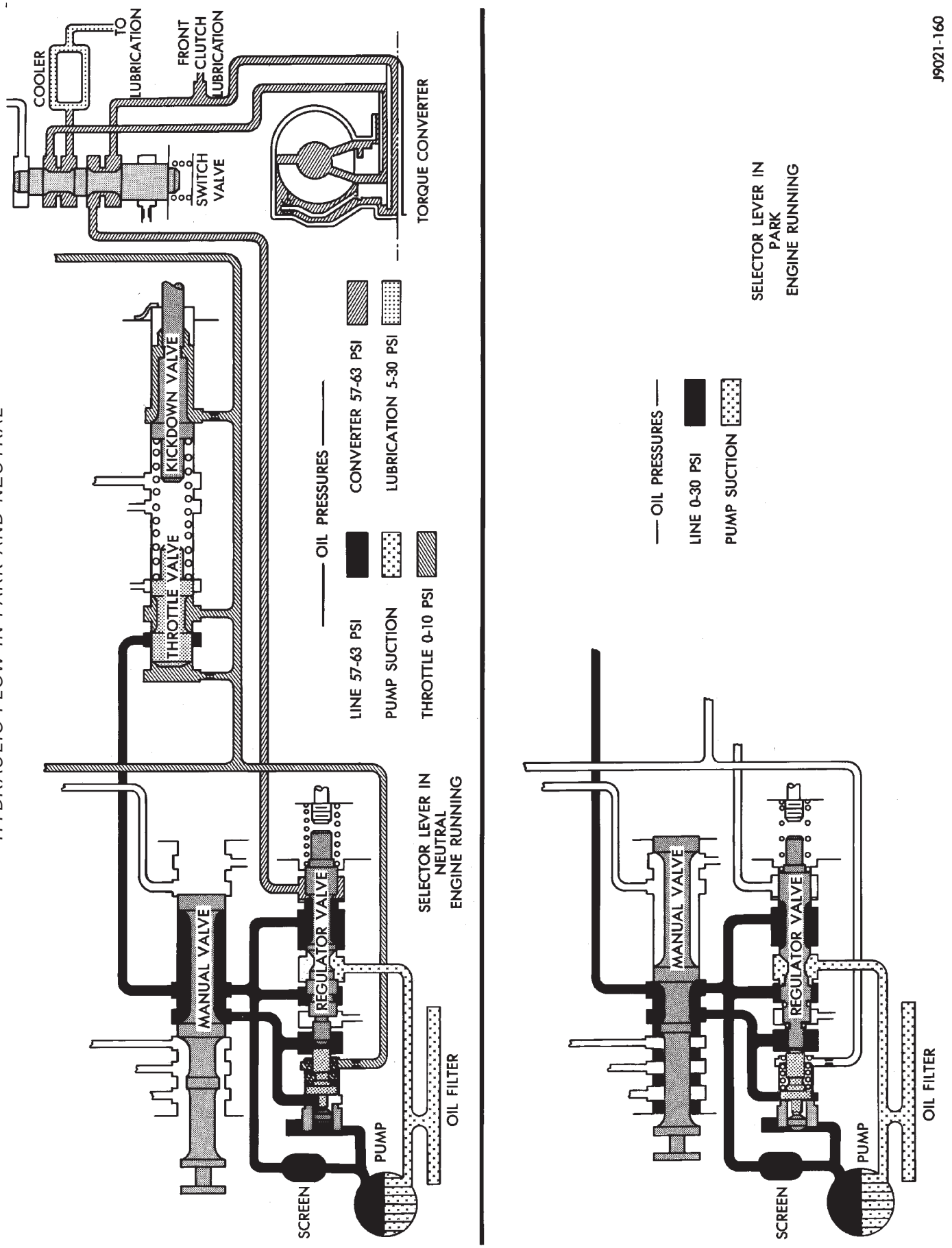
J9121-450

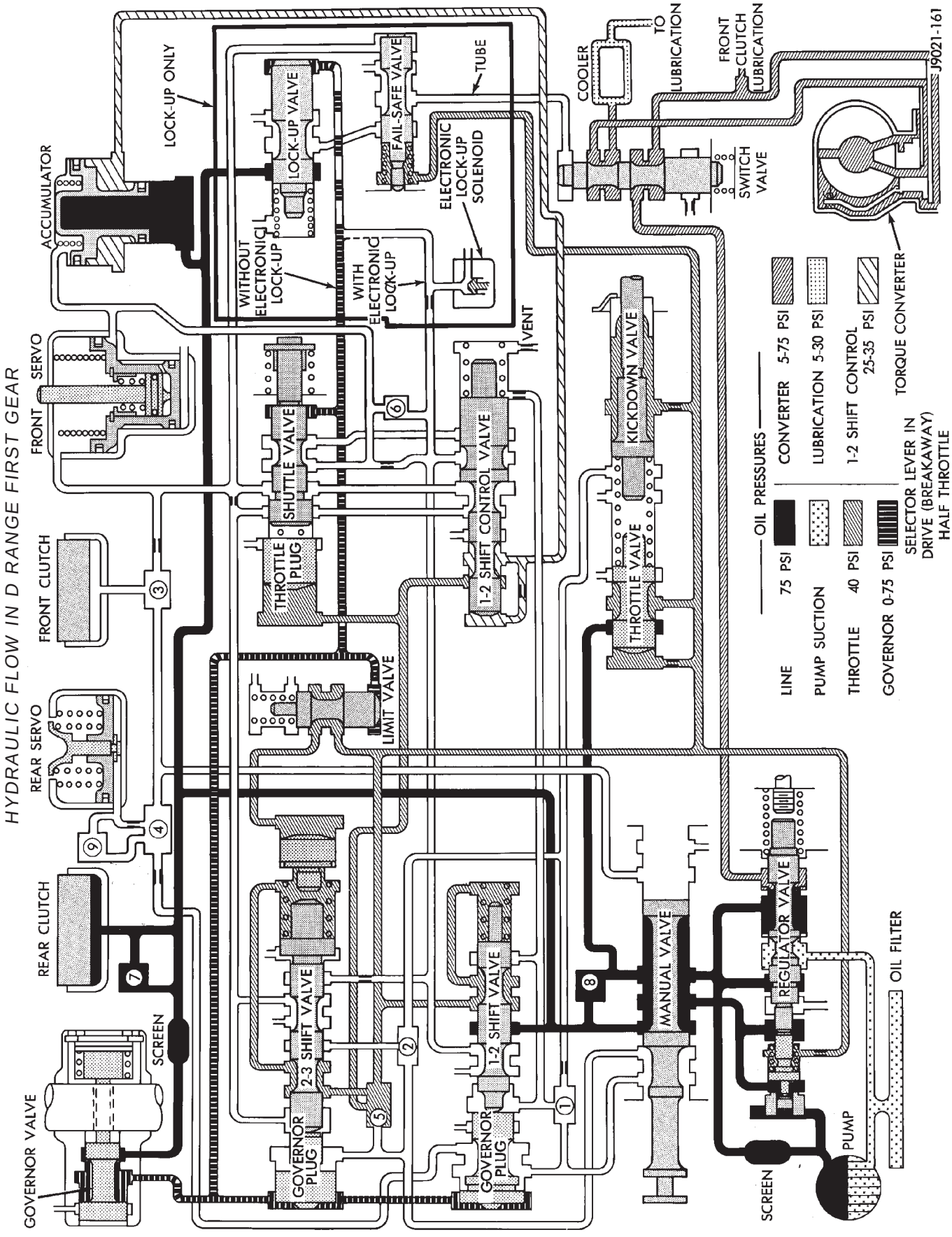
30RH/32RH TRANSMISSION DIAGNOSIS

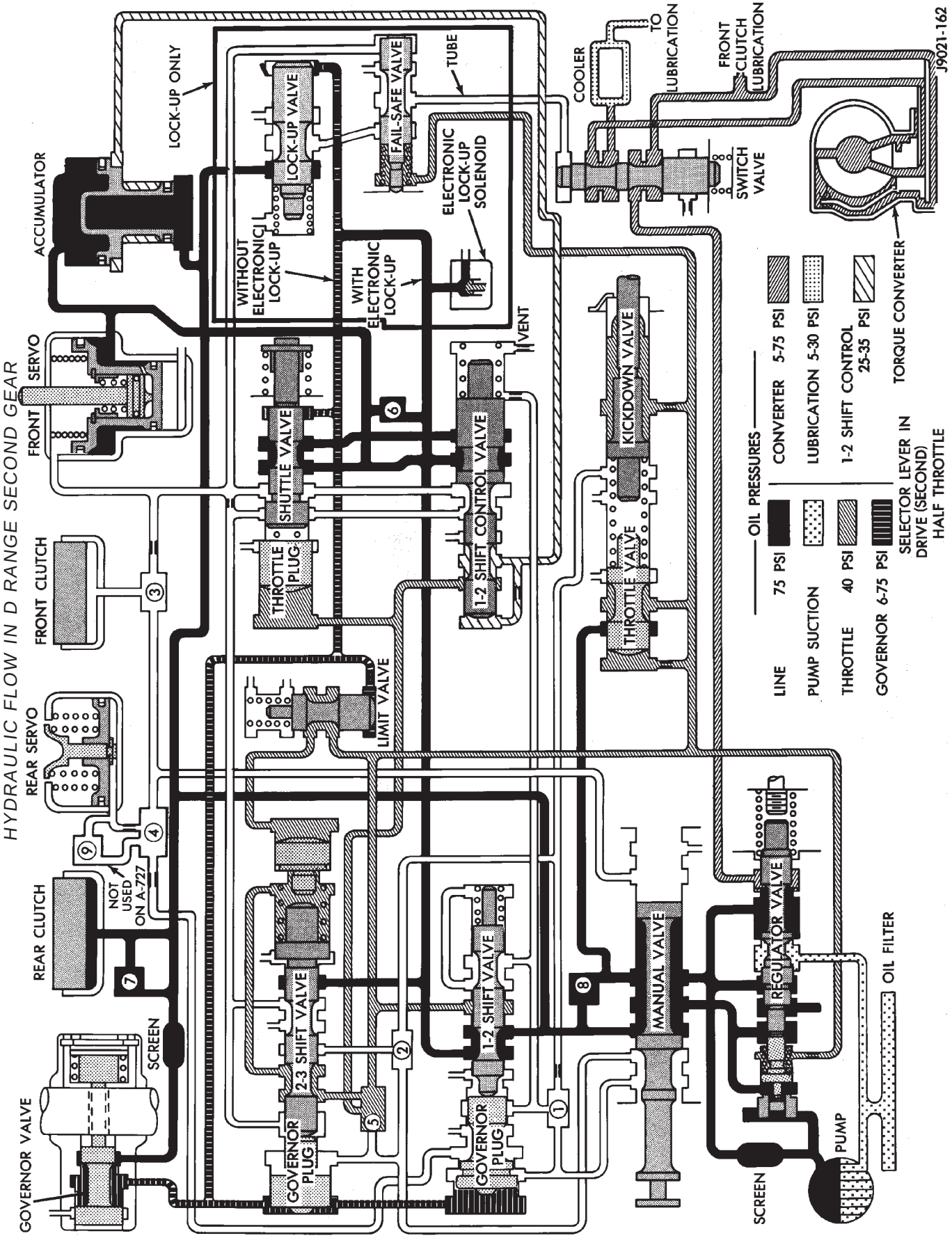
Condition	Possible Cause	Correction
NO START IN PARK OR NEUTRAL	1. Gearshift linkage out of adjustment 2. Neutral switch wire broken or open 3. Faulty neutral switch 4. Valve body manual lever assembly bent, worn, broken, or not aligned with switch	1. Adjust linkage 2. Check continuity with test lamp; repair as required 3. Refer to service section for test and replacement procedure 4. Inspect lever assembly and replace if damaged
SLUGGISH ACCELERATION AT LOW SPEEDS OR REQUIRES EXCESSIVE THROTTLE OPENING TO MAINTAIN HIGHWAY SPEEDS	1. Poor engine performance 2. Gearshift or throttle linkage out of adjustment 3. Transmission clutches slipping 4. Overrunning clutch in converter not holding 5. Converter overrunning clutch stuck	1. Check engine and repair as required 2. Adjust linkage 3. Perform stall test and repair as required 4. Perform stall test and replace converter if clutch has failed 5. Replace converter
FLUID CONTAMINATED (DISCOLORED, FULL OF SLUDGE AND/OR METAL AND FRICTION MATERIAL PARTICULAR)	1. If contamination occurred shortly after overhaul, fluid cooler and lines were not flushed and flow tested. This is especially true when original overhaul was to correct a problem that generated a large amount of debris, such as a gear failure or a clutch pack failure Note: Flushing the cooler and lines is mandatory after a failure of the converter lockup clutch 2. Incorrect fluid used in transmission 3. Main cooler in radiator is cracked, allowing engine coolant to enter transmission 4. Severe overload results in overheat, fluid breakdown, and accelerated wear, especially in high ambient temperatures. Most frequent causes are: • Vehicle is not properly equipped for heavy duty service • Tow vehicle and boat or trailer are both overloaded • Trailer or boat are too large for tow vehicle (load exceeds rated capacity of tow vehicle)	1. If contamination is severe, cooler flushing, converter replacement, and another overhaul may be necessary; particularly so if shift problems were also present 2. If transmission is operating properly, drain fluid, reverse flush cooler and lines, and change fluid and filter. However, if shift problem has developed, converter replacement and transmission overhaul may be required 3. Replace radiator (and cooler) and flush lines. If problem was diagnosed early enough, fluid and filter change may only be necessary. If contamination period was prolonged, overhaul and converter replacement may be required 4. Repair transmission, flush cooler, and lines. Replace converter if necessary. Install auxiliary cooler if needed. Also install HD cooling system if needed. If tow vehicle and unit being towed are both overloaded, the only repair is to reduce the load to rated limits. However, if trailer or boat is too large for tow vehicle, the only option is for the owner to move up to properly-equipped and load-rated tow vehicle

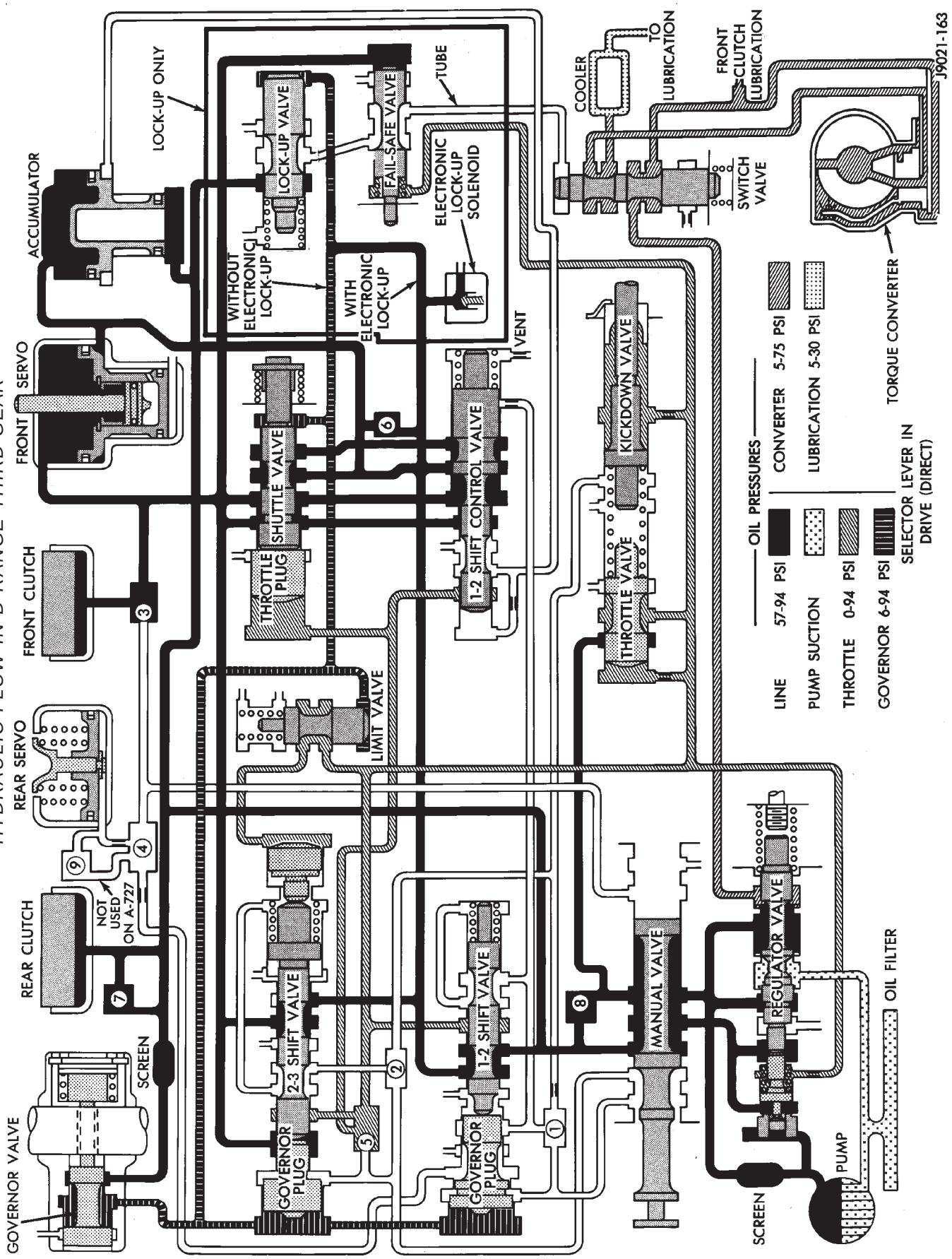
J9121-449

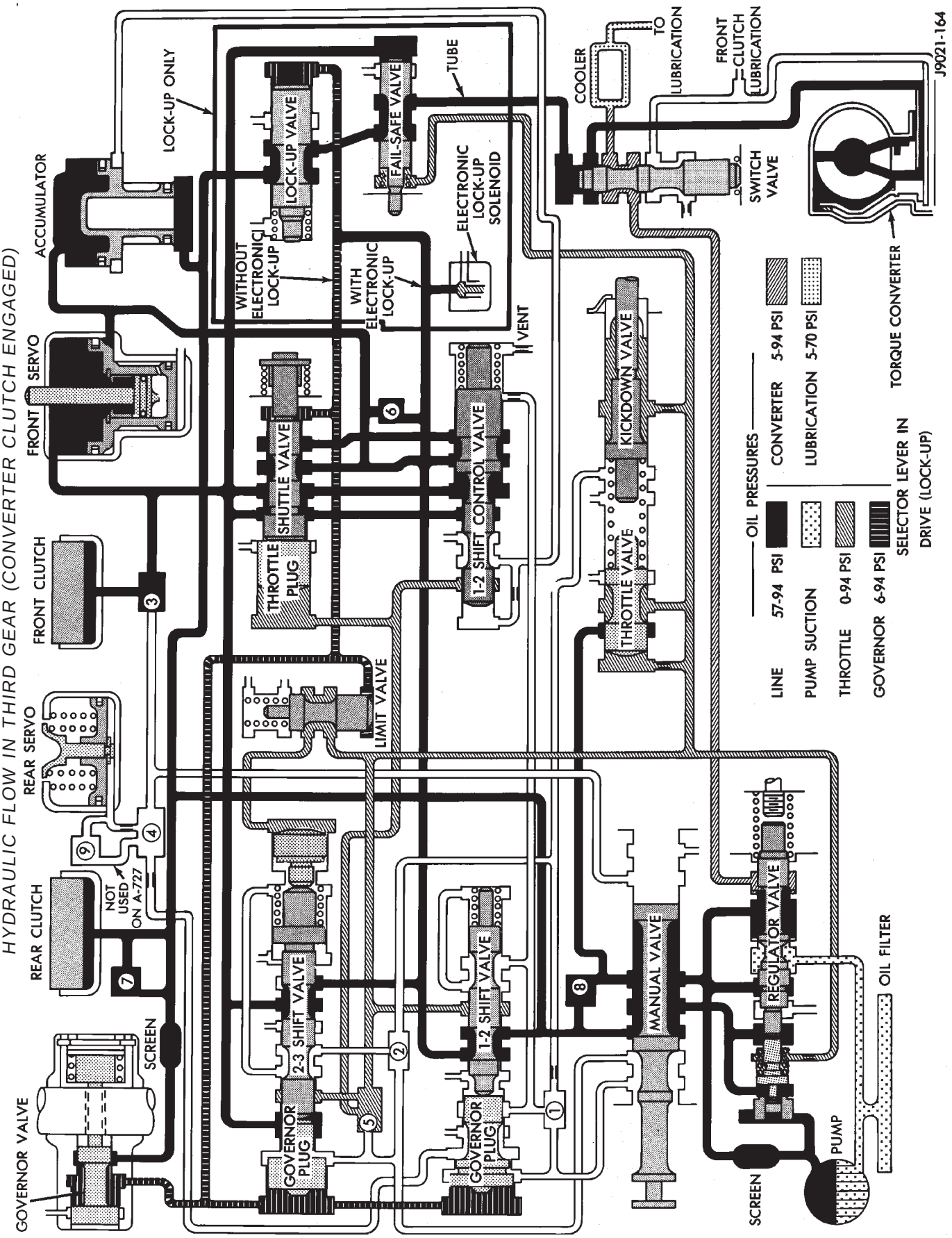
HYDRAULIC FLOW IN PARK AND NEUTRAL

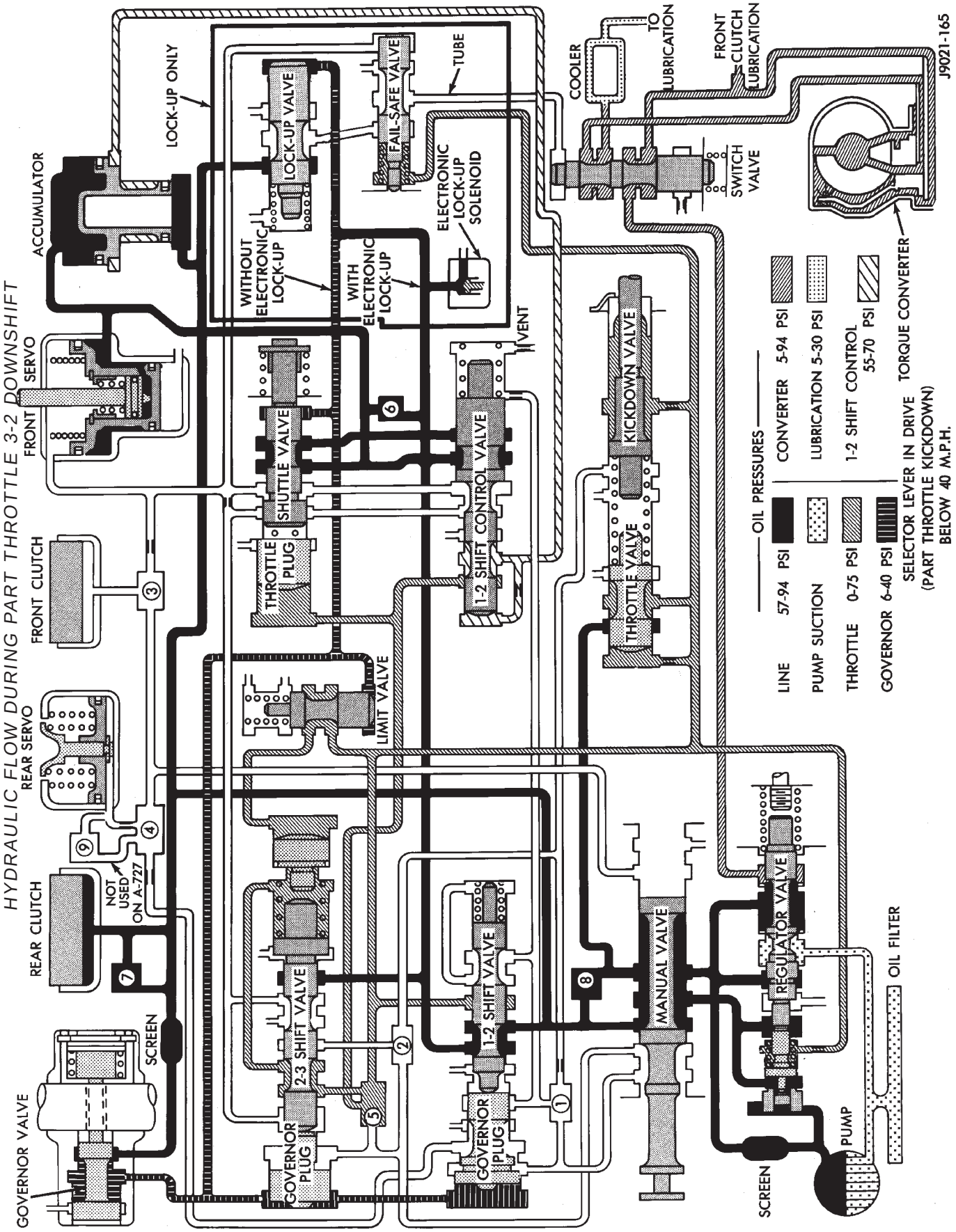


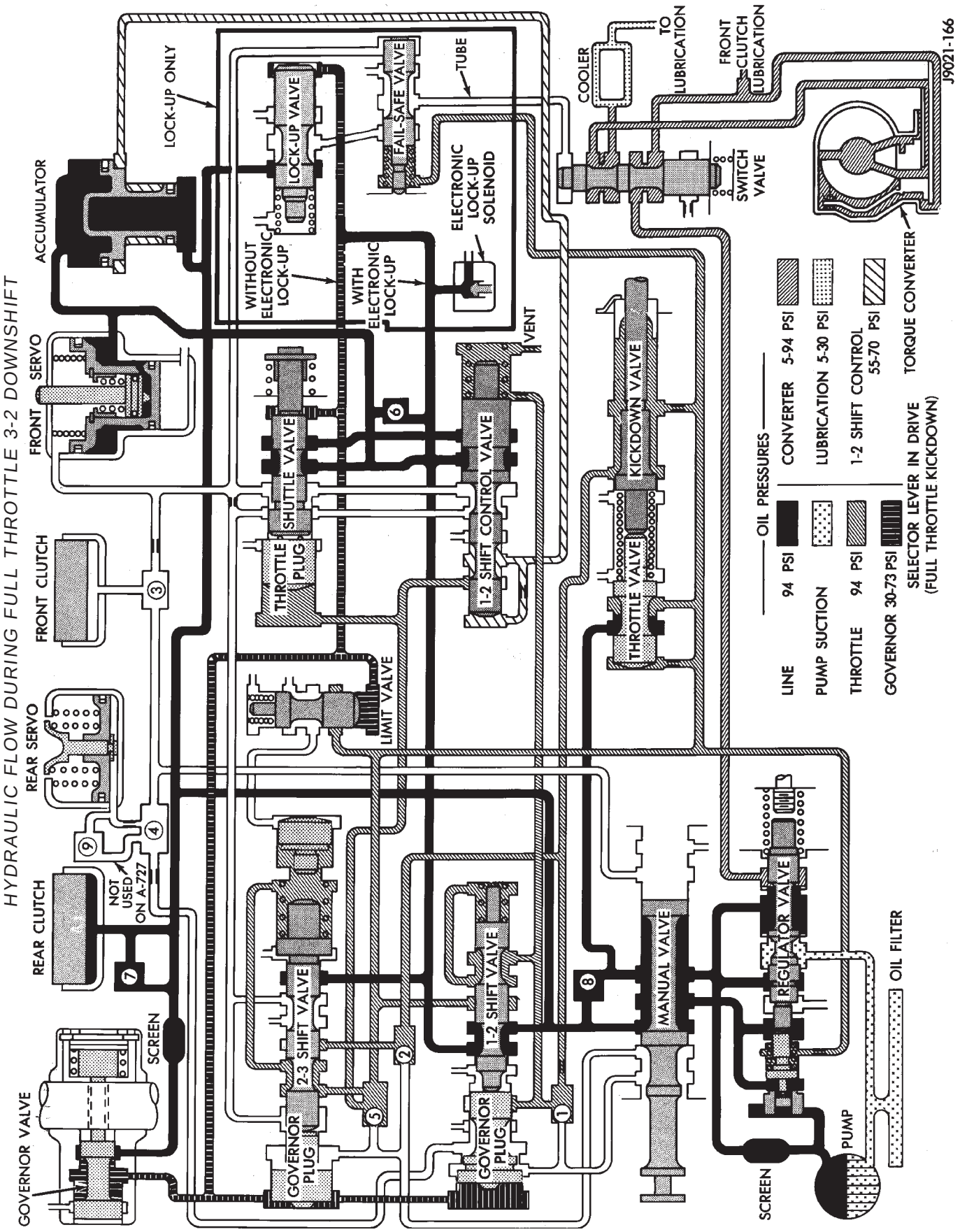

HYDRAULIC FLOW IN D RANGE FIRST GEAR
GOVERNOR VALVE
SCREEN
REAR CLUTCH
REAR SERVO
FRONT CLUTCH
FRONT SERVO
ACCUMULATOR
LOCK-UP ONLY
WITHOUT ELECTRONIC LOCK-UP
WITH ELECTRONIC LOCK-UP
LOCK-UP VALVE
FAIL-SAFE VALVE
TUBE
ELECTRONIC LOCK-UP SOLENOID
VENT
SHUTTLE VALVE
THROTTLE PLUG
1-2 SHIFT CONTROL VALVE
KICKDOWN VALVE
THROTTLE VALVE
LIMIT VALVE
2-3 SHIFT VALVE
GOVERNOR PLUG
1-2 SHIFT VALVE
MANUAL VALVE
REGULATOR VALVE
PUMP
SCREEN
OIL FILTER
COOLER
TO LUBRICATION
FRONT CLUTCH LUBRICATION
SWITCH VALVE
TORQUE CONVERTER
J9021-161
OIL PRESSURES
LINE 75 PSI
PUMP SUCTION
THROTTLE 40 PSI
GOVERNOR 0-75 PSI
CONVERTER 5-75 PSI
LUBRICATION 5-30 PSI
1-2 SHIFT CONTROL 25-35 PSI
SELECTOR LEVER IN DRIVE (BREAKAWAY) HALF THROTTLE


HYDRAULIC FLOW IN D RANGE SECOND GEAR
J9021-162
ACCUMULATOR
LOCK-UP ONLY
LOCK-UP VALVE
FAIL-SAFE VALVE
TUBE
COOLER
TO LUBRICATION
FRONT CLUTCH LUBRICATION
SWITCH VALVE
ELECTRONIC LOCK-UP SOLENOID
WITHOUT ELECTRONIC LOCK-UP
WITH ELECTRONIC LOCK-UP
VENT
FRONT SERVO
SHUTTLE VALVE
THROTTLE PLUG
1-2 SHIFT CONTROL VALVE
KICKDOWN VALVE
THROTTLE VALVE
FRONT CLUTCH
LIMIT VALVE
REAR SERVO
REAR CLUTCH
NOT USED ON A-727
SCREEN
2-3 SHIFT VALVE
1-2 SHIFT VALVE
GOVERNOR PLUG
GOVERNOR VALVE
MANUAL VALVE
REGULATOR VALVE
OIL FILTER
PUMP
SCREEN
OIL PRESSURES
LINE 75 PSI
PUMP SUCTION
THROTTLE 40 PSI
GOVERNOR 6-75 PSI
CONVERTER 5-75 PSI
LUBRICATION 5-30 PSI
1-2 SHIFT CONTROL 25-35 PSI
SELECTOR LEVER IN DRIVE (SECOND) HALF THROTTLE
TORQUE CONVERTER


HYDRAULIC FLOW IN D RANGE THIRD GEAR
LOCK-UP ONLY
ACCUMULATOR
FRONT SERVO
FRONT CLUTCH
REAR SERVO
REAR CLUTCH
NOT USED ON A-727
SCREEN
GOVERNOR VALVE
GOVERNOR PLUG
2-3 SHIFT VALVE
1-2 SHIFT VALVE
GOVERNOR PLUG
LIMIT VALVE
THROTTLE PLUG
SHUTTLE VALVE
WITHOUT ELECTRONIC LOCK-UP
LOCK-UP VALVE
WITH ELECTRONIC LOCK-UP
FAIL-SAFE VALVE
TUBE
ELECTRONIC LOCK-UP SOLENOID
VENT
1-2 SHIFT CONTROL VALVE
KICKDOWN VALVE
THROTTLE VALVE
MANUAL VALVE
REGULATOR VALVE
SCREEN
PUMP
OIL FILTER
COOLER
TO LUBRICATION
FRONT CLUTCH LUBRICATION
SWITCH VALVE
TORQUE CONVERTER
OIL PRESSURES
LINE 57-94 PSI
PUMP SUCTION
THROTTLE 0-94 PSI
GOVERNOR 6-94 PSI
CONVERTER 5-75 PSI
LUBRICATION 5-30 PSI
SELECTOR LEVER IN DRIVE (DIRECT)
J9021-163


HYDRAULIC FLOW IN THIRD GEAR (CONVERTER CLUTCH ENGAGED)
ACCUMULATOR
LOCK-UP ONLY
FRONT SERVO
FRONT CLUTCH
REAR SERVO
REAR CLUTCH
NOT USED ON A-727
SCREEN
GOVERNOR VALVE
2-3 SHIFT VALVE
GOVERNOR PLUG
1-2 SHIFT VALVE
GOVERNOR PLUG
LIMIT VALVE
THROTTLE PLUG
SHUTTLE VALVE
WITHOUT ELECTRONIC LOCK-UP
WITH ELECTRONIC LOCK-UP
LOCK-UP VALVE
FAIL-SAFE VALVE
TUBE
ELECTRONIC LOCK-UP SOLENOID
VENT
1-2 SHIFT CONTROL VALVE
KICKDOWN VALVE
THROTTLE VALVE
MANUAL VALVE
REGULATOR VALVE
SCREEN
PUMP
OIL FILTER
COOLER
TO LUBRICATION
FRONT CLUTCH LUBRICATION
SWITCH VALVE
TORQUE CONVERTER
OIL PRESSURES
LINE 57-94 PSI
PUMP SUCTION
THROTTLE 0-94 PSI
GOVERNOR 6-94 PSI
CONVERTER 5-94 PSI
LUBRICATION 5-70 PSI
SELECTOR LEVER IN DRIVE (LOCK-UP)
J9021-164


HYDRAULIC FLOW DURING PART THROTTLE 3-2 DOWNSHIFT
GOVERNOR VALVE
SCREEN
REAR CLUTCH
REAR SERVO
NOT USED ON A-727
FRONT CLUTCH
FRONT SERVO
ACCUMULATOR
LOCK-UP ONLY
WITHOUT ELECTRONIC LOCK-UP
WITH ELECTRONIC LOCK-UP
LOCK-UP VALVE
FAIL-SAFE VALVE
TUBE
ELECTRONIC LOCK-UP SOLENOID
VENT
SHUTTLE VALVE
THROTTLE PLUG
1-2 SHIFT CONTROL VALVE
KICKDOWN VALVE
THROTTLE VALVE
LIMIT VALVE
2-3 SHIFT VALVE
1-2 SHIFT VALVE
GOVERNOR PLUG
GOVERNOR PLUG
MANUAL VALVE
REGULATOR VALVE
SCREEN
PUMP
OIL FILTER
COOLER
TO LUBRICATION
FRONT CLUTCH LUBRICATION
SWITCH VALVE
TORQUE CONVERTER
J9021-165
OIL PRESSURES
LINE 57-94 PSI
PUMP SUCTION
THROTTLE 0-75 PSI
GOVERNOR 6-40 PSI
CONVERTER 5-94 PSI
LUBRICATION 5-30 PSI
1-2 SHIFT CONTROL 55-70 PSI
SELECTOR LEVER IN DRIVE
(PART THROTTLE KICKDOWN)
BELOW 40 M.P.H.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SCREEN
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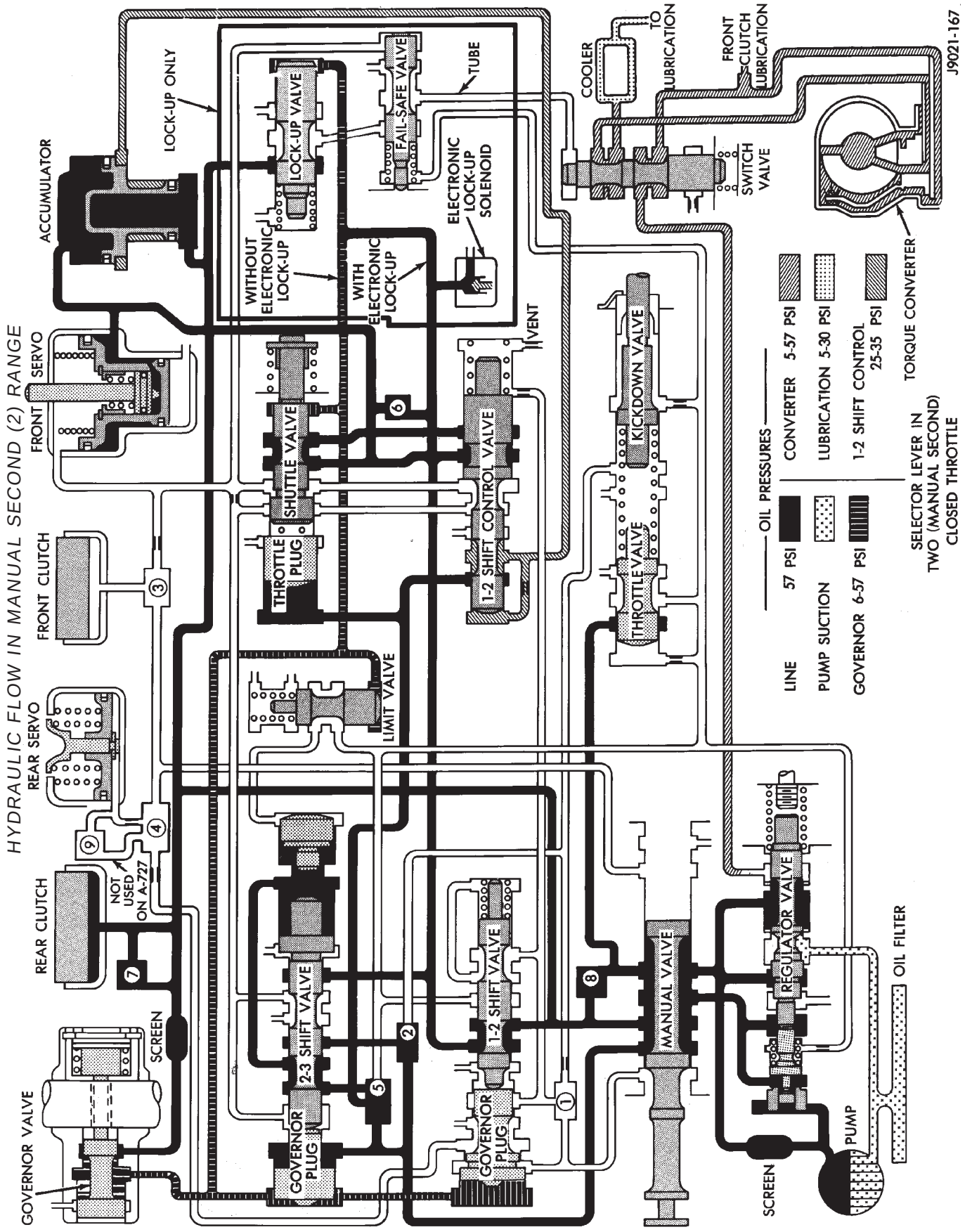
NOT USED ON A-727
REAR SERVO
FRONT CLUTCH
FRONT SERVO
ACCUMULATOR
LOCK-UP ONLY
WITHOUT ELECTRONIC LOCK-UP
WITH ELECTRONIC LOCK-UP
LOCK-UP VALVE
FAIL-SAFE VALVE
TUBE
ELECTRONIC LOCK-UP SOLENOID
VENT
SHUTTLE VALVE
THROTTLE PLUG
1-2 SHIFT CONTROL VALVE
KICKDOWN VALVE
THROTTLE VALVE
LIMIT VALVE
2-3 SHIFT VALVE
1-2 SHIFT VALVE
GOVERNOR PLUG
GOVERNOR PLUG
MANUAL VALVE
REGULATOR VALVE
SCREEN
PUMP
OIL FILTER
COOLER
TO LUBRICATION
FRONT CLUTCH LUBRICATION
SWITCH VALVE
TORQUE CONVERTER
J9021-166
OIL PRESSURES
LINE 94 PSI
PUMP SUCTION
THROTTLE 94 PSI
GOVERNOR 30-73 PSI
CONVERTER 5-94 PSI
LUBRICATION 5-30 PSI
1-2 SHIFT CONTROL 55-70 PSI
SELECTOR LEVER IN DRIVE
(FULL THROTTLE KICKDOWN)


HYDRAULIC FLOW IN MANUAL SECOND (2) RANGE
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LOCK-UP VALVE
FAIL-SAFE VALVE
TUBE
ELECTRONIC LOCK-UP SOLENOID
COOLER
TO LUBRICATION
FRONT CLUTCH LUBRICATION
SWITCH VALVE
TORQUE CONVERTER
J9021-167
FRONT SERVO
FRONT CLUTCH
SHUTTLE VALVE
THROTTLE PLUG
VENT
1-2 SHIFT CONTROL VALVE
KICKDOWN VALVE
THROTTLE VALVE
LIMIT VALVE
REAR SERVO
REAR CLUTCH
NOT USED ON A-727
OIL PRESSURES
LINE 57 PSI
PUMP SUCTION
GOVERNOR 6-57 PSI
CONVERTER 5-57 PSI
LUBRICATION 5-30 PSI
1-2 SHIFT CONTROL 25-35 PSI
SELECTOR LEVER IN TWO (MANUAL SECOND) CLOSED THROTTLE
GOVERNOR VALVE
SCREEN
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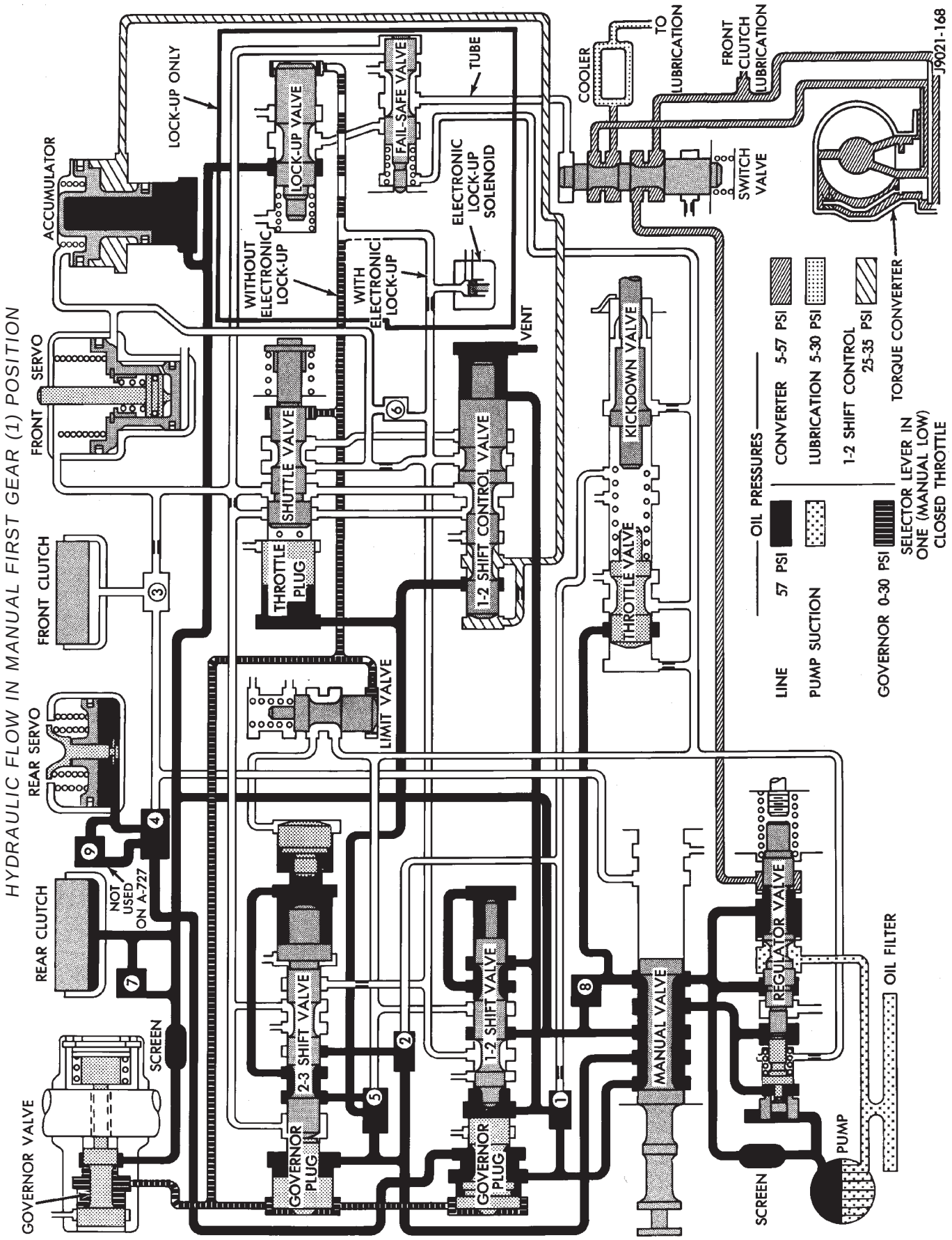
GOVERNOR PLUG
1-2 SHIFT VALVE
MANUAL VALVE
REGULATOR VALVE
OIL FILTER
PUMP
SCREEN


HYDRAULIC FLOW IN MANUAL FIRST GEAR (1) POSITION
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NOT USED ON A-727
REAR SERVO
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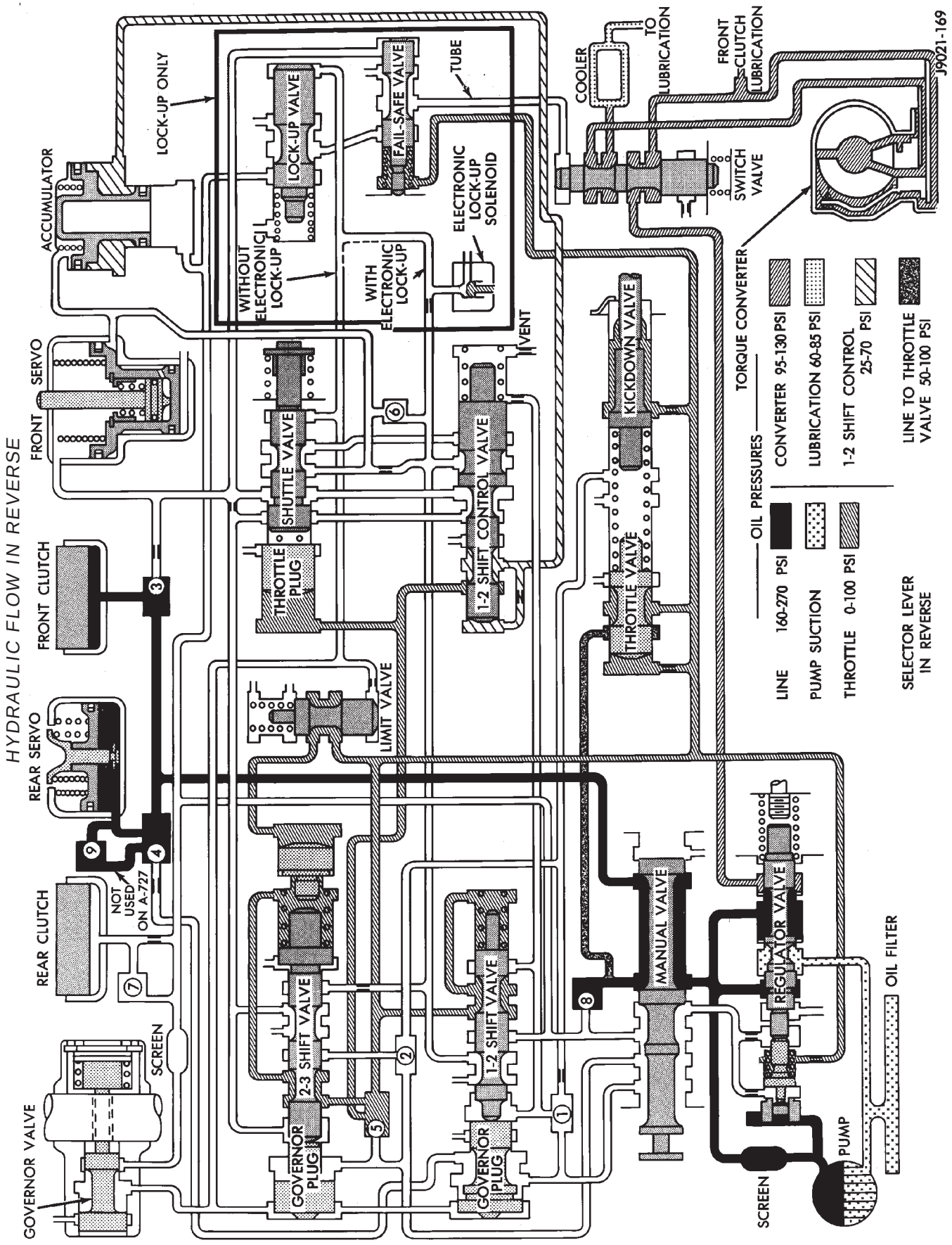
FRONT SERVO
ACCUMULATOR
LOCK-UP ONLY
WITHOUT ELECTRONIC LOCK-UP
WITH ELECTRONIC LOCK-UP
LOCK-UP VALVE
FAIL-SAFE VALVE
TUBE
ELECTRONIC LOCK-UP SOLENOID
VENT
SHUTTLE VALVE
THROTTLE PLUG
1-2 SHIFT CONTROL VALVE
LIMIT VALVE
KICKDOWN VALVE
THROTTLE VALVE
2-3 SHIFT VALVE
1-2 SHIFT VALVE
GOVERNOR PLUG
GOVERNOR PLUG
MANUAL VALVE
REGULATOR VALVE
SCREEN
PUMP
OIL FILTER
COOLER
TO LUBRICATION
FRONT CLUTCH LUBRICATION
SWITCH VALVE
TORQUE CONVERTER
J9021-168
OIL PRESSURES
LINE 57 PSI
PUMP SUCTION
CONVERTER 5-57 PSI
LUBRICATION 5-30 PSI
1-2 SHIFT CONTROL 25-35 PSI
GOVERNOR 0-30 PSI
SELECTOR LEVER IN ONE (MANUAL LOW) CLOSED THROTTLE


HYDRAULIC FLOW IN REVERSE
LOCK-UP ONLY
ACCUMULATOR
WITHOUT ELECTRONIC LOCK-UP
WITH ELECTRONIC LOCK-UP
LOCK-UP VALVE
FAIL-SAFE VALVE
TUBE
ELECTRONIC LOCK-UP SOLENOID
COOLER
TO LUBRICATION
FRONT CLUTCH LUBRICATION
J9021-169
FRONT SERVO
FRONT CLUTCH
SHUTTLE VALVE
THROTTLE PLUG
VENT
1-2 SHIFT CONTROL VALVE
KICKDOWN VALVE
THROTTLE VALVE
SWITCH VALVE
TORQUE CONVERTER
OIL PRESSURES
CONVERTER 95-130 PSI
LUBRICATION 60-85 PSI
1-2 SHIFT CONTROL 25-70 PSI
LINE TO THROTTLE VALVE 50-100 PSI
LINE 160-270 PSI
PUMP SUCTION
THROTTLE 0-100 PSI
SELECTOR LEVER IN REVERSE
REAR SERVO
LIMIT VALVE
REAR CLUTCH
NOT USED ON A-727
MANUAL VALVE
REGULATOR VALVE
OIL FILTER
GOVERNOR VALVE
SCREEN
2-3 SHIFT VALVE
1-2 SHIFT VALVE
GOVERNOR PLUG
GOVERNOR PLUG
SCREEN
PUMP

30RH/32RH IN-VEHICLE SERVICE

INDEX

RECOMMENDED FLUID

The recommended and preferred fluid for 30RH/32RH transmissions is Mopar ATF Plus, Type 7176.

Mopar Dexron II is acceptable but should only be used when ATF Plus is not available.

Transmission fluid capacity is approximately 17 pints (7.9 liters). This is the approximate amount of fluid required to fill the transmission and torque converter after overhaul.

CHECKING FLUID LEVEL AND CONDITION

(1) Position vehicle on flat, level surface. This is important in obtaining an accurate fluid level check.

(2) To avoid false readings, which could produce under or over fill condition, do not check level until fluid is at normal operating temperature.

(3) Shift transmission into Neutral.

(4) Apply parking brakes.

(5) Operate engine at curb idle speed.

WARNING: WHEN PERFORMING UNDERHOOD OPERATIONS WITH THE ENGINE RUNNING, KEEP YOUR HANDS WELL AWAY FROM HOT OR ROTATING ENGINE COMPONENTS. DO NOT WEAR LOOSE ARTICLES OF CLOTHING WHICH COULD BECOME ENTANGLED IN ENGINE COMPONENTS OR ACCESSORIES.

(6) Shift transmission through all gear ranges and back to Neutral (leave engine running).

(7) Clean exterior of dipstick cap and fill tube before removing transmission dipstick.

(8) Remove dipstick and inspect fluid level.

- Correct level is to FULL mark
- Acceptable level is between ADD and FULL marks

(9) Check fluid condition. Fluid should be dark to light red in color and free of dirt or debris.

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

(11) If fluid is black or dark brown, burned/turned to sludge, contains large quantities of metal or friction material particles, transmission will need overhaul. Especially if problems were evident during road test and preliminary diagnosis. Fluid cooler should also be flow tested and flushed if necessary.

GEARSHIFT LINKAGE ADJUSTMENT (YJ)

(1) Check linkage adjustment by starting engine in Park and Neutral.

(2) Adjustment is OK if engine starts only in park and Neutral. Adjustment is incorrect if engine starts in one but not both positions.

(3) If engine starts in any position other than Park or Neutral, or if engine will not start at all, park/neutral position switch may be faulty.

(4) Shift transmission into Park.

(5) Raise vehicle.

(6) Check condition of shift rods, bellcrank, bellcrank brackets and linkage bushings/grommets (Fig. 1). Tighten, repair, replace worn, damaged parts. Do not attempt adjustment if linkage components are worn or damaged.

(7) Loosen shift rod trunnion lock bolt or nut. Be sure upper shift rod slides freely in trunnion (Fig. 1). Also be sure shift rods and bellcrank rotate freely and do not bind at any point.

(8) Verify that manual lever is in Park detent (Fig. 1). Move lever all the way rearward to be sure it is in Park.

(9) Check for positive engagement of park lock by attempting to rotate propeller shaft. Shaft will not turn when park pawl is engaged.

(10) Adjust shift rod trunnion to a obtain free pin fit in bellcrank arm and tighten trunnion lock bolt or nut. Prevent shift rod from turning while tightening bolt or nut. Gearshift linkage lash must be eliminated to obtain proper adjustment. Eliminate lash by pulling downward on shift rod and pressing upward on bellcrank.

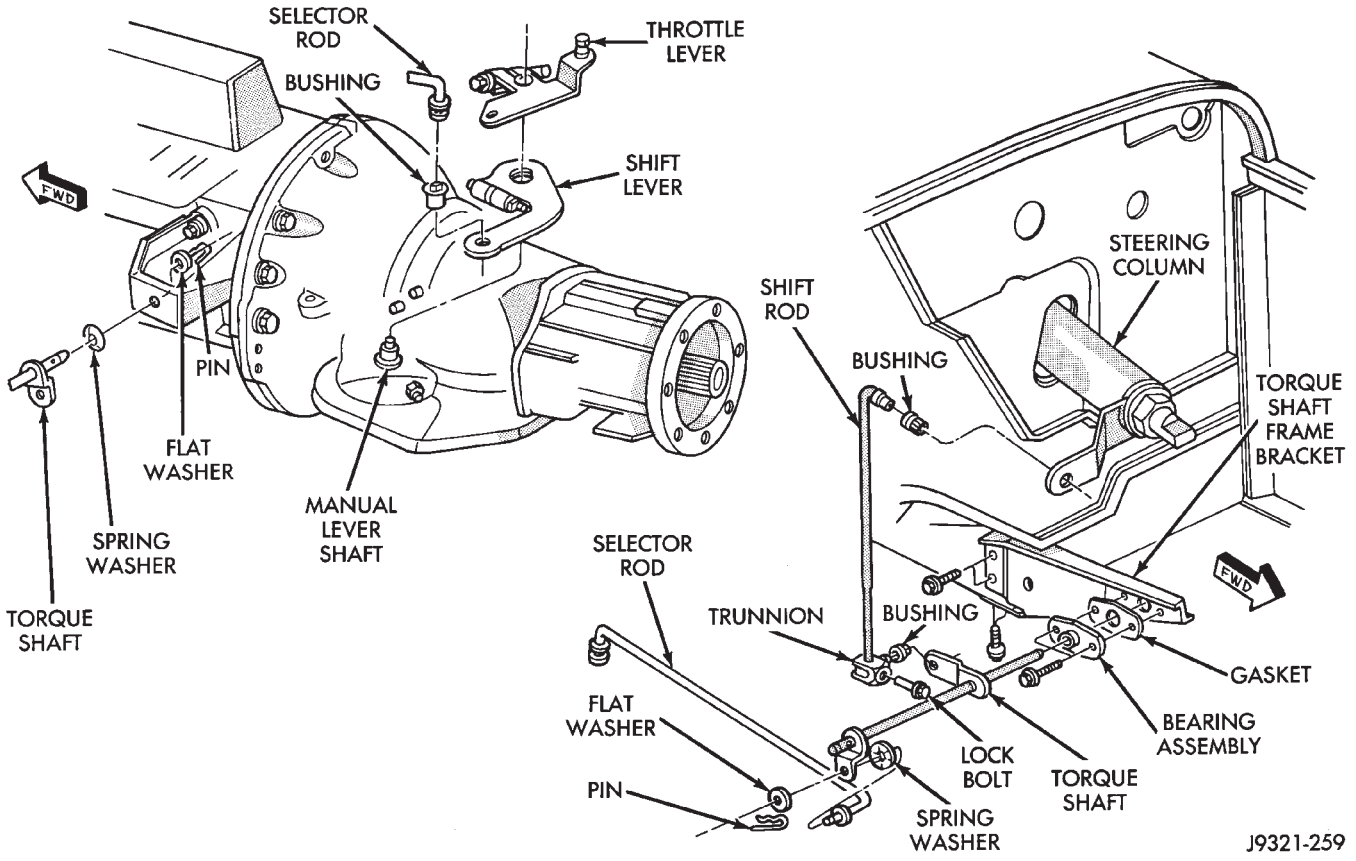


Fig. 1 Gearshift Linkage (YJ)

(11) Confirm proper adjustment by starting engine in Park and Neutral. Engine should start in these positions only. **If engine starts in any position other than Park or Neutral, adjustment is incorrect or neutral switch is faulty.**

(12) Lower vehicle and verify that steering lock operates correctly.

SHIFT CABLE ADJUSTMENT (XJ)

(1) Shift transmission into Park.

(2) Raise vehicle.

(3) Release cable adjuster clamp to unlock cable (Figs. 2 and 3). Clamp is at transmission end of cable.

(4) Unsnap cable from transmission cable bracket (Figs. 2 and 3).

(5) Move transmission shift lever fully rearward to Park detent. Lever is on manual valve shaft at driver side of case.

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

(7) Snap cable into cable bracket.

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

(9) Check engine starting. Engine should start only in Park and Neutral.

(10) Lower vehicle.

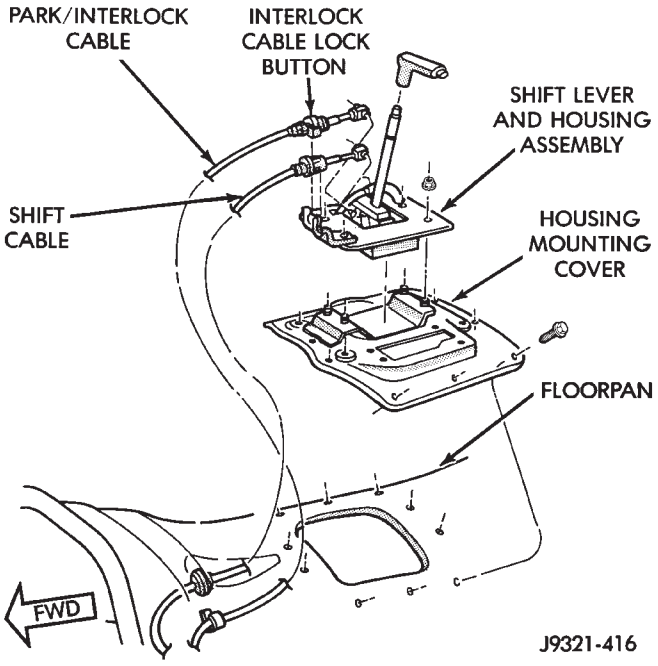


Fig. 2 Shift Cable (XJ)

PARK INTERLOCK CABLE ADJUSTMENT (XJ)

(1) Shift transmission into Park.

(2) Turn ignition switch to Lock position.

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

(4) Pull cable lock button up to release cable (Fig. 3).

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

(6) Check adjustment as follows:

(a) Check movement of release shift handle button (floor shift) or release lever (column shift). You should not be able to press button inward or move column lever.

(b) Turn ignition switch to On position.

(c) Press floor shift lever release button or move column lever. Then shift into Neutral. If cable adjustment is correct, ignition switch can not be turned to Lock position. Perform same check with transmission in D range.

(7) Move shift lever back to Park and check ignition switch operation. You should be able to turn switch to Lock position and shift lever release button/lever should not move.

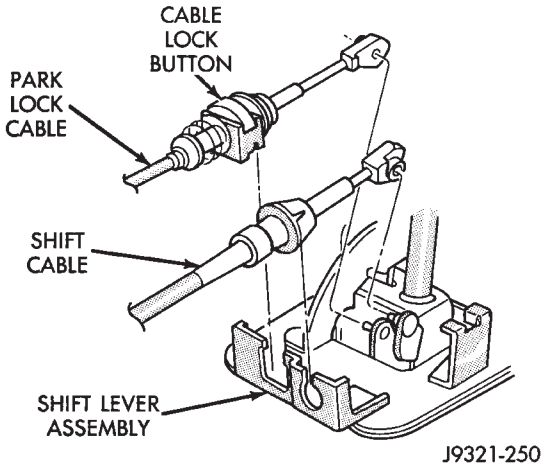


Fig. 3 Park Lock Cable Attachment (XJ)

TRANSMISSION THROTTLE CABLE ADJUSTMENT (XJ/YJ)

A cable is used to control throttle pressure and kickdown on 30RH/32RH transmissions (Fig. 4).

Correct cable adjustment is important to proper operation. The cable positions the throttle valve which controls shift speed, shift quality and part throttle downshift sensitivity. If the setting is incorrect, shift quality and shift speeds will be unsatisfactory.

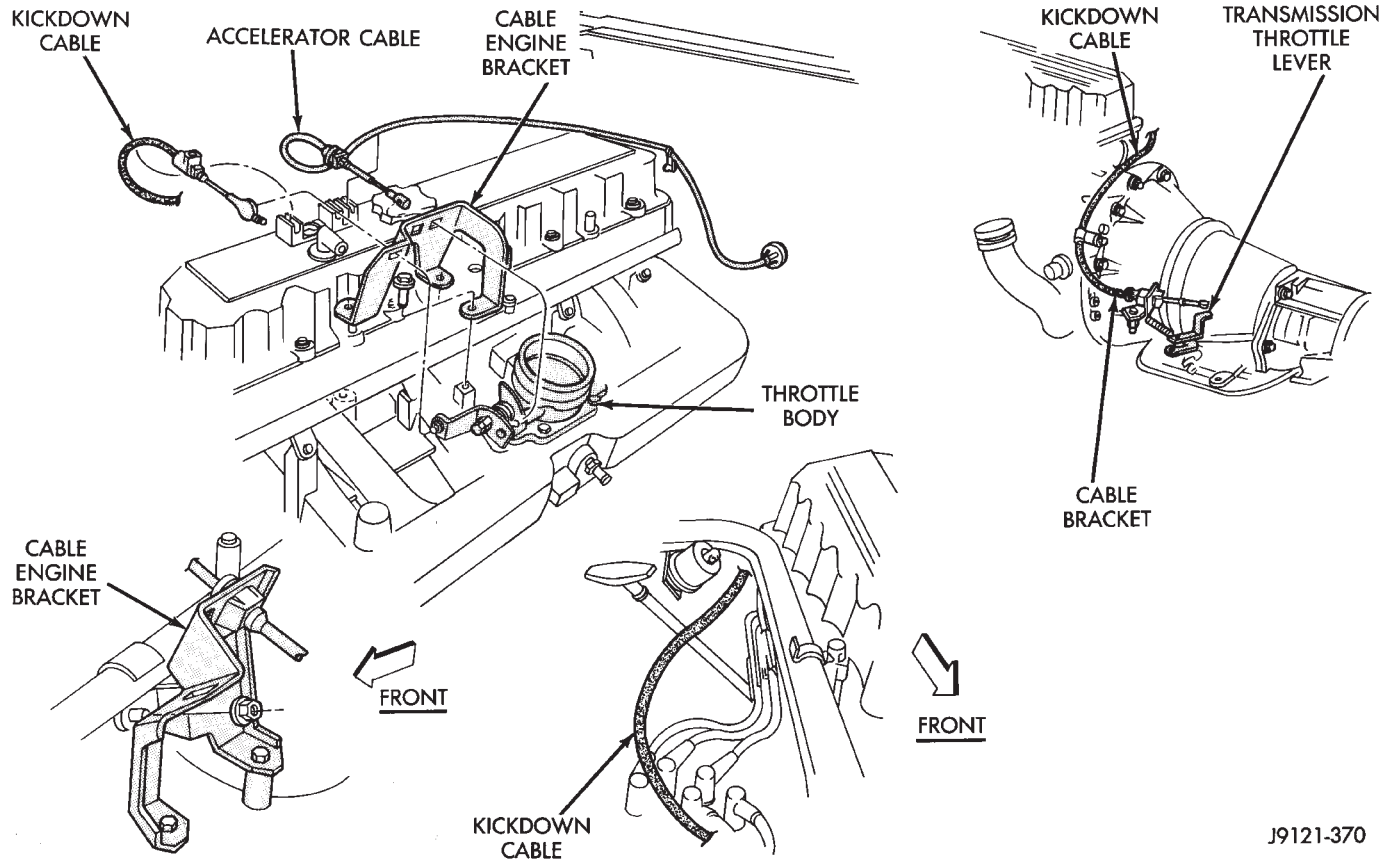


Fig. 4 Transmission Throttle Valve (Kickdown) Cable

THROTTLE CABLE ADJUSTMENT PROCEDURE

Cable adjustment is performed entirely in the engine compartment. It is not necessary to raise the vehicle for access to any other components.

(1) Shift transmission into Park and shut engine off.

(2) Press cable release button (Fig. 5).

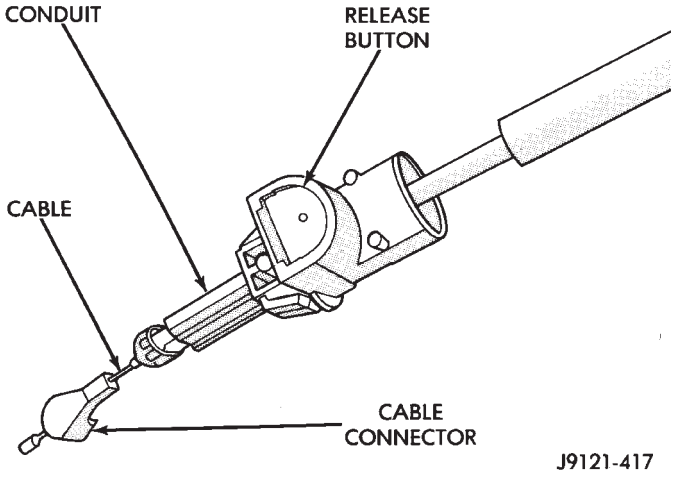


Fig. 5 Throttle Valve Cable Components

(3) Push cable conduit back into cable adjuster body as far as possible (Fig. 6).

(4) Rotate throttle body lever to wide open throttle position. Cable will ratchet to correct adjustment point as lever is rotated (Fig. 6).

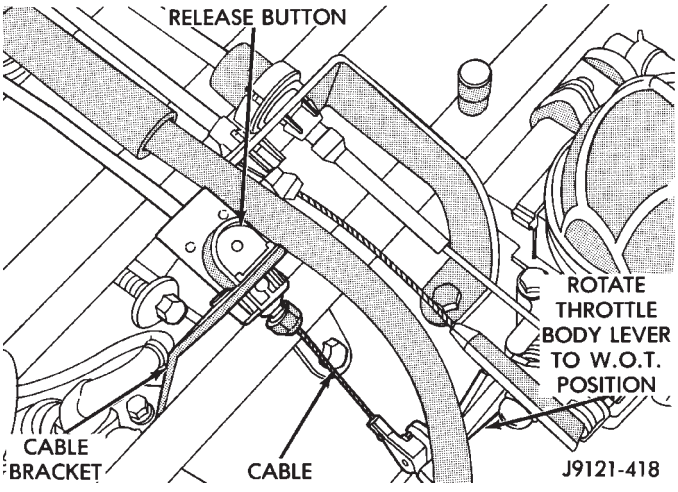


Fig. 6 Throttle Valve Cable Adjustment

FRONT BAND ADJUSTMENT

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

(1) Raise vehicle.

(2) Loosen band adjusting screw locknut. Then back locknut off 4-5 turns.

(3) Clean adjusting screw threads with Mopar rust penetrant if necessary. Then lubricate threads with Mopar spray lube or petroleum jelly. Be sure screw turns freely in case. This is necessary for accurate adjustment.

(4) Tighten band adjusting screw to 8 N·m (72 in. lbs.) torque with inch-pound torque wrench. **If Adapter Extension C-3705 is needed in order to reach adjusting screw, tighten screw to only 5-6 N·m (47-50 in. lbs.) torque (Fig. 7).**

(5) Back off front band adjusting screw as follows:

- **On 30RH (2.5L), back adjusting screw off 2-1/2 turns**
- **On 32RH (4.0L), back adjusting screw off 2-1/4 turns**

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

(7) Lower vehicle.

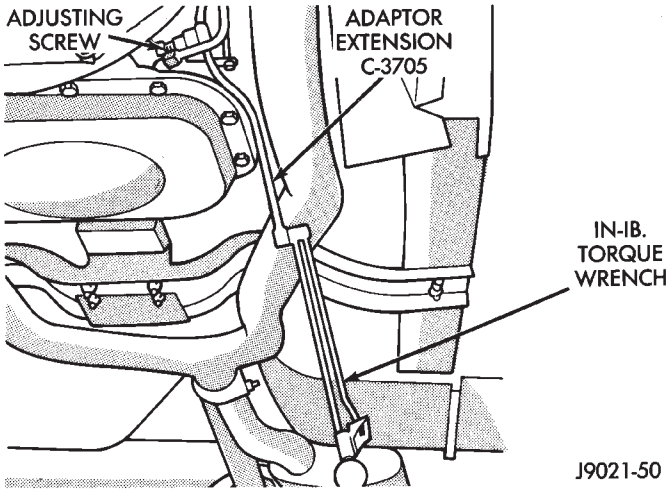


Fig. 7 Front Band Adjustment

REAR BAND ADJUSTMENT

The transmission oil pan must be removed for access to the rear (low-reverse) band adjusting screw.

(1) Raise vehicle.

(2) Remove transmission oil pan and drain fluid.

(3) Loosen band adjusting screw locknut 5-6 turns. Be sure adjusting screw turns freely in lever.

(4) Tighten adjusting screw as follows: On 32Rh transmission, tighten screw to 8 N·m (72 in. lbs.) torque. On 30RH transmission, tighten adjusting screw to 5 N·m (41 in. lbs.) torque (Fig. 8).

(5) Back off rear band adjusting screw as follows:

- **On 30RH (2.5L), back adjusting screw off 7 turns**
- **On 32RH (4.0L), back adjusting screw off 4 turns**

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

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

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

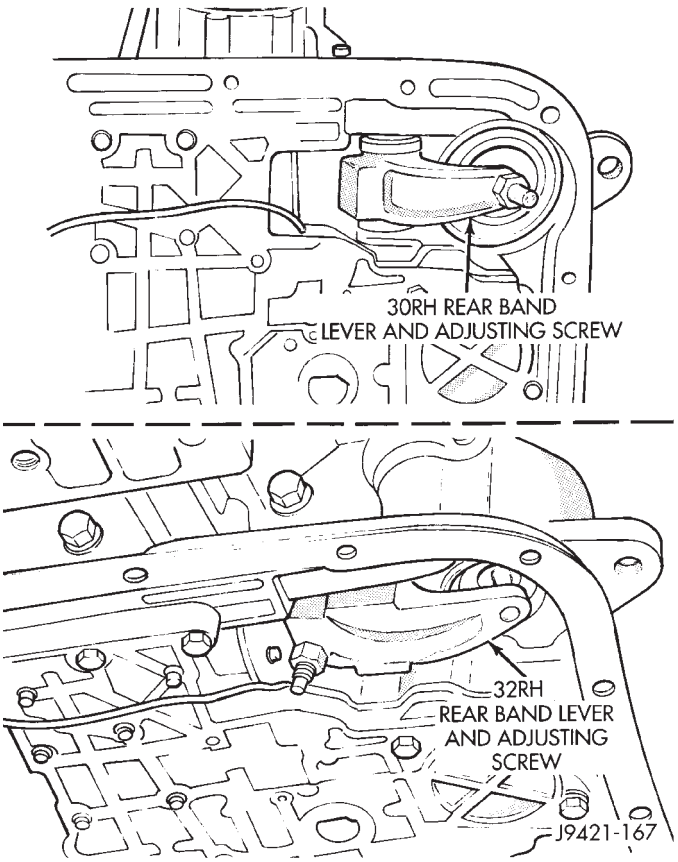


Fig. 8 Rear Band Lever And Adjusting Screw Location

OIL FILTER REPLACEMENT

(1) Raise vehicle.

(2) Remove oil pan and drain fluid.

(3) Remove filter screws and remove oil filter (Fig. 9).

(4) Position new filter on valve body and install filter screws finger tight.

(5) Tighten filter screws to 4 N·m (35 in. lbs.) with inch pound torque wrench.

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

(7) Lower vehicle.

(8) Refill transmission with Mopar ATF Plus, Type 7176. Mopar Dexron II can be used if ATF Plus is not readily available.

VALVE BODY REMOVAL

(1) Raise vehicle.

(2) Remove oil pan and drain fluid.

(3) Disconnect gearshift and throttle linkage at transmission levers.

(4) Loosen clamp bolts and remove throttle and manual valve levers from manual valve shaft.

(5) Disconnect park/neutral position switch wires and remove switch and switch seal.

(6) Remove valve body oil filter.

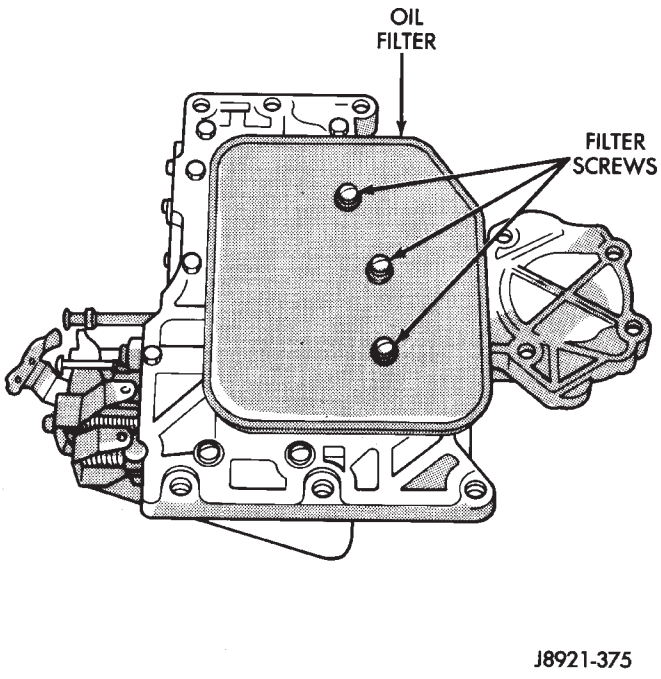


Fig. 9 Oil Filter Screw Locations

(7) Remove valve body attaching screws. Lower valve body slightly and remove accumulator piston and spring (Fig. 10). Rotate valve body down and away from case. Pull it forward to disengage park rod and remove valve body.

(8) Position valve body on bench or on repair stand for disassembly, cleaning and inspection (Fig. 11).

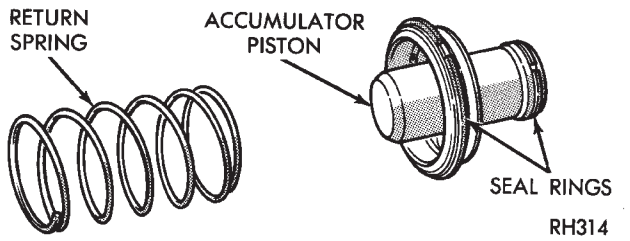


Fig. 10 Accumulator Piston And Spring

VALVE BODY SERVICE

The valve body can be disassembled for cleaning and inspection of the individual components. Valve body service procedures are detailed in the overhaul section.

The only serviceable valve body components are:

- park lock rod and E-clip
- switch valve and spring
- pressure adjusting screw bracket
- throttle valve lever
- manual lever
- manual lever shaft seal, washer, E-clip and detent ball
- fluid filter
- converter clutch solenoid

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

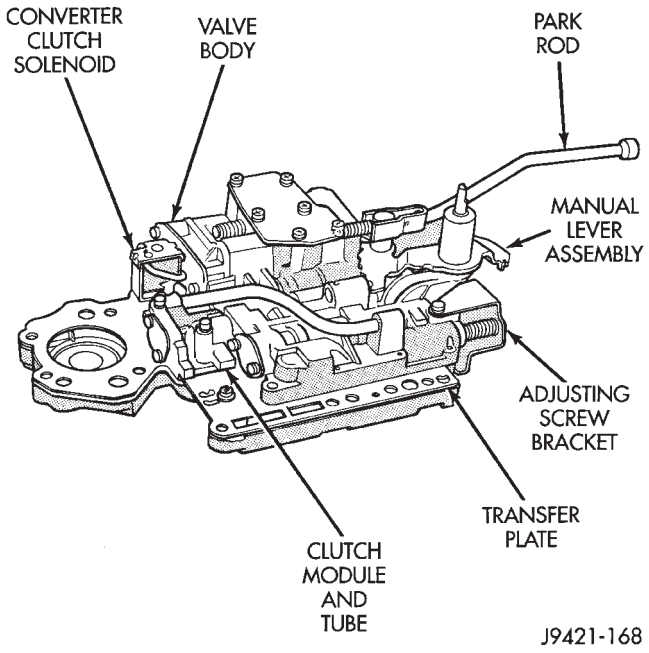


Fig. 11 Valve Body Assembly

VALVE BODY INSTALLATION

(1) Place valve body manual lever in low (1 position) so park lock rod can be installed in sprag.

(2) Position park sprag with screwdriver to ease lock rod installation and engagement.

(3) Install new seals on accumulator piston if necessary and install piston in case. A small amount of petroleum jelly can be used to hold piston in place.

(4) Lubricate shaft of manual lever and lip of shaft seal with petroleum jelly.

(5) Raise valve body and align park rod with case opening and park sprag. Then push rod end through opening and past sprag. Rotate propeller shaft if necessary.

(6) Position accumulator spring on transfer plate.

(7) Align valve body and seat it on case. Be sure manual lever shaft and accumulator spring are properly seated.

(8) Hold valve body in position and install one or two attaching bolts to hold valve body in place.

(9) Install remaining valve body bolts. Tighten all bolts evenly in a diagonal pattern to 12 N·m (105 in-lbs) torque.

(10) Install new oil filter and tighten filter screws to 4 N·m (35 in. lbs.) torque.

(11) Connect converter solenoid wire to case connector.

(12) Install manual and throttle levers on throttle lever shaft. Tighten lever clamp screws and check for free operation. Shaft and levers must operate freely without any bind.

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

(14) Install seal on neutral switch, install switch in case, and connect switch wires.

(15) Lower vehicle.

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

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

GOVERNOR AND PARK GEAR SERVICE

GOVERNOR REMOVAL

(1) Raise vehicle.

(2) Mark both propeller shaft yokes for assembly reference and disconnect propeller shafts at transfer case.

(3) Disconnect speedometer cable.

(4) Position support stand under transmission converter housing.

(5) Remove rear crossmember.

(6) Disconnect parking brake cable at equalizer and disconnect exhaust pipe support brackets, if necessary.

(7) Support transfer case with jack.

(8) Remove bolts attaching transfer case to transmission adapter housing and remove transfer case.

(9) Remove bolts attaching adapter, or extension housing to transmission and remove housing.

(10) Rotate transmission output shaft until governor valve shaft E-clip faces downward (Fig. 12).

(11) Remove E-clip from one end of governor valve shaft (Fig. 12).

(12) Remove governor valve and shaft from governor body.

(13) Remove snap ring that retains governor body-park gear assembly on output shaft (Fig. 12).

(14) Remove governor body-park gear assembly from output shaft.

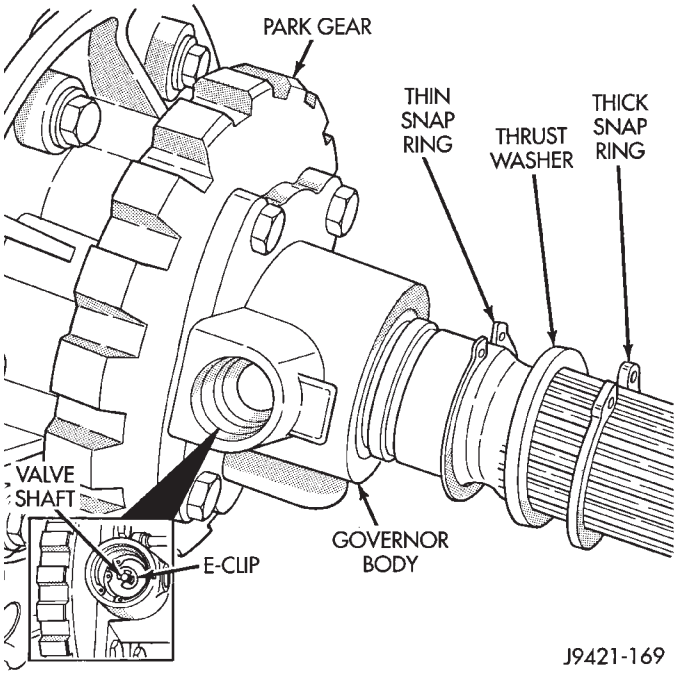


Fig. 12 Governor E-clips And Attaching Bolts

GOVERNOR DISASSEMBLY

(1) Remove governor weights and spring from body (Fig. 13).

(2) Remove snap ring and separate inner weight and outer weight and spring (Fig 13).

(3) Remove bolts attaching governor to park gear (Fig. 13).

(4) Remove park gear from governor body.

(5) Remove filter screen from park gear or governor body (Fig. 13).

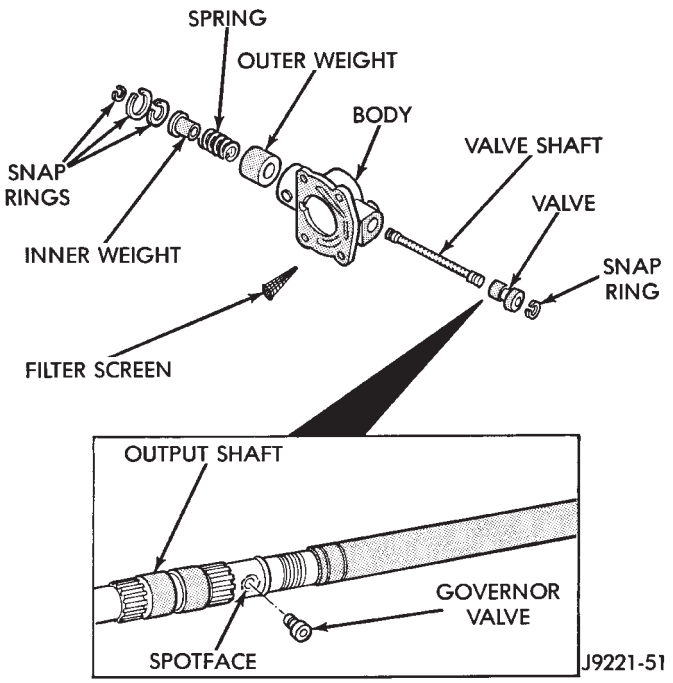


Fig. 13 Governor Components

CLEANING AND INSPECTION

Thoroughly clean all the governor parts in a suitable cleaning solution but do not use any type of caustic cleaning agents.

The weights and valves should fall freely in their bores when clean and dry. Minor surface scratches and burrs can be removed with crocus cloth.

Inspect the governor weight spring for distortion. Replace the spring, if damaged. Clean the filter in solvent and dry it with compressed air. Replace the filter, if damaged. Inspect the park gear for chipped or worn gear teeth or damaged ring grooves. Replace the gear, if damaged.

GOVERNOR ASSEMBLY

The governor valve used in 30RH/31RH/32RH transmissions built since the 1992 model year, is made of aluminum. In addition, the output shaft has been spotfaced to accept the new aluminum valve. The aluminum valve must not be used in previous transmissions. The valve can only be used with an output shaft that has been spotfaced for valve end clearance. In addition, the governor body and output shaft must be properly indexed during reassembly. Be sure to index these components as described in the Transmission Assembly and Adjustment procedures.

(1) Install filter screen in park gear.

(2) Assemble governor body and park gear. Be sure oil passages in body and gear are aligned.

(3) Install governor-to-park gear bolts finger tight only at this time.

(4) Install governor weight snap ring in governor body. Then install governor weight and spring assembly in governor body.

GOVERNOR INSTALLATION

(1) Align and install park gear/governor assembly on output shaft.

(2) Align valve shaft bore in governor body with bore in output shaft. **Be sure hole in output shaft for governor valve shaft is aligned with governor valve bore in governor body. Valve shaft will bind if misalignment occurs. Remove and reposition governor body if necessary.**

(3) Install governor valve and shaft. Be sure shaft slides freely in bore before installing E-clip on shaft.

(4) Install governor valve on shaft and in governor body. Then install remaining shaft retaining snap ring.

(5) Install components that retain governor body and park gear on output shaft as follows:

(a) On models with single snap ring, install snap ring (Fig. 12). Be sure ring is seated in shaft.

(b) On models with thrust washer and two snap rings, install thin snap ring first. Then install thrust washer second and thick snap ring last (Fig. 12).

16(c) Verify correct position of snap rings. **Be sure flat side of each snap ring is toward governor body.**

(6) Tighten governor-to-park gear bolts to 11 N·m (95 in. lbs.).

(7) Install adapter and gasket on transmission. Tighten adapter bolts to 32 N·m (24 ft. lbs.).

(8) Install transfer case and rear crossmember.

(9) Connect speedometer cable, or vehicle speed sensor wires exhaust pipe brackets and brake cable, if removed.

(10) Align and connect propeller shafts. Tighten clamp bolts to 19 N·m (14 ft. lbs.) torque.

(11) Remove supports and lower vehicle.

(12) Check and adjust transmission fluid level.

PARK LOCK COMPONENT REPLACEMENT

COMPONENT REMOVAL

(1) Raise vehicle and remove transfer case and adapter housing from transmission.

(2) Slide sprag shaft out of adapter housing and remove park sprag and spring (Fig. 14).

(3) Remove snap ring and slide plug and pin assembly out of housing (Fig. 14).

(4) If park rod must be serviced, remove valve body and remove rod.

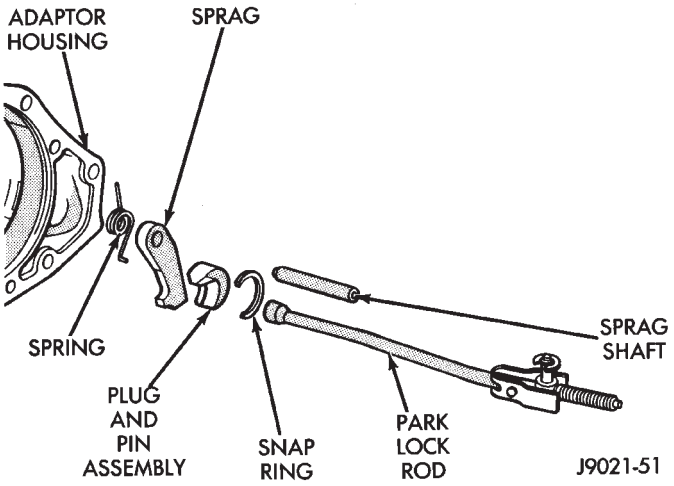


Fig. 14 Park Lock Components

Inspection

Check the sprag shaft for scores and for free movement in the housing and sprag.

Check the sprag and control rod springs for loss of tension or distortion. Check the square lug on the sprag for broken edges. Check the lugs on the governor support (park gear) for broken edges.

Check the knob on the end of the control rod for nicks, burrs and free turning.

Replace any park lock components that are worn or damaged.

The park lock rods used in Chrysler 3-speed transmissions are different lengths. If the rod must be replaced, be sure to install the correct length and shape rod.

COMPONENT INSTALLATION

(1) Install park lock rod on valve body.

(2) Install reaction plug and pin assembly in the housing and install the snap ring.

(3) Position sprag and spring in housing and install sprag shaft. Be sure square lug on sprag is facing park gear and that spring is positioned so it moves sprag away from park gear.

(4) Install valve body.

(5) Install adapter housing and transfer case.

PARK/NEUTRAL POSITION SWITCH SERVICE

The starter feed circuit of the switch is through the switch center terminal (Fig. 15). It provides a ground for the starter solenoid circuit through the gearshift lever in park and neutral only.

The two outer terminals of the park/neutral position switch are for the backup lamp switch circuit.

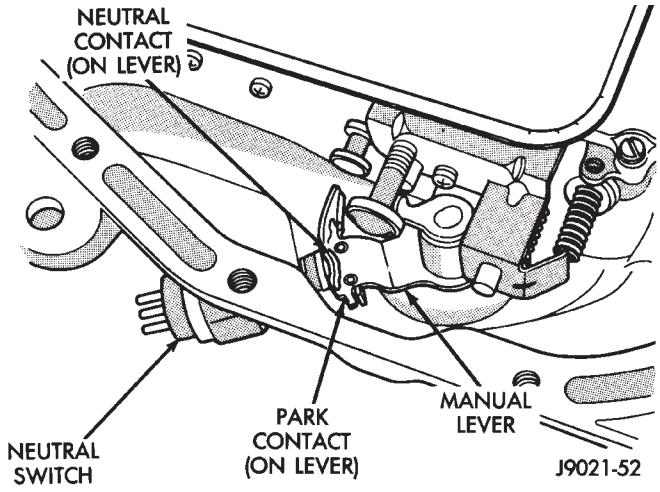


Fig. 15 Park/Neutral Position Switch And Manual Lever

SWITCH TEST PROCEDURE

(1) Remove wiring connector from switch.

(2) Test continuity between switch center terminal and transmission case. Continuity should exist only when transmission is in Park or Neutral. Replace switch if continuity occurs in any gear other than Park or Neutral.

(3) Shift into reverse and test continuity between two outside terminals on switch. Continuity should exist only when transmission is in reverse.

(4) Leave transmission in reverse and test continuity between each switch outer terminal and transmission case. Continuity should not exist between either pin and case in reverse.

(5) If switch tests OK, check gearshift linkage adjustment or backup light circuit. Replace switch if it fails continuity tests.

SWITCH REPLACEMENT

(1) Position drain pan under neutral switch.

(2) Disconnect switch wires.

(3) Remove switch from transmission.

(4) Move shift lever to Park and Neutral positions. Inspect manual lever fingers, lever and shaft for proper alignment with switch opening in case. Replace lever if worn or bent. Do not attempt to straighten the lever.

(5) Install new switch and seal in case. Tighten switch to 33 N·m (24 ft. lbs.) torque.

(6) Adjust transmission fluid level as required.

(7) Verify switch operation.

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. It is important for speedometer accuracy that the pinion have the correct number of teeth.

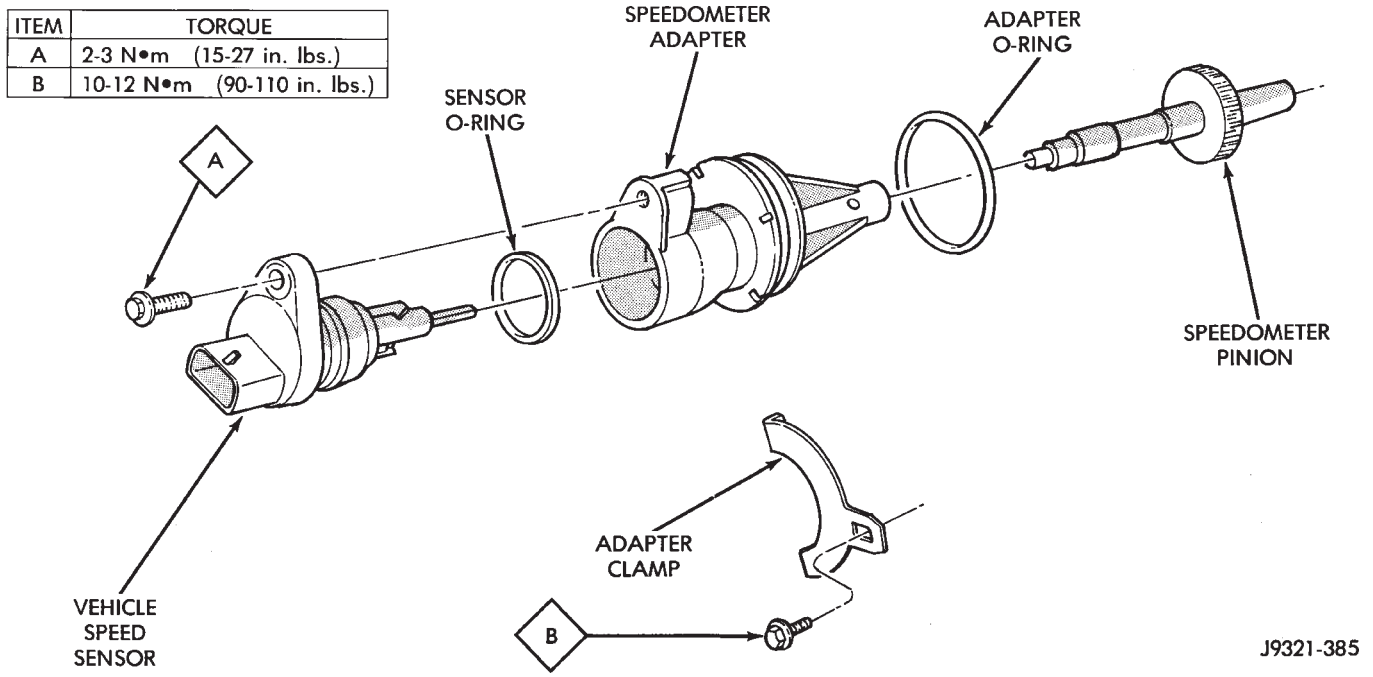


Fig. 16 Speedometer Components (With Unit Style Sensor)

The speedometer assembly used in XJ models is the new unit type (one-piece) speed sensor (Fig. 16). However, YJ models may be equipped with either the new unit style, or the older style that has a two-piece speed sensor and a metal adapter (Fig. 16). Service procedures for both styles are described in the following procedures.

SPEEDOMETER ASSEMBLY REMOVAL (WITH UNIT STYLE SENSOR)

(1) Raise vehicle.
(2) Disconnect wires from vehicle speed sensor.
(3) Remove adapter clamp and screw (Fig. 16).
(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. 16). Remove and discard O-rings if worn or damaged.
(8) Inspect terminal pins in vehicle 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 (UNIT STYLE)

(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. 17).
(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. 17). These numbers will correspond to number of teeth on pinion.

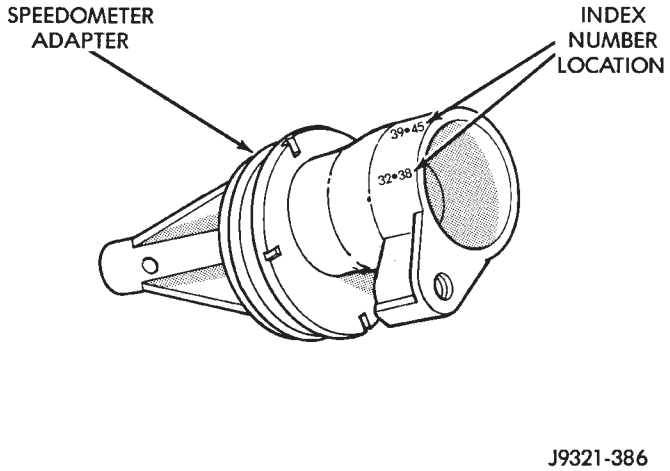


Fig. 17 Location Of Index Numbers On Speedometer Adapter (Unit Style Sensor)

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

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

(11) Connect wires to vehicle speed sensor.

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

SPEEDOMETER COMPONENT REMOVAL (TWO-PIECE SENSOR)

(1) Raise vehicle.

(2) Disconnect speed sensor wires.

(3) Remove bolt attaching vehicle speed sensor to sensor adapter. Then slide sensor out of adapter.

(4) Inspect speed sensor mounting area in sensor adapter. If transmission fluid is found in this area, oil seal in metal speedometer adapter is leaking and will have to be replaced.

(5) Remove speedometer adapter clamp bolt and remove clamp (Fig. 18).

(6) Remove speedometer adapter, sensor adapter and speedometer pinion as assembly.

SPEEDOMETER COMPONENT INSTALLATION AND INDEXING (TWO-PIECE SENSOR)

(1) Replace speedometer O-ring if cut, torn, or worn.

(2) If oil seal in metal speedometer adapter needs replacement, remove old seal with pointed tool. Then install new seal with Special Tool C-4004. Push seal into place with tool until tool bottoms (Fig. 19).

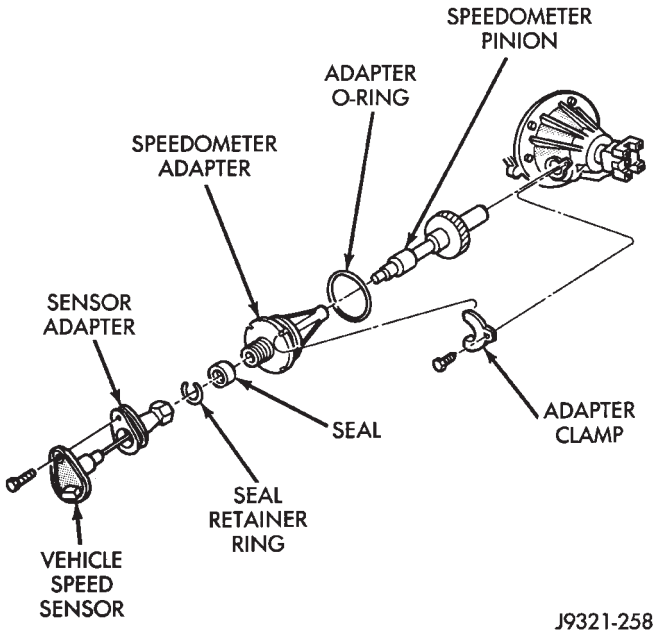


Fig. 18 Speedometer Components (With Two-Piece Sensor)

(3) Clean speedometer adapter mounting surface of transmission, or transfer case thoroughly.

(4) Lubricate adapter seals with transmission fluid.

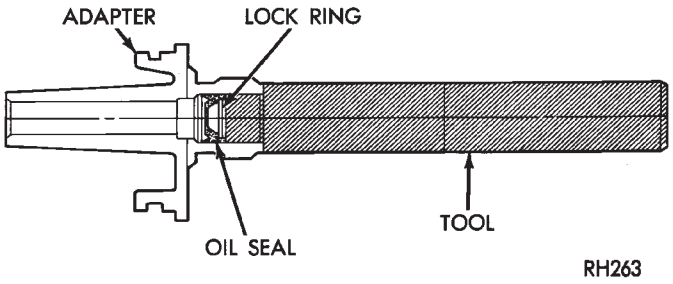


Fig. 19 Installing Speedometer Adapter Seal (With Two-Piece Sensor And Metal Adapter)

(5) Count number of teeth on speedometer pinion. Do this before installing pinion and adapter.

(6) Note range numbers on face of speedometer adapter (Fig. 20). These numbers correspond to number of teeth on speedometer pinion.

(7) Install pinion in adapter and install assembled pinion and adapter in transmission or transfer case.

(8) Rotate speedometer adapter until required range numbers are at 6 o'clock position (Fig. 20). **Verify that range numbers correspond to number of teeth on pinion.**

(9) Push speedometer adapter into place until seated.

(10) Install speedometer adapter clamp and bolt. Tighten bolt to 11 N·m (100 in. lbs.) torque.

(11) Install sensor adapter on speedometer adapter (Fig. 18). Tighten sensor adapter coupling nut to 17 N·m (150 in. lbs.) torque.

(12) Carefully align and insert vehicle speed sensor into sensor adapter.

(13) Install bolt that attaches speed sensor to adapter. Tighten bolt to 5-8 N·m (48-72 in. lbs.)

(14) Connect wires to speed sensor.

(15) Lower vehicle.

(16) Check top off transmission fluid level if necessary.

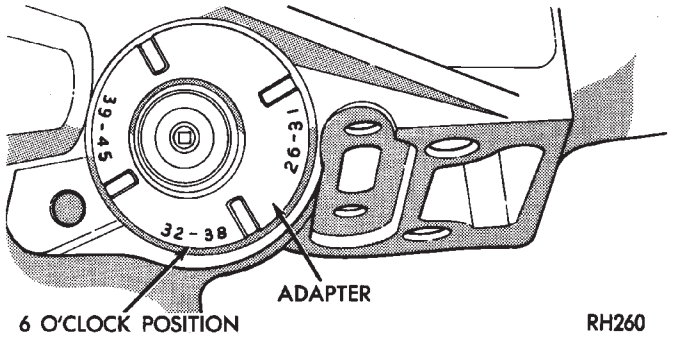


Fig. 20 Indexing Speedometer Adapter (With Two-Piece Sensor)

TRANSMISSION COOLER REVERSE FLUSHING

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

On models with an auxiliary cooler, the cooler is mounted in front of the radiator or air conditioning

condenser. The auxiliary cooler is a serviceable component and can be repaired if necessary.

The main and auxiliary coolers should be thoroughly reverse flushed if a transmission failure contaminates the fluid. Reverse flushing the cooler and lines will prevent sludge and particles from flowing back into the transmission after repair.

The same flushing procedure is used for main and auxiliary coolers. Pressure equipment is preferred for reverse flushing. However, reverse flushing can be performed using hand operated equipment as described in the following procedure.

REVERSE FLUSHING PROCEDURE

(1) Disconnect cooler lines at transmission. Refer to Figure 21 for cooler line fitting identification. Front fitting is outlet to cooler and rear fitting is inlet from cooler.

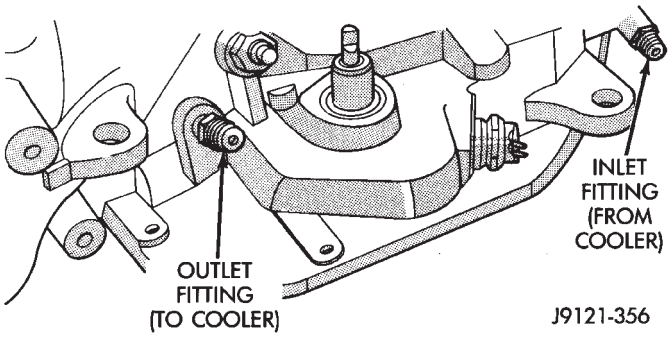


Fig. 21 Identifying Transmission Cooler Lines

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

(3) Reverse flush cooler using hand operated suction gun filled with mineral spirits. Insert gun nozzle (or hose) into cooler inlet (return) line. Then force mineral spirits through Line and cooler.

(4) Continue reverse flushing until fluid exiting inlet (pressure) line is clear and free of debris/residue. **Replace radiator if fluid cannot be pumped through cooler.**

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

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

TRANSMISSION COOLER FLOW TESTING

The transmission main and auxiliary coolers should be flow tested whenever a fluid overheat condition is suspected. An overheat condition is indicated when the fluid changes from the normal red, to a dark orange, or brown color.

The same method of flow testing is used for both coolers.

Cooler flow is checked by measuring the amount of fluid flow through the cooler in a 20 second time period. The test is performed with the engine running and transmission in neutral. Fluid is then pumped through the cooler by the transmission oil pump.

(1) Disconnect cooler inlet line at transmission fitting.

(2) Securely attach hose to end of inlet line and position line in a one quart test container.

(3) Add extra quart of fluid to transmission.

(4) Use stopwatch to check flow test time.

(5) Shift transmission into neutral and set parking brake.

(6) Start and run engine at curb idle speed and immediately note cooler flow. Approximately one quart of fluid should flow into test container in 20 second period.

(7) If cooler flow is intermittent, flows less than one quart in 20 seconds, or does not flow at all, cooler is faulty and must be replaced.

SERVICING TRANSMISSION COOLER LINES AND FITTINGS

Fitting Types

The transmission cooler lines are attached with quick disconnect fittings.

A flange on the cooler line serves as the sealing mechanism. The wire retainer clip (Fig. 22), secures the cooler line in the fitting by this flange. The clip fits behind the flange to hold the line in place.

Three different fitting styles may be used. Type 1 fittings have the retainer clip exposed (Fig. 22). Type 2 fittings have the retainer clip and fitting body encased in a shrink wrap material (Fig. 23). Type 3 fittings have the retainer clip encased in a metal sleeve crimped onto the fitting body (Fig. 24).

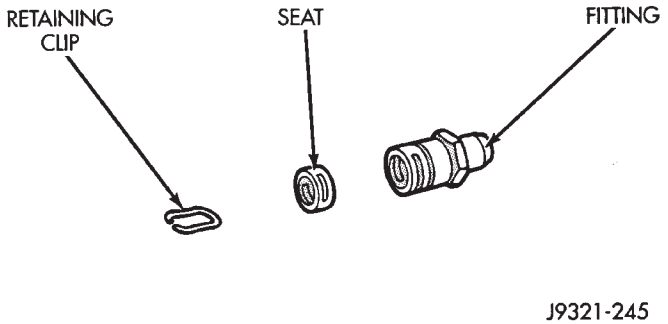


Fig. 22 Type 1 Quick Disconnect Fitting

Fitting Release Tool

A release tool is **required** to disconnect each of the fitting types. A plastic tool is clipped directly to one of the cooler lines on models with the type 2 and 3 fittings. This tool can also be used to disconnect type 1 fittings. The tool is needed to spread the wire retainer clip in each fitting. The clip must be opened in order to release the cooler line from the fitting.

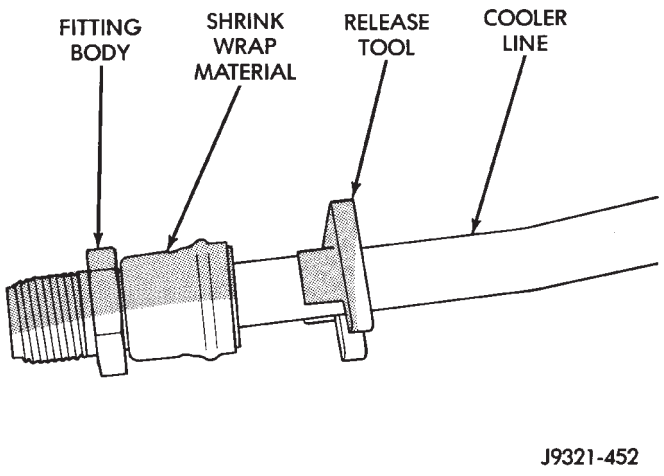


Fig. 23 Type 2 Quick Disconnect fitting

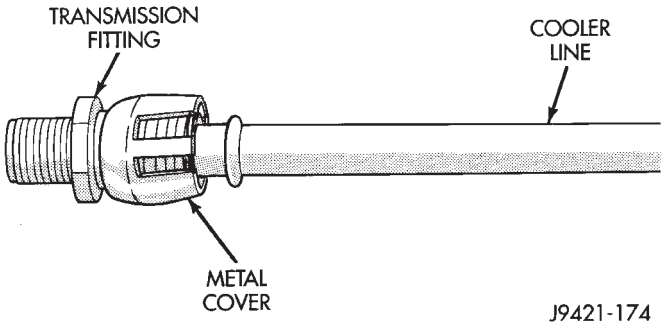


Fig. 24 Type 3 Quick Disconnect fitting

Fitting And Cooler Line Service

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

Fittings swedged into cooler line hoses (Fig. 25) are serviced only as part of the entire cooler line.

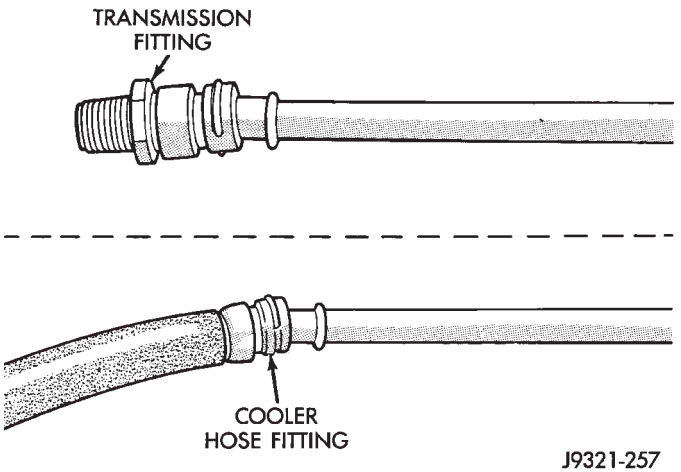


Fig. 25 Transmission And Cooler Line Fitting Placement

DISCONNECTING COOLER LINES WITH QUICK DISCONNECT FITTINGS

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

(2) Slide small plastic release tool into fitting until tool bottoms against flange on cooler line (Fig. 26).

(3) Push and turn tool to spread retainer clip and pull cooler line out of fitting (Fig. 26).

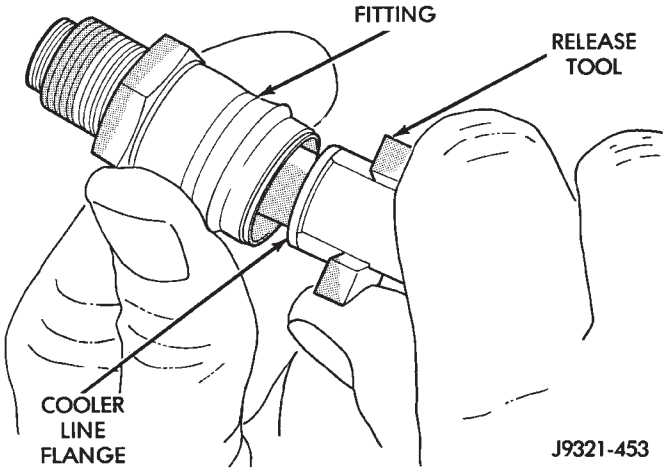


Fig. 26 Disconnecting Cooler Line With Release Tool (Type 2 Fitting Shown)

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

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

REATTACHING COOLER LINES WITH QUICK DISCONNECT FITTINGS

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

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

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

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

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

30RH/32RH TRANSMISSION REMOVAL AND INSTALLATION

INDEX

TRANSMISSION AND CONVERTER REMOVAL

(1) Remove fan shroud attaching bolts.

(2) Disconnect transmission fill tube at upper bracket.

(3) Raise vehicle.

(4) Remove inspection cover from converter housing and remove skid plate for access, if necessary.

(5) Remove transmission fill tube and fill tube O-ring.

(6) Remove starter motor.

(7) Mark propeller shafts and axle yokes for alignment reference.

(8) Disconnect propeller shafts at yokes. Secure shafts to frame rails with wire.

(9) Disconnect exhaust pipes at exhaust manifolds, if necessary.

(10) Drain transfer case lubricant.

(11) Disconnect vehicle speed sensor wires.

(12) Disconnect transfer case shift linkage.

(13) Disconnect gearshift linkage and throttle cable at transmission levers.

(14) Disconnect park/neutral position switch wires.

(15) Disconnect and remove crankshaft position sensor. Retain sensor bolt for reinstallation.

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

(16) Remove converter housing access cover and mark drive plate and converter for alignment reference.

(17) Remove bolts attaching converter to drive plate.

(18) Support engine with support stand.

(19) Support transmission-transfer case assembly with transmission jack. Secure transmission to jack with safety chain.

(20) Remove bolts/nuts attaching cushion and torque arm bracket to skid plate (Fig. 1).

(21) Remove skid plate, or rear crossmember, if equipped.

(22) Lower transmission slightly and disconnect cooler lines at transmission. **Refer to In-Vehicle Service section for procedures.**

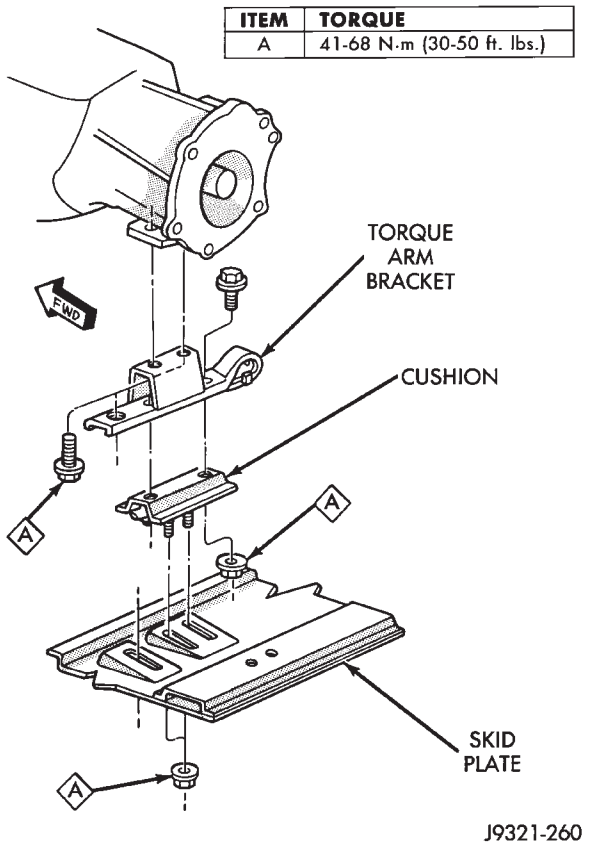


Fig. 1 Transmission Rear Mount

(23) Remove bolts attaching transmission to engine.

(24) Move transmission and converter rearward until clear of crankshaft.

(25) Hold converter in position and lower transmission until converter housing clears engine.

(26) Remove converter from transmission.

(27) Remove transfer case from transmission.

(28) If necessary, following components can now be serviced:

- torque converter
- torque converter drive plate
- oil pump seal
- engine rear core hole plugs
- engine rear oil galley plugs

CONVERTER—PUMP SEAL—DRIVE PLATE SERVICE

Drive Plate

The drive plate can be replaced or removed for service access after the transmission is out of the vehicle (Fig. 2).

CAUTION: On YJ models with a 2.5L engine and 30RH transmission, special bolts are used to attach the driveplate to the crankshaft. These bolts have a smaller hex head for torque converter clearance. DO NOT interchange these bolts with similar size bolts for any reason.

Torque Converter

The torque converter can be replaced or removed for service access after the transmission has been removed (Fig. 2).

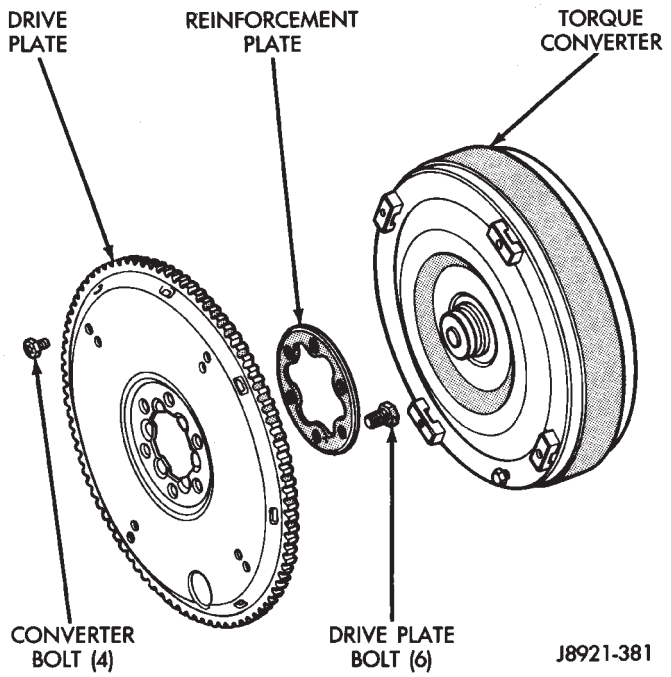


Fig. 2 Typical Converter And Drive Plate

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

A new torque converter and oil pump are used in 30RH/32RH transmissions built after the 1993 model year. The new converter has a different style drive hub. The hub was changed to accept the new design drive flats on the oil pump inner gear. The drive flats replace the square lugs used previously. If converter replacement should become necessary, be sure to use the new style converter. The new converter and oil pump are not interchangeable with previous style parts.

The oil pump seal is accessible and can be replaced after the transmission and torque converter are removed.

Use Remover Tool C-3981B to remove the seal (Fig. 3). To use the tool, first start the tool into the seal by hand. Next, thread the tool into the seal as far as it will go. Use a wrench on the tool hex to turn the tool. Continue tightening until all the tool threads firmly grip the metal part of the seal. Then tighten the tool puller screw to withdraw the seal from the pump body.

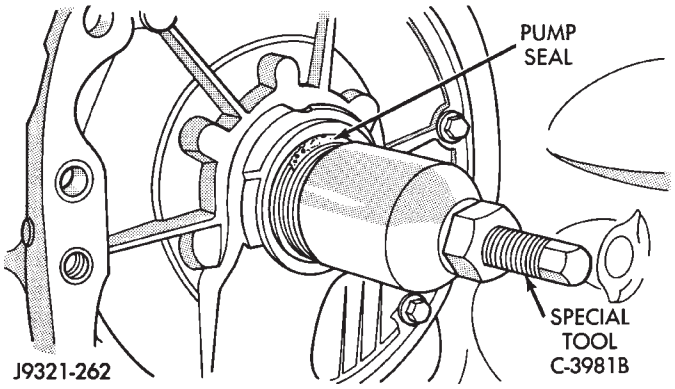


Fig. 3 Pump Seal Removal

Use Installer Tool C-4193 to install and seat the seal (Fig. 4).

Be sure to lubricate the pump seal and converter hub with transmission fluid before installation.

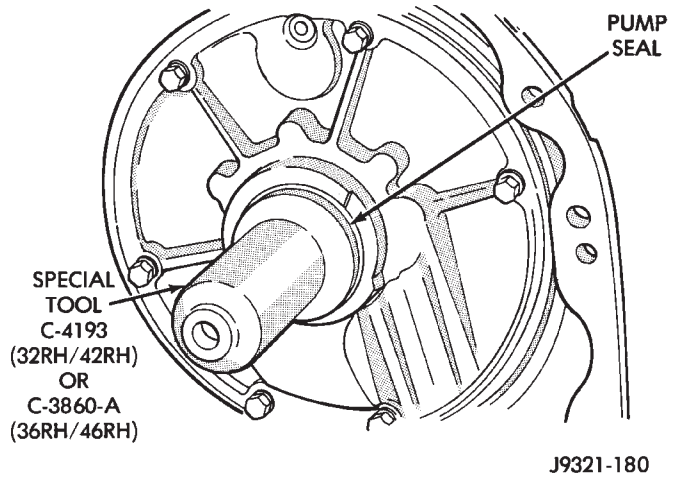


Fig. 4 Pump Seal Installation

TRANSMISSION AND CONVERTER INSTALLATION

CAUTION: The transmission oil cooler and lines must be reverse flushed if repair corrected a problem that generated sludge and/or debris. Sludge and metal or friction particles from a gear or clutch pack failure must be removed before reinstalling the transmission. This is necessary to avoid re-contaminating the repaired transmission. Failure to remove sludge or debris from the cooler and lines will result in a repeat failure and shop comeback.

(1) Lubricate converter drive hub and pump seal with Mopar ATF Plus, or Dexron II transmission fluid. Then install converter. Turn converter back and forth to align drive slots in converter hub with pump gear lugs. Be sure converter is fully seated in pump (Fig. 5).

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

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

(4) Raise transmission and align converter with drive plate.

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

(6) Install two converter housing lower attaching bolts and tighten bolts to draw housing toward engine.

(7) Install and tighten converter attaching bolts.

(8) Install and tighten bolts that attach transmission to engine (Fig. 6).

(9) Install crankshaft position sensor as follows:

CAUTION: Clearance between the sensor pickup face and driveplate ring gear must be correctly established before engine startup. A cardboard spacer, attached to the sensor face, is used for this purpose. Failure to establish correct clearance will result in sensor breakage.

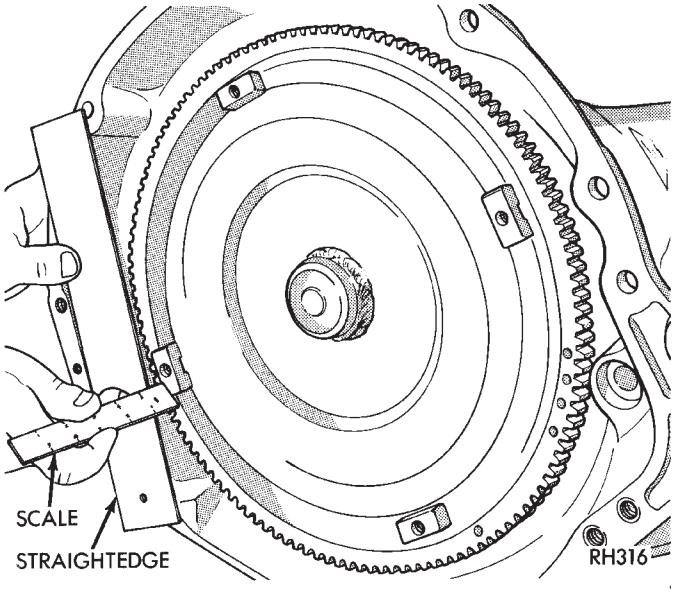


Fig. 5 Checking Torque Converter Seating

(a) Remove any remaining fragments of original cardboard spacer from sensor pickup face.

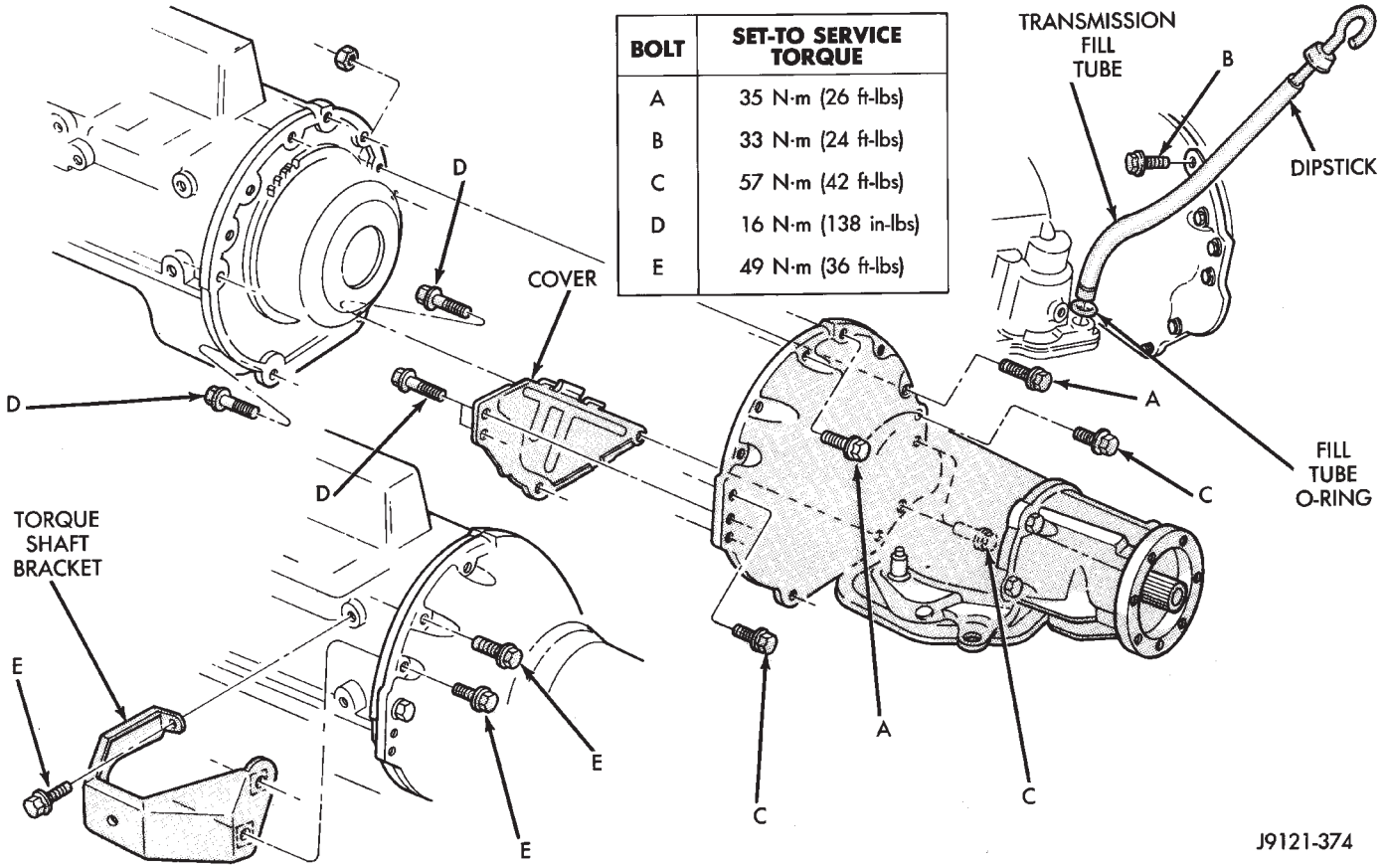


Fig. 6 Transmission Attachment

(b) Align and install new spacer on sensor pickup face. Spacer has adhesive backing so it will adhere to sensor face.

(c) Insert sensor into housing until it just touches ring gear teeth. Then install and tighten sensor attaching bolt. Correct clearance is established when spacer is peeled off by ring gear during engine startup.

(10) Install transmission fill tube and O-ring (Fig. 6).

(11) Connect transmission cooler lines to fittings. Refer to Figure 7 for cooler line identification.

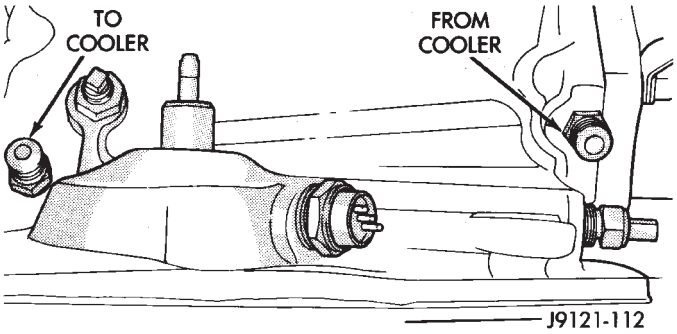


Fig. 7 Transmission Cooler Line Location And Identification

(12) Position support stand under transmission and remove transmission jack.

(13) Install transfer case on transmission adapter. Tighten attaching nuts to 41 N·m (30 ft. lbs.) torque.

(14) Install rear crossmember and attach transmission rear support to crossmember.

(15) Connect vehicle speed sensor wires.

(16) Install inspection cover on converter housing.

(17) Install exhaust pipes and support brackets, if removed.

(18) Install starter motor.

(19) Connect wires to park/neutral position switch.

(20) Connect gearshift and linkage and throttle cable.

(21) Connect transfer case shift linkage.

(22) Connect propeller shafts to transfer case yokes.

(23) Connect front exhaust pipes and catalytic converter support bracket bolts (if removed).

(24) Install skid plate, rear cushion and bracket, if removed.

(25) Fill transfer case to bottom edge of fill plug hole with Mopar Dexron II.

(26) Lower vehicle and fill transmission to correct level with ATF Plus, type 7176 fluid.

(27) Install fan shroud and bolts (if removed).

(28) Check and adjust gearshift linkage if necessary. Then check and adjust throttle cable if necessary.

30RH/32RH TRANSMISSION OVERHAUL

INDEX

TRANSMISSION DISASSEMBLY

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

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

(3) Mount transmission in repair stand C-3750-B (Fig. 1).

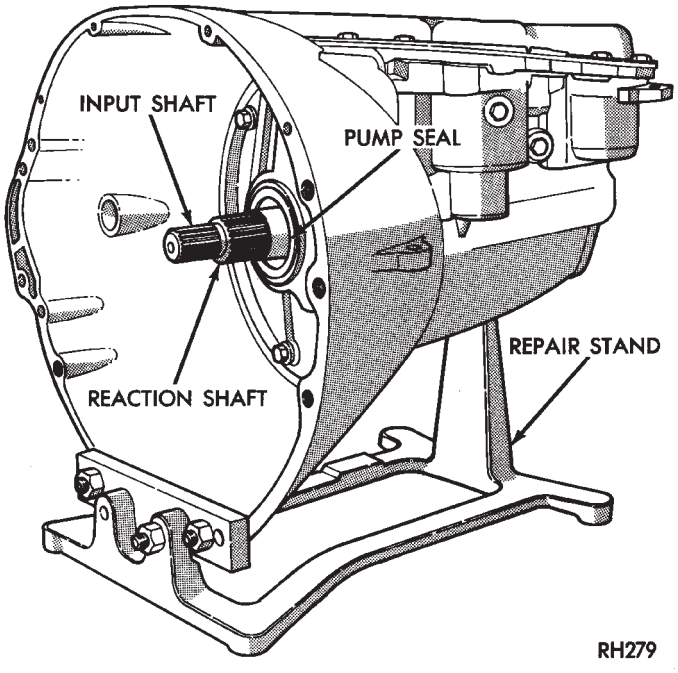


Fig. 1 Transmission Mounted On Typical Repair Stand

(4) Remove nuts attaching adapter, or extension housing to transmission case.

(5) Remove adapter/extension housing and gasket (Fig. 2).

(6) Remove rear bearing and snap ring, if equipped.

(7) Remove park/neutral position switch and seal (Fig. 3).

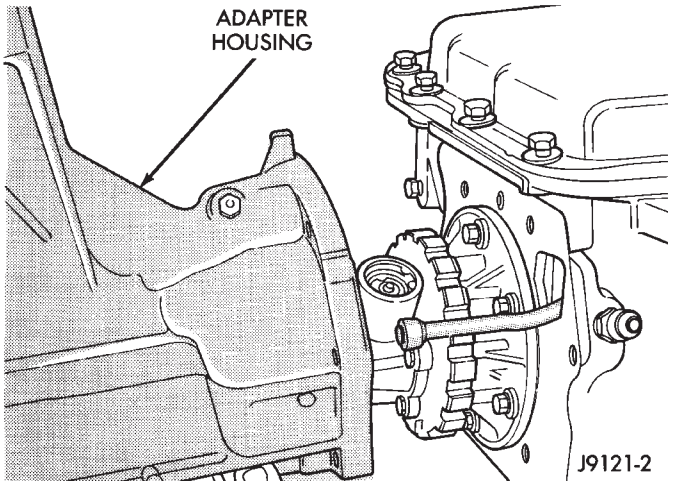


Fig. 2 Adapter Housing Removal/Installation (4 x 4 Models)

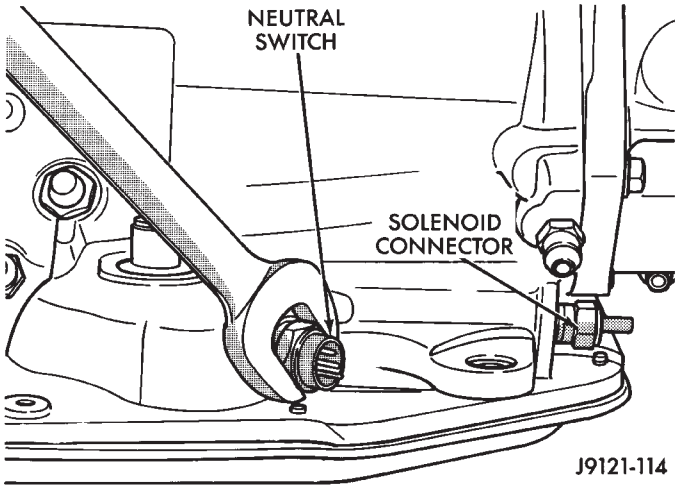


Fig. 3 Park/Neutral Position Switch Removal/ Installation

(8) Remove oil pan bolts and remove pan and gasket (Fig. 4).

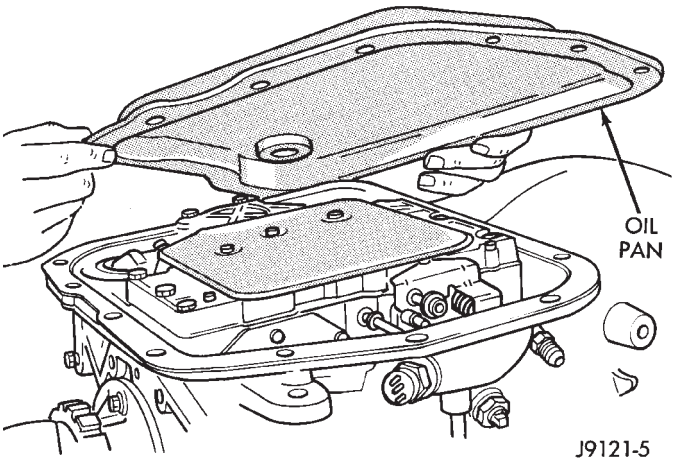


Fig. 4 Oil Pan Removal/Installation

(9) Remove hex head valve body attaching bolts (Fig. 5).

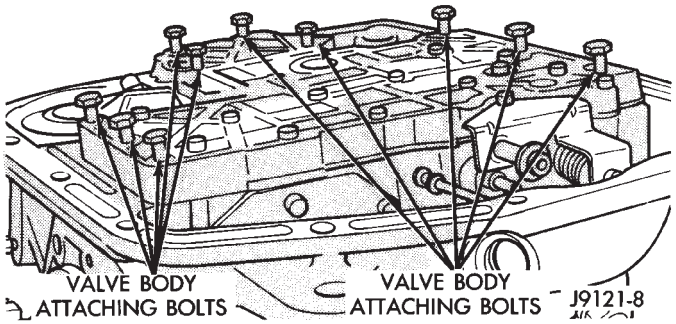


Fig. 5 Valve Body Attaching Bolt Locations (Typical)

(10) Disconnect solenoid wire from case connector (Fig. 6).

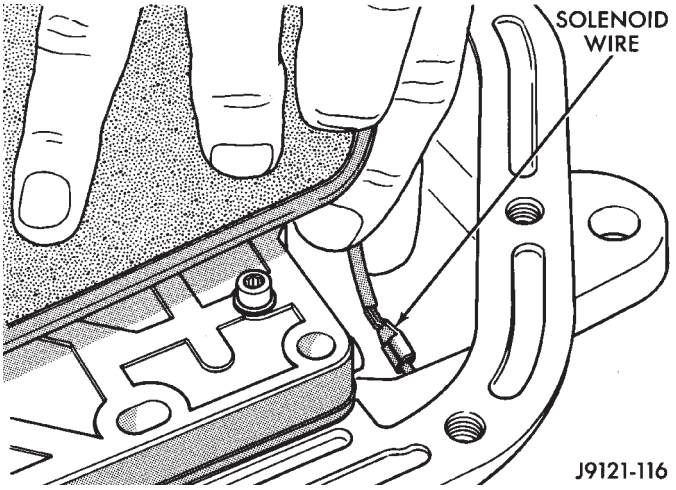


Fig. 6 Solenoid Wire Connection

(11) Lift valve body upward, guide park rod out of case opening and remove valve body (Fig. 7).

(12) Remove accumulator spring and piston (Fig. 8).

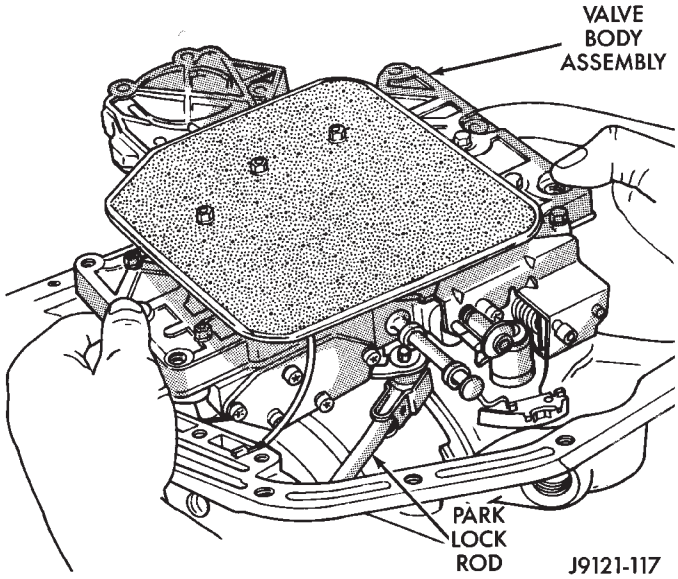


Fig. 7 Valve Body Removal/Installation

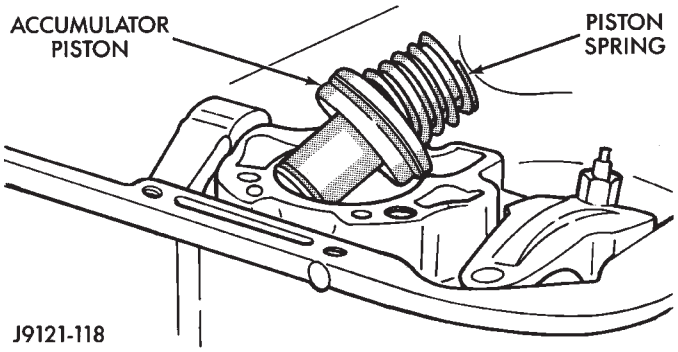


Fig. 8 Removing/Installing Accumulator Piston And Spring

(13) Remove front band pivot pin access plug (Fig. 9). Plug is accessible through converter housing. Use 1/4 inch drive extension to remove plug as shown.

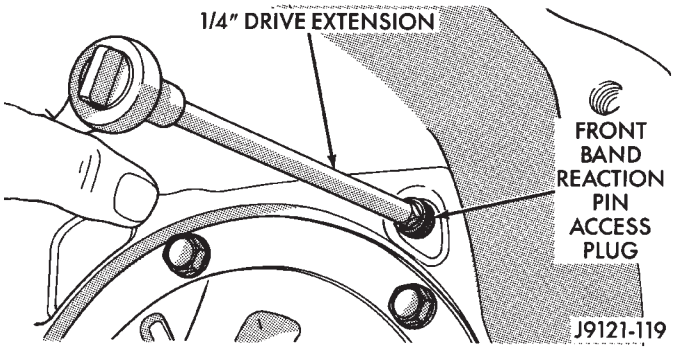


Fig. 9 Removing/Installing Front Band Pivot Pin Access Plug

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

(15) Remove oil pump bolts.

(16) Thread bolts of Slide Hammer Tools C-3752 into threaded holes in pump body flange (Fig. 10).

(17) Bump slide hammer weights outward to remove pump and reaction shaft support assembly from case (Fig. 10).

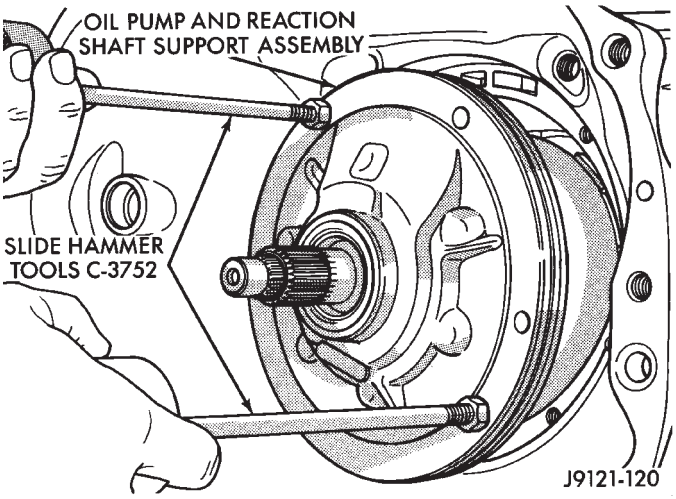


Fig. 10 Removing Oil Pump/Reaction Shaft Support

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

(19) Squeeze front band together and remove band strut (Fig. 11).

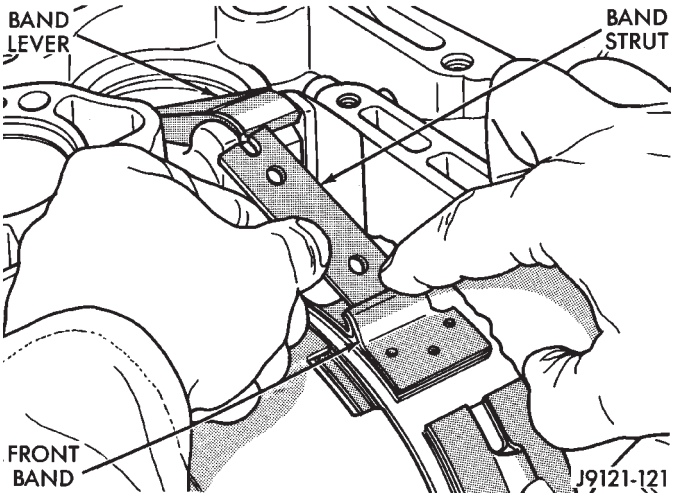


Fig. 11 Removing/Installing Front Band Strut

(20) Remove front band reaction pin with pencil magnet. Pin is accessible from converter housing side of case (Fig. 12).

(21) Remove front band lever (Fig. 13)

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

(23) Remove front and rear clutch units as assembly. Grasp input shaft, hold clutch units together and remove them from case (Fig. 14).

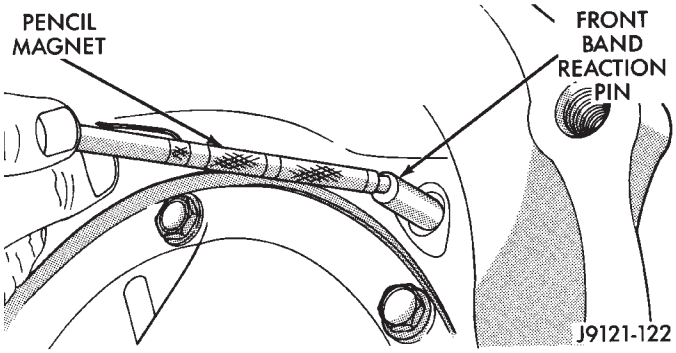


Fig. 12 Removing Front Band Reaction Pin

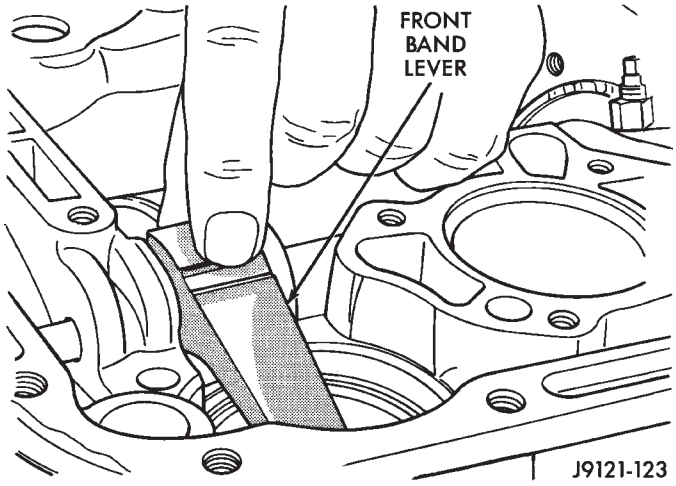


Fig. 13 Removing/Installing Front Band Lever

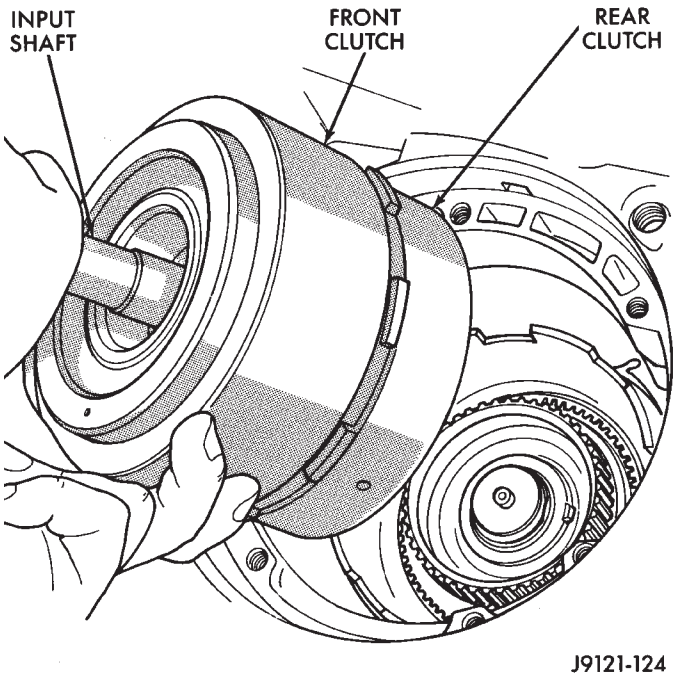


Fig. 14 Removing Front/Rear Clutch Assemblies

(24) Lift front clutch off rear clutch (Fig. 15). Set clutch units aside for disassembly, cleaning and overhaul.

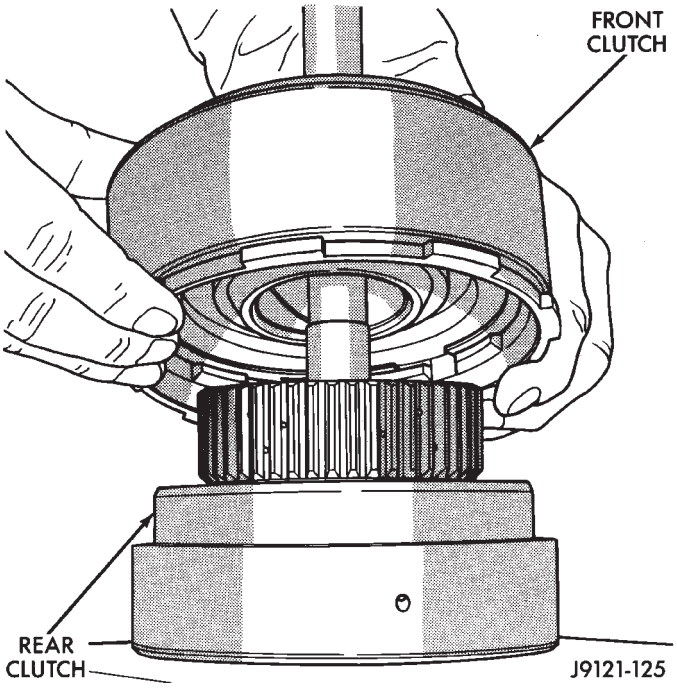


Fig. 15 Separating Front/Rear Clutch Assemblies

(25) Remove output shaft thrust washer from output shaft (or from rear clutch hub).

(26) Remove output shaft thrust plate from output shaft hub (Fig. 16).

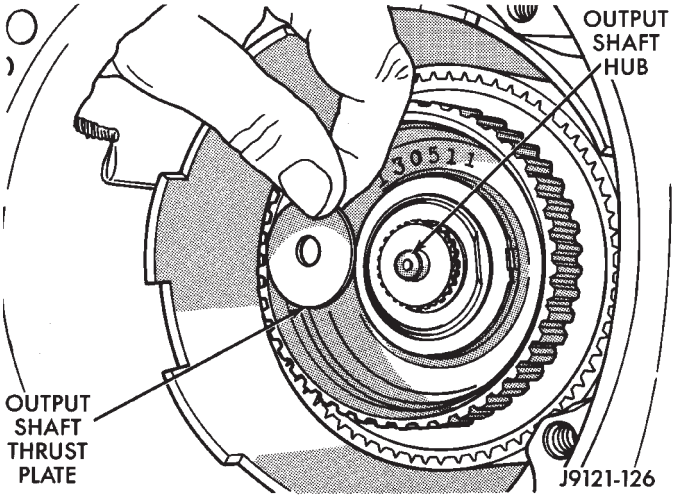


Fig. 16 Removing/Installing Output Shaft Thrust Plate

(27) Slide front band off driving shell (Fig. 17) and remove band from case.

(28) Remove E-clip from one end of governor valve shaft and remove valve and shaft from governor body (Fig. 19). Reinstall E-clip on shaft to avoid losing it.

(29) Remove thick snap, thrust washer and thin snap ring that retain governor body and park gear on shaft (Fig. 19).

(30) Loosen bolts attaching governor body to park gear.

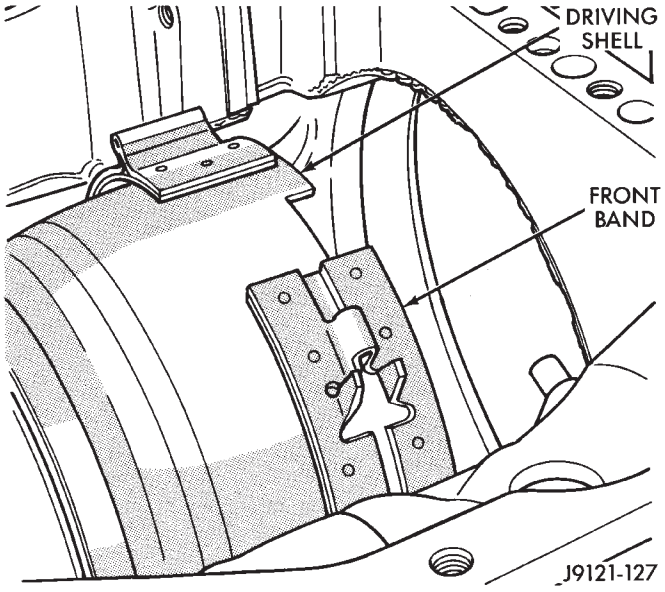


Fig. 17 Front Band Removal/Installation

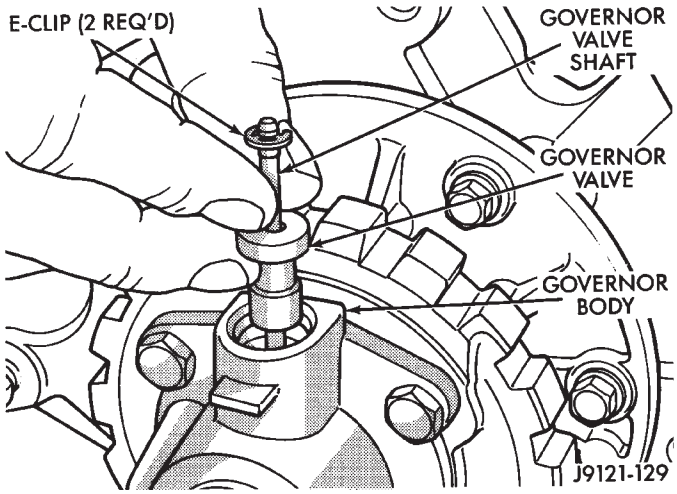


Fig. 18 Removing Governor Valve And Shaft

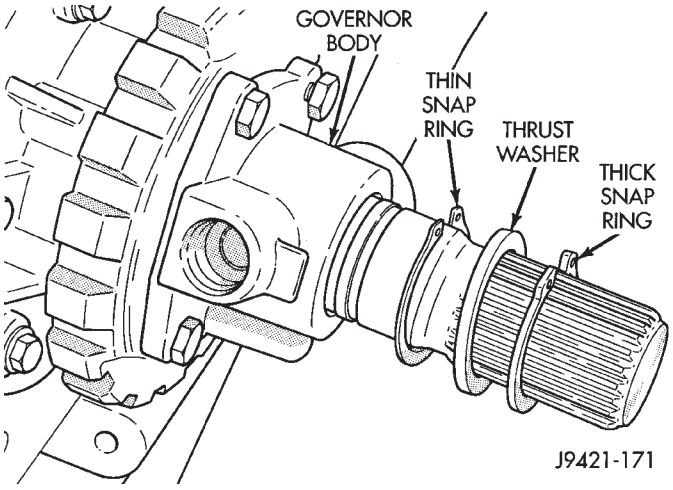


Fig. 19 Governor Body/Park Gear Attachment

(31) Mark position of governor body on park gear with center punch or scriber.

(32) Remove governor body and park gear as assembly (Fig. 20). Work park gear out of rear support and slide assembly off output shaft.

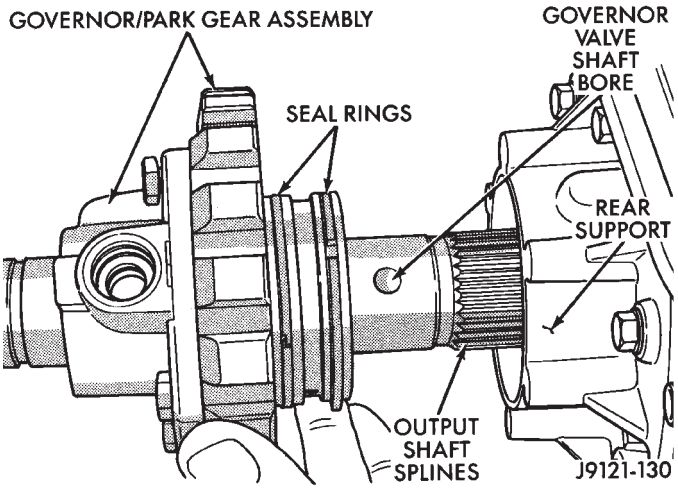


Fig. 20 Removing/Installing Governor Body And Park Gear

(33) Remove planetary geartrain as assembly (Fig. 21). Support geartrain with both hands during removal. Do not allow machined surfaces on output shaft to become nicked or scratched.

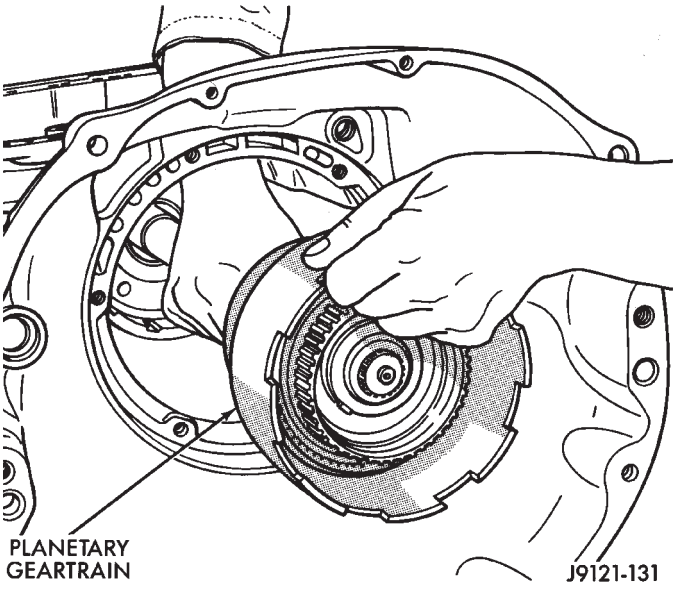


Fig. 21 Planetary Geartrain Removal

(34) Loosen rear band adjusting screw until band is fully released and does not grip low reverse drum.

(35) Remove snap ring that secures low-reverse drum to rear support (Fig. 22).

(36) Remove rear band lever pins as follows:

(a) On 30RH transmission, rear band has only one pivot pin. Remove pin with parallel jaw snap ring pliers (Fig. 23). Spread plier jaws in pin bore to grip pin. Then remove pin with a twist and pull motion.

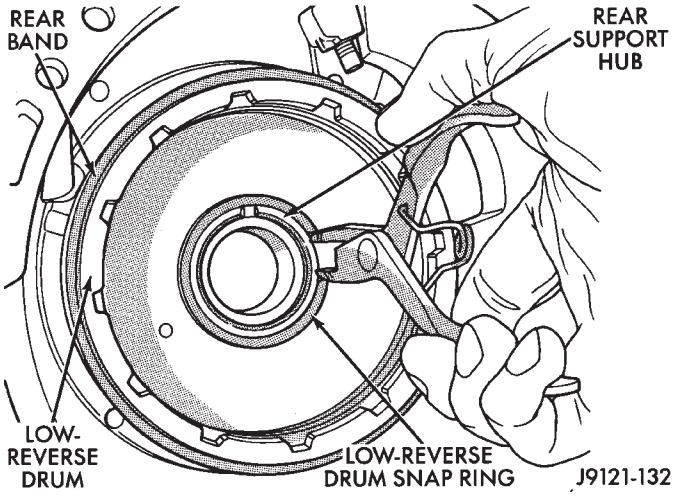


Fig. 22 Removing Low-Reverse Drum Snap Ring

(b) On 32RH transmission, rear band has two pins. Remove pivot pin and reaction pin with parallel jaw snap ring pliers (Fig. 24).

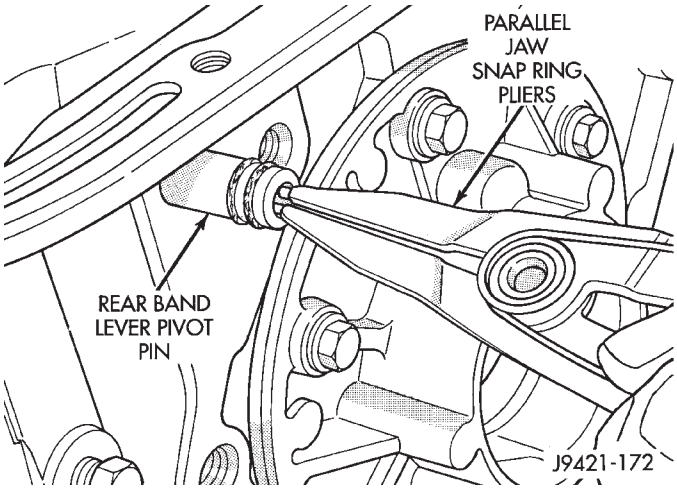


Fig. 23 Removing Rear Band Lever Pivot Pin (30RH)

(37) Remove rear band lever, link and strut.

(38) Mark position of rear support for assembly reference (Fig. 25). Use scriber or center punch to mark case and support.

(39) Remove rear support bolts and remove support from low-reverse drum and case (Fig. 26). Keep rear support bolts together for assembly reference.

(40) Remove bolts attaching overrunning clutch cam to case (Fig. 27).

(41) Remove low-reverse drum and overrunning clutch as assembly. Slide drum and clutch through rear band and out of case. Set drum and clutch assembly aside for cleaning and inspection.

(42) Remove rear band and link from case.

(43) Compress front servo rod guide about 3 mm (1/8 in.) with Valve Spring Compressor Tool C-3422-B (Fig. 28). A C-clamp and tool C-4470 can also be used to compress rod guide.

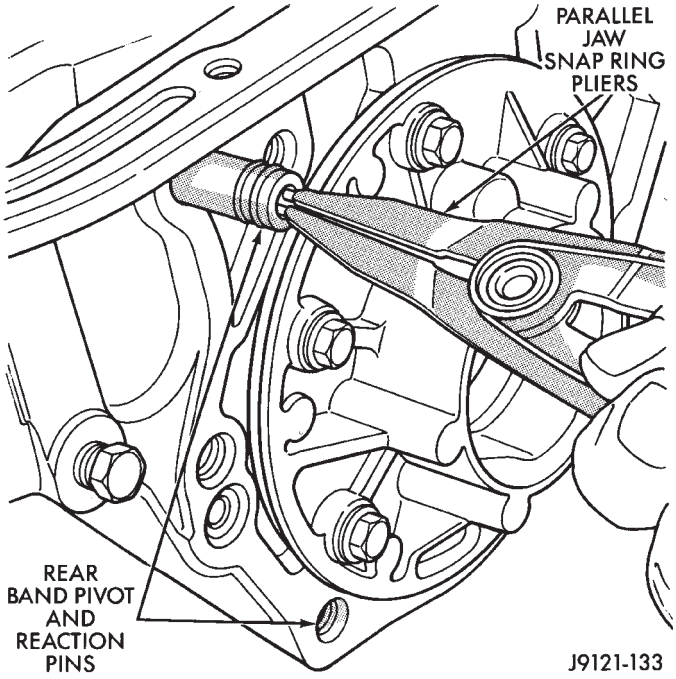


Fig. 24 Removing Rear Band Pivot And Reaction Pins (32RH)

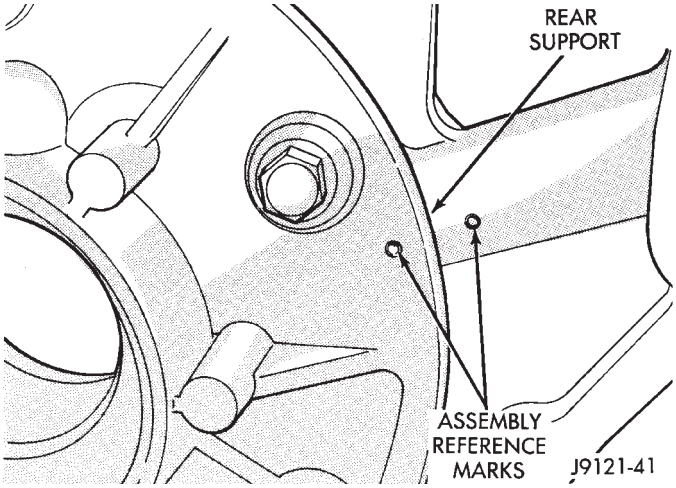


Fig. 25 Marking Rear Support For Assembly Reference

(44) Remove front servo rod guide snap ring (Fig. 28). **Exercise caution when removing snap ring. Servo bore can be scratched or nicked if care is not exercised.**

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

(46) Compress rear servo spring retainer about 1.5 mm (1/16 in.) with C-clamp and Tool C-4470 or SP-5560 (Fig. 29). Valve Spring Compressor C-3422-B can also be used to compress spring retainer.

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

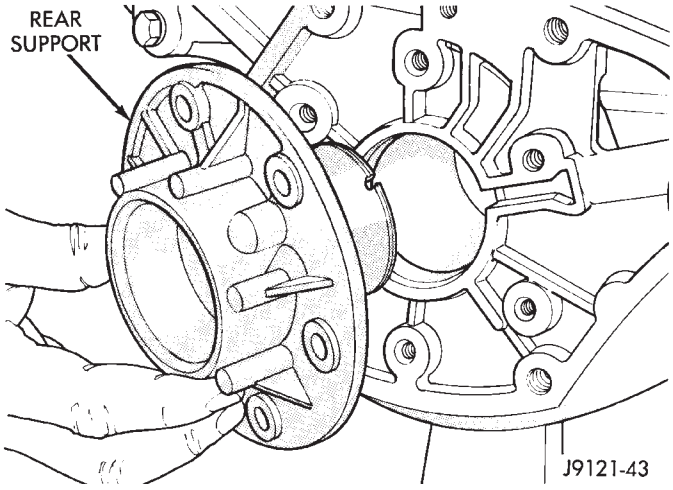


Fig. 26 Removing Rear Support

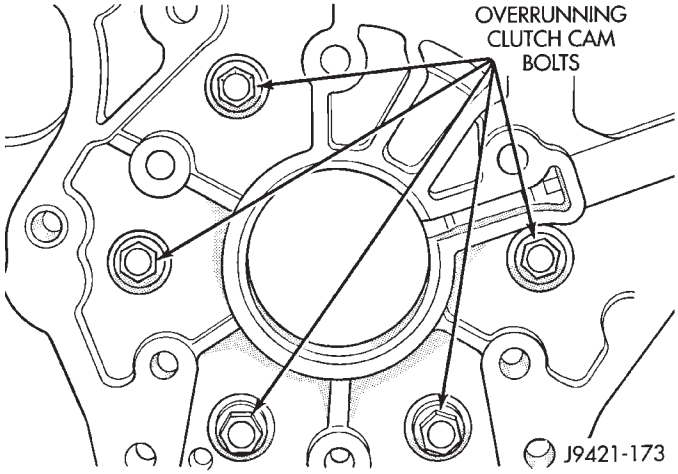


Fig. 27 Overrunning Clutch Cam Bolt Locations

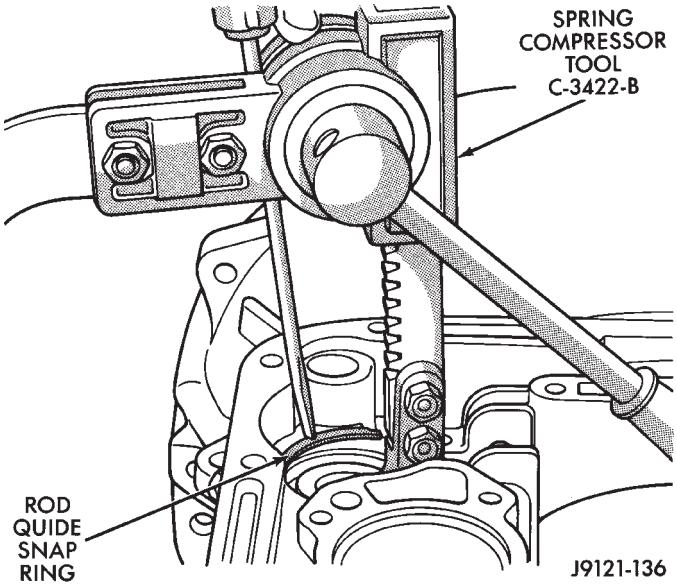


Fig. 28 Compressing Front Servo Rod Guide

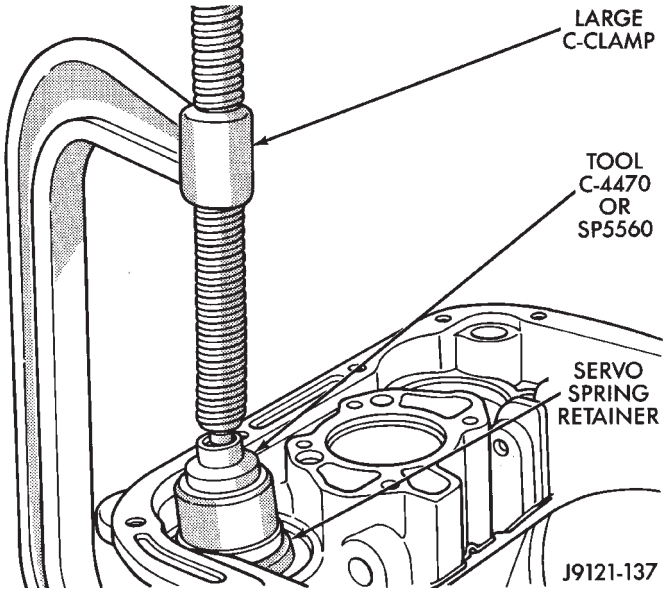


Fig. 29 Compressing Rear Servo Spring

OVERHAUL SERVICE INFORMATION

Inspect the transmission bushings during overhaul. Bushing condition is important as severely worn, or scored bushings contribute to low pressures, clutch slip and accelerated wear of other components. **However, do not replace bushings as a matter of course. Replace bushings only when they are actually worn, or scored.**

Use recommended tools to replace bushings. The tools are sized and designed to remove, install and seat bushings correctly. The bushing replacement tools are included in Bushing Tool Set C-3887-B. The tool set is manufactured by Miller Tool Co. and is available through the dealer tool program.

Pre-sized service bushings are available for replacement purposes. Only the sun gear bushings are not serviced. Low cost of the sun gear assembly makes it easier to simply replace the gear and bushings as an assembly.

Heli-Coil inserts are recommended for repairing damaged, stripped or worn threads in aluminum parts. These inserts are available from most automotive jobbers. Stainless steel inserts are preferred.

The use of crocus cloth is permissible where necessary. When used on valves, use care to avoid rounding off sharp edges. Sharp edges are vital as they prevent foreign matter from getting between the valve and valve bore.

Do not reuse oil seals, gaskets, seal rings, or O-rings during overhaul. Replace these parts as a matter of course. Also do not reuse snap rings or E-clips that are bent or distorted. Replace these parts as well.

Lubricate transmission parts with Mopar ATF Plus, Type 7176 transmission fluid during overhaul and assembly.

Use petroleum jelly to hold parts like thrust washers in place during assembly. Use Ru-Glyde, Door Eze, or similar products to lubricate piston seals and O-rings to ease installation. Petroleum jelly can also be used to prelubricate parts during reassembly if desired.

TRANSMISSION CASE CLEANING AND INSPECTION

Clean the case in a solvent tank. Flush the case bores and fluid passages thoroughly with solvent. Dry the case and all fluid passages with compressed air. Be sure all solvent is removed from the case and that all fluid passages are clear.

Do not use shop towels or rags to dry the case (or any other transmission component) unless they are made from lint-free materials. Lint will readily adhere to case surfaces and transmission components and will circulate throughout the transmission after assembly. A sufficient quantity of lint can block fluid passages and interfere with valve body operation.

Inspect the case for cracks, porous spots, worn bores, or damaged threads. Damaged threads can be repaired with Helicoil thread inserts. However, the case will have to be replaced if it exhibits any type of damage or wear.

Lubricate the front band adjusting screw threads with petroleum jelly and thread the screw part-way into the case. Be sure the screw turns freely.

Remount the case in a repair stand after cleaning and inspection.

OVERRUNNING CLUTCH—LOW-REVERSE DRUM—REAR SUPPORT OVERHAUL

DISASSEMBLING OVERRUNNING CLUTCH/ LOW-REVERSE DRUM

If the clutch assembly came out with the low-reverse drum, thread two clutch cam bolts into the cam. Then lift the cam out of the drum with the bolts (Fig. 30). Rotate the cam back and forth to ease removal if necessary. Remove the clutch roller and spring assembly from the race afterward.

CLEANING AND INSPECTION

Clean the overrunning clutch assembly, clutch cam, low-reverse drum and rear support in solvent. Dry them with compressed air after cleaning.

Inspect condition of each clutch part after cleaning. Replace the overrunning clutch roller and spring assembly if any rollers or springs are worn or damaged, or if the roller cage is distorted, or damaged. Replace the cam if worn, cracked or damaged.

Replace the low-reverse drum if the clutch race, roller surface or inside diameter is scored, worn or damaged. **Do not remove the clutch race from the**

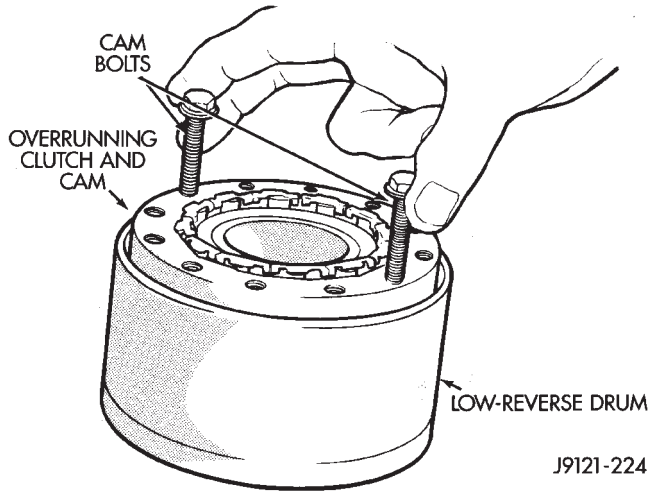


Fig. 30 Removing Overrunning Clutch From Low-Reverse Drum

low-reverse drum under any circumstances. Replace the drum and race as an assembly if either component is damaged.

Examine the rear support carefully for wear, cracks, scoring or other damage. Be sure the support hub is a snug fit in the case and drum. Replace the support if worn or damaged.

ASSEMBLING OVERRUNNING CLUTCH/LOW-REVERSE DRUM

(1) Assemble clutch rollers and springs in retainer if necessary (Fig. 31).

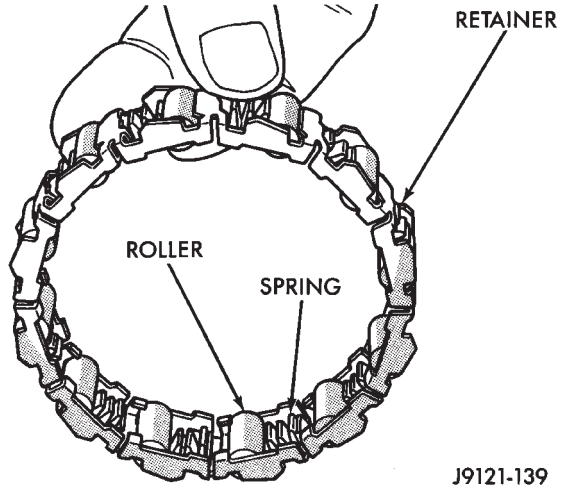


Fig. 31 Overrunning Clutch Rollers, Springs, Retainer

(2) Install overrunning clutch roller, spring and retainer assembly in clutch cam (Fig. 32).

(3) Temporarily assemble and check overrunning clutch operation as follows:

(a) Assemble cam and clutch.

(b) Install clutch assembly on low-reverse drum with twisting motion (Fig. 33).

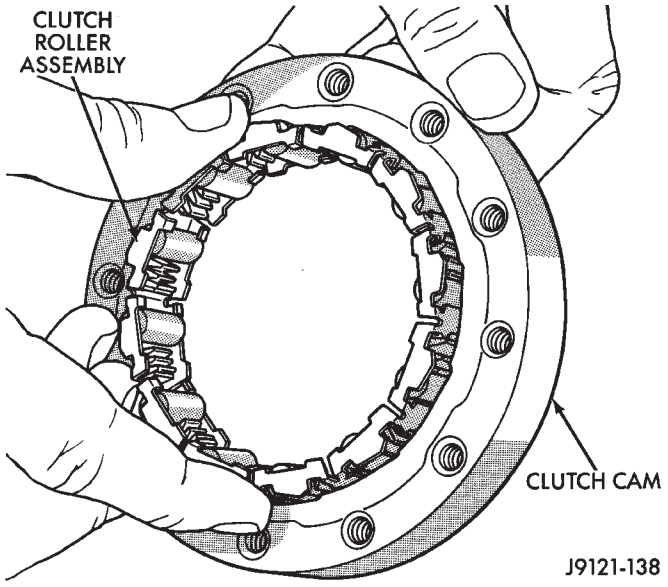


Fig. 32 Assembling Overrunning Clutch And Cam

(c) Install drum-clutch assembly in case and install clutch cam bolts.

(d) Install rear support and support attaching bolts.

(e) Check low-reverse drum rotation. **Drum should rotate freely in clockwise direction and lock when turned in counterclockwise direction (as viewed from front of case).**

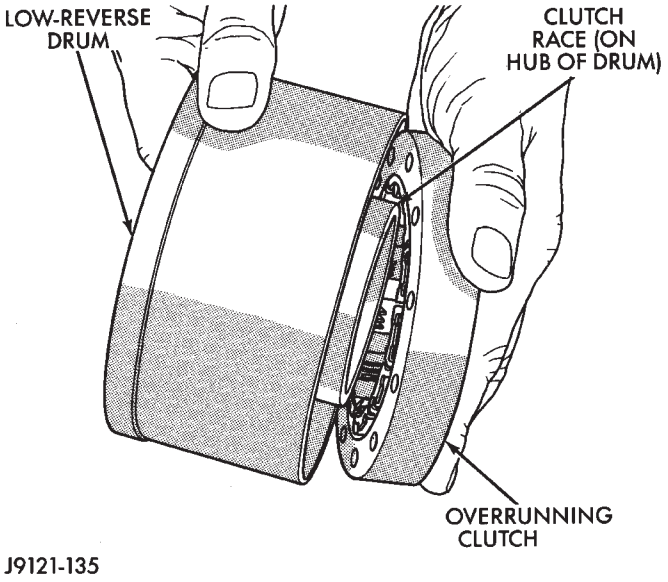


Fig. 33 Temporary Assembly Of Clutch And Drum To Check Operation

(4) Note component position for assembly reference. Bolt holes in clutch cam are countersunk on one side, Be sure this side of cam will face rearward when installed (Fig. 34).

(5) Remove rear support, overrunning clutch and low-reverse drum. Set components aside for final assembly. **If overrunning clutch will be installed**

before final assembly, install cam only as described in Transmission Assembly And Adjustment section. Clutch cam must be properly indexed in case to fit and operate properly.

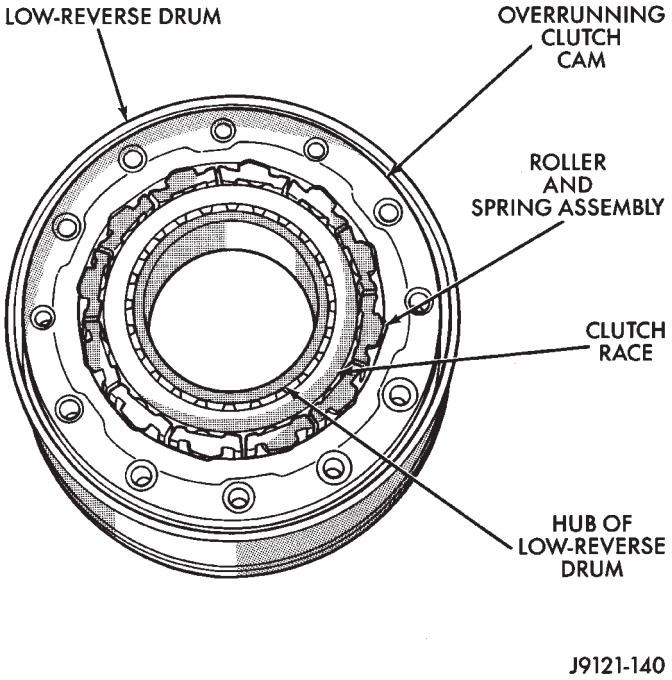


Fig. 34 Assembled Overrunning Clutch Components

ADAPTER HOUSING AND PARK LOCK COMPONENT OVERHAUL

Clean the housing and park lock components in solvent and dry them with compressed air.

Inspect the output shaft bearing in the housing (Fig. 35). Replace the bearing if worn, damaged, or noisy.

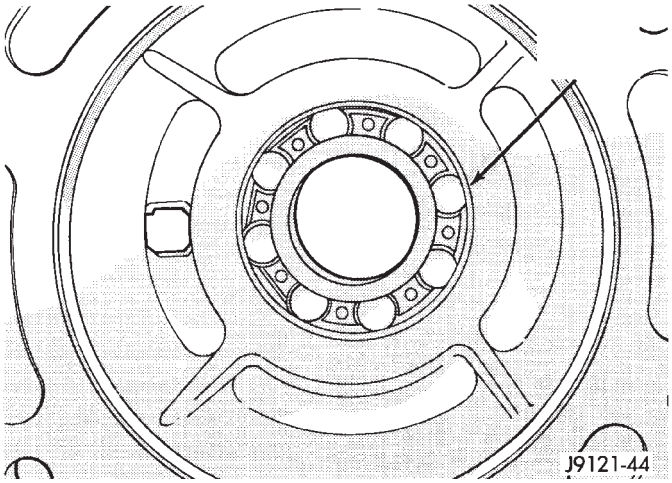


Fig. 35 Adapter Housing Bearing (4 x 4 Models)

Examine the park lock components in the housing. If replacement is necessary, remove the shaft with parallel jaw snap ring pliers (Fig. 36) and remove the sprag and spring. Then remove the spring clip and reaction plug (Fig. 37).

Compress the reaction plug spring clip only enough to remove or install it. The clip is easily distorted if overcompressed. Replace the clip if it becomes bent or distorted. Do not straighten and reuse the clip if this occurs.

Be sure a replacement sprag is installed so the sprag locking lug will face the park gear. Also be sure the spring is correctly positioned as shown (Fig. 38). **The sprag may not retract if the spring is improperly installed.**

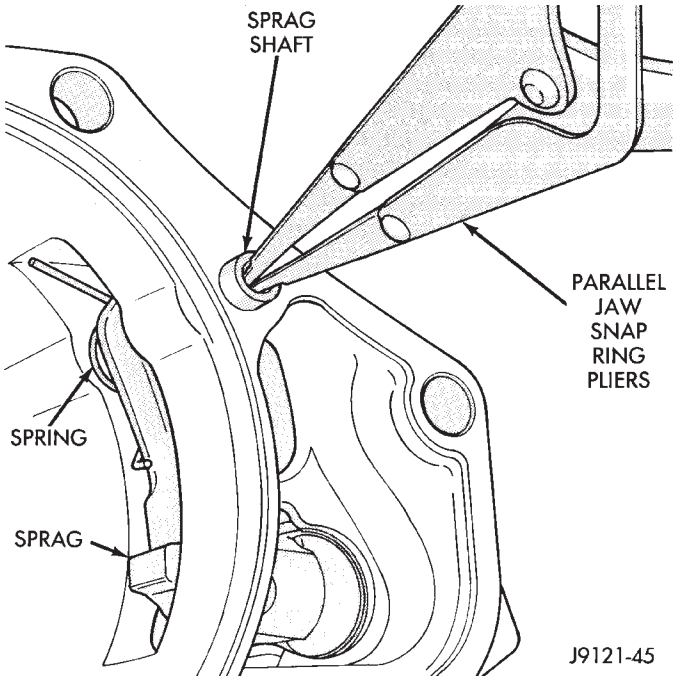


Fig. 36 Park Sprag, Shaft And Spring Removal

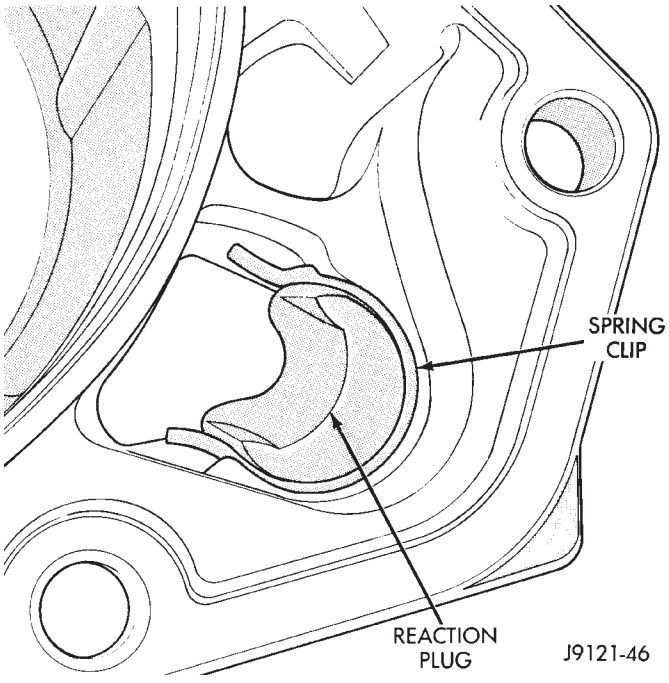


Fig. 37 Park Sprag Reaction Plug And Spring Location

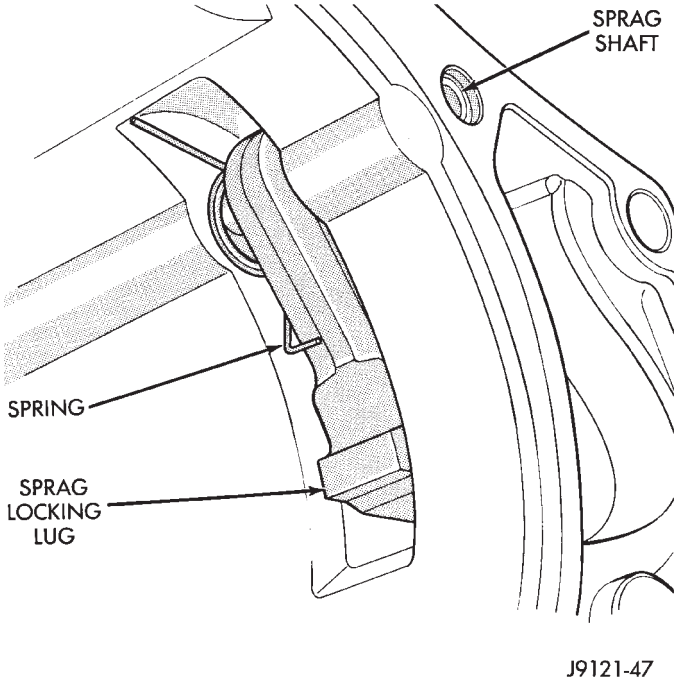


Fig. 38 Correct Position Of Sprag And Spring

GOVERNOR AND PARK GEAR OVERHAUL

GOVERNOR/PARK GEAR DISASSEMBLY

(1) Loosen bolts attaching governor to park gear.

(2) Remove governor snap ring and locating snap ring from output shaft (Fig. 39).

(3) Remove E-clip securing governor valve shaft and remove shaft and valve from governor body.

(4) Slide governor and park gear off output shaft.

(5) Remove governor retaining bolts and separate governor from park gear.

(6) Remove governor filter from park gear. Keep filter with governor body.

(7) Remove governor weight snap ring and remove weight assembly from governor body. Remove inner snap ring and separate governor weights.

GOVERNOR/PARK GEAR CLEANING AND INSPECTION

Clean the governor and park gear components in solvent and dry with compressed air.

Examine the governor components carefully (Fig. 39). Discard any snap rings or E-clips if distorted, or worn. Be sure the governor weights operate freely in the bores and do not bind. Also verify that the governor valve slides freely on the shaft and in the bore.

Minor scratches, or burrs on governor components can be cleaned up with oil-soaked crocus cloth. However, do not attempt to salvage components that are severely worn or scored.

The governor valve used in 30RH/32RH transmissions built starting with the 1992 model year, is now made of aluminum. In addition, the output shaft has been spotfaced to accept the new aluminum valve (Fig. 39). The aluminum valve must not be used in prior transmissions. The valve can only be used with an output shaft that has been spotfaced for valve end clearance. In addition, the governor body and output shaft must be properly indexed during reassembly. Be sure to index these components as described in the Transmission Assembly and Adjustment procedures.

Check condition of the park gear seal rings, ring grooves and gear teeth (Fig. 40). Replace the gear as an assembly if the teeth or ring grooves are worn, or damaged.

Replace the park gear front and rear seal rings if cracked, or worn. The production style front ring is a plain type and the rear ring is a hook style. If replacement rings are both hook-style, be sure the ring ends are properly hooked together.

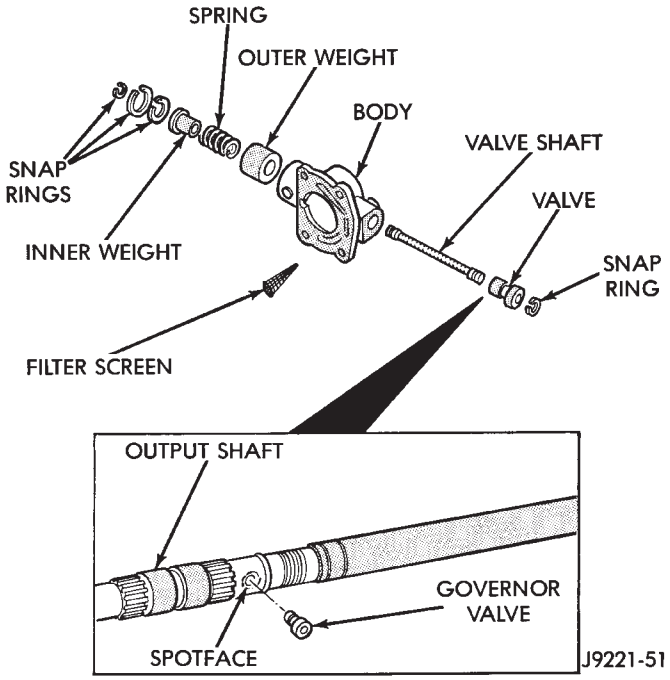


Fig. 39 Governor Components

ASSEMBLING GOVERNOR AND PARK GEAR

(1) Coat governor body bores and valves with transmission fluid.

(2) Assemble governor weights and springs. Then install weight assembly in governor body but do not install valve and shaft at this time. These parts are not installed until after governor and park gear are in place on output shaft.

(3) Install new seal rings on park gear if necessary.

(4) Insert filter screen in park gear and position governor body on park gear.

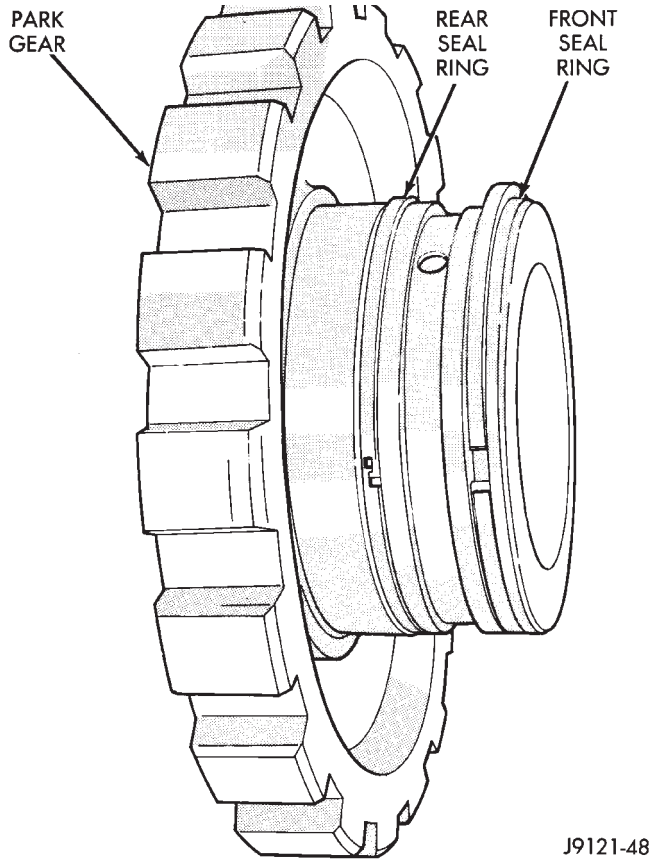


Fig. 40 Park Gear And Seal Rings

(5) Tighten governor body attaching bolts finger tight only. Bolts will not be final tightened until after governor and park gear are mounted on output shaft.

OIL PUMP OVERHAUL

PUMP AND REACTION SHAFT SUPPORT DISASSEMBLY

(1) Remove seal ring from housing and reaction shaft support (Fig. 41).

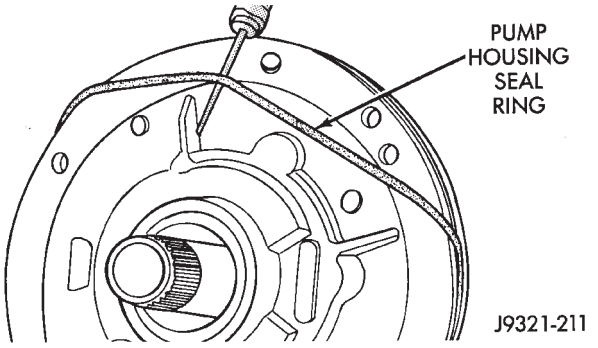


Fig. 41 Removing Pump Seal Ring

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

(3) Loosen bolts that attach pump body to support (Fig. 42).

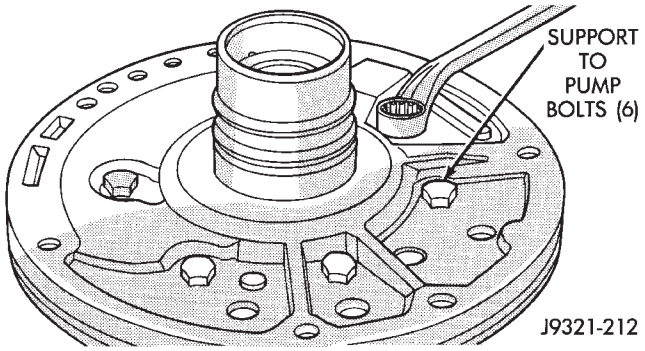


Fig. 42 Loosening Pump Support Bolts

(4) Remove pump-to-support bolts and separate support from pump housing (Fig. 43).

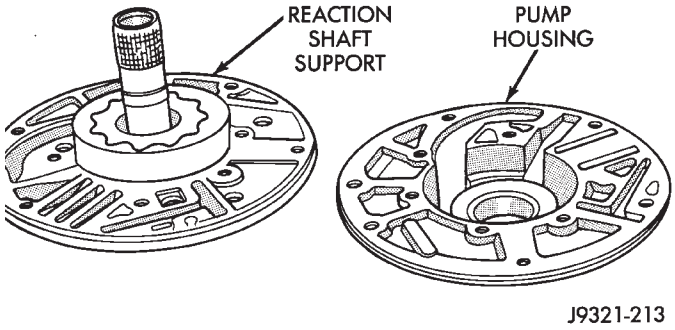


Fig. 43 Separating Pump Housing From Reaction Shaft Support

(5) Remove inner and outer gears from reaction shaft support (Fig. 44).

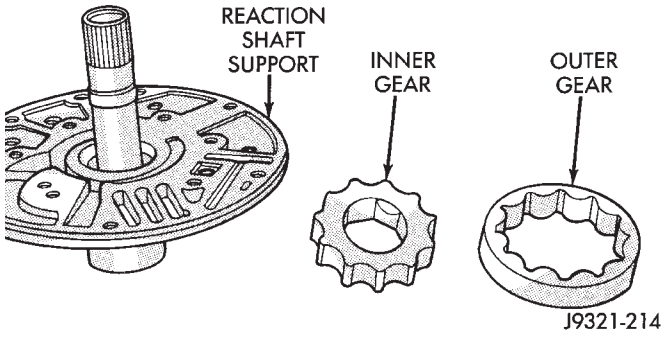


Fig. 44 Pump Gear Removal

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

(7) Remove front clutch thrust washer from support hub (Fig. 45).

OIL PUMP AND REACTION SHAFT SUPPORT CLEANING AND INSPECTION

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

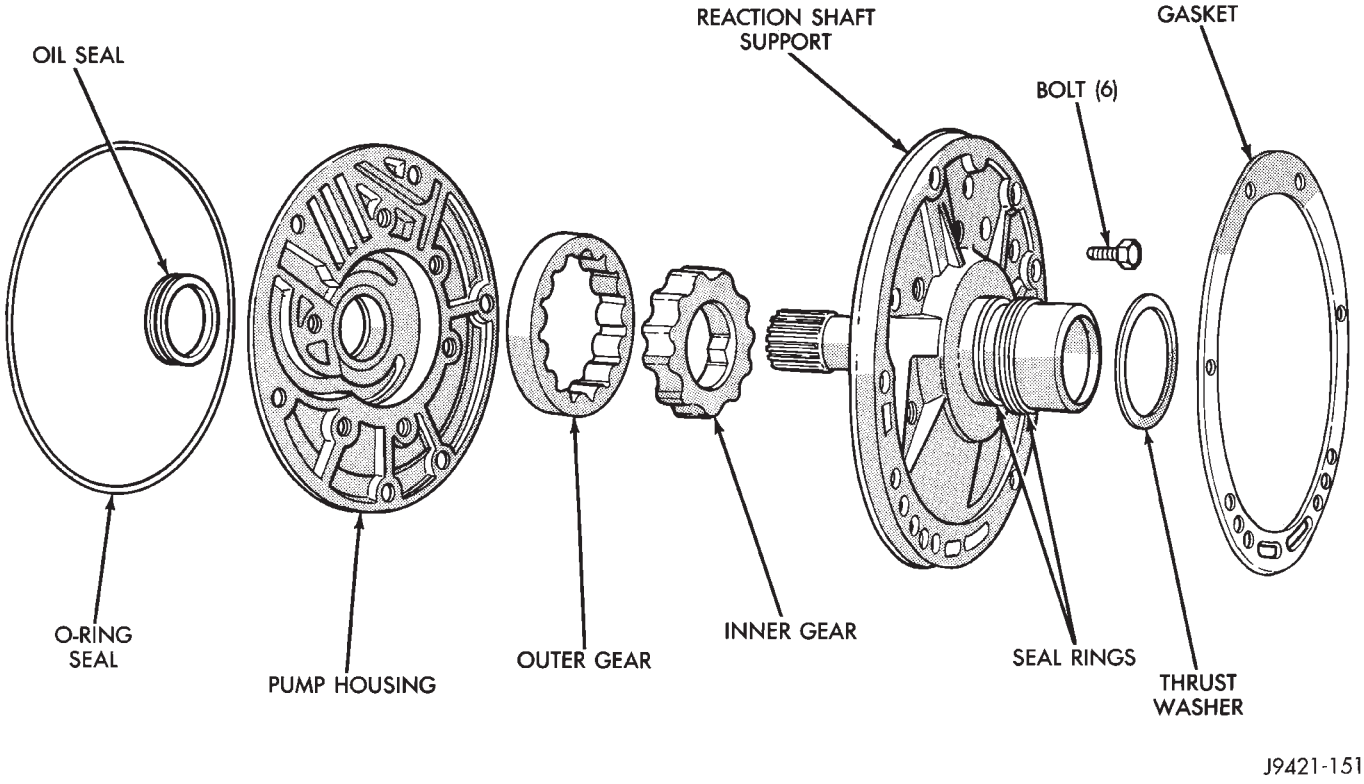


Fig. 45 Oil Pump And Reaction Shaft Support Components (All)

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

Replace the pump gears if pitted, worn chipped, or damaged. Inspect the thrust washer for wear or damage. Replace the washer if necessary. **Note that the inner gear used in 1993 and later 30RH/32RH oil pumps has a new design drive lug. The new design incorporates tapered drive flats instead of the square lug used previously. The torque converter hub has also been redesigned to accept the new drive flats. If pump gear replacement is necessary, be very sure to order and install the correct style gears.**

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

Install the gears in the pump housing and measure end clearance with a feeler gauge and straightedge (Fig. 46). Clearance should be 0.010 - 0.06 mm (0.0004 - 0.0025 in.).

Measure clearance between the outer gear and the pump body (Fig. 47). Clearance should be 0.08 - 0.19 mm (0.0035 - 0.0075 in.).

Measure gear tooth clearance with a feeler gauge. Align one tooth of the outer gear in inner gear and measure clearance (Fig. 48). Clearance should be 0.08 - 0.19 mm (0.0035 - 0.0075 in.).

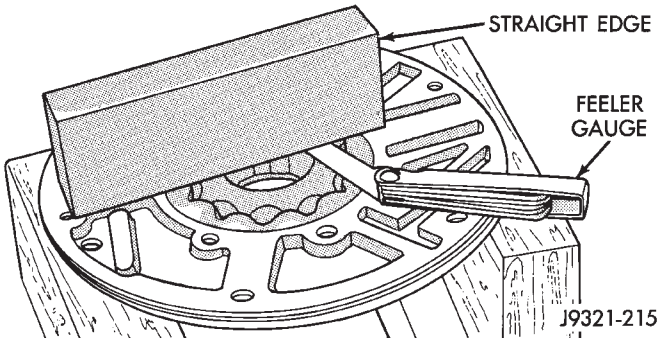


Fig. 46 Measuring Pump Gear End Clearance

OIL PUMP BUSHING REPLACEMENT

(1) Remove pump bushing with Tool Handle C-4171 and Bushing Remover SP-3551 (Fig. 49).

(2) Install new pump bushing with Tool Handle C-4171 and Bushing Installer SP-5117 (Fig. 49). Bushing should be flush with pump housing bore.

(3) Stake new pump bushing in two places with blunt punch (Fig. 50). Remove burrs from stake points with knife blade afterward.

REACTION SHAFT SUPPORT BUSHING REPLACEMENT

(1) Assemble Bushing Remover Tools SP-1191,

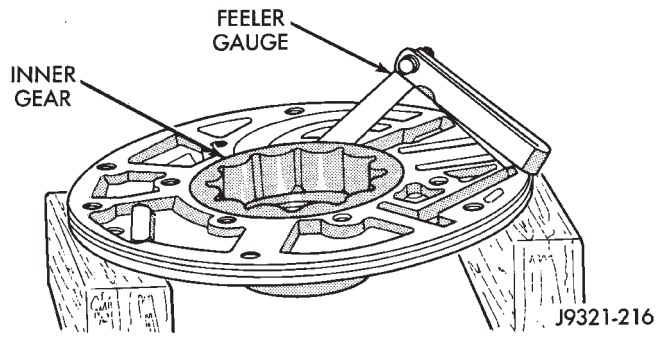


Fig. 47 Measuring Pump Housing-To-Inner Gear Clearances

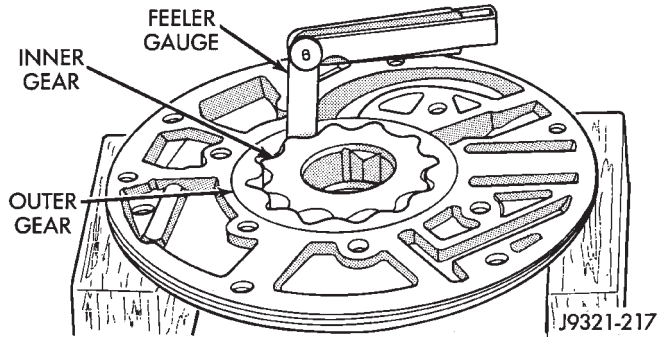


Fig. 48 Measuring Pump Gear Tooth Clearance

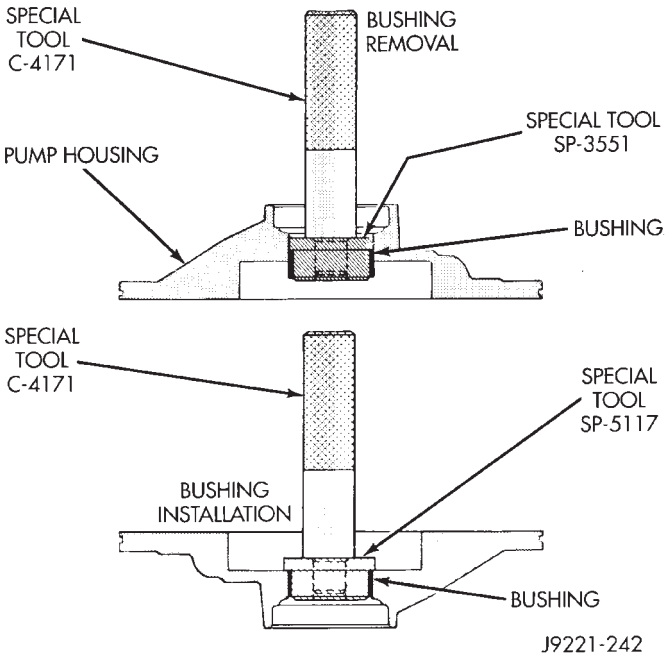


Fig. 49 Removing Oil Pump Bushing

3633 and 5324 (Fig. 51). **Do not clamp any part of reaction shaft or support in vise.**

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

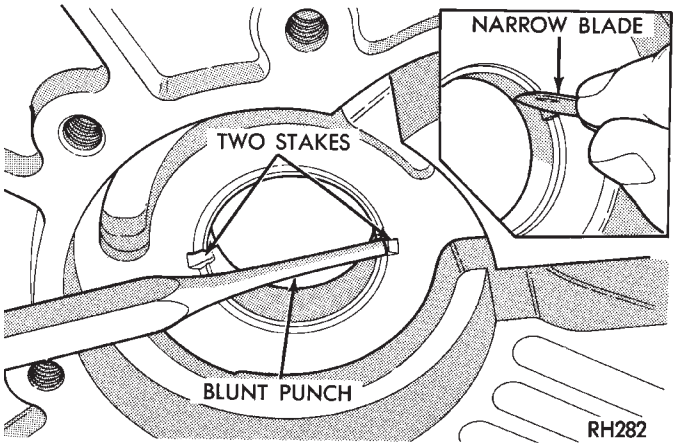


Fig. 50 Staking Oil Pump Bushing

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

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

(5) Assemble Bushing Installer Tools C-4171 and SP-5325 (Fig. 51).

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

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

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

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

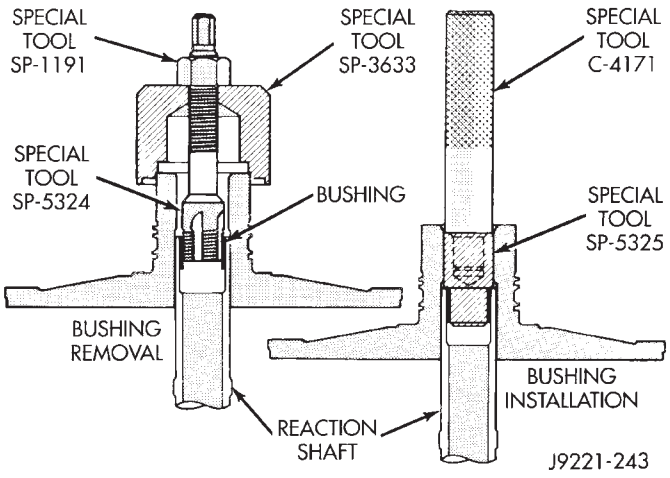


Fig. 51 Replacing Reaction Shaft Support Bushing

ASSEMBLING OIL PUMP AND REACTION SHAFT SUPPORT

(1) Lubricate gear bore in pump housing with transmission fluid.

(2) Lubricate pump gears with transmission fluid.

(3) Support pump housing on wood blocks (Fig. 52).

(4) Install outer gear in pump housing (Fig. 52). Gear can be installed either way (it is not a one-way fit).

(5) Install pump inner gear (Fig. 53).

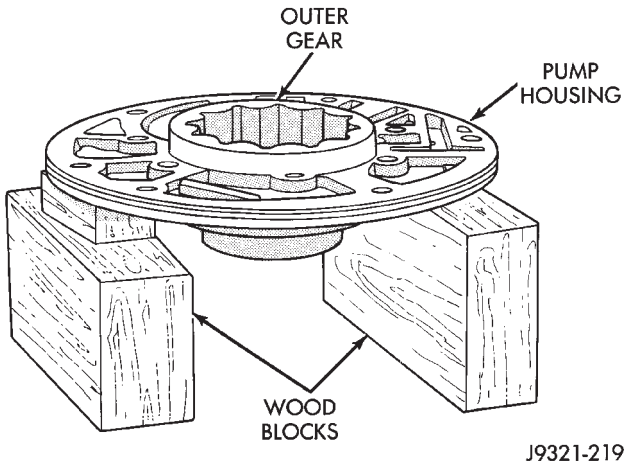


Fig. 52 Supporting Pump And Installing Outer Gear

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

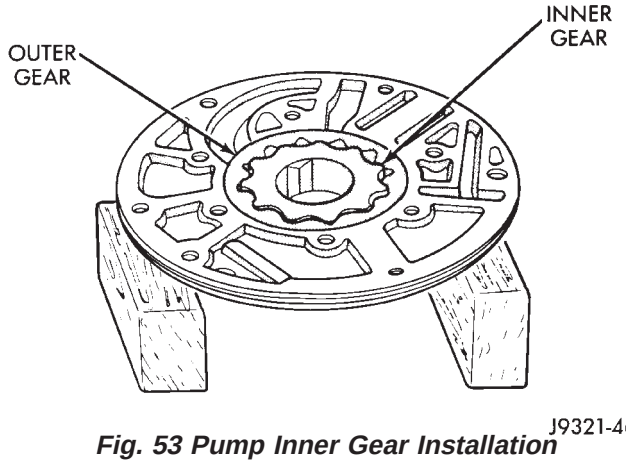


Fig. 53 Pump Inner Gear Installation

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

(7) If reaction shaft seal rings are being replaced, install new seal rings on support hub (Fig. 54). Lubricate seal rings with transmission fluid or petroleum jelly after installation. Squeeze each ring until ring ends are securely hooked together.

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

(8) Install reaction shaft support on pump housing (Fig. 55).

(9) Align reaction support on pump housing. Use alignment marks made at disassembly. Or, rotate

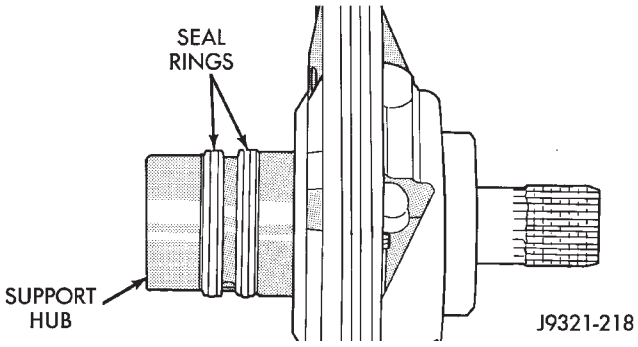


Fig. 54 Hub Seal Ring Position

support until bolt holes in support and pump housing are all aligned (holes are offset for one-way fit).

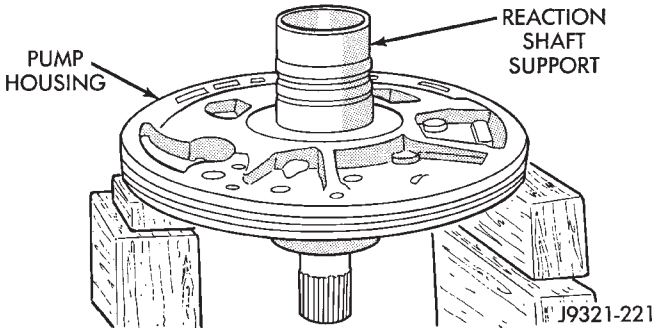


Fig. 55 Assembling Reaction Shaft Support And Pump Housing

(10) Install all bolts that attach support to pump housing. Then tighten bolts finger tight.

(11) Tighten support-to-pump bolts to required torque as follows:

(a) Reverse pump assembly and install it in transmission case. Position pump so bolts are facing out and are accessible.

(b) Secure pump assembly in case with 2 or 3 bolts, or with pilot studs.

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

(d) Remove pump assembly from transmission case.

(12) Install new oil seal in pump with Special Tool C-4193 and Tool Handle C-4171 (Fig. 56). Be sure seal lip faces inward.

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

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

FRONT CLUTCH OVERHAUL

FRONT CLUTCH DISASSEMBLY

(1) Remove waved snap ring and remove pressure plate, clutch plates and clutch discs (Fig. 57).

(2) Compress clutch piston spring with Compressor Tool C-3575-A (Fig. 58). Be sure legs of tool are seated squarely on spring retainer before compressing spring.

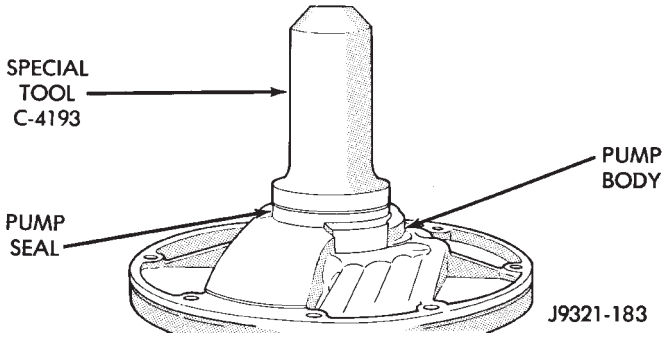


Fig. 56 Pump Oil Seal Installation

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

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

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

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

FRONT CLUTCH INSPECTION

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

Replace the clutch discs if warped, worn, scored, burned or charred, or if the facing is flaking off. Replace the steel plates if heavily scored, warped, or broken. Be sure the driving lugs on the plates are in good condition. The lugs must not be bent, cracked or damaged in any way.

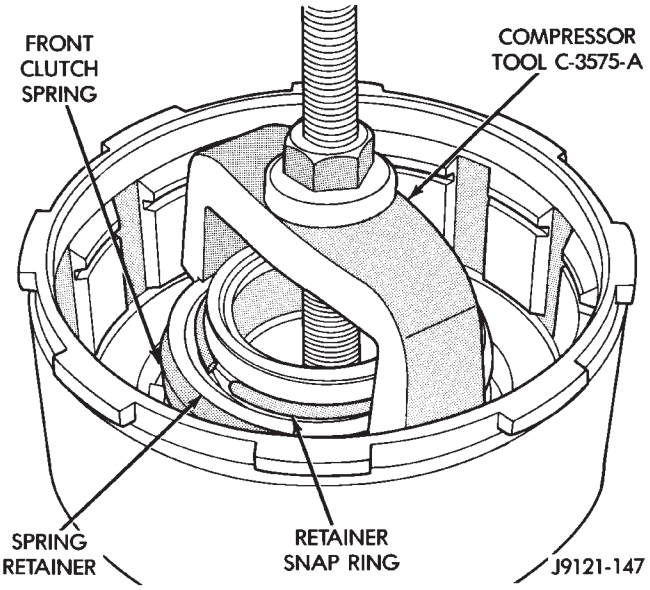


Fig. 58 Compressing Front Clutch Piston Spring

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

Check the lug grooves in the clutch retainer. The steel plates should slide freely in the slots. Replace the retainer if the grooves are worn or damaged.

Check action of the check ball in the retainer (Fig. 59). The ball must move freely and not stick.

Inspect the clutch retainer bushings carefully (Fig. 60). The retainer bushings are not service-

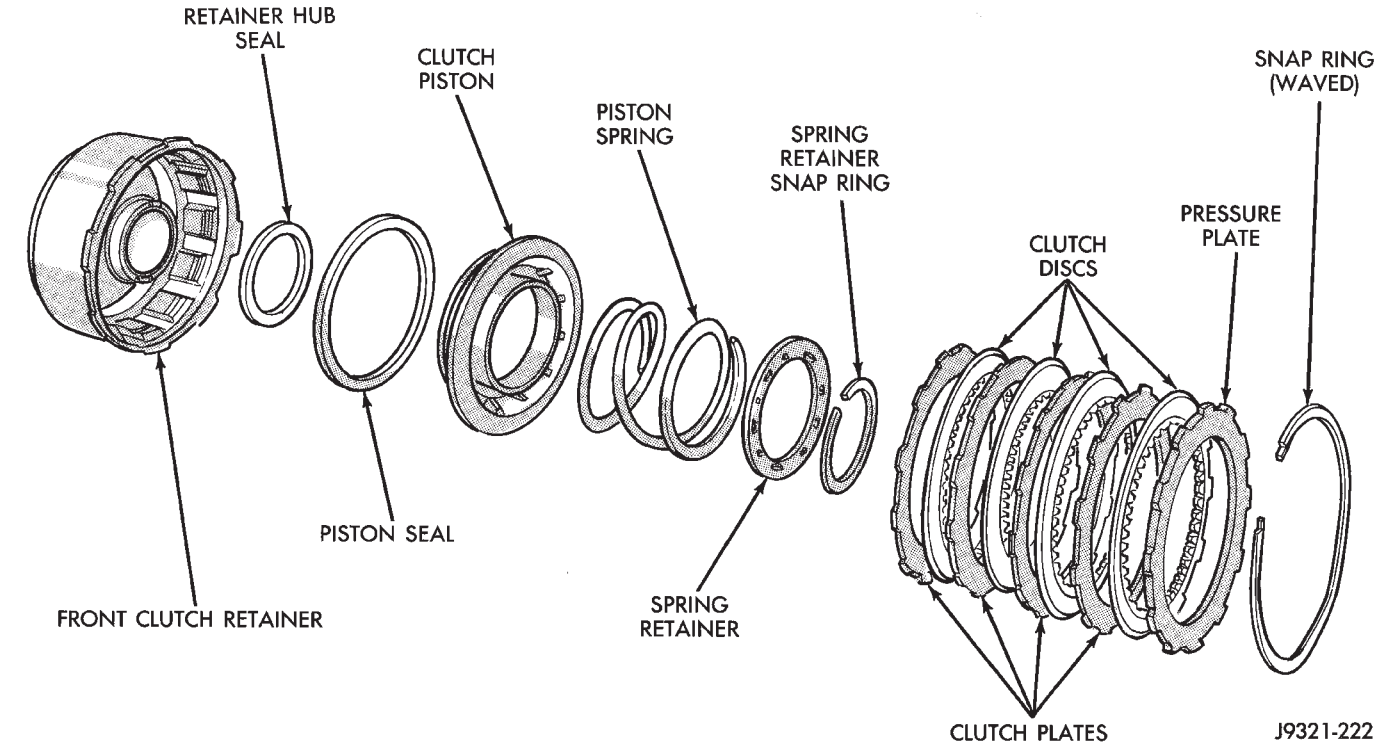


Fig. 57 Front Clutch Components (30RH/32RH)

able. It will be necessary to replace the retainer if either bushing is scored, or worn.

Inspect the piston and retainer seal surfaces for nicks or scratches. Minor scratches can be removed with crocus cloth. However, replace the piston and/or retainer if the seal surfaces are seriously scored.

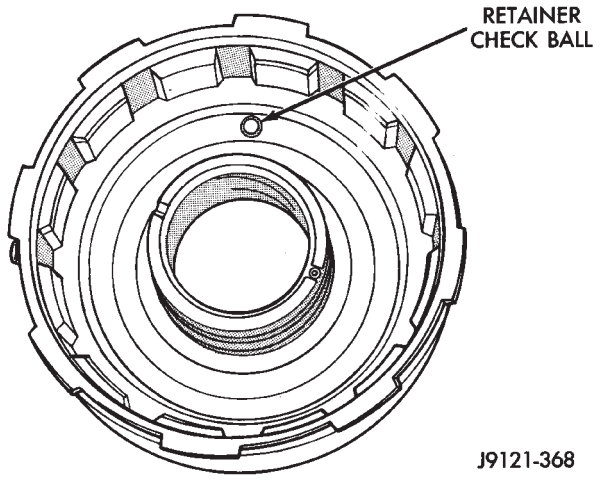


Fig. 59 Front Clutch Piston Retainer Check Ball Location

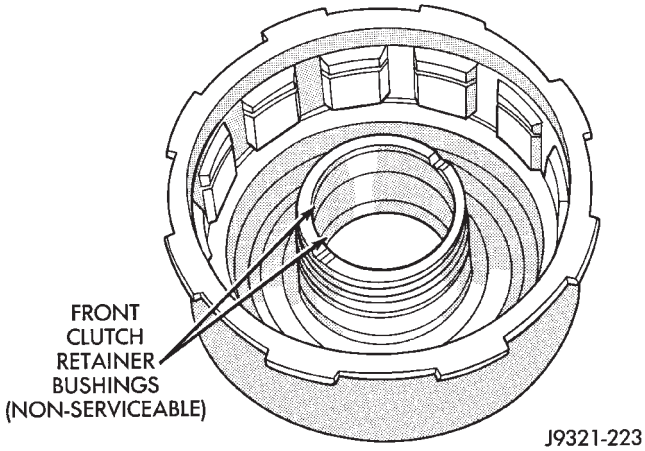


Fig. 60 Retainer Bushing Locations

FRONT CLUTCH ASSEMBLY

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

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

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

(4) Install clutch piston in retainer (Fig. 61). Use twisting motion to seat piston in bottom of retainer. **Do not attempt to push the piston straight in. This could fold the seals over causing leakage and clutch slip.**

(5) Position spring in clutch piston (Fig. 62).

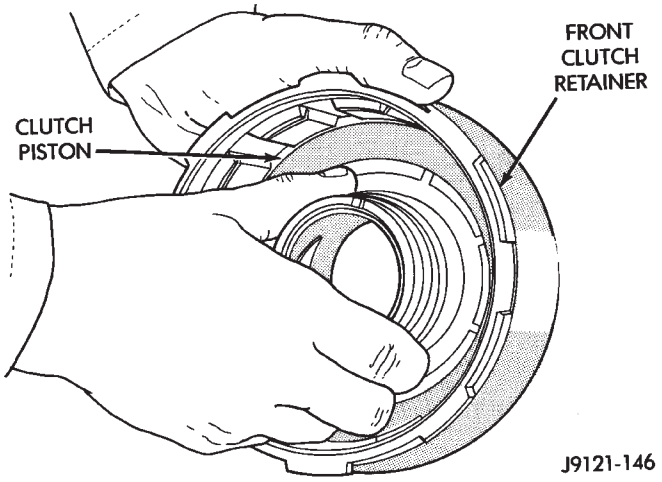


Fig. 61 Front Clutch Piston Installation

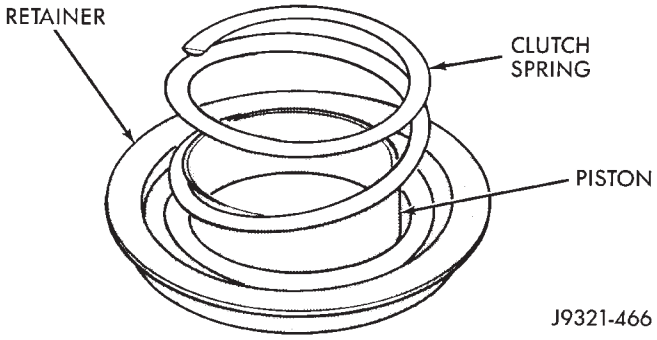


Fig. 62 Clutch Piston Spring Installation

(6) Position spring retainer on top of piston spring (Fig. 63). **Make sure retainer is properly installed. Small raised tabs should be facing upward. Semicircular lugs on underside of retainer are for positioning retainer in spring.**

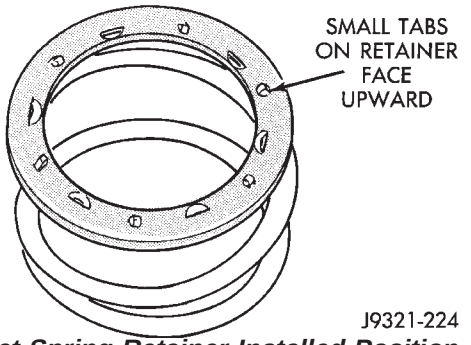


Fig. 63 Correct Spring Retainer Installed Position

(7) Compress piston spring and retainer with Compressor Tool C-3575-A (Fig. 64). Then install new snap ring to secure spring retainer and spring.

(8) Install clutch plates and discs (Fig. 57). Install steel plate then disc until all plates and discs are installed.

(9) Install pressure plate and waved snap ring (Fig. 57).

(10) Check clutch plate clearance (Fig. 64). Clearance should be 1.70 to 3.40 mm (0.067 to 0.134 in.). If clearance is incorrect, clutch discs, plates pressure plates and snap ring may have to be changed.

REAR CLUTCH OVERHAUL

REAR CLUTCH DISASSEMBLY

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

(2) Remove selective clutch pack snap ring (Figs. 65 and 66).

(3) Remove top pressure plate, clutch discs, steel plates, bottom pressure plate and wave spring (Figs. 65 and 66).

(4) Remove clutch piston with rotating motion.

(5) Remove and discard piston seals.

(6) Remove input shaft snap ring (Fig. 67).

(7) Press input shaft out of retainer with shop press and suitable size press tool (Fig. 68).

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

REAR CLUTCH INSPECTION

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

Replace the clutch discs if warped, worn, scored, burned/charred, the lugs are damaged, or if the facing is flaking off. Replace the top and bottom pressure plates if scored, warped, or cracked. Be sure the driving lugs on the pressure and clutch plates are also in good condition. The lugs must not be bent, cracked or damaged in any way.

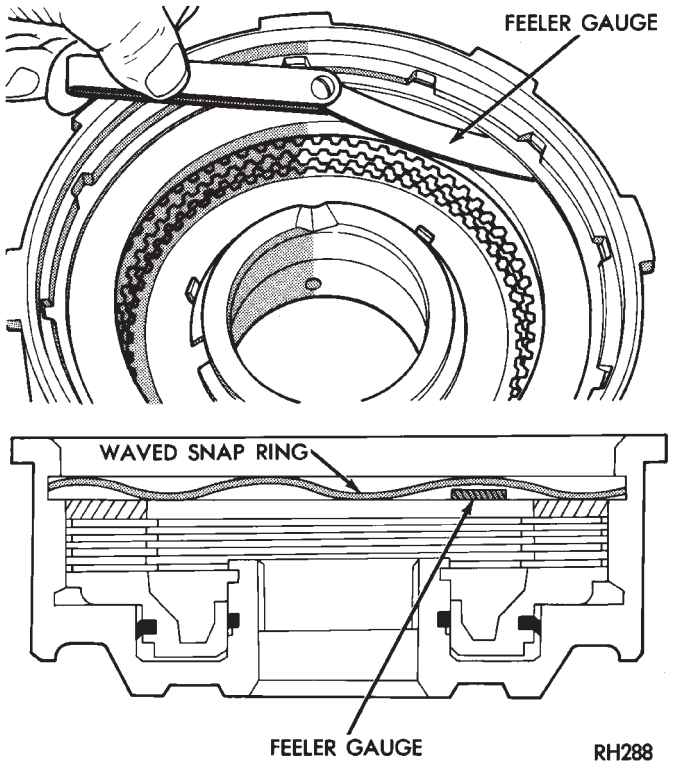


Fig. 64 Measuring Front Clutch Pack Clearance

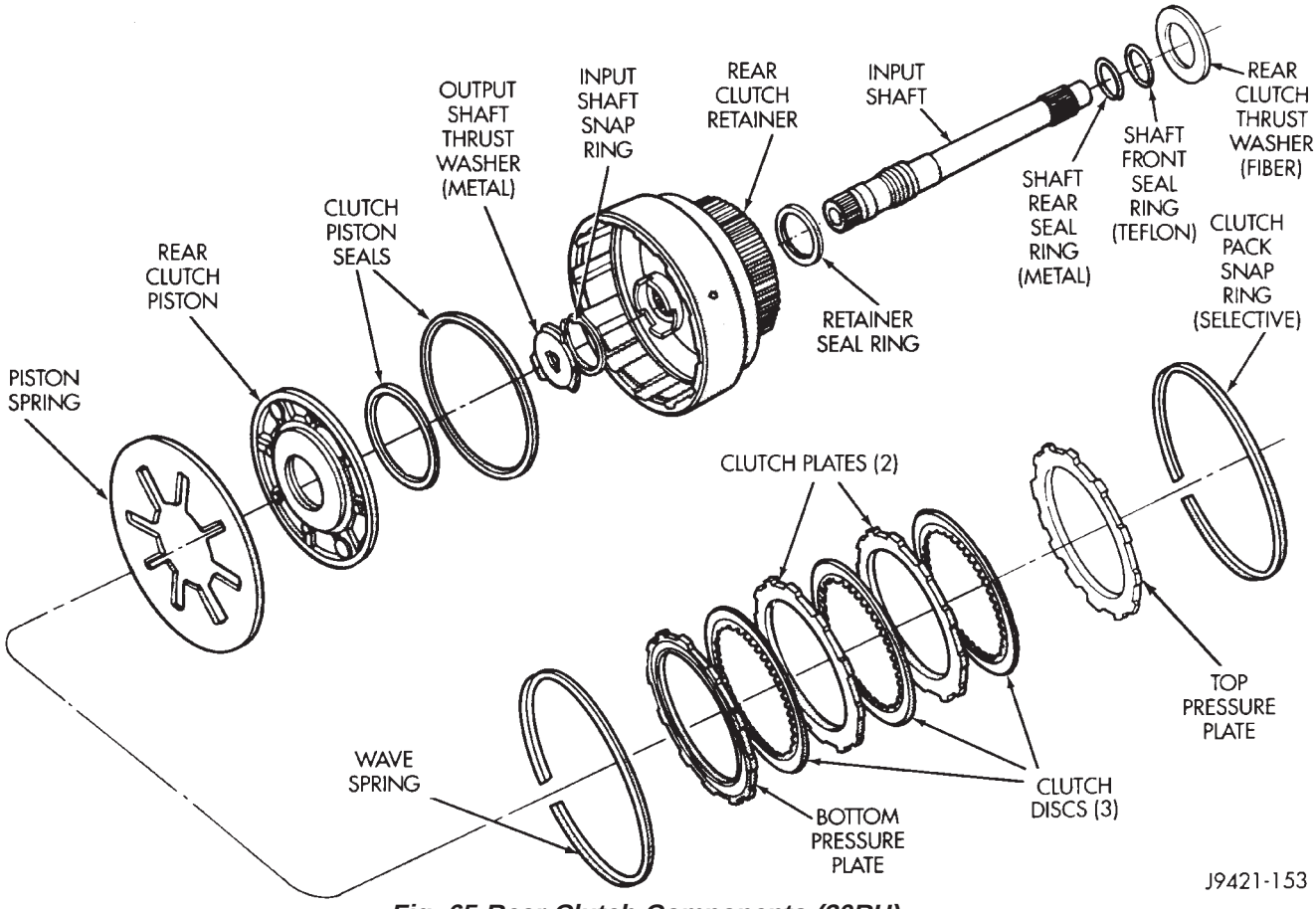


Fig. 65 Rear Clutch Components (30RH)

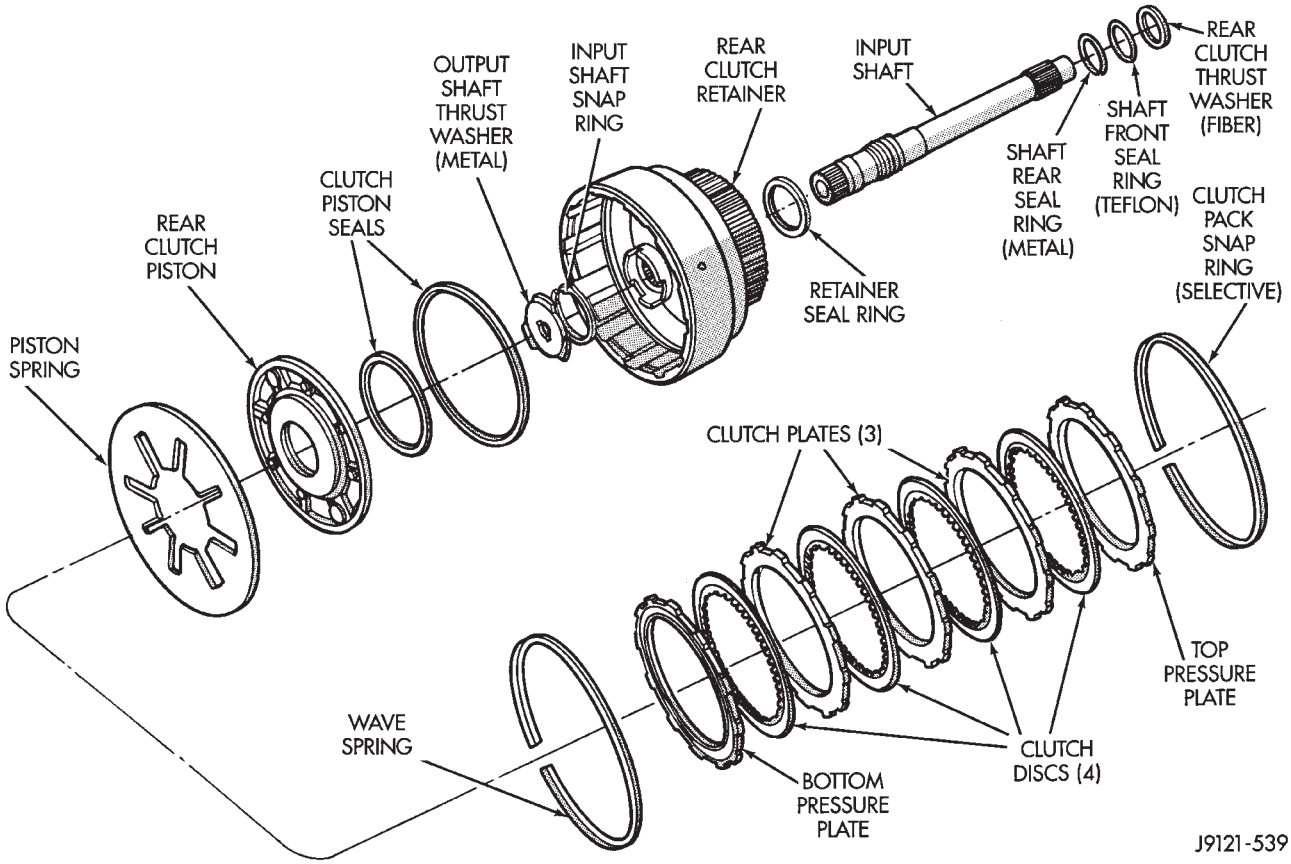


Fig. 66 Rear Clutch Components (32RH)

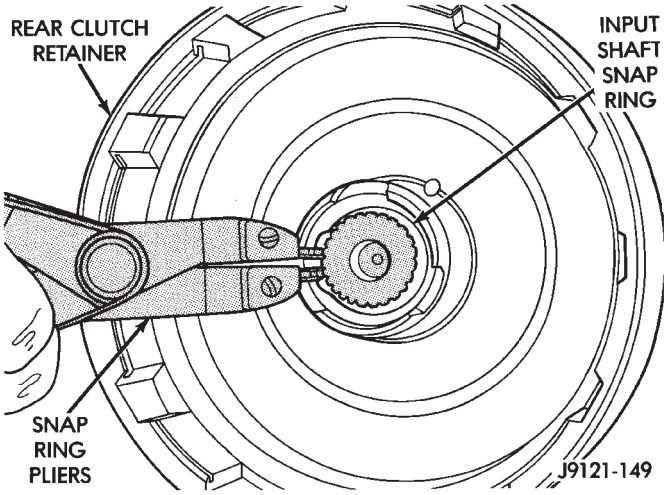


Fig. 67 Removing/Installing Input Shaft Snap Ring

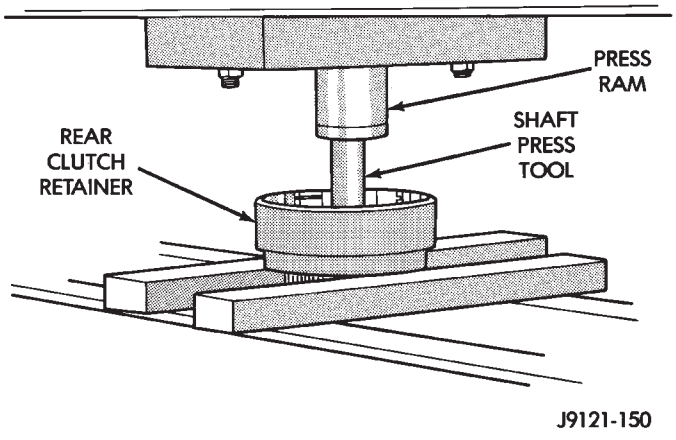


Fig. 68 Pressing Input Shaft Out Of Rear Clutch Retainer

Replace the piston spring and wave spring if either part is distorted, warped or broken.

Check the lug grooves in the clutch retainer. The clutch and pressure plates should slide freely in the slots. Replace the retainer if the grooves are worn or damaged. Also check action of the check balls in the retainer and piston. Each check ball must move freely and not stick.

Replace the retainer bushing if worn, scored, or doubt exists about bushing condition.

Inspect the piston and retainer seal surfaces for nicks or scratches. Minor scratches can be removed with crocus cloth. However, replace the piston and/or retainer if the seal surfaces are seriously scored.

Check condition of the fiber thrust washer and metal output shaft thrust washer. Replace either washer if worn or damaged.

Check condition of the seal rings on the input shaft and clutch retainer hub. Replace the seal rings only if worn, distorted, or damaged. The input shaft front

seal ring is teflon with chamfered ends. The rear ring is metal with interlocking ends.

Check the input shaft for wear, or damage. Replace the shaft if worn, scored or damaged in any way.

ASSEMBLING REAR CLUTCH

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

(2) Install new seal rings on clutch retainer hub and input shaft if necessary (Fig. 69).

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

(b) Note that input shaft front seal ring is teflon and rear seal ring is metal (Fig. 70). Be sure chamfered ends of teflon ring are properly joined and that ends of rear ring are securely hooked together. Lubricate both rings with transmission fluid after installation.

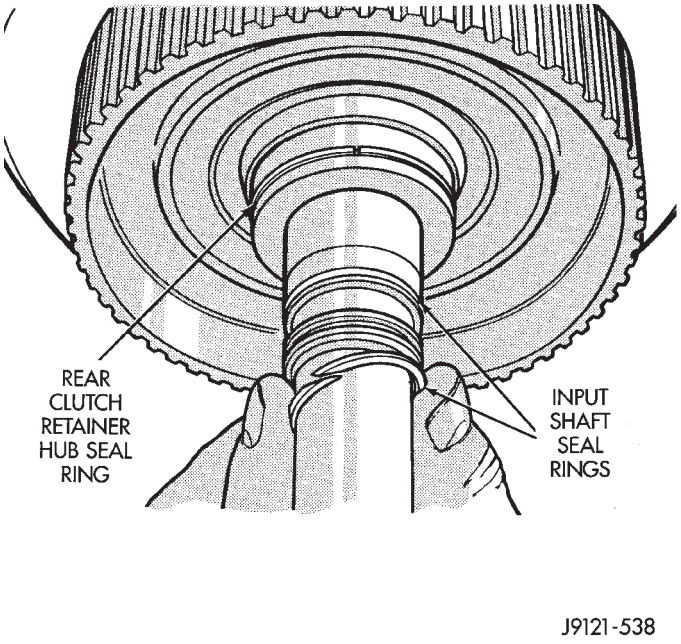


Fig. 69 Rear Clutch Retainer And Input Shaft Seal Ring Installation

(3) Lubricate splined end of input shaft and clutch retainer with transmission fluid. Then press input shaft into retainer (Fig. 71).

(4) Install input shaft snap ring (Figs. 65-66).

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

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

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

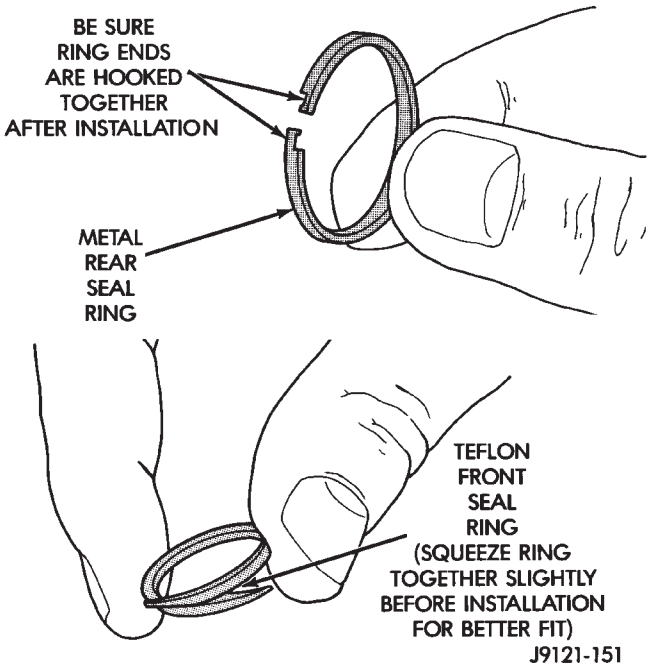


Fig. 70 Input Shaft Seal Ring Identification

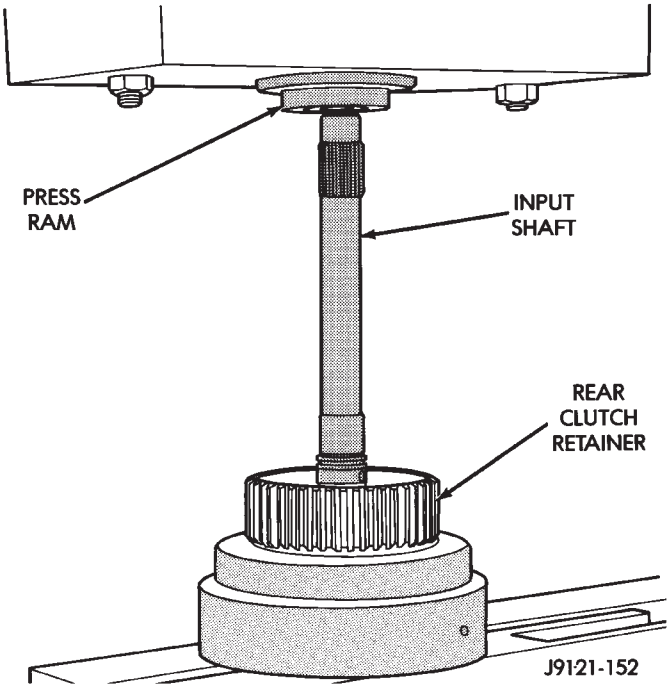


Fig. 71 Pressing Input Shaft Into Rear Clutch Retainer

(8) Install piston spring in retainer and on top of piston (Fig. 72). Concave side of spring faces downward (toward piston).

(9) Install wave spring in retainer (Fig. 72). Be sure spring is completely seated in retainer groove.

(10) Install bottom pressure plate (Fig. 65). Ridged side of plate faces downward (toward piston) and flat side toward clutch pack.

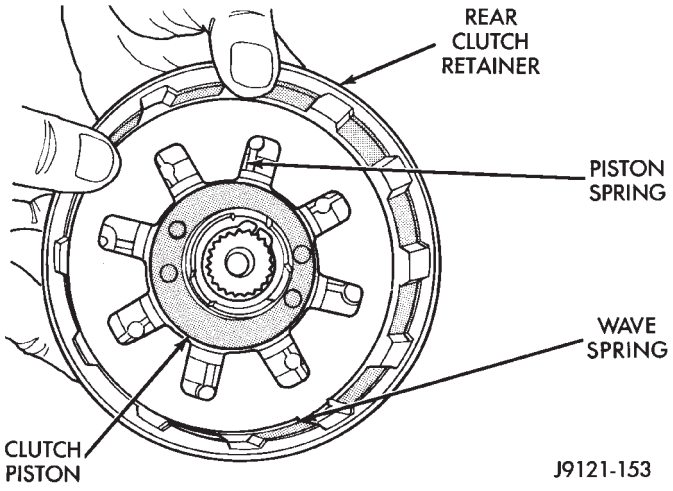


Fig. 72 Piston And Wave Spring Position

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

- 3 discs and 2 plates are used in 30RH (Fig. 65)
- 4 discs and 3 plates are required in 32RH (Fig. 66).

(12) Install top pressure plate (Figs. 65-66).

(13) Install selective snap ring (Figs. 65-66). Be sure snap ring is fully seated in retainer groove.

(14) Measure clutch pack clearance (Fig. 73). Clearance should be 0.64 - 1.14 mm (0.025 - 0.045 in.). If clearance is incorrect, steel plates, discs, snap ring and pressure plates may have to be changed.

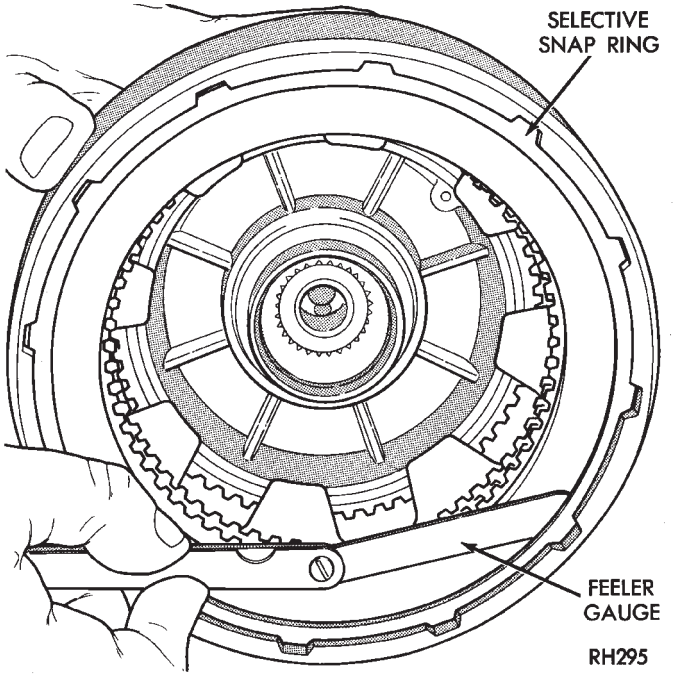


Fig. 73 Typical Method Of Checking Rear Clutch Pack Clearance

(15) Coat rear clutch fiber thrust washer with petroleum jelly and install washer over input shaft and into clutch retainer (Fig. 74). Use enough petroleum jelly to hold washer in place.

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

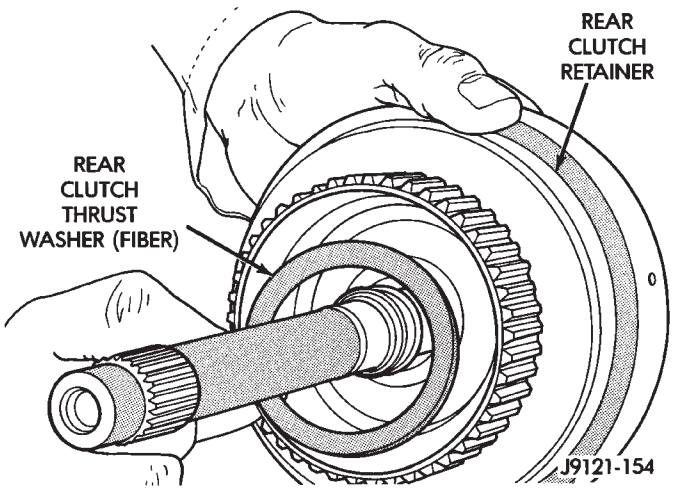


Fig. 74 Installing Rear Clutch Thrust Washer

PLANETARY GEAR TRAIN OVERHAUL

PLANETARY GEARTRAIN DISASSEMBLY

(1) Remove planetary snap ring (Fig. 75).

(2) Remove front annulus and planetary assembly from driving shell (Fig. 75).

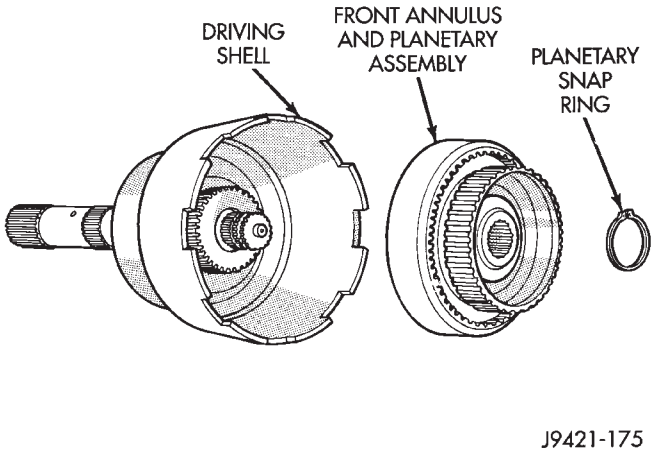


Fig. 75 Front Annulus And Planetary Assembly Removal

(3) Remove snap ring that retains front planetary gear in annulus gear (Fig. 76).

(4) Remove tabbed thrust washer and tabbed thrust plate from hub of front annulus (Fig. 77).

(5) Separate front annulus and planetary gears (Fig. 77).

(6) Remove front planetary gear front thrust washer from annulus gear hub (Fig. 77).

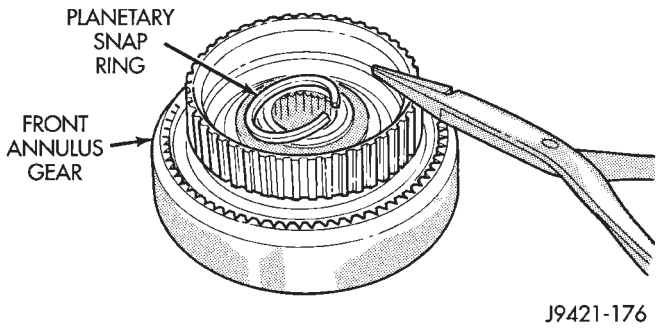


Fig. 76 Front Planetary Snap Ring Removal

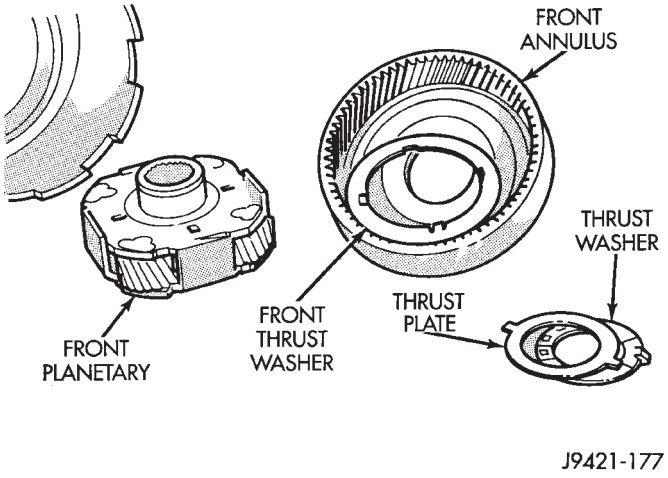


Fig. 77 Front Planetary And Annulus Gear Disassembly

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

(8) Separate and remove driving shell, rear planetary and rear annulus from output shaft (Fig. 78).

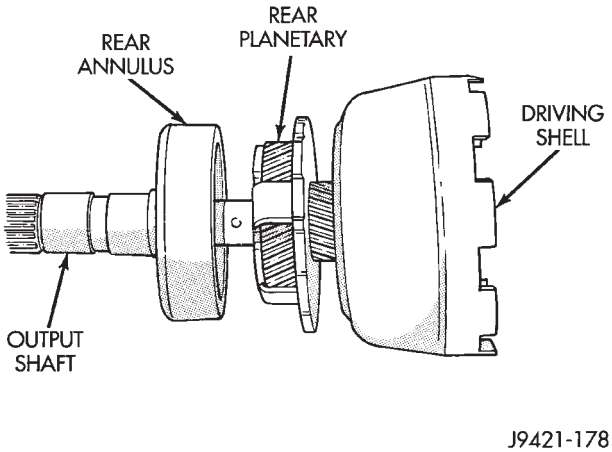


Fig. 78 Removing Driving Shell, Rear Planetary And Rear Annulus

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

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

PLANETARY GEARTRAIN INSPECTION

Clean the planetary components in solvent and dry them with compressed air.

Check sun gear and driving shell condition (Fig. 79). Replace the gear if damaged or if the bushings are scored or worn. The bushings are not serviceable. Replace the driving shell if worn, cracked or damaged.

Replace planetary gear sets if gears, pinion pins, or carrier are damaged in any way. Replace the annulus gears and supports if either component is worn or damaged.

Inspect the geartrain spacers, thrust plates, snap rings, and thrust washers (Fig. 79). Replace any of these parts that are worn, distorted or damaged. Do not attempt to reuse these parts.

The planetary gear thrust washers are different sizes. The large diameter washers go on the front planetary and the smaller washers go on the rear planetary. All the washers have four locating tabs on them. These tabs fit in the holes or slots provided in each planetary gear.

Inspect the output shaft carefully. Pay particular attention to the machined bushing/bearing surfaces on the shaft and the governor valve shaft bore at the shaft rear.

Replace the output shaft if the machined surfaces are scored, pitted, or damaged in any way. Also replace the shaft if the splines are damaged, or exhibits cracks at any location (especially at the governor valve shaft bore).

The annulus gears can be removed from their supports if necessary. Just remove the snap rings and separate the two parts when replacement is necessary. In addition, the annulus gear bushings can be replaced if severely worn, or scored. However it is not necessary to replace the bushings if they only exhibit normal wear. Check bushing fit on the output shaft to be sure.

ASSEMBLING PLANETARY GEARTRAIN

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

(2) Assemble rear annulus gear and support if disassembled. Be sure support snap ring is seated and that shoulder-side of support faces rearward (Fig. 80).

(3) Install rear thrust washer on rear planetary gear (Fig. 79). Use enough petroleum jelly to hold washer in place. Also be sure all four washer tabs are properly engaged in gear slots.

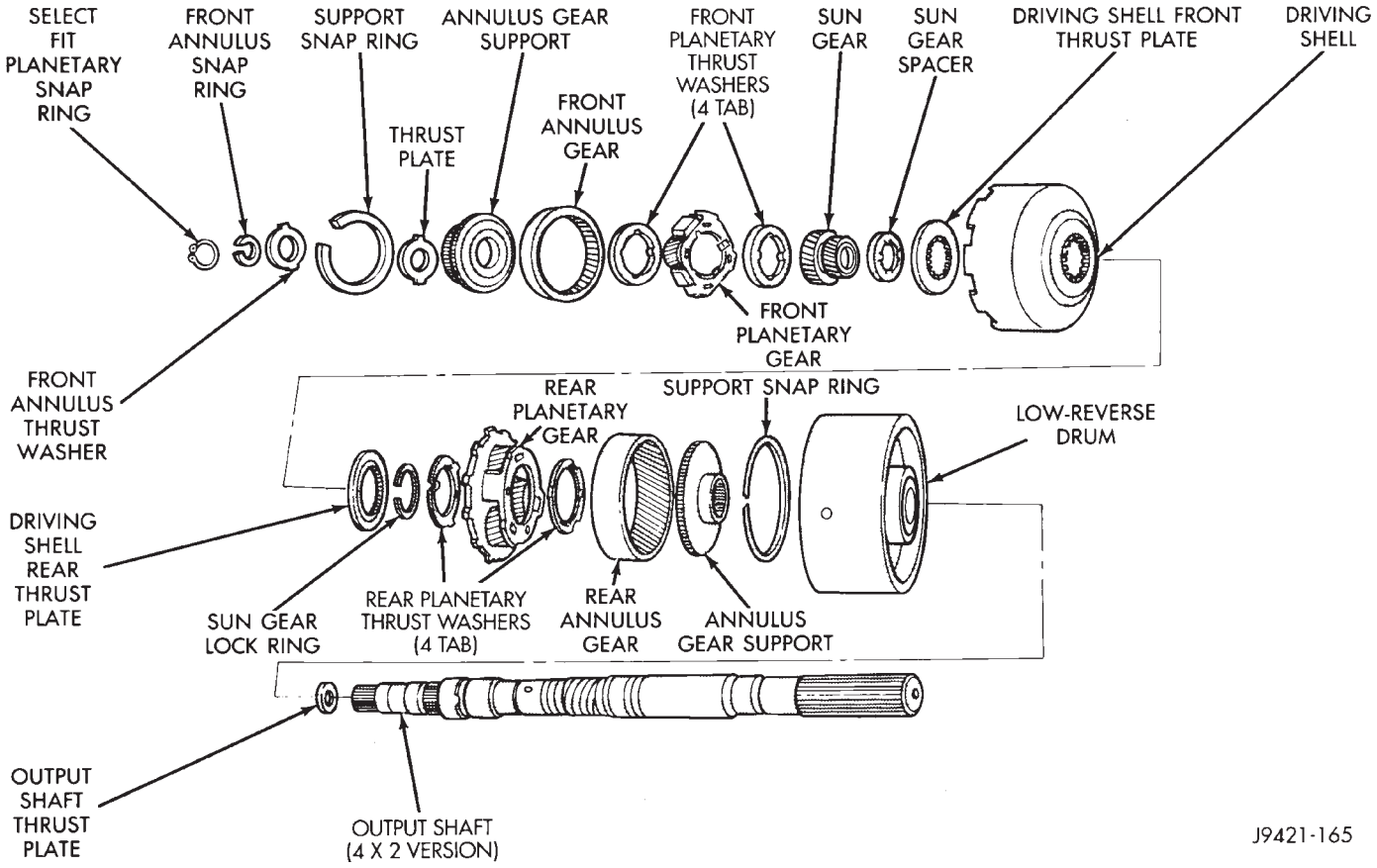


Fig. 79 Planetary Geartrain Components (30RH/32RH)

(4) Install rear annulus over and onto rear planetary gear (Fig. 80).

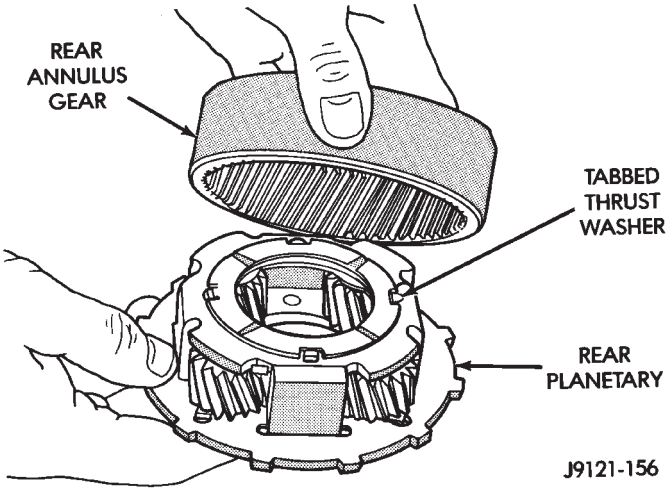


Fig. 80 Assembling Rear Annulus And Planetary Gear

(5) Install assembled rear planetary and annulus gear on output shaft (Fig. 81). Verify that assembly is fully seated on shaft.

(6) Install front thrust washer on rear planetary gear (Fig. 82). Use enough petroleum jelly to hold washer on gear. Be sure all four washer tabs are seated in slots.

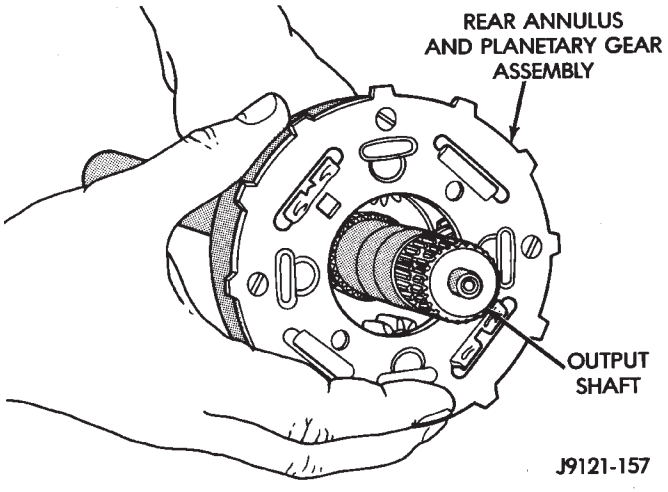


Fig. 81 Installing Rear Annulus And Planetary On Output Shaft

(7) Install spacer on sun gear (Fig. 83).

(8) Install thrust plate on sun gear (Fig. 84). Note that driving shell thrust plates are interchangeable. Use either plate on sun gear and at front/rear of shell.

(9) Hold sun gear in place and install thrust plate over sun gear at rear of driving shell (Fig. 85).

(10) Position wood block on bench and support sun gear on block (Fig. 86). This makes it easier to align

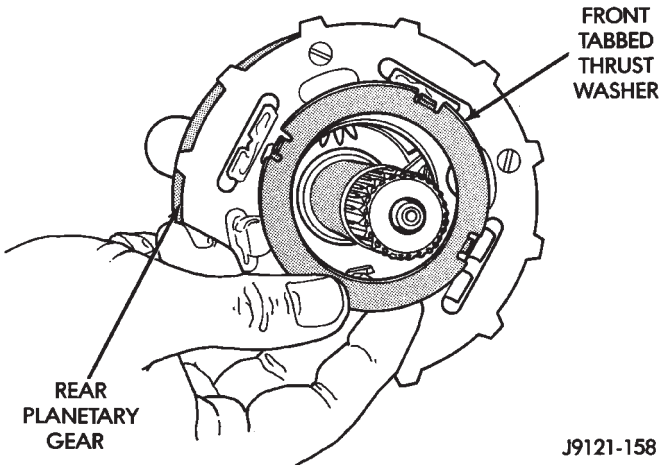


Fig. 82 Installing Rear Planetary Front Thrust Washer

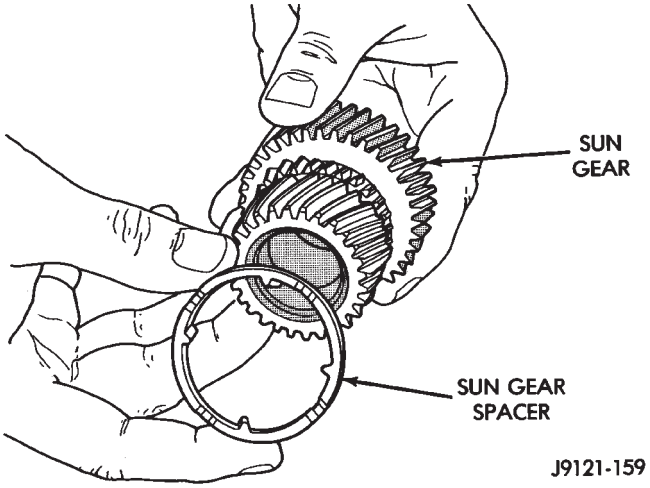


Fig. 83 Installing Spacer On Sun Gear

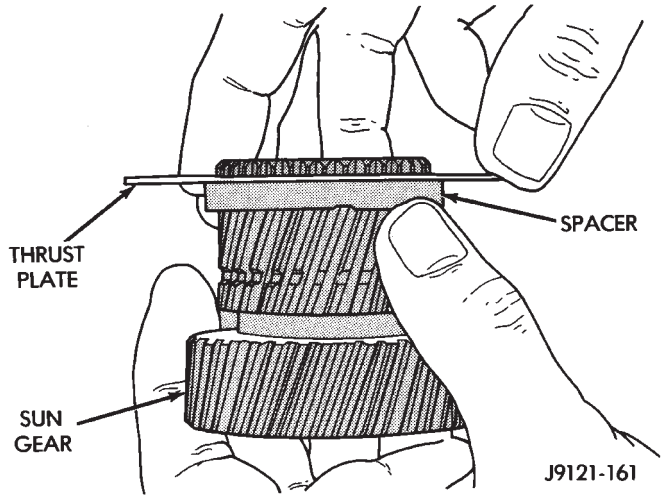


Fig. 84 Installing Driving Shell Front Thrust Plate On Sun Gear

and install sun gear lock ring. Keep wood block handy as it will also be used for geartrain end play check.

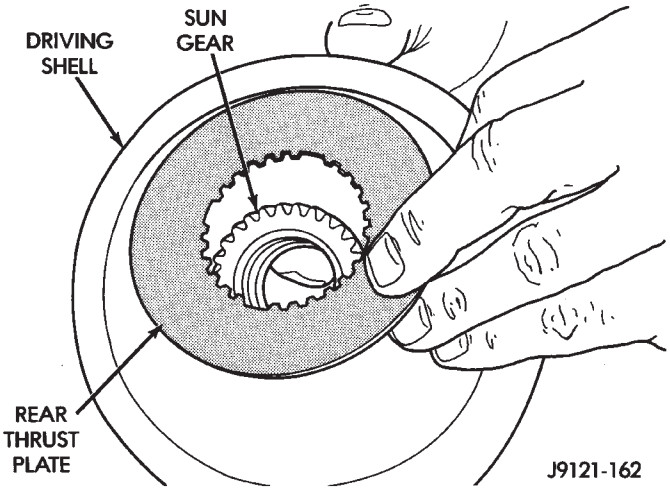


Fig. 85 Installing Driving Shell Rear Thrust Plate

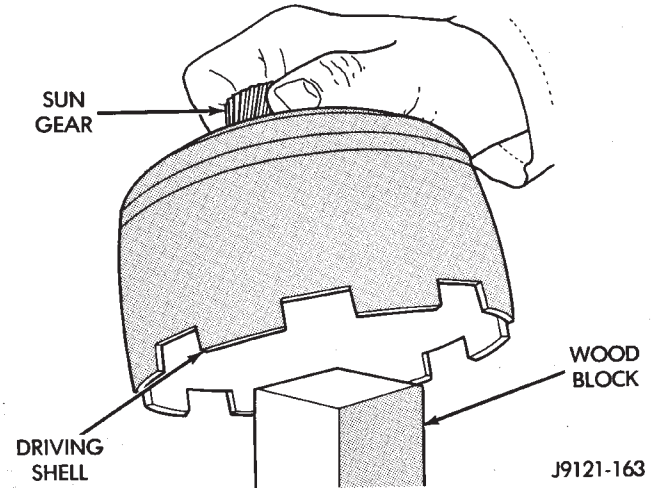


Fig. 86 Supporting Sun Gear On Wood Block

(11) Align rear thrust plate on driving shell and install sun gear lock ring. Be sure ring is fully seated in sun gear ring groove (Fig. 87).

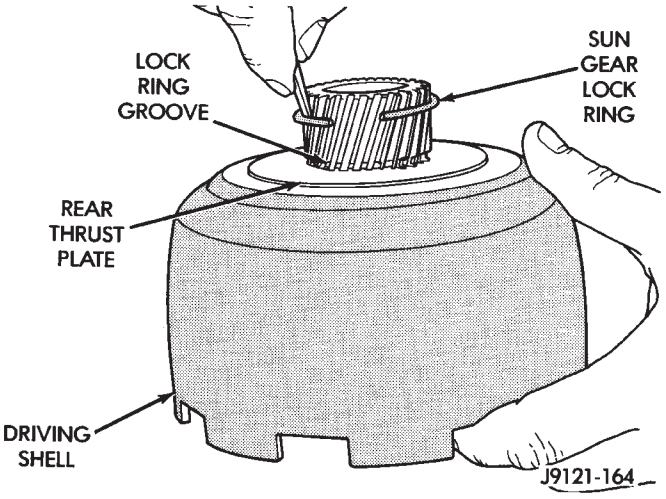


Fig. 87 Installing Sun Gear Lock Ring

(12) Install assembled driving shell and sun gear on output shaft (Fig. 88).

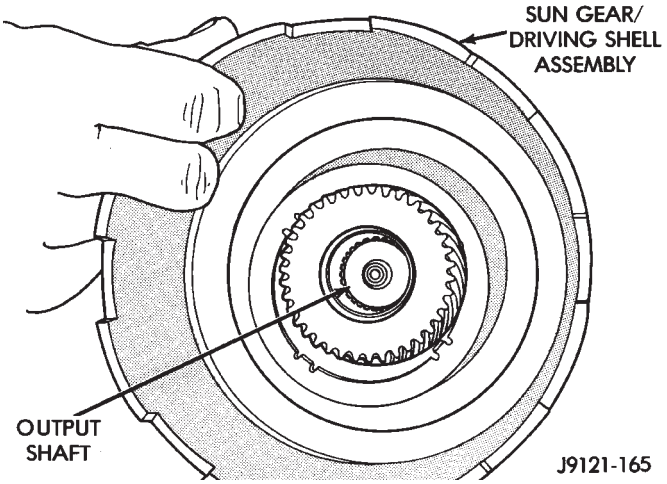


Fig. 88 Installing Assembled Sun Gear And Driving Shell On Output Shaft

(13) Install rear thrust washer on front planetary gear (Fig. 89). Use enough petroleum jelly to hold washer in place and be sure all four washer tabs are seated.

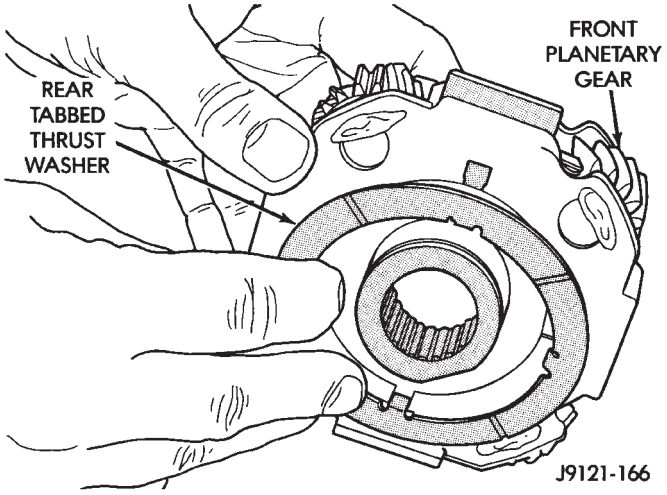


Fig. 89 Installing Rear Thrust Washer On Front Planetary Gear

(14) Install front planetary gear on output shaft and in driving shell (Fig. 90).

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

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

(17) Install front annulus on front planetary (Fig. 90).

(18) Position thrust plate on front annulus gear support (Fig. 91). **Note that plate has two tabs on it. These tabs fit in notches of annulus hub.**

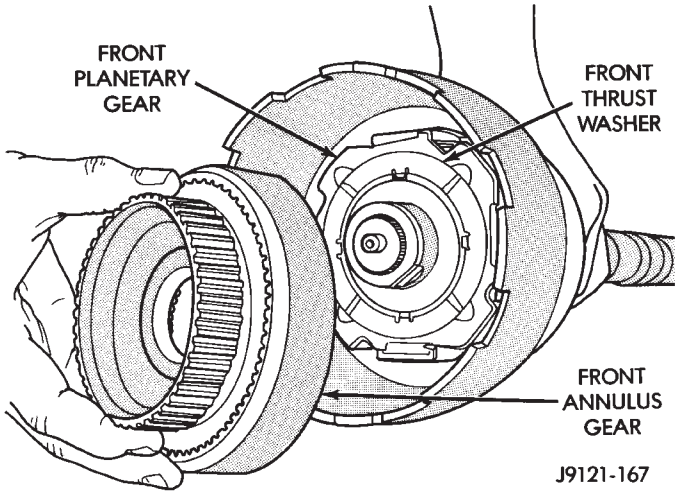


Fig. 90 Installing Front Planetary And Annulus Gears

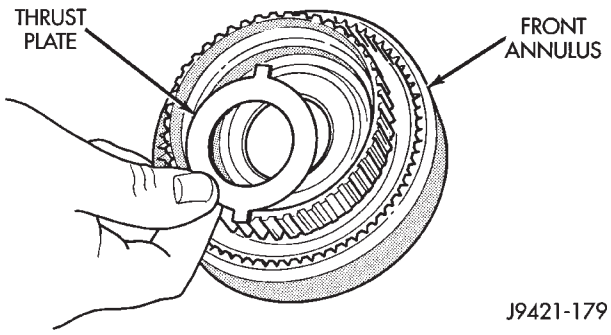


Fig. 91 Positioning Thrust Plate On Annulus Support

(19) Install thrust washer in front annulus (Fig. 92). **Align flat on washer with flat on planetary hub. Also be sure washer tab is facing up.**

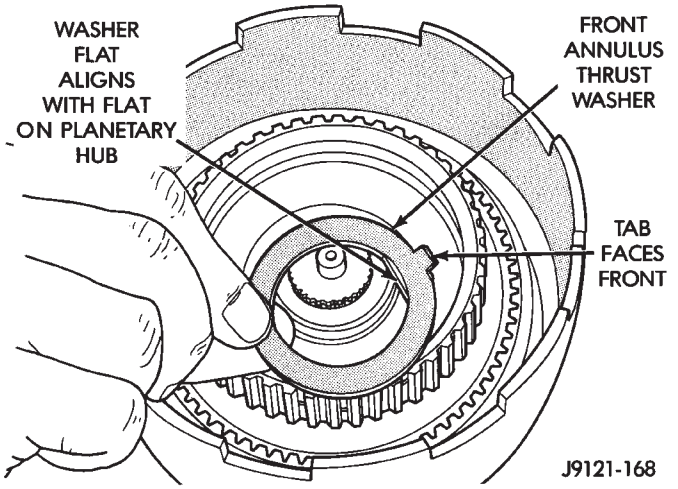


Fig. 92 Installing Front Annulus Thrust Washer

(20) Install front annulus snap ring (Fig. 93). Use snap ring pliers to avoid distorting ring during installation. Also be sure ring is fully seated.

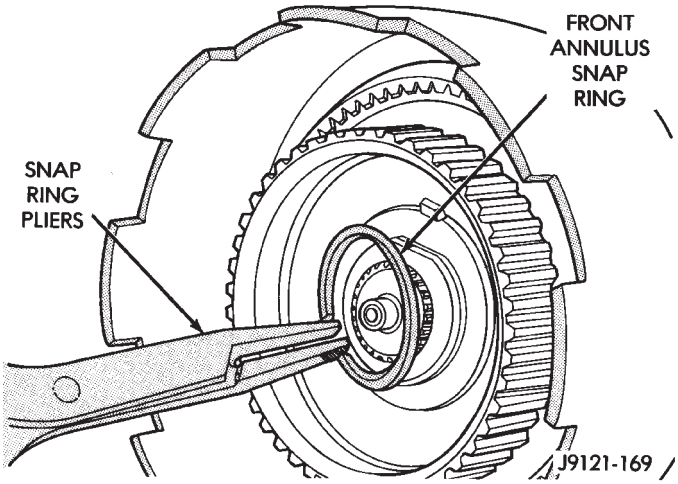


Fig. 93 Installing Front Annulus Snap Ring

(21) Install planetary selective snap ring with snap ring pliers (Fig. 94). Be sure ring is fully seated.

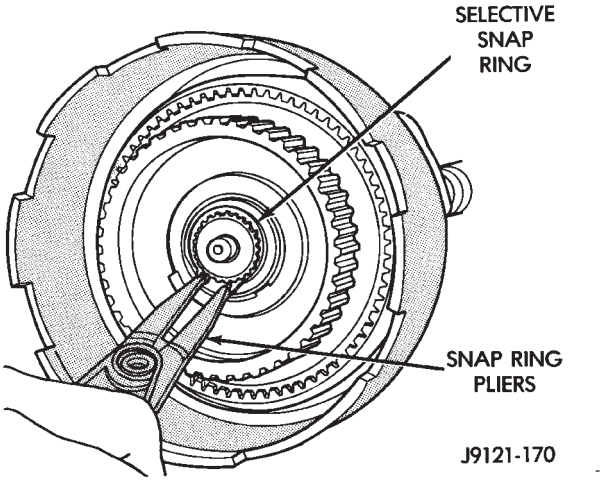


Fig. 94 Installing Planetary Selective Snap Ring

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

(23) Check planetary geartrain end play with feeler gauge (Fig. 95). Gauge goes between shoulder on output shaft and end of rear annulus support.

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

FRONT SERVO AND BAND OVERHAUL

FRONT SERVO DISASSEMBLY (FIG. 96)

(1) Remove small snap ring from servo piston.

(2) Remove piston, rod, springs and guide.

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

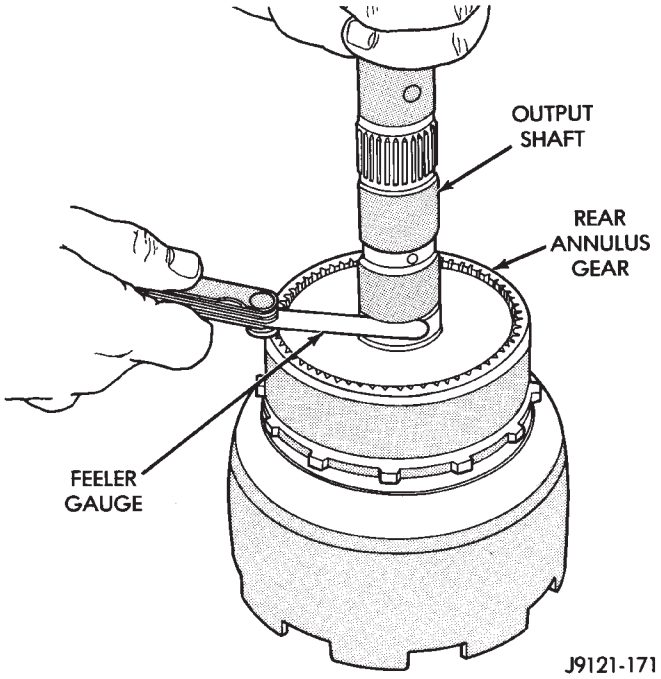


Fig. 95 Checking Planetary Geartrain End Play

FRONT SERVO AND BAND INSPECTION

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

Inspect the servo components. Replace the springs if collapsed, distorted or broken. Replace the guide, rod and piston if cracked, bent, or worn. Discard the servo snap ring if distorted or warped.

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

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

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

ASSEMBLING FRONT SERVO PISTON

(1) Lubricate servo parts with transmission fluid.

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

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

(4) Assemble rod, piston, servo springs and snap ring (Fig. 96).

REAR SERVO AND BAND OVERHAUL

REAR SERVO PISTON DISASSEMBLY

(1) Remove seal from servo piston. Note which way seal lip faces for assembly reference.

(2) Compress cushion spring in vise only enough to allow piston plug snap ring removal (Fig. 97). Use wood block between vise jaws and end of piston plug to keep plug aligned and in position.

(3) Remove snap ring from end of piston plug (Fig. 97).

(4) Open vise and remove wood block, piston plug, cushion spring and servo piston.

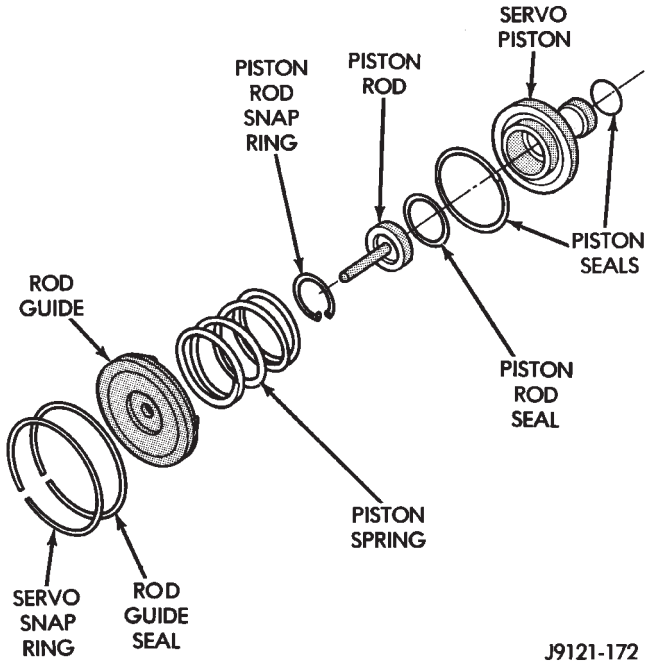


Fig. 96 Front Servo Components

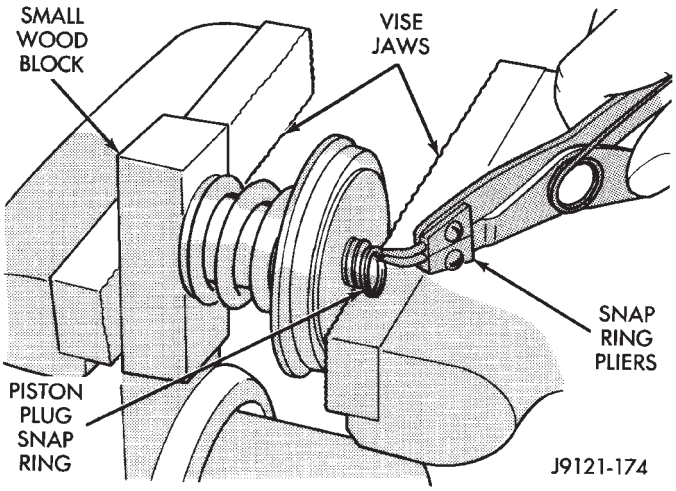


Fig. 97 Removing/Installing Servo Piston Plug Snap Ring

REAR SERVO INSPECTION

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

Check rear band condition. Replace the band if distorted, the lining is burned or flaking off, or the lining is excessively worn.

On 30RH models, inspect the rear band link (Fig. 98). Replace the link if bent, or damaged. Check the band reaction pin. Replace the O-rings if they are cut, or torn. Minor pin scoring can be cleaned up with crocus cloth. However, replace the pin if worn, severely scored, or cracked.

Inspect the servo components (Fig. 99). Replace the servo and cushion springs if collapsed, distorted or broken. Replace the plug or piston if cracked, bent, or worn. Discard the servo snap ring and spring retainer if distorted or warped.

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

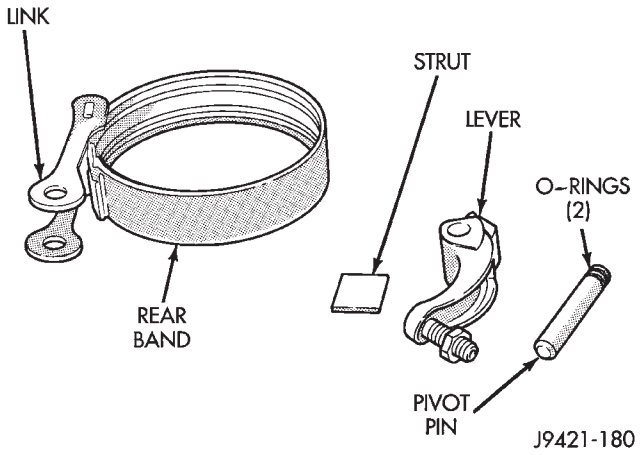


Fig. 98 Rear Band Components (30RH Shown)

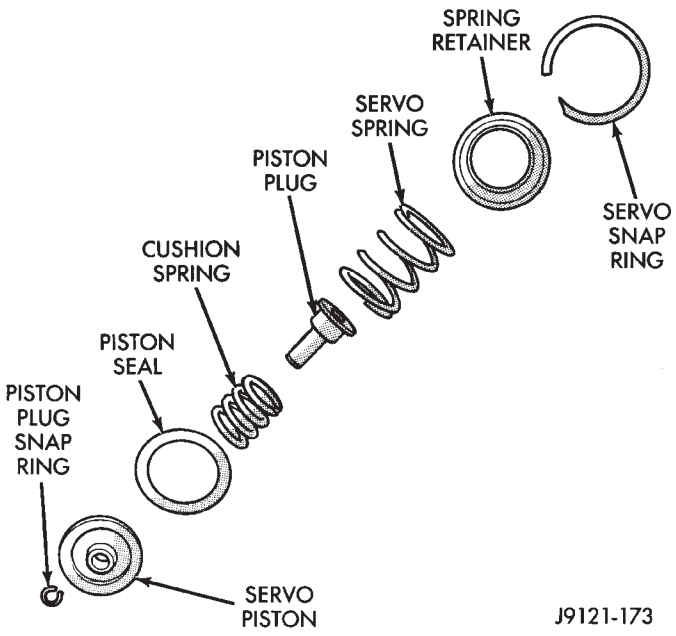


Fig. 99 Rear Servo Components

ASSEMBLING REAR SERVO PISTON

(1) Assemble piston plug, cushion spring and piston (Fig. 99).

(2) Compress cushion spring in vise and install piston plug snap ring.

(3) Install new seal on piston. Be sure seal lip is toward servo bore (Fig. 100).

(4) Lubricate piston seal with petroleum jelly. Lubricate other servo parts with transmission fluid.

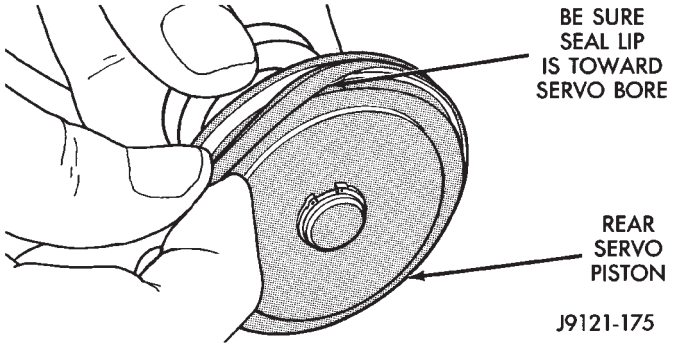


Fig. 100 Installing Rear Servo Piston Seal

VALVE BODY DISASSEMBLY AND INSPECTION

CAUTION: Do not clamp any part of the valve body assembly (Fig. 101) in a vise. This practice will distort the valve body and transfer plate resulting in valve bind. Slide valves and plugs out carefully. Do not use force at any time. The valves and valve body will be damaged if force is used. Also tag or mark the valve body springs for reference as they are removed. Do not allow them to become intermixed.

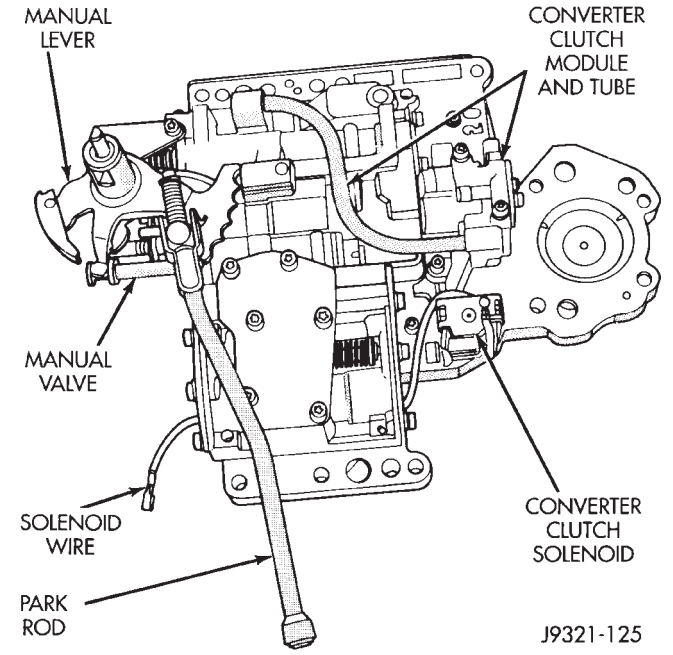


Fig. 101 Valve Body Assembly

(1) Remove screws attaching adjusting screw bracket to valve body and transfer plate. Hold bracket firmly against spring force while removing last screw.

(2) Remove adjusting screw bracket, line pressure adjusting screw, pressure regulator spring and switch valve spring (Fig. 102). **Do not remove throttle pressure adjusting screw from bracket and do not disturb adjusting screw settings during removal.**

(3) Secure detent ball and spring in housing with retainer tool 6583 (Fig. 103).

(4) Remove manual shaft E-clip and washer (Fig. 104).

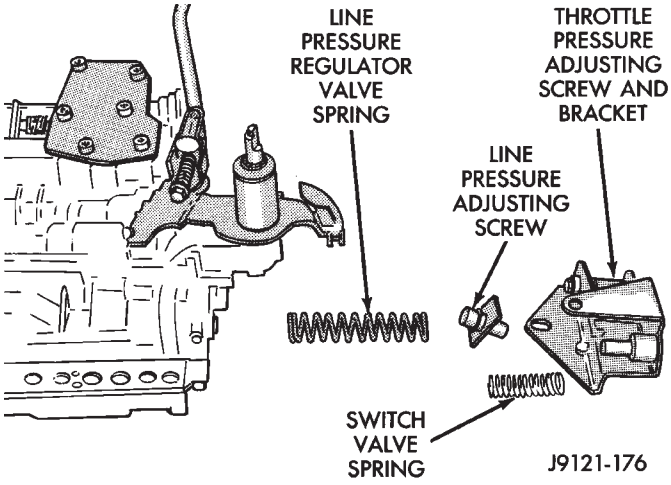


Fig. 102 Adjusting Screw Bracket And Spring Removal

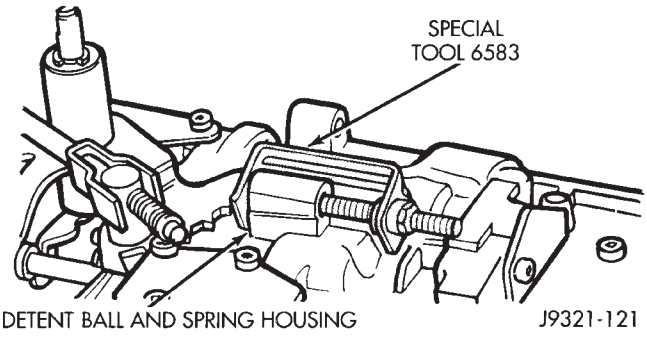


Fig. 103 Securing Detent Ball And Spring With Retainer Tool

(5) Pull manual shaft and park rod assembly upward out of valve body and off throttle lever (Fig. 104).

(6) Remove Retainer Tool 6583. Then remove and retain detent ball and spring.

(7) Remove throttle lever (Fig. 104).

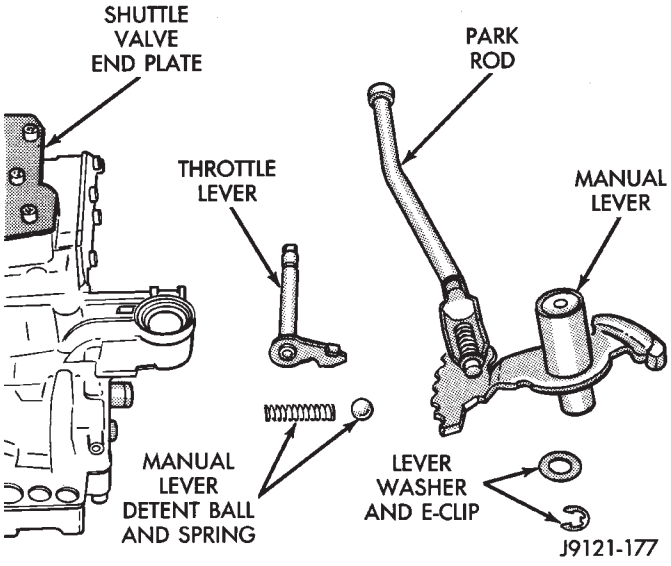


Fig. 104 Removing Manual And Throttle Levers

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

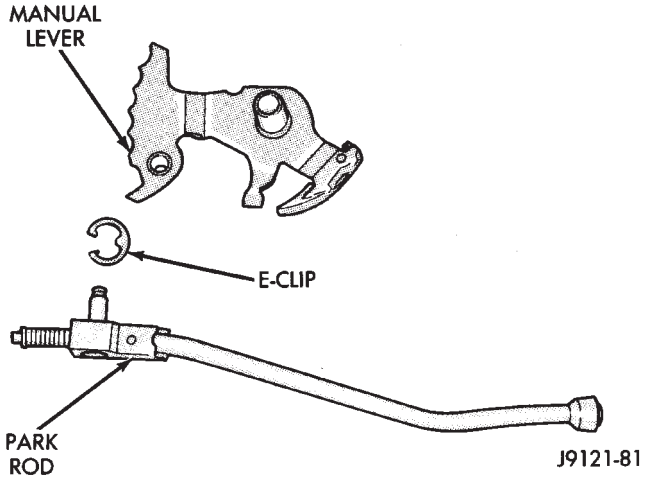


Fig. 105 Park Rod Removal

(9) Remove screws attaching converter clutch module to valve body and remove module and connecting tube (Fig. 106).

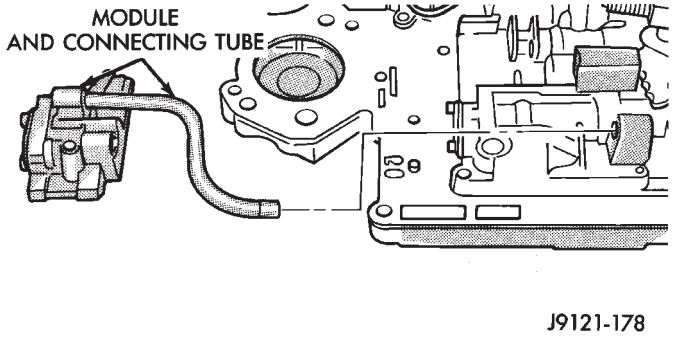


Fig. 106 Clutch Module And Connecting Tube Removal/Installation

(10) Turn valve body over so transfer plate is facing upward (Fig. 107). With valve body in this position, valve body check balls will remain in place and not fall out when transfer plate is removed.

(11) Remove screws attaching transfer plate to valve body (Fig. 107).

(12) Remove transfer plate and separator plate from valve body. Note position of filter and clutch solenoid for reference (Fig. 108).

(13) Position transfer plate on bench so separator plate, filter and lockup solenoid are facing up. This will avoid having rear clutch and rear servo check balls fall out when plates are separated.

(14) Remove screws attaching separator plate to transfer plate.

(15) Remove converter clutch solenoid from separator plate (Fig. 109). A T25 torx bit is required to remove solenoid attaching screw.

(16) Note position of filter, solenoid and rear clutch/rear servo check balls for assembly reference (Fig. 110).

(17) Remove shuttle valve end plate (Fig. 111).

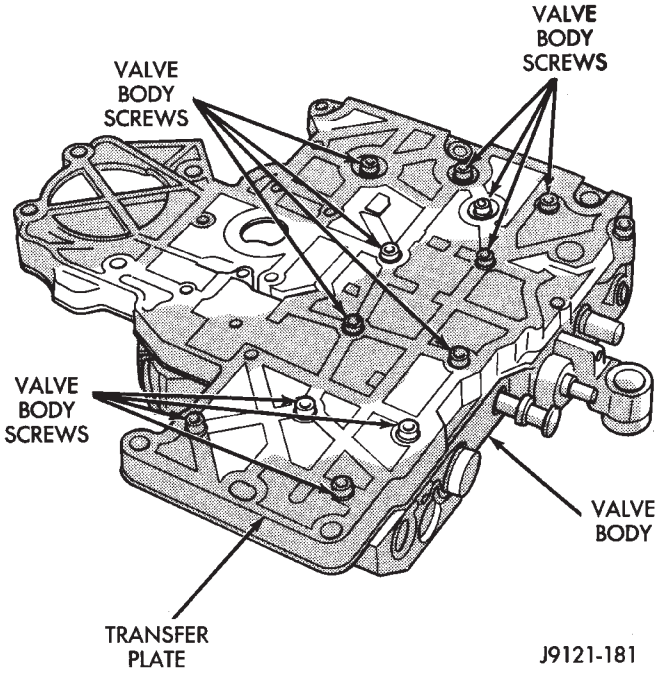


Fig. 107 Valve Body-To-Transfer Plate Screw Locations

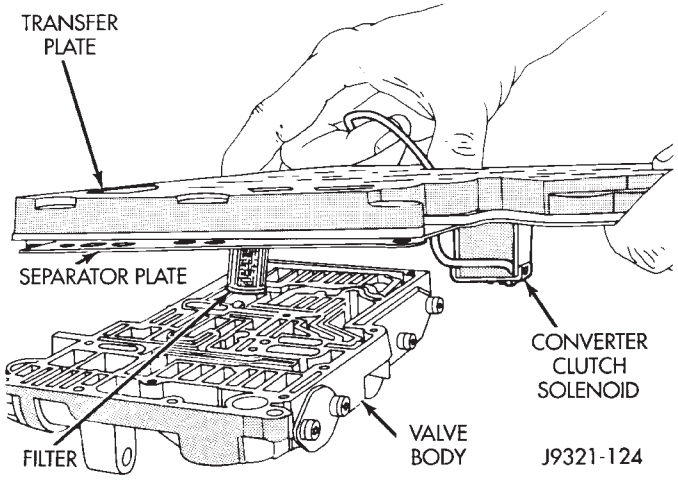


Fig. 108 Transfer Plate Removal/Installation

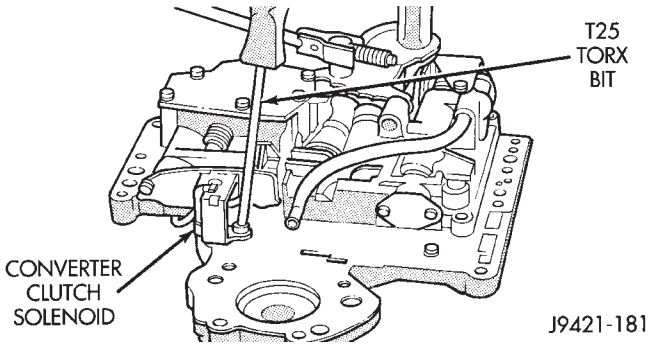


Fig. 109 Converter Clutch Solenoid Removal

(18) Remove shuttle valve E-clip and remove secondary spring and spring guides from end of valve (Fig. 111).

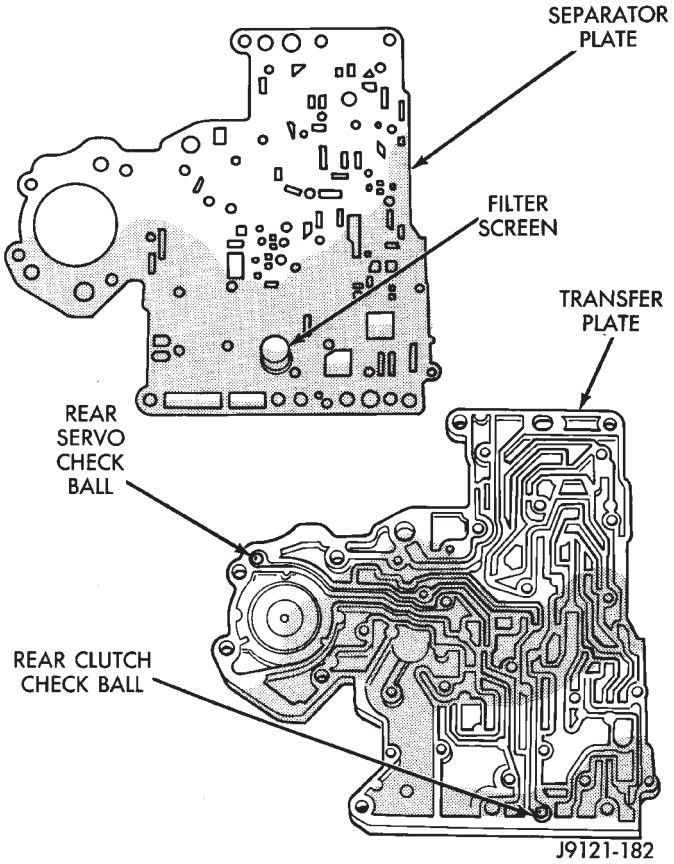


Fig. 110 Transfer And Separator Plates

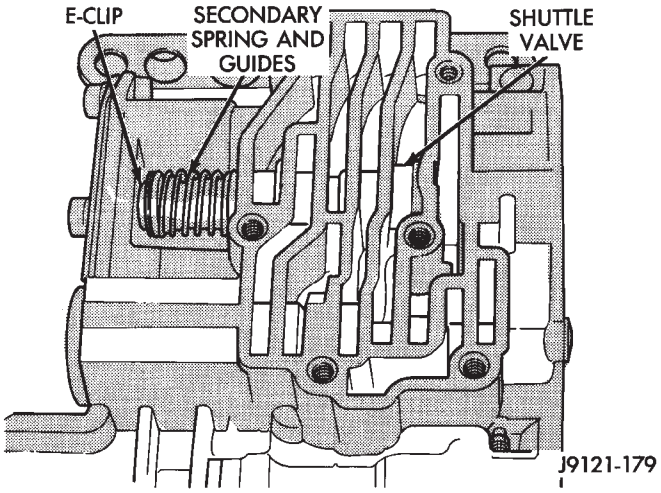


Fig. 111 Shuttle Valve E-Clip And Secondary Spring Location

(19) Remove governor valve end plate (Fig. 112).

(20) Remove switch valve and pressure regulator valve from valve body (Fig. 112).

(21) Remove throttle valve and spring, kickdown valve and detent and manual valve from valve body (Fig. 112).

(22) Remove 1-2 and 2-3 shift valve governor plugs from valve body (Fig. 112).

(23) Remove shuttle valve throttle plug, primary spring and shuttle valve from valve body (Fig. 112).

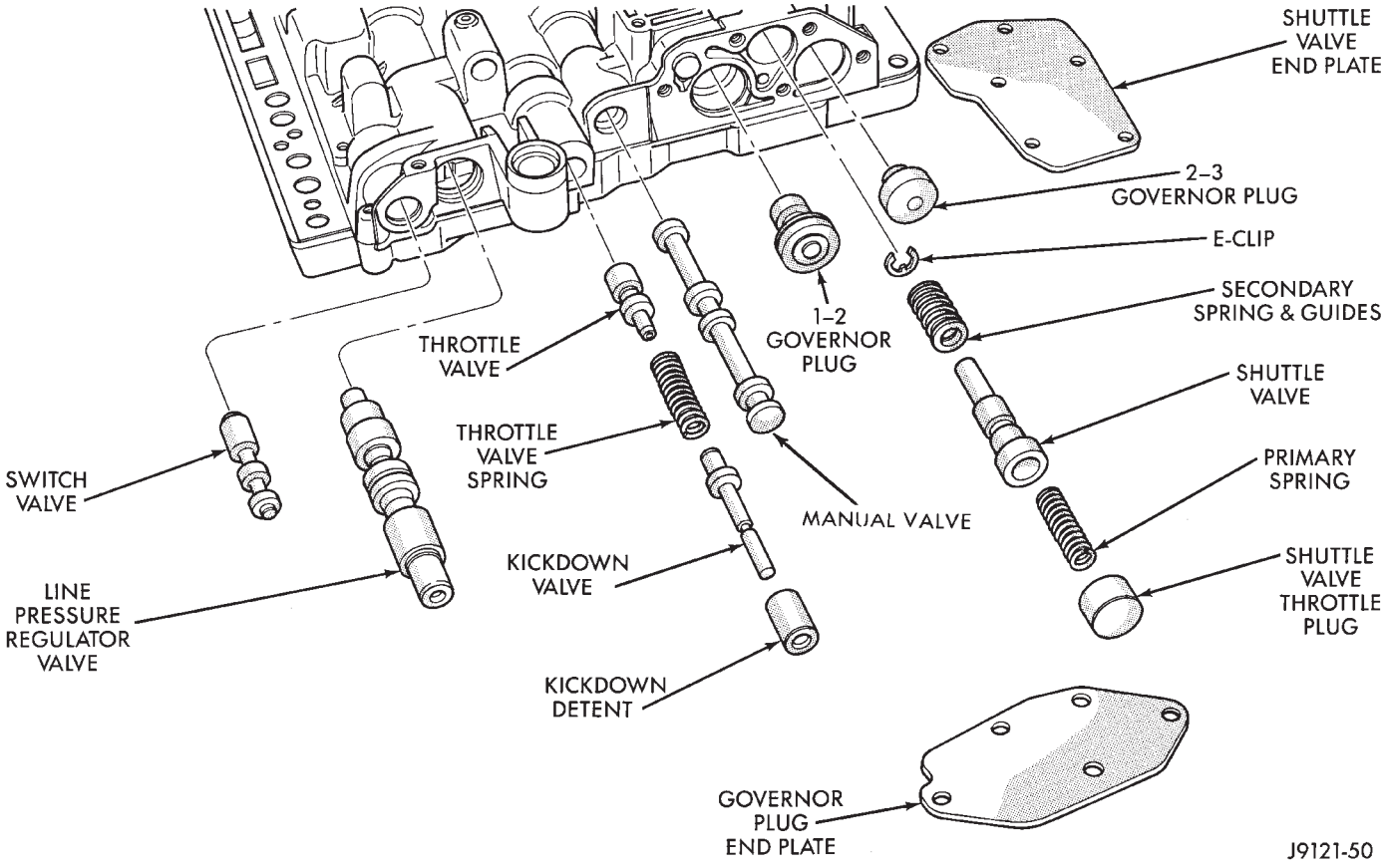


Fig. 112 Control Valves And Governor Plugs

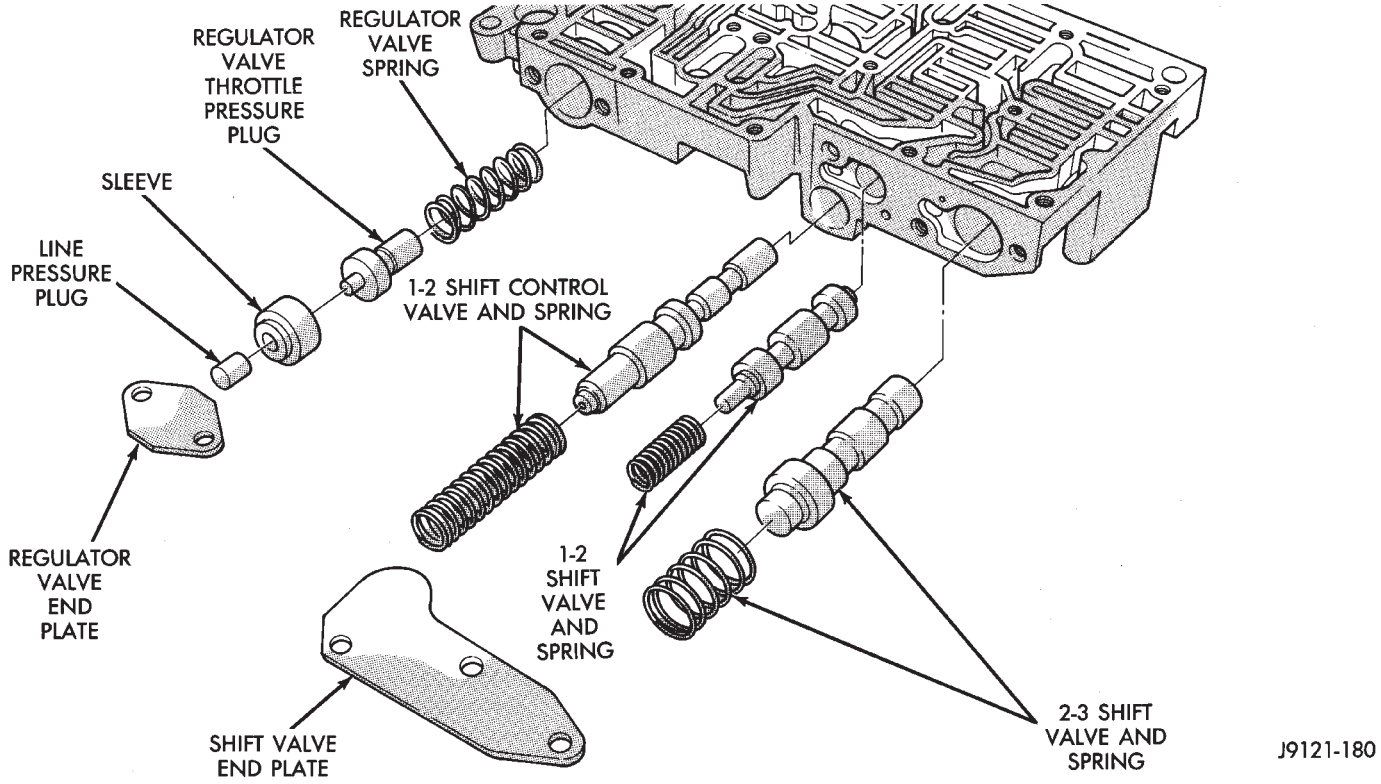


Fig. 113 Shift Valves And Pressure Regulator Plugs

(24) Remove 1-2 shift control valve and spring from valve body (Fig. 113).

(25) Remove 2-3 shift valve and spring from valve body (Fig. 113).

(26) Remove 1-2 shift valve and spring from valve body (Fig. 113).

(27) Remove regulator valve end plate (Fig. 113).

(28) Remove regulator valve line pressure plug, pressure plug sleeve, throttle pressure plug and spring (Fig. 113).

VALVE BODY CLEANING AND INSPECTION

The only serviceable valve body components are:

- park lock rod and E-clip
- switch valve and spring
- pressure adjusting screw bracket
- throttle valve lever
- manual lever
- manual lever shaft seal, washer, E-clip and detent ball
- fluid filter
- converter clutch solenoid

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

Clean the valve body components in a parts cleaning solution only. Do not use gasoline, kerosene, or any type of caustic solution. Dry the parts with compressed air. Make sure all passages are clean and free from obstructions.

Do not use rags or shop towels to wipe off valve body components. Lint from these materials will adhere to the valve body components. Lint will interfere with valve operation and may clog filters and fluid passages.

Inspect the throttle and manual valve levers and shafts. Do not attempt to straighten a bent shaft or correct a loose lever. Replace these components if worn, bent, loose or damaged in any way.

Inspect all of the valve body mating surfaces for scratches, nicks, burrs, or distortion. Use a straightedge to check surface flatness. Minor scratches may be removed with crocus cloth using only very light pressure.

Minor distortion of a valve body mating surface may be corrected by smoothing the surface with crocus cloth. The cloth should be in sheet form and be positioned on a surface plate, sheet of plate glass, or equally flat surface. However, if distortion is severe or any surfaces are heavily scored, the valve body will have to be replaced.

CAUTION: The throttle valve, shuttle valve plug, 1-2 shift valve and 1-2 governor plug are made of coated aluminum. These components are identified in Figure 114 with the abbreviation (Alum.). Aluminum components can be identified by the dark color of the special coating applied to the surface (or by testing with a magnet). DO NOT polish or sand aluminum valves or plugs with any type of material, or under any circumstances. This practice might damage the special coating and cause the valves and plugs to stick and bind.

Inspect the valves and plugs for scratches, burrs, nicks, or scores. Also inspect the coating on the aluminum valves and plugs (Fig. 114). If the coating is damaged or worn through, the valve (or valve body) should be replaced.

Aluminum valves and plugs should not be sanded or polished under any circumstances. However, minor burrs or scratches on steel valves and plugs can be removed with crocus cloth but do not round off the valve or plug edges. Squareness of these edges is vitally important. These edges prevent foreign matter from lodging between the valves, plugs and bore.

Inspect all the valve and plug bores in the valve body. Use a penlight to view the bore interiors. Replace the valve body if any bores are distorted or scored. Inspect all of the valve body springs. The springs must be free of distortion, warpage or broken coils.

Trial fit each valve and plug in its bore to check freedom of operation. When clean and dry, the valves and plugs should drop freely into the bores. Valve body bores do not change dimensionally with use. If the valve body functioned correctly when new, it will continue to operate properly after cleaning and inspection. It should not be necessary to replace a valve body assembly unless it is damaged in handling.

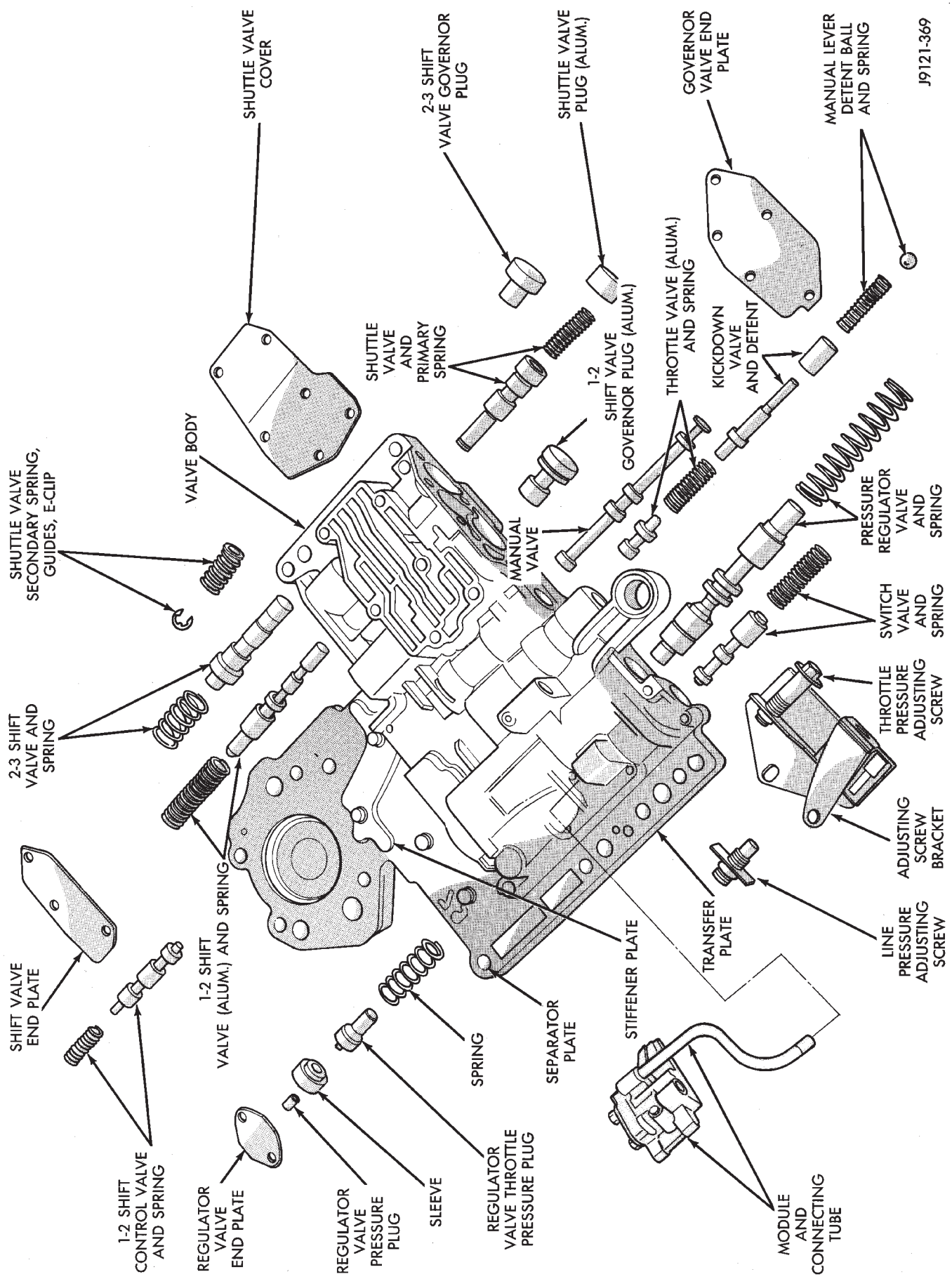


Fig. 114 Valve Body Components (Alum. Indicates Aluminum Part)

VALVE BODY ASSEMBLY AND ADJUSTMENT

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 valve body resulting in valve sticking, cross leakage and unsatisfactory operation. Tighten valve body screws to recommended torque only.

(1) Lubricate valve body bores, valves and plugs with ATF Plus, or Dexron II™ transmission fluid.

(2) Insert rear clutch and rear servo check balls in transfer plate (Fig. 110).

(3) Install filter screen in separator plate (Fig. 110).

(4) Align and install separator plate on transfer plate. Verify check ball position before installing separator plate on transfer plate.

(5) Install new O-ring on converter clutch solenoid and insert solenoid in separator plate (Fig. 115). Then secure solenoid in position with attaching screw. Tighten screw to 4 N·m 35 in. lbs.) torque.

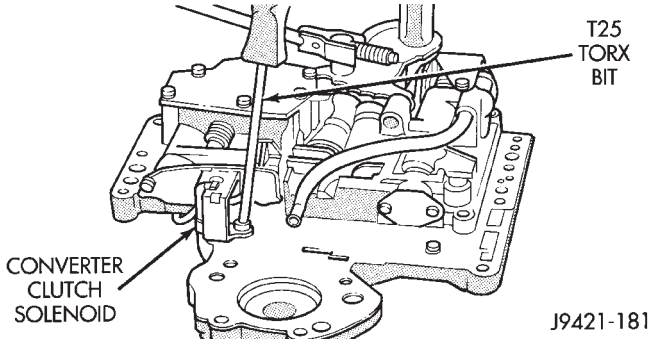


Fig. 115 Installing Converter Clutch Solenoid

(6) Position valve body so internal passages and check ball seats are facing upward. Then install steel/plastic check balls in valve body (Fig. 116). The one large check ball is approximately 11/32 inch in diameter. The remaining check balls are approximately 1/4 inch in diameter.

(7) Align and install assembled transfer and separator plates on valve body. Install and tighten valve body screws alternately in a diagonal pattern to 4 N·m (35 in. lbs.) torque.

(8) Assemble and install clutch module and components on valve body (Fig. 117).

(9) Assemble regulator valve line pressure plug, sleeve, throttle plug and spring (Fig. 108). Insert assembly in valve body and install end plate. Tighten end plate screws to 4 N·m (35 in. lbs.) torque.

(10) Install 1-2 and 2-3 shift valves and springs (Fig. 113).

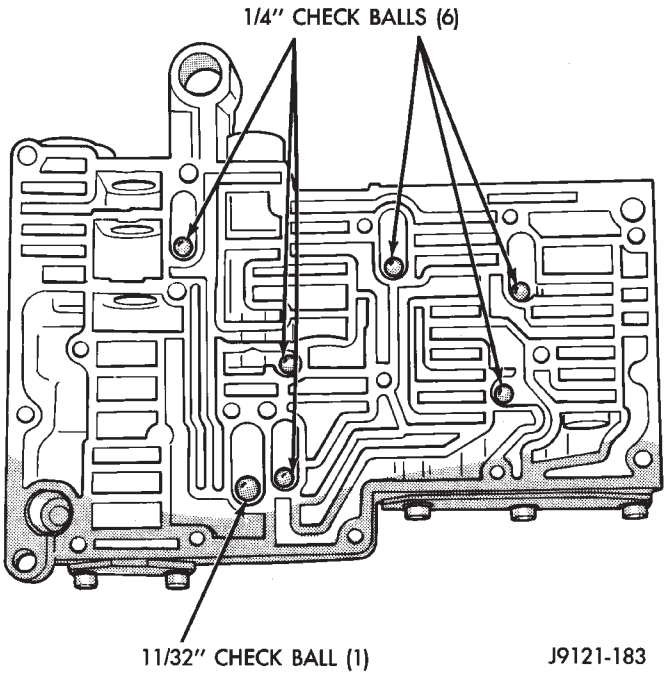


Fig. 116 Correct Position Of Valve Body Check Balls

(11) Install 1-2 shift control valve and spring (Fig. 113)

(12) Install shuttle valve as follows:

(a) Insert shuttle valve in bore.

(b) Insert plastic guides in shuttle valve secondary spring.

(c) Install spring on end of valve.

(d) Hold shuttle valve in place. Then compress secondary spring and install E-clip in groove at end of valve.

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

(13) Install shuttle valve cover plate (Fig. 113). Tighten end plate screws to 4 N·m (35 in. lbs.) torque.

(14) Install 1-2 and 2-3 valve governor plugs in valve body (Fig. 113). Then install shuttle valve primary spring and throttle plug.

(15) Align and install governor plug end plate on valve body and install end plate screws. Tighten screws to 4 N·m (35 in. lbs.) torque.

(16) Install manual valve (Fig. 112).

(17) Install throttle valve and spring. Then install kickdown valve and detent (Fig. 112).

(18) Install pressure regulator valve and switch valve in valve body.

(19) Install manual lever detent spring in housing. Place detent ball on end of spring and push ball and spring into housing. Secure ball and spring with Detent Retainer 6583 (Fig. 103).

(20) Insert line pressure adjusting screw in adjusting screw bracket (Fig. 102).

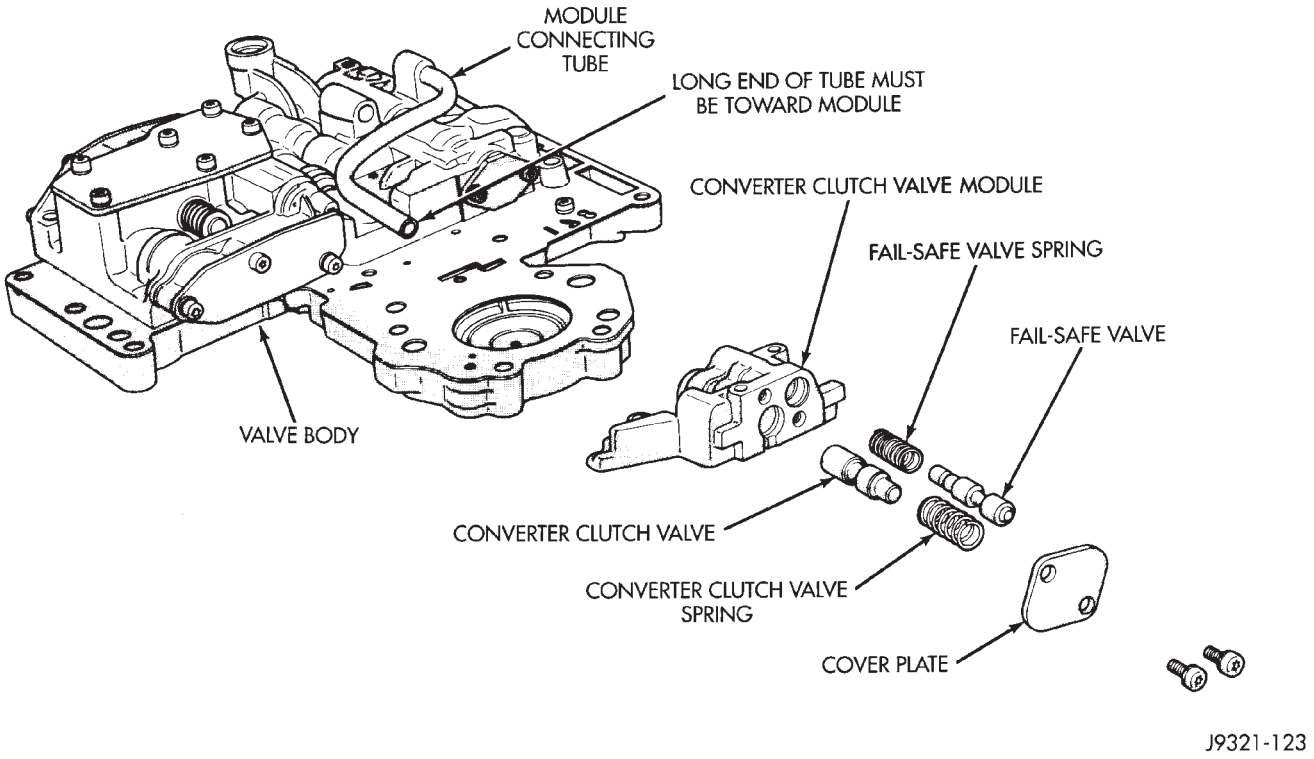


Fig. 117 Converter Clutch Module Components

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

(22) Install switch valve spring on tang at end of adjusting screw bracket (Fig. 102).

(23) 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.

(24) Install module and connecting tube. Be sure long end of tube goes to module (Fig. 106). Tighten module screws to 4 N·m (35 in. lbs.) torque.

(25) Install throttle lever in valve body. Then install manual lever over throttle lever and start manual lever into valve body.

(26) Align manual lever detent with detent ball and align lever arm with manual valve. Hold throttle lever upward. Then press down on manual lever until lever is fully seated.

(27) Install manual lever seal, washer and retaining E-clip.

(28) Lubricate shaft of manual lever with light coat of petroleum jelly. This will help protect seal lip when manual shaft seal is installed.

(29) Verify that throttle lever is aligned with end of kickdown valve stem and that manual lever arm is engaged in manual valve (Fig. 118).

(30) 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.

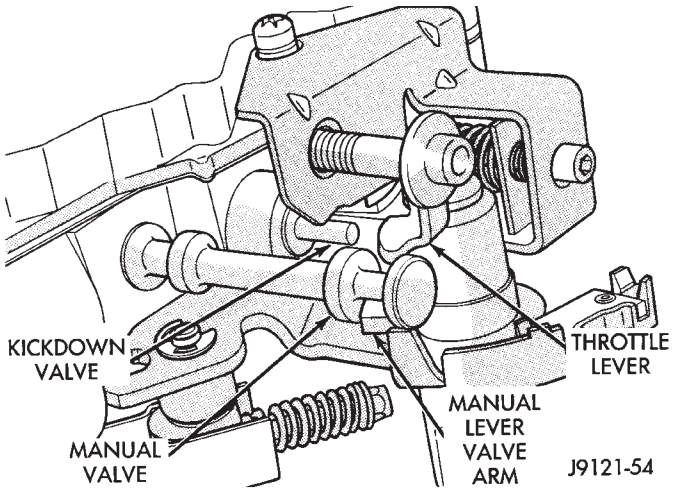


Fig. 118 Manual And Throttle Lever Alignment

VALVE BODY CONTROL PRESSURE ADJUSTMENTS

There are two control pressure adjustments on the valve body which are, line pressure and throttle pressure.

The two pressures are interdependent because each affects shift quality and timing. Each pressure adjustment must be performed properly and in the cor-

rect sequence. The correct sequence is line pressure adjustment first and throttle pressure adjustment last.

Line Pressure Adjustment

Measure distance from the valve body to the inner edge of the adjusting screw with an accurate steel scale (Fig. 119).

Distance should be 33.4 mm (1-5/16 in.).

If adjustment is required, turn the adjusting screw in, or out, to obtain required distance setting.

The 33.4 mm (1-5/16 in.) setting is an approximate setting. Because of manufacturing tolerances, it may be necessary to vary from this dimension to obtain desired pressure.

One complete turn of the adjusting screw changes line pressure approximately 1-2/3 psi (9 kPa). Turning the adjusting screw counterclockwise increases pressure while turning the screw clockwise decreases pressure.

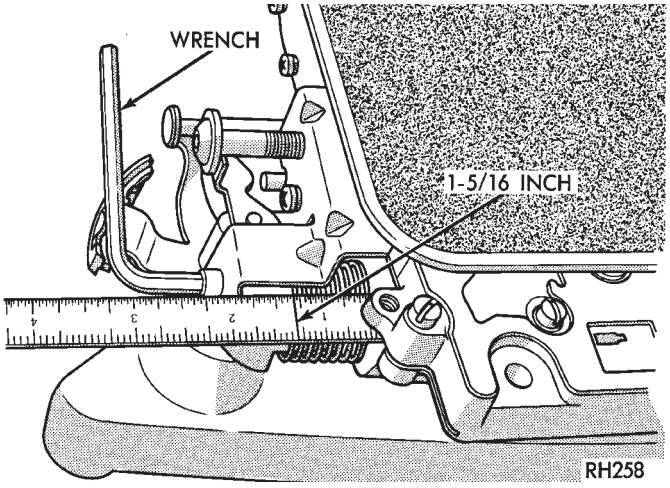


Fig. 119 Line Pressure Adjustment

Throttle Pressure Adjustment

Insert Gauge Tool C-3763 between the throttle lever cam and the kickdown valve stem (Fig. 120).

Push the gauge tool inward to compress the kickdown valve against the spring and bottom the throttle valve.

Maintain pressure against kickdown valve spring. Turn throttle lever stop screw until the screw head touches throttle lever tang and the throttle lever cam touches gauge tool.

The kickdown valve spring must be fully compressed and the kickdown valve completely bottomed to obtain correct adjustment.

TRANSMISSION ASSEMBLY TIPS

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

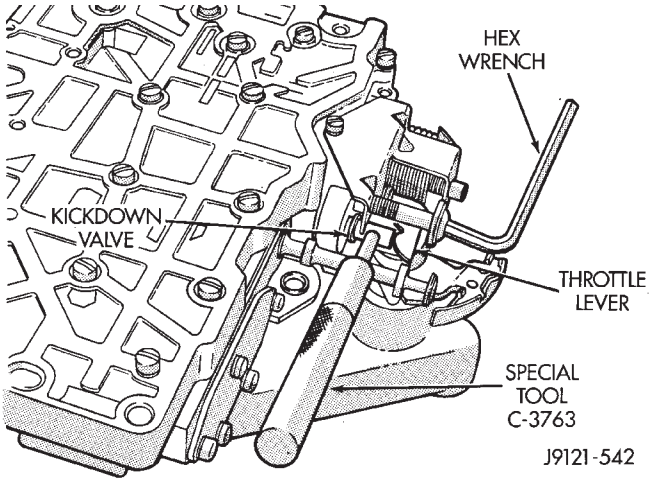


Fig. 120 Throttle Pressure Adjustment

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

Lubricate the transmission components with ATF Plus, or Dexron II™ during reassembly. Use petroleum jelly, Door Eze, or Ru-Glyde on seals and O-rings to ease installation.

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

Do not force parts into place. Most of the transmission components are easily installed by hand when properly aligned. If a part seems extremely difficult to install, it is either misaligned or incorrectly assembled. Also verify that thrust washers, thrust plates and seal rings are correctly positioned before assembly. These parts can interfere with proper assembly if mispositioned or "left out" by accident.

TRANSMISSION ASSEMBLY AND ADJUSTMENT PROCEDURES

SERVO INSTALLATION

(1) Install rear servo piston, spring and spring retainer. Compress rear servo spring and retainer with Compressor Tool C-3422-B or a large C-clamp.

(2) Install front servo piston, spring and rod guide. Compress front servo rod guide with Valve Spring Compressor C-3422-B and install servo snap ring.

OVERRUNNING CLUTCH INSTALLATION

(1) Examine bolt holes in overrunning clutch cam. Note that one hole is **not threaded** (Fig. 121). This hole must align with blank area in clutch cam bolt circle (Fig. 122).

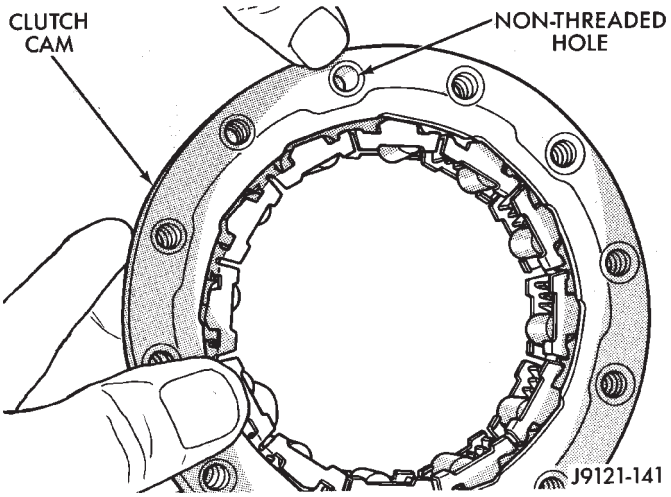


Fig. 121 Location Of Non-Threaded Hole In Clutch Cam

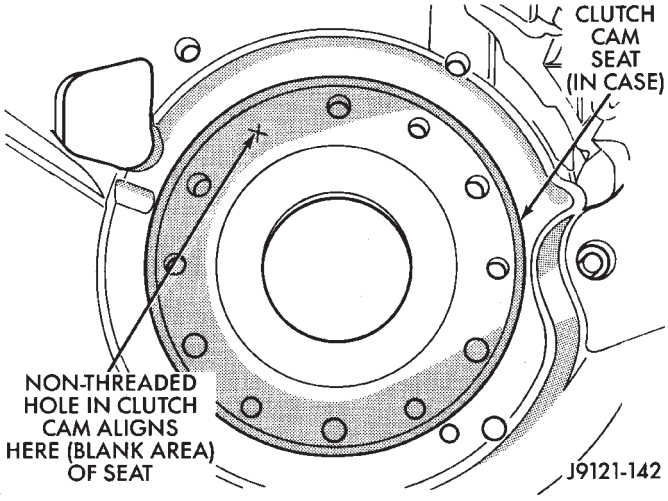


Fig. 122 Location Of Blank Area In Clutch Cam Seat Of Case

(2) Mark location of non threaded hole in clutch cam and blank area of case with paint stripe (Fig. 123).

(3) Align and install overrunning clutch cam in case (Fig. 123). **Be sure cam is correctly installed. Bolt holes in cam are slightly countersunk on one side. This side of cam faces rearward (toward rear support).**

(4) Partially install overrunning clutch in cam (Fig. 123).

(5) Verify that non threaded hole in clutch cam is properly aligned (Fig. 123). Check alignment by threading a clutch cam bolt into each hole. Adjust cam position if necessary before proceeding.

(6) Seat overrunning clutch in clutch cam after verifying correct cam alignment.

(7) Install overrunning clutch cam bolts. **Clutch cam bolts are shorter than rear support bolts.** Tighten cam bolts to 17 N·m (150 in. lbs. or 13 ft. lbs.) torque.

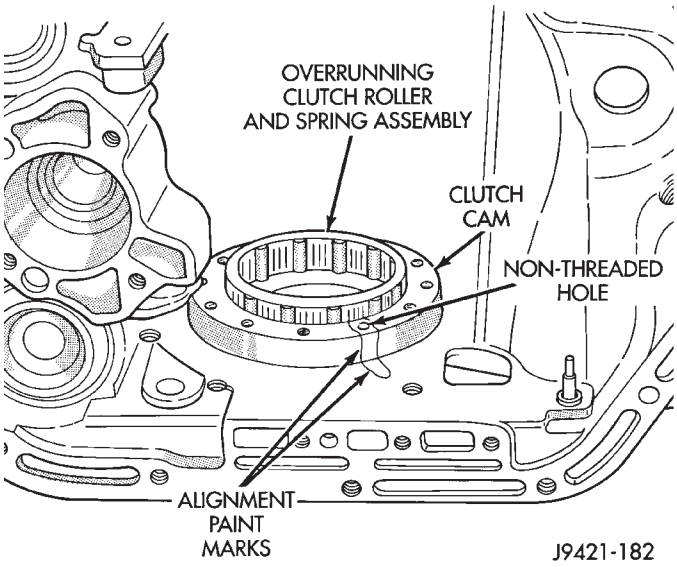


Fig. 123 Overrunning Clutch Cam Alignment

(8) Lubricate overrunning clutch rollers, springs and cam with ATF Plus transmission fluid.

REAR BAND, LOW-REVERSE DRUM AND REAR SUPPORT INSTALLATION

A different rear band and linkage is used in 30RH and 32RH transmissions.

The 30RH transmission has a single wrap band, one pivot pin and a band link to connect the lever (Fig. 124). The lever adjusting screw is in direct contact with the servo piston. A strut is used to connect the lever to the band lug.

The 32RH transmission has a double wrap band, a pivot pin, and a reaction pin (Fig. 125). The band lever pivots against a lug on the band. A strut is not used. The reaction pin functions as the stop, or locating mechanism for the band lower lug.

Rear Band Installation Procedure

(1) On 32RH transmission, install band components and low-reverse drum as follows:

(a) Install reaction pin in case (Fig. 126).

(b) Position band in case and seat band lug against reaction pin.

(c) Slide low-reverse drum through band (Fig. 127). Then tilt drum slightly and start clutch race into overrunning clutch rollers.

(d) Rotate drum in clockwise direction and push drum inward until race is seated in overrunning clutch.

(e) Install rear band lever (Fig. 128). Be sure lever pivot pin is fully seated in case afterward.

(2) On 30RH transmission, install band components and low-reverse drum as follows:

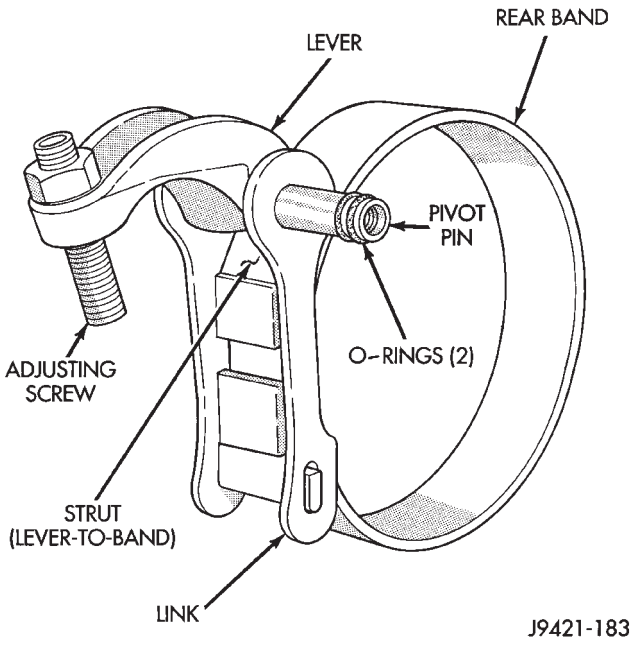


Fig. 124 Rear Band Components (30RH)

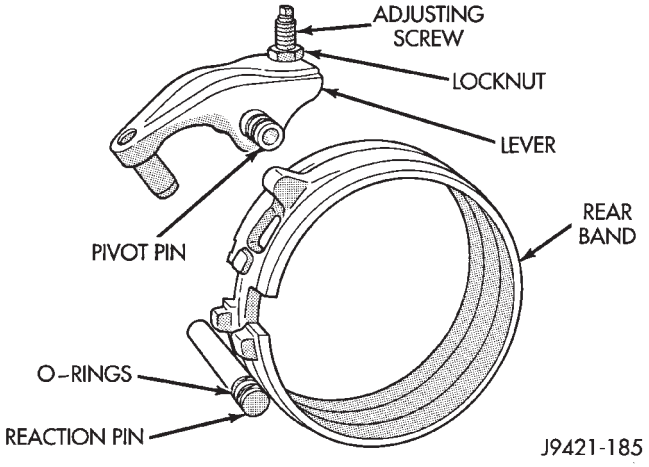


Fig. 125 Rear Band Components (32RH)

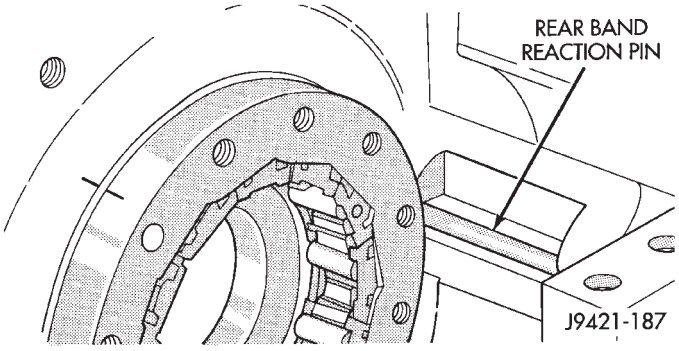


Fig. 126 Rear Band Reaction Pin Installation (32RH)

(a) Assemble band and link. Be sure that notch in one side of link is facing band (Fig. 129).

(b) Position band and link in case (Fig. 130).

(c) Slide low-reverse drum through band (Fig. 131). Then tilt drum slightly and start clutch race into overrunning clutch rollers.

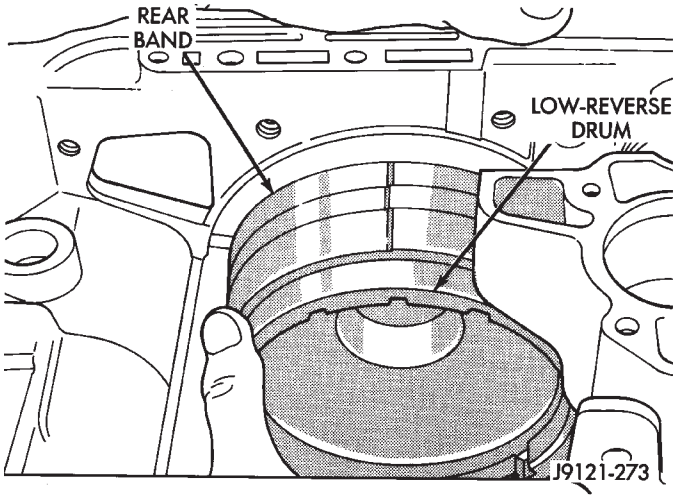


Fig. 127 Rear Band And Low-Reverse Drum Installation (32RH)

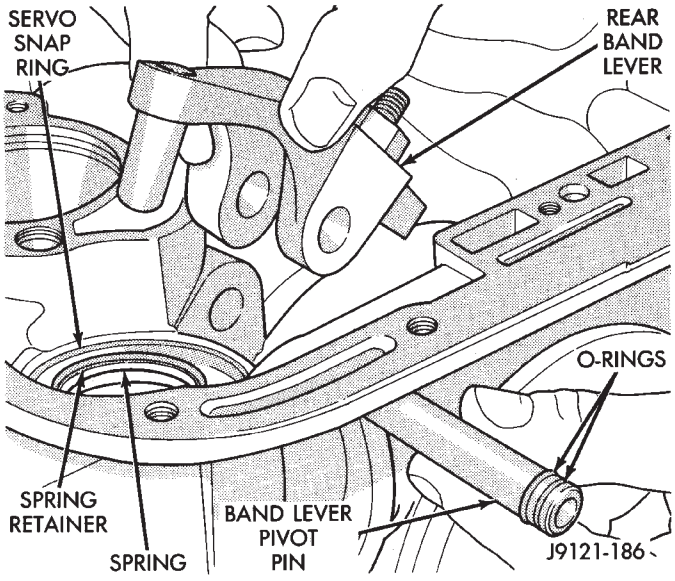


Fig. 128 Rear Band Lever And Pivot Pin Installation (32RH)

(d) Rotate drum in clockwise direction and push drum inward until race is seated in overrunning clutch.

(e) Install rear band lever and pivot pin. Be sure lever pivot pin is fully seated in case afterward.

(3) Hold low-reverse drum in position and install rear support (Fig. 132)

(4) Align support with punch marks made during disassembly.

(5) Install and tighten rear support bolts to 17 N·m (150 in. lbs.) torque.

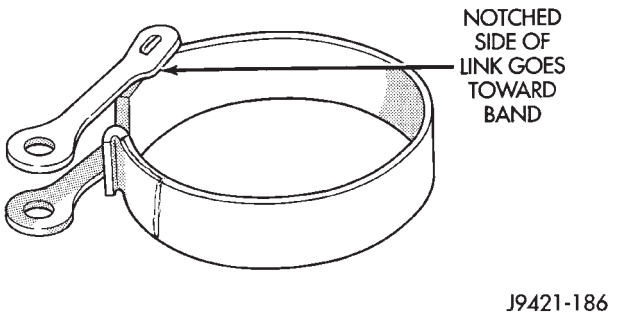


Fig. 129 Assembling Rear Band And Link (30RH)

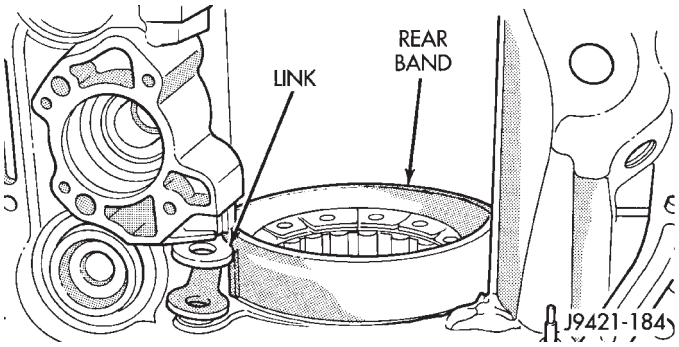


Fig. 130 Rear Band Positioned In Case (30RH)

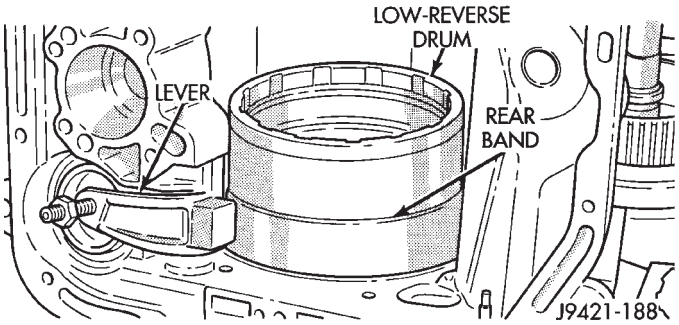


Fig. 131 Low-Reverse Drum And Band Lever Installation (30RH)

(6) Install snap ring that retains low-reverse drum to hub of rear support (Fig. 133).

PLANETARY GEARTRAIN AND OUTPUT SHAFT INSTALLATION

(1) Lubricate output shaft, rear support bore and low-reverse drum hub with transmission fluid.

(2) Install assembled output shaft and planetary geartrain in case (Fig. 134).

(3) Align drive lugs on rear planetary gear with slots in low-reverse drum (Fig. 135). Then seat planetary assembly in drum.

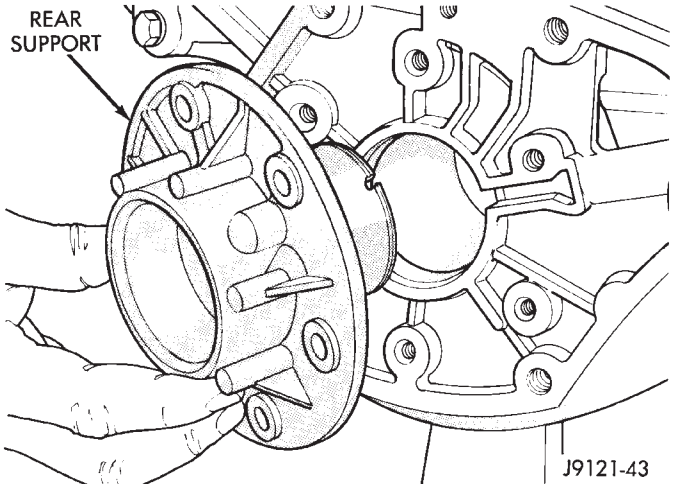


Fig. 132 Rear Support Installation

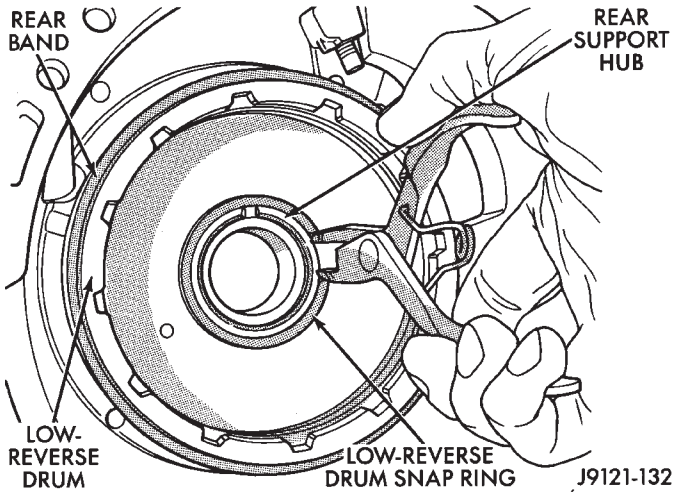


Fig. 133 Installing Low-Reverse Drum Snap Ring

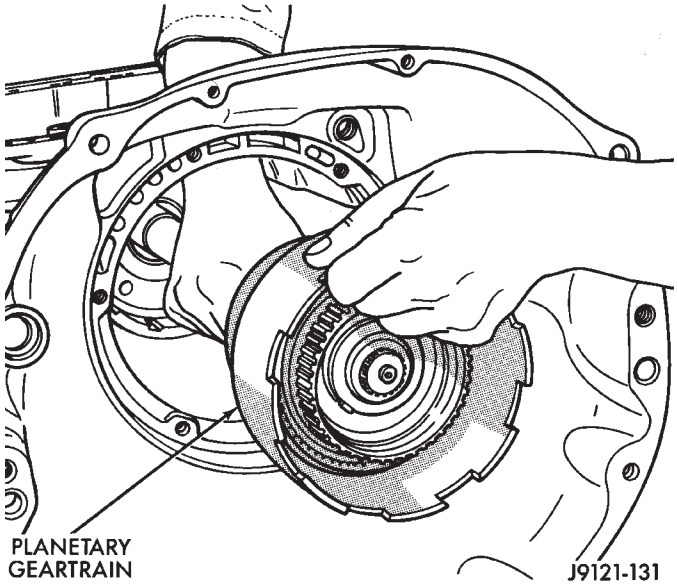


Fig. 134 Installing Output Shaft And Planetary Geartrain

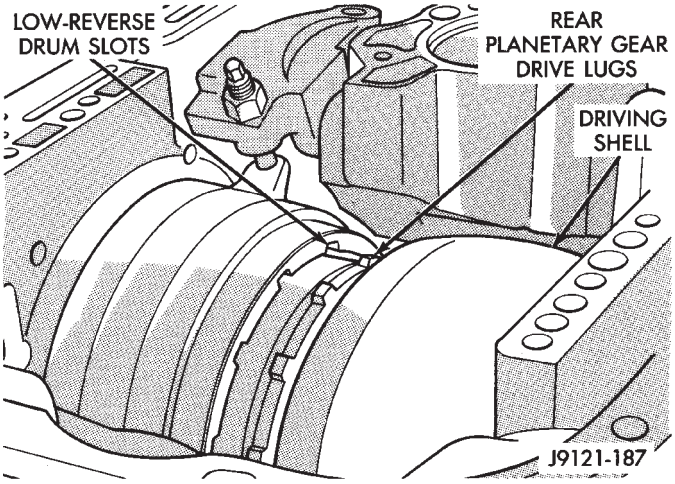


Fig. 135 Aligning/Seating Rear Planetary In Low-Reverse Drum

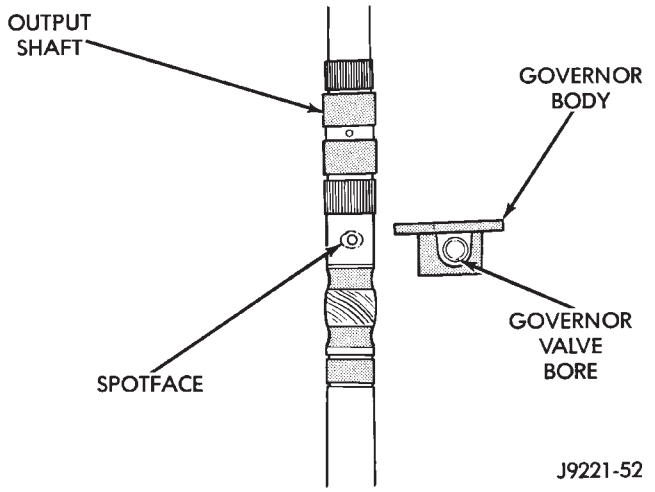


Fig. 136 Governor Valve And Output Shaft Spotface Alignment

GOVERNOR AND PARK GEAR INSTALLATION

(1) Lubricate governor components and park gear seal rings with transmission fluid.

(2) Install governor filter in park gear and install governor body on gear. Align governor body on gear using marks made at disassembly.

(3) Install new seal rings on hub of park gear if necessary. Be sure ring (or rings) with hooked ends are properly connected.

(4) Install governor weight assembly in governor body. Be sure governor weight snap rings are securely seated.

(5) Align and install governor/park gear assembly on output shaft as follows:

(a) **Note that output shaft in current transmission is spotfaced for governor valve end clearance (Fig. 136). Shaft must be indexed so that small end of governor valve will seat in this spotface. Install governor body and park as follows to ensure proper alignment and operation.**

(b) Rotate output shaft until spotface (at governor valve shaft hole) is facing upward (Fig. 136).

(c) Position valve bore in governor body over spotface on output shaft. Then align valve shaft holes in governor body and output shaft.

(d) Align splines in output shaft and park gear hub.

(e) Carefully push assembly into place in rear support (Fig. 137).

(f) Verify that governor valve shaft holes in output shaft and governor body are still in alignment. Reposition governor body and park gear if alignment is not correct.

(g) Tighten bolts attaching governor body to park gear to 11 N·m (95 in. lbs.) torque.

(6) Install first E-clip on governor valve shaft. Then install governor valve and shaft in governor body (Fig. 138). **Be sure valve shaft moves freely**

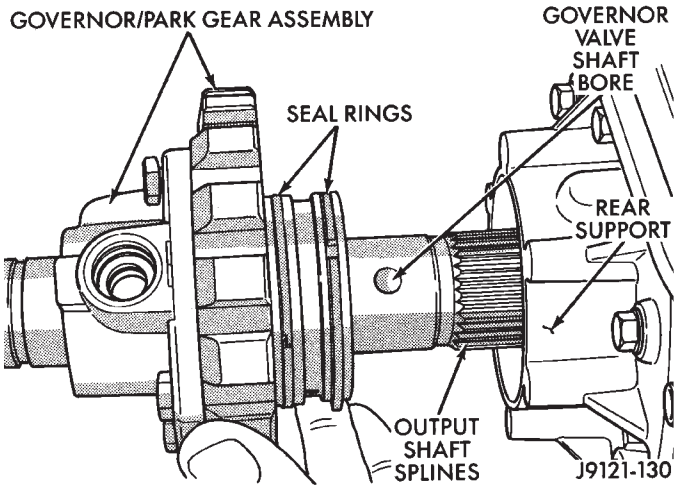


Fig. 137 Installing Governor Body And Park Gear

in valve and in output shaft. If valve shaft binds, governor/park gear is misaligned.

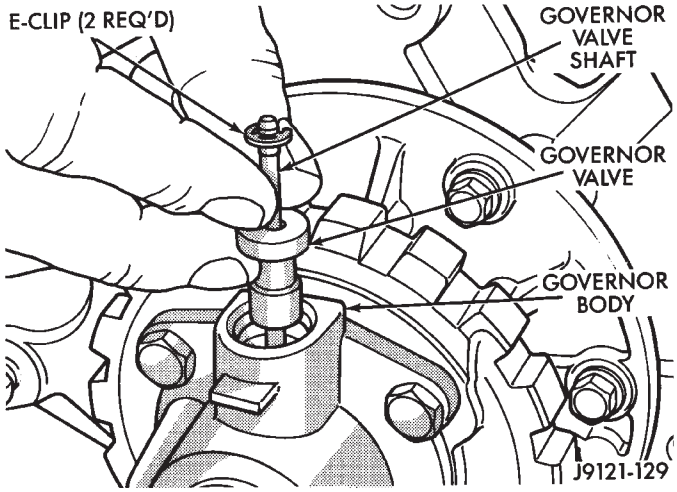


Fig. 138 Installing Governor Valve And Shaft

(7) Rotate output shaft until opposite end of governor valve shaft is facing upward. Then install remaining E-clip on governor valve shaft (Fig. 139). **Be very sure both E-clips are firmly seated on shaft.**

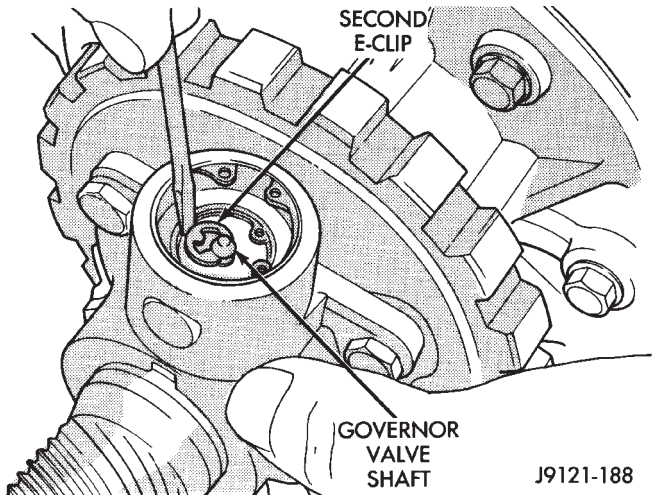


Fig. 139 Securing Governor Valve Shaft With New E-Clip

(8) Install snap ring that retains governor body on output shaft (Fig. 140).

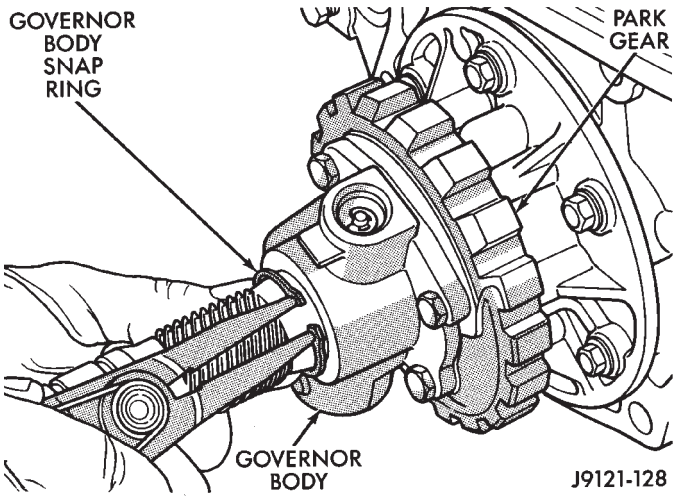


Fig. 140 Installing Governor Body Snap Ring

FRONT/REAR CLUTCH INSTALLATION

(1) Install output shaft thrust plate on shaft hub (Fig. 141). Use petroleum jelly to hold thrust plate in place.

(2) Check input shaft seal rings (Fig. 142). Verify that diagonal-cut ends of teflon seal ring are properly joined and ends of metal ring are correctly hooked together. Also be sure rings are installed sequence shown.

(3) Check rear clutch thrust washer. Use additional petroleum jelly to hold washer in place if necessary.

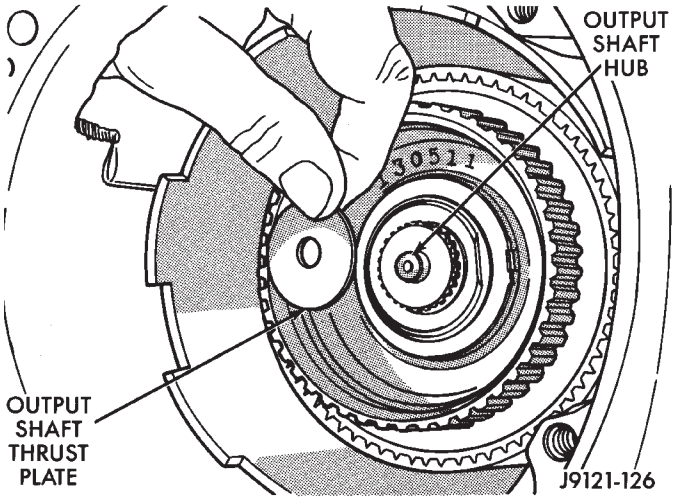


Fig. 141 Installing Output Shaft Thrust Plate

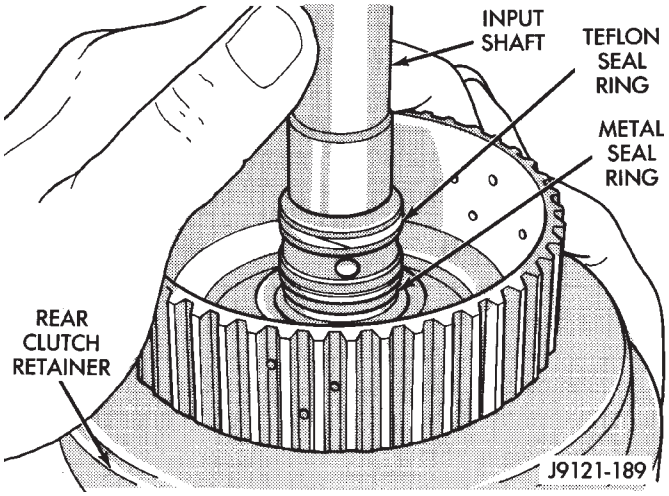


Fig. 142 Input Shaft Seal Ring Location

(4) Align clutch discs in front clutch and install front clutch on rear clutch (Fig. 143). Rotate front clutch retainer back and forth until completely seated on rear clutch.

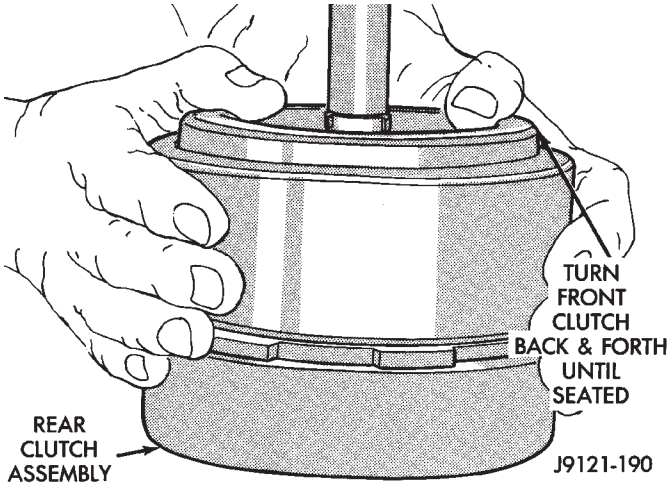


Fig. 143 Assembling Front And Rear Clutch Units

(5) Coat output shaft thrust washer with petroleum jelly. Then install washer in rear clutch hub (Fig. 144). Use enough petroleum jelly to hold washer in place. **Be sure grooved side of washer faces rearward (toward output shaft) as shown. Also note that washer only fits one way in clutch hub.**

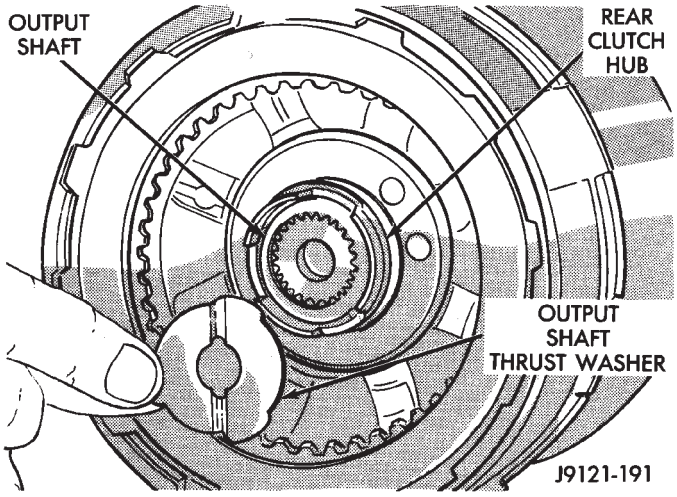


Fig. 144 Installing Output Shaft Thrust Washer

(6) Align drive teeth on rear clutch discs with small screwdriver (Fig. 145). This will make installation on front planetary easier.

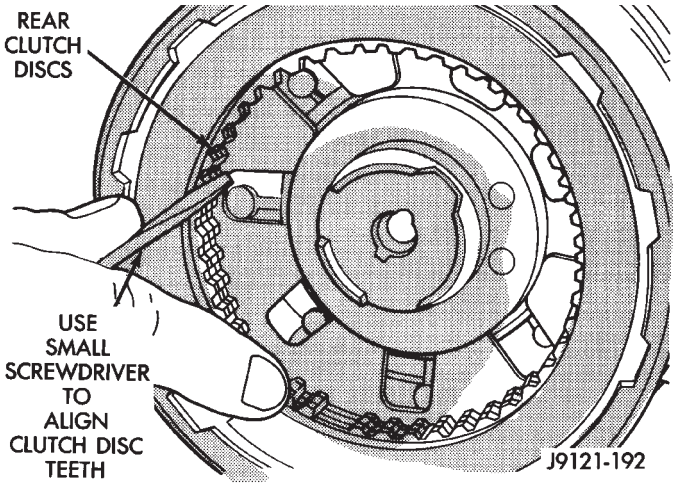


Fig. 145 Aligning Rear Clutch Disc Lugs

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

(8) Install front and rear clutch units as assembly (Fig. 146). Align rear clutch with front annulus gear and install assembly in driving shell. **Be sure output shaft thrust washer and thrust plate are not displaced during installation.**

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

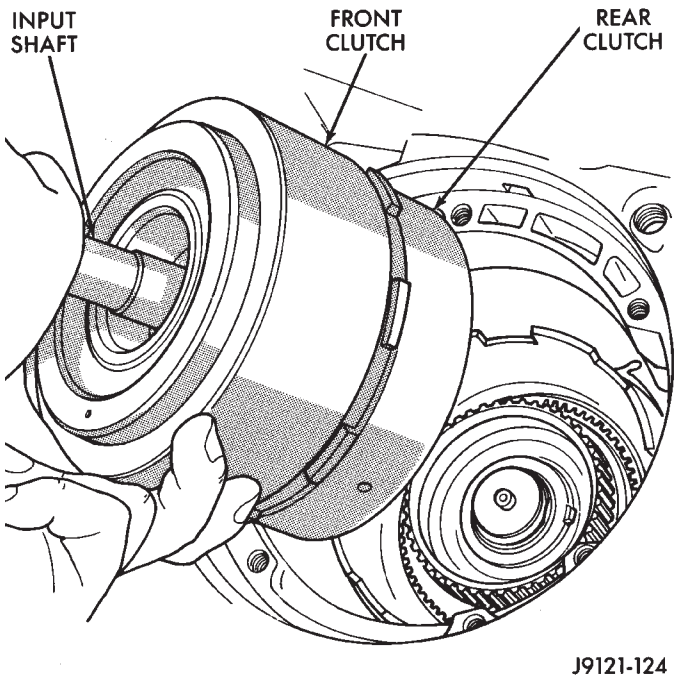


Fig. 146 Installing Front/Rear Clutch Assemblies

FRONT BAND AND OIL PUMP INSTALLATION

(1) Slide front band over front clutch retainer (Fig. 147).

(2) Insert front band reaction pin part way into case (Fig. 147).

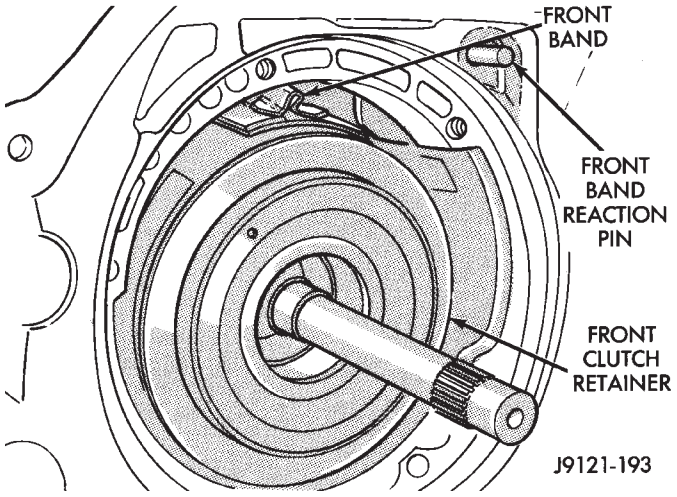


Fig. 147 Installing Front Band And Reaction Pin

(3) Install front band lever, strut, lever pin and adjusting screw (Fig. 148).

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

(5) Coat band lever pin access plug with sealer and install plug in converter housing (Fig. 149).

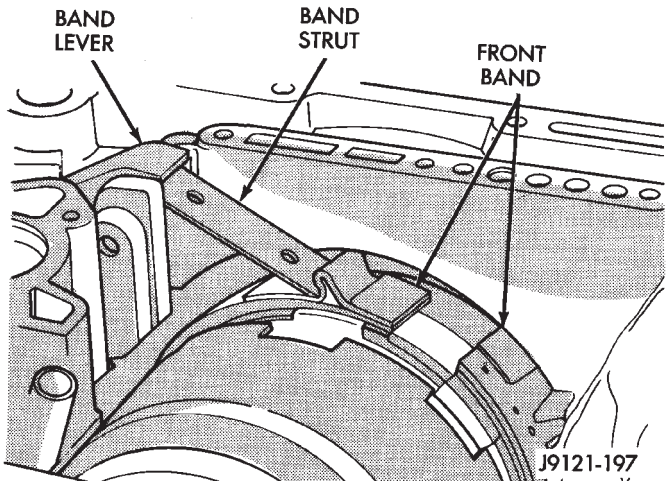


Fig. 148 Front Band Linkage Installation

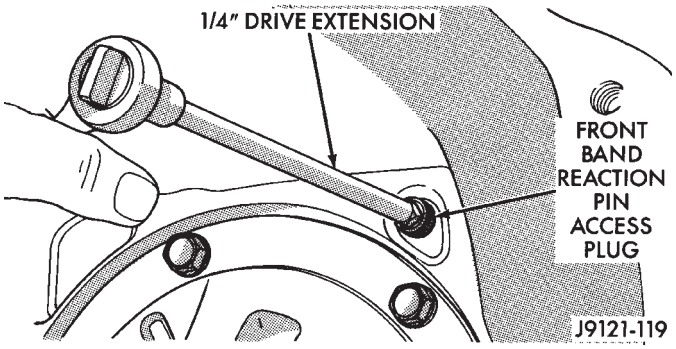


Fig. 149 Installing Front Band Pivot Pin Access Plug

(6) Verify that reaction shaft support hub seal rings are hooked together (Fig. 150).

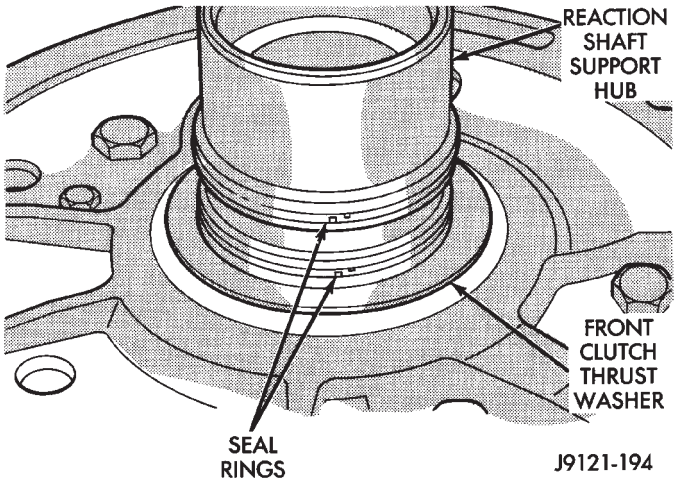


Fig. 150 Reaction Shaft Support Seal Rings

(7) Coat front clutch thrust washer with petroleum jelly to hold it in place. Then install washer over reaction shaft hub and seat it on pump (Fig. 151).

CAUTION: The thrust washer bore (I.D.), is chamfered on one side. Make sure the chamfered side is installed so it faces the pump.

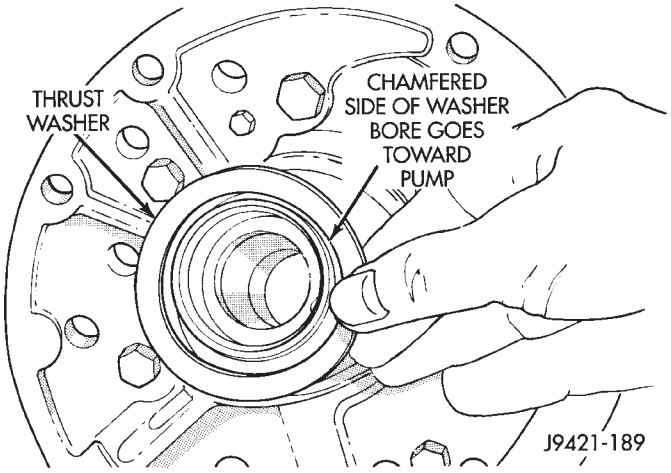


Fig. 151 Front Clutch Thrust Washer Installation

(8) Thread two Pilot Stud Tools C-3288-B into bolt holes in oil pump flange (Fig. 152).

(9) Align and install oil pump gasket (Fig. 152).

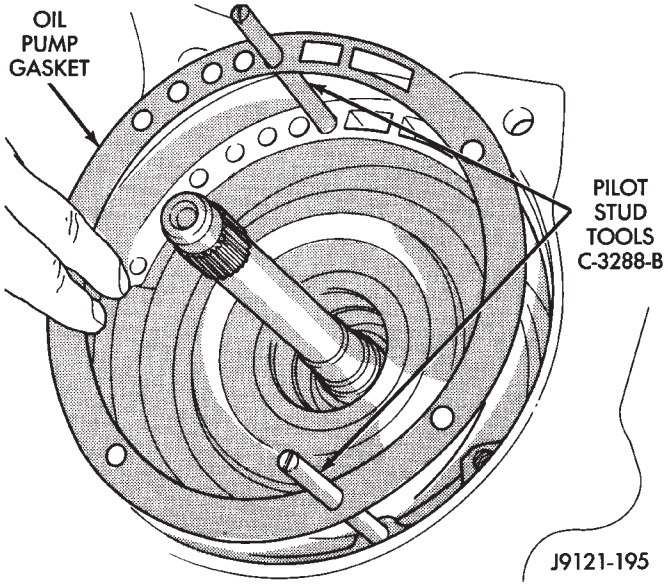


Fig. 152 Installing Pilot Studs And Oil Pump Gasket

(10) Lubricate oil pump seals with Ru-Glyde, Door Eze, or transmission fluid.

(11) Install oil pump (Fig. 153). Align and position pump on pilot studs. Slide pump down studs and work it into front clutch hub and case by hand. Then install two or three pump bolts to hold pump in place.

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

CHECKING INPUT SHAFT END PLAY

(1) Measure input shaft end play (Fig. 154).

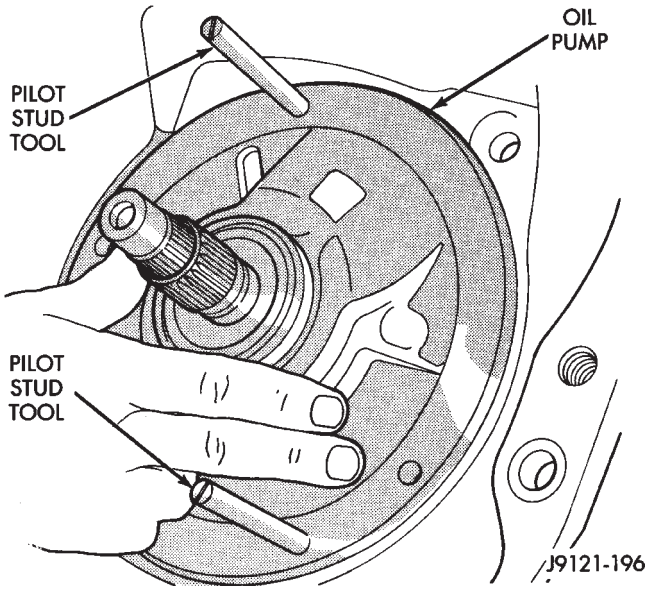


Fig. 153 Installing Oil Pump And Reaction Shaft Support

(2) Attach dial indicator to converter housing. Position indicator plunger against input shaft and zero indicator.

(3) Move input shaft in and out and record reading. End play should be 0.56 - 2.31 mm (0.022 - 0.091 in.).

(4) If end play is incorrect, transmission is incorrectly assembled, or output shaft thrust washer and/or thrust plate are worn and need to be changed.

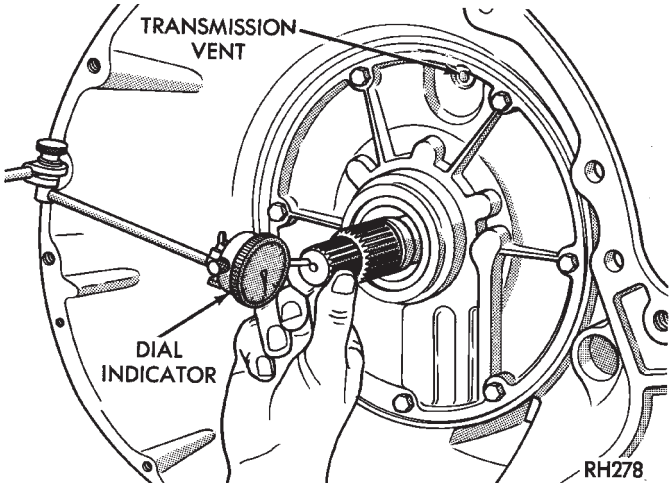


Fig. 154 Checking Input Shaft End Play

VALVE BODY INSTALLATION

(1) Install new manual lever shaft seal in case. Use 15/16 deep well socket to install seal.

(2) Make sure neutral switch has **not** been installed in case. Remove switch if necessary as it will interfere with valve body installation.

(3) Install new seal rings on accumulator piston (Fig. 155). Lubricate accumulator piston, seals and accumulator bore with transmission fluid.

(4) Install accumulator piston and spring (Fig. 155) in case.

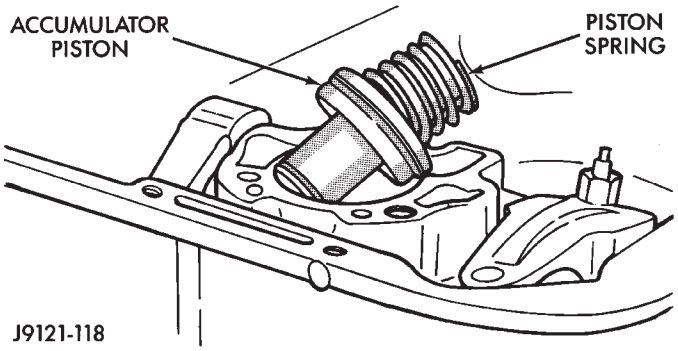


Fig. 155 Installing Accumulator Piston And Spring

(5) Place valve body manual lever in low to move park lock rod rearward.

(6) Position valve body on case. Work park rod past sprag and install valve body-to-case bolts finger tight.

(7) Install park/neutral position switch in case. Tighten switch to 34 N·m (25 ft. lbs.) torque.

(8) Align valve body on case (Fig. 156).

(9) Install and tighten valve body-to-case bolts alternately and evenly to 12 N·m (105 in. lbs.) torque. Start at center and work outward when tightening bolts. **Do not overtighten valve body bolts. This could result in distortion and cross leakage after installation.**.

(10) Connect converter clutch solenoid wire to case connector (Fig. 156).

(11) Install new filter on valve body (Fig. 157). Tighten filter screws to 4 N·m (35 in. lbs.).

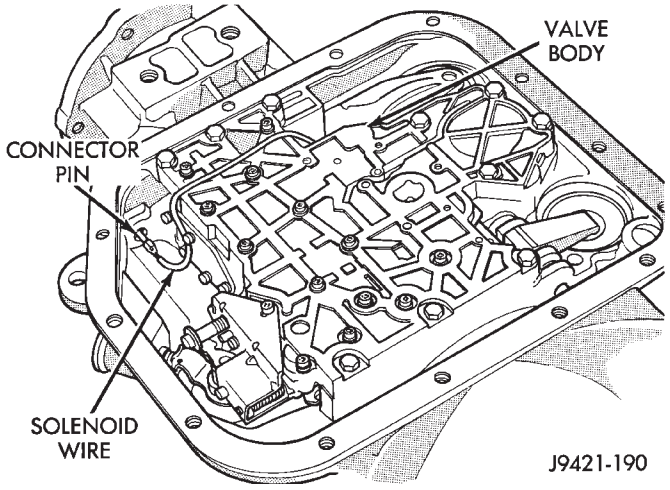


Fig. 156 Valve Body Installation

BAND ADJUSTMENT AND OIL PAN INSTALLATION

(1) Adjust **front band** as follows:

(a) Loosen locknut.

(b) Tighten adjusting screw to 72 in. lbs. torque.

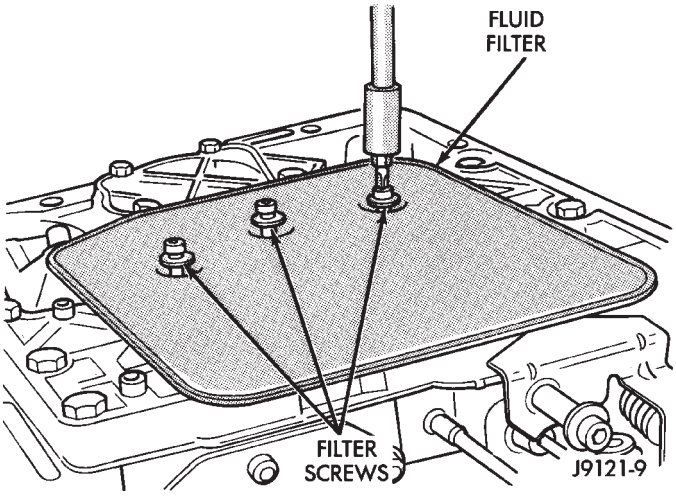


Fig. 157 Fluid Filter Installation

(c) Back off front band adjusting screw as follows:

- **On 30RH (2.5L), back adjusting screw off 2 1/2 turns**
- **On 32RH (4.0L), back adjusting screw off 2 1/4 turns**

(d) Hold adjusting screw in position and tighten locknut to 34 N·m (25 ft. lbs.).

(2) Adjust **rear band** as follows:

(a) Loosen locknut.

(b) Tighten adjusting screw as follows: On 32RH transmission, tighten screw to 8 N·m (72 in. lbs). torque. On 30RH transmission. Tighten screw to 5 N·m (41 in. lbs.) torque.

(c) Back off rear band adjusting screw as follows:

- **On 30RH (2.5L), back adjusting screw off 7 turns**
- **On 32RH (4.0L), back adjusting screw off 4 turns**

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

(3) Install new pan gasket on transmission and install oil pan. Tighten pan bolts to 17 N·m (13 ft. lbs.).

(4) Turn transmission over.

EXTENSION HOUSING, CONTROL LEVER AND CONVERTER INSTALLATION

(1) Install throttle valve and manual valve levers on shaft.

(2) Position new extension adapter housing gasket on transmission case. Use petroleum jelly to hold gasket in place.

(3) Install new rear seal in extension housing if required.

(4) Install extension/adapter housing on transmission case. Tighten housing fasteners to 33 N·m (24 ft. lbs.). Be sure park lock rod is properly engaged in sprag before tightening fasteners.

(5) Lubricate converter hub with transmission fluid and carefully install converter. Turn converter back and forth until seated. Be sure converter hub slots are fully seated in oil pump gear lugs.

(6) Secure converter in oil pump before mounting transmission on jack and before moving transmission back under vehicle. Use metal strapping, C-clamp, or locking pliers to hold converter in place. Attach holding tool to converter housing.

CAUTION: The transmission cooler and lines must be reverse flushed if overhaul corrected a malfunction that generated sludge, metal particles, or clutch friction material. The torque converter should also be replaced if contaminated by the same malfunction. Debris and residue not flushed from the cooler and lines will flow back into the transmission and converter. The result could be a repeat failure and shop comeback.