INTRODUCTION
CHRYSLER 42LE (A-606)

The 42LE four speed transaxle has many similarities to the A-604. Both these units are fully computer controlled. The 42LE is mounted in the same fashion as the rear drive transmissions. That is NORTH-SOUTH(longitudinally, whereas the A-604 is transverse mounted. Since the front axle of the vehicle passes through the bell housing the pump support shaft and the turbine shaft are longer. This unit is unique it that it has two sumps. One for the transmission fluid and the other for the differential fluid. The transmission valve body, PRNDL AND NEUTRAL SAFETY SWITCHES, are mounted inside the transmission case. There is a chain drive from the out-put shaft to the pinion shaft in a similar manner as we have seen on other units. We thank Chrysler Corporation for the information and illustrations that have made this booklet possible.

This information and part numbers contained in this booklet
have been carefully compiled from industry sources known
for their reliability, but ATSG does not guarantee the accuracy.

ROBERT D. CHERRNAY
TECHNICAL DIRECTOR

DALE ENGLAND
FIELD SERVICE CONSULTANT

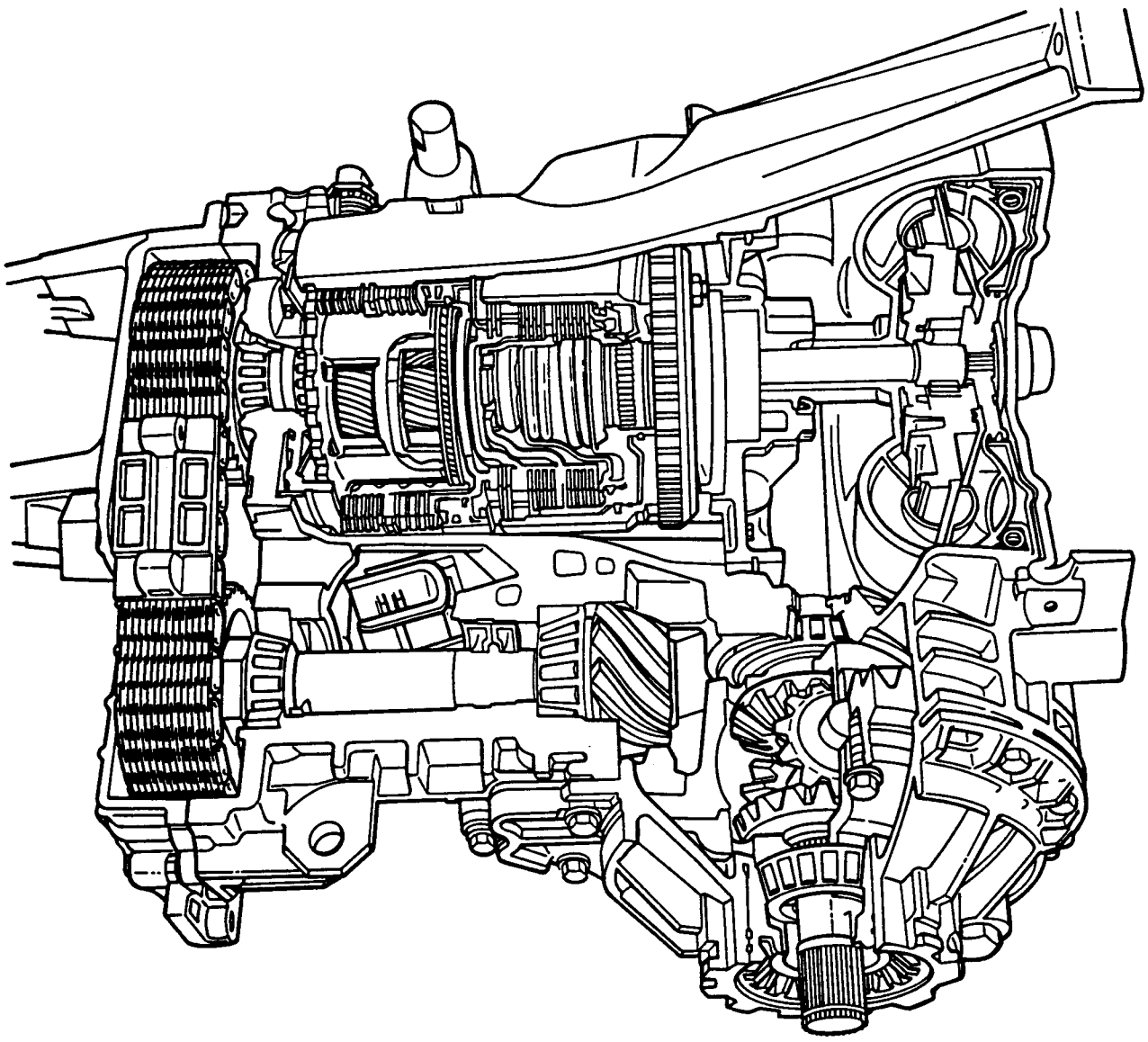
FRANK MIETUS
TECHNICAL CONSULTANT

WAYNE COLONNA
TECHNICAL SUPERVISOR

ED KRUSE
LAYOUT

PETE LUBIN
TECHNICAL CONSULTANT

AUTOMATIC TRANSMISSION SERVICE GROUP
9200 S. DADELAND BLVD.
SUITE 720
MIAMI, FL 33156
(305) 670-4161



ATSG
AUTOMATIC TRANSMISSION SERVICE GROUP

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Automatic Transmission Service Group
9200 South Dadeland Blvd.
Suite 720
Miami, FL 33156
(305) 670-4161

42LE FOUR SPEED AUTOMATIC TRANSAXLE

The 42LE Four Speed Transaxle uses fully-adaptive controls. Adaptive controls are those which perform their functions based on real-time feedback sensor information. The transaxle is conventional in the use of hydraulically-applied clutches to shift a planetary gear train. It uses electronics to control virtually all other functions.

42LE TRANSAXLE IDENTIFICATION

The 42LE transaxle identification code is printed on a bar code label. The label is located on the transaxle case (Fig. 1).

IN-VEHICLE SERVICE

The following is a list of transaxle components that are serviceable in the vehicle:

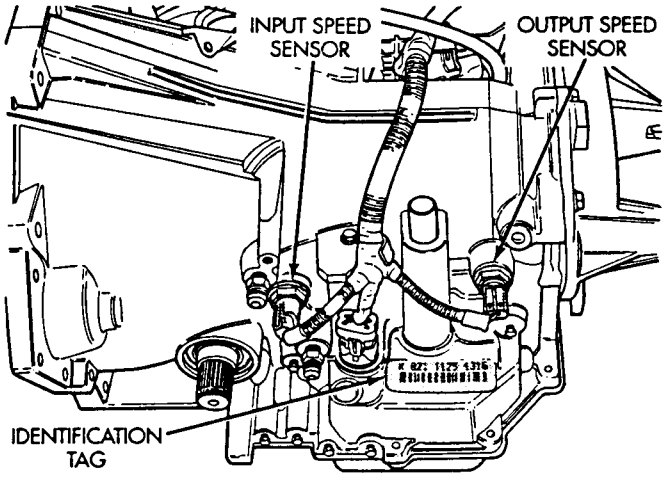


Fig. 1 Identification Tag Location

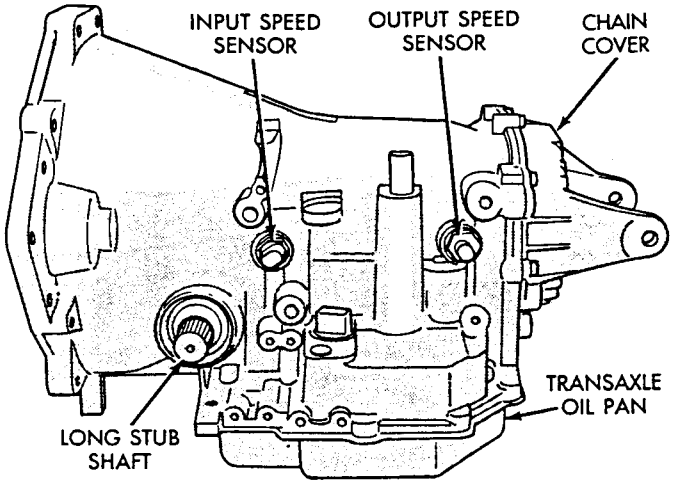


Fig. 2 Left Side View of Transaxle

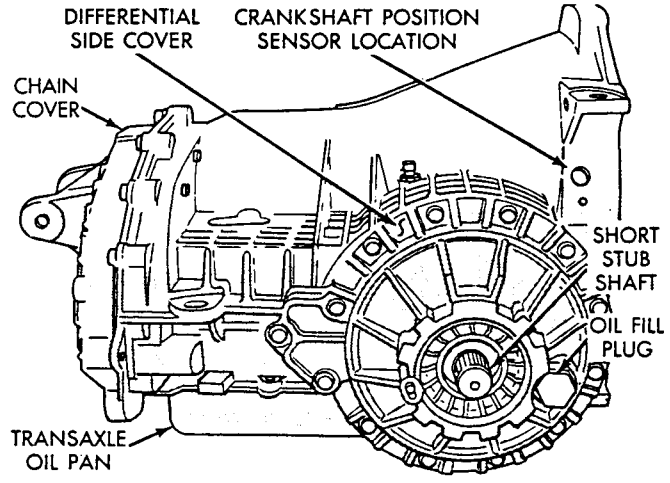


Fig. 3 Right Side View of Transaxle

- Valve Body Assembly
- Solenoid Pack
- Manual Valve Lever Position Sensor (MVLPS)
- Input Speed Sensor
- Output Speed Sensor
- Transfer Chain
- Chain Sprockets
- Short (Right) Stub Shaft Seal
- Long (left) Stub Shaft and Ball Bearing

OPERATION

The 42LE transaxle provides forward ratios of 2.84, 1.57, 1.00, and 0.69 with torque converter clutch available in 2nd, direct, or overdrive gear; the Reverse ratio is 2.21. The shift lever is conventional with six positions (P, R, N, OD, 3, and L). When OD is selected the transaxle shifts normally through all four speeds with the torque converter clutch operational in third and overdrive; this position is recommended for most driving. The 3 position is tailored for use in hilly or mountainous driving. When 3 is selected, the transmission uses only 1st, 2nd, and direct gears with 2nd-direct shift delayed to 40 mph or greater. When operating in 3 or L positions torque converter clutch application occurs in direct gear. This improves transmission cooling when towing trailers and/or driving on steep grades. If high engine coolant temperature occurs, the torque converter clutch will also engage in 2nd gear. The L position provides maximum engine braking for descending steep grades. Unlike most current transaxles, upshifts are provided to 2nd or direct gear at peak engine speeds if the accelerator is depressed. This provides engine over-speed protection and maximum performance.

CLUTCH AND GEAR

The 42LE transaxle consists of:

- Three multiple-disc input clutches
- Two multiple-disc grounded clutches
- Four hydraulic accumulators
- Two planetary gear sets

This provides four forward ratios and a reverse ratio. The clutch apply pistons have a centrifugally balanced oil cavities so that quick response and good control can be achieved. A push/pull piston is incorporated for two of the three input clutches.

CAUTION: Some clutch packs appear similar, but they are not the same. Do not interchange clutch components as they might fail.

HYDRAULICS

The hydraulics of the transaxle provide:

- Manual shift lever select function
- Main line pressure regulation
- Torque converter flow control
- Transaxle oil cooler flow control

Oil flow to the friction elements is controlled directly by four solenoid valves. The hydraulics also include a logic-controlled "solenoid switch valve". It locks out the 1st gear reaction element with the application of 2nd, direct, or overdrive gear elements. It also redirects the 1st gear solenoid output so that it can control torque converter clutch operation. To regain access to 1st gear, a special sequence of solenoid commands must be used to unlock and move the solenoid switch valve. This precludes any application of the 1st gear reaction element with other elements applied. It also allows one solenoid to control two friction elements.

Small, high-rate accumulators are provided in each controlled friction element circuit. These serve to absorb the pressure responses, and allow the controls to read and respond to changes that are occurring.

SOLENOIDS

Since the solenoid valves perform all control functions, these valves must be durable and tolerant of dirt particles. For that reason hardened-steel poppet and ball valves are used. These are free from any close operating clearances, and the solenoids operate the valves directly. Direct operation means that these units must have very high output so that they can close against the sizeable flow areas and high line pressures. Fast response is also required to meet the control requirements.

Two of the solenoids are normally-venting and two are normally-applying; this was done to provide a default mode of operation. With no electrical power, the transmission provides 2nd gear in "OD," "3," or "L" shift lever positions. All other shift lever positions will function normally. The choice of 2nd gear was made to provide adequate performance while still accommodating highway speeds.

SENSORS

There are three pressure switches which identify solenoid application. The pressure switches are incorporated in an assembly with the solenoids. Two speed sensors read input (torque converter turbine) and output (parking sprag) speeds. There is also a manual valve lever position sensor (MVLPS) which senses manual valve position.

Engine speed, throttle position, temperature, etc., are also observed. Some of these signals are read directly from the engine control sensors; others are read from a multiplex circuit with the engine controller.

ADAPTIVE CONTROLS

These controls function by reading the input and output speeds over 140 times a second and responding to each new reading. This provides the friction element control needed to make smooth clutch-to-clutch shifts for all gear changes without the use of overrunning clutches. As with most automatic transaxles, all shifts involve releasing one element and applying a different element. In simplified terms, the upshift logic allows the releasing element to slip backwards slightly to ensure that it does not have excess capacity; the apply element is filled until it begins to make the speed change to the higher gear; its apply pressure is then controlled to maintain the desired rate of speed change until the shift is com-

plete. The key to providing excellent shift quality is precision; for example, as mentioned, the release element for upshifts is allowed to slip backwards slightly; the amount of that slip is typically less than a total of 20 degrees. To achieve that precision, the transmission control module learns the characteristics of the particular transaxle that it is controlling. It learns:

- The release rate of the releasing element.
- The apply time of the applying element.
- The rate the apply element builds pressure.

This method achieves more precision than would be possible with exacting tolerances. It can also adapt to any changes that occur with age or environment.

For kickdown shifts, the control logic allows the releasing element to slip and then controls the rate at which the input (and engine) accelerate; when the lower gear speed is achieved, the releasing element reapplies to maintain that speed until the apply element is filled. This provides quick response and a smooth torque exchange since the release element can control the rate of torque increase. This control can make any powertrain feel more responsive without increasing harshness.

Adaptive controls respond to input speed changes. They compensate for changes in engine or friction element torque. This provide consistent shift quality for the life of the transaxle.

DIAGNOSTICS

These controls also provide comprehensive, onboard transaxle diagnostics. The information available can aid in transaxle diagnosis. For example, apply element buildup rate indicates solenoid performance. Also included are self-diagnostic functions which allow the technician to test the electronic controls. The transmission control module monitors its critical functions, records any malfunctions, and the number of engine starts since the last malfunction. The technician can use this information in the event of a customer complaint. Refer to the "42LE Transaxle Diagnostic Procedure Manual."for specifics.

42LE GENERAL DIAGNOSIS

CAUTION: Before attempting any repair on the 42LE Four Speed Automatic Transaxle, always check for proper shift linkage adjustment. Also check for diagnostic trouble codes with the DRB II scan tool*

-SPECIAL NOTE -SCANNER CHECKING EQUIPMENT

*SNAP-ON and OTC Scanners Can be Used

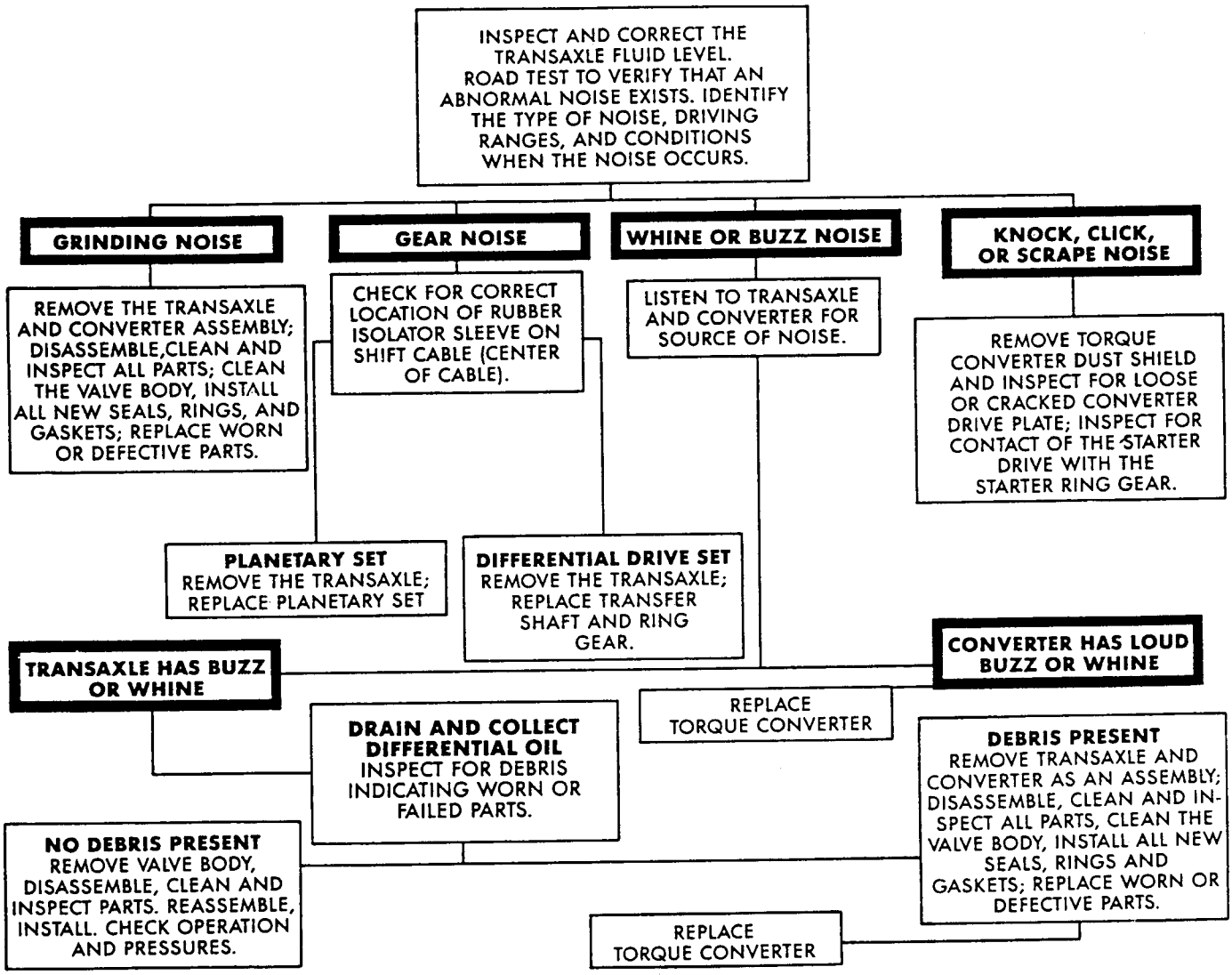
42LE automatic transaxle malfunctions may be caused by these general conditions:

- Poor engine performance
- Improper adjustments
- Hydraulic malfunctions
- Mechanical malfunctions
- Electronic malfunctions

When Diagnosing a problem always begin with recording the complaint. The complaint should be defined as specific as possible. Include the following checks:

- Temperature at occurrence (cold, hot, both)
- Dynamic conditions (acceleration, deceleration, upshift, cornering)
- Elements in use when condition occurs (what gear is transaxle in during condition)
- Road and weather conditions

DIAGNOSIS GUIDE-ABNORMAL NOISE



- Any other useful diagnostic information.

After noting all conditions, check the easily accessible variables:

- Fluid level and condition
- Shift linkage adjustment
- Diagnostic trouble code inspection

Then perform a road test to determine if the problem has been corrected or that more diagnosis is necessary. If the problem exists after the preliminary tests and corrections are completed, hydraulic pressure checks should be performed.

DIAGNOSIS GUIDE-VEHICLE WILL NOT MOVE

ENSURE THAT THE TRANSAXLE HAS FLUID, ADD FLUID IF NECESSARY. LISTEN FOR NOISES IN NEUTRAL.

NO ABNORMAL NOISE, MOVE THE SELECTOR TO A FORWARD DRIVE RANGE AND OBSERVE THE FRONT WHEELS FOR TURNING.

ABNORMAL NOISE, STOP ENGINE IMMEDIATELY, REMOVE THE TRANSAXLE AND CONVERTER AS AN ASSEMBLY. DISASSEMBLE, CLEAN AND INSPECT ALL PARTS. CLEAN VALVE BODY; INSTALL ALL NEW SEALS, RINGS AND GASKETS: REPLACE WORN OR DEFECTIVE PARTS.

DRIVE SHAFTS TURN BUT FRONT WHEELS DO NOT TURN, INSPECT FOR BROKEN DRIVE SHAFT PARTS.

DRIVE SHAFTS DO NOT TURN MONITOR "RPM DISPLAY" WITH DRBII

TURBINE AND OUTPUT SENSOR SHOW RPM FINAL DRIVE HAS BROKEN. REMOVE TRANSAXLE AND TORQUE CONVERTER AS AN ASSEMBLY. REMOVE REAR COVER. INSPECT FOR CONDITION. IF NONE, REMOVE DIFFERENTIAL COVER AND INSPECT FOR CONDITION. REPAIR AS NECESSARY.

TURBINE SHOWS RPM OUTPUT DOES NOT SHOW RPM

CENTERLINE PROBLEM GEAR TRAIN AND/OR CLUTCHES. REMOVE TRANSAXLE AND RECONDITION.

TURBINE DOES NOT SHOW RPM

REMOVE TRANSAXLE. INSPECT DRIVE PLATE, TORQUE CONVERTER, INPUT SHAFT, INPUT CLUTCH ASSEMBLY AND ENGINE CRANKSHAFT. REPAIR AS REQUIRED.

DIAGNOSIS GUIDE-FLUID LEAKS

VISUALLY INSPECT FOR SOURCE OF LEAK. IF THE SOURCE OF LEAK CANNOT BE READILY DETERMINED, CLEAN THE EXTERIOR OF THE TRANSAXLE. CHECK TRANSAXLE FLUID LEVEL. CORRECT IF NECESSARY.

THE FOLLOWING LEAKS MAY BE CORRECTED WITHOUT REMOVING THE TRANSAXLE:

MANUAL LEVER SHAFT OIL SEAL
PRESSURE GAUGE PLUGS
REAR COVER SEALANT
OIL PAN SEALANT
OIL COOLER FITTINGS
MANUAL VALVE LEVER POSITION SENSOR SEAL
SOLENOID VENT PLUG
SOLENOID WIRING CONNECTOR
DIFFERENTIAL SHORT STUB SHAFT SEAL

THE FOLLOWING LEAKS REQUIRE REMOVAL OF THE TRANSAXLE AND TORQUE CONVERTER FOR CORRECTION.

TRANSAXLE FLUID LEAKING FROM THE LOWER EDGE OF THE CONVERTER HOUSING; CAUSED BY FRONT PUMP SEAL, PUMP TO CASE SEAL, OR TORQUE CONVERTER WELD.

CRACKED OR POROUS TRANSAXLE CASE.
LONG STUB SHAFT SEAL.
TRANSFER SHAFT SEAL LEAKING FROM WEEP HOLE,

DIAGNOSTIC TROUBLE CODE CHART "A"

NOTE:
Code 36 is not stored alone. It is stored if a speed error (codes 50 through 58) is detected immediately after a shift. Look at the possible causes associated with the speed error code.

Fault Code Number	Condition	Planetary gear sets broken or seized	Faulty cooling system	Torque converter clutch failure	Internal solenoid leak	Pressures too high	Valve body leakage	Regulator valve	Torque converter control valve	Torque converter clutch switch valve	Solenoid switch valve	Stuck/sticky valves	Plugged filter	Worn or damaged accumulator seal rings	Damaged clutch seals	L/R clutch	2/4 clutch	Reverse clutch	OD clutch	UD clutch	Damaged or failed clutches:	Worn pump	Worn or damaged input shaft seal rings	Worn or damaged reaction shaft support seal rings	Aeroled fluid (high fluid level)	Low fluid level
		Possible Cause																								
21	OD clutch—pressure too low		X	X	X	X	X	X				X	X	X	X				X			X		X	X	X
22	2/4 clutch—pressure too low		X	X	X	X	X	X				X	X	X	X		X					X			X	X
23	2/4 clutch and OD clutch—pressures too low		X	X	X	X	X	X				X	X	X	X							X			X	X
24	L/R clutch—pressure too low		X	X	X	X	X	X				X	X	X	X	X						X			X	X
25	L/R clutch and OD clutches—pressures too low		X	X	X	X	X	X				X	X	X	X							X			X	X
26	L/R clutch and 2/4 clutches—pressures too low		X	X	X	X	X	X				X	X	X	X							X			X	X
27	OD, 2/4, and L/R clutches—pressures too low		X	X	X	X	X	X				X	X	X	X							X			X	X
31	OD clutch pressure switch response failure			X	X		X												X			X			X	X
32	2/4 pressure switch response failure				X		X										X					X			X	X
33	2/4 and O/D clutch pressure response failures				X		X						X									X			X	X
37	Solenoid switch valve stuck in the LO position				X		X				X	X														
38	Partial torque converter clutch out of range			X	X	X	X		X	X		X										X	X			
47	Solenoid switch valve stuck in the LR position				X		X				X	X														
50	Speed ratio default in reverse	X	X		X	X	X	X				X	X	X	X	X	X	X				X	X	X		X
51	Speed ratio default in 1st	X	X		X	X	X	X				X	X	X	X	X	X			X		X	X	X		X
52	Speed ratio default in 2nd	X	X		X	X	X	X				X		X	X	X		X		X		X	X	X		X
53	Speed ratio default in 3rd	X	X		X	X	X	X				X		X	X				X	X		X	X	X		X
54	Speed ratio default in 4th	X	X		X	X	X	X				X		X	X			X	X			X	X	X		X
60	Inadequate LR element volume	X						X						X	X	X										
61	Inadequate 2/4 element volume	X						X						X	X			X								
62	Inadequate OD element volume	X						X						X	X				X							

DIAGNOSIS CHART "B"

POSSIBLE CAUSE

CONDITION	HARSH ENGAGEMENT FROM NEUTRAL TO D	HARSH ENGAGEMENT FROM NEUTRAL TO R	DELAYED ENGAGEMENT FROM NEUTRAL TO D	DELAYED ENGAGEMENT FROM NEUTRAL TO R	POOR SHIFT QUALITY	SHIFTS ERRATIC	DRIVES IN NEUTRAL	DRAGS OR LOCKS	GRATING, SCRAPING, GROWLING NOISE	ENGINE MISFIRE	BUZZING NOISE	BUZZING NOISE DURING SHIFTS ONLY	HARD TO FILL OIL BLOWS OUT FILLER TUBE	TRANSAXLE OVERHEATS	HARSH UPSHIFT	NO UPSHIFT INTO OVERDRIVE	NO TORQUE CONVERTER CLUTCH	HARSH DOWNSHIFTS	HIGH SHIFT EFFORTS	HARSH CONVERTER CLUTCH
Engine Performance	X	X				X									X			X		
Worn or faulty clutch(es)	X	X	X	X		X	X	X							X	X		X		
— Underdrive clutch	X		X			X	X	X										X		
— Overdrive clutch						X	X	X							X	X				
— Reverse clutch		X		X			X	X												
— 2/4 clutch						X		X							X			X		
— Low/reverse clutch	X	X				X		X										X		
Clutch(es) dragging							X													
Insufficient clutch plate clearance							X							X						
Damaged clutch seals			X	X														X		
Worn or damaged accumulator seal ring(s)	X	X	X	X														X		
Faulty cooling system														X						
Engine coolant temp. too low																X	X			
Incorrect gearshift control linkage adjustment			X	X		X	X							X						
Shift linkage damaged																			X	
Chipped or damaged gear teeth								X	X											
Planetary gear sets broken or seized								X	X											
Bearings worn or damaged								X	X											
Driveshaft(s) bushing(s) worn or damaged									X											
Worn or broken reaction shaft support seal rings			X	X	X	X												X		
Worn or damaged input shaft seal rings			X	X													X			
Valve body malfunction or leakage	X	X	X	X	X	X	X				X						X	X	X	
Hydraulic pressures too low			X	X	X	X								X	X		X			
Hydraulic pressures too high	X	X													X			X		
Faulty oil pump			X	X		X								X			X			
Oil filter clogged			X	X	X	X							X							
Low fluid level			X	X	X	X					X			X			X	X		
High fluid level													X	X						
Aerated fluid			X	X	X	X					X		X	X			X	X		
Engine idle speed too low			X	X																
Engine idle speed too high	X	X												X				X		
Normal solenoid operation												X								
Solenoid sound cover loose												X								
Sticking torque converter clutch position																				X
Torque Converter Failure	X													X			X			X
Drive Plate cracked or bent									X	X										

FLUID LEVEL AND CONDITION

The transmission and differential have separate oil sumps. The transmission sump requires automatic transmission fluid. The differential sump requires petroleum based hypoid gear lube.

TRANSMISSION SUMP

The transmission sump has a dipstick to check oil similar to most automatic transmissions. It is located on the left side of the engine compartment. Be sure to wipe all dirt from dipstick handle before removing.

The torque converter fills in both the "P" Park and "N" Neutral positions. Place the selector lever in "P" Park to be sure that the fluid level check is accurate. **The engine should be running at idle speed for at least one minute, with the vehicle on level ground.** The fluid should be at normal operating temperature (approximately 82 C. or 180 F.). The fluid level is correct if it is in the "HOT" region (cross-hatched area) on the oil level indicator (Fig. 1).

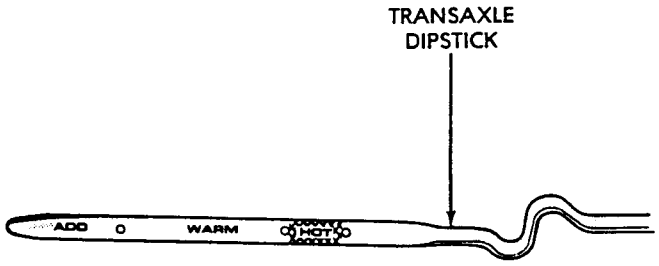


Fig. 1 Dipstick Markings

Low fluid level can cause a variety of conditions because it allows the pump to take in air along with the fluid. As in any hydraulic system, air bubbles make the fluid spongy, therefore, pressures will be low and build up slowly.

Improper filling can also raise the fluid level too high. When the transaxle has too much fluid, the gears churn up foam and cause the same conditions which occur with a low fluid level.

In either case, air bubbles can cause over heating and/or fluid oxidation, and varnishing. This can interfere with normal valve, clutch, and accumulator operation. Foaming can also result in fluid escaping from the transaxle vent where it may be mistaken for a leak.

Along with fluid level, it is important to check the condition of the fluid. When the fluid smells burned, and is contaminated with metal or friction material particles, a complete transaxle recondition is needed. Be sure to examine the fluid on the dipstick closely. If there is any doubt about its condition, drain out a sample for a double check.

After the fluid has been checked, seat the dipstick fully to seal out water and dirt.

The transmission fluid level should be inspected at least every six months.

DIFFERENTIAL SUMP

The differential sump is checked separately from the transmission. A fill plug located on the side of the transaxle must be removed to check fluid level (Fig. 2). The fluid should be level with the bottom of the fill hole. The differential capacity is .946 liters (32 ounces).

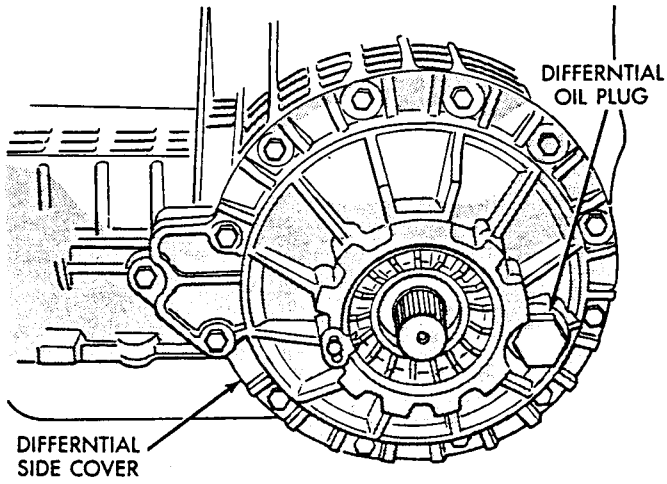


Fig. 2 Differential Oil Fill Plug Location

Inspect the differential area during engine oil changes for any leaks. If leakage is present, determine the source of the leak and repair as required. Remove the fill plug and verify the proper level. Adjust if needed.

SELECTION OF LUBRICANTS

It is important that the proper lubricants be used in the 42LE transaxle. Mopar ATF Plus (Automatic Transmission Fluid-Type 7176) should be used in the transmission side of the transaxle. Substitute fluids can induce torque converter clutch shudder.

The differential side of the transaxle should be filled with Mopar petroleum based hypoid gear lubricant 80W-90. Synthetic gear lubricants should not be used.

SPECIAL ADDITIVES

Chrysler Corporation does not recommend the addition of any fluids to the transmission, other than the fluid listed above. An exception to this policy is the use of special dyes to aid in detecting fluid leaks. The use of transmission sealers should be avoided, since they may adversely affect seals.

FLUID AND FILTER CHANGE-TRANSMISSION SUMP

When the factory fill fluid is changed, only fluids of the type labeled Mopar ATF Plus (Automatic Transmission fluid) Type 7176 should be used. A filter change should be made at the time of the oil change. The magnet (on the inside of the oil pan) should also be cleaned with a clean, dry cloth.

If the transaxle is disassembled for any reason, the fluid and filter should be changed.

(1) Raise vehicle on a hoist (See Lubrication, Group 0). Place a drain container with a large opening, under transaxle oil pan.

(2) Loosen pan bolts and tap the pan at one corner to break it loose allowing fluid to drain, then remove the oil pan.

(3) Install a new filter and o-ring on bottom of the valve body and tighten retaining screws to 5 N•m (40 in. lbs.).

(4) Clean the oil pan and magnet. Reinstall pan using new Mopar Silicone Adhesive sealant. Tighten oil pan bolts to 19 N•m (165 in. lbs.).

(5) Pour four quarts of Mopar ATF Plus (Automatic Transmission Fluid) Type 7176 through the dipstick opening.

(6) Start engine and allow to idle for at least one minute. Then, with parking and service brakes applied, move selector lever momentarily to each position, ending in the park or neutral position.

(7) Add sufficient fluid to bring the level 1/4 inch above the bottom hole of the dipstick. Room temperature oil (70°F.) set at this level will expand (when heated to 180°F.) to a level within the hot range (Fig. 3).

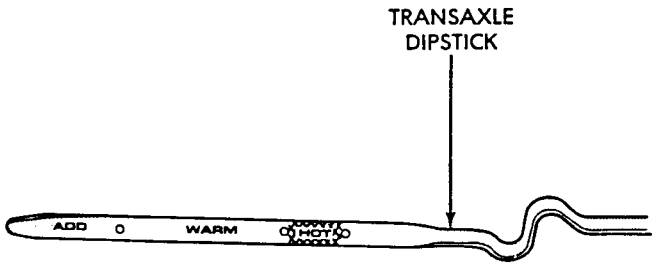


Fig. 3 Dipstick Markings

Recheck the fluid level after the transaxle has reached normal operating temperature (180°F.) to ensure the level is within the hot range.

To prevent dirt from entering transaxle, make certain that dipstick is full seated into the dipstick opening.

FLUID DRAIN AND REFILL-DIFFERENTIAL SUMP

The differential fluid can be drained and filled without having to remove the transaxle from the vehicle. Use only Mopar 80W-90 petroleum based hypoid gear lubricant when replacing fluid.

REMOVAL

(1) Raise vehicle on hoist.

(2) Remove differential drain plug located on the bottom of the differential housing. Allow the fluid to drain into oil drain pan.

(3) Remove differential fill plug located on the differential side cover. This will assist the flow of fluid from the drain plug hole.

INSTALLATION

(1) Install drain plug into differential housing. Tighten drain plug to 7 N•m (60 in. lbs.)

(2) Fill differential with Mopar 80W-90 or equivalent petroleum based hypoid gear lubricant. The fluid should be level with the bottom of the fill hole. The differential capacity is .946 liters (32 ounces).

CAUTION: Overfilling the differential can result in oil foaming and/or oil loss from the differential vent.

(3) Install differential fill plug. Tighten fill plug to 4 N•m (35 in. lbs.).

GEARSHIFT LINKAGE—COLUMN SHIFT

The gear shift linkage should be adjusted if any of the following repairs or situations are encountered:

- Transaxle replacement.
- Valve body repair.
- Shift cable replacement.
- Column shifter replacement.
- Interlock cable replacement.
- When there is no cranking in park or neutral.
- When the transaxle can be shifted without the key in the ignition.
- When the key can be removed with the shifter in reverse.
- When the key can not be removed with the shifter in the park position.

REMOVAL

(1) Remove upper and lower steering column shrouds, along with lower kick panel.

(2) Disconnect shifter cable from cable attaching stud (pin).

(3) Remove clip from shift cable conduit bracket.

(4) From underhood side of dash panel unseat grommet and remove cable from interior of vehicle.

(5) Raise vehicle and remove transaxle fill tube. Clean the area around the fill tube before removing. This will prevent dirt from entering the transaxle once the tube is removed.

CAUTION: The transaxle will lose oil from the fill tube opening when the fill tube is removed.

(6) Loosen bolt that clamps shift cable to transaxle.
(7) Disconnect shifter cable from shift lever assembly at transaxle.
(8) Remove cable from underneath vehicle.

INSTALLATION

(1) Reroute new cable from underside of vehicle. The cable must be routed between the engine block and the heater return tube.
(2) Snap new transaxle cable on to shift lever assembly.
(3) Set shift lever assembly in park position at transaxle. This is the most rearward position.
(4) Place conduit end fitting in clamp and tighten mounting bolt.
(5) Reinstall transaxle fill tube and lower vehicle.
(6) Route transaxle shift cable through hole in dash panel.
(7) Install cable grommet in dash panel.
(8) Route transaxle shift cable along steering column.
(9) Connect transaxle shift cable to shift cable conduit bracket and secure with new clip.
(10) Attach shift cable to attaching stud (pin) by snapping into place.
(11) Place the shift lever in park, the steering column in full tilt upward, and the column shifter in park with key removed.
(12) Adjust cable by rotating the adjuster into lock position.
(13) Reinstall steering column shrouds and kick panel.
(14) Check shifter for proper operation. It should operate smoothly without binding. The vehicle should crank in Park or Neutral only.
(15) Start engine and check transaxle fluid level. Adjust level as required.

ADJUSTMENT

(1) Remove upper steering column shroud.
(2) Rotate cable adjuster into unlock position.
(3) Make sure that the transaxle shift lever (at transaxle) is in the park position.
(4) Tilt the steering column to the full up position.
(5) Place shifter in the park position with the key removed.
(6) Adjust by rotating adjuster into lock position.
(7) Reinstall upper steering column shroud.
(8) Check shifter for proper operation. It should operate smoothly without binding. The vehicle should crank in Park or Neutral only.
(9) Start engine and check transaxle fluid level. Adjust level as required.

GEARSHIFT LINKAGE—FLOOR SHIFT

The gear shift linkage should be adjusted if any of the following repairs or situations are encountered:

- Transaxle replacement.
- Valve body repair.
- Shift cable replacement.
- Interlock cable replacement.
- When there is no cranking in park or neutral.
- When the transaxle can be shifted without the key in the ignition.
- When the key can be removed with the shifter in reverse.
- When the key can not be removed with the shifter in the park position.

REMOVAL

(1) Remove shift handle and console bezel.
(2) Loosen nut on shift cable adjust lever.
(3) Remove clip from shift cable conduit bracket.
(4) Disconnect shifter cable from cable attach stud (pin).
(5) From underhood side of dash panel unseat grommet and remove cable from interior of vehicle.
(6) Raise vehicle and remove transaxle fill tube. Clean the area around the fill tube before removing. This will prevent dirt from entering the transaxle once the tube is removed.

CAUTION: The transaxle will lose oil from the fill tube opening when the fill tube is removed.

(7) Loosen bolt that clamps shift cable to transaxle.
(8) Disconnect shifter cable from shift lever assembly at transaxle.
(9) Remove cable from underneath vehicle.

INSTALLATION

(1) Reroute new cable from underside of vehicle. The cable must be routed between the engine block and the heater return tube.
(2) Snap new transaxle cable on to shift lever assembly.
(3) Set shift lever assembly in park position at transaxle. This is the most rearward position.
(4) Place conduit end fitting in clamp and tighten mounting bolt.
(5) Reinstall transaxle fill tube and lower vehicle.
(6) Route transaxle shift cable through hole in dash panel.
(7) Install cable grommet in dash panel.
(8) Route transaxle shift cable along steering column.
(9) Route transaxle shift cable under a/c duct, over central distribution duct, through support strut and air bag mounting bracket. Then route over carpeting and down to the shifter bracket.

(10) Route cable through hole in shifter bracket and attach to cable attaching stud (pin) by snapping into place.

(11) Place shifter in park and clip the cable to the shifter bracket.

(12) Tighten the adjuster nut.

(13) Reinstall console bezel and shifter handle.

(14) Check shifter for proper operation. It should operate smoothly without binding. The vehicle should crank in Park or Neutral only.

(15) Start engine and check transaxle fluid level. Adjust level as required.

ADJUSTMENT

(1) Remove shifter handle and console bezel.

(2) Loosen nut on shifter cable adjuster.

(3) Set shift lever assembly in park position at transaxle. This is the most rearward position.

(4) Place shifter in park position.

(5) Place ignition in lock with key removed.

(6) Tighten adjuster nut at shifter.

(7) Reinstall console bezel and shifter handle.

(8) Check shifter for proper operation. It should operate smoothly without binding. The vehicle should crank in Park or Neutral only.

(9) Start engine and check transaxle fluid level. Adjust level as required.

FLOOR SHIFTER

REMOVAL

(1) Remove shifter handle and console bezel.

(2) Loosen adjuster nuts on interlock adjuster and shifter adjuster.

(3) Disconnect shifter cable from cable attaching stud.

(4) Disconnect interlock cable from shifter base slot. Be careful not to break tab on interlock cable conduit end fitting.

(5) Remove the three floor pan attaching nuts from the interior of the shifter base.

(6) Remove shifter assembly from vehicle.

INSTALLATION

(1) Install new shifter. Make sure eyelet of shifter cable is inside of shifter housing.

(2) Install three floor pan attaching nuts to hold shifter base.

(3) Place shift lever and transaxle in park.

(4) With the ignition in the lock position, attach shift cable eyelet to cable attaching stud (pin).

(5) Slip interlock cable core wire into interlock adjustment lever groove. Make sure the interlock cable slug is seated in the groove.

(6) Slip interlock cable conduit end fitting into base and snap into place.

(7) With the shift lever in park and ignition in lock with the key removed, tighten the shifter and interlock adjustment nuts.

(8) To check interlock and shift adjustment, perform the following three tests:

(a) With the key out of the ignition, can the vehicle be shifted out of park?

(b) With the vehicle in reverse, can the key be removed from the ignition.

(c) With the vehicle in park, are you prevented from removing the ignition key.

If the results to any of the tests was "yes" then the vehicle requires adjustment.

(9) If the results to all of the tests was "no" then reinstall console bezel and shifter handle.

ROAD TEST

Prior to performing a road test, be certain that the fluid level, fluid condition, and the gear shift linkage adjustment have been checked and approved.

During the road test, the transaxle should be operated in each position to check for slipping and any variation in shifting.

If the vehicle operates properly at highway speeds, but has poor acceleration, the converter stator overrunning clutch may be slipping. If acceleration is normal, but high throttle opening is needed to maintain highway speeds, the converter stator clutch may have seized. Both of these stator defects require replacement of the torque converter and thorough transaxle cleaning.

An engine miss could be attributed to a cracked driveplate. A cracked driveplate could cause the camshaft position sensor and crankshaft position sensor signals to be out of synchronization. This could cause a no-start condition.

A slipping clutch can be determined by operating the transaxle in all selector positions. Then comparing which internal units are applied in those positions. The "Elements in Use Chart" provides a basis for road test analysis.

The process of elimination can be used to detect any unit which slips and to confirm proper operation of good units. Road test analysis can diagnose slipping units, but the cause of the malfunction can not be determined. Practically any condition can be caused by leaking hydraulic circuits or sticking valves.

HYDRAULIC PRESSURE TESTS

Pressure testing is a very important step in the diagnostic procedure. These tests usually reveal the cause of most transaxle problems.

Before performing pressure tests, be certain that fluid level and condition, and shift cable adjustments have been checked and approved. Fluid must be at operating temperature (150 to 200 degrees F.).

ELEMENTS IN USE AT EACH POSITION OF THE SELECTOR LEVER

Shift Lever Position	Start Safety	Park Sprag	CLUTCHES Underdrive	Overdrive	Reverse	2/4	Low/ Reverse
P — PARK	X	X					X
R — REVERSE					X		X
N — NEUTRAL	X						X
OD — OVERDRIVE							
First			X				X
Second			X			X	
Direct			X	X			
Overdrive				X		X	
D — DRIVE*							
First			X				X
Second			X			X	
Direct			X	X			
L — LOW*							
First			X				X
Second			X			X	
Direct			X	X			

*Vehicle upshift and downshift speeds are increased when in these selector positions.

Install an engine tachometer, raise vehicle on hoist which allows front wheels to turn, and position tachometer so it can be read.

Using special adapters (L-4559), attach 300 psi gauges to ports required for test being conducted.

Test port locations are shown in (Figure 1).

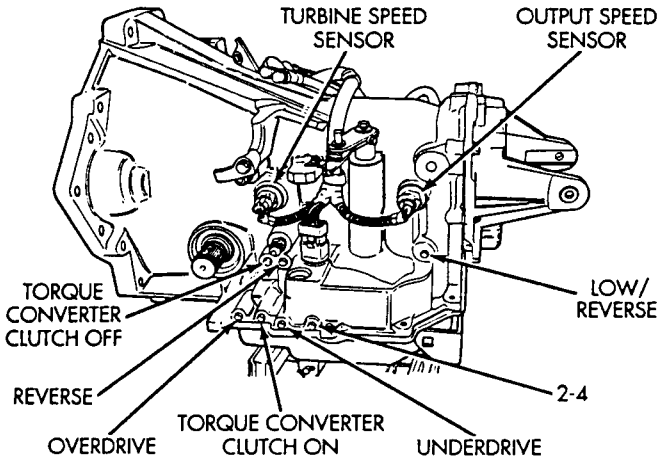


Fig. 1 Pressure Taps

TEST ONE-SELECTOR IN "L"

This test checks pump output, pressure regulation and condition of the low/reverse clutch hydraulic circuit and shift schedule.

(1) Attach pressure gauge to the low/reverse clutch tap.

(2) Move selector lever to the L position.

(3) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed to 20 mph.

(4) Low/reverse clutch pressure should read 115 to 145 psi.

TEST TWO-SELECTOR IN "3"

This test checks the underdrive clutch hydraulic circuit as well as the shift schedule.

(1) Attach gauge to the underdrive clutch tap.

(2) Move selector lever to the 3 position.

(3) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 30 mph.

(4) Underdrive clutch pressure should read 110 to 145 psi.

TEST THREE-SELECTOR IN "OD"

This test checks the overdrive clutch hydraulic circuit as well as the shift schedule.

(1) Attach gauge to the overdrive clutch tap.

(2) Move selector lever to the OD position.

(3) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 20 mph.

(4) Overdrive clutch pressure should read 74 to 95 psi.

(5) Move selector lever to the 3 position and increase indicated vehicle speed to 30 mph.

(6) The vehicle should be in second gear and overdrive clutch pressure should be less than 5 psi.

TEST FOUR-SELECTOR IN "OD"

This test checks the 2/4 clutch hydraulic circuit.

(1) Attach gauge to the 2/4 clutch tap.

(2) Move selector lever to the OD position.

42LE PRESSURE CHECK SPECIFICATIONS

ALL PRESSURE SPECIFICATIONS ARE PSI

(on hoist, with front wheels free to turn)

Gear Selector Position	Actual Gear	PRESSURE TAPS					
		Under-Drive Clutch	Over-Drive Clutch	Reverse Clutch	Torque Converter Clutch Off	2/4 Clutch	Low/ Reverse Clutch
PARK * 0 mph	PARK	0-2	0-5	0-2	60-110	0-2	115-145
REVERSE * 0 mph	REVERSE	0-2	0-7	165-235	50-100	0-2	165-235
NEUTRAL * 0 mph	NEUTRAL	0-2	0-5	0-2	60-110	0-2	115-145
L # 20 mph	FIRST	110-145	0-5	0-2	60-110	0-2	115-145
3 # 30 mph	SECOND	110-145	0-5	0-2	60-110	115-145	0-2
3 # 45 mph	DIRECT	75-95	75-95	0-2	60-90	0-2	0-2
OD # 30 mph	OVERDRIVE	0-2	75-95	0-2	60-90	75-95	0-2
OD # 50 mph	OVERDRIVE WITH TCC	0-2	75-95	0-2	0-5	75-95	0-2

***Engine speed at 1500 rpm**
#CAUTION: Both front wheels must be turning at same speed.

(3) Allow vehicle front wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 30 mph.

(4) The 2/4 clutch pressure should read 75 to 95 psi.

TEST FIVE-SELECTOR IN "OD"

These tests checks the torque converter clutch hydraulic circuit.

(1) Attach gauge to the torque converter clutch off pressure tap.

(2) Move selector lever to the OD position.

(3) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 50 mph.

CAUTION: Both wheels must turn at the same speed.

(4) Torque converter clutch off pressure should be less than 5 psi.

(5) Now attach the gauge to the torque converter clutch on pressure tap.

(6) Move selector to the OD position.

(7) Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 50 mph.

(8) Verify the torque converter clutch is applied mode using the RPM display of the DRB II scan tool.

(9) torque converter clutch on pressure should be 60-90 psi.

TEST SIX-SELECTOR IN "R"

This test checks the reverse clutch hydraulic circuit.

(1) Attach gauge to the reverse clutch tap.

(2) Move selector lever to the "R" position.

(3) Read reverse clutch pressure with output stationary (foot on brake) and throttle opened to achieve 1500 rpm.

(4) Reverse clutch pressure should read 165 to 235 psi.

TEST RESULT INDICATIONS

(1) If proper line pressure is found in any one test, the pump and pressure regulator are working properly.

(2) Low pressure in all positions indicates a defective pump, a clogged filter, or a stuck pressure regulator valve.

(3) Clutch circuit leaks are indicated if pressures do not fall within the specified pressure range.

(4) If the overdrive clutch pressure is greater than 5 psi in step (6) of Test Three, a worn reaction shaft seal ring is indicated.

CLUTCH AIR PRESSURE TESTS

Inoperative clutches can be located by substituting air pressure for fluid pressure. The clutches may be tested by applying air pressure to their respective passages after the valve body has been removed. Use Special Tool 6599-1 and 6599-2 to perform test (Fig. 2).

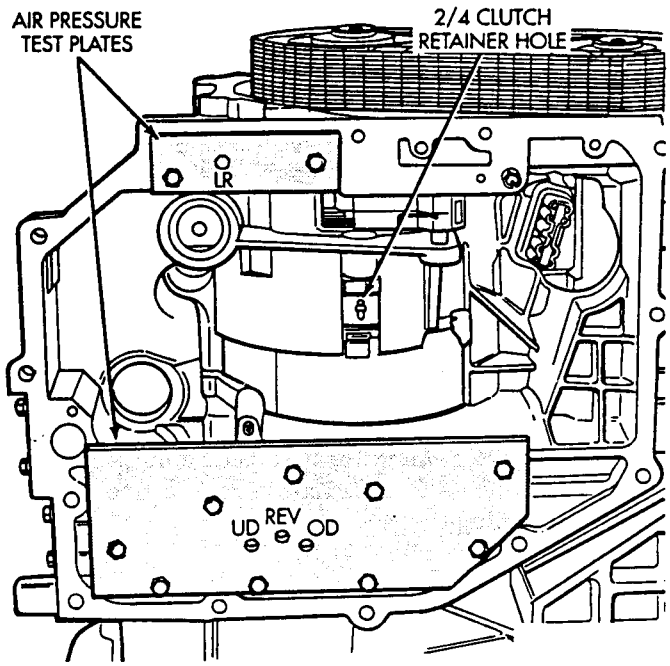


Fig. 2 Air Pressure Test Plate

To make air pressure tests, proceed as follows:

The compressed air supply must be free of all dirt and moisture. Use a pressure of 30 psi.

Remove oil pan and valve body. See Valve body recondition.

Apply air pressure to the holes in the special tool, one at a time.

Listen for the clutch to apply. It will give a slight thud sound. If a large amount of air is heard escaping, the transaxle must be removed from vehicle, disassembled and all seals inspected.

OVERDRIVE CLUTCH

Apply air pressure to the overdrive clutch apply passage and watch for the push/pull piston to move forward. The piston should return to its starting position when the air pressure is removed.

UNDERDRIVE CLUTCH

Because this clutch piston cannot be seen, its operation is checked by function. Air pressure is applied to the low/reverse or the 2/4 clutches. This locks the output shaft. Use a piece of rubber hose wrapped around the input shaft and a pair of clamp-on pliers to turn the input shaft. Next apply air pressure to the underdrive clutch (Fig. 3). The input shaft should not rotate with hand torque. Release the air pressure and confirm that the input shaft will rotate.

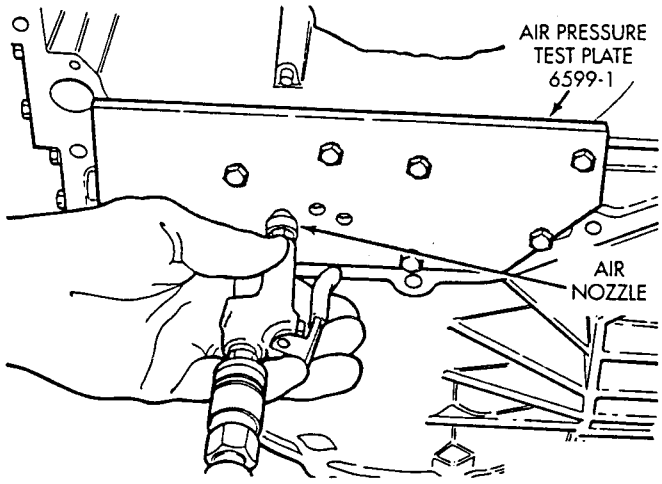


Fig. 3 Testing Underdrive Clutch

REVERSE CLUTCH

Apply air pressure to the reverse clutch apply passage and watch for the push/pull piston to move rearward. The piston should return to its starting position when the air pressure is removed.

2/4 CLUTCH

Apply air pressure to the feed hole located on the 2/4 clutch retainer. Look in the area where the 2/4 piston contacts the first separator plate and watch carefully for the 2/4 piston to move rearward. The piston should return to its original position after the air pressure is removed.

LOW/REVERSE CLUTCH

Apply air pressure to the low/reverse clutch feed hole passage. Then, look in the area where the low/reverse piston contacts the first separator plate and watch carefully for the piston to move forward. The piston should return to its original position after the air pressure is removed.

FLUID LEAKAGE

The 42LE is a dual sump transaxle using both automatic transaxle fluid (ATF) for the main sump and hypoid gear lube for the differential sump. When diagnosing a leak, it is important to distinguish which type of fluid is leaking. Factory fill ATF is dyed red, while differential hypoid oil is brown in color and has a distinctive odor.

There are two seals at the boundary of the two sumps. There is a weep hole in the right side of the transaxle case (Fig. 4) which vents the area between the two seals. If oil is leaking from the weep hole, there is at least one seal leaking. Never plug the weep hole to correct a leaking condition. Plugging the weep hole could result in contaminating one or both transaxle sumps, low oil level, poor transaxle

performance or transaxle failure. In order to correctly repair this type of leak the transaxle must be removed from the vehicle and both transfer shaft seals replaced. Refer to "Transfer Shaft Seal Replacement" procedure in this section.

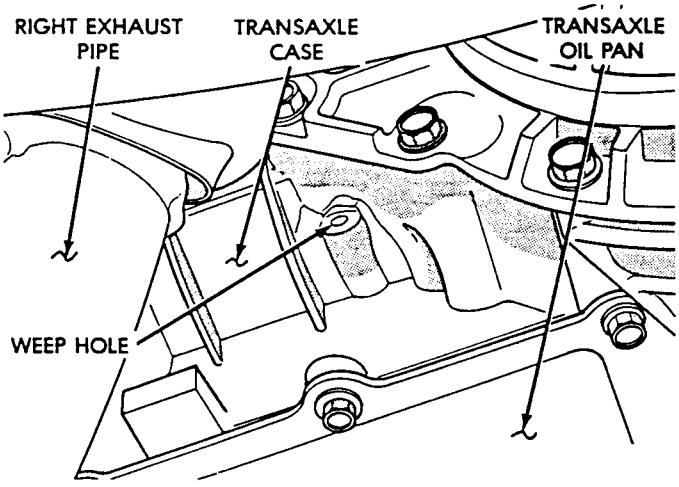


Fig. 4 Weep Hole Location

FLUID LEAKAGE-TORQUE CONVERTER HOUSING AREA

(1) Check for source of leakage. Fluid leakage from the torque converter area may originate from an engine oil leak, a differential oil leak or an ATF oil leak. The area should be examined closely.

(2) Prior to removing the transaxle, perform the following checks:

- When leakage is determined to be automatic transmission fluid, check fluid level prior to removal of the transaxle and torque converter.
- High oil level can result in oil leakage out the vent. If the fluid level is high, adjust to proper level.
- After performing this operation, inspect for leakage. If a leak persists, perform the following operation on the vehicle to determine if it is the torque converter or transaxle that is leaking.

LEAKAGE TEST PROBE

(1) Remove torque converter housing dust shield.

(2) Clean the inside of torque converter housing (lower area) as dry as possible. A solvent spray followed by compressed air drying is preferable.

(3) Fabricate and fasten test probe (Fig. 5) securely to convenient dust shield bolt hole. Make certain torque converter is cleared by test probe. Tool must be clean and dry.

(4) Run engine at approximately 2,500 rpm with transaxle in neutral, for about 2 minutes. Transaxle must be at operating temperature.

(5) Stop engine and carefully remove tool.

(6) If upper surface of test probe is dry, there is no torque converter leak. A path of fluid across probe

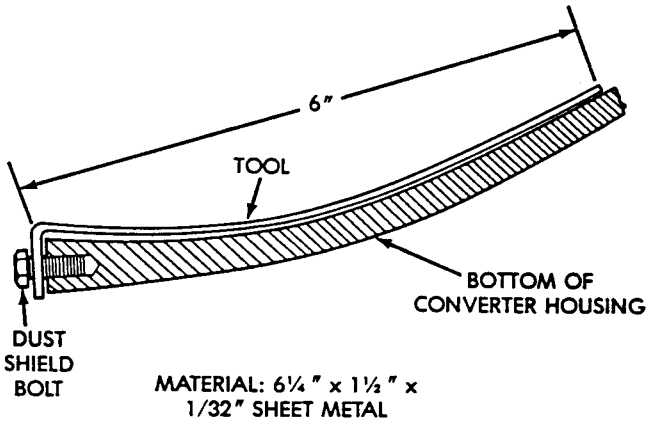


Fig. 5 Leak Locating Test Probe Tool

indicates a torque converter leak. Oil leaking under the probe is coming from the transaxle.

(7) Remove transaxle and torque converter assembly from vehicle for further investigation. The fluid should be drained from the transaxle. Re install oil pan (with Mopar Adhesive Sealant) at specified torque.

Possible sources of transaxle torque converter area ATF fluid leakage are:

- Torque converter hub seal.
- Seal lip cut, check torque converter hub finish.
- Bushing moved and/or worn.
- Oil return hole in pump housing plugged or omitted.
- Seal worn out (high-mileage vehicles).
- Fluid leakage at the outside diameter from pump housing O-ring.
- Fluid leakage at the front pump to case bolts. Check condition of washers on bolts and use new bolts, if necessary.
- Fluid leakage due to case or front pump housing porosity.

One once of oil dye can be added to the automatic transmission fluid to help locate leaks. Add the dye through the transaxle dipstick tube. Then reproduce the leak and check for traces of dye. Repair leak as required.

TORQUE CONVERTER LEAKAGE

Possible sources of torque converter leakage are:

- Torque converter weld leaks at the out side (peripheral) weld.
- Torque converter hub weld.

Hub weld is inside and not visible. Do not attempt to repair. Replace torque converter.

FLUID LEAKAGE—DIFFERENTIAL HOUSING AREA

The differential uses 80w-90 petroleum based hypoid gear lube. It can be distinguished from ATF by its brown color (ATF is dyed red). Also gear lube has a distinctive odor (hypoid smell).

(1) If it is suspected that the leakage is gear lube, check the differential for proper fluid level. High oil level can result in leakage from the differential vent.

CAUTION: A crushed vent baffle will cause oil to leak from vent hose.

(2) If fluid level in the differential is correct, add 1/4 to 1/2 ounce of leak detecting florescent dye to the differential fluid.
(3) Clean the suspect area of the transaxle with solvent.
(4) Road test the vehicle until the leak reoccurs.
(5) Using a black light determine the source of the leak and repair as required.
Do not add oil dye to both the ATF sump and the differential sump at the same time. This can cause confusion when trying to pinpoint a leak source.

AIR PRESSURE TEST OF TRANSAXLE SUMP

It may be necessary to air pressure test the transaxle to pinpoint the leak. The following two sections describe the recommended procedure for pressure testing the ATF side and the differential side of the transaxle.
Transaxle temperature may be a factor in oil leaks, therefore some leaks may not show-up during air pressure testing.

AUTOMATIC TRANSMISSION FLUID SIDE

Fabricate equipment needed for test as shown in Figures 6 and 7.

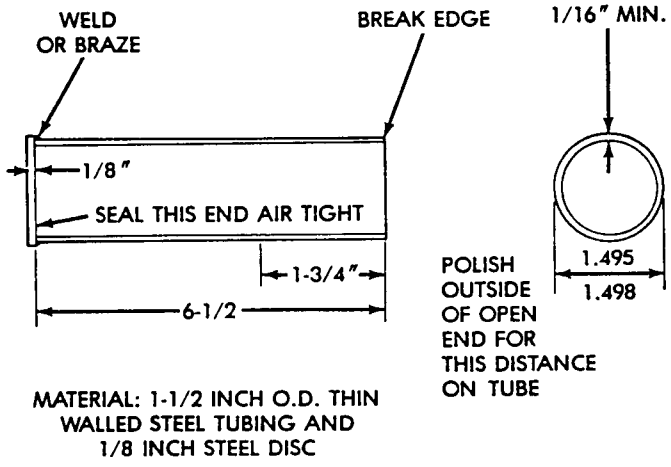


Fig. 6 Torque Converter Hub Seal Cup

The transaxle should be prepared for pressure test as follows after removal of the torque converter:
(1) Plug dipstick tube and plug oil cooler line fittings.

CAUTION: Prevent manual shaft rotation during installation and removal.

(2) With rotary motion, install converter hub seal cup over input shaft, and through the converter hub seal. The cup must bottom against the pump gear lugs. Secure with cup retainer strap using starter upper hole and opposite bracket hole.

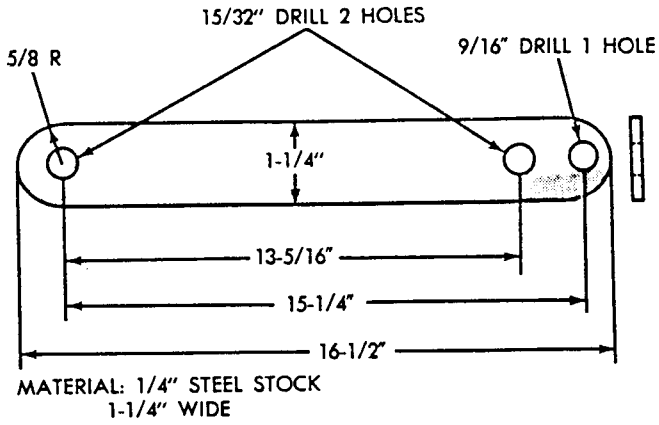


Fig. 7 Hub Seal Cup Retaining Strap

(3) Plug cooler lines.
(4) Remove the remote vent hose from the main sump vent fitting. Then attach and clamp hose from nozzle of tool C-4080 or 7700 to the vent fitting.

CAUTION: Do not, under any circumstances, pressurize a transaxle to more than 10 psi.

(5) Pressurize the transaxle using Tool C-4080 or 7700 until the pressure gauge reads 8 psi. Position transaxle so that pump housing and case front may be covered with soapy solution of water. Leaks are sometimes caused by porosity in the case or pump housing.
If a leak source is located, that part and all associated seals, O-rings, and gaskets should be replaced with new parts.

TRANSAXLE DIFFERENTIAL SUMP SIDE

(1) Leave stub shafts secured in the differential.
(2) Remove the remote vent hose from the differential vent fitting. Then attach and clamp hose from nozzle of tool C-4080 or 7700 to the vent fitting.

CAUTION: Do not, under any circumstances, pressurize a transaxle to more than 10 psi.

(3) Pressurize the differential to 8 psi.
(4) Position transaxle so that the differential area of the transaxle can be covered with a soapy solution of water. Be sure to cover the case with solution to check for case porosity.
(5) Look for bubbles to appear in the soapy solution that was applied to the transaxle. This will indicate the leak point.
If a leak source is located, that part and all associated seals, O-rings, and gaskets should be replaced with new parts.

LONG STUB SHAFT SEAL REPLACEMENT

If it has been diagnosed that the long stub shaft seal is leaking, the following procedure can be used to replace failed seal. This procedure will allow the replacement of the seals without having to set backlash and measure differential bearing turning torque.

CAUTION: The differential bearings and the differential adjusters must be reused in order to use this procedure. If any of the items listed above require replacement, this procedure cannot be used. Refer to "Differential Recondition" section of this manual.

(1) Remove transaxle from vehicle. Refer to "Transaxle Removal and Installation" procedure in this section.

(2) Remove long stub shaft from transaxle (Fig. 1).

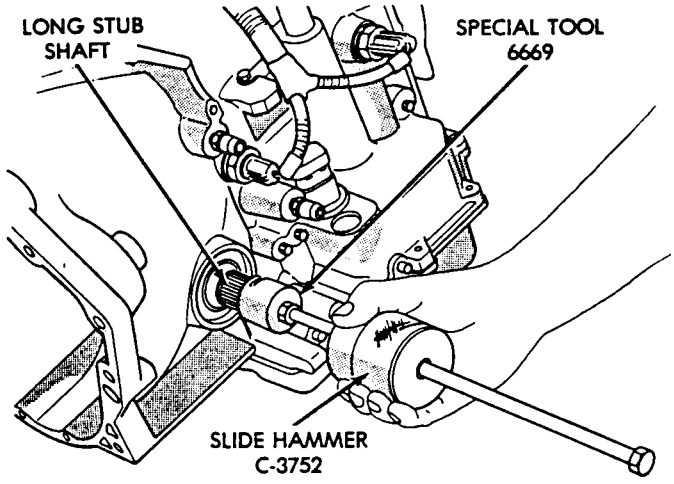


Fig. 1 Long Stub Shaft Removal

(3) Index the inner differential adjuster with a "cross hair" as shown in figure 2.

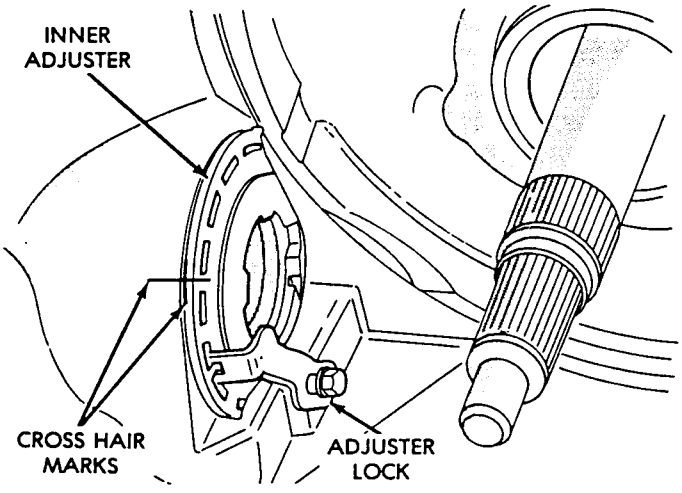


Fig. 2 Indexing Inner Adjuster

CAUTION: If short stub shaft has corrosion, use caution when removing differential cover. Inspect seal and shaft for damage after removal of cover. Replace shaft and/or seal as required.

(4) Index outer adjuster (Fig. 3). Remove lock bracket and back out adjuster exactly one revolution. Then remove differential cover.

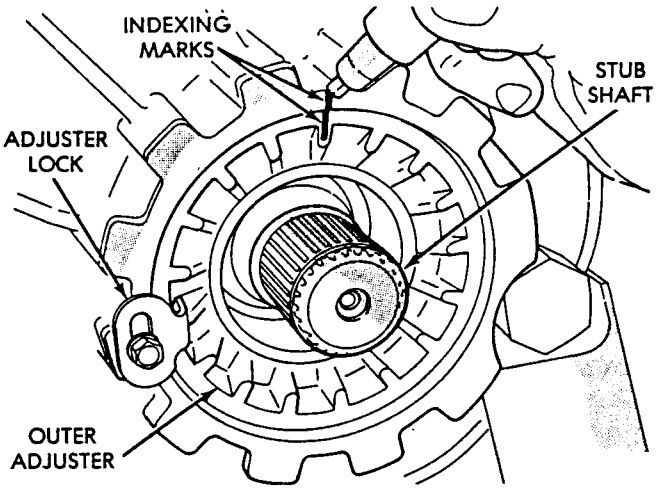


Fig. 3 Indexing Outer Adjuster

(5) Remove The inner adjuster lock bracket. Then remove the inner adjuster.

CAUTION: Keep the inner adjuster for reinstallation.

(6) Lube inner adjuster threads with gear oil and reinstall to the "cross haired" index marks.

(7) Install the differential carrier. Then install stub shaft seal protector.

(8) Install the differential cover/outer adjuster assembly with sealant applied. Install and tighten differential cover bolts.

(9) Tighten the outer adjuster 3/4 of a turn. Seat bearings by turning differential carrier three or four turns in both directions. Finish tightening the adjuster 1/4 turn to its index mark (original location).

(10) Reinstall long stub shaft, fill differential with fluid and reinstall transaxle.

(11) After installing transaxle check transmission side fluid level.

SHORT STUB SHAFT SEAL REPLACEMENT

The following procedure can be used to replace the short stub shaft seal without having to remove the transaxle from the vehicle. If the adjuster or bearing located behind the adjuster require replacement, do not use this procedure. Refer to "Differential Recondition" section of this manual.

(1) Place vehicle in neutral and lift vehicle on hoist.

(2) Remove short drive shaft.

(3) Index the outer adjuster (Fig. 4).

(4) Remove Outer adjuster lock (Fig. 5)

(5) Using special tool 6503 loosen outer adjuster, then retighten to the index mark using a torque wrench. Record the amount of torque required to return the index marks to their original location. Remove the adjuster.

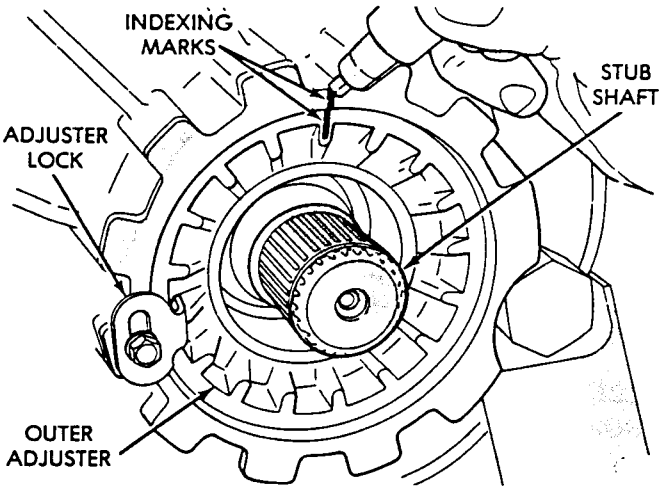


Fig. 4 Indexing Outer Adjuster

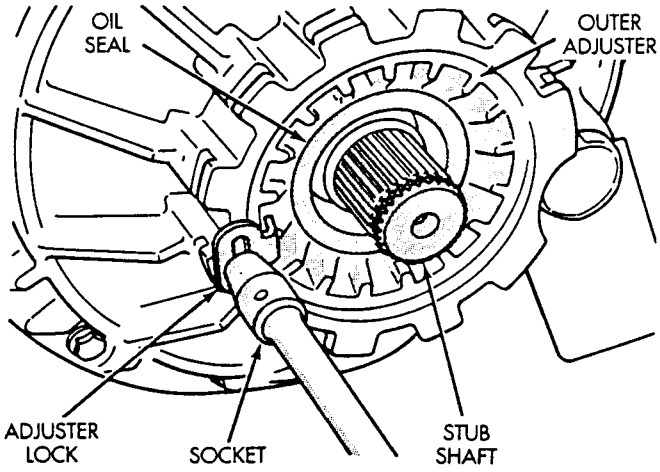


Fig. 5 Outer Adjuster Lock Removal

(6) Use special tool 6558 to remove old seal and install new seal (Fig. 6).

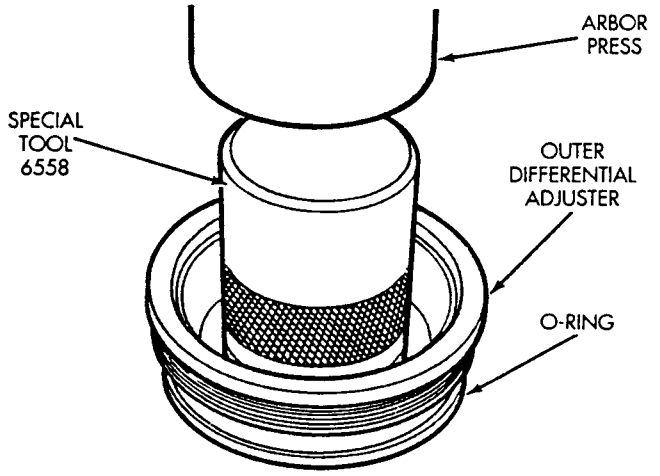


Fig. 6 Seal Removal and Installation

(7) Inspect stub shaft for corrosion (Fig. 7). If corrosion exists, wrap stub shaft with wax paper and install seal protector over wax paper.

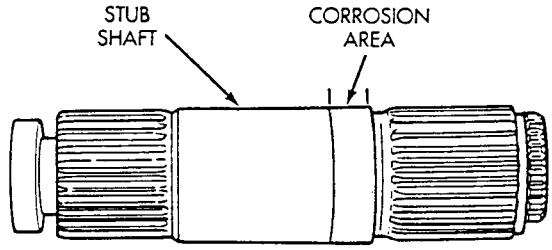


Fig. 7 Stub Shaft Corrosion

(8) Lube o-ring, threads on adjuster, seal protector and seal lips with gear oil before installing.

(9) Install outer adjuster into transaxle case and tighten adjuster within 10 ft. lbs. of the torque reading recorded in step five.

(10) Rotate ring gear three or four revolutions in both directions to seat differential bearings.

(11) Continue tightening outer adjuster until index marks line up (original location).

(12) Install adjuster lock.

(13) Install new driveshaft retaining circlip and o-ring on stub shaft. Then reinstall driveshaft.

(14) Check fluid level in differential and adjust as required.

(15) Road test and recheck for leaks as required.

ALUMINUM THREAD REPAIR

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

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

COOLERS AND TUBES REVERSE FLUSHING

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

CAUTION: If vehicle is equipped with two oil coolers (one in the radiator tank, one in front of the radiator) they must be flushed separately. Do not attempt to flush both coolers at one time.

Use the following procedure to flush cooler:

(1) Disconnect the cooler lines at the transaxle.

(2) Using a hand suction gun filled with mineral spirits, reverse flush the cooler. This is done by forcing mineral spirits into the **From Cooler** line of the cooler (Fig. 8). Catch the exiting spirits from the **To Cooler** line. Observe for the presence of debris in the exiting fluid. Continue until fluid exiting is clear and free from debris.

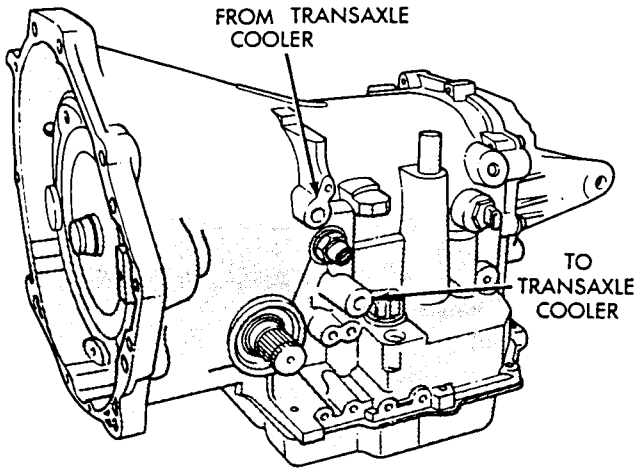


Fig. 8 Cooler Line Identification

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

(4) To remove remaining mineral spirits from the cooler, pump one (1) quart of transmission fluid through the cooler. This should be done prior to reconnecting the hoses to the transaxle.

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

OIL COOLER FLOW CHECK

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

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

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

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

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

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

MANUAL VALVE LEVER POSITION SENSOR

The Manual Valve Lever Position Sensor (MVLPS) interprets the position of the manual valve. This information is sent to the transmission control module. Also the MVLPS provides for Park/Neutral only starter operation and back-up lamp operation.

The MVLPS connector extends outside the transaxle on the left side, next to the fill tube. The MVLPS is mounted to the top of the valve body. The MVLPS and valve body must be removed from the transaxle as an assembly.

TEST

Refer to the 1993 42LE Transaxle Diagnostic Procedures Manual for MVLPS diagnostic test procedures.

REMOVAL AND INSTALLATION

(1) Disconnect the MVLPS connector.

(2) Remove valve body assembly from vehicle. Refer to "Valve Body" in this section for procedure.

(3) Remove manual shaft retaining screw (Fig. 1).

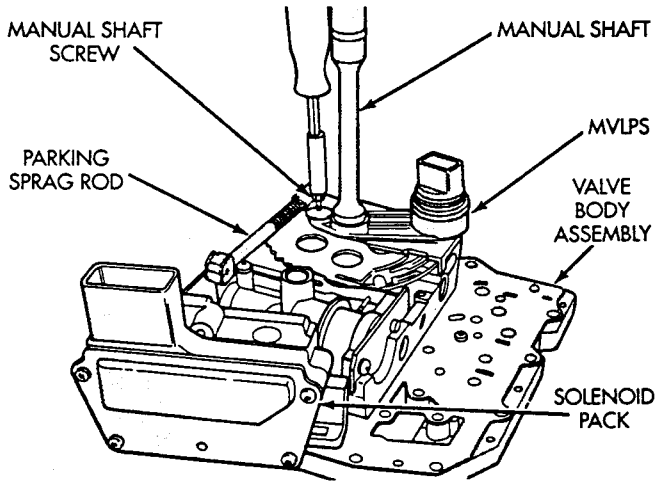


Fig. 1 Manual Shaft Retaining Screw

(4) Slide MVLPS off of manual valve shaft.

To install, reverse removal procedure.

SOLENOID ASSEMBLY

The transaxle solenoid pack is located on the top side of the valve body. The valve body must be removed from the transaxle in order to service the solenoid pack.

The solenoid pack contains four solenoids. If any one of the solenoids fail, all of the solenoids must be replaced. There are no serviceable parts for the solenoid pack.

TEST

Refer to the 1993 42LE Transaxle Diagnostic Procedures Manual for diagnostic test procedures.

REMOVAL AND INSTALLATION

(1) Raise vehicle on hoist.

(2) Remove valve body assembly from transaxle. Refer to Valve Body in this section for removal procedure.

(3) Remove solenoid retaining screws from solenoid (Fig. 2).

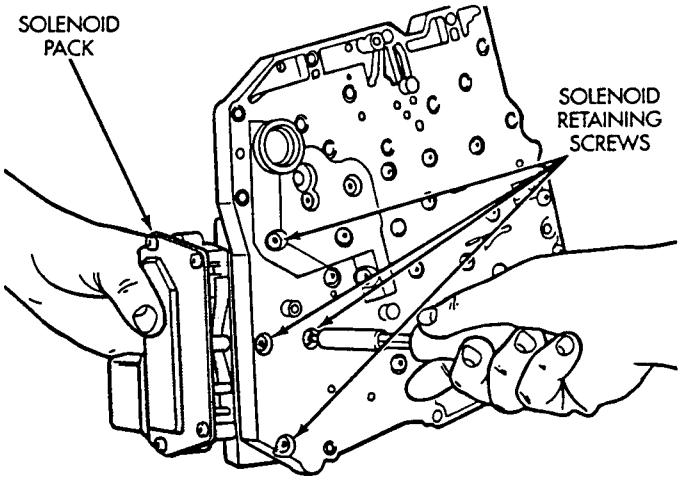


Fig. 2 Solenoid Retaining Screws

(4) Remove solenoid and screen from valve body (Fig. 3).

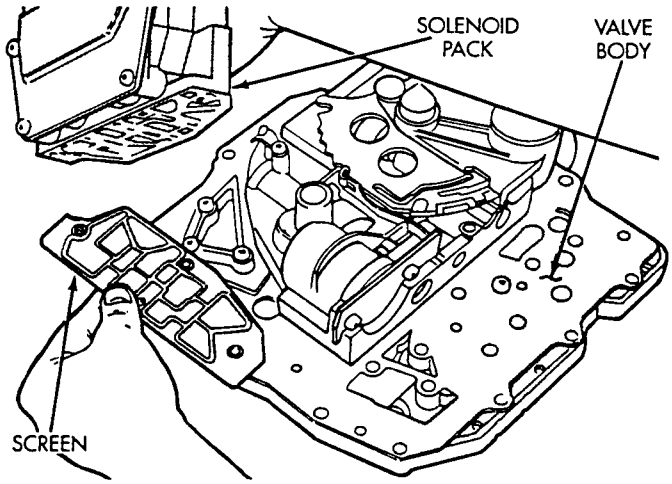


Fig. 3 Solenoid and Screen removal

To install, reverse removal procedure.

TRANSMISSION CONTROL RELAY

The transmission control module controls power to the solenoid pack through the transmission control relay. The relay is located in the power distribution center on the left strut tower.

TEST

Refer to the 1993 42LE Transaxle Diagnostic Procedures Manual for test procedures.

REMOVAL AND INSTALLATION

(1) Open hood and locate power distribution center in the engine compartment.

(2) Remove power distribution center plastic cover.

(3) Pull relay out of power distribution center (Fig. 4).

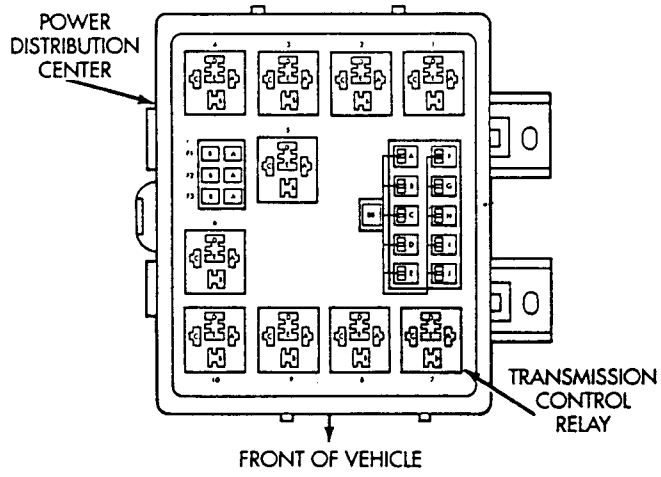


Fig. 4 Transmission Control Relay Location

To install, reverse removal procedure.

TRANSMISSION CONTROL MODULE

The transmission control module is located in the engine compartment between the left front fender and the battery. It is held in place by four mounting screws. The battery must be moved to gain access to the transmission control module.

If the transmission control module has been replaced, refer to "Quick Learn Procedure". This program will allow the transmission control module to learn the characteristics of the vehicle.

REMOVAL

(1) Loosen battery hold-down clamp and slide the battery to the right.

(2) Loosen 60 way retaining screw, located in the center of the 60 way connector. Then disconnect the 60 way connector on transmission control module.

(3) Remove transmission control module mounting screws and lift module from vehicle.

INSTALLATION

(1) Install transmission control module and tighten mounting screws.

(2) Install 60 way connector. Then tighten 60 way retaining screw to 4 N•m (35 in. lbs.).

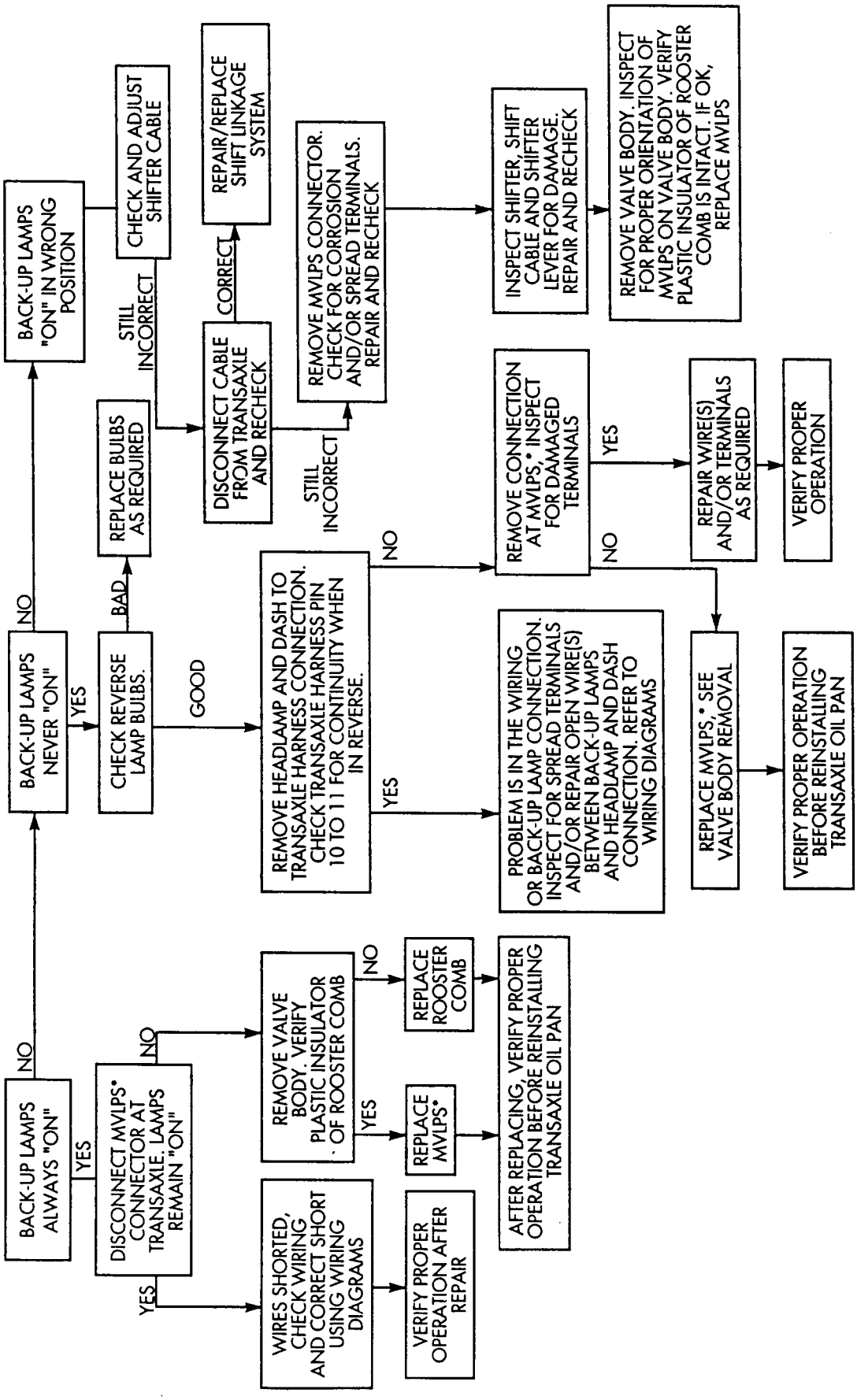
(3) Place battery back in its original location and tighten battery hold-down clamp.

BACK UP LAMP DIAGNOSIS

The back-up lamps are controlled by the Manual Valve Lever Position Sensor (MVLPS). The following flow chart will assist in diagnosing the back-up lamp system. Refer to Manual Valve Lever Position Sensor in this section for removal procedure.

BACK-UP LAMP DIAGNOSTIC CHART

PERFORM ALL TESTS WITH IGNITION IN THE "ON" POSITION AND PARKING BRAKE APPLIED.



*MANUAL VALVE LEVER POSITION SENSOR

SPEED SENSOR-INPUT

The input speed sensor can be serviced without having to remove the transaxle from the vehicle.

CAUTION: When disconnecting speed sensor connector, be sure that the weather seal does not fall off or remain in the old sensor.

The input speed sensor is not interchangeable with the output speed sensor.

The input speed sensor is located on the left side of the transaxle case (Fig. 5). The sensor threads into the transaxle case. Tighten input speed sensor to 20-34 N•m (180-300 in. lbs.).

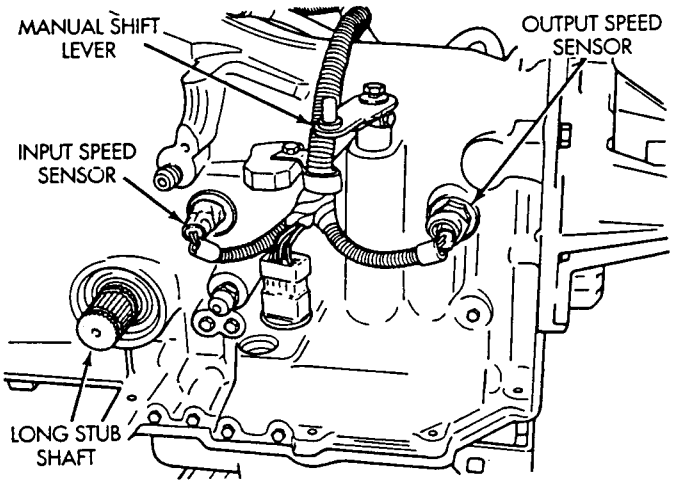


Fig. 5 Speed Sensor Location

SPEED SENSOR-OUTPUT

The output speed sensor can be serviced without having to remove the transaxle from the vehicle.

CAUTION: When disconnecting speed sensor connector, be sure that the weather seal does not fall off or remain in old sensor.

The output speed sensor is not interchangeable with the input speed sensor.

The output speed sensor is located on the left side of the transaxle case (Fig. 5). The sensor threads into the transaxle case. Tighten output speed sensor to 20-34 N•m (180-300 in. lbs.).

VALVE BODY

The valve body can be removed from the transaxle with the transaxle remaining in the vehicle, or with the transaxle removed from the vehicle. The illustrations in this procedure shows the transaxle removed from the vehicle for clarity.

The solenoid pack and Manual Valve Lever Position Sensor (MVLPS) are mounted on top side of the valve body. They will remain attached to the valve body when the valve body is removed from the transaxle. The solenoid pack and MVLPS can only be removed from the valve body after the valve body is removed from the transaxle.

REMOVAL AND INSTALLATION

(1) Disconnect the MVLPS wiring connector. The solenoid wiring connector can remain attached to the case.

(2) Disconnect the shift cable from the shift lever (at the transaxle).

(3) Move the shift lever clockwise as far as it will go. This should be one position past the "L" position. Then remove the shift lever.

(4) Remove transaxle pan bolts (Fig. 1).

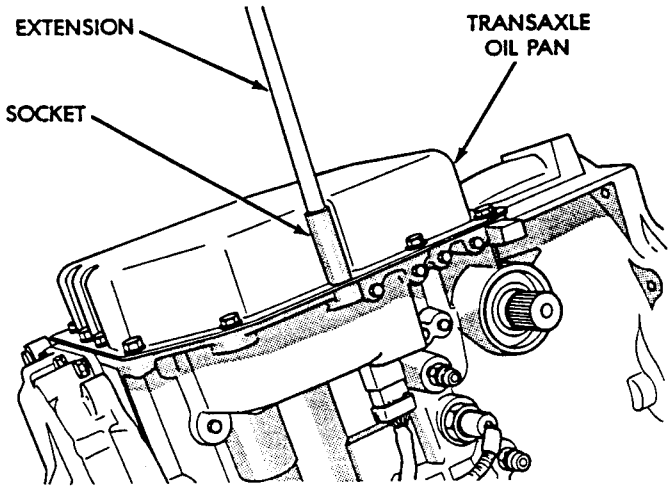


Fig. 1 Remove Transaxle Oil Pan Bolts

(5) Remove transaxle oil pan (Fig. 2). When reinstalling oil pan be sure that pan flange is clean and oil free. Apply a 1/8 inch bead of Mopar Silicone Sealer onto oil pan flange before installing.

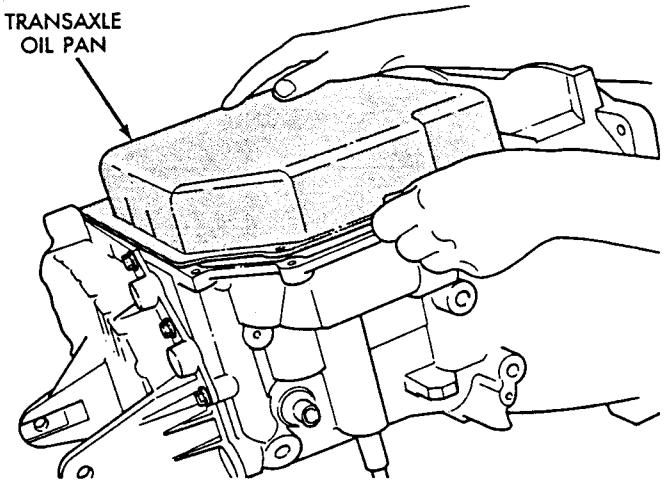


Fig. 2 Remove Transaxle Oil Pan

(6) Remove oil filter from valve body (Fig. 3). It is held in place by two clips.

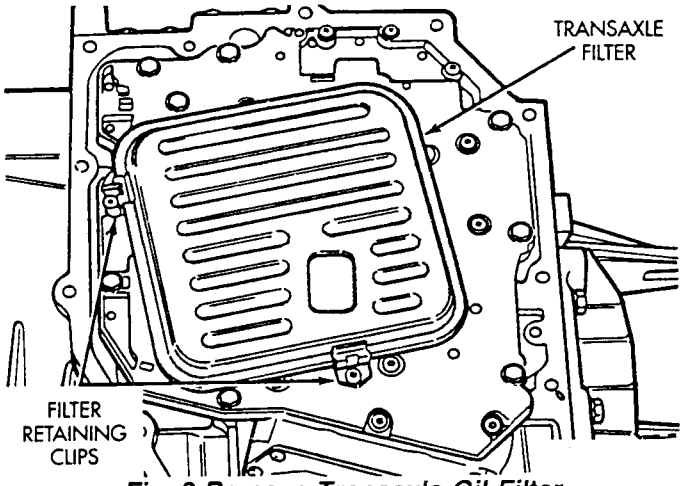


Fig. 3 Remove Transaxle Oil Filter

CAUTION: The 42LE transaxle oil filter is not interchangeable with the 41TE transaxle filter. Installation of a 41TE oil filter in a 42LE may cause transaxle damage.

(7) Remove valve body bolts (Fig. 4).

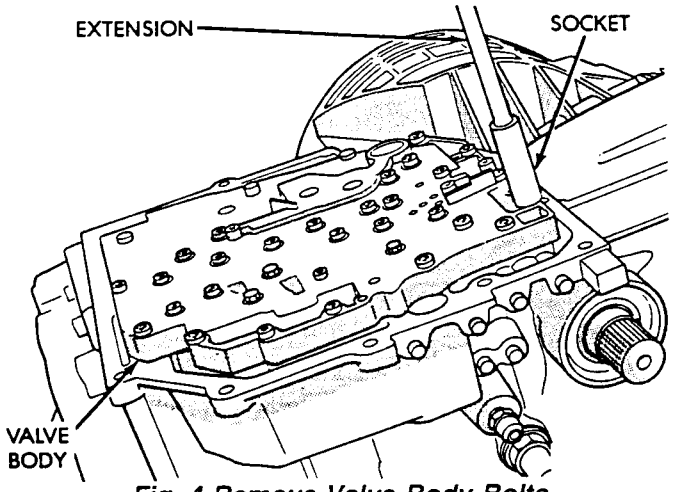


Fig. 4 Remove Valve Body Bolts

(8) Carefully remove valve body assembly from transaxle (Fig. 5).

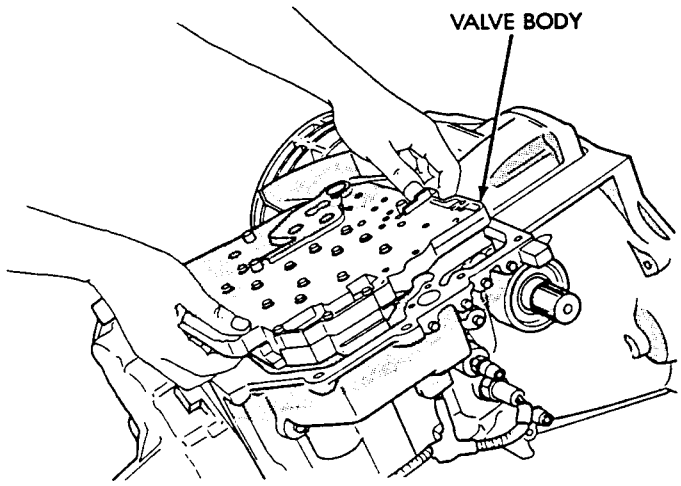


Fig. 5 Remove Valve Body From Transaxle

CAUTION: The overdrive and underdrive accumulators and springs may fall out when removing the valve body. (Fig. 6, 7, and 8)

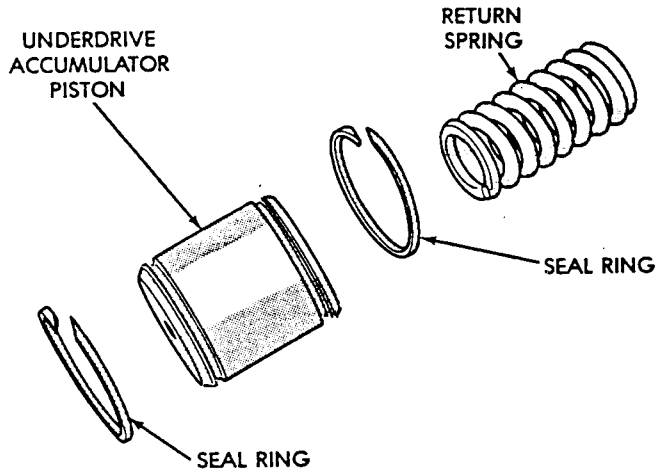


Fig. 6 Underdrive Accumulator and Spring

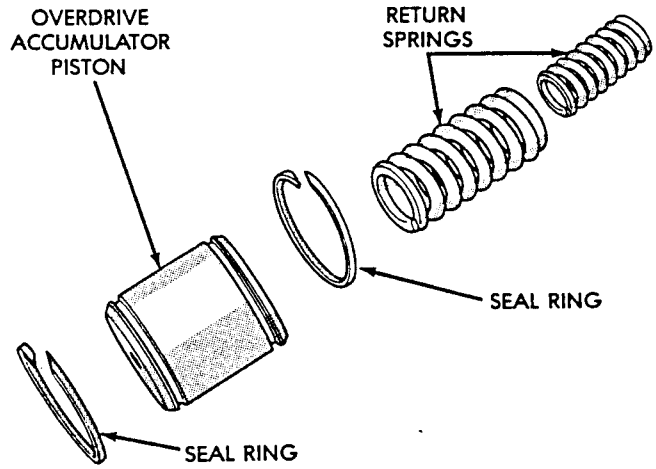


Fig. 7 Overdrive Accumulator and Springs

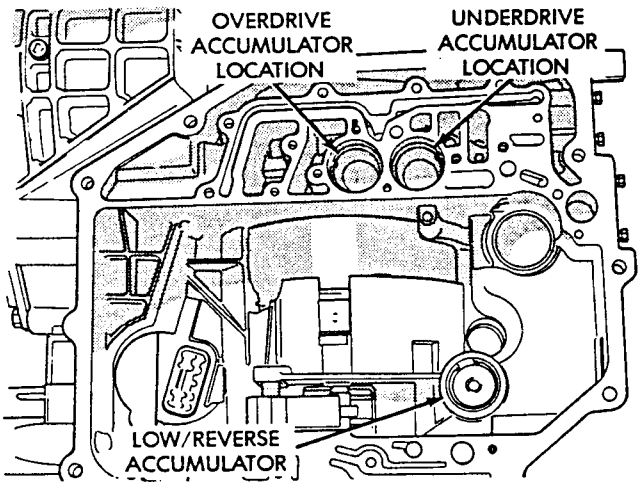


Fig. 8 Accumulator Locations

To reinstall valve body, reverse removal procedure.

RECONDITION

(1) Remove manual shaft screw (Fig. 9)

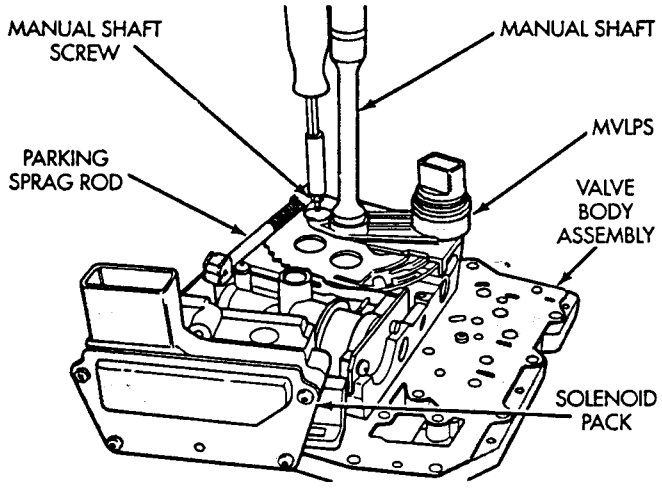


Fig. 9 Manual Shaft Screw

(2) Remove Manual Valve Lever Position Sensor (MVLPS) and manual shift lever.

(3) Remove solenoid pack from valve body (Fig. 10).

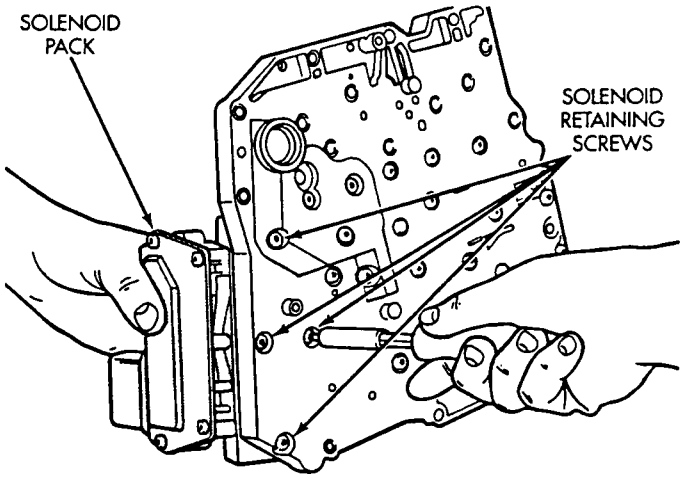


Fig. 10 Solenoid Pack Location

(4) Remove valve body stiffener plate (Fig. 11).

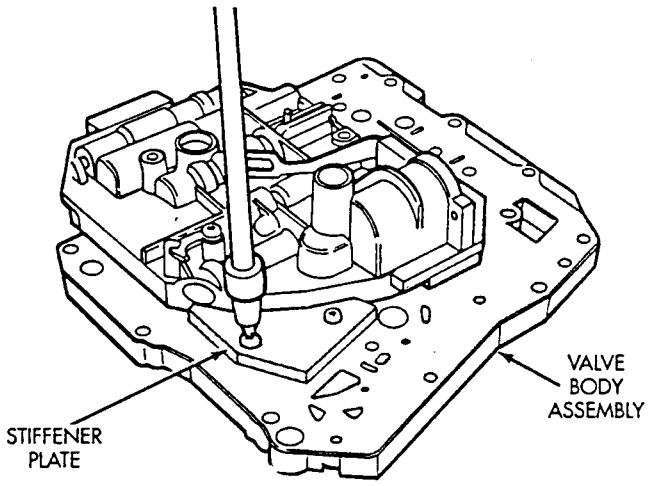


Fig. 11 Stiffener Plate Location

(5) Remove 2/4 accumulator retaining plate screws.

(6) Remove thermal valve (Fig. 12).

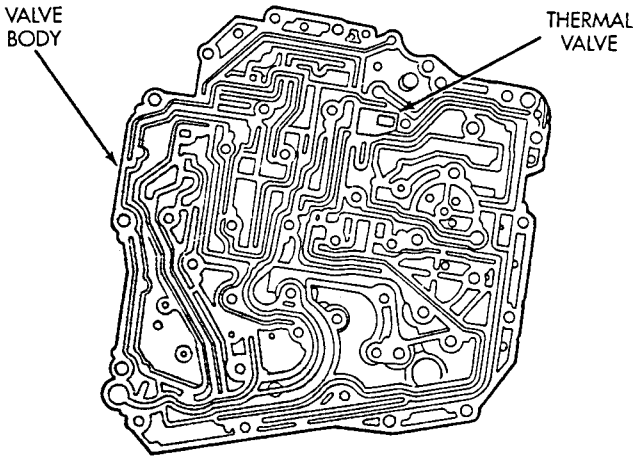


Fig. 12 Thermal Valve Location

(7) Remove valve body check balls. Note the location of valve body check balls (Fig. 13).

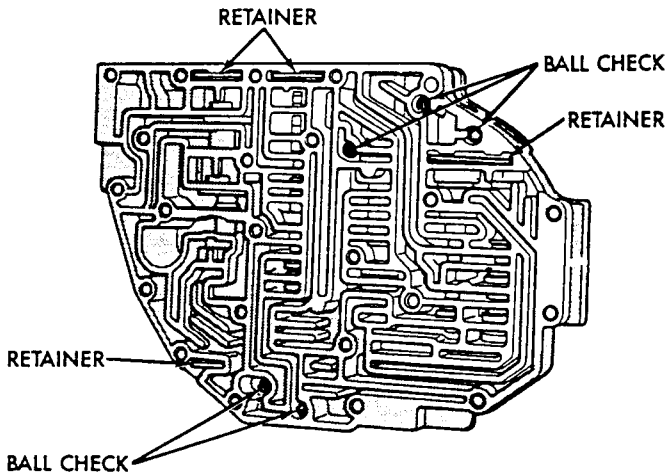


Fig. 13 Ball Check Location

(8) Remove dual retainer plate from valve body. Use special tool 6301 to remove plate (Fig. 14).

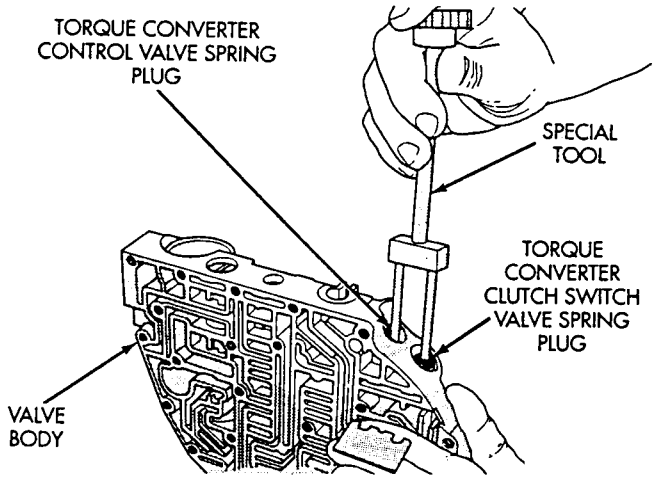


Fig. 14 Remove or Install Dual Retainer Plate

(9) Remove Retainer plate from valve body using special tool 6302 (Fig. 15).

(10) Tag all springs, as they are removed, for reassembly identification (Fig. 16).

Cleanliness through entire disassembly and assembly of the valve body cannot be overemphasized. When disassembling, each part should be washed in a suitable solvent, then dried by compressed air. **Do not wipe parts with shop towels.** All mating surfaces in the valve body are accurately machined; therefore, careful handling of all parts must be exercised to avoid nicks or burrs.

To reassemble, reverse recondition procedure.

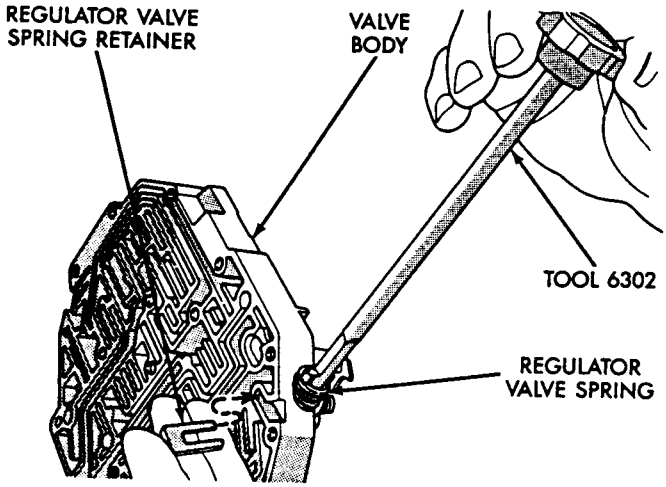


Fig. 15 Remove or Install Retainer Plate

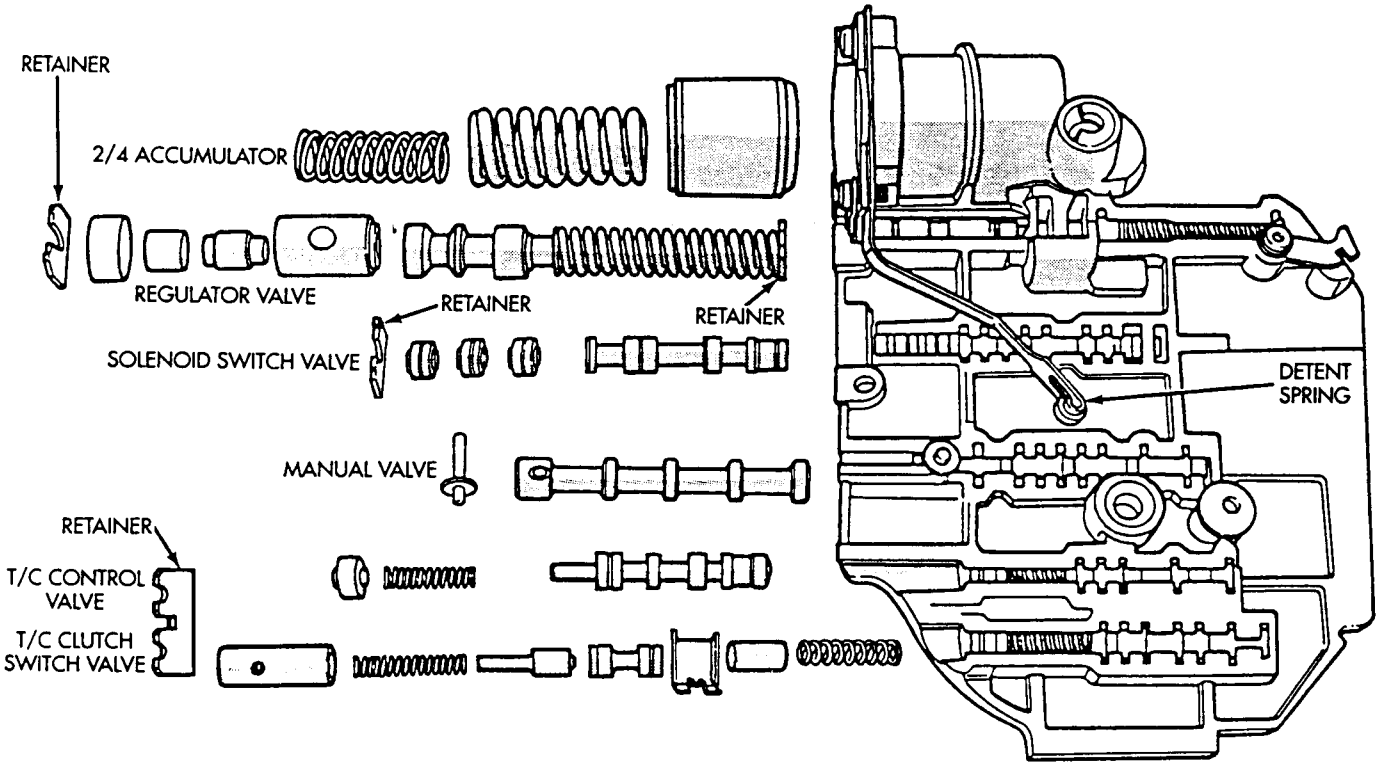


Fig. 16 Valve Body Components

TRANSFER SHAFT SEAL REPLACEMENT

If it has been diagnosed that one or both of the transfer shaft seals are leaking, the following procedure can be used to replace failed seals. This procedure will allow the technician to replace the seals without having to set backlash and measure differential bearing turning torque.

CAUTION: The transfer shaft rear shim, transfer shaft bearing cups and cones, differential bearings and the differential adjusters must be reused in order to use this procedure. If any of the items listed above require replacement, refer to "Differential Recondition" section of this manual.

(1) Remove transaxle from vehicle. Refer to "Transaxle Removal and Installation" procedure in this section.
(2) Remove valve body from transaxle.
(3) Remove solenoid connector from transaxle case.
(4) Remove long stub shaft from transaxle (Fig. 17).

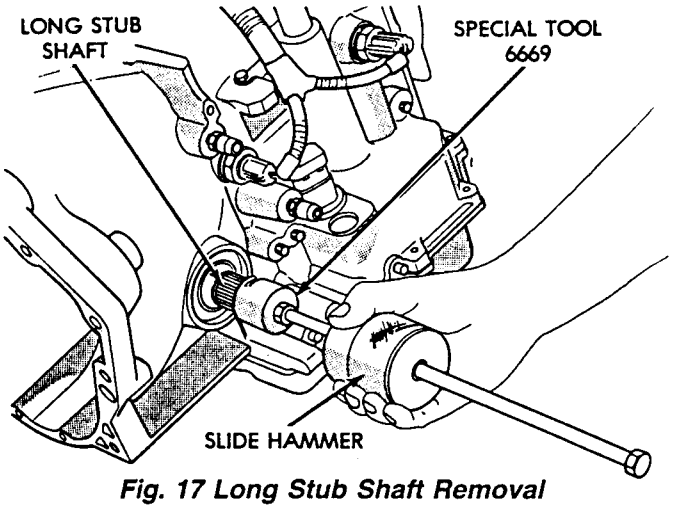


Fig. 17 Long Stub Shaft Removal

(5) Index the inner differential adjuster with a "cross hair" as shown in figure 18.

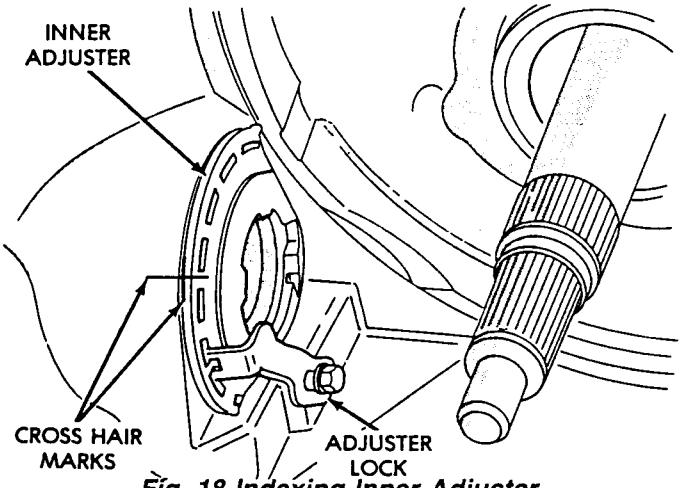


Fig. 18 Indexing Inner Adjuster

CAUTION: If short stub shaft has corrosion, use caution when removing differential cover. Inspect seal and shaft for damage after removal of cover. Replace shaft and/or seal as required.

(6) Index outer adjuster (Fig. 19). Remove lock bracket and back out adjuster exactly one revolution. Then remove differential cover.

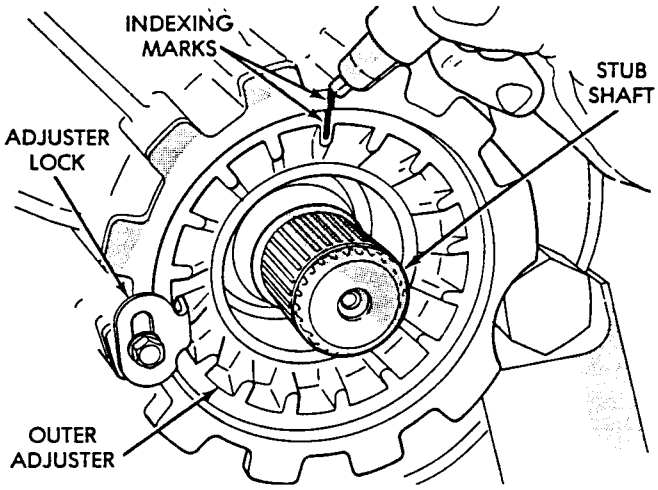


Fig. 19 Indexing Outer Adjuster

CAUTION: Keep rear shim and rear bearing cup cone for reinstallation.

(7) Remove The inner adjuster lock bracket. Then remove the inner adjuster.

CAUTION: Keep the inner adjuster for reinstallation.
(8) Remove the transfer shaft nut, rear cone, rear cup, oil baffle, rear shim, transfer shaft and transfer shaft seals. Refer to appropriate procedures within this section for detailed removal and installation procedures if required.
(9) Install transfer shaft, transfer shaft seals, oil baffle, rear cup, rear shim, rear cone and a new nut. Refer to appropriate procedures within this section for detailed removal and installation procedures if required.
(10) Install a new o-ring onto the inner adjuster.
(11) Lube inner adjuster threads and o-ring with gear oil and reinstall to the "cross haired" index marks.
(12) Reinstall the inner adjuster locking bracket.
(13) Install the differential carrier. Then install stub shaft seal protector.
(14) Install the differential cover/outer adjuster assembly with Mopar Silicone Sealant applied. Install and tighten differential cover bolts.
(15) Tighten the outer adjuster 3/4 of a turn. Seat bearings by turning differential carrier three or four turns in both directions. Finish tightening the adjuster 1/4 turn to its index mark (original location).
(16) Reinstall the outer adjuster locking bracket.

TRANSAXLE REMOVAL AND INSTALLATION

The transaxle can be removed **without** having to remove the engine.

(1) Disconnect battery.

(2) Remove engine air inlet tube.

(3) Disconnect crankshaft position sensor connector and remove sensor (Fig. 1). The sensor is located on the upper right side of the transaxle bell housing.

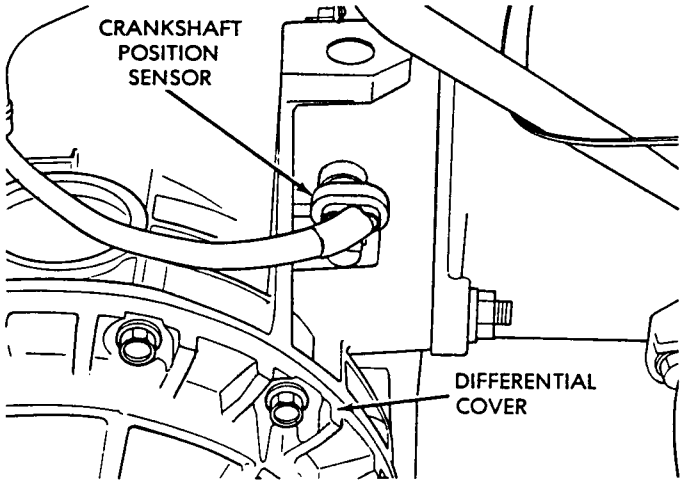


Fig. 1 Crankshaft Position Sensor Location

(4) Disconnect transaxle wiring connector located on the right shock tower (Fig. 2).

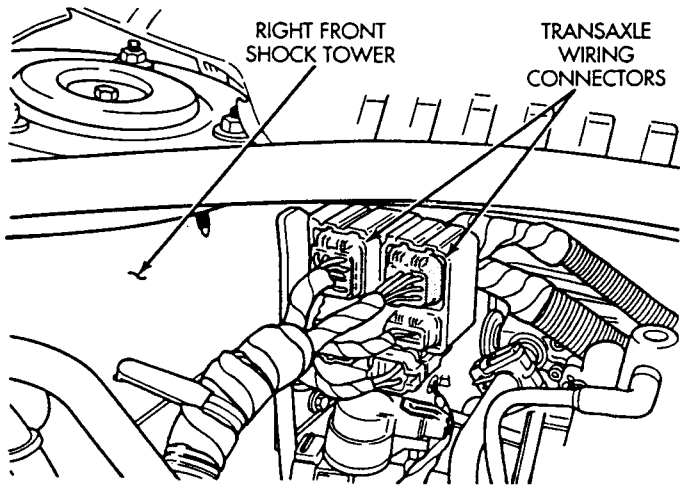


Fig. 2 Wiring Connector Location

(5) Lift vehicle on hoist.

(6) Remove front wheels.

(7) Remove strut to steering knuckle bolts on both sides of the vehicle (Fig. 3).

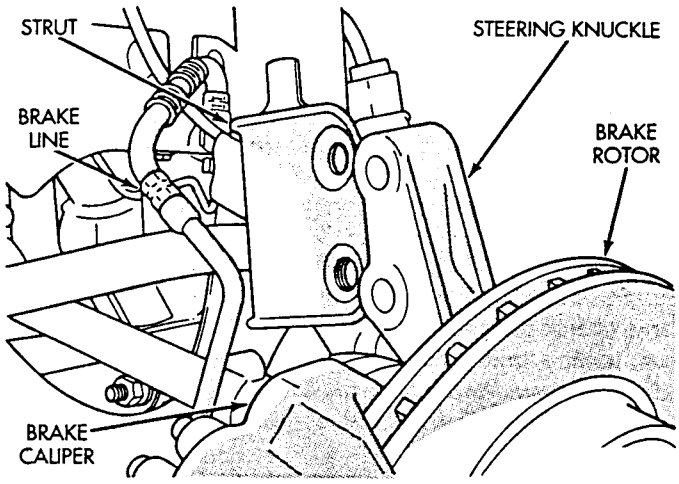


Fig. 3 Strut to Steering Knuckle Bolts

(8) Remove Anti-lock Brake System (ABS) wheel speed sensor (if equipped).

CAUTION: Do not allow drive shaft or CV joint to hang freely. Internal joint damage may occur if allowed to hang freely.

CAUTION: Drive shaft retainer clips and seals located on the stub shafts must be replaced before reinstalling drive shafts.

(9) Using a pry bar, disconnect the inner CV joint from the transaxle (Fig. 4).

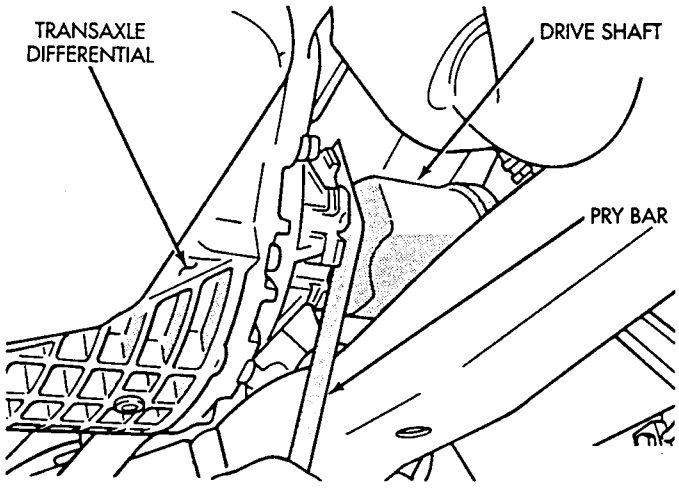


Fig. 4 Drive Shaft Removal

(10) Pull top of knuckle and drive shaft outward to allow clearance during transaxle removal. The drive shafts do not have to be completely remove from the vehicle. **Do not allow the inner CV joint to hang unsupported or joint damage may occur.**

(11) Remove engine to transaxle brackets.

(12) Remove transaxle bell-housing cover.

(13) Remove torque converter bolts. The torque converter is indexed to the flex plate. Mark the torque converter location to ensure that the torque converter is reinstalled correctly.

CAUTION: The drive plate to torque converter bolts and the drive plate to crankshaft bolts must not be reused. Install new bolts when ever these bolts are removed.

(14) Unbolt starter assembly. Do not disconnect wiring or completely remove the starter from the vehicle. Allow the starter to sit between the engine and the frame.

(15) Disconnect transaxle cooler lines at the transaxle.

(16) Disconnect the gear selector cable from the transaxle.

(17) Disconnect the exhaust system at the exhaust manifolds and remove the exhaust system from the vehicle.

(18) Place a transmission jack under the transaxle. Secure the transaxle to the jack.

(19) Raise transaxle slightly to relieve the weight on the rear transaxle mount.

(20) Remove the transaxle mount through-bolt.

(21) Remove rear crossmember mounting bolts.

(22) Pry the transaxle mount rearward to separate the mount from the transaxle.

(23) Remove the rear crossmember.

(24) Lower the rear of the transaxle to gain access to the bell housing bolts.

(25) Remove bell housing bolts.

(26) Remove dipstick tube from transaxle. Be prepared to plug the dipstick hole when removing dipstick to prevent fluid from spilling out of the transaxle.

(27) Remove engine to transaxle bolts.

(28) The transaxle can now be lowered from the vehicle.

When installing transaxle, reverse the above procedure.

The factory torque converters for 3.3 and 3.5 liter engines are **not interchangeable**. There will be only one torque converter released for service use. The service torque converter can be used in either engine application.

If the torque converter is being replaced, apply a light coating of grease to the crankshaft pilot hole.

Inspect the driveplate for cracks before reinstalling transaxle. If any cracks are found replace the driveplate. Do not attempt to repair a cracked driveplate.

Always use new torque converter to driveplate bolts.

If the torque converter has been replaced, refer to Torque Converter Clutch Break-in Procedure in this section. This procedure will reset the transmission control module break-in status. Failure to perform this procedure may cause torque converter shutter.

If the transaxle assembly, transmission control module, solenoid pack or clutch plates have been replaced, refer to "Quick Learn Procedure". This program will allow the transmission control module to compensate for any parts replaced in the electronic transaxle system.

Check and/or adjust gear shift cable. Refer to Shift Linkage in this section for procedure.

When installing the transaxle, ensure the fuel tubes at the rear of the engine do not contact the following:

- Tie rod attachment plate at the power steering rack
- Exhaust Gas Recirculation (EGR) Tube
- Transaxle wiring harness

Refill transaxle with Mopar ATF Plus (Automatic Transmission Fluid) Type 7176.

OIL PUMP SEAL REPLACEMENT

The transaxle must be removed from the vehicle to replace this oil seal.

REMOVAL

(1) Remove the transaxle from the vehicle.

(2) Remove the torque converter from the transaxle bell housing.

(3) Use special tool C-3981B to remove oil pump seal (Fig. 5).

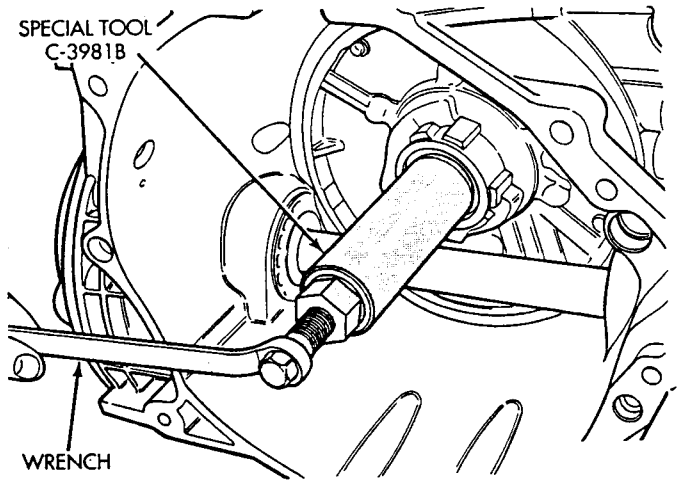


Fig. 5 Oil Seal Removal

INSTALLATION

(1) Clean and inspect oil pump seal seat. Then install seal using special tool C-4193A (Fig. 6).

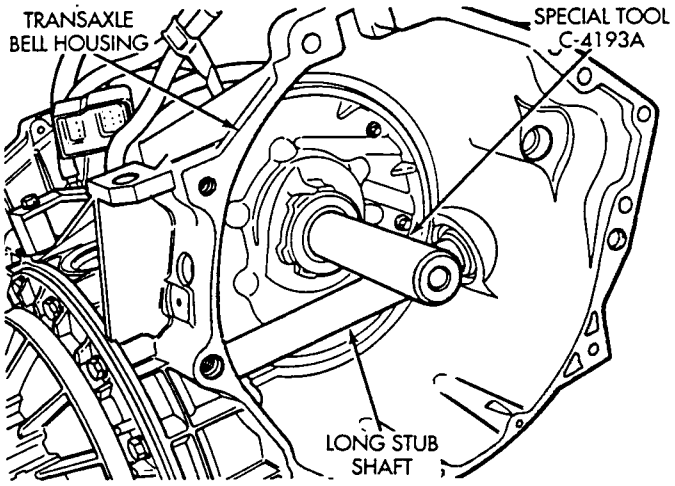


Fig. 6 Oil Seal Installation

(2) Clean and inspect torque converter hub. If nicks, scratches or hub wear are found, torque converter replacement will be required.

CAUTION: The factory torque converters for 3.3 and 3.5 liter engines are not interchangeable. There will be only one torque converter released for service use. The service torque converter can be used in either engine application.
CAUTION: If the torque converter is being replaced, apply a light coating of grease to the crankshaft pilot hole. Also inspect the engine driveplate for cracks. If any cracks are found replace the driveplate. Do not attempt to repair a cracked driveplate. Always use new torque converter to driveplate bolts.

(3) Apply a light film of Transmission oil to the torque converter hub and oil seal lips. Then install torque converter into transaxle. Be sure that the hub lugs mesh with the front pump lugs when installing.

(4) Reinstall the transaxle into the vehicle.

TORQUE CONVERTER CLUTCH BREAK-IN PROCEDURE

Electronic Modulated Converter Clutch (EMCC) modulates the application of the torque converter clutch.

A torque converter clutch break-in program is being used to properly condition the torque converter clutch. This will eliminate shudder during torque converter clutch operation on a new torque converter.

If the torque converter is replaced, the new clutch within the torque converter will require break-in. The current break-in status stored in the transmission control module will have to be reset to the start of break-in with the DRB II scan tool.

If a new transmission control module is put on the vehicle, the status will be at the start of break-in. This status is acceptable regardless of the mileage on the torque converter. No modification of the break-in status is required.

To properly service these vehicles, it is necessary to use a DRB II scan tool to read or reset the break-in status. Perform the following steps with the DRB II scan tool to reset the break-in status:

(1) Plug the DRB II scan tool into the blue CCD Buss connector. The connector is located under the instrument panel on the drivers side of the vehicle.

(2) Insert the 1993 DRB II scan tool cartridge into the DRB II scan tool.

(3) The red and green lights on the DRB II scan tool will light up and then begin flashing. Wait until the lights stop flashing before continuing with this procedure.

(4) Press the number 4 key on the DRB II scan tool key pad. Item number 4 will not appear on the DRB II screen unless you scroll down. It is not necessary to scroll down to be able to choose item 4.

(5) Press the number 2 on the DRB II scan tool key pad (Transmission).

(6) Press the number 1 on the DRB II scan tool key pad. Wait for the DRB II scan tool to perform the following three tests before continuing (These tests are done automatically by the DRB II scan tool).

- Buss Test
- Initialize
- Controller Part Number

(7) Press the number 5 on the DRB II scan tool key pad (Adjustments).

(8) Press the number 1 on the DRB II scan tool key pad (Reset EMCC). The DRB II scan tool will display one of three screens.

(a) EMCC Break-in Status: **Start**

(b) EMCC Break-in Status: **In-progress** Press ENTER to Reset Break-in status

(c) EMCC Break-in Status: **Complete** Press ENTER to Reset Break-in status

If screen (a) appears, the controller is at the beginning of its break-in program. No further action is required.

If screen (b) appears, the controller is in the middle of a its break-in program. Press the enter key on the DRB II scan tool key pad to return the status to the start of break-in.

If screen (c) appears, the controller has completed its break-in status program. Press the enter key on the DRB II scan tool key pad to return the status to the start of break-in.

(9) After pressing the enter key a second time in step 8 a screen will appear that says "RESET EMCC ARE YOU SURE ?". Press the enter key on the DRB II scan tool key pad. The DRB II scan tool will then carry out the reset command.

(10) After the DRB II scan tool completes the reset command, a screen will appear saying "EMCC Break-in Status has been RESET to Start". This screen will indicate that the reset procedure has been successfully completed.

(11) Disconnect the DRB II scan tool from the blue CCD Bus connector.

TRANSAXLE QUICK LEARN PROCEDURE

The quick learn procedure requires the use of the DRB II scan tool and the 1993 DRB II scan tool cartridge.

This program allows the electronic transaxle system to recelebrate itself to provide the best possible transaxle operation. The quick learn procedure should be performed if any of the following procedures are performed:

- Transaxle Assembly Replacement
- Transmission Control Module Replacement
- Solenoid Pack Replacement
- Clutch Plate and/or Seal Replacement
- Valve Body Replacement or Recondition

(1) Plug the DRB II scan tool into the blue CCD Buss connector. The connector is located under the instrument panel on the drivers side of the vehicle.

(2) Insert the 1993 DRB II scan tool cartridge into the DRB II scan tool.

(3) The red and green lights on the DRB II scan tool will light up and then begin flashing. Wait until the lights stop flashing before continuing with this procedure.

(4) Press the number 4 key on the DRB II scan tool key pad. Item number 4 will not appear on the DRB II screen unless you scroll down. It is not necessary to scroll down to be able to choose item 4.

(5) Press the number 2 on the DRB II scan tool key pad (Transmission).

(6) Press the number 1 on the DRB II scan tool key pad. Wait for the DRB II scan tool to perform the following three tests before continuing (These tests are done automatically by the DRB II scan tool).

- Buss Test
- Initialize
- Controller Part Number

(7) Press the number 5 on the DRB II scan tool key pad (Adjustments).

(8) Press the number 3 on the DRB II scan tool key pad (Quick Learn). Then follow the instructions on the DRB II scan tool screen.

TRANSAXLE DISASSEMBLE/REASSEMBLE

Before disassembling transaxle, move the shift lever clockwise as far as it will go. This should be one position past the "L" position. Then remove the shift lever.

Tag all clutch pack assemblies, as they are removed, for reassembly identification.

CAUTION: Do not intermix clutch discs or plates as the unit might then fail.

Measuring input shaft end play before disassembly will usually indicate when a #4 thrust plate change is required, (except when major parts are replaced). The number 4 thrust plate is located behind the overdrive clutch hub. Attach a dial indicator to transaxle bell housing with its plunger seated against end of input shaft (Fig. 1). Move input shaft in and out to obtain end play reading. End play specifications are .13 to .64 mm (.005 to .025 inch). Record indicator reading for reference when reassembling the transaxle.

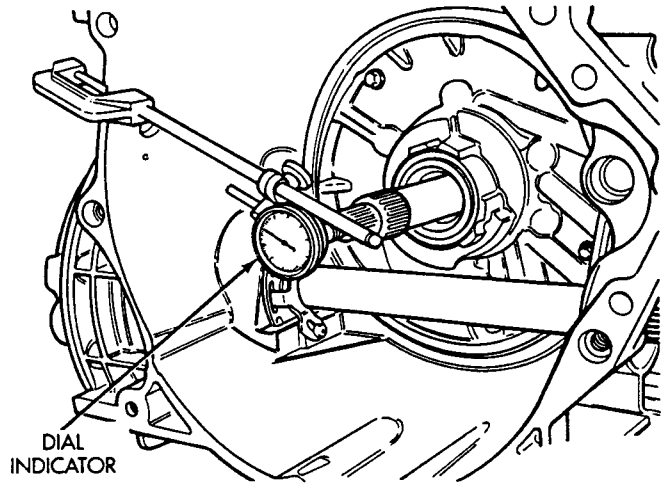


Fig. 1 Measure Input Shaft End Play

Remove both speed sensors from transaxle case (Fig. 2).

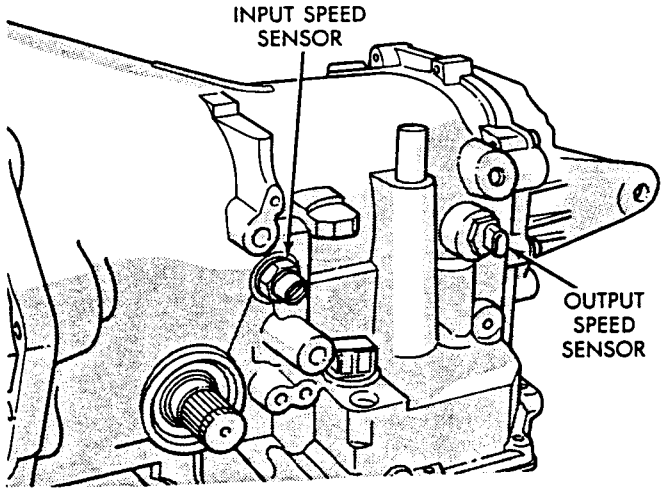


Fig. 2 Remove Input and Output Speed Sensor

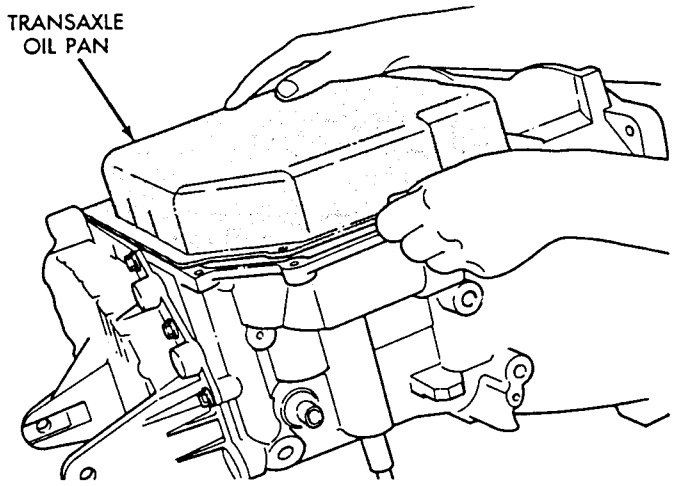


Fig. 3 Remove Transaxle Oil Pan

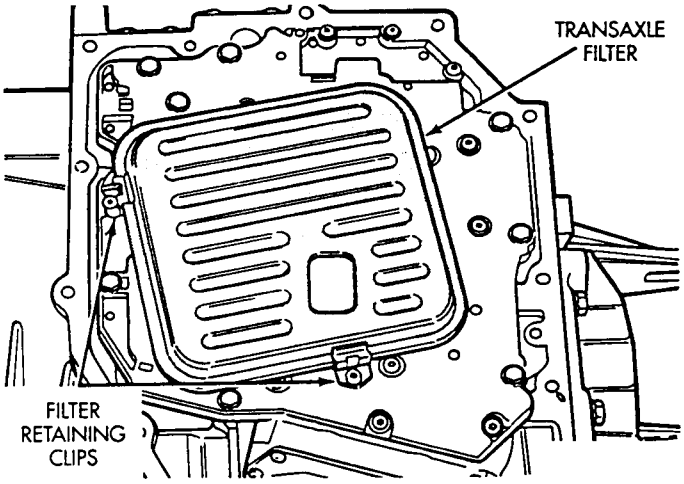


Fig. 4 Remove Transaxle Oil Filter

CAUTION: Valve body must be in the park position before removing from transaxle.

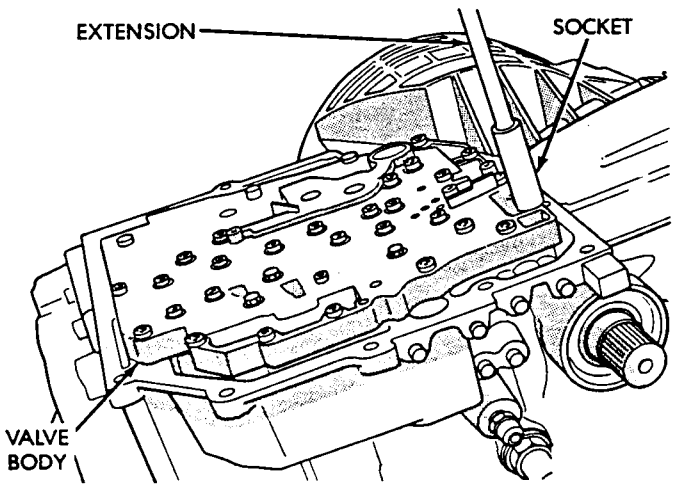


Fig. 5 Remove Valve Body Bolts

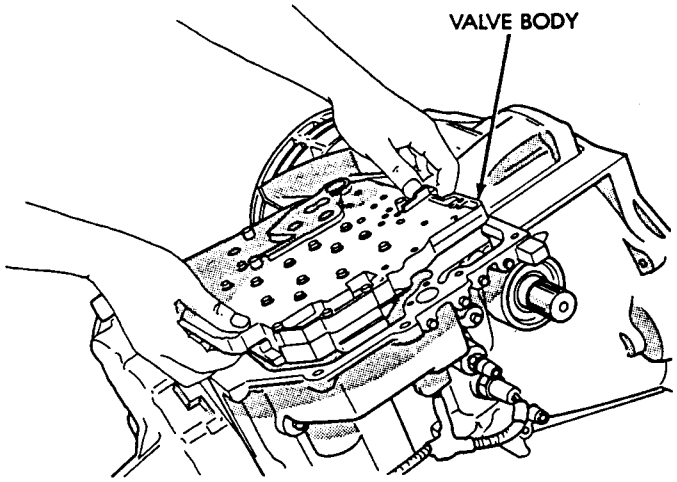


Fig. 6 Remove Valve Body From Transaxle

For valve body recondition procedure, refer to "Valve Body" in this section.

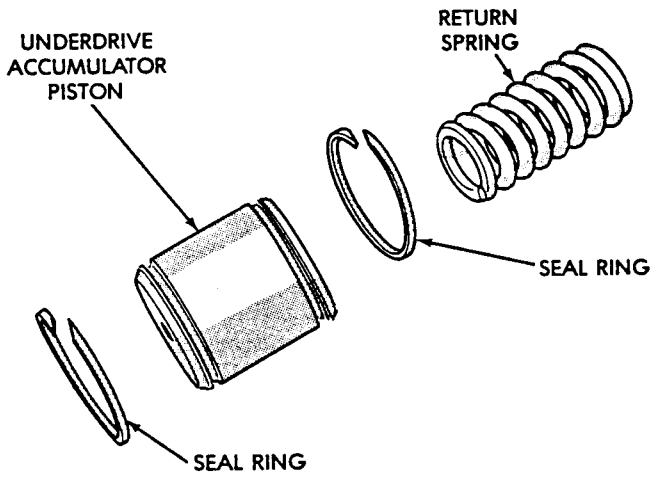


Fig. 7 Remove Underdrive Accumulator and Spring

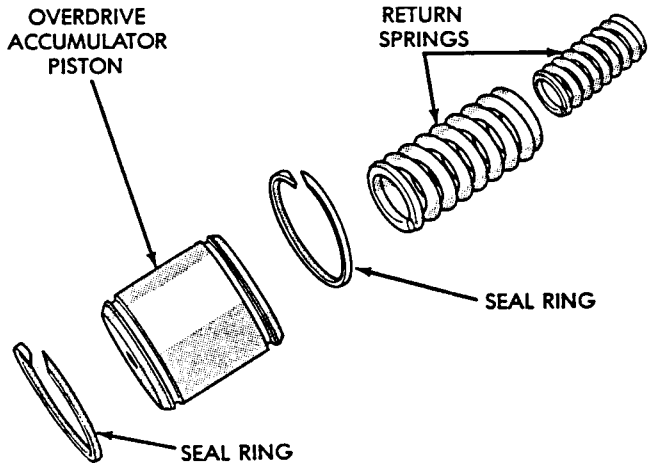


Fig. 8 Remove Overdrive Accumulator and Springs

CAUTION: Tag the springs for the Overdrive Accumulator so that they are not confused with the springs in the Low/Reverse Accumulator.

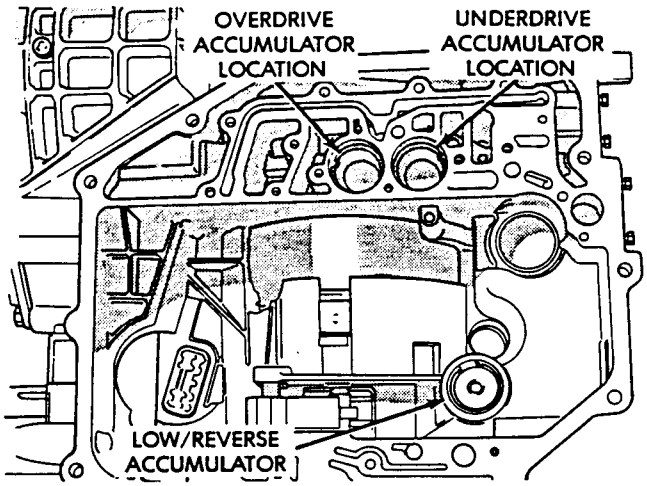


Fig. 9 Accumulator Locations

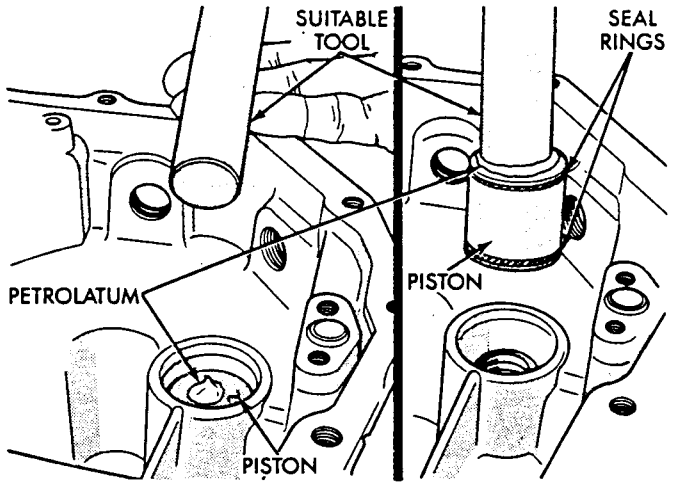


Fig. 12 Low/Reverse Accumulator Piston

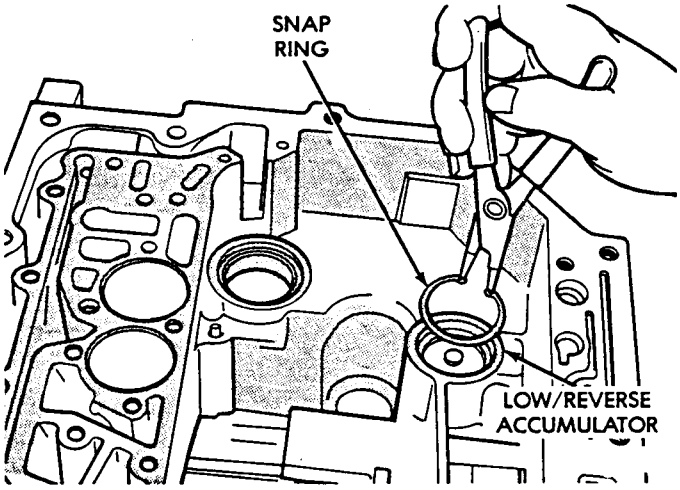


Fig. 10 Remove Low/Reverse Accumulator

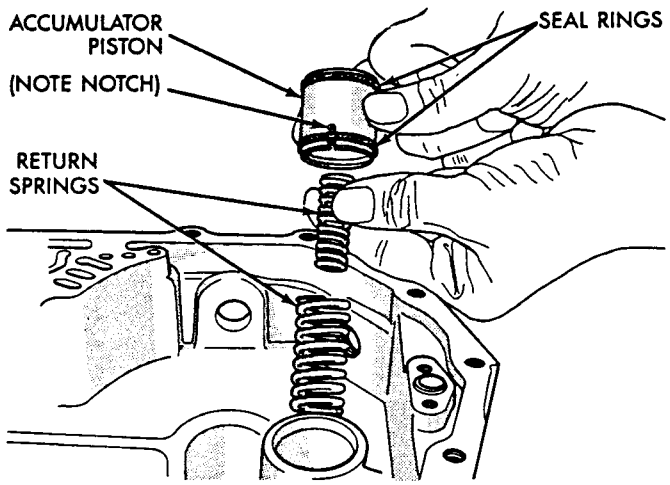


Fig. 13 Low/Reverse Accumulator

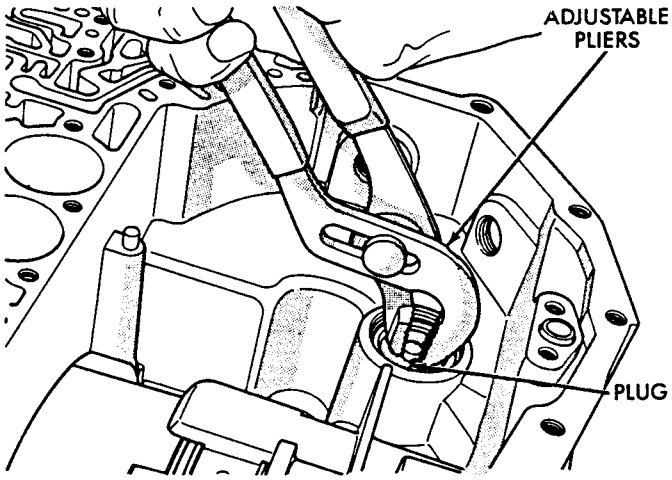


Fig. 11 Low/Reverse Accumulator Plug (Cover)

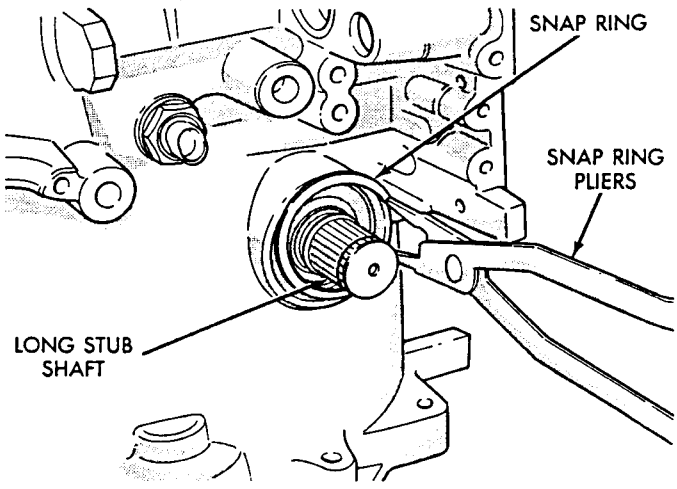


Fig. 14 Remove Long Stub Shaft Snap Ring

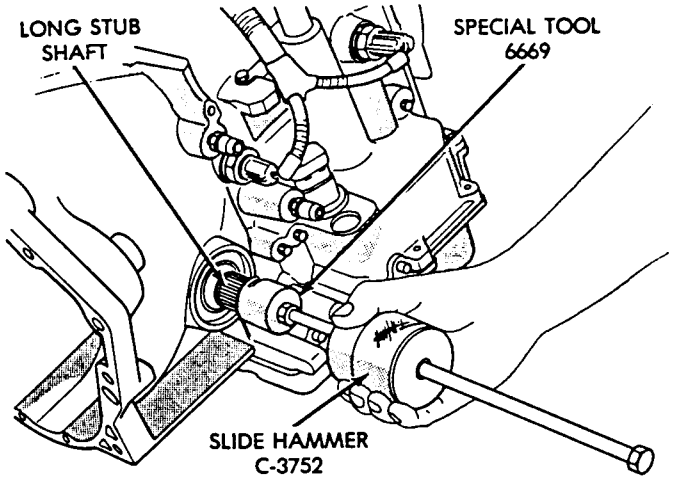


Fig. 15 Remove Long Stub Shaft From Bell-housing

CAUTION: Drive shaft retainer clips and seals located on the stub shafts must be replaced before reinstalling drive shafts.

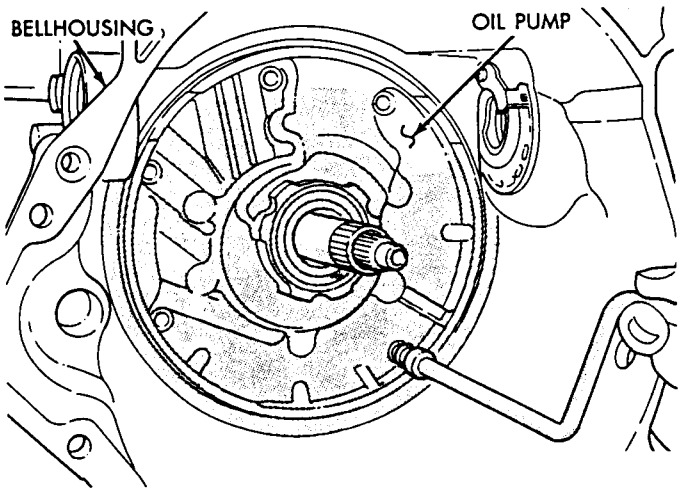


Fig. 16 Remove Oil Pump Attaching Bolts

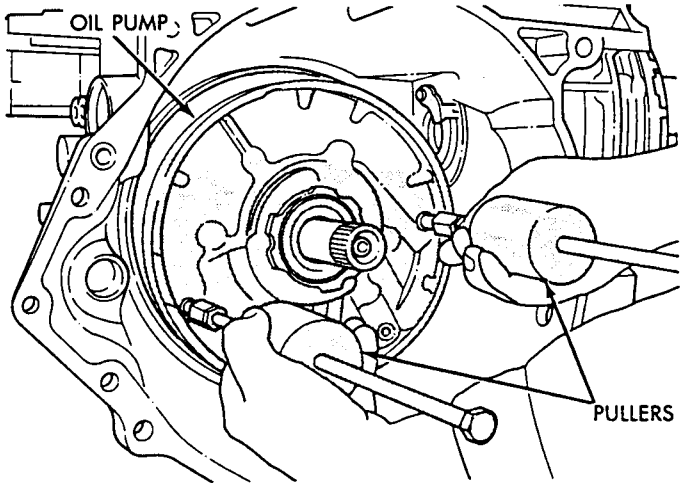


Fig. 17 Oil Pump Pullers

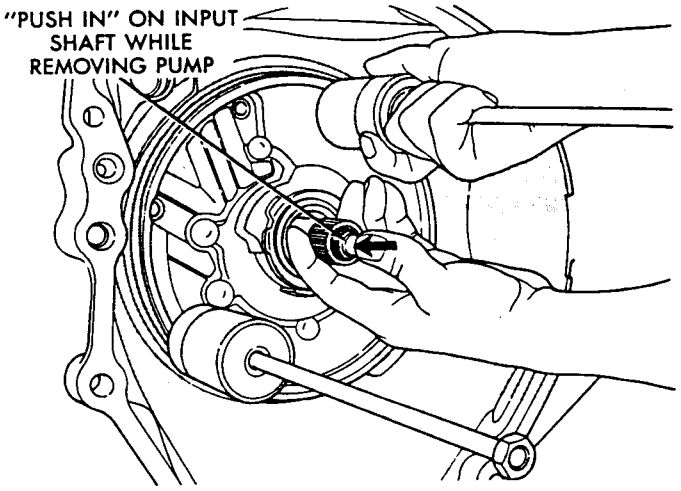


Fig. 18 Remove Oil Pump

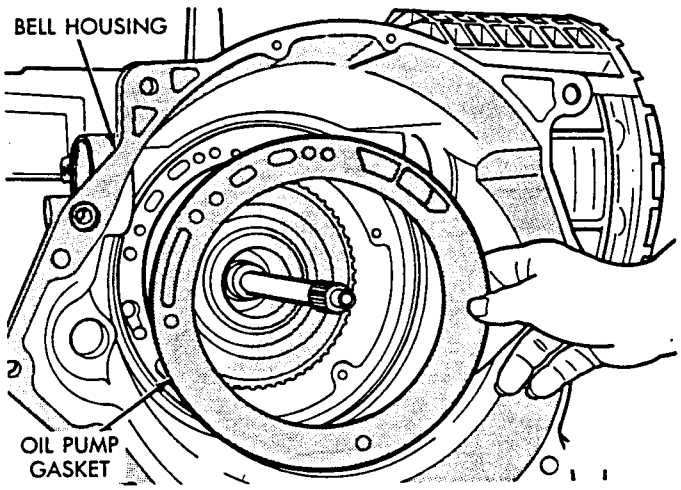


Fig. 19 Remove Oil Pump Gasket

CAUTION:By-pass valve must be replaced transmission failure occurs.

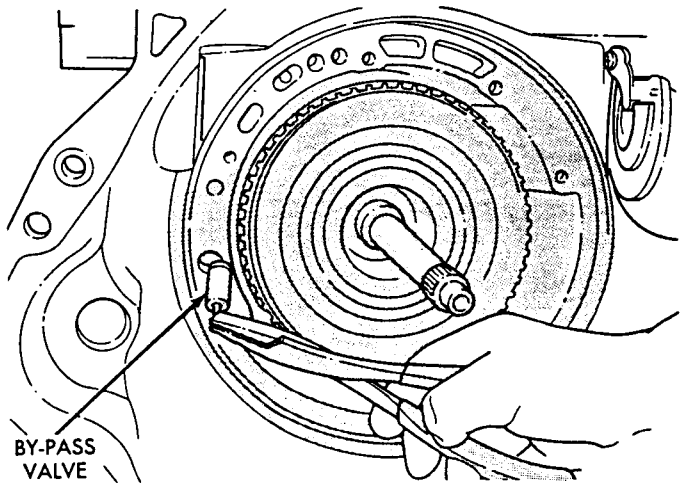


Fig. 20 Remove By-Pass Valve

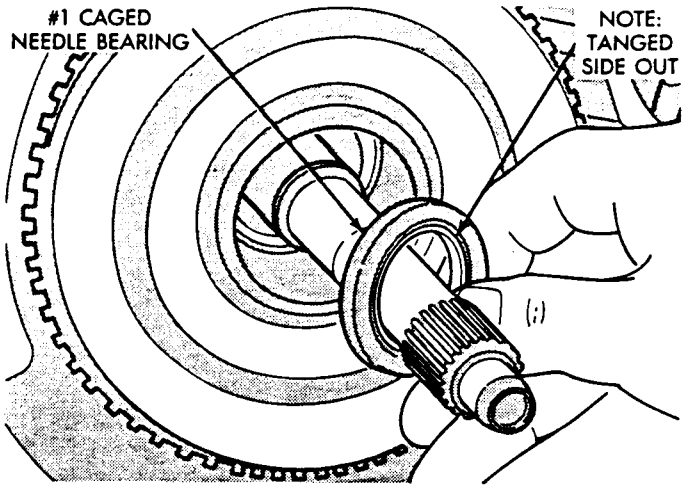


Fig. 21 Remove No. 1 Caged Needle Bearing

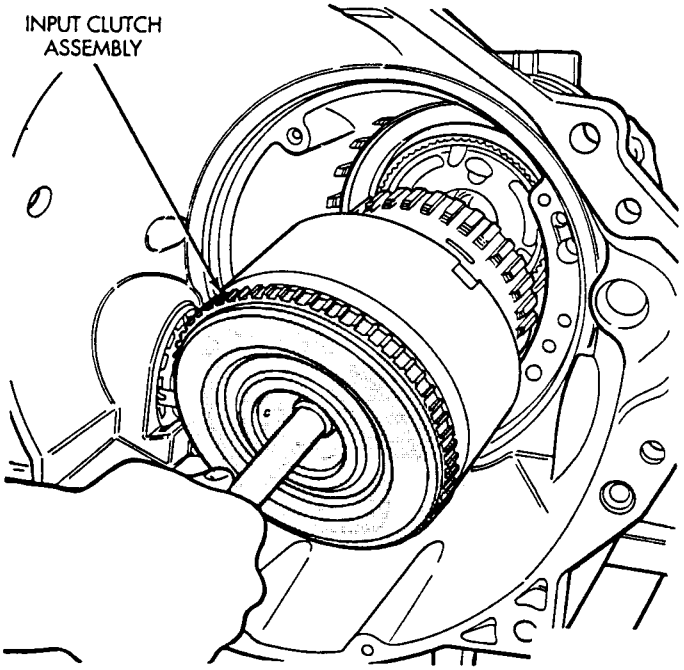


Fig. 22 Remove Input Clutch Assembly

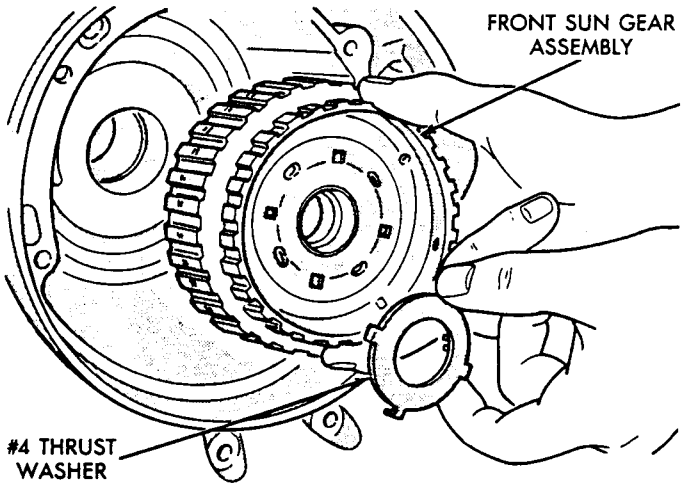


Fig. 23 Remove Front Sun Gear Assembly

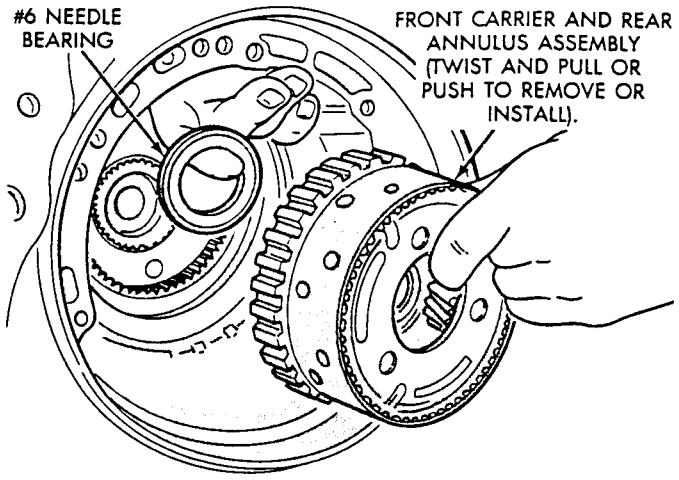


Fig. 24 Remove Front Carrier and Rear Annulus Assembly

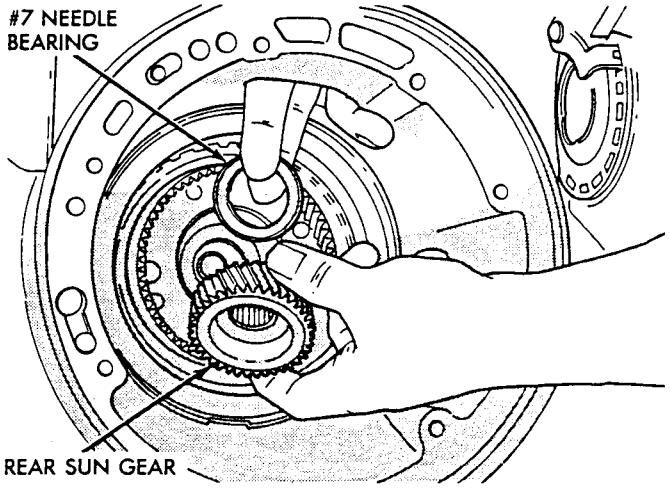


Fig. 25 Remove Rear Sun Gear

The number 7 needle bearing that was removed must not be reversed when reinstalling. This bearing is visually similar to the number 2 and 5 bearings but it is unique to the number 7 position. It is recommended that the number 7 thrust bearing be individually tagged after removing. This will eliminate the possibility of installing the incorrect bearing in the number 7 bearing position.

The number 7 bearing must be installed so that the inside diameters elbow flange is seated against the rear sun gear (Fig. 26). A small amount of petrolatum can be used to hold the bearing to the rear sun gear.

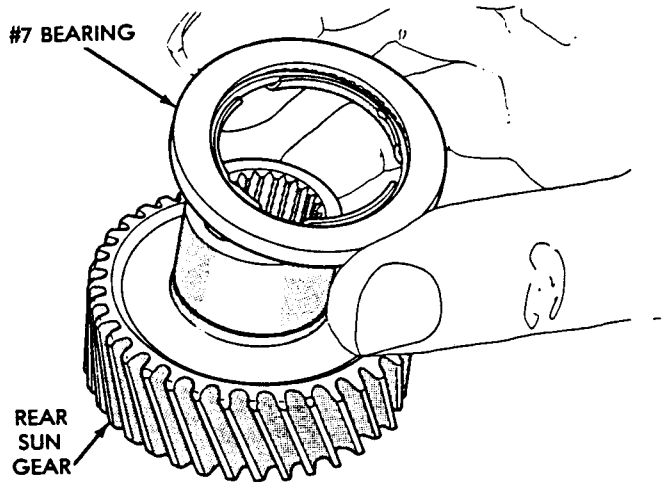


Fig. 26 Number 7 Bearing

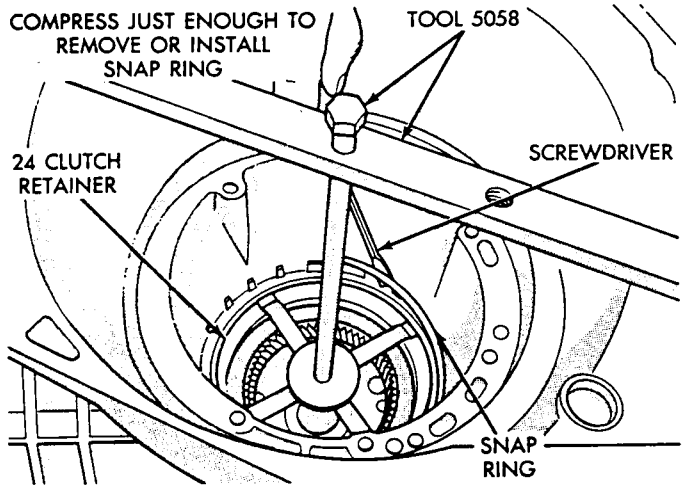


Fig. 27 Remove 2/4 Clutch Retainer Snap Ring

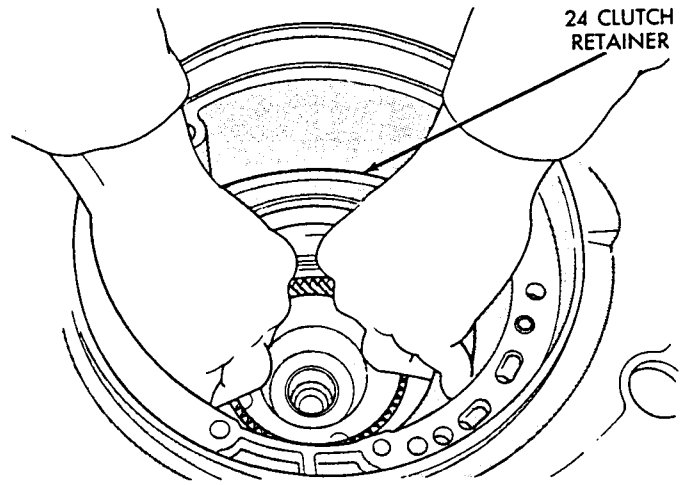


Fig. 28 Remove 2/4 Clutch Retainer

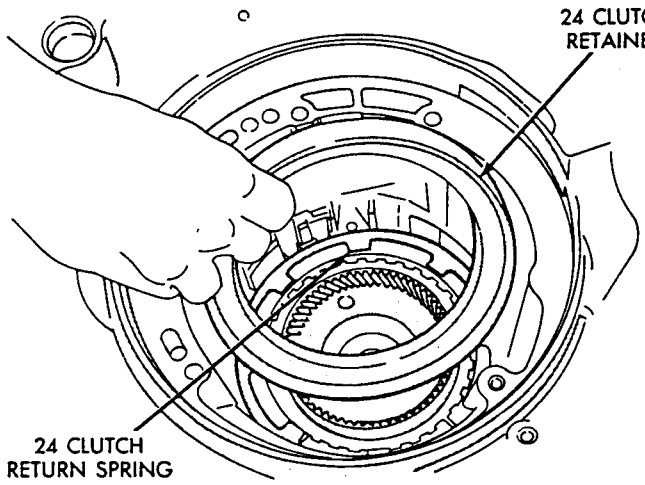


Fig. 29 Remove 2/4 Clutch Retainer

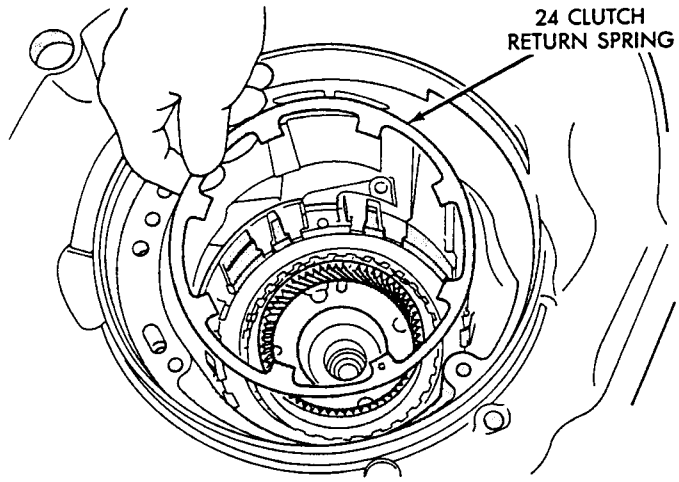


Fig. 30 Remove 2/4 Clutch Return Spring

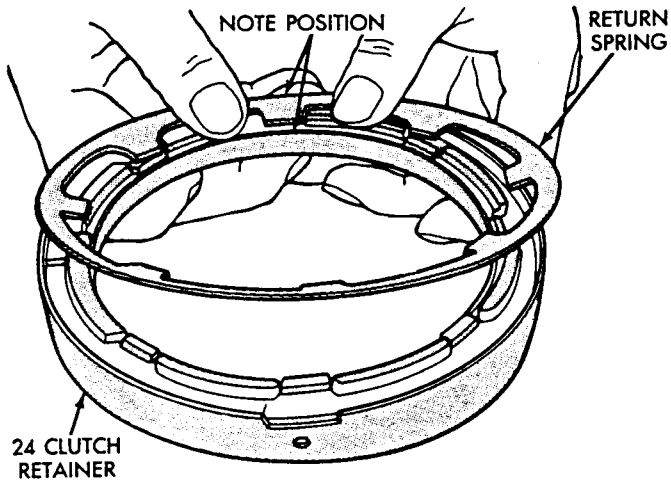


Fig. 31 2/4 Retainer and Spring Indexed

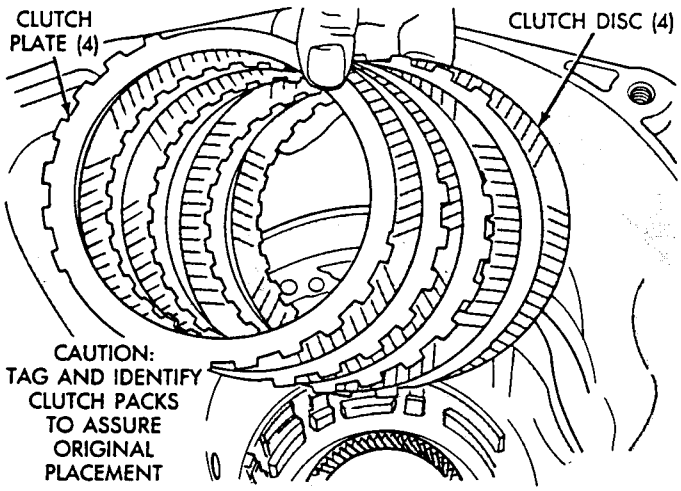


Fig. 32 Remove 2/4 Clutch Pack

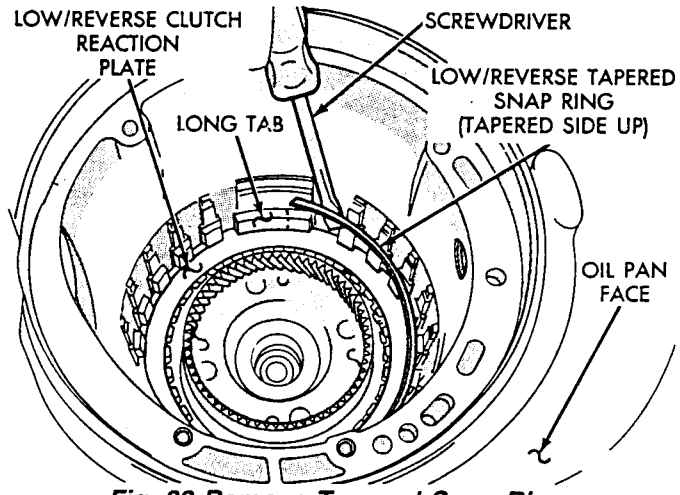


Fig. 33 Remove Tapered Snap Ring

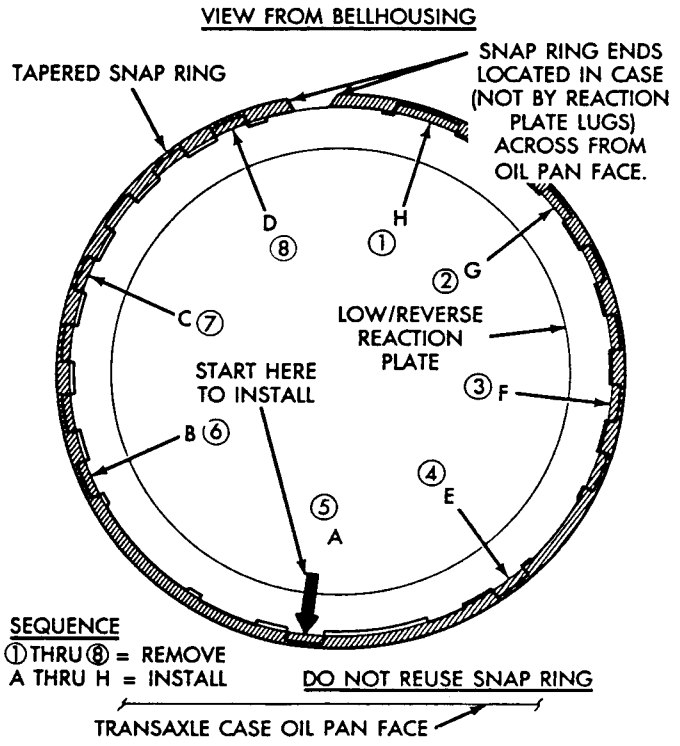


Fig. 34 Tapered Snap Ring Instructions

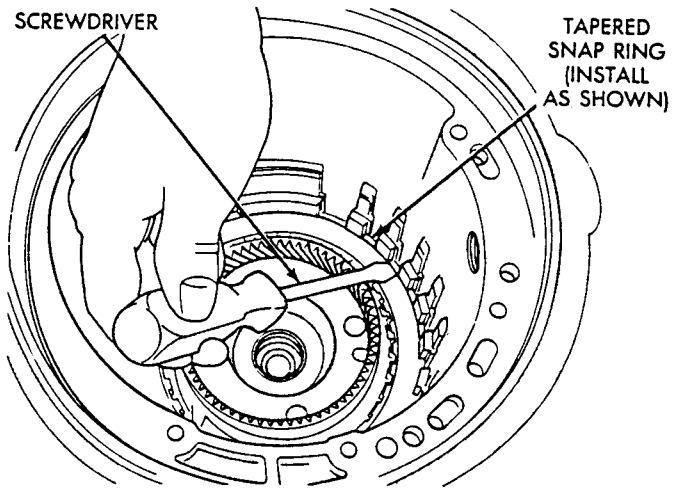


Fig. 35 Snap Ring Installed

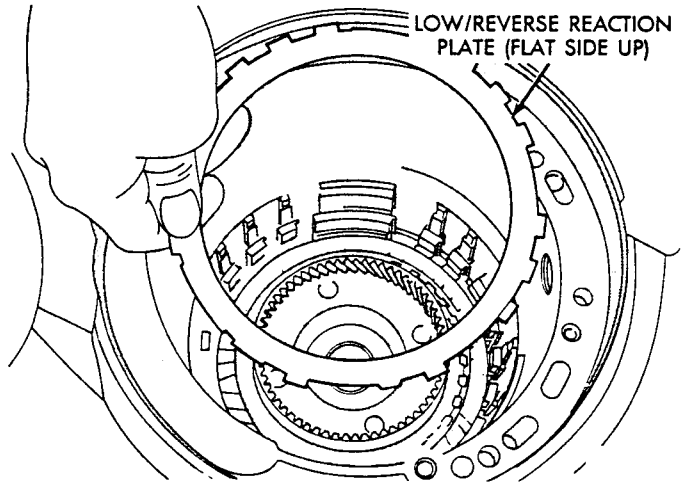


Fig. 36 Low/Reverse Reaction Plate

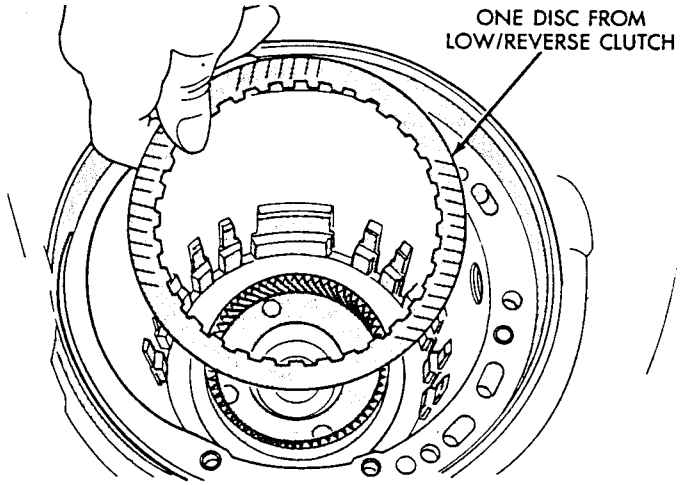


Fig. 37 Remove One Disc

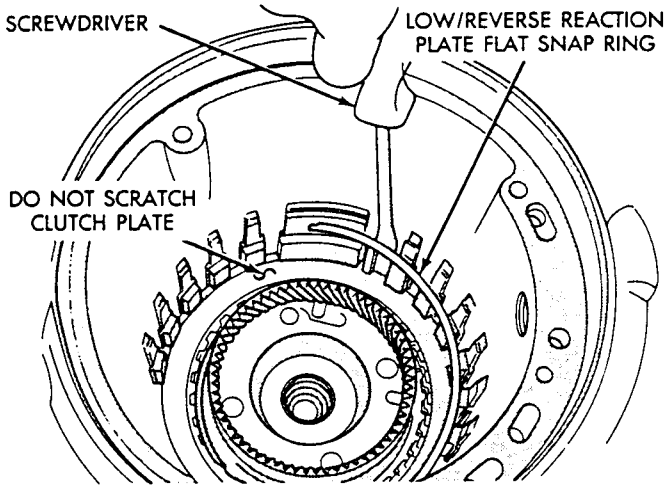


Fig. 38 Remove Low/Reverse Reaction Plate Snap Ring

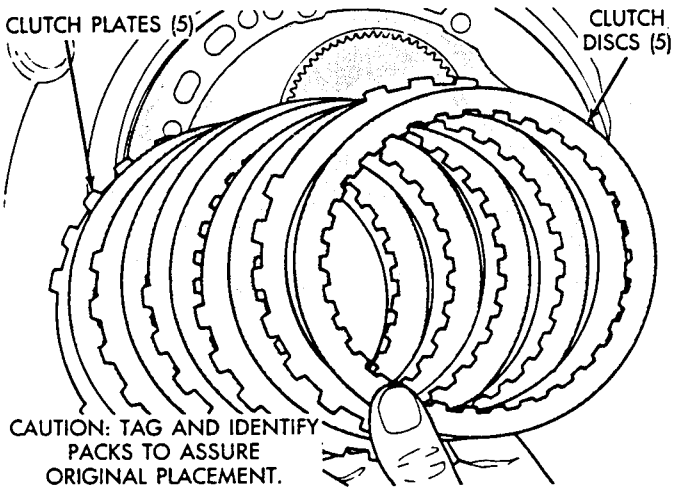


Fig. 39 Remove Low/Reverse Clutch Pack

Stand Trans Upright on Bell-housing

Chain cover must be free of old sealant, dirt and oil before applying new sealant. Apply a 1/8 inch bead of sealant to flange of cover.

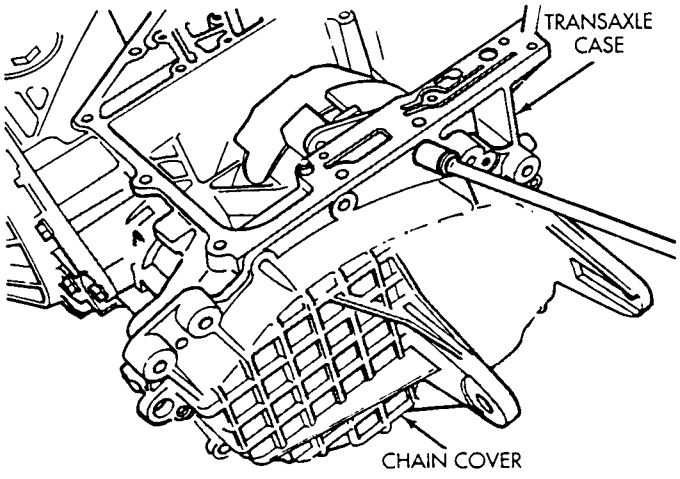


Fig. 40 Remove Chain Cover

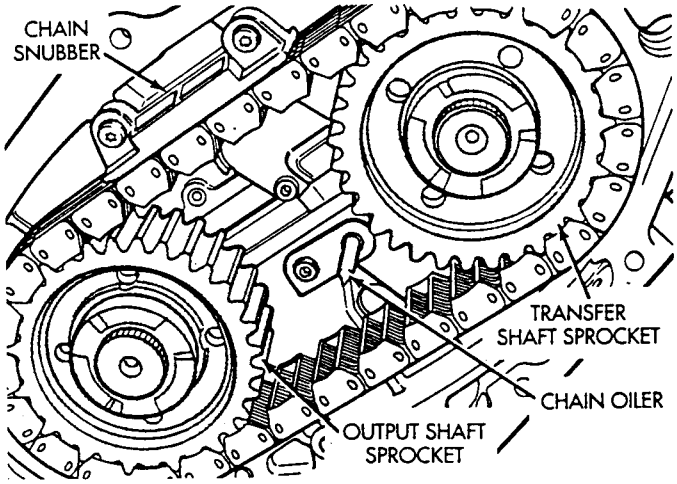


Fig. 41 Remove Chain Oiler

CAUTION: Be sure to reinstall the chain snubber and chain oiler when reassembling.

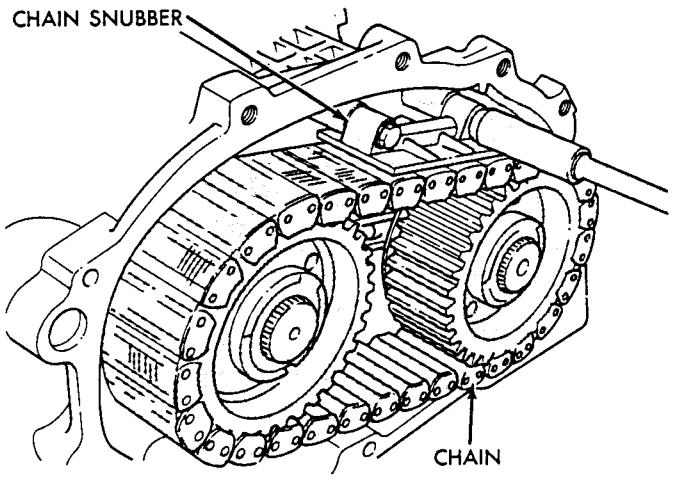


Fig. 42 Remove Chain Snubber

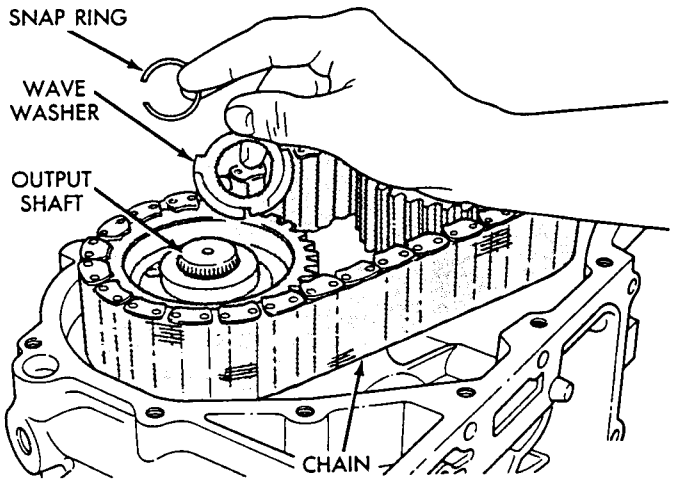


Fig. 43 Remove Output Shaft Sprocket Snap Ring and Wave Washer

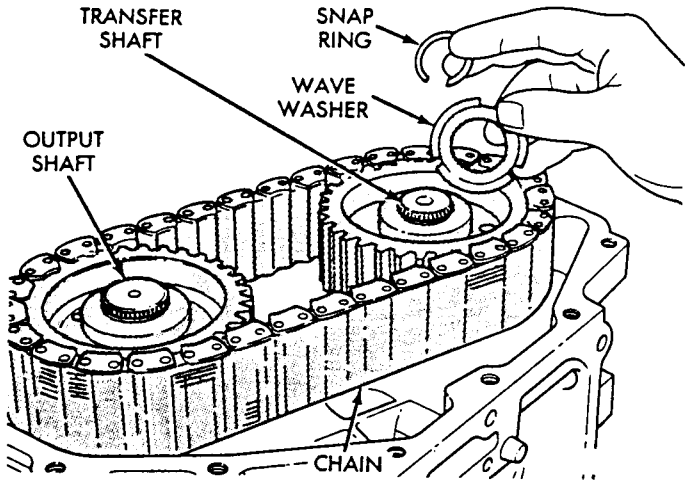


Fig. 44 Remove Transfer Shaft Sprocket Snap Ring and Wave Washer

CAUTION: The chain sprockets have a slip fit onto there shafts. Apply only a slight amount of pressure to the chain spreader to release the chain pressure. If chain sprockets are not spread slightly removal or installation will be difficult. Overspreading of the chain sprocket will also make sprocket removal difficult.

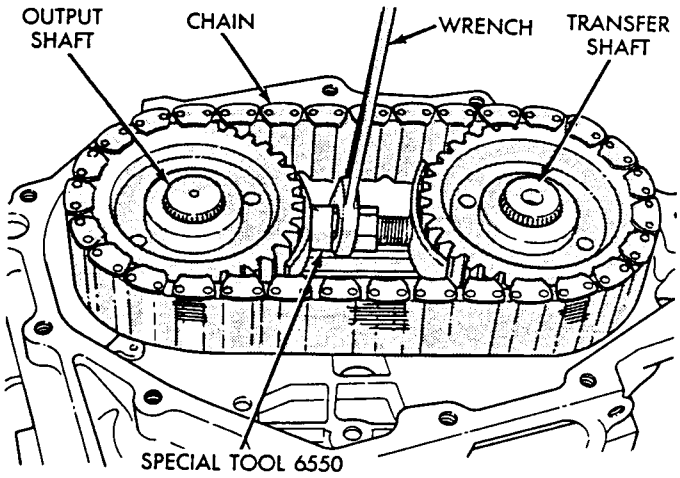


Fig. 45 Install Chain Spreader

CAUTION: When reinstalling drive chain, the blue link must face outward.

When reinstalling transaxle drive chain and sprockets, sprocket height must be checked. Refer to Drive Sprocket Height Adjustment Procedure in this group.

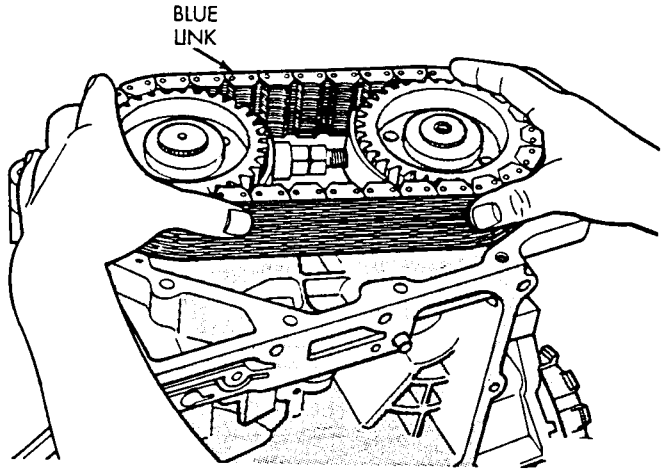


Fig. 46 Remove Chain and Both Sprockets as an Assembly

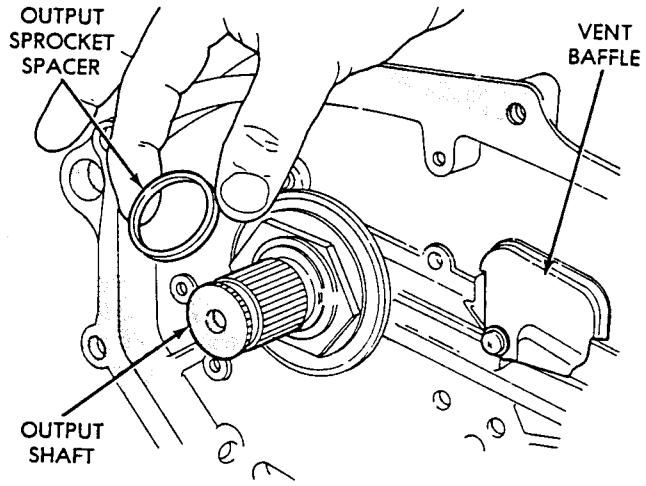


Fig. 47 Output Sprocket Spacer

Remove main sump baffle from transaxle case (Fig. 48).

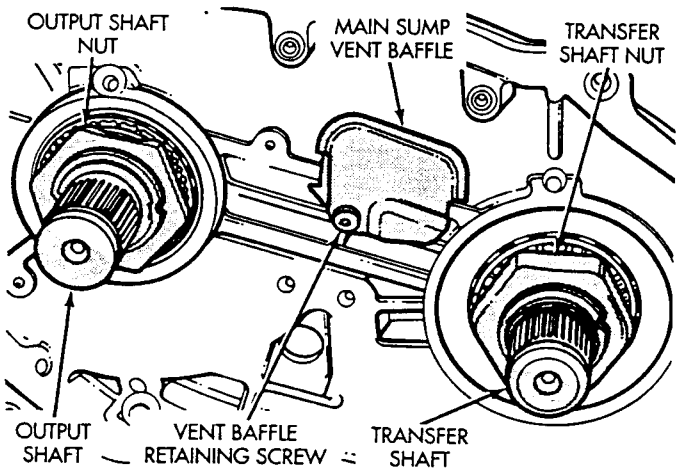


Fig. 48 Main Sump Vent Baffle Location

When reinstalling main sump baffle apply Mopar Silicone Sealant as shown in figure 49.

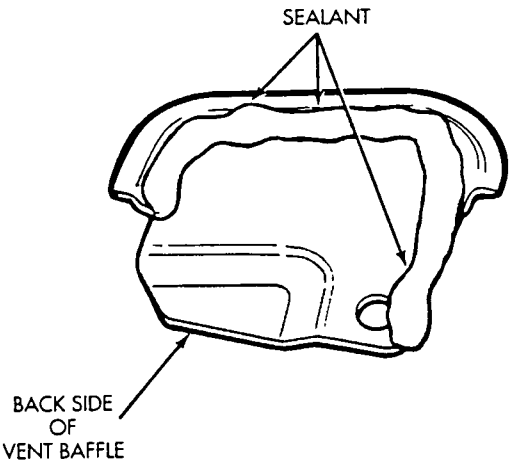


Fig. 49 Correctly Applied Sealant

CAUTION: Failure to grind and open stakes of the output shaft nut and transfer shaft nut will result in thread damage to the shafts during nut removal.

WARNING: WEAR SAFETY GOGGLES WHILE GRINDING STAKE NUTS.

Using a die grinder or equivalent, grind the stakes in the shoulder of the shaft nuts as shown in figure 50 and 51. Do not grind all the way through the nut and into the shaft. There are two stakes on each nut.

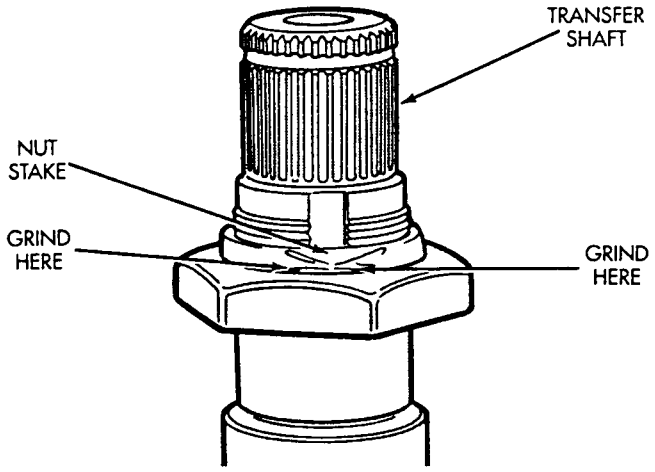


Fig. 50 Grinding Stakes

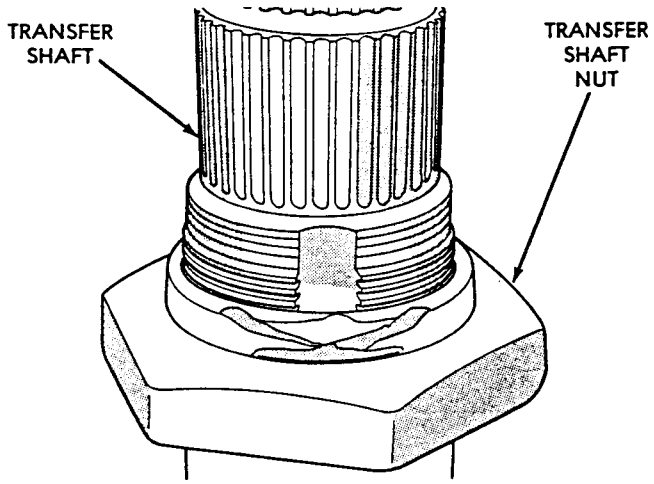


Fig. 51 Stake Grinding Pattern

Using a small chisel, carefully open stakes on nut (Fig. 52)

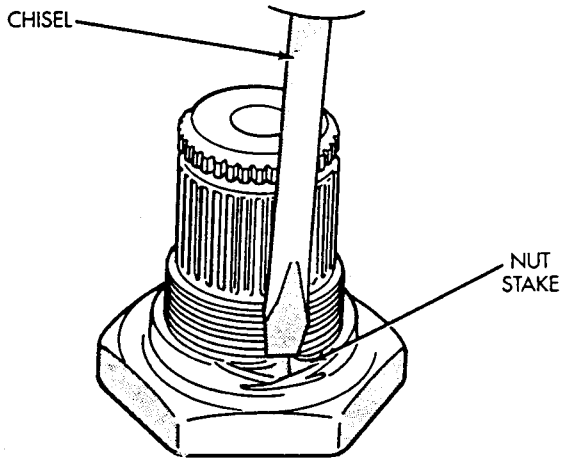


Fig. 52 Opening Nut Stakes

Use special tool 6497 and 6498 to remove the transfer shaft nut or the output shaft nut (Fig. 53). Note that your breaker bar will turn clockwise to remove the nut and counter clockwise to install the nut.

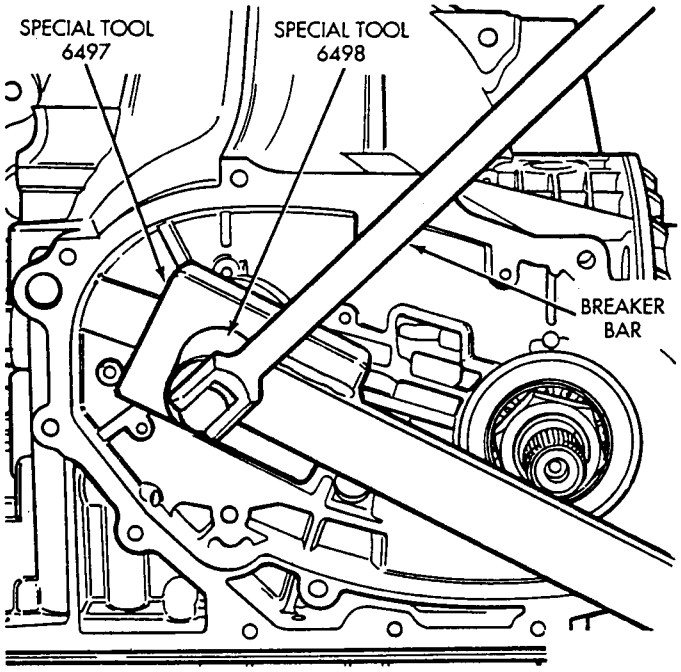


Fig. 53 Remove Output Shaft Nut

CAUTION: Do not reuse old transfer shaft nut or output shaft nut because the removed stake weakens the nut flange.

When installing new nuts use special tool 6639 to stake output shaft nut and special tool 6589 to stake transfer shaft nut.

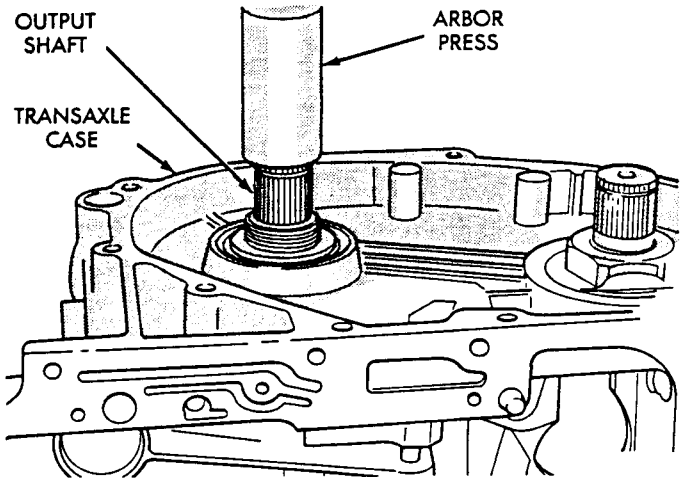


Fig. 54 Use Arbor Press to Remove Output Shaft from Case

Use special tool 6596 to remove front output shaft bearing cup (Fig. 55).

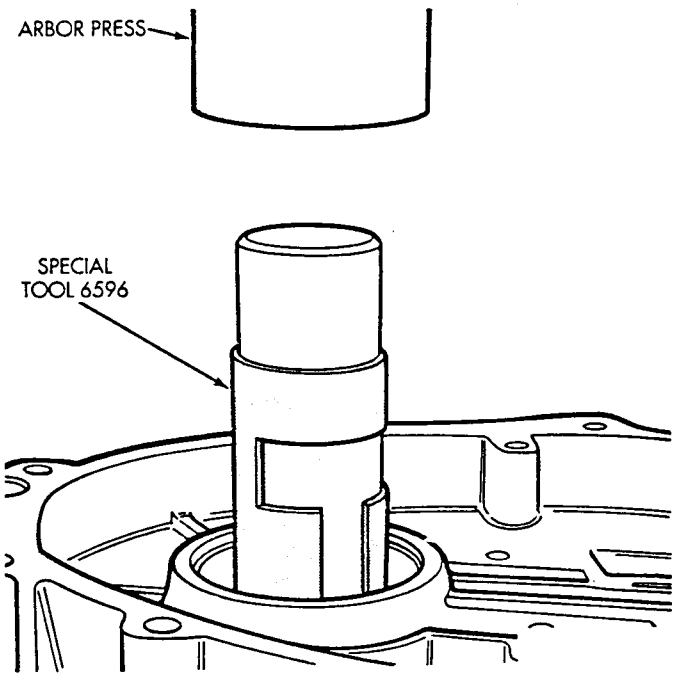


Fig. 55 Remove Front Bearing Cup

Use special tool 6597 and handle C-4171 and C-4171-2 to press rear output shaft bearing cup rearward (Fig. 56).

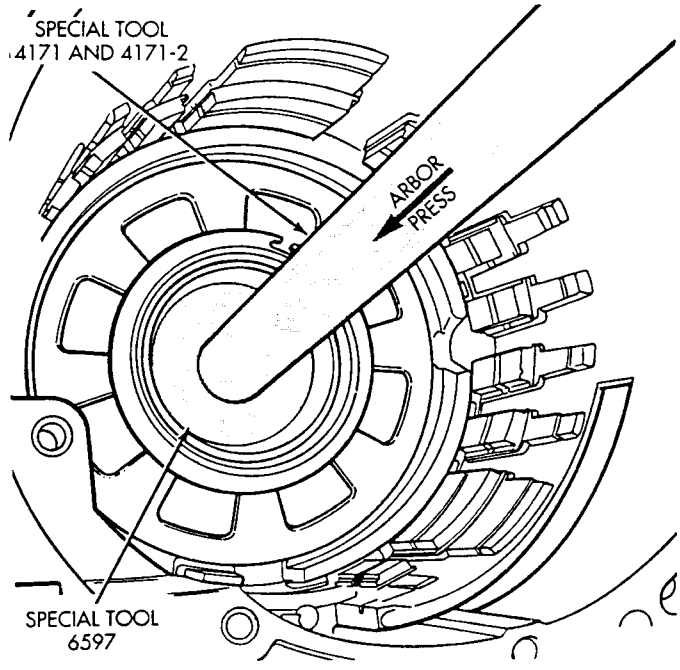


Fig. 56 Remove Rear Bearing Cup

Use special tool 5050A to install both front and rear bearing cups (Fig. 57).

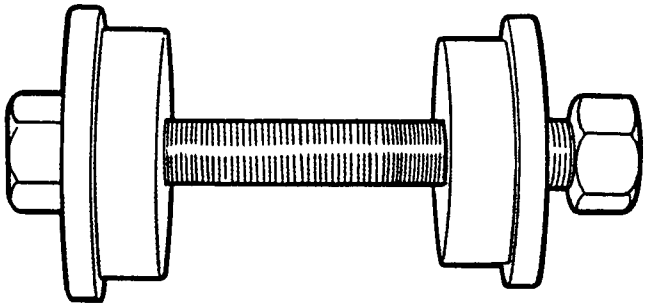


Fig. 57 Bearing Cup Installation Special Tool 5050A

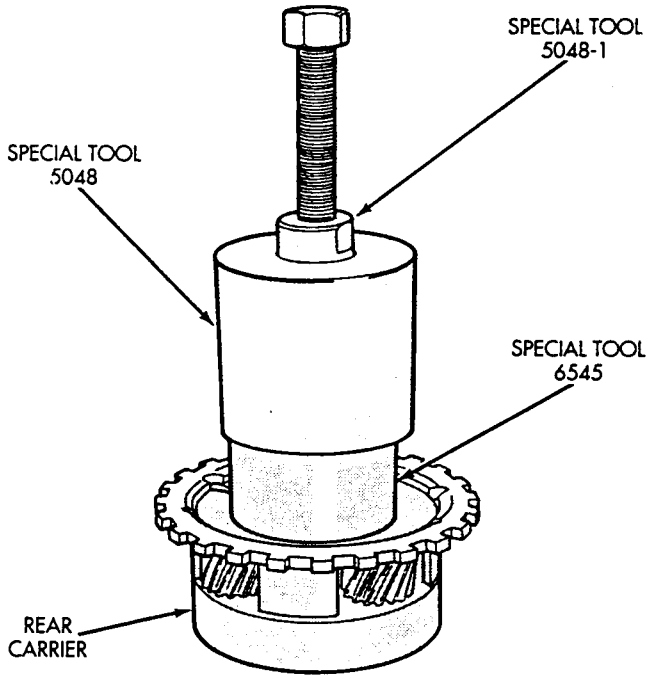


Fig. 58 Remove Rear Carrier Front Bearing Cone

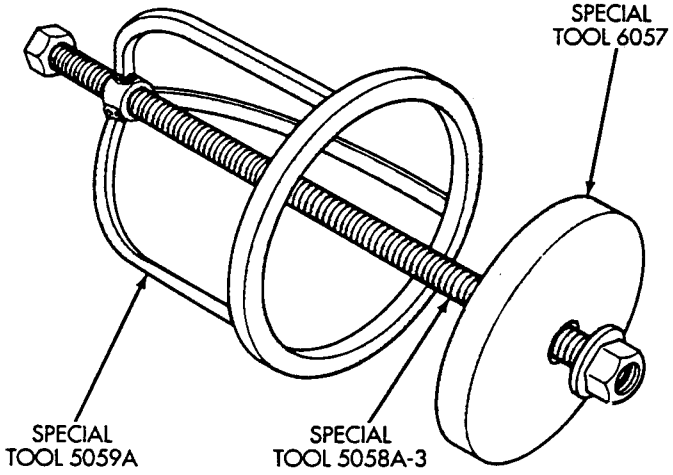


Fig. 59 Low/Reverse Spring Compressor Tool

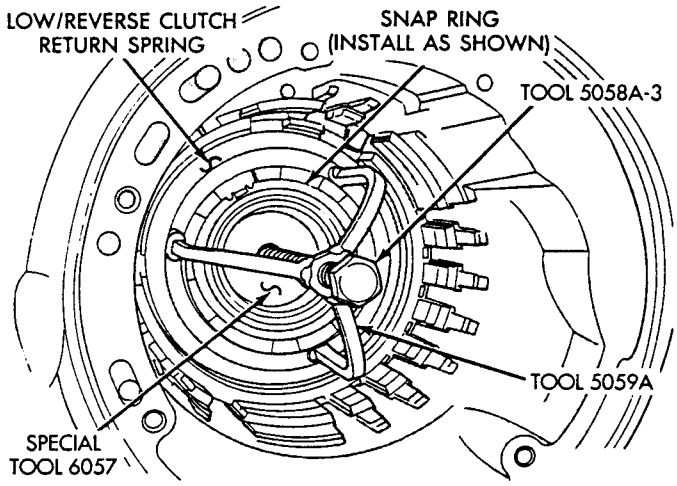


Fig. 60 Compressor Tool in Use

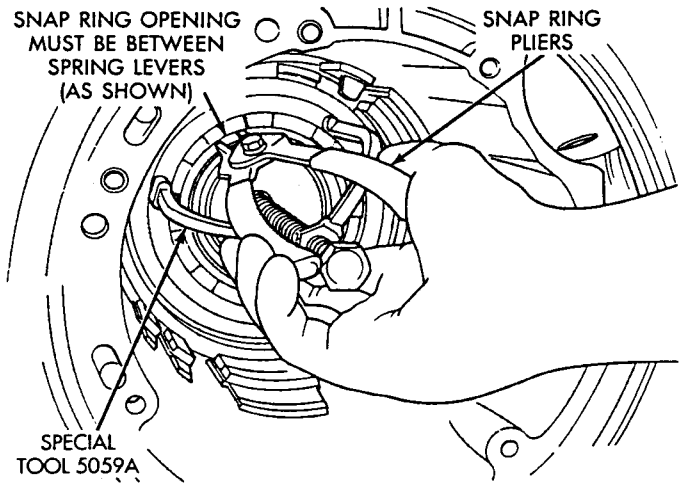


Fig. 61 Remove Snap Ring

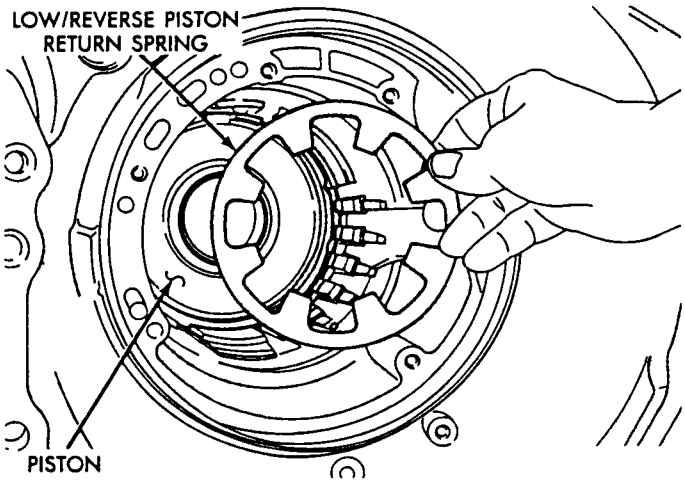


Fig. 62 Low/Reverse Piston Return Spring

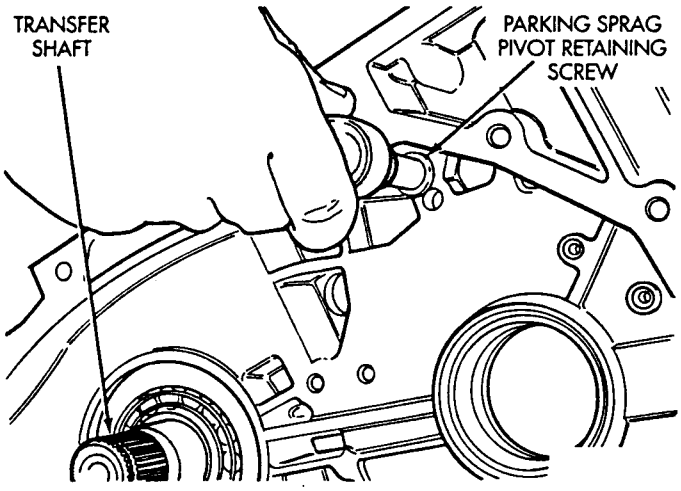


Fig. 63 Remove Parking Sprag Pivot Retaining Screw

CAUTION: When installing, be sure guide bracket and split sleeve touch the rear of the transaxle case.

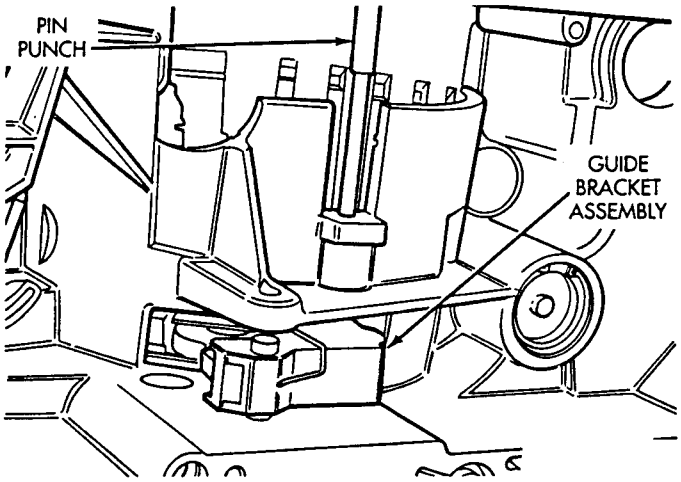


Fig. 64 Anchor Shaft Removal

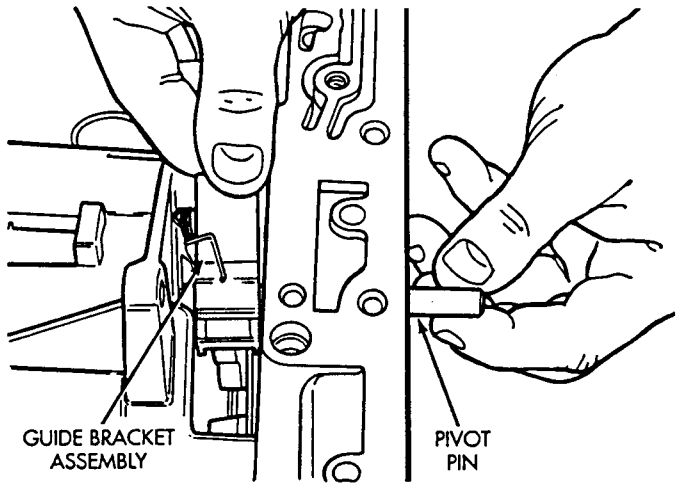


Fig. 65 Guide Bracket Pivot Shaft

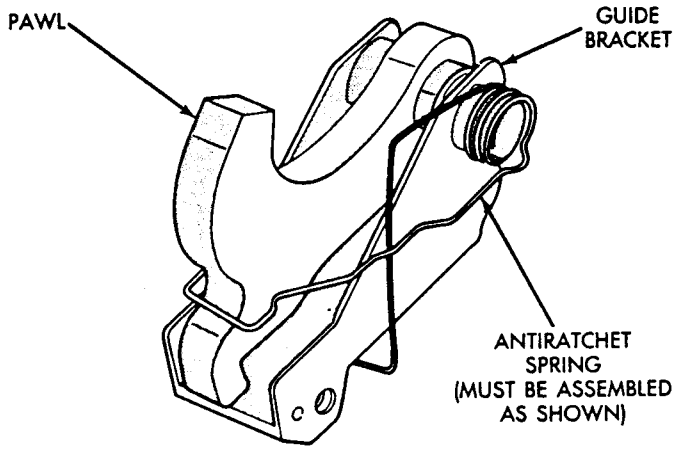


Fig. 66 Guide Bracket Assembled

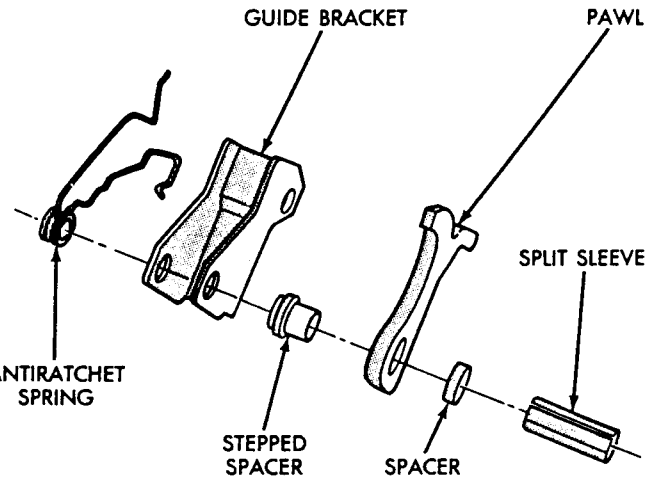


Fig. 67 Guide Bracket Disassembled

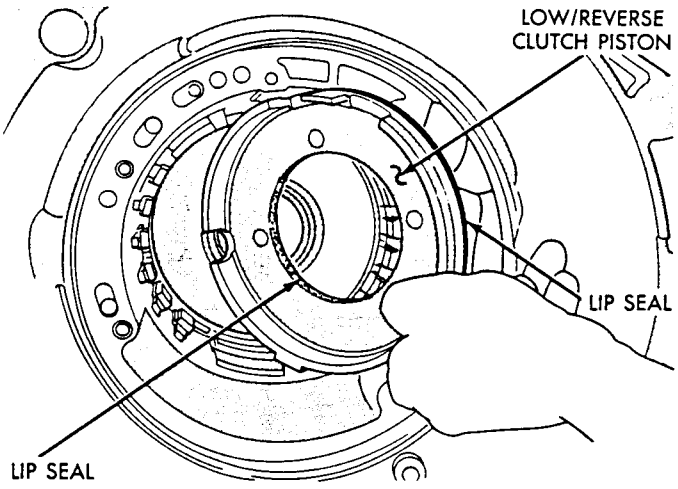


Fig. 68 Low/Reverse Clutch Piston

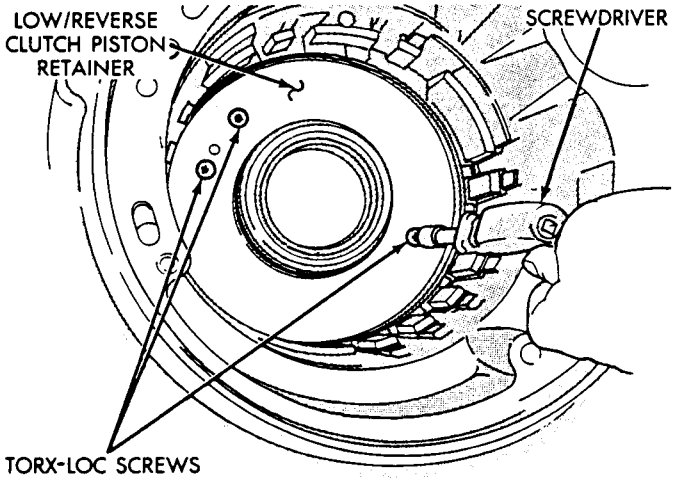


Fig. 69 Piston Retainer Attaching Screws

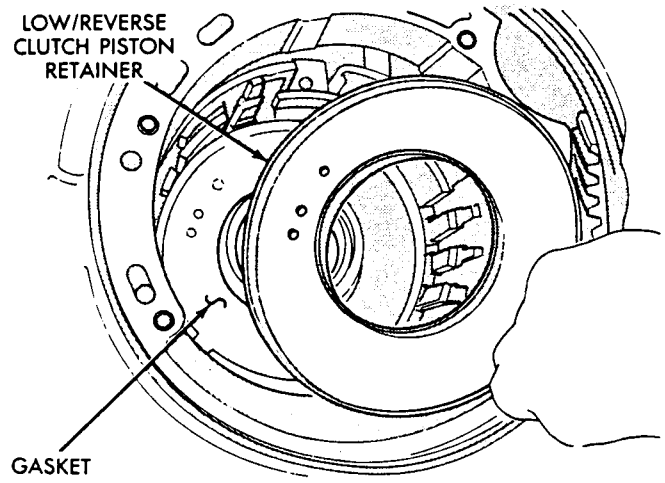


Fig. 70 Piston Retainer

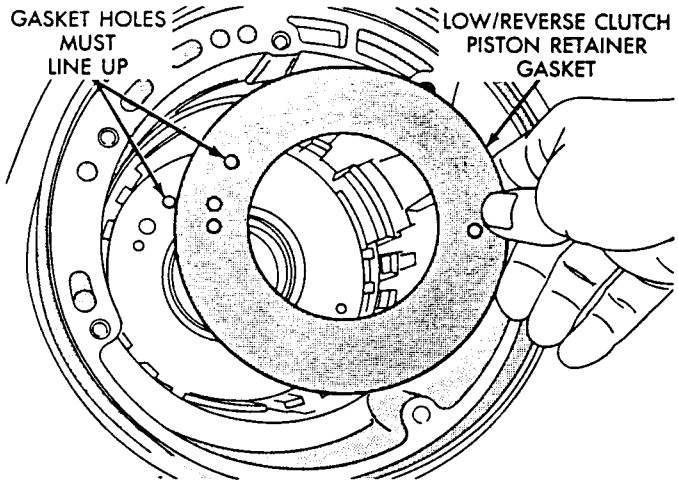


Fig. 71 Piston Retainer Gasket

AT THIS POINT the "Centerline" of the transaxle has been removed. If the condition for disassembly did not pertain to the differential, its disassembly may not be required. Inspect the rear transfer shaft area and the transfer shaft seal area for contamination (can be viewed through valve body opening with the valve body removed). If evidence of contamination is present, replace the rear transfer shaft bearing and/or the transfer shaft seal. Refer to the Transfer Shaft Seal Removal Section and the Differential Disassembly/Assembly section in this group.

To assemble transaxle, reverse the above procedure. Be sure to check both grounded clutch clearances. Before installing the input clutches retainer, follow the instructions in **Determining No. 4 Thrust Plate Thickness.**

OUTPUT SHAFT BEARING PRELOAD SHIM SELECTION

When assembling, the output bearing preload must be checked and/or adjusted if any of the following items have been replaced:

- Output shaft (rear carrier assembly)
- Output shaft bearings
- Transaxle case

SHIM SELECTION

(1) Install rear carrier front bearing cone (Fig. 1).

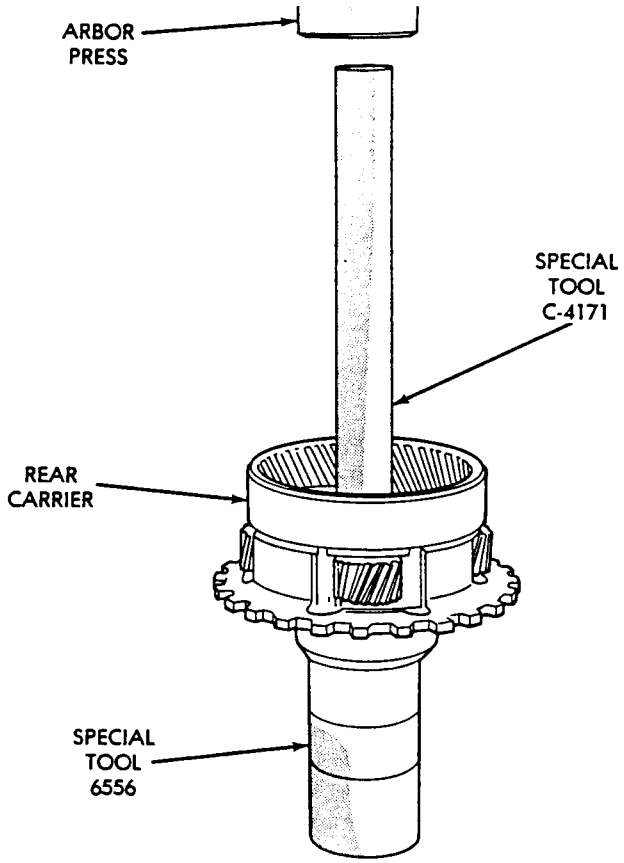


Fig. 1 Install Rear Carrier Front Bearing Cone

(2) Install rear output shaft bearing cone and special tool 6618A (Fig. 2).

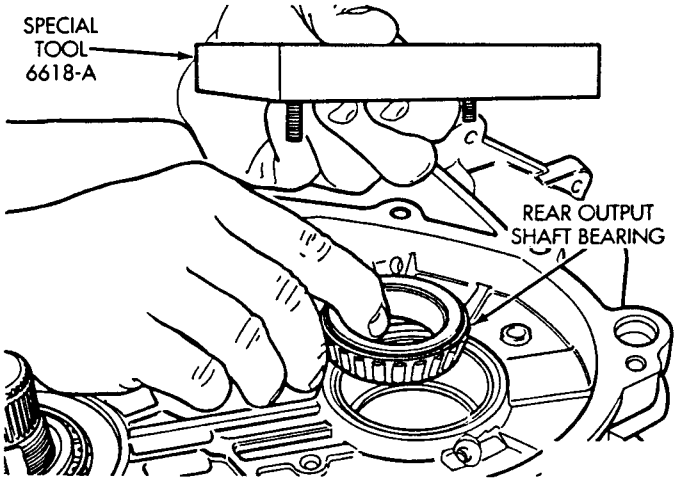


Fig. 2 Bearing Installation

(3) Install special tool 6618A (Fig. 3). Lightly tighten retaining screws. Screws should be below the plate surface, but do not snug screws.

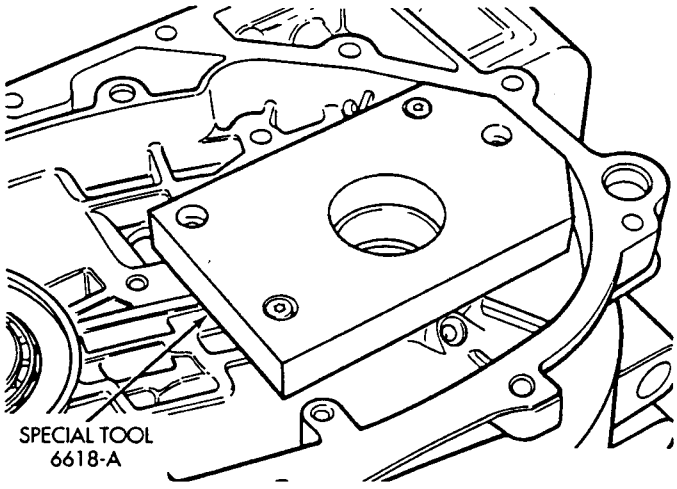


Fig. 3 Special Tool Installed

(4) Turn case over on arbor press so that the plate is resting on the press base

CAUTION: The output shaft will extend through the hole of tool 6618A. Ensure your press table has clearance for the output shaft.

(5) Install shim on output shaft (Fig. 4). Apply small amount of petrolatum onto the shim to hold it in place. Use the original shim as a starting point. If original shim is not available, use the thickest shim available. Refer to Output Shaft Rear Shim Chart for available sizes.

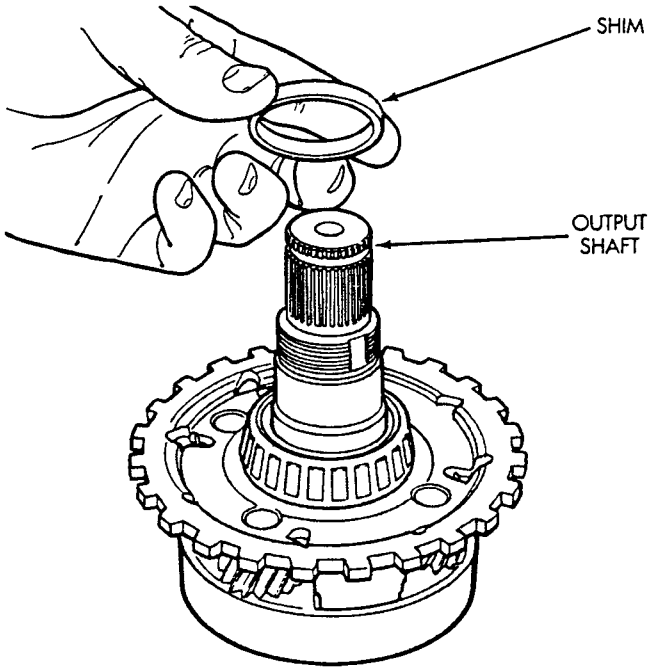


Fig. 4 Shim Installation

OUTPUT SHAFT REAR SHIM CHART

5.17 - 5.19	5.62 - 5.64
5.20 - 5.22	5.65 - 5.67
5.23 - 5.25	5.68 - 5.70
5.26 - 5.28	5.71 - 5.73
5.29 - 5.31	5.74 - 5.76
5.32 - 5.34	5.77 - 5.79
5.35 - 5.37	5.80 - 5.82
5.38 - 5.40	5.83 - 5.85
5.41 - 5.43	5.86 - 5.88
5.44 - 5.46	5.89 - 5.91
5.47 - 5.49	5.92 - 5.94
5.50 - 5.52	5.95 - 5.97
5.53 - 5.55	5.98 - 6.00
5.56 - 5.58	6.01 - 6.03
5.59 - 5.61	6.04 - 6.06

(6) Install output shaft/rear carrier into rear bearing. The shaft must be pressed into position. Use special tool MD-998911 (Disc) and C-4171 and C4171-2 (Handle) to press shaft into rear bearing (Fig. 5).

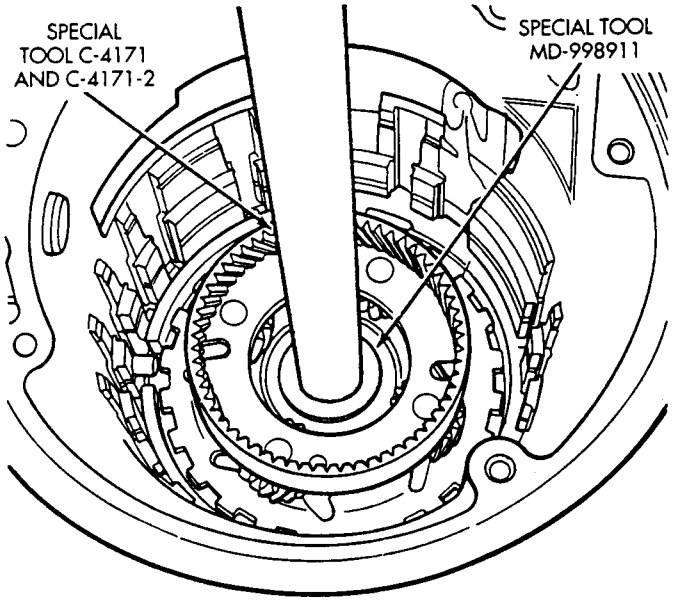


Fig. 5 Press Shaft Into Case

(7) Using special tools 6497 and 6498, install new output shaft nut. Do not reuse old output shaft nut. Tighten new output shaft nut to 271 N•m (200 ft. lbs.).

(8) Check the turning torque of the output shaft (Fig. 6). The shaft should have 1 to 8 in. lbs. of turning torque. If the turning torque is **higher than** 8 in. lbs., install a thicker shim. If the turning torque is **less than** 1 in. lb., install a thinner shim. Make sure there is no end play.

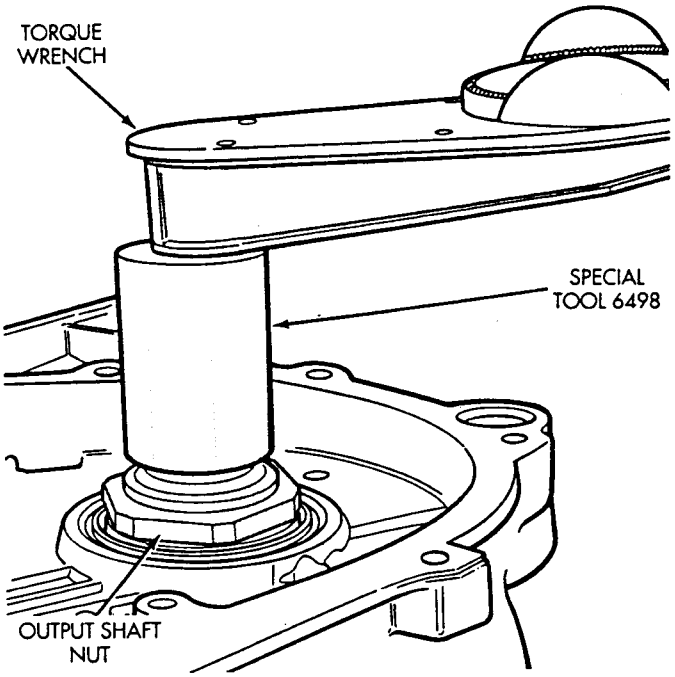


Fig. 6 Checking Turning Torque

CAUTION: Failure to stake shaft nuts could allow the nuts to back-off during use.

(9) The new nut must be staked after the correct turning torque is obtained. Use special tool 6639 to stake output shaft nut and special tool 6589 to stake transfer shaft (Fig. 7 and 8).

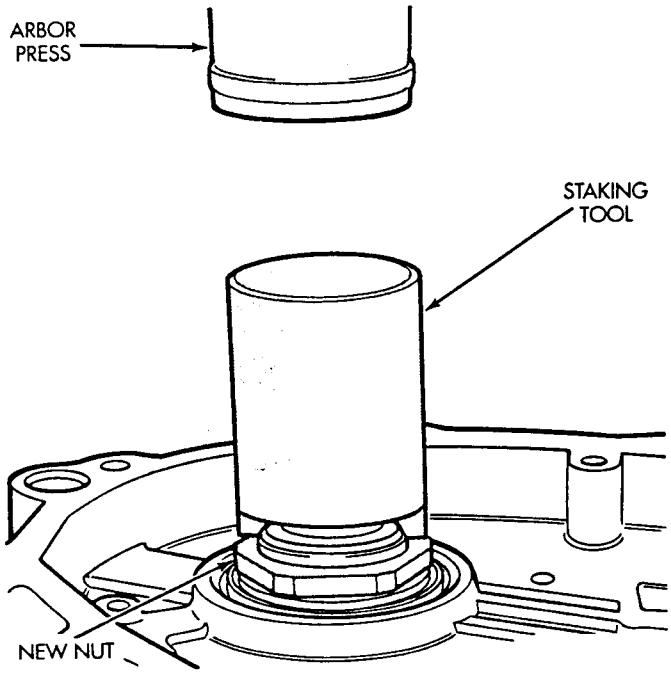


Fig. 7 Staking Output Shaft Nut

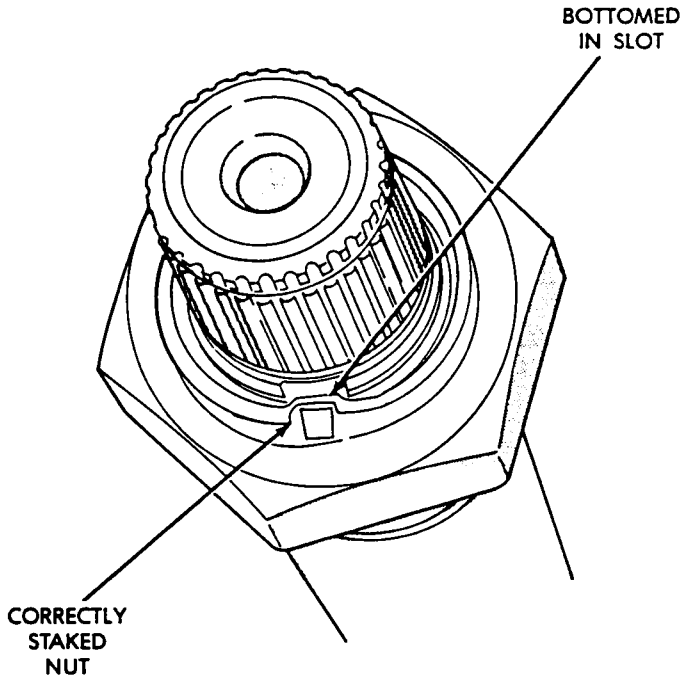


Fig. 8 Correctly Staked Nut

LOW/REVERSE CLUTCH CLEARANCE

Press down clutch pack with finger and zero dial indicator. **Low/Reverse clutch pack clearance is 1.04 to 1.65 mm (.042 to .065 inch).**

Select the proper low/reverse reaction plate to achieve specifications:

Press down clutch pack with finger and zero dial indicator. **The 2/4 clutch pack clearance is 0.76 to 2.64 mm (.030 to .104 inch).** If not within specifications, the clutch is not assembled properly. **There is no adjustment for the 2/4 clutch clearance.**

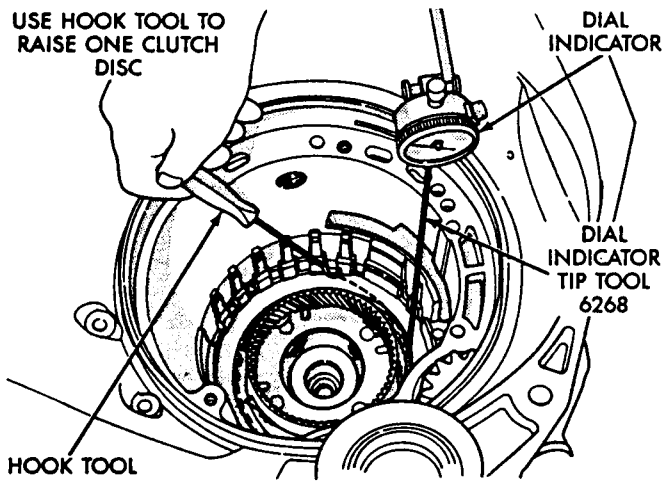


Fig. 9 Check Low/Reverse Clutch Clearance

LOW/REVERSE REACTION PLATE CHART

THICKNESS
6.92 mm (.273 in.)
6.66 mm (.262 in.)
6.40 mm (.252 in.)
6.14 mm (.242 in.)
5.88 mm (.232 in.)
5.62 mm (.221 in.)
5.36 mm (.211 in.)

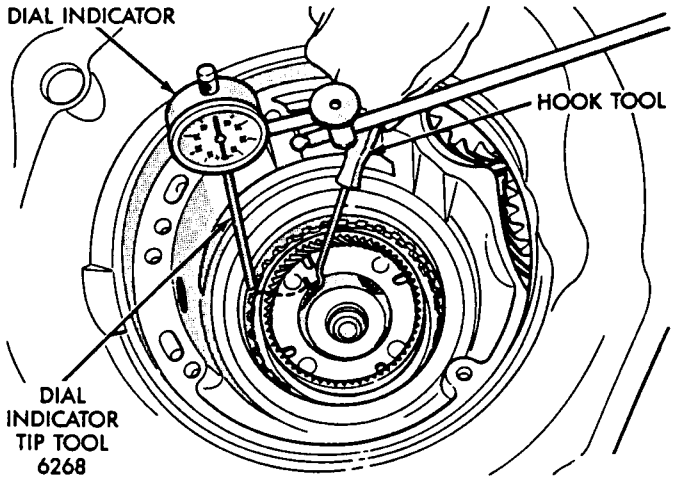


Fig. 10 Check 2/4 Clutch Clearance

INPUT CLUTCHES-RECONDITION

DISASSEMBLY

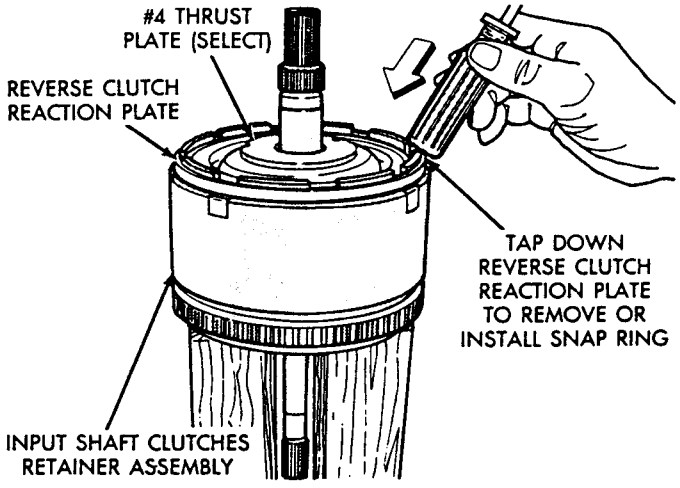


Fig. 1 Tapping Reaction Plate

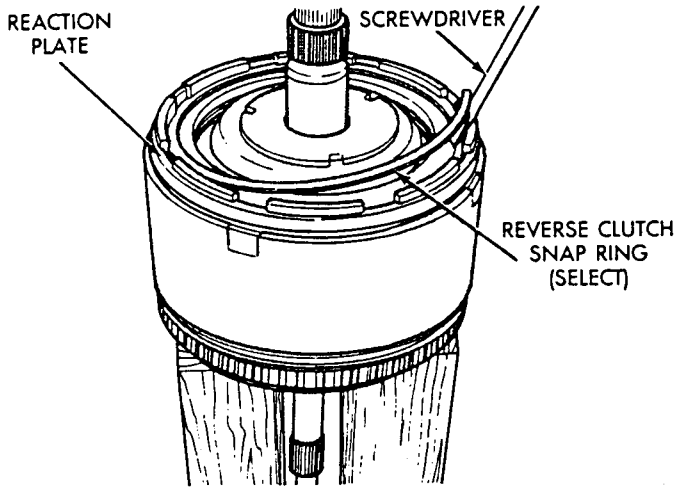


Fig. 2 Reverse Clutch Snap Ring

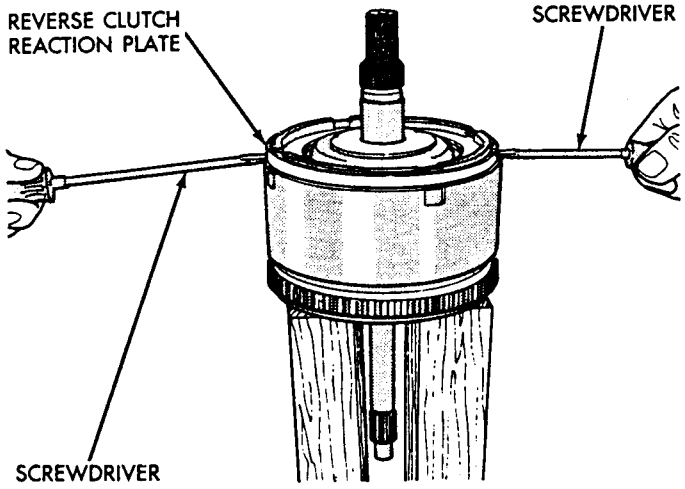


Fig. 3 Pry Reverse Clutch Reaction Plate

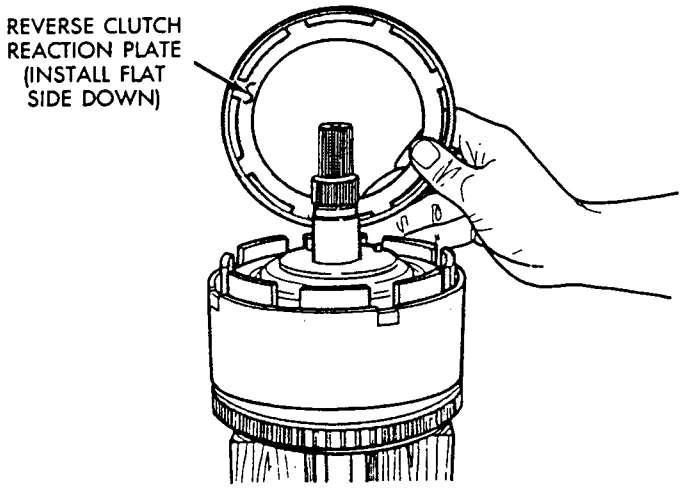


Fig. 4 Reverse Clutch Reaction Plate

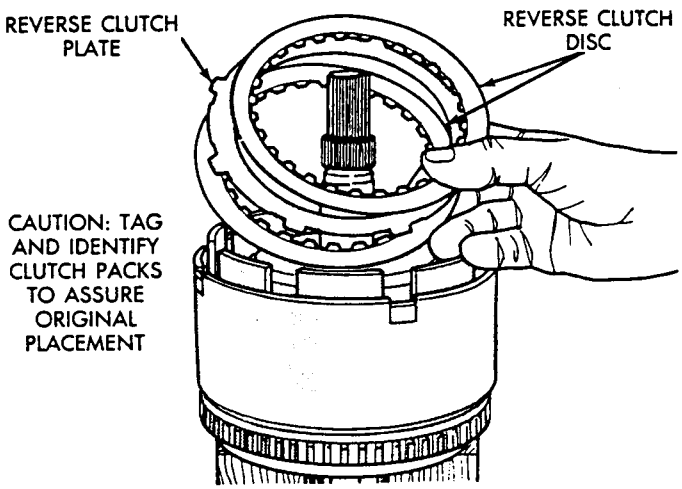


Fig. 5 Reverse Clutch Pack

Tag reverse clutch pack for reassembly identification.

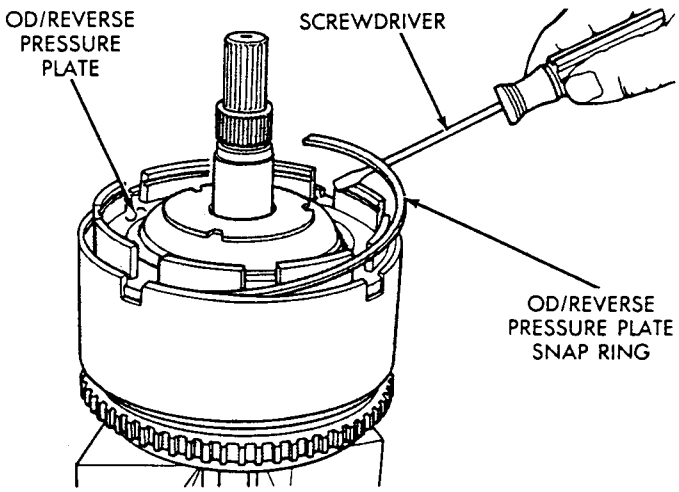


Fig. 6 OD/Reverse Pressure Plate Snap Ring

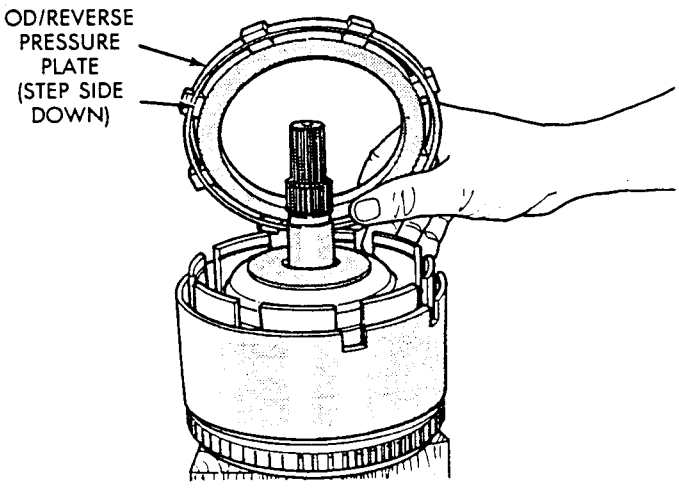


Fig. 7 OD/Reverse Pressure Plate

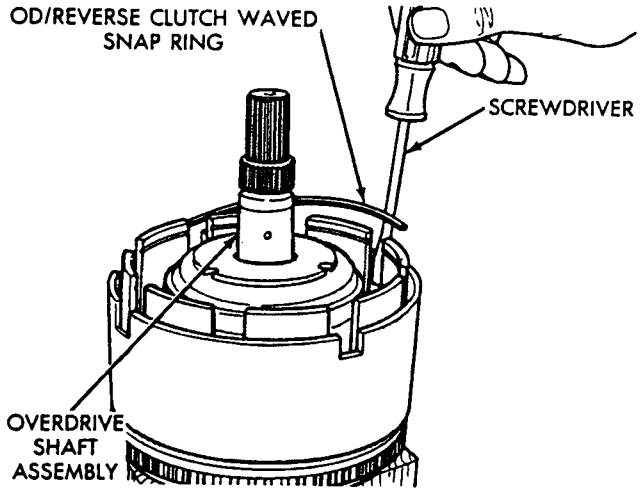


Fig. 8 Waved Snap Ring

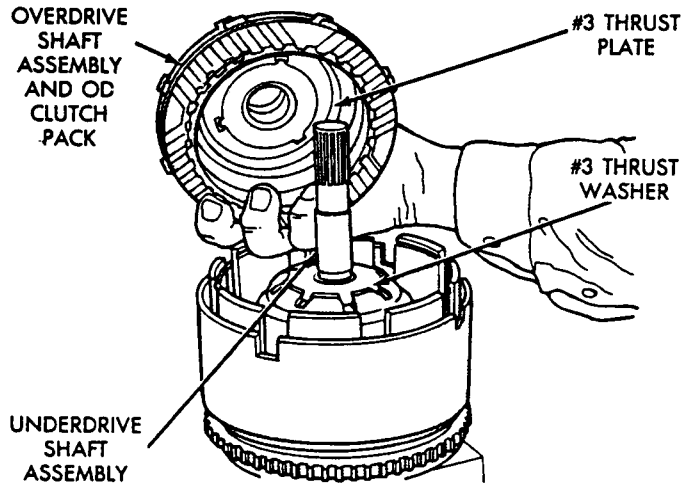


Fig. 9 Remove OD Clutch Pack

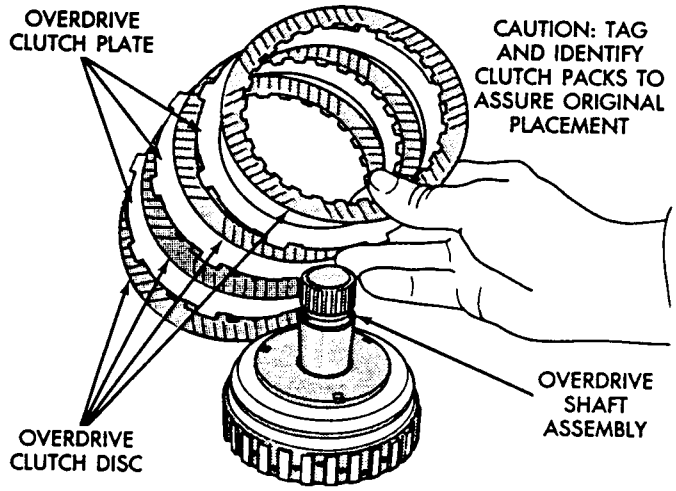


Fig. 10 Overdrive Clutch Pack

Tag overdrive clutch pack for reassembly identification.

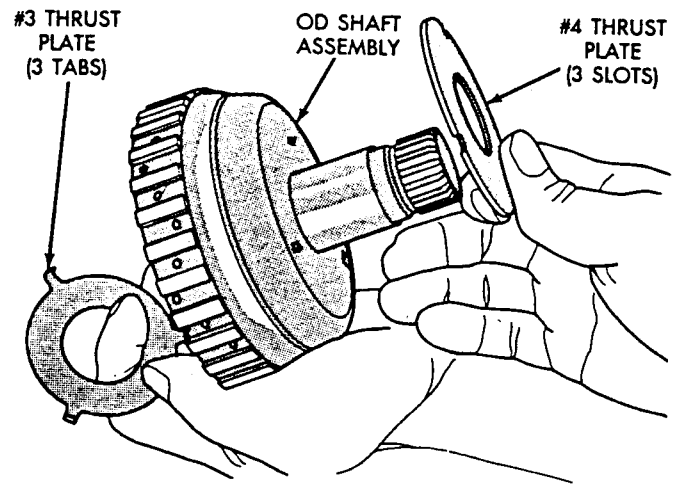


Fig. 11 Overdrive Shaft Assembly

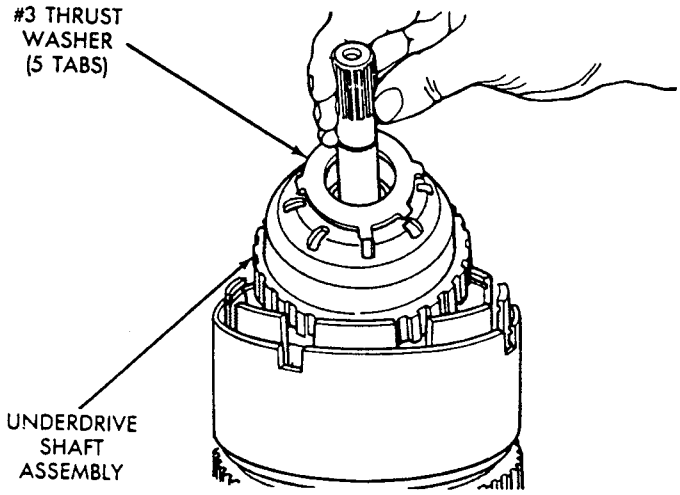


Fig. 12 Underdrive Shaft Assembly

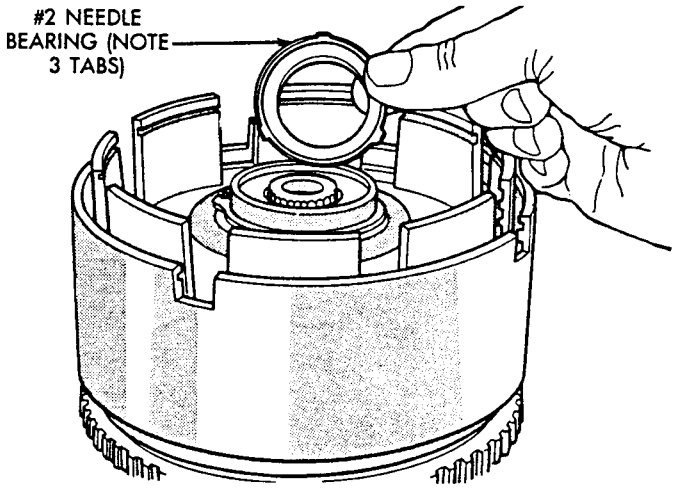


Fig. 13 No. 2 Needle Bearing

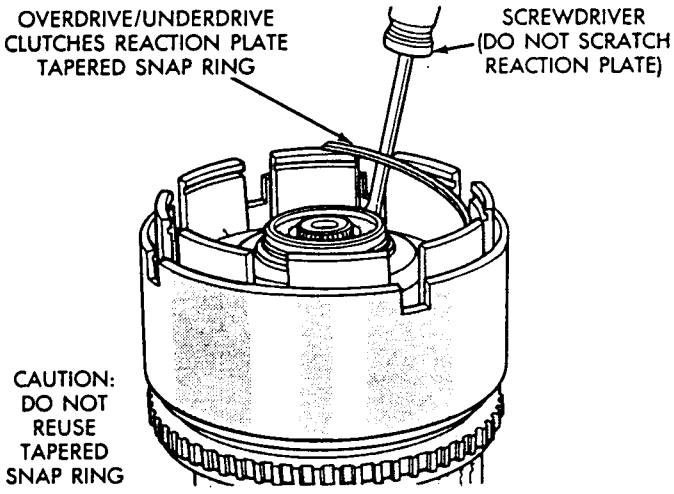


Fig. 14 OD/UD Reaction Plate Tapered Snap Ring

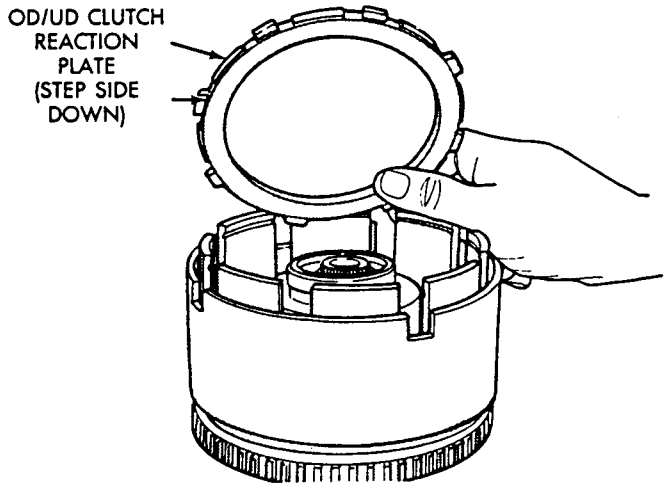


Fig. 15 OD/UD Reaction Plate

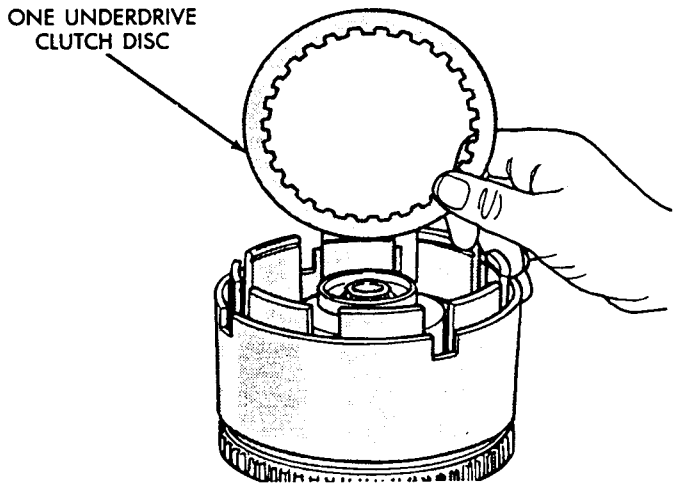


Fig. 16 Remove One UD Clutch Disc

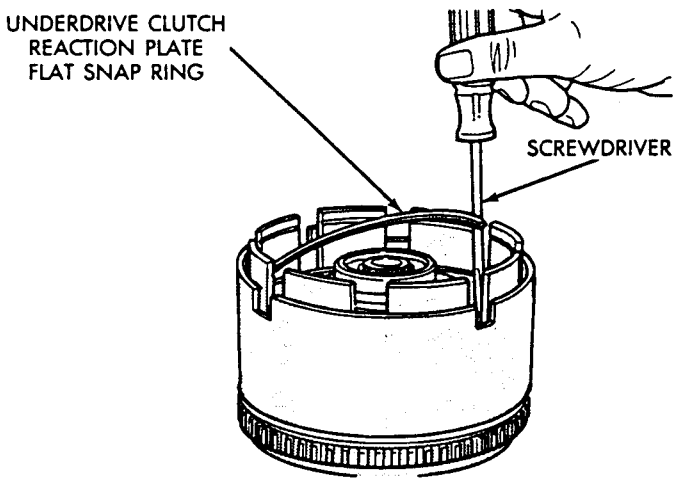


Fig. 17 UD Clutch Flat Snap Ring

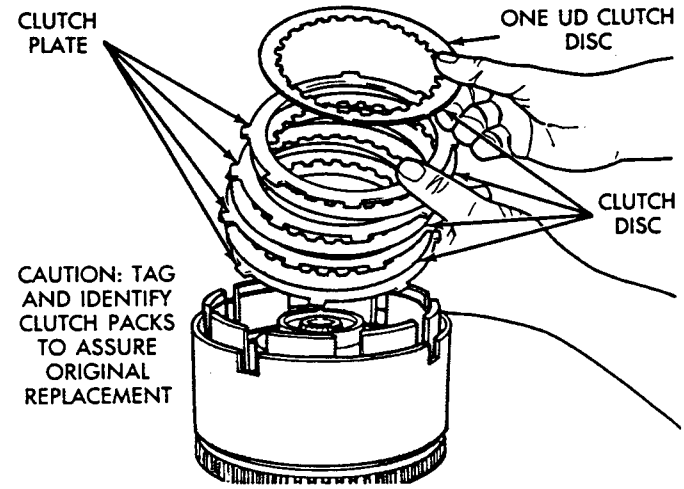


Fig. 18 Underdrive Clutch Pack

Tag underdrive clutch pack for reassembly identification.

CAUTION: Compress return spring just enough to remove or install snap ring.

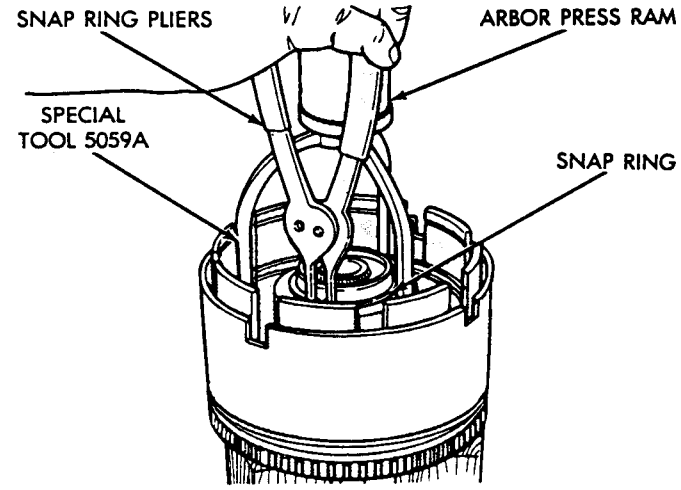


Fig. 19 UD Spring Retainer Snap Ring

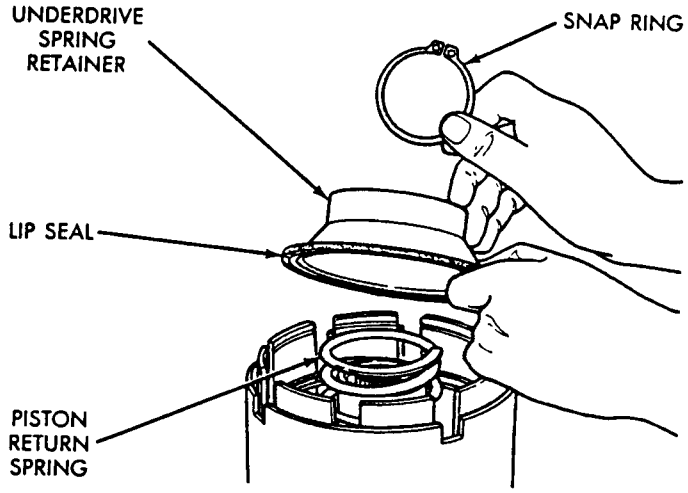


Fig. 20 UD Return Spring and Retainer

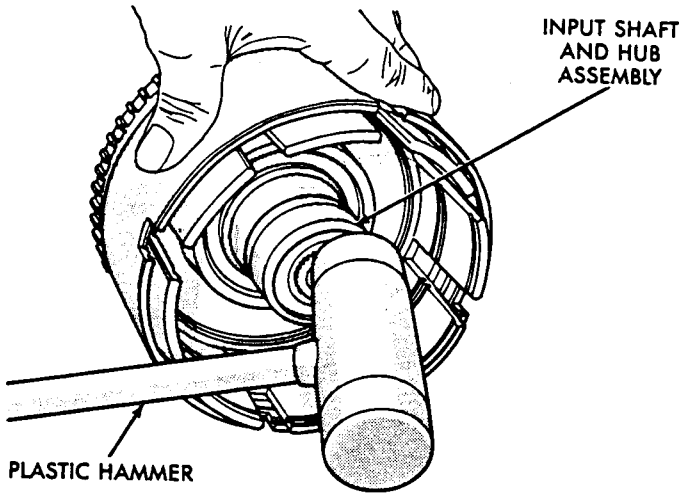


Fig. 23 Tap on Input Hub

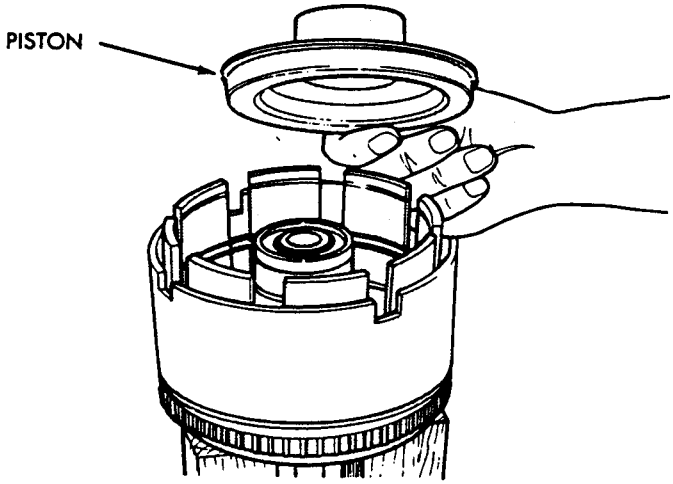


Fig. 21 Underdrive Clutch Piston

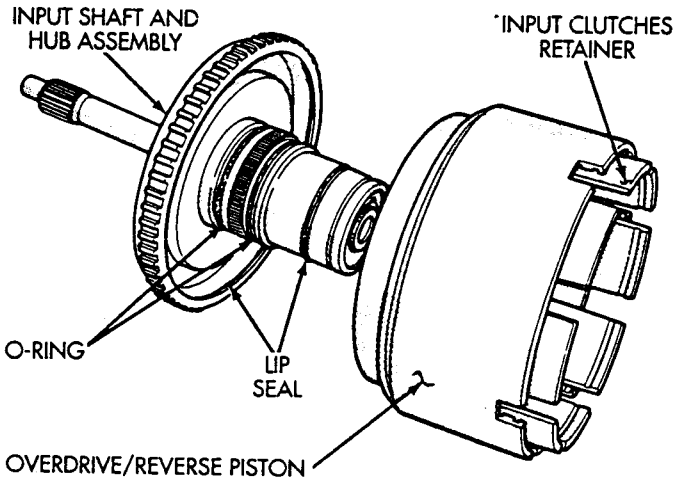


Fig. 24 Input Hub Removed

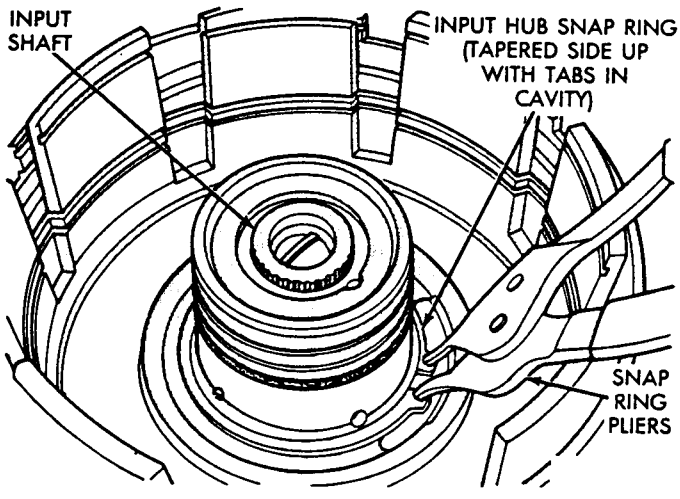


Fig. 22 Input Hub Tapered Snap Ring

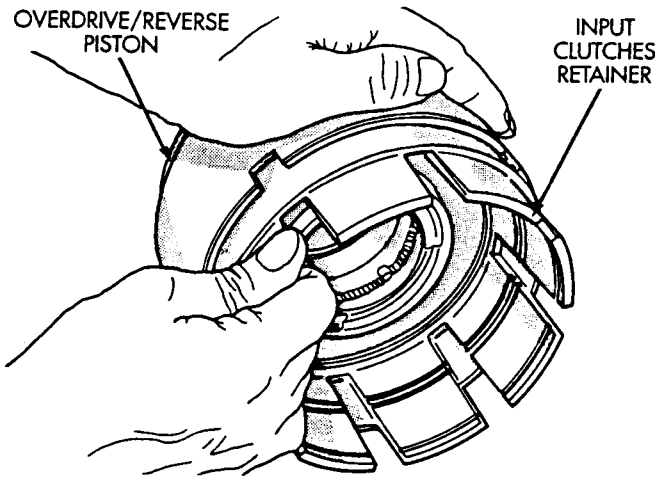


Fig. 25 Pull Retainer from Piston

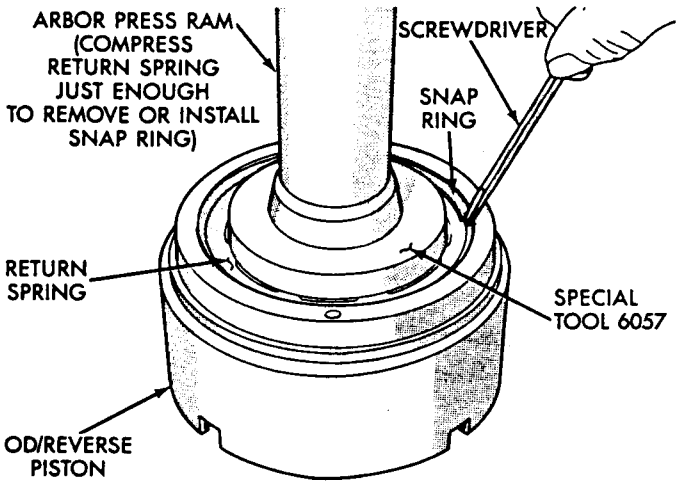


Fig. 26 Install Snap Ring

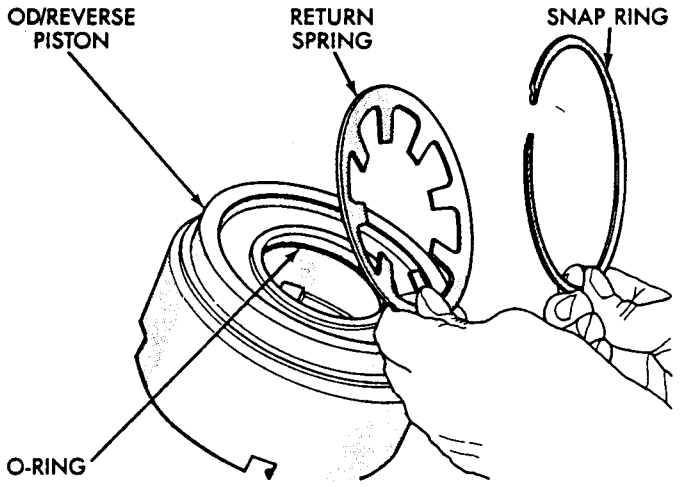


Fig. 27 Snap Ring and Return Spring

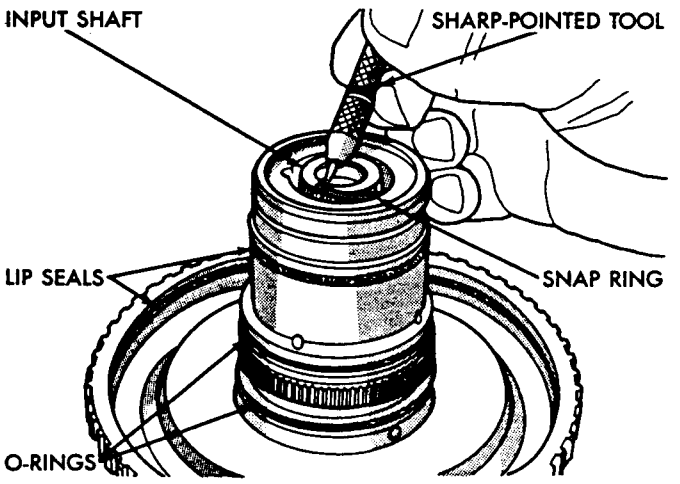


Fig. 28 Remove Input Shaft Snap Ring

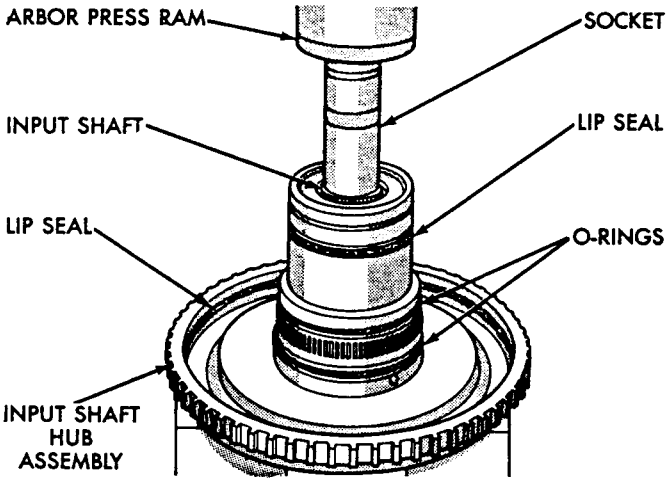


Fig. 29 Remove Input Shaft

ASSEMBLY

Use petrolatum on all seals to ease assembly of components.

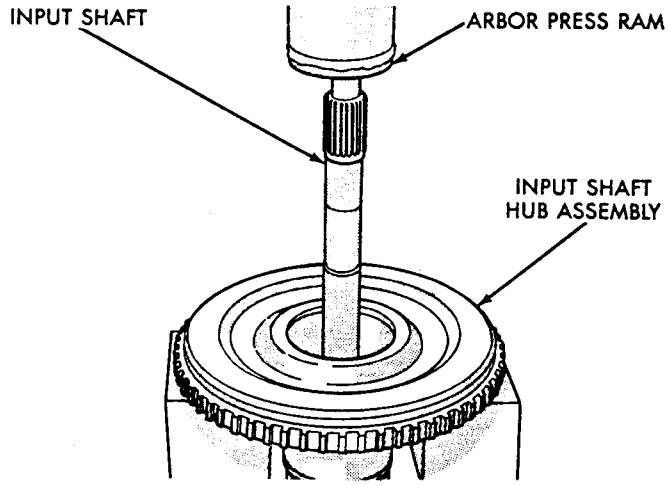


Fig. 1 Install Input Shaft

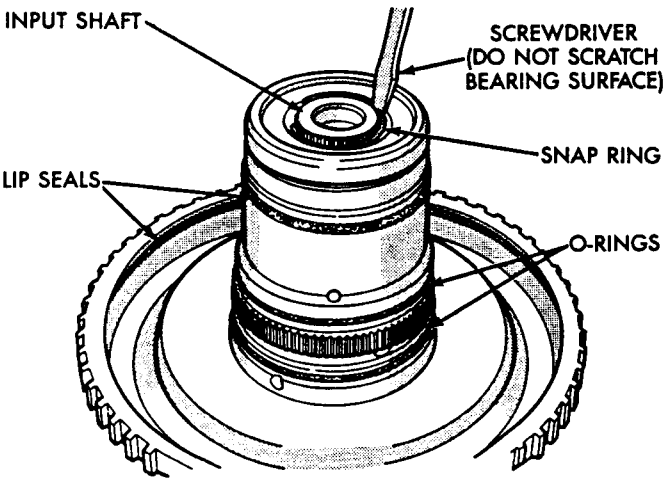


Fig. 2 Install Input Shaft Snap Ring

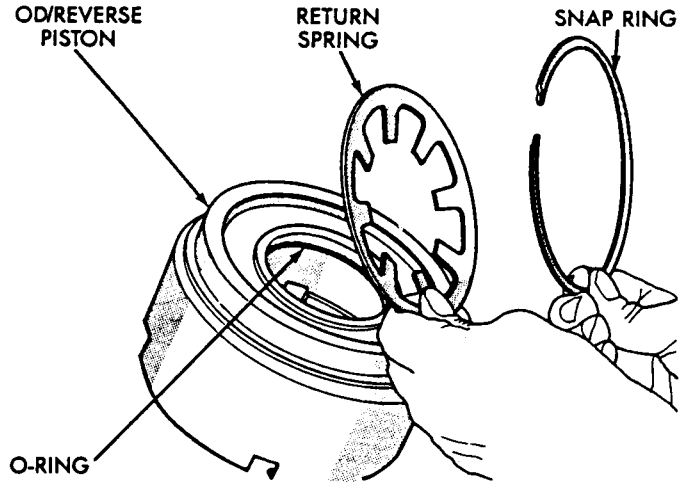


Fig. 3 Return Spring and Snap Ring

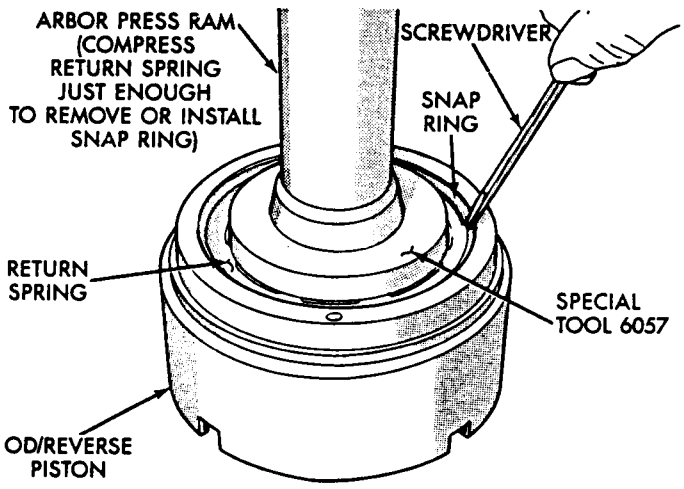


Fig. 4 Install Snap Ring

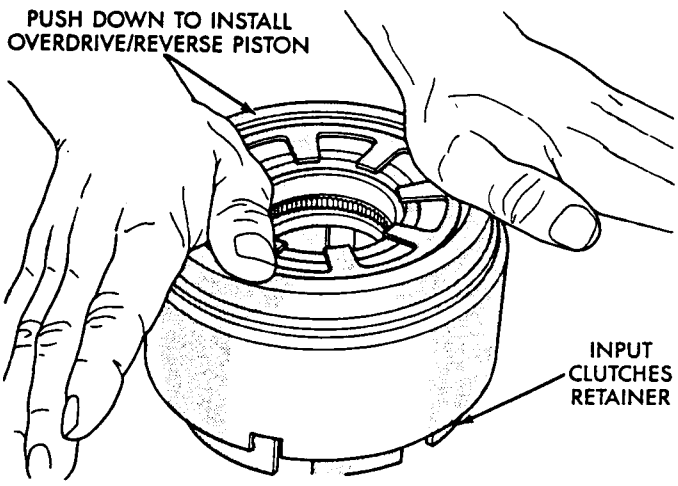


Fig. 5 Install OD/Reverse Piston

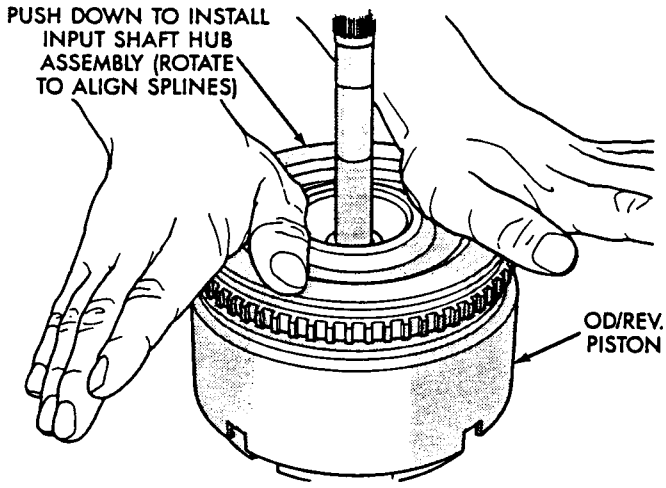


Fig. 6 Install Input Shaft Hub Assembly

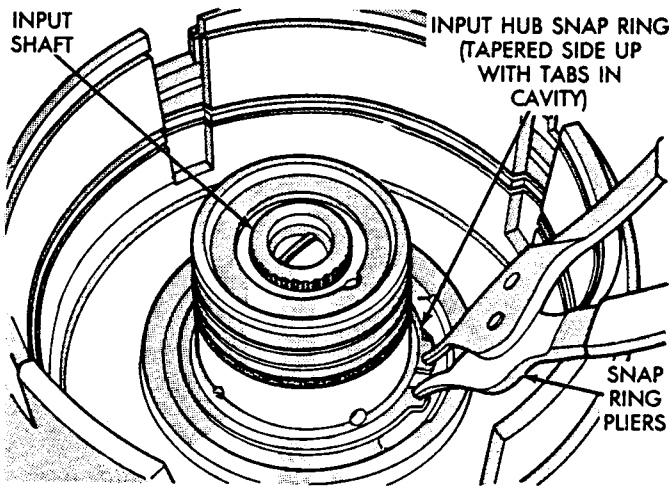


Fig. 7 Input Hub Tapered Snap Ring

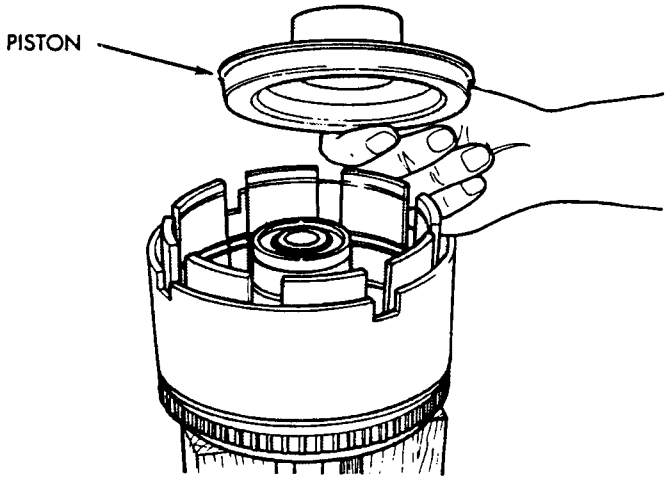


Fig. 8 Underdrive Clutch Piston

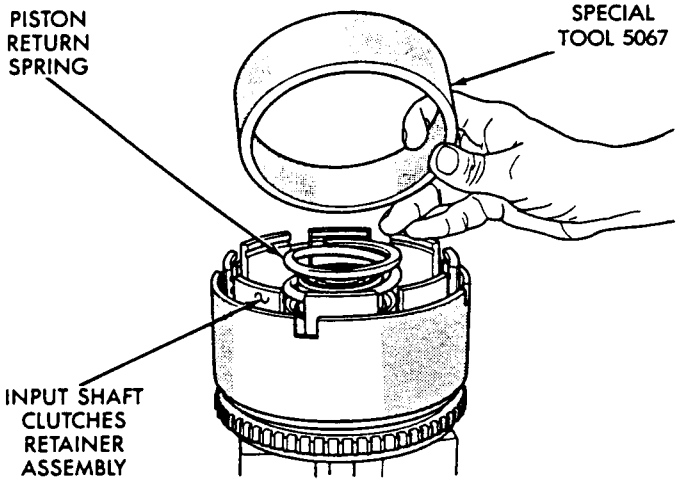


Fig. 9 Seal Compressor Special Tool 5067

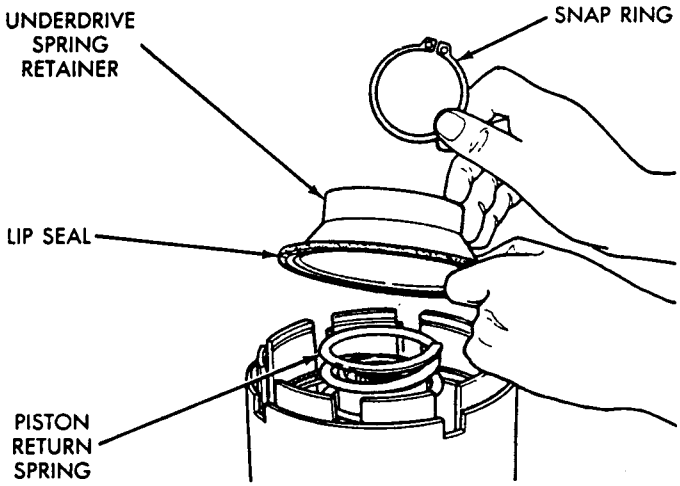


Fig. 10 UD Return Spring and Retainer

CAUTION: Compress return spring just enough to remove or install snap ring.

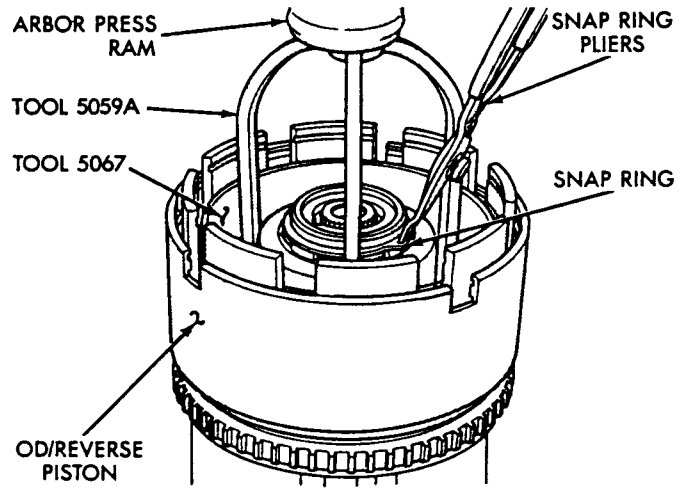


Fig. 11 Install UD Spring Retainer and Snap Ring

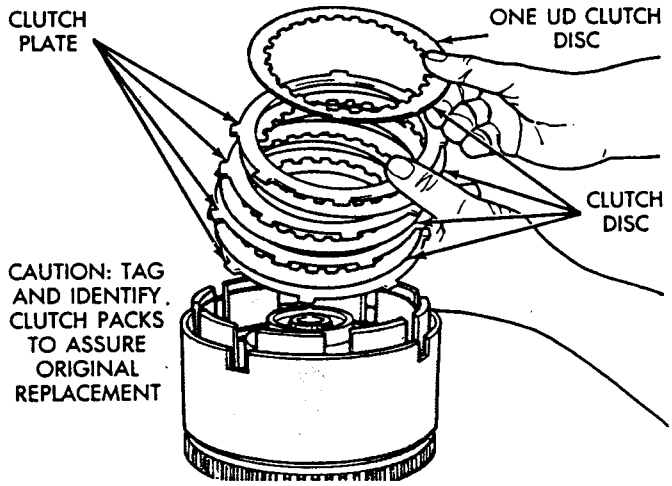


Fig. 12 Underdrive Clutch Pack

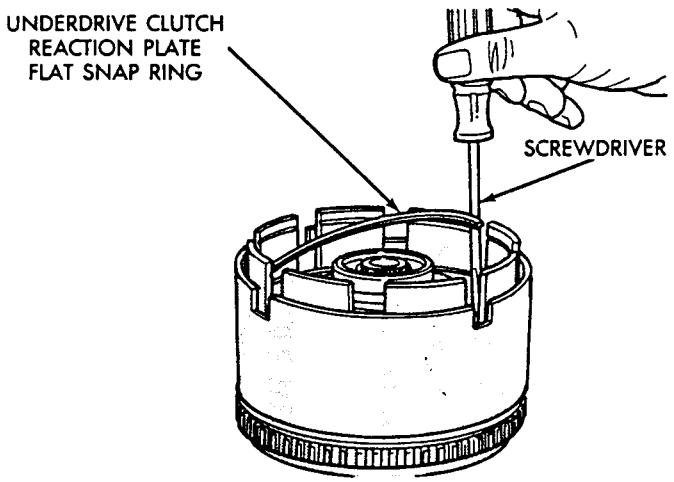


Fig. 13 UD Clutch Flat Snap Ring

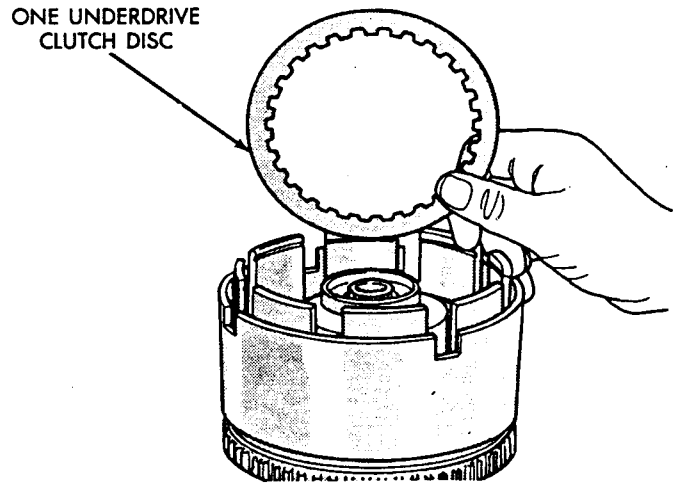


Fig. 14 Install Last UD Clutch Disc

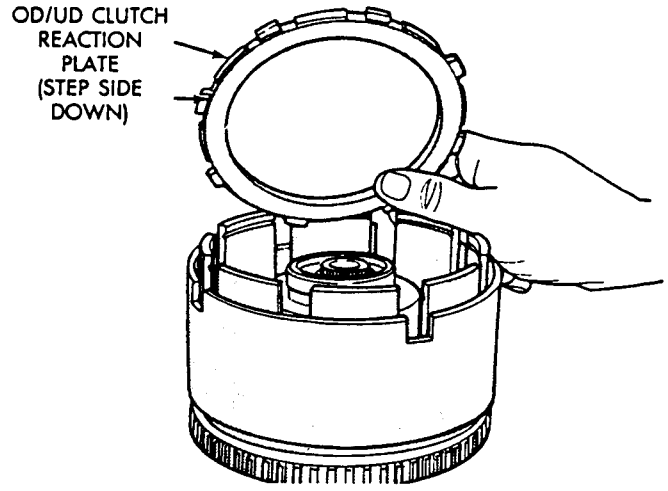


Fig. 15 OD/UD Reaction Plate

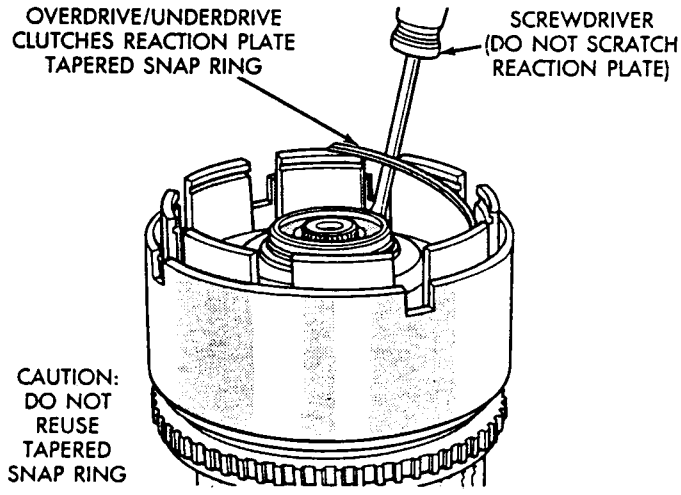


Fig. 16 Tapered Snap Ring

Snap ring ends must be located within one finger of the input clutch hub. Be sure that snap ring is fully seated, by pushing with screwdriver, into snap ring groove all the way around.

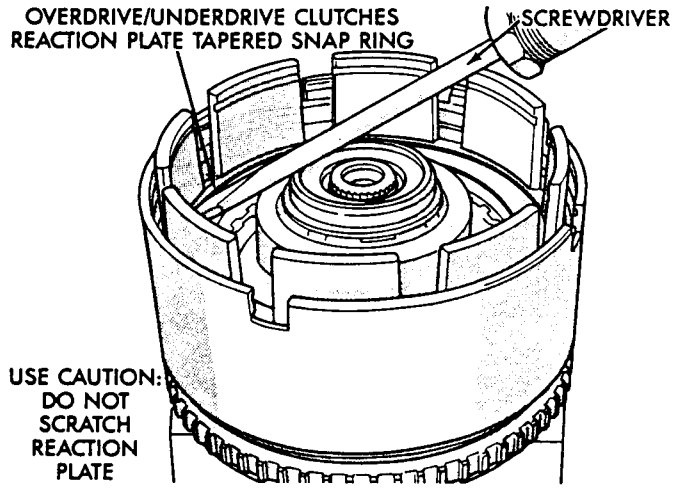


Fig. 17 Seating Tapered Snap Ring

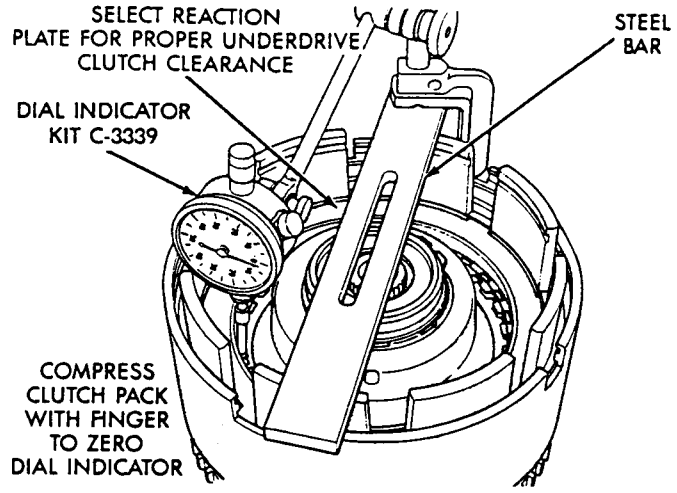


Fig. 18 Set Up Dial Indicator for Clutch Clearance

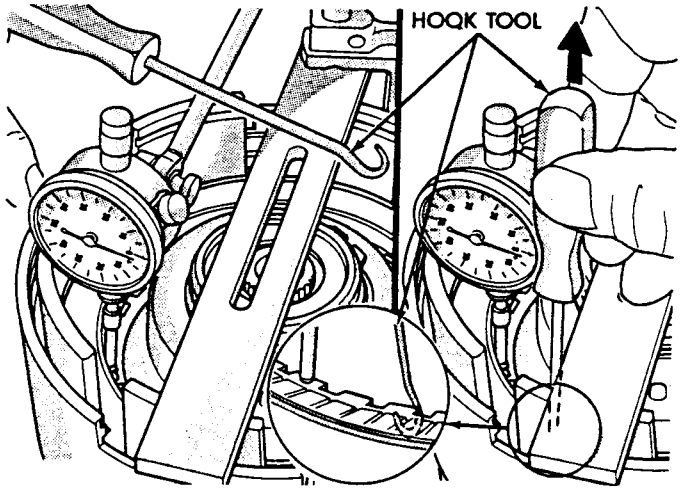


Fig. 19 Use Hook Tool to Raise One Clutch Disc

Underdrive clutch pack clearance must be 0.91 to 1.47 mm (.036 to .058 inch). Select the proper reaction plate to achieve specifications:

UNDERDRIVE REACTION PLATE CHART

THICKNESS
6.99 mm (.275 in.)
6.50 mm (.256 in.)
6.01 mm (.237 in.)
5.52 mm (.217 in.)

9121-5

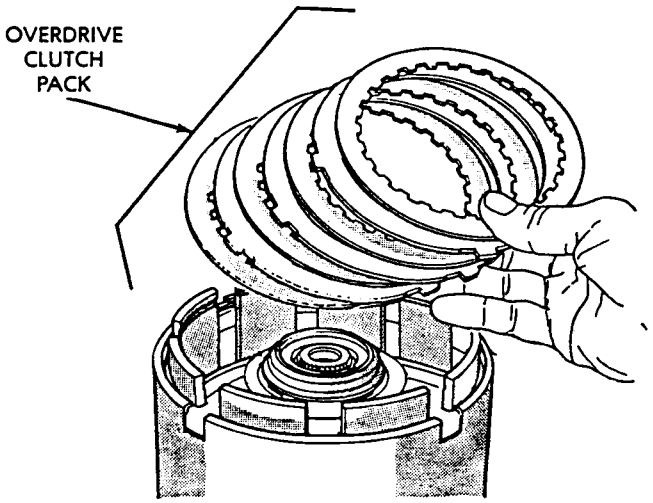


Fig. 20 Install OD Clutch Pack

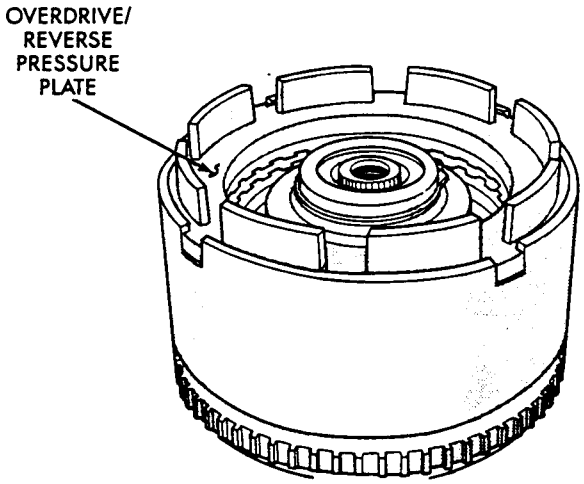


Fig. 23 Pressure Plate Installed

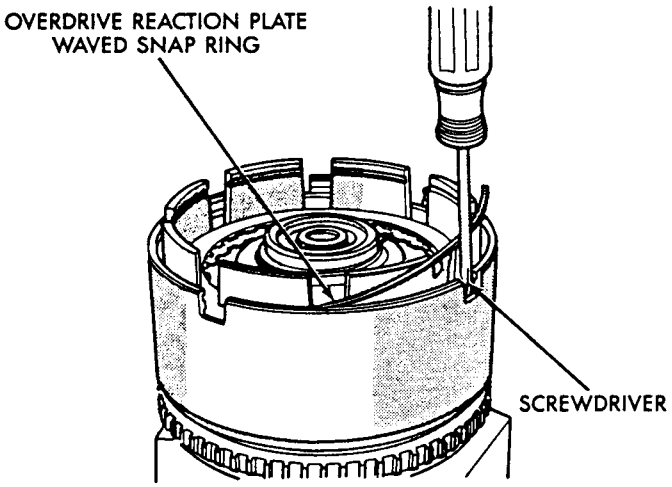


Fig. 21 Install Waved Snap Ring

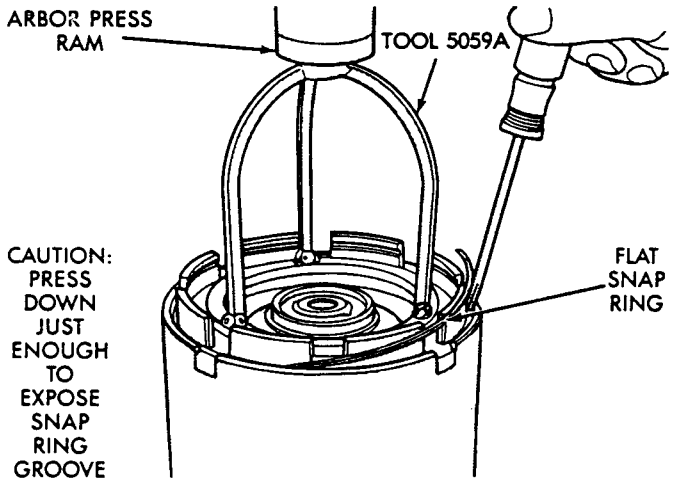


Fig. 24 Install Flat Snap Ring

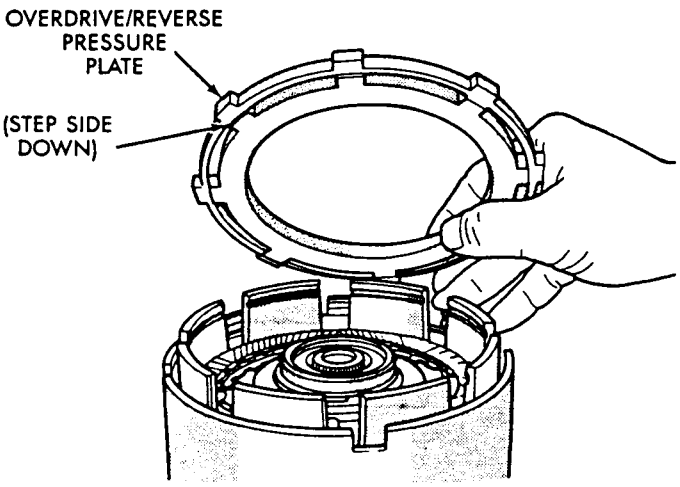


Fig. 22 OD/Reverse Pressure Plate

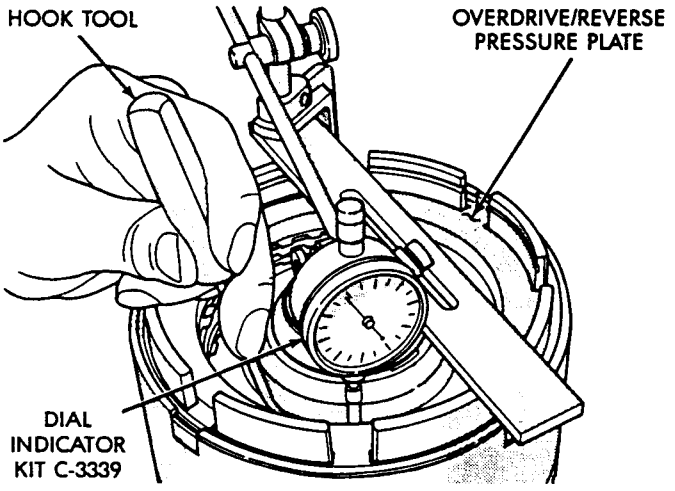


Fig. 25 Check OD Clutch Pack Clearance

The overdrive (OD) clutch pack clearance is .965 to 2.26 mm (.038 to .089 inch). If not within specifications, the clutch is not assembled properly. There is no adjustment for the OD clutch clearance.

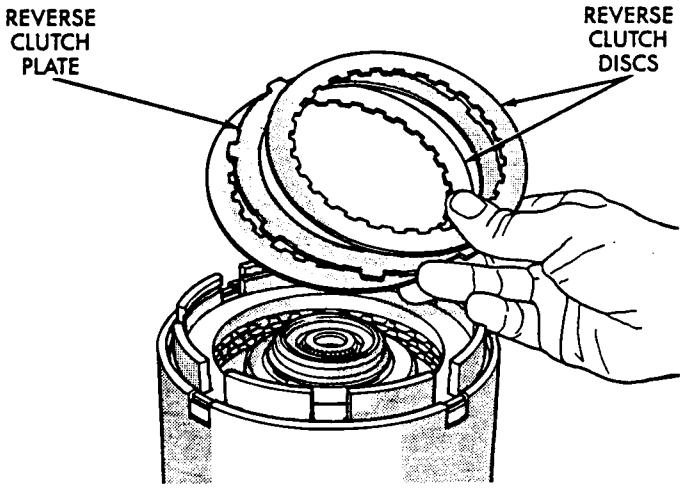


Fig. 26 Install Reverse Clutch Pack

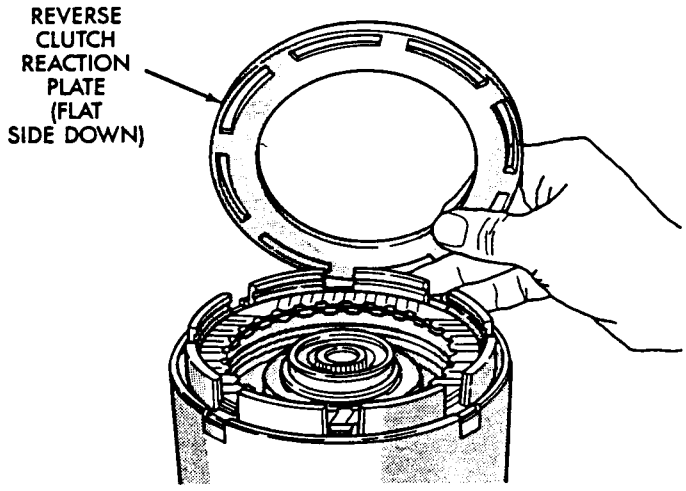


Fig. 27 Install Reaction Plate

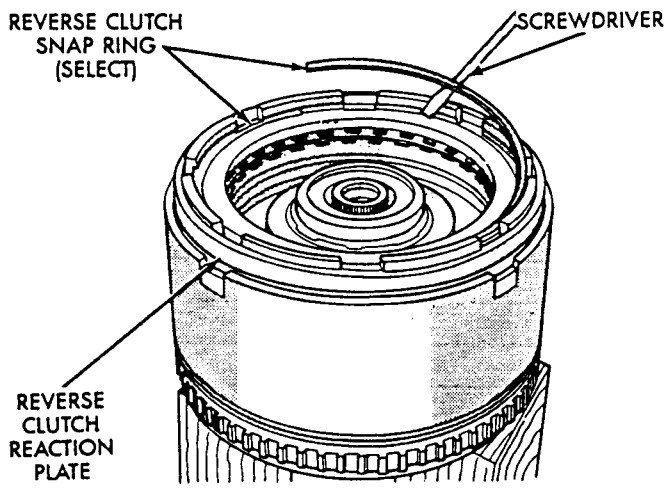


Fig. 28 Install Reverse Clutch Snap Ring

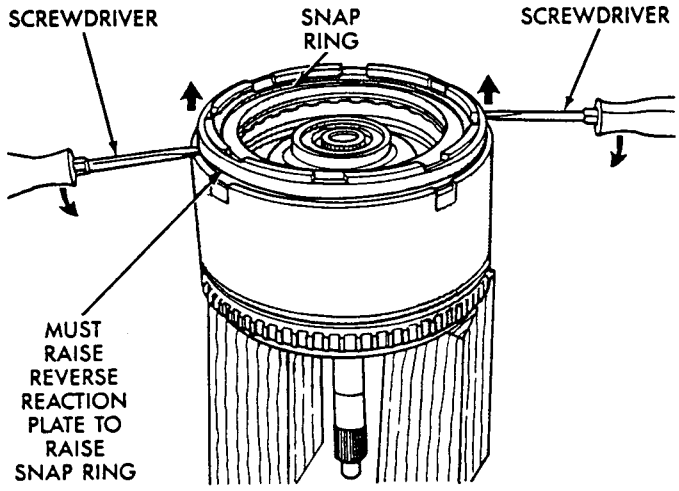


Fig. 29 Seating Snap Ring to Determine Reverse Clutch Clearance

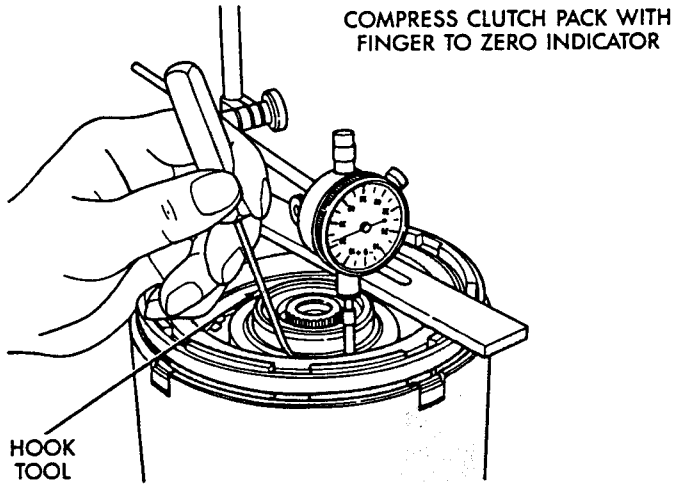


Fig. 30 Check Reverse Clutch Pack Clearance

The reverse clutch pack clearance is 0.76 to 1.24 mm (.030 to .049 inch). Select the proper reverse clutch snap ring to achieve specifications:

REVERSE CLUTCH SNAP RING CHART

THICKNESS
1.56 mm (.061 in.)
1.80 mm (.071 in.)
2.05 mm (.081 in.)
2.30 mm (.090 in.)

All clutch clearances in the input clutch retainer have now been checked and approved.

To complete the assembly of the input clutch retainer, the reverse clutch and the overdrive clutch must be removed from the retainer.

CAUTION: Do not intermix clutch parts. Keep in exact same order.

Now proceed with the next phase of the assembly:

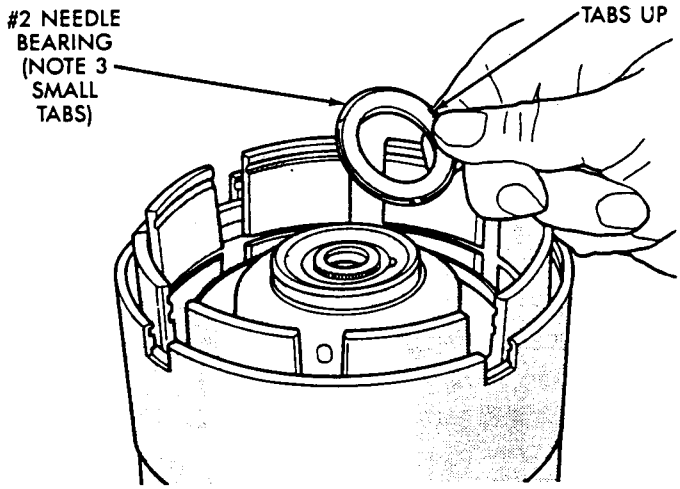


Fig. 31 Install No. 2 Needle Bearing

Now that both shaft assemblies and thrust washers are properly installed, reinstall overdrive clutch and reverse clutch as shown in Figures 20 through 28. **Rechecking these clutch clearances is not necessary, as they were set and approved previously.**

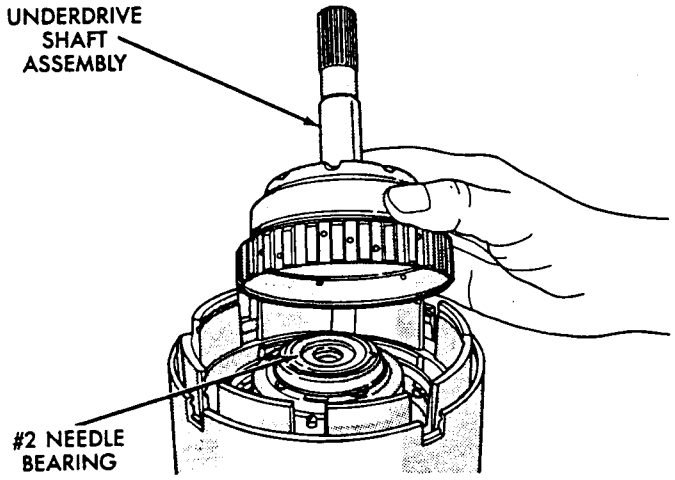


Fig. 32 Install Underdrive Shaft Assembly

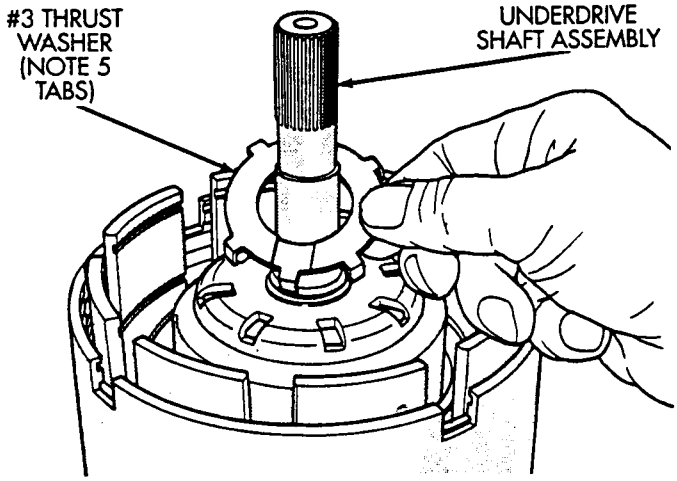


Fig. 33 Install No. 3 Thrust Washer

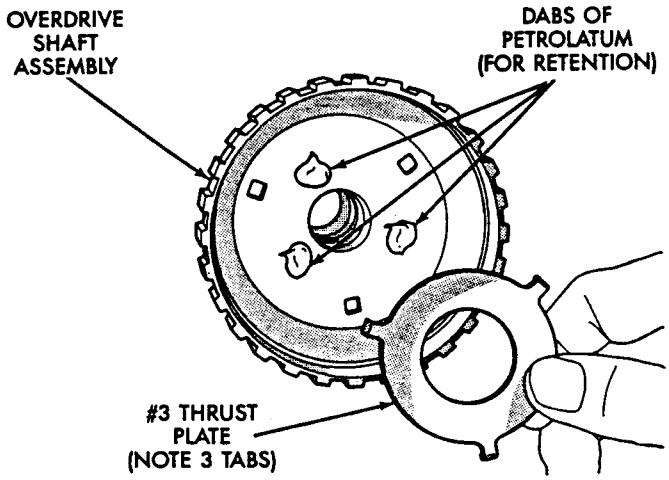


Fig. 34 Install No. 3 Thrust Plate

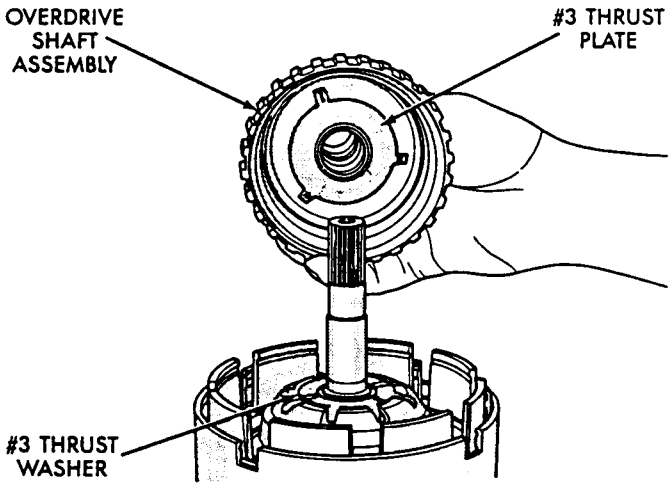


Fig. 35 Install Overdrive Shaft Assembly

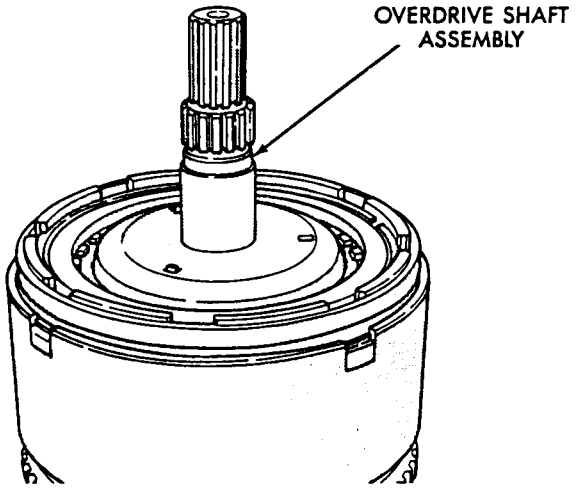


Fig. 36 Input Clutch Assembly

DETERMINING No. 4 THRUST PLATE THICKNESS (Input Shaft End Play)

The input clutch assembly must be completed prior to performing this step.

To determine the proper thickness of the No. 4 thrust plate, select the thinnest No. 4 thrust plate (Fig. 1). Using petrolatum to hold thrust plate in position, install input clutch assembly.

Be sure the input clutch assembly is completely seated. This can be verified by looking into the turbine speed sensor hole (Fig. 2).

CAUTION: If view through input speed sensor hole is not as shown in figure 3, the input clutch assembly is not seated properly.

By removing the oil pump O-ring, you will be able to install and remove the oil pump and gasket very easily to select the proper No. 4 thrust plate.

CAUTION: Be sure to reinstall O-ring on oil pump after selecting the proper No. 4 thrust plate.

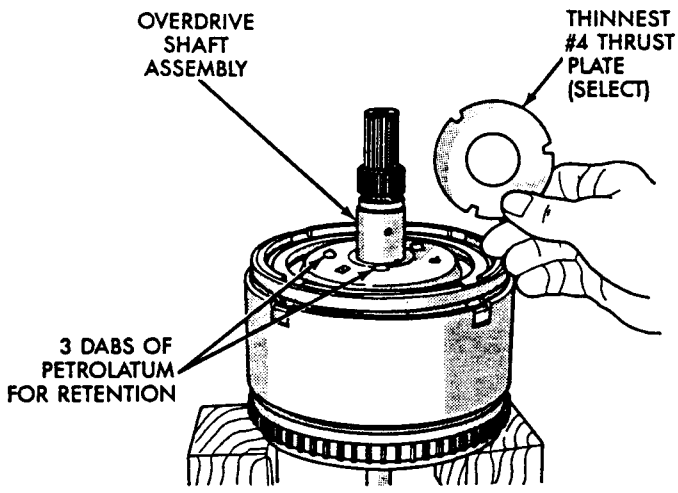


Fig. 1 Select Thinnest No. 4 Thrust Plate

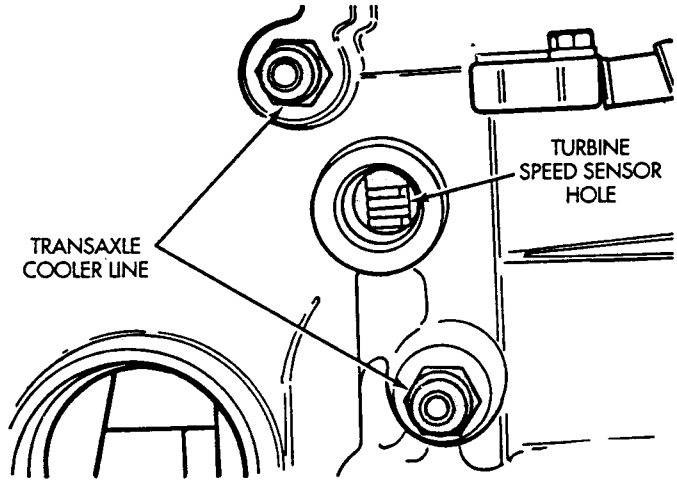


Fig. 2 View Through Turbine Speed Sensor Hole

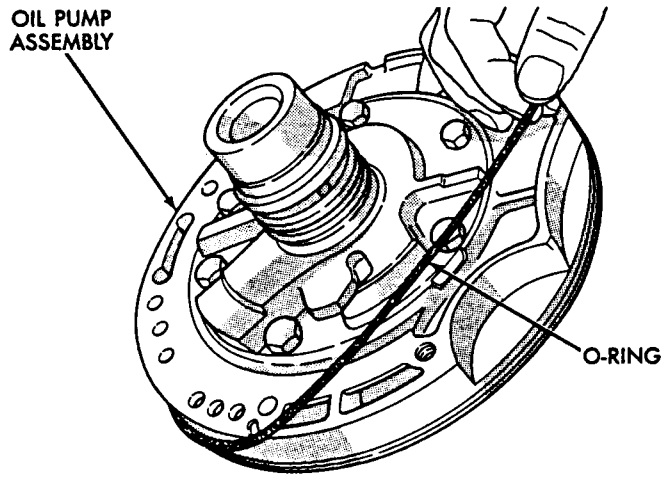


Fig. 3 Remove Oil Pump O-Ring

Input shaft end play must be .005 to .025 inch. For example, if end play reading is .055 inch, select No. 4 Thrust Plate which is .071 to .074 thick. This should provide an input shaft end play reading of .020 inch which is within specifications.

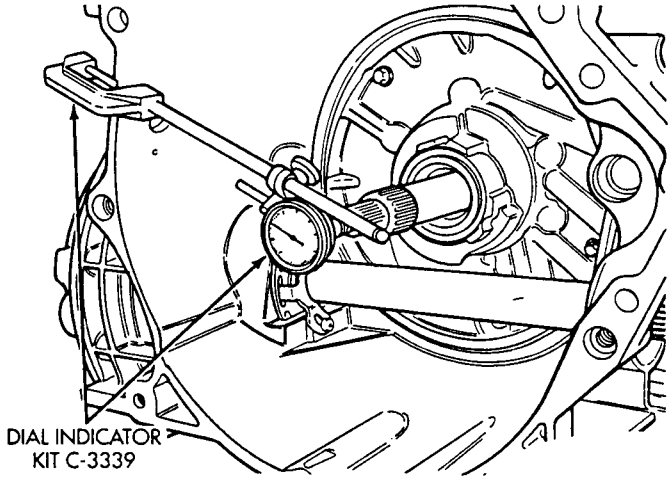


Fig. 4 Measure Input Shaft End Play

See chart below to select the proper No. 4 thrust plate.

NO. 4 THRUST PLATE CHART

SHIM THICKNESS mm	inch
0.93–1.00	.037–.039
1.15–1.22	.045–.048
1.37–1.44	.054–.057
1.59–1.66	.063–.066
1.81–1.88	.071–.074
2.03–2.10	.080–.083
2.25–2.32	.089–.091
2.47–2.54	.097–.100
2.69–2.76	.106–.109
2.91–2.98	.114–.117
3.13–3.20	.123–.126
3.35–3.42	.132–.135

TRANSFER CHAIN LENGTH MEASUREMENT

The need to replace the transfer chain because of excessive wear is unlikely. If the chain length is suspected to be long, perform the following procedure to measure the chain length:

(1) Insert a screwdriver into the 18 mm hole with the screwdriver **ABOVE** the chain (Fig. 1).

(2) Pry the chain down at the center of the chain.

(3) Butt a scale against the snubber and mark the scale at the bottom of the chain (Fig. 2).

(4) Insert a screwdriver into the 18 mm hole with the screwdriver **BELOW** the chain (Fig. 3). A assistant may be needed to perform this step.

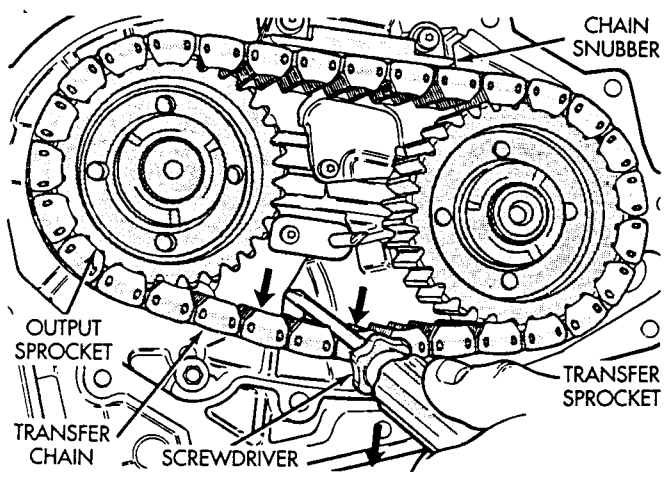


Fig. 1 Screwdriver Placement

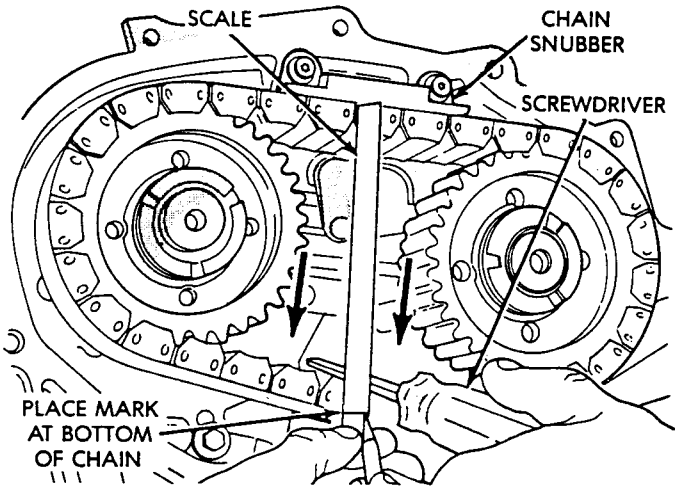


Fig. 2 Chain Measurement

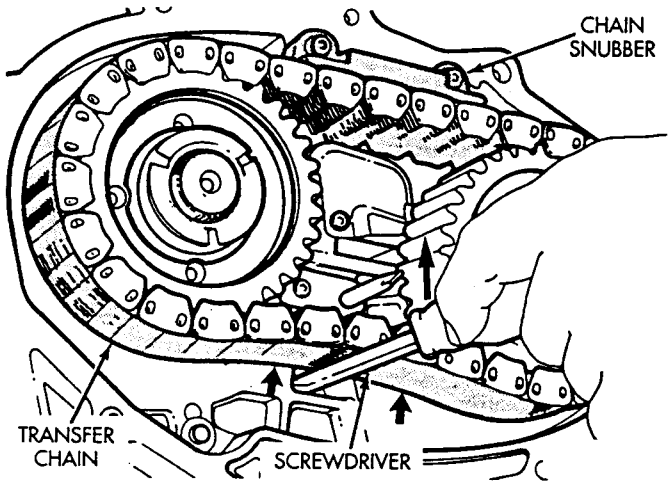


Fig. 3 Screwdriver Placement

(5) Pry the chain up at the center of the chain.

(6) Butt a scale against the snubber and place a second mark on the scale at the bottom of the chain (Fig. 4).

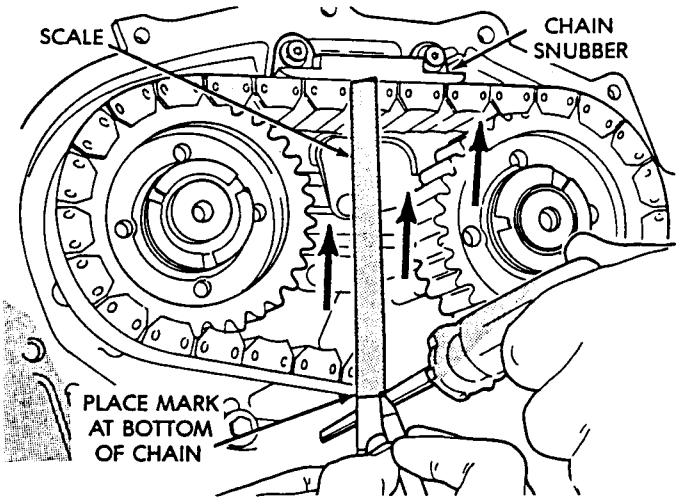


Fig. 4 Chain Measurement

(7) Measure the distance between the two marks placed on the scale (Fig. 5). If the two marks on the scale are more than one inch apart, replace the drive chain.

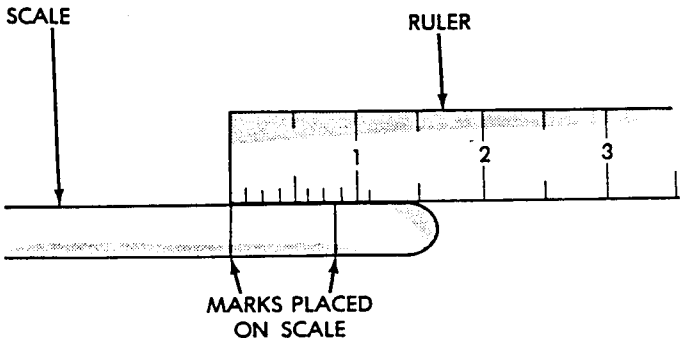


Fig. 5 Measuring Marks on Scale

If the transfer chain was replaced, refer to "Snubber Gap Measurement" in this section to verify correct snubber clearance.

SNUBBER GAP MEASUREMENT

The gap between the snubber face and the top of the chain should be 0.0" to 0.030" inch with chain slack removed. The gap can be adjusted by installing snubbers with different off-set mounting holes. The amount of off-set the mounting holes has will determine the position of the chain snubber.

The snubbers can be identified by their color. There are three different snubber colors available (black, green and tan). The_black snubber will give the most clearance between the chain and the snubber face. The green snubber will give the least clearance between the chain and the snubber face. The tan snubber is the nominal snubber.

(1) Insert screwdriver into the 18 mm hole below the chain and pry up on chain to remove slack in chain.

(2) Using a feeler gauge, measure the gap between the snubber face and the top of the chain (Fig. 6).

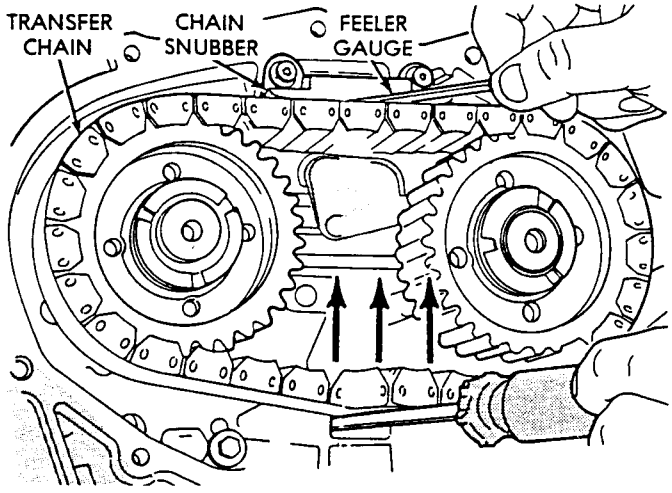


Fig. 6 Chain to Snubber Gap

(3) If the measurement is not within specifications, install the correct snubber as required.

DRIVE SPROCKET HEIGHT ADJUSTMENT PROCEDURE

A spacer beneath the output sprocket is used to position the output sprocket "in line" with the transfer sprocket. The sprocket must be within 0.015" of each other. In order to do this operation, install original spacer over the output shaft. If original spacer is not available, use the thickest available shim as a starting point. Refer to Output Sprocket Spacer Chart for available sizes. Then install the two sprockets without the chain.

The chain sprockets are not reversible. The output sprocket has 32 teeth and the transfer sprocket has 33 teeth. Check the height difference using a straight edge (special tool 6311 or equivalent) and a set of feeler gauges.

If the output sprocket is lower than transfer sprocket, add the amount measured to the shim that was installed during measurement process (Fig. 7).

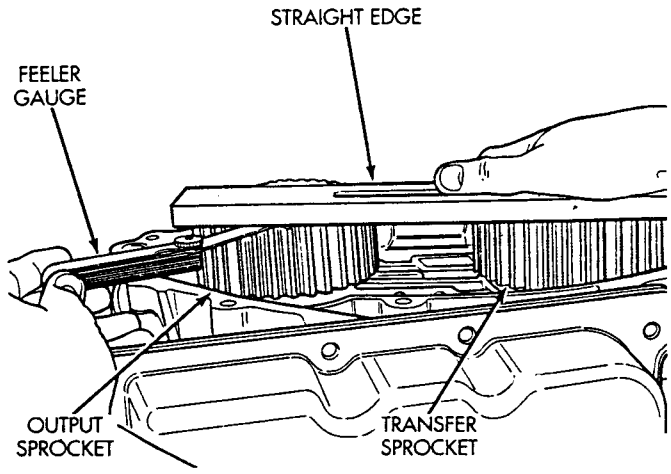


Fig. 7 Checking Sprocket Height

If the output sprocket is higher than transfer sprocket, subtract the amount measured to the shim that was installed during measurement process (Fig. 8).

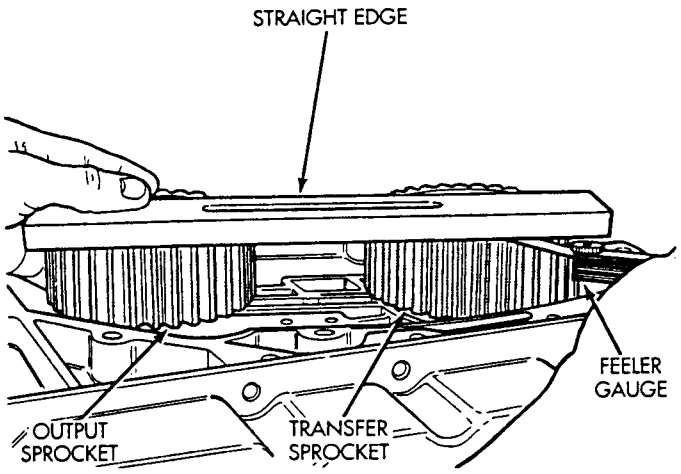


Fig. 8 Checking Sprocket Height

OUTPUT SPROCKET SPACER CHART

2.64 - 2.84	3.48 - 3.68
2.85 - 3.05	3.69 - 3.89
3.06 - 3.26	3.90 - 4.10
3.27 - 3.47	4.11 - 4.31

DIFFERENTIAL RECONDITION

The valve body and solenoid wiring connector must be removed from the transaxle in order to recondition the transaxle differential. The transfer shaft cannot be removed with the valve body in place. Refer to Valve Body Recondition for removal procedure.

If any bearings in the differential require replacement, then all the bearings on the differential carrier and transfer shaft must also be replaced. The differential adjusters must also be replaced when differential bearings are replaced.

DISASSEMBLY

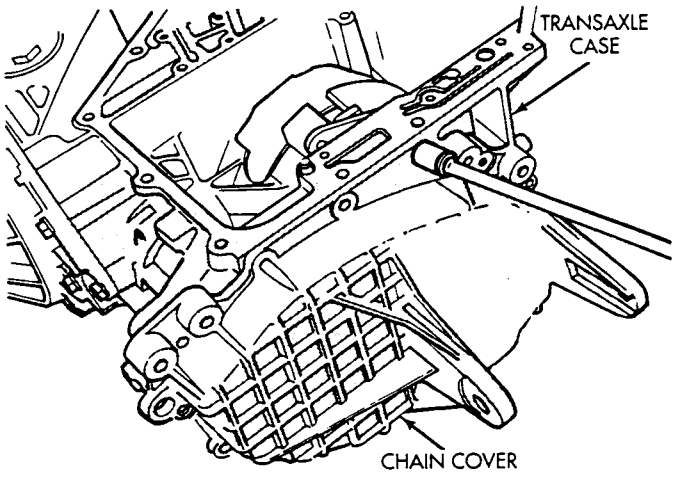


Fig. 1 Remove Chain Cover

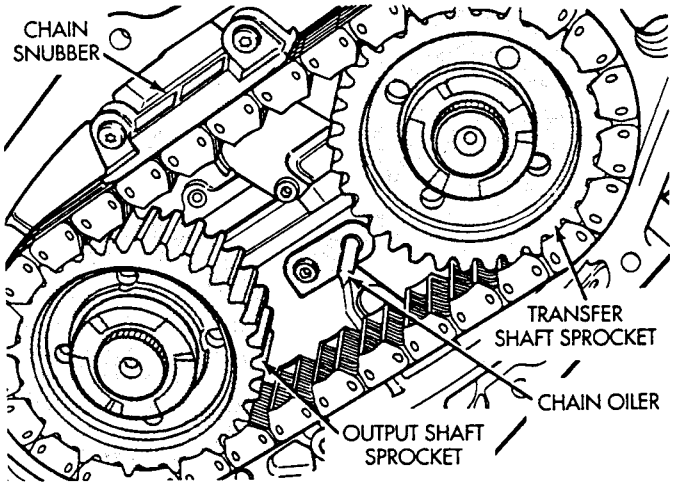


Fig. 2 Remove Chain Oiler

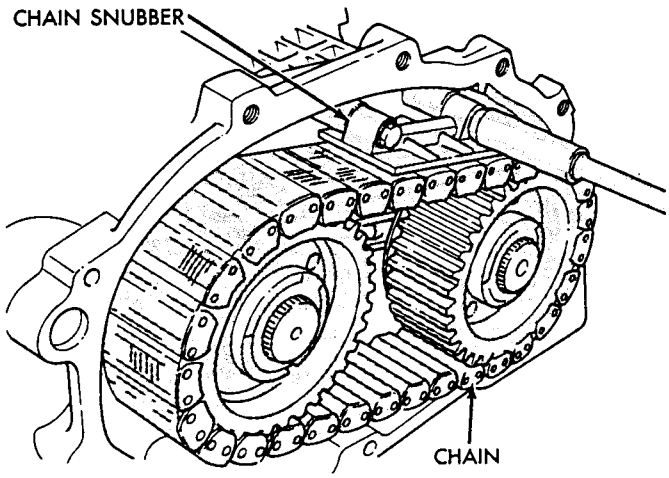


Fig. 3 Remove Chain Snubber

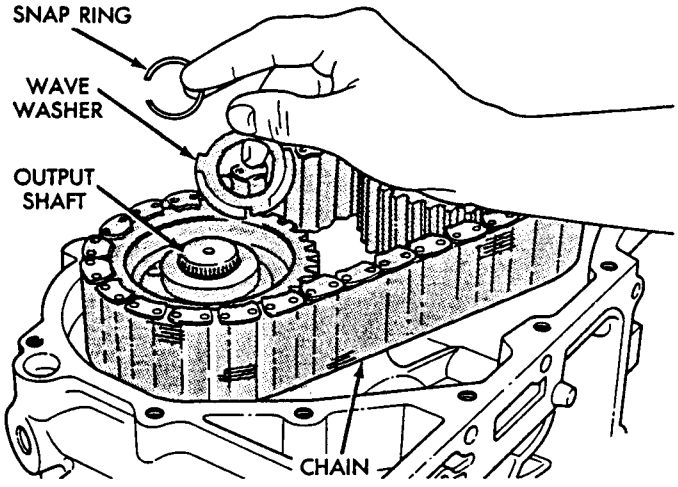


Fig. 4 Remove Output Shaft Sprocket Snap Ring and Wave Washer

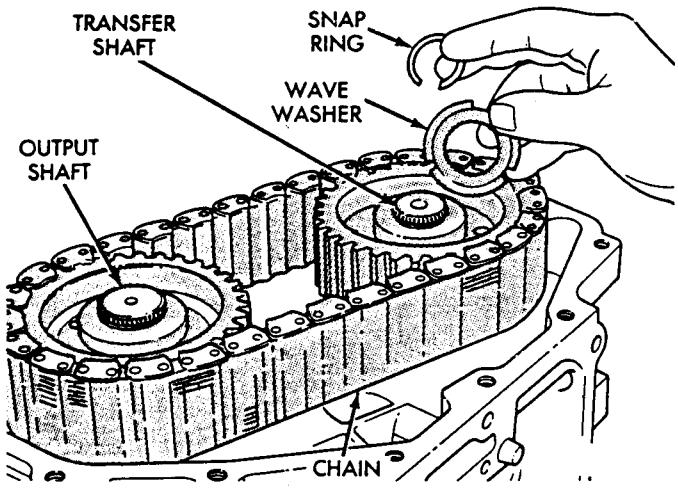


Fig. 5 Remove Transfer Shaft Sprocket Snap Ring and Wave Washer

CAUTION: The chain sprockets have a slip fit onto there shafts. Apply only a slight amount of pressure to the chain spreader to release the chain pressure. If chain sprockets are not spread slightly removal or installation will be difficult. Overspreading of the chain sprocket will also make sprocket removal difficult.

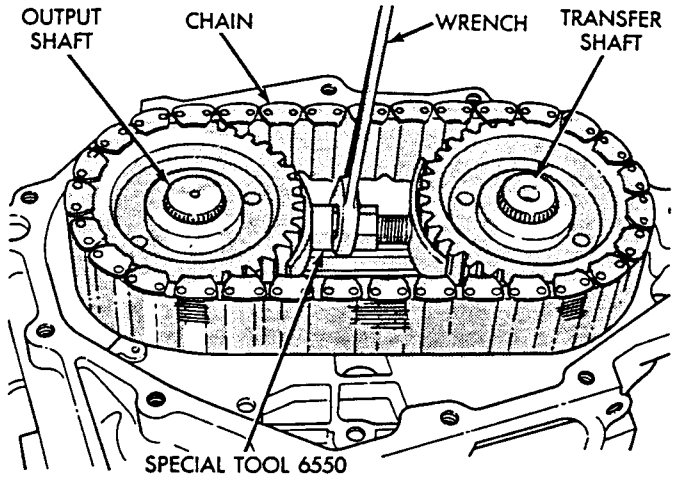


Fig. 6 Install Chain Spreader

CAUTION: When reinstalling drive chain, the blue link must face outward.

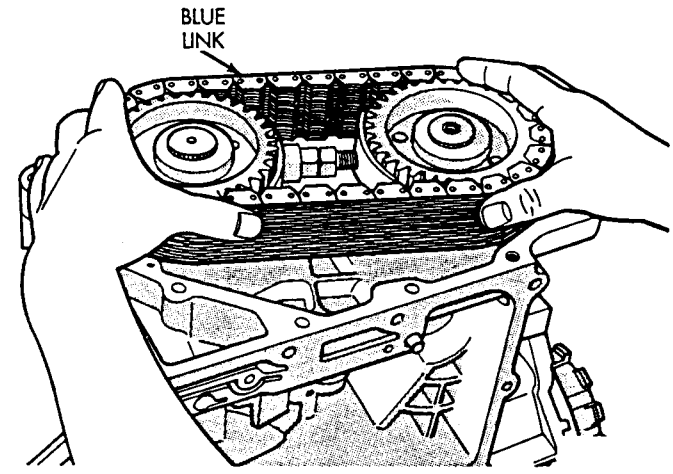


Fig. 7 Remove Chain and Sprockets as an Assembly

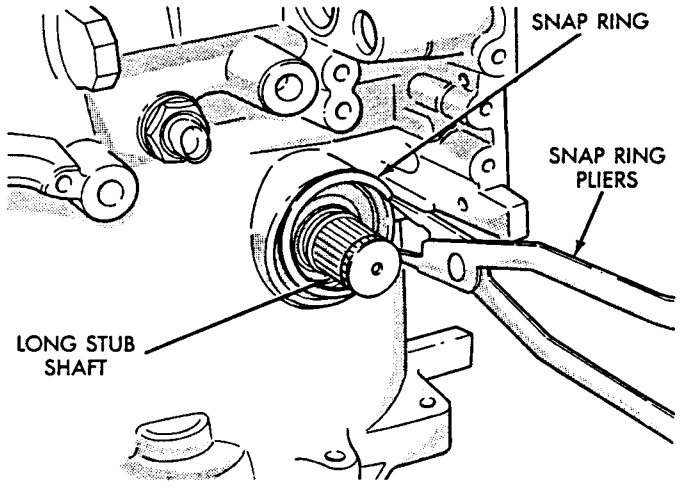


Fig. 8 Remove Long Stub Shaft Snap Ring

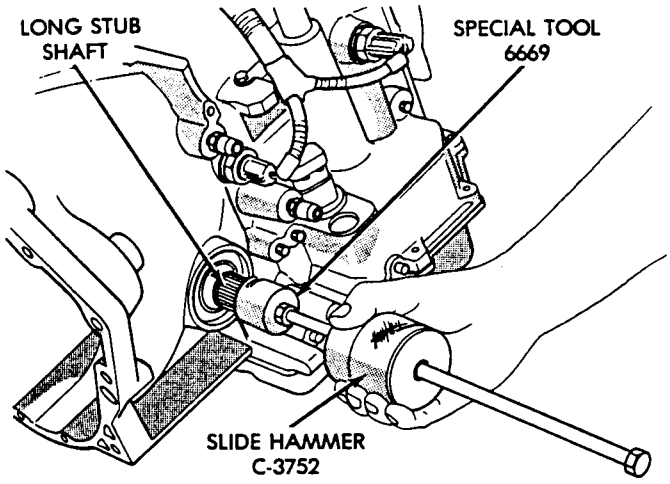


Fig. 9 Remove Long Stub Shaft

CAUTION: Drive shaft retainer clips and seals located on the stub shafts must be replaced before reinstalling drive shafts.

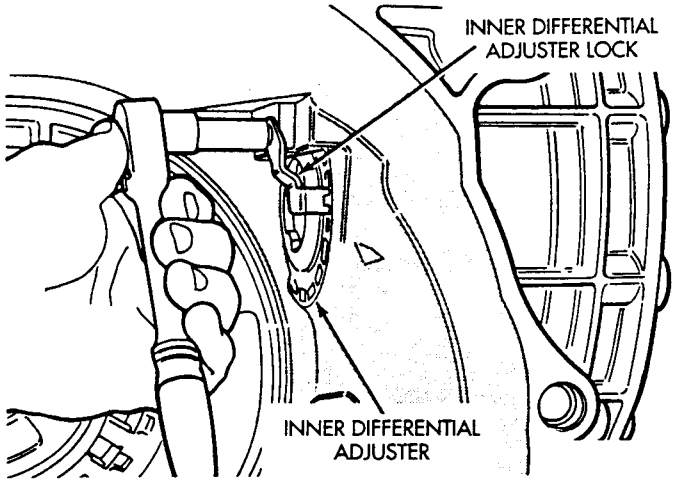


Fig. 10 Remove Inner Differential Adjuster Lock

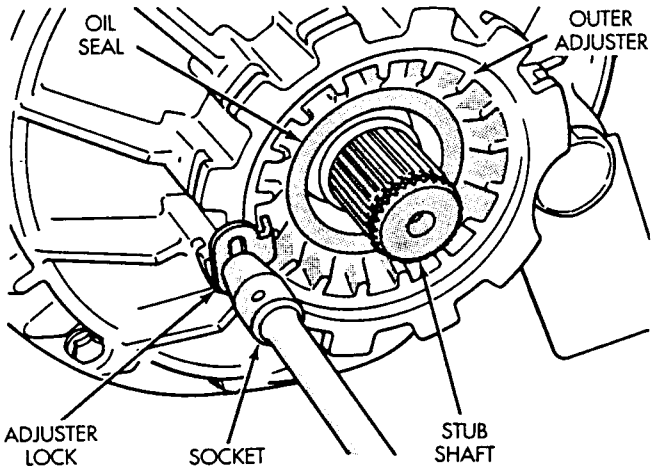


Fig. 11 Remove Outer Adjuster

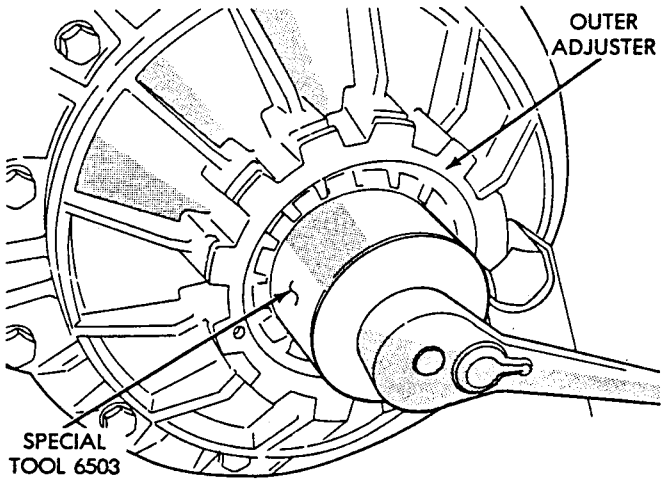


Fig. 12 Loosen Outer Adjuster

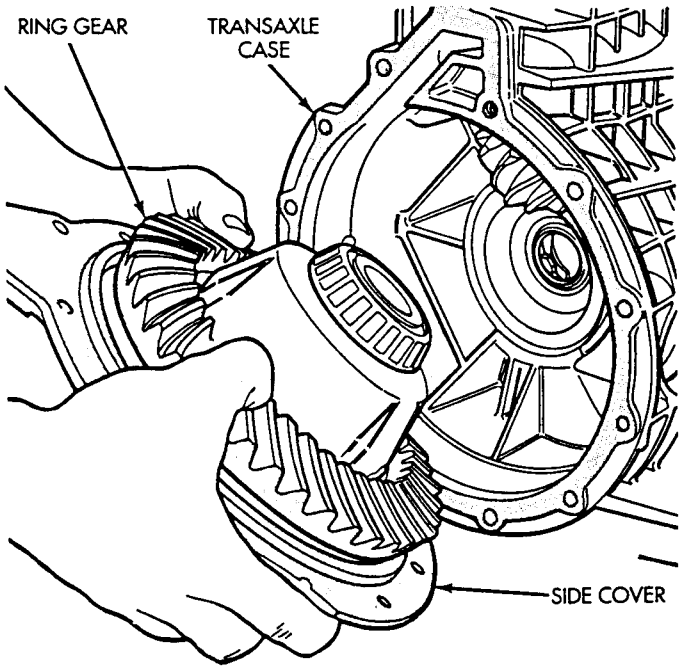


Fig. 13 Remove Differential Side Cover, Carrier and Ring Gear Assembly

If the differential carrier requires reconditioning, refer to "Differential Carrier Recondition".

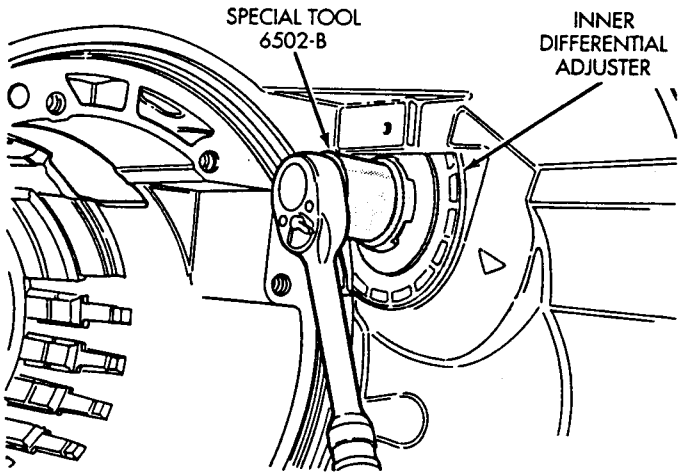


Fig. 14 Remove Inner Adjuster By Turning Clockwise

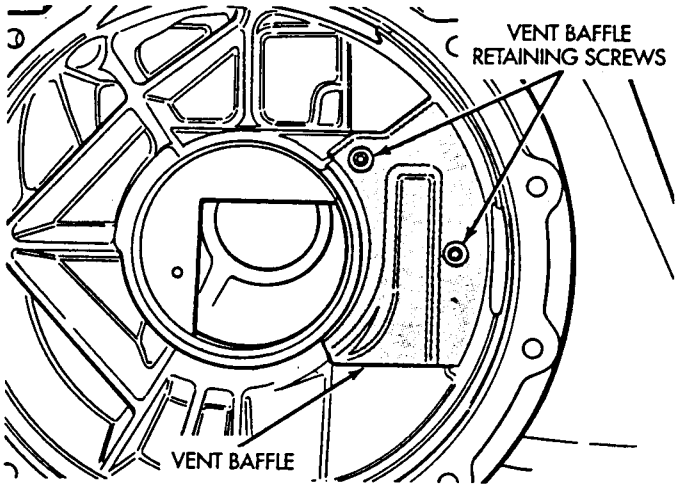


Fig. 15 Remove Differential Vent Baffle

CAUTION: Failure to grind and open stakes on the transfer shaft nut will result in thread damage to transfer shaft during nut removal.

WARNING: WEAR SAFETY GOGGLES WHILE GRINDING STAKE NUTS.

Using a die grinder or equivalent, grind the stakes in the shoulder of the shaft nut as shown in figure 16 and 17. Do not grind through the transfer shaft nut into the shaft. There are two stakes on the nut.

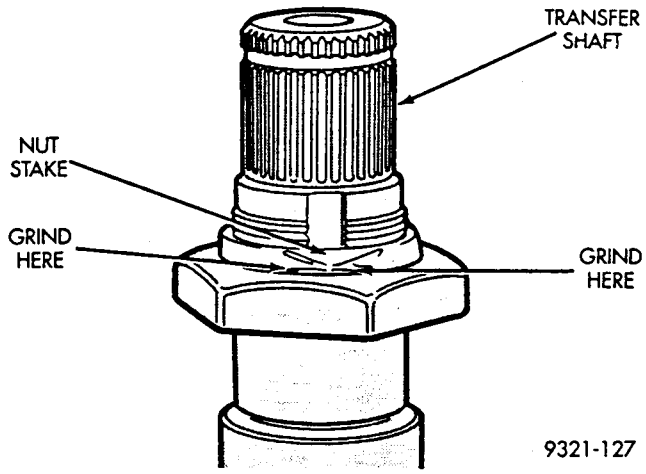


Fig. 16 Grinding Stakes

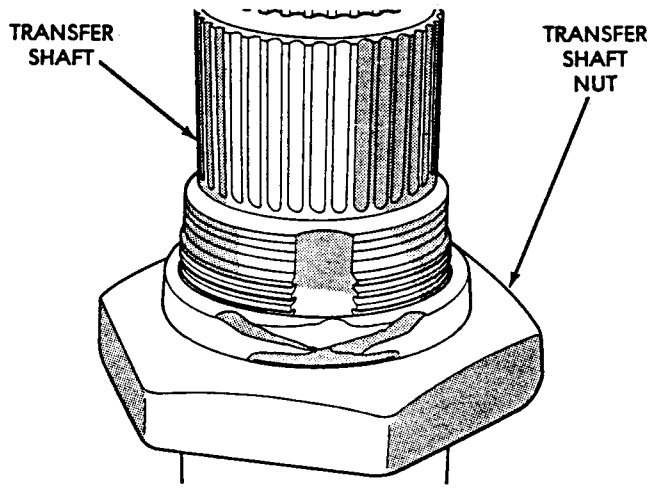


Fig. 17 Stake Grinding Pattern

Using a small chisel, carefully open stakes on nut (Fig. 18)

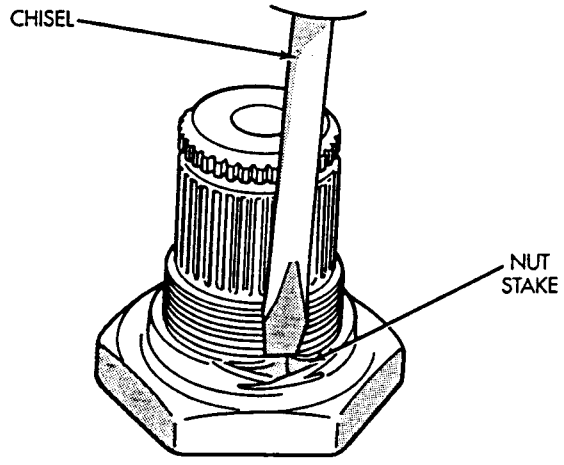


Fig. 18 Opening Nut Stakes

Remove the transfer shaft nut.

CAUTION: Do not reuse old transfer shaft nut because the removed stake weakens the nut flange.

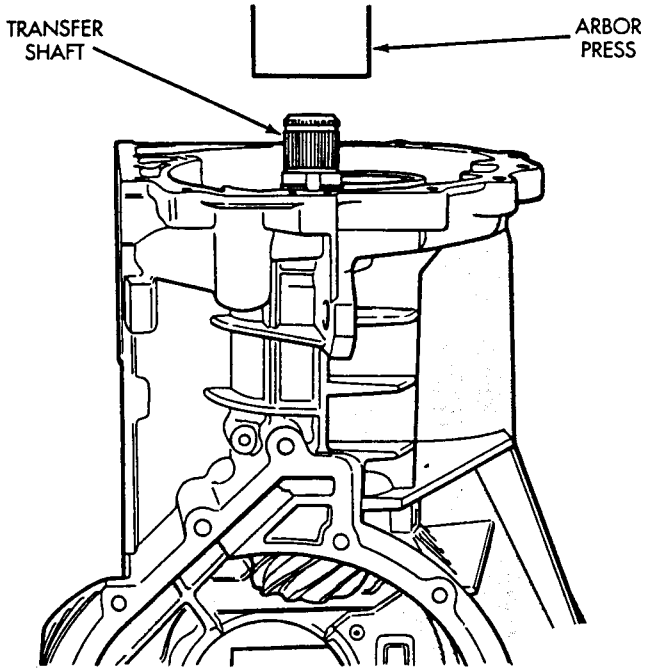


Fig. 19 Press Transfer Shaft Downward to Remove Rear Cone

CAUTION: The transfer shaft cannot be removed from the case at this time.

Install special tool 6577 to remove rear transfer bearing cup (Fig. 20).

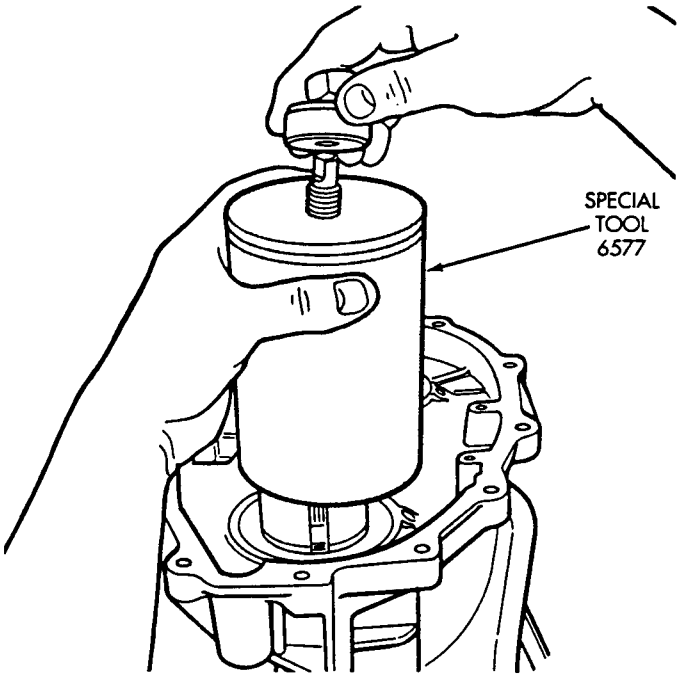


Fig. 20 Transfer Bearing Cup Removal

Remove oil baffle using a pry tool (Fig. 21). The baffle will be destroyed upon removal. Do not reuse original oil baffle.

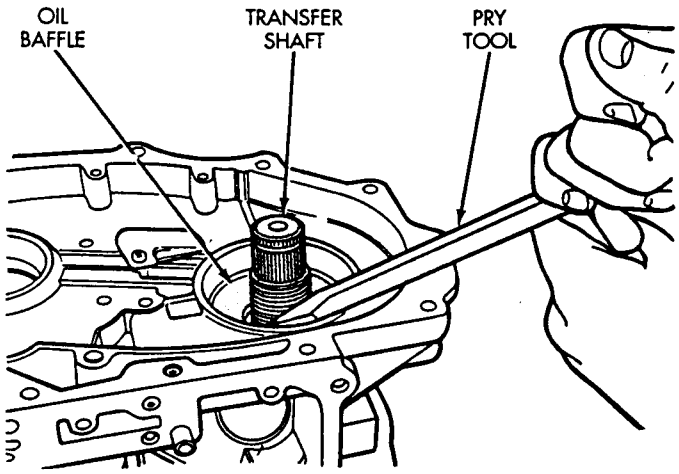


Fig. 21 Oil Baffle Removal

Remove transfer shaft preload shim (Fig. 22). If transfer shaft bearings are to be reused, the original shim must also be reused.

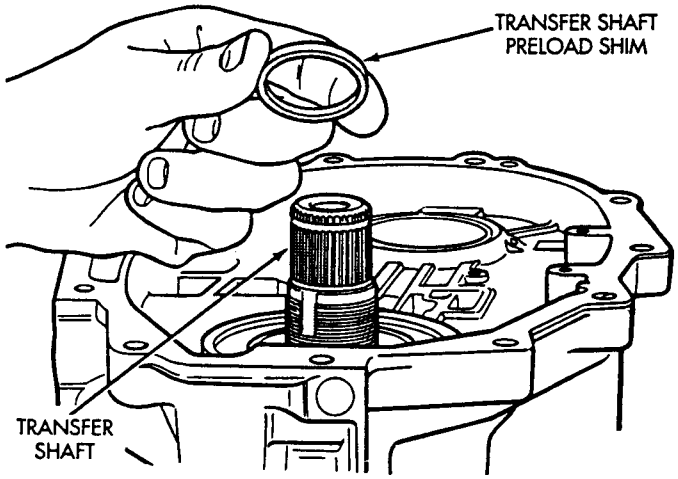


Fig. 22 Preload Shim Removal

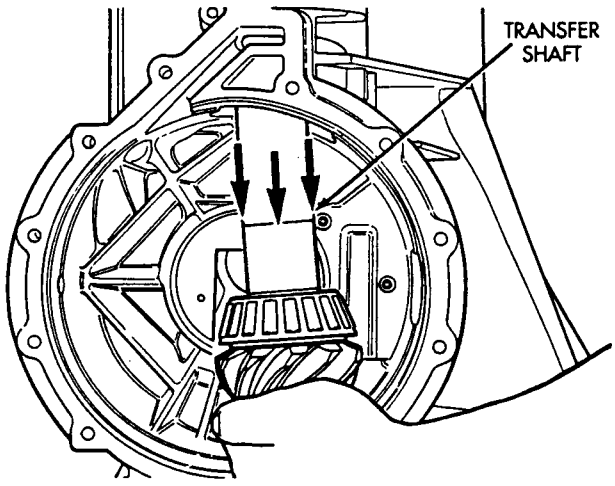


Fig. 23 Remove Transfer Shaft Assembly From Case

CAUTION:If the transfer shaft is removed from the transaxle case for any reason, both seals must be replaced.

Remove transfer shaft seals (Fig. 24) using special tool 6310 and foot 6310-9 (Tar 960). Do not reuse old seals. The seals will be pulled out the rear of the case.

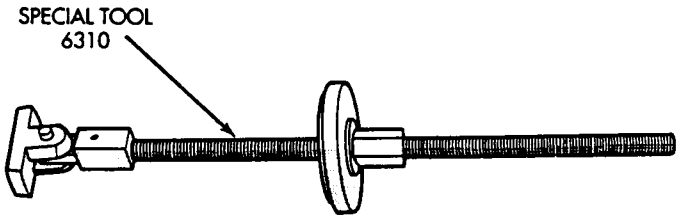


Fig. 24 Transfer Shaft Seal Remover

Remove the front transfer shaft bearing cup using special tool 6495 and handle C-4171 (Fig. 25). Use a press with special tools to remove cup.

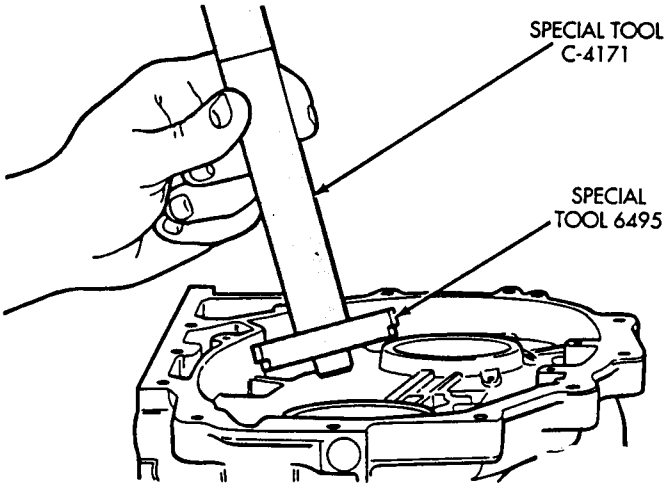


Fig. 25 Front Transfer Shaft Cup Removal

Support special tool P-334 on press table so that pinion head of transfer shaft can be pressed through table (Fig. 26).

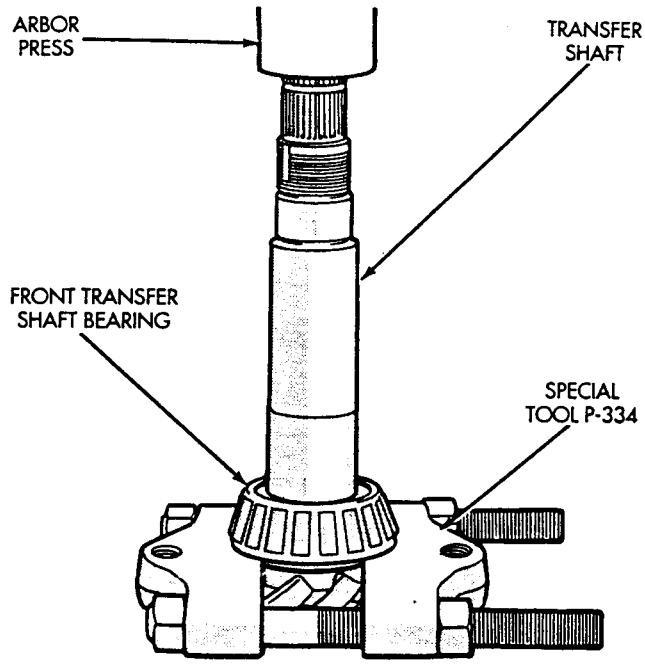


Fig. 26 Remove Front Transfer Shaft Bearing And Pinion Depth Shim

ASSEMBLE AND BEARING ADJUSTMENT PROCEDURE

The following steps will determine the correct shim thickness required to obtain proper pinion depth. All special tools described in this procedure must be used to obtain correct results.

CAUTION: Failure to adjust pinion depth correctly could cause gear noise or transaxle failure.

(1) Install front transfer shaft bearing cup (Fig. 1). The transfer shaft bearing cup must be installed before making pinion depth measurement. Use special tool 6494 to install bearing cup. There are no shims located behind this bearing cup.

CAUTION: The bearing cup is seated in the case correctly if there is no clearance between the bottom of the bearing cup and case. If a 0.001" or 0.002" feeler gauge does not fit, the bearing cup is completely seated into transaxle case.

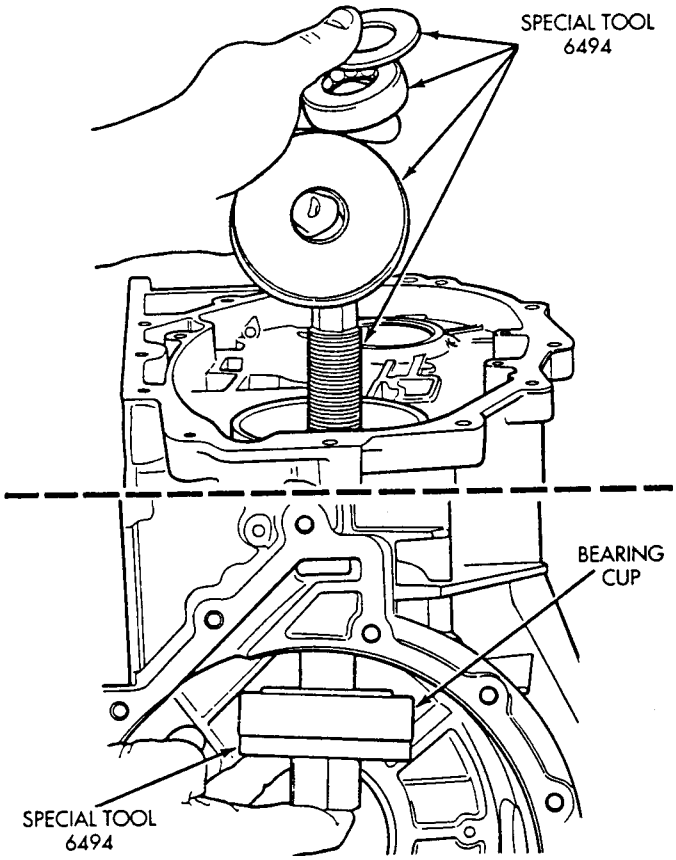


Fig. 1 Install Front Transfer Shaft Cup

(2) Install centering block (special tool 6549-2) into the transaxle case (Fig. 2). Screw centering block into inner adjuster hole of case until it bottoms. The pegs on the special tool are only used for installation. Orientation with in the case is not required.

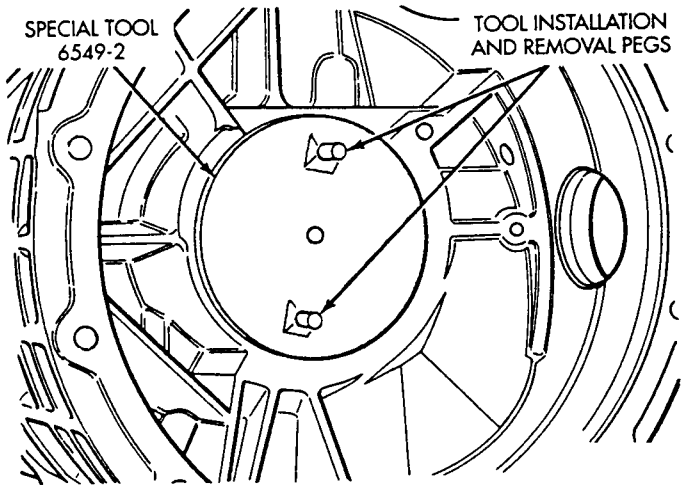


Fig. 2 Installing Centering Block

(3) Install new front bearing (actual bearing to be used during reassembly) onto gauge disc (special tool 6549-3) (Fig. 3).

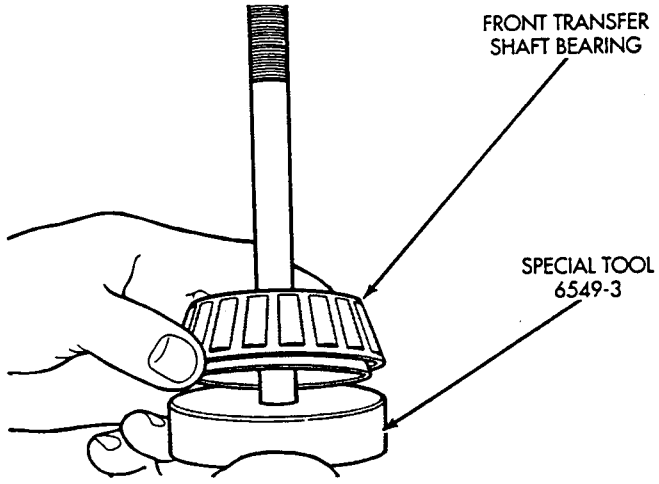


Fig. 3 Gauge Disc and Bearing

(4) Install gauge disc and bearing into case using gauge disc rod (Fig. 4).

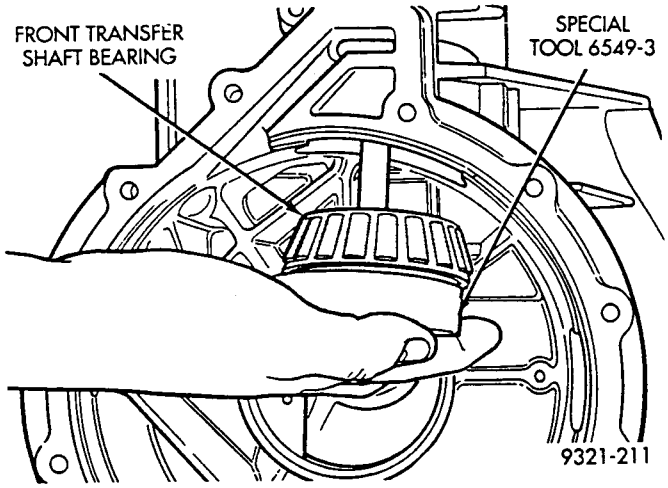


Fig. 4 Installing Gauge Disc with Front Transfer Shaft Bearing

(5) Install centering disc (special tool 6494-2) onto gauge disc rod (Fig. 5).

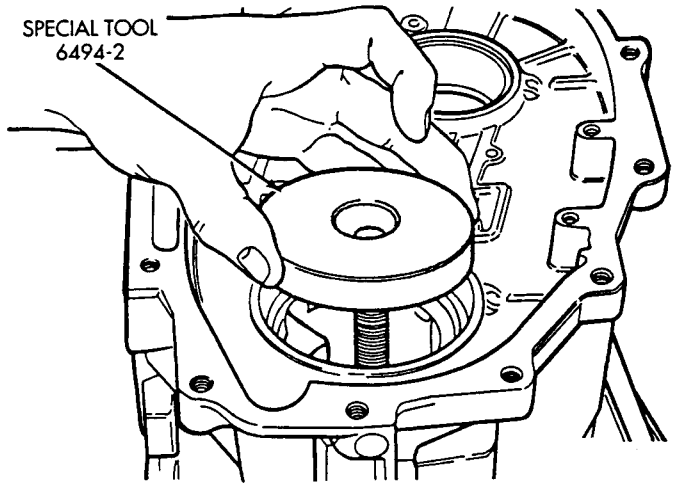


Fig. 5 Disc Installation

(6) Install centering nut as shown in figure 6.

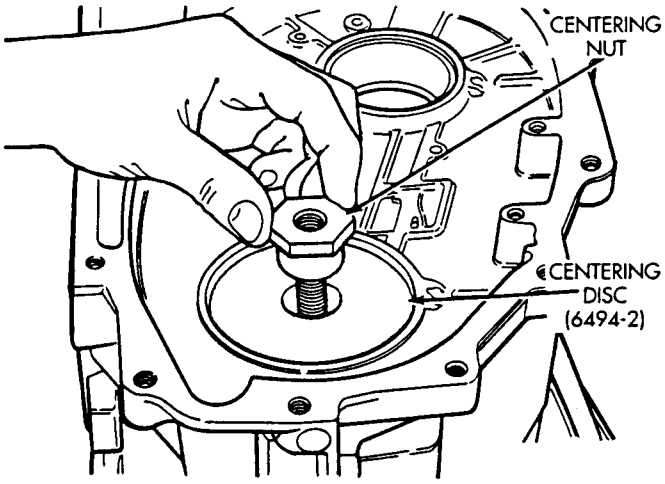


Fig. 6 Installing Centering Nut

(7) Hand tighten centering nut until all play in the tool has been removed.

(8) Install dial indicator into locating block. Then screw extension rod onto dial indicator.

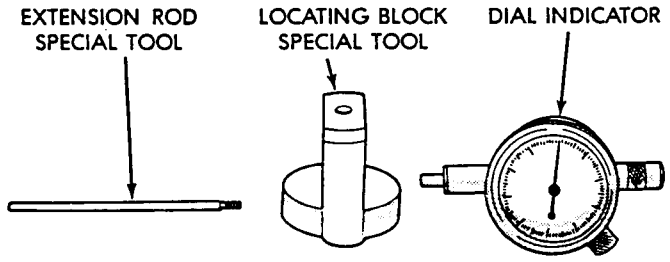


Fig. 7 Dial indicator, Locating Block and Extension Rod

The dial indicator used to make this measurement must have a face that shows 0-50-0 (0.001 inch increments) readings (Fig. 8). All steps from this point forward will reflect this assumption. If the dial indicator being used is a 0-100 reading face, take the reading obtained and subtract it from 100 to obtain proper shim thickness.

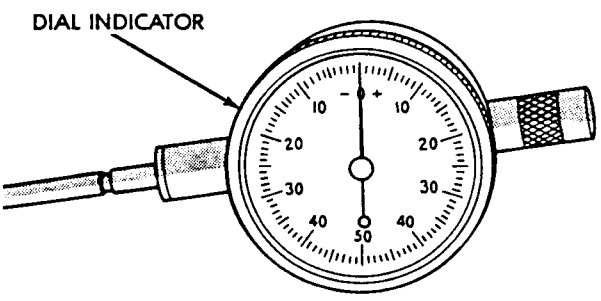


Fig. 8 0-50-0 Dial Indicator

(9) Before making a pinion depth measurement the dial indicator must be zeroed. This is done by placing the dial indicator in the zeroing fixture (special tool 6549-6). Then place the zeroing fixture on a flat surface. Adjust the dial face so that the pointer on the dial indicator lines up with the zero on the dial indicator face (Fig. 9).

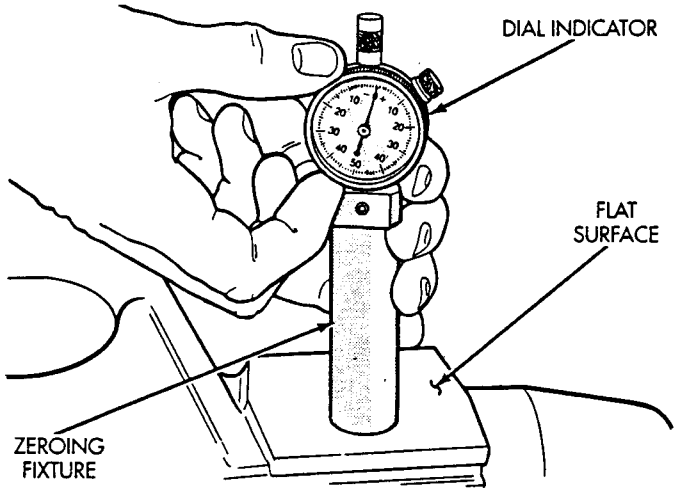


Fig. 9 Zero Dial Indicator

(10) Compress the dial indicator slightly and insert dial indicator pin into centering block (Fig. 10).

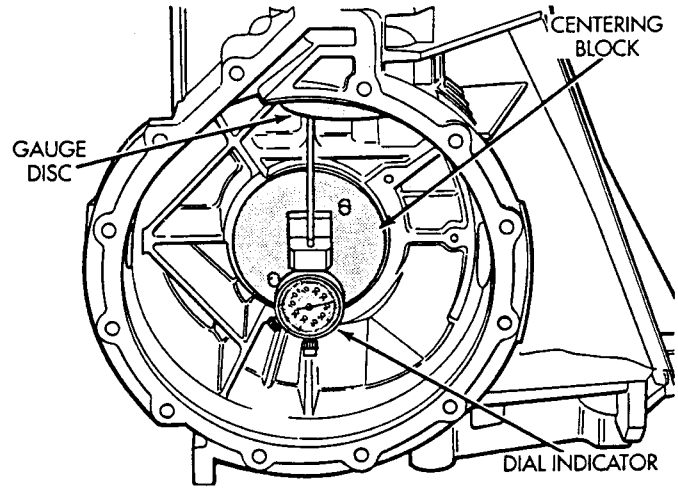


Fig. 10 Mounting Dial Indicator to Centering Block

(11) Pivot dial indicator back and forth (Fig. 11) on centering pin to obtain the shortest distance measurement. **This will be the highest number reading on dial indicator.** Record the number obtained.

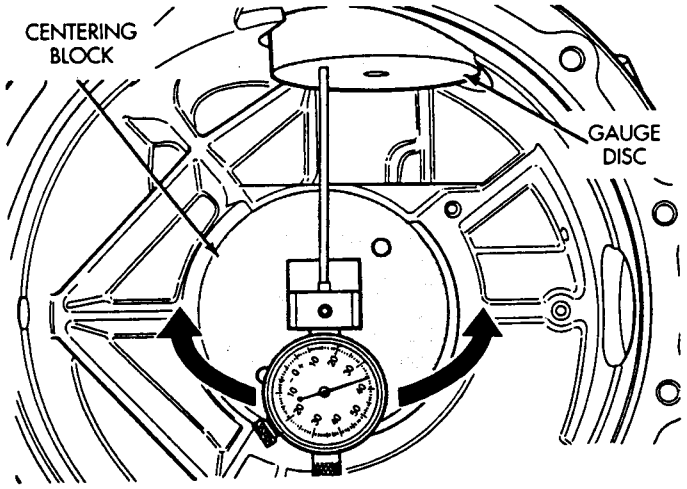


Fig. 11 Pivot Dial Indicator

Now rotate the gauge disc clockwise 1/3 of a turn and recheck readings. Record number obtained. Rotate the gauge disc another 1/3 of a turn clockwise and take another reading. Average of the three reading. **This is the thickness of shim that will be required between the transfer shaft pinion head and the front transfer shaft bearing. (Refer to pinion head shim chart for shim selections.** If the readings differ more than a two thousands recheck gauge disc installation. It may have been installed slightly cocked.

PINION HEAD SHIM CHART

0.681 - 0.707	0.924 - 0.950
0.708 - 0.734	0.951 - 0.977
0.735 - 0.761	0.978 - 1.004
0.762 - 0.788	1.005 - 1.031
0.789 - 0.815	1.032 - 1.058
0.816 - 0.842	1.059 - 1.085
0.843 - 0.869	1.086 - 1.112
0.870 - 0.896	1.113 - 1.139
0.897 - 0.923	

(12) Remove Dial indicator, gauge disc and centering block from transaxle.

(13) Install shim selected in step 9 of this procedure onto the transfer shaft (Fig. 12).

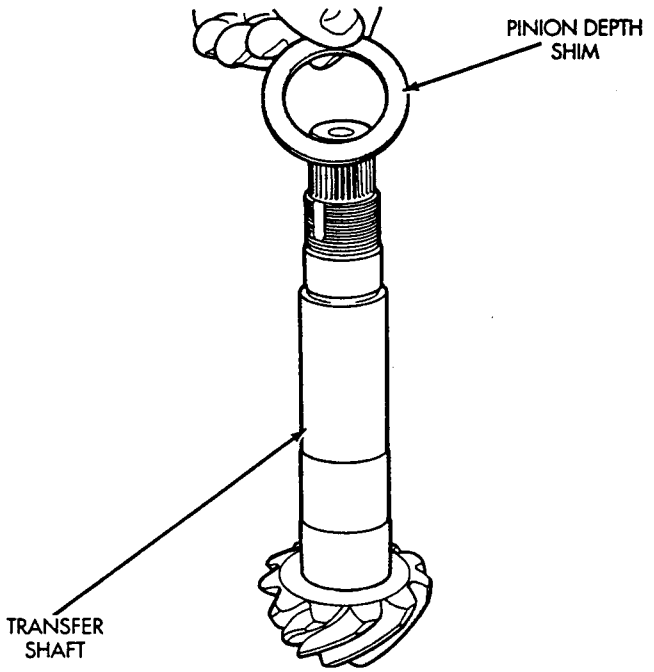


Fig. 12 Shim Installation

(14) Press front transfer shaft bearing onto transfer shaft (special tool 6052). The shim must be in place before pressing on bearing (Fig. 13).

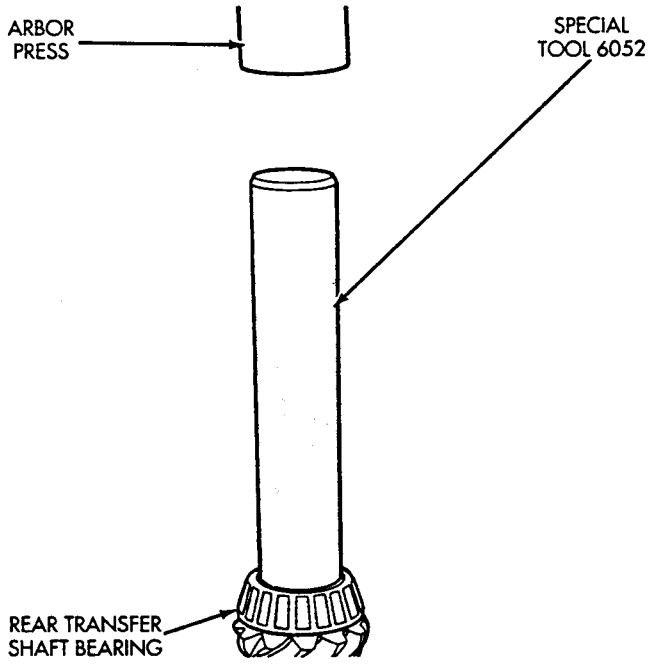


Fig. 13 Bearing Installation

At this point the pinion depth has been determined and the shim has been installed onto the transfer shaft. Before the pinion is installed into the transaxle case, bearing preload must be determined for the differential bearings. The following steps must be performed before the pinion is installed.

The following steps will determine how many foot pounds are required on the outer differential adjuster to obtain the correct differential turning torque.

CAUTION: Failure to set differential bearing preload correctly may cause bearing failure, gear noise and/or axle shaft seal failure.

(15) Remove outer adjuster with special tool 6503 (Fig. 14).

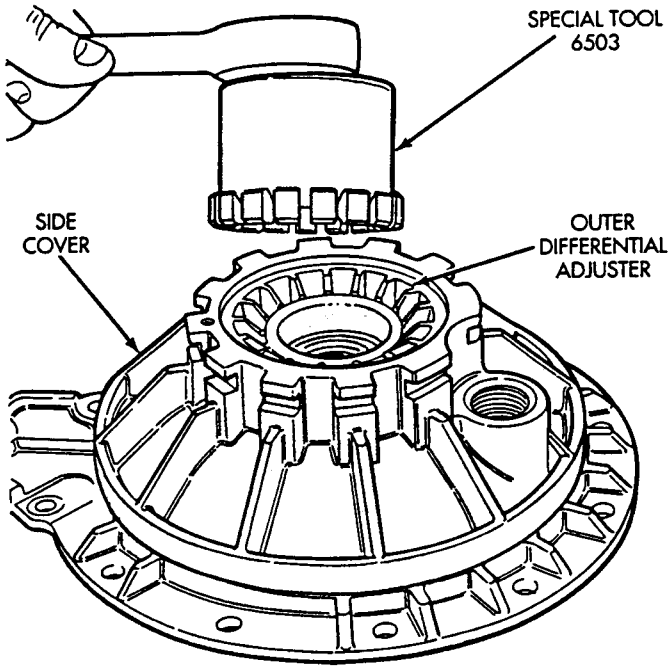


Fig. 14 Outer Adjuster Removal

(16) Remove old stub shaft seals. Press inner adjuster seal out with special tool 6502B. Press outer adjuster seal out with special tool 6558.

(17) Install new stub shaft seals in both adjusters using special tool 6558 (Fig. 15).

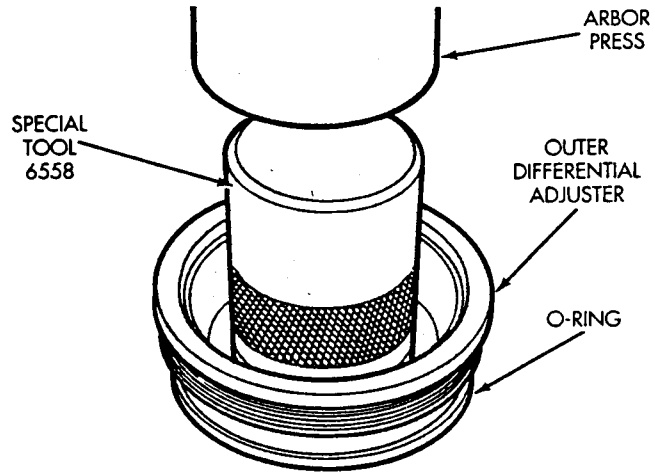


Fig. 15 Axle Shaft Seal Installation

(18) Lube adjuster threads and o-ring with gear oil before installing. Failure to lube threads will result in thread damage to the adjuster and transaxle case.

(19) Screw in the inner adjuster using special tool 6502B (Fig. 16). The inner adjuster should be screwed in until under-flush with inside of the case (viewed from differential side).

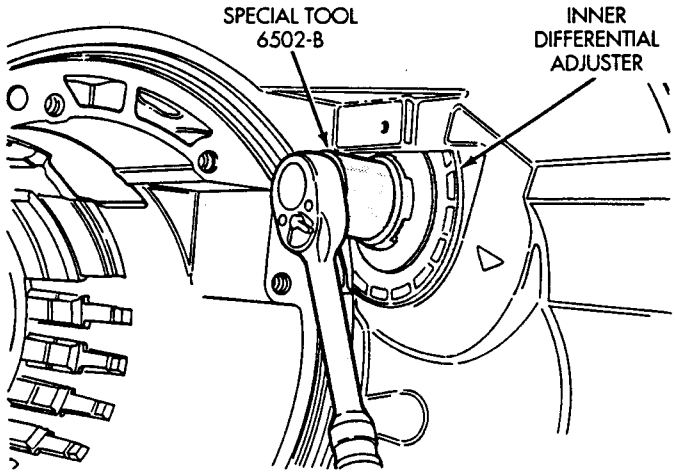


Fig. 16 Inner Adjuster Installation

(20) Install differential assembly into the transaxle case (Fig. 17).

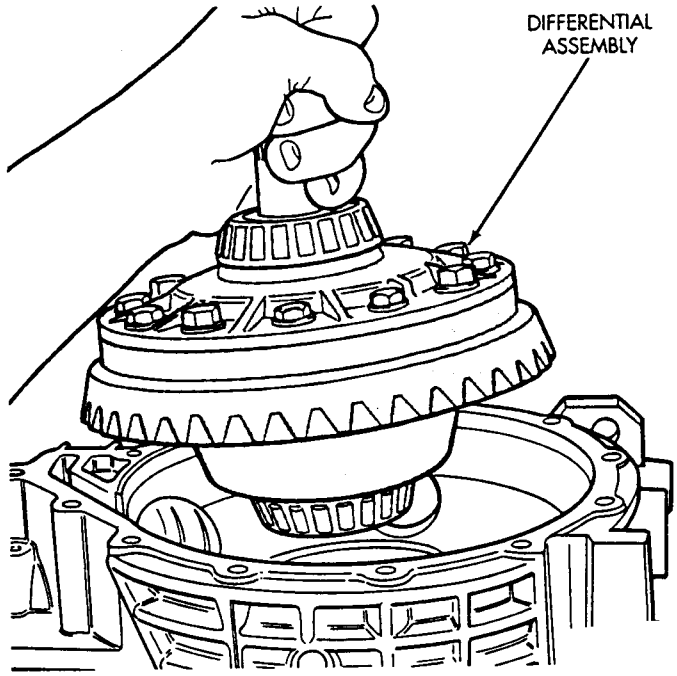


Fig. 17 Differential Assembly Installation

(21) Install differential cover (Fig. 18). Do not apply silicone sealant at this time. All bolts should be installed and tightened.

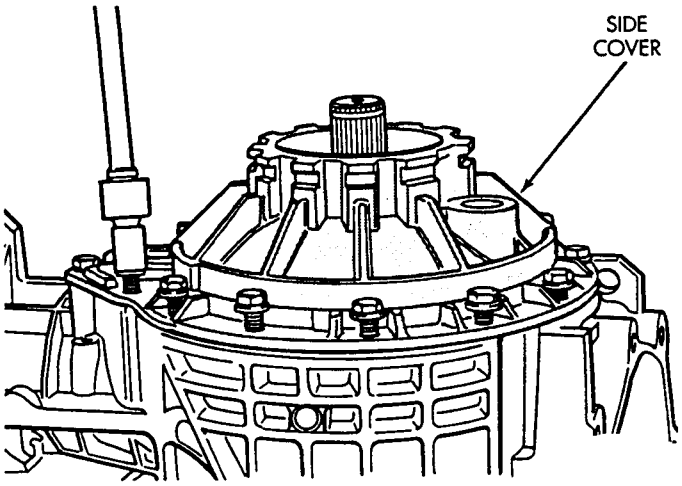


Fig. 18 Differential Cover Installation

(22) Install seal protector (special tool 6591) as shown in figure 19). Apply a thin film of gear oil on the protector.

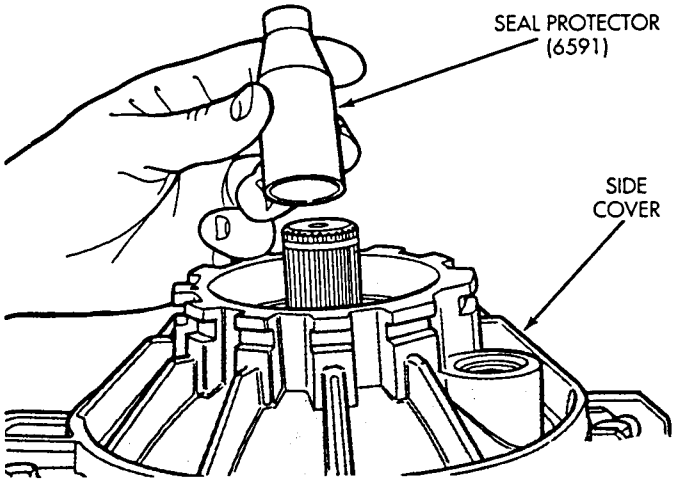


Fig. 19 Seal Protector

CAUTION: Lube threads and o-ring on adjuster before installing. Failure to due so will result in thread damage to the adjuster and transaxle case.

(23) Screw on outer adjuster and tighten adjuster down finger tight (Fig. 20).

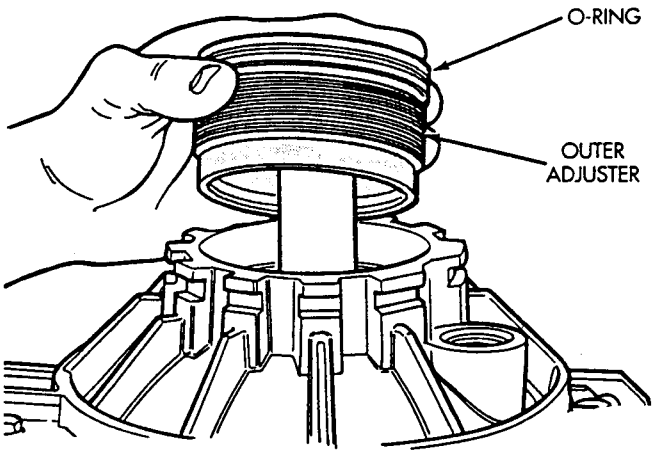


Fig. 20 Outer Adjuster Installation

(24) Insert special tool 6548 (Fig. 21). This tool will be used to check turning torque of the differential assembly.

CAUTION: Differential bearings must be seated before taking turning torque readings. This is done by rotating the differential three or four turns in both directions.

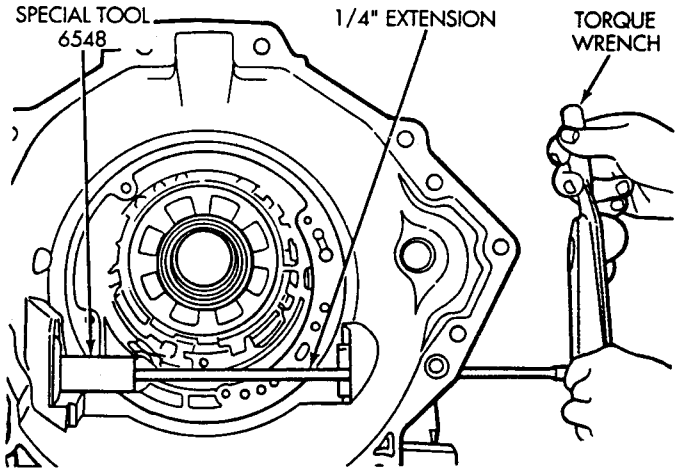


Fig. 21 Special Tool 6548

CAUTION: Turning torque of 19 to 23 in. lbs. can only be obtain when using new bearings. Do not attempt to obtain this turning torque with used bearings.

(25) Tighten outer adjuster with special tool 6503 until 19 to 23 in. lbs. of turning torque are obtained on special tool 6548. **Record how many foot pounds were required on the outer adjuster to obtain the correct turning torque** (Fig. 22). Record the foot pound reading. The reading that you are recording will be used in step 48 of this procedure.

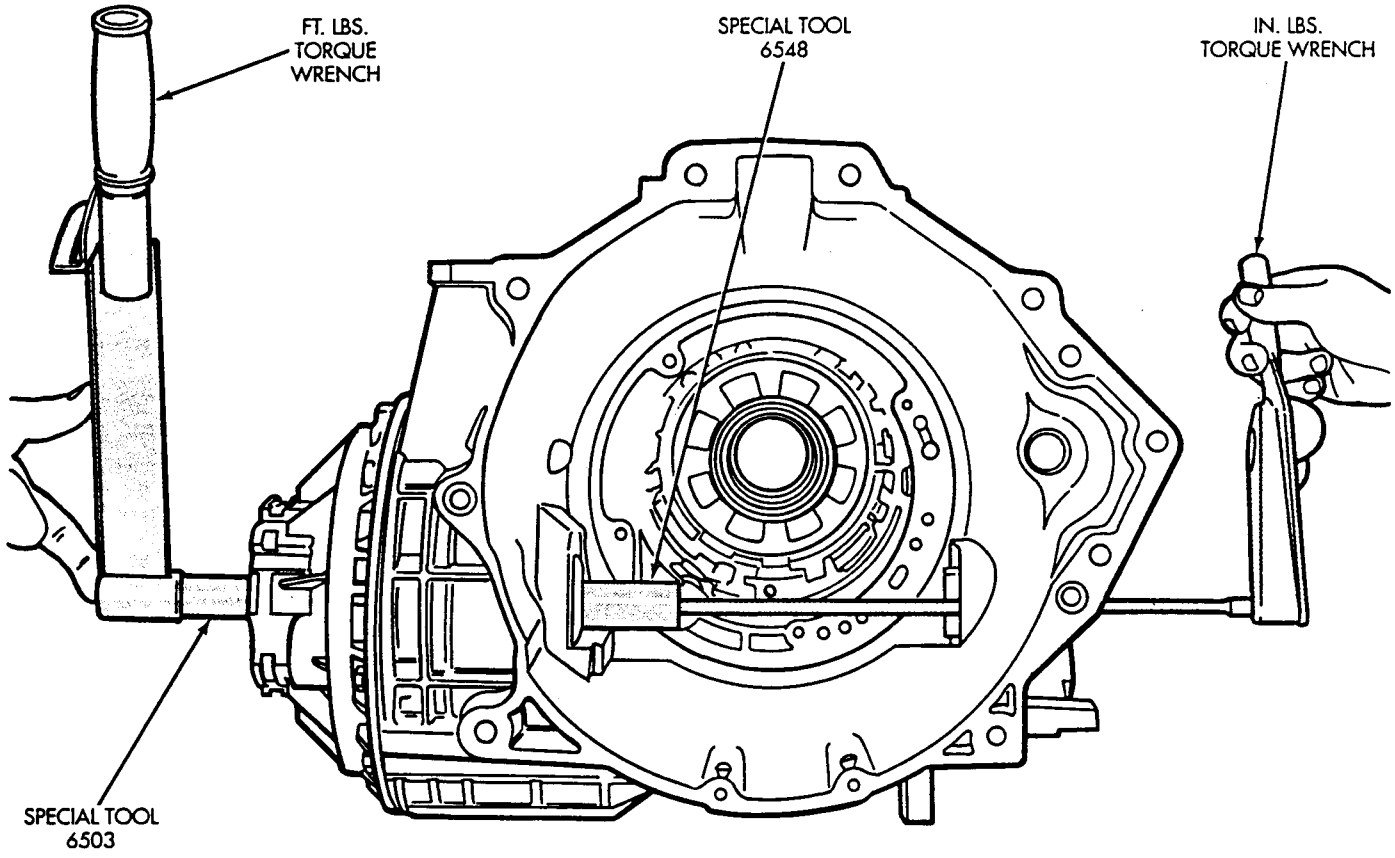


Fig. 22 Determining Turning Torque

(26) Remove the differential cover, differential carrier assembly and inner adjuster.

At this point the amount of torque required on the outer differential adjuster has been determined. The transfer shaft can now be installed into the transaxle case. Perform the following steps to install transfer shaft into transaxle case.

(27) Install transfer shaft into transaxle case (Fig. 23).

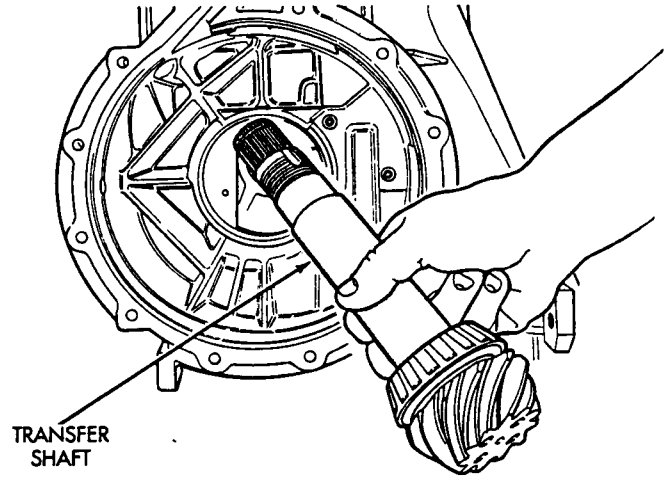


Fig. 23 Transfer Shaft Installation

CAUTION: Bottom of support fixture must be flush with face of bell housing. If the support fixture is not flush, the seals and rear transfer shaft bearing cup will be pressed in cocked.

(28) Install transfer shaft support fixture (special tool 6595) (Fig. 24).

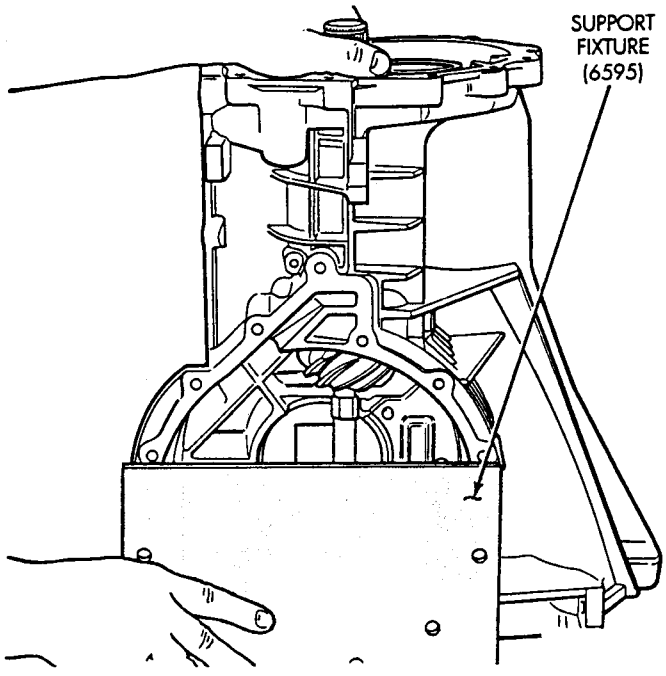


Fig. 24 Transfer Shaft Support Fixture

(29) Install transfer shaft seal protector (special tool 6592) (Fig. 25). Apply thin film of gear oil to protector.

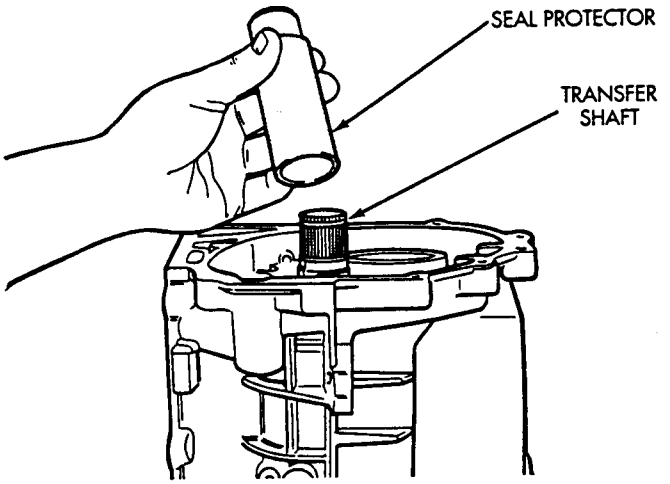


Fig. 25 Seal Protector Installation

(30) Apply a small amount of lube to seal lips and install front transfer shaft seal. The serrated edges must face toward the rear of the transaxle (Fig. 26).

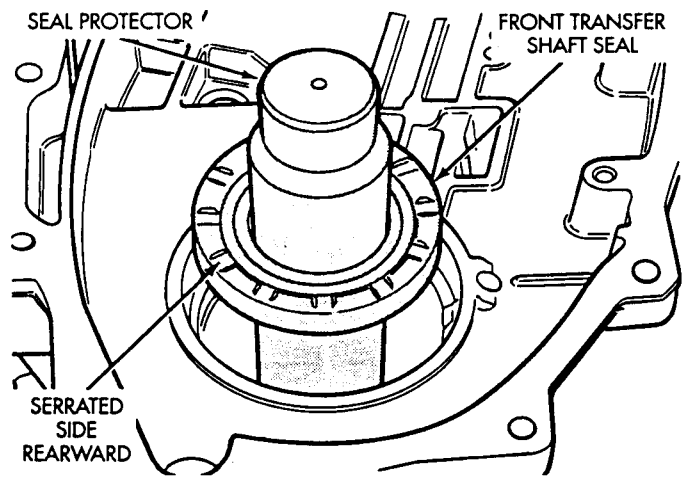


Fig. 26 Correct Seal Orientation

(31) Install seal with special tool 6567A (Fig. 27). Use a press to install seal. The installation tool will set the seal depth. Do not use a hammer to install seal. The seal may be damaged if installed with a hammer.

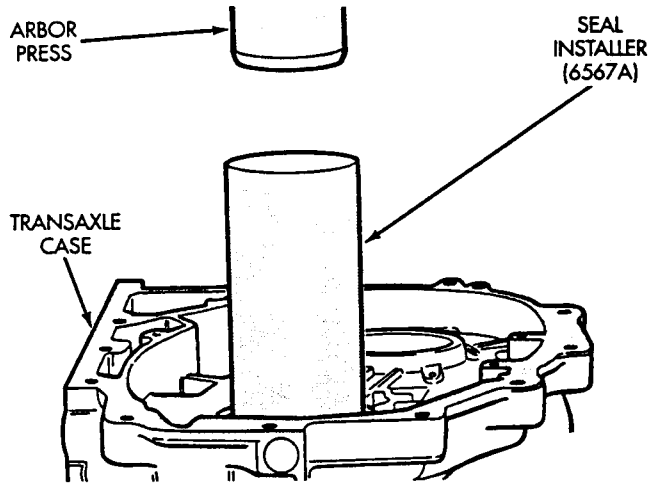


Fig. 27 Seal Installation

(32) Install rear transfer shaft seal. The seal must be installed so that the spring side of the seal faces the installation tool (Fig. 28). Use the same special tool (6567A) to install the seal. The installation tool will set the seal depth. Use a press to install this seal. Do not use a hammer.

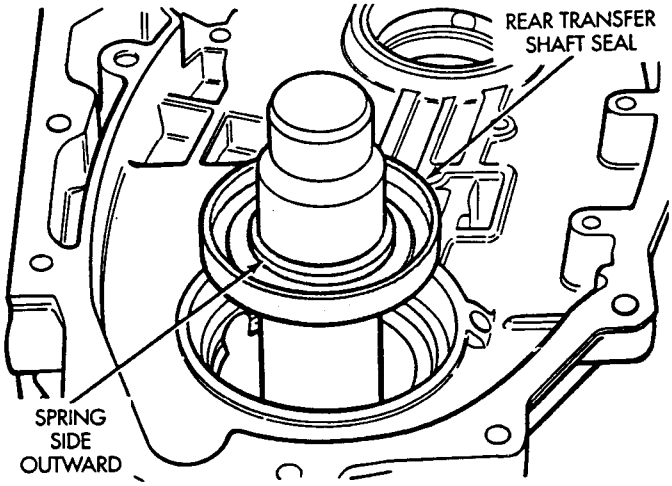


Fig. 28 Correct Seal Orientation

(33) Install oil baffle with special tool 6560 (Fig. 29). Use a hammer and lightly tap in baffle.

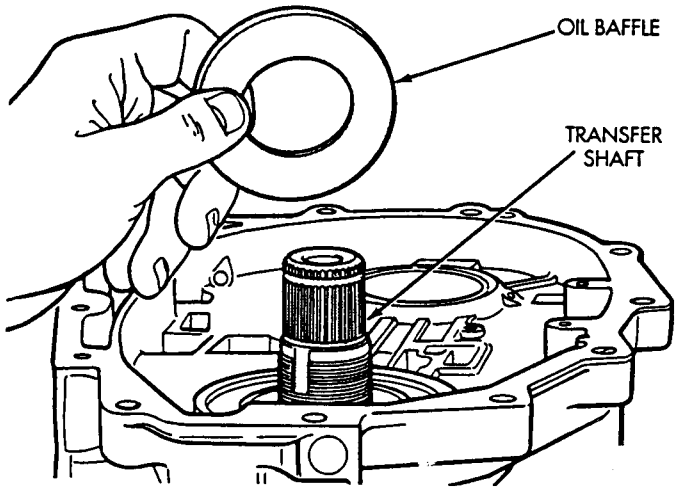


Fig. 29 Oil Baffle Installation

(34) Install rear transfer shaft cup into case (Fig. 30).

CAUTION: Properly seated cups are essential in correctly setting bearing preload.

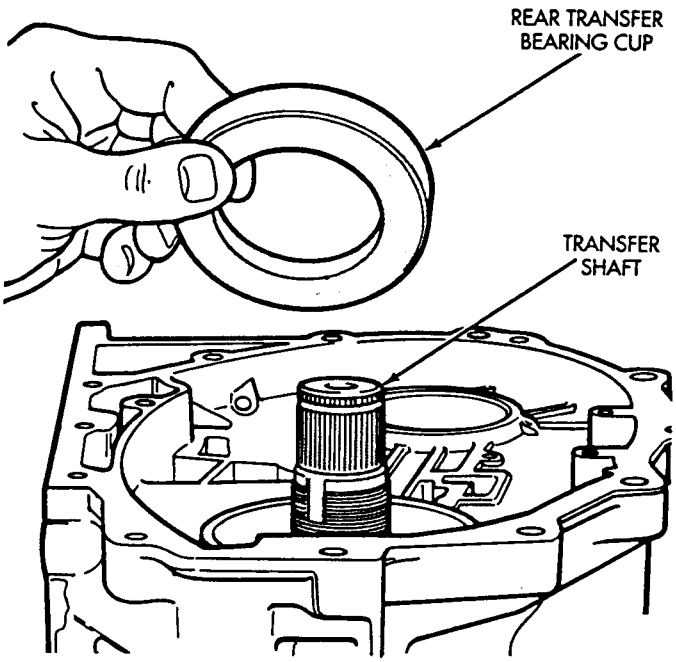


Fig. 30 Rear Transfer Bearing Cup

(35) Use special tool 6560 to press cup into case (Fig. 31).

(36) Install Transfer shaft preload shim (Fig. 32). Use the original shim that was taken out of transaxle if possible. If original shim is not available, use the thickest shim as a starting point. Refer to Transfer Shaft Rear Shim Chart for available sizes.

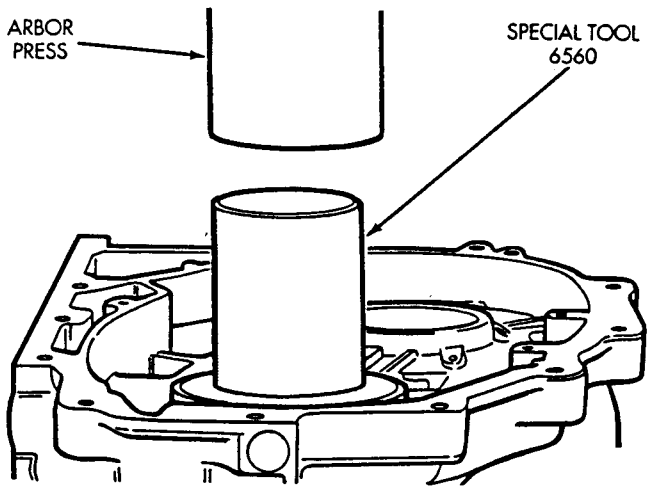


Fig. 31 Rear Transfer Shaft Cup Installation

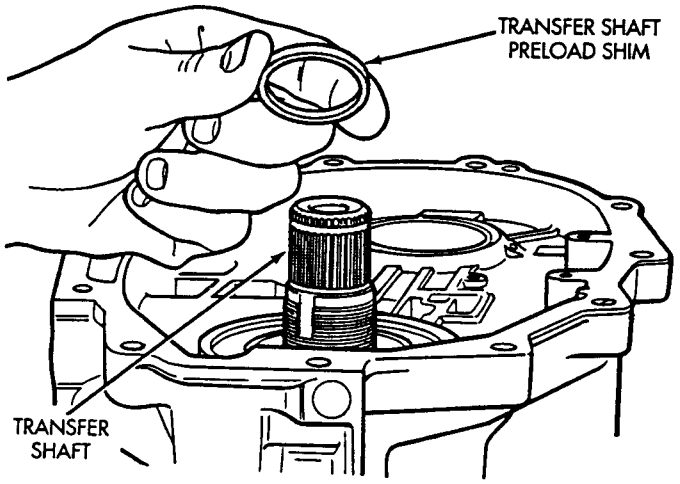


Fig. 32 Transfer Preload Shim Installation

TRANSFER SHAFT REAR SHIM CHART

3.53 - 3.55	4.13 - 4.15
3.56 - 3.58	4.16 - 4.18
3.59 - 3.61	4.19 - 4.21
3.62 - 3.64	4.22 - 4.24
3.65 - 3.67	4.25 - 4.27
3.68 - 3.70	4.28 - 4.30
3.71 - 3.73	4.31 - 4.33
3.74 - 3.76	4.34 - 4.36
3.77 - 3.79	4.37 - 4.39
3.80 - 3.82	4.40 - 4.42
3.83 - 3.85	4.43 - 4.45
3.86 - 3.88	4.46 - 4.48
3.89 - 3.91	4.49 - 4.51
3.92 - 3.94	4.52 - 4.54
3.95 - 3.97	4.55 - 4.57
3.98 - 4.00	4.58 - 4.60
4.01 - 4.03	4.61 - 4.63
4.04 - 4.06	4.64 - 4.66
4.07 - 4.09	4.67 - 4.69
4.10 - 4.12	

(37) Install rear transfer shaft cone (Fig. 33). Press cone on transfer shaft using special tool 6560.

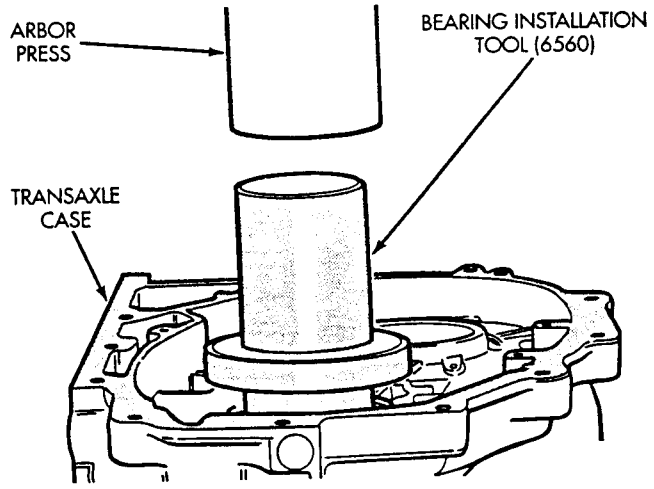


Fig. 33 Transfer Shaft Cone Installation

(38) Remove transfer shaft support fixture (special tool 6595).

CAUTION: Always use a new transfer shaft nut. Do not reuse old transfer shaft nut.

(39) Install a new transfer shaft nut (Fig. 34). Tighten nut to 271 N•m (200 ft. lbs.). Use special tools 6497 holder and 6498 shaft socket to tighten nut.

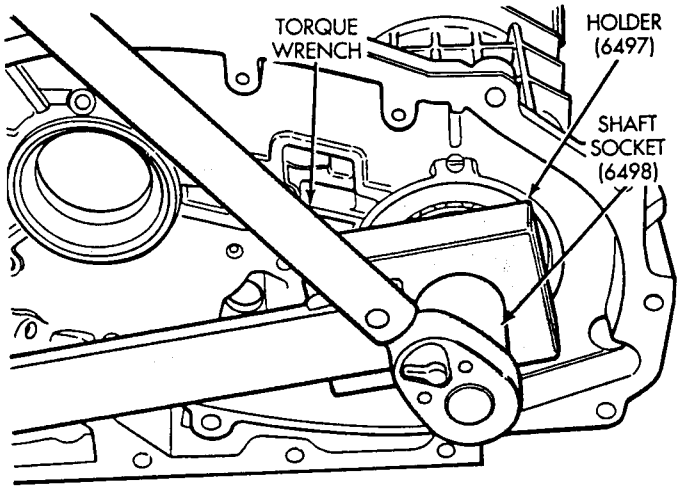


Fig. 34 Transfer Shaft Nut Installation

CAUTION: Failure to set the transfer shaft turning torque correctly may cause transfer shaft bearings or seals to fail. Be sure transfer shaft does not have end play. If end play exists, install a thinner preload shim.

(40) Check the turning torque of the transfer shaft using a torque wrench (Fig. 35). The turning torque should be 0.5 to 1.3 N•m (5 to 12 in. lbs.). If the turning torque is too high, install a thicker transfer shaft preload shim. If the turning torque is too low, install a thinner transfer shaft preload shim.

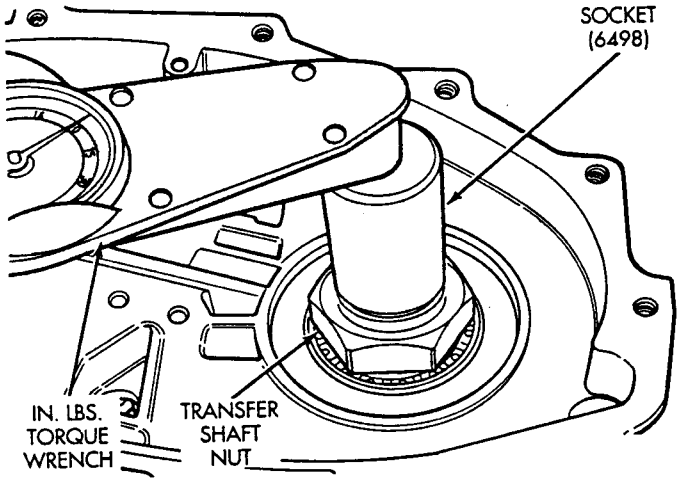


Fig. 35 Checking Turning Torque

(41) After the correct turning torque is obtained, use special tool 6589 to stake the new transfer shaft nut (Fig. 36). Be sure that the tool arms line up with slots in the transfer shaft. Use a press with the special tool to make the stakes in the nut.

CAUTION: A press and special tool 6589 must be used when staking the transfer shaft nut. Do not use a hammer and the special tool to stake nut. If a hammer is used seal, bearing and/or tool damage may result. Also the stake will not be seated against the shaft correctly. This will allow the nut to loosen.

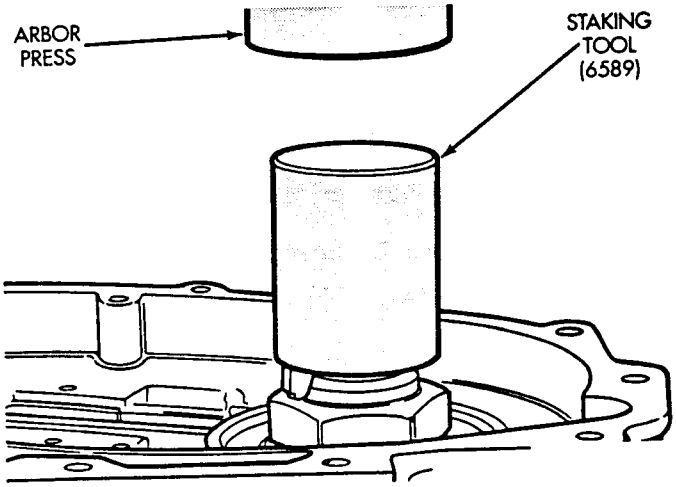


Fig. 36 Staking New Nuts

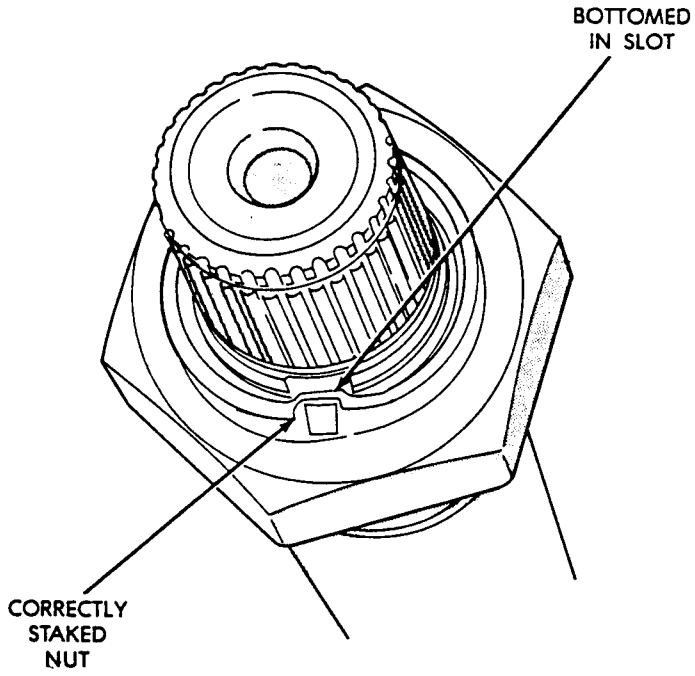


Fig. 37 Correctly Staked Nut

CAUTION: Failure to stake the transfer shaft nut correctly may allow the nut to loosen during transaxle operation. This will cause transaxle failure.

At this point the transfer shaft, new oil seals, pinion depth and transfer shaft pre-load have been set. The following steps will set the backlash between the transfer shaft and the ring gear.

If the differential requires reconditioning, refer to "Differential Carrier-Recondition".

(42) Install vent baffle. Apply sealer as shown in figure 38.

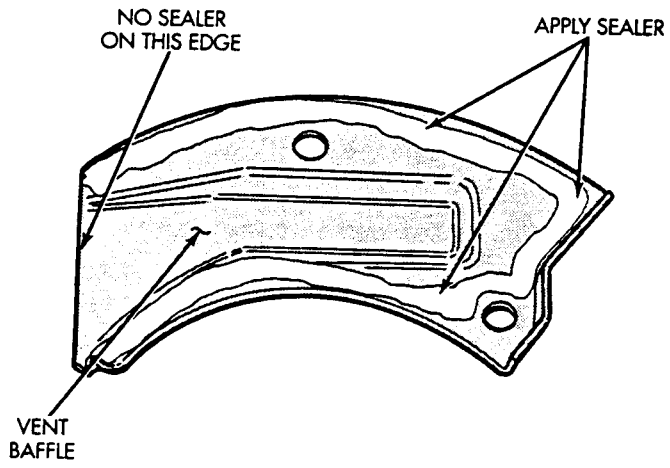


Fig. 38 Baffle Installation

(43) Install new inner adjuster o-ring. Lube inner adjuster threads and o-ring. Then install inner adjuster flush with differential side of case.

(44) Install differential assembly (with ring gear attached) into transaxle case (Fig. 39).

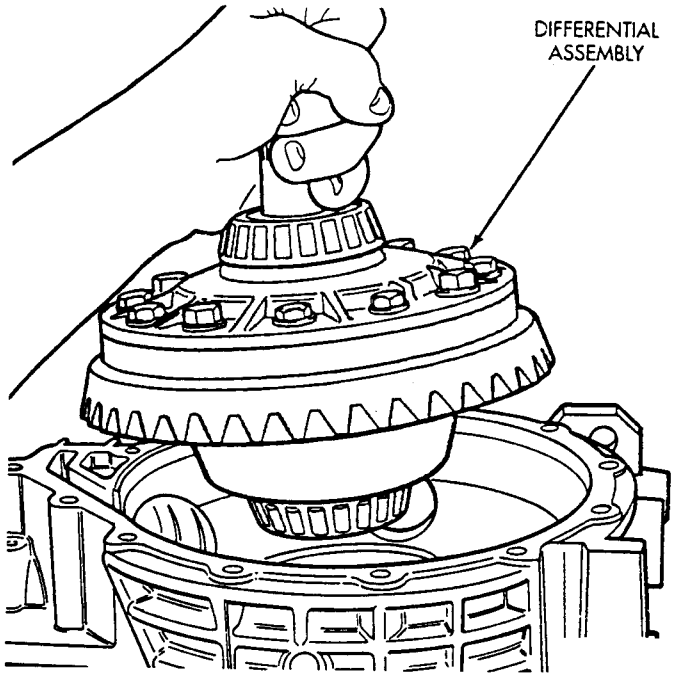


Fig. 39 Differential Assembly Installation

(45) Transfer shaft to ring gear backlash should be 0.006" to 0.009" thousands of an inch. To get the backlash close enough to measure, perform the following steps. Hold the transfer shaft with one hand and rock the ring gear back and forth (Fig. 40). You should feel some backlash between the gears. If no backlash is felt use special tool 6502B to turn the inner adjuster so that it raises the differential assembly. This will increase backlash. If there is to much backlash, use special tool 6502B to turn the inner adjuster so that it lowers the differential assembly. This will decrease backlash. Recheck the backlash after each adjustment.

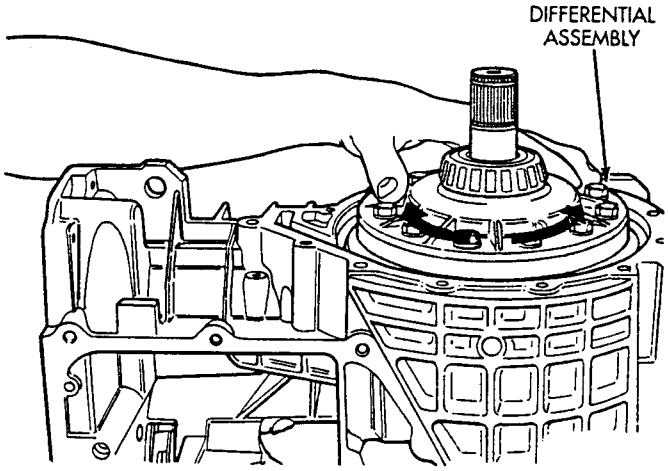


Fig. 40 Rocking Ring Gear Back and Forth

(46) Apply a 1/8 inch bead of sealant to differential cover flange. Then install differential cover with sealant (Fig. 41) and tighten cover bolts.

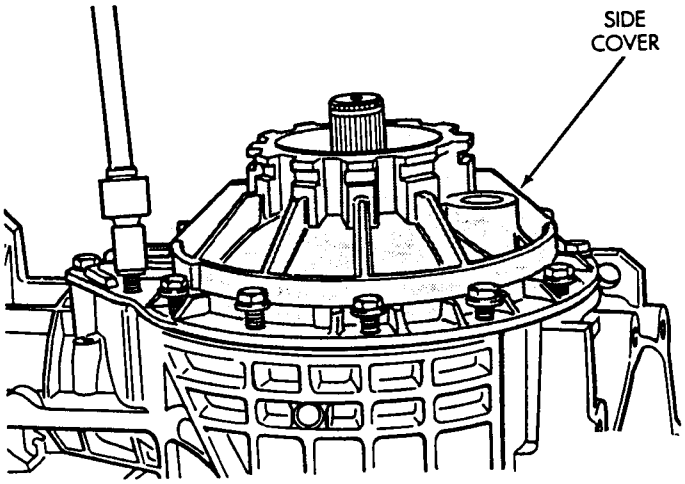


Fig. 41 Differential Cover Installation

(47) Install seal protector (special tool 6591) on shaft (Fig. 42).

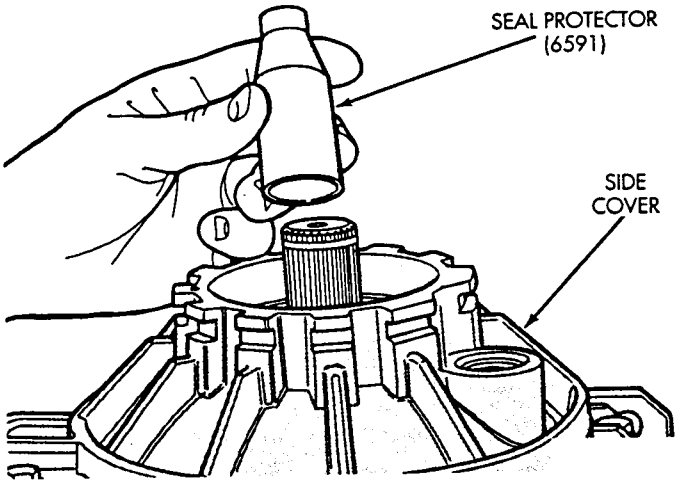


Fig. 42 Seal Protector

CAUTION: Lube threads and o-ring on adjuster before installing. Failure to due so will result in thread damage to the adjuster and differential cover.

(48) Install outer adjuster with new o-ring (Fig. 43). Torque the outer adjuster (special tool 6503) to the torque reading recorded in step 25. Then seat bearings by turning differential three or four revolutions in both directions. Tighten adjuster a second time to same torque recorded in step 25. Again reseat bearings. Repeat this sequence until correct adjuster torque is maintained.

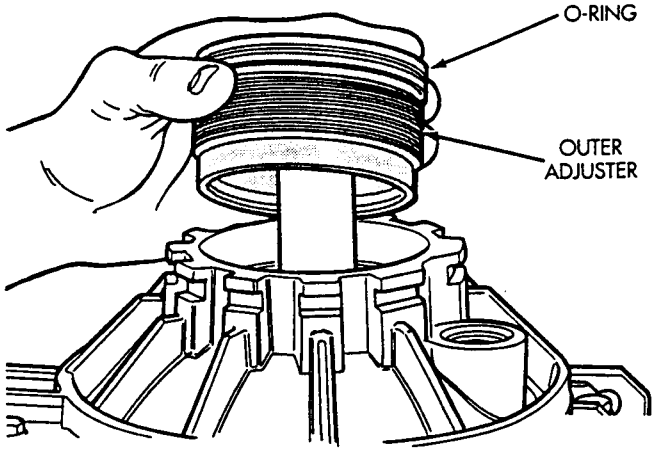


Fig. 43 Outer Adjuster Installation

(49) To check and/or adjust backlash remove the inspection plug from the top of the differential and install dial indicator as shown in figure 44. The tip of the dial indicator must be perpendicular against one of the ring gear teeth. Hold transfer shaft with locking pliers. Move ring gear back and forth with special tool 6548. Read the amount of backlash with dial indicator. Backlash should be 0.006" to 0.009" thousands of an inch.

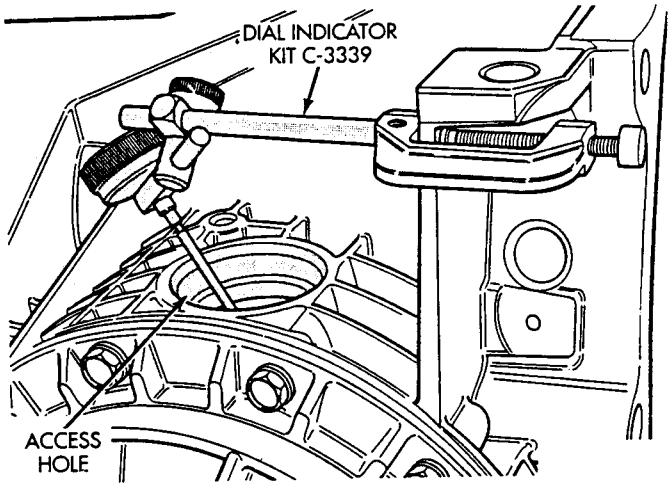


Fig. 44 Dial Indicator Installation

If there is too much backlash, loosen the outer adjuster with special tool 6503. Then turn the inner adjuster so that it **moves away from the ring gear.** After adjusting the inner adjuster, retighten the outer adjuster to the torque recorded in step 25. The inner adjuster should be turned in small increments.

If there is not enough backlash, loosen the outer adjuster with special tool 6503. Then turn the inner adjuster so that it **moves towards the ring gear.** After adjusting the inner adjuster, retighten the outer adjuster to the torque recorded in step 25. The inner adjuster should be turned in small increments.

(50) Once the backlash is with-in specifications, re-check the back lash in four spots on the ring gear 90 degrees apart (every 10 teeth). All four readings should be within specifications.

(51) Install inner and outer adjuster locking brackets.

(52) Install new inspection plug. Use a wooden block to tap inspection plug into place.

It is easier to fill the differential prior to installing the transaxle back into the vehicle. The differential holds 32 ounces of fluid.

DIFFERENTIAL CARRIER-RECONDITION

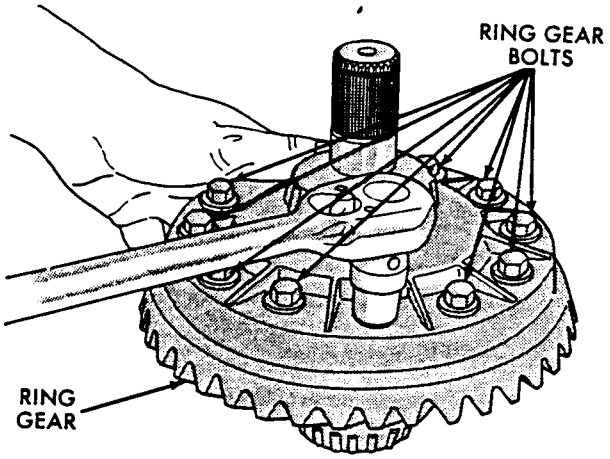


Fig. 1 Remove Ring Gear Bolts

CAUTION: Ring gear bolts are not reusable. When reassembling use new bolts.

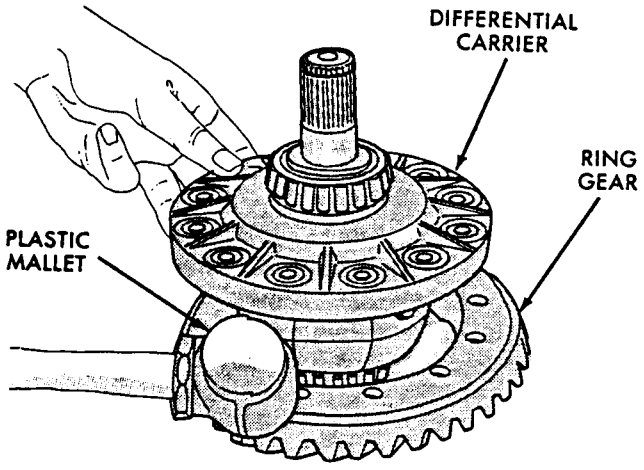


Fig. 2 Tap Off Ring Gear

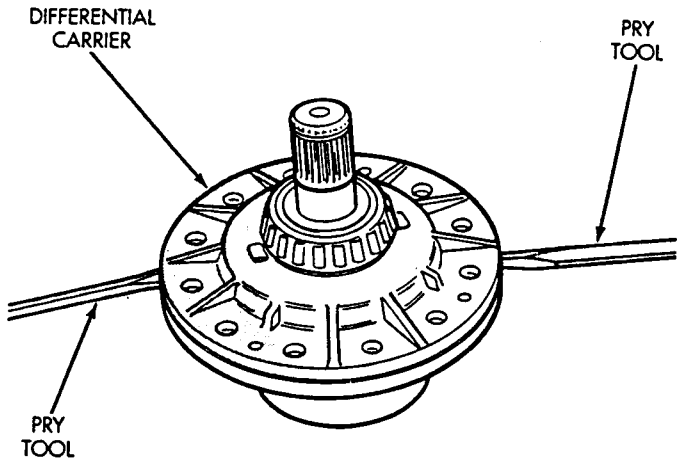


Fig. 3 Pry Differential Carrier Apart

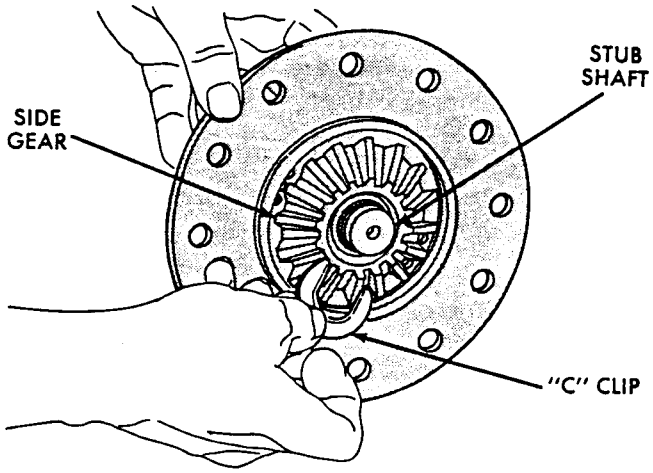


Fig. 4 Remove "C" Clip

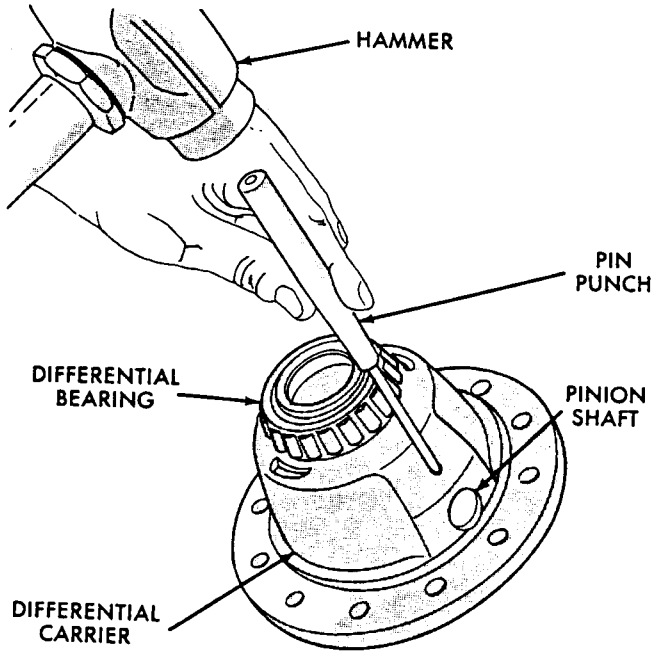


Fig. 5 Remove Pinion Shaft Roll Pin

CAUTION: When reassembling use a new roll pin

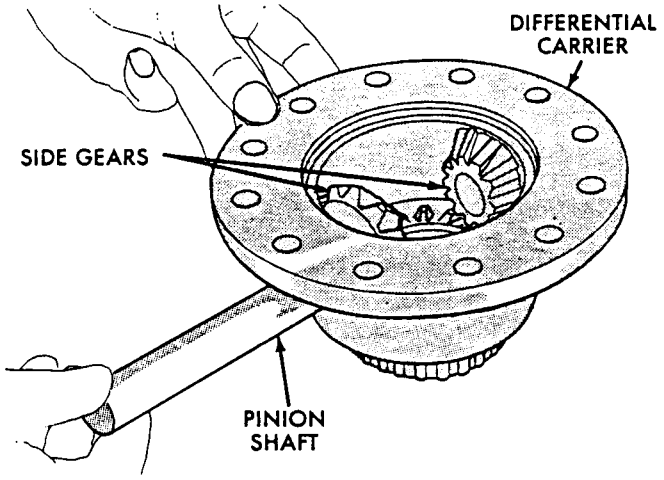


Fig. 6 Slide Out Differential Pinion Shaft and Remove Pinion Gears and Side Gears

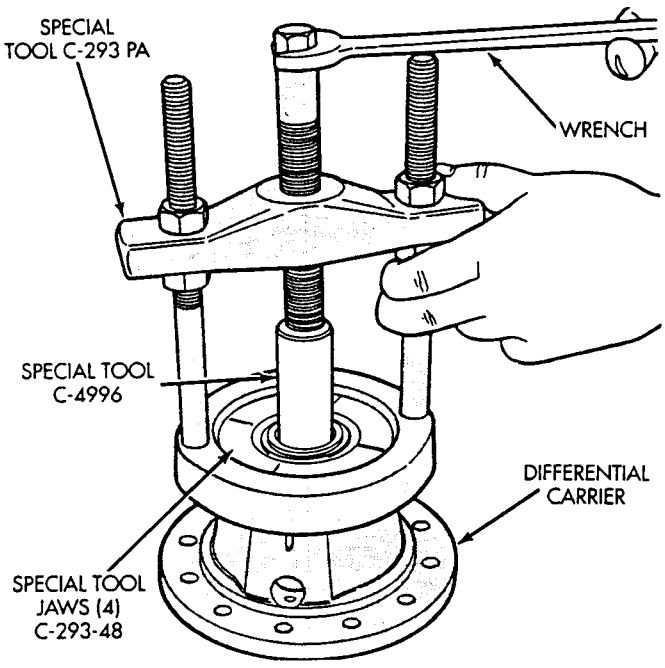


Fig. 7 Carrier Bearing Removal

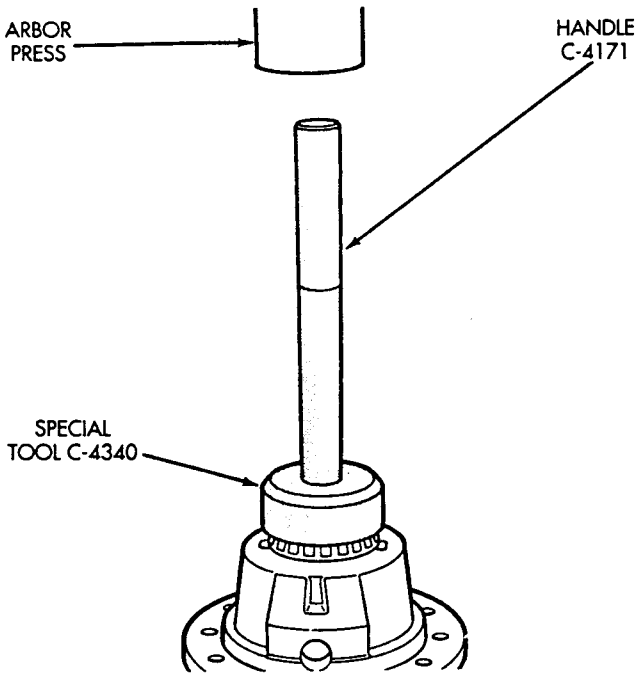


Fig. 8 Carrier Bearing Installation

BEARING ADJUSTMENT PROCEDURES

GENERAL RULES ON SERVICING BEARINGS

Take extreme care when removing and in stalling bearing cups and cones. **Use only an arbor press for installation,** as a hammer may not properly align the bearing cup or cone. Burrs or nicks on the bearing seat will give a false end play reading, while gauging for proper shims. Improperly seated bearing cup and cones are subject to low-mileage failure.

Bearing cups and cones should be replaced if they show signs of pitting or heat distress.

If distress is seen on either the cup or bearing rollers, both cup and cone must be replaced.

Bearing end play and drag torque specifications must be maintained to avoid premature bearing failures.

Used (original) bearing may lose up to 50 percent of the original drag torque after break-in.

All bearing adjustments must be made with no other component interference or gear intermesh, except the transfer gear bearing.

Oil all bearings before checking turning torque.

42LE ON-BOARD DIAGNOSTICS

GENERAL INFORMATION

The information in this manual is designed to help the technician repair the transaxle with the aid of on-board diagnostics.

Chrysler Corporation has developed a complete set of diagnostic manuals which cover the diagnosis of the 42LE transaxle. They have been designed to make transaxle diagnosis accurate and simple. Use these manuals with the DRB II scan tool and the latest cartridge, when diagnosing transaxle problems.

ON-BOARD DIAGNOSTICS INFORMATION

The 42LE transaxle is controlled and monitored by the transmission control module. The transmission control module monitors critical input and output circuits within the transaxle.

Some circuits are tested continuously; others are checked only under certain conditions. Each circuit monitored by the transmission control module has a corresponding fault message assigned to it that can be read with the DRB II scan tool.

If the on-board diagnostic system senses that one of the circuits is malfunctioning, the corresponding code is stored in memory. If the malfunction goes away after the code is stored, the transmission control module will erase the code after 75 key cycles.

CCD BUS

In order to diagnose the 42LE transaxle, diagnostic trouble codes in the transmission control module's memory should be read using the DRB II scan tool. If more than one diagnostic trouble code exists, diagnostic priority should be given to the most recent code. With CCD bus bias and communication problems, however, the DRB II scan tool displays an appropriate message. Diagnostic trouble codes might not be accessible until the bus problem is fixed. The following is a list of probable causes for a bus problem:

- Open or short to ground/battery in either or both CCD bus wires (pins 4 and 43).
- Open or short to ground/battery in either or both 42LE transaxle's bias wires (pin 5 and 44) on vehicles requiring the transaxle to bias the bus.
- Open or short to ground/battery in the diagnostic connector bus wire.
- Internal failure of any module connected to the bus.

The CCD bus should have 2.5 volts (+2.5 volts on CCD+ and -2.5 volts on CCD-).

The bus error message displayed by the DRB II scan tool should be helpful in diagnosing the CCD bus.

For information on diagnosing CCD bus, refer to the 1993 Diagnostic Procedures Manual for non-communication with the CCD bus. All other problems refer to the 1993 Body Vehicle Communications Diagnostic Procedures Manual.

DIAGNOSTIC TROUBLE CODES

Diagnostic Trouble Codes are two-digit numbers that identify which circuit is malfunctioning. A code can be set for hydraulic and mechanical reasons as well as for electrical problems. In most cases, codes do not pinpoint which specific component is defective.

Diagnostic trouble codes can only be read with the use of the DRB II scan tool or equivalent.

HARD FAULTS

Any Diagnostic trouble code that comes back within 3 engine starts (reset count 3 or less) is a "Hard Fault". This means that the defect is there every time the transmission control module checks that circuit.

SOFT FAULTS

A "Soft Fault" is one that occurs intermittently. It is not there every time the transmission control module checks the circuit. Most soft faults are caused by wiring or connector problems. Intermittent defects must be looked for under the specific conditions that caused them.

LIMP-IN MODE

The transmission control module continuously checks for electrical and internal transaxle problems. When a problem is sensed, the transmission control module stores a diagnostic trouble code. All but twelve of these codes cause the transaxle to go into the "Limp-in mode". While in this mode, electrical power is taken away from the transaxle. When this happens, the only transaxle ranges that will function are:

- Park
- Neutral
- Reverse
- Second Gear

No upshifts or downshifts are allowed while in the Limp-in mode. The position of the manual valve alone allows the three ranges that are available.

Although engine performance will be reduced while in this mode, the vehicle can be driven in for service.

DRB II SCAN TOOL

The DRB II scan tool is a diagnostic read-out box designed by Chrysler. It is used to gain access to the on-board diagnostics that are found on all Chrysler-built cars and trucks.

The DRB II scan tool has a few diagnostic capabilities by itself. To perform most diagnostic tests, a program cartridge must be inserted. It contains the diagnostic test programs.

There are diagnostic read-out boxes available from other manufactures that can be used on Chrysler vehicles. However, the diagnostic test procedures in this manual have been designed for use with the Chrysler's DRB II scan tool.

The DRB II scan tool operates by communicating with the module of the vehicle system being tested. To communicate with the transmission control module, the DRB II scan tool must be connected to the blue CCD bus connector. The connector is located under the instrument panel. Refer to the "Using the DRB II scan tool" manual or the Diagnostic Procedures Manual for information on how to use the DRB II scan tool.

DIAGNOSTIC TROUBLE CODE CHARTS

Below is a brief description of what each section of the diagnostic trouble code charts are addressing.

- **DIAGNOSTIC TROUBLE CODE**-Tells the code number and name (as shown on the DRB II scan tool).
- **BACKGROUND**-A brief description of the circuit that the transmission control module is monitoring.
- **WHEN CHECKED**-The point of time or condition when the transmission control module makes it's system check.
- **ARMING CONDITIONS**-The parameters that must be met before a code can be set.
- **FAULT CONDITION**-What the transmission control module saw that is determined to be a problem. (ie. voltage to high or low, switch/solenoid problems)
- **FAULT SET TIME**-Refers to the amount of time (in seconds) a failure must occur before a diagnostic trouble code is set in memory.
- **EFFECT**-Refers to how the fault effects transaxle operations.
- **POSSIBLE CAUSE**-Refers to the systems or circuits which could cause the fault to be recorded.

DIAGNOSTIC TROUBLE CODE 11

DIAGNOSTIC TROUBLE CODE:	11 Internal Transmission Control Module (Watchdog Circuit Test)
BACKGROUND:	The internal watchdog (WD) circuit continuously monitors the microprocessor. It provides a transmission limp-in when it detects a problem in the microprocessor. On the other hand, the microprocessor periodically TESTs the WD's ability to provide this shutdown function.
WHEN CHECKED:	After a reset (ignition key turned to the RUN position or after cranking engine), and periodically thereafter.
ARMING CONDITIONS:	(1) Solenoid test must not be in progress. (2) Watchdog test must be in progress. (3) A specific type of watchdog test must be scheduled.
CONDITIONS:	The Delay/Monitor line remains high after period has elapsed for corresponding Watchdog Test.
SET TIME:	Less than 1 second.
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 12

DIAGNOSTIC TROUBLE CODE:	12 Battery Was Disconnected. Note: This is not a code. It exists to provide reference information only.
BACKGROUND:	A battery-backed RAM is used to maintain some learned values. When the battery is disconnected, this memory is lost and, when the battery is connected, it will be detected by the Transmission Control Module. The code will be set and the learned values will be initialized to known constants.
WHEN CHECKED:	After a reset (ignition key turned to the RUN position or after cranking engine).
ARMING CONDITIONS:	None.
CONDITIONS:	Battery disconnected or first installation. – OR – Software interrupt. – OR – Watchdog re-initialization.
RESET CONDITIONS:	75 or more restarts without setting a new fault.
SET TIME:	Less than 1 second.
EFFECT:	Setting the code has no effect except for re-initialization of some learned values. However, disconnecting the battery will result in transmission limp-in.
POSSIBLE CAUSES:	Battery disconnected.

DIAGNOSTIC TROUBLE CODE 13

DIAGNOSTIC TROUBLE CODE:	13 Internal Transmission Control Module (Watchdog Circuit Shutdown)
BACKGROUND:	The internal watchdog (WD) circuit continuously monitors the microprocessor. It provides a shutdown function when it detects a problem in the microprocessor.
WHEN CHECKED:	After a reset (ignition key turned to the RUN position or after ranking engine), and periodically thereafter.
ARMING CONDITIONS:	(1) Watchdog test must not be in progress. (2) The Delay/Monitor line must be detected to be low. – OR – The relay coil power must be detected to be low. – OR – The switched battery must be detected to be low.
CONDITIONS:	Delay/Monitor is low for more than 0.6 second. – OR – Delay/Monitor is low and either Relay Power or Switched Battery is low for more than 0.2 second.
SET TIME:	Less than 1 second.
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 14

DIAGNOSTIC TROUBLE CODE:	14 Transmission Control Module Relay Output Always On (Relay Contacts Are Welded Closed)
BACKGROUND:	The Transmission Control Module relay is used to supply power to the solenoid pack (when in normal operating mode) and to turn off power (when in transmission "limp-in" mode). The relay output (which supplies power to the solenoid pack) is fed back to the controller through pins 16 and 17. It is referred to as SWITCHED BATTERY. After a Transmission Control Module reset (ignition key turned to the RUN position or after cranking engine), the Transmission Control Module energizes the relay. But before this is done, the Transmission Control Module verifies that the relay contacts are open by checking for no voltage on Switched Battery (i.e., relay output).
WHEN CHECKED:	After a reset (ignition key turned to the RUN position or after cranking engine) and after a powerdown.
ARMING CONDITIONS:	Before the Transmission Control Module energizes the solenoid relay.
CONDITIONS:	Relay output (Switched Battery) has more than 3 volts when relay is not energized by the Transmission Control Module.
SET TIME:	Less than 1 second.
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Relay failure (welded contacts). Short to battery in Transmission Control Module Relay Coil Power circuit. Short to battery in Transmission Control Module Relay Output circuit. 40-way connector problem (Cavities 15, 16, and 17). Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 15

DIAGNOSTIC TROUBLE CODE:	15 Transmission Control Module Relay Output Always Off (Relay Contacts Are Stuck Open)
BACKGROUND:	The Transmission Control Module relay is used to supply power to the solenoid pack (when in normal operating mode) and to turn off power (when in transmission "limp-in" mode). The relay output (which supplies power to the solenoid pack) is fed back to the Transmission Control Module through pins 16 and 17. It is referred to as SWITCHED BATTERY. After a Transmission Control Module reset (ignition key turned to the RUN position or when cranking engine), the Transmission Control Module energizes the relay. Then the Transmission Control Module makes sure that the relay contacts closed by checking for voltage on Switched Battery (i.e., relay output).
WHEN CHECKED:	After a reset (ignition key turned to the RUN position or after cranking engine).
ARMING CONDITIONS:	After the Transmission Control Module energizes the solenoid relay.
CONDITIONS:	Relay output (Switched Battery) has less than 3 volts when relay is energized by the Transmission Control Module.
SET TIME:	Less than 1 second.
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Relay failure (open contacts). Short to ground in Transmission Control Module Relay Coil Power circuit. Open Transmission Control Module Relay Coil Power circuit between relay and Transmission Control Module. Open Transmission Control Module Relay Output circuit between relay and Transmission Control Module. Open Transmission Control Module Power Ground (B-) circuit from relay to ground. Open Battery Feed circuit from relay to splice. 40-way connector problem (cavities 15, 16, and 17). Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 16

DIAGNOSTIC TROUBLE CODE:	16 Internal Transmission Control Module (ROM Check Failure)
BACKGROUND:	When the Transmission Control Module is reset, the microprocessor checks the integrity of the program memory (ROM). It adds all used bytes in the program memory. The amount should be the same as a known constant (stored in program memory).
WHEN CHECKED:	After a reset (ignition key turned to the RUN position or after cranking engine).
ARMING CONDITIONS:	None.
CONDITIONS:	ROM check sum does not match a known constant.
SET TIME:	Less than 1 second.
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 17

DIAGNOSTIC TROUBLE CODE:	17 Internal Transmission Control Module (RAM Check Failure)
BACKGROUND:	When the Transmission Control Module is reset, the microprocessor checks the integrity of each RAM location by writing to it and reading back from it. The read value should be the same as the value written.
WHEN CHECKED:	After a reset (ignition key turned to the RUN position or after cranking engine).
ARMING CONDITIONS:	Data read from at least one RAM location does not match data written to it.
CONDITIONS:	RAM check sum does not match a known constant.
SET TIME:	Less than 1 second.
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 18

DIAGNOSTIC TROUBLE CODE:	18 Engine Speed Sensor Circuit (Loss of Engine Speed Signal)
BACKGROUND:	The Transmission Control Module uses a distributor signal to calculate the engine rpm (which could be zero when the ignition key is in the RUN position and the engine is not running). When the calculated engine rpm is almost zero, it is compared to the engine speed received from the Powertrain Control Module over the CCD bus to confirm that the engine is actually not running. Otherwise this means a problem with the engine speed signal circuit.
WHEN CHECKED:	Every 0.007 second.
ARMING CONDITIONS:	(1) Calculated engine speed is less than or equal to the start-run threshold of 390 rpm. (2) CCD bus must be operational during the last 1.0 second.
CONDITIONS:	Engine speed received from the Powertrain Control Module over the CCD bus is greater than 384 rpm.
SET TIME:	2 seconds.
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Open/short in Engine Speed Signal circuit (distributor pickup or crank sensor signal). Defective distributor reference pickup or crank sensor. 40-way connector problem (cavity 45). Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 19

DIAGNOSTIC TROUBLE CODE:	19 Bus Communication With Powertrain Control Module
BACKGROUND:	The Transmission Control Module communicates with the Powertrain Control Module over the CCD bus. Engine rpm, Engine and Ambient Temperature are among the information received by the Transmission Control Module. The Transmission Control Module continuously monitors the bus activity and receives the messages it needs.
WHEN CHECKED:	Every 0.007 second.
ARMING CONDITIONS:	Engine speed must not equal zero (engine cranking or running).
CONDITIONS:	No CCD messages received for 10 seconds.
SET TIME:	10 seconds.
EFFECT:	No limp-in. Due to loss of temperature information: (a) Delayed 3/4 shift and early 4/3 shift for few minutes after engine is started. (b) No lock-up operations for a few minutes after the engine is started.
POSSIBLE CAUSES:	Open Serial Bus (+) circuit or Serial Bus (-) circuits between the Transmission Control Module and the Powertrain Control Module. Shorted Serial Bus (+) or Serial Bus (-) circuit. CCD bus biasing problem (bus has to be properly biased by one of the vehicle's modules). Powertrain Control Module CCD problem circuit. Transmission Control Module or body-controller CCD circuit problem.

DIAGNOSTIC TROUBLE CODE 20

DIAGNOSTIC TROUBLE CODE:	20 Switched Battery
BACKGROUND:	The Transmission Control Module relay is used to supply power to the solenoid pack (when in normal operating mode) and to turn off power (when in transmission "limp-in" mode). The relay output (which supplies power to the solenoid pack) is fed back to the Transmission Control Module through pins 16 and 17. It is referred to as SWITCHED BATTERY. After a Transmission Control Module reset (ignition key turned to the RUN position or after cranking engine), the Transmission Control Module energizes the relay. But before this is done, the Transmission Control Module verifies that the relay contacts are open by checking for no voltage on Switched Battery (i.e., relay output). After Switched Battery is verified for no voltage, the voltage of the solenoid pack pressure switches is also checked. Since the solenoid pack is not powered up, there should be no voltage on any of the pressure switches. Otherwise there is a problem on the switched battery.
WHEN CHECKED:	After a reset (ignition key turned to the RUN position or after cranking engine).
ARMING CONDITIONS:	Switched battery relay contacts are open.
CONDITIONS:	A voltage is detected on any of the pressure switches before the relay is energized.
SET TIME:	Less than 1 second.
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Defective Transmission Control Module relay (welded contacts) with an open Transmission Control Module Relay Output circuit between the Transmission Control Module and splice. Intermittent short to battery on the Transmission Control Module Relay Output circuit. Defective relay (intermittent contacts). Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 21-27

DIAGNOSTIC TROUBLE CODE:

21-27 Pressure Switch Circuits
Code 21 OD Pressure Switch Circuit
Code 22 2/4 Pressure Switch Circuit
Code 23 2/4-OD Pressure Switch Circuit
Code 24 LR Pressure Switch Circuit
Code 25 LR-OD Pressure Switch Circuit
Code 26 LR-2/4 Pressure Switch Circuit
Code 27 All Pressure Switch Circuits

BACKGROUND:

The transmission system uses three pressure switches to monitor the fluid pressure in the LR, 2/4, and OD elements. The pressure switches are continuously checked for the correct states in each gear as indicated below:

Normal Pressure Switch States

GEAR	LR	2/4	OD
R	O	O	O
N	C	O	O
1ST	C	O	O
2ND	O	C	O
3RD	O	O	C
4TH	O	C	C

O = Switch is open
C = Switch is closed

When a pressure switch mismatch is detected, the solenoid circuits are tested for continuity. If that test fails, solenoid circuits are blamed for the pressure switches mismatch. Otherwise the appropriate pressure switch code is set.

WHEN CHECKED:

Every 0.007 second.

ARMING CONDITIONS:

(1) More than 2.0 seconds since start-up.
(2) No loss of transaxle oil pump prime.
(3) Engine speed greater than 500 rpm.
(4) No shift in progress.
(5) Pressure switch mask inconsistent with the normal pressure switch state table. Use DRB II State Input/Output display.

CONDITIONS:

Pressure switch error count must equal 255.

SET TIME:

For hard faults when super cold = 3.3 seconds
For hard faults when cold = 2.2 seconds
For hard faults when warm = 1.4 seconds
For hard faults when hot = 0.6 second
(Temperature description based off of DRB II transaxle state display)

EFFECT:

Transmission limp-in.

POSSIBLE CAUSES:

Low/high fluid level in transmission.
Short/open in LR Pressure Switch circuit, 2/4
Pressure Switch circuit, or OD Pressure Switch circuit.
Solenoid pack internal problem.
Internal transmission problem.
40-way connector problem (cavities 9, 47, and 50).
Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 28

DIAGNOSTIC TROUBLE CODE:	28 Check Shifter Signal (Bad PRNO3L Data)
BACKGROUND:	PRNO3L and Neutral/Start switches are used to: (1) Determine the Shift Lever Position. (2) Supply a ground to the Starter Relay in Park and Neutral only. (3) Supply a ground to the Backup Lamp Relay in Reverse only. The Transmission Control Module reads the switch signals (from Neutral/Start switch, and from PRNO3L switch) according to the table below, which includes two recognized temporary codes that occur while moving Shift Lever Position (SLP). Normal PRNO3L & Neutral/Start Switch States SLP / T42 / T41 / T01 / T03 P C C O O R O O C C N O C C O OD O O O C 3 O O C O L C O O O T1 O C O O T2 O O O O O = Switch is open C = Switch is closed When an invalid code is seen, the Transmission Control Module tries to determine Shift Lever Position through hydraulic interpretation (by energizing some solenoids and monitoring the pressure switch responses).
WHEN CHECKED:	Every 0.007 second.
ARMING CONDITIONS:	(1) Ignition key turned to the run position. (2) Loss of prime test must not be in progress. (3) CASE 1: PRNO3L switch mask inconsistent with normal PRNO3L switch state table. (Invalid PRNO3L code.) Use DRB II State Monitor for Shift Lever display. CASE 2: PRNO3L data error flag is set due to invalid sequence of old PRNO3L data versus new PRNO3L data (i.e., Instantaneous PRNO3L data change from reverse to overdrive or overdrive to reverse.)
CONDITIONS:	CASE 1: Invalid code timer has expired (0.1 second). CASE 2: Third occurrence of setting PRNO3L data error flag since start-up.
SET TIME:	CASE 1: 0.1 second. CASE 2: Third occurrence of setting PRNO3L data error flag since start-up. This fault case is not time specific.
EFFECT:	No limp-in. However, valid but incorrect PRNO3L and Neutral/Start signals (e.g., shift lever is in OD position where R code is being received) might result in other fault codes and possibly a limp-in. This is why it is very important to verify the correctness of the Shift Lever Position signals before diagnosing any problems.
POSSIBLE CAUSES:	Open/short Starter Relay Ground, PRNDL (T42) circuit, Neutral Start Switch circuit, PRNDL (T01) circuit, or Back up Lamp Relay Coil Driver. Open Ignition (+) circuit between Neutral Safety switch and splice. Open ETAX power Ground (B-) circuit between PRNO3L switch and splice. Defective or disconnected Neutral Safety or PRNO3L switch. Defective or disconnected Backup Lamp Relay. 40-way connector problem (cavities 1, 2, 3, 41, and 42). Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 29

DIAGNOSTIC TROUBLE CODE:	29 Throttle Position Signal
BACKGROUND:	The Transmission Control Module receives the Throttle Position Signal circuit and its ground (Signal Reference circuit) from the Throttle Position Sensor (TPS). The TPS has a 5-volt pull-up supplied by the Powertrain Control Module. The throttle signal is checked for out-of-range as well as intermittency (excessive signal changes).
WHEN CHECKED:	Every 0.007 second.
ARMING CONDITIONS:	Engine must be running.
CONDITIONS:	Throttle angle less than 6 degrees. -OR- Throttle angle greater than 120 degrees.
SET TIME:	0.6 second.
EFFECT:	No limp-in. A default throttle value is used. No Torque Converter Clutch. No 4th gear. Limited shift schedule.
POSSIBLE CAUSES:	Open/shorted Throttle Position Signal circuit. Open Signal Reference circuit. Open 5-volt output (for TPS) circuit between TPS and Powertrain Control Module. 40-way connector problem. Defective TPS. Defective Powertrain Control Module. Internal Transmission Control Module.

DIAGNOSTIC TROUBLE CODE 31-32

DIAGNOSTIC TROUBLE CODE:	31-32 Hydraulic Pressure Switch Failure Code 31 OD Hydraulic Pressure Switch Code 32 2/4 Hydraulic Pressure Switch
BACKGROUND:	The Transmission Control Module tests the OD and 2/4 pressure switches when they are off (i.e., when the corresponding friction element [clutch] is not applied). The test makes sure the switches are operational. The Transmission Control Module verifies that the switch closes when the corresponding element is applied. If a switch fails to respond, it is retested.
WHEN CHECKED:	After a shift is made, periodically thereafter.
ARMING CONDITIONS:	(1) Transmission is at normal operating temperature. (2) Must be in 1st, 2nd or 3rd Gear. (3) Engine rpm fast enough to provide pump pressure (1000 rpm). (4) Acceptable pressure switch fault count (60). (5) Acceptable speed check fault count (80).
CONDITIONS:	Pressure switch does not respond within specified time for given temperature range.
SET TIME:	5 seconds.
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Low/high transmission fluid level. Solenoid pack problem. Internal transmission problem.

DIAGNOSTIC TROUBLE CODE 36

DIAGNOSTIC TROUBLE CODE:	36 Fault Immediately After Shift
BACKGROUND:	This code is not stored alone. It is stored if a speed error (codes 50 through 58) is detected immediately after shift. The existence of code 36 indicates a mechanical or hydraulic (non-electrical) related problem. It should be noted, however, that all mechanical problems don't necessarily result in code 36. When this code exists, diagnosing the system should be based on the associated code and ONLY mechanical causes should be considered.
WHEN CHECKED:	After a Speed Error code is stored in Transmission Control Module.
ARMING CONDITIONS:	Fault code 50 – 58 (Speed Error) has already been set.
CONDITIONS:	Fault happened within 1.3 seconds of a shift.
SET TIME:	Same as associated speed error.
EFFECT:	Same as associated speed error.
POSSIBLE CAUSES:	Internal transmission problem (refer to Speed Errors).

DIAGNOSTIC TROUBLE CODE 37

DIAGNOSTIC TROUBLE CODE:	37 Solenoid Switch Valve in the LU Position
BACKGROUND:	The Solenoid Switch Valve (SSV) controls the direction of the transmission fluid when the LR/LU solenoid is energized. Solenoid Switch Valve will be in the downshifted position in 1st gear, thus directing the fluid to the LR element. In 2nd, 3rd and 4th, it will be in the upshifted position and directs the fluid into the Torque Converter Clutch Switch Valve which controls the Torque Converter. When shifting into 1st gear, a special sequence is followed to make sure the Solenoid Switch Valve moves into the downshifted position. LR pressure switch is monitored to confirm Solenoid Switch Valve movement. If Solenoid Switch Valve movement is not confirmed, 2nd gear is substituted for 1st.
WHEN CHECKED:	Prior to a shift into 1st.
ARMING CONDITIONS:	(1) Transmission at normal operating temperature. (2) Solenoid Switch Valve flag must be set.
CONDITIONS:	Three unsuccessful attempts to shift into 1st gear.
SET TIME:	Concurrent with the third consecutive unsuccessful attempt to shift into 1st gear.
EFFECT:	No limp-in. No 1st gear (2nd gear is substituted). No Torque Converter Clutch operation.
POSSIBLE CAUSES:	Internal transmission problem.

DIAGNOSTIC TROUBLE CODE 38

DIAGNOSTIC TROUBLE CODE:	38 Torque Converter Clutch control (Out of Range).
BACKGROUND:	When in 2nd, 3rd or 4th gear, the Torque Converter Clutch can be applied when certain conditions are met. The LU piston is modulated (partial apply) by modulating the LR/LU solenoid until the torque converter slip (difference between engine and turbine rpm) is within a desired range. Then the LR/LU solenoid is fully energized (full apply).
WHEN CHECKED:	When in partial Torque Converter Clutch application.
ARMING CONDITIONS:	(1) In partial Torque Converter Clutch application. (2) Turbine speed greater than 1750 rpm. (3) Transmission temperature not cold or warm. (4) Brake not on. (5) PRNO3L is in 'OD' position.
CONDITIONS:	Partial Torque Converter Clutch application fault counter equals 255.
SET TIME:	7 seconds.
EFFECT:	No limp-in. Torque Converter Clutch operation is not allowed.
POSSIBLE CAUSES:	Low/high transmission fluid. Internal transmission problem.

DIAGNOSTIC TROUBLE CODE 41-44

DIAGNOSTIC TROUBLE CODE:	41-44 Solenoid Continuity Test Failure Code 41 LR Solenoid Circuit Code 42 2/4 Solenoid Circuit Code 43 OD Solenoid Circuit Code 44 UD Solenoid Circuit
BACKGROUND:	Four Solenoids are used to control the friction elements (clutches). The continuity of the solenoid circuits is tested periodically. Each solenoid is turned off and an inductive voltage spike should be detected. When no spike is detected, the solenoid circuits are tested a second time to verify the failure. In addition to the periodic testing, solenoid circuits are tested when a speed or pressure switch circuit error occurs. In this case, one failure will result in setting the appropriate code.
WHEN CHECKED:	After a reset, then every 10 seconds thereafter. When a speed error or pressure switch mismatch is detected.
ARMING CONDITIONS:	(1) Shift not in progress. (2) Shift Lever Position Test not in progress. (3) Pressure Switch Test not in progress. (4) Watchdog Test not in progress. (5) No voltage spike detected from solenoid during first test.
CONDITIONS:	Solenoid Continuity Test failed for the second time. – OR – Either a pressure switch or speed data problem and Solenoid Continuity Test failed for the first time.
SET TIME:	Without Speed or Pressure Switch error 12.0 seconds. – OR – With Speed error 0.2 second. – OR – With Pressure Switch error Super Cold: 3.0 seconds Cold: 2.0 seconds Warm: 1.2 seconds Hot: 0.5 second (Temperature description based off of DRB II transaxle state display.)
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Open/shorted LR Solenoid Driver circuit, 2/4 Solenoid Driver circuit, UD Solenoid Driver circuit and OD Solenoid Driver circuit. Open Power Ground circuit. 60-way connector problem (cavities 16, 17, 19, 20, 57, 58, 59, and 60). 8-way connector problem (cavities 4, 5, 6, 7, and 8). Solenoid Pack internal problem. Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 45

DIAGNOSTIC TROUBLE CODE:	45 Internal Transmission Control Module (EEPROM Byte Failure)
BACKGROUND:	The transmission system supports several engine models, each requiring different shift schedules and calibration constants. The Transmission Control Module receives the engine model code from the Powertrain Control Module and stores it in the microprocessor's EEPROM memory. Once the engine model code is established in the EEPROM memory, it is used to select the appropriate shift schedule and other calibrations. The EEPROM memory location used for the engine model code is checked to make sure it can hold data. If the EEPROM memory location fails the checks, the code is set.
WHEN CHECKED:	After a reset (ignition key turned to the RUN position or after cranking engine).
ARMING CONDITIONS:	(1) No write request to EEPROM. (2) Engine model not erased from Transmission Control Module memory.
CONDITIONS:	Engine model stored in EEPROM is different from data stored in RAM.
SET TIME:	14 seconds.
EFFECT:	No limp-in.
POSSIBLE CAUSES:	Internal Transmission Control Module failure.

DIAGNOSTIC TROUBLE CODE 46

DIAGNOSTIC TROUBLE CODE:	46 3/4 Shift Abort (UD Hydraulic Circuit Failure)
BACKGROUND:	The following table shows the clutches applied in each gear:

Gear	UD	OD	REV.	2/4	LR
Park					X
Reverse			X		X
Neutral					X
1st	X				X
2nd	X			X	
3rd	X	X			
4th		X		X	

When shifting from 3rd to 4th gear, a delayed speed change will indicate a problem in the UD hydraulic circuit. When this is detected, the 3/4 shift is aborted temporarily. The Transmission Control Module will attempt the 3/4 shift again. After three unsuccessful shift attempts, the code is set.

WHEN CHECKED:	Prior to the 3/4 shift.
ARMING CONDITIONS:	(1) Must be doing a 3/4 shift. (2) Under Drive Failure flag must be set. (Temperature must not be cold.)
CONDITIONS:	Under Drive Fault Counter is greater than three.
SET TIME:	Concurrent with the third consecutive 3/4 shift abort.
EFFECT:	No limp-in.
POSSIBLE CAUSES:	Internal transmission failure.

DIAGNOSTIC TROUBLE CODE 47

DIAGNOSTIC TROUBLE CODE:	47 Solenoid Switch Valve in LR Position
BACKGROUND:	The Solenoid Switch Valve (SSV) controls the direction of the transmission fluid when the LR/LU solenoid is energized. Solenoid Switch Valve will be in the downshifted position in 1st gear, thus directing the fluid to the LR element. In 2nd, 3rd, and 4th, it will be in the upshifted position and directs the fluid into the Torque Converter Clutch Switch Valve which controls the Torque Converter. When doing partial Torque Converter Clutch or full Torque Converter Clutch application, the LR pressure switch should indicate no pressure if Solenoid Switch Valve is in the LU position. If LR pressure switch indicates pressure for some time while in partial or full Torque Converter Clutch, Torque Converter Clutch operation is stopped to avoid accidental application of the LR clutch. Partial Torque Converter Clutch is attempted when there is no LR pressure. A second detection of LR pressure will result in setting the fault code and a shutdown.
WHEN CHECKED:	Continuously when doing partial or full Torque Converter Clutch.
ARMING CONDITIONS:	Must be in partial or full Torque Converter Clutch.
CONDITIONS:	LR pressure is high for the second time.
SET TIME:	1.5 seconds (minimum). 2.6 seconds (maximum).
EFFECT:	Transmission limp-in.
POSSIBLE CAUSES:	Internal transmission problem.

DIAGNOSTIC TROUBLE CODE 48

DIAGNOSTIC TROUBLE CODE:	48 Torque Management
BACKGROUND:	Engine torque management is used during high-torque, high-speed 1-2, 2-3, 4-2, and 3-1 shifts in order to reduce the energy dissipation in the 2-4 clutch and the OD clutch to an acceptable level.
WHEN CHECKED:	Every 7 msec
ARMING CONDITIONS:	1) Throttle must be less than 15 degrees. 2) Turbine input speed must be less than 200 rpm. 3) Engine speed must be less than 1200 rpm. 4) Must be in Reverse, Neutral or 1st Gear. 5) If the transmission control module does not receive, within 1.0 seconds via the CCD, confirmation that the torque management request signal was read by the engine control module.
CONDITIONS:	When the torque fault management fault counter matures to a value exceeding 15.
SET TIME:	1) If an incorrect response from powertrain control module on CCD acknowledging request for torque management test during idle. 2) Event dependent on two sequential requests for torque managed shifts without correct response from powertrain control module on CCD acknowledging that torque management is in progress.
EFFECT:	Throttle used for shift point selection is limited to 54 degrees if T/M fault counter is greater than seven.
POSSIBLE CAUSES:	CCD buss communication problem.

DIAGNOSTIC TROUBLE CODE 50-58

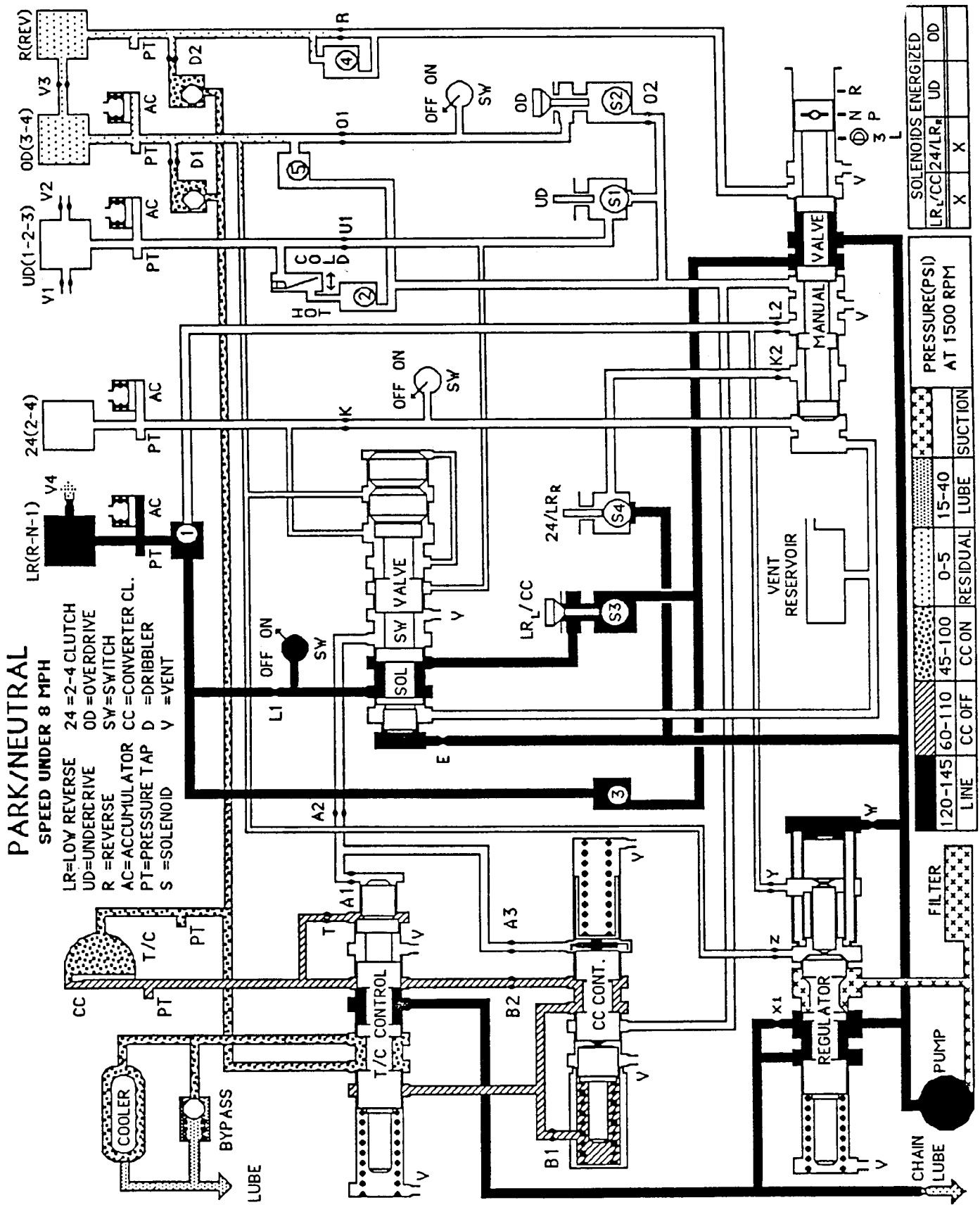
DIAGNOSTIC TROUBLE CODE:	50-58 Speeds Error Code 50 Gear Ratio in Reverse Code 51 Gear Ratio in 1st Code 52 Gear Ratio in 2nd Code 53 Gear Ratio in 3rd Code 54 Gear Ratio in 4th Code 55 (Not Used) Code 56 Turbine Speed Sensor Code 57 Output Speed Sensor Code 58 Speed Sensors' Ground
BACKGROUND:	The system uses two speed sensors, one for turbine rpm and the other for output rpm. These inputs are very essential for transaxle operation. Therefore, the integrity of this data is verified through the following checks: (1) When in gear, if the ratio of the turbine rpm speed sensor to the output rpm speed sensor doesn't compare to a known gear ratio, the corresponding in-gear fault code is set (50 through 54). (2) An excessive change in turbine or output speeds indicating signal intermittency will result in codes 56 and 57 respectively. (3) After a reset in neutral, observing a certain turbine rpm speed sensor or output rpm speed sensor ratio indicates a loss of the common speed sensors ground which sets code 58. Note: When any of these codes is set immediately after a shift, code 36 will also be set which indicates mechanical hydraulic problems (see code 36).
WHEN CHECKED:	Continuously when transmission is in gear.
ARMING CONDITIONS:	(1) Must not be extremely cold. (2) Engine must be running. (3) Delay after start-up must be greater than 0.3 second. (4) Shift must not be in progress. (5) Engine speed is greater than 500 rpm. (6) Codes 50 through 54 ..... In-Gear Ratio Error. The ratio of the Turbine rpm speed sensor to the output rpm speed sensor doesn't compare to the particular gear ratio. Code 56 ..... Turbine Speed Sensor An excessive change in turbine rpm speed sensor in any gear. Code 57 ..... Output Speed Sensor An excessive change in output rpm speed sensor in any gear. Code 58 ..... Sensors Ground After a reset in Neutral and Turbine speed sensor or Output speed sensor equals a ratio of turbine gear teeth to output gear teeth of 2:50.
CONDITIONS:	A hard fault is considered to exist when the fault counter has matured to a value of 255. An intermittent fault is considered to be present when the fault counter is greater than or equal to 6 and less than 255. No fault is considered to exist when the fault counter is less than 6.
SET TIME:	If hard fault speed signal(s): If cold: 2.7 seconds If not cold: 1.2 seconds If intermittent speed signal(s): 15.0 seconds
EFFECT:	Transmission limp-in. Solenoid circuits are tested and, if they fail, are blamed for the speeds error. Shifts are inhibited. Torque Converter Clutch operation is inhibited.

	Speed Error Code								
POSSIBLE CAUSES:	50	51	52	53	54	55	56	57	58
Open/shorted Output Speed Sensor Circuit	X	X							
Defective Output Sensor	X	X						X	
Output Sensor Connector Problem	X	X						X	
40-way Connector Problem Cavity 13	X	X					X	X	
Cavity 14	X	X						X	
Cavity 52	X	X					X		
Open/shorted Turbine Speed Sensor Circuit	X	X							
Defective Turbine Sensor	X	X					X		
Turbine Sensor Connector Problem	X	X					X		
Open Output Sensor Ground Circuit									X
Internal Transmission Control Module Failure	X	X					X	X	X
Internal Transmission Problem	X	X	X	X	X				

DIAGNOSTIC TROUBLE CODE 60-62

DIAGNOSTIC TROUBLE CODE:	60-62 Inadequate Element Volumes Code 60 Inadequate LR Element Volume Code 61 Inadequate 2/4 Element Volume Code 62 Inadequate OD Element Volume
BACKGROUND:	The volumes of the transmission fluid needed to apply the friction elements are continuously monitored and learned for adaptive controls. As the friction material wears, the volume of fluid needed to apply the element increases. The following are typical clutch volumes (in 3) beyond which the clutches might be damaged: LR: 35-83 OD: 75-150 2/4: 20-77 UD: 24-70 However, certain transmission mechanical problems (such as broken return spring, out-of-position snap ring, etc.) can cause near-zero learned volumes resulting in setting the appropriate code.
WHEN CHECKED:	When volumes are updated: LR: When doing a 2/1 or 3/1 shift. 2/4: When doing a 1/2 shift. OD: When doing a 2/3 shift. UD: When doing a 4/3 or 4/2 shift.
ARMING CONDITIONS:	None.
CONDITIONS:	The updated learned volume is below a threshold value.
SET TIME:	Less than 1 second.
EFFECT:	No limp-in.
POSSIBLE CAUSES:	Internal transmission problem.

42LE HYDRAULIC SCHEMATICS



42LE SPECIFICATIONS

42LE FOUR SPEED AUTOMATIC TRANSAXLE

Name	42LE	
Type	Longitudinally Mounted, Fully-Adaptive, Electronically Controlled, Four Speed Automatic. Electronically Modulated Torque Converter Clutch. Separate Sump Differential.	
Torque Converter Diameter	254 mm (10 inch)	
Oil Capacity	**Liters**	**Quarts**
Transmission and Torque Converter Sump	9.40	9.9
Differential Sump	0.95	1.0
Oil Type		
Transmission and Torque Converter Sump	Mopar ATF Type 7176 ONLY	
Differential Sump	80W-90 Petroleum Based Hypoid Gear Lube	
Cooling Method	Water Heat Exchanger	
Lubrication	Pump (Internal-External Gear Type)	
Gear Ratios:		
Transmission Portion:		
First	2.84	
Second	1.57	
Third	1.00	
Fourth (OD)	0.69	
Reverse	2.21	
Overall Top Gear Ratio:		
(in Overdrive)	2.52	
Teeth Per Gear (Sprocket):		
Front Sun Gear	28	
Front Planetary Gear	17	
Front Annulus Gear	62	
Rear Sun Gear	38	
Rear Planetary Gear	17	
Rear Annulus Gear	70	
Output Shaft Sprocket	32	
Transfer Shaft Sprocket	33	
Transfer Shaft Pinion Head	11	
Ring Gear (Differential)	39	
Side Gear (Differential)	16	
Clutch Clearances:	**Millimeters**	**Inch**
Underdrive Clutch	0.091 to 1.47	0.036 to 0.058
Overdrive Clutch	0.965 to 2.26	0.038 to 0.089
Reverse Clutch	0.760 to 1.24	0.030 to 0.049
2/4 Clutch	0.760 to 2.64	0.030 to 0.104
Low/Reverse Clutch	1.040 to 1.65	0.042 to 0.065
Pump Clearances:	**Millimeters**	**Inch**
Outer Gear to Pocket	0.045 to 0.141	.0018 to .0056
Outer Gear Side Clearance	0.020 to 0.046	.0008 to .0018
Inner Gear Side Clearance	0.020 to 0.046	.0008 to .0018
Tapered Roller Bearing Settings:		
Output Shaft	1 to 8 in. lbs. of Turning Torque	
Transfer Shaft	6 to 12 in. lbs. of Turning Torque	
Differential	19 to 23 in. lbs. of Turning Torque	
Hypoid Gear Set (Ring and Pinion) Backlash	**Millimeters**	**Inch**
	0.152 to 0.229	0.006 to 0.009

42LE TORQUE SPECIFICATIONS

DESCRIPTION	TORQUE
Adjuster Lock Bracket Screws	5 N•m (40 in. lbs.)
Cooler Line Connector	18 N•m (155 in. lbs.)
Differential Assembly Partial Bolts	8 N•m (50 in. lbs.)
Differential Cover To Case Screw and Washer Assembly	29 N•m (250 in. lbs.)
Differential Drain Plug	7 N•m (60 in. lbs.)
Differential Fill Plug	4 N•m (35 in. lbs.)
Differential Ring Gear Bolts (Nylon Patch)	95 N•m (70 ft. lbs.)
Differential Vent Baffle Screw	5 N•m (40 in. lbs.)
Differential Vent	11 N•m (100 in. lbs.)
Driveplate to Crankshaft Bolts	101 N•m (75 ft. lbs.)
End Cover To Case Screw and Washer Assembly	29 N•m (250 in. lbs.)
Filter Retainer	5 N•m (40 in. lbs.)
Input Sensor to Case	27 N•m (240 in. lbs.)
Low/Reverse Clutch Retainer to Case	5 N•m (40 in. lbs.)
Main Sump Vent Baffle Screw	5 N•m (40 in. lbs.)
Main Sump Vent	11 N•m (100 in. lbs.)
Manual Lever to Valve Body	5 N•m (40 in. lbs.)

DESCRIPTION	TORQUE
Oil Pan to Case Screw and Washer Assembly	19 N•m (165 in. lbs.)
Output Sensor to case	27 N•m (240 in. lbs.)
Output Shaft Stake Nut	271 N•m (200 ft. lbs.)
Park Sprag Retention Screw	5 N•m (40 in. lbs.)
Pressure Check Plug (Wet)	6 N•m (45 in. lbs.)
Pump To Case Bolt	30 N•m (265 in. lbs.)
Reaction Shaft To Pump Housing Bolt	29 N•m (250 in. lbs.)
Snubber Screws	5 N•m (40 in. lbs.)
Solenoid Assembly To Transfer Plate	6 N•m (50 in. lbs.)
Solenoid Wiring Connector Retainer	6 N•m (50 in. lbs.)
Torque Converter to Driveplate Bolts	81 N•m (60 ft. lbs.)
Transfer Plate Screw Washer Assembly	5 N•m (40 in. lbs.)
Transfer Plate To Case Screw and Washer Assembly	12 N•m (105 in. lbs.)
Transfer Shaft Stake Nut	271 N•m (200 ft. lbs.)
Valve Body Screw And Washer Assembly	5 N•m (40 in. lbs.)
Wiring Harness Tie Down Bolt	6 N•m (50 in. lbs.)

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MASTER SHIM CHART

TRANSFER SHAFT REAR SHIMS (mm)	
3.53 - 3.55	4.13 - 4.15
3.56 - 3.58	4.16 - 4.18
3.59 - 3.61	4.19 - 4.21
3.62 - 3.64	4.22 - 4.24
3.65 - 3.67	4.25 - 4.27
3.68 - 3.70	4.28 - 4.30
3.71 - 3.73	4.31 - 4.33
3.74 - 3.76	4.34 - 4.36
3.77 - 3.79	4.37 - 4.39
3.80 - 3.82	4.40 - 4.42
3.83 - 3.85	4.43 - 4.45
3.86 - 3.88	4.46 - 4.48
3.89 - 3.91	4.49 - 4.51
3.92 - 3.94	4.52 - 4.54
3.95 - 3.97	4.55 - 4.57
3.98 - 4.00	4.58 - 4.60
4.01 - 4.03	4.61 - 4.63
4.04 - 4.06	4.64 - 4.66
4.07 - 4.09	4.67 - 4.69
4.10 - 4.12	

PINION HEAD SHIMS (mm)	
0.681 - 0.707	0.924 - 0.950
0.708 - 0.734	0.951 - 0.977
0.735 - 0.761	0.978 - 1.004
0.762 - 0.788	1.005 - 1.031
0.789 - 0.815	1.032 - 1.058
0.816 - 0.842	1.059 - 1.085
0.843 - 0.869	1.086 - 1.112
0.870 - 0.896	1.113 - 1.139
0.897 - 0.923	

OUTPUT SHAFT REAR SHIMS (mm)	
5.17 - 5.19	5.62 - 5.64
5.20 - 5.22	5.65 - 5.67
5.23 - 5.25	5.68 - 5.70
5.26 - 5.28	5.71 - 5.73
5.29 - 5.31	5.74 - 5.76
5.32 - 5.34	5.77 - 5.79
5.35 - 5.37	5.80 - 5.82
5.38 - 5.40	5.83 - 5.85
5.41 - 5.43	5.86 - 5.88
5.44 - 5.46	5.89 - 5.91
5.47 - 5.49	5.92 - 5.94
5.50 - 5.52	5.95 - 5.97
5.53 - 5.55	5.98 - 6.00
5.56 - 5.58	6.01 - 6.03
5.59 - 5.61	6.04 - 6.06

OUTPUT SPROCKET SPACER SHIMS (mm)	
2.64 - 2.84	3.48 - 3.68
2.85 - 3.05	3.69 - 3.89
3.06 - 3.26	3.90 - 4.10
3.27 - 3.47	4.11 - 4.31