TRANSAXLE

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NV T350 (A-578) MANUAL TRANSAXLE

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GENERAL INFORMATION

NV T350 MANUAL TRANSAXLE

NOTE: Safety goggles should be worn at all times when working on these transaxles.

This five speed is a constant-mesh manual transaxle. All gear ranges, except reverse, are synchronized. The reverse gear utilizes a brake and blocking ring for shifting ease. The reverse idler gear is supported on a sliding spindle idler shaft. The transaxle case is aluminum with a steel end–plate bearing cover. It is housed in a die-cast aluminum case featuring a two–piece, middle split design (Fig. 1).

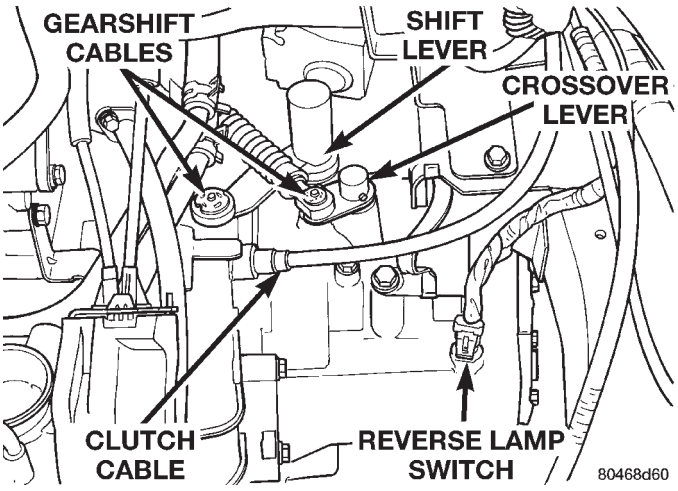


Fig. 1 External Transaxle Components

The NV T350 (A-578) transaxle internal components can be serviced only by separating the gear case from the bellhousing case.

CAUTION: The transaxle output shaft is serviced as a unit. No disassembly and reassembly is possible. Damage to the transaxle may result.

TRANSAXLE IDENTIFICATION INFORMATION

The transaxle model, assembly number, and build date are on a metal I.D. tag that is attached to the end cover of the transaxle (Fig. 2). This information is also shown on a bar code label that is attached to the front of the transaxle (Fig. 3).

NOTE: Transaxles use various final drive gear ratios in different vehicle applications. Therefore, it is necessary that the correct transaxle assembly number is used when ordering service parts.

The last eight digits of the Vehicle Identification Number (V.I.N.) are stamped on the case, below the back–up lamp switch.

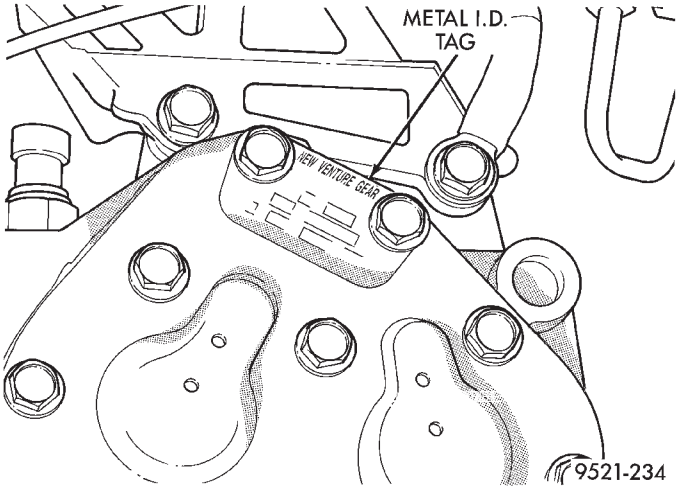


Fig. 2 Metal I.D. Tag

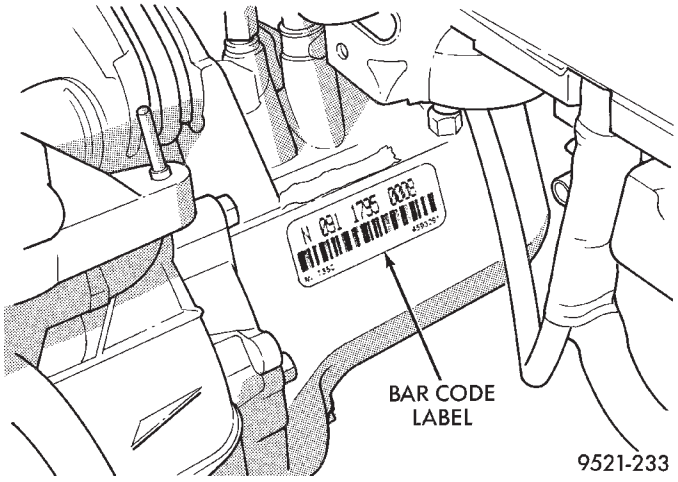


Fig. 3 Bar Code Label

NOTE: There are four different versions of this transaxle. There are no external differences between the models. Refer to the identification tag on the transaxle to determine which transaxle the vehicle is equipped with.

SELECTION OF LUBRICANT

NV T350 (A-578) transaxles use Mopar® Type M.S. 9417 Manual Transaxle Fluid. **Hypoid gear lube, engine oil, and/or automatic transmission fluid should not be used in this transaxle.** Hard shifting effort, bearing, gear, and/or synchronizer failure may occur if incorrect fluid is used.

SPECIAL ADDITIVES

The addition of any fluids to the transaxle, other than the fluid listed above, is not recommended. 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.

GENERAL INFORMATION (Continued)

SEALANTS

The sealant used to seal the transaxle case halves and input bearing is Mopar® Gasket Maker, Loctite® 518, or equivalent. The sealant used for the bearing end plate cover is Mopar® RTV.

GEAR RATIOS

CAUTION: All gears and shafts must not be interchanged with other transaxles; they will not function correctly.

The differential is a conventional arrangement of gears that is supported by tapered roller bearings. The final output gear turns the ring gear and differential assembly, thereby turning the drive axle shafts.

All transaxles have a torque capacity of 136 lb. ft. The gear ratios of each transaxle are shown in the following chart. The chart also shows which transaxles are available with the reverse–input shaft brake. This brake allows easier shifting into reverse and helps eliminate reverse gear clash.

GEARSHIFT PATTERN

The NV T350 (A-578) transaxle shift pattern is a modified H–pattern (Fig. 4). Overdrive fifth and reverse gears are in–line and outboard of the first through fourth gear positions.

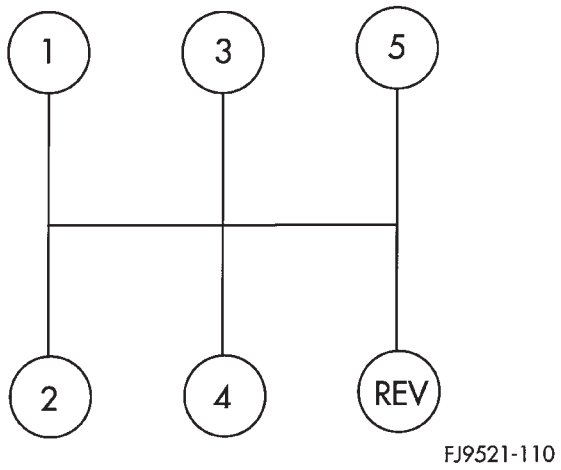


Fig. 4 NV T350 (A-578) Shift Pattern

ENGINE GEAR	2.0 SOHC	2.0 DOHC (U.S. ONLY)	2.0 SOHC or DOHC W/COMP PKG. SALES CODE ACR OR MEXICO	2.0 SOHC and DOHC-EUROPE ONLY	2.0 SOHC-RIGHT HAND DRIVE ONLY
1st	3.54	3.54	3.54	3.54	3.54
2nd	2.13	2.13	2.13	2.13	2.13
3rd	1.36	1.36	1.36	1.36	1.36
4th	1.03	1.03	1.03	1.03	1.03
5th	0.72	0.72	0.81	0.72	0.72
FINAL DRIVE	3.55	3.94	3.94	3.55	3.55
REVERSE BRAKE	NO	YES	YES	YES	YES
CLUTCH RELEASE SYSTEM	CABLE	CABLE	CABLE	CABLE	HYDRAULIC

DESCRIPTION AND OPERATION

SHIFT LEVERS

The shift levers are serviceable in the vehicle. The shift levers are different from each other and do not interchange.

SELECTOR LEVER

The selector shaft uses a lever with a weight on the end (Fig. 5). The weight is used to improve shift feel and reduce noise.

The selector lever is retained by two roll pins (one inside the other).

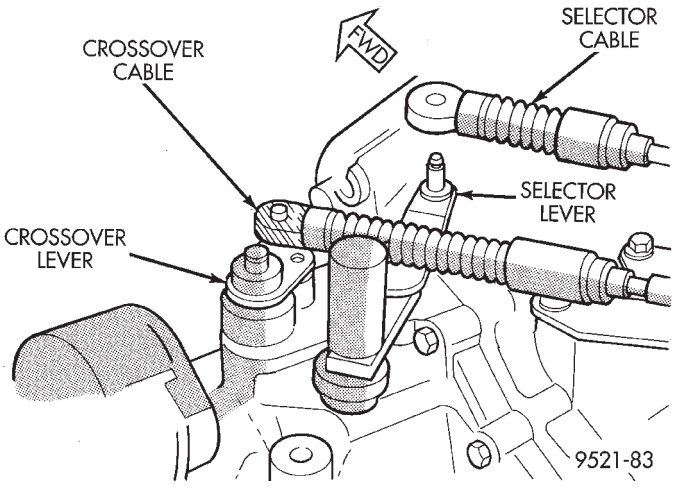


Fig. 5 Selector Lever

AXLE SEALS

The axle shaft seals are identical for both sides of the differential and will interchange.

DIAGNOSIS AND TESTING

COMMON PROBLEM CAUSES

The majority of transaxle malfunctions are a result of:

- Insufficient lubrication
- Incorrect lubricant
- Misassembled or damaged internal components
- Improper operation

HARD SHIFTING

Hard shifting may be caused by a misadjusted crossover cable. If hard shifting is accompanied by gear clash, synchronizer clutch and stop rings, or gear teeth may be worn or damaged.

Misassembled synchronizer components also cause shifting problems. Incorrectly installed synchronizer sleeves, struts, or springs can cause shift problems.

NOISY OPERATION

Transaxle noise is most often a result of worn or damaged components. Chipped, broken gear or synchronizer teeth, and brinnelled, spalled bearings all cause noise.

Abnormal wear and damage to the internal components is frequently the end result of insufficient lubricant.

SLIPS OUT OF GEAR

Transaxle disengagement may be caused by misaligned or damaged shift components, or worn teeth on the drive gears or synchronizer components. Incorrect assembly also causes gear disengagement.

LOW LUBRICANT LEVEL

Insufficient transaxle lubricant is usually the result of leaks, or inaccurate fluid level check or refill method. Leakage is evident by the presence of oil around the leak point. If leakage is not evident, the condition is probably the result of an underfill.

If air–powered lubrication equipment is used to fill a transaxle, be sure the equipment is properly calibrated. Equipment out of calibration can lead to an underfill condition.

CLUTCH PROBLEMS

Worn, damaged, or misaligned clutch components can cause difficult shifting, gear clash, and noise.

A worn or damaged clutch disc, pressure plate, or release bearing can cause hard shifting and gear clash.

SERVICE PROCEDURES

FLUID DRAIN AND FILL

All NV T350 (A-578) transaxles are equipped with a fill plug. The fill plug is located on the left side of the transaxle differential area (Fig. 6). The fluid level should be within 3/16 inch from the bottom of the transaxle fill hole (vehicle must be level when checking).

All NV T350 (A-578) transaxles are equipped with a drain plug. The drain plug is located on the lower right side of the transaxle differential housing (Fig. 7). Tighten drain plug to 28 N·m (250 in. lbs.)

Dry fill lubricant capacity is approximately 1.9-2.2 liters (4.0-4.6 pints). Wipe the outside of the transaxle if any lubricant spills.

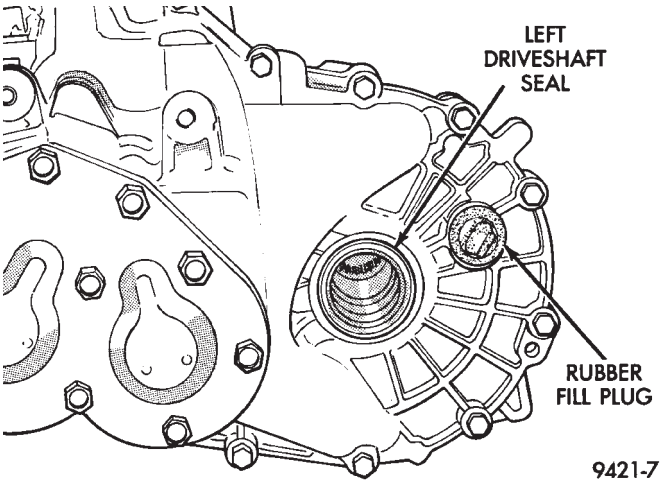


Fig. 6 Fill Plug Location

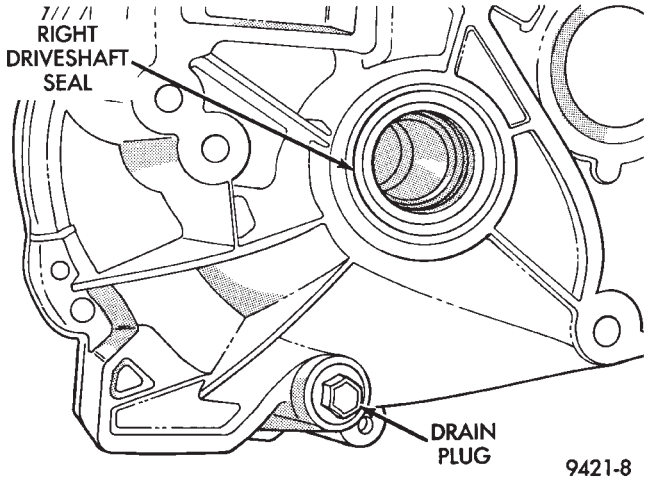


Fig. 7 Drain Plug Location

REMOVAL AND INSTALLATION

GEARSHIFT KNOB

REMOVAL

(1) Pull shifter boot down and away from shifter roll pin.

(2) Pry legs of shift knob away from shift lever roll pin using a flat blade pry tool.

(3) Remove knob from shifter handle (Fig. 8).

INSTALLATION

(1) For installation, reverse removal procedure.

GEARSHIFT BOOT

REMOVAL

(1) Remove shifter knob. Refer to gearshift knob removal.

(2) Remove the console assembly. Refer to Group 23, Body.

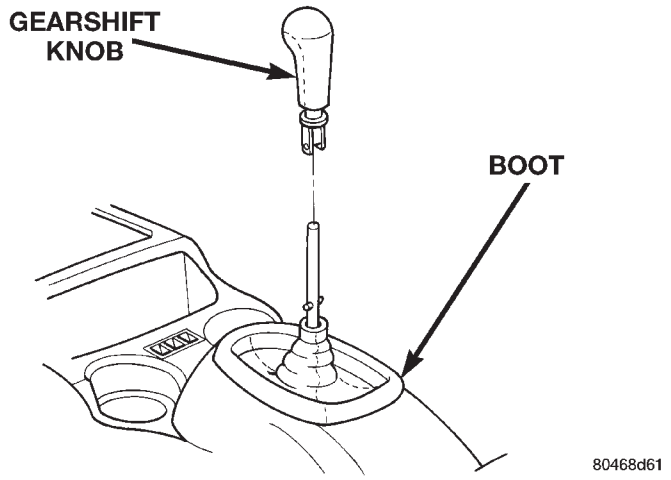


Fig. 8 Gearshift Knob

(3) Snip the plastic retaining clips at the base of the boot (Fig. 9). Remove the boot from the gearshift mechanism.

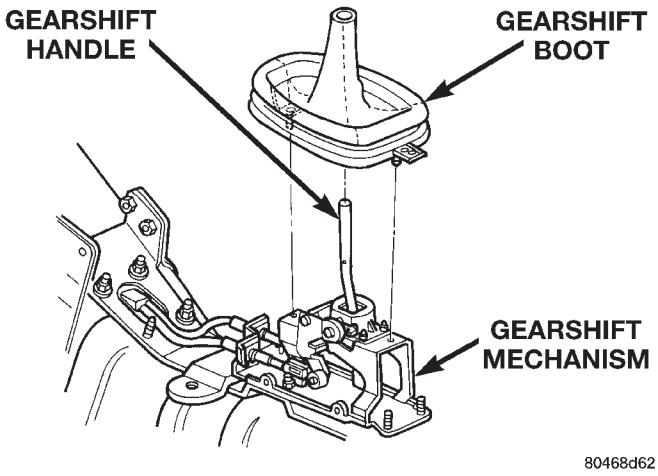


Fig. 9 Gearshift Boot

INSTALLATION

(1) For installation, reverse removal procedure. Install new plastic retaining clips.

GEARSHIFT CABLES

Use this procedure if either of the shift cables require replacement.

REMOVAL

(1) Disconnect Power Distribution Center from battery tray and set aside.

(2) Remove air cleaner inlet horn.

(3) Remove battery and battery tray.

(4) Disconnect gear shift cable ends from transaxle shift levers (Fig. 10) (Fig. 11).

REMOVAL AND INSTALLATION (Continued)

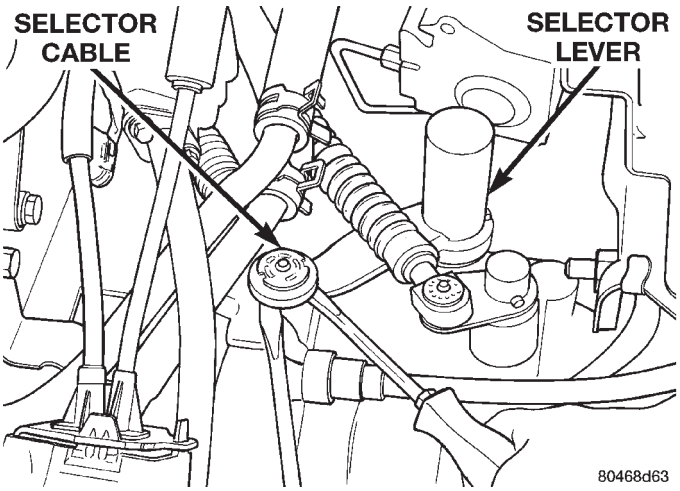


Fig. 10 Selector Cable Removal

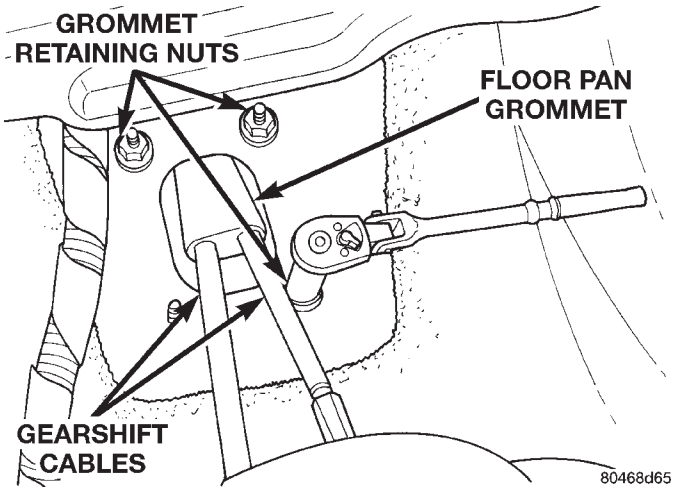


Fig. 12 Grommet Retaining Nuts (Interior)

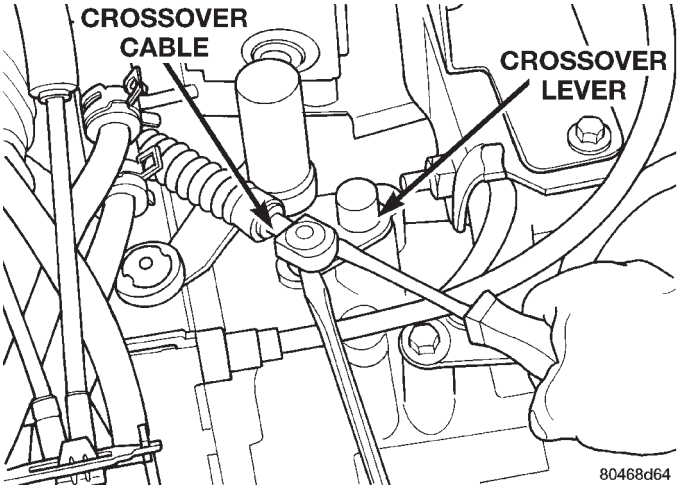


Fig. 11 Crossover Cable Removal

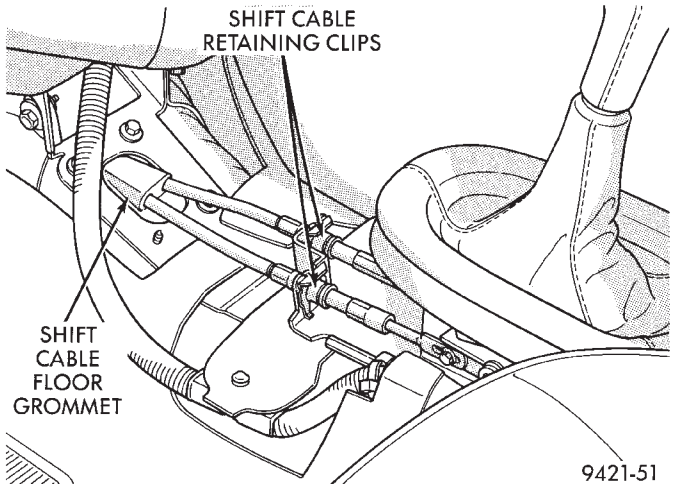


Fig. 13 Cable Retaining Clips

CAUTION: Pry up with equal force on both sides of shifter cable isolator bushings to avoid damaging cable isolator bushings.

(5) Remove cable to bracket retaining clips at transaxle.

CAUTION: It is recommended that new cable retaining clips be used for reinstallation.

(6) Pull cables up out of transaxle bracket.

(7) Remove console from vehicle. Refer to Group 23, Body.

(8) Remove floor pan grommet retaining nuts (Fig. 12).

(9) Remove cable retaining clips at shifter (Fig. 13).

CAUTION: It is recommended that new cable retaining clips be used for reinstallation.

(10) Disconnect shift cables from shifter. Pry with equal force on both sides of shifter cable isolator bushings to avoid damaging bushings.

(11) Lift vehicle on hoist. Remove self-tapping screw securing grommet plate to underbody heat shield and floor pan (Fig. 14).

(12) Detach cables from cable support clip in tunnel above exhaust catalyst.

(13) Remove shift cable assembly from vehicle.

INSTALLATION

CAUTION: Gearshift cable bushings must not be lubricated or the bushings will swell and split.

(1) To install, reverse removal procedure. After cables have been replaced, cable adjustment should be checked. Refer to cable adjustment procedure in this section.

REMOVAL AND INSTALLATION (Continued)

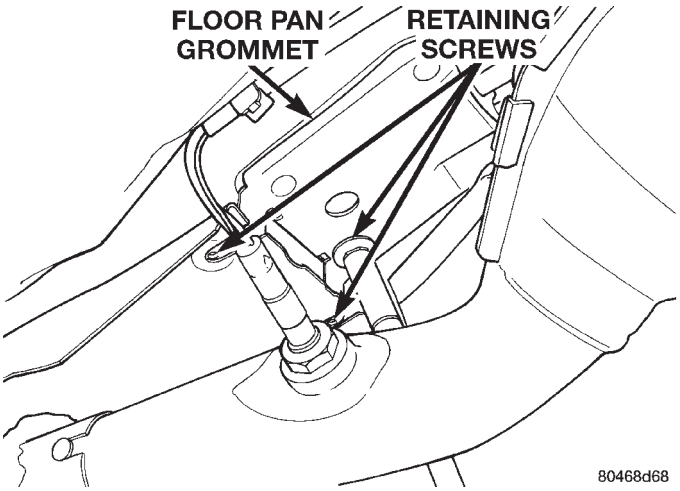


Fig. 14 Grommet Retaining Screw (Underbody)

CAUTION: Only the crossover cable is adjustable. The selector cable does not have any adjustment capabilities.

GEARSHIFT CROSSOVER CABLE ADJUSTMENT

(1) Remove shift console from vehicle.

(2) Loosen adjusting screw on crossover cable at shifter (Fig. 15).

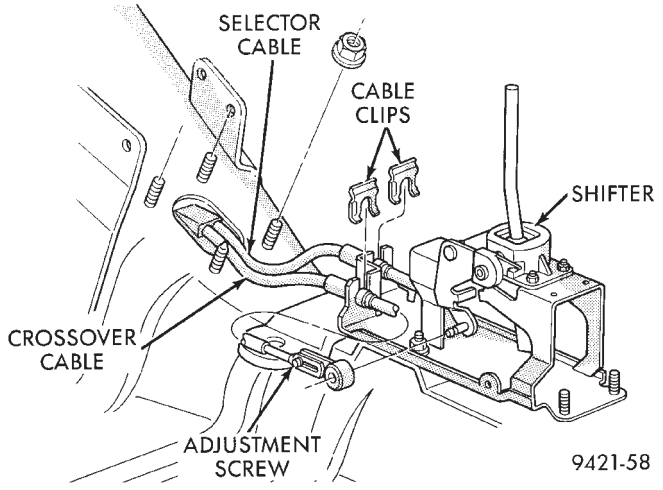


Fig. 15 Crossover Cable Adjustment Screw

(3) Pin transaxle crossover lever in 3-4 neutral position using a 1/4 inch drill bit. Align hole in crossover lever with the hole in the boss on the transaxle case (Fig. 16). Be sure drill bit goes into transaxle case at least one half inch.

(4) The shifter is spring–loaded and self–centering. Allow shifter to rest in its neutral position. Torque adjustment screw to 8 N·m (70 in. lbs.). Care must be taken to avoid moving the shift mechanism off-center during screw tightening.

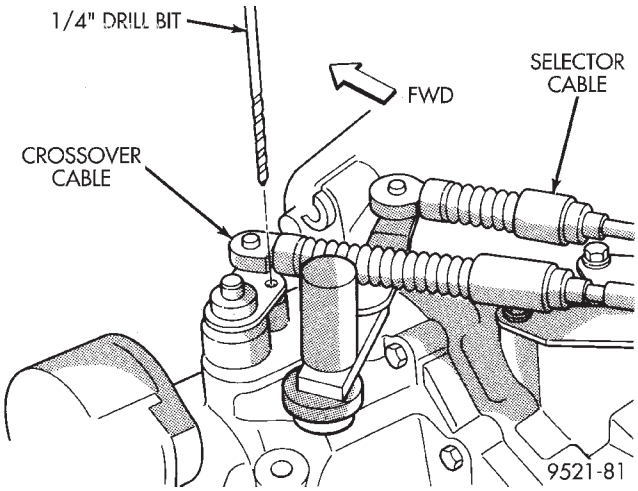


Fig. 16 Crossover Lever Pin Procedure

(5) Remove drill bit from transaxle case and perform functional check by shifting transaxle into all gears.

(6) Reinstall center shift console. Blouse boot out around console. Seat boot lip on top of console.

GEARSHIFT MECHANISM REPLACEMENT

REMOVAL

(1) Remove shifter knob.

(2) Remove console assembly. Refer to Group 23, Body for procedure.

(3) Remove shifter boot.

(4) Remove gearshift cables.

(5) Remove the parking brake mechanism. Refer to Group 5, Brakes for procedure.

(6) Remove the airbag control module. Refer to Group 8M, Passive Restraint System for procedure.

(7) Remove the two remaining nuts at the base of the gearshift mechanism (Fig. 17). Remove shifter.

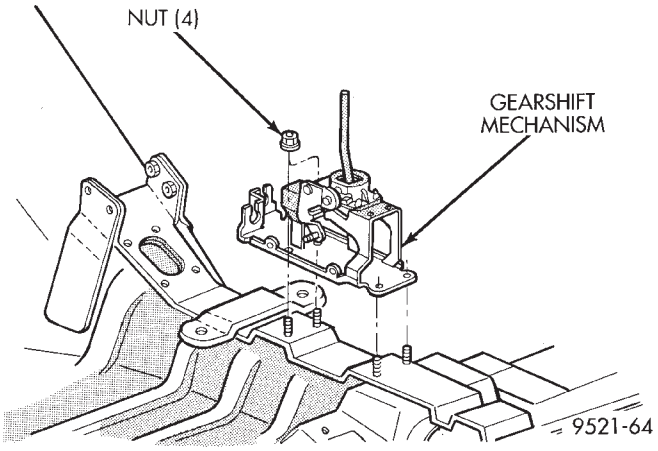


Fig. 17 Gearshift Mechanism

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) For installation, reverse removal procedure.

VEHICLE SPEED SENSOR DRIVE GEAR

REMOVAL

(1) Raise vehicle on hoist.

(2) Remove wiring connector from speed sensor.

CAUTION: Clean area around speed sensor before removing. This prevents the possibility of dirt from entering the transaxle during speed sensor removal.

(3) Remove speed sensor retaining bolt (Fig. 18).

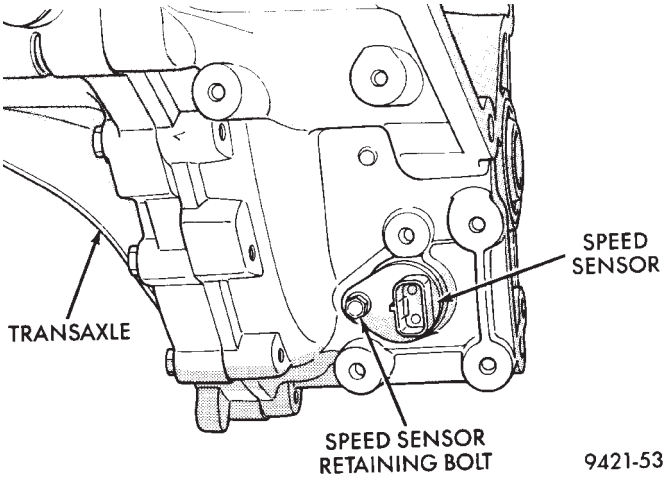


Fig. 18 Speed Sensor Retaining Bolt

(4) Remove speed sensor from transaxle.

CAUTION: Carefully remove vehicle speed sensor so that sensor drive gear does not fall into transaxle. Should sensor drive gear fall into the transaxle during sensor removal, drive gear must be reattached to sensor.

(5) Remove speed sensor drive gear from speed sensor.

INSTALLATION

(1) To install, reverse removal procedure.

(2) Confirm vehicle speedometer is functioning properly following installation.

BACK-UP LAMP SWITCH

The back-up lamp switch is located on the top left front side of the transaxle case (Fig. 19).

REMOVAL

(1) Lift vehicle on hoist.

(2) From bottom side of vehicle, remove wiring connector from switch.

(3) Unscrew switch from transaxle.

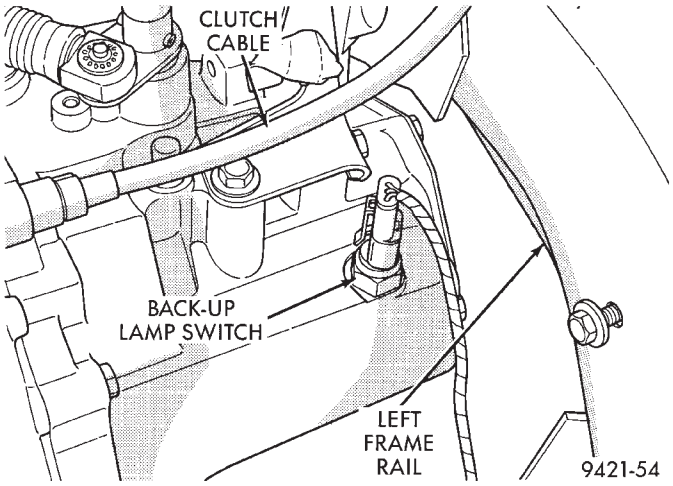


Fig. 19 Back-up Lamp Switch

INSTALLATION

(1) To install, reverse removal procedure. Teflon tape or equivalent must be used on switch threads.

CAUTION: Do not overtighten switch.

(2) Confirm back-up lamps are functioning properly following installation.

CROSSOVER LEVER

REMOVAL

(1) Remove crossover cable. Refer to Gearshift Cable removal.

(2) Using a pin punch, remove the crossover roll pin from lever.

(3) Pull up and remove the crossover lever from the transaxle crossover shaft (Fig. 20).

INSTALLATION

(1) For installation, reverse removal procedure. Replace the roll pin that was removed with a new one.

SELECTOR LEVER

The selector shaft uses a lever with a weight on the end. The weight is used to improve shift–feel and reduce noise.

The selector lever is retained by two roll pins (one inside the other).

REMOVAL

(1) Remove the selector cable. Refer to Gearshift Cable removal.

(2) Using a pin punch, remove both roll pins from the lever.

(3) Pull up and remove the selector lever from the transaxle selector shaft

REMOVAL AND INSTALLATION (Continued)

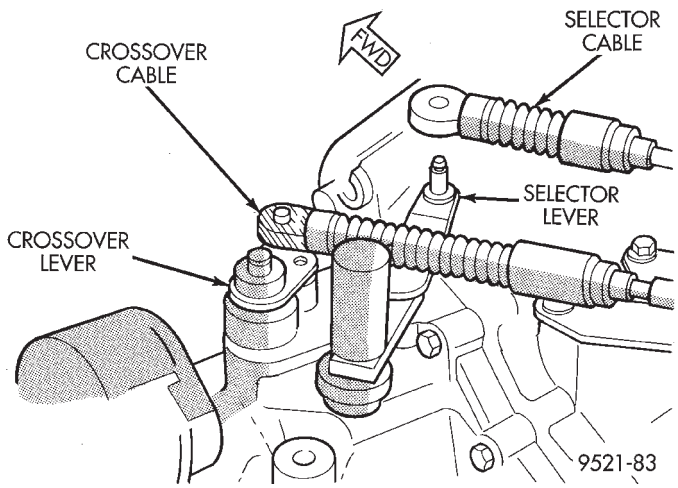


Fig. 20 Crossover Lever

INSTALLATION

(1) For installation, reverse removal procedure. Replace the roll pins that were removed with new ones. The correct orientation for the roll pins is shown in (Fig. 21).

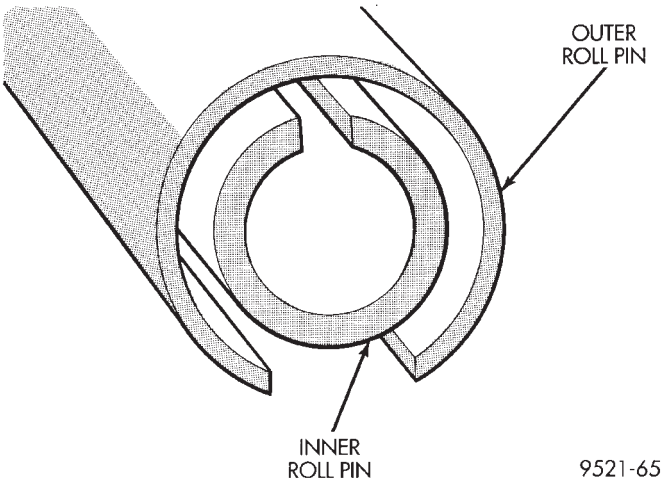


Fig. 21 Correct Orientation of Roll Pins

AXLE SEALS

The axle shaft seals are identical for both sides of the differential and will interchange.

REMOVAL

(1) Remove axle shaft. Refer to Group 2, Suspension and Driveshafts for service procedures.

(2) Insert a flat–blade pry tool at outer edge of axle shaft seal (Fig. 22).

(3) Tap on the pry tool with a small hammer and remove axle shaft seal.

INSTALLATION

(1) Clean axle shaft seal bore of any excess sealant.

(2) Align axle shaft seal with axle shaft seal bore.

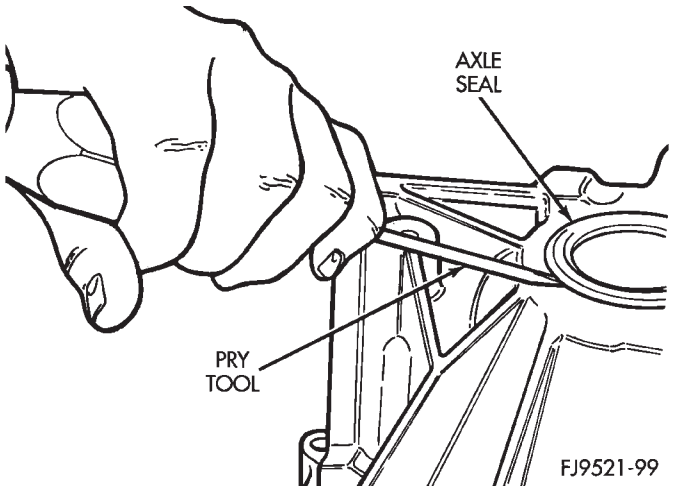


Fig. 22 Axle Shaft Seal Removal

(3) Install axle seal on tool #6709 and C-4171 and insert into axle shaft seal bore.

(4) Tap seal into position.

SHIFT SHAFT SEALS

It is **not** necessary to remove the shift shafts from the transaxle to service the shift shaft seals.

REMOVAL

(1) Using a pick tool, pry up on the shift shaft seal and remove seal from bore.

INSTALLATION

(1) Position new shift shaft seal in bore.

(2) Install shift shaft seal into bore using an appropriate size deep–well socket.

TRANSAXLE

NOTE: The transaxle can be removed from the vehicle without having to remove the engine.

All transaxle components are serviced with the transaxle out of the vehicle with the exception of:

- Selector shaft seal
- Crossover shaft seal
- End plate
- Axle shaft seals
- Shift levers
- Back up lamp switch
- Vehicle speed sensor

REMOVAL

(1) Disconnect the battery.

(2) Pull Power Distribution Center up and out of its holding bracket. Set Power Distribution Center aside to gain clearance.

(3) Remove battery heat shield and remove battery from engine compartment. Remove battery tray from

REMOVAL AND INSTALLATION (Continued)

engine compartment. Disconnect cruise control (if equipped).

(4) Remove vehicle speed sensor wire.

(5) Disconnect back-up lamp switch wiring at transaxle.

CAUTION: Pry up with equal force on both sides of shifter cable isolator bushing to avoid damaging cable isolator bushing.

(6) Disconnect both gear shift cables ends from transaxle shift levers (Fig. 23).

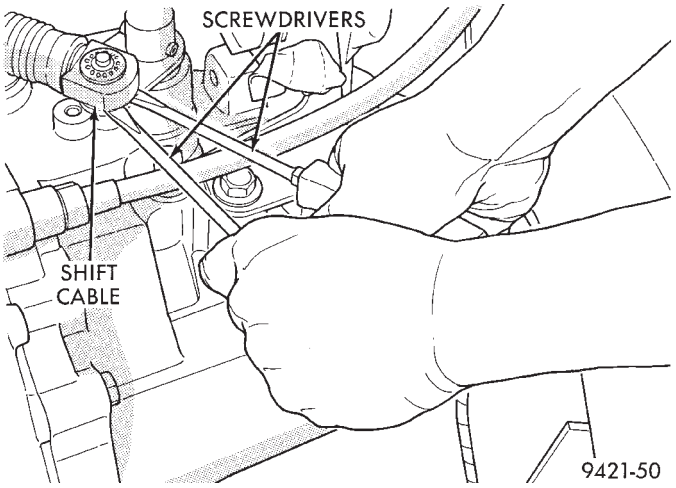


Fig. 23 Shift Cables

(7) Remove clutch housing vent cap, exposing the clutch cable end and clutch release lever. Then remove clutch cable from transaxle bellhousing (Fig. 24) (Fig. 25).

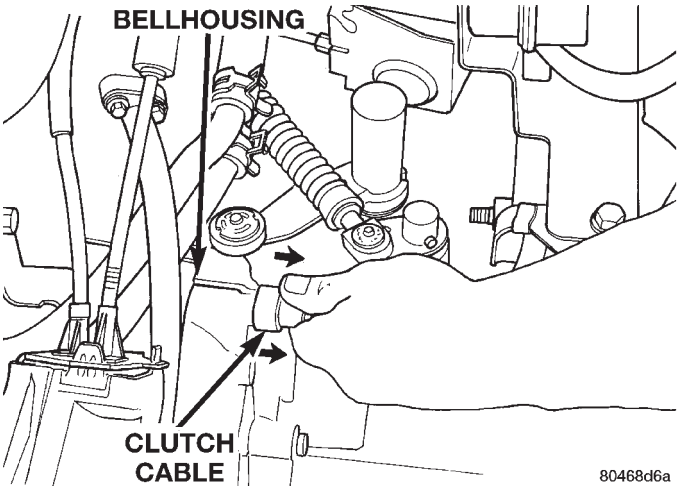


Fig. 24 Pull Clutch Cable Backward

(8) Remove shift cable mounting bracket (Fig. 26).

(9) Remove Accelerator cable shield (if equipped).

(10) Remove intake manifold support bracket (if equipped) and upper starter bolt.

(11) Remove upper bellhousing bolts.

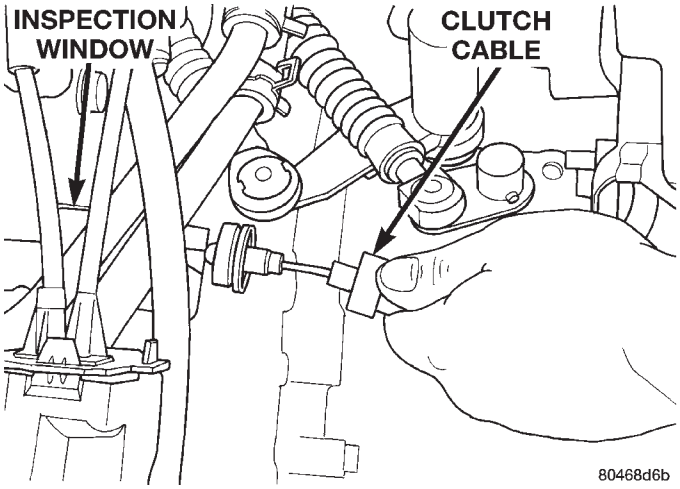


Fig. 25 Remove Clutch Cable From Lever

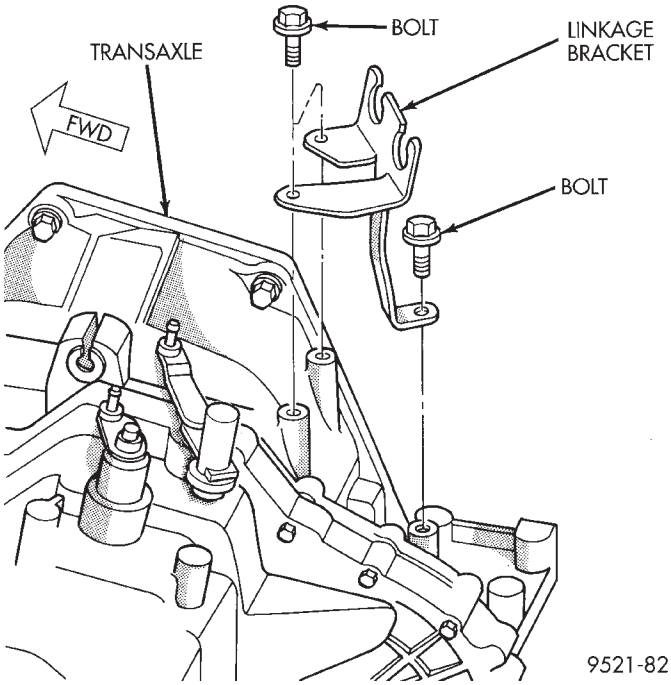


Fig. 26 Linkage Bracket Bolts

(12) Install engine bridge fixture and support engine.

(13) Lift vehicle on hoist and remove front wheels.

(14) Drain fluid from transaxle.

(15) Remove both front driveshafts. Refer to Group 2, Suspension for procedure.

CAUTION: When reinstalling driveshafts, new driveshaft retaining clips must be used. Do not reuse old clips. Failure to use new clips may result in disengagement of inner constant-velocity joint.

(16) Remove power hop damper and bracket.

(17) Remove lower starter bolt (Fig. 27).

(18) Remove transaxle to rear lateral bending strut from engine and transaxle (Fig. 28).

REMOVAL AND INSTALLATION (Continued)

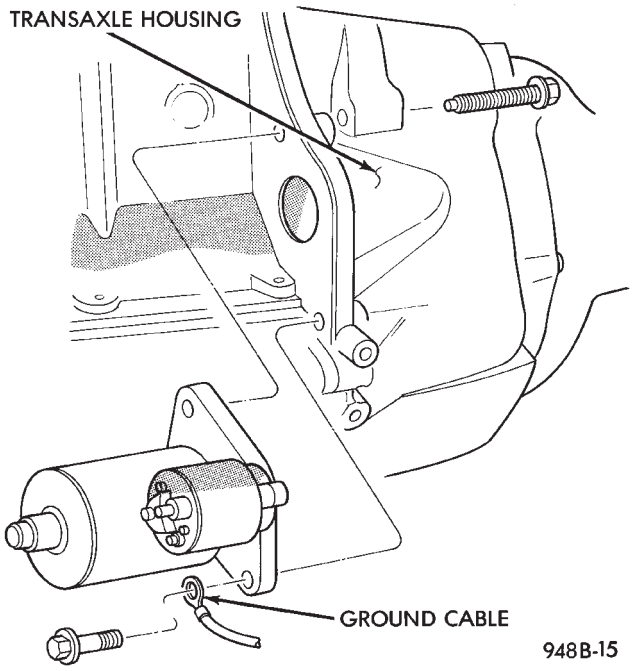


Fig. 27 Starter Bolts

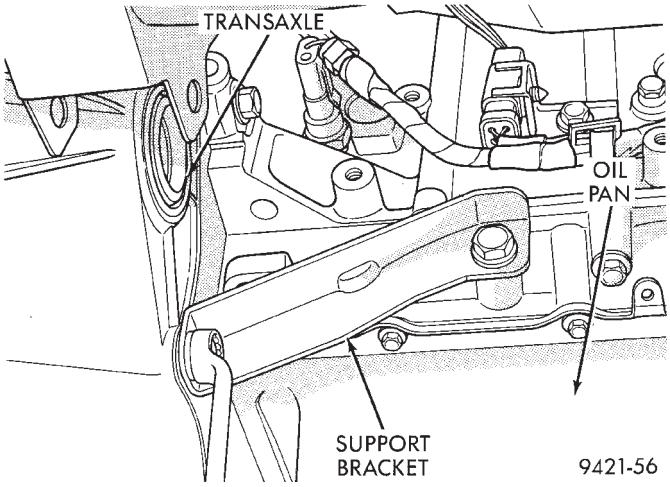


Fig. 28 Bracket Removal

(19) Support transaxle with a transmission jack.

(20) Remove front motor mount through-bolt. Remove front motor mount bolts from engine and transaxle.

(21) Remove lower dust–shield screw and dust shield.

(22) Rotate engine crankshaft clockwise to expose driveplate–to–modular clutch bolts.

NOTE: Before removal of bolts, mark the driveplate and clutch pressure plate for ease of assembly alignment.

(23) Remove four driveplate–to–modular clutch bolts to separate driveplate from clutch assembly.

(24) Push modular clutch assembly into the transaxle bellhousing for easier transaxle removal.

(25) Remove frame rail to left transaxle mount through-bolt (Fig. 29).

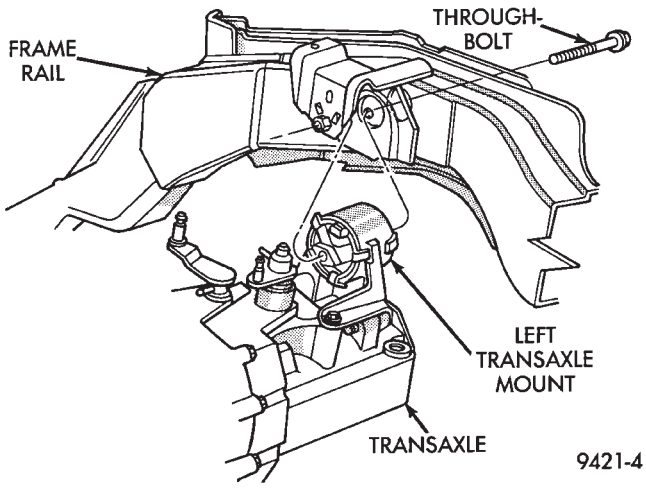


Fig. 29 Left Transaxle Mount Through-Bolt

(26) Remove left transaxle mount from transaxle. Then push mount up to gain clearance for transaxle removal.

(27) Remove transaxle from vehicle.

(28) Remove modular clutch assembly from transaxle input shaft.

INSTALLATION

(1) To install transaxle, reverse removal procedure.

(2) After installing transaxle, fill transaxle to bottom of fill plug hole (vehicle level on hoist). Fill transaxle with Mopar® type M.S. 9417 Manual Transaxle Fluid before lowering vehicle to floor.

(3) Verify that vehicle's back-up lights and speedometer are functioning properly. Crossover cable adjustment procedure is required after installing transaxle in car to ensure proper shifter adjustment. Road test vehicle for proper transaxle function.

DISASSEMBLY AND ASSEMBLY

TRANSAXLE

The NV T350 (A-578) transaxle internal components can be serviced only by separating the gear case from the bellhousing case.

CAUTION: The transaxle output shaft is serviced as a unit. No disassembly and reassembly is possible. Damage to the transaxle may result.

DISASSEMBLY

(1) Place transaxle on bench.

(2) Remove shift levers. Remove transaxle case half bolts (Fig. 30).

DISASSEMBLY AND ASSEMBLY (Continued)

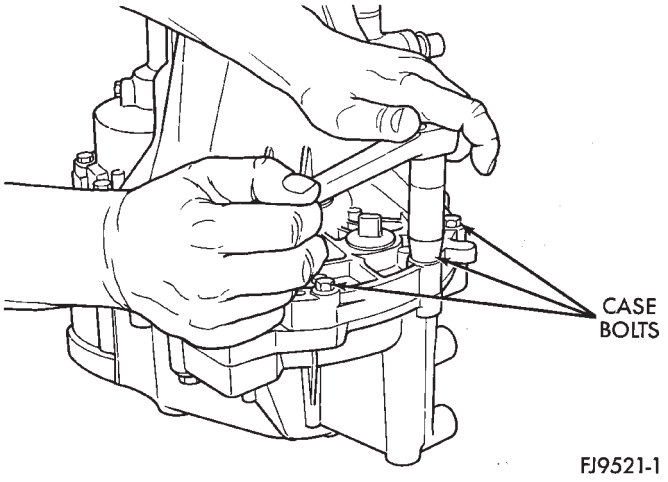


Fig. 30 Case Bolts

(3) Place two screwdrivers into the slots provided in the case halves near the dowels (Fig. 31). Separate the case halves (Fig. 32).

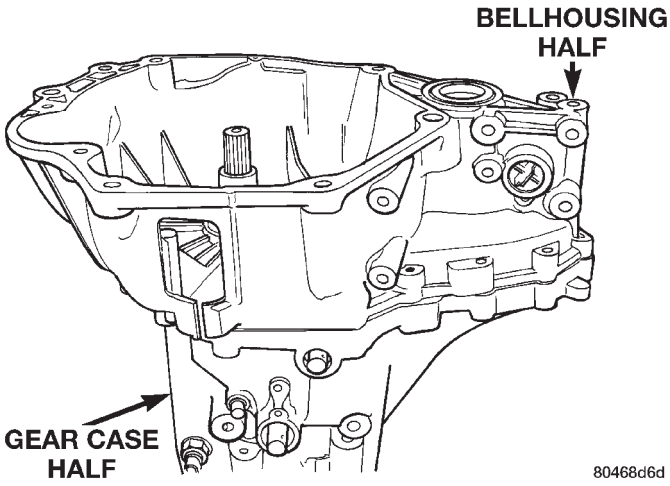


Fig. 31 Transaxle Case Halves

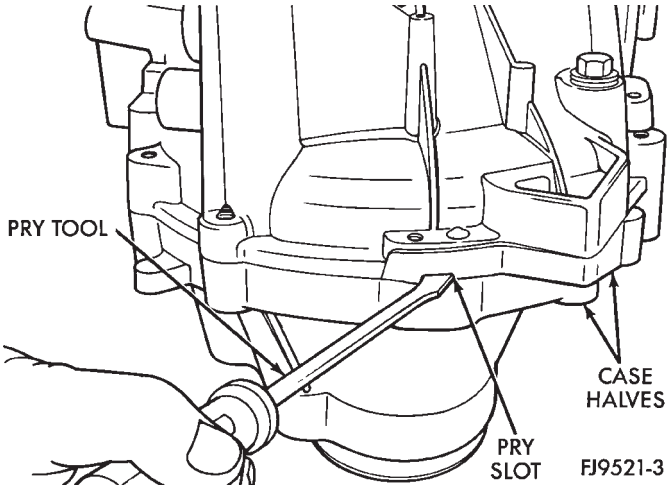


Fig. 32 Separate Case Halves

(4) Remove bellhousing half from gear case half (Fig. 33).

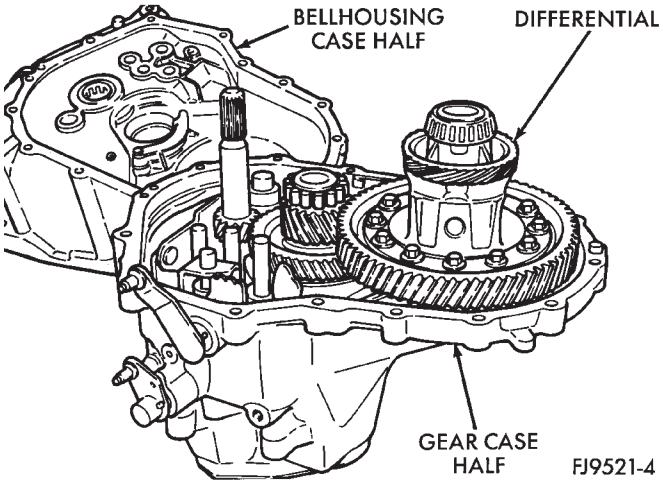


Fig. 33 Bellhousing Case Half Removal

(5) Remove output shaft roller bearing from output shaft.

(6) Remove differential assembly (Fig. 34).

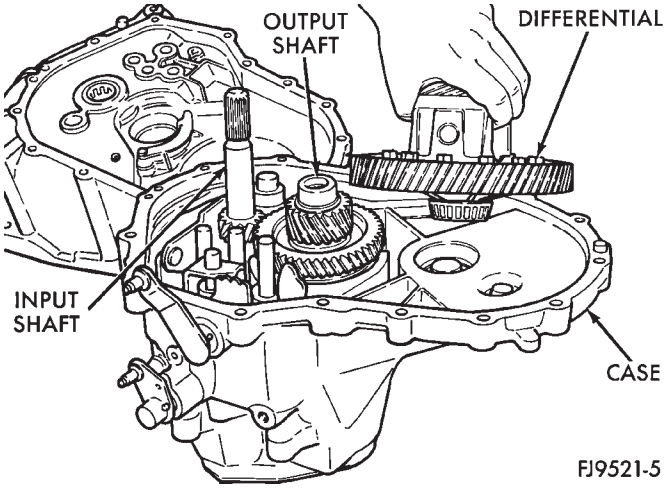


Fig. 34 Differential Assembly Removal

(7) Remove reverse idler shaft bolt (Fig. 35). Remove reverse idler gear (Fig. 36).

(8) Remove two screws retaining reverse fork bracket (Fig. 37). Remove reverse fork bracket and reverse cam blockout assembly (Fig. 38).

(9) Using snap–ring pliers, remove selector shaft spacer (Fig. 39).

(10) Pull the selector shaft shift pin out of the slot in the blocker assembly. Turn selector shaft up and out of the way (Fig. 40).

(11) Remove transaxle end cover (Fig. 41) (Fig. 42).

(12) Remove two snap rings retaining the output shaft and the input shaft to the bearings (Fig. 43).

(13) Using bench fixture and shims provided (Miller tools # 6785, 6785-1, and 6785-2), turn transaxle over. Install transaxle onto bench fixture (Fig. 44).

DISASSEMBLY AND ASSEMBLY (Continued)

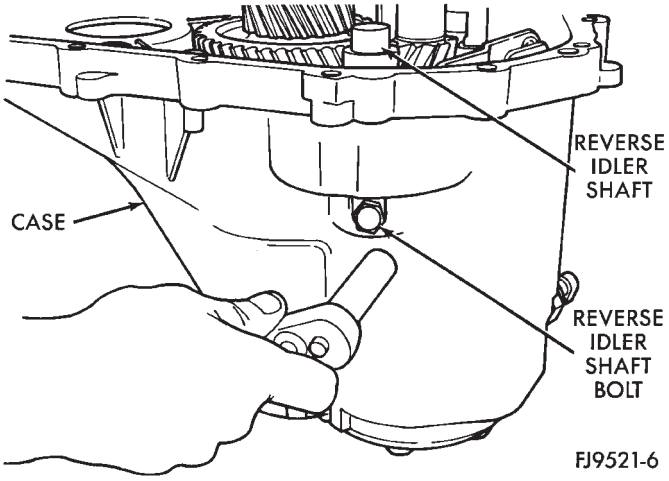


Fig. 35 Reverse Idler Shaft Bolt Removal

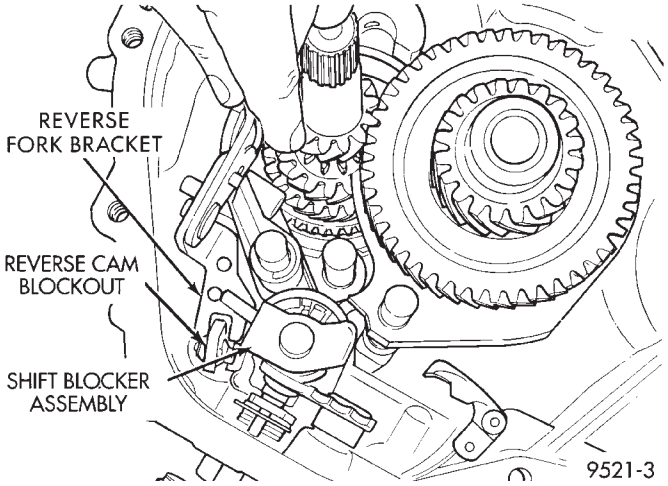


Fig. 38 Remove Reverse Fork Bracket

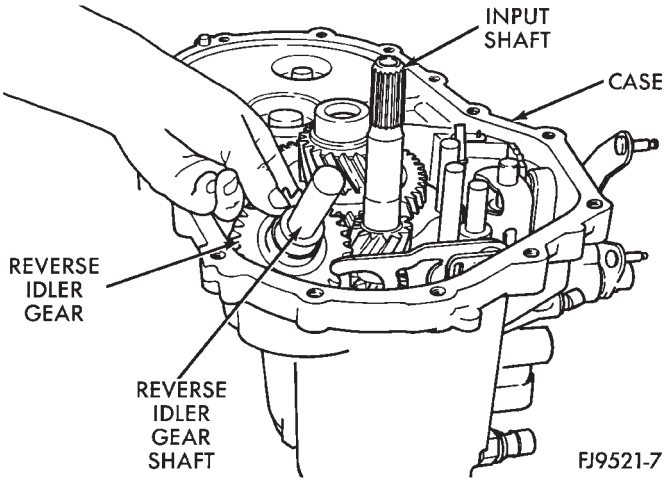


Fig. 36 Reverse Idler Gear Removal

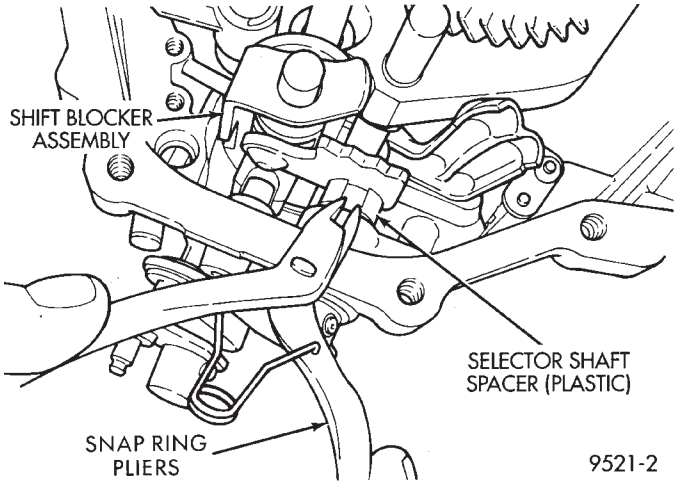


Fig. 39 Remove Selector Shaft Spacer

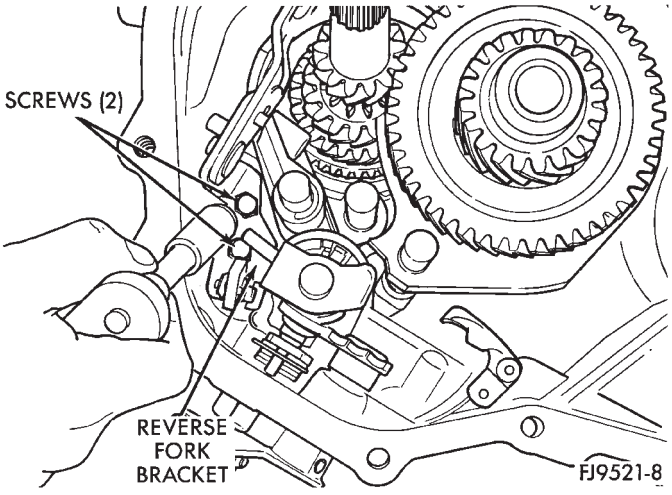


Fig. 37 Screws Retaining Reverse Fork Bracket

Verify shim spacers are in position on bench fixture. Install transaxle into shop press.

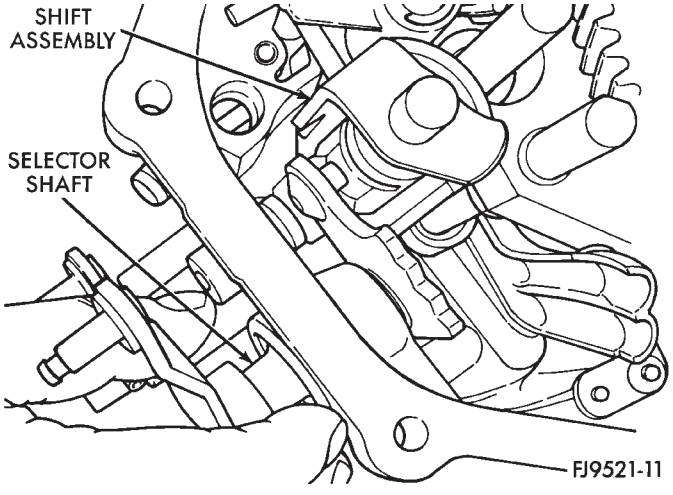


Fig. 40 Selector Shaft

(14) Install bearing fixture Miller tool #6768 onto transaxle end bearings (Fig. 45). Verify tool is properly aligned to input and output shafts.

DISASSEMBLY AND ASSEMBLY (Continued)

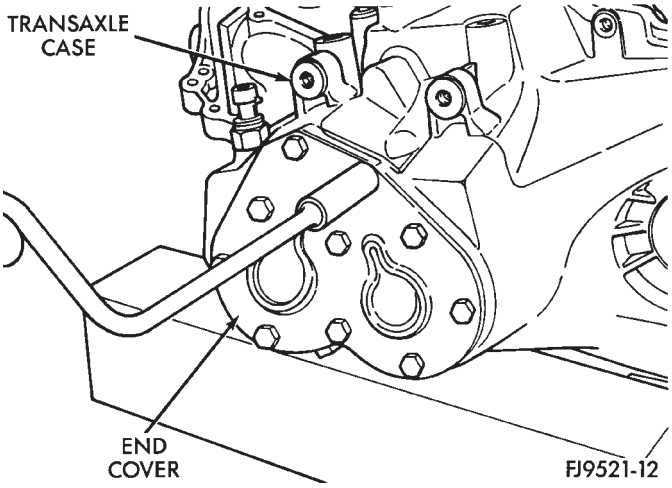


Fig. 41 Transaxle Cover Removal

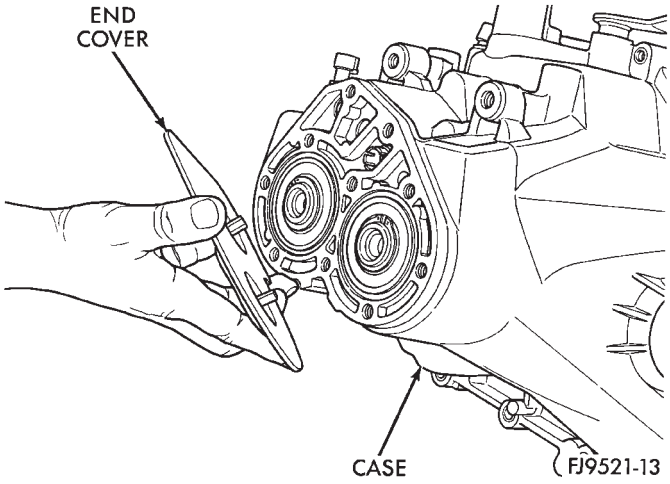


Fig. 42 End Cover

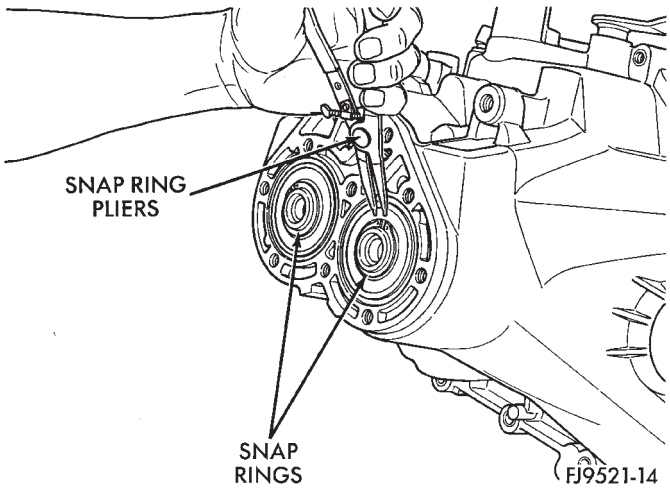


Fig. 43 Snap Rings Retaining Bearings

CAUTION: The oil dams in the input and output shafts can be damaged while pressing on the shafts if the bearing fixture is not used properly.

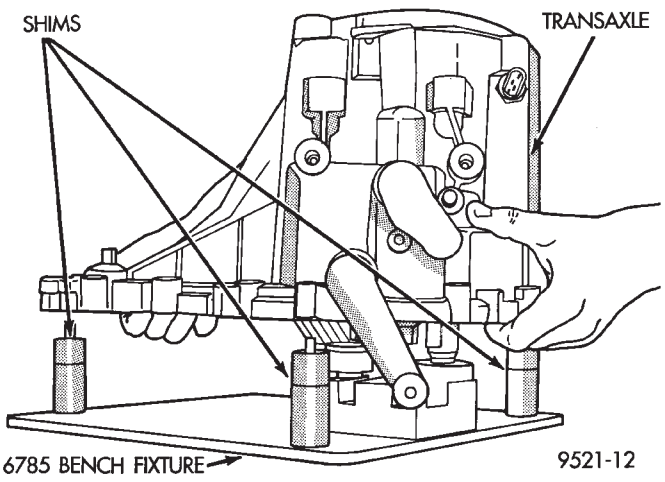


Fig. 44 Bench Fixture

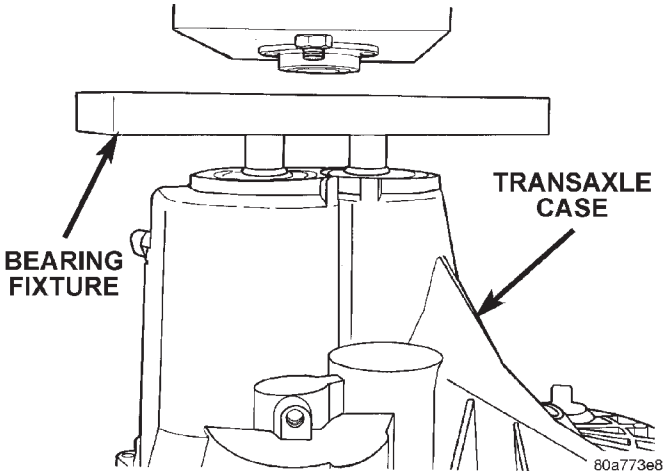


Fig. 45 Bearing Fixture

(15) Install transaxle gear case into shop press. Press output and input shaft assemblies out of case (Fig. 46).

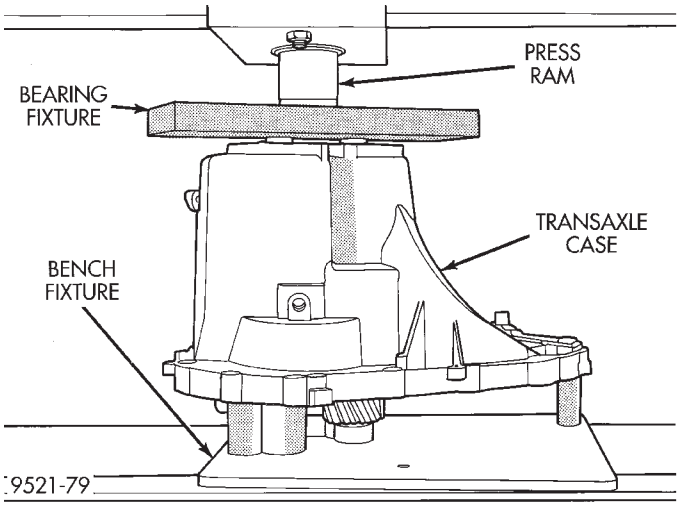


Fig. 46 Pressing Gears Out of Case

DISASSEMBLY AND ASSEMBLY (Continued)

(16) Remove transaxle from press.

(17) Carefully remove transaxle case from the shaft assemblies and bench fixture (Fig. 47). Be sure the oil–feed trough to the end bearings is not damaged (Fig. 48).

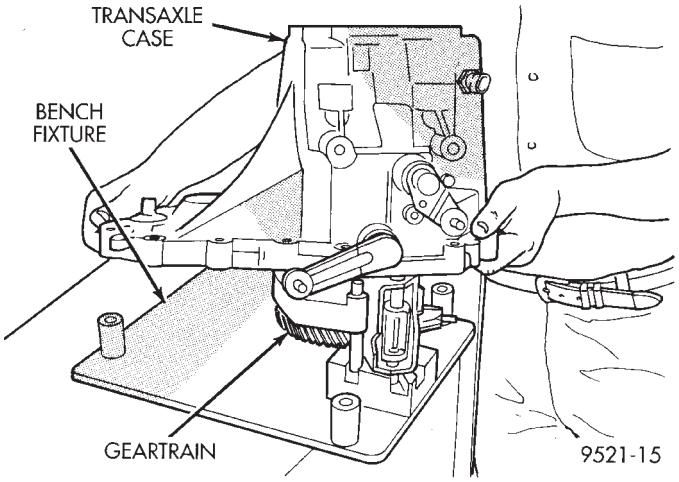


Fig. 47 Transaxle Case Removal

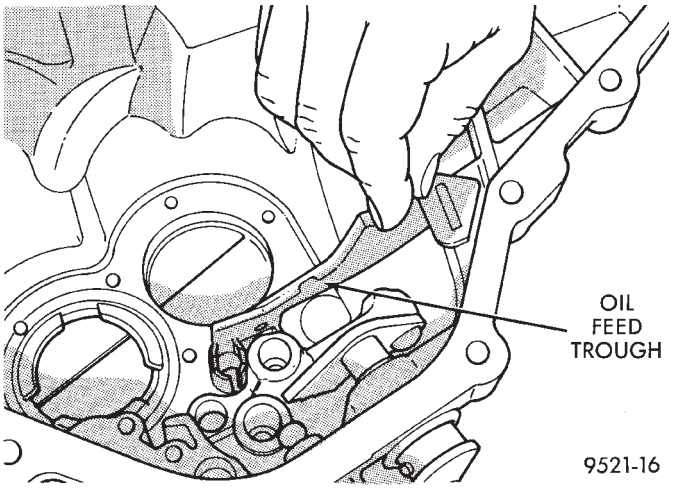


Fig. 48 Oil Feed Trough

(18) **TRANSAXLE W/REVERSE BRAKE:** Remove the reverse brake blocking ring, shim, reverse brake friction cone, bearing and race from the input shaft assembly (Fig. 49) (Fig. 50) (Fig. 51) (Fig. 52) (Fig. 53). **TRANSAXLE W/O REVERSE BRAKE:** Remove plastic spacer from the input shaft assembly.

(19) Remove the shift blocker assembly from the bench fixture (Fig. 54).

(20) Remove the 1-2 shift fork from the output shaft (Fig. 55).

(21) Remove input and output shaft assemblies from bench fixture (Fig. 56).

CAUTION: The output shaft assembly is serviced as an assembly. Do not try to repair any component on the output shaft. If the 1-2 synchronizer or gear fails, it is necessary to replace the complete output shaft assembly.

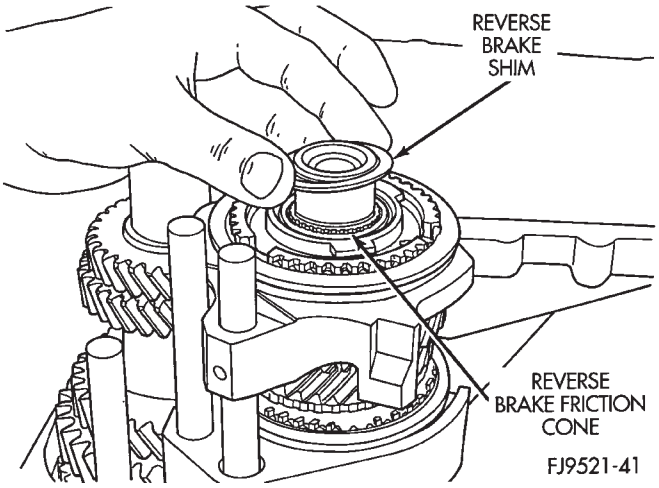


Fig. 49 Reverse Brake Shim

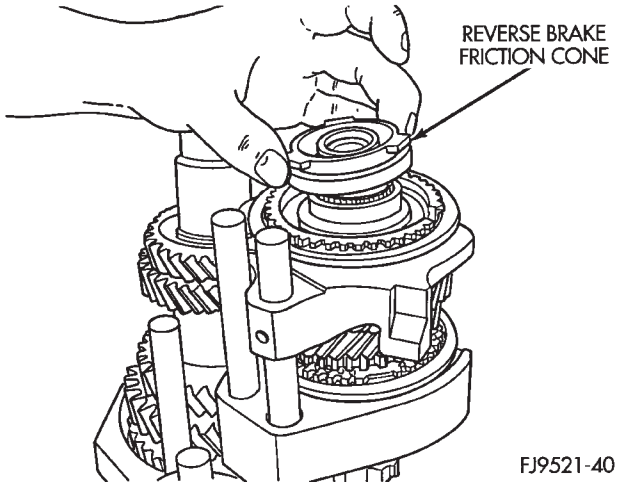


Fig. 50 Reverse Brake Friction Cone

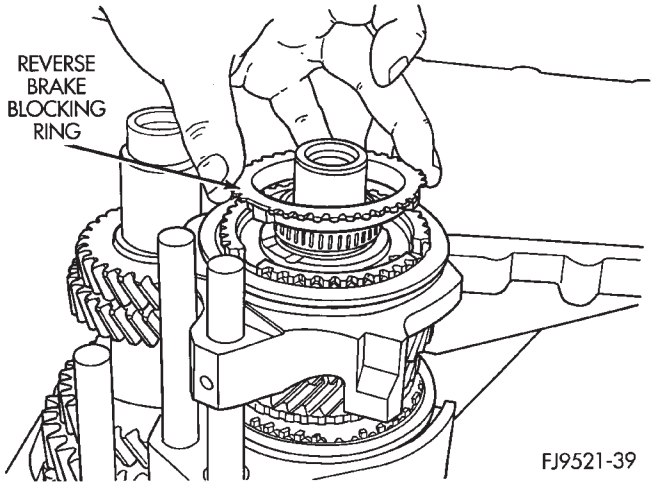


Fig. 51 Reverse Brake Blocking Ring

DISASSEMBLY AND ASSEMBLY (Continued)

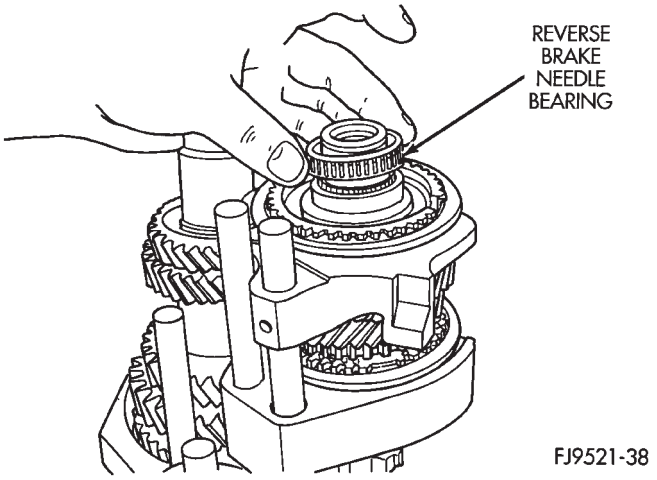


Fig. 52 Reverse Brake Needle Bearing

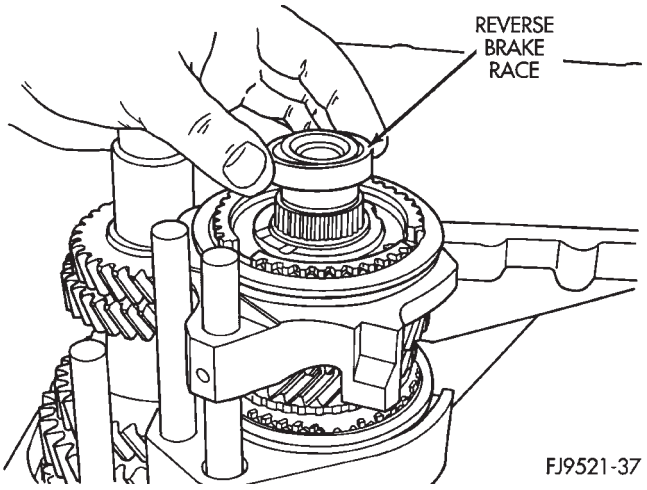


Fig. 53 Reverse Brake Race

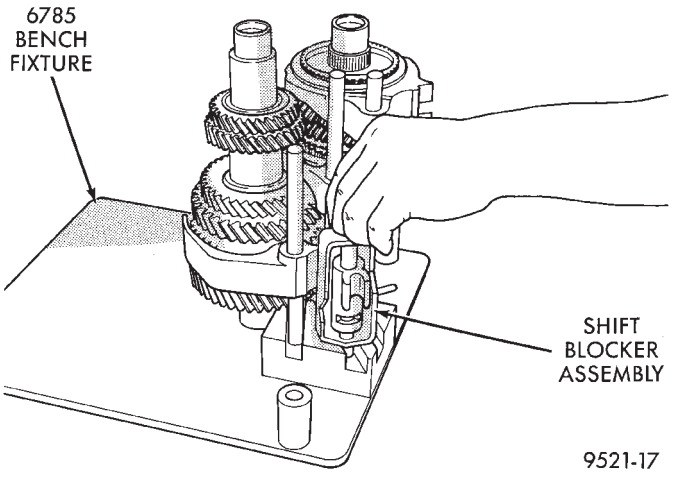


Fig. 54 Shift Blocker Removal

ASSEMBLY

The sealant used to seal the transaxle case halves is Mopar® Gasket Maker, Loctite® 518, or equivalent.

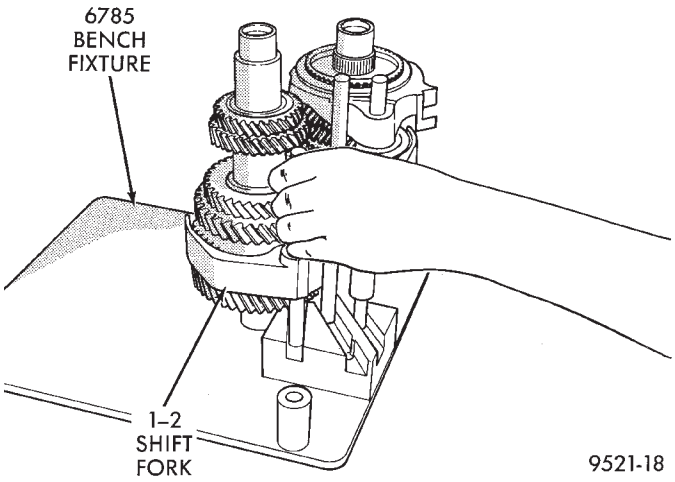


Fig. 55 1–2 Shift Fork Removal

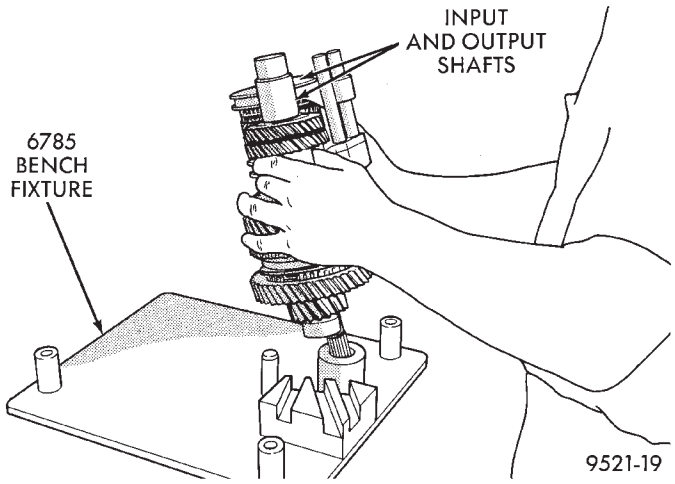


Fig. 56 Gear Train Removal

The sealant used for the bearing end plate cover is Mopar® RTV.

(1) Verify bench fixture shims are removed from bench fixture. Install output and input shafts into bench fixture (Miller tool #6785) (Fig. 57).

(2) Install shift rails and forks into bench fixture (Fig. 58).

(3) Install shift blocker assembly into bench fixture (Fig. 59).

(4) Install reverse brake race onto input shaft (Fig. 60).

(5) Install reverse brake needle bearing (Fig. 61).

(6) Install reverse brake blocking ring (Fig. 62).

(7) Install reverse brake friction cone (Fig. 63).

(8) Install reverse brake shim (Fig. 64). Apply petroleum jelly to shim to hold in place.

(9) Install gear–case half over bench fixture (Fig. 65). Line up shift finger over 3-4 lug.

(10) Line up reverse brake friction cone lugs to the slots in the gear case (Fig. 66). Verify reverse brake shim is in position.

DISASSEMBLY AND ASSEMBLY (Continued)

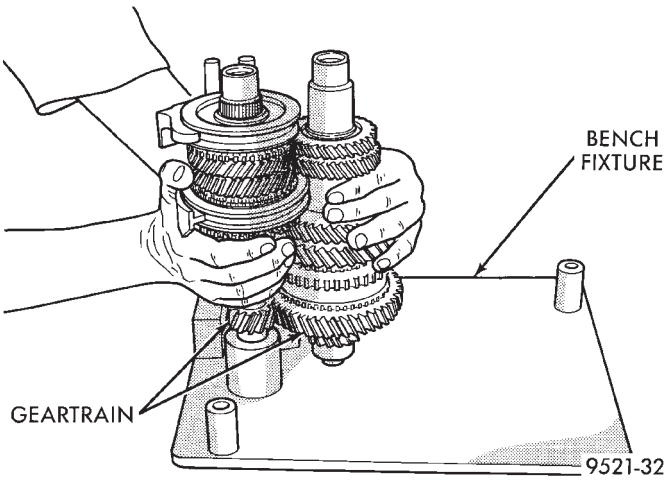


Fig. 57 Bench Fixture

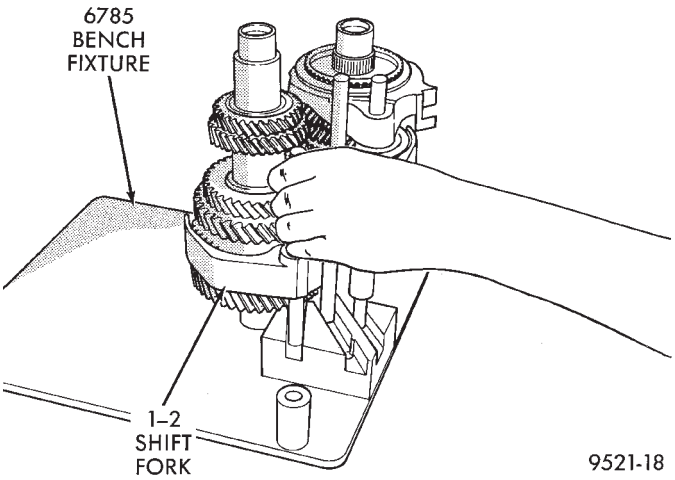


Fig. 58 Shift Rail Installation

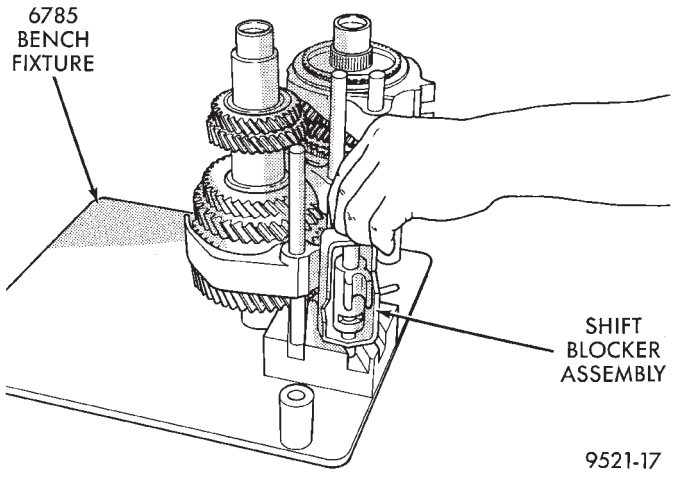


Fig. 59 Shift Blocker Installation

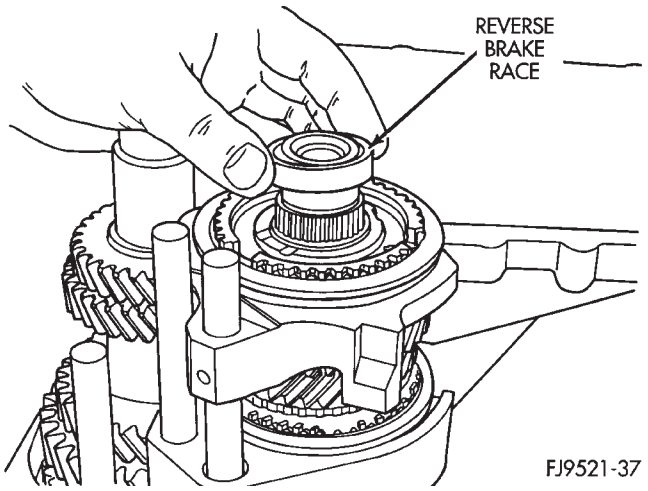


Fig. 60 Reverse Brake Race Installation

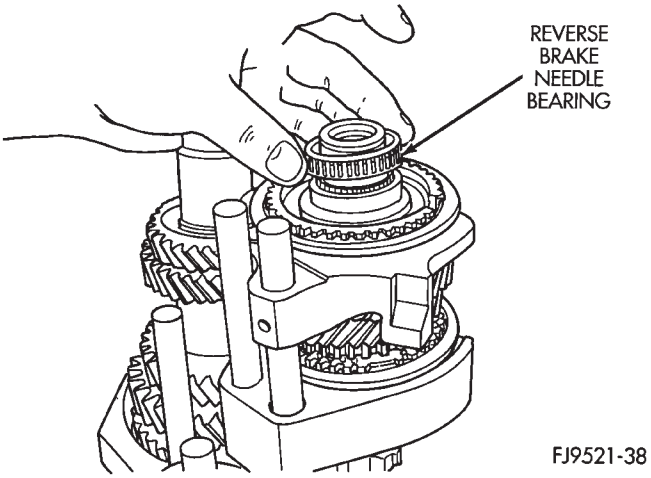


Fig. 61 Reverse Brake Needle Bearing

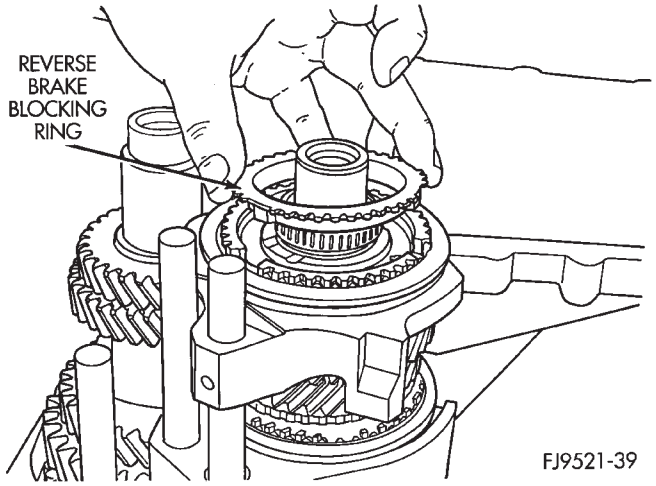


Fig. 62 Reverse Brake Blocking Ring Installation

(11) Position input and output bearings on the shafts. Using Miller tool C-4992-1, press on input and output shaft bearings until they bottom into the case and against the shafts (Fig. 67).

(12) Install shaft snap rings at input and output bearings (Fig. 68).

(13) Apply Mopar® RTV sealant to end–cover outer edge and around bolt holes. Install end–cover onto

DISASSEMBLY AND ASSEMBLY (Continued)

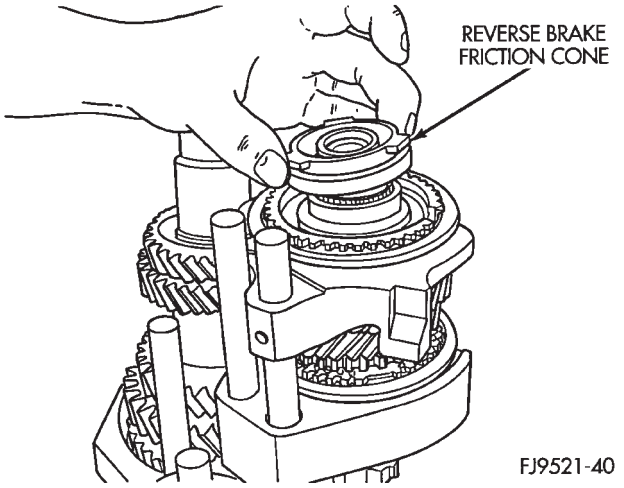


Fig. 63 Reverse Brake Friction Cone Installation

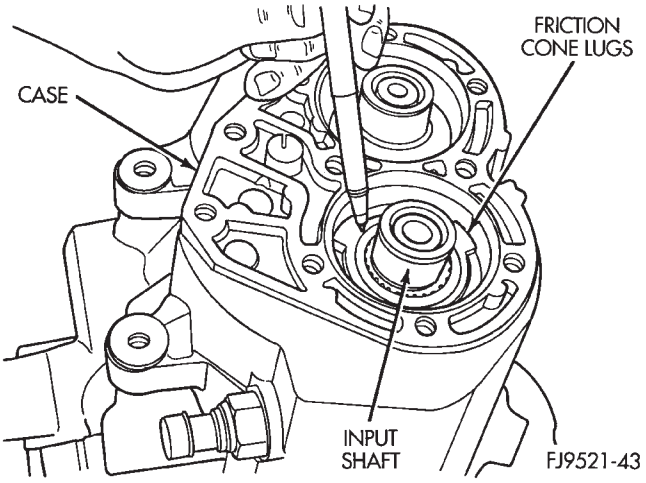


Fig. 66 Friction Cone Lugs

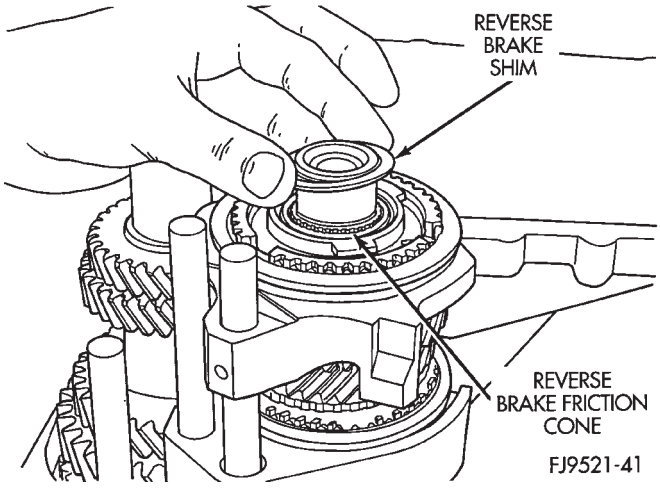


Fig. 64 Reverse Brake Shim

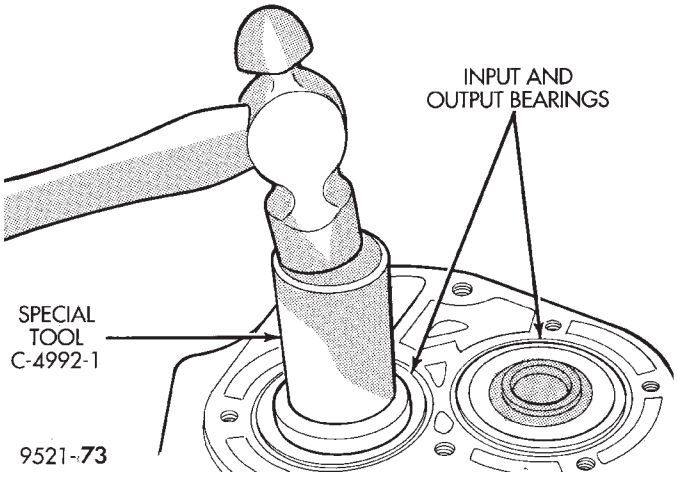


Fig. 67 Installing Input and Output Bearings

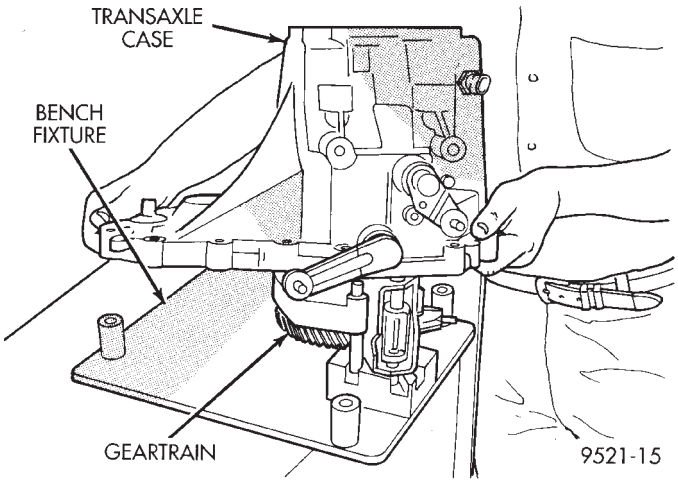


Fig. 65 Gear Case Half

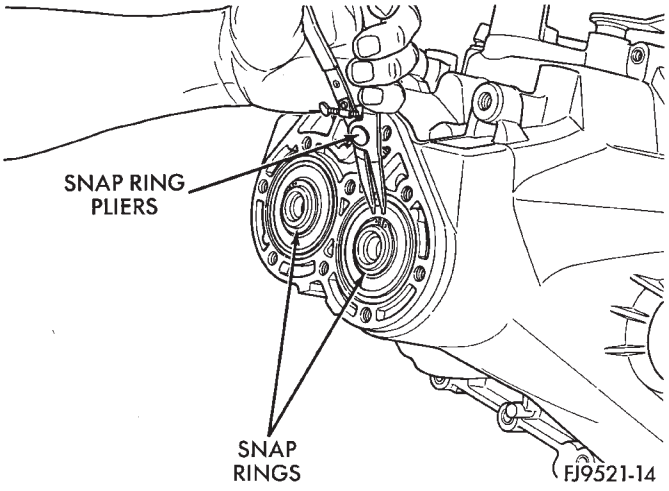


Fig. 68 Snap Rings Retaining Bearings

gear case. Tighten end cover bolts to 29 N·m (21 ft. lbs.) torque (Fig. 69).

(14) Remove gear case from bench fixture.

(15) Install gear case in a holding fixture with end cover facing down.

(16) Turn selector shaft into slot on blocker assembly (Fig. 70).

DISASSEMBLY AND ASSEMBLY (Continued)

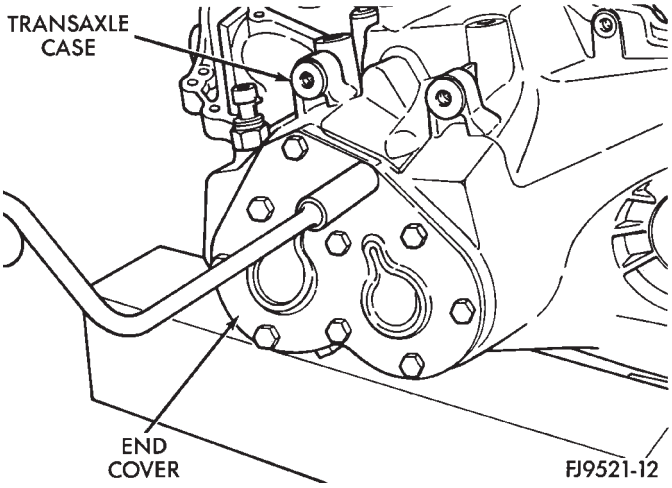


Fig. 69 Transaxle End Cover

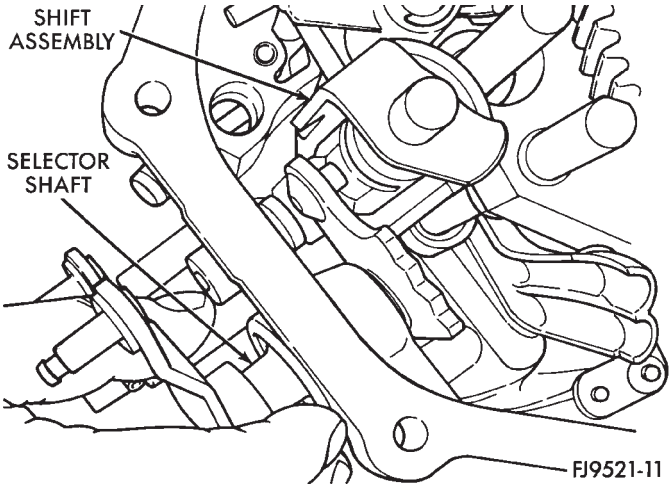


Fig. 70 Selector Shaft

(17) Push selector shaft spacer clip onto selector shaft. Install shift levers.

(18) Install reverse idler gear and shaft. Install bolt into shaft. Tighten bolt on shaft to 26 N·m (19 ft. lbs.) torque (Fig. 71) (Fig. 72).

(19) Install reverse fork bracket and reverse lockout. Tighten screws to 11 N·m (96 in. lbs.) torque (Fig. 73) (Fig. 74).

(20) Install differential into gear case (Fig. 75).

BEARING ADJUSTMENT PROCEDURE

(1) Use extreme care when removing and installing 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 gives a false end–play reading while gauging for proper shims. Improperly seated bearing cups and cones are subject to low–mileage failure.

(2) 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.

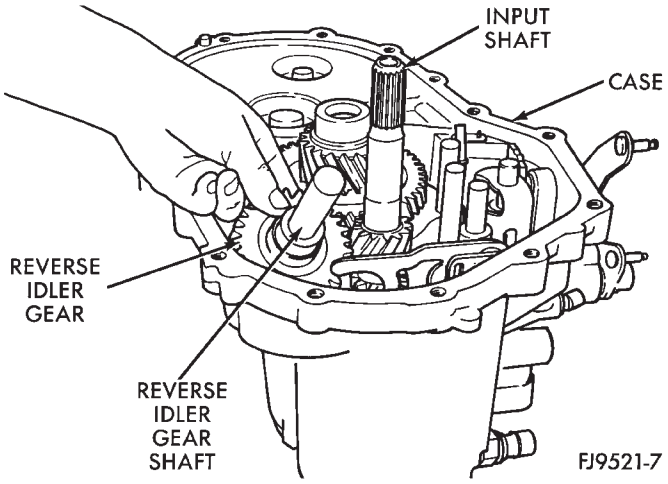


Fig. 71 Reverse Idler Gear

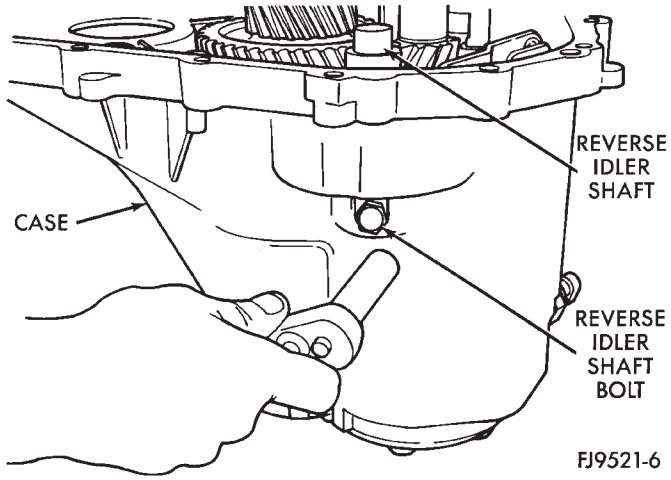


Fig. 72 Reverse Idler Shaft Bolt

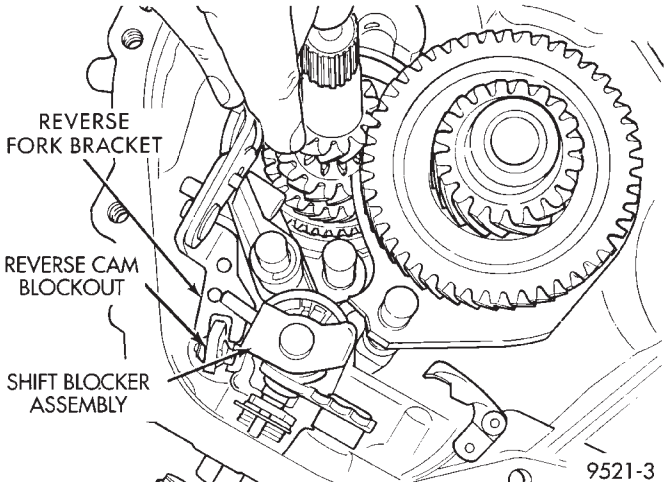


Fig. 73 Reverse Fork Bracket

(3) Bearing preload and drag torque specifications must be maintained to avoid premature bearing failures. Used (original) bearings may lose up to 50% of the original drag torque after break–in. All bearing

DISASSEMBLY AND ASSEMBLY (Continued)

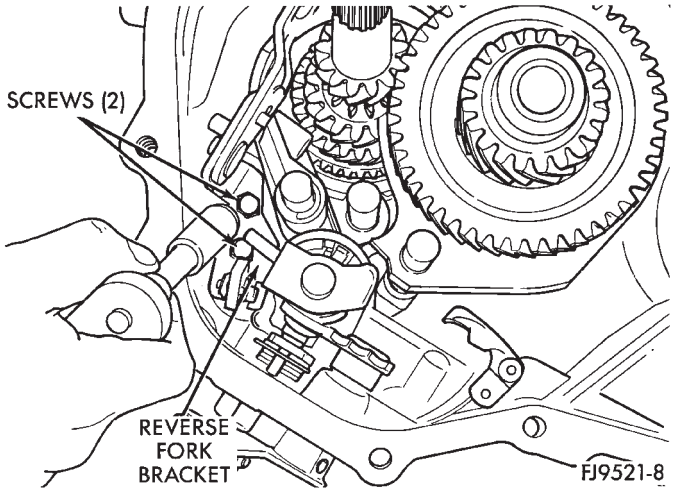


Fig. 74 Reverse Fork Screws

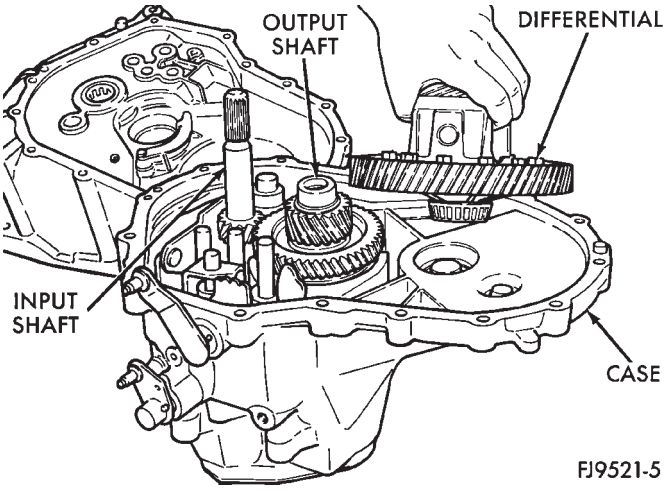


Fig. 75 Differential Assembly

adjustments must be made with no other component interference or gear intermesh.

(4) Replace bearings as a pair: If one differential bearing is defective, replace both differential bearings, if one input shaft bearing is defective, replace both input shaft bearings.

(5) Bearing cones must not be reused if removed.

(6) Turning–torque readings should be obtained while smoothly rotating in either direction.

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT

NOTE: True bearing turning–torque readings can be obtained only with the geartrain removed from the case.

(1) Remove bearing cup and existing shim from clutch bellhousing case.

(2) Press in new bearing cup into bellhousing case (or use a cup that has been ground down on the outer edge for ease of measurement).

(3) Press in new bearing cup into gear case side.

(4) Oil differential bearings with Mopar® type M.S. 9417 Manual Transaxle Fluid. Install differential assembly in transaxle gear case. Install clutch bellhousing over gear case. Install and torque case bolts to 29 N·m (21 ft. lbs.).

(5) Position transaxle with bellhousing facing down on workbench with C-clamps. Position dial indicator.

(6) Apply a medium load to differential with Tool C-4995 and a T-handle, in the downward direction. Roll differential assembly back and forth a number of times. This will settle the bearings. Zero the dial indicator. To obtain end play readings, apply a medium load in an upward direction while rolling differential assembly back and forth (Fig. 76). Record end play.

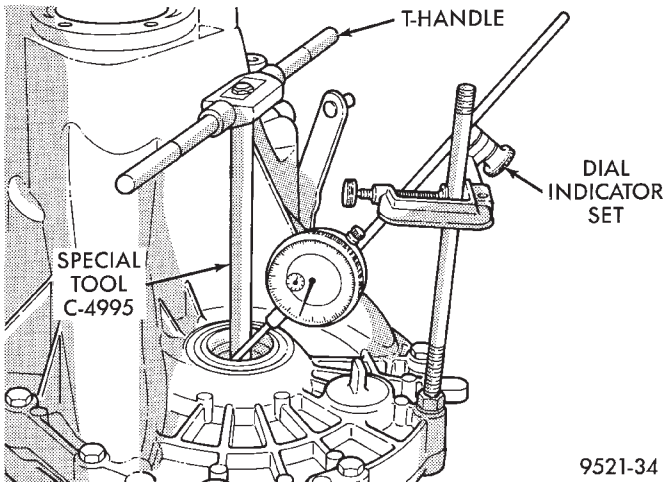


Fig. 76 Checking Differential Bearing End Play To Determine Shim Thickness

(7) The shim required for proper bearing preload is the **total of end play, plus (constant) preload of 0.18mm (0.007 in.).** Never combine shims to obtain the required preload.

(8) Remove case bolts. Remove clutch bellhousing differential bearing cup. Install shim(s) selected in Step 7. Then press the bearing cup into clutch bellhousing.

(9) Install clutch bellhousing. Install and torque case bolts to 26 N·m (19 ft. lbs.).

(10) Using Special Tool C-4995 and an inch-pound torque wrench, check turning torque of the differential assembly (Fig. 77). **The turning torque should be 6 to 12 in. lbs. If the turning torque is too high, install a 0.05mm (0.002 inch) thinner shim. If the turning torque is too low, install a 0.05mm (0.002 inch) thicker shim.**

(11) Recheck turning torque. Repeat Step 10 until the proper turning torque is obtained.

Once proper turning torque has been established, place gear case on the end plate. Draw a bead of Mopar® Gasket Maker, Loctite® 518, or equivalent,

DISASSEMBLY AND ASSEMBLY (Continued)

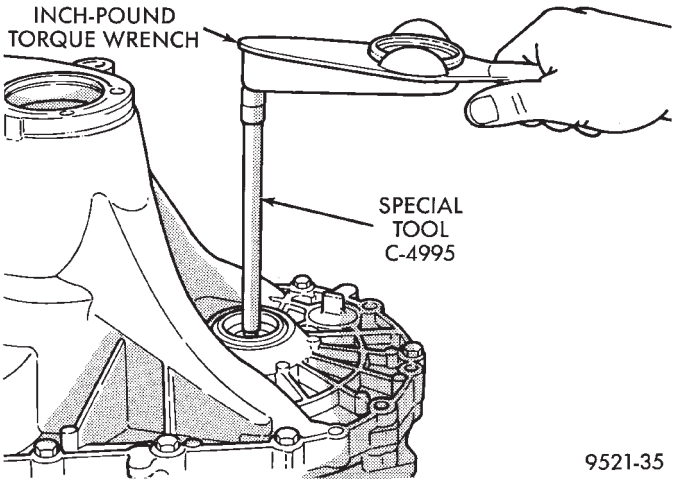


Fig. 77 Checking Differential Bearing Turning Torque

on the flat surface of the case mating flange. Install clutch bellhousing onto gear case. Install and tighten case bolts to 29 N·m (21 ft. lbs.).

INPUT SHAFT

DISASSEMBLY

Before disassembly of the input shaft, it is necessary to check the synchronizer stop ring gap. Use a feeler gauge to measure the gaps between the stop rings and the speed gears. The correct gaps are listed below:

- 1st—1.04-1.72 mm (0.041-0.069 in).
- 2nd—0.94-1.72 mm (0.038-0.069 in).
- 3rd—1.37-1.93 mm (0.054-0.076 in).
- 4th—1.41-1.97 mm (0.056-0.078 in).
- 5th—1.37-1.93 mm (0.054-0.076 in).

If a stop ring gap does not fall within the specifications, it must be inspected for wear and replaced. If the 1st or 2nd synchronizer stop ring is worn beyond specifications, the complete output shaft assembly must be replaced.

The input shaft incorporates the 3rd, 4th, and 5th speed gears and synchronizers on the assembly (Fig. 78).

(1) Install bearing splitter behind 5th speed gear. Remove snap ring at 5th synchronizer hub on input shaft (Fig. 79).

(2) Remove synchronizer and gear using shop press (Fig. 80).

(3) Remove caged needle bearing (Fig. 81).

(4) Remove 4-5 gears split thrust washer ring (Fig. 82).

(5) Remove split thrust washer (Fig. 83).

(6) Remove split thrust washer separation pin (Fig. 84).

(7) Remove 4th gear (Fig. 85).

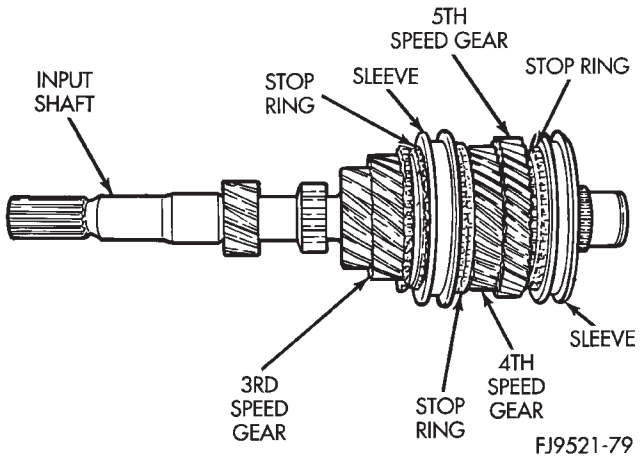


Fig. 78 Input Shaft

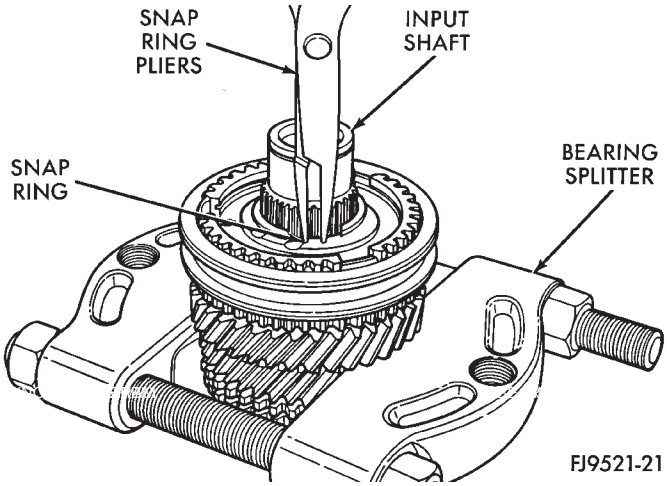


Fig. 79 5th Synchro and Hub Snap Ring Removal

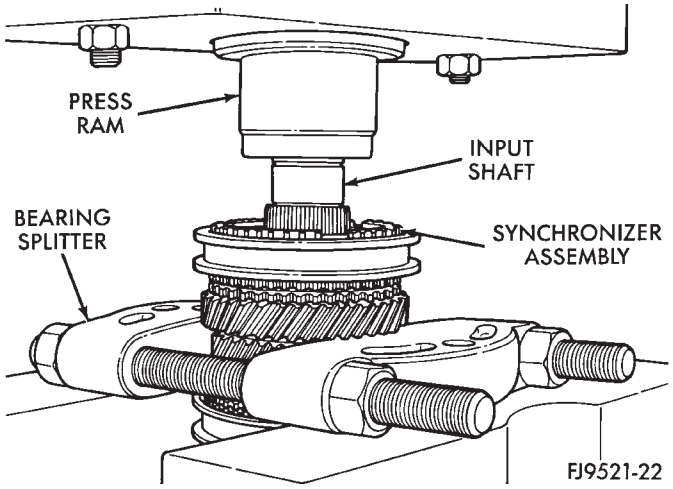


Fig. 80 Remove Synchronizer Using Shop Press

(8) Remove 4th gear caged needle bearing (Fig. 86). Check the caged needle bearing for a broken retention spring.

DISASSEMBLY AND ASSEMBLY (Continued)

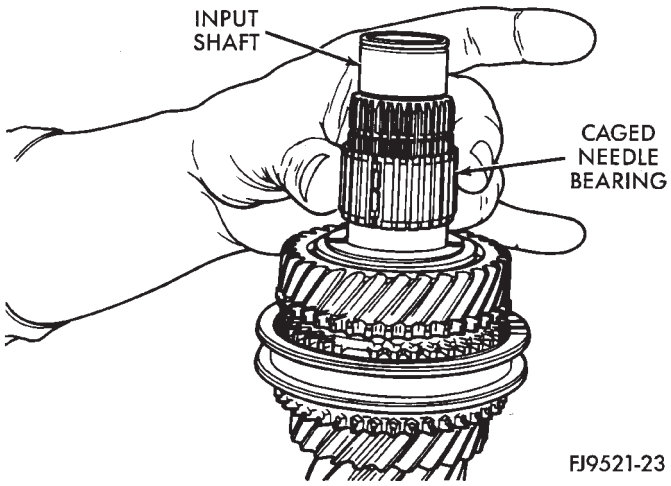


Fig. 81 Caged Needle Bearing Removal

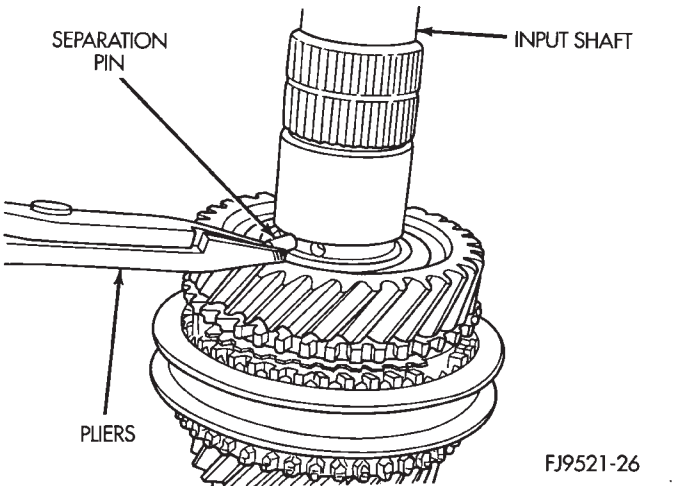


Fig. 84 Split Thrust Washer Separation Pin

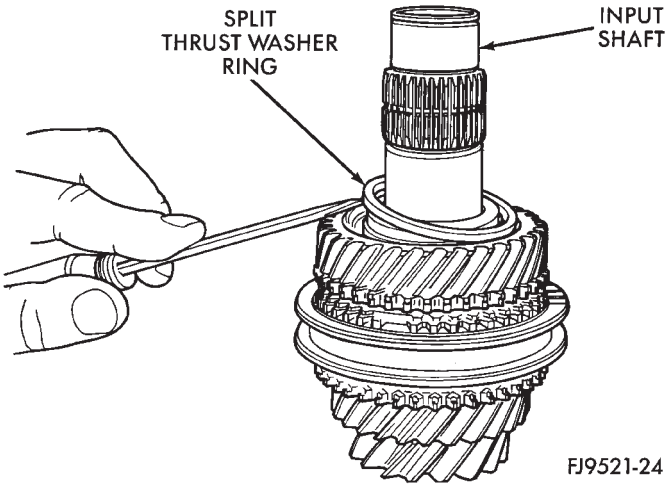


Fig. 82 Split Thrust Washer Ring Removal

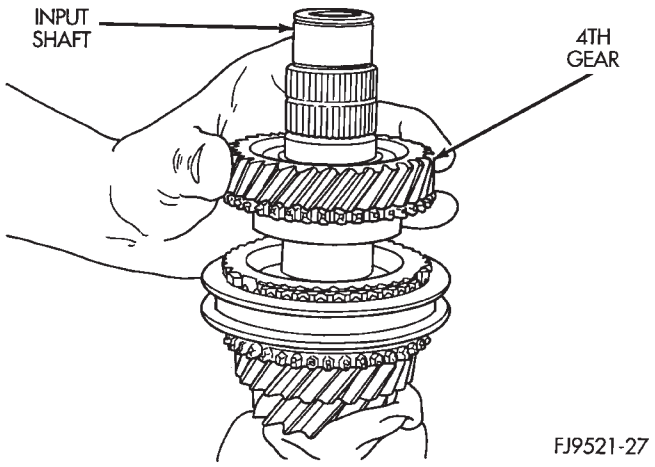


Fig. 85 4th Gear Removal

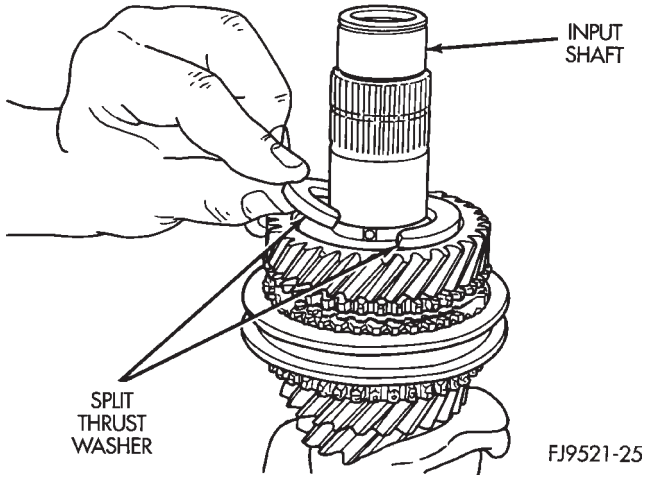


Fig. 83 Split Thrust Washer Removal

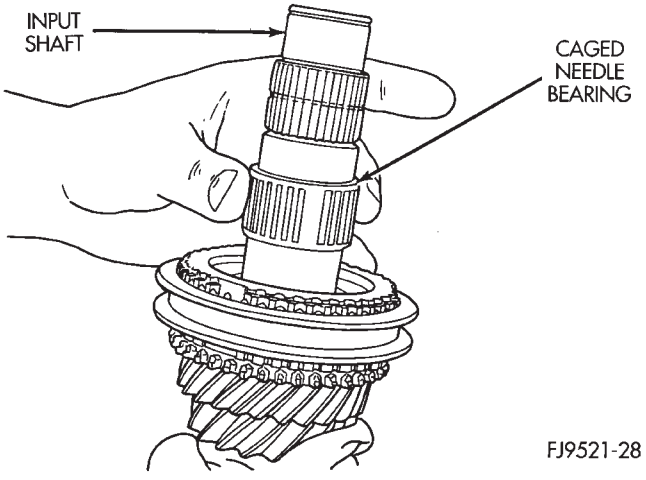


Fig. 86 Caged Needle Bearing Removal

(9) Remove blocking ring. Remove 3-4 synchronizer hub retaining snap ring (Fig. 87).

(10) Install input shaft in shop press. Using bearing splitter, remove 3-4 synchronizer and 3rd gear (Fig. 88).

DISASSEMBLY AND ASSEMBLY (Continued)

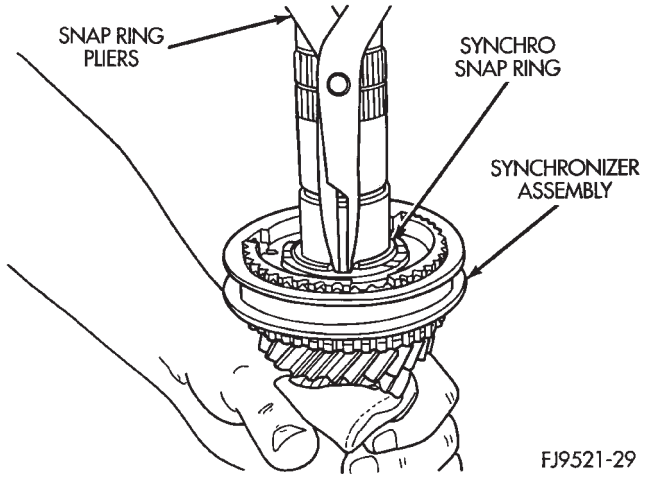


Fig. 87 3-4 Synchronizer Hub Snap Ring

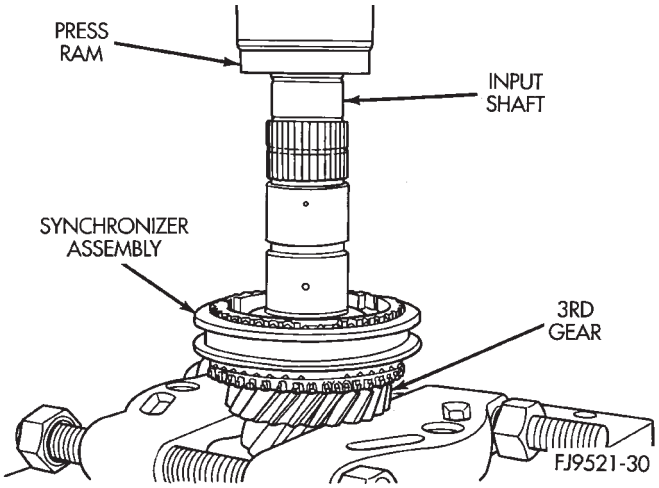


Fig. 88 3rd Gear Removal

(11) Remove 3rd gear caged needle bearing (Fig. 89). Check the caged needle bearing for a broken retention spring.

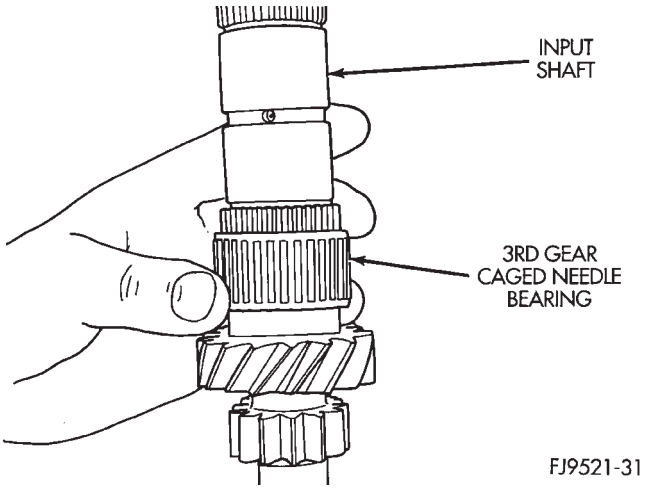


Fig. 89 3rd Gear Caged Needle Bearing

(12) Inspect the input shaft for worn or damaged bearing races or chipped gear teeth. Replace as necessary.

ASSEMBLY

The snap rings that are used on the input shaft are available in select fit sizes. Use the thickest snap ring that fits in each snap ring groove.

(1) Place input shaft into shop press.

(2) Install 3rd gear caged needle bearing on input shaft.

(3) Install 3rd gear and 3-4 synchronizer onto input shaft. Install Tool #C-3717 over input shaft and press on synchronizer hub and 3rd gear (Fig. 90). The synchronizer hub has the letter **U** stamped on the top face of the hub. This designates that the hub must be installed with the **U** facing upward.

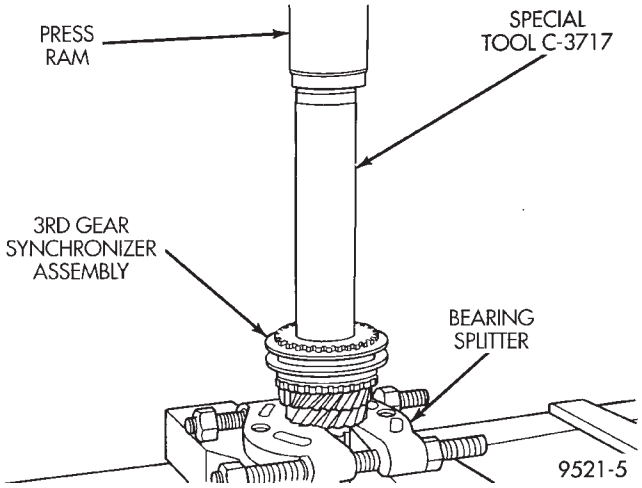


Fig. 90 Press On 3rd Gear Synchronizer Hub

(4) Install 3-4 synchronizer snap ring into slot on input shaft.

(5) Install blocking ring into 3-4 synchronizer. Install 4th gear caged needle bearing.

(6) Install 4th gear onto input shaft.

(7) Install 4-5 split thrust washer separation pin (Fig. 91).

(8) Install split thrust washer onto input shaft (Fig. 92).

(9) Install split thrust washer retaining ring (Fig. 93).

(10) Install 5th gear caged needle bearing (Fig. 94).

(11) Using special tool #C-3717, install 5th speed gear and synchronizer (Fig. 95). The 5th gear synchronizer hub has the letter **S** stamped on the top face of the hub. This designates that the hub must be installed with the **S** facing upward.

(12) Install 5th gear synchronizer snap ring (Fig. 96).

DISASSEMBLY AND ASSEMBLY (Continued)

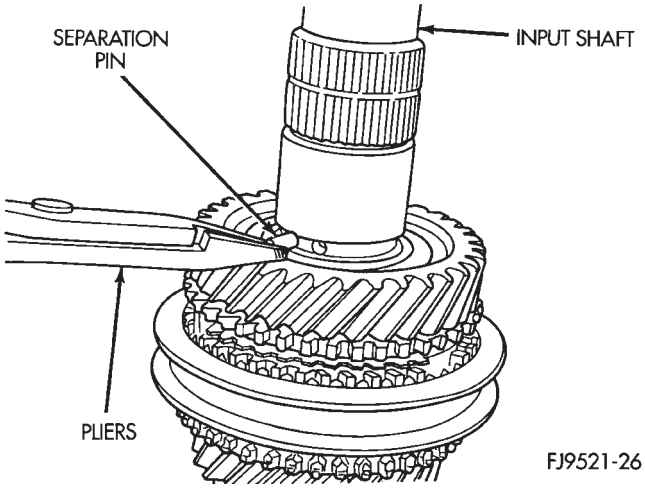


Fig. 91 Split Thrust Washer Separation Pin Installation

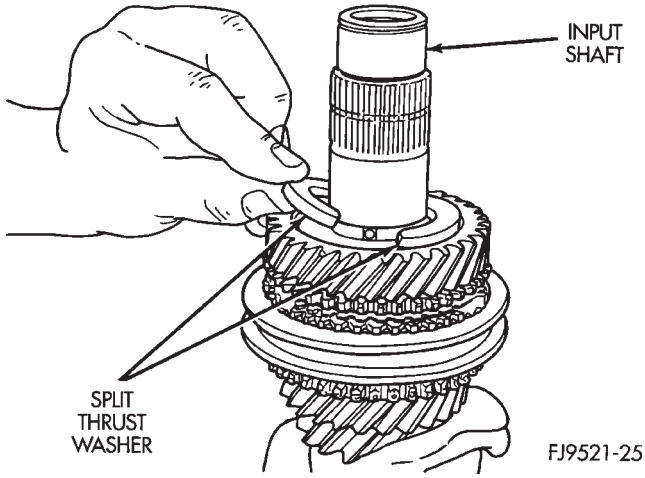


Fig. 92 Split Thrust Washer Installation

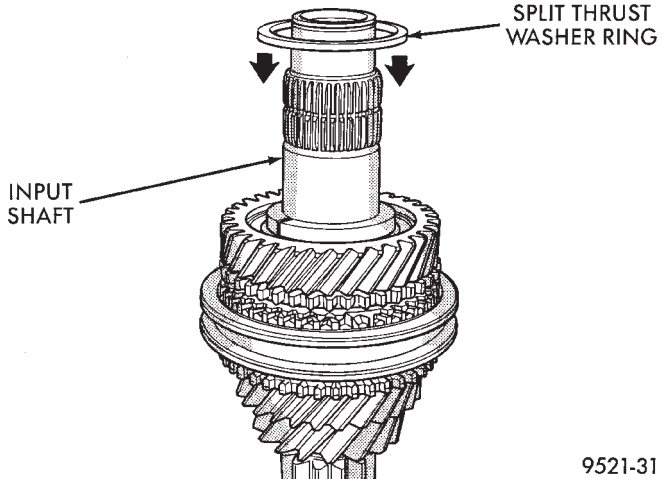


Fig. 93 Retaining Ring Installation

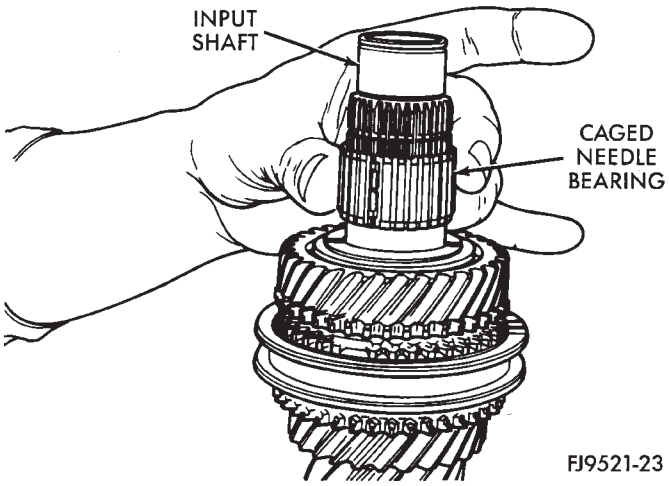


Fig. 94 Caged Needle Bearing Installation

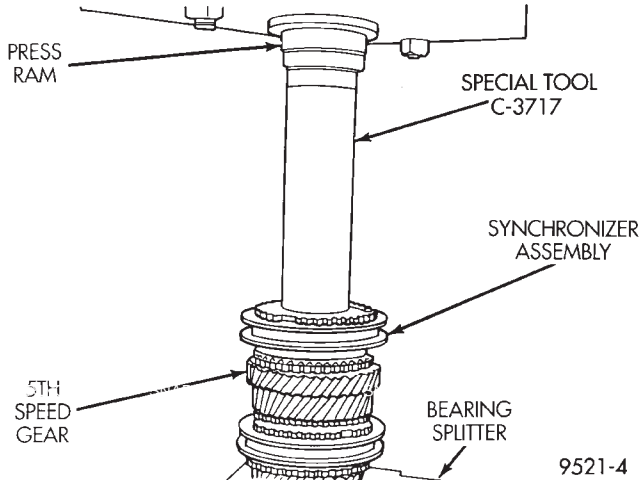


Fig. 95 5th Speed Gear Installation

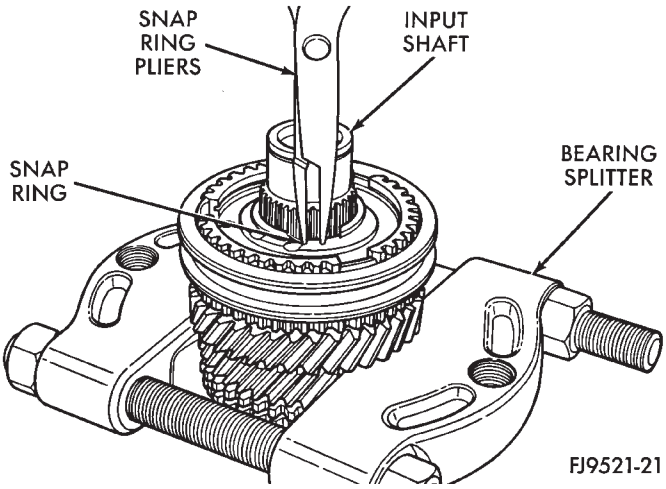


Fig. 96 5th Gear Synchronizer Snap Ring Installation

DISASSEMBLY AND ASSEMBLY (Continued)

OUTPUT SHAFT

CAUTION: The output shaft is serviced as an assembly. Do not try to repair any component on the output shaft. If the 1-2 synchronizer or gear fails, it is necessary to replace the output shaft assembly.

It is necessary to check the synchronizer stop ring gap. Use a feeler gauge to measure the gaps between the stop rings and the speed gears. The correct gaps are listed below:

- 1st—1.04-1.72 mm (0.041-0.069 in).
- 2nd—0.94-1.72 mm (0.038-0.069 in).
- 3rd—1.37-1.93 mm (0.054-0.076 in).
- 4th—1.41-1.97 mm (0.056-0.078 in).
- 5th—1.37-1.93 mm (0.054-0.076 in).

If a stop ring gap does not fall within the specifications it must be inspected for wear and replaced. If the 1st or 2nd synchronizer stop ring is worn beyond specifications, the complete output shaft assembly must be replaced.

The output shaft incorporates the 1st and 2nd gears and synchronizers on the assembly (Fig. 97).

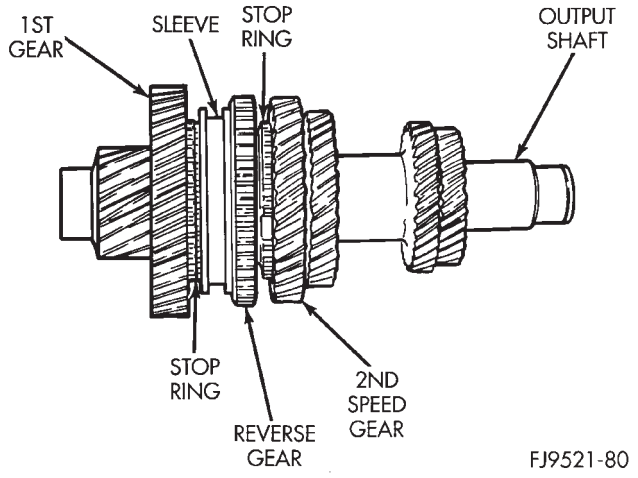


Fig. 97 Output Shaft

DIFFERENTIAL

Shim thickness need be determined only if any of the following parts are replaced:

- Transaxle gear case
- Clutch bellhousing case
- Differential case
- Differential bearings

Refer to **Bearing Adjustment Procedure** in the Adjustments section at the end of this section to determine proper shim thickness. This will provide correct bearing preload and proper bearing turning torque.

DIFFERENTIAL BEARINGS

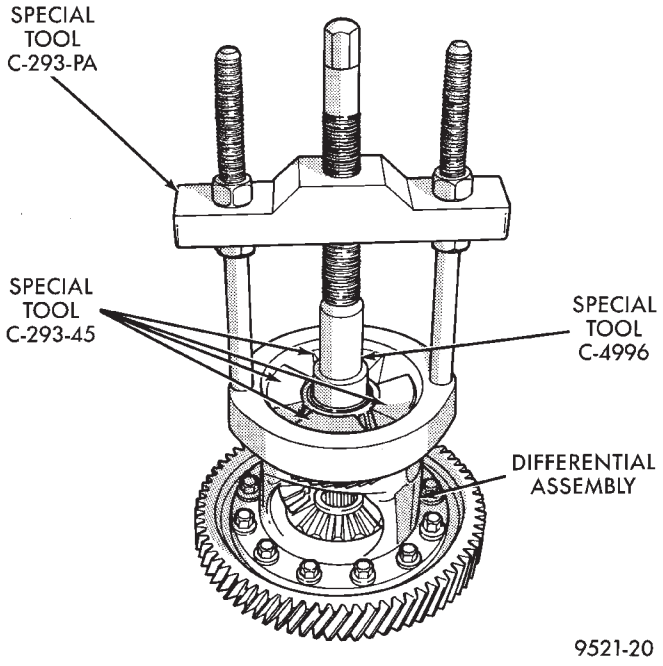


Fig. 98 Remove Differential Bearing Cone

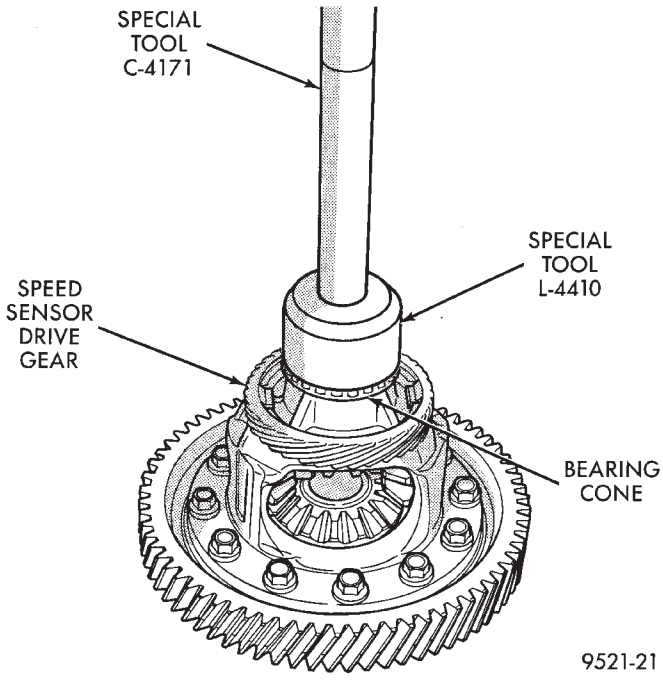


Fig. 99 Install Differential Bearing Cone

DISASSEMBLY AND ASSEMBLY (Continued)

RING GEAR

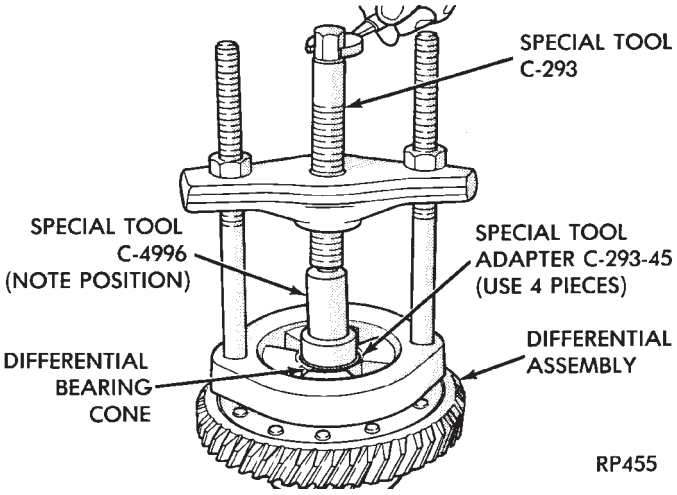


Fig. 100 Remove Differential Bearing Cone

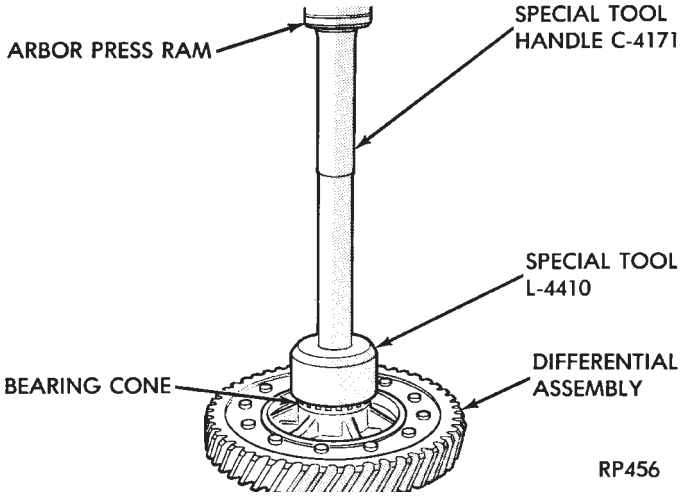


Fig. 101 Install Differential Bearing Cone

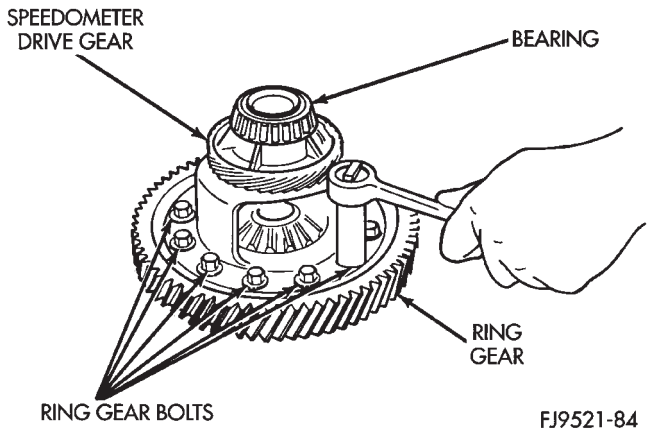


Fig. 102 Remove or Install Ring Gear Bolts and Ring Gear

CAUTION: Always install new ring gear bolts. Tighten ring gear bolts to 81 N·m (60 ft. lbs.) torque.

SPEEDOMETER DRIVE GEAR

NOTE: The plastic speedometer drive gear must be removed from the differential case in order to service the differential gears

REMOVAL

(1) Pry the plastic speedometer drive gear off of the differential case using a flat blade pry tool (Fig. 103) (Fig. 104).

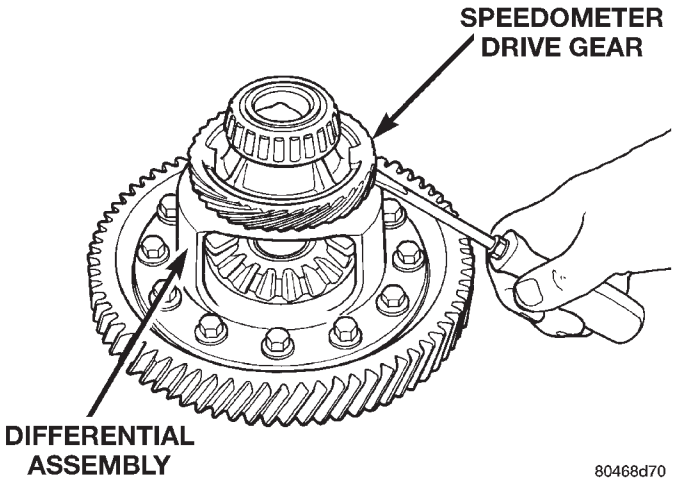


Fig. 103 Pry Off Speedometer Drive Gear

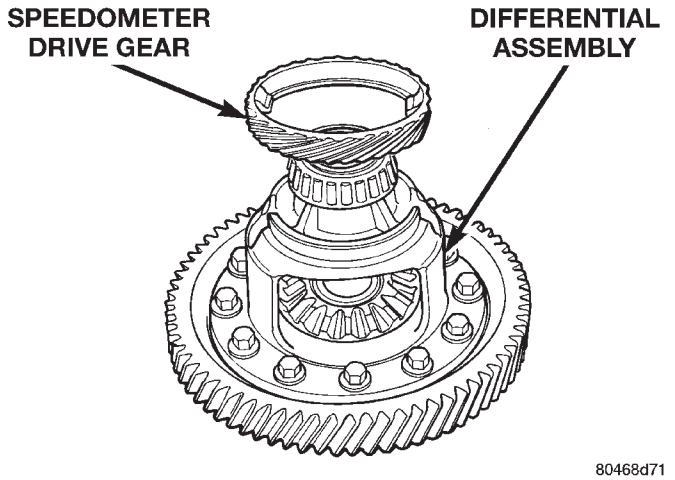


Fig. 104 Speedometer Drive Gear Removed

INSTALLATION

NOTE: A new speedometer drive gear must be installed on differential assembly. The lip on the speedometer drive gear must be positioned downward when installing onto differential assembly.

DISASSEMBLY AND ASSEMBLY (Continued)

(1) Position speedometer drive gear onto differential assembly (Fig. 105).

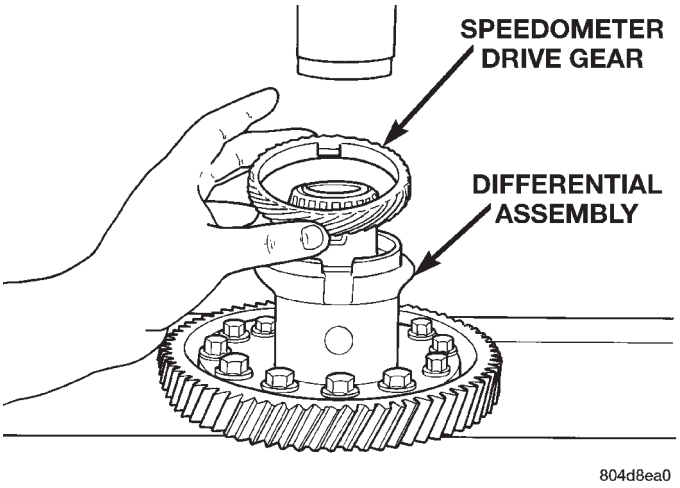


Fig. 105 Speedometer Drive Gear

(2) Using Miller Tool # L-4440 and steel stock, press speedometer drive gear onto differential (Fig. 106) (Fig. 107). Do not use a hammer.

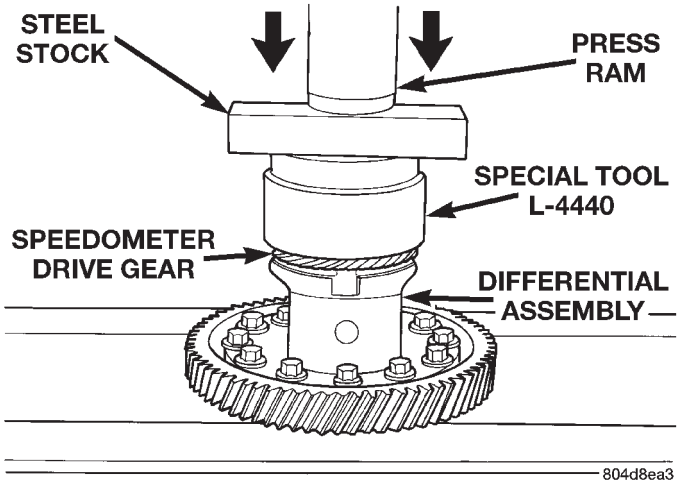


Fig. 106 Press Gear onto Diferential

DIFFERENTIAL GEARS

NOTE: The plastic speedometer drive gear must be removed from the differential case in order to service the differential gears. Refer to Speedometer Drive Gear for service information.

REMOVAL

(1) Remove pinion shaft retaining pin (Fig. 108) (Fig. 109).

(2) Remove pinion shaft (Fig. 110).

(3) Rotate side gears to opening in differential (Fig. 111).

(4) Remove differential gears (Fig. 112).

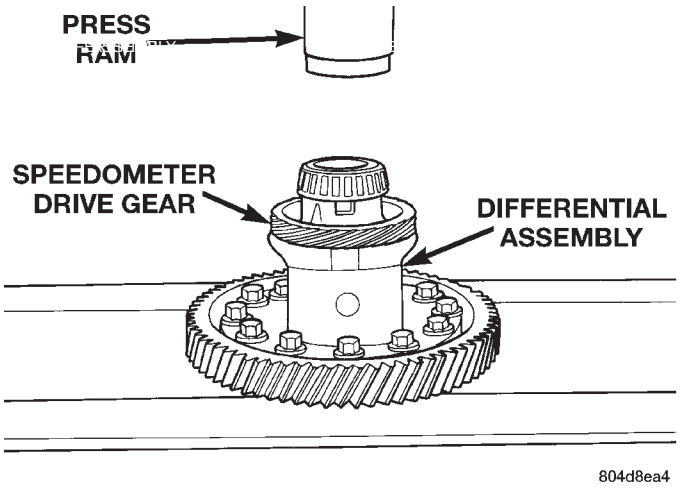


Fig. 107 Drive Gear Pressed onto Differential

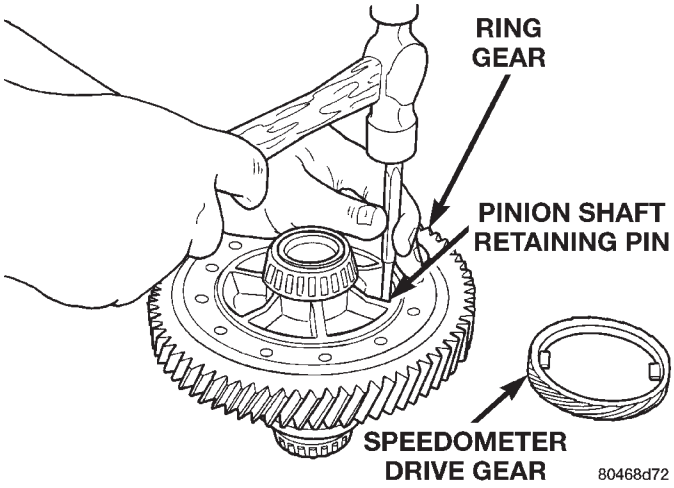


Fig. 108 Remove Pinion Shaft Retaining Pin

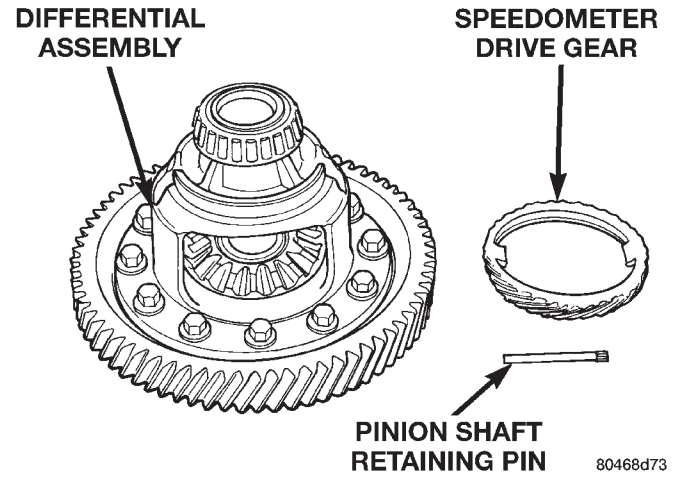


Fig. 109 Retaining Pin Removed

INSTALLATION

(1) Assemble the differential side gears, pinion gears and pinion gears with the pinion gear washers.

(2) Install pinion shaft retaining pin (Fig. 113).

DISASSEMBLY AND ASSEMBLY (Continued)

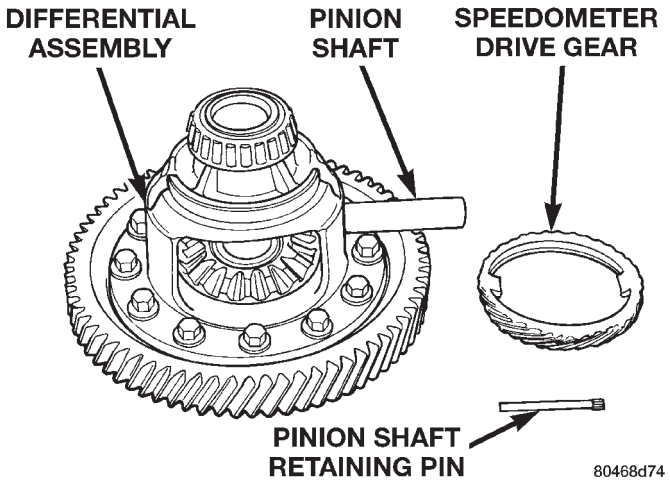


Fig. 110 Pinion Shaft Removal

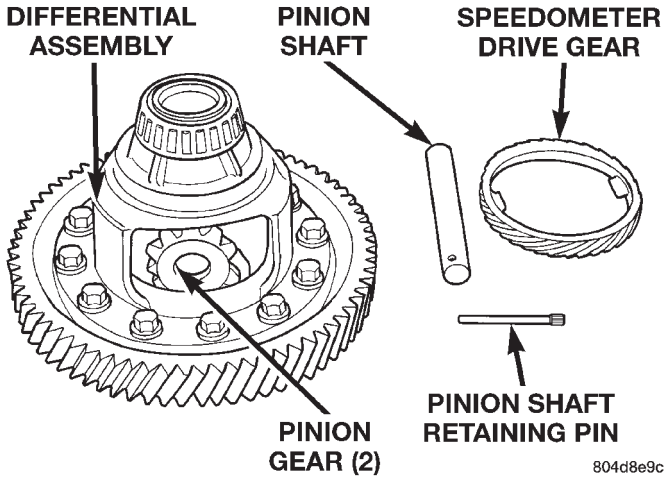


Fig. 111 Remove Pinion Gears, Side Gears, and Thrust Washers by Rotating Side Gears to Opening in Case

(3) Stake pinion shaft retaining pin with a suitable chisel (Fig. 114).

(4) Rotate the assembly two full revolutions both clockwise and counterclockwise.

(5) Set up dial indicator as shown and record end play (Fig. 115) (Fig. 116). Rotate side gear 90 degrees and record another end play. Again, rotate side gear 90 degrees and record a final end play.

(6) Using the smallest end play recorded, shim that side gear to within 0.001 to 0.013 inch. The other side gear should be checked using the same procedure.

CAUTION: Side gear end play must be within 0.001 to 0.013 inch. Five select thrust washers are available: 0.027, 0.032, 0.037, 0.042, and 0.047 inch.

(7) After the end play is measured and adjusted, replace speedometer drive gear with a new one. Install drive gear lip downward. For service information, refer to Speedometer Drive Gear service in this section.

SYNCHRONIZER

DISASSEMBLY

Place synchronizer in a clean shop towel and wrap. Press on inner hub. Carefully open up shop towel and remove springs, balls, keys, hub, and sleeve.

ASSEMBLY

(1) Position synchronizer hub onto a suitable holding fixture (input shaft). The synchronizer hubs are directional. The hubs must be installed with the **U** facing upward.

(2) Install springs into hub slot (Fig. 117).

(3) Insert key into hub and spring.

(4) Apply petroleum jelly to the hole in the key. Insert balls into each key (Fig. 118).

(5) Slide sleeve over the hub and depress balls as you carefully slip the sleeve into position (Fig. 119).

(6) Line up stop ring tang over the keys in the hub (Fig. 120). Install stop rings. Center the keys and balls by pushing on both stop rings.

SHIFT RAILS OVERHAUL

(1) Remove shift rails from the geartrain.

(2) To service the 5-R shift rail, remove the C-clip retaining the reverse shift lever arm. Remove the 5th shift fork roll pin and remove the 5th shift fork. Remove the shift lug roll pin and remove the shift lug. Replace parts as necessary.

(3) To service the 3-4 shift rail, remove the roll pin retaining the 3-4 shift fork. Remove the shift fork. Remove the shift lug roll pin and remove the shift lug. Replace parts as necessary.

(4) To service the 1-2 shift rail, remove the roll pin retaining the 1-2 shift fork. Remove the shift fork and replace parts as necessary.

TRANSAXLE CASE OVERHAUL

The sealant used to seal the transaxle case halves is Mopar® Gasket Maker, Loctite® 518, or equivalent. The sealant used for the bearing end–plate cover is Mopar® RTV.

The components that are left in the gear cases when the gear train is pulled out are the:

- Axle shaft seals
- Output bearing race and retainer
- Input bearing and sleeve
- Differential bearing cones
- Shift rail bushings
- Shift shafts
- Shift shaft seals
- Shift shaft bushings
- Rear bearing oil feed trough

DISASSEMBLY AND ASSEMBLY (Continued)

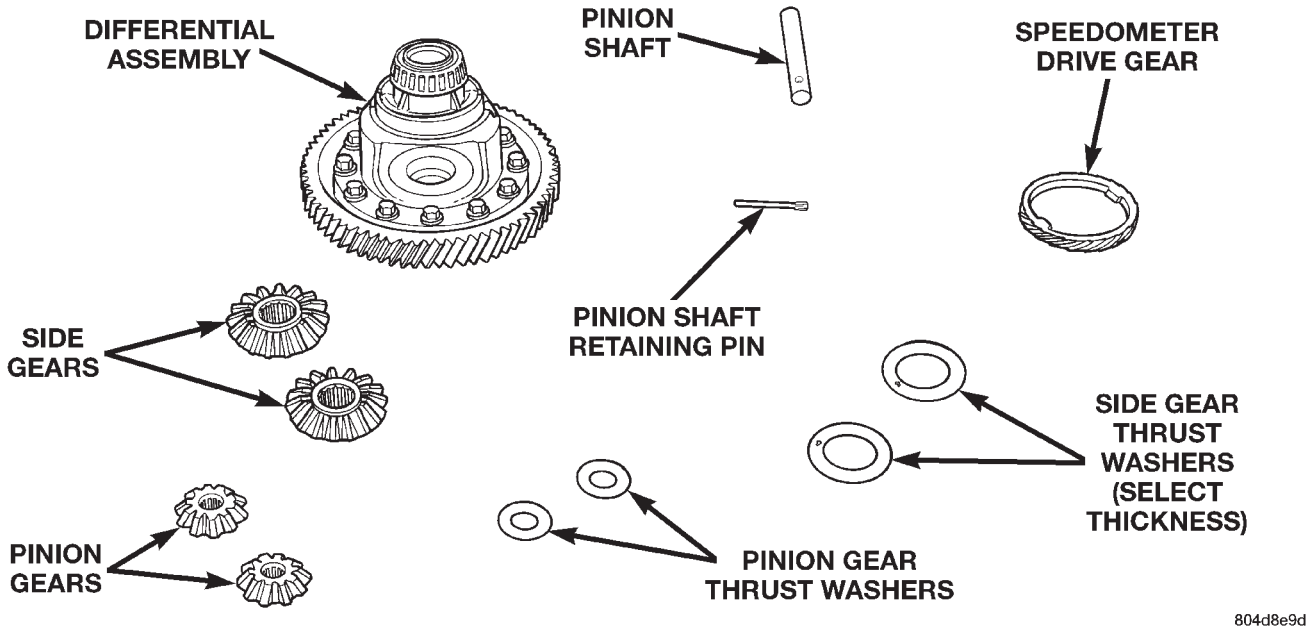


Fig. 112 Differential Gears

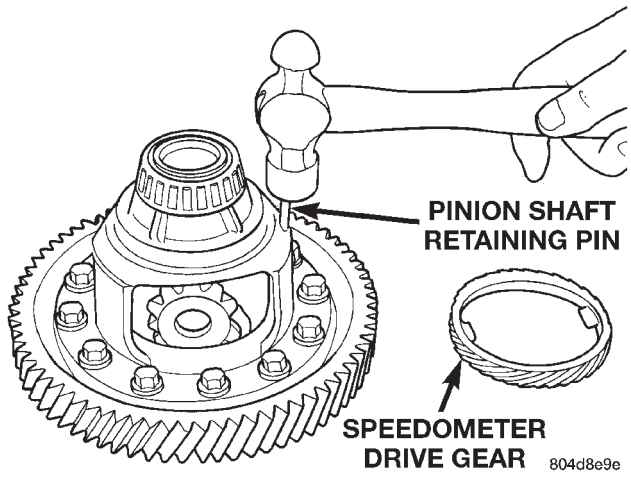


Fig. 113 Install Retaining Pin

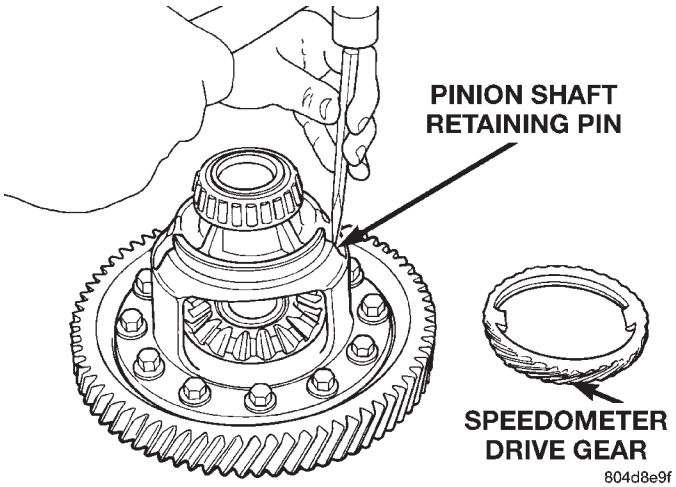


Fig. 114 Staking Retaining Pin

AXLE SHAFT SEALS

REMOVAL

(1) Insert a flat–blade pry tool at outer edge of axle shaft seal (Fig. 121).

(2) Tap on the pry tool with a small hammer and remove axle shaft seal.

INSTALLATION

(1) Clean axle shaft seal bore of any excess sealant.

(2) Align axle shaft seal with axle shaft seal bore.

(3) Install axle seal on tool #6709 with C-4171 and insert into axle shaft seal bore.

(4) Tap seal into position (Fig. 122).

OUTPUT BEARING

REMOVAL

NOTE: The position of the output shaft bearing is critical. The bearing is not identical end–to–end. Install bearing with larger diameter cage ring facing out.

(1) Remove caged roller bearing from output bearing race (Fig. 123).

(2) Remove screws at output bearing retainer strap (Fig. 124).

(3) Install tool #6787 and slide hammer (Fig. 125). Tighten tool to output bearing race.

DISASSEMBLY AND ASSEMBLY (Continued)

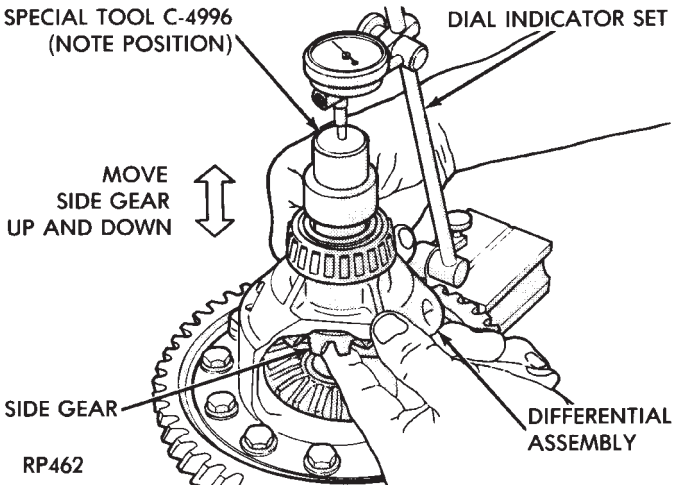


Fig. 115 Checking Side Gear End Play (Typical)

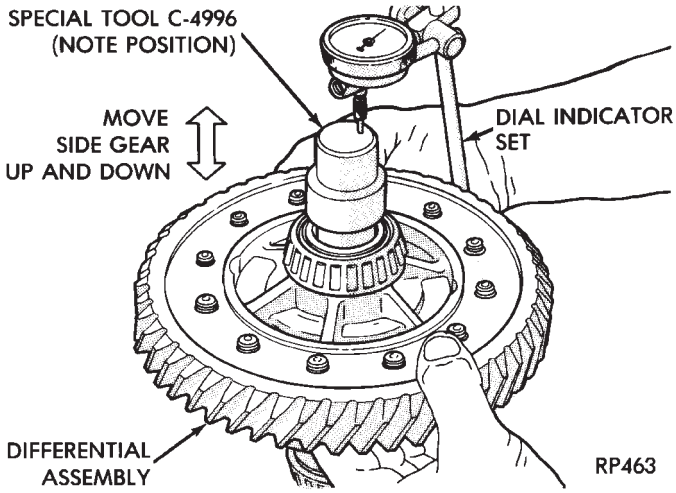


Fig. 116 Checking Side Gear End Play (Typical)

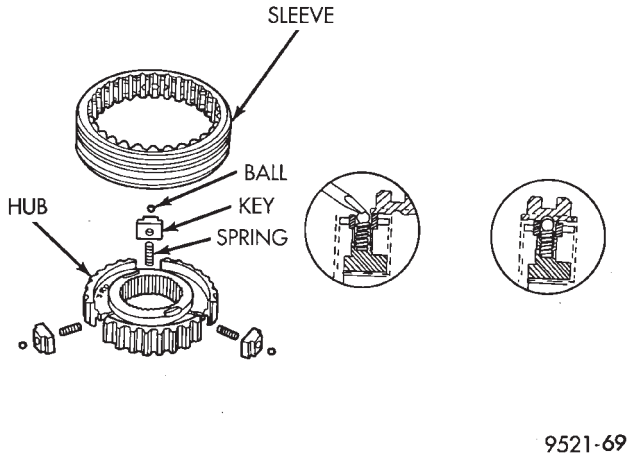


Fig. 117 Synchronizer Assembly

(4) Using slide hammer, remove output bearing race.

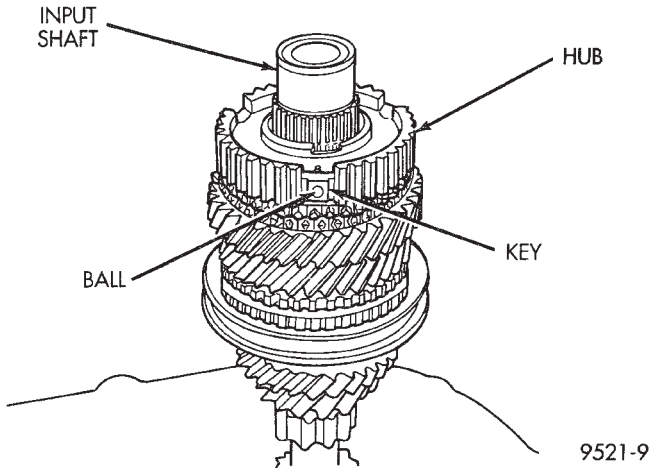


Fig. 118 Synchronizer Balls

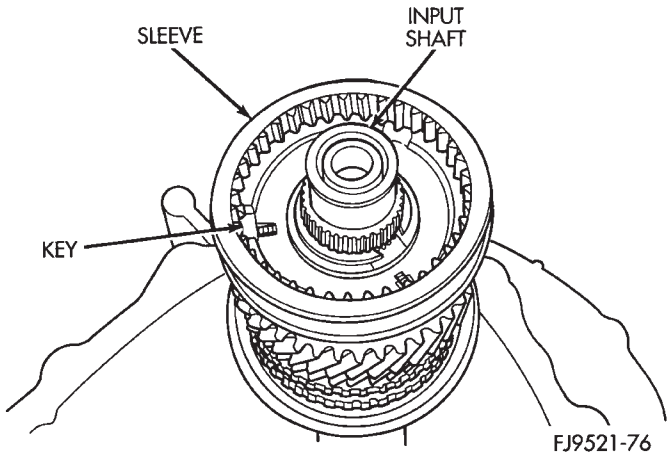


Fig. 119 Synchronizer Sleeve

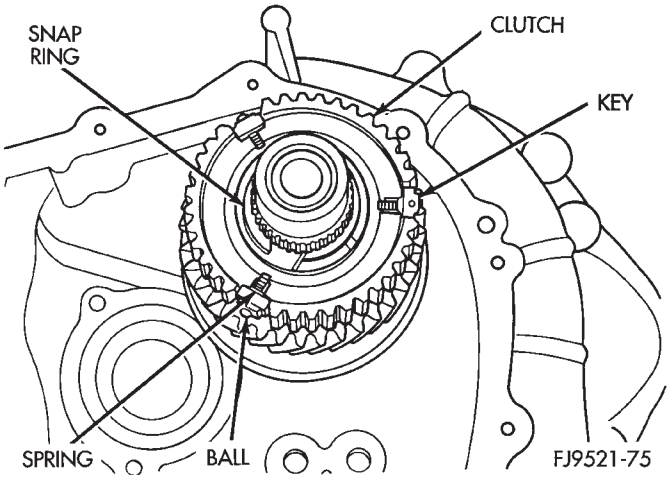


Fig. 120 Keys in Hub

INSTALLATION

(1) Line up output bearing race to race bore.

(2) Insert tool #4628 with C-4171 into output bearing race (Fig. 126). Tap race into bore. Install output bearing into race. Verify that the larger diameter

DISASSEMBLY AND ASSEMBLY (Continued)

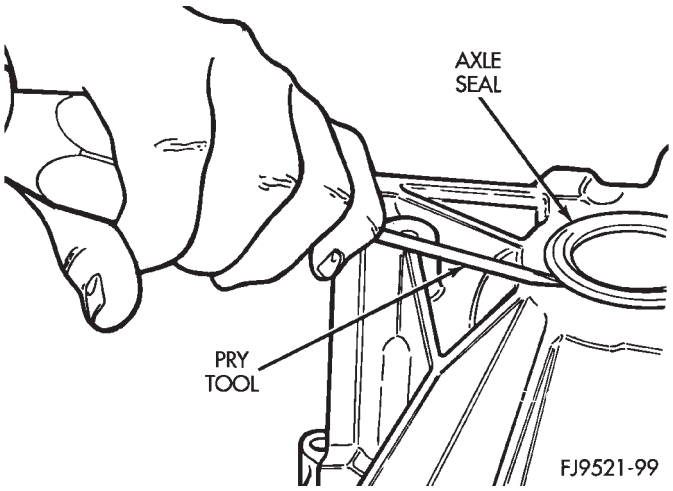


Fig. 121 Axle Shaft Seal Removal

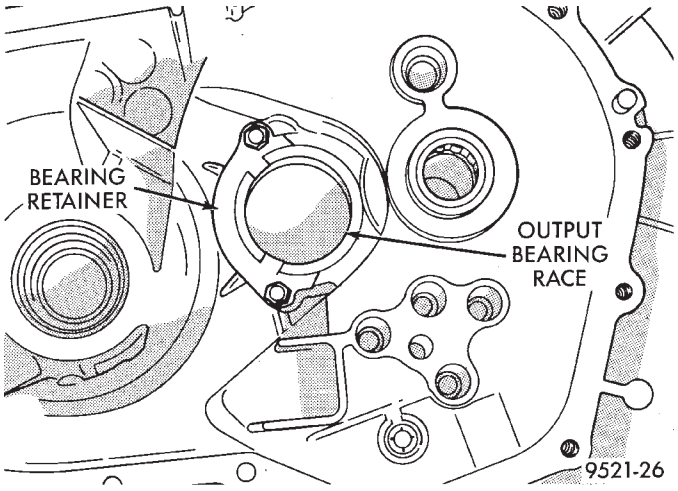


Fig. 124 Output Bearing Strap

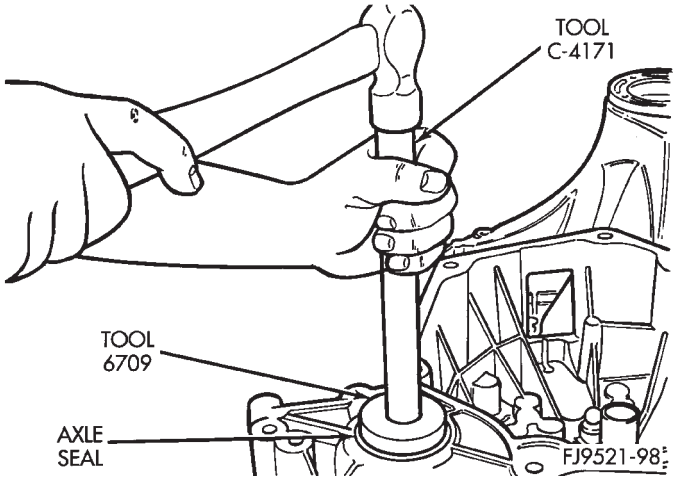


Fig. 122 Axle Seal Installation

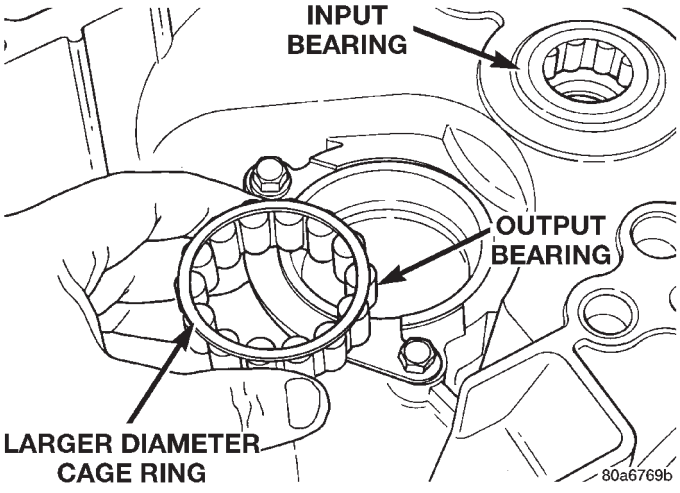


Fig. 123 Output Roller Bearing

cage is facing outward. Position bearing retaining strap. Tighten bolts to 11 N·m (96 in. lbs.).

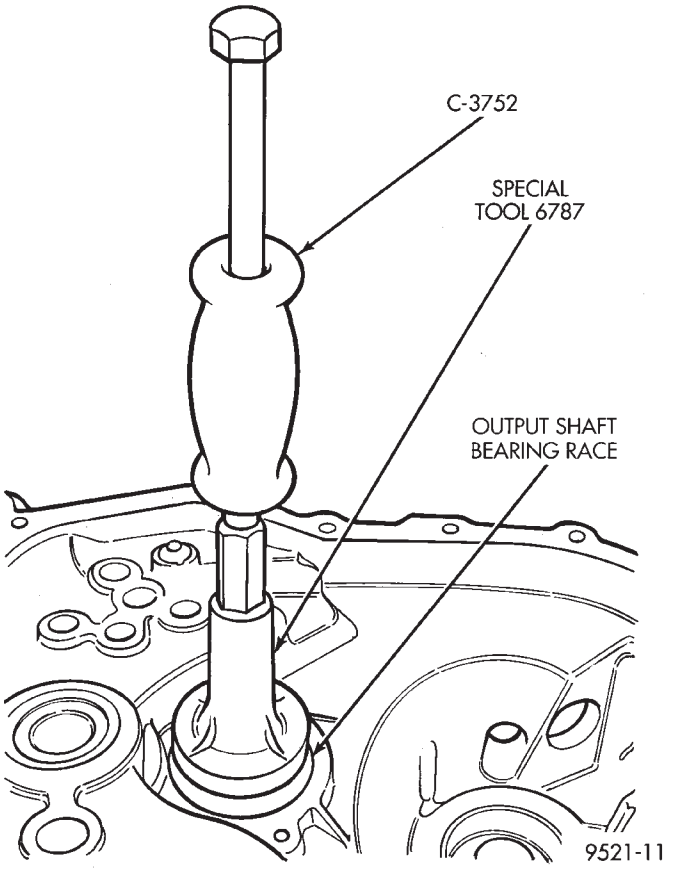


Fig. 125 Output Bearing Race Removal

INPUT BEARING AND SLEEVE

The input bearing is a one–piece bearing and sleeve unit (Fig. 127). The sleeve is the slide point for the clutch–release bearing and lever.

REMOVAL

(1) Install tool #6342 over input bearing on the gear case side of the transaxle clutch housing.

DISASSEMBLY AND ASSEMBLY (Continued)

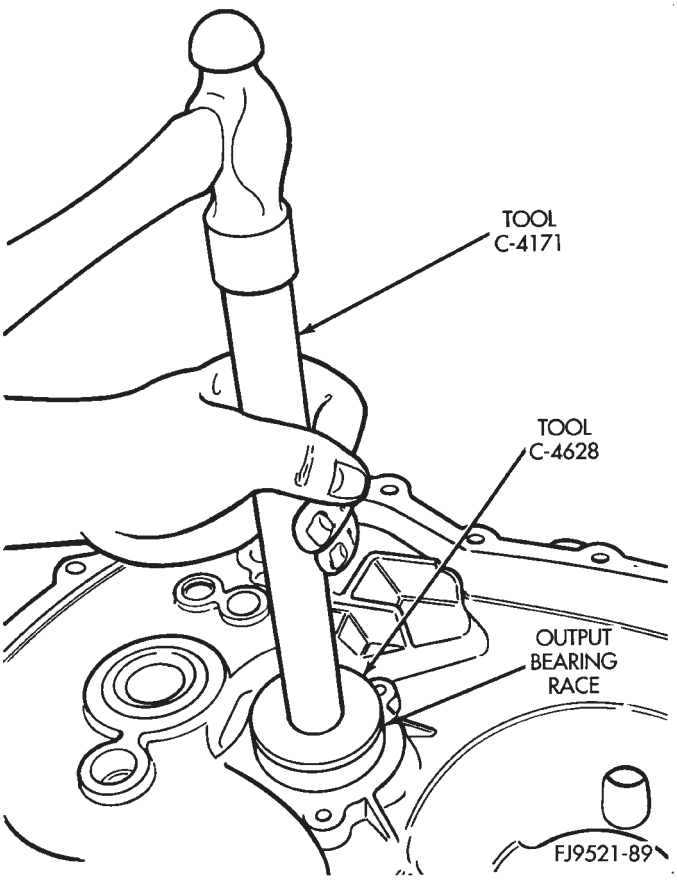


Fig. 126 Output Bearing Race Installation

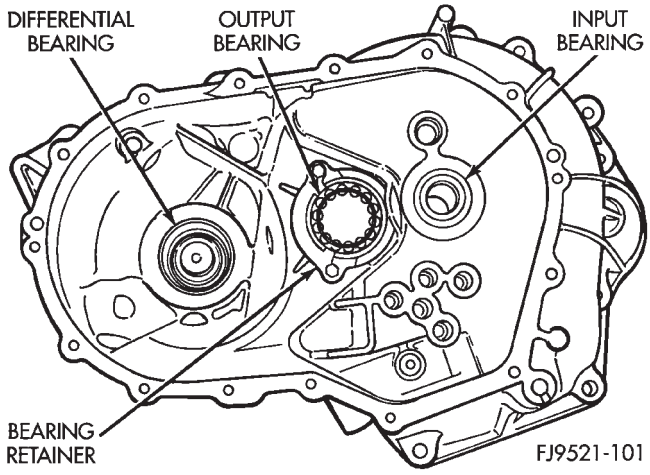


Fig. 127 Input Bearing And Sleeve

(2) Press the input bearing out of the housing (Fig. 128).

INSTALLATION

(1) Apply coating of Loctite® sealant on bearing outer diameter. Position sleeve and bearing assembly at input bearing bore.

(2) Install tool #C-4680-1 over input bearing (Fig. 129).

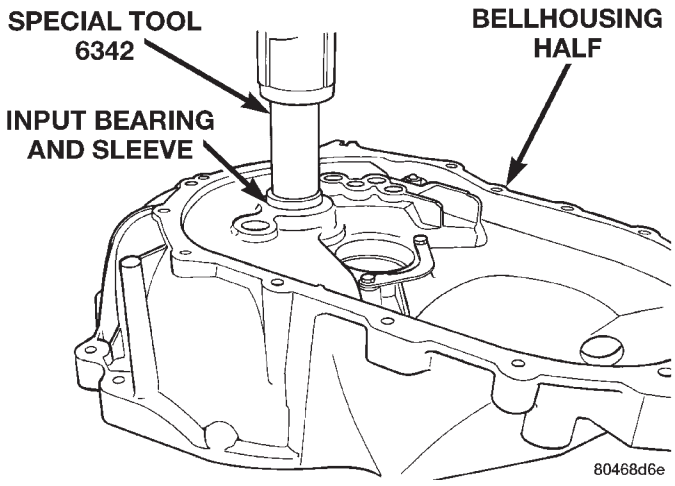


Fig. 128 Input Bearing Removal

(3) Using the spacer tool #4894 and shop press, install input bearing into bore until it is fully seated (Fig. 130).

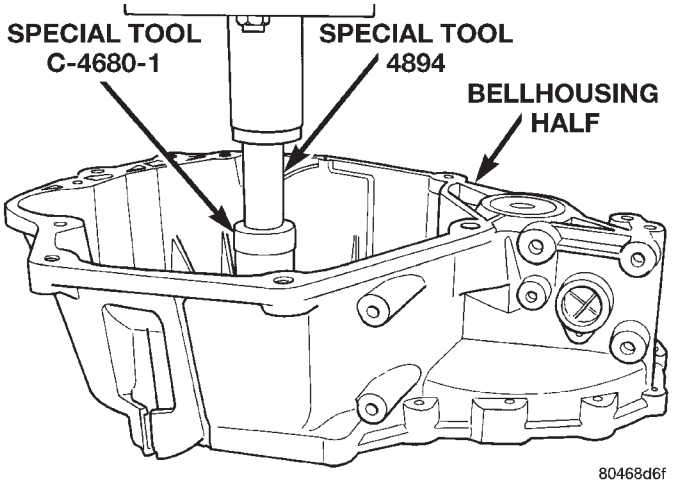


Fig. 129 Input Bearing Tool

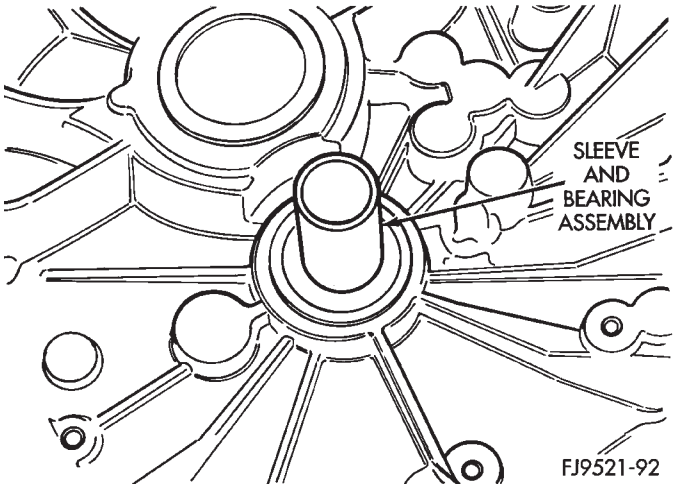


Fig. 130 Input Bearing Installed

DISASSEMBLY AND ASSEMBLY (Continued)

DIFFERENTIAL BEARING CUPS

REMOVAL

(1) Remove differential assembly from gear case using the procedure outlined in this group.

(2) Install Miller tool #L-4518 into the differential bearing cup (Fig. 131).

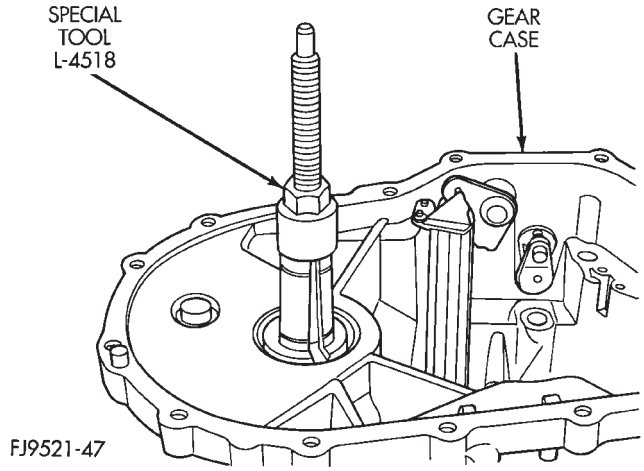


Fig. 131 Tool Installed in Bearing

(3) Install the tool cup over the tool (Fig. 132).

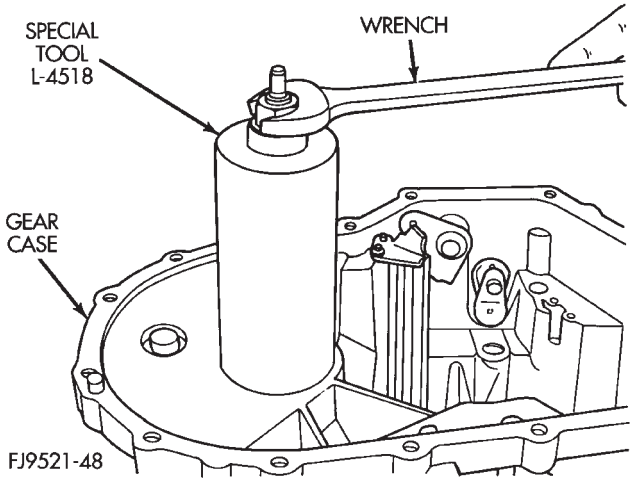


Fig. 132 Tool Cup Installed

(4) Tighten the tool until the race is removed from the case.

INSTALLATION

(1) Position the bearing cup into the case.

(2) Install the bearing cup onto Miller tool #L-4520.

(3) Using Miller tool #L-4520 and C-4171 driver, install differential bearing cup into the transaxle case.

SHIFT RAIL BUSHINGS

REMOVAL

(1) Thread tool #6786 into shift rail bushing.

(2) Install slide hammer #3752 onto tool.

(3) Remove bushing using slide hammer and tool assembly (Fig. 133).

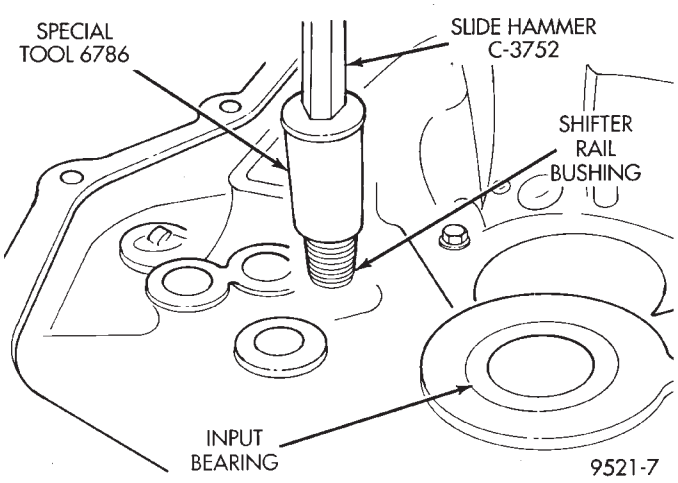


Fig. 133 Shift Rail Bushing Removal

INSTALLATION

(1) Line up replacement bushing in bore.

(2) Using tool #MD998343, tap bushing into bore until flush with the chamfer in the case.

SHIFT SHAFT SEALS

It is not necessary to remove the shift shafts from the transaxle to service the shift shaft seals.

REMOVAL

(1) Using a pick tool, pry up on the shift shaft seal and remove seal from bore.

INSTALLATION

(1) Position new shift shaft seal in bore.

(2) Install shift shaft seal into bore using an appropriate size deep-well socket.

SHIFT SELECTOR SHAFT

REMOVAL

(1) Disassemble transaxle using the procedure outlined in this group.

(2) With the transaxle disassembled, remove the selector shaft by pushing on the shaft from the outside. Pull shaft out from the inside.

INSTALLATION

(1) Reverse removal procedure to install selector shaft.

DISASSEMBLY AND ASSEMBLY (Continued)

SHIFT CROSSOVER SHAFT

REMOVAL

(1) Disassemble transaxle using the procedure outlined in this group.

(2) With the transaxle disassembled, remove the crossover shaft seal.

(3) Using snap–ring pliers, remove the snap ring at the crossover shaft bore (Fig. 134).

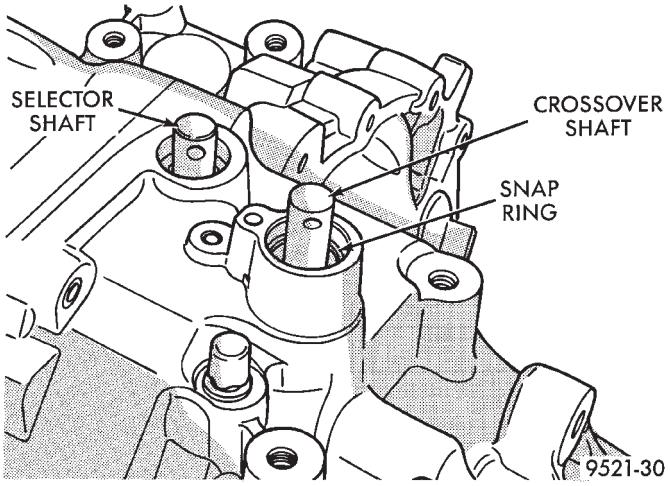


Fig. 134 Crossover Shaft Snap Ring

(4) Push the crossover shaft in the case and remove the crossover assembly.

INSTALLATION

(1) Reverse removal procedure to install crossover shaft.

SHIFT SELECTOR SHAFT BUSHING

REMOVAL

(1) Remove selector shaft using procedure in this group.

(2) Thread tool #6786 into bushing.

(3) Install slide hammer #3752 onto tool and remove bushing using slide hammer (Fig. 135).

INSTALLATION

(1) Position replacement bushing over selector shaft bore.

(2) Using an appropriate size deep–well socket, install bushing in selector shaft bore (Fig. 136).

SHIFT CROSSOVER SHAFT BUSHING

REMOVAL

(1) Install slide hammer #3752 through the crossover bushing.

(2) Thread nut and washer onto slide hammer.

(3) Using the slide hammer, remove the crossover shaft bushing (Fig. 137).

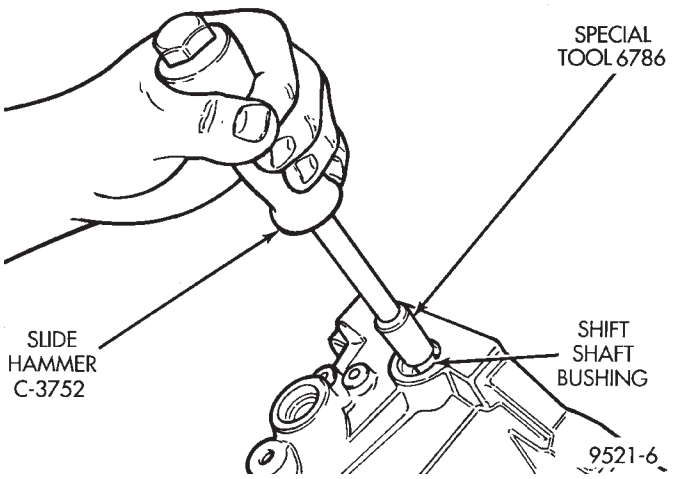


Fig. 135 Selector Shaft Bushing Removal

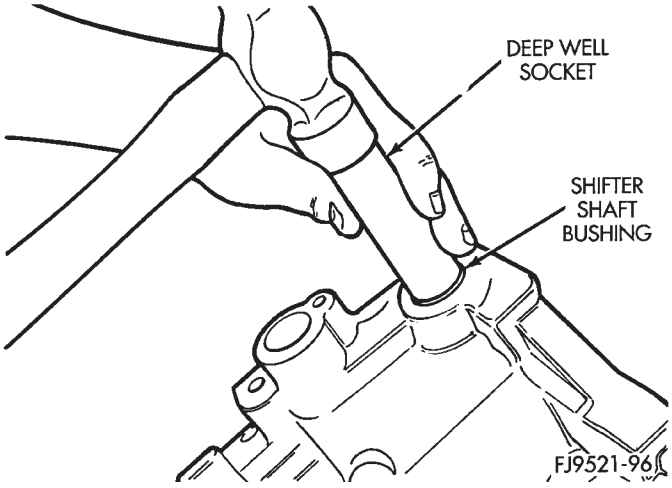


Fig. 136 Selector Shaft Bushing Installation

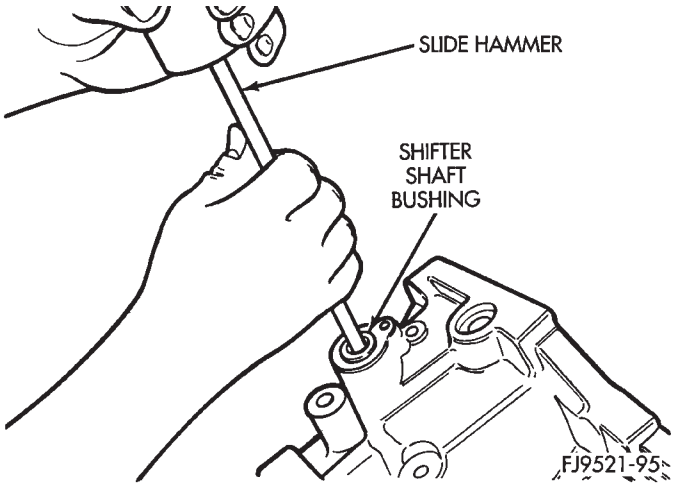


Fig. 137 Crossover Shaft Bushing Removal

INSTALLATION

(1) Position the replacement crossover shaft bushing over the crossover shaft bushing bore.

DISASSEMBLY AND ASSEMBLY (Continued)

(2) Using an appropriate size deep–well socket, install the crossover shaft bushing into the bushing bore.

REAR BEARING OIL FEED TROUGH

The bearing oil feed trough is retained in the case by a pin that is molded into the case and clips that are part of the trough (Fig. 138).

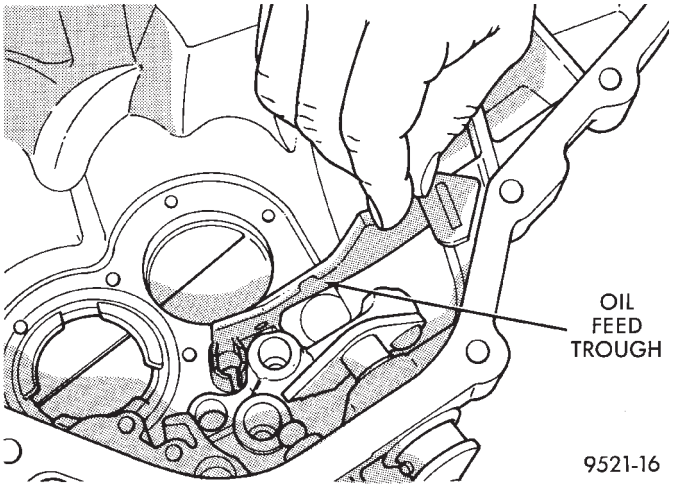


Fig. 138 Oil Feed Trough

REMOVAL

(1) Using light plier pressure, squeeze the clips together at the rear of the trough.

(2) Slide the trough over the retaining pin that locates the trough in the case.

INSTALLATION

(1) Reverse removal procedure to install oil feed trough.

CLEANING AND INSPECTION

TRANSAXLE

Clean the gears, bearings, shafts, synchronizers, thrust washers, oil feeder, shift mechanism, gear case, and bellhousing with solvent. Dry all parts except the bearings with compressed air. Allow the bearings to either air dry or wipe them dry with clean shop towels.

Inspect the gears, bearings, shafts and thrust washers. Replace the bearings and cups if the rollers are worn, chipped, cracked, flat spotted, or brinnelled, or if the bearing cage is damaged or distorted. Replace the thrust washers if cracked, chipped, or worn. Replace the gears if the teeth are chipped, cracked, or worn thin. Inspect the synchronizers. Replace the sleeve if worn or damaged in any way. Replace the stop rings if the friction material is burned, flaking off, or worn. Check the condition of the synchro keys and springs. Replace these parts if worn, cracked, or distorted.

SYNCHRONIZER

CLEAN

Do not attempt to clean the blocking rings in solvent. The friction material will become contaminated. Place synchronizer components in a suitable holder and clean with solvent. Air dry.

INSPECT

Proper inspection of components involve:

- Teeth, for wear, scuffed, nicked, burred, or broken teeth
- Keys, for wear or distortion
- Balls and springs, for distortion, cracks, or wear

If any of these conditions exist in these components, replace as necessary.

ADJUSTMENTS

GEARSHIFT CROSSOVER CABLE

(1) Remove shift console from vehicle.

(2) Loosen adjusting screw on crossover cable at shifter (Fig. 139).

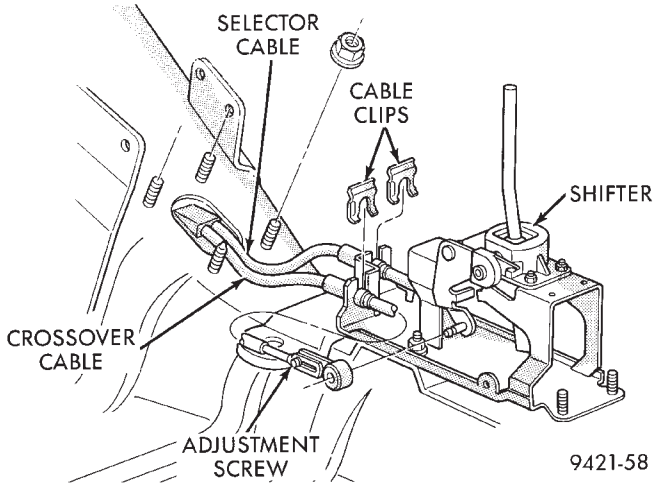


Fig. 139 Crossover Cable Adjustment Screw

(3) Pin transaxle crossover lever in 3-4 neutral position using a 1/4 inch drill bit. Align hole in crossover lever with the hole in the boss on the transaxle case (Fig. 140). Be sure drill bit goes into transaxle case at least one–half inch.

(4) The shifter is spring–loaded and self–centering. Allow shifter to rest in its neutral position. Torque adjustment screw to 8 N·m (70 in. lbs.). Care must be taken to avoid moving the shift mechanism off-center during screw tightening.

ADJUSTMENTS (Continued)

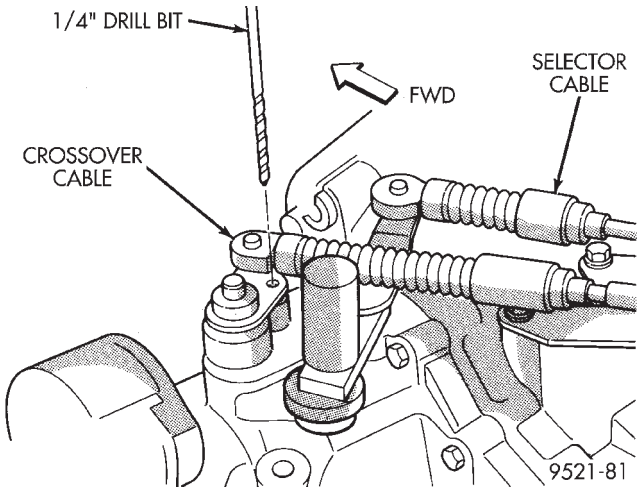


Fig. 140 Crossover Lever Pin Procedure

(5) Remove drill bit from transaxle case and perform functional check by shifting transaxle into all gears.

(6) Reinstall center shift console. Blouse boot out around console. Seat boot lip on top of console.

BEARING ADJUSTMENT PROCEDURE

GENERAL RULES ON SERVICING BEARINGS

(1) Use extreme care when removing and installing 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 cups and cones are subject to low–mileage failure.

(2) 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.

(3) Bearing preload and drag torque specifications must be maintained to avoid premature bearing failures. Used (original) bearings may lose up to 50% of their original drag torque after break in. All bearing adjustments must be made with no other component interference or gear intermesh.

(4) Replace bearings as a pair: If one differential bearing is defective, replace both differential bearings, if one input shaft bearing is defective, replace both input shaft bearings.

(5) Bearing cones must not be reused if removed.

(6) Turning torque readings should be obtained while smoothly rotating in either direction.

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT

NOTE: True bearing turning torque readings can be obtained only with the geartrain removed from the case.

(1) Remove bearing cup and existing shim from clutch bellhousing case.

(2) Press in new bearing cup into bellhousing case (or use a cup that has been ground down on the outer edge for ease of measurement).

(3) Press in new bearing cup into gear case side.

(4) Oil differential bearings with Mopar® type M.S. 9417 Manual Transaxle Fluid. Install differential assembly in transaxle gear case. Install clutch bellhousing over gear case. Install and torque case bolts to 29 N·m (21 ft. lbs.).

(5) Position transaxle with bellhousing facing down on workbench with C-clamps. Position dial indicator.

(6) Apply a medium load to differential with Tool C-4995 and a T-handle, in the downward direction. Roll differential assembly back and forth a number of times. This will settle the bearings. Zero the dial indicator. To obtain end play readings, apply a medium load in an upward direction while rolling differential assembly back and forth (Fig. 141). Record end play.

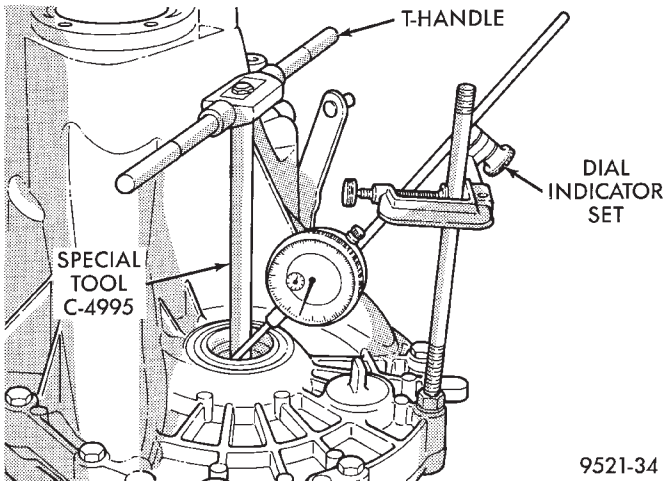


Fig. 141 Checking Differential Bearing End Play to Determine Shim Thickness

(7) The shim required for proper bearing preload is the **total of end play, plus (constant) preload of 0.18mm (0.007 in.).** Never combine shims to obtain the required preload.

(8) Remove case bolts. Remove clutch bellhousing differential bearing cup. Install shim(s) selected in Step 7. Then press the bearing cup into clutch bellhousing.

(9) Install clutch bellhousing. Install and torque case bolts to 26 N·m (19 ft. lbs.).

(10) Using Special Tool C-4995 and an inch-pound torque wrench, check turning torque of the differential assembly (Fig. 142). **The turning torque should be 6 to 12 in. lbs. If the turning torque is too high, install a 0.05mm (0.002 inch) thinner**

ADJUSTMENTS (Continued)

shim. If the turning torque is too low, install a 0.05mm (0.002 inch) thicker shim.

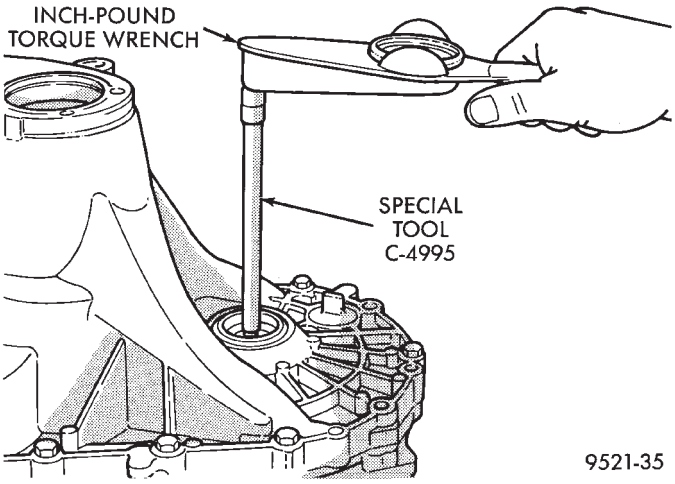


Fig. 142 Checking Differential Bearing Turning Torque

(11) Recheck turning torque. Repeat Step 10 until the proper turning torque is obtained.

SPECIFICATIONS

NV T350 (A-578) SPECIFICATIONS

DESCRIPTION	TORQUE
Back-up Lamp Switch	24 N·m (18 ft. lbs.)
Crossover Cable Adj. Screw	8 N·m (70 in. lbs.)
Drain Plug	30 N·m (267 in. lbs.)
Differential Ring Gear Bolts	81 N·m (60 ft. lbs.)
Dust Shield to Transaxle	12 N·m (105 in. lbs.)
End Plate Cover Bolts	29 N·m (21 ft. lbs.)
Front Engine Mount to Trans	108 N·m (80 ft. lbs.)
Front Mount Through Bolt	61 N·m (45 ft. lbs.)
Front Mount to Engine Bolt	54 N·m (40 ft. lbs.)
Lateral Bending Strut to Engine	54 N·m (40 ft. lbs.)
Lateral Bending Strut to Trans.	54 N·m (40 ft. lbs.)
Left Mount Through Bolt	108 N·m (80 ft. lbs.)
Left Mount to Transaxle	54 N·m (40 ft. lbs.)
Output Bearing Race Ret. Strap	11 N·m (96 in. lbs.)
Power Hop Damper Bkt. to Trans.	54 N·m (40 ft. lbs.)
Power Hop Damper to Frame Bkt.	54 N·m (40 ft. lbs.)
Power Hop Damper to Trans. Bkt.	54 N·m (40 ft. lbs.)
Reverse Fork Bracket	11 N·m (96 in. lbs.)
Reverse Idler Shaft Bolt	26 N·m (19 ft. lbs.)
Shift Cable Bracket to Transaxle	28 N·m (250 in. lbs.)
Transaxle Case Bolts	29 N·m (21 ft. lbs.)
Transaxle to Engine Bolt	95 N·m (70 ft. lbs.)
Trans. to Eng. Intake Bkt. Bolts	95 N·m (70 ft. lbs.)
Vehicle Speed Sensor	7 N·m (60 in. lbs.)
Vertical Bending Strut to Engine	108 N·m (80 ft. lbs.)
Vertical Bending Strut to Trans.	108 N·m (80 ft. lbs.)

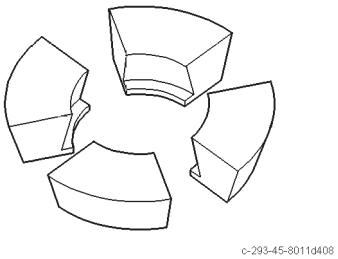
NOTE: Bolts that have thread sealer or torque lock patches should not be reused. Always install new bolts in these applications.

NV T350 (A-578) MANUAL TRANSAXLE FLUID FILL

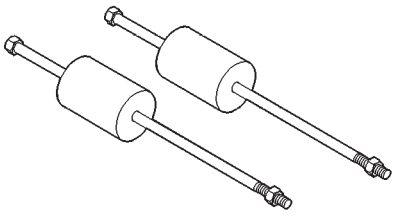
TRANSAXLE	METRIC MEASURE	U.S. MEASURE
NV T350	1.9-2.2 Liters	2.0-2.3 Quarts

SPECIAL TOOLS

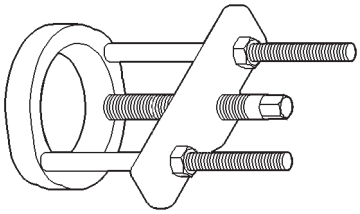
SPECIAL TOOLS–NV T350 (A-578) MANUAL TRANSAXLE



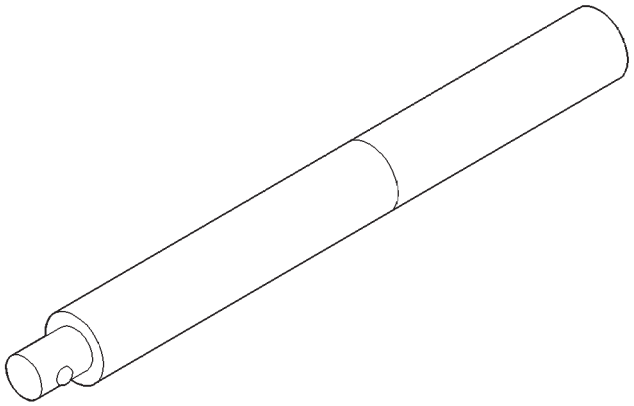
Adapter Blocks C-293–45



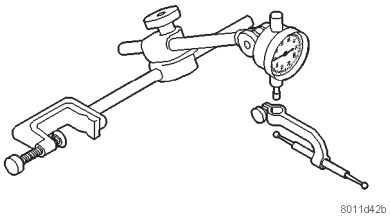
Slide Hammer C-3752



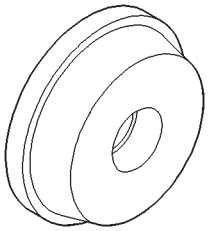
Puller Press C-293–PA



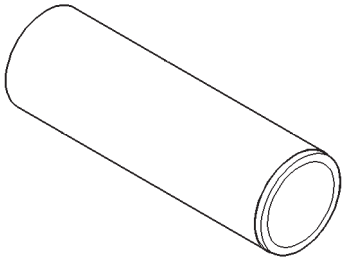
Universal Handle C-4171



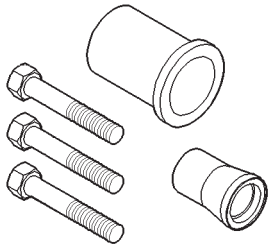
Dial Indicator C-3339



Bearing Installer C-4628

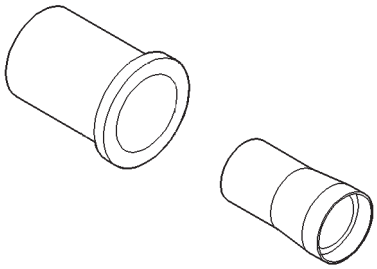


Sleeve C-3717

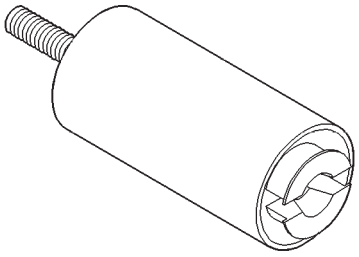


Seal Remover C-4680

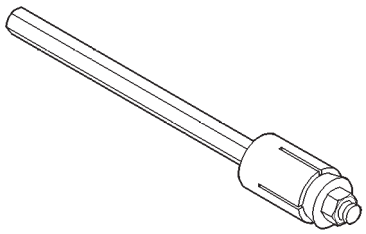
SPECIAL TOOLS (Continued)



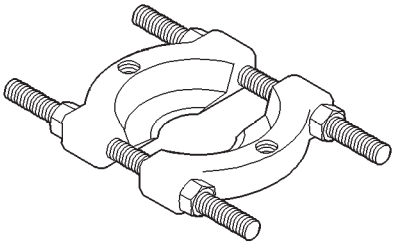
Seal Installer C-4992



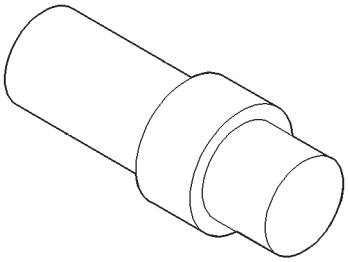
Special Jaw Set L-4518



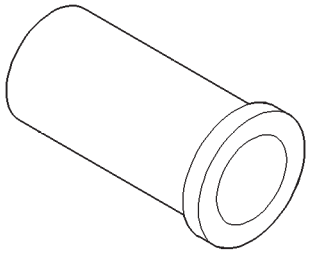
Torque Tool C-4995



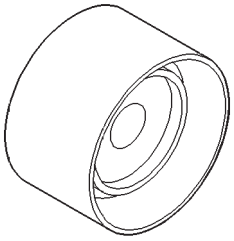
Bearing Splitter 1130



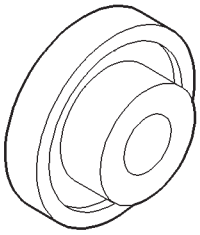
Adapter C-4996



Driver 6342



Installer L-4410



Seal Installer 6709

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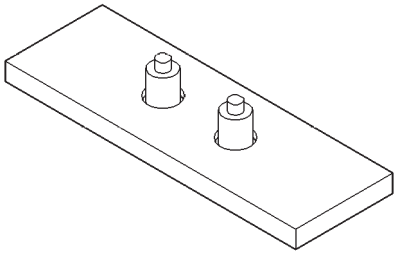
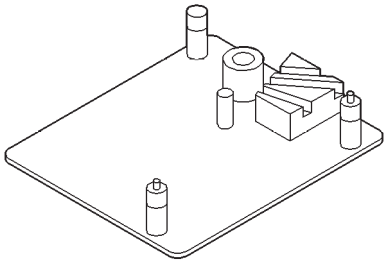
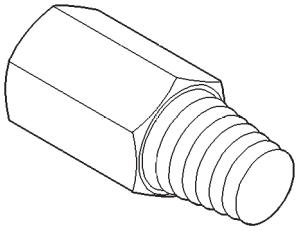


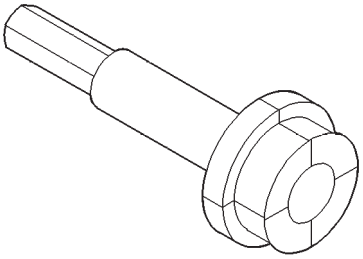
Bearing Remover 6768



Bench Fixture 6785



Remover 6786



Remover 6787

31TH AUTOMATIC TRANSAXLE

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GENERAL INFORMATION

GENERAL INFORMATION

NOTE: Safety goggles should be worn at all times when working on these transaxles.

This transaxle combines torque converter, three speed transmission, final drive gearing, and differential into a front wheel drive system. The identification markings and usage of the transaxle are charted in Diagnosis and Tests.

NOTE: Transaxle operation requirements are different for each vehicle and engine combination. Some internal parts will be different to provide for this. Therefore, when replacing parts, refer to the seven digit part number stamped on rear of the transaxle oil pan flange.

Within this transaxle, there are three primary areas:

(1) Main center line plus valve body.

(2) Transfer shaft center line (includes governor and parking sprag).

(3) Differential center line.

Center distances between the main rotating parts in these three areas are held precise to maintain a low noise level.

The torque converter, transaxle area, and differential are housed in an integral aluminum die casting. **The differential oil sump is common with the transaxle sump. Separate filling of the differential is NOT necessary.**

The torque converter is attached to the crankshaft through a flexible driving plate. Cooling of the converter is accomplished by circulating the transaxle fluid through a remote cooler. There are two types of coolers used. An oil-to-water type cooler located in the radiator side tank and/or an oil-to-air heat exchanger. The torque converter assembly is a sealed unit that cannot be disassembled.

The transaxle fluid is filtered by an internal filter attached to the lower side of the valve body assembly.

Engine torque is transmitted to the torque converter and then through the input shaft to multiple-disc clutches in the transaxle. The power flow depends on the application of the clutches and bands. Refer to Elements in Use Chart in Diagnosis and Tests section.

The transaxle consists of:

- Two multiple-disc clutches
- An overrunning clutch
- Two servos
- A hydraulic accumulator
- Two bands
- Two planetary gear sets

This provides three forward ratios and a reverse ratio. The common sun gear of the planetary gear sets is connected to the front clutch by a driving shell. The driving shell is splined to the sun gear and front clutch retainer. The hydraulic system consists of an oil pump and a single valve body which contains all of the valves except the governor valves. The transaxle sump and differential sump are both vented through the dipstick. Output torque from the main center line is delivered through helical gears to the transfer shaft. This gear set is a factor in the transaxle final drive (axle) ratio. The shaft also carries the governor and parking sprag. An integral helical gear on the transfer shaft drives the differential ring gear. The final drive gearing is completed with one of two gear ratios; 2.98 or 3.19 depending on model and application.

FLUID LEVEL AND CONDITION

NOTE: The transmission and differential sump have a common oil sump with a communicating opening between the two.

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. This will ensure complete oil level stabilization between differential and transmission.** 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 dipstick.

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 will build up slowly.

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

In either case, the air bubbles can cause overheating, fluid oxidation, and varnishing. This can interfere with normal valve, clutch, and servo operation. Foaming also can result in fluid escaping from the transaxle dipstick, 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, or is contaminated with metal or friction material particles, a complete transaxle overhaul 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.

GENERAL INFORMATION (Continued)

SELECTION OF LUBRICANT

It is important that the proper lubricant be used in these transmissions. Mopar ATF PLUS (Automatic Transmission Fluid- type 7176) should be used to aid in ensuring optimum transmission performance. Fluids of the type labeled DEXRON II Automatic Transmission Fluid should be used only if the recommended fluid is not available. If more than a small amount of Dexron fluid is used, shudder or shift quality problems may be encountered. It is important that the transmission fluid be maintained at the prescribed level using the recommended fluids.

SPECIAL ADDITIVES

Chrysler Corporation does not recommend the addition of any fluids to the transmission, other than that 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.

DESCRIPTION AND OPERATION

TORQUE CONVERTER CLUTCH

A torque converter clutch is standard on all vehicles. The torque converter clutch is activated only in direct drive and is controlled by the engine electronics. A solenoid on the valve body, is powered by the powertrain control module to activate the torque converter clutch.

HYDRAULIC CONTROL SYSTEM

The hydraulic control system makes the transaxle fully automatic, and has four important functions to perform. The components of any automatic control system may be grouped into the following basic groups:

- Pressure supply system
- Pressure regulating valves
- Flow control valves
- Clutches
- Band servos

Taking each of these basic groups or systems in turn, the control system may be described as follows:

PRESSURE SUPPLY SYSTEM

The pressure supply system consists of an oil pump driven by the engine through the torque converter. The single pump furnishes pressure for all hydraulic and lubrication requirements. **Oil pump housing assemblies are available with preselected pump gears.**

PRESSURE REGULATING VALVES

The pressure regulating valve controls line pressure dependent on throttle opening. The governor valve transmits regulated pressure to the valve body (in conjunction with vehicle speed) to control upshift and downshift.

The throttle valve transmits regulated pressure to the transaxle (dependent on throttle position) to control upshift and downshift.

FLOW CONTROL VALVES

The manual valve provides the different transaxle drive ranges selected by the vehicle operator.

The 1-2 shift valve automatically shifts the transaxle from first to second or from second to first, depending on the vehicle operation.

The 2-3 shift valve automatically shifts the transaxle from second to third or from third to second depending on the vehicle operation.

The kickdown valve makes possible a forced downshift from third to second, second to first, or third to first (depending on vehicle speed). This can be done by depressing the accelerator pedal past the detent feel near wide open throttle.

The shuttle valve has two separate functions and performs each independently of the other. The first is providing fast release of the kickdown band, and smooth front clutch engagement when a lift-foot upshift from second to third is made. The second function is to regulate the application of the kickdown servo and band when making third–to–second kickdown.

The bypass valve provides for smooth application of the kickdown band on 1-2 upshifts.

The torque converter clutch solenoid allows for the electronic control of the torque converter clutch. It also disengages the torque converter at closed throttle. This is done during engine warm-up and part-throttle acceleration.

The switch valve directs oil to apply the torque converter clutch in one position. The switch valve releases the torque converter clutch in the other position.

CLUTCHES, BAND SERVOS, AND ACCUMULATOR

The front and rear clutch pistons, and both servo pistons, are moved hydraulically to engage the clutches and apply the bands. The pistons are released by spring tension when hydraulic pressure is released. On the 2-3 upshift, the kickdown servo piston is released by spring tension and hydraulic pressure.

The accumulator controls the hydraulic pressure on the apply–side of the kickdown servo during the 1-2 upshift; thereby cushioning the kickdown band application at any throttle position.

DESCRIPTION AND OPERATION (Continued)

AUTOMATIC TRANSMISSION SHIFTER/IGNITION INTERLOCK

The Shifter/Ignition Interlock, is a mechanical cable operated system (Fig. 1). It interconnects the automatic transmission floor–mounted shifter to the steering column ignition switch. The interlock system locks the floor–mounted shift lever into the PARK position whenever the ignition switch is in the LOCK or ACCESSORY position. When the key is in the OFF or RUN position, the shifter is unlocked and will move into any position. Also the interlock system prevents the ignition switch from being turned to LOCK or ACCESSORY position, unless shifter is in the PARK position.

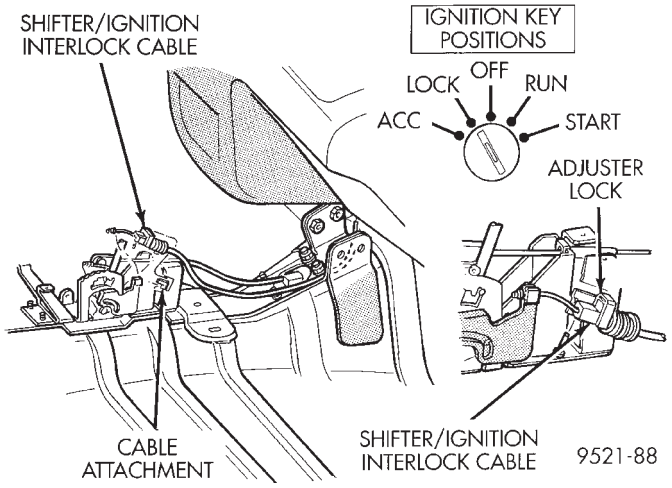

Fig. 1 Shifter Ignition Interlock System Components

GEARSHIFT AND PARKING LOCK CONTROLS

The transaxle is controlled by a **lever type** gearshift incorporated within the console. The control has six selector lever positions: P (Park), R (Reverse), N (Neutral), and D (Drive), 2 (Second), and 1 (First). The parking lock is applied by moving the selector lever past a gate to the (P) position. **Do not apply the parking lock until the vehicle has stopped; otherwise, a severe banging noise will occur.**

TORQUE CONVERTER CLUTCH SOLENOID WIRING CONNECTOR

If the solenoid wiring connector is unplugged, the torque converter will not engage (Fig. 2).

GOVERNOR

The governor can be serviced by removing the transaxle oil pan and valve body assembly. The governor can be unbolted from the governor support and removed from the transaxle for reconditioning or replacement.

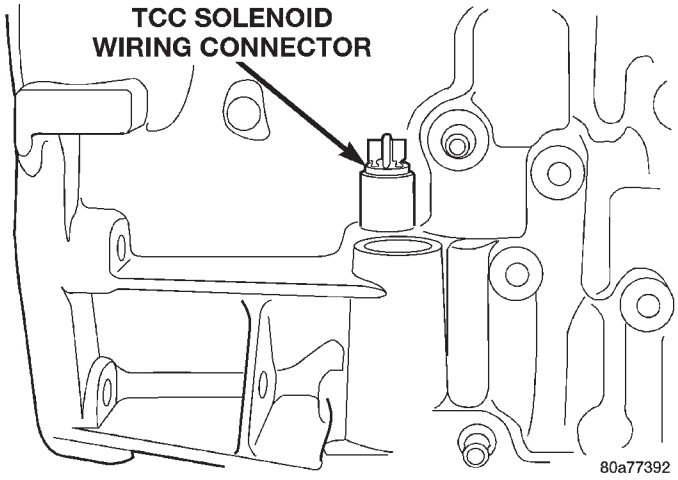

Fig. 2 Torque Converter Clutch Solenoid Wiring Connector

When cleaning or assembling the governor, be sure the governor valves move freely in the bores of the governor body.

DIAGNOSIS AND TESTING

31TH TRANSAXLE DIAGNOSIS AND TESTS

Automatic transaxle malfunctions can be caused by four general conditions:

(1) Poor engine performance
(2) Improper adjustments
(3) Hydraulic malfunctions
(4) Mechanical malfunctions

Diagnosis of these problems should always begin by checking the easily accessible variables: fluid level and condition, gearshift cable adjustment, and throttle pressure cable adjustment. 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 tests should be performed

31TH HYDRAULIC TROUBLE CODE CHARTS

The following charts should be used to help diagnose hydraulic or mechanical faults in the transaxle.

ROAD TEST

Prior to performing a road test, check the fluid level and control cable adjustments.

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

If vehicle operates at high speeds, but has poor acceleration, the converter's overrunning clutch may be slipping. If acceleration is normal, but high throt-

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
HARSH ENGAGEMENT FROM NEUTRAL TO DRIVE	Engine idle speed too high	Check engine curb idle speed. Correct as necessary.
	Valve body malfunction	Inspect valve body and repair.
	Hydraulic pressure too high	Check fluid pressure at ports.
	Worn or faulty rear clutch	Replace discs and seals at rear clutch.
	Rear clutch spring load high	Replace rear clutch spring.
	Engine performance	Check engine specs.
HARSH ENGAGEMENT FROM NEUTRAL TO REVERSE	Low/Reverse band misadjusted	Adjust band to specs.
	Engine idle speed too high	Set up engine to specs.
	Low/Reverse band worn out	Replace Low/Reverse band.
	Low/Reverse band, servo or linkage malfunction	Repair Low/Reverse servo. Adjust band and linkage
	Hydraulic pressure too high	Check fluid pressure at ports.
	Worn or faulty rear clutch	Replace discs and seals at rear clutch.
	Engine performance	Set up engine to specs.
DELAYED ENGAGEMENT FROM NEUTRAL TO DRIVE	Hydraulic pressure too low	Check fluid pressure at ports.
	Valve body malfunction	Inspect valve body and repair.
	Low fluid level	Fill transaxle to proper level.
	Incorrect gearshift linkage adjustment	Adjust gearshift linkage.
	Oil filter clogged	Replace oil filter.
	Faulty oil pump	Replace oil pump.
	Worn input shaft seal rings	Replace input shaft seal rings.
	Aerated fluid	Replace transaxle fluid.
	Engine idle speed too low	Set engine to specs.
	Worn or faulty rear clutch	Replace discs and seals at rear clutch.

tle opening is needed for high speeds, the stator clutch may have seized.

Observe closely for slipping or engine speed flare-up. Slipping or flare-up in any gear usually indicates clutch, band, or overrunning clutch problems. If the condition is far advanced, an overhaul will probably be necessary to restore normal operation.

In most cases, the clutch or band that is slipping can be determined by noting the transaxle operation in all selector positions and then comparing which internal units are applied in those positions. The Elements–in–Use Chart provides a basis for road test analysis.

The rear clutch is applied in both the D first gear and 1 first gear positions. Also, the overrunning clutch is applied in D first gear and the low/reverse band is applied in 1 first gear position. If the transaxle slips in D range first gear, but does not slip in 1 first gear, the overrunning clutch is slipping. Similarly, if the transaxle slips in any two forward gears, the rear clutch is slipping.

Using the same procedure, the rear clutch and front clutch are applied in D third gear. If the transaxle slips in third gear, either the front clutch or the rear clutch is slipping. By selecting another gear that does not use one of those units, the unit that is slipping can be determined. If the transaxle also slips in reverse, the front clutch is slipping. If the transaxle does not slip in reverse, the rear clutch is slipping.

The process of elimination can be used to detect any unit that slips and to confirm proper operation of good units. Road testing can usually diagnose slipping units, although the actual cause of the problem may not be detected. Practically any condition can be caused by leaking hydraulic circuits or sticking valves.

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
DELAYED ENGAGEMENT FROM NEUTRAL TO REVERSE	1. Low reverse band misadjusted. 2. Hydraulic pressures too low. 3. Low reverse band worn out. 4. Valve body malfunction. 5. Low reverse band, servo or linkage malfunction. 6. Low fluid level. 7. Incorrect gearshift linkage adjustment. 8. Oil filter clogged. 9. Faulty oil pump. 10. Worn input shaft seal rings. 11. Aerated fluid. 12. Engine idle speed too low. 13. Worn reaction shaft support seal rings. 14. Worn or faulty front clutch.	1. Adjust bands to specs. 2. Check fluid pressure at ports. 3. Replace low reverse band. 4. Inspect valve body and repair. 5. Repair low reverse servo. Adjust reverse band and linkage. 6. Fill trans. to level. 7. Adjust gearshift linkage. 8. Replace oil filter. 9. Replace oil pump. 10. Replace input shaft seal rings. 11. Replace trans. fluid. 12. Set up engine to specs. 13. Inspect and replace reaction shaft support seal rings. 14. Replace discs and seal at front clutch.
RUNAWAY UPSHIFT	1. Hydraulic pressures too low. 2. Valve body malfunction. 3. Low fluid level. 4. Oil filter clogged. 5. Aerated fluid. 6. Incorrect throttle linkage. 7. Worn reaction shaft support seal rings. 8. Governor malfunction. 9. Kickdown band, servo or linkage malfunction. 10. Worn front clutch.	1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Replace oil filter. 5. Replace trans. fluid. 6. Adjust throttle linkage. 7. Replace reaction shaft support seal rings. 8. Inspect and repair governor. 9. Inspect and repair kickdown band, servo or linkage. 10. Replace discs and seals at front clutch.

Diagnosis Guide

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO UPSHIFT	1. Hydraulic pressure too low. 2. Valve body malfunction. 3. Low fluid level. 4. Incorrect gearshift linkage adjustment. 5. Incorrect throttle linkage. 6. Governor support seal rings worn. 7. Worn reaction shaft support seal rings. 8. Governor malfunction. 9. Kickdown band, servo or linkage malfunction. 10. Worn front clutch. 11. Engine performance.	1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Adjust gearshift linkage. 5. Adjust throttle linkage. 6. Replace governor support seal rings. 7. Replace reaction shaft support seal rings. 8. Inspect and repair governor. 9. Inpsect and repair kickdown band, servo or linkage. 10. Replace discs and seals at front clutch. 11. Set up engine to specs.
3-2 KICKDOWN RUNAWAY	1. Hydraulic pressure too low. 2. Valve body malfunction. 3. Low fluid level. 4. Aerated fluid. 5. Incorrect throttle linkage adjustment. 6. Kickdown band out of adjustment. 7. Governor support seal rings worn. 8.Kickdown band, servo or linkage malfunction. 9. Worn front clutch.	1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Replace trans. fluid. 5. Adjust throttle linkage. 6. Adjust kickdown band. 7. Replace governor support seal rings. 8. Inspect and repair kickdown band, servo or linkage. 9. Replace discs and seals at front clutch.
NO KICKDOWN OR NORMAL DOWNSHIFT	1. Valve body malfunction. 2. Incorrect throttle linkage adjustment. 3. Governor malfunction. 4. Kickdown band, servo or linkage malfunction.	1. Inspect valve body and repair. 2. Adjust throttle linkage. 3. Inspect and repair governor. 4. Inspect and repair kickdown band, servo or linkage.

Diagnosis Guide

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
SHIFTS ERRATIC	1. Hydraulic pressure too low. 2. Valve body malfunction. 3. Low fluid level. 4. Incorrect gearshift linkage adjustment. 5. Oil filter clogged. 6. Faulty oil pump. 7. Aerated fluid. 8. Incorrect throttle linkage adjustment. 9. Governor support seal rings worn. 10. Worn reaction shaft support seal rings. 11. Governor malfunction. 12. Kickdown band, servo or linkage malfunction. 13. Worn front clutch. 14. Engine performance.	1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Adjust gearshift linkage. 5. Replace oil filter. 6. Replace oil pump. 7. Replace trans. fluid. 8. Adjust throttle linkage. 9. Replace governor support seal rings. 10. Replace reaction shaft support seal rings. 11. Inspect and repair governor. 12. Inspect and repair kickdown band, servo or linkage. 13. Replace discs and seals at front clutch. 14. Set up engine to specs.
SLIPS IN FORWARD DRIVE POSITIONS	1. Hydraulic pressure too low. 2. Valve body malfunction. 3. Low fluid level. 4. Incorrect gearshift linkage adjustment. 5. Oil filter clogged. 6. Faulty oil pump. 7. Worn input shaft seal rings. 8. Aerated fluid. 9. Incorrect throttle linkage adjustment. 10. Overrunning clutch not holding. 11. Worn rear clutch. 12. Overrunning clutch worn, broken or seized.	1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Adjust gearshift linkage. 5. Replace oil filter. 6. Replace oil pump. 7. Replace input shaft seal rings. 8. Replace trans. fluid. 9.Adjust throttle linkage. 10. Inspect and repair overrunning clutch. 11. Replace discs and seals at rear clutch. 12. Replace overrunning clutch assembly.

Diagnosis Guide

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
SLIPS IN REVERSE ONLY	1. Low reverse band misadjusted. 2. Hydraulic pressure too low. 3. Low reverse band worn out. 4. Valve body malfunction. 5. Low reverse band, servo or linkage malfunction. 6. Low fluid level. 7. Incorrect gearshift linkage adjustment. 8. Faulty oil pump. 9. Aerated fluid. 10. Worn reaction shaft suppport seal rings. 11. Worn front clutch.	1. Adjust low reverse band. 2. Check fluid pressure at ports. 3. Replace low reverse band. 4. Inspect valve body and repair. 5. Repair low reverse servo. Adjust reverse band and linkage. 6. Fill trans. to level. 7. Adjust gearshift linkage. 8. Replace oil pump. 9. Replace trans. fluid. 10. Replace reaction shaft support seal rings. 11. Replace discs and seals at front clutch.
SLIPS IN ALL POSITIONS	1. Hydraulic pressure too low. 2. Valve body malfunction. 3. Low fluid level. 4. Oil filter clogged. 5. Faulty oil pump. 6. Worn input shaft seal rings. 7. Aerated fluid.	1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Replace oil filter. 5. Replace oil pump. 6. Replace input shaft seal rings. 7. Replace trans. fluid.
NO DRIVE IN ANY POSITION	1. Hydraulic pressure too low. 2. Valve body malfunction. 3. Low fluid level. 4. Oil filter clogged. 5. Faulty oil pump. 6. Planetary gear sets broken or seized.	1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Replace oil filter. 5. Replace oil pump. 6. Replace planetary gear sets.

Diagnosis Guide

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
NO DRIVE IN FORWARD DRIVE POSITIONS	1. Hydraulic pressure too low. 2. Valve body malfunction. 3. Low fluid level. 4. Worn input shaft seal rings. 5. Overrunning clutch not holding. 6. Worn rear clutch. 7. Planetary gear sets broken or seized. 8. Overrunning clutch worn, broken or seized.	1. Check fluid pressure at ports. 2. Inspect valve body and repair. 3. Fill trans. to level. 4. Replace input shaft seal rings. 5. Inspect and repair overrunning clutch. 6. Replace discs and seals at rear clutch. 7. Replace planetary gear sets. 8. Replace overrunning clutch assembly.
NO DRIVE IN REVERSE	1. Hydraulic pressure too low. 2. Low reverse band worn out. 3. Valve body malfunction. 4. Low reverse band, servo or linkage malfunction. 5. Incorrect gearshift linkage adjustment. 6. Worn reaction shaft support seal rings. 7. Worn front clutch. 8. Worn rear clutch. 9. Planetary gear sets broken or seized.	1. Check fluid pressure at ports. 2. Replace low reverse band. 3. Inspect valve body and repair. 4. Repair low reverse servo. Adjust reverse band and linkage. 5. Adjust gearshift linkage. 6. Replace reaction shaft support seal rings. 7. Replace discs and seals at front clutch. 8. Replace discs and seals at rear clutch. 9. Replace planetary gear sets.
DRIVES IN NEUTRAL	1. Valve body malfunction. 2. Incorrect gearshift linkage adjustment. 3. Insufficient clutch plate clearance. 4. Worn rear clutch. 5. Rear clutch dragging.	1. Inspect valve body and repair. 2. Adjust gearshift linkage. 3. Check and adjust clutch plate clearance. 4. Replace discs and seals at rear clutch. 5. Inspect and repair rear clutch.
DRAGS OR LOCKS	1. Low reverse band worn out. 2. Kickdown band adjustment too tight. 3. Planetary gear sets broken or seized. 4. Overrunning clutch worn, broken or seized.	1. Replace low reverse band. 2. Adjust kickdown band. 3. Replace planetary gear sets. 4. Replace overrunning clutch assembly.

Diagnosis Guide

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
GRATING, SCRAPING, OR GROWLING NOISE	1. Low reverse band worn out. 2. Kickdown band out of adjustment. 3. Drive shaft bushing damaged. 4. Planetary gear sets broken or seized. 5. Overrunning clutch worn, broken or seized.	1. Replace low reverse band. 2. Adjust kickdown band. 3. Replace drive shaft bushing. 4. Replace planetary gear sets. 5. Replace overrunning clutch assembly.
BUZZING NOISE	1. Valve body malfunction. 2. Low fluid level. 3. Aerated fluid. 4. Overrunning clutch inner race damaged.	1. Inspect valve body and repair. 2. Fill fluid to level. 3. Replace trans. fluid. 4. Replace overrunning clutch assembly.
HARD TO FILL, OIL BLOWS OUT FILLER HOLE	1. Oil filter clogged. 2. Aerated fluid. 3. High fluid level.	1. Replace oil filter. 2. Replace trans. fluid. 3. Adjust fluid level to specs.
TRANSAXLE OVERHEATS	1. Stuck cooler flow switch valve. 2. Engine idle speed too high. 3. Hydraulic pressures too low. 4. Low fluid level. 5. Incorrect gearshift linkage adjustment. 6. Faulty oil pump. 7. Kickdown band adjustment too tight. 8. Faulty cooling system. 9. Insufficient clutch plate clearance.	1. Replace switch valve behind oil pump housing. 2. Adjust engine idle to specs. 3. Check fluid pressure at ports. 4. Fill trans. to level. 5. Adjust gearshift linkage. 6. Replace oil pump. 7. Adjust kickdown band. 8. Check cooling system temperature and repair as needed. 9. Check and adjust clutch plate clearance.

Diagnosis Guide

DIAGNOSIS AND TESTING (Continued)

CONDITION	POSSIBLE CAUSES	CORRECTION
HARSH UPSHIFT	1. Hydraulic pressures too low. 2. Incorrect throttle linkage adjustment. 3. Kickdown band out of adjustment. 4. Hydraulic pressure too high. 5. Engine performance.	1. Check fluid pressure at ports. 2. Adjust throttle linkage. 3. Adjust kickdown band. 4. Check fluid pressure at ports. 5. Set up engine to specs.
DELAYED UPSHIFT	1. Incorrect throttle linkage adjustment. 2. Kickdown band out of adjustment. 3. Governor support seal rings worn. 4. Worn reaction shaft support seal rings. 5. Governor malfunction. 6. Kickdown band, servo or linkage malfunction. 7. Worn front clutch. 8. Engine performance.	1. Adjust throttle linkage. 2. Adjust kickdown band. 3. Replace governor support seal rings. 4. Replace reaction shaft support seal rings. 5. Inspect and repair governor. 6. Inspect and repair kickdown band, servo or linkage. 7. Replace discs and seals at front clutch. 8. Set up engine to specs.
NO TORQUE CONVERTER CLUTCH APPLICATION	1. Stuck cooler flow switch valve. 2. Hydraulic pressures too low. 3. Low fluid level. 4. Faulty oil pump. 5. Worn input shaft seal rings. 6. Aerated fluid.	1. Replace switch valve behind oil pump housing. 2. Check fluid pressure at ports. 3. Fill trans. to level. 4. Replace oil pump. 5. Replace input shaft seal rings. 6. Replace trans. fluid.

Diagnosis Guide

DIAGNOSIS AND TESTING (Continued)

Lever Position	Start Safety	Parking Sprag	Clutches				Bands	
			Front	Rear	Lockup	Overrunning	(Kickdown) Front	(Low-Rev.) Rear
P - PARK	X	X						
R - REVERSE			X					X
N - NEUTRAL	X							
D - DRIVE:								
First				X		X		
Second				X			X	
Third			X	X	X			
2 - SECOND:								
First				X		X		
Second				X			X	
1- LOW (First)				X				X

ELEMENTS IN USE AT EACH POSITION OF THE SELECTOR LEVER

Therefore, unless the condition is obvious, the transaxle should never be disassembled until hydraulic pressure tests have been performed.

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, check fluid level and condition, as well as control cable adjustments. Fluid must be at operating temperature (150 to 200 degrees F.).

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

Disconnect throttle cable and shift cable from transaxle levers so they can be controlled from outside the vehicle.

Attach 150 psi gauges to ports required for test being conducted. A 300 psi gauge (C-3293) is required for reverse pressure test at rear servo.

Test port locations are shown in (Fig. 3).

TEST ONE (SELECTOR IN 1)

(1) Attach gauges to line and low-reverse ports.

(2) Operate engine at 1000 rpm for test.

(3) Move selector lever on transaxle all the way rearward (1 position).

(4) Read pressures on both gauges as throttle lever on transaxle is moved from full clockwise position to full counterclockwise position.

(5) Line pressure should read 52 to 58 psi with throttle lever clockwise. Pressure should gradually increase to 80 to 88 psi.as lever is moved counterclockwise.

(6) Low/reverse pressure should read the same as line pressure, within 3 psi.

(7) This tests pump output, pressure regulation, and condition of rear clutch and rear servo hydraulic circuits.

TEST TWO (SELECTOR IN 2)

(1) Attach one gauge to line pressure port, and tee another gauge into lower cooler line fitting. This will allow lubrication pressure readings to be taken..

(2) Operate engine at 1000 rpm for test.

(3) Move selector lever on transaxle one detent forward from full rearward position. This is selector 2 position.

(4) Read pressures on both gauges as throttle lever on transaxle is moved from full clockwise position to full counterclockwise position.

(5) Line pressure should read 52 to 58 psi with throttle lever clockwise. Pressure should gradually increase to 80 to 88 psi. as lever is moved counterclockwise.

(6) Lubrication pressure should be 10 to 25 psi with lever clockwise and 10 to 35 psi with lever at full counterclockwise.

(7) This tests pump output, pressure regulation, and condition of rear clutch and lubrication hydraulic circuits.

TEST THREE (SELECTOR IN D)

(1) Attach gauges to line and kickdown release ports.

(2) Operate engine at 1600 rpm for test.

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

(4) Read pressures on both gauges as throttle lever on transaxle is moved from full clockwise to the full counterclockwise position.

DIAGNOSIS AND TESTING (Continued)

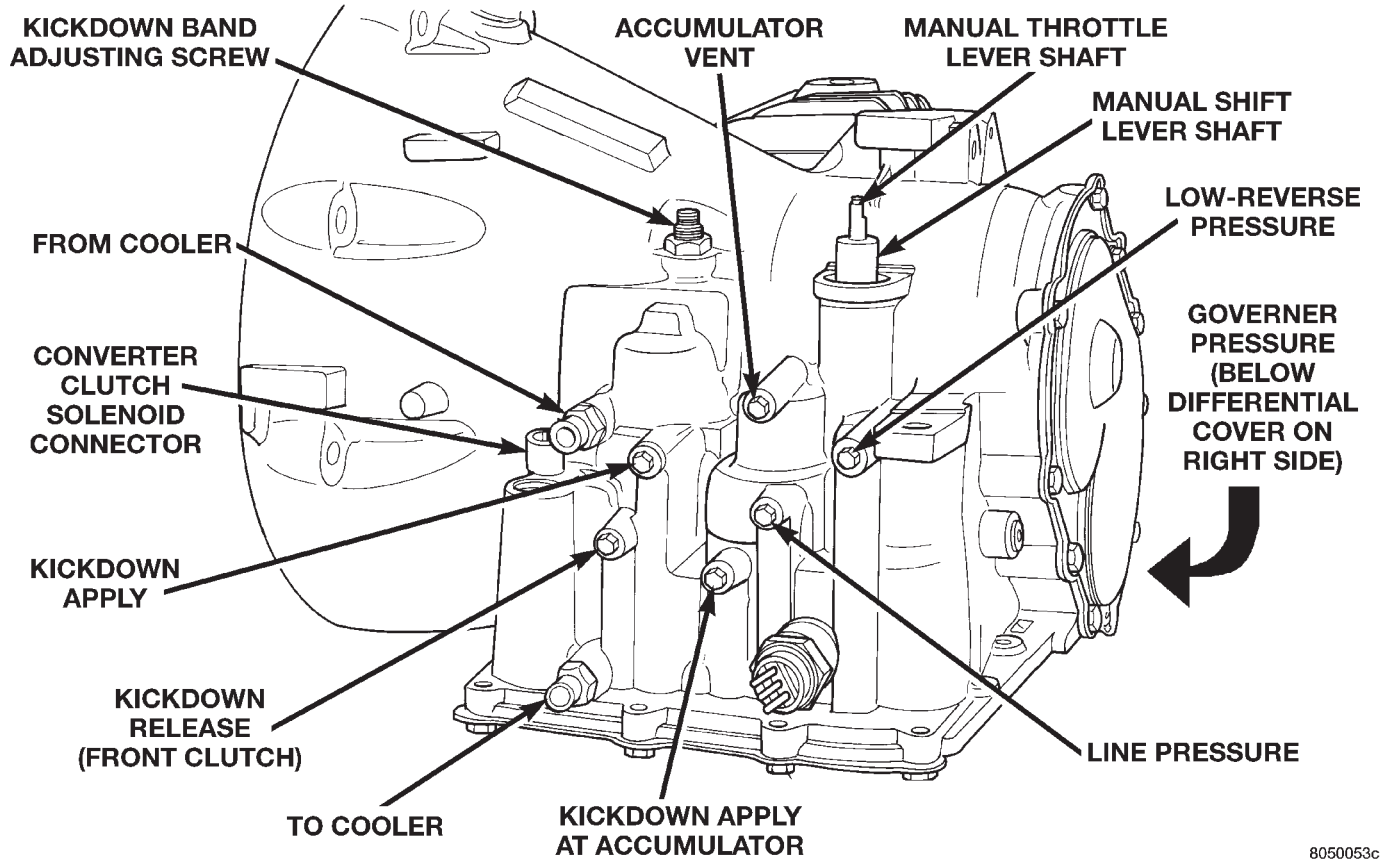

Fig. 3 Test Port Locations

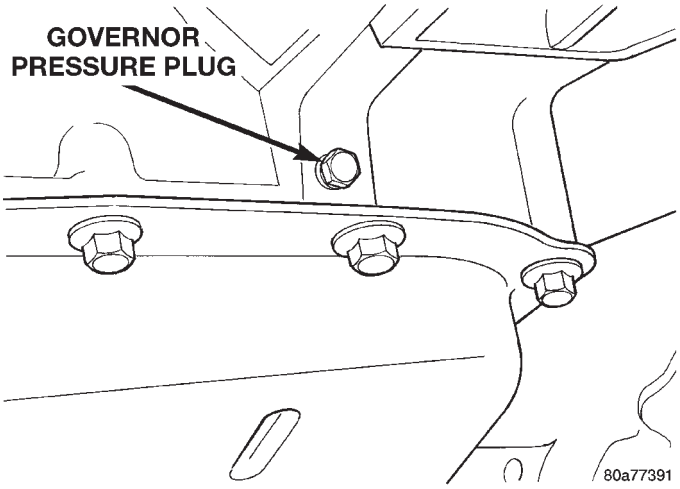

Fig. 4 Governor Pressure Tap

(5) Line pressure should read 52 to 58 psi with throttle lever clockwise. Pressure should gradually increase to 80 to 88 psi. as lever is moved counterclockwise.

(6) Kickdown release is pressurized only in direct drive and should be same as line pressure within 3 psi, up to kickdown point.

(7) This tests pump output, pressure regulation, and condition of rear clutch, front clutch, and hydraulic circuits.

TEST FOUR (SELECTOR IN REVERSE)

(1) Attach 300 psi gauge to low-reverse port.

(2) Operate engine at 1600 rpm for test.

(3) Move selector lever on transaxle four detents forward from full rearward position. This is selector R position.

(4) Low/reverse pressure should read 180 to 220 psi with throttle lever clockwise. Pressure should gradually increase to 260 to 300 psi. as lever is moved counterclockwise.

(5) This tests pump output, pressure regulation, and condition of front clutch and rear servo hydraulic circuits.

(6) Move selector lever on transaxle to D position to check that low/reverse pressure drops to zero.

(7) This tests for leakage into rear servo, due to case porosity, which can cause reverse band burn out.

TEST RESULT INDICATIONS

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

(2) Low pressure in D, 1, and 2 but correct pressure in R, indicates rear clutch circuit leakage.

(3) Low pressure in D and R, but correct pressure in 1 indicates front clutch circuit leakage.

DIAGNOSIS AND TESTING (Continued)

(4) Low pressure in R and 1, but correct pressure in 2 indicates rear servo circuit leakage.

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

GOVERNOR PRESSURE

Test only if transaxle shifts at wrong vehicle speeds when throttle cable is correctly adjusted.

(1) Connect a 0-150 psi pressure gauge to governor pressure take-off point. It is located at lower right side of case, below differential cover.

(2) Operate transaxle in third gear to read pressures. The governor pressure should respond smoothly to changes in mph and should return to 0 to 3 psi when vehicle is stopped. High pressure (above 3 psi) at standstill will prevent the transaxle from downshifting.

THROTTLE PRESSURE

No gauge port is provided for throttle pressure. Incorrect throttle pressure should be suspected if part throttle upshift speeds are either delayed or occur too early in relation to vehicle speed. Engine runaway on shifts can also be an indicator of low throttle pressure setting, or misadjusted throttle cable.

In no case should throttle pressure be adjusted until the transaxle throttle cable adjustment has been verified to be correct.

CLUTCH AND SERVO AIR PRESSURE TESTS

A no–drive condition might exist even with correct fluid pressure, because of inoperative clutches or bands. The inoperative units, clutches, bands, and servos can be located through a series of tests. This is done by substituting air pressure for fluid pressure (Fig. 5).

The front and rear clutches, kickdown servo, and low/reverse servo can be tested by applying air pressure to their respective passages. To make air pressure tests, proceed as follows:

NOTE: Compressed air supply must be free of all dirt and moisture. Use a pressure of 30 psi.

Remove oil pan and valve body. Refer to Valve Body for removal procedure.

FRONT CLUTCH

Apply air pressure to front clutch apply passage and listen for a dull thud, which indicates that front clutch is operating. Hold air pressure on for a few seconds and inspect system for excessive oil leaks.

REAR CLUTCH

Apply air pressure to rear clutch apply passage and listen for a dull thud, which indicates that rear clutch is operating. Also, inspect for excessive oil leaks. If a dull thud cannot be heard in the clutches, place finger tips on clutch housing and again apply air pressure. Movement of piston can be felt as the clutch is applied.

KICKDOWN SERVO (FRONT)

Direct air pressure into KICKDOWN SERVO ON passage. Operation of servo is indicated by a tightening of front band. Spring tension on servo piston should release the band.

LOW AND REVERSE SERVO (REAR)

Direct air pressure into LOW/REVERSE SERVO APPLY passage. Operation of servo is indicated by a tightening of rear band. Spring tension on servo piston should release the band.

If clutches and servos operate properly, no upshift indicates that a malfunction exists in the valve body.

FLUID LEAKAGE-TRANSAXLE TORQUE CONVERTER HOUSING AREA

(1) Check for source of leakage.

(2) Since fluid leakage near the torque converter area may be from an engine oil leak, the area should be checked closely. Factory fill fluid is dyed red and, therefore, can be distinguished from engine oil.

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

(4) When leakage is determined to originate from the transaxle, check fluid level prior to removal of the transaxle and torque converter.

(5) High oil level can result in oil leakage out the vent in the dipstick. If the fluid level is high, adjust to proper level.

(6) After performing this operation, inspect for leakage. If a leak persists, perform the following operation on the vehicle. This will determine if the torque converter or transaxle is leaking.

TORQUE CONVERTER LEAKAGE

Possible sources of torque converter leakage are:

- Torque converter weld leaks at the outside diameter (peripheral) weld
- Torque converter hub weld
- Torque converter impeller shell cracked adjacent to hub
- At drive lug welds

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

DIAGNOSIS AND TESTING (Continued)

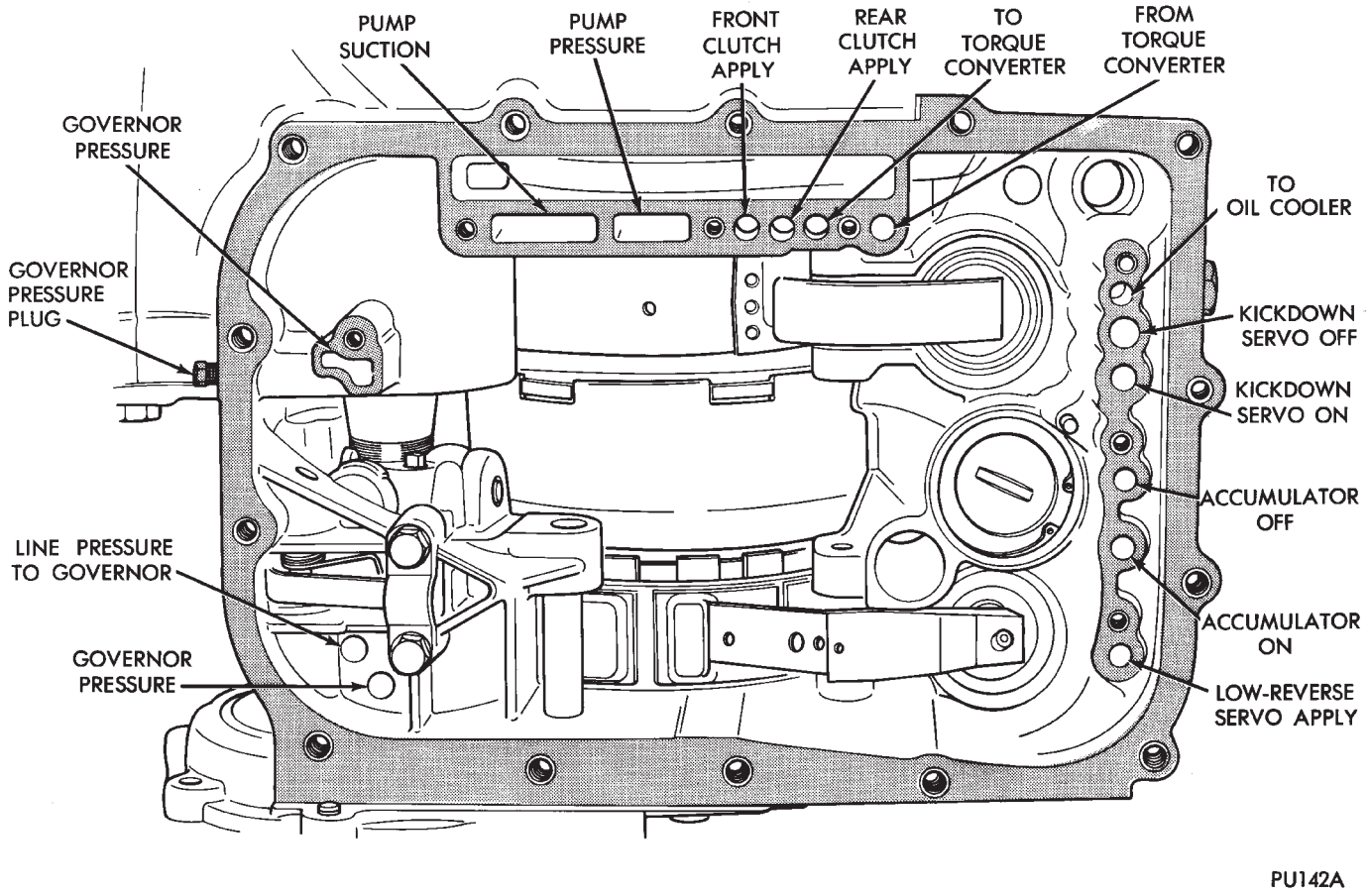

Fig. 5 Air Pressure Tests

INTERLOCK SYSTEM OPERATION CHECK

(1) Place shifter in PARK, the ignition switch should rotate freely from OFF to LOCK position. When the shifter is moved to the DRIVE position, the ignition switch should not rotate from OFF to LOCK.

(2) Moving shifter out of PARK should be possible only when ignition switch is in the OFF or the RUN position. Movement of the shifter from the PARK position should not be possible when the ignition switch is in the LOCK or the ACCESSORY position.

(3) If the interlock system, operates in any way other than as described above, repair of the interlock system is required. See Adjustment and Repair procedures in this section for the required procedures.

SERVICE PROCEDURES

FLUID AND FILTER CHANGE

NOTE: Only fluids of the type labeled Mopar ATF PLUS (Automatic Transmission fluid) type 7176 should be used. A band adjustment and filter change should be made at the time of the oil change. The magnet (inside of oil pan) should be cleaned with a clean, dry cloth.

NOTE: If the transaxle is disassembled for any reason, the fluid and filter should be changed, and the band(s) adjusted.

FLUID DRAIN AND REFILL

(1) Raise vehicle on a hoist (See Group 0, Lubrication). 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 gasket on bottom of the valve body and tighten retaining screws to 5 N·m (40 inch-pounds).

(4) Clean the oil pan and magnet. Reinstall pan using new 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 into the transaxle filler tube.

SERVICE PROCEDURES (Continued)

(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 level to 1/8 inch below the ADD mark.

(8) Recheck fluid level after transaxle is at normal operating temperature. The level should be in the HOT region.

ALUMINUM THREAD REPAIR

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

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

FLUSHING COOLERS AND TUBES

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

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

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

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

KEEP THE AREA WELL VENTILATED.

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

COOLER FLUSH USING TOOL 6906

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

(2) Reinstall filler plug on Tool 6906.

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

(4) Disconnect the cooler lines at the transmission (Fig. 6).

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

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

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

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

(8) Turn pump OFF.

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

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

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

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

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

COOLER FLUSH USING SUCTION GUN AND MINERAL SPIRITS

(1) Disconnect the cooler lines at the transmission.

(2) Using a hand suction gun filled with mineral spirits, reverse flush the cooler. Force mineral spirits into the **From Cooler** line of the cooler (Fig. 6) and catch the exiting spirits from the **To Cooler** line. Observe for the presence of debris in the exiting fluid. Continue until fluid exiting is clear and free from debris.

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

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

SERVICE PROCEDURES (Continued)

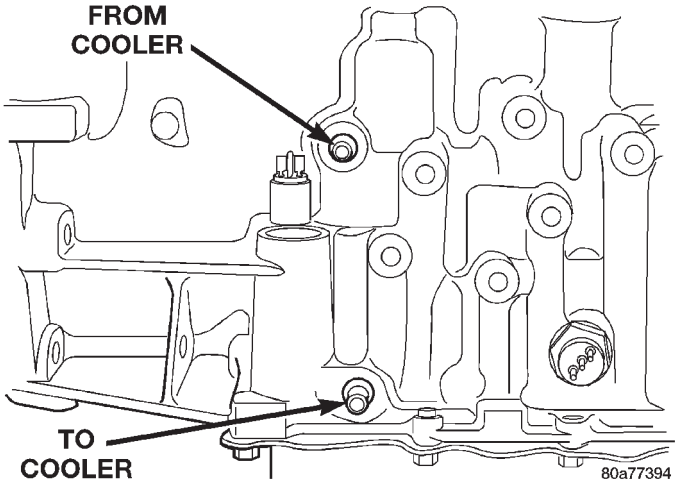

Fig. 6 Cooler Line Location

(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 and filled, the oil cooler flow should be checked using the following procedure:

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

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

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

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

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

REMOVAL AND INSTALLATION

GEARSHIFT CABLE

REMOVAL

(1) Disconnect both battery cables.

(2) Pull up and remove the power distribution center.

(3) Remove the battery thermoguard.

(4) Remove the battery and battery holddown from the battery tray.

(5) Remove the battery tray and cruise control servo (if equipped).

(6) Remove the screw from the cable bracket at the transaxle (Fig. 7).

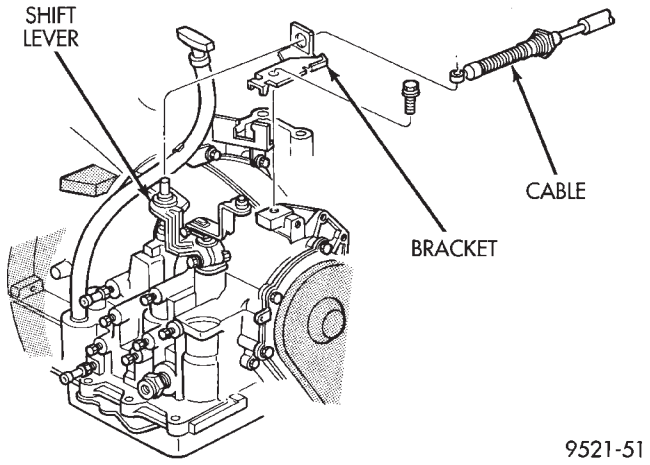

Fig. 7 Gearshift Cable

(7) Squeeze the three metal tabs in and remove the cable from the bracket.

(8) Remove the floor console. Refer to Group 23, Body.

(9) Remove the gearshift knob set screw and knob (Fig. 8).

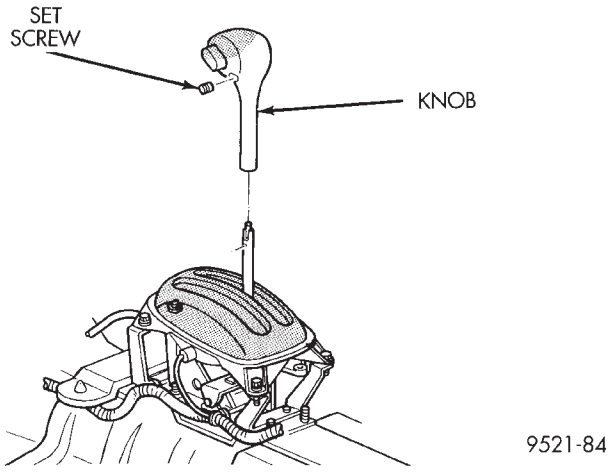

Fig. 8 Gearshift Handle

(10) Remove gearshift indicator lamp at shifter bezel.

(11) Remove the screws retaining the shifter bezel (Fig. 9).

(12) Using a flat–blade pry tool, remove the shifter cable core end from the shift lever pin (Fig. 10).

(13) Using a small screwdriver, pry the cable conduit end tabs away from the shifter mechanism. Pull up on the conduit end and slide the end out of the gearshift mechanism.

(14) Remove the three nuts retaining the shift cable grommet plate to the floor pan (Fig. 11).

REMOVAL AND INSTALLATION (Continued)

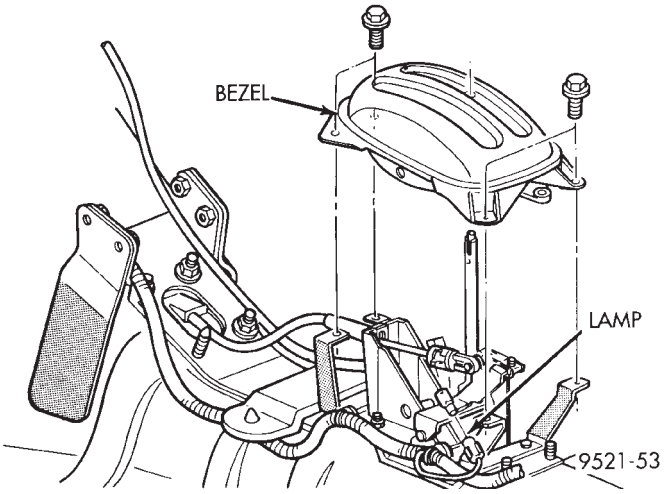

Fig. 9 Gearshift Bezel

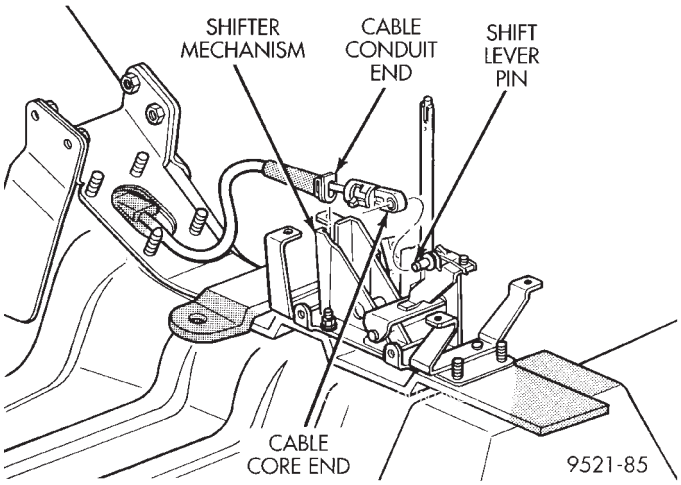

Fig. 10 Gearshift Cable

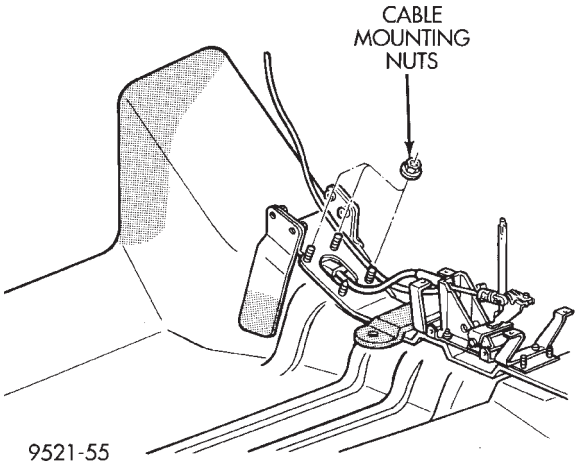

Fig. 11 Cable Mounting

(15) Hoist vehicle. Refer to Group 0, Lubrication and Maintenance.

(16) Remove the one screw at the shift cable grommet plate (Fig. 12).

(17) Loosen screws on shift cable grommet plate. Slide plate out and away from heat shield.

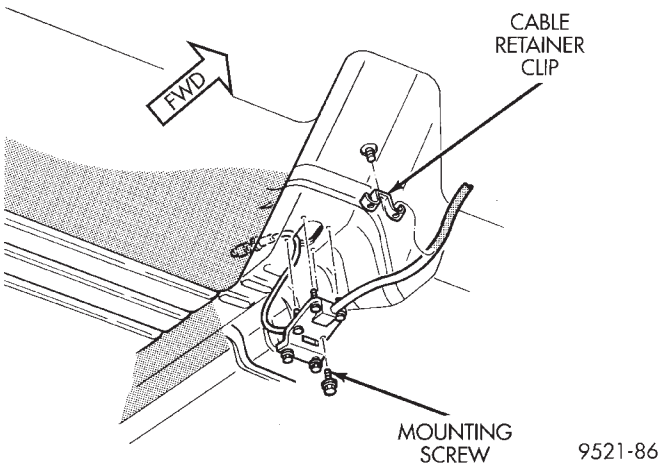

Fig. 12 Cable Mounting Underbody

(18) Carefully remove the cable from the underbody by unfolding the cable retainer clip as you go along.

INSTALLATION

(1) To install gearshift cable, reverse removal procedure.

(2) Adjust gearshift cable using the adjustment procedure in this Group.

GEARSHIFT MECHANISM

REMOVAL

(1) Disconnect battery negative cable and isolate.

(2) Remove console assembly. Refer to Group 23, Body.

(3) Remove the gearshift knob set screw and knob (Fig. 13).

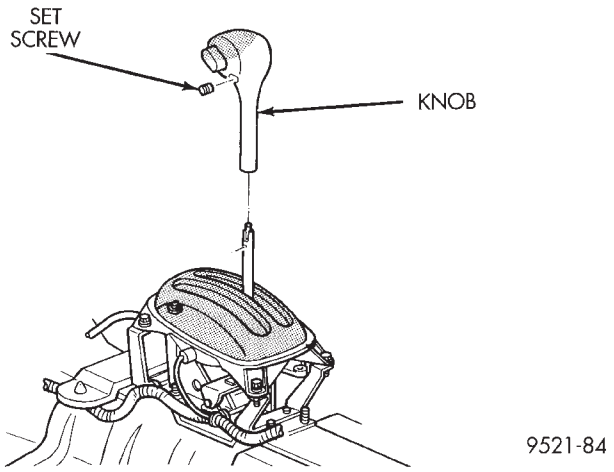

Fig. 13 Gearshift Handle

REMOVAL AND INSTALLATION (Continued)

(4) Remove the screws retaining the gearshift indicator bezel and remove bezel and indicator lamp.

(5) Using a flat–blade pry tool, remove the shifter cable end from the gearshift pin (Fig. 14).

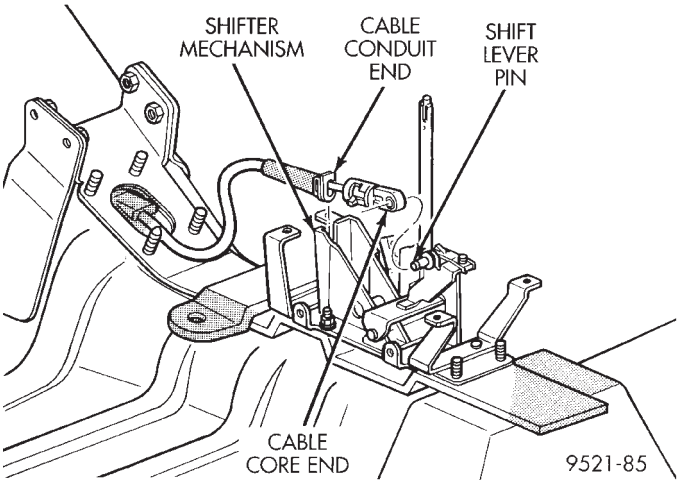

Fig. 14 Gearshift Cable

(6) Pry the two tabs on the cable conduit end away from the gearshift mechanism and pull up on the cable. Remove the gearshift cable from the gearshift mechanism.

(7) Pry up the adjuster lock on the shifter/ignition interlock cable. Unsnap the shifter/ignition interlock cable end fitting from the groove in the gearshift mechanism. Remove the cable core end from the plastic cam of the shifter mechanism (Fig. 15).

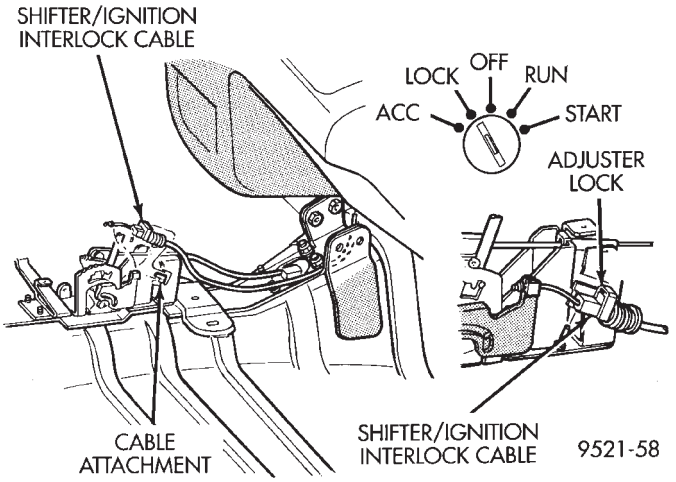

Fig. 15 Shifter Ignition Interlock Cable

(8) Remove the nuts at the base of the gearshift mechanism (Fig. 16). Remove the shifter mechanism.

INSTALLATION

(1) For installation, reverse removal steps. Refer to Cable Adjustment for proper cable adjustment procedure.

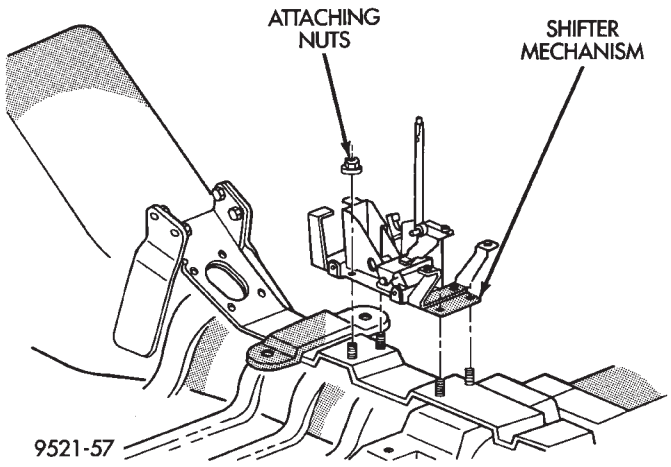

Fig. 16 Gearshift Mechanism

THROTTLE PRESSURE CABLE

REMOVAL

(1) Unsnap the throttle pressure cable end at the throttle control lever at transaxle (Fig. 17).

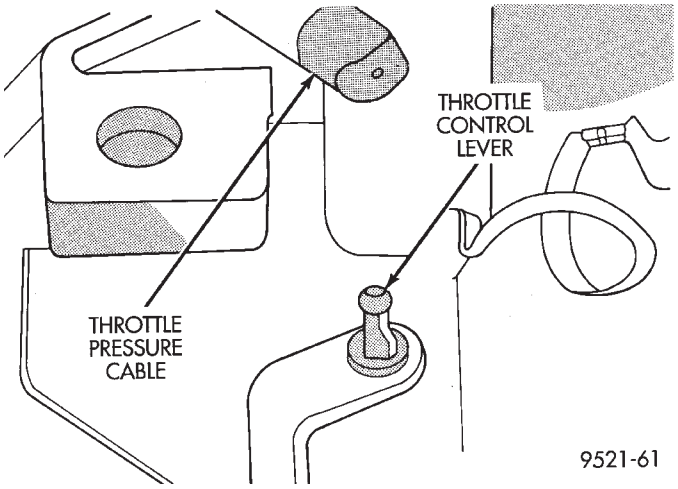

Fig. 17 Throttle Pressure Cable And Lever

(2) Squeeze the retaining tabs inward at the mounting bracket (Fig. 18). Remove the cable from the bracket.

(3) Unsnap the cable end from the throttle linkage cam. Squeeze the tabs inward at the bracket (Fig. 19). Remove the cable from the vehicle.

INSTALLATION

(1) To install cable, reverse removal procedure. Refer to cable adjustment procedure for proper cable adjustment.

THROTTLE PRESSURE CABLE ADJUSTMENT PROCEDURE

The throttle pressure cable adjustment is very important to proper transaxle operation. This adjustment positions a valve that controls shift speed, shift

REMOVAL AND INSTALLATION (Continued)

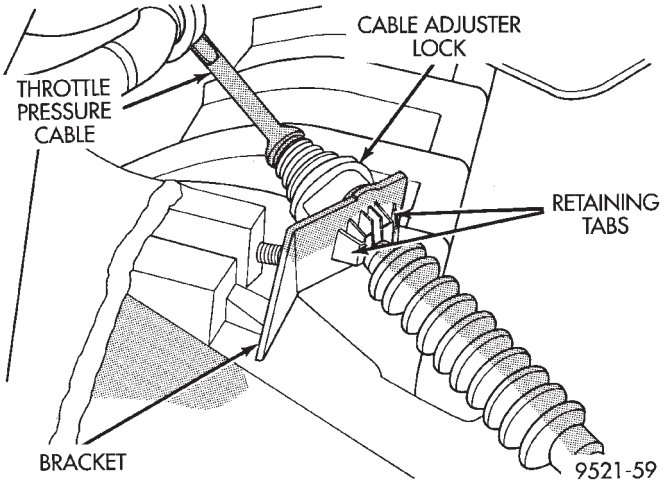

Fig. 18 Throttle Pressure Cable Bracket

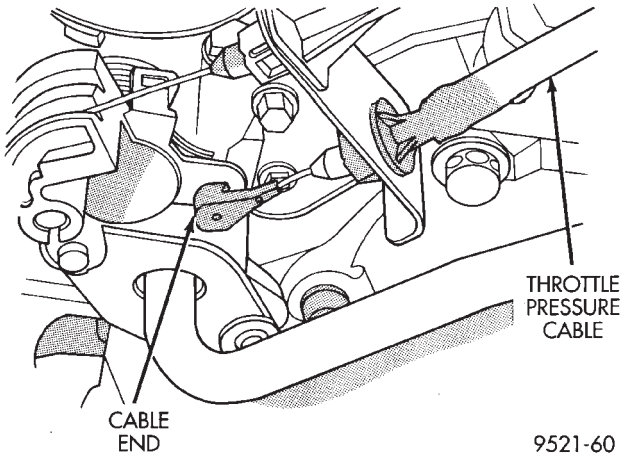

Fig. 19 Cable End At Throttle Linkage

quality, and part throttle downshift sensitivity. If the setting is too long, early shifts and slippage between shifts may occur. If the setting is too short, shifts may be delayed and part throttle downshifts may be very sensitive.

(1) Perform transaxle throttle pressure cable adjustment while engine is at normal operating temperature.

(2) Release cross-lock on the cable assembly (pull cross-lock upward) See (Fig. 18).

(3) To insure proper adjustment, the cable must be free to slide all the way toward the engine, against its stop, after the cross-lock is released.

(4) Move transaxle throttle control lever fully clockwise, against its internal stop, and press cross-lock downward into locked position.

The adjustment is complete and transaxle throttle cable backlash was automatically removed.

Test cable freedom of operation by moving the transaxle throttle lever forward (counterclockwise). Then slowly release it to confirm it will return fully rearward (clockwise).

No lubrication is required for any component of the throttle cable system.

SHIFTER IGNITION INTERLOCK CABLE

REMOVAL

(1) Disconnect and isolate, the battery negative (-) cable from the vehicle battery.

(2) Remove console assembly. Refer to Group 23, Body.

(3) Remove the gearshift knob set screw and knob (Fig. 20).

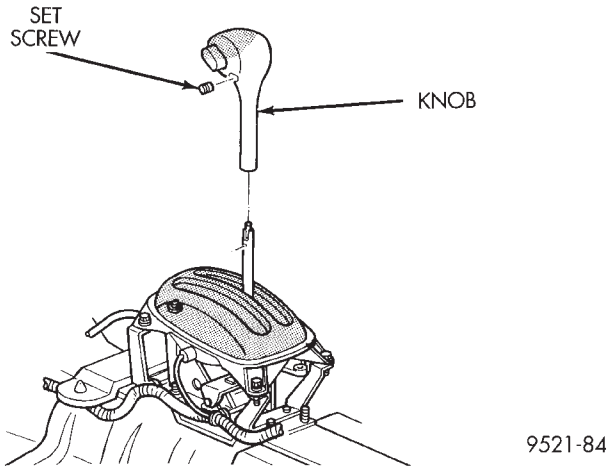

Fig. 20 Gearshift Handle

(4) Remove the screws retaining the gearshift indicator bezel and remove bezel and indicator lamp (Fig. 21).

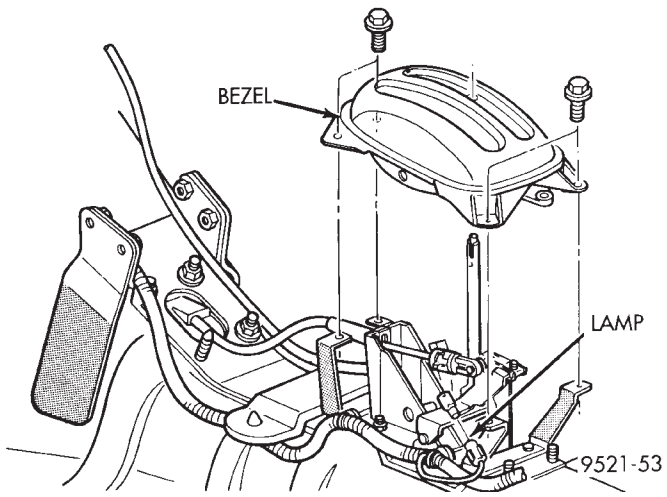

Fig. 21 Shift Indicator Bezel

(5) Pry up the adjuster lock on the shifter/ignition interlock cable. Unsnap the shifter/ignition interlock cable end fitting from the groove in the gearshift mechanism (Fig. 22).

(6) Remove the cable core end from the plastic cam of the shifter mechanism.

REMOVAL AND INSTALLATION (Continued)

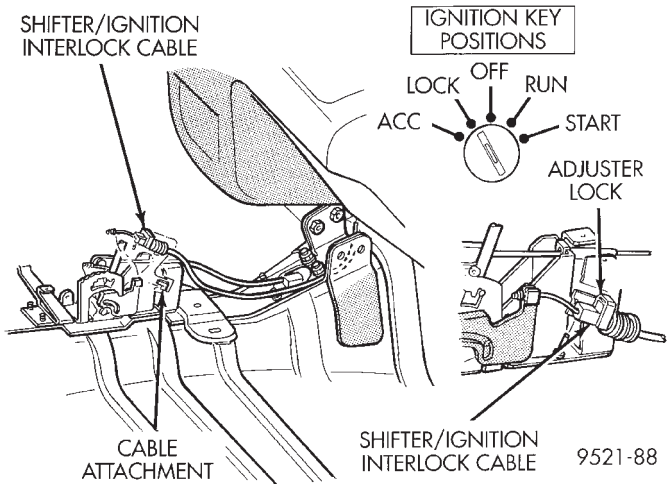

Fig. 22 Shifter Ignition Interlock Cable

(7) Pull cable up and out of the gearshift mechanism.

(8) Remove the three screws along the bottom of the lower steering column cover and screw on the left outward face of cover (Fig. 23).

(13) Insert a screwdriver into access hole in the lower shroud. Depress the cylinder button while rotating the cylinder with the key inserted between the ON and START positions. This will disengage the cylinder from the column (Fig. 24).

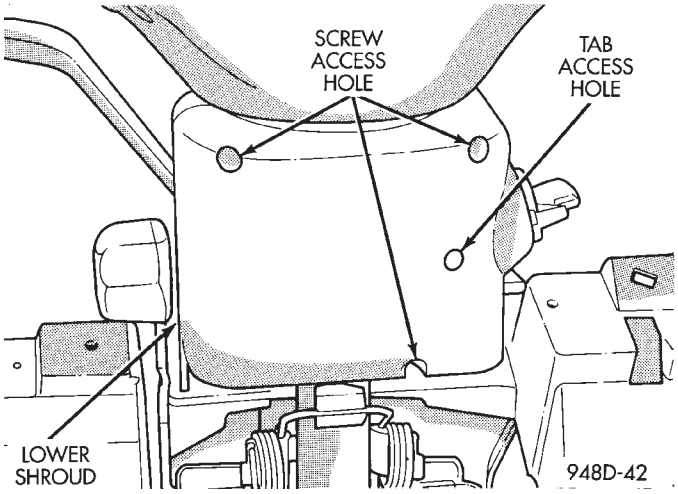

Fig. 24 Ignition Lock Cylinder

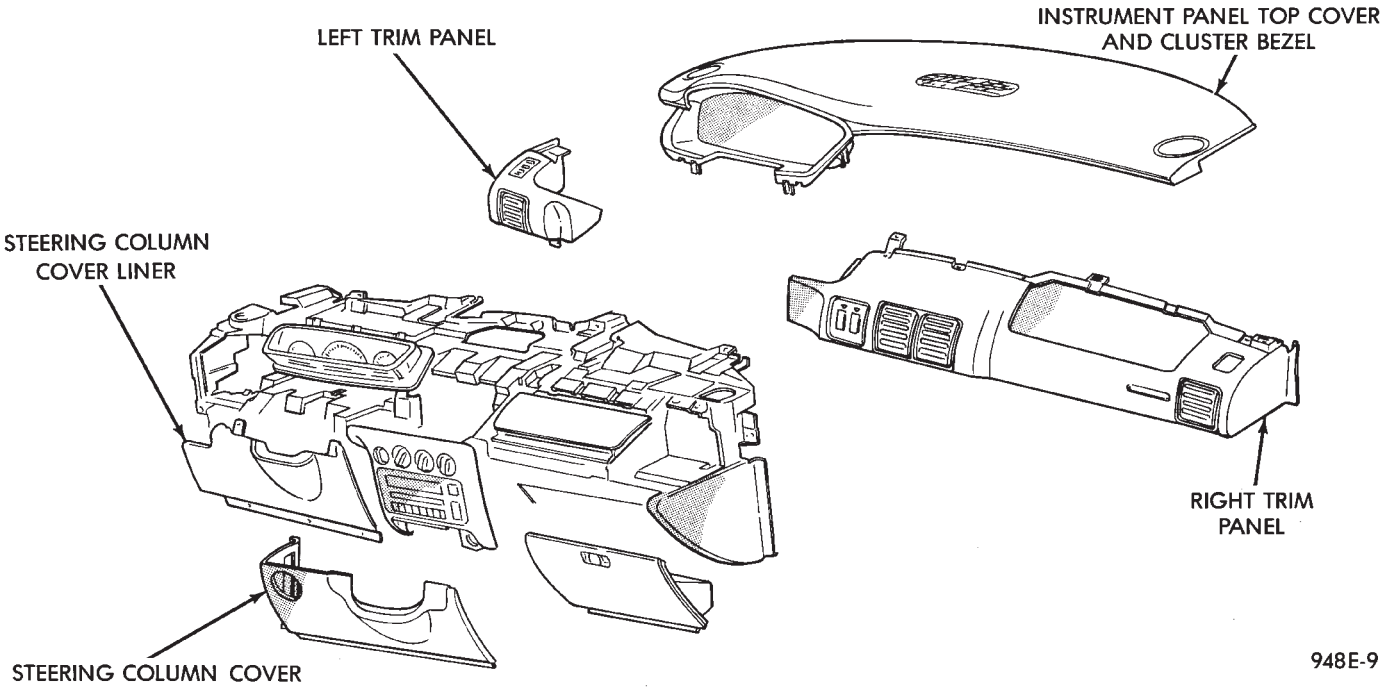

Fig. 23 Lower Column Covers

(9) Grasp the cover and pull rearward until the clips disengage.

(10) Remove two screws at the upper area of the column liner and lower left corner.

(11) Remove steering column cover and steering column cover liner.

(12) Lift up the top cover and cluster bezel until the clips disengage and separate to provide clearance.

(14) Pull out the key cylinder.

(15) Remove the three lower–to–upper shroud attaching screws through the bottom of the lower shroud (Fig. 25).

(16) Separate the upper and lower shrouds.

(17) Grasp the interlock cable clip and connector. Remove the cable from the interlock housing (Fig. 26).

(18) Unclip the cable from the retaining clip located within the wiring harness.

REMOVAL AND INSTALLATION (Continued)

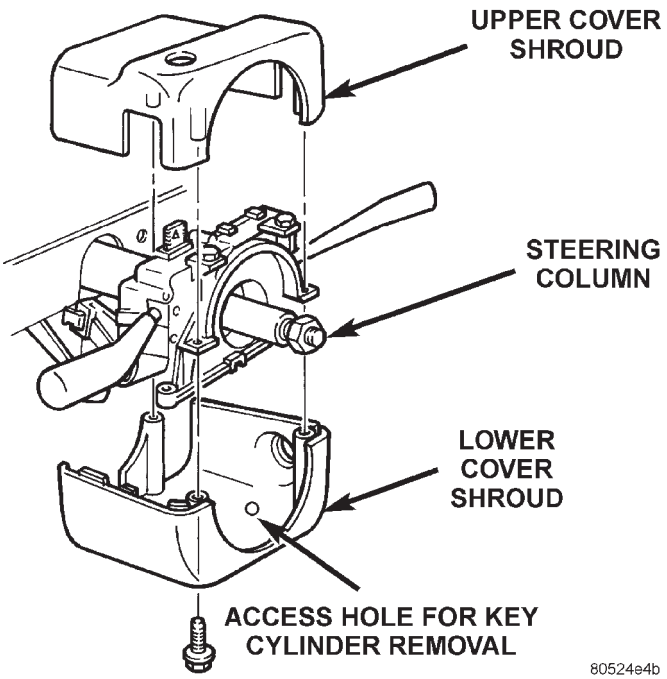

Fig. 25 Upper/Lower Shroud

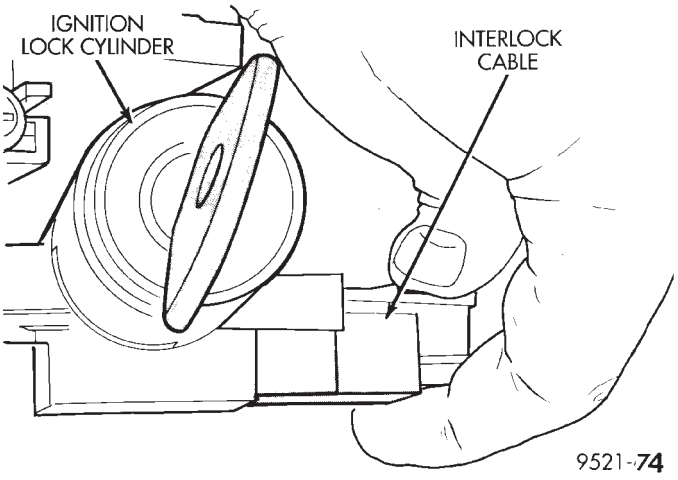

Fig. 26 Interlock Cable and Connector

(19) Remove interlock cable from under center console mounting bracket and out front of dash panel.

INSTALLATION

CAUTION: When installing interlock cable assembly, care must be taken not to bend exposed cable wire and slug at shifter end of cable.

(1) Route interlock cable into lower dash panel.

(2) Install the ignition switch into housing. Turn the ignition switch to the RUN position.

(3) Install the interlock cable into the interlock housing at the steering column (Fig. 27). Verify the cable snaps into the housing.

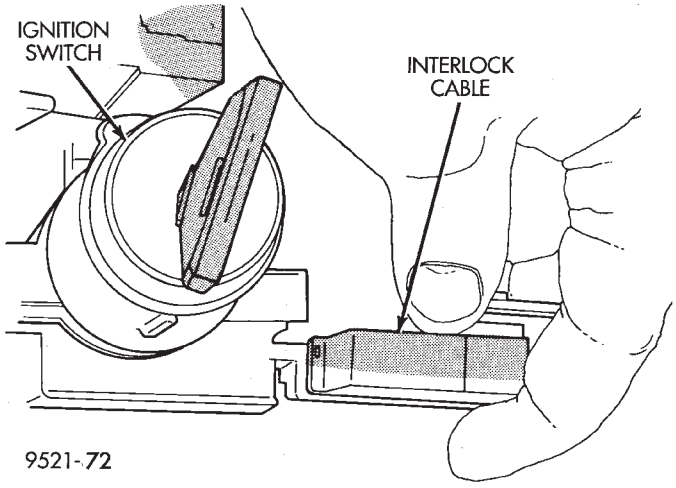

Fig. 27 Interlock Cable at Interlock Housing

(4) Install interlock cable into routing clip located within the wiring harness.

(5) Route interlock cable to the console.

(6) Install the cable core end to the plastic cam of the shifter mechanism. Snap the shifter/ignition interlock cable end fitting into the groove in the gearshift mechanism.

(7) Adjust the Shifter/Ignition Interlock System. See Interlock System Adjustment, in this section.

(8) Perform the Shifter/Ignition Interlock System operation check, as described in the beginning of this section.

(9) Install console assembly. Refer to Group 23, Body.

(10) Install screws retaining the gearshift indicator bezel and install bezel and indicator lamp.

(11) Install the gearshift knob set screw and knob.

(12) Install two screws at the upper area of the column liner and lower left corner.

(13) Snap the clips in at the lower column cover. Install the three screws along the bottom of the lower steering column cover and screw on the left outward face of cover.

(14) Install key cylinder.

(15) Position the shrouds in place. Install the three lower–to–upper shroud attaching screws through the bottom of the lower shroud.

(16) Reinstall the ignition lock cylinder into housing.

(17) Reconnect the battery negative (-) cable to the vehicle battery.

INTERLOCK SYSTEM ADJUSTMENT

If ignition switch cannot be turned to the LOCK position, with shifter in PARK, an adjustment of the Interlock System may be required. To adjust Shifter/ Ignition Interlock System, follow procedure listed below.

REMOVAL AND INSTALLATION (Continued)

(1) Disconnect and isolate, the battery negative (-) cable from the vehicle battery.
(2) Remove console assembly. Refer to Group 23, Body.
(3) Remove the gearshift knob set screw and knob.
(4) Remove the screws retaining the gearshift indicator bezel and remove bezel and indicator lamp.
(5) Reinstall the gearshift knob.
(6) Place shifter in PARK.
(7) Turn ignition switch to the LOCK or ACCESSORY position. If cable has lost its adjustment, manually position cable to get key into LOCK or ACCESSORY position. Grasp slug on interlock cable with needle nose pliers and pull back on cable. This will allow the ignition switch to be turned to the LOCK or ACCESSORY position.
(8) Check that the interlock cable slug is completely seated into the shifter interlock lever.
(9) Check that the ignition switch is still in the LOCK or ACCESSORY position.
(10) Pry up the adjuster lock on the shifter/ignition interlock cable (Fig. 28).

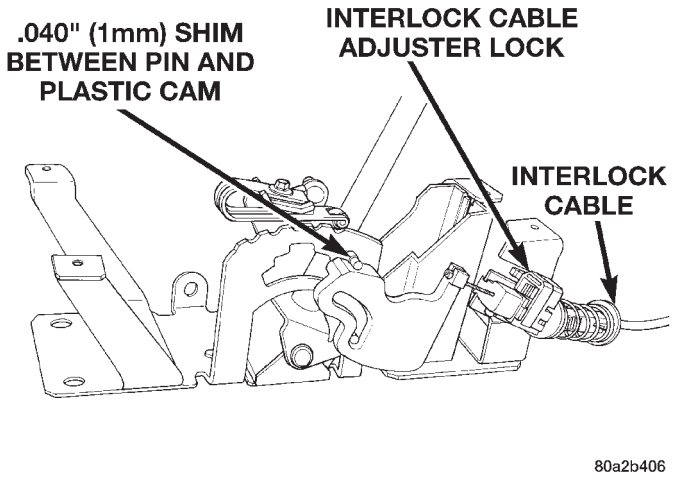

Fig. 28 Interlock Cable Adjuster Lock

(11) Place a 1mm (0.040) shim between the larger diameter portion of the shifter gate pin and the plastic cam (Fig. 28).
(12) The spring on the interlock cable should automatically compensate for the slack in the adjuster.
(13) Snap down the interlock adjuster lock onto the cable and remove the shim.
(14) After adjusting the interlock system, perform the Interlock System Operation Check in the Adjustments section of this group.

INTERLOCK MECHANISM

REMOVAL

(1) Remove the lower column covers, ignition switch, and shrouds. Refer to Interlock Cable Replacement.
(2) Grasp the interlock cable and connector firmly. Remove the interlock cable (Fig. 29).
(3) Remove the two interlock mechanism–to–steering column attaching screws (Fig. 30). Remove the interlock housing.

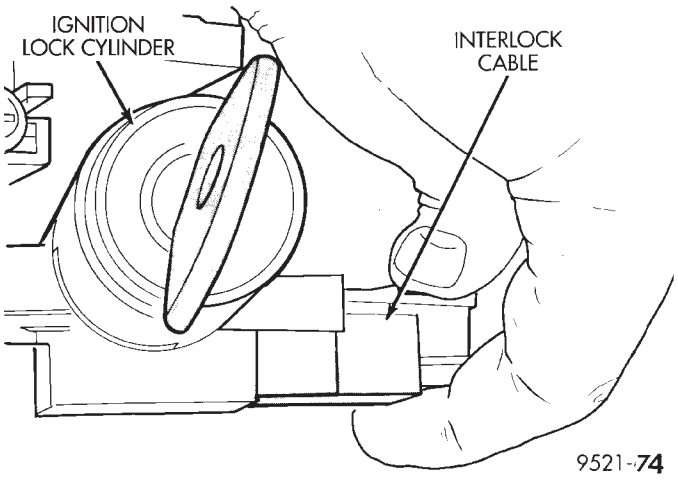

Fig. 29 Interlock Cable

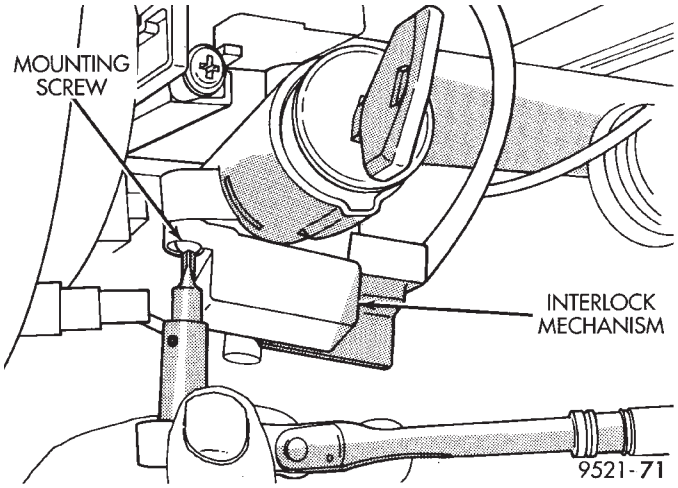

Fig. 30 Interlock Mechanism

INSTALLATION

(1) Position the interlock housing at steering column. Install the two interlock mechanism–to–steering column attaching screws. Torque screws to 3 N·m (21 in. lbs.).
(2) Snap the interlock cable into the housing.
(3) Install the lower column covers, shrouds, and ignition switch. Refer to Interlock Cable Replacement.

VEHICLE SPEED SENSOR PINION GEAR

When the sensor is removed for any reason, a NEW O-ring must be installed on its outside diameter.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Remove harness connector from sensor. Be sure weather seal stays on harness connector.

(2) Remove bolt securing the sensor in the extension housing.

(3) Carefully pull sensor and pinion gear assembly out of extension housing.

(4) Remove pinion gear from sensor.

INSTALLATION

(1) To install, reverse the above procedure. Be sure extension housing and sensor flange are clean prior to installation. Always use a NEW sensor O-ring.

(2) Tighten bolt to 7 N·m (60 in. lbs.). Tighten speedometer cable to 4 N·m (35 in. lbs.).

PARK/NEUTRAL STARTING AND BACK-UP LAMP SWITCH

TEST

The park/neutral starting switch is the center terminal of the three terminal switch. It provides ground for the starter solenoid circuit through the selector lever in PARK and NEUTRAL positions only.

(1) To test switch, remove wiring connector from switch and test for continuity between center pin of switch and transaxle case. Continuity should exist only when transaxle is in PARK or NEUTRAL.

(2) Check gearshift cable adjustment before replacing a switch that tests bad.

REMOVAL

(1) Unscrew switch from transaxle case allowing fluid to drain into a container. Move selector lever to PARK, then to NEUTRAL position, and inspect to see the switch operating lever fingers are centered in switch opening.

INSTALLATION

(1) Screw the switch with a new seal into transaxle case and tighten to 33 N·m (24 ft. lbs.). Retest switch with the test lamp.

(2) Add fluid to transaxle to bring up to proper level.

(3) The back-up lamp switch circuit is through the two outside terminals of the three terminal switch.

(4) To test switch, remove wiring connector from switch and test for continuity between the two outside pins.

(5) Continuity should exist only with transaxle in REVERSE position.

(6) No continuity should exist from either pin to the case.

TRANSAXLE

REMOVAL

NOTE: The transaxle can be removed from the vehicle without having to remove the engine.

The transaxle and torque converter must be removed as an assembly; otherwise, the torque converter drive plate, pump bushing, or oil seal may be damaged. The drive plate will not support a load; therefore, none of the weight of the transaxle should be allowed to rest on the plate during removal.

All transaxle components are serviced with the transaxle out of the vehicle. The components that are serviceable in the vehicle are:

- Axle shaft seals
- Back–up lamp switch
- End plate
- Extension housing
- Neutral safety switch
- Shift lever
- Transaxle oil pan
- Valve Body
- Vehicle speed sensor

(1) Disconnect the battery.

(2) Pull Power Distribution Center up and out of its holding bracket. Set Power Distribution Center aside to gain clearance.

(3) Remove battery heat shield and remove battery from engine compartment. Remove battery tray from engine compartment. Disconnect cruise control (if equipped).

(4) Remove vehicle speed sensor wiring.

(5) Disconnect neutral safety switch and torque converter control wiring at transaxle.

CAUTION: Pry up with equal force on both sides of shifter cable isolator bushing to avoid damaging cable isolator bushing.

(6) Disconnect gear shift cable end from transaxle shift lever (Fig. 31). Remove bracket bolt at transaxle (Fig. 32).

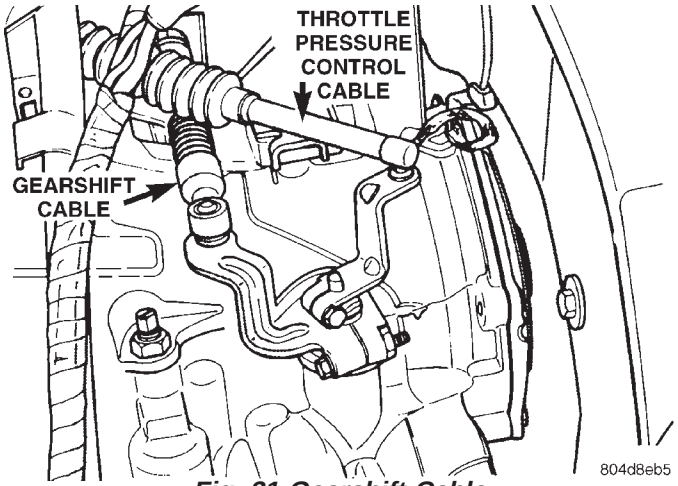

Fig. 31 Gearshift Cable

REMOVAL AND INSTALLATION (Continued)

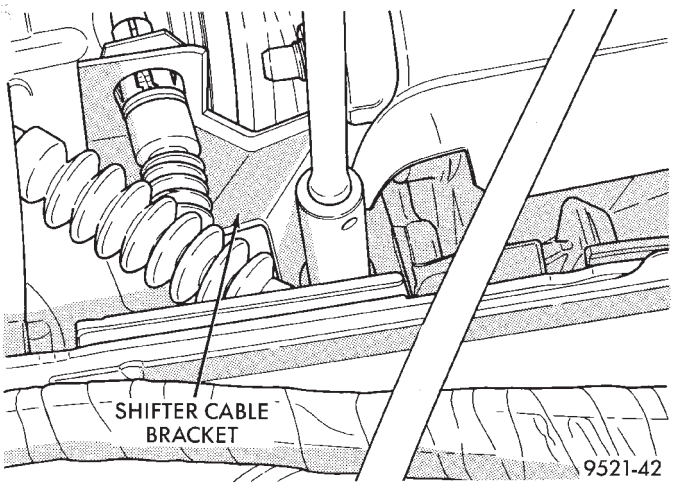

Fig. 32 Shifter Cable Bracket

(7) Remove throttle pressure control cable from lever. Then remove bracket bolts at the transaxle (Fig. 33).

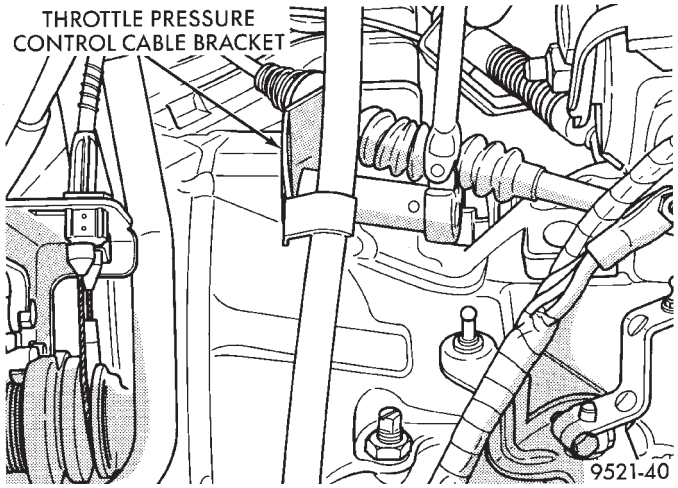

Fig. 33 Bracket Removal

(8) Remove dipstick tube.

(9) Remove transaxle cooler lines and plug lines (Fig. 34).

(10) Remove throttle pressure control cable support bracket bolts. Remove upper bellhousing bolts and upper starter bolt (Fig. 35).

(11) Install engine bridge fixture and support engine (Fig. 36).

(12) Lift vehicle on hoist and remove front wheels.

(13) Remove both front driveshafts. Refer to Group 2, Suspension for procedure.

CAUTION: When reinstalling driveshafts, new driveshaft retaining clips must be used. Do not reuse old clips. Failure to use new clips may result in disengagement of inner constant–velocity joint.

(14) Remove transaxle to rear lateral bending strut from engine and transaxle (Fig. 37).

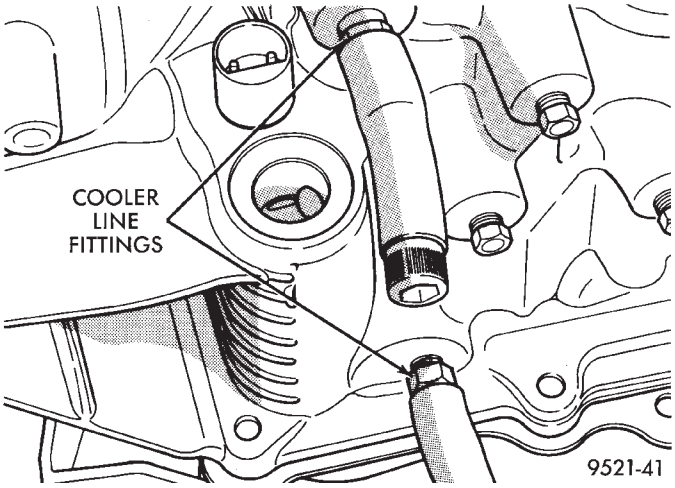

Fig. 34 Cooler Lines

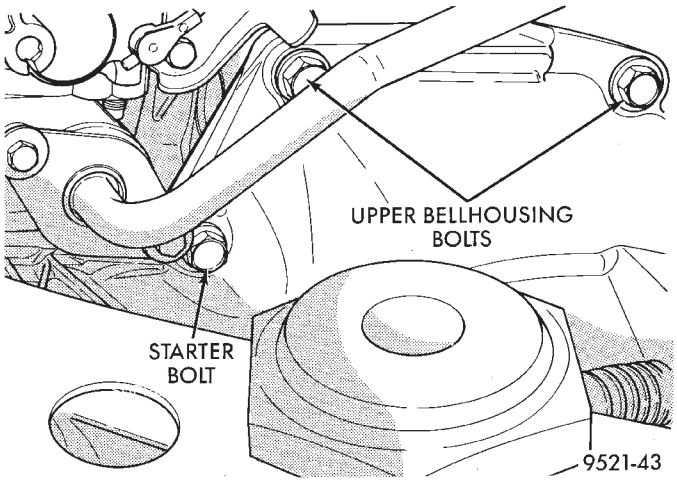

Fig. 35 Starter and Bellhousing Bolts

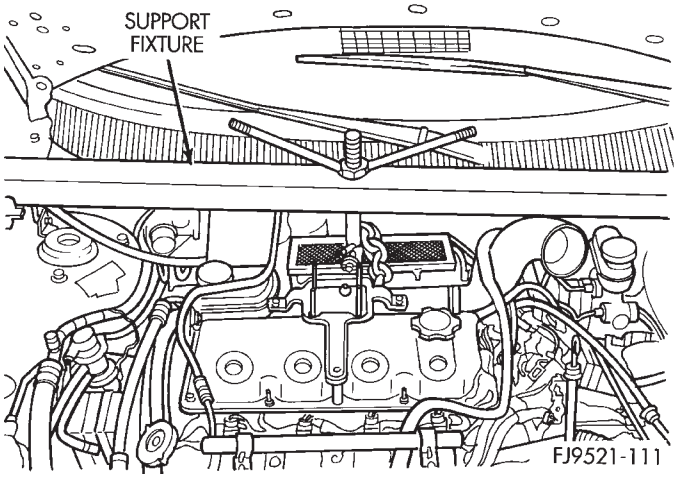

Fig. 36 Engine Bridge Fixture

(15) Remove front engine bracket through–bolt. Remove front engine bracket bolts (Fig. 38).

(16) Remove lower starter bolt (Fig. 39).

(17) Remove lower dust shield screw.

REMOVAL AND INSTALLATION (Continued)

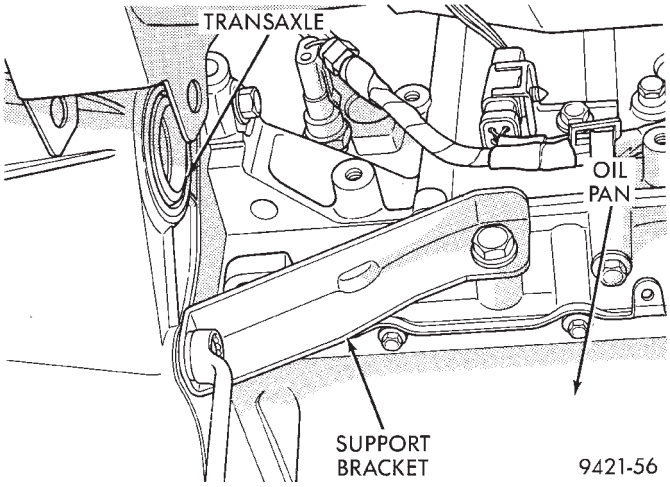

Fig. 37 Bracket Removal

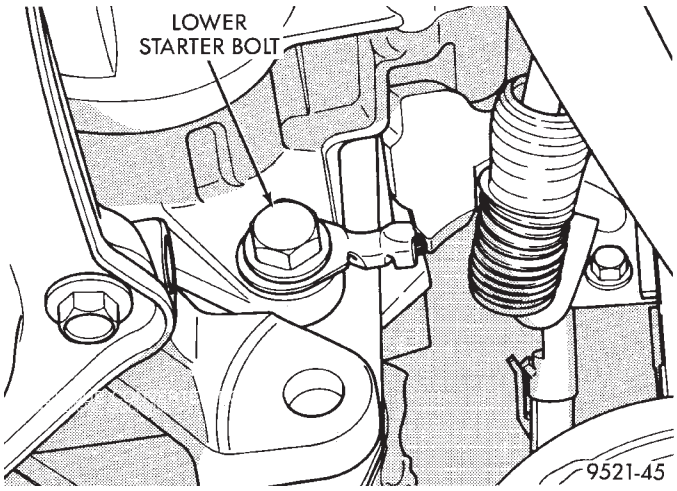

Fig. 39 Starter Bolts

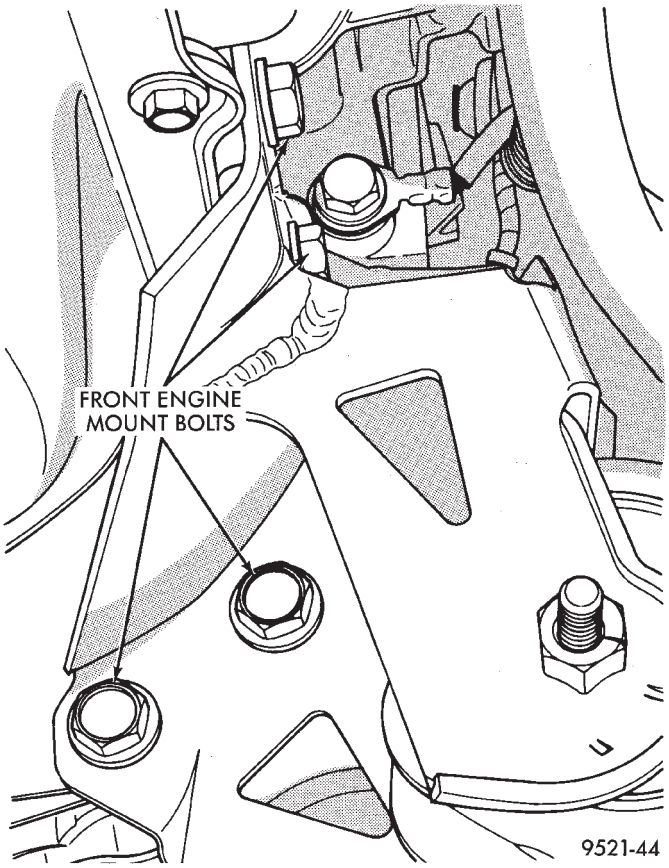

Fig. 38 Front Engine Bracket

(18) Rotate engine clockwise to gain access to converter bolts (Fig. 40). Remove torque converter bolts (Fig. 41). Mark converter to flex plate for reassembly ease.

(19) Support transaxle with a transmission jack.

(20) Remove left mount through–bolt (Fig. 42). Remove left mount bolts from transaxle (Fig. 43).

(21) Remove left transaxle mount from transaxle.

(22) Remove rear engine bolt at transaxle.

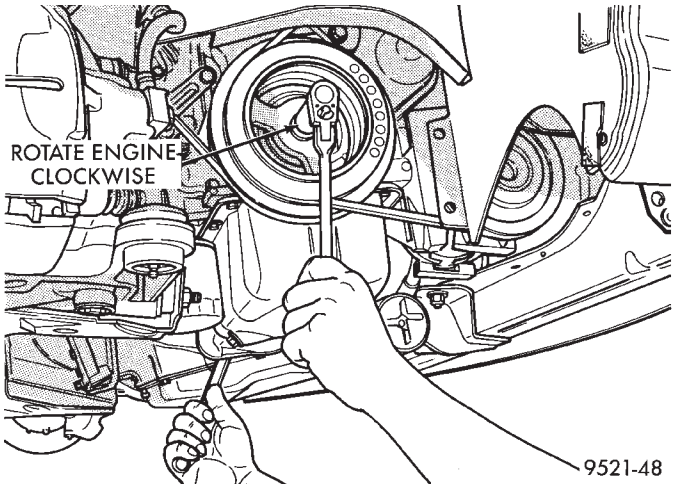

Fig. 40 Rotate Engine

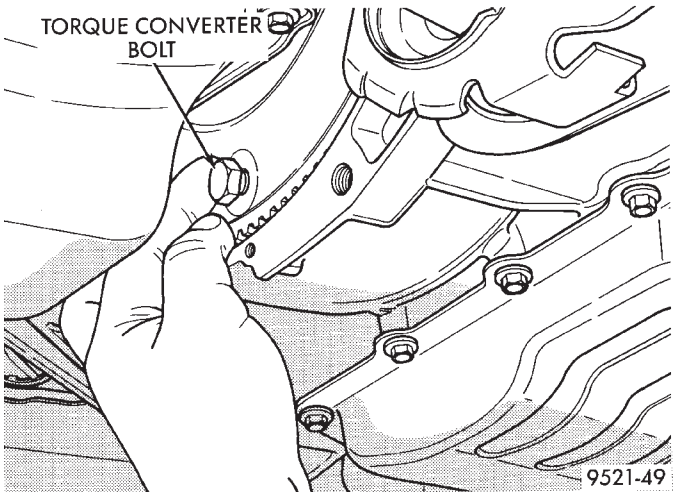

Fig. 41 Torque Converter Bolts

(23) Carefully work transaxle and torque converter assembly rearward off engine block dowels. Disengage converter hub from end of crankshaft. **Attach a small C-clamp to edge of bellhousing. This will**

REMOVAL AND INSTALLATION (Continued)

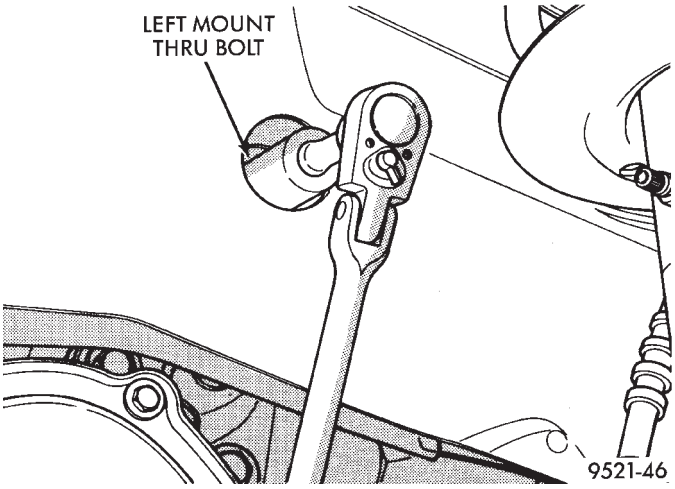

Fig. 42 Left Transaxle Mount Through–Bolt

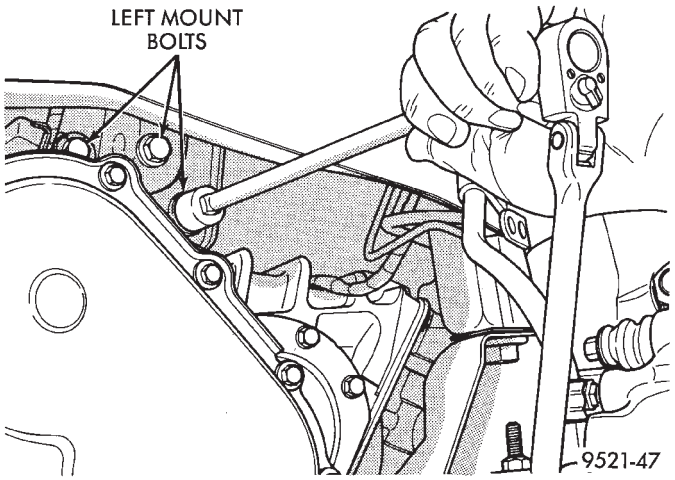

Fig. 43 Left Mount Bolts

hold torque converter in place during transaxle removal. Lower transaxle and remove assembly from under the vehicle.

INSTALLATION

(1) To install transaxle, reverse removal procedure.

(2) If torque converter was removed from transaxle be sure to align pump inner gear pilot flats with torque converter impeller hub flats.

(3) Adjust gearshift and throttle cables.

(4) Refill transaxle with MOPAR® ATF PLUS (Automatic Transmission Fluid) type 7176.

(5) Verify that vehicle's back-up lights and speedometer are functioning properly.

PUMP OIL SEAL

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

REMOVAL

(1) Screw seal remover Tool C-3981-B into seal (Fig. 44), then tighten screw portion of tool to withdraw the seal.

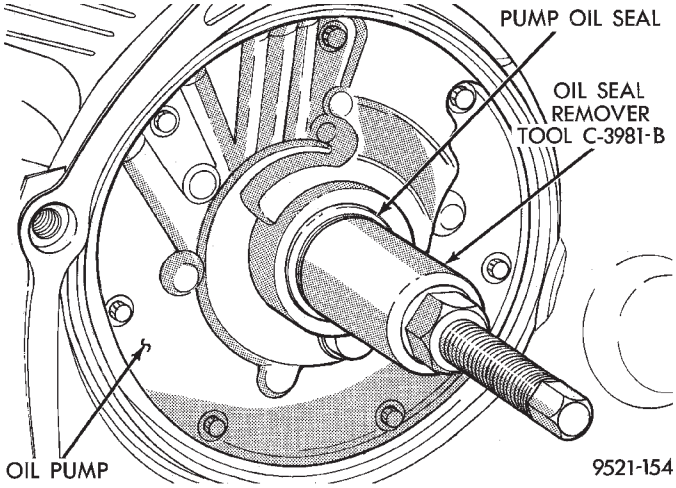

Fig. 44 Remove Pump Oil Seal

INSTALLATION

(1) To install a new seal, place seal in opening of the pump housing (lip side facing inward). Using Tool C-4193 and Handle Tool C-4171, drive new seal into housing until tool bottoms (Fig. 45).

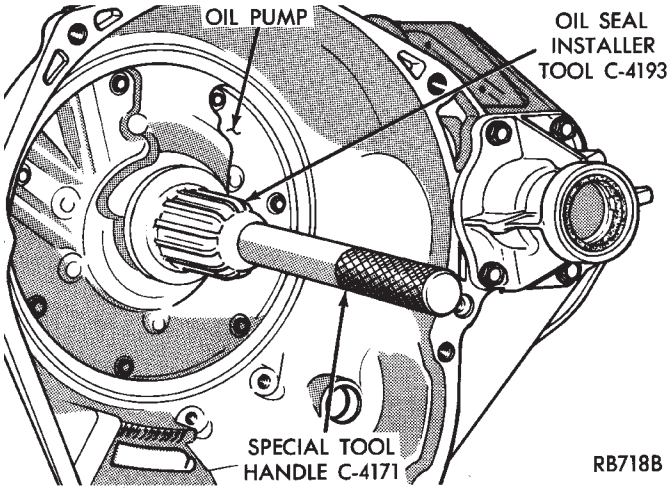

Fig. 45 Install Pump Oil Seal

DISASSEMBLY AND ASSEMBLY

TRANSAXLE

Prior to removing any transaxle parts, plug all openings and clean the unit, preferably with steam. When disassembling, each part should be washed in a suitable solvent, then dried with compressed air. Do not wipe parts with shop towels. All mating surfaces in the transaxles are accurately machined; therefore, careful handling of all parts must be exercised to avoid nicks or burrs.

DISASSEMBLY AND ASSEMBLY (Continued)

DISASSEMBLY

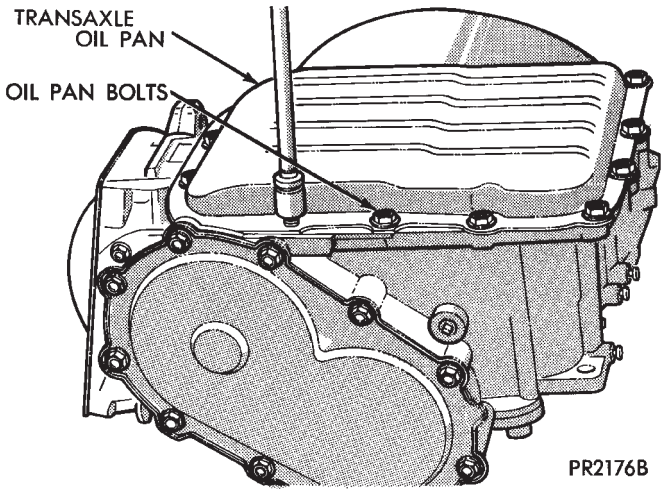

Fig. 46 Transaxle Oil Pan Bolts

Remove all old sealant before applying new sealant.

Use only Mopar® Silicone Rubber Sealant or equivalent when installing oil pan.

Put sealant on the oil pan flange (Fig. 47) and on all oil pan bolts (underside of bolt head).

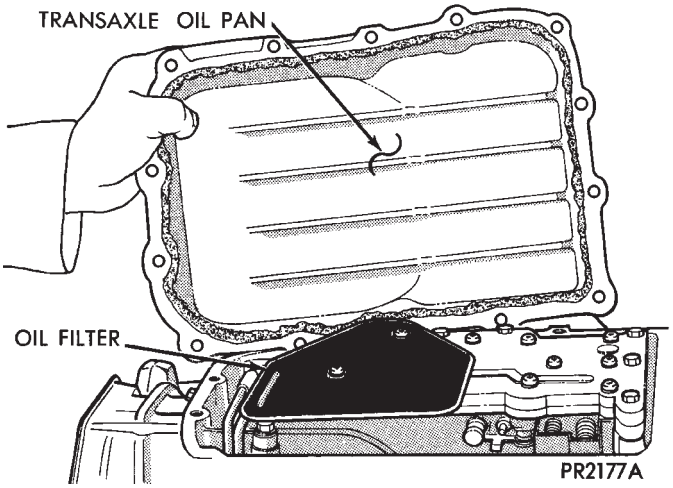

Fig. 47 Transaxle Oil Pan

Remove neutral starting and back-up lamp switch.

Measuring input shaft end play before disassembly will usually indicate if a thrust washer change is required. The thrust washer is located between input and output shafts.

Attach a dial indicator to transaxle bell housing with its plunger seated against end of input shaft (Fig. 54).

Move input shaft in and out to obtain end play reading. End play specifications are 0.19 to 1.50 mm (0.008 to 0.060 inch).

Record indicator reading for reference when reassembling the transaxle.

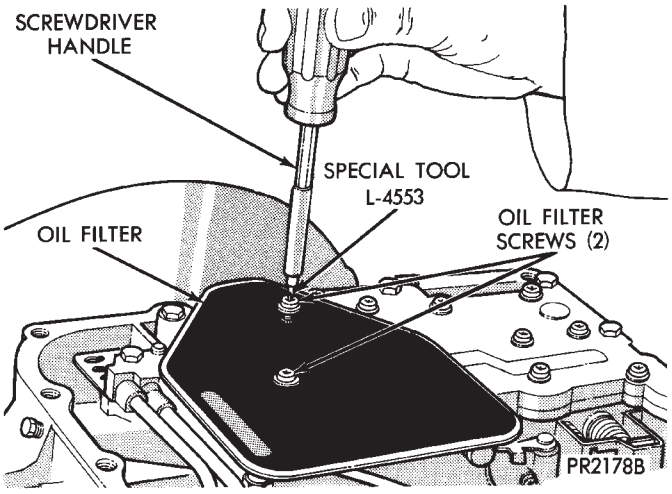

Fig. 48 Oil Filter Screws

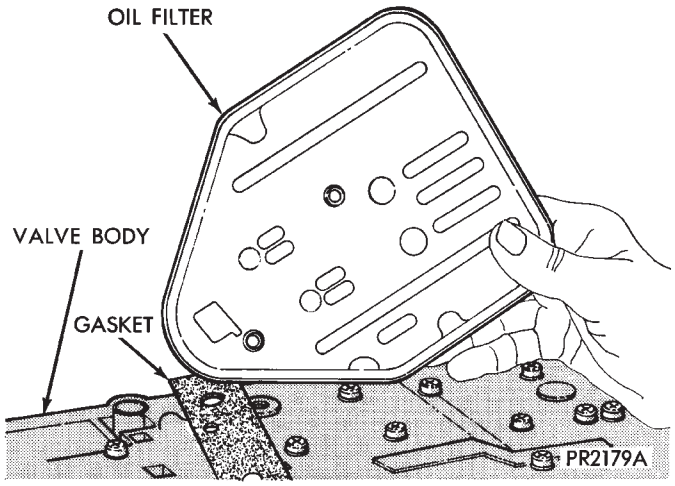

Fig. 49 Oil Filter

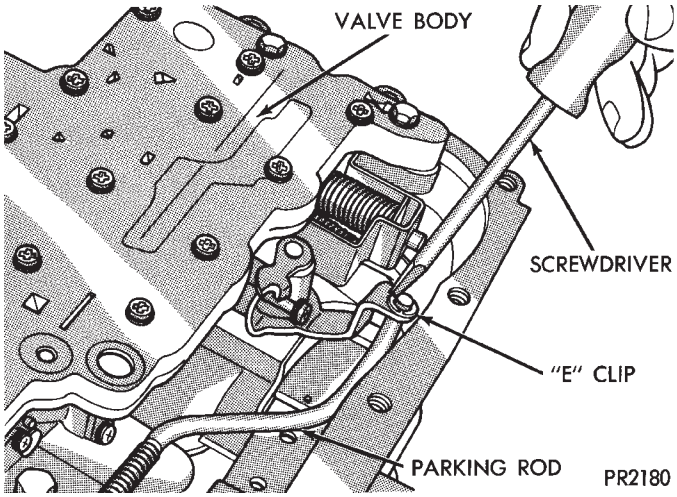

Fig. 50 Remove Parking Rod E-Clip

CAUTION: The input shaft for torque converter without a clutch has two seal rings. The input shaft for torque converter with a clutch has three seal rings.

DISASSEMBLY AND ASSEMBLY (Continued)

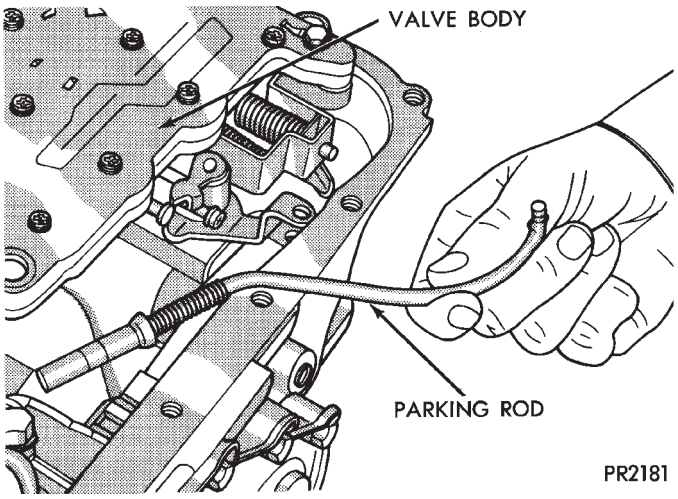

Fig. 51 Parking Rod

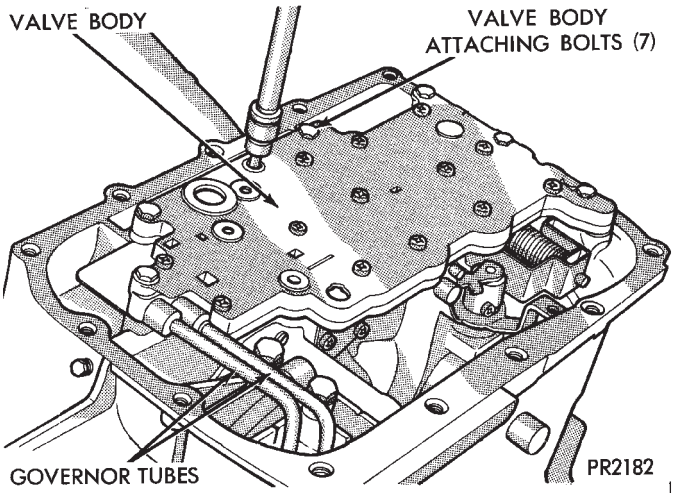

Fig. 52 Valve Body Attaching Bolts

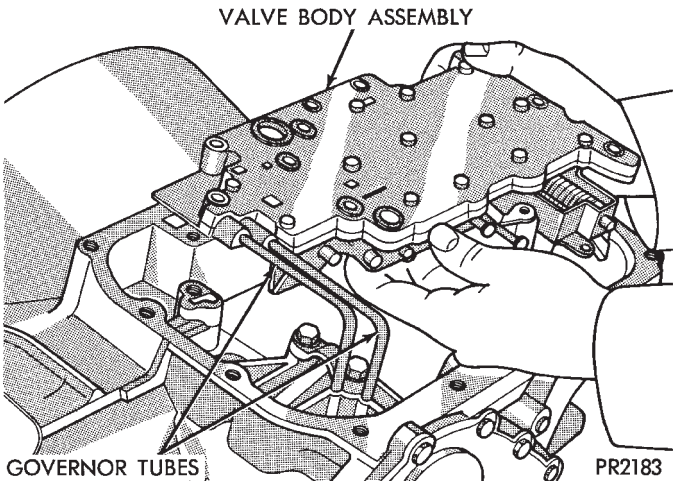

Fig. 53 Valve Body and Governor Tubes

Remove Number 6 thrust washer from sun gear driving shell.

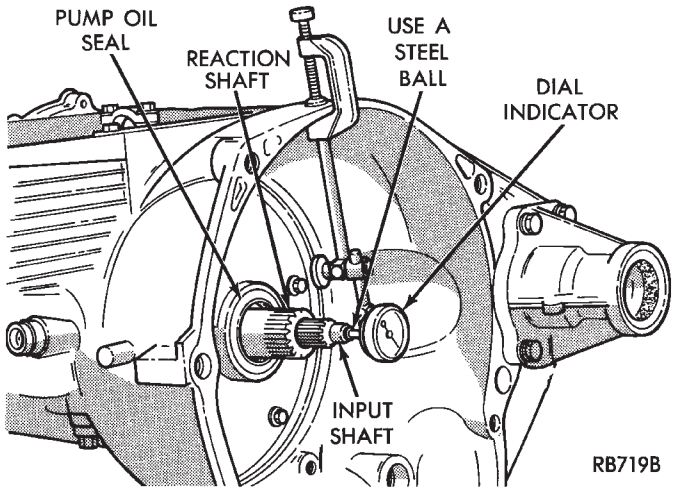

Fig. 54 Measure Input Shaft End Play

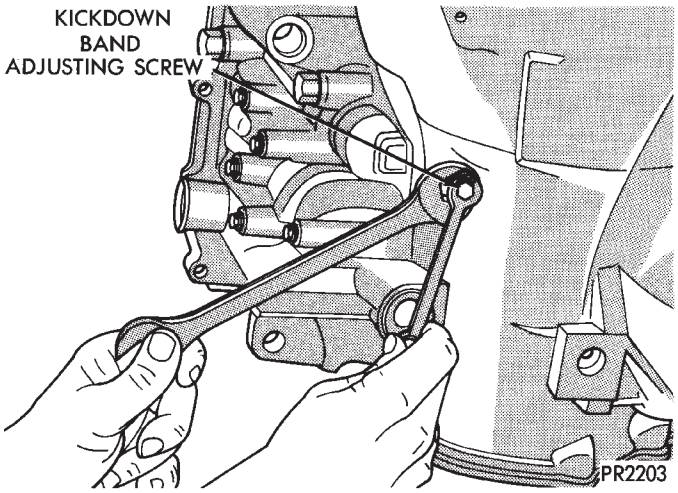

Fig. 55 Loosen Lock Nut and Tighten Kickdown Band Adjusting Screw

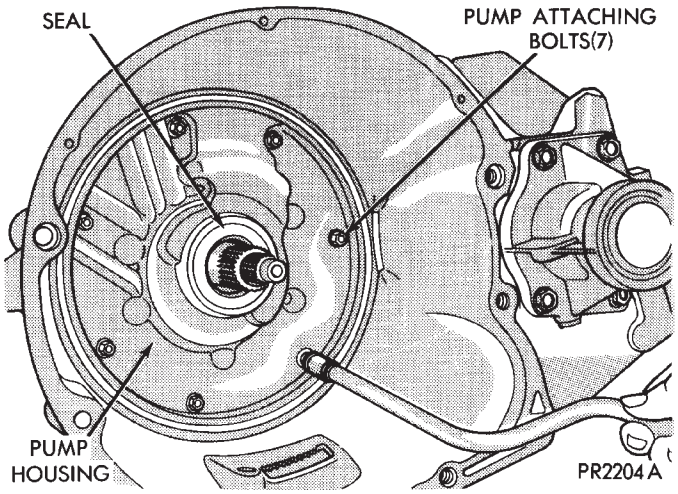

Fig. 56 Pump Attaching Bolts

DISASSEMBLY AND ASSEMBLY (Continued)

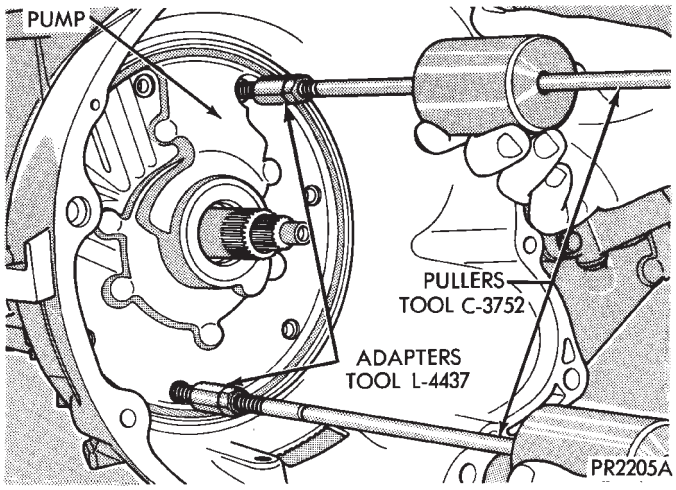

Fig. 57 Install Tool C-3752 with Adapters L-4437

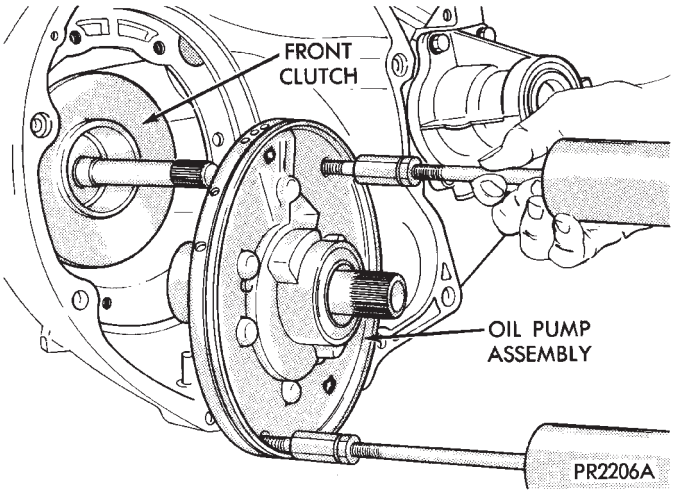

Fig. 58 Oil Pump with No. 1 Thrust Washer

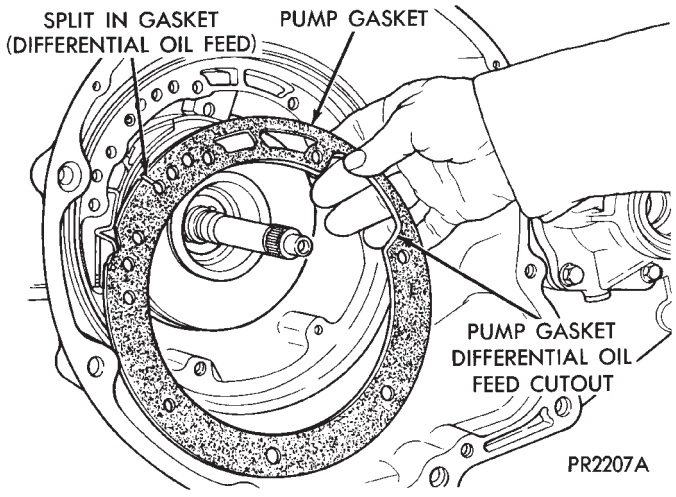

Fig. 59 Oil Pump Gasket

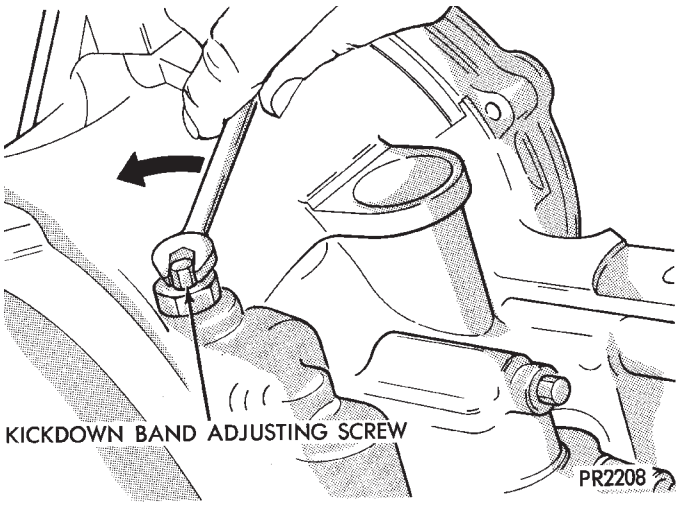

Fig. 60 Loosen Kickdown Band Adjusting Screw

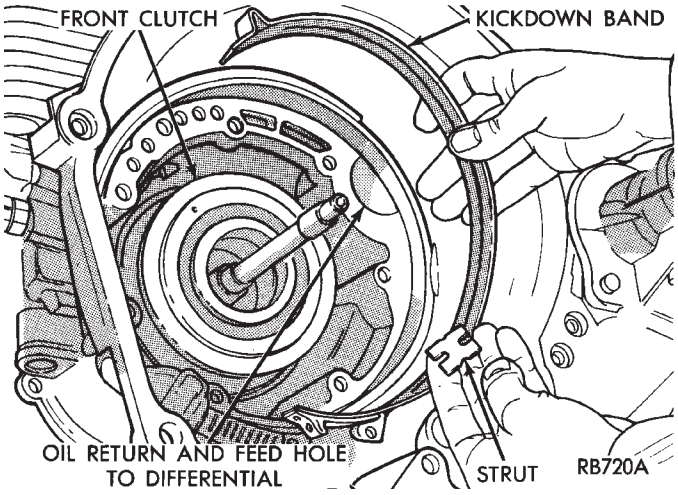

Fig. 61 Kickdown Band and Strut

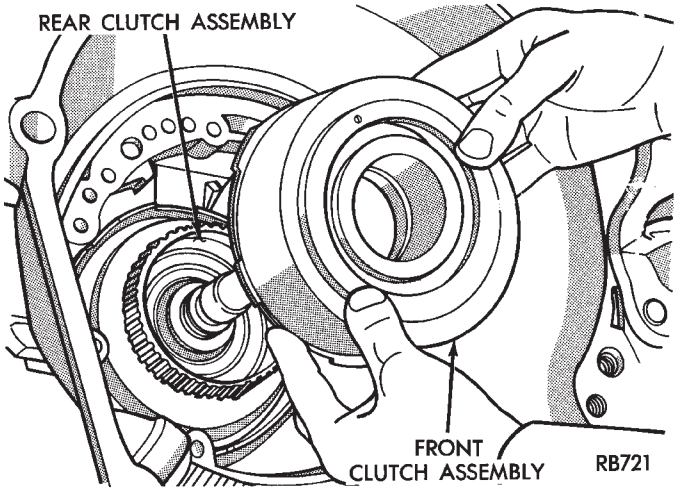

Fig. 62 Front Clutch Assembly

DISASSEMBLY AND ASSEMBLY (Continued)

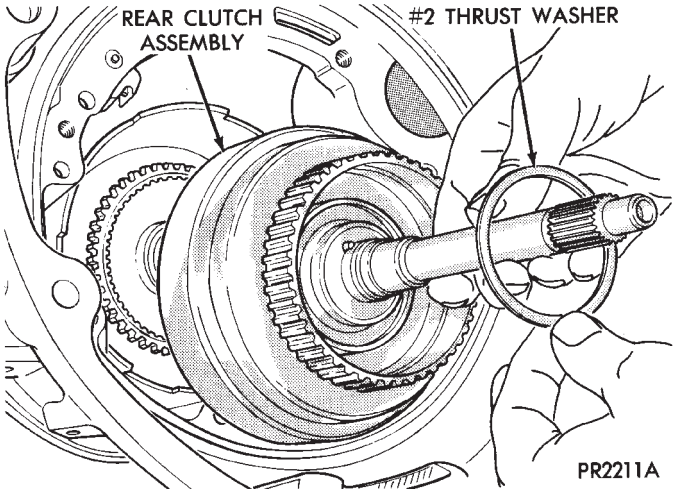

Fig. 63 No. 2 Thrust Washer and Rear Clutch

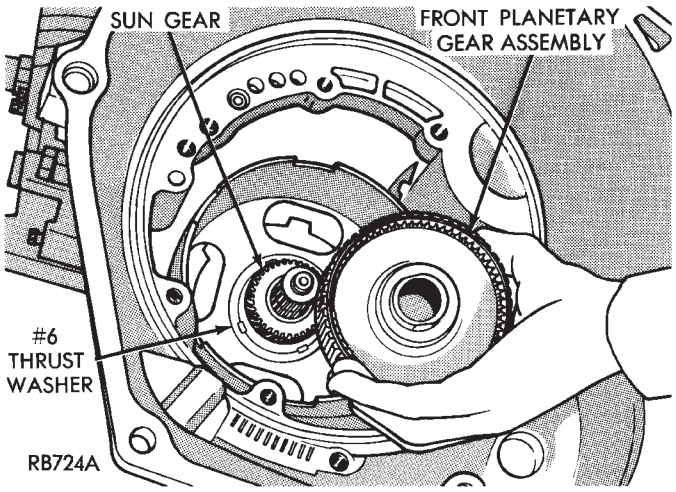

Fig. 66 Front Planetary Gear Assembly

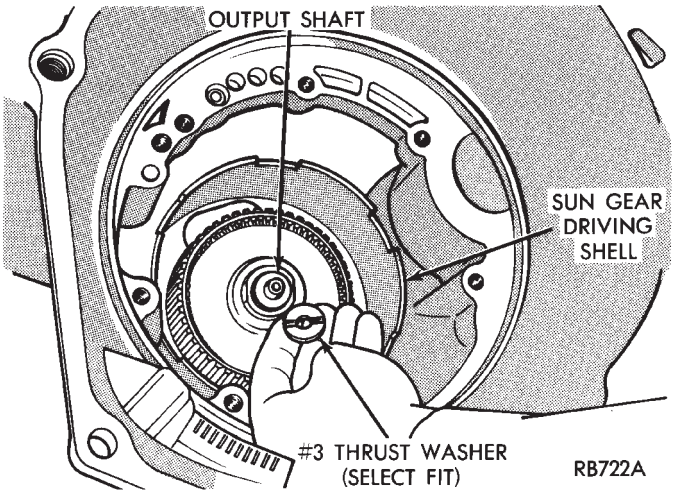

Fig. 64 No. 3 Thrust Washer

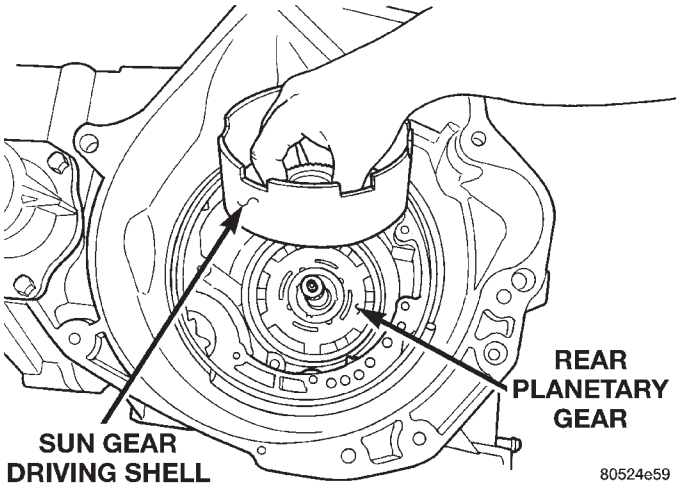

Fig. 67 Sun Gear Driving Shell

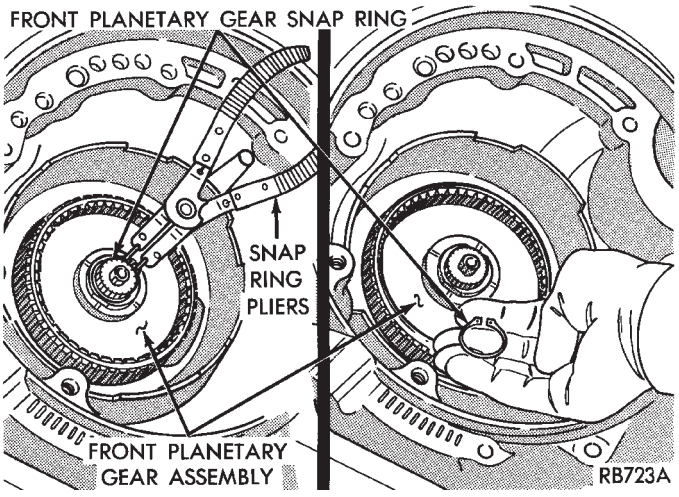

Fig. 65 Front Planetary Gear Snap Ring

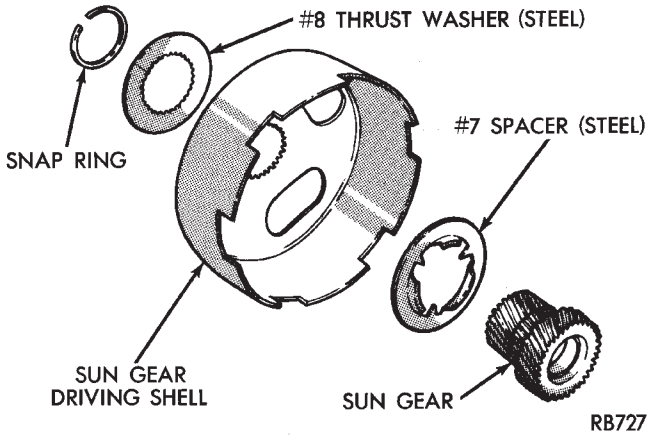

Fig. 68 Sun Gear Driving Shell Components

ASSEMBLY

When rebuilding, reverse the above procedure.

DISASSEMBLY AND ASSEMBLY (Continued)

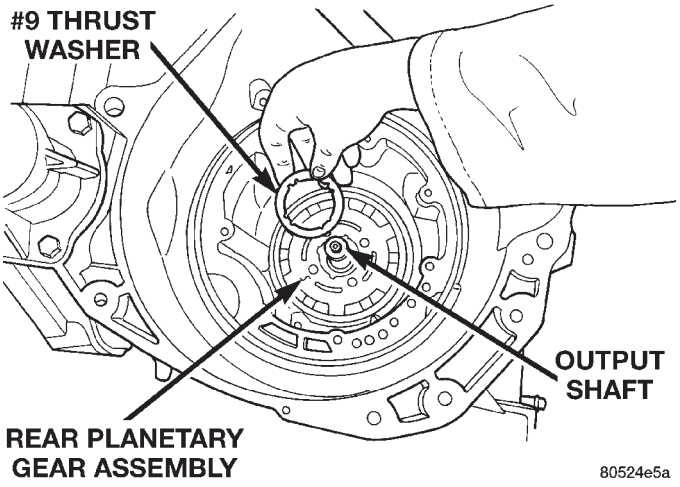

Fig. 69 No. 9 Thrust Washer

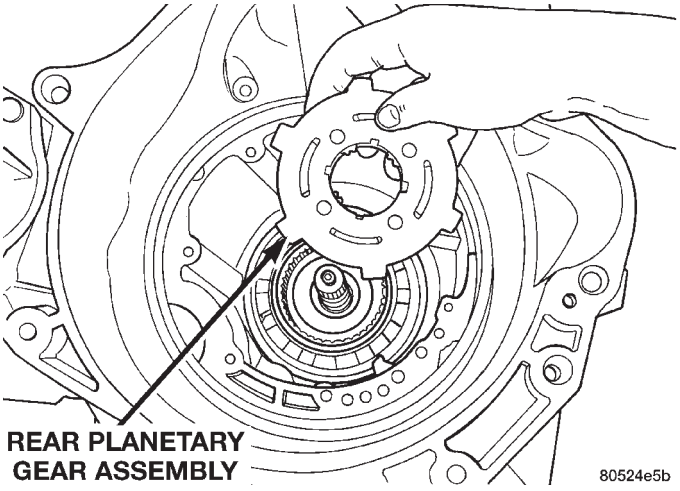

Fig. 70 Rear Planetary Gear Assembly

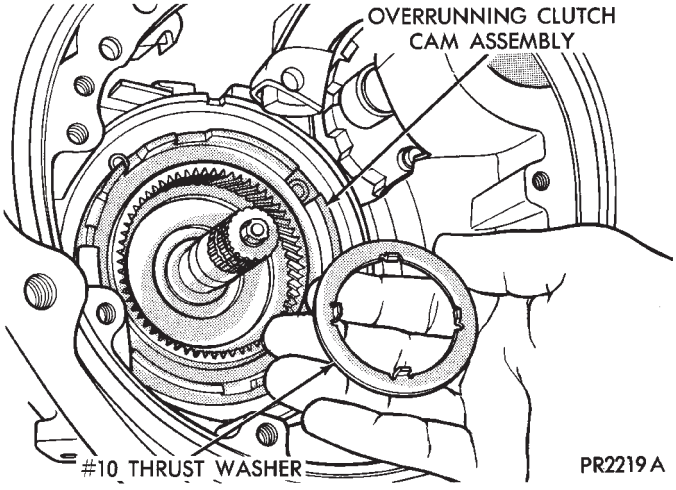

Fig. 71 No. 10 Thrust Washer

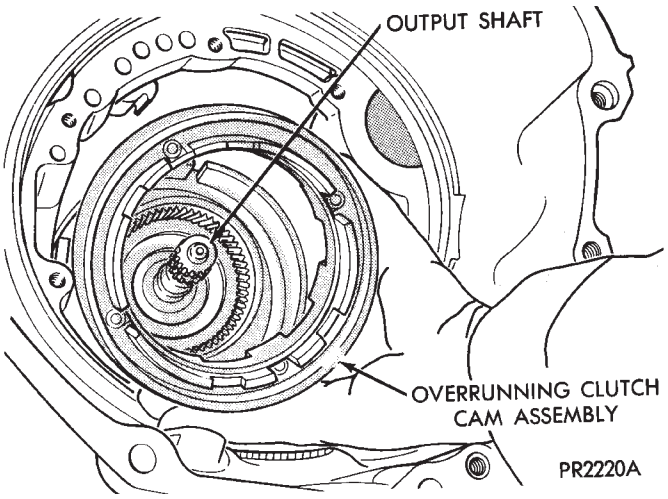

Fig. 72 Overrunning Clutch Cam Assembly

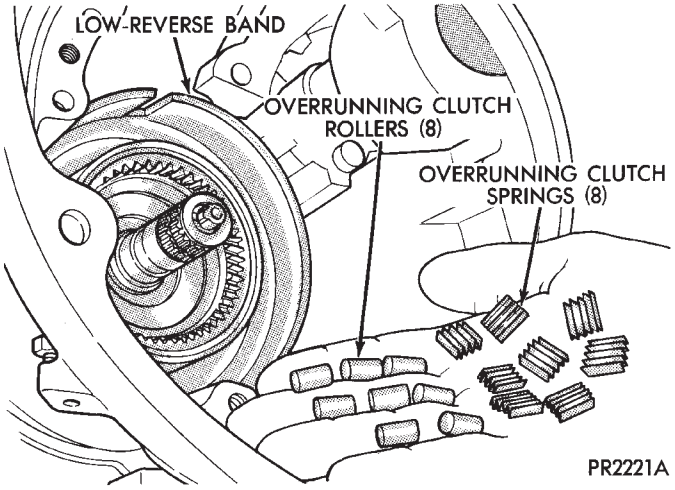

Fig. 73 Overrunning Clutch Rollers and Spring

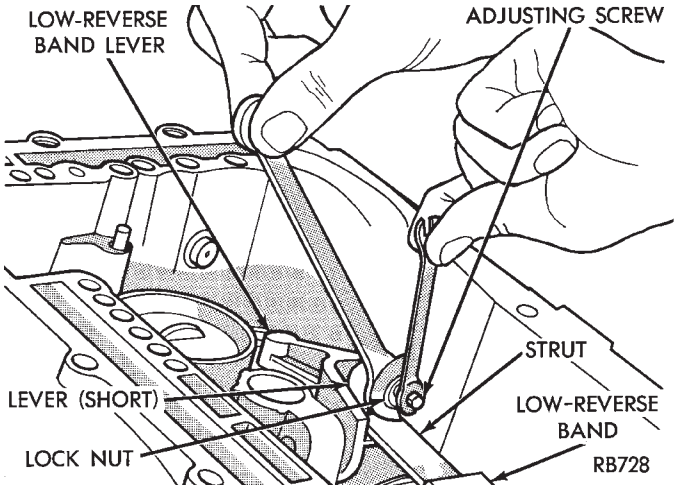

Fig. 74 Loosen or Adjust Low/Reverse Band

DISASSEMBLY AND ASSEMBLY (Continued)

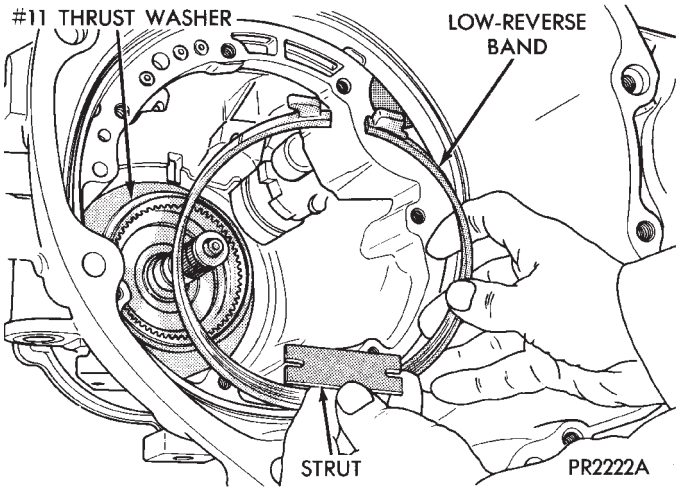

Fig. 75 Low/Reverse Band and Strut

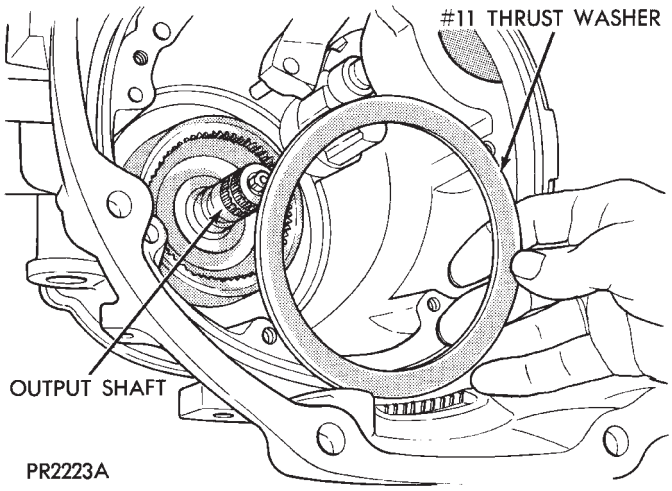

Fig. 76 No. 11 Thrust Washer

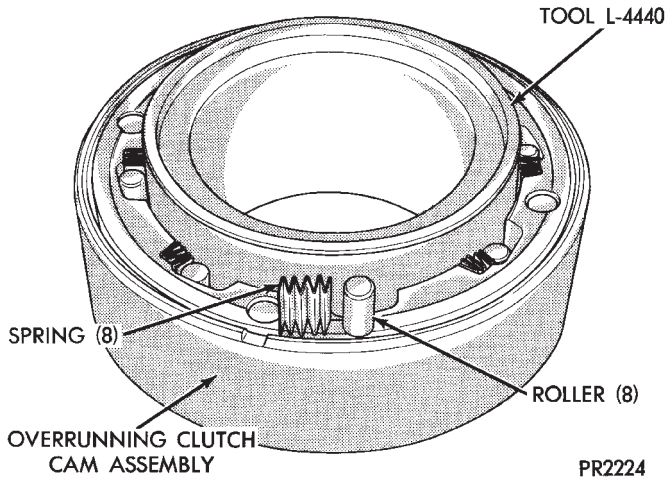

Fig. 77 Install Overrunning Clutch Rollers and Springs

VALVE BODY RECONDITION

NOTE: Tighten all valve body screws to 5 N·m (40 in. lbs.)

Do not clamp any portion of valve body or transfer plate in a vise. Any slight distortion of the aluminum body or transfer plate will result in sticking valves, excessive leakage, or both. **When removing or installing valves or plugs, slide them in or out carefully. Do not use force.**

NOTE: TAG ALL SPRINGS AS THEY ARE REMOVED FOR REASSEMBLY IDENTIFICATION.

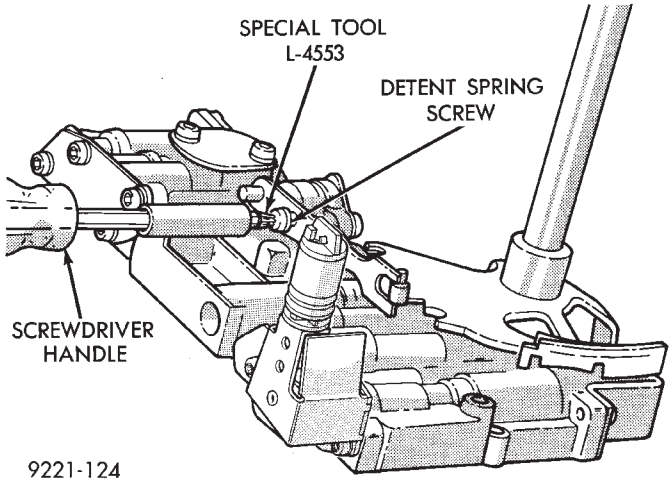

Fig. 78 Detent Spring Attaching Screw and Spring

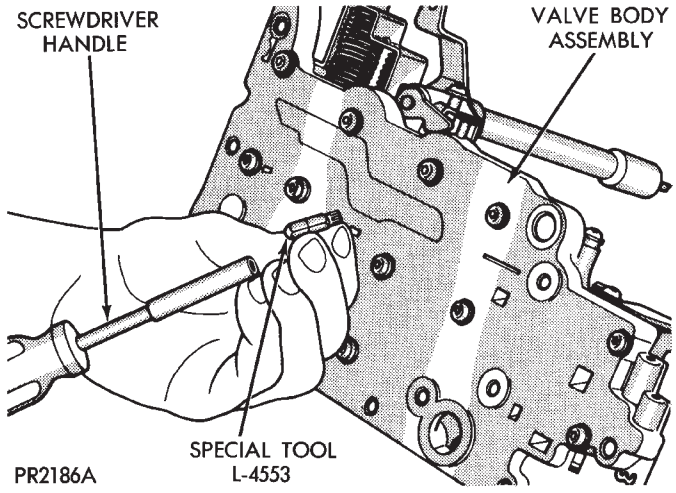

Fig. 79 Using Tool L-4553 on Valve Body Screw

DISASSEMBLY AND ASSEMBLY (Continued)

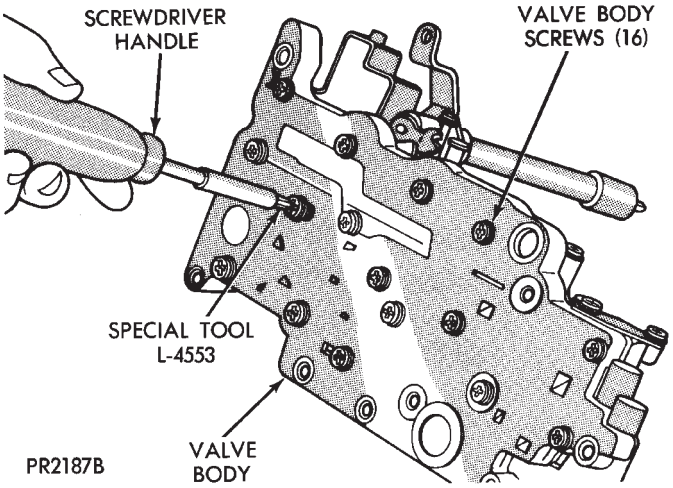

Fig. 80 Remove or Install Valve Body Screws

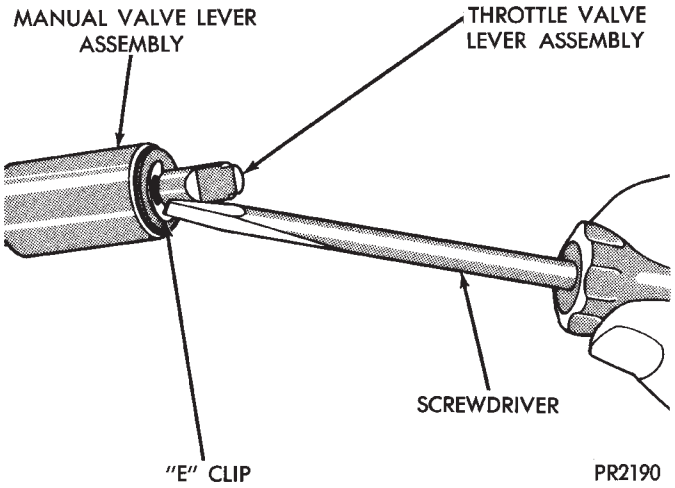

Fig. 83 Remove or Install Throttle Shaft E-Clip

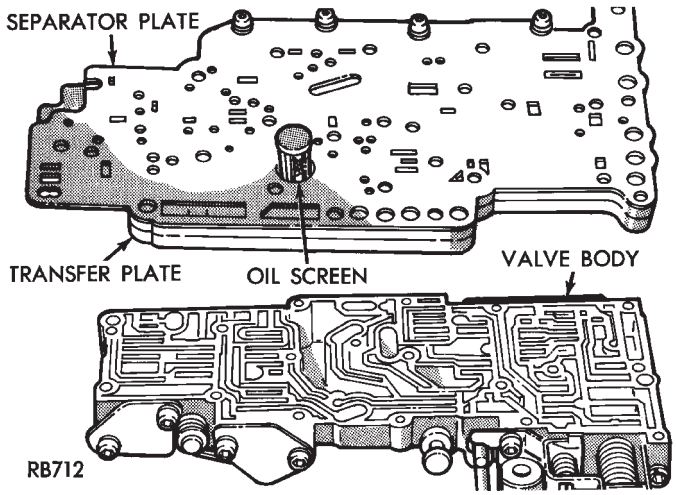

Fig. 81 Transfer Plate and Separator Plate

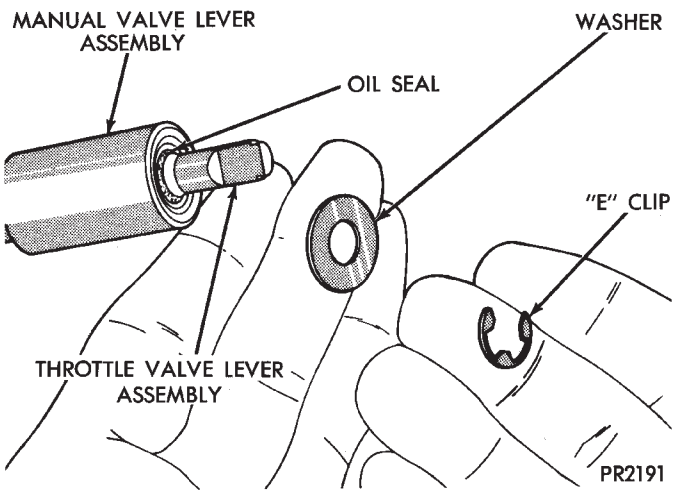

Fig. 84 Throttle Shaft E-Clip, Washer, and Seal

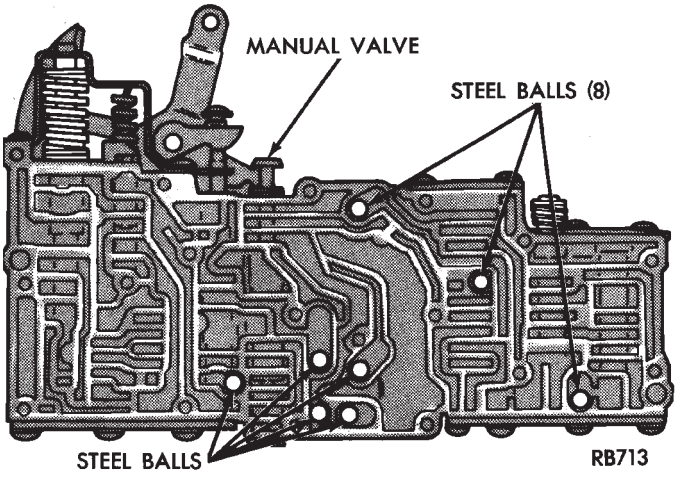

Fig. 82 Steel Ball Locations

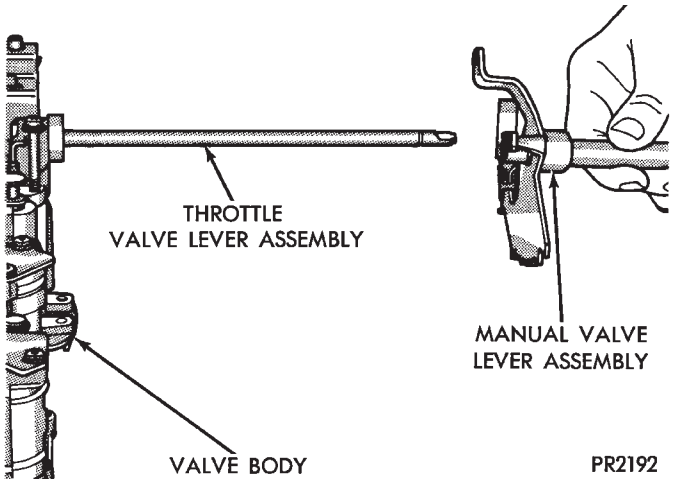

Fig. 85 Manual Valve Lever Assembly

DISASSEMBLY AND ASSEMBLY (Continued)

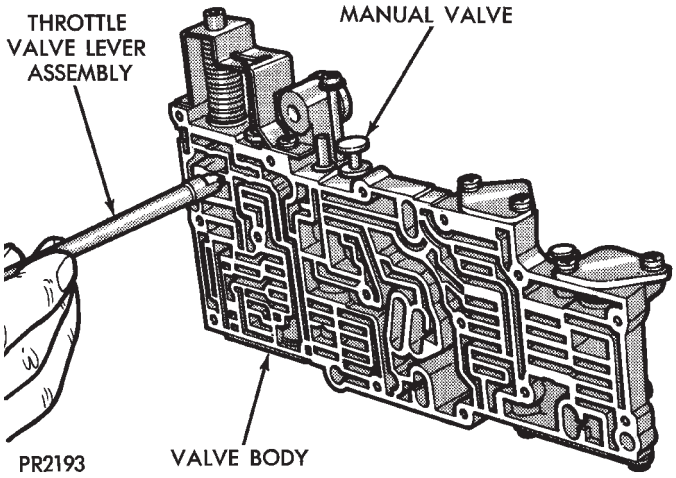

Fig. 86 Throttle Valve Lever Assembly

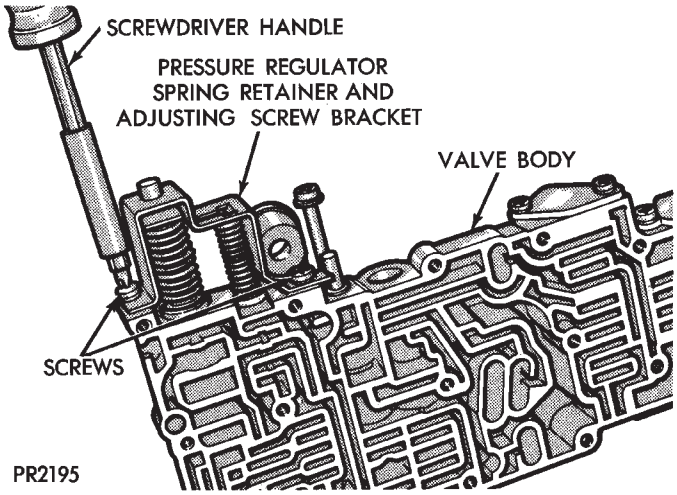

Fig. 88 Pressure Regulator and Adjusting Screw Bracket

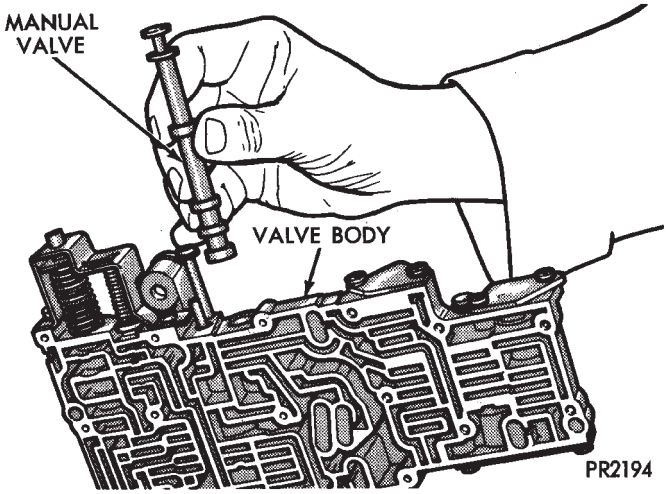

Fig. 87 Manual Valve

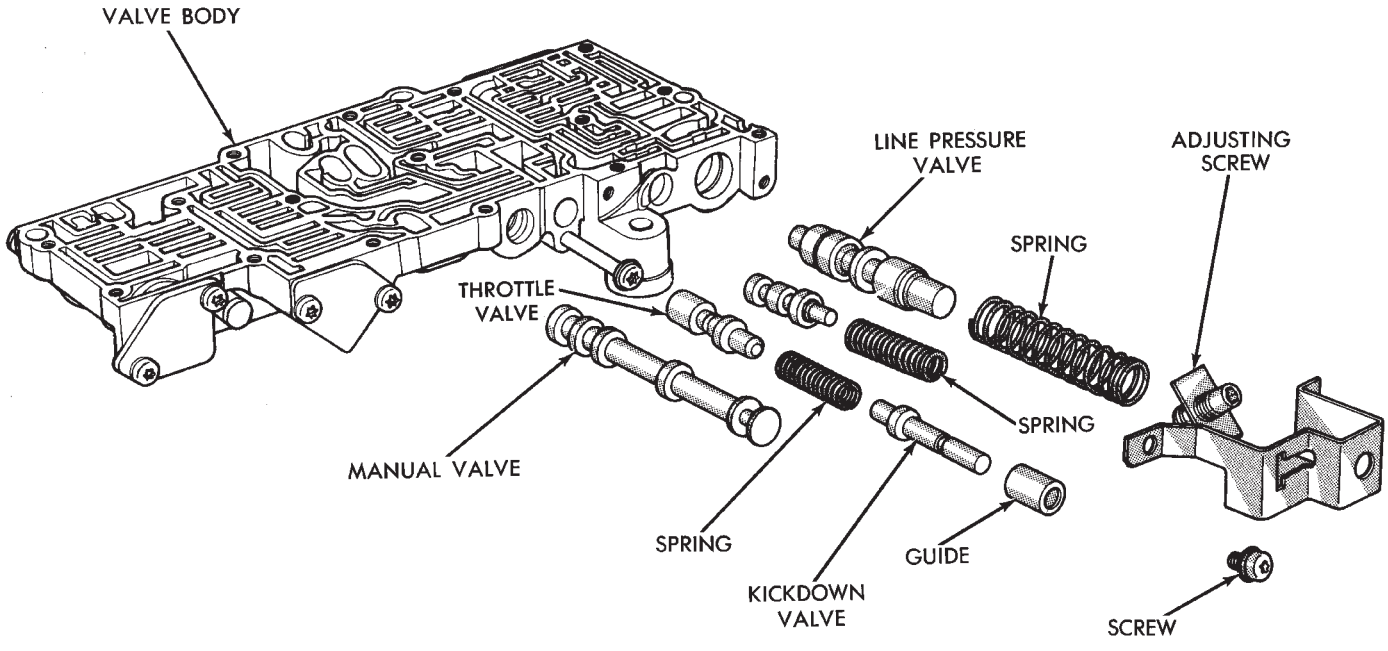

Fig. 89 Pressure Regulators and Manual Controls

DISASSEMBLY AND ASSEMBLY (Continued)

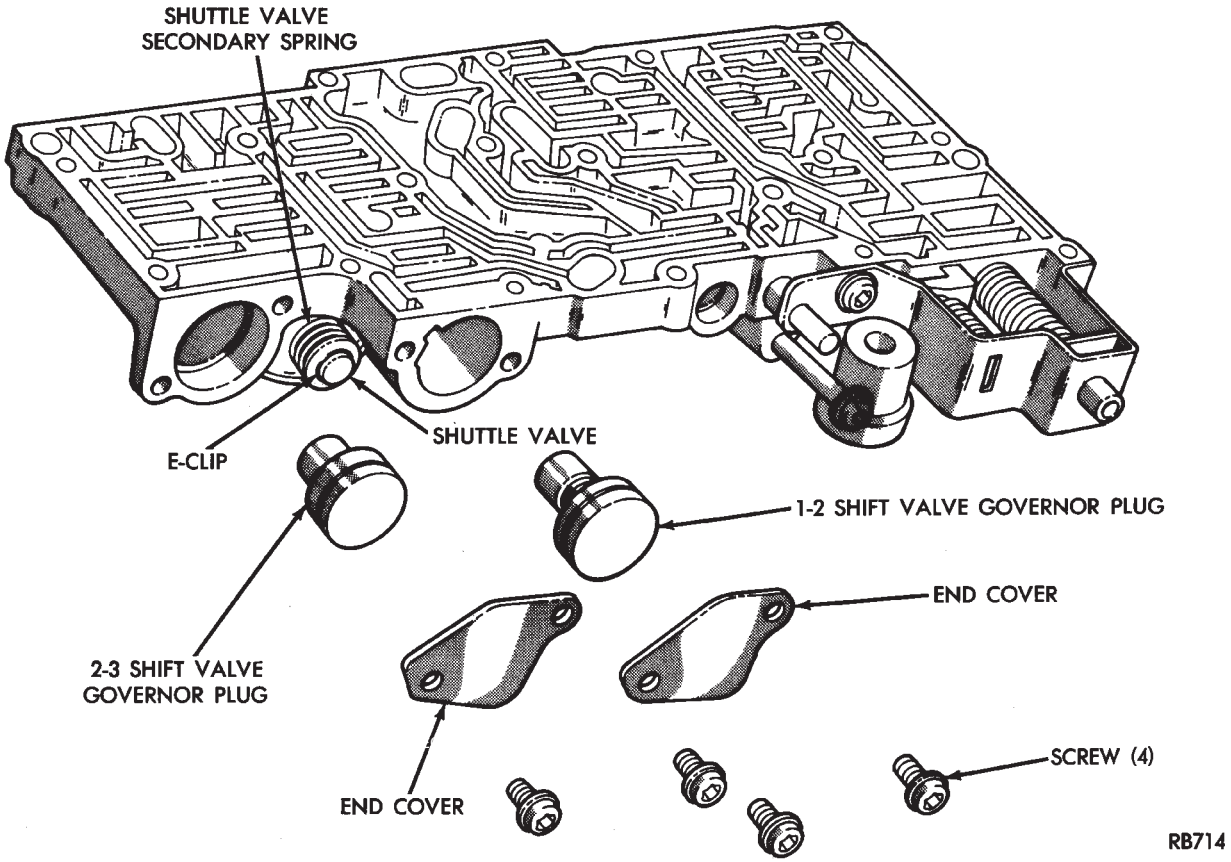

Fig. 90 Governor Plugs

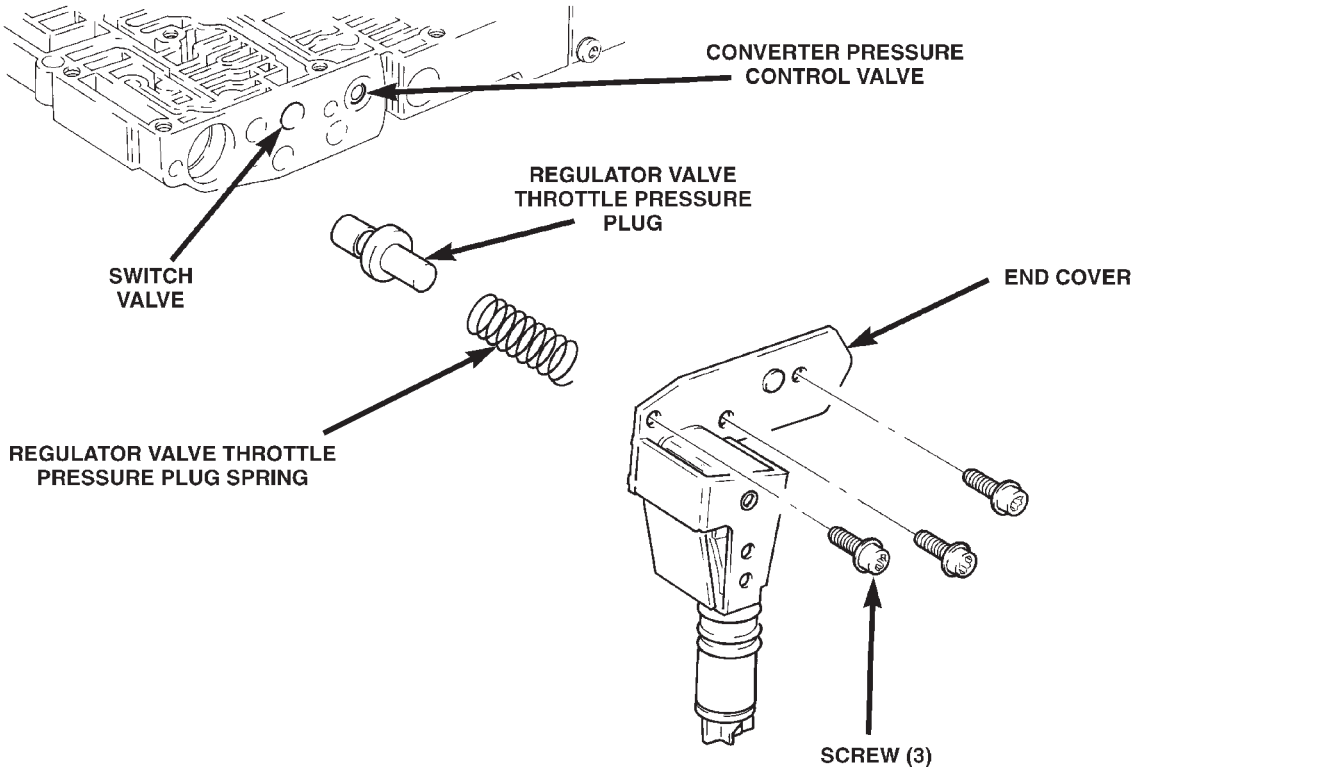

Fig. 91 Pressure Regulator Valve Plugs

DISASSEMBLY AND ASSEMBLY (Continued)

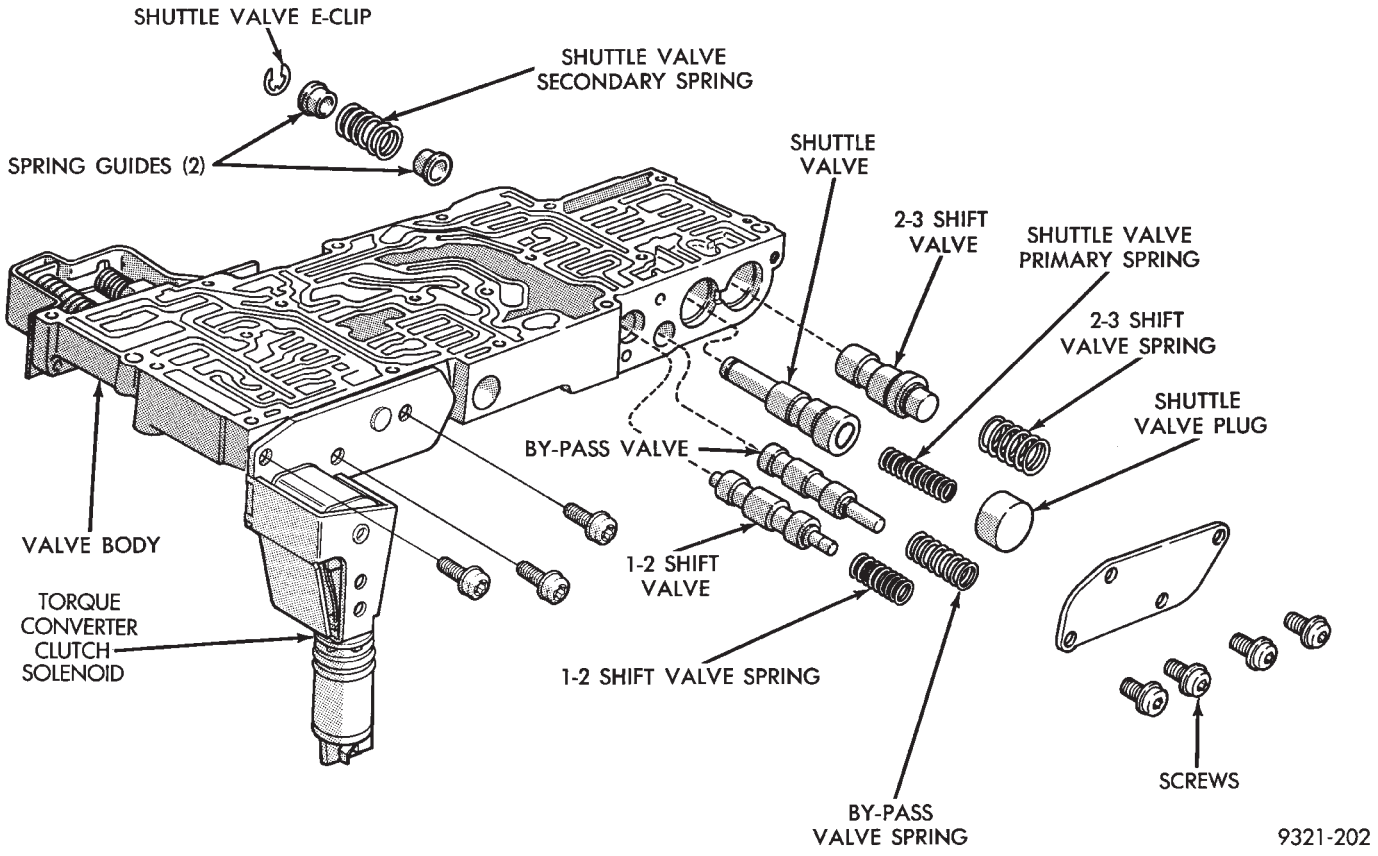

Fig. 92 Shift Valves and Shuttle Valve

OIL PUMP-RECONDITION

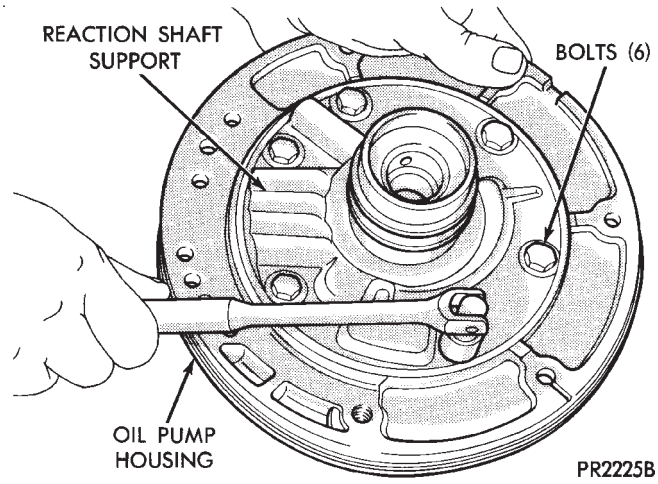

Fig. 93 Reaction Shaft Support Bolts

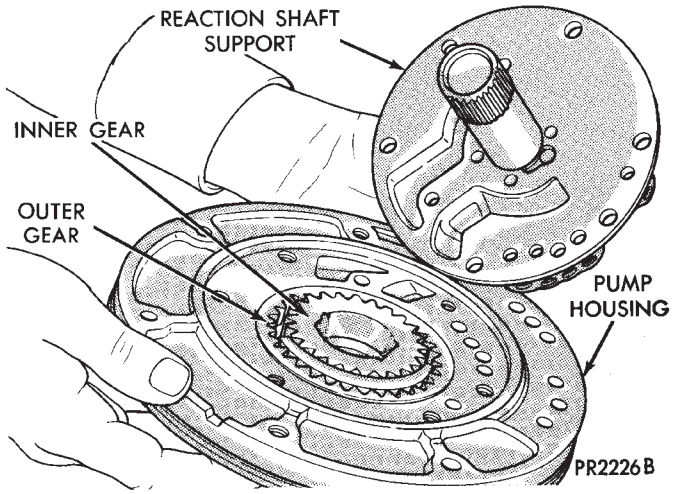

Fig. 94 Reaction Shaft Support

DISASSEMBLY AND ASSEMBLY (Continued)

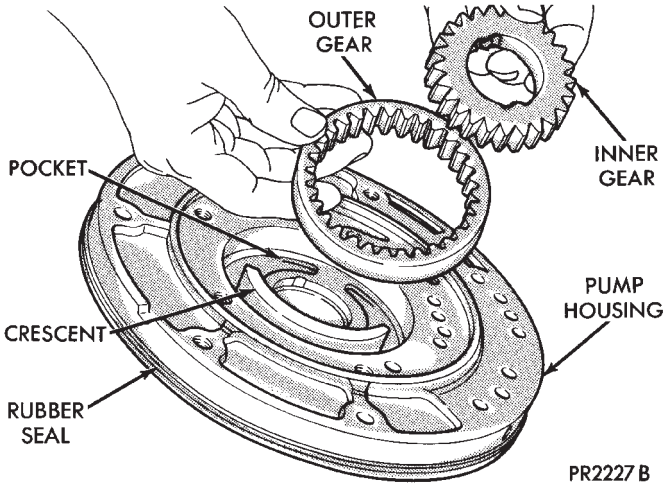

Fig. 95 Inner and Outer Pump Gears

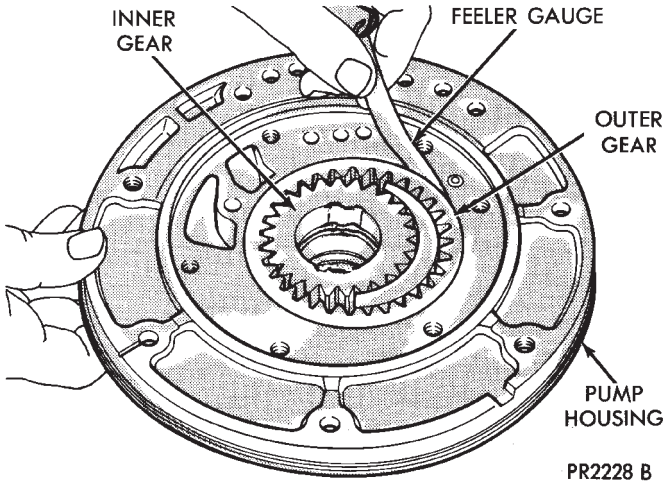

Fig. 96 Measuring Pump Clearance (Gear to Pocket)

NOTE: Also, check gear side clearance with a straight edge and a feeler gauge (See Specifications).

FRONT CLUTCH-RECONDITION

DISASSEMBLY

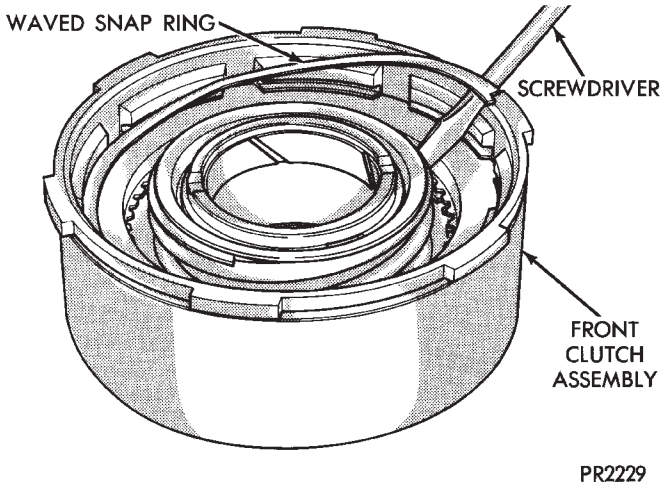

Fig. 97 Front Clutch Waved Snap Ring

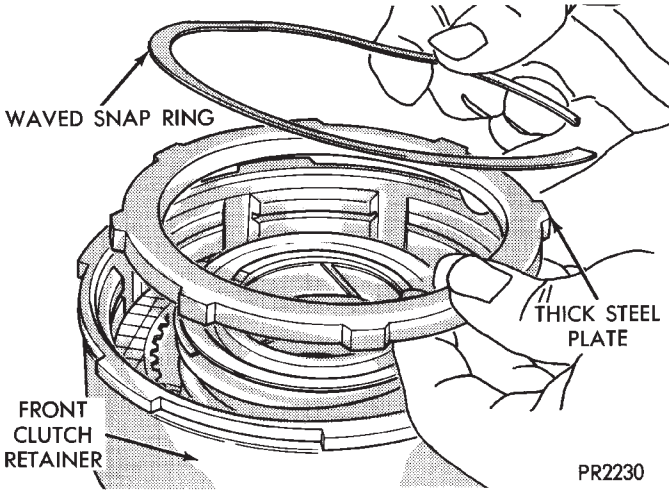

Fig. 98 Thick Steel Plate and Waved Snap Ring

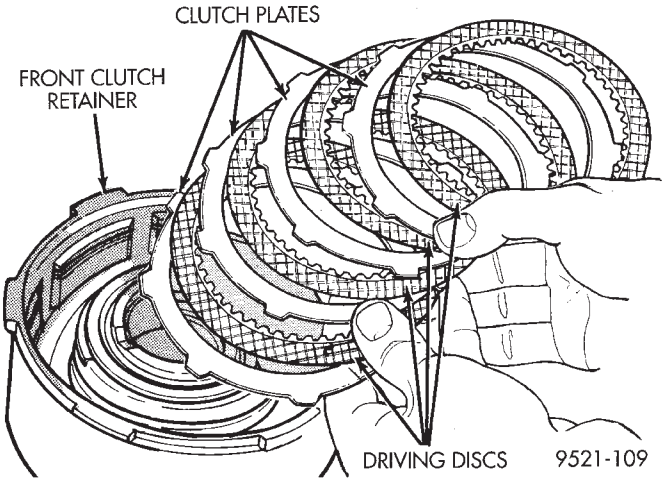

Fig. 99 Front Clutch (4-Disc Shown)

DISASSEMBLY AND ASSEMBLY (Continued)

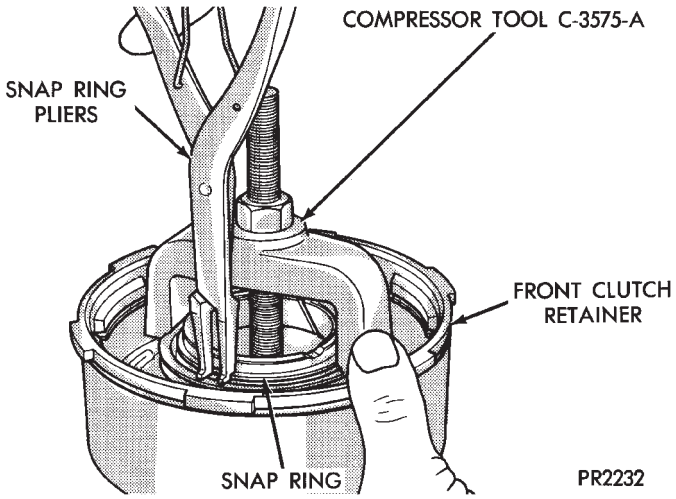

Fig. 100 Front Clutch Return Spring Snap Ring

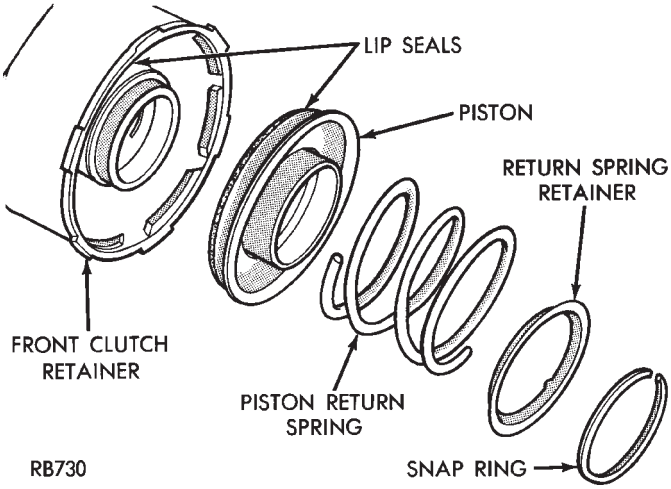

Fig. 101 Front Clutch Return Spring and Piston

ASSEMBLY

To reassemble, reverse the above procedure.

MEASURING PLATE CLEARANCE

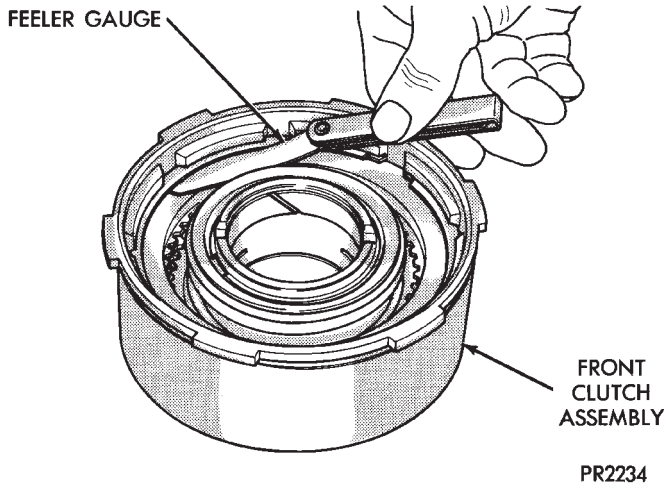

Fig. 102 Measuring Front Clutch Plate Clearance

REAR CLUTCH-RECONDITION

INSPECTION

Inspect facing material on all driving discs. Replace discs that are charred, glazed, or heavily pitted. Discs should also be replaced if they show evidence of material flaking off, or if facing material can be scraped off easily. Inspect driving disc splines for wear or other damage. Inspect steel plate and pressure plate surface for burning, scoring, or damaged driving lugs. Replace if necessary. Inspect plates and discs for flatness; they must not be warped or cone-shaped.

Inspect steel plate lug grooves in clutch retainer for smooth surfaces; plates must travel freely in the grooves. Note ball check in piston; be sure ball moves freely. Inspect seal rings surfaces in clutch retainer for nicks or deep scratches; light scratches will not interfere with sealing of the seals. Inspect Neoprene seal rings for deterioration, wear, and hardness. Inspect piston spring and waved snap ring for distortion or breakage.

Inspect Teflon and/or cast iron seal rings on input shaft for wear. Do not remove rings unless conditions warrant. Inspect rear clutch to front clutch No. 2 thrust washer for wear. Washer thickness should be 0.061 to 0.063 inch. Replace if necessary.

DISASSEMBLY

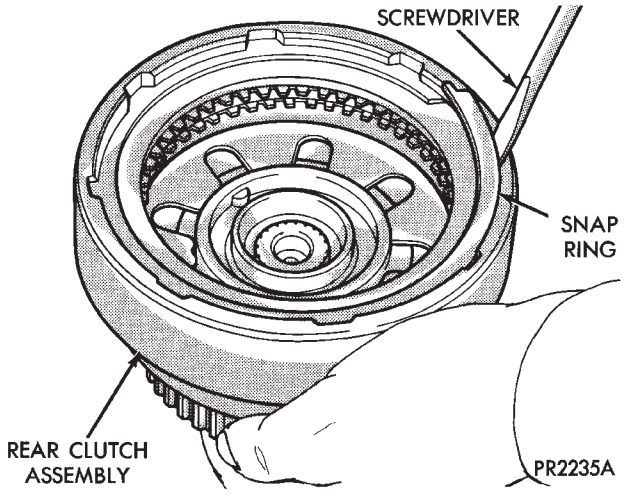

Fig. 103 Rear Clutch Outer Snap Ring

Press out input shaft, if required.

ASSEMBLY

To reassemble, reverse the above procedure.

DISASSEMBLY AND ASSEMBLY (Continued)

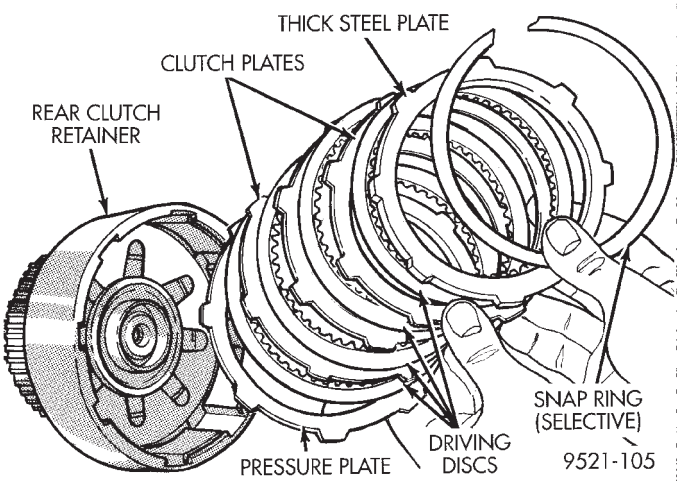

Fig. 104 Rear Clutch (4-Disc Shown)

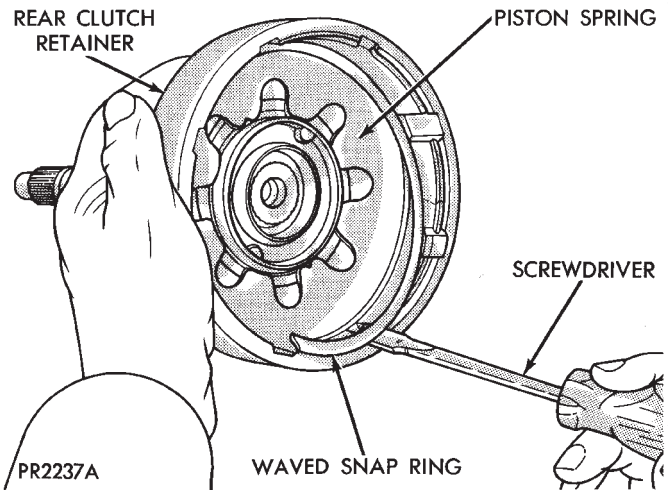

Fig. 105 Piston Spring Waved Snap Ring

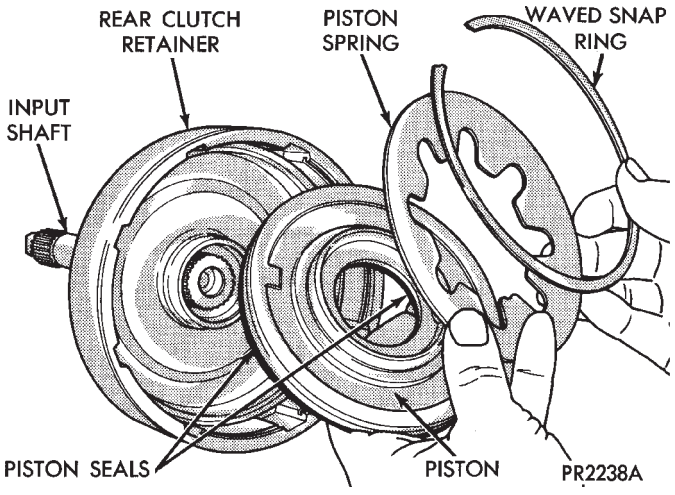

Fig. 106 Rear Clutch Piston and Piston Spring

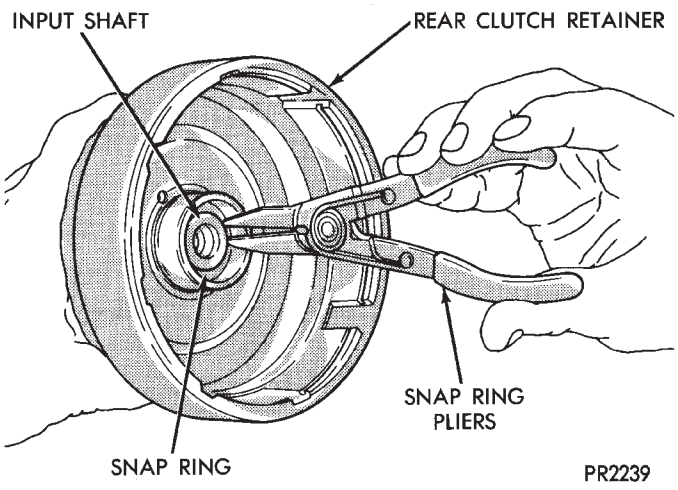

Fig. 107 Remove or Install Input Shaft Snap Ring

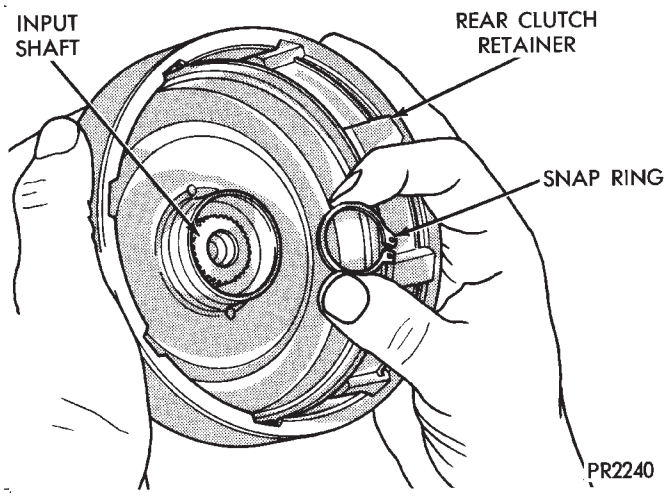

Fig. 108 Input Shaft Snap Ring

MEASURING PLATE CLEARANCE

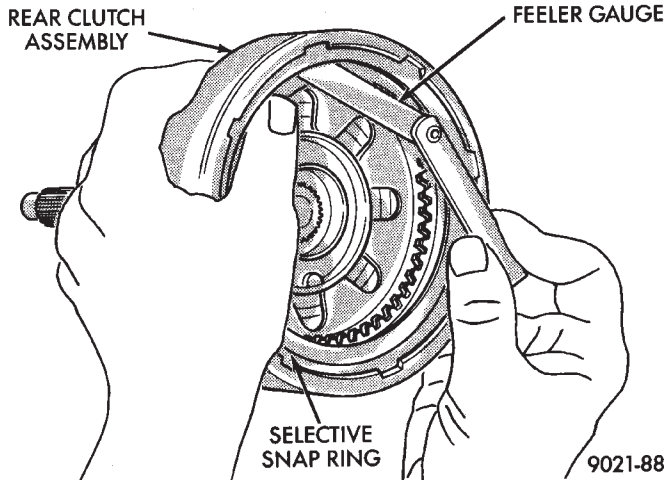

Fig. 109 Measuring Rear Clutch Plate Clearance

DISASSEMBLY AND ASSEMBLY (Continued)

FRONT PLANETARY AND ANNULUS GEAR-RECONDITION

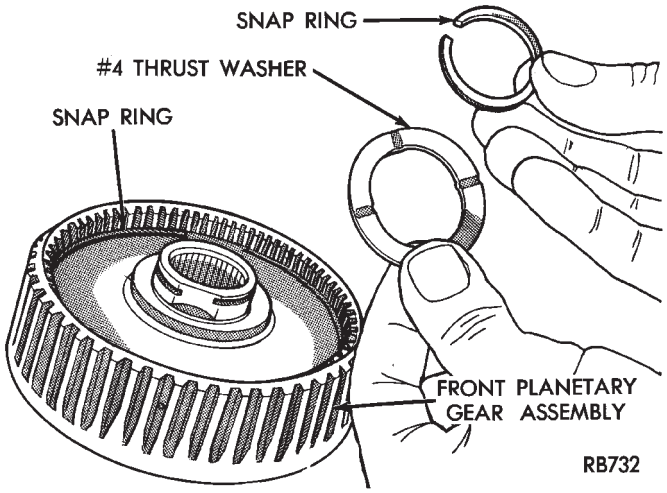

Fig. 110 Front Planetary Gear Snap Ring and No. 4 Thrust Washer (Always Install a New Snap Ring)

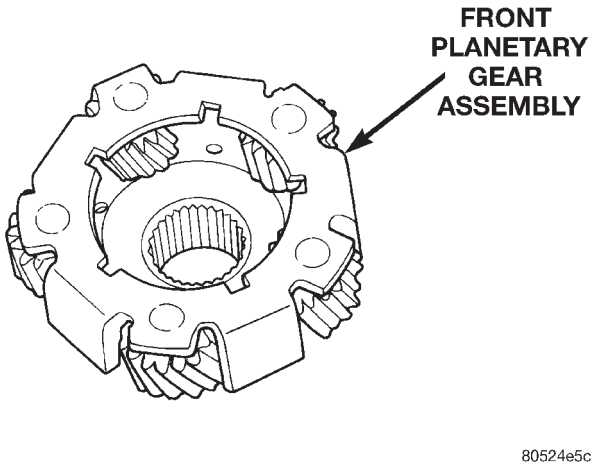

Fig. 111 Front Planetary Gear

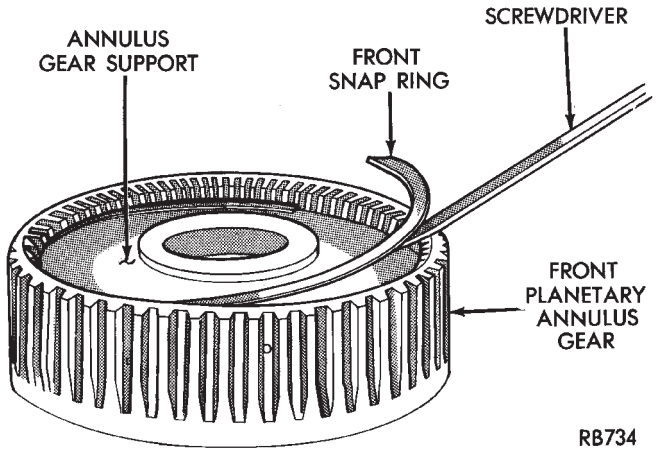

Fig. 112 Annulus Gear Support Front Snap Ring

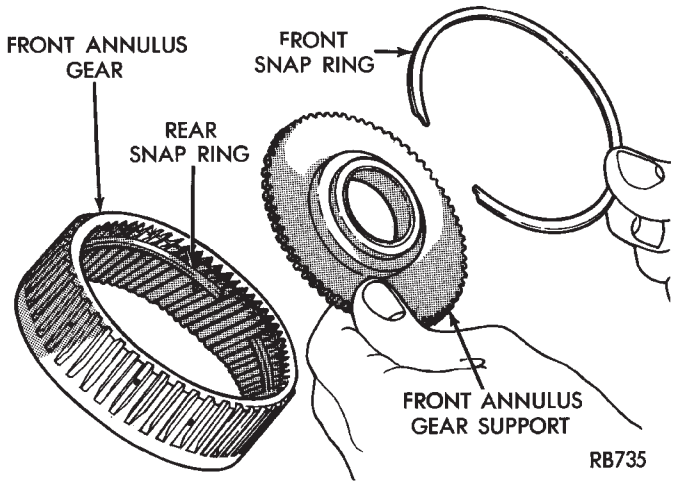

Fig. 113 Front Annulus Gear Support and Snap Ring

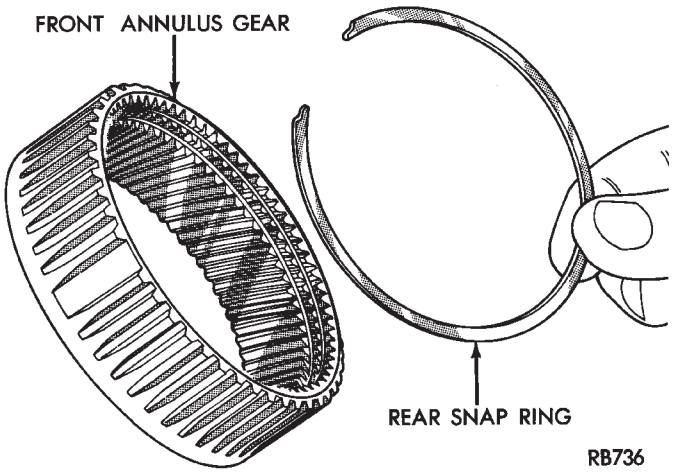

Fig. 114 Front Annulus Gear Support Snap Ring

LOW/REVERSE (REAR) SERVO-RECONDITION

DISASSEMBLY

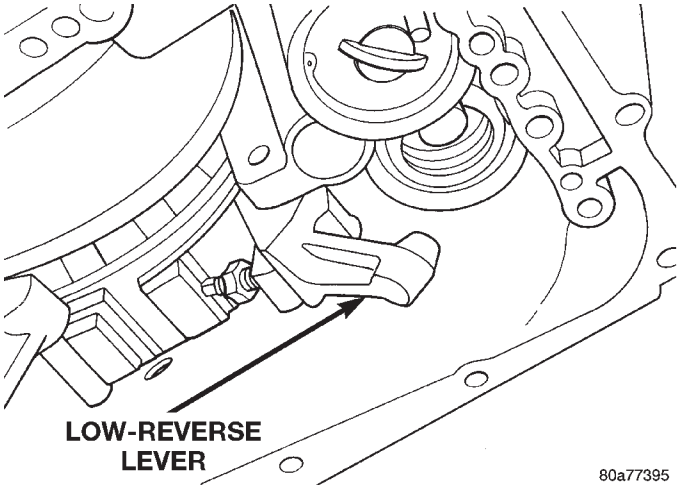

Fig. 115 Low/Reverse Lever

DISASSEMBLY AND ASSEMBLY (Continued)

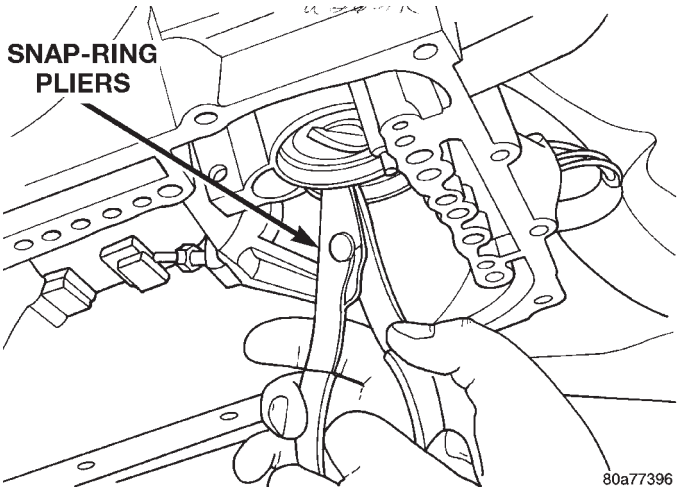

Fig. 116 Low/Reverse Servo Snap Ring

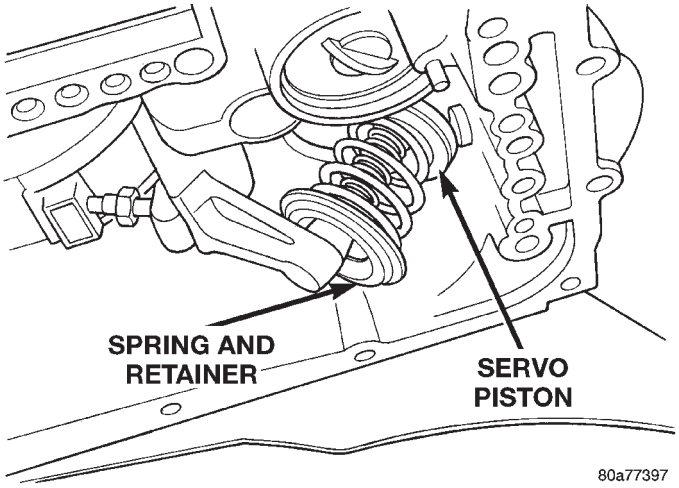

Fig. 117 Remove Retainer, Spring and Servo

ASSEMBLY

To assemble, reverse the above procedure.

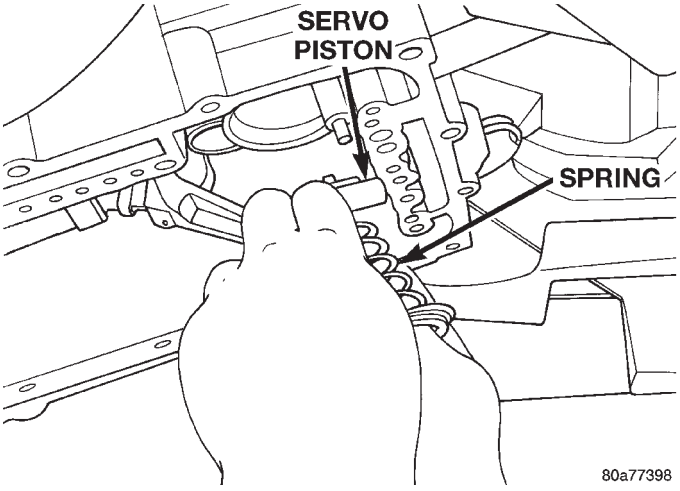

Fig. 118 Low/Reverse Servo Assembly

ACCUMULATOR-RECONDITION

DISASSEMBLY

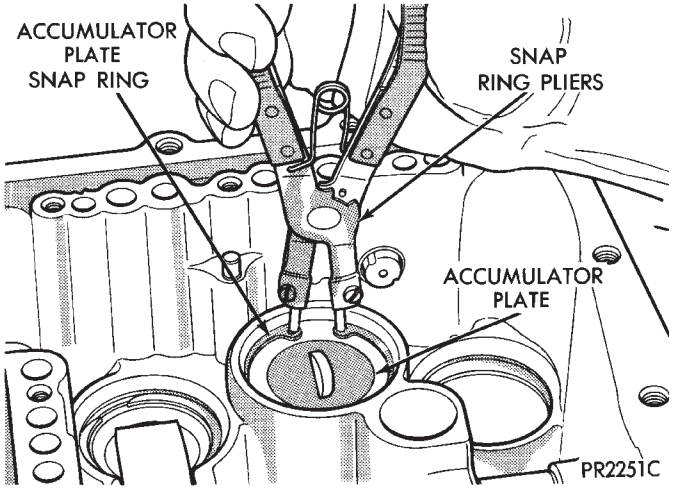

Fig. 119 Accumulator Snap Ring

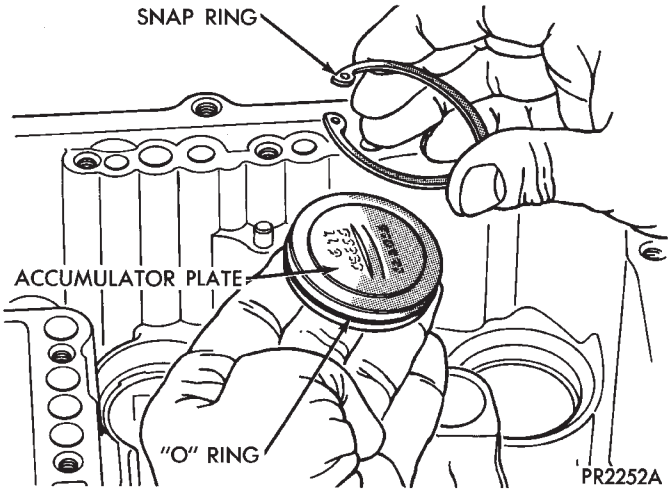

Fig. 120 Accumulator Plate and Snap Ring

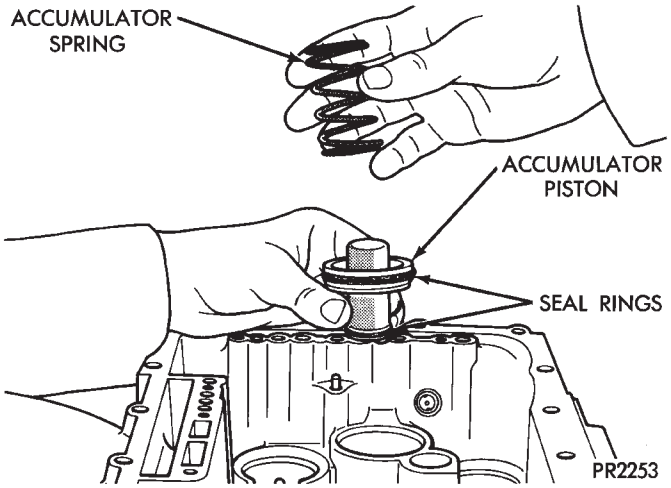

Fig. 121 Accumulator Spring and Piston

DISASSEMBLY AND ASSEMBLY (Continued)

ASSEMBLY

To assemble, reverse the above procedure.

KICKDOWN SERVO (CONTROLLED LOAD)-RECONDITION

DISASSEMBLY

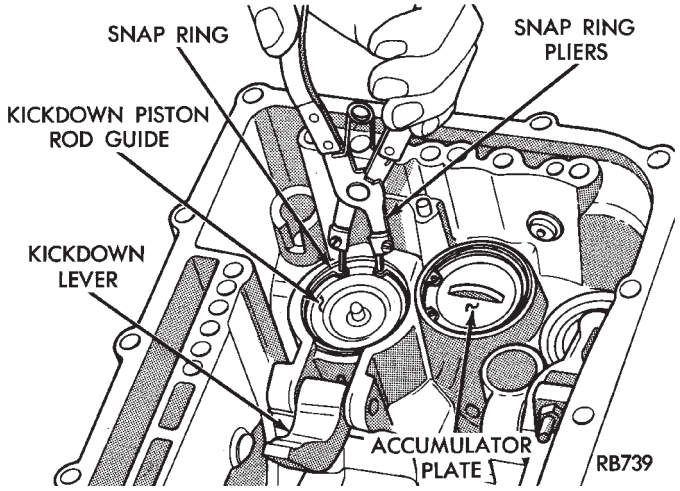

Fig. 122 Kickdown Servo Snap Ring

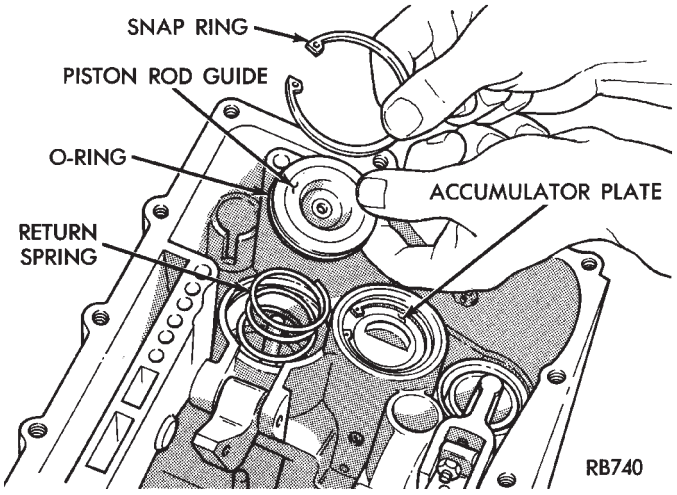

Fig. 123 Kickdown Servo Rod Guide and Snap Ring

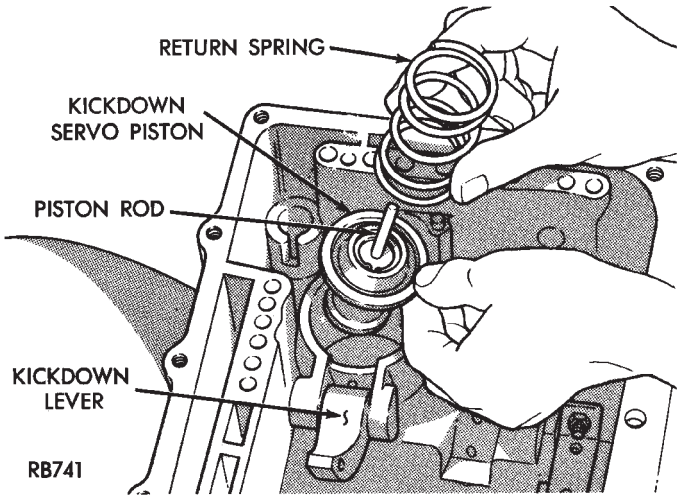

Fig. 124 Kickdown Piston Return Spring and Piston

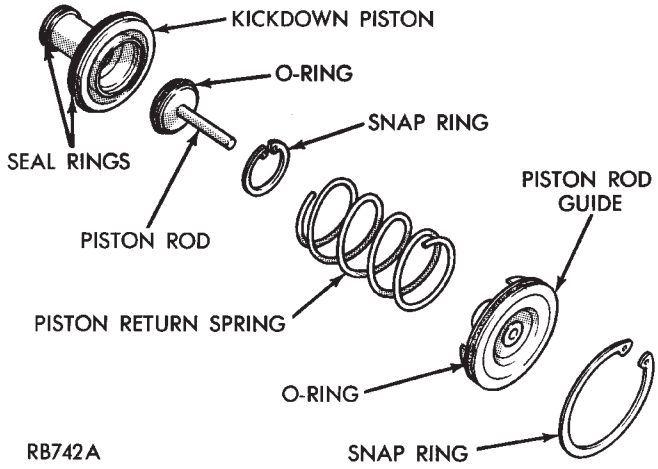

Fig. 125 Controlled Load Kickdown Servo

ASSEMBLY

To assemble, reverse the above procedure.

TRANSFER SHAFT REPAIR

DISASSEMBLY

NOTE: Remove old sealant before applying new sealant. Use Mopar® RTV sealant, or equivalent, when installing cover.

STIRRUP AND STRAP REMOVAL

NOTE: A stirrup and retaining strap is attached to the transfer gear. The stirrup prevents the transfer gear retaining nut from turning and backing off the transfer shaft. The strap is used to hold the stirrup to the transfer gear and prevent the stirrup retaining bolts from backing out.

DISASSEMBLY AND ASSEMBLY (Continued)

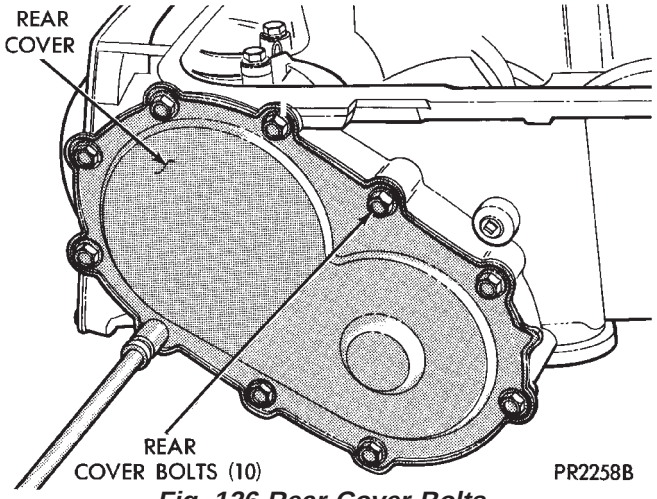

Fig. 126 Rear Cover Bolts

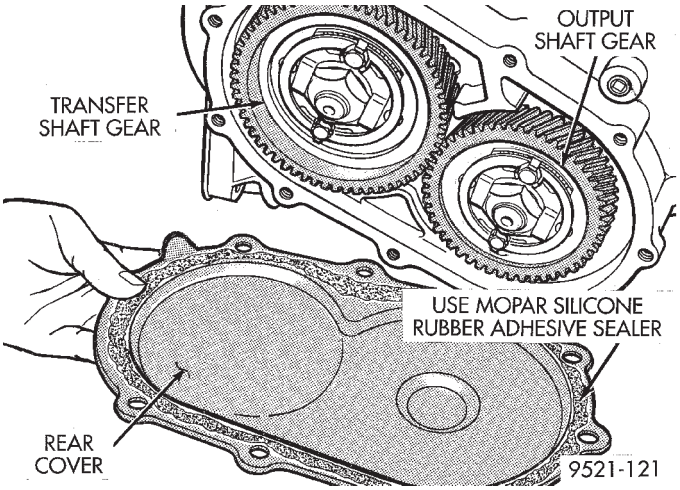

Fig. 127 Remove or Install Rear Cover

(1) Using a punch, bend tabs on strap flat against transfer gear.

(2) Remove bolts holding retaining strap to stirrup.

(3) Remove strap from transfer gear and stirrup.

(4) Remove stirrup from transfer gear.

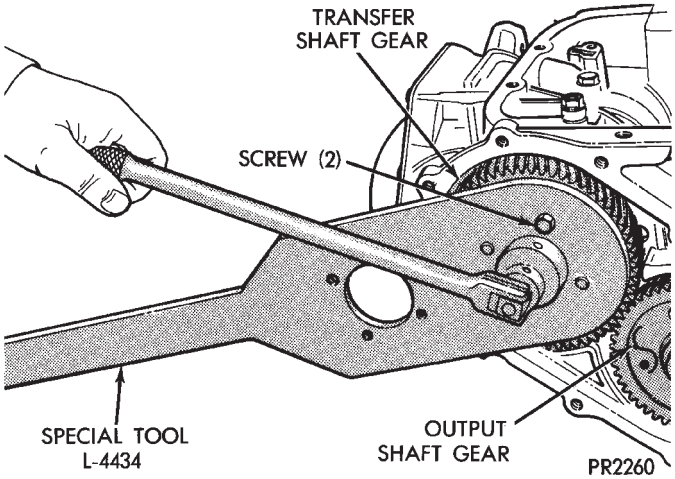

Fig. 128 Remove Transfer Shaft Gear Retaining Nut

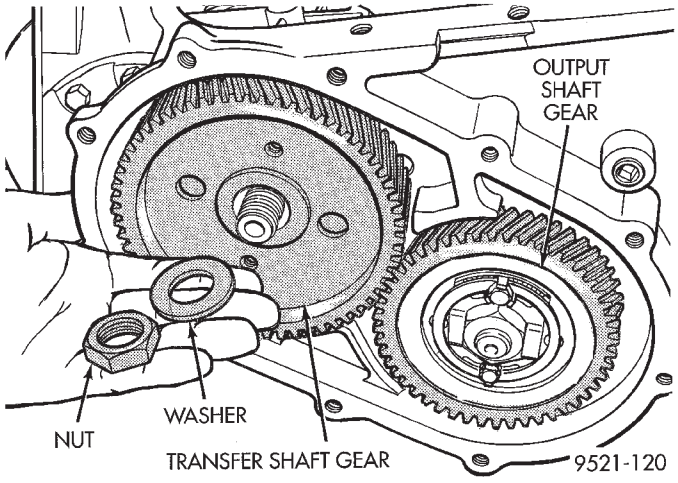

Fig. 129 Transfer Shaft Gear Nut and Washer

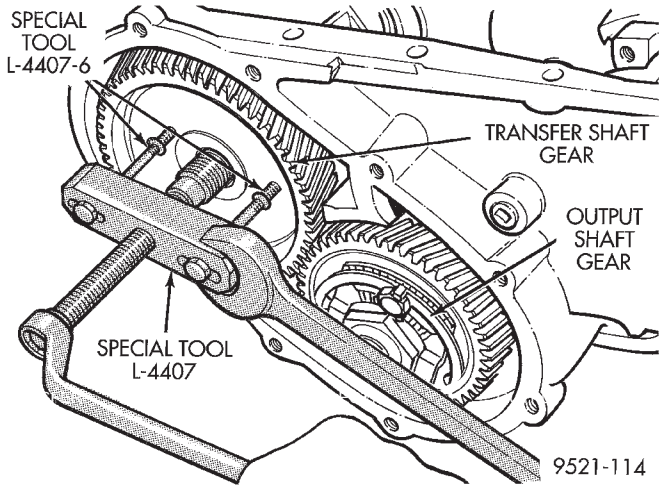

Fig. 130 Remove Transfer Shaft Gear

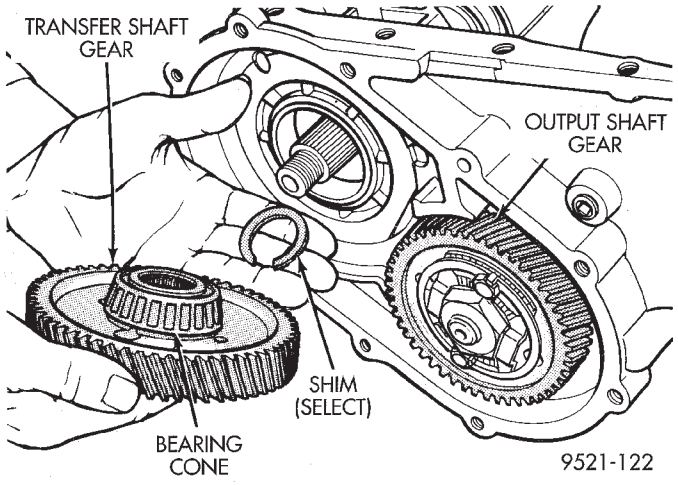

Fig. 131 Transfer Shaft Gear and (Select) Shim

DISASSEMBLY AND ASSEMBLY (Continued)

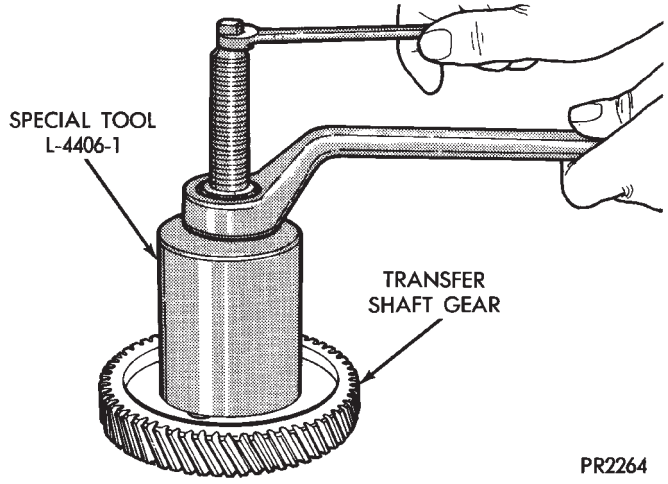

Fig. 132 Using Tool L-4406-1 with Adapter L-4406-3, Remove Transfer Shaft Gear Bearing Cone

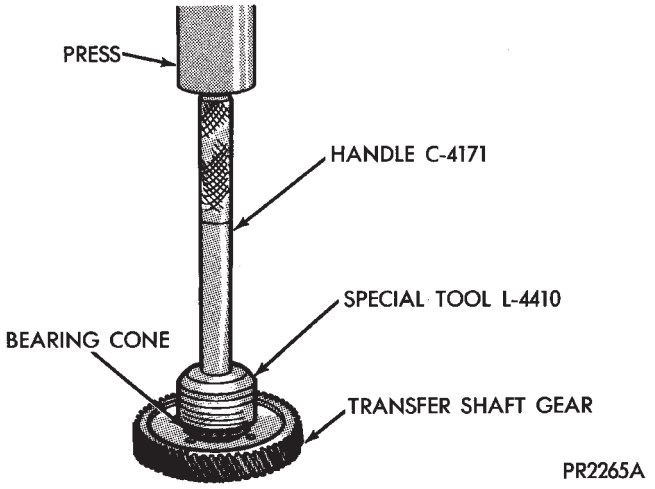

Fig. 133 Install Transfer Shaft Gear Bearing Cone

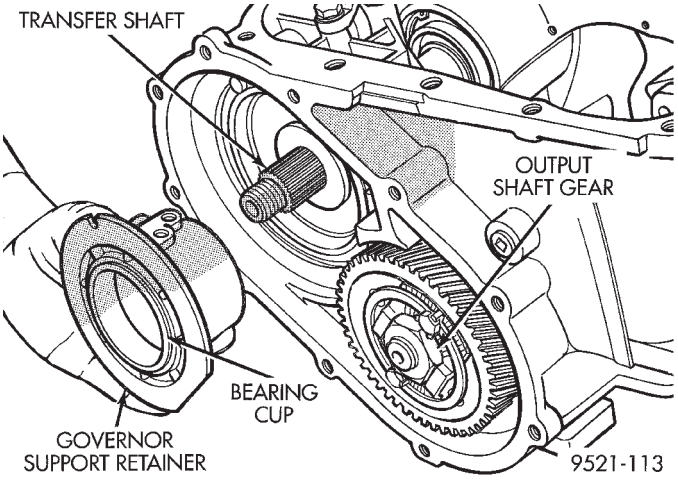

Fig. 134 Governor Support Retainer

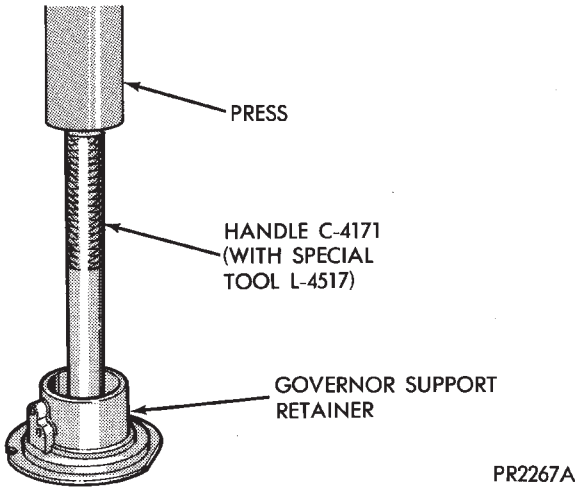

Fig. 135 Remove Governor Support Retainer Bearing Cup

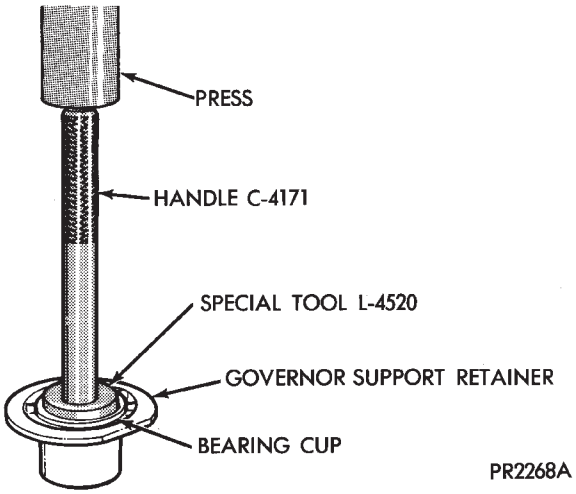

Fig. 136 Install Governor Support Retainer Bearing Cup

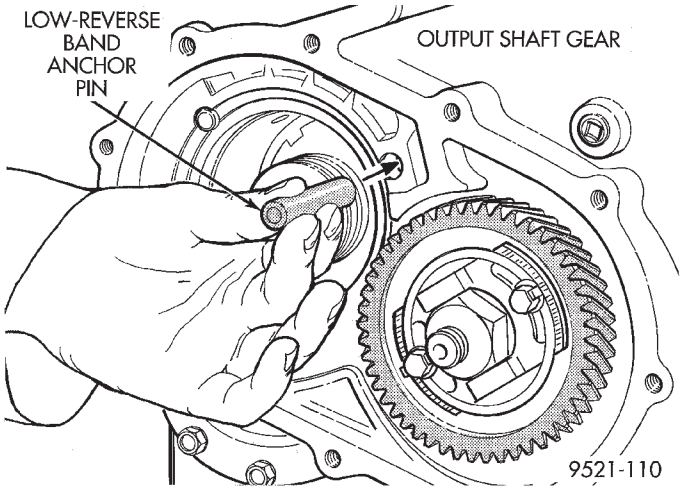

Fig. 137 Low/Reverse Band Anchor Pin

DISASSEMBLY AND ASSEMBLY (Continued)

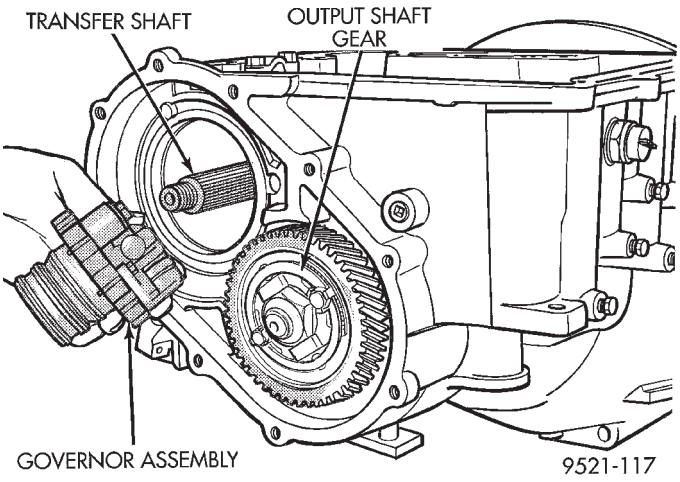

Fig. 138 Governor Assembly

NOTE: Remove or install both governor valves and governor body.

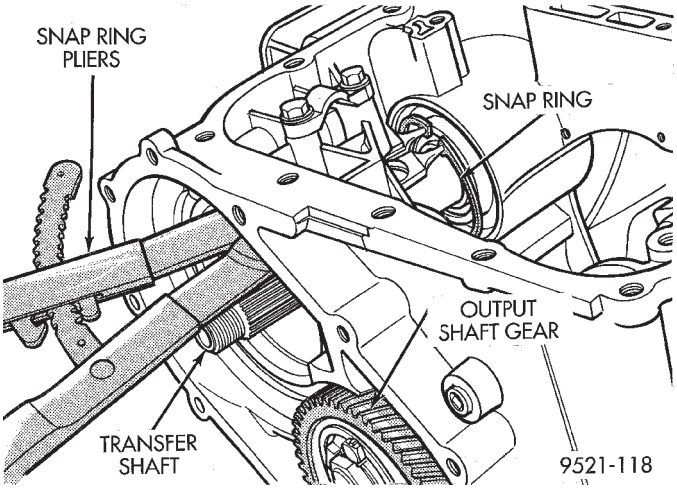

Fig. 139 Transfer Shaft Bearing Snap Ring

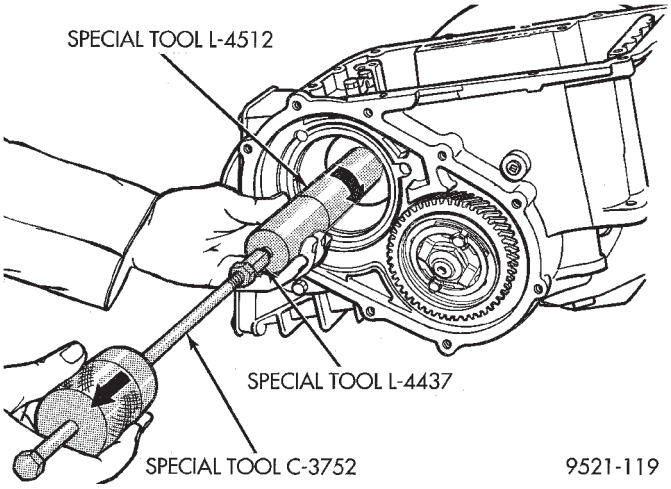

Fig. 140 Remove Transfer Shaft and Bearing Retainer Assembly

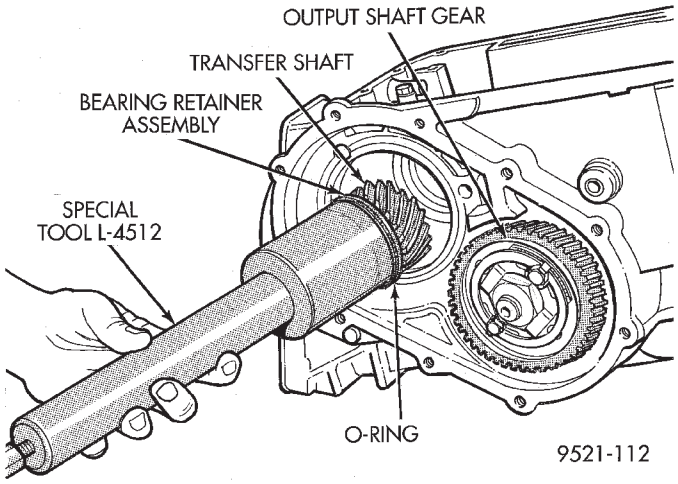

Fig. 141 Remove or Install Transfer Shaft and Bearing Retainer Assembly Using Tool L-4512

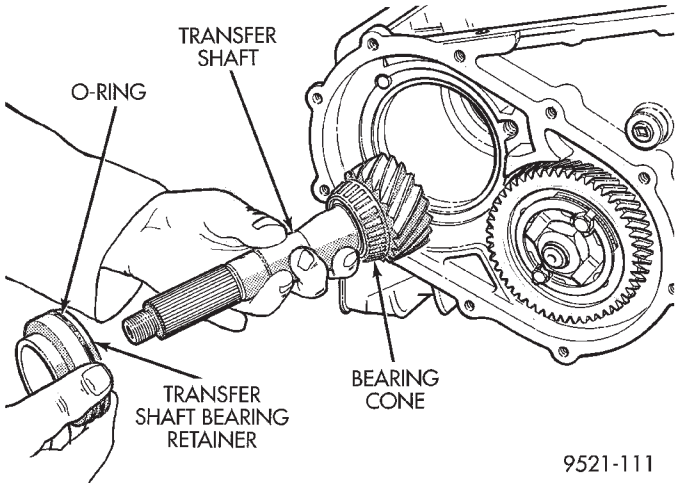

Fig. 142 Transfer Shaft and Bearing Retainer

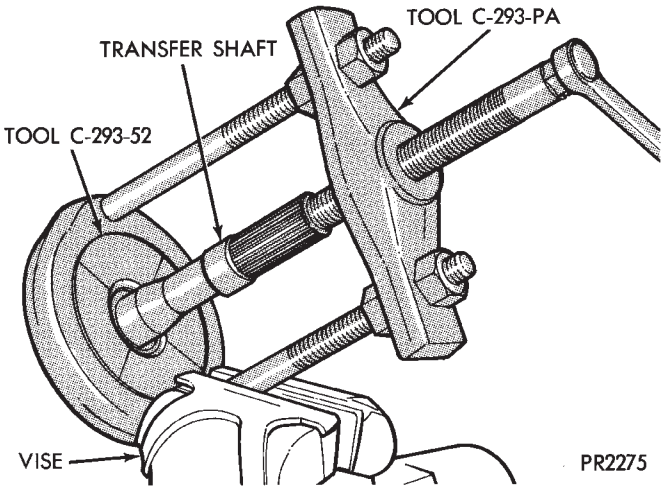

Fig. 143 Remove Transfer Shaft Bearing Cone

DISASSEMBLY AND ASSEMBLY (Continued)

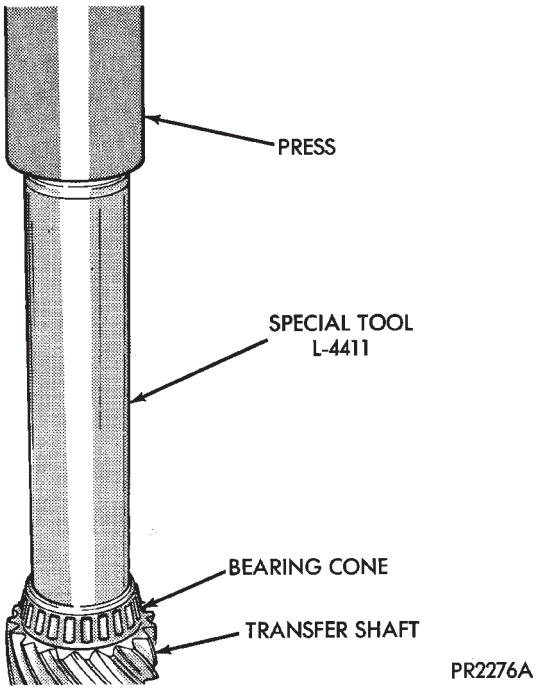

Fig. 144 Install Transfer Shaft Bearing Cone

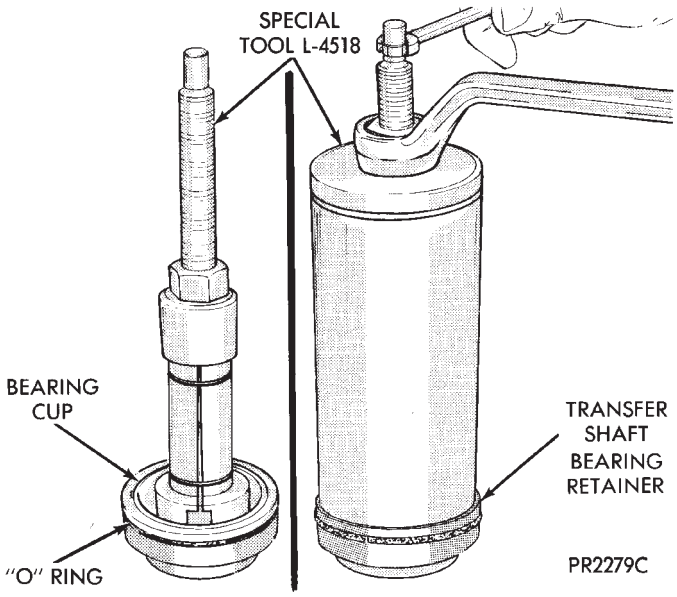

Fig. 145 Remove Transfer Shaft Bearing Cup

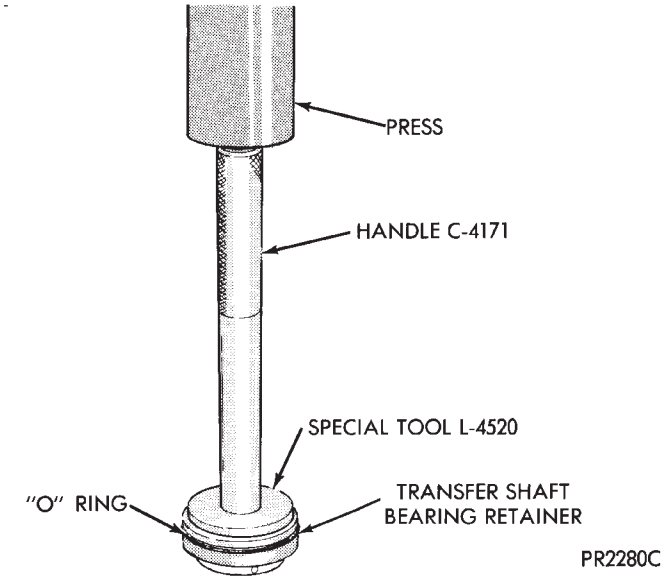

Fig. 146 Install Transfer Shaft Bearing Cup

DETERMINING SHIM THICKNESS

Shim thickness need be determined only if any of the following parts are replaced:

- Transaxle case
- Transfer shaft
- Transfer shaft gear
- Transfer shaft bearings
- Governor support retainer
- Transfer shaft bearing retainer
- Retainer snap ring
- Governor support

Refer to Bearing Adjustment Procedure in rear of this section to determine proper shim thickness.

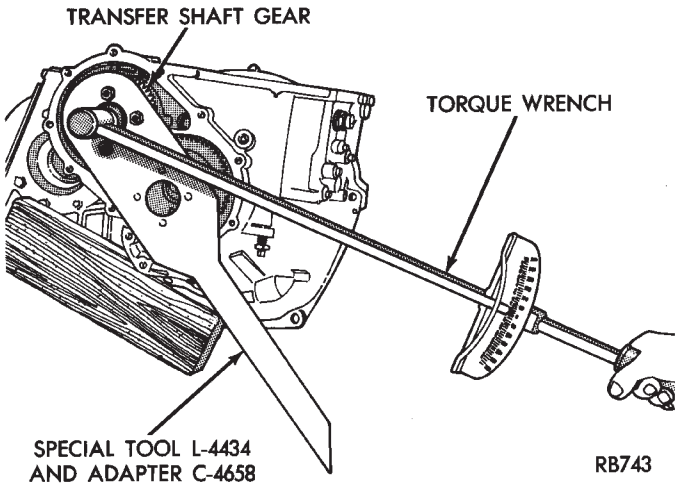

Fig. 147 Tighten Transfer Shaft Gear Retaining Nut to 271 N·m (200 ft. lbs.)

DISASSEMBLY AND ASSEMBLY (Continued)

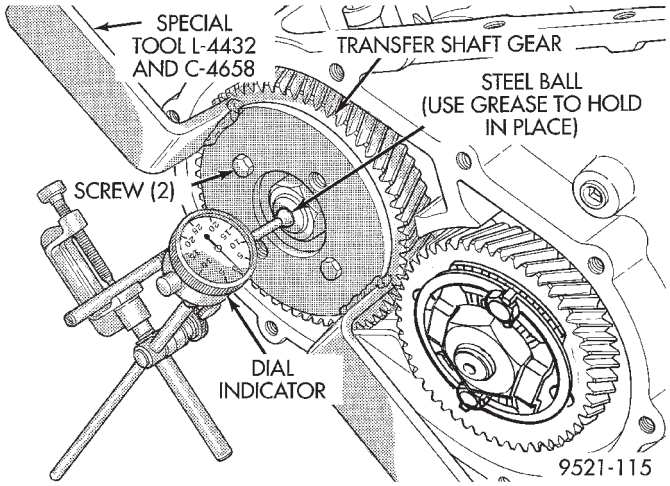

Fig. 148 Checking Transfer Shaft End Play

STIRRUP AND STRAP INSTALLATION

Once bearing shim selection has been adjusted, install stirrup and strap assembly onto transfer gear.

NOTE: Once the stirrup assembly is positioned onto the transfer gear, it is necessary to "clock" the stirrup against the flats of the transfer gear retaining nut.

(1) Position the stirrup on the transfer gear.
(2) Position strap.
(3) Install retaining bolts into transfer gear. Finger–tighten bolts.
(4) Turn stirrup clockwise against the flats of the transfer gear retaining nut.
(5) Tighten retaining bolts to 23 N·m (200 in. lbs.).
(6) Bend tabs of strap up against "flats"of retaining bolts.

ASSEMBLY

To install transfer shaft, reverse the above procedure.

PARKING PAWL

DISASSEMBLY

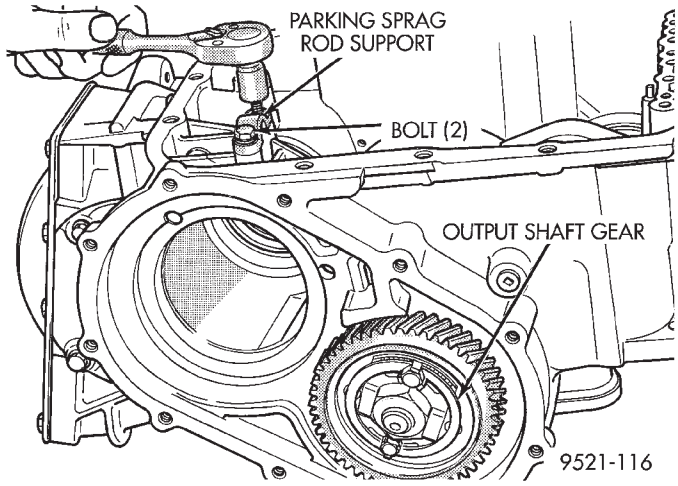

Fig. 149 Parking Sprag Rod Support

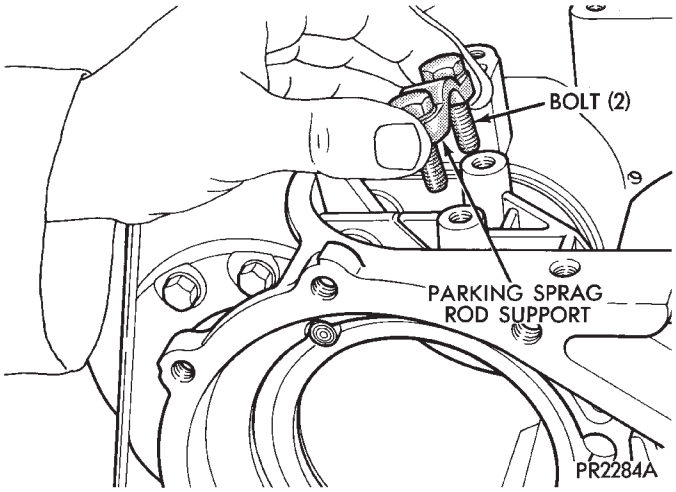

Fig. 150 Support and Bolts

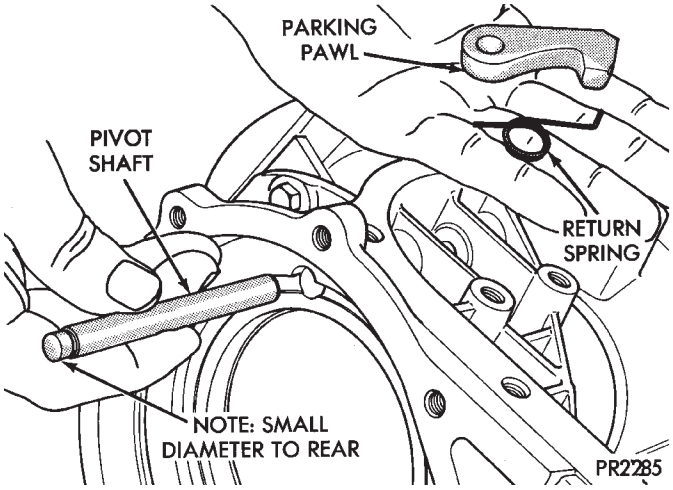

Fig. 151 Parking Pawl, Return Spring, and Pivot Shaft

DISASSEMBLY AND ASSEMBLY (Continued)

ASSEMBLY

To install, reverse the above procedure.

OUTPUT SHAFT REPAIR

NOTE: Transfer shaft should be removed for repair of output shaft. Planetary gear sets must be removed to accurately check output shaft bearing turning torque.

STIRRUP AND RETAINING STRAP

NOTE: A stirrup and retaining strap (Fig. 152) is attached to the output gear. The stirrup prevents the output gear retaining nut from turning and backing off the output shaft. The strap is used to hold the stirrup to the output gear and prevent the stirrup retaining bolts from backing out.

REMOVAL

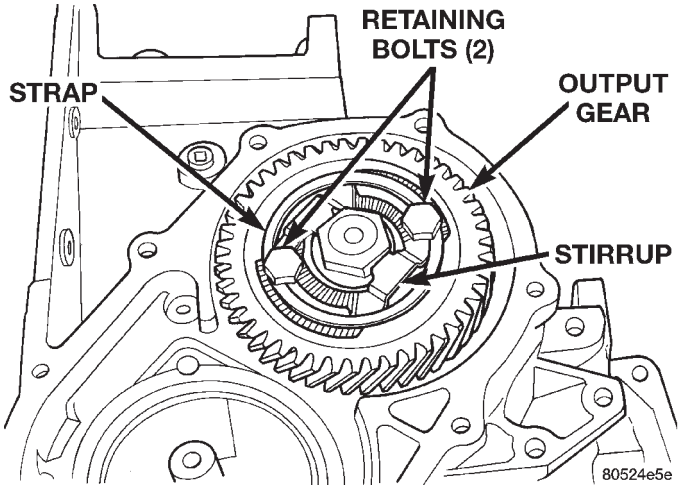

Fig. 152 Stirrup and Retaining Strap Assembly

(1) Using a punch, bend tabs on strap flat against output gear (Fig. 153).

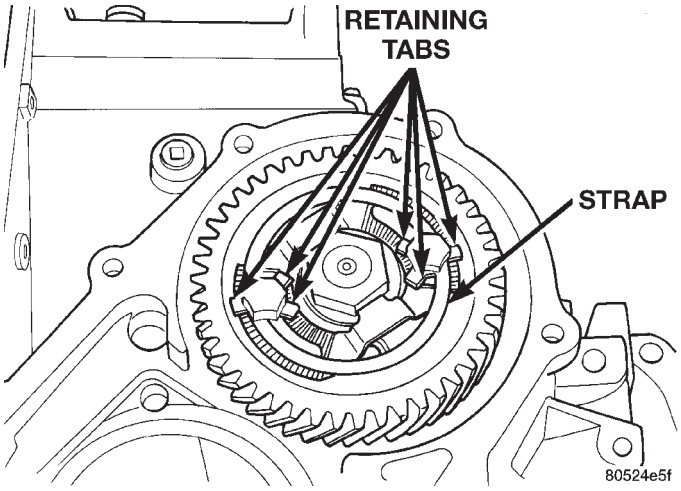

Fig. 153 Bend Strap Tabs Flat

(2) Remove bolts holding retaining strap to stirrup (Fig. 154).

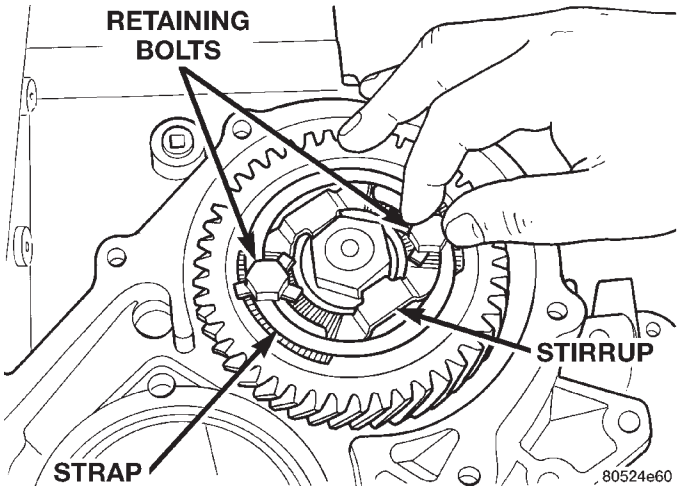

Fig. 154 Remove Strap Bolts

(3) Remove strap from output gear and stirrup (Fig. 155).

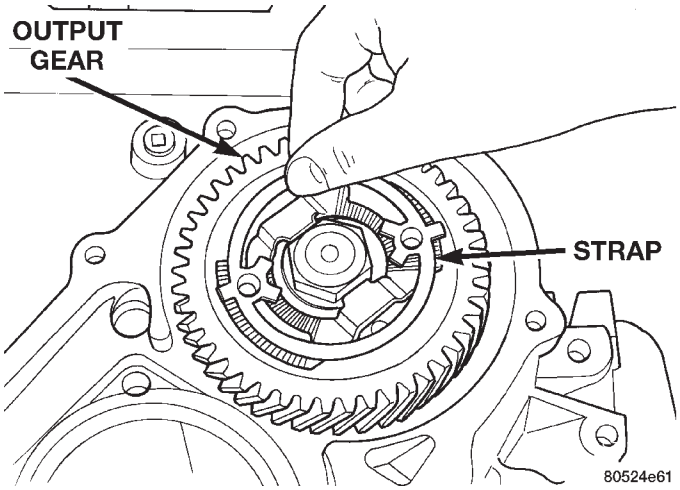

Fig. 155 Remove Strap From Stirrup and Gear

(4) Remove stirrup from output gear (Fig. 156) (Fig. 157).

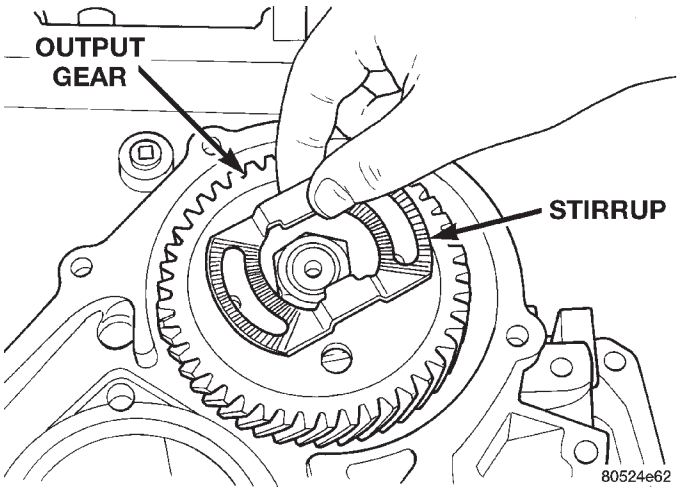

Fig. 156 Remove Stirrup From Gear

DISASSEMBLY AND ASSEMBLY (Continued)

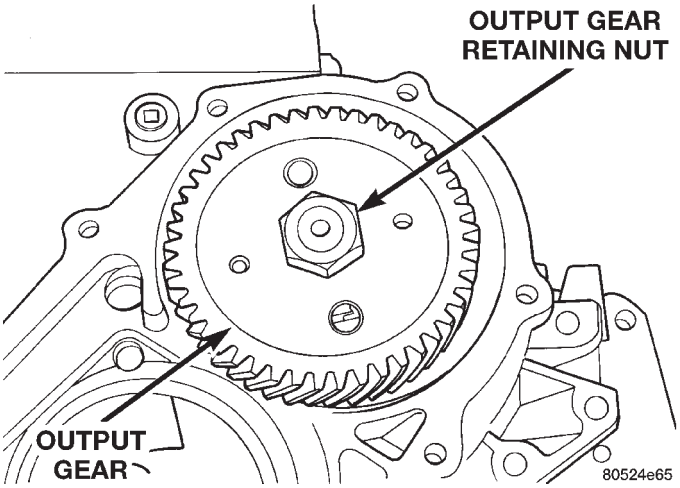

Fig. 157 Stirrup and Strap Removed From Output Gear

OUTPUT GEAR AND SHAFT

DISASSEMBLY

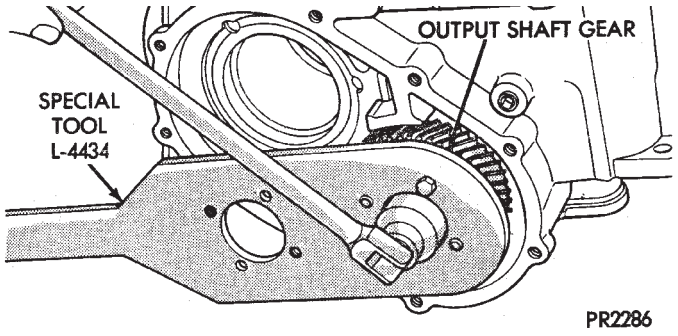

Fig. 158 Remove Output Shaft Retaining Nut and Washer

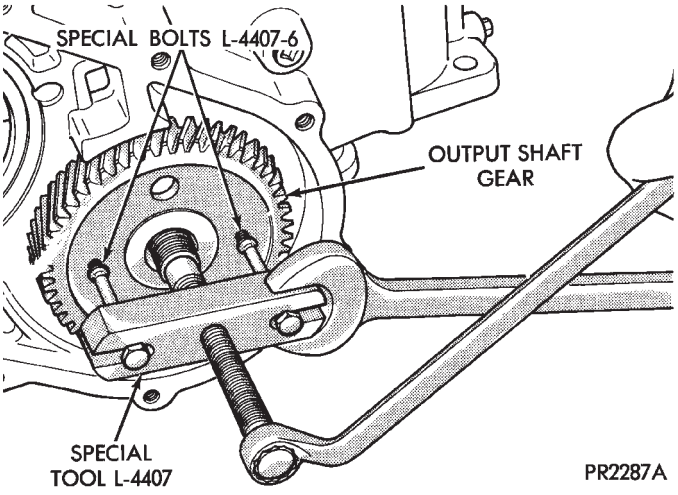

Fig. 159 Remove Output Shaft Gear

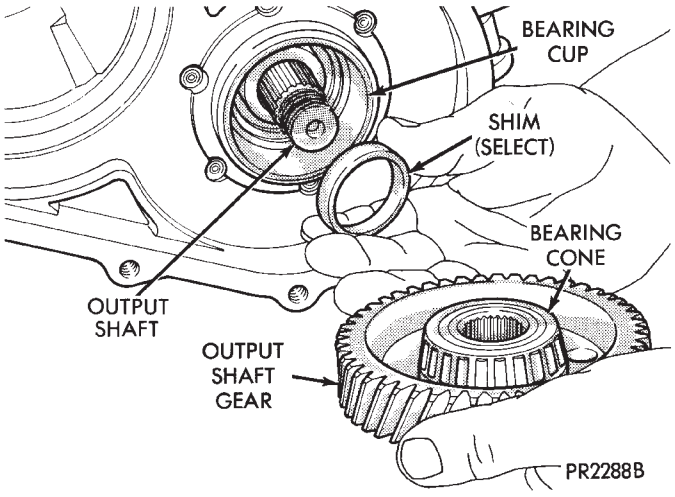

Fig. 160 Output Shaft Gear and (Select) Shim

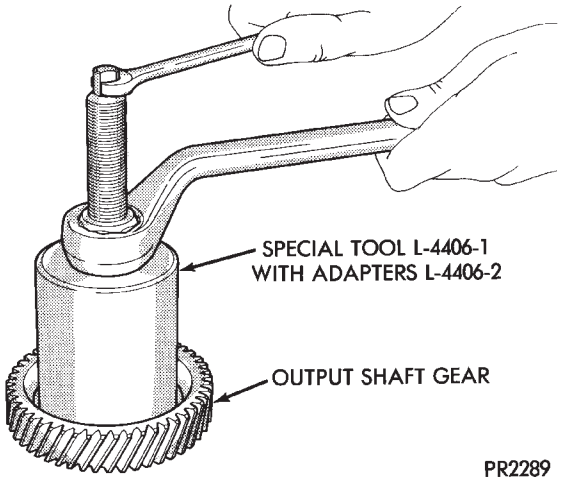

Fig. 161 Remove Output Shaft Gear Bearing Cone

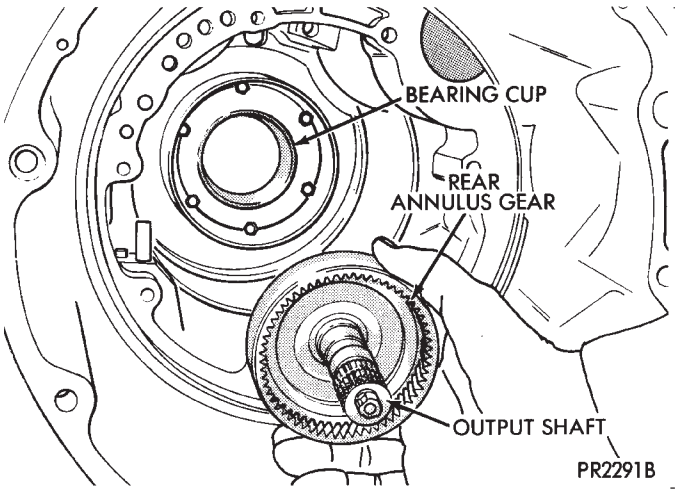

Fig. 162 Remove Output Shaft and Rear Annulus Gear Assembly

DISASSEMBLY AND ASSEMBLY (Continued)

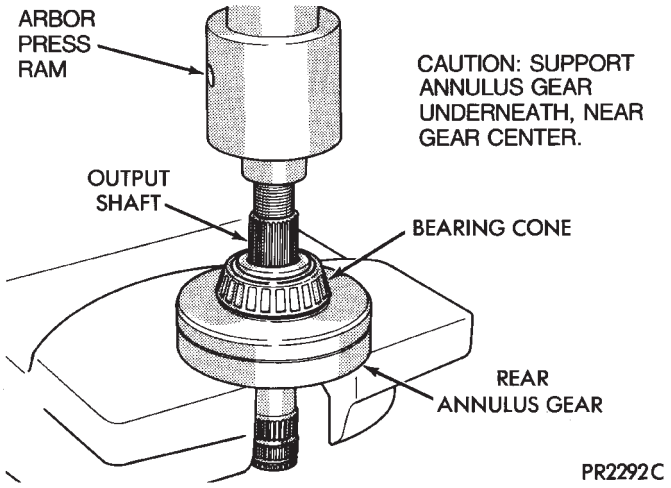

Fig. 163 Remove Output Shaft

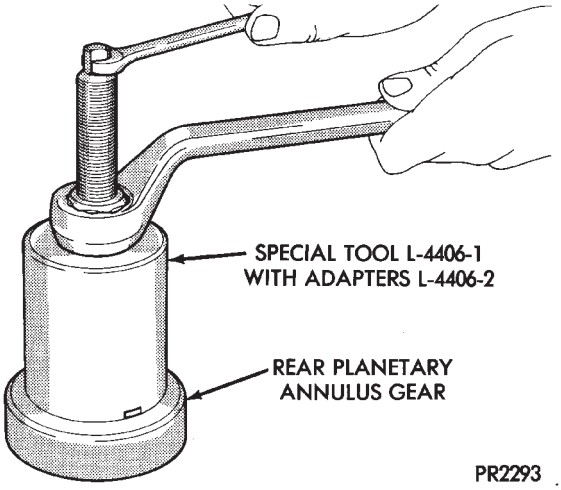

Fig. 164 Remove Rear Planetary Annulus Gear Bearing Cone

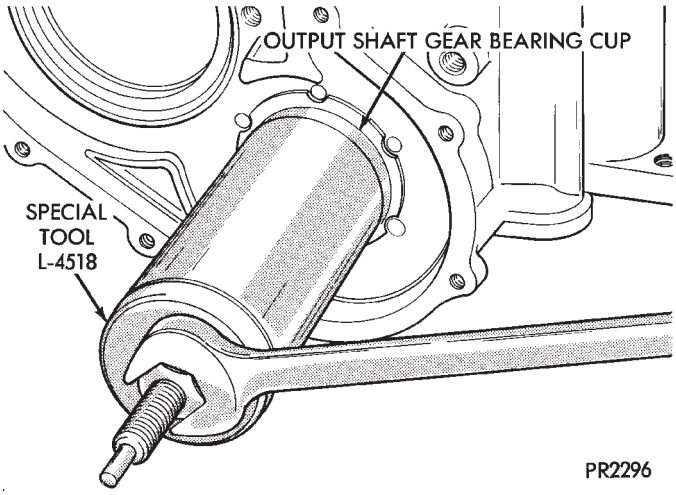

Fig. 165 Remove Output Shaft Gear Bearing Cup

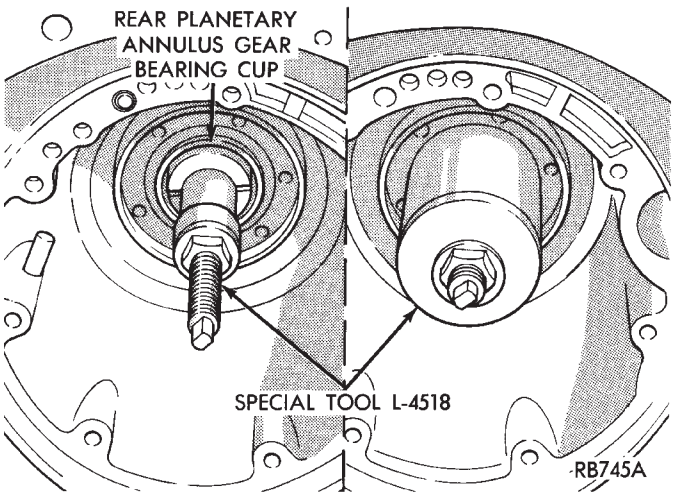

Fig. 166 Remove Rear Planetary Annulus Gear Bearing Cup

ASSEMBLY

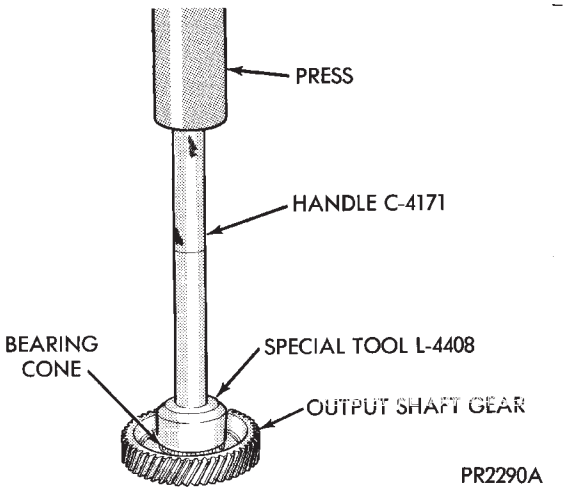

Fig. 167 Install Output Shaft Gear Bearing Cone

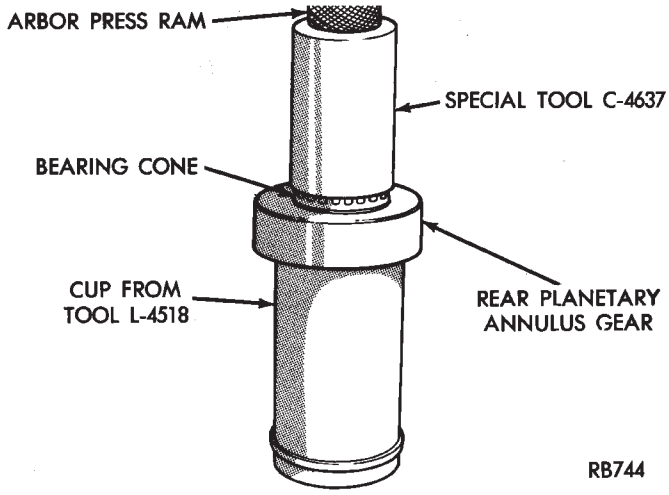

Fig. 168 Install Rear Planetary Annulus Gear Bearing Cone

DISASSEMBLY AND ASSEMBLY (Continued)

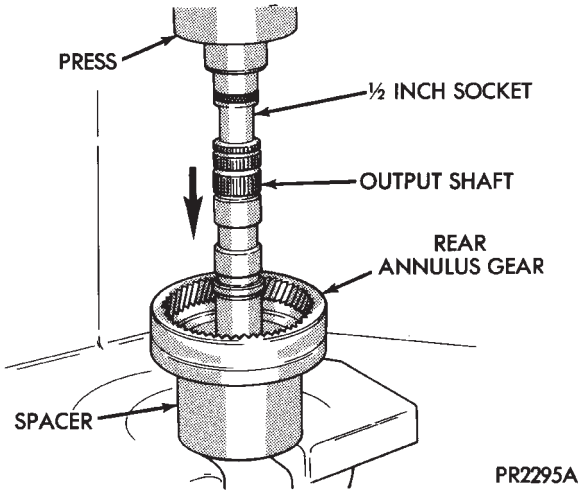

Fig. 169 Install Output Shaft into Rear Planetary Annulus Gear

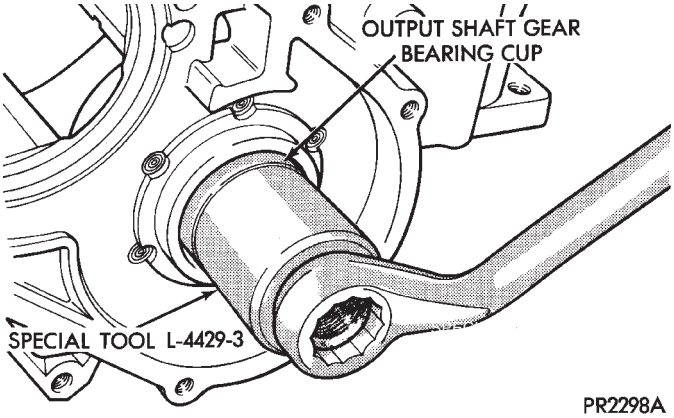

Fig. 170 Install Output Shaft Gear Bearing Cup

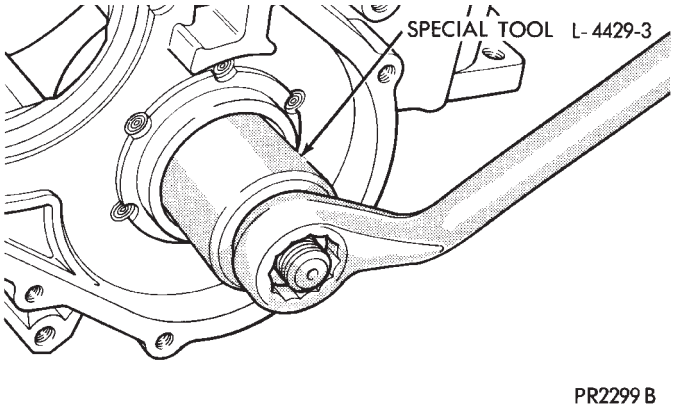

Fig. 171 Install Rear Planetary Annulus Gear Bearing Cup

DETERMINING SHIM THICKNESS

Shim thickness need be determined only if any of the following parts are replaced:

- Transaxle case
- Output shaft
- Rear planetary annulus gear
- Output shaft gear
- Rear annulus and output shaft gear bearing cones
- Overrunning clutch race cups

Refer to Bearing Adjustment Procedure at the rear of this section, to determine proper shim thickness. **Check output shaft bearing turning torque, using an inch-pound torque wrench. If turning torque is 3 to 8 inch-pounds, the proper shim has been installed.**

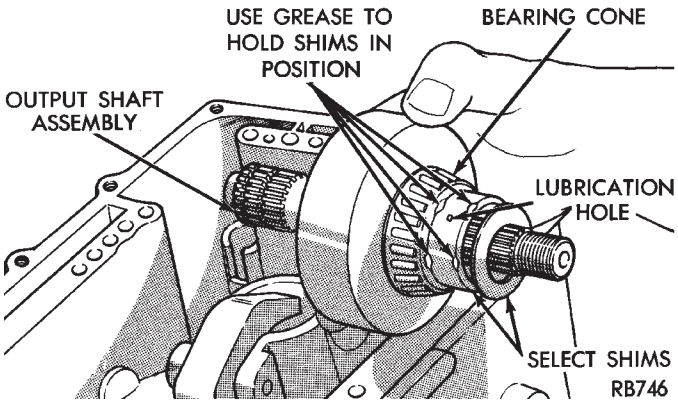

Fig. 172 Install Output Shaft Assembly

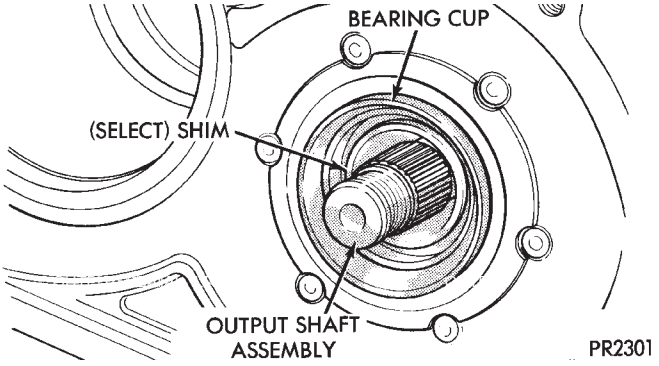

Fig. 173 Output Shaft and (Select) Shims in Position

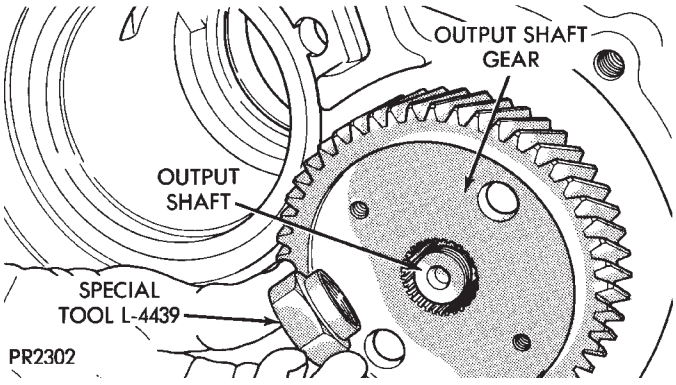

Fig. 174 Start Output Shaft Gear onto Output Shaft

DISASSEMBLY AND ASSEMBLY (Continued)

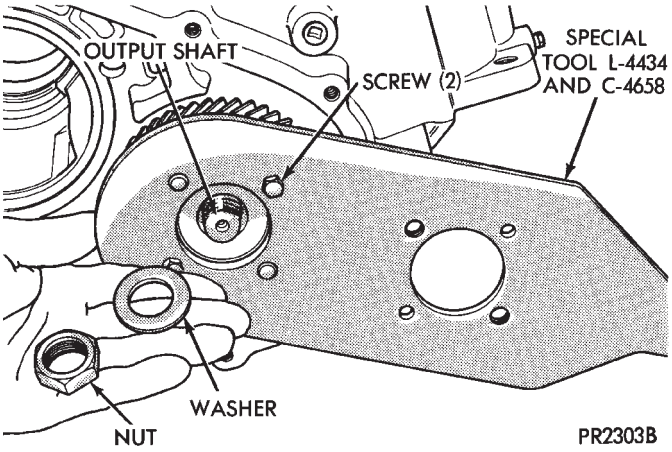

Fig. 175 Holding Output Shaft Gear

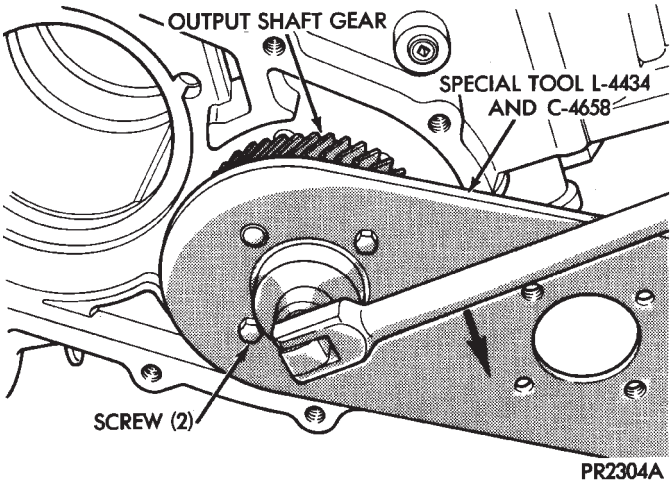

Fig. 176 Tighten Output Shaft Retaining Nut to 271 N·m (200 ft. lbs.)

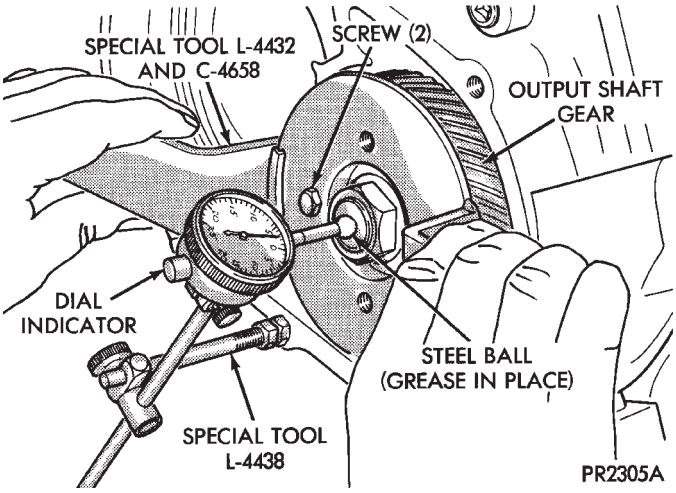

Fig. 177 Checking Output Shaft End Play

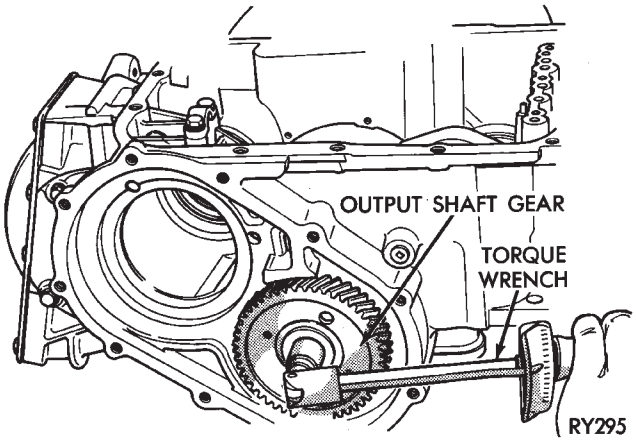

Fig. 178 Checking Bearing Turning Torque

STIRRUP AND RETAINING STRAP

INSTALLATION

Once bearing turning torque and shim selection has been adjusted, install stirrup and strap assembly onto output gear.

NOTE: Once the stirrup assembly is positioned onto the output gear, it is necessary to "clock" the stirrup against the flats of the output gear retaining nut.

(1) Position the stirrup on the output gear.
(2) Position strap.
(3) Install retaining bolts into output gear. Finger–tighten bolts.
(4) Turn stirrup clockwise against the flats of the output gear retaining nut (Fig. 179).

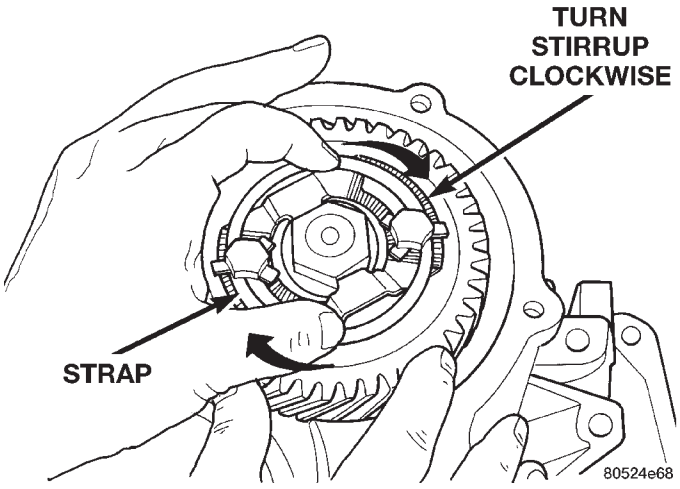

Fig. 179 Turn Stirrup Clockwise Against Flats Of Retaining Nut

DISASSEMBLY AND ASSEMBLY (Continued)

(5) Tighten retaining bolts to 23 N·m (200 in. lbs.) (Fig. 180).

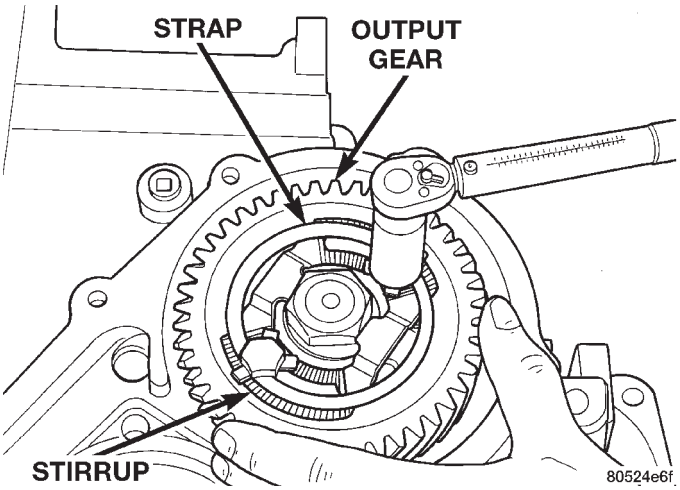

Fig. 180 Tighten Strap Retaining Nuts

(6) Bend tabs of strap up against "flats"of retaining bolts.

DIFFERENTIAL REPAIR

NOTE: The transfer shaft should be removed for differential repair and bearing turning torque checking.

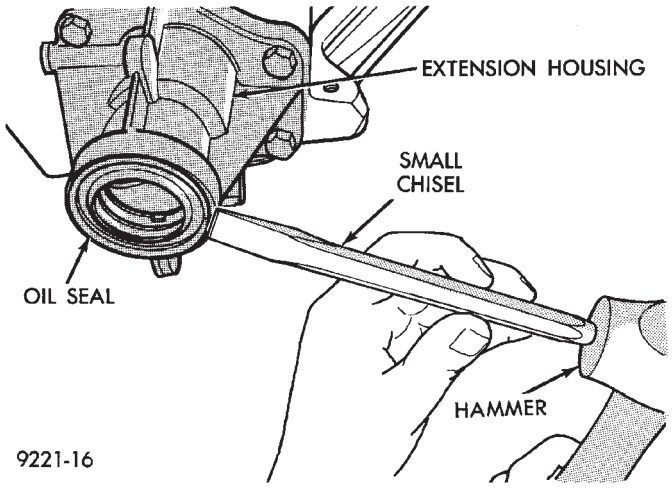

Fig. 181 Remove Extension Seal

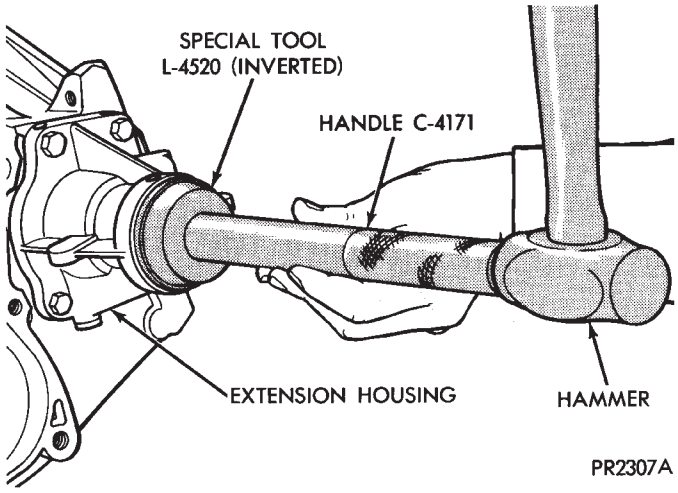

Fig. 182 Install New Seal into Extension

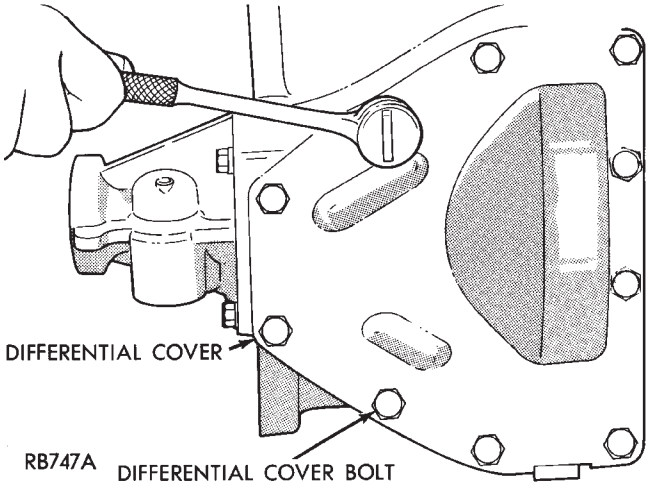

Fig. 183 Differential Cover Bolts

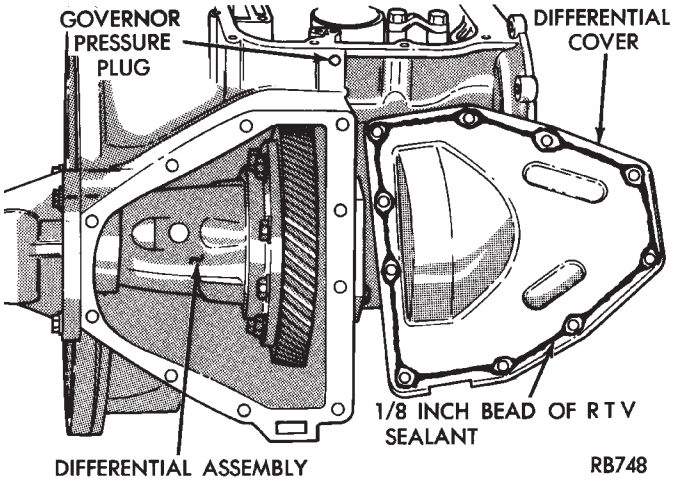

Fig. 184 Remove or Install Differential Cover

DISASSEMBLY AND ASSEMBLY (Continued)

NOTE: Use Mopar® RTV sealant, or equivalent, when installing differential cover.

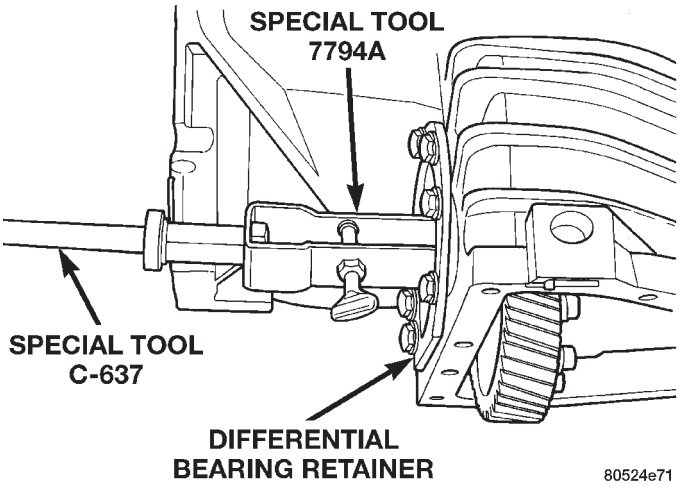

Fig. 185 Remove Bearing Retainer Axle Seal

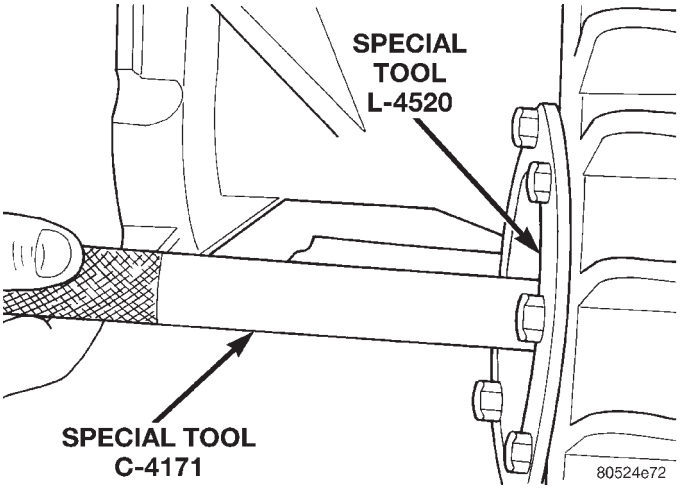

Fig. 186 Install Bearing Retainer Axle Seal

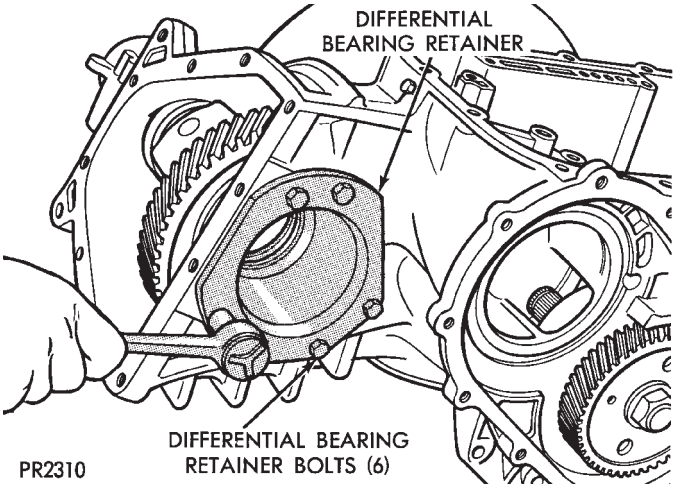

Fig. 187 Differential Bearing Retainer Bolts

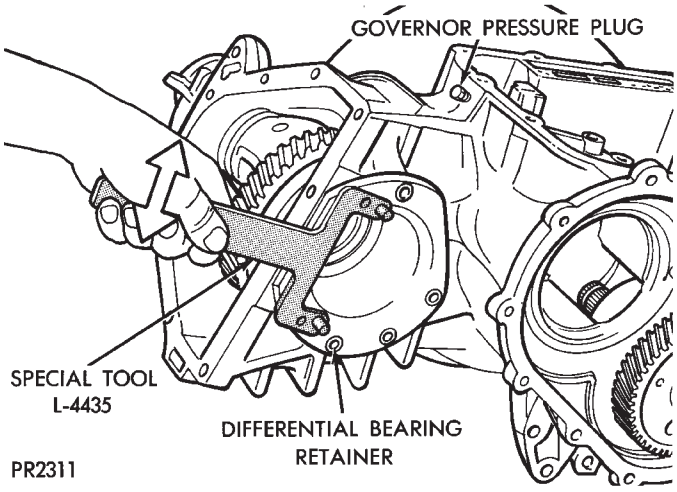

Fig. 188 Remove or Install Bearing Retainer

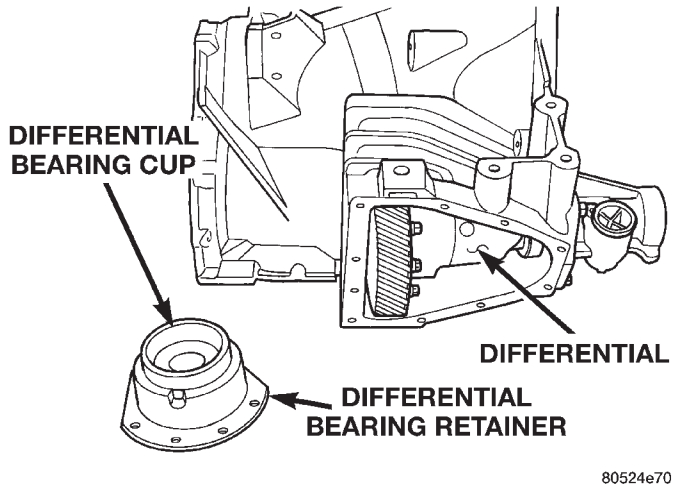

Fig. 189 Differential Bearing Retainer (Typical)

NOTE: Use Mopar® RTV sealant, or equivalent, when installing differential bearing retainer.

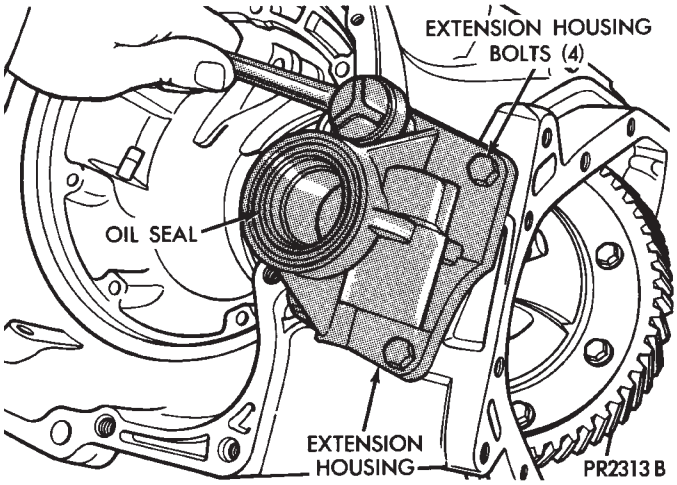

Fig. 190 Extension Bolts

DISASSEMBLY AND ASSEMBLY (Continued)

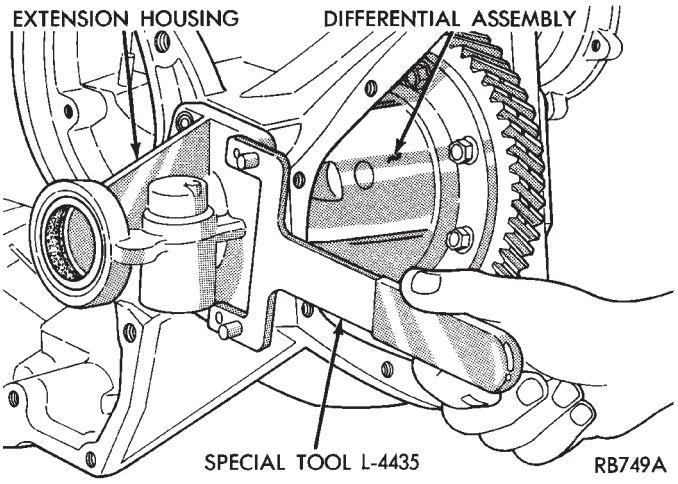

Fig. 191 Remove or Install Extension Housing

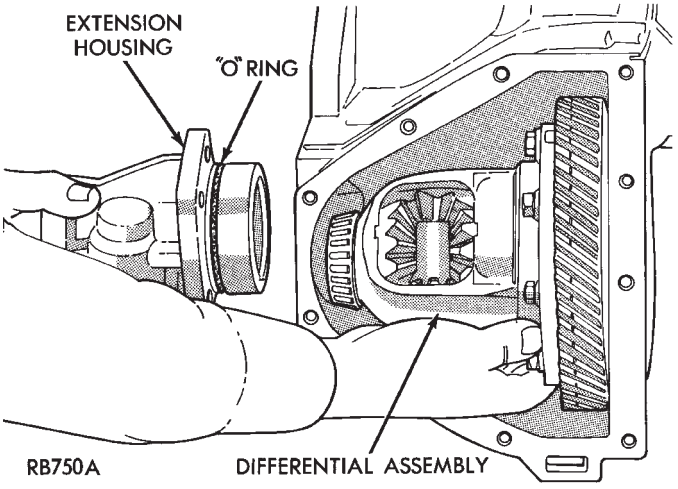

Fig. 192 Differential and Extension

WARNING: HOLD ONTO DIFFERENTIAL ASSEMBLY TO PREVENT IT FROM ROLLING OUT OF HOUSING.

Use Mopar® Silicone Rubber Adhesive Sealant, or equivalent, when installing extension housing.

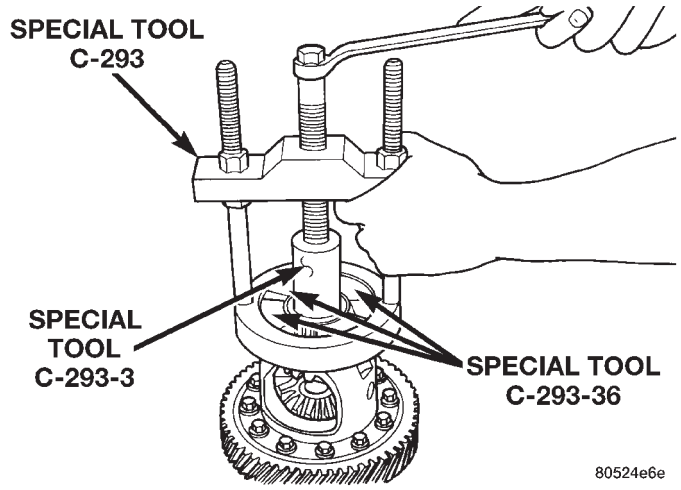

Fig. 193 Remove Differential Bearing Cone (Extension Housing Side)

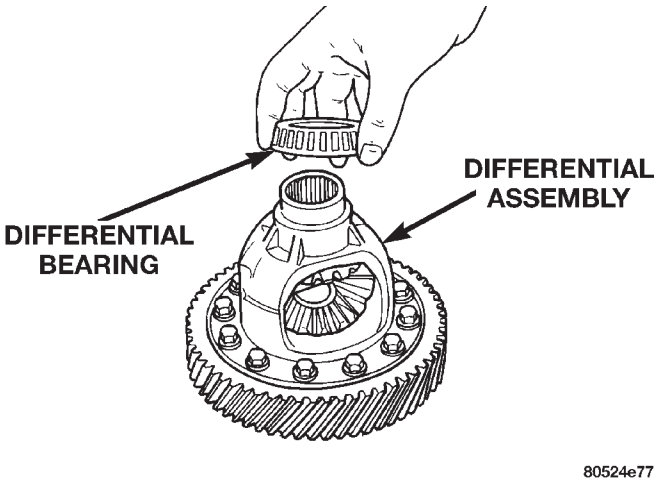

Fig. 194 Position Bearing Cone Onto Differential

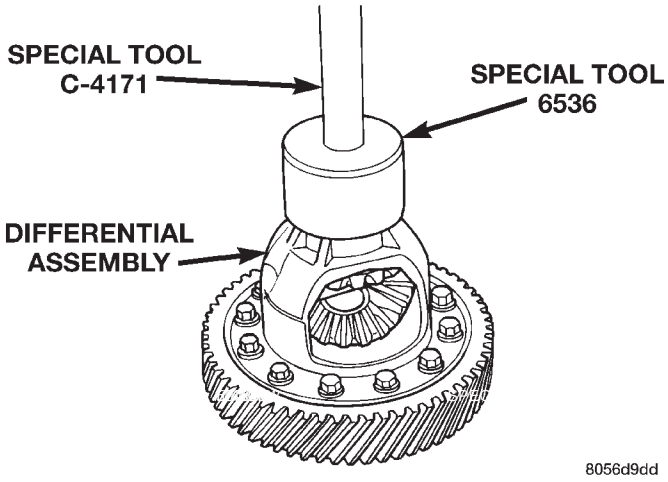

Fig. 195 Install Differential Bearing Cone

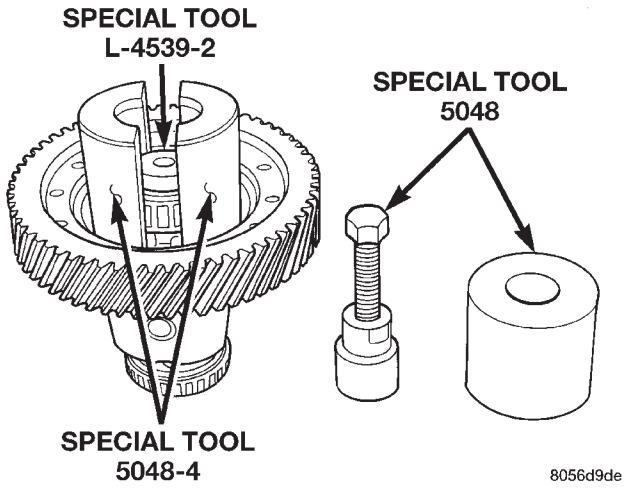

Fig. 196 Position Button and Collets Onto Differential and Bearing (Ring Gear Side)

DISASSEMBLY AND ASSEMBLY (Continued)

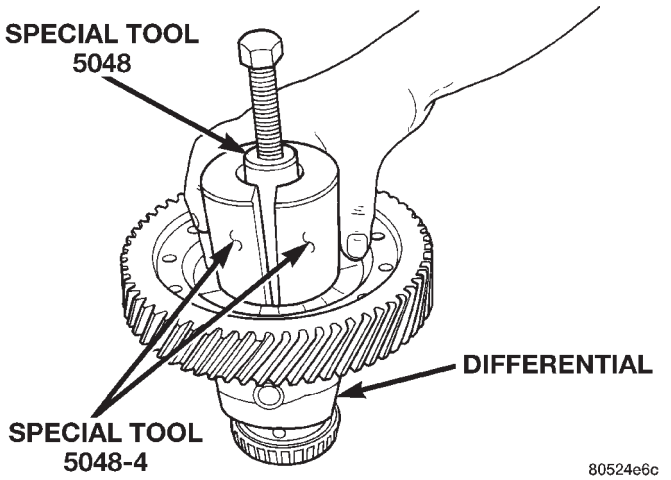

Fig. 197 Position Tool 5048 Over Button and Collets at Differential Bearing

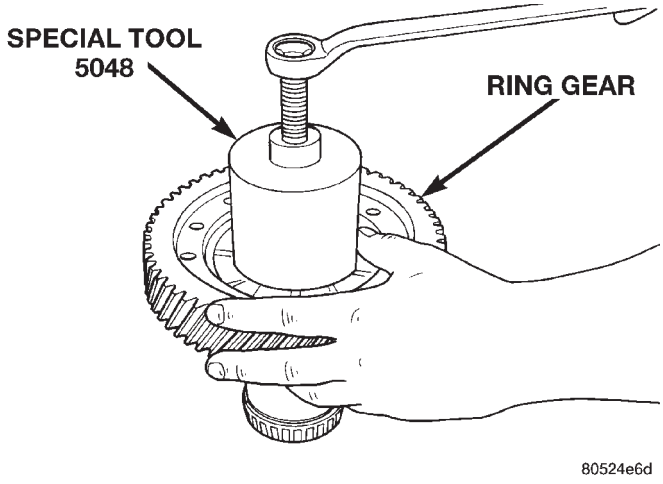

Fig. 198 Remove Differential Bearing Cone

To install the differential bearing cup and cone on the ring gear side, use Special Tool 5052, and Special Tool C-4171.

NOTE: The differential is serviced as an assembly. The only parts that are serviceable within the differential are the differential bearing cups and cones. If any other part fails within the differential, you must replace the differential assembly along with the transfer shaft.

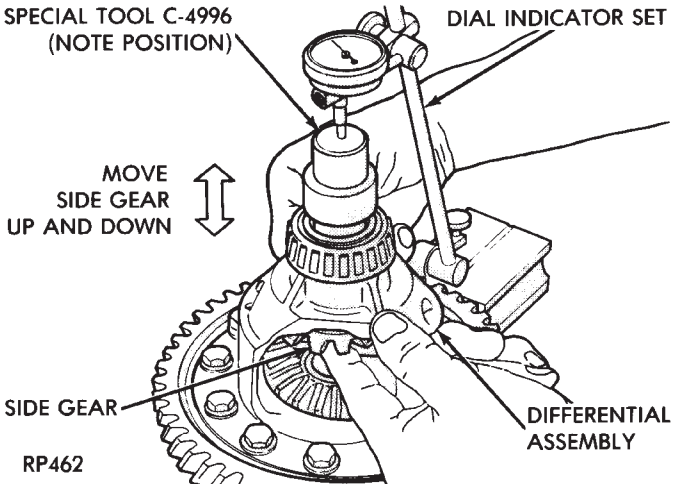

Fig. 199 Checking Side Gear End Play

CAUTION: Side gear end play must be BETWEEN 0.001 to 0.013 inch.

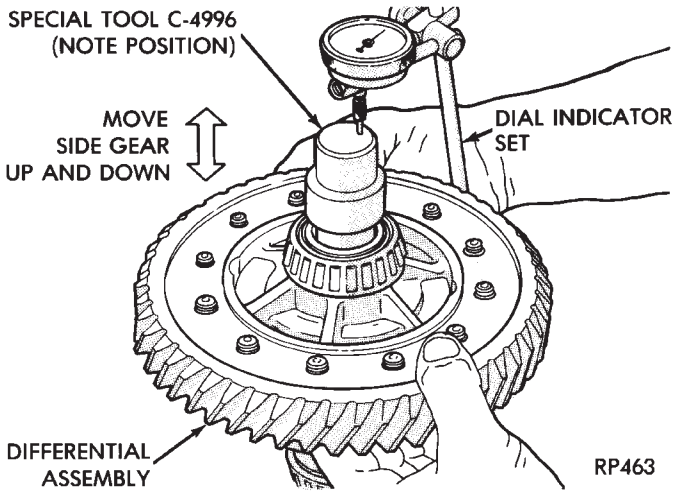

Fig. 200 Checking Side Gear End Play (Typical)

DISASSEMBLY AND ASSEMBLY (Continued)

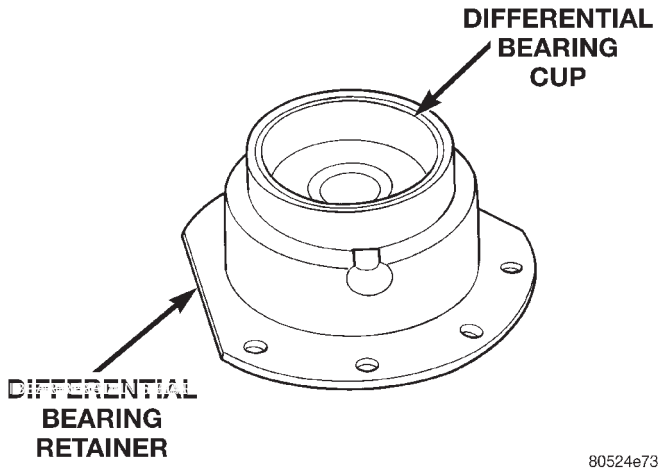

Fig. 201 Differential Bearing Retainer

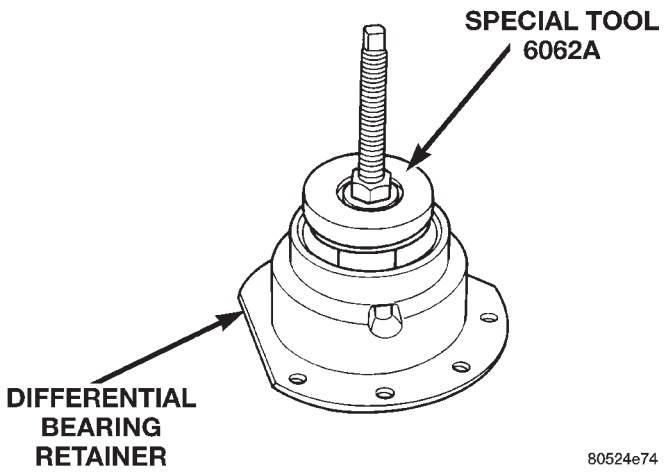

Fig. 202 Position Bearing Cup Remover Tool in Retainer

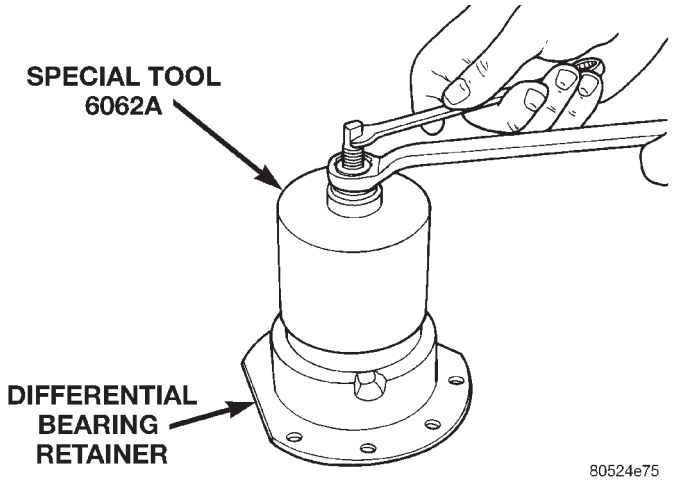

Fig. 203 Remove Bearing Cup

To remove the differential bearing cup from the extension housing/adapter side, use Special Tool 6062A, Remover. To install the differential bearing cup on the extension housing/adapter side, use Special Tool 6536, Driver and Special Tool C-4171, Handle.

DETERMINING SHIM THICKNESS

Shim thickness need be determined only if any of the following parts are replaced:

- Transaxle case
- Differential carrier
- Differential bearing retainer
- Extension housing
- Differential bearing cups and cones

Refer to Bearing Adjustment Procedure in rear of this section to determine proper shim thickness.

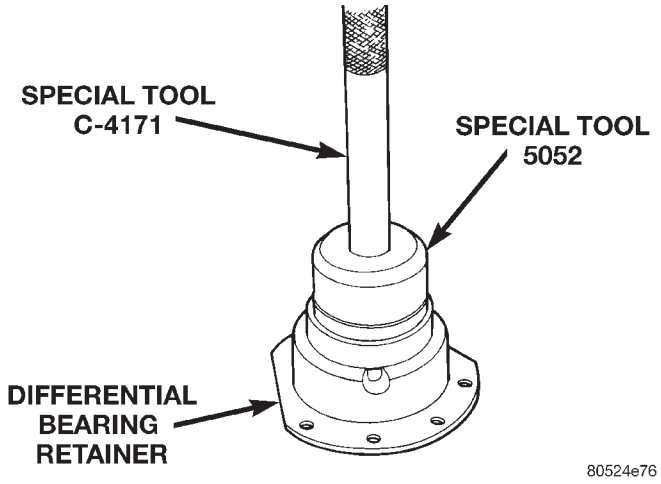

Fig. 204 Install Bearing Cup

CLEANING AND INSPECTION

VALVE BODY

Allow all parts to soak a few minutes in a suitable clean solvent. Wash thoroughly and blow dry with compressed air. Be sure all passages are clean and free from obstructions.

Inspect manual and throttle valve operating levers and shafts for being bent, worn or loose. If a lever is loose on its shaft, it should be replaced. Do not attempt to straighten bent levers.

Inspect all mating surfaces for burrs, nicks and scratches. Minor blemishes may be removed with crocus cloth, using only a very light pressure. Using a straightedge, inspect all mating surfaces for warpage or distortion. Slight distortion may be corrected, using a surface plate. Be sure all metering holes in steel plate are open. Using a penlight, inspect bores in valve body for scores, scratches, pits, and irregularities.

Inspect all valve springs for distortion and collapsed coils. Inspect all valves and plugs for burrs, nicks, and scores. Small nicks and scores may be removed with crocus cloth, providing extreme care is taken not to round off sharp edges. The sharpness of

CLEANING AND INSPECTION (Continued)

these edges is vitally important. It prevents foreign matter from lodging between valve and valve body. This reduces the possibility of sticking. Inspect all valves and plugs for freedom of operation in valve body bores.

When bores, valves, and plugs are clean and dry, the valves and plugs should fall freely in the bores. The valve body bores do not change their dimensions with use. Therefore, a valve body that was functioning properly when vehicle was new, will operate correctly if it is properly and thoroughly cleaned. There is no need to replace a valve body unless it is damaged in handling.

ADJUSTMENTS

GEARSHIFT CABLE

Normal operation of the Park/Neutral Position Switch provides a quick check to confirm proper linkage adjustment.

Move the selector level slowly forward until it clicks into the PARK (P) position. The starter should operate.

After checking the (P) position, move selector slowly toward the NEUTRAL (N) position until lever drops in the (N) position. If the starter will operate also at this point, the gearshift linkage is properly adjusted. If the starter fails to operate in either position, linkage adjustment is required.

ADJUSTMENT

(1) Set parking brake.

(2) Remove floor console. Refer to Group 23, Body.

(3) Place gearshift lever in the (PARK) (P) position.

(4) Push down on the tab and unsnap the collar at the shifter cable to allow the cable to be adjusted (Fig. 205).

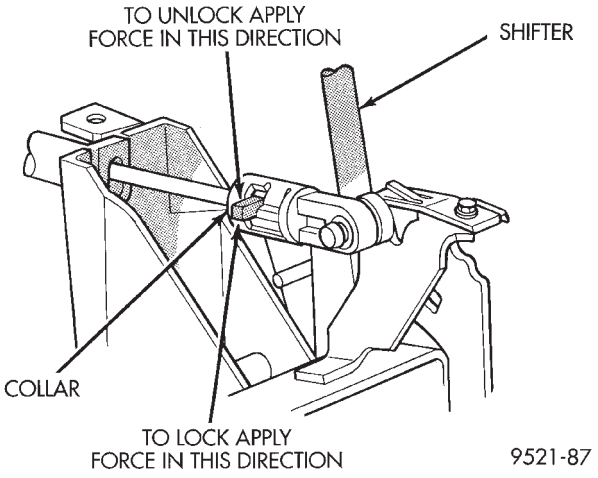

Fig. 205 Gearshift Cable Adjustment

(5) Move the gearshift lever on the transaxle to the PARKposition.

(6) Verify the shift lever and transaxle are in the PARK position. Rotate collar on the shift cable adjuster end up until it seats against the plastic housing. NOTE: If the collar will not rotate to the fully detented lock position, rotate the collar back to its initial unlocked position. Position the ATX in the gated PARK position. Apply a slight load to the shift lever, fore or aft in vehicle, while simultaneously rotating the collar upward to the LOCK position. The collar must seat against the plastic housing to achieve the required detented lock position. The gearshift linkage should now be properly adjusted.

Check adjustment as follows:

(7) Detent position for NEUTRAL and DRIVE should be within limits of hand lever gate stops.

(8) Key start must occur only when the shift lever is in PARK or NEUTRAL positions.

THROTTLE PRESSURE CABLE ADJUSTMENT PROCEDURE

The throttle pressure cable adjustment is very important to proper transaxle operation. This adjustment positions a valve which controls shift speed, shift quality, and part throttle downshift sensitivity. If the setting is too long, early shifts and slippage between shifts may occur. If the setting is too short, shifts may be delayed and part throttle downshifts may be very sensitive.

(1) Perform transaxle throttle pressure cable adjustment while engine is at normal operating temperature.

(2) Release cross-lock on the cable assembly (pull cross-lock upward) see (Fig. 206).

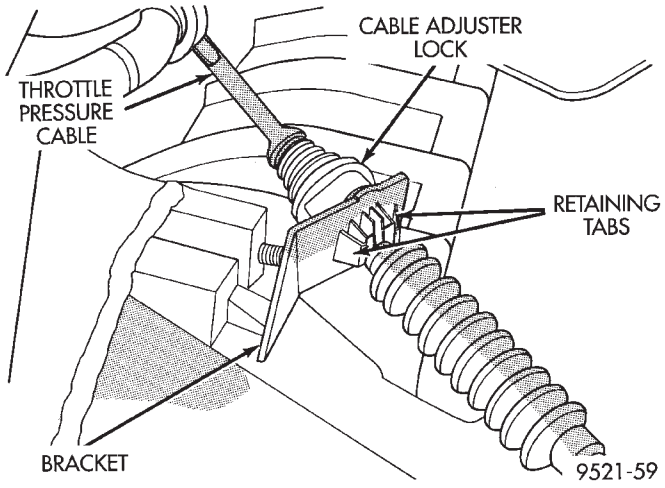

Fig. 206 Throttle Pressure Cable Adjuster Lock

(3) To ensure proper adjustment, the cable must be free to slide all the way toward the engine, against its stop, after the cross-lock is released.

ADJUSTMENTS (Continued)

(4) Move transaxle throttle control lever fully clockwise, against its internal stop, and press cross-lock downward into locked position.

The adjustment is complete and transaxle throttle cable backlash was automatically removed.

Test cable freedom of operation by moving the transaxle throttle lever forward (counterclockwise). Then slowly release it to confirm it will return fully rearward (clockwise).

No lubrication is required for any component of the throttle cable system.

SHIFTER/IGNITION INTERLOCK SYSTEM

If ignition switch cannot be turned to the LOCK position, with shifter in PARK, an adjustment of the Interlock System may be required. To adjust Shifter/ Ignition Interlock System, follow procedure listed below.

(1) Disconnect and isolate, the battery negative (-) cable from the vehicle battery.

(2) Remove console assembly. Refer to Group 23, Body.

(3) Remove the gearshift knob set screw and knob (Fig. 207).

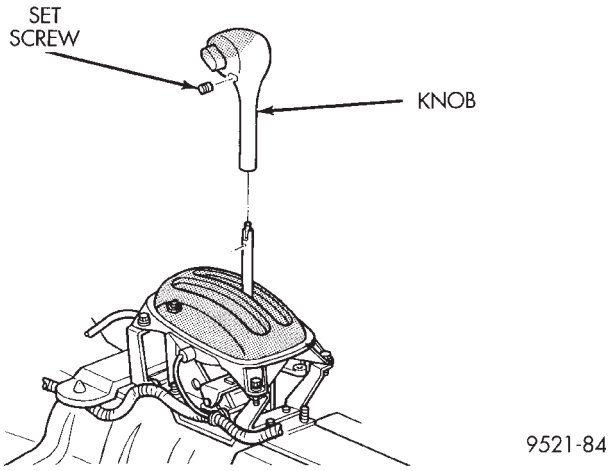

Fig. 207 Gearshift Handle

(4) Remove the screws retaining the gearshift indicator bezel and remove bezel and indicator lamp (Fig. 208).

(5) Reinstall the gearshift knob.

(6) Place shifter in PARK.

(7) Turn ignition switch to the LOCK or ACCESSORY position. If cable has lost its adjustment, manually position cable to get key into LOCK or ACCESSORY position. Grasp slug on interlock cable with needle–nose pliers and pull back on cable. This will allow the ignition switch to be turned to the LOCK or ACCESSORY position.

(8) Check that the interlock cable slug is completely seated into the shifter interlock lever.

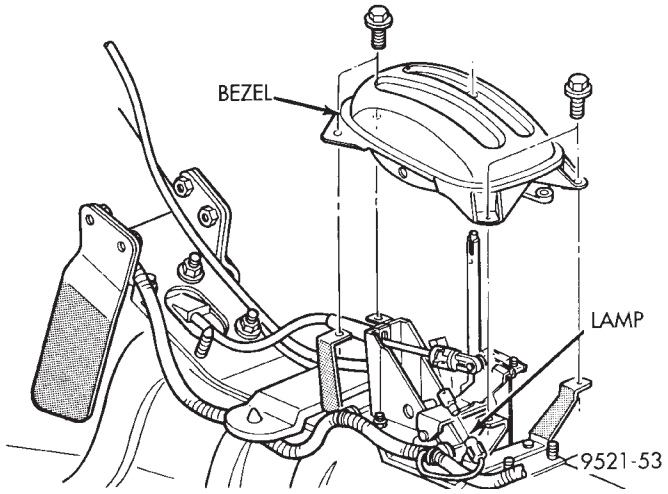

Fig. 208 Shift Indicator Bezel

(9) Check that the ignition switch is still in the LOCK or ACCESSORY position.

(10) Pry up the adjuster lock on the shifter/ignition interlock cable (Fig. 209).

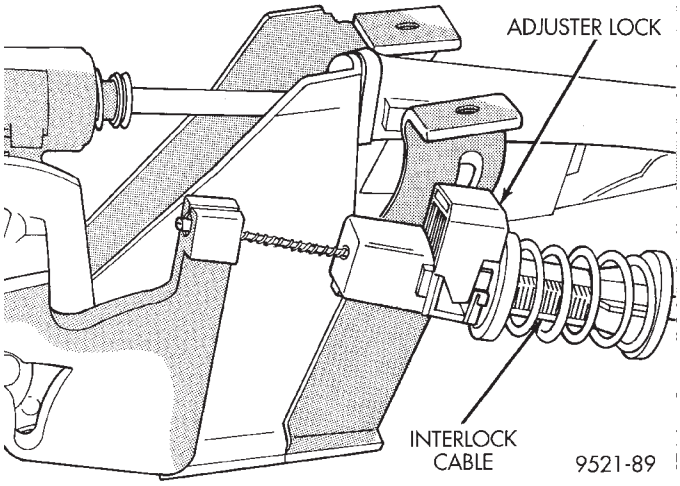

Fig. 209 Interlock Cable Adjuster Lock

(11) The spring on the interlock cable should automatically compensate for the slack in the adjuster.

(12) Then snap down the interlock adjuster lock onto cable.

(13) After adjusting the interlock system, perform the interlock system operation check. See Interlock System Operation Check in this section.

ADJUSTMENTS (Continued)

BAND ADJUSTMENT

KICKDOWN BAND (FRONT)

The kickdown band adjusting screw is located on left side (top front) of the transaxle case.

(1) Loosen locknut and back–off nut approximately five turns. Test adjusting screw for free turning in the transaxle case.

(2) Using wrench, tighten adjusting screw to 8 N·m (72 in. lbs.).

(3) Back–off adjusting screw the number of turns listed in Specifications. Hold adjusting screw in this position and tighten locknut to 47 N·m (35ft. lbs.)

LOW/REVERSE BAND (REAR)

To adjust low/reverse band, proceed as follows:

(1) Loosen and back off locknut approximately five turns.

(2) Using an inch-pound torque wrench, tighten adjusting screw to 5 N·m (41 in. lbs.) true torque.

(3) Back–off adjusting screw the number of turns listed under Specifications. A chart is located at the rear of this section.

(4) Tighten locknut to 14 N·m (10 ft. lbs.).

HYDRAULIC CONTROL PRESSURE ADJUSTMENTS

LINE PRESSURE

An incorrect throttle pressure setting will cause incorrect line pressure readings even though line pressure adjustment is correct. Always inspect and correct throttle pressure adjustment before adjusting the line pressure.

The approximate adjustment for line pressure is 1-5/16 inches, measured from valve body to inner edge of adjusting nut. However, due to manufacturing tolerances, the adjustment can be varied to obtain specified line pressure.

The adjusting screw may be turned with an Allen wrench. One complete turn of adjusting screw changes closed throttle line pressure approximately 1-2/3 psi. Turning adjusting screw counterclockwise increases pressure, and clockwise decreases pressure.

THROTTLE PRESSURE

Throttle pressures cannot be tested accurately; therefore, the adjustment should be measured if a malfunction is evident.

(1) Insert gauge pin of Tool C-3763 between the throttle lever cam and kickdown valve.

(2) By pushing in on tool, compress kickdown valve against its spring so throttle valve is completely bottomed inside the valve body.

(3) While compressing spring, turn throttle lever stop screw with adapter C-4553. Turn until head of screw touches throttle lever tang, with throttle lever cam touching tool and throttle valve bottomed. Be sure adjustment is made with spring fully compressed and valve bottomed in the valve body.

BEARING ADJUSTMENT PROCEDURES

(1) Take extreme care when removing and installing 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.

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

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

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

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

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

(5) Refer to the conversion chart in specifications to convert inches to millimeter measurements. Refer to bearing shim chart for proper shim thicknesses.

OUTPUT SHAFT BEARING

With output shaft gear removed, install a 13.65 mm (0.537 inch) and a 1.34 mm (0.053 inch) gauging shim on the planetary rear annulus gear hub using grease to hold the shim in place. The 13.65 mm shim has a larger inside diameter and must be installed over the output shaft first. The 1.34 mm shim pilots on the output shaft.

Install output shaft gear and bearing assembly, torque to 271 N·m (200 ft. lbs.).

To measure bearing end play:

(1) Attach Tool L-4432 to the output shaft gear.

(2) Mount a steel ball with grease into the end of the output shaft.

(3) Push and pull the gear while rotating back and forth to insure seating of the bearing rollers.

(4) Using a dial indicator mounted to the transaxle case, measure output shaft end play.

(5) Once bearing end play has been determined, refer to the output shaft bearing shim chart.

(6) The 12.65 mm (0.498 inch), 13.15 mm (0.518 inch) or 13.65 mm (0.537 inch) shims are always installed first. **These shims have lubrication slots that are necessary for proper bearing lubrication.**

ADJUSTMENTS (Continued)

(7) Shims thinner than 12.65 mm listed in the chart are common to both the transfer shaft and output shaft bearings.

(8) Use tool L-4434 to remove the retaining nut and washer. To remove the output shaft gear use tool L-4407.

(9) Remove the two gauging shims and install the proper shim combination, making sure to install the 12.65, 13.15, or 13.65 mm shim first. Use grease to hold the shims in place. Install the output shaft gear and bearing assembly.

(10) Install the retaining nut and washer, and torque to 271 N·m (200 ft. lbs.).

(11) Using an inch-pound torque wrench, check the turning torque. **The torque should be between 3 and 8 inch-pounds.**

(12) If the turning torque is too high, install a 0.05mm (0.002 inch) thicker shim. If the turning torque is too low, install a 0.05 mm (0.002 inch) thinner shim. Repeat until the proper turning torque is 3 to 8 inch pounds.

End Play (with 13.65 mm and 1.34 mm gauging shims installed)		Required Shim Combination	Total Thickness	
mm	inch	mm	mm	inch
.0	.0	13.65 + 1.34	14.99	.590
.05	.002	13.65 + 1.24	14.89	.586
.10	.004	13.65 + 1.19	14.84	.584
.15	.006	13.65 + 1.14	14.79	.582
.20	.008	13.65 + 1.09	14.74	.580
.25	.010	13.65 + 1.04	14.69	.578
.30	.012	13.65 + .99	14.64	.576
.35	.014	13.65 + .94	14.59	.574
.40	.016	13.15 + 1.39	14.54	.572
.45	.018	13.15 + 1.34	14.49	.570
.50	.020	13.15 + 1.29	14.44	.568
.55	.022	13.15 + 1.24	14.39	.566
.60	.024	13.15 + 1.19	14.34	.564
.65	.026	13.15 + 1.14	14.29	.562
.70	.028	13.15 + 1.09	14.24	.560
.75	.030	13.15 + 1.04	14.19	.558
.80	.032	13.15 + .99	14.14	.556
.85	.034	13.15 + .94	14.09	.554
.90	.036	12.65 + 1.39	14.04	.552
.95	.038	12.65 + 1.34	13.99	.550
1.00	.040	12.65 + 1.29	13.94	.548
1.05	.042	12.65 + 1.24	13.89	.547
1.10	.044	12.65 + 1.19	13.84	.545
1.15	.046	12.65 + 1.14	13.79	.543
1.20	.048	12.65 + 1.09	13.74	.541
1.25	.049	12.65 + 1.04	13.69	.539
1.30	.051	12.65 + .99	13.64	.537
1.35	.053	12.65 + .94	13.59	.535

Average Conversion .05 mm = .002 inch 9121-17

OUTPUT SHAFT BEARING SHIM CHART

DIFFERENTIAL BEARING

(1) Position the transaxle assembly vertically on the support stand, differential bearing retainer side up.

(2) Install Tool L-4436A into the differential and onto the pinion mate shaft.

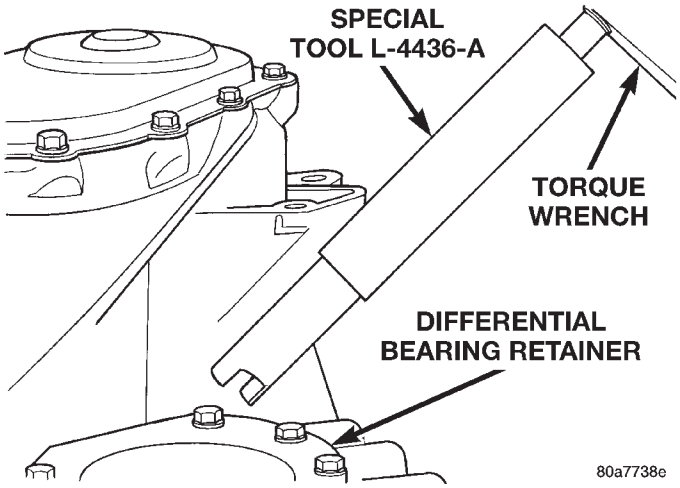

Fig. 210 Tool L-4436 and Torque Wrench

(3) Rotate the differential at least one full revolution to ensure the tapered roller bearings are fully seated.

(4) Using Tool L-4436A and an inch-pound torque wrench, check the turning torque of the differential. **The turning torque should be between 5 and 18 inch-pounds.**

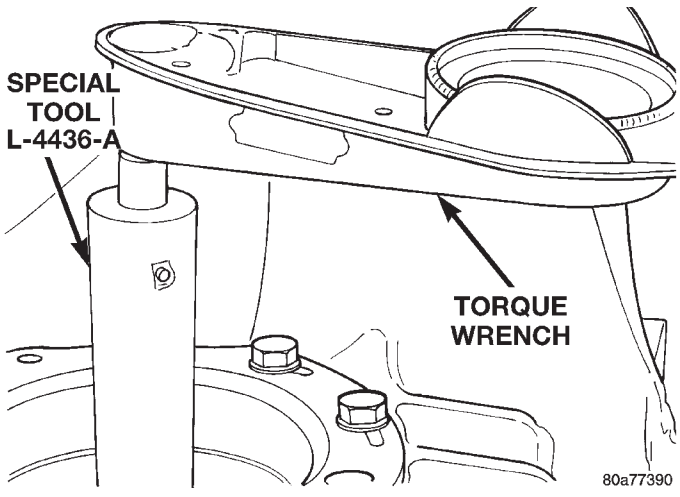

Fig. 211 Checking Differential Bearings Turning Torque

(5) If the turning torque is within specifications, remove tools. Setup is complete.

(6) If turning torque is not within specifications proceed with the following steps.

(a) Remove differential bearing retainer from the transaxle case.

ADJUSTMENTS (Continued)

(b) Remove the bearing cup from the differential bearing retainer using Tool 6062A.

(c) Remove the existing shim from under the cup.

(d) Measure the existing shim.

NOTE: If the turning torque was too high when measured, install a .05 mm (.002 inch) thinner shim. If the turning torque is was too low, install a .05 mm (.002 inch) thicker shim. Repeat until 5 to 18 inch-pounds turning torque is obtained.

Oil Baffle is not required when making shim selection.

(e) Install the proper shim under the bearing cup. Make sure the oil baffle is installed properly in the bearing retainer, below the bearing shim and cup.

(f) Install the differential bearing retainer using Tool 5052 and C-4171. Seal the retainer to the housing with MOPAR® Adhesive Sealant and torque bolts to 28 N·m (250 in. lbs.).

DIFFERENTIAL BEARING SHIM CHART

SHIM	THICKNESS
MM	INCH
.980	0.0386
1.02	0.0402
1.06	0.0418
1.10	0.0434
1.14	0.0449
1.18	0.0465
1.22	0.0481
1.26	0.0497
1.30	0.0512
1.34	0.0528
1.38	0.0544
1.42	0.0560
1.46	0.0575
1.50	0.0591
1.54	0.0607
1.58	0.0623
1.62	0.0638
1.66	0.0654
1.70	0.0670
2.02	0.0796
2.06	0.0812

(7) Using Tool L-4436A and an inch-pound torque wrench, recheck the turning torque of the differential. **The turning torque should be between 5 and 18 inch-pounds.**

TRANSFER SHAFT BEARING

(1) Use tool L-4434 to remove the retaining nut and washer. Remove the transfer shaft gear using tool L-4407.

(2) Install a 2.29 mm (0.090 inch) and a 1.39 mm (0.055 inch) gauging shims on the transfer shaft behind the governor support.

(3) Install transfer shaft gear and bearing assembly and torque the nut to 271 N·m (200 ft. lbs.).

To measure bearing end play:

a. Attach tool L-4432 to the transfer gear.

b. Mount a steel ball with grease into the end of the transfer shaft.

c. Push and pull the gear while rotating back and forth to insure seating of the bearing rollers.

d. Using a dial indicator, measure transfer shaft end play.

e. Refer to the Transfer Bearing Shim Chart for the required shim combination to obtain the proper bearing setting.

f. Use tool L-4434 to remove the retaining nut and washer. Remove the transfer shaft gear using tool L-4407.

g. Remove the two gauging shims and install the correct shim combination. Install the transfer gear and bearing assembly.

h. Install the retaining nut and washer and torque to 271 N·m (200 ft. lbs.). Measure transfer shaft end play, end play should be 0.05 to 0.25 mm (0.002 to 0.010 inch).

i. Measure bearing end play. End play should be between .05 mm and .25 mm (.002 to .010 inch).

NOTE: If end play is too high, install a 0.05 mm (0.002 inch) thinner shim combination. If end play is too low, install a 0.05 mm (0.002 inch) thicker shim combination. Repeat until 0.05 to 0.25 mm (0.002 to 0.010 inch) end play is obtained.

SCHEMATICS AND DIAGRAMS (Continued)

End Play (with 2.29 mm and 1.39 mm gauging shims installed)		Required Shim Combination	Total Thickness	
mm	inch	mm	mm	inch
.0	.0	2.29 + 1.39	3.68	.145
.05	.002	2.29 + 1.39	3.68	.145
.10	.004	2.29 + 1.39	3.68	.145
.15	.006	2.29 + 1.39	3.68	.145
.20	.008	2.29 + 1.34	3.63	.143
.25	.010	2.29 + 1.29	3.58	.141
.30	.012	2.29 + 1.24	3.53	.139
.35	.014	2.29 + 1.19	3.48	.137
.40	.016	2.29 + 1.14	3.43	.135
.45	.018	2.29 + 1.09	3.38	.133
.50	.020	2.29 + 1.04	3.33	.131
.55	.022	2.29 + .99	3.28	.129
.60	.024	1.84 + 1.39	3.23	.127
.65	.026	1.84 + 1.34	3.18	.125
.70	.028	1.84 + 1.29	3.13	.123
.75	.030	1.84 + 1.24	3.08	.121
.80	.032	1.84 + 1.19	3.03	.119
.85	.034	1.84 + 1.14	2.98	.117
.90	.036	1.84 + 1.09	2.93	.115
.95	.038	1.84 + 1.04	2.88	.113
1.00	.040	1.84 + .99	2.83	.111
1.05	.042	1.39 + 1.39	2.78	.109
1.10	.044	1.39 + 1.34	2.73	.107
1.15	.046	1.39 + 1.29	2.68	.105
1.20	.048	1.39 + 1.24	2.63	.103
1.25	.049	1.39 + 1.19	2.58	.101
1.30	.050	1.39 + 1.14	2.53	.099
1.35	.052	1.39 + 1.09	2.48	.097
1.40	.055	1.39 + 1.04	2.43	.095
1.45	.057	1.39 + .99	2.38	.093
1.50	.059	.94 + 1.39	2.33	.091
1.55	.061	.94 + 1.34	2.28	.089
1.60	.063	.94 + 1.29	2.23	.087

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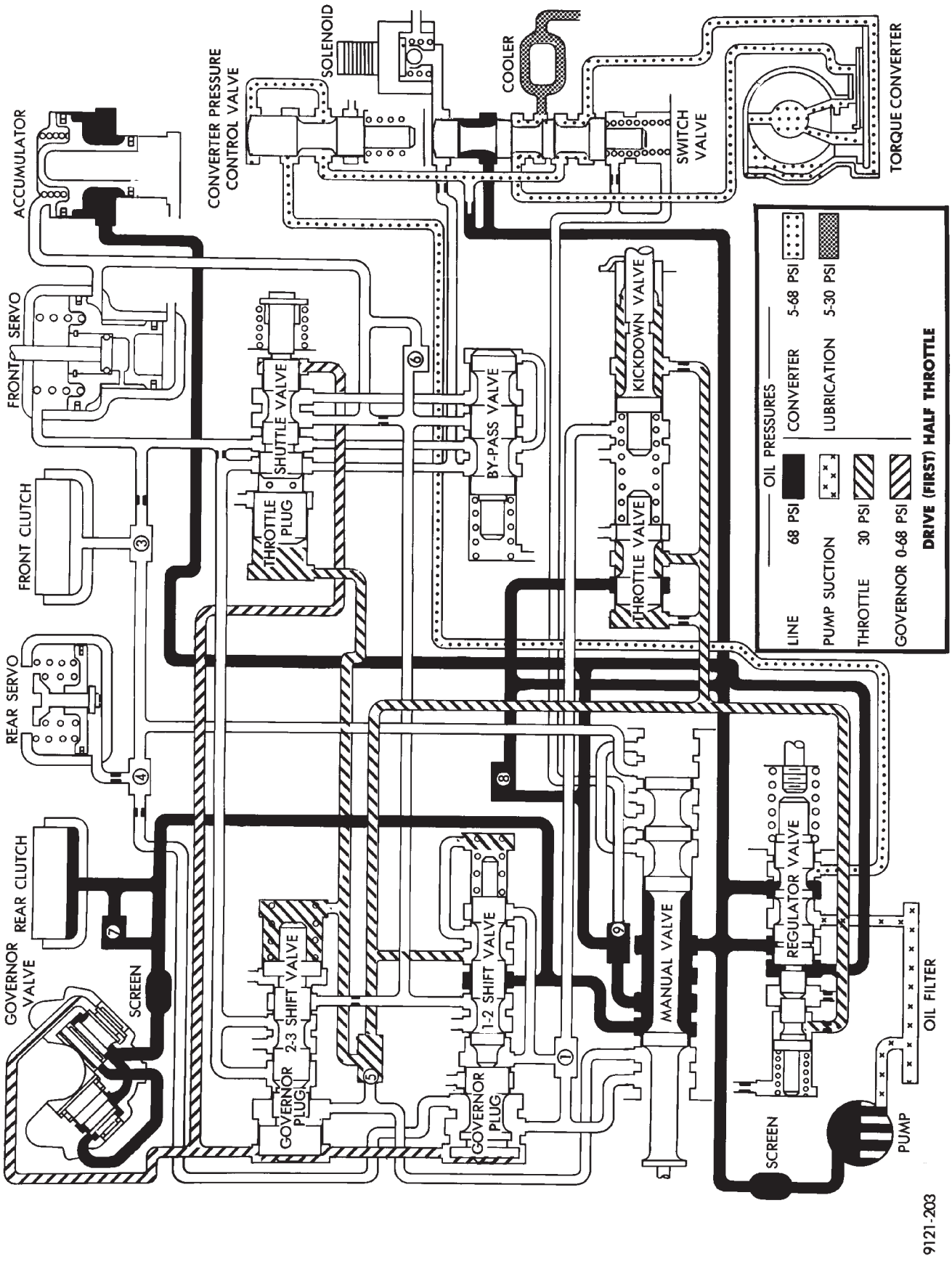
TRANSFER BEARING SHIM CHART

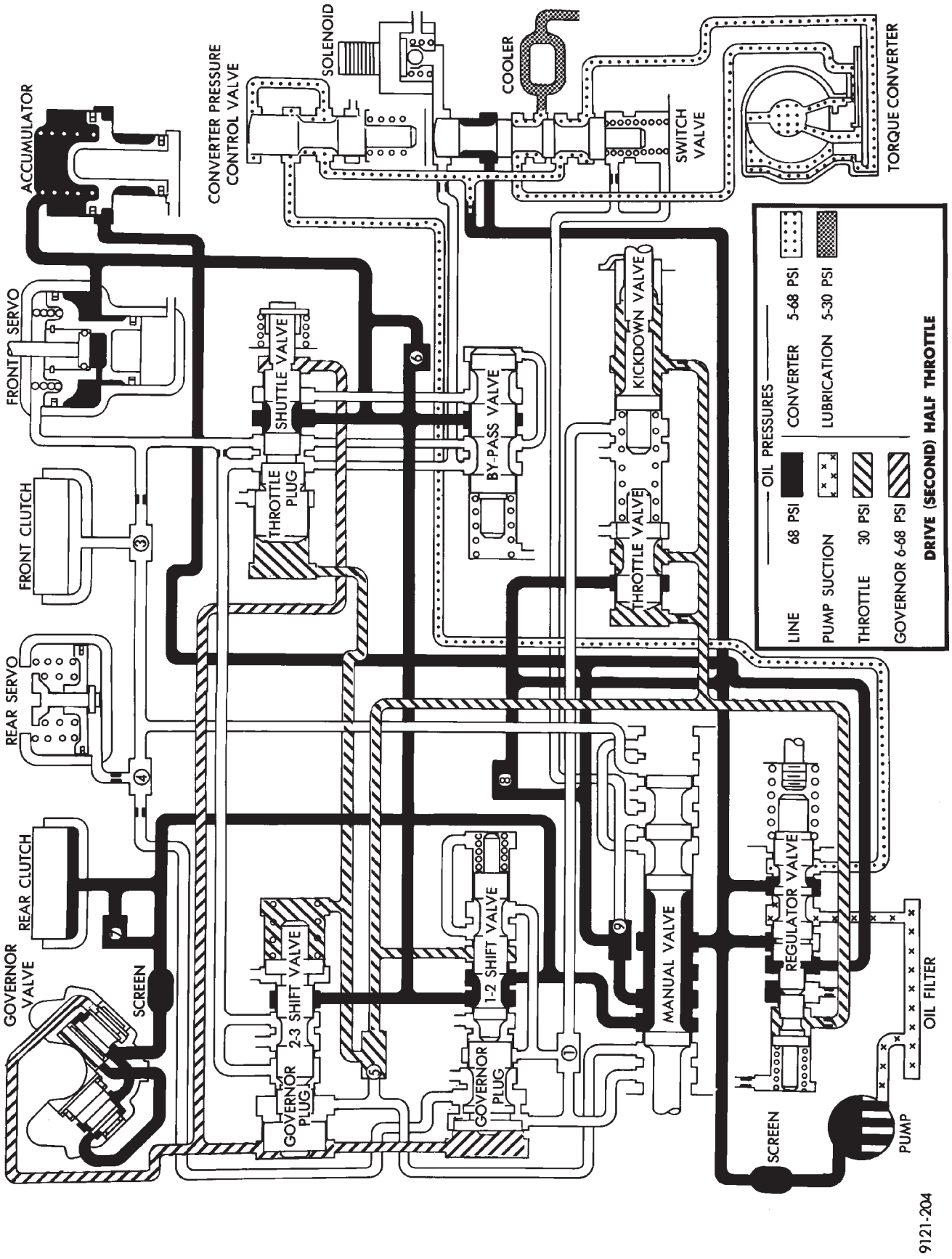
SCHEMATICS AND DIAGRAMS

31TH TRANSAXLE HYDRAULIC SCHEMATIC



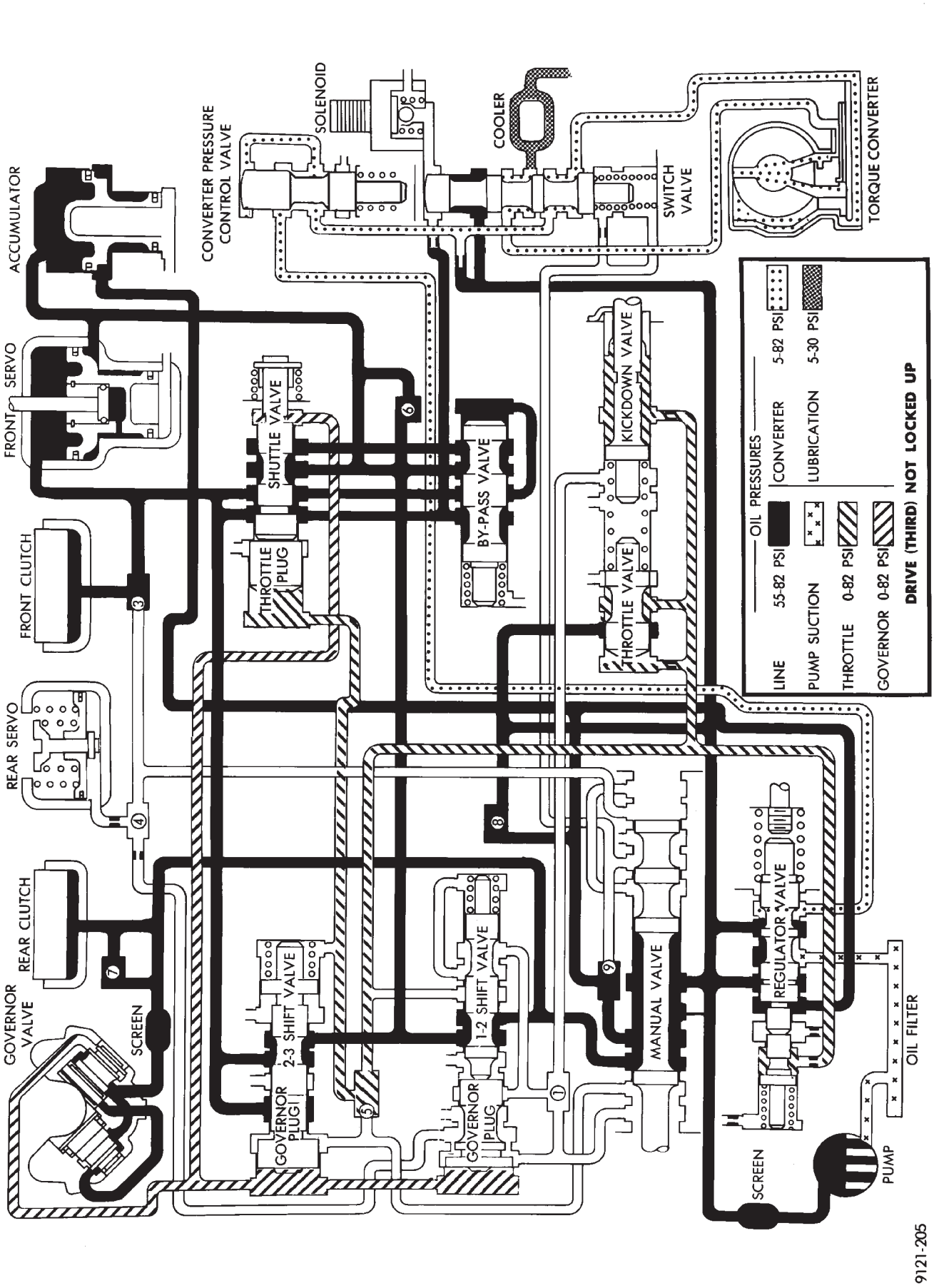
31TH TRANSAXLE HYDRAULIC SCHEMATIC

SCHEMATICS AND DIAGRAMS (Continued)



31TH TRANSAXLE HYDRAULIC SCHEMATIC

SCHEMATICS AND DIAGRAMS (Continued)



31TH TRANSAXLE HYDRAULIC SCHEMATIC

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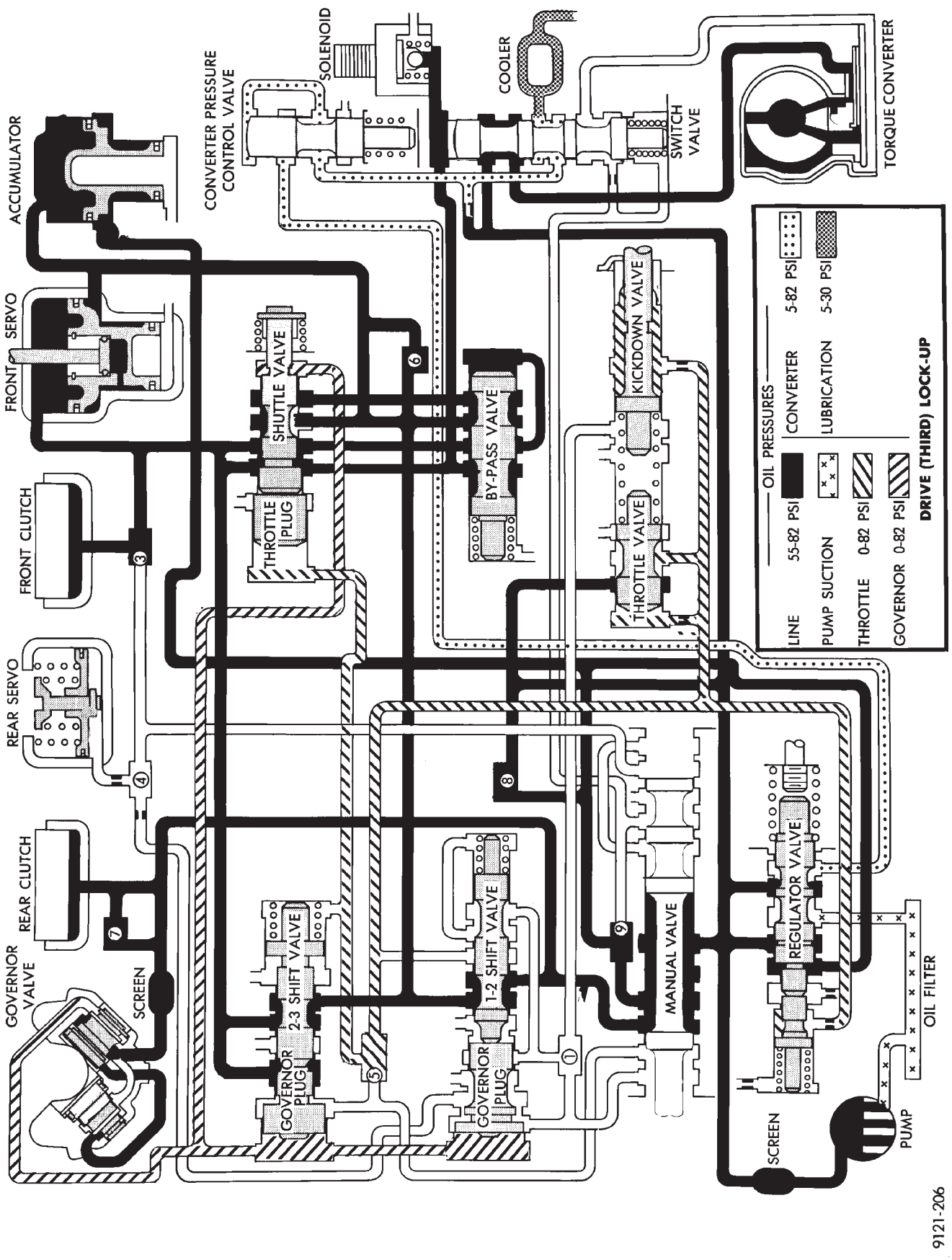
SCHEMATICS AND DIAGRAMS (Continued)



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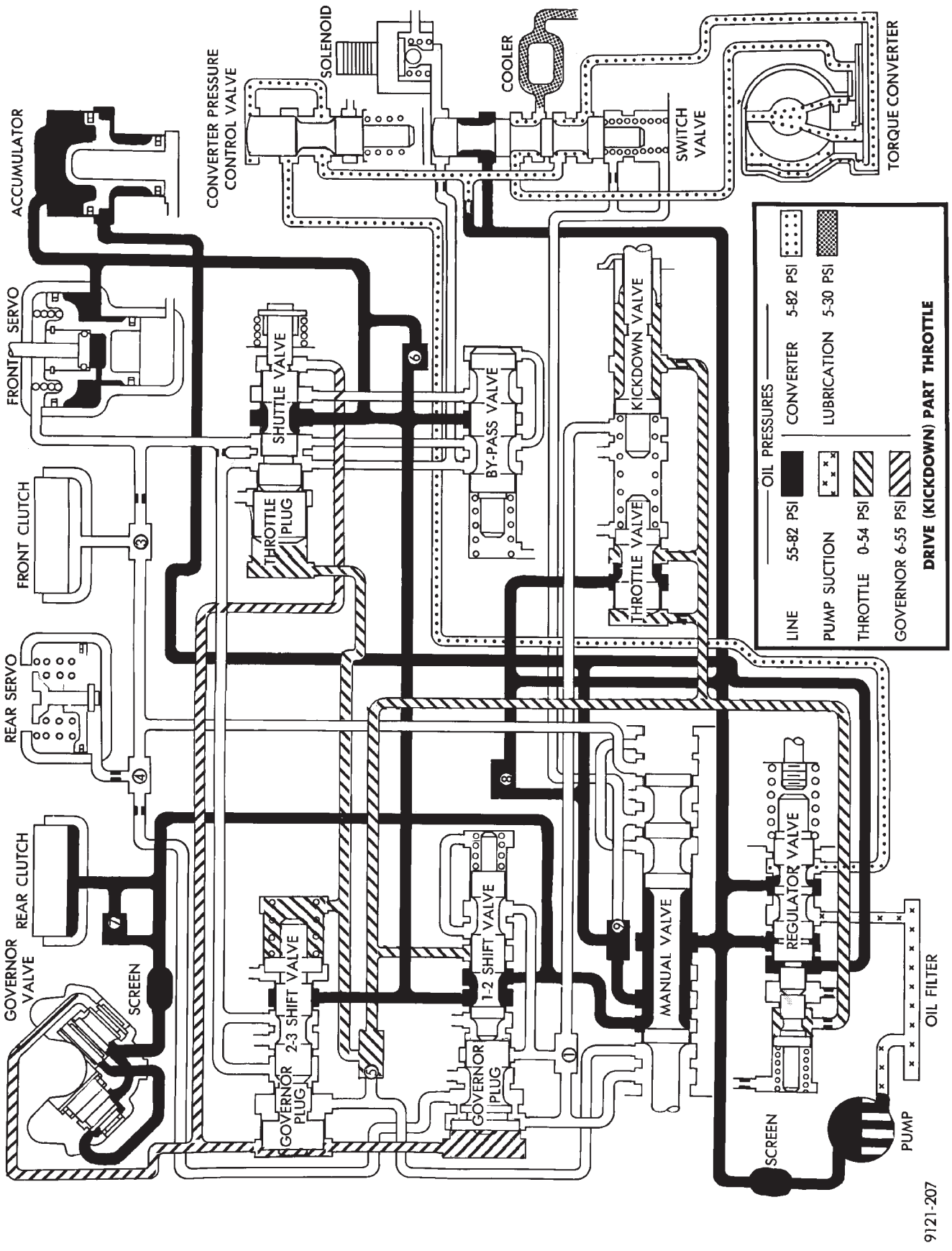
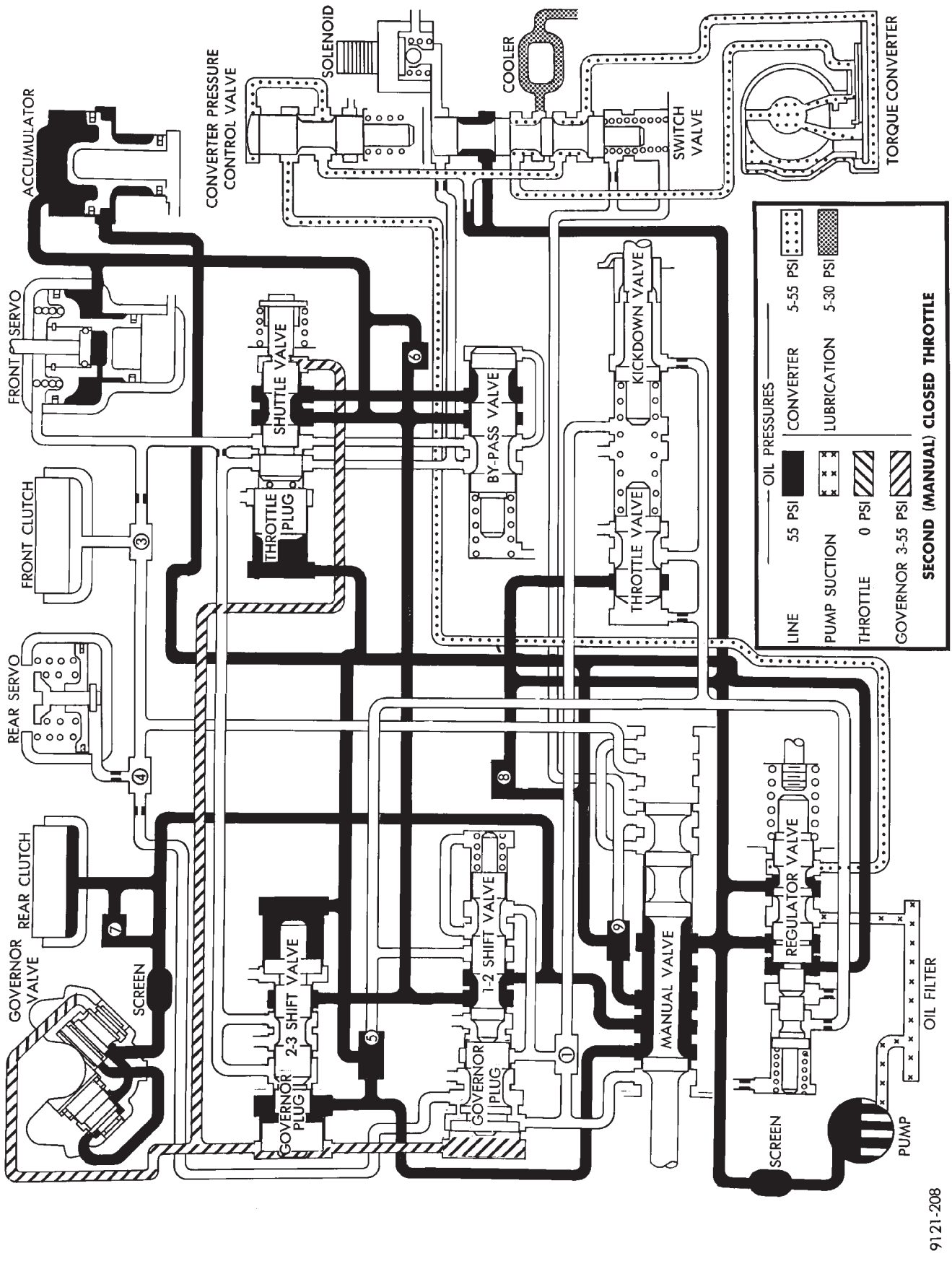
31TH TRANSAXLE HYDRAULIC SCHEMATIC

SCHEMATICS AND DIAGRAMS (Continued)



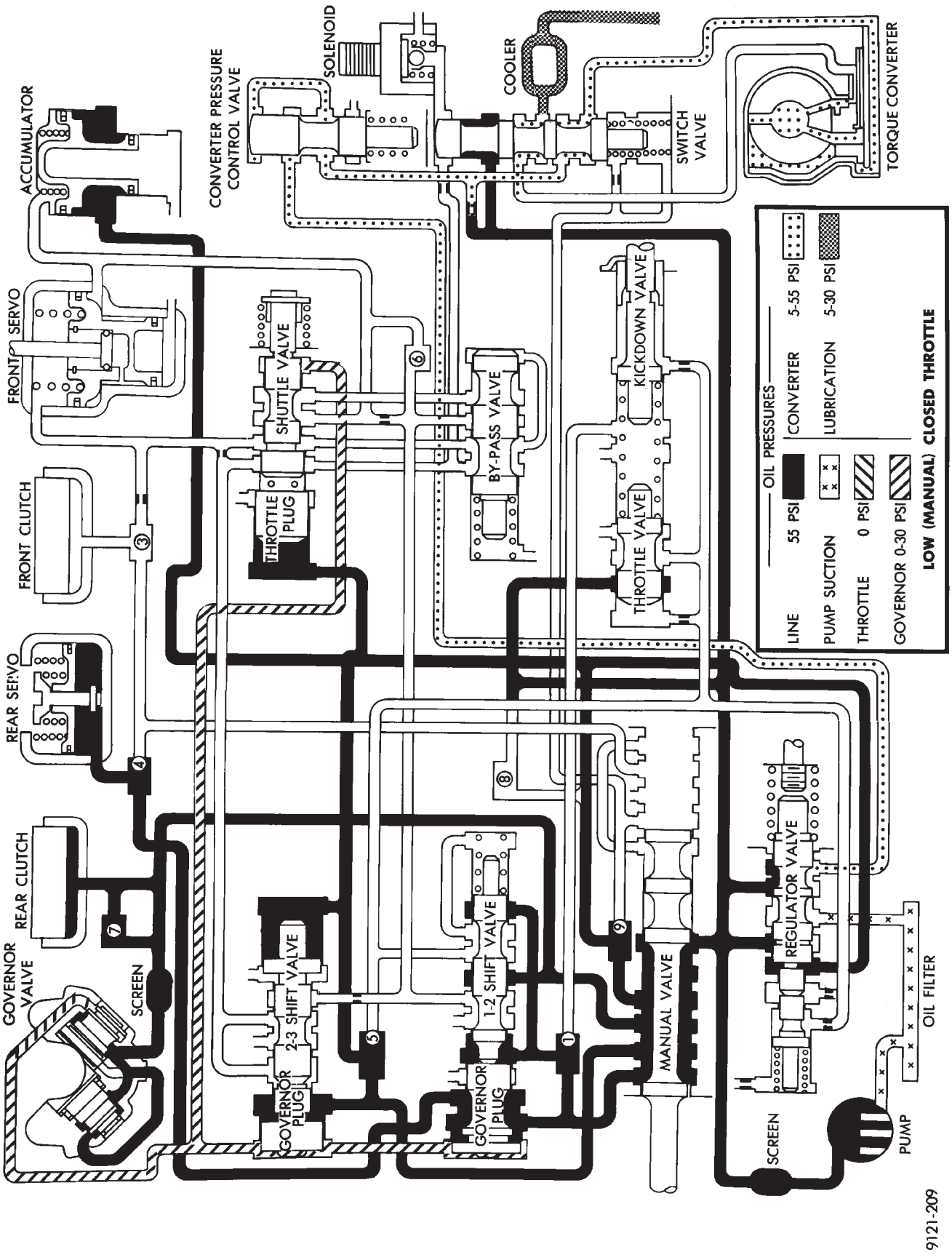
31TH TRANSAXLE HYDRAULIC SCHEMATIC

SCHEMATICS AND DIAGRAMS (Continued)

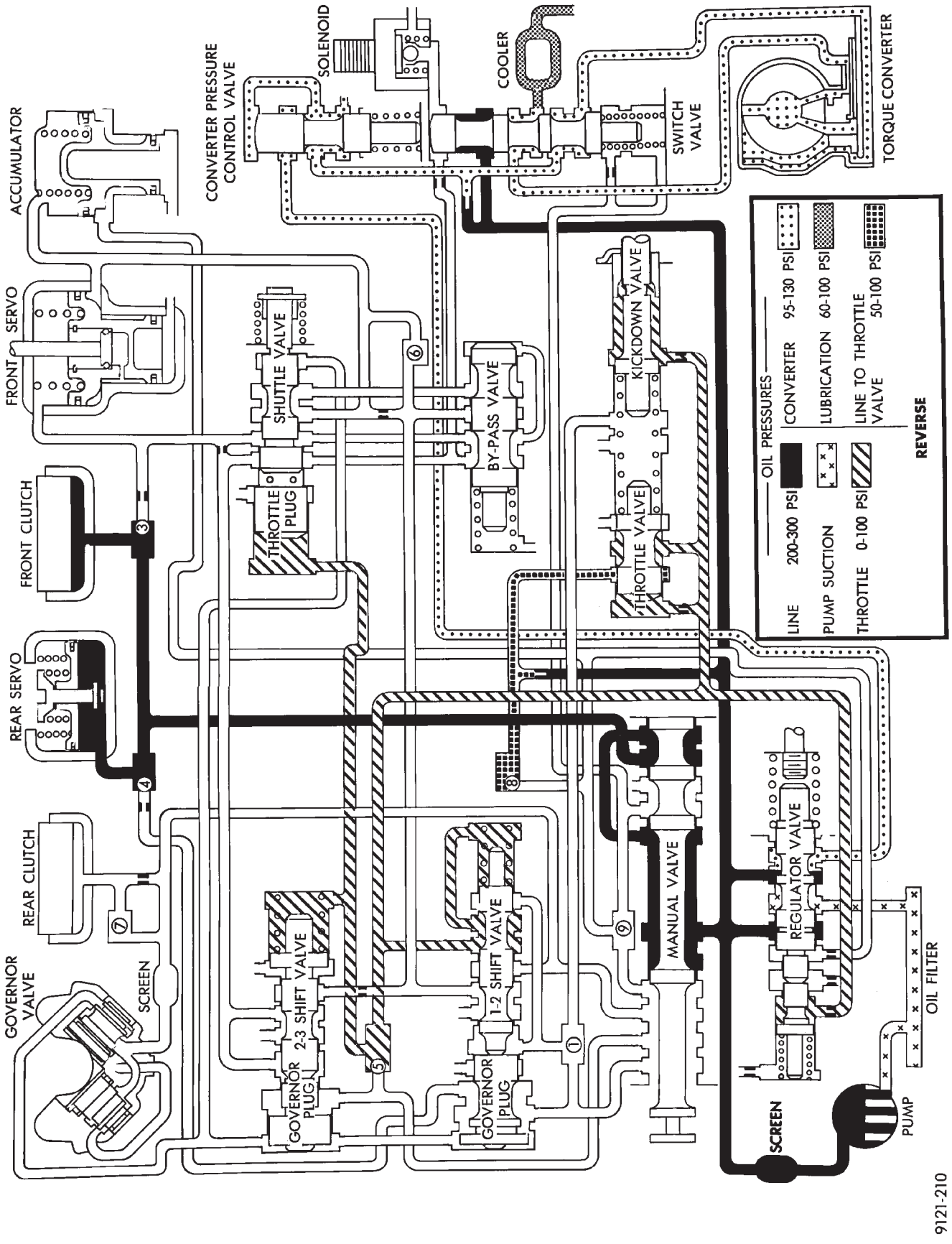


31TH TRANSAXLE HYDRAULIC SCHEMATIC

SCHEMATICS AND DIAGRAMS (Continued)



SCHEMATICS AND DIAGRAMS (Continued)



9121-210

31TH TRANSAXLE HYDRAULIC SCHEMATIC

SPECIFICATIONS

31TH TRANSAXLE SPECIFICATIONS

		Metric Measure	U.S. Measure
Type		Automatic Three Speed With Torque Converter and Integral Differential	
Torque Converter Diameter		24.1 millimeters	9.48 inches
Oil Capacity—Transaxle and Torque Converter:		8.4 Liters	8.9 qts.
Use MOPAR ATF Automatic Transmission Fluid Type 7176 (or DEXRON II)			
Cooling Method		Water-Heat Exchanger and/or oil-to-air heat exchanger Pump	
Lubrication		(Internal-External Gear Type)	
Gear Ratios:			
Transmission Portion:	First	2.69	
	Second	1.55	
	Third	1.00	
	Reverse	2.10	
Pump Clearances:		**Millimeter**	**Inch**
Outer Gear to Pocket		.045-.141	.0018-.0056
Outer Gear Side Clearance		.020-.046	.0008-.0018
Inner Gear Side Clearance		.020-.046	.0008-.0018
End Play:		**Millimeter**	**Inch**
Input Shaft		.19-1.50	.008-.060
Front Clutch Retainer		.76-2.69	.030-.106
Front Carrier		.89-1.45	.007-.057
Front Annulus Gear		.09-0.50	.0035-.020
Planet Pinion		.15-0.59	.006-.023
Reverse Drum		.76-3.36	.030-.132
Clutch Clearance and Selective Snap Rings:		Millimeter	Inch
Front Clutch (Non-Adjustable) Measured from Reaction Plate to "Farthest" Wave			
	4 Disc	1.27-2.79	.050-.110
Rear Clutch (4 Disc) Adjustable			
	4 Disc	.71-1.10	.028-.043
Selective Snap Rings (5)		1.22-1.27	.048-.050
		1.52-1.57	.060-.062
		1.73-1.78	.068-.070
		1.88-1.93	.074-.076
		2.21-2.26	.087-.089
Band Adjustment:			
Kickdown, Backed off from 8 N·m (72 in. lbs.)		2-1/4 Turns	
Low-Reverse, Backed off from 5 N·m (41 in. lbs.)		3-1/2 Turns	
Thrust Washers:		**Millimeter**	**Inch**
Reaction Shaft Support (Phenolic)	No. 1	1.55-1.60	.061-.063
Rear Clutch Retainer (Phenolic)	No. 2	1.55-1.60	.061-.063
Output Shaft, Steel Backed Bronze (Select)	No. 3	1.98-2.03	.077-.080
		2.15-2.22	.085-.087
		2.34-2.41	.092-.095
Front Annulus, Steel Backed Bronze	No. 4	2.95-3.05	.116-.120
Front Carrier, Steel Backed Bronze	Nos. 5, 6	1.22-1.28	.048-.050
Sun Gear (Front)	No. 7	.85-0.91	.033-.036
Sun Gear (Rear)	No. 8	.85-0.91	.033-.036
Rear Carrier, Steel Backed Bronze	Nos. 9, 10	1.22-1.28	.0948-.050
Rev. Drum, Phenolic	No. 11	1.55-1.60	.061-.063
Tapered Roller Bearing Settings:		**Millimeter**	**Inch**
Output Shaft		.0-.07 Preload	.0-.0028 Preload
Transfer Shaft		.05-.25 End Play	.002-.010 End Play
Differential		.15-.29 Preload	.006-.012 Preload

SPECIFICATIONS (Continued)

INCHES TO MILLIMETERS

All values in this table are exact

inches	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
	millimeters									
0.000	—	0.0254	0.0508	0.0762	0.1016	0.1270	0.1524	0.1778	0.2032	0.2286
0.010	0.2540	0.2794	0.3048	0.3302	0.3556	0.3810	0.4064	0.4318	0.4572	0.4826
0.020	0.5080	0.5334	0.5588	0.5842	0.6096	0.6350	0.6604	0.6858	0.7112	0.7366
0.030	0.7620	0.7874	0.8128	0.8382	0.8636	0.8890	0.9144	0.9398	0.9652	0.9906
0.040	1.0160	1.0414	1.0668	1.0922	1.1176	1.1430	1.1684	1.1938	1.2192	1.2446
0.050	1.2700	1.2954	1.3208	1.3462	1.3716	1.3970	1.4224	1.4478	1.4732	1.4986
0.060	1.5240	1.5494	1.5748	1.6002	1.6256	1.6510	1.6764	1.7018	1.7272	1.7526
0.070	1.7780	1.8034	1.8288	1.8542	1.8796	1.9050	1.9304	1.9558	1.9812	2.0066
0.080	2.0320	2.0574	2.0828	2.1082	2.1336	2.1590	2.1844	2.2098	2.2352	2.2606
0.090	2.2860	2.3114	2.3368	2.3622	2.3876	2.4130	2.4384	2.4638	2.4892	2.5146
0.100	2.5400	2.5654	2.5908	2.6162	2.6416	2.6670	2.6924	2.7178	2.7432	2.7686
0.110	2.7940	2.8194	2.8448	2.8702	2.8956	2.9210	2.9464	2.9718	2.9972	3.0226
0.120	3.0480	3.0734	3.0988	3.1242	3.1496	3.1750	3.2004	3.2258	3.2512	3.2766
0.130	3.3020	3.3274	3.3528	3.3782	3.4036	3.4290	3.4544	3.4798	3.5052	3.5306
0.140	3.5560	3.5814	3.6068	3.6322	3.6576	3.6830	3.7084	3.7338	3.7592	3.7846
0.150	3.8100	3.8354	3.8608	3.8862	3.9116	3.9370	3.9624	3.9878	4.0132	4.0386
0.160	4.0640	4.0894	4.1148	4.1402	4.1656	4.1910	4.2164	4.2418	4.2672	4.2926
0.170	4.3180	4.3434	4.3688	4.3942	4.4196	4.4450	4.4704	4.4958	4.5212	4.5466
0.180	4.5720	4.5974	4.6228	4.6482	4.6736	4.6990	4.7244	4.7498	4.7752	4.8006
0.190	4.8260	4.8514	4.8768	4.9022	4.9276	4.9530	4.9784	5.0038	5.0292	5.0546
0.200	5.0800	5.1054	5.1308	5.1562	5.1816	5.2070	5.2324	5.2578	5.2832	5.3086
0.210	5.3340	5.3594	5.3848	5.4102	5.4356	5.4610	5.4864	5.5118	5.5372	5.5626
0.220	5.5880	5.6134	5.6388	5.6642	5.6896	5.7150	5.7404	5.7658	5.7912	5.8166
0.230	5.8420	5.8674	5.8928	5.9182	5.9436	5.9690	5.9944	6.0198	6.0452	6.0706
0.240	6.0960	6.1214	6.1468	6.1722	6.1976	6.2230	6.2484	6.2738	6.2992	6.3246
0.250	6.3500	6.3754	6.4008	6.4262	6.4516	6.4770	6.5024	6.5278	6.5532	6.5786
0.260	6.6040	6.6294	6.6548	6.6802	6.7056	6.7310	6.7564	6.7818	6.8072	6.8326
0.270	6.8580	6.8834	6.9088	6.9342	6.9596	6.9850	7.0104	7.0358	7.0612	7.0866
0.280	7.1120	7.1374	7.1628	7.1882	7.2136	7.2390	7.2644	7.2989	7.3152	7.3406
0.290	7.3660	7.3914	7.4168	7.4422	7.4676	7.4930	7.5184	7.5438	7.5692	7.5946
0.300	7.6200	7.6454	7.6708	7.6962	7.7216	7.7470	7.7724	7.7978	7.8232	7.8486
0.310	7.8740	7.8994	7.9248	7.9502	7.9756	8.0010	8.0264	8.0518	8.0772	8.1026
0.320	8.1280	8.1534	8.1788	8.2042	8.2296	8.2550	8.2804	8.3058	8.3312	8.3566
0.330	8.3820	8.4074	8.4328	8.4582	8.4836	8.5090	8.5344	8.5598	8.5852	8.6106
0.340	8.6360	8.6614	8.6868	8.7122	8.7376	8.7630	8.7884	8.8138	8.8392	8.8646
0.350	8.8900	8.9154	8.9408	8.9662	8.9916	9.0170	9.0424	9.0678	9.0932	9.1186
0.360	9.1440	9.1694	9.1948	9.2202	9.2456	9.2710	9.2964	9.3218	9.3472	9.3726
0.370	9.3980	9.4234	9.4488	9.4742	9.4996	9.5250	9.5504	9.5758	9.6012	9.6266
0.380	9.6520	9.6774	9.7028	9.7282	9.7586	9.7790	9.8044	9.8298	9.8552	9.8806
0.390	9.9060	9.9314	9.9568	9.9822	10.0076	10.0330	10.0584	10.0838	10.1092	10.1346
0.400	10.1600	10.1854	10.2108	10.2362	10.2616	10.2870	10.3124	10.3378	10.3632	10.3886
0.410	10.4140	10.4394	10.4648	10.4902	10.5156	10.5410	10.5664	10.5918	10.6172	10.6426
0.420	10.6680	10.6934	10.7188	10.7442	10.7696	10.7950	10.8204	10.8458	10.8712	10.8966
0.430	10.9220	10.9474	10.9728	10.9982	11.0236	11.0490	11.0744	11.0998	11.1252	11.1506
0.440	11.1760	11.2014	11.2268	11.2522	11.2776	11.3030	11.3284	11.3538	11.3792	11.4046
0.450	11.4300	11.4554	11.4808	11.5062	11.5316	11.5570	11.5824	11.6078	11.6332	11.6586
0.460	11.6840	11.7094	11.7348	11.7602	11.7856	11.8110	11.8364	11.8618	11.8872	11.9126
0.470	11.9380	11.9634	11.9888	12.0142	12.0396	12.0650	12.0904	12.1158	12.1412	12.1666
0.480	12.1920	12.2174	12.2428	12.2682	12.2936	12.3190	12.3444	12.3698	12.3952	12.4206
0.490	12.4460	12.4714	12.4968	12.5222	12.5476	12.5730	12.5984	12.6238	12.6492	12.6746
inches	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009

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CONVERSION CHART

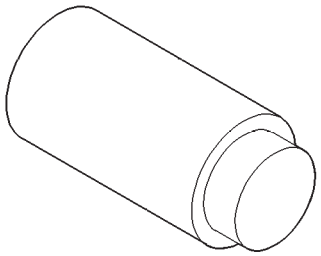
SPECIFICATIONS (Continued)

31TH TRANSAXLE TORQUE SPECIFICATIONS

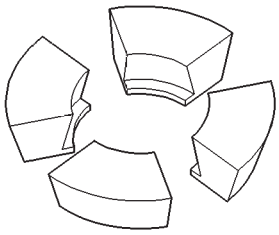
DESCRIPTION	TORQUE
Bell Housing Cover Bolts	12 N·m (105 in. lbs.)
Cooler Hose To Rad. Conn.	12 N·m (105 in. lbs.)
Cooler Line Conn.	28 N·m (250 in. lbs.)
Diff. Bear. Ret. To Case Bolt	34 N·m (300 in. lbs.)
Diff. Cover To Case Bolt	19 N·m (165 in. lbs.)
Exten. Hous. To Case Bolt	28 N·m (250 in. lbs.)
Flex Plate To Crankshaft Bolts	95 N·m (70 ft. lbs.)
Flex Plate To Torque Conv. Bolts	68 N·m (50 ft. lbs.)
Fluid Filter Screw	5 N·m (45 in. lbs.)
Front Motor Mount Bolt	54 N·m (40 ft. lbs.)
Governor Counterweight Screw	28 N·m (250 in. lbs.)
Governor To Support Bolt	7 N·m (60 in. lbs.)
Kickdown Band Adj. Lock Nut	47 N·m (35 ft. lbs.)
Left Motor Mount Bolts	54 N·m (40 ft. lbs.)
Lower Bell Housing Cover Screw	41 N·m (30 ft. lbs.)
Manual Cable To Trans. Case Bolt	28 N·m (250 in. lbs.)
Manual Control Lever Screw	12 N·m (105 in. lbs.)
Oil Pan To Trans. Case Screw	19 N·m (165 in. lbs.)
Output Gear Strap Bolts	23 N·m (17 ft. lbs.)
Output Shaft Nut	271 N·m (200 ft. lbs.)
Park/Neutral Switch	34 N·m (25 ft. lbs.)
Pressure Check Plug	5 N·m (45 in. lbs.)
Pump To Case Bolts	31 N·m (275 in. lbs.)
Reaction Shaft Assembly Bolt	28 N·m (250 in. lbs.)
Rear Cover To Case Screw	19 N·m (165 in. lbs.)
Reverse Band Adj. Lock Nut	14 N·m (125 in. lbs.)
Reverse Band Shaft Plug	7 N·m (60 in. lbs.)
Ring Gear Screw	95 N·m (70 ft. lbs.)
Speedo. To Ext. Hous. Screw	7 N·m (60 in. lbs.)
Sprag Ret. To Transfer Case Bolt	28 N·m (250 in. lbs.)
Starter To Trans. Bell Bolts	54 N·m (40 ft. lbs.)
Stirrup Strap Ret. Bolts	23 N·m (200 in. lbs.)
Throttle Cable To Trans. Case Bolt	12 N·m (105 in. lbs.)
Throttle Lever To Trans. Shaft Bolts	12 N·m (105 in. lbs.)
Trans. To Cyl. Block Bolt	95 N·m (70 ft. lbs.)
Transfer Shaft Nut	271 N·m (200 ft. lbs.)
Transfer Gear Strap Bolts	23 N·m (17 ft. lbs.)
Valve Body Assy. To Case Bolts	12 N·m (105 in. lbs.)
Valve Body Screw	5 N·m (45 in. lbs.)

SPECIAL TOOLS

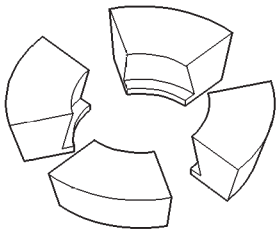
31TH AUTOMATIC TRANSAXLE



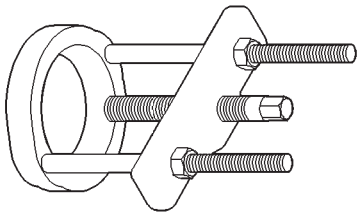
Puller Press Extension C-293-3



Adapter Blocks C-293–36

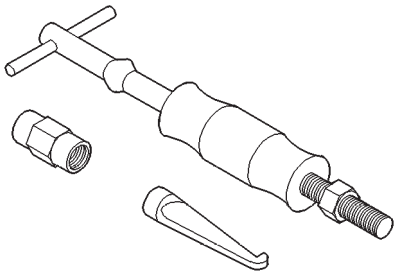


Adapter Blocks C-293–52

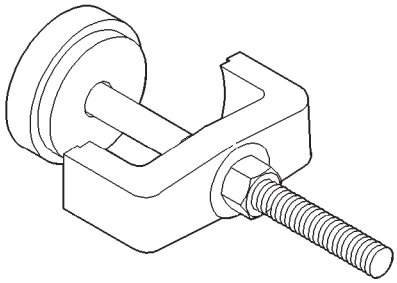


Puller Press C-293–PA

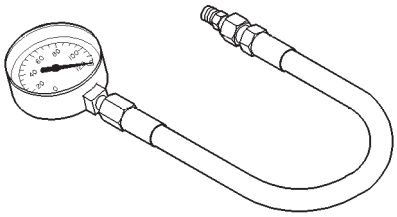
SPECIAL TOOLS (Continued)



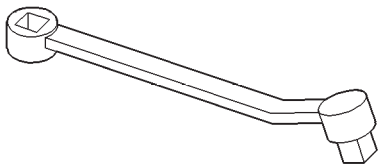
Slide Hammer C-637



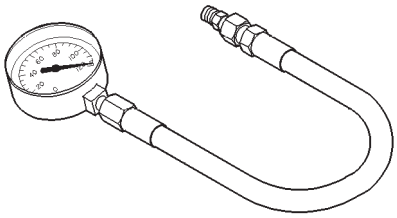
Spring Compressor C-3575–A



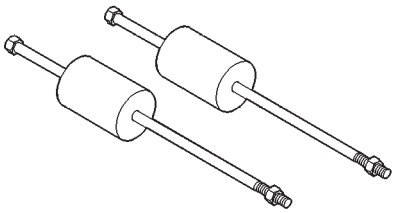
Pressure Gauge (Low) C-3292



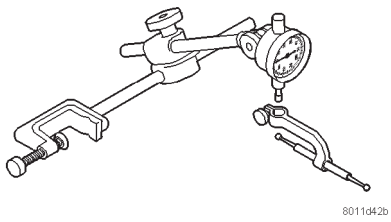
Band Adjusting Adapter



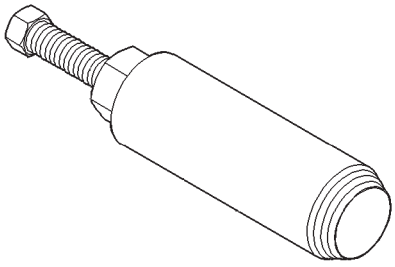
Pressure Gauge (High) C-3293SP



Oil Pump Puller C-3752

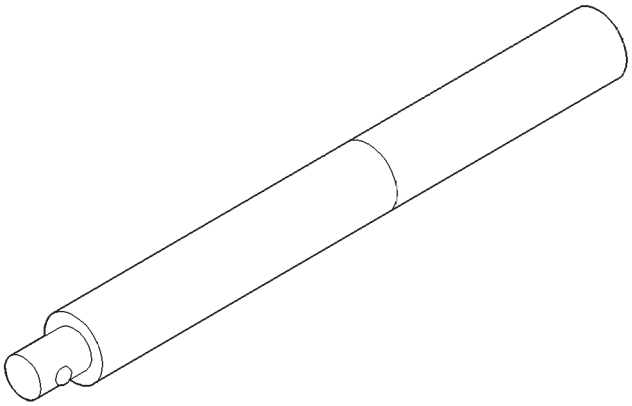


Dial Indicator C-3339

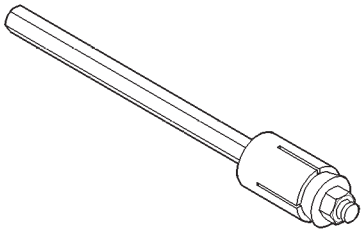


Seal Puller C-3981B

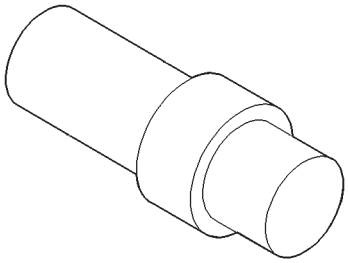
SPECIAL TOOLS (Continued)



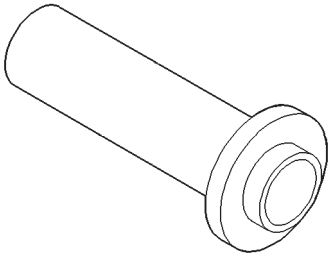
Universal Handle C-4171



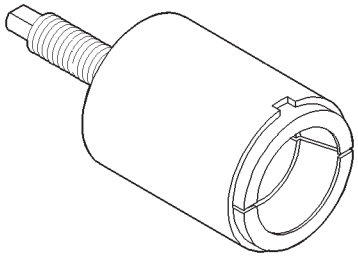
Torque Tool C-4995



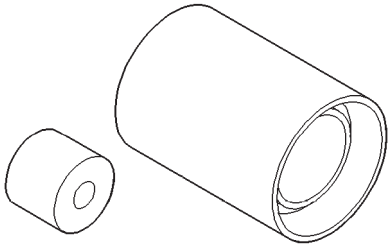
Adapter C-4996



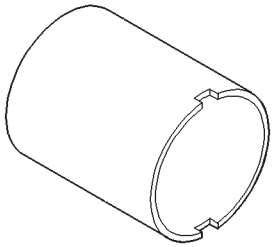
Seal Installer C-4193A



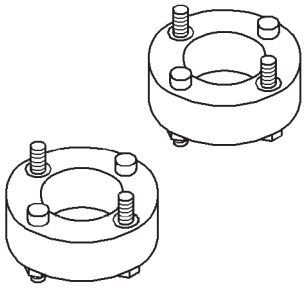
Remover Kit L-4406



Bearing Installer C-4637

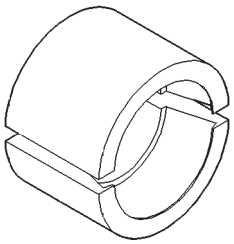


Bearing Remover Cup L-4406–1

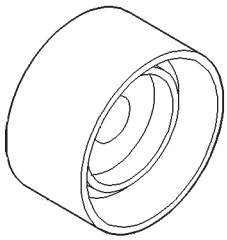


Adapter C-4658

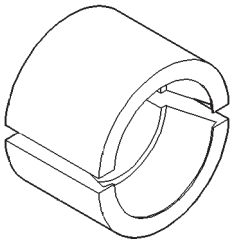
SPECIAL TOOLS (Continued)



Bearing Remover Jaws L-4406–2



Bearing Installer L-4408



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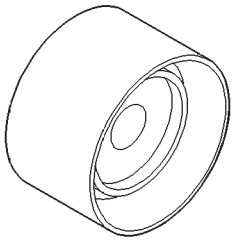

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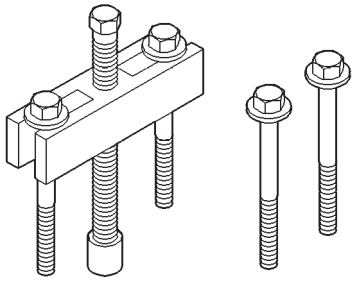
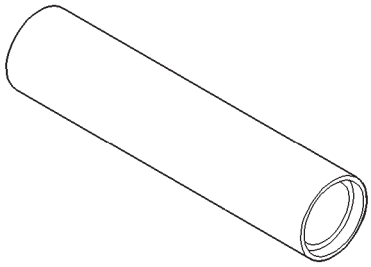


Gear Puller L-4407A



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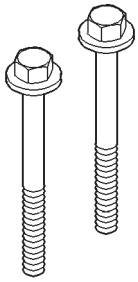
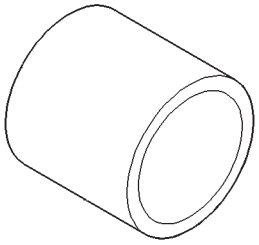
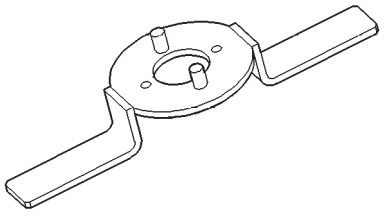


Puller L-4407–6

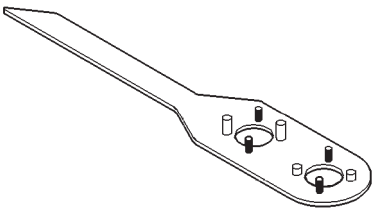


Installer Adapter L-4429-3

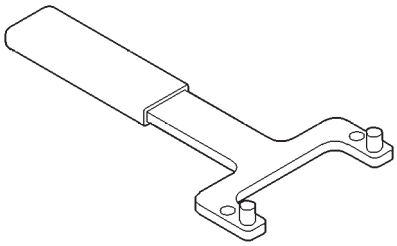
SPECIAL TOOLS (Continued)



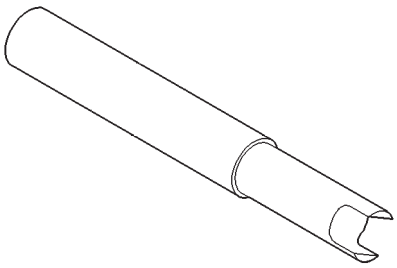
Gear Checking Plate L-4432



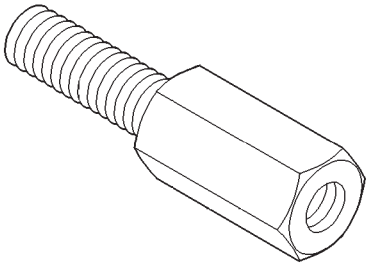
Gear Removing Plate L-4434



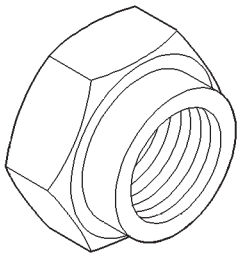
Bearing Puller L-4435



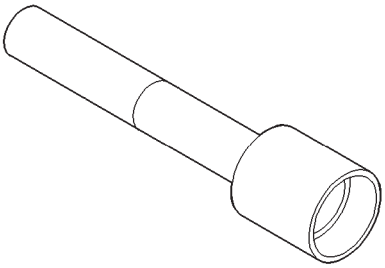
Differential Tool L-4436A



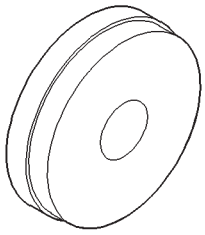
Housing Remover Adapter L-4437



Starter Nut L-4439

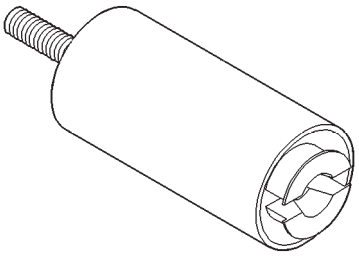


Transfer Shaft Remover-Installer L-4512

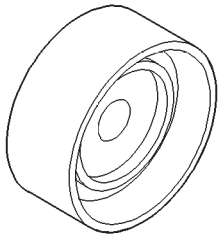


Bearing Cup Remover L-4517

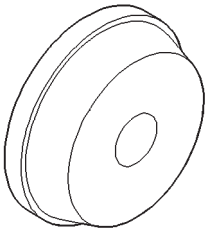
SPECIAL TOOLS (Continued)



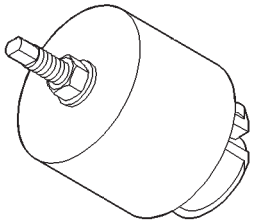
Special Jaw Set L-4518



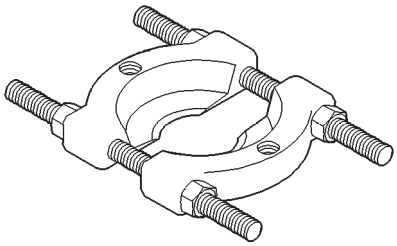
Bearing Installer 5052



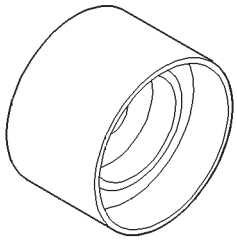
Installer L-4520



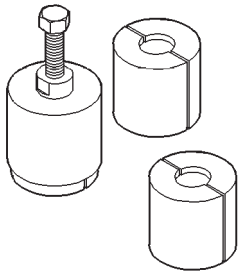
Bearing Cup Remover 6062-A



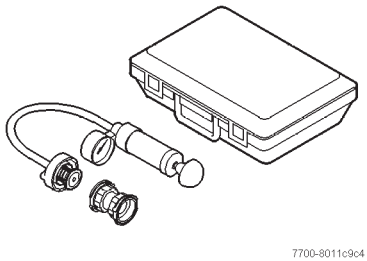
Bearing Splitter P-334



Bearing Installer 6536-A

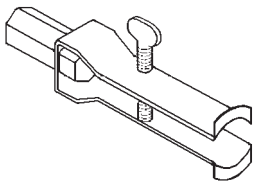


Bearing Cone Remover 5048



Cooling System Tester 7700

SPECIAL TOOLS (Continued)



Seal Remover 7794-a

TRANSAXLE

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NV T350 (A-578) MANUAL TRANSAXLE

GENERAL INFORMATION

GEAR RATIOS

All transaxles have a torque capacity of 184 N·m. The gear ratios of each transaxle are shown in the following chart.

ENGINE GEAR	2.0 SOHC and DOHC	2.0 SOHC- RIGHT HAND DRIVE ONLY
1st	3.54	3.54
2nd	2.13	2.13
3rd	1.36	1.36
4th	1.03	1.03
5th	0.72	0.72
FINAL DRIVE	3.55	3.55
REVERSE BRAKE	NO	NO
CLUTCH RELEASE SYSTEM	CABLE	HYDRAULIC