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OVERDRIVE

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DESCRIPTION

Overdrive is available as an option with manual transmission only.

The overdrive is an additional gear unit installed between the transmission and propeller shaft (fig. 6-27). When in operation, overdrive provides a higher overall gear ratio than that provided by the drive gear and drive pinion.

The purpose of overdrive is to allow highway cruising at an engine speed that is lower than it would be in normal third gear. When engaged, overdrive reduces the engine-to-rear axle ratio approximately 30 percent, providing a transmission ratio in overdrive third gear of 0.75 to 1.00.

The overdrive is a hydraulically operated unit that is engaged and disengaged by a solenoid valve. The solenoid valve is activated by the overdrive control switch mounted in the turn signal lever on the steering column (fig. 6-28). A governor speed switch, operated by the speedometer cable, determines overdrive cut-in and cutout speeds.

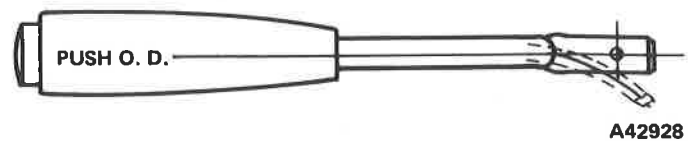


Fig. 6-28 Control Switch and Turn Indicator Lever

The transmission and overdrive assemblies share a common lubricating oil supply. Lubricant level is checked and corrected at the transmission fill plug.

OPERATION

Overdrive may be engaged at any time after reaching the governor cut-in speed of 38 mph and only when in Third gear. (A Third gear switch installed in the transmission prevents overdrive engagement in First, Second, or Reverse gears.)

Overdrive may be engaged or disengaged at any speed or throttle opening above governor cut-in. It is not necessary to release the clutch when engaging or

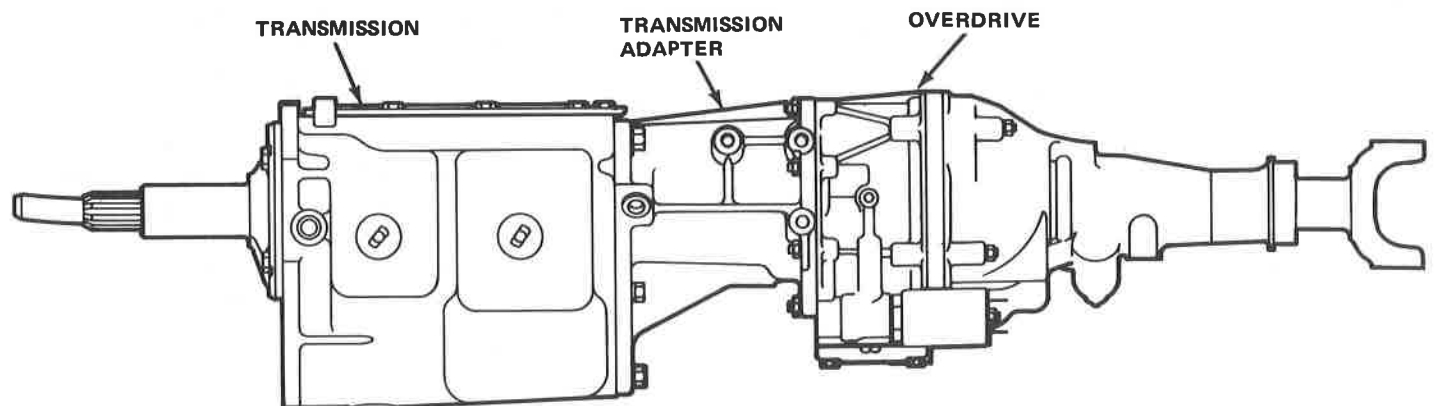


Fig. 6-27 Transmission—Overdrive Assembly

disengaging overdrive, as overdrive is designed to be operated while transmitting full power. Activating the pushbutton-type overdrive control switch in the turn signal lever will engage the overdrive. Until the control switch is deactivated or car speed falls below the governor cutout speed of 32 mph, the overdrive will remain engaged.

For additional acceleration, a kickdown switch is incorporated into the overdrive electrical control circuit. The plunger-type switch is mounted on the carburetor base and is actuated by the throttle linkage.

When the accelerator pedal is fully depressed, the switch is opened and it interrupts continuity in the overdrive control circuit. This deenergizes the solenoid valve, which in turn disengages the overdrive. As soon as the accelerator pedal is released from a the fully depressed position, the kickdown switch closes, restoring continuity in the electrical control circuit. The solenoid valve is then re-energized and engages the overdrive once again.

An indicator lamp mounted in the instrument panel signals overdrive engagement. The lamp is connected electrically to the solenoid valve. When the overdrive is engaged, the lamp will light and remain lit until the overdrive is disengaged or until the ignition switch is turned off.

POWER FLOW

General

A single planetary gear train is used in the overdrive. The gear train consists of a central sun gear in mesh with three planetary pinion gears, which in turn mesh with an internally toothed annulus gear. All gears are in constant mesh. The pinion carrier is connected to the transmission output shaft through the sun gear and overrunning clutch. The annulus gear and overdrive main shaft are an integral (one-piece) assembly.

SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
OVERDRIVE WILL NOT ENGAGE	(1) Low lubricant level	(1) Check and correct level. Correct any oil leaks.
	(2) Open switch or wire in electrical control circuit.	(2) Check for loose, broken, shorted wires, blown fuse, or open switches (use 12V test lamp). Repair or replace parts as required.
	(3) Solenoid valve sticking, grounded, open.	(3) Remove, clean, and test solenoid valve as outlined in Service Procedures - In Car. Replace solenoid valve if defective.
	(4) Plugged oil pan or pressure filters. Plugged, or sticking pump non-return valve assembly. Sticking relief valve piston. Broken relief valve assembly or piston springs. Plugged control orifice.	(4) Perform hydraulic pressure test with overdrive engaged. If pressures are below 520 psi with overdrive engaged, remove oil pan, main case plugs, and all valves and filters. Clean all parts thoroughly. Replace plugged filters, worn o-ring seals, scored or pitted valves, or valves with broken springs. Remove solenoid valve and clean control orifice with compressed air.
	(5) Sticking sliding clutch. Worn sliding clutch friction lining. Broken weak clutch return springs. Leaking clutch apply piston seals.	(5) Road test car with control switch on - at 40 to 45 mph - depress and release clutch pedal 3 or 4 times in rapid succession. If

Service Diagnosis (continued)

Condition	Possible Cause	Correction
OVERDRIVE WILL NOT ENGAGE (Continued)	Internal case leaks. Damaged or worn gear components. Pump body not aligned with oil feed slot in case bore. Pump plunger or pump body worn excessively.	overdrive does not engage, remove and disassemble overdrive. Repair or replace defective parts as required.
OVERDRIVE WILL NOT DISENGAGE (Continued)	(1) Closed switch or shorted wire in electrical control circuit.	(1) Check for shorted wires, sticking control switch pushbutton (at turn indicator lever) or closed switches.
CAUTION: This condition calls for immediate attention. Do not attempt to back up car— extensive damage to overdrive may result.	(2) Solenoid valve stuck, or shorted.	(2) Remove, clean, and test solenoid valve as outlined in Service Procedures - In Car. Replace solenoid valve if defective.
	(3) Relief valve piston stuck or spring broken. Relief valve assembly spring broken. Control orifice plugged.	(3) Install pressure test gauge and check residual pressure at 25 to 30 mph. Pressure should be approximately 20 to 40 psi. If pressure is higher than 40 psi, remove oil pan, main case plugs and all valves and filters. Clean all components thoroughly. Replace plugged filters, worn o-ring seals, scored or pitted valves, or valves with broken springs. Remove solenoid valve and clean control orifice with compressed air.
	(4) Sliding clutch sticking. Damaged or seized gear components.	(4) Remove and disassemble overdrive. Repair or replace defective parts as required.
SLOW DISENGAGE- MENT AND/OR OVERDRIVE FREEWHEELS ON OVERRUN	(1) Relief valve piston sticking.	(1) Remove and clean piston. Replace if scored, pitted or corroded. Check sleeve for pitting, scoring, or corrosion. Replace sleeve if damaged.
	(2) Solenoid valve oil feed holes plugged or valve sticking.	(2) Remove, clean, and test solenoid valve as outlined in Service Procedures - In Car. Replace solenoid valve if defective.
	(3) Control orifice plugged.	(3) Remove relief valve piston, valve assembly, sleeve, and valve body. Remove solenoid valve and clean control orifice with compressed air.

Condition	Possible Cause	Correction
SLOW DISENGAGE- MENT AND/OR OVERDRIVE FREEWHEELS ON OVERRUN	(4) Overrunning clutch worn, or seized. Worn, damaged sun gear, or sliding clutch hub. Worn or damaged friction material on sliding clutch hub. Worn, damaged brake ring.	(4) Remove and disassemble overdrive. Repair or replace parts as required.
OVERDRIVE SLIPS WHEN ENGAGING	<p>(1) Low lubricant level.</p> <p>(2) Plugged oil pan, or pressure filter.</p> <p>(3) Sticking or plugged non-return valve. Sticking relief valve piston. Broken spring on relief valve assembly. Control orifice plugged.</p> <p>(4) Solenoid valve sticking, oil feed holes plugged, or loose wire at solenoid terminal.</p> <p>(5) Worn clutch apply piston seals. Worn friction material on sliding clutch. Internal leak in case. Worn pump plunger or pump body. Damaged or worn gear components. Pump body not aligned with oil feed slot in case bore. Annulus gear clutch surface worn, burned, or galled.</p>	<p>(1) Check and correct level. Correct any oil leaks.</p> <p>(2) Remove and clean filters. Replace filters if cleaning does not unplug them.</p> <p>(3) Perform hydraulic pressure test with overdrive engaged. If pressures are below 510 psi with overdrive engaged or pressure fluctuates rapidly, remove oil pan, main case plugs, and all valves and filters. Clean all parts thoroughly. Replace plugged filters, worn o-ring seals, scored, or pitted valves, or valves with broken springs. Remove solenoid valve and clean control orifice with compressed air.</p> <p>(4) Remove, clean, and test valve as outlined in Service Procedures - In Car. Replace solenoid valve if defective. Repair loose connections at terminals.</p> <p>(5) Remove and disassemble overdrive. Repair or replace defective parts as required.</p>
SHUDDERS - CHATTERS WHEN BACKING UP - (OVERDRIVE DISENGAGED)	<p>(1) Loose or defective engine and transmission support cushions.</p> <p>(2) Transmission clutch slipping (incorrectly adjusted).</p>	<p>(1) Inspect all support cushions. Tighten if loose; replace if defective.</p> <p>(2) Adjust clutch tree play as outlined in clutch section.</p>

Condition	Possible Cause	Correction
SHUDDERS- CHATTERS WHEN BACKING UP— (OVERDRIVE DISENGAGED) (Continued)	(3) Weak clutch return springs. Worn or damaged friction material on sliding clutch. Burned, or galled annulus gear clutch surface.	(3) Remove and disassemble overdrive. Replace parts as required.
NO KICKDOWN	(1) Kickdown switch not adjusted correctly. (2) Kickdown switch stuck, shorted, broken.	(1) Adjust switch. (2) Check plunger and switch continuity. Replace if necessary.
NOISY WHEN ENGAGED	(1) Sliding clutch slipping. All bearings worn, pitted, or galled. Rear bushing worn. Pinion gears or mainshaft annulus gear teeth chipped or broken, worn, chipped overrunning clutch rollers, or clutch race in annulus gear bore. Mainshaft thrust washer worn, broken, or missing. Sun gear teeth chipped or broken.	(1) Remove and disassemble overdrive. Replace defective parts as required.
MAKES LIGHT KNOCKING SOUND	(1) Pump body installed improperly. (Flat not aligned with oil hole.)	(1) Remove pump body and align properly in case bore.

Overdrive Disengaged

Power from the transmission output shaft is transmitted to the overdrive main shaft through the overrunning clutch. The sliding clutch is held rearward by clutch return spring pressure exerted through the thrust bearing and thrust bearing cover. This spring pressure loads the sliding clutch, holding the inner friction lining of the clutch in contact with the outside diameter of the annulus gear on the main shaft. Loading of the sliding clutch is further increased by reverse torque from the sun gear which is splined to the sliding clutch. In this condition, the planetary gear train is locked and overrun or reverse torque is absorbed by the sliding clutch. Since overrun or reverse torque is absorbed by the sliding clutch, the overrunning clutch does not freewheel when the overdrive is disengaged (fig. 6-29).

Overdrive Engaged

The sliding clutch is moved forward, by hydraulic pressure in the clutch apply cylinders, until the outer

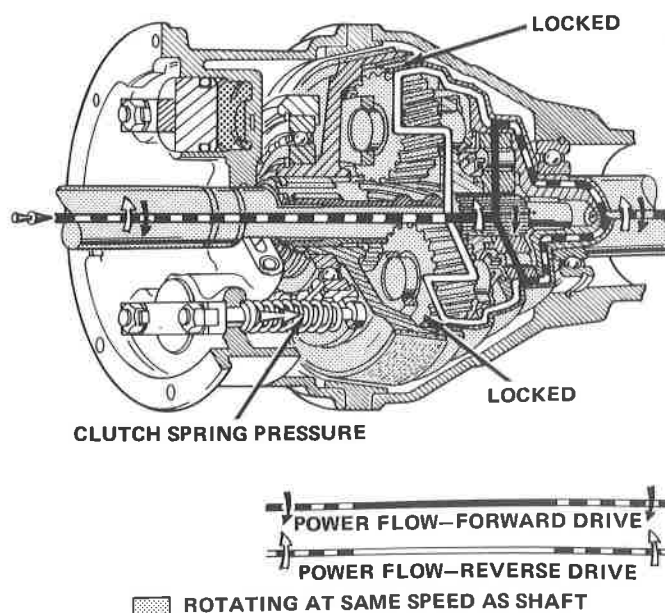


Fig. 6-29 Power Flow—Overdrive Disengaged

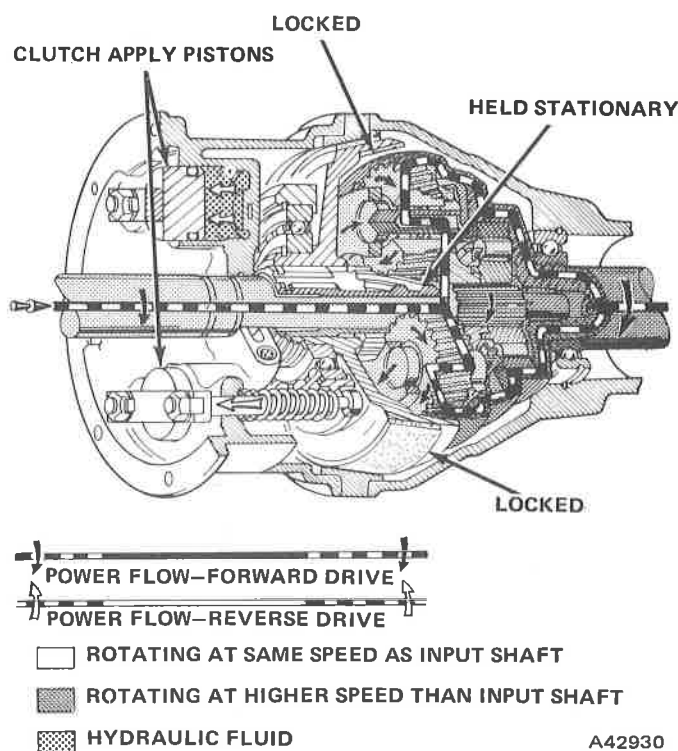


Fig. 6-30 Power Flow—Overdrive Engaged

friction surface of the clutch contacts the stationary clutch brake ring. Since the sliding clutch is splined to the sun gear, both components come to rest and the sun gear becomes the reaction member for the planetary gear train. Because the pinion carrier is splined to the transmission output shaft, and driven by it, the pinion gears revolve around the now stationary sun gear. As the pinion gears revolve around the sun gear, they turn the annulus gear and main shaft at a speed greater than that of the pinion carrier and transmission output shaft. The overrunning clutch can now freewheel, allowing the main shaft to rotate faster than the transmission output shaft (fig. 6-30).

HYDRAULIC SYSTEM

Hydraulic system pressure is developed by a cam operated plunger-type pump. The pump cam is operated by the transmission output shaft through a drive key (fig. 6-31). The pump draws oil from the air cooled sump, through the oil pan filter, and delivers it through the non-return valve and pressure filter to the clutch apply pistons, solenoid valve, and relief valve assembly.

A spring-loaded piston in the relief valve assembly provides for smooth engagement and disengagement under all operating conditions. When the overdrive is disengaged, a residual system pressure of 20 to 40 psi is maintained. With overdrive engaged, system pres-

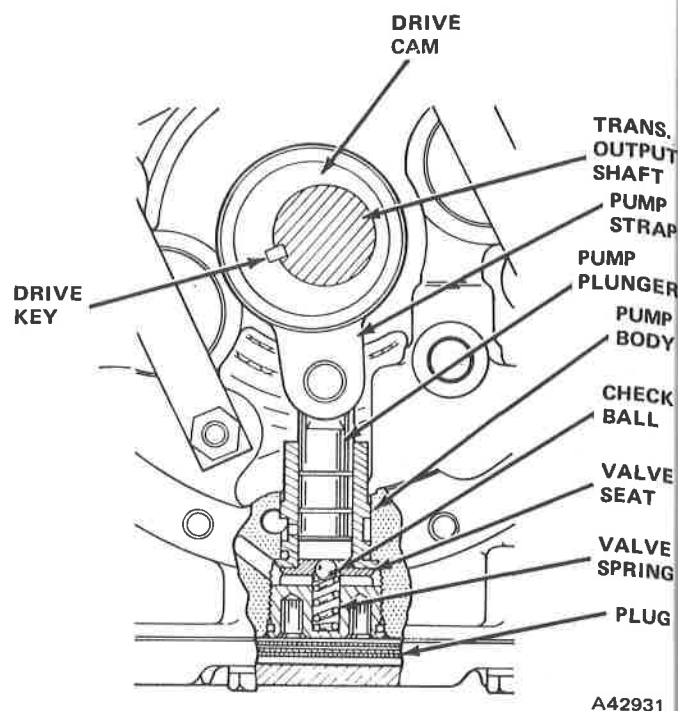


Fig. 6-31 Pump and Non-Return Valve Assembly

sure increases to 520 to 540 psi and is controlled by relief valve spring pressure.

Overdrive Disengaged

Oil is drawn from the sump, through the oil pan filter, and is delivered through the non-return valve assembly to the pressure filter and clutch apply pistons.

As the oil leaves the clutch apply pistons, it passes into the relief valve oil passages in the main case and acts upon the solenoid valve which is closed. Because the solenoid valve is closed, the oil continues through the relief valve oil passages and into the relief valve exhaust port. Oil leaving the exhaust port is then delivered through the lubrication passage in the case to the main shaft and planetary gear train for lubrication purposes. Pressure buildup in the lubrication passages is controlled by the spring-loaded lubrication relief valve.

Since the solenoid valve has not been energized and remains closed, oil pressure to the relief valve piston is withheld. The relief valve piston will then remain seated under relief valve spring pressure. The relief valve residual pressure spring maintains residual oil pressure in the hydraulic system at 20 to 40 psi. This pressure is insufficient to move the clutch apply pistons, but is necessary for the purpose of lubrication and for smoother system response to engagement pressures (fig. 6-32).

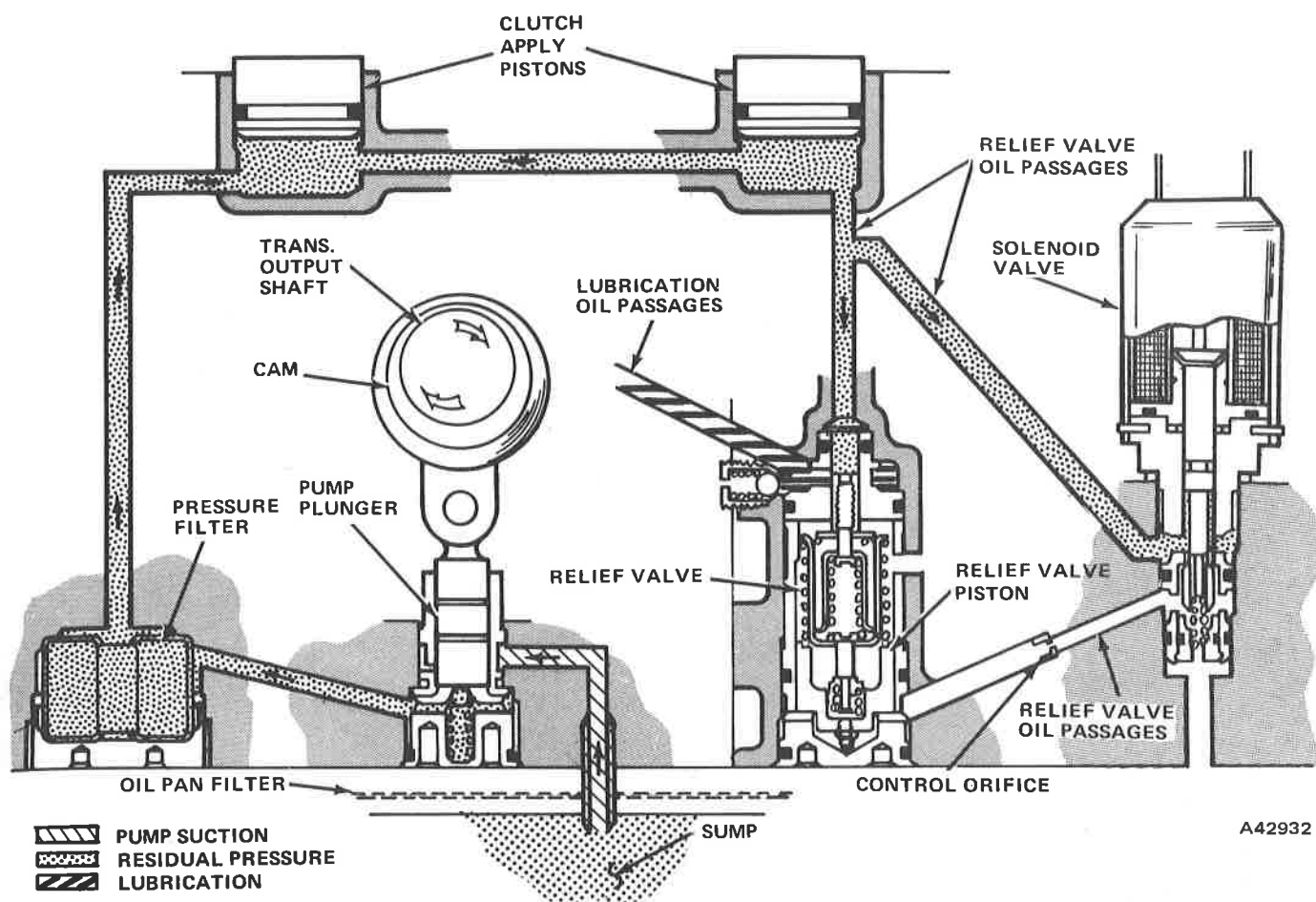


Fig. 6-32 Hydraulic System—Overdrive Disengaged

Overdrive Engaged

When the solenoid is energized, its valve opens and oil (at residual pressure) is delivered through the control orifice in the relief valve oil passage to the relief valve piston. Residual oil pressure then causes the relief valve piston to rise and begin compressing the relief valve springs.

As the relief valve springs are compressed, system pressure increases until the relief valve piston reaches its stop. At this point, the relief valve and residual pressure springs are fully compressed and the hydraulic system is now at its maximum operating pressure of 520 to 540 psi.

With maximum system pressure developed, the clutch apply pistons overcome clutch return spring pressure and move forward, engaging the sliding clutch in the stationary brake ring (fig. 6-33).

Lubricating Oil Circuit

Oil is discharged from the relief valve exhaust port into the lubrication passage in the case. From this passage the oil is then pumped into the main shaft

and thrust bearing through lubrication holes drilled in the main shaft. As lubrication oil leaves the main shaft through the thrust bearing, it passes through the overrunning clutch and onto the overrunning clutch oil slinger. The oil slinger then directs oil to the oil catcher disc on the pinion carrier and onto the planetary gear train through the hollow pinion gear pins. The main shaft bearing is lubricated by oil fed through the main shaft. Lubrication pressure is controlled by the lubrication relief valve.

MAINTENANCE AND LUBRICATION

The transmission and overdrive assemblies share a common lubricating oil supply. Lubricant level for both units is checked at the transmission fill plug.

The correct fill level for the transmission-overdrive assembly is to the edge of the transmission fill plug. Lubricant level should be checked every 5000 miles.

NOTE: Check lubricant level only after the transmission-overdrive assembly has been brought to operating temperature and the overdrive has been engaged and disengaged at least once.

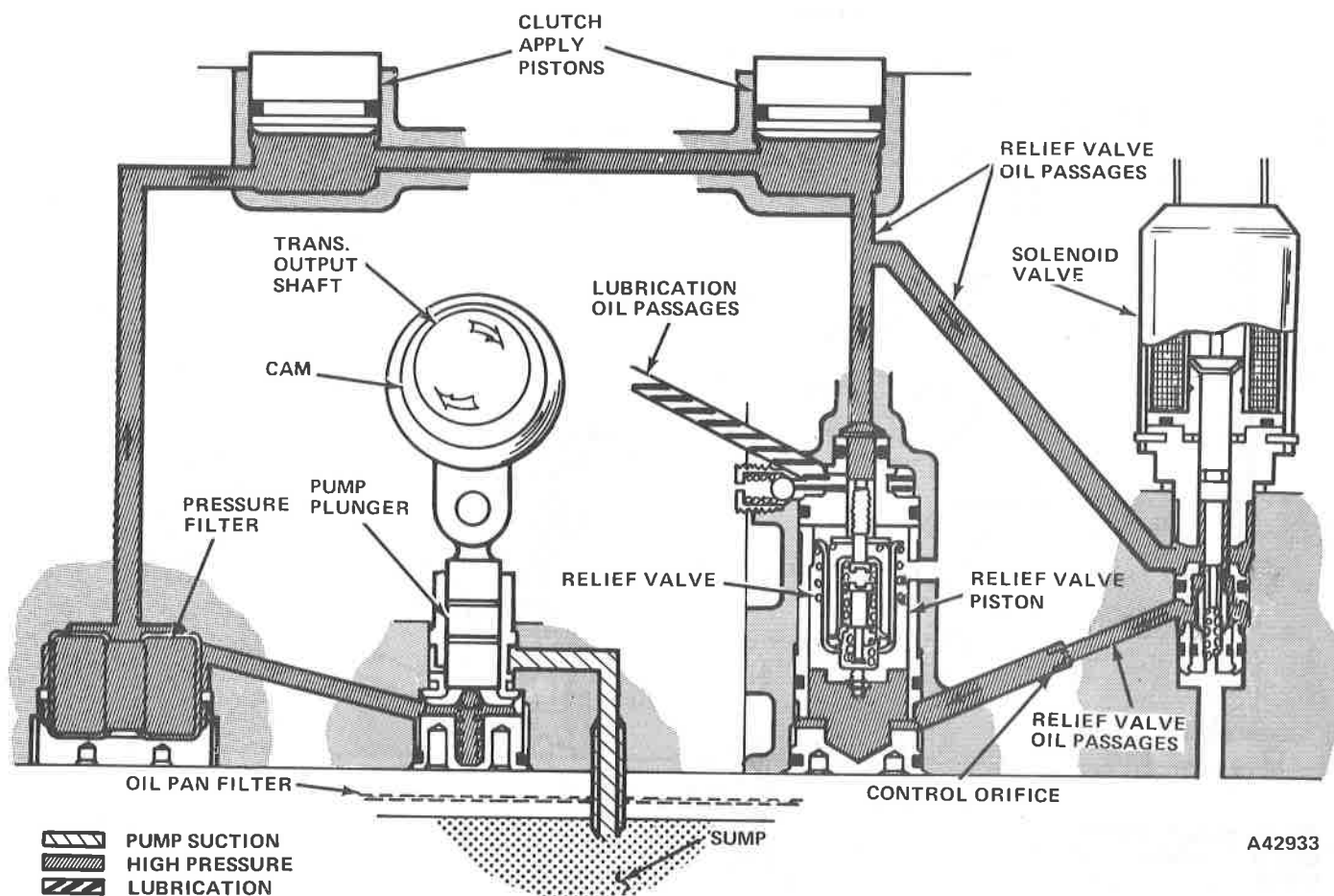


Fig. 6-33 Hydraulic System Overdrive Engaged

To drain the transmission-overdrive assembly, the oil pan of the overdrive unit must be removed as well as the transmission drain bolt. After complete draining and refilling, operate the transmission and overdrive, recheck the lubricant level, and add additional lubricant as required.

The following recommended lubricants are equally acceptable:

- SAE 80W-140 Gear Lubricant—API GL-4
- SAE 80W-90 Gear Lubricant API GL-4

Fluid Capacity:

- Overdrive.....1 pint (approximate)
- Transmission-overdrive assembly.....4.0 pints (approximate)

ELECTRICAL CONTROL SYSTEM

The electrical control system circuit is wired in series and consists of the following components: A pushbutton-type overdrive control switch, a kickdown switch, a Third gear switch, a solenoid valve, and a governor speed switch (fig. 6-34).

NOTE: On California cars, the Third gear switch is replaced with a TCS switch and Third gear relay, which is located under the instrument panel.

An overdrive indicator lamp, mounted in the instrument panel, is wired electrically (in parallel) to the solenoid valve. With overdrive engaged, the lamp will light and remain lit until overdrive is disengaged.

CIRCUIT OPERATION

In order to engage the overdrive, all switches in the control circuit must be closed. If any switch remains open, the solenoid valve cannot be energized to engage the overdrive. All switches in the control circuit are actuated mechanically.

With the overdrive control switch ON, the transmission in third gear, and car speed at or above the governor cut-in speed of 38 mph, the circuit is completed and battery current can energize the solenoid valve to effect overdrive engagement. If the transmission is shifted out of third gear, or the control switch is tur-

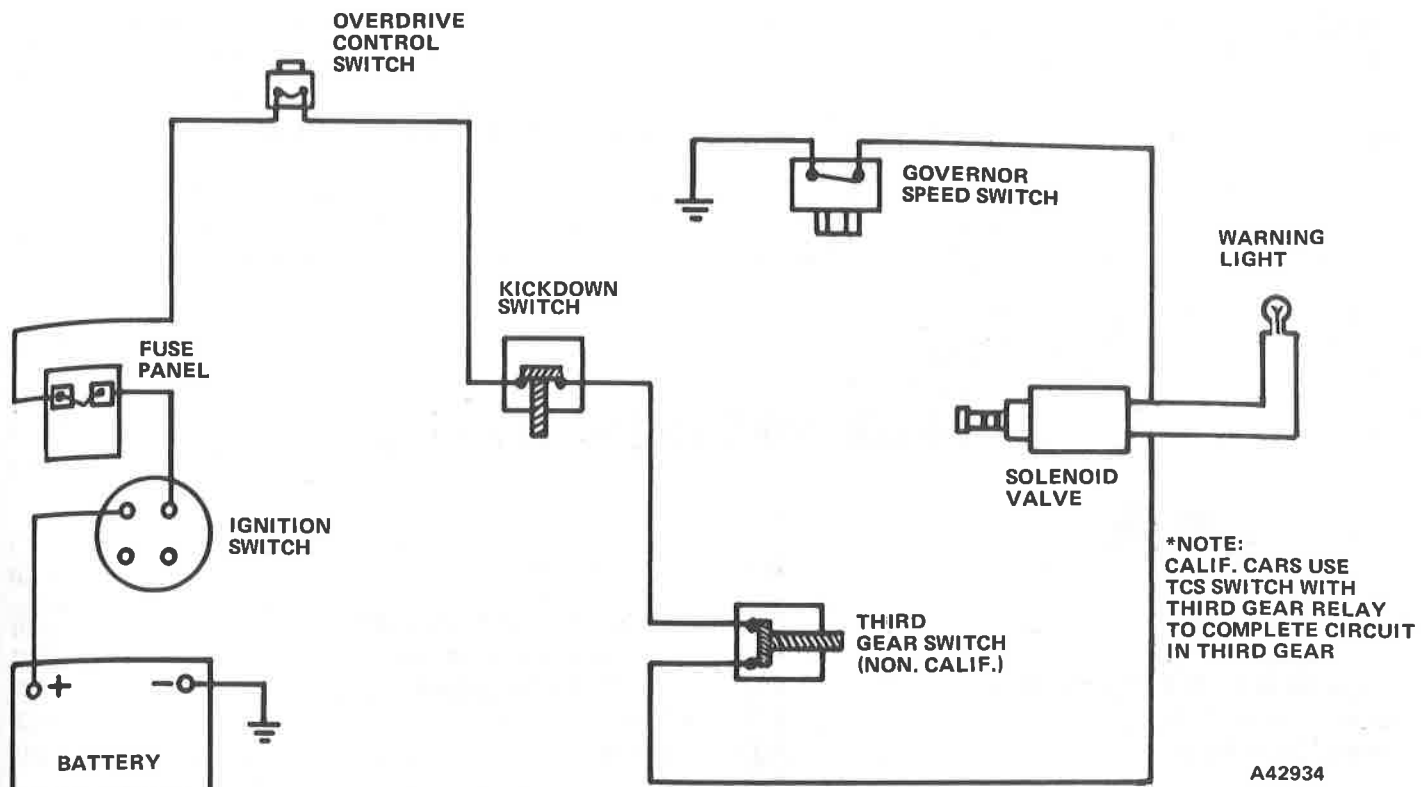


Fig. 6-34 Electrical Control Circuit

ned off, or the kickdown switch is activated, or if car speed drops below the governor cutout speed of 32 mph, the circuit will be broken and the solenoid deenergized, disengaging the overdrive.

Governor Speed Switch

When car speed reaches 38 mph, centrifugal action of internal weights in the governor speed switch will close the contact points in the switch. These contacts will remain closed until car speed drops below 32 mph. The governor speed switch is attached to the speedometer governor switch adapter and is operated by the speedometer cable.

Third Gear Switch (Nationwide)

The switch is mounted in the transmission and is actuated by the Second-Third shift rail.

The Third gear switch remains open until the transmission is shifted into Third gear. This switch prevents overdrive operation in First, Second, or Reverse gears.

TCS switch and Third Gear Relay (California Only)

California cars require a TCS switch which is open

when the transmission is in Third gear. In order to complete the overdrive circuit, but prevent overdrive operation in First, Second, or Reverse gears, a Third gear relay is connected to the TCS switch. The relay is mounted in the dash panel and performs the same function as the Third gear switch. The relay is closed only when the transmission is in Third gear.

Kickdown Switch

The kickdown switch remains closed except when the accelerator pedal is fully depressed. This switch serves as a circuit interrupter, permitting temporary overdrive disengagement whenever additional acceleration is needed. The plunger-type kickdown switch is attached to a bracket mounted on the carburetor base and is actuated by the carburetor throttle lever.

Overdrive Control Switch

The overdrive control switch is a pushbutton-type switch which is mounted in the turn signal lever on the steering column (fig. 6-28). When the switch button is pressed the overdrive will automatically engage after the transmission is in Third gear and car speed reaches 38 mph. If the switch button is pressed again, the control circuit will open, preventing battery

current from energizing the solenoid valve, which automatically disengages the overdrive.

Solenoid Valve

The solenoid valve is grounded through the governor speed switch. The valve remains closed until the solenoid is energized, preventing sufficient hydraulic

pressure to build up and engage the overdrive. The solenoid valve is installed in the overdrive unit.

Solenoid Valve and Switch Servicing

All control switches and the solenoid valve are serviced as assemblies. Do not attempt to repair any switch or solenoid valve if found inoperative.

SERVICE PROCEDURES—IN CAR

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HYDRAULIC PRESSURE TESTING PROCEDURE

(1) Lift and support car so rear wheels are free to rotate.

(2) Check and correct lubricant level at transmission as outlined in Maintenance and Lubrication.

(3) Remove main case pressure plug and copper gasket and install Pressure Gauge Set J-25303. Be sure to use copper gasket with pressure gauge adapter fitting (fig. 6-35).

(4) Place overdrive control switch in OFF position, start engine, shift transmission into Third gear, and operate at 25 to 30 mph. Hydraulic pressure should be approximately 20 to 40 psi at this speed.

(5) Press overdrive control switch in turn indicator and increase car speed to 40 to 45 mph. When overdrive engages, pressure should increase to 520 to 540 psi.

(6) Place overdrive control switch in OFF position. When overdrive disengages, hydraulic pressure should return to approximately 20 to 40 psi.

(7) Stop engine, remove pressure gauge set, and install main case pressure port plug and copper gasket. Tighten plug to 12 foot-pounds torque and lower car.

KICKDOWN SWITCH ADJUSTMENT

- (1) Loosen locknut on switch plunger.
- (2) Place carburetor throttle lever in wide open position.

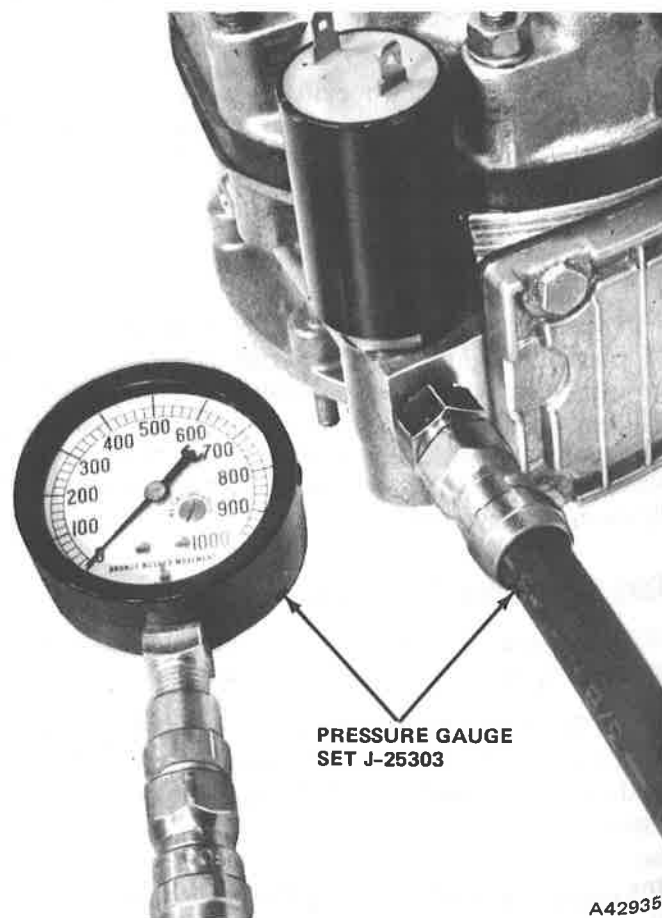


Fig. 6-35 Hydraulic Pressure Testing

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- (3) Position switch plunger so that it is fully pressed by carburetor throttle lever with throttle lever in wide open position.
- (4) Tighten locknut on switch plunger.

SOLENOID VALVE

Removal—Testing—Installation

- (1) Raise car on hoist.
- (2) Disconnect wires from solenoid valve.
- (3) Remove valve with Solenoid Valve Wrench J-25304 or with 1-inch open end wrench that has been ground to a thickness of 1/4 inch or less.

CAUTION: Do not attempt to remove valve by turning body with pliers or similar tools, as the solenoid valve will be severely damaged.

- (4) Inspect valve for cracks, plugged oil feed holes, broken electrical terminals, and seized solenoid valve plunger. Discard old O-ring if cut, worn, or stretched oversize (loose). If oil feed holes in valve end are plugged, soak in a cleaning solvent until clean (fig. 6-36). Do not use compressed air to clear any blockage or to dry valve after cleaning. Allow valve to dry on clean, lint-free shop cloth.

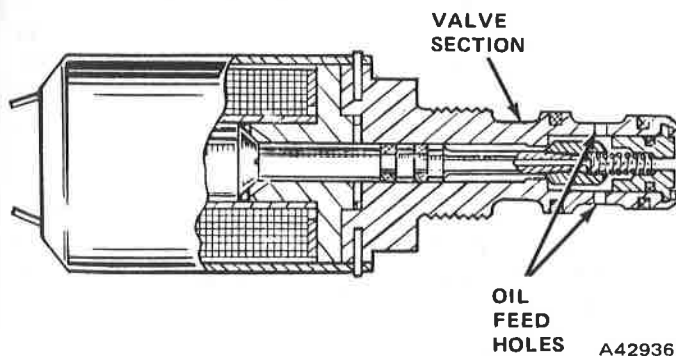


Fig. 6-36 Solenoid Valve

- (5) Test solenoid coil with a 12-volt battery and ammeter. When energized, the solenoid draw should be approximately 2 amps. Check that the valve plunger moves fully forward when solenoid is energized, and that plunger returns under spring pressure when deenergized.

- (6) If solenoid is found inoperative, replace it as an assembly. If solenoid is not defective, install new O-rings on valve end, install in overdrive with Wrench J-25304, and reconnect solenoid valve wires.

- (7) Lower car.

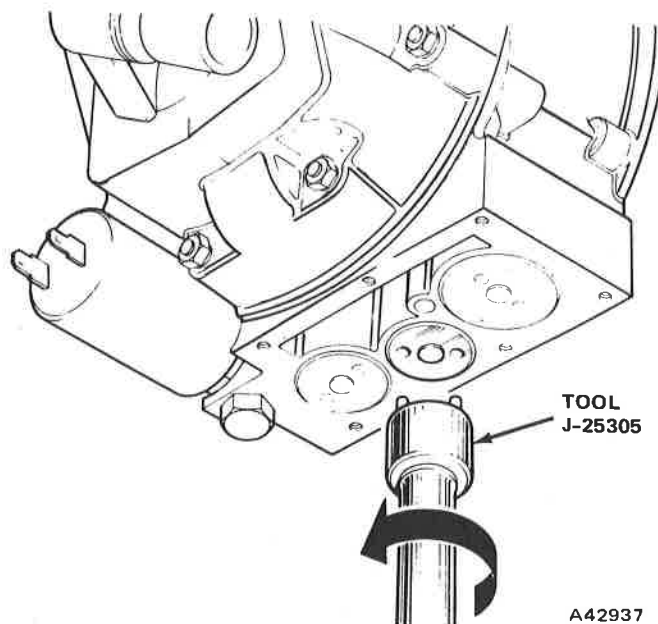


Fig. 6-37 Main Case Plugs Removal and Installation

RELIEF VALVE ASSEMBLY

Removal

- (1) Raise car on hoist.
- (2) Remove oil pan, oil pan gasket, and oil pan filter.
- (3) Remove relief valve piston plug with Spanner Tool J-25305 (fig. 6-37).
- (4) Remove relief valve piston, relief valve residual pressure spring, and relief valve and spring assembly (fig. 6-38).

NOTE: Relief valve residual pressure spring is the only loose spring in the valve assembly. DO NOT REMOVE springs from piston or relief valve.

- (5) Insert hooked end of Relief Valve Body Remover Tool J-25307 into side orifice of relief valve body (fig. 6-39). When hooked end of tool is in position in side orifice of relief valve body, slide barrel of tool upward to secure hooked end of tool, and pull straight down on tool to remove valve body and relief valve sleeve.

NOTE: Exert firm, steady pressure on tool to remove valve body and sleeve. Do not attempt to jerk valve and sleeve out of case bore, as both parts could be damaged.

Inspection—Cleaning

Inspect piston, sleeve, and valve body for scratches, nicks, burrs, cracks, corrosion, and excessive wear. Be

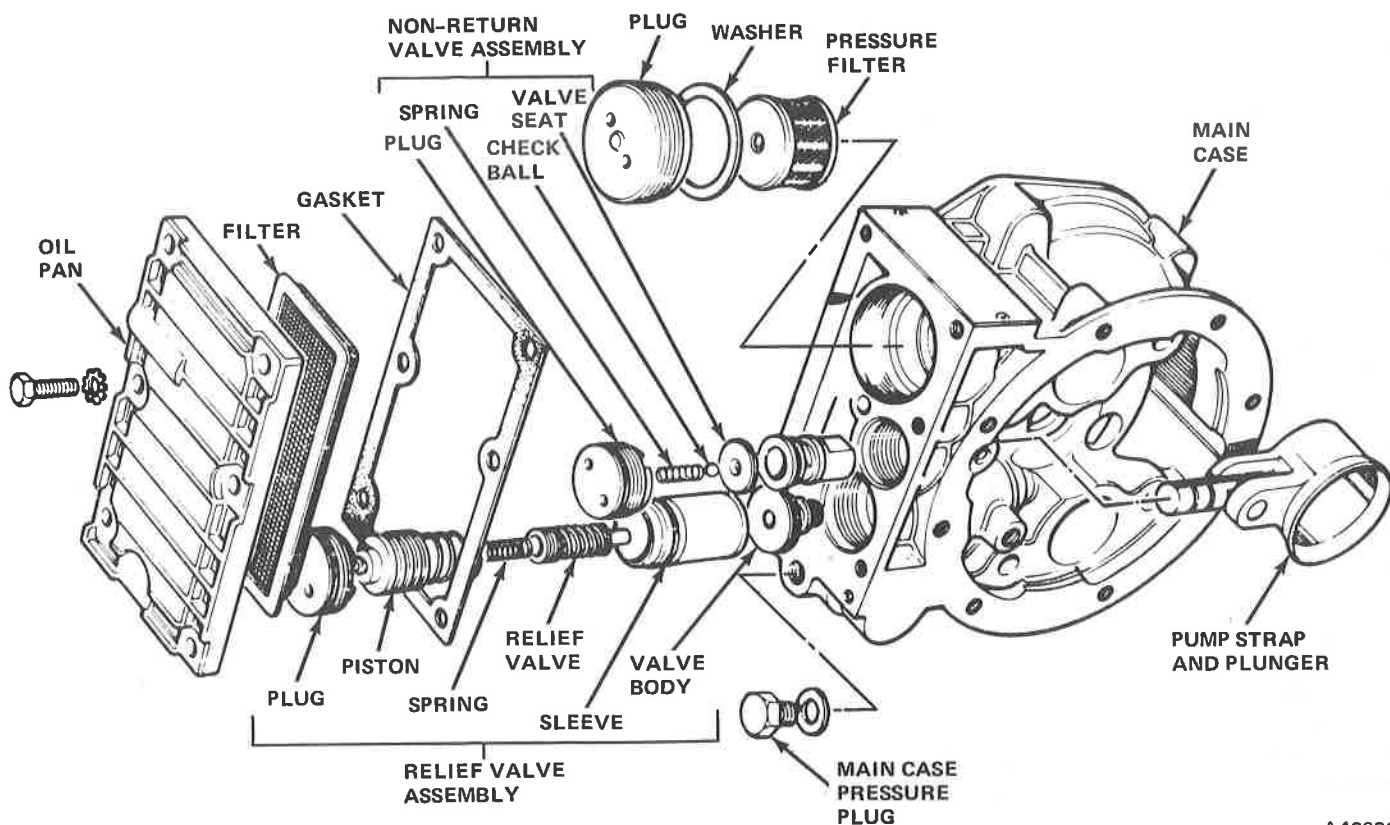


Fig. 6-38 Main Case Components

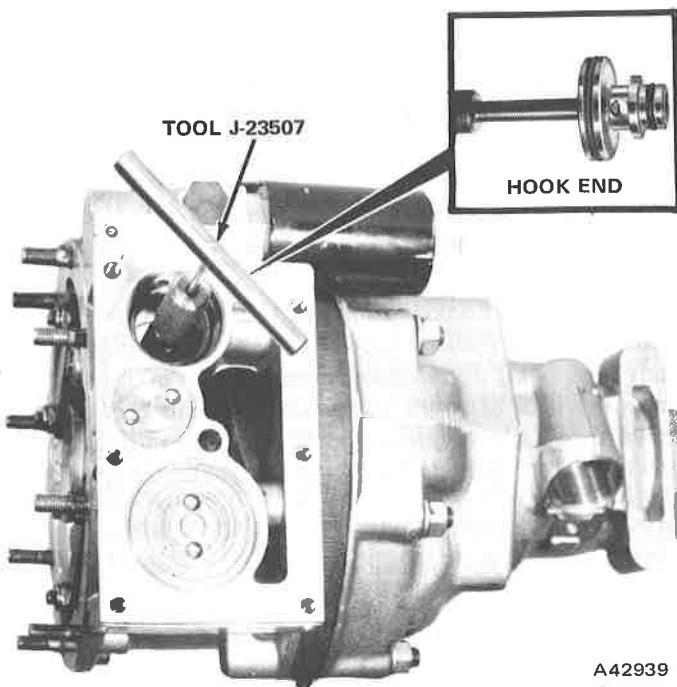


Fig. 6-39 Removing Relief Valve Body and Sleeve

sure piston moves freely in the sleeve. Inspect for broken, worn, or distorted springs. Inspect oil pan fil-

ter for holes, tears, or foreign material. Clean or replace as required. Discard old O-rings. Wash all parts in clean solvent and dry with filtered compressed air.

Installation

(1) Clean control orifice, located in relief valve bore of case, with compressed air. Do not clean orifice with wire. This could impair calibration of the orifice (fig. 6-40).

(2) Install new O-rings on relief valve piston plug, relief valve sleeve, and relief valve body.

(3) Coat relief valve body and relief valve sleeve with transmission lubricant, then insert valve body in case bore, followed by sleeve. Push firmly on sleeve to seat both sleeve and valve body.

(4) Assemble relief valve and spring assembly, residual pressure spring, and relief valve piston. Coat all parts with lubricant and insert assembled parts in relief valve sleeve (fig. 6-37).

(5) Install relief valve piston plug in case bore with Tool J-25305. Tighten plug to 14 to 18 foot-pounds torque.

(6) Install oil pan filter, oil pan gasket and oil pan. Tighten oil pan bolts to 6 foot-pounds torque.

(7) Add lubricant to transmission, as required, and

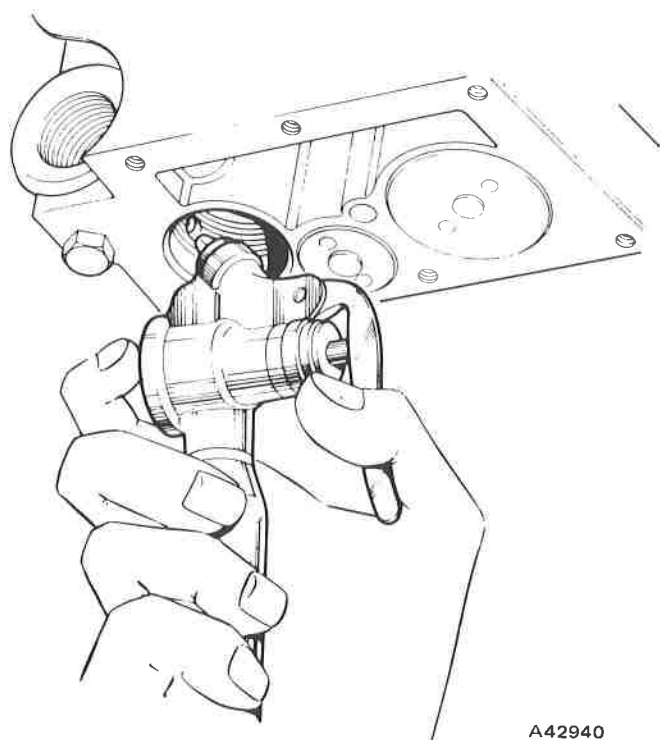


Fig. 6-40 Cleaning Control Orifice

lower car. Operate overdrive, recheck lubricant level and correct as necessary.

CONTROL ORIFICE

The control orifice is located in the solenoid-to-relief valve oil feed passage in the main case (fig. 6-40). To gain access to the control orifice, the relief valve and solenoid valve must be removed as outlined in Relief Valve Assembly and Solenoid Valve under Service Procedures—In Car.

To clean the control orifice, use compressed air only. DO NOT attempt to clean the orifice with wire; this will impair calibration of the orifice.

PUMP NON-RETURN VALVE ASSEMBLY

Removal

- (1) Raise car on hoist.
- (2) Remove oil pan, oil pan gasket, and oil pan filter.
- (3) Remove pump plug, using Spanner Tool J-25305, and remove non-return valve seat spring and check ball (fig. 6-37).

CAUTION: Spring and ball are resting in pump plug. When plug is removed, take care not to lose spring or ball.

- (4) Remove non-return valve seat with magnet or section of wire with hooked end.

Inspection—Cleaning

Inspect valve seat and ball for pitting, corrosion, wear, nicks, burrs, and scratches. Inspect spring for distortion, loss of tension, or breakage. Clean all removed parts in solvent and dry with filtered compressed air. Discard old O-rings on pump plug.

- (1) Install new O-ring on pump plug.
- (2) Place non-return valve seat spring in pump plug.
- (3) Place non-return valve seat check ball on top of spring, then place non-return valve seat on check ball.
- (4) Carefully thread assembled valve seat check ball, spring, and plug into case. Tighten pump plug with Tool J-25305 to 16 foot-pounds torque.
- (5) Install oil pan filter, oil pan gasket, and oil pan. Tighten pan bolts to 6 foot-pounds torque.
- (6) Add lubricant to transmission, as required, and lower car. Operate overdrive, recheck lubricant level, and correct as necessary.

OIL PAN FILTER AND PRESSURE FILTER

Removal—Cleaning—Installation

- (1) Raise car on hoist.
- (2) Remove oil pan, oil pan gasket, and oil pan filter.
- (3) Remove pressure filter plug with Tool J-25305. Pressure filter and aluminum washer will come out with plug (fig. 6-38).
- (4) Thoroughly clean pressure filter and oil pan filter with gasoline or kerosene. Use reduced pressure compressed air to dry filters or place filters on clean, lint-free shop cloth to drain until dry. If either filter is torn, split, or so severely plugged that it cannot be cleaned, replace the filter.
- (5) Install new aluminum washer on pressure filter plug.
- (6) Position pressure filter in plug and install assembled filter, washer, and plug. Tighten plug to 14 to 18 foot-pounds torque with Tool J-25305.
- (7) Install oil pan, oil pan gasket and oil pan filter. Tighten oil pan bolts to 6 foot-pounds.
- (8) Add lubricant, as required, to transmission and lower car. Operate overdrive, recheck fluid level, and correct if necessary.

GOVERNOR SPEED SWITCH AND SPEEDOMETER GEAR

Removal

- (1) Raise car on hoist.
- (2) Disconnect speedometer cable from governor speed switch.
- (3) Remove speedometer adapter clamp bolt and remove clamp, governor speed switch, speedometer adapter, speedometer support, and speedometer driven gear from speedometer (fig. 6-41).

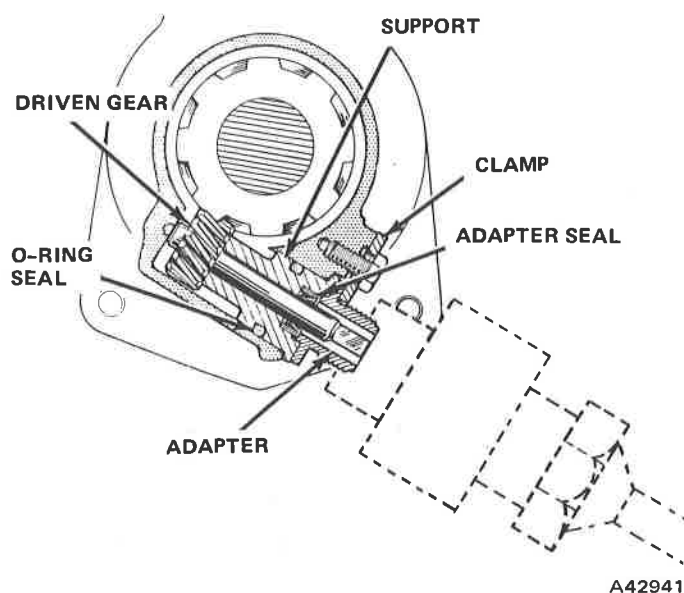


Fig. 6-41 Speedometer Assembly

(4) If governor speed switch is to be replaced, unthread it from speedometer adapter and thread adapter into new governor speed switch.

Installation

- (1) Install new O-ring seal on speedometer support and new adapter oil seal in support (fig. 6-41).
- (2) Insert speedometer driven gear into support and install gear and guide into speedometer bore.
- (3) Install assembled adapter and governor speed switch into speedometer bore in overdrive. Be sure

that adapter oil seal does not become dislodged during installation.

(4) Install speedometer adapter clamp and clamp bolt. Tighten bolt to 100 inch-pounds torque.

(5) Connect speedometer cable to governor speed switch.

(6) Lower car.

LUBRICANT LEVEL

Lubricant level is checked at the transmission fill plug as outlined under Maintenance and Lubrication. Use only those lubricants recommended. Do not use any type of anti-friction or lubricant "booster" type additives.

REAR OIL SEAL REPLACEMENT

(1) Raise car on hoist.

(2) Remove propeller shaft. Mark rear universal joint and pinion yoke for correct alignment at installation.

(3) Thread rear oil Seal Remover Tool J-25313 into rear oil seal. Thread Knockout Tool J-7004-1 into Tool J-25313 and bump outward with weight to remove seal.

(4) Lubricate new seal with transmission lubricant and install in rear case with Seal Installer Tool J-25306. Be sure seal is fully seated in rear case.

(5) Install propeller shaft. Align index marks made during removal.

(6) Check and correct lubricant level at transmission.

(7) Lower car.

SERVICE PROCEDURES—OUT OF CAR

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OVERDRIVE REMOVAL

NOTE: Before removing overdrive, operate car, engage and disengage overdrive **WITH CLUTCH PEDAL DEPRESSED** (clutch disengaged). This procedure will relieve torque loading on overrunning clutch and pinion carrier easing removal.

(1) Raise car on hoist.

(2) Disconnect solenoid valve wires.

(3) Disconnect speedometer cable at governor speed switch.

(4) Remove speedometer adapter clamp bolt and remove clamp, governor speed switch, speedometer

adapter, speedometer support, and speedometer driven gear from speedometer bore.

(5) Remove propeller shaft. Mark rear universal joint and pinion yoke for correct alignment at installation.

(6) Disconnect shift rods at transmission shifter levers and slide rods forward out of gearshift lever retainer bushings. Remove mounting bolts that attach retainer to transmission adapter and remove retainer.

(7) Remove cotter pin from parking brake equalizer, disconnect front cable from equalizer, remove adjuster and hooks from floorpan, and lower equalizer and rear cables to provide working clearance.

(8) Place a support stand under clutch housing. Disconnect ground strap from floorpan. Remove bolts attaching rear support cushion to transmission adapter and remove crossmember with rear support cushion attached.

(9) Remove eight locknuts and lockwashers from overdrive main case-to-transmission adapter studs and remove overdrive. Discard old transmission adapter gasket.

OVERDRIVE INSTALLATION

(1) Clean gasket surfaces of overdrive main case and transmission adapter. Apply light coat of sealer to both surfaces and position new gasket on overdrive main case, taking care not to tear gasket when installing over main case studs.

(2) Install spring clip on transmission output shaft, if removed. Use long screwdriver to align overrunning clutch splines with transmission output shaft splines. Align drive slot in transmission output shaft with drive key in plunger pump drive cam and install overdrive. Be sure transmission output shaft splines are aligned with splines in overrunning clutch hub. DO NOT force engagement when installing.

(3) Install eight locknuts and lockwashers on overdrive main case-to-transmission adapter studs. Tighten nuts to 18 foot-pounds torque.

(4) Install rear crossmember with rear support cushion attached. Tighten rear crossmember stud nuts to 30 foot-pounds torque. Tighten support cushion-to-transmission adapter bolts to 22 foot-pounds torque, and remove support stand from under clutch housing. Connect ground strap to floorpan. Install parking brake equalizer, adjuster and hooks, and cables.

(5) Install gearshift lever retainer on transmission adapter. Position shift rods in retainer bushings and connect shift rods to transmission shifter levers.

(6) Install propeller shaft. Be sure to align index marks made during removal. Tighten universal joint strap bolts to 20 foot-pounds torque. If equipped with U-bolts, tighten U-bolt nuts to 13 foot-pounds torque.

(7) Assemble speedometer gear, speedometer sup-

port, speedometer adapter, and governor speed switch and install in speedometer bore in overdrive. Install speedometer adapter clamp and clamp bolt. Tighten bolt to 100 inch-pounds torque.

(8) Connect speedometer cable to governor speed switch.

(9) Connect solenoid valve wires.

(10) Check and correct fluid level in transmission and lower car.

(11) Install gearshift lever, crossover spring, insulator, boot, bezel, and knob.

Disassembly

(1) Remove solenoid valve with Wrench Tool J-25304. Do not attempt to remove solenoid by turning body with pliers or similar tool as solenoid could be damaged.

(2) Remove self-locking nuts that attach clutch piston apply bars to thrust bearing cover pins and discard nuts (fig. 6-42).

(3) Remove nuts, lockwashers, and copper gaskets from main case-to-rear case studs and separate main case assembly from rear case assembly.

NOTE: Copper gaskets are used under top two stud nuts. Note location of these gaskets for correct assembly.

(4) Remove loose clutch return springs from main case and remove clutch brake ring and gaskets from main case (fig. 6-42).

NOTE: Do not pry on clutch brake ring to remove it from main case. If brake ring is stuck, tap it lightly with plastic mallet to loosen.

(5) Remove oil pan, oil pan gasket, oil pan filter and main case pressure plug from main case and discard oil pan gasket (fig. 6-42).

(6) Remove pressure filter plug from main case with Spanner Tool J-25305 and remove pressure filter and aluminum washer (fig. 6-37).

(7) Remove pump body plug with Spanner Tool J-25305 and remove non-return valve ball seat spring, check ball, and valve seat. Remove O-ring from plug (fig. 6-38 and 6-42).

(8) Using pliers, carefully remove clutch apply pistons from bores in main case and remove O-rings from pistons. Discard O-rings (fig. 6-43).

NOTE: Do not remove lubrication relief valve plug, spring, or ball from main case.

(9) Remove pump body and assembled pump plunger and pump strap as follows:

(a) Push pump body upward until unseated in main case bore (fig. 6-44).

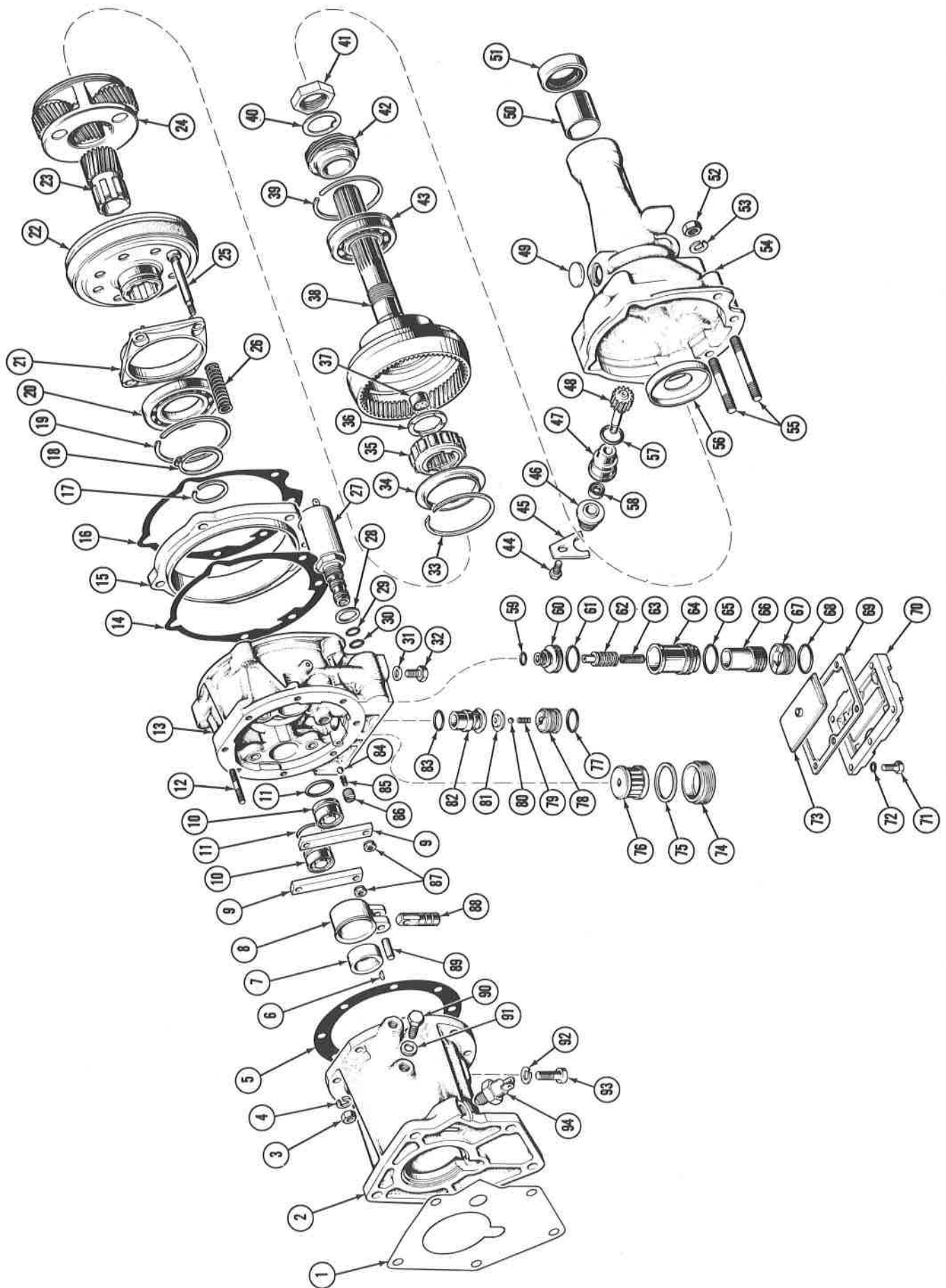


Fig. 6-42 Overdrive Assembly

1. Gasket Transmission to Adapter
2. Adapter, Transmission
3. Nut, Self Locking, Main Case Stud
4. Washer, Lock
5. Gasket, Main Case to Transmission Adaptor
6. Key, Pump Strap Cam Drive
7. Cam, Pump Strap
8. Strap, Pump
9. Bar, Clutch Piston Apply
10. Piston, Clutch Apply
11. Seal, Clutch Apply Piston O-Ring
12. Stud, Main Case to Transmission Adapter
13. Main Case
14. Gasket, Clutch Brake Ring (front)
15. Brake Ring, Clutch
16. Gasket, Clutch Brake Ring (rear)
17. Ring, Sun Gear Snap
18. Ring Lock, Sliding Clutch
19. Ring, Thrust Bearing Snap
20. Bearing, Thrust
21. Cover, Thrust Bearing
22. Clutch, Sliding
23. Sun Gear
24. Assembly, Pinion Carrier
25. Bolt, Thrust Bearing Cover (4 reqd.)
26. Spring, Clutch Return (4 reqd.)
27. Solenoid Valve
28. Washer, Solenoid Valve
29. Seal, Solenoid Valve O-Ring
30. Seal, Solenoid Valve O-Ring
31. Gasket, Main Case Pressure Plug
32. Plug, Main Case Pressure
33. Ring, Overrunning Clutch Snap
34. Slinger, Overrunning Clutch Oil
35. Assembly, Overrunning Clutch
36. Washer, Mainshaft Thrust
37. Bushing, Mainshaft Support (Included in Mainshaft)
38. Main Shaft and Annulus Gear
39. Ring, Mainshaft Bearing Snap
40. Washer, Speedometer Drive Gear Tab
41. Nut, Speedometer Drive Gear Lock
42. Gear, Speedometer Drive
43. Bearing, Mainshaft
44. Bolt, Speedometer Adapter Clamp
45. Clamp, Speedometer Adapter
46. Adapter, Speedometer to Governor Speed Switch
47. Adapter, Speedometer Driven Gear
48. Gear, Speedometer Driven
49. Plug, Expansion
50. Bushing, Rear Case (Included in Case)
51. Seal, Rear Case Oil
52. Nut, Self Locking, Main Case to Rear Case Stud
53. Washer, Lock
54. Rear Case
55. Stud, Main Case to Rear Case
56. Washer, Disc (not removed: included in rear case)
57. Seal, Speedometer Adapter O-Ring
58. Seal, Speedometer Adaptor Oil
59. Seal, Relief Valve Body O-Ring (Inner)
60. Body, Relief Valve
61. Seal, Relief Valve Body O-Ring (Outer)
62. Assembly, Relief Valve and Spring
63. Spring, Relief Valve Residual Pressure
64. Sleeve, Relief Valve
65. Seal, Relief Valve Sleeve O-Ring
66. Piston, Relief Valve
67. Plug, Relief Valve Piston
68. Seal, Relief Valve Piston Plug O-Ring
69. Gasket, Oil Pan
70. Oil Pan
71. Bolt, Oil Pan
72. Washer, Lock
73. Filter, Oil Pan
74. Plug, Pressure Filter
75. Washer, Pressure Filter (Aluminum)
76. Filter, Pressure
77. Seal, Pump Body O-Ring
78. Plug, Pump Body
79. Spring, Non-return Valve Ball-seat
80. Ball, Non-return Valve Check
81. Seat, Non-return Valve
82. Body, Pump Plunger
83. Seal, Pump Plunger Body O-Ring
84. Ball, Lubrication Relief Valve Check
85. Spring, Lubrication Relief Valve
86. Plug, Lubrication Relief Valve
87. Nut, Self Locking, Clutch Piston Apply Bar
88. Plunger, Pump
89. Pin, Pump Plunger
90. Bolt, Gearshift Lever Retainer to Adapter
91. Washer, Lock
92. Washer, Lock
93. Bolt, Rear Support Cushion to Adapter
94. Switch, Back-up Light

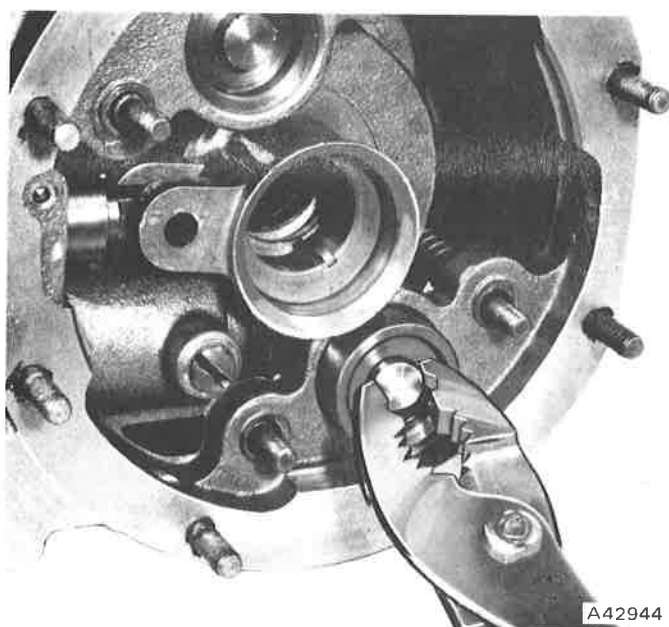


Fig. 6-43 Clutch Apply Pistons Removal

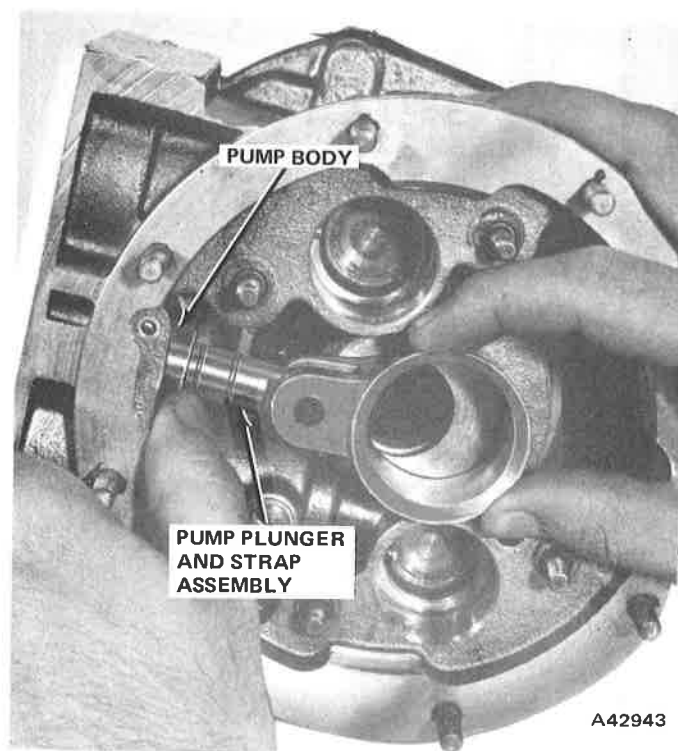


Fig. 6-44 Pump Plunger and Body Removal

(b) Carefully slide pump plunger out of pump body. Do not cock piston in body during removal.

(c) Remove body from main case bore.

NOTE: Pump body has a flat machined on one side. This flat aligns with oil feed hole and slot in main case bore. Note location of both for correct assembly.

(d) Remove drive cam and key from pump strap. **Do not** disassemble pump strap and pump plunger. They are serviced as an assembly only.

(10) Remove relief valve piston plug with Spanner Tool J-25305, and remove relief valve piston and relief valve residual pressure spring (fig. 6-42). Discard O-ring on plug.

NOTE: Residual pressure spring is only loose spring in relief valve assembly. **DO NOT** attempt to remove spring from relief valve piston as spring calibration will be impaired.

(11) Using magnet or needlenose pliers, carefully remove relief valve and spring assembly.

NOTE: Do not attempt to remove spring from valve as spring calibration will be impaired.

(12) Remove relief valve sleeve and relief valve body with Remover Tool J-25307 as follows (fig. 6-39):

(a) Insert hooked end of tool into side orifice relief valve body.

(b) When hooked end of tool is in position in side orifice of relief valve body, slide barrel of tool downward to secure hook end of tool, and exert firm, steady pull on tool handle. Tool will remove valve body and sleeve together (fig. 6-39).

NOTE: Do not attempt to jerk valve and sleeve out of case bore as both parts could be damaged.

(c) Remove O-rings from valve body, sleeve, and plug. Discard O-rings.

(13) Remove sliding clutch, sun gear, and thrust bearing cover assembly from main shaft annulus gear in rear case, and remove pinion carrier assembly from main shaft annulus gear (fig. 6-45).

(14) Remove sun gear snap ring and sliding clutch ring lock and push sun gear out of sliding clutch hub.

(15) Separate thrust bearing and cover from sliding clutch hub with Installer-Remover Tool J-25315 as follows:

(a) Insert tool into sliding clutch hub (fig. 6-46).

(b) Hand-support thrust bearing cover and tap on end of Remover Tool to drive clutch hub from thrust bearing.

(16) Remove thrust bearing snap ring, with small screwdriver or pointed tool, and press bearing from cover using arbor press. Do not remove thrust bearing cover bolts.

(17) Remove overrunning clutch snap ring and remove brass oil slinger (fig. 6-45).

(18) Insert overrunning clutch Remover-Installer Tool J-25308 into bore in main shaft annulus gear (fig. 6-47). Hold tool in position, reach through tool with

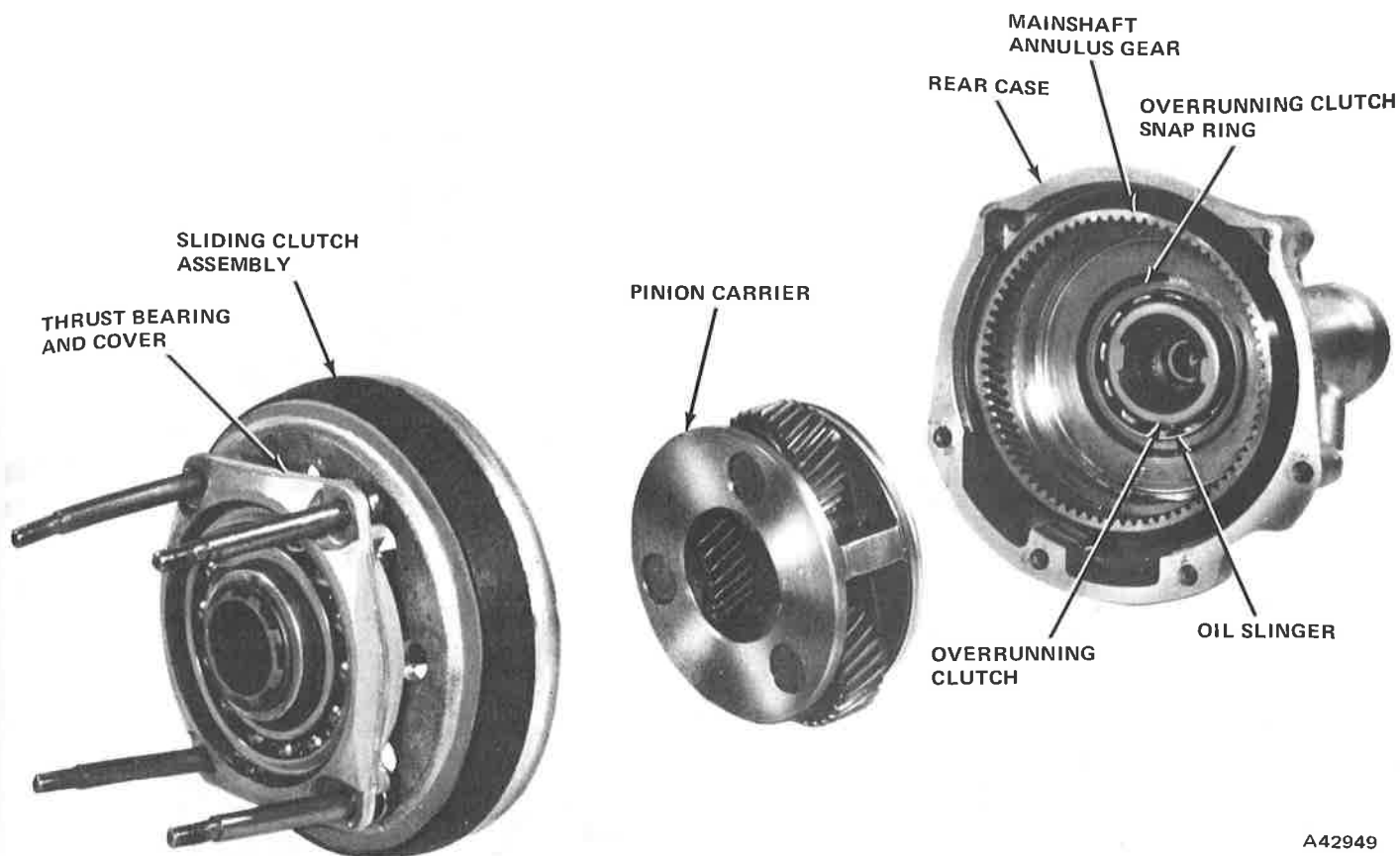


Fig. 6-45 Sliding Clutch Assembly and Pinion Carrier Removal and Installation

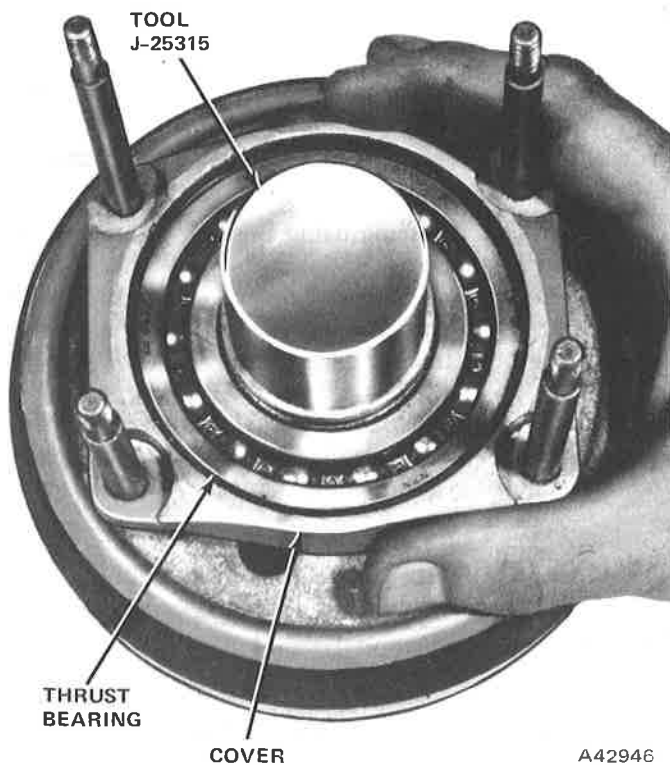


Fig. 6-46 Driving Clutch Hub from Bearing and Cover

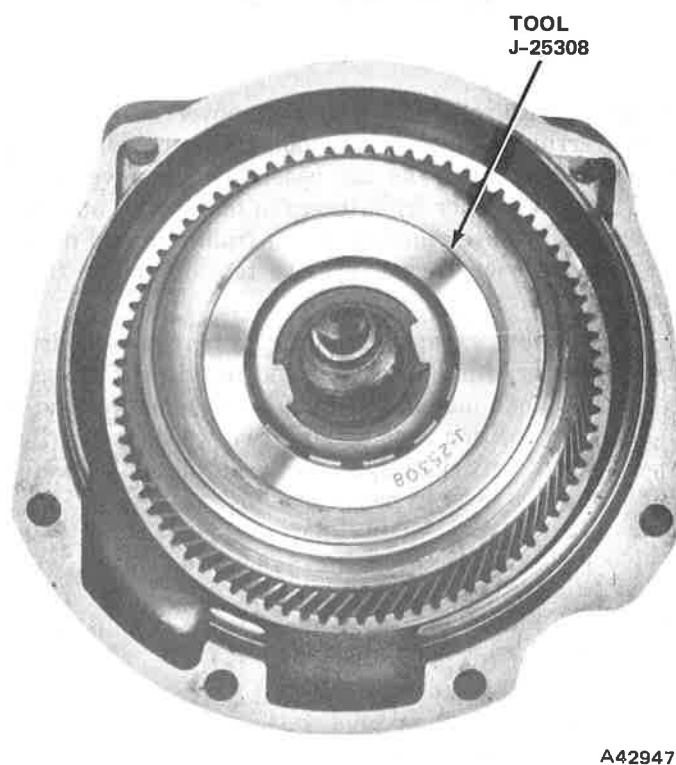


Fig. 6-47 Overrunning Clutch Removal and Installation

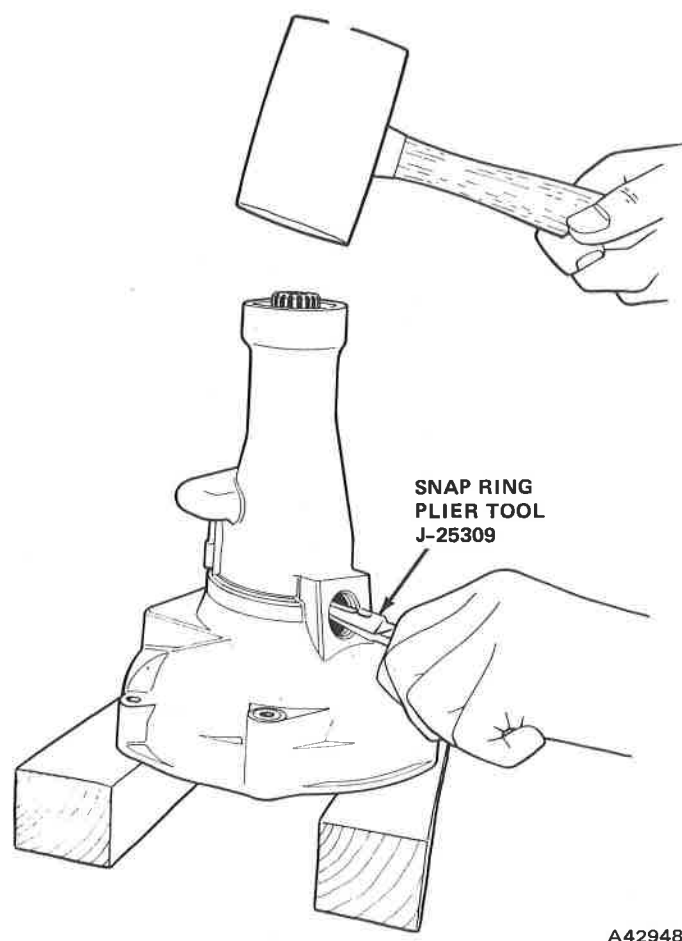


Fig. 6-48 Main Shaft Removal

finger or with relief valve body Remover Tool J-25307, pull overrunning clutch into tool, and remove tool and overrunning clutch as an assembly. Remove main shaft thrust washer from recess in main shaft annulus gear. Remove overrunning clutch from tool and disassemble; however, do not remove tension spring from cage.

(19) Remove expansion plug from rear case by driving punch or chisel into plug and prying out of case.

(20) Remove main shaft annulus gear as follows:

(a) Position rear case on two wood blocks (fig. 6-48). Allow sufficient space between blocks for main shaft annulus gear to pass through.

(b) Expand main shaft bearing snap ring, which is accessible through expansion plug hole, with Snap Ring Plier Tool J-25309 and tap end of main shaft with plastic or lead hammer to drive main shaft out of rear case (fig. 6-48).

(21) Place Torque Adapter Tool J-25312 onto spline end of main shaft to hold main shaft and remove speedometer drive gear locknut with Remover-Installer Tool J-25311 (fig. 6-49). Remove speedometer drive gear tab washer and speedometer drive gear. Re-

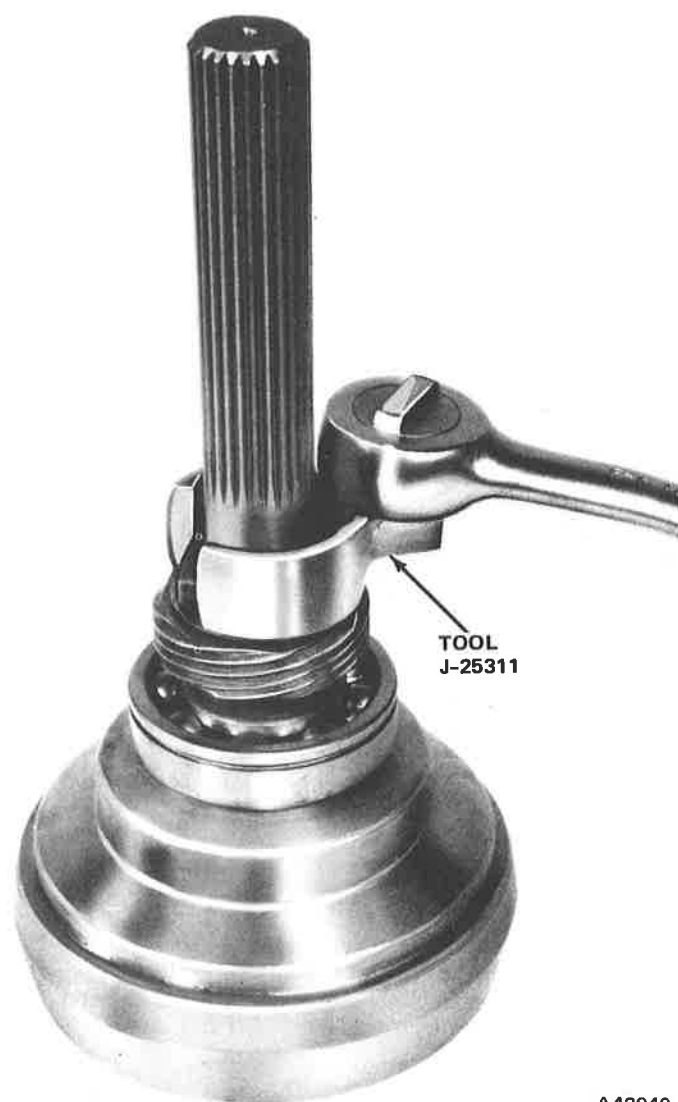


Fig. 6-49 Speedometer Gear Locknut Removal and Installation

move main shaft bearing using Bearing Remover Tool J-8157 and arbor press.

(22) Pry rear case oil seal out of case with screwdriver and remove main shaft bearing snap ring from machined groove in rear case.

NOTE: DO NOT remove disc washer or rear bushing from rear case. These components are not serviceable items. They are available only as part of the rear case.

CLEANING AND INSPECTION

Cleaning

Thoroughly wash all parts, except solenoid valve and sliding clutch, in a clean solvent. Do not use caustic cleaning agents on any part.

After cleaning, dry all parts, except solenoid valve and sliding clutch, with filtered compressed air. Be

sure to direct compressed air into all oil passages in the main case and main shaft to remove any debris, foreign material, or cleaning solvent.

To clean the valve portion of the solenoid valve, immerse the valve portion up to the threads in gasoline or kerosene. Allow to soak until clean, then air dry on a clean, lint-free shop cloth.

Do not attempt to clean the sliding clutch in any type of solvent. Solvent cleaning may loosen the friction material or reduce its holding ability. To clean the sliding clutch, simply wipe it off with a clean, lint-free cloth.

Inspection

Inspect overdrive components for the following:

Main Case:

Cracks in case or in valve and piston bores. Nicks and scratches in valve and piston bores or grooves, scratches, or warped mating surfaces. piston bores. Worn, stripped, or galled threads on plugs and in valve bores. Worn, stripped, or galled threads on studs. Loose lubrication valve plug. Blocked oil passages or control orifice.

Rear Case:

Cracks in case or in main shaft bearing snap ring groove. Nicks, scratches, or warped mating surfaces. Worn, stripped, or galled threads in stud holes. Worn or loose rear bushing or disc washer.

Pump, Valves, and Pistons:

Scratches, nicks, burrs, excessive wear, pitting, or corrosion of any pump or valve component. Weak, broken, or distorted relief valve springs. Torn, distorted, or plugged oil pan and pressure filters. Cracked or warped oil pan. Nicks, scratches, or excessive wear in clutch apply pistons. Wear, grooves, burrs, or cracks in piston bores.

Clutch Brake Ring:

Worn, grooved, distorted, or burned clutch surfaces. Cracks in brake ring or at stud holes.

Sliding Clutch, Thrust Bearing, and Cover:

Worn, burned, loose, or peeling friction material. Cracks in clutch hub or friction surface. Worn, rough, or galled bearings and races in thrust bearing. Cracks, warpage, or worn thrust bolt splines in thrust bearing cover. Worn, galled, or, stripped threads on thrust bolts or worn splines on thrust bolts (bolts rotate freely in cover). Weak, broken, or distorted clutch return springs.

Mainshaft, Pinion Carrier, and Sun Gear:

Loose or worn bushing in annulus gear bore. Chipped, worn, broken teeth in annulus gear. Worn, broken, chipped splines on sun gear and main shaft or bent or distorted main shaft. Plugged lubrication oil holes in main shaft. Worn, burned, rough clutch surface on annulus gear. Cracks in main shaft or sun gear. Loose worn pins in pinion carrier. Cracked, worn, or chipped teeth on pinion gears. Loose oil catcher on pinion carrier. Rough, galled, or, worn main shaft bearing.

Overrunning Clutch:

Cracked or worn hub and rollers. Broken or distorted spring, cracked, bent, or broken cage. Worn thrust washer. Worn clutch race in annulus gear bore. Cracked clutch hub. Worn splines in clutch hub.

Component Service

All overdrive components are serviced individually except for the following which are serviced as assemblies:

- Main shaft support bushing: included in main shaft—annulus gear assembly only.
- Disc washer and rear case bushing: included in rear case assembly only.
- Overrunning clutch assembly.
- Pump plunger, pump strap, and pump plunger pin.
- Relief valve springs: included with relief valve assembly only.

Assembly

CAUTION: Assemble overdrive only on clean work surface. Dirt or foreign material allowed to enter overdrive during assembly could impair operation after overdrive is installed.

(1) Lubricate main shaft bearing with transmission fluid and install main shaft bearing on main shaft with snap ring groove toward rear of main shaft. Seat bearing on main shaft with Bearing Installer Tool J-2995 (fig. 6-50).

(2) Install speedometer drive gear on main shaft with shoulder side of gear toward main shaft bearing. Install new speedometer drive gear washer on top of gear with washer tab located in main shaft slot and install speedometer drive gear locknut (finger-tighten only).

(3) Place Torque Adapter Tool J-25312 on spline end of main shaft. Place Installer Tool J-25311 on speedometer drive gear locknut. While holding locknut with Tool J-25311 and ratchet handle, insert a torque wrench into Adapter Tool J-25312 and tighten locknut

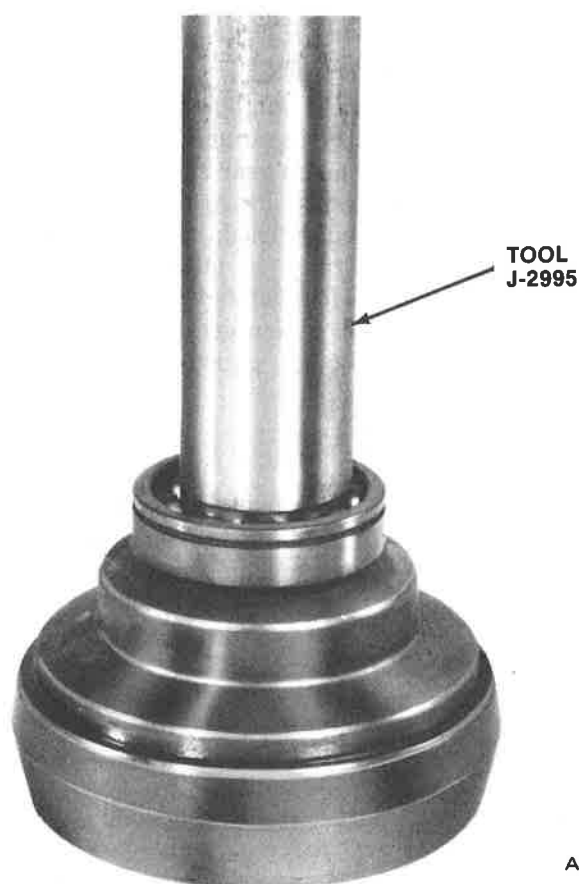


Fig. 6-50 Main Shaft Bearing Installation

to 55 foot-pounds torque. After locknut is tightened to specified torque, bend speedometer drive gear washer up against locknut in two places to further secure locknut.

(4) Install new main shaft bearing snap ring in machined groove in rear case. Position snap ring so butt ends are accessible through expansion plug hole in case.

(5) Place main shaft in upright position and lower rear case onto main shaft. Tap end of case with plastic or lead hammer to start main shaft bearing into counterbore in case. When bearing contacts snap ring, expand snap ring with Tool J-25309 and continue tapping end of case until bearing is fully seated in counterbore, and snap ring is seated in bearing groove (fig. 6-48).

(6) Lubricate lip of rear case oil seal with transmission fluid. Install seal with Installer Tool J-25306. Install new expansion plug in rear case. Be sure to bottom oil seal in counterbore and to secure expansion plug by striking center of plug with flat-faced punch or similar tool.

(7) Lubricate main shaft thrust washer with transmission fluid and install washer into recess in main shaft annulus gear (fig. 6-51).

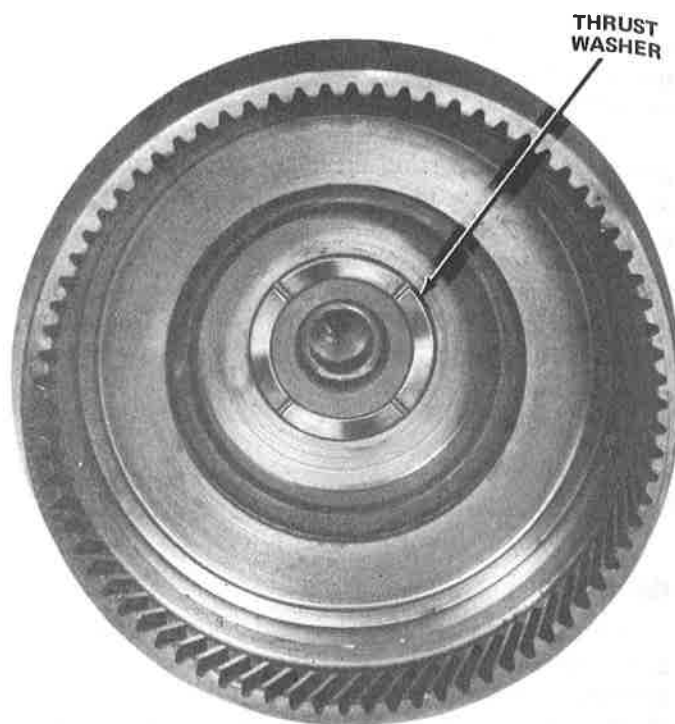


Fig. 6-51 Main Shaft Thrust Washer Location

(8) Assemble overrunning clutch as follows:

(a) Insert hooked end of hub spring into spring locating hole in case (fig. 6-52).

(b) Hold cage and rotate hub (against spring pressure) until cage tabs are aligned with hub slots, then seat cage on hub.

(9) Place assembled cage and hub into overrunning clutch Installer Tool J-25308 with open end of cage facing out (fig. 6-53).

(a) Feed clutch rollers into cage slots through gate in Tool J-25308 (fig. 6-53). Turn cage in clockwise direction when installing rollers.

(10) Lubricate overrunning clutch assembly with transmission fluid and install in bore of main shaft

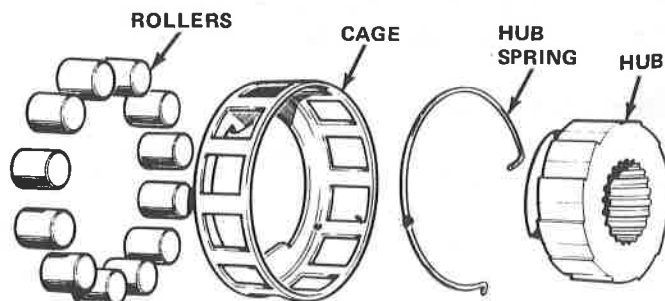


Fig. 6-52 Overrunning Clutch Components

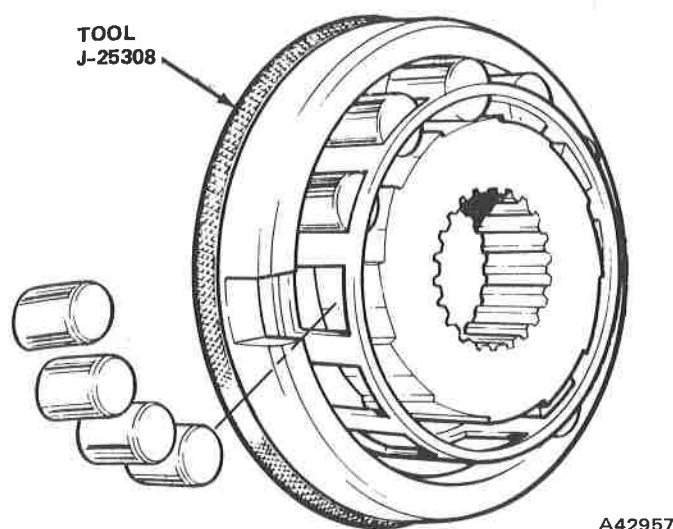


Fig. 6-53 Roller Installation

annulus gear (fig. 6-47). Install brass oil slinger, with shoulder facing out, and install overrunning clutch snap ring. Be sure snap ring is fully seated in its groove.

(11) Lubricate pinion carrier assembly with transmission fluid and install in main shaft annulus gear.

(12) Press thrust bearing into thrust bearing cover using arbor press and install thrust bearing snap ring. Lubricate bearing with transmission fluid.

(13) Install thrust bearing and cover assembly onto sliding clutch hub as follows:

(a) Position thrust bearing and cover assembly clutch hub. Tap cover with plastic or lead hammer to start bearing onto hub.

(b) Turn assembly over, hand support thrust bearing cover, insert Installer-Remover Tool J-25315 into clutch hub and drive hub into thrust bearing (fig. 6-54).

(14) Install sun gear into sliding clutch hub. Install sliding clutch ring lock (sharp edge facing up) and sun gear snap ring. Be sure ring lock and snap ring are fully seated.

(15) Install sliding clutch assembly onto main shaft annulus gear while engaging sun gear in pinion gears. Be sure sliding clutch is seated on annulus and sun gear is fully engaged in pinion gears (fig. 6-45).

NOTE: Rotating main shaft while engaging sun gear will ease installation.

(16) Lubricate clutch apply pistons with transmission fluid, install new O-ring seals, and install pistons in main case bores with counterbored end of pistons facing out (fig. 6-44).

(17) Lubricate all relief valve assembly components with transmission fluid and install new O-ring seals

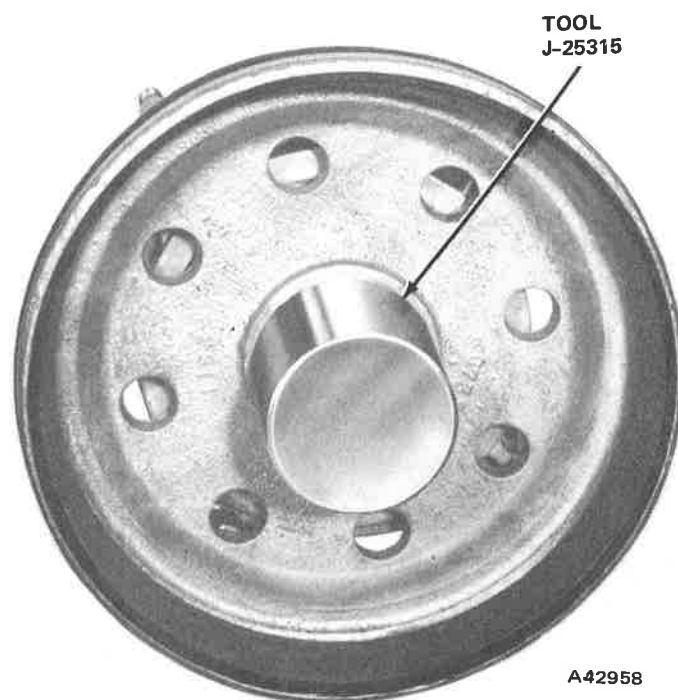


Fig. 6-54 Installing Clutch Hub in Thrust Bearing and Cover

on relief valve body, relief valve sleeve, and relief valve piston plug.

(18) Install relief valve assembly as follows (fig. 6-38 and 6-42):

(a) Insert relief valve body into main case bore.

(b) Align oil hole in relief valve sleeve with oil hole in bore and insert sleeve.

NOTE: End of sleeve containing O-ring should be facing up.

(c) Push sleeve firmly into bore to seat sleeve and valve body.

(d) Install relief valve and spring assembly in relief valve body (fig. 6-38 and 6-42), and install relief valve residual pressure spring in relief valve and spring assembly.

(e) Install relief valve piston in relief valve sleeve and install relief valve piston plug. Tighten plug to 16 foot-pounds torque using Torque Wrench and Spanner Tool J-25305.

(19) Install pressure filter into main case bore. Place new aluminum washer on pressure filter plug and install plug. Tighten plug to 16 foot-pounds torque with Torque Wrench and Spanner Tool J-25305.

(20) Lubricate pump plunger assembly, pump body, and non-return valve seat with transmission fluid. Install new O-ring seals on pump body and pump plug.

(21) Install pump plunger, pump body, and non-return valve components as follows (fig. 6-38):

(a) Align flat on pump body with oil hole in

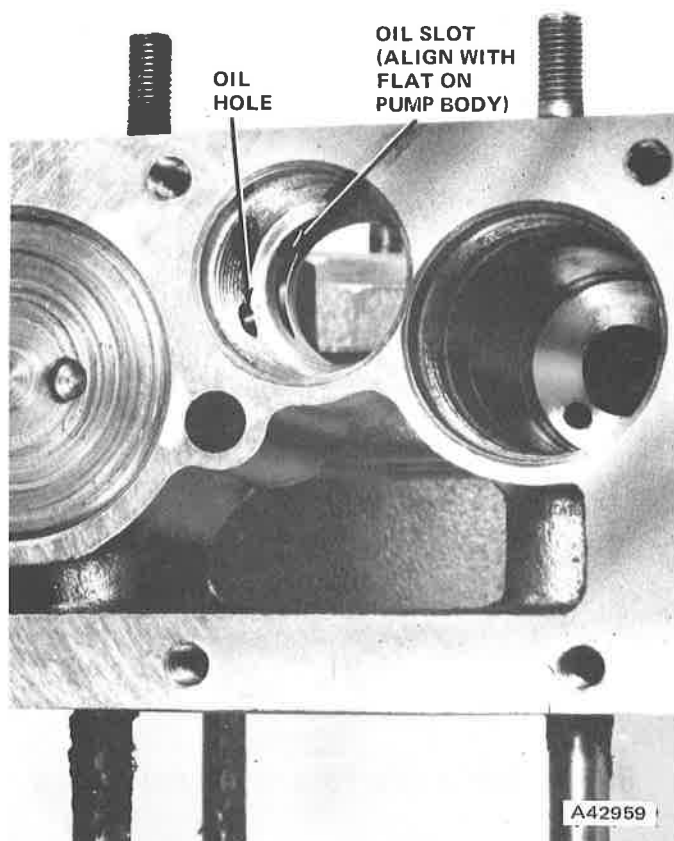


Fig. 6-55 Alignment of Pump Body with Slot

main case bore and insert pump body halfway into bore (fig. 6-55).

(b) Carefully insert pump plunger into pump body then push pump body completely into main case bore until seated. Do not allow plunger to cock in pump body during installation.

(c) Install non-return valve seat on top of pump body with seat for check ball facing up and place non-return valve check ball into valve seat.

(d) Place non-return valve ball seat spring in pump body plug and install plug and spring. Take care that spring or ball are not dislodged when plug is installed. Tighten plug to 16 foot-pounds with Torque Wrench and Spanner Tool J-25305.

(22) Install main case pressure plug and gasket, oil pan filter, new oil pan gasket, and oil pump cover on main case. Tighten pan bolts to 6 foot-pounds torque and pressure plug to 13 foot-pounds torque.

(23) Mount rear case assembly upright in vise with soft jaws. Do not overtighten vise on aluminum rear case. Install new clutch return springs on thrust bearing cover bolts.

(24) Install first clutch brake ring gasket on rear case. Install clutch brake ring into rear case with tapered surface of brake ring facing rear of case and install second new clutch brake ring ring gasket on brake ring ring. Be sure gaskets and brake ring are aligned with stud holes in rear case (fig. 6-42).

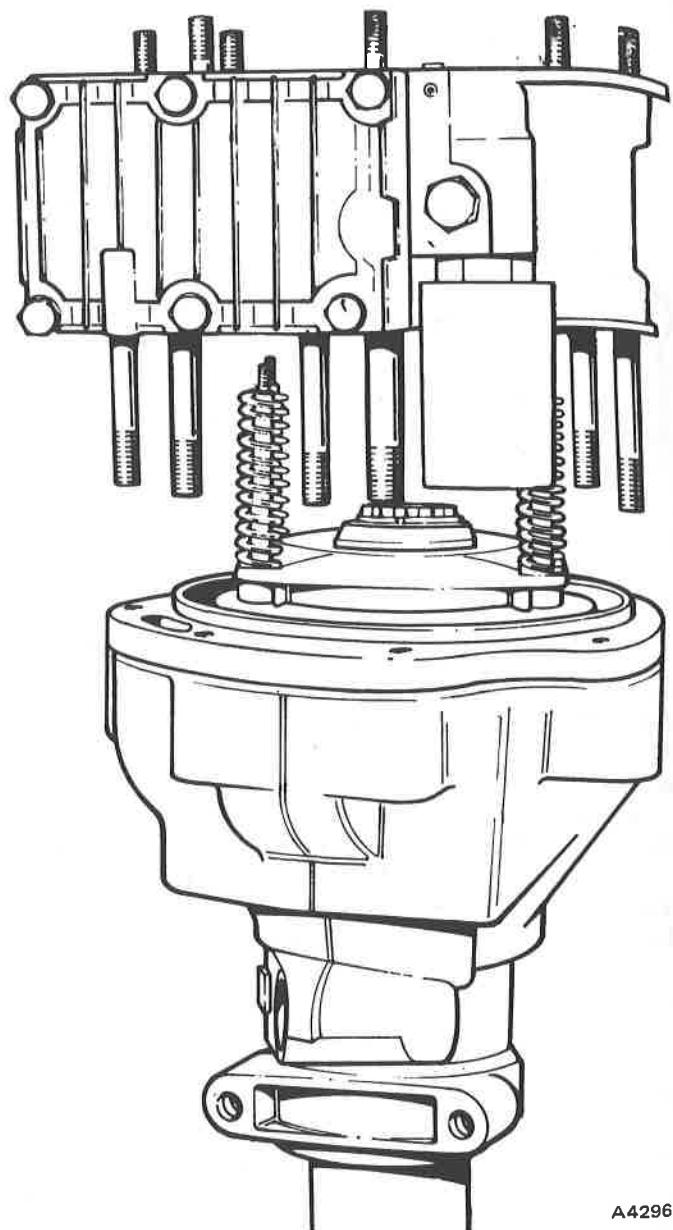
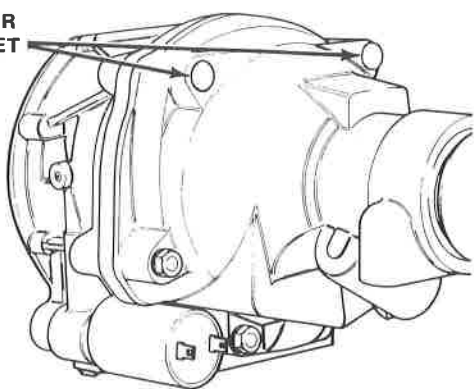


Fig. 6-56 Installing Main Case on Rear Case

(25) Apply light coat of sealer to main case-to-rear case studs. Position main case assembly over rear case assembly, align studs, and lower main case assembly onto rear case assembly. As main case assembly is being lowered, align thrust bearing cover bolts with bolt holes in main case (fig. 6-56).

(26) Install six nuts, four lockwashers, and two copper gaskets on main case-to-rear case studs. Copper gaskets are installed on top two studs (fig. 6-57). Tighten nuts progressively to avoid cocking main case or rear case as both components are under clutch return spring pressure. Tighten nuts to 11 foot-pounds torque.

(27) Install clutch apply bars on thrust bearing

**COPPER
GASKET**


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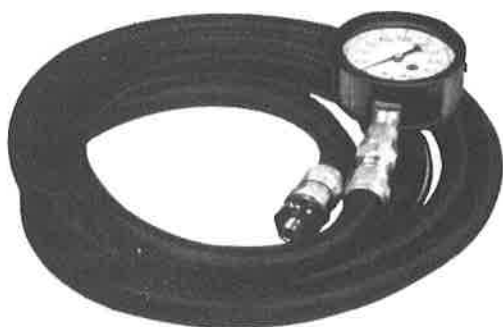
Fig. 6-57 Copper Gasket Location

cover bolts and secure with new locknuts. Tighten nuts to 8 foot-pounds torque.

(28) Install solenoid valve using Wrench Tool J-25304. Tighten solenoid valve securely but do not overtighten.

(29) Lubricate new drive cam with transmission fluid and install cam and new drive key in pump strap.

(30) Pour approximately one pint of transmission fluid into oil pan through access hole in front of main case, and install overdrive as outlined under Overdrive Installation in this section.

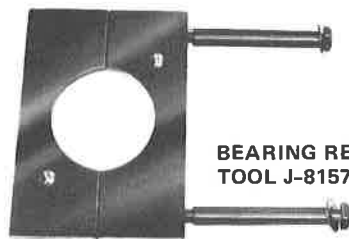
**PRESSURE GAUGE SET
J-25303**

**MAINSHAFT BEARING
INSTALLER TOOL
J-2995**

**CLUTCH HUB
REMOVER/INSTALLER TOOL
J-25315**

**SPANNER TOOL
J-25305**

**J-25306
SEAL INSTALLER**

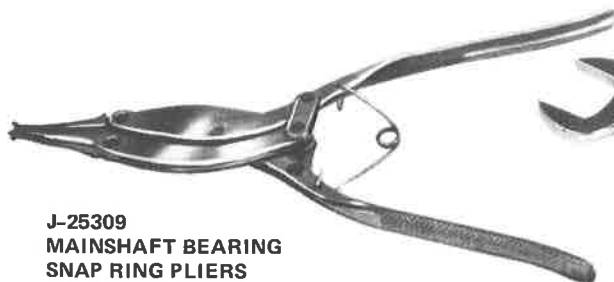
**J-25313
SEAL REMOVER**

**BEARING REMOVER
TOOL J-8157**

**TORQUE ADAPTER
TOOL J-25312**

**SPEEDO LOCKNUT
REMOVER/INSTALLER
TOOL J-25311**

**J-7004-1
USED WITH SEAL REMOVER**

**J-25308
OVERRUNNING CLUTCH
REMOVER/INSTALLER TOOL**

**J-25309
MAINSHAFT BEARING
SNAP RING PLIERS**

**J-25304
SOLENOID WRENCH**

**J-25307
RELIEF VALVE BODY-
SLEEVE REMOVER
TOOL**


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Fig. 6-58 Service Tools

Overdrive Lubrication Specifications

FREQUENCY

Inspect / Correct Fill Level. Every 5,000 Miles

LUBRICANTS

Recommended API GL-4 SAE 80W-140 Gear Lubricant
 Acceptable API GL-4 SAE 80W-90 Gear Lubricant

CAUTION: *Gear lubricants designed for use in limited slip differentials must not be used at any time.*

CAPACITY (Transmission-Overdrive Assembly)

U.S. Measure 4.0 Pints
 Imperial Measure 3.5 Pints

HYDRAULIC SYSTEM PRESSURES

Overdrive disengaged 20 - 40 P.S.I.
 Overdrive engaged 520 - 540 P.S.I.

Overdrive Torque Specifications

	<u>Service Set To Torque</u>	<u>Service In Use Recheck Torque</u>
Oil Pan Bolts	6	5-7
Clutch Apply Bar Lock Nuts	8	6-9
Main Case Pressure Plug	12	9-15
Main Case to Rear Case Stud Nuts	11	9-12
Relief Valve Plug	16	14-18
Pump Body—Non-Return Valve Plug	16	14-18
Pressure Filter Plug	16	14-18
Speedometer Drive Gear Locknut	50	40-60
Speedometer Adapter Clamp Bolt	100 inch pounds	80-110 inch pounds

All Torque Values given in foot pounds with dry fits unless otherwise noted.

I.
I.

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