of lock straps over bolt heads.

(2) Place the governor valve on valve shaft, insert the assembly into housing and through the governor weights. Install the valve shaft retaining snap ring.

Extension Housing

(1) Using a new gasket, carefully slide the extension housing into place. Install the retaining bolts and washers, tighten bolts to 25 foot-pounds torque.

(2) Install the transmission output shaft flange. Install washer with its three projections toward the flange and the nut with its convoluted surface contacting the washer. Hold the flange with Tool C-3281, and tighten nut to 100 foot-pounds torque. Torque reading must be taken as the nut passes over hump.

IMPORTANT: Recheck the drive train end play as described in Paragraph 33. Correct if necessary.

Valve Body Assembly and Accumulator Piston

(1) Clean mating surfaces and check for burrs on both the transmission case and valve body transfer plate.

(2) Install accumulator piston in the transmission case and place piston spring on the accumulator piston.

(3) Carefully position the valve body assembly into place in transmission case and start all the retaining bolts. Snug the bolts down evenly, then tighten to 100 inch-pounds torque.

(4) Connect the control cable adapter to manual lever and install retaining nut.

(5) Install seal, flat washer and throttle lever on throttle shaft. Tighten clamp bolt.

(6) Adjust the kickdown, and low-reverse bands as described in Paragraph 16.

(7) Install the oil pan, using new gasket. Tighten pan bolts to 150 inch-pounds torque.

TORQUEFLITE TRANSMISSION

CONTENTS

CONTENTS—(Continued)

SPECIFICATIONS

TYPE	Automatic Three Speed with Torque Converter
TORQUE CONVERTER DIAMETER	11¾ inches

SPECIFICATIONS—(Continued)

OIL CAPACITY—TRANSMISSION AND TORQUE CONVERTER (Dry Fill)	18½ pts. Automatic Transmission Fluid Type "A", Suffix "A" Imperial Measure 15½ pts.
COOLING METHOD	Water-Heat Exchanger
LUBRICATION	Pump (Rotor Type)
CLUTCHES	
Number of Front Clutch Plates	4
Number of Front Clutch Discs	4
Number of Rear Clutch Plates	2 (318 Cu. In. Eng.) 3 (361 Cu. In. Eng.)
Number of Rear Clutch Discs	3 (318 Cu. In. Eng.) 4 (361 Cu. In. Eng.)
GEAR RATIOS	
1—Low	2.45 to 1
2—Second	1.45 to 1
D—Drive	1 to 1
R—Reverse	2.20 to 1
N—Neutral	—
FRONT—REAR PUMPS	
Type	Gear (Rotary)
End Clearance	.001 to .0025 inch
DRIVE TRAIN END PLAY	.030 to .070 inch
CLUTCH PLATE CLEARANCE	
Front Clutch	.024 to .123 inch
Rear Clutch	.022 to .042 (3 Disc Clutch) .026 to .054 (4 Disc Clutch)
SNAP RINGS	
Front and Rear Clutches	
Rear Snap Ring (Selective)	.060 to .062 inch .074 to .076 inch .088 to .090 inch
Output Shaft Bearing	.086 to .088 inch
THRUST WASHERS	
Reaction Shaft Support to Front Clutch Retainer (Selective)	.043 to .045 inch (Natural) .061 to .063 inch (Green) .084 to .086 inch (Red)
Output Shaft to Input Shaft	.062 to .064 inch
Sun Gear Driving Shell Thrust Plate (Steel)	.034 to .036 inch
Rear Planetary Gear to Driving Shell	.062 to .064 inch
Front Planetary Gear to Annulus Gear Support	.062 to .064 inch
Front Annulus Gear Support to Driving Shell	.062 to .064 inch
Front Clutch Piston Retainer to Rear Clutch Piston Retainer	.061 to .063 inch (Green)

SPEEDOMETER PINION USAGE CHART

Tire Size	Axle Ratio	Output Shaft	Pinion No. Teeth	Pinion Color
700-14	2.76:1	8 Teeth	17	Orange
	3.23:1	8 Teeth	20	Light Blue

SPECIAL TOOLS

C-452.....Puller—Companion Flange
C-484.....Pliers—Snap Ring
C-748.....Remover—Output Shaft Oil Seal
C-763.....Switch—Remote Control Starter
C-3203A.....Jack—Transmission
C-3204.....Driver—Output Shaft Bearing
C-3229.....Pliers—Snap Ring
C-3275.....Remover—Output Shaft Bearing
C-3281.....Wrench—Companion Flange Holding
C-3288.....Studs—Pilot
C-3292.....Gauge—Low Pressure
C-3293.....Gauge—High Pressure
C-3335.....Straight Edge
C-3339.....Dial Indicator
C-3422.....Compressor—Engine Valve Spring
C-3487.....Fixture—Engine Support
C-3705.....Adapter—Transmission Band Adjuster (Use with C-3380 Torque Wrench)
C-3749.....Stand—Valve Body
C-3752.....Remover—Front Oil Pump and Reaction Shaft Support
C-3763.....Gauge—Throttle Pressure Setting
C-3765.....Installer—Shifter Shaft Detent Ball
C-3837.....Driver—Output Shaft Oil Seal
C-3860.....Driver—Front Pump Oil Seal
C-3861.....Remover—Front Pump Oil Seal
C-3863.....Compressor—Front Clutch Piston Spring Installer—Overrunning Clutch Cam
C-3864.....Aligning Sleeve—Rear Oil Pump Cover
C-3881.....Aligning Tool—Front Oil Pump Rotor
C-3882.....Adapter Kit—Use with C-3750 Transmission Stand

TORQUE REFERENCE

	Foot-Pounds	Inch-Pounds
Kickdown Band Adjusting Screw Lock Nut	29	
Kickdown Lever Shaft Plug		150
Reverse Band Adjusting Screw Lock Nut	35	
Cooler Line Fitting		75
Control Cable Adjusting Wheel Bolt		40
Converter Drain Plug	14	
Converter Drive Plate to Crankshaft Bolt	55	
Converter Drive Plate to Torque Converter Bolt		270
Extension Housing to Transmission Case Bolt	24	
Extension Housing to Insulator Mounting Bolt	35	
Extension Housing—Crossmember to Frame Bolt	75	
Front Oil Pump Housing to Transmission Case Bolt		150
Governor Body to Parking Sprag Bolt		100
Neutral Starter Switch—Initial Contact + ⅓ to ½ Turn	60 Max.	
Oil Filler Tube Bracket Bolt		150
Oil Pan Bolt		150
Oil Pan Drain Plug	15	
Output Shaft Flange Nut	175	
Overrunning Clutch Cam Set Screw		40
Parking Lock Cable Locking Bolt		10
Parking Lock Lever Shaft Plug		150

TORQUE REFERENCE—(Continued)

	Foot-Pounds	Inch-Pounds
Parking Sprag Cover Bolt		150
Parking Sprag Cover Plug		75
Pressure Test Take-Off Plug		75
Reaction Shaft Support to Front Oil Pump Bolt		150
Rear Oil Pump Cover Bolt		140
Transmission Strut to Case Screw (318 Cu. In. Engine)	40	
Transmission to Engine Bolt	25-30	
Valve Body Screw		28
Valve Body to Transmission Case Bolt		100
Speedometer Cable Clamp Screw		150

TROUBLE DIAGNOSIS CHART

CONDITION	ITEMS TO CHECK
1. Harsh Initial Engagement in N to D or N to R	D,E,G,R,S,d,e.
2. Delayed Initial Engagement in N to D	A,C,E,R,S,b,e,h.
3. Runaway on 2-3 and 3-2 Shifts	A,B,C,E,F,P,S,b,d,e,h
4. Harsh 2-3 and 3-2 Shifts	B,E,F,P,O,S,d.
5. No Upshift	A,B,C,E,F,L,M,N,O,P,S,d,g,h.
6. No Kickdown or Normal Downshift	A,B,C,D,E,F,M,P,O,S.
7. Erratic Shifting	A,B,C,D,E,F,M,O,P,b,h.
8. Slip in Forward Drive Only	A,C,E,P,S,b,d,e,g,h.
9. Slips in Reverse Only	C,E,G,P,Q,R,b,d.
10. Slips in All Positions	A,E,P,b,h.
11. No Drive in any Position	A,E,O,P,a,b.
12. No Drive in Forward Positions	E,F,P,Q,S,d,e,g.
13. No Drive in Reverse Only	E,G,R,d.
14. Drives in Neutral	C,e.
15. Drags or Locks	F,G,I,J,Q,R,d,e,f,g.
16. Scraping, Growling or Ratcheting Noise	I,J,L,M,N,a,b,d,e,f,g.
17. Buzzing Noises	A,P
18. Hard to Fill, Oil Blows Out Filler Tube	A,O,P,b,c.
19. Transmission Overheats	A,F,G,J,K,N,P,b,d,e.
20. Failure to Push Start	A,C,E,G,N,R,e,f,g,h.
21. Starter Will Not Energize	C,H.

KEY—ITEMS TO CHECK	KEY—ITEMS TO CHECK
A. Fluid Level	P. Kickdown Servo
B. Throttle Linkage Adjustment	Q. Low and Reverse Servo
C. Gearshift Cable Adjustment	R. Accumulator
D. Engine Idle Speed Adjustment	S. Air Pressure Tests
E. Hydraulic Pressures	(TRANSMISSION OUT OF VEHICLE)
F. Kickdown Band Adjustment	
G. Low and Reverse Band Adjustment	a. Converter Drive Plate
H. Neutral Starting Switch	b. Front Oil Pump
I. Parking Lock Adjustment	c. Transmission Vent
J. Transmission Oil Cooler	d. Front Clutch
K. Extension Housing Bushing or Bearing	e. Rear Clutch
L. Governor	f. Planetary Gear Sets
M. Rear Oil Pump	g. Over-running Clutch
N. Oil Strainer	h. Seal Rings—Input Shaft and Reaction Shaft Support
O. Valve Body	

SERVICE DIAGNOSIS

The Trouble Diagosis Chart lists the most common operating difficulties that may be encountered in the automatic transmission, and gives the possible causes of the trouble. The "Items to Check" are listed in a logical diagnosis sequence which should be followed for quickest results. Capital letter items refer to those operations which may be performed without removing the transmission. The small letter items refer to those operations done after removal of transmission from vehicle.

Before proceeding with any diagnosis checks, make certain the transmission fluid is up to correct level and the engine is properly tuned. Also, check the gearshift control cable and throttle linkage for proper adjustment and possible wear. Never remove a transmission from a vehicle until all the possible "in vehicle" causes have been checked for the operating difficulty. In some cases, the oil pan should be removed to check for dirt, metal chips, band material, broken band ends, and burned or scored band contacting surfaces. Also, check the fluid for burnt odor, indicating burned clutches.

Corrective procedures for the "Items to Check" column are covered in detail later in one of the following sections of this transmission group:

Maintenance, Adjustments and Tests

Servicing Operations — Transmission in Vehicle

Recondition Transmission — Unit out of Vehicle

TORQUEFLITE TRANSMISSION

1. DESCRIPTION

The TorqueFlite Transmission combines a torque converter with a fully-automatic 3-speed planetary gear system (Fig. 1). The torque converter housing and transmission case are an integral aluminum casting. The transmission consists of two multiple disc clutches, an overrunning clutch, two servos and bands, and two planetary gear sets to provide 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 which is splined to the sun gear and to the front clutch retainer. The hydraulic system consists of a front and rear pump, and a single valve body which contains all of the valves except the governor valve.

Venting of the transmission is accomplished by a drilled passage through the upper part of the front oil pump housing behind a shield plate.

The torque converter is attached to the crankshaft through a flexible driving plate. Cooling of the converter is accomplished by circulating the transmission fluid through an oil-to-water type cooler, located in the radiator lower tank. The torque converter assembly is a sealed unit which cannot be disassembled. Dirt or other foreign material may be removed by flushing.

The transmission fluid is filtered by means of an external fluid filter "Disposable Type", located in the cooler to transmission return line. The filter has an integral relief valve, which permits fluid to bypass the filter if the element becomes clogged.

2. OPERATION

The transmission is operated by a gearshift control unit consisting of five push buttons, identified by R (reverse), N (neutral), D (drive), 2 (second) and 1 (low).

In the drive range, the transmission shifts through all three ratios automatically. Shift points are determined by throttle opening and car speed. If additional acceleration is desired while in drive range, the transmission will downshift (depending on vehicle speed) to second or breakaway automatically when the accelerator pedal is completely depressed.

The intermediate or second position range is used to operate the transmission in the first two ranges only. This range is suitable for heavy city traffic where the driver may desire part throttle second range operation for more precise control. It may also be used on long down grades where additional engine braking is needed. A low or first position range is also available to keep the transmission in first only. This position provides added handling ease in mountain driving and exceptional pulling qualities in sand and snow.

3. POWER FLOW

Engine torque is transmitted to the torque converter then, through the input shaft to the muliple disc clutches in the transmission. The power flow depends on the application of the clutches and bands. Refer to Clutch Engagement and Band Application Chart. A compound planetary gear system provides neutral,

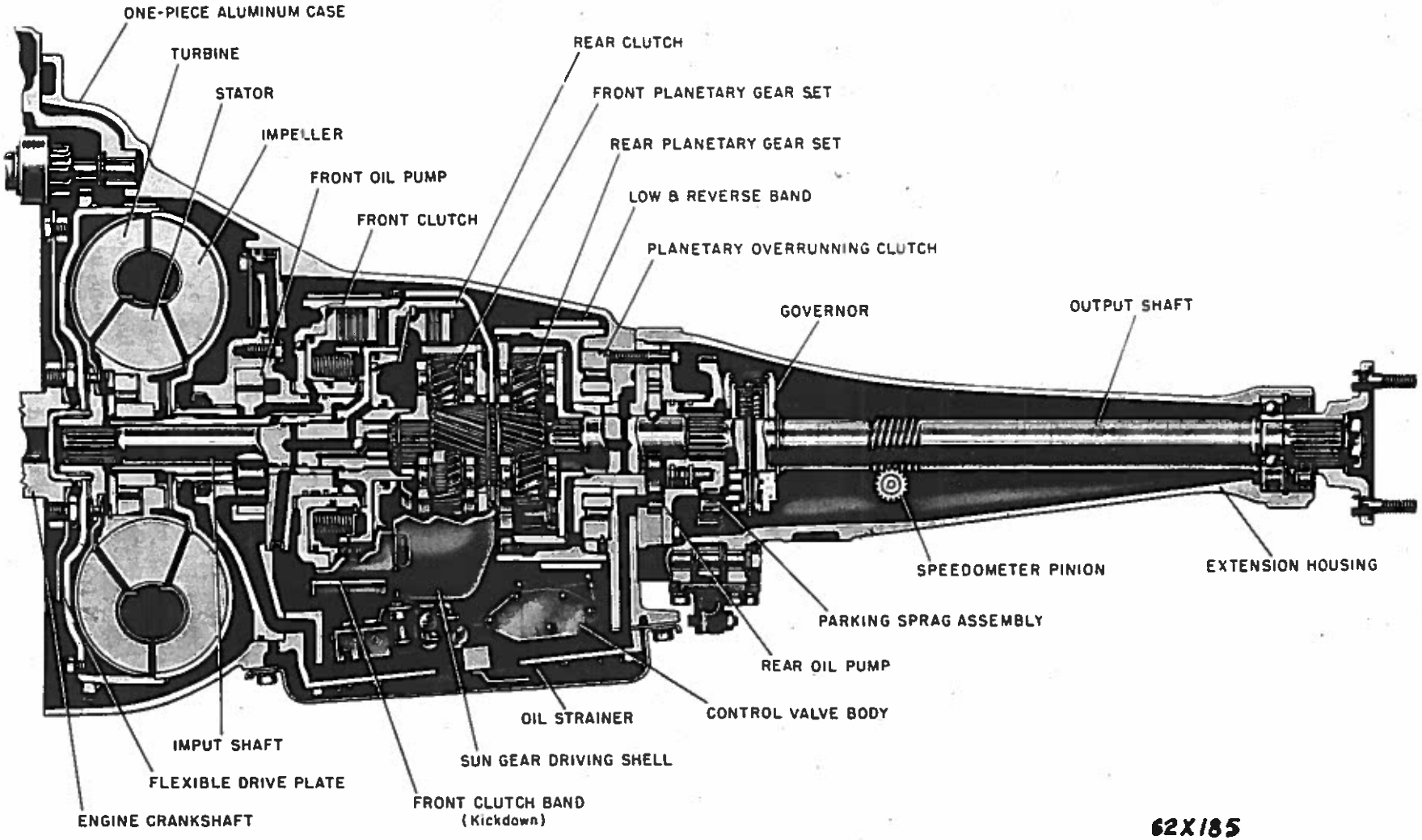


Fig. 1—TorqueFlite Transmission and Torque Converter

CLUTCH ENGAGEMENT AND BAND APPLICATION CHART

BUTTON POSITION AND DRIVE CONDITION	FRONT CLUTCH	REAR CLUTCH	FRONT (KICKDOWN) BAND	REAR (LOW – REV.) BAND	OVERRUNNING CLUTCH
N NEUTRAL	DISENGAGED	DISENGAGED	RELEASED	RELEASED	NO MOVEMENT
D DRIVE (DIRECT) 1.00 to 1	ENGAGED	ENGAGED	RELEASED	RELEASED	OVER RUNS
D DRIVE (BREAKAWAY) 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	RELEASED	HOLDS
D (DRIVE) KICKDOWN (TO SECOND) 1.45 to 1	DISENGAGED	ENGAGED	APPLIED	RELEASED	OVER RUNS
2 SECOND 1.45 to 1	DISENGAGED	ENGAGED	APPLIED	RELEASED	OVER RUNS
2 (SECOND) KICKDOWN (TO LOW) 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	RELEASED	HOLDS
1 LOW 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	APPLIED	PARTIAL HOLD
1 LOW (RETARDING) 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	APPLIED	NO MOVEMENT
R REVERSE 2.20 to 1	ENGAGED	DISENGAGED	RELEASED	APPLIED	NO MOVEMENT

low, second, drive, and reverse ranges.

NOTE: All reference to direction of rotation in the following items is described as viewed from the front of transmission.

Neutral

When the control unit is in the N (neutral) position, none of the clutches are engaged or bands applied. Therefore, no power is transmitted to the output shaft.

Drive

In D (drive) direct, the front and rear clutches are engaged, while front and rear bands are released (Fig. 2).

NOTE: Figures 2 through 6 shows a four-disc clutch which is used wth the 361 cubic inch engine. Transmissions used with the 318 cubic inch engine have a three-disc rear clutch.

With both clutches engaged and both bands released, the front planetary pinions cannot rotate.

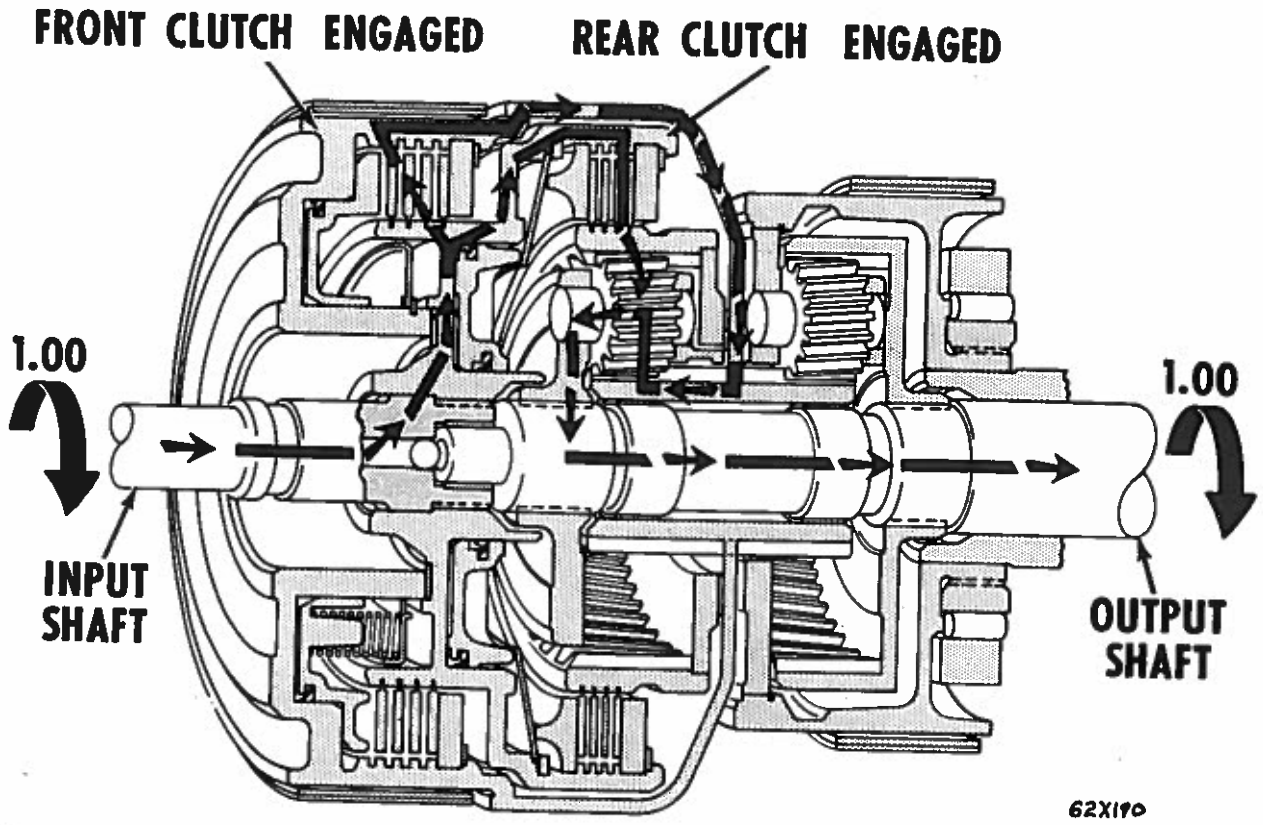


Fig. 2—Power Flow in D (Drive) Position—Direct

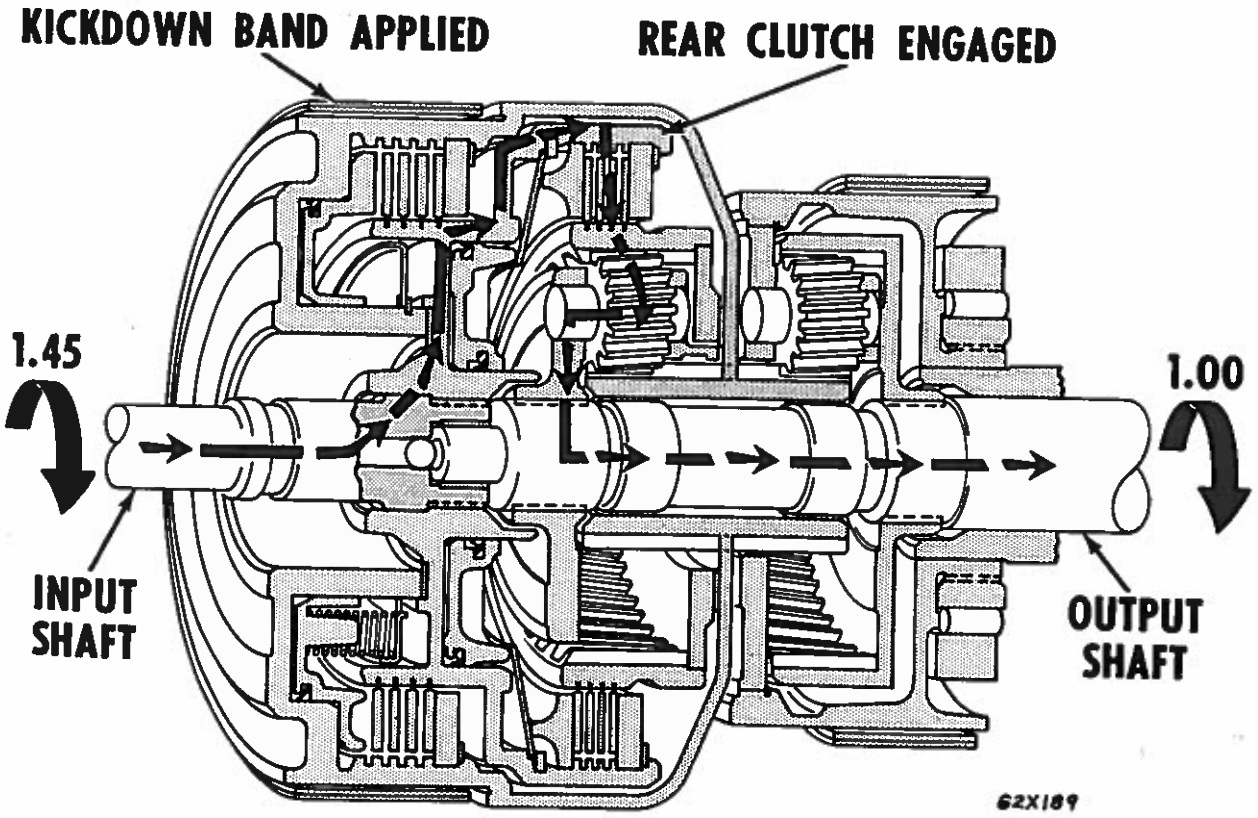


Fig. 3—Power Flow in D (Drive) Position—Second or Kickdown

Therefore, the front planetary cage (splined to output shaft) rotates the output shaft at the same speed as the input shaft thus obtaining direct drive.

Second

In 2 (second), the rear clutch is engaged, to drive the front annulus gear, pinions and sun gear. At the same time the front band is applied, holding the front clutch, driving shell and sun gear stationary (Fig. 3).

With rear clutch engaged, the clutch, front annulus gear and front planetary pinions all rotate clockwise. The applied front band holds the driving shell and sun gear from turning. Therefore, with sun gear held stationary, the planet pinions roll (clockwise) around the sun gear turning the front planetary cage (splined to output shaft) in the same direction at a reduced speed.

Low

In 1 (low), the rear clutch is engaged and drives the front annulus gear, front planetary pinions and the sun gear. The low and reverse drum and rear planetary cage are held stationary by the rear band and overrunning clutch (Fig. 4).

With rear clutch engaged; the clutch, front annulus gear, and front planetary pinions all rotate clockwise, which turns the sun gear counterclockwise. With the rear planetary cage held stationary, the sun gear (rotating counterclockwise), rotates the rear planet pinion clockwise which turns rear annulus gear (splined to output shaft) in the same direction at a reduced speed.

Reverse

In R (reverse), the front clutch is engaged to drive the driving shell and the sun gear. The low and reverse drum and rear planetary cage are held stationary by the rear band (Fig. 5).

With front clutch engaged, the clutch, driving shell and sun gear all rotate clockwise. With the rear planetary cage held stationary, the sun gear (rotating clockwise) rotates the rear planet pinions counterclockwise, which turns the rear annulus gear (splined to output shaft) in the reverse direction at a reduced speed.

Breakaway

With car standing, engine operating, and the D (drive) button depressed, the phase of operation is known as "breakaway." Breakaway simply means that to get the vehicle moving from a standstill, the lowest forward ratio is used. Therefore, at this time, the rear clutch is engaged which drives the front annulus gear, front planetary pinions and the sun

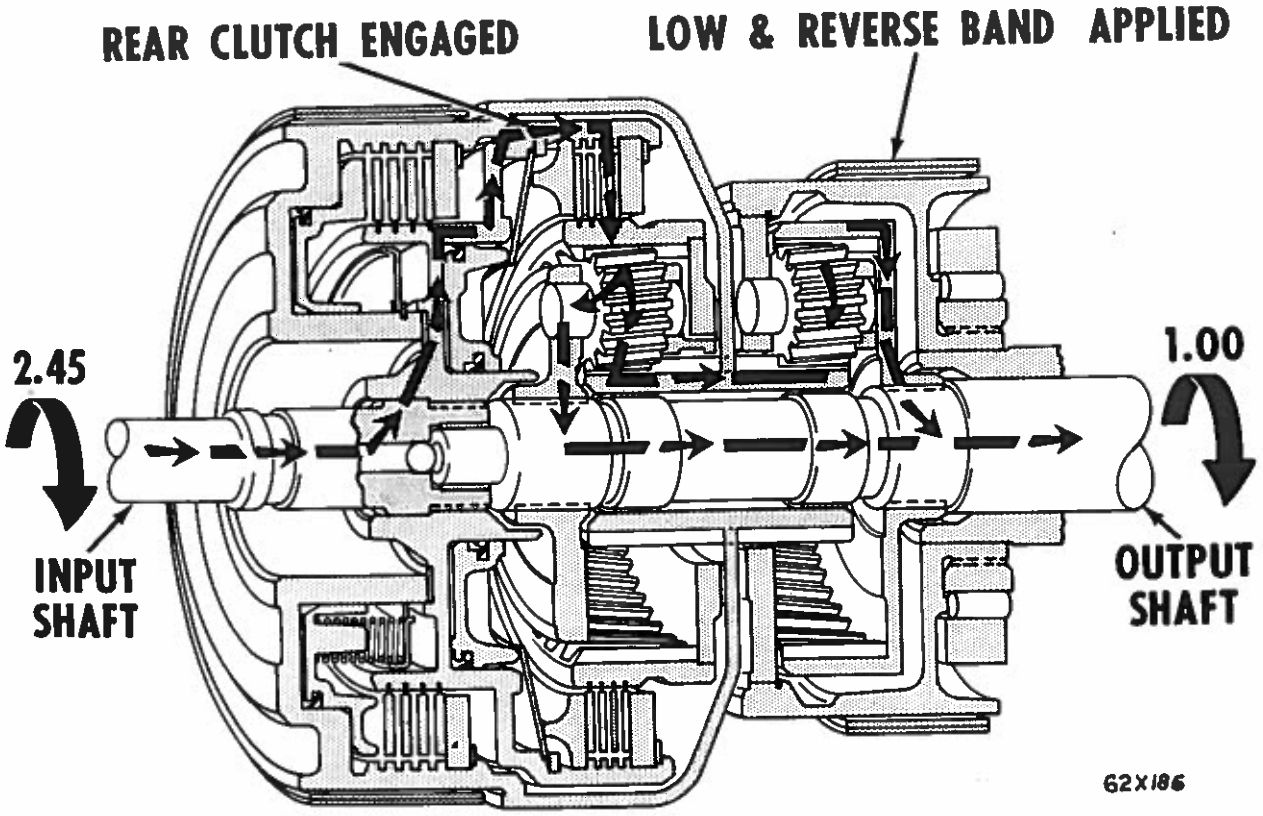


Fig. 4—Power Flow in 1 (Low) Position—Low and Retarding

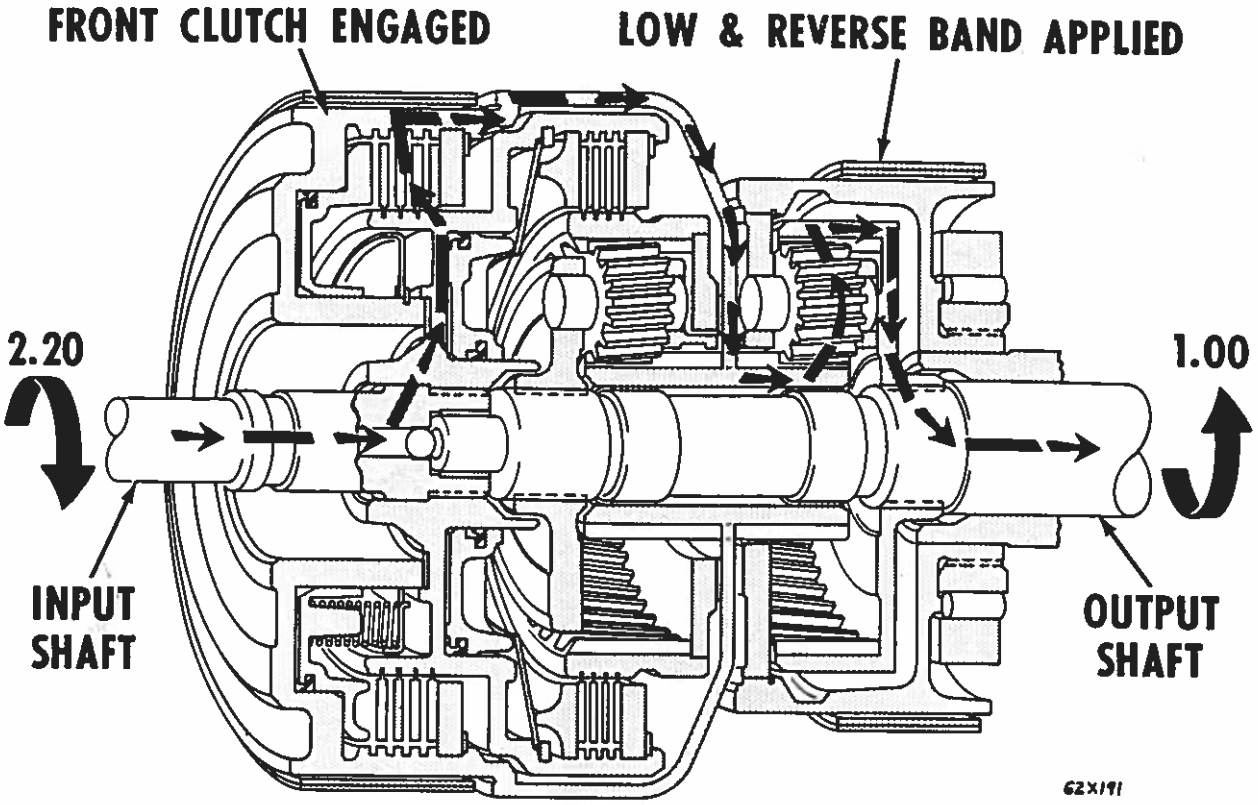


Fig. 5—Power Flow in R (Reverse) Position

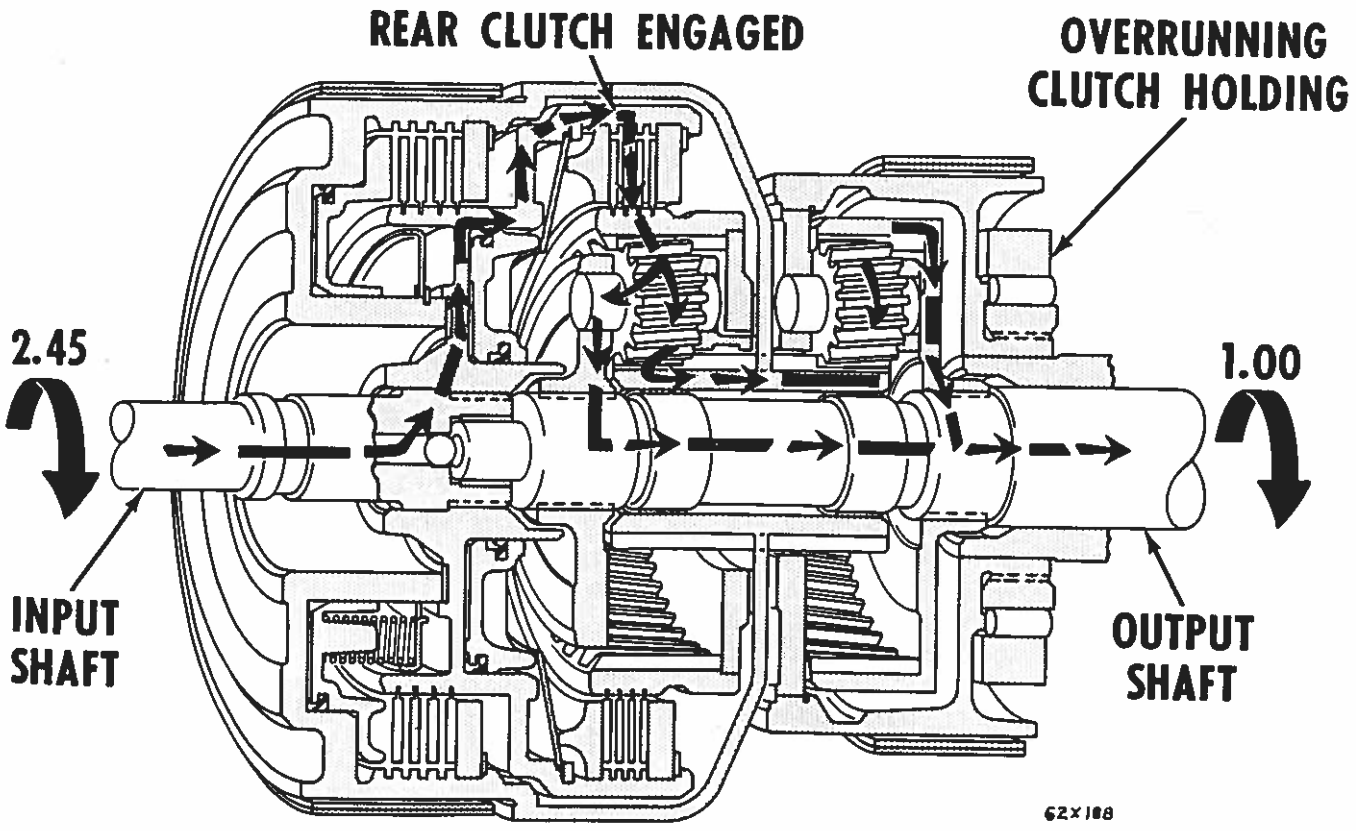


Fig. 6—Power Flow in D (Drive) Position—Breakaway

gear. The rear planetary cage is prevented from turning counterclockwise by the overrunning clutch (Fig. 6).

NOTE: The operation of the overrunning clutch can be described as follows: When reverse torque is applied to the rear planetary cage, low and reverse drum, and clutch hub, the clutch rollers are forced into a wedged contact by the ramps in the cam-thus, holding the planetary cage stationary. When the reverse torque is removed, the rollers are released from their wedging contacts on the ramps, and the overrunning clutch will coast.

With the rear clutch engaged; the clutch, front annulus gear and front planetary pinions all rotate clockwise, which turns the sun gear counterclockwise. The sun gear tends to rotate the rear planetary cage and drum counterclockwise, which is immediately locked by the overrunning clutch. With the rear planetary cage held stationary, the sun gear (rotating counterclockwise) rotates the rear planet pinions clockwise which turns rear annulus gear (splined to output shaft) in the same direction at low range ratio.

Kickdown (Direct Drive to Second)

In kickdown from direct drive "D" (drive), the transmission shifts back to the same power flow as outlined for "Second." (Fig. 3).

Kickdown (Second to Low)

In kickdown from 2(second), the transmission shifts back to the same power flow as outlined for "Breakaway" (Fig. 6).

Retarding

When retarding in l (low), the low and reverse drum and rear planetary cage are held stationary by the low and reverse band to provide engine braking (Fig. 4).

4. HYDRAULIC CONTROL SYSTEM

The hydraulic control system has four important functions to perform.

In a general way, the components of any automatic control system may be grouped into the following basic components or units:

The pressure supply system, the clutches and band servos, the pressure regulating valves and the flow control valves.

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

Pressure Supply System (Fig. 7)

Front Pump

At idle, the front pump, driven at engine speed, provides all oil needed for torque converter pressure, control pressures and lubrication. As the vehicle speed increases, the front pump is aided by the rear pump turning at propeller shaft speed.

The front pump delivers oil at pressures ranging from 55-60 psi at closed throttle to 90-95 psi at wide open throttle. In reverse, the front pump pressure is increased to approximately 260 psi in order to handle the high torque loads imposed during reverse operation. Front pump pressure is reduced at high vehicle speeds by the action of the rear pump. This reduces transmission drag losses.

Rear Pump

The rear pump (smaller than the front pump and driven by the output shaft) furnishes all of the oil required by the transmission in normal driving at the higher vehicle speeds. The rear clutch and low-reverse band are applied by the oil pressure developed by the rear pump when the engine is started by pushing in manual low.

Clutches and Band Servos (Fig. 7)

Front Clutch

The front clutch contains four steel plates and four discs in order to develop the required capacity. Both front and rear clutches are engaged to transmit full engine and converter torque in direct drive. The front clutch is also engaged to drive the car in reverse.

The front clutch piston is moved hydraulically to engage the multiple clutch plates and discs, and is released by means of the clutch piston return spring when hydraulic pressure is released.

Rear Clutch

The rear clutch contains two steel plates and three discs when used with the 318 cubic inch engine, it has three steel plates and four discs with the 361, 383 and 413 cubic inch engines. The rear clutch contains a washer type return spring. The rear clutch is engaged in all forward driving ranges and is disengaged during reverse operation.

Hydraulic pressure against the rear clutch piston moves the piston into contact with the spring washer which multiplies the force to lock the clutch plates together. The spring washer returns the clutch to "disengaged" position when hydraulic pressure is released.

Kickdown Servo

The kickdown piston actuates the kickdown band

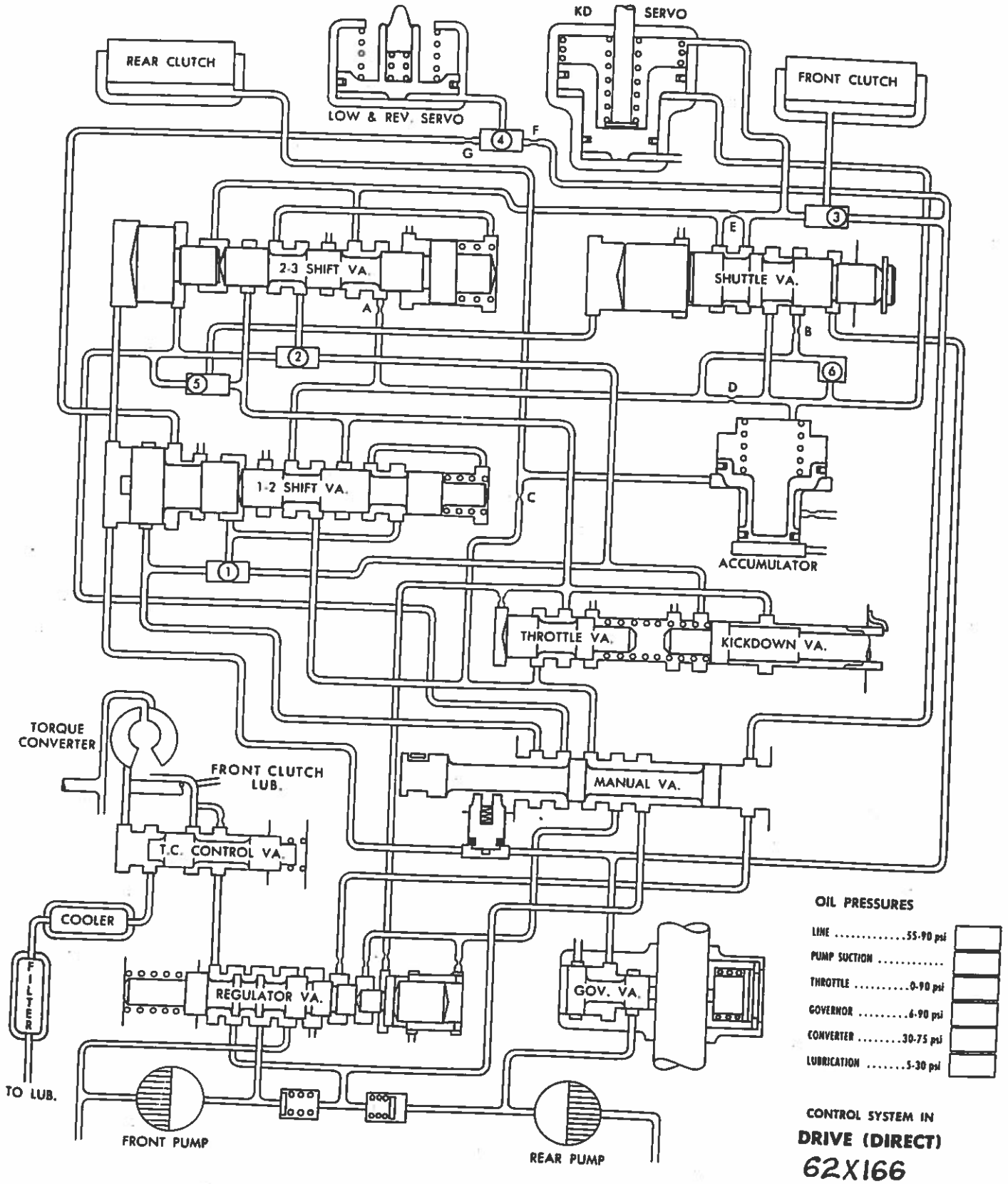


Fig. 7—Hydraulic Control System

through the kickdown lever, strut and anchor holding the front clutch piston retainer, driving shell and sun gear stationary. The result is a reduced forward ratio through the front planetary gear set.

The kickdown piston is hydraulically applied by a variable pressure which is a function of line pressure. The kickdown piston is released by spring tension or spring tension with hydraulic pressure depending upon the operation.

Low-Reverse Servo

The low-reverse servo has two functions which are performed independently. The low-reverse servo piston is moved hydraulically to apply the low-reverse band through the low-reverse band lever, strut, and anchor. The results are:

To hold the carrier of the rear planetary gear set stationary while the front clutch (applied) drives the sun gear. This provides a reverse ratio of 2.20 to 1 through the rear planetary gear set.

To hold the carrier of the rear planetary gear set stationary when the vehicle is retarding in manual low. This provides engine braking to a 2.45 to 1 ratio change through the planetary gear sets. The band is necessary to hold the carrier stationary because the direction of applied torque is opposite that required for overrunning clutch engagement.

Initial engagement of the low-reverse servo (when shifting from neutral to low or reverse) is softened by compression of the low-reverse servo cushion spring.

The servo piston is released by a return spring when the source of apply pressure is discontinued.

Accumulator

The accumulator controls the pressure on the apply side of the kickdown servo during the 1-2 shift. At light throttle, accumulator pressure is low, at heavy throttle pressure is high. Therefore, the application of the kickdown band is cushioned at any throttle position by the action of the accumulator.

In neutral and reverse the accumulator piston is held released by the accumulator spring, there being no pressure to the piston at these times.

Pressure Regulating Valves (Fig. 7)

Regulator Valve

The regulator valve controls line pressure at a value dependent on throttle opening, and it ranges from 55-60 psi at closed throttle to 90-95 psi at wide open throttle.

For reverse operation, oil must be at a pressure of 240-280 psi. This is accomplished by switching the effective reaction area of the regulator valve, with the result that a line pressure of 240-280 psi, applied to the smaller reaction area, is required to overcome the force of the regulator valve spring.

Torque Converter Control Valve

This valve maintains an oil pressure of approximately 30 psi within the torque converter. When the torque converter pressure rises to 30 psi, the control valve will move against the spring load and allow oil to flow through the cooler then back to the lubrication circuit. From the cooler, oil is routed through the transmission lubrication system to lubricate the gear train at approximately 5 to 25 psi pressure.

Governor Valve

The governor valve assembly transmits a hydraulic pressure to the transmission which is proportional to car speed. This governed pressure, in conjunction with throttle pressure, controls upshift and downshift speeds. The governor is so mounted on the output shaft that when the output shaft rotates; the governor weight assembly exerts a centrifugal force on the governor shaft. The governor shaft transmits this force to the governor valve. Oil is allowed to flow from the line pressure port to the governor pressure port, building up pressure in the governor circuit and against the valve reaction area sufficient to balance the centrifugal force of the weight.

The greater the vehicle speed, the greater is the centrifugal force of the weights, and hence the greater the governor pressure necessary to balance the centrifugal force. If the vehicle speed decreases, the decrease in centrifugal force allows the valve to move out slightly, venting excess oil and bringing the governor once more in balance at a lower pressure.

The governor weight assembly is constructed so that for vehicle speeds under approximately 30 mph, both weights act as a unit, with the result that small changes in vehicle speed result in comparatively large changes in centrifugal force and governor pressure. Above approximately 30 mph, the primary weight moves outward against the preload of the spring and bottoms against the snap ring leaving only the secondary weight active. Small variations in vehicle speed above approximately 30 mph; therefore, result in only small variations in governor pressure.

Throttle Valve

The throttle valve assembly transmits a hydraulic pressure to the transmission which is proportional to the amount of throttle opening. The throttle valve

lever shaft is rotated in proportion to the amount of throttle opening of the carburetor by a linkage connecting the throttle valve lever shaft to the car's throttle linkage. The throttle valve lever shaft positions the kickdown valve and throttle valve spring in accordance with the amount of carburetor throttle opening, the spring being free (no load) at closed throttle and compressed at wide open throttle. Therefore, the throttle valve spring exerts a force on the throttle valve that increases with carburetor throttle opening.

Throttle pressure will vary with the amount of carburetor throttle opening from a value of 0 (zero) pressure at closed throttle to a value of approximately 90 psi at wide open throttle.

Flow Control Valves (Fig. 7)

Front and Rear Pump Check Valves

The front pump check valve is located in the valve body. The valve is opened when front pump is supplying operating pressure and is closed when rear pump is supplying the pressure.

The rear pump check valve is located in the transfer plate. The valve is opened when rear pump is supplying operating pressure and is closed when the vehicle is at a standstill and during reverse operation.

Manual Valve

The manual valve obtains the different transmission drive ranges as selected by the vehicle operator. The valve is removed by a cable which is connected to the push button control unit on the instrument panel. It is held in these positions by the force of a spring-loaded detent ball on the valve body.

The manual valve distributes fluid pressure to various clutches, servos, and other valves to apply clutches and servos automatically, dependent on car speed and throttle opening.

Reverse Blocker Valve

The reverse blocker valve mechanically blocks the manual valve from moving into reverse position to prevent accidental reverse engagement above approximately 20 mph. When the reverse button is depressed above this speed the manual valve is stopped at neutral and the transmission remains in neutral until another button is depressed. The reverse blocker valve is activated by governor pressure.

1-2 Shift Valve

The 1-2 shift valve determines whether the transmission is either in low gear ratio or second gear ratio depending upon whether the valve is in the upshifted or down-shifted position. The 1-2 shift valve train consists of a shift valve, valve spring and a governor plug.

The factors controlling the upshift and downshift of 1-2 shift valve are determined by governor pressure and throttle pressure.

The 1-2 shift valve is moved to upshift position by governor pressure acting on the governor plug, when the governor pressure is high enough to overcome shift valve spring tension and throttle pressure. The 1-2 shift valve is moved to downshift position by shift valve spring tension alone at normal closed throttle stops or by spring and kickdown pressure which overcomes governor pressure during a forced downshift.

2-3 Shift Valve

The 2-3 shift valve automatically shifts the transmission from second to direct or from direct to second depending on the vehicle operation. This shift valve train is similar in construction and operation to the 1-2 shift valve train, in that it is controlled by governor and throttle pressures and spring force.

Kickdown Valve

The kickdown valve makes possible a forced downshift from direct to second — second to breakaway or direct to breakaway by depressing the accelerator pedal past the detent "feel" near wide open throttle.

It is desirable to limit the maximum vehicle speed at which kickdown may be made (approximately 60 mph from drive to second and approximately 30 mph from drive or second to breakaway). The throttle pressure actuated kickdown detent plug on the stem of the kickdown valve, supplies the resistance necessary for a detent "feel" at kickdown.

Kickdown pressure, when applied to the spring end of the shift valves is great enough to make the shift valves downshift against the force of any governor pressure up to the kickdown limit speeds.

Shuttle Valve and Shuttle Valve Plug

The shuttle valve has two separate functions and performs each independently of the other. The first is that of providing fast release of the kickdown band, and smooth front clutch engagement when the driver makes a "lift-foot" upshift from second to direct.

The "lift-foot" upshift is made by accelerating the vehicle in breakaway or second gear and then returning the accelerator pedal to closed throttle. Without the shuttle valve, the resulting upshift to

direct would consist of a series of lurches, caused first by the braking effect on the vehicle by the second gear ratio and then by the harsh engagement of the front clutch.

The second function of the shuttle valve is to regulate the application of the kickdown piston when making direct to second kickdowns.

Kickdowns made at low vehicle speeds require very little time in which to complete the shift due to the comparatively small change in engine speed between direct and kickdown gear. The higher the vehicle speed at which the kickdown is made, the longer is the time required to make a smooth shift. The shuttle valve controls the timing of the shift by controlling the rate of oil flow to the kickdown servo.

5. OPERATING INSTRUCTIONS

Starting the Engine

(1) As a safety precaution, apply parking or foot brake.

(2) Push the N (neutral) push button all the way in.

(3) Depress accelerator pedal one-third of travel to insure proper choke operation.

(4) Turn ignition key all the way to the right to START position. When engine starts, release key and it will return to ON position.

Push Starting

If the engine fails to start in the normal manner, it may be started by pushing. **Towing the car to start is not recommended due to the sudden surge of power when the engine starts.**

Turn the ignition on, then push the 1 (low) button in and depress the accelerator pedal slightly. After the vehicle has been pushed to a speed of 15 to 25 mph (approximately), the transmission will drive the engine.

How to Drive the Car

(1) When starting in extremely cold weather, allow the engine and transmission to warm up while in N (neutral) position. If the engine is cold (engine on fast idle), apply the the foot brake lightly to prevent a tendency of vehicle to creep when making a push button selection.

(2) D (drive). All normal forward driving will be done in this range. The vehicle will have a slight tendency to creep after pushing the button from N (neutral) to D (drive) at idle. This can be prevented by applying the foot brake lightly. As soon as the accelerator is depressed, the vehicle will move forward in the drive (breakaway) range. Depending on the amount the accelerator is depressed and vehicle speed, the transmission will automatically upshift to second.

Then, depending upon the amount the accelerator is depressed and vehicle speed, the transmission will automatically upshift from second to direct. When slowing down the vehicle (at closed throttle), the transmission will automatically downshift to breakaway at approximately 10 mph.

(3) The 2 (second) position provides driving characteristics similar to D (drive) — second speed, except that the transmission will not upshift to direct. As soon as accelerator is depressed, the vehicle will move forward in the drive (breakaway) range. Depending on amount the accelerator is depressed and car speed, the transmission will automatically upshift into second. No upshift to direct is possible with the 2 button depressed. **The vehicle should not be driven at speeds exceeding 70 mph with the "2" button depressed, nor should the "2" button be depressed at speeds above 70 mph.** If vehicle speed falls below 8 mph or if the accelerator is completely depressed, provided vehicle speed is below 30 mph, the transmission will automatically downshift to breakaway.

NOTE: All shift speeds may vary somewhat due to production tolerances and rear axle ratios. This is not too important; however, the quality of the shifts is very important. All shifts should be smooth, responsive, and with no noticeable engine runaway.

(4) 1 (low) provides driving characteristics similar to D (drive-breakaway) except that the transmission will not upshift into any other range regardless of vehicle speed and throttle opening. **To prevent overspeeding of engine, do not operate vehicle above 40 mph in (low) position. Do not depress 1 (low) or 2 (second) buttons above 70 mph as immediate downshift into second gear will result. The transmission will not however shift into low gear if vehicle speed is above the 3-1 kickdown limit.**

(5) R (reverse). Stop the vehicle and with foot brake lightly applied, push the R (reverse) button in.

(6) Kickdown (forced downshift). At speeds below 3-2, 3-1 kickdown limits shown in Shift Pattern Summary Chart, after the transmission has upshifted, into D (drive) or 2 (second), the transmission will automatically downshift to a lower ratio by completely depressing the accelerator; thereby giving maximum acceleration for passing or climbing steep grades. The transmission will automatically upshift if the accelerator is released after kickdowns. Refer to Shift Pattern Summary Chart.

SHIFT PATTERN SUMMARY CHART

CONDITION	CAR SPEED TO AXLE RATIOS Plymouth 8 Cyl.		Plymouth 8 Cyl. (Hi Per.)	
	2.76-1	3.23-1	2.76-1	3.23-1
Closed Throttle 1-2 Upshift	8-14	7-12	7-14	6-12
Closed Throttle 2-3 Upshift	13-18	11-15	13-18	11-16
Wide Open Throttle 1-2 Upshift	32-45	27-38	42-57	36-48
Wide Open Throttle 2-3 Upshift	68-80	58-68	79-89	67-76
3-2 Kickdown Limit	59-73	51-63	70-83	60-70
3-1 Kickdown Limit	30-38	25-33	30-50	24-47
Closed Throttle Downshift	5-13	4-11	5-13	4-11

Mountain Driving

When driving in the mountains with either heavy loads or when pulling trailers, the 2 (second) or 1 (low) position should be selected on upgrades which requires heavy throttle for ½ mile or more. Lower ratios reduces possibility of overheating the transmission and converter under these conditions. 1 (low) position is for severe operation or to obtain better control.

Transmission Inoperative

Tow the vehicle with a rear end pickup or remove the propeller shaft.

Transmission Operating Properly

The vehicle may be towed safely in N (neutral) at moderate speeds. For long distance towing (over 100 miles), the propeller shaft should be removed.

GEARSHIFT AND PARKING LOCK CONTROL UNIT

The transmission gearshift control unit is essentially the same on all cars, except that the push buttons are arranged in a different manner. The transmission parking lock control lever is attached to the control unit. The lock control handle is located on the instrument panel at the left or below the push buttons depending on the model application.

When the parking lock is applied, the gearshift control unit automatically shifts the transmission to neutral.

CAUTION: Never apply the parking lock until the vehicle has stopped. Otherwise, a severe ratcheting noise will occur, which might result in damage to the transmission lock components.

6. CONTROL UNIT-REMOVAL, ADJUSTMENT AND INSTALLATION

Removal

(1) Disconnect negative (ground) cable from the battery.

(2) Remove parking lock handle from the lever.

(3) Disconnect back-up lamp switch connectors (if so equipped).

(4) Remove three nuts securing control assembly to the instrument cluster (Fig. 8). Carefully work the assembly rearward out of the cluster.

(5) Remove push buttons by pulling them off the push button slides.

(6) Unscrew two nuts and remove mounting bracket from the control.

(7) Remove hairpin lock securing gearshift control cable to actuator and remove the cable.

(8) Disconnect parking lock cable from the control.

(9) Unscrew two nuts and remove parking lock arm from the control.

Control Unit Adjustment

The following procedures describe the gearshift control unit adjustments. If the transmission fails to shift into NEUTRAL when the parking lock is applied, check the parking lock lever travel in the instrument panel slot and the parking lock cable adjustment at the transmission before adjusting the control unit. Refer to Paragraph 15.

(1) Remove the overcenter spring and back off the lever stop screw (Fig. 9). Make sure no binding exists in the neutral slide, neutral slide pin and

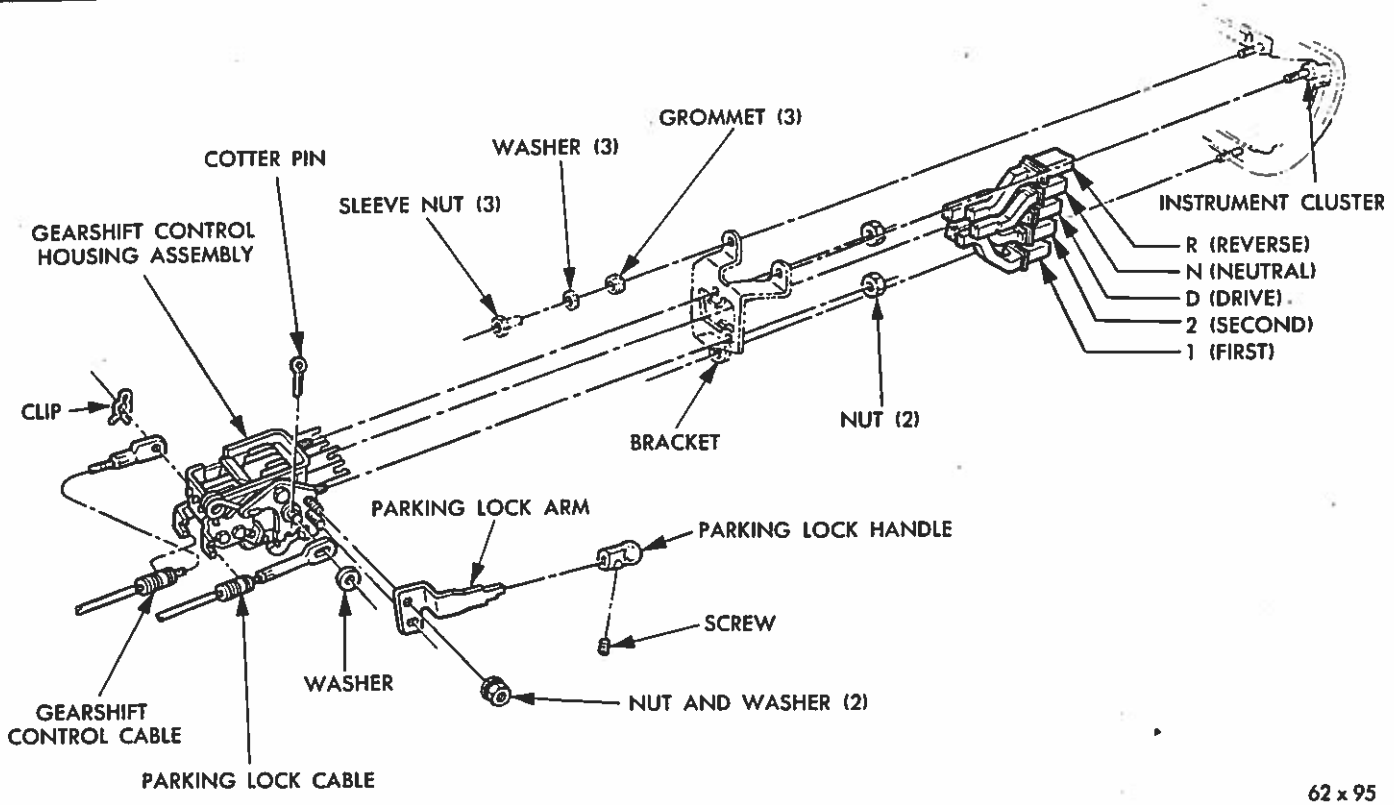


Fig. 8—Removing or Installing Gearshift Control Unit

bushing, cam pivot, and that they are adequately lubricated.

(2) Hold the neutral slide in against the rocker bar with about 5 to 10 pound load.

(3) Loosen lock nut and rotate cam so the lever nose just touches the neutral slide pin as it passes over the pin when moving the parking lock lever from the **OFF** to **ON** position. Only light contact should occur so the lever does not hang up on the pin. Hold the cam in this position and tighten the lock nut to 95 inch-pounds torque. Install overcenter spring.

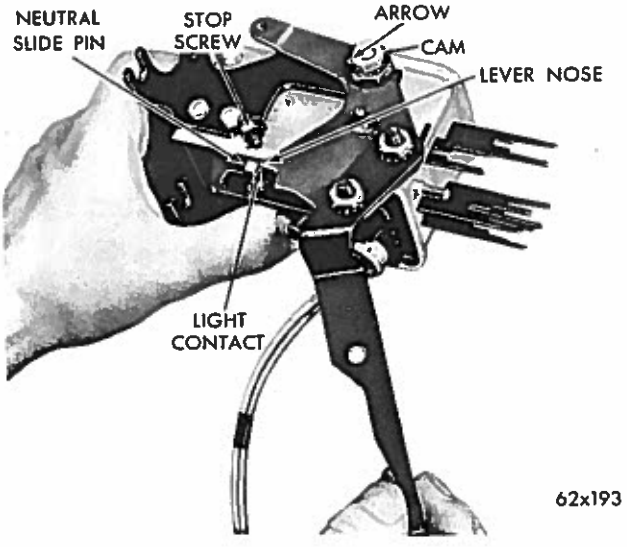


Fig. 9—Adjusting Lever Nose Contact at Neutral Slide Pin

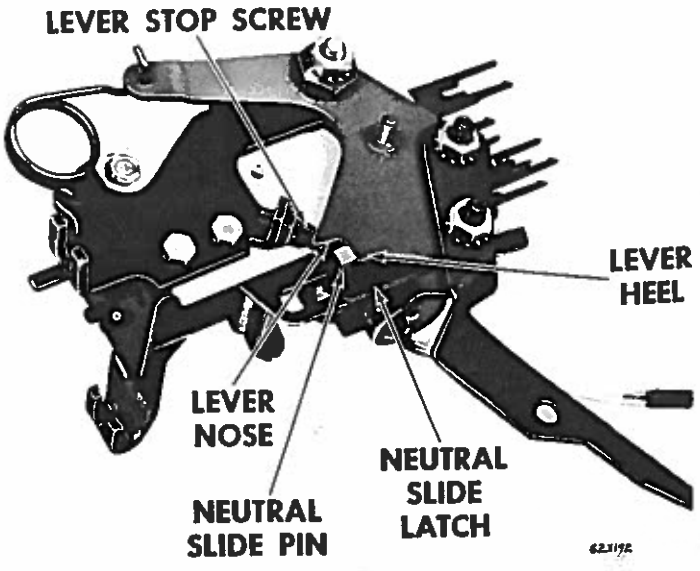


Fig. 10—Adjusting Lever Heel to Neutral Slide Pin Clearance

(4) Adjust the lever stop screw to obtain .010 inch clearance between the neutral slide pin and the lever heel (Fig. 10). Tighten the lever stop screw lock nut securely.

Installation

(1) Install parking lock arm on control unit and secure with washers and nuts. Connect the parking lock cable and secure cable in the control bracket.

(2) Place end of gearshift control cable on actuator and secure with hairpin lock. Secure cable in the control bracket.

(3) Install mounting bracket on control and tighten retaining nuts.

(4) Install push buttons in proper order on the control actuator slides.

(5) Carefully guide the control unit into position from the rear of instrument cluster housing. Install the three retaining nuts and tighten securely.

(6) Operate push buttons and correct any binding of buttons that might exist.

(7) Install parking lock control handle. Connect back-up switch wires (if so equipped).

7. BACK-UP LAMP SWITCH REPLACEMENT (When So Equipped)

(1) Remove the gearshift and parking lock control unit.

(2) Remove screws securing back-up switch bracket to the control unit and disconnect switch wires.

(3) Straighten the four tabs that hold the switch to switch bracket and separate switch from the bracket.

(4) To install, place switch in position on the switch bracket and bend over the four tabs.

(5) Attach switch and bracket to the control unit and connect the switch wires.

(6) Reinstall the gearshift and parking lock control unit.

8. PUSH BUTTON LAMP SWITCH REPLACEMENT

The push button lamp is located approximately in the center of the push button cluster. The instrument cluster must be removed to gain access to the bulb. Disconnect the speedometer cable and remove heater blower switch and temperature control knobs. Remove the instrument cluster retaining screws and lift out the cluster assembly. Slide a short piece of tight fitting rubber hose over the bulb to remove it from the socket.

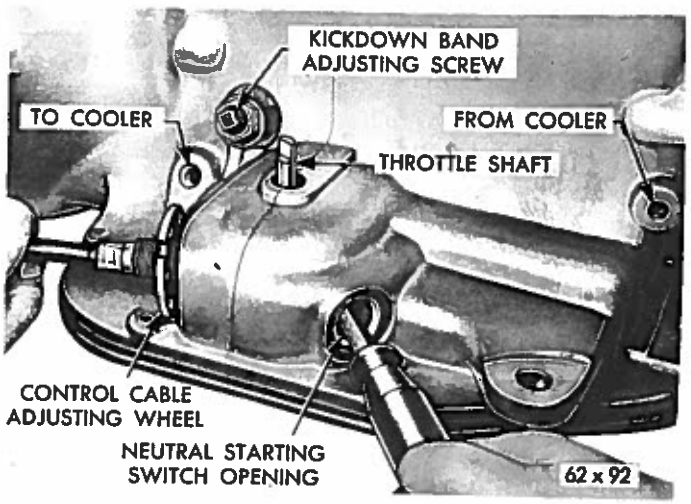


Fig. 11—Removing Gearshift Control Cable

9. GEARSHIFT CONTROL CABLE (Transmission End)

Removal and Installation

(1) Raise vehicle on hoist and drain approximately two quarts of fluid from transmission.

(2) Depress 1 (low) push button to position cable for removal from transmission.

(3) Disconnect wire from neutral starting switch and remove switch.

(4) Remove push button control cable to transmission adjusting wheel lock screw.

(5) With a screwdriver, inserted through the neutral starter switch opening, gently push against the upper projecting portion of the cable adapter lock-spring and pull outward on cable to remove cable assembly from case (Fig. 11).

(6) To install the cable, have an assistant engage the (R) button and hold it firmly engaged until the cable attachment operation is completed.

(7) Back the adjustment wheel off on the cable housing (counter-clockwise) until two or three threads are showing on the guide behind the wheel.

(8) Lubricate the cable housing with transmission fluid, insert cable in transmission case, push inward on cable making sure lock-spring engages cable. Adjust control cable as outlined in "Maintenance, Adjustments and Tests," Paragraph 13.

(9) Refill transmission with Automatic Transmission Fluid (Type "A" Suffix "A") to proper level. Refer to Paragraph 11.

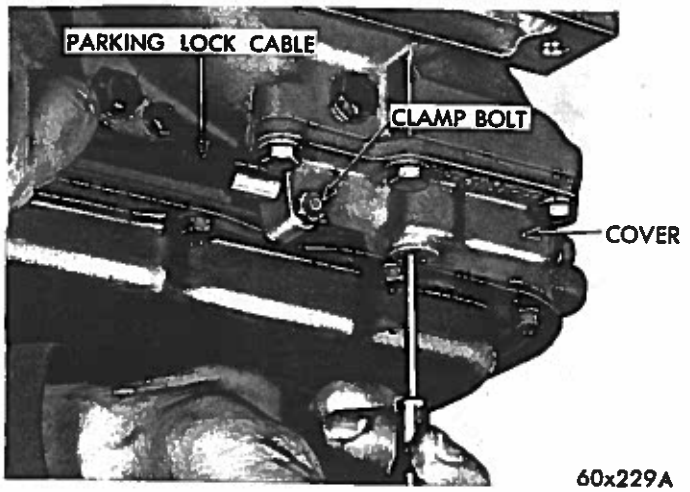


Fig. 12—Removing Parking Lock Cable

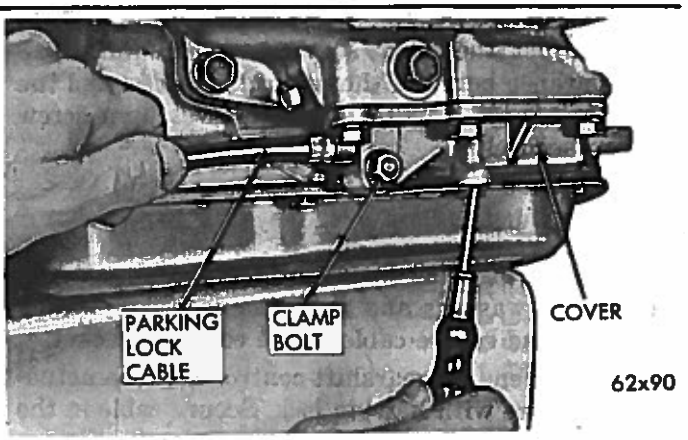


Fig. 13—Installing Parking Lock Cable

10. PARKING LOCK CABLE (Transmission End)

Removal and Installation

(1) Loosen parking lock cable clamp bolt where cable enters housing cover (Fig 12). Remove housing cover lower plug.

(2) With a screw driver inserted through plug opening, push gently against projecting portion of cable lock-spring, then withdraw the lock cable. **Do not use pliers or similar tool to withdraw cable from adapter cover as the cable cover might be damaged causing an oil leak.**

(3) To install the cable, have an assistant hold parking lock lever (on instrument panel) in the OFF position.

(4) Insert screw driver through plug opening and position it behind the cable adapter stop washer (Fig. 13). Hold the adapter outward while pushing the cable in as far as possible, making sure lock-spring engages cable.

(5) Gently pull outward on cable housing to its limit of travel, release and then tighten the clamp bolt to 10 inch-pounds torque. Reinstall plug in cover and tighten to 75 inch-pounds torque.

MAINTENANCE, ADJUSTMENTS AND TESTS

While in the process of making adjustments and tests, do not stall test the torque converter. For safety reasons and because damage to the transmission may occur, wide open throttle stall operation should be avoided.

CAUTION: To prevent dirt from entering the transmission after checking or replenishing fluid, make certain that the dip stick cap is fully seated onto the filler tube.

11. LUBRICATION

Fluid Level

The fluid level should be checked every 4,000 miles. When checking, the engine and transmission should be at normal operating temperature.

(1) With the parking brake on and the engine idling, depress each push button momentarily, ending with the N (Neutral) button pushed in.

(2) The fluid level should check between the "FULL" mark and the "ADD ONE PINT" mark, but never above the "FULL" mark when the engine is at its normal warmed condition described above. Add or delete fluid as necessary to bring to this prescribed level (Fig. 14).

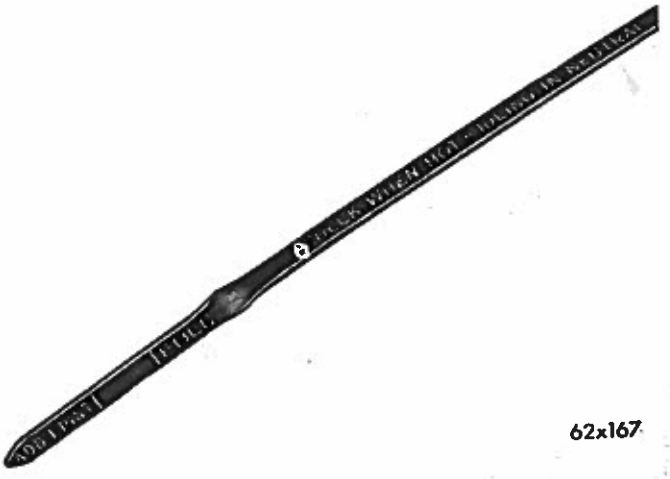


Fig. 14—Transmission Dip Stick Markings

(3) If it is necessary to check the fluid level when the transmission is cold, the fluid level should be at the "ADD ONE PINT" mark to 3/8 inch below the "ADD ONE PINT" mark.

Drain, Refill and Periodic Adjustments

The transmission adjustments, fluid and filter change should be made every 32,000 miles as outlined in the following steps.

NOTE: Police cars, taxicabs and cars which frequently tow trailers, operate in heavy traffic in hot weather or operate continuously with abnormal loads should have more frequent periodic maintenance. Transmissions should not be idled in gear for long periods.

(1) Remove the drain plug from the transmission oil pan and allow transmission to drain (Fig. 15).

(2) Remove the torque converter access plate and remove the converter drain plug and allow to drain (Fig. 15). Remove lower plug from parking sprag cover and allow to drain.

(3) Replace the torque converter drain plug. Tighten the plug to 14 foot-pounds torque. Install and tighten the parking sprag cover plug to 75 inch-pounds torque.

(4) Remove the transmission oil pan. Clean the intake screen and pan.

(5) Adjust the reverse band. Refer to Paragraph 16.

(6) Adjust the kickdown band. Refer to Paragraph 16.

(7) Adjust the push button cable. Refer to Paragraph 13.

(8) Reinstall the intake screen and oil pan. Be sure to use a new gasket.

(9) Install a new fluid filter in the oil cooler to transmission return line.

(10) Pour eight quarts of Automatic Transmission Fluid, Type "A" Suffix "A" into the transmission.

(11) Start the engine and allow to idle for at least two minutes. Then, with the parking brake on, depress each push button momentarily, ending with the N (Neutral) button pushed in.

(12) Add sufficient fluid to bring the fluid level to the "ADD ONE PINT" mark. (Approximately 1½ quarts.)

Recheck the fluid level after the transmission is at normal operating temperature. The level should be between the "FULL" mark and the "ADD ONE PINT" mark.

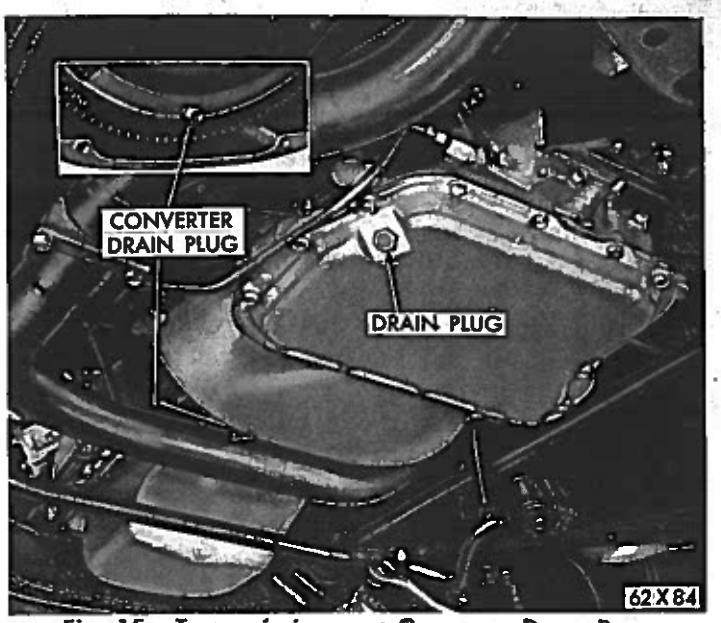


Fig. 15—Transmission and Converter Drain Plugs

(13) Adjust the transmission and carburetor throttle linkage to obtain the proper shift pattern. Refer to Paragraph 17.

CAUTION: To prevent dirt from entering the transmission, make certain that the dip stick cap is fully seated onto the filler tube.

12. FLUID LEAKS

Leaks Repaired With Transmission in Vehicle

Transmission output shaft oil seal. Extension housing gasket. Speedometer pinion seal and cable seal. Oil filler tube seal. Oil pan gasket and drain plug gasket. Gearshift control cable seal. Throttle shaft seal. Neutral starting switch seal. Oil cooler line fittings and pressure take-off plugs.

CAUTION: If the oil filler tube is removed, every precaution must be taken to prevent dirt from falling into the transmission hole. If necessary remove oil pan and clean.

NOTE: The transmission fluid is colored with a red dye. The colored fluid will aid in determining the exact location of seepage should a fluid leak be encountered.

If oil is found inside torque converter housing, determine whether it is transmission fluid or engine oil. Check converter drain plugs for tightness. Correct torque (14 foot-pounds) is very important on this plug.

Leaks at these locations should be corrected, re-

gardless of how slight. Correct by tightening loose screws, nuts or plugs. Where this does not remedy the situation, replace faulty gaskets, seals, plugs or other parts as required.

Leaks Requiring Removal of Transmission

Porous transmission case. Sand hole in front oil pump housing. Front oil pump housing retaining screws or damaged sealing washers. Front oil pump housing seal (located-on outside diameter of pump-housing). Torque converter assembly and converter impeller hub oil seal (located in front pump housing).

Leaks at these locations may be corrected by tightening loose bolts or replacing damaged or faulty parts. Any sharp edges on the converter impeller hub which could contact the seal during reinstallation should be removed by stoning with a fine stone.

13. GEARSHIFT CONTROL CABLE ADJUSTMENT

(1) Raise car on hoist. Have an assistant hold the R (reverse) button firmly depressed.

(2) Remove the push button control cable adjustment wheel lock screw at the left side of transmission (Fig. 11).

(3) Back the adjustment wheel off on the cable guide (turn counter-clockwise) until two or three threads are showing on the guide behind the wheel.

IMPORTANT: Check the wheel for free turning on the guide; remove any dirt or burrs in the threads of the cable guide that may interfere. Lubricate the cable guide threads with a few drops of transmission fluid.

(4) Hold the control cable guide centered in the hole of the transmission case and apply only enough inward force (approximately two pounds) to bottom the assembly at the reverse detent. While holding the cable bottomed, rotate the adjustment wheel clockwise until it just contacts the case squarely.

(5) Turn the wheel clockwise just enough to make the next adjustment hole in the wheel line up with the screw hole in the case.

(6) Counting this hole as number one, continue turning the wheel clockwise until the fifth hole lines up with the screw hole in the case.

(7) Install the lock screw, tighten to 75 inch-pounds torque.

14. NEUTRAL STARTING SWITCH

Adjustment and Test

(1) With proper control cable adjustment assured, depress the N (neutral) push button.

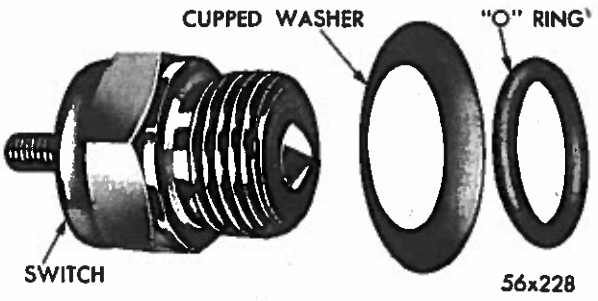


Fig. 16—Neutral Starting Switch (Disassembled)

(2) Raise vehicle and drain approximately two quarts of fluid from transmission.

(3) Unscrew neutral starting switch from transmission case and check to see that switch operating lever is aligned in center of switch opening in the case.

(4) Place cupped washer and "O" ring over threads of the switch (Fig. 16), then screw switch into transmission case a few turns

(5) Connect one lead of a test lamp to battery current and the other lead to the switch terminal. Screw switch into transmission case until the lamp lights, then tighten switch an additional ⅛ to ½ turn.

NOTE: The switch must be tight enough to prevent oil leakage. If not, add a thin washer and readjust the switch.

(6) Remove test lamp and connect wire to the switch.

(7) Add fluid to transmission to bring up to proper level. Refer to Paragraph 11.

15. PARKING LOCK CABLE ADJUSTMENT

(1) Operate parking lock lever from one end of the slot in the instrument panel to the other. The lever should have clearance at both ends. One hole in the parking lock arm is slotted to permit parking lock lever adjustment (Fig. 8). If adjustment of the lever is required, first loosen the cable clamp bolt on the transmission, making sure the cable housing is free to move in the parking sprag cover hole.

(2) To adjust, move the lever to fully OFF position. Loosen the two nuts attaching lock arm to the pushbutton housing. Loosen nuts just enough to free up the lock arm.

(3) Block the locking lever 1/16 inch from the OFF end of the lever slot, then tighten the two nuts

on pushbutton housing. Recheck lever travel to be certain that clearance exists at both ends of lever travel.

(4) Place the parking lock lever (on instrument panel) in the OFF position.

(5) If not performed in step 1, loosen clamp bolt securing cable housing in the parking pawl lever cover on bottom of transmission extension housing. Tap the end of clamp bolt lightly to release its hold on the cable.

(6) Gently pull outward on cable housing to its limit of travel, release and then tighten the clamp bolt to 10 inch-pounds torque. **Do not use pliers or similar tool to pull outward on cable as the cable cover might be damaged causing an oil leak.**

(7) Check the adjustments by allowing vehicle to roll slowly on a slight incline. The parking pawl should fully engage the sprag with lever in ON position, and there should be no ratcheting noise with lever in the OFF position.

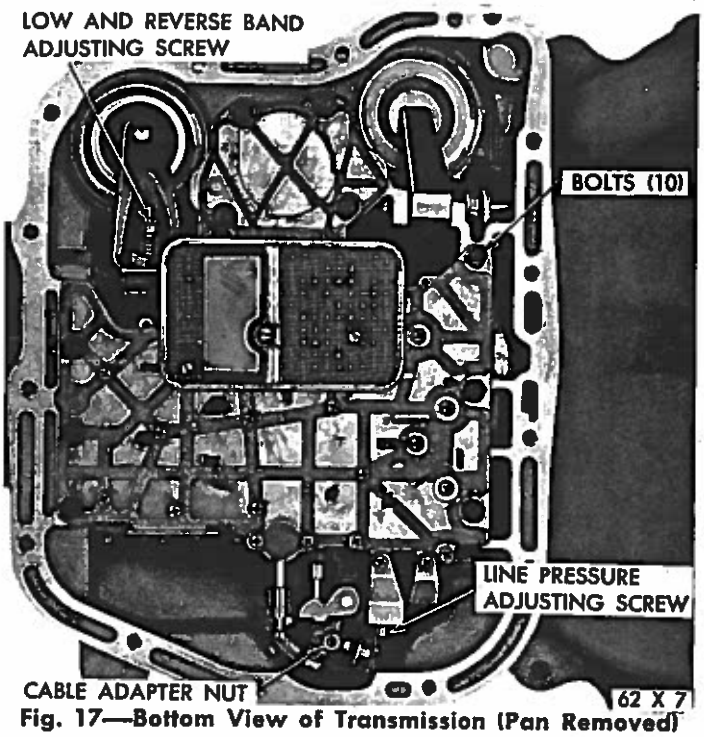


Fig. 17—Bottom View of Transmission (Pan Removed)

16. BAND ADJUSTMENTS

Kickdown Band

The kickdown band adjusting screw is located on the left side of the transmission case near the throttle lever shaft (Fig. 11).

(1) Loosen the lock nut and back off approximately five turns. Check adjusting screw for free turning in the transmission case.

(2) Using wrench, Tool C-3380 with adapter C-3705, tighten band adjusting screw to 47-50 inch-pounds torque. If adapter C-3705 is not used, tighten adjusting screw to 72 inch-pounds which is the true torque.

(3) Back off adjusting screw 2 turns. Hold adjusting screw in this position and tighten lock nut to 29 foot-pounds torque.

Low and Reverse Band

(1) Raise vehicle, drain transmission fluid and remove the oil pan.

(2) Loosen the adjusting screw lock nut and back off nut approximately five turns (Fig. 17). Check adjusting screw for free turning in the lever.

(3) Using wrench, Tool C-3380 with adapter C-3705, tighten band adjusting screw to 47-50 inch-pounds torque. If adapter C-3705 is not used, tighten adjusting screw to 72 inch-pounds which is the true torque.

(4) Back off adjusting screw 3 turns. Hold adjusting screw in this position and tighten lock nut to 35 foot-pounds torque.

(5) Reinstall oil pan using new gasket. Tighten oil pan bolts to 150 inch-pounds torque.

(6) Fill transmission with Automatic Transmission Fluid. Refer to Paragraph 11.

17. THROTTLE LINKAGE ADJUSTMENT

(1) With the engine at operating temperature and carburetor off the fast idle cam, adjust idle speed to 500 rpm, (use tachometer).

(2) Adjust the throttle linkage as outlined and illustrated in Figure 18 or 19.

18. HYDRAULIC CONTROL PRESSURE TESTS

Line Pressure and Front Servo Release Pressure

Line pressure and front servo release pressure tests must be made in D (drive) position with rear wheels free to turn. The transmission fluid must be at operating temperature (150° F to 200° F).

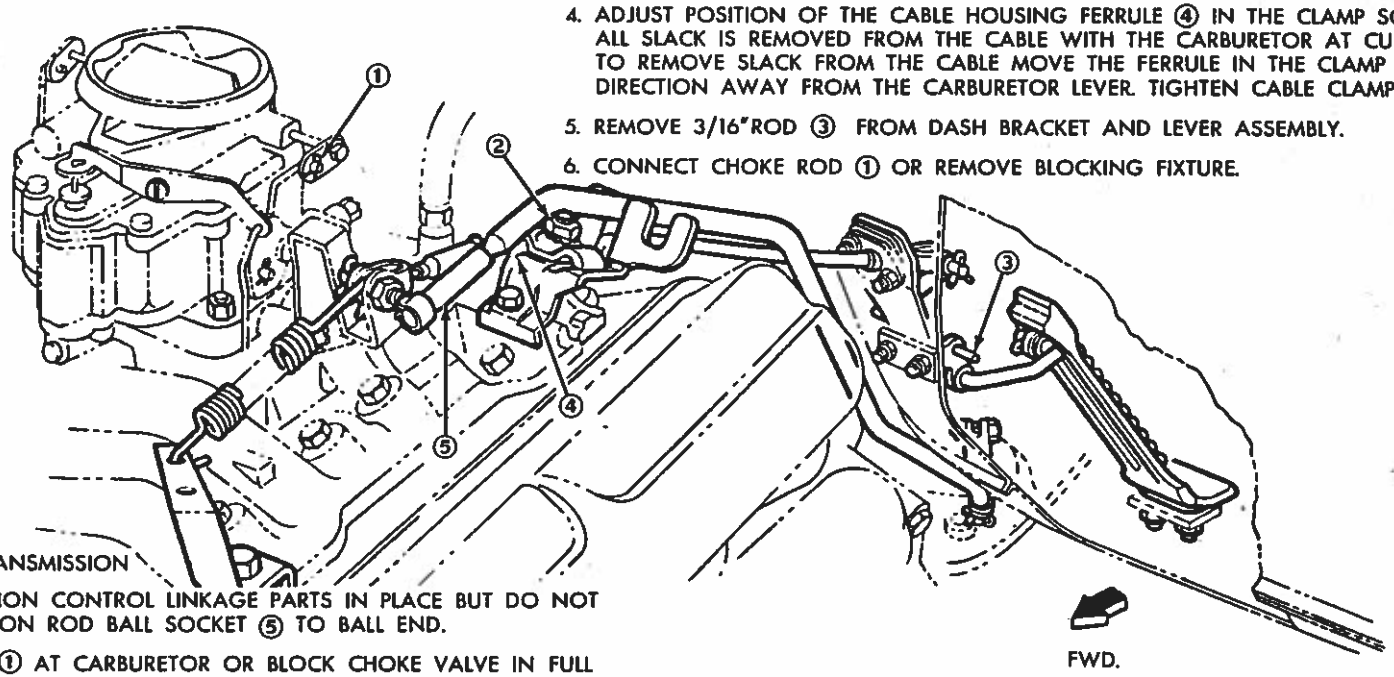
(1) Install an engine tachometer, raise car on a hoist and position tachometer so it can be read under the car.

(2) Connect two O-100 psi pressure gauges, Tool C-3292 to pressure take-off-points at the side of the accumulator and at the front servo release (Fig. 20).

(3) With control in D (drive) position, speed up engine slightly until transmission shifts into direct.

WITH MANUAL TRANSMISSION

1. ASSEMBLE THE THROTTLE LINKAGE PARTS IN PLACE.
2. DISCONNECT CHOKE ① AT CARBURETOR OR BLOCK CHOKE VALVE IN FULL OPEN POSITION. OPEN THROTTLE SLIGHTLY TO RELEASE FAST IDLE CAM, THEN RETURN CARBURETOR TO CURB IDLE.
3. WITH THE CABLE CLAMP NUT ② LOOSE, INSERT A 3/16" DIAMETER ROD ③ APPROXIMATELY 4" LONG IN THE HOLES PROVIDED IN THE DASH BELLCRANK AND LEVER ASSEMBLY. THIS LOCATES THE BELLCRANK AND PEDAL AT THE CORRECT ANGLES UNTIL THE FINAL ADJUSTMENT IS COMPLETED.
4. ADJUST POSITION OF THE CABLE HOUSING FERRULE ④ IN THE CLAMP SO THAT ALL SLACK IS REMOVED FROM THE CABLE WITH THE CARBURETOR AT CURB IDLE. TO REMOVE SLACK FROM THE CABLE MOVE THE FERRULE IN THE CLAMP IN THE DIRECTION AWAY FROM THE CARBURETOR LEVER. TIGHTEN CABLE CLAMP NUT. ②
5. REMOVE 3/16"ROD ③ FROM DASH BRACKET AND LEVER ASSEMBLY.
6. CONNECT CHOKE ROD ① OR REMOVE BLOCKING FIXTURE.



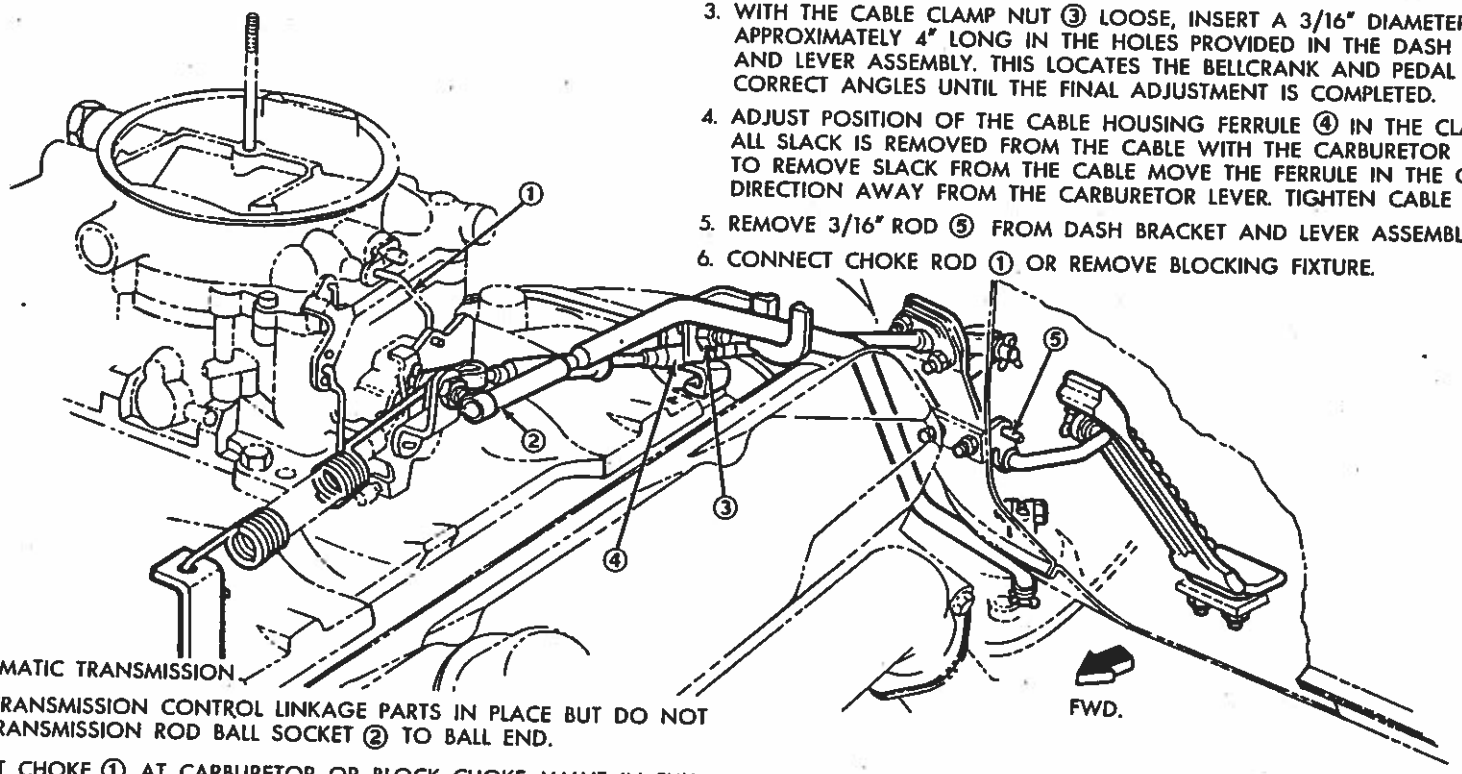
WITH AUTOMATIC TRANSMISSION

1. ASSEMBLE TRANSMISSION CONTROL LINKAGE PARTS IN PLACE BUT DO NOT ASSEMBLE TRANSMISSION ROD BALL SOCKET ⑤ TO BALL END.
2. DISCONNECT CHOKE ① AT CARBURETOR OR BLOCK CHOKE VALVE IN FULL OPEN POSITION, OPEN THROTTLE SLIGHTLY TO RELEASE FAST IDLE CAM, THEN RETURN CARBURETOR TO CURB IDLE.
3. HOLD THE TRANSMISSION LEVER FORWARD AGAINST ITS STOP AND ADJUST THE LENGTH OF THE TRANSMISSION ROD BY MEANS OF THE THREADED ADJUSTMENT ⑤ AT THE UPPER END. THE CORRECT LENGTH HAS BEEN ATTAINED WHEN THE BALL SOCKET LINES UP DIRECTLY WITH THE BALL END WITHOUT EXERTING ANY FORWARD FORCE ON THE ROD. THE BALL SOCKET MUST BE AT THE SAME HEIGHT AS THE BALL END WHEN CHECKING ROD LENGTH.
4. ASSEMBLE BALL SOCKET ⑤ TO BALL END. IF THE TRANSMISSION ROD ADJUSTMENT IS CORRECT, THE TRANSMISSION LEVER WILL BE IN ITS EXTREME FORWARD POSITION WITH THE CARBURETOR AT CURB IDLE. WHEN THE CARBURETOR THROTTLE IS OPENED THE TRANSMISSION LEVER WILL BEGIN ITS TRAVEL AT THE SAME TIME WITH NO VERTICAL MOVEMENT OF THE LEVER OR VERTICAL MOVEMENT OF THE ROD IN THE LEVER.
5. ASSEMBLE REMAINDER OF THROTTLE LINKAGE PARTS IN PLACE. WITH THE CABLE CLAMP NUT ② LOOSE, INSERT A 3/16" DIAMETER ROD ③ APPROXIMATELY 4" LONG IN THE HOLES PROVIDED IN THE DASH BELLCRANK AND LEVER ASSEMBLY.
6. ADJUST POSITION OF THE CABLE HOUSING FERRULE ④ IN THE CLAMP SO THAT ALL SLACK IS REMOVED FROM THE CABLE WITH THE CARBURETOR AT CURB IDLE. TO REMOVE SLACK FROM THE CABLE MOVE THE FERRULE IN THE CLAMP IN THE DIRECTION AWAY FROM THE CARBURETOR LEVER. TIGHTEN CLAMP NUT. ②
7. REMOVE 3/16" ROD ③ FROM DASH BRACKET AND LEVER ASSEMBLY.
8. CONNECT CHOKE ROD ① OR REMOVE BLOCKING FIXTURE. 62x161

Fig. 18—Throttle Linkage Adjustment (318 Cu. In. Eng.)

WITH MANUAL TRANSMISSION

1. ASSEMBLE THE THROTTLE LINKAGE PARTS IN PLACE.
2. DISCONNECT CHOKE ① AT CARBURETOR OR BLOCK CHOKE VALVE IN FULL OPEN POSITION. OPEN THROTTLE SLIGHTLY TO RELEASE FAST IDLE CAM, THEN RETURN CARBURETOR TO CURB IDLE.
3. WITH THE CABLE CLAMP NUT ③ LOOSE, INSERT A 3/16" DIAMETER ROD ⑤ APPROXIMATELY 4" LONG IN THE HOLES PROVIDED IN THE DASH BELLCRANK AND LEVER ASSEMBLY. THIS LOCATES THE BELLCRANK AND PEDAL AT THE CORRECT ANGLES UNTIL THE FINAL ADJUSTMENT IS COMPLETED.
4. ADJUST POSITION OF THE CABLE HOUSING FERRULE ④ IN THE CLAMP SO THAT ALL SLACK IS REMOVED FROM THE CABLE WITH THE CARBURETOR AT CURB IDLE. TO REMOVE SLACK FROM THE CABLE MOVE THE FERRULE IN THE CLAMP IN THE DIRECTION AWAY FROM THE CARBURETOR LEVER. TIGHTEN CABLE CLAMP NUT. ③
5. REMOVE 3/16" ROD ⑤ FROM DASH BRACKET AND LEVER ASSEMBLY.
6. CONNECT CHOKE ROD ① OR REMOVE BLOCKING FIXTURE.



WITH AUTOMATIC TRANSMISSION

1. ASSEMBLE TRANSMISSION CONTROL LINKAGE PARTS IN PLACE BUT DO NOT ASSEMBLE TRANSMISSION ROD BALL SOCKET ② TO BALL END.
2. DISCONNECT CHOKE ① AT CARBURETOR OR BLOCK CHOKE VALVE IN FULL OPEN POSITION, OPEN THROTTLE SLIGHTLY TO RELEASE FAST IDLE CAM, THEN RETURN CARBURETOR TO CURB IDLE.
3. HOLD THE TRANSMISSION LEVER FORWARD AGAINST ITS STOP AND ADJUST THE LENGTH OF THE TRANSMISSION ROD BY MEANS OF THE THREADED ADJUSTMENT ② AT THE UPPER END. THE CORRECT LENGTH HAS BEEN ATTAINED WHEN THE BALL SOCKET LINES UP DIRECTLY WITH THE BALL END WITHOUT EXERTING ANY FORWARD FORCE ON THE ROD. THE BALL SOCKET MUST BE AT THE SAME HEIGHT AS THE BALL END WHEN CHECKING ROD LENGTH.
4. ASSEMBLE BALL SOCKET ② TO BALL END. IF THE TRANSMISSION ROD ADJUSTMENT IS CORRECT, THE TRANSMISSION LEVER WILL BE IN ITS EXTREME FORWARD POSITION WITH THE CARBURETOR AT CURB IDLE. WHEN THE CARBURETOR THROTTLE IS OPENED THE TRANSMISSION LEVER WILL BEGIN ITS TRAVEL AT THE SAME TIME WITH NO VERTICAL MOVEMENT OF THE LEVER OR VERTICAL MOVEMENT OF THE ROD IN THE LEVER.
5. ASSEMBLE REMAINDER OF THROTTLE LINKAGE PARTS IN PLACE. WITH THE CABLE CLAMP NUT ③ LOOSE, INSERT A 3/16" DIAMETER ROD ⑤ APPROXIMATELY 4" LONG IN THE HOLES PROVIDED IN THE DASH BELLCRANK AND LEVER ASSEMBLY.
6. ADJUST POSITION OF THE CABLE HOUSING FERRULE ④ IN THE CLAMP SO THAT ALL SLACK IS REMOVED FROM THE CABLE WITH THE CARBURETOR AT CURB IDLE. TO REMOVE SLACK FROM THE CABLE MOVE THE FERRULE IN THE CLAMP IN THE DIRECTION AWAY FROM THE CARBURETOR LEVER. TIGHTEN CLAMP NUT. ③
7. REMOVE 3/16" ROD ⑤ FROM DASH BRACKET AND LEVER ASSEMBLY.
8. CONNECT CHOKE ROD ① OR REMOVE BLOCKING FIXTURE. 62x158

Fig. 19—Throttle Linkage Adjustment (361 Cu. In. Eng.)

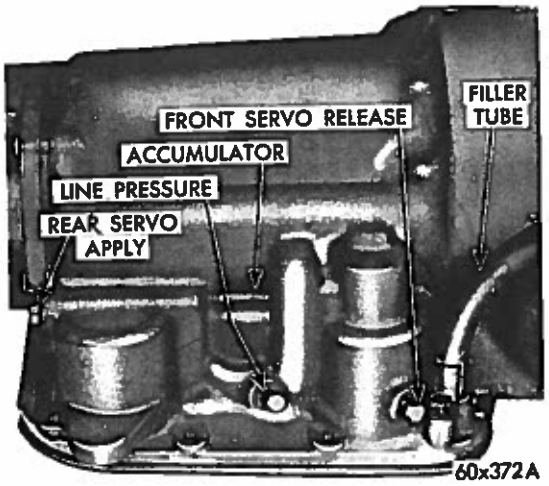


Fig. 20—Pressure Test Locations (Right Side of Case)

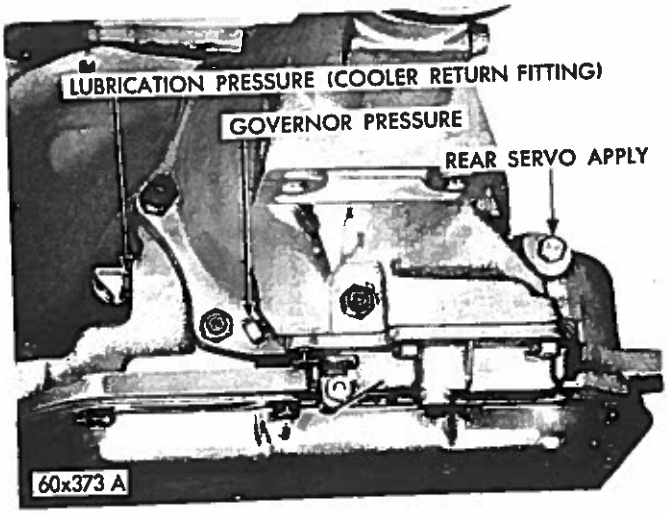


Fig. 21—Pressure Test Locations (Rear End of Case)

(Front servo release will be pressurized in direct). Reduce engine speed slowly to 1,000 rpm. Line pressure at this time (1,000 rpm) must be 54-60 psi, and front servo release pressure must not be more than 3 psi below line pressure.

(4) Disconnect throttle linkage from the transmission throttle lever and move the throttle lever to full throttle position gradually. Line pressure must rise to a maximum of 90-96 psi just before or at kickdown into low gear. Front servo release pressure must follow line pressure up to the kickdown point and should not be more than 3 psi below line pressure.

If line pressure is not 54-60 psi at 1,000 rpm, adjust the pressure as outlined in Paragraph 19.

If front servo release pressures are less than pressures specified and line pressures are within limits, there is excessive leakage in the front clutch and/or front servo circuits.

CAUTION: Always inspect the external transmission throttle lever for looseness on the valve body shaft when making the pressure tests.

Lubrication Pressures

The lubrication pressure test should be made at the same time that line pressure and front servo release pressure are tested.

(1) Install a "tee" fitting between the cooler return line fitting and fitting hole in transmission case at rear of left side of transmission (Fig. 21). Connect a O-100 psi pressure gauge, Tool C-3292 to the "tee" fitting.

(2) At 1,000 engine rpm, with throttle closed and transmission in direct, lubrication pressure should be 5-15 psi. Lubrication pressure will be approximately doubled as the throttle is opened to maximum line pressure.

Rear Servo Apply Pressure

(1) Connect a O-300 psi pressure gauge, Tool C-3293 to apply pressure take-off point at rear servo (Fig. 21).

(2) With transmission control in R (reverse) position and the engine speed set at 1600 rpm, the reverse servo apply pressure should be 240-280 psi.

Governor Pressure

(1) Connect a O-100 psi pressure gauge, Tool C-3292 to the governor pressure take-off point, located at lower left side of extension near the mounting flange (Fig. 21).

(2) Governor pressures should fall within the limits given in the chart. See Page 101.

If governor pressures are incorrect at the given vehicle speeds, the governor valve and/or weights are probably sticking.

Throttle Pressure

No provisions are made to test throttle pressure. Incorrect throttle pressure should only be suspected if the part throttle shift speeds are either very delayed or occur too early in relation to vehicle speeds. In which case, the throttle linkage should be adjusted before throttle pressure setting is adjusted. Refer to Paragraphs 17 and 19.

19. HYDRAULIC CONTROL PRESSURE ADJUSTMENTS

Line Pressure

An incorrect throttle pressure setting will cause incorrect line pressure readings even though the line

GOVERNOR PRESSURE CHART

CAR SPEED TO AXLE RATIOS

Plymouth 8 Cyl.		Plymouth 8 Cyl. (Hi. Per.)		Pressure Limits*
2.76-1	3.23-1	2.76-1	3.23-1	PSI
18-22	15-19	18-22	15-19	15
40-51	34-43	51-61	44-52	50
58-68	50-58	68-77	58-66	65

*The governor pressure should respond smoothly to changes in M.P.H. and should return to 0 to 1½ psi when the vehicle is stopped. High pressure at standstill (above 2 psi) will prevent the transmission from downshifting.

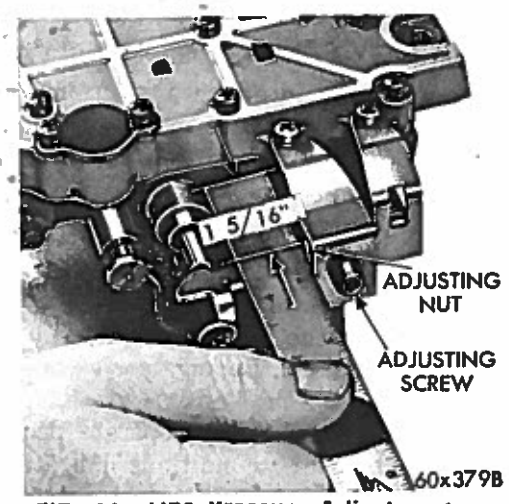


Fig. 22—Line Pressure Adjustment

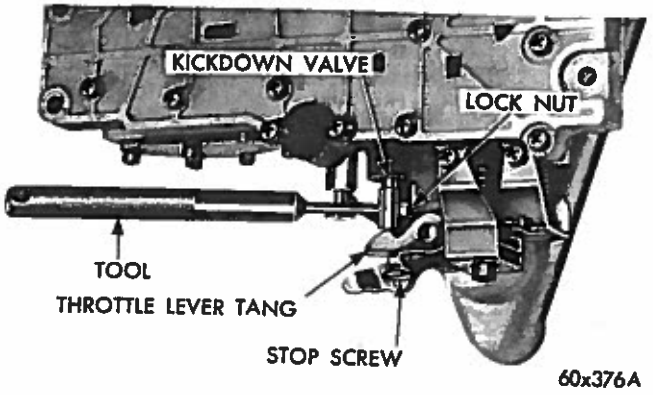


Fig. 23—Throttle Pressure Adjustment (Tool C-3763)

pressure adjustment is correct. Always inspect and correct the throttle pressure adjustment before adjusting the line pressure.

If the line pressure is not correct, it will be necessary to remove the valve body assembly to perform the adjustment. Refer to Paragraph 28.

The approximate adjustment is $1\frac{15}{16}$ inches, measured from the valve body to inner edge of the adjusting nut (Fig. 22). However, due to manufacturing tolerances, the adjustment can be varied to obtain the specified line pressure.

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

Throttle Pressure

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

(1) Remove valve body assembly from the transmission to perform the adjustment. Refer to Paragraph 28.

(2) Loosen throttle lever stop screw lock nut and back off approximately five turns (Fig. 23).

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

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

(5) As force is being exterted to compress the spring, tighten throttle lever stop screw finger tight against the throttle lever tang with the throttle lever cam touching the tool and the throttle valve bottomed. **Be sure the adjustment is made with the spring fully compressed and the valve bottomed in the valve body.**

(6) Remove the tool and tighten the stop screw lock nut securely.

20. 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 by substituting air pressure for the fluid pressure. The

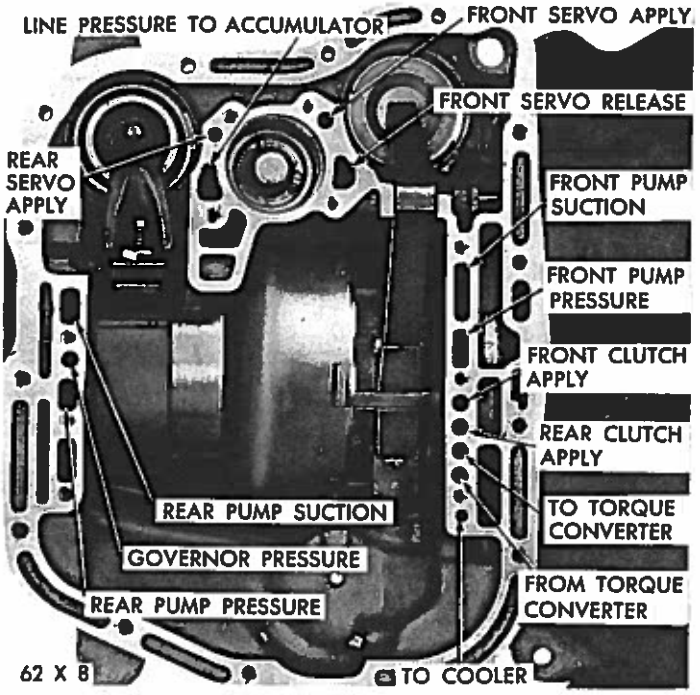


Fig. 24—Air Pressure Tests

front and rear clutches, kickdown servo, and low-reverse servo may be tested by applying air pressure to their respective passage after the valve body assembly has been removed (Fig. 24). Refer to Paragraph 28. To make the complete air pressure tests, proceed as follows:

CAUTION: Compressed air supply must free of all dirt or moisture.

Front Clutch

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

Rear Clutch

Apply air pressure to the rear clutch "apply" passage and listen for a dull "thud" which indicates that the rear clutch is operating. Also check for excessive oil leaks.

NOTE: If a dull "thud" cannot be heard in the clutches, place the finger tips on clutch housing and again apply air pressure. Movement of the piston can be felt as the clutch is applied.

Kickdown Servo

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

Low and Reverse Servo

Direct air pressure into the rear servo "apply" passage. Operation of the servo is indicated by a tightening of the rear band. Spring tension on the servo piston should release the band.

If the clutches and servos operate properly; no upshift or erratic shift conditions indicate that the malfunctions exists in the control valve body assembly.

Governor

Governor operating failures can generally be diagnosed by a road test or hydraulic pressure tests. Refer to Paragraph 18.

SERVICING OPERATIONS WITH TRANSMISSION IN VEHICLE

Various transmission components can be removed for repairs without removing the transmission from vehicle. The removal, reconditioning and installation procedures for these components are covered here, except valve body reconditioning, which is described in Paragraph 35.

Heli-Coil inserts are recommended for repairing damaged, stripped or worn threads in aluminum parts. Refer to Paragraph 31.

21. SPEEDOMETER PINION

Removal and Installation

(1) Remove screw and retainer securing speedometer cable to the extension housing. Carefully work the pinion and sleeve assembly out of the housing (Fig. 25).

(2) To replace the pinion and/or oil seal, pry the clip off the pinion and slide pinion assembly off the cable. Install new seal on cable housing.

(3) If transmission fluid is found in the cable housing, replace seal inside the pinion bore (Fig. 26). Pry old seal out of pinion bore. Place new seal on end of cable with lips toward cable, then slide pinion over seal and cable. Secure with the spring clip.

(4) To install, push the pinion and sleeve assembly into the extension housing so the sleeve flange

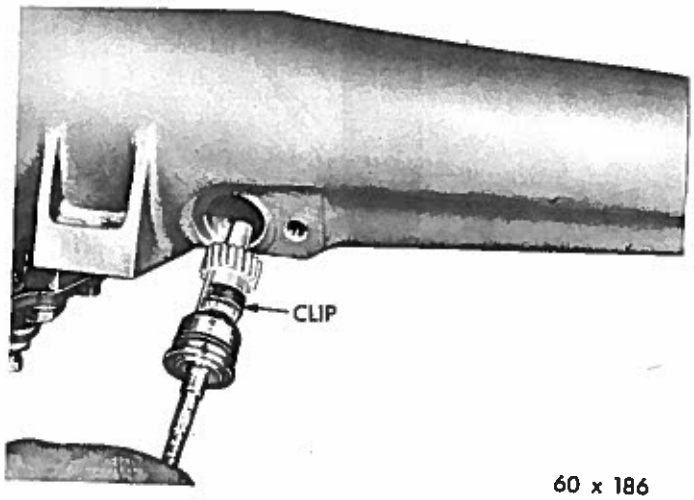


Fig. 25—Removing or Installing Speedometer Pinion

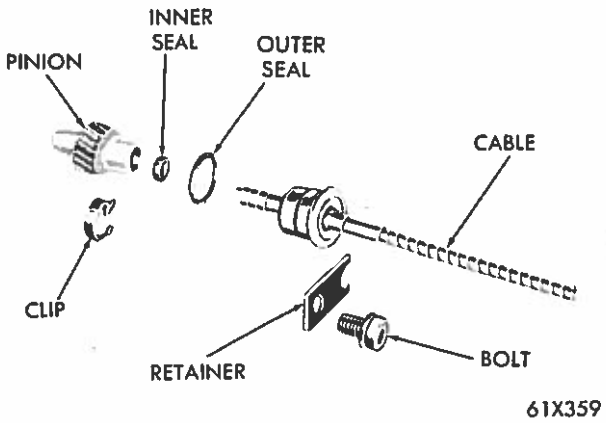


Fig. 26—Speedometer Pinion (Disassembled)

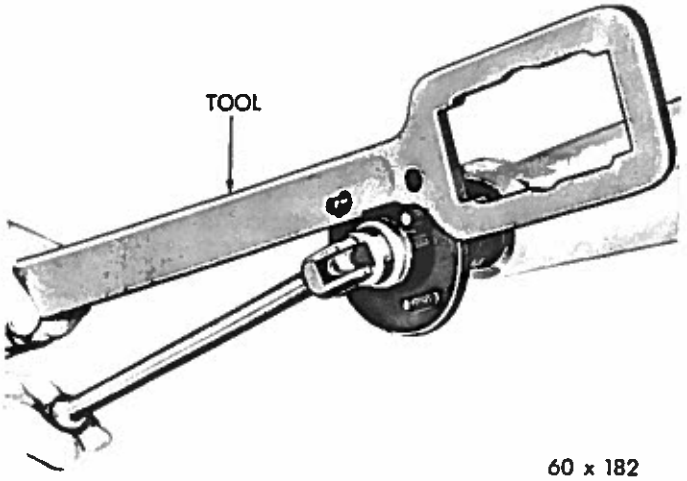


Fig. 27—Removing or Installing Output Shaft Flange Nut (Tool C-3281)

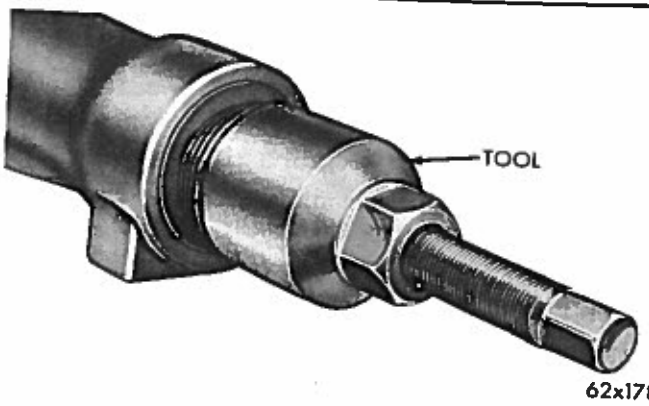


Fig. 28—Removing Output Shaft Oil Seal (Tool C-748)

is tight against the housing, then install the retainer and screw. Tighten screw to 150 inch-pounds torque.

22. OUTPUT SHAFT OIL SEAL

Replacement

(1) Disconnect propeller shaft at the transmission flange.

(2) Hold transmission flange with Tool C-3281 and remove the retaining nut and washer (Fig. 27). Slide the flange off the output shaft. (Use puller, Tool C-452 if necessary).

(3) Screw taper threaded end of Tool C-748 into the seal (Fig. 28) then tighten screw of tool to remove the seal.

(4) To install new seal, position seal in opening of extension housing with lip of seal facing inward. Drive seal into housing with Tool C-3837 (Fig. 29).

(5) Install the transmission output shaft flange. Install washer with its three projections toward the flange and the nut with its convoluted surface contacting the washer. Hold the flange with Tool C-3281, and tighten nut to 175 foot-pounds torque.

(6) Connect propeller shaft to the transmission flange.

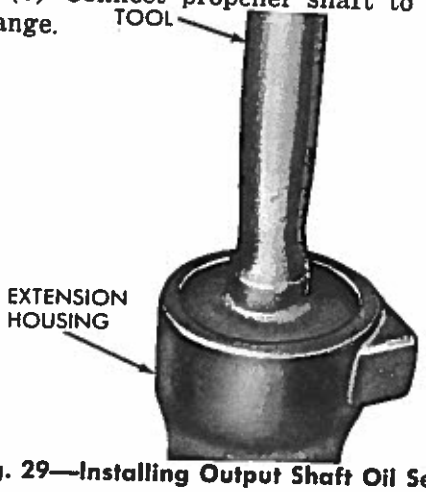


Fig. 29—Installing Output Shaft Oil Seal (Tool C-3837)

23. EXTENSION HOUSING

Removal

(1) Remove the speedometer drive pinion and sleeve assembly. See Paragraph 21.

(2) Remove the transmission flange. See Paragraph 22.

(3) Drain approximately two quarts of fluid from the transmission.

(4) Loosen parking lock cable clamp bolt where cable enters the housing cover. Refer to Figure 12. Remove housing cover lower plug. Insert screw driver through hole, then while exerting pressure against projecting portion of cable lock-spring, withdraw the lock cable.

(5) Remove two bolts securing extension housing to the crossmember insulator.

(6) Raise transmission slightly to clear crossmember with service jack, Tool C-3203A. Remove crossmember attaching bolts and remove crossmember, insulator and spring assembly.

(7) Remove extension housing to transmission bolts, tap the housing lightly with a soft mallet to break it loose from the transmission, then remove the housing.

Bearing Replacement

(1) Pry or drive oil seal out of extension housing with a long blunt drift. Be sure not to mar oil seal surface in the housing.

(2) Remove bearing snap ring from the extension housing. Drive the bearing rearward out of housing with Tool C-3275 (Fig. 30).

(3) Place new bearing in opening of extension housing. Using Tool C-3204, drive bearing into housing (Fig. 31). Install bearing retaining snap ring.

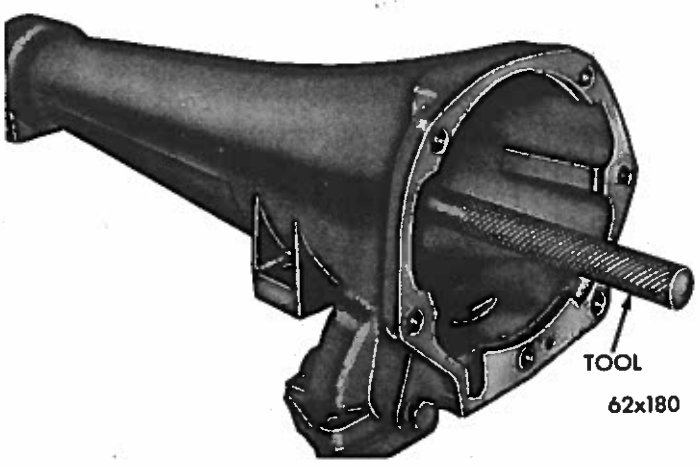


Fig. 30—Removing Output Shaft Bearing (Tool C-3275)

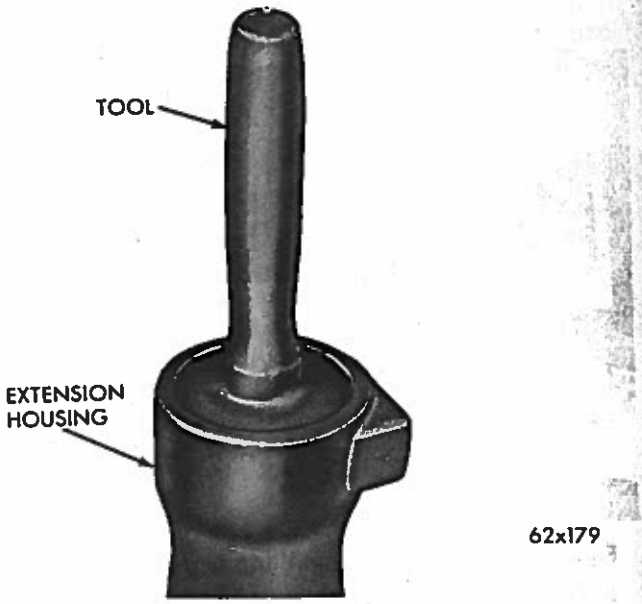


Fig. 31—Installing Output Shaft Bearing (Tool C-3204)

(4) Place new seal in opening of extension housing (lip of seal facing inward). Using Tool C-3837, drive seal into housing until tool bottoms (Fig. 29).

Installation

(1) Using a new gasket, carefully slide the extension housing into place, install the retaining bolts and washers, tighten bolts to 24 foot-pounds torque.

(2) Install the crossmember, insulator and spring assembly. Tighten crossmember attaching bolts to 75 foot-pounds torque. Lower the transmission so extension housing rests on, and is aligned with the insulator. Install insulator to extension housing bolts and tighten to 35 foot-pounds torque.

(3) Install and adjust the parking lock cable. Refer to Paragraphs 10 and 15.

(4) Install the transmission flange and connect the propeller shaft. Refer to Paragraph 22, step 5.

(5) Install the speedometer drive pinion and sleeve.

(6) Add fluid to the transmission to bring up to proper level. Refer to Paragraph 11.

24. GOVERNOR

Removal

(1) Remove the extension housing. See Paragraph 23.

(2) Using a screw driver carefully pry the snap ring from the weight end of governor valve shaft (Fig. 32). Slide the valve and shaft assembly out

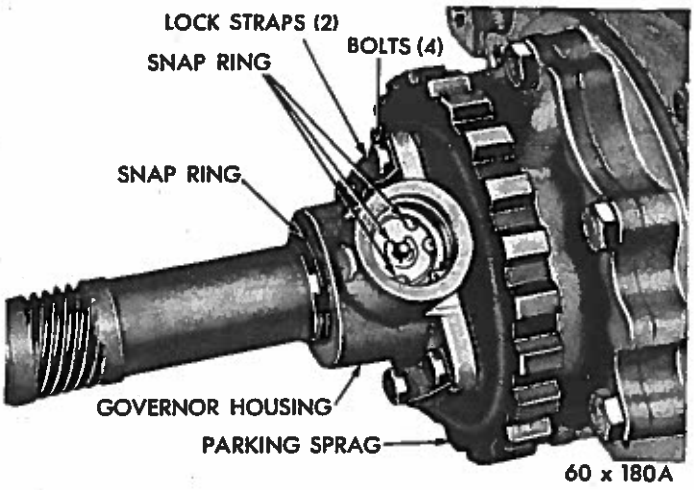


Fig. 32—Governor Shaft and Weight Snap Rings

of governor housing.

(3) Remove large snap ring from weight end of governor housing, lift out governor weight assembly.

(4) Remove snap ring from inside governor weight, remove inner weight and spring from the outer weight. Figure 33 shows an exploded view of the governor assembly.

(5) Remove the snap ring from behind the governor housing, then slide the governor housing and parking lock sprag assembly off the output shaft. If necessary remove four bolts and separate governor housing from the sprag.

Cleaning and Inspection

The primary cause of governor operating failure is due to a sticking governor valve or weights. Rough surfaces may be removed with crocus cloth. Thoroughly clean all parts in clean solvent and check for free movement before assembly.

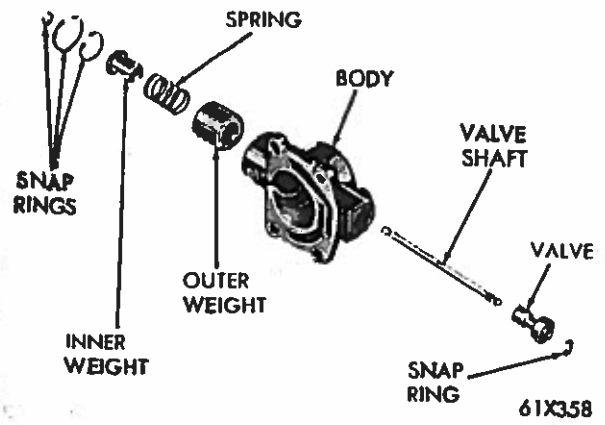


Fig. 33—Governor Assembly (Exploded View)

Installation

(1) Assemble the governor housing to the parking lock sprag (if disassembled) and tighten bolts finger tight. Make sure oil passage of governor housing aligns with passage in sprag.

(2) Position parking lock sprag and governor assembly on output shaft. Align the assembly so the governor valve shaft hole in governor body aligns with the hole in the output shaft, then slide the assembly into place. Install snap ring behind the governor housing (Fig. 32). Tighten housing to sprag bolts to 100 inch-pounds torque. Bend ends of lock straps over bolt heads.

(3) Assemble the governor weights and spring, and secure with snap ring inside of large governor weight. Place the weight assembly in governor housing and install snap ring.

(4) Place the governor valve on valve shaft, insert the assembly into housing and through the governor weights. Install the valve shaft retaining snap ring. Check valve and weight assembly for free movement after installation.

(5) Install the extension housing, transmission flange and connect propeller shaft.

(6) Connect and adjust the parking lock cable. Refer to Paragraphs 10 and 15.

25. REAR OIL PUMP

Removal

(1) Remove the extension housing. See Paragraph 23.

(2) Remove the governor and parking sprag. See Paragraph 24.

(3) Unscrew the rear oil pump cover retaining bolts and remove cover.

(4) The oil pump inner rotor is keyed to output shaft by a small ball, therefore, use care in sliding out inner rotor so as not to lose the ball (Fig. 34). Remove outer rotor from the pump body.

NOTE: If rear oil pump body requires replacement, it will be necessary to disassemble the transmission as the pump body must be driven rearward out of the case with a wood block.

Inspection

Inspect oil pump body and cover machined surfaces for nicks and burrs. Inspect rotors for scoring or pitting. With gears cleaned and installed in pump body, place a straight edge across face of rotors and pump body. Using a feeler gauge, check clearance

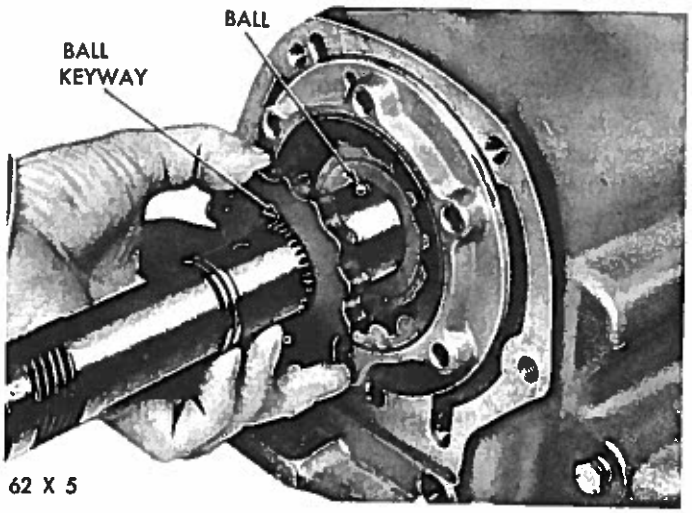


Fig. 34—Removing or Installing Rear Oil Pump Inner Rotor

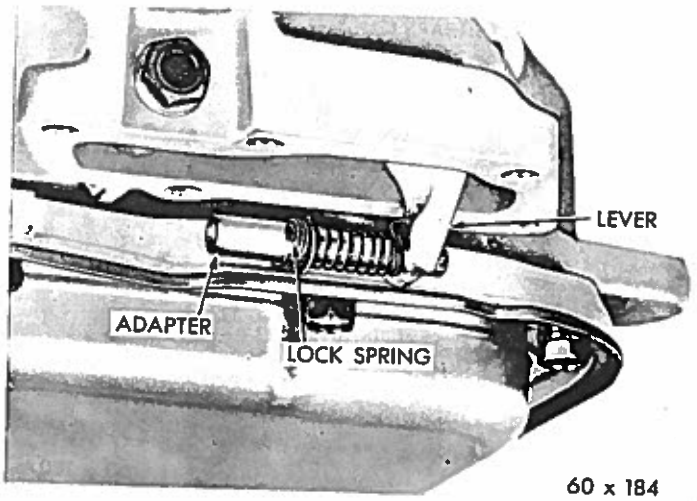


Fig. 36—Cable Adapter Attached to Parking Lock Lever

between straight edge and face of rotors. Clearance limits are from .0015 to .003 inch.

Installation

(1) Place outer rotor in the pump body.

(2) Turn output shaft so inner rotor driving ball pocket is up. Install the ball and slide inner rotor on the output shaft in alignment with the ball (Fig. 34).

(3) Install the oil pump cover with the retaining bolts threaded in a few turns. Slide the aligning fixture Tool C-3864 all the way in until it bottoms against rotors (Fig. 35), then retighten the cover bolts evenly to 140 inch-pounds torque.

(4) Install the governor and parking sprag. See Paragraph 24.

(5) Install the extension housing, transmission flange and connect the propeller shaft.

(6) Connect the parking lock cable.

26. PARKING LOCK COMPONENTS

Removal

(1) Remove the extension housing. See Paragraph 23.

(2) To replace the parking lock sprag, refer to Paragraph 24.

(3) Remove the parking lock cable adapter cover from bottom of the extension housing.

(4) Carefully remove the cable adapter from parking lock lever (Fig. 36). Replace the spring on the adapter if it becomes distorted during removal.

(5) Remove plug from extension housing and slide out shaft to remove the parking lock lever and shim (Fig. 37).

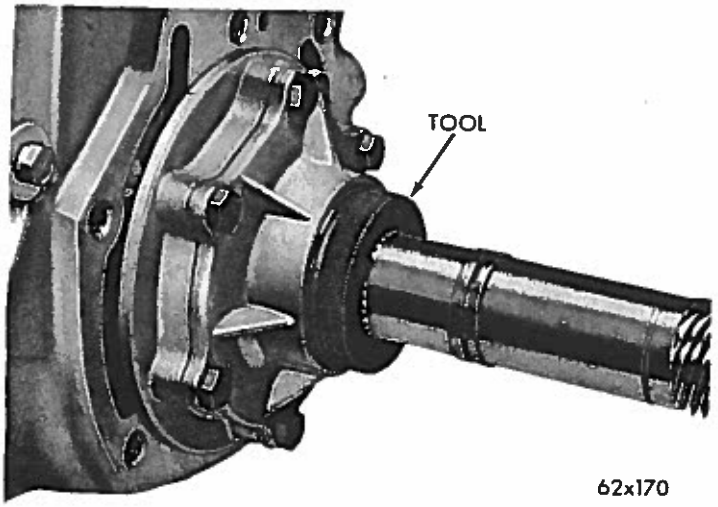


Fig. 35—Aligning Rear Oil Pump Cover (Tool C-3864)

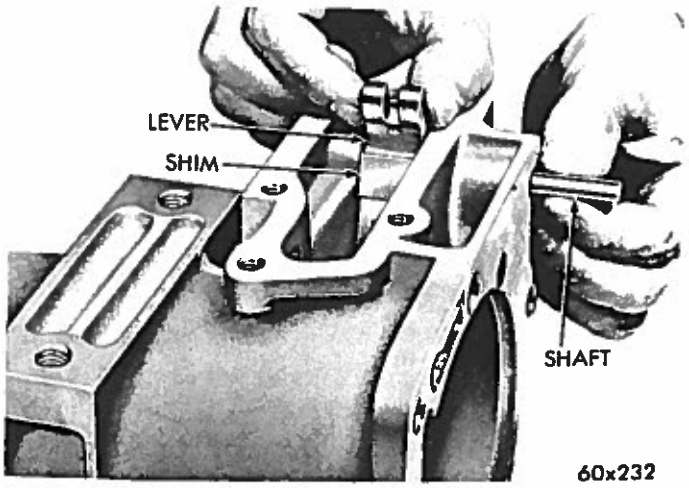


Fig. 37—Removing or Installing Parking Lock Lever

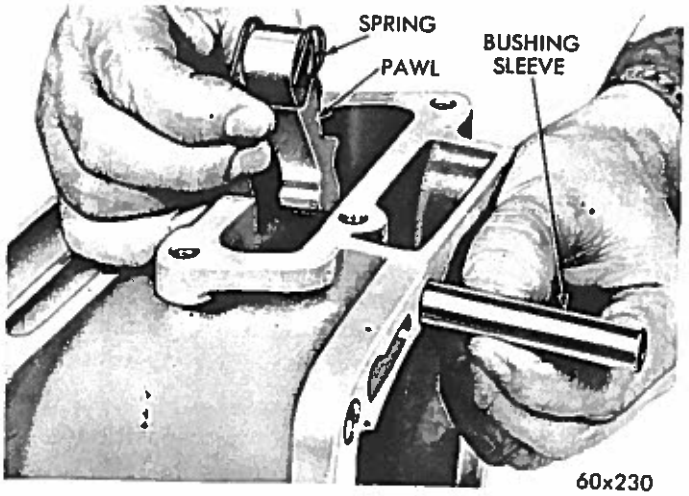


Fig. 38—Removing or Installing Parking Pawl

(6) Slide bushing sleeve out of housing to remove the parking pawl and spring (Fig. 38).

Installation

(1) Position the parking pawl and spring in the housing and insert the bushing sleeve (Fig. 38). Make sure the square lug on the pawl is toward the sprag and the spring is positioned so as to lift the pawl away from the sprag.

(2) Position the lock lever and shim in the housing and install the lever shaft (Fig. 37). The lever roller must be on top of the pawl so as to push it into engagement with the sprag. Tighten the plug to 150 inch-pounds torque.

(3) Attach the cable adapter to parking lock lever. Make sure the adapter is attached exactly as shown in Figure 36. Place a new adapter cover gasket on the extension housing.

(4) Insert small punch through cable opening in adapter cover and into end of adapter. Carefully lower the cover into position, feeding the adapter into cable opening in the cover. Install cover retaining screws and tighten to 150 inch-pounds torque.

(5) Install the extension housing, transmission flange and connect the propeller shaft.

(6) Connect the parking lock cable. See Paragraphs 10 and 15.

27. NEUTRAL STARTING SWITCH

Removal

(1) Drain approximately two quarts of fluid from the transmission.

(2) Disconnect wire from switch and unscrew switch from transmission case.

Installation and Tests

(1) With proper gearshift control cable adjustment assured and N (neutral) button depressed, check to see that switch operating lever is aligned in center of switch opening in the case.

(2) Place cupped washer and "O" ring over threads of switch (Fig. 16), then screw switch into transmission case a few turns.

(3) Connect one lead of a test lamp to battery current and the other lead to the switch terminal. Screw switch into transmission case until the lamp lights, then tighten switch an additional ⅛ to ½ turn.

NOTE: The switch must be tight enough to prevent oil leakage. If not, add a thin washer and readjust the switch.

(4) Remove test lamp and connect wire to the switch.

(5) Add fluid to transmission to bring up to proper level. Refer to Paragraph 11.

28. VALVE BODY ASSEMBLY AND ACCUMULATOR PISTON

Removal

(1) Remove the drain plug from transmission oil pan and drain the transmission fluid.

(2) Remove the oil pan and gasket.

(3) Loosen clamp bolt and lift the throttle lever, washer and seal off the transmission throttle lever shaft.

(4) Shift the manual lever into the 1 (low) position to expose the nut securing the cable adapter to the lever (Fig. 17). Remove nut and disengage cable adapter from the manual lever.

(5) Place drain pan under transmission, then remove the ten hex-head valve body to transmission case bolts. Hold valve body in position while removing bolts.

(6) Lower the valve body assembly down out of the transmission, being careful not to cock the throttle lever shaft in the case hole or lose the accumulator spring.

(7) Withdraw accumulator piston from transmission case. Inspect piston for scoring, check rings for wear or breakage. Replace as required.

NOTE: Servicing the valve body assembly is outlined in Paragraph 35.

Installation

(1) Clean mating surfaces and check for burrs

on both the transmission case and valve body steel plate.

(2) Install accumulator piston in the transmission case.

(3) Position accumulator spring on the valve body.

(4) Carefully position the valve body assembly into place in transmission case and start all the retaining bolts.

(5) Snug the bolts down evenly, then tighten to 100 inch-pounds torque.

(6) Connect the control cable adapter to manual lever and install retaining nut.

(7) Install seal, flat washer and throttle lever on throttle shaft. Tighten clamping bolt. Check throttle lever for looseness by forcing it in both directions.

(8) Install the oil pan, using new gasket.

(9) Add fluid to transmission to bring up to proper level. Refer to Paragraph 11.

29. TRANSMISSION AND CONVERTER REMOVAL AND INSTALLATION

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

Removal

(1) Connect Remote Control Starter Switch, Tool C-763 to starter solenoid and position switch so engine can be rotated from under vehicle.

(2) Disconnect high tension wire from distributor cap.

(3) Raise vehicle on a hoist or support with stands.

(4) Remove cover plate from in front of converter assembly to provide access to the converter drain plug and mounting bolts.

(5) Rotate engine with the Remote Control Switch to bring the drain plug to "6 o'clock" position. Drain the torque converter and transmission.

(6) Mark the converter and drive plate to aid in reassembly. The crankshaft flange bolt circle, the inner and outer circle of holes in the drive plate, and the four tapped holes in the front face of the converter all have one hole offset so these parts will be installed in the original position. This maintains the balance of the engine and converter.

(7) Rotate engine with Remote Control Switch to locate two converter to drive plate bolts at "5 and 7 o'clock" positions. Remove the two bolts, rotate engine with switch and remove the other two bolts.

CAUTION: Do not rotate converter or drive plate by prying with a screw driver or similar tool as the drive plate might become distorted. Also, the starter should never be engaged if the drive plate is not attached to the converter with at least one bolt or if the transmission case to engine block bolts have been loosened.

(8) Depress 1 (low) push button to position control cable for removal from transmission.

(9) Disconnect negative (ground) cable from the battery.

(10) Remove the starting motor assembly.

(11) Disconnect wire from neutral starting switch and remove the switch.

(12) Remove push button control cable to transmission adjusting wheel lock screw. Insert screw driver through neutral starting switch opening. (Fig. 11). Push gently against upper projecting portion of cable lock-spring and pull outward on cable to remove cable from adapter and transmission case.

(13) Loosen clamp screw and remove throttle link and lever assembly from the throttle shaft on transmission.

(14) Disconnect oil cooler lines at the transmission and remove oil filler tube.

(15) Remove speedometer pinion and sleeve assembly from the transmission (Fig. 25).

(16) Loosen transmission parking lock cable clamp bolt where cable enters the cover (Fig. 12). Remove the housing cover lower plug. Insert screw driver through hole, then gently exert pressure against projecting portion of cable lock-spring and withdraw the lock cable.

(17) Disconnect front universal joint and secure propeller shaft out of the way.

(18) Remove two bolts securing extension housing to the crossmember insulator.

(19) Install engine support fixture, Tool C-3487 and raise the engine slightly.

(20) Remove crossmember attaching bolts and remove crossmember, insulator and spring assembly.

(21) Place transmission service jack under the transmission to support the assembly.

(22) Attach a small "C" clamp to edge of bell

plate. A stamped V mark identifies the offset hole in the converter front cover (Fig. 41). Carefully work the transmission assembly forward over the engine block dowels with the converter hub entering the crankshaft opening.

(4) After the transmission is in position, install bell housing bolts and tighten to 25-30 foot-pounds torque.

(5) Install and tighten the two lower drive plate to converter bolts to 270 inch-pounds torque.

(6) Install the starting motor and connect battery ground cable.

(7) Rotate engine with Remote Control Switch and install the other two drive plate to converter bolts. Tighten bolts to 270 inch-pounds torque.

(8) Install the crossmember, insulator and spring assembly. Tighten crossmember attaching bolts to 75 foot-pounds torque. Lower the transmission so extension housing rests on, and is aligned with the insulator. Install insulator to extension housing bolts and tighten to 35 foot-pounds torque.

(9) Insert screw driver through parking lock cover plug opening and position it behind the cable adapter stop washer (Fig. 13). Hold the adapter outward while pushing the cable in as far as possible, making sure lock-spring engages cable. Gently pull outward on cable housing to its limit of travel, then tighten the clamp bolt to 10 inch-pounds torque. Remove screw driver and, reinstall plug in cover.

(10) Connect the propeller shaft to the front companion flange.

(11) Install the speedometer drive pinion and sleeve.

(12) Connect oil cooler lines to the transmission and install oil filler tube.

(13) Position throttle lever on transmission throttle shaft and tighten clamp screw.

(14) Have an assistant engage the R (reverse) button and hold it firmly depressed. Insert push button control cable in transmission case, push inward on cable making sure lock-spring engages cable. Install control cable adjusting wheel retaining screw.

(15) Install neutral starting switch and connect wire.

(16) Install cover plate in front of the converter assembly.

(17) Install the transmission case to cylinder block brace.

The converter cover plate must be between the case and the brace. The oil line bracket is attached in front of the brace. Tighten the bolts holding the brace to the case before attaching brace to the cylinder block.

(18) Refill transmission with Automatic Transmission Fluid, Type "A" Suffix "A". Refer to Paragraph 11 for complete transmission filling instructions.

NOTE: To completely adjust the throttle linkage, push button control cable, and neutral starting switch, refer to "Maintenance, Adjustments and Tests", Paragraphs 13, 14 and 17.

RECONDITION TRANSMISSION—UNIT OUT OF VEHICLE

The following reconditioning paragraphs cover the removal, disassembly, inspection, repair, assembly and installation procedures for each sub-assembly in detail.

In the event that any part has failed in the transmission, the torque converter should be flushed to insure that fine metal particles are not later transferred back into the reconditioned transmission.

30. FLUSHNG TORQUE CONVERTER

The torque converter must be removed from vehicle for flushing, as the converter should never be rotated by the starter with the transmission removed.

(1) Place torque converter in an upright position and pour two quarts of new clean solvent or kerosene into converter through the impeller hub.

(2) Turn and shake the converter so as to swirl the solvent through the internal parts. Turning the turbine and stator with transmission input and reaction shafts will aid in dislodging foreign material.

(3) Position the converter in its normal operating position with drain plug at the lowest point. Remove drain plug and drain the solvent. Rotate the turbine and stator, and shake converter while draining to prevent dirt particles from settling.

(4) Repeat the flushing operation at least once, or as many times as required until the solvent or kerosene drained out is clear.

(5) After flushing, shake and rotate the converter several times with drain plug out to remove any residual solvent and dirt. Flush any remaining solvent from the converter with two quarts of new transmission fluid. This will prevent any adverse effect the solvent may have on the transmission seals.

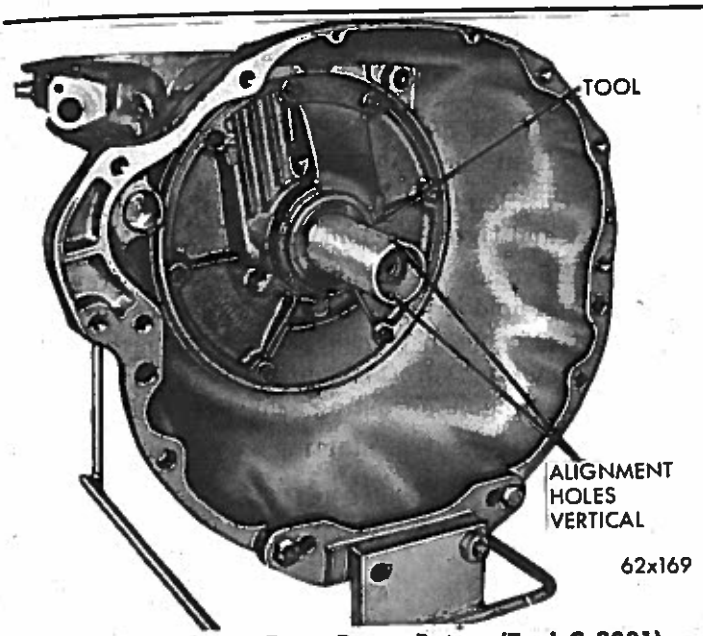


Fig. 39—Aligning Front Pump Rotors (Tool C-3881)

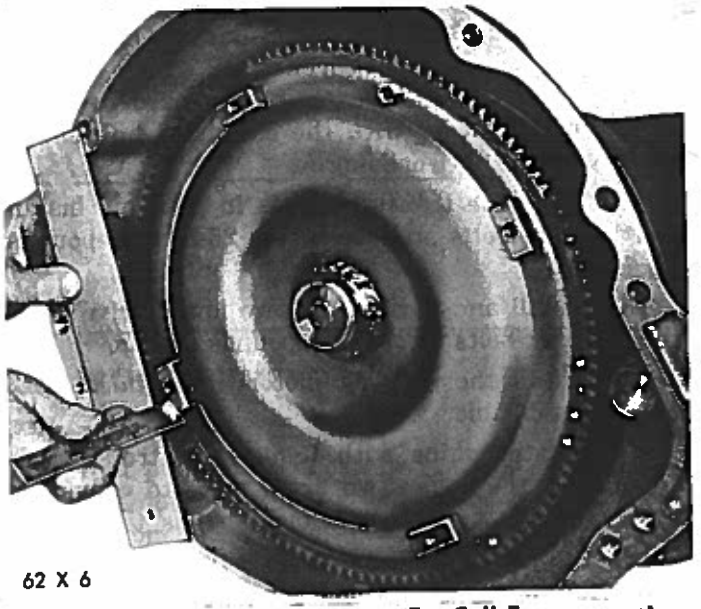


Fig. 40—Checking Converter For Full Engagement in Transmission

housing to hold converter in place during removal of transmission.

(23) Remove the bell housing retaining bolts. Carefully work the transmission rearward off the engine block dowels and disengage converter hub from the end of crankshaft.

(24) Lower the transmission jack and remove the transmission and converter assembly.

(25) To remove the converter assembly, remove "C" clamp from edge of bell housing, then carefully slide the assembly out of the transmission.

Converter Installation

(1) Rotate the front pump rotors with Tool C-3881 until the two small holes in handle of tool are vertical (Fig. 39).

(2) Carefully slide the converter assembly over the input shaft and reaction shaft. Make sure the converter impeller shaft slots are also vertical and fully engage the front pump inner rotor lugs.

Check for full engagement by placing a straightedge on the face of the case (Fig. 40). The surface of the converter front cover lug should be at least ½ inch to the rear of the straightedge when the converter is pushed all the way into the transmission.

(3) Attach a small "C" clamp to edge of bell housing to hold converter in place during transmission installation.

Installation

(1) Inspect the converter drive plate for distortion or cracks and replace if necessary.

(2) Coat the converter hub hole in the crankshaft with wheel bearing grease. Place transmission and converter assembly on service jack and position assembly under vehicle for installation. Raise or tilt as necessary until the transmission is aligned with engine.

(3) Rotate the converter so mark on converter (made during removal) will align with mark on drive plate. The offset holes in the plate are located next to the ⅛ inch hole in the inner circle of the

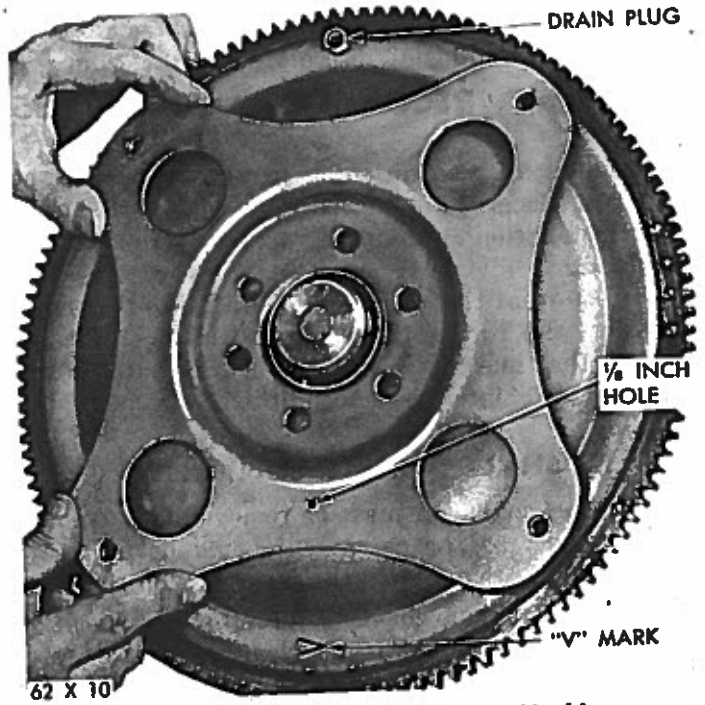


Fig. 41—Converter and Drive Plate Markings

HELI-COIL INSERT			DRILL	TAP	INSERTING TOOL	EXTRACTING TOOL
Thread Size	Part No.	Insert Length	Size	Part No.	Part No.	Part No.
10-24	1185-3	.285"	13/64" (.203")	3 CPB	528-3N	1227-6
1/4-20	1185-4	3/8"	17/64" (.265")	4 CPB	528-4N	1227-6
5/16-18	1185-5	15/32"	Q (.332")	5 CPB	528-5N	1227-6
3/8-16	1185-6	9/16"	X (.397")	6 CPB	528-6N	1227-6

Reinstall drain plug and tighten to 14 foot-pounds torque.

31. ALUMINUM THREAD REPAIR

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

The above chart lists the threaded hole sizes which are used in the aluminum case and valve body, and the necessary tools and inserts for the repair of damaged or worn threads. Heli-Coil tools and inserts are readily available from most automotive parts jobbers.

NOTE: Some thread drag may occur in screwing a bolt into the installed Heli-Coil insert. Therefore, a torque reading should be taken of the thread drag with an inch-pound torque wrench and added to the specified bolt torque, so that all bolts securing a particular part will be tightened to the same torque.

32. FRONT PUMP OIL SEAL

Replacement

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

(1) Screw seal remover, Tool C-3861 into the seal (Fig. 42). Tighten screw portion of tool to withdraw the seal.

(2) To install new seal, place seal in opening of pump housing (lip side facing inward). Using Tool C-3860, drive seal into housing until tool bottoms (Fig. 43).

33. REMOVAL OF SUB-ASSEMBLIES

Prior to removing any of the transmission subassemblies, plug all openings and thoroughly clean the exterior of the unit, preferably by steam. Cleanliness through the entire disassembly and assembly cannot be over-emphasized. When disassembling, each part should be washed in a suitable solvent, then dried by compressed air. **Do not wipe parts with shop towels.** All of the mating surfaces in the transmission are accurately machined; therefore,

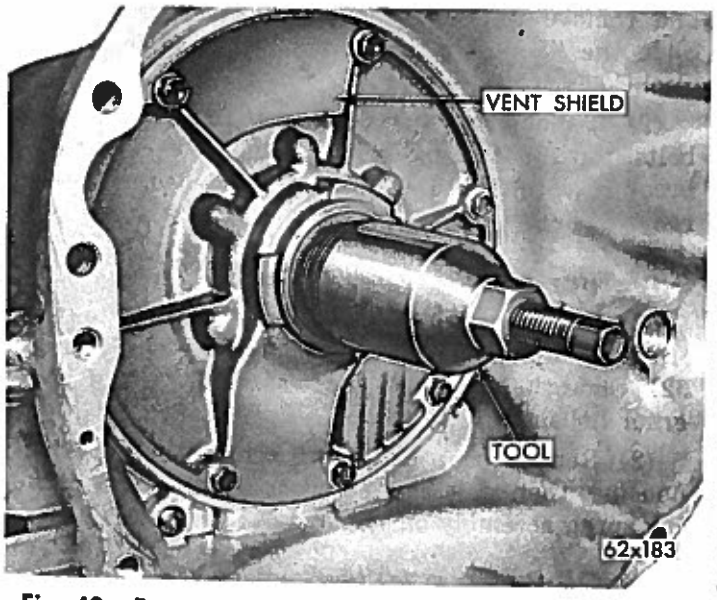


Fig. 42—Removing Front Pump Oil Seal (Tool C-3861)

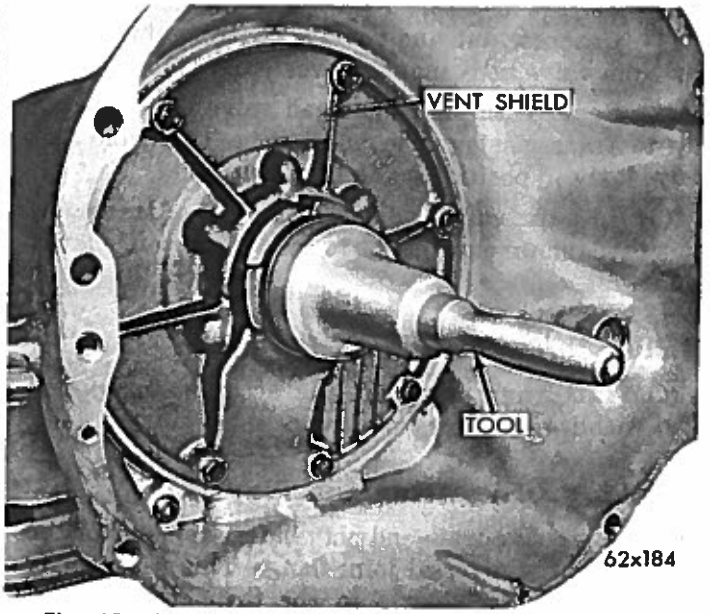


Fig. 43—Installing Front Pump Oil Seal (Tool C-3860)

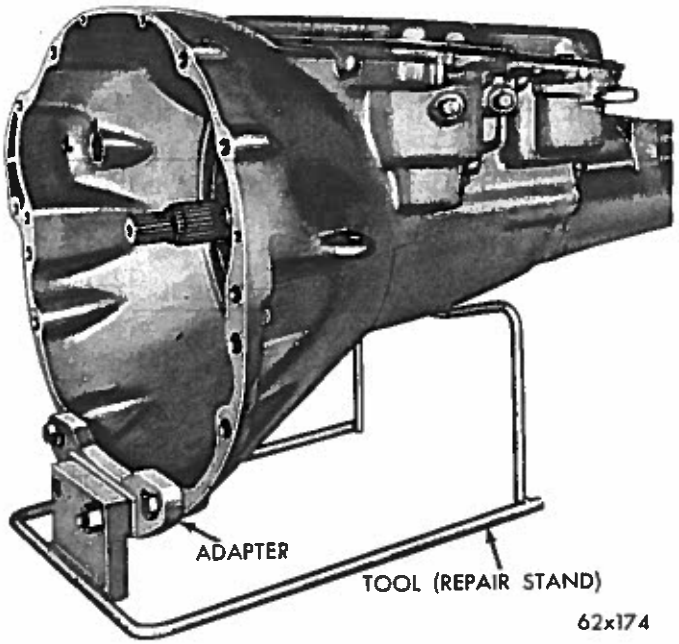


Fig. 44—Transmission Installed in Repair Stand (Tool C-3750, Adapter C-3882)

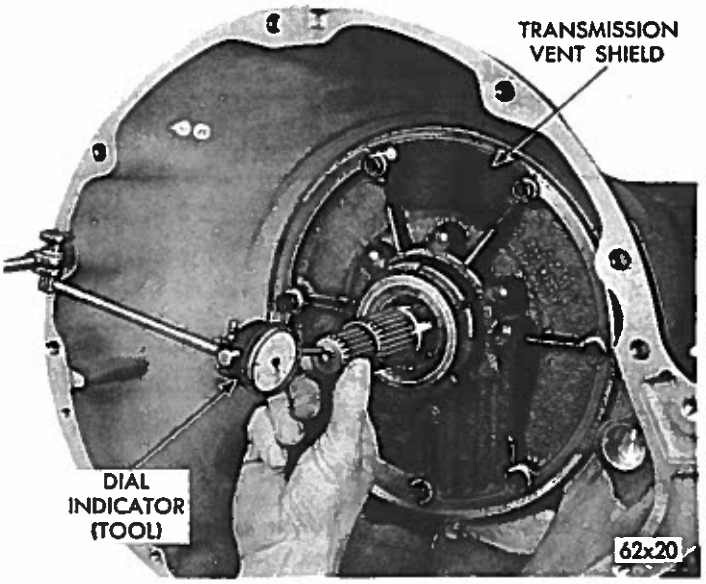


Fig. 45—Checking Drive Train End Play (Tool C-3339)

careful handling of parts must be exercised to avoid nicks or burrs.

Oil Pan

(1) Place transmission assembly in repair stand, Tool C-3750 with adapter C-3882 (Fig. 44).

(2) Unscrew oil pan bolts and remove oil pan and gasket.

Valve Body Assembly

(1) Unscrew nut and remove control cable adapter from valve body manual lever (Fig. 17).

(2) Remove the ten hex-head valve body assembly to transmission case bolts (Fig. 17). Hold the valve body in position while removing bolts.

(3) Lift the valve body assembly out of transmission case, being careful not to cock the throttle lever shaft.

Accumulator Piston and Spring

(1) Lift the spring off the accumulator piston and withdraw piston from the case.

Checking Drive Train End Play

Check the drive train end play before removal of the output shaft universal joint flange. This will usually indicate when a change in the thrust washer between the reaction shaft support and front clutch retainer is required to properly adjust end play during assembly (except when major parts are replaced).

(1) Attach a dial indicator to the transmission bell housing with its plunger seated against the end of input shaft (Fig. 45).

(2) Chuck the input shaft in and out to obtain end play reading.

(3) Record the indicator reading for reference when reassembling the transmission. End play specifications are .030-.070 inch.

Extension Housing

(1) Hold transmission flange with Tool C-3281, and remove retaining nut and washer (Fig. 27). Slide the flange off the output shaft. (Use puller, Tool C-452 if necessary).

(2) Remove extension housing to transmission bolts, tap the housing lightly with a soft mallet to break it loose from the transmission, then carefully remove the housing.

Governor and Parking Sprag

(1) Using a screw driver, carefully pry snap ring from the weight end of governor valve shaft (Fig. 32). Slide the valve and shaft assembly out of governor housing.

(2) Remove snap ring from behind the governor housing, then slide the governor housing and parking sprag assembly off the output shaft.

Rear Oil Pump

(1) Unscrew the rear oil pump cover retaining

bolts and remove cover.

(2) The oil pump inner rotor is keyed to output shaft by a small ball. Therefore, use care in sliding out inner rotor so as not to lose the ball (Fig. 34). Remove outer rotor from the pump body.

NOTE: If replacement of rear oil pump body is required, drive it rearward out of the case with a wood block after the transmission has been disassembled.

Front Oil Pump and Reaction Shaft Support

(1) Remove the front oil pump housing retaining bolts.

(2) Tighten the front band adjusting screw until the band is tight on the front clutch retainer. This prevents the clutch retainer from coming out with the pump which might cause unnecessary damage to the clutches.

(3) Attach Tool C-3752 to pump housing flange as shown in Figure 46, thread the screws of the tool into the flange holes at 9 and 3 o'clock locations.

(4) Bump outward evenly on the two "knocker weights" to withdraw oil pump and reaction shaft support assembly from the case.

Front Band and Front Clutch

(1) Loosen the front band adjuster, remove the band strut and slide the band out of the case.

(2) Slide the front clutch assembly out of the case.

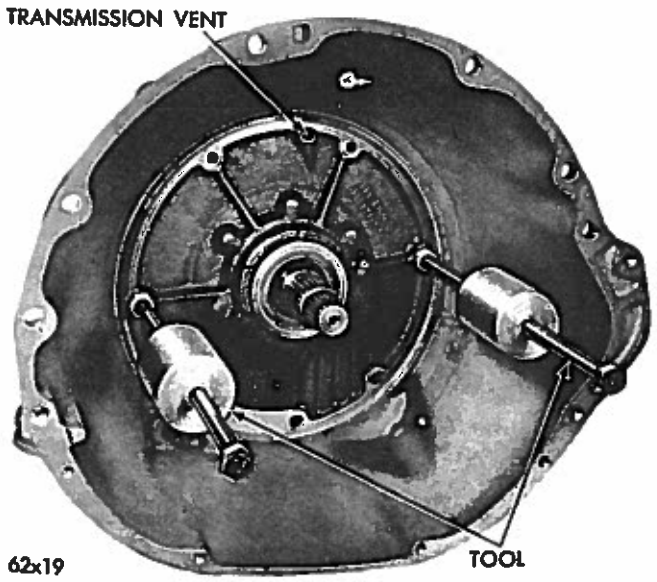


Fig. 46—Removing Front Oil Pump and Reaction Shaft Support Assembly (Tool C-3752)

Input Shaft and Rear Clutch

(1) Grasp the input shaft, and slide input shaf and rear clutch assembly out of the case.

CAUTION: Be careful not to lose the thrust washe located between rear end of input shaft and forwar end of output shaft.

Planetary Gear Assemblies, Sun Gear, Driving Shell

(1) While supporting the output shaft and driv ing shell, carefully slide the assembly forward an out through the case.

CAUTION: Be very careful not to damage groun surfaces on the output shaft during removal.

Rear Band and Low-Reverse Drum

(1) Remove the low-reverse drum, then loose the rear band adjuster, remove the band strut an remove band from the case.

Overrunning Clutch

(1) Note the position of the overrunning clutc rollers and springs before disassembly to assist i reassembly.

(2) Carefully slide out clutch hub and remov rollers and springs.

NOTE: If overrunning clutch cam and/or rolle spring retainer are found damaged or worn, refer t Paragraph 45 for replacement procedures.

Kickdown Servo

(1) Compress the kickdown servo spring by usin "Engine Valve Spring Compressor Tool C-3422' then remove the snap ring (Fig. 47).

(2) Remove the rod guide, springs and pisto rod from the case. Be careful not to damage pisto rod or guide during removal.

(3) Insert Tool C-484 inside piston and withdra piston from the transmission case.

Low and Reverse Servo

(1) Compress the low and reverse servo pisto spring by using "Engine Valve Spring Compresso Tool C-3422", then remove the snap ring.

(2) Remove spring retainer, spring, and serv piston and plug assembly from the case.

34. RECONDITION SUB-ASSEMBLIES

The following procedures cover the disassembly, in spection, repair, and assembly of each sub-assem

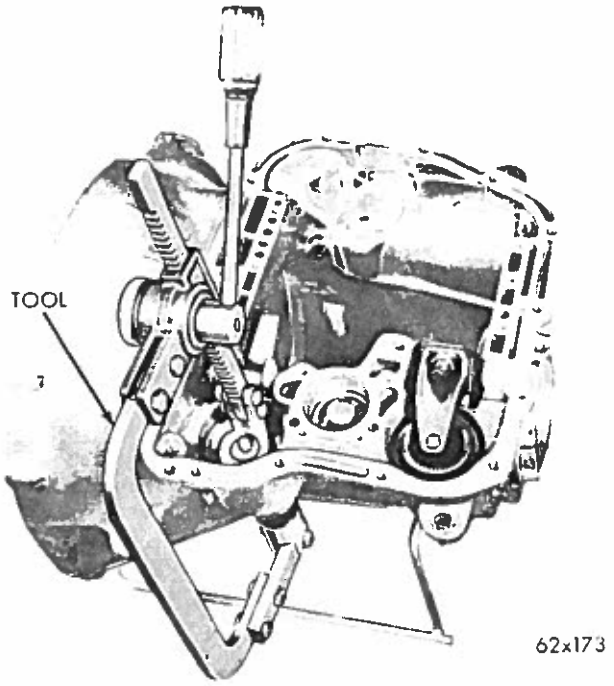


Fig. 47—Compressing Kickdown Servo Spring (Tool C-3422)

bly as removed from the transmission.

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on valves, use extreme care to avoid rounding off the sharp edges. The sharp edge is vitally important to this type valve. Sharp edges prevent dirt and foreign matter from getting between the valve and body, thus reducing the possibilities of sticking. When it becomes necessary to recondition the transmission, and vehicle has accumulated considerable mileage, install new seal rings on parts requiring their usage.

NOTE: Coat each part with Automatic Transmission Fluid—Type "A", Suffix "A" during assembly.

35. VALVE BODY ASSEMBLY

Disassembly

CAUTION: Never clamp any portion of the valve body or transfer plate in a vise. Any slight distortion of the aluminum body or the 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.

(1) Place the valve body assembly on repair stand, Tool C-3749 (Fig. 48). Remove three screws from oil screen and lift off the screen.

(2) While holding the spring retainer bracket firmly against the spring force, remove the three bracket retaining screws (Fig. 49).

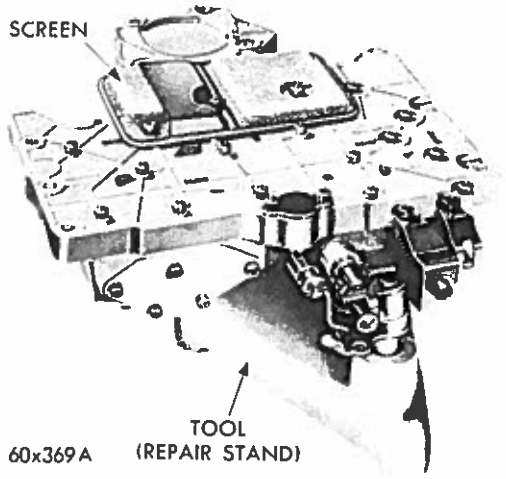


Fig. 48—Removing or Installing Oil Screen (Tool C-3749)

(3) Remove spring bracket, torque converter control valve spring, and the regulator valve spring with line pressure adjusting screw assembly.

NOTE: Do not alter the setting of the line pressure adjusting screw and nut. The nut has an interference thread and does not turn easily on the screw.

(4) Slide regulator valve out of the valve body. Slide torque converter control valve out of the valve body.

(5) Remove the 14 transfer plate retaining screws. Carefully lift the transfer plate and steel plate assembly off the valve body.

(6) Invert transfer plate assembly and remove the stiffener plate. Remove remaining screws securing steel plate to transfer plate, and carefully lift

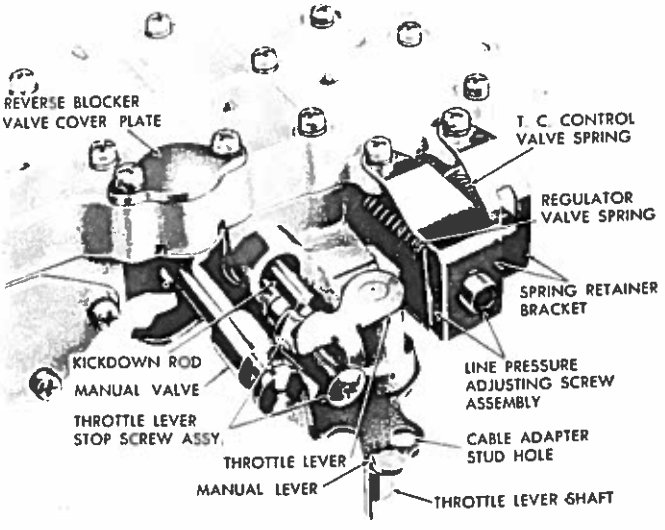


Fig. 49—Regulator and Converter Control Valves (Assembled View)

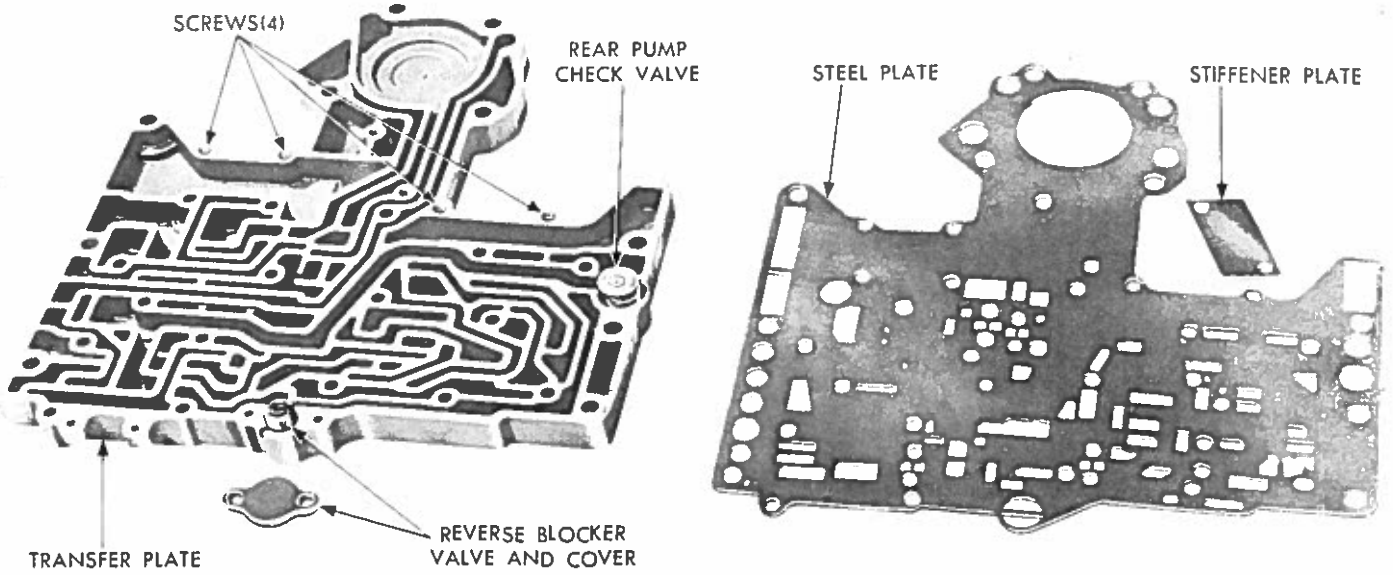


Fig. 50—Transfer and Steel Separator Plate Assembly (Disassembled View)

off steel plate (Fig. 50). Remove the rear pump check valve and spring.

(7) Remove reverse blocker valve cover and lift out spring and valve.

(8) Note location of the six steel balls in the valve body, one of them is larger than the other five and is in the larger chamber (Fig. 51). Remove the steel balls, front pump check valve and spring.

(9) Invert valve body and lay it on a clean cloth or paper. Remove E-clip from the throttle lever shaft (Fig. 52). Remove any burrs from the shaft, then while holding manual lever detent ball and spring in their bore with Tool C-3765 or similar tool, slide manual lever off the throttle shaft. Remove detent ball and spring.

(10) Remove the manual valve, carefully slide it out of valve body with a rotating motion.

(11) Remove throttle lever and shaft from the valve body.

(12) Remove shuttle valve cover plate (Fig. 53). Remove E-clip from the exposed end of shuttle valve.

(13) If necessary, remove throttle lever stop screw assembly (Fig. 54), be careful not to disturb the setting any more than is necessary.

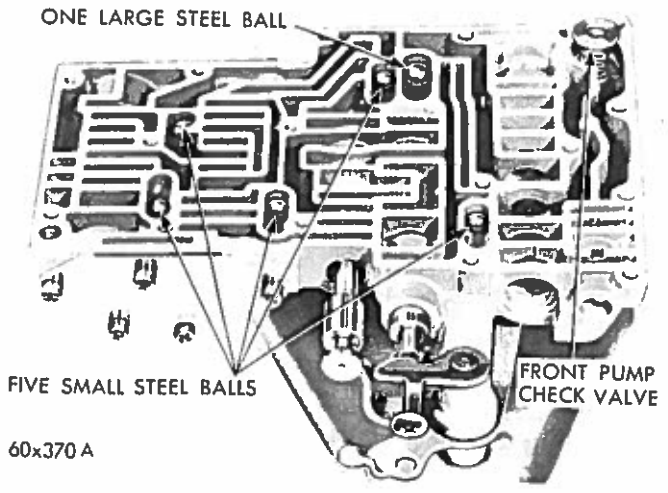


Fig. 51—Front Pump Check Valve and Steel Ball Locations

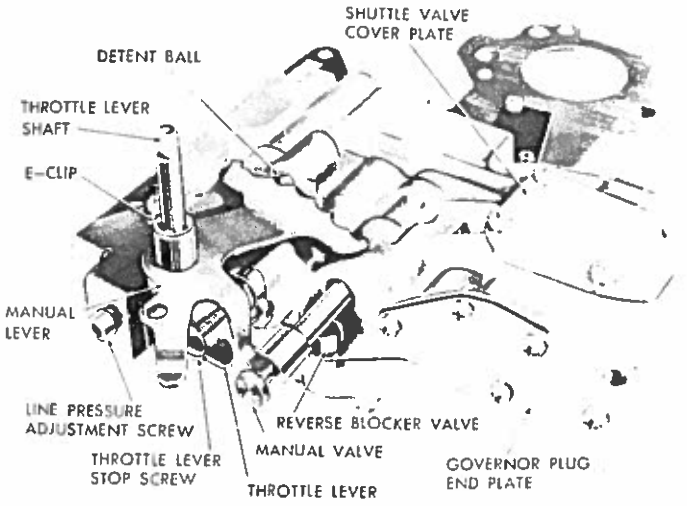


Fig. 52—Valve Body Controls (Assembled View)

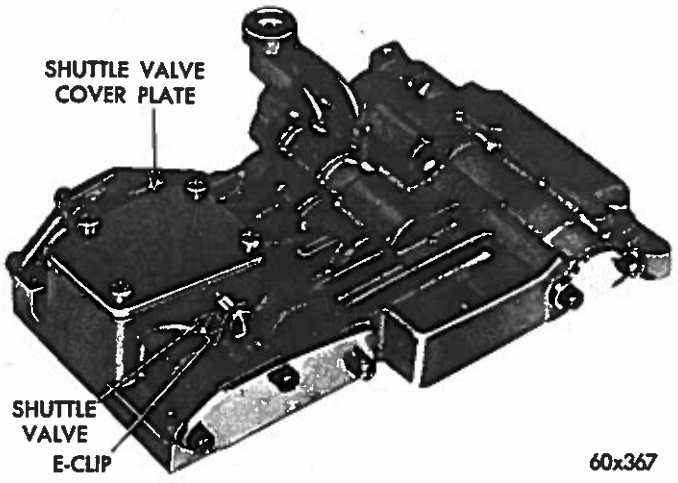


Fig. 53—Shuttle Valve and Retainer Clip

(14) Remove kickdown detent, kickdown valve, throttle valve spring and the throttle valve (Fig. 54).

(15) Remove governor plug end plate (Fig. 54). Tip up the valve body to allow the shuttle valve throttle plug, spring, shuttle valve, and the shift valve governor plugs to slide out into your hand. Note the longer stem on the 1-2 shift valve plug as a means for identification.

(16) Remove shift valve end plate (Fig. 55) and slide out the two springs and valves.

(17) Remove the regulator valve end plate. Slide regulator valve line pressure plug, sleeve, and the regulator valve throttle pressure plug out of the valve body.

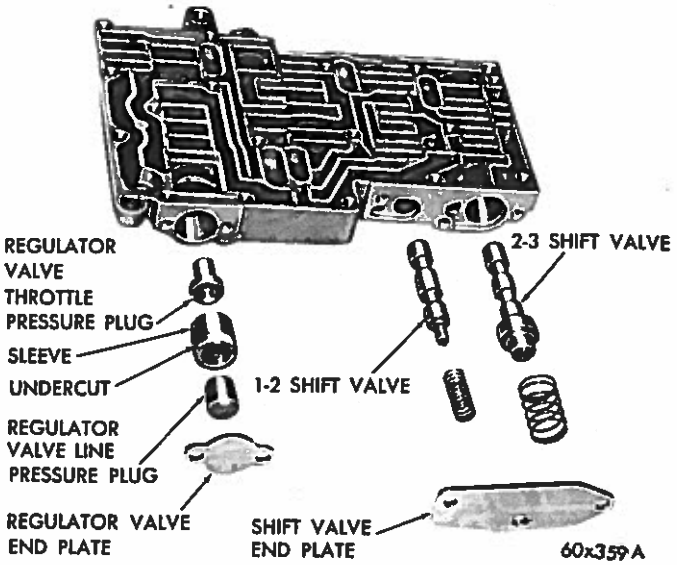


Fig. 55—Valve Body-Shift Valve Side (Exploded View)

Cleaning and Inspection

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

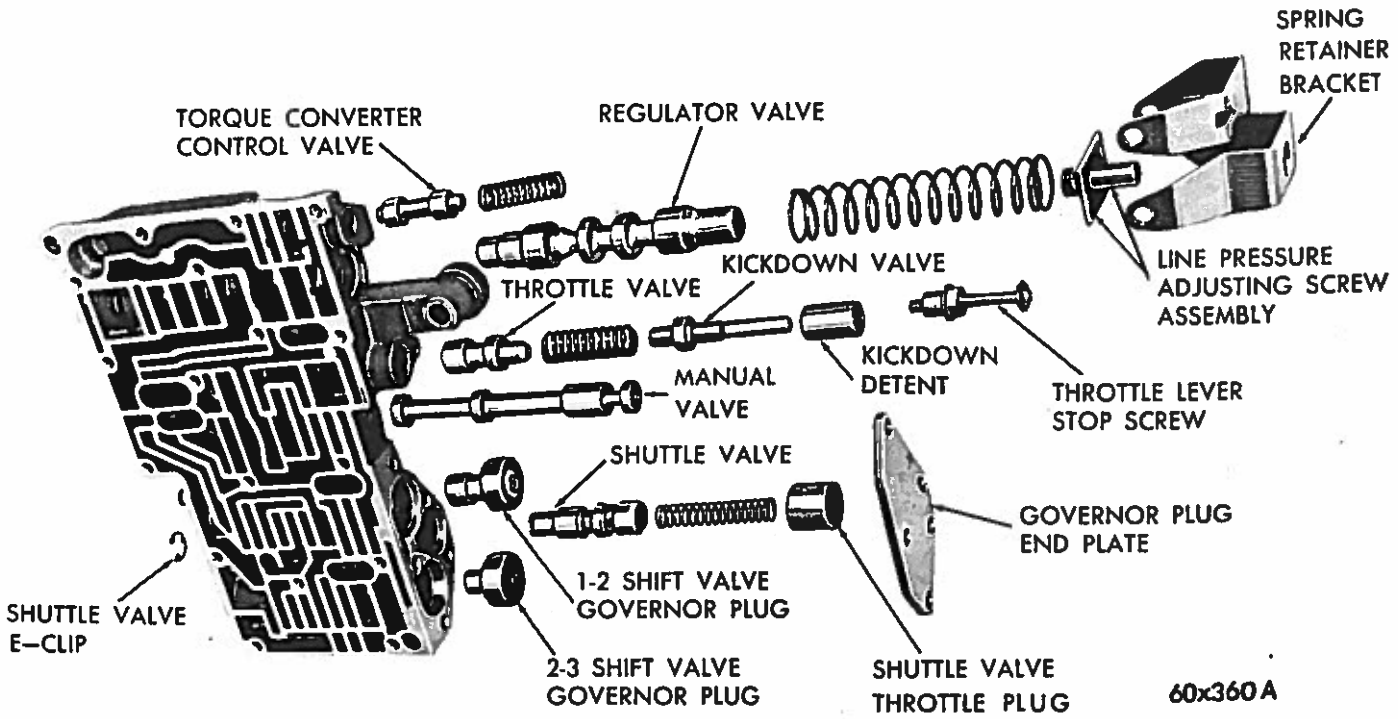


Fig. 54—Valve Body-Lever Side (Exploded View)

Inspect the manual and throttle valve operating levers and shafts for being bent, worn or loose. If a lever is loose on its shaft, it may be silver soldered only, or the lever and shaft assembly should be replaced.

CAUTION: 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 straightedge, Tool C-3335, check all mating surfaces for warpage or distortion. Slight distortion may be corrected, using a surface plate. Make sure all metering holes in the steel plate are open. Using a pen light, inspect bores in the valve body for scores, scratches, pits and irregularities.

Check 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 these edges is vitally important because it prevents foreign matter from lodging between the valve and the valve body, thus reducing the possibility of sticking. Check all valves and plugs for freedom of operation in the valve body bores. When bores, valves and plugs are clean and dry, the valves and plugs should fall freely in the bores.

Assembly

(1) Place rear pump check valve and spring in the transfer plate (Fig. 50). Position steel plate on the transfer plate, hold rear pump check valve in its bore with a thin steel scale, and install four steel plate to transfer plate retaining screws. Make sure bolt holes in steel plate and transfer plate are aligned, then tighten screws evenly to 28 inch-pounds torque. Check rear pump check valve for free movement in the transfer plate. Install stiffener plate and tighten retaining screws to 28 inch-pounds torque.

(2) Turn transfer plate over and install reverse blocker valve spring and valve (Fig. 50). Rotate valve until it seats through the steel plate. Hold the valve down and install blocker valve cover plate. Tighten the two retaining screws to 28 inch-pounds torque.

(3) Place the 1-2 and 2-3 shift valve governor plugs in their respective bores (Fig. 54). Install shuttle valve, spring and shuttle valve throttle plug. Install governor plug end plate and tighten the four retaining screws to 28 inch-pounds torque.

(4) Install E-clip on end of shuttle valve (Fig. 53). Install shuttle valve cover plate and tighten the four retaining screws to 28 inch-pounds torque.

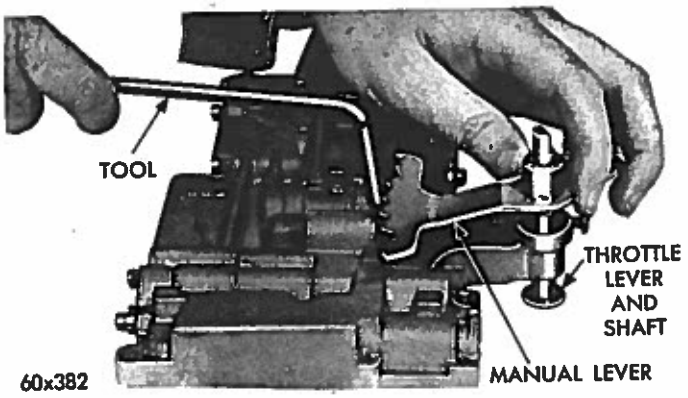


Fig. 56—Installing Detent Ball, Spring and Manual Lever (Tool C-3765)

(5) Install the 1-2 and 2-3 shift valves and springs (Fig. 55). Install shift valve end plate and tighten the three retaining screws to 28 inch-pounds torque.

(6) Install regulator valve throttle pressure plug, sleeve (under cut on sleeve toward end plate), and line pressure plug (Fig. 55). Install regulator valve end plate and tighten the two retaining screws to 28 inch-pounds torque.

(7) Install the throttle valve and spring (Fig. 54). Slide the kickdown detent on kickdown valve (counterbore side of detent toward valve), then install the assembly in the valve body.

(8) Install throttle lever stop screw (Fig. 54), and tighten lock nut finger tight.

(9) Install manual valve in the valve body (Fig. 54).

(10) Install throttle lever and shaft on the valve body (Fig. 56). Insert detent spring and ball in its bore in the valve body. Depress ball and spring with Tool C-3765 or similar tool and slide manual lever over throttle shaft so that it engages manual valve and detent ball. Install the retaining E-clip on the throttle shaft.

(11) Position the valve body assembly on the holding stand.

(12) Place the six steel balls in the valve body chambers with large ball in the large chamber (Fig. 51). Place the front pump check valve and spring in valve body.

(13) Position transfer plate assembly on the valve body. Hold front pump check valve in its bore with a thin steel scale. Install the 14 retaining screws, starting at the center and working outward, tighten screws to 28 inch-pounds torque.

(14) Install the torque converter valve and the regulator valve and spring retainer ring (Fig. 54).

(15) Position torque converter valve spring and regulator valve spring over ends of their respective valves. Place line pressure adjusting screw assembly on end of regulator valve spring with long dimension of nut at right angles to the valve body (Fig. 54).

(16) Install spring retainer bracket, making sure converter valve spring is engaged on tang and position squarely in the bracket. Tighten the three bracket retaining screws to 28 inch-pounds torque (Fig. 52).

(17) Install oil strainer and tighten the three retaining screws to 28 inch-pounds torque.

IMPORTANT: After the valve body has been serviced and completely assembled, adjust the throttle and line pressures as outlined in Paragraph 19. However, if pressures were satisfactory prior to disassembly, use original settings.

36. ACCUMULATOR PISTON AND SPRING

Inspection

Inspect the two seal rings for wear and make sure they turn freely in the piston grooves. It is not necessary to remove rings unless condition warrants. Inspect the piston for nicks, burrs, scores and wear. Check the piston bore in the case for scores or other damage. Check piston spring for distortion. Replace parts as required.

37. EXTENSION HOUSING BEARING AND OIL SEAL

Replacement

(1) Pry or drive oil seal out of extension housing with a long blunt drift. Be sure not to mar the oil seal surface in the extension housing.

(2) Remove bearing snap ring from the extension housing.

(3) Drive the bearing rearward out of extension housing with Tool C-3275 (Fig. 30).

(4) Place new bearing in opening of extension housing. Using Tool C-3204, drive bearing into the housing (Fig. 31). Install bearing retaining snap ring.

(5) Place new oil seal in opening of extension housing (lip of seal facing inward). Using Tool C-3837, drive seal into housing until tool bottoms (Fig. 29).

38. PARKING PAWL AND LEVER

Disassembly

(1) Remove parking lock cable adapter cover from bottom of the extension housing. Remove the adapter from the lock lever.

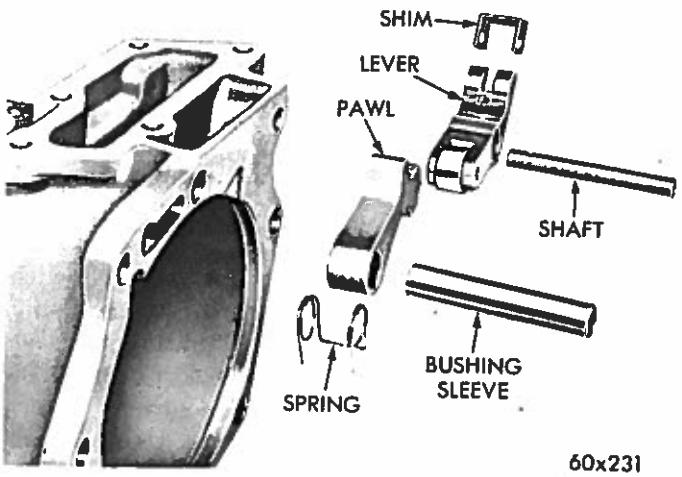


Fig. 57—Parking Lock Lever, Pawl and Spring (Exploded View)

(2) Remove the plug and slide shaft out of extension housing to remove the parking lock lever and shim (Fig. 37).

(3) Slide bushing sleeve out of housing to remove the parking pawl and spring (Fig. 38).

Inspection

Figure 57 shows the parking pawl and lever disassembled.

Check bushing sleeve and shaft for scores and free movement in the housing, and in pawl and lever Check roller for nicks, burrs, and free turning. Inspect the square lug on parking pawl for broken edges or other damage. Replace parts as required.

Assembly

(1) Position the parking pawl and spring in the housing and insert the bushing sleeve (Fig. 38). Make sure the square lug on the pawl is toward the sprag, and the spring is positioned so as to lift the pawl away from the sprag.

(2) Position the lock lever and shim in the housing and install the lever shaft (Fig. 37). The lever roller must be on top of the pawl so as to push it into engagement with the sprag.

(3) Attach the cable adapter to parking lock lever. Make sure the adapter is attached exactly as shown in Figure 36.

(4) Place a new adapter cover gasket on extension housing, then insert small punch through cable opening in adapter cover and into end of adapter. Carefully lower the cover into position, feeding the adapter into cable opening in the cover. Install cover

retaining screws and tighten to 150 inch-pounds torque.

39. GOVERNOR AND PARKING SPRAG

Disassembly

(1) Remove large snap ring from weight end of governor housing, lift out weight assembly.

(2) Remove snap ring from inside governor weight, remove inner weight and spring from the outer weight.

(3) If lugs on parking sprag are damaged, remove the four bolts and separate sprag from governor housing.

Cleaning and Inspection

Figure 33 shows an exploded view of the governor assembly.

Inspect all parts for burrs and wear. Check inner weight for free movement in outer weight, and outer weight for free movement in governor housing. Check valve for free movement in governor housing. The weights and valve should fall freely in the bores when clean and dry. Rough surfaces may be removed with crocus cloth.

Check governor weight spring for distortion. Inspect the lugs on parking sprag for broken edges or other damage. Thoroughly clean all governor parts in clean solvent and check for free movement before assembly.

Assembly

(1) If parking sprag was separated from governor housing, assemble and tighten bolts finger tight. Make sure oil passage of governor housing aligns with passage in sprag.

(2) Assemble the governor weights and spring, and secure with snap ring inside of large governor weight. Place the weight assembly in governor housing and install snap ring.

40. REAR OIL PUMP

Inspection

Inspect oil pump body and cover machined surfaces for nicks and burrs. Inspect rotors for scoring or pitting. With rotors cleaned and installed in pump body, place a straight edge across face of rotors and pump body. Using a feeler gauge, check clearance between straight edge and face of rotors. Clearance limits are from .0015 to .003 inch.

Rear Oil Pump Body Replacement

If replacement of rear oil pump body is required, drive it rearward out of the case with a wood block and hammer. The following procedures must be followed when installing a new rear oil pump body or reinstalling original pump body to prevent pump body distortion.

(1) Screw two pilot studs, Tool C-3288 into the

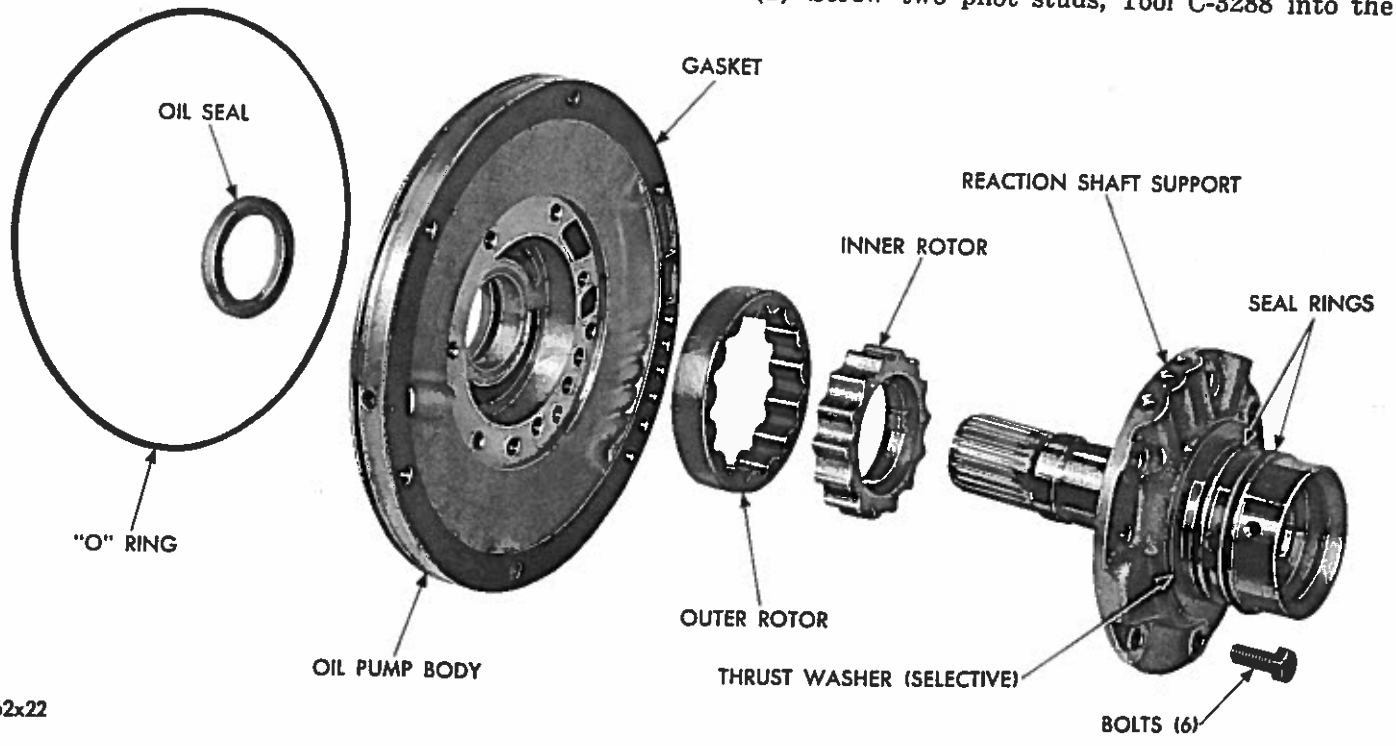


Fig. 58—Front Oil Pump and Reaction Shaft Support (Exploded View)

case to guide the pump body during installation.

(2) Chill the pump body in cold water or with ice. Quickly position the body over the pilot studs, and drive it firmly into the case with a wood block and hammer. Remove the pilot studs.

41. FRONT OIL PUMP AND REACTION SHAFT SUPPORT

Disassembly

Figure 58 shows the front oil pump and reaction shaft support disassembled.

(1) Remove bolts from rear side of reaction shaft support and lift support off the oil pump.

(2) Remove rubber seal ring from front pump body flange.

(3) Drive out oil seal with a blunt punch.

Inspection

Inspect interlocking seal rings (Fig. 58) on reaction shaft support for wear or broken locks, make sure they turn freely in the grooves. Do not remove rings unless conditions warrant. Inspect bushing and bore of the reaction shaft for wear. Inspect machined surfaces on oil pump body and reaction shaft support for nicks and burrs. Inspect oil pump rotors for scoring or pitting. With rotors cleaned and installed in pump body, place a straightedge across face of rotors and pump body. Using a feeler gauge, check clearance between straight edge and face of rotors. Clearance limits are from .0015 to .003 inch.

Assembly

(1) Assemble pump rotors in the pump housing (Fig. 58).

(2) Install the reaction shaft support. Install retaining bolts and tighten to 150 inch-pounds torque.

(3) Place new oil seal in opening of front oil pump housing (lip of seal facing inward) using Tool C-3860 drive seal into housing until tool bottoms.

42. FRONT CLUTCH

Disassembly

Figure 59 shows an exploded view of the front clutch assembly.

(1) Using a screw driver, remove large snap ring that secures the pressure plate in clutch piston retainer. Lift the pressure plate and clutch plates out of the retainer.

(2) Install compressor, Tool C-3860 over piston spring retainer as shown in Figure 60. Compress springs and remove snap ring, then slowly release tool until spring retainer is free of the hub. Remove the tool, retainer and springs.

(3) Invert clutch retainer assembly and bump on a wood block to remove the piston. Remove seals from the piston and clutch retainer hub.

Inspection

Inspect driving discs for evidence of burning, glazing and flaking off of facing material. Scratch fac-

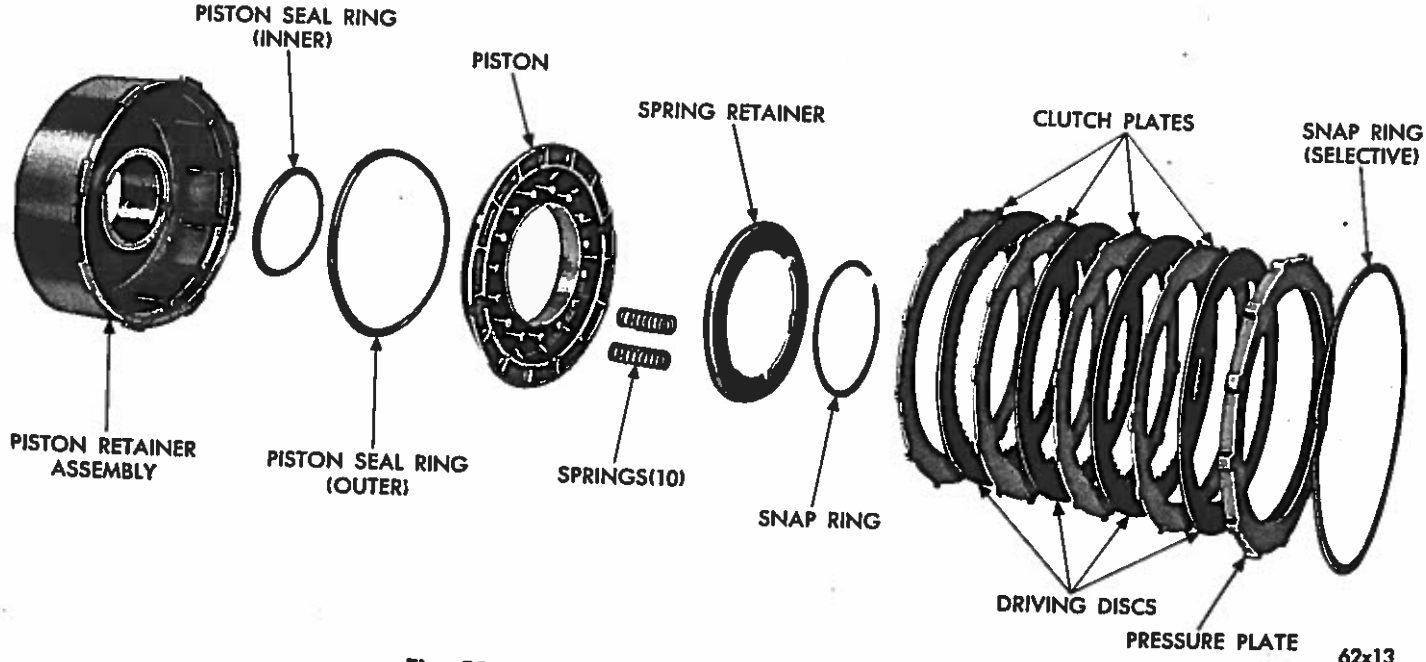


Fig. 59—Front Clutch Assembly (Exploded View)

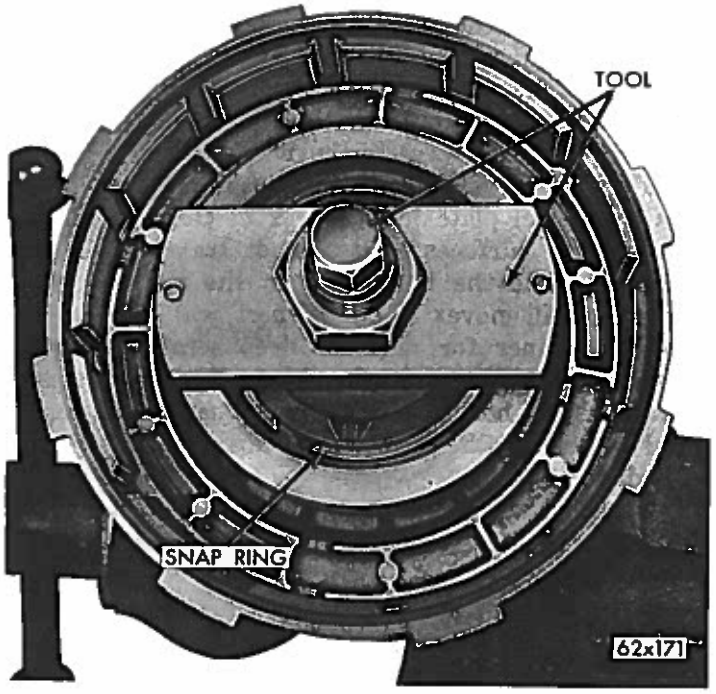


Fig. 60—Removing or Installing Front Clutch Spring Retainer Snap Ring (Tool C-3863)

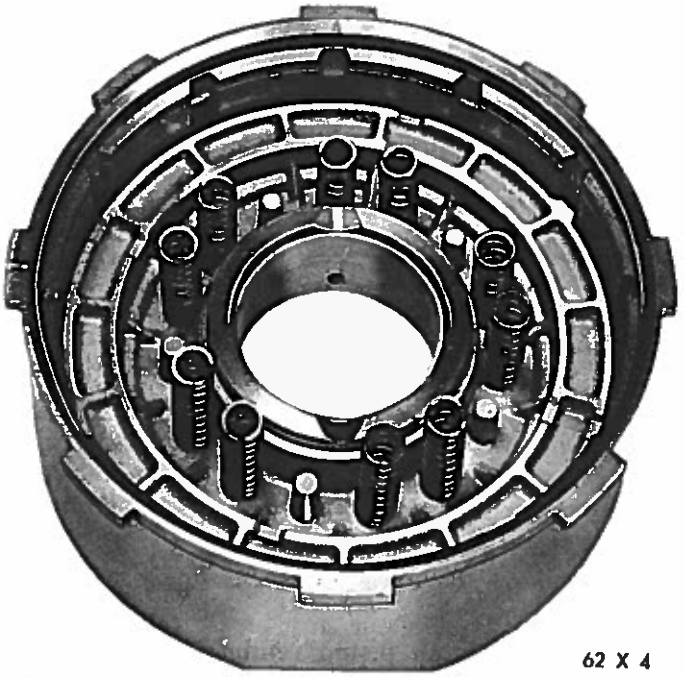


Fig. 61—Front Clutch Piston Return Spring—Location

ings with finger nail, if material collects under nail, replace all driving discs. Check disc driving splines for wear or other damage. Inspect steel plate and pressure plate surfaces for burning, scoring or damaged driving lugs, replace if necessary.

Check steel plate lug grooves in clutch retainer for smooth surfaces, plates must travel freely in grooves. Inspect band contacting surface on clutch retainer for scores. Note the ball check in clutch retainer, make sure the ball moves freely. Inspect seal surfaces in clutch retainer for nicks or deep scratches, light scratches will not interfere with sealing of neoprene rings.

Inspect inside bore of piston for score marks, if light, remove with crocus cloth. Check seal grooves for nicks and burrs. Inspect neoprene seals for deterioration, wear, and hardness. Check piston springs, retainer and snap ring for distortion.

Assembly

(1) Lubricate and install inner seal on hub of clutch retainer. Make sure lip of seal faces down and is properly seated in the groove.

(2) Install outer seal on the clutch piston, with lip of seal toward bottom of the clutch retainer. Apply a coating of "Door Ease" to the outer edge of the seal for easier installation of the piston assembly. Place the piston assembly in retainer and carefully seat the piston in bottom of the retainer.

(3) Place the 10 springs on piston hub exactly as shown in Figure 61. Position the spring retainer and snap ring on the springs. Compress springs with Tool C-3863 (Fig. 60), and seat snap ring in the hub groove. Remove compressor tool.

(4) Lubricate all clutch plates, install one steel plate followed by a lined plate until all plates are installed. Install the pressure plate and snap ring. Make sure snap ring is properly seated.

(5) With front clutch completely assembled, in-

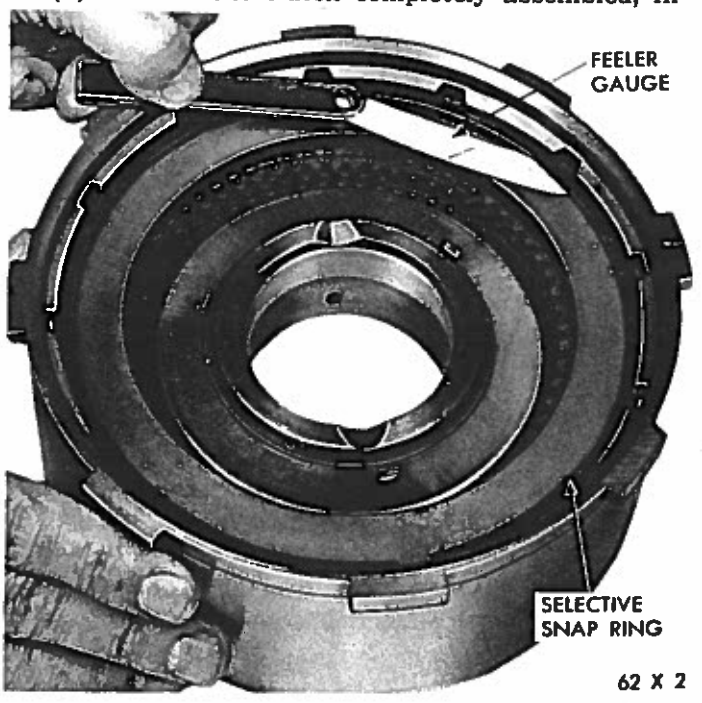


Fig. 62—Checking Front Clutch Plate Clearance

sert feeler gauge between pressure plate and snap ring (Fig. 62). The clearance should be .024 to .123 inch. If not, install a snap ring of proper thickness to obtain the specified clearance.

NOTE: Snap rings are the same as that used in the rear clutch and are available in .060-.062, .074-.076 and .088-.090 inch thickness.

43. REAR CLUTCH

Disassembly

Figure 63 shows an exploded view of the rear clutch assembly.

(1) Using a screw driver, remove large snap ring that secures the pressure plate in clutch retainer. Lift pressure plate, clutch plates, and inner pressure plate out of the retainer.

(2) Remove piston spring snap ring and remove the spring.

(3) Invert clutch piston retainer assembly and bump on a wood block to remove the piston. Remove seals from the piston.

(4) If necessary, remove snap ring and press input shaft from the clutch piston retainer.

Inspection

Inspect driving discs for evidence of burning, glazing and flaking off of facing material. Scratch facings with finger nail, if material collects under nail, replace all driving discs. Check disc driving splines for wear or other damage. Inspect steel plate and pressure plate surfaces for burning, scoring or damaged driving lugs, replace if necessary.

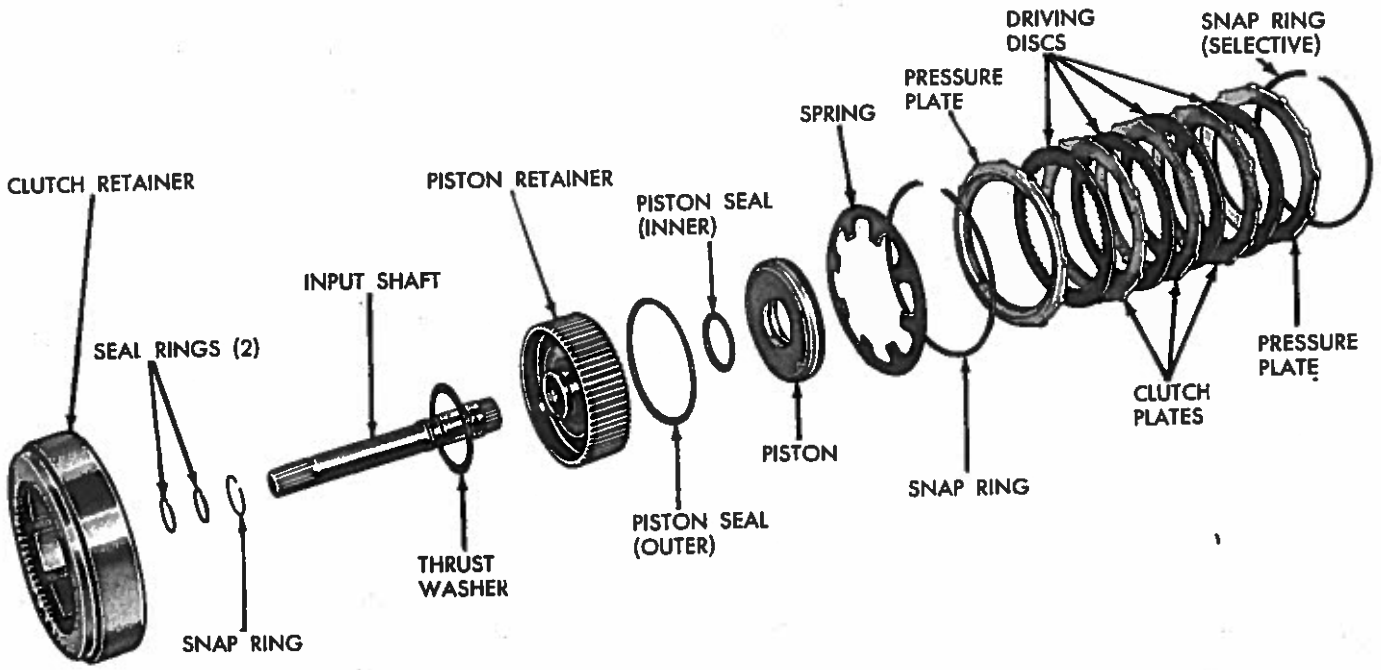
Check steel plate lug grooves in clutch retainer for smooth surfaces, plates must travel freely in grooves. Note the ball check in the piston, make sure the ball moves freely. Inspect seal surfaces in clutch retainer for nicks or deep scratches, light scratches will not interfere with sealing of neoprene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

Inspect inter locking seal rings (Fig. 63) on input shaft for wear or broken locks, make sure they turn freely in the grooves. Do not remove rings unless conditions warrant. Inspect the bushing in the input shaft for wear or scores. Inspect rear clutch to front clutch thrust washer for wear. Washer thickness should be .061 to .063 inch, replace if necessary.

Assembly

(1) If removed, press input shaft into clutch piston retainer and install snap ring.

(2) Lubricate and install inner and outer seal rings on the clutch piston. Make sure lip of seals



62x165

Fig. 63—Rear Clutch Assembly (Exploded View)

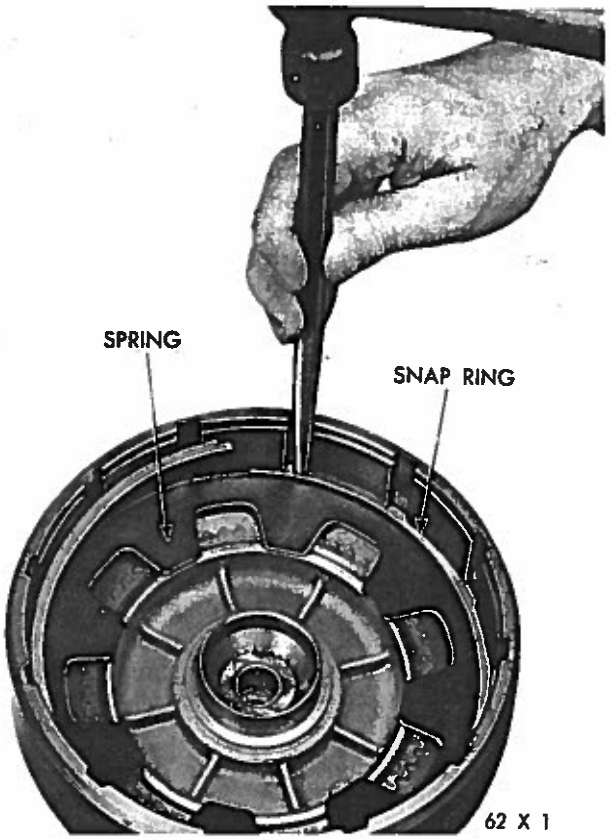


Fig. 64—Installing Rear Clutch Spring and Snap Ring

face toward head of clutch retainer, and are properly seated in the piston grooves.

(3) Place piston assembly in retainer and, with a twisting motion, seat piston in bottom of retainer.

(4) Position the clutch retainer over the piston retainer splines and support the assembly so the clutch retainer remains in place.

(5) Place spring over piston with outer edge of spring positioned below snap ring groove. Start one end of snap ring in the groove, make sure the spring is exactly centered on the piston, then progressively tap snap ring into the groove. (Fig. 64). Be sure the snap ring is fully seated in the groove.

(6) Install inner pressure plate in clutch retainer with raised portion of plate resting on the spring.

(7) Lubricate all clutch plates, install one lined plate followed by a steel plate until all plates are installed. Install outer pressure plate and snap ring.

(8) With rear clutch completely assembled, insert feeler gauge between pressure plate and snap ring (Fig. 65). The clearance should be .022-.042 inch for the three-disc clutch and .026-.054 inch for the four-disc clutch. If not, install a snap ring of proper thickness to obtain the specified clearance. Low limit clearances are desirable.

NOTE: Rear clutch plate clearance is very important in obtaining proper clutch operation. The clearance can be adjusted by the use of various thickness outer snap rings. Snap rings are available in .060-.062, .074-.076 and .088-.090 inch thickness.

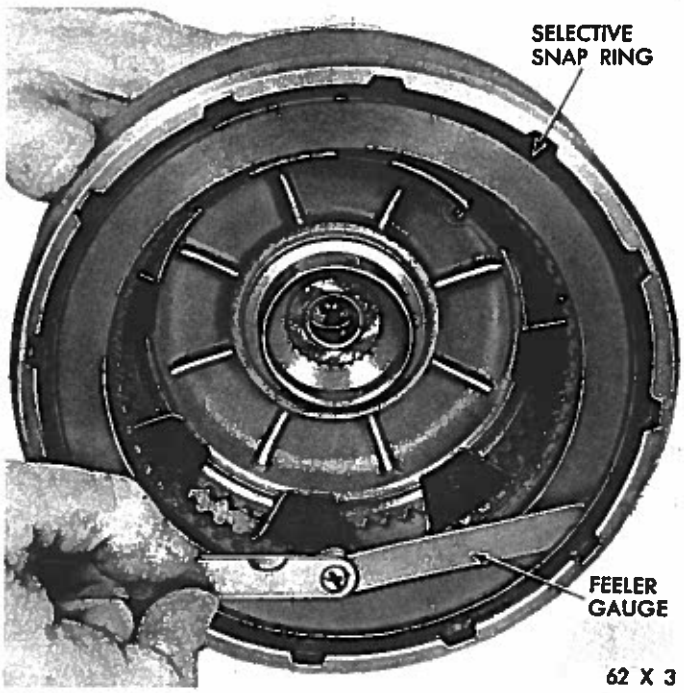


Fig. 65—Checking Rear Clutch Plate Clearance

44. PLANEARY GEAR ASSEMBLIES, SUN GEAR, DRIVING SHELL

Measure the end play of the planetary gear assemblies, sun gear and driving shell before removing these parts from the output shaft. With the assembly in an upright position, push the rear annulus gear support downward on the output shaft. Insert a feeler gauge between the rear annulus gear support hub and the shoulder on the output shaft (Fig. 66). The clearance should be .012 to .055 inch.

Disassembly

(1) Remove thrust washer from forward end of output shaft (Fig. 67).

(2) Remove snap ring from forward end of output shaft, then slide front planetary assembly off the shaft.

(3) Slide front annulus gear off the planetary gear set (Fig. 67). Remove thrust washer from rear side of planetary gear set.

(4) Slide sun gear, driving shell, rear planetary assembly with low and reverse drum off the output shaft.

(5) Lift sun gear and driving shell off the rear planetary gear assembly. Remove thrust washer

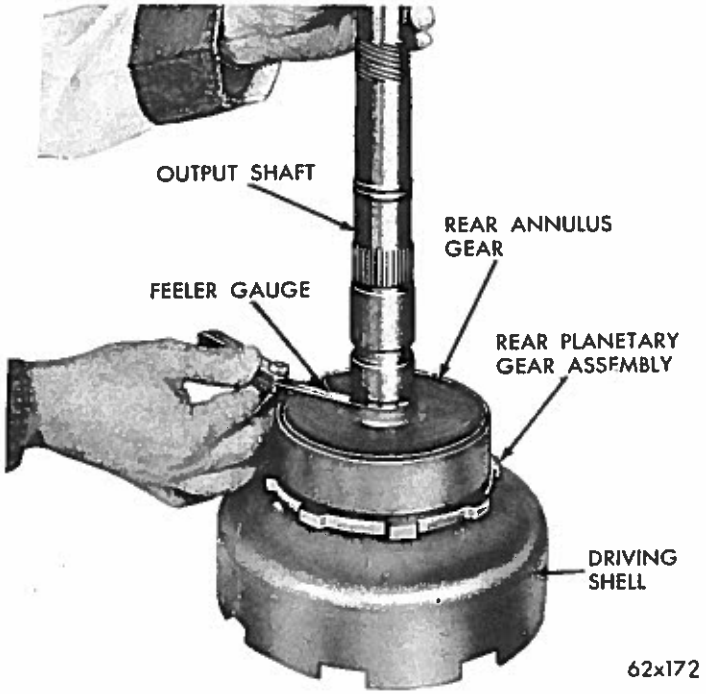


Fig. 66—Measuring End Play of Planetary Gear Assemblies, Sun Gear and Driving Shell

from inside the driving shell. Remove snap ring and steel washer from sun gear (rear side of driving shell) and slide sun gear out of the shell. Remove front snap ring from sun gear if necessary. Note that the front end of sun gear is longer than the rear.

(6) Remove thrust washer from forward side of rear planetary gear assembly, remove planetary gear set from rear annulus gear.

Inspection

Inspect bearing surfaces on output shaft for nicks, burrs, scores or other damage. Light scratches, small nicks or burrs can be removed with crocus cloth or a fine stone. Check speedometer drive gear for any nicks or burrs, and remove with a sharp edged stone. Make sure all oil passages in the shaft are open and clean.

Inspect bushings in sun gear for wear or scores, replace sun gear assembly if bushings are damaged. Inspect all thrust washers for wear and scores, replace if damaged or worn below specifications. Inspect thrust faces of planetary gear carriers for wear, scores or other damage, replace as required. Inspect planetary gear carrier for cracks and pinions for broken or worn gear teeth. Inspect annulus gear and driving gear teeth for damage. Replace distorted lock rings.

Assembly

Refer to Figure 67 for parts reference.

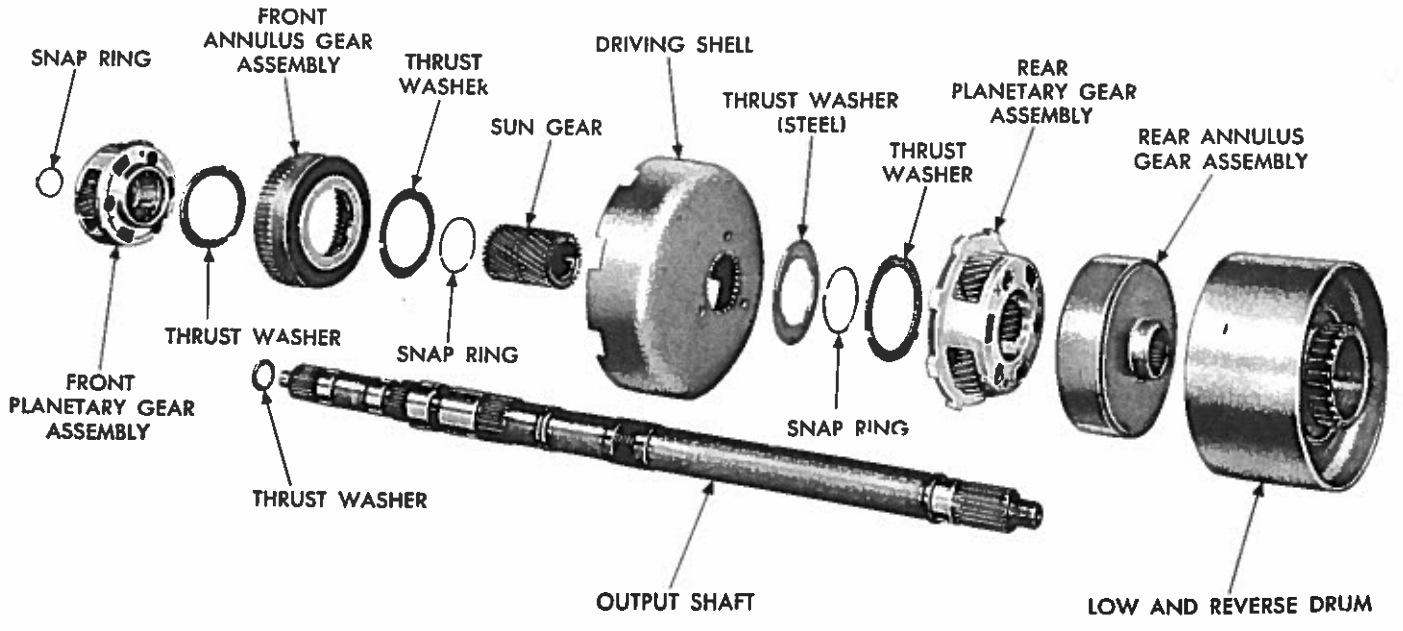


Fig. 67—Planetary Gear Assemblies, Sun Gear, Driving Shell, Low and Reverse Drum and Output Shaft (Exploded View)

(1) Position rear planetary gear assembly in rear annulus gear. Place thrust washer on front side of planetary gear assembly.

(2) Insert output shaft in rear opening of the rear annulus gear. Carefully work the shaft through the annulus gear and planetary gear assembly. Make sure shaft splines are fully engaged in splines of the annulus gear.

(3) Install snap ring in front groove of sun gear (long end of gear). Insert sun gear through front side of driving shell, install rear steel washer and snap ring.

(4) Carefully slide the driving shell and sun gear assembly on output shaft, engaging sun gear teeth with the rear planetary pinion teeth. Place thrust washer inside front of driving shell.

(5) Place thrust washer on rear hub of front planetary gear set, then slide the assembly into the front annulus gear.

(6) Carefully work the front planetary and annulus gear assembly on the output shaft, meshing planetary pinions with the sun gear teeth.

(7) With all components properly positioned, install retaining snap ring on front end of the output shaft.

45. OVERRUNNING CLUTCH

Inspection

Inspect clutch rollers for smooth round surfaces, they must be free of flat spots and chipped edges. Inspect roller contacting surfaces in the cam and race for brinelling. Check roller springs for distortion, wear or other damage. Inspect the cam set screw for tightness. If loose, tighten and restake the case around the screw.

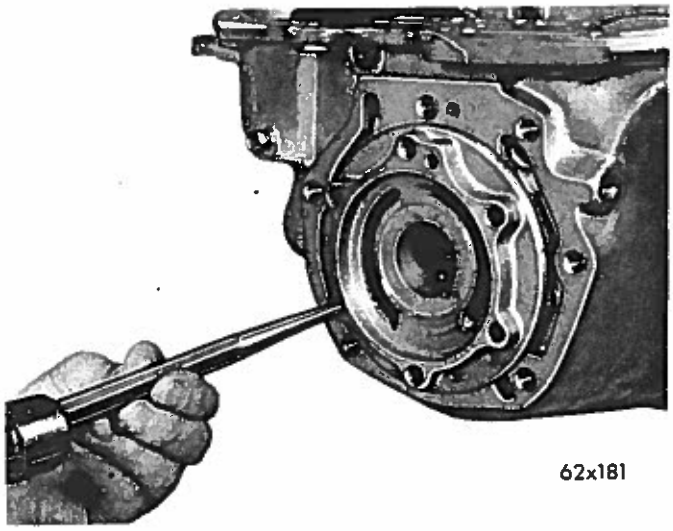


Fig. 68—Removing Overrunning Clutch Cam

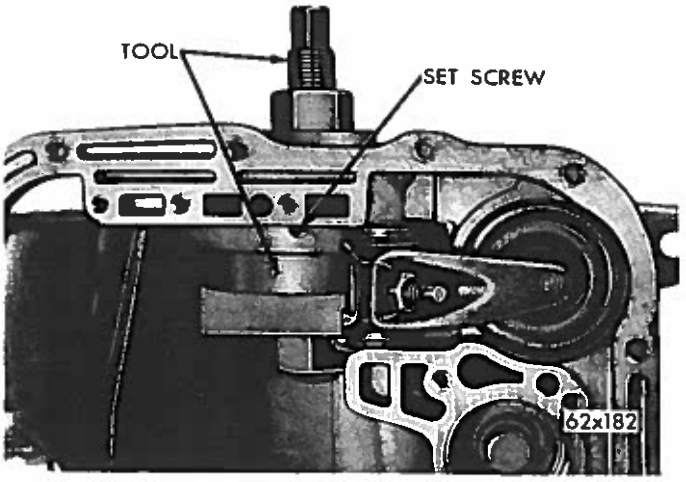


Fig. 69—Installing Overrunning Clutch Cam (Tool C-3863)

Overrunning Clutch Cam Replacement

If the overrunning clutch cam and/or the roller spring retainer are found damaged, replace the cam and spring retainer in the following manner:

(1) Remove set screw from the case below the clutch cam.

(2) Insert a punch through the pump body bolt holes and drive the cam from the case (Fig. 68). Alternate the punch from one bolt hole to another so the cam will be driven evenly from the case.

(3) Clean all burrs and chips from the cam area in the case.

(4) Place the spring retainer on the cam, making sure the retainer lugs snap firmly into the notches on the cam.

(5) Position the cam in the case with cam serrations aligned with those in the case. Tap the cam evenly into the case as far as possible with a soft mallet.

(6) Install Tool C-3863 as shown in Figure 69, tighten nut on the tool to seat the cam into the case. Make sure the cam is firmly bottomed, then install the cam retaining set screw. Stake the case around the set screw to prevent it from coming loose.

46. KICKDOWN SERVO AND BAND

Inspection

Figure 70 shows an exploded view of the kickdown servo assembly.

Inspect piston and guide seal rings for wear, and make sure they turn freely in the grooves. It is not necessary to remove seal rings unless conditions warrant. Inspect piston for nicks, burrs, scores and wear. Check the piston bore in the case for scores

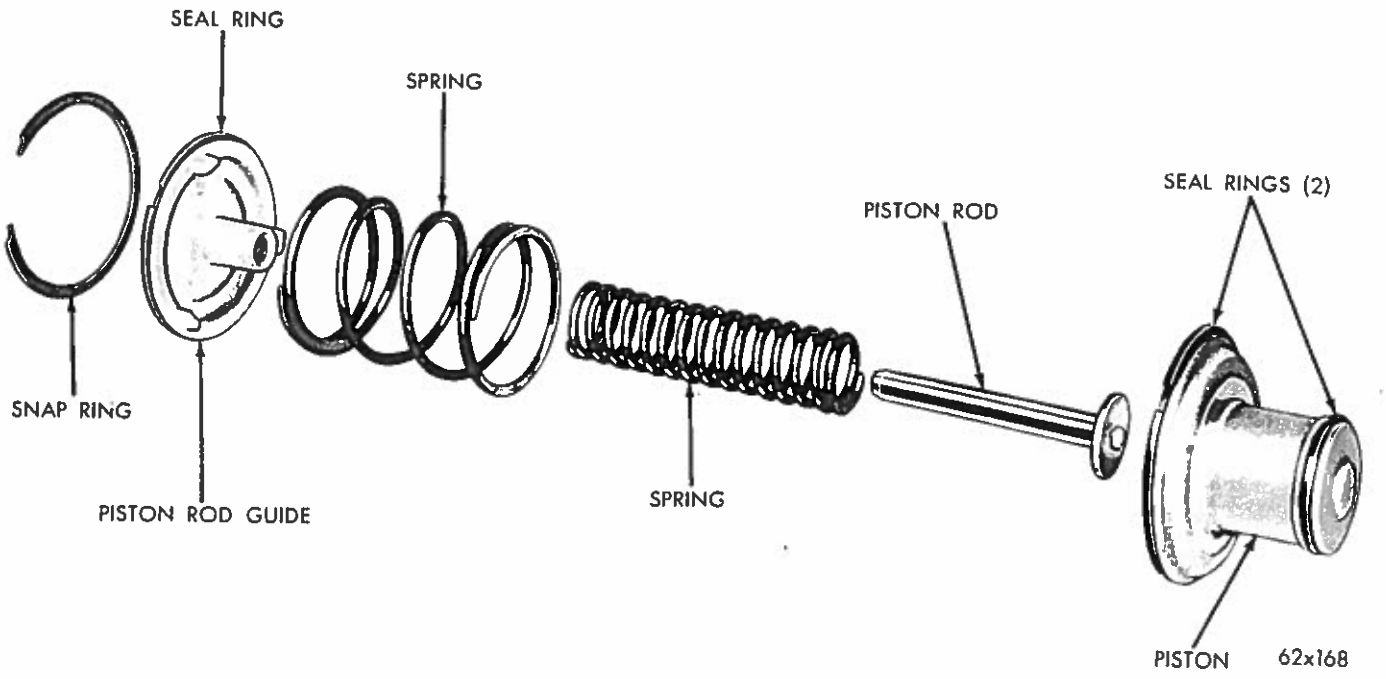


Fig. 70—Kickdown Servo (Exploded View)

or other damage. Check fit of guide on the piston rod. Check piston spring for distortion.

Check band lining for wear and bond of lining to the band. Check lining for black burn marks, glazing, non-uniform wear pattern and flaking. If lining is worn so grooves are not visible at the ends or any portion of the band, replace the band. Inspect band for distortion or cracked ends.

47. LOW AND REVERSE SERVO AND BAND

Disassembly

(1) Remove snap ring from piston and remove the piston plug and spring (Fig. 71).

Inspection

Inspect seal for deterioration, wear and hardness. Check piston and piston plug for nicks, burrs, scores and wear; piston plug must operate freely in the piston. Check the piston bore in the case for scores or other damage. Check springs for distortion.

Check band lining for wear and bond of lining to the band. If lining is worn so grooves are not visible at the ends or any portion of the band, replace the band. Inspect the band for distortion or cracked ends.

Assembly

(1) Lubricate and insert piston plug and spring in the piston, and secure with the snap ring.

48. INSTALLATION OF SUB-ASSEMBLIES

The assembly procedures given here include the installation of sub-assemblies in the transmission case

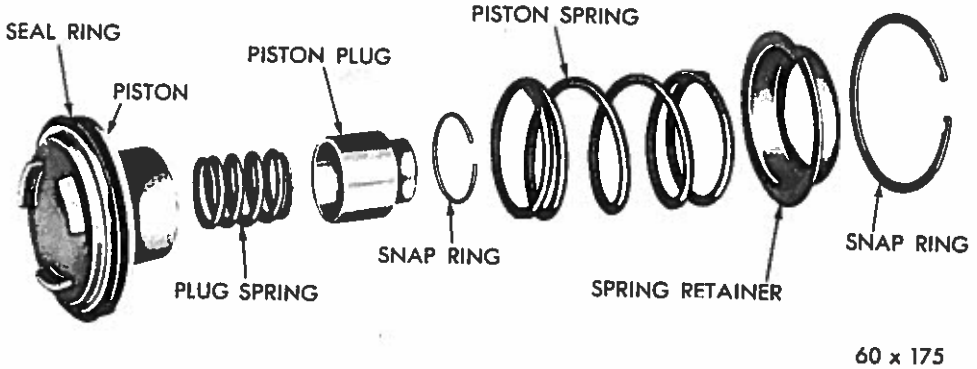


Fig. 71—Low and Reverse Servo (Exploded View)

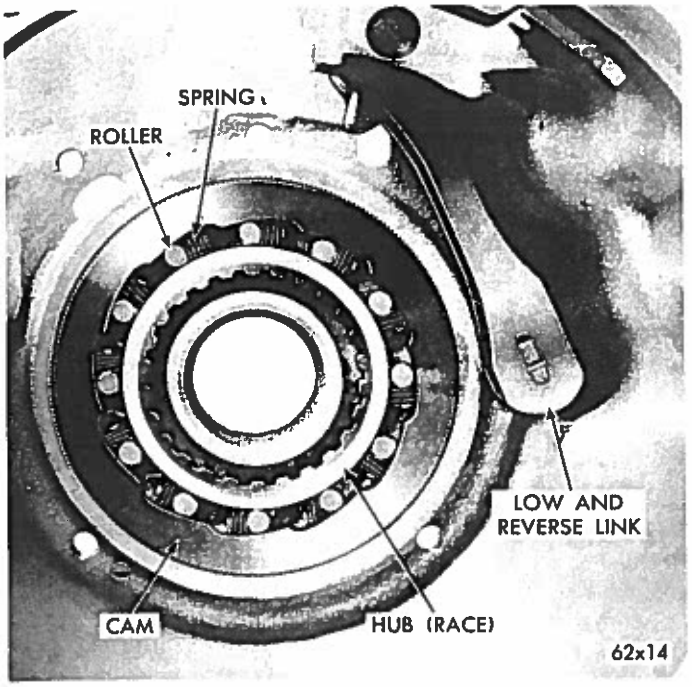


Fig. 72—Overrunning Clutch, Low and Reverse Band Link

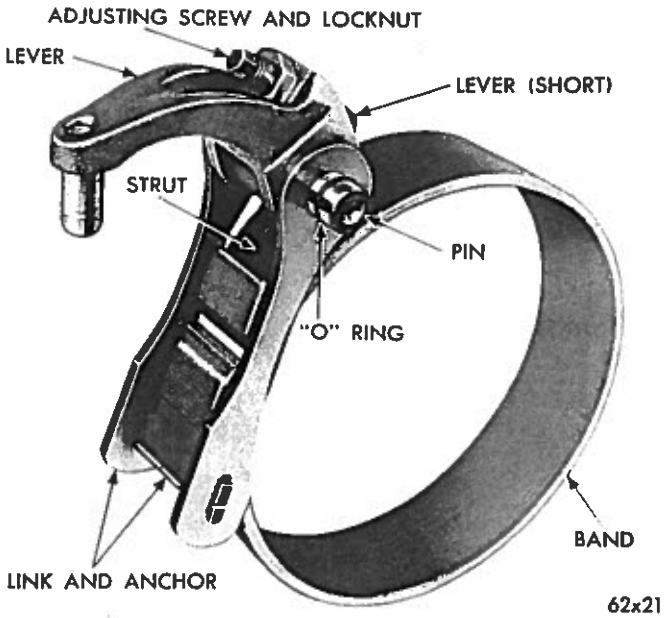


Fig. 73—Low-Reverse Band and Linkage

and adjusting drive train end play. Do not use force to assemble mating parts. If the parts do not assemble freely, investigate the cause, and correct the trouble before proceeding with the assembly procedures. Always use new gaskets during the assembly operations.

IMPORTANT: Use only Automatic Transmission Fluid Type "A", Suffix "A" to lubricate transmission parts during assembly.

Overrunning Clutch

(1) With transmission case in an upright position, insert clutch race inside the cam. Install the overrunning clutch rollers and springs exactly as shown in Figure 72.

Low and Reverse Servo and Band

(1) Carefully work servo piston assembly into case with a twisting motion. Place spring, retainer and snap ring over piston (Fig. 71).

(2) Compress the low and reverse servo piston spring by using "Engine Valve Spring Compressor Tool C-3422", then install the snap ring.

(3) Position rear band in the case, install the short strut, then connect the long lever and strut to the band (Fig. 73). Screw in band adjuster just enough to hold the struts in place. Be sure the long lever and strut assembly is installed as shown in Figure 72 to provide running clearance for the low and reverse drum. Install the low-reverse drum.

Kickdown Servo

(1) Carefully push the servo piston into case bore. Install piston rod, the two springs and the guide (Fig. 70).

(2) Compress the kickdown servo springs by using "Engine Valve Spring Compressor Tool C-3422", then install the snap ring.

Planetary Gear Assemblies, Sun Gear, Driving Shell

(1) While supporting the assembly in the case, insert output shaft through the rear pump housing. Carefully work the assembly rearward engaging the rear planetary carrier lugs into the low-reverse drum slots.

CAUTION: Be very careful not to damage ground surfaces on the output shaft during installation.

(2) Apply a coat of grease on the input to output shaft thrust washer (Fig. 67), and install washer on front end of the output shaft.

Input Shaft and Rear Clutch

(1) Invert transmission and support in an upright position with output shaft downward.

(2) Align the rear clutch plate inner splines, lower the input shaft and clutch assembly into position in the case.

(3) Carefully work the clutch assembly in a circular motion to engage clutch splines over splines of the front annulus gear.

(4) Coat one side of the fiber thrust washer with

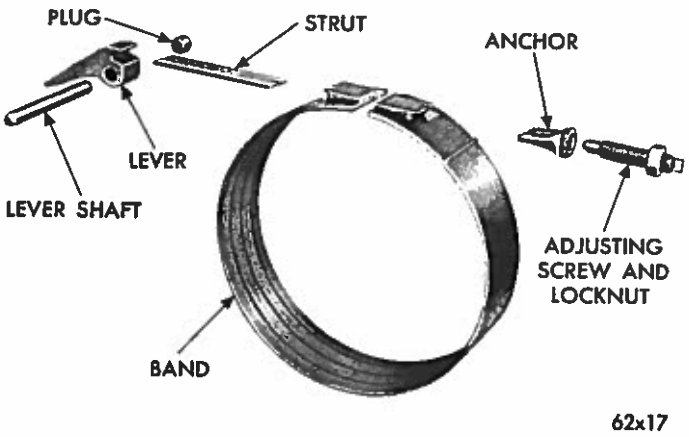


Fig. 74—Kickdown Band and Linkage (Exploded View)

heavy grease, then position washer in the recess on front face of rear clutch piston retainer.

Front Clutch

(1) Align the front clutch plate inner splines, lower the clutch assembly into position in the case.

(2) Carefully work the clutch assembly in a circular motion to engage clutch splines over splines of the rear clutch piston retainer. Make sure front clutch driving lugs are fully engaged in the slots in driving shell.

Front Band

Figure 74 shows an exploded view of the kickdown band assembly.

(1) Slide the band over the front clutch assembly.

(2) Install the band strut, screw in adjuster just enough to hold the strut in place.

Front Oil Pump and Reaction Shaft Support

If difficulty was encountered in removing the front oil pump assembly due to an exceptionally tight fit in the case, it may be necessary to expand the case with heat during pump installation. Using a suitable heat lamp, heat the case in the area of front pump for a few minutes prior to installing the front pump and reaction shaft support assembly.

NOTE: If the drive train end play was not within specifications (.030-.070 inch) when checked in Paragraph 33, replace the thrust washer on reaction shaft support hub with one of proper thickness.

The following selective thrust washers are available:

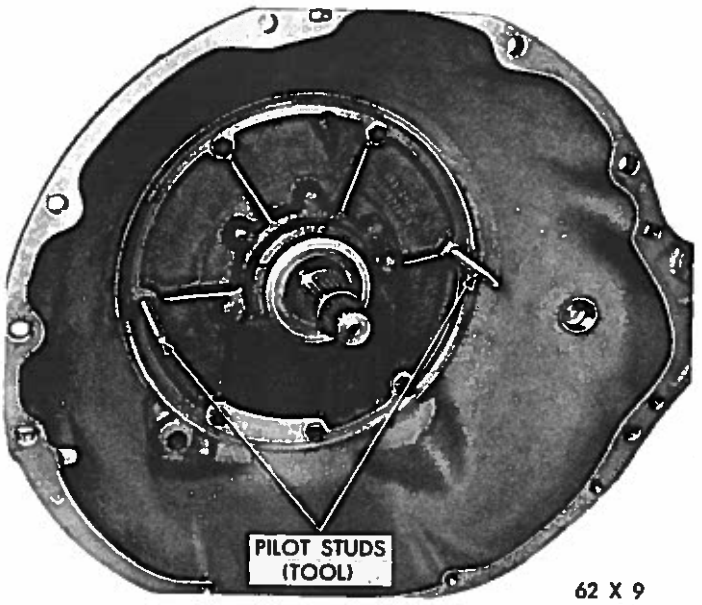


Fig. 75—Installing Front Pump and Reaction Shaft Support Assembly (Tool C-3288)

Thickness	Color
.043-.045 inch	Natural
.061-.063 inch	Green
.084-.086 inch	Red

(1) Screw two pilot studs, Tool C-3288 in front oil pump opening in the case (Fig. 75). Install a new gasket over the pilot studs.

(2) Place a new rubber seal ring in groove on outer flange of oil pump housing. Make sure seal ring is not twisted.

(3) Insert aligning Tool C-3881 through pump body and engage with inner rotor.

(4) Install the assembly in the case, tap lightly with a soft mallet if necessary. Place deflector over vent opening and install four pump body bolts, remove pilot studs and install remaining bolts. Snug. bolts down evenly, then tighten to 150 inch-pounds torque.

(5) Rotate the pump rotors with Tool C-3881 until the two small holes in handle of the tool are vertical (Fig. 39). This will locate the inner rotor so the converter impeller shaft will engage the inner rotor lugs during installation.

Rear Oil Pump

(1) Place outer rotor in the pump body.

(2) Turn output shaft so the inner rotor driving ball pocket is up. Install the ball and slide inner rotor on the output shaft in alignment with the ball (Fig. 34).

(3) Install the oil pump cover with the retaining bolts threaded in a few turns. Slide aligning sleeve, Tool C-3864 all the way in until it bottoms against rotors (Fig. 35), then tighten the cover bolts evenly to 150 inch-pounds torque.

Governor and Parking Sprag

(1) Position parking lock sprag and governor housing assembly on output shaft. Align the assembly so the governor valve shaft hole in governor body aligns with the hole in the output shaft, then slide the assembly into place. Install snap ring behind the governor housing (Fig. 32). Tighten housing to sprag bolts to 100 inch-pounds torque. Bend ends of lock straps against bolt heads.

(2) Place the governor valve on valve shaft, insert the assembly into housing and through the governor weights. Install the valve shaft retaining snap ring.

Extension Housing

(1) Using a new gasket, carefully slide the extension housing into place. Install the retaining bolts and washers, tighten bolts to 24 foot-pounds torque.

(2) Install the transmission flange, install washer with its three projections toward the flange and the nut with its convoluted surface contacting the washer. Hold flange with Tool C-3281, and tighten nut to 175 foot-pounds torque.

IMPORTANT: Recheck the drive train end play as described in Paragraph 33. Correct if necessary.

Valve Body Assembly and Accumulator Piston

(1) Clean mating surfaces and check for burrs on both the transmission case and valve body transfer plate.

(2) Install accumulator piston in the transmission case and place piston spring on the accumulator piston.

(3) Carefully position the valve body assembly into place in transmission case and start all the retaining bolts. Snug the bolts down evenly, then tighten to 100 inch-pounds torque.

(4) Connect the control cable adapter to manual lever and install retaining nut.

(5) Install seal, flat washer and throttle lever on throttle shaft. Tighten clamp bolt.

(6) Adjust the kickdown, and low-reverse bands as described in Paragraph 16.

(7) Install the oil pan, using new gasket. Tighten pan bolts to 150 inch-pounds torque.

SERVICE REPLACEMENT BUSHINGS
AUTOMATIC TRANSMISSIONS

CONTENTS