SECTION A
SUPER TURBINE "300" AUTOMATIC TRANSMISSION
CONTENTS

DIVISION I SPECIFICATIONS AND ADJUSTMENTS

74-1 GENERAL SPECIFICATIONS

a. Model Designations

Trans. Model	Converter Assembly Information	Valve Body Plate	Reverse Clutch Pressure Plate	Reverse Clutch Piston	Reverse Clutch		Forward Clutch		Forward Clutch Piston	Modulator Can Assembly	Model Usage
					Driven Plate Req'd.	Drive Plate Req'd.	Driven Plate Req'd.	Drive Plate Req'd.			
MJ	Blue Dot of Paint	One Notch	See Figure 74-294	1371900	5	5	6	5	1371511	1377046	All 300 Cu. In. V-8 Models except Sportwagons
MR	Blue Dot of Paint	One Notch		1371900	5	5	6	5	1371511	8623365 8623947	All 340 Cu. In. V-8 Model Sportwagons
ML	Blue Dot of Paint	One Notch		1371900	5	5	6	5	1371511	8623365 8623947	All 340 Cu. In. Engines except Sportwagons
LJ	Orange Dot of Paint	Two Notches in Valve Body Plate		1371899	4	4	5	4	1371510	1367032	All 225 Cu. In. V-6 Model Cars
NK	White Dot of Paint	Three Notches in Valve Body Plate		1371901	6	6	7	6	1371512	1361577	Skylark Gran Sport

b. Transmission Identification Number

A production day build number, trans model and model year is stamped on the low servo cover located on the middle right side of the transmission case. See Figure 74-1. Since the production day build number furnishes the key to construction and interchangeability of parts in each transmission, the number should be used when selecting replacement parts as listed in the master parts list. The model number and day build number should always be furnished on product reports, AFA forms, and all correspondence with the factory concerning a particular transmission.

c. General Specifications

Oil Capacity	19 Pints
Oil Capacity indicated between Marks on Gauge Rod	1 Pint
Oil Specification	Automatic Transmission Fluid Type A, Suffix A
Planetary Gearing Type	Compound
Number of Pinions	3 Short 3 Long
Drain and Refill Mileage Recommendations. Drain pan and Clean Strainer	24,000 Mi.
NOTE: Under extreme heavy operation the above should be performed at	12,000 Mi.
If a major overhaul is necessary the strainer must be thoroughly cleaned.	
Adjust Low Band	24,000 Mi.
Under Heavy Duty Operation the above must be performed at	12,000 Mi.

74-2 BOLT TORQUE SPECIFICATIONS

Part	Location	Thread Size	Torque Lb. Ft.
Bolt	Case to Cylinder Block	3/8 -16	35-35
Screw-Tapping	Converter Cover Pan to Transmission Case	1/4 -20	8-12
Pipe Fitting	Water Cooler Pipes to Transmission Case	1/4 -18	25-35
Nut	Nut for Low Band Adjusting Screw	7/16-20	20-30
Bolt	Pump Body to Pump Cover	5/16-18	16-24
Bolt	Transmission Case	5/16-18	8-12
Bolt	Valve Body Assembly to Transmission Case	5/16-18	8-12
Bolt	Solenoid Valve to Valve Body	1/4 -20	8-12
Bolt	Vacuum Modulator to Transmission Case	5/16-18	8-12
Bolt	Pump Assembly to Transmission Case	5/16-18	16-24
Bolt	Rear Bearing Retainer to Transmission Case	3/8 -16	25-35
Bolt-Special	Oil Pan to Transmission Case	5/16-18	10-16
Bolt	Speedo Sleeve Retainer to Bearing Retainer	5/16-18	5-10
Bolt	Governor Cover to Transmission Case	5/16-18	8-12

NOTE: These specifications are for clean and lubricated threads only. Dry or dirty threads produce increased friction which prevents accurate measurement of tightness.

Use a reliable torque wrench to tighten the attaching bolts or nuts of the parts listed above.

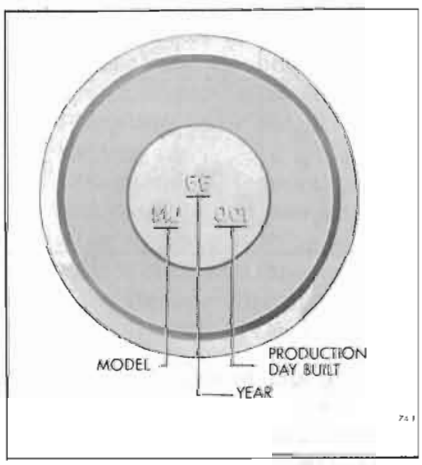

Figure 74-1—Model Identification Information

74-3 IDLE STATOR AND DETENT SWITCH ADJUSTMENTS

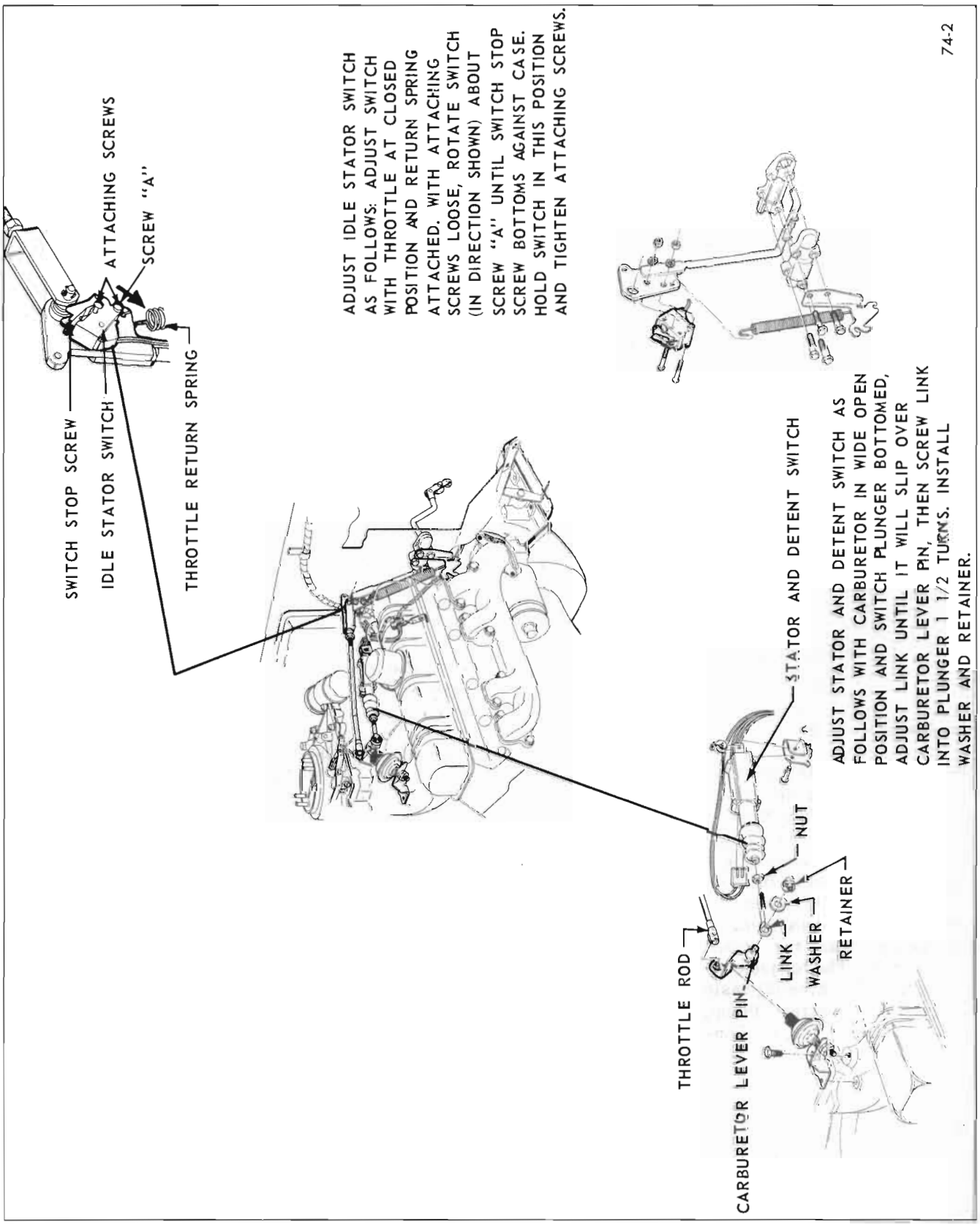

Figure 74-2—Transmission Control Switch Adjustments

DIVISION II

DESCRIPTION AND OPERATION

74-4 DESCRIPTION OF THE SUPER TURBINE "300" AUTOMATIC TRANSMISSION

The Super Turbine "300" automatic transmission is a combination torque converter, two speed planetary geared transmission. Torque multiplication is obtained hydraulically through the converter, and mechanically through a compound planetary gear set. The gear set, in combination with the torque converter, provides a high starting ratio for acceleration from a stop, up steep grades, etc. The torque converter provides torque multiplication for performance and exceptionally smooth operation. It functions as a fluid coupling at normal road load conditions and at higher speeds. Description of transmission is divided into six (6) basic sections: (1) Torque Converter, (2) Oil Pump, (3) Planetary Gear Set and Controls, (4) Reverse Clutch, (5) Governor, (6) Valve Body.

1. Torque Converter

The torque converter is connected to the engine flywheel and serves as a hydraulic coupling through which engine torque is transmitted to the input shaft. The torque converter steps up or multiplies engine torque whenever operating conditions demand greater torque than the engine alone can supply. The torque converter consists of three (3) basic sections: (a) Converter Pump, (b) Variable Pitch Stator, (c) Converter Turbine.

a. Converter Pump

The function of the converter pump is to convert engine torque into an energy transmitting flow of oil to drive the converter turbine into which the oil is projected. The converter pump operates as a centrifugal pump, picking up oil at its center and discharging the oil at its rim. However, the converter is shaped to discharge the oil parallel to its axis in the form of a spinning hollow cylinder. See Figure 74-3.

b. Variable Pitch Stator

The variable pitch stator, see Figure 74-4, is located between the converter turbine and the converter pump, and is supported by the stator shaft. The stator is equipped with a free wheel clutch assembly. When the clutch assembly is held stationary, it changes the direction of oil flow from the turbine to the proper angle for smooth entrance into the converter pump. As the turbine approaches pump speed the direction of oil flow changes until it no longer opposes pump rotation. The stator then free wheels so that it will not interfere with the flow of oil between the turbine and converter pump. For normal operation in Drive range the stator blades are set at low angle. For increased acceleration and performance, torque may be obtained by setting the stator blades at high angle.

c. Converter Turbine

The function of the converter turbine is to absorb energy from the oil projected into it by the pump and convert the energy into torque and transmit that torque to the input shaft. See Figure 74-5.

2. Oil Pump Assembly

A positive displacement internal-external gear type oil pump is used to supply oil to fill the converter, for engagement of forward and reverse clutches for application and release of the low band, and to circulate oil for lubrication, and heat transfer. See Figure 74-6.

3. Planetry Gear Set and Controls

The planetary gear set consists of an input sun gear, low sun gear, short and long pinions, a reverse ring gear and a planet carrier. The input sun gear is splined to the input shaft. The low sun gear, which is part of the forward clutch assembly, may revolve freely until the low band or forward clutch is applied. The input sun gear is in mesh with three (3) long pinions and the long pinions are in mesh with three (3) short pinions. The short pinions are in mesh with the low sun gear and reverse ring gear. The input sun gear and short pinions always rotate in the same direction. Application of either the low band or the reverse clutch determines whether the output shaft rotates clockwise or counterclockwise. See Figure 74-7.

a. Forward Clutch

The forward clutch assembly consists of a drum, piston, springs, cushion ring, piston seals, and a clutch pack. These parts are retained inside the drum by the low sun gear and flange assembly and retainer ring. When oil pressure is applied to the piston, the clutch plates are pressed together connecting the clutch drum to the input shaft through the clutch hub. This engagement of the clutch causes the low sun gear to rotate with the input shaft. See Figure 74-8.

b. Low Band

The low band is a double-wrap steel band faced with a bonded lining which surrounds the forward clutch drum. The band is hydraulically applied by the low

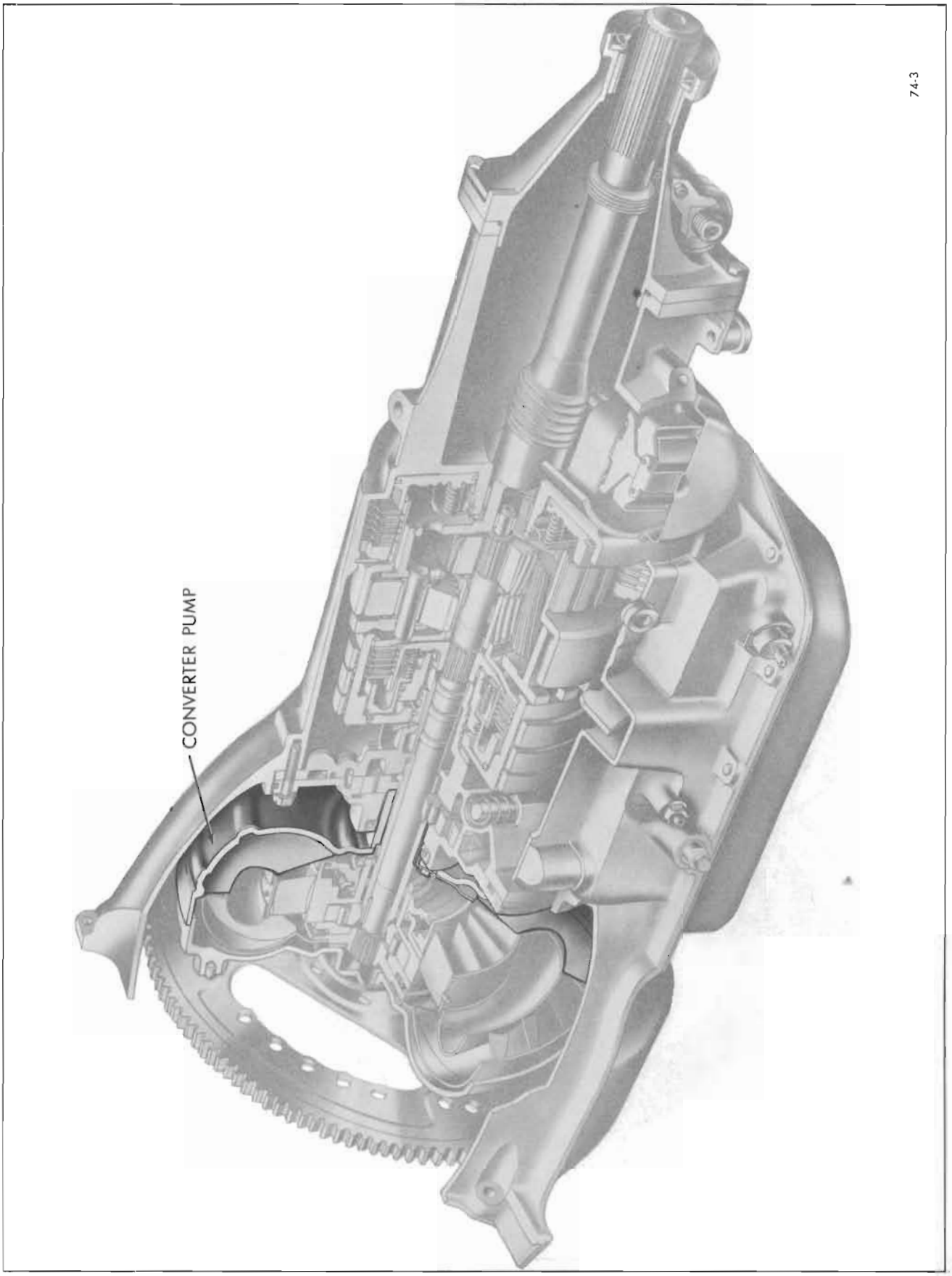

Figure 74-3—Converter Pump

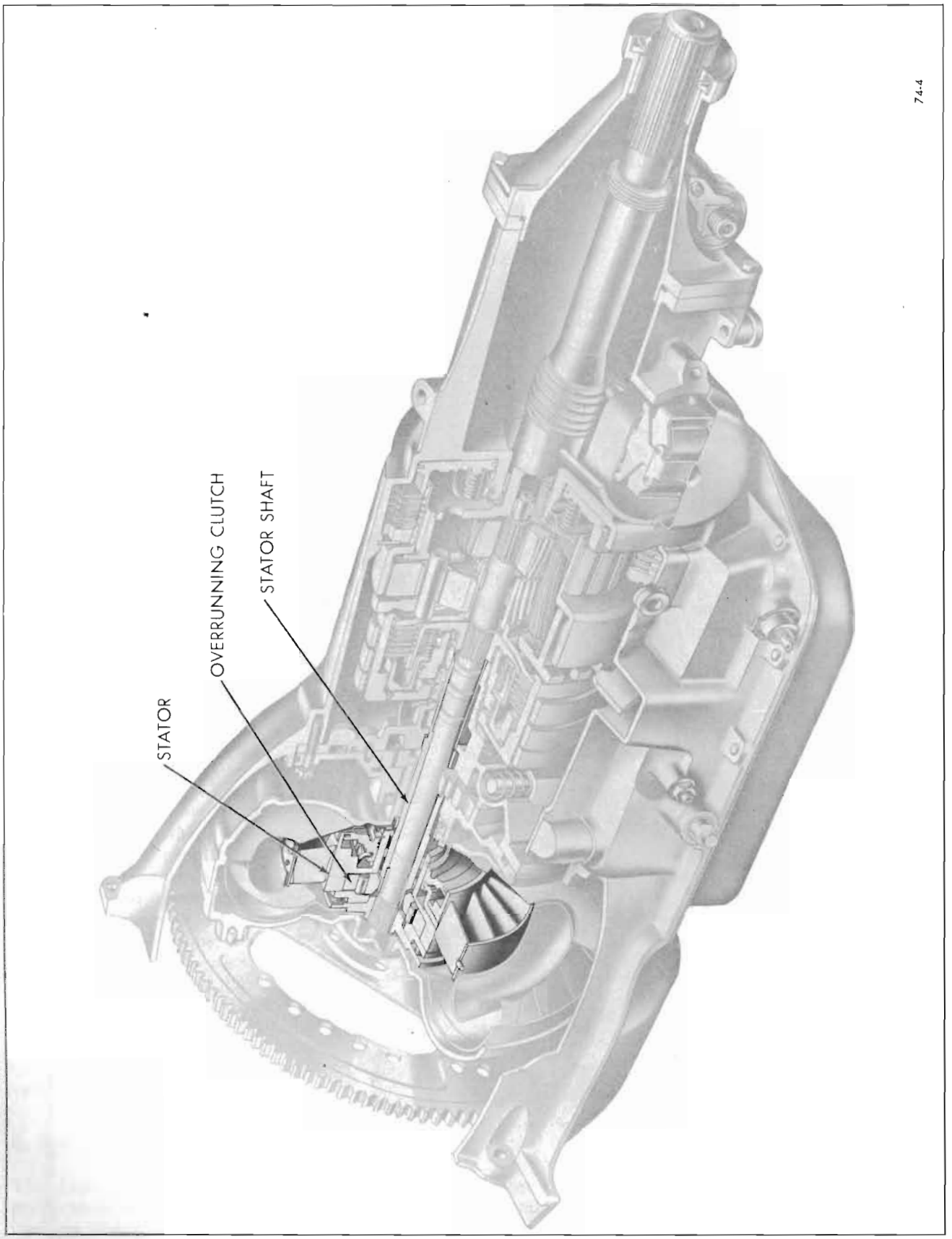

Figure 74-4—Stator and Stator Shaft

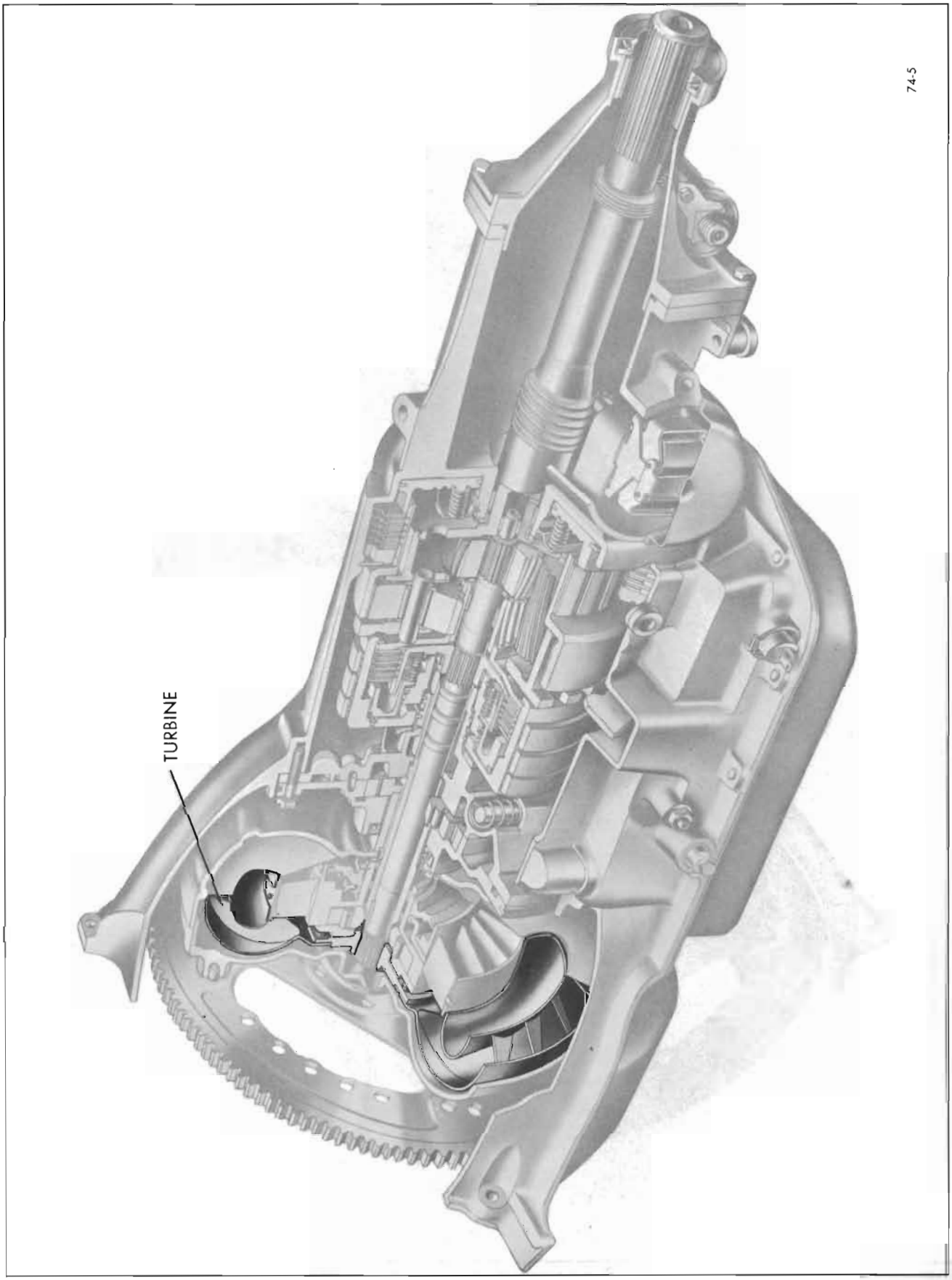

Figure 74-5—Converter Turbine

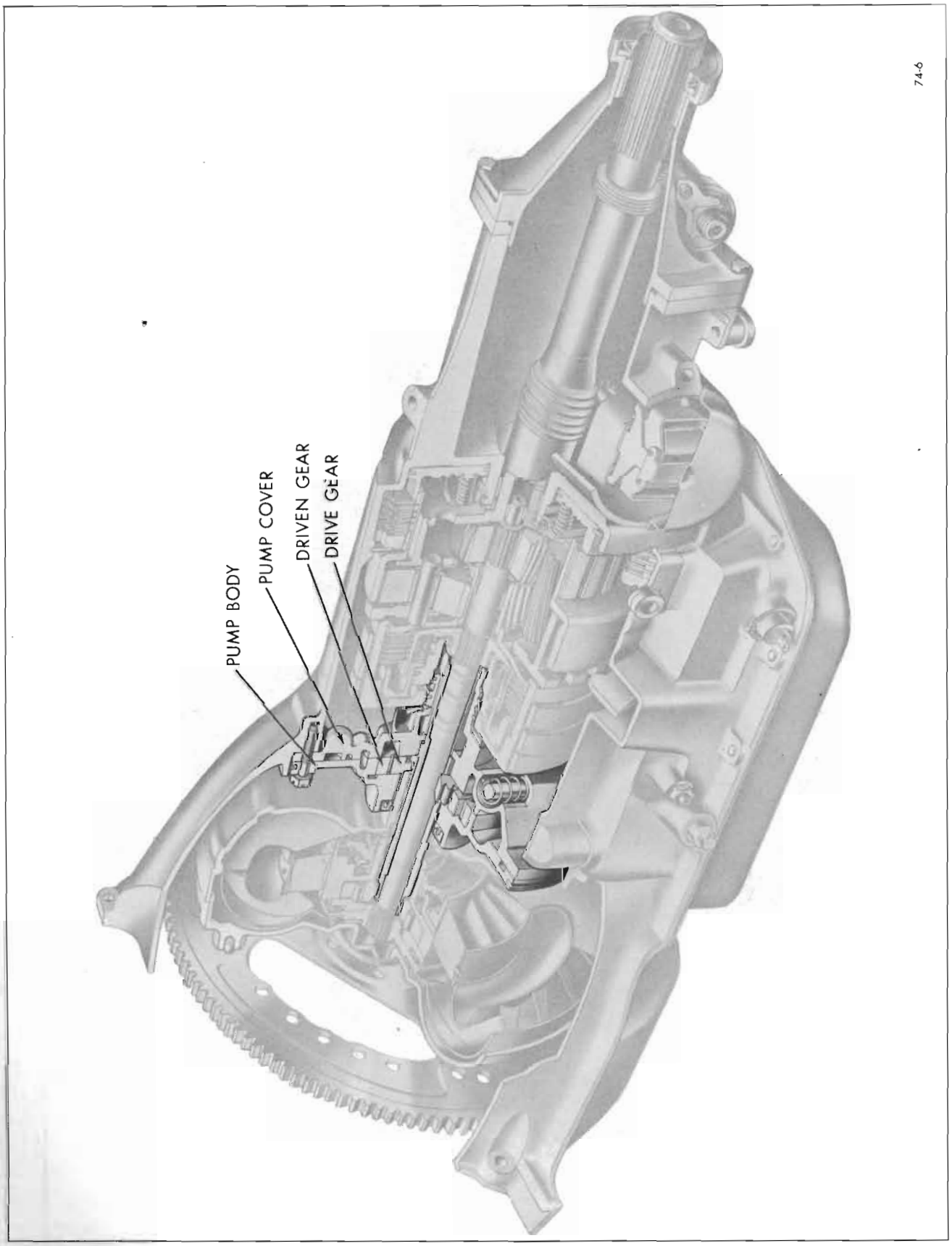

Figure 74-6—Oil Pump and Stator Shaft

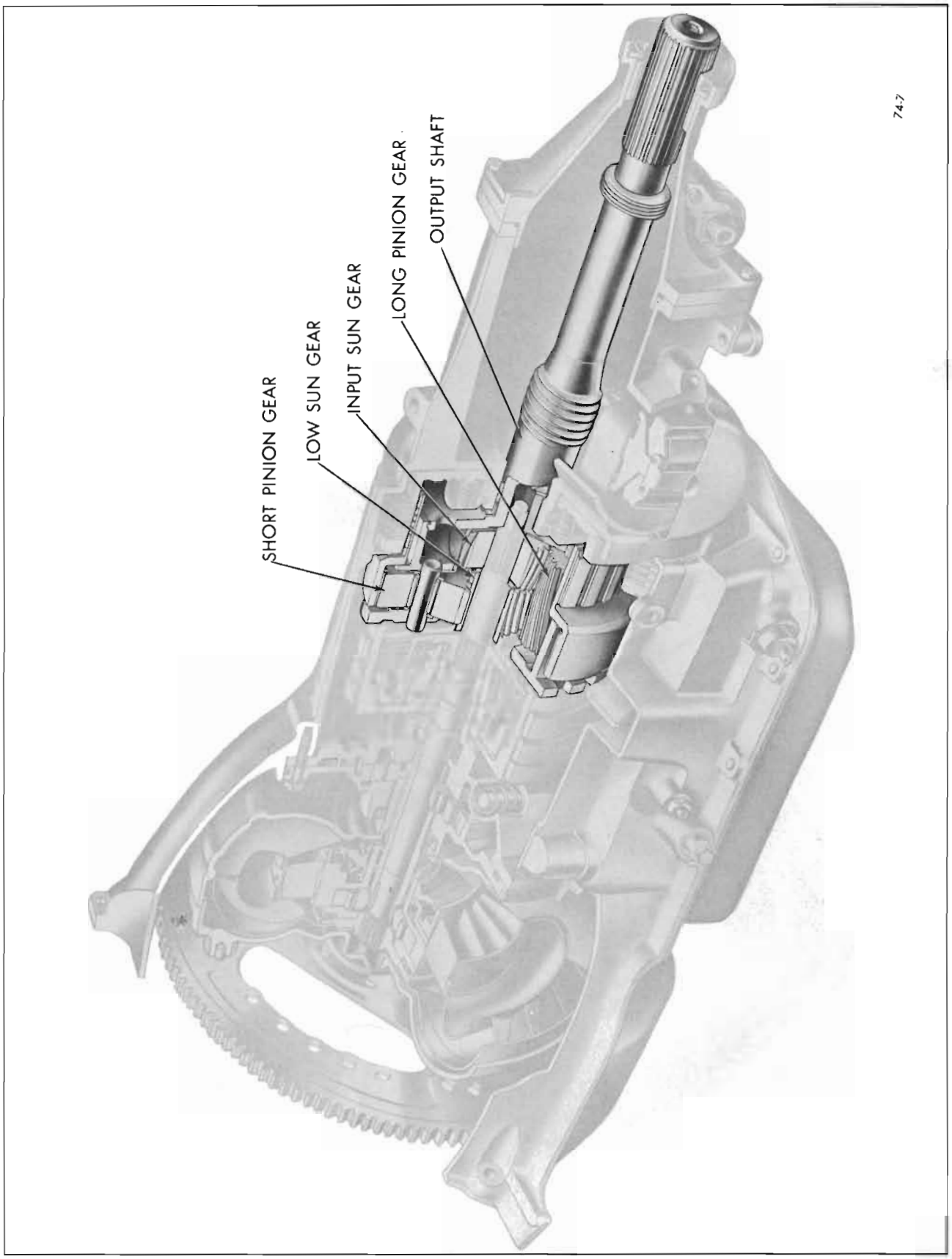

Figure 74-7—Planetary Gear Set

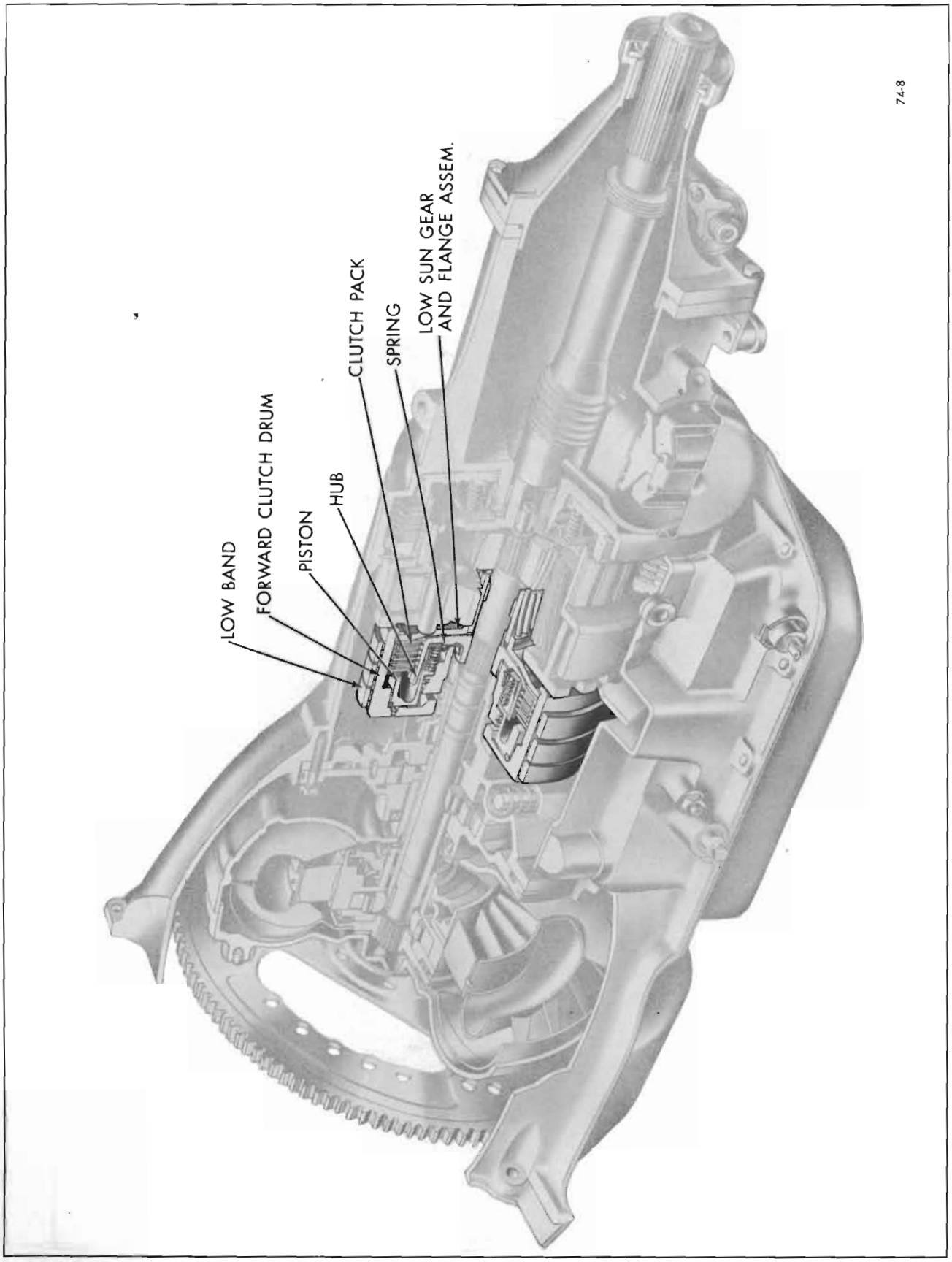

Figure 74-8—Forward Clutch and Low Band

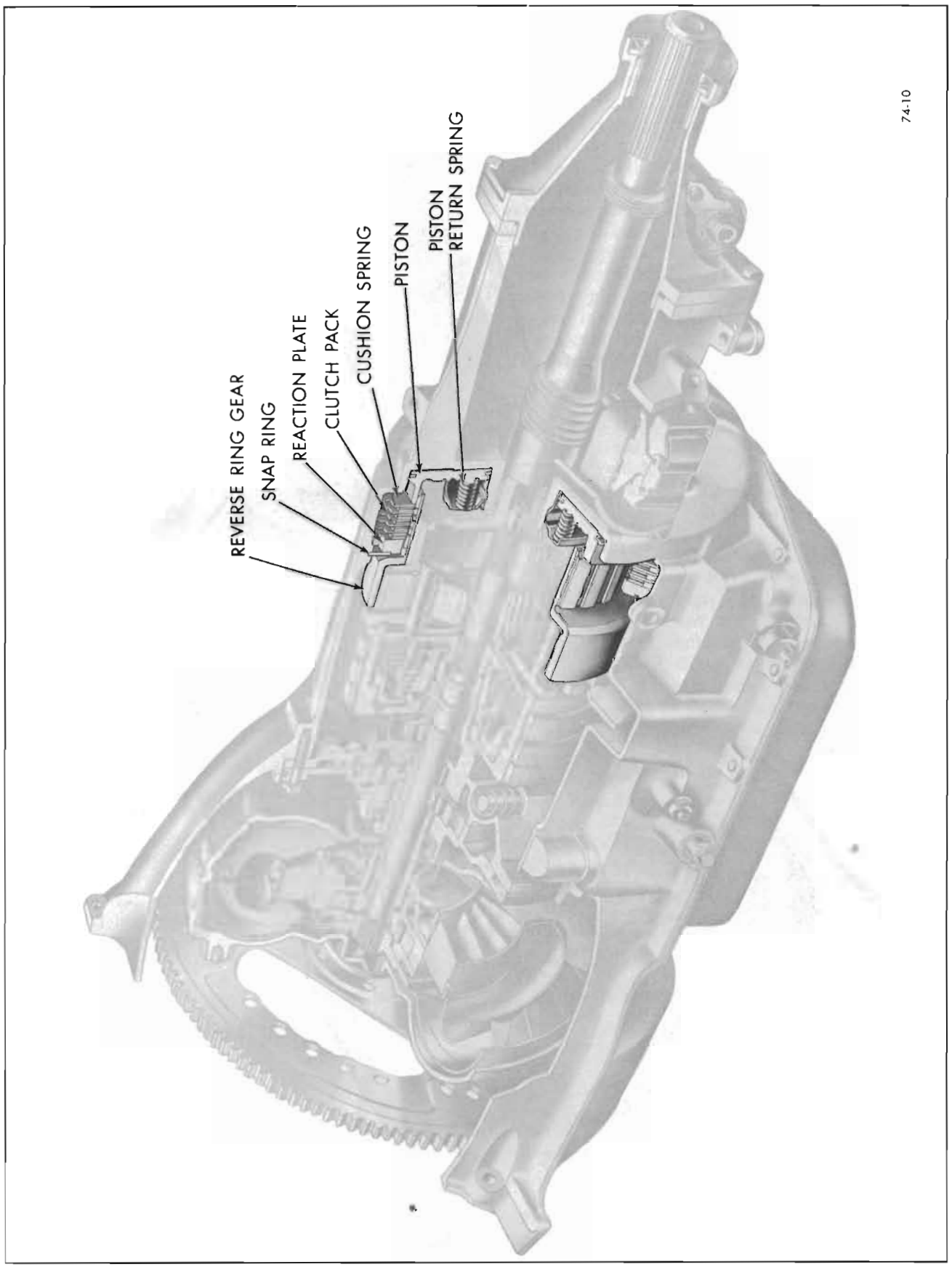

Figure 74-10—Reverse Clutch

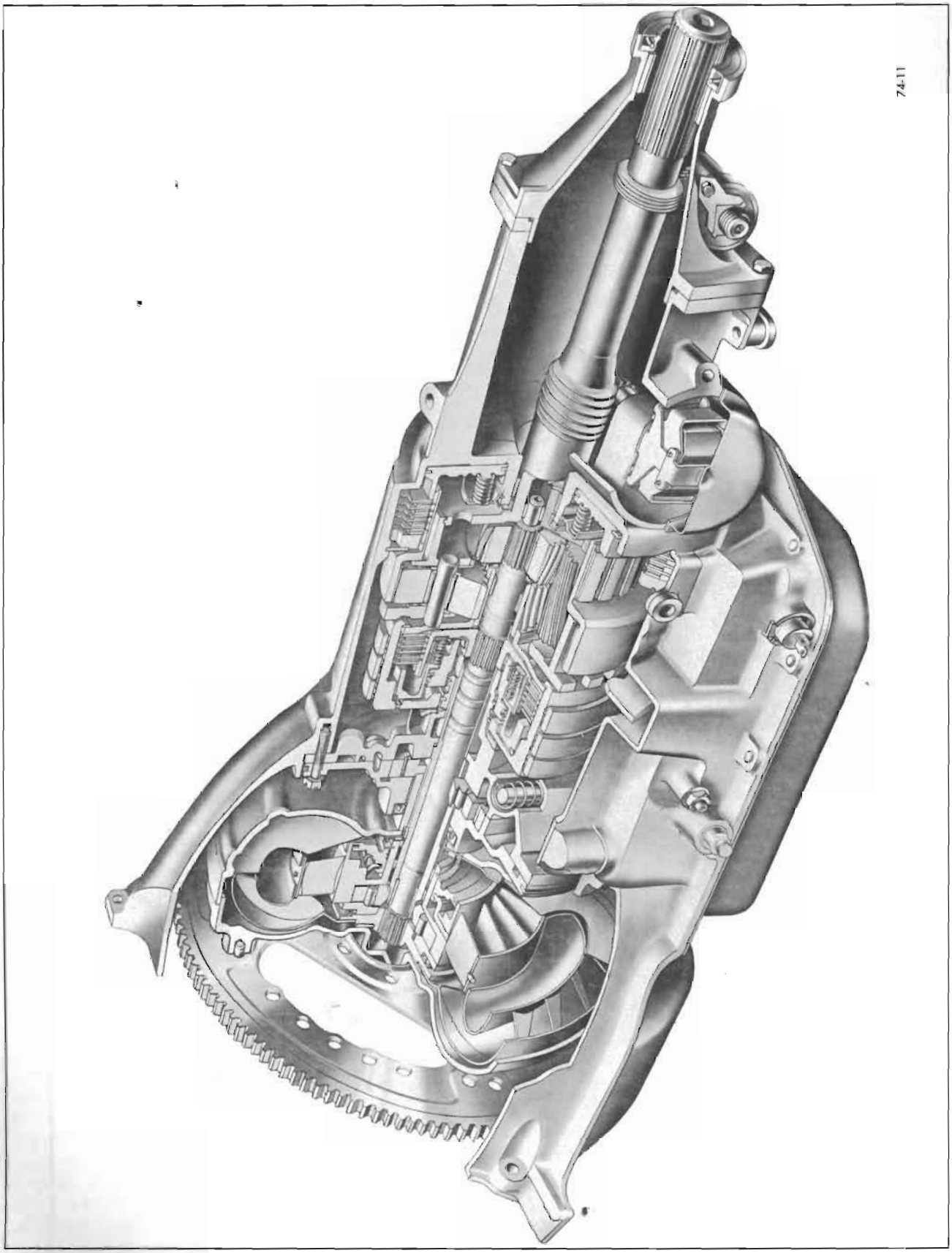

Figure 74-11—Cross Section of Transmission

servo piston assembly, and released by spring pressure. See Figure 74-8.

4. Reverse Clutch

The reverse clutch assembly consists of a piston, inner and outer seal, cushion ring, coil springs, clutch pack, and pressure plate. These parts are retained inside the case by a retaining snap ring. When oil pressure is applied to the piston, the clutch plates are pressed together holding the reverse ring gear stationary. This engagement of the clutch causes reverse rotation of the output shaft. See Figure 74-10.

5. Governor

The governor is located to the rear of the transmission case on the left side and is driven off the output shaft. The purpose of the governor is to generate a speed sensitive modulating oil pressure that increases up to a point with output shaft or car speed.

6. Valve Body

The valve body assembly is bolted to the bottom of the transmission case and is accessible for service by removing the oil pan. The valve body assembly consists of manual control valve, detent valve, shift valve, modulator limit valve, and high speed down shift timing valve.

74-5 MECHANICAL OPERATION OF THE SUPER TURBINE "300" AUTOMATIC TRANSMISSION

1. Operation of Components in Drive Range

With the manual control lever in Drive range, the transmission is started automatically in Low range. The forward clutch is released and the low band is applied to the outside diameter of the forward clutch drum. With the low band applied, the low sun gear and flange assembly is held stationary. Drive then is from the converter through the input shaft to the input sun gear in the planetary gear set. The input sun gear drives the long planet pinions which in turn drive the short planet pinions. The short pinions are in mesh with the low sun gear. With the low sun gear held stationary by the low band application, the short pinions will walk around the low sun gear. As they walk around the sun gear, they carry with them the planet carrier and the output shaft to which they are attached, at a reduction of 1.76 to 1.

The upshift into Drive range is dependent upon car speed and throttle opening. When the shift occurs, the low band is released and the forward clutch is applied. Application of the forward clutch locks the planetary system causing it to rotate as a unit. With the clutch applied, the clutch hub which is splined to the input shaft is locked to the low sun gear and flange assembly through the clutch plates. The low sun gear is meshed to the short pinions, the short pinions are meshed with the long pinions, and the long pinions are meshed with the input sun gear; the sun gear is also splined to the input shaft. Since both the low sun gear and input sun gear are now locked to the input shaft, the entire planetary unit will revolve at input shaft speed. See Figure 74-12.

2. Operation of Components in Manual or Automatic Low Range

In Low range, the forward clutch is released and the low band is applied to the outside diameter of the forward clutch drum. With the low band applied, the low sun gear and flange assembly is held stationary. Drive then is from the converter through the input shaft to the input sun gear in the planetary gear set. The input sun gear drives the long planet pinions which are in mesh with the short planet pinions. Since the low sun gear is held stationary with the low band applied, the short pinions walk around the low sun gear, and as they walk around the sun gear, they carry with them the planet carrier and the output shaft to which they are attached at a reduction of 1.76 to 1. See Figure 74-13.

3. Operation of Components in Reverse Range

When the manual control lever is in Reverse position, the forward clutch and low band are released, and the reverse clutch is applied, holding the ring gear stationary. Drive is through the input shaft and input sun gear to the long pinions and then to the short pinions. The short pinions mesh with the reverse ring gear which is held stationary by the reverse clutch. The short pinions walk around the inside of the ring gear in a reverse direction, turning the output shaft to which they are attached at a reduction of 1.76 to 1. See Figure 74-14.

4. Operation of Components in Neutral Position

With the shift control lever in Neutral position, the output shaft remains stationary. The clutches and low band are released; therefore, there is no reaction member to provide positive drive. All gears are free to spin around their own axis, and no motion is imparted to the planet carrier. See Figure 74-15.

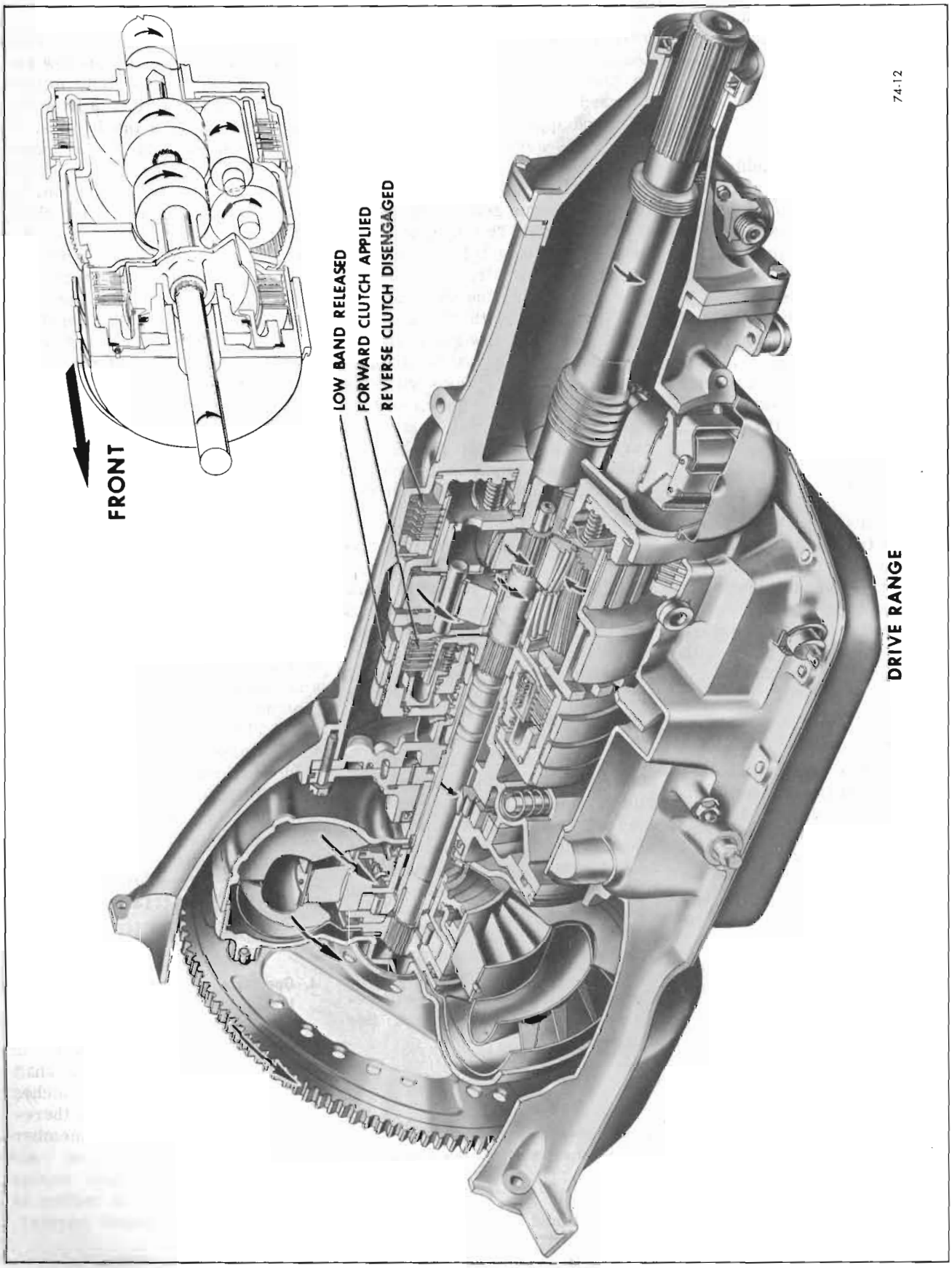

Figure 74-12—Operation of Components in Drive Range

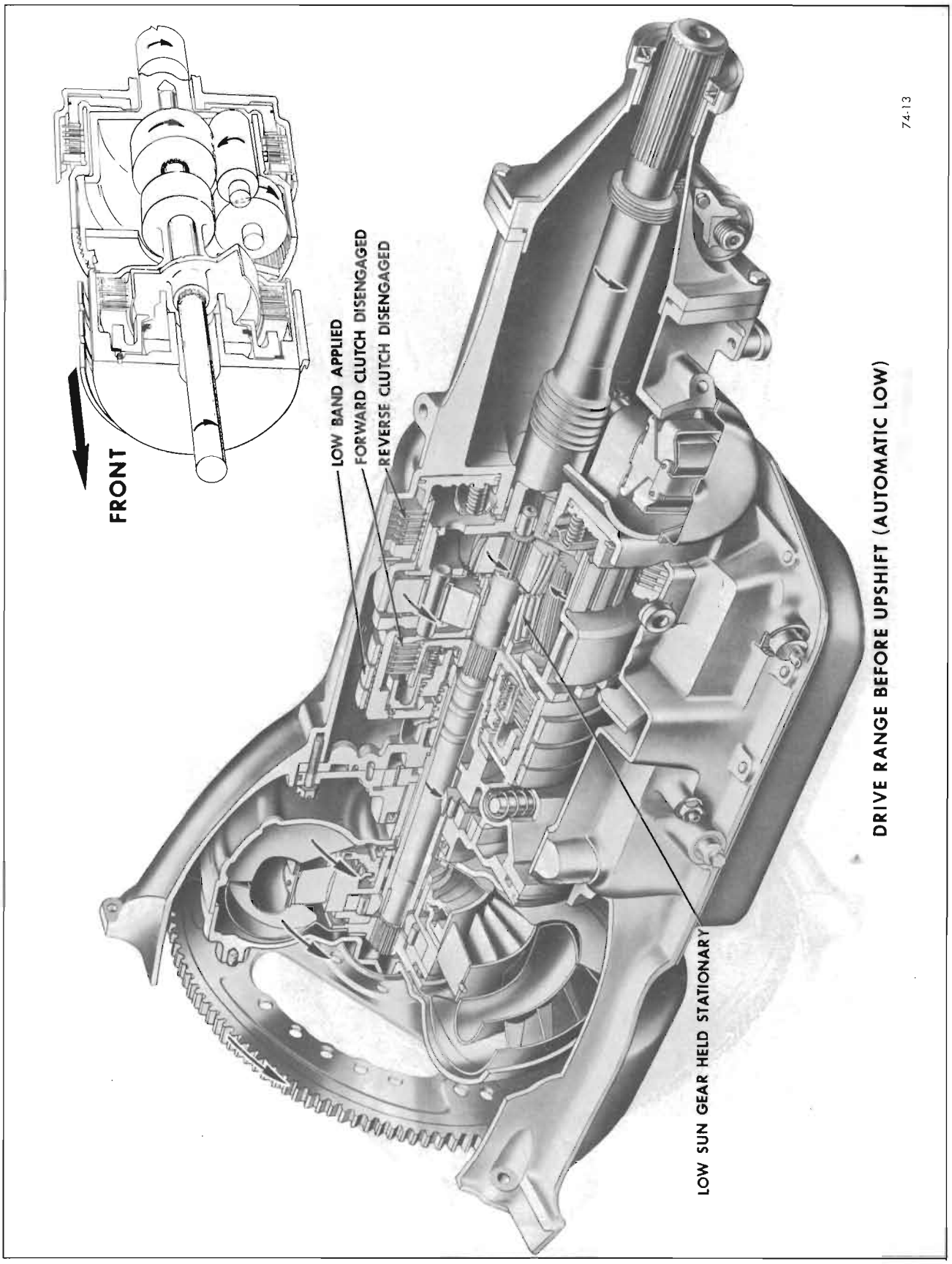

Figure 74-13—Operation of Components in Manual Low or Automatic Low

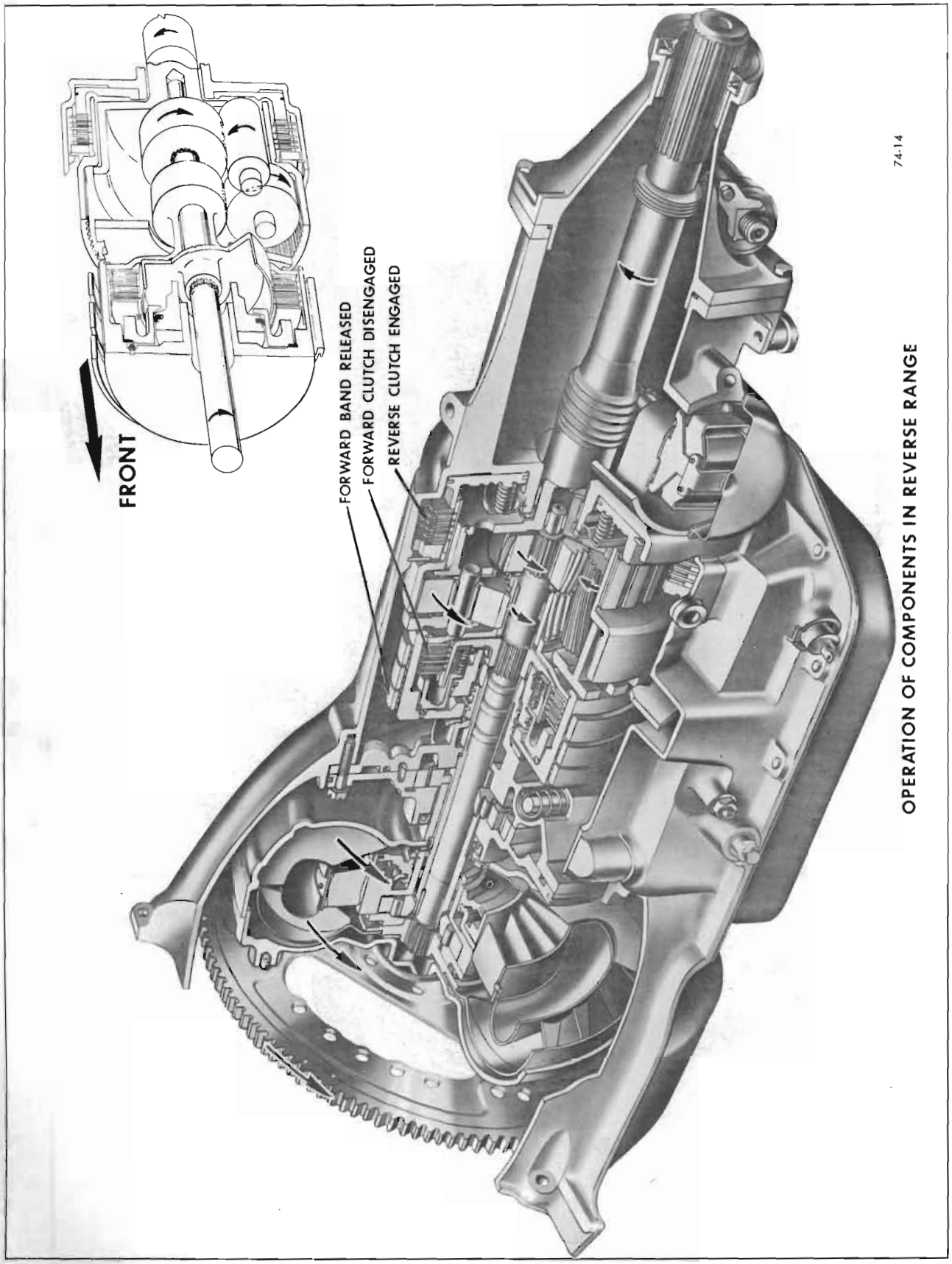

Figure 74-14—Operation of Components in Reverse Range

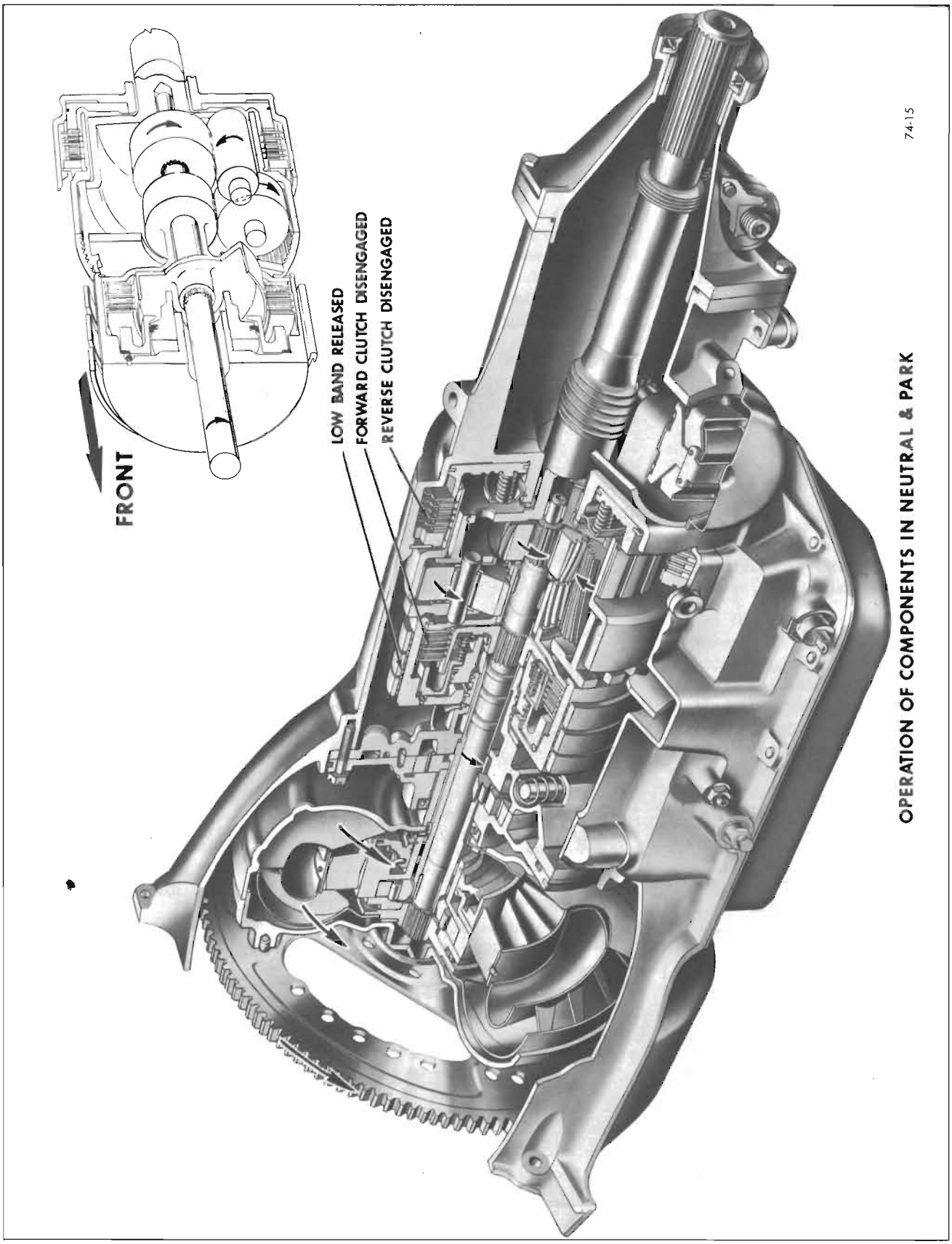

Figure 74-15—Operation of Components in Neutral and Park Range

5. Operation of Components in Park Position

In Park position, all reaction members are released as in Neutral. A positive gear train lock is provided when the parking pawl is engaged with the heavy teeth spaced around the front face of the planetary carrier. The linkage is actuated by direct manual action, but the parking pawl is activated by spring action. If the pawl is in line with a tooth of the planet carrier, rather than a spacer between teeth, the linkage remains in the park position with the spring holding pressure against the pawl. Slight rotation of the planet carrier will immediately seat the pawl and lock the output shaft to the case. See Figure 74-15.

74-6 OIL PUMP AND PRESSURE REGULATOR

a. Oil Pump

A positive displacement internal-external gear type oil pump is used to supply oil to fill the converter, for engagement of the forward and reverse clutches for application and release of the low band and to accumulate oil for lubrication and heat transfer.

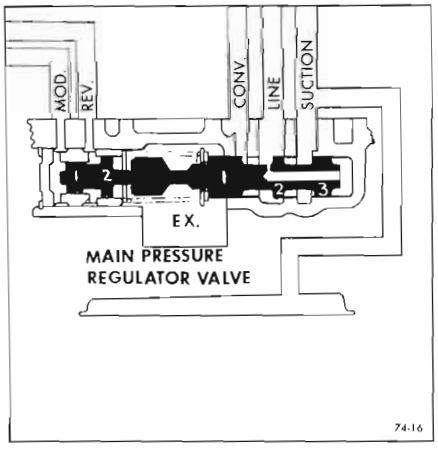

Figure 74-16—Pressure Regulator Valve (First Stage Regulation)

b. Main Pressure Regulator Valve

The pressure regulator valve located in the pump cover is used as the basic control of hydraulic pressure within the transmission.

1. First Stage Regulation

When the engine is idling or has just been started, oil enters the main pressure regulator valve assembly between the first and second lands and flows through interconnecting drilled holes in the valve to occupy the space between the third land and the oil pump cover. Oil under pressure between the third land and the pump cover moves the valve against its spring to uncover the port which directs oil to the converter and then to the oil cooler and lubrication systems of the transmission. Figure 74-16 shows the pressure regulator valve in first stage regulator position.

2. Second Stage Regulation

As higher engine speeds are attained, the volume of oil leaving the pump increases until the valve moves to the position shown in Figure 74-17 which opens a port to allow main line oil to escape to suction to regulate pressure. Second stage regulation is only necessary during operation at high speeds or operations with cold oil.

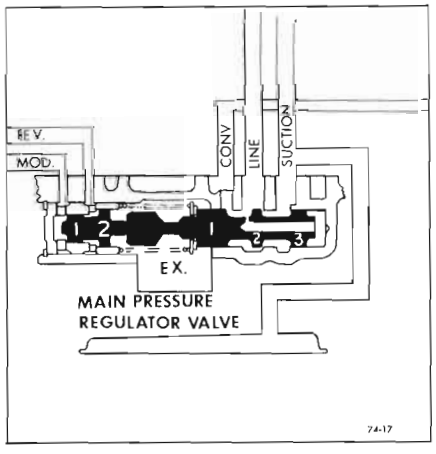

Figure 74-17—Pressure Regulator Valve (Second Stage Regulation)

3. Boost Valve

A boost valve at the spring end of the pressure regulator valve functions to raise line pressure when necessary by adding hydraulic pressure to the spring pressure on the main pressure regulator valve.

4. Modulator Boost

With the manual shift control valve positioned in drive range, oil under pressure varied by operating conditions (load, car speed, grade, etc.) is directed to the space between the first land of the boost valve and the valve body. Oil under pressure in this space has the same effect as increasing the spring pressure against the pressure regulator valve, that is, it increases main line oil pressure.

5. Reverse Boost

With the manual shift control valve positioned in reverse range, oil under pressure is directed to the space between the first and second lands of the boost valve. Since the second land is larger than the first, the boost valve bears on the spring end of the pressure regulator valve adding to the spring pressure of the valve, thus increasing main line oil pressure for operation in reverse range.

74-7 HYDRAULIC CONTROLS

The hydraulic control system consists of the following main components:

- Manual Shift Control Valve
- Stator Control Valve
- Shift Valve and Shift Control Valve
- Vacuum Modulator Valve
- Governor Valve
- Modulator Limit Valve
- Detent Valve

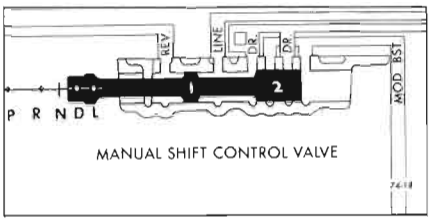

Figure 74-18—Manual Shift Control Valve

High Speed Down Shift Timing Valve

a. Manual Shift Control Valve

The manual shift control valve in the valve body routes oil to the controlling devices that govern operation in Drive, Low and Reverse. See Figure 74-18. In Neutral and Park ranges, the manual control valve cuts off oil pressure to the low servo and forward clutch. The manual shift control valve is connected by mechanical linkage to the manual control lever on the steering column.

b. Stator Control Valve

The stator control valve is a spring loaded valve located in the pump cover. The function of the valve is to control high or low angle of the stator blades. See Figures 74-20 and 74-21. The action

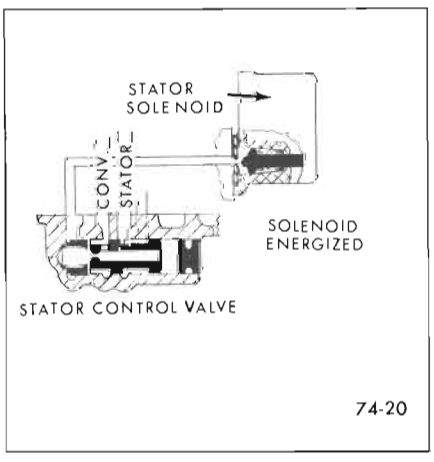

Figure 74-20—Stator Blades in High Angle

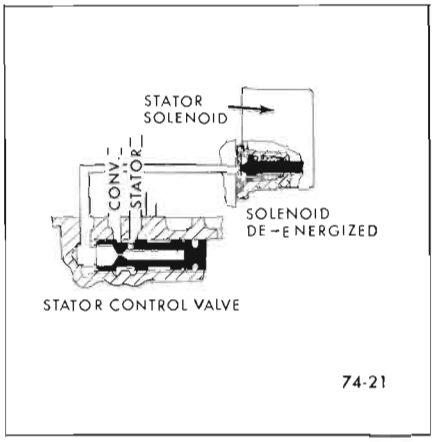

Figure 74-21—Low Angle

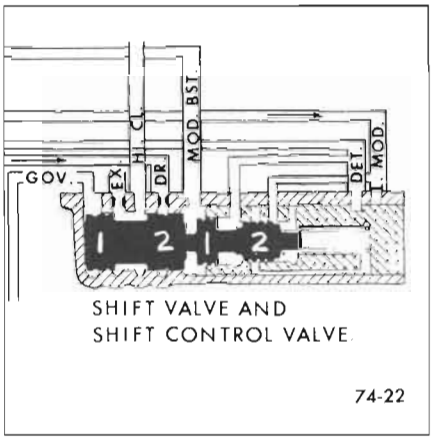

Figure 74-22—Automatic Low

of the valve is affected by spring pressure and a solenoid valve. When the stator control valve solenoid is energized the valve plunger is retracted, uncovering an exhaust port through which oil may escape from the spring side of the stator control valve. Oil thus escaping allows oil at converter charging pressure to move the valve against its spring. With the stator valve positioned against the valve plug no oil is directed to the front of the stator blade piston and converter charging pressure then moves the piston (connected to the stator blade cranks) to shift the blades to high angle. See Figure 74-20.

c. Shift Valve and Shift Control Valve

The shift valve and shift control valve are housed together in the valve body. They interpret oil pressure from the governor and vacuum modulator valve to the shift from automatic low (manual shift control valve in drive range) to drive range or from drive to automatic low range.

1. Upshift from automatic low range to drive range

As the car is accelerated from a stop the shift valve and shift control valve are positioned as shown in Figure 74-22. The shift valve is held against the end of its bore by the force of a spring and the pressure exerted on the end of the shift control valve. With the shift valve thus positioned no oil under pressure is directed to the high clutch piston or spring side of the low servo piston, thus the low band is applied and the transmission is in low range.

When the proper relationship bebetween car speed and throttle opening exists, governor oil pressure against the first land of the shift valve will overcome spring pressure and the force of limited modulator oil pressure against the shift control valve and move both valves to the right as shown in Figure 74-23.

With the valves thus positioned, oil under pressure is directed to the forward clutch piston and the spring side of the low servo piston.

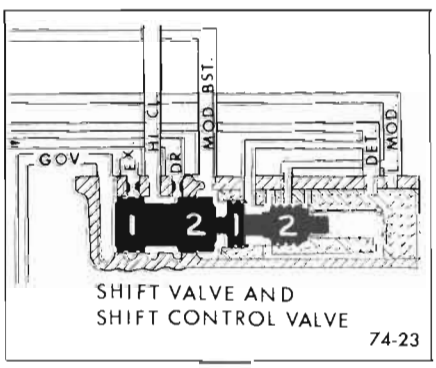

Figure 74-23—Up-Shifted

2. Down shift from drive to low

When detent pressure against the shift control valve in combination with the spring reaches a value sufficient to overcome governor valve pressure against the first land of the shift valve, both valves move to the shift valve end of the bore and the transmission is down shifted by exhausting oil under pressure to the high clutch and spring side of the low servo piston. See Figure 74-22.

3. Manual Low

With the manual shift control valve positioned in low (L) range oil under pressure is directed to the space between the shift valve and the shift control valve. Oil under pressure in this space moves the shift valve to the end of its bore. With the shift valve thus positioned no oil under pressure is directed to the high clutch piston or spring side of the low servo piston, thus the low band is applied and the transmission is in low range. See Figure 74-24.

d. Vacuum Modulator and Valve

The vacuum modulator and valve assembly is a device to translate load (engine manifold vacuum), barometric pressure (altitude) and speed (governor valve oil pressure) into modulated oil pressures to regulate main line oil pressure at an efficient value.

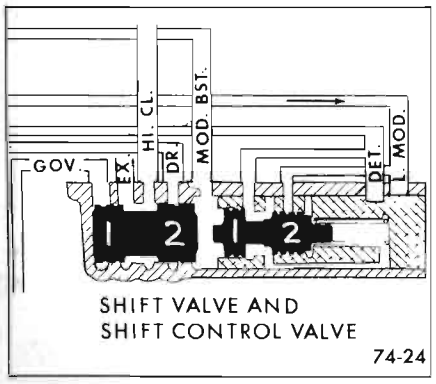

Figure 74-24—Manual Low

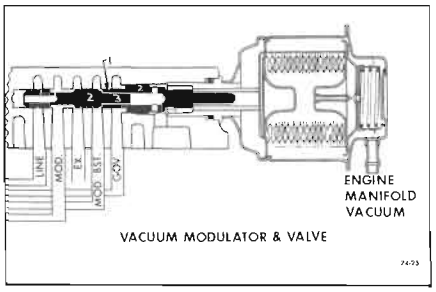

Figure 74-25—Vacuum Modulator and Valve

Main line oil enters the valve between the first and second lands of the valve, flows through the drilled ports to the space between the first land and the valve body. Here, the oil when it reaches sufficient pressure moves the valve against its spring to regulate the exit oil (called modulator oil).

1. Manifold vacuum effect

The modulator valve spring is housed in a sealed container in such a way that engine manifold vacuum may act upon it to reduce the force of the spring against the valve and thus affect modulator oil pressure. Conditions of load or grade that lower manifold vacuum increase modulator oil pressure, while high manifold vacuum decreases modulator pressure. See Figure 74-25.

2. Altitude or barometric pressure effect

If the car is operated at high altitudes where barometric pressure is reduced the aneroid device in the vacuum modulator housing expands and acts against the valve spring to reduce modulator oil pressure in proportion to the barometric pressure.

At high altitudes engine output is reduced. Comparable reduction in transmission main line oil pressure is necessary to accomplish smooth shifts under these conditions.

3. Governor effect

As car speed increases governor valve oil pressure increases (up to the limit of the valve as described in subpar. e).

Oil at governor valve pressure bearing on the vacuum modulator valve has the effect of re-reducing the spring pressure against the valve, thereby reducing modulator oil pressure as governor pressure (car speed) increases.

4. Modulator boost effect

With the manual shift control valve positioned in Low (L) range, oil at main line pressure bears against the second land of the modulator valve which separates the two pieces of the valve and tends to move the valve to the bottom of its bore independent of the valve spring. Thus, modulator oil under pressure is directed to the main line pressure regulator valve to provide an increase in main line oil pressure in low range, regardless of engine vacuum. If driving conditions result in low engine vacuum however, the valve spring will move the two sections of the valve back together. Then both the valve spring and oil at main line pressure against the second land of the valve will regulate modulator oil pressure.

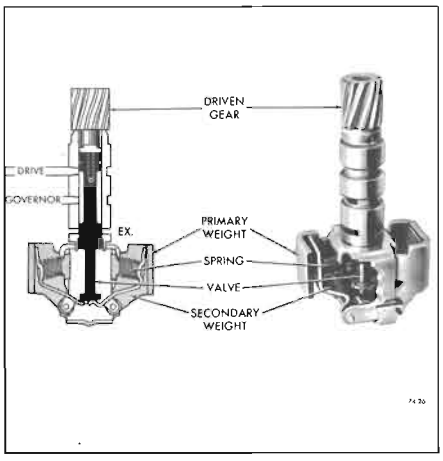

Figure 74-26—Governor Valve

e. Governor Valve

The governor valve is a pressure regulator valve the output of which is determined by car speed acting through the centrifugal force of a pair of dual weights; the inner pair of which is spring loaded. See Figure 74-26.

As the car begins to move the weight assemblies move outward to provide a regulating force against the valve through the springs between the primary and secondary weights. As car speed is further increased, regulating force against the valve is provided by the secondary weights moving outward. At approximately 19 MPH the primary weights have reached the limit of their travel and the force against the valve is then entirely through the secondary weights.

Thus governor valve pressure is determined at very low speeds by the primary and secondary weights and at higher speeds by the secondary weights plus the force of the springs between the weights. In this manner governor pressure is increased rapidly but smoothly from very low speeds to approximately 19 MPH, where it increases at a slower rate.

Regulated oil from the governor valve is channeled to the shift valve, vacuum modulator valve, modulator limit valve, and high speed down shift timing valve. Governor pressure thus determines or affects shift points, main line oil pressure, and down shift timing.

f. Modulator Limit Valve

The modulator limit valve is a pressure regulator valve that regulates the point at which a wide open throttle upshift will occur.

The valve regulates limited feed oil (main line pressure) to provide diminishing oil pressure bearing against the shift control valve as car speed is increased. This decrease in oil pressure is accomplished by governor valve pressure bearing on the third land of the valve and acting to diminish spring pressure as car speed (governor valve pressure) increases. See Figures 74-27 and 74-28.

The modulator limit valve is in operation only before the upshift during wide open throttle operation with the manual shift control valve in Drive position.

g. Detent Valve

The detent valve is a solenoid operated two position valve that provides a down shift at wide open throttle if car speed is low enough.

Electrical contacts on the throttle linkage energize the detent solenoid as wide open throttle is reached. Energization of the solenoid retracts its plunger and allows oil from the center of the valve to flow to exhaust. Drive oil pressure against the first land and end of the valve moves the valve against its spring as shown in Figure 74-30.

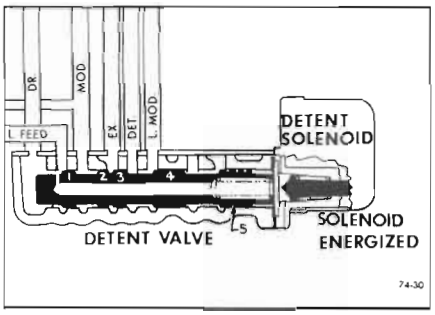

Figure 74-30—Solenoid Valve Energized

With the valve in this position, ports are opened to allow oil at drive oil pressure to flow to the modulator limit valve, and limited modulator oil to flow to the detent port of the shift control valve. When the solenoid is de-energized the spring loaded plunger seals the port in the valve center. Oil at drive oil pressure then occupies the center of the valve and bears against the fifth land of the valve as well as the first land. The detent valve spring then moves the valve to the position shown in Figure 74-31, shutting off the detent and limited modulator ports.

h. High Speed Down Shift Timing Valve (Except Model NK)

The high speed down shift timing valve is a spring loaded valve

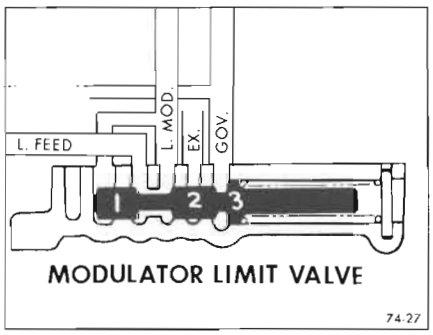

Figure 74-27—Modulator Limit Valve (First Stage)

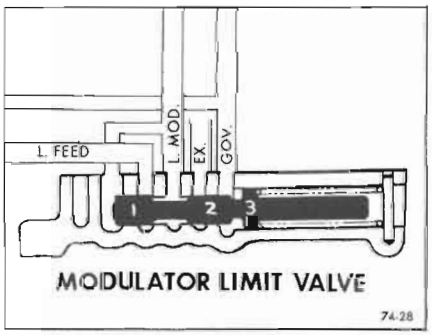

Figure 74-28—Modulator Limit Valve (Second Stage)

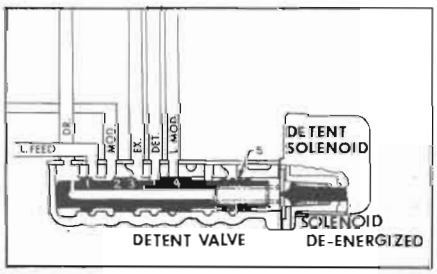

Figure 74-31—Solenoid Valve De-Energized

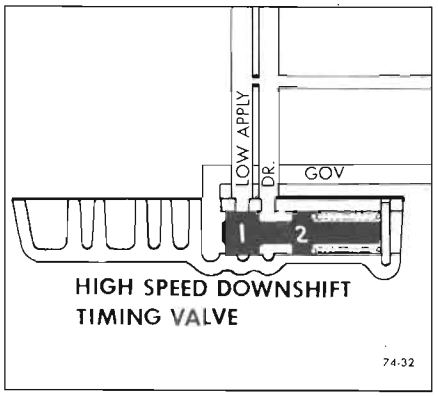

Figure 74-32—High Speed Down Shift Timing Valve

located in the valve body. Its function is to control the rate of low servo application at high road speeds.

At sufficiently high road speeds governor pressure against the first land of the valve overcomes spring pressure to move the valve to the position shown in Figure 74-32. With the valve in this position oil for low servo application must pass two orifices as shown. At lower car speeds, governor valve pressure is not sufficient to overcome the spring pressure and low servo application is made through passages containing one orifice as shown in Figure 74-33.

i. High Speed Down Shift Timing Valve (Model NK Only)

A special two (2) piece high speed down shift timing valve is used on Model NK Transmissions. The new valve meters the rate of oil flow to the low servo through the whole speed range by use of three (3) orifices.

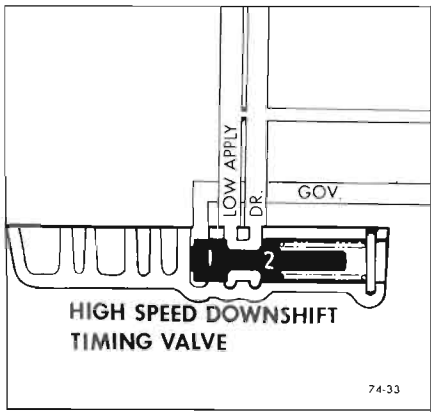

Figure 74-33—High Speed Down Shift Timing Valve Regulated

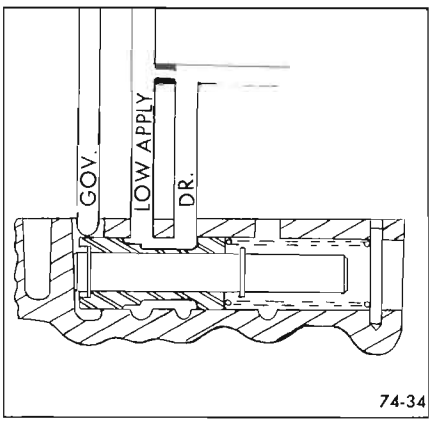

Figure 74-34

At lower car speeds, governor pressure is not sufficient to overcome the high speed down shift timing valve spring. Oil then is allowed to flow unrestricted by the valve to the orifice at the low servo. See Figure 74-34.

As car speed increases governor pressure on the end of the valve and pin assembly increases, the assembly will move to the left as shown in Figure 74-35. With the valve in this position the oil has to flow simultaneously around the flats on the number 1 land of valve (which acts as an orifice) and through the high speed timing orifice before flowing through the orifice at the low servo to apply the low band.

At higher car speeds governor pressure on the number N land of the valve moves the valve over to the retaining clip on the pin. This prohibits oil from passing through the valve and allows it to pass through the high speed timing orifice only before flowing through the orifice at the low servo to apply the low band. See Figure 74-36.

j. Operation of Hydraulic Controls in Drive Range (Part Throttle Upshifted)

During operation in Drive range the manual shift control valve is positioned as shown in Figure 74-37. During part throttle acceleration main line oil is directed to the modulator valve and manual shift control valve. Main line oil entering the manual shift control valve is routed into the drive oil passage and then directed to the governor valve, shift valve, detent valve, high speed down shift timing valve and low servo.

Main line oil being directed to the modulator valve enters between the first and second lands. At low engine vacuum the vacuum modulator tends to keep the valve toward the bottom of its bore. In this position oil is delivered

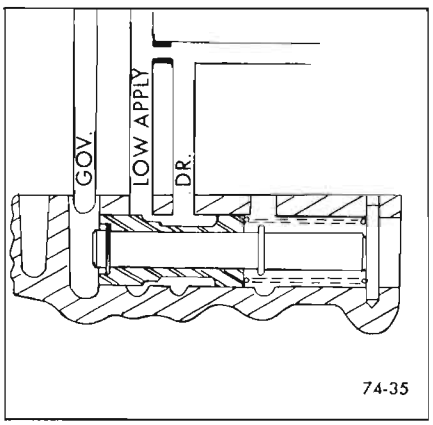

Figure 74-35

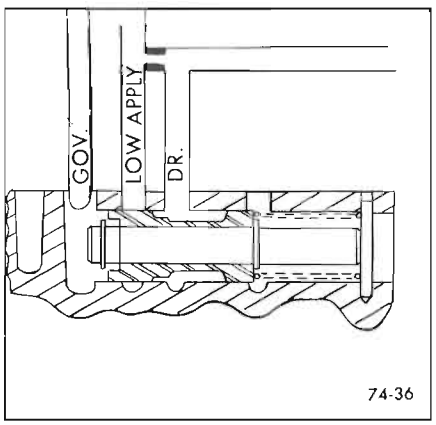

Figure 74-36

through a drilled passage in the valve to the space between the first land of the valve and the valve body. Oil under pressure in this area plus governor pressure on the second land of the second modulator valve tends to move the valve against the force of its spring to regulate modulator oil pressure leaving the valve. Modulator oil leaves the modulator valve and is routed to the boost valve, detent valve, modulator limit valve, and to the second land of the shift control valve. Modulator pressure applies a force to the space between the first land of the boost valve and the oil pump body causing it to move to the right See Figure 74-37. As the boost valve moves to the right it contacts the pressure regulator valve. This hydraulic force combined with normal spring force on the pressure regulator valve results in higher main line pressure. Also modulator pressure is routed through the detent valve and modulator limit valve to the shift control valve.

When sufficient car speed has been obtained, the governor valve will move allowing drive oil to be directed at regulated pressure to the space between the first land of the shift valve and the valve body, and between second and third lands of the modulator valve, between the second and third lands of the modulator limit valve, and in the space between the first land of the high speed down shift timing valve and the valve body. As governor pressure is received between the second and third lands of the modulator valve it will tend to move the valve against its spring, reducing modulator pressure.

When governor pressure reaches a high enough value the shift valve will move to the right allowing drive oil to apply the forward clutch and release the low band.

k. Operation of Hydraulic Controls in Drive Range (Full Throttle to Detent Switch Pitch Only)

During operation in Drive range at full throttle to detent switch pitch only, the stator control solenoid is energized. See Figure 74-38.

Main line oil passes through the pressure regulator valve to the converter and stator control valve. Energization of the stator control solenoid allows oil from the center of the valve to flow to exhaust. Converter oil pressure against the valve body and the first land of the valve moves the valve against its spring until it bottoms in its bore. When the valve reaches the bottom of its bore it will exhaust the stator, switching the blades to high angle.

Main line oil entering the manual shift control valve is routed into the drive oil passage and then directed to the governor valve, shift valve, detent valve, high speed down shift timing valve and low servo. Main line oil directed to the modulator valve enters between the first and second lands. At low engine vacuum, the vacuum modulator tends to keep the valve toward the bottom of its bore. In this position, oil is delivered through a drilled passage in the valve to the space between the first land of the valve and the valve body. Oil pressure in this area plus governor pressure on the second land of the second modulator valve will tend to move the valve against the force of its spring to regulate modulator oil pressure leaving the valve. At the same time, line oil pressure enters the area between the first and second lands of the modulator valve and into the modulator pressure line. Modulator oil leaves the modulator valve and is routed to the boost valve, detent valve, modulator limit valve, and to the shift control valve. Modulator pressure applies a force to the space between the first land of the boost valve and the oil pump body causing it to move to the right in Figure 74-38. As the boost valve moves to the right it contacts the pressure regulator valve. This hydraulic force combined with normal spring force on the pressure regulator valve results in a higher main line pressure. Also limited modulator pressure is routed through the detent valve and to the modulator limit valve. Limited modulator from the modulator limit valve is routed to the shift control valve.

When sufficient speed is obtained, the governor valve will move, allowing drive oil to be directed at reduced pressure to left end of the shift valve and between the second and third lands of the modulator valve, between the second and third lands of the modulator limit valve and at the left end of the high speed down shift timing valve. As governor pressure is received between the second and third lands of the modulator valve it will tend to move the valve to the right, reducing modulator pressure. When governor pressure reaches a high enough value, the shift valve will move to the right allowing drive oil to apply the forward clutch.

l. Operation of Hydraulic Controls in Drive Range (Full Throttle Detent and Switch Pitch)

During operation in Drive range at full throttle detent and switch pitch, both the stator control valve and detent valve solenoids are energized. The manual shift control valve is positioned as shown in Figure 74-40.

Main line oil passages through the pressure regulator valve to the converter and stator valve. When the stator control valve solenoid is energized it allows oil from the center of the valve to flow to exhaust. Converter oil applying

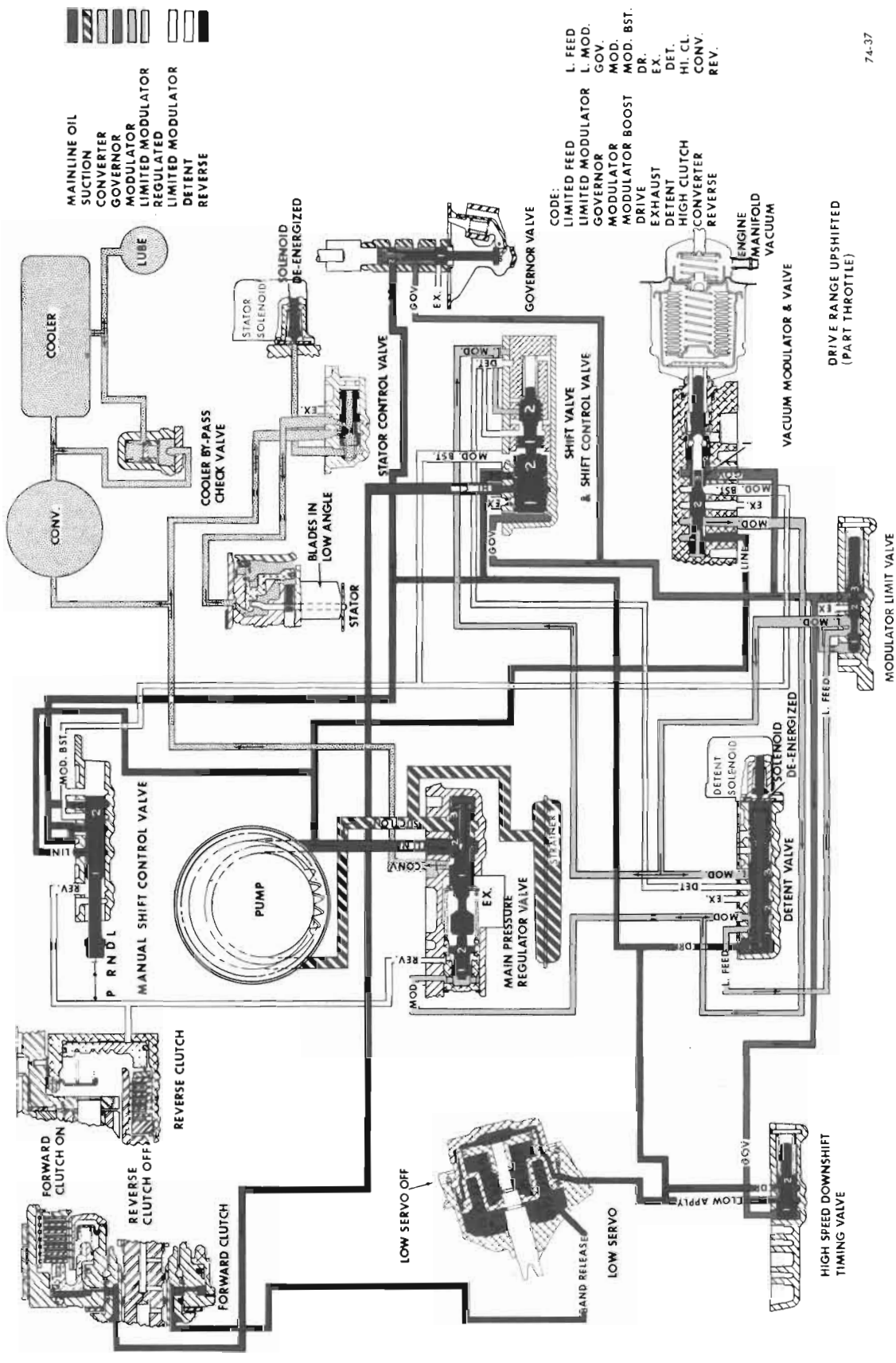

Figure 74-37—Drive Range Unshifted (Part Throttle)

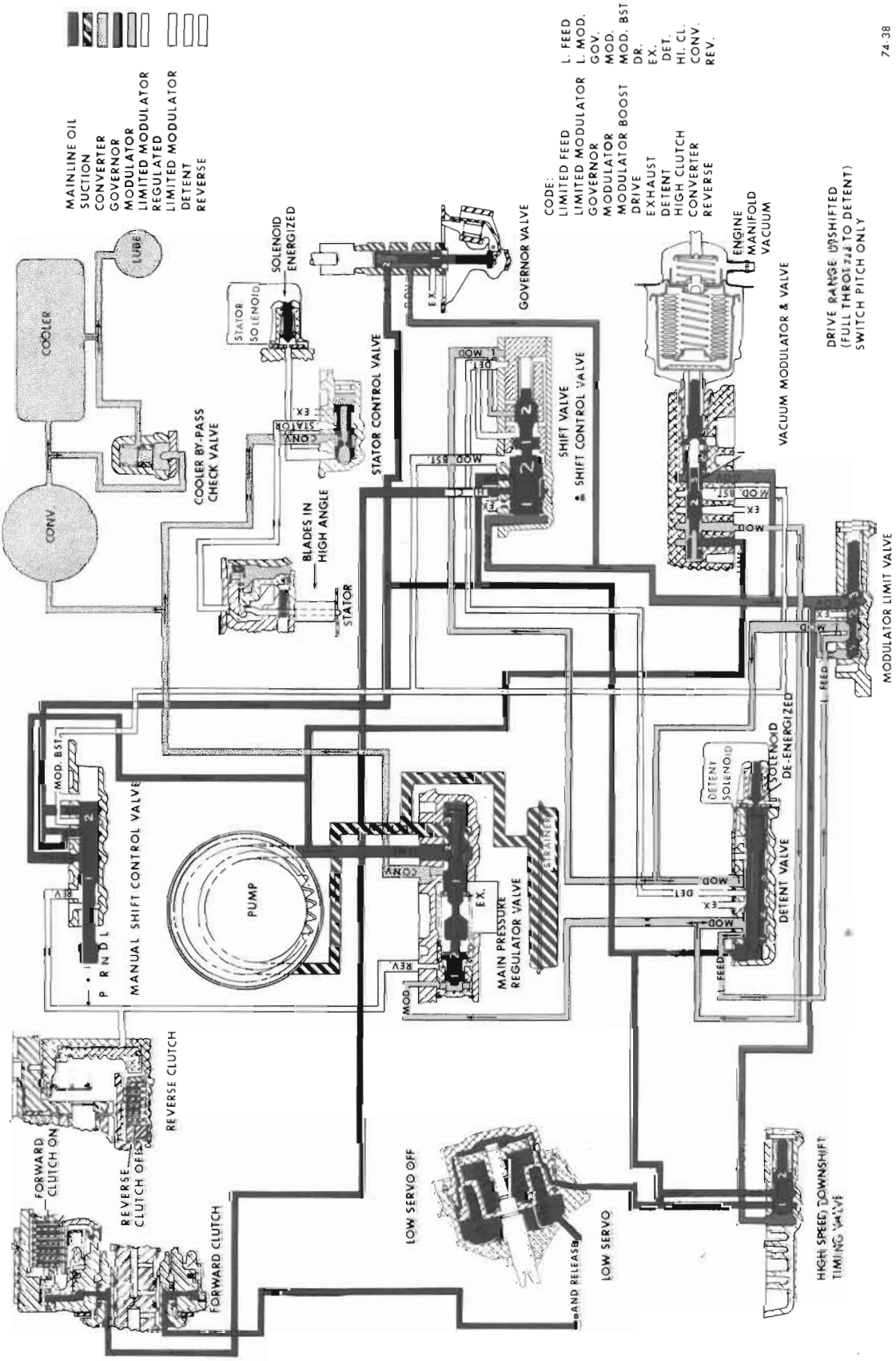

Figure 74-38—Drive Range (Full Throttle to Detent Switch Pitch Only)

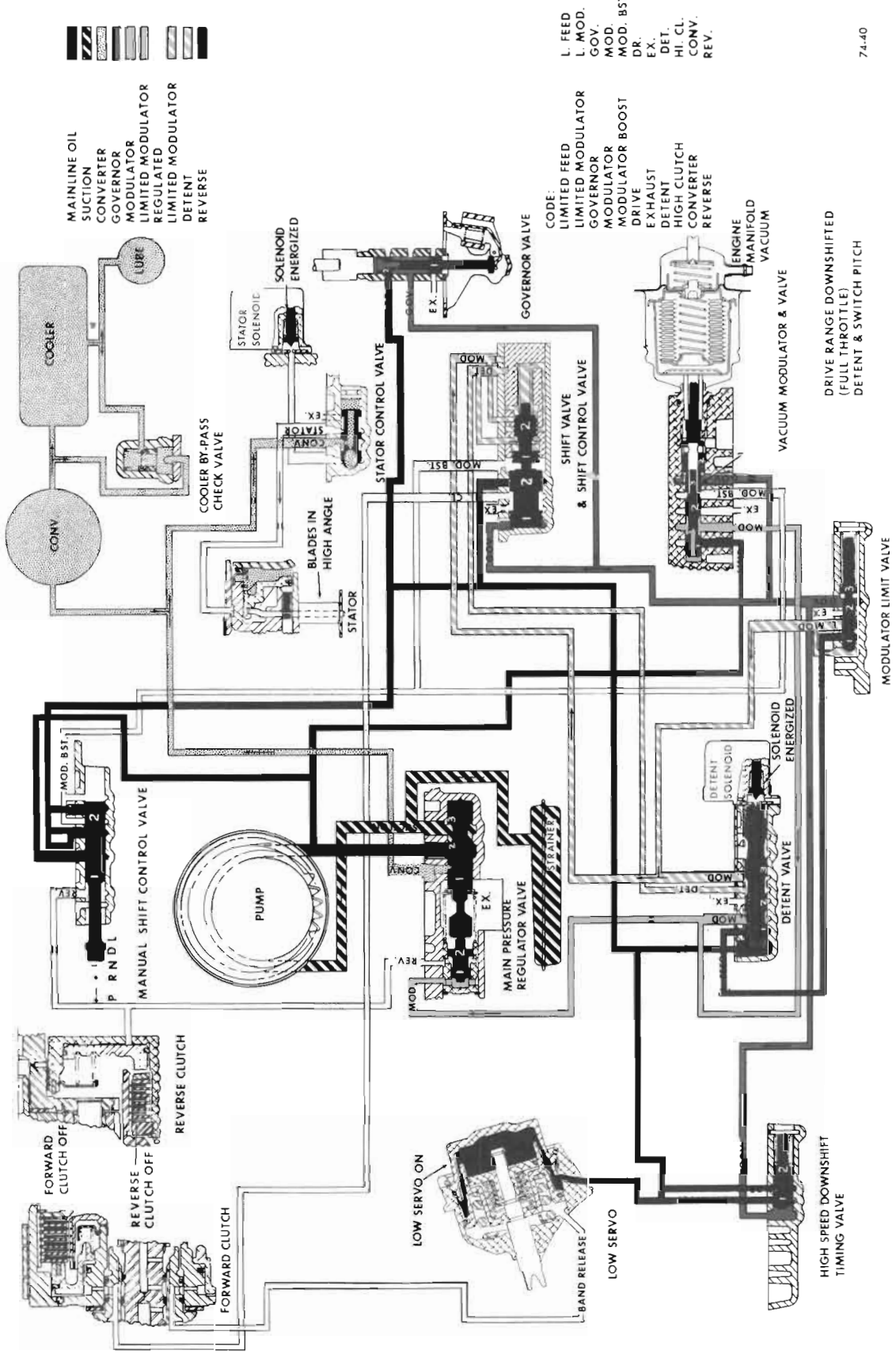

Figure 74-40—Drive Range (Full Throttle to Detent and Switch Pitch)

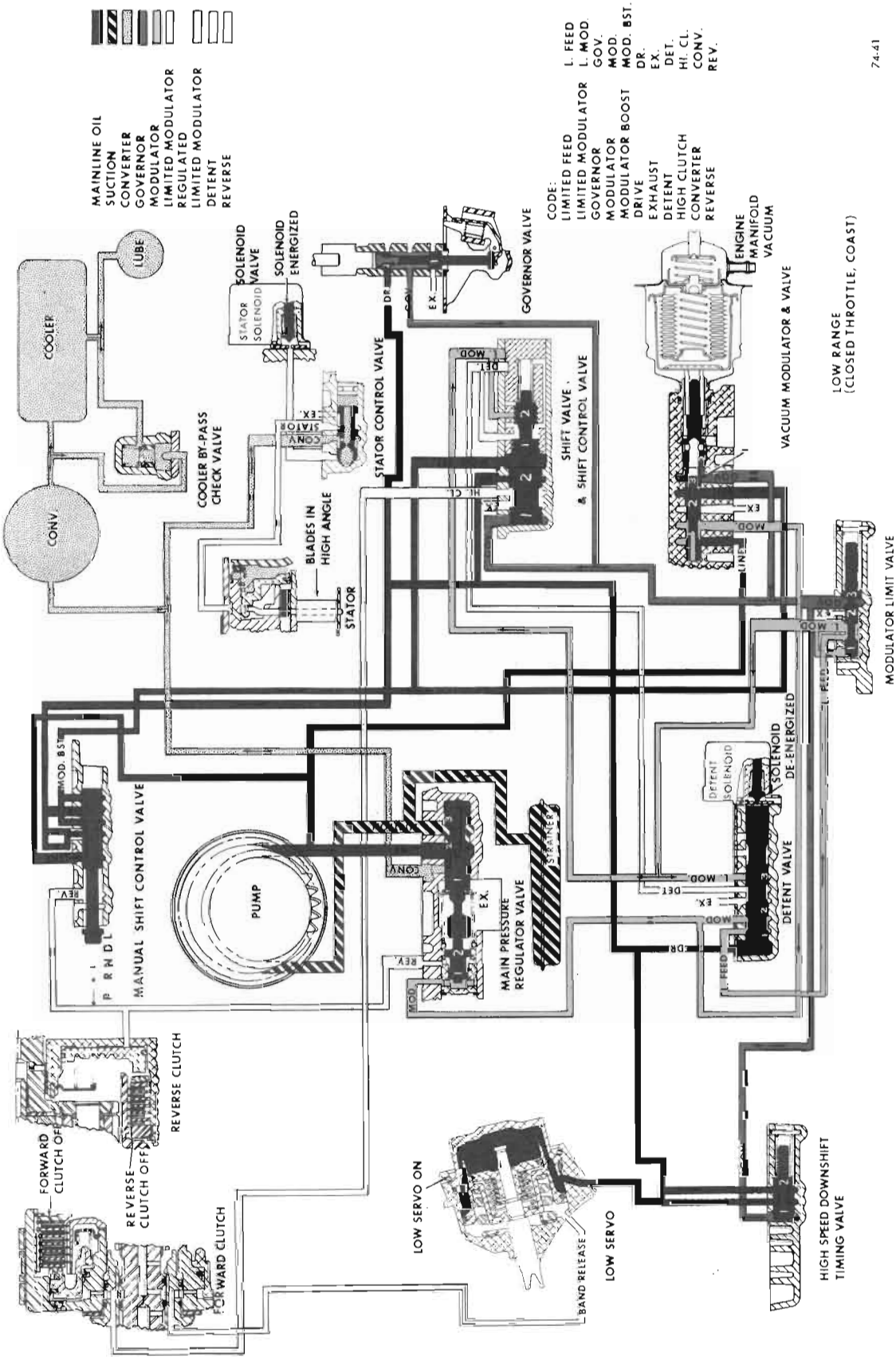

Figure 74-41—Low Range (Closed Throttle Coast)

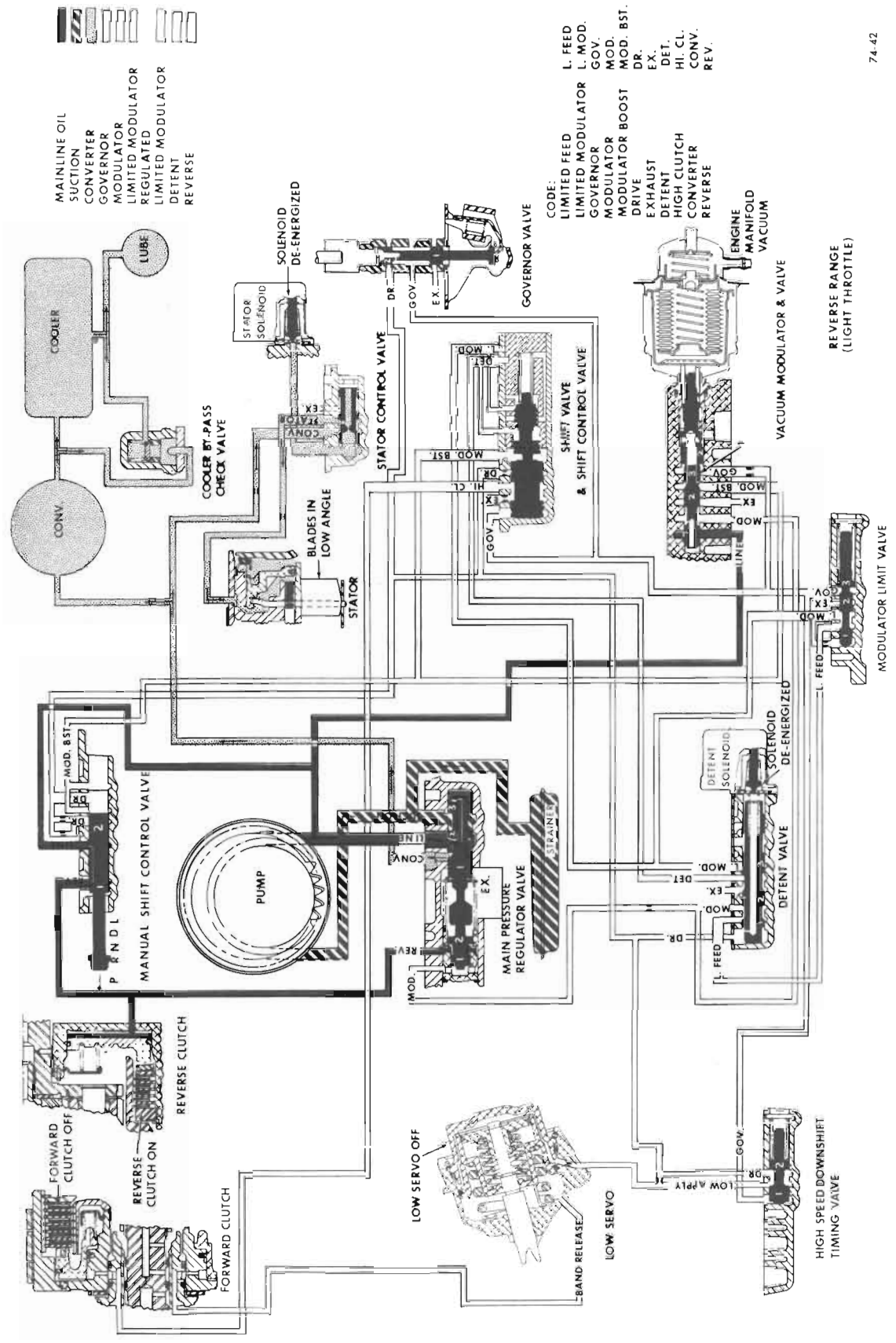

Figure 74-42—Reverse Range (Light Throttle)

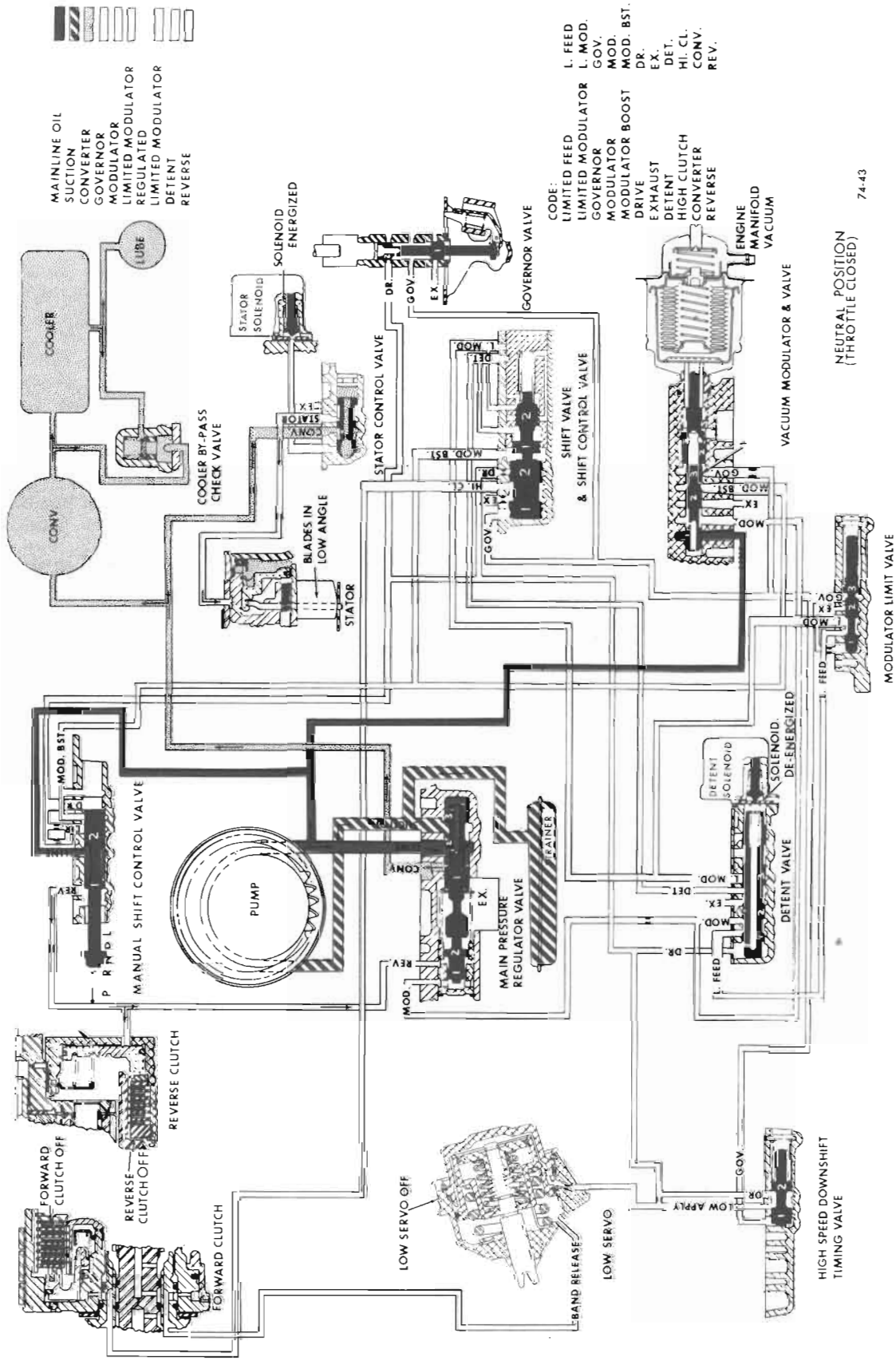

Figure 74-43—Neutral Range (Throttle Closed)

force to the area between the valve body and the first land of the valve moves the valve against its spring pressure to the bottom of its bore.

When the valve reaches the bottom of its bore it will exhaust the stator, switching the pitch to high angle. Converter pressure oil applies force to the area between the valve body and the first land of the valve keeping it at the bottom of its bore as long as the solenoid is energized.

Energization of the detent solenoid allows oil from the center of the valve to flow to exhaust. Drive oil applying force to the area between the valve body and the first land of the valve moves the valve against its spring pressure to the bottom of its bore.

During a full-throttle acceleration main line oil is directed to the modulator valve and manual shift control valve. Main line oil entering the manual shift control valve is routed into the drive oil passage and then directed to the governor valve, shift valve, detent valve, high speed down shift timing valve, and modulator limit valve, and low servo.

Main line oil directed to the modulator valve enters between the first and second lands. At low engine vacuum the vacuum modulator tends to keep the valve toward the bottom of its bore. In this position oil is delivered through a drilled passage in the valve to the space between the first land of the valve and the valve body. Oil pressure in this area plus governor pressure on the second land of the second modulator valve tend to move the valve against the force of its spring to regulate oil pressure leaving the valve.

Modulator pressure applies force to the left end of the boost valve causing it to move to the right. As the boost valve moves to the right it contacts the pressure regulator valve. This hydraulic force combined with normal spring force on the pressure regulator valve results in a higher main line pressure. With the detent valve solenoid energized, drive oil pressure will enter into the limited feed line. When limited feed pressure reaches a high enough value and exerts enough force to overcome spring pressure on the modulator limit valve, the valve will regulate governing the limited modulator and detent pressure to the shift control valve.

As higher governor pressure is reached it acts on in the area between the valve body and the first land of the high speed down shift timing valve until governor pressure overcomes spring pressure and moves the valve to the right. This movement blocks the non-restricted line, routing the servo apply oil through the restricted orifice. On a down shift this restriction of flow causes the band apply to be delayed slightly and is thus timed to the forward clutch release for a smooth down shift.

m. Operation of Hydraulic Controls in Low Range (Closed Throttle Coast)

During operation in Low range, the manual shift control valve is positioned as shown in Figure 74-41. During a closed throttle coast in low range, main line oil is directed to the modulator valve and the manual shift control valve. Main line oil entering the manual shift control valve is routed into drive oil passage and modulator boost passage. Oil routed in the drive oil passage is directed to the governor valve, shift valve, and detent valve, high speed down shift timing valve and low servo. Oil routed in the modulator boost passage is directed to the shift valve and vacuum modulator valve.

Modulator boost oil enters the shift valve between the shift valve and the shift control valve, moving the shift valve to the left and holding it in the bottom of its bore thus exhausting the forward clutch. Drive oil directed from the manual shift control valve will apply the low servo.

n. Operation of Hydraulic Controls in Reverse Range (Light Throttle)

During operation in Reverse range the manual shift control valve is positioned as shown in Figure 74-42. During light throttle in reverse, main line oil is directed to the manual shift control valve. Main line oil entering the manual shift control valve is directed to the reverse clutch and between the 1st and 2nd lands of the boost valve. Main line pressure applies a force to the 2nd land of the boost valve causing it to move to the right. As the boost valve moves to the right it contacts the pressure regulator valve. This hydraulic force combined with normal spring force on the pressure regulator valve results in a higher main line pressure needed for reverse operation. When the manual shift control valve is in reverse the forward clutch and low servo are exhausted.

o. Operation of Hydraulic Controls in Neutral Range (Closed Throttle)

During operation in Neutral range, the manual shift control valve is positioned as shown in Figure 74-43. In neutral operation main line oil entering the manual shift control valve is routed to the vacuum modulator only. In neutral operation the stator control solenoid is energized switching the pitch to high angle.

NOTE: At any closed throttle condition a switch on the throttle linkage will energize the stator control solenoid switching the pitch to high angle. By switching the pitch to high angle it will allow higher engine RPM in relation to turbine speed. With the solenoid energized the valve will bottom in its bore allowing the stator to exhaust switching the pitch to high angle.

DIVISION III
SERVICE PROCEDURES

74-8 TRANSMISSION ASSEMBLY— REMOVAL AND INSTALLATION

a. Removal

1. Raise car and provide support for front and rear of car.

2. Disconnect front exhaust crossover pipe if necessary.

3. Remove propeller shaft.

4. Place suitable jack under transmission and fasten transmission securely to jack.

5. Remove vacuum line from vacuum modulator. See Figure 74-100 and 74-101.

6. Loosen cooler line nuts and separate cooler lines from transmission. See Figure 74-102 and 74-103.

7. Remove transmission mounting pad to cross member bolts.

8. Remove transmission cross member support to frame rail bolts. Remove cross member.

9. Disconnect speedometer cable.

10. Loosen shift linkage adjusting clamp bolt. Remove cotter key, spring, and washer attaching equalizer to outer range selector lever. Remove equalizer.

11. Disconnect transmission filler pipe at engine. Remove filler pipe from transmission. See Figure 74-100 and 74-101.

12. Support engine at oil pan.

13. Remove transmission flywheel cover pan to case tapping screws. Remove flywheel cover pan.

14. Mark flywheel and converter pump for reassembly in same position, and remove three converter pump to flywheel bolts.

15. Remove transmission case to engine block bolts.

16. Move transmission rearward to provide clearance between converter pump and crankshaft. Lower transmission and move to bench.

CAUTION: Install converter holding Tool J-21366 to retain converter.

b. Installation

1. Assemble transmission to suitable transmission jack and raise transmission into position. Remove converter holding Tool J-21366. Rotate converter to permit coupling of flywheel and converter with original relationship.

2. Install transmission case to engine block bolts. Torque to 30-40 lb. ft. Do not overtighten.

3. Install flywheel to converter pump bolts. Torque to 25-35 lb. ft.

4. Install transmission cross member support. Install mounting pad.

5. Remove transmission jack and engine support.

6. Install transmission flywheel cover pan with tapping screws.

7. Install transmission filler pipe using a new "O" ring.

8. Reconnect speedometer cable.

9. Install propeller shaft.

10. Reinstall front exhaust crossover pipe if removed.

11. Install oil cooler lines to transmission. See Figure 74-102 and 74-103.

12. Install vacuum line to vacuum modulator. See Figure 74-100 and 74-101.

13. Fill transmission with oil as follows:

a. Add 4 pints of oil.

b. Start engine in neutral. DO NOT RACE ENGINE. Move manual control lever through each range.

c. Check oil level, adjust oil level to full mark on dipstick, ONLY WHEN OIL IS HOT.

74-9 PRELIMINARY INSTRUCTIONS

1. Before starting disassembly of the transmission it should be thoroughly cleaned externally to avoid getting dirt inside.

2. Place transmission on a CLEAN work bench and use CLEAN tools during disassembly. Provide CLEAN storage space for parts and units removed from transmission. An excellent working arrangement is provided by assembling the transmission to Holding Fixture J-8763. See Figure 74-104.

3. The transmission contains parts which are ground and highly polished, therefore, parts should be kept separated to avoid nicking and burring surfaces.

4. When disassembling transmission carefully inspect all gaskets at times of removal. The imprint of parts on both sides of an old gasket will show whether a good seal was obtained. A poor imprint indicates a possible source of oil leakage due to gasket condition, looseness of bolts, or uneven surfaces of parts.

5. None of the parts require forcing when disassembling or assembling transmission. Use a rawhide or plastic mallet to separate tight fitting cases - do not use a hard hammer.

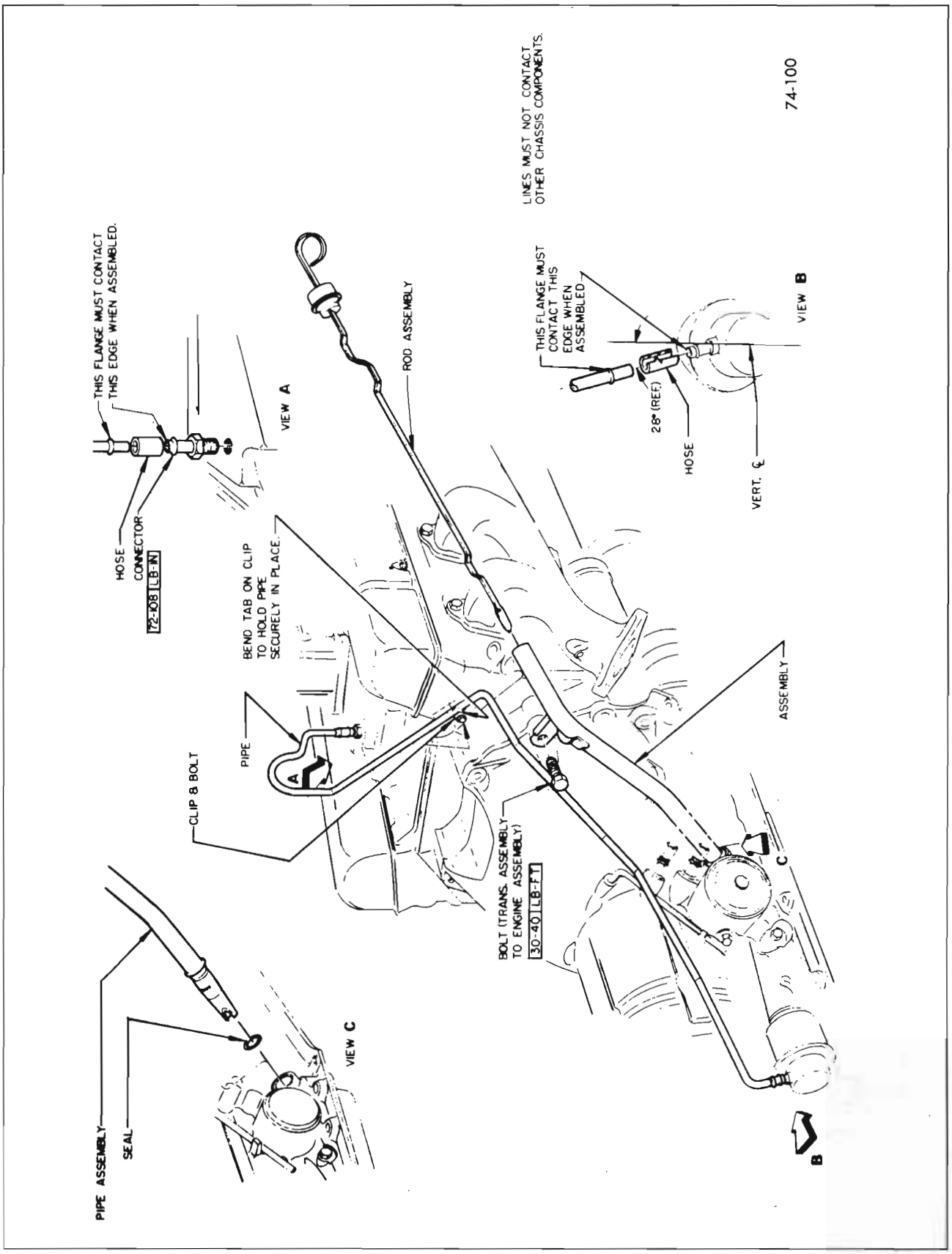

Figure 74-100—43-44000 Series

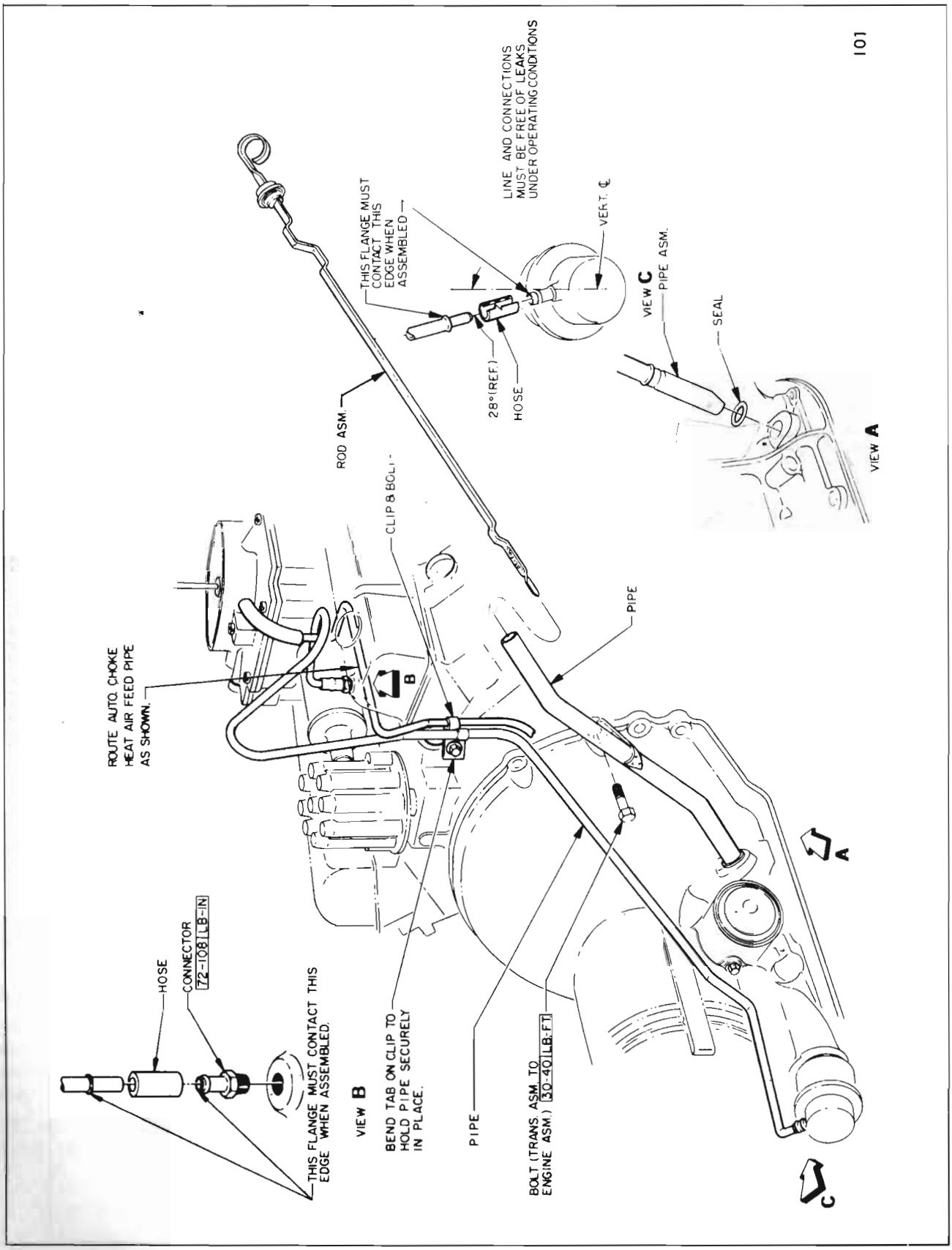

Figure 74-101—Skylark Gran Sport

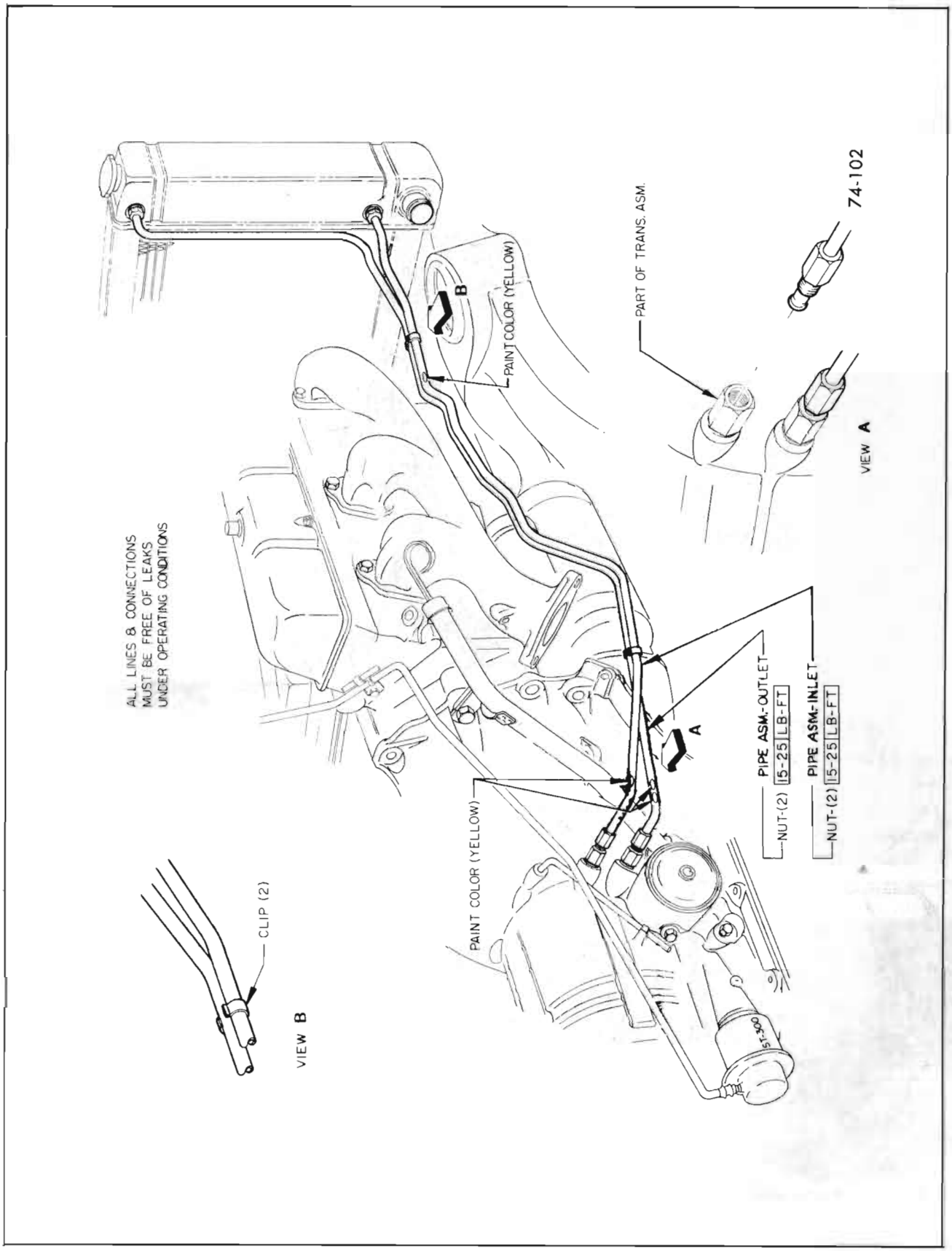

Figure 74-102—43 and 44000 Series

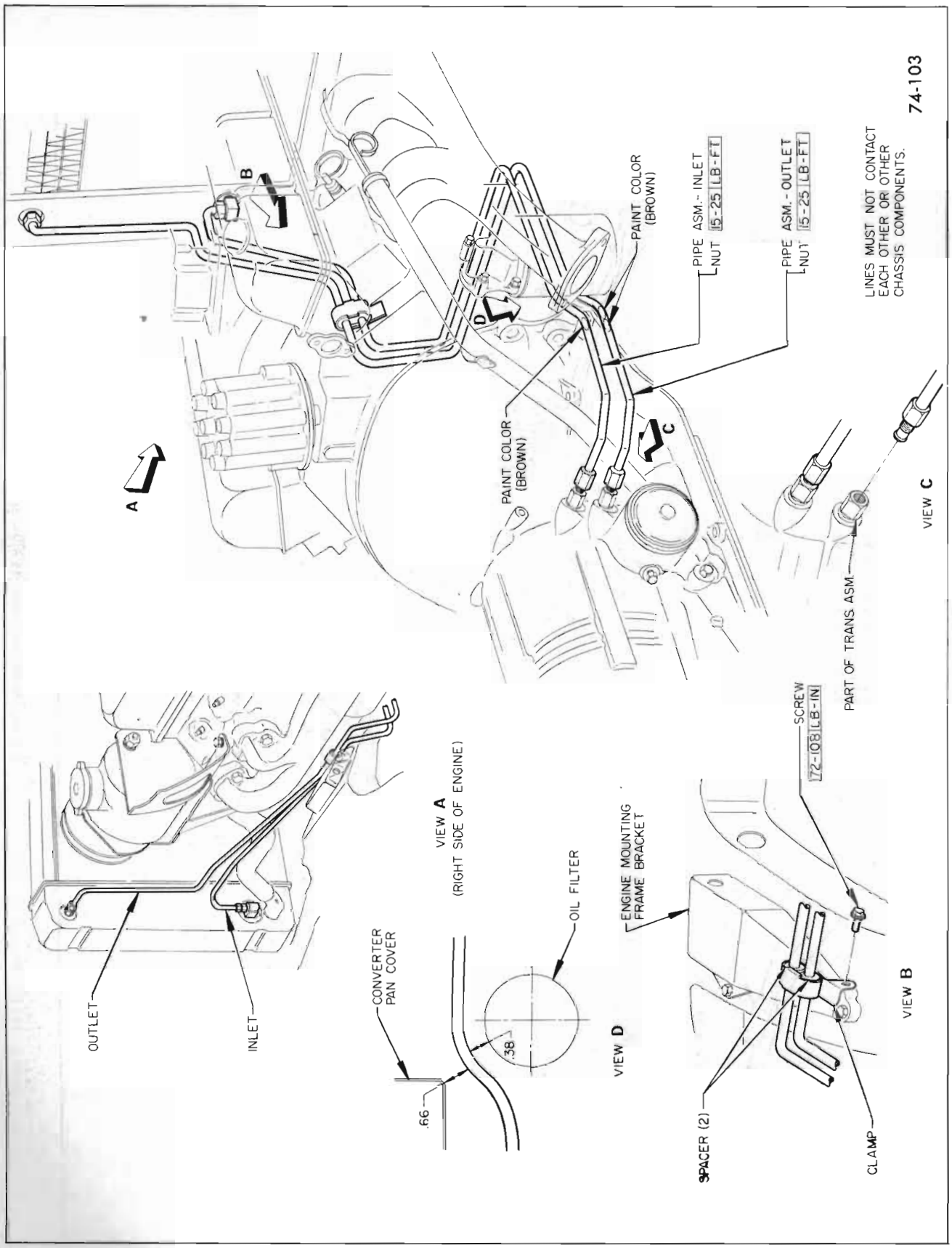

Figure 74-103—Skylark Gran Sport

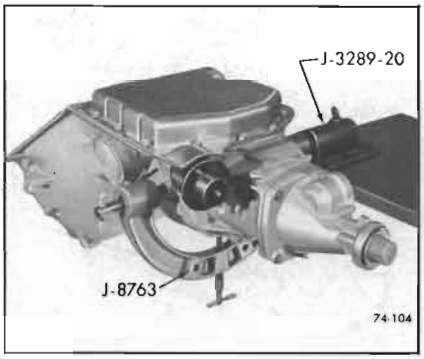

Figure 74-104

74-10 REMOVAL OF OIL PAN, OIL STRAINER, VALVE BODY, LOW SERVO COVER AND PISTON ASSEMBLY

a. Removal of Oil Pan

NOTE: Transmission need not be removed from car to perform the following operations.

1. If transmission has been removed from car, assemble transmission in Fixture J-8763. See Figure 74-104.

2. With transmission in horizontal position remove converter. See Figure 74-105.

3. Remove fourteen (14) oil pan attaching bolts. See Figure 74-106.

4. Remove oil pan and gasket from transmission. See Figure 74-107.

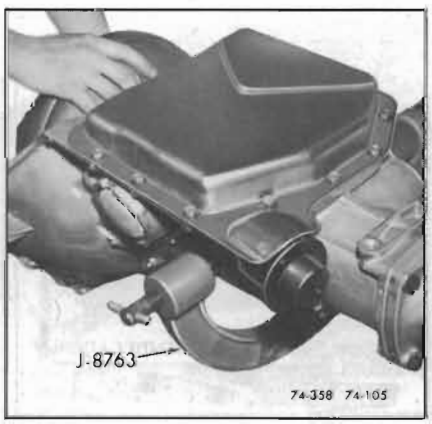

Figure 74-105

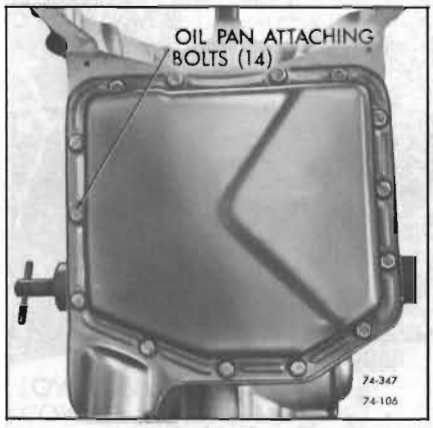

Figure 74-106

Figure 74-107

b. Removal of Oil Strainer Assembly

1. Remove the oil strainer. See Figure 74-108.

2. Remove oil strainer to case

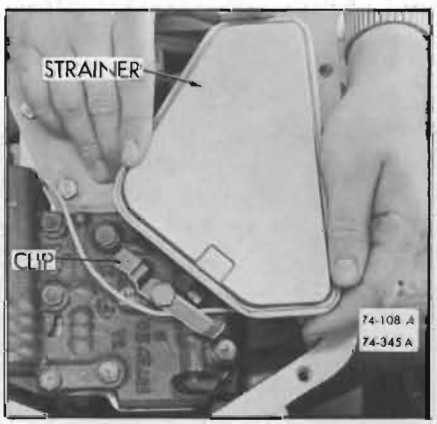

Figure 74-108

Figure 74-110

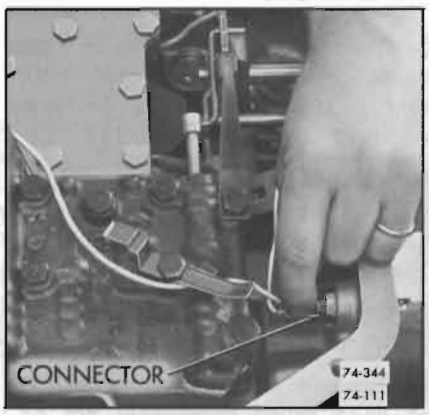

Figure 74-111

oil seal and discard. See Figure 74-110.

c. Removal of Valve Body

1. Disconnect solenoid connector from case connector. See Figure 74-111.

2. Remove stator solenoid wire from connector. See Figure 74-112.

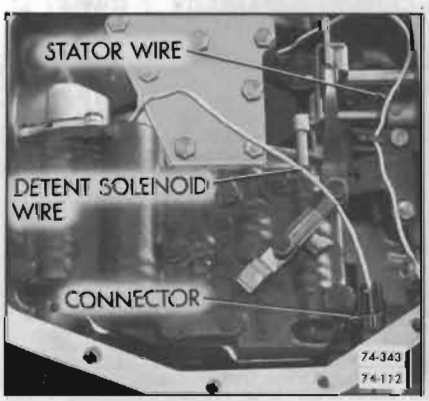

Figure 74-112

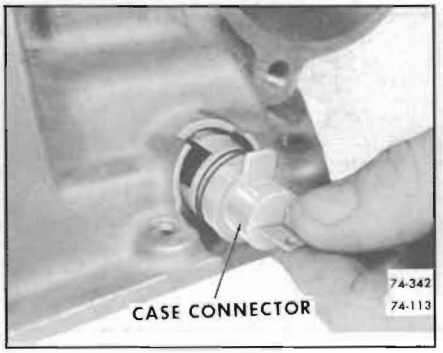

Figure 74-113

Figure 74-115

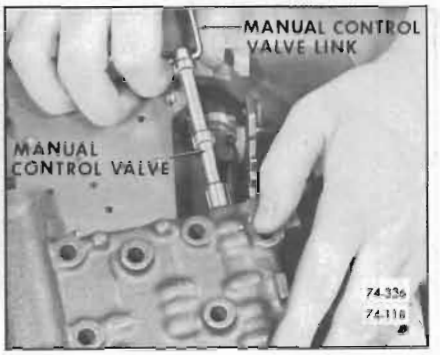

Figure 74-118

3. Remove case connector from case. Inspect connector "O" ring. If nicked, torn or worn replace. See Figure 74-113.

4. Remove spring detent assembly bolt. Remove spring detent assembly from valve body. See Figure 74-114.

5. Remove oil channel support plate. See Figure 74-115.

6. Remove eleven (11) valve body to case bolts only. Do not remove valve body. See Figure 74-116.

7. Remove manual control valve link by rotating valve body in a counterclockwise direction to remove link from Park lock and range selector inner valve. See Figure 74-117.

8. Remove manual control valve and link from valve body assembly. Remove valve body. See Figure 74-118.

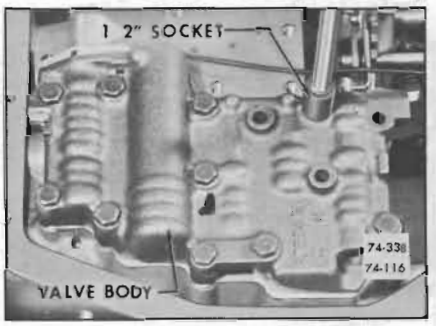

Figure 74-116

9. Remove valve body plate. See Figure 74-120.

NOTE: LJ models have two identification notches and NK models have three notches. See Figure 74-121.

10. Remove valve body plate to case gasket. See Figure 74-122.

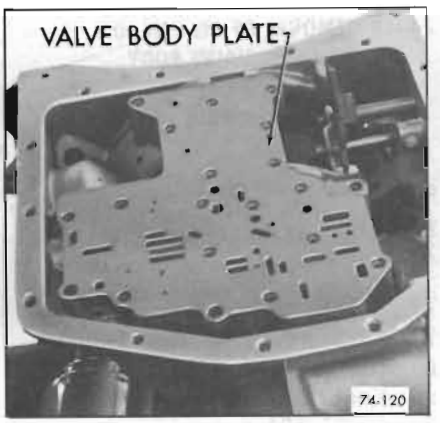

Figure 74-120

d. Removal of Low Servo Cover and Piston Assembly

1. Release tension on low band adjusting screw retaining nut. Release tension on low band by turning adjusting screw in a counterclockwise direction. Use a

Figure 74-114

Figure 74-117

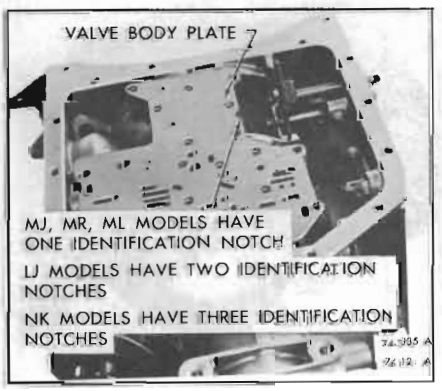

Figure 74-121

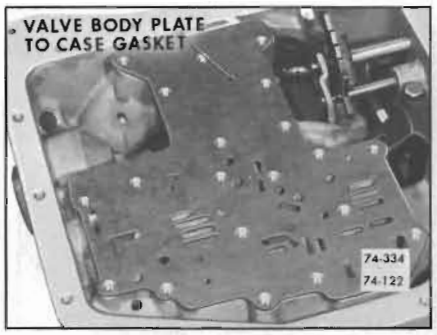

Figure 74-122

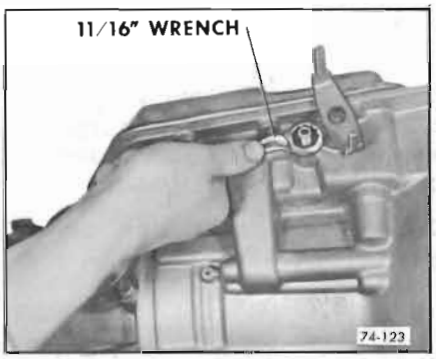

Figure 74-123

7/32" Allen Wrench. See Figure 74-123.

2. Remove low servo cover snap ring. Use Tool J-22269 to compress servo cover so snap ring can be removed. See Figure 74-124.

3. Remove Tool J-22269 from case. Remove low servo cover. See Figure 74-125.

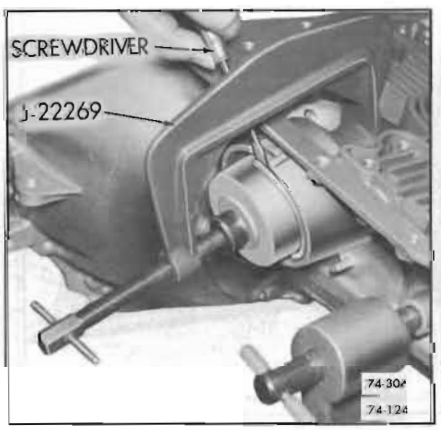

Figure 74-124

Figure 74-125

NOTE: If low servo cover has to be replaced make certain all model information is stamped on new cover.

4. Inspect low servo cover seal. If nicked, torn or worn discard. See Figure 74-126.

5. Remove low servo piston assembly from case. See Figure 74-127.

NOTE: When removing low servo cover take extreme care not to disturb low band apply strut.

74-11 REMOVAL OF OIL PUMP, FORWARD CLUTCH, AND LOW BAND

a. Removal of Oil Pump

1. With transmission in vertical position, remove eight (8) pump

Figure 74-126

Figure 74-127

attaching bolts with "O" ring seals, then install Slide Hammers J-7004 into threaded holes in pump and tighten jam nuts. Using slide hammers, loosen pump from case. Remove pump from case. Remove pump and gasket from case. See Figure 74-128.

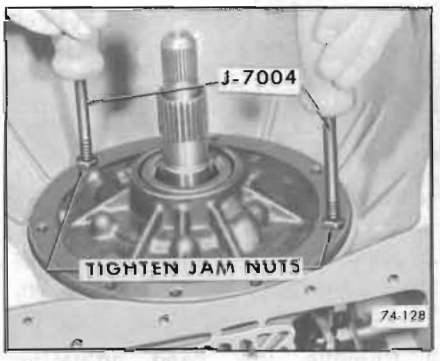

Figure 74-128

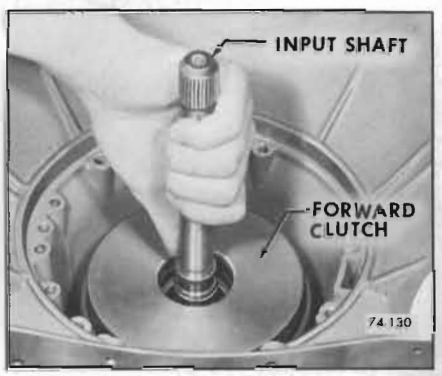

Figure 74-130

Figure 74-131

b. Removal of Forward Clutch

1. Remove input shaft from forward clutch drum. See Figure 74-130.

2. Examine input shaft oil rings. If nicked or worn, remove rings. See Figure 74-131.

3. Remove forward clutch assembly by pulling straight out of case. Make certain low band has been released before attempting to remove forward clutch. See Figure 74-132.

c. Removal of Low Band

1. Remove low band and struts from inside case. See Figure 74-133.

2. Remove low band adjusting screw. See Figure 74-134.

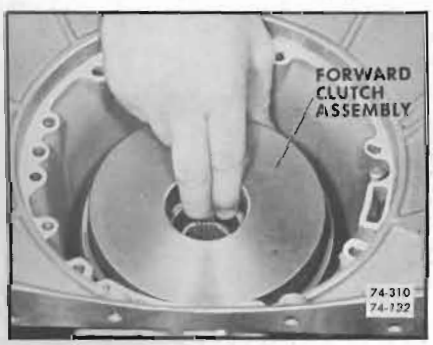

Figure 74-132

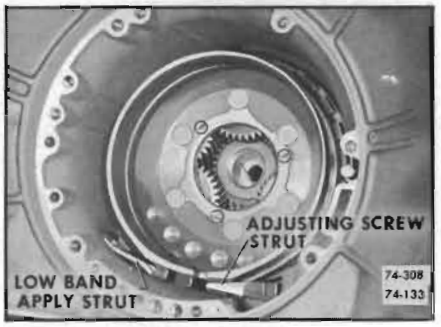

Figure 74-133

Figure 74-134

74-12 REMOVAL OF SPEEDOMETER DRIVEN GEAR, REAR BEARING RETAINER, RETAINER OIL SEAL, RETAINER BUSHING, AND GOVERNOR

a. Removal of Speedometer Driven Gear

NOTE: Transmission need not be removed from car to perform the following operations.

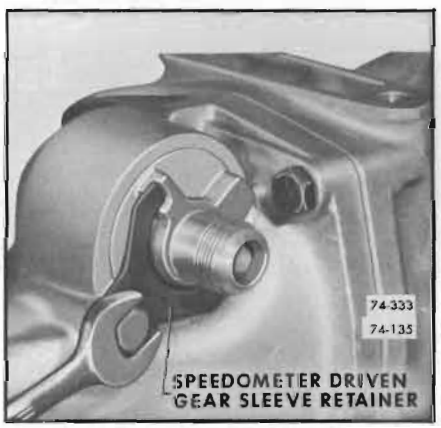

Figure 74-135

Figure 74-136

1. With transmission in a horizontal position, remove speedometer driven gear sleeve retainer. See Figure 74-135.

2. Remove speedometer driven gear sleeve. See Figure 74-136.

b. Removal of Rear Bearing Retainer

1. Remove four (4) rear bearing retaining bolts. Remove rear bearing retainer from case. See Figure 74-137.

2. Remove rear bearing retainer oil seal. See Figure 74-138.

c. Removal of Rear Bearing Retainer Oil Seal

1. Inspect and if necessary remove output shaft to rear bearing retainer oil seal. See Figure 74-140.

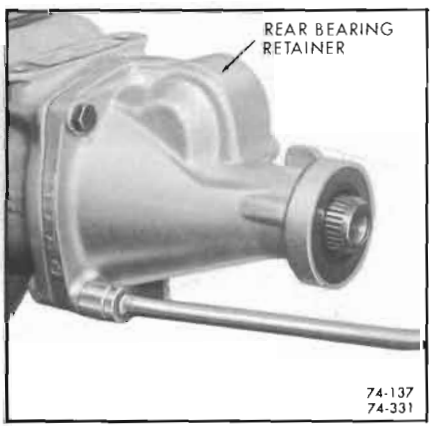

Figure 74-137

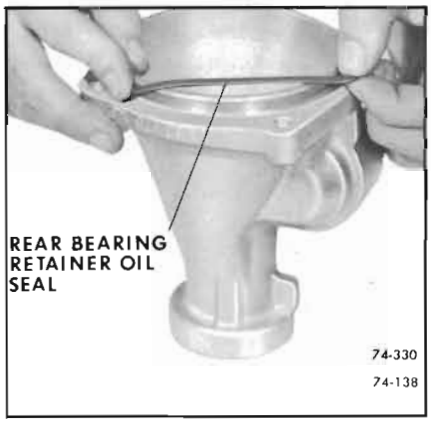

Figure 74-138

d. Removal of Rear Bearing Retainer Bushing

1. Inspect and if necessary replace rear bearing retainer bushing. Place screwdriver in notch in rear bearing retainer, then tap screwdriver with hammer to collapse bushing. See Figure 74-141.

e. Removal of Governor

1. Remove three (3) attaching bolts retaining governor cover to case. Remove cover and gasket. See Figure 74-142.

2. With a twisting motion slide governor assembly out of its bore in case. See Figure 74-143.

Figure 74-141

74-13 REMOVAL OF SPEEDOMETER DRIVE GEAR AND VACUUM MODULATOR

a. Removal of Speedometer Driving Gear

1. Depress retainer clip, then slide gear off output shaft. See Figure 74-144.

b. Removal of the Vacuum Modulator Assembly

1. Remove vacuum modulator retainer bolt and retainer. Remove vacuum modulator and valve assembly. See Figure 74-145.

Figure 74-143

Figure 74-144

2. Inspect and if necessary remove vacuum modulator to case oil seal. See Figure 74-146.

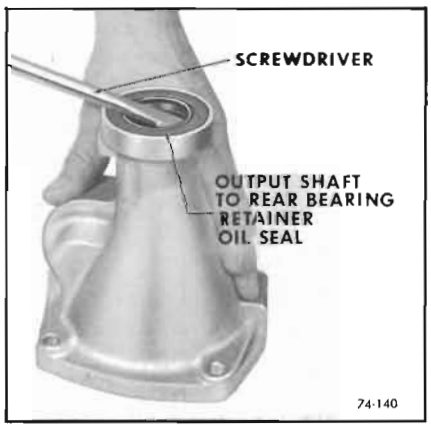

Figure 74-140

Figure 74-142

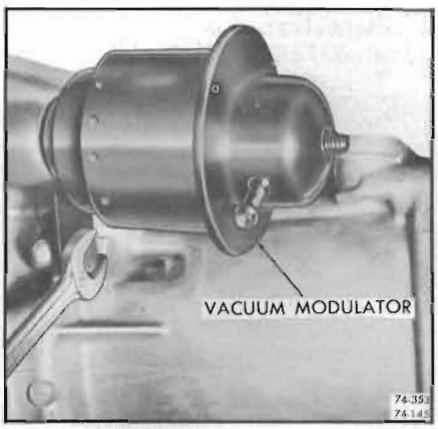

Figure 74-145

Figure 74-146

74-14 REMOVAL OF PLANETARY GEAR SET, REVERSE CLUTCH AND PARKING LOCK MECHANISM

a. Removal of Planetary Gear Set

1. Remove planet carrier assembly from case, using care not to damage case bushing. See Figure 74-147.

2. Remove reverse ring gear from case. See Figure 74-148.

3. Remove needle bearing and two (2) bearing races from rear of planet carrier. See Figure 74-150.

b. Removal of Reverse Clutch

1. Place transmission in vertical position and remove reverse

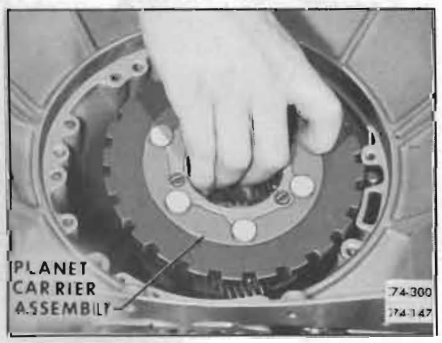

Figure 74-147

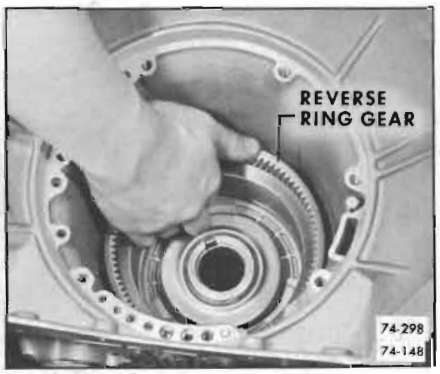

Figure 74-148

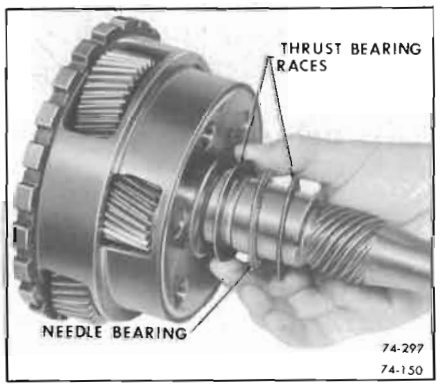

Figure 74-150

clutch pack snap ring with screwdriver. See Figure 74-151.

2. Lift reverse clutch pressure plate from transmission case. See Figure 74-152.

3. Remove reverse clutch pack from transmission case. See Figure 74-153.

4. To remove reverse piston, center Tool J-21420-1 on reverse clutch piston return seat. Install J-21420-2 over threaded shaft at

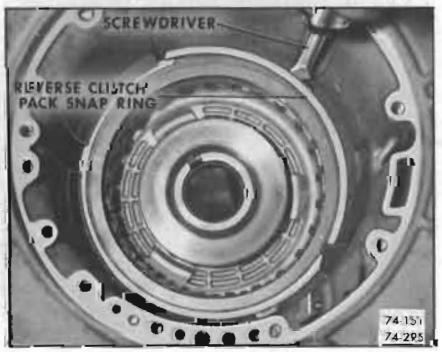

Figure 74-151

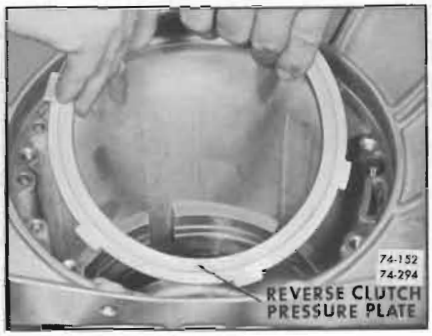

Figure 74-152

rear of case. Tighten wing nut to compress piston seat; then remove snap ring with Pliers J-5586. See Figure 74-154.

5. Remove Tool J-21420-2 being careful that piston seat does not catch in snap ring groove. Lift off piston seat and remove seventeen (17) piston return springs. See Figure 74-155.

6. Place transmission in a horizontal position and remove reverse clutch piston with compressed air. As air is applied to

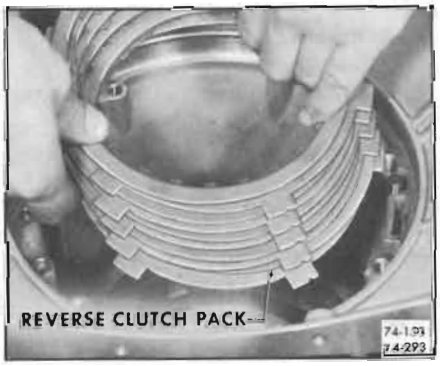

Figure 74-153

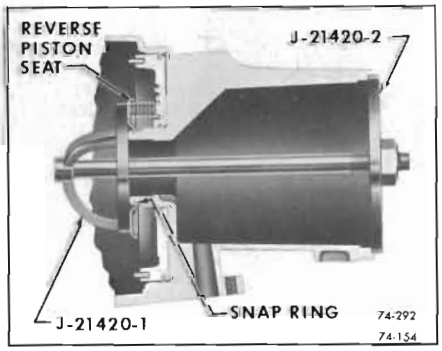

Figure 74-154

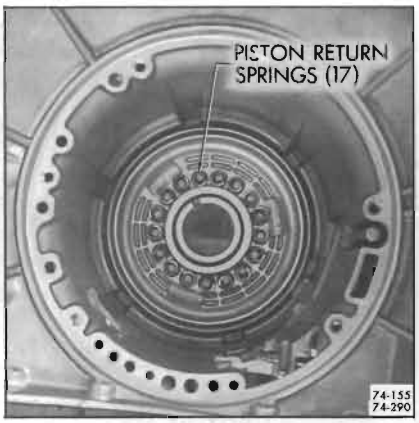

Figure 74-155

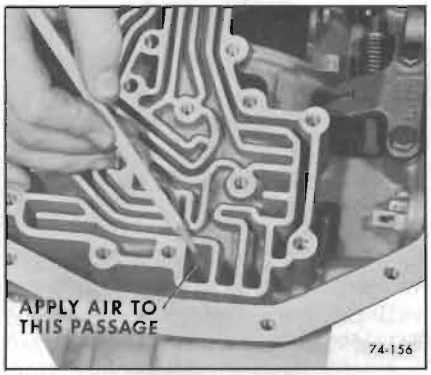

Figure 74-156

the rear surface of the piston, it will pop out far enough so it can be removed. Insert air nozzle to rear of case as shown in figure. See Figure 74-156.

Figure 74-157

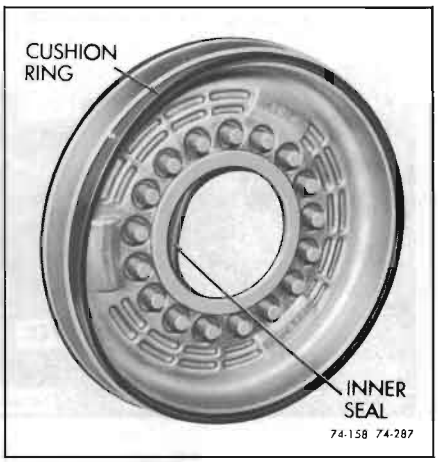

Figure 74-158

7. Examine reverse clutch piston outer seal. If nicked, torn or worn, remove seal. See Figure 74-157.

8. Examine reverse clutch piston inner seal and cushion ring. If nicked torn or worn, remove. See Figure 74-158.

c. Removal of Range Selector Lever and Shaft, and Parking Lock Actuator

1. Remove two (2) parking lock bracket bolts. Remove parking lock bracket. See Figure 74-160.

2. Remove range selector shaft retainer. See Figure 74-161.

3. Fully loosen nut that retains outer range selector lever to inner park lock and range selector lever. See Figure 74-162.

Figure 74-160

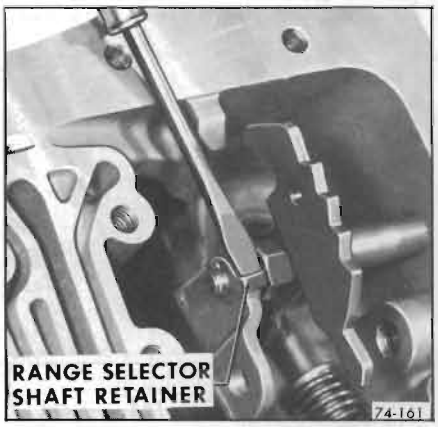

Figure 74-161

4. Slide outer range selector lever out of case. Remove nut, inner park lock and range selector lever. See Figure 74-163.

Figure 74-162

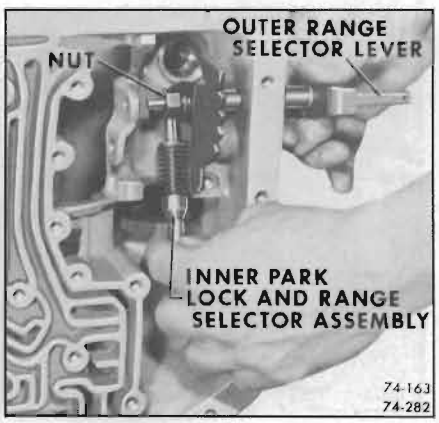

Figure 74-163

Figure 74-164

5. Remove retaining ring which holds inner park lock and range selector to park lock assembly. See Figure 74-164.

6. Slide parking lock pawl shaft out of parking lock pawl. Remove parking lock pawl and spring. See Figure 74-165.

Figure 74-165

Figure 74-166

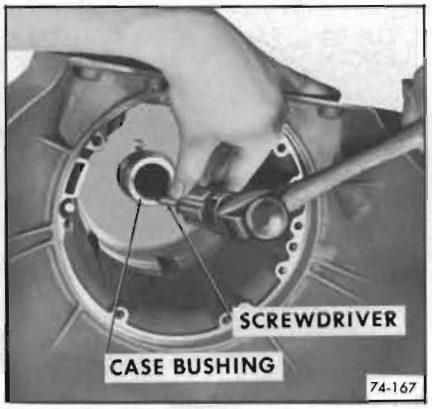

Figure 74-167

7. Examine outer shift lever oil seal. If nicked, torn or worn, replace seal. See Figure 74-166.

d. Removal of Case Bushing

1. Inspect case bushing for nicks, scoring or excessive wear. If damaged, remove as follows: Place screwdriver in notch in case, then tap screwdriver with hammer to collapse bushing. Remove bushing. See Figure 74-167.

74-15 VALVE BODY DISASSEMBLY, INSPECTION AND REASSEMBLY

a. Disassembly

NOTE: Transmission need not be removed from car to perform the following operations.

1. Remove two (2) bolts attaching detent solenoid. Remove solenoid,

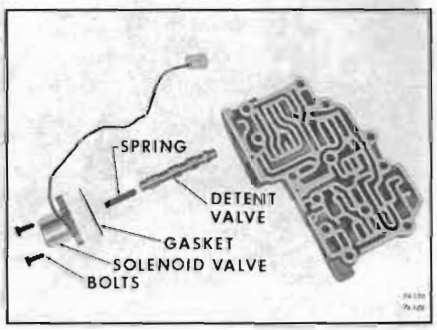

Figure 74-168

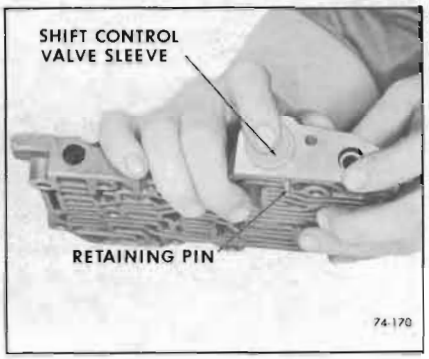

Figure 74-170

solenoid gasket, spring and detent valve. See Figure 74-168.

2. Depress shift control valve sleeve and remove retaining pin. Remove shift control valve sleeve, retainer shift control valve, spring, washer, and shift valve. See Figure 74-170.

3. Depress modulator limit spring with Tool J-21547-1. Turn valve body over and retaining pin will fall free. Remove spring and valve. See Figure 74-171.

NOTE: Modulator limit spring is under moderate pressure. Care should be exercised in removal.

4. Depress high speed down shift timing valve plug and remove pin by turning valve body over so pin will fall free. See Figure 74-172.

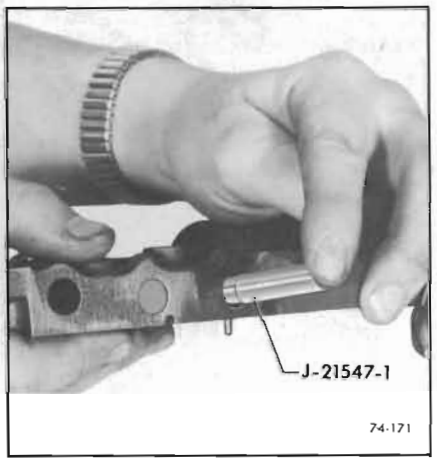

Figure 74-171

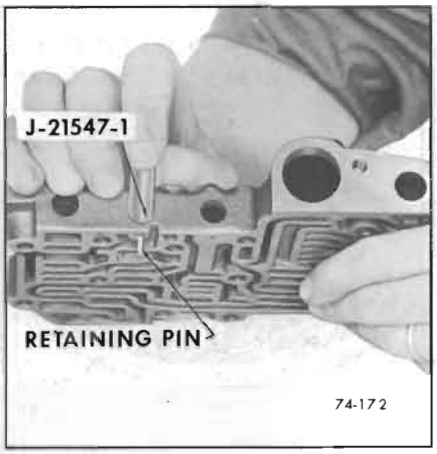

Figure 74-172

b. Inspection

1. Thoroughly clean all valves and valve body in solvent. Inspect valves and valve body for evidence of wear or damage due to foreign material. Dry valve body and valves with clean air blast.

2. Test each valve in its bore. All valves must move freely of their own weight.

c. Reassembly of Valve Body

1. Install high speed down shift timing valve and spring. Depress spring with J-21547-1 and install retaining pin. See Figure 74-173.

2. Install modulator limit valve, and spring into bore of valve body. With aid of Tool J-21547-1 compress spring and install retaining pin. See Figure 74-174.

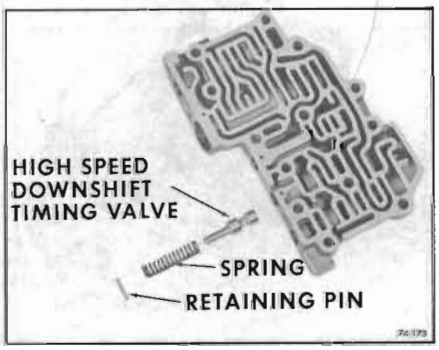

Figure 74-173

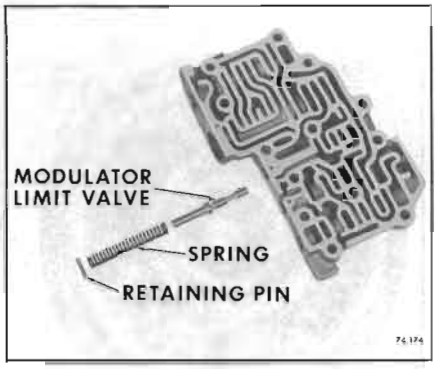

Figure 74-174

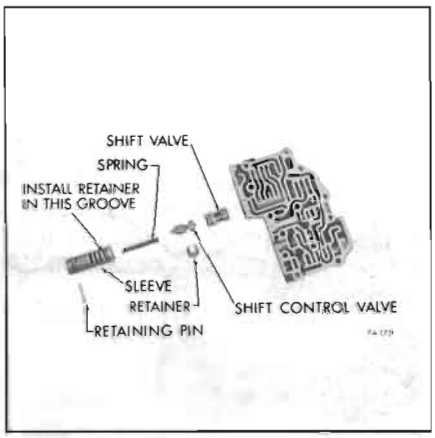

Figure 74-175

3. Install spring and shift control valve into sleeve. Depress spring and valve and insert retainer in groove as shown in Figure 74-175. Install shift valve and sleeve assembly.

4. Install detent valve and spring. Install gasket to solenoid with notch facing bottom of valve body. Install solenoid to valve body using two 7/16" bolts. See Figure 74-176.

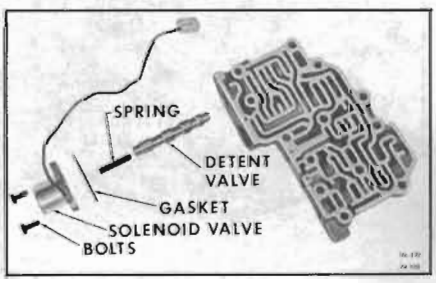

Figure 74-176

Figure 74-177

74-16 LOW SERVO DISASSEMBLY AND REASSEMBLY

a. Disassembly

1. Remove secondary piston seal. See Figure 74-177.

2. Compress primary piston using J-22269 and remove Truarc snap ring. Release J-22269. See Figure 74-178.

Remove primary piston, springs; apply pin and washer from secondary piston assembly. See Fig-74-180.

3. If necessary remove steel oil seal ring from primary piston.

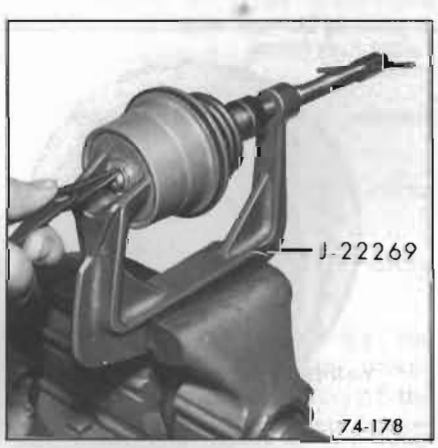

Figure 74-178

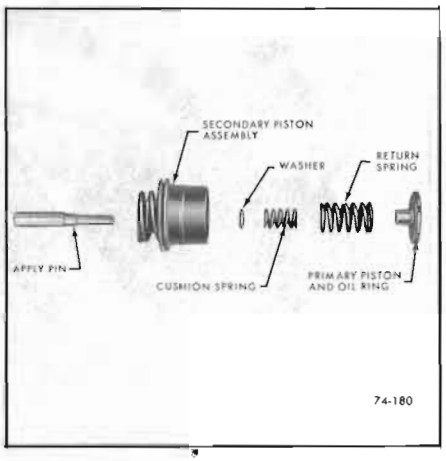

Figure 74-180

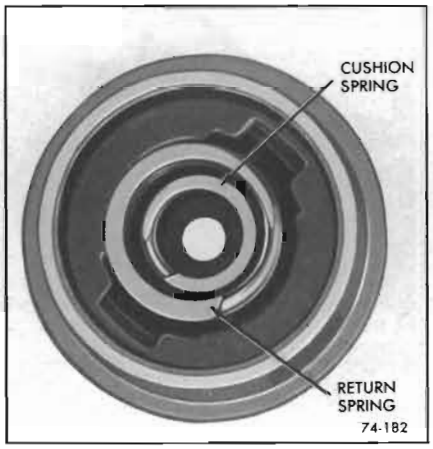

Figure 74-182

Figure 74-185

b. Reassembly

1. Install washer into secondary piston assembly. See Figure 74-181.

2. Install cushion and return springs into secondary piston assembly. See Figure 74-182.

3. Install primary piston. Install hose clamp around steel oil seal ring. Compress piston using J-22269. Install new retaining Truarc ring. See Figure 73-183.

74-17 DISASSEMBLY, INSPECTION, AND REASSEMBLY OF THE OIL PUMP

a. Disassembly

1. Remove stator solenoid. See Figure 74-184.

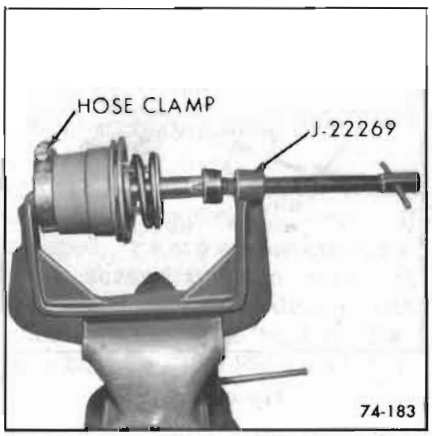

Figure 74-183

2. Remove the two (2) hook type oil sealing rings from pump hub. See Figure 74-185.

3. Remove pump cover to forward clutch drum thrust washer. See Figure 74-186.

Figure 74-186

4. Remove oil pump to case seal and discard. See Figure 74-187.

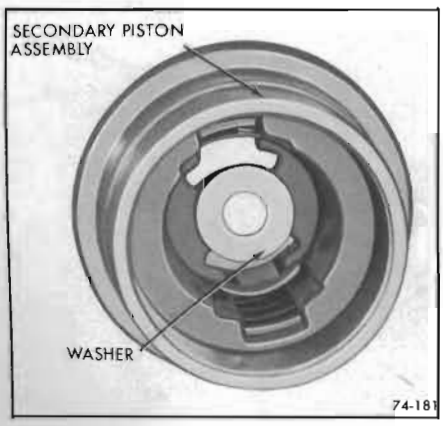

Figure 74-181

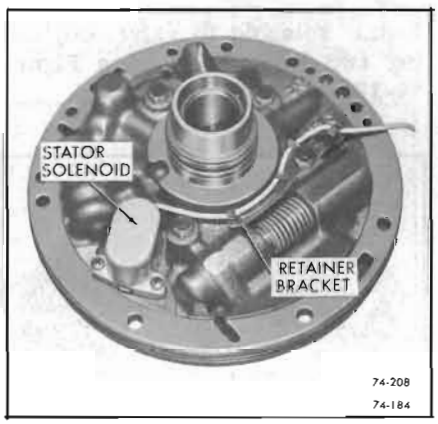

Figure 74-184

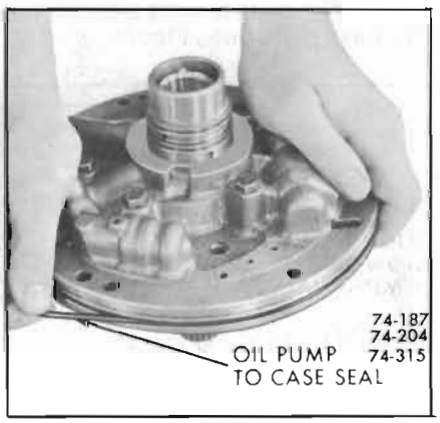

Figure 74-187

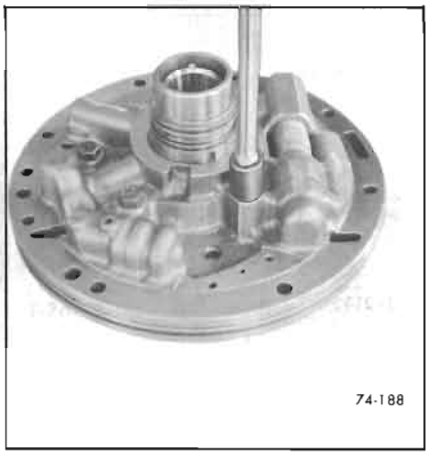

Figure 74-188

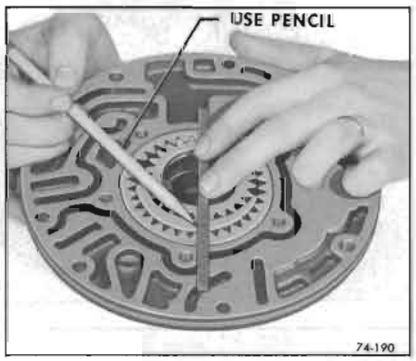

Figure 74-190

5. Support oil pump on wood blocks. Remove five (5) pump cover bolts. Remove pump cover. See Figure 74-188.

6. Mark, but do not scar, gear faces so gears can be reassembled in same position. See Figure 74-190.

7. Remove oil pump drive gear. See Figure 74-191.

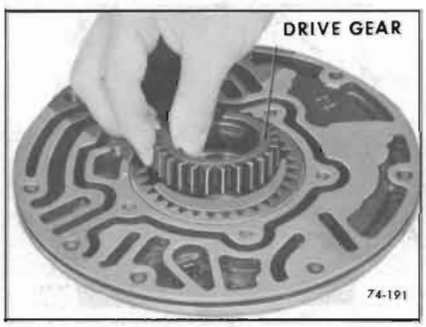

Figure 74-191

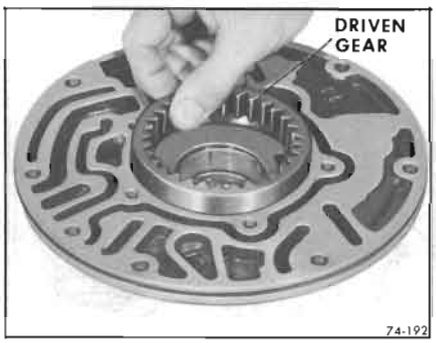

Figure 74-192

8. Remove oil pump driven gear. See Figure 74-192.

9. Remove seat, valve and spring from cooler by-pass valve. Use Tool J-21361 to remove seat from bore in pump cover. See Figure 74-193.

10. Compress boost valve sleeve with thumb and remove retaining snap ring. See Figure 74-194.

CAUTION: Reverse and modulator boost valve sleeve is under extreme spring pressure. Extreme care should be taken after retaining snap ring has been removed.

11. After retaining snap ring has been removed, remove boost valve sleeve and valve, spring, washer, and pressure regulator valve. See Figure 74-195.

12. Remove stator valve and spring. See Figure 74-195.

13. Examine oil pump seal. If nicked, torn or worn remove seal as follows: Support oil pump body

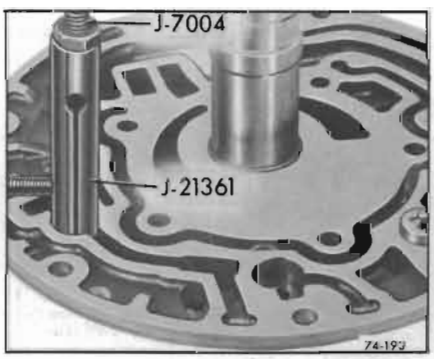

Figure 74-193

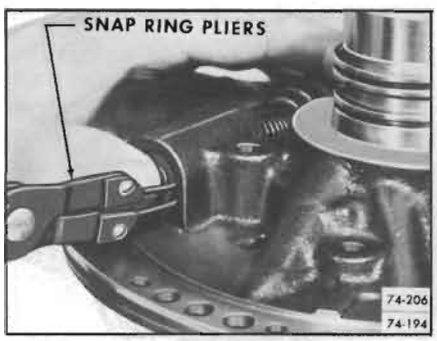

Figure 74-194

on wood blocks. Remove oil seal with a screwdriver and discard. See Figure 74-196.

14. Check oil pump bushing for nicks, severe scoring or wear. If bushing replacement is necessary remove as follows: Support pump on wood blocks using Tool J-21465-17 and Drive Handle J-8092. Press bushing out of pump body. See Figure 74-197.

15. Check stator shaft bushing for nicks, severe scoring or wear. If bushing replacement is necessary remove as follows: Assemble Bushing Remover J-21424-7 to Extension J-21465-13. Assemble this assembly to Drive Handle J-8092. Grasp stator shaft with hand using other hand and assembled tools drive out bushing. See Figure 74-198.

b. Inspection

1. Wash all parts in a cleaning solvent and blow out oil passages with compressed air.

NOTE: Make certain cooler by-pass valve is clean.

2. Inspect pump gears for nicks or damage.

3. Inspect pump body for nicks or scoring.

4. With parts clean and dry, install pump gears, noting mark on gears for identification of the side that faces the pump cover. After gears have been installed, proceed as follows:

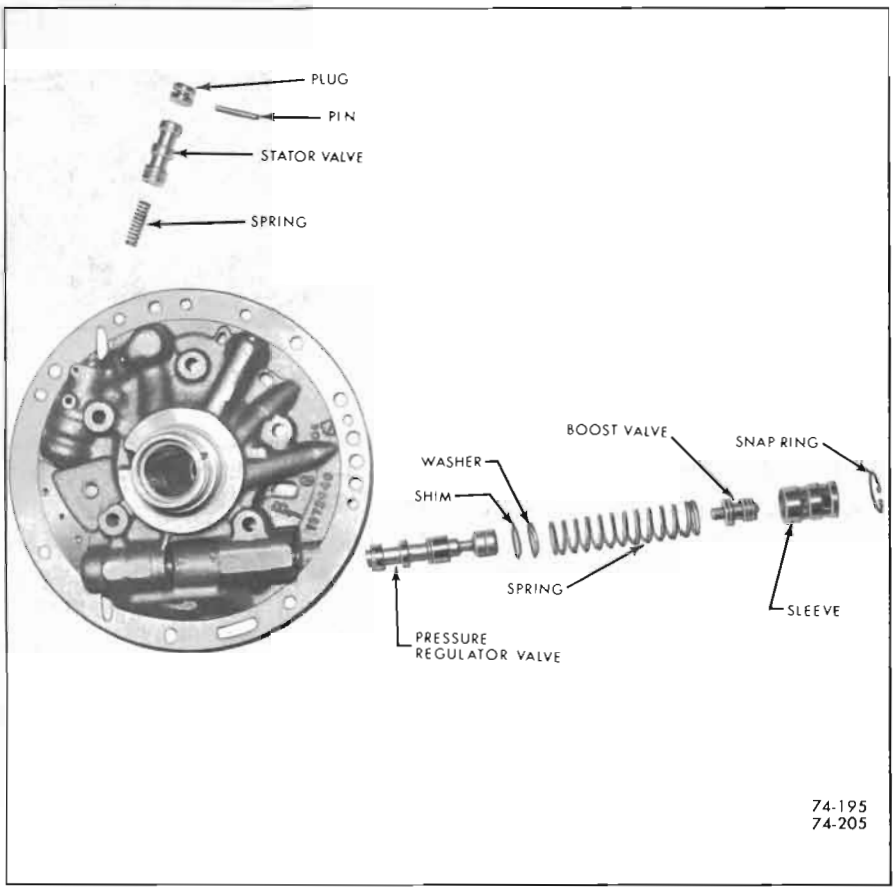

Figure 74-195

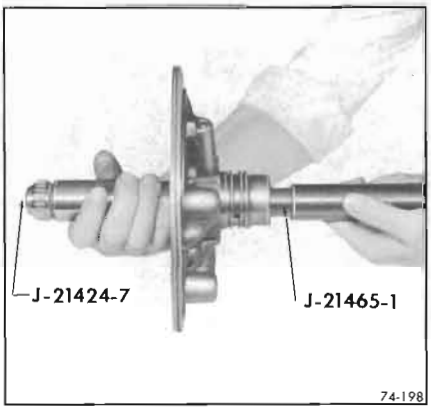

Figure 74-198

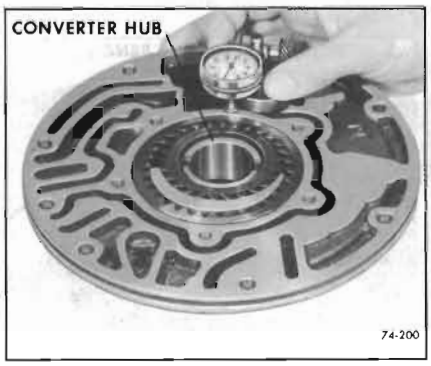

Figure 74-200

a. Install pump on converter hub. With dial indicator set check end clearance. The clearance allowed is .0005/.0035. See Figure 74-200.

c. Reassembly

1. Using Tool J-21465-17 press new bushing into pump body. Press until it is flush with top of pump hub. See Figure 74-201.

2. Install stator shaft bushing as follows: Support pump assembly on J-21424-3 before installing bushing. Install bushing into the front end of stator shaft. Using Installer J-2142-7 and Drive Handle J-8092 tap bushing into shaft until it bottoms in counterbore. See Figure 74-202.

NOTE: Extreme care must be taken so bushing is not driven past counterbore.

3. Using Installer J-21359 tap in new oil seal. See Figure 74-203.

4. Install new oil pump to case seal. See Figure 74-204.

5. Assemble pressure regulator

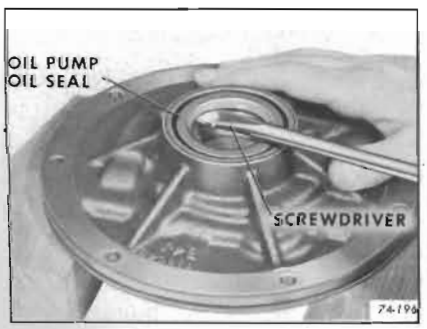

Figure 74-196

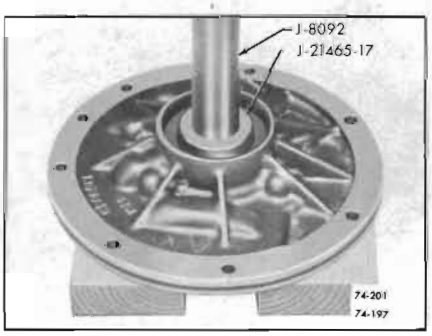

Figure 74-197

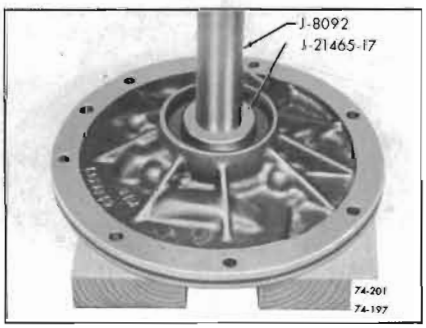

Figure 74-201

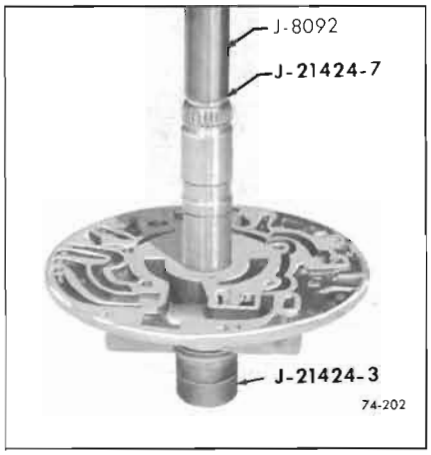

Figure 74-202

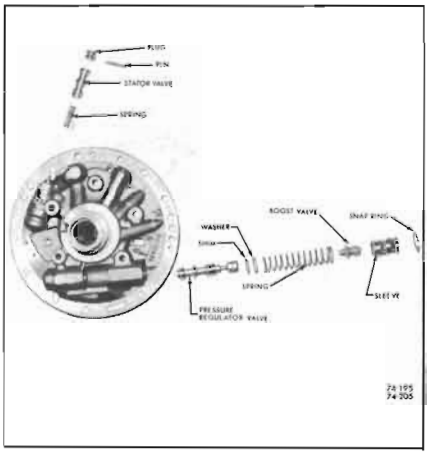

Figure 74-205

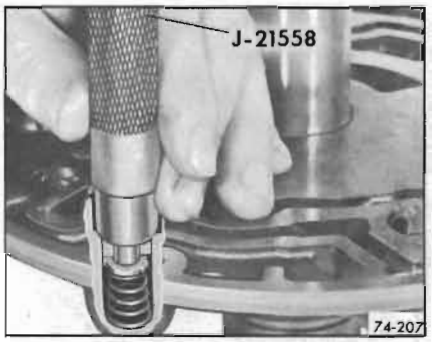

Figure 74-207

Figure 74-203

valve, washer, spring, reverse and modulator boost valve and sleeve. See Figure 74-205.

When installing spring and shim make certain the same springs and the proper number of shims are installed.

Color of Spring	Number of Shims
Yellow	None
Blue	One
Green	Two

Actual number of shims may vary to meet production standards.

6. Install stator valve and spring. See Figure 74-205.

7. Compress boost valve sleeve with thumb, then install retaining snap ring. See Figure 74-206.

8. Install spring, valve, and seat into cooler by-pass valve. Using Tool J-21558 press seat into bore of pump body until tool bottoms on face of pump. See Figure 74-207.

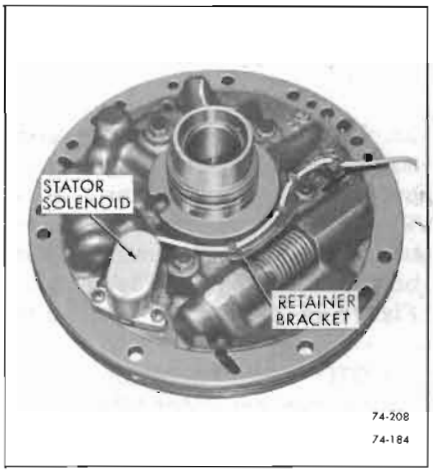

Figure 74-208

NOTE: Thrust washer and oil pump sealing ring will be installed later.

9. Install stator solenoid. See Figure 74-208.

Figure 74-204

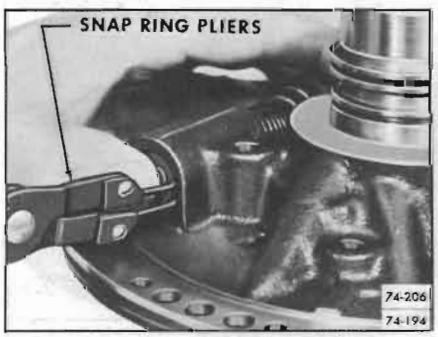

Figure 74-206

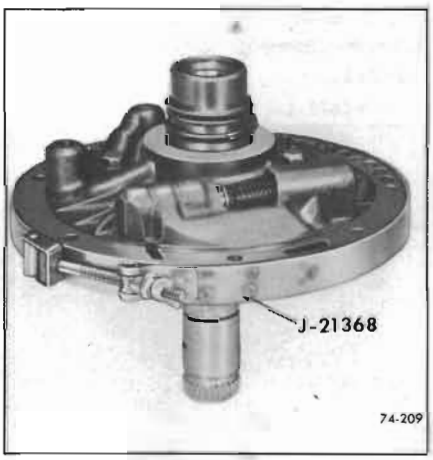

Figure 74-209

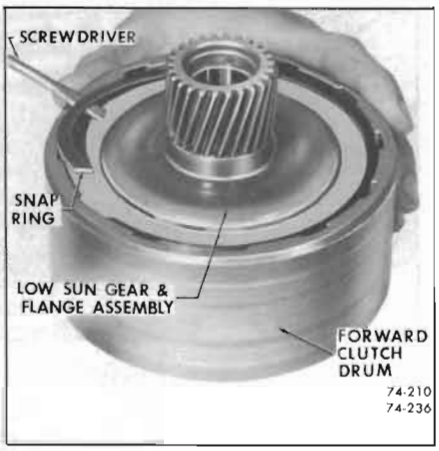

Figure 74-210

10. Install pump cover to pump body. Install five (5) retaining bolts but do not tighten. Place Tool J-21368 around pump to obtain proper alignment. Tighten bolts to 16-24 lb. ft. torque. See Figure 74-209.

NOTE: Bolt location at the pressure regulator valve takes a longer bolt.

74-18 DISASSEMBLY, INSPECTION, AND REASSEMBLY OF FORWARD CLUTCH

a. Disassembly

1. Remove low sun gear and flange assembly retaining snap ring. See Figure 74-210.

2. Remove low sun gear and flange assembly. See Figure 74-211.

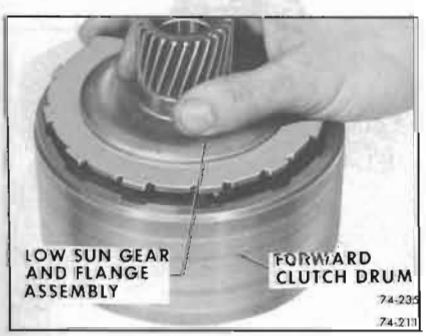

Figure 74-211

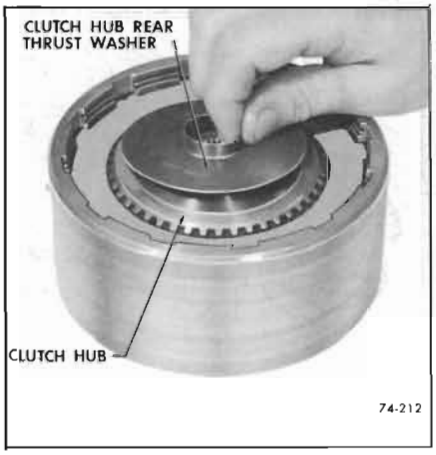

Figure 74-212

Figure 74-213

3. Remove clutch hub rear thrust washer. See Figure 74-212.

4. Lift forward clutch hub from clutch pack. See Figure 74-213.

Figure 74-214

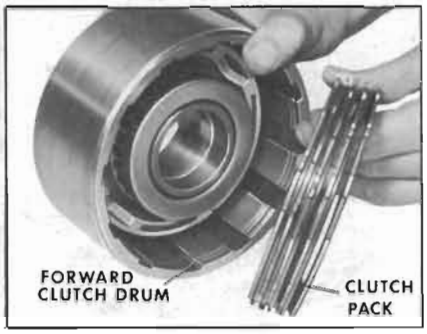

Figure 74-215

5. Remove clutch hub front thrust washer. See Figure 74-214.

6. Remove clutch pack from forward clutch drum. See Figure 74-215.

7. Using Tools J-2590-3, J-2590-5 and J-2590-12 compress spring retainer. Remove snap ring. Then remove Tool

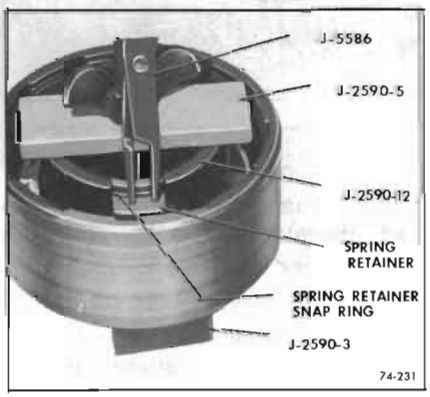

Figure 74-216

Figure 74-217

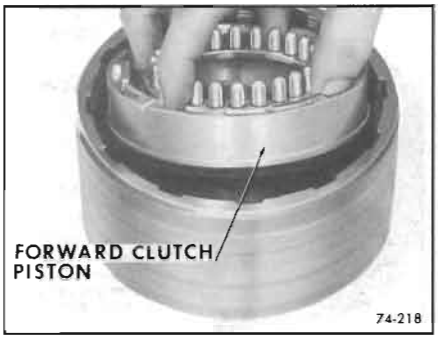

Figure 74-218

J-2590 and component parts, being careful that spring retainer does not catch in snap ring groove. See Figure 74-216.

NOTE: Place a piece of hard board between Tool J-2590-3 and surface of forward clutch hub.

8. Lift off spring retainer and twenty-four (24) clutch springs. See Figure 74-217.

9. Lift up on forward clutch piston with a twisting motion and remove. See Figure 74-218.

10. Examine forward clutch piston outer seal and cushion ring. If nicked, torn or worn, remove. See Figure 74-220.

11. Examine forward clutch piston inner seal. If nicked, torn or worn, remove seal. See Figure 74-221.

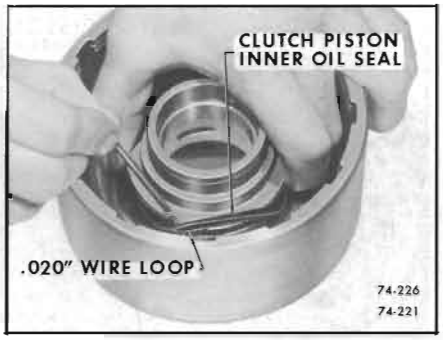

Figure 74-221

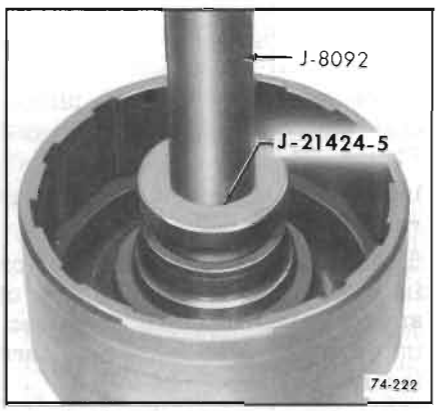

Figure 74-222

12. Check forward clutch drum bushing for nicks, severe scoring or wear. If bushing replacement is necessary proceed as follows: Using Tool J-21424-5, press damaged bushing from forward clutch drum. See Figure 74-222.

13. Check low sun gear and flange assembly bushing for nicks, severe scoring, or wear. If bushing replacement is necessary proceed as follows: Support low sun gear assembly on press plate using Tool J-21424-4 and Drive Handle J-8092 press out bushing. See Figure 74-223.

Figure 74-224

b. Inspection

1. Wash all parts in a suitable cleaning solvent. Use compressed air to dry.

2. Check steel ball in the forward clutch drum. Be sure it is free to move in hole and that orifice leading to front of clutch drum is open.

3. Check clutch plates for wear or scoring.

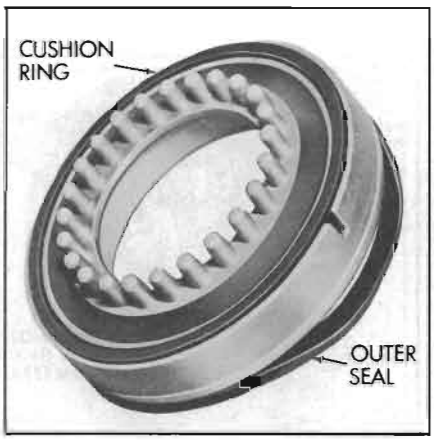

Figure 74-220

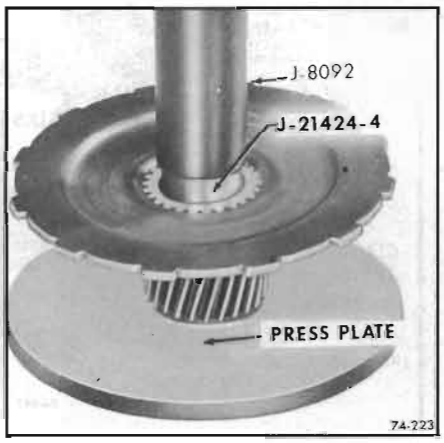

Figure 74-223

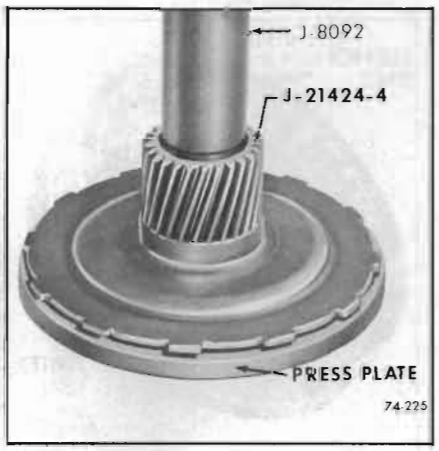

Figure 74-225

Figure 74-226

Figure 74-228

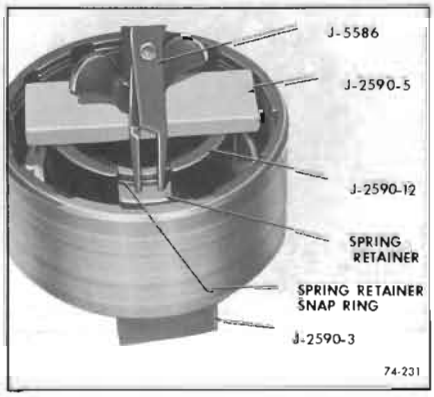

Figure 74-231

c. Reassembly

1. Install J-21424-5 in front of forward clutch drum. Using Drive Handle J-8092 press bushing into bore until Tool J-21424-5 bottoms on hub. See Figure 74-224.

2. Install Tool J-21424-4 into low sun gear. Using Drive Handle J-8092 press bushing into low sun gear until bushing installer is flush with top of low sun gear. See Figure 74-225.

3. Lubricate with transmission oil and install new forward clutch piston inner seal with seal lip pointing downward. See Figure 74-226.

NOTE: Run hand around seal after it is installed to make certain seal is fully in groove.

4. Lubricate with transmission oil and install new forward clutch piston outer seal in clutch piston. Seal lip must point down. See Figure 74-227.

Install cushion ring if it was removed.

5. Install forward clutch piston into clutch drum using a loop of smooth wire to start lip of seal into bore. Piston should turn freely. See Figure 74-228.

NOTE: A satisfactory tool can be made by crimping a loop of .020" music wire in a short length of cooper tubing.

6. Carefully reassemble return springs, retainer and snap ring. See Figure 74-230.

7. With spring retainer in place compress spring retainer with Tools J-2590-3, J-2590-4 and J-2590-5 far enough so the spring retainer snap ring can be installed. Make sure retainer doesn't catch in snap ring groove when compressing springs. See Figure 74-231.

NOTE: Place a piece of hard board between Tool J-2590-3 and forward clutch drum.

8. Install clutch hub front thrust washer to clutch hub (retain with grease) aligning tangs in clutch hub with grooves in thrust washer. Install clutch hub. See Figure 74-232.

9. Install steel driven plates and lined drive plates alternately, beginning with a steel driven plate. See Figure 74-233.

NOTE: LJ model use 5 driven and 4 drive plates. MJ & MR models use 6 driven and 5 drive. NK models use 7 driven and 6 drive.

Figure 74-227

Figure 74-230

Figure 74-232

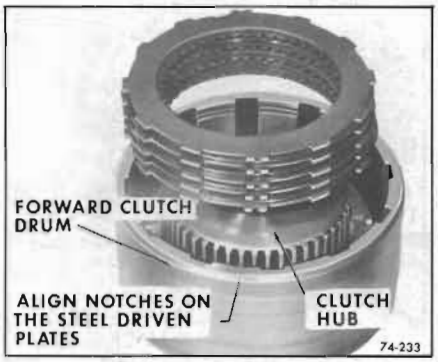

Figure 74-233

Figure 74-234

10. Install clutch hub rear thrust washer with its flange toward low sun gear and flange assembly. See Figure 74-234.

11. Install low sun gear and flange assembly. See Figure 74-235.

12. Install low sun gear and flange assembly retaining ring. Position snap ring so gap is cen-

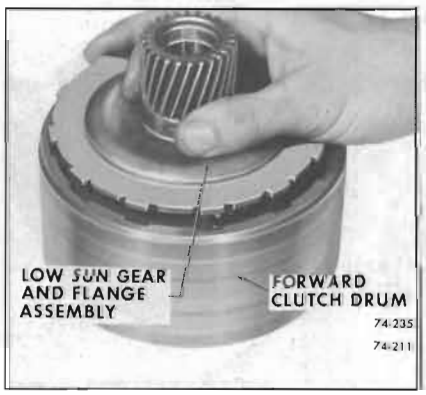

Figure 74-235

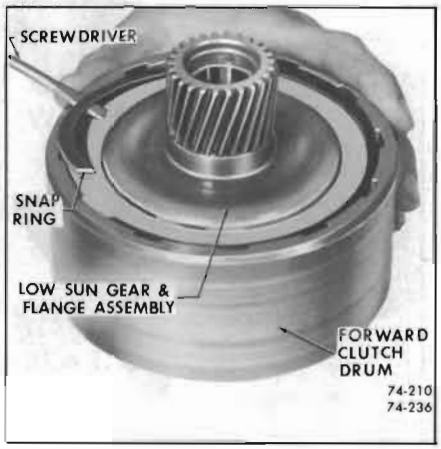

Figure 74-236

tered between slots in drum. See Figure 74-236.

74-19 DISASSEMBLY AND REASSEMBLY OF SPEEDOMETER DRIVEN GEAR

NOTE: Transmission need not be removed from the car to perform the following operations.

a. Disassembly

1. Remove speedometer driven gear. See Figure 74-237.

2. Examine speedometer driven gear oil seal. If nicked, torn or worn remove seal.

3. Examine speedometer driven gear shaft oil seal. If nicked, torn or worn remove seal.

b. Reassembly

1. Install speedometer driven gear shaft oil seal. Install oil seal retaining ring.

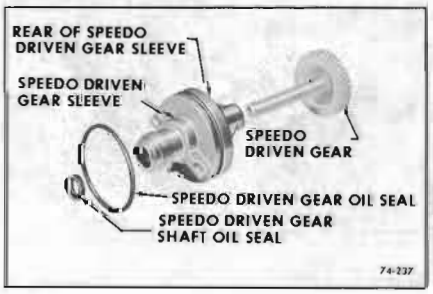

Figure 74-237

Figure 74-238

2. Install speedometer driven gear oil seal. See Figure 74-237.

3. Install speedometer driven gear.

74-20 REMOVAL AND INSTALLATION OF GOVERNOR DRIVEN GEAR

Before any attempt is made to service the governor gear, the following checks must be made.

1. Check for secondary governor weight tab wear. See Figure 74-238.

2. Check governor feed port opening. See Figure 74-240.

NOTE: If either secondary tab wear or less than .019 feed port opening is found, the complete governor assembly must be replaced.

Figure 74-240

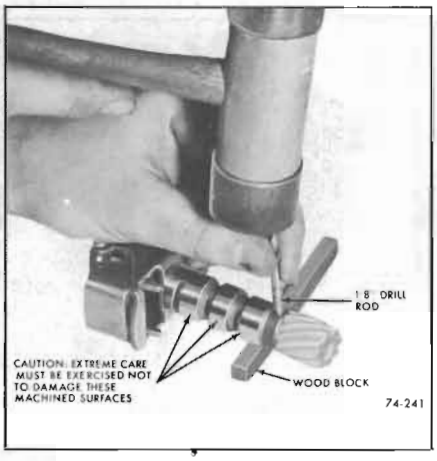

Figure 74-241

Figure 74-243

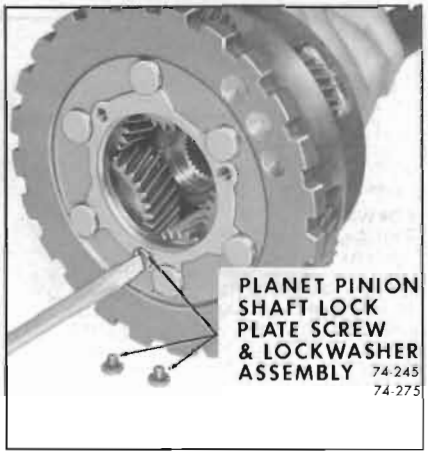

Figure 74-245

a. Removal

1. Support governor sleeve on wood block as shown in Figure 74-241, remove roll pin with a 1/8" drill rod.

CAUTION: If wood block is placed under nylon gear, breakage of gear inside governor sleeve will result. Exercise extreme care not to damage machine surfaces of governor sleeve.

2. Remove driven gear. Remove any chips or burrs from inside governor sleeve.

b. Installation

1. Install replacement gear by carefully pressing new gear into sleeve as follows:

a. Use press plate J-8853.

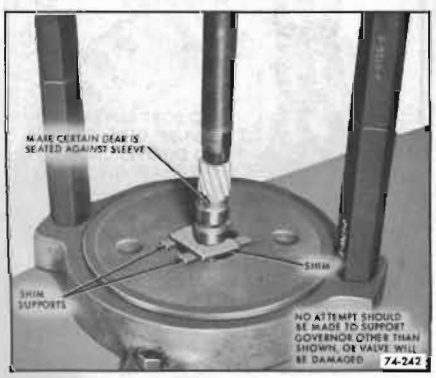

Figure 74-242

b. Place shim supplied in replacement gear kit between the second and third lands of governor sleeve. See Figure 74-242.

c. Make certain new gear is positioned squarely on sleeve and press gear onto sleeve. Gear must be seated against sleeve. See Figure 74-242.

CAUTION: DO NOT SUPPORT OR HAMMER ON REAR OF GOVERNOR.

2. Through existing hole in governor sleeve, drill a 1/8" hole half-way through from each end. See Figure 74-243.

NOTE: It is important that the hole for roll pin be drilled straight as possible to insure proper retention and installation of roll pin and gear. This can be best accomplished by above method.

Figure 74-244

3. Support end of governor sleeve (not gear) on a wooden block. Install new roll pin; then using a small chisel, stake pin in place at both ends to prevent pin from becoming loose. See Figure 74-244.

4. Check for burrs on sleeve and if valve is free in its bore. Any burrs that are left on governor sleeve will damage the case.

74-21 PLANET CARRIER DISASSEMBLY, INSPECTION, AND REASSEMBLY

a. Disassembly

1. Remove three (3) planet pinion

Figure 74-246

Figure 74-247

shaft lock plate screw and lock washers. See Figure 74-245.

2. Rotate planet pinion lock plate and remove. See Figure 74-246.

3. Start with a short planet pinion first. Insert Brass Drift into front of carrier. See Figure 74-247.

4. Remove pinion shaft and pinion gear from planet carrier. See Figure 74-248.

5. Remove needle bearings, and thrust washers (2) from the short planet pinion gear. See Figure 74-250.

NOTE: Remove the other two (2) short planet pinion gears in same manner as described in Steps 4 and 5.

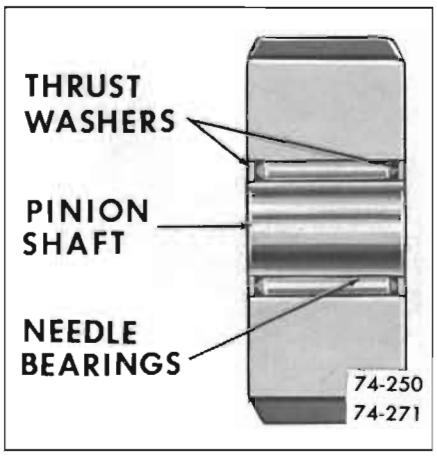

Figure 74-250

6. Remove low sun gear needle thrust bearing. See Figure 74-251.

7. Remove input sun gear. See Figure 74-252.

8. Remove input sun gear thrust washer. See Figure 74-253.

9. Insert Brass Drift through long planet pinion. Remove the long planet pinion shaft. See Figure 74-254.

10. Remove front planet pinion thrust washer and long planet pinion gear. See Figure 74-255.

11. Remove needle bearings, spacer and two (2) thrust washers from the long planet pinion gear. See Figure 74-256.

12. Remove rear planet pinion thrust washer. See Figure 74-257.

Figure 74-252

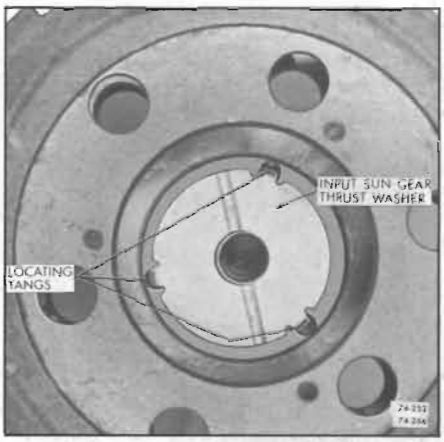

Figure 74-253

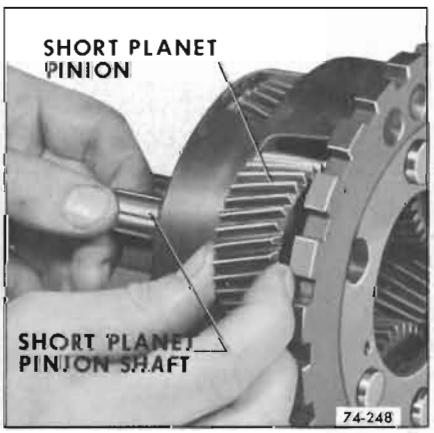

Figure 74-248

Figure 74-251

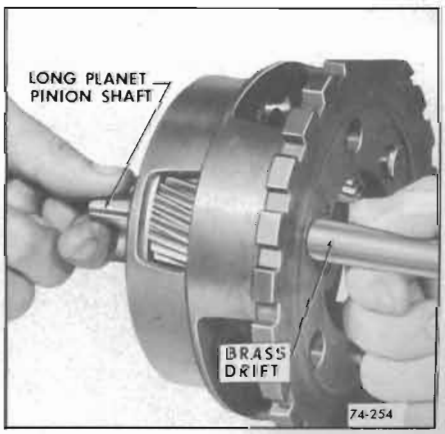

Figure 74-254

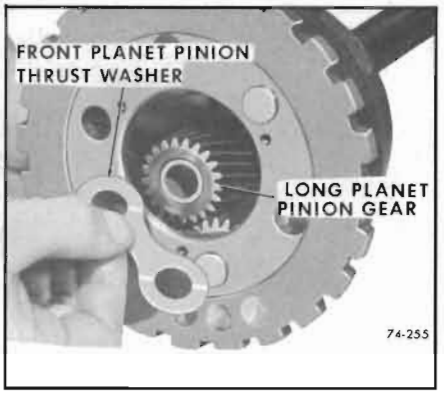

Figure 74-255

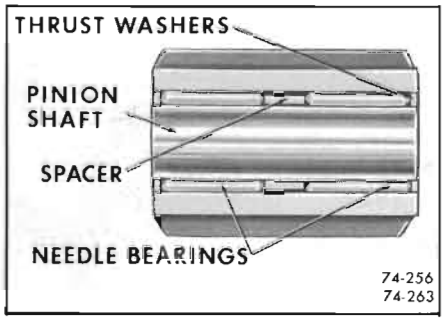

Figure 74-256

13. Check output shaft bushing for nicks, severe scoring or wear. If bushing replacement is necessary remove as follows: Install Bushing Remover J-9534 into bushing. Install Slide Hammer J-2619 into J-9534, using slide hammer remove bushing from planet carrier. See Figure 74-258.

Figure 74-257

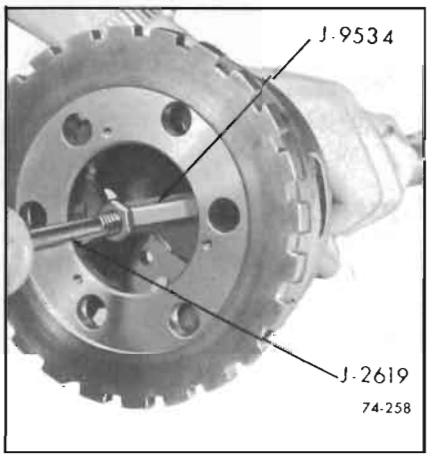

Figure 74-258

b. Inspection of Planet Carrier Parts

1. Wash all parts in a cleaning solvent. Air dry all parts.

2. Check the planet pinion gears and input sun gear tooth damage.

3. Check the planet pinion thrust washers and input sun gear thrust washer.

4. Check planet pinion needle bearings. If bearings show excessive wear, all needle bearings must be replaced.

5. Check the planet pinion shafts closely, if worn replace the worn shafts.

c. Reassembly

1. Using Tool J-21424-3 and J-8092 press the new bushing in until J-21424-3 touches the machined surface of the planet carrier assembly. See Figure 74-260.

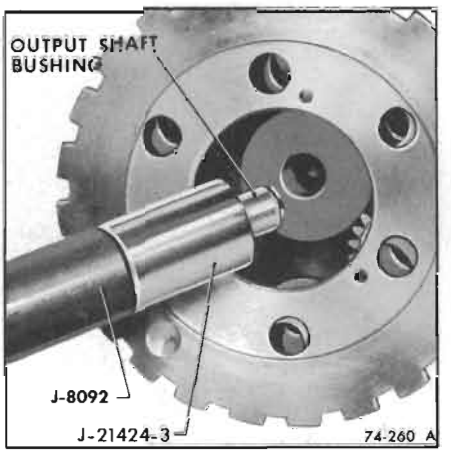

Figure 74-260

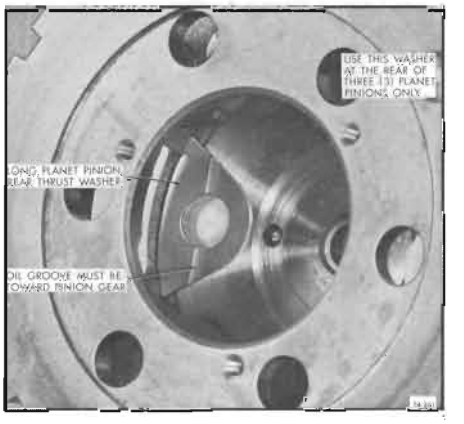

Figure 74-261

2. Start with the long planet pinion gears first. Install the long planet pinion rear thrust washer. Oil groove must be toward pinion gear. Retain thrust washer with grease. See Figure 74-261.

3. Install front planet pinion thrust washer. Retain thrust washer to case with grease. Oil grooves on the thrust washer must be toward the pinion gears. See Figure 74-262.

4. Coat inside pinion gear with petrolatum. Install Pinion Shaft into long planet pinion gear. Install twenty (20) needle bearings, spacer, twenty more needle rollers, and two (2) thrust washers.

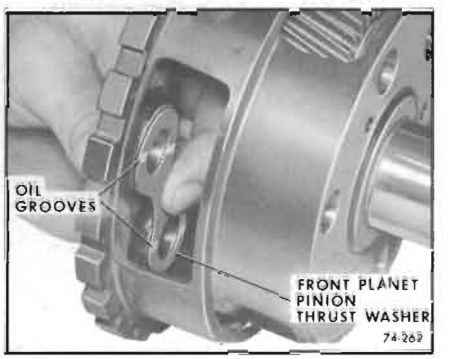

Figure 74-262

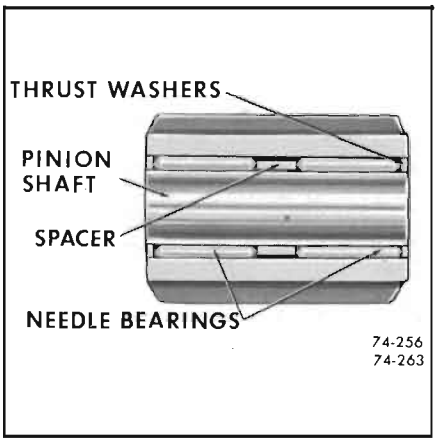

Figure 74-263

See Figure 74-263.

Carefully remove pinion shaft. With a twisting motion lock both sets of needle rollers in place. See Figure 74-264.

5. Position the long planet pinion assembly with the thrust washers at each end, in the planet carrier. Install the pinion shaft from the front of the carrier. As the shaft is being pushed in, make certain that it picks up the thrust washer. Turn the pinion shaft so the groove faces the center of the planet carrier. See Figure 74-265.

NOTE: Install the other two (2) long planet pinion gears as described in Steps 2-3-4-5.

6. Install the input sun gear thrust washer with the oil groove facing input sun gear. See Figure 74-266.

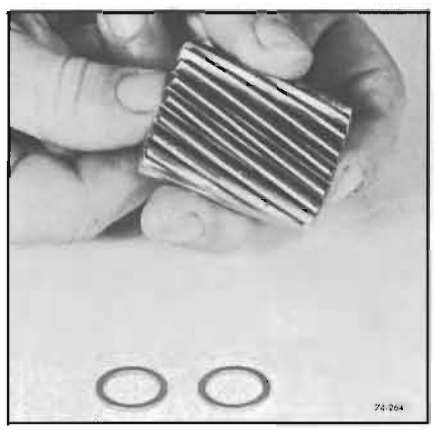

Figure 74-264

Figure 74-265

7. Install input sun gear into planet carrier. See Figure 74-267.

8. Install low sun gear needle thrust bearing. See Figure 74-268.

9. Install the rear planet pinion thrust washer. Oil groove must be toward pinion gear. See Figure 74-270.

NOTE: The front thrust washer already installed with the long planet pinions also is used for the short planet pinions as the two (2) pinions are paired together on one set of thrust washers.

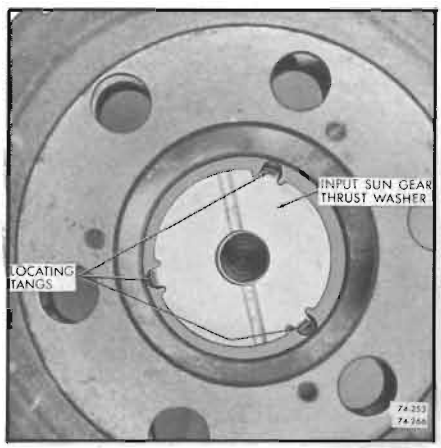

Figure 74-266

Figure 74-267

Figure 74-268

10. Install twenty (20) needle bearings, and one thrust washer

Figure 74-270

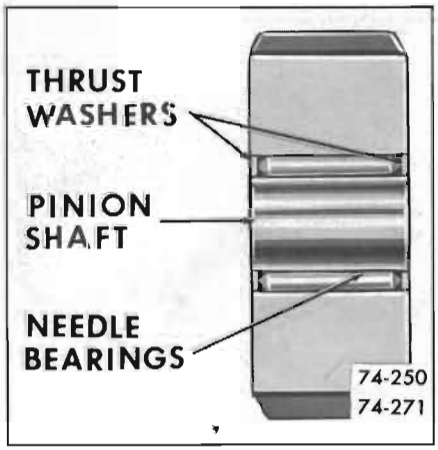

Figure 74-271

Figure 74-272

in the pinion gear. See Figure 74-271. With a twisting motion, lock the needle rollers in place. See Figure 74-272.

Figure 74-273

Figure 74-274

11. Position short planet pinion assembly and thrust washers at each end of the planet carrier. Install pinion shaft from the front of planet carrier. As the pinion shaft is being pushed in, make certain that it picks up the thrust washers. Turn the pinion shaft so the groove faces center of planet carrier. See Figure 74-273.

12. Install planet pinion lock plate. Rotate plate so extended portions align with slots in planet pinion shafts, and three (3) attaching screw holes. See Figure 74-274.

13. Install three (3) planet pinion shaft lock plate screw and lock washers. See Figure 74-275.

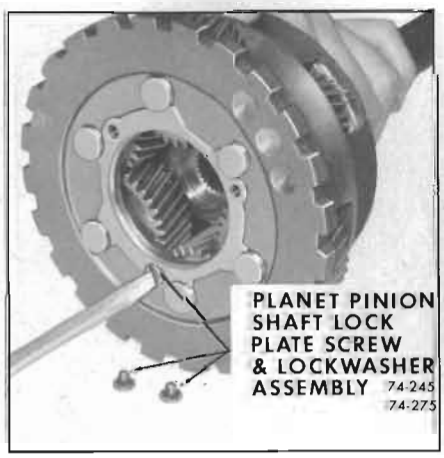

Figure 74-275

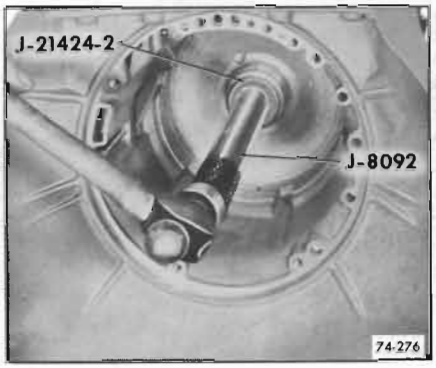

Figure 74-276

74-22 ASSEMBLY OF TRANSMISSION FROM MAJOR PARTS AND UNITS

a. General Instructions

1. Before starting to assemble the transmission make certain that all parts are absolutely clean. Keep hands and tools clean to avoid getting dirt into assembly. If work is stopped before assembly is completed cover all openings with clean cloths.

2. All moving parts should be given a light coating of transmission oil before installation. Thrust washers may be held in place with petroleum jelly, sparingly applied.

3. Do not take a chance on used gaskets and seals - use new ones to avoid oil leaks.

Figure 74-277

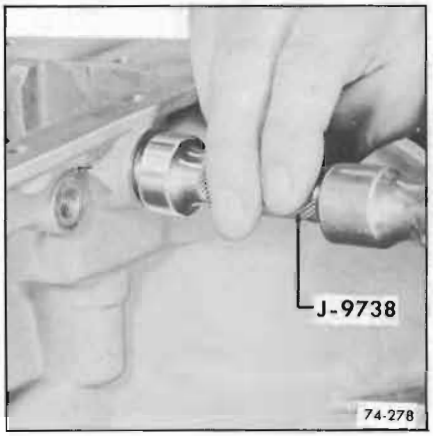

Figure 74-278

4. Use care to avoid making nicks or burrs on parts, particularly at bearing surfaces and surfaces where gaskets are used.

5. It is extremely important to tighten all parts evenly and in proper sequence, to avoid distortion of parts and leakage at gaskets and other joints. Use a reliable torque wrench to tighten all bolts and nuts to specified torque and in the specified sequence.

b. Installation of Range Selector Lever, Shaft and Parking Lock Actuator

1. Install case bushing, make certain split on bushing is opposite notch in case. See Figure 74-276.

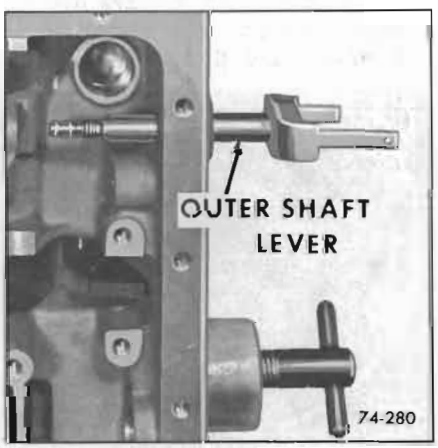

Figure 74-280

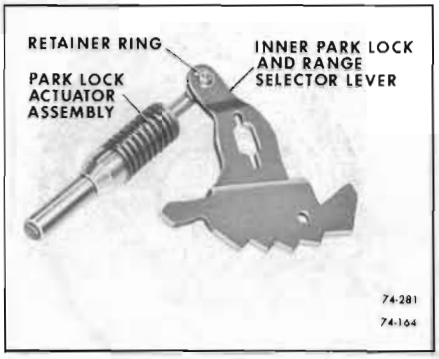

Figure 74-281

2. Retain parking lock pawl and spring in case with parking lock pawl shaft. See Figure 74-277.

NOTE: Position spring as shown.

NOTE: Make certain parking pawl shaft is bottomed in its bore in case.

3. Install outer shaft lever seal using J-9738. Make certain lip of seal points toward center of case. See Figure 74-278.

4. With a twisting motion insert outer range selector lever into case. See Figure 74-280.

5. Assemble park lock actuator assembly to inner park lock and range selector lever. See Figure 74-281.

6. Install outer range selector lever to selector lever shaft.

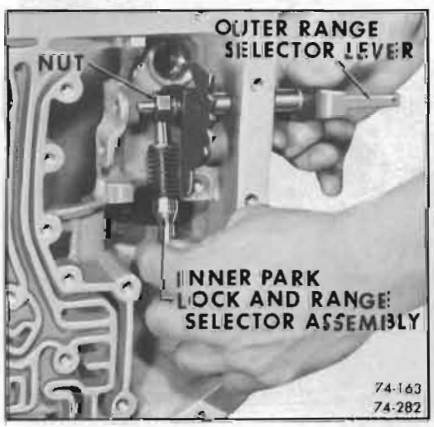

Figure 74-282

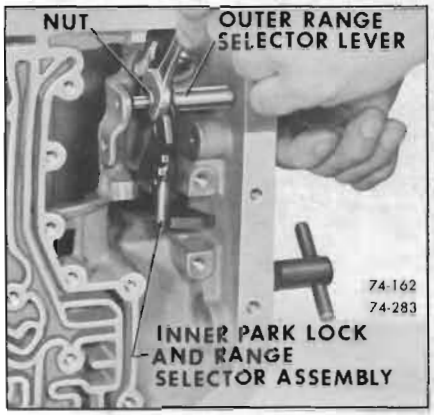

Figure 74-283

7. Install inner park lock and range selector assembly to outer range selector lever. Install nut on range selector lever. See Figure 74-282.

NOTE: Make certain longest end on range selector lever is to the bottom of transmission.

8. Slide outer range selector lever into case and tighten nut. See Figure 74-283.

9. Install range selector shaft retainer. See Figure 74-284.

10. Install parking bracket to transmission case. Torque bolts to 8-12 lb. ft. torque. See Figure 74-285.

11. If outer range selector lever was removed install nut. Torque to 20-30 lb. ft.

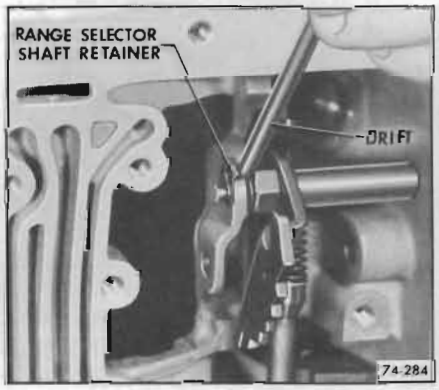

Figure 74-284

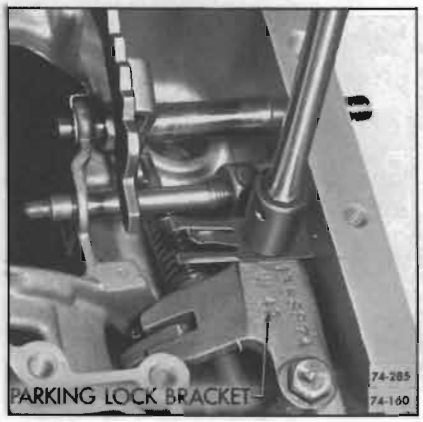

Figure 74-285

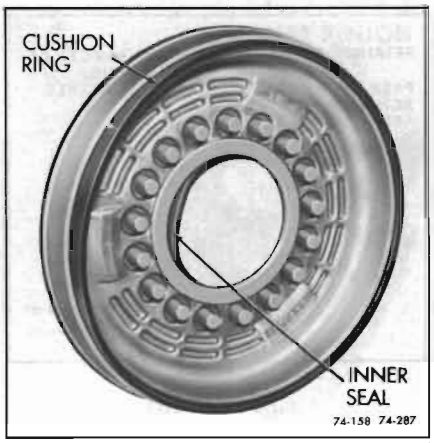

Figure 74-287

Figure 74-291

c. Installing Reverse Clutch

1. Lubricate with transmission oil and install reverse clutch piston outer seal. See Figure 74-286.

2. Lubricate with transmission oil and install reverse clutch piston inner seal. See Figure 74-287.

Install cushion ring if it was removed.

3. With transmission in vertical position install reverse clutch piston into case. Tap piston with hammer handle to make certain piston is seated in case. See Figure 74-288.

4. Install seventeen (17) clutch piston return springs. See Figure 74-290.

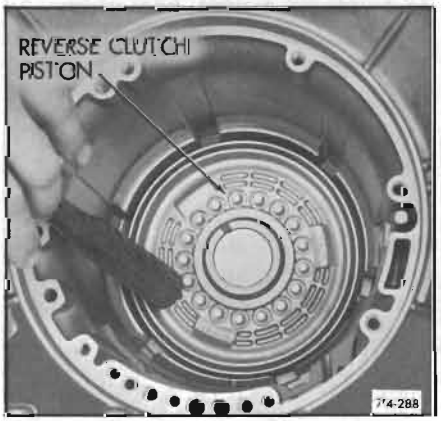

Figure 74-288

5. Position piston return seat on piston return springs. Place snap ring on return seat so that ring may be easily installed when seat is compressed with tool. See Figure 74-291.

6. Using J-21420-1 and J-21420-2 compress piston return seat so snap ring may be installed with J-5586 Pliers. See Figure 74-292.

CAUTION: As spring retainer is compressed make certain inner edge of retainer does not hang up on snap ring groove.

7. Align notches on the steel driven plates. Install the steel driven plates and lined drive plates alternately, beginning with a steel driven plate. The notched lug on each driven plate goes in the 5 o'clock groove in case. See Figure 74-293.

NOTE: LJ models use 4 drive and 4 driven plates. MJ and MR models use 5 drive and 5 driven plates. NK models use 6 drive and 6 driven plates.

Figure 74-286

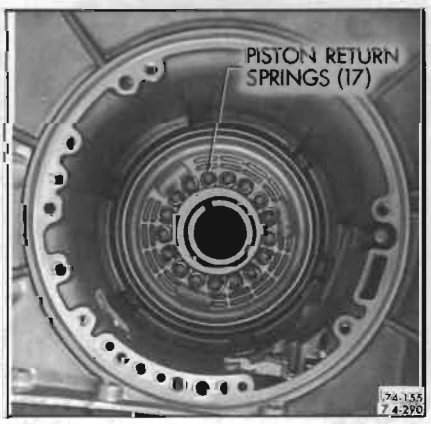

Figure 74-290

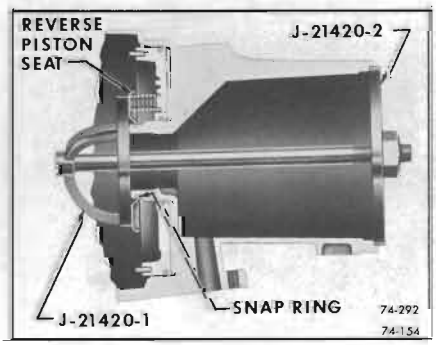

Figure 74-292

Figure 74-293

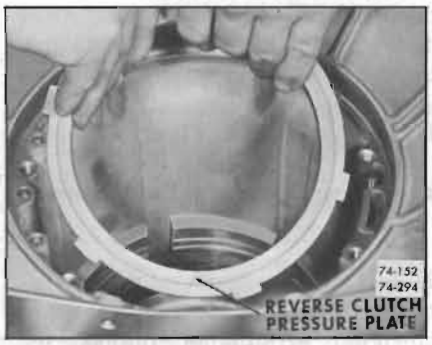

Figure 74-294

8. Install reverse clutch pressure plate with the identification mark being installed in the 5 o'clock groove in case. See Figure 74-294.

9. Install reverse clutch pack snap ring. See Figure 74-295.

NOTE: One pressure plate is released for service. This plate is identified by one identification mark.

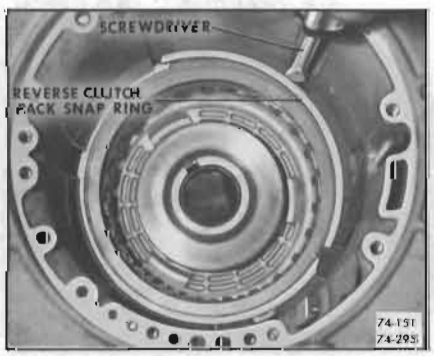

Figure 74-295

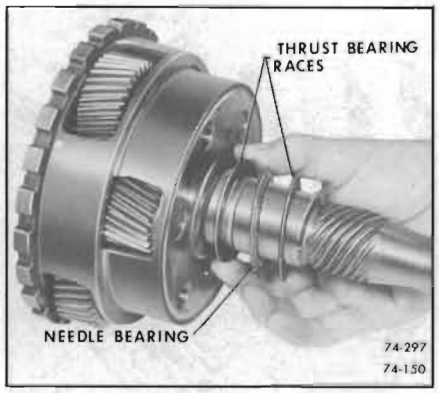

Figure 74-297

d. Installing Planetary Gear Set

1. Install thrust bearing race with a lip, needle bearing, and a second plain thrust bearing race to the rear face of the planetary gear set. Retain with grease. See Figure 74-297.

2. Install reverse ring gear into case. Rock and turn ring gear to pick up clutch plate splines. See Figure 74-298.

3. Install planetary gear set into case. See Figure 74-300.

74-23 INSTALLATION OF LOW SERVO ASSEMBLY, LOW BAND, AND FORWARD CLUTCH

a. Installation of Low Servo

1. Install low servo piston assembly into case. See Figure 74-301.

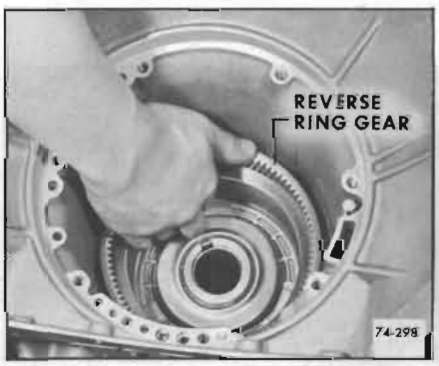

Figure 74-298

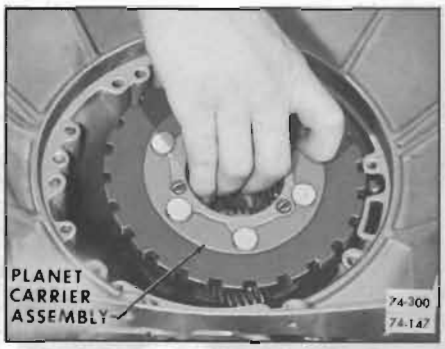

Figure 74-300

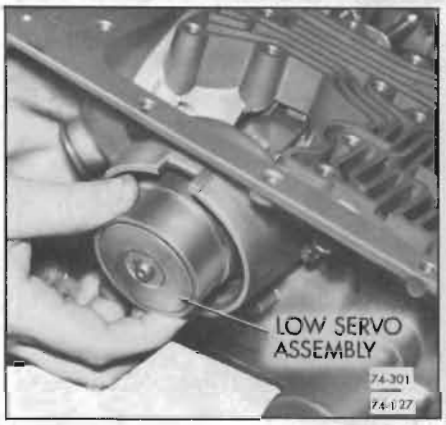

Figure 74-301

2. Install low servo cover oil seal. See Figure 74-302.

3. Install low servo cover to case. See Figure 74-303.

4. Compress low servo cover with J-21495 and install retaining snap ring. See Figure 74-304.

Figure 74-302

Figure 74-303

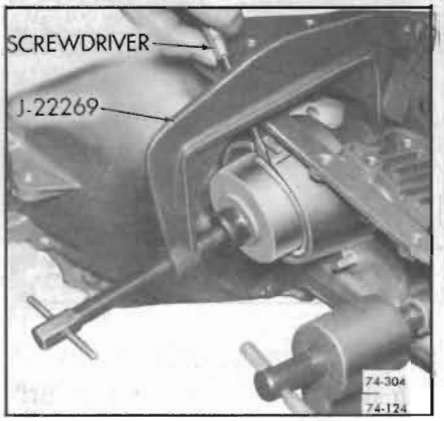

Figure 74-304

b. Installation of Low Band

1. With transmission in vertical position install band adjusting screw into case. See Figure 74-305.

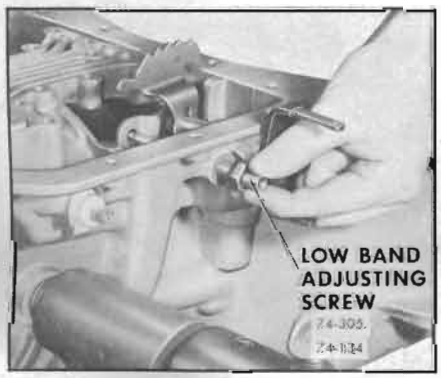

Figure 74-305

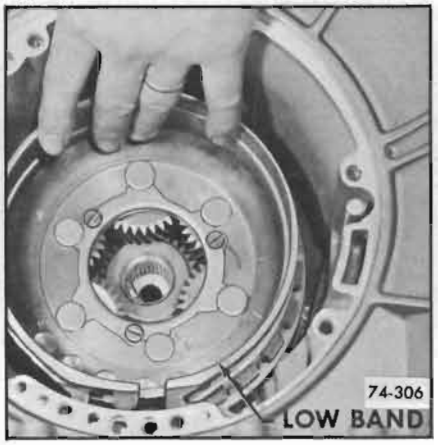

Figure 74-306

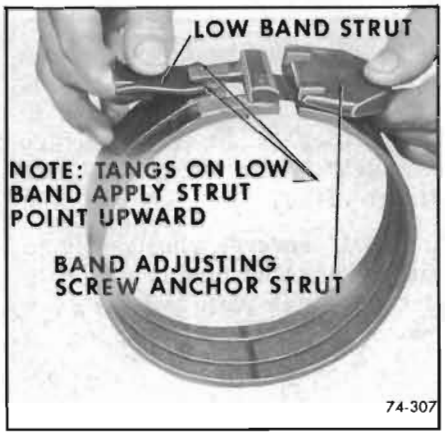

Figure 74-307

2. Install low band into case. See Figure 74-306.

3. This picture is for illustration purposes only. It shows the proper positioning of the low band apply strut and band adjusting screw anchor strut. See Figure 74-307.

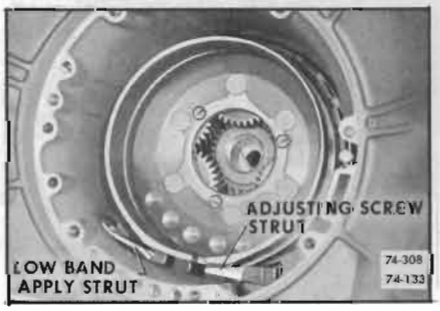

Figure 74-308

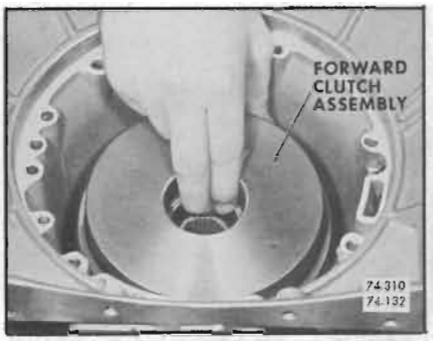

Figure 74-310

4. Install low band apply strut and band adjusting screw strut. After both struts have been installed, tighten low band adjusting screw enough to prevent struts from falling out. See Figure 74-308.

c. Installing the Forward Clutch Assembly

1. Install forward clutch assembly turning slightly to engage low sun gear with planet pinions. See Figure 74-310.

d. Check Forward Clutch to Oil Pump Clearance

1. Attach slide hammer bolt to threaded hole in oil pump. See Figure 74-311. With flat of hand on end of input shaft move so parts are clear back. Install dial indicator set on rod and "O" dial indicator on end of input

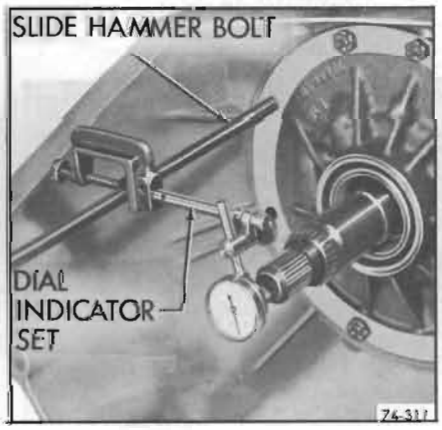

Figure 74-311

Figure 74-312

shaft. Push on end of output shaft to move everything forward, the reading obtained will be the clearance. There are three selective thrust washers available, .099/.095, 081/.077 and .063/.059. Select washer so the clearance will be between .022" and .054".

2. Grease and install selective fit washer to pump cover hub. See Figure 74-312.

3. Install two (2) pump cover to clutch drum oil sealing rings. See Figure 74-313.

74-24 INSTALLATION OF OIL PUMP GUIDE PIN, GASKET AND OIL PUMP ASSEMBLY

1. Install oil pump to case seal. See Figure 74-315.

Figure 74-313

Figure 74-315

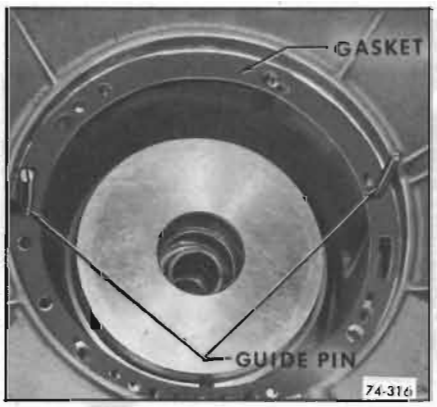

Figure 74-316

2. Install guide pins and new pump gasket. See Figure 74-316.

3. Install input shaft oil rings. See Figure 74-317.

4. Coat input shaft oil rings with oil and install into oil pump. Then

Figure 74-317

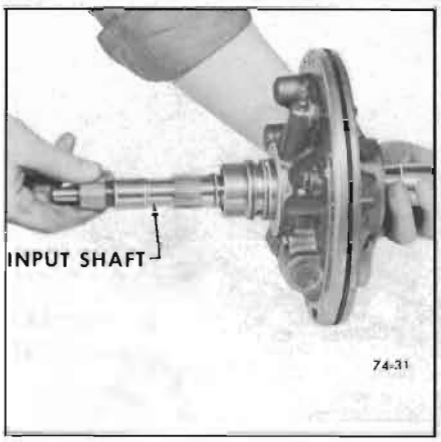

Figure 74-318

install pump into case. Apply a thin coat of oil around edge of pump. See Figure 74-318.

5. Remove guide pins and install eight (8) retaining bolts (with new "O" rings under head). See Figure 74-320.

6. Torque the eight (8) pump retaining bolts to 16-24 lb. ft. See Figure 74-321.

74-25 LOW BAND ADJUSTMENT

1. Remove adjusting screw cap. Adjust low band by first tightening adjusting screw to 40 in. lbs. torque. See Figure 74-322.

2. Back off band adjusting screw four (4) turns and lock nut. See Figure 74-323.

Figure 74-320

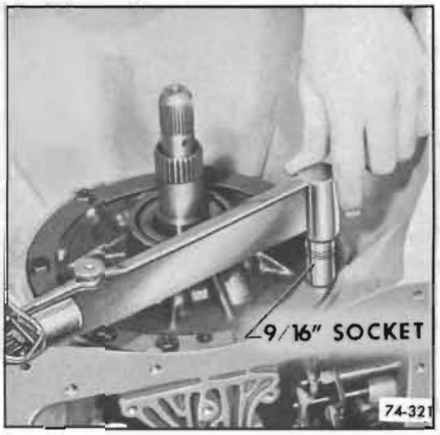

Figure 74-321

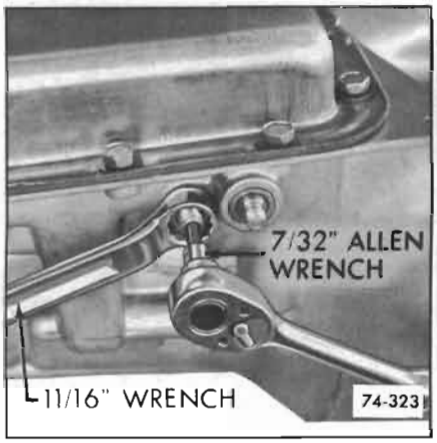

Figure 74-323

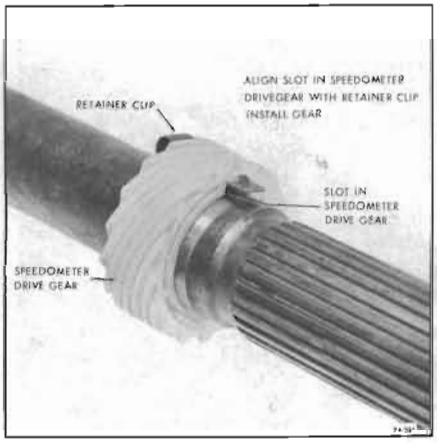

Figure 74-326

3. Install adjusting screw, cap. See Figure 74-324.

74-26 INSTALLATION OF SPEEDOMETER DRIVING GEAR

1. Place retainer into hole in output shaft. See Figure 74-325.

2. Align slot in speedometer drive gear with retainer clip and install. See Figure 74-326.

74-27 INSTALLATION OF REAR BEARING RETAINER BUSHING, OIL SEAL, BEARING RETAINER AND SPEEDO DRIVEN GEAR

a. Installation of Rear Bearing Retainer Bushing

1. Using Drive Handle J-8092 and Installer J-21424-1 install rear bearing retainer bushing. See Figure 74-327.

Figure 74-324

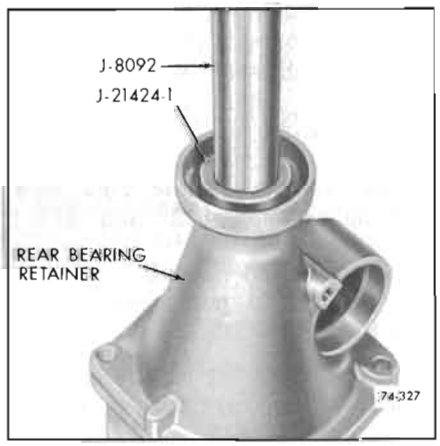

Figure 74-327

b. Installation of Output Shaft to Rear Bearing Retainer Oil Seal

1. Install output shaft to rear bearing retainer oil seal using

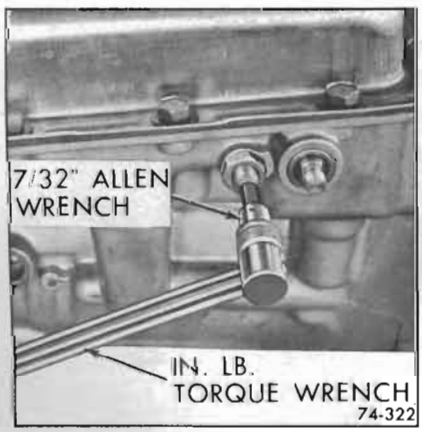

Figure 74-322

Figure 74-325

Figure 74-328

Figure 74-330

Installer J-21426. See Figure 74-328.

c. Installation of Rear Bearing Retainer

1. Install rear bearing retainer oil seal. See Figure 74-330.

2. Install rear bearing retainer to case and install four (4) retaining bolts. Torque bolts to 25-35 lb. ft. torque. See Figure 74-331.

d. Installing Speedometer Driven Gear Assembly

1. Install speedometer driven gear assembly into rear bearing retainer. See Figure 74-332.

2. Install speedometer driven gear sleeve retainer. Torque bolt to 5-10 lb. ft. torque. See Figure 74-333.

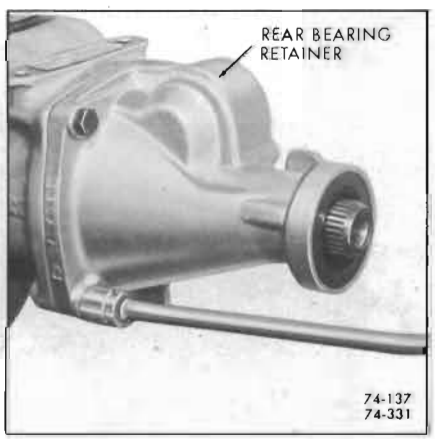

Figure 74-331

Figure 74-332

Figure 74-333

74-27 INSTALLATION OF VALVE BODY ASSEMBLY

1. With transmission in horizontal position, install valve body to plate gasket. See Figure 74-334.

2. Install valve body plate.

3. Install manual control valve and link into valve body assembly. See Figure 74-336.

Figure 74-334

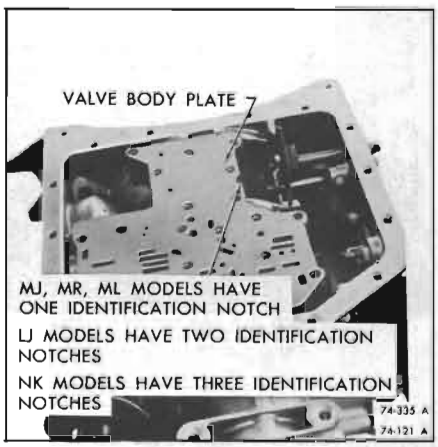

Figure 74-335

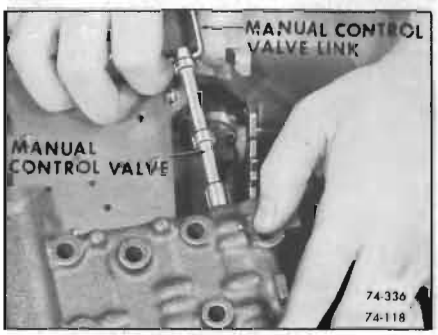

Figure 74-336

4. Install manual control valve link into park, lock and range selector inner lever. See Figure 74-337.

5. Install eleven (11) valve body to case retaining bolts. Torque bolts to 8-11 lb. ft. See Figure 74-338.

Figure 74-337

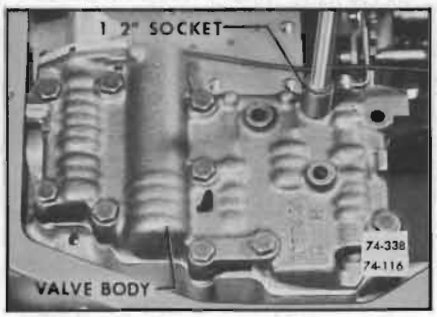

Figure 74-338

Figure 74-342

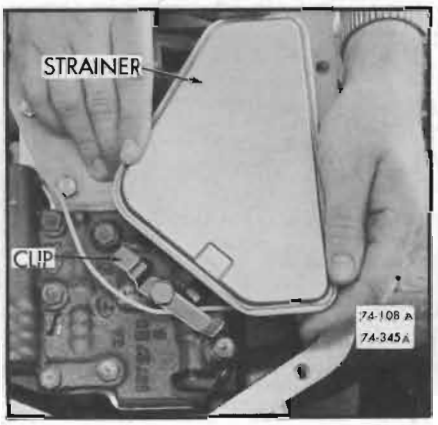

Figure 74-345

Figure 74-340

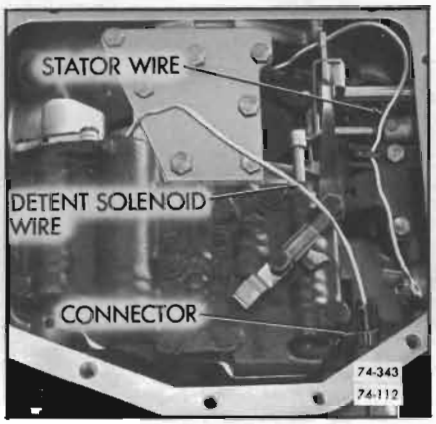

Figure 74-343

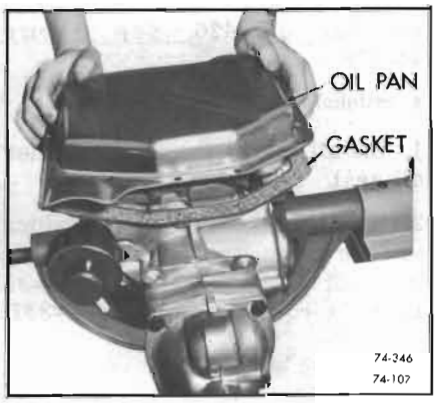

Figure 74-346

6. Install oil channel support plate. Torque bolts to 8-12 lb. ft. See Figure 74-340.

7. Install spring detent assembly. Torque bolt to 8-12 lb. ft. Center spring over detent plate. See Figure 74-341.

8. Install case connector into case. See Figure 74-342.

9. Install stator solenoid wire into connector. See Figure 74-343.

10. Install solenoid connector to case connector. See Figure 74-344.

11. Install new oil strainer pipe to case "O" ring seal.

12. Install oil strainer. See Figure 74-345.

13. Install oil pan gasket and pan. See Figure 74-346.

Figure 74-341

Figure 74-344

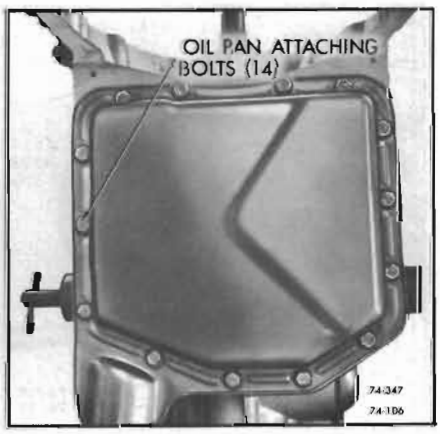

Figure 74-347

Figure 74-348

14. Install fourteen (14) oil pan attaching bolts. Torque bolts to 10-16 lb. ft. See Figure 74-347.

74-28 INSTALLATION OF GOVERNOR AND VACUUM MODULATOR

a. Installation of Governor

1. Slide governor into case. Turn governor assembly so teeth on governor gear engage teeth on output shaft. See Figure 74-348.

2. Install governor gasket and cover to case. Torque bolts to 8-12 lb. ft. See Figure 74-350.

b. Installation of Vacuum Modulator

1. Slide rear modulator valve into front modulator valve, then install into case. See Figure 74-351.

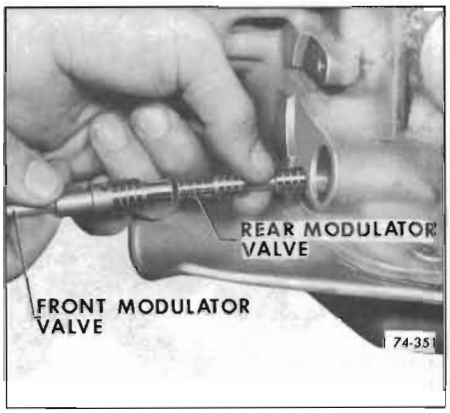

Figure 74-351

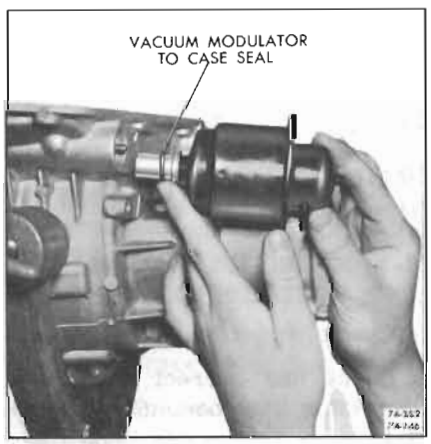

Figure 74-352

2. Install case to vacuum modulator oil seal. Install modulator into case. See Figure 74-352.

3. Install vacuum modulator retainer. Install retainer so tang points toward vacuum modulator. Torque bolt to 8-12 lb. ft. See Figure 74-353.

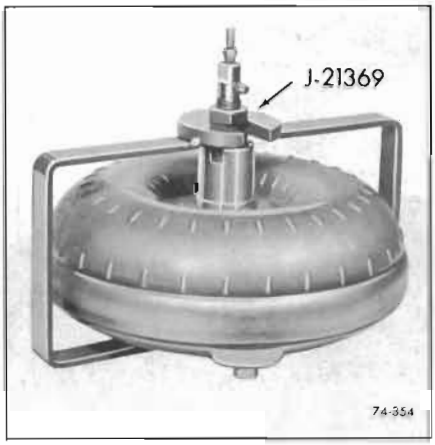

Figure 74-354

74-29 CONVERTER CHECKING PROCEDURE

1. Check converter for leaks as follows:

a. Install Tool J-21369 and tighten. See Figure 74-354.

b. Fill converter with air; 80 psi.

c. Submerge in water and check for leaks.

2. Check converter end clearance as follows:

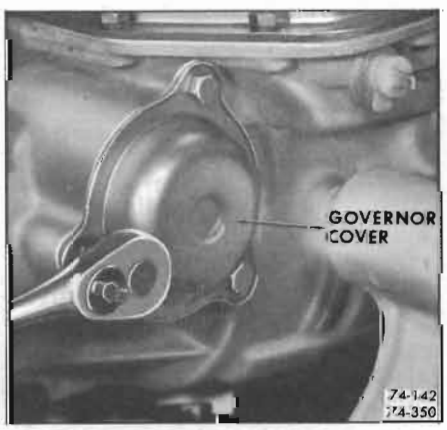

Figure 74-350

Figure 74-353

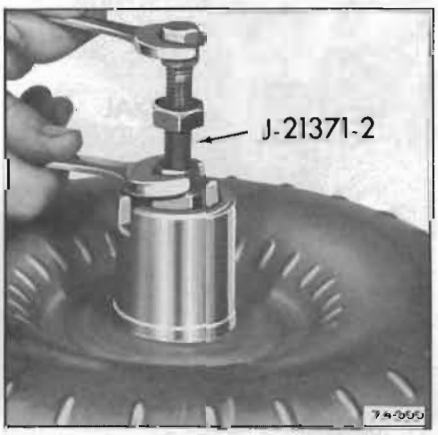

Figure 74-355

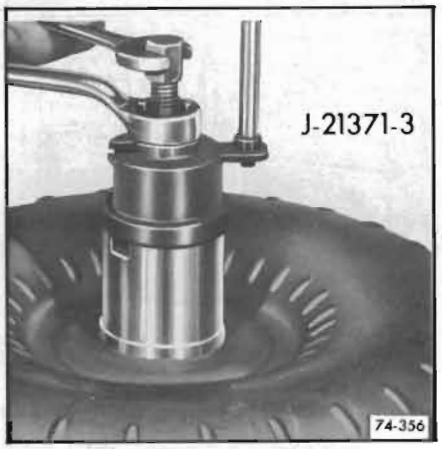

Figure 74-356

a. Install Tool J-21371-2 and tighten brass nut. See Figure 74-355.

b. Install Tool J-21371-3 and tighten hex nut. See Figure 74-356.

c. Install dial indicator set at 0 as shown in Figure 74-357.

d. Loosen hex nut. When nut is fully loosened the reading obtained on the dial indicator will be converter end clearance. If clearance is .050" or over and the oil has the appearance of having been mixed with aluminum paint, replace the converter. See Figure 74-357.

3. Install converter. See Figure 74-358.

Figure 74-357

Figure 74-358

4. Install converter holding Tool J-21366.

DIVISION IV

TROUBLE DIAGNOSIS

74-30 SEQUENCE FOR SUPER TURBINE 300 TRANSMISSION DIAGNOSIS

1. Check and correct oil level.

2. Check and correct detent and idle stator switches. See Figure 74-2.

3. Check and correct vacuum line and fittings.

4. Check and correct manual linkage. See Group 73.

5. Road test car.

a. Install oil pressure gauge.

b. Road test using all selective ranges, noting when discrepancies in operation or oil pressure occur.

c. Attempt to isolate the unit or circuit involved in the malfunction.

d. If engine performances indicates an engine tune-up is required, this should be performed before road testing is completed or transmission correction attempted. Poor engine performance can result in rough shifting or other malfunctions.

74-31 SUPER TURBINE 300 TRANSMISSION OIL CHECKING PROCEDURES

Before diagnosis of any transmission complaint is attempted, there must be an understanding of oil checking procedures and what appearance the oil should have. Many times a transmission malfunction can be traced to low oil level, improper reading of dipstick, or oil appearance; therefore, a careful analysis of the condition of oil and the level may eliminate needless repairs.

When checking oil level in the Super Turbine 300 Transmission, the following procedure should be observed to obtain the most accurate reading.

1. Bring transmission oil to operating temperature of 170°F. Usually driving five (5) miles with frequent stops and starts will bring the transmission to operating temperature. Before oil is checked the selector lever should be moved through all driving ranges.

NOTE: Prior to road testing car, oil level must be visible on dipstick.

2. Oil level must be checked with the selector lever in Park (P) or Neutral (N) position ONLY, engine running, and the vehicle on LEVEL pavement.

NOTE: If oil level is checked in any other driving range, a lower reading will result.

3. Dipstick should always be inserted into the oil filler tube positioned so that the oil level indicator markings are toward the center of the car.

Also, when the dipstick is removed, it should be noted whether the oil is devoid of air bubbles or not. Oil with air bubbles gives an indication of an air leak in the suction lines, which can cause erratic operation and slippage. Water in the oil imparts a milky, pink cast to the oil and can cause spewing.

74-32 EXTERNAL OIL LEAKS

a. Determining Source of Oil Leak

Before attempting to correct an oil leak, the actual source of the leak must be determined. In many cases, the source of the leak can be deceiving due to "wind flow" around the engine and transmission.

The suspected area should be wiped clean of all oil before inspecting for the source of the leak. Red dye is used in the transmission oil at the assembly plant and will indicate if the oil leak is from the transmission.

The use of a "Black Light" to locate the point at which the oil is leaking is helpful. Comparing the oil from the leak to that on the engine or transmission dipstick, when viewed by black light, will determine the source of the leak - engine or transmission.

Oil leaks around the engine and transmission are generally carried toward the rear of the car by the air stream. For example, a transmission oil filler tube to case leak will sometimes appear as a leak at the rear of the transmission. In determining the source of a leak, proceed as follows:

1. Degrease underside of transmission.

2. Road test to get unit at operating temperature.

3. Inspect for leak with engine running.

4. With engine off, check for oil leaks due to the raised oil level caused by drain back.

b. Possible Points of Oil Leaks

1. Transmission Oil Pan Leak

a. Attaching bolts not correctly torqued.

b. Improperly installed or damaged pan gasket.

c. Oil pan gasket mounting face not flat.

2. Rear Bearing Retainer

a. Attaching bolts not correctly torqued.

b. Rear seal assembly damaged or improperly installed.

c. Square seal, extension to case, damaged or improperly installed.

d. Porous casting. See subparagraph c.

3. Case Leak

a. Filler pipe "O" ring seal damaged or missing; misposition of filler pipe bracket to engine.

b. Modulator assembly "O" ring seal damaged or improperly installed.

c. Solenoid connector "O" ring seal damaged or improperly installed.

d. Governor cover bolts not torqued, gasket damaged or leak between case face and gasket.

e. Speedometer gear "O" ring damaged.

f. Manual shaft seal damaged or improperly installed.

g. Line pressure band release tap plug loose.

h. Vent pipe (refer to item 5).

i. Porous casting. See subparagraph c.

4. Leak at Front of Transmission

a. Front pump seal leaks.

(1) Seal lip cut. Check converter hub, etc.

(2) Bushing moved and damaged. Oil return hole plugged.

(3) No oil return hole.

b. Front pump attaching bolts loose or bolt "O" rings damaged or missing.

c. Front pump housing "O" ring damaged or cut.

Figure 74-360—Checking Modulator Can Assembly

d. Converter leak in weld area.

e. Porous casting (pump).

5. Oil Comes Out Vent Pipe

a. Transmission over-filled.

b. Water in oil.

c. Foreign material between pump and case or between pump cover and body.

d. Case - porous near converter bosses. Front pump cover or housing oil channels shy of stock near breather. See subparagraph c.

e. Pump to case gasket mispositioned.

Figure 74-361—Checking Cross Leakage Between Pump Cover and Stator Shaft

c. Case Porosity Repair

Super Turbine 300 transmission external oil leaks caused by case porosity can be successfully repaired with the transmission in the car by using the following recommended procedures:

1. Road test and bring the transmission to operating temperature, approximately 170°F.

2. Raise car on a hoist or jack stand, engine running, and locate source of oil leak. Check for oil leaks in Low, Drive, and Reverse.

NOTE: Use of a mirror is helpful in finding leaks.

3. Shut engine off and thoroughly clean area to be repaired with a suitable cleaning solvent and a brush - air dry.

NOTE: A clean, dry soldering acid brush can be used to clean the area and also to apply the epoxy cement.

4. Using instructions of the manufacturer, mix a sufficient amount of epoxy, Group 0.423, Part No. 1360016, to make the repair.

NOTE: Observe cautions in handling.

5. While the transmission case is still HOT, apply the epoxy to the area to be repaired.

NOTE: Make certain the area to be repaired is fully covered.

6. Allow cement to cure for 3 hours before starting engine.

7. Road test and check for leaks.

74-33 SUPER TURBINE 300 TROUBLE DIAGNOSIS CHART

PROBLEM	PROBABLE REMEDY
I. No Drive in Any Selector Position	a. Check oil level. See paragraph 74-31. b. Check oil pressure as described in paragraph 74-34. c. Check manual shift linkage adjustment. d. Check internal linkage. See Figure 74-285. e. Check for defective pressure regulator valve. f. Check for pressure regulator valve retaining ring out of groove. g. Check for defective front pump.
II. Erratic Operation and Slippage (Light to Medium Acceleration)	a. Check filter to screen and suction pipe assembly for leaks. b. Check suction pipe "O" ring. c. Low oil level. d. Check for defective modulator. See Figure 74-360.
III. Excessive Slip or Engine Flare on Coasting to a Stop or When Cornering	a. Check engine idle. See paragraph 64-2. b. Check for suction leak as described in item II and paragraph 74-31. c. Check low band adjustment. See paragraph 74-25. d. Check for proper modulator can assembly. See paragraph 74-1. e. Check for defective modulator can--no bellows load. f. Check for leak at inner hole low servo piston assembly.

74-33 SUPER TURBINE 300 TROUBLE DIAGNOSIS CHART (Cont'd)

PROBLEM	PROBABLE REMEDY
IV. Transmission Sluggish From a Standing Start	a. Check idle stator switch. b. Check stator valve and solenoid. c. Check idle stator switch adjustment. See Figure 74-2.
V. No Reverse	a. Check reverse clutch piston seals. b. Check freedom of reverse clutch piston. c. Check for open feed lines to reverse clutch. See Figures 74-362 through 74-368. d. Loose oil channel support plate attaching bolts. Specification is 8-12 lb. ft.
VI. Slips (In Any Range)	a. Refer to items II and XIX.
VII. Harsh Neutral to Drive Shift at Idle	a. Check vacuum line connections. b. Check engine idle speed. See paragraph 64-2.
VIII. No Upshift	a. On "no upshift" complaints, road test car or check on a twin post host by accelerating slowly to approximately 65 MPH. If a shift occurs at approximately 65 MPH, look for: 1. Open detent solenoid 2. Loose detent solenoid attaching bolts 3. Stuck detent valve. 4. No vacuum to modulator b. If no shift occurs, look for: 1. Governor* 2. Stuck shift valve or shift control valve. c. If transmission has "no upshift" cold but is satisfactory when warm, look for a sticky shift valve or shift control valve and improper bolt torque (spec. 8-12 lb. ft.)
*If a gage is installed, the governor can be checked as follows: Depress accelerator to a fixed position, approximately 1/4 throttle. With the accelerator kept at this fixed position, line pressure will drop with increasing car speed.	
IX. Long Shift Time--Shift Does Not Have Positive Engagement	a. Check for proper modulator can assembly. See paragraph 74-1. b. Check for leak in clutch circuit. See Figures 74-362 through 74-368. c. Check valve body port between modulator boost and clutch feed in shift valve bore. See Figure 74-368. d. If foreign material in oil pan indicates a clutch failure, replace clutch plates and necessary parts.

74-33 SUPER TURBINE 300 TROUBLE DIAGNOSIS CHART (Cont'd)

PROBLEM	PROBABLE REMEDY
X. Engine Flares on Upshift	a. Refer to item XVIII.
XI. Late Upshift	a. Check vacuum line connections. b. Stuck detent valve.* c. Open detent solenoid or loose solenoid attaching bolts.* d. Sticky shift valve. e. Check governor assembly. See paragraph 74-20. f. If upshifts occur late cold, but are satisfactory warm, check for no roll pin in governor pinion or improper valve body bolt torque (Spec. 8-12 lb. ft.)
*Transmission will upshift only at wide-open throttle.	
XII. Upshifts-Downshifts Erratic	a. Refer to paragraph 74-20. b. Refer to item II. c. Check for crossed solenoid wires. See Figure 74-370.
XIII. No Wide Open Throttle Downshift	a. Check detent control switch adjustment and continuity in wiring. (Wiring fused with windshield wiper.) b. Check for stuck detent valve and shift valves. c. Check orifice in detent valve. d. Check detent solenoid on valve body.
XIV. Engine Flares on Wide Open Throttle Downshift	a. Check low band adjustment. See paragraph 74-25. b. Check item XIX. c. Check for restriction in vacuum line or fitting to transmission. d. Check for correct valve body plate. See chart on 74-1.
XV. Delayed Engagement of Manual Low	a. Check freedom of 2-piece modulator valve.
XVI. No Stator Action	a. Check stator idle and detent control switch adjustments and wiring. See Figure 74-2. b. Check stator solenoid and stator valve. c. Check stator bushings for excessive wear and scoring. d. Check reaction shaft bushing for extreme wear and scoring. e. Check front oil seal ring on input shaft. See Figure 74-131.

74-33 SUPER TURBINE 300 TROUBLE DIAGNOSIS CHART (Cont'd)

PROBLEM	PROBABLE REMEDY
XVII. Oil Spews Out Breather	a. High oil level. b. Water in oil. c. Chip or burr between pump cover and housing or between complete pump assembly and case. d. Direct leak from front pump pressure line into vent chamber. See Figure 74-363.
XVIII. Drive Clutch Plates Burned (Usually Low Band and Reverse Clutch Good)	a. Check for leakage in clutch circuit. See Figures 74-362 through 74-368. b. Check ball in forward clutch drum. c. Clutch lines in front pump cover and stator shaft assembly. See Figure 74-363. d. Plug in pump cover assembly missing. See Figure 74-369. e. Clutch piston seals. f. Clutch feed oil rings. g. Check for proper number of clutch plates and correct piston. See Chart on page 74-3.
XIX. Drive Clutch Plates, Low Band and Reverse Clutch Plates--All Burned	a. Check the following causes of low maximum line pressure. 1. Modulator can load check. See Figure 74-360. 2. Check for proper modulator can. See chart on page 74-1. 3. Check modulator valve and bore in case for freedom or movement. 4. Check freedom of boost valve in front pump regulator. b. Valve body bolts loose. Torque specification is 8-12 lb. ft. c. Low oil level.

The V-8 pressures are approximately 60 psi at idle and 145 psi at zero output speed with the vacuum modulator line disconnected from the modulator assembly and with the engine at 1000 RPM. See Chart below.

The V-6 pressures are approximately 60 psi (see chart below for exact pressure) at idle and 135 psi at zero output speed with the vacuum modulator line disconnected from the modulator assembly and with the engine at 1000 RPM.

If the 60 psi, are not being obtained, check the pressure regulator valve, spring and shims and the front pump gears. These are the only parts which affect the minimum line pressure.

If the 135-140 psi are not being obtained, check the following parts in the complete modulator circuit:

1. Modulator can bellows.
2. Front pump boost valve and sleeve.
3. Oil channel lines to above.
4. Modulator valve.

(PARAGRAPH 74-34)

1966
SUPER TURBINE 300
TRANSMISSION PRESSURE CHECKS

MAXIMUM LINE PRESSURE CHECKS are to be made in the garage bay with the vacuum modulator line disconnected and plugged. The engine speed set at 1000 RPM.

Altitude	Barometric Pressure (in. Hg.) at Standard Conditions*	Model LJ Vacuum Modulator Part No. 1367032		Model MR and ML Vacuum Modulator Part No. 8623365 8623947		Model MJ Vacuum Modulator Part No. 1377046		Model NK Vacuum Modulator Part No. 1361577	
		D and L ± 4 psi	R ± 6 psi	D and L ± 4 psi	R ± 6 psi	D and L ± 4 psi	R ± 6 psi	D and L ± 4 psi	R ± 6 psi
Sea Level	29.92	152	218	161	231	156	224	166	237
2,000 ft.	27.82	144	206	153	218	148	213	157	225
5,000 ft.	24.89	131	189	140	201	136	195	145	208
10,000 ft.	20.58	114	164	123	177	118	177	127	183

MINIMUM LINE PRESSURE CHECKS are to be made while road testing car. The vacuum modulator line connected. Engine and/or car speed as shown in note below.**

MINIMUM LINE PRESSURE CHECKS FOR ALL MODELS REGARDLESS OF VACUUM MODULATOR USED. (Pressures not affected by Altitude or Barometric Pressure)

PARK, NEUTRAL, and DRIVE	56 ± 2 psi
LOW	92 ± 4 psi
REVERSE	84 ± 4 psi

*Line pressures vary 3.5 psi for each 1 in. Hg. change in Barometric Pressure

**Minimum line pressure checks to be made as follows:

1. Drive - 20-40 MPH coast with foot off throttle. Park and Neutral can be checked at 1000 RPM.
2. Low - 20-40 MPH coast with foot off throttle.
3. Reverse - coast with foot off throttle.

NOTE: PRESSURE TAP IS LOCATED BESIDE THE LOW SERVO COVER. See Figure 74-371.

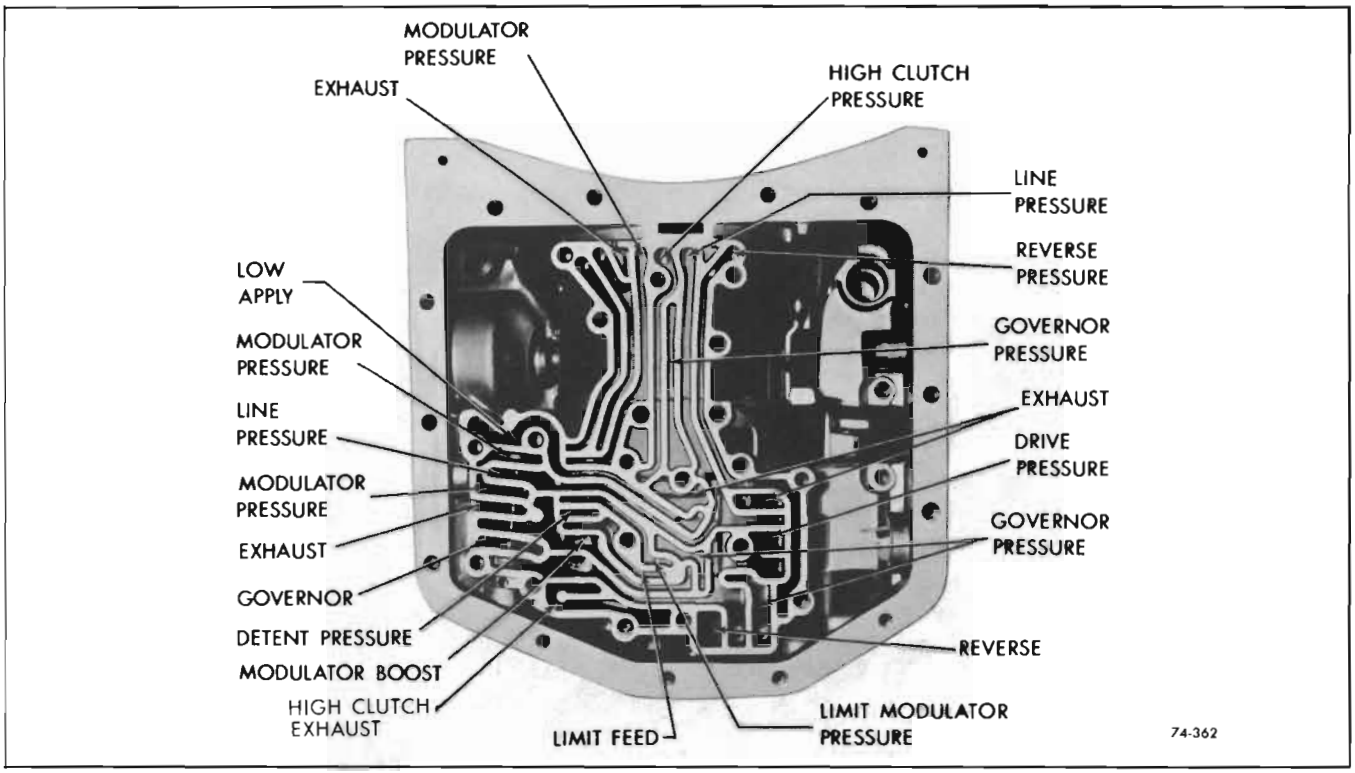

Figure 74-362—Oil, Passages in Bottom of Transmission Case

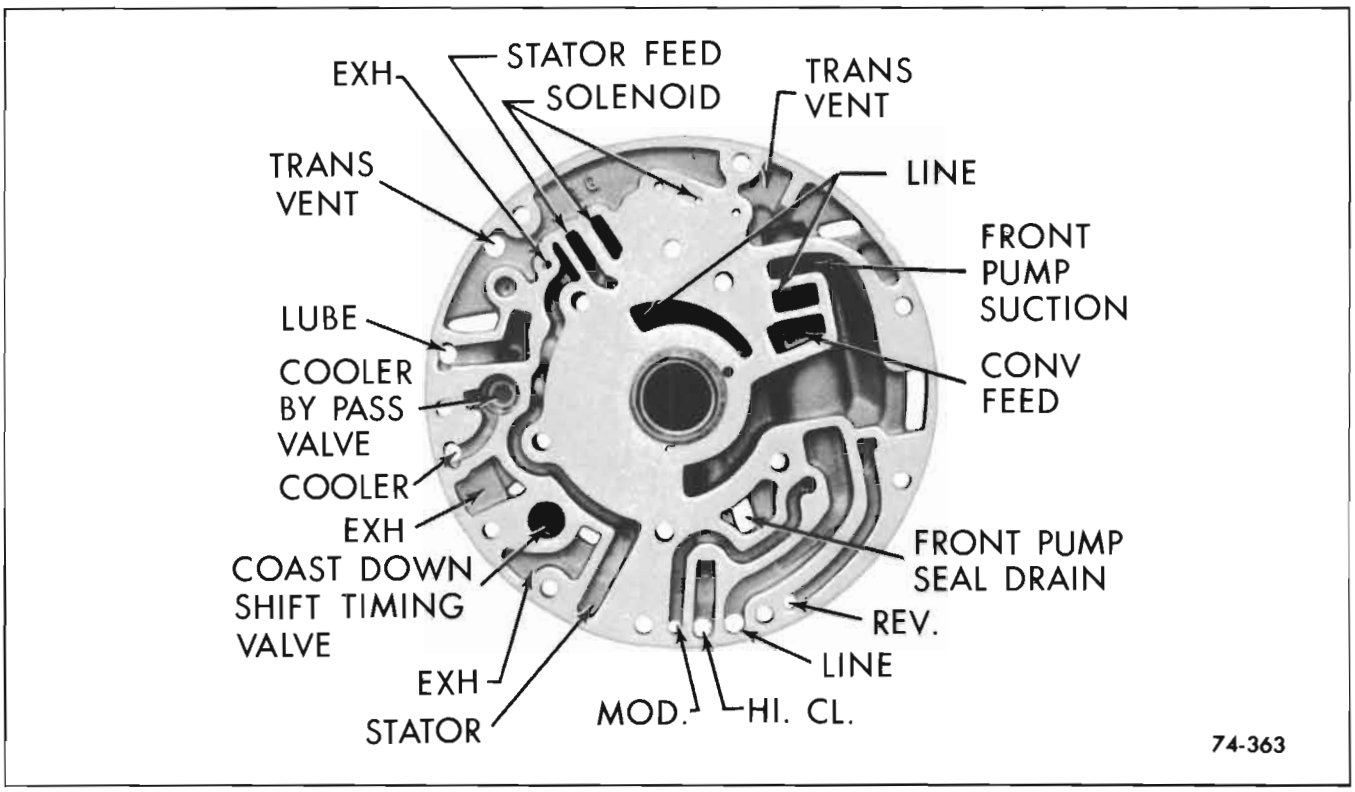

Figure 74-363—Oil Passages in Pump Cover

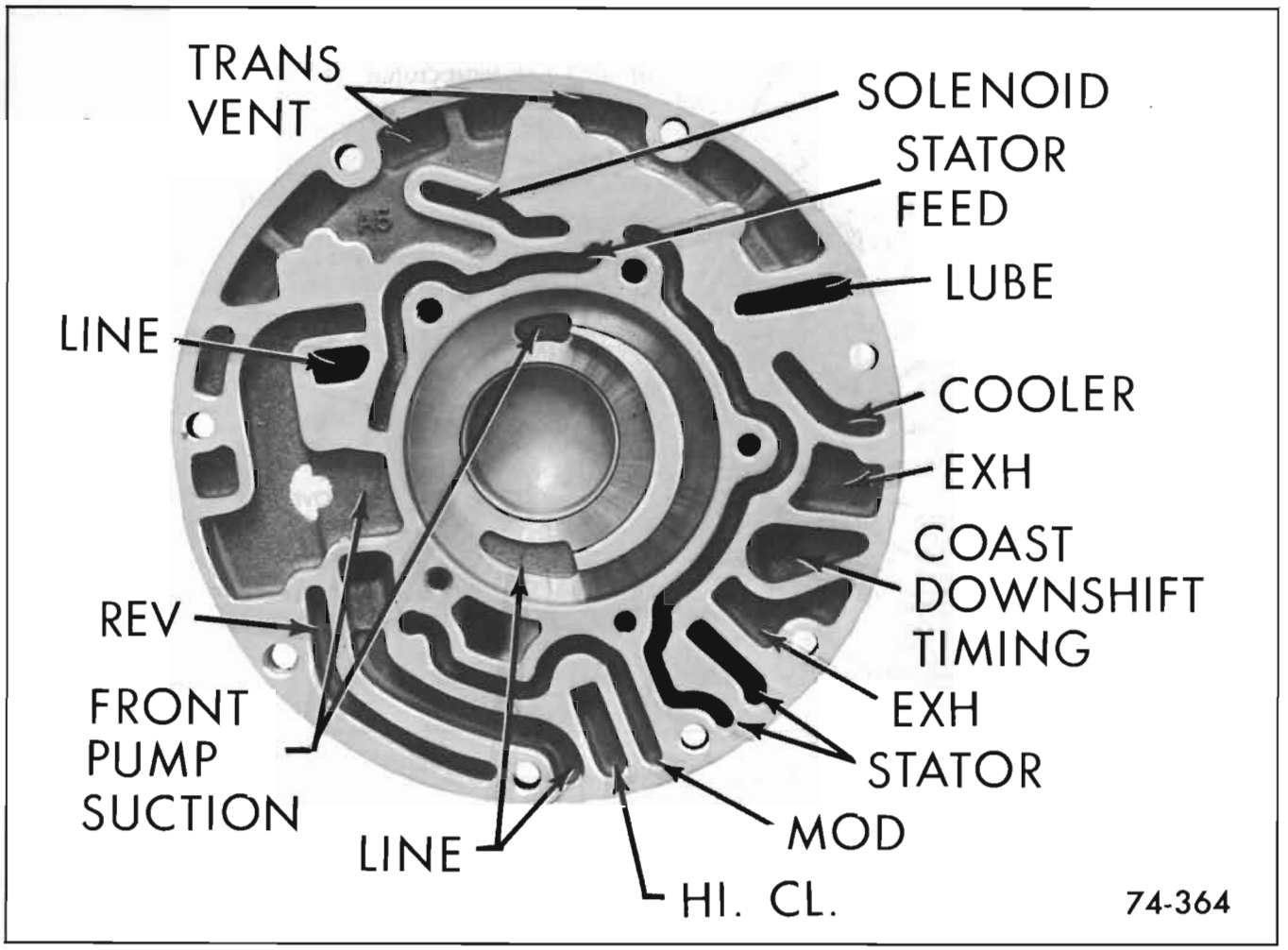

Figure 74-364—Oil Passages in Pump Body

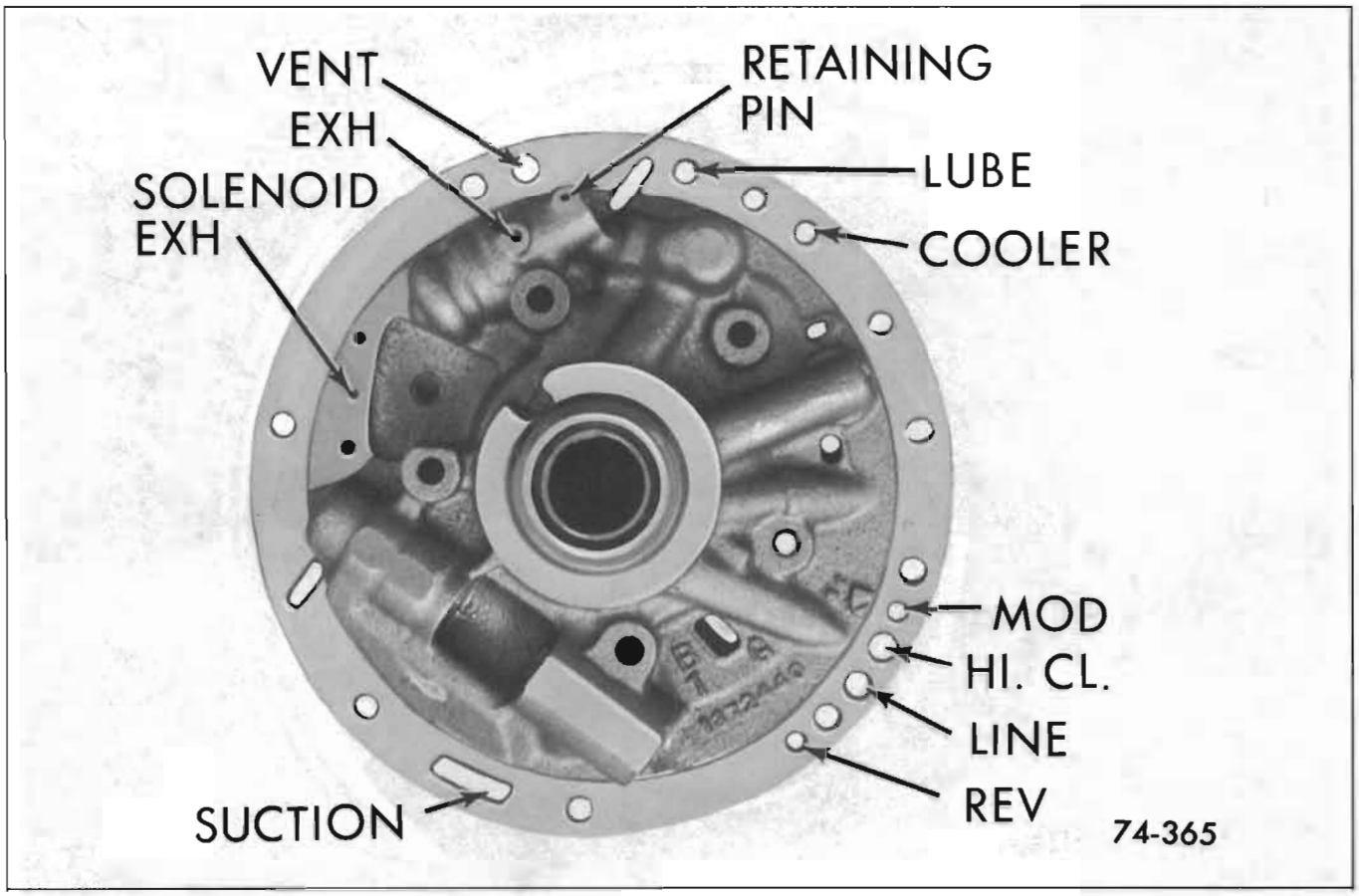

Figure 74-365—Oil Passages in Rear Face of Pump Cover

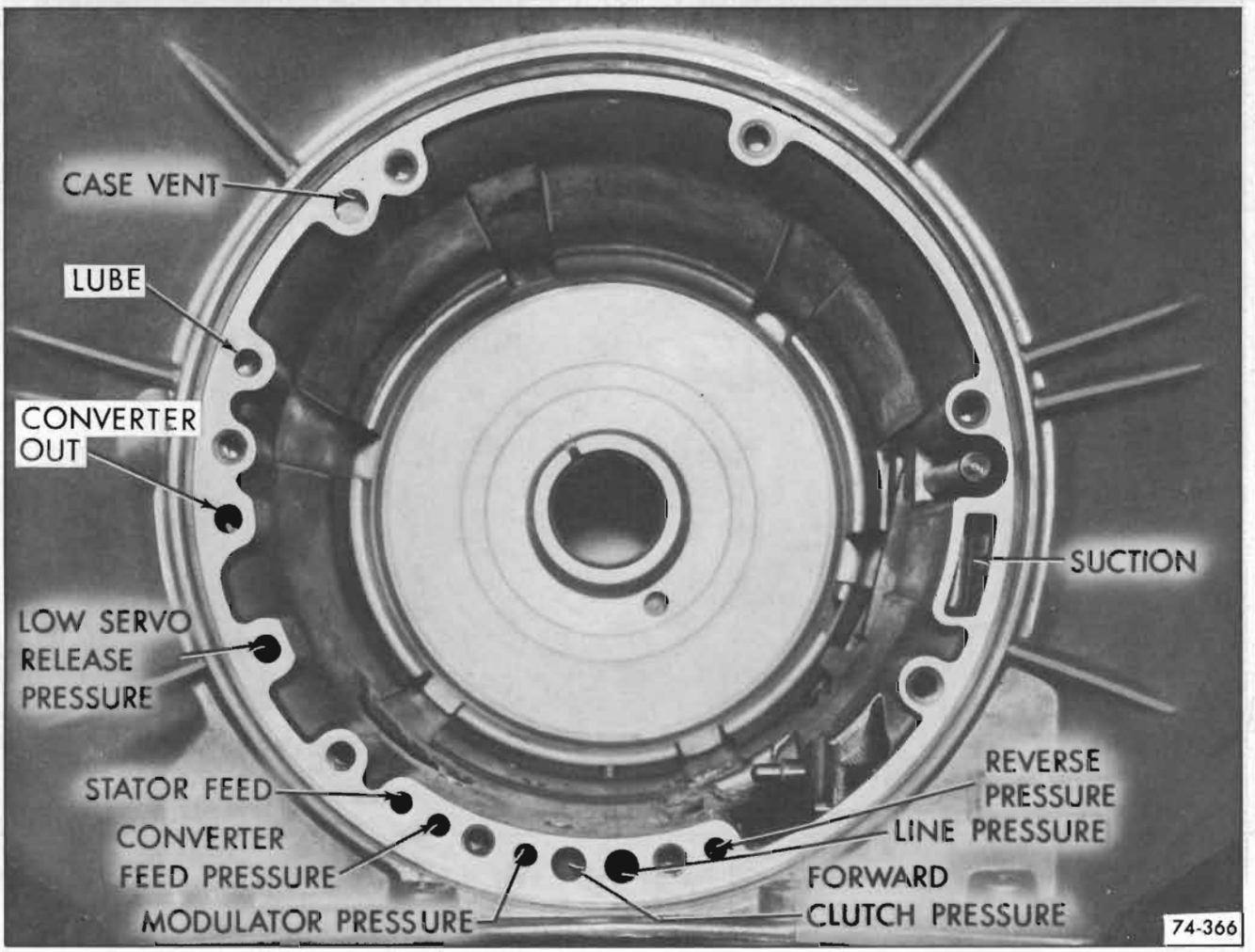

Figure 74-366—Oil Passages in Front Transmission Case

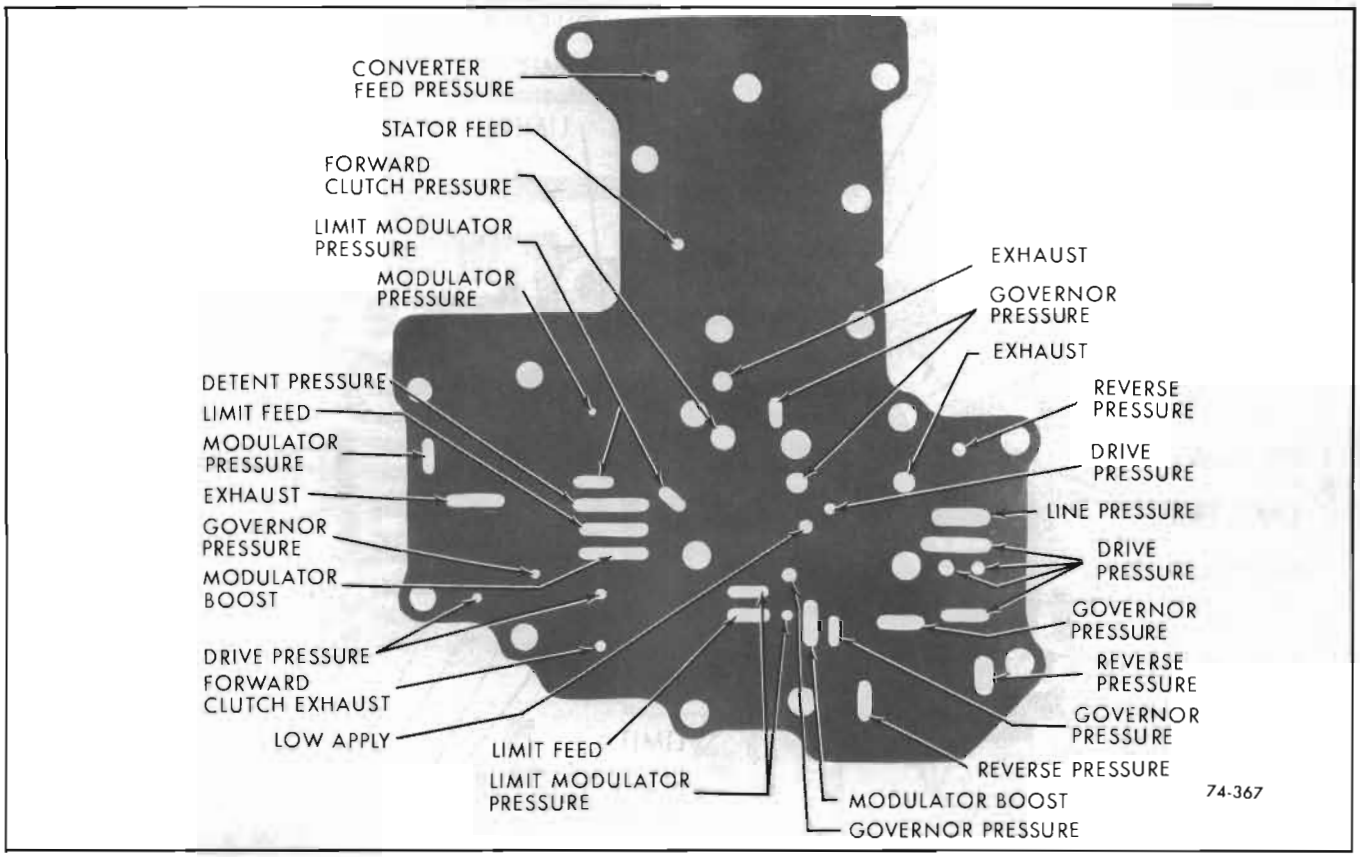

Figure 74-367—Valve Body Plate

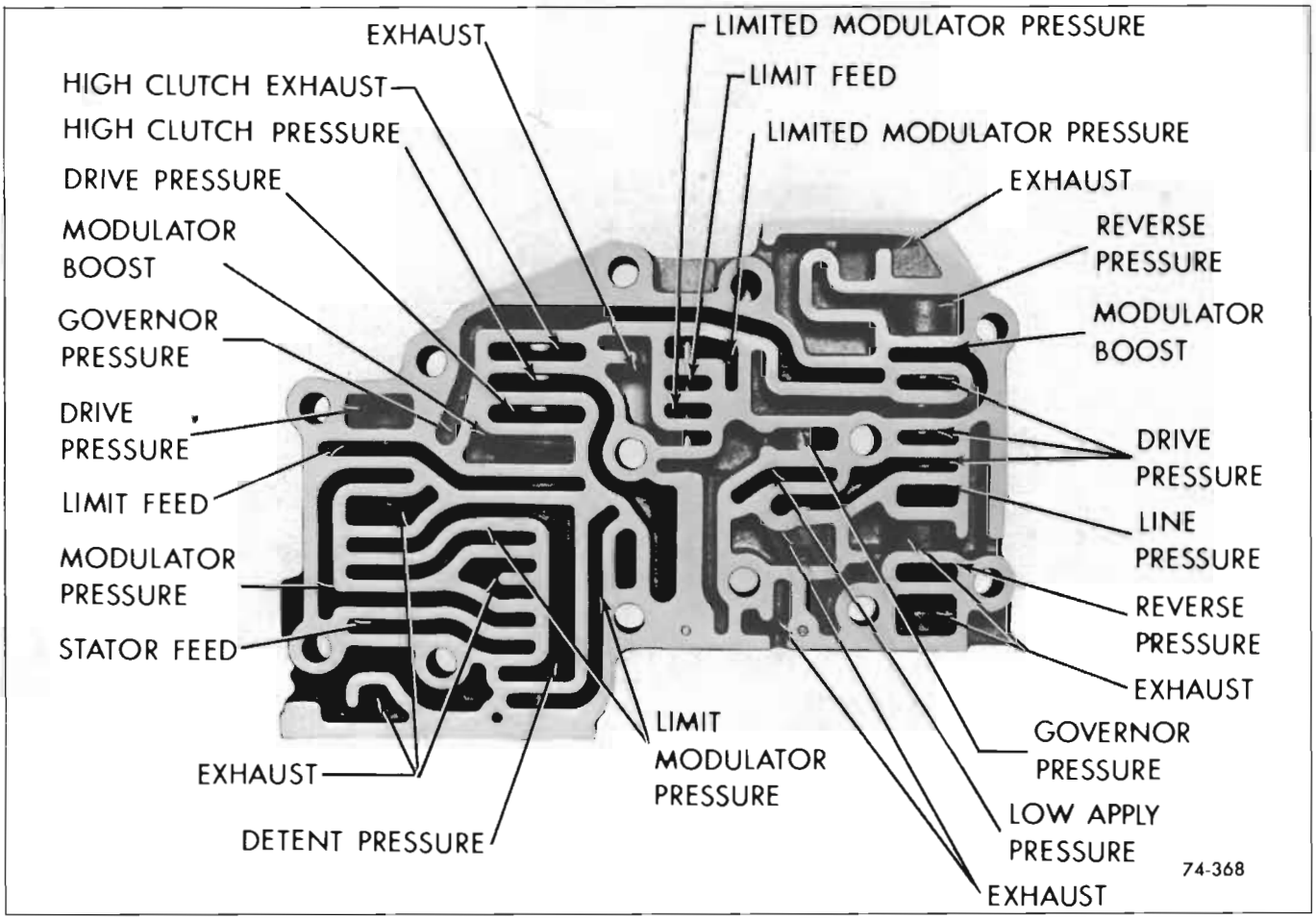

Figure 74-368—Oil Passages in Main Valve Body

Figure 74-369—Checking for Plug in Front Pump Cover

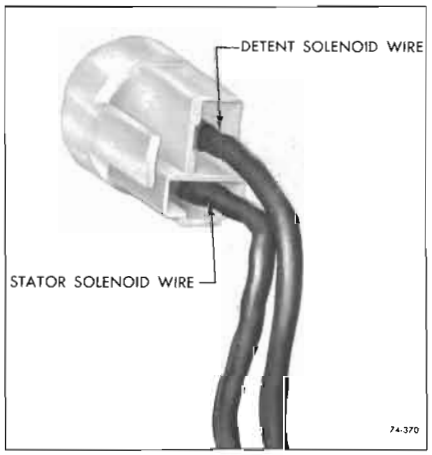

Figure 74-370—Location of Solenoid Wires

Figure 74-371— Super Turbine "300" Transmission Pressure Checks

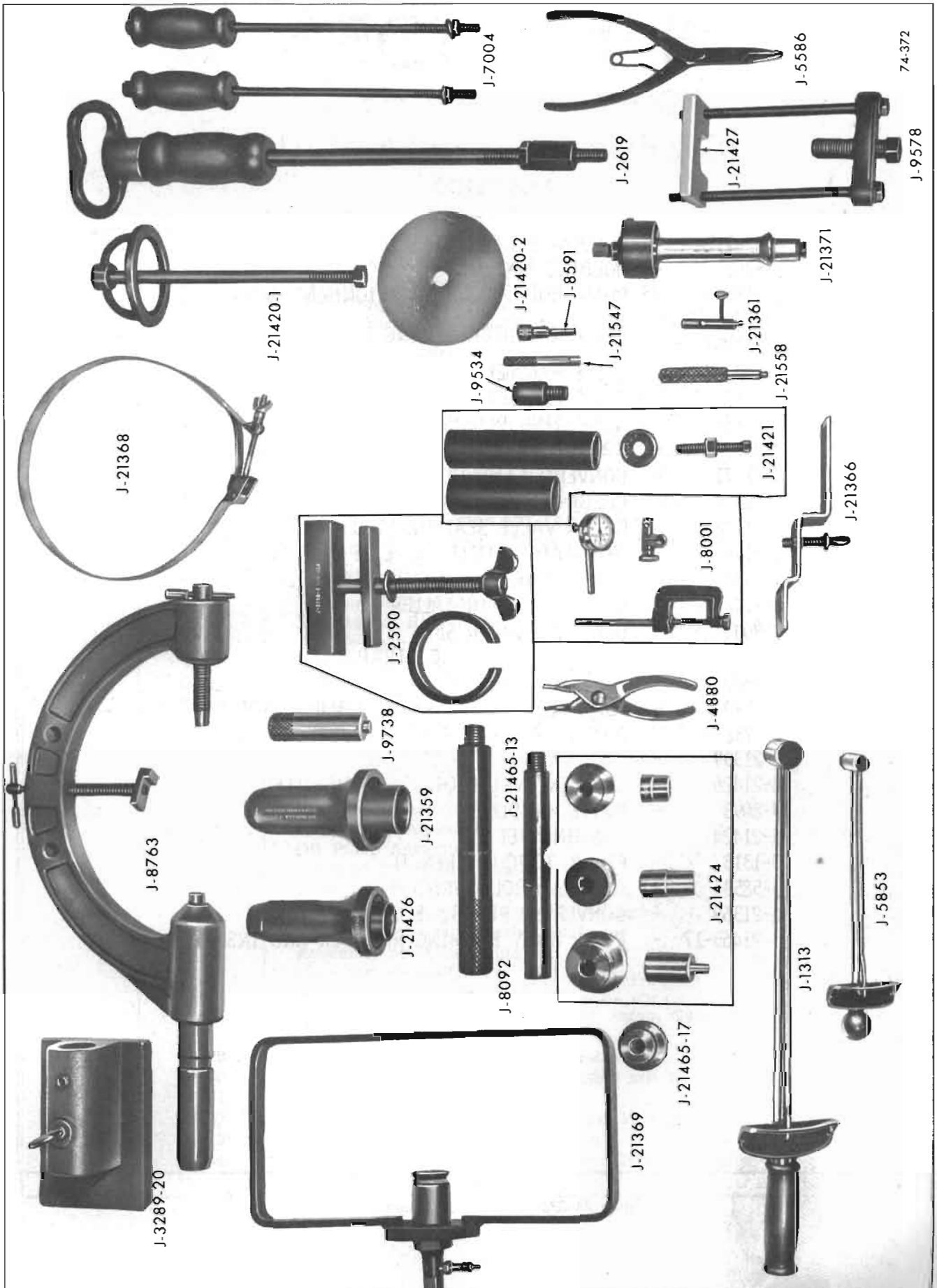

Figure 74-372—Special Tools

J-3289-20	-	HOLDING FIXTURE BASE
J-8763	-	HOLDING FIXTURE
J-21368	-	PUMP BODY TO COVER ALIGNMENT BAND
J-21420-1 J-21420-2	-	REVERSE CLUTCH SPRING COMPRESSOR
J-7004	-	SLIDE HAMMER
J-2619	-	SLIDE HAMMER
J-5586	-	SNAP RING PLIERS
J-9578	-	SPEEDO GEAR REMOVER
J-21371	-	CONVERTER END PLAY CHECKING FIXTURE
J-21361	-	CHECK VALVE SEAT REMOVER
J-21558	-	CHECK VALVE SEAT INSTALLER
J-21547	-	MODULATOR LIMIT VALVE SPRING COMPRESSOR
J-9534	-	PLANET CARRIER BUSHING REMOVER
J-21421	-	SPEEDO GEAR INSTALLER
J-8001	-	DIAL INDICATOR SET
J-21366	-	CONVERTER HOLDING STRAP
J-4880	-	SNAP RING PLIERS
J-2590	-	FORWARD CLUTCH SPRING COMPRESSOR
J-9738	-	OUTER SHIFT LEVER SEAL INSTALLER
J-21359	-	OIL PUMP SEAL INSTALLER
J-21426	-	CASE EXTENSION OIL SEAL INSTALLER
J-8093	-	DRIVE HANDLE
J-21424	-	BUSHING SET
J-1313	-	FT. LB. TORQUE WRENCH
J-5853	-	IN. LB. TORQUE WRENCH
J-21369	-	CONVERTER PRESSURE CHECK FIXTURE
J-21465-17	-	PUMP BODY BUSHING REMOVER AND INSTALLER

Figure 74-373—Special Tool Identification