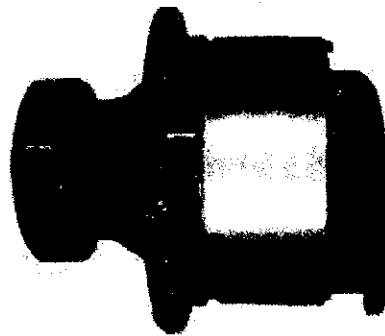
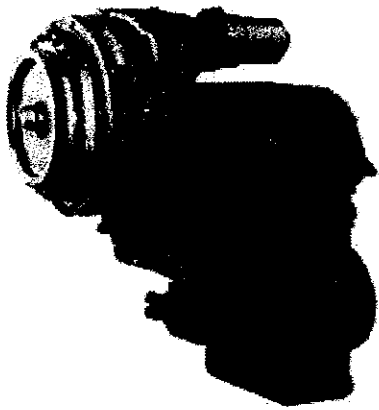
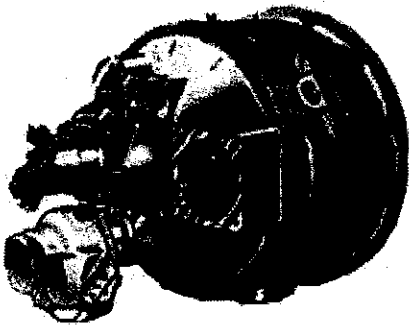


18000 3 SPEED INTERMEDIATE DROP 0114



SPICER OFF-HIGHWAY COMPONENTS



FOREWORD

This manual has been prepared to provide the customer and the maintenance personnel with information and instructions on the maintenance and repair of the **CLARK-HURTH COMPONENTS** product.

Extreme care has been exercised in the design, selection of materials and manufacturing of these units. The slight outlay in personal attention and cost required to provide regular and proper lubrication, inspection at stated intervals, and such adjustments as may be indicated will be reimbursed many times in low cost operation and trouble free service.

In order to become familiar with the various parts of the product, its principal of operation, trouble shooting and adjustments, it is urged that the mechanic study the instructions in this manual carefully and use it as a reference when performing maintenance and repair operations.

Whenever repair or replacement of component parts is required, only **Clark-Hurth Components**-approved parts as listed in the applicable parts manual should be used. Use of "will-fit" or non-approved parts may endanger proper operation and performance of the equipment. **Clark-Hurth Components** does not warrant repair or replacement parts, nor failures resulting from the use of parts which are not supplied by or approved by **Clark-Hurth Components**. **IMPORTANT: Always furnish the Distributor with the serial and model number when ordering parts.**

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NOTE: Metric Dimensions Shown in Brackets [].

HOW THE UNITS OPERATE

The transmission and hydraulic torque portion of the power train enacts an important role in transmitting engine power to the driving wheels. In order to properly maintain and service these units it is important to first understand their function and how they operate.

The transmission and torque converter function together and operate through a common hydraulic system. It is necessary to consider both units in the study of their function and operation.

To supplement the text below, and for reference use therewith, the following illustrations are provided:

SECTIONAL VIEWS AND PARTS IDENTIFICATION

Basic Design.....	Fig. A
Converter and Transmission Case Group.....	Fig. B
Converter Group.....	Fig. C
Three Speed Gear and Clutch Group.....	Fig. D
Control Valve Assembly.....	Fig. E
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External Plumbing and Pressure Check Points.....	Fig. G
Assembly Instructions.....	Fig. H
HR18000 Typical Cross Section	Fig. I

The HR Model consists of a torque converter and powershifted transmission in one package mounted directly to the engine.

The shift control valve assembly is mounted directly on the side of the converter housing. The function of the control valve assembly is to direct oil under pressure to the desired directional and speed clutch. A provision is made on certain models to neutralize the transmission when the brakes are applied. This is accomplished through use of a brake actuated shutoff valve. The speed and direction clutch assemblies are mounted inside the transmission case and are connected to the output shaft of the converter by direct gearing. The purpose of the speed or directional clutches is to direct the power flow through the gear train to provide the desired speed range and direction.

With the engine running, the converter charging pump draws oil from the transmission sump through the removable oil suction screen and directs it through the pressure regulating valve and oil filter.

The pressure regulating valve maintains pressure to the transmission control cover for actuating the direction and speed clutches. This requires a small portion of the total volume of oil used in the system. The remaining volume of oil is directed through the torque converter circuit to the oil cooler and returns to the transmission for positive lubrication. This regulator valve consists of a hardened valve spool operating in a closely fitted bore. The valve spool is spring loaded to hold the valve in a closed position. When a specific pressure is achieved, the valve spool works against the spring until a port is exposed along the side of the bore. This sequence of events provides the proper system pressure.

After entering the converter housing the oil is directed through the stator support to the converter blade cavity and exits in the passage between the turbine shaft and converter support. The oil then flows out of the converter to the oil cooler. After leaving the cooler, the oil is directed to a lubricating fitting on the transmission and through a series of tubes and passages lubricates the transmission bearings and clutches. The oil then gravity drains to the transmission sump.

The hydraulic torque converter consists basically of three elements and their related parts to multiply engine torque. The engine power is transmitted from the engine flywheel to the impeller element through the impeller cover. This element is the pump portion of the hydraulic torque converter and is the primary component which starts the oil flowing to the other components which results in torque multiplication. This element can be compared to a centrifugal pump in that it picks up fluid at its center and discharges at its outer diameter.

The torque converter turbine is mounted opposite the impeller and is connected to the output shaft of the torque converter. This element receives fluid at its outer diameter and discharges at its center. Fluid directed by the impeller out into the particular design of blading in the turbine and reaction member is the means by which the hydraulic torque converter multiplies torque.

The reaction member of the torque converter is located between and at the center or inner diameters of the impeller and turbine elements. Its function is to take the fluid which is exhausting from the inner portion of the turbine and change its direction to allow correct entry for recirculation into the impeller element.

The torque converter will multiply engine torque to its designed maximum multiplication ratio when the output shaft is at zero RPM. Therefore, we can say that as the output shaft is decreasing in speed the torque multiplication is increasing.

The shift control valve assembly consists of a valve body with selector valve spools. A detent ball and spring in the selector spool provides one position for each speed range. A detent ball and spring in the direction spool provides three positions, one each for forward, neutral and reverse.

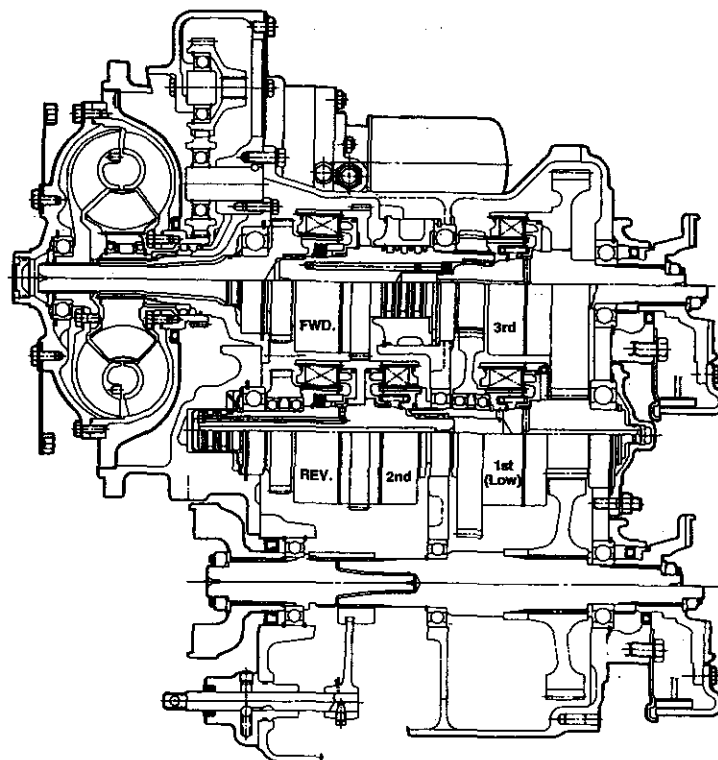
With the engine running and the directional control lever in neutral position, oil pressure from the regulating valve is blocked at the control valve, and the transmission is in neutral. Movement of the forward and reverse spool will direct oil, under pressure to either the forward or reverse direction clutch as desired.

When either directional clutch is selected the opposite clutch is relieved of pressure and vents back through the direction selector spool. The same procedure is used in the speed selector.

The direction or speed clutch assembly consists of a drum with internal splines and a bore to receive a hydraulically actuated piston. The piston is "oil tight" by the use of sealing rings. A steel disc with external splines is inserted into the drum and rests against the piston. Next, a friction disc with splines at the inner diameter is inserted. Discs are alternated until the required total is achieved. A heavy back-up plate is then inserted and secured with a snap ring. A Hub with O.D. splines is inserted into the splines of discs with teeth on the inner diameter. The discs and hub are free to increase in speed or rotate in the opposite direction as long as no pressure is present in that specific clutch.

To engage the clutch, as previously stated, the control valve is placed in the desired position. This allows oil under pressure to flow from the control valve, through a passageway, to a chosen clutch shaft. This shaft has a drilled passageway for oil under pressure to enter the shaft. Oil pressure sealing rings are located on the clutch shaft. These rings direct oil under pressure to a desired clutch. Pressure of the oil forces the piston and discs against the heavy back-up plate. The discs, with teeth on the outer diameter, clamping against discs with teeth on the inner diameter, enables the hub and clutch shaft to be locked together and allows them to drive as a unit.

There are bleed balls or bleed orifices, depending upon the model, in the clutch piston which allow quick escape for oil when the pressure to the piston is released.



**BASIC DESIGN
HR MODEL**

Figure A

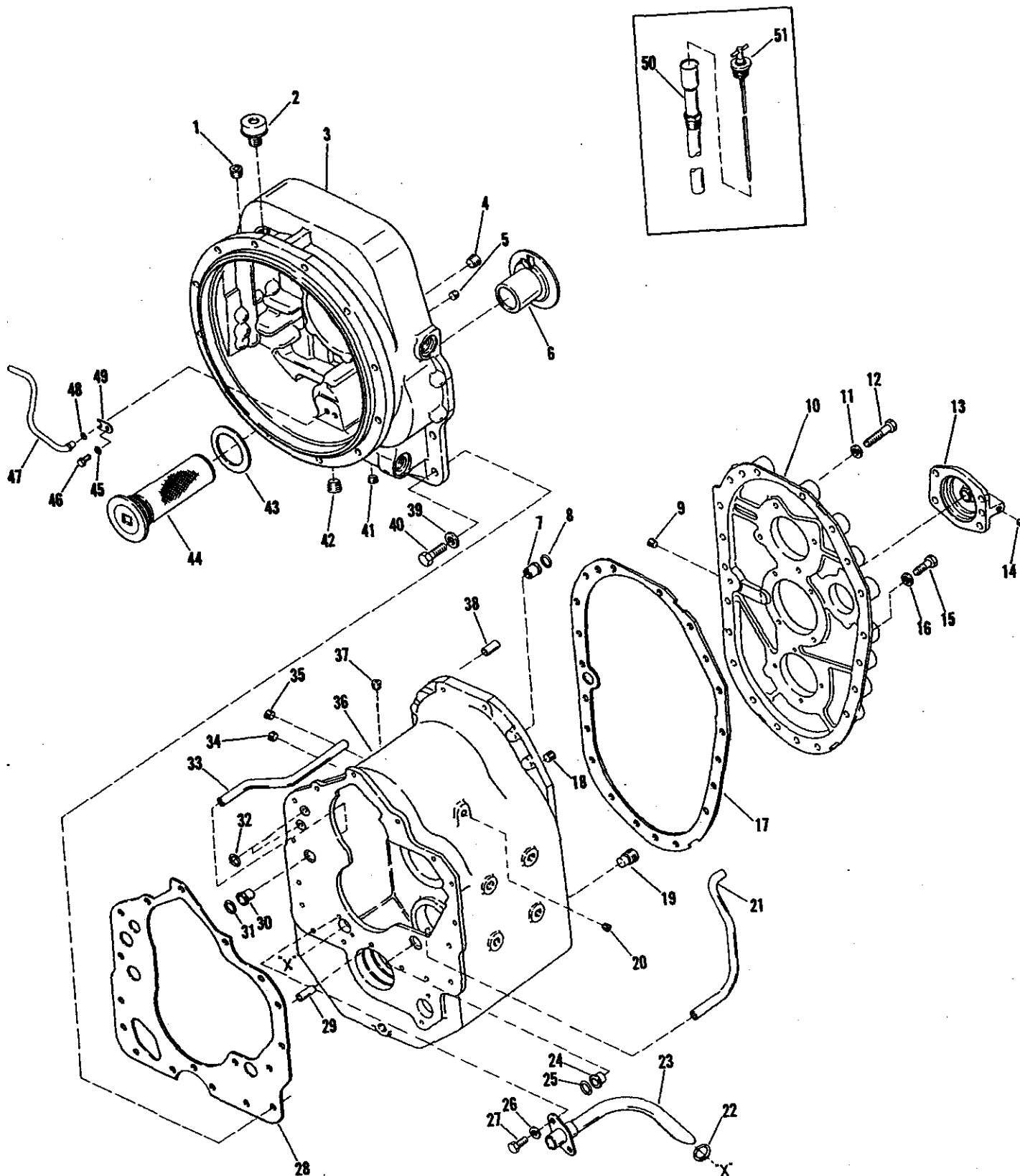


Figure B

**18000 CONVERTER HOUSING, TRANSMISSION,
CASE & REAR COVER GROUP**

SEE PAGE 67 FOR R-MODEL FRONT COVER GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Pipe Plug	1	26	Retainer Screw Lockwasher	2
2	Air Breather	1	27	Suction Line Retainer Screw	2
3	Converter Housing	1	28	Converter Housing to Trans.	
4	Pipe Plug	1		Case Gasket	1
5	Pipe Plug	1	29	Dowel Pin	1
6	Converter Housing Sleeve	1	30	Tube Sleeve	1
7	Tube Sleeve	1	31	Pressure Tube "O" Ring	1
8	Pressure Tube "O" Ring	1	32	Clutch Pressure "O" Ring	2
9	Cover Pipe Plug	1	33	Low Speed Clutch Pressure Tube	1
10	Rear Cover	1	34	Pipe Plug	1
11	Rear Cover to Case Screw		35	Pipe Plug	1
	Lockwasher	10	36	Transmission Case	1
12	Rear Cover to Case Screw	10	37	Dipstick Hole Plug	1
13	Low Shaft Rear Bearing Cap	1	38	Case to Cover Dowel Pin	2
14	Plug	1	39	Housing to Case Screw Lockwasher	16
15	Rear Cover to Case Screw	10	40	Housing to Case Screw	16
16	Rear Cover to Case Screw		41	Pipe Plug	1
	Lockwasher	10	42	Pipe Plug	1
17	Rear Cover to Case Gasket	1	43	Screen Assembly Gasket	1
18	Pipe Plug	1	44	Screen Assembly	1
19	Magnetic Drain Plug	2	45	Tube Clip Screw Lockwasher	1
20	Pipe Plug	1	46	Tube Clip Screw	1
21	Clutch Lube Tube	1	47	Lube Bypass Tube	1
22	Suction Line "O" Ring	1	48	Tube "O" Ring	1
23	Suction Tube Assembly	1	49	Tube Clip	1
24	Tube Sleeve	1	50	Dipstick Tube Assembly	1
25	Pressure Tube "O" Ring	1	51	Dipstick	1

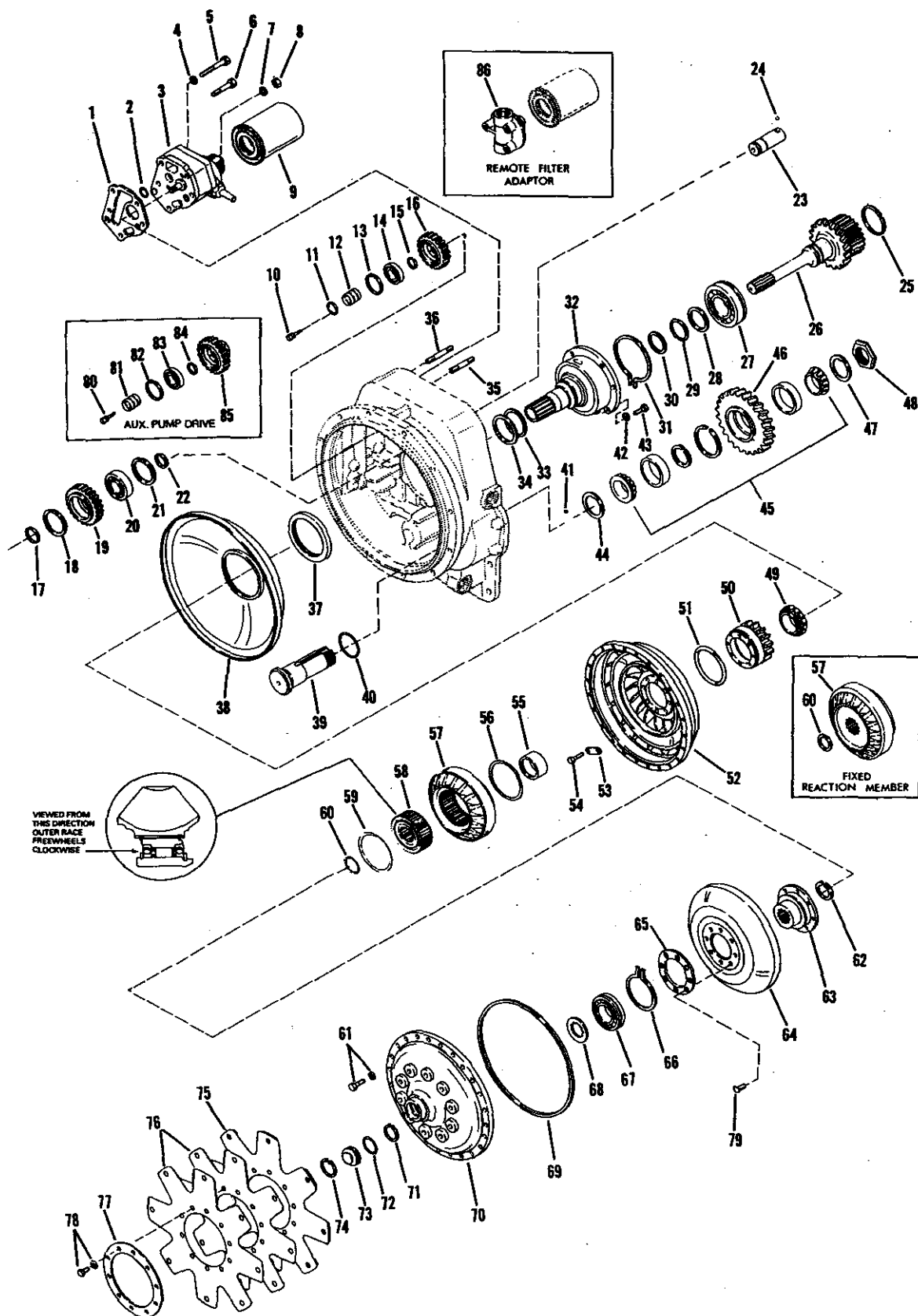


Figure C

HR18000 CONVERTER GROUP
HR MODEL ONLY

ITEM	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY
1	Pump to Housing Gasket	1	44	Bearing Retainer Thrust Plate	1
2	"O" Ring	1	45	Reverse Idler Gear Bearing Assembly	1
3	Charging Pump Assembly	1	46	Reverse Idler Gear	1
4	Pump Mounting Screw Lockwasher	3	47	Bearing Retaining Thrust Plate	1
5	Pump Mounting Screw	1	48	Retaining Plate Nut	1
6	Pump Mounting Screw	2	49	Impeller Hub Gear Bearing	1
7	Pump Mounting Stud Lockwasher	2	50	Impeller Hub Gear	1
8	Pump Mounting Stud Nut	2	51	Impeller Hub "O" Ring	1
9	Filter Assembly	1	52	Impeller	1
10	Bearing Support Screw	2	53	Impeller to Hub Screw Lock Tab	4
11	Bearing Locating Ring	1	54	Impeller to Hub Screw	8
12	Pump Drive Bearing Support	1	55	Reaction Member Spacer	1
13	Bearing Retaining Ring	1	56	Freewheel Outer Race Snap Ring	1
14	Pump Drive Gear Bearing	1	57	Reaction Member	1
15	Bearing Locating Ring	1	58	Freewheel Assembly	1
16	Pump Drive Gear	1	59	Freewheel Outer Race Snap Ring	1
17	Idler Gear Bearing Locating Ring	1	60	Reaction Member Retainer Ring	1
18	Idler Gear Bearing Retaining Ring	1	61	Impeller to Cover Screw and Lockwasher	18
19	Pump Drive Idler Gear	1	62	Turbine Retaining Ring	1
20	Idler Stub Shaft Bearing	1	63	Turbine Hub	1
21	Bearing Retaining Ring	1	64	Turbine	1
22	Bearing Locating Ring	1	65	Turbine Backing Ring	1
23	Idler Gear Stub Shaft	1	66	Turbine Hub Bearing Locating Ring	1
24	Stub Shaft Lock Ball	1	67	Turbine Hub Bearing	1
25	Baffle Ring	1	68	Bearing Retaining Washer	1
26	Turbine Shaft & Disc Hub Assembly	1	69	Impeller to Cover "O" Ring	1
27	Turbine Shaft Bearing	1	70	Impeller Cover	1
28	Bearing Locating Washer	1	71	Turbine Retaining Ring	1
29	Bearing Retaining Ring	1	72	Impeller Cover Bore Plug "O" Ring	1
30	Piston Ring	1	73	Bore Plug	1
31	Bearing Snap Ring	1	74	Bore Plug Retaining Ring	1
32	Reaction Member Support	1	75	Drive Plate Assembly	1
33	Piston Ring Expander Spring	1	76	Drive Plate	2
34	Piston Ring	1	77	Drive Plate Backing Ring	1
35	Pump Mounting Stud	1	78	Drive Plate Mounting Screw & Lockwasher	10
36	Pump Mounting Stud	1	79	Turbine Hub Screw	12
37	Oil Seal	1	80	Bearing Support Screw & Lockwasher	2
38	Oil Baffle Assembly	1	81	Auxiliary Pump Drive Bearing Support	1
39	Reverse Idler Shaft	1	82	Bearing Retaining Ring	1
40	Reverse Idler Shaft "O" Ring	1	83	Pump Drive Gear Bearing	1
41	Reverse Idler Shaft Lock Ball	1	84	Bearing Locating Ring	1
42	Support Screw Washer	6	85	Auxiliary Pump Drive Gear	1
43	Reaction Member Support Screw	6	86	Remote Filter Adaptor (Optional)	1

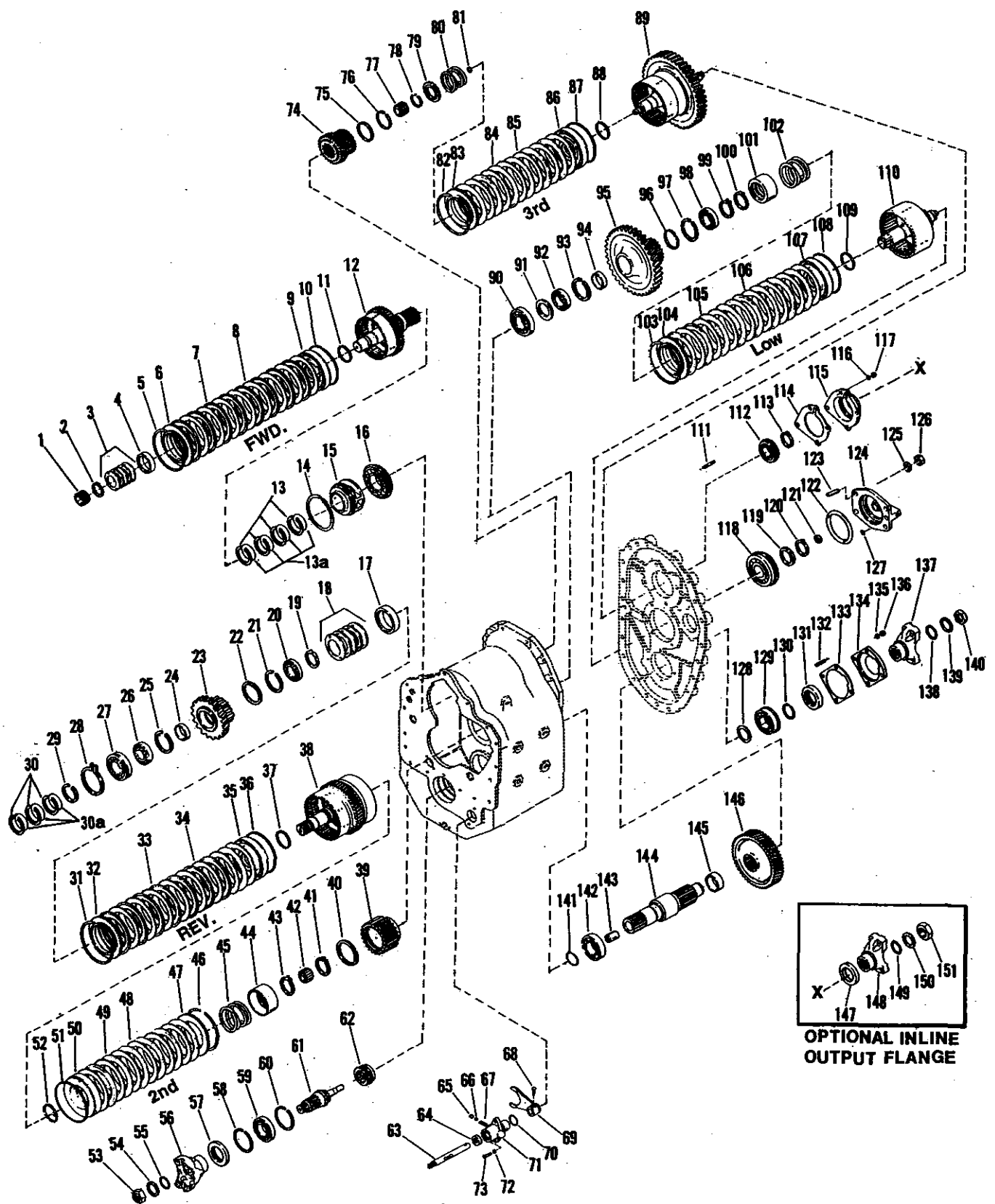


Figure D

18000 INTERMEDIATE DROP CLUTCH & GEAR GROUP

ITEM	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY
1	Forward Shaft Pilot Bearing	1	76	3rd Gear & Hub Retainer Ring	1
2	Spring Retaining Snap Ring	1	77	Pilot Bearing	1
3	Piston Return Disc Spring	5	78	Spring Retainer Snap Ring	1
4	Piston Return Spring Spacer	1	79	Spring Retainer	1
5	Backing Plate Snap Ring	1	80	Piston Return Spring	1
6	Clutch Disc Backing Plate	1	81	3rd Shaft Piston Ring	1
7	Clutch Inner Disc	8	82	Backing Plate Snap Ring	1
8	Clutch Outer Disc	8	83	Clutch Disc Backing Plate	1
9	Clutch Piston	1	84	Clutch Inner Disc	6
10	Clutch Piston Seal - Outer	1	85	Clutch Outer Disc	6
11	Clutch Piston Seal - Inner	1	86	Clutch Piston Assembly	1
12	Forward Shaft Drum & Plug Assembly	1	87	Clutch Piston Seal - Outer	1
13	Forward Shaft Piston Ring	4	88	Clutch Piston Seal - Inner	1
13A	Piston Ring Expander Spring	4	89	3rd Clutch Shaft, Drum & Hub Assembly	1
14	Piston Ring Sleeve Retaining Ring	1	90	Low Speed Shaft Front Bearing	1
15	Piston Ring Sleeve	1	91	Front Bearing Spacer	1
16	Forward Shaft Rear Bearing	1	92	Low Speed Gear Bearing	1
17	Piston Return Spring Spacer	1	93	Low Speed Gear Bearing Locating Ring	1
18	Piston Return Disc Spring	5	94	Low Speed Gear Spacer	1
19	Spring Retainer Snap Ring	1	95	Low Shaft Gear & Hub	1
20	Clutch Driven Gear Bearing	1	96	Baffle Ring	1
21	Bearing Retaining Ring	1	97	Low Speed Gear Bearing Locating Ring	1
22	Baffle Ring	1	98	Low Speed Gear Bearing	1
23	Reverse Clutch Gear & Baffle Ring Assembly	1	99	Low Speed Gear Bearing Retaining Ring	1
24	Clutch Driven Gear Bearing Spacer	1	100	Spring Retainer Snap Ring	1
25	Bearing Retaining Ring	1	101	Spring Retainer	1
26	Clutch Driven Gear Bearing	1	102	Piston Return Spring	1
27	Reverse & 2nd Shaft Front Bearing	1	103	Backing Plate Snap Ring	1
28	Front Bearing Snap Ring	1	104	Clutch Disc Backing Plate	1
29	Front Bearing Retaining Ring	1	105	Clutch Inner Disc	8
30	Reverse & 2nd Shaft Piston Ring	3	106	Clutch Outer Disc	8
30A	Expander Spring	3	107	Clutch Piston	1
31	Backing Plate Snap Ring	1	108	Clutch Piston Seal - Outer	1
32	Clutch Disc Backing Plate	1	109	Clutch Piston Seal - Inner	1
33	Clutch Inner Disc	8	110	Low Clutch Shaft Drum & Bleed Valve Ass'y.	1
34	Clutch Outer Disc	8	111	3rd Shaft Rear Bearing Cap Stud	4
35	Clutch Piston	1	112	3rd Shaft Rear Bearing	1
36	Clutch Piston Seal - Outer	1	113	3rd Shaft Rear Bearing Retaining Ring	1
37	Clutch Piston Seal - Inner	1	114	3rd Shaft Bearing Cap Gasket	1
38	Reverse & 2nd Shaft, Drum & Plug Assembly	1	115	3rd Shaft Rear Bearing Cap	1
39	2nd Clutch Disc Hub	1	116	Bearing Cap Stud Lockwasher	4
40	Baffle Ring	1	117	Bearing Cap Stud Nut	4
41	2nd Clutch Disc Hub Snap Ring	1	118	Low Speed Shaft Rear Bearing	1
42	Reverse & 2nd Shaft Rear Bearing	1	119	Rear Bearing Support Washer	1
43	Spring Retainer Snap Ring	1	120	Rear Bearing Retaining Ring	1
44	Spring Retainer	1	121	Low Shaft Piston Ring	1
45	Piston Return Spring	1	122	Rear Bearing Cap "O" Ring	1
46	Backing Plate Snap Ring	1	123	Bearing Cap Stud	4
47	Clutch Disc Backing Plate	1	124	Low Shaft Bearing Cap	1
48	Clutch Outer Disc	6	125	Bearing Cap Stud Lockwasher	4
49	Clutch Inner Disc	6	126	Bearing Cap Stud Nut	4
50	Clutch Piston	1	127	Bearing Cap "O" Ring	1
51	Clutch Piston Seal - Outer	1	128	Gear Thrust Washer	1
52	Clutch Piston Seal - Inner	1	129	Output Shaft Rear Bearing	1
53	Flange Nut	1	130	Retaining Ring	1
54	Flange Washer	1	131	Output Shaft Rear Bearing Cap Oil Seal	1
55	Flange "O" Ring	1	132	Bearing Cap Stud	4
56	Output Flange	1	133	Bearing Cap Gasket	1
57	Output Oil Seal	1	134	Output Shaft Rear Bearing Cap	1
58	Bearing Retainer Ring	1	135	Bearing Cap Stud Lockwasher	4
59	Bearing	1	136	Bearing Cap Stud Nut	4
60	Bearing Retainer Ring	1	137	Output Flange	1
61	Disconnect Shaft	1	138	Flange "O" Ring	1
62	Shift Hub	1	139	Flange Washer	1
63	Shift Rail	1	140	Flange Nut	1
64	Shift Rail Oil Seal	1	141	Output Shaft Bearing Retaining Ring	1
65	Disconnect Shift Rail Housing Detent Plug	1	142	Output Shaft Front Bearing	1
66	Detent Ball	1	143	Output Shaft Bushing	1
67	Detent Spring	1	144	Output Shaft	1
68	Shift Fork Lockscrew	1	145	Output Gear Spacer	1
69	Shift Fork	1	146	Output Shaft Gear	1
70	Disconnect Shift Rail Housing "O" Ring	1	147	Oil Seal	1
71	Disconnect Shift Rail Support	1	148	Output Flange	1
72	Disconnect Shift Rail Hsg. Lockwasher	2	149	Flange "O" Ring	1
73	Disconnect Shift Rail Hsg. Screw	2	150	Flange Washer	1
74	3rd Gear & Hub Assembly	1	151	Flange Nut	1
75	Baffle Ring	1			

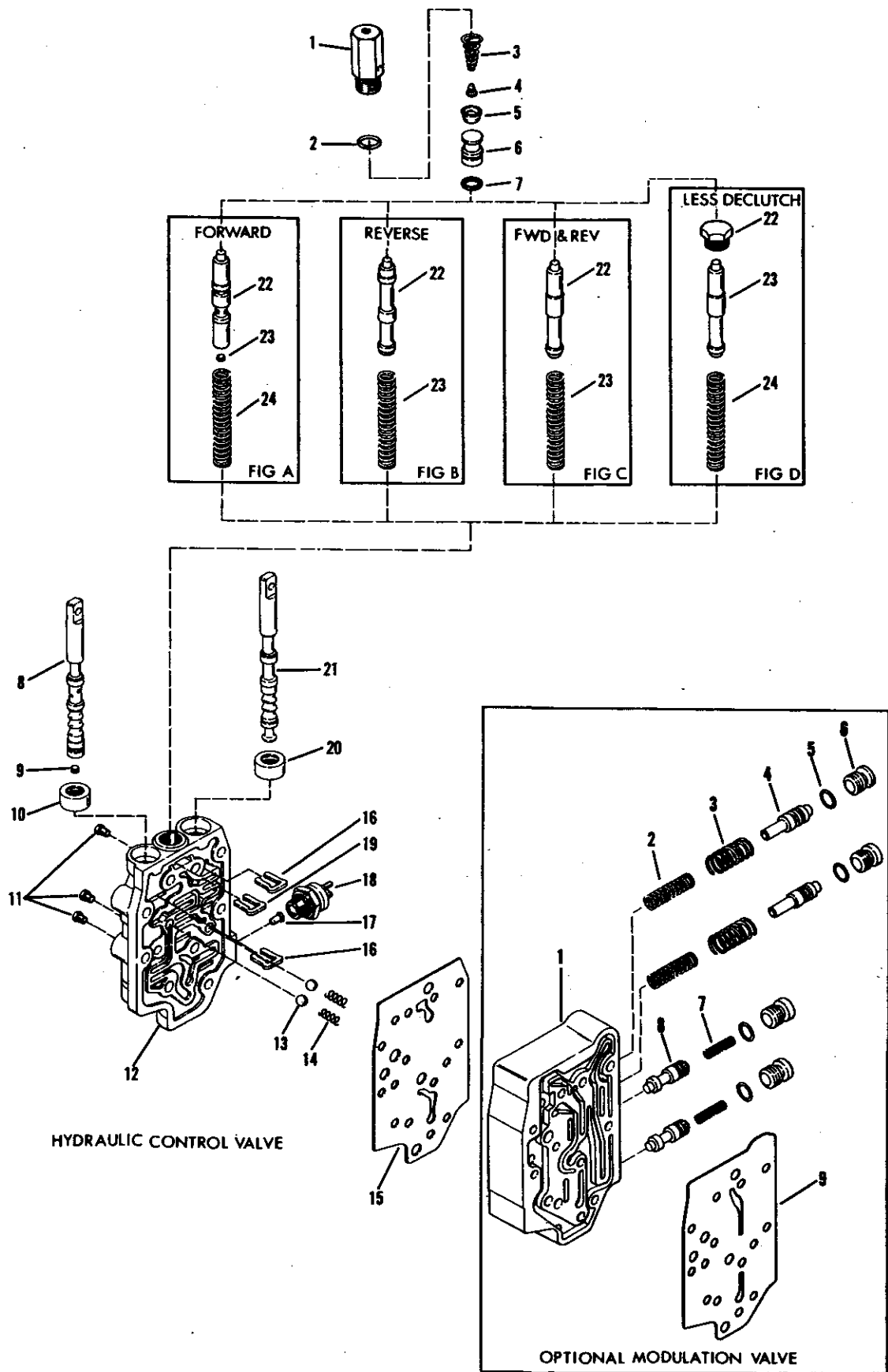


Figure E

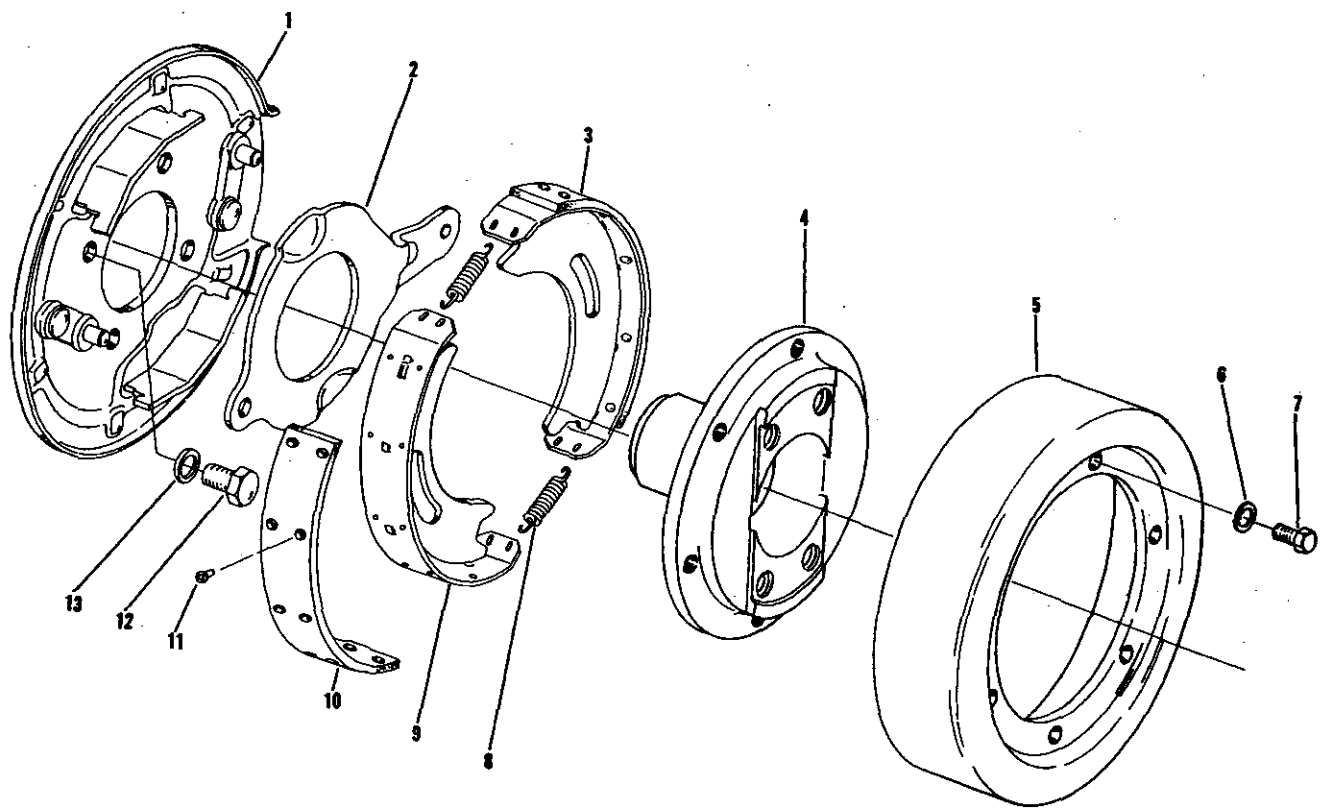
CONTROL VALVE ASSEMBLY

ITEM	DESCRIPTION	QTY.
1	Hydraulic Actuator Assembly	1
2	Piston Housing "O" Ring	1
3	Piston Balance Spring	1
4	Spring Retainer Pin	1
5	Piston Seal	1
6	Piston	1
7	Glyd Ring	1
8	Speed Selector Spool	1
9	Spool Plug	1
10	Oil Seal	1
11	Pipe Plug	3
12	Control Valve Housing	1
13	Detent Ball	2
14	Detent Spring	2
15	Control Valve Gasket	1
16	Valve Spool Stop	2
17	Neutral Switch Actuating Pin	1
18	Neutral Switch	1
19	Declutch Spool Stop	1
20	Oil Seal	1
21	Forward and Reverse Valve Spool	1

NOTE: Items 22 thru 24 are various declutch options.

MODULATOR VALVE ASSEMBLY (Optional)

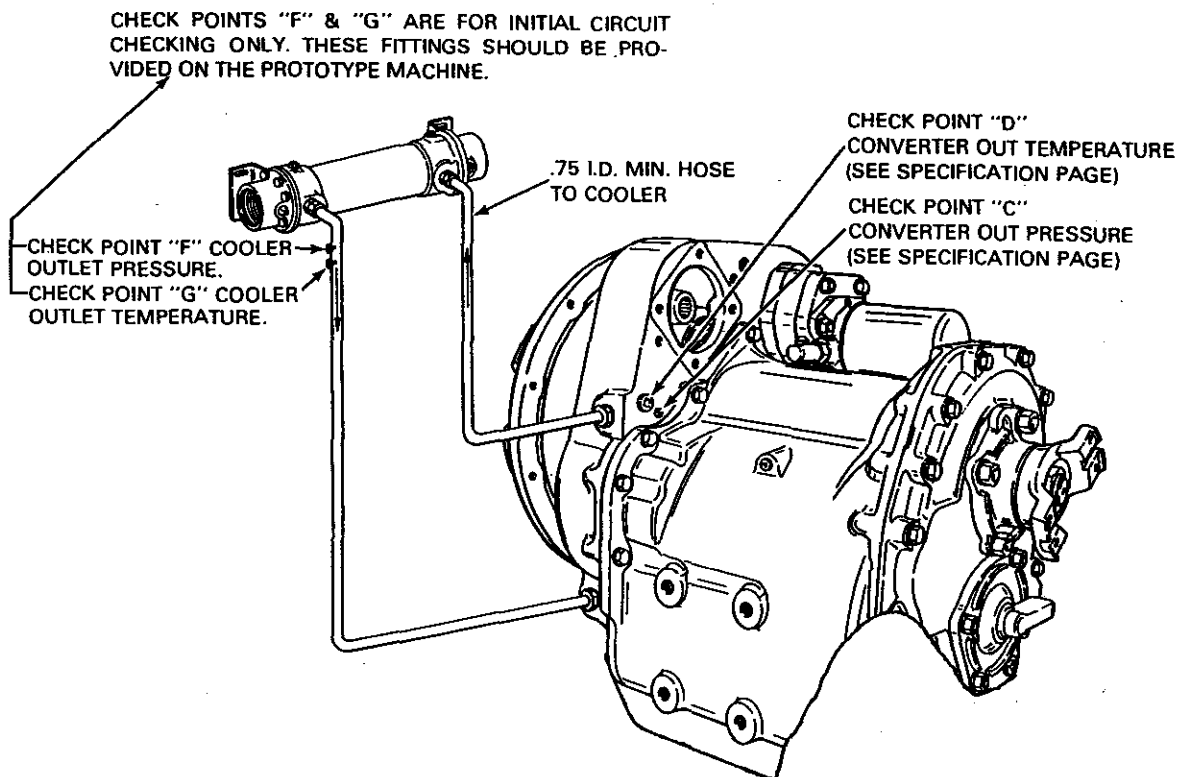
ITEM	DESCRIPTION	QTY.
1	Modulator Valve Housing	1
2	Accumulator Spring (Inner) Not Used on All Models	2
3	Accumulator Spring (Outer)	2
4	Accumulator Valve	2
5	Spool Stop Plug "O" Ring	4
6	Spool Stop Plug	4
7	Regulator Spring	2
8	Regulator Spool	2
9	Modulator Valve to Converter Housing Gasket	1



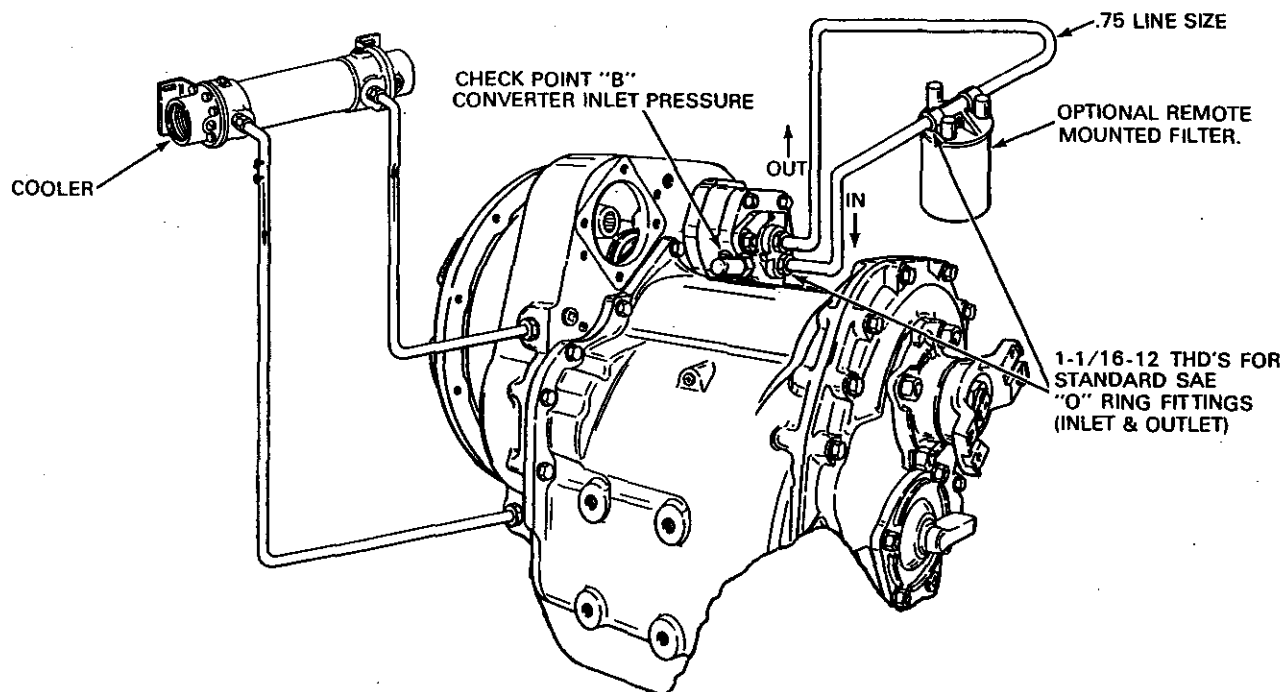
PARKING BRAKE GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Backing Plate Assembly	1	8	Return Spring	2
2	Actuating Lever	1	9	Brake Shoe, See Item 3	
3	Brake Shoe and Lining	1	10	Brake Lining	1
4	Brake Flange	1	11	Brake Lining Rivet	20
5	Brake Drum	1	12	Backing Plate Screw	4
6	Brake Drum to Flange Screw Lockwasher	6	13	Backing Plate Screw Lockwasher	4
7	Brake Drum to Flange Screw	6			

Figure F



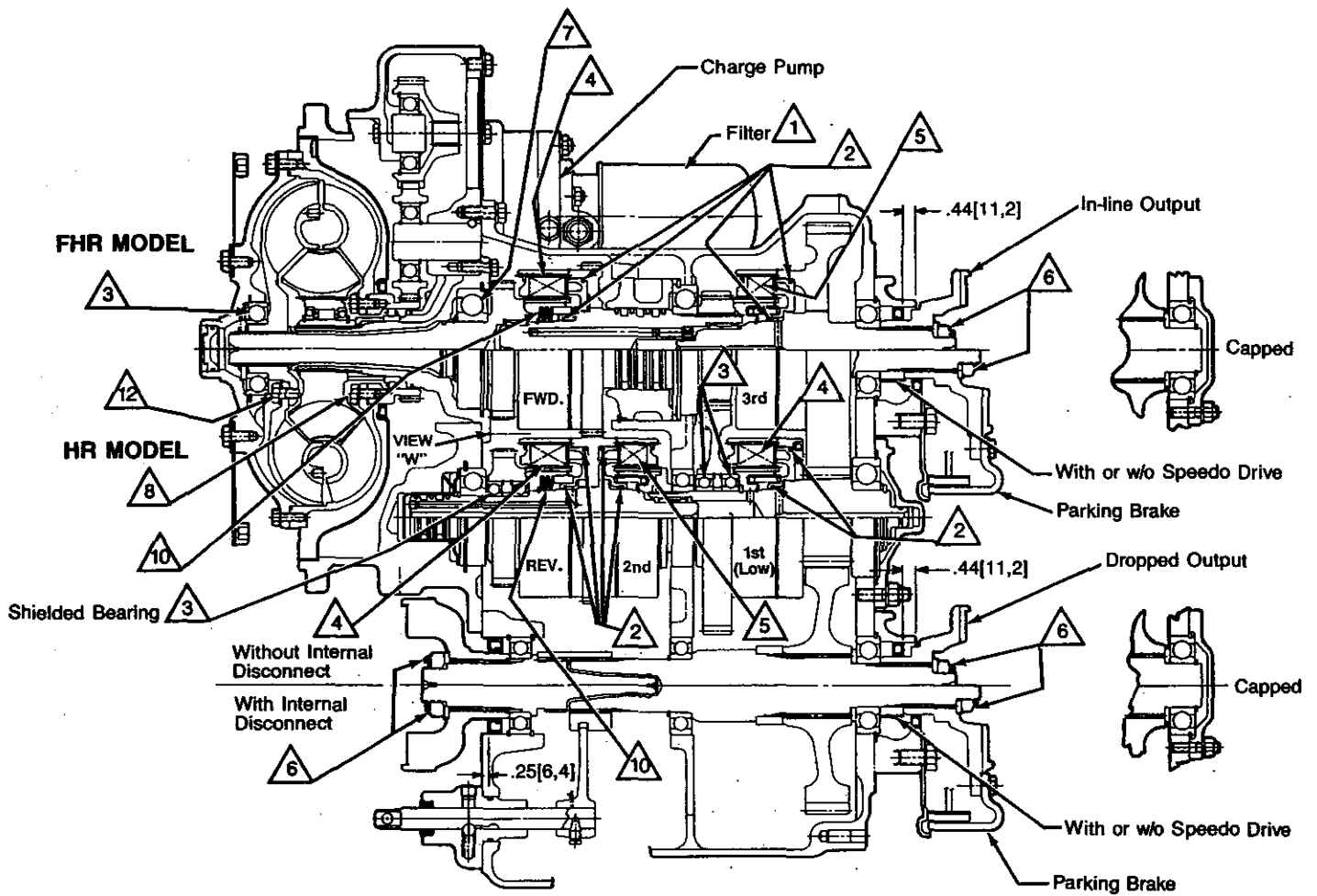
**18000 PLUMBING DIAGRAM
3 SPEED INTERMEDIATE DROP**



**18000 PLUMBING DIAGRAM
3 SPEED INTERMEDIATE DROP
(WITH REMOTE FILTER)**

See page 69 for R-Model plumbing

Figure G



ASSEMBLY INSTRUCTIONS

For R-Model Front End see page 68

Figure H

- 1 Assemble oil filter and tighten
20 to 25 Lbs.Ft. [27,2-33,8 N·m]
- 2 Teflon seals must be sized prior to ass'y.
- 3 Must be loose internal fit bearing with a
No. 3 etched on the bearing.
- 4 8-outer steel plates, 8-inner friction plates.
Alternately assemble, starting with
outer steel plate.
- 5 6-outer steel plates, 6-inner friction plates.
Alternately assemble, starting with
outer steel plate.
- 6 Tighten 200 to 250 Lbs.Ft [271,2-338,9 N·m]
- 7 Special bearing loading notches
opposite snap ring.
- 8 Bend lock tabs after tightening
cap screws to proper torque.
- 9 Tighten oil screen assy.
10 to 15 Lbs.Ft. [13,6-20,3 N·m]
- 10 Forward and Reverse Clutch Piston Return
Disc Springs Concave side of first Disc
Spring to be placed against clutch piston.
Remaining four springs of each clutch to
be stacked alternately reversed as shown.
- 11 Tighten 200-250 Lbs.Ft. [271,2-338,9 N·m]
and stake nut securely into shaft notch.
- 12 Clean mounting surfaces and tapped
holes with solvent. Dry thoroughly,
being certain tapped holes are
dry and clean. See text for proper
installation.
- 13 Front and rear output rotation same
as input when Forward Clutch engaged.

Notes

All lead in chamfers for oil seals, piston rings, and "O" rings must be smooth and free from burrs. Inspect at assembly.

Lubricate all piston ring grooves and "O" rings with oil before assembly.

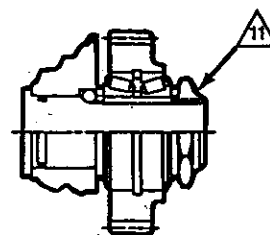
Apply a thin coating of grease between seal lips on lip type seals prior to assembly.

Apply a very light coat of Permatex No. 2 to O.D. of all oil seals and bore plugs before assy.

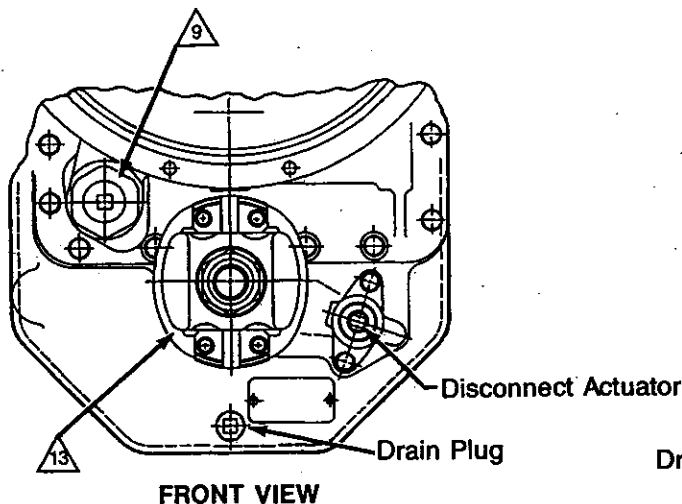
Apply a light coat of Loctite No. 592 to all plug threads.

Apply a light coat of Permatex No. 2 to all thru hole stud threads.

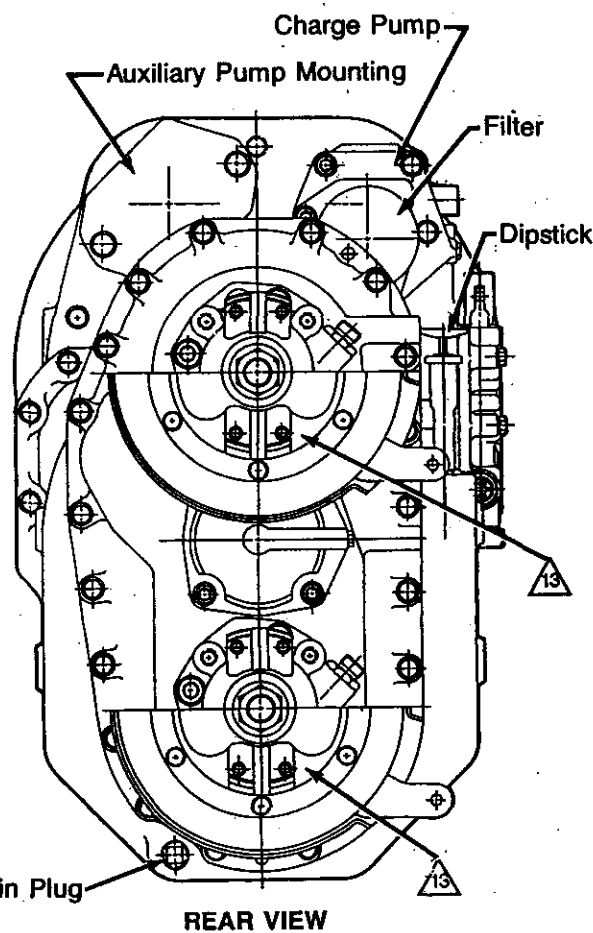
After assembly of parts using Loctite or Permatex, there must not be any free or excess material which might enter the oil circuit.



VIEW "W"
REVERSE IDLER



FRONT VIEW



REAR VIEW



Torque Specification for Lubricated
or Plated Screw Threads



NOM. SIZE	FINE THREAD		COARSE THREAD		FINE THREAD		COARSE THREAD	
	LB-FT	[N·m]	LB-FT	[N·m]	LB-FT	[N·m]	LB-FT	[N·m]
.2500	9 - 11	[12,3 - 14,9]	8 - 10	[10,9 - 13,5]	11 - 13	[15,0 - 17,6]	9 - 11	[12,3 - 14,9]
.3125	16 - 20	[21,7 - 27,1]	12 - 16	[16,3 - 21,6]	28 - 32	[38,0 - 43,3]	26 - 30	[35,3 - 40,6]
.3750	26 - 29	[35,3 - 39,3]	23 - 25	[31,2 - 33,8]	37 - 41	[50,2 - 55,5]	33 - 36	[44,8 - 48,8]
.4375	41 - 45	[55,6 - 61,0]	37 - 41	[50,2 - 55,5]	58 - 64	[78,7 - 86,7]	52 - 57	[70,6 - 77,2]
.5000	64 - 70	[86,8 - 94,9]	57 - 63	[77,3 - 85,4]	90 - 99	[122,1 - 134,2]	80 - 88	[108,5 - 119,3]
.5625	91 - 100	[123,4 - 135,5]	82 - 90	[111,2 - 122,0]	128 - 141	[173,6 - 191,1]	115 - 127	[156,0 - 172,2]
.6250	128 - 141	[173,5 - 191,2]	113 - 124	[153,2 - 168,1]	180 - 198	[224,0 - 268,5]	159 - 175	[215,6 - 237,3]
.7500	223 - 245	[302,3 - 332,2]	200 - 220	[271,2 - 298,3]	315 - 347	[427,1 - 470,5]	282 - 310	[382,3 - 420,3]

Figure H

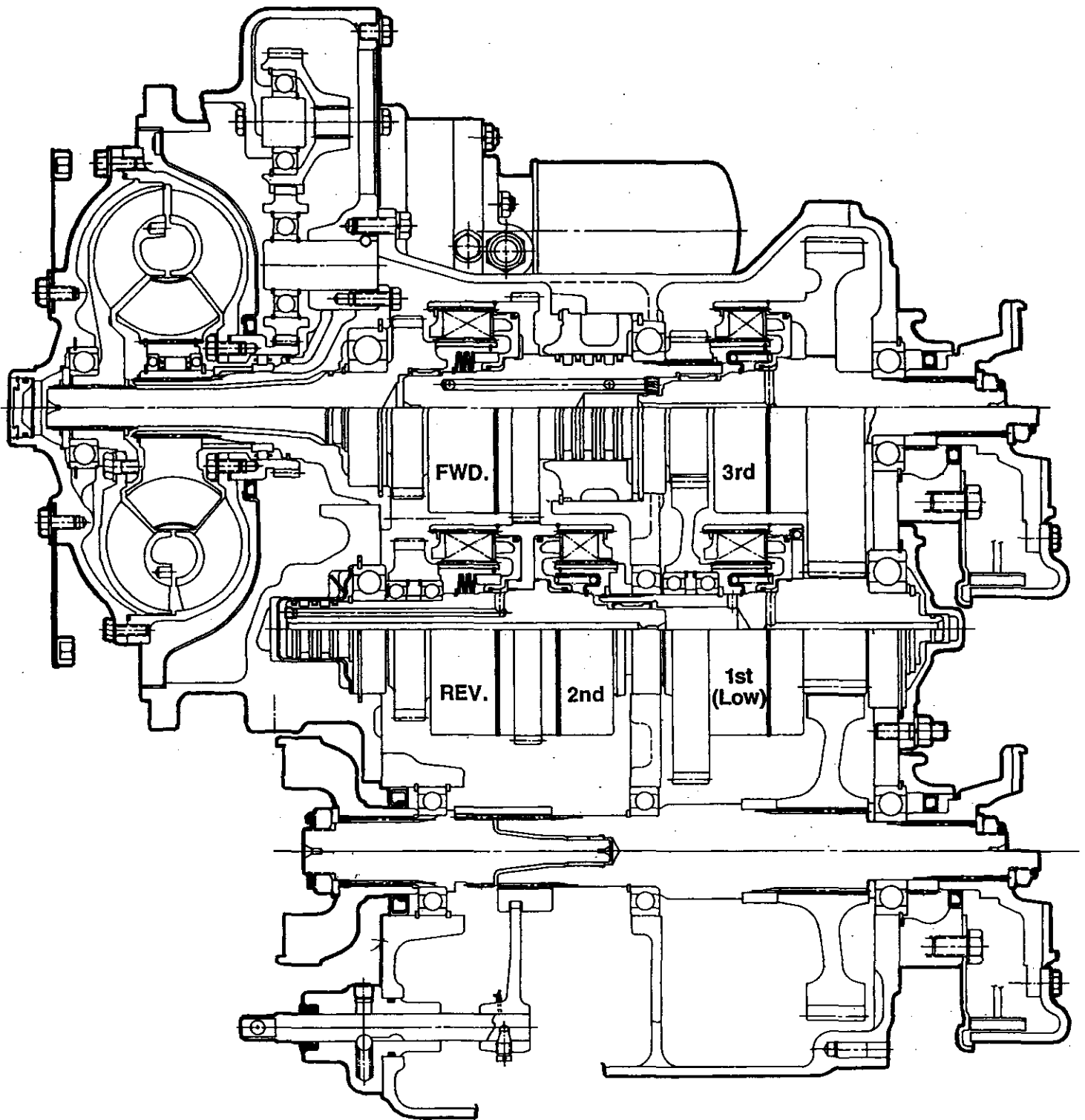


Figure 1

MAINTENANCE AND SERVICE

The instructions contained herein cover the disassembly and reassembly of the transmission in a sequence that would normally be followed after the unit has been removed from the machine and is to be completely overhauled. It must also be understood that this is a basic 18000 transmission with many options. All 18000 transmissions are very similar to trouble shoot, disassemble, repair, and reassemble.

CAUTION: Cleanliness is of extreme importance and an absolute must in the repair and overhaul of this unit. Before attempting any repairs, the exterior of the unit must be thoroughly cleaned to prevent the possibility of dirt and foreign matter entering the mechanism. **NOTE:** For R-Model (remote mounted) front cover removal, service and installation on transmission see page 71, Figure 305.

DISASSEMBLY

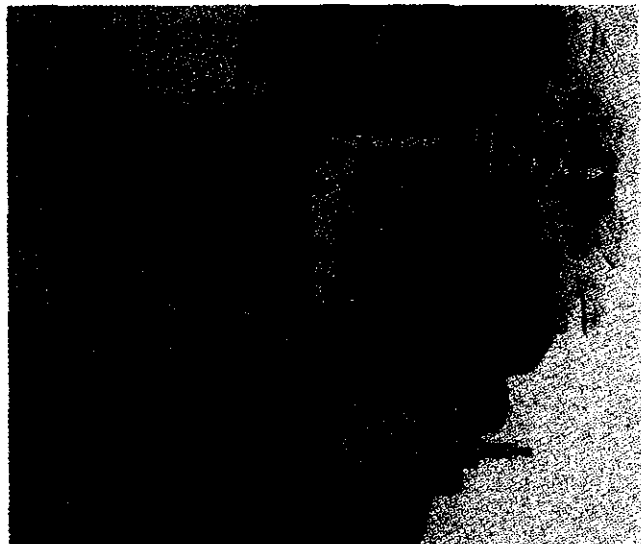


Figure 1

Side view of HR18000 Powershift transmission with a intermediate output.

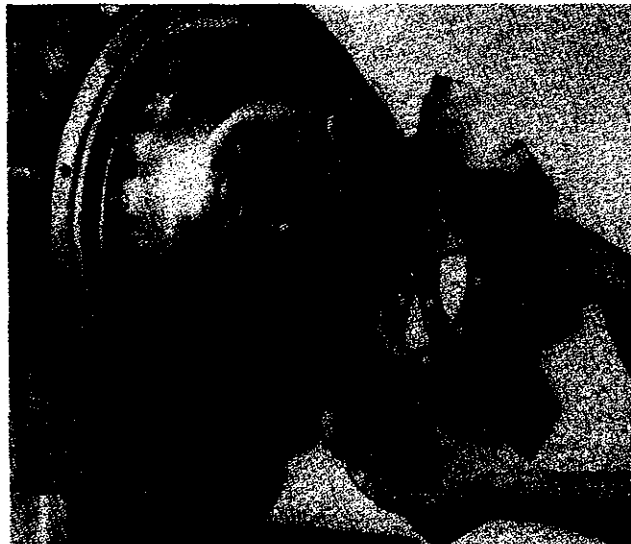


Figure 3

Remove flexplate and backing ring.



Figure 2

Remove flexplate mounting screws and washers.



Figure 4

Loosen filter assembly. It is recommended a small pan be used to catch the oil left in the filter element. Remove filter assembly.



Figure 5

Remove pressure regulating valve and charging pump bolts and stud nuts.

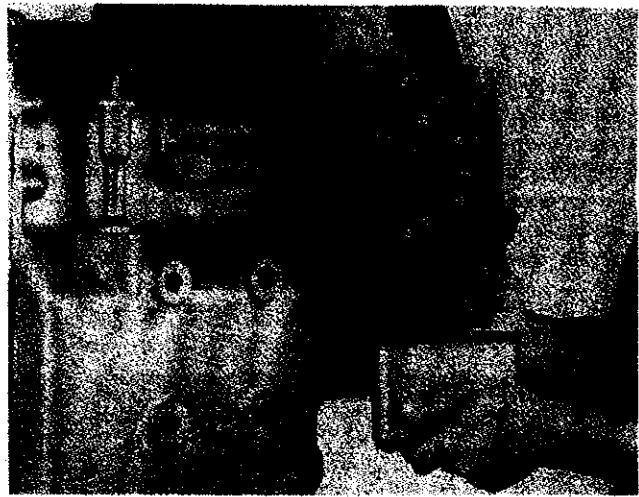


Figure 8

Remove valve assembly.



Figure 6

Remove pump and valve assembly.

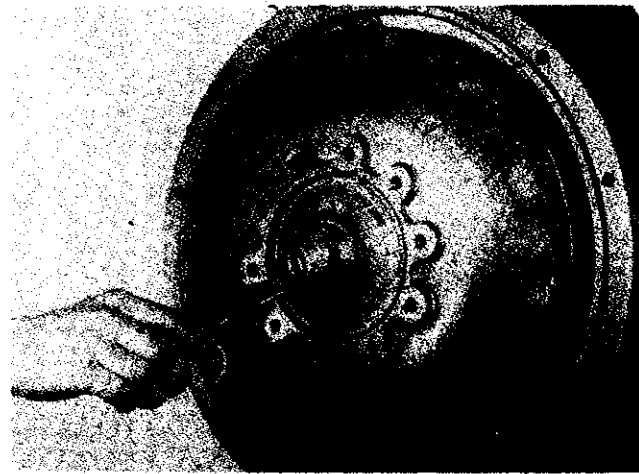


Figure 9

Remove impeller cover bore plug retainer ring.



Figure 7

Remove control valve bolts and washers.



Figure 10

Using two small screwdrivers as shown, remove bore plug.

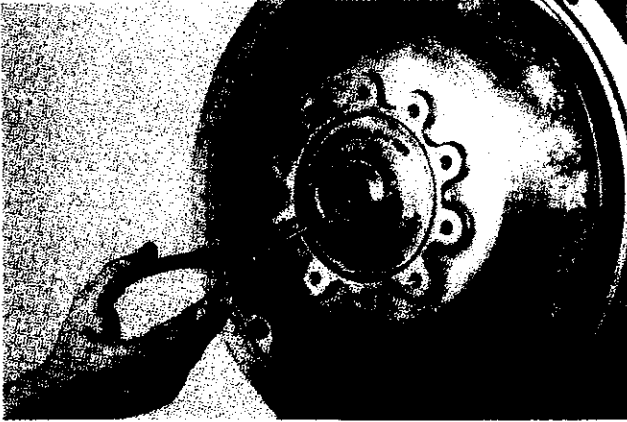


Figure 11

Through bore plug hole, remove turbine retaining ring. (See Figure 11-A)

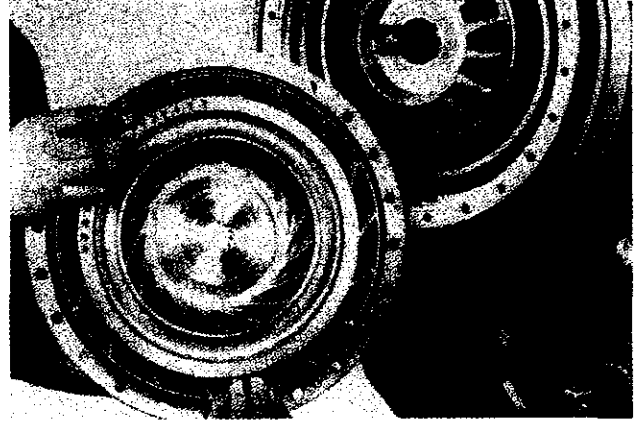


Figure 13

Remove impeller cover and turbine as an assembly.

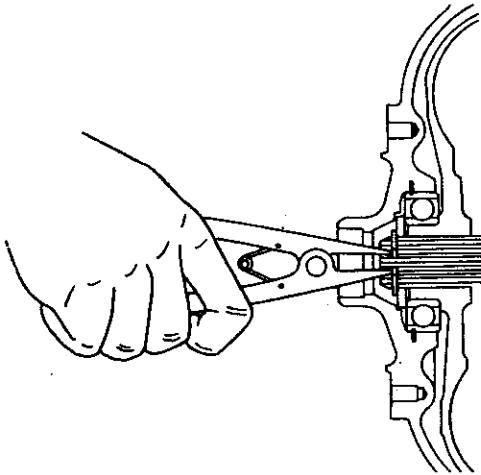


Figure 11-A

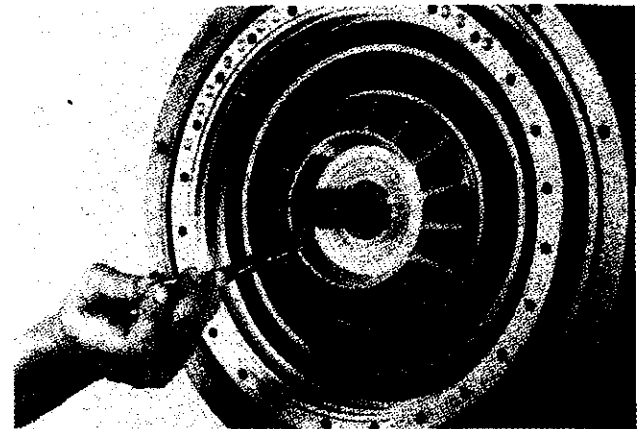


Figure 14

Remove turbine locating ring.

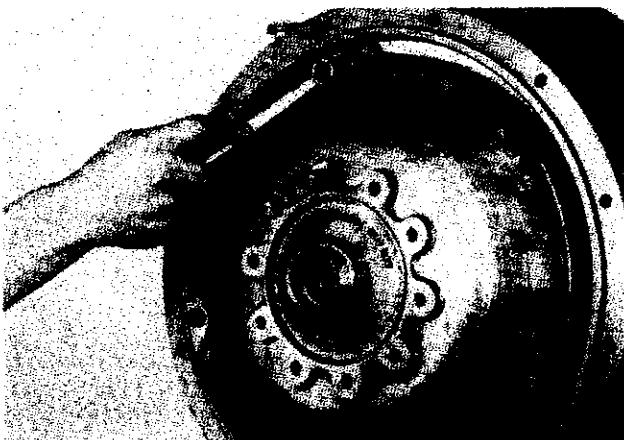


Figure 12

Remove impeller cover to impeller bolts.

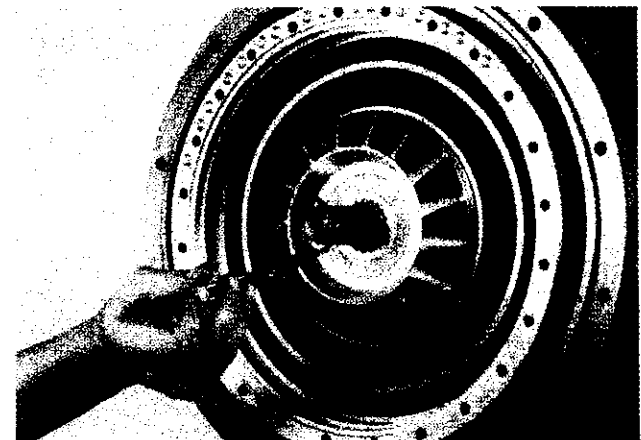


Figure 15

Remove reaction member retaining ring.



Figure 16

Remove reaction member. **Note:** Some units will have a fixed reaction member and some units will have a free wheeling reaction member. Remove reaction member and freewheeling unit as an assembly. The unit shown is a fixed reaction member.

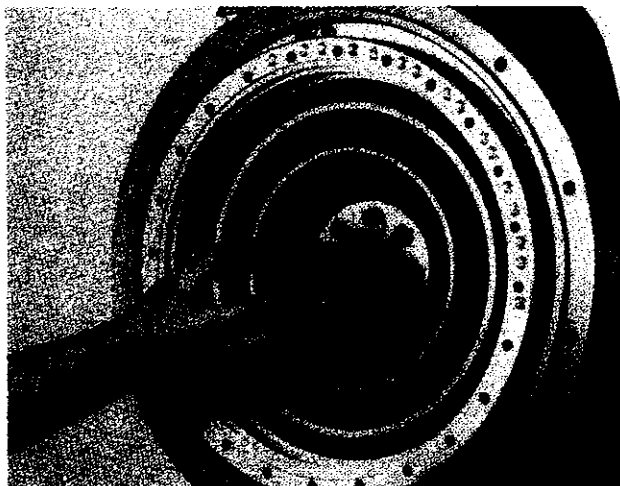


Figure 17

Remove reaction member spacer.

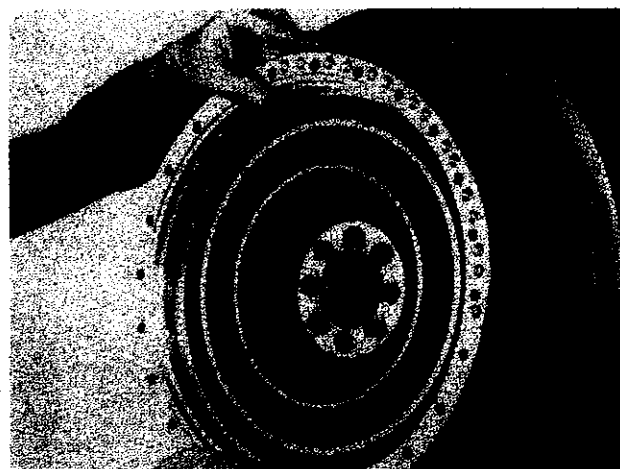


Figure 18

Remove impeller and hub assembly.

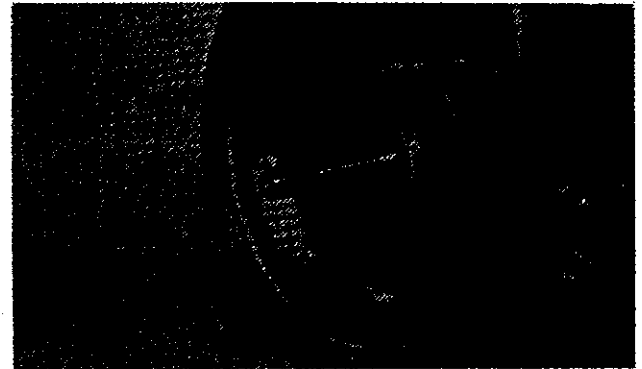


Figure 19

Using oil baffle puller holes provided, remove oil baffle. **Note:** Puller tool like shown can be fabricated from diagram shown in figure 19-A.

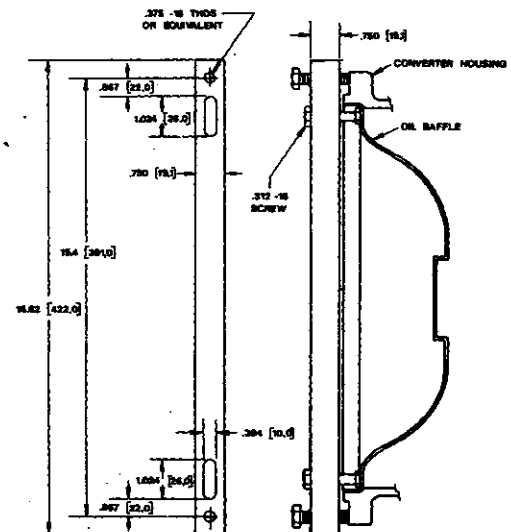


Figure 19-A



Figure 20

Remove pump drive bearing support screws and lock washers.

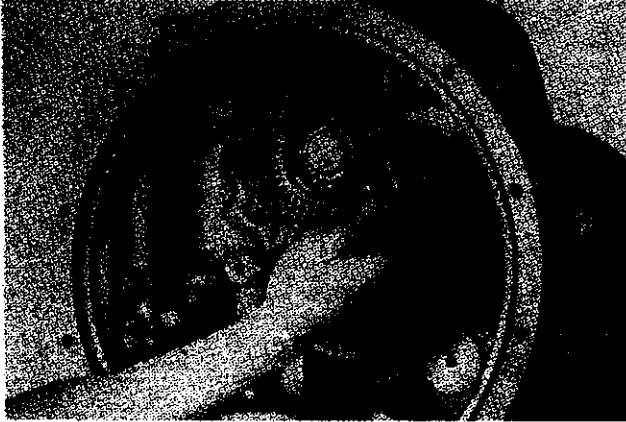


Figure 21
Remove pump drive gear assembly.

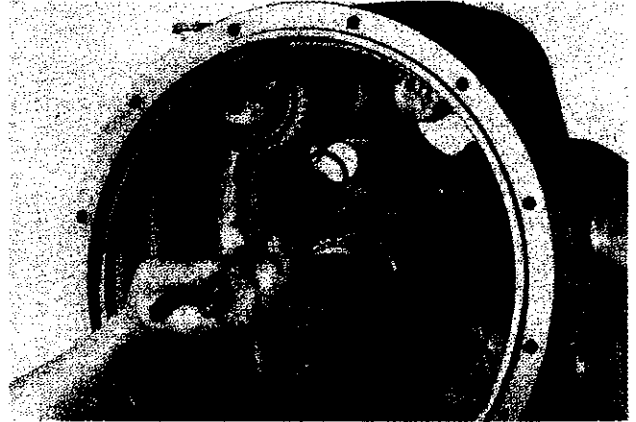


Figure 24
Remove idler gear locating ring.

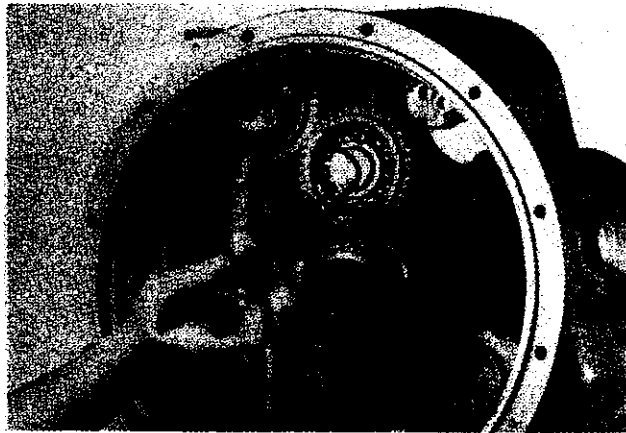


Figure 22
Remove idler gear retaining ring.

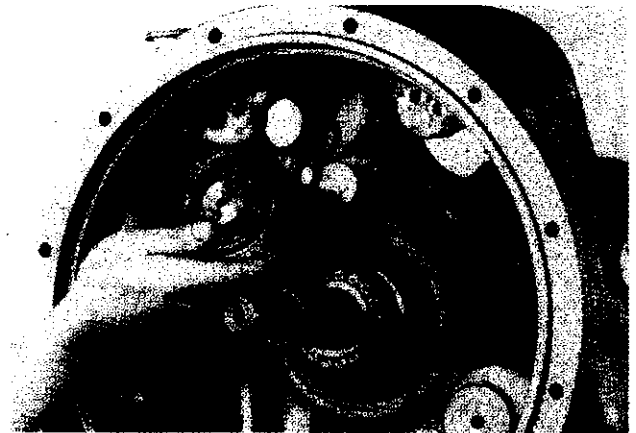


Figure 25
Remove charging pump drive gear and bearing assembly.

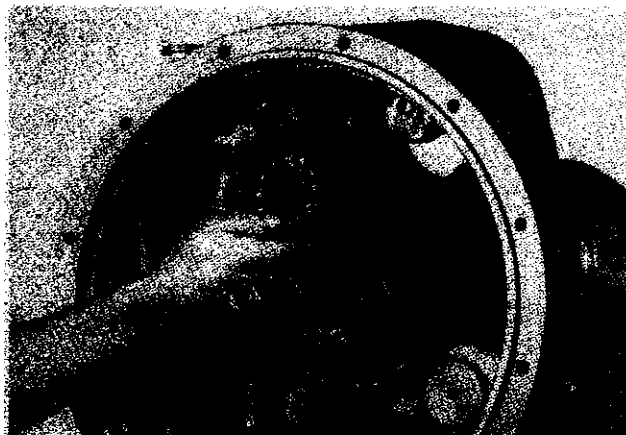


Figure 23
Remove gear and bearing assembly.



Figure 26
Remove sump screen assembly.



Figure 27

Remove front output flange nut, washer and "O" ring.



Figure 28

Remove front output flange.



Figure 29

Remove bolts securing transmission case to converter housing.

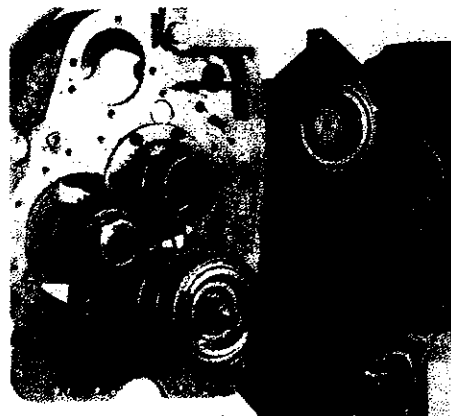


Figure 30

Support converter housing with a chain hoist. Separate converter housing from transmission case assembly. **Note:** Reverse and 2nd clutch will remain in converter housing.

**FOR CONVERTER HOUSING
DISASSEMBLY SEE FIGURE 235**

**FOR R-MODEL FRONT COVER DISASSEMBLY
SEE FIGURE 312**



Figure 31

Remove 3rd speed clutch rear bearing cap stud nuts and washers.



Figure 32

Remove bearing cap and gasket.

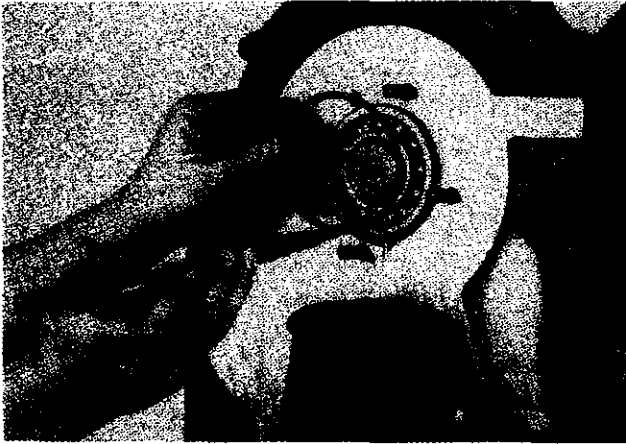


Figure 33
Remove rear bearing locating ring.

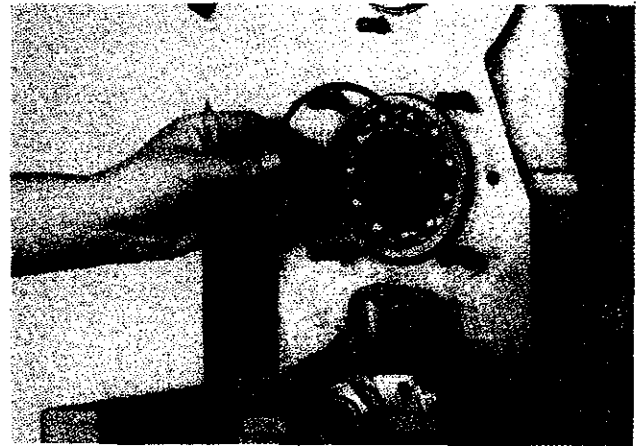


Figure 36
Remove low clutch rear bearing locating ring.



Figure 34
Remove low clutch rear bearing cap stud nuts and washers.



Figure 37
Remove output flange nut, washer and "O" ring.



Figure 35
Remove bearing cap and "O" rings.

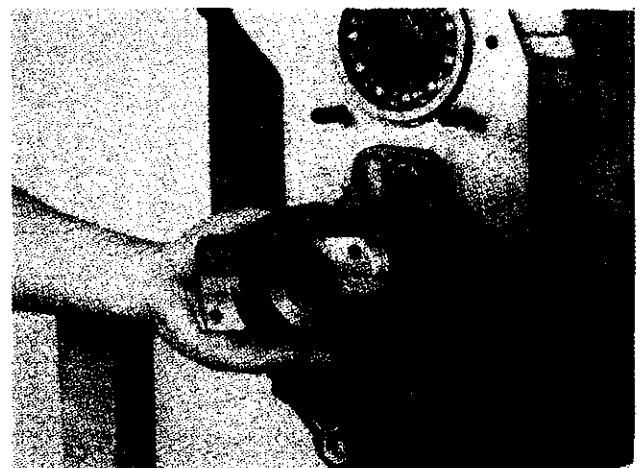


Figure 38
Remove output flange.

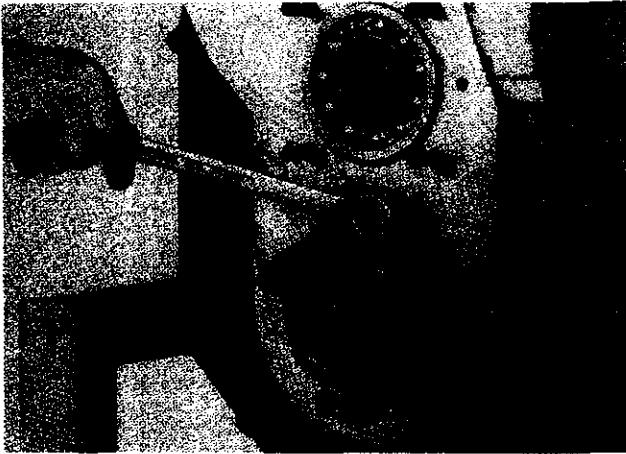


Figure 39

Remove rear output bearing cap stud nuts and washers.

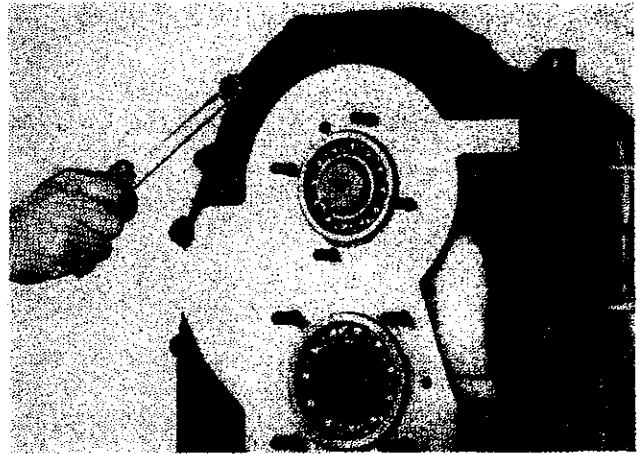


Figure 42

Remove rear cover bolts and washer.

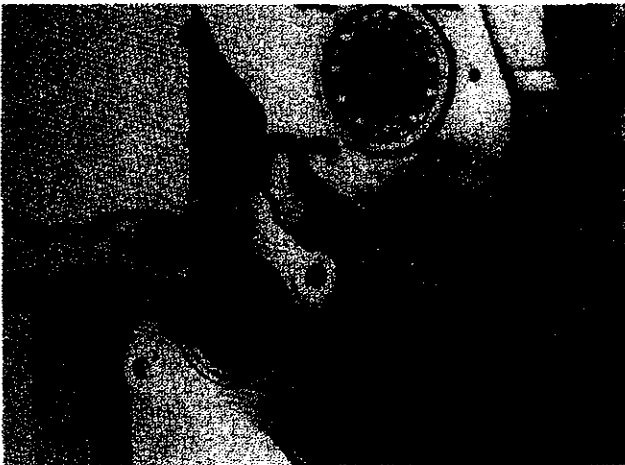


Figure 40

Remove output bearing cap and gasket.

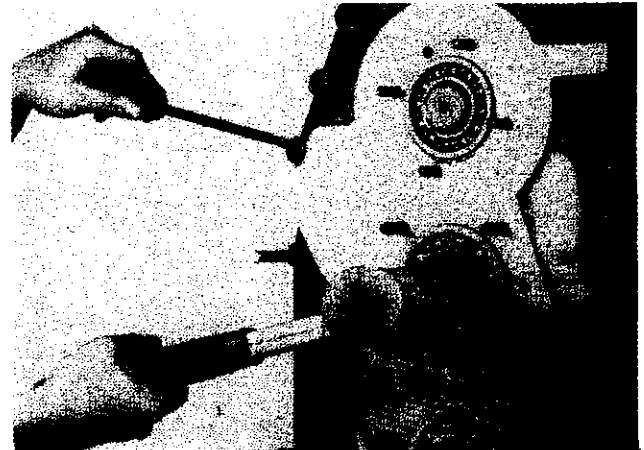


Figure 43

Using pry slots provided, pry cover from transmission housing, tapping on clutch and output shaft to allow cover to be removed without shaft binding.

NOTE: The use of alignment studs will facilitate cover removal.



Figure 41

Remove output rear bearing locating ring.



Figure 44

Remove low clutch rear bearing retainer ring.

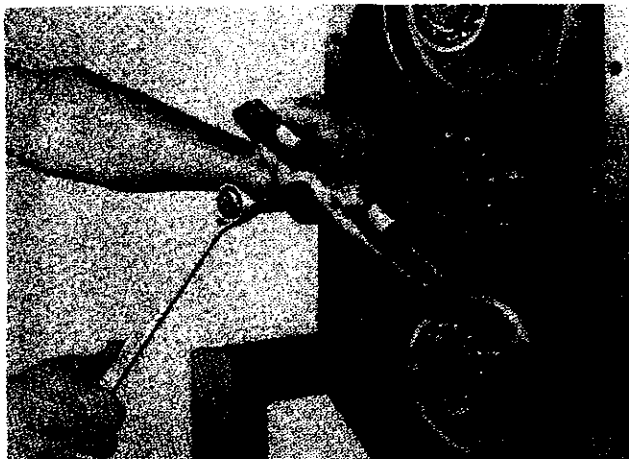


Figure 45

Remove rear bearing.

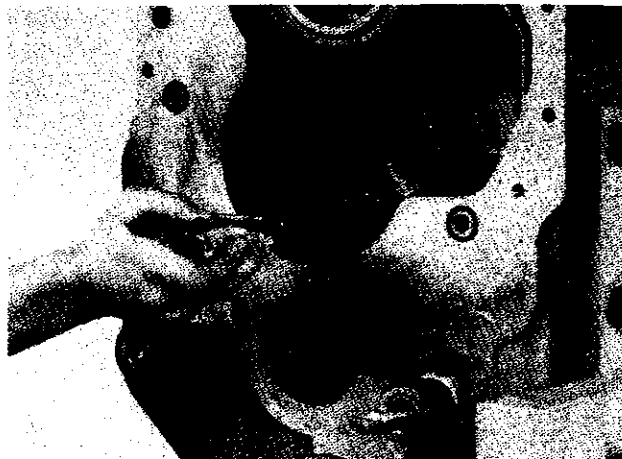


Figure 48

Remove low clutch disc hub retainer ring.

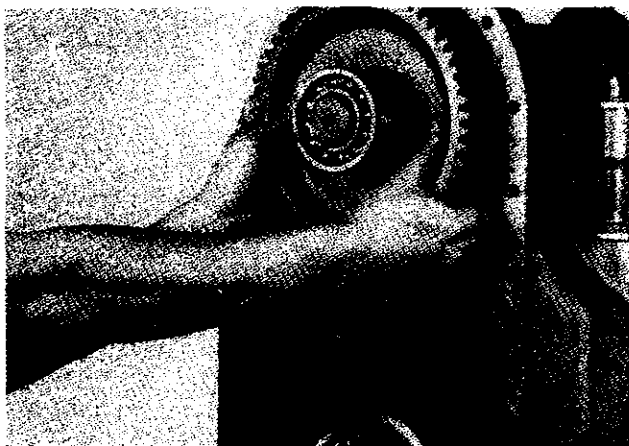


Figure 46

Remove 3rd speed clutch assembly.



Figure 49

Remove clutch disc hub.



Figure 47

Remove output shaft and gear assembly.

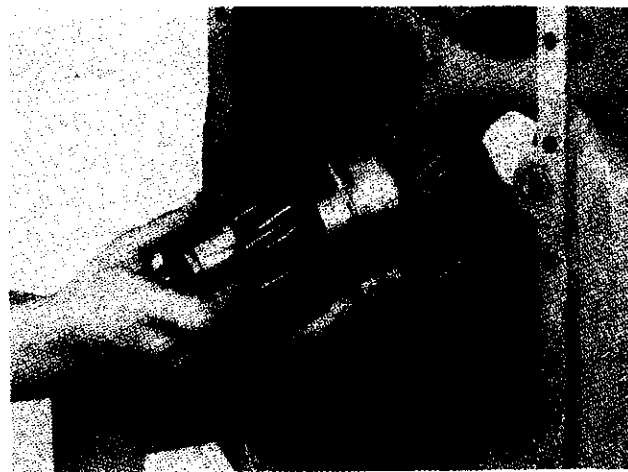


Figure 50

Remove low clutch assembly.

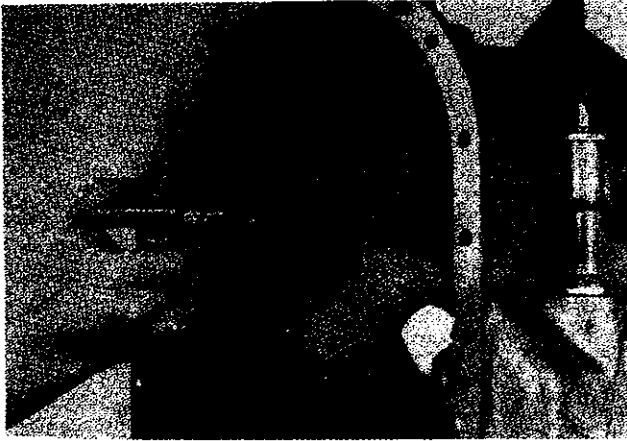


Figure 51

Remove 3rd speed clutch disc hub retainer ring.

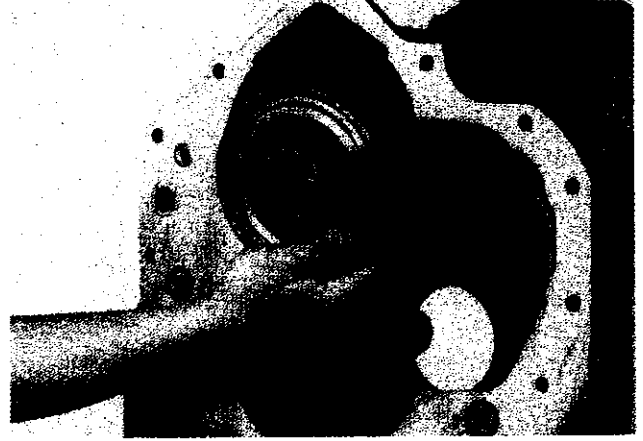


Figure 54

Remove forward clutch assembly.



Figure 52

Remove clutch disc hub.



Figure 55

Remove forward clutch oil sealing ring sleeve retainer ring.

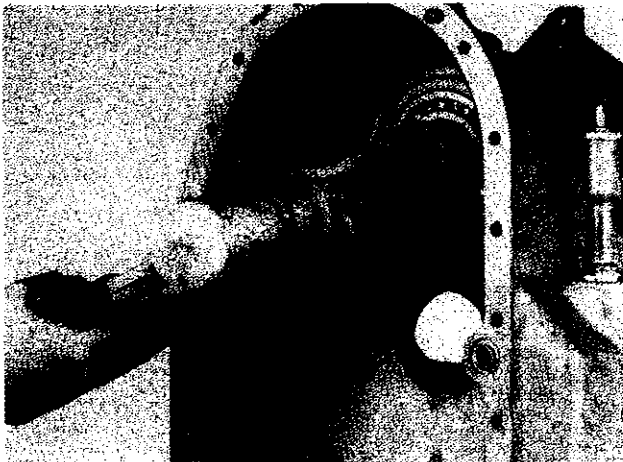


Figure 53

Tap forward clutch assembly from bearing.



Figure 56

Tap forward clutch bearing and sleeve from housing.

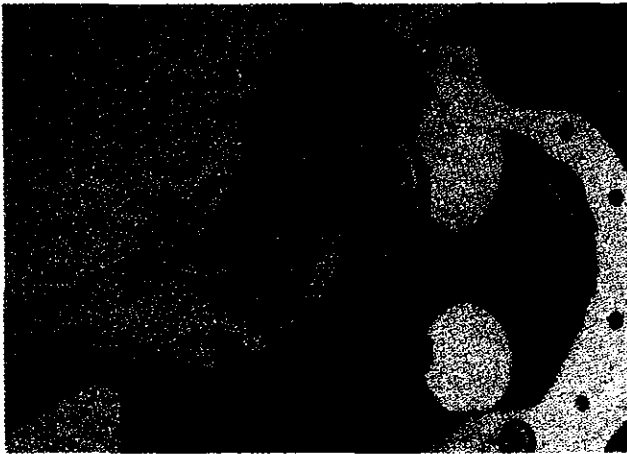


Figure 57
Sleeve and bearing removed.

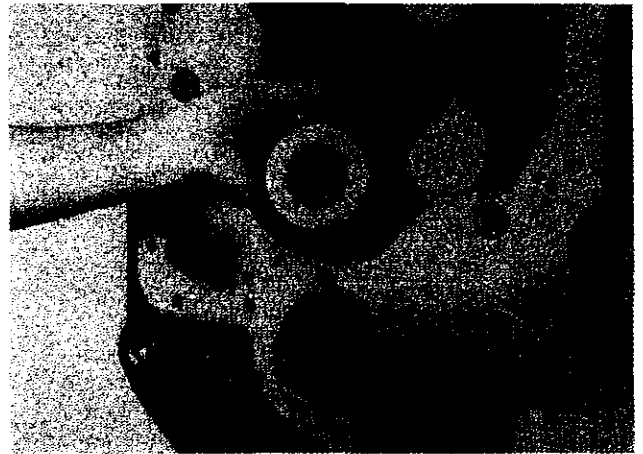


Figure 60
Remove shift hub and shift fork.



Figure 58
Remove disconnect shift rail housing screw and washer.



Figure 61
Tap front output shaft from housing.



Figure 59
Remove shift rail and housing.

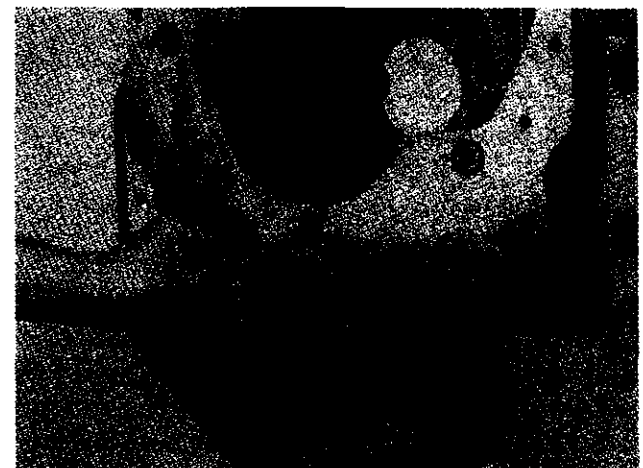


Figure 62
Remove front output shaft oil seal.

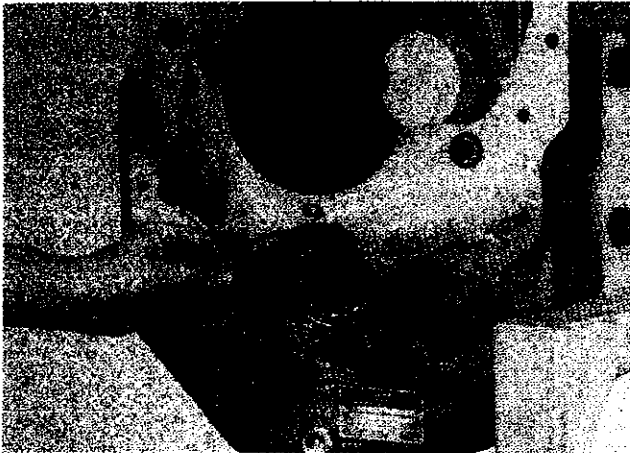


Figure 63

Remove front bearing retainer ring.

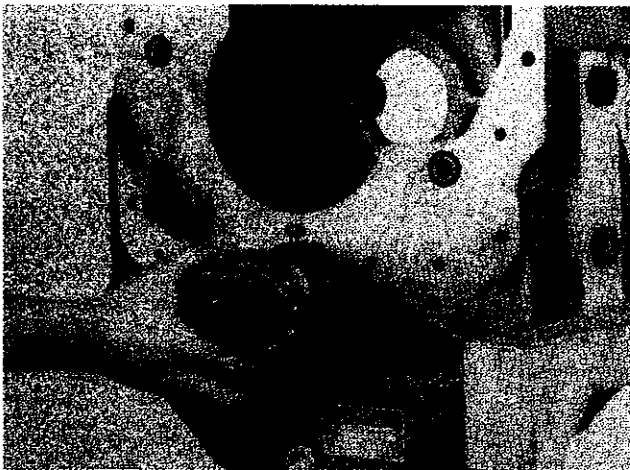


Figure 64

Remove front bearing. Remove bearing locating ring.

CLUTCH DISASSEMBLY

NOTE: Each disc spring assembly is made up of selected springs to precisely match each part within this assembly. Failure to replace all piston return springs can result in unequal deflection within the spring pack. The result of this imbalance may adversely affect overall life of springs.

The disc spring packs are to be used as complete assemblies and care should be taken not to intermix the individual disc springs with disc springs in another clutch or disc spring pack.

Figure 65

DISASSEMBLY AND ASSEMBLY OF FORWARD CLUTCH DISASSEMBLY



Figure 66

Remove forward shaft oil sealing rings and expander springs.

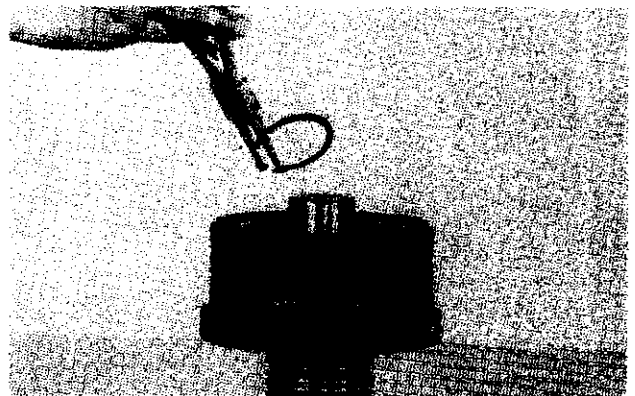


Figure 67

Remove piston return disc spring retainer ring.

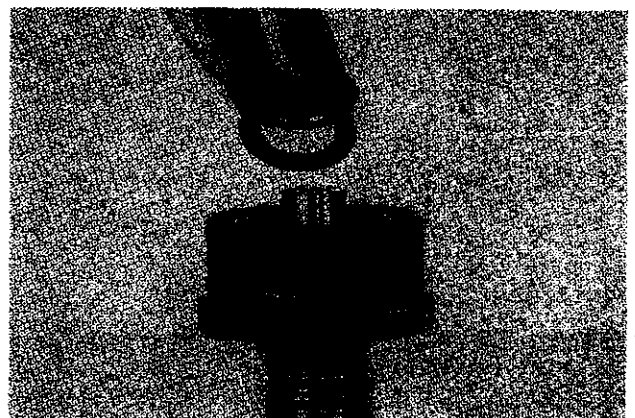


Figure 68

Remove disc springs (see Figure 65).

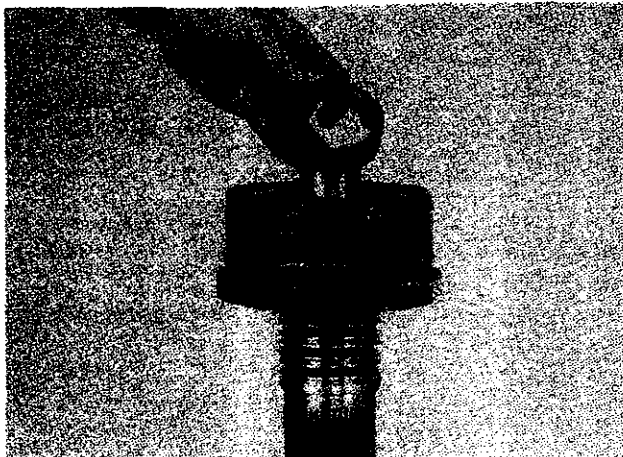


Figure 69

Remove piston return spring spacer.

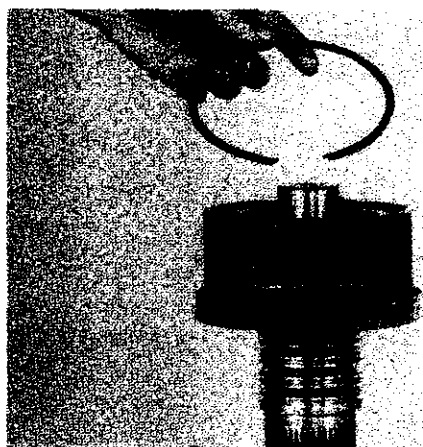


Figure 70

Remove end plate retainer ring.

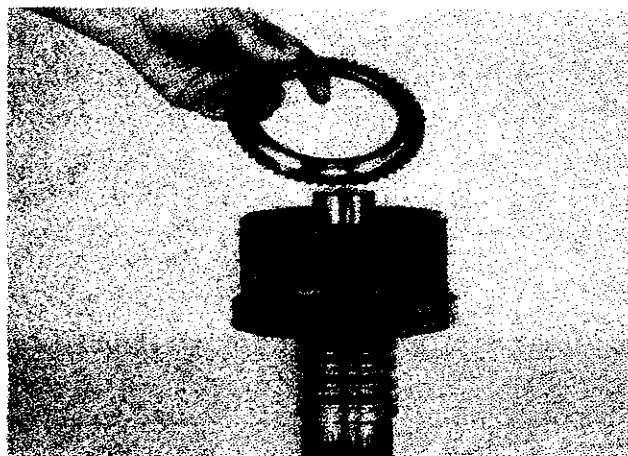


Figure 71

Remove end plate.

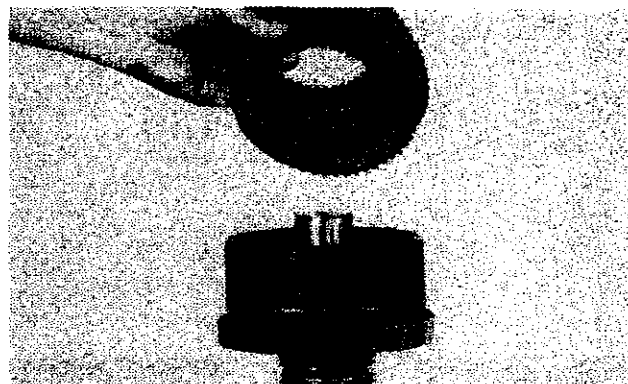


Figure 72

Remove inner and outer clutch discs. Turn clutch over and tap clutch pilot shaft on a block of wood to remove clutch piston.

(See cleaning and inspection page.)
FORWARD CLUTCH REASSEMBLY

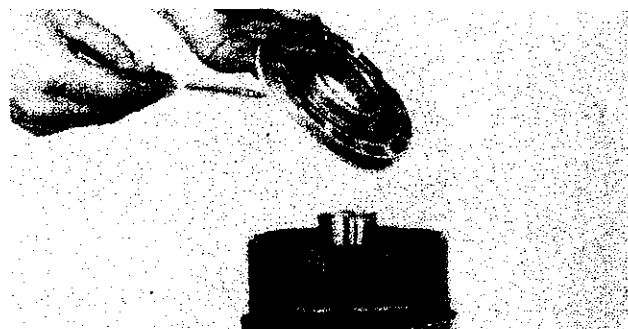


Figure 73

Install clutch piston outer seal ring. **NOTE:** Ring must be sized before installing in clutch drum. Sizing is best accomplished by rotating piston while holding a round object against the new seal ring. Rotate piston until seal ring is flush with outer diameter of piston.



Figure 74

Install clutch piston inner seal ring and size as described in Figure 73. Position piston in clutch drum, use caution as not to damage inner and outer piston sealing rings.

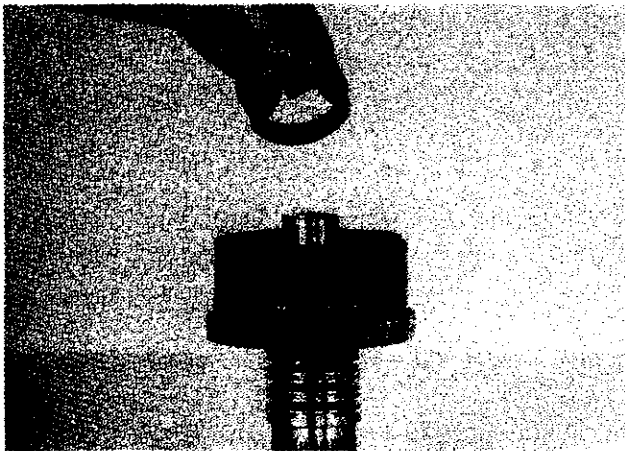


Figure 75
Install piston return spring spacer.
See Figure 65.

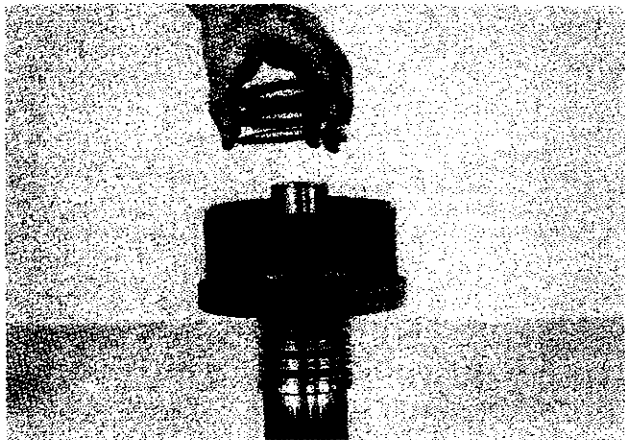


Figure 76
Install disc springs. First disc spring with large diameter of bevel toward spacer. Alternate five (5) disc springs (see Figure 78).

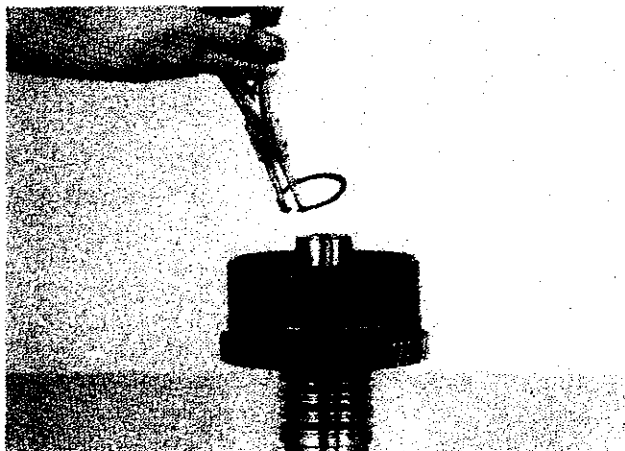


Figure 77
Install return spring retainer ring.

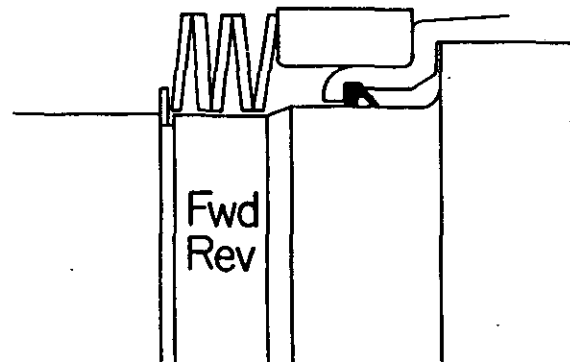


Figure 78

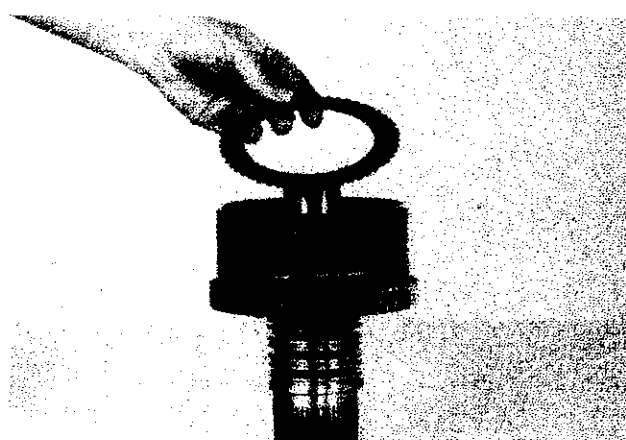


Figure 79
Install one steel disc.

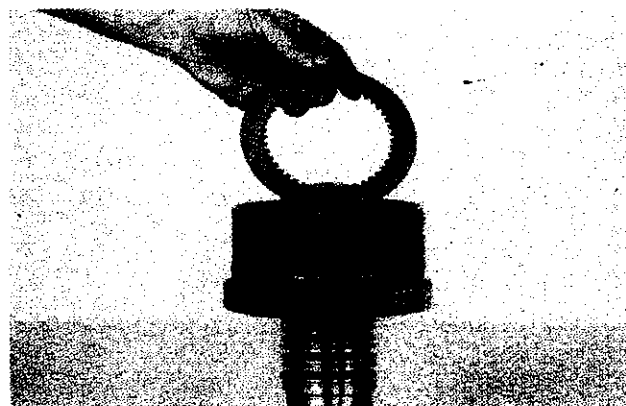


Figure 80
Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.



Figure 81

Install end plate.

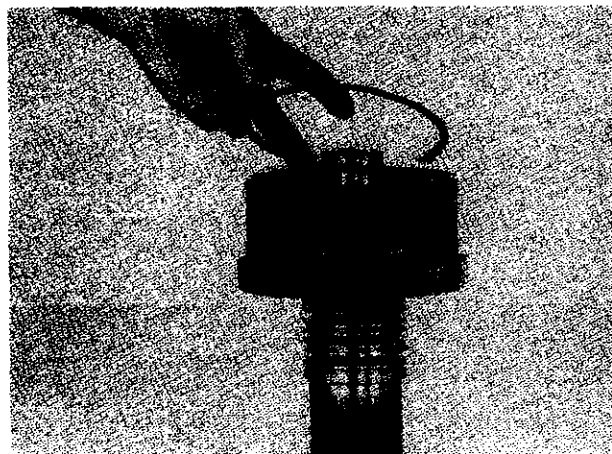


Figure 82

Install end plate retainer ring.

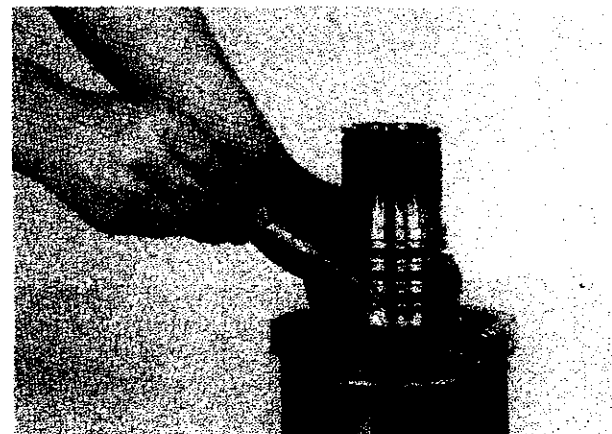


Figure 83

Install new clutch shaft piston rings and expander springs per instructions on Page 82.

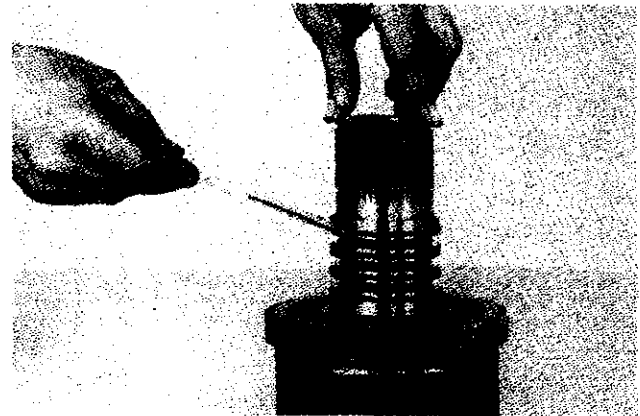


Figure 84

Four (4) oil sealing rings installed. Grease rings to facilitate reassembly into sleeve as explained on Page 82.

3RD SPEED CLUTCH DISASSEMBLY AND REASSEMBLY DISASSEMBLY

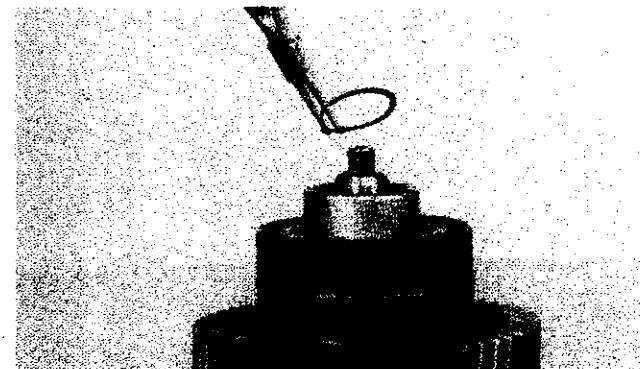


Figure 85

Remove return spring retainer ring.



Figure 86

Remove return spring retainer and spring.

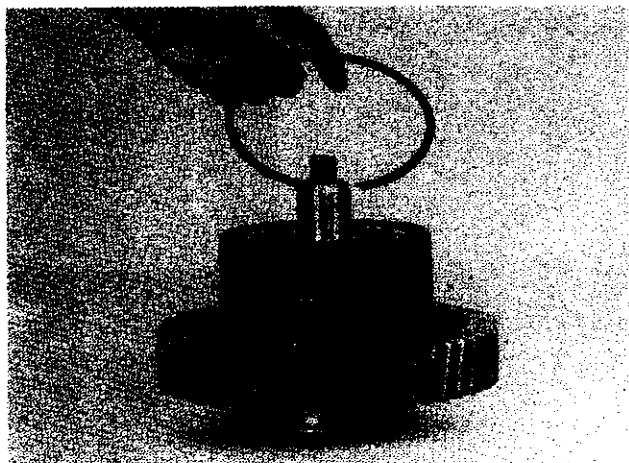


Figure 87.

Remove end plate retainer ring.

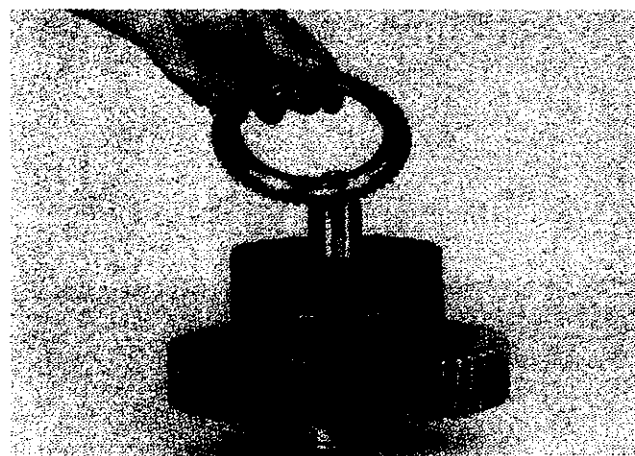


Figure 88

Remove end plate



Figure 89

Remove inner and outer clutch discs. Remove clutch piston.

(See cleaning and inspection page.)
3rd SPEED CLUTCH REASSEMBLY

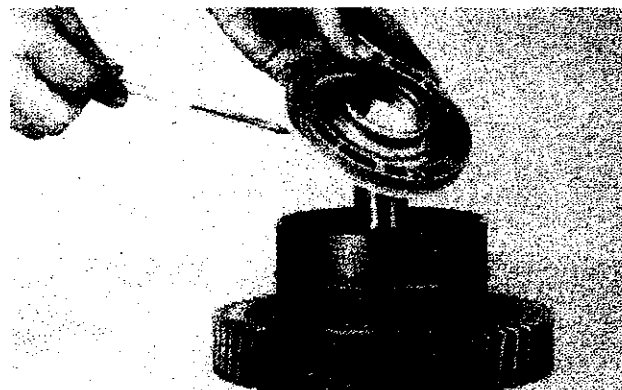


Figure 90

Install clutch piston inner and outer seal rings. Size as explained in Figure 73. Install clutch piston in clutch drum. Use caution as not to damage seal rings.



Figure 91

Position piston return spring and spring retainer on clutch shaft.

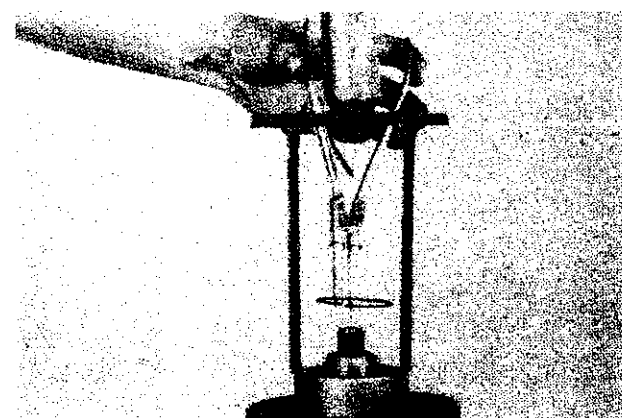


Figure 92

Compress return spring and install retainer ring.

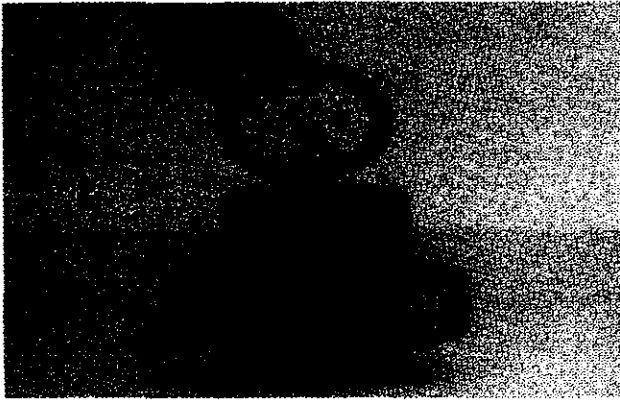


Figure 93

Install one steel disc. Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

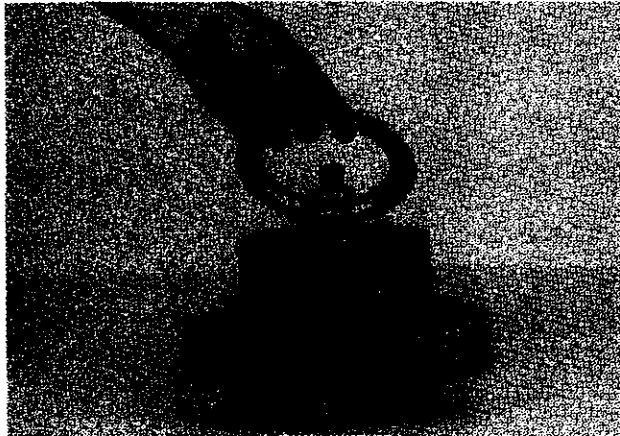


Figure 94

Install end plate.

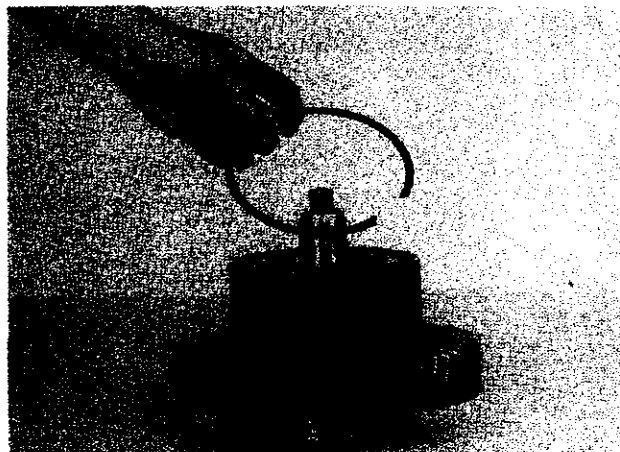


Figure 95

Install end plate retainer ring.

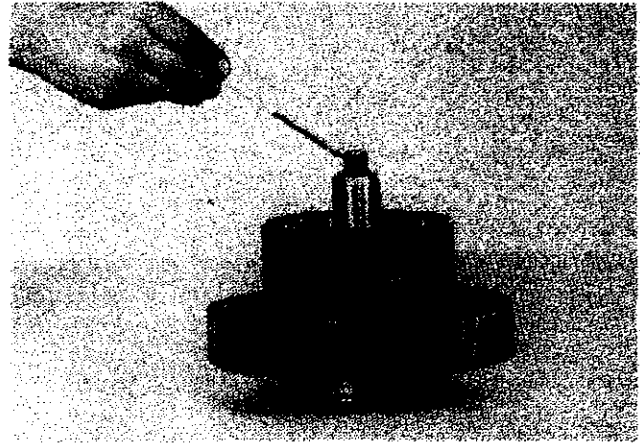


Figure 96

Install clutch shaft oil sealing ring.

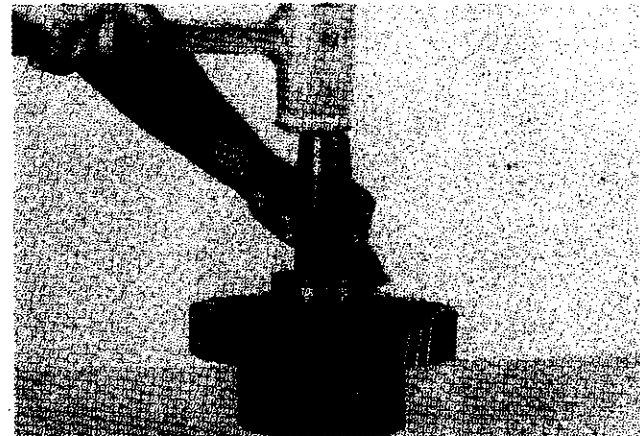


Figure 97

If the clutch shaft rear bearing was removed, install bearing with bearing locating ring groove up.



Figure 98

Install bearing retainer ring.

LOW CLUTCH DISASSEMBLY AND REASSEMBLY DISASSEMBLY

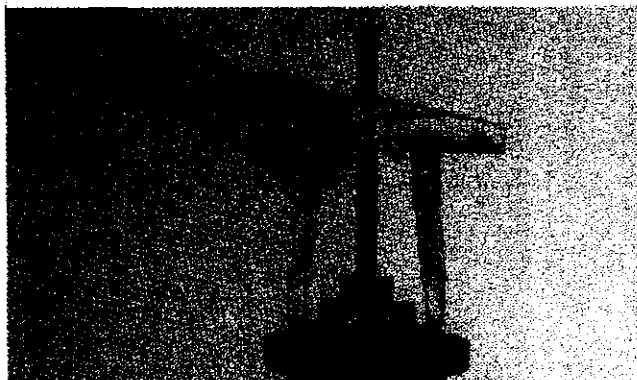


Figure 99
Remove low clutch front bearing.

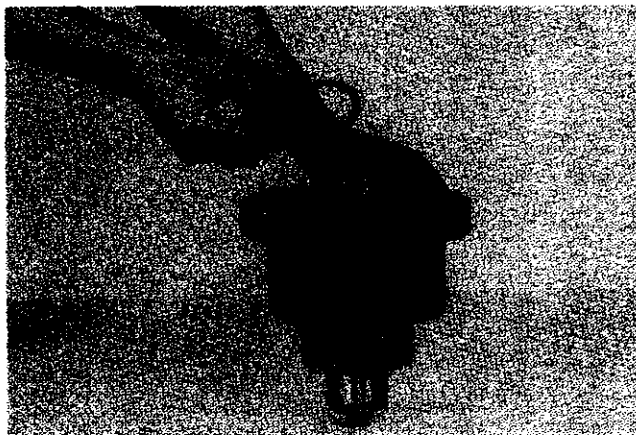


Figure 100
Remove bearing spacer.

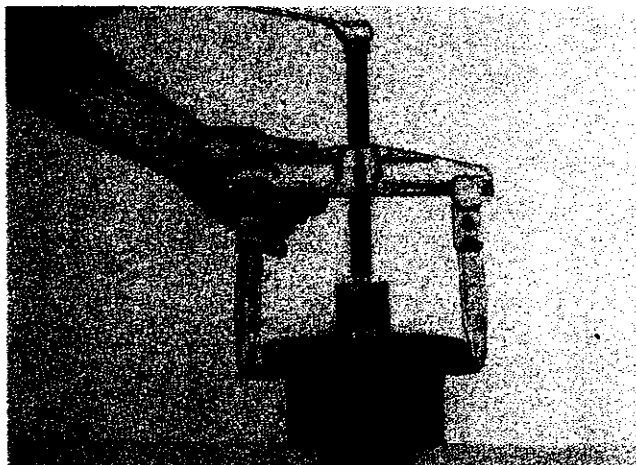


Figure 101
Remove low gear and outer bearing.

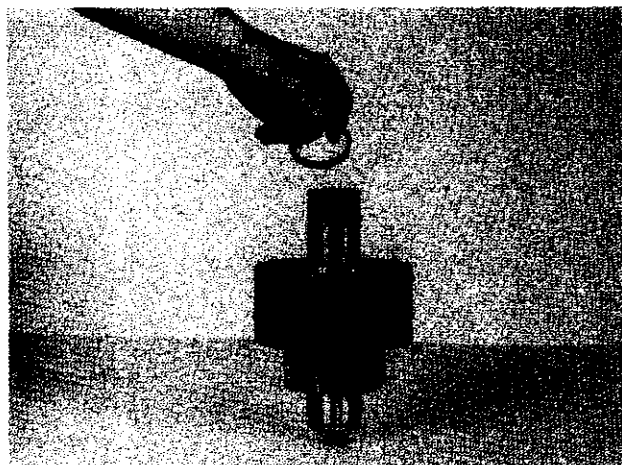


Figure 102
Remove bearing spacer.

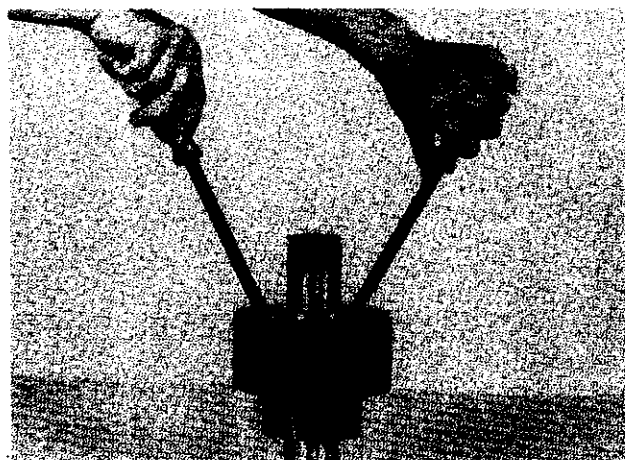


Figure 103
Pry inner bearing up far enough to use a bearing puller.

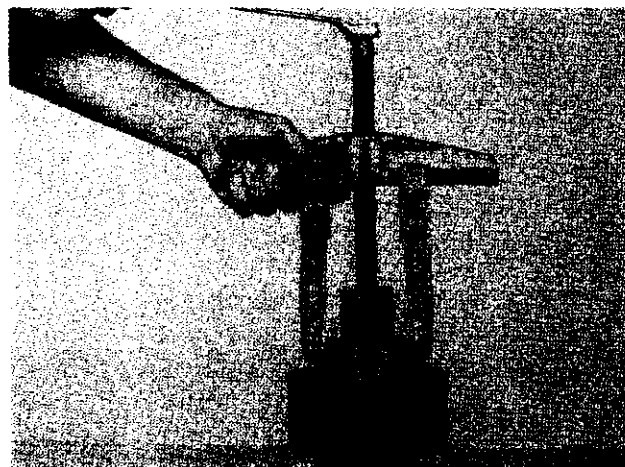


Figure 104
Remove inner bearing.

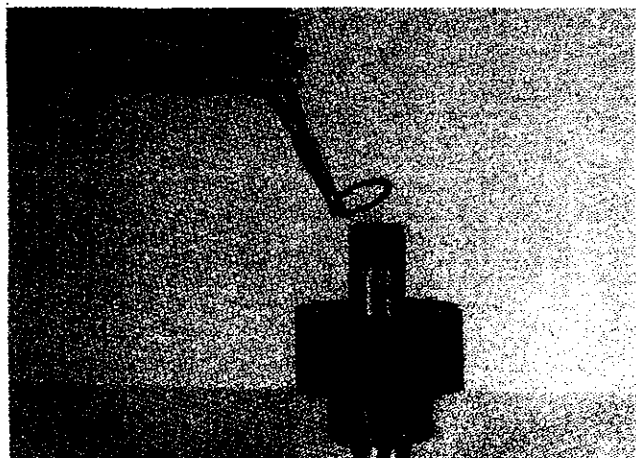


Figure 105
Remove inner bearing locating ring.

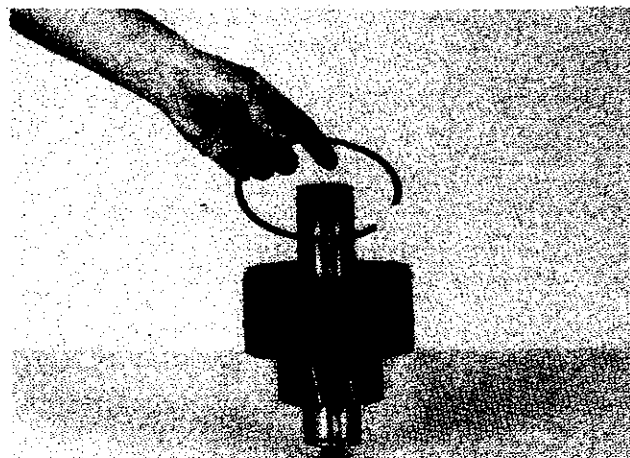


Figure 108
Remove end plate retainer ring.



Figure 106
Remove piston return spring retainer ring.

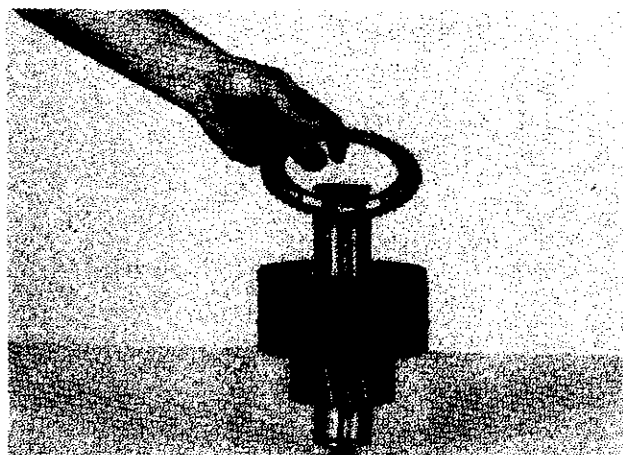


Figure 109
Remove end plate.

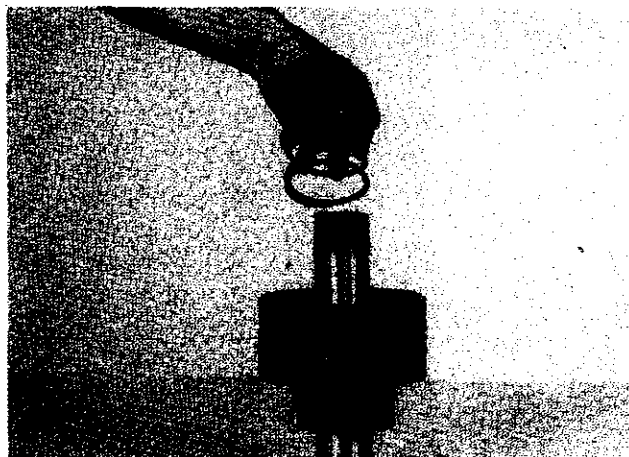


Figure 107
Remove spring retainer and return spring.

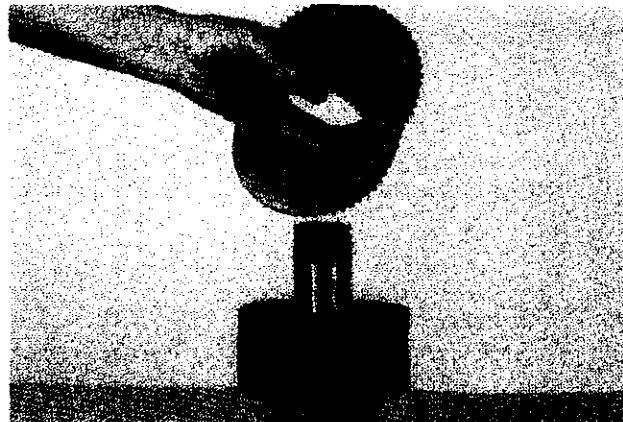


Figure 110
Remove inner and outer clutch discs. Remove clutch piston.

(See cleaning and inspection page.)

REASSEMBLY

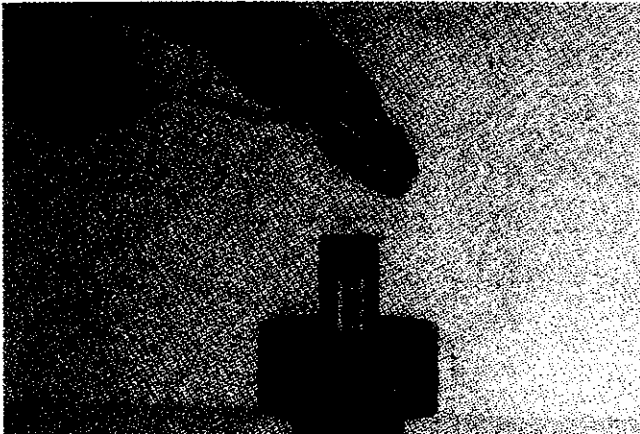


Figure 111

Install clutch piston inner and outer sealing rings and size as explained in Figure 73. Install clutch piston.

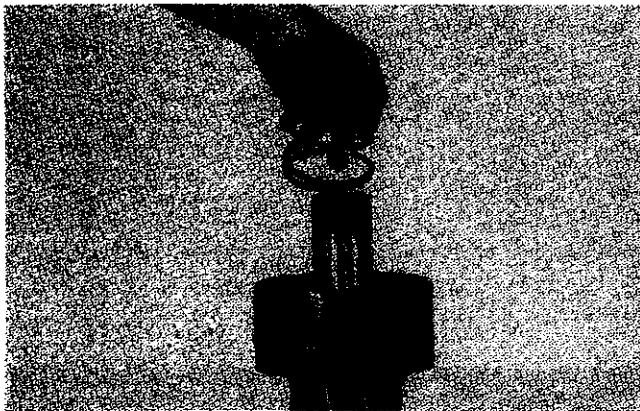


Figure 112

Position piston return spring and spring retainer on clutch shaft.

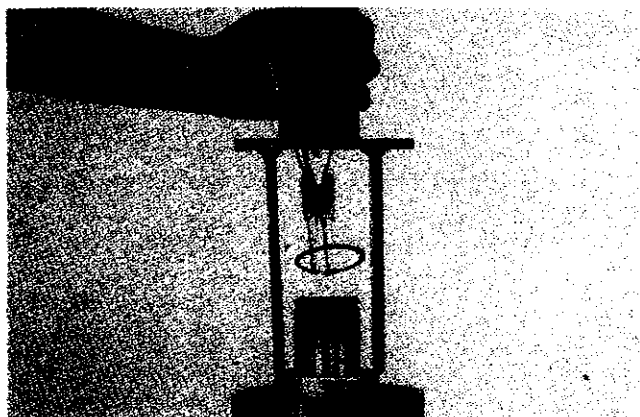


Figure 113

Compress return spring and install spring retainer ring. Be sure ring is in full position in ring groove.



Figure 114

Install one steel disc.

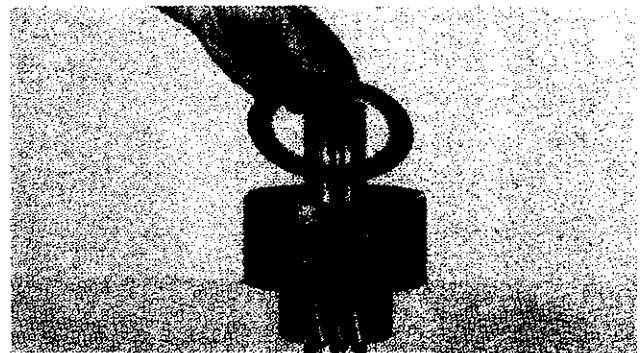


Figure 115

Install one friction disc. **NOTE:** The friction discs in the low clutch has a higher co-efficient rating than the friction discs in the other clutches, therefore the discs must not be mixed. The low clutch friction disc has a yellow mark of nonsoluble paint on the outer diameter for permanent identification. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.



Figure 116

Install end plate.

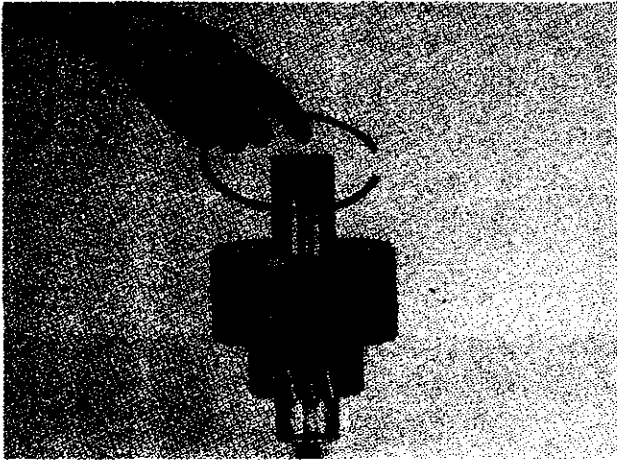


Figure 117

Install end plate retainer ring.

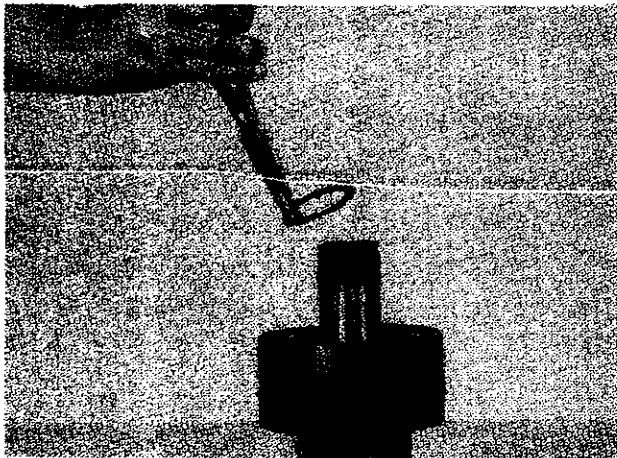


Figure 118

Install low gear inner bearing locating ring.

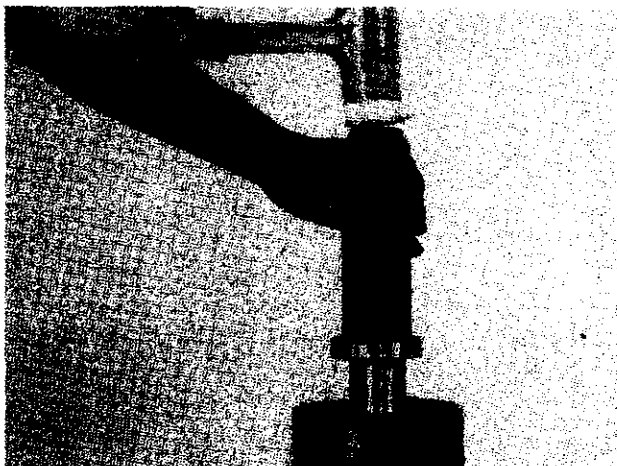


Figure 119

Install inner bearing.

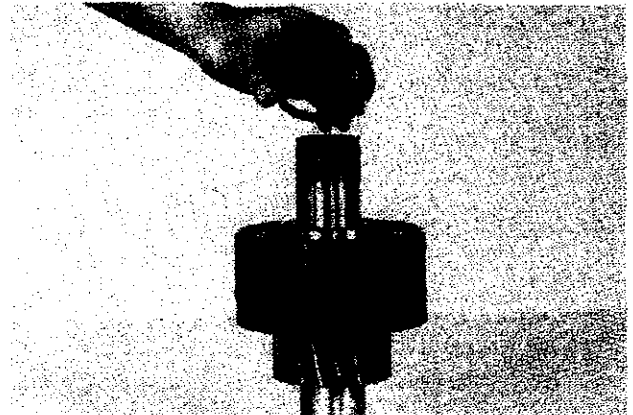


Figure 120

Position bearing spacer on clutch shaft.

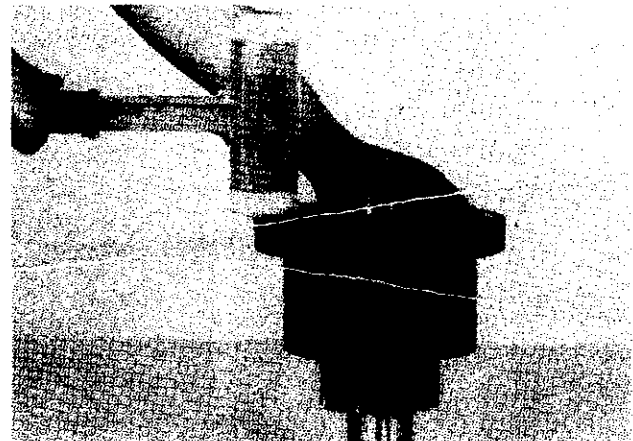


Figure 121

Install clutch driven gear into clutch drum. Align splines on clutch gear with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.

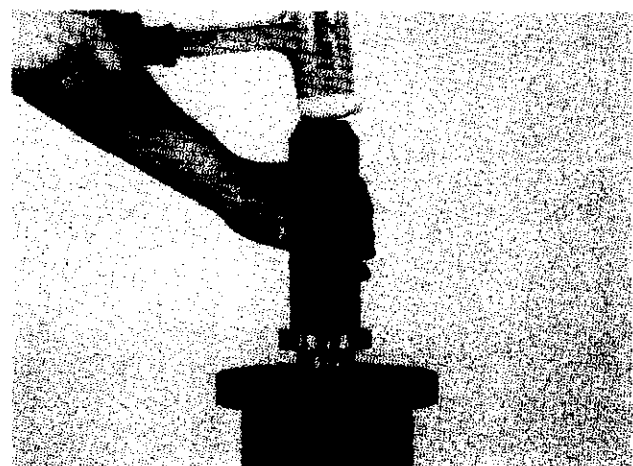


Figure 122

Install low gear outer bearing.

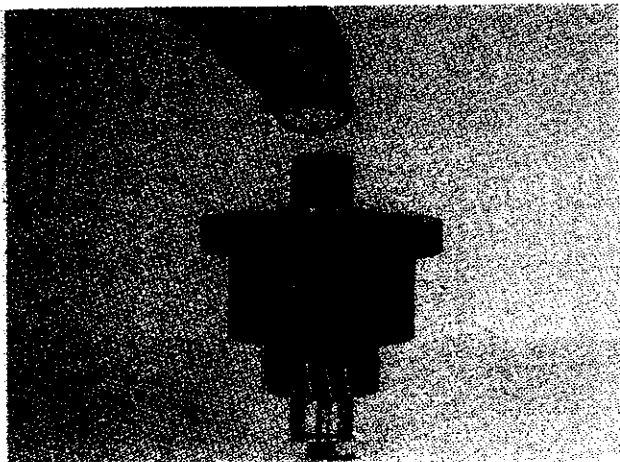


Figure 123
Position outer bearing spacer on clutch shaft.

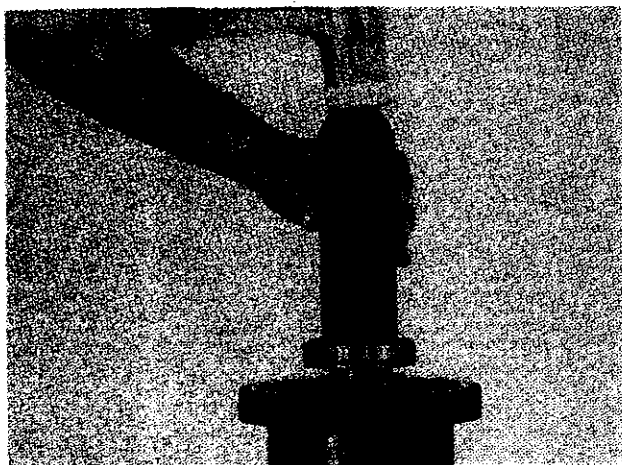


Figure 124
Install clutch shaft front bearing.

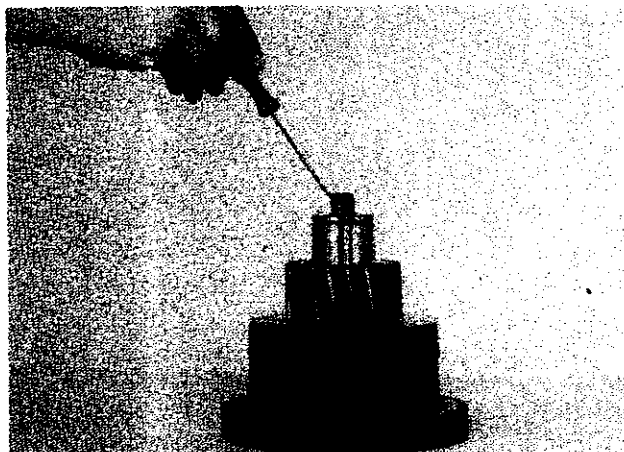


Figure 125
Install clutch shaft oil sealing ring.

REVERSE AND 2nd CLUTCH DISASSEMBLY AND REASSEMBLY (2nd clutch being disassembled) DISASSEMBLY

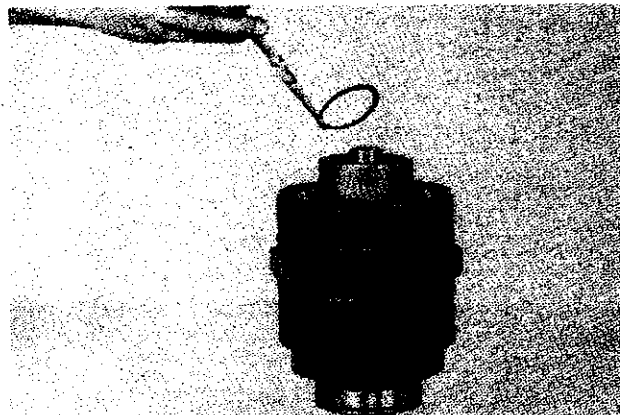


Figure 126
Remove 2nd clutch return spring retainer ring.



Figure 127
Remove return spring retainer and spring.

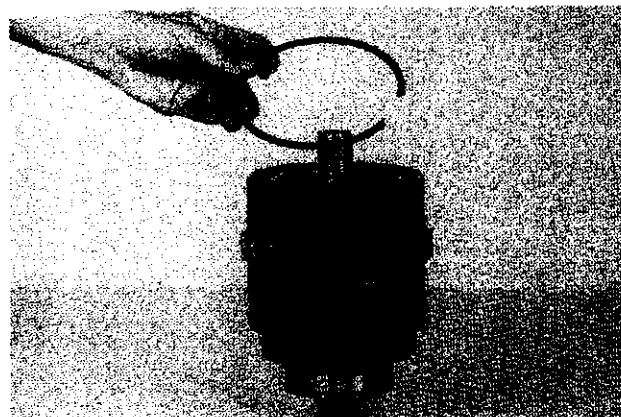


Figure 128
Remove end plate retainer ring.

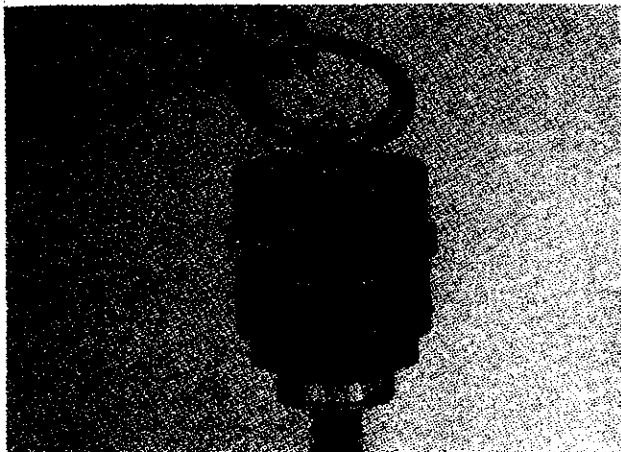


Figure 129

Remove end plate.



Figure 132

Remove front bearing retainer ring.

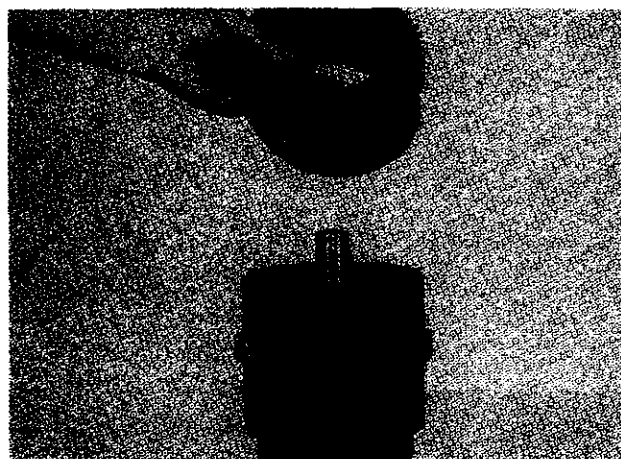


Figure 130

Remove inner and outer clutch discs. Remove clutch piston.

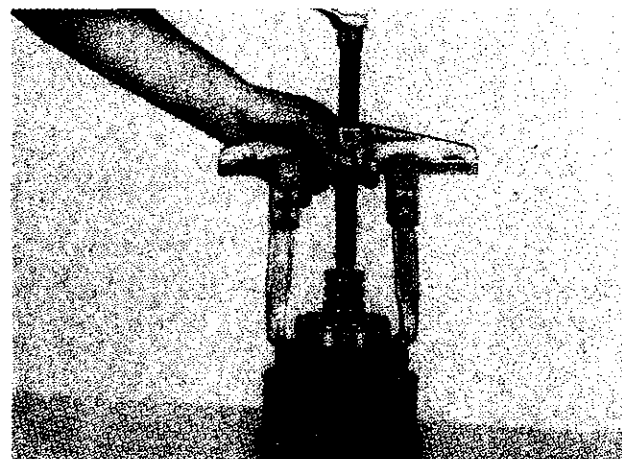


Figure 133

Remove front bearing.

REVERSE CLUTCH DISASSEMBLY

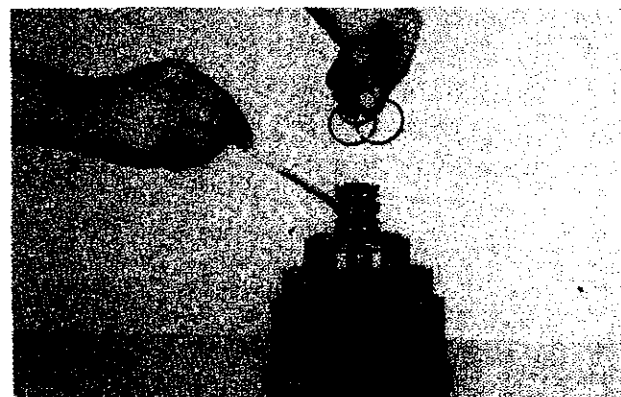


Figure 131

Remove clutch shaft oil sealing rings and expander springs. See Page 82 for proper piston ring and expander spring installation.

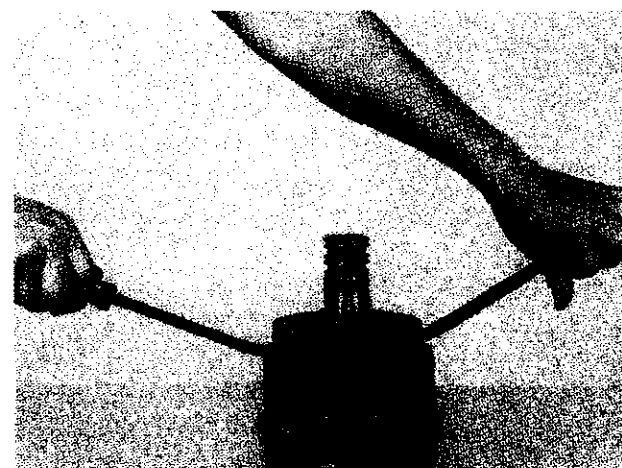


Figure 134

Pry reverse gear up far enough to use a gear puller.



Figure 135
Remove reverse gear and outer bearing.

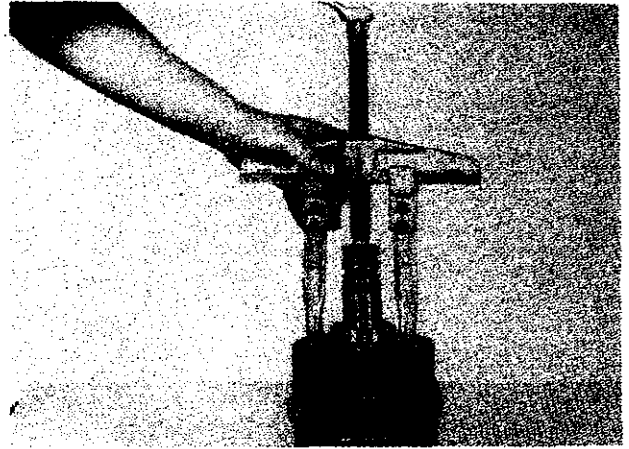


Figure 138
Remove inner bearing.

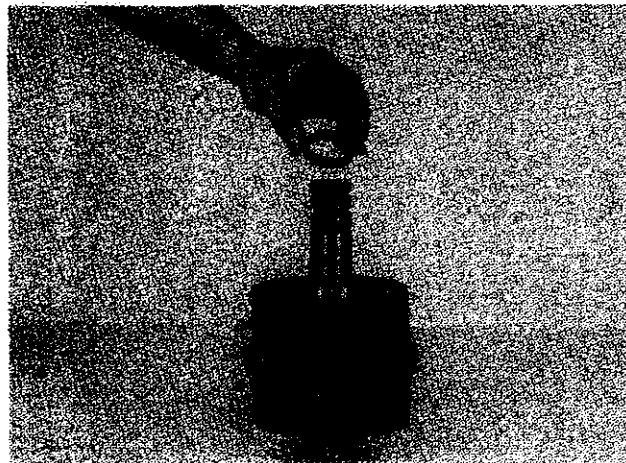


Figure 136
Remove bearing spacer.

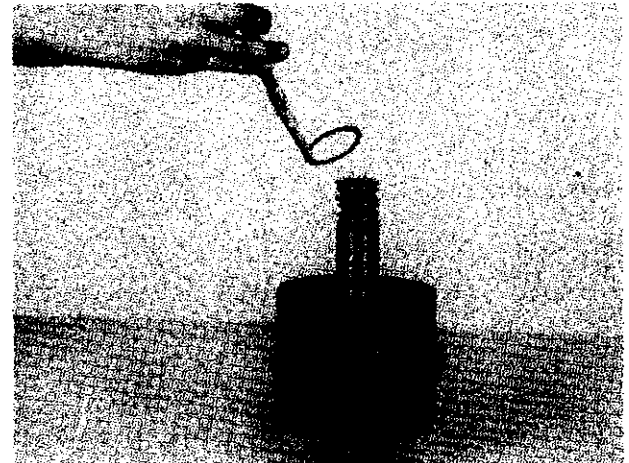


Figure 139
Remove return disc spring retainer ring.
See Figure 65.

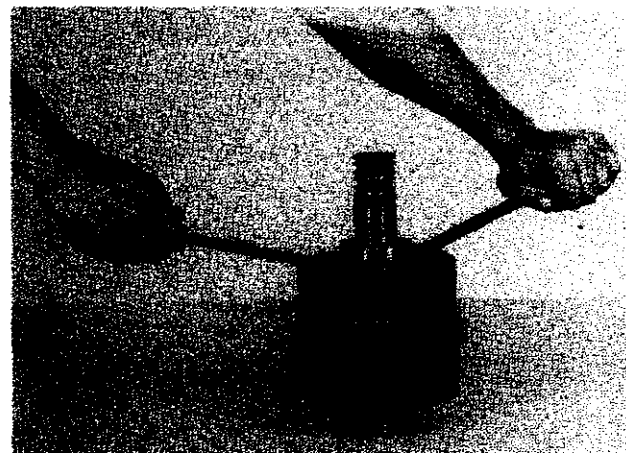


Figure 137
Pry inner bearing up far enough to use a bearing puller.



Figure 140
Remove disc springs.

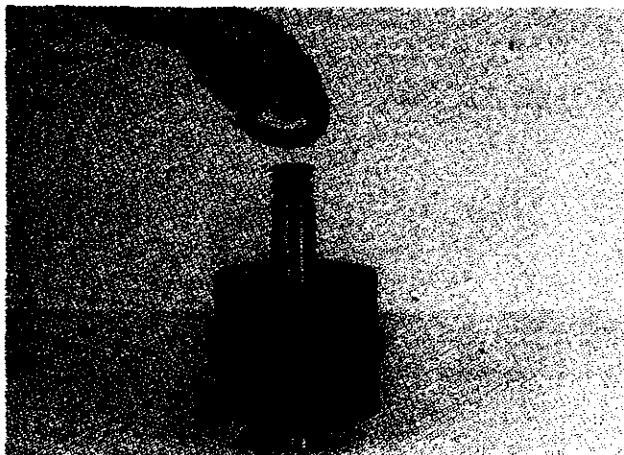


Figure 141
Remove return spring spacer.

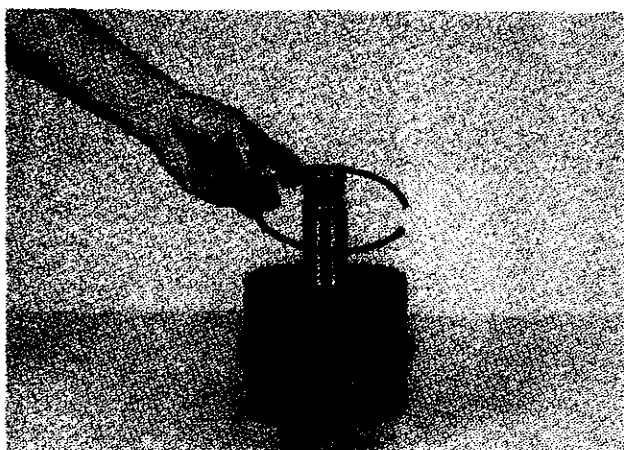


Figure 142
Remove end plate retainer ring.

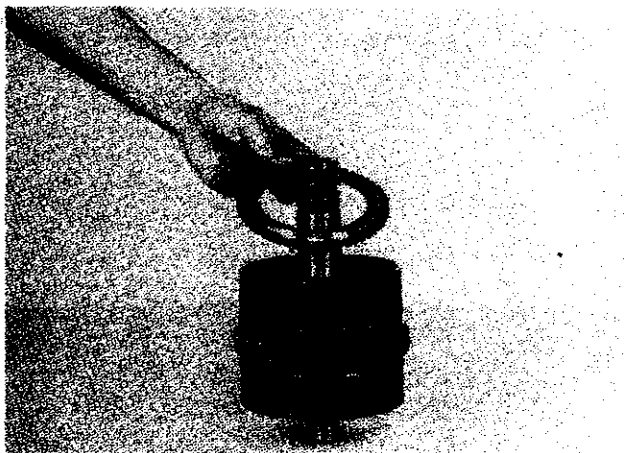


Figure 143
Remove end plate.

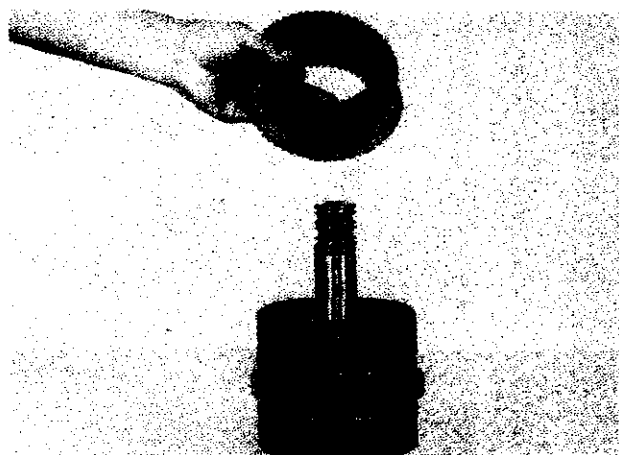


Figure 144
Remove inner and outer clutch discs. Remove clutch piston.

(See cleaning and inspection page.)
REVERSE AND 2nd CLUTCH REASSEMBLY
(Reverse being reassembled)

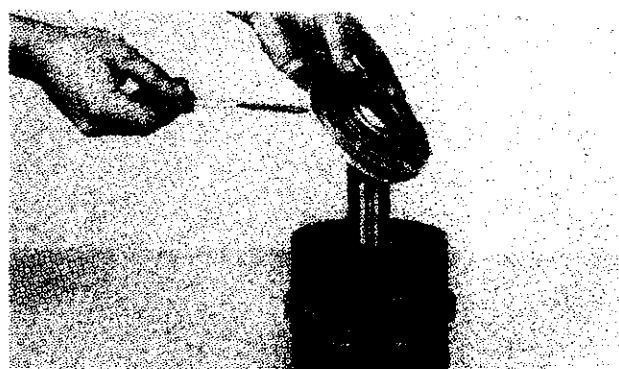


Figure 145
Install clutch piston inner and outer sealing rings and size as explained in Figure 73. Install clutch piston.



Figure 146
Install piston return spring spacer.
See Figure 65.

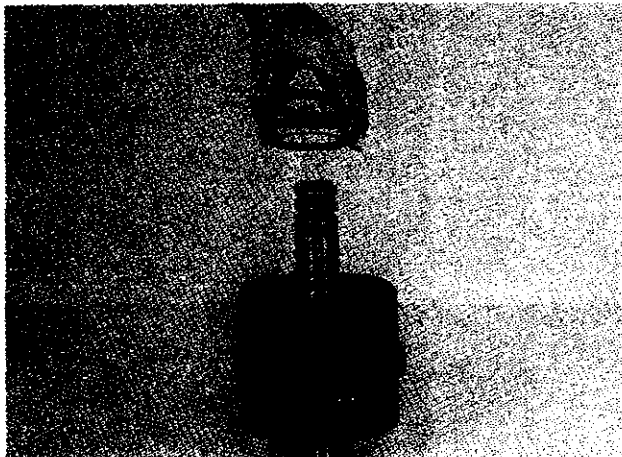


Figure 147
Install disc springs. First disc spring with large diameter of bevel toward spacer. Alternate five (5) disc springs (see Figure 148).

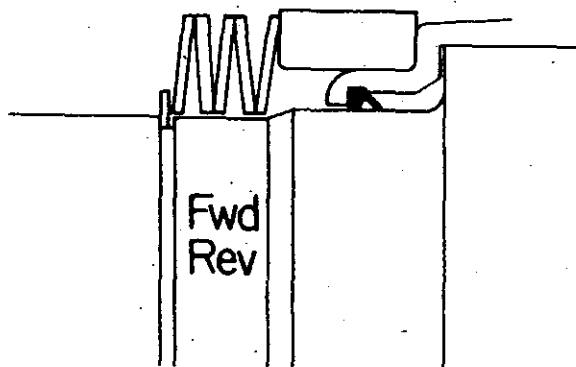


Figure 148

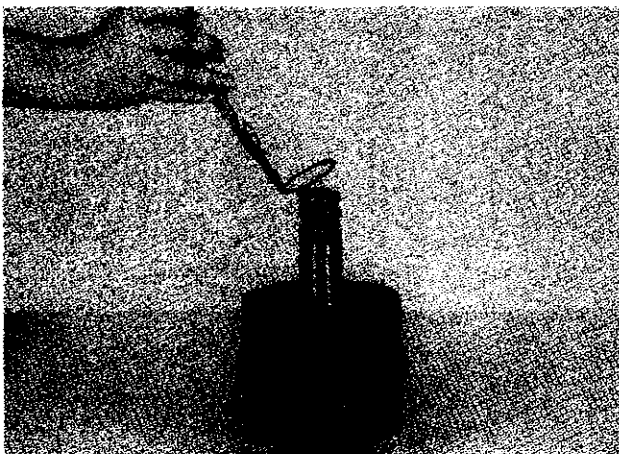


Figure 149
Install return spring retainer ring.



Figure 150
Drive retainer ring into position.



Figure 151
Install one steel disc.



Figure 152
Install one friction disc. Alternate steel and friction disc until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

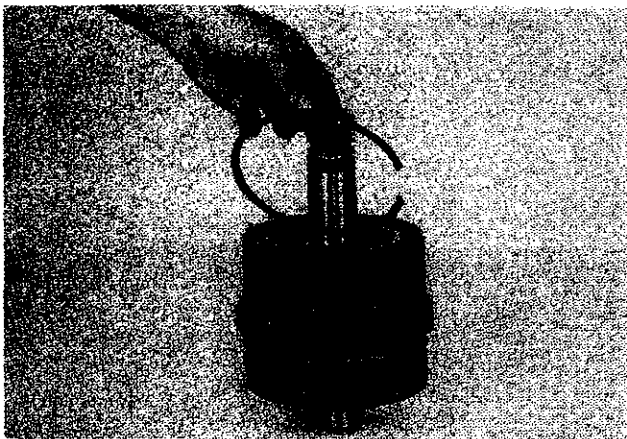


Figure 153

Install end plate and retainer ring.

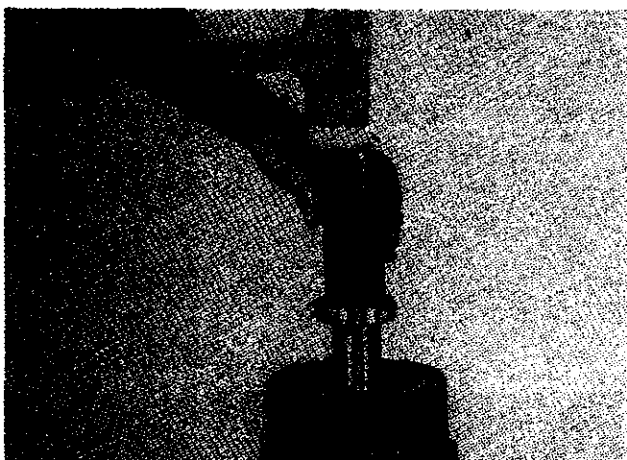


Figure 154

Install reverse gear inner bearing. **NOTE:** This bearing does not have a shield in it.

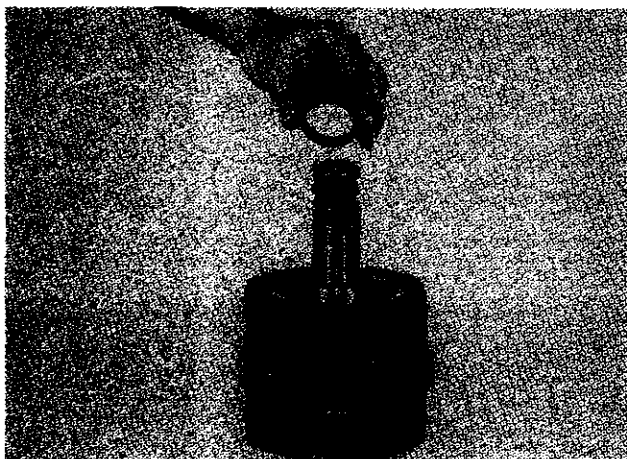


Figure 155

Position bearing spacer on clutch shaft.

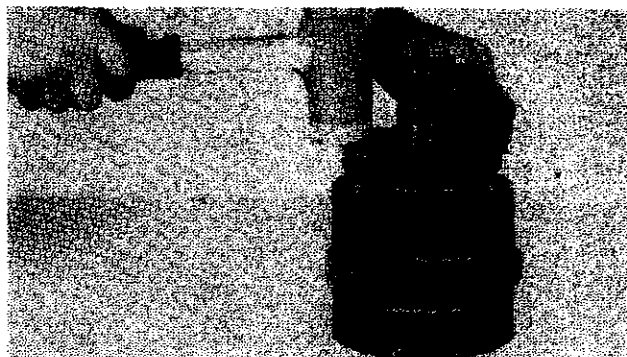


Figure 156

Install reverse gear into clutch drum. Align splines on reverse gear with internal teeth of friction discs. Do not force this operation. Gear splines must be in full position with internal discs.



Figure 157

Install clutch gear outer bearing. **NOTE:** Outer bearing has a shield in it, this shield must be up.

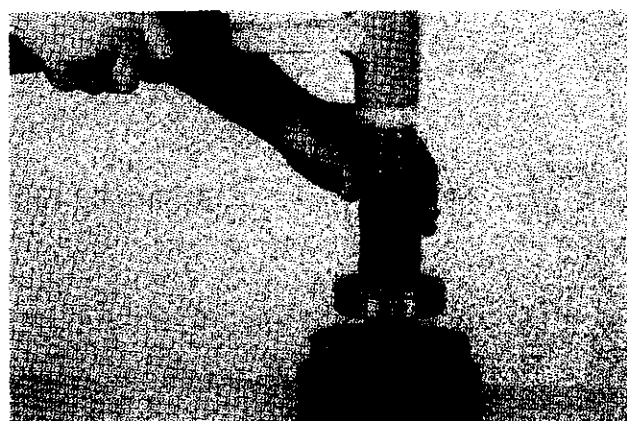


Figure 158

Install clutch shaft front bearing. **NOTE:** Bearing outer diameter locating ring groove must be up.

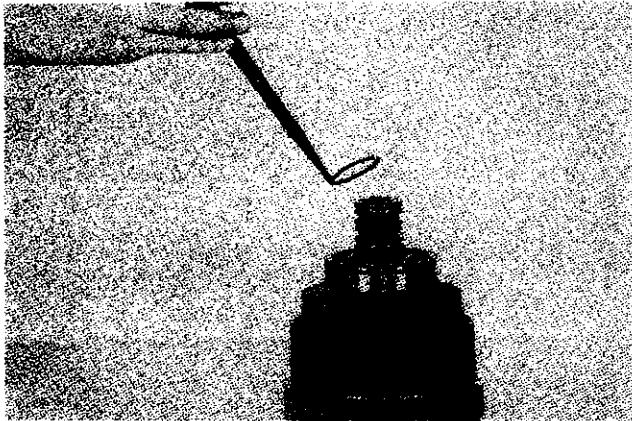


Figure 159

Install bearing retainer ring.

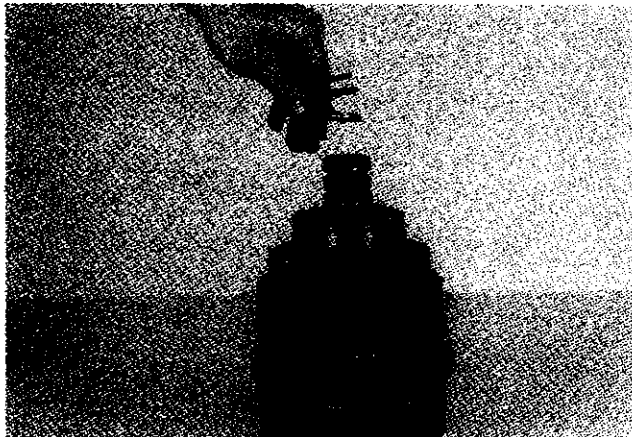


Figure 160

Install clutch shaft oil sealing rings and expander springs per instructions on Page 82.

SECOND CLUTCH REASSEMBLY

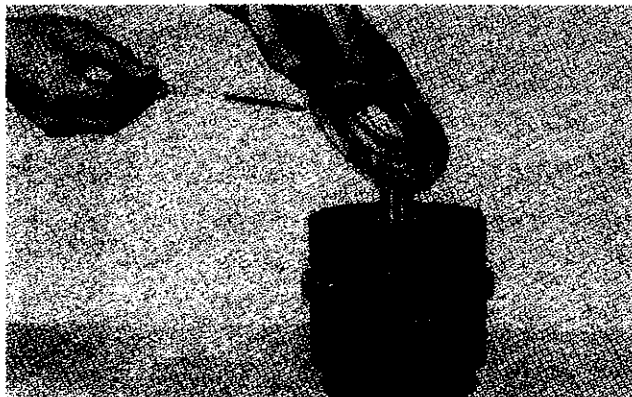


FIGURE 161

Install clutch piston outer and inner seal rings. Size as explained in Figure 73. Install clutch piston in clutch drum. Use caution as not to damage sealing rings.



Figure 162

Position piston return spring and spring retainer on clutch shaft.

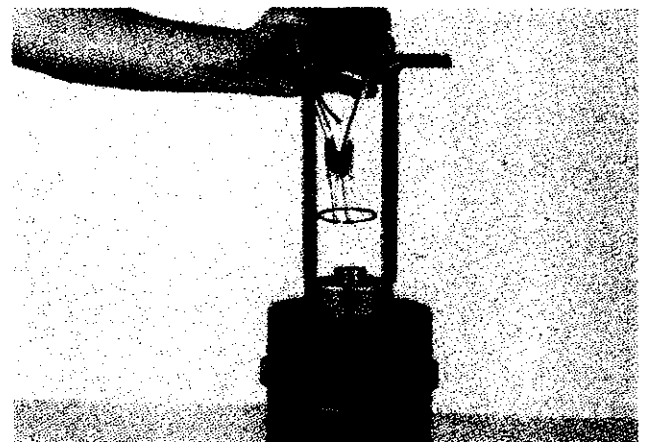


Figure 163

Compress return spring and install retainer ring.

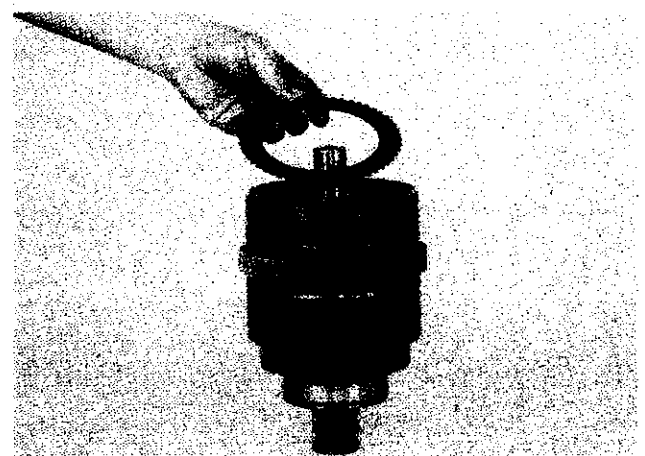


Figure 164

Install one steel disc.

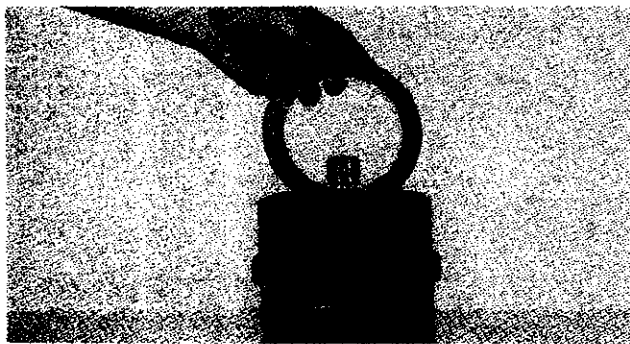


Figure 165

Install one friction disc. Alternate friction and steel discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

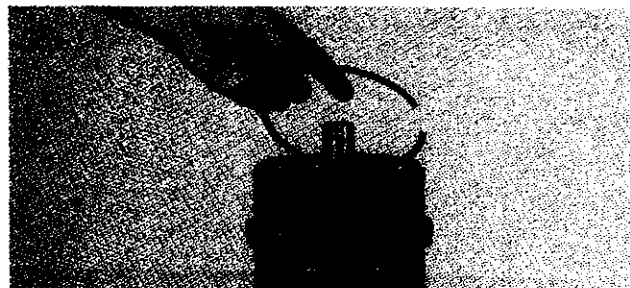


Figure 166

Install end plate and retainer ring.

DISASSEMBLY AND REASSEMBLY OF OUTPUT SHAFT

DISASSEMBLY

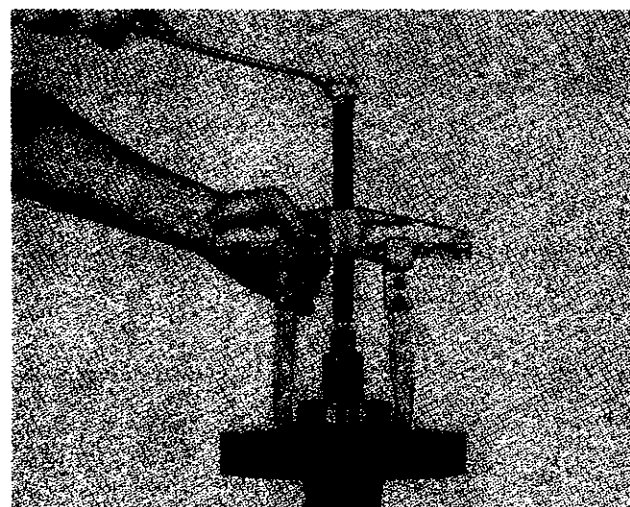


Figure 167

Remove the output shaft rear bearing.

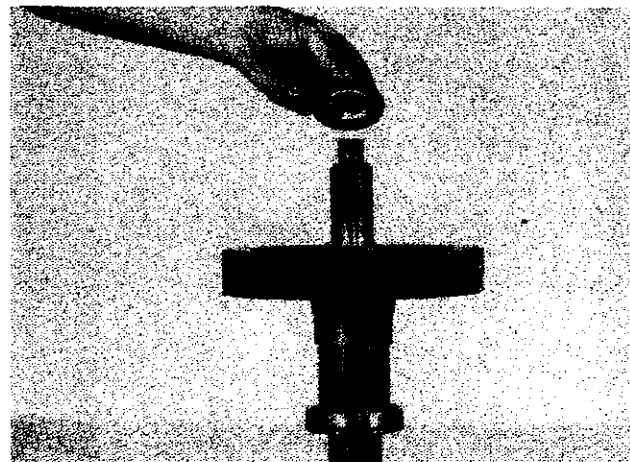


Figure 168

Remove bearing spacer.



Figure 169

Remove output gear.

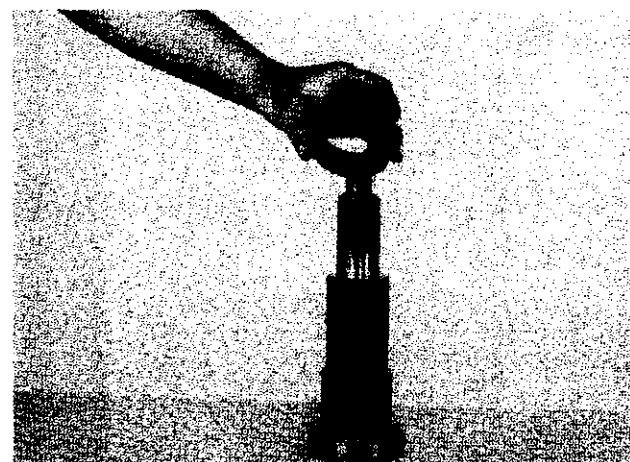


Figure 170

Remove gear spacer.



Figure 171

Remove rear bearing retainer ring.

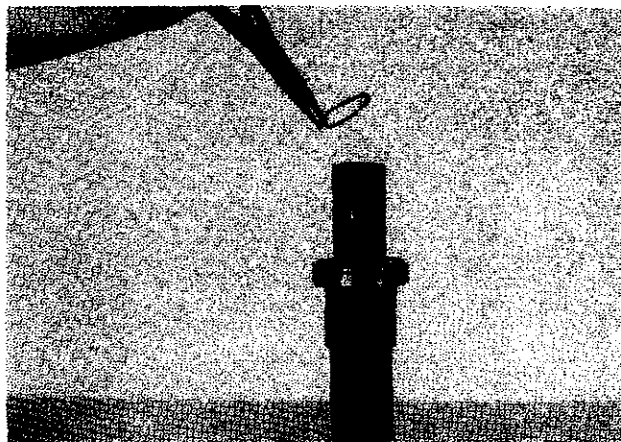


Figure 174

Install bearing retainer ring.

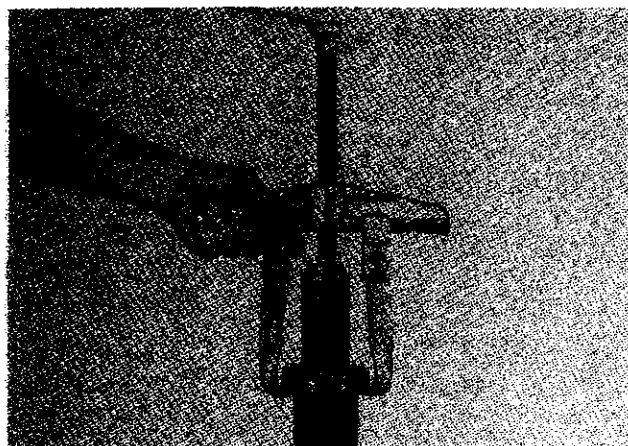


Figure 172

Remove bearing.

(See cleaning and inspection page.)

REASSEMBLY

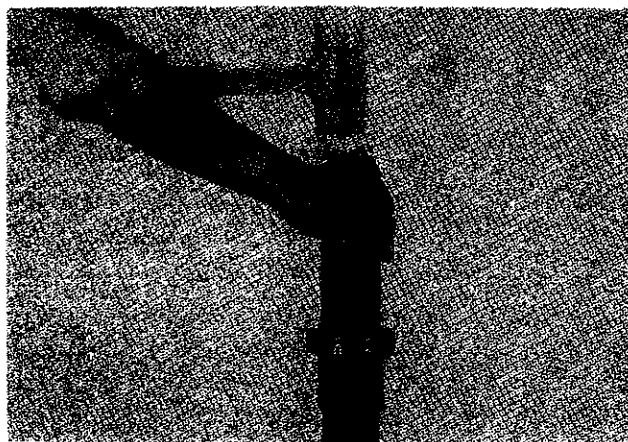


Figure 173

Install rear bearing.

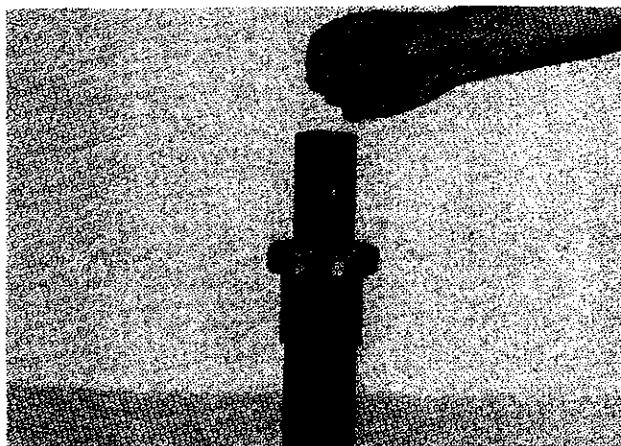


Figure 175

If the output shaft front bushing was changed, install a new bushing as shown in Figure 175-A.

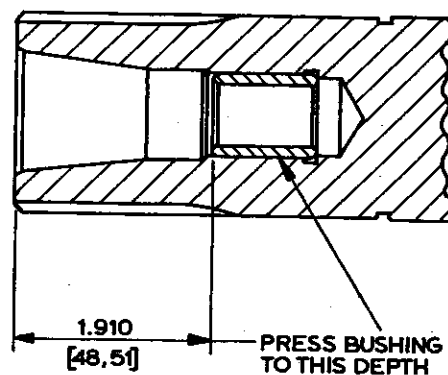


Figure 175-A

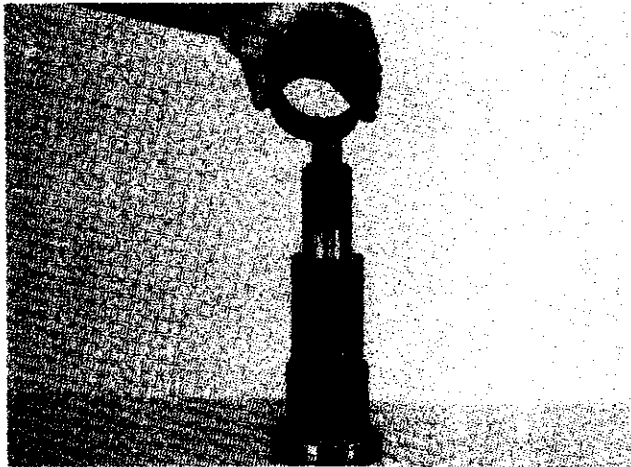


Figure 176
Position gear spacer on shaft.



Figure 177
Position output gear on shaft with long hub of gear toward gear spacer.



Figure 178
Position bearing spacer on shaft.

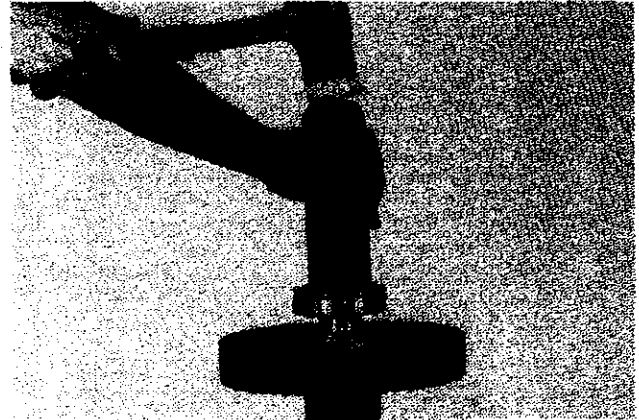


Figure 179
Install output rear bearing. **NOTE:**Rear bearing locating ring groove must be up.

DISASSEMBLY & REASSEMBLY OF INTERNAL DISCONNECT

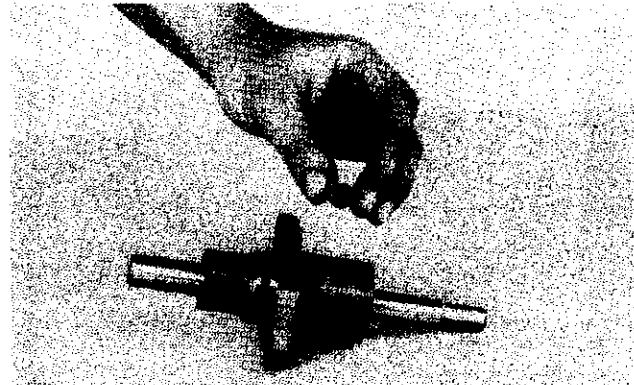


Figure 180
Remove detent plug.

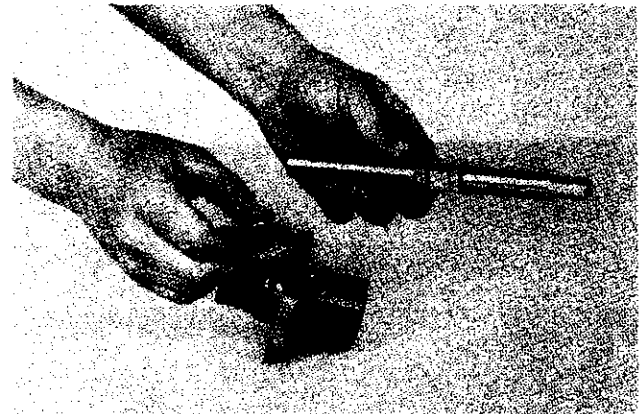


Figure 181
Remove shift rail and detent spring and ball. Remove shift rail oil seal.

(See cleaning and inspection page.)
REASSEMBLY

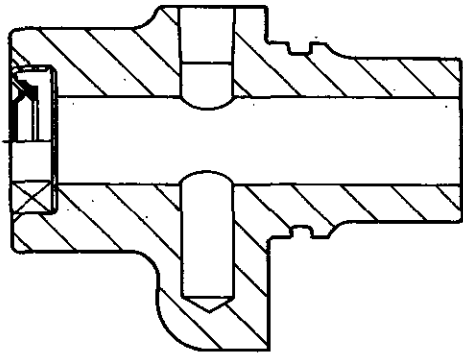


Figure 182

Apply a light coat of Permatex #2 to the outer diameter of the shift rail oil seal. Press seal in shift rail support with lip of seal in.

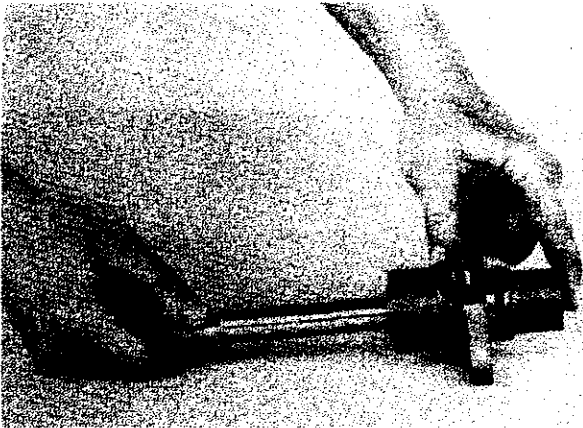


Figure 183

Position spring and ball in support. Compress ball and spring and install shift rail, use caution as not to damage oil seal.

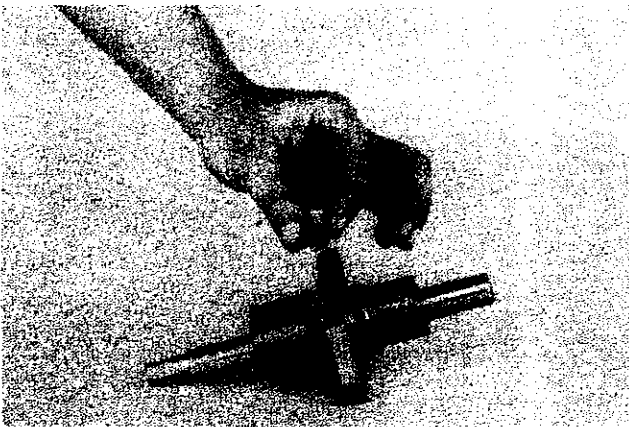


Figure 184

Install detent plug.

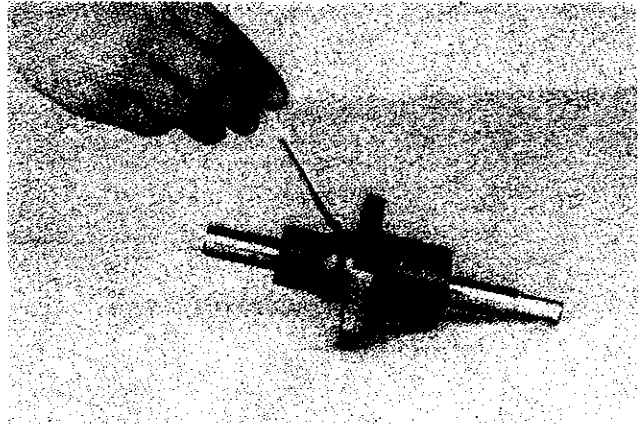


Figure 185

Install new support "O"ring.

(See cleaning and inspection page.)
TRANSMISSION REASSEMBLY



Figure 186

Install forward clutch rear bearing with bearing locating ring toward the front.



Figure 187

Align clutch oil sealing ring sleeve with notch in case. Tap sleeve into position.



Figure 188
Install sleeve retainer ring.



Figure 191
Install disc hub retainer ring.



Figure 189
The use of heavy grease will help center the forward clutch shaft oil sealing rings in the ring grooves. Tap forward clutch into sleeve and rear bearing, use caution as not to damage sealing rings.

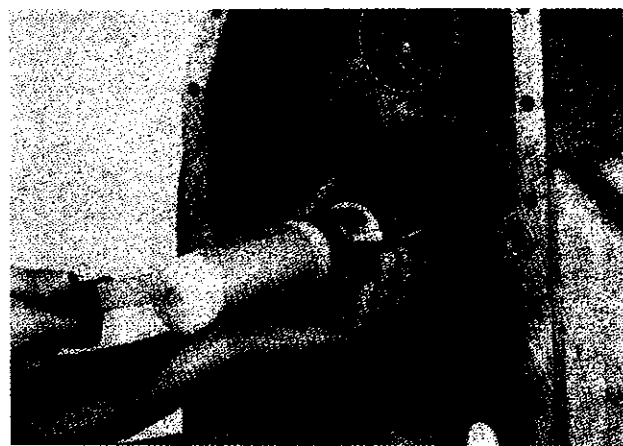


Figure 192
Tap low clutch assembly into position.



Figure 190
Install gear and 3rd clutch disc hub on forward clutch shaft.



Figure 193
Position output shaft assembly in housing.

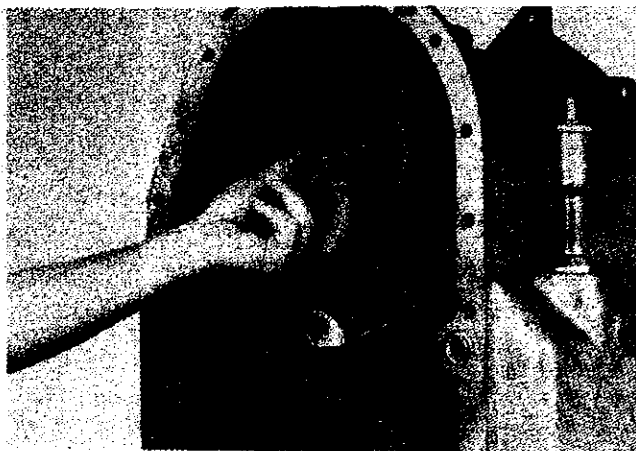


Figure 194

Position 3rd speed clutch front pilot bearing in forward clutch shaft.

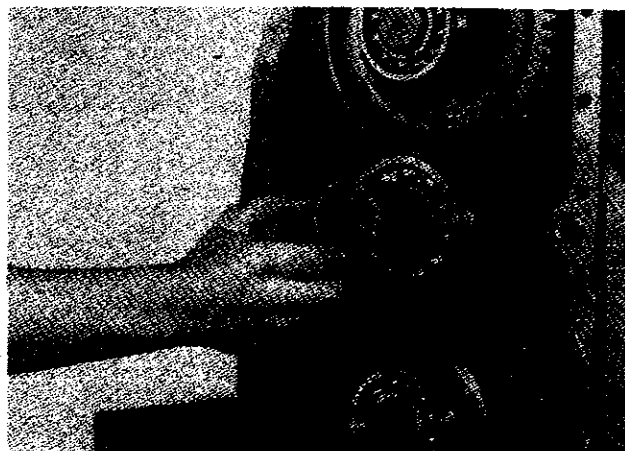


Figure 197

Position rear bearing washer on shaft.

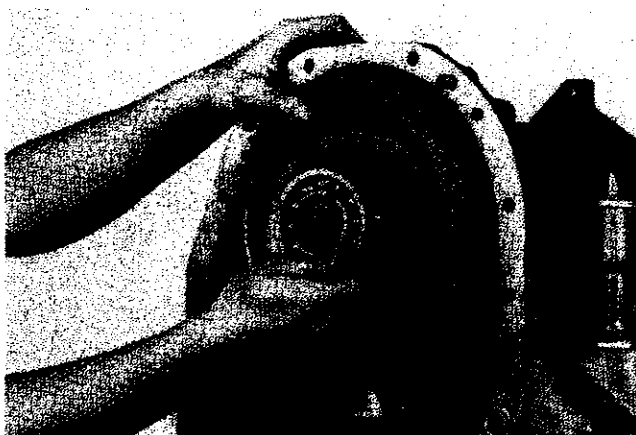


Figure 195

Position the 3rd speed clutch assembly in pilot bearing. Use caution as not to damage pilot bearing.

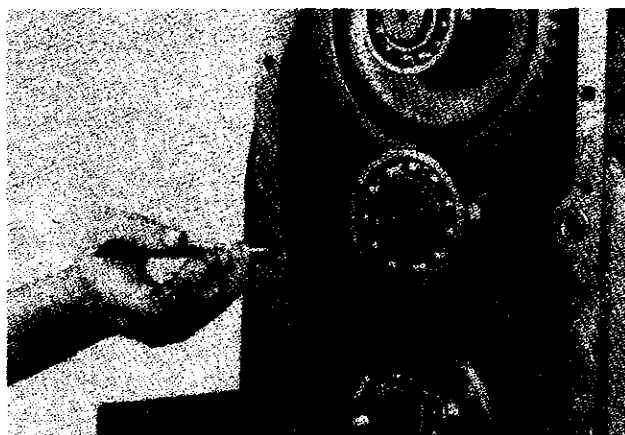


Figure 198

Install rear bearing retainer ring.

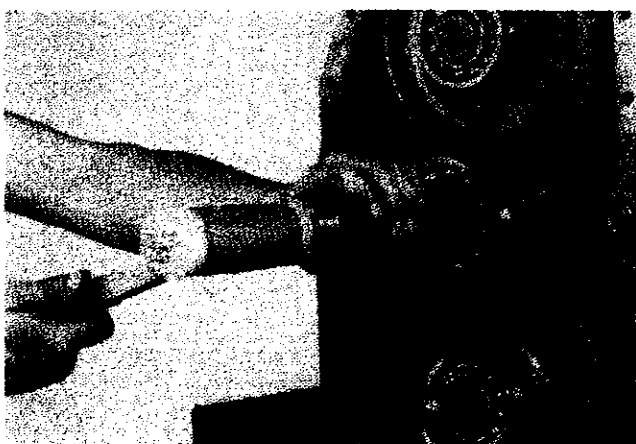


Figure 196

Install the low clutch rear bearing with the bearing locating ring groove to the rear.

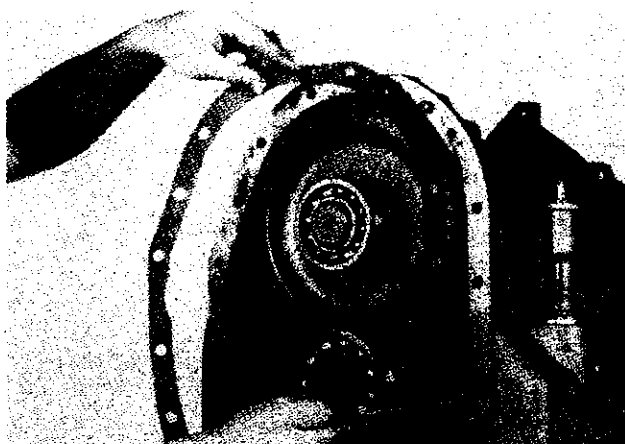


Figure 199

Position a new gasket and "O" ring on rear of case. A light coat of grease will hold gasket in place.