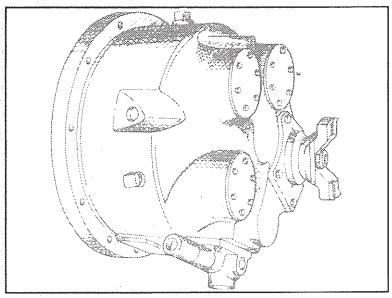
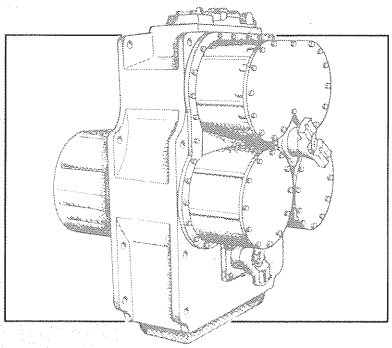
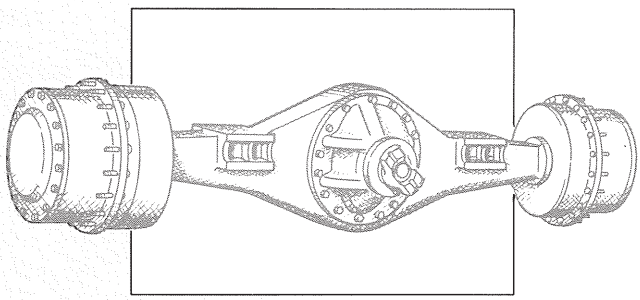
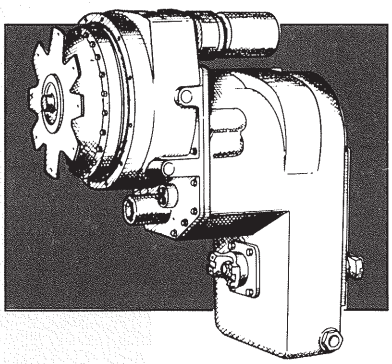
Maintenance and Service Manual









34000

Powershift Transmission

R-HR LHR & MHR
4 SPEED LONG DROP

FOR SERVICING ALLIED SYSTEMS TRANSMISSION #236799

CLARK-HURTH COMPONENTS

ALLIED SYSTEMS FORM #80-795

SM R-HR 34 4 LD (Rev. 2-94)

Service Publications

I-77 at I-40, Rt. 18, Box 38

Statesville, NC 28677

TOWING OR PUSH STARTING

Before towing the vehicle, be sure to lift the rear wheels off the ground or disconnect the driveline to avoid damage to the transmission during towing.

NOTE: If the transmission has 4 wheel drive, disconnect both front and rear drivelines. Because of the design of the hydraulic system, the engine **cannot** be started by pushing or towing.

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 principle 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.**

TABLE OF CONTENTS

NOTE: Metric Dimensions Shown in Brackets [ ].

TRANSMISSION ASSEMBLY

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:

Basic Design Silhouette
Converter Group
Converter and Transmission Case Group
Reverse and 2nd, Low & Output Group
Forward-4th, 3rd & Idler Group
Regulating Valve & Charging Pump Group
Control Valve Assembly
Electric Control Valve
Axle Disconnect and Mechanical Parking Brake
Assembly Instruction
External Plumbing
Ring Gear Installation
Four Speed Power Flow

The R, HR, and MHR Model Transmissions are of three basic designs.

The R Model consists of a separate torque converter, mounted to the engine with the powershift transmission remotely mounted and connected to the torque converter with a drive shaft.

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

The MHR version is a mid-mount torque converter and transmission assembly connected to the engine by means of a drive shaft. (See Fig. A for basic design silhouette.)

The shift control valve assembly may be mounted directly on the side of the converter housing or front transmission cover, or remote mounted and connected to the transmission by means of flexible hoses. 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 either by direct gearing or drive shaft. 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.

An axle disconnect is optional and is located on the output shaft. The drive to the front or rear axle can be disconnected or connected by manual shifting.

HOW THE UNITS OPERATE

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 fitting on the transmission. Then 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.

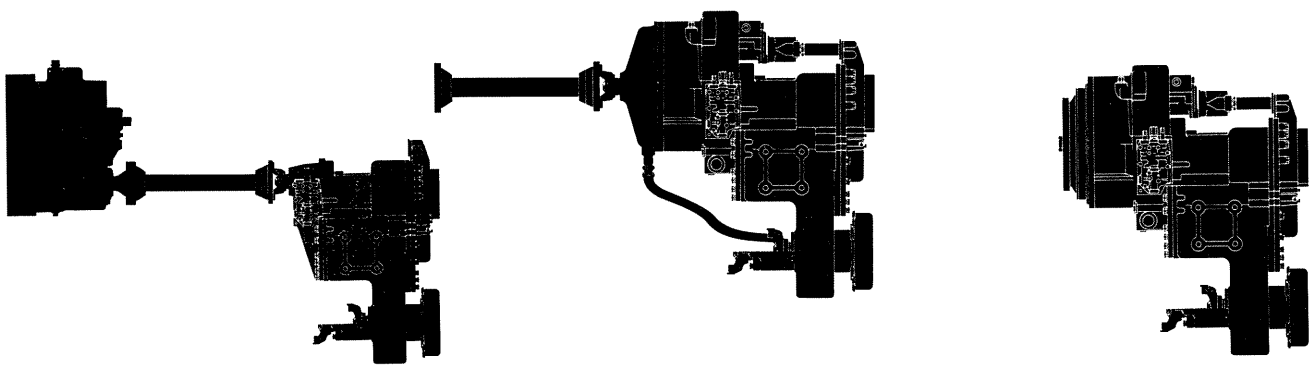
With the engine running and the directional control lever in neutral position, oil pressure from the regulating valve is blocked at the control valve, and the transmission is in neutral. Movement of the forward and reverse spool will direct oil, under pressure to either the forward or reverse direction 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 tube, 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 in the clutch piston which allow quick escape for oil when the pressure to the piston is released.



R34000 **MHR34000** **HR34000**

FIG. A

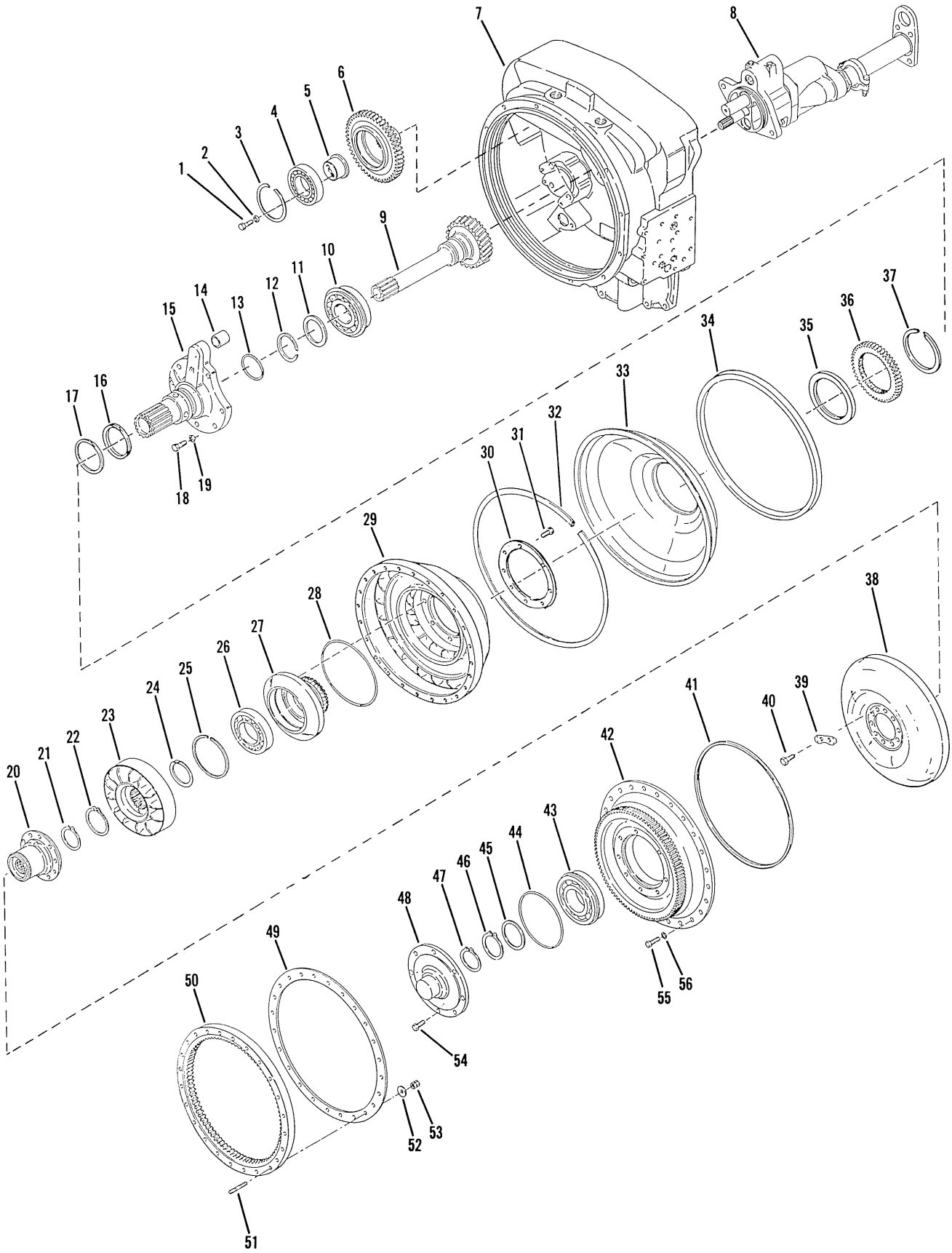

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FIG. B

HR 34000 CONVERTER GROUP
FOR R-MODEL (REMOTE MOUNTED CONVERTER) SEE PAGE 63

ITEM	DESCRIPTION	QTY
1	Bearing Support Screw	6
2	Bearing Support Screw Lockwasher	6
3	Drive Gear Snap Ring	3
4	Pump Drive Gear Bearing	3
5	Pump Drive Bearing Support	3
6	Pump Drive Gear	3
7	Converter Housing	1
8	Charging Pump & Regulating Valve Assembly	1
9	Turbine Shaft	1
10	Turbine Shaft Bearing	1
11	Turbine Shaft Bearing Washer	1
12	Turbine Shaft Bearing Snap Ring	1
13	Turbine Shaft Piston Ring	1
14	Converter Inlet Tube	1
15	Stator Support	1
16	Piston Ring	1
17	Piston Ring Expander Spring	1
18	Stator Support Screw	7
19	Stator Support Screw Lockwasher	7
20	Turbine Hub	1
21	Turbine Hub Snap Ring	1
22	Reaction Member Snap Ring	1
23	Reaction Member	1
24	Reaction Member Spacer	1
25	Bearing Snap Ring	1
26	Impeller Hub Bearing	1
27	Impeller Hub	1
28	Impeller Hub "O" Ring	1
29	Impeller	1
30	Impeller to Hub Screw Backing Ring	1
31	Hub to Impeller Screw	8
32	Oil Baffle Retainer Ring	1
33	Oil Baffle	1
34	Oil Baffle Seal Ring	1
35	Oil Baffle Oil Seal	1
36	Impeller Hub Gear	1
37	Impeller Hub Gear Snap Ring	1
38	Turbine	1
39	Turbine Hub Screw Lock Tab	5
40	Turbine Hub Screw	10
41	Impeller to Cover "O" Ring	1
42	Impeller Cover	1
43	Turbine Hub Bearing	1
44	Impeller Cover Hub "O" Ring	1
45	Bearing Spacer	1
46	Bearing Snap Ring	1
47	Turbine Hub Snap Ring	1
48	Impeller Cover Hub	1
49	Ring Gear Backing Plate	1
50	Flywheel Ring Gear	1
51	Ring Gear Stud	24
52	Ring Gear Stud Belleville Washer	72
53	Ring Gear Stud Nut	24
54	Impeller Cover Hub Screw	8
55	Impeller to Impeller Cover Screw	24
56	Impeller to Impeller Cover Screw Lockwasher	24

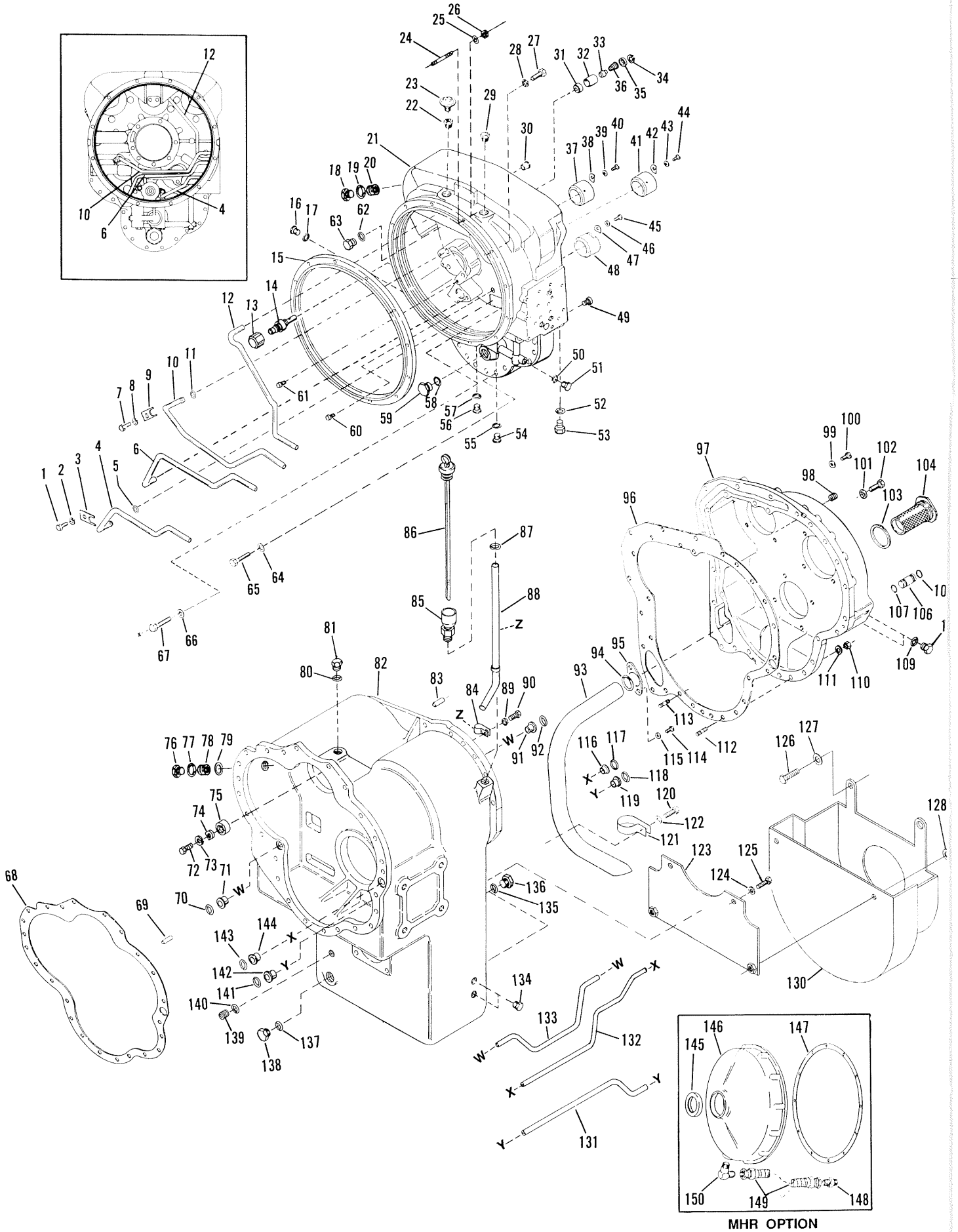


FIG. C

34000 CONVERTER HOUSING &TRANSMISSION CASE GROUP

SEE PAGE 64 FOR R-MODEL CASE GROUP

ITEM	DESCRIPTION	QTY
1	Tube Clip Screw	1
2	Tube Clip Screw Lockwasher	1
3	Tube Clip	1
4	4th Speed Pressure Tube	1
5	4th Speed Pressure Tube "O" Ring	1
6	3rd Speed Pressure Tube	1
7	Tube Clip Screw	1
8	Tube Clip Screw Lockwasher	1
9	Tube Clip	1
10	Forward Pressure Tube Assembly	1
11	Forward Tube "O" Ring	1
12	Valve Oil Supply Tube	1
13	4th Lube Pressure Plug Cap	1
14	4th Lube Pressure Plug	1
15	Converter Housing Adaptor (Not used on all models)	1
16	Lube Pressure Port Plug	1
17	Port Plug "O" Ring	1
18	Speed Sensor Plug	1
19	Speed Sensor Plug "O" Ring	1
20	Speed Sensor Adjuster Bushing	1
21	Converter Housing	1
22	Reducing Bushing	1
23	Breather	1
24	Converter Housing to Front Cover Stud	2
25	Converter Housing to Front Cover Stud Lockwasher	2
26	Converter Housing to Front Cover Stud Nut	2
27	Converter Housing to Front Cover Screw	10
28	Converter Housing to Front Cover Screw Lockwasher	10
29	Fill Plug	1
30	Tube Sleeve	2
31	Safety Valve Seat	1
32	Valve Seat Retainer	1
33	Pressure Relief Valve Plunger	1
34	Retaining Ring	1
35	Washer	1
36	Pressure Relief Spring	1
37	Converter Housing Sleeve	1
38	Converter Housing Sleeve Lock	1
39	Sleeve Lock Screw Lockwasher	1
40	Sleeve Lock Screw	1
41	Converter Housing Sleeve	1
42	Converter Housing Sleeve Lock	1
43	Sleeve Lock Screw Lockwasher	1
44	Sleeve Lock Screw	1
45	Sleeve Lock Screw	1
46	Sleeve Lock Screw Lockwasher	1
47	Converter Housing Sleeve Lock	1
48	Converter Housing Sleeve	1
49	Plug-for External Lube for Low Bearing	1
50	Port Plug "O" Ring	1
51	Forward Clutch Pressure Port Plug	1
52	Port Plug "O" Ring	1
53	Port Plug	1
54	Port Plug	1
55	Port Plug "O" Ring	1
56	4th Clutch Pressure Port Plug	1
57	Port Plug "O" Ring	1
58	Cap Gasket	1
59	Cap	1
60	Plug	1
61	Plug	1
62	Port Plug "O" Ring	1
63	Lube By-Pass Port Plug	1
64	Converter Housing to Case Screw Lockwasher	14
65	Converter Housing to Transmission Case Screw	14
66	Converter Housing to Transmission Case Screw Lockwasher	9
67	Converter Housing to Transmission Case Screw	9
68	Converter Housing to Transmission Gasket	2
69	Converter Housing to Transmission Case Dowel Pin	2
70	Tube Sleeve "O" Ring	1
71	Tube Sleeve	1
72	Retainer Screw	1
73	Retainer Screw Lockwasher	1
74	Outer Race Retainer	1
75	Outer Race - used with lock-up only	1
76	Speed Sensor Hole Plug	1
77	Speed Sensor Plug "O" Ring	1
78	Speed Sensor Adjuster Bushing	1
79	Adjusting Bushing Shim	1
80	Plug "O" Ring	1
81	Lock-Up Supply Hole Plug	1
82	Transmission Case	1
83	Transmission Case to Rear Cover Dowel Pin	2
84	Dipstick Tube Clip	1
85	Dipstick Housing	1
86	Dipstick	1
87	Dipstick Housing "O" Ring	1
88	Dipstick Tube	1
89	Dipstick Tube Clip Lockwasher	1
90	Dipstick Tube Clip Screw	1
91	Tube Sleeve	1
92	Tube Sleeve "O" Ring	1
93	Suction Tube	1
94	Suction Tube "O" Ring	1
95	Suction Tube Flange	1
96	Transmission Case to Rear Cover Gasket	1
97	Transmission Case Rear Cover	1
98	3rd Clutch Supply Passage Plug	1
99	Rear Cover to Case Screw Lockwasher	5
100	Rear Cover to Case Screw	5
101	Rear Cover to Case Screw Lockwasher	11
102	Rear Cover to Case Screw	11
103	Screen Assembly Gasket	1
104	Screen Assembly	1
105	1st Speed Sleeve "O" Ring	2
106	1st Speed Clutch Pressure Sleeve	2
107	1st Speed Sleeve "O" Ring	2
108	Rear Cover Supply Plug	2
109	Plug "O" Ring	2
110	Rear Cover to Case Stud Nut	12
111	Rear Cover to Case Stud Lockwasher	12
112	Rear Cover to Case Stud	7
113	Rear Cover to Case Stud	5
114	Suction Tube Retainer Washer Screw	2
115	Suction Tube Retainer Washer	2
116	Tube Sleeve	1
117	Tube Sleeve "O" Ring	2
118	Tube Sleeve "O" Ring	1
119	Tube Sleeve	1
120	Suction Tube Clip Screw	1
121	Suction Tube Clip	1
122	Suction Tube Clip Screw Lockwasher	1
123	Baffle Mounting Plate Assembly	1
124	Mounting Plate to Case Screw Washer	2
125	Mounting Plate to Case Screw	2
126	Oil Baffle to Case Screw	2
127	Oil Baffle to Case Screw Lockwasher	2
128	Oil Baffle to Mounting Plate Washer	2
129	Oil Baffle to Mounting Plate Screw	2
130	Oil Baffle	1
131	1st Speed Clutch Pressure Tube	1
132	Low Shaft Rear Bearing Lube Tube	1
133	3rd Speed Clutch Pressure Tube	1
134	Oil Level Plug	2
135	Drain Plug "O" Ring	2
136	Drain Plug	2
137	Auxiliary Drain Plug "O" Ring	1
138	Auxiliary Drain Plug	1
139	Drain Back Plug	1
140	Drain Back Plug "O" Ring	1
141	Tube Sleeve "O" Ring	1
142	Tube Sleeve	1
143	Tube Sleeve "O" Ring	1
144	Tube Sleeve	1
145	Front Cover Oil Seal	1
146	Converter Housing Front Cover	1
147	Converter Housing Front Cover Gasket	1
148	Hose Fitting	1
149	Hose Assembly	1
150	Hose Fitting	1

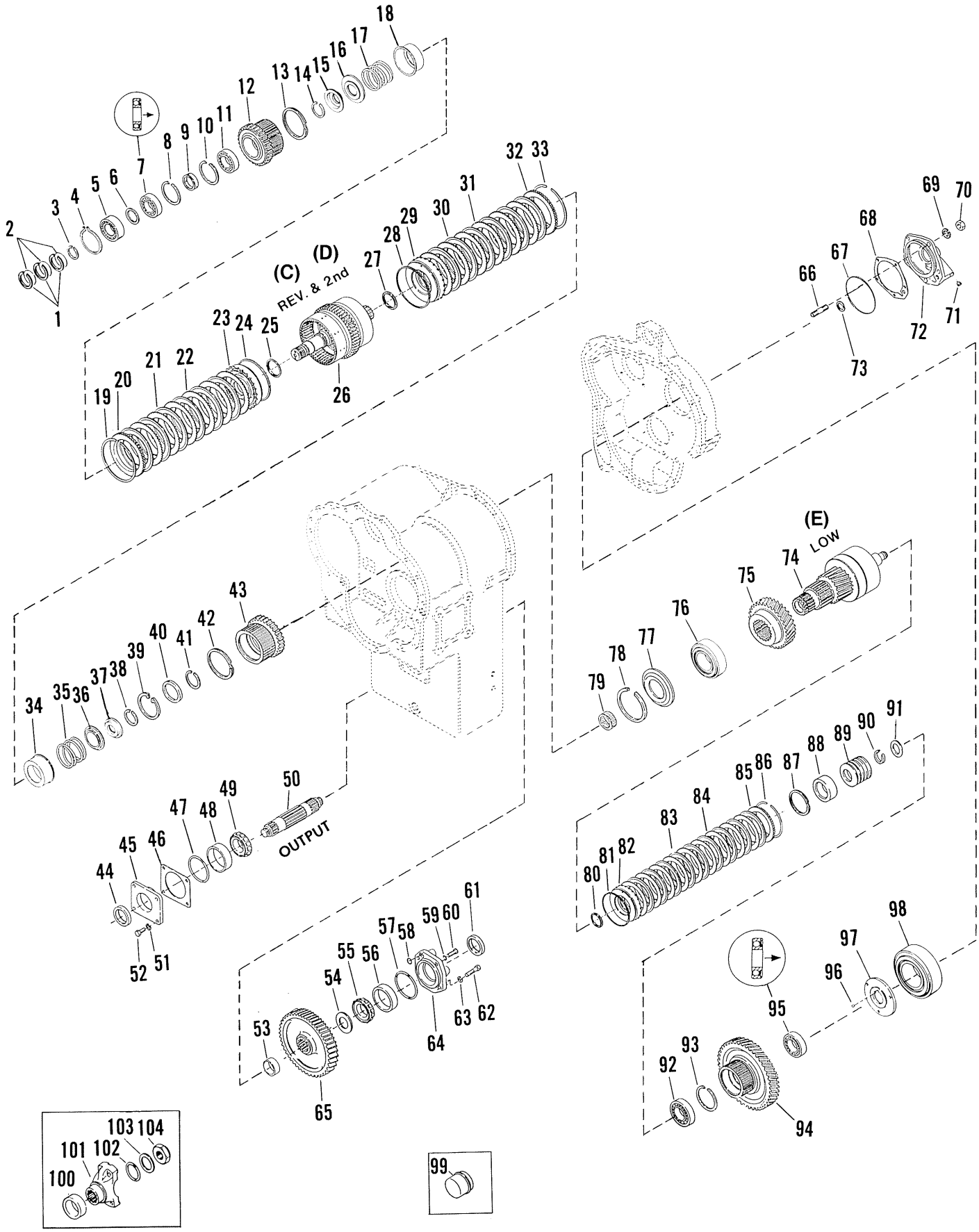


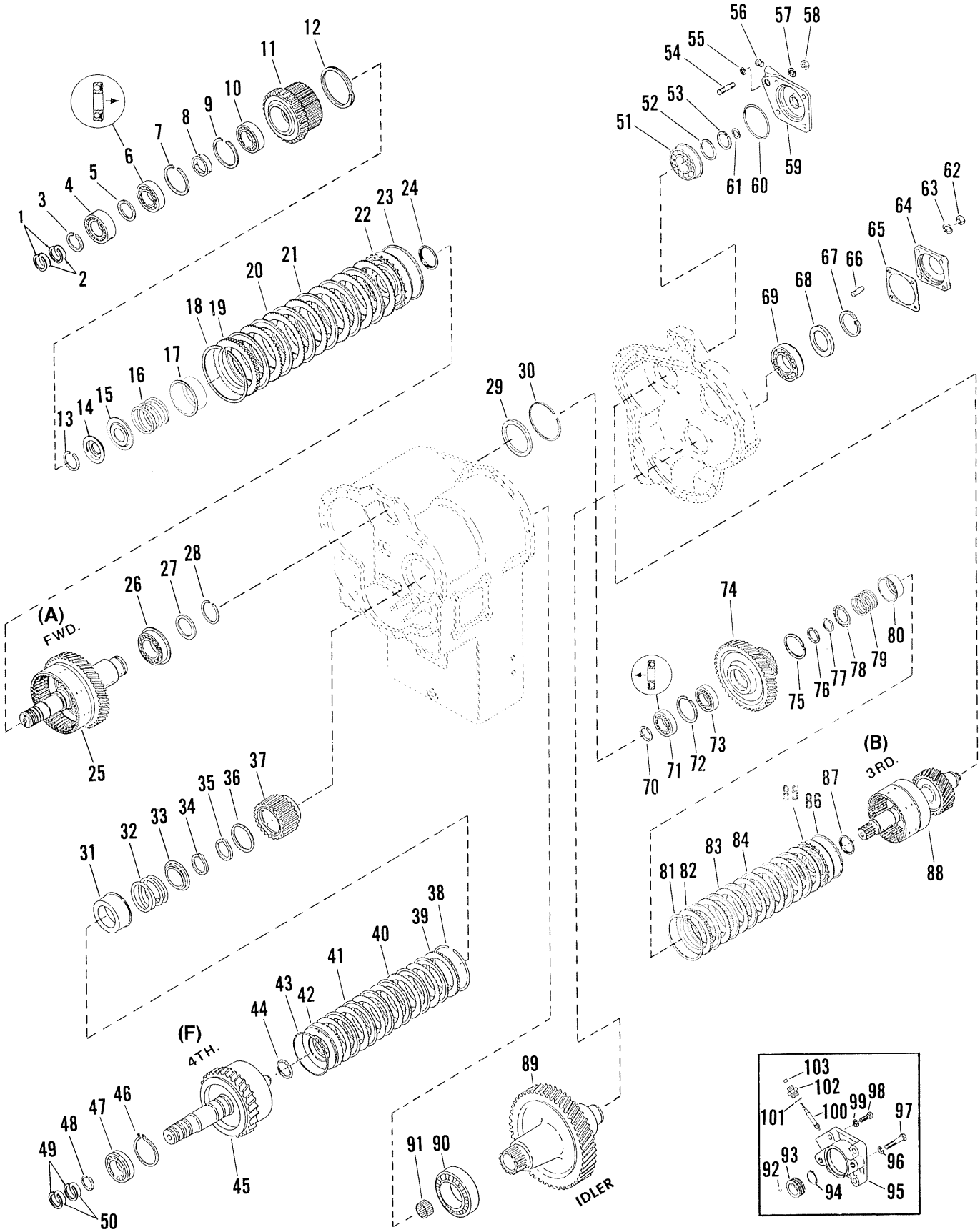
FIG. D

34000
REVERSE & 2ND, LOW & OUTPUT GROUP

ITEM	DESCRIPTION	QTY
1	Reverse & 2nd Clutch Shaft Piston Ring	3
2	Piston Ring Expander Spring	3
3	Front Bearing Retainer Ring	1
4	Front Bearing Snap Ring	1
5	Reverse & 2nd Shaft Front Bearing	1
6	Reverse & 2nd Shaft Front Bearing Spacer	1
7	Clutch Driven Gear Bearing	1
8	Clutch Driven Gear Locating Ring	1
9	*Clutch Driven Gear Bearing Spacer	1
10	Clutch Driven Gear Locating Ring	1
11	Clutch Driven Gear Bearing	1
12	Clutch Driven Gear	1
13	Clutch Hub Oil Baffle Ring	1
14	Spring Retainer Snap Ring	1
15	Snap Ring Retainer	1
16	Spring Retainer	1
17	Piston Return Spring	1
18	Spring Retainer	1
19	Backing Plate Retainer Ring	1
20	Backing Plate-Reverse Clutch	1
21	Clutch Inner Disc-Reverse Clutch	6
22	Clutch Outer Disc-Reverse Clutch	6
23	Clutch Piston Assembly-Reverse Clutch	1
24	Clutch Piston Outer Seal	1
25	Clutch Piston Inner Seal	1
26	Reverse & 2nd Clutch Drum	1
27	Clutch Piston Inner Seal	1
28	Clutch Piston Outer Seal	1
29	Clutch Piston-2nd Clutch	1
30	Clutch Inner Disc-2nd Clutch	6
31	Clutch Outer Disc-2nd Clutch	6
32	Backing Plate-2nd Clutch	1
33	Backing Plate Retaining Ring	1
34	Spring Retainer	1
35	Piston Return Spring	1
36	Spring Retainer	1
37	Snap Ring Retainer	1
38	Spring Retainer Snap Ring	1
39	2nd Clutch Disc Hub Retainer Snap Ring	1
40	2nd Clutch Hub Retainer Ring Retainer	1
41	2nd Clutch Disc Hub Retainer Ring	1
42	Clutch Hub Oil Baffle Ring	1
43	2nd Clutch Disc Hub	1
44	Front Bearing Cap Oil Seal	1
45	Front Bearing Cap	1
46	Bearing Cap Shim	AR
47	Front Bearing Cap "O" Ring	1
48	Front Bearing Cup	1
49	Front Bearing Cone	1
50	Output Shaft	1
51	Front Bearing Cap Screw	4
52	Front Bearing Cap Screw Lockwasher	4
53	Output Shaft Gear Spacer	1
54	Thrust Washer	1

ITEM	DESCRIPTION	QTY.
55	Rear Bearing Cone	1
56	Rear Bearing Cup	1
57	Rear Bearing Cap "O" Ring	1
58	Rear Bearing Cap "O" Ring	1
59	Rear Bearing Cap Screw Lockwasher	3
60	Rear Bearing Cap Screw	3
61	Rear Bearing Cap Oil Seal	1
62	Rear Bearing Cap Screw	1
63	Rear Bearing Cap Screw Lockwasher	1
64	Rear Bearing Cap	1
65	Output Shaft Gear	1
66	Rear Bearing Cap Stud	4
67	Rear Bearing Cap "O" Ring	1
68	Bearing Cap Shim	AR
69	Rear Bearing Cap Stud Lockwasher	4
70	Rear Bearing Cap Stud Nut	4
71	Rear Bearing Cap Plug	1
72	Rear Bearing Cap	1
73	Clutch Shaft Piston Ring	1
74	1st Speed Clutch Shaft & Drum	1
75	3rd Speed Driven Gear	1
76	1st Speed Clutch Front Bearing Assembly (Cup and Cone)	1
77	1st Speed Clutch Shaft Bearing Spacer	1
78	1st Speed Clutch Shaft Retainer Ring	1
79	1st Speed Clutch Shaft Pilot Bearing	1
80	Clutch Piston Inner Seal	1
81	Clutch Piston Outer Seal	1
82	Clutch Piston	1
83	Clutch Inner Disc	9
84	Clutch Outer Disc	9
85	Clutch Disc Backing Plate	1
86	Backing Plate Snap Ring	1
87	Clutch Hub Oil Baffle Ring	1
88	Piston to Disc Spring Washer Spacer	1
89	Disc Springs	5
90	Spring Retainer Ring	1
91	1st Speed Gear Bearing Spacer	1
92	1st Speed Gear Bearing	1
93	1st Gear Bearing Snap Ring	1
94	1st Speed Gear	1
95	1st Speed Gear Bearing	1
96	Thrust Washer Lock Ball	1
97	1st Speed Gear Bearing Thrust Washer	1
98	1st Speed Clutch Shaft Rear Bearing Assembly (Cup and Cone)	1
99	Bore Plug	1
100	Oil Seal	1
101	Output Flange	1
102	Output Flange "O" Ring	1
103	Output Flange Washer	1
104	Output Flange Nut	1

AR-As Required
*—Not used on all models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(B)
3RD.
(F)
4TH.
IDLER

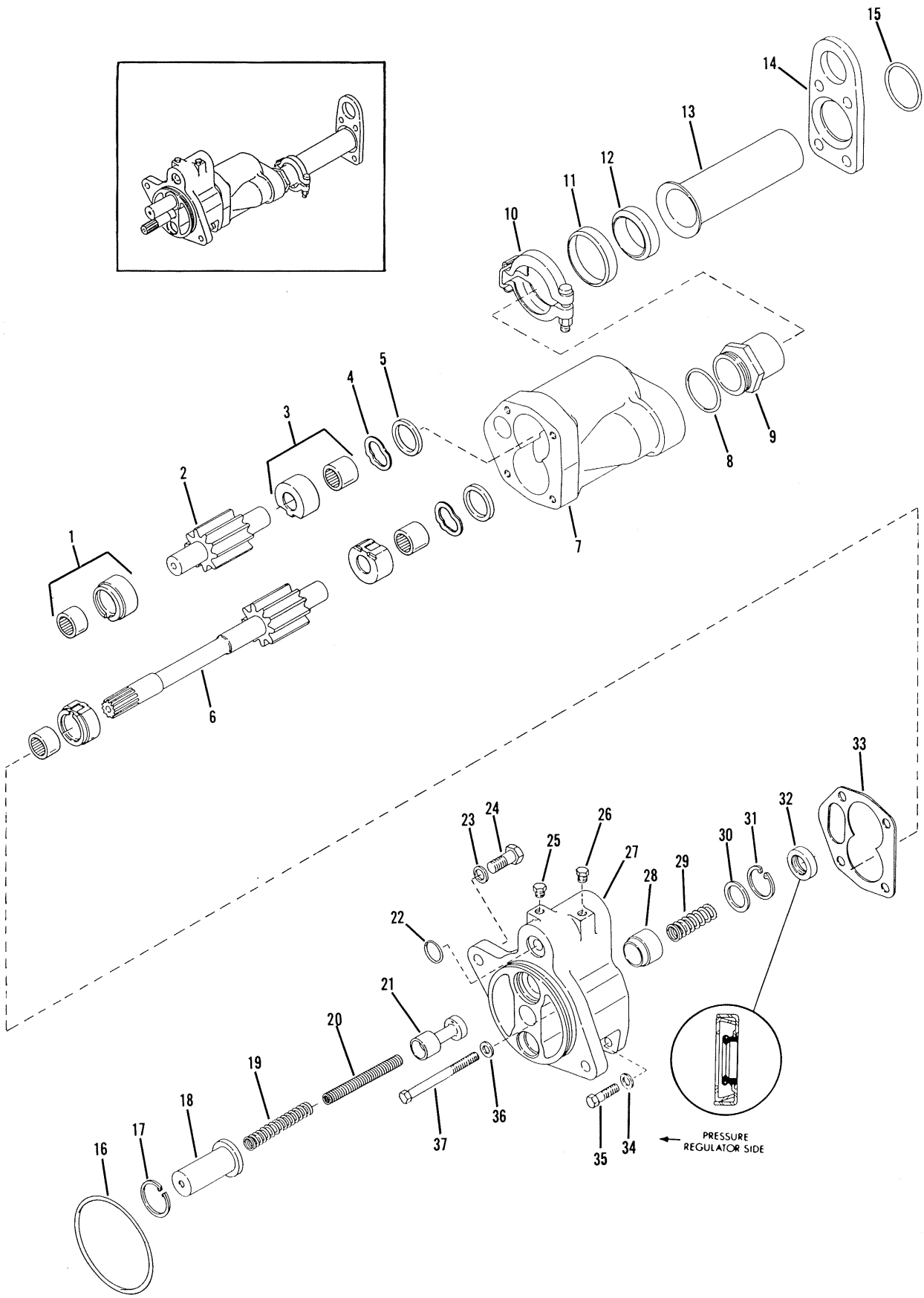
FIG. E

34000
FORWARD, 4TH, 3RD & IDLER GROUP

ITEM	DESCRIPTION	QTY
1	Forward & 2nd Shaft Piston Ring	2
2	Piston Ring Expander Spring	2
3	Front Bearing Retainer Ring	1
4	Forward Shaft Front Bearing	1
5	Forward Shaft Front Spacer	1
6	Clutch Driven Gear Bearing	1
7	Clutch Driven Gear Locating Ring	1
8	*Clutch Driven Gear Bearing Spacer	1
9	Clutch Driven Gear Locating Ring	1
10	Clutch Driven Gear Bearing	1
11	Forward Clutch Driven Gear	1
12	Clutch Hub Oil Baffle Ring	1
13	Spring Retainer Snap Ring	1
14	Snap Ring Retainer	1
15	Spring Retainer	1
16	Piston Return Spring	1
17	Spring Retainer	1
18	Backing Plate Snap Ring	1
19	Clutch Disc Backing Plate	1
20	Clutch Outer Disc	6
21	Clutch Inner Disc	6
22	Clutch Piston Assembly	1
23	Clutch Piston Outer Seal	1
24	Clutch Piston Inner Seal	1
25	Forward Shaft & Clutch Drum	1
26	Forward Shaft Rear Bearing	1
27	Forward Shaft Bearing Washer	1
28	Forward Shaft Rear Bearing Washer Retainer Ring	1
29	Forward Shaft Rear Bearing Thrust Washer	1
30	Bearing Thrust Washer Retainer Ring	1
31	Spring Retainer	1
32	Piston Return Spring	1
33	Spring Retainer	1
34	Spring Retainer Snap Ring	1
35	4th Clutch Disc Hub Retaining Ring	1
36	Clutch Hub Oil Baffle Ring	1
37	4th Clutch Disc Hub	1
38	Backing Plate Snap Ring	1
39	Clutch Disc Backing Plate	1
40	Clutch Outer Disc	6
41	Clutch Inner Disc	6
42	Clutch Piston	1
43	Clutch Piston Outer Seal	1
44	Clutch Piston Inner Seal	1
45	4th Speed Shaft & Clutch Drum	1
46	Front Bearing Locating Ring	1
47	4th Speed Shaft Front Bearing	1
48	Front Bearing Retainer Ring	1
49	4th Speed Shaft Piston Ring	2
50	Piston Ring Expander Spring	2
51	3rd Speed Rear Bearing	1

ITEM	DESCRIPTION	QTY.
52	Bearing Thrust Washer	1
53	3rd Speed Shaft Rear Bearing Retainer Ring	1
54	Rear Bearing Cap Stud	4
55	Rear Bearing Cap "O" Ring	1
56	Rear Bearing Cap Plug	1
57	Rear Bearing Cap Lockwasher	4
58	Rear Bearing Cap Nut	4
59	Rear Bearing Cap	1
60	Rear Bearing Cap "O" Ring	1
61	3rd Speed Shaft Piston Ring	1
62	Idler Shaft Bearing Cap Stud Nut	4
63	Idler Shaft Bearing Cap Stud Lockwasher	4
64	Idler Shaft Rear Bearing Cap	1
65	Idler Shaft Bearing Cap Gasket	1
66	Idler Shaft Bearing Cap Stud	4
67	Rear Bearing Washer Retainer Ring	1
68	Idler Shaft Rear Bearing Washer	1
69	Idler Shaft Rear Bearing	1
70	3rd Speed Bearing Retaining Ring	1
71	3rd Speed Gear Bearing	1
72	Bearing Retainer Ring	1
73	3rd Speed Gear Bearing	1
74	3rd Speed Gear	1
75	Clutch Hub Oil Baffle Ring	1
76	3rd Speed Bearing Retaining Ring	1
77	Spring Retainer Snap Ring	1
78	Spring & Snap Ring Retainer	1
79	Piston Return Spring	1
80	Spring Retainer	1
81	Backing Plate Snap Ring	1
82	Backing Plate	1
83	Clutch Outer Disc	6
84	Clutch Inner Disc	6
85	Clutch Piston Assembly	1
86	Clutch Piston Outer Seal	1
87	Clutch Piston Inner Seal	1
88	3rd Speed Clutch Shaft & Drum	1
89	Idler Shaft & Gear	1
90	Idler Shaft Front Bearing	1
91	Idler Shaft Pilot Bearing	1
92	Speedo Drive Gear Lockball	1
93	Speedo Drive Gear	1
94	Speedo Gear Retaining Ring	1
95	Rear Bearing Cap	1
96	Bearing Cap Screw Lockwasher	3
97	Bearing Cap Screw	3
98	Rear Bearing Cap Screw	1
99	Rear Bearing Cap Screw Lockwasher	1
100	Speedo Driven Gear	1
101	Speedo Tube Nut "O" Ring	1
102	Speedo Tube Nut	1
103	Speedo Tube Nut Oil Seal	1

*—not used on all models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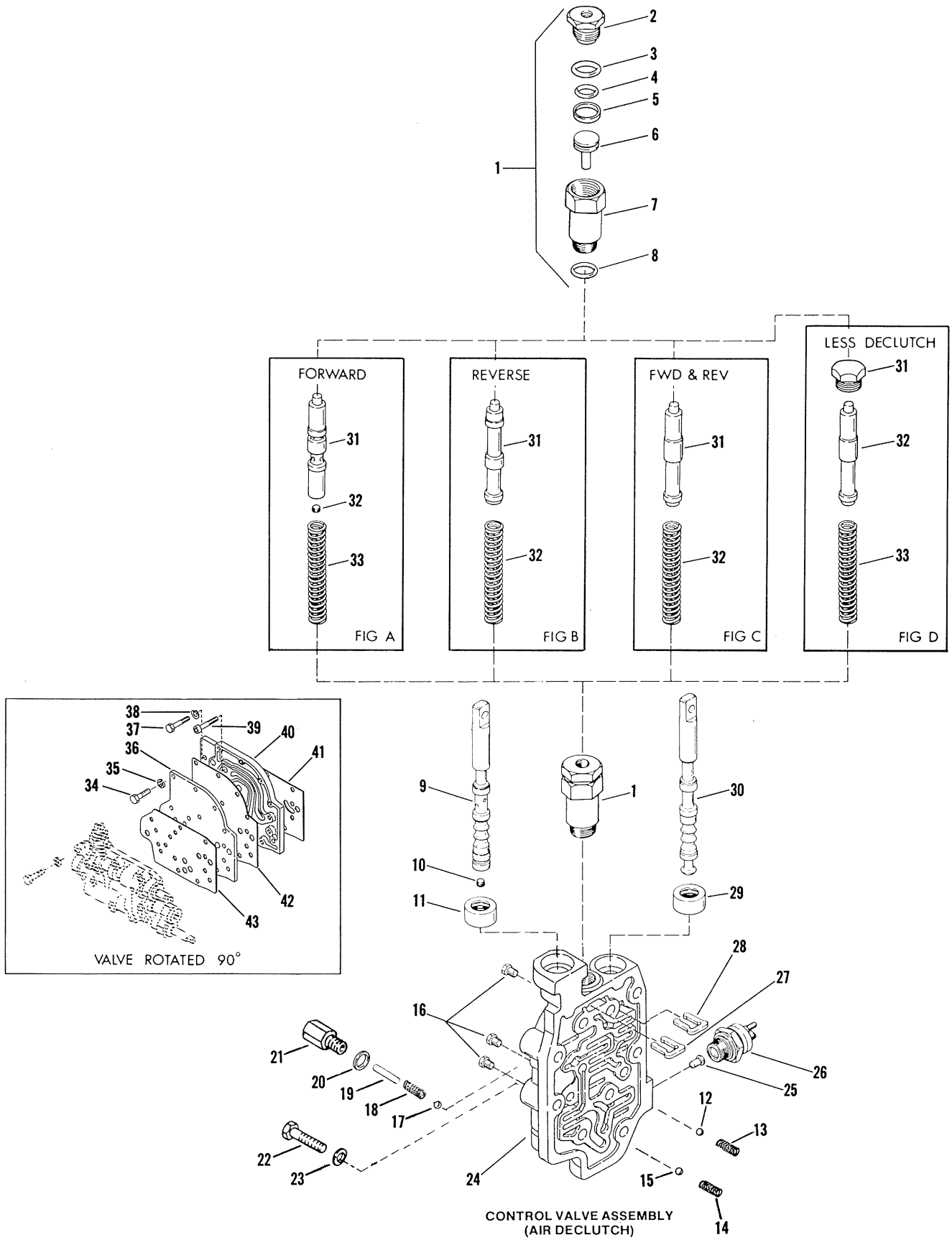
PRESSURE REGULATOR SIDE

FIG. F

34000
PRESSURE REGULATOR VALVE & CHARGING PUMP

ITEM	DESCRIPTION	QTY.
1	Thrust Plate & Bearing Assembly	2
2	Pump Driven Shaft Assembly	1
3	Thrust Plate & Bearing Assembly	2
4	Wave Spring	2
5	Pump Shaft Seal	2
6	Pump Drive Shaft Assembly	1
7	Charging Pump Housing	1
8	Pump Suction Adaptor "O" Ring	1
9	Pump Suction Adaptor Fitting	1
10	Charging Pump Suction Tube Coupling	1
11	Charging Pump Suction Tube Retainer	1
12	Charging Pump Suction Tube Gasket	1
13	Charging Pump Suction Tube Sleeve	1
14	Rear Cover Suction Flange	1
15	Rear Cover Suction Flange "O" Ring	1
16	Regulator Valve Pilot "O" Ring	1
17	Spring Retainer Snap Ring	1
18	Valve Spring Retainer Cup	1
19	Valve Spring - Outer	1
20	Valve Spring - Inner	1
21	Regulator Valve Spool	1
22	Clutch Pressure Supply "O" Ring	1
23	Valve to Converter Housing Screw Lockwasher	2
24	Valve to Converter Housing Screw	2
25	Regulator Valve Plug	1
26	Regulator Valve Plug	1
27	Pressure Regulator Valve	1
28	Safety Valve Piston	1
29	Safety Valve Piston Spring	1
30	Piston Spring Retainer	1
31	Spring Retainer Snap Ring	1
32	Pump Shaft Oil Seal	1
33	Valve Body to Pump Gasket	1
34	Valve to Pump Screw Lockwasher	2
35	Valve to Pump Screw	2
36	Valve to Pump Screw Lockwasher	2
37	Valve to Pump Screw	2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FORWARD
REVERSE
FWD & REV
LESS DECLUTCH
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FIG A
FIG B
FIG C
FIG D
VALVE ROTATED 90°
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CONTROL VALVE ASSEMBLY
(AIR DECLUTCH)

FIG. G

34000
CONTROL VALVE ASSEMBLY
4 SPEED WITH AIR DECLUTCH
FORWARD & REVERSE

ITEM	DESCRIPTION	QTY.
1	Air Actuator Assembly	1
2	Piston Housing Stop Plug	1
3	Piston Housing Plug "O" Ring	1
4	Piston "O" Ring	1
5	Glyd Ring	1
6	Piston	1
7	Piston Housing	1
8	"O" Ring	1
9	Speed Selector Spool	1
10	Plug	1
11	Oil Seal	1
12	Detent Ball	1
13	Detent Spring	1
14	Detent Spring	1
15	Detent Ball	1
16	Pipe Plug	3
17	Detent Ball	1
18	Detent Spring	1
19	Detent Spring Pin	1
20	Detent Spring Plug Washer	1
21	Detent Spring Plug	1
22	Valve to Adaptor Housing Screw	9
23	Valve to Adaptor Housing Screw Lockwasher	9
24	Control Valve Housing	1
25	Neutral Switch Actuating Pin	1
26	Neutral Switch	1
27	Valve Spool Stop	1
28	Spool Stop	1
29	Oil Seal	1
30	Forward & Reverse Valve Spool	1
31	Valve Spool - Figure "C"	1
32	Control Valve Spring - Figure "C"	1
33	Not Used On This Option	
34	Seal Plate to Adaptor Plate Screw	4
35	Seal Plate to Adaptor Plate Screw Lockwasher	4
36	Control Valve Seal Plate	1
37	Adaptor Housing to Converter Housing Screw	3
38	Adaptor Housing to Converter Housing Screw Lockwasher	3
39	Converter Housing to Valve Adaptor Screw	6
40	Valve Adaptor Plate	1
41	Converter Housing to Valve Adaptor Plate Gasket	1
42	Seal Plate to Adaptor Plate Gasket	1
43	Control Valve to Seal Plate Gasket	1

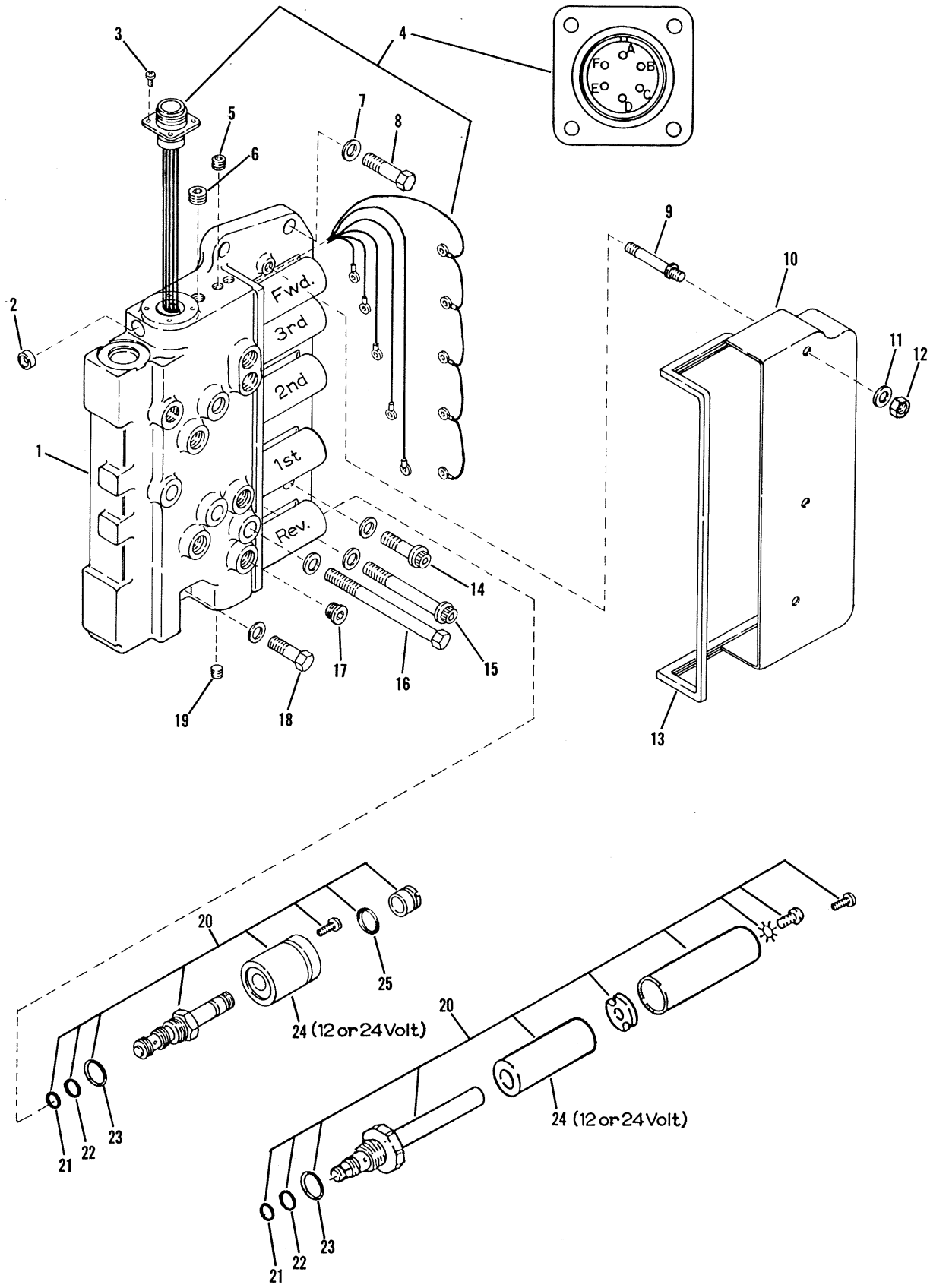
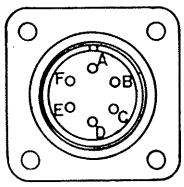


FIG. H

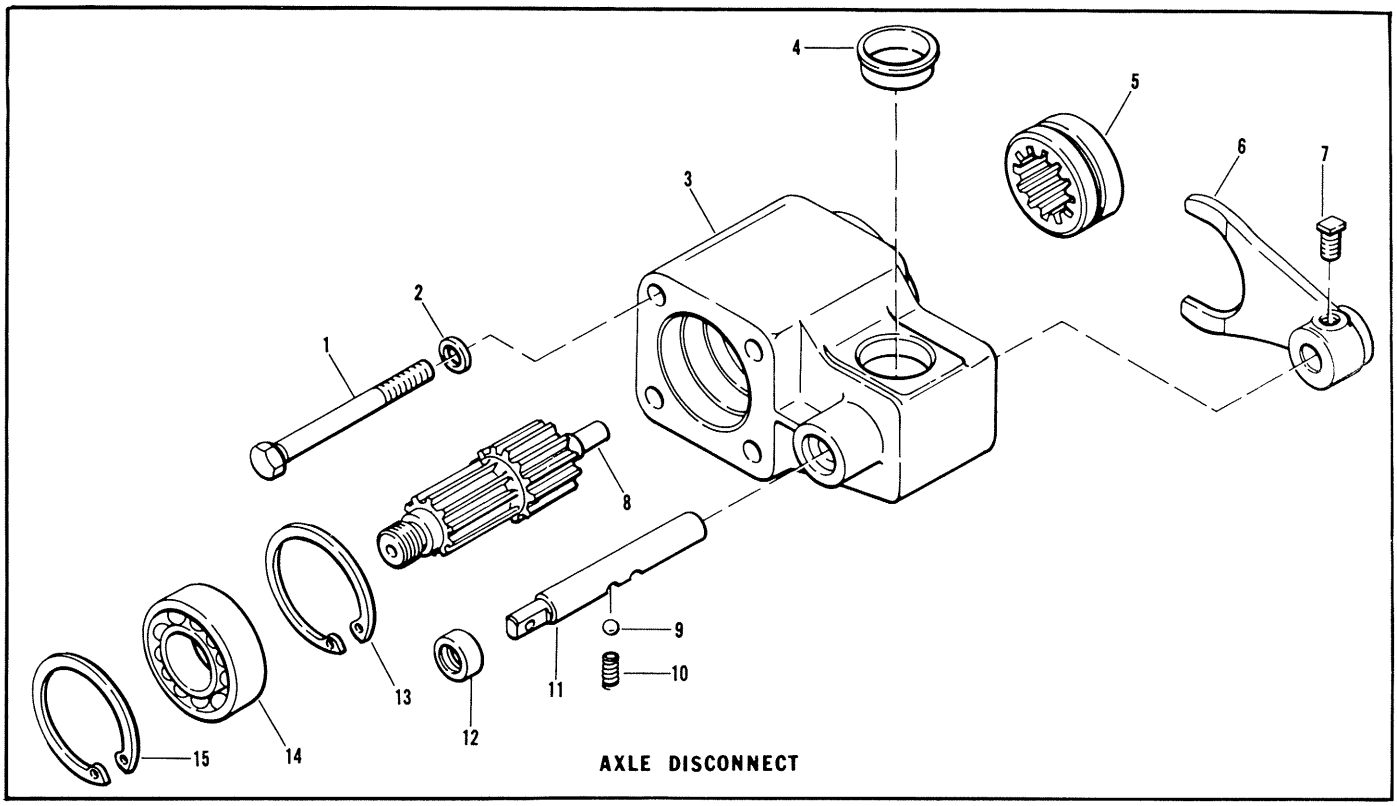
WIRE NO.	RECEPTACLE CODE	SOLENOID	WIRE COLOR CODE	NUMBER OF LEADS	WIRE LENGTHS
4	C	1st	YELLOW	1	14.00 [355,6]
8	F	F,3,2,1 & R	⏚ PINK	1 (5 Connectors)	17.80 [452,0]
6	E	FWD.	BLUE	1	9.00 [228,6]
7	A	REV.	BROWN	1	17.25 [438,2]
5	B	2nd	GREEN	1	12.00 [304,8]
9	D	3rd	ORANGE	1	10.75 [273,0]



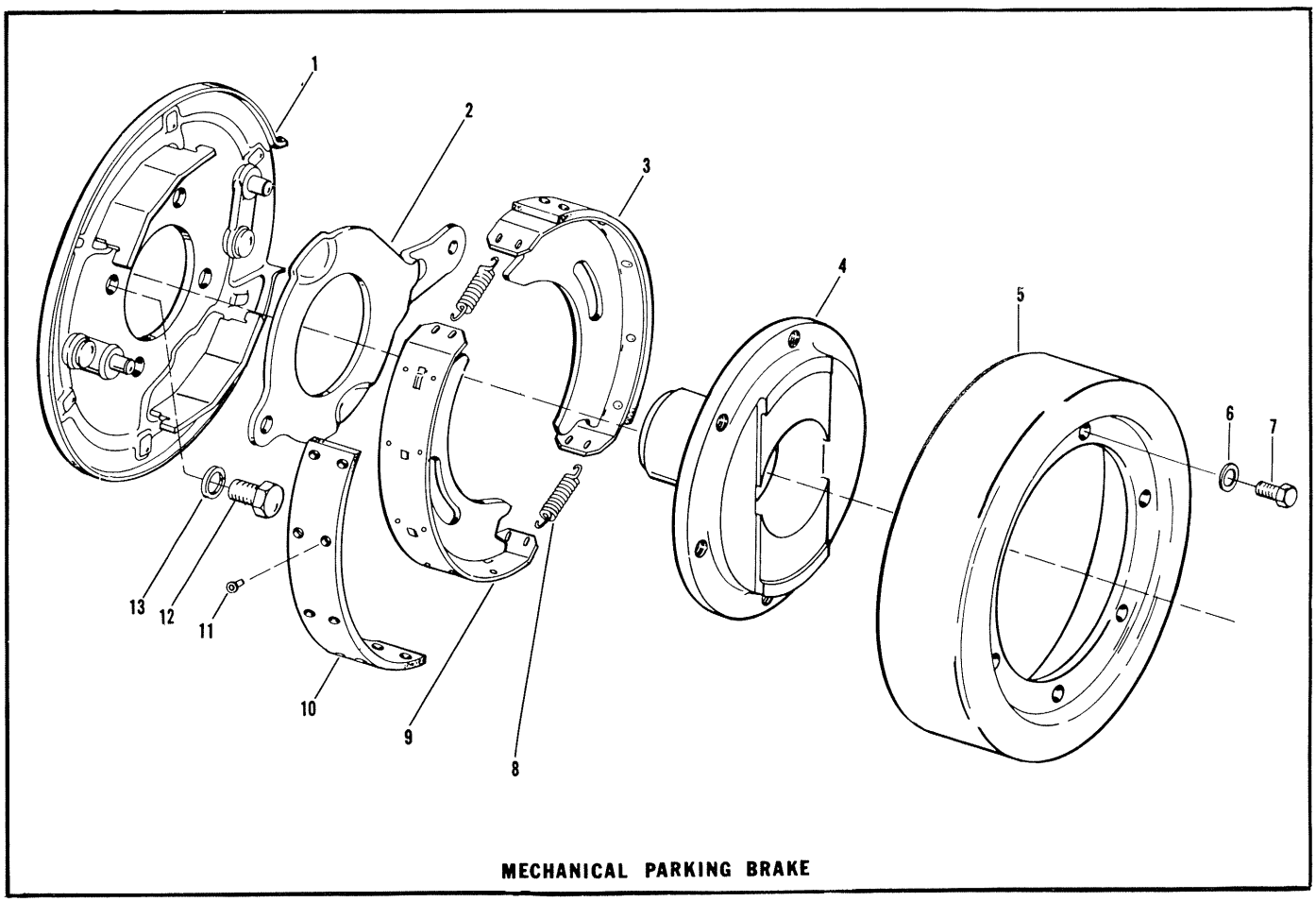
ELECTRIC CONTROL VALVE ASSEMBLY

ITEM	DESCRIPTION	QTY.
1	Control Valve Housing	1
2	Plug	1
3	Receptacle Screws	4
4	6 Pin Receptacle & Wire Assembly	1
5	Housing Plug	2
6	Housing Plug	1
7	Housing Screw Washer	14
8	Housing Screw	2
9	Solenoid Cover Stud	3
10	Solenoid Dust Cover	1
11	Cover Stud Washer	3
12	Cover Stud Nut	3
13	Dust Cover Seal	1
14	Housing Screw	4
15	Housing Screw	2
16	Housing Screw	5
17	Housing Plug	8
18	Housing Screw	1
19	Housing Plug	2
20	Solenoid Assembly	5
21	Solenoid "O" Ring	1
22	Solenoid "O" Ring	1
23	Solenoid "O" Ring	1
24	Solenoid Coil (12 or 24 Volt)	1
25	Solenoid "O" Ring	1

See page 59 for wiring diagram.



AXLE DISCONNECT



MECHANICAL PARKING BRAKE

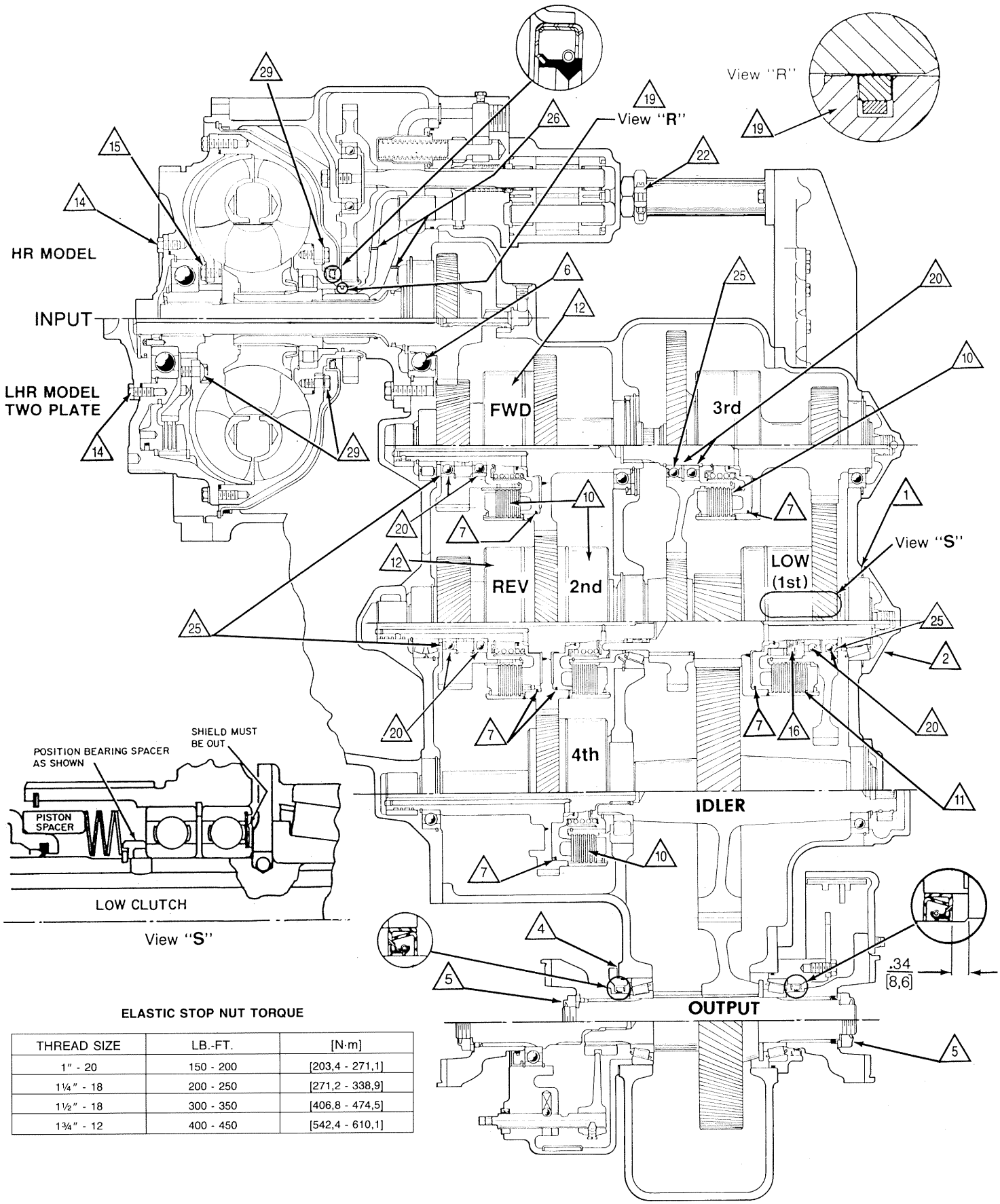
FIG. I

AXLE DISCONNECT

ITEM	DESCRIPTION	QTY.
1	Disconnect Housing Capscrew	4
2	Disconnect Housing Capscrew Lockwasher	4
3	Disconnect Housing	1
4	Disconnect Housing Plug	1
5	Shift Hub	1
6	Shift Fork	1
7	Shift Fork Lockscrew	1
8	Disconnect Shaft	1
9	Detent Ball	1
10	Detent Spring	1
11	Shift Rail	1
12	Shift Rail Oil Seal	1
13	Bearing Retainer Ring	1
14	Bearing	1
15	Bearing Retainer Ring	1

MECHANICAL PARKING BRAKE

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



View "S"

ELASTIC STOP NUT TORQUE

THREAD SIZE	LB.-FT.	[N·m]
1" - 20	150 - 200	[203,4 - 271,1]
1¼" - 18	200 - 250	[271,2 - 338,9]
1½" - 18	300 - 350	[406,8 - 474,5]
1¾" - 12	400 - 450	[542,4 - 610,1]

FIG. J

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

Prelube before assembly. All piston ring grooves and "O" rings, with Multi-purpose grease Grade 2.

Apply thin coat of Loctite 638 (color green) to outside diameter of all oil seals, bore plugs and bores they are to be installed into, before assembly. Use extreme care not to allow sealant to come into contact with seal lip material.

Apply thin coat of Loctite 270 (color green) to all thru hole stud threads which do not have pre-applied sealant.

Apply thin coat of Loctite Vibra Seal 516 (color burnt orange) to all pipe thread fittings which do not have pre-applied sealant.

If grease required for positioning gasket during assembly, use Multi-purpose grease Grade 2.

After assembly of parts using Loctite, there must not be any free or excess material which might enter the oil circuit. *Only use Loctite where specified.*

General Bearing Installation Procedure
If a thermal assembly aid is used, (expanding by heating 275°F ± 25°F [135° ± 3.90°C] a check must be made after mating parts have reached the same temperature within 20°F [6.7°C] of ambient, to be sure the bearings are positioned solidly against their respective shoulders.

△1 Low (1st) clutch taper bearing adjustment (See Special Instructions)

△2 Low shaft rear bearing cap must be assembled as shown on Rear View.

△4 Shim output shaft bearings to produce 4-10/In. lbs. [.67-.90 N·m] preload rolling torque.

△5 See Elastic Stop Nut Torque Chart.

△6 Special turbine shaft bearing 314MG loading notches must be on same side as retaining ring.

△7 Cast iron piston rings in outer piston ring location and Viton Rings at inner piston ring location. All speed versions, all clutches.

△10 6 outer steel plates, 6 inner friction plates, alternately assemble, starting with outer steel plate.

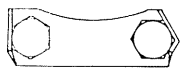
△11 9 outer steel plates, 9 inner friction plates, alternately assemble, starting with outer steel plate.

△12 Modulated Forward and Reverse clutches. 11 outer steel plates, 12 inner friction plates, alternately assembled starting with inner friction plate. Non-Modulated Forward and Reverse clutches use item △10

△14 Place bolts to be used at these locations - Requires Special Torque.

PLACE BOLT	TORQUE FT. LBS.	[N·m]
.4375	52-57	[71-77]
.3750	33-36	[45-49]

△15 Bend lock tabs at assembly, after tightening cap screws to proper torque. Tabs must be bent against screw head flats or around corners as shown below.



△16 Clutch piston return spring:
Concave side of first Belleville spring must be assembled toward clutch piston. Alternate remaining springs.

△17 All dowel pins must be installed in transmission case before assembly of mating parts.

△18 Tighten oil screen assembly 10 to 15 Ft. Lbs. [13-20 N·m] all models.

△19 When installing clutch support piston ring, hooking ends must be 180° from expander spring opening.

△20 Must be loose internal fit bearings with a No. 3 etched on the bearing.

△22 Oil Pump Sleeve and Coupling Assembly. Torque clamp bolt 7.5 to 9 Ft. Lbs. [10-12 N·m].

△25 **Bearing shield must face OUT on Low & 3rd clutch. Bearing shield must face IN on Forward & Reverse clutches.**

△26 Lube holes in converter support (.046 - .049 [1.17 - 1.24] diameter) must be checked prior to assembly —must be free of dirt and burrs.

△29 Impeller hub and turbine hub assembly with backing ring and special self-locking screws.
1. Clean hub mounting surface and tapped holes with solvent. Dry thoroughly, being certain tapped holes are clean and dry.
2. Install backing ring and special self-locking screws. Tighten screws to 90-99 Ft. Lbs. [122-134 N·m] for turbine and 58-64 Ft. Lbs. [79-87 N·m] for impeller.

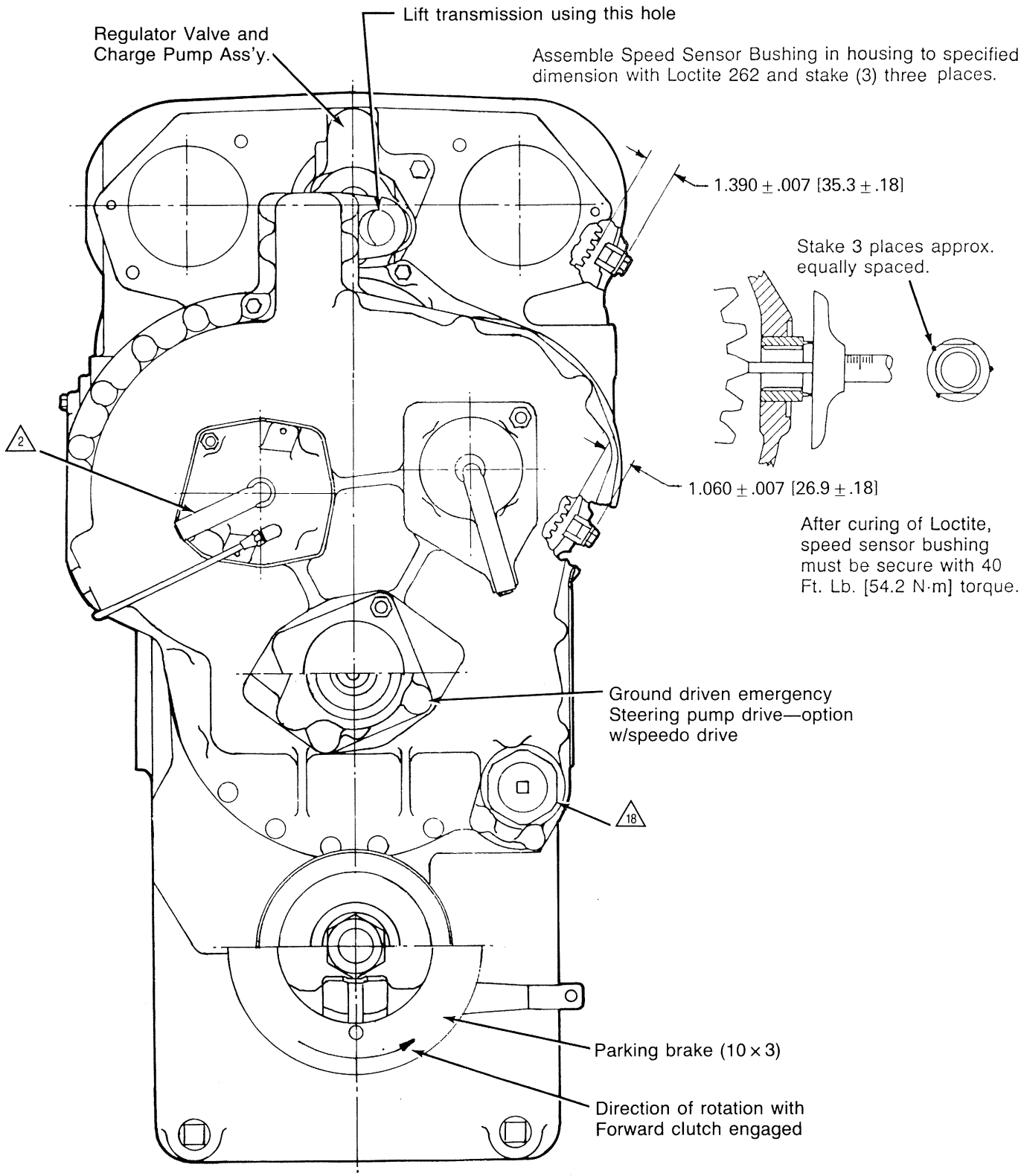
Note: Assembly of hub must be completed within a fifteen minute period from start of screw installation. The special screw is to be used for one installation only. If the screw is removed for any reason, it must be replaced. The epoxy left in the hub holes must be removed with the proper tap and cleaned with solvent. Dry hole thoroughly and use a new screw for reinstallation.

Torque Specification for Lubricated or Plated Screw Threads

Grade 5 Grade 8

NOM. SIZE	FINE THREAD LB-FT	FINE THREAD [N·m]	COARSE THREAD LB-FT	COARSE THREAD [N·m]
.7500	223 - 245	[302 - 332]	200 - 220	[271 - 298]
.6250	128 - 141	[174 - 191]	113 - 124	[153 - 168]
.5625	91 - 100	[123,4 - 135,5]	82 - 90	[111,2 - 122,0]
.5000	64 - 70	[86,8 - 94,9]	57 - 63	[77,3 - 85,4]
.4375	41 - 45	[55,6 - 61,0]	37 - 41	[50,2 - 55,5]
.3750	26 - 29	[35,3 - 39,3]	23 - 25	[31,2 - 33,8]
.3125	16 - 20	[21,7 - 27,1]	12 - 16	[16,3 - 21,6]
.2500	9 - 11	[12,3 - 14,9]	8 - 10	[10,9 - 13,5]

FINE THREAD LB-FT	FINE THREAD [N·m]	COARSE THREAD LB-FT	COARSE THREAD [N·m]
315 - 347	[427 - 470]	282 - 310	[382 - 420]
180 - 198	[244 - 268]	159 - 175	[216 - 237]
128 - 141	[173,6 - 191,1]	115 - 127	[156,0 - 172,2]
90 - 99	[122,1 - 134,2]	80 - 88	[108,5 - 119,3]
58 - 64	[78,7 - 86,7]	52 - 57	[70,6 - 77,2]
37 - 41	[50,2 - 55,5]	33 - 36	[44,8 - 48,8]
28 - 32	[38,0 - 43,3]	26 - 30	[35,3 - 40,6]
11 - 13	[15,0 - 17,6]	9 - 11	[12,3 - 14,9]



REAR VIEW HR, LHR & MHR 34000 4 SPEED

FIG. K

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 HR 34000 4 Speed transmission with many options. Companion flanges and output shafts with and without disconnect assemblies may vary on specific models. The units 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.

Drain as much oil as possible before disassembly. See page 81 for LHR (Converter Lock-up) Disassembly and Reassembly. See page 63 for R-Model (Remote mounted) transmission front cover section. See page 98 for MHR (Mid-mount) (see Figure A for basic design silhouette).

DISASSEMBLY

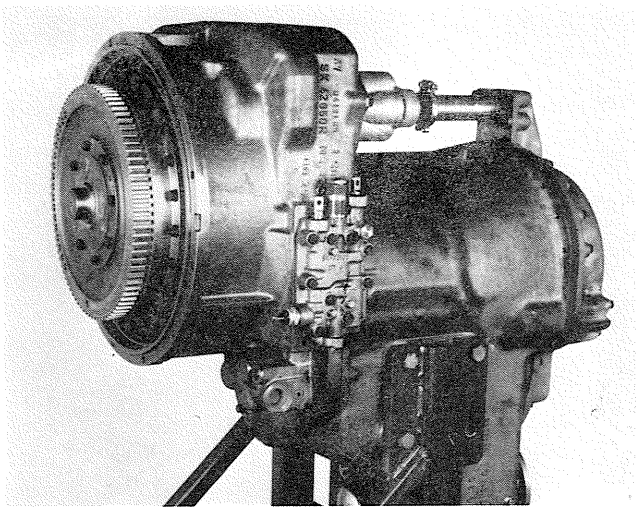


Figure 1
Side view with manual control valve. If low clutch has external lube, remove tube as shown in Figures 8 and 9 on page 70. See page 75 for low clutch lube transfer information.

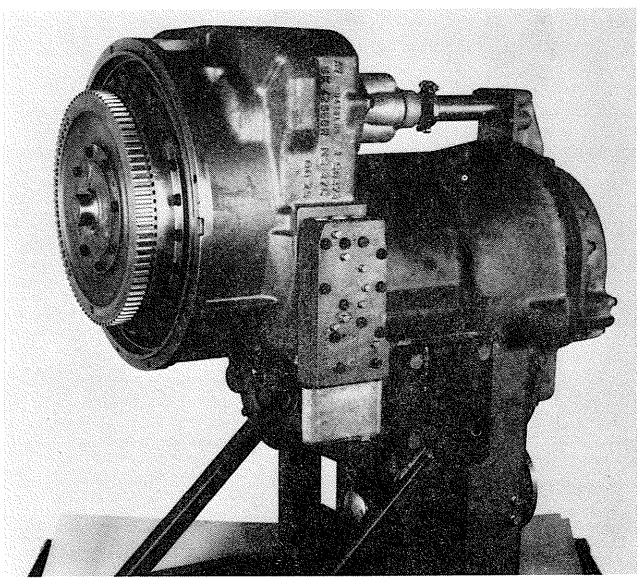


Figure 2
Side view with electric control valve. **NOTE:** Valve shown is a six speed valve-see Fig. H for the four speed valve.

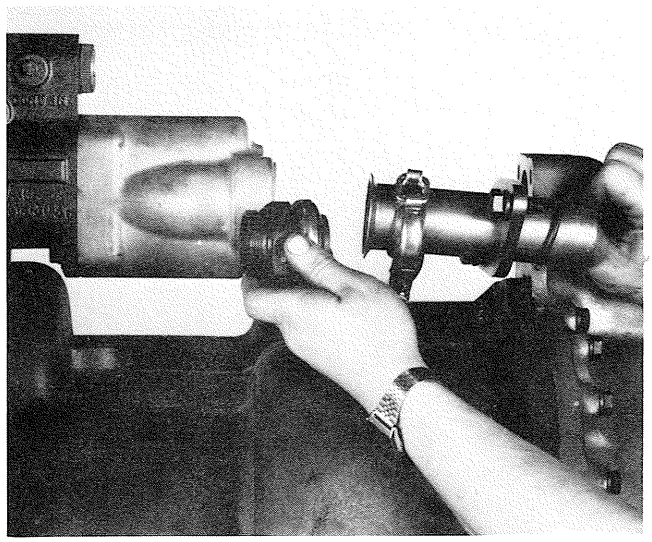


Figure 3
Remove pump suction tube, tube adaptor, flange and "O" ring.

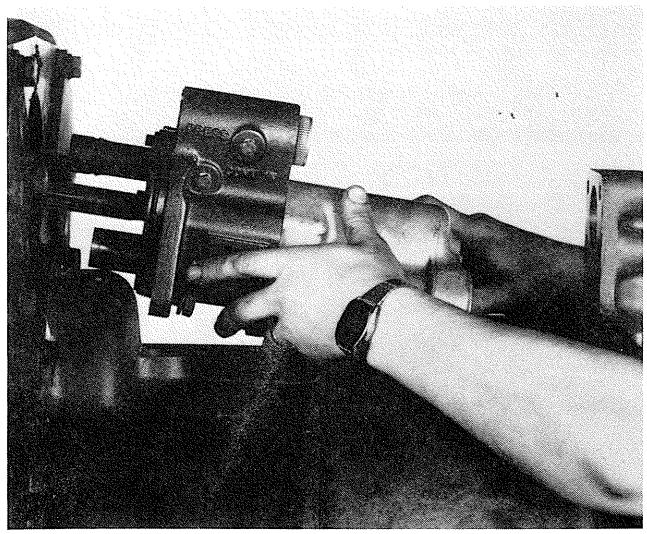


Figure 4
Remove charging pump and pressure regulating valve assembly.

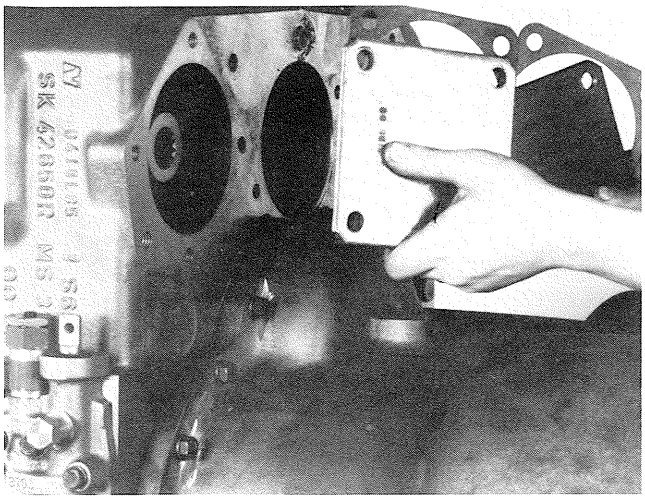


Figure 5
If used, remove pump hole covers.

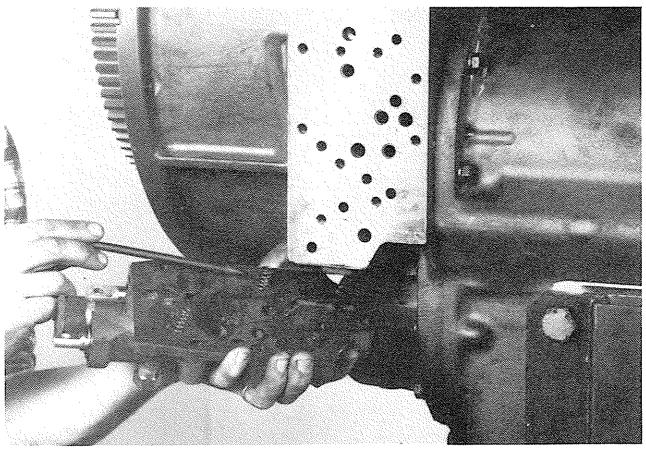


Figure 6
Remove control valve bolts and washers. Remove control valve. Use caution as not to lose detent springs and balls. (Manual valve shown)

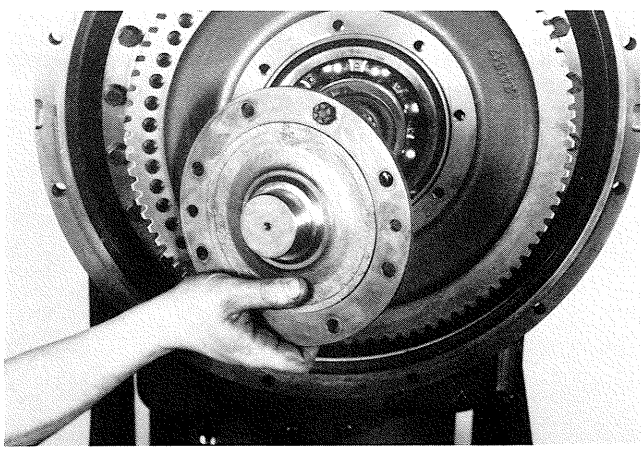


Figure 7
Remove impeller cover bearing cap bolts. Remove bearing cap.

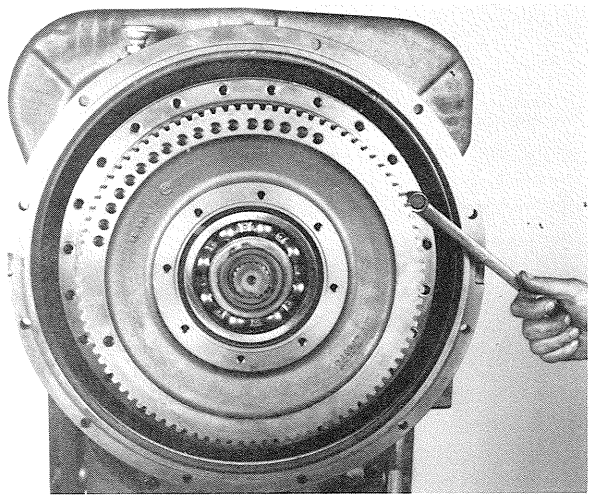


Figure 8
Remove impeller cover to impeller bolts.

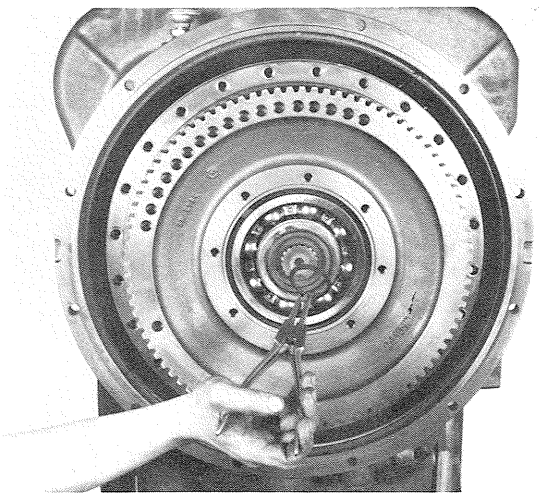


Figure 9
Remove turbine shaft outer retainer ring.

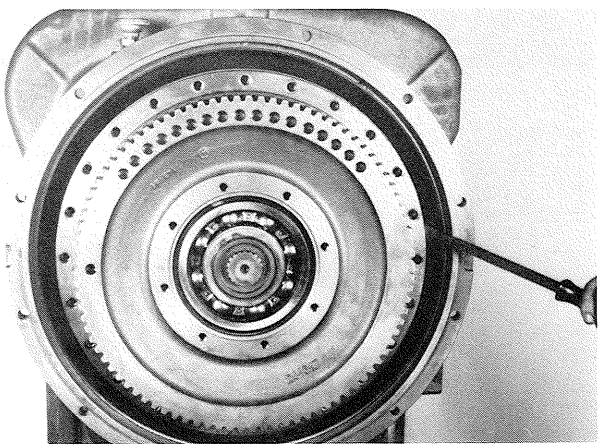


Figure 10
Using pry slots provided, pry impeller cover and turbine from turbine shaft.

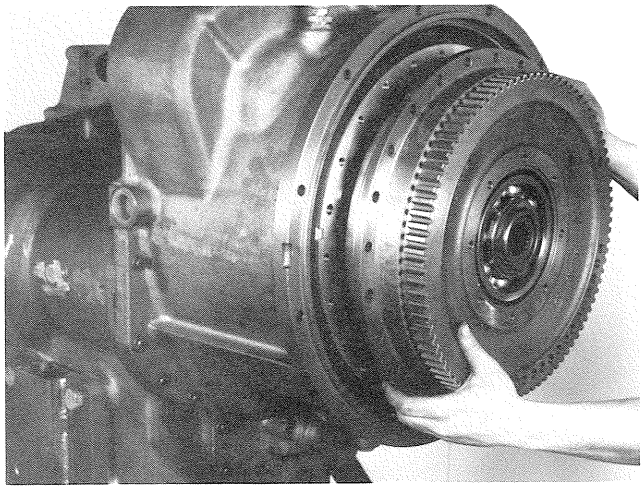


Figure 11
Remove impeller cover and turbine as an assembly.

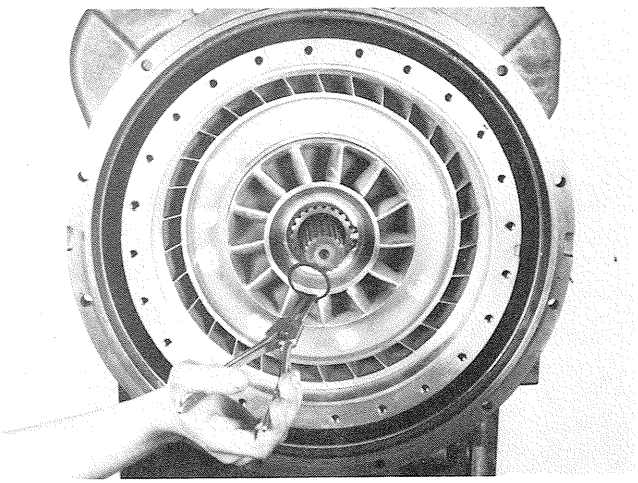


Figure 12
Remove turbine locating ring from turbine shaft.

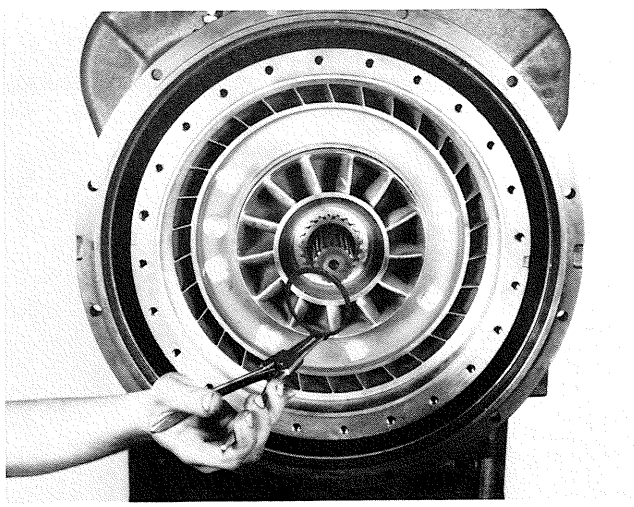


Figure 13
Remove reaction member retainer ring.

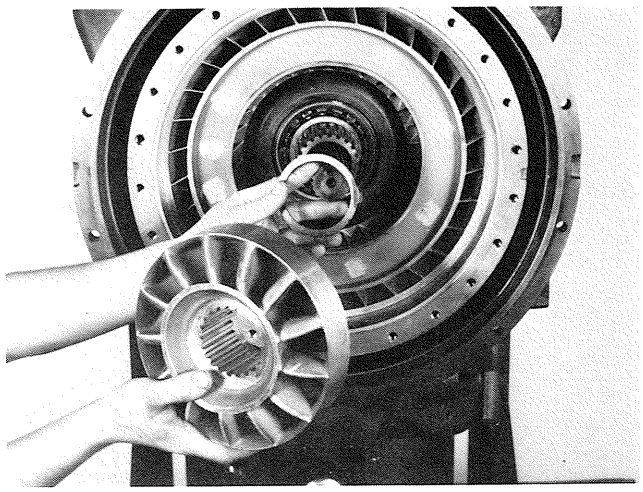


Figure 14
Remove reaction member and spacer.

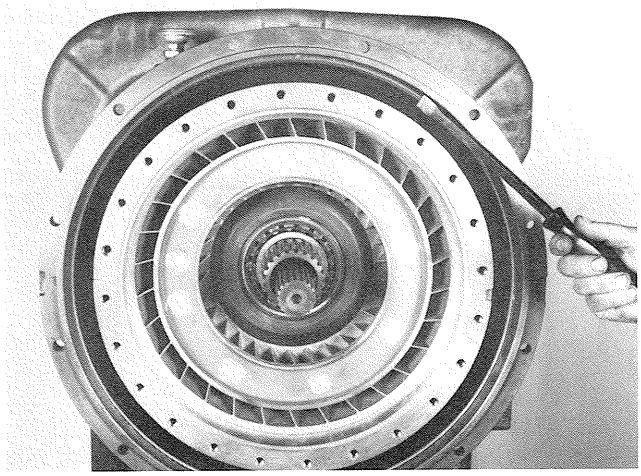


Figure 15
Remove oil baffle retainer ring.

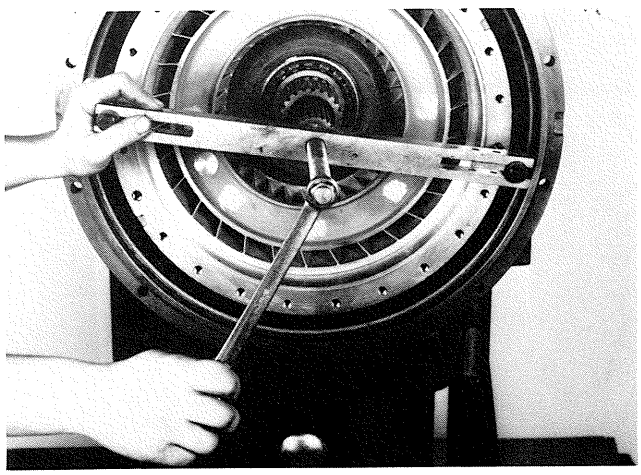


Figure 16
An impeller removal tool like the one shown can be fabricated to facilitate removal of impeller and oil baffle.

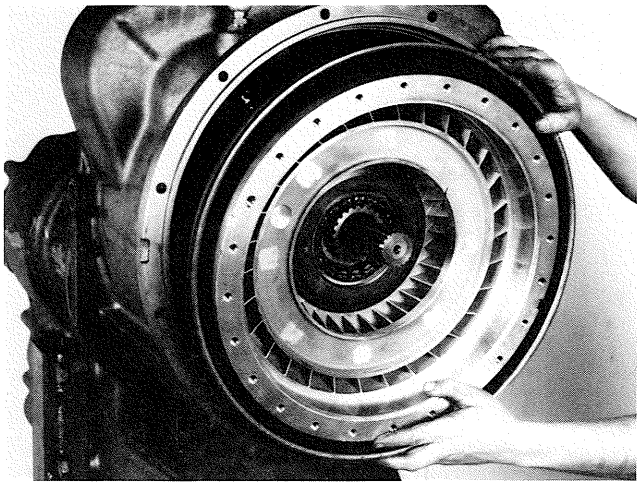


Figure 17
Remove impeller and baffle as an assembly.

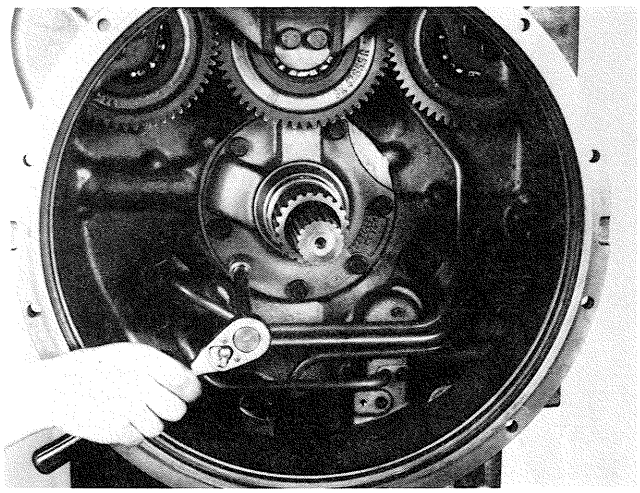


Figure 18
Remove stator support bolts.

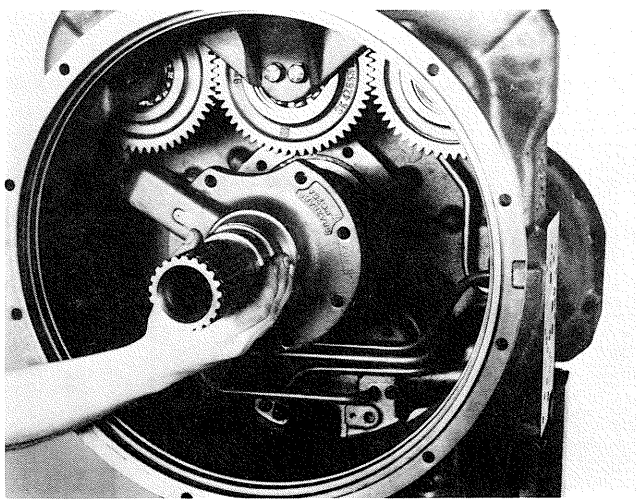


Figure 19
Turn support to clear pump drive gear. Remove support.

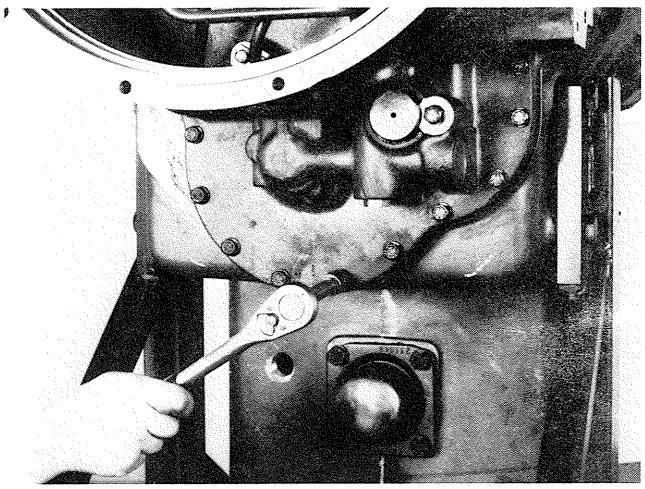


Figure 20
Remove converter housing to transmission housing bolts.

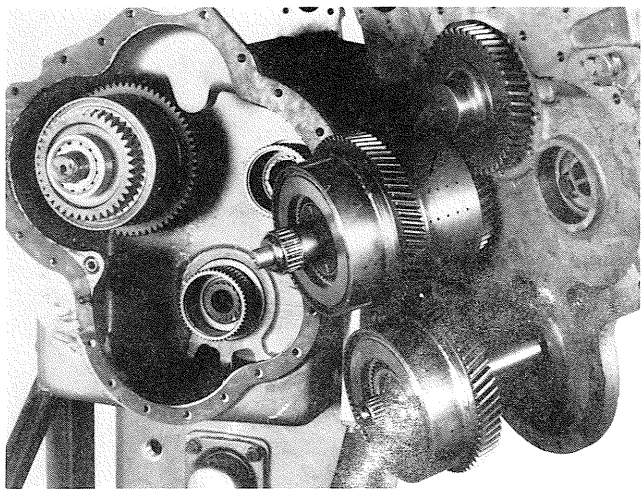


Figure 21
Remove converter housing and clutch assemblies from transmission housing.

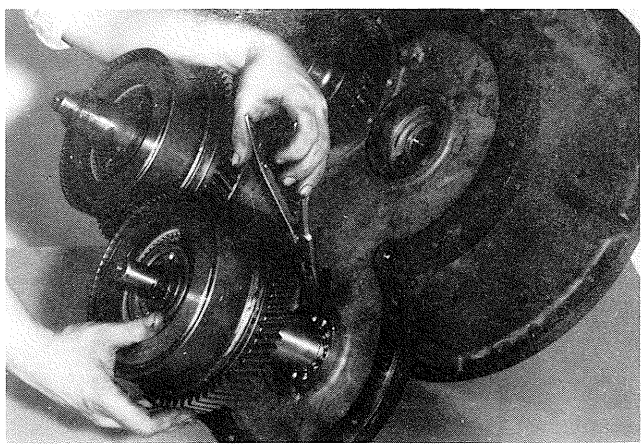


Figure 22
Spread 4th clutch inner bearing retainer ring and tap clutch assembly from housing.

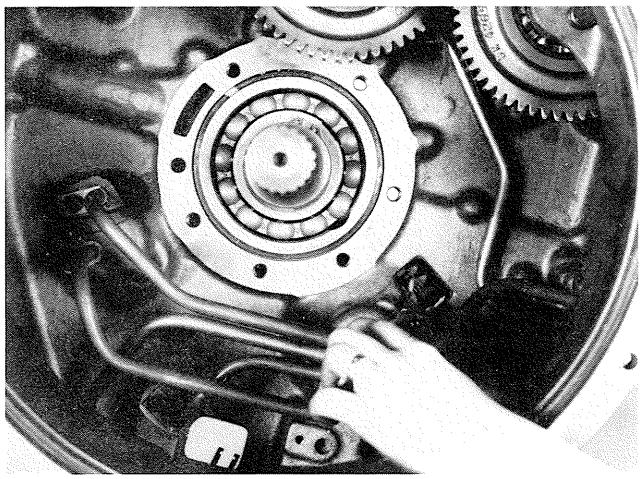


Figure 23
Spread reverse clutch inner bearing retainer ring and tap reverse and 2nd clutch assembly from housing.

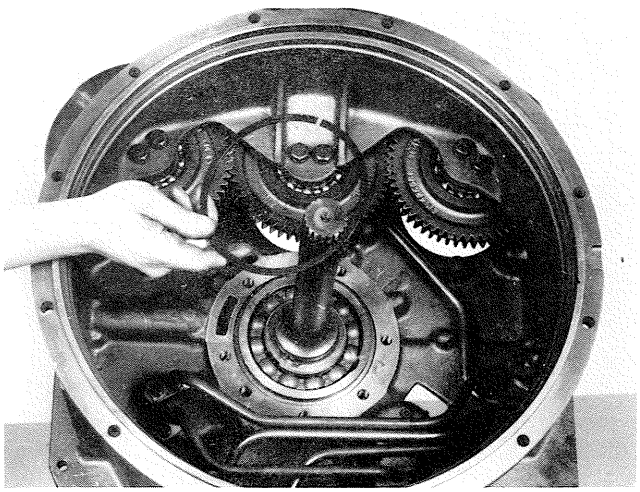


Figure 24
Remove turbine shaft bearing outer retainer ring.

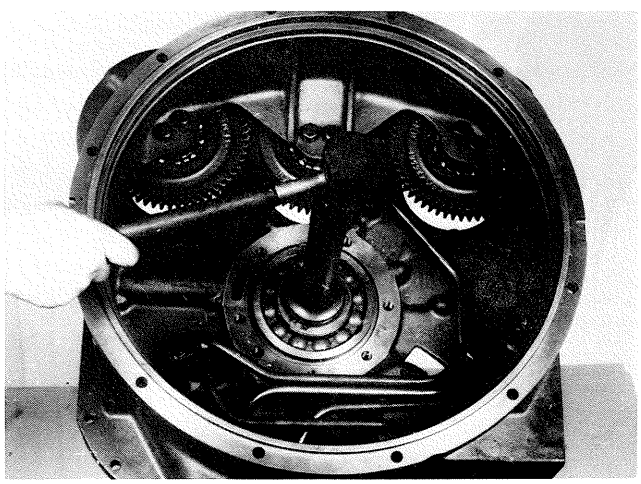


Figure 25
Tap turbine shaft and bearing from converter housing.

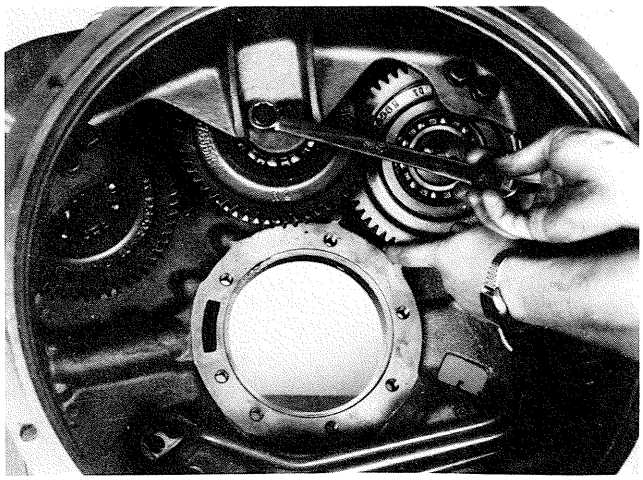


Figure 26
Remove pump drive gear bearing support bolts.

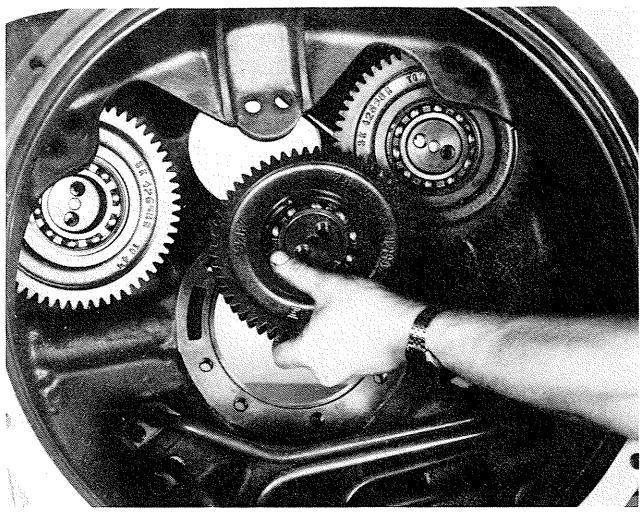


Figure 27
Remove pump drive gears.

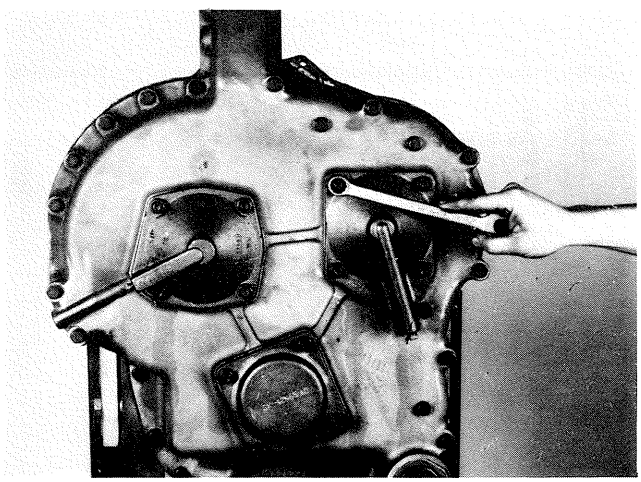


Figure 28
Remove 3rd clutch bearing cap stud nuts and washers.

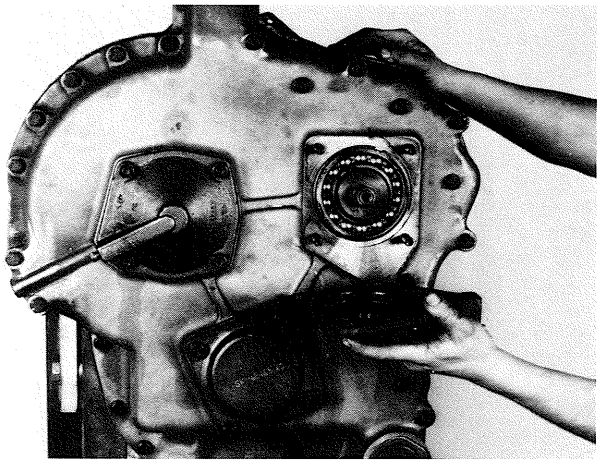


Figure 29
Remove bearing cap.

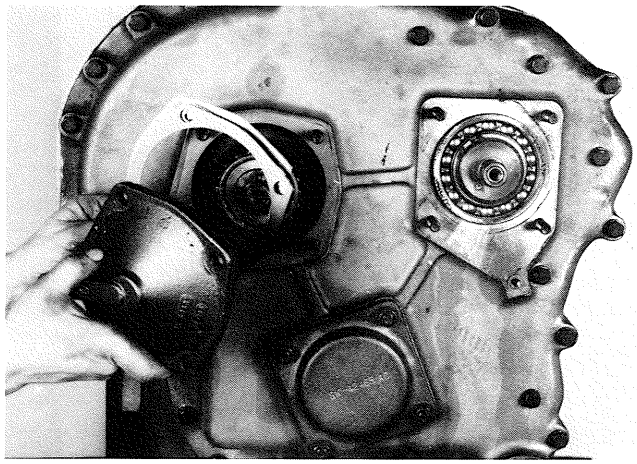


Figure 32
Remove low (1st) clutch bearing cap and shims.

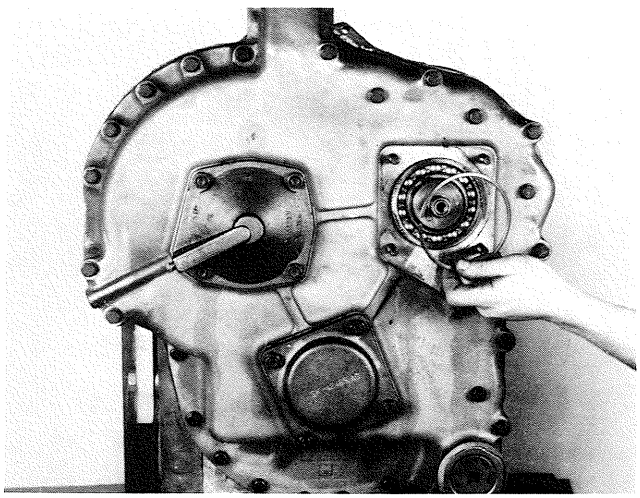


Figure 30
Remove outer bearing locating ring.

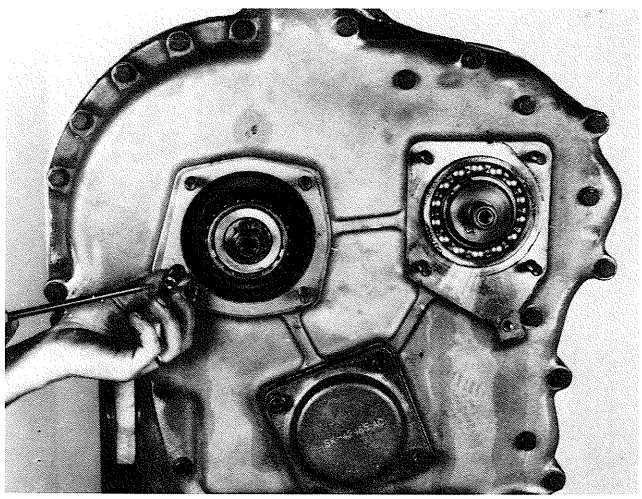


Figure 33
Remove low (1st) speed clutch pressure sleeve.

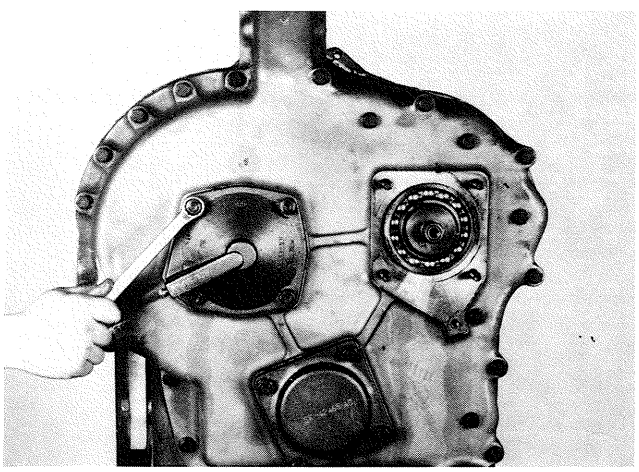


Figure 31
Remove low (1st) clutch bearing cap stud nuts and washers.

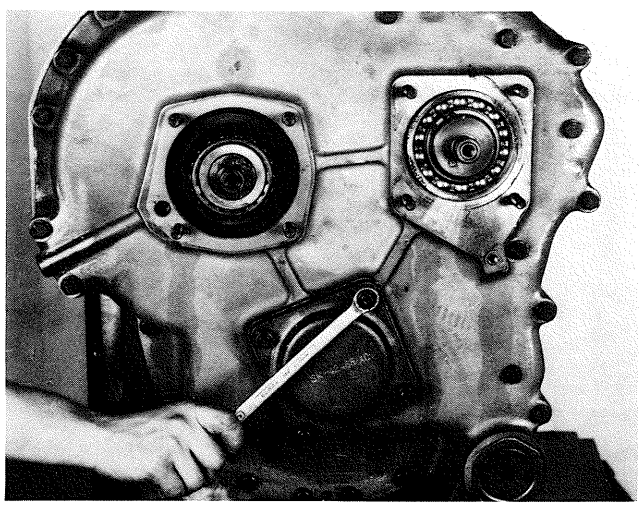


Figure 34
Remove idler shaft bearing cap stud nuts and washers.

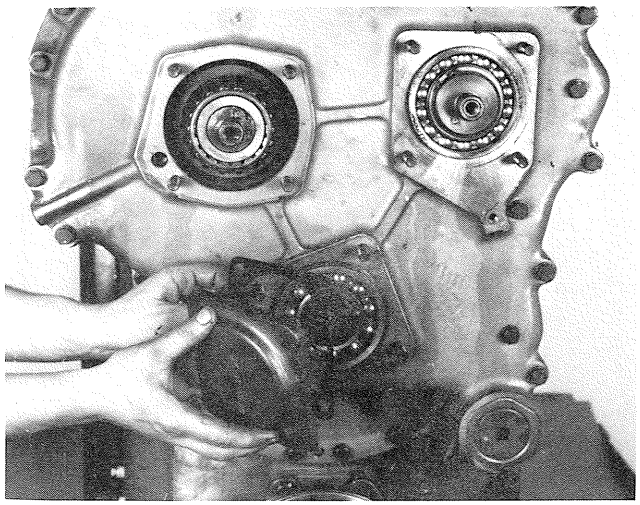


Figure 35
Remove bearing cap and gasket.

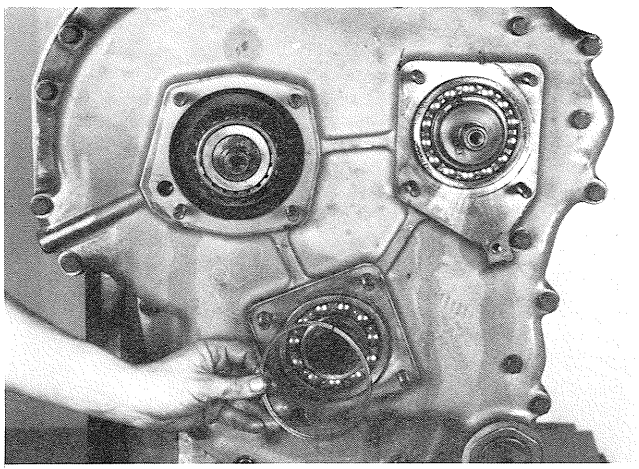


Figure 36
Remove outer bearing locating ring.

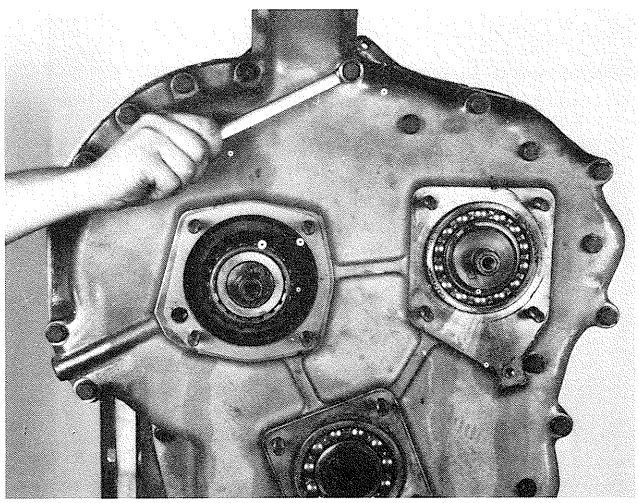


Figure 37
Remove rear cover bolts and washers.

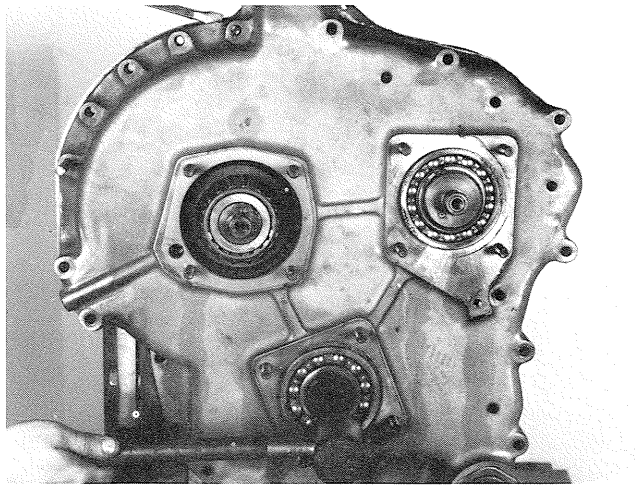


Figure 38
Using pry slots provided, pry cover from transmission housing, tapping on idler shaft and 3rd clutch to allow cover to be removed without shaft binding.

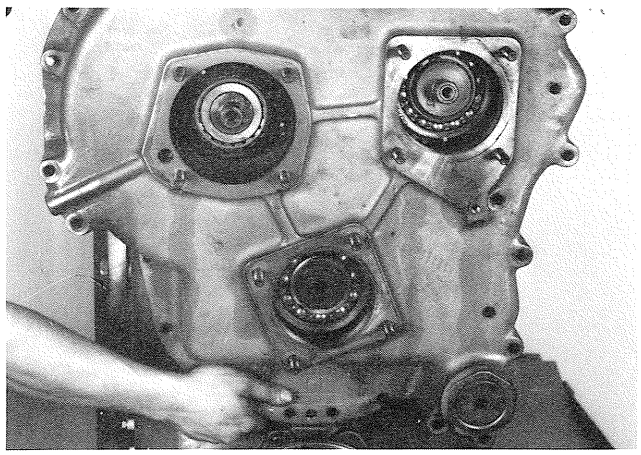


Figure 39
Remove rear cover.

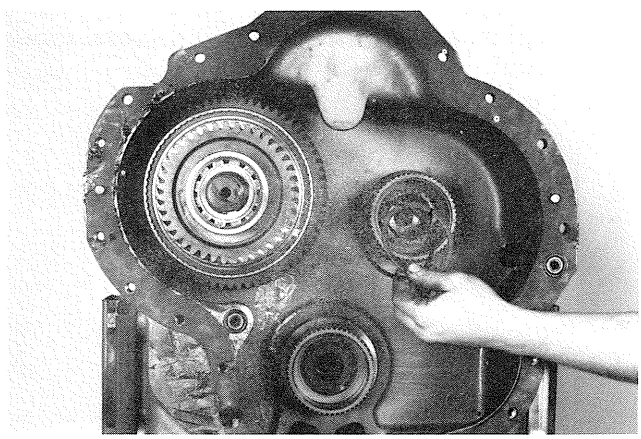


Figure 40
Remove 2nd clutch disc hub retainer snap ring and disc hub retainer.

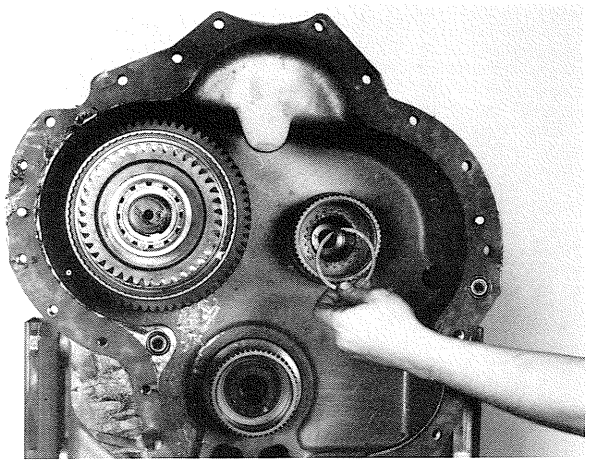


Figure 41
Remove disc hub retainer ring.

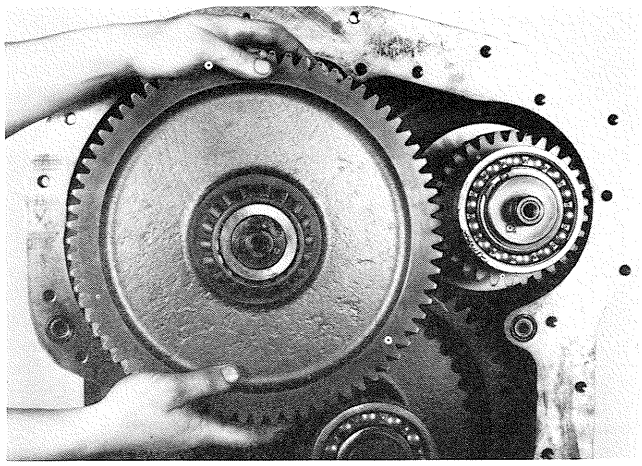


Figure 44
Loosen low (1st) clutch.

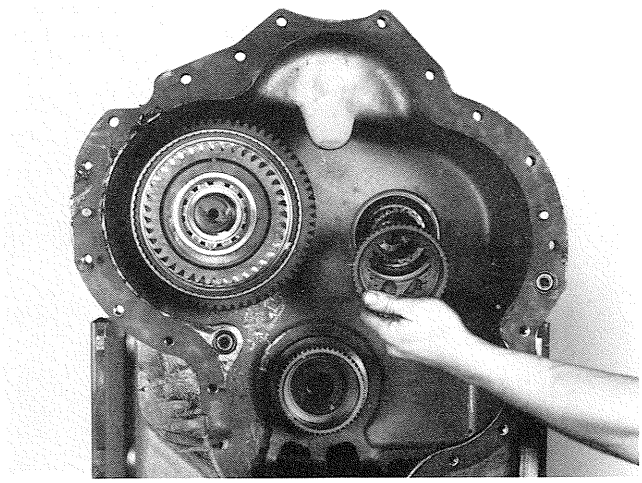


Figure 42
Remove 2nd clutch disc hub.

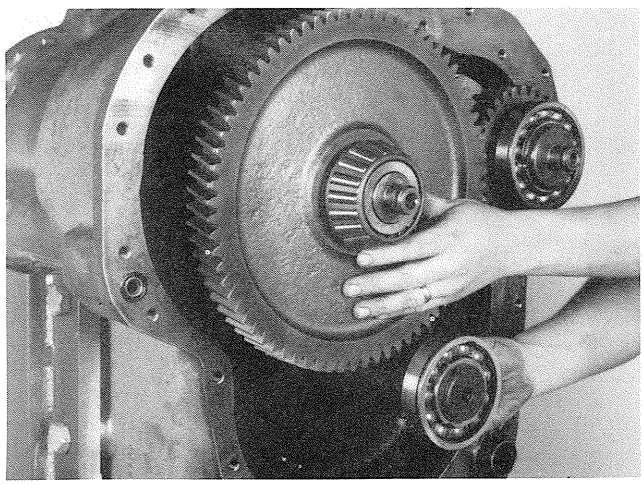


Figure 45
Remove low (1st) clutch and idler shaft together from housing.

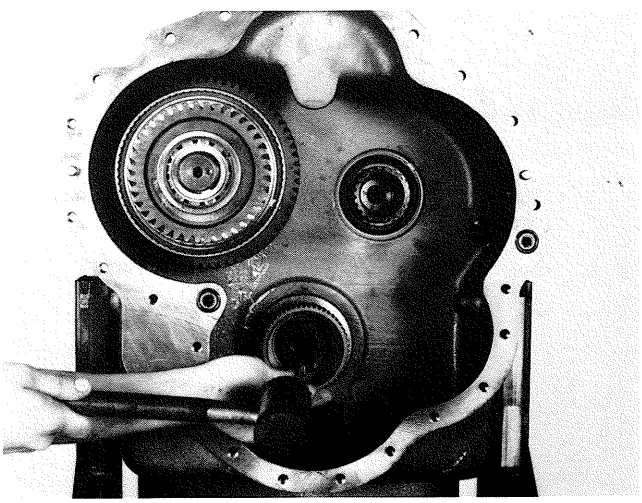


Figure 43
Tap idler shaft toward rear of housing. **NOTE:** Idler shaft and low (1st) clutch must be removed together.

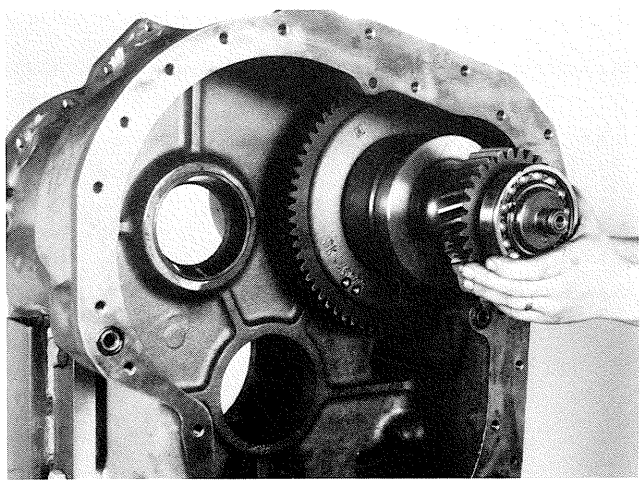


Figure 46
Remove 3rd speed clutch assembly.

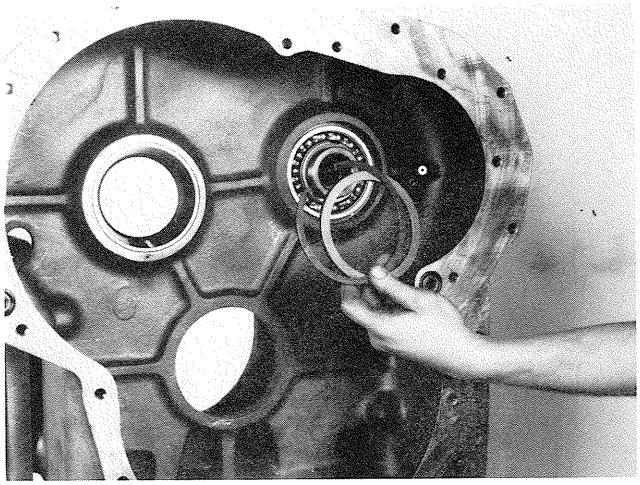


Figure 47
Remove forward clutch inner bearing retainer ring and thrust washer.

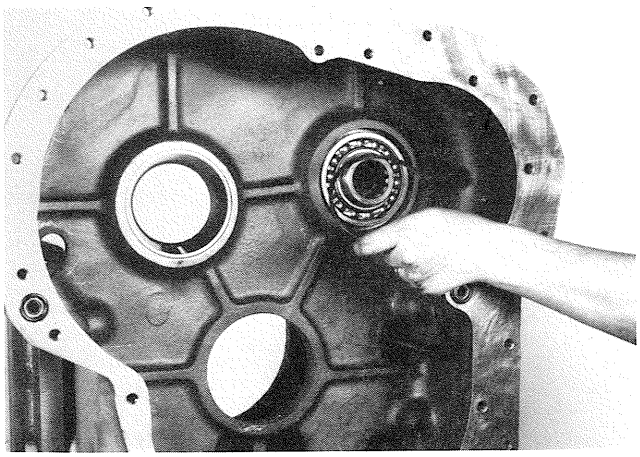


Figure 48
Tap forward clutch assembly to the rear far enough to remove inner bearing outer locating ring.

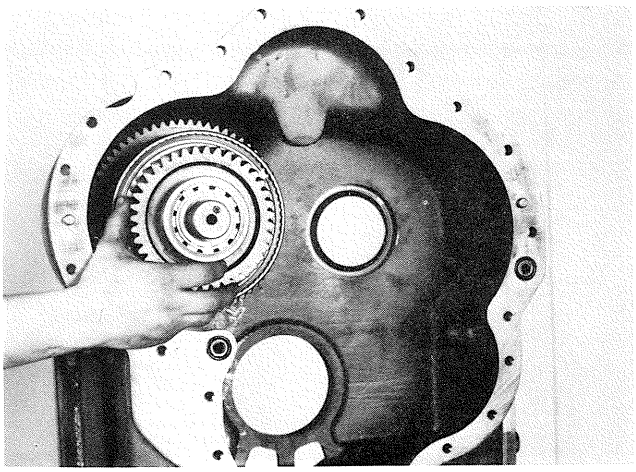


Figure 49
Remove forward clutch assembly.

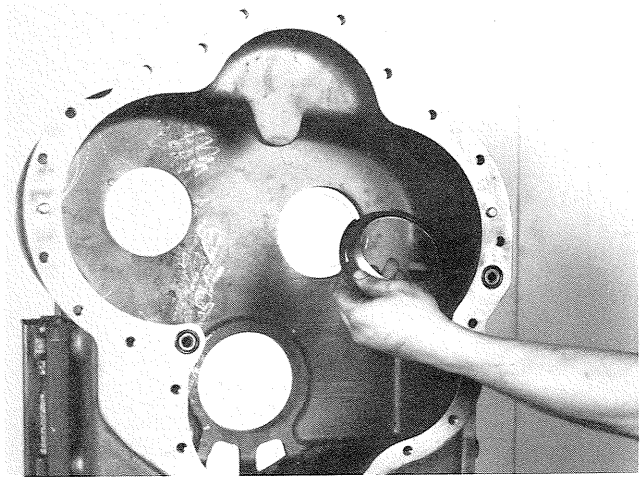


Figure 50
Remove low (1 st) clutch inner bearing cup locating ring and spacer (oil baffle).

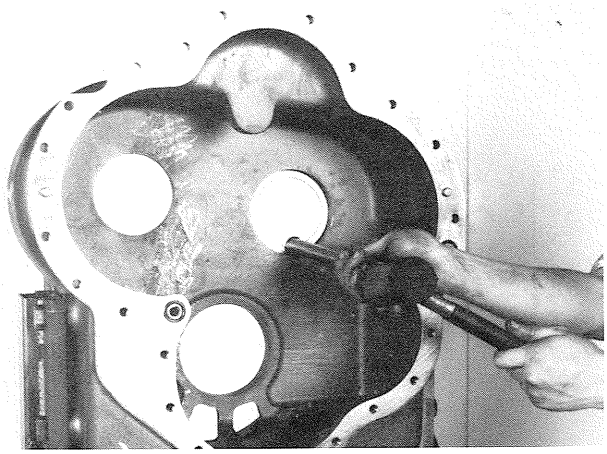


Figure 51
Tap inner bearing cup from housing.

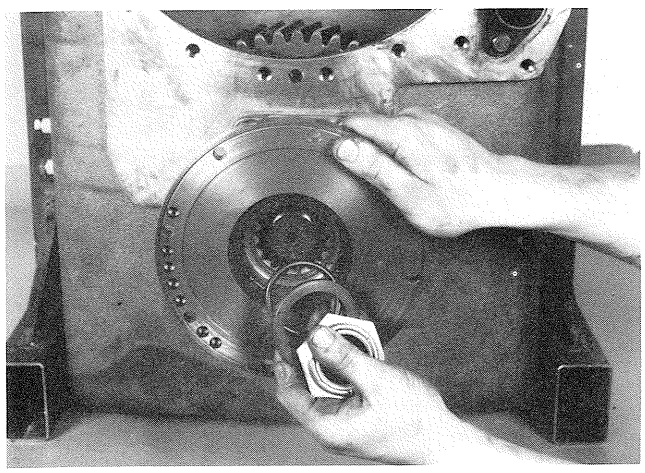


Figure 52
Block output shaft to prevent turning. Remove output flange nut, washer and "O" ring. Remove flange.

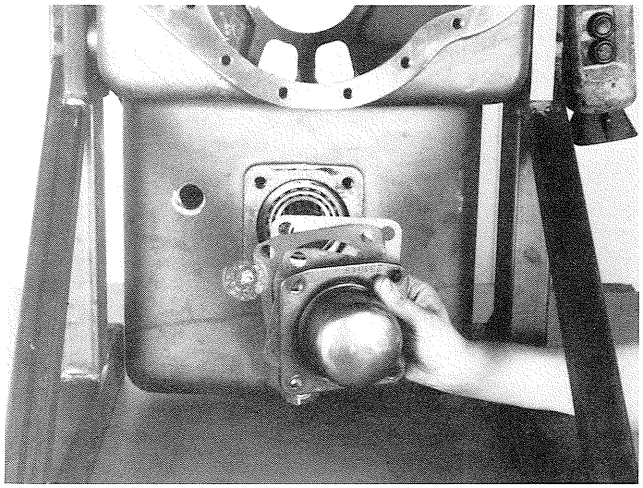


Figure 53
Remove front bearing cap and shims.

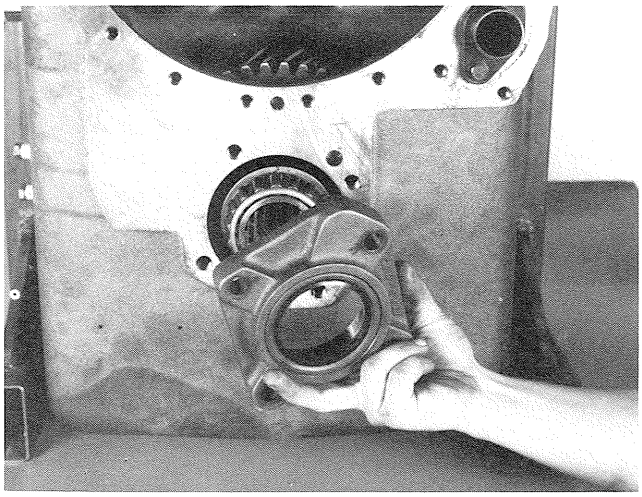


Figure 54
Remove rear bearing cap.

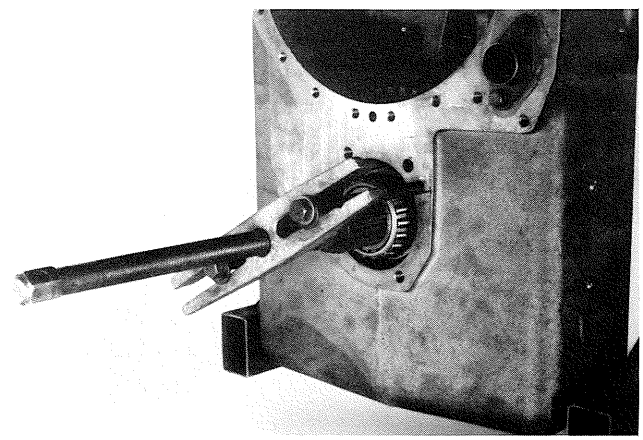


Figure 55
Block output gear. Push output shaft through bearing and gear from the rear.

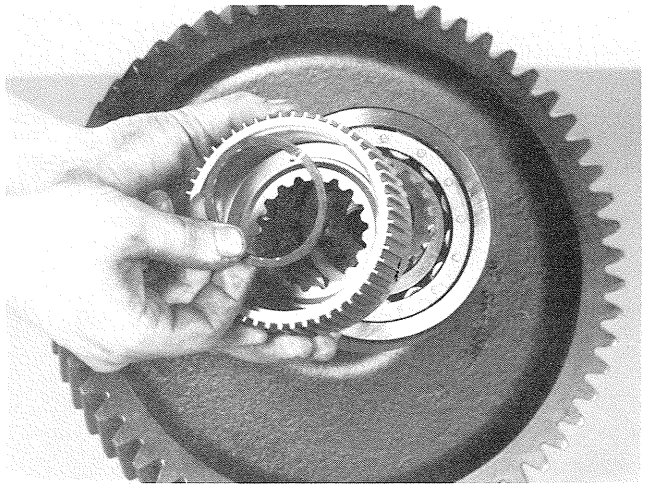


Figure 56
Remove the 4th speed clutch disc hub retainer ring and disc hub from idler shaft.

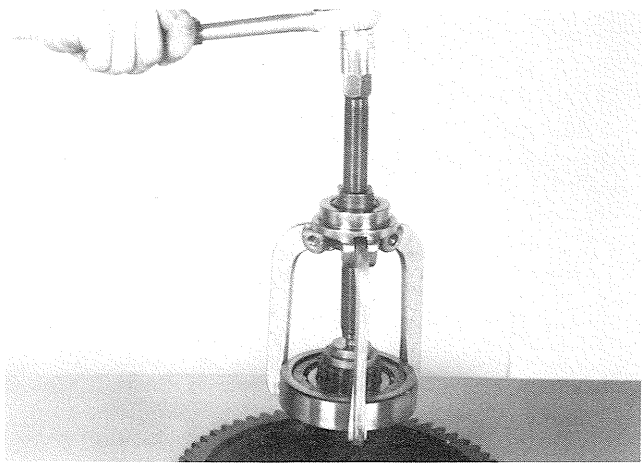


Figure 57
Remove idler shaft inner bearing, this should be a slip fit.

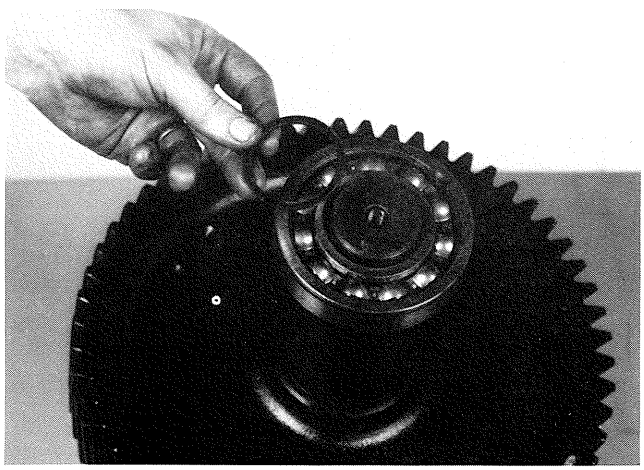


Figure 58
Remove idler shaft outer bearing retainer ring.

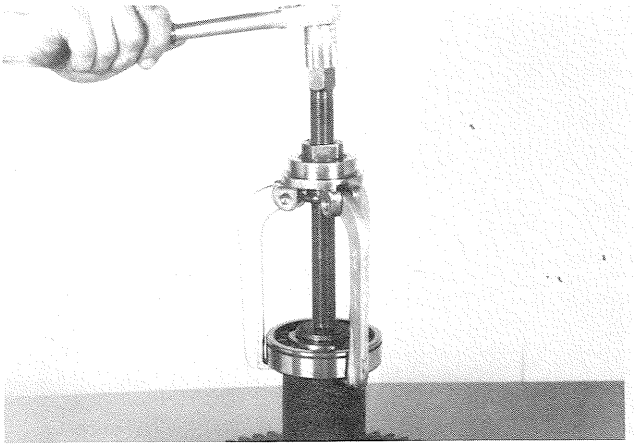


Figure 59
Remove idler shaft outer bearing.

IDLER SHAFT REASSEMBLY
(See cleaning and inspection page.)

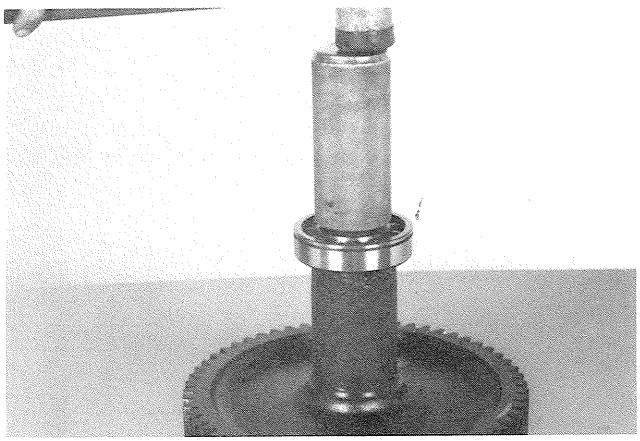


Figure 60
Install idler shaft outer bearing. **NOTE:** Bearing outer retainer ring groove must be up.

Figure 61
Install shaft to bearing retainer ring.

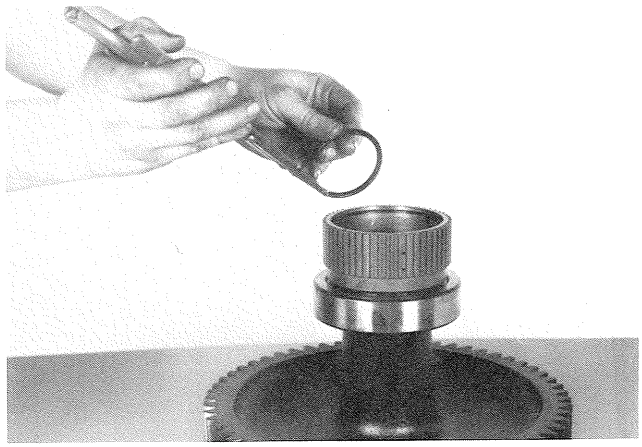


Figure 62
Install inner bearing on bearing race. Position 4th speed clutch disc hub on idler shaft. Install disc hub retainer ring.

4th SPEED CLUTCH DISASSEMBLY

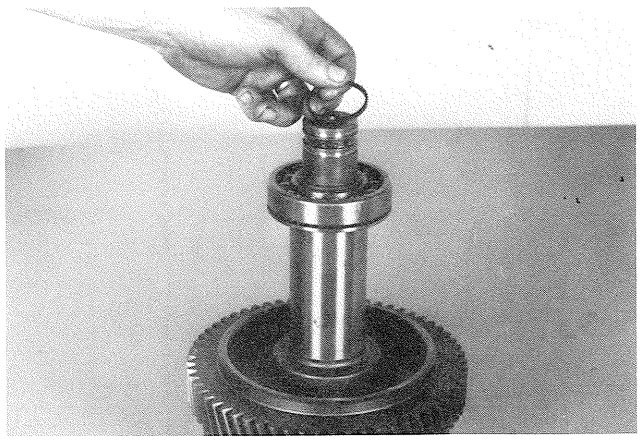


Figure 63
Remove clutch shaft oil sealing rings (piston rings). See page 119 for sealing ring and expander spring installation.

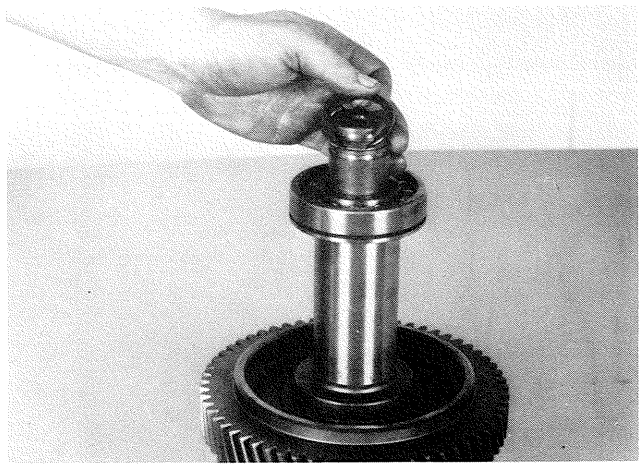


Figure 64
Remove bearing to shaft retainer ring.

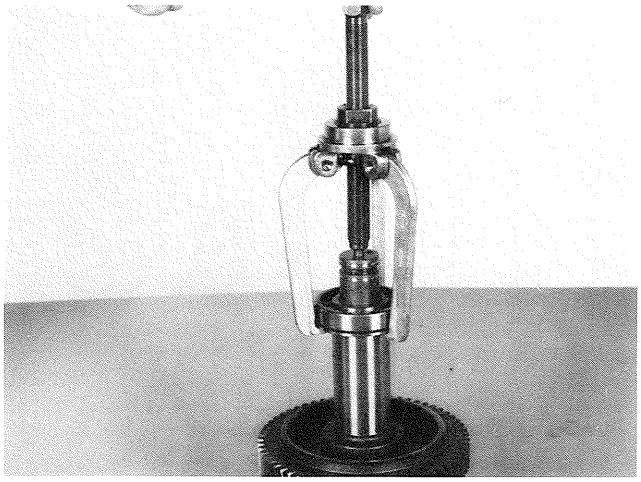


Figure 65
Remove clutch bearing.

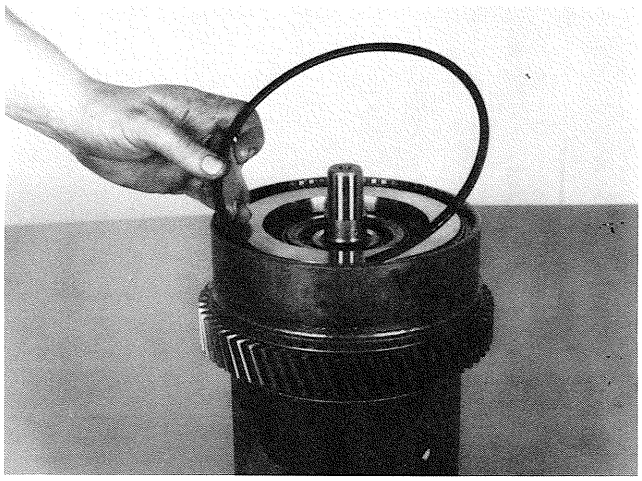


Figure 66
Remove end plate retainer ring.

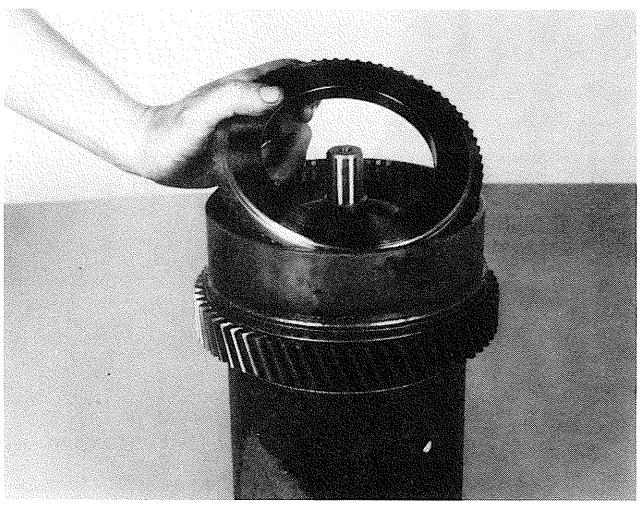


Figure 67
Remove end plate.

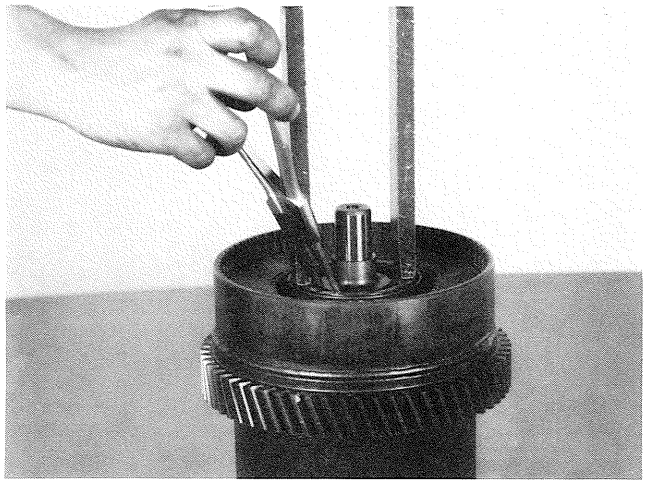


Figure 68
Compress return spring retainer. Remove return spring retainer ring.

Figure 69
Remove piston return spring and inner and outer spring retainers.

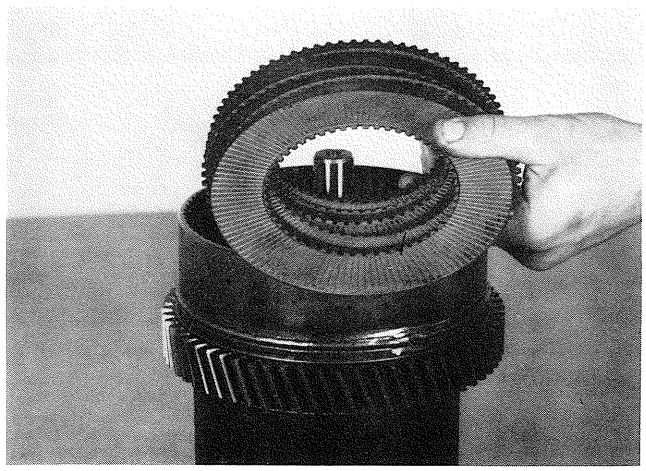


Figure 70
Remove inner and outer clutch discs.

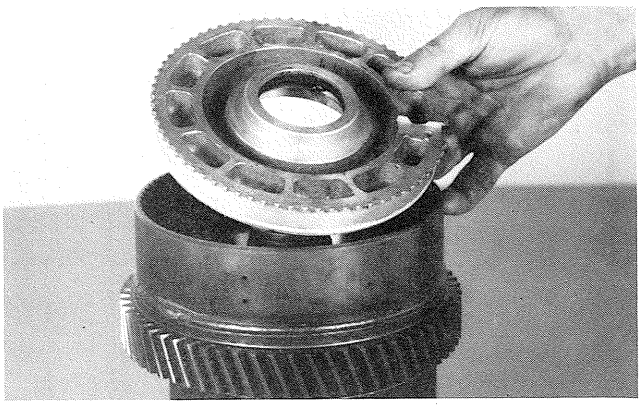


Figure 71
Turn clutch over and tap on a block of wood to remove the clutch piston.

REASSEMBLY OF 4th SPEED CLUTCH
(See cleaning and inspection page)

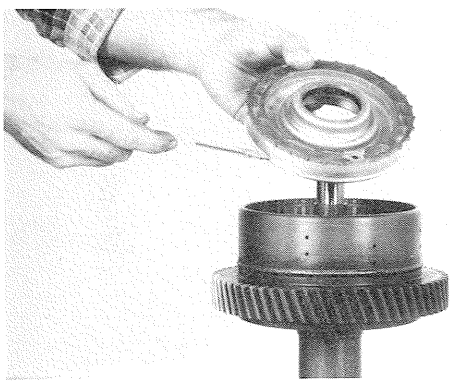


Figure 72
Make sure clutch piston bleed valve is clean and free of foreign material. Install piston inner seal ring. Install clutch piston outer piston ring. Lock piston ring joint securely. Grease ring to stabilize in ring groove.

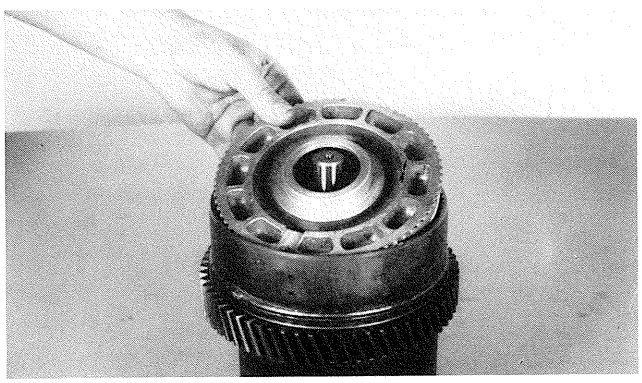


Figure 73
Position piston in clutch drum, use caution as not to damage the inner or outer piston seal rings.

Figure 74
Position the inner spring retainer, the piston return spring, the outer spring retainer, and retainer ring in clutch drum.

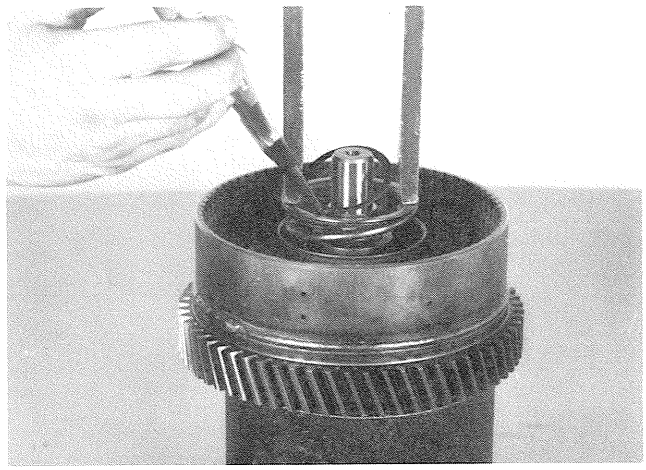


Figure 75
Compress return spring. Install spring retainer ring.

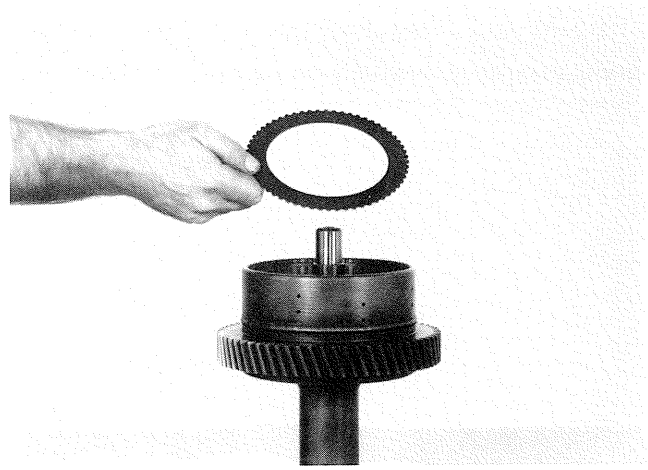


Figure 76
Install 1st steel disc.

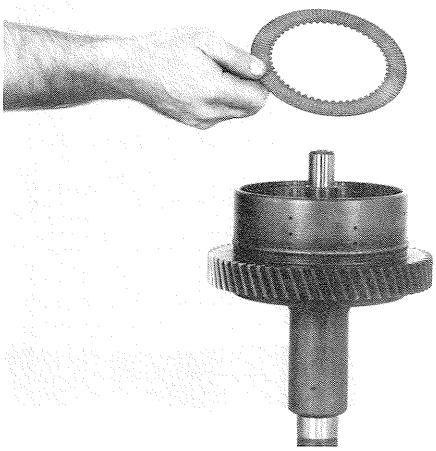


Figure 77

Install 1st friction disc. Install next steel 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.

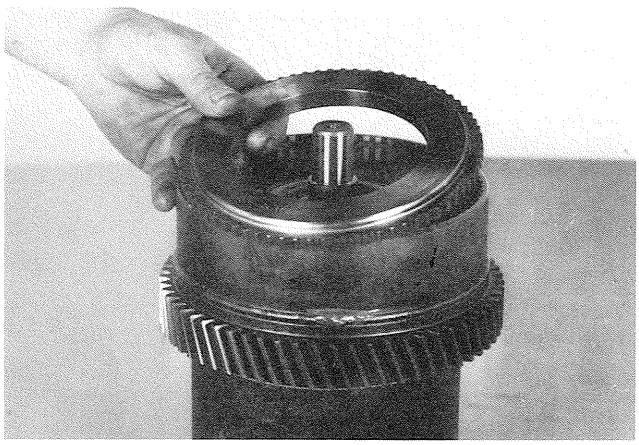


Figure 78

Install clutch disc end plate.

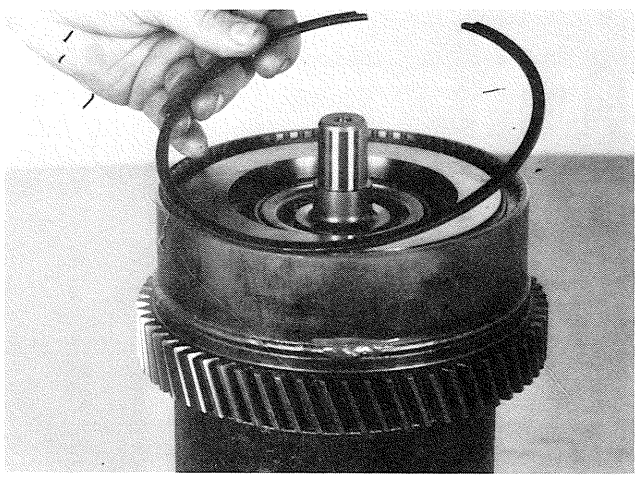


Figure 79

Install end plate retainer ring.

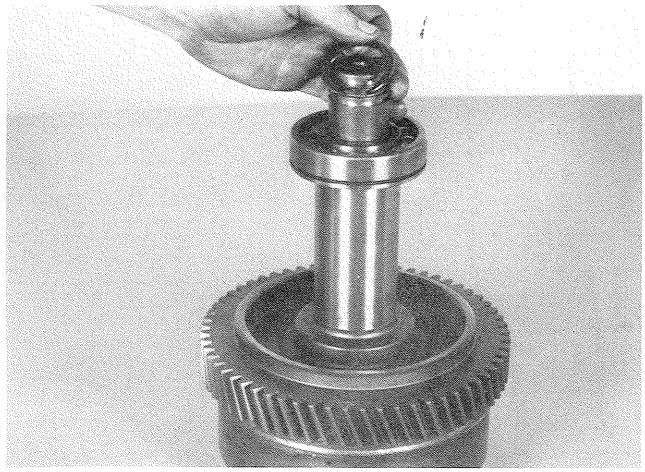


Figure 80

Install clutch shaft front bearing with bearing outer locating ring groove down. Install bearing to clutch shaft retainer ring.

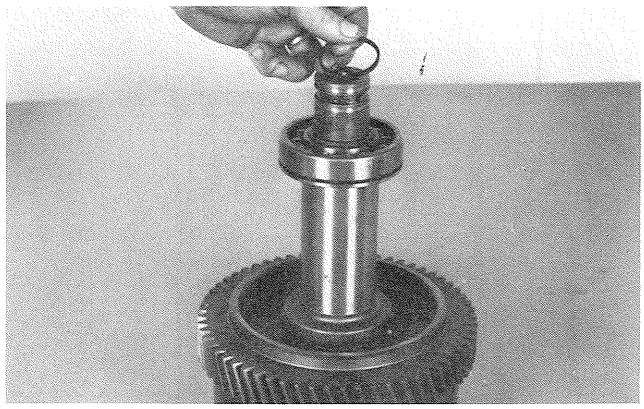


Figure 81

Install clutch shaft oil sealing rings and expander springs per instructions on page 119.

3rd SPEED CLUTCH DISASSEMBLY

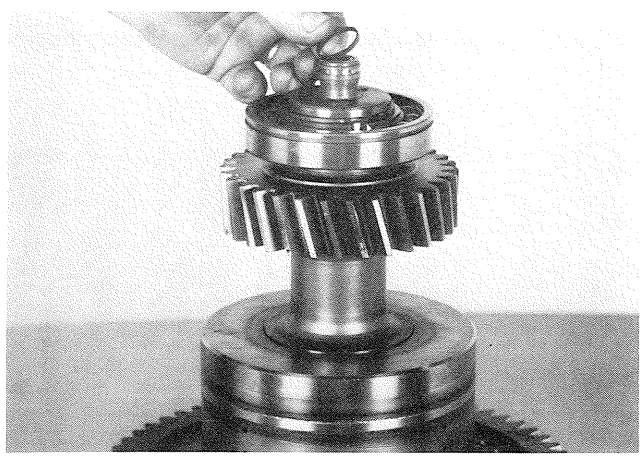


Figure 82

Remove clutch shaft rear oil sealing ring.

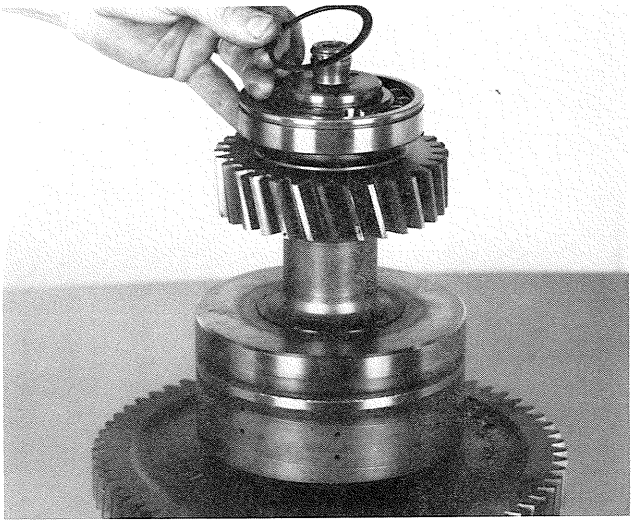


Figure 83
Remove clutch shaft to rear bearing retainer ring.

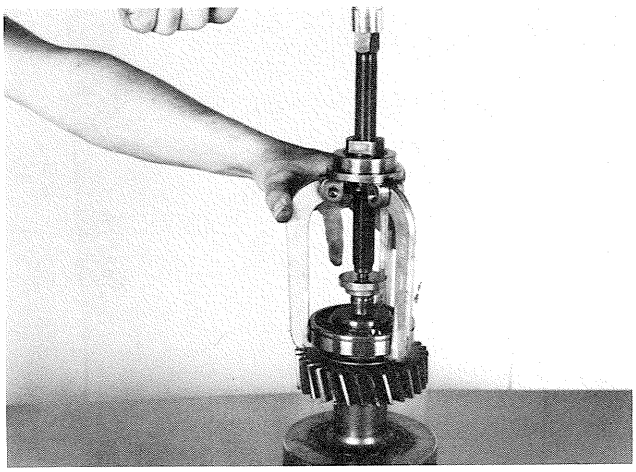


Figure 84
Remove rear bearing.

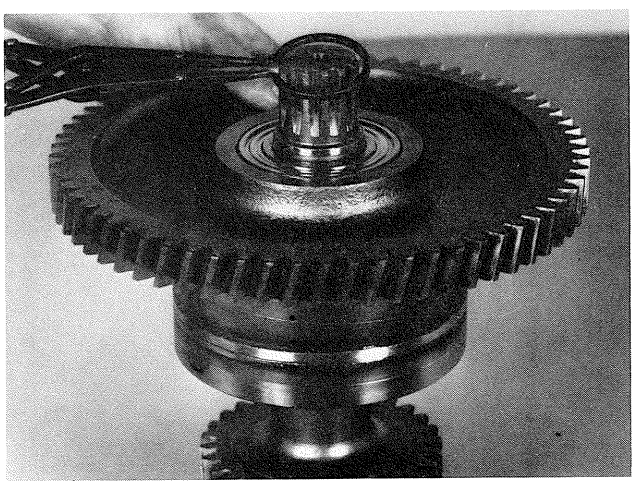


Figure 85
Turn clutch over and remove clutch gear retainer ring.

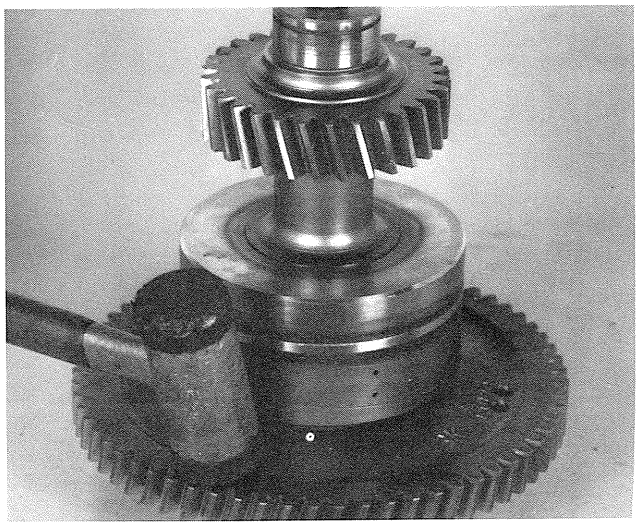


Figure 86
Tap gear and outer bearing from clutch.

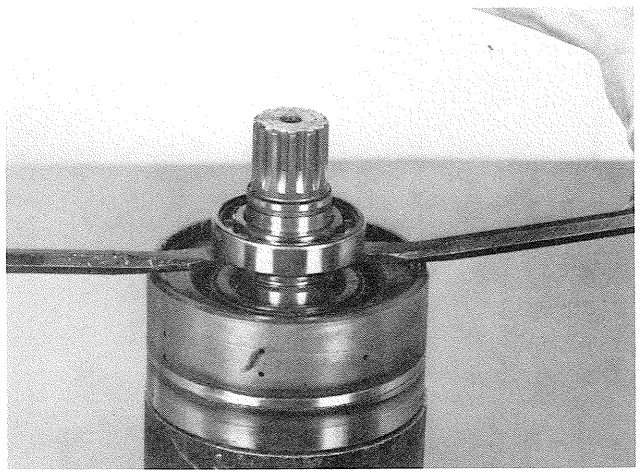


Figure 87
Pry inner bearing up enough to install a bearing puller.

Figure 88
Remove inner bearing.

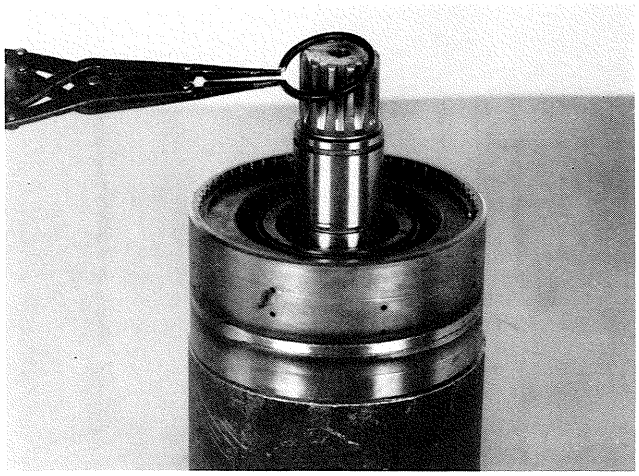


Figure 89
Remove inner bearing locating ring.

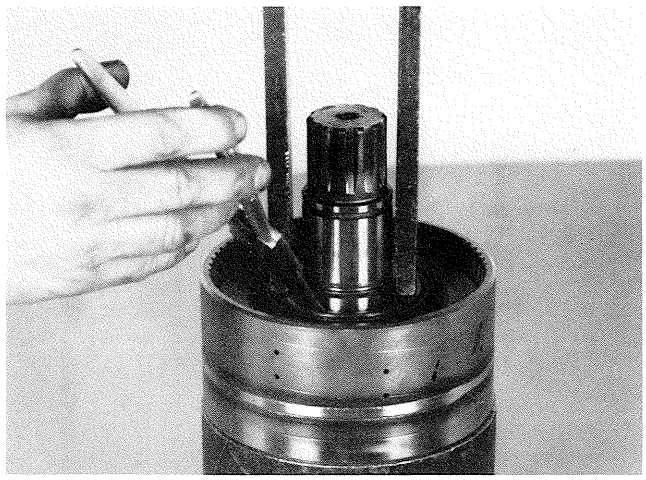


Figure 92
Compress return spring retainer. Remove return spring retainer ring.

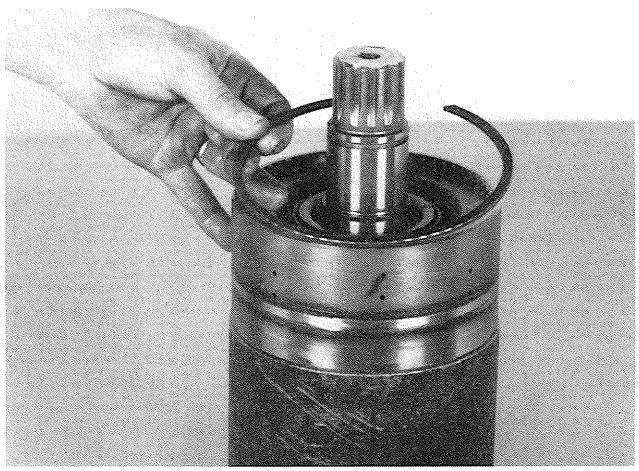


Figure 90
Remove end plate retainer ring.

Figure 93
Remove piston return spring and inner and outer spring retainers.

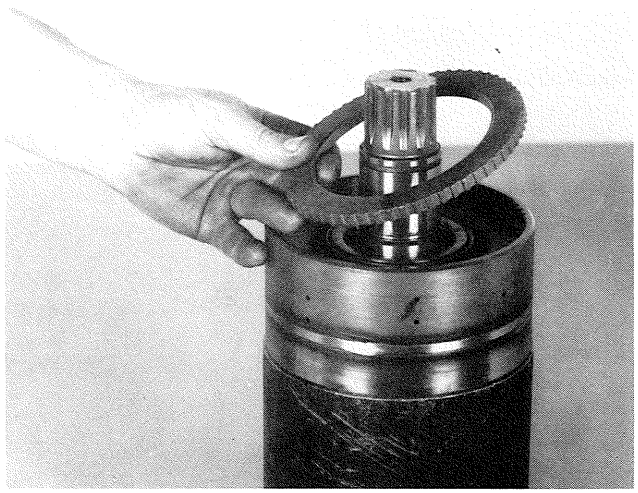


Figure 91
Remove end plate.

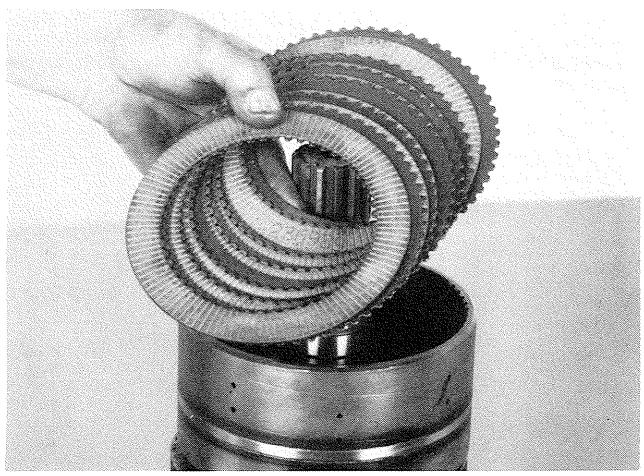


Figure 94
Remove inner and outer clutch discs.

Figure 95

Remove clutch piston.

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

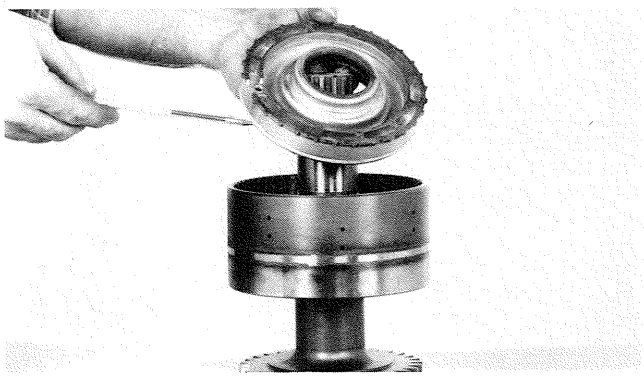


Figure 96

Make sure clutch piston bleed valve is clean and free of foreign material. Install piston inner seal ring. Install clutch piston outer piston ring. Lock piston ring securely. Grease ring to stabilize in ring groove.

Figure 97

Position piston in clutch drum, use caution as not to damage the inner and outer piston seal rings.

Figure 98

Position the inner spring retainer, the piston return spring, the outer spring retainer and retainer ring in clutch drum.

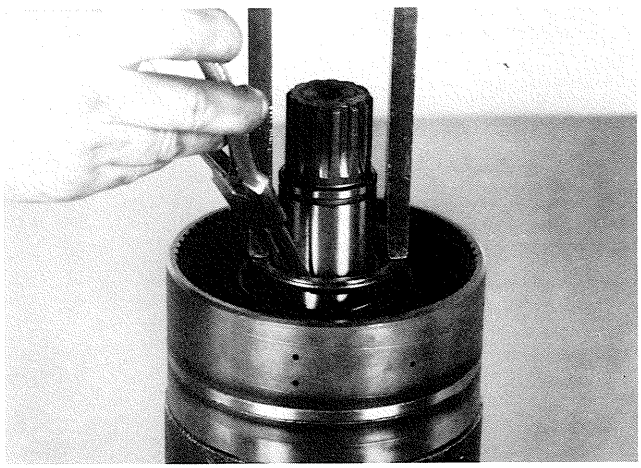


Figure 99

Compress return spring. Install spring retainer ring.

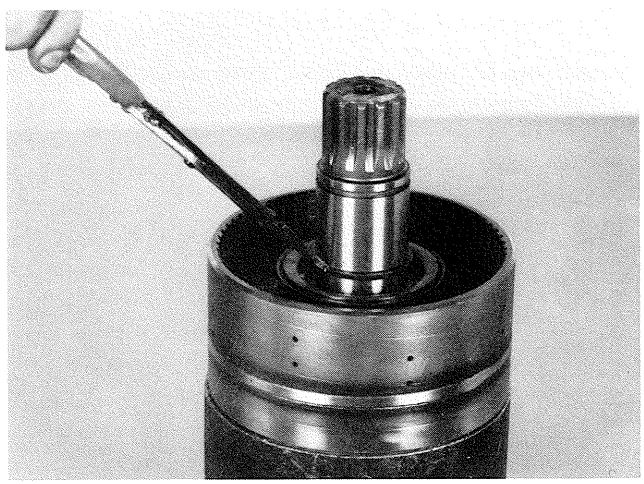


Figure 100

Install clutch gear inner bearing locating ring.

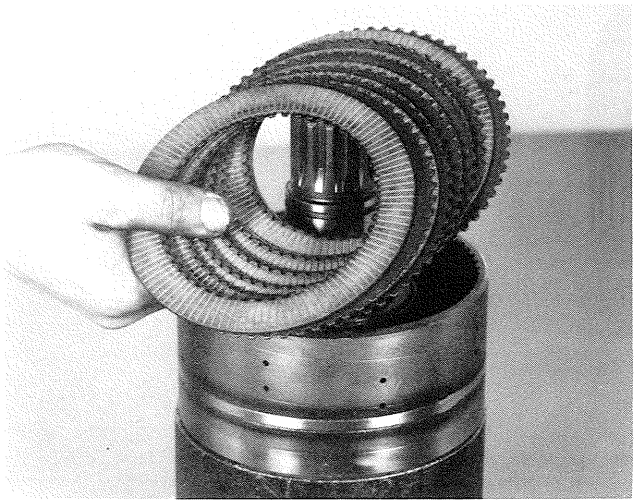


Figure 101
Install 1st steel disc. Install 1st friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

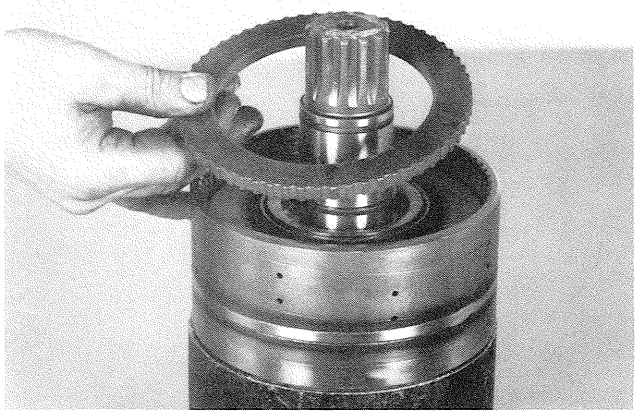


Figure 102
Install clutch disc end plate.

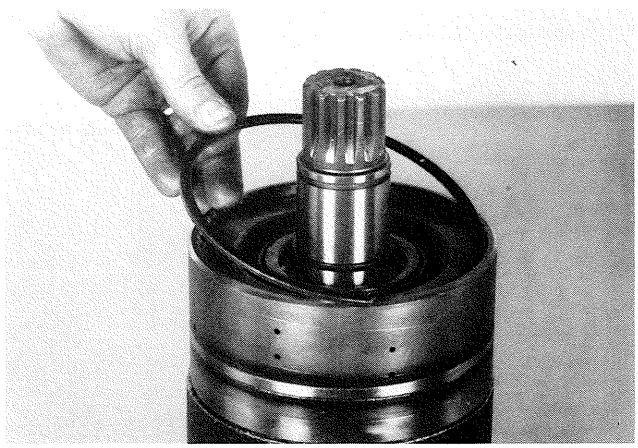


Figure 103
Install end plate retainer ring.

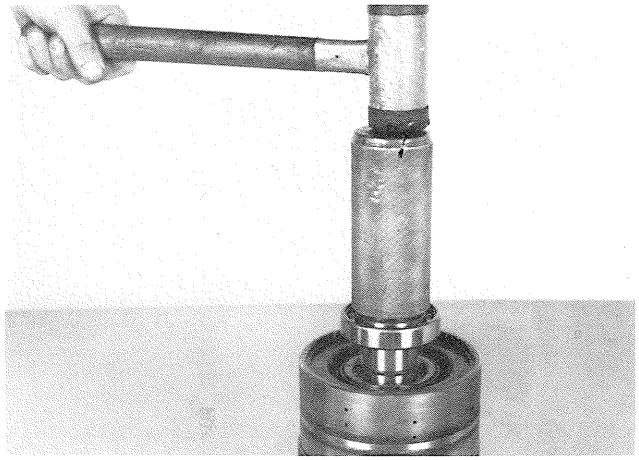


Figure 104
Install clutch gear inner bearing. **NOTE:**This bearing does not have a shield in it.

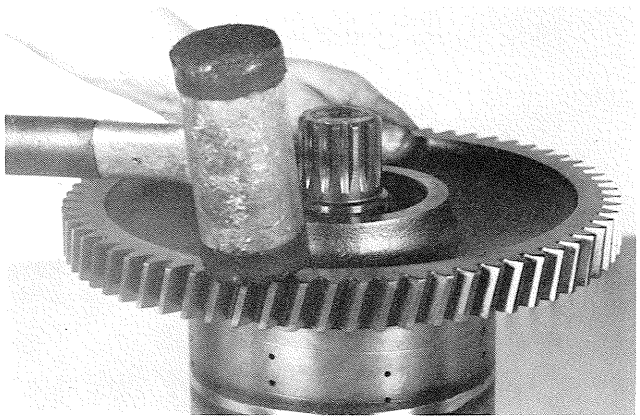


Figure 105
Install clutch driven gear and hub into clutch drum. Align splines on clutch hub with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.

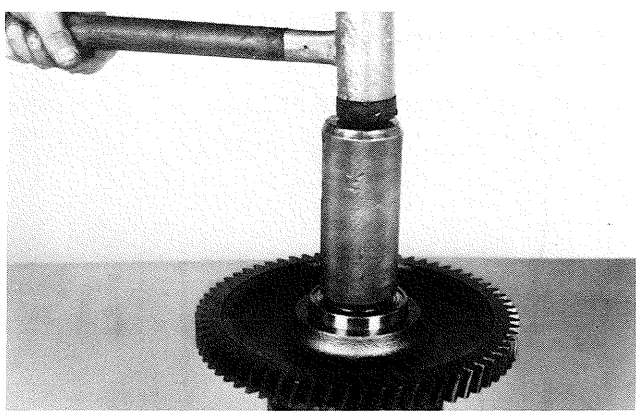


Figure 106
Install clutch gear outer bearing. **NOTE:** Outer bearing has a shield in it, this shield must be up.

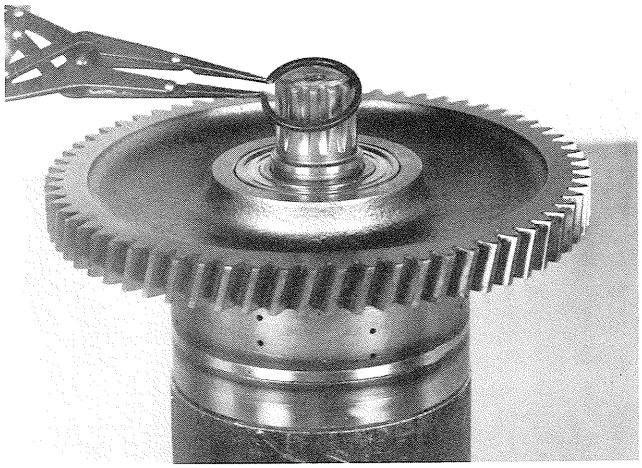


Figure 107
Install outer bearing retainer ring.

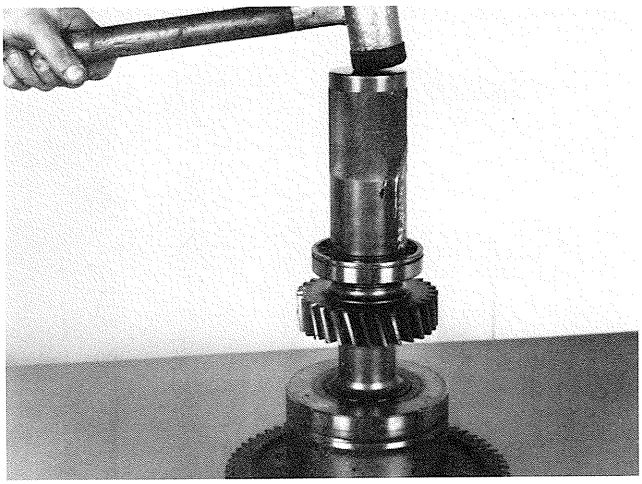


Figure 108
Install clutch shaft rear bearing. **NOTE:** Bearing outer retainer ring groove must be up.

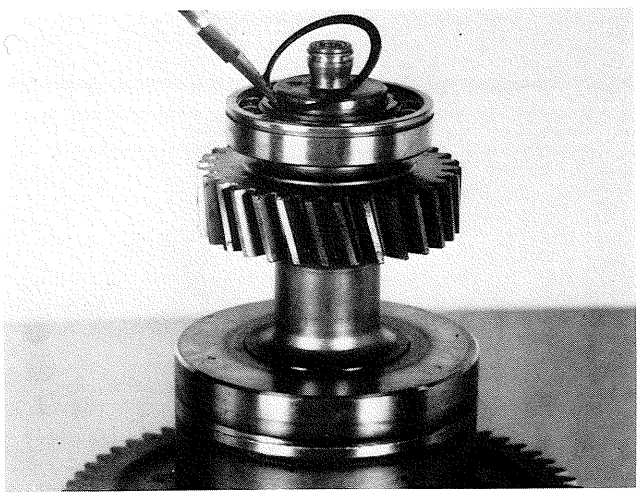


Figure 109
Install rear bearing retainer ring.

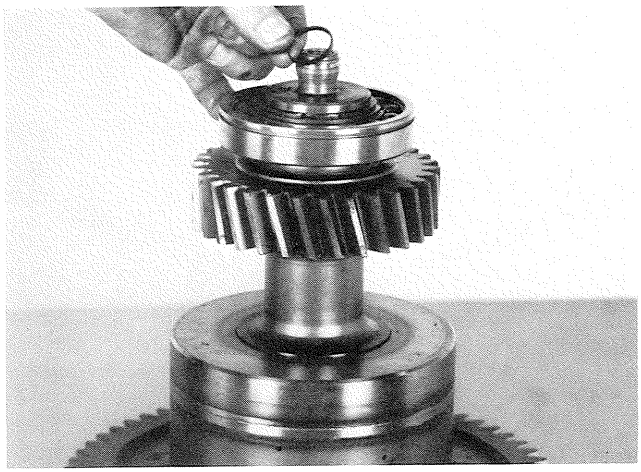


Figure 110
Install clutch shaft oil sealing ring.

FORWARD CLUTCH DISASSEMBLY
For Modulated Clutch See Page 108

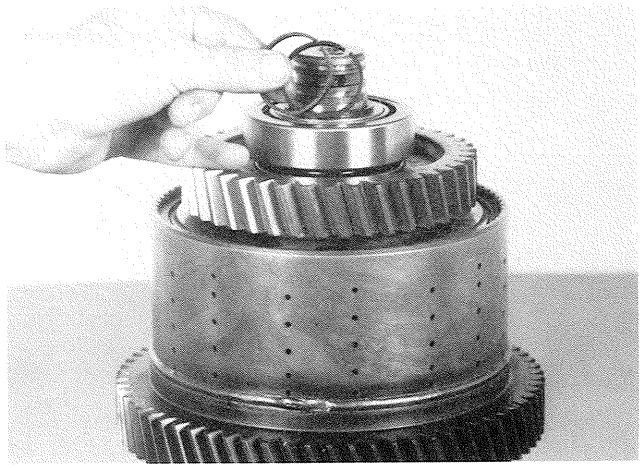


Figure 111
Remove clutch shaft front oil sealing rings (piston rings). See page 119 for sealing ring and expander spring installation.

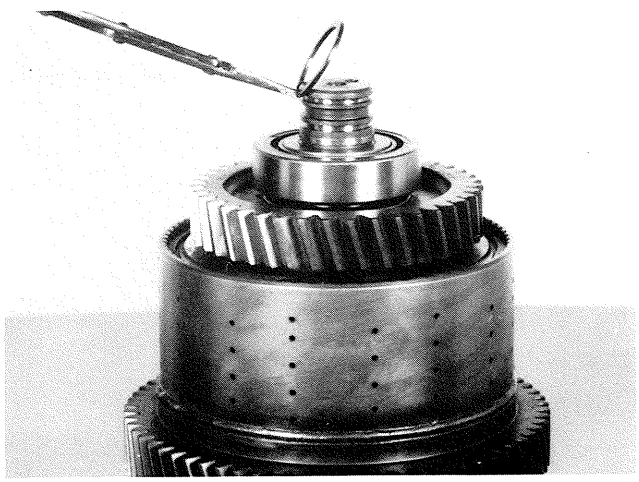


Figure 112
Remove front bearing retaining ring.

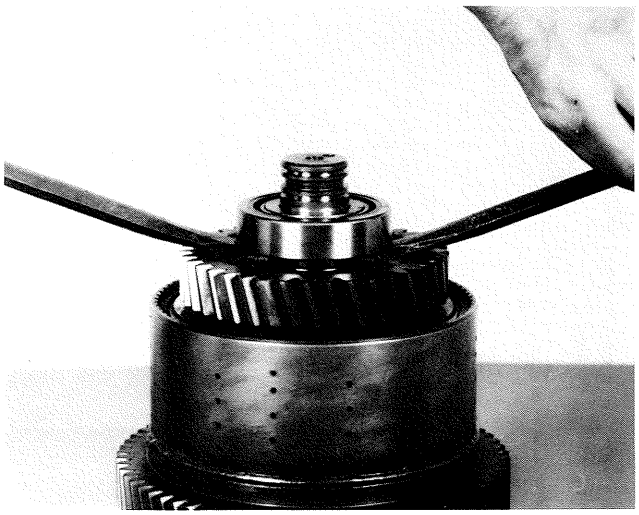


Figure 113
Pry front bearing up far enough to install a bearing puller.

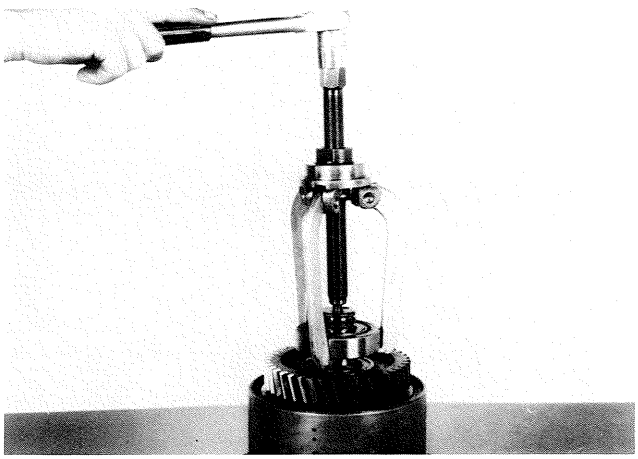


Figure 114
Remove front bearing.

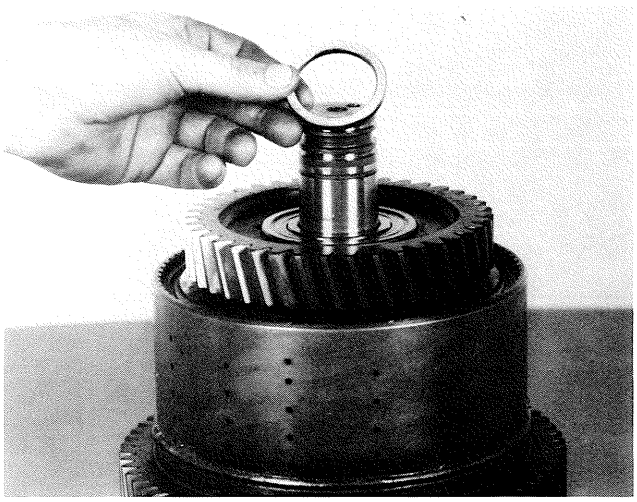


Figure 115
Remove front bearing spacer.

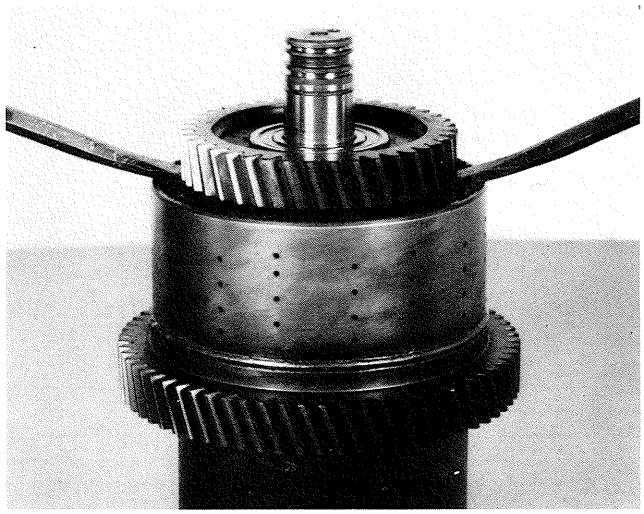


Figure 116
Pry clutch gear up far enough to install a gear puller.

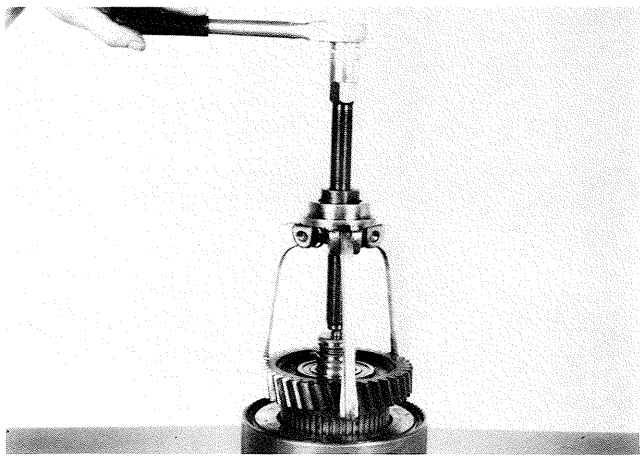


Figure 117
Remove clutch gear and outer bearing.

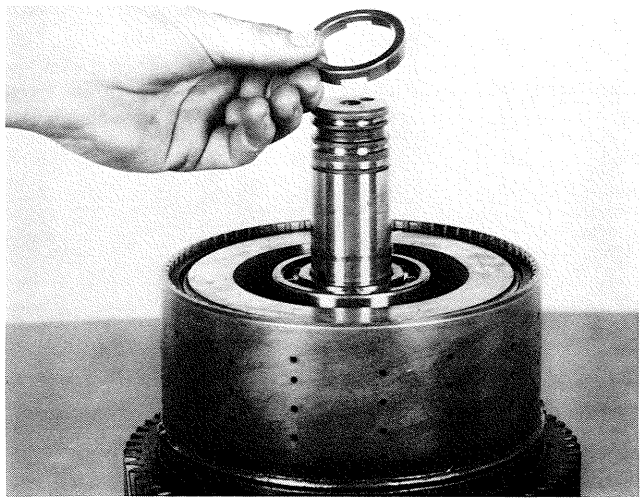


Figure 118
Remove bearing spacer. Not used on all models.

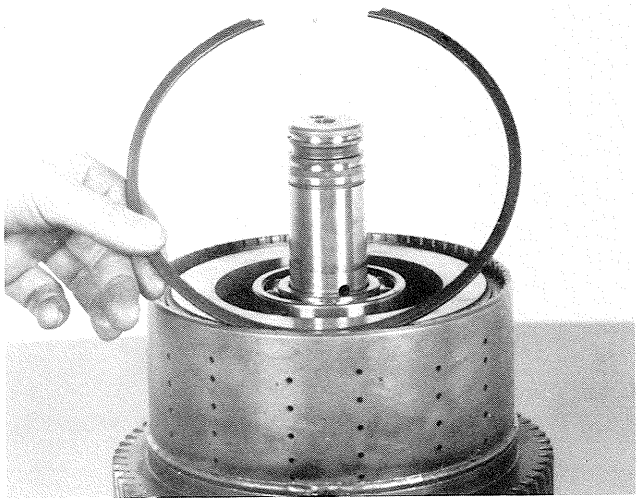


Figure 119
Remove clutch disc end plate retainer ring.

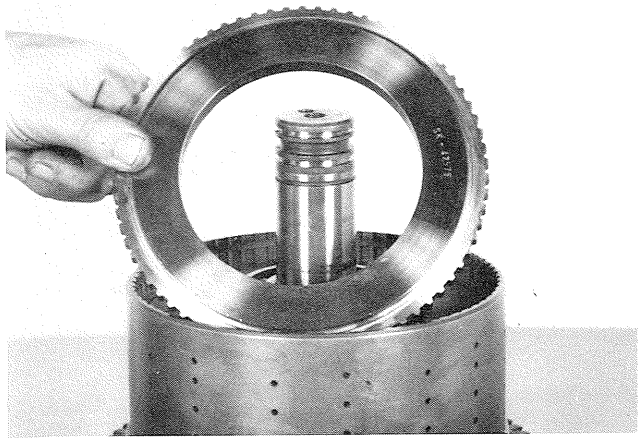


Figure 120
Remove end plate.

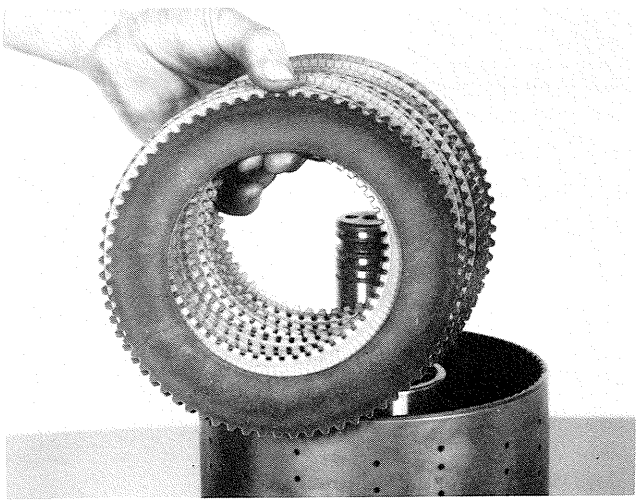


Figure 121
Remove the inner and outer clutch discs.

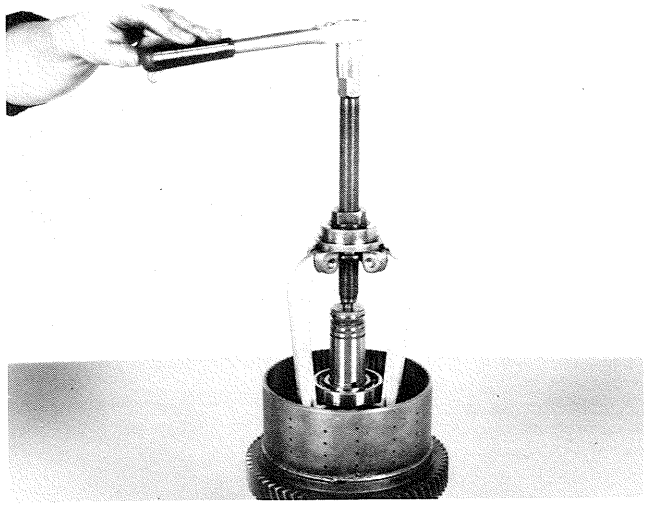


Figure 122
Remove inner bearing.

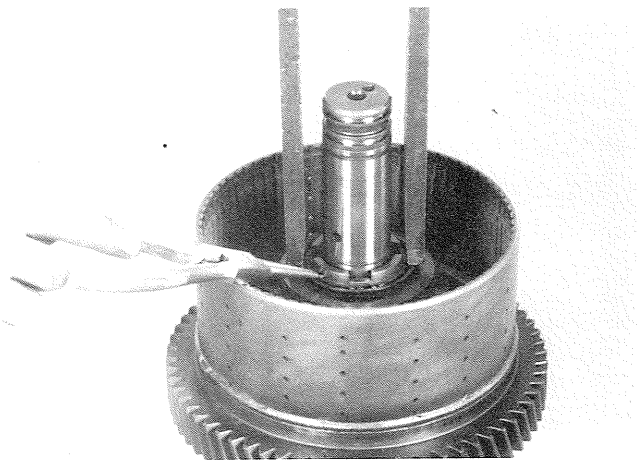


Figure 123
Compress piston return spring. Remove spring retainer ring, retainer washer, spring retainer washer, return spring and spring retainer.

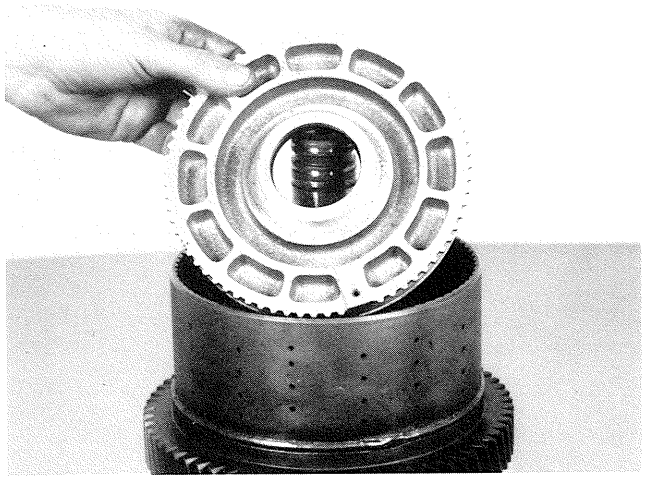


Figure 124
Remove clutch piston.

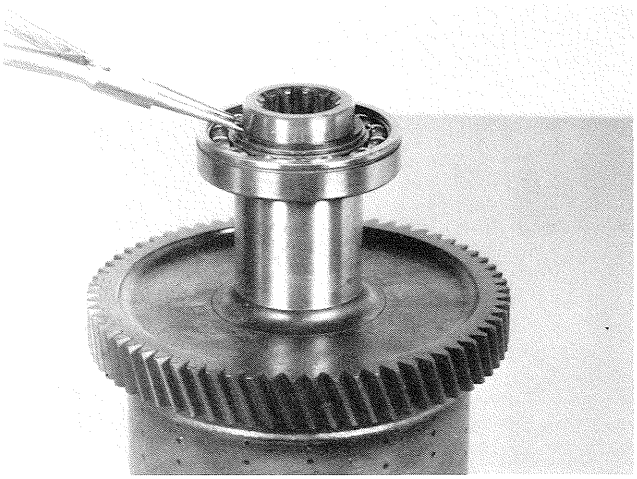


Figure 125
Remove clutch shaft rear bearing retainer ring.

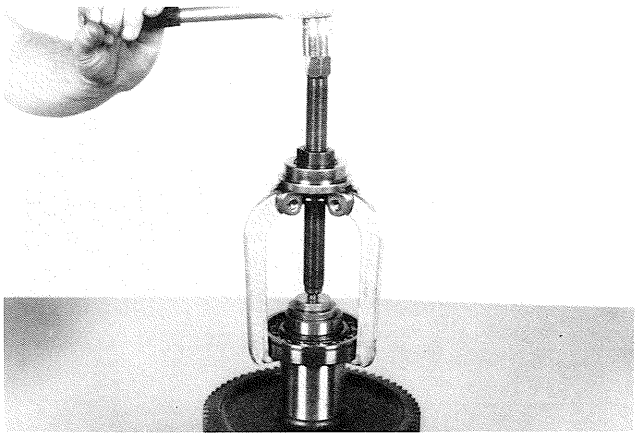


Figure 126
Remove rear bearing.

FORWARD CLUTCH REASSEMBLY
(See cleaning and inspection page)
For Modulated Clutch see page 110

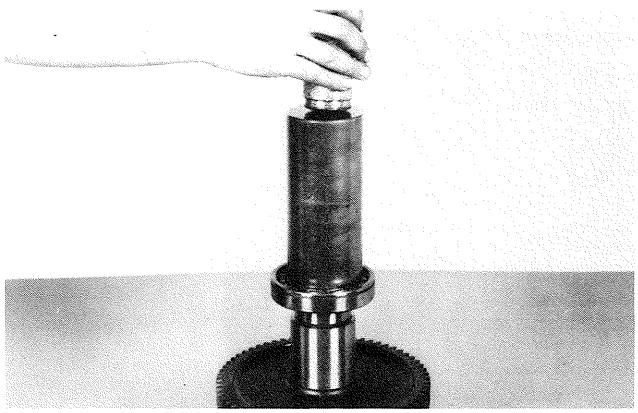


Figure 127
Install clutch shaft rear bearing. **NOTE:** Bearing outer locating ring groove must be up.

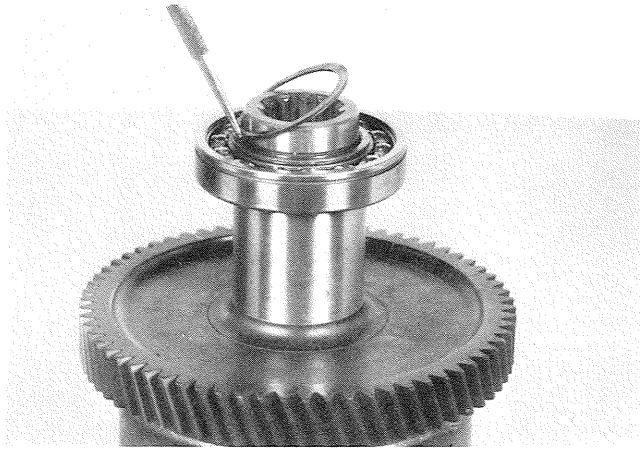


Figure 128
Install bearing retainer ring.

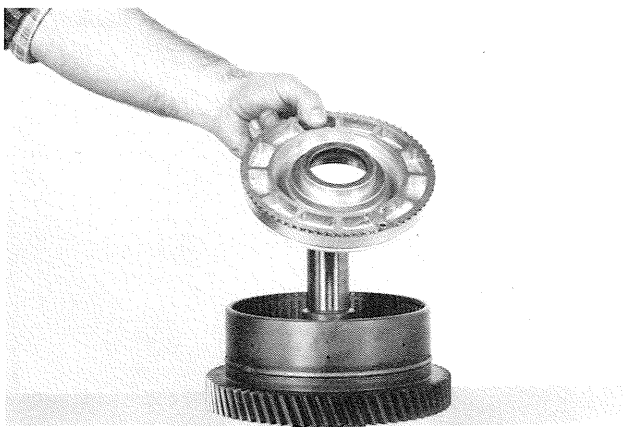


Figure 129
Make sure clutch piston bleed valve is clean and free of foreign material. Install piston inner seal ring. Install piston outer piston ring. Lock piston ring joint securely. Grease ring to stabilize in ring groove.

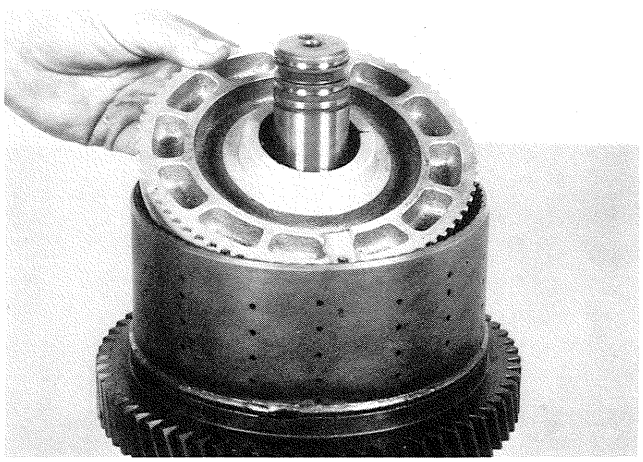


Figure 130
Position piston in clutch drum, use caution as not to damage the inner and outer piston seal rings.

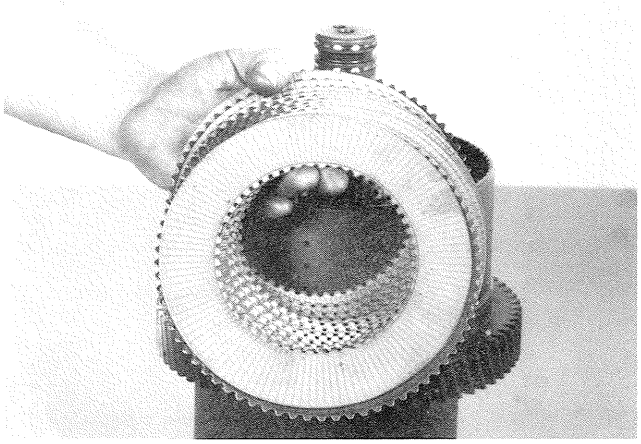


Figure 131

Install the clutch piston return spring as explained in figures 98 and 99. Install the clutch discs as explained in figure 101. **NOTE:** The forward clutch has an outer spring retainer washer that is installed between the return spring and spring retainer ring retainer washer.

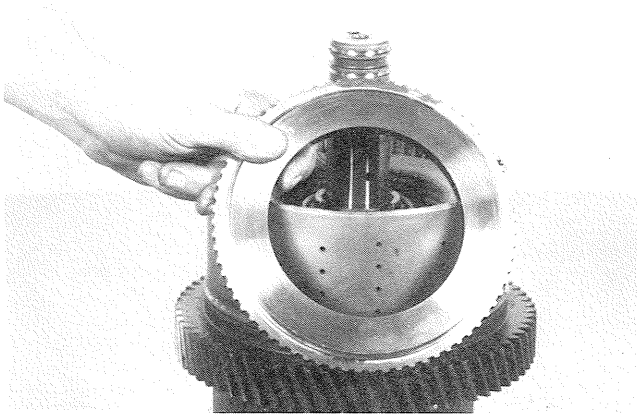


Figure 132

Install clutch disc end plate.

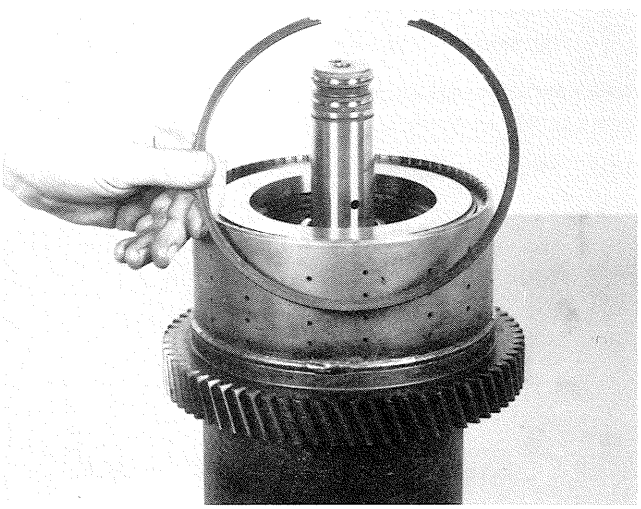


Figure 133

Install end plate retainer ring.

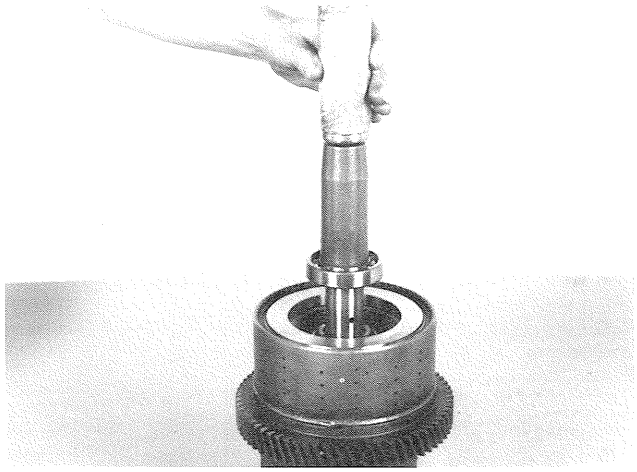


Figure 134

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

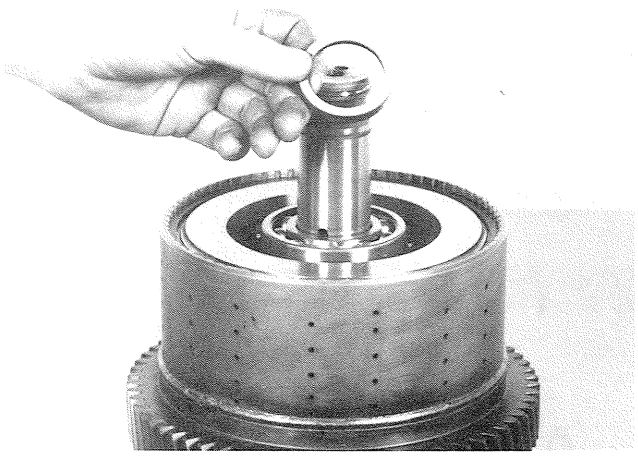


Figure 135

Position bearing spacer on clutch shaft. Not used on all models.

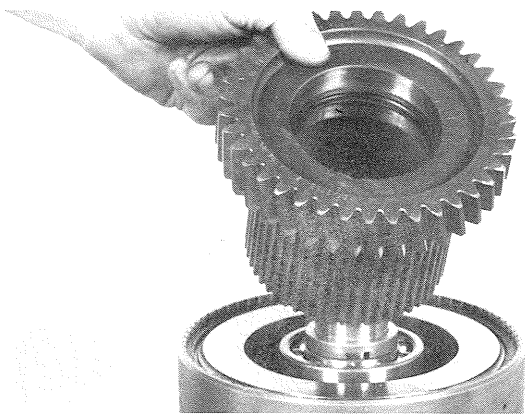


Figure 136

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

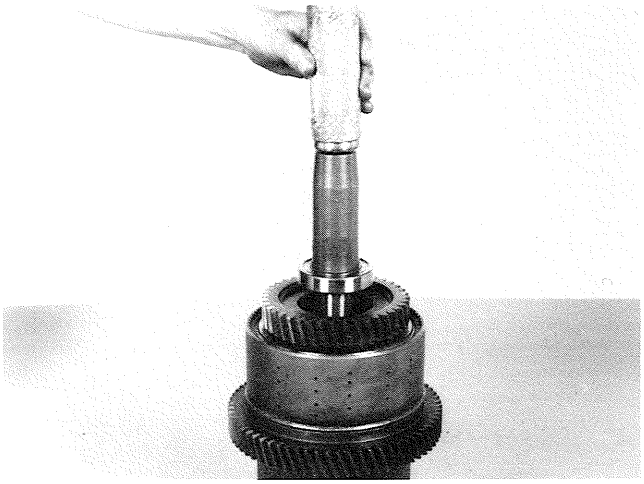


Figure 137
Install clutch gear outer bearing. **NOTE**: Outer bearing has a shield in it, this shield must be down.

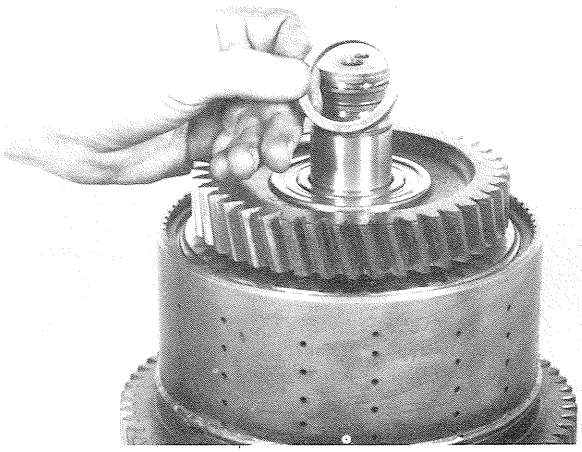


Figure 138
Position front bearing spacer on clutch shaft.

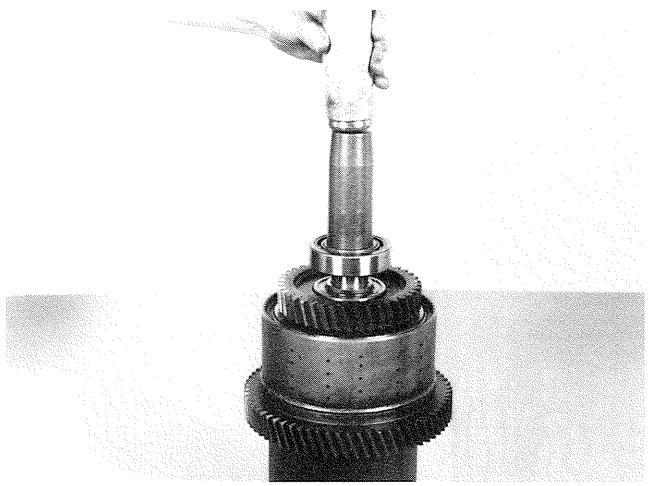


Figure 139
Install clutch shaft front bearing.

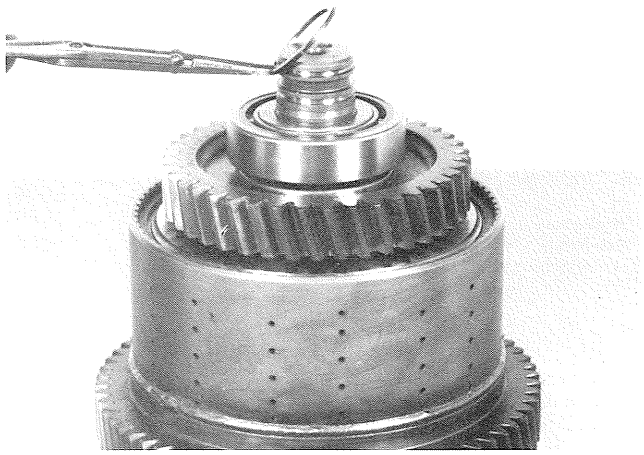


Figure 140
Install front bearing retainer ring.

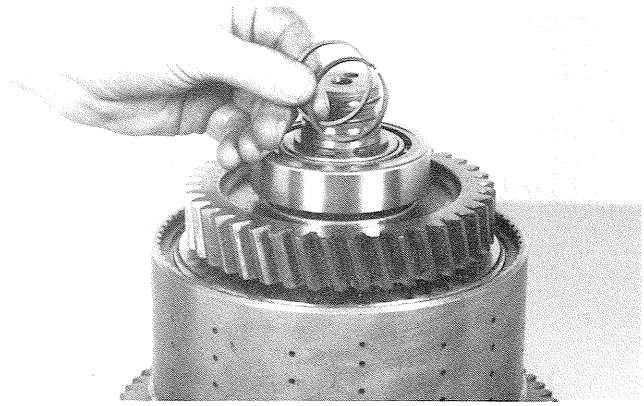


Figure 141
Install clutch shaft oil sealing rings and expander springs per instructions on page 119.

REVERSE & 2nd CLUTCH DISASSEMBLY
(Reverse being disassembled)
For Modulated Clutch see page 113

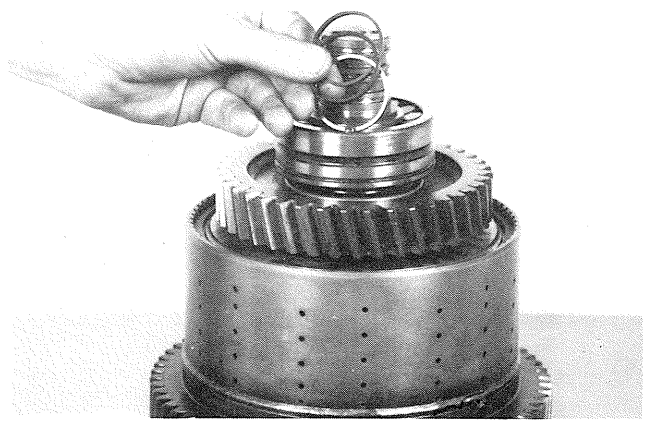


Figure 142
Remove clutch shaft oil sealing rings (piston rings). See page 119 for sealing ring and expander spring installation.

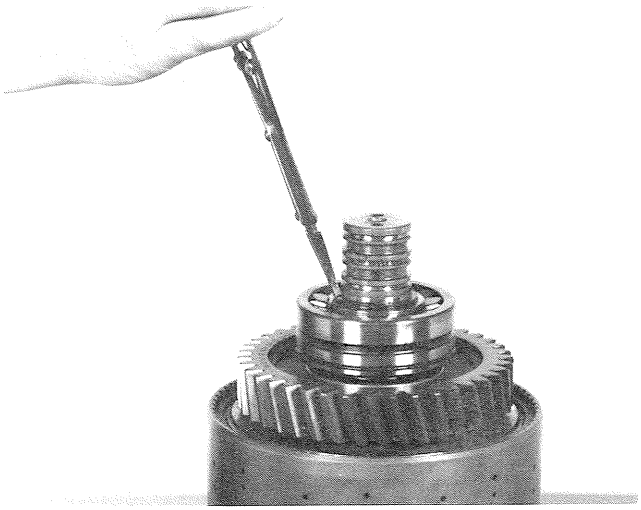


Figure 143
Remove front bearing retainer ring.

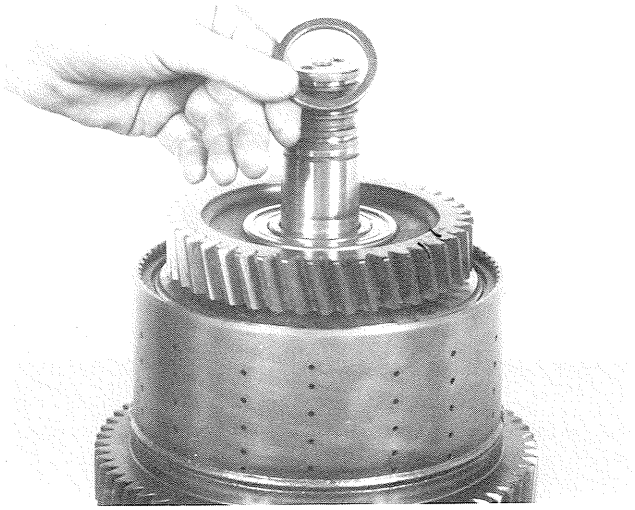


Figure 146
Remove front bearing spacer.

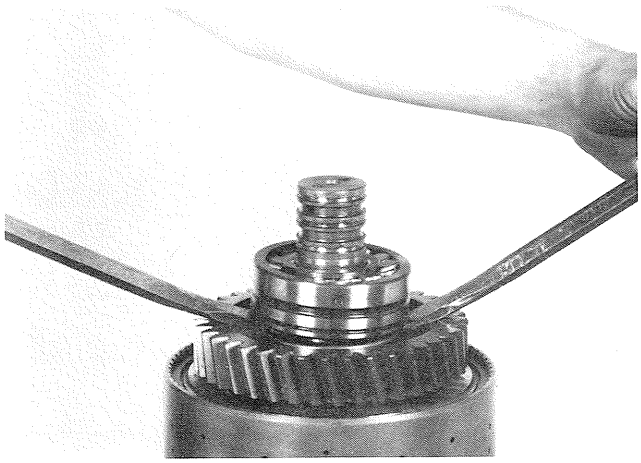


Figure 144
Pry front bearing up far enough to install a bearing puller.

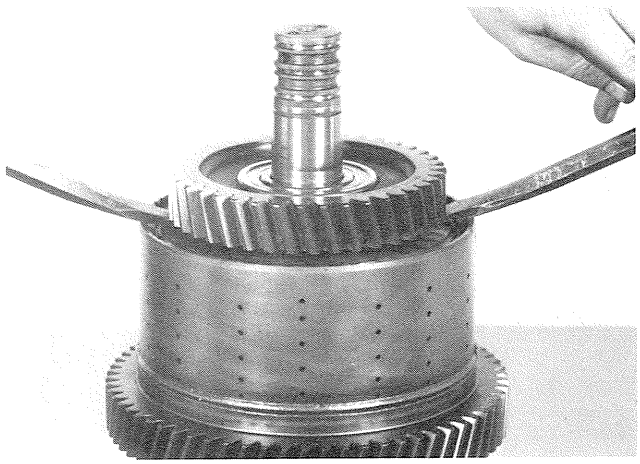


Figure 147
Pry clutch gear far enough to install a gear puller.

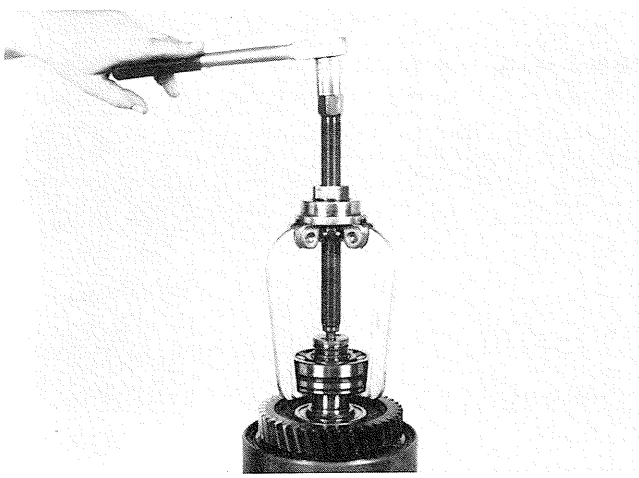


Figure 145
Remove front bearing.

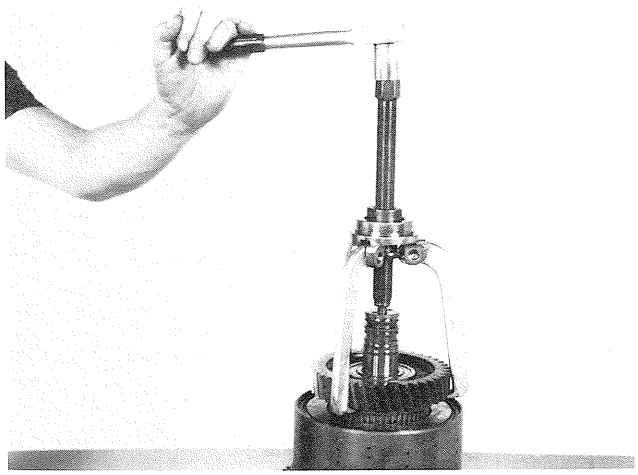


Figure 148
Remove the clutch gear and outer bearing.

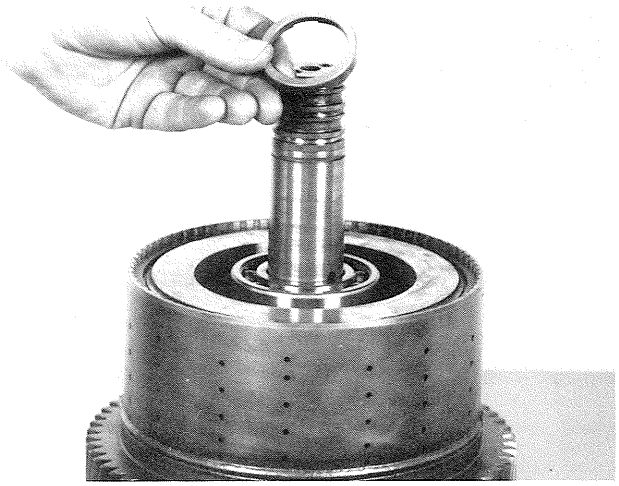


Figure 149
Remove bearing spacer. Not used on all models.

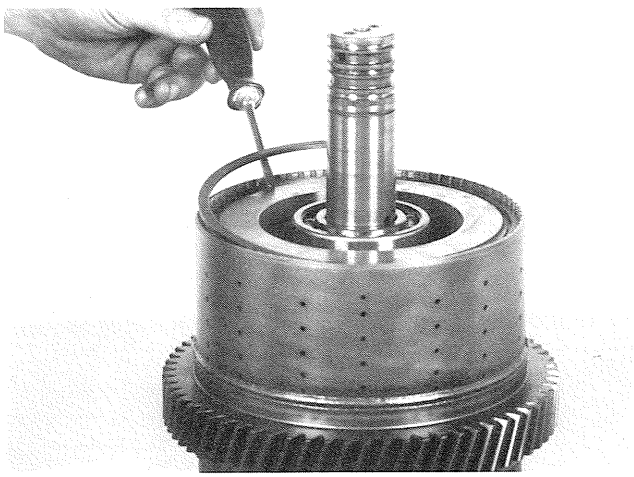


Figure 150
Remove the end plate retainer ring.

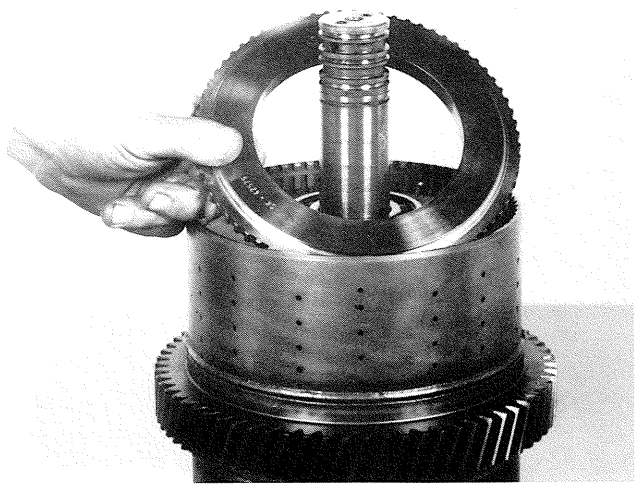


Figure 151
Remove end plate.

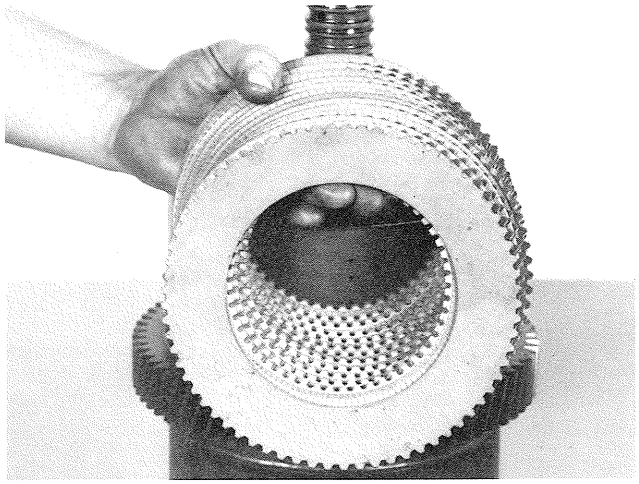


Figure 152
Remove the inner and outer clutch discs.

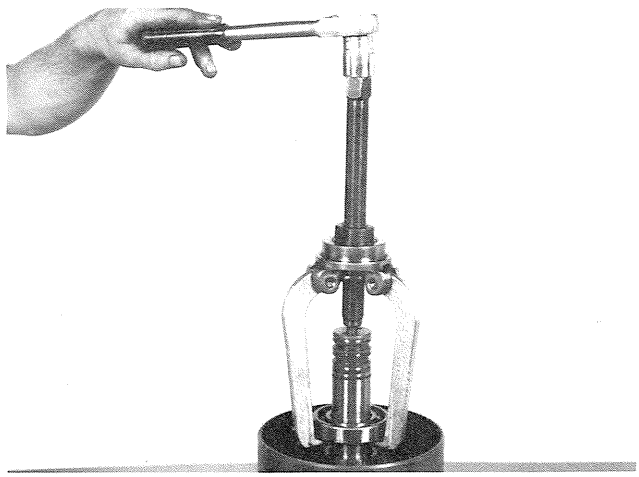


Figure 153
Remove clutch gear inner bearing.

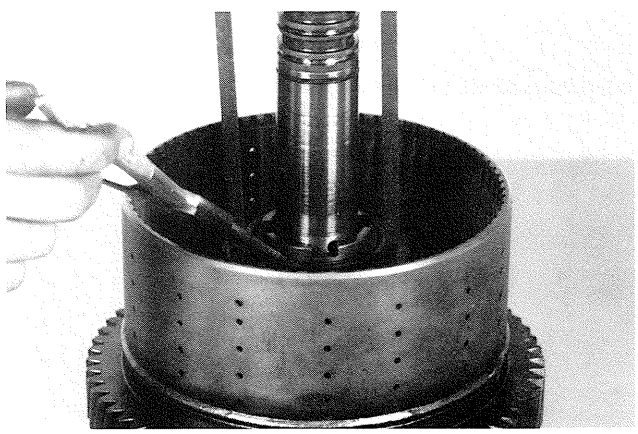


Figure 154
Compress piston return spring. Remove spring retainer ring, retainer washer, spring retainer washer, return spring and spring retainer.

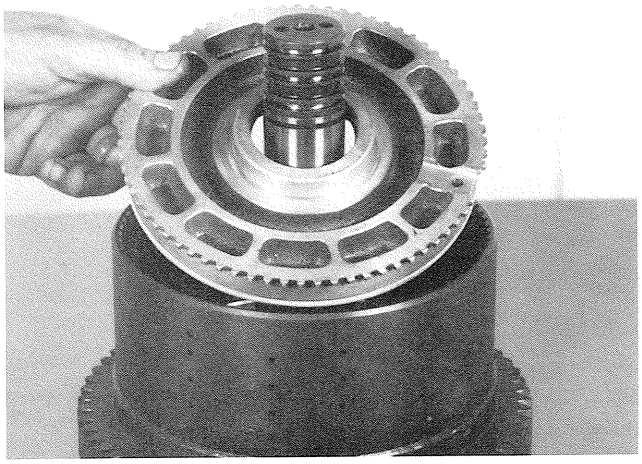


Figure 155
Remove clutch piston.

2nd CLUTCH DISASSEMBLY

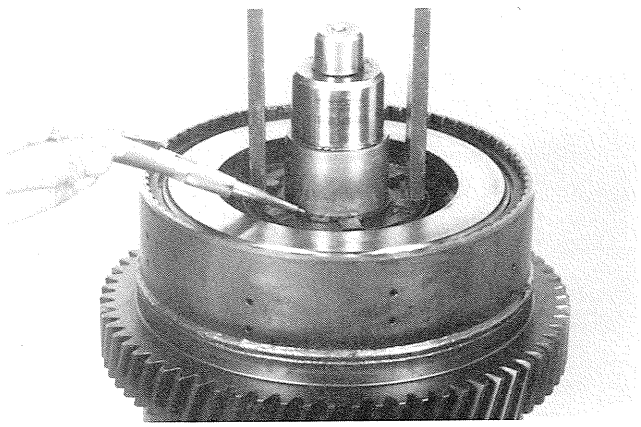


Figure 156
Compress piston return spring. Remove return spring retainer ring.

Figure 157
Remove return spring and spring retainers.

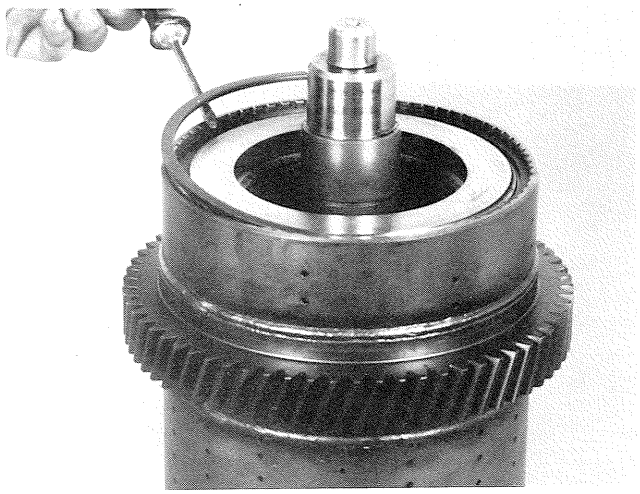


Figure 158
Remove end plate retainer ring.

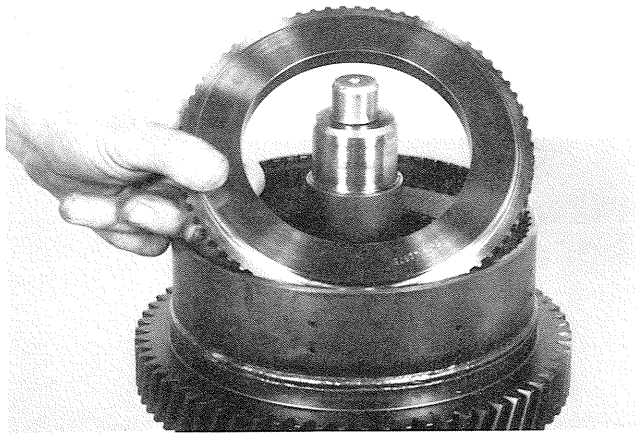


Figure 159
Remove end plate.

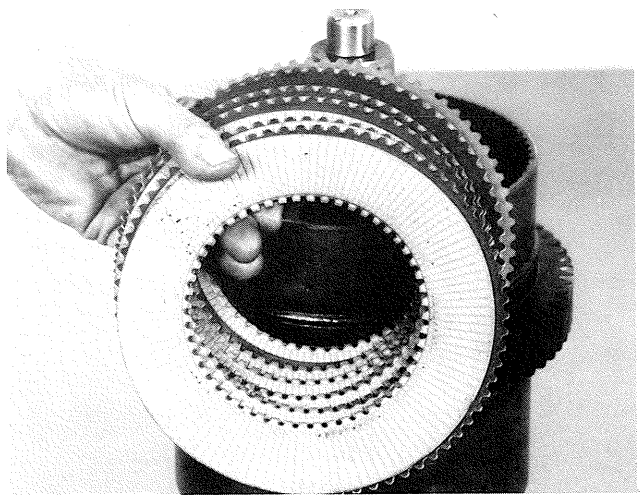


Figure 160
Remove inner and outer clutch discs.

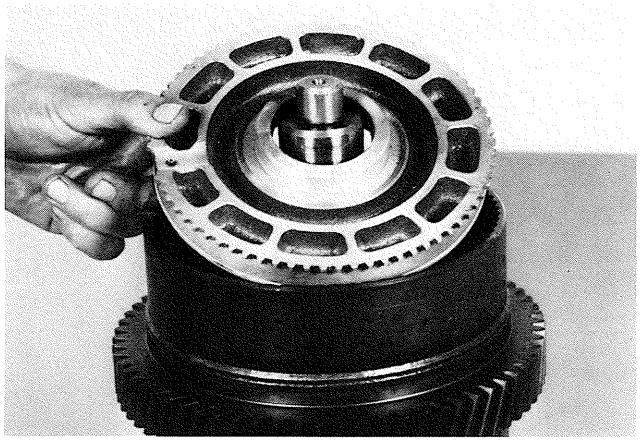


Figure 161
Remove clutch piston.

2nd CLUTCH REASSEMBLY
(See cleaning and inspection page)

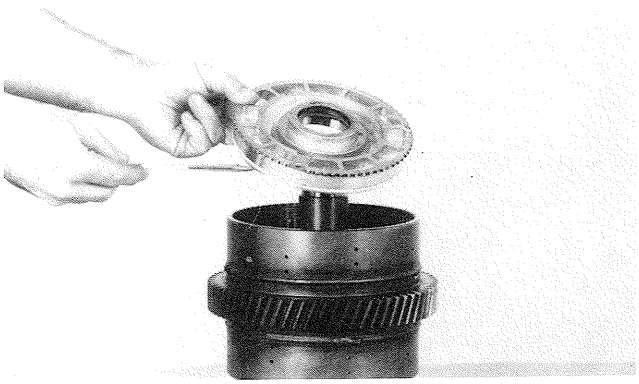


Figure 162
Make sure clutch piston bleed valve is clean and free of foreign material. Install inner seal ring. Install piston outer piston ring. Lock piston ring joint securely. Grease ring to stabilize in ring groove.

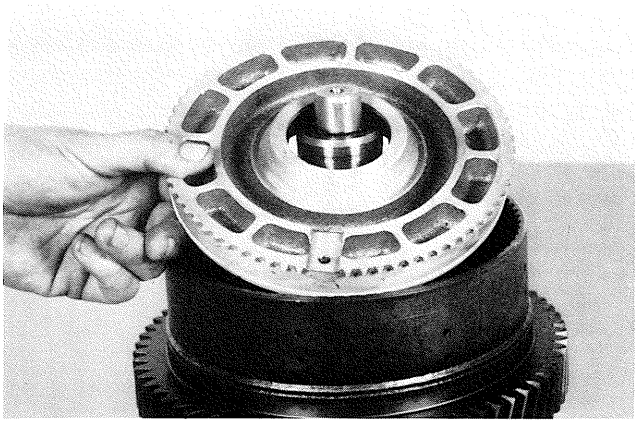


Figure 163
Position clutch piston in clutch drum, use caution as not to damage the inner and outer piston seal rings.

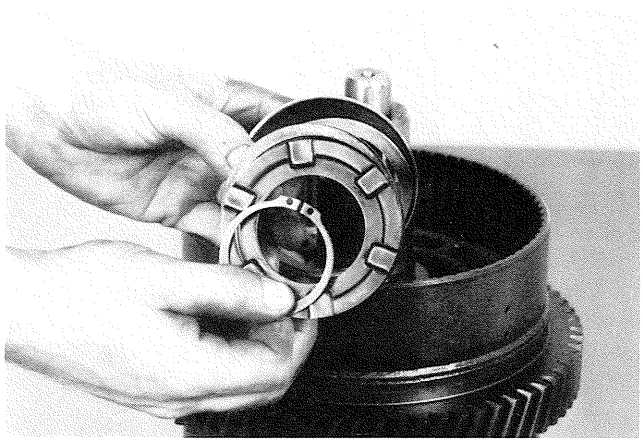


Figure 164
Position inner return spring retainer, return spring and outer spring retainer washer. Install return spring retainer ring washer and retainer ring.

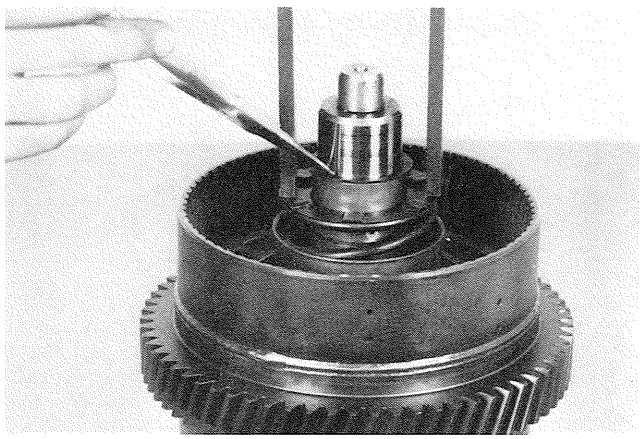


Figure 165
Compress return spring and install retainer ring in ring groove.

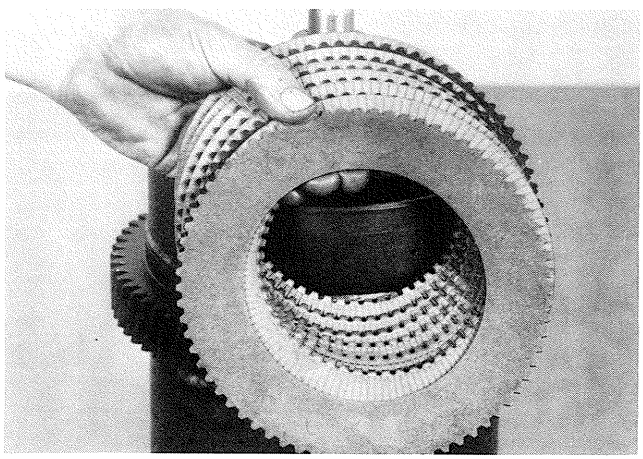


Figure 166
Install one steel disc. Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

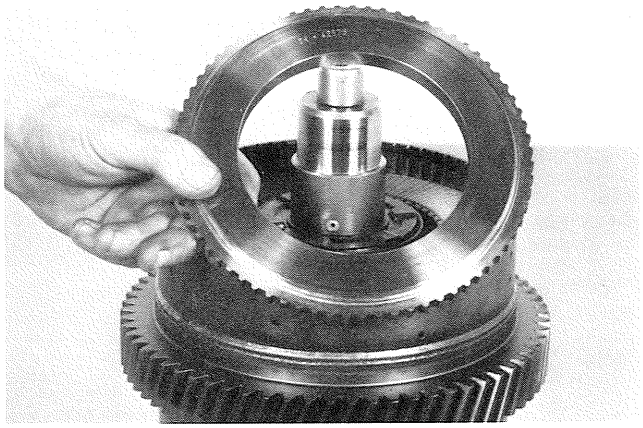


Figure 167
Install clutch disc end plate.

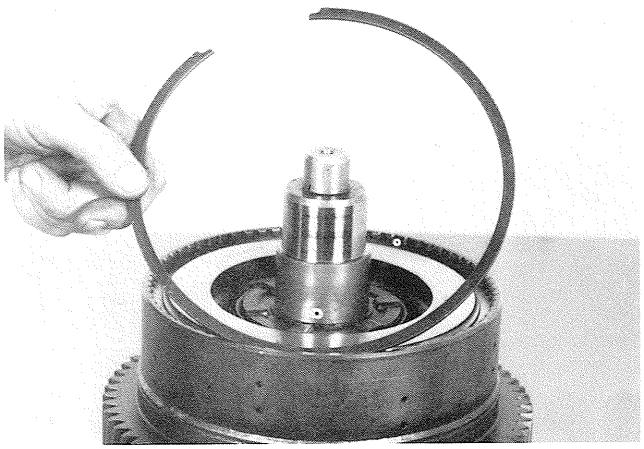


Figure 168
Install end plate retainer ring.

REVERSE CLUTCH REASSEMBLY
(See cleaning and inspection page)
For Modulation see page 116

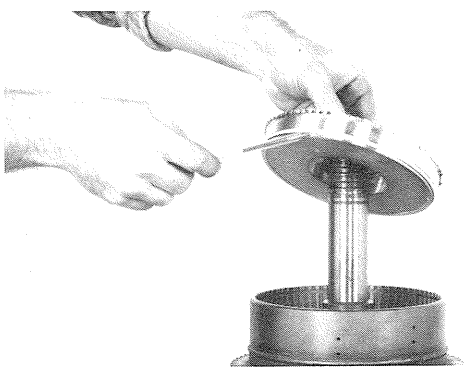


Figure 169
Make sure clutch piston bleed valve is clean and free of foreign material. Install inner seal ring. Install piston outer piston ring. Lock piston ring joint securely. Grease ring to stabilize in ring groove.

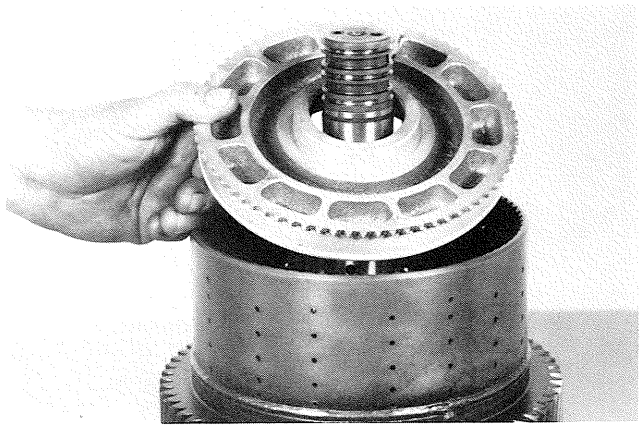


Figure 170
Position piston in clutch drum, use caution as not to damage the inner and outer piston seal rings.

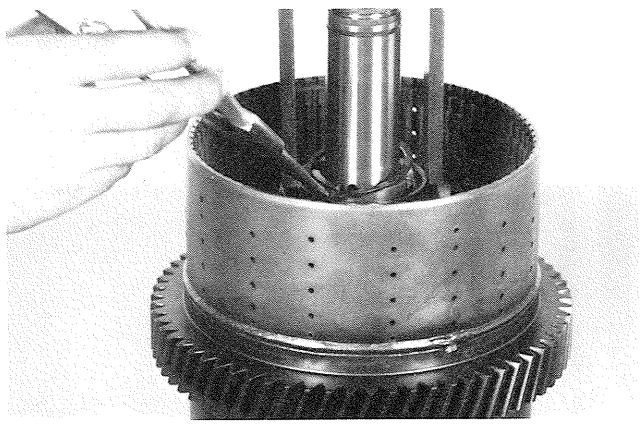


Figure 171
Position inner return spring retainer, return spring, outer spring retainer washer, retainer ring washer and retainer ring. Compress return spring and install retainer ring in ring groove.

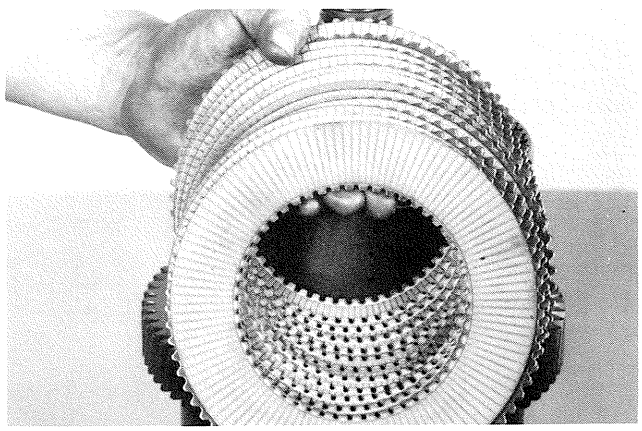


Figure 172
Install one steel disc. Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

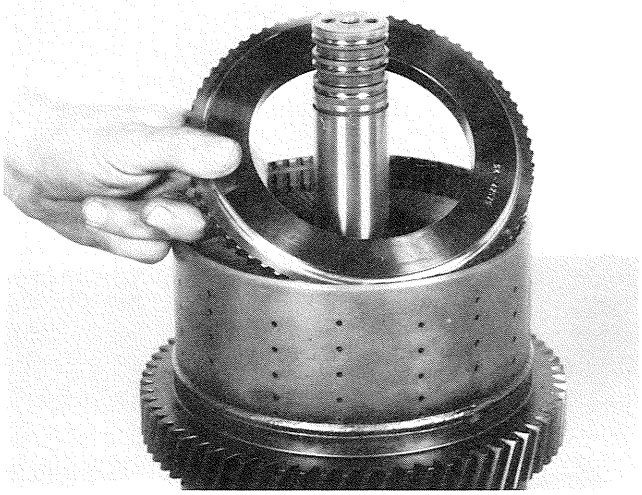


Figure 173
Install clutch disc end plate.

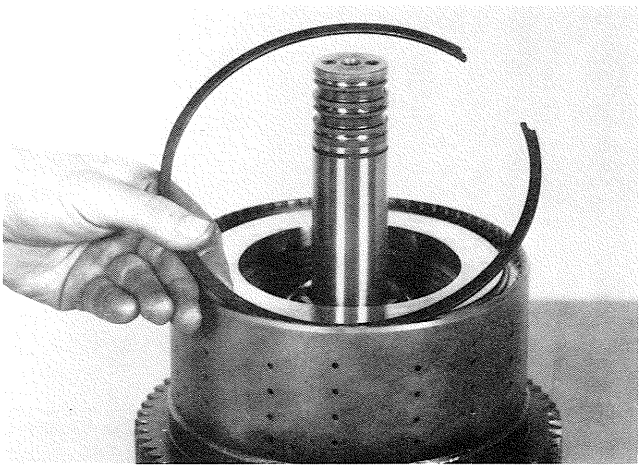


Figure 174
Install end plate retainer ring.

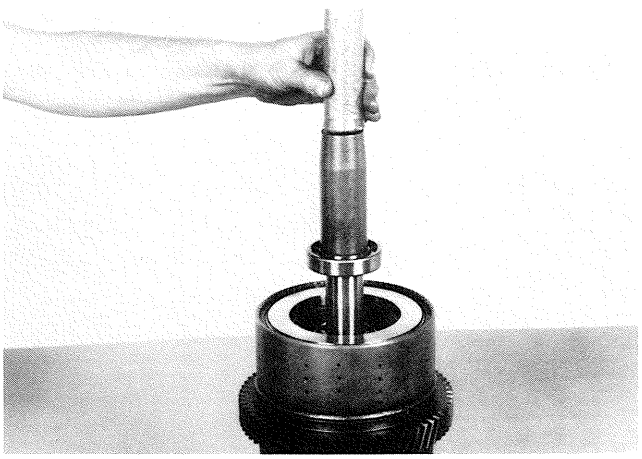


Figure 175
Install the clutch gear inner bearing. **NOTE:** This bearing does not have a shield in it.

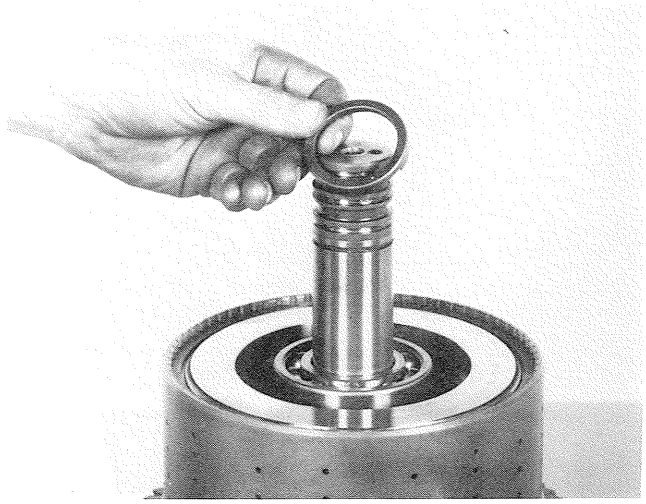


Figure 176
Position bearing spacer on clutch shaft. Not used on all models.

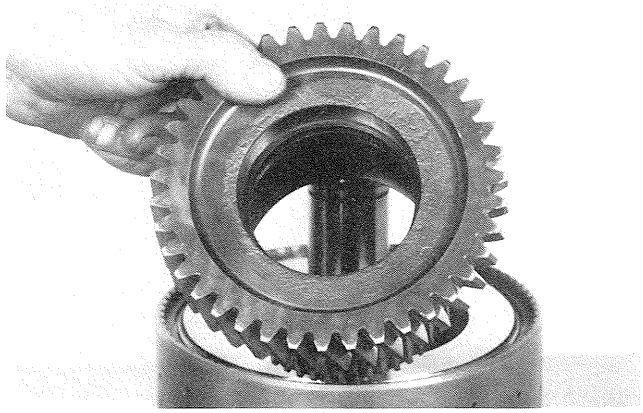


Figure 177
Install clutch driven gear into clutch drum. Align splines on clutch gear with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.

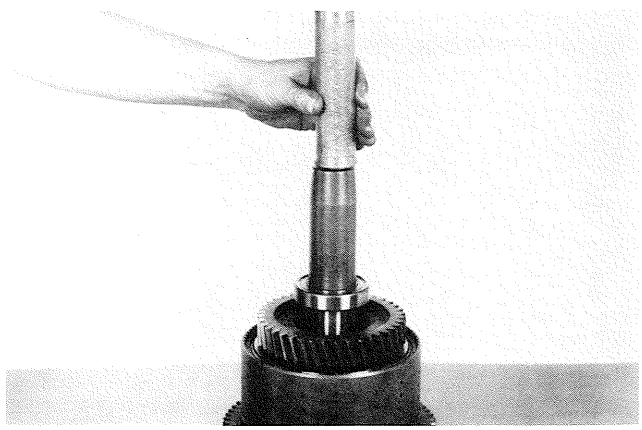


Figure 178
Install clutch gear outer bearing. **NOTE:** This bearing has a shield in it, this shield must be down.

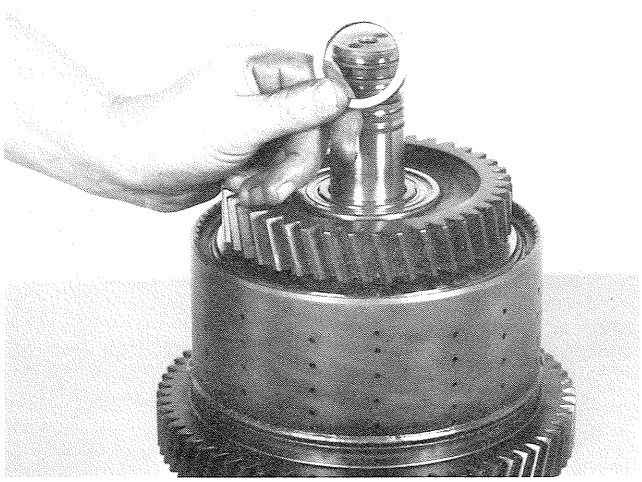


Figure 179
Position front bearing spacer on clutch shaft.

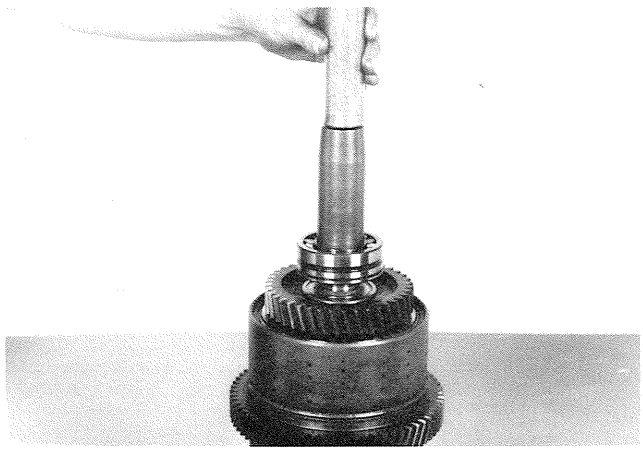


Figure 180
Install clutch shaft front bearing. **NOTE:** Bearing outer retainer ring groove must be down.

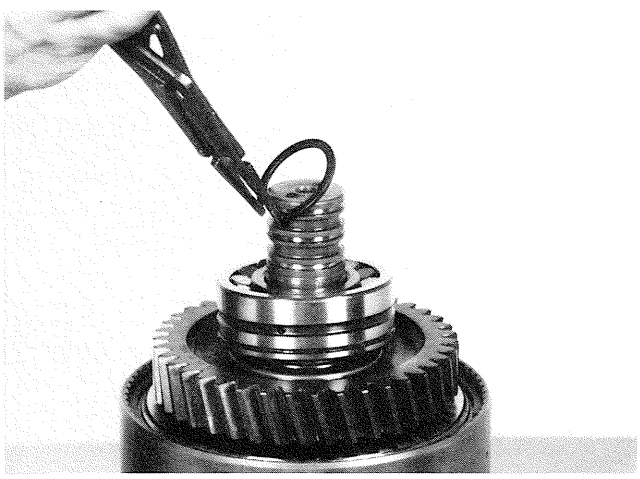


Figure 181
Install front bearing retainer ring.

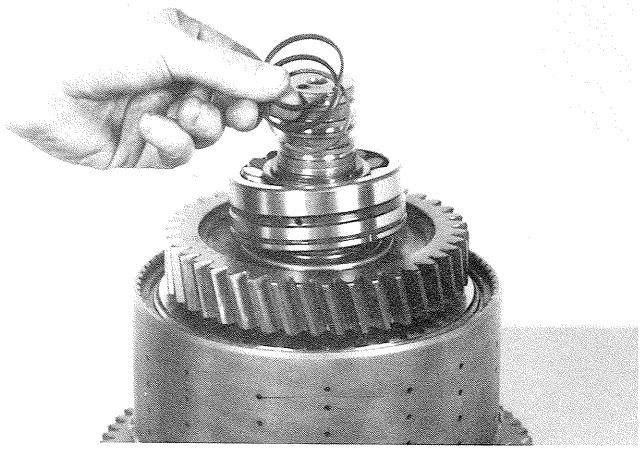


Figure 182
Install clutch shaft oil sealing rings and expander springs per instruction on page 119.

LOW CLUTCH (1st) DISASSEMBLY

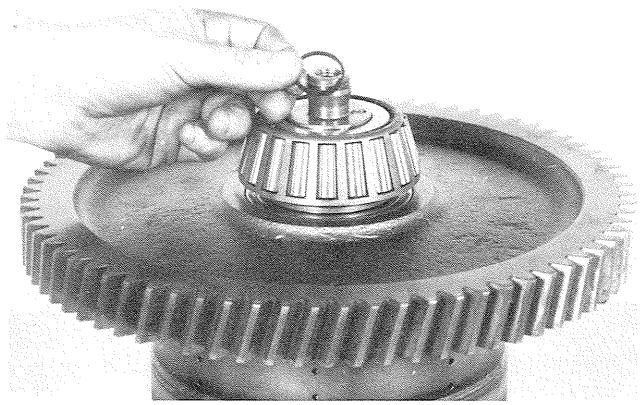


Figure 183
Remove clutch shaft oil sealing ring.

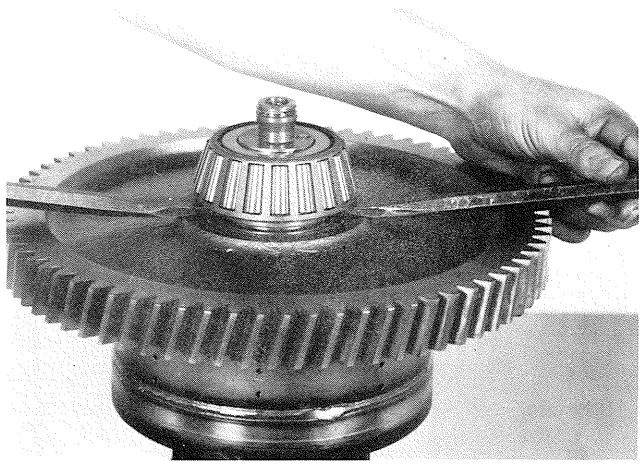


Figure 184
Pry rear taper bearing up far enough to use a bearing puller.

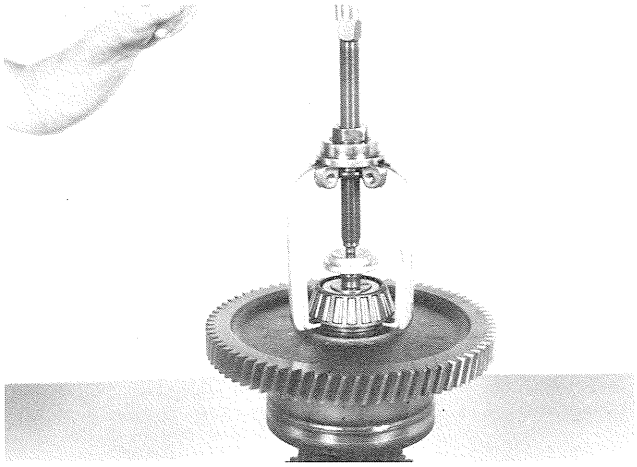


Figure 185
Remove rear bearing.

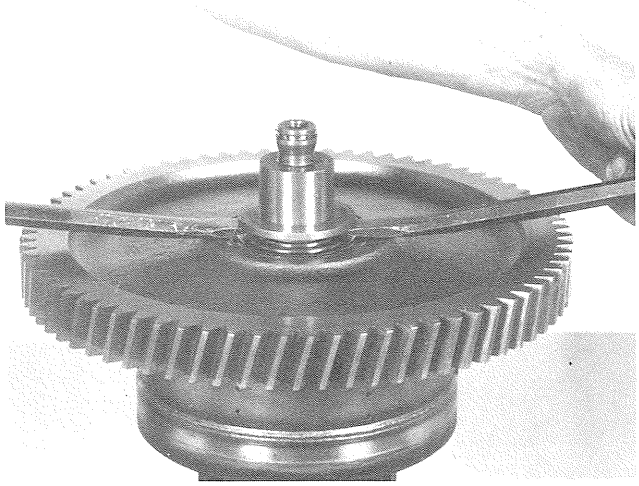


Figure 186
Remove gear thrust washer. **Caution:** Do not lose thrust washer lock ball.

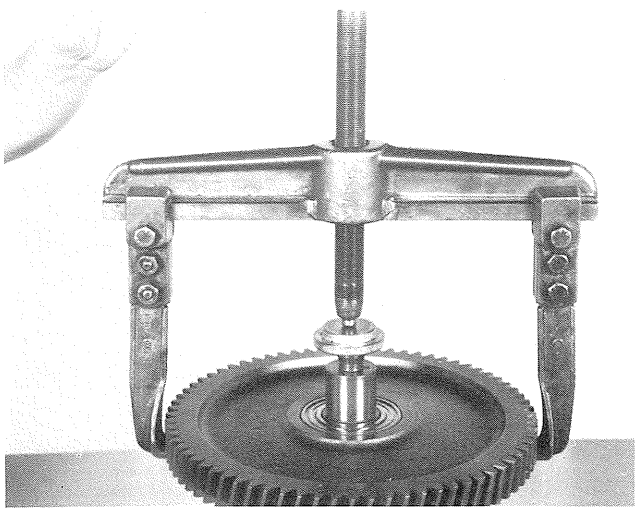


Figure 187
Remove low clutch gear and outer bearing.

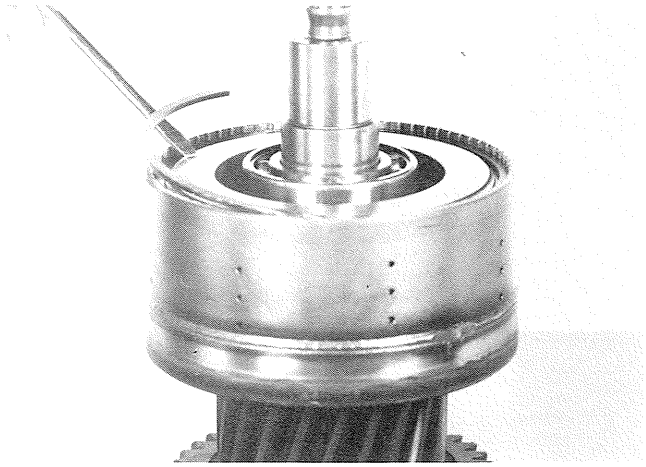


Figure 188
Remove end plate retainer ring.

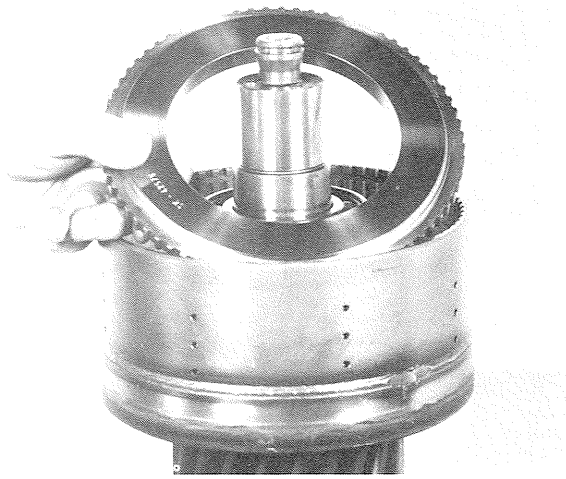


Figure 189
Remove clutch disc end plate.

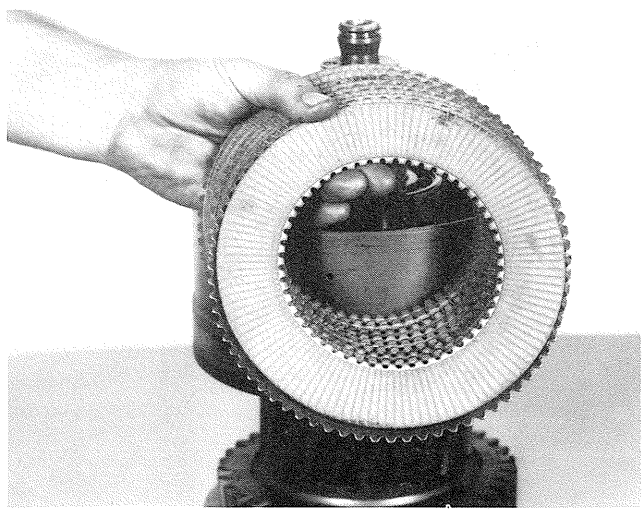


Figure 190
Remove inner and outer clutch discs.

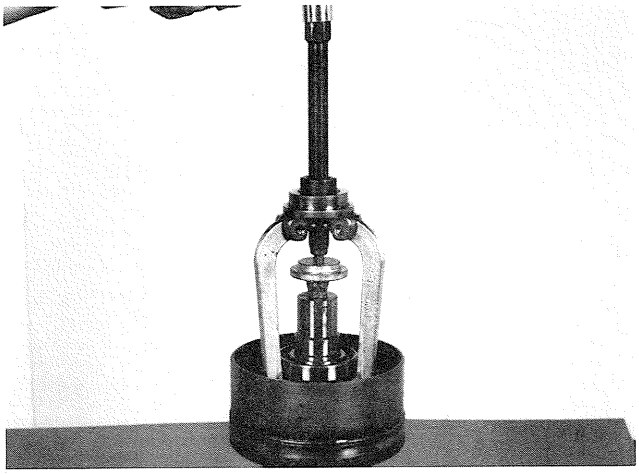


Figure 191
Remove clutch inner bearing.

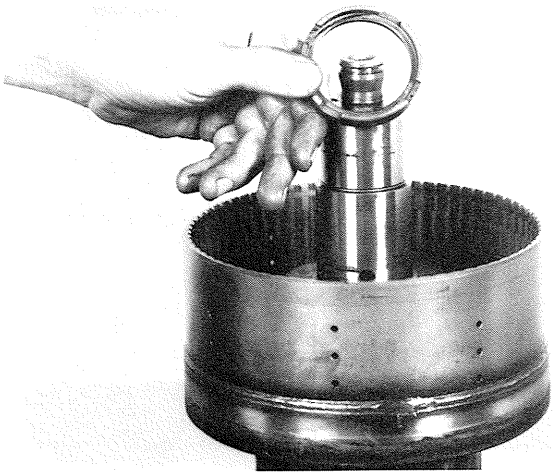


Figure 192
Remove low gear spacer.

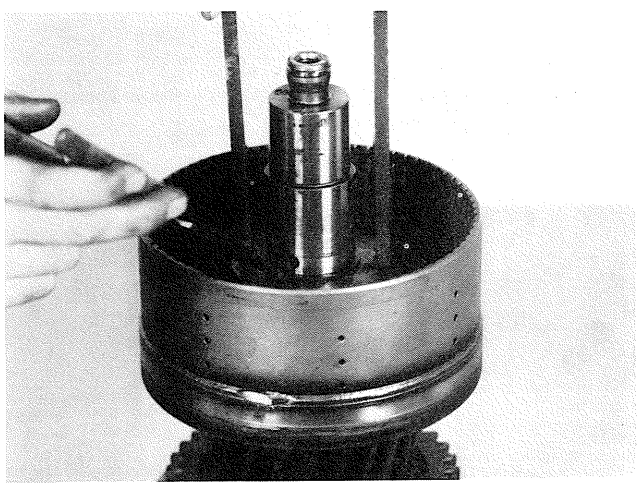


Figure 193
Compress the piston return disc springs. Remove retainer ring.

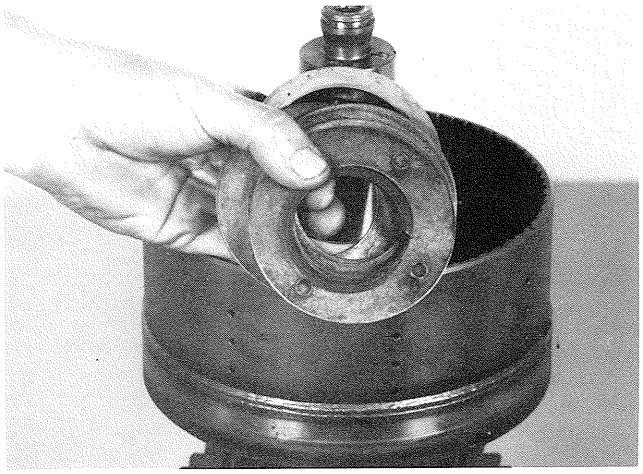


Figure 194
Remove disc springs and spring to piston spacer. Do not intermix with other disc springs **(see note on page 49).**

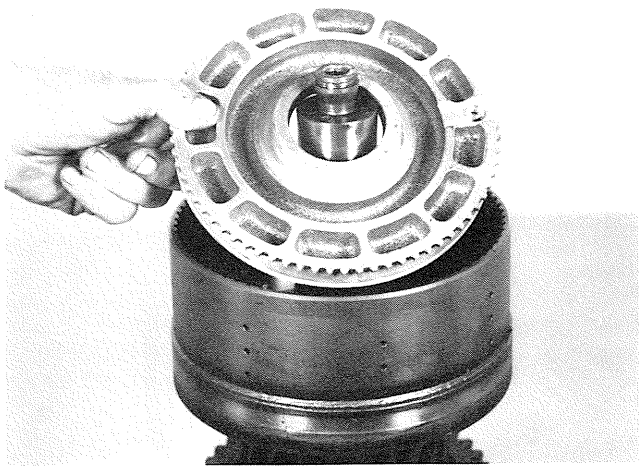


Figure 195
Remove clutch piston.

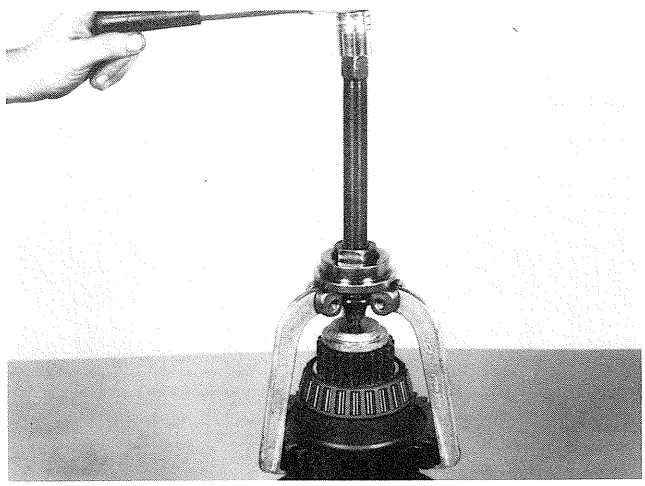


Figure 196
Using a gear puller, remove gear and taper bearing from clutch shaft.

LOW CLUTCH (1st) REASSEMBLY

(See cleaning and inspection page)

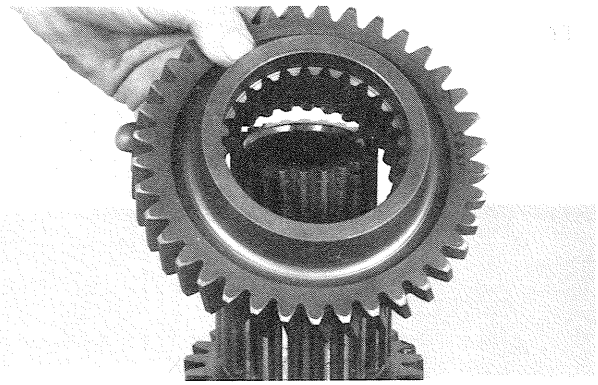


Figure 197

Position clutch shaft gear on clutch shaft with long hub of gear up.

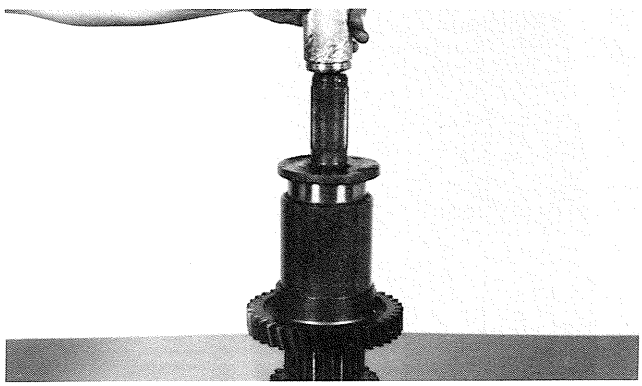


Figure 198

Tap gear into position.

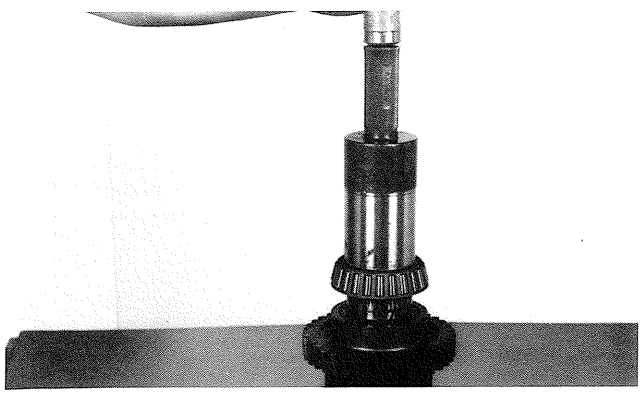


Figure 199

Position rear taper bearing on clutch shaft with small diameter of taper up. Press bearing into position. **NOTE: If thermal assembly aid is used, (expanding by heating 275+/−25°F. [135°C+/− [−3.9°C]) a check must be made after mating parts have reached the same temperature within 20°F [−6.7°C] of ambient, to be sure the bearings are positioned solidly against their respective shoulders before bearing adjustment can be made.**

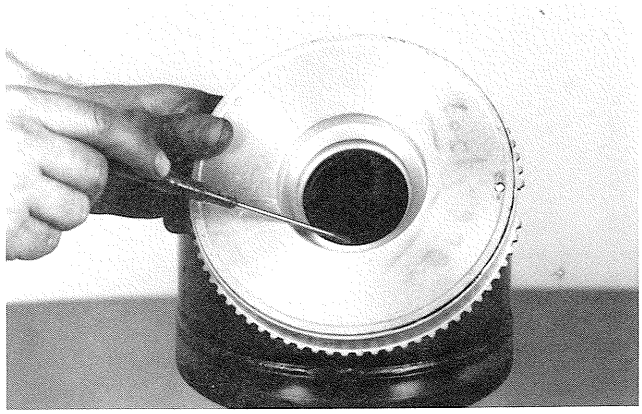


Figure 200

Make sure clutch drum bleed valve is clean and free of foreign material. Install inner seal ring. Install piston outer piston ring. Lock piston joint securely. Grease ring to stabilize in ring groove.

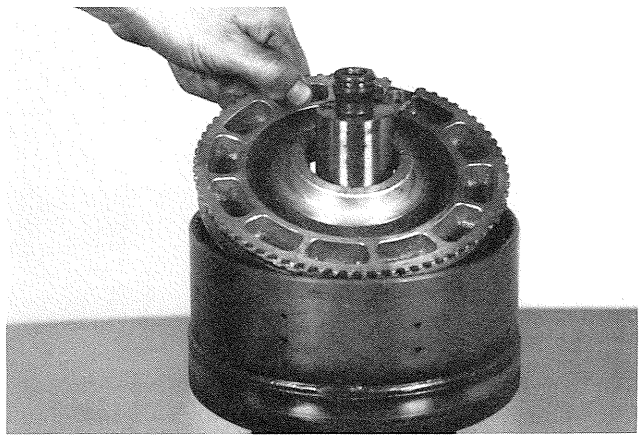


Figure 201

Position piston in clutch drum, use caution as not to damage the inner and outer piston seal rings.

Figure 202

Install piston to disc spring spacer. Install 1st disc spring with large diameter of bevel down. Install 2nd disc spring with large diameter of bevel up. Install balance of springs, quantity (5) five, alternate bevel. **(See note on page 49).**

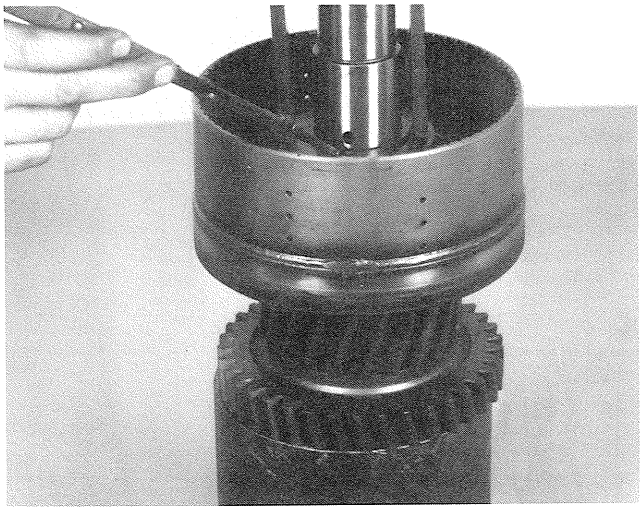


Figure 203
Compress piston return disc springs and install retainer ring. See figure 204.

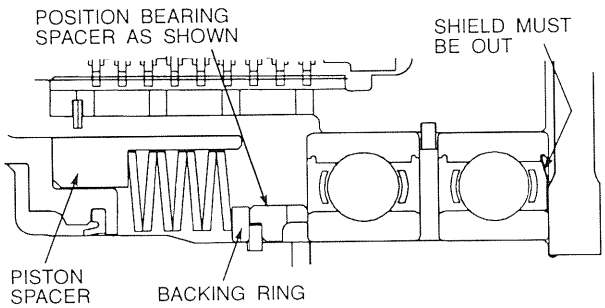


Figure 204

Figure 205
Install bearing spacer, being sure spacer is in full position over disc spring retainer ring.

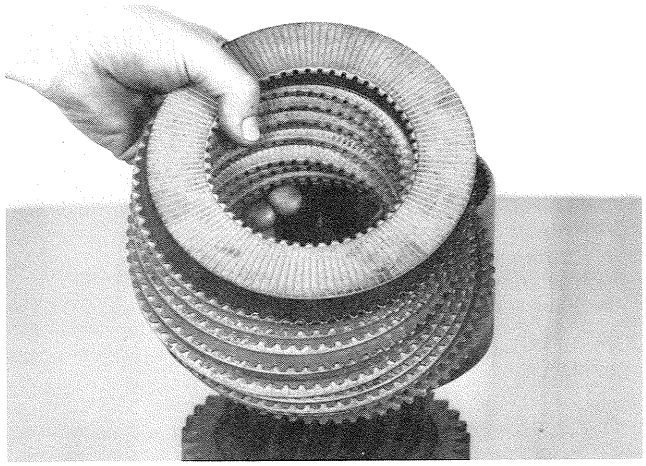


Figure 206
Install one steel disc. Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel. Last disc installed is friction.

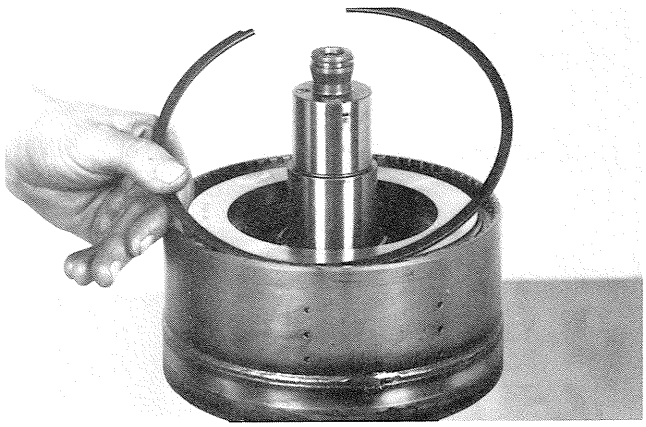


Figure 207
Install clutch disc end plate and retainer ring.

Figure 208
Install the clutch gear inner bearing. **NOTE:** This bearing does not have a shield in it. See figure 204.

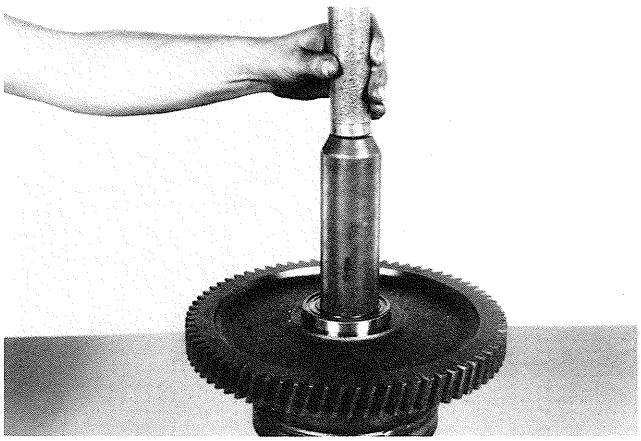


Figure 209

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. Install clutch gear outer bearing. **NOTE:** This bearing has a shield in it, this shield must be up. See figure 204.

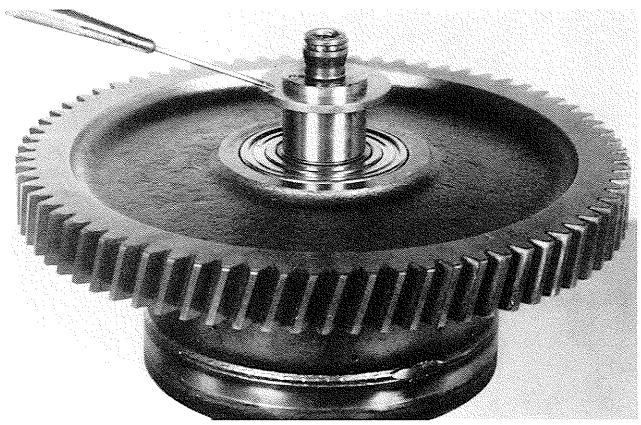


Figure 210

Position rear bearing thrust washer lock ball in clutch shaft. Install washer with relief in washer down. (Toward clutch gear.)

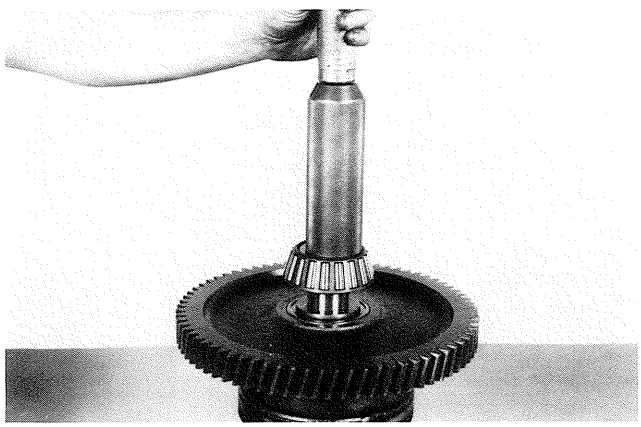


Figure 211

Install rear taper bearing on clutch shaft, with small diameter of taper up. **(See note in figure 199)**

TRANSMISSION REASSEMBLY

(See cleaning and inspection page)

NOTE: If a new transmission case or converter housing is needed for reassembly see Figure K for speed sensor bushing installation. See page 75 for low clutch lube transfer information.

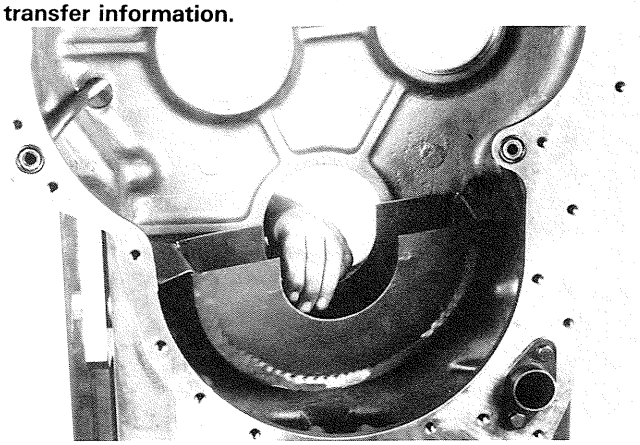


Figure 212

Install oil sump oil baffle in transmission sump, being certain oil baffle is in full position. (Not as shown)

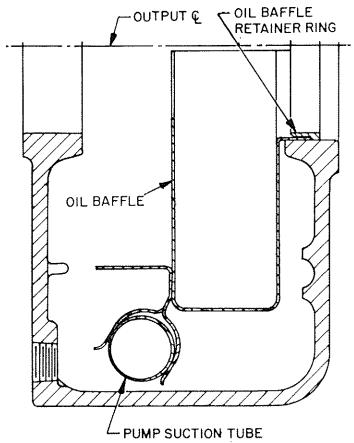


Figure 212A

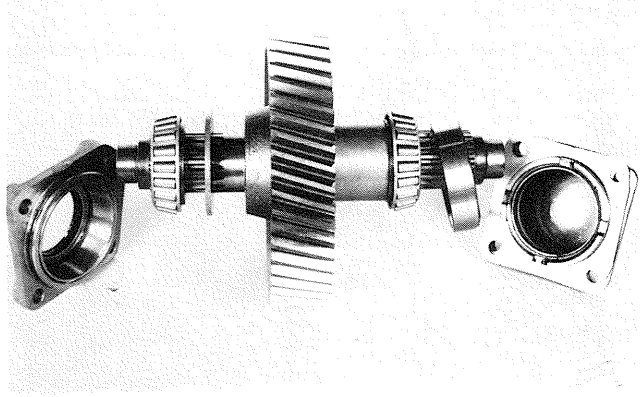


Figure 213

View of output shaft as it would be positioned in trans - mission case. **NOTE:** Long hub of gear away from gear spacer.

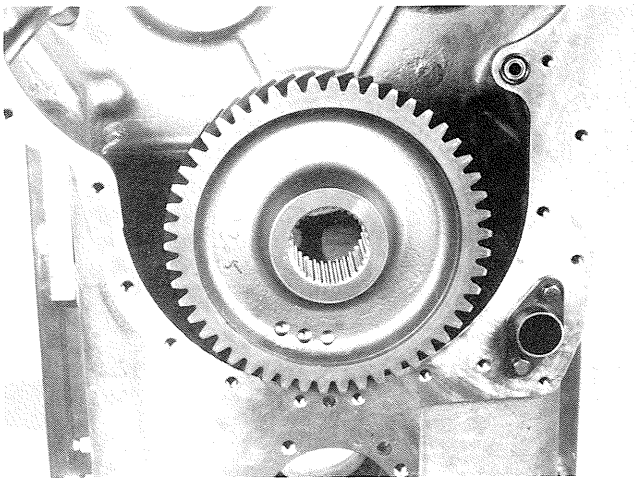


Figure 214
Position output gear in transmission case with long hub of gear to the rear.

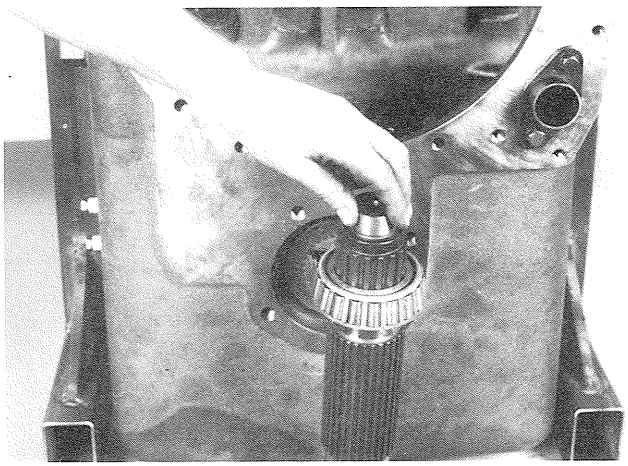


Figure 215
Press output shaft front taper bearing on shaft with large diameter of taper down.

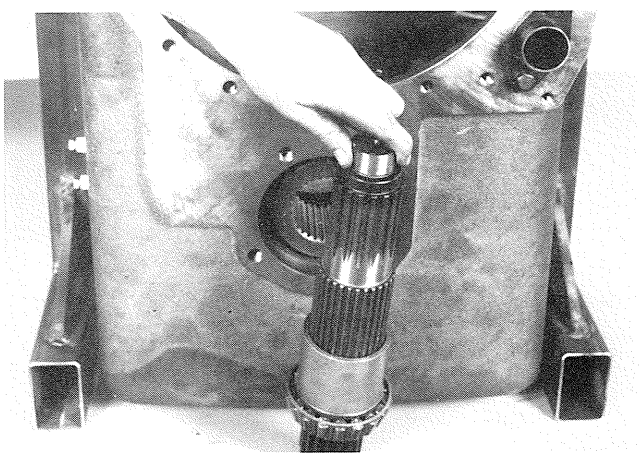


Figure 216
Position long gear spacer on output shaft.

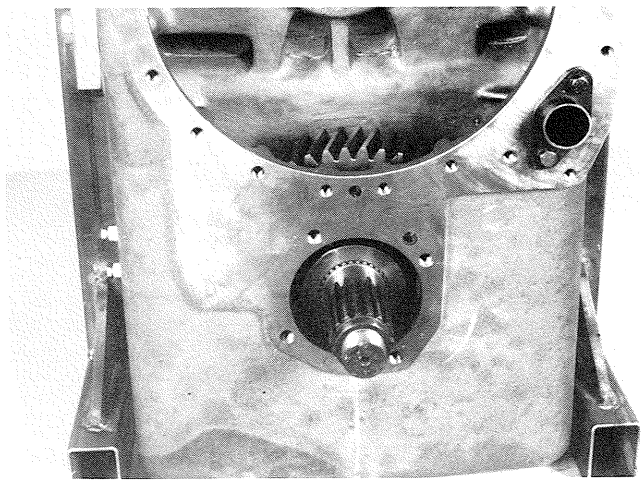


Figure 217
Insert output shaft, gear spacer and taper bearing from front of case and through output gear.

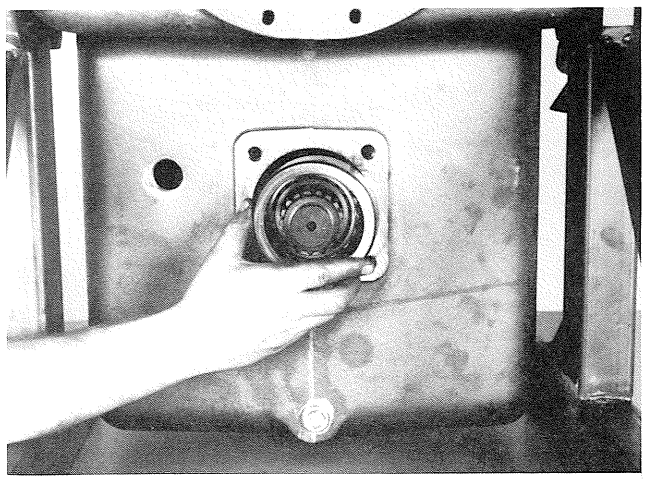


Figure 218
Install front taper bearing cup.

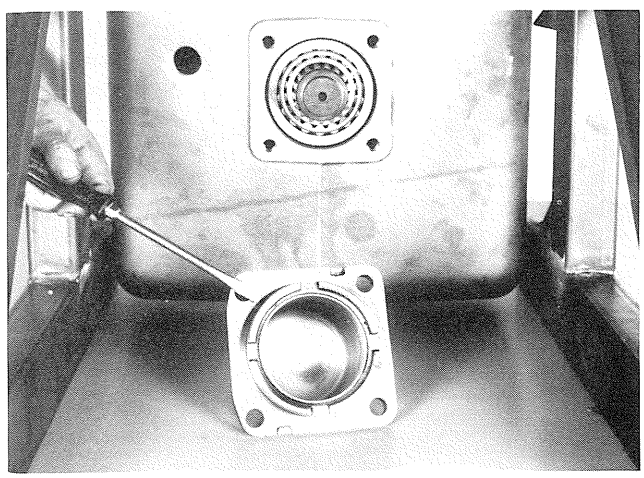


Figure 219
Install New "O" ring on front bearing cap.

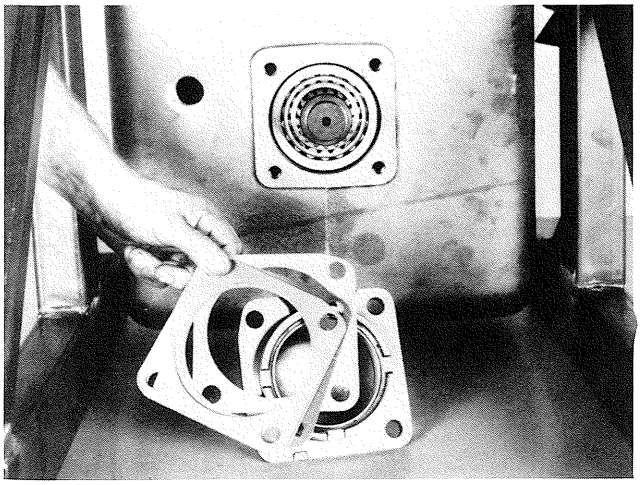


Figure 220
Position shims on front bearing cap. Install bearing cap and shims on output shaft.

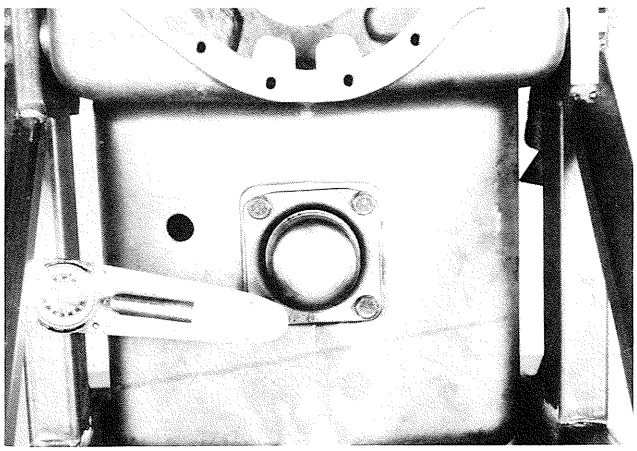


Figure 221
Install bearing cap bolts and washers. Tighten to specified torque. (See torque chart)

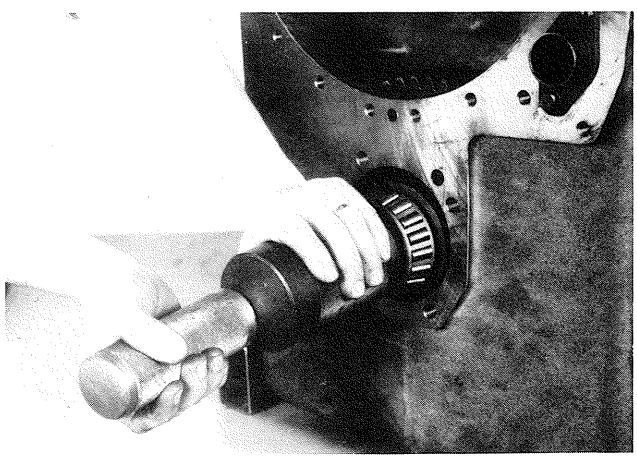


Figure 222
From the rear, install output gear to bearing thrust washer. Install rear taper bearing with large diameter of taper in.

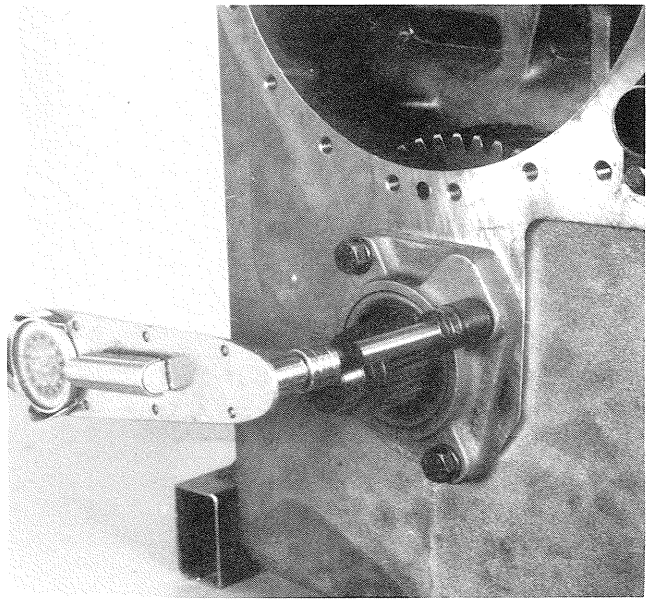


Figure 223
Install oil baffle retainer ring in rear output bore. Be sure ring engages baffle. See Figure 212-A. Coat outer diameter of oil seal with Loctite 638 and press seal in the output shaft bearing cap with lip of seal in. Using new "O" rings install rear output bearing cap on transmission case. Lube opening in bearing cap must be aligned with lube opening in case. Tighten bearing cap bolts to specified torque. (See torque chart).

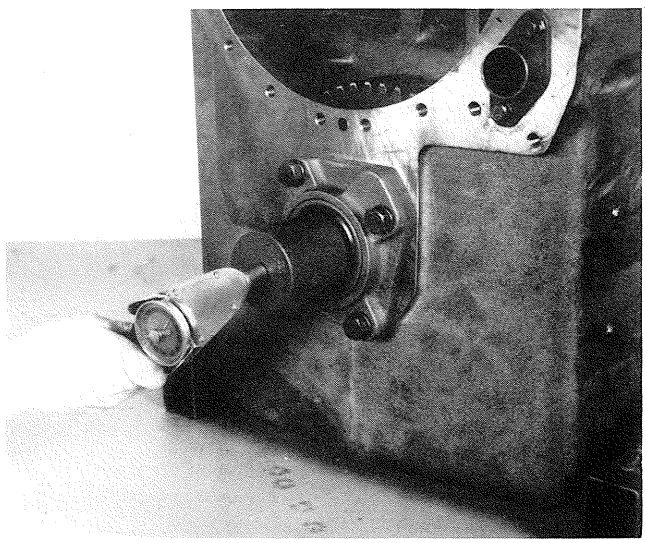


Figure 224
Tap and rotate output shaft to seat taper bearings. Loosen rear bearing cap bolts. Using an inch lb. torque wrench, determine the rolling torque of the output shaft and record. Tighten rear bearing cap bolts to specified torque. Check rolling torque with bolts tight. Torque must be 4 to 10 inch lbs. [0,46-1,1 N·m] more than when bearing cap bolts were loose. Add or omit shims on the front bearing cap to achieve the proper preload.

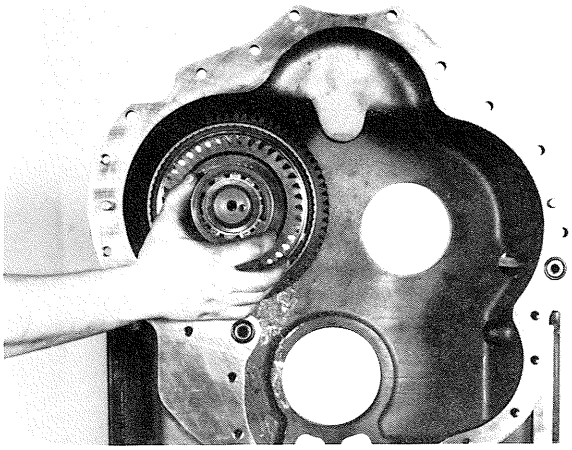


Figure 225

Position the forward clutch assembly into housing. Push clutch shaft rear bearing through housing bore far enough to install bearing outer locating ring. Push bearing and clutch assembly back in bearing bore until locating ring shoulders in bearing bore.

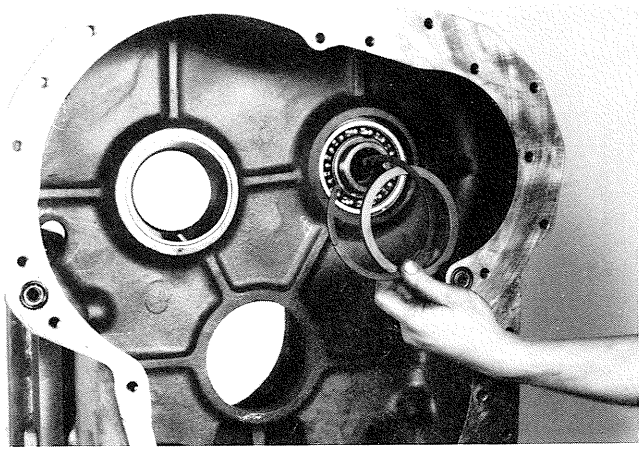


Figure 226

Install rear bearing thrust washer and retainer ring.

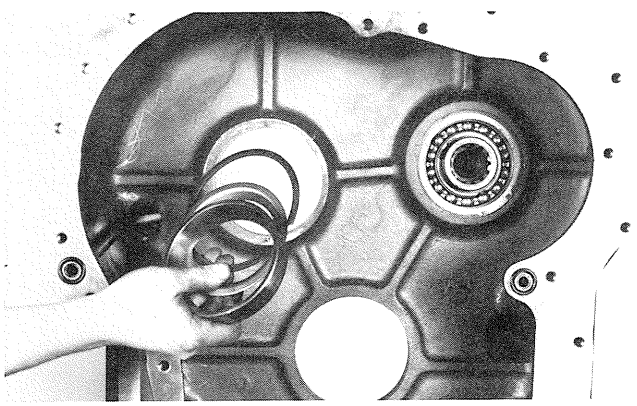


Figure 227

Install low clutch front bearing cup and spacer (oil baffle) locating ring. Install spacer (oil baffle) and front bearing cup.

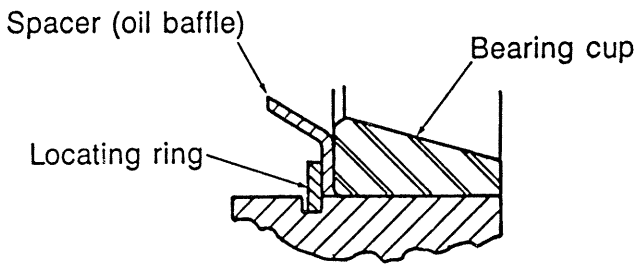


Figure 227A

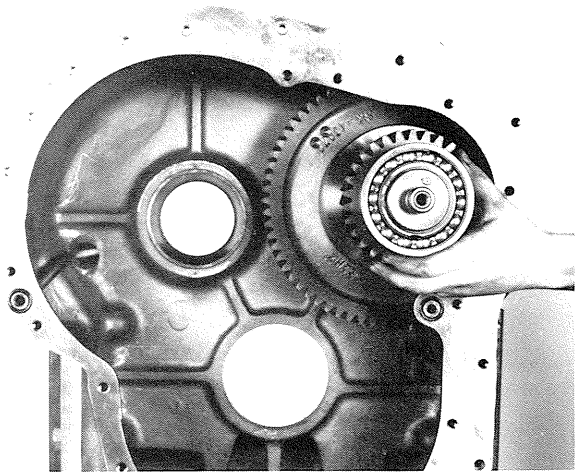


Figure 228

Install 3rd Speed clutch assembly.

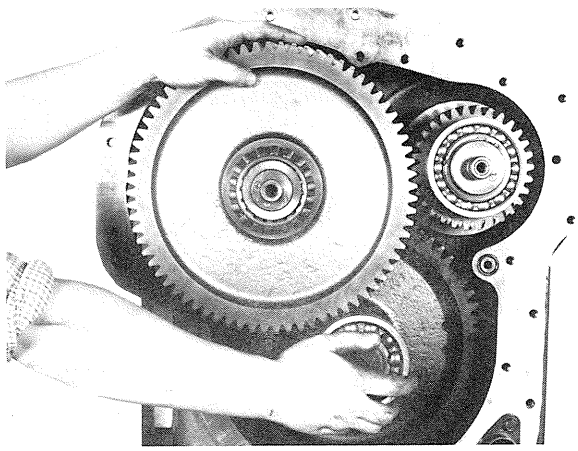


Figure 229

The low clutch (1st) assembly and idler shaft assembly must be installed together. Be sure clutch and idler are in full position in housing.

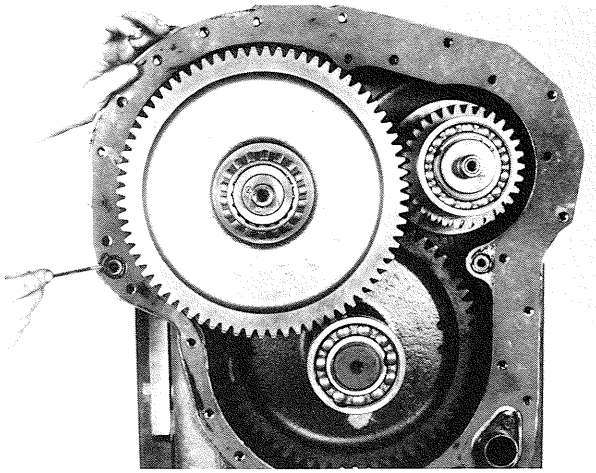


Figure 230

Position a new gasket and "O" ring on rear of transmission case.

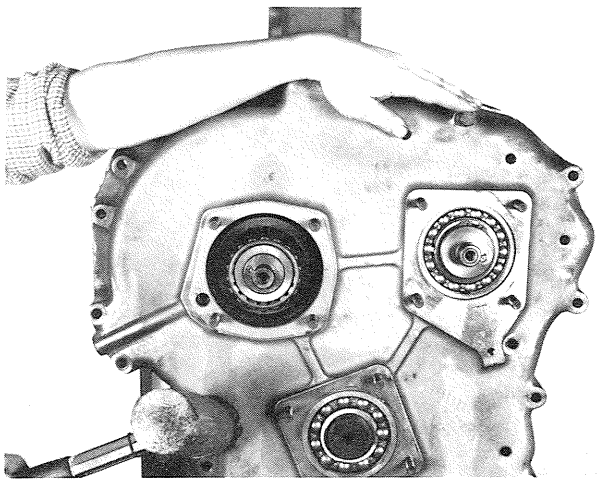


Figure 231

Tap rear cover in place.

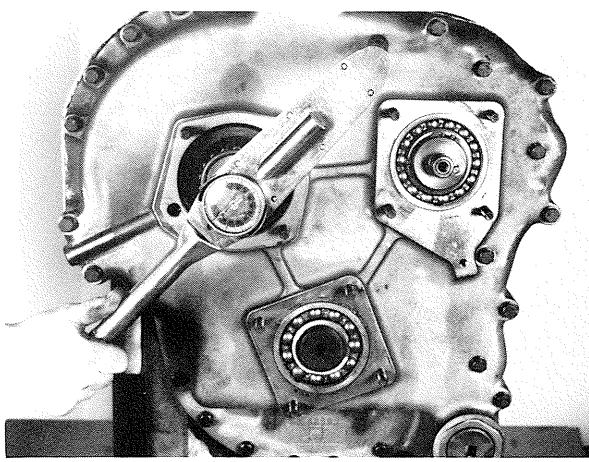


Figure 232

Install rear cover to case screws and washers. Tighten screws to specified torque. (See torque chart)

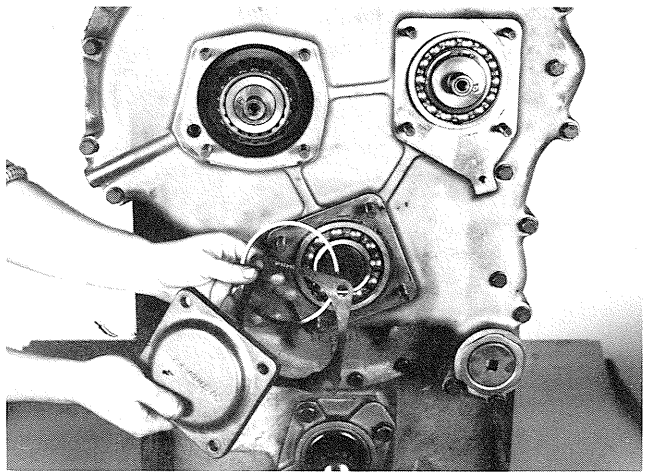


Figure 233

Install idler shaft rear bearing locating ring. Position new gasket on idler shaft bearing cap.

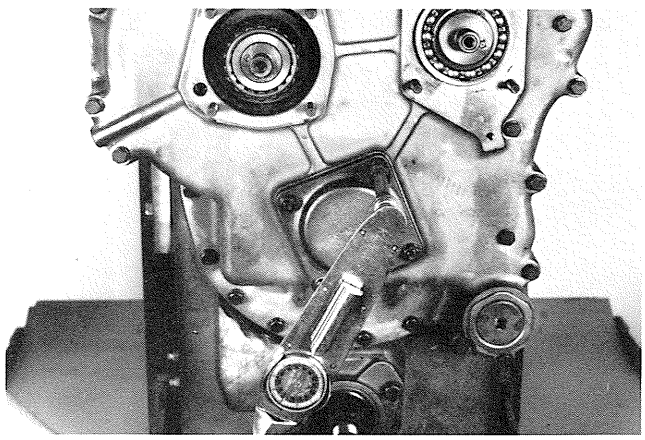


Figure 234

Install bearing cap. Install stud nut washers and stud nuts. Tighten to specified torque.

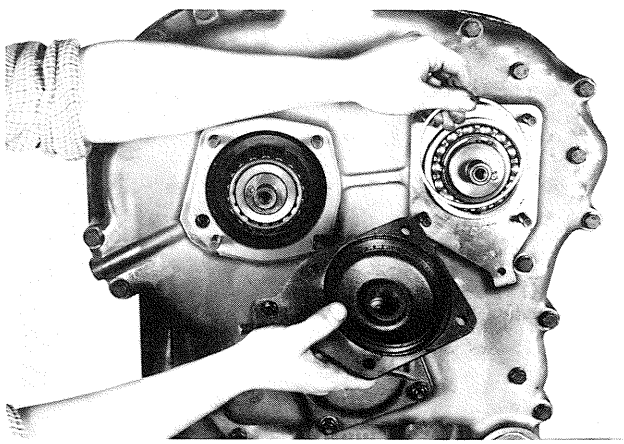


Figure 235

Install 3rd speed clutch rear bearing locating ring. Install new "O" rings on rear bearing cap. Position bearing cap on studs. Use caution as not to damage oil sealing ring.

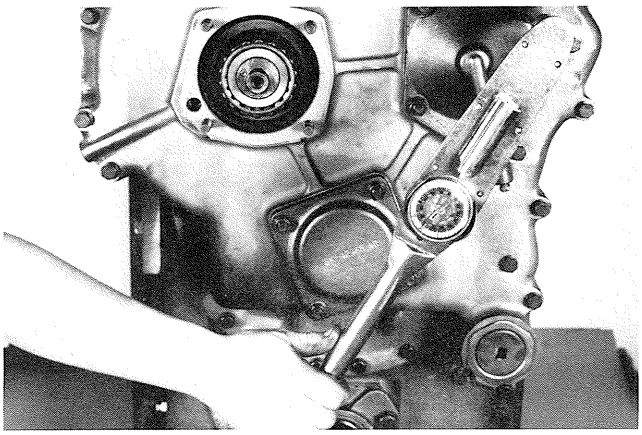


Figure 236

Install stud nut washers and stud nuts. Tighten to specified torque.

NOTE: Do not install Low (1st) clutch rear bearing cap at this time, or install bearing cap temporarily. See note after Figure 253.

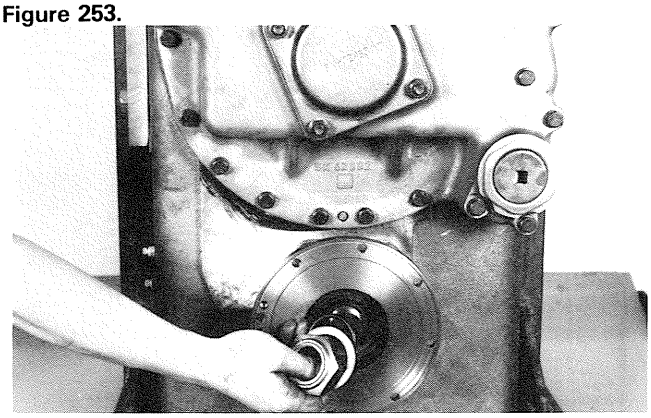


Figure 237

Install output flange, flange "O" ring, flange washer and flange nut. Secure flange to prevent turning. Tighten flange nut. See elastic stop nut torque chart.

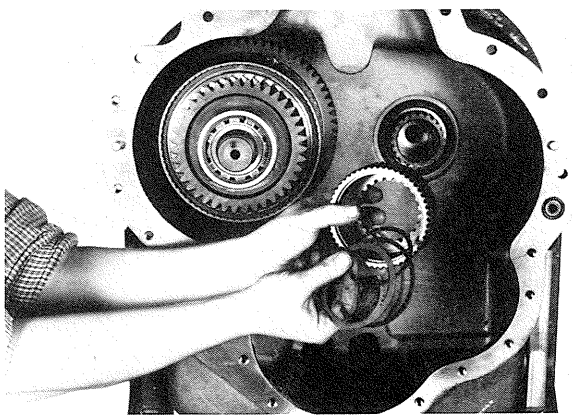


Figure 238

Position the 2nd speed clutch disc hub on the low (1st) clutch shaft. Install disc hub retainer ring. Install retainer ring retainer. Install ring retainer, retainer ring. See Figure 238-A.

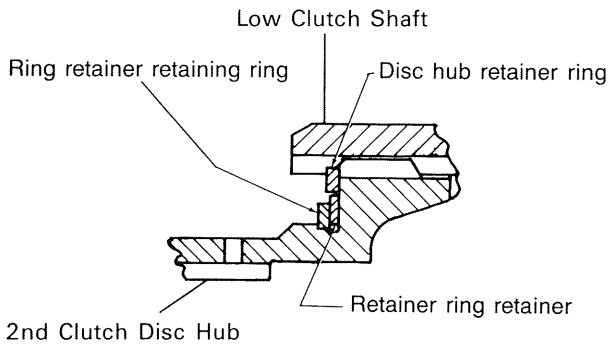


Figure 238-A

CONVERTER HOUSING REASSEMBLY

See page 62 for lube pressure relief valve and clutch shaft oil sealing ring sleeve installation.

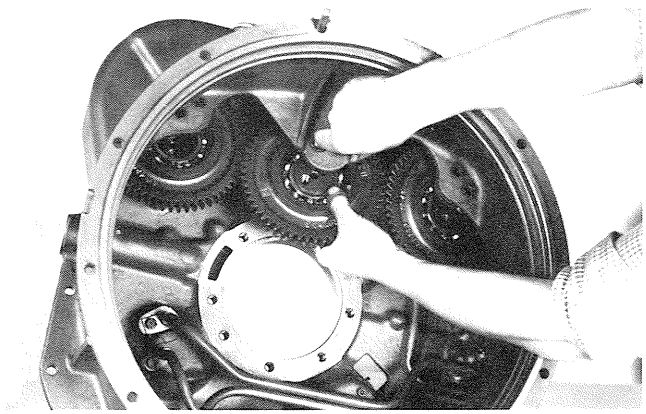


Figure 239

Install pump drive gear and bearing assemblies in converter housing.

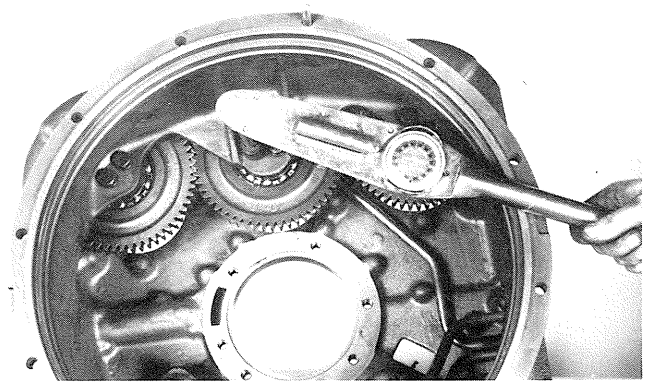


Figure 240

Align holes in pump drive gear bearing supports with holes in converter housing. Install bolts and washers and tighten to specified torque.

Figure 241
Remove turbine shaft oil sealing ring. Remove bearing retainer ring and washer.

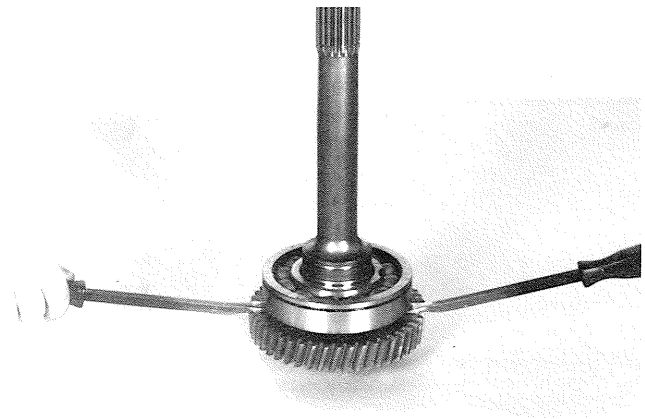


Figure 242
Pry bearing up enough to use a bearing puller. Remove bearing.

(See cleaning and inspection page.)

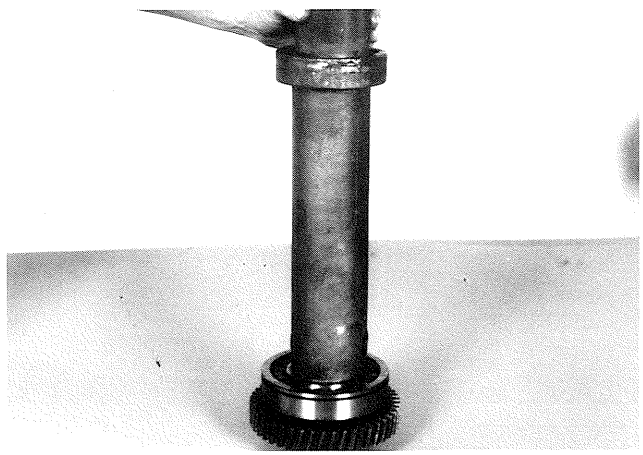


Figure 243
Using a bearing driver, install the turbine shaft bearing with the bearing outer locating ring groove up.

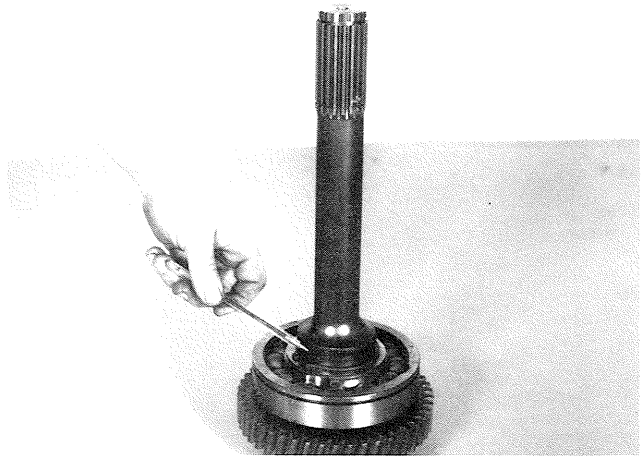


Figure 244
Position bearing washer on bearing. Install bearing retainer ring. Install a new oil sealing ring.

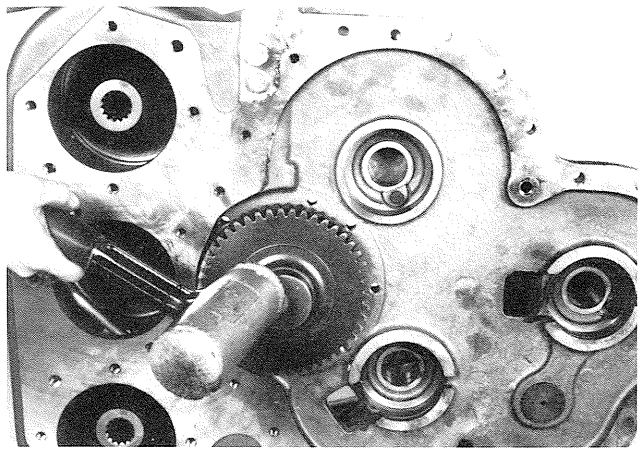


Figure 245
Tap turbine shaft and bearing into converter housing. Tap shaft until gear shoulders against converter housing.

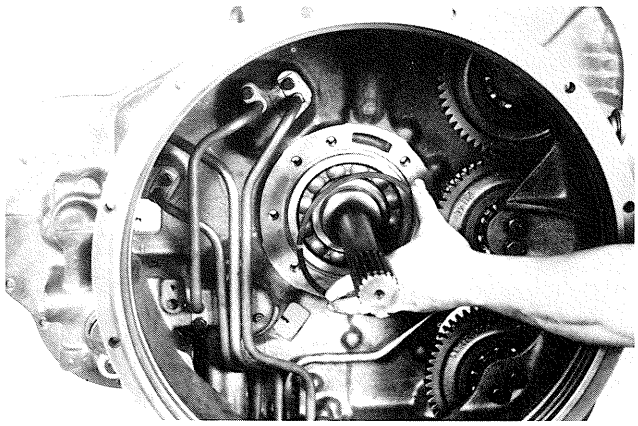


Figure 246
From front of housing, install turbine shaft bearing locating ring. Tap shaft back until bearing locating ring shoulders in groove in housing.

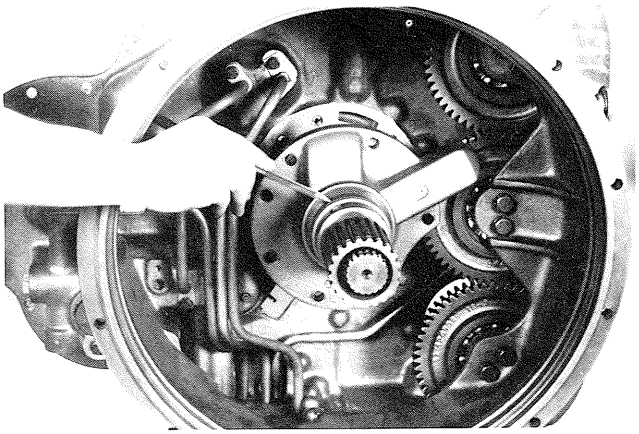


Figure 247

Install new sealing ring expander spring and oil sealing ring on support. **NOTE:** Expander spring gap to be 180° from sealing ring hook joint. Position support on turbine shaft, turn support to clear pump drive gear. Align support holes with converter housing.

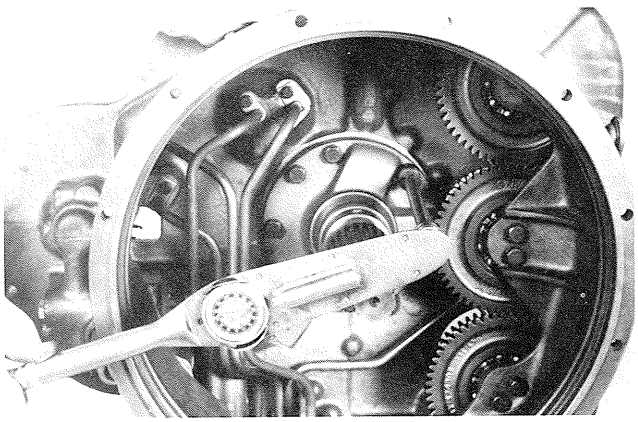


Figure 248

Install stator support bolts and tighten to specified torque.

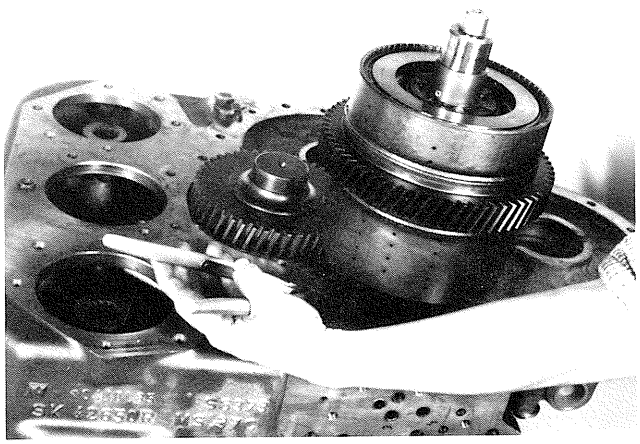


Figure 249

Spread reverse clutch front bearing locating ring and tap reverse and 2nd clutch assembly into converter housing. Be certain locating ring is in full position in ring groove.

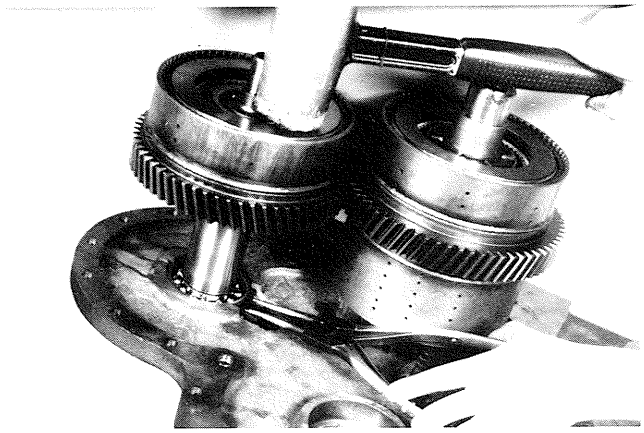


Figure 250

Spread 4th speed clutch front bearing locating ring and tap clutch assembly into position. Be certain locating ring is in full position in ring groove.

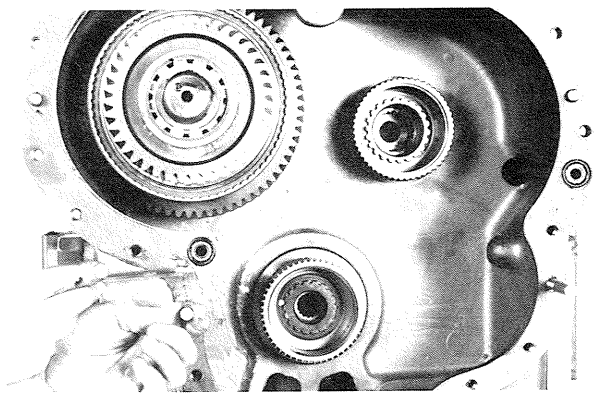


Figure 251

Position new transmission housing to converter housing gasket and "O" rings. **NOTE:** The use of alignment studs will facilitate housing to housing assembly.

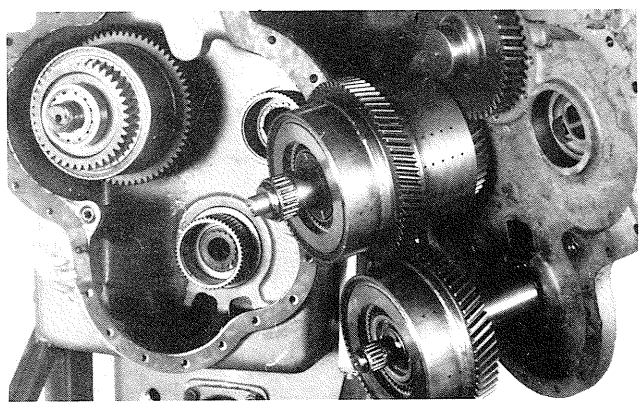


Figure 252

Position clutch shaft pilot bearings on 2nd and 4th clutch shafts. A high quality grease will hold bearings in position during assembly. Install alignment studs and position converter housing on studs. **NOTE:** Turn output shaft to align clutch disc hub in clutch and final assembly.

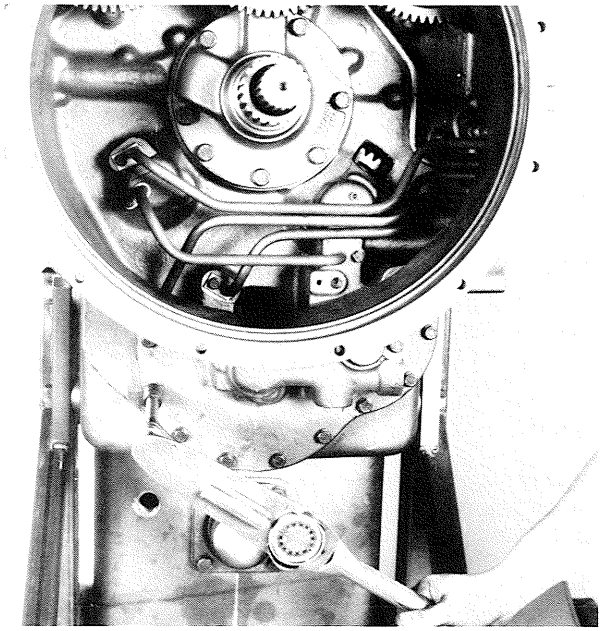


Figure 253
Install converter housing to transmission housing bolts and tighten to specified torque. **CAUTION:** Bolts are not to be used to pull converter housing to transmission housing.

NOTE: SEE PAGE 52 FOR LOW (1st) SPEED CLUTCH TAPER BEARING ADJUSTMENT.

NOTE: After Low (1st) Clutch taper bearing adjustment and bearing cap and shims installed and torqued, return transmission to an upright position.

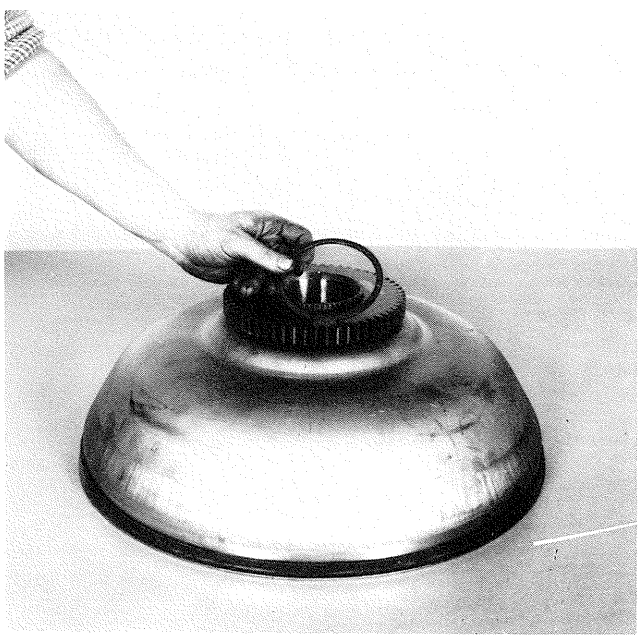


Figure 254
Remove impeller hub gear retainer ring.

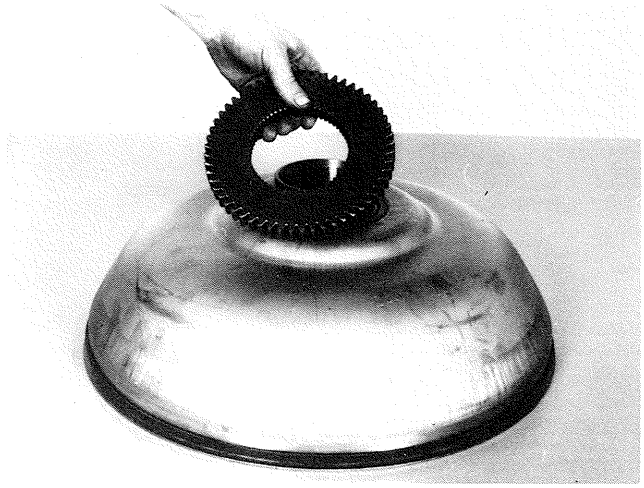


Figure 255
Remove impeller hub gear.

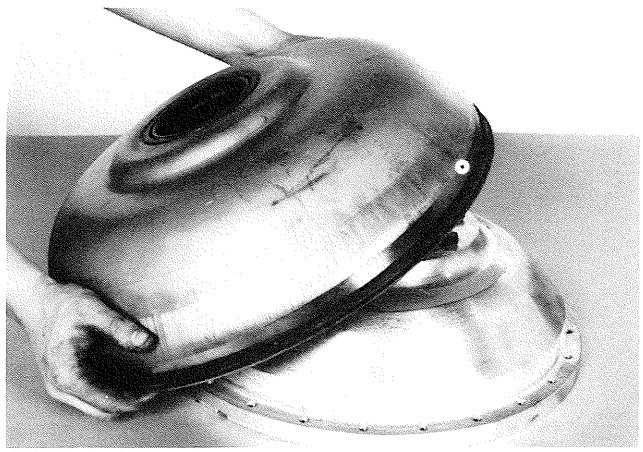


Figure 256
Remove oil baffle from impeller.

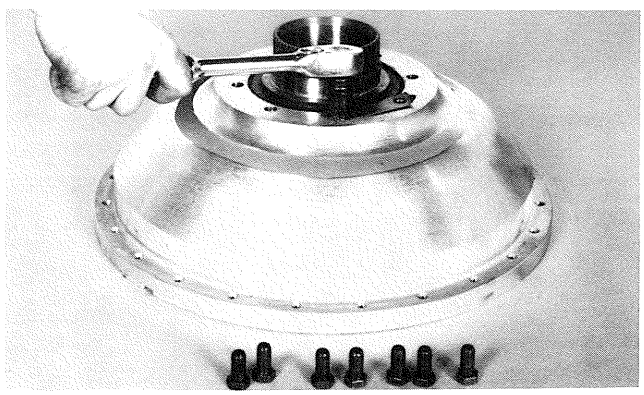


Figure 257
Straighten impeller hub bolt lock tabs. Remove hub bolts. **NOTE:** Some units will have a backing ring instead of lock tabs. Impeller and hub must be reassembled as explained in Figure 260.

(See cleaning and inspection page.)

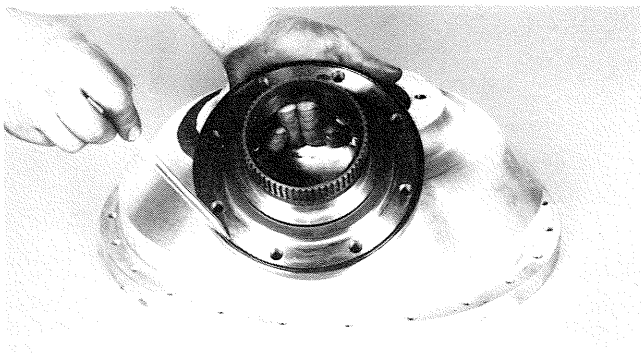


Figure 258
Position a new impeller to hub "O" ring on impeller hub.

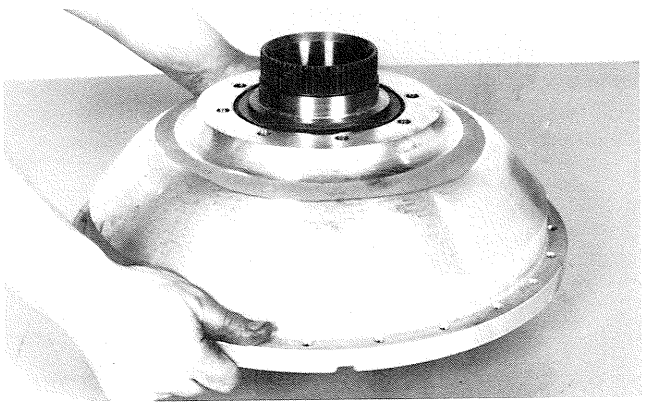


Figure 259
Align holes in impeller with impeller hub. Use caution as not to disrupt "O" ring.

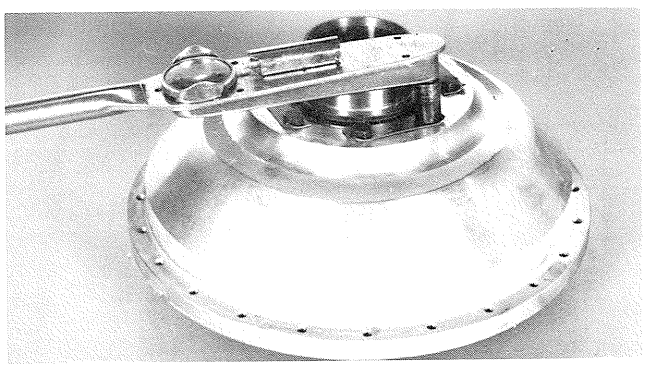


Figure 260
Clean hub mounting surface and tapped holes with solvent. Dry thoroughly, being certain tapped holes are clean and dry. Install backing ring and special self locking screws. Tighten screws 58-64 ft. lbs. [79-87 N·n]. **NOTE**: Assembly of hub must be completed within a fifteen minute period from start of screw installation. The special screw is to be used for one installation only. If the screw is removed for any reason it must be replaced. The epoxy left in the hub holes must be removed with the proper tap and cleaned with solvent. Dry hole thoroughly and use a new screw for reinstallation.

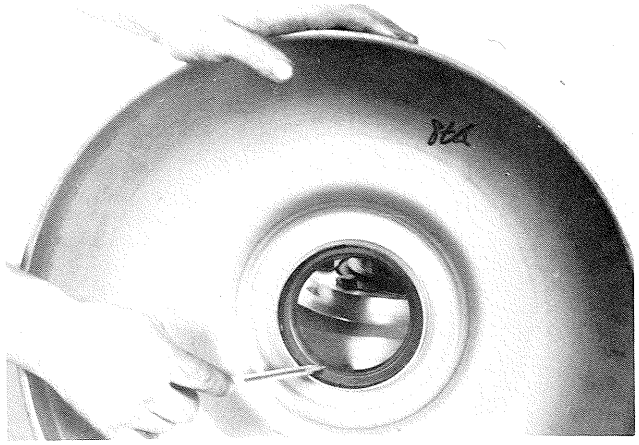


Figure 261
Apply a light coat of Loctite 638 to the outer diameter of the oil baffle oil seal. Press oil seal in oil baffle with lip of seal down.

Figure 262
Install a new oil baffle oil seal ring on oil baffle. Position oil baffle on impeller assembly.

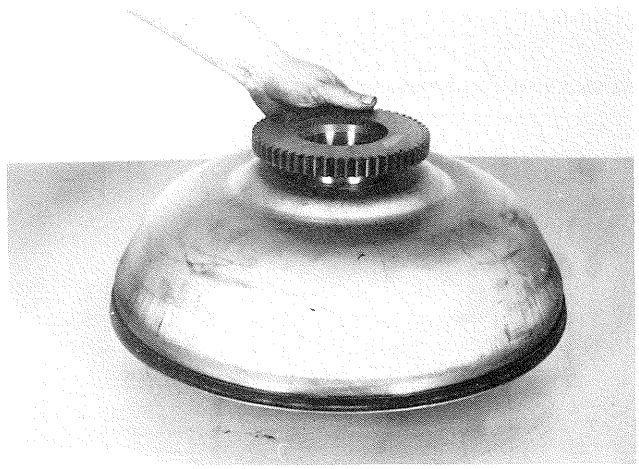


Figure 263
Install impeller hub gear.

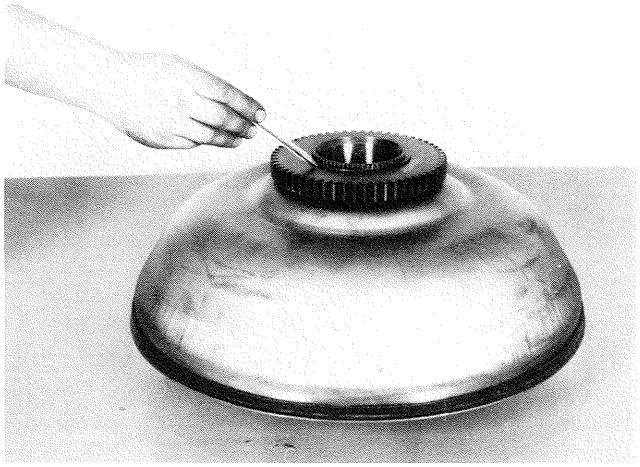


Figure 264
Install hub gear retainer ring.

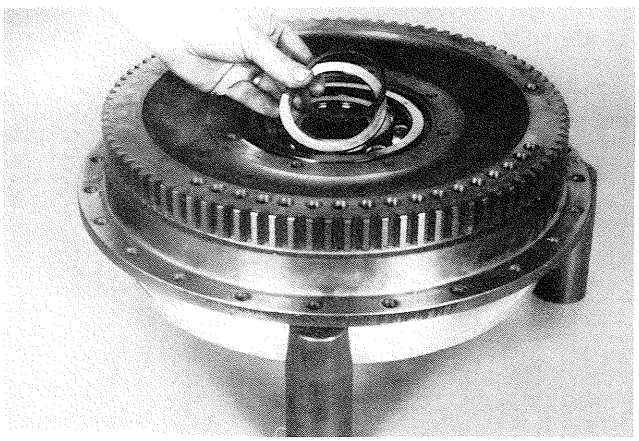


Figure 265
Block impeller cover and turbine assembly as shown. Remove turbine hub to front bearing retainer ring and washer.

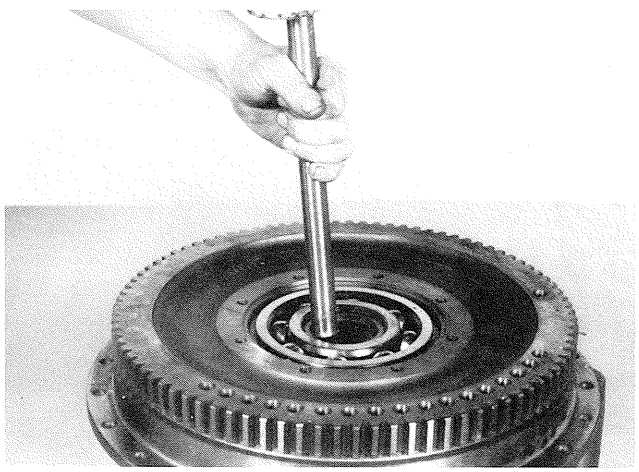


Figure 266
Tap turbine hub from front bearing.

Figure 267
Remove turbine to hub bolts and lock tabs.

REASSEMBLY

(See cleaning and inspection page.)

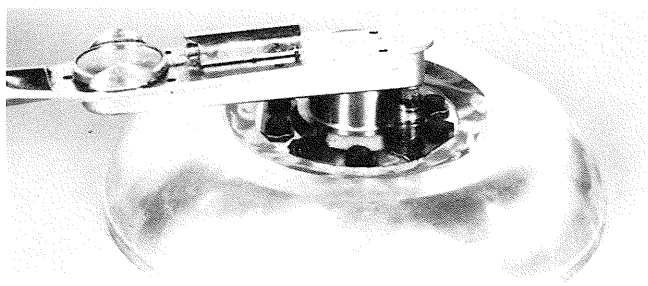


Figure 268
Align holes in turbine with holes in turbine hub. Position lock tabs and install turbine to turbine hub bolts. Tighten bolts to specified torque. (See torque chart). Bend a corner of the lock tab over a flat of the bolt heads. **NOTE:** On units with converter lock-up, special turbine to hub installation must be used. See Lock-up section.

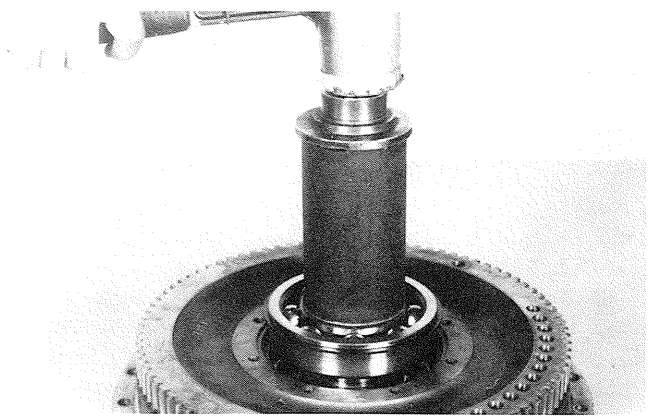


Figure 269
Center impeller cover over turbine hub. Install impeller cover bearing in impeller cover and over turbine hub.

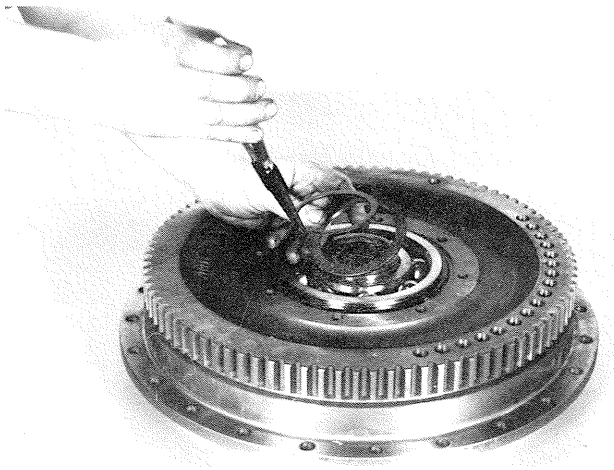


Figure 270
Install bearing washer and retainer ring.

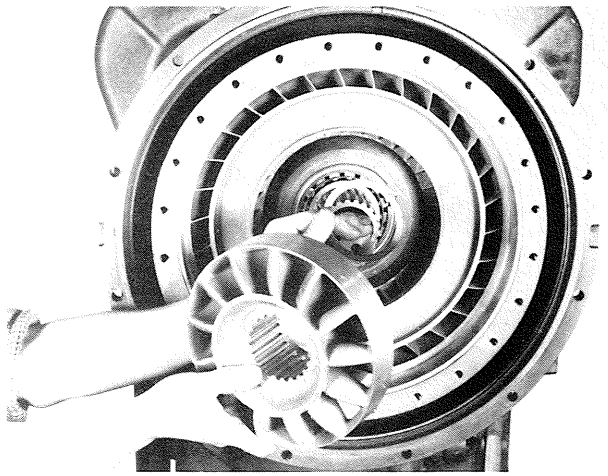


Figure 273
Install reaction member spacer with tang facing out. Install reaction member.

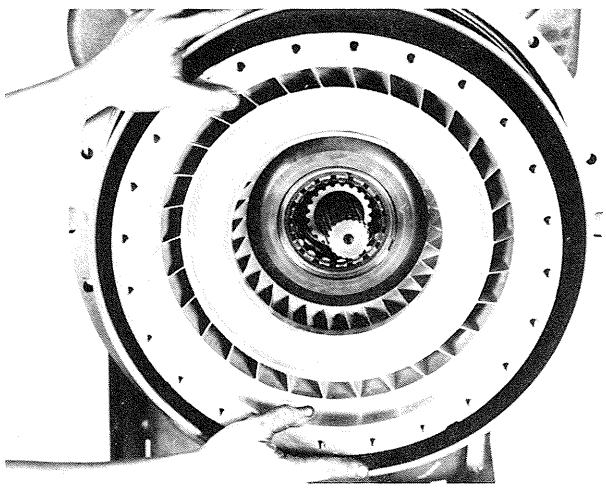


Figure 271
Install impeller and baffle assembly.

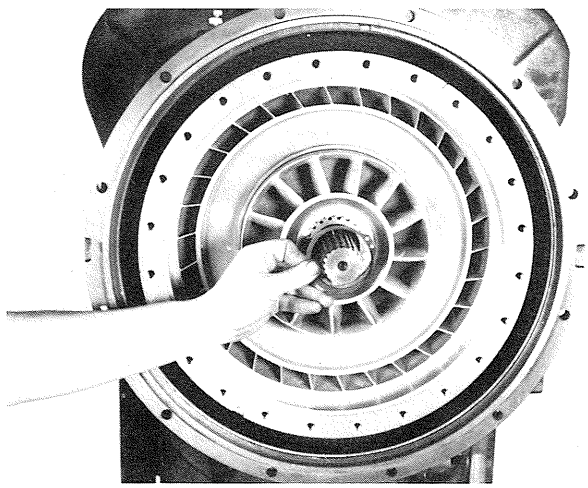


Figure 274
Install reaction member retainer ring.

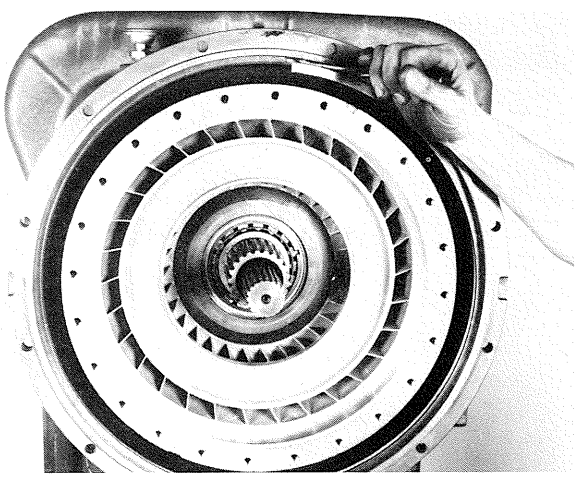


Figure 272
Install oil baffle retainer ring.

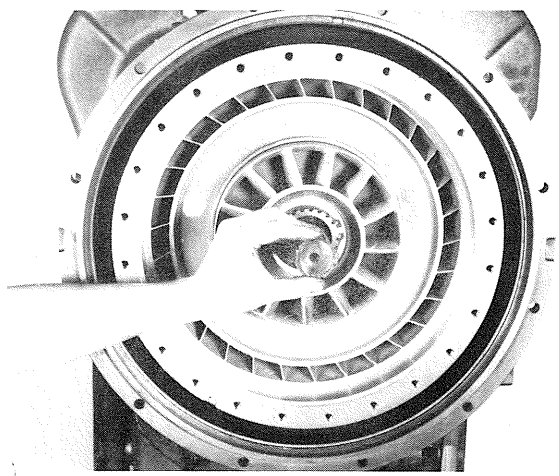


Figure 275
Install turbine locating ring on turbine shaft.

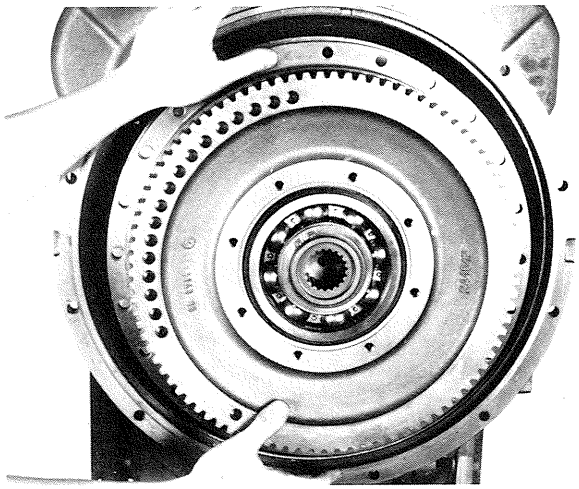


Figure 276
Install impeller and turbine assembly on turbine shaft.

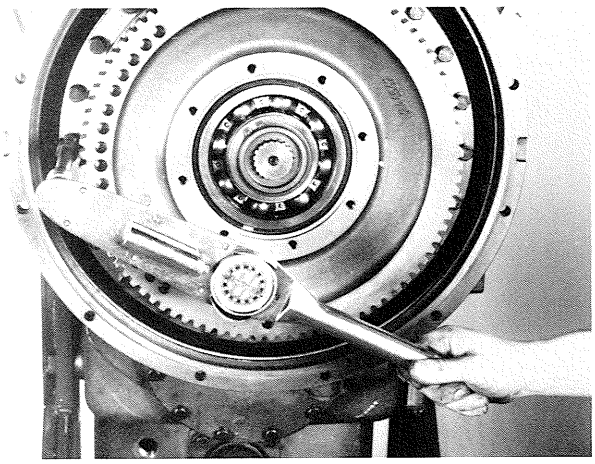


Figure 277
Install impeller cover to impeller bolts and washers. Tighten to specified torque.

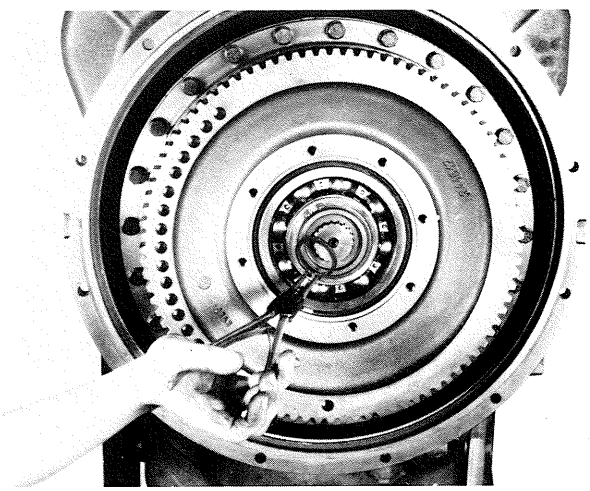


Figure 278
Install turbine retainer ring.

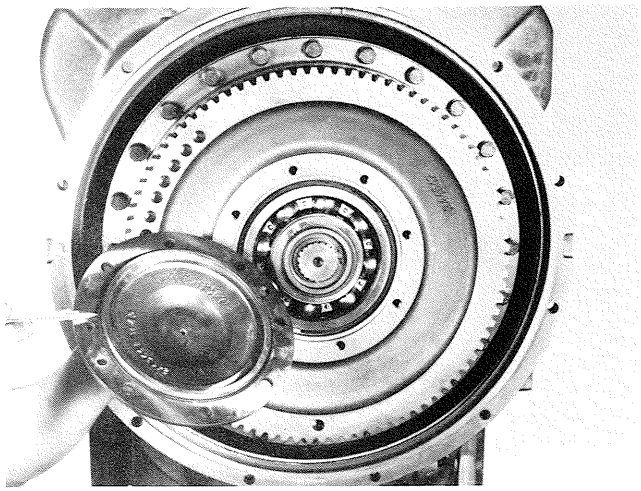


Figure 279
Install a new "O" ring seal on impeller cover bearing cap.

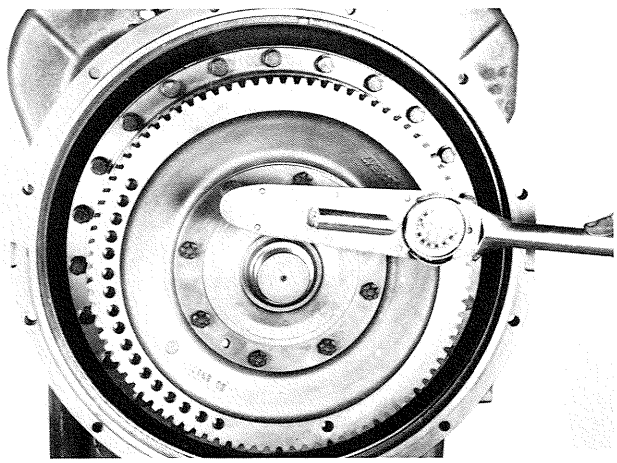


Figure 280
Position bearing cap on impeller cover. Install bearing cap bolts and tighten to specified torque.

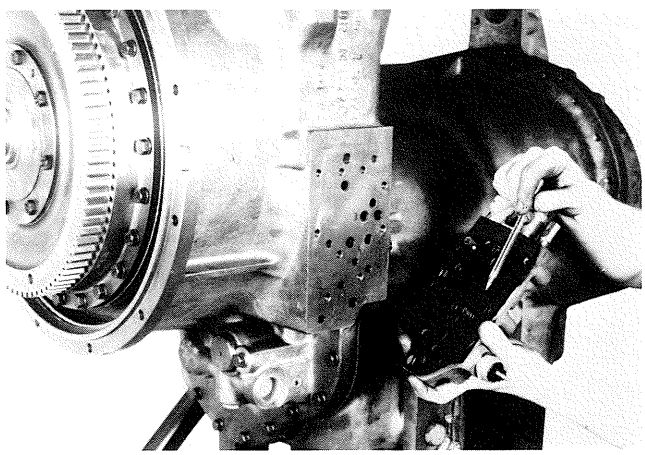


Figure 281
Position new gasket on control valve. Install detent balls and springs in valve.

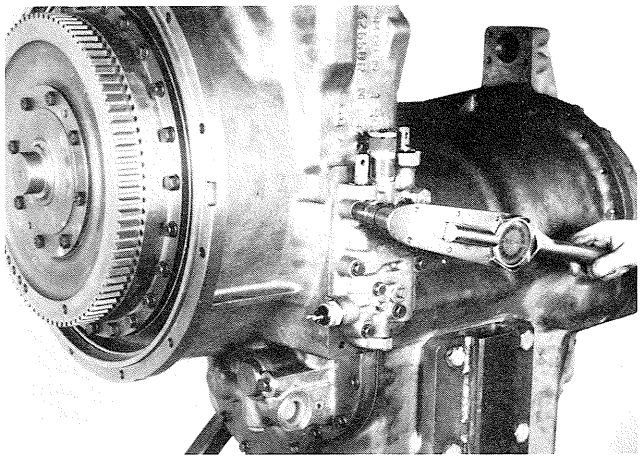


Figure 282
Position control valve on housing and install bolts and washers. Tighten to specified torque.

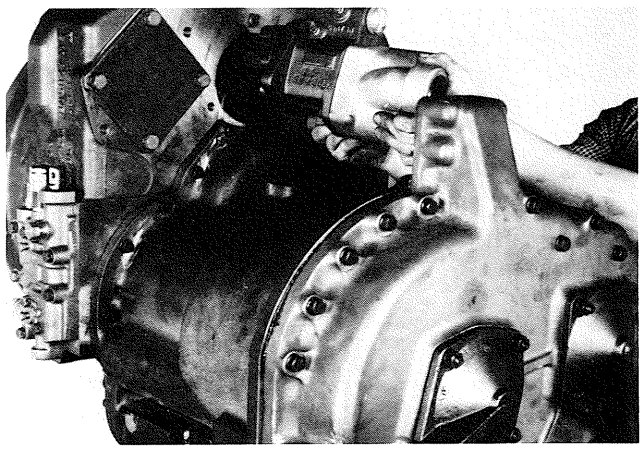


Figure 283
Position pressure regulating valve and charging pump on housing.

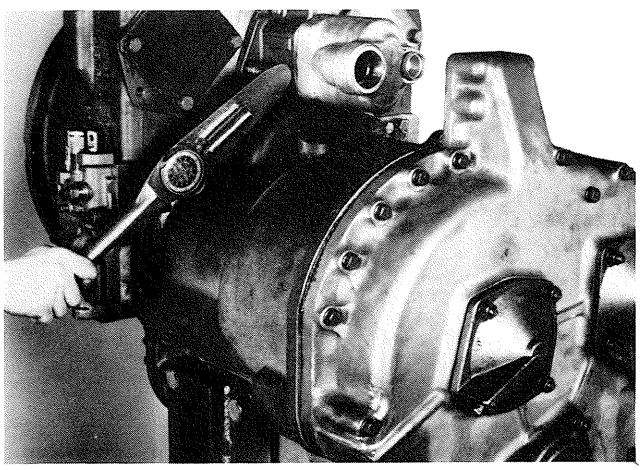


Figure 284
Install regulating valve to housing bolts and washers, tighten to specified torque.

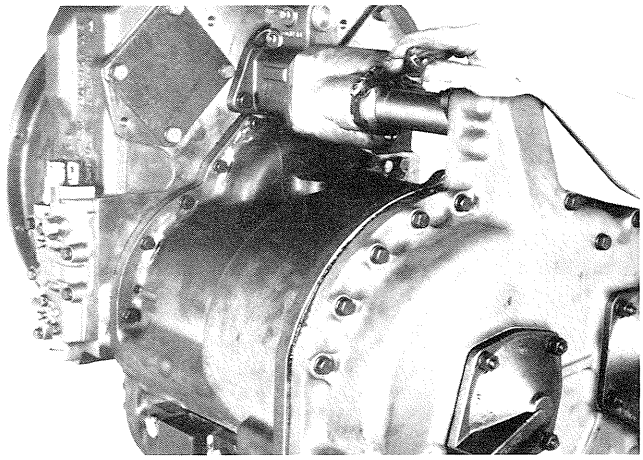


Figure 285
Install pump suction adaptor fitting and adaptor flange. Install flange bolts and washers. Tighten to specified torque.

NOTE: 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.

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 resut in unequal deflection within the spring pack. The result of this imbalance may adversely affect overall life of springs.

Service replacement assemblies are banded together and must be replaced as assembly.

CLEANING AND INSPECTION

CLEANING

Clean all parts thoroughly using solvent type cleaning fluid. It is recommended that parts be immersed in cleaning fluid and moved up and down slowly until all old lubricant and foreign material is dissolved and parts are thoroughly cleaned.

CAUTION: Care should be exercised to avoid skin rashes, fire hazards and inhalation of vapors when using solvent type cleaners.

Bearings

Remove bearings from cleaning fluid and strike flat against a block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning fluid to flush out particles. Repeat above operation until bearings are thoroughly clean. Dry bearings using moisture-free compressed air. Be careful to direct air stream across bearing to avoid spinning. Do not spin bearings when drying. Bearings may be rotated slowly by hand to facilitate drying process.

Housings

Clean interior and exterior of housings, bearing caps, etc., thoroughly. Cast parts may be cleaned in hot solution tanks with mild alkali solutions providing these parts do not have ground or polished surfaces. Parts should remain in solution long enough to be thoroughly cleaned and heated. This will aid the evaporation of the cleaning solution and rinse water. Parts cleaned in solution tanks must be thoroughly rinsed with clean water to remove all traces of alkali. Cast parts may also be cleaned with steam cleaner.

CAUTION: Care should be exercised to avoid inhalation of vapors and skin rashes when using alkali cleaners.

All parts cleaned must be thoroughly dried immediatley by using moisture-free compressed air or soft, lintless absorbent wiping rags free of abrasive materials such as metal filings, contaminated oil or lapping compound.

INSPECTION

The importance of careful and thorough inspection of all parts cannot be overstressed. Replacement of all parts showing indication of wear or stress will eliminate costly and avoidable failures at a later date.

Bearings

Carefully inspect all rollers; cages and cups for wear, chipping or nicks to determine fitness of bearings for further use. Do not replace a bearing cone or cup individually without replacing the mating cup or cone at the same time. After inspection, dip bearings in Automatic Transmission Fluid and wrap in clean lintless cloth or paper to protect them until installed.

Oil Seals, Gaskets, Etc.

Replacement of spring load oil seals, "O" rings, metal sealing rings, gaskets and snap rings is more economical when unit is disassembled than premature overhaul to replace these parts at a future time. Further loss of lubricant through a worn seal may result in failure of other more expensive parts of the assembly. Sealing members should be handled carefully, particularly when being installed. Cutting, scratching, or curling under of lip of seal seriously impairs its efficiency. Apply a thin coat of Permatex No. 2 on the outer diameter of the oil seal to assure an oil tight fit into the retainer. When assembling new metal type sealing rings, same should be lubricated with coat of chassis grease to stabilize rings in their grooves for ease of assembly of mating members. Lubricate all "O" rings and seals with recommended type Automatic Transmission Fluid before assembly.

Gears and Shafts

If magna-flux process is available, use process to check parts. Examine teeth on all gears carefully for wear, pitting, chipping, nicks, cracks or scores. If gear teeth show spots where case hardening is worn through or cracked, replace with new gear. Small nicks may be removed with suitable hone. Inspect shafts and quills to make certain they are not sprung, bent, or splines twisted, and that shafts are true.

Housing, Covers, etc.

Inspect housings, covers and bearing caps to be certain they are thoroughly clean and that mating surfaces, bearing bores, etc., are free from nicks or burrs. Check all parts carefully for evidence of cracks or condition which would cause subsequent oil leaks or failures.

SERVICING MACHINE AFTER TRANSMISSION OVERHAUL

The transmission, torque converter, and its allied hydraulic system are important links in the drive line between the engine and the wheels. The proper operation of either unit depends greatly on the condition and operation of the other; therefore, whenever repair or overhaul of one unit is performed, the balance of the system must be considered before the job can be considered completed.

After the overhauled or repaired transmission has been installed in the machine, the oil cooler, and connecting hydraulic system must be thoroughly cleaned. This can be accomplished in several manners and a degree of judgment must be exercised as to the method employed.

The following are considered the minimum steps to be taken:

1. Drain entire system thoroughly.

2. Disconnect and clean all hydraulic lines. Where feasible, hydraulic lines should be removed from machine for cleaning.

3. Replace oil filter elements, cleaning out filter cases thoroughly.

4. The oil cooler must be thoroughly cleaned. The cooler should be "back flushed" with oil and compressed air until all foreign material has been removed. Flushing in direction of normal oil flow will not adequately clean the cooler. If necessary, cooler assembly should be removed from machine for cleaning, using oil, compressed air and steam cleaner for that purpose. **DO NOT** use flushing compounds for cleaning purposes.

5. On remote mounted torque converters remove drain plug from torque converter and inspect interior of converter housing, gears, etc. If presence of considerable foreign material is noted, it will be necessary that converter be removed, disassembled and cleaned thoroughly. It is realized this entails extra labor; however, such labor is a minor cost compared to cost of difficulties which can result from presence of such foreign material in the system.

6. Reassemble all components and use only type oil recommended in lubrication section. Fill transmission through filler opening until fluid comes up to **LOW** mark on transmission dipstick. **NOTE:** If the dipstick is not accessible oil level check plugs are provided.

   Remove **LOWER** check plug, fill until oil runs from **LOWER** oil hole. Replace filler and level plug.

   Run engine two minutes at 500-600 RPM to prime torque converter and hydraulic lines. Recheck level of fluid in transmission with engine running at idle (500-600 RPM).

   Add quantity necessary to bring fluid level to **LOW** mark on dipstick or runs freely from **LOWER** oil level check plug hole. Install oil level plug or dipstick. Recheck with hot oil (180-200° F.) [82, 2-93, 3° C].

   Bring oil level to **FULL** mark on dipstick or runs freely from **UPPER** oil level plug.

7. Recheck all drain plugs, lines, connections, etc., for leaks and tighten where necessary.

TORQUE IN (LBS.—FT.)
BOLTS, CAPSCREWS, STUDS AND NUTS

Grade 5 Identification, 3 Radial
Dashes 120° Apart on Head of Bolt

Grade 8 Identification, 6 Radial
Dashes 60° Apart on Head of Bolt

Torque Specification for Lubricated or Plated Screw Threads

NOM. SIZE	Grade 5 FINE THREAD LB-FT	Grade 5 FINE THREAD [N·m]	Grade 5 COARSE THREAD LB-FT	Grade 5 COARSE THREAD [N·m]	Grade 8 FINE THREAD LB-FT	Grade 8 FINE THREAD [N·m]	Grade 8 COARSE THREAD LB-FT	Grade 8 COARSE THREAD [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]

LOW (1ST) CLUTCH TAPER BEARING ADJUSTMENT

GENERAL BEARING INSTALLATION PROCEDURE

If a thermal assembly aid is used, (expanding by heating 275°F ± 25°F [135°C ± 3.90°C]) a check MUST be made after mating parts have reached the same temperature within 20°F [-6, 7°C] of ambient, to be sure the bearings are positioned solidly against their respective shoulders before bearing adjustment can be made. This check must be made when installing the front and rear taper bearings on the low (1st) clutch shaft and before clutch assembly is installed in the transmission housing.

TAPER BEARING ADJUSTMENT

Build up transmission as explained in assembly section of the service manual through converter housing installation on transmission housing. Place transmission assembly in a horizontal position with low (1st) clutch vertical (low clutch rear taper bearing up). If the clutch shaft rear bearing cap was temporarily installed remove bearing cap. This bearing adjustment must be made with the bearing cap "O" ring, clutch pressure sleeve and clutch shaft rear oil sealing ring removed. Measure thickness of bearing cap "D" with micrometer at location "A" & "B". Add the two dimensions together and divide by two, to get an average thickness and record.

Example:	"A"	.871 [22,123]	
	"B"	+ .873 [22,174]	
		1.744 [44,298]	
		÷ 2	
	"D"	.872 [22,149]	Average Thickness **(Example only)**

Lubricate taper bearing and bearing cap bore. Be sure bearing cap "slip fits" in bearing bore. Install bearing cap on rear cover using all four (4) bearing cap studs. Install all four (4) stud nuts.

Rotate the output shaft flange to seat taper bearings and rap transmission rear cover adjacent to taper bearing while tightening stud nuts in a crisscross sequence 15 to 20 ft. lbs. torque [20,3-27,0 N.m.]. Use a mechanical advantage (a socket and extension on the output flange nut) to rotate flange if needed.

After seating the bearings, remove two (2) nuts 180° apart. (Remove the two (2) nuts that are not next to the raised machine surface). Loosen the remaining two (2) nuts "G" until they are finger tight.

Using a micrometer depth gage "C" set firmly against raised machined surface "A" & "B" and using a calibrated inch lbs or equivalent metric torque wrench, tighten the two remaining nuts in 10 inch lbs [1,13 N.m.] increments, from 10 inch lbs [1,13 N.m.] through 100 inch lbs [11,3 N.m.]. Rotate the output shaft flange while tightening the nuts. Measure "A" and "B" at each 10 inch lbs increment. The difference between dimension of "A" and "B" must not exceed .005 inch [.1270mm]. If variation greater than .005 inch [.1270mm] occurs start seating procedure over, beginning at bearing installation procedure. Plot on the bearing record chart the average measurement of "A" and "B" at each 10 inch lbs [1,13 N.m.] increments.

Draw a "best fit" straight line through the data points plotted on the record chart. The gap value where the line crosses "zero" torque minus the average of previously recorded "A" and "B" is the no endplay, no preload shim gap. To this gap add .006 ± .001 inch [.1524 ± .0254mm] to equal final shim gap.

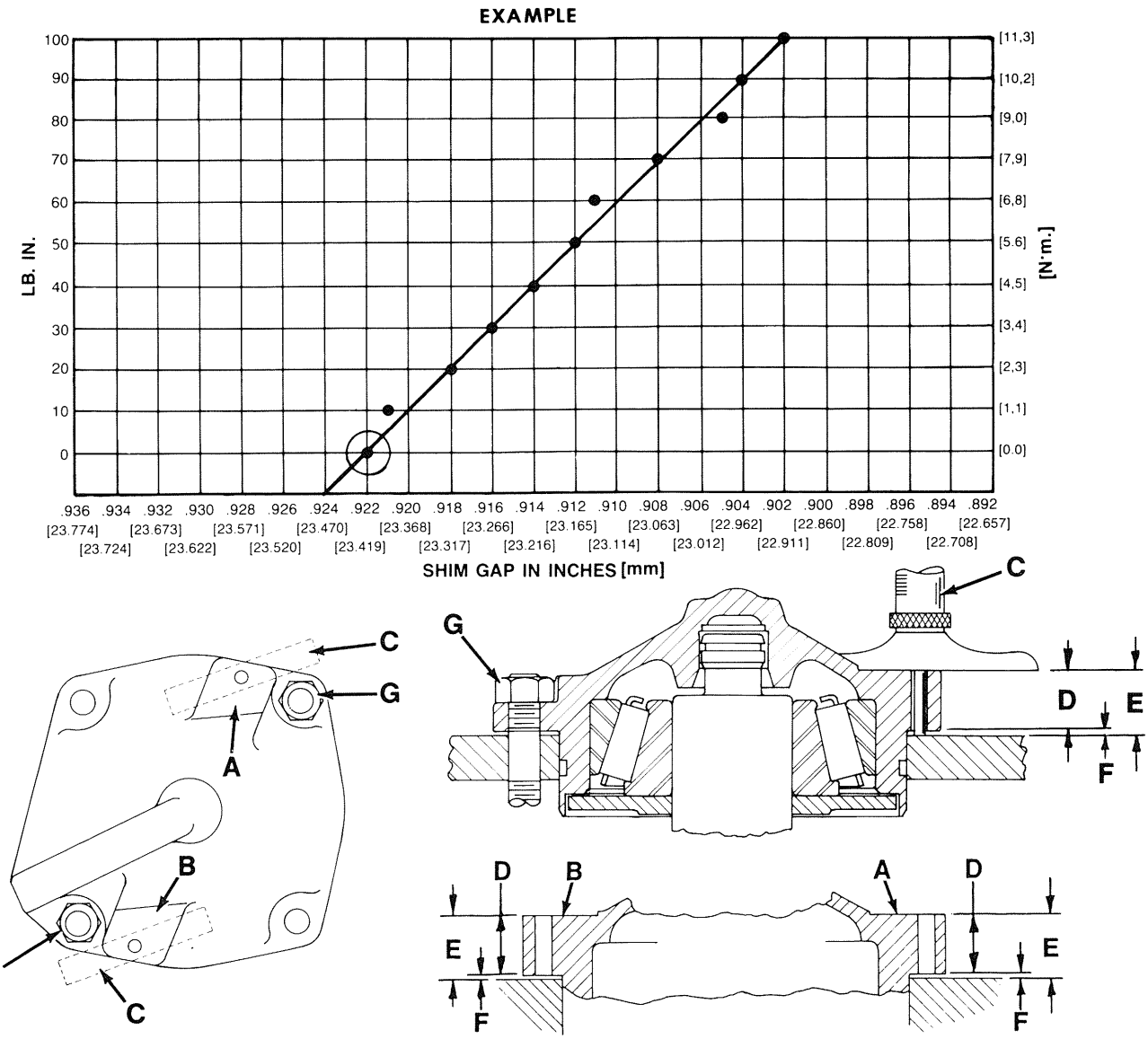
Establish the shim pack, using a micrometer, measure each shim to obtain the total shim pack compliment. Measure the total shim pack to check if it equals exactly the total sum of each shim. If the pack compliment does not equal the total sum then repeat the shim pack selection process from the beginning.

After proper low (1st) speed clutch taper bearing adjustment is made, remove bearing cap, and install a new clutch shaft oil sealing ring, new "O" rings on clutch pressure sleeve and bearing cap. Install pressure sleeve.

Install bearing cap with proper shim pack.

Install stud nut lockwashers and stud nuts and tighten to 41-45 lbs ft. torque [55,6-61,0 N.m.]. Rotate output shaft to seat bearings and recheck stud nut torque.

Install external low bearing cap lube line from lube pressure check port in front housing to low clutch rear bearing cap.



Shim Gap in Inches [mm]

Example shown:

Inch-Pounds - [N.m.]	Shim Gap Dimension "E" taken at "A" & "B" location divided by two (2) for average dimension.
10 - [1,1]	.921 - [23,393]
20 - [2,3]	.918 - [23,317]
30 - [3,4]	.916 - [23,266]
40 - [4,5]	.914 - [23,216]
50 - [5,6]	.912 - [23,165]
60 - [6,8]	.911 - [23,139]
70 - [7,9]	.908 - [23,063]
80 - [9,10]	.905 - [22,987]
90 - [10,2]	.904 - [22,962]
100 - [11,3]	.902 - [22,911]

The "best fit" straight line through the data points, where the line crosses zero, is .922 [23,419]. Subtract average "A" & "B" dimension .872 [22,149] "D". This is .050 [1,270] "F" shim gap. No preload, no endplay. To this "F" .050 shim gap, add .006 ± .001 inch [.0254]. Final shim pack .055 to .057 [1,40-1,44]. **This is an example only. See page 60 for plotting charts.**

SPECIFICATIONS AND SERVICE DATA—POWER SHIFT TRANSMISSION AND TORQUE CONVERTER

CONVERTER OUT PRESSURE	Converter outlet oil temp. 180° - 200° F. [82,3° - 93.3° C]. Transmission in **NEUTRAL**. Operating specifications: 25 P.S.I. [172,4 kPa] minimum pressure at 2000 R.P.M. engine speed **AND** a maximum of 70 P.S.I. [482,6 kPa] outlet pressure with engine operating at no-load governed speed.
CONTROLS	Forward and Reverse — Manual Speed Selection — Manual
CLUTCH TYPE	Multiple discs, hydraulically actuated, spring released, automatic wear compensation and no adjustment. All clutches oil cooled and lubricated.
CLUTCH INNER DISC	Friction.
CLUTCH OUTER DISC	Steel.
OIL FILTRATION	Full flow oil filter safety by-pass, also strainer screen in sump at bottom of transmission case.
CLUTCH PRESSURE	240 - 300 psi [1654,8 - 2068,4 kPa] — With parking brake set (**see note**), oil temperature 180° - 200°F. [82,2° - 93,3°C], engine at idle (400 to 600 RPM), shift thru direction and speed clutches. All clutch pressure must be equal within 5 psi. [34,5 kPa]. If clutch pressure varies in any one clutch more than 5 psi [34,5 kPa] repair clutch. **NOTE: Never use service brakes while making clutch pressure checks. Units having brake actuated declutching in forward and/or reverse will not give a true reading.** **ALWAYS USE PARKING BRAKE WHEN MAKING CLUTCH PRESSURE CHECKS.**

LUBRICATION

TYPE OF OIL	See Lube Chart.
CAPACITY	Consult Operator's Manual on applicable machine model for system capacity. Torque Converter, Transmission and allied hydraulic system must be considered as a whole to determine capacity.
CHECK PERIOD	Check oil level DAILY with engine running at 500-600 RPM and oil at 180° to 200° F. [82,2 -93,3° C]. Maintain oil level to FULL Mark.
NORMAL * DRAIN PERIOD	Every 500 hours, change oil filter element. Every 1000 hours, drain and refill system as follows: Drain with oil at 150° to 200° F. [65,6 -93,3° C].

NOTE: It is recommended that filter elements be changed after 50 and 100 hours of operation on new and rebuilt or repaired units.

(a) Drain transmission and remove sump screen. Clean screen thoroughly and replace, using new gaskets.

(b) Drain oil filters, remove and discard filter elements. Clean filter shells and install new elements.

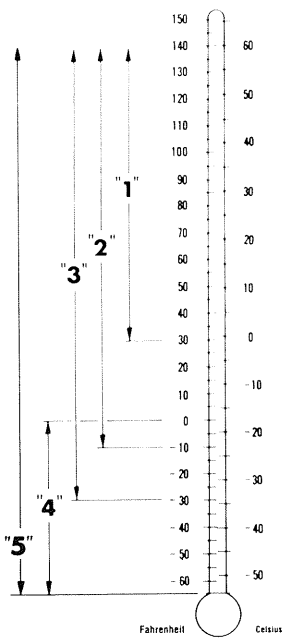
(c) Refill transmission to LOW mark.

(d) Run engine at 500-600 RPM to prime converter and lines.

(e) Recheck level with engine running at 500-600 RPM and add oil to bring level to LOW mark. When oil temperature is hot (180-200° F.) [82,2-93,3° C] make final oil level check. BRING OIL LEVEL TO FULL MARK.

RECOMMENDED LUBRICANTS FOR CLARK POWER SHIFTED TRANSMISSION AND TORQUE CONVERTERS

Prevailing Ambient Temperature



*Dexron is a registered trademark of General Motors Corporation.

Temperature Range	"1"	C-2 Grade 30 C-3 Grade 30 Engine Oil:-Grade 30 API-CD/SE or CD/SF MIL-L-2104C-Grade 30 MIL-L-2104D-Grade 30
Temperature Range	"2"	MIL-L-2104C-Grade 10 MIL-L-2104D-Grade 10 C-2 Grade 10 C-3 Grade 10 Engine Oil:-Grade 10 API-CD/SE or CD/SF Quintolubric 822-220 (Non Phosphate Ester Fire Resistant Fluid)
Temperature Range	"3"	*Dexron *Dexron II D - **See Caution Below**
Temperature Range	"4"	MIL-L-46167 MIL-L-46167 A
Temperature Range	"5"	Conoco High-Performance Synthetic Motor Oil — Spec. No. 6718

PREFERRED OIL VISCOSITY: Select highest oil viscosity compatible with prevailing ambient temperatures and oil application chart.

Temperature ranges "2" and "3" may be used to lower ambient temperatures when sump preheaters are used.

Temperature range "4" should be used only in ambient temperature range shown.

MODULATED SHIFT TRANSMISSIONS: T12000, 18000, 24000, 28000 & 32000 series transmissions with modulated shift use only C-3 or temperature range 3 items (a) & (b) *Dexron or *Dexron II D. **SEE CAUTION BELOW.** 3000, 4000, 5000, 6000, 8000, 16000 & 34000 series transmissions with modulated shift use only C-3 or temperature range 3 item (a) only *Dexron. Do **NOT** use *Dexron II D. **SEE CAUTION BELOW.**

CAUTION: *Dexron II D is not compatible with graphitic clutch plate friction material UNLESS IT MEETS THE APPROVED C-3 SPECIFICATIONS. *Dexron II D cannot be used in the 3000, 4000, 5000, 6000, 8000, 16000 or 34000 series power shift transmissions, or the HR28000 & HR32000 series having converter lock-up, or the C270 series converter having lock-up UNLESS IT MEETS THE APPROVED C-3 SPECIFICATIONS.

Any deviation from this chart must have written approval from the application department of the Clark-Hurth Components Engineering and Marketing Department.

***Normal drain periods and filter change intervals are for average environmental and duty-cycle conditions. Severe or sustained high operating temperatures or very dusty atmospheric conditions will cause accelerated deterioration and contamination. For extreme conditions judgment must be used to determine the required change intervals.**

TROUBLE SHOOTING GUIDE

For The

R and HR, 34000 Transmission

The following data is presented as an aid to locating the source of difficulty in a malfunctioning unit. It is necessary to consider the torque converter charging pump, transmission, oil cooler, and connecting lines as a complete system when running down the source of trouble since the proper operation of any unit therein depends greatly on the condition and operations of the others. By studying the principles of operation together with data in this section, it may be possible to correct any malfunction which may occur in the system.

TROUBLE SHOOTING PROCEDURE BASICALLY CONSISTS OF TWO CLASSIFICATIONS: MECHANICAL AND HYDRAULIC.

MECHANICAL CHECKS

Prior to checking any part of the system from a hydraulic standpoint, the following mechanical checks should be made:

1. A check should be made to be sure all control lever linkage is properly connected and adjusted at all connecting points.

2. Check shift levers and rods for binding or restrictions in travel that would prevent full engagement. Shift levers by hand at control valve, if full engagement cannot be obtained, difficulty may be in control cover and valve assembly.

HYDRAULIC CHECKS

Before checking on the torque converter, transmission, and allied hydraulic system for pressures and rate of oil flow, it is essential that the following preliminary checks be made:

Check oil level in transmission. This should be done with oil temperatures of 180 to 200° F. [82,2-93,3° C]. DO NOT ATTEMPT THESE CHECKS WITH COLD OIL. To bring the oil temperature to this specification it is necessary to either work the machine or "stall" out the converter. Where the former means is impractical, the latter means should be employed as follows:

Engage shift levers in forward and high speed and apply brakes. Accelerate engine half to three-quarter throttle.

Hold stall until desired converter outlet temperature is reached. **CAUTION:** FULL THROTTLE STALL SPEEDS FOR AN EXCESSIVE LENGTH OF TIME WILL OVERHEAT THE CONVERTER.

LOW CLUTCH PRESSURE

Cause	Remedy
1. Low oil level.	1. Fill to proper level.
2. Clutch pressure regulating valve spool stuck open.	2. Clean valve spool and housing.
3. Faulty charging pump.	3. Replace pump.
4. Broken or worn clutch shaft or piston sealing rings.	4. Replace sealing rings.
5. Clutch piston bleed valve stuck open.	5. Clean bleed valves thoroughly.

LOW CONVERTER CHARGING PUMP OUTPUT

1. Low oil level.	1. Fill to proper level.
2. Suction screen plugged.	2. Clean suction screen.
3. Air leaks at pump intake hose and connections or collapsed hose. (R-34000 only)	3. Tighten all connections or replace hose if necessary.
4. Defective oil pump.	4. Replace pump.

OVERHEATING

1. Worn oil sealing rings.	1. Remove, disassemble, and rebuild converter assembly.
2. Worn oil pump.	2. Replace.
3. Low oil level.	3. Fill to proper level.
4. Pump suction line taking air. (R-34000 only)	4. Check oil line connections and tighten securely.

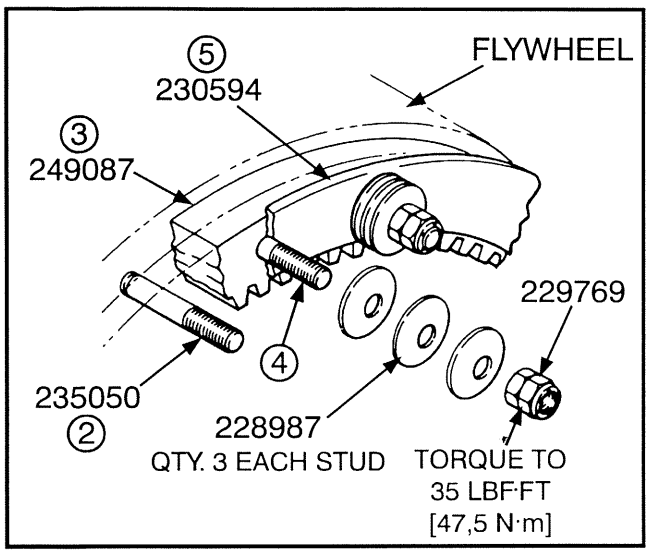
NOISY CONVERTER

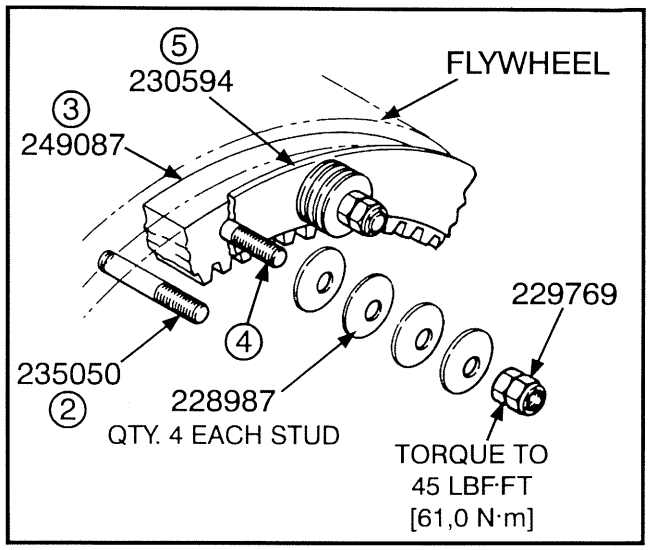
1. Worn coupling gears.	1. Replace.
2. Worn oil pump.	2. Replace.
3. Worn or damaged bearings.	3. A complete disassembly will be necessary to determine what bearing is faulty.

LACK OF POWER

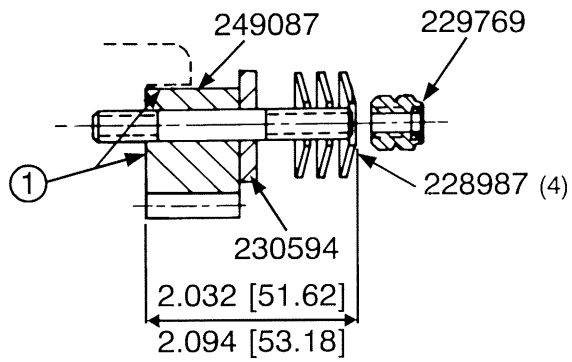
1. Low engine RPM at converter stall.	1. Tune engine check governor.
2. See "Overheating" and make same checks.	2. Make corrections as explained in "Overheating."

FLYWHEEL RING GEAR REPLACEMENT PROCEDURE





C & CL-5000 - HR & LHR-34000



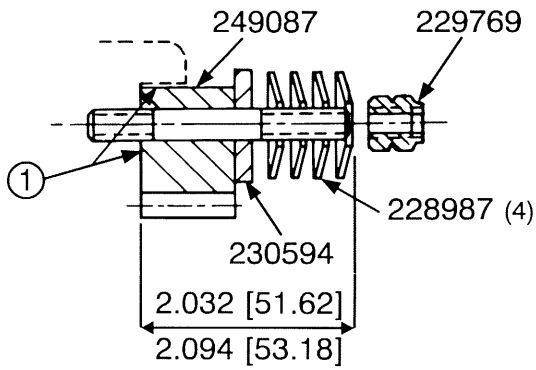
① — REMOVE ALL BURRS FROM FLYWHEEL MOUNTING FACE AND PILOT BORE, CLEAN WITH SOLVENT.

THE ENGINE FLYWHEEL AND HOUSING MUST CONFORM TO STANDARD S.A.E. NO. 1 – S.A.E. J927 TOLERANCE SPECIFICATIONS FOR PILOT BORES, ECCENTRICITIES AND MOUNTING FACE DEVIATIONS. CHECK ENGINE CRANKSHAFT "END PLAY", MUST BE THE SAME VALUE BEFORE AND AFTER THE TORQUE CONVERTER IS MOUNTED TO THE ENGINE.

② — INSTALL THREE (3) STUDS 235050 – EQUALLY SPACED. TIGHTEN 33 to 36 LBF·FT [44,8 - 48,8 N·m] OF TORQUE.

③ — INSTALL RING GEAR 249087 BY TAPPNG LIGHTLY IN PLACE

C & CL-8000



④ — INSTALL REMAINING STUDS. TIGHTEN 33 TO 36 LBF·FT [44,8 - 48,8 N·m] TORQUE.

⑤ — INSTALL BACKING PLATE 230594.

⑥ — LUBRICATE STUD THREADS, BELLEVILLE WASHERS AND NUTS WITH S.A.E. #10 OIL.

⑦ — INSTALL BELLEVILE WASHERS & ELASTIC STOP NUTS AS SHOWN (3 WASHERS, EACH STUD FOR C & CL-5000 and HR & LHR-34000; 4 WASHERS, EACH STUD FOR C & CL-8000). TIGHTEN NUTS IN A CRISS CROSS PATTERN TO 25 LBF. FT. [34N.m]. THEN TIGHTEN NUTS IN INCREMENTS OF 5LBF. FT. [6,7 N.m] IN A CRISS CROSS PATTERN TO THE SPECIFIC TORQUE VALUE INDICATED IN ILLUSTRATION ABOVE.

NOTE: When installing studs in flywheel, the stud standout must range between 2.032 (51.62) to 2.094 (53.18).

When the C & CL-5000, C & CL-8000 and HR & LHR-34000 flywheel ring is to be replaced order Kit No. 802551. If the backing ring is to be replaced order Part No. 230594 backing plate.

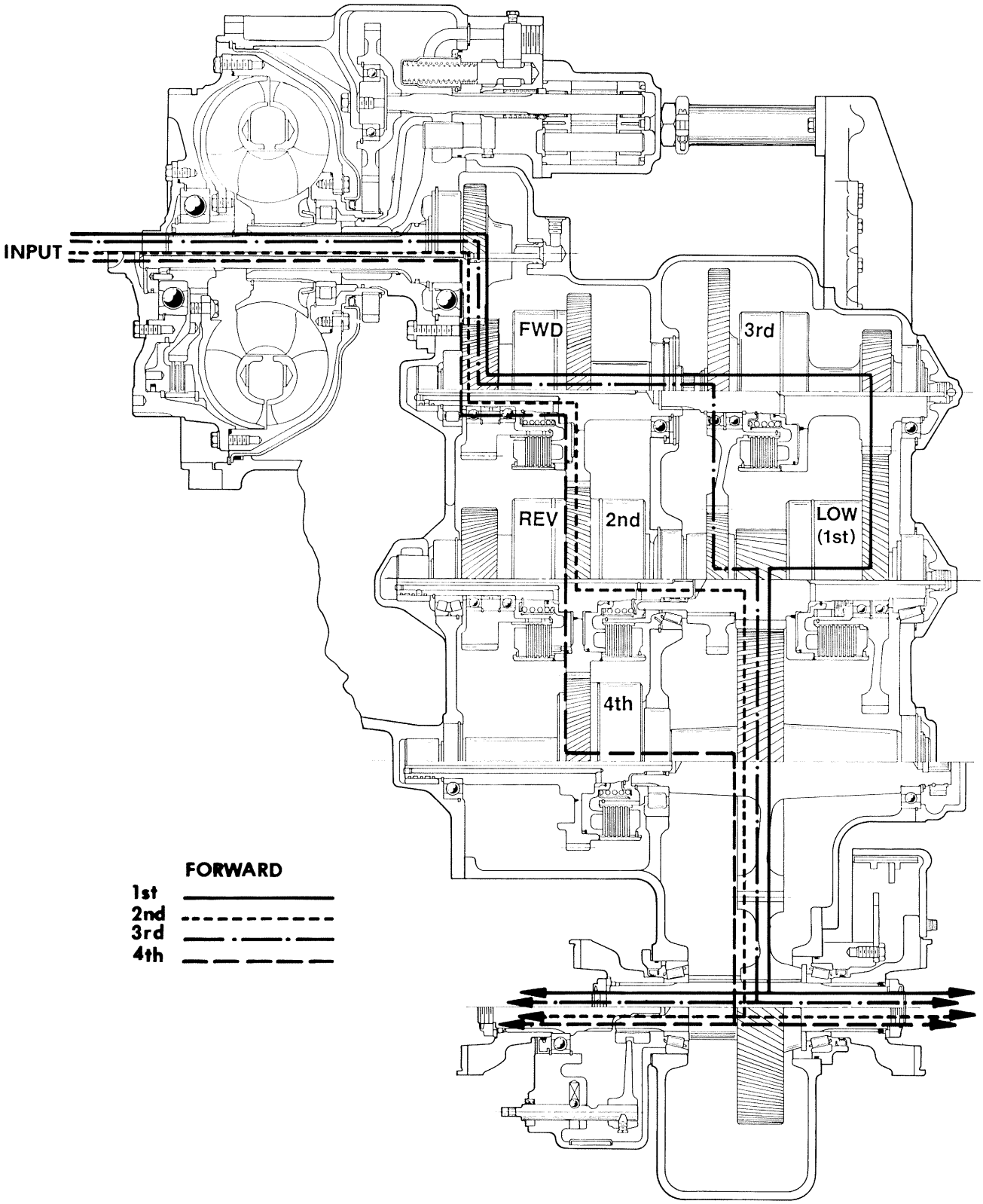
The 802551 Kit Includes:

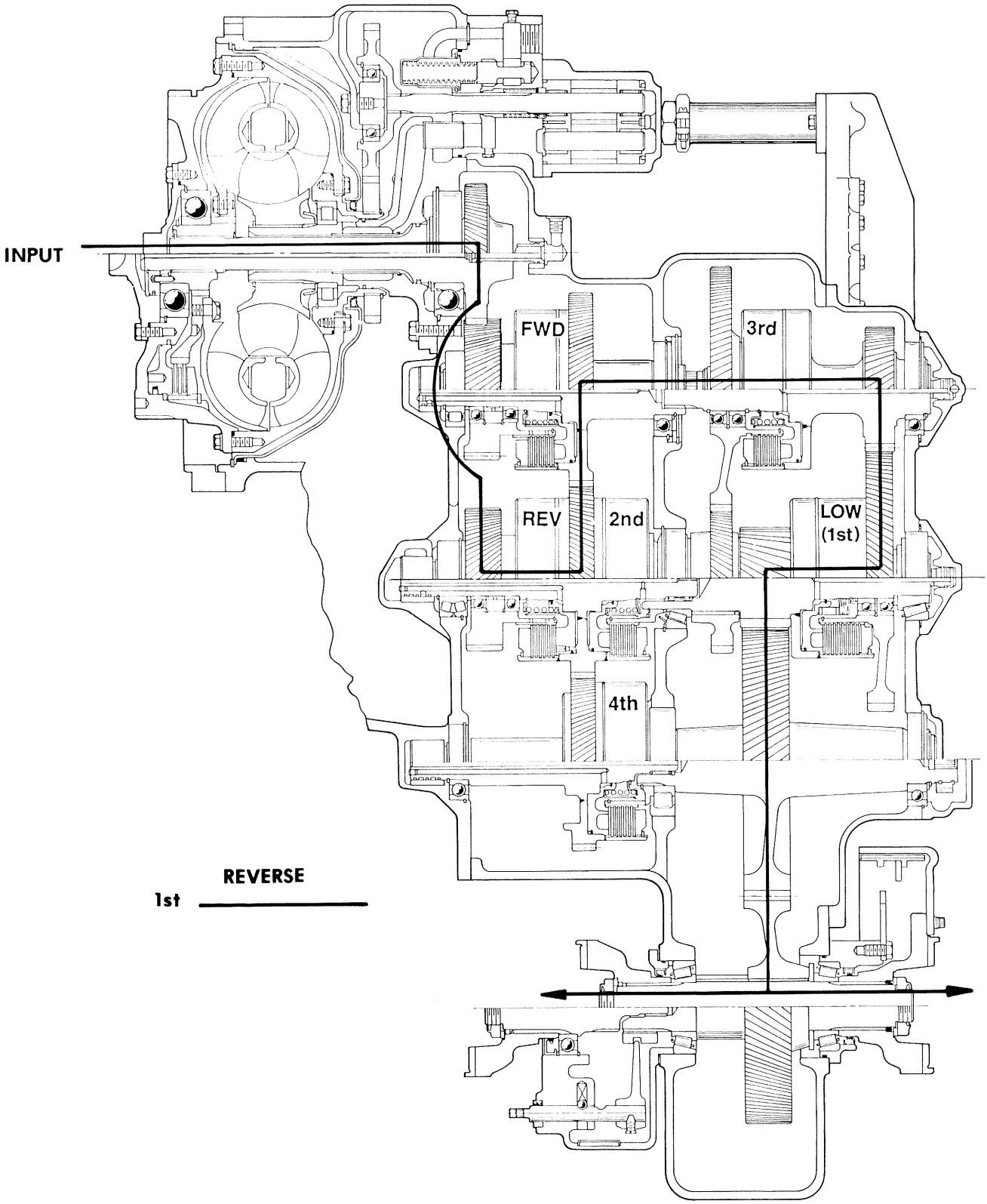
1	249087	Ring Gear
24	235050	Stud
96	228987	Belleville Washer
24	229769	Stud Nut
1	802552	Instruction Sheet

When servicing the C & CL-5000 and HR & LHR-34000 flywheel ring gear with 24 bolt holes you will use 72 of the 96 belleville washers (3 on each stud) and 24 stud nuts.

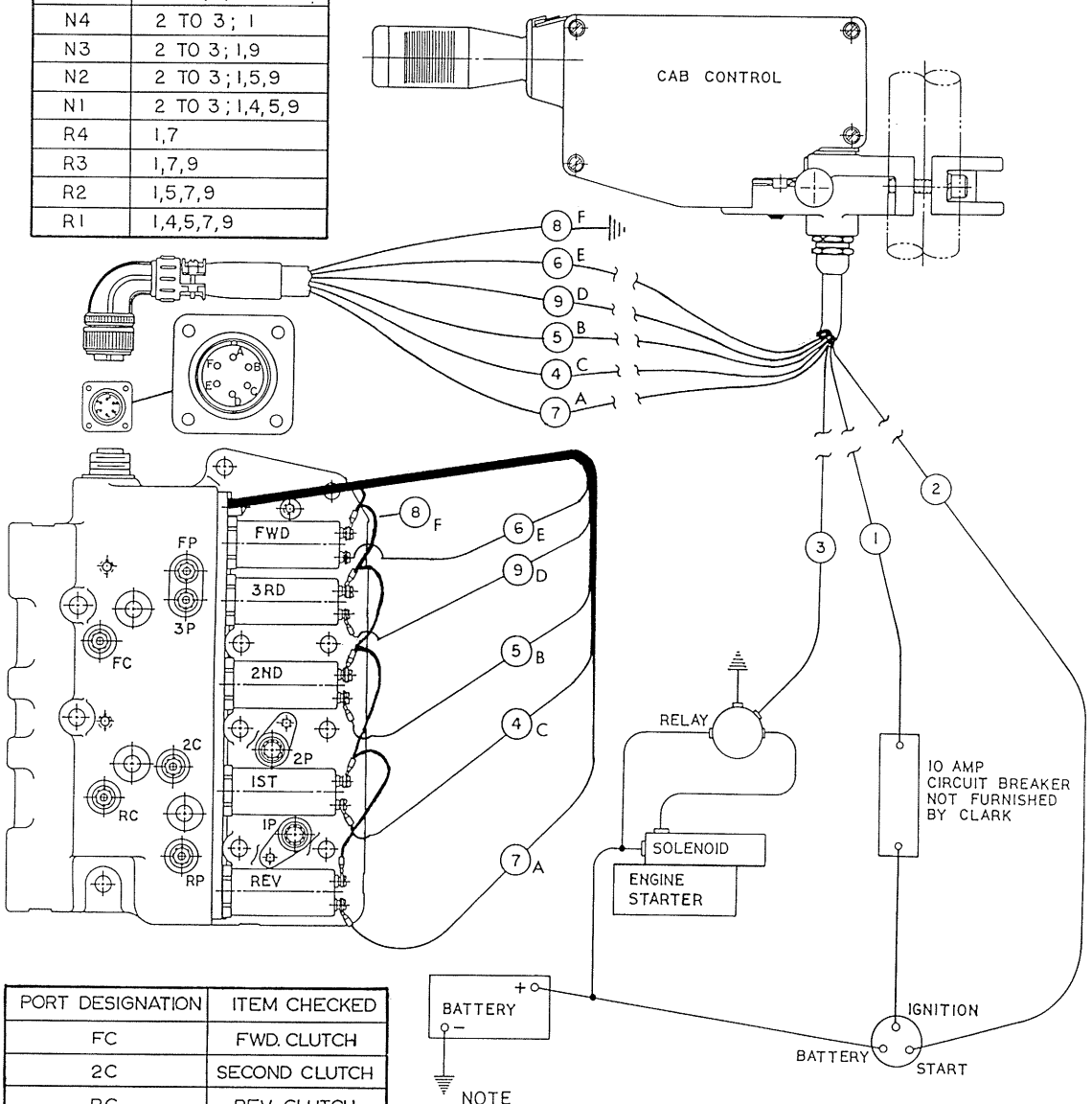
The C & CL-8000 will use all 96 of the belleville washers (4 on each stud) and 24 stud nuts.

Tighten the stud nuts per instruction in step ⑦ above. Dimensions are in inches - Dimension in [ ] are mm.


INPUT
FWD
3rd
REV
2nd
LOW
(1st)
4th
FORWARD
1st
2nd
3rd
4th


INPUT
FWD
3rd
REV
2nd
LOW
(1st)
4th
REVERSE
1st

ENERGIZED WIRES	
SPEED	CAB CONTROL
F4	1,6
F3	1,6,9
F2	1,5,6,9
F1	1,4,5,6,9
N4	2 TO 3; 1
N3	2 TO 3; 1,9
N2	2 TO 3; 1,5,9
N1	2 TO 3; 1,4,5,9
R4	1,7
R3	1,7,9
R2	1,5,7,9
R1	1,4,5,7,9



PORT DESIGNATION	ITEM CHECKED
FC	FWD. CLUTCH
2C	SECOND CLUTCH
RC	REV. CLUTCH
FP	FWD. PILOT
RP	REV. PILOT
3P	THIRD PILOT
2P	SECOND PILOT
1P	FIRST PILOT
1st Clutch Rear Brg. Cap - See Figure K	FIRST CLUTCH
3rd Clutch Rear Brg. Cap - See Figure K	THIRD CLUTCH

NOTE

1. USE RELAY WHERE STARTER SOLENOID DRAW IS MORE THAN 6 AMPS

   RELAYS
   DELCO REMY 1114238 DR-12V OR EQUIV
   DELCO REMY 1114239 DR-24V OR EQUIV

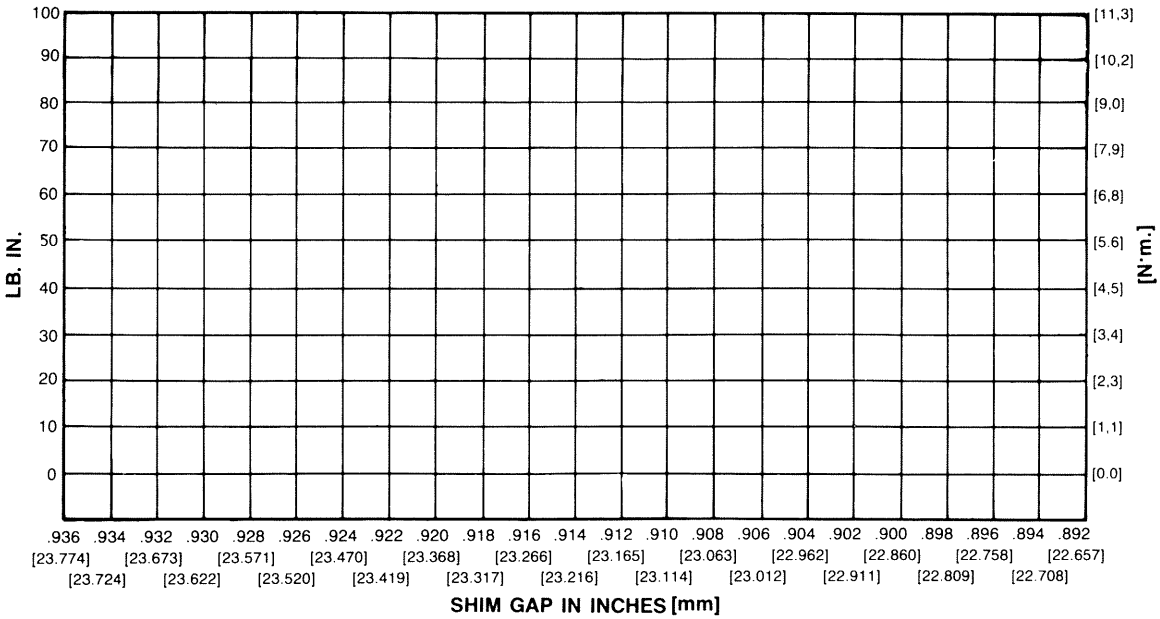
2. SOLENOID ASSY IS SUPPLIED WITH #6-32 PAN HEAD SCREW TERMINALS. EITHER TERMINAL MAY BE USED FOR GROUND. CUSTOMER TO SUPPLY WIRING HARNESS - 16AWG AND WIRE TERMINALS

3. WIRES 2 AND 3 ARE ENERGIZED ONLY WHEN ENGINE STARTER IS ON.

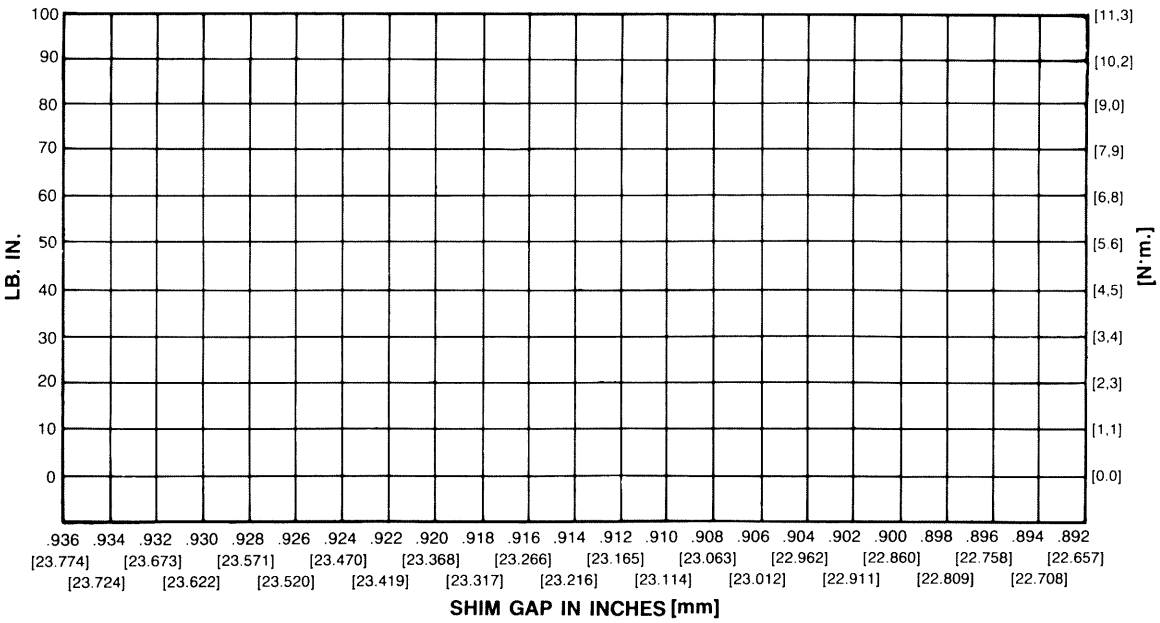
WIRE NO.	COLOR CODE
1	WHITE
2	BLACK
3	RED
4	YELLOW
5	GREEN
6	BLUE
7	BROWN
8	PINK ⏚
9	ORANGE

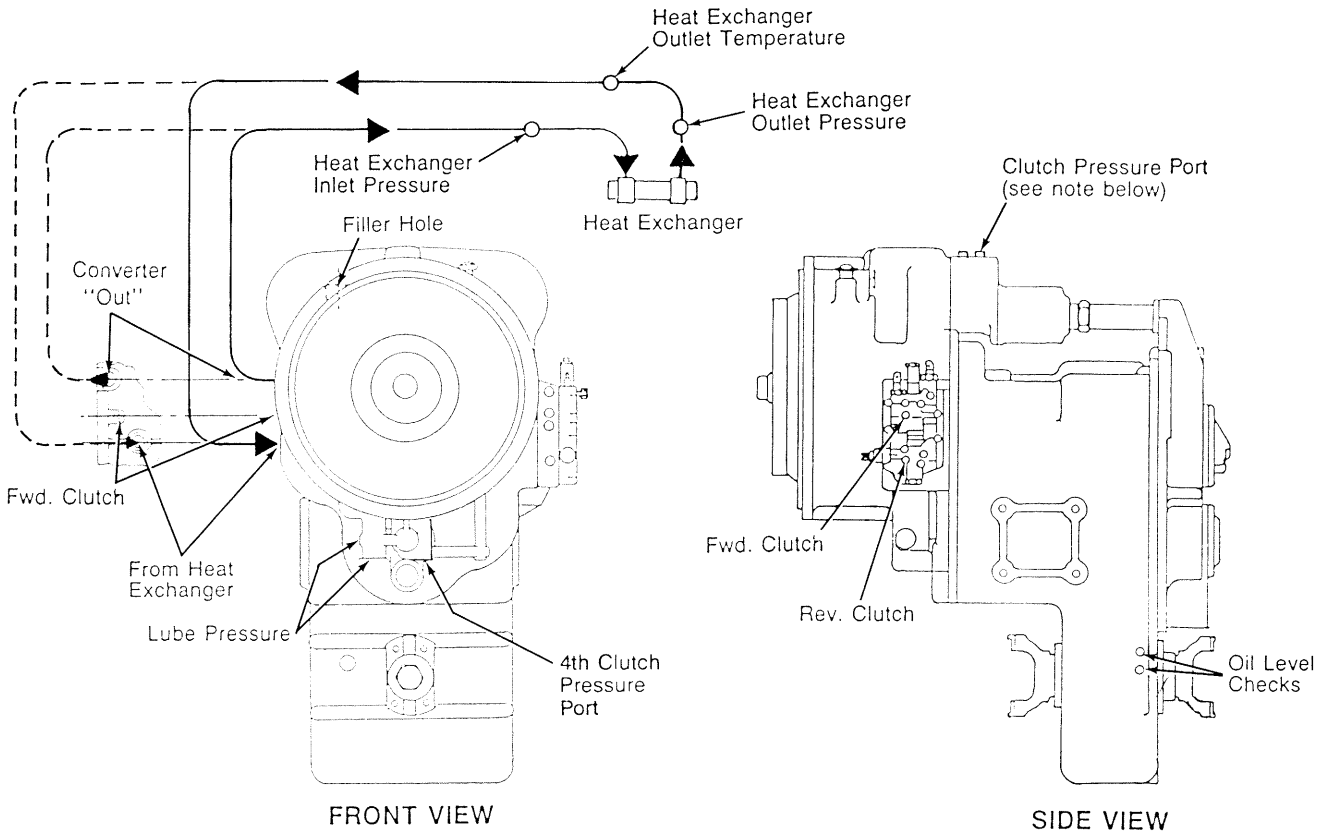
LOW (1ST) CLUTCH TAPER BEARING ADJUSTMENT PLOTTING CHARTS

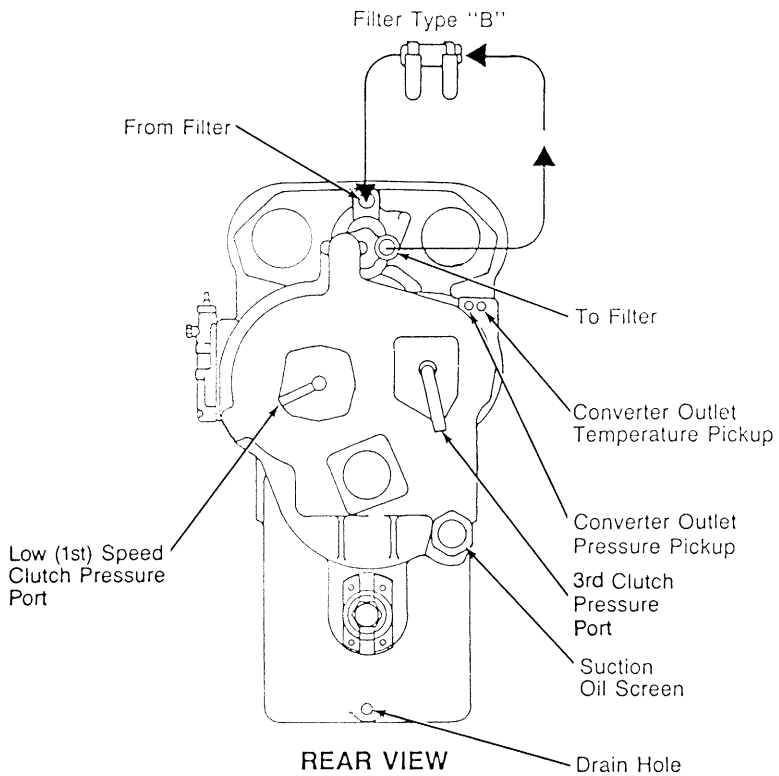
THIS CHART IS FOR PLOTTING USE



THIS CHART IS FOR PLOTTING USE







Converter Outlet Temperature
Port is to be used for converter outlet temperature pickup. Gauge is to be located in the operators compartment.

Converter Outlet Pressure
Test Conditions:
Converter outlet oil temp. 180°-200° [82,3°-93,3° C]
Transmission in "Neutral".
25 PSI [172,4 kPa] Minimum pressure at 2000 RPM Engine speed and a maximum 70 PSI [482,6 kPa] outlet pressure with engine at no load governed speed.

Clutch Pressure
Recommend that the clutch pressure be monitored by a gauge having an indicator dial range of 0-400 [0-2758 kPa]. Gauge is to be located in the operators compartment. Clutch pressure range 240-280 PSI [1655-1931 kPa].

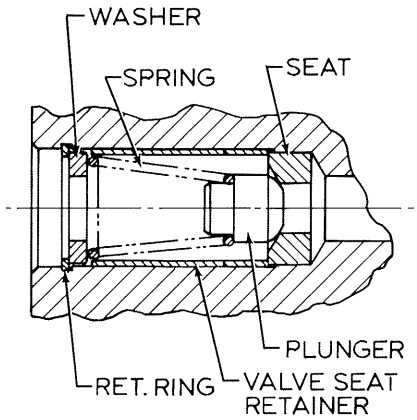


Figure 286

If unit has lube pressure relief valve and was disassembled for cleaning or replacement, reassemble in order shown.

OIL SEALING RING SLEEVE REMOVAL

NOTE: The following photos are not of the HR 34000 Converter Housing but the sleeve removal procedure is identical.

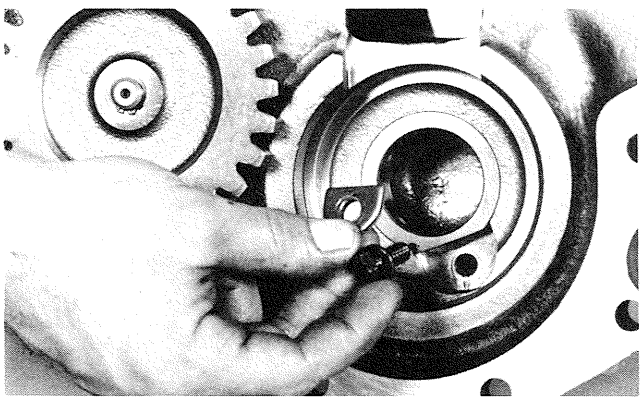


Figure 287

Remove clutch shaft front bearing locating ring. Remove sleeve retainer plate screw, washer and retainer plate.

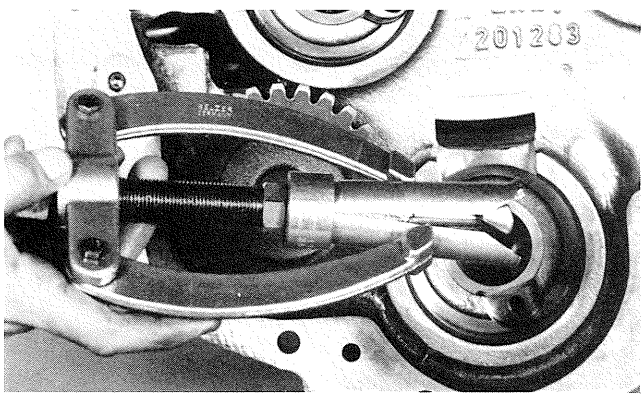


Figure 288

Using a sleeve puller like the one shown, remove sleeve.

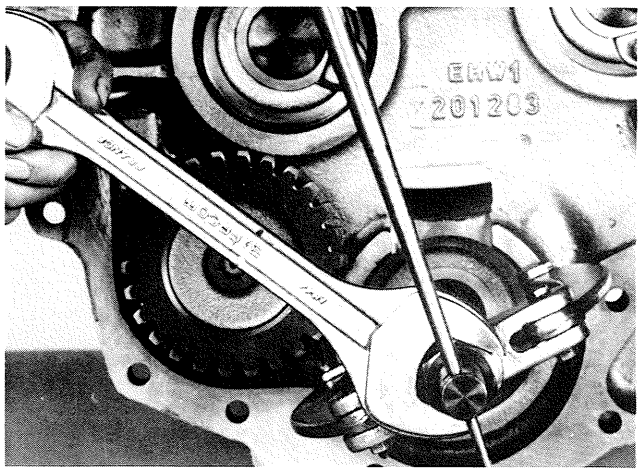


Figure 289

Sleeve being removed.

When installing a new sleeve it is recommended a press or a driver be used to prevent damage to the sleeve and be sure the notch in the sleeve is aligned with sleeve lock notch.

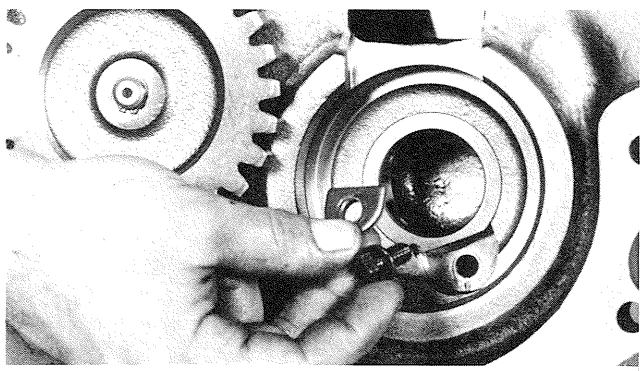


Figure 290

Install sleeve lock and capscrew.

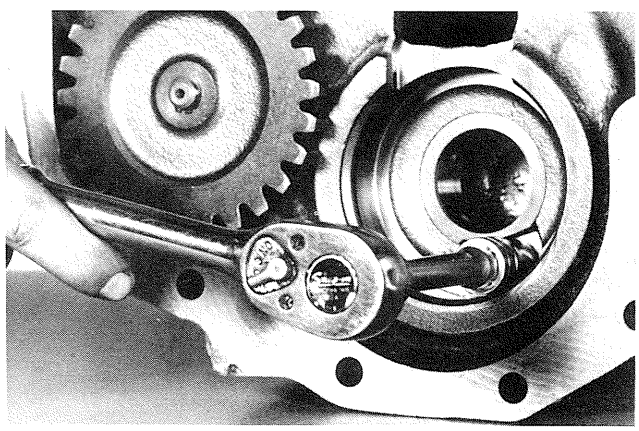
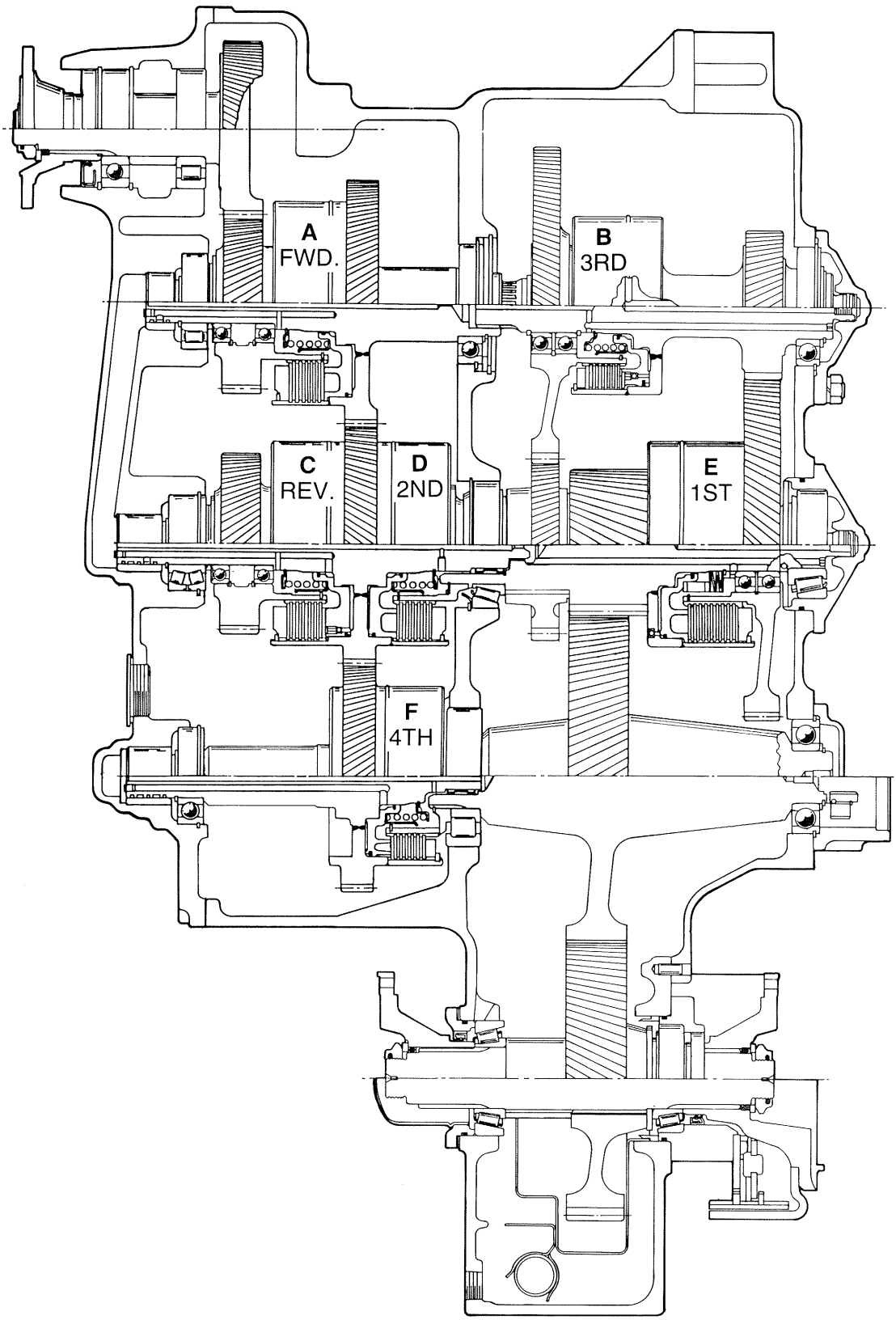
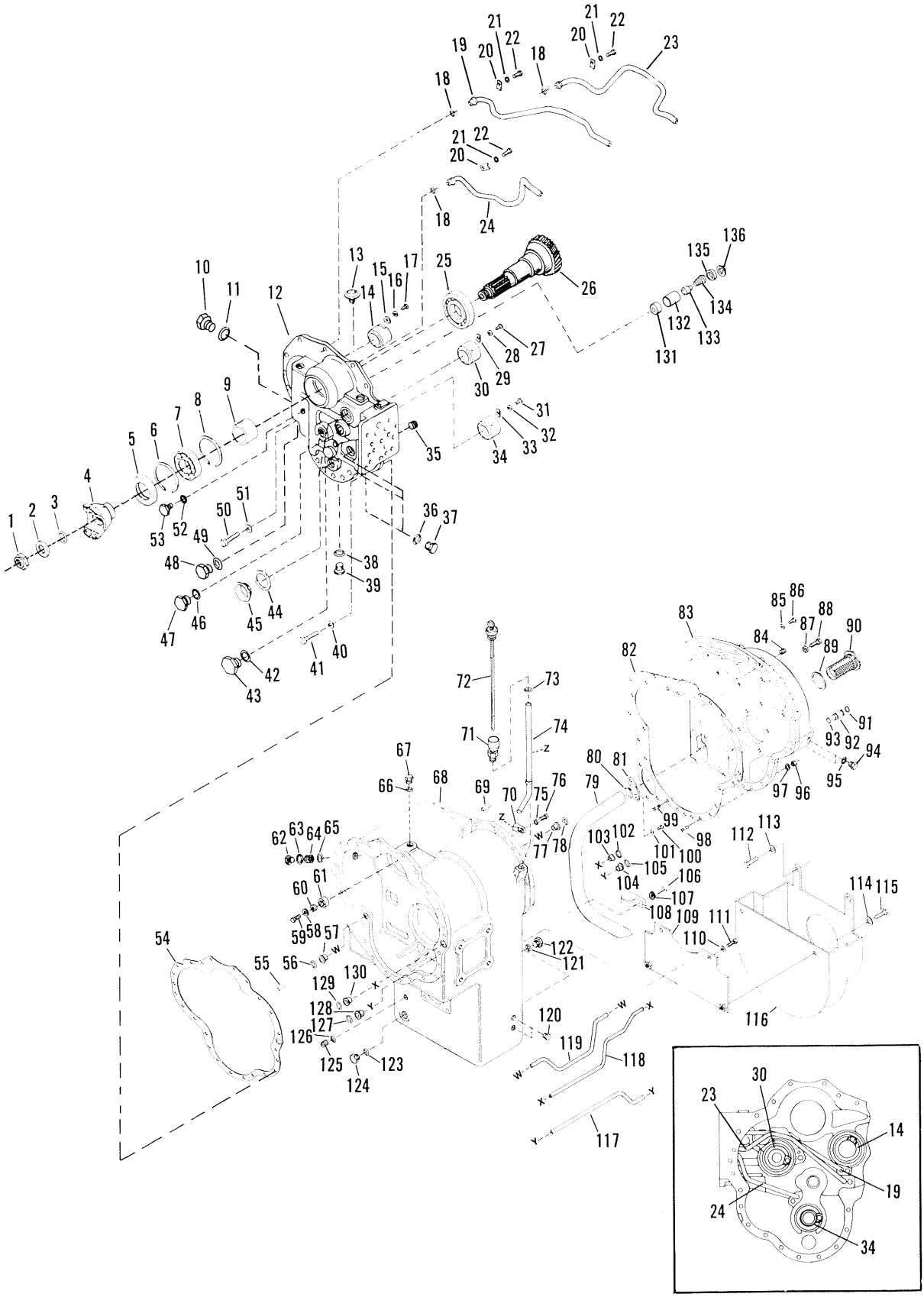


Figure 291

Tighten capscrew to specified torque. (See torque chart.) Position clutch shaft front bearing locating ring in ring groove.

R-MODEL SECTION
BASIC DESIGN

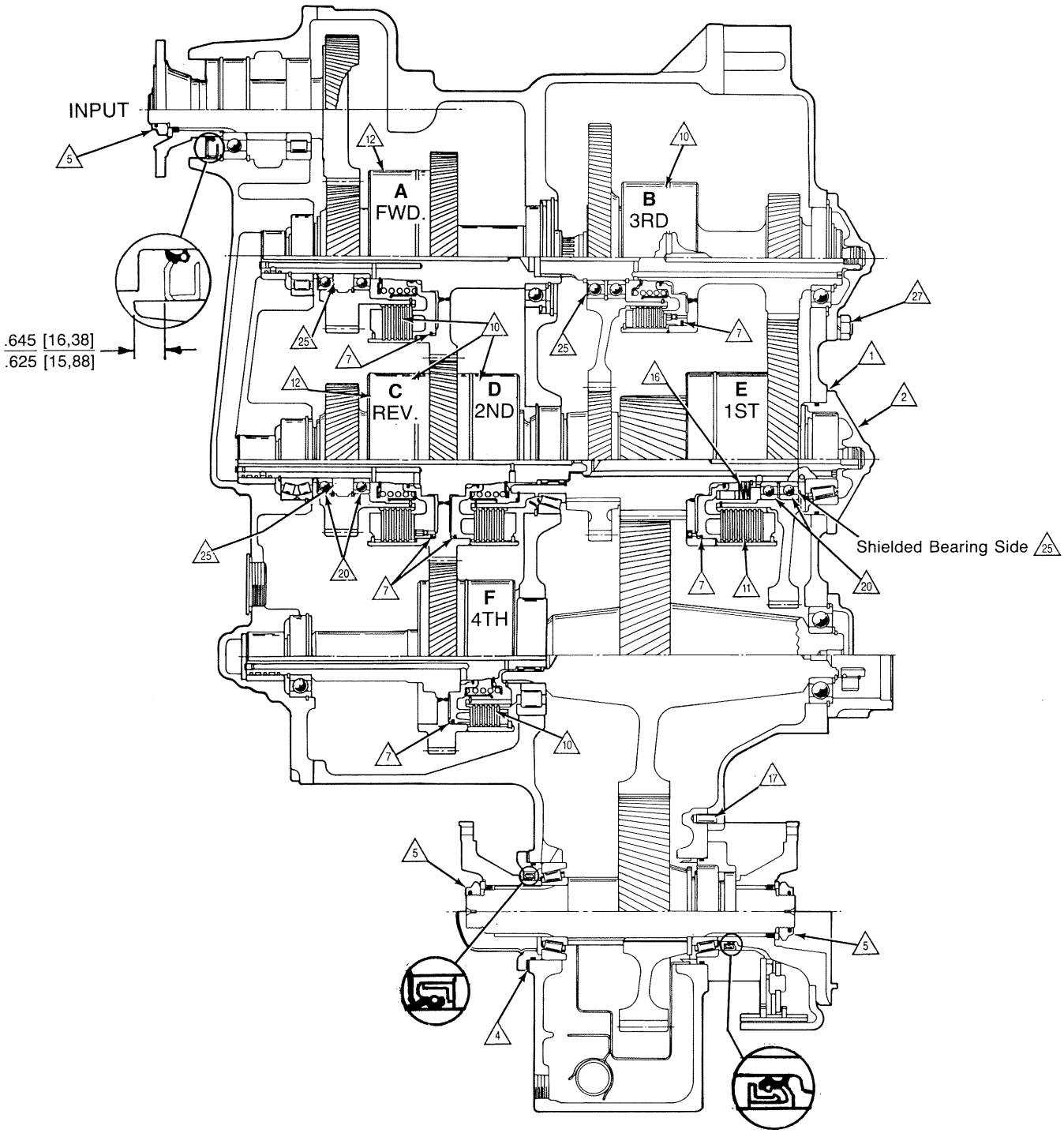



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136
W X Y Z
23 30 14 19 24 34

34000
TRANSMISSION CASE & REAR COVER GROUP

ITEM	DESCRIPTION	QTY
1	Flange Nut	1
2	Flange Nut Washer	1
3	Flange "O" Ring	1
4	Input Flange	1
5	Input Flange Oil Seal	1
6	Input Shaft Front Bearing Locating Ring	1
7	Input Shaft Front Bearing	1
8	Input Shaft Front Bearing Retaining Ring	1
9	Input Shaft Bearing Spacer	1
10	Lube Pressure Port Plug	1
11	Port Plug "O" Ring	1
12	Front Cover	1
13	Breather	1
14	Housing Sleeve	1
15	Housing Sleeve Lock	1
16	Housing Sleeve Screw Lockwasher	1
17	Housing Sleeve Screw	1
18	Tube "O" Ring	3
19	Forward Speed Tube	1
20	Tube Clip	3
21	Tube Clip Screw Lockwasher	3
22	Tube Clip Screw	3
23	3rd Pressure Tube	1
24	4th Pressure Tube	1
25	Input Shaft Rear Bearing	1
26	Input Shaft	1
27	Housing Sleeve Screw	1
28	Housing Sleeve Screw Lockwasher	1
29	Housing Sleeve Lock	1
30	Housing Sleeve	1
31	Housing Sleeve Screw	1
32	Housing Sleeve Screw Lockwasher	1
33	Housing Sleeve Lock	1
34	Housing Sleeve	1
35	Plug-for External Lube for Low Bearing	1
36	Plug "O" Ring	3
37	Pipe Plug	3
38	Plug "O" Ring	1
39	Pipe Plug	1
40	Cover to Case Screw Lockwasher	14
41	Cover to Case Screw	14
42	Plug "O" Ring	1
43	Front Cover Plug	1
44	Front Cover Plug Gasket	1
45	Front Cover Plug	1
46	Front Cover Plug "O" Ring	1
47	Front Cover Plug	1
48	Front Cover Plug	1
49	Front Cover Plug "O" Ring	1
50	Cover to Case Screw	9
51	Cover to Case Screw Lockwasher	9
52	Front Cover Plug "O" Ring	1
53	Front Cover Plug	1
54	Front Cover Gasket	1
55	Front Cover Dowel Pin	2
56	Tube Sleeve "O" Ring	1
57	Tube Sleeve	1
58	Retainer Screw Lockwasher	1
59	Retainer Screw	1
60	Outer Race Retainer	1
61	Outer Race-used with lock-up only	1
62	Speed Sensor Hole Plug	1
63	Speed Sensor Hole Plug "O" Ring	1
64	Speed Sensor Adjuster Bushing	1
65	Adjusting Bushing Shim	AR
66	Plug "O" Ring	1
67	Lock-up Supply Hole Plug	1
68	Transmission Case	1
69	Transmission Case to Rear Cover Dowel Pin	2
70	Dipstick Tube Clip	1
71	Dipstick Housing	1
72	Dipstick	1
73	Dipstick Housing "O" Ring	1
74	Dipstick Tube	1
75	Tube Clip Lockwasher	1
76	Dipstick Tube Clip Screw	1
77	Tube Sleeve	1
78	Tube Sleeve "O" Ring	1
79	Suction Tube	1
80	Suction Tube "O" Ring	1
81	Suction Tube Flange	1
82	Transmission Case to Rear Cover Gasket	1
83	Transmission Case Rear Cover	1
84	3rd Clutch Supply Passage Plug	1
85	Rear Cover to Case Screw Lockwasher	5
86	Rear Cover to Case Screw Lockwasher	5
87	Rear Cover to Case Screw Lockwasher	11
88	Rear Cover to Case Screw Lockwasher	11
89	Screen Assembly Gasket	1
90	Screen Assembly	1
91	1st Speed Sleeve "O" Ring	2
92	1st Speed Clutch Pressure Sleeve	2
93	1st Speed Sleeve "O" Ring	2
94	Rear Cover Supply Plug	2
95	Supply Plug "O" Ring	2
96	Rear Cover to Case Stud Nut	12
97	Rear Cover to Case Stud Lockwasher	12
98	Rear Cover to Case Stud	7
99	Rear Cover to Case Stud	7
100	Suction Tube Retainer Screw	2
101	Suction Tube Retainer Screw Washer	2
102	Tube Sleeve "O" Ring	1
103	Tube Sleeve	1
104	Tube Sleeve	1
105	Tube Sleeve "O" Ring	1
106	Suction Tube Clip Screw	1
107	Suction Tube Clip Screw Washer	1
108	Suction Tube Clip	1
109	Baffle Mounting Plate Assembly	1
110	Baffle Mounting Plate Screw Washer	2
111	Baffle Mounting Plate Screw	2
112	Oil Baffle to Case Screw	2
113	Oil Baffle to Case Screw Washer	2
114	Oil Baffle to Plate Screw Washer	2
115	Oil Baffle to Plate Screw	2
116	Oil Baffle	1
117	1st Speed Clutch Pressure Tube	1
118	Low Shaft Rear Bearing Lube Tube	1
119	3rd Speed Clutch Pressure Tube	1
120	Oil Level Plug	2
121	Drain Plug "O" Ring	2
122	Drain Plub	2
123	Auxiliary Drain Plug "O" Ring	1
124	Auxiliary Drain Plug	1
125	Drain Back Plug	1
126	Drain Back Plug "O" Ring	1
127	Tube Sleeve "O" Ring	1
128	Tube Sleeve	1
129	Tube Sleeve "O" Ring	1
130	Tube Sleeve	1
131	Safety Valve Seat	1
132	Valve Seat Retainer	1
133	Pressure Relief Valve Plunger	1
134	Pressure Relief Spring	1
135	Pressure Relief Valve Washer	1
136	Relief Valve Retaining Ring	1

*AR-As Required



R Model 4 Speed Cross-Section

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

Prelube before assembly. All piston ring grooves and "O" rings, with Multi-purpose grease Grade 2.

Apply thin coat of Loctite 638 (color green) to outside diameter of all oil seals, bore plugs and bores they are to be installed into, before assembly. Use extreme care not to allow sealant to come into contact with seal lip material.

Apply thin coat of Loctite 270 (color green) to all thru hole stud threads which do not have pre-applied sealant.

Apply thin coat of Loctite Vibra Seal 516 (color burnt orange) to all pipe thread fittings which do not have pre-applied sealant.

If grease required for positioning gasket during assembly, use Multi-purpose grease Grade 2.

After assembly of parts using Loctite, there must not be any free or excess material which might enter the oil circuit. *Only use Loctite where specified.*

△1 Low (1st) clutch taper bearing adjustment (See Special Instructions)

△2 Low shaft rear bearing cap must be assembled as shown on Rear View.

△4 Shim output shaft bearings to produce 4-10 In. lbs. [0,46-1,1 N·m] preload rolling torque.

△5 See Elastic Stop Nut Torque Chart.

△7 Cast iron piston rings in outer piston ring location and Viton Rigs at inner piston ring location. All speed versions, all clutches.

△10 6 outer steel plates, 6 inner friction plates, alternately assemble, starting with outer steel plate.

△11 9 outer steel plates, 9 inner friction plates, alternately assemble, starting with outer steel plate.

△12 Modulated Forward and Reverse clutches. 11 outer steel plates, 12 inner friction plates, alternately assembled starting with inner friction plate. Non-Modulated Forward and Reverse clutches use item △10

△16 Clutch piston return spring: Concave side of first Belleville spring must be assembled toward clutch piston. Alternate remaining springs.

△17 All dowel pins must be installed in transmission case before assembly of mating parts.

△18 Tighten oil screen assembly 10 to 15 Ft. Lbs. [13-20 N·m] all models.

△20 Must be loose internal fit bearings with a No. 3 etched on the bearing.

△25 **Bearing shield faces OUT on Low & 3rd clutches. Bearing shield faces IN on FWD & Reverse clutches.**

△27 Must tighten stud nuts in sequence on Third Speed Shaft Bearing Cap to avoid damage to "O" Ring.

ELASTIC STOP NUT TORQUE

THREAD SIZE	LB.-FT.	[N·m]
1" - 20	150 - 200	[203,4 - 271,1]
1¼" - 18	200 - 250	[271,2 - 338,9]
1½" - 18	300 - 350	[406,8 - 474,5]
1¾" - 12	400 - 450	[542,4 - 610,1]

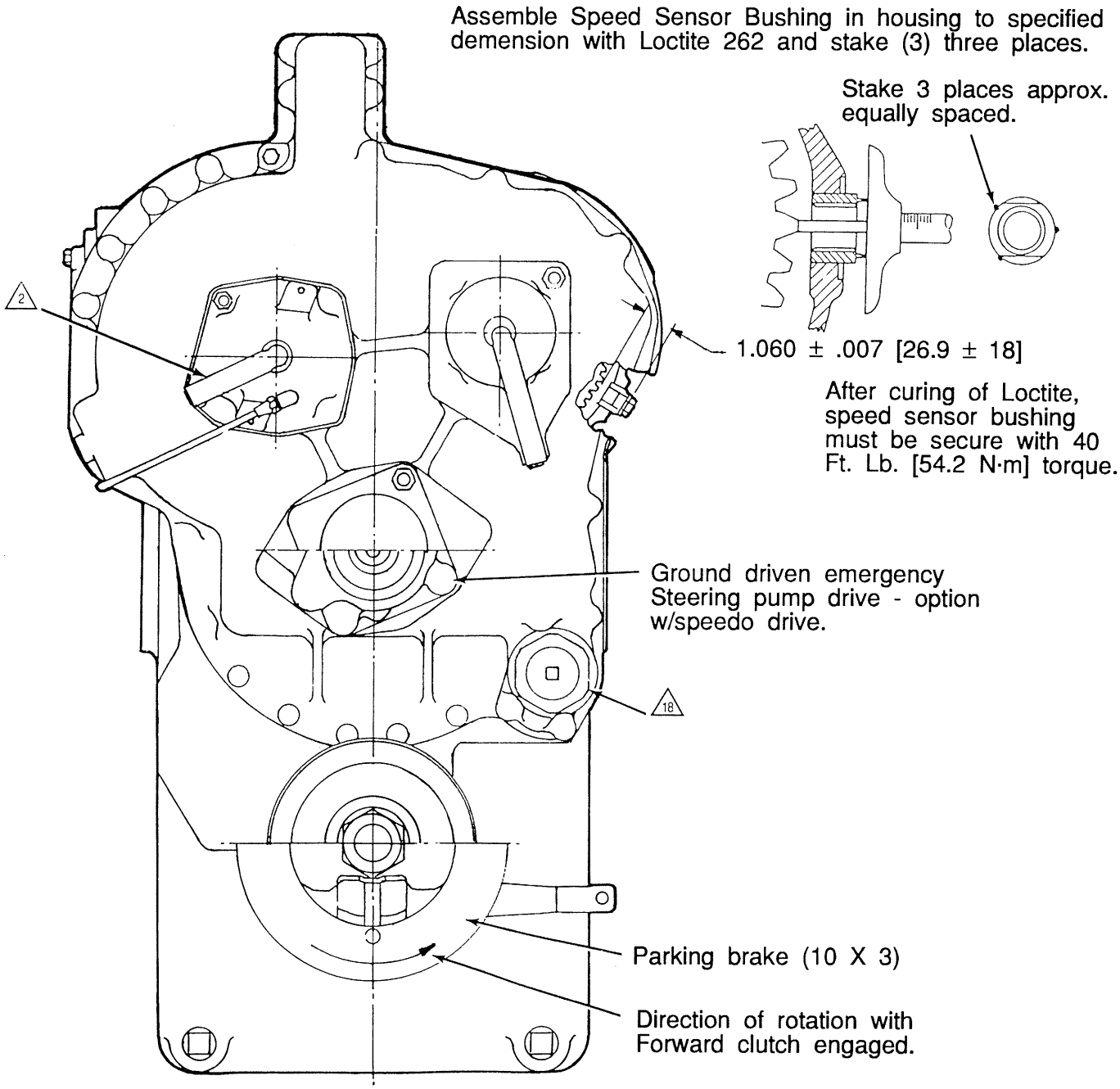
Torque Specification for Lubricated or Plated Screw Threads

Grade 5

NOM. SIZE	FINE THREAD LB-FT	[N·m]	COARSE THREAD LB-FT	[N·m]
.7500	223 - 245	[302 - 332]	200 - 220	[271 - 298]
.6250	128 - 141	[174 - 191]	113 - 124	[153 - 168]
.5625	91 - 100	[123,4 - 135,5]	82 - 90	[111,2 - 122,0]
.5000	64 - 70	[86,8 - 94,9]	57 - 63	[77,3 - 85,4]
.4375	41 - 45	[55,6 - 61,0]	37 - 41	[50,2 - 55,5]
.3750	26 - 29	[35,3 - 39,3]	23 - 25	[31,2 - 33,8]
.3125	16 - 20	[21,7 - 27,1]	12 - 16	[16,3 - 21,6]
.2500	9 - 11	[12,3 - 14,9]	8 - 10	[10,9 - 13,5]

Grade 8

FINE THREAD LB-FT	[N·m]	COARSE THREAD LB-FT	[N·m]
315 - 347	[427 - 470]	282 - 310	[382 - 420]
180 - 198	[244 - 268]	159 - 175	[216 - 237]
128 - 141	[173,6 - 191,1]	115 - 127	[156,0 - 172,2]
90 - 99	[122,1 - 134,2]	80 - 88	[108,5 - 119,3]
58 - 64	[78,7 - 86,7]	52 - 57	[70,6 - 77,2]
37 - 41	[50,2 - 55,5]	33 - 36	[44,8 - 48,8]
28 - 32	[38,0 - 43,3]	26 - 30	[35,3 - 40,6]
11 - 13	[15,0 - 17,6]	9 - 11	[12,3 - 14,9]



Rear View R Model 34000
6 Speed Full Power Shift

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 R 34000 4 speed transmission with many options. Companion flanges and output shafts with and without disconnect assemblies may vary on specific models. The units 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 possiblility of dirt and foreign matter entering the mechanism.

Drain as much oil as possible before disassembly.

DISASSEMBLY

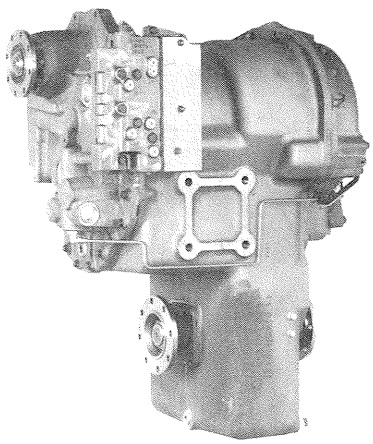


Figure 1
Side view of transmission with electric control valve.

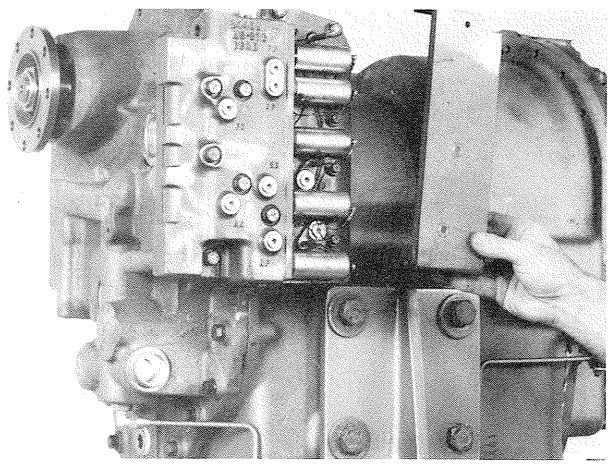


Figure 3
Remove dust cover.

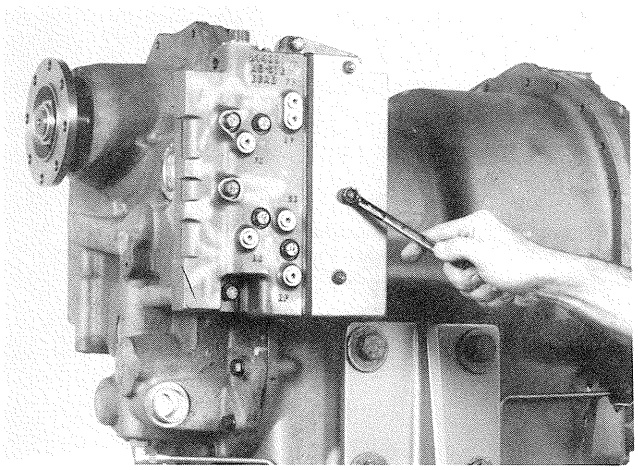


Figure 2
Remove solenoid dust cover stud nuts and washers.

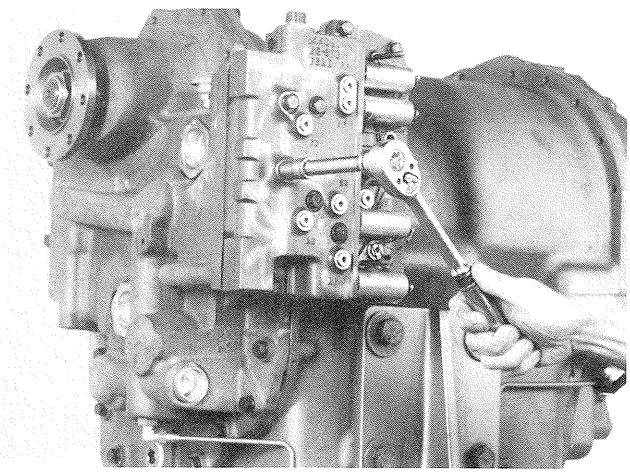


Figure 4
Remove control valve to adaptor bolts.

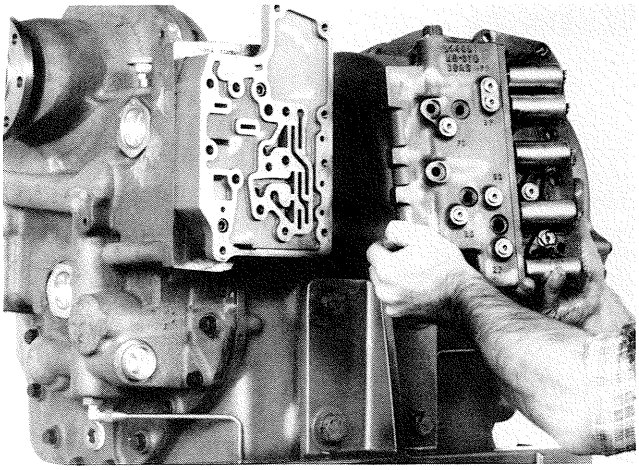


Figure 5
Remove control valve, gaskets and seal plate.

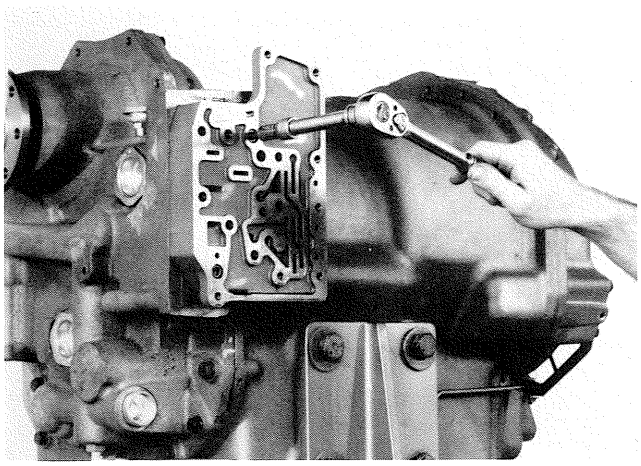


Figure 6
Remove valve adaptor bolts.

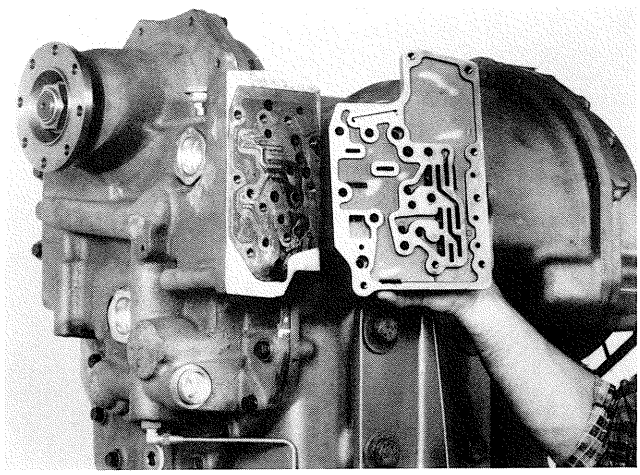


Figure 7
Remove adaptor and gasket.

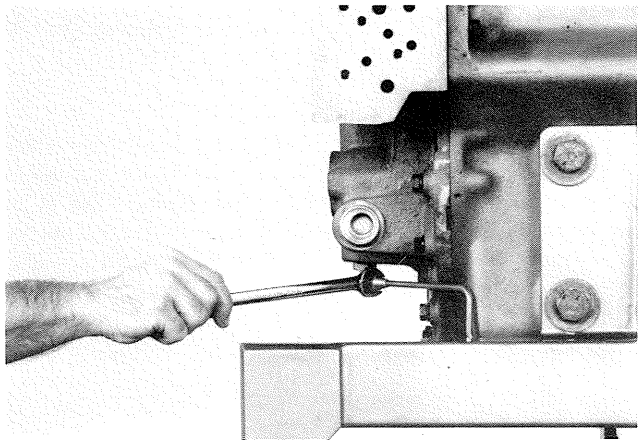


Figure 8
Remove low clutch lube tube nut from oil distributor adaptor. See page 75 for low clutch lube transfer information.

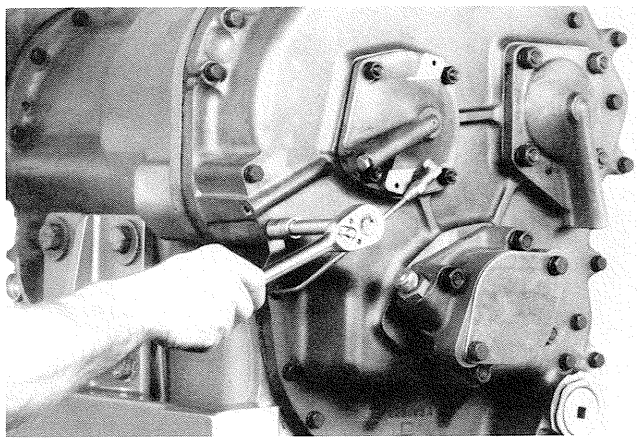


Figure 9
Remove lube tube from low (1st) clutch rear bearing cap. Remove lube tube to rear cover bracket. Remove tube.

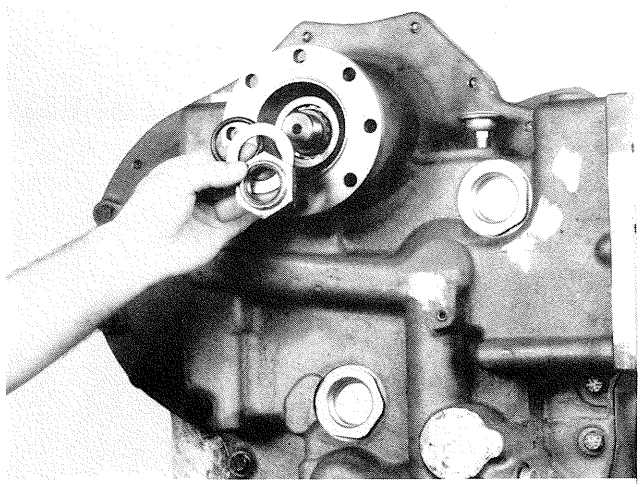


Figure 10
Remove input flange nut, washer, "O" ring and flange.

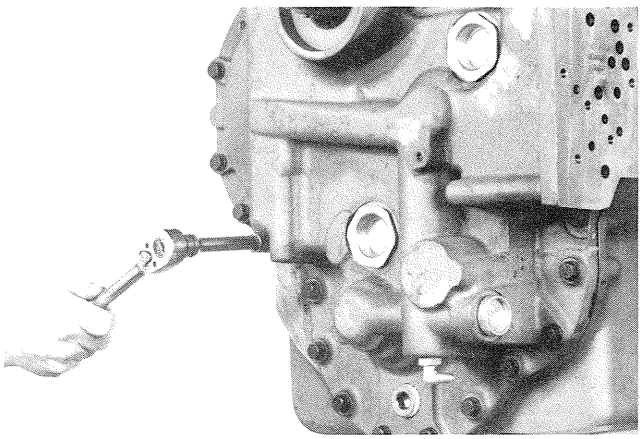


Figure 11
Remove front cover to transmission case bolts and washers.

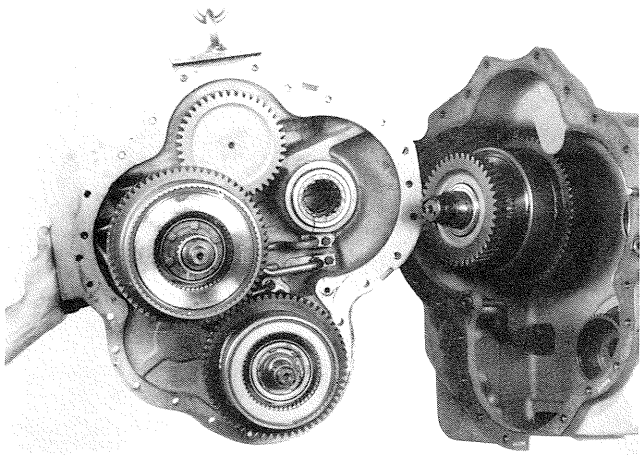


Figure 12
Support front cover with a chain hoist. Remove cover assembly from transmission assembly. **NOTE: Reverse and 2nd and 4th speed clutch will come out with front cover. Remove front cover gasket and "O" rings.**

FRONT COVER DISASSEMBLY

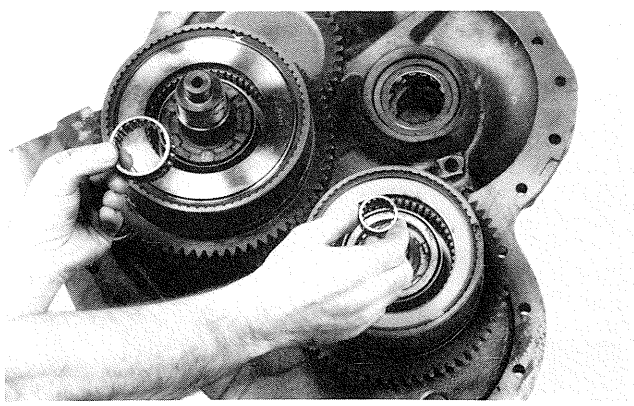


Figure 13
Remove 2nd and 4th speed clutch pilot bearings.

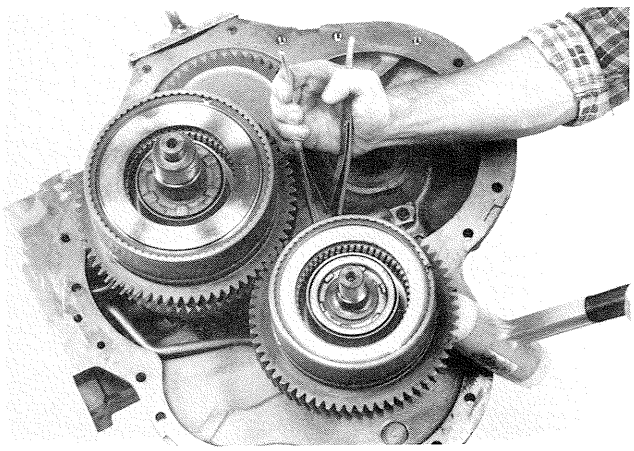


Figure 14
Spread 4th speed clutch front bearing locating ring out of ring groove in bearing. Tap or pry 4th speed clutch from cover.

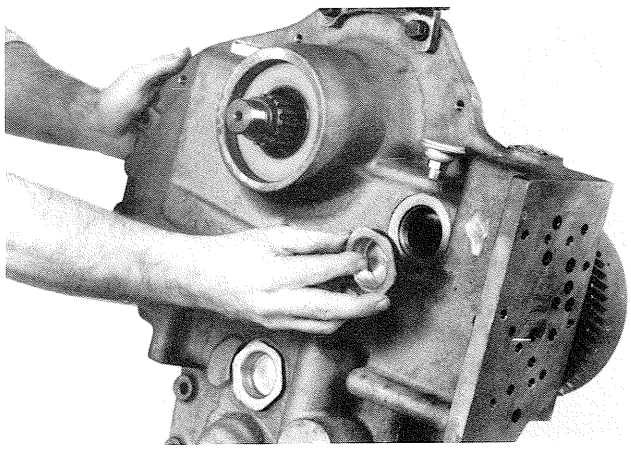


Figure 15
Remove bore plug in front of reverse clutch.

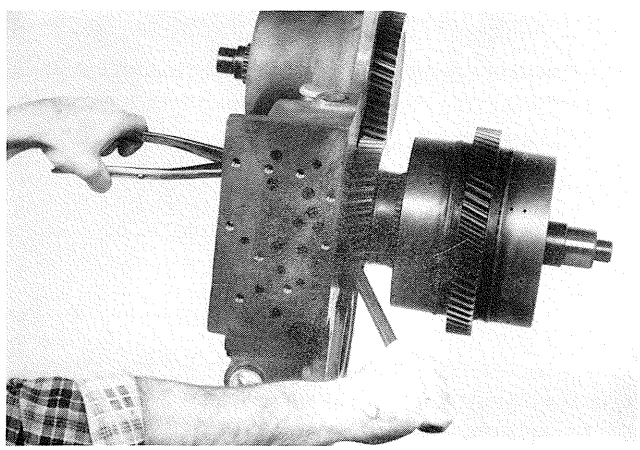


Figure 16
Spread reverse clutch front bearing locating ring out of bearing ring groove. Pry reverse and 2nd clutch from cover.

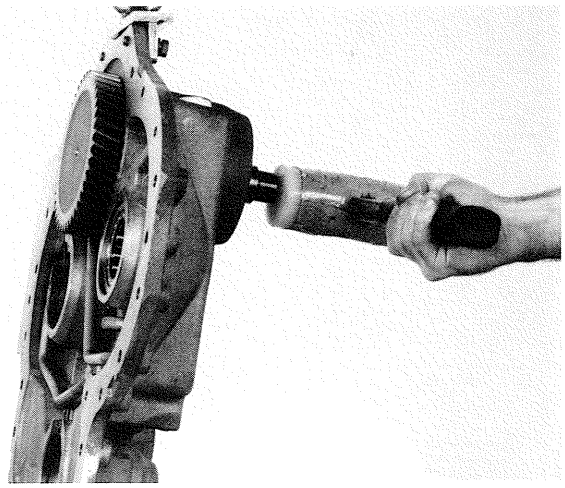


Figure 17
Tap input shaft and inner bearing from cover.

FRONT COVER REASSEMBLY

(See cleaning and inspection page)
See page 62 for oil sealing ring sleeve & pressure relief valve service.

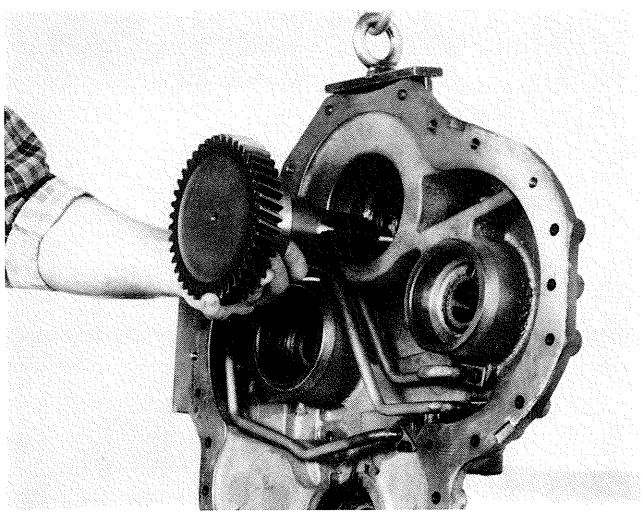


Figure 18
Install input shaft outer bearing locating ring in front cover. Install outer input shaft bearing. Install bearing retaining ring. Apply a thin coat of Locktite 638 to the outer diameter of the input shaft oil seal. Install seal in front cover with lip of seal in to the depth of .625/.645 [15,88-16,38mm]. Press inner input shaft bearing on input shaft. Position bearing spacer on shaft. Install shaft, bearing and spacer in front cover.

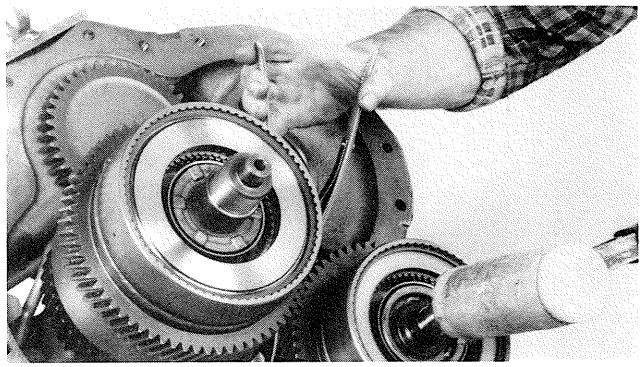


Figure 19
Spread reverse clutch front bearing locating ring and tap reverse and 2nd clutch assembly into front cover. Be certain locating ring is in full position in ring groove. Spread 4th speed clutch front bearing locating ring and tap clutch assembly into position. Be certain locating ring is in full position in ring groove.

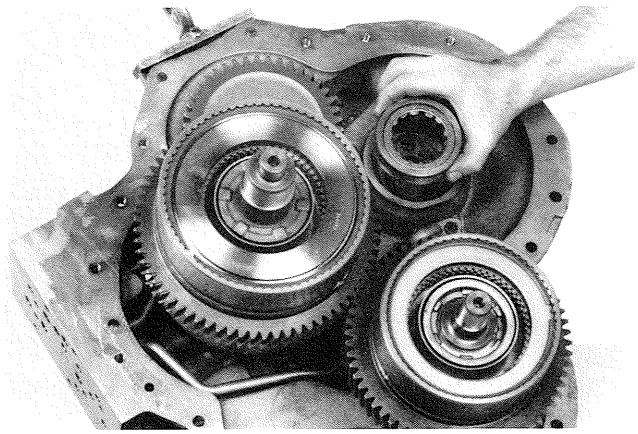


Figure 20
Position forward clutch front bearing in front cover.

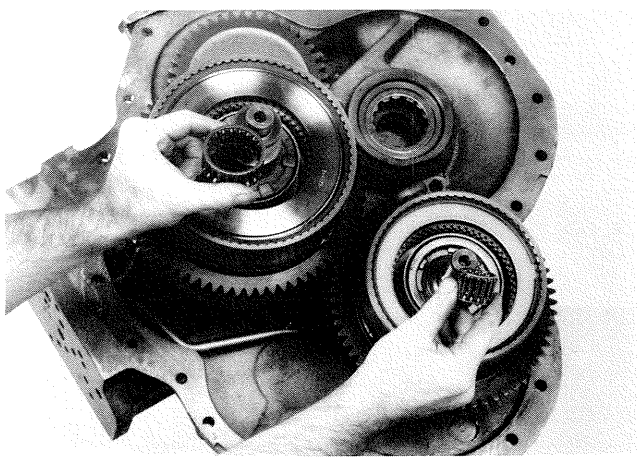


Figure 21
Position clutch shaft pilot bearings on 2nd and 4th clutch shafts. A high quality grease will hold bearings in position during assembly.

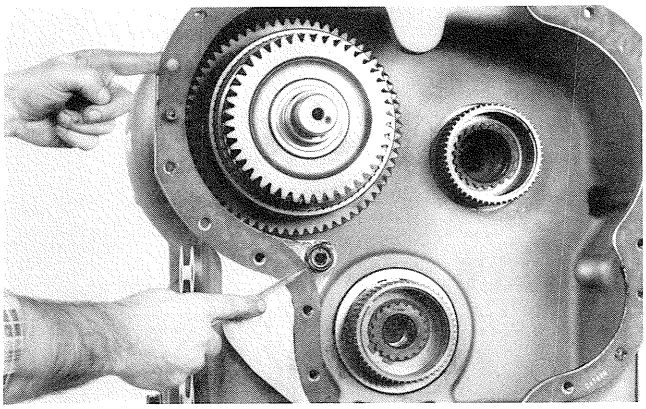


Figure 22

Position new transmission to front cover and "O" rings. **NOTE: The use of alignment studs will facilitate case to cover assembly.**

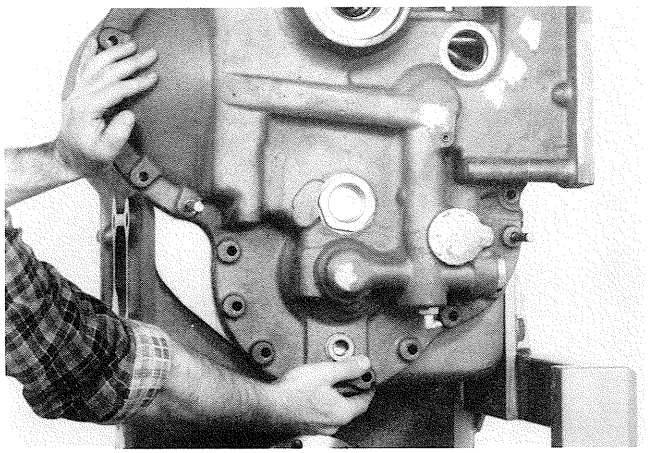


Figure 23

Position front cover assembly on alignment studs. Turn input and output shafts to help align clutch disc hubs in clutch discs. Do not force this operation.

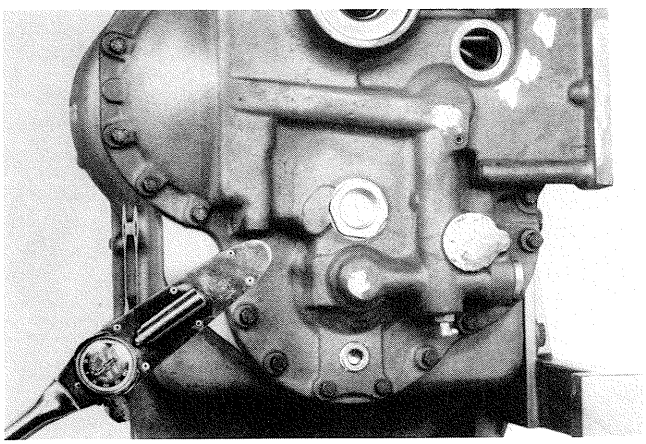


Figure 24

After front cover assembly is tight against the transmission case install cover to case bolts and washers. Tighten bolts to specified torque. (See torque chart). **NOTE: Do not use bolts to pull cover and case together.**

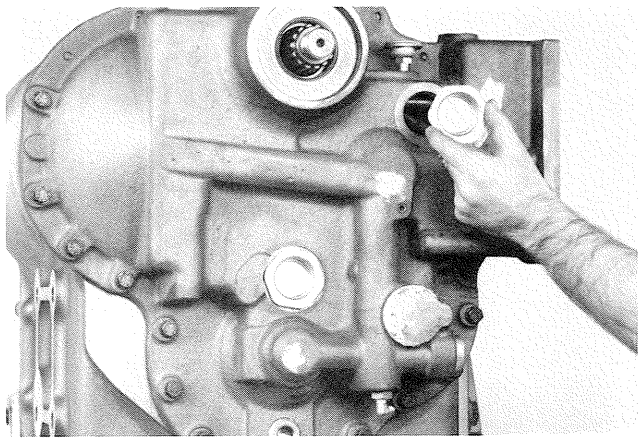


Figure 25

Using new plug gaskets install front cover gaskets and plugs.

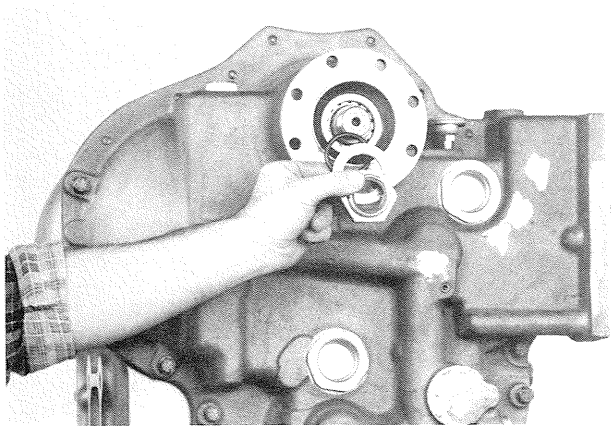


Figure 26

Install input flange, flange "O" ring, flange washer and flange nut. Tighten flange nut to specified torque (see elastic stop nut torque chart).

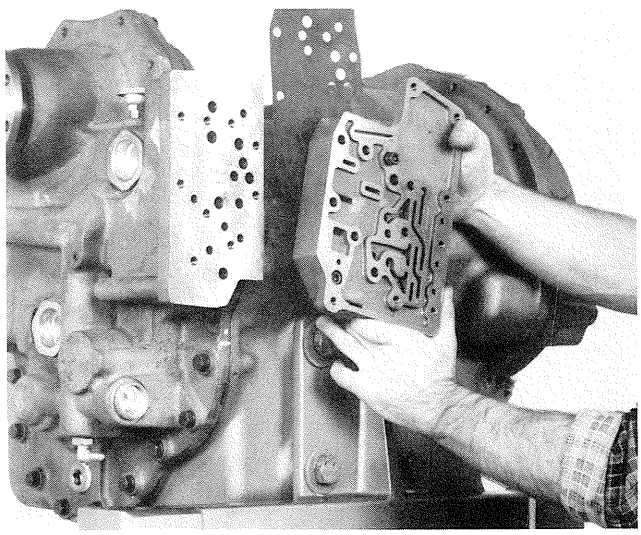


Figure 27

With a new gasket in position, install the control valve adaptor on front cover.

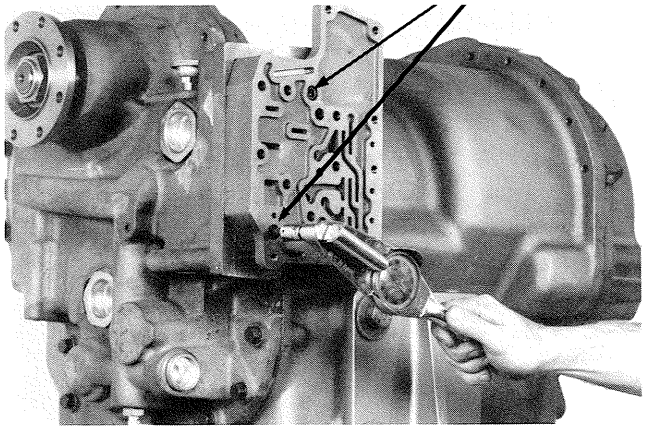


Figure 28

Install the two allen head 3/8 16 x 1 3/4 screws. In the locations shown. Tighten to specified torque (see torque chart).

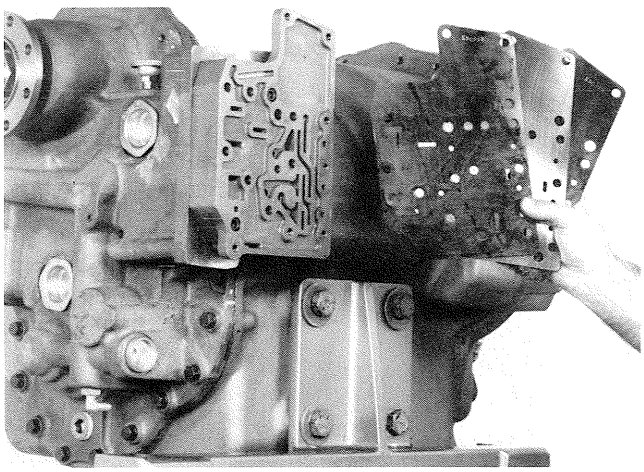


Figure 29

The use of aligning studs will facilitate control valve installation. Position a new seal plate to adaptor gasket, seal plate and plate to control valve gasket on studs.

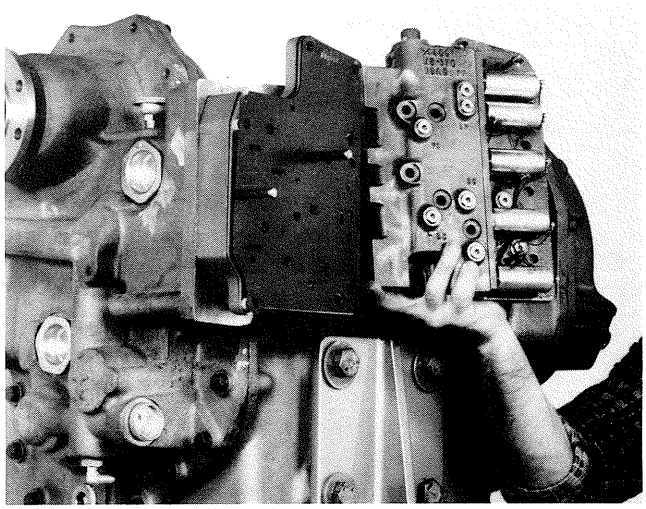


Figure 30

Position control valve assembly on aligning studs.

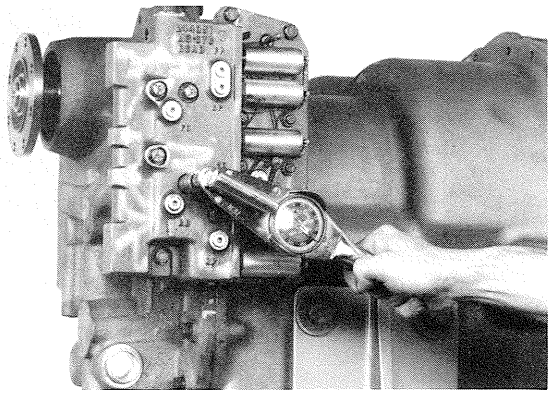


Figure 31

Install all valve to front cover bolts and washers in their specified locations (see bolt tightening diagram 99). Tighten all bolts in the sequence shown 23 to 25 ft. lbs. torque [31,2-33,8 N.m].

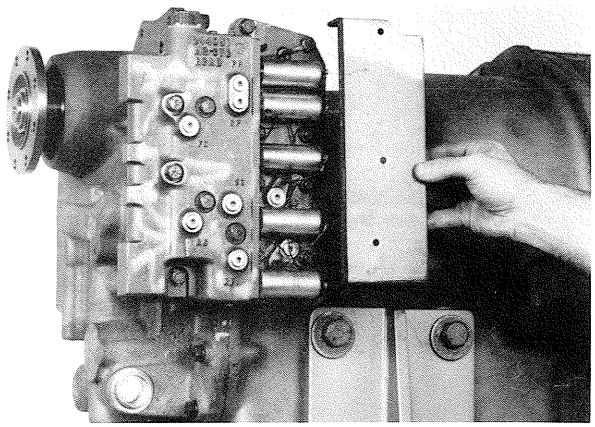


Figure 32

Position the solenoid dust cover seal on dust cover. Install cover on studs in control valve. Install washers and stud nuts. Tighten nuts 9 to 11 ft. lbs. torque [12,3-13,9 N.m].

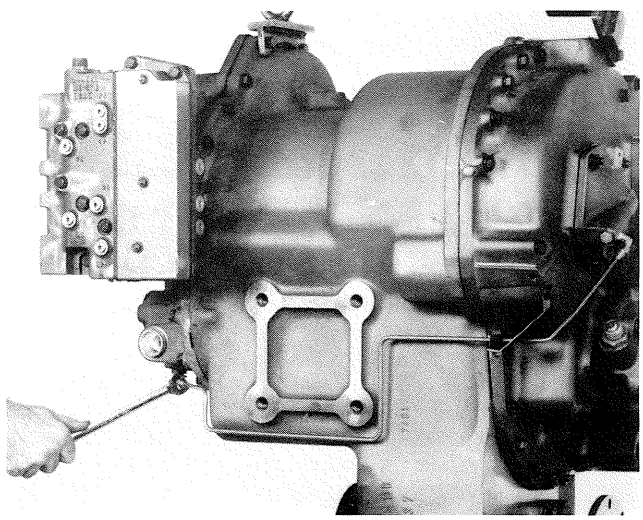
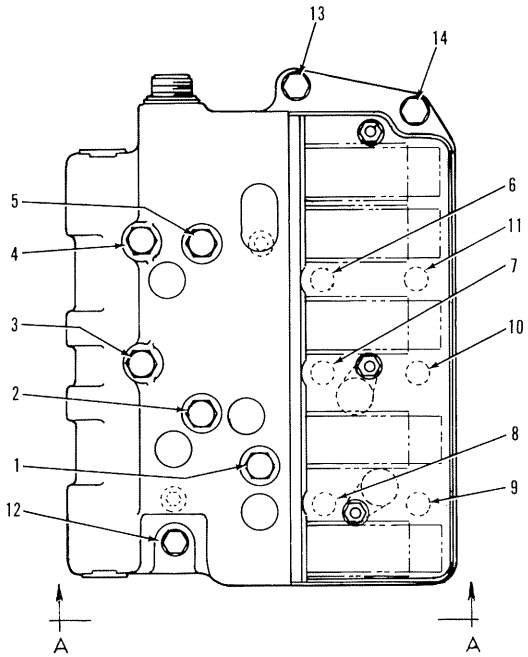
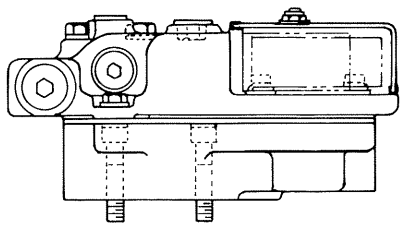


Figure 33

Install low (1st clutch bearing cap lube tube and clamp from bearing cap to oil distributor.

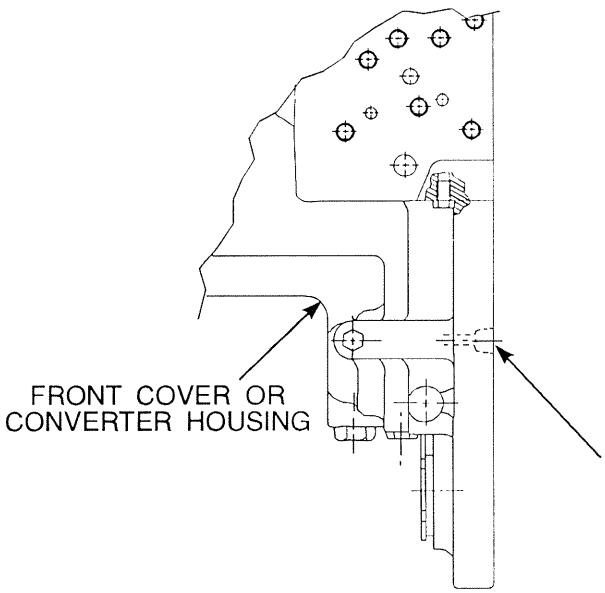


Items 1, 2, 3, 4 & 5 are Hex. Head Capscrews 3/8 – 16 x 4 1/4"
Items 12, 13 & 14 are Hex. Head Capscrews 3/8 – 16 x 1"
Items 6 & 7 are flanged 12 point Head capscrews 3/8 – 16 x 3"
Items 8, 9, 10 & 11 are flanged 12 point Head capscrews 3/8 – 16 x 1 1/4"
Tighten in sequence as follows:
1-2-3-4-5-12-13 & 14
6-7-8-9-10 & 11.



VIEW A-A

CONTROL VALVE BOLT TIGHTENING SEQUENCE DIAGRAM

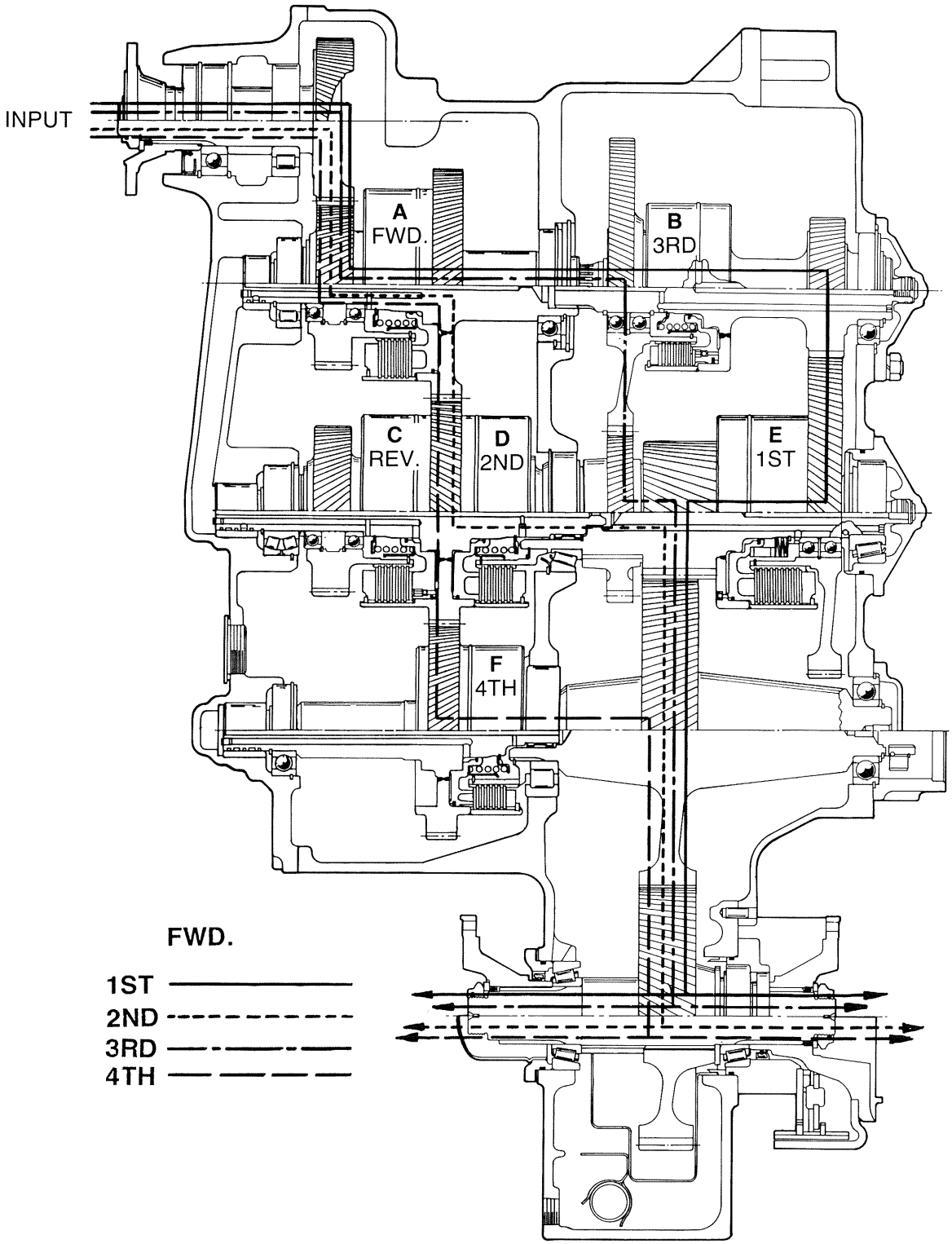


PASSAGE MUST BE LEFT OPEN FOR INTERNAL LUBE TUBE TRANSFER TO LOW CLUTCH.

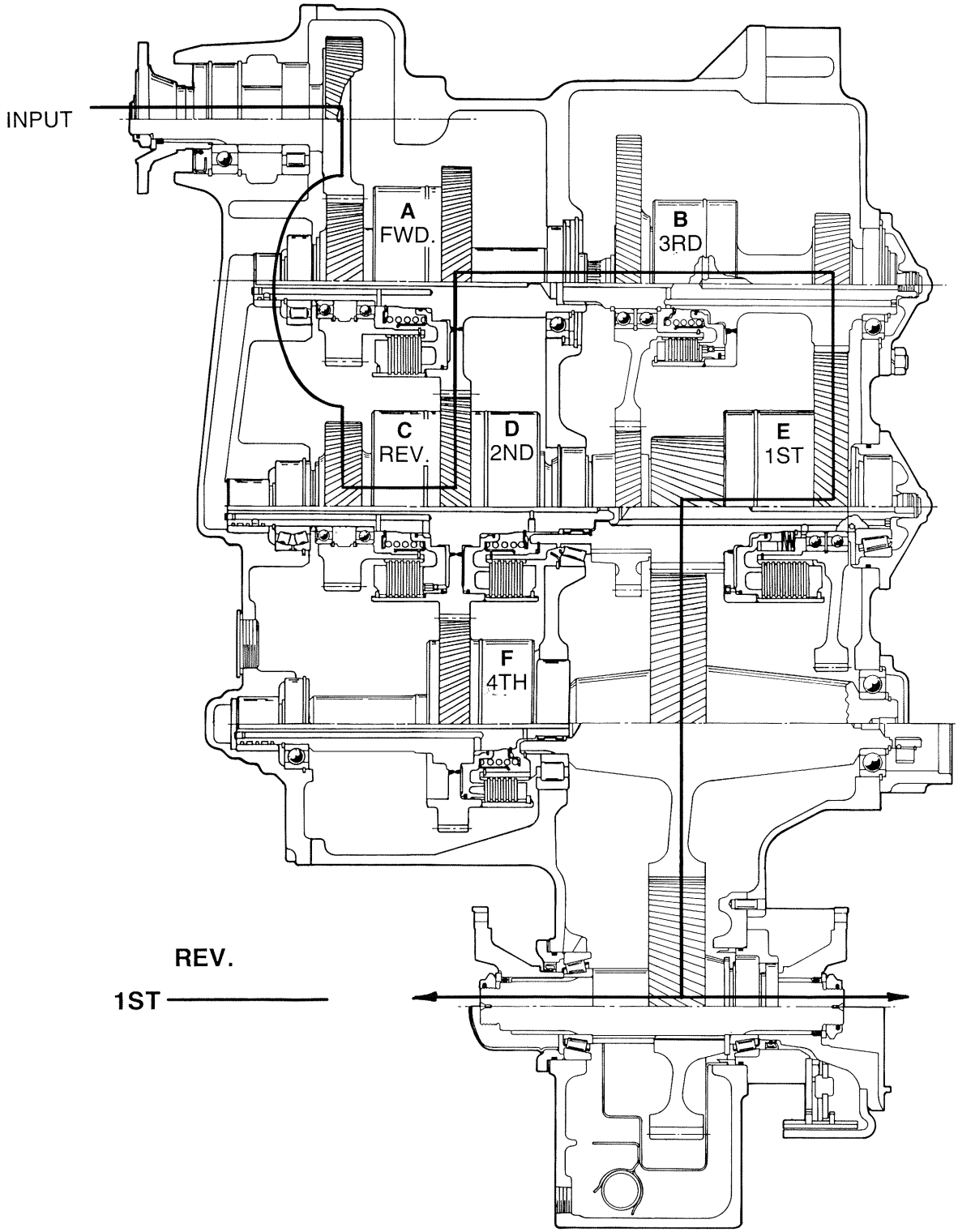
PASSAGE MUST BE BLOCKED FOR EXTERNAL LUBE TUBE TRANSFER TO LOW CLUTCH. TIGHTEN PLUG 7-10 LBF·FT [9.5-13.5 N·m]

LOW CLUTCH LUBE TRANSFER INSTRUCTIONS

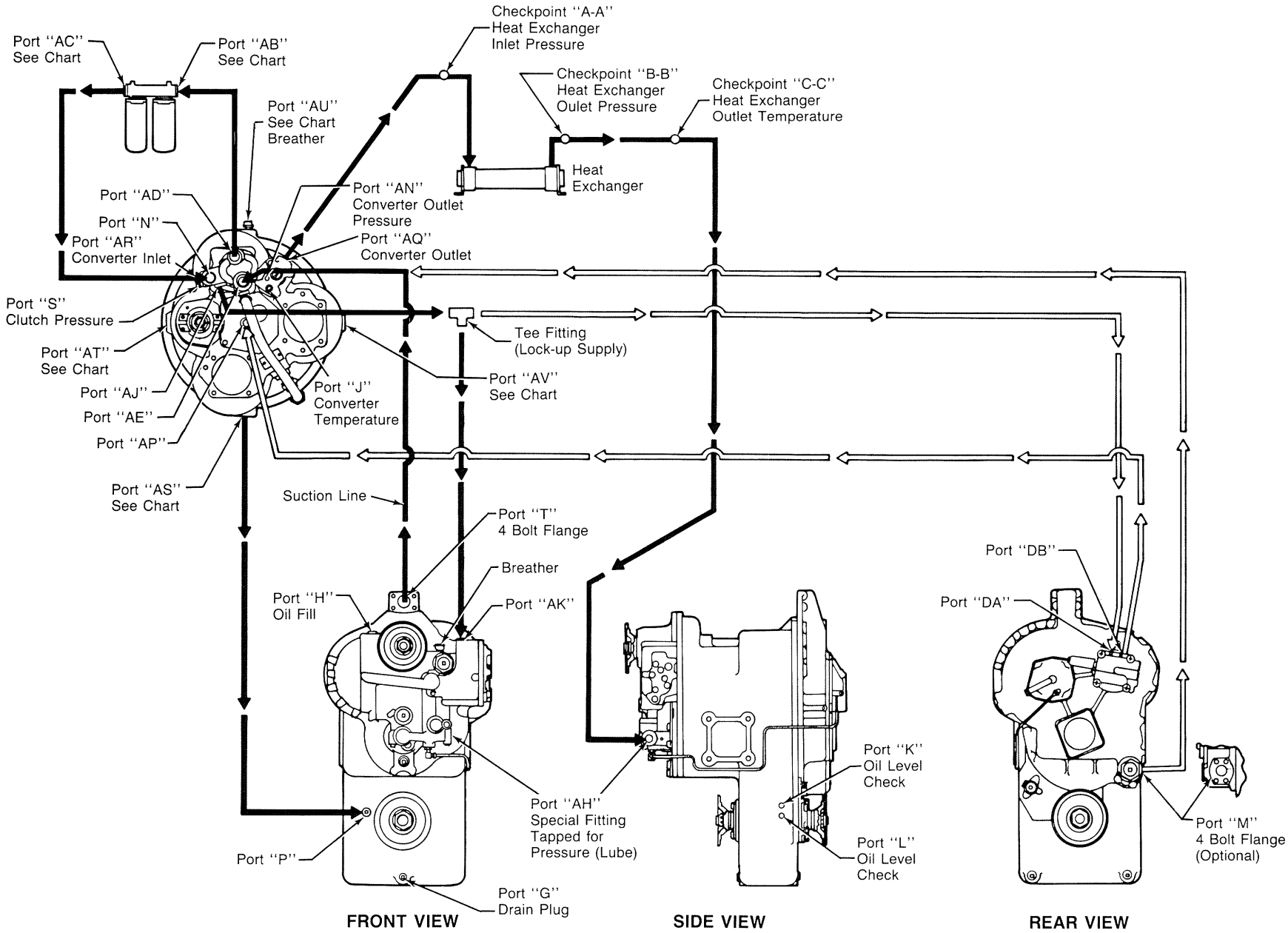
POWER FLOW



POWER FLOW



EXTERNAL PLUMBING DIAGRAM



Hose Line Operating Requirements

1. Pressure lines suitable for operating from ambient to 250°F [121,1°C] continuous operating temperature. Must withstand 300 PSI [2068,4 kPa] continuous pressure with 600 PSI [4136,9 kPa] intermittent surges. Ref. SAE Spec. No. J517100RI Hydraulic Hose Specification.

2. Suction Line to be protected from collapse by interwoven steel wire. Ref. SAE Spec. No. J5171COR4 Hydaulic Hose Specification. Suitable for operation from ambient to 250°F [121,1°C] continuous operating temperature.

3. Gravity Drain Line suitable for operation from ambient to 250°F [121,1°C] continuous operating temperature. Ref. SAE Spec. No. J517100RI Hydraulic Hose Specification.

4. All hose lines used must conform to SAE Spec. No. J109 test procedure for High Temperature Transmission Oil Hose.

Port "AU" - Breather
Alternate Ports "AS", "AT" & 'AV" —Install Breather and Valve Assembly, from Instruction Bag and Tag Assembly in highest converter port noted. See Port Chart.

Port "AS" - Converter Drain
Alternate Ports "AT", "AU" & "AV"—Select lowest of ports noted for gravity drain to Transmission. Line must have continuous slope from Converter to Transmission. If vehicle configuration will not allow slope of drain line under all operating conditions, a scavenger pump must be provided.

Port "J" - Converter Outlet Temperature
Port is to be used for Converter Outlet Temperature Pick-up. Gauge is to be located in the Operator Compartment. See Oil Temperature Gauge Specification.

Port "AN" - Converter Outlet Pressure
Test Conditions:
Warm Transmission to normal operating temperature and stabilize Converter Outlet Oil Temperature at 180° - 200°F [82,2° - 93,3°C]. Test with Transmission in Neutral.
Operating Specifications:
55 PSI [379.2 kPa] minimum pressure at low idle engine speed and must range between 60 PSI [413.7 kPa] and 70 PSI [482.6 kPa] with engine at wide open throttle no load governed speed.
Circuit pressure drop from Port "AQ" to Port "AH" is not to exceed 40 PSI [275.8 kPa] with engine at wide open throttle. No load governed speed.

Ports "S", "J", "AN" & "AR" used for field "Trouble Shooting" or Production Tests.

PORT CHART

FROM PORT	TO PORT	REMARKS
M	AE	SUCTION LINE (OPT)
T	AE	SUCTION LINE
AD	AB	
AC	N	
AJ	TEE	
TEE	AK	
TEE	DA	MOD. LOCK-UP (OPT)
AQ	HEAT EXCHANGE	
HEAT EXCHANGE	AH	
AS	P	DRAIN LINE
DB	AP	MOD. LOCK-UP (OPT)

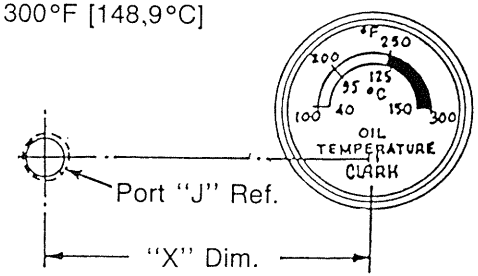
FILTER	PART NO.
CARTRIDGE	234777
SPIN-ON	246787

PORT CHART

LOCATION	PORT
CONVERTER OUT	AQ
DRAIN	AS
DRAIN	AT
DRAIN	AU
DRAIN	AV

OIL TEMPERATURE GAUGE SPECIFICATIONS
1. Normal Operating Temp. Range: 180° to 250°F [82,2° to 121,1°C]
2. Red Lined Temp: 250°F [121,1° C]
3. Maximum Operating Temp.: 300°F [148,9°C]
4. Chart—Oil Temp. Gauge:

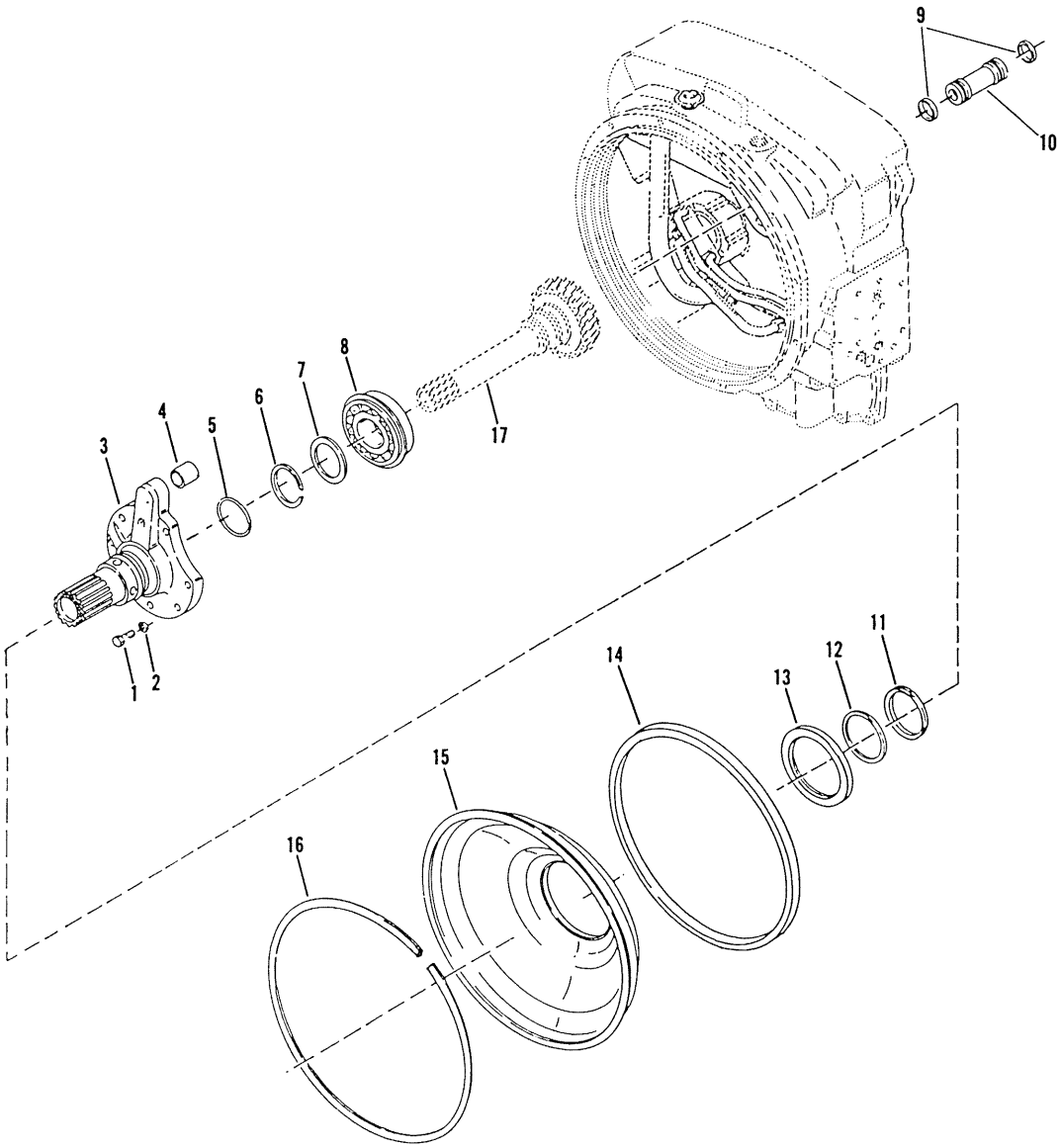
"X" Dim.	PART NO.
144.00 [3657,6]	234033
48.00 [1219,2]	234034



NOTES

CONVERTER LOCK-UP SECTION

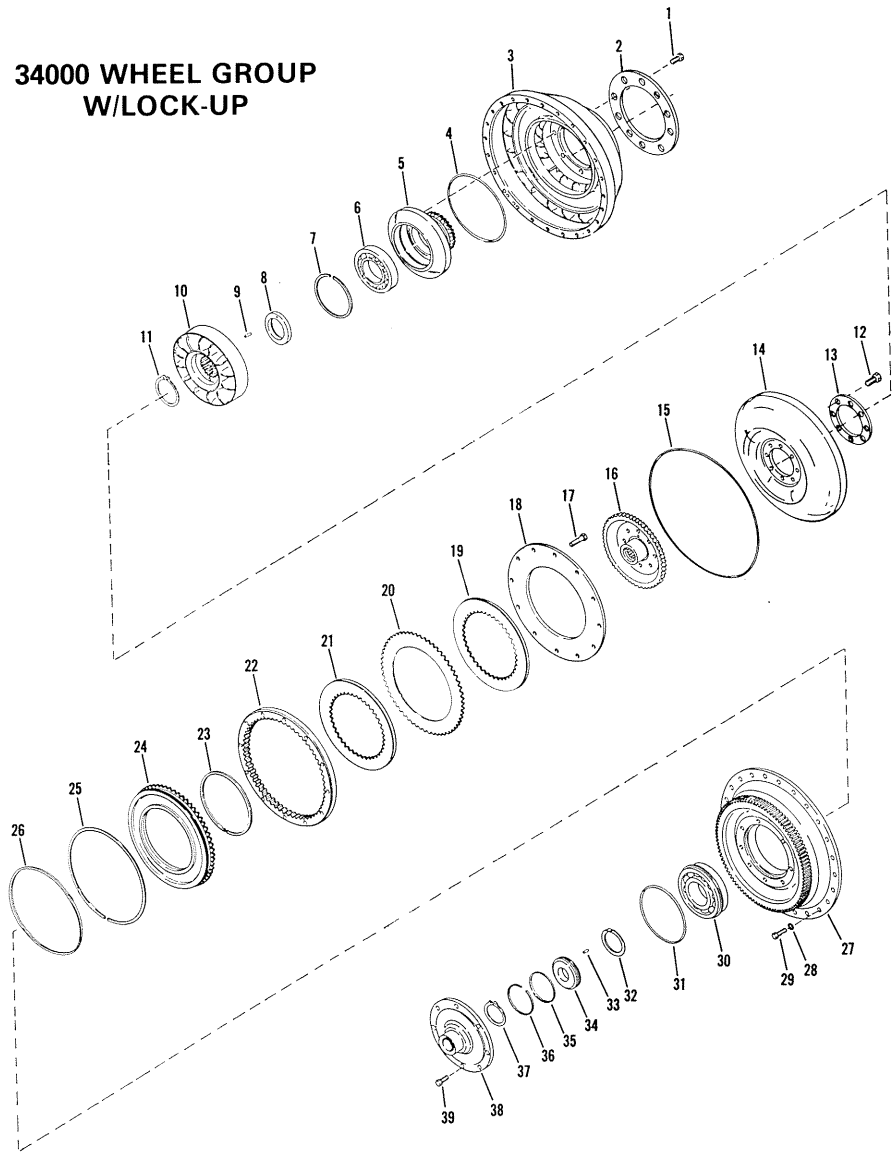
34000 OIL BAFFLE GROUP
W/LOCK-UP



ITEM	DESCRIPTION	QTY
1	Stator Support Screw	7
2	Stator Support Screw Lockwasher	7
3	Stator Support and Sleeve Assembly	1
4	Converter Inlet Tube	1
5	Turbine Shaft Piston Ring	1
6	Turbine Shaft Bearing Snap Ring	1
7	Turbine Shaft Bearing Washer	1
8	Turbine Shaft Bearing	1
9	Piston Ring	2

ITEM	DESCRIPTION	QTY
10	Turbine Shaft Piston Ring Race	1
11	Piston Ring	1
12	Piston Ring Expander Spring	1
13	Oil Baffle Oil Seal	1
14	Oil Baffle Seal Ring	1
15	Oil Baffle	1
16	Oil Baffle Retainer Ring	1
17	Turbine Shaft	1

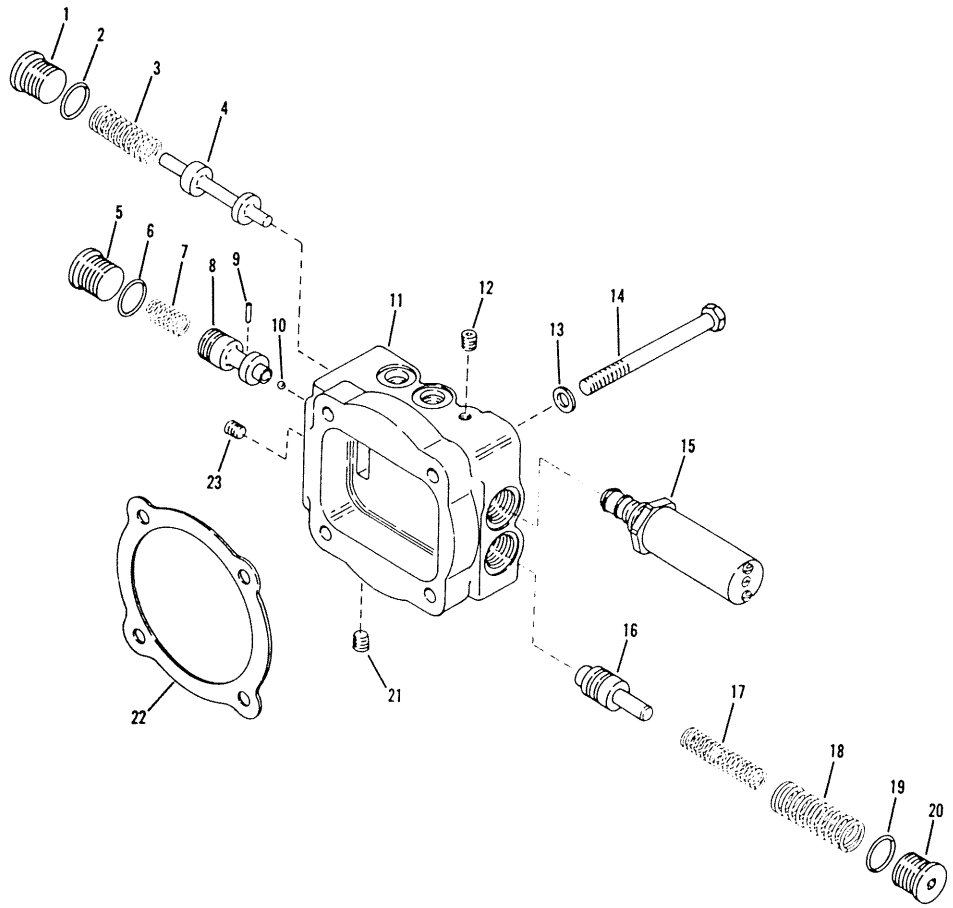
34000 WHEEL GROUP W/LOCK-UP



ITEM	DESCRIPTION	QTY
1	Hub to Impeller Screw	8
2	Impeller to Hub Screw Backing Ring	4
3	Impeller	1
4	Impeller Hub "O" Ring	1
5	Impeller Hub	1
6	Impeller Hub Bearing	1
7	Bearing Snap Ring	1
8	Reaction Member Spacer	1
9	Dowel Pin	1
10	Reaction Member	1
11	Reaction Member Snap Ring	1
12	Turbine Hub Screw	8
13	Turbine Hub Screw Backing Ring	4
14	Turbine	1
15	Impeller to Cover "O" Ring	1
16	Turbine and Lock-Up Hub	1
17	Lock-Up Backing Plate Screw	12
18	Lock-Up Backing Plate	1
19	Lock-Up Disc	1
20	Lock-Up Clutch Plate (Not used on one plate lock-up)	1

ITEM	DESCRIPTION	QTY
21	Lock-Up Disc (Not used on one plate lock-up)	1
22	Outer Drive Disc	1
23	Inner Piston Ring	1
24	Lock Up Piston	1
25	Outer Piston Ring	1
26	Piston Ring Expander Spring	1
27	Impeller Cover	1
28	Impeller Cover Screw Lockwasher	32
29	Impeller to Cover Screw	32
30	Impeller Cover Bearing	1
31	Bearing Cap to Impeller Cover "O" Ring	1
32	Turbine Hub Snap Ring	1
33	Dowel Pin	2
34	Bearing Retainer	1
35	Piston Ring Expander Spring	1
36	Piston Ring	1
37	Bearing Snap Ring	1
38	Impeller Cover Bearing Cap	1
39	Bearing Cap to Impeller Cover Screw and Lockwasher	8

34000 LOCK-UP
MODULATOR VALVE ASSEMBLY



ITEM	DESCRIPTION	QTY
1	Spool Stop Plug	1
2	Spool Stop Plug "O" Ring	1
3	Spool Stop Spring	1
4	Spool	1
5	Regulator Spool Stop Plug	1
6	Regulator Spool Stop Plug "O" Ring	1
7	Regulator Spool Spring	1
8	Regulator Spool Assembly (Incl. Items 9 & 10	1
9	Roll Pin	1
10	Relief Ball	1
11	Lock Up and Modulator Valve Housing	1
12	Plug	1

ITEM	DESCRIPTION	QTY
13	Valve Mounting Screw Lockwasher	4
14	Valve Mounting Screw	4
15	Solenoid	1
16	Accumulator Valve Spool	1
17	Accumulator Spring - Inner	1
18	Accumulator Spring - Outer	1
19	Stop Plug "O" Ring	1
20	Accumulator Spool Stop Plug	1
21	Plug	1
22	Lock Up and Modulator Valve Gasket	1
23	Plug	1

HR34000 CONVERTER SECTION LOCK-UP DISASSEMBLY AND REASSEMBLY PROCEDURE.

CONVERTER LOCK-UP PERMITS DIRECT ENGINE DRIVE FOR HIGH SPEED TRAVEL CYCLES.

This lock-up section must be used in conjunction with the HR34000 transmission maintenance and service section of this manual for complete disassembly and reassembly.

MAINTENANCE AND SERVICE

The instructions contained herein cover the disassembly and reassembly of the lock-up portion of the torque converter in a sequence that would normally be followed after the unit has been removed from the machine and is to be completely overhauled.

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.

DISASSEMBLY

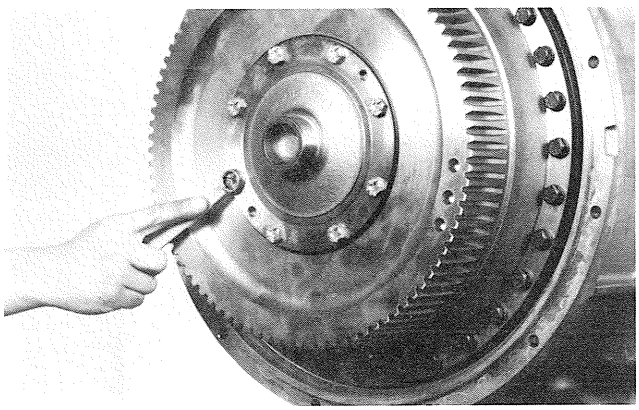


Figure 1
Remove impeller cover bearing cap bolts.

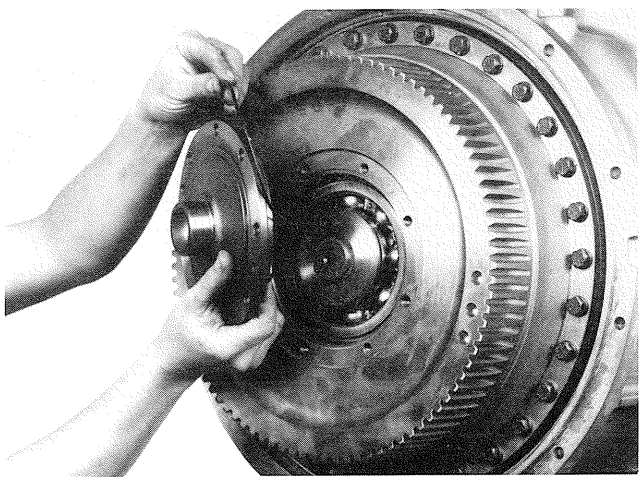


Figure 2
Remove bearing cap and "O" ring.

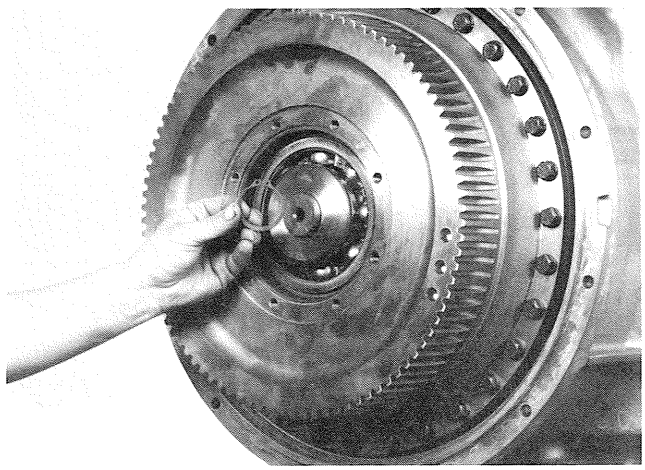


Figure 3
Remove front bearing retainer, retaining ring.

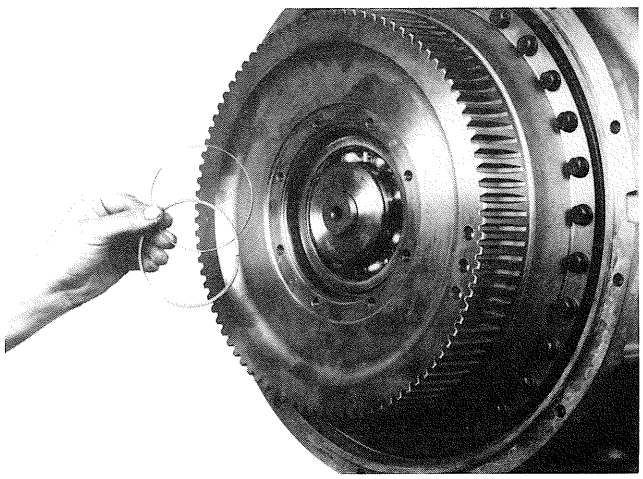


Figure 4
Remove bearing retainer oil sealing ring and expander spring.

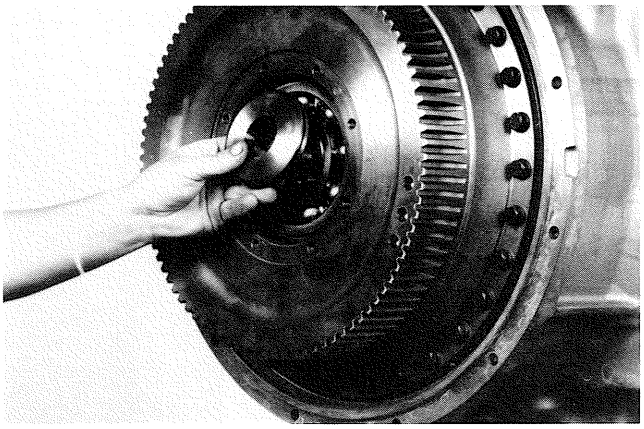


Figure 5
Remove bearing retainer.

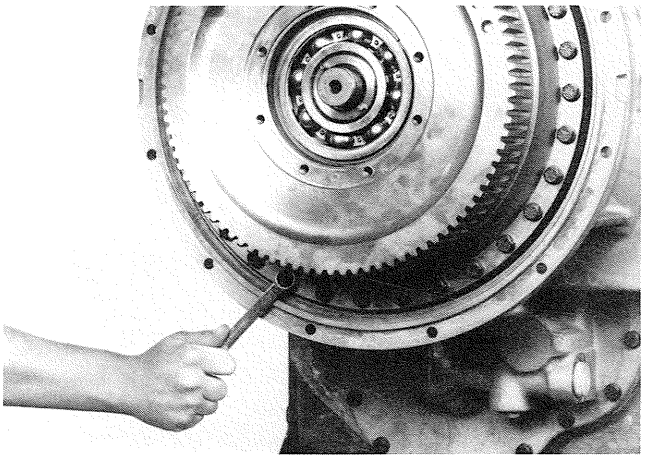


Figure 6
Remove impeller cover to impeller bolts.

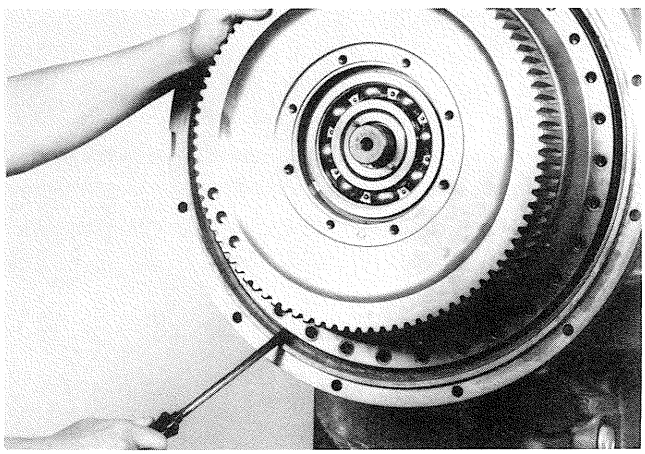


Figure 7
Using pry slots provided, pry impeller cover and lock-up assembly from impeller. **CAUTION:** When impeller cover is far enough from impeller, use a hook and hoist in one of the bolt holes to prevent assembly from falling.

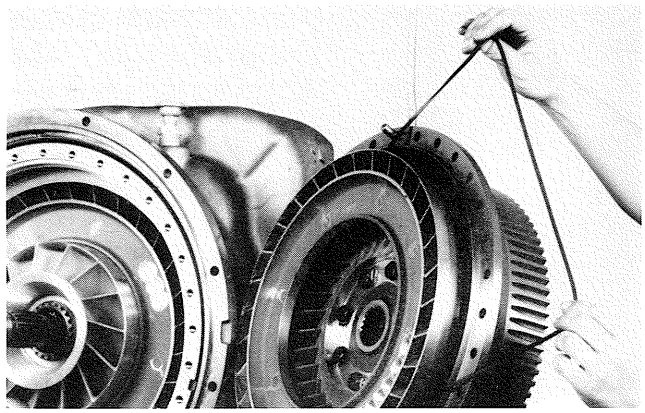


Figure 8
Remove impeller cover to impeller "O" ring.

IMPELLER COVER AND LOCK-UP DISASSEMBLY AND REASSEMBLY

DISASSEMBLY

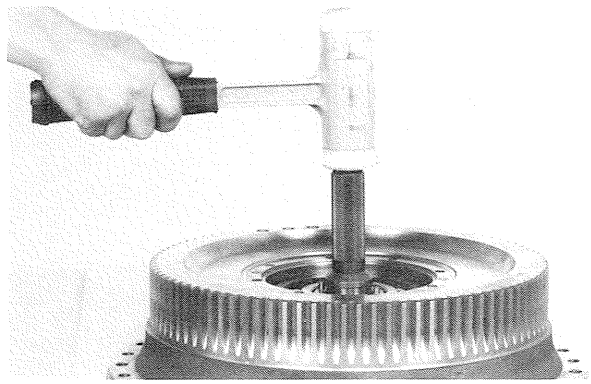


Figure 9
Support impeller cover on blocks as shown. Tap turbine hub from impeller cover bearing.

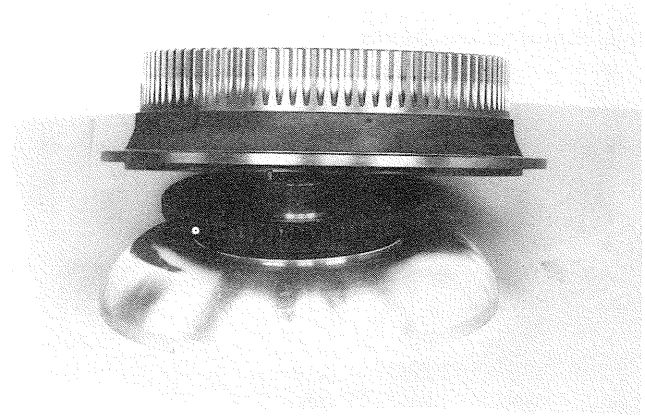


Figure 10
Remove turbine and lock-up hub from impeller cover.

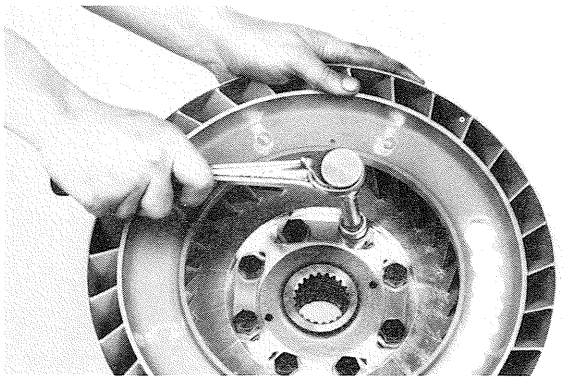


Figure 11
Straighten corners of turbine hub capscrew lockplates. Remove turbine hub capscrews and lockplates. **NOTE:** A change has been made on the turbine to turbine lock-up hub retention. See page 11 for proper reassembly procedure.

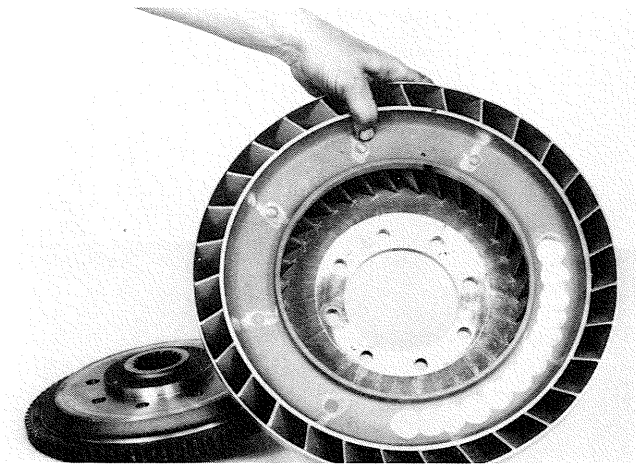


Figure 12
Separate lock-up hub from turbine.

Figure 13
Remove lock-up backing plate to impeller cover self locking capscrews.

Figure 14
Remove backing plates. **NOTE:** Some lock-ups will have one friction disc as shown in Figure 15 and some will have two frictions discs separated by a steel disc as shown in Figure 16.

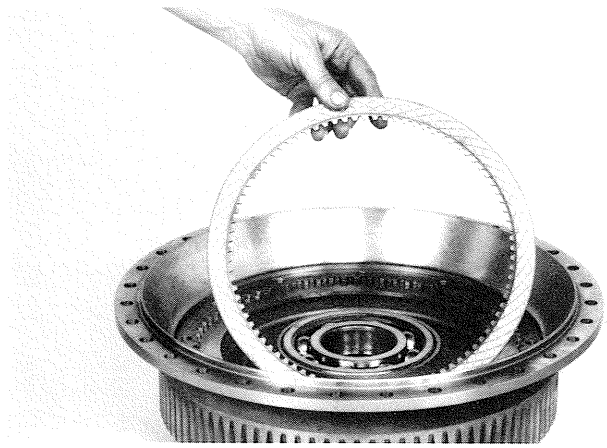


Figure 15
Remove one friction disc. (1 plate lock-up).

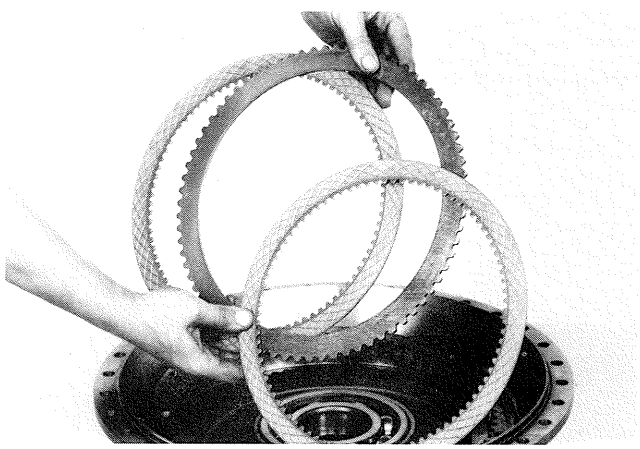


Figure 16
Remove two friction discs and one inner steel disc. (2 plate lock-up).

Figure 17
Remove lock-up drive disc.

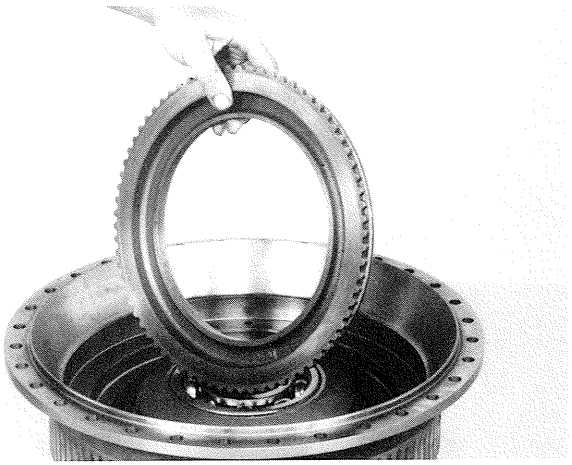


Figure 18
Remove lock-up piston.

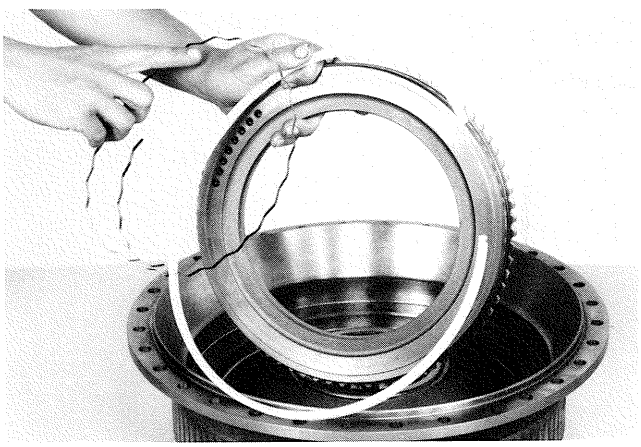


Figure 19
Remove lock-up piston outer piston ring and ring expander spring.

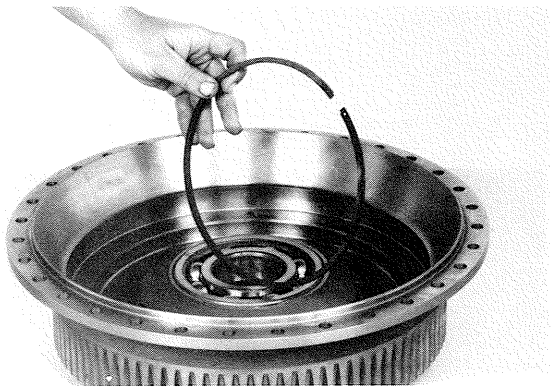


Figure 20
Remove lock-up piston inner piston ring from impeller cover.

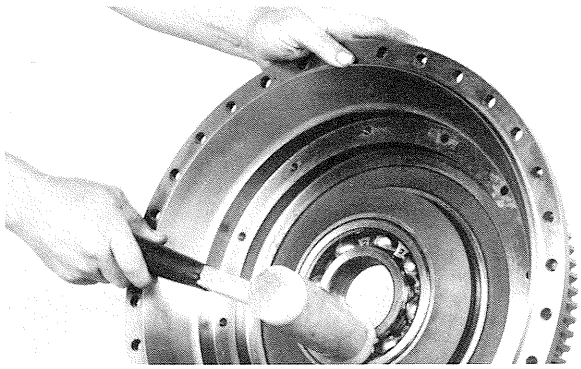


Figure 21
Remove impeller cover bearing.

See cleaning and inspection section in the transmission maintenance and service manual and complete transmission disassembly and reassembly.

REASSEMBLY OF THE LOCK-UP, IMPELLER COVER AND TURBINE

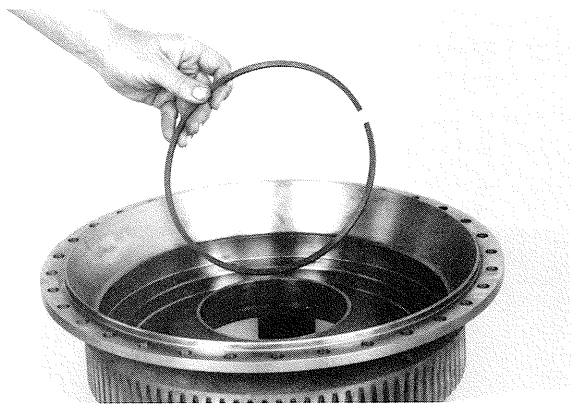


Figure 22
Install a new lock-up piston inner piston ring. Be sure ring lock joint is securely fastened. Grease ring to stabilize in ring groove.

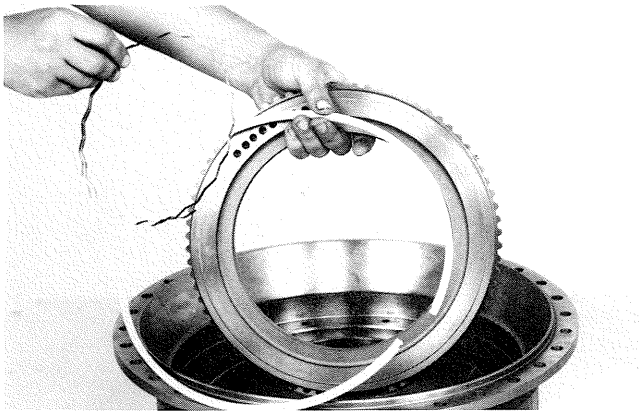


Figure 23

Position lock-up piston outer oil sealing ring expander spring in ring groove. Install oil sealing ring over expander spring being sure lock joint is securely fastened. **NOTE:** Expander spring gap to be 180° from sealing ring hook joint. Grease ring to facilitate assembly into impeller cover.

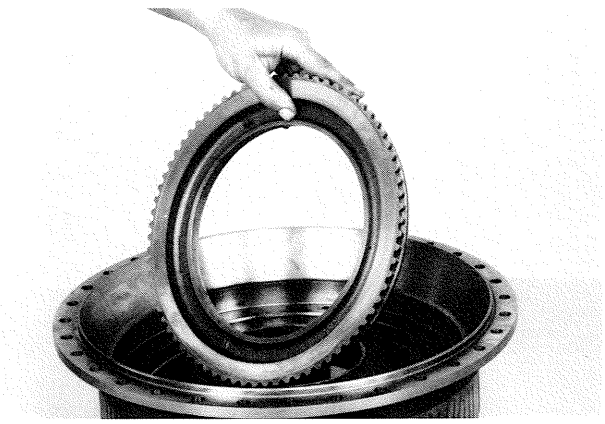


Figure 24

Position lock-up piston in impeller cover using caution as not to damage the inner and outer piston rings.

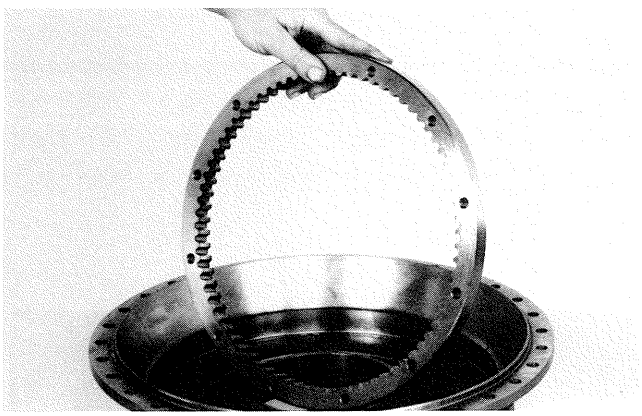


Figure 25

Position drive disc in impeller cover, aligning holes in drive disc with holes in impeller cover.

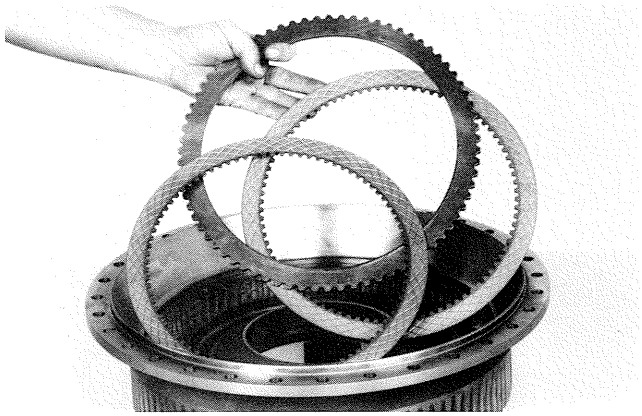


Figure 26

Install lock-up disc (friction). **NOTE:** Some units will have two (2) lock-up discs (friction) and one steel disc, if you have a two (2) lock-up discs, install one (1) friction disc (teeth on the inner diameter of disc). Install steel disc (teeth on the outer diameter) install second friction disc. The steel disc separates the two friction discs.

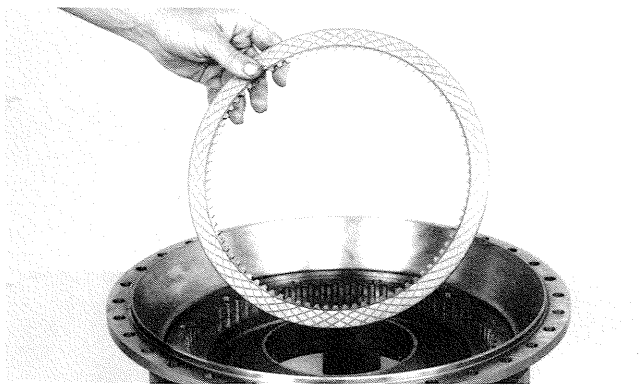


Figure 27

Some units will have only one (1) friction disc as shown in Figure 27. Install friction disc.

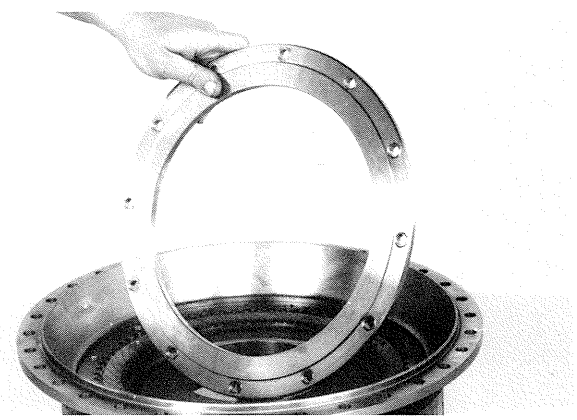


Figure 28

Position lock-up backing plate in impeller cover aligning holes in backing plate with holes in drive disc and impeller cover.

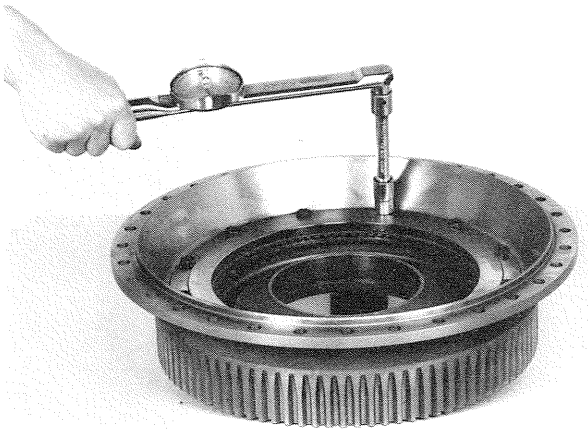


Figure 29
Install backing plate to impeller cover self locking capscrews. Tighten to specified torque. (See torque chart.)

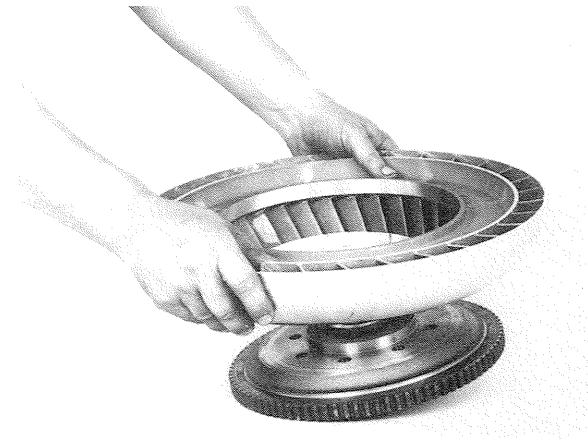


Figure 30
Align holes of lock-up hub with holes in turbine. Tap hub into place.

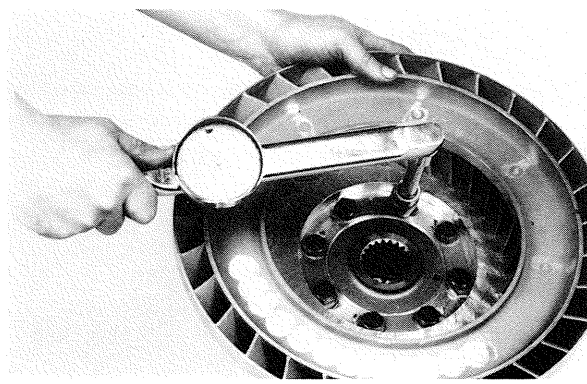


Figure 31
Install capscrew backing ring. Install turbine to lock-up hub special capscrews. **NOTE: SEE SPECIAL CAPSCREW INSTALLATION PROCEDURE ON PAGE 11.**

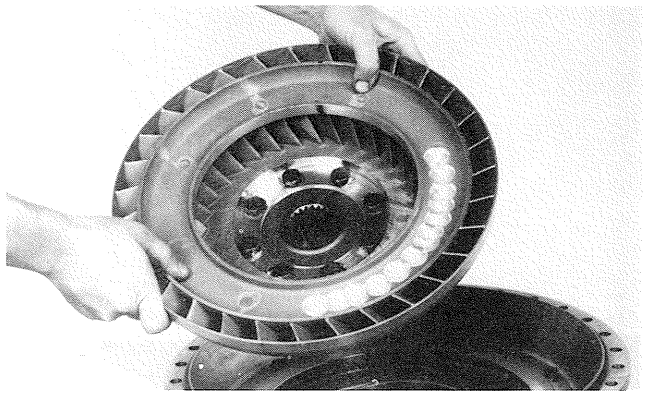


Figure 32
Position turbine and lock-up hub in impeller cover assembly aligning lock-up hub teeth with drive disc (discs). Install turbine in cover. **CAUTION:** Do not force this operation. Turn impeller cover and turbine over. **NOTE:** Do not let turbine lock-up hub slip out of lock-up disc (discs).

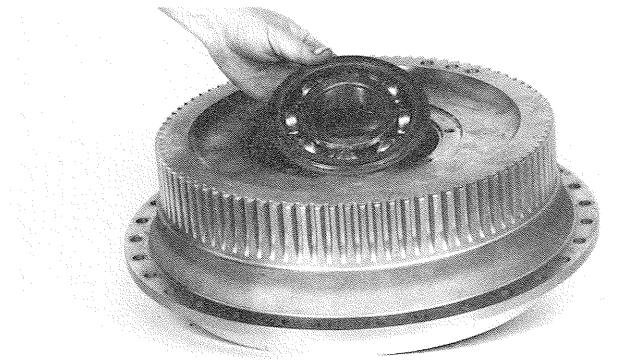


Figure 33
Block turbine hub from under side and install impeller cover bearing. If inner turbine hub locating ring was removed, install ring in turbine hub.

TRANSMISSION PORTION OF LOCK-UP

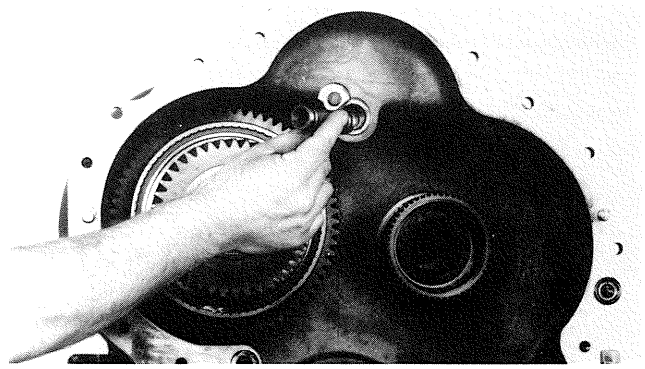


Figure 34
After converter housing has been removed, check turbine shaft to transmission housing lock-up pressure tube. Check pressure tube sealing rings. Check tube sleeve in transmission.

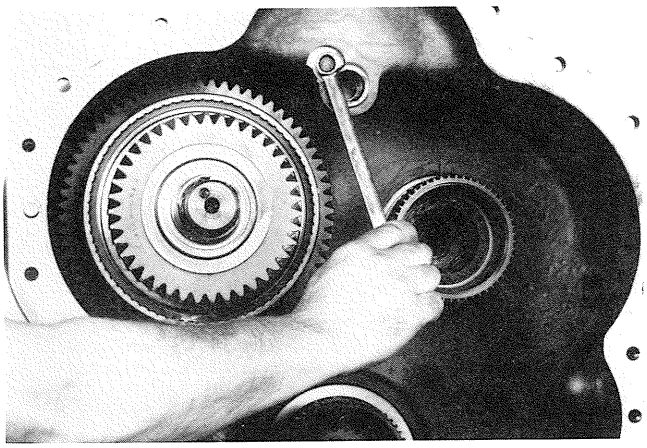


Figure 35
If tube sleeve is to be replaced, remove sleeve retainer capscrew.

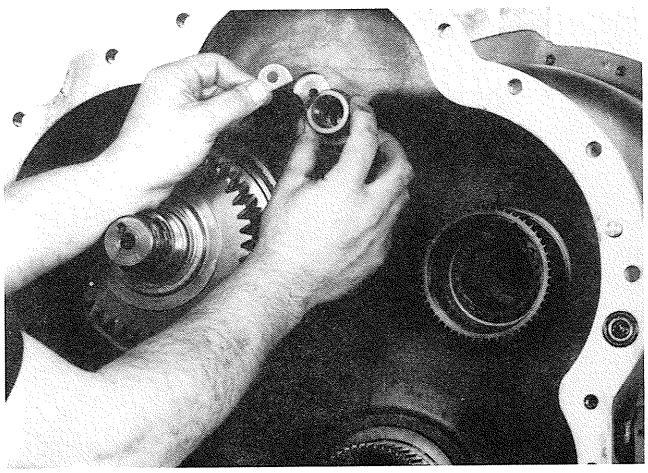


Figure 36
Remove retainer and sleeve.

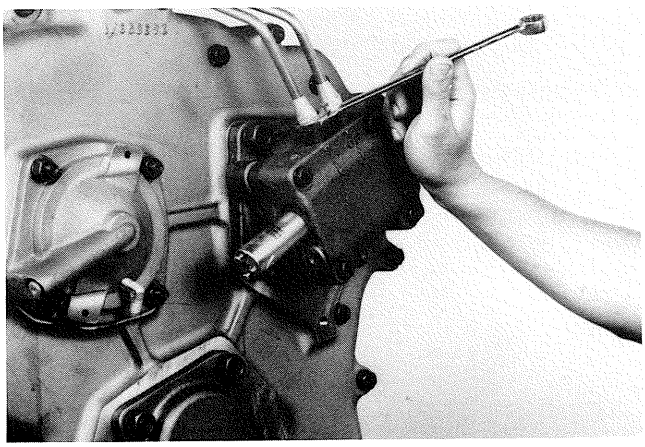


Figure 37
Remove modulator lock-up valve supply line tube nut from modulator valve.

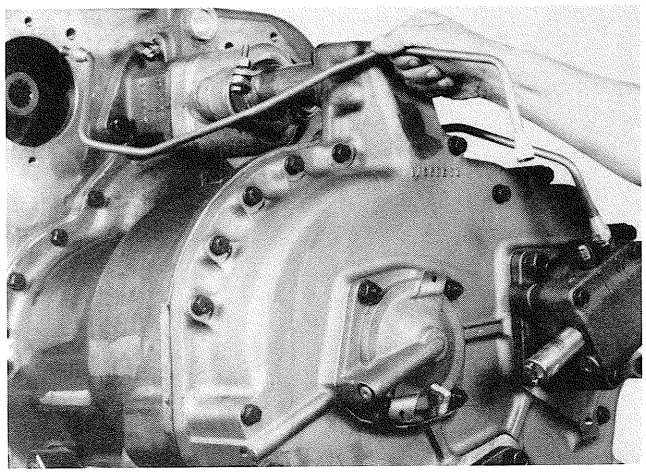


Figure 38
Remove supply line from pressure regulator valve fitting.

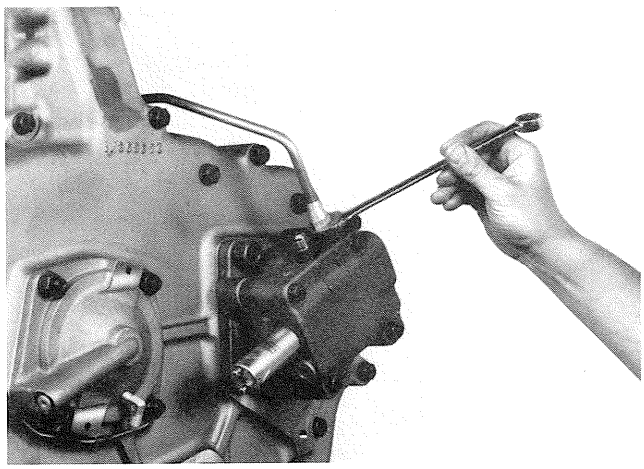


Figure 39
Remove lock-up supply line from modulator valve.

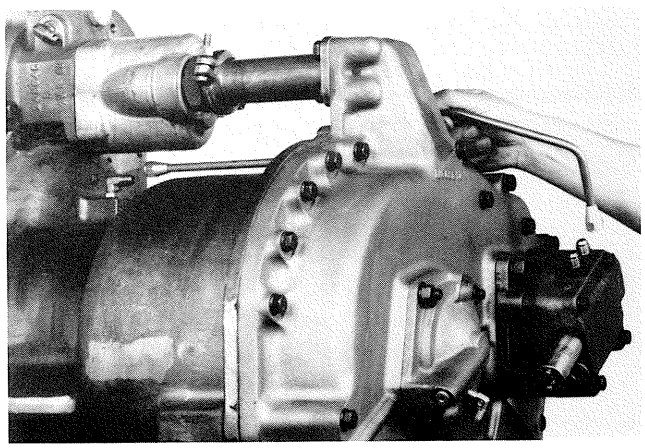


Figure 40
Remove supply line from lock-up inlet elbow on transmission housing.

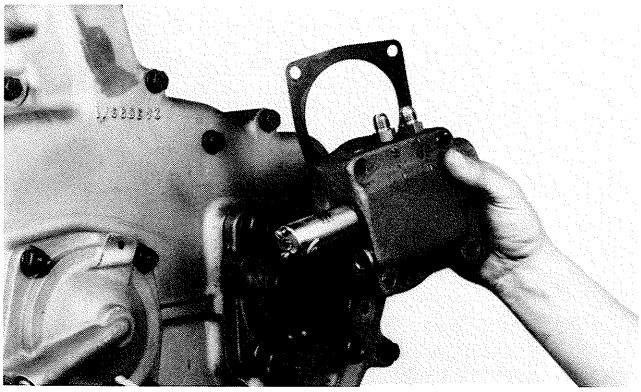


Figure 41
Remove modulator valve from transmission.

Proceed with transmission disassembly, cleaning and inspection and reassembly as explained in the appropriate maintenance and service manual up to turbine and impeller cover installation.

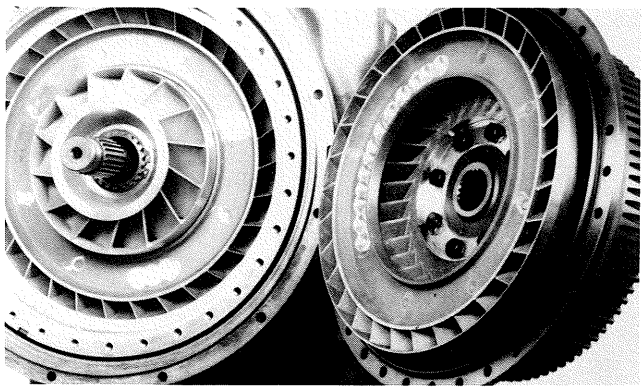


Figure 42
Position a new impeller cover to impeller "O" ring on impeller cover.

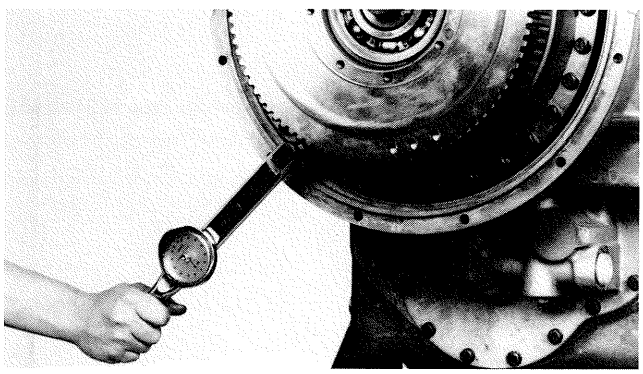


Figure 43
Align holes in impeller cover with holes in impeller. Carefully install impeller cover and lock-up assembly on impeller. Use extreme caution as not to disrupt or damage "O" ring. Install cover to impeller capscrews and tighten to specified torque. (See torque chart).

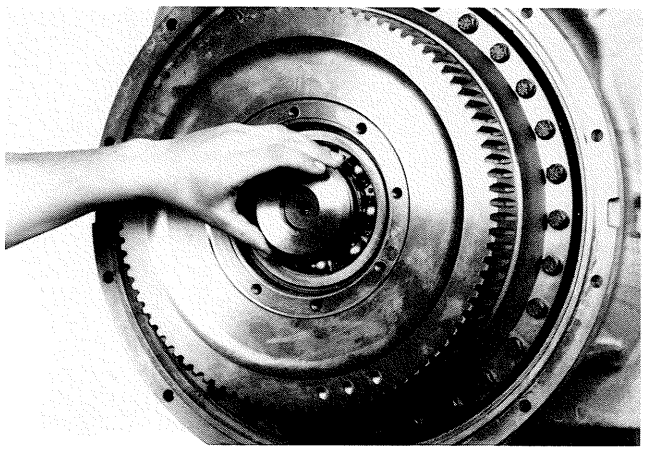


Figure 44
Align holes in bearing retainer with dowel pins in end of the turbine hub. Tap retainer into position.

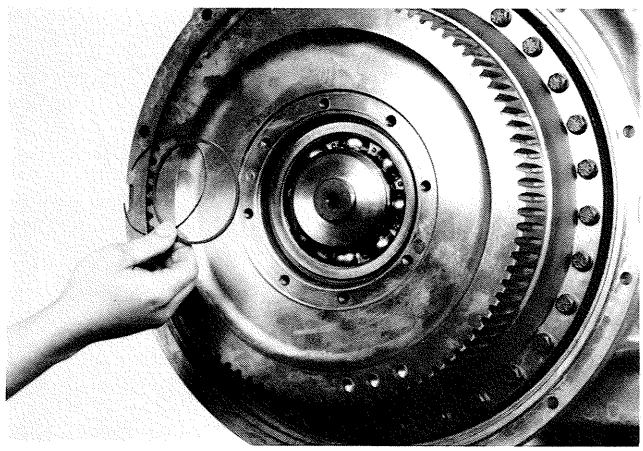


Figure 45
Install new sealing ring expander spring and oil sealing ring on impeller cover bearing retainer. Expander spring gap to be 180° from sealing ring hook joint.

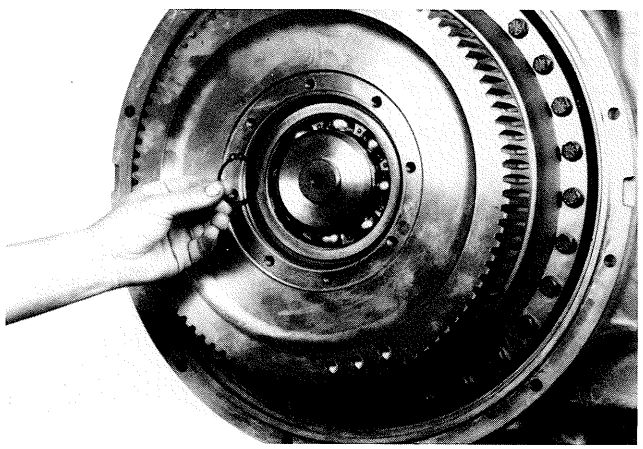


Figure 46
Install bearing retainer retaining ring.

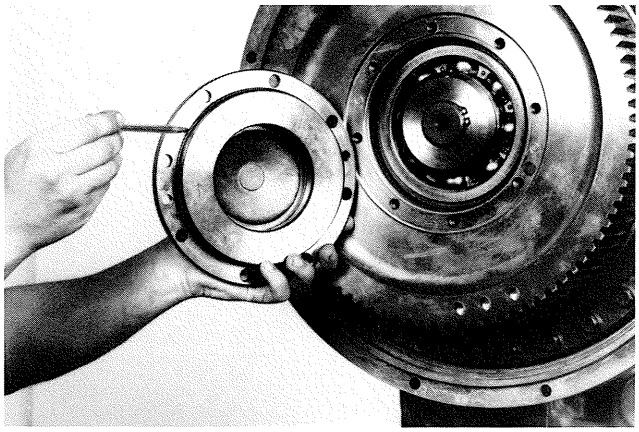


Figure 47
Position a new "O" ring on impeller cover bearing cap.

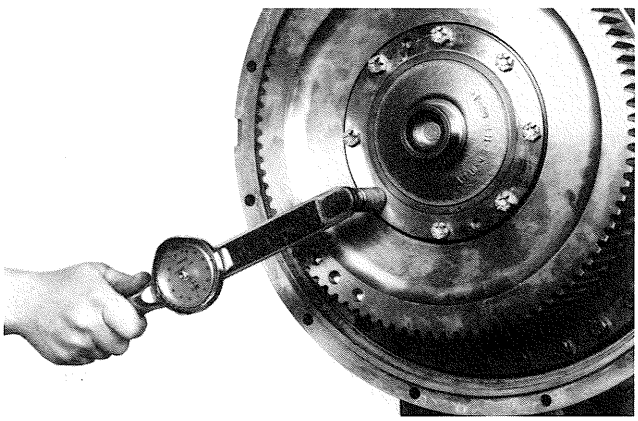


Figure 48
Position bearing cap on impeller cover using caution as not to damage "O" ring. Install self locking capscrews, tighten capscrews 52 to 57 ft. lbs. torque [71-77 N.m].

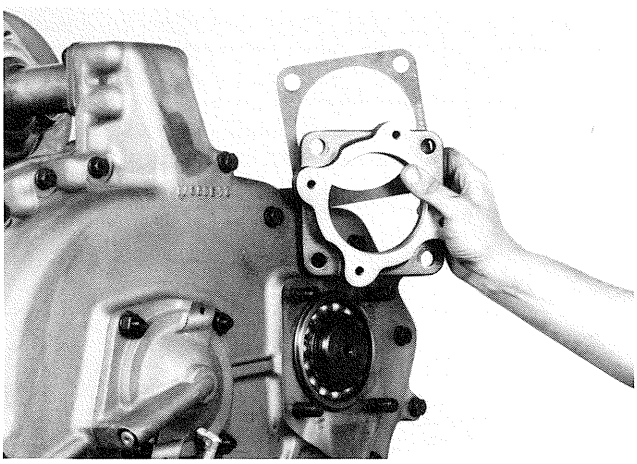


Figure 49
Position modulator lock-up valve adaptor and new gasket on transmission rear cover studs. Install lockwashers and stud nuts. Tighten to specified torque. (See torque chart).

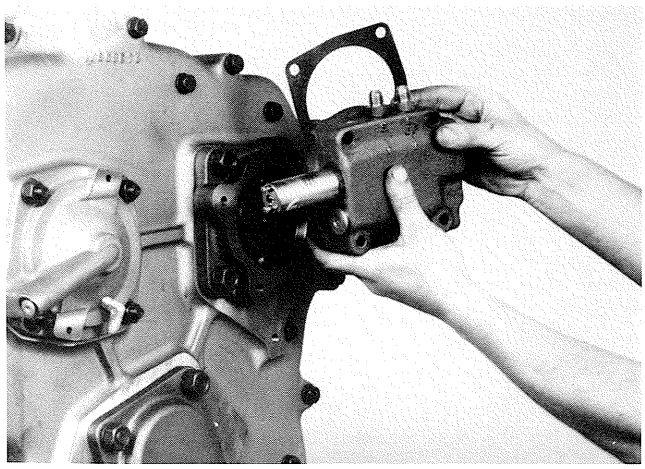


Figure 50
Position lock-up valve and new gasket on valve adaptor.

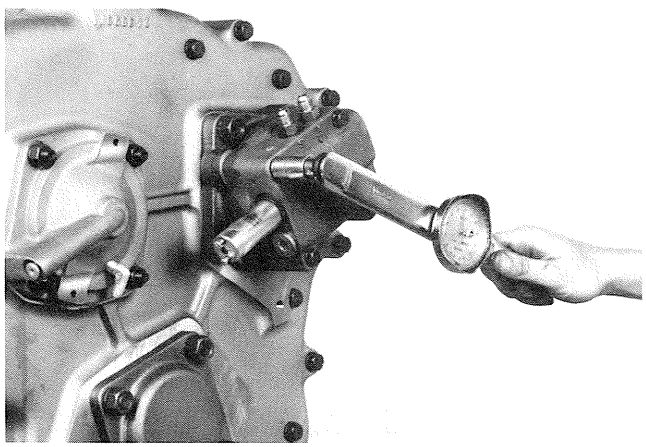


Figure 51
Install valve to adaptor capscrews and washers, tighten to specified torque. (See torque chart).

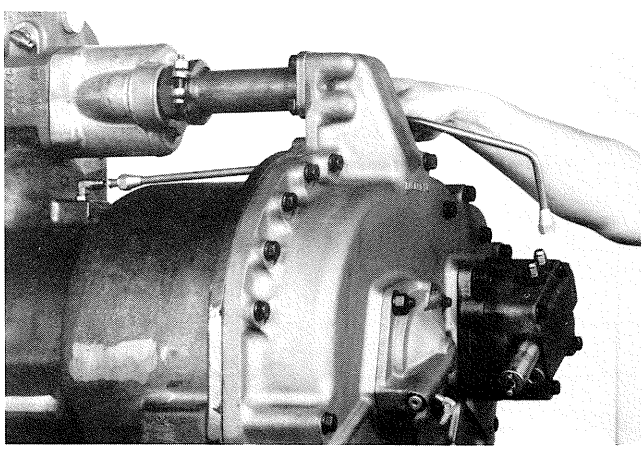


Figure 52
Install lock-up supply line from valve to inlet elbow on transmission housing.

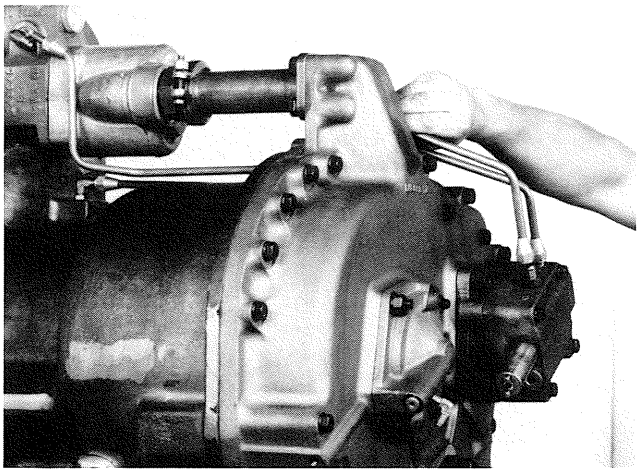


Figure 53
Install lock-up valve supply line from pressure regulator valve to modulator valve.

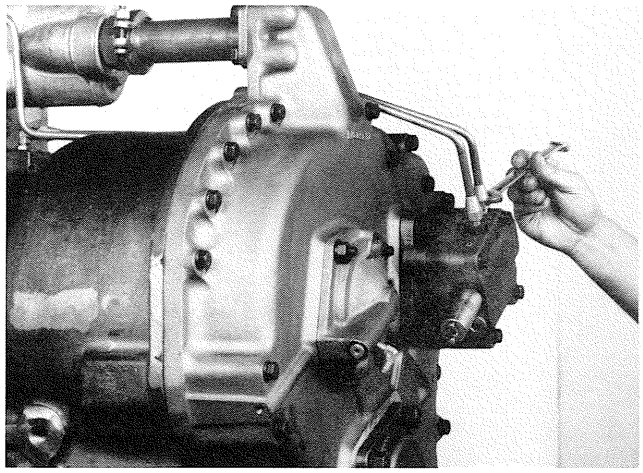


Figure 54
Tighten supply line tube nuts securely.

NOTES

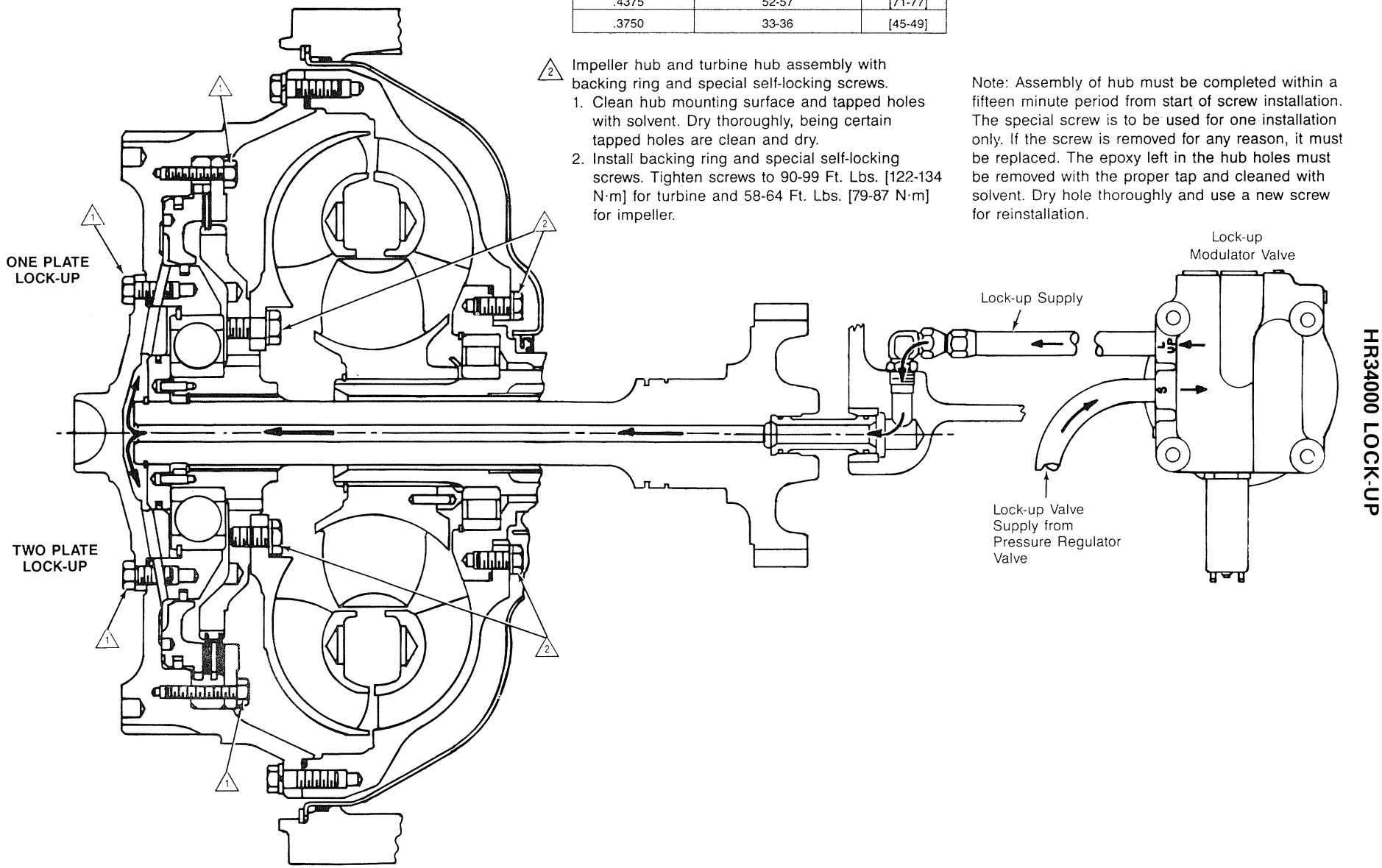
△1 Place bolts to be used at these locations - Requires Special Torque.

PLACE BOLT	TORQUE FT. LBS.	[N·m]
.4375	52-57	[71-77]
.3750	33-36	[45-49]

△2 Impeller hub and turbine hub assembly with backing ring and special self-locking screws.

1. Clean hub mounting surface and tapped holes with solvent. Dry thoroughly, being certain tapped holes are clean and dry.
2. Install backing ring and special self-locking screws. Tighten screws to 90-99 Ft. Lbs. [122-134 N·m] for turbine and 58-64 Ft. Lbs. [79-87 N·m] for impeller.

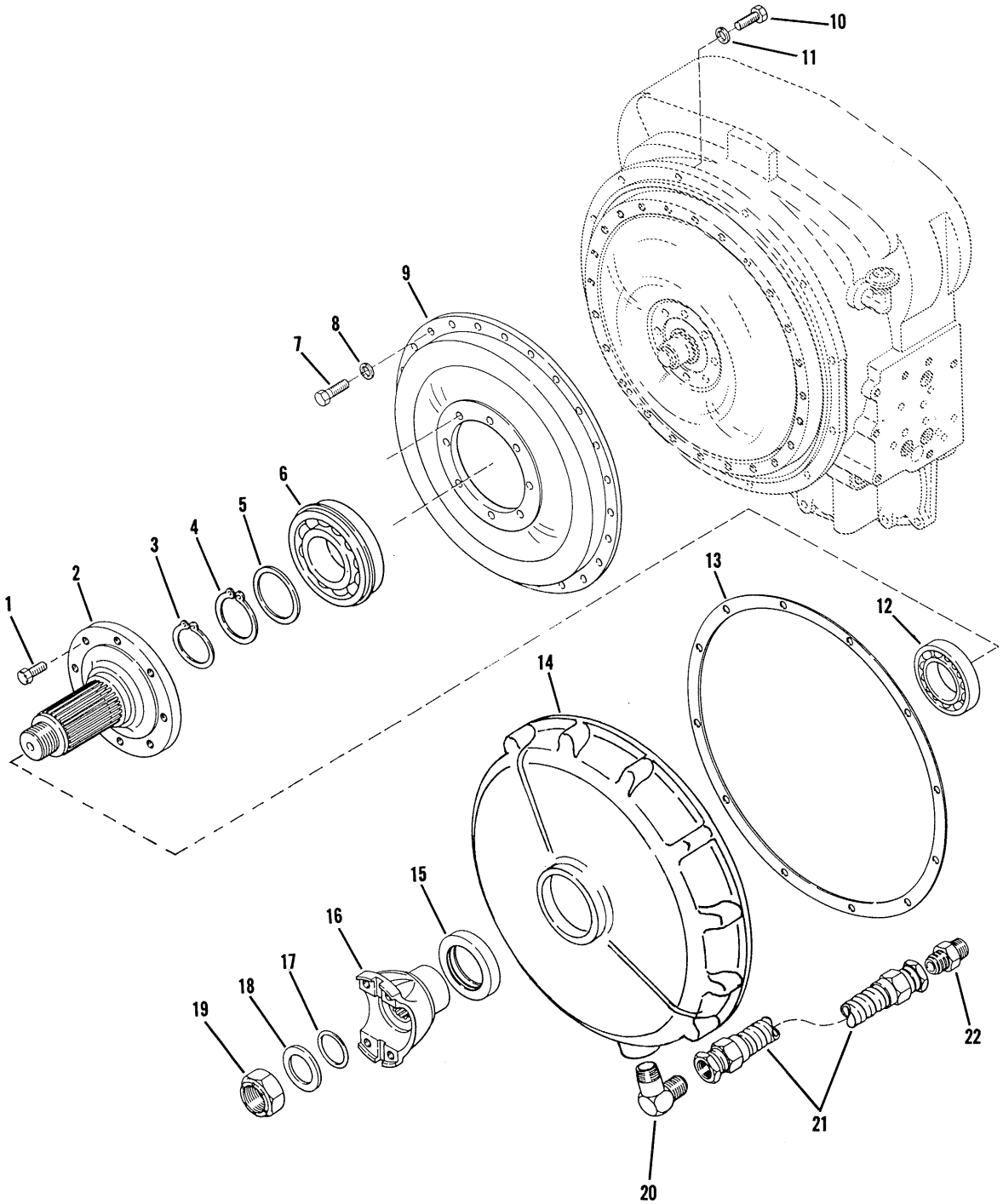
Note: Assembly of hub must be completed within a fifteen minute period from start of screw installation. The special screw is to be used for one installation only. If the screw is removed for any reason, it must be replaced. The epoxy left in the hub holes must be removed with the proper tap and cleaned with solvent. Dry hole thoroughly and use a new screw for reinstallation.



NOTES

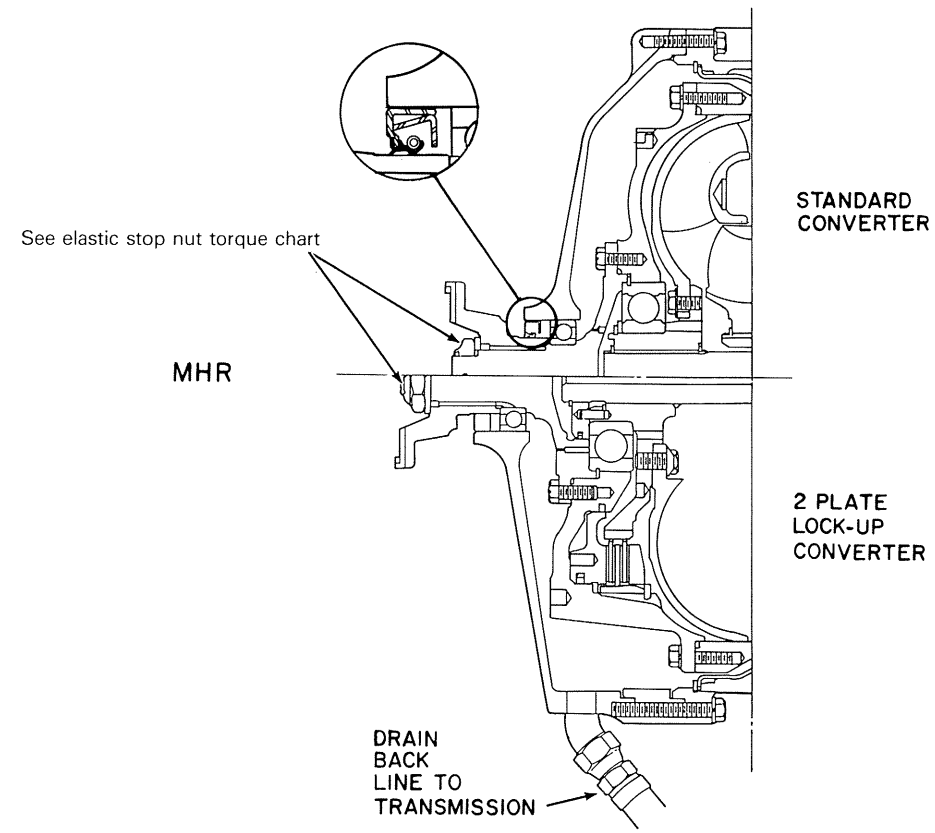
MHR SECTION

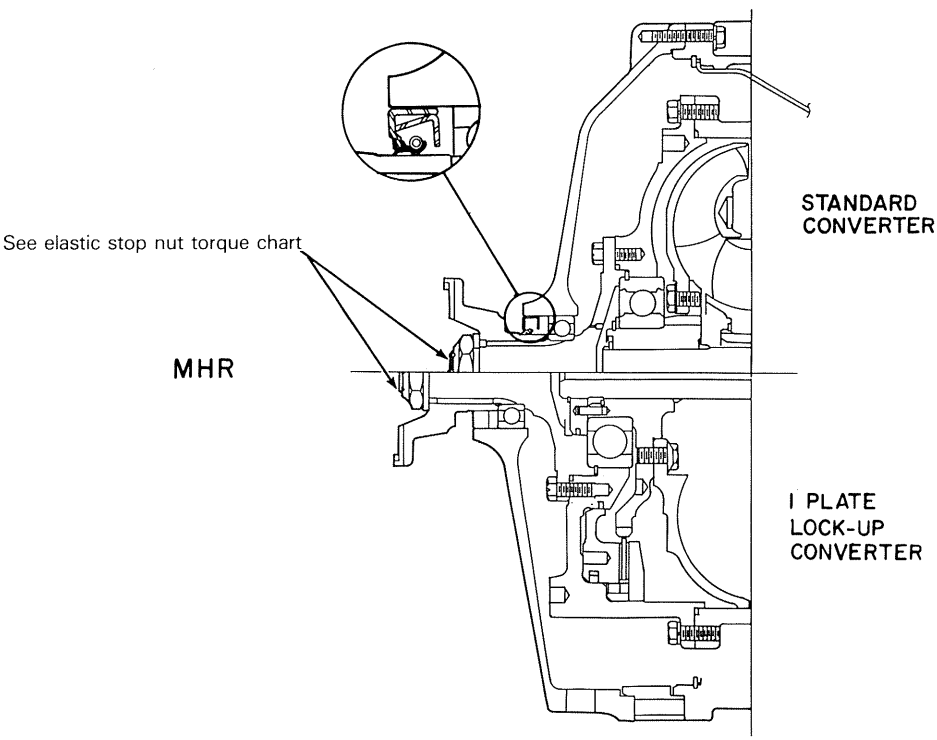
MHR SECTION
(MID-MOUNT TORQUE CONVERTOR & TRANSMISSION)



MHR COVER GROUP

ITEM	DESCRIPTION	QTY.
1	Input Shaft Screw	8
2	Input Shaft	1
3	Turbine Hub Retainer Ring	1
4	Impeller Cover Bearing Retainer Ring	1
5	Impeller Cover Bearing Spacer	1
6	Impeller Cover Bearing	1
7	Impeller Cover to Impeller Screw	24
8	Impeller Cover to Impeller Screw Lockwasher	24
9	Impeller Cover	1
10	Converter Housing to Front Cover Screw	12
11	Converter Housing to Front Cover Screw Lockwasher	12
12	Input Shaft Bearing	1
13	Front Cover Gasket	1
14	Front Cover	1
15	Input Shaft Oil Seal	1
16	Input Shaft Flange	1
17	Input Shaft Flange "O" Ring	1
18	Input Shaft Flange Washer	1
19	Input Shaft Flange Nut	1
20	Front Cover Drain Back Hose Adaptor	1
21	Front Cover Drain Back Hose	1
22	Drain Back Hose to Transmission Sump Adaptor	1


See elastic stop nut torque chart
MHR
STANDARD CONVERTER
2 PLATE LOCK-UP CONVERTER
DRAIN BACK LINE TO TRANSMISSION


See elastic stop nut torque chart
MHR
STANDARD CONVERTER
1 PLATE LOCK-UP CONVERTER

The information contained herein must be used in conjunction with a HR34000 section.

The MHR Model is the midship mounted 34000 series transmission with a integral converter unit.

MHR DISASSEMBLY

Midship Mounted — Closed Front End

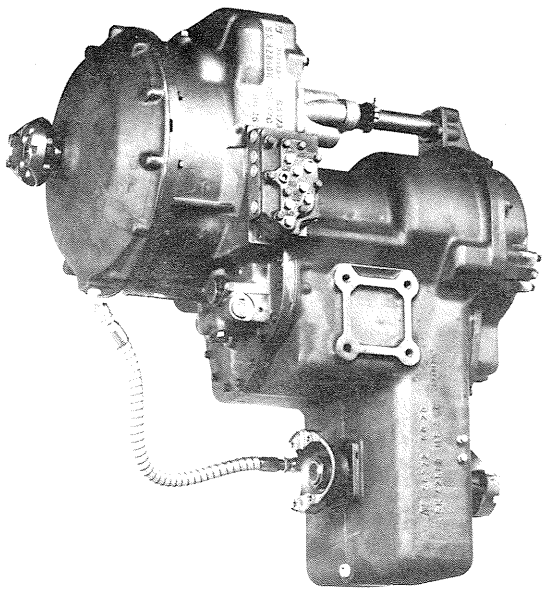


Figure 1
Overall view of the transmission.

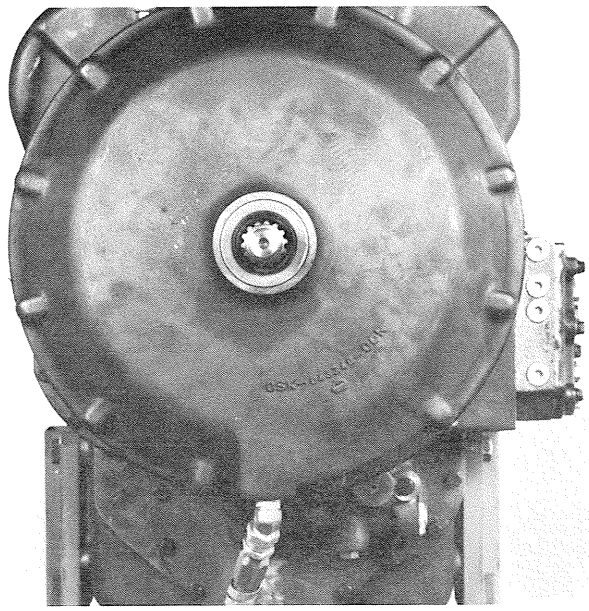


Figure 3
Remove input flange.

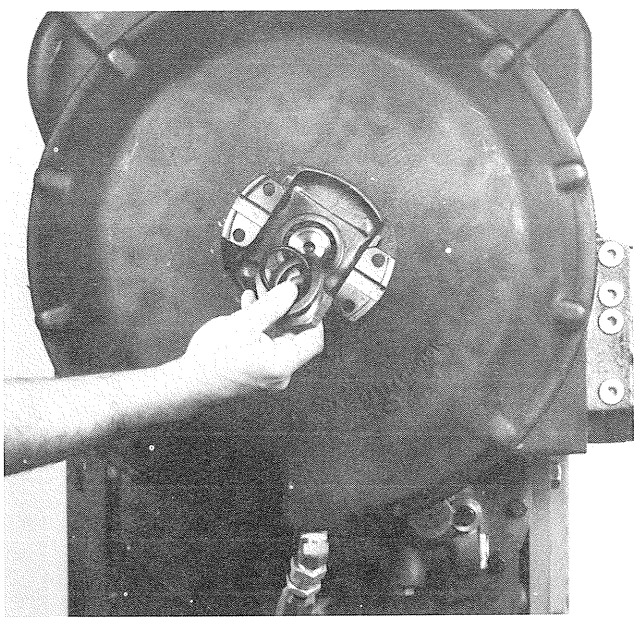


Figure 2
Remove input flange nut, washer and "O" ring.

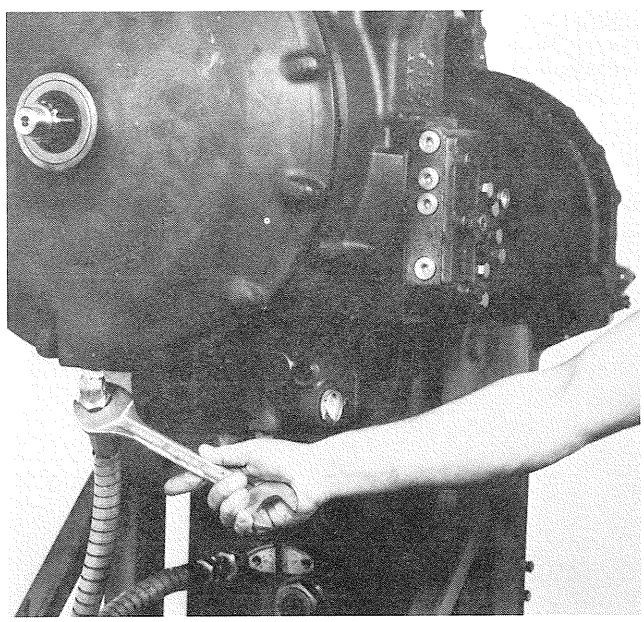


Figure 4
Remove drain hose from front cover as shown.

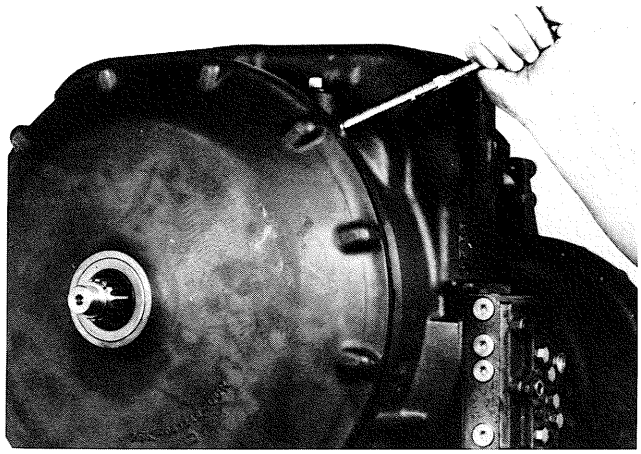


Figure 5
Remove bolts and washers securing converter housing front cover to converter housing.

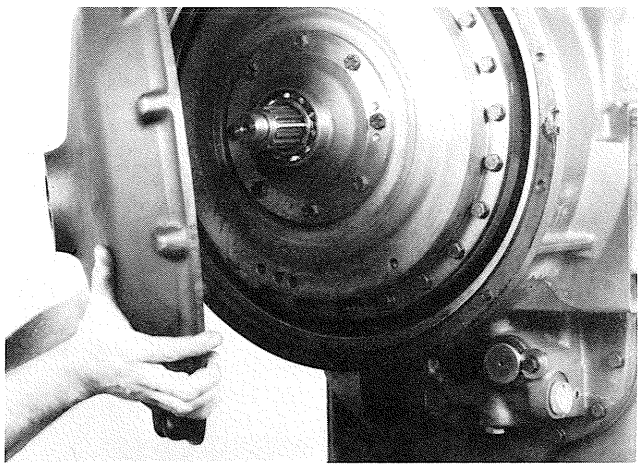


Figure 6
Remove converter housing front cover.

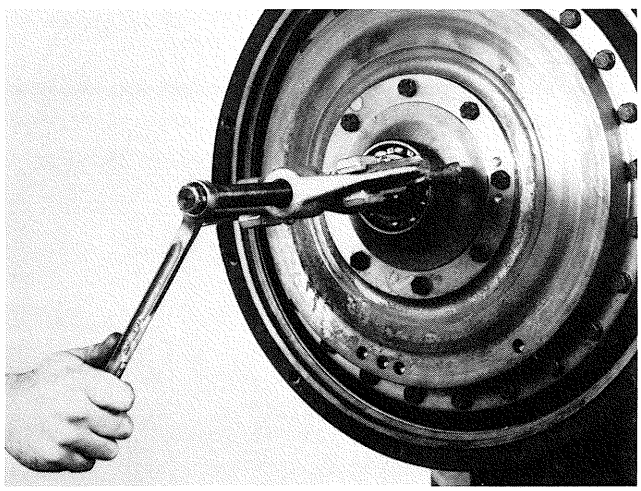


Figure 7
Remove input shaft support bearing.

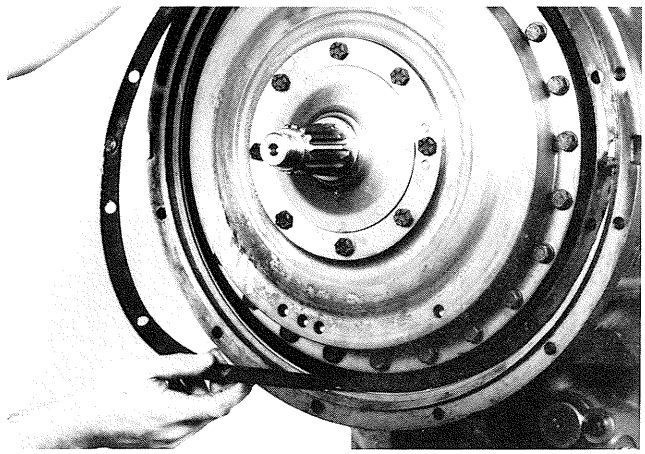


Figure 8
Remove converter housing front cover gasket.

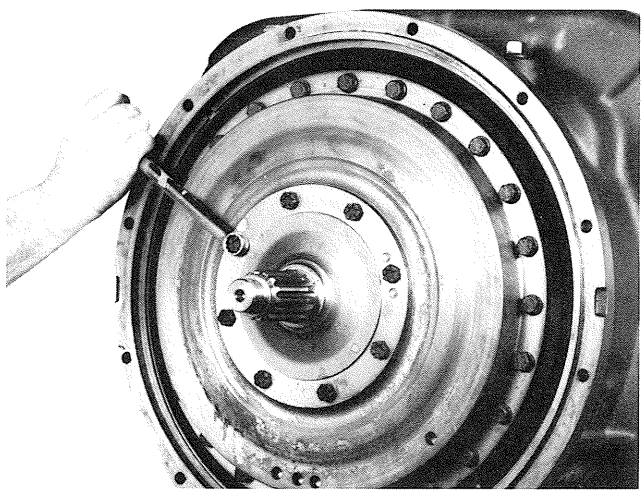


Figure 9
Remove input shaft bolts.

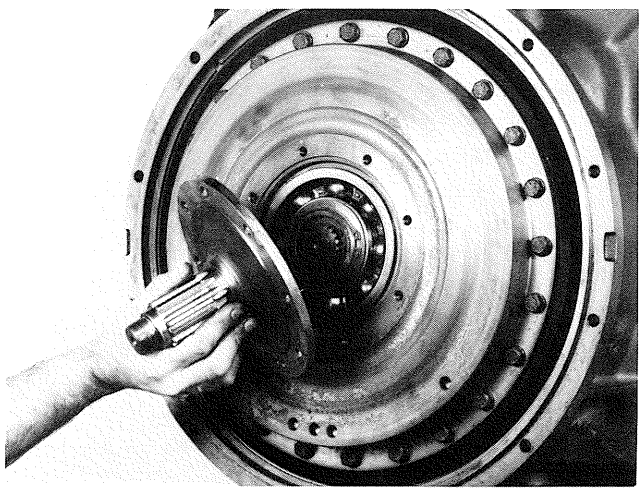


Figure 10
Remove input shaft.

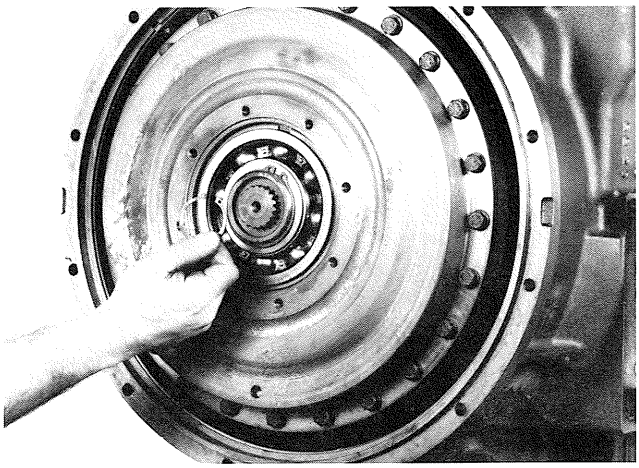


Figure 11
Remove turbine retainer ring.

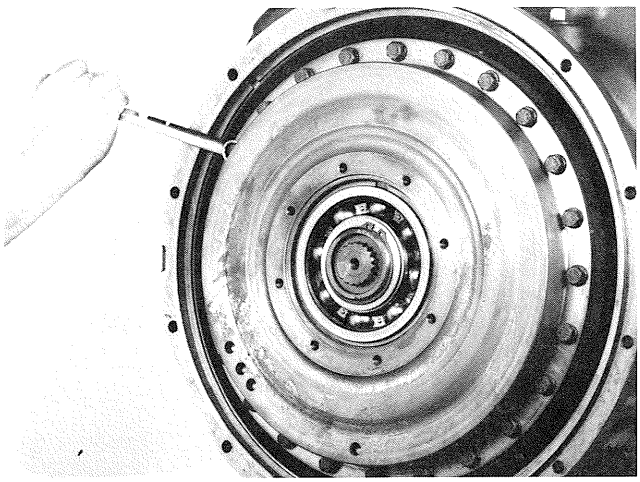


Figure 12
Remove impeller cover to impeller bolts.

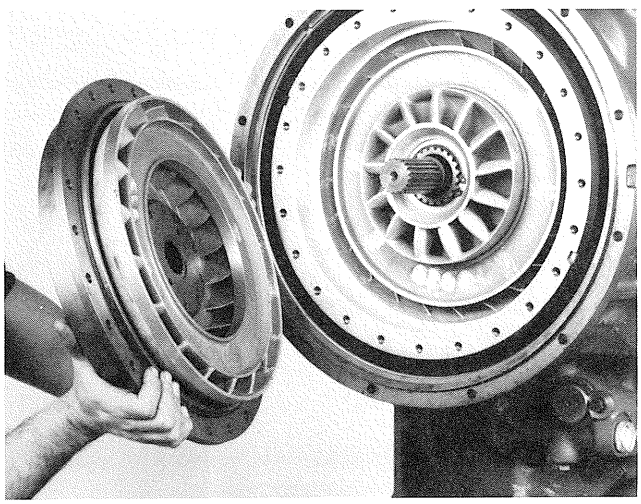


Figure 13
Remove impeller cover and turbine as an assembly.

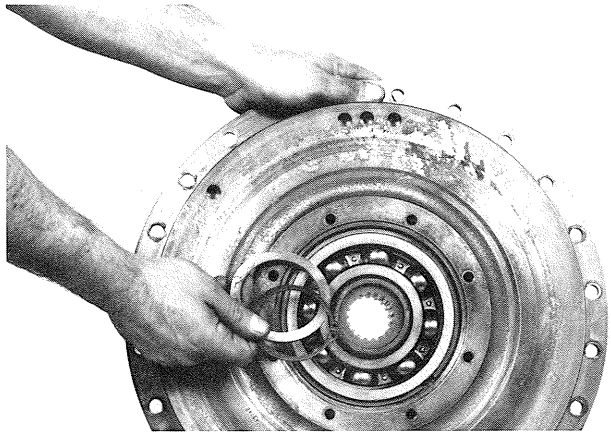


Figure 14
Remove turbine retaining snap ring and spacer.

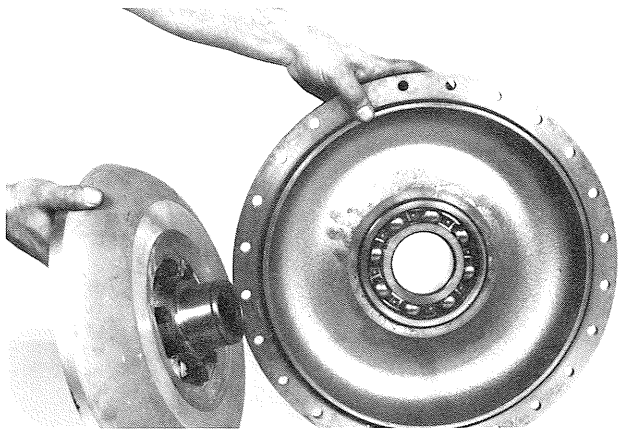


Figure 15
Remove turbine from impeller cover.

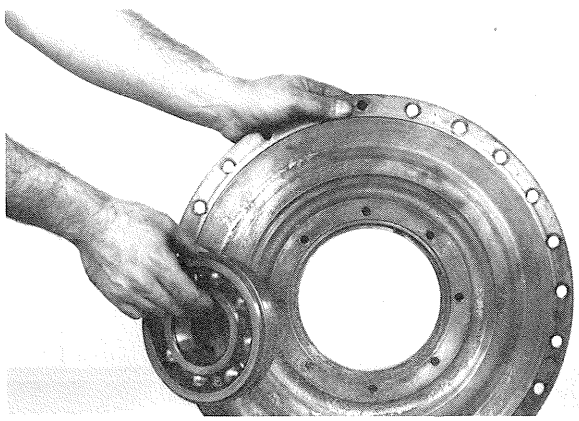


Figure 16
Remove impeller cover bearing.

Proceed with disassembly of the transmission by using the information explained in the specific speed HR34000 section of the maintenance manual.

See cleaning and inspection section.

REASSEMBLY

Reassemble transmission following step by step procedures as explained in the HR34000 section up to and including "install turbine hub locating ring on turbine shaft."

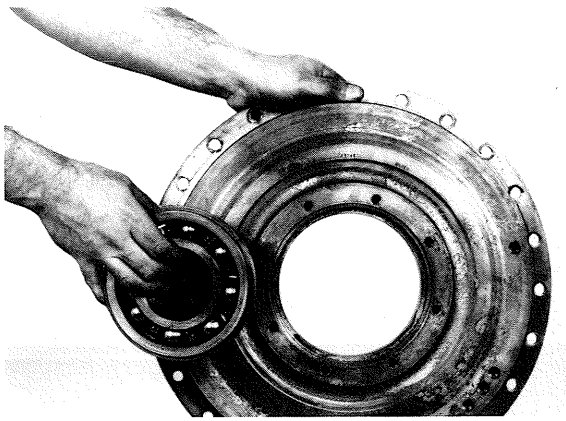


Figure 17
Install impeller cover bearing.

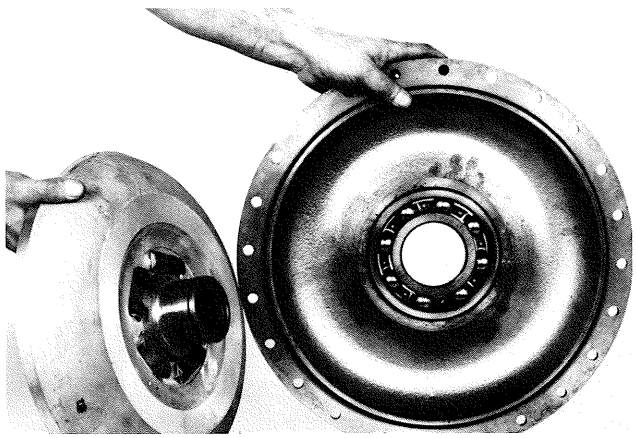


Figure 18
Position turbine into impeller cover bearing.

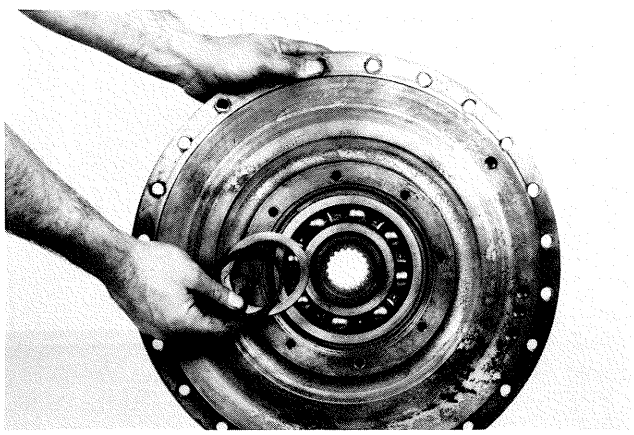


Figure 19
Install spacer and turbine retaining snap ring.

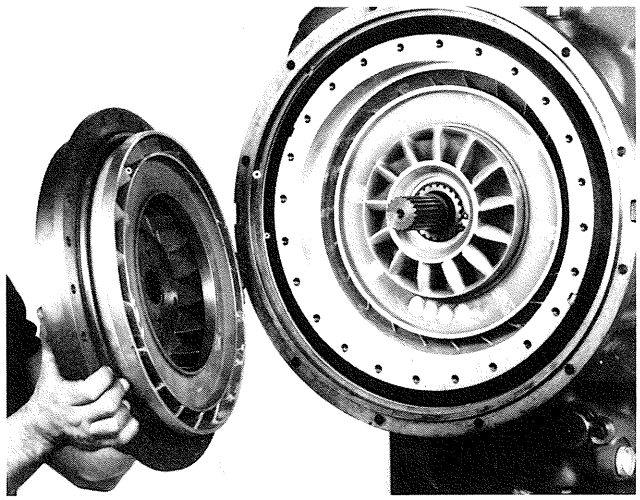


Figure 20
Position impeller cover and turbine as an assembly on turbine shaft.

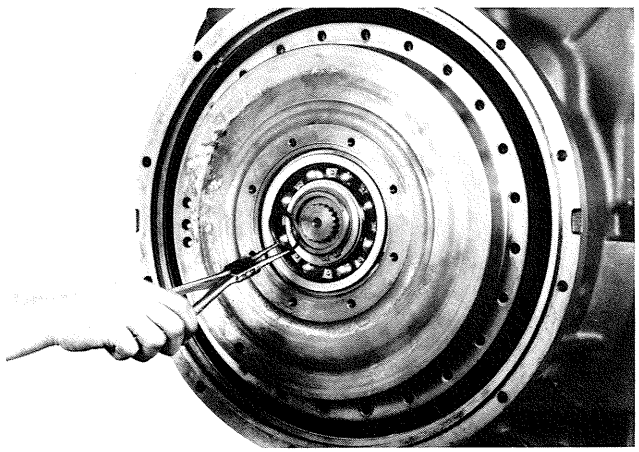


Figure 21
Install turbine retainer ring.

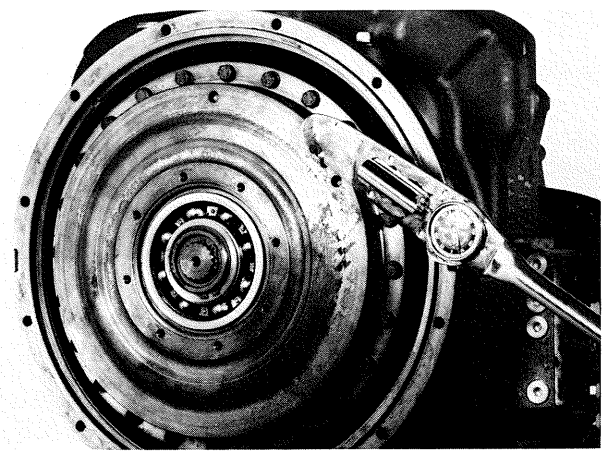


Figure 22
Install impeller cover to impeller bolts and tighten 37-41 ft. lbs. torque [50,2-55,5 N.m].

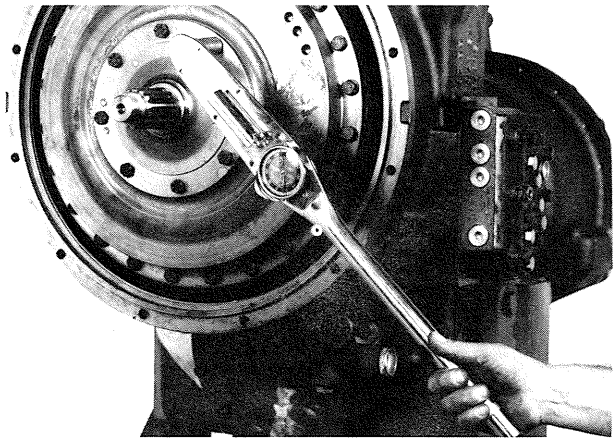


Figure 23
Install input shaft bolts, tighten 37-41 ft. lbs. torque [50,2-55,5 N.m].

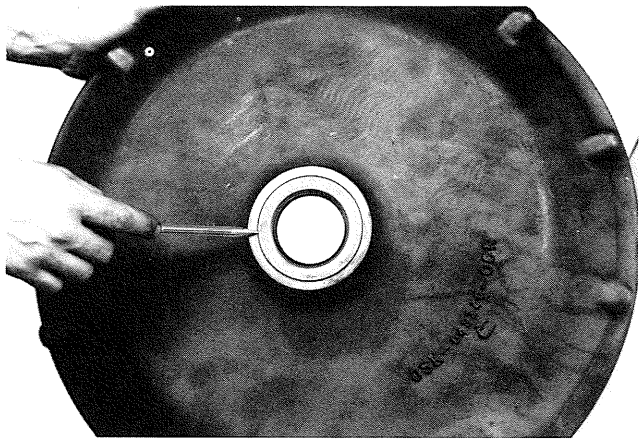


Figure 26
Apply a light coat of Permatex #2 on the outer diameter of the front cover oil seal. Press seal in front cover with lip of seal in.

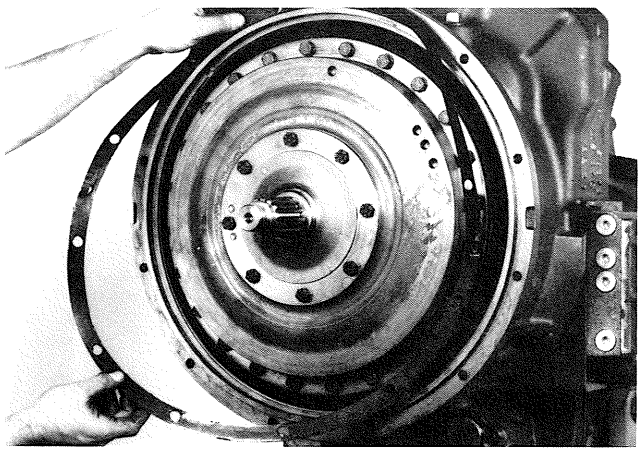


Figure 24
Install new converter housing gasket.

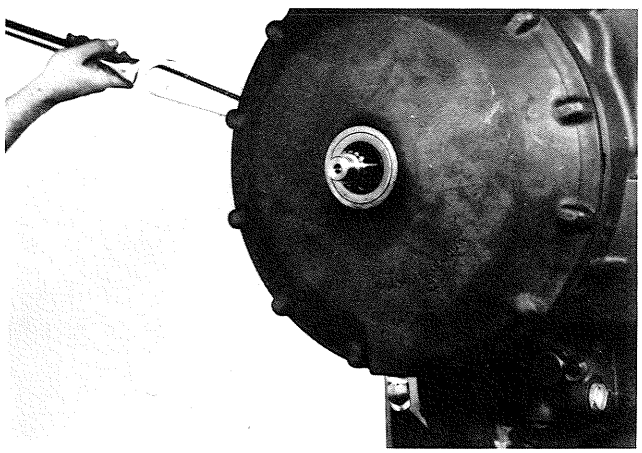


Figure 27
Install bolts and washers and tighten 37-41 ft. lbs. torque [50,2-55,5 N.m].

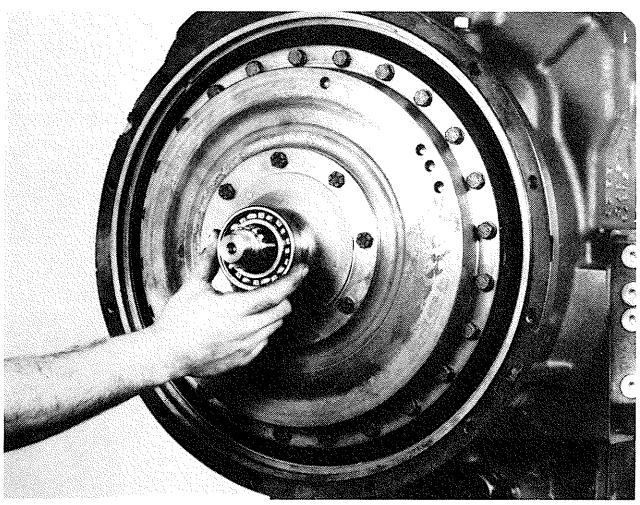


Figure 25
Install input shaft bearing on shaft.

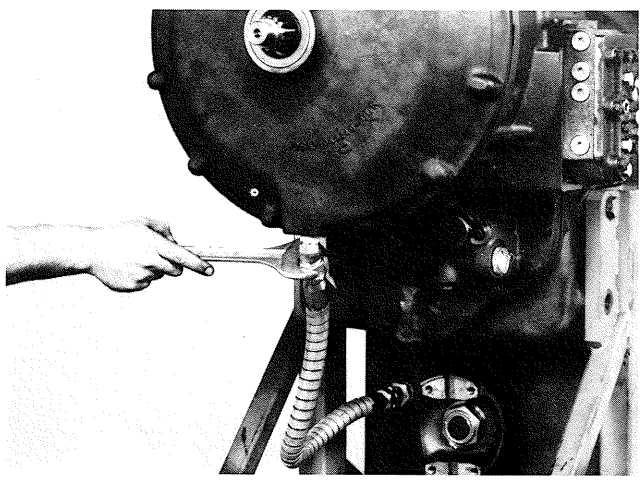


Figure 28
Connect drain hose to front cover.

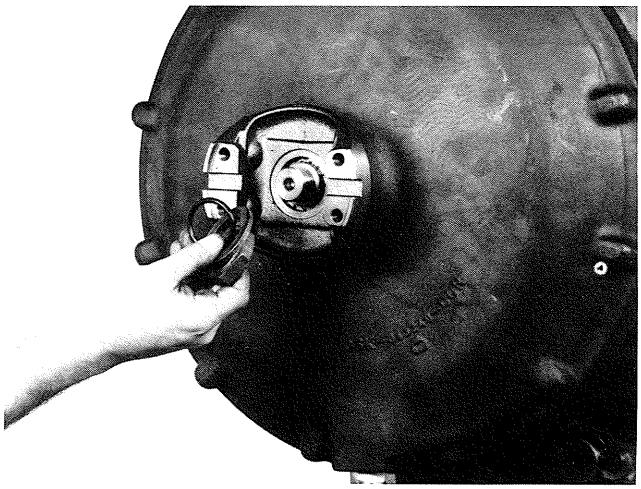


Figure 29
Install input flange "O" ring, washer and nut. Tighten nut to specified torque. (See elastic stop nut torque chart on Figure J).

SELF LOCKING ELASTIC STOP NUT TORQUE

THREAD SIZE	FT. LBS. TORQUE	NEWTON METERS (N.m.)
1" - 20	150 - 200	203,4 - 271,1
1¼" - 18	200 - 250	271,2 - 338,9
1½" - 18	300 - 350	406,8 - 474,5
1¾" - 12	400 - 450	542,4 - 610,1

MODULATION SECTION

FORWARD CLUTCH DISASSEMBLY AND REASSEMBLY (Modulation only)

DISASSEMBLY

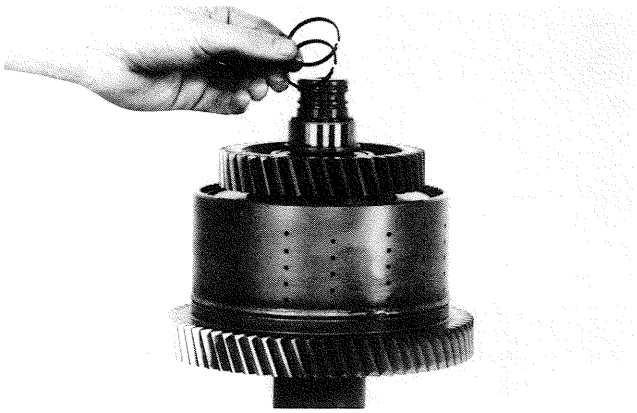


Figure 1
Remove clutch shaft oil sealing rings (piston rings). See page 119 for sealing ring and expander spring installation.

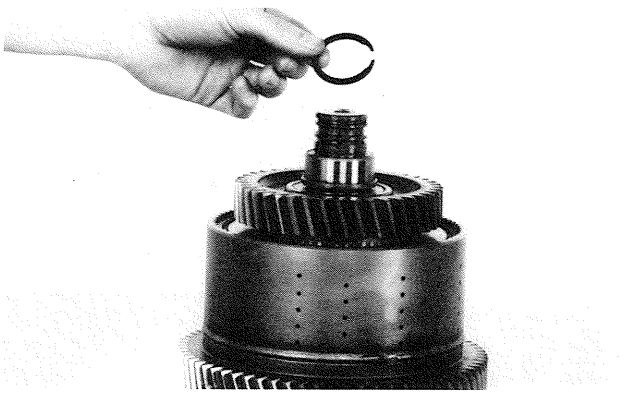


Figure 2
Remove front bearing inner race retainer ring.

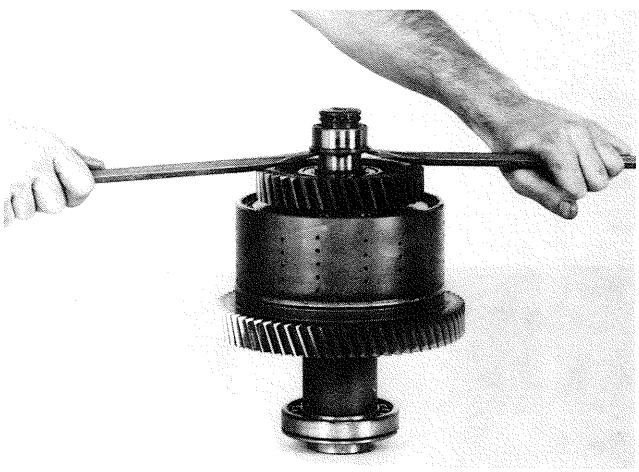


Figure 3
Pry inner race from clutch shaft.

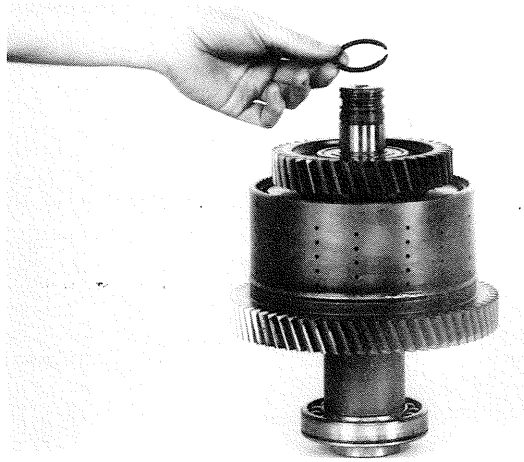


Figure 4
Remove clutch gear outer bearing retainer ring.

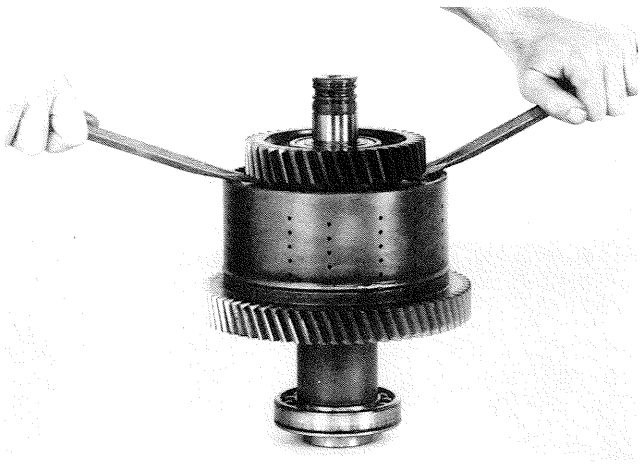


Figure 5
Pry clutch gear and outer bearing from clutch shaft.

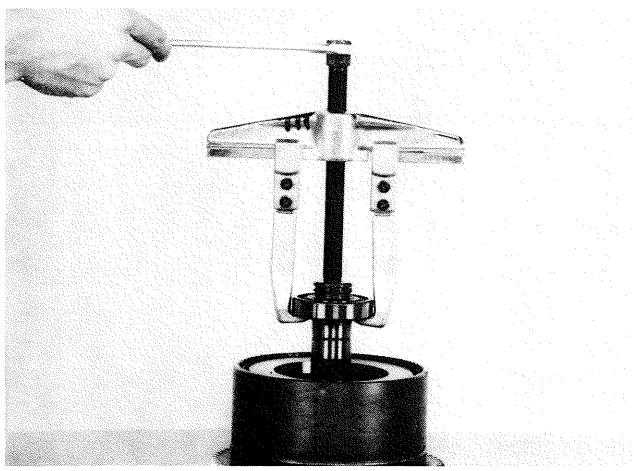


Figure 6
Remove clutch gear inner bearing.

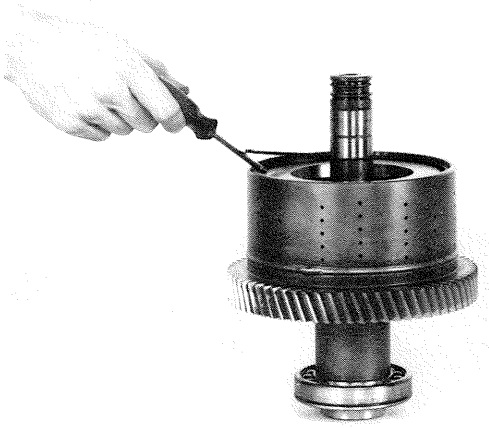


Figure 7
Remove clutch disc end plate retainer ring.

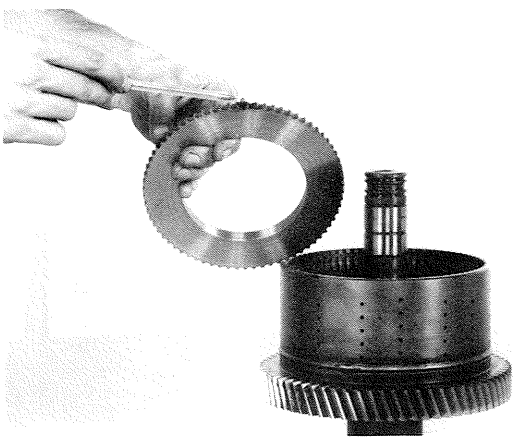


Figure 8
Remove end plate. Use caution as not to lose end plate ball and spring. (Modulated clutch only.)

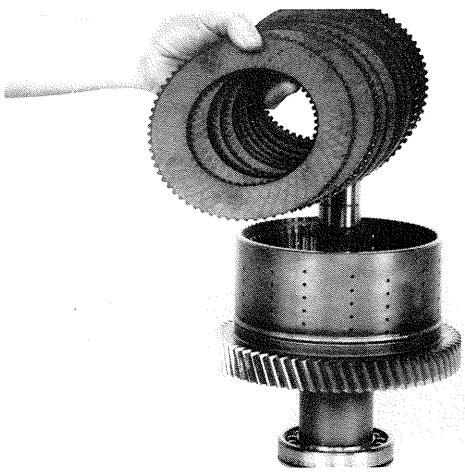


Figure 9
Remove inner and outer clutch discs.

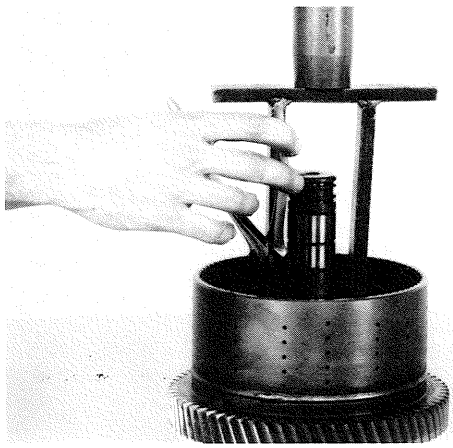


Figure 10
Compress piston return disc springs and remove spring retaining ring.

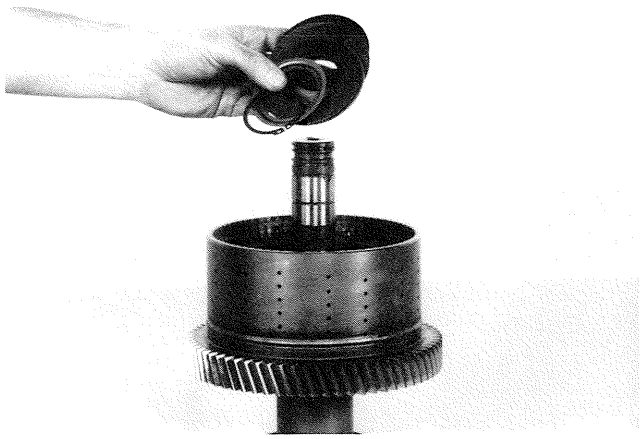


Figure 11
Remove retaining ring, ring retainer and return springs (disc springs). **See note on page 49.**

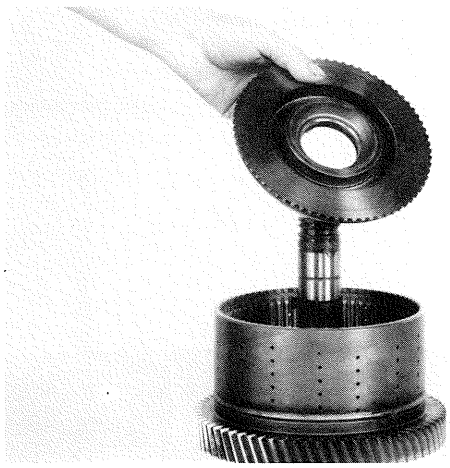


Figure 12
Remove clutch piston.

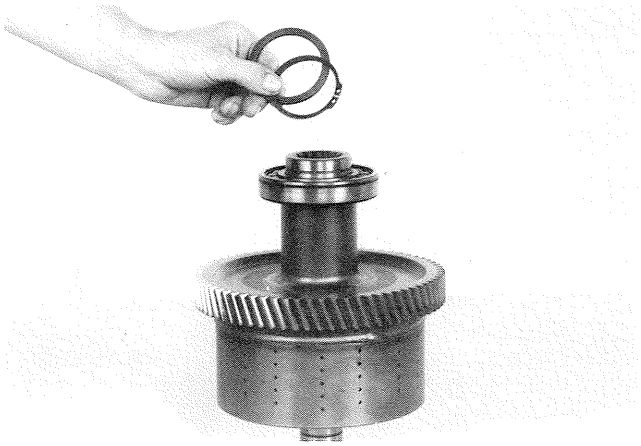


Figure 13
Remove forward clutch shaft rear bearing retainer ring and thrust washer.

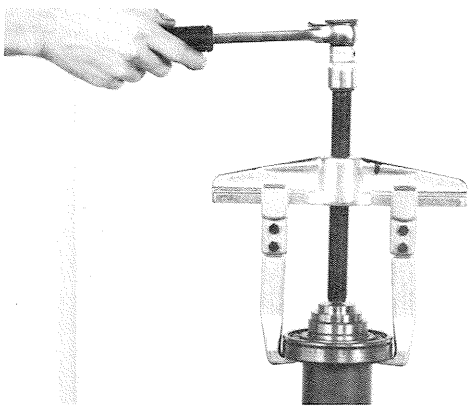


Figure 14
Remove rear bearing.

FORWARD CLUTCH REASSEMBLY

See cleaning and inspection page. (Modulation only)

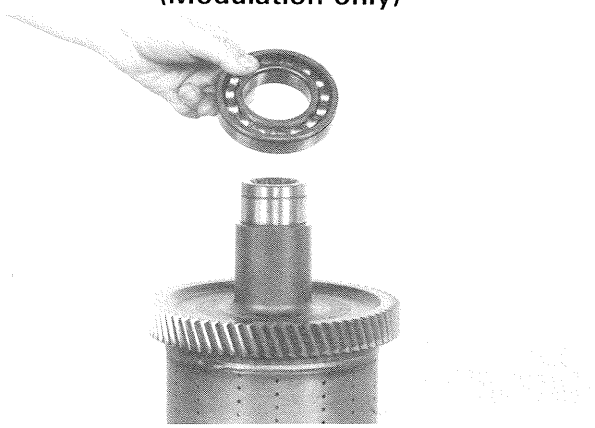


Figure 15
Install rear bearing on shaft with bearing outer locating ring groove up. (To the rear).

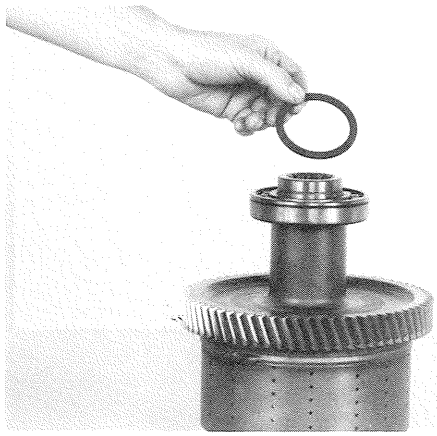


Figure 16
Position bearing thrust washer on shaft.

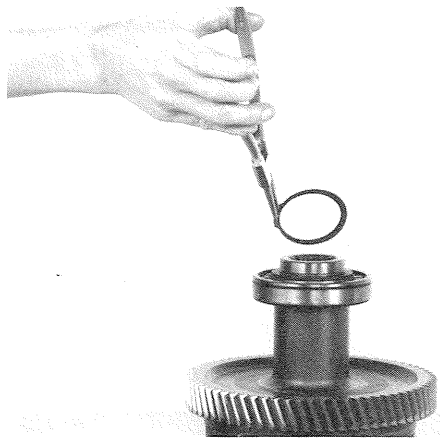


Figure 17
Install bearing retaining ring.

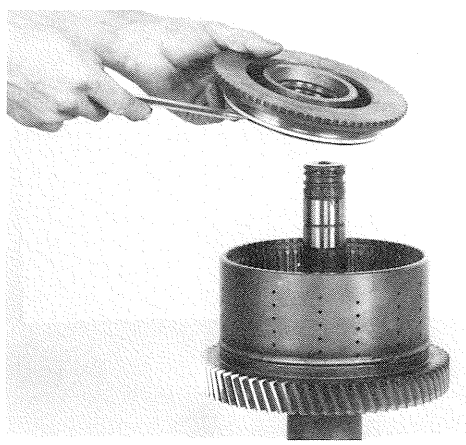


Figure 18
Install clutch piston inner and outer seal rings. Grease rings to facilitate assembly into clutch drum. Install piston in drum.

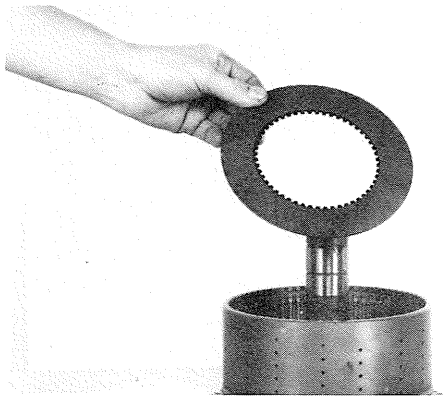


Figure 19
Install one friction disc, (teeth on the inner diameter).

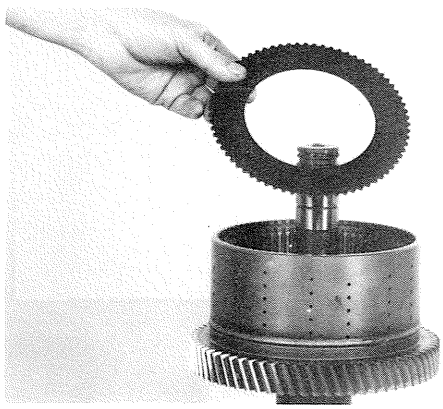


Figure 20
Install one steel disc, (teeth on the outer diameter). Alternate friction and steel discs until proper amount of discs are installed. First disc next to the piston is **friction**, the last disc installed is **friction. NOTE:** This is the sequence of installation when the clutch has an iron piston.

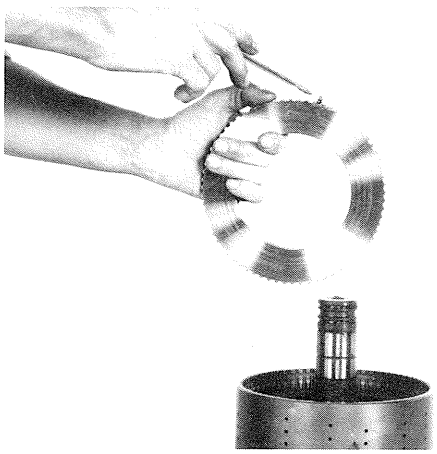


Figure 21
Install detent spring and ball in end plate. Install end plate in clutch using caution as not to lose spring or ball.

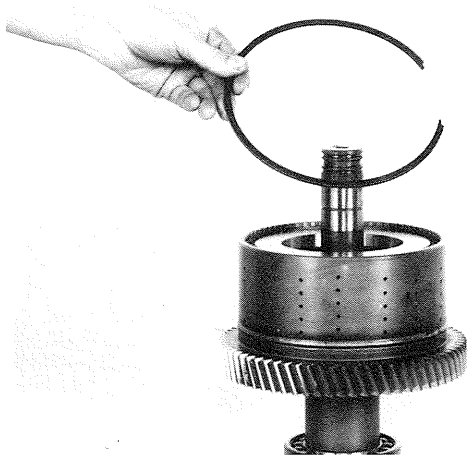


Figure 22
Compress end plate and install retainer ring.

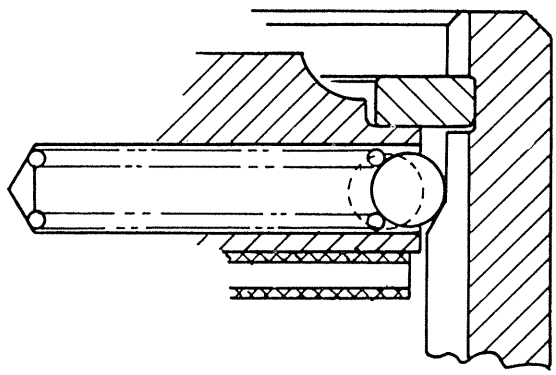


Figure 22-A

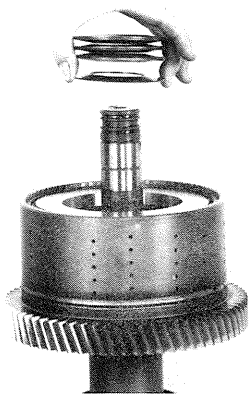


Figure 23
Install piston return disc springs. First washer with large diameter toward piston. **See note on page 49.**

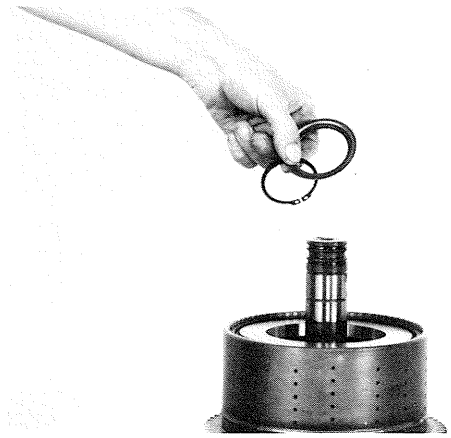


Figure 24
Position return spring retainer ring retainer and retainer ring on clutch shaft.

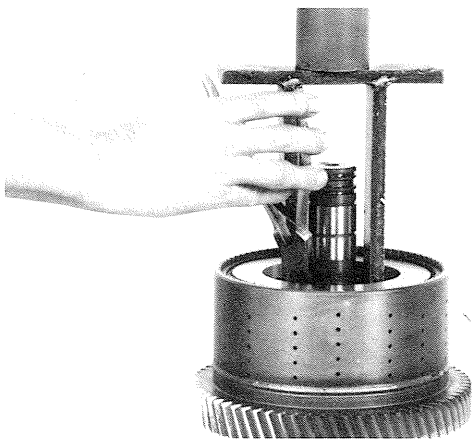


Figure 25
Compress return spring and install retainer ring. Be sure ring is in full position in retainer.

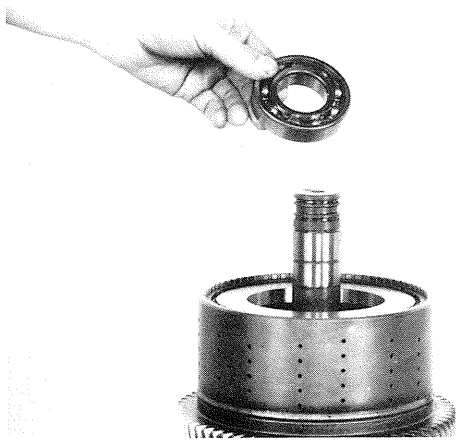


Figure 26
Install clutch gear inner bearing. **NOTE:** This bearing does not have a shield in it.

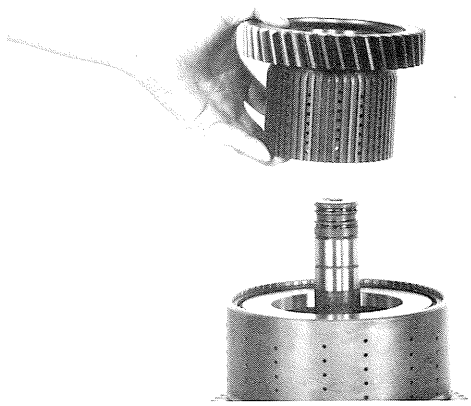


Figure 27
Install clutch driven gear into clutch drum. Align splines on clutch gear with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.

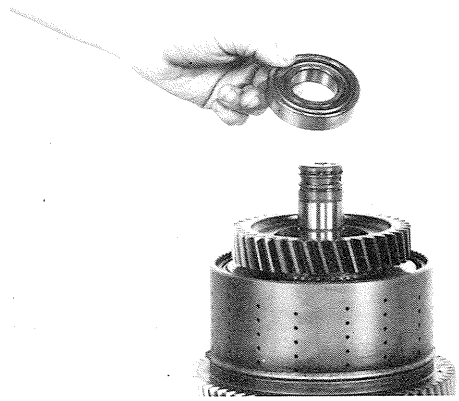


Figure 28
Install clutch gear outer bearing. **NOTE:** Outer bearing has a shield in it, this shield must be down.

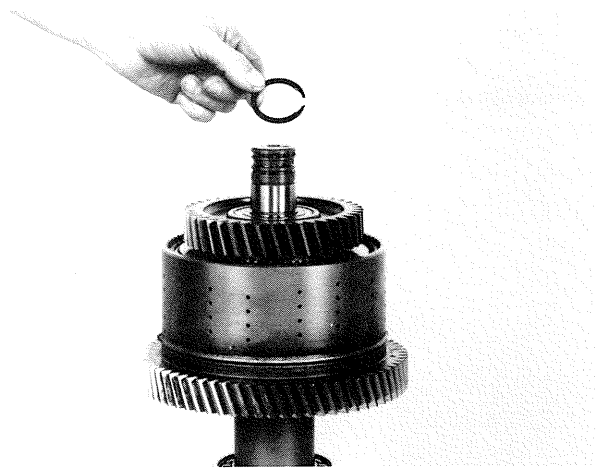


Figure 29
Install outer bearing retainer ring.

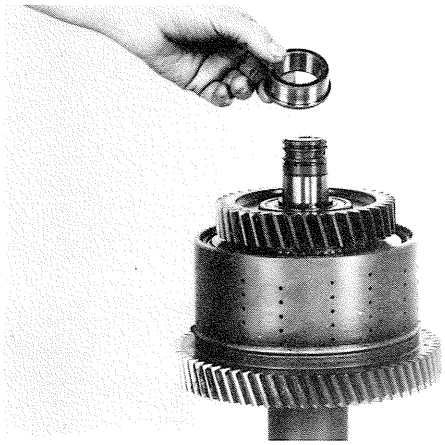


Figure 30
Install clutch shaft front bearing inner race with large diameter of race down.

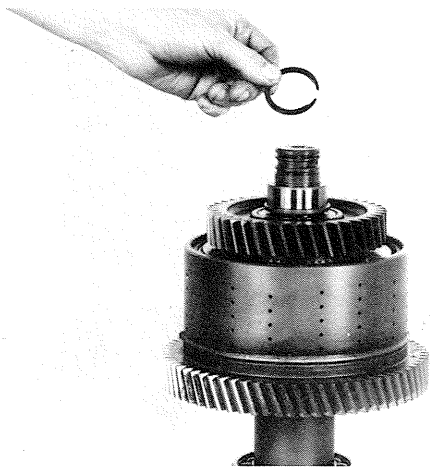


Figure 31
Install bearing race retainer ring.

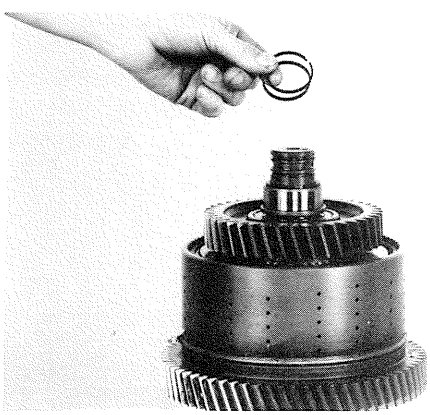


Figure 32
Install clutch shaft oil sealing rings and expander springs per instructions on page 119.

REVERSE CLUTCH DISASSEMBLY AND REASSEMBLY (Modulation only)

DISASSEMBLY

(Reverse being disassembled)

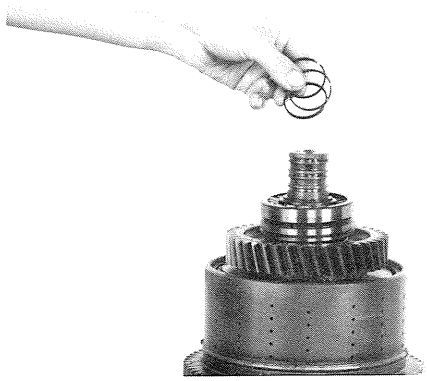


Figure 33
Remove clutch shaft oil sealing rings (piston rings). See page 119 for sealing ring and expander spring installations.

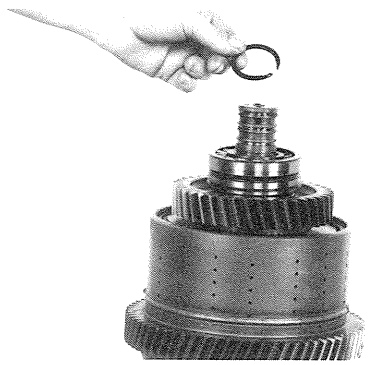


Figure 34
Remove front bearing retainer ring.

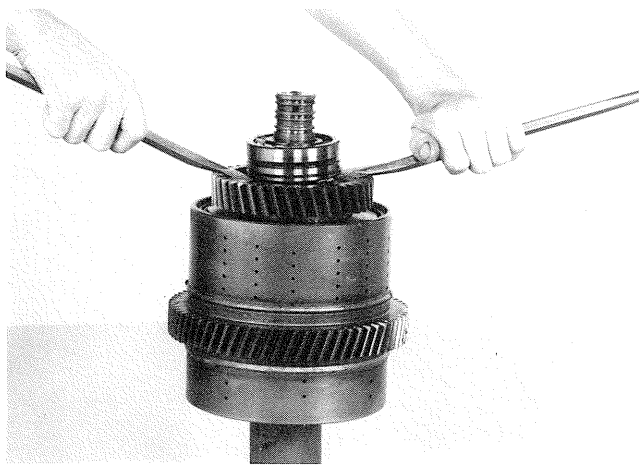


Figure 35
Pry front bearing up far enough to use a bearing puller.

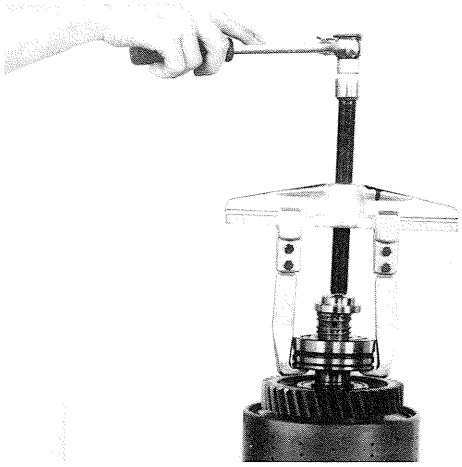


Figure 36
Remove front bearing.

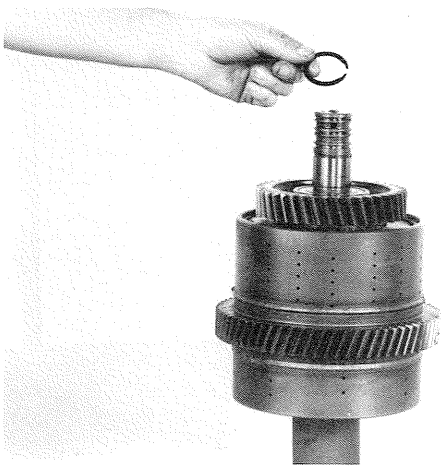


Figure 37
Remove clutch gear outer bearing retainer ring.

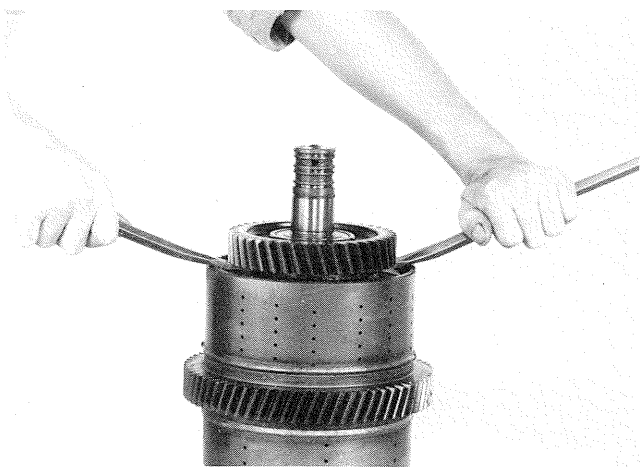


Figure 38
Pry clutch gear up far enough to install gear puller.

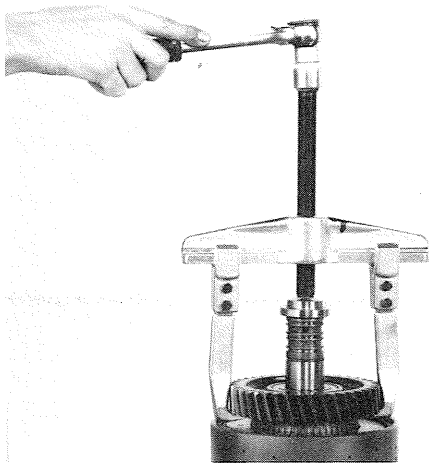


Figure 39
Remove clutch gear and outer bearing.

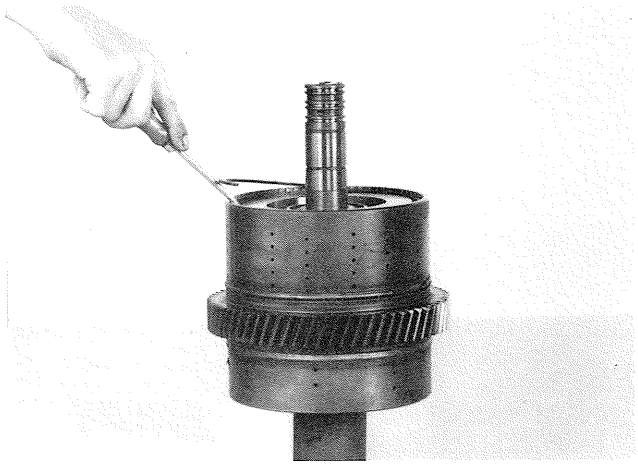


Figure 40
Remove clutch disc end plate retainer ring.

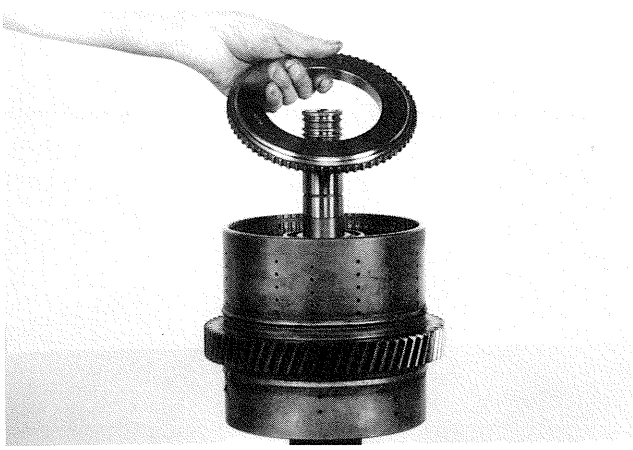


Figure 41
Remove end plate, use caution as not to lose end plate spring and ball. (Modulation only).

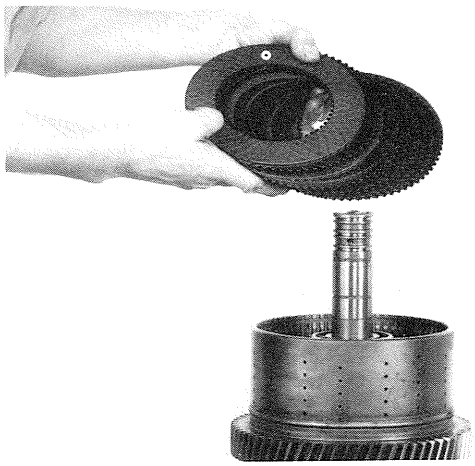


Figure 42
Remove inner and outer clutch discs.

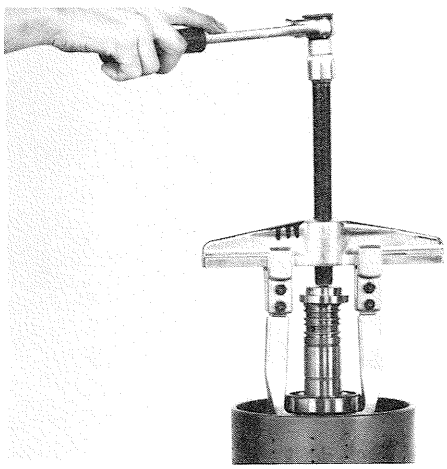


Figure 43
Remove clutch gear inner bearing.

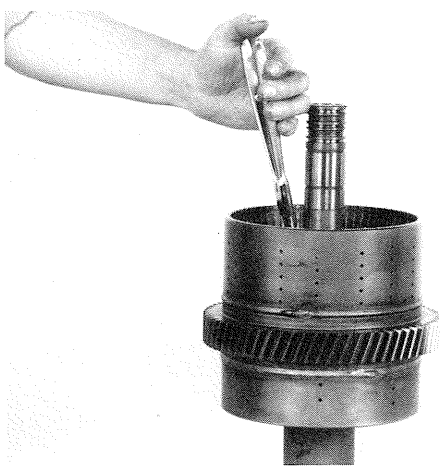


Figure 44
Remove piston return disc spring retainer ring.

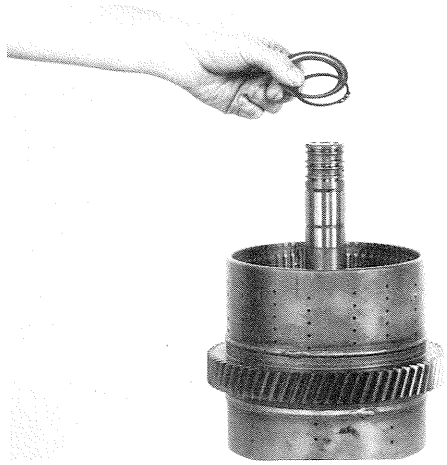


Figure 45
Remove spring retainer and retainer ring.

Figure 46
Remove piston return disc springs. **See note on page 49.**

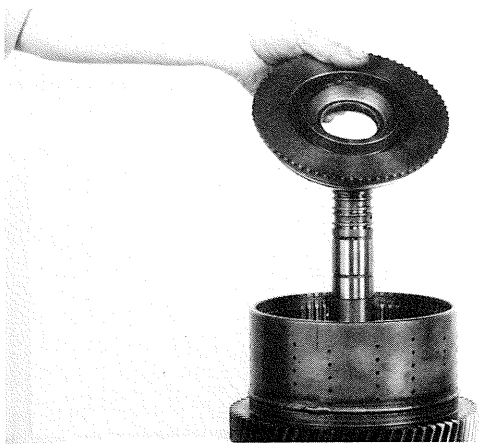


Figure 47
Remove clutch piston.

REVERSE CLUTCH REASSEMBLY
See cleaning & inspection page. (Modulation only)

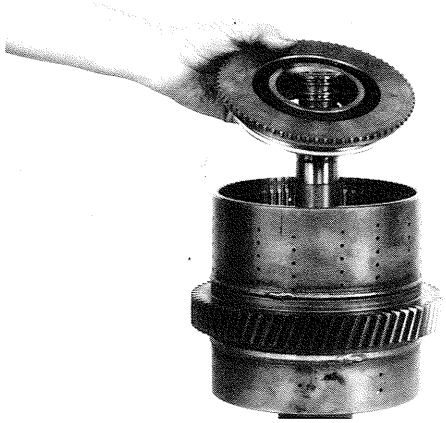


Figure 48
Install clutch piston inner and outer seal rings. Grease rings to facilitate assembly into clutch drum. Install piston in drum.

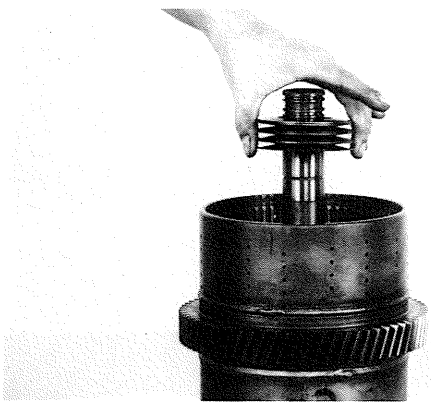


Figure 49
Install piston return disc springs. First spring with large diameter toward piston. **See note on page 49.**

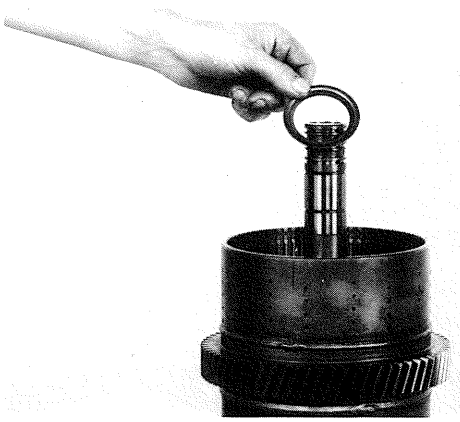


Figure 50
Position return spring retainer ring retainer on clutch shaft.

Figure 51
Compress return springs and install retainer ring. Be sure ring is in full position in ring retainer washer and ring groove.

Figure 52
Install clutch gear inner bearing. **NOTE:** This bearing does not have a shield in it.

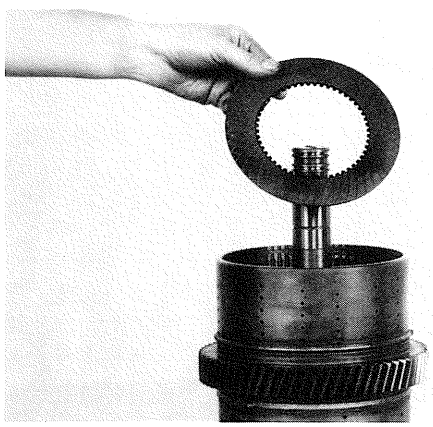


Figure 53
Install one friction disc, (teeth on inner diameter).

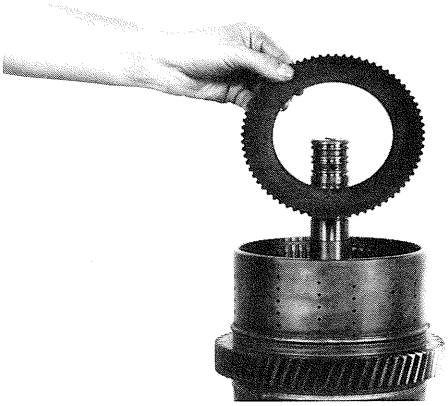


Figure 54

Install one steel disc, (teeth on outer diameter). Alternate friction and steel discs until proper amount of discs are installed. First disc next to the piston is **friction,** the last disc installed is **friction. NOTE:** This is the sequence of installation when the clutch has an iron piston.

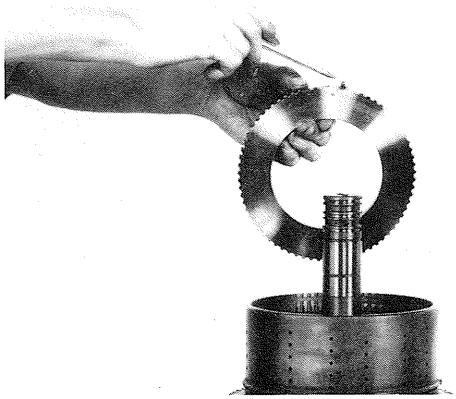


Figure 55

Install detent spring and ball in end plate. Install end plate in clutch using caution as not to lose spring or ball.

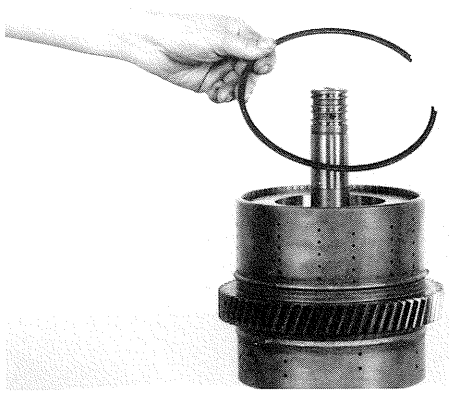


Figure 56

Compress end plate and install end plate retainer ring. (See Fig. 22-A, page 129).

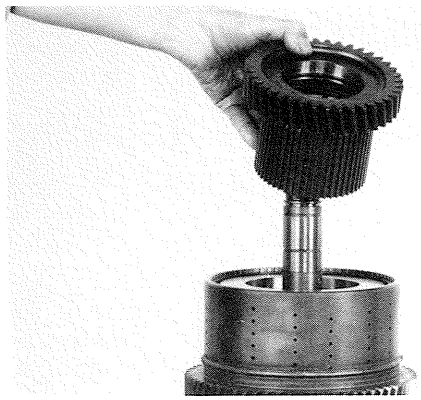


Figure 57

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 58

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

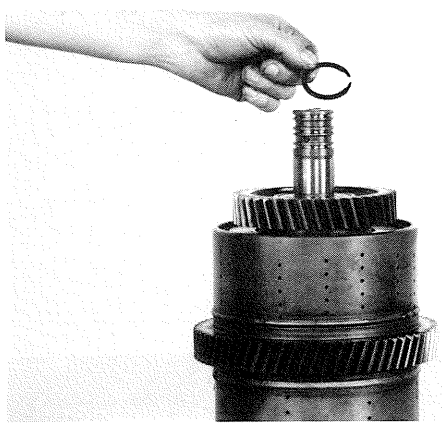


Figure 59

Install outer bearing retainer ring.

Figure 60
Install clutch shaft front bearing. **NOTE:** Outer bearing locating ring groove must be down.

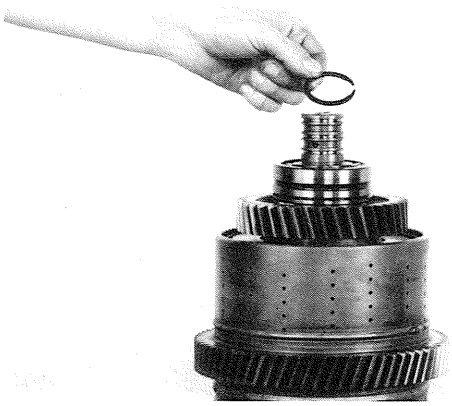


Figure 61
Install bearing retainer ring.

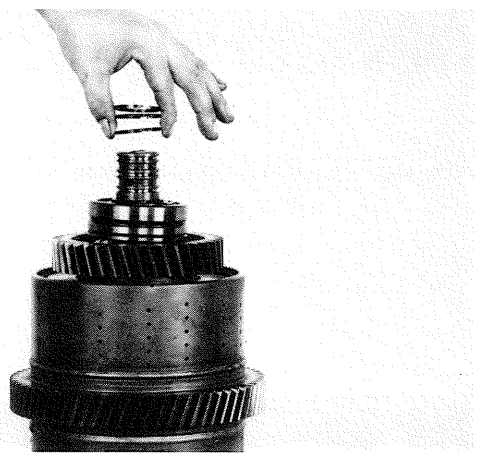


Figure 62
Install clutch shaft oil sealing rings and expander springs per instructions on page 119.

PROPER INSTALLATION OF TEFLON PISTON RING AND PISTON RING EXPANDER SPRINGS

NOTE: NOT ALL TRANSMISSIONS WILL HAVE TEFLON PISTON RINGS AND EXPANDER SPRINGS

1. Fill the oil sealing ring grooves with a good grade of grease, this will help stabilize the teflon ring and expander spring in the ring groove for installation.

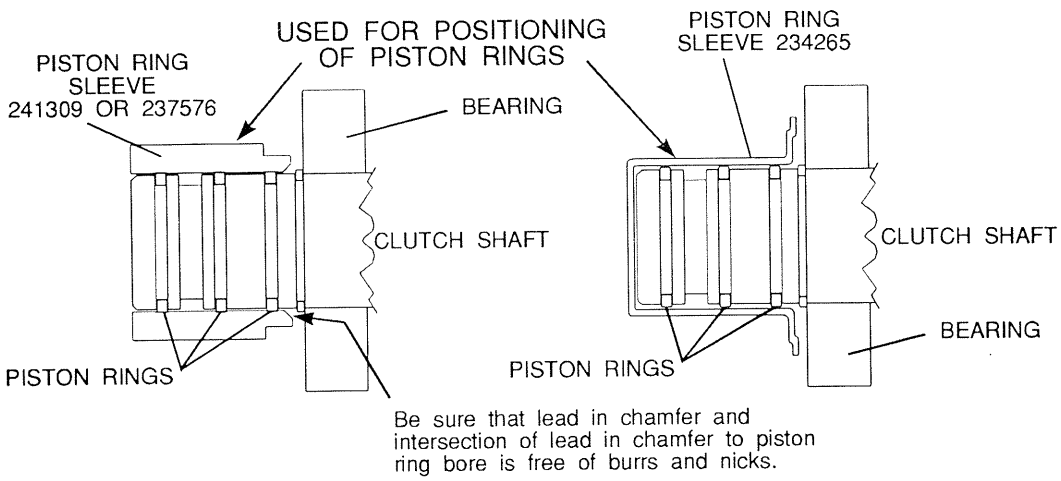
2. Position the expander spring in the inner groove of the new piston ring, with the expander spring gap 180° from the hook joint gap of the piston ring.

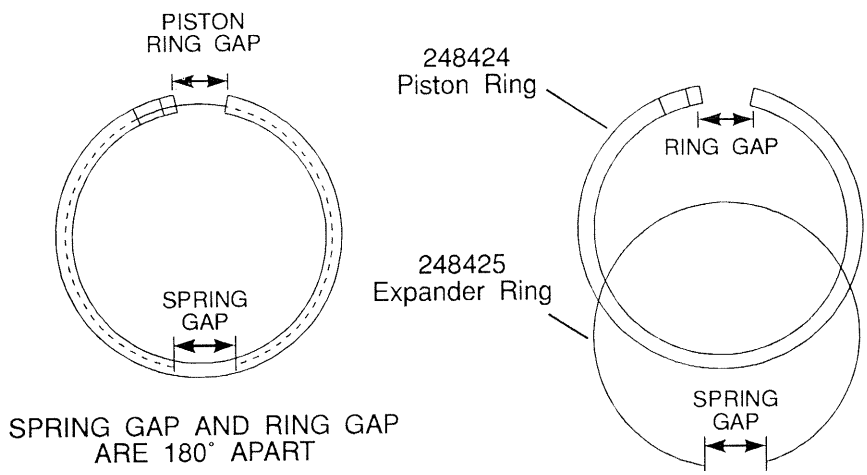
3. Carefully position the piston ring and expander spring on the clutch shaft in the inner most ring groove. Hook the piston piston ring joint.

4. Repeat steps 1, 2 and 3 for the remaining ring or rings making certain all hook joints are fastened securely.

5. Apply a heavy coat of grease to the outer diameter of the rings and clutch shaft. Center the piston ring's in the ring groove.

6. Before installing the clutch assembly in the front cover or converter housing it is recommended a piston ring sleeve P/N's 241309, 237576 or 234265 be used to center all of the piston rings in their respective ring grooves. Use extreme caution to not damage piston rings when installing the clutch shaft in the front trasnmission cover or converter housing.





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