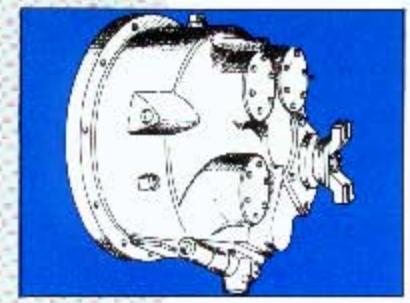
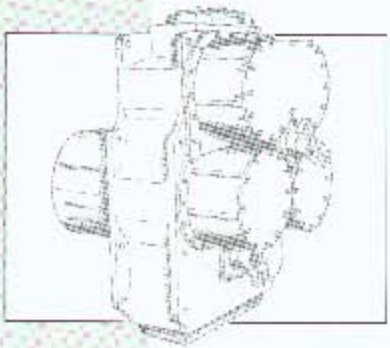
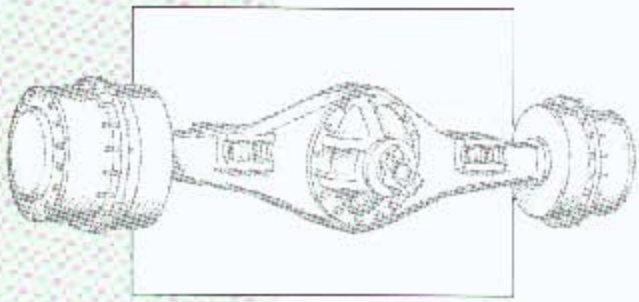
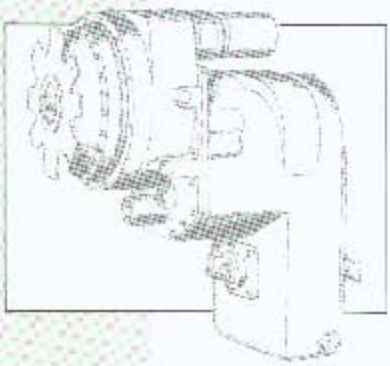
Maintenance and Service Manual









C 320

Torque Converter

CLARK-HURTH COMPONENTS

SMC 320 (Rev. 3-97)

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 [ ].

HOW THE UNITS OPERATE

The torque converter portion of the power train enacts an important role in delivering 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 torque converter and transmission function together and operate through a common hydraulic system. To obtain maximum serviceability they have been designed and built as separate units. It is necessary, however, to consider both units in the study of their function and operation.

To supplement the text herein, and for reference use therewith, the following illustrations are provided.

Torque Converter Assembly — Cross Section
Internal Oil Flow — Torque Converter
Torque Converter Assembly — Exploded View
Assembly Instructions

The torque converter is composed of four members: The impeller which is the driving member, the drive disc or impeller cover, the turbine, which is the driven member and the reaction member. The reaction member option is splined to the converter support and does not rotate in either direction or can be free wheeling, depending on the application. The impeller and drive disc form the outer shell. The turbine runs within the outer shell and is connected to the output shaft. The oil is the only connection between the turbine and impeller member.

Three pump drive gears are bearing mounted in the converter housing and meshed with a gear on the impeller hub. With the engine running the pump drive gears rotate at engine speed. The pumps are externally mounted on the converter housing and are connected to the pump shafts by a pump drive sleeve.

With the engine running, the converter charging pump draws oil from the transmission sump and directs it through oil filters to the pressure regulating valve located on top of the converter. From the regulating valve it is then directed to the transmission clutches and into the converter.

The pressure regulating valve remains closed until required pressure is delivered to the transmission for actuating the direction and speed clutches. This regulator valve consists of a hardened valve spool operating in a closely fitted bore. The valve spool is backed up by a spring to hold the valve spool against its seat until the oil pressure overrides the spring force. The valve spool moves toward the spring until a port is exposed in the side of the bore. The oil can flow through this port into a distributor which directs the oil through a passage into the converter.

After entering the converter, the oil is directed into the converter support through the impeller bearing and to the converter cavity.

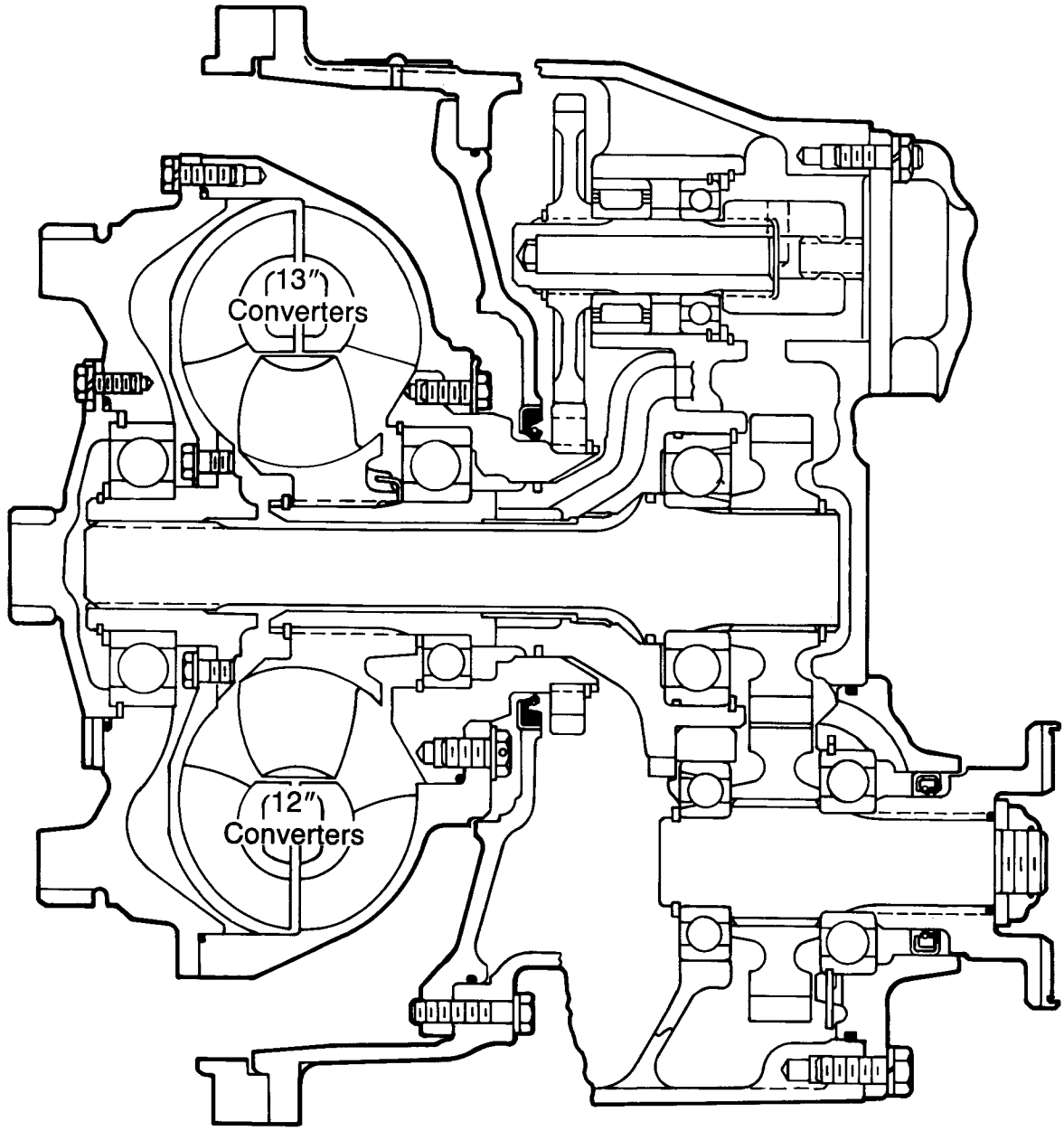
Three members of the torque converter are composed of a series of blades. The blades are curved in such a manner as to force the oil to circulate from the impeller to the turbine, through the reaction member and again into the impeller. This circulation causes the turbine to turn in the same direction as the impeller. Oil enters the inner diameter of the impeller and exits from the outer diameter into the outer diameter of the turbine, then exits from the inner diameter of the turbine and through the reaction member. The oil again enters the inner diameter of the impeller.

The oil exits between the turbine shaft and reaction member support and through an oil distributor which directs the oil out of the converter, and to the oil cooler. After leaving the cooler the oil is directed to the lubricating oil inlet on the transmission and through a series of tubes to the transmission bearings, and clutches. The oil is internally returned to the transmission sump.

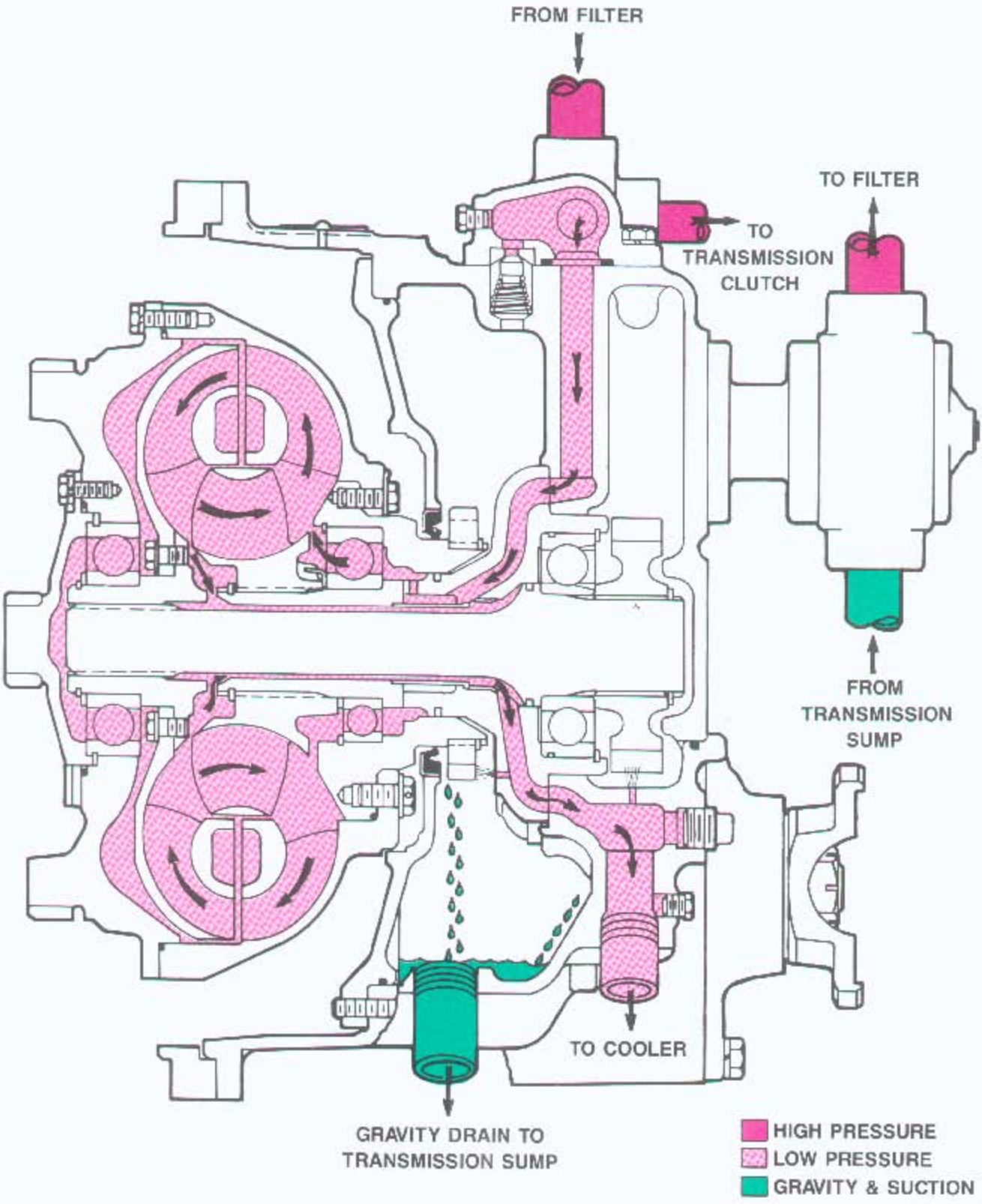
The converter lube and leakage oil is returned to the transmission sump by a flexible hose installed in the lowest pipe tap hole in the converter housing. This line must have a continuous drop to allow by gravity flow, leakage oil to return to the transmission sump.

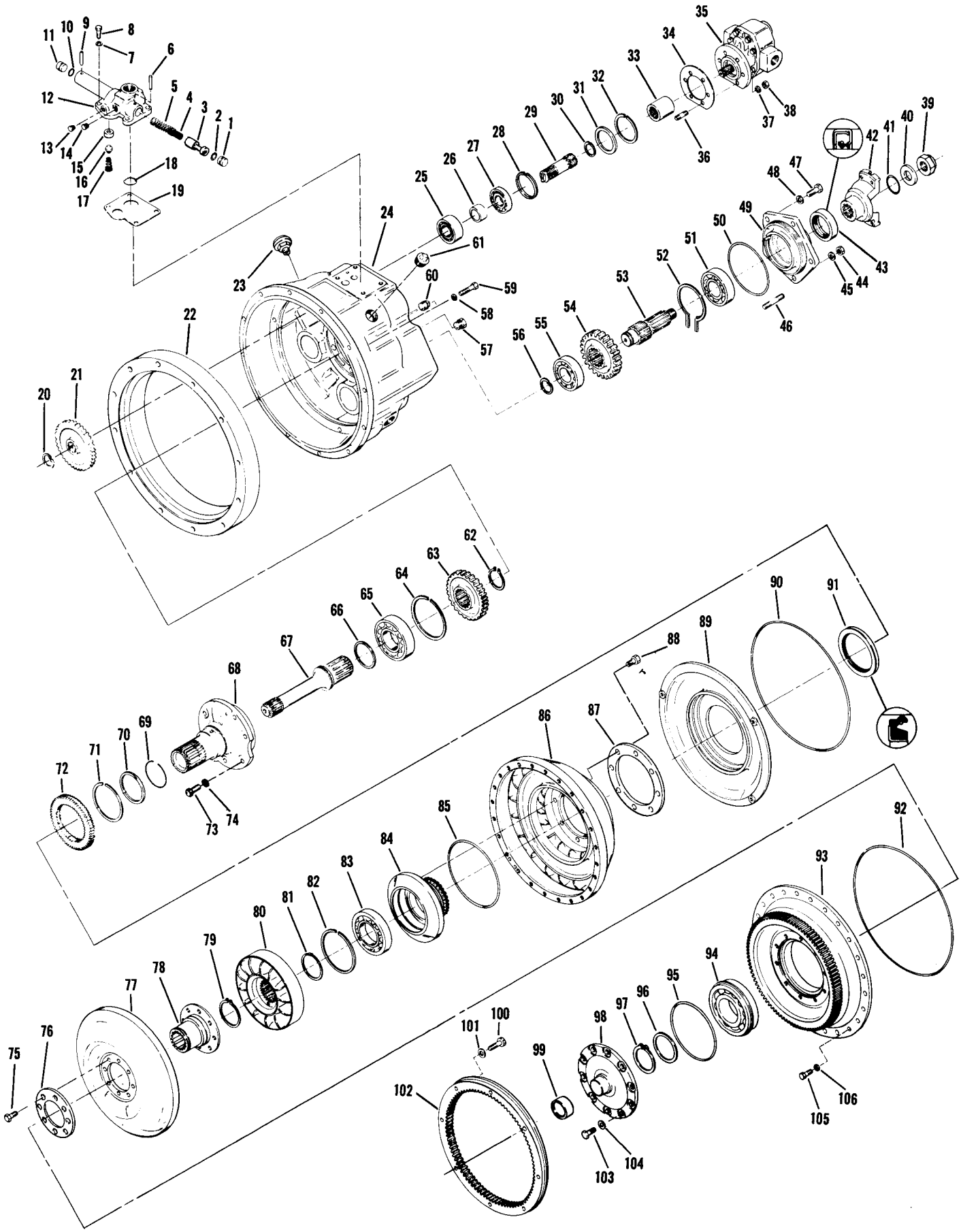
A safety valve is built in the pressure regulating valve and will open to bypass oil only if an excessive pressure is built up due to a blocked passage.

With the engine operating at any speed and the turbine and output shafts stationary, the converter is in a "stall" condition. Full power or wide open throttle "stalls" for more than 30 seconds at a time will generate excessive heat and may cause converter or transmission seal damage.



C320 SERIES CONVERTER OIL FLOW DIAGRAM

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C320 CONVERTER

ITEM	DESCRIPTION	QTY.
1	Valve Stop	1
2	Valve Stop "O" Ring	1
3	Valve Piston	1
4	Valve Spring - Inner	1
5	Valve Spring - Outer	1
6	Valve Stop Roll Pin	1
7	Regulator Valve to Housing Screw Lockwasher	4
8	Regulator Valve to Housing Screw	4
9	Valve Stop Roll Pin	1
10	Valve Stop "O" Ring	1
11	Valve Stop	1
12	Regulator Valve Assembly	1
13	Valve Housing Pipe Plug	1
14	Valve Housing Pipe Plug	1
15	Safety Valve Seat	1
16	Safety Valve Plunger	1
17	Safety Valve Spring	1
18	Regulating Valve to Housing "O" Ring	1
19	Regulating Valve to Housing Gasket	1
20	Pump Drive Gear Snap Ring	3
21	Pump Drive Gear	3
22	Converter Housing Adaptor Ring	1
23	Breather Assembly	1
24	Converter Housing	1
25	Pump Drive Shaft Bearing	3
26	Pump Drive Shaft Spacer	3
27	Pump Drive Shaft Bearing	3
28	Pump Drive Shaft Bearing Snap Ring	3
29	Pump Drive Shaft	3
30	Pump Drive Shaft Snap Ring	3
31	Pump Drive Shaft Washer	3
32	Pump Shaft Snap Ring	3
33	Charging Pump Sleeve	1
34	Charging Pump Gasket	1
35	Converter Charging Pump	1
36	Pump Mounting Stud	3
37	Pump Mounting Stud Lockwasher	3
38	Pump Mounting Stud Nut	3
39	Output Shaft Nut	1
40	Output Shaft Washer	1
41	Output Shaft "O" Ring	1
42	Output Flange	1
43	Bearing Retainer Oil Seal	1
44	Bearing Retainer Stud Nut	2
45	Bearing Retainer Stud Lockwasher	2
46	Bearing Retainer Stud	2
47	Bearing Retainer Screw	3
48	Bearing Retainer Screw Lockwasher	3
49	Bearing Retainer	1
50	Bearing Retainer "O" Ring	1
51	Output Shaft Rear Bearing	1
52	Output Shaft Bearing Snap Ring	1
53	Output Shaft	1
54	Output Shaft Gear	1
55	Output Shaft Front Bearing	1
56	Bearing Snap Ring	1
57	Converter Housing Pipe Plug	1
58	Oil Baffle Screw Lockwasher	3
59	Oil Baffle Screw	3
60	Converter Housing Pipe Plug	1
61	Converter Housing Pipe Plug	4
62	Gear Snap Ring	1
63	Turbine Shaft Gear	1
64	Turbine Shaft Snap Ring	1
65	Turbine Shaft Bearing	1
66	Turbine Shaft Piston Ring	1
67	Turbine Shaft	1
68	Stator Support & Sleeve Assembly	1
69	Piston Ring Expander Spring	1
70	Stator Support Piston Ring	1
71	Impeller Hub Gear Snap Ring	1
72	Impeller Hub Gear	1
73	Stator Support Screw	6
74	Stator Support Screw Lockwasher	6
75	Turbine Hub Screw	8
76	Turbine Hub Screw Washer	8
77	Turbine	1
78	Turbine Hub	1
79	Reaction Member Snap Ring	1
80	Reaction Member	1
81	Reaction Member Spacer	1
82	Bearing Snap Ring	1
83	Impeller Hub Bearing	1
84	Impeller Hub	1
85	Impeller Hub "O" Ring	1
86	Impeller	1
87	Impeller Hub Screw Backing Ring	1
88	Hub to Impeller Screw	12
89	Oil Baffle	1
90	Oil Baffle "O" Ring	1
91	Oil Baffle Oil Seal	1
92	Impeller to Cover "O" Ring	1
93	Impeller Cover	1
94	Impeller Cover Bearing	1
95	Bearing Cap to Impeller Cover "O" Ring	1
96	Bearing Washer	1
97	Bearing Snap Ring	1
98	Impeller Cover Bearing Cap	1
99	Impeller Cover Sleeve	1
100	Ring Gear Screw	16
101	Ring Gear Screw Plain Washer	16
102	Flywheel Ring Gear	1
103	Bearing Cap to Impeller Cover Screw	10
104	Bearing Cap to Impeller Cover Screw Washer	10
105	Impeller to Cover Screw	24
106	Impeller to Cover Screw Washer	24

C & CL-320
ASSEMBLY INSTRUCTION WITH OFFSET OUTPUT

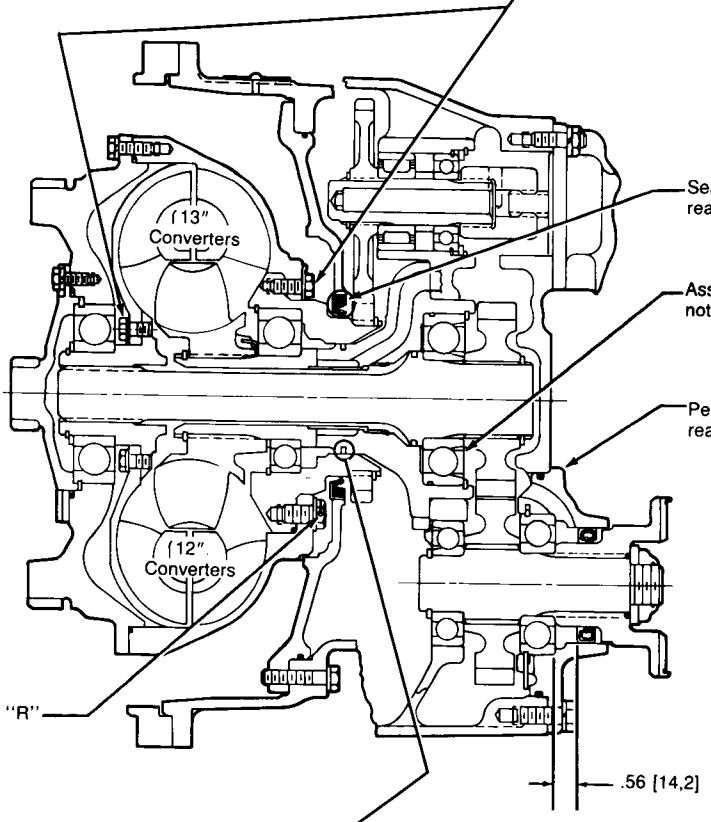
GENERAL NOTES

1. Torque output shaft nut 200 to 250 Lbs. Ft. [271-339 N·m]
2. All lead-in chamfers for oil seals, piston rings & "O" rings must be smooth & free from burrs. Inspect at assembly.
3. Lubricate all piston rings & "O" rings at assembly.
4. Apply thin coating of grease between seal lips on lip type seals prior to assembly.
5. Use Permatex & Crane Sealer only where specified.
6. Apply very light coat of Permatex No. 2 to O.D. of all oil seals before assembly.
7. After assembly of parts using Permatex or Crane sealer, there must be no free or excess material that could enter the oil circuit.
8. Heat nose bushing to 200°F [94°C] before assembly of bushing to cover.

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 40 to 45 Lbs. Ft. [54,3-61,0 N·m] 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.

OFFSET DRIVE



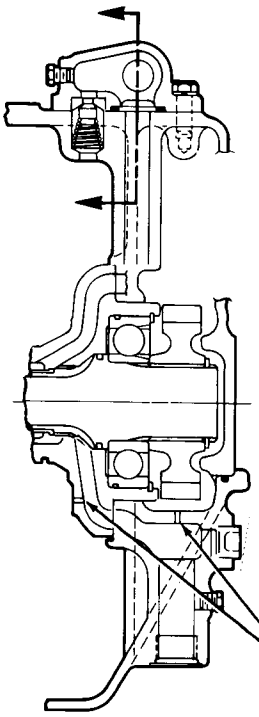
Seal to be flush with rear surface.

Assemble bearing with notches as shown

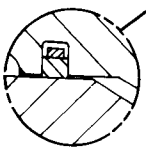
Permatex studs used on rear bearing cap.

Lockwire See View "R"

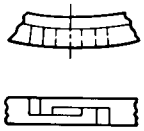
.56 [14,2]



Lube holes to be checked prior to assembly. Holes must be free of dirt and burrs.

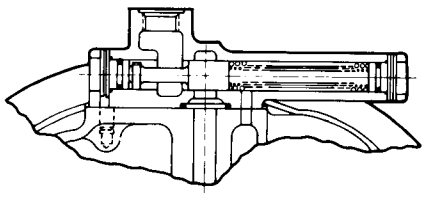


Enlarged view of piston ring & expander.



Expander gap to be approx. 180° from ring hook joint to aid assembly.

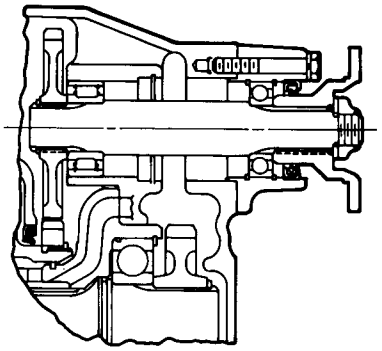
REGULATOR VALVE



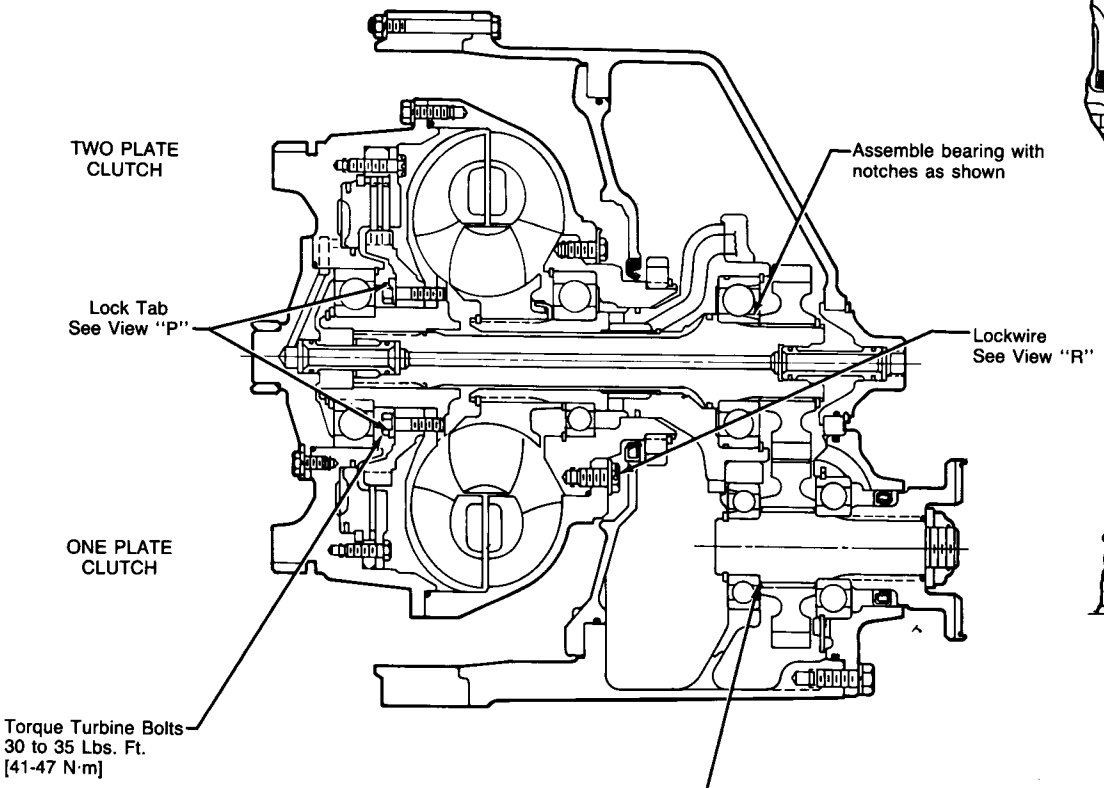
SECTION A-A

Note:
Power take off can be mounted on either offset or straight thru drive converter.

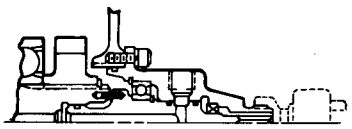
POWER TAKE OFF



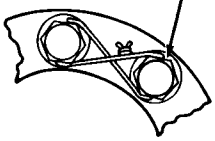
OFFSET DRIVE WITH LOCK-UP



LOCK-UP WITH TACH DRIVE

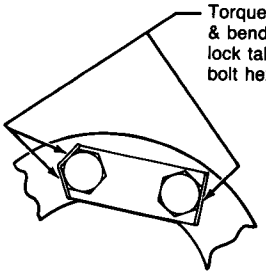


Torque cap screws & lockwire every 2 capscrews together as shown, lockwire must not protrude above capscrew head.



View "R"

Torque cap screws & bend corners of lock tabs up against bolt hex flats as shown.



View "P"

Torque Specification for Lubricated or Plated Screw Threads

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

OVERHAUL INSTRUCTIONS FOR TORQUE CONVERTER

The following instructions will cover the disassembly and reassembly of the torque converter in a sequence that would normally be followed after the unit is 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 OF THE TORQUE CONVERTER

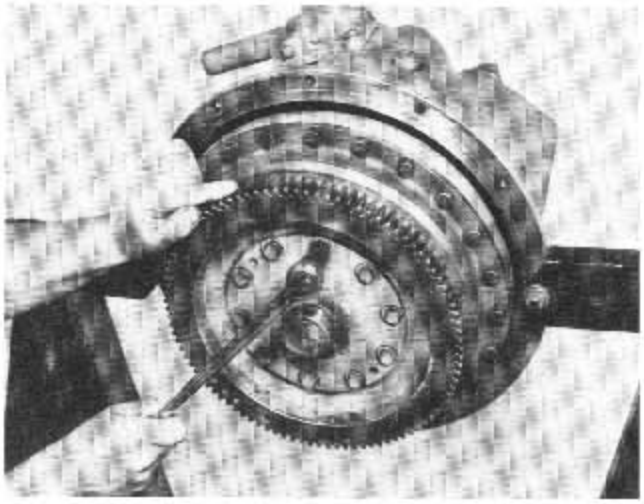


Figure 1
Remove impeller cover bearing cap bolts.

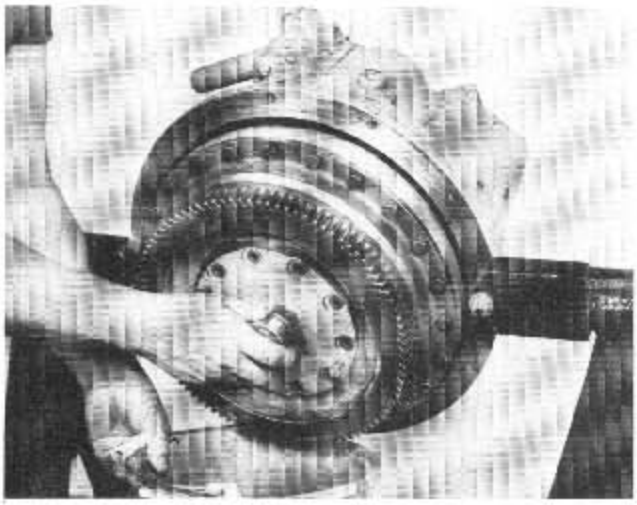


Figure 3
Remove bearing cap and drain oil. This will still not drain all of the oil but will catch most of it.

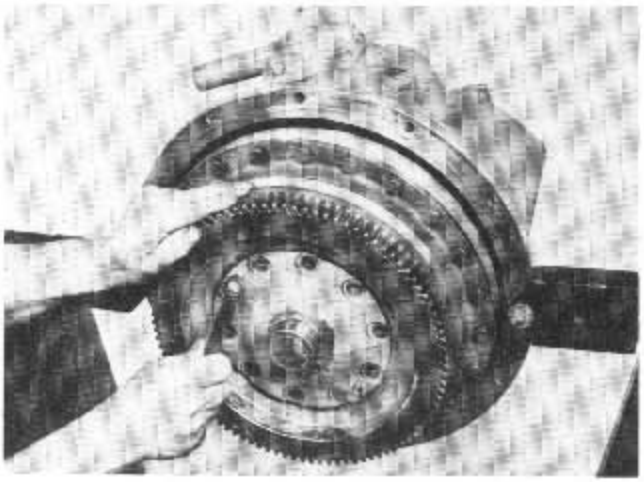


Figure 2
CAUTION: Converter can not be completely drained of oil thru drain plugs. It is recommended a container be used to catch oil. Use puller screws in threaded holes in bearing cap.

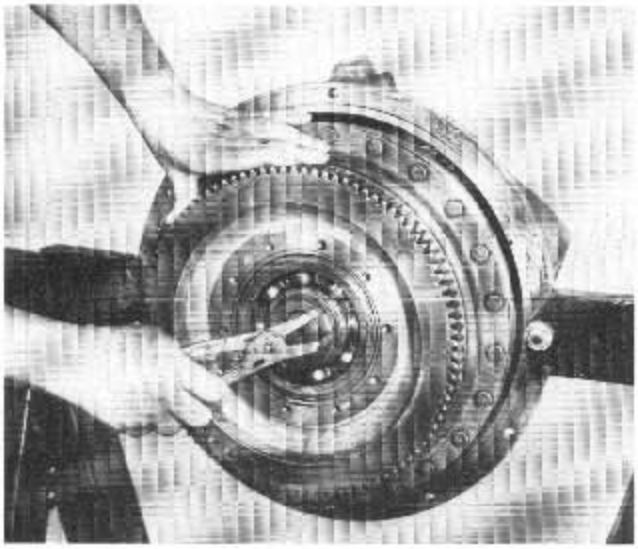


Figure 4
Remove impeller cover bearing to turbine hub retainer ring.

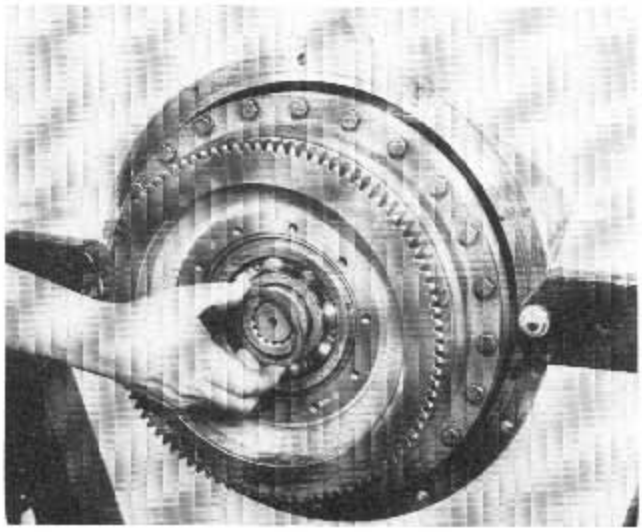


Figure 5
Remove retainer ring washer.

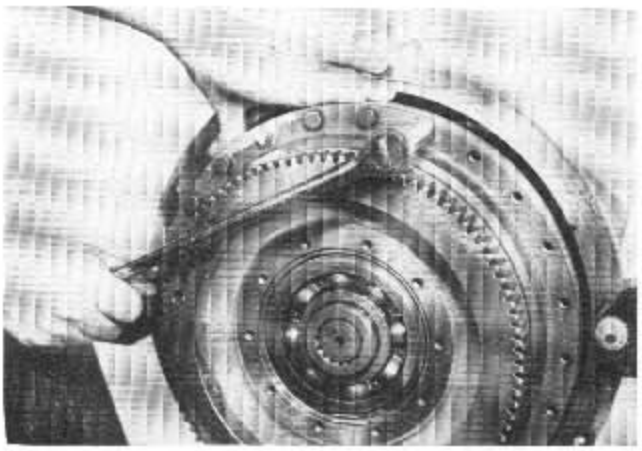


Figure 6
Remove impeller cover to impeller bolts.

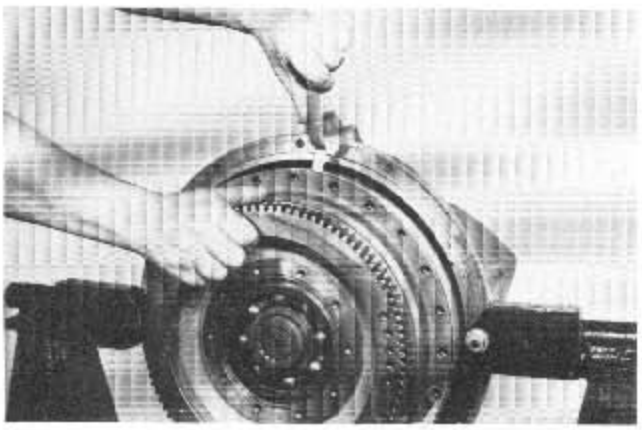


Figure 7
Using pry slots provided, pry impeller cover from impeller.
NOTE: Be prepared to catch more oil trapped in the converter wheels.

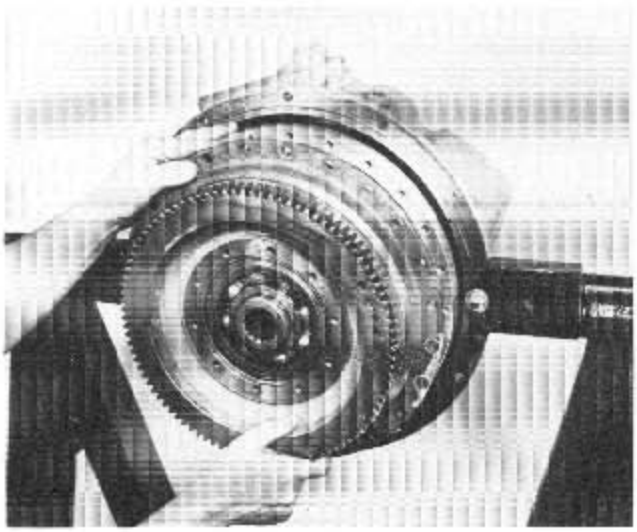


Figure 8
Remove impeller cover and turbine as an assembly.

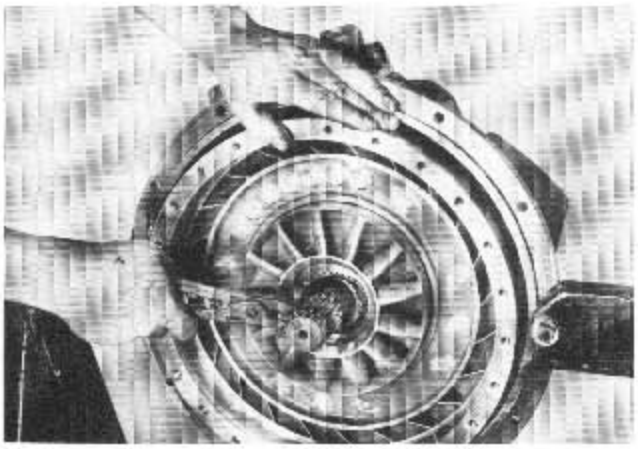


Figure 9
Remove reaction member retainer ring.

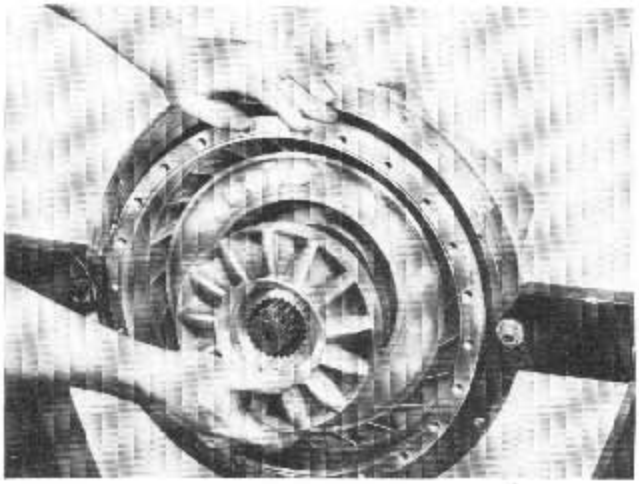


Figure 10
Remove reaction member.

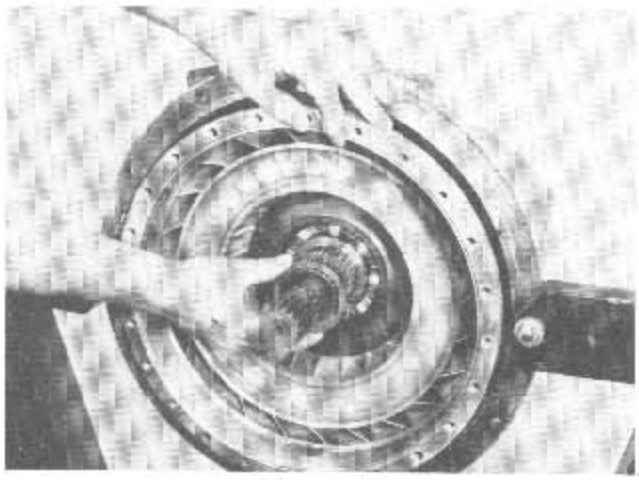


Figure 11
Remove reaction member spacer.

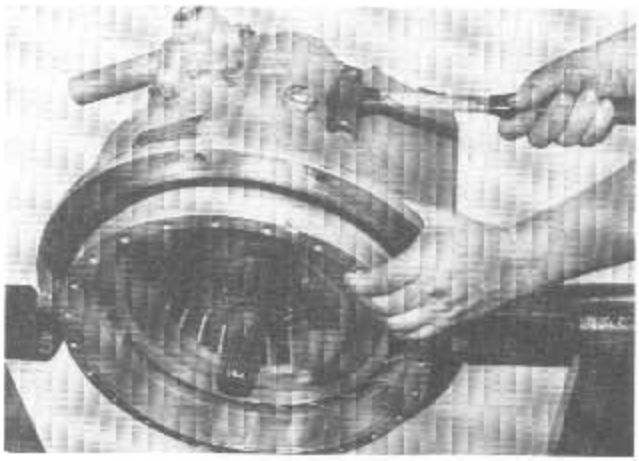


Figure 12
Loosen oil baffle bolts (qty. 3). Tap lightly on each bolt. This will loosen oil baffle from converter housing.

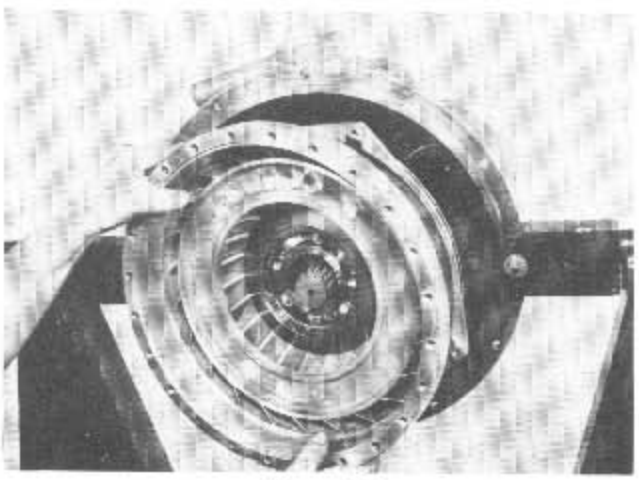


Figure 13
Remove 3 oil baffle bolts. Remove impeller and oil baffle as an assembly.

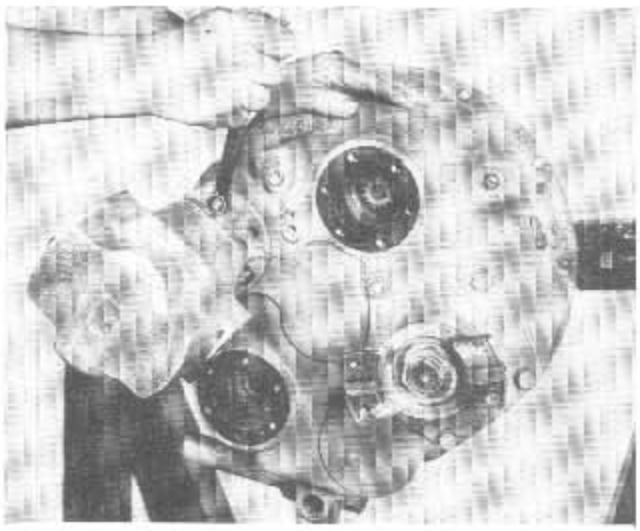


Figure 14
Remove charging pump stud nuts.

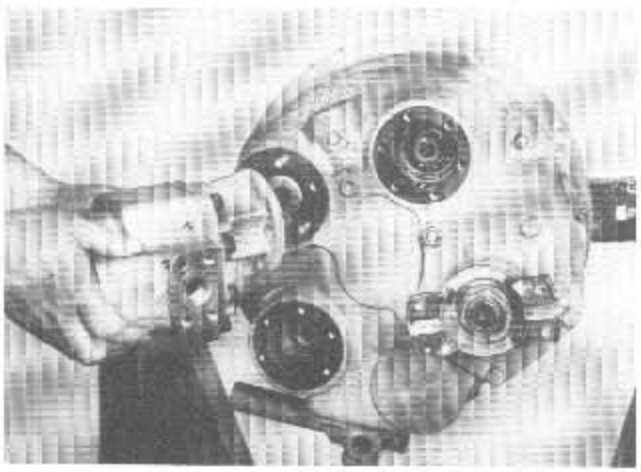


Figure 15
Remove charging pump assembly.

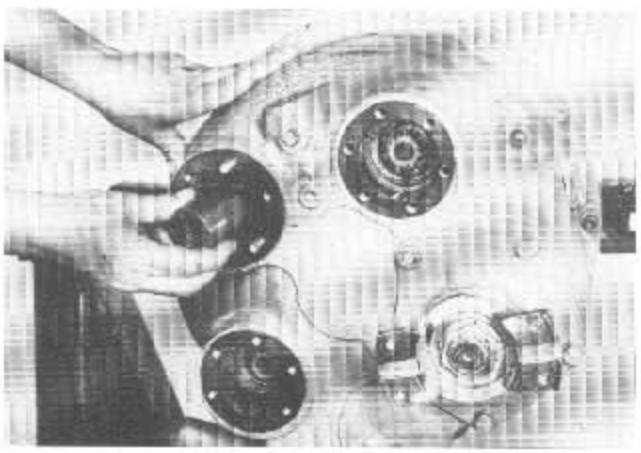


Figure 16
Remove pump drive sleeve.

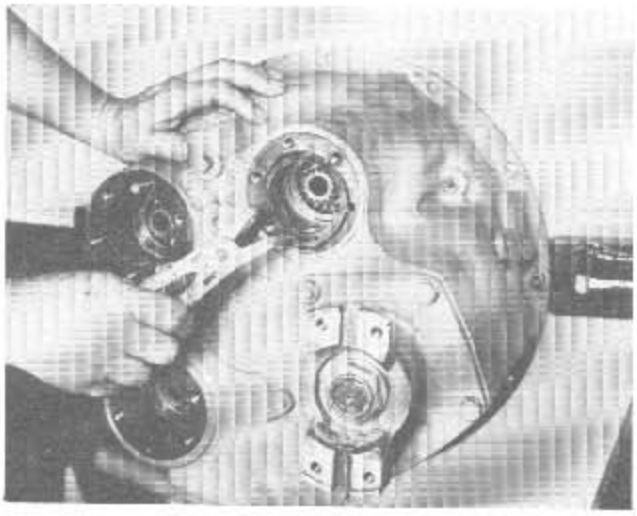


Figure 17
Remove pump shaft retaining ring.

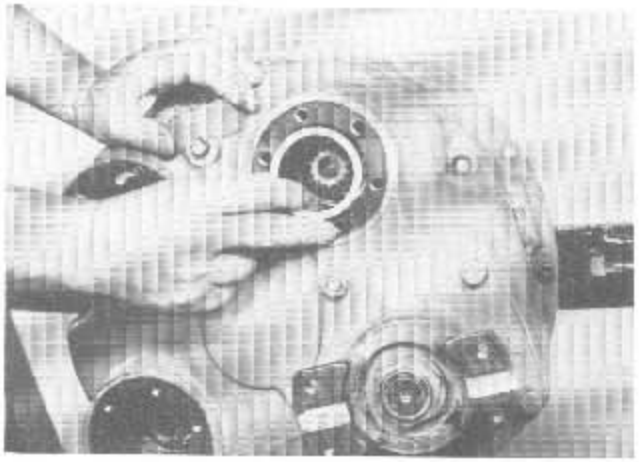


Figure 18
Remove pump shaft retaining washer.

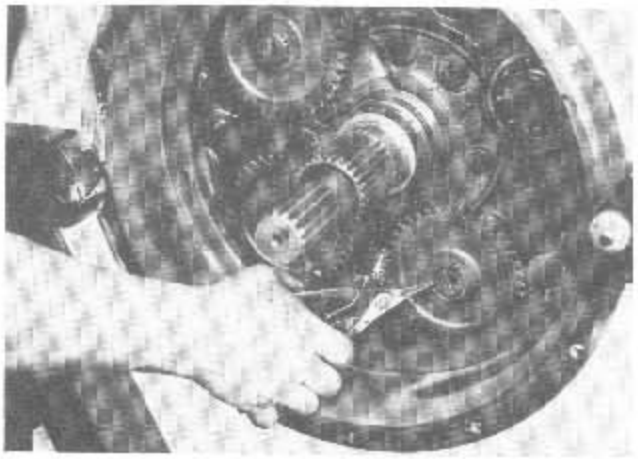


Figure 19
Remove pump drive gear retaining ring.

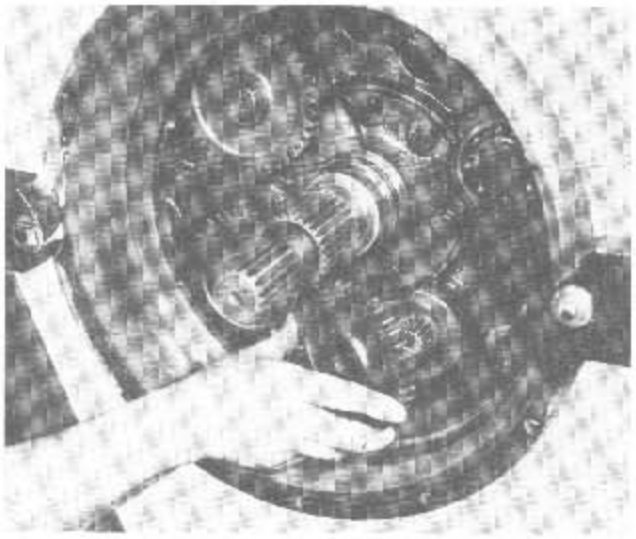


Figure 20
Remove pump drive gear.

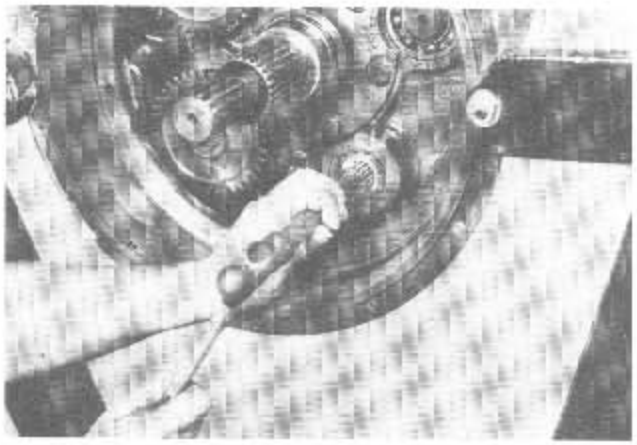


Figure 21
Tap on pump drive shaft to remove shaft and bearing assembly.

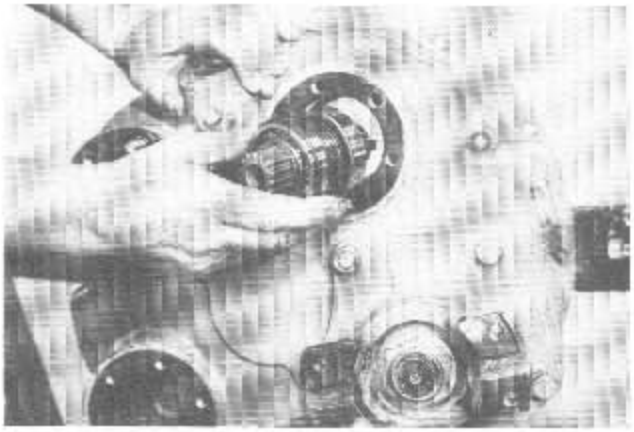


Figure 22
From rear of housing remove pump drive shaft and bearing assembly.

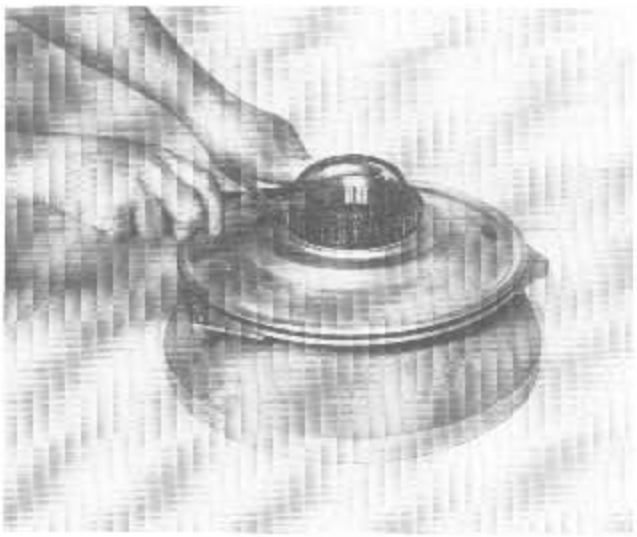


Figure 23
Remove impeller hub gear retaining ring.

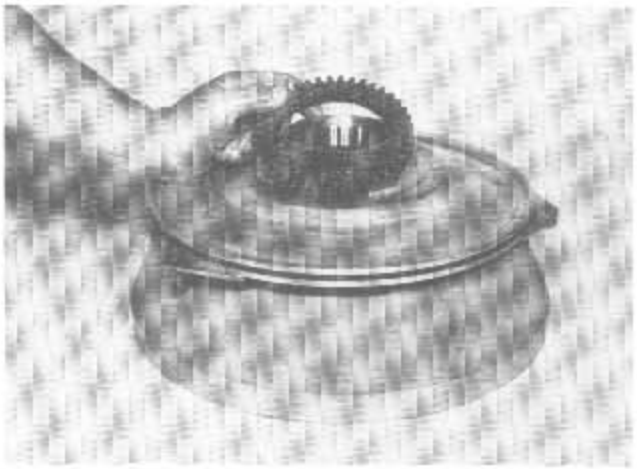


Figure 24
Remove hub gear.

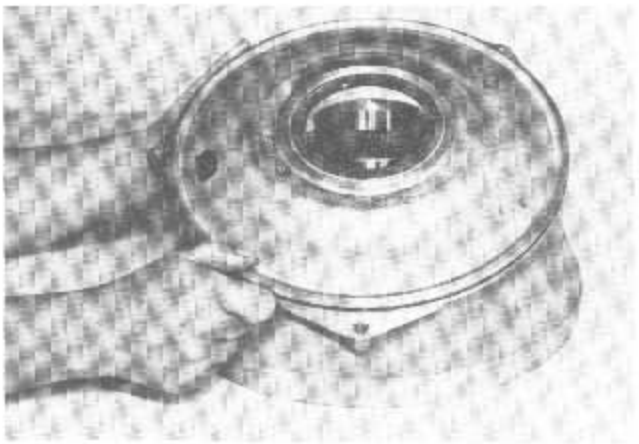


Figure 25
Remove oil baffle and seal from impeller hub.

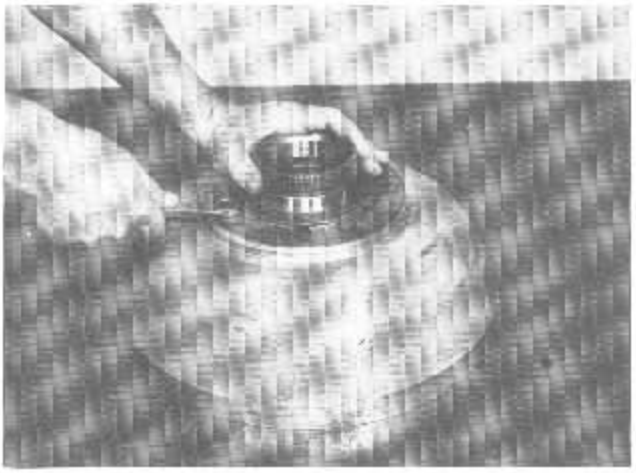


Figure 26
Remove impeller hub to impeller bolts.

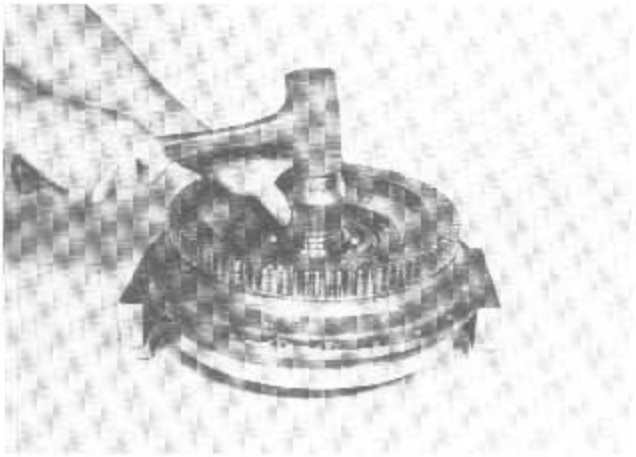


Figure 27
Support outer edge of impeller cover. Using an appropriate driver, drive turbine hub from impeller cover bearing.

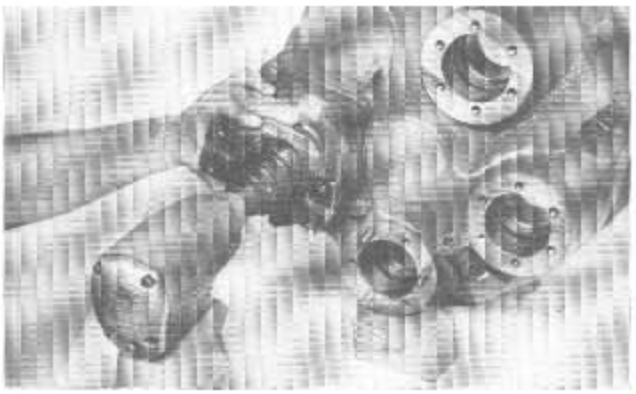


Figure 28
Using an impact wrench (if available) remove output flange nut. If impact wrench is not available a flange retainer bar must be used to hold flange from turning while removing flange nut.

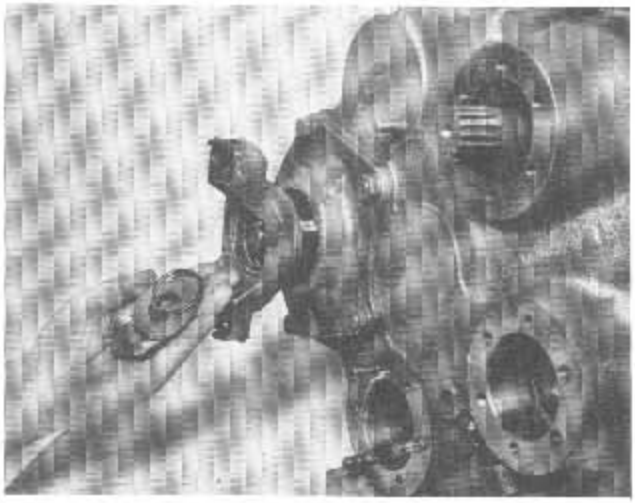


Figure 29

Remove flange nut, washer, "O" ring and flange from output shaft.

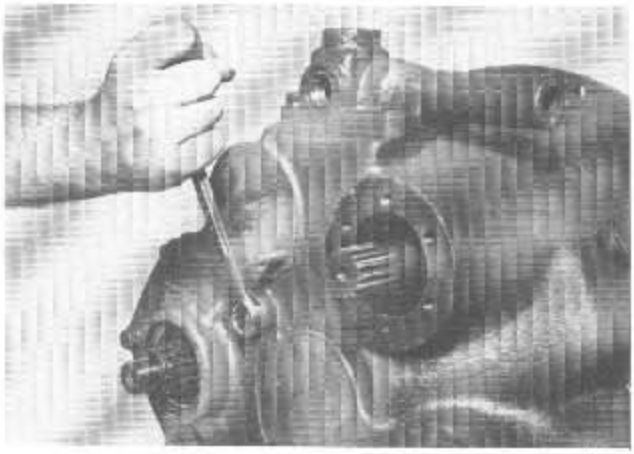


Figure 30

Remove output shaft bearing retainer bolts, stud nuts and washers.

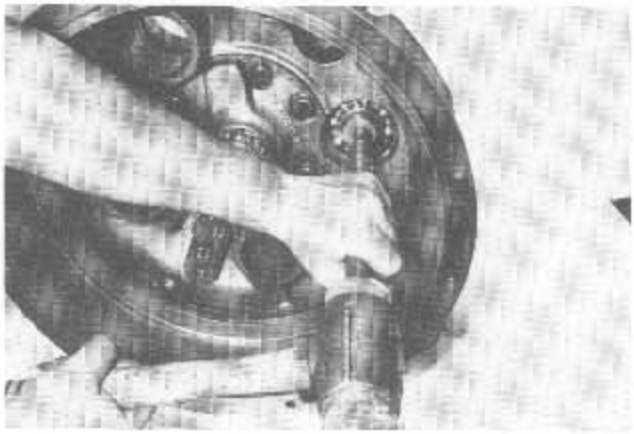


Figure 31

From front of housing drive output shaft assembly from converter housing.

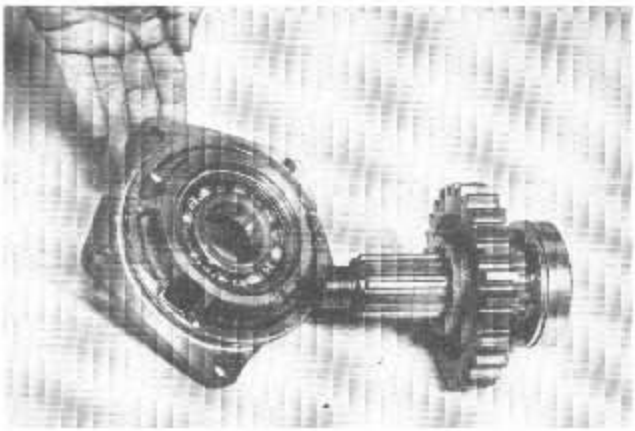


Figure 32

Output shaft, gear and bearing pressed from bearing retainer. Using a spreading type snap ring plier, spread ears on rear output shaft bearing snap ring. Press bearing from bearing retainer while spreading snap ring.

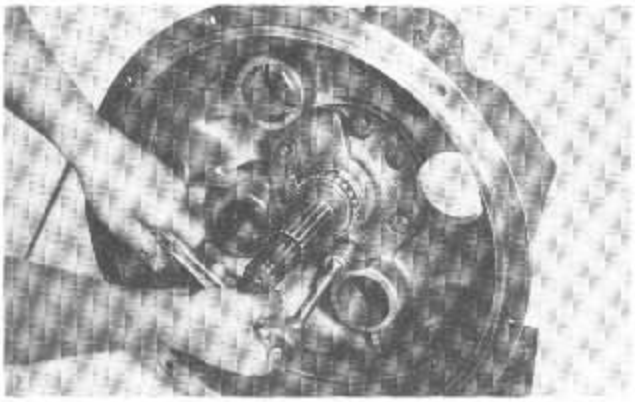


Figure 33

Remove reaction member support bolts. Remove support and turbine shaft assembly. **NOTE**: If converter housing has a bore plug in the rear center line, remove plug. Remove turbine shaft gear retainer ring. Remove support and turbine shaft assembly. Turbine shaft gear will remain in rear of housing. This is a special ratio gear and is larger than the support bore.

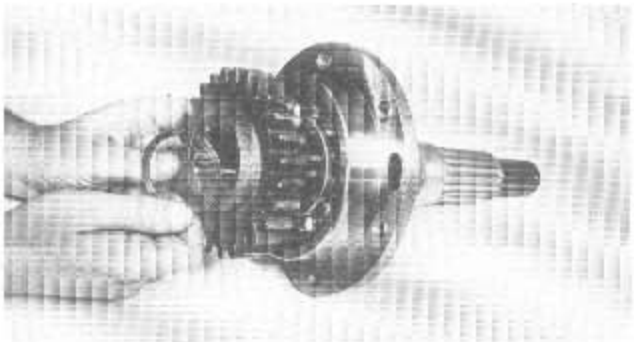


Figure 34

Remove turbine shaft gear retainer ring and gear. See note above.

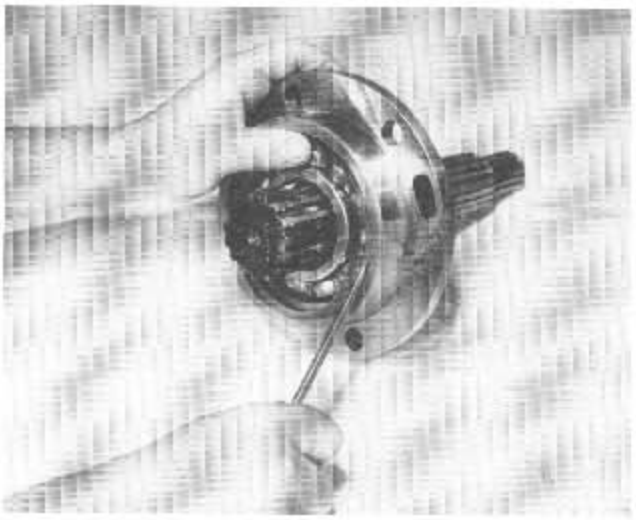


Figure 35
Remove turbine shaft bearing retainer ring from support.

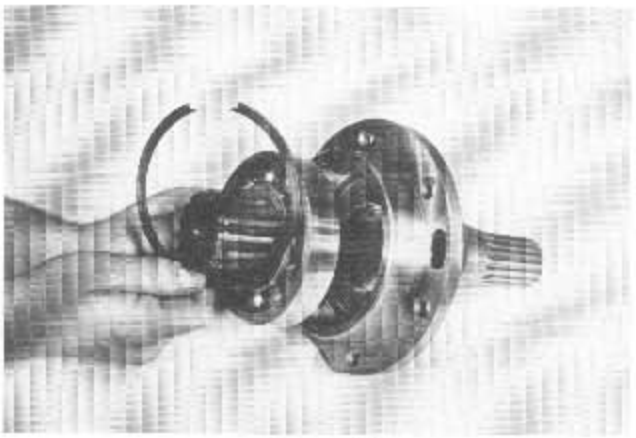


Figure 36
Remove turbine shaft and bearing from support.

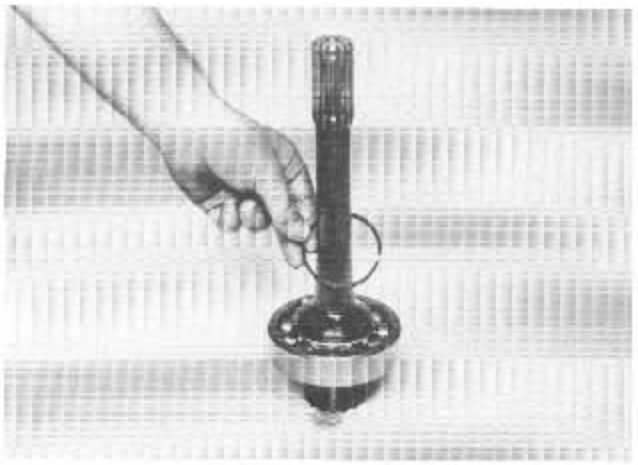


Figure 37
Remove turbine shaft oil sealing ring.

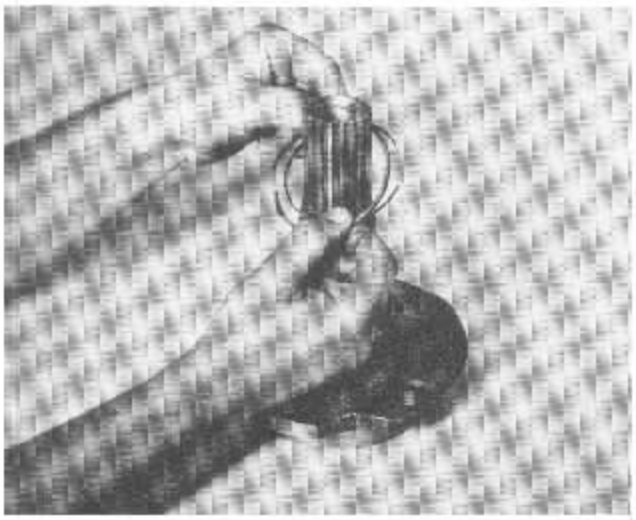


Figure 38
Remove support oil sealing ring; some models will have an expander spring also.

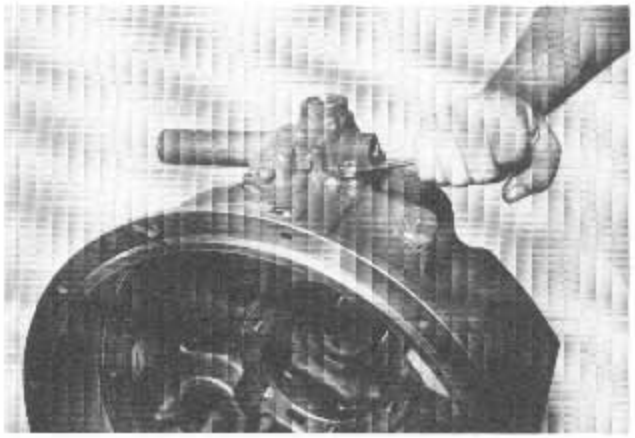


Figure 39
Remove pressure regulating valve to housing screws and lockwashers.

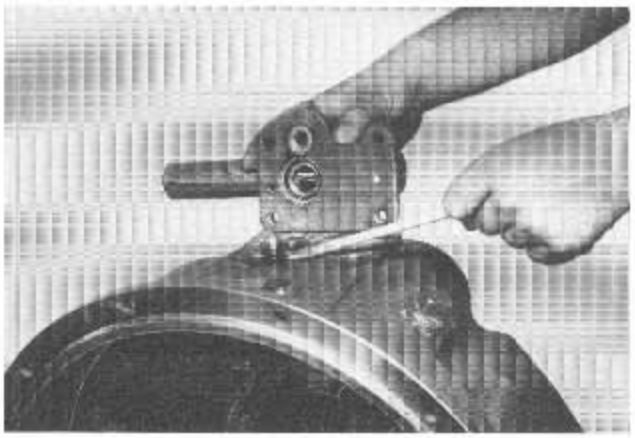


Figure 40
Remove pressure regulating valve, safety valve plunger and spring.

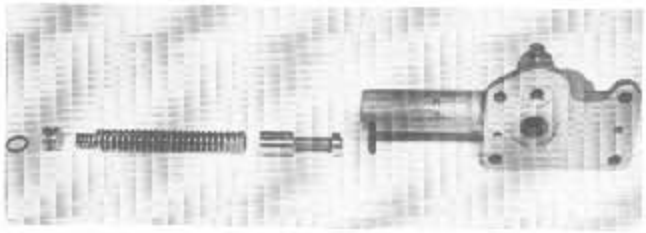


Figure 41

If pressure regulating valve is to be disassembled, compress valve spring stop. Tap roll pin from valve housing. **CAUTION:** Spring stop is under spring pressure. Remove spring stop, inner and outer spring and valve piston.

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 larger side of cone 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.

Freewheel Assembly

Clean the complete freewheel assembly the same as cleaning bearings. **NOTE:** Do not disassemble freewheel assembly. **If freewheel assembly is damaged it must be replaced with a complete assembly.**

After cleaning and drying freewheel assembly dip complete assembly in automatic transmission fluid and wrap in a clean lintless cloth or paper to protect until assembled.

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 skin rashes and inhalation of vapors when using alkali cleaners.

Thoroughly dry all parts cleaned immediately by using moisture-free compressed air or soft, lintless absorbent wiping rags free of abrasive materials such as metal filings, contaminated oil or laping 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 clean light oil 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 then 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 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 cleaned and that mating surfaces, bearing bores, etc., are free from nicks or burrs. Check all parts carefully for evidence of cracks or conditions which would cause subsequent oil leaks or failures.

REASSEMBLY OF TORQUE CONVERTER

NOTE: If converter housing was changed, see page 31 for speed sensor bushing installation.

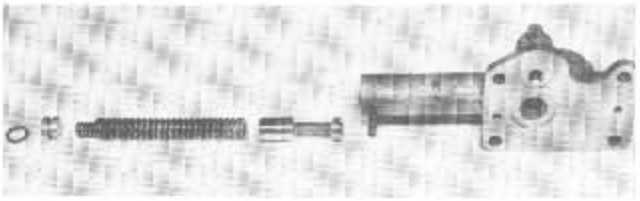


Figure 42

If pressure regulating valve was disassembled, reassemble as follows: Install new "O" ring on valve spring stop (one on each end, only one shown). Insert piston in housing. Install inner and outer valve springs. Install spring stop on spring. Depress spring stop and install spring stop roll pin.

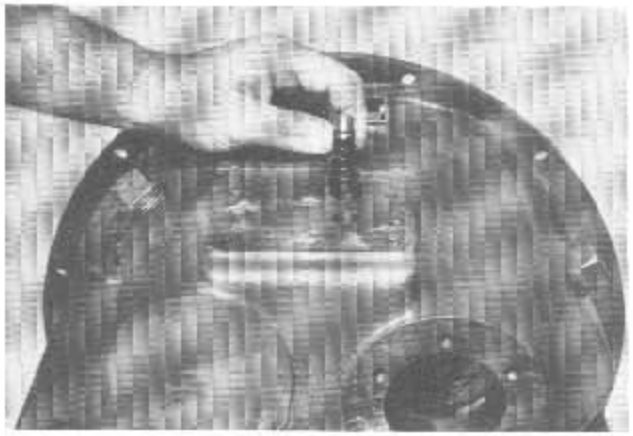


Figure 43

Position safety valve spring and plunger in converter housing.

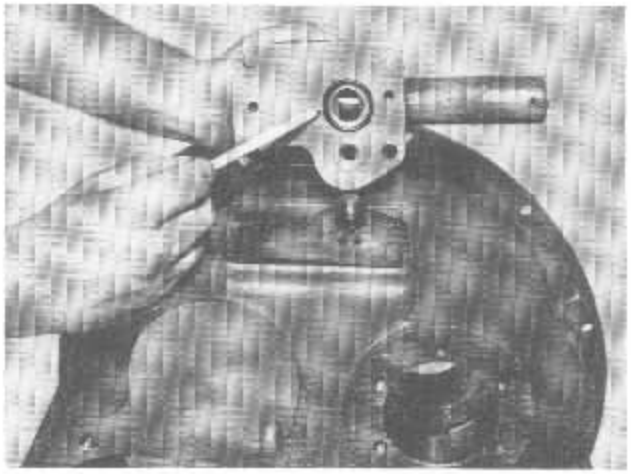


Figure 44

Install new gasket on converter housing, and new "O" ring on valve housing. Position valve assembly on converter housing.

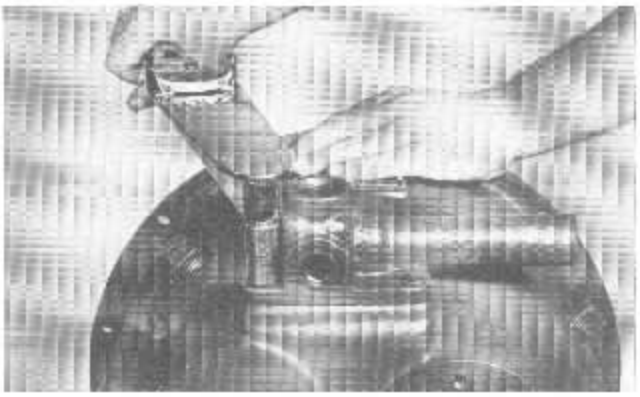


Figure 45

Install valve screws and lockwashers. Tighten 23 to 25 ft. lbs. torque [31,2-33,8 N.m].

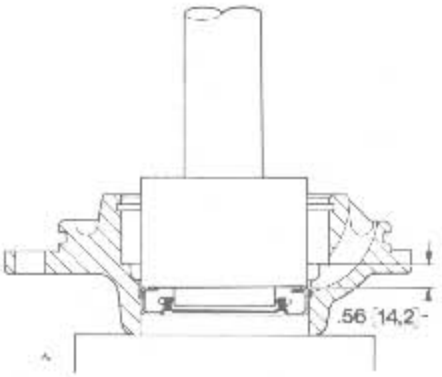


Figure 46

Apply a light coat of Permatex on the outer diameter of the output shaft oil seal. Press oil seal in bearing retainer from inside of retainer as shown and to dimension shown. See assembly instruction sheet, page 6.

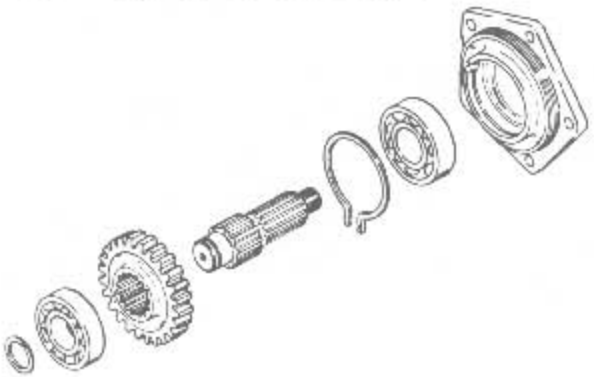


Figure 47

Spread ears on the rear bearing retainer ring in bearing retainer. Press output rear bearing in bearing retainer. Be certain snap ring is in full position in snap ring groove. Press output shaft into bearing retainer. Use caution as not to damage oil seal. Position output gear on shaft. Press front output bearing on shaft. **NOTE: Use bearings with full inner race shoulder only. Do not use bearing with seal or shield grooves on inner race.** Install bearing retainer ring.

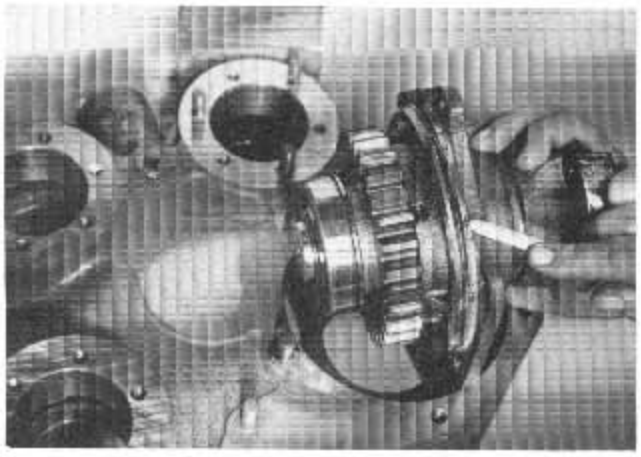


Figure 48

Install output flange, "O" ring, washer and flange nut. Tighten nut 200 to 250 ft. lbs. torque [271,2-338,9 N.m]. Install new "O" ring on output shaft bearing retainer. Position output assembly on converter housing.

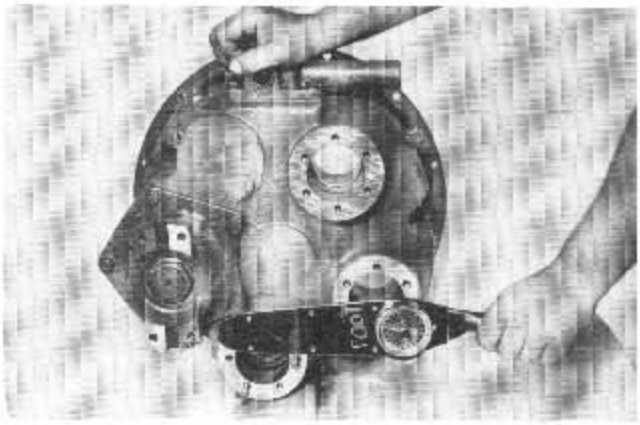


Figure 49

Install lockwashers, cap screws and stud nuts. Tighten stud nuts 41 to 45 ft. lbs. torque [55,6-61,0 N.m]. Tighten capscrews 37 to 41 ft. lbs. torque [50,1-55,5 N.m].

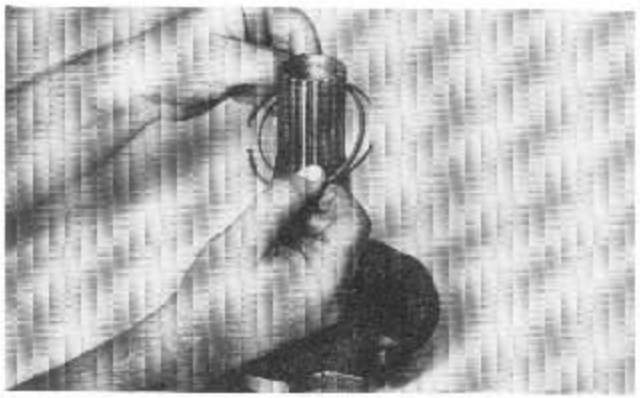


Figure 50

Install new oil sealing ring. Expander spring no longer used with new sealing rings.

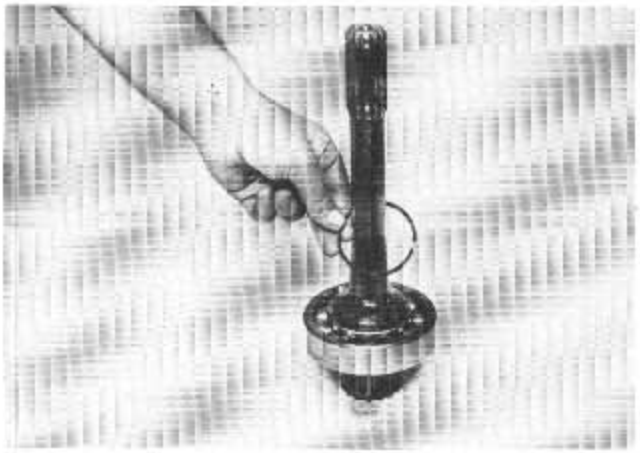


Figure 51

If turbine shaft bearing was removed, press bearing on shaft. **NOTE:** Ball bearing loading notches must be away from shoulder of turbine shaft. Install new turbine shaft oil sealing ring.

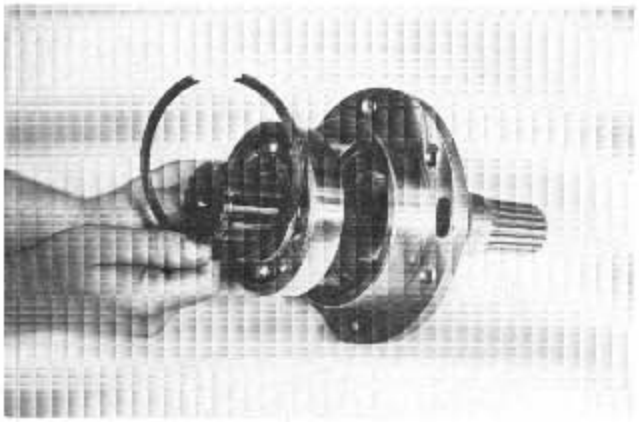


Figure 52

Install turbine shaft assembly in reaction member support. Use caution as not to damage turbine shaft oil sealing ring.

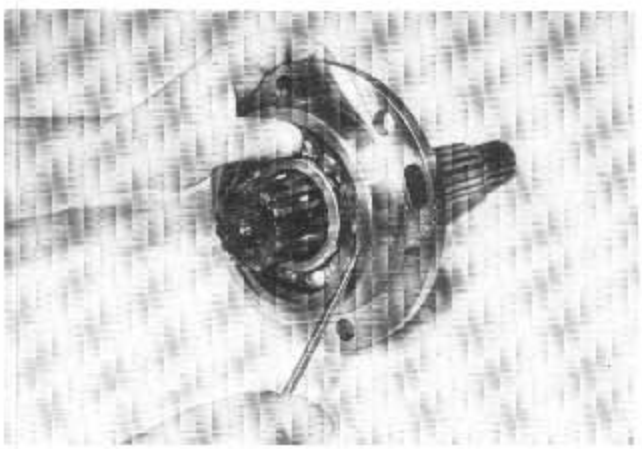


Figure 53

Install turbine shaft bearing retaining ring.

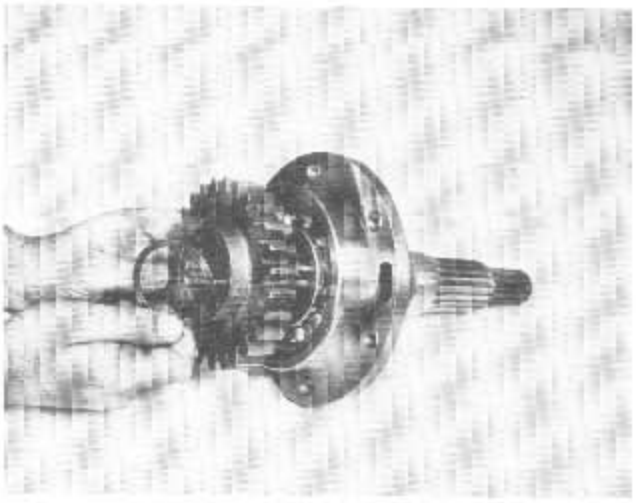


Figure 54

Position turbine shaft gear on shaft. Install gear retaining ring. See note in Figure 33 and reassemble accordingly.

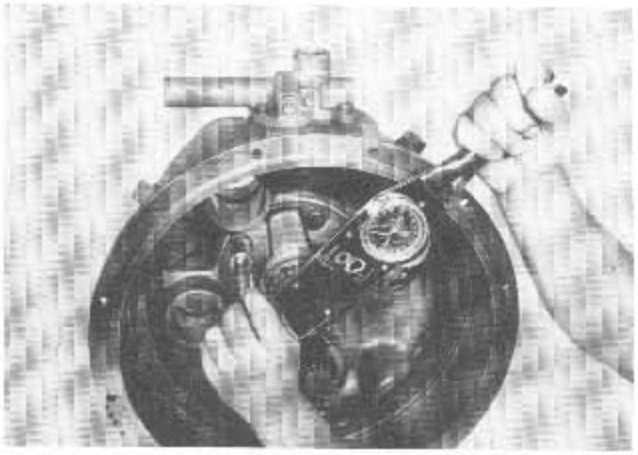


Figure 55

Install support washers and screws. Torque screws 57 to 63 ft. lbs. torque [77.3-85,4 N.m].

Figure 56

Position pump drive shaft and bearing assembly into converter housing.

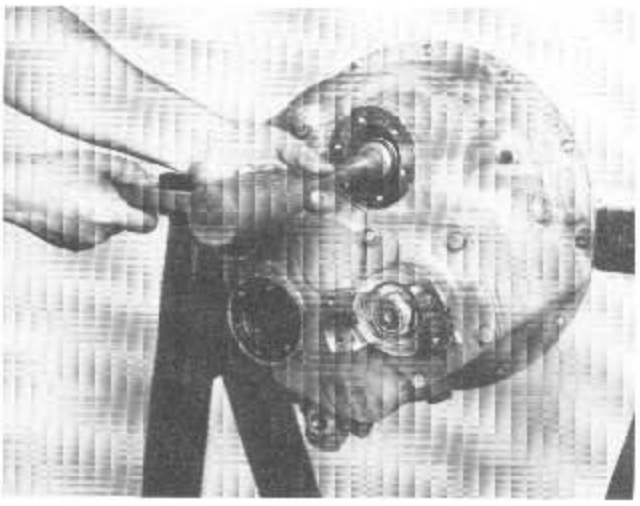


Figure 57

Tap pump drive shaft assembly into housing until rear bearing snap ring shoulders in bearing bore.

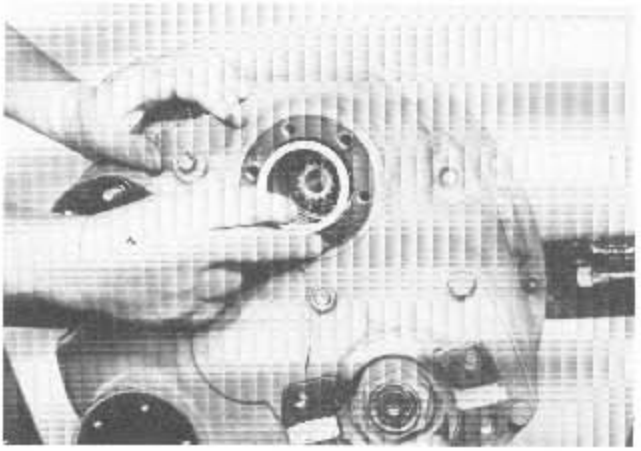


Figure 58

Position pump shaft rear bearing retaining washer in housing.

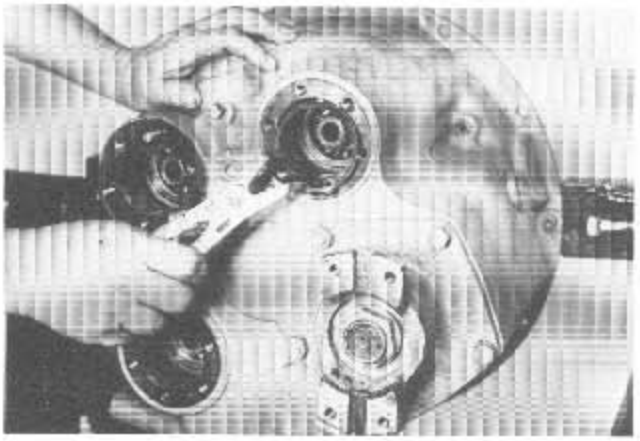


Figure 59

Install retainer washer snap ring.

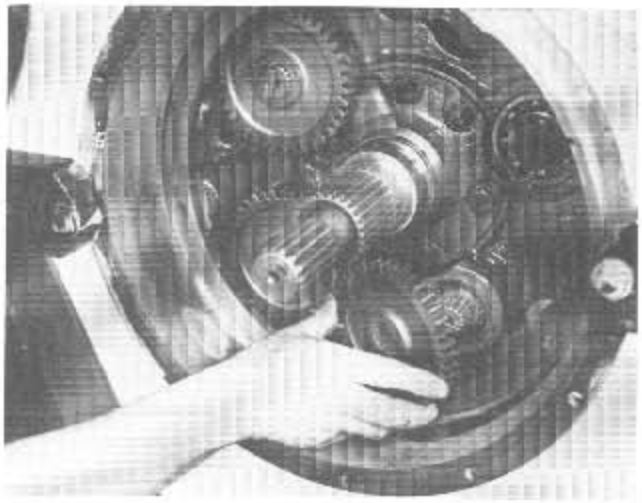


Figure 60
Install pump drive gear.

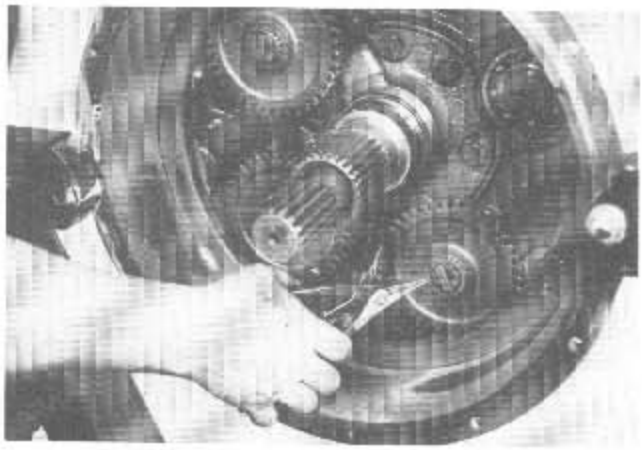


Figure 61
Install drive gear retainer ring.

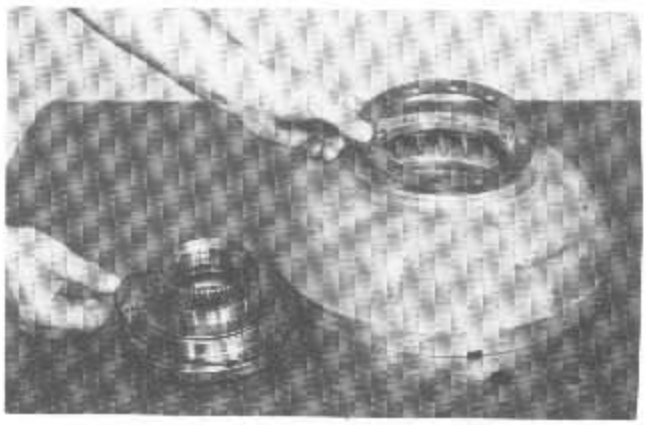


Figure 62
Clean impeller hub mounting surface and tapped holes with solvent. Dry thoroughly being certain tapped holes are dry and clean. Install new "O" ring on impeller hub. Position impeller hub screw backing ring. (**NOTE:** Backing ring used on 13" converters only).

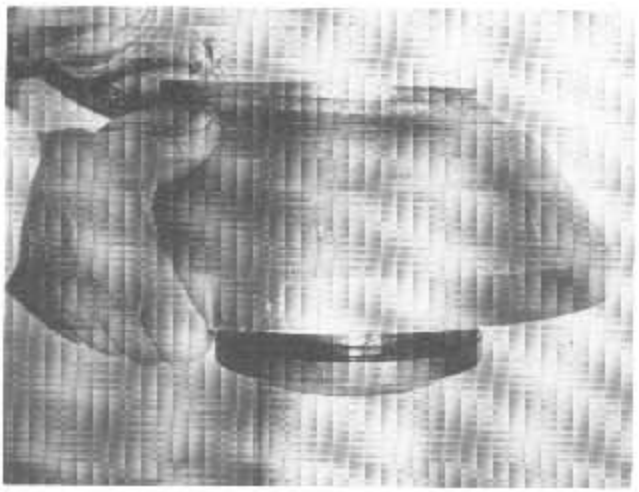


Figure 63
Align holes in impeller hub with holes in impeller. **On 12" converters with 8 impeller hub screws, install screws and flat washers. Tighten 41 to 45 ft. lbs. torque [55,6-61,0 N.m]. Lockwire in pairs to prevent loosening. See view "R" on page 7. SEE FIGURE 64 FOR 13" CONVERTER WITH SPECIAL IMPELLER HUB SCREWS.**

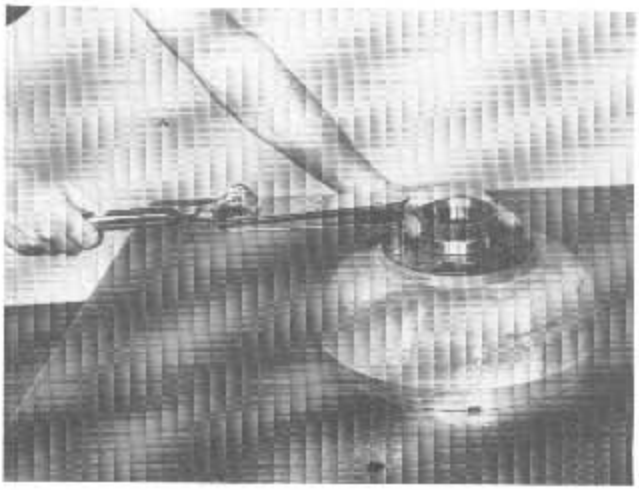


Figure 64
13" Converter with 12 special screws and backing ring. Install (12) impeller hub special screws to approximately .06 inch [1,5] of seated position. With a calibrated torque wrench, tighten screws to 40-45 Lbs. Ft. [54,3-61,0 N.m] torque. **NOTE:** Assembly of impeller to impeller hub must be completed within a fifteen minute period from start of screw installation. The screws are prepared with coating which begins to harden after installation in the impeller hub holes. If not tightened to proper torque within the fifteen minute period, insufficient screw clamping tension will result. The special screw is to be used for one installation only. If the screw is removed for any reason it must be replaced.

The compound 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.

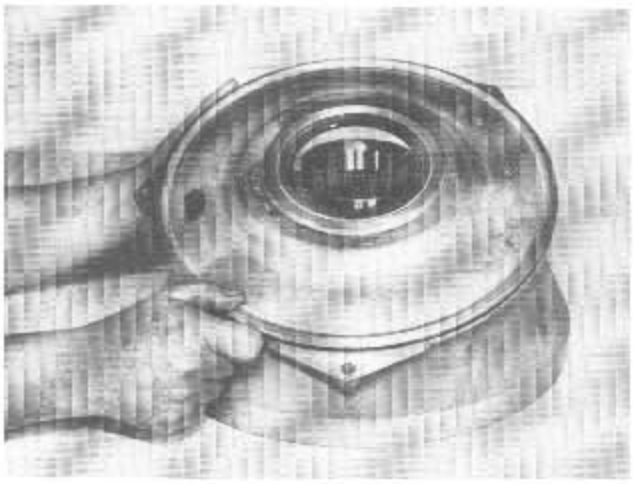


Figure 65
Install new oil baffle oil seal as shown in assembly instruction sheet page 6. Position baffle and seal on impeller assembly use caution as not to damage oil seal.

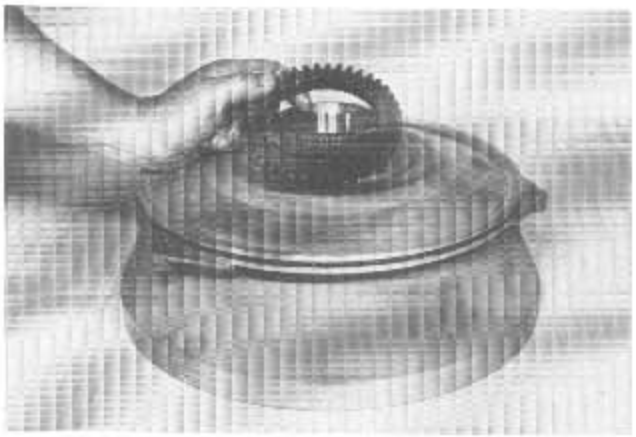


Figure 66
Position impeller hub gear on hub.

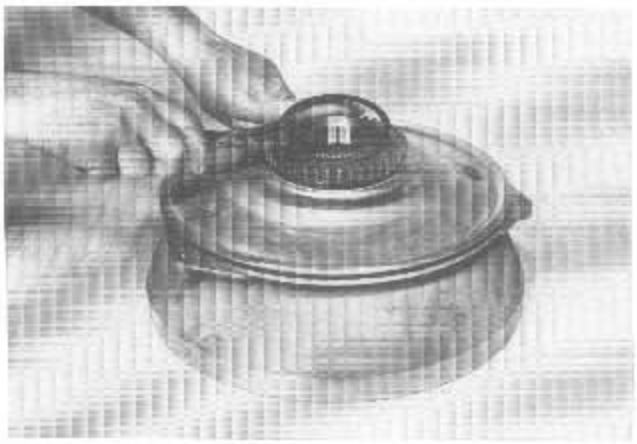


Figure 67
Install hub gear retaining ring.

Figure 68
Support turbine and hub assembly at the turbine hub and outer edge. Position impeller cover over turbine assembly, centering bearing bore with turbine hub. Install impeller cover bearing.

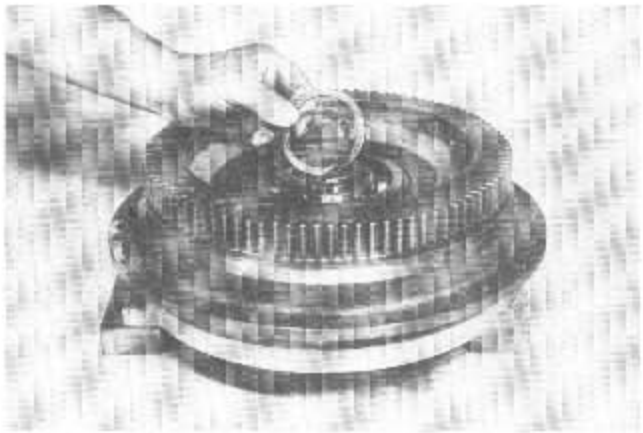


Figure 69
Install bearing spacer and retainer ring.

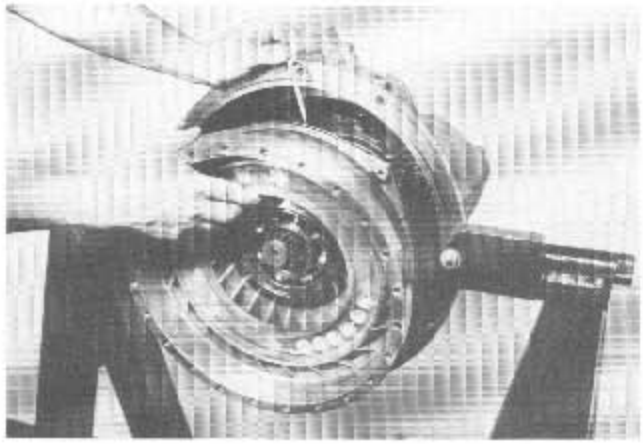


Figure 70
Install new oil baffle "O" ring.

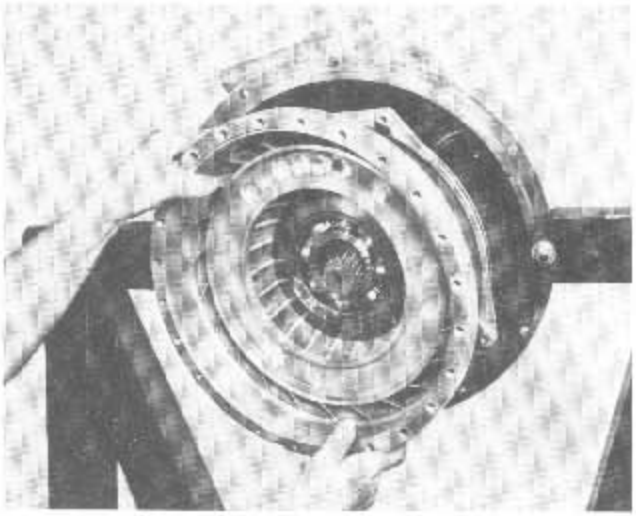


Figure 71
Position impeller and baffle assembly in housing. Align three (3) oil baffle bolt holes with bolt holes in housing.

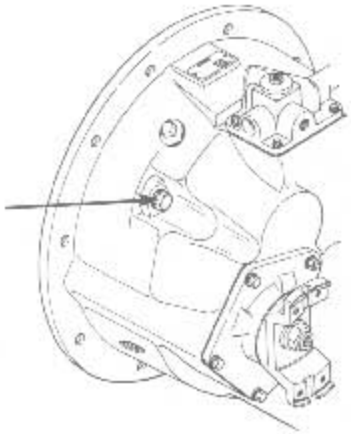


Figure 72
Install three (3) oil baffle bolts and lockwashers. Tighten baffle bolts evenly to prevent damaging oil baffle "O" ring.

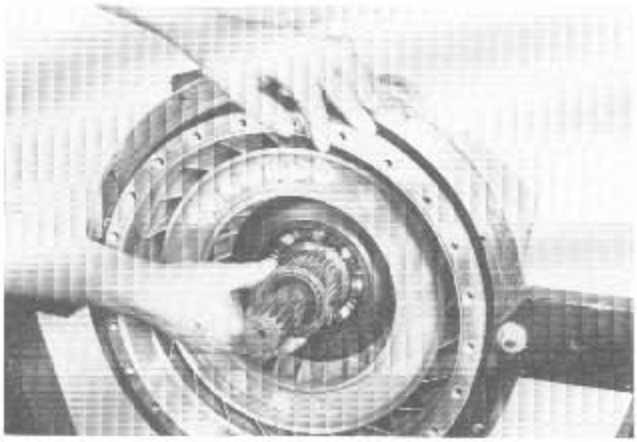


Figure 73
Install reaction member spacer with tang facing out.

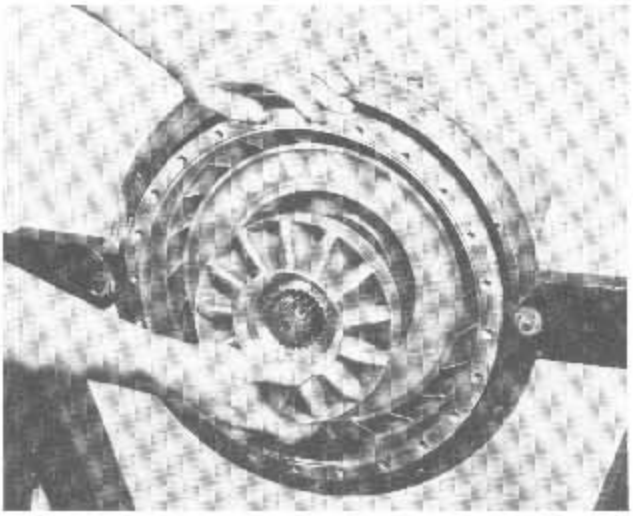


Figure 74
Install reaction member.

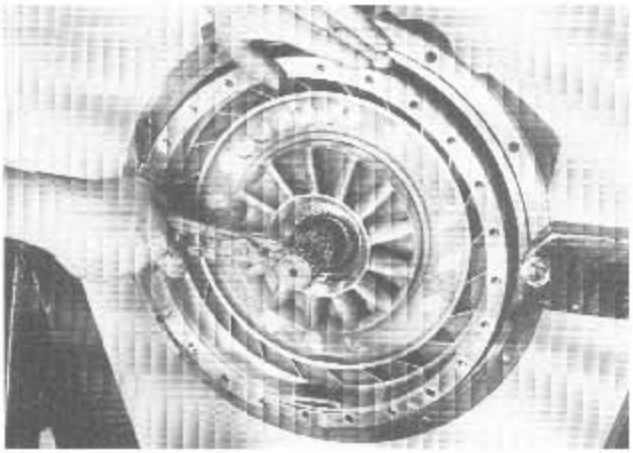


Figure 75
Install reaction member retainer ring.

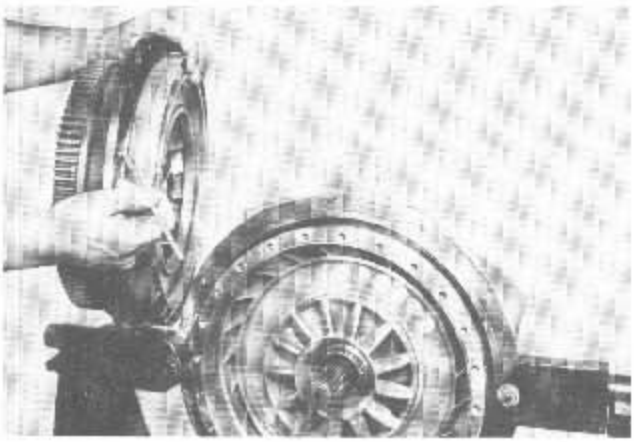


Figure 76
Position new impeller cover to impeller "O" ring.

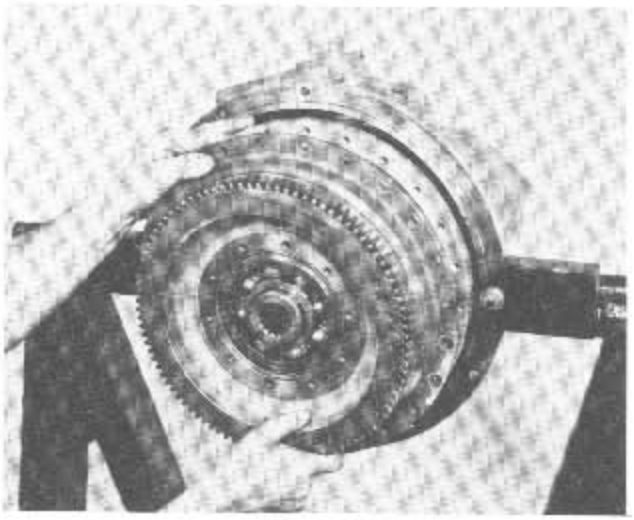


Figure 77
Install impeller cover and turbine assembly on turbine shaft.

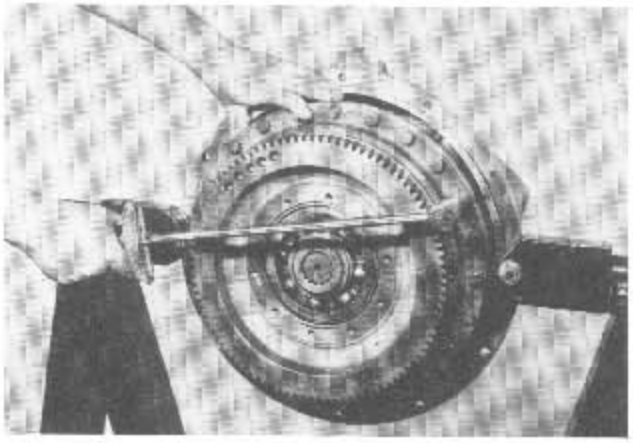


Figure 78
Install impeller cover to impeller bolts. Tighten bolts to specifications.

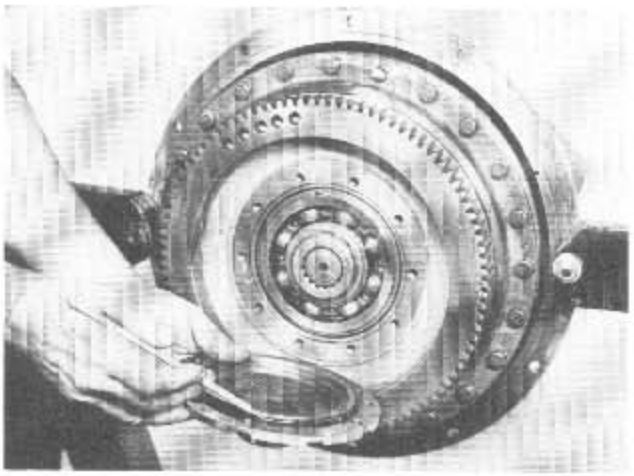


Figure 79
Position new "O" ring on impeller cover bearing cap.

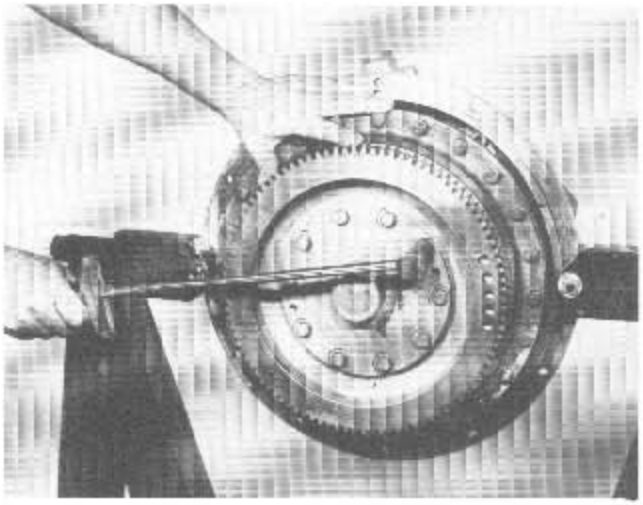


Figure 80
Install bearing cap on impeller cover, install bearing cap bolts and washers. Tighten to specifications.

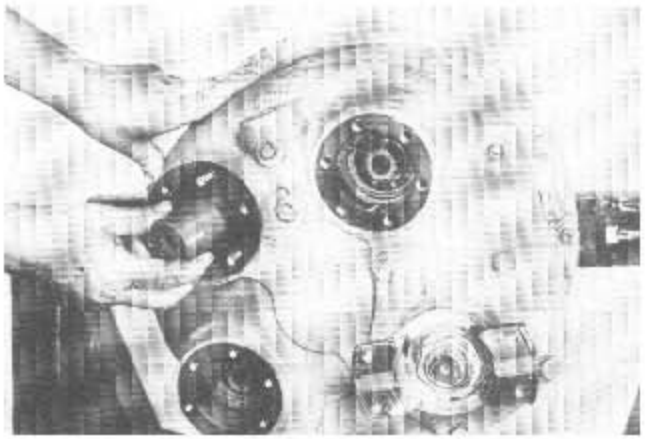


Figure 81
Position pump drive sleeves on pump drive shafts.

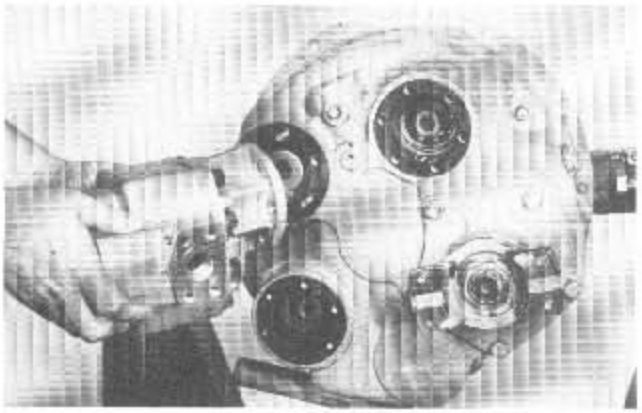


Figure 82
Install charging pump at the same pump opening it was removed from. Install stud nuts and washers, tighten to specifications.

OIL PRESSURE AND LUBRICATION SPECIFICATIONS FOR C-320 SERIES CONVERTERS

Converter Out Pressure

Converter outlet oil temperature 180° - 200° F. [82,3° - 93.3° C]. Transmission in NEUTRAL.

Operating specifications:

25 P.S.I. [172,4 kPa] minimum pressure at 2000 RPM engine speed AND a maximum of 70 P.S.I. [482,6 kPa] outlet pressure with engine operating at no-load governed speed.

Converter outlet presssure equals the total pressure drop of the cooler, cooler lines and back pressure of the tranmemission lubrication systems.

Converter Lube Flow

Disconnect CONVERTER DRAIN BACK line at transmission with engine running at 2000 RPM and measure oil into a gallon container. Measure oil leakage for 15 seconds and multiply the volume of oil by four to get gallons per minute leakage.

Leakage in Converter

Leakage in C-320 series not to exceed 2 gallons maximum.

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.

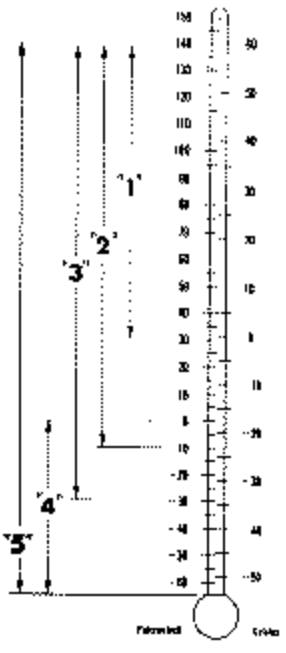
(c) Refill transmission to LOW mark.

(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"	(a) C-2 Grade 30 (b) C-3 Grade 30 (c) Engine Oil-Grade 30 API CD/SE or CD/SF (d) MIL-L-2104C-Grade 30 (e) MIL-L-2104D-Grade 30
Temperature Range	"2"	(a) MIL-L-2104C-Grade 10 (b) MIL-L-2104D-Grade 10 (c) C-2 Grade 10 (d) C-3 Grade 10 (e) Engine Oil-Grade 10 API-CD/SE or CD/SF (f) Quintolubric 822-220 (Non Phosphate Ester Fire Resistant Fluid)
Temperature Range	"3"	(a) *Dexron (b) *Dexron II D - See Caution Below
Temperature Range	"4"	(a) MIL-L-46167 (b) MIL-L-46167 A
Temperature Range	"5"	(a) Conoco High-Performance Synthetic Motor Oil — Spec. No. 5718

PREFERRED OIL VISCOSITY: Select highest oil viscosity compatible with prevailing ambient temperature per 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: 11200, 16000, 24000, 25000 & 32000 series transmissions with modulated shift use only C-3 in 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 in 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 HR25000 & 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.**

IRREGULARITIES IN PERFORMANCE

C320 Series Converters

Make all checks with converter outlet temperature at least 180° - 200° F. [82,3° - 93,3° C.]

TROUBLE	PROBABLE CAUSE	REMEDY
1. Low converter OUT pressure (Below 25 P.S.I. [172,4 kPa] with wngine at 2000 RPM — NOT LOAD) Governed Speed (See Converter Pressure Specifictions)	Worn oil sealing and "O" rings	A. Trouble is internal and will require a complete tear-down of the converter.
	Worn oil pump.	B. Replace.
	Safety Valve stays open.	C. Clean and check valve spring and valve.
2. **Suction line taking air.**	Low oil level.	D. Fill to proper level.
	Suction line connections taking air.	E. Check oil line connections and tighten securely.
	Worn oil pump.	F. Replace.
3. High converter OUT pressure (Above 70 P.S.I. [483,6 kPa] with engine at 2000 RPM — NO LOAD) Governed Speed (See Converter Pressure Specifictions)	Oil cooler or oil lines restricted.	G. Check oil cooler line and oil cooler for restrictions. Clean or replace.
	Oil too heavy	H. Check oil weight. See oil recommendations.
	Cold oil.	I. Converter pressure in cold weather will vary. As soon as converter gets hot, pressure should drop.
4. Over-heating	See items No. 1 & 2.	
	Oil cooler or oil cooler lines restricted causing safety valve to stay open.	J. Clean and check oil cooler and oil cooler lines. Replace if necessary.
	Oil cooler too small.	K. Replace with larger cooler.
	Worn oil pump	L. Replace oil pump.
	Converter drain line to transmission or oil sump not installed properly.	M. Install at lowest drain opening in converter housing. Line must maintain constant gradual drop to oil sump for gravity drain.
5. Noisy Converter.	Worn coupling gear.	N. Replace.
	Worn oil pump	O. Replace.
	Damaged bearing.	P. A complete teardown will be necessary to determine this. Replace if necessary.
	Worn drive gears.	Q. Replace.
6. Low clutch pressure. (See pressure specifications)	Transmission malfunction.	R. Close pressure line to transmission control valve. If clutch pressure returns to normal, trouble is in transmission.
	Worn oil pump.	S. Replace.
	Regulator valve stuck open.	T. Clean and check valve for worn or dirty parts, replace if necessary.

IRREGULARITIES IN PERFORMANCE (Cont'd.)

C320 Series Converters

TROUBLE	PROBABLE CAUSE	REMEDY
7. High clutch pressure. (See pressure specifications)	Regulator valve stuck closed.	U. See item T.
8. Lack of power.	Improper engine function.	V. Tune engine.
	Engine stall speed below normal.	W. Tune engine. Check governor.
	Low converter out pressure.	X. See item No. 1.
	Air in the oil.	Y. See item No. 2.
	Improper oil.	Z. See oil recommendations.
9. Oil in engine flywheel housing.	"O" ring between impeller cover and impeller damaged.	AA. Replace.
	Oil baffle "O" ring damaged.	BB. Replace.
	Oil baffle oil seal damaged.	CC. Replace.

GENERAL INFORMATION:

Use Clark 1533614 Oil Filter only.

Use Clark 215502 Oil Filter Element only.

Use minimum number of Pipe and Hose Fittings.

Gravity drain from Converter Sump to Transmission must be of minimum length and have no "U" bends to trap air or oil.

Cooler capacity for normal application, 30 per cent of net Engine Horsepower at Governed Speed.

Check oil level with engine idling and transmission in neutral.

CHANGE OIL FILTER ELEMENT EVERY 500 HOURS. DRAIN AND REFILL SYSTEM EVERY 1000 HOURS.

TRANSMISSION CLUTCH OIL PRESSURE P.S.I.

The C320 Converter will be equipped with one of three variations involving the clutch regulating valve. They are as follows:

1. Inlet cover for **Converter oil only** with clutch pressure valve in transmission control cover. **180 to 220 P.S.I. [1241,1 - 1516,8 kPa]** pressure range. (See note).

2. Pressure regulator valve on Converter with a **240 to 280 P.S.I. [1654,8 - 1930,5 kPa]** pressure range. (See Note).

3. Pressure regulator valve on Converter with a **180 to 220 P.S.I. [1241,1 - 1516,8 kPa]** pressure range. (See Note).

NOTE: All pressure must be equal within **5 P.S.I. [34,5 kPa]**. If clutch pressure varies in any one clutch more than **5 P.S.I. [34,5 kPa]** repair clutch. All pressures must be taken with two clutches engaged.

16 SCREW RING GEAR INSTALLATION PROCEDURE
(Non-Asbestos Ring Gear)

1. Remove all burrs from flywheel mounting face and pilot bores. Clean the torque converter ring gear flywheel mounting surface and the ring gear screw tapped holes with solvent. Dry thoroughly, being certain ring gear screw holes are dry and clean.

2. Check engine flywheel and housing or housing adaptor for conformance to standard S.A.E. No. 3 — SAE J927 and J1033 tolerance specifications for pilot bores size, pilot bores eccentricities and mounting face deviations. Measure and record engine crankshaft end play.

3. Install torque converter ring gear as shown.

   NOTE: Assembly of the ring gear must be completed within a fifteen minute period from start of screw installation. The screws are prepared with an epoxy coating which begins to harden after installation in the flywheel mounting holes. If not tightened to proper torque within the fifteen minute period insufficient screw clamping tension will result.

4. Install backing ring and sixteen (16) special screws to approximately .06 inch [1,5 mm] of seated position. It is permissible to use a power wrench for this installation phase. With a calibrated torque wrench tighten screws 30 to 33 pounds feet of torque [40,7 - 44,7 N.m].

   To obtain maximum effectiveness of the special screw's locking feature, a minimum time period after screw installation of twelve (12) hours is suggested before engine start-up.

   The special screw is to be used for **ONE** installation only. If the screw is removed for any reason it **MUST BE REPLACED.** It is recommended that the epoxy left in the flywheel hole be removed with the proper tap and cleaned with solvent. Dry hole thoroughly and use a **NEW** screw for re-installation.

5. Assemble torque converter to engine flywheel by sliding converter into position by hand before fastening housing attachment screws. This may require more than one trial to match the drive gear teeth. Pulling the converter into position with housing attachment bolts is not recommended.

6. Measure engine crankshaft end play after assembly of torque converter. This value must be within one thousandth (.001) of an inch [0,0254mm] of end play recorded (in Paragraph #2) before assembly of torque converter.

802183 — 1.5 INCH [38,1] 16 SCREW RING GEAR KIT

1	243765	Torque Converter Ring Gear
16	236288	Ring Gear Screw 1.5 Inch [38,1]
1	802184	Installation Instruction Sheet

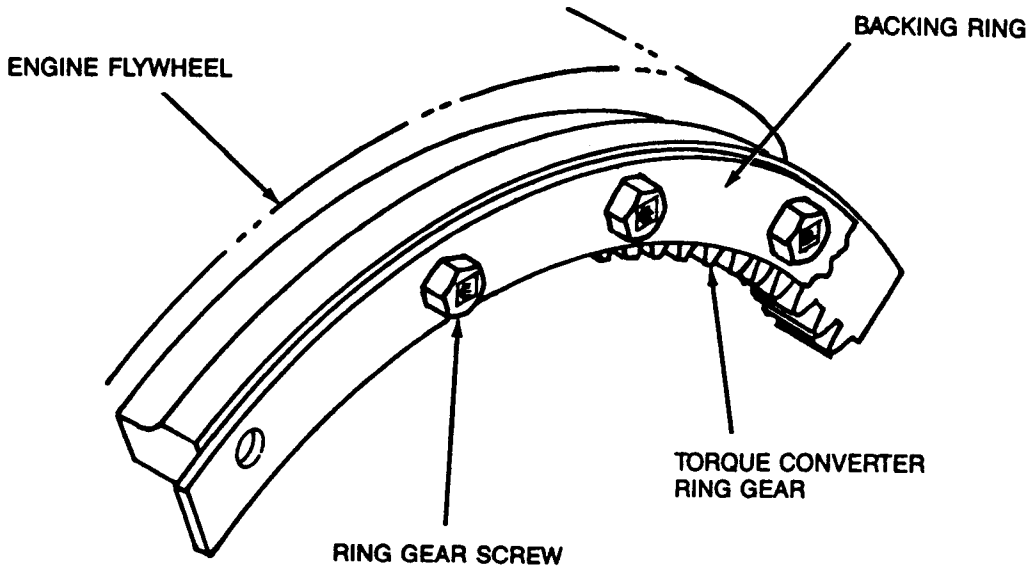
802392 — 1.5 INCH [38,1] 16 SCREW RING GEAR KIT

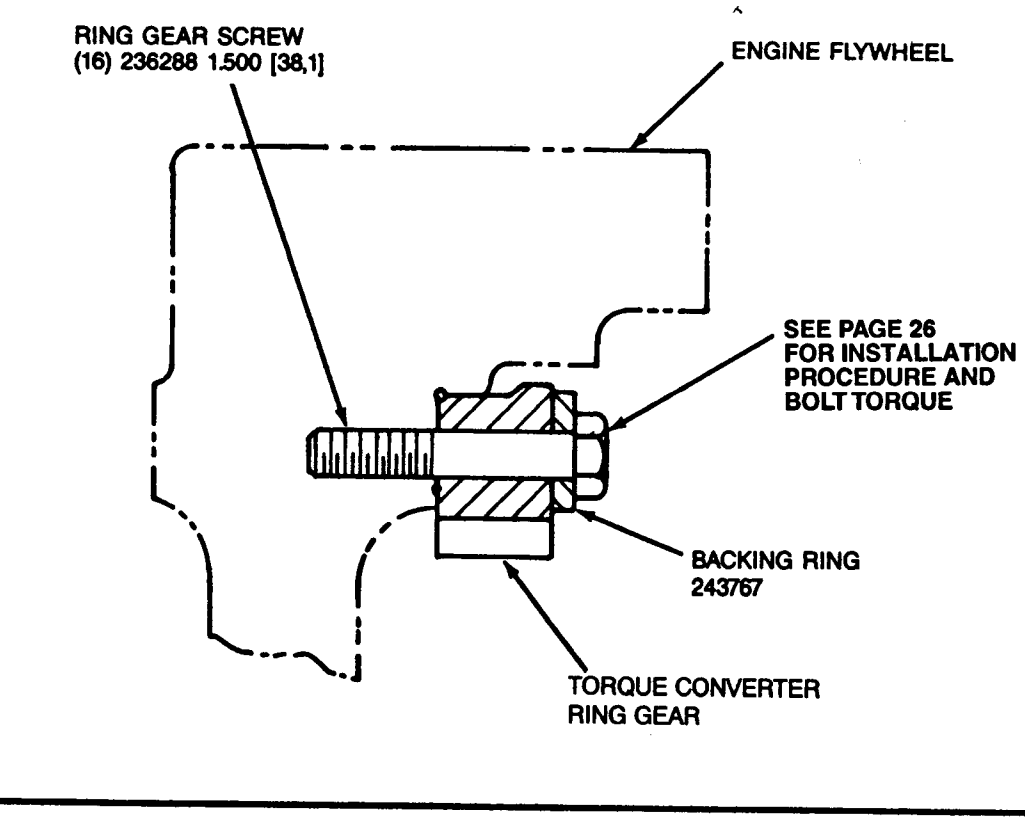
1	243765	Torque Converter Ring Gear
16	236288	Ring Gear Screw 1.5 Inch [38,1]
1	243767	Backing Ring
1	802184	Installation Instruction Sheet

243767 Backing Ring Not Included in 802183 Ring Gear Kit. Must be Ordered Separately.

CONVERTER INSTALLATION

1. Check end play on engine crankshaft & record! (End play to be as specified by engine manufacturer)
2. The use of guide pins in the engine flywheel housing will facilitate converter installation.
3. Assemble torque converter to engine flywheel by sliding converter into position by hand before fastening housing attachment screws. This may require more than one trial to match the drive gear teeth. Pulling the converter into position with housing attachment bolts is not recommended.
4. Measure engine crankshaft end play after assembly of torque converter. This value must be within one thousandth (.001) of an inch [0,0254 mm] of end play recorded (in Paragraph #1) before assembly of torque converter.


ENGINE FLYWHEEL
BACKING RING
TORQUE CONVERTER
RING GEAR
RING GEAR SCREW


RING GEAR SCREW
(16) 236288 1.500 [38,1]
ENGINE FLYWHEEL
SEE PAGE 26
FOR INSTALLATION
PROCEDURE AND
BOLT TORQUE
BACKING RING
243767
TORQUE CONVERTER
RING GEAR

32 SCREW STABLE DRIVE CONNECTION NON-ASBESTOS CONVERTER DRIVE RING GEAR INSTALLATION PROCEDURE

1. Remove all burrs from flywheel mounting face and pilot bores. Clean the torque converter ring gear flywheel mounting surface and the ring gear screw tapped holes with solvent. Dry thoroughly, being certain ring gear screw holes are dry and clean.

2. Check engine flywheel and housing or housing adaptor for conformance to standard S.A.E. No. 3 – SAE J927 and J1033 tolerance specifications for pilot bores size, pilot bores eccentricities and mounting face deviations. Measure and record engine crankshaft end play.

3. Install torque converter ring gear as shown.

   NOTE: Assembly of the ring gear must be completed within a fifteen minute period from start of screw installation. The screws are prepared with an epoxy coating which begins to harden after installation in the flywheel mounting holes. If not tightened to proper torque within the fifteen minute period insufficient screw clamping tension will result.

4. Install backing ring and thirty-two (32) special screws to approximately .06 inch [1,5 mm] of seated position. It is permissible to use a power wrench for this installation phase. With a calibrated torque wrench tighten screws 23 to 25 pounds feet of torque [31,2 - 33,8 N.m].

5. To obtain maximum effectiveness of the special screw's locking featured, a minimum time period after screw installation of twelve (12) hours is suggested before engine start-up.

   The special screw is to be used for **ONE** installation only. If the screw is removed for any reason is **MUST BE REPLACED.** It is recommended that the epoxy left in the flywheel hole be removed with the proper tap and cleaned with solvent. Dry hole thoroughly and use a **NEW** screw for re-installation.

   Assemble torque converter to engine flywheel by sliding converter into position by hand before fastening housing attachment screws. This may require more than one trial to match the drive gear teeth. Pulling the converter into position with housing attachment bolts is not recommended.

6. Measure engine crankshaft end play after assembly of torque converter. This value must be within one thousandth (.001) of an inch [0,0254 mm] of end play recorded (in Paragraph #2) before assembly of torque converter.

802649 - 1.5 INCH [38,1] 32 SCREW RING GEAR KIT

1	249473	**SDC** Torque Converter Ring Gear
32	243970	Ring Gear Screw 1.5 Inch [38,1]
1	802655	Installation Instruction Sheet

802650 - 1.75 INCH [44,4] 32 SCREW RING GEAR KIT

1	249473	**SDC** Torque Converter Ring Gear
32	244903	Ring Gear Screw 1.75 Inch [44,4]
1	802655	Installation Instruction Sheet

802651 - 2.0 INCH [50,8] 32 SCREW RING GEAR KIT

1	249473	**SDC** Torque Converter Ring Gear
32	240318	Ring Gear Screw 2.0 Inch [50,8]
1	802655	Installation Instruction Sheet

802652 - 2.5 INCH [63,5] 32 SCREW RING GEAR KIT

1	249473	**SDC** Torque Converter Ring Gear
32	237153	Ring Gear Screw 2.5 Inch [63,5]
1	802655	Installation Instruction Sheet

802653 - 3.0 INCH [76,2] 32 SCREW RING GEAR KIT

1	249473	**SDC** Torque Converter Ring Gear
32	236938	Ring Gear Screw 3.0 Inch [76,2]
1	802655	Installation Instruction Sheet

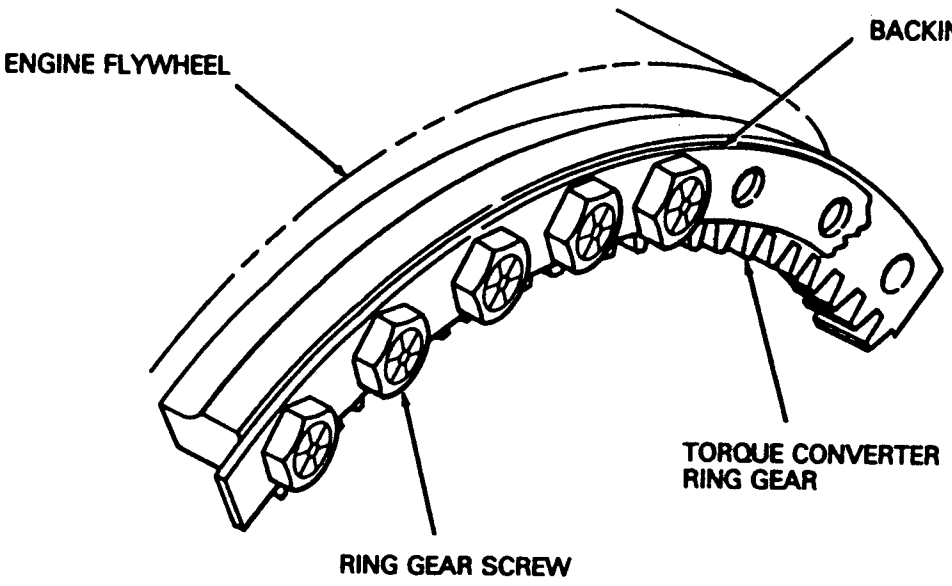
802654 - M8-32 SCREW RING GEAR KIT

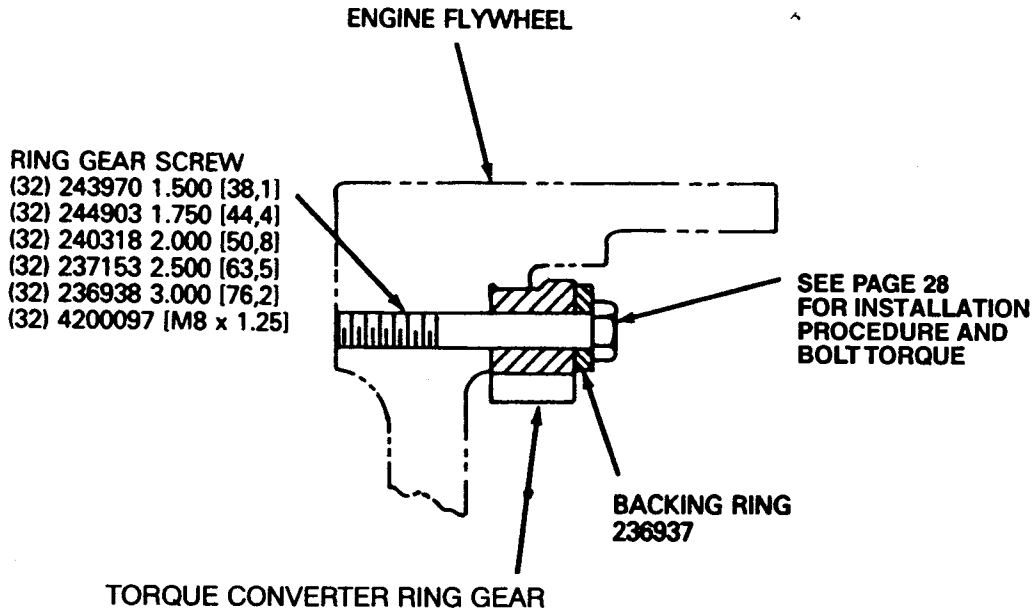
1	249473	**SDC** Torque Converter Ring Gear
32	4200097	Ring Gear Screw [M8 x 1.25]
1	802655	Installation Instruction Sheet

236937 Backing Ring Not Included in Ring Gear Kit. Must be Ordered Separately.

NOTE: The initial installation drive gear mounting kit includes a converter air breather. This breather is used on C & CL 270/C & CL 320 converters only and is not required for the HR & LHR 28000/Hr & LHR 32000 applications.

SEE PAGE 29 FOR INSTALLATION ILLUSTRATIONS


ENGINE FLYWHEEL
BACKING RING
TORQUE CONVERTER
RING GEAR
RING GEAR SCREW


ENGINE FLYWHEEL
RING GEAR SCREW
(32) 243970 1.500 [38,1]
(32) 244903 1.750 [44,4]
(32) 240318 2.000 [50,8]
(32) 237153 2.500 [63,5]
(32) 236938 3.000 [76,2]
(32) 4200097 [M8 x 1.25]
SEE PAGE 28
FOR INSTALLATION
PROCEDURE AND
BOLT TORQUE
BACKING RING
236937
TORQUE CONVERTER RING GEAR

SERVICING MACHINE AFTER TORQUE CONVERTER 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).

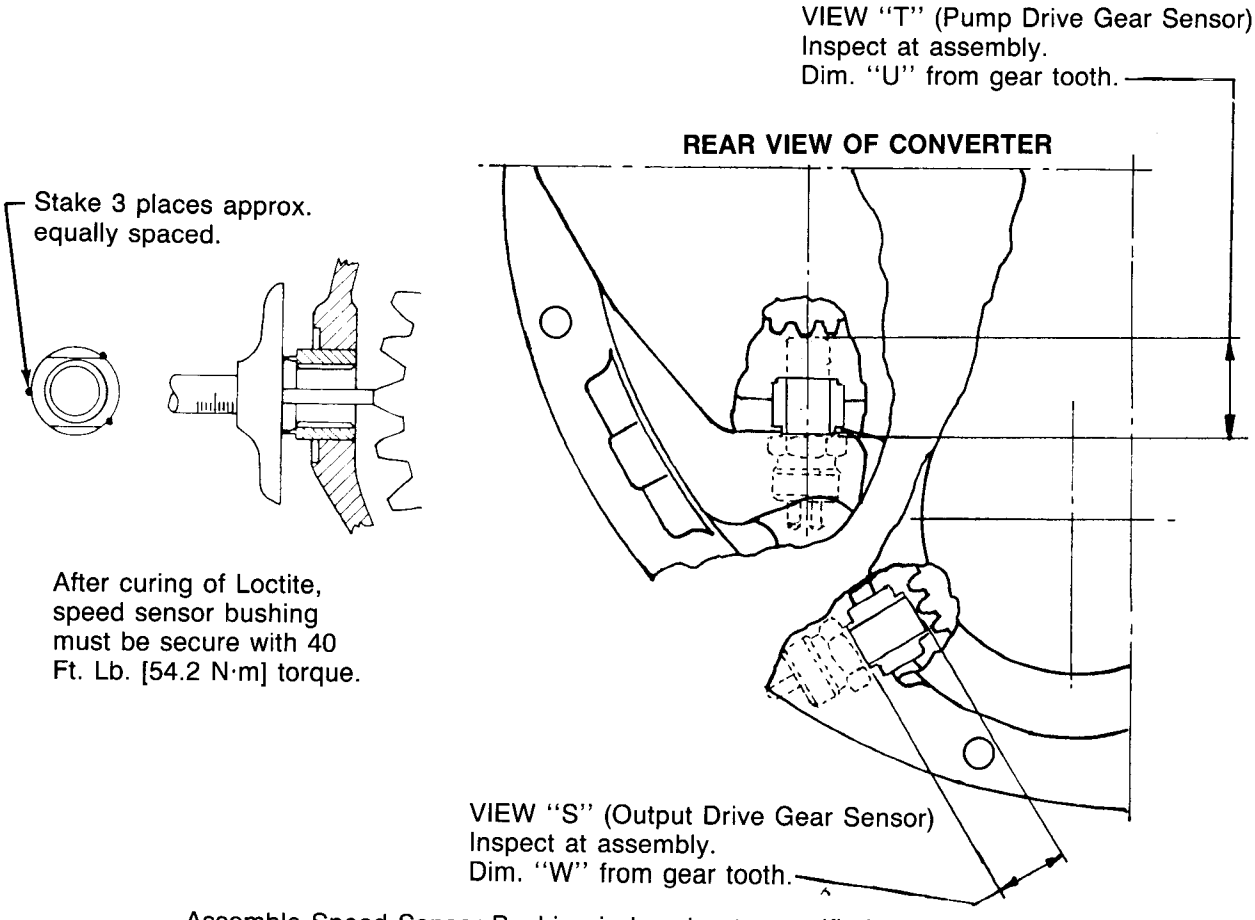
   Add quantity necessary to bring fluid level to **LOW** mark on dipstick or runs freely from **LOWER** oil level check plug hole. Install oil level plug or dipstick. Recheck with hot oil (180-200° F.) [82, 2-93, 3° C].

   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.

CONVERTER CHARGE PUMP REPLACEMENT AND PRIMING PROCEDURE

1. The cause for pump failure must be found and corrected before a replacement pump is installed. Check all of the hoses, tubes, "O" rings, adaptors and split flanges.
2. Replace any collapsed or damaged hoses, damaged split flange "O" rings, tube "O" rings and adaptors.
3. After all checks have been made and corrections completed install the pump.
4. See filling instructions in paragraph 6 above.
5. Start the engine. Run the engine at low idle for two minutes, watch the clutch pressure gage and listen for cavitation of the pump.
6. If the pressure does not come up, check the oil level and bleed off air from system as follows.
7. To bleed off the air from the system, loosen the pressure gage line at the pressure regulating valve or loosen the pressure hose at the oil filter or pressure regulating valve. Crank the engine over until the air is displaced with oil. DO NOT START THE ENGINE.
8. If bleeding the lines does not correct the problem it may become necessary to prime the pump. Disconnect the suction hose or pressure hose, whichever is higher, and fill the port with transmission oil, reconnect the hose and tighten.
9. Start the engine and check pressure.
10. Recheck oil level with hot oil (180-200°F) with engine at idle. Add oil as necessary to bring oil level to full mark.

SPEED SENSOR INSTALLATION



Assemble Speed Sensor Bushing in housing to specified dimension "U" or "W" with Loctite 262 and stake (3) three places. See Pump Drive and Output Gear Charts for dimensions.

PUMP DRIVE RATIO

RATIO	DRIVE GEAR NO. OF TEETH	DRIVEN GEAR NO. OF TEETH	SPEED SENSOR BUSHING DEPTH "U" PER VIEW "T"
1.135	37	42	1.060 ± .007 [26.9 ± .17]
.951	41	39	1.060 ± .007 [26.9 ± .17]

OUTPUT GEAR RATIO

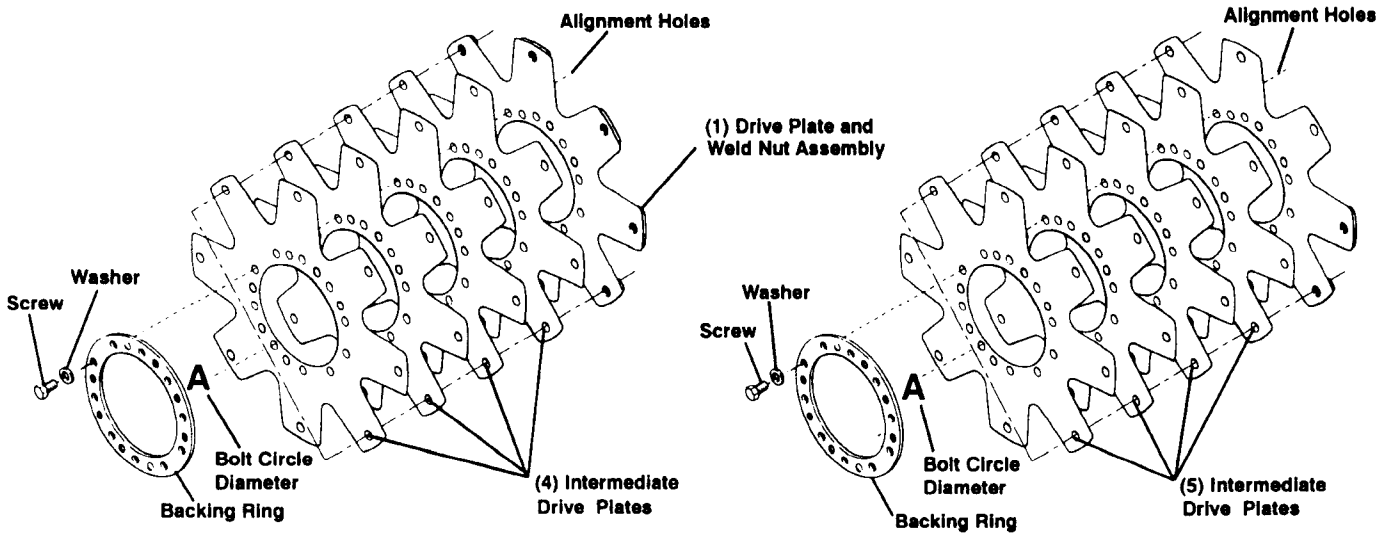
RATIO	TURBINE SHAFT & GEAR ASS'Y NO. OF TEETH	OUTPUT GEAR NO. OF TEETH	SPEED SENSOR BUSHING DEPTH "W" PER VIEW "S"
1.333	21	28	1.060 ± .007 [26.9 ± .17]
1.130	23	26	1.060 ± .007 [26.9 ± .17]
1.042	24	25	1.390 ± .007 [35.3 ± .17]
.960	25	24	1.390 ± .007 [35.3 ± .17]
.885	26	23	1.390 ± .007 [35.3 ± .17]

28000/32000 SERIES TRANSMISSION AND C-270/C-320 CONVERTER DRIVE PLATE

INSTALLATION INSTRUCTIONS

Proper Identification by Bolt Circle Diameter.

Measure the "A" dimension (Bolt Circle diameter) and order Drive Plate Kit listed below.



"A"Dimension (Bolt Circle Diameter)
13.125" [333,375 mm] Diameter
Kit No. 802335

13.50 [342,900 mm] Diameter
Kit No. 802517

17.00" [431,800 mm] Diameter
Kit No. 802454

NOTE: Assembly of flexplates must be completed within a 15 minute period from start of screw installation. If the screw is removed for any reason it must be replaced. The adhesive left in the tapped hole must be removed with the proper tap and cleaned with solvent. Dry the hole thoroughly and use a new screw for reinstallation.

"A" Dimension (Bolt Circle Diameter)
13.125" [333.375 mm] Diameter
Kit No. 802521

13.50" [342,900 mm] Diameter
Kit No. 802568

17.00" [431,800 mm] Diameter
Kit No. 802566

Each kit will include the following parts:

4 Intermediate Drive Plates
1 Drive Plate and Weld Nut Assembly
1 Backing Ring
10 Drive Plate Mounting Screws
10 Drive Plate Washer
1 Instruction Sheet

Each kit will include the following parts:

5 Intermediate Drive Plates
1 Backing Ring
10 Drive Plate Mounting Screws
10 Drive Plate Washer
1 Instruction Sheet

TO FACILITATE ASSEMBLY, ALIGN SMALL HOLES IN DRIVE PLATES-SEE ILLUSTRATION ABOVE.

Position drive plate and weld nut assembly on impeller cover with weld nuts toward cover. Align intermediate drive plate and backing ring with holes in impeller cover. NOTE: Two dimples 180 degrees apart in backing ring must be out (toward engine flywheel). Install capscrews and washers. Tighten 33 to 36 ft. lbs. torque [45-49 N.m]

SEE PAGE 33 FOR TRANSMISSION TO ENGINE INSTALLATION PROCEDURE

TRANSMISSION TO ENGINE INSTALLATION PROCEDURE

1. Remove all burrs from flywheel mounting face and nose pilot bore. Clean drive plate surface with solvent.
2. Check engine flywheel and housing for conformance to standard S.A.E. #3 - S.A.E. J-927 tolerance specifications for pilot bore size, pilot bore runout and mounting face flatness. Measure and record engine crankshaft end play.
3. Install two 3.50 [88,90 mm] long transmission to flywheel housing guide studs in the engine flywheel housing as shown. Rotate the engine flywheel to align a drive plate mounting screw hole with the flywheel housing access hole.
4. Install a 4.00 [101,60 mm] long drive plate locating stud .3750-24 fine thread in a drive plate nut. Align the locating stud in the drive plate with the flywheel drive plate mounting screw hole positioned in step No. 3.
5. Locate transmission on flywheel housing aligning drive plate to flywheel and transmission to flywheel housing.

   Install transmission to flywheel housing screws. Tighten screws to specified torque. Remove transmission to engine guide studs. Install remaining screws and tighten to specified torque.
6. Remove drive plate locating stud.
7. Install drive plate attaching screw and washer. Snug screw but **do not tighten.** Some engine flywheel housings have a hole located on the flywheel housing circumference in line with the drive plate screw access hole. A screwdriver or pry bar used to hold the drive plate against the flywheel will facilitate installation of the drive plate screws. Rotate the engine flywheel and install the remaining seven (7) flywheel to drive plate attaching screws. Snug screws but do not tighten. After all eight (8) screws are installed torque each one 25 to 30 ft. lbs. torque [33,9 - 40,6 N.m.]. This will require torquing each screw and rotating the engine flywheel until the full amount of eight (8) screws have been tightened.
8. Measure engine crankshaft end play after transmission has been completely installed on engine flywheel. This value must be within .001 [0,025 mm] of the end play recorded in step No. 2.

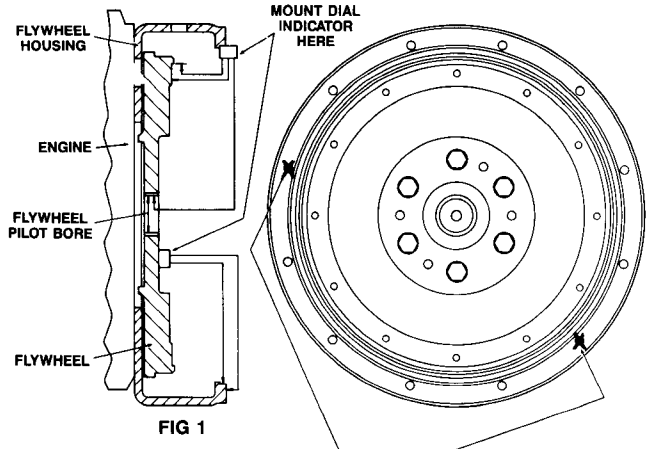


FIG 1

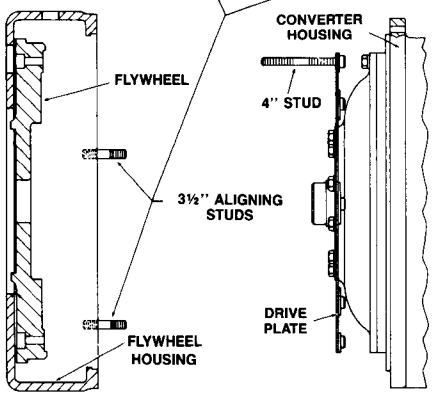


FIG 2

SPECIAL STUD, WASHER AND SELF LOCK NUT FURNISHED BY MACHINE MANUFACTURER.

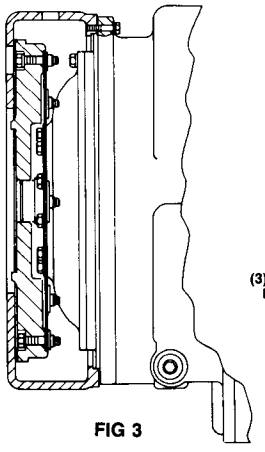


FIG 3

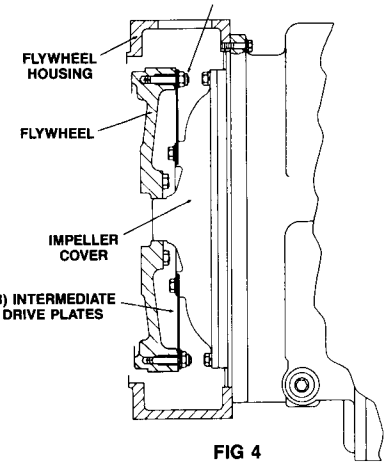


FIG 4

DISASSEMBLY OF LOCK-UP COVER

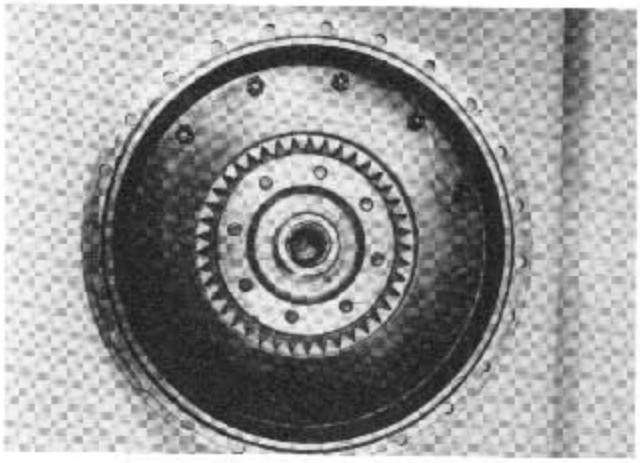


Figure 1
Remove end plate to lock-up cover bolts

Figure 2
Remove end plate and clutch disc.

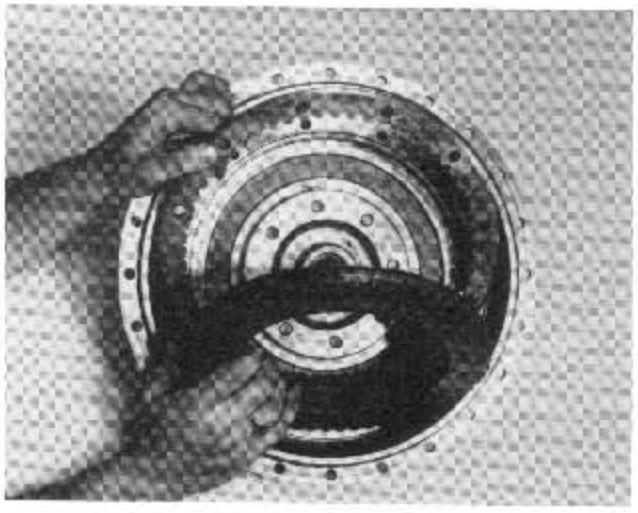


Figure 3
Remove piston and outer drive disc.

REASSEMBLY OF LOCK-UP COVER

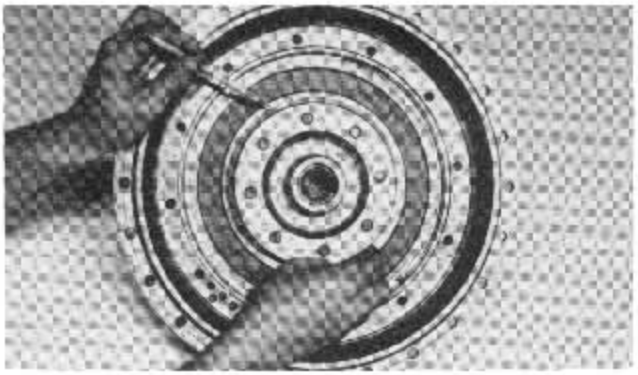


Figure 4
Position new oil sealing ring on input hub. Grease ring lightly to facilitate reassembly.

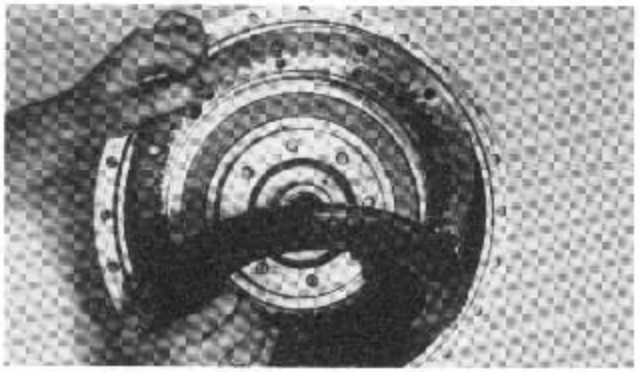


Figure 5
Install new oil sealing ring on outer diameter of actuating piston and grease lightly. Position piston over input hub, use caution as not to damage oil sealing rings. Locate outer drive disc teeth with teeth on the outer diameter of the piston.

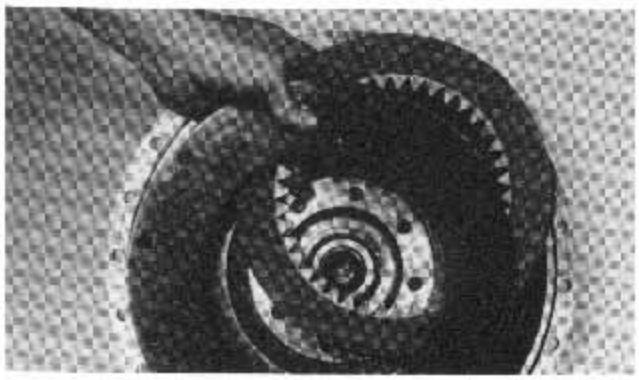


Figure 6
Lubricate clutch disc lightly and position in cover. Align holes of end plate with holes in driving disc and lock-up cover. Install bolts and tighten 30 to 35 lbs.ft. torque [40,7–27,4 N•m.]

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