

CLARK

SHOP MANUAL

No. 2249

C-270 SERIES
TORQUE CONVERTER



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** Torque Converter.

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 torque converter, 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-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. The Clark Equipment Company does not warrant repair or replacement parts, nor failures resulting from the use thereof, which are not supplied by or approved by the Clark Equipment Company. **IMPORTANT: Always furnish the Distributor with the Converter serial and model number when ordering parts.**

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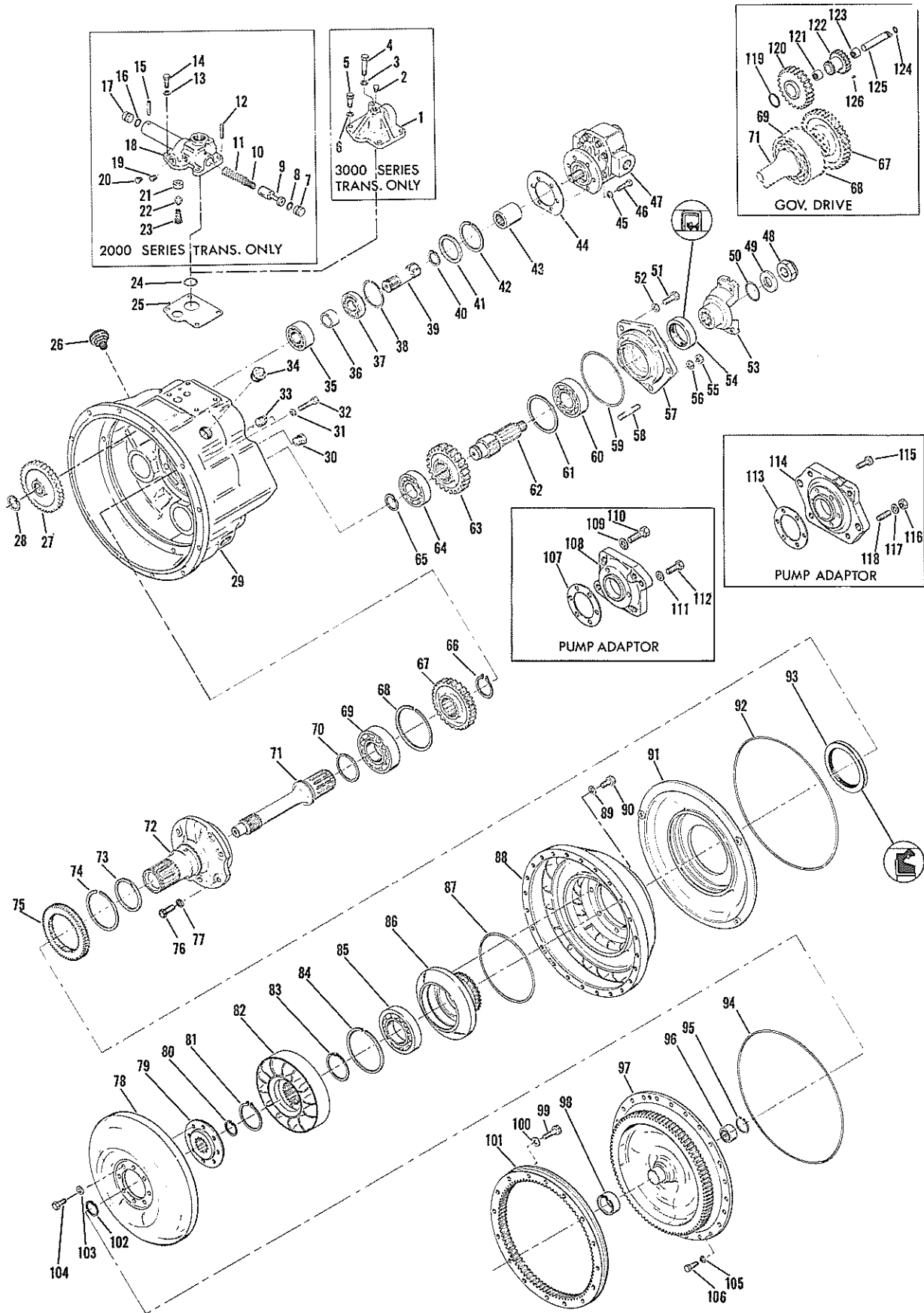
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NOTE: Metric Dimensions Shown in Brackets [].

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C-270 CONVERTER WITH OFFSET OUTPUT

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Inlet Cover (3000 Trans. only).....	1	64	Output Shaft Front Bearing	1
2	Inlet Cover Plug (3000 Trans. only).....	1	65	Bearing Snap Ring.....	1
3	Cover Bolt Lockwasher (3000 Trans. only).....	1	66	Output Gear Snap Ring	1
4	Cover Bolt—Long (3000 Trans. only).....	1	67	Turbine Shaft Gear	1
5	Cover Bolt—Short (3000 Trans. only).....	3	68	Turbine Shaft Snap Ring	1
6	Cover Bolt Lockwasher (3000 Trans. only).....	3	69	Turbine Shaft Bearing	1
7	Valve Stop	1	70	Turbine Shaft Piston Ring	1
8	Valve Stop "O" Ring.....	1	71	Turbine Shaft	1
9	Valve Piston.....	1	72	Stator Support & Sleeve Assembly.....	1
10	Valve Spring — Inner.....	1	73	Stator Support Piston Ring.....	1
11	Valve Spring — Outer	1	74	Impeller Hub Gear Snap Ring.....	1
12	Valve Stop Roll Pin.....	1	75	Impeller Hub Gear	1
13	Regulator Valve to Housing Screw Lockwasher....	4	76	Stator Support Screw	6
14	Regulator Valve to Housing Screw.....	4	77	Stator Support Screw Lockwasher.....	6
15	Valve Stop Roll Pin.....	1	78	Turbine	1
16	Valve Stop "O" Ring.....	1	79	Turbine Hub	1
17	Valve Stop.....	1	80	Turbine Shaft Snap Ring.....	1
18	Regulating Valve Assembly.....	1	81	Reaction Member Snap Ring	1
19	Valve Housing Pipe Plug.....	1	82	Reaction Member	1
20	Valve Housing Pipe Plug.....	1	83	Reaction Member Spacer.....	1
21	Safety Valve Seat	1	84	Impeller Bearing Snap Ring.....	1
22	Safety Valve Plunger	1	85	Impeller Hub Bearing.....	1
23	Safety Valve Spring	1	86	Impeller Hub	1
24	Regulator Valve to Housing "O" Ring.....	1	87	Impeller Hub "O" Ring	1
25	Regulator Valve to Housing Gasket	1	88	Impeller	1
26	Air Breather Check Valve Assembly.....	1	89	Hub to Impeller Screw Washer	8
27	Pump Drive Gear.....	3	90	Hub to Impeller Screw	8
28	Pump Drive Gear Snap Ring.....	3	91	Oil Baffle	1
29	Converter Housing.....	1	92	Oil Baffle "O" Ring.....	1
30	Converter Housing Pipe Plug.....	1	93	Oil Baffle Oil Seal	1
31	Oil Baffle Screw Lockwasher.....	3	94	Impeller to Cover "O" Ring.....	1
32	Oil Baffle Screw	3	95	Impeller Cover Bearing Snap Ring	1
33	Converter Housing Pipe Plug.....	1	96	Impeller Cover Bearing	1
34	Converter Housing Pipe Plug.....	2	97	Impeller Cover	1
35	Pump Drive Shaft Bearing	3	98	Impeller Cover Sleeve	1
36	Pump Drive Shaft Spacer	3	99	Ring Gear Screw.....	16
37	Pump Drive Shaft Bearing	3	100	Plain Washer	16
38	Bearing Locating Ring.....	3	101	Flywheel Ring Gear.....	1
39	Pump Drive Shaft	3	102	Turbine Shaft Snap Ring.....	1
40	Pump Drive Shaft Snap Ring.....	3	103	Turbine Hub Screw Lockwasher	8
41	Pump Shaft Washer	3	104	Turbine Hub Screw	8
42	Pump Shaft Snap Ring.....	3	105	Impeller to Cover Screw Lockwasher	24
43	Charging Pump Sleeve.....	1	106	Impeller to Cover Screw	24
44	Pump Gasket	1	107	Pump Adaptor Gasket	1
45	Pump Mounting Screw Lockwasher	3	108	Pump Adaptor	1
46	Pump Mounting Screw	3	109	Pump Adaptor Screw Lockwasher	4
47	Converter Charging Pump.....	1	110	Pump Adaptor Screw	4
48	Output Shaft Nut	1	111	Pump Adaptor Screw Lockwasher	4
49	Output Shaft Washer.....	1	112	Pump Adaptor Screw	4
50	Output Shaft "O" Ring	1	113	Pump Adaptor Gasket	1
51	Bearing Retainer Screw	3	114	Pump Adaptor	1
52	Bearing Retainer Screw Lockwasher	3	115	Pump Adaptor Screw	6
53	Companion Flange.....	1	116	Pump Adaptor Stud Nut	4
54	Bearing Retainer Oil Seal.....	1	117	Pump Adaptor Stud Lockwasher	4
55	Bearing Retainer Stud Nut.....	2	118	Pump Adaptor Stud	4
56	Bearing Retainer Stud Lockwasher.....	2	119	Idler Shaft Snap Ring	1
57	Bearing Retainer	1	120	Idler Shaft Drive Gear	1
58	Output Shaft Bearing Retainer Stud.....	2	121	Idler Shaft Bearing	1
59	Bearing Retainer "O" Ring.....	2	122	Governor Drive Gear.....	1
60	Output Shaft Rear Bearing.....	1	123	Idler Shaft Bearing	1
61	Output Shaft Bearing Snap Ring.....	1	124	Idler Shaft "O" Ring	1
62	Output Shaft	1	125	Idler Shaft	1
63	Output Shaft Gear	1	126	Idler Shaft Key	1

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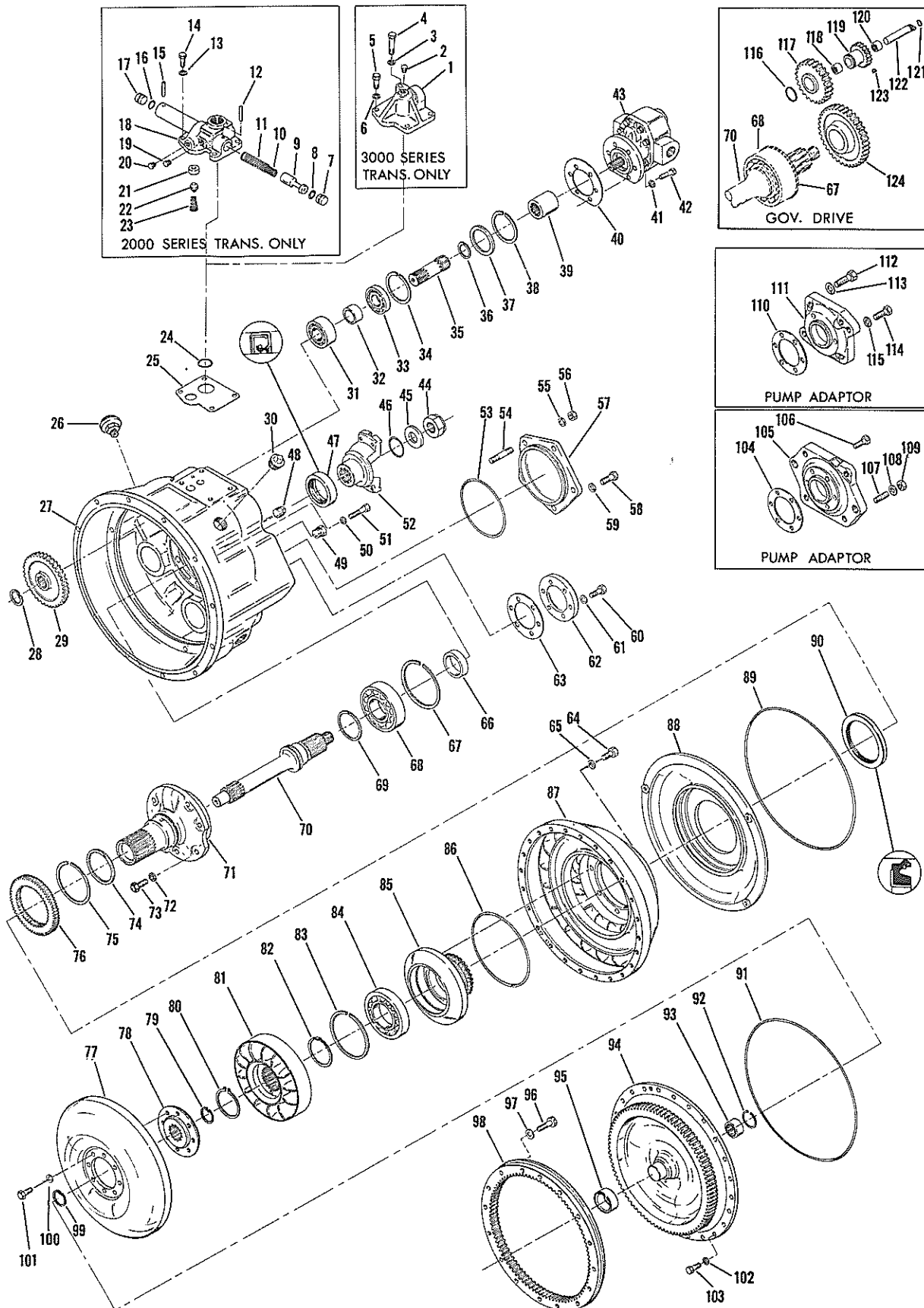
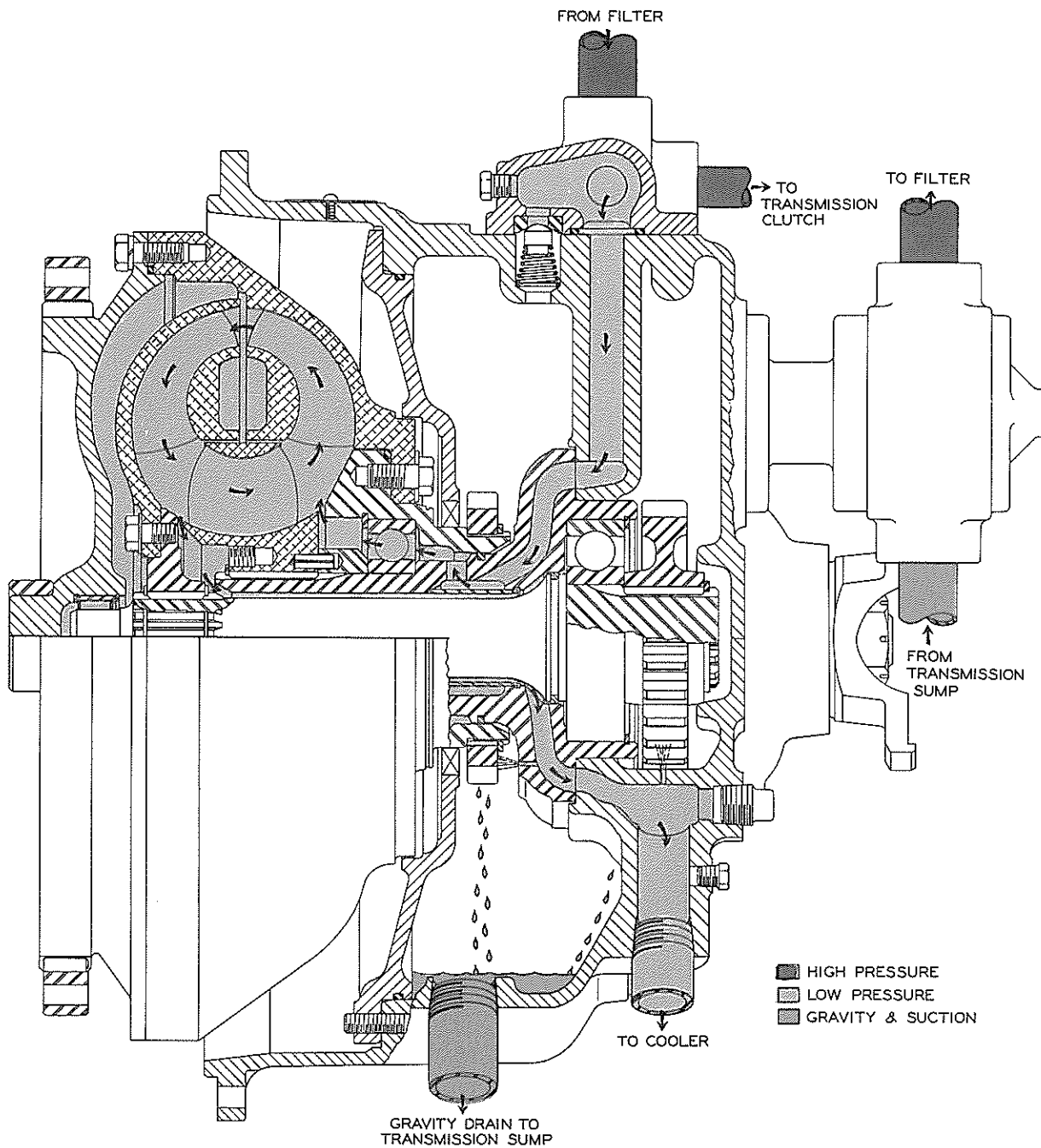


Figure C

C-270 CONVERTER WITH INLINE OUTPUT

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Inlet Cover (3000 Trans. only).....	1	63	Pump Hole Cover Gasket.....	2
2	Inlet Cover Plug (3000 Trans. only).....	1	64	Hub to Impeller Screw.....	8
3	Cover Bolt Lockwasher (3000 Trans. only).....	1	65	Hub to Impeller Screw Lockwasher	8
4	Cover Bolt—Long (3000 Trans. only).....	1	66	Companion Flange Spacer.....	1
5	Cover Bolt—Short (3000 Trans. only).....	3	67	Snap Ring.....	1
6	Cover Bolt Lockwasher (3000 Trans. only).....	3	68	Turbine Shaft Bearing.....	1
7	Valve Stop	1	69	Piston Ring.....	1
8	Valve Stop "O" Ring.....	1	70	Turbine Shaft.....	1
9	Valve Piston	1	71	Stator Support & Sleeve Assembly	1
10	Valve Spring—Inner	1	72	Stator Support Screw Lockwasher	6
11	Valve Spring—Outer	1	73	Stator Support Screw	6
12	Valve Stop Roll Pin.....	1	74	Piston Ring.....	1
13	Regulator Valve to Housing Screw Lockwasher....	4	75	Impeller Hub Gear Snap Ring.....	1
14	Regulator Valve to Housing Screw	4	76	Impeller Hub Gear.....	1
15	Valve Stop Roll Pin.....	1	77	Turbine	1
16	Valve Stop "O" Ring	1	78	Turbine Hub.....	1
17	Valve Stop	1	79	Turbine Locating Snap Ring.....	1
18	Regulating Valve Assembly.....	1	80	Reaction Member Snap Ring	1
19	Valve Housing Pipe Plug.....	1	81	Reaction Member	1
20	Valve Housing Pipe Plug.....	1	82	Reaction Member Spacer	1
21	Safety Valve Seat	1	83	Bearing Snap Ring.....	1
22	Safety Valve Plunger	1	84	Impeller Hub Bearing	1
23	Safety Valve Spring	1	85	Impeller Hub	1
24	Regulator Valve to Housing "O" Ring	1	86	Impeller Hub "O" Ring.....	1
25	Regulator Valve to Housing Gasket.....	1	87	Impeller	1
26	Air Breather Check Valve Assembly	1	88	Oil Baffle	1
27	Converter Housing.....	1	89	Oil Baffle "O" Ring.....	1
28	Pump Drive Gear Snap Ring.....	3	90	Oil Seal	1
29	Pump Drive Gear	3	91	Impeller to Cover "O" Ring.....	1
30	Converter Housing Pipe Plug.....	2	92	Bearing Snap Ring.....	1
31	Pump Drive Shaft Bearing	3	93	Impeller Cover Bearing	1
32	Pump Drive Shaft Spacer	3	94	Impeller Cover	1
33	Pump Drive Shaft Bearing	3	95	Impeller Cover Sleeve	1
34	Bearing Locating Ring	3	96	Ring Gear to Flywheel Bolt.....	16
35	Pump Drive Shaft	3	97	Ring Gear to Flywheel Bolt Washer.....	16
36	Pump Drive Shaft Snap Ring.....	3	98	Ring Gear	1
37	Pump Shaft Washer	3	99	Turbine Retaining Snap Ring.....	1
38	Pump Shaft Snap Ring.....	3	100	Turbine Hub Screw Lockwasher	8
39	Charging Pump Sleeve.....	1	101	Turbine Hub Screw.....	8
40	Pump Gasket	1	102	Impeller to Cover Bolt Lockwasher	24
41	Pump Mounting Screw Lockwasher	3	103	Impeller to Cover Bolt.....	24
42	Pump Mounting Screw	3	104	Pump Adaptor Gasket	1
43	Converter Charging Pump.....	1	105	Pump Adaptor	1
44	Turbine Shaft Nut.....	1	106	Pump Adaptor Screw	6
45	Turbine Shaft Washer	1	107	Pump Adaptor Stud	4
46	Flange "O" Ring.....	1	108	Pump Adaptor Stud Lockwasher	4
47	Oil Seal.....	1	109	Pump Adaptor Stud Nut	4
48	Converter Housing Plug.....	1	110	Pump Adaptor Gasket	1
49	Converter Housing Plug.....	1	111	Pump Adaptor	1
50	Oil Baffle Screw Lockwasher	3	112	Pump Adaptor Screw.....	4
51	Oil Baffle Screw	3	113	Pump Adaptor Screw Lockwasher.....	4
52	Output Flange	1	114	Pump Adaptor Screw	4
53	Offset Drive Hole Cover "O" Ring.....	1	115	Pump Adaptor Screw Lockwasher	4
54	Cover Stud	2	116	Idler Shaft Snap Ring.....	1
55	Cover Stud Nut Lockwasher.....	2	117	Idler Shaft Drive Gear	1
56	Cover Stud Nut	2	118	Idler Shaft Bearing	1
57	Offset Drive Hole Cover.....	1	119	Governor Drive Gear	1
58	Cover Screw.....	3	120	Idler Shaft Bearing	1
59	Cover Screw Lockwasher.....	3	121	Idler Shaft Bearing "O" Ring.....	1
60	Pump Hole Cover Screw.....	6	122	Idler Shaft	1
61	Pump Hole Cover Screw Lockwasher.....	6	123	Idler Shaft Key	1
62	Pump Hole Cover	2	124	Turbine Shaft Gear	1



C-270 SERIES CONVERTER OIL FLOW DIAGRAM

Figure E

IRREGULARITIES IN PERFORMANCE

C-270 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. [1,76 Kg/cm ²] with engine at 2000 RPM — NO LOAD) (See Converter Pressure Specifications)	Worn oil sealing and "O" rings Worn oil pump. Safety Valve stays open.	A. Trouble is internal and will require a complete tear-down of the converter. B. Replace. C. Clean and check valve spring and valve.
2. Suction line taking air.	Low oil level. Suction line connections taking air. Worn oil pump.	D. Fill to proper level. E. Check oil line connections and tighten securely. F. Replace.
3. High converter OUT pressure (Above 70 P.S.I. [4,92 Kg/cm ²] with engine at 2000 RPM — NO LOAD) (See Converter Pressure Specifications)	Oil cooler or oil lines restricted. Oil too heavy Cold oil.	G. Check oil cooler line and oil cooler for restrictions. Clean or replace. H. Check oil weight. See oil recommendations. 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. Oil cooler too small. Worn oil pump Converter drain line to transmission or oil sump not installed properly.	J. Clean and check oil cooler and oil cooler lines. Replace if necessary. K. Replace with larger cooler. L. Replace oil pump. 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. Worn oil pump Damaged bearing. Worn drive gears.	N. Replace. O. Replace. P. A complete teardown will be necessary to determine this. Replace if necessary. Q. Replace.
6. Low clutch pressure. (See pressure specifications)	Transmission malfunction. Worn oil pump. Regulator valve stuck open.	R. Close pressure line to transmission control valve. If clutch pressure returns to normal, trouble is in transmission. S. Replace. T. Clean and check valve for worn or dirty parts, replace if necessary.

IRREGULARITIES IN PERFORMANCE (Cont'd.)

C-270 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 250 HOURS. DRAIN AND REFILL SYSTEM EVERY 500 HOURS.

TRANSMISSION CLUTCH OIL PRESSURE P.S.I.

The C-270 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. [12,7-15,4 Kg/cm²]** pressure range. (See note).

2. Pressure regulator valve on Converter with a **240 to 280 P.S.I. [16,9-19,6 Kg/cm²]** pressure range. (See Note)

3. Pressure regulator valve on Converter with a **180 to 220 P.S.I. [12,7-15,4 Kg/cm²]** pressure range. (See Note)

NOTE: All pressure must be equal within **5 P.S.I. [0,4 Kg/cm²]**. If clutch pressure varies in any one clutch more than **5 P.S.I. [0,4 Kg/cm²]** repair clutch. All pressures must be taken with two clutches engaged.

OIL PRESSURE AND LUBRICATION SPECIFICATIONS for C-270 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. [1,76 Kg/cm²] minimum pressure at 2000 R. P. M. engine speed AND a maximum of 70 P. S. I. [4,92 Kg/cm²] outlet pressure with engine operating at no-load governed speed.

Converter outlet pressure equals the total pressure drop of the cooler, cooler lines and back pressure of the transmission lubrication system.

B. OIL IN A TORQUE CONVERTER is used primarily as means of transmitting power as well as providing adequate lubrication. Such oil must have the following properties:

1. It must remain fluid at all prevailing temperatures.
2. It must not foam excessively nor materially increase in volume.
3. It must be chemically stable at elevated temperatures.
4. It must be free from additives and impurities which would centrifuge out during operation.
5. IT MUST BE CLEAN. Dirt in the converter hydraulic circuit will cause wear and shorten life. Also it will cause malfunction by damaging the hydraulic pump, pressure regulating valves and oil seals within the unit.

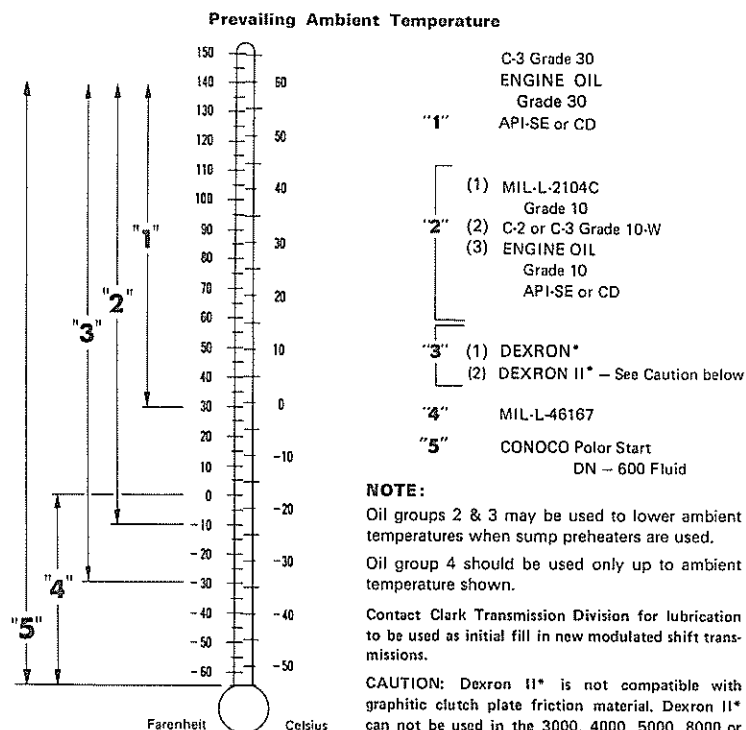
CONVERTER LUBE FLOW

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

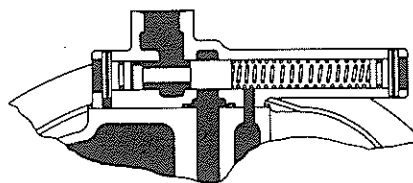
Leakage in C2000 series not to exceed 2 gal. max.

RECOMMENDED LUBRICANTS FOR CLARK POWER SHIFTED TRANSMISSION AND TORQUE CONVERTERS

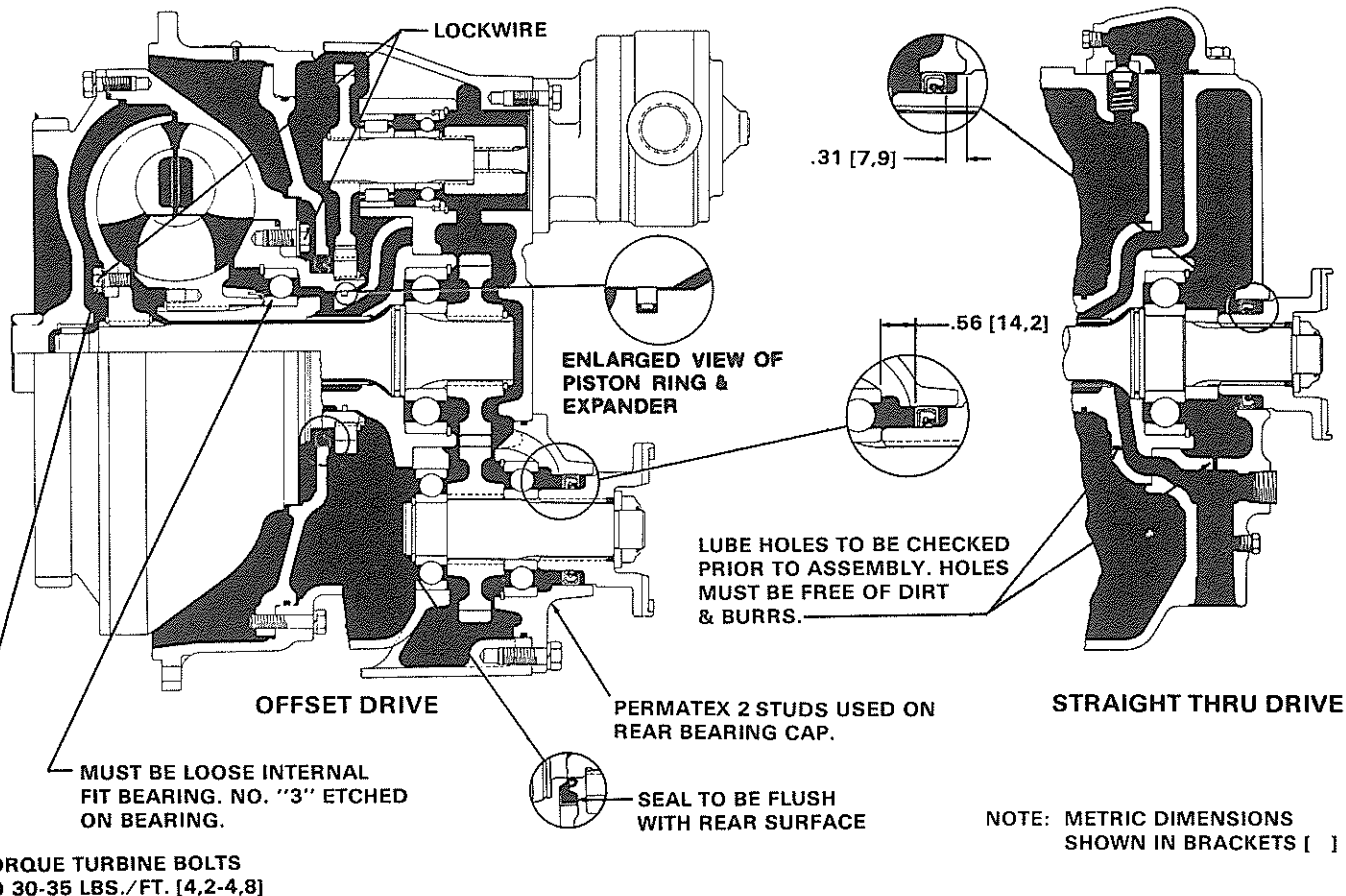


*Dexron is a registered trademark of General Motors Corporation.

1. TORQUE OUTPUT SHAFT NUT TO 200-250 lb-ft [27, 7-34, 5 kg-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. [93° C] BEFORE ASSEMBLY OF BUSHING TO COVER.
9. GOVERNOR DRIVE NEEDLE BEARINGS TO BE PRESSED 0.031 [0, 79] BELOW ENDS OF GEAR.
10. LUBE HOLES TO BE CHECKED PRIOR TO ASSEMBLY. HOLES MUST BE FREE OF DIRT & BURRS.






REGULATOR VALVE



TORQUE SPECIFICATIONS FOR SCREW THREADS

TORQUE lb-ft [kg-m]

NOMINAL SIZE	GRADE 5  		GRADE 8 	
	FINE THREADS	COARSE THREADS	FINE THREADS	COARSE THREADS
1/4 .2500	9-11 [1,3-1,5]	8-10 [1,2-1,3]	11-13 [1,6-1,7]	9-11 [1,3-1,5]
5/16 .3125	16-20 [2,3-2,7]	12-16 [1,7-2,2]	28-32 [3,9-4,4]	26-30 [3,6-4,1]
3/8 .3750	26-29 [3,6-4,0]	23-25 [3,2-3,4]	37-41 [5,2-5,6]	33-36 [4,6-4,9]
7/16 .4375	41-45 [5,7-6,2]	37-41 [5,2-5,6]	58-64 [8,1-8,8]	52-57 [7,2-7,8]
1/2 .5000	64-70 [8,9-9,6]	57-63 [7,9-8,7]	90-99 [12,5-13,6]	80-88 [11,1-12,1]
9/16 .5625	91-100 [12,6-13,8]	82-90 [11,4-12,4]	128-141 [17,7-19,4]	115-127 [15,9-17,5]

ASSEMBLY INSTRUCTIONS FOR C-270 CONVERTER WITH INLINE AND OFFSET OUTPUT

C-270 SERIES CONVERTER

The following instructions will cover the disassembly and assembly of the C-270 Converter in a sequence that would normally be followed after the Converter has been removed from the vehicle.

CAUTION: Cleanliness is of extreme importance and an absolute must in the repair and overhaul of the Converter. 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

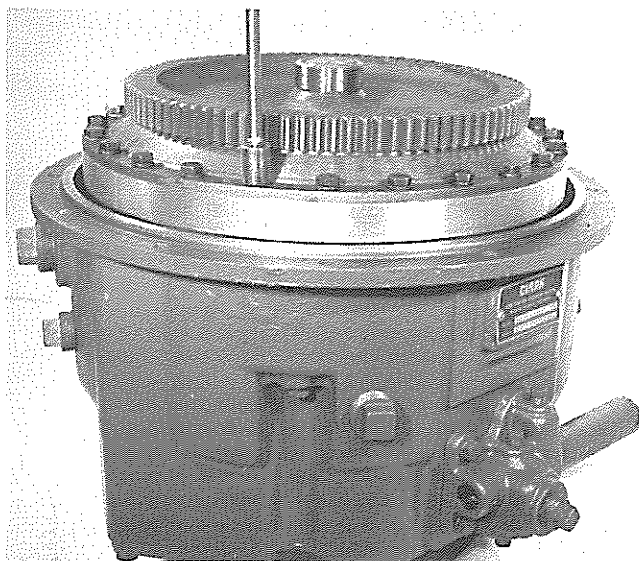


Figure 1

Remove bolts securing impeller cover to impeller.

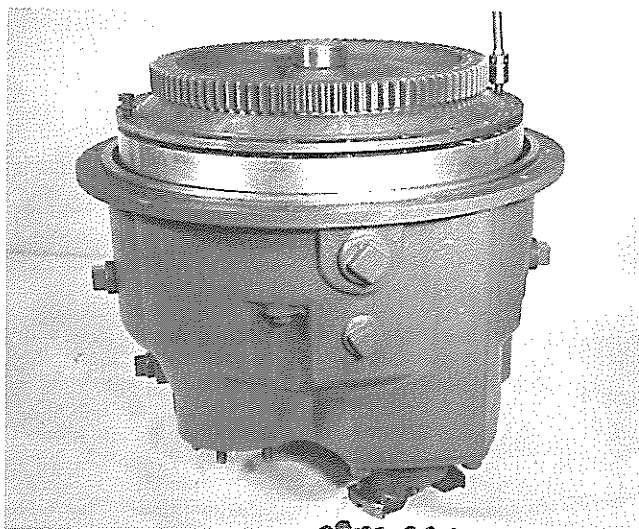


Figure 2

Use two bolts in threaded puller holes 180° apart to remove impeller cover from impeller. **NOTE:** some units may have pry slots instead of threaded holes.

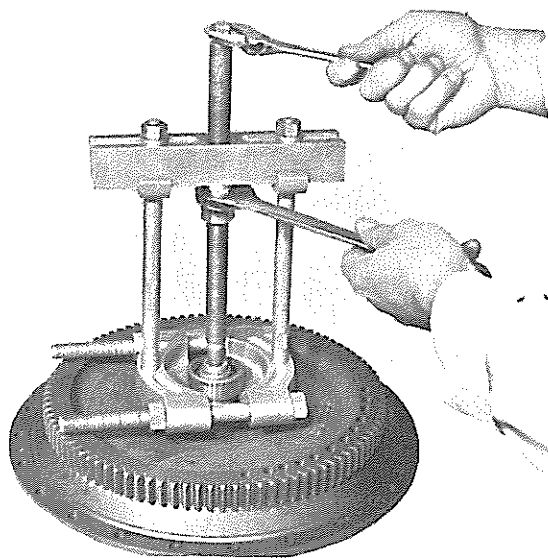


Figure 3

If pilot bushing sleeve is to be replaced use procedure as shown above.

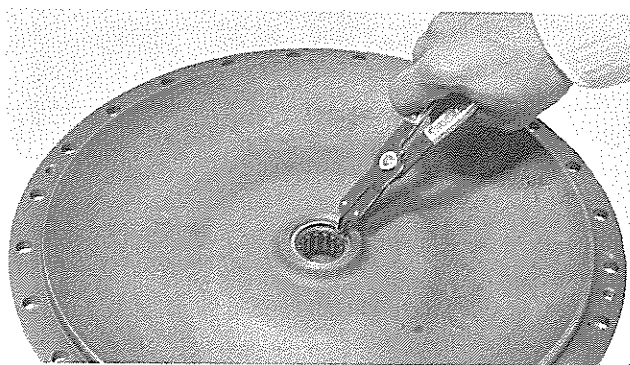


Figure 4

If necessary to replace pilot bearing, remove retain-er ring and use small inside bearing puller.

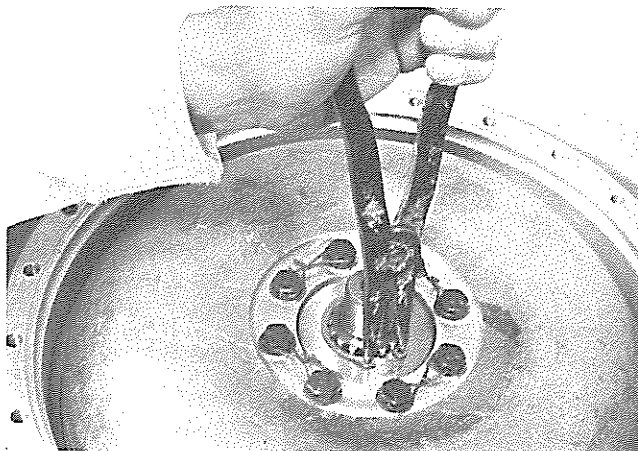


Figure 5

Remove outer turbine hub retain-er ring.

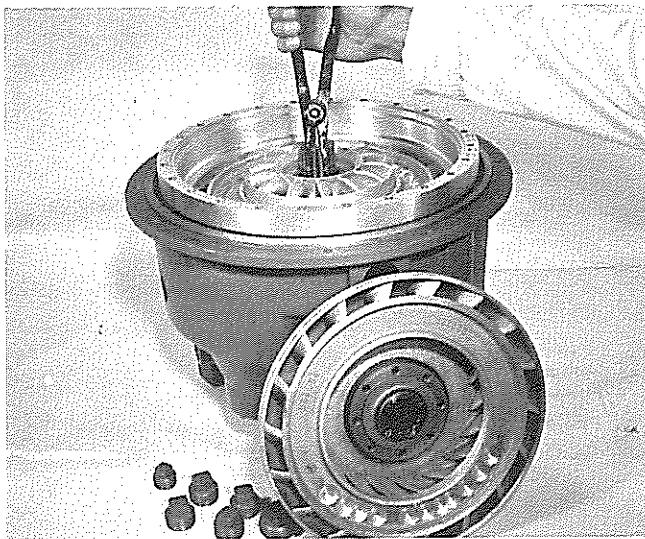


Figure 6

Remove turbine and hub assembly from turbine shaft. Remove turbine locating ring.

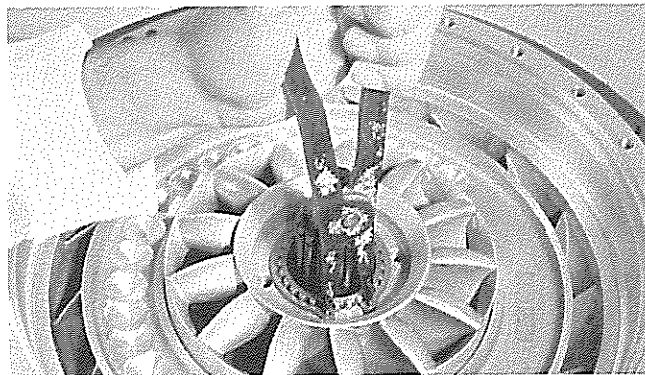


Figure 7

Remove reaction member retainer ring.

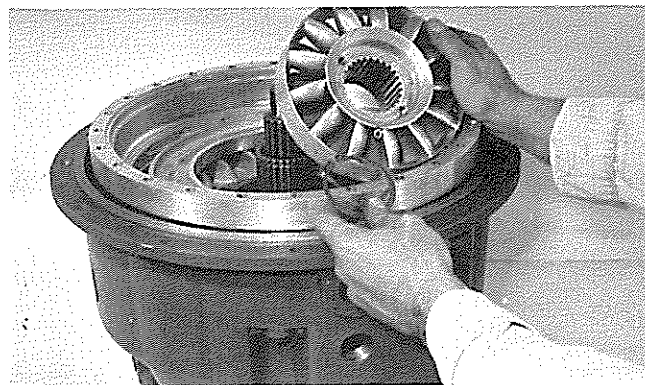


Figure 8

Remove reaction member from stator support, threaded puller holes are provided should reaction member be too tight to be removed by hand.

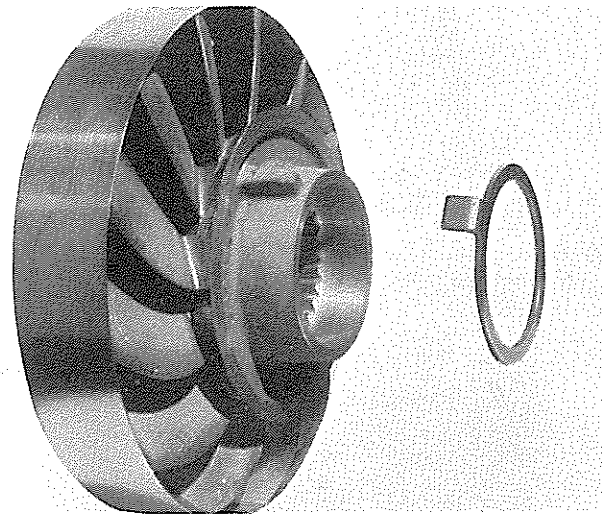


Figure 9

Reaction member and spacer.

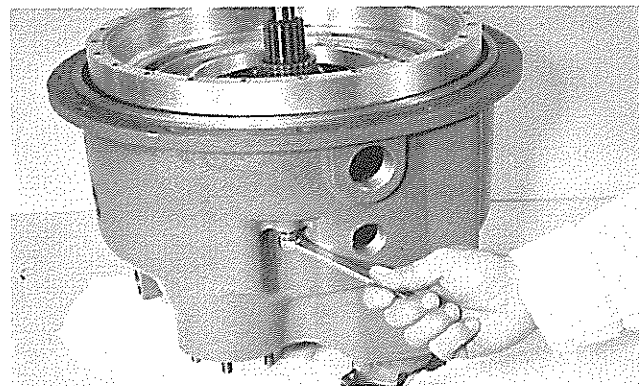


Figure 10

Remove three bolts that secure oil baffle to converter housing.

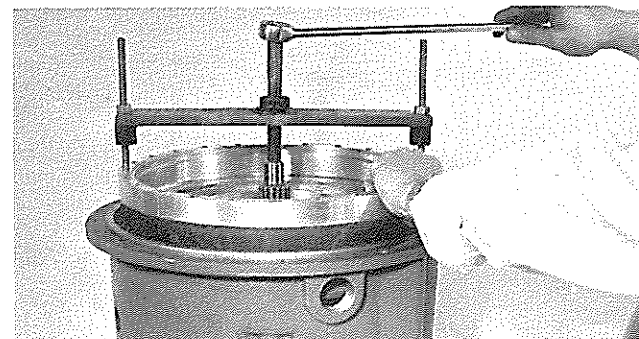


Figure 11

Install special puller tool as shown above, turn jack screw pulling oil baffle and impeller from stator support as an assembly. Special tool can be made for easier removal of impeller assembly but it is not necessary. (See Figure 12).

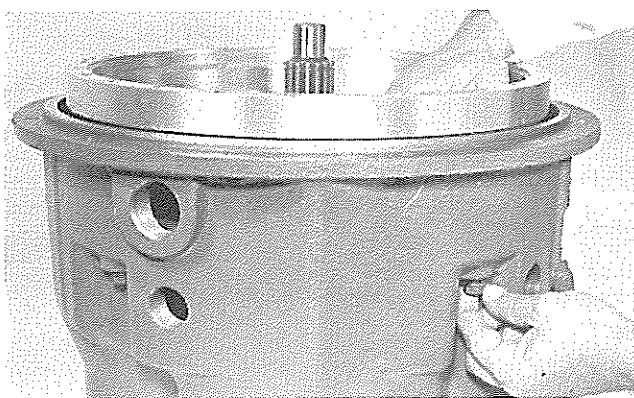


Figure 12

If special tool is not available, remove oil baffle bolts part way. Tap lightly on each bolt, this will loosen oil baffle from converter housing, remove oil baffle and impeller from housing as an assembly.

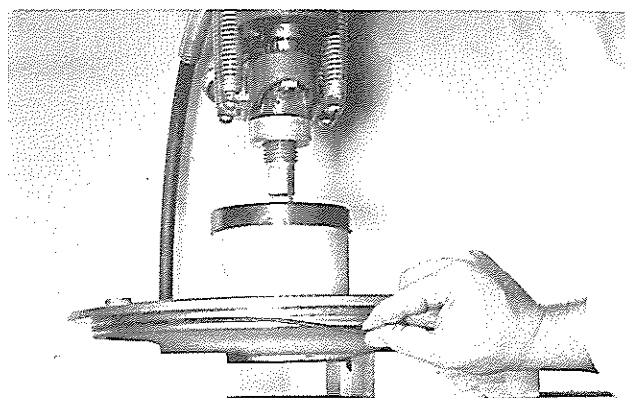


Figure 15

Remove oil baffle oil seal and "O" ring. **NOTE:** Oil seal should be removed only if it is to be replaced.

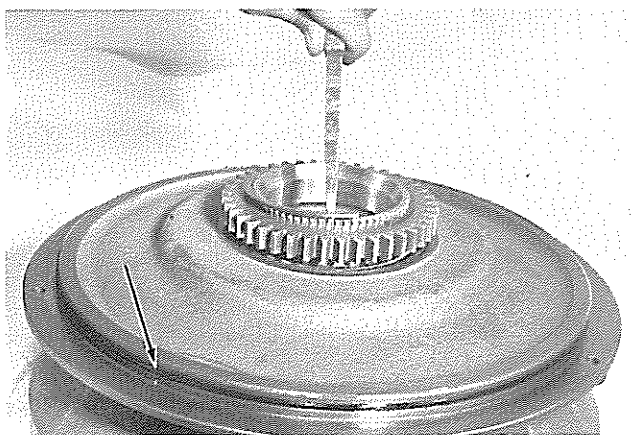


Figure 13

Remove impeller hub gear retainer ring.

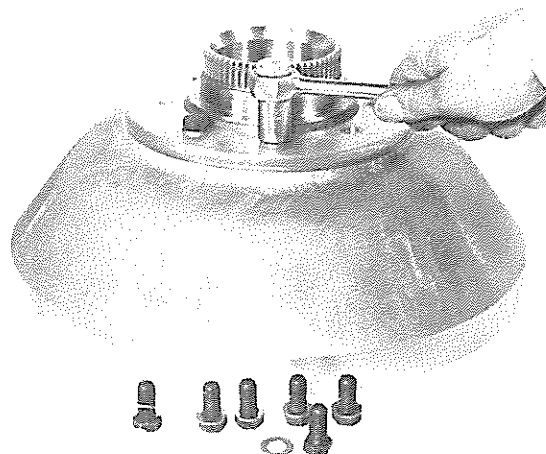


Figure 16

Remove impeller hub bolts and washers.

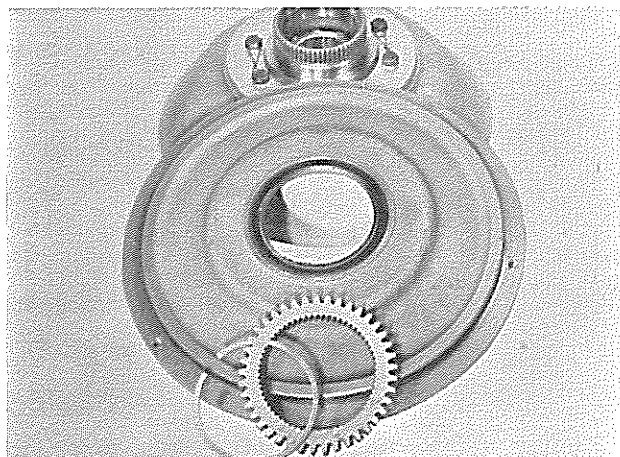


Figure 14

Remove impeller hub gear and oil baffle from impeller.

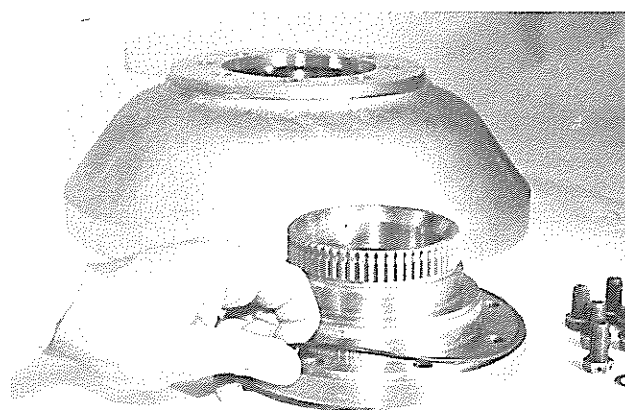


Figure 17

Remove impeller hub from impeller. Remove hub "O" ring.

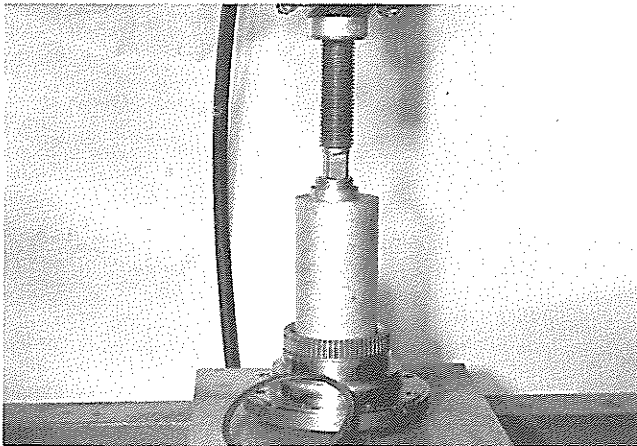


Figure 18

Remove hub bearing retainer ring and press bearing from hub.

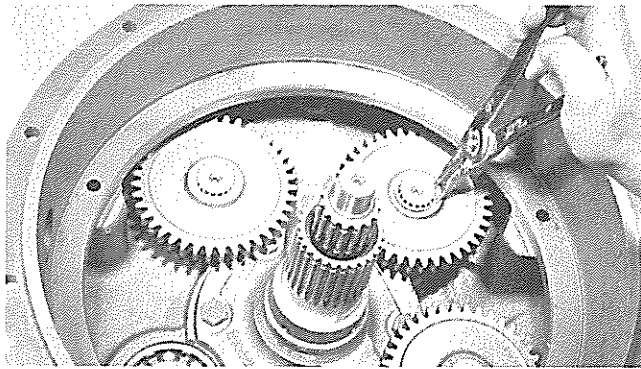


Figure 19

PUMP DRIVES VARY IN QUANTITY FROM ONE TO THREE — ALL DRIVES DISASSEMBLE THE SAME.

Remove oil pump drive gear retaining rings. Remove drive gears from pump shafts.

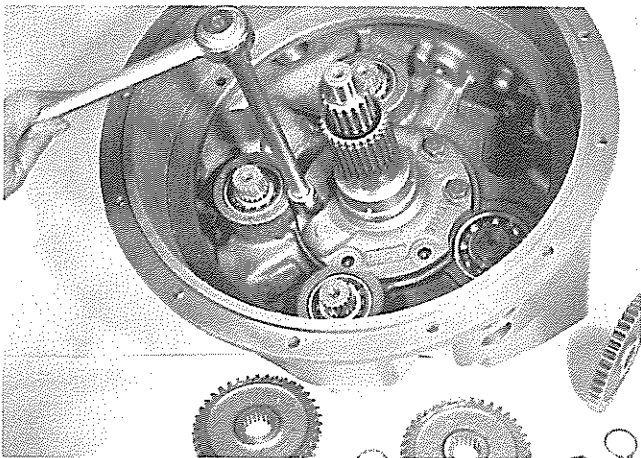


Figure 20

Remove stator support bolts.

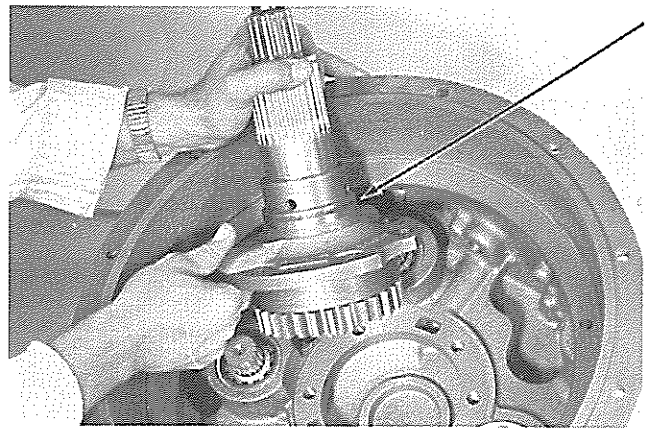


Figure 21

On offset output, remove stator support and turbine shaft assembly from converter housing.

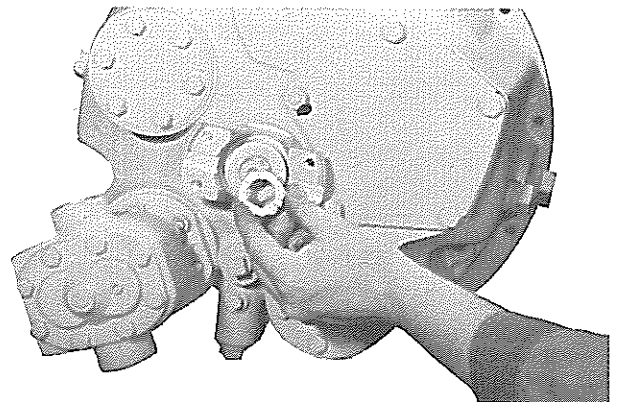


Figure 22

On inline output, remove companion flange cotter, nut, washer, "O" ring, and companion flange from inline turbine shaft.

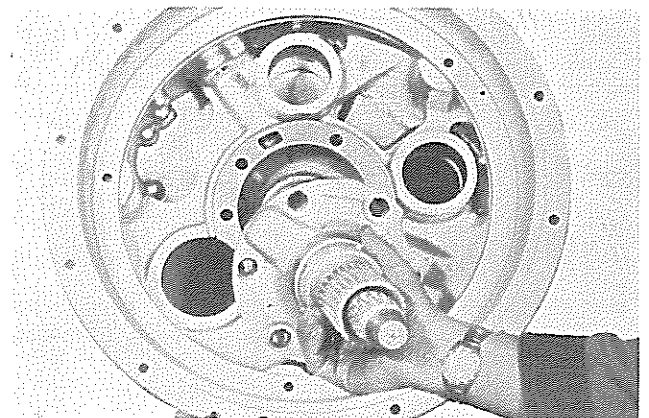


Figure 23

Remove inline turbine shaft by using a brass hammer and tapping on threaded end of shaft. Stator support and turbine shaft will come out as a unit.

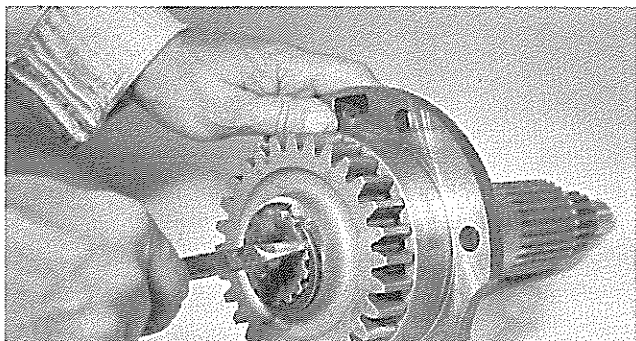


Figure 24

On offset output remove turbine shaft gear retainer ring and turbine shaft gear.

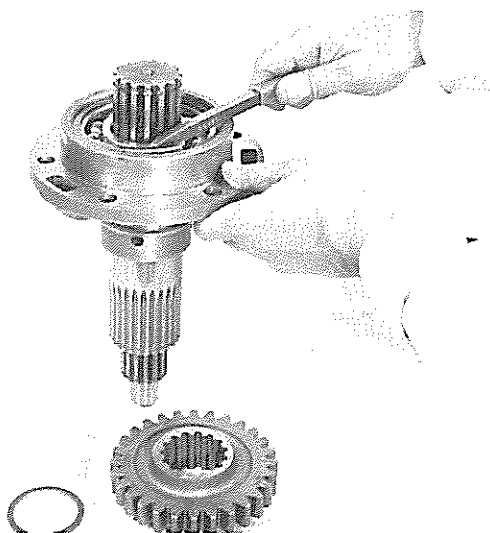


Figure 25

Remove turbine shaft bearing retainer ring from stator support. **NOTE:** Use same procedure on inline output or offset output.

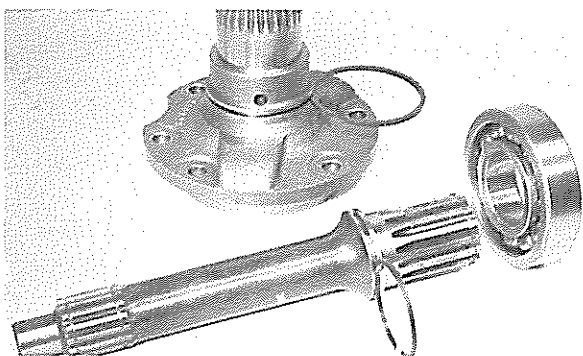


Figure 26

Press turbine shaft from stator support. Press turbine bearing from turbine shaft. Remove oil sealing rings from stator support and turbine shaft. **NOTE:** Use same procedure on inline output or offset output.

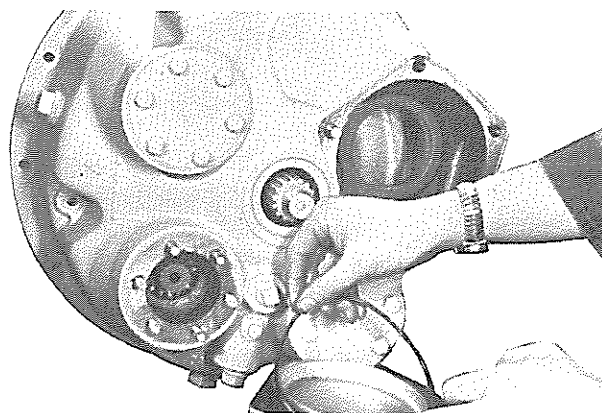


Figure 27

On the inline output converter, the offset output shaft cover need not be removed unless "O" ring is to be changed.

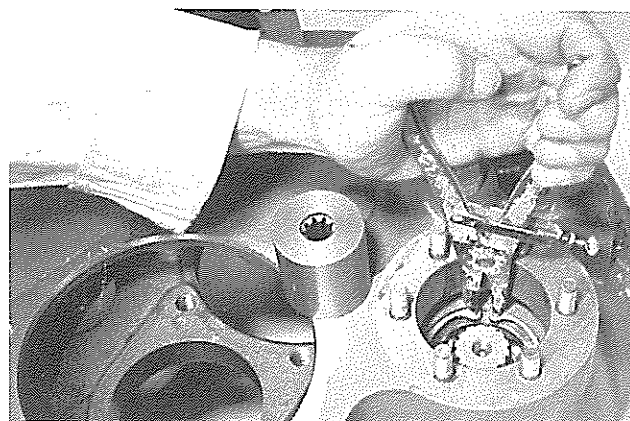


Figure 28

Remove pump adaptor sleeve from pump shaft. Remove pump shaft washer retainer ring and pump shaft washer.

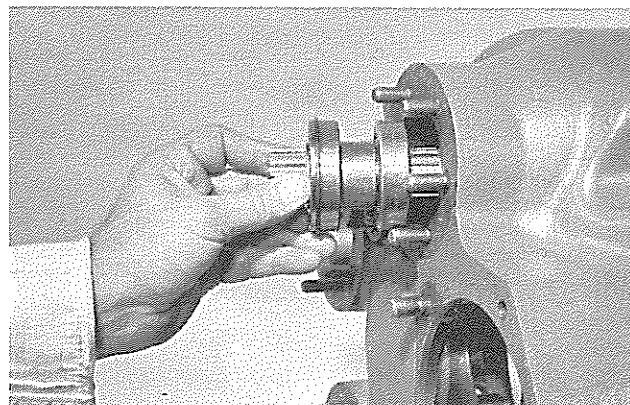


Figure 29

Tap on pump shaft from inside converter housing, pump shaft and bearings will come out as an assembly.

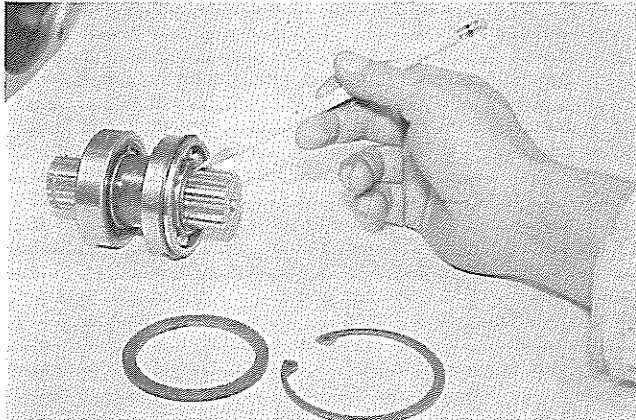


Figure 30

Remove pump shaft bearing locating ring. Press bearings from pump shaft.

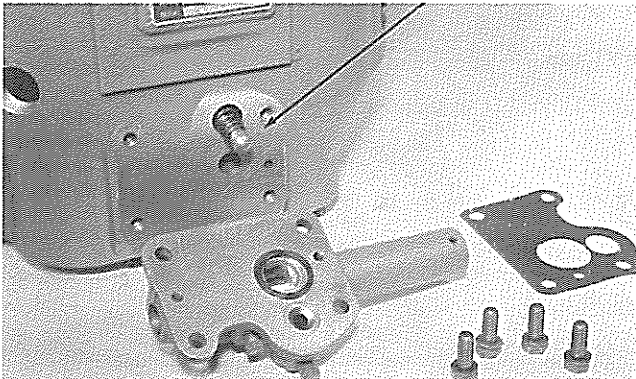


Figure 31

Remove pressure regulator valve assembly. Use caution as not to lose safety valve plunger or spring (See arrow).

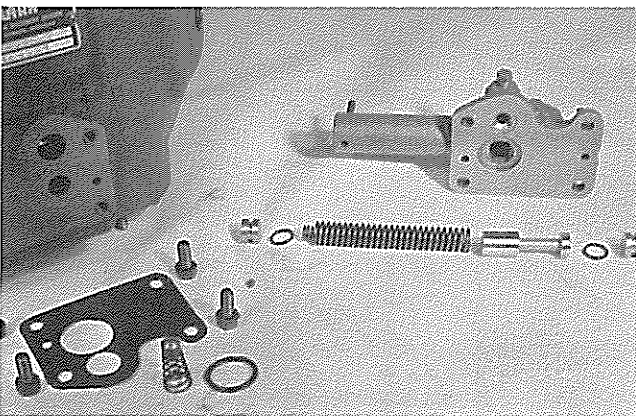


Figure 32

Depress piston stop and remove piston stop roll pin. Remove piston stop and inner and outer spring. Remove roll pin at opposite end. Remove valve stop 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 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 immediately 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 recommended type 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 cleaned 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.

REASSEMBLY OF TORQUE CONVERTER

Instructions given below on reassembly of components are given in the sequence that must be followed in rebuilding.

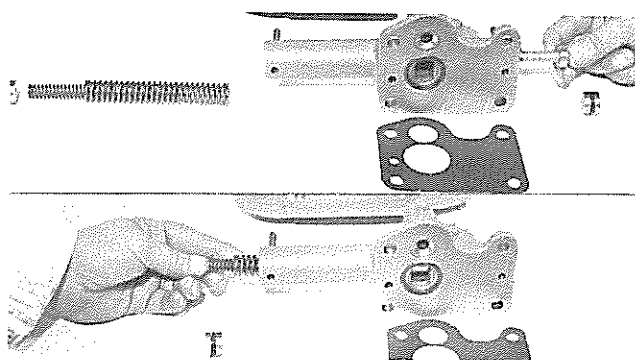


Figure 33

Install valve piston (top view Figure 33). Install valve stop and new "O" ring in valve housing and secure with roll pin. Install inner and outer valve spring in valve housing. Install valve spring stop and new "O" ring in valve housing. Depress spring stop and install spring stop roll pin.

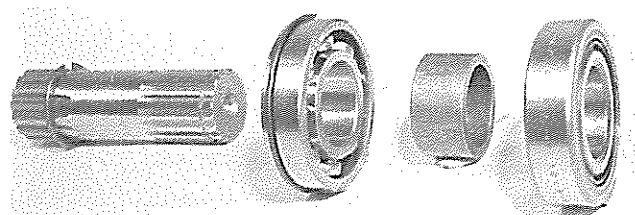


Figure 34

Install pump shaft rear bearing locating ring. Press rear bearing on pump shaft with bearing snap ring toward rear of shaft. Install bearing spacer and press front bearing on shaft until it shoulders against bearing spacer.

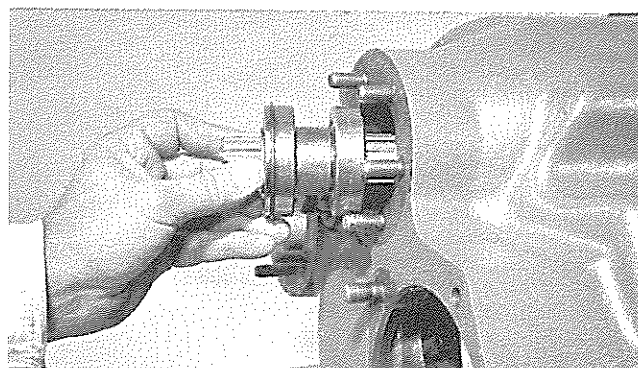


Figure 35

Install pump shaft and bearing assembly in converter housing.



Figure 36

Tap pump shaft and bearing assembly in converter housing until rear bearing snap ring shoulders against bearing bore.

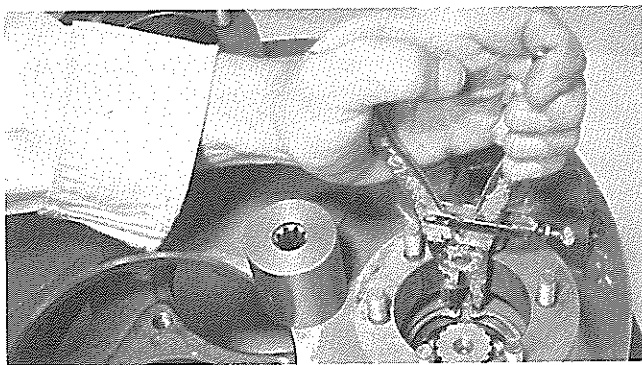


Figure 37

Install pump shaft washer and washer retainer ring. Pump adaptor sleeve can be installed just before pump.

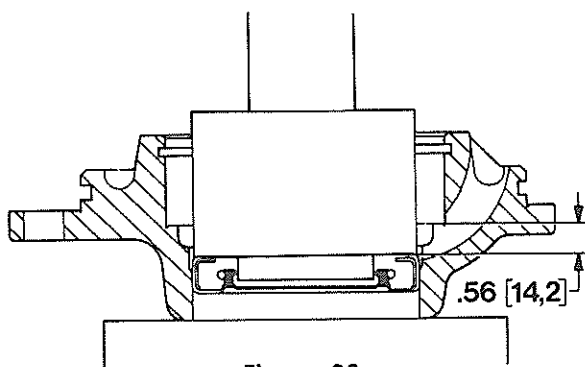


Figure 38

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. Press inline output shaft oil seal in converter housing. Lip of seal in. **NOTE:** Oil seal must be pressed 5/16" [7,93 mm] below rear face of converter housing.

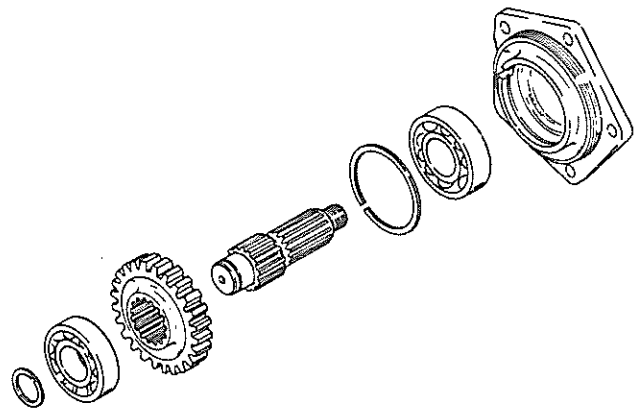


Figure 39

Press output rear bearing in bearing retainer. Secure with retainer ring. 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. Install bearing retainer ring.

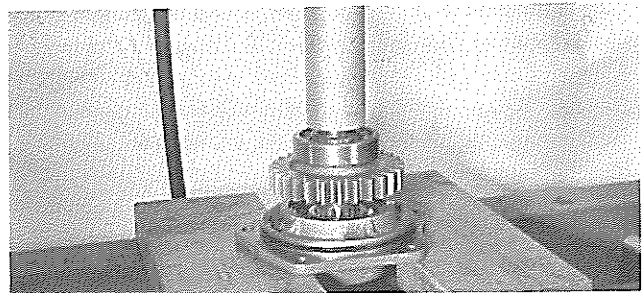


Figure 40

Press offset output shaft, gear and bearing assembly through rear bearing and bearing retainer. Secure output shaft gear in vise equipped with soft jaws. Install companion flange, new flange "O" ring, flange washer and flange nut, tighten nut 200 to 250 foot pounds torque [27,7-34,5 m.kg]. Install nut cotter.

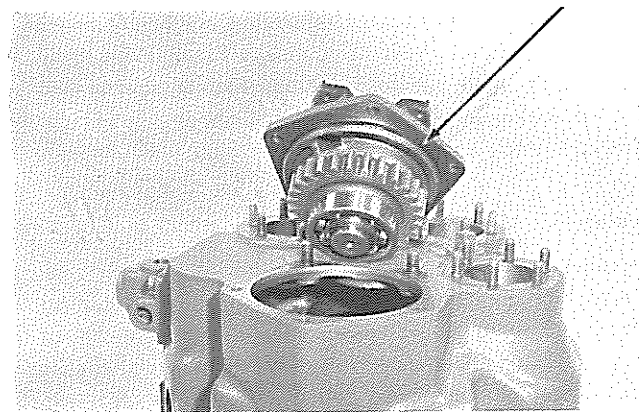


Figure 41

Install new "O" ring (See arrow) on offset output shaft bearing retainer. Install output shaft assembly to converter housing and secure with nuts, bolts and lock-washer. Tighten to specified torque.

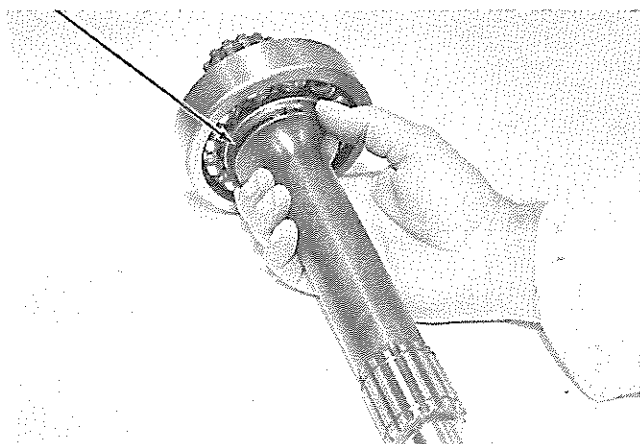


Figure 42

Press rear bearing on turbine shaft, this is also the output shaft for the inline output converter, install shaft oil sealing ring (See arrow).

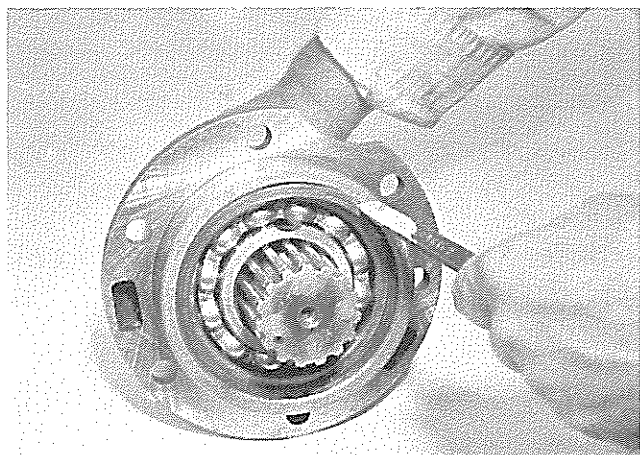


Figure 43

Press shaft and bearing assembly in stator support. Use caution as not to damage oil sealing ring. Secure bearing with retainer ring. Use same procedure on inline output or offset output.

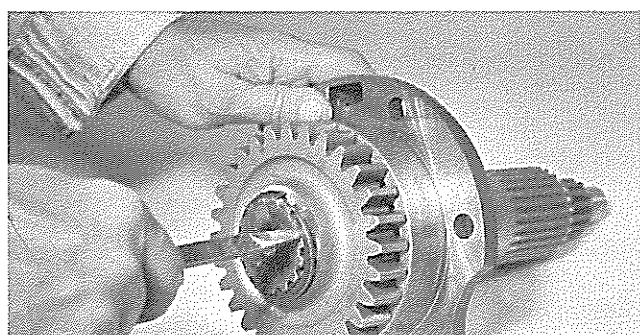


Figure 44

Install output shaft gear on offset output shaft and secure with retainer ring.

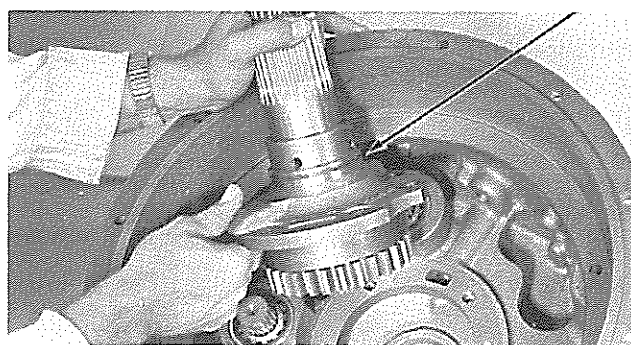


Figure 45

Install new sealing ring expander spring and oil sealing ring on support. **NOTE:** Expander spring gap to be 180° from sealing ring hook joint.

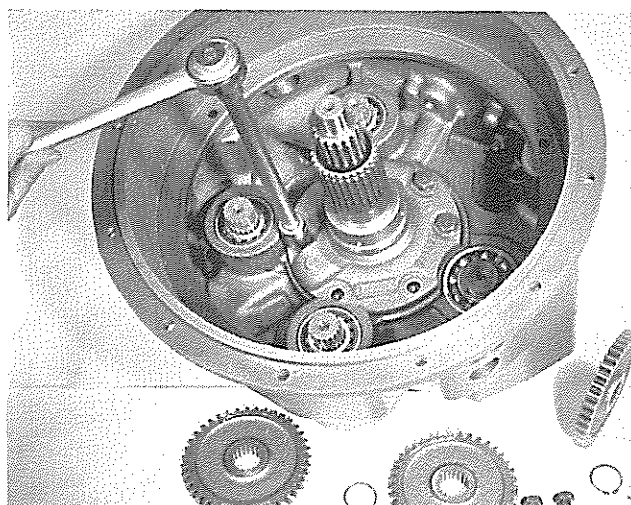


Figure 46

Install companion flange spacer on threaded end of inline output shaft. **NOTE:** Spacer must be put on shaft before shaft installation in converter housing, as spacer will not pass through oil seal. Align holes in stator support with holes in converter housing. Install bolts and tighten to specified torque.

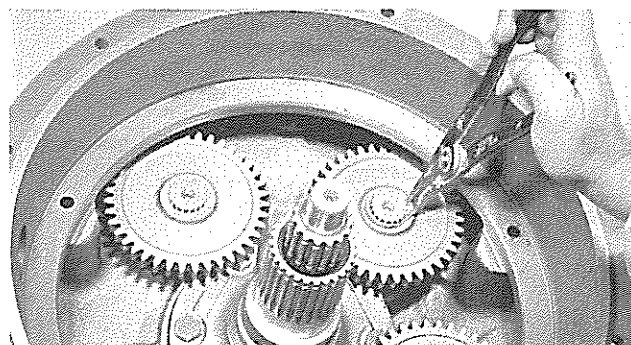


Figure 47

Install oil pump drive gears and secure with retainer rings.

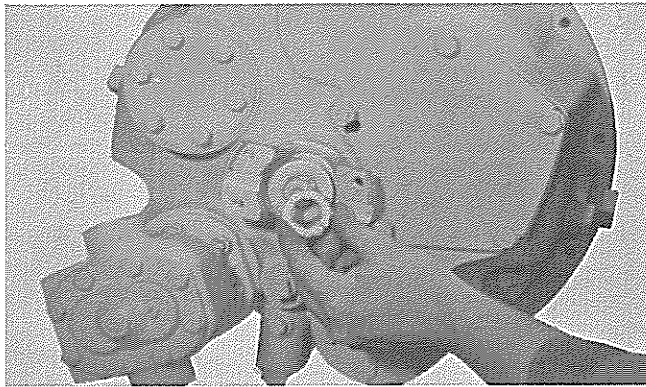


Figure 48

On inline output shaft install companion flange, new flange "O" ring, flange washer and flange nut. Tighten nut 200 to 250 foot pounds torque [27,7-34,5 m.kg]. Secure with cotter pin.

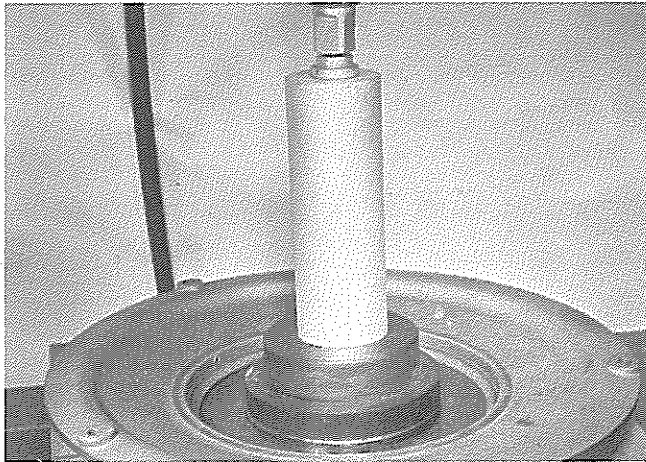


Figure 49

Press new oil seal in oil baffle with lip of seal down. (See Page 15).

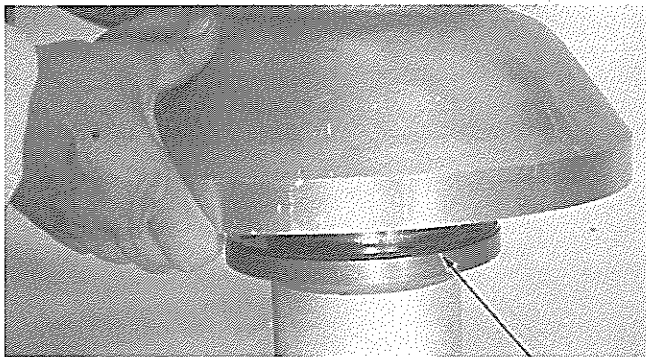


Figure 50

Press impeller bearing in impeller hub and secure with retainer ring. Install new "O" ring (see arrow) on impeller hub. Align holes in impeller hub with holes in impeller.

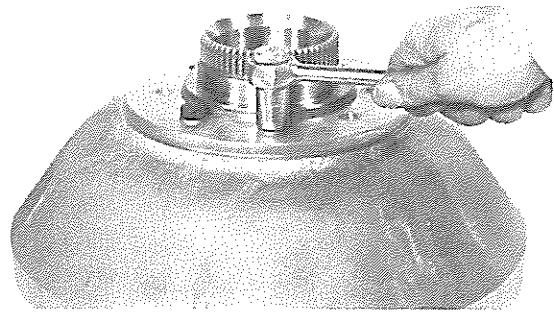


Figure 51

NOTE: See page 16 for 13 inch special impeller hub bearing and 12 bolt assembly instruction.

Install bolts and tighten to specified torque. Lock-wire in pairs to prevent loosening.

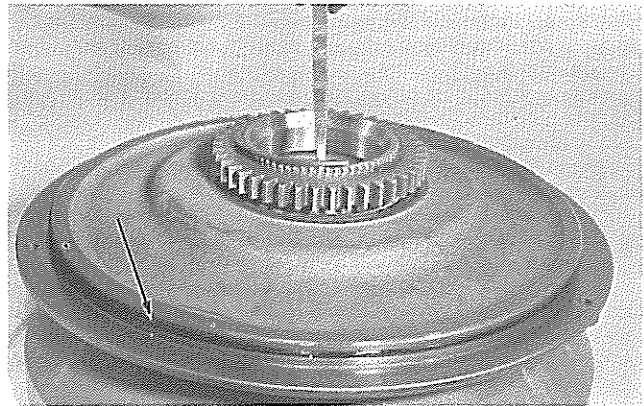


Figure 52

Install oil baffle on impeller assembly. Install impeller hub gear on impeller hub and secure with retainer ring. Install new "O" ring on oil baffle (See arrow).

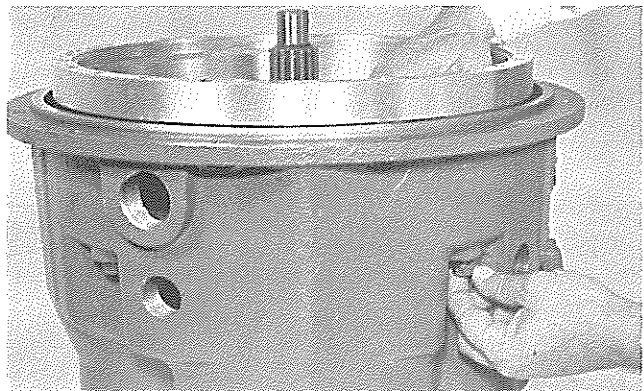


Figure 53

Install impeller and oil baffle assembly over stator support and into converter housing. Align holes in oil baffle with holes in converter housing. Install bolts and lockwashers into oil baffle. Tighten baffle bolts evenly to prevent damaging oil baffle "O" ring. Tighten to specified torque.

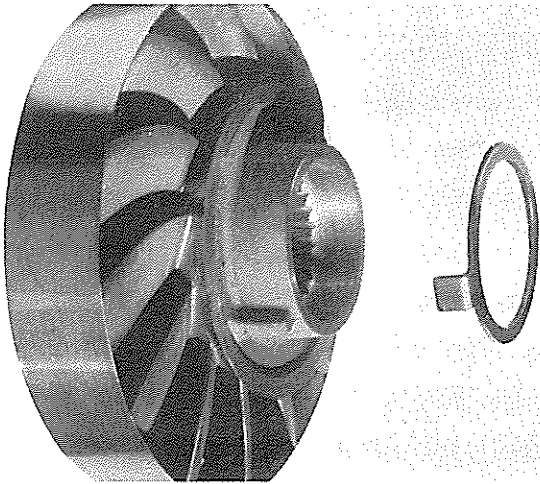


Figure 54

Install reaction member spacer on stator support with tang as shown.

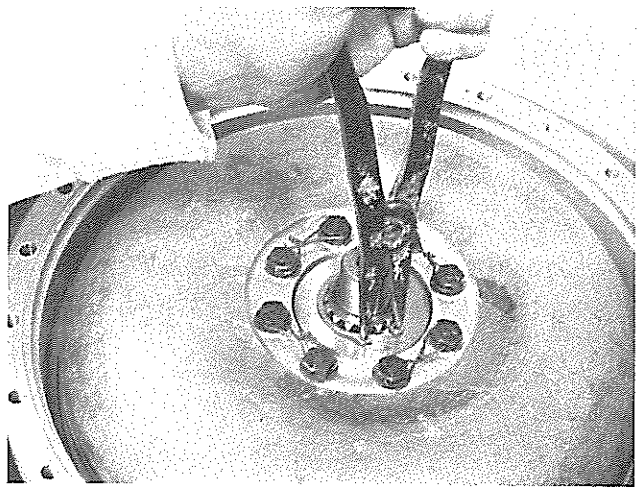


Figure 57

Install turbine and hub assembly on turbine shaft and secure with outer retaining ring.

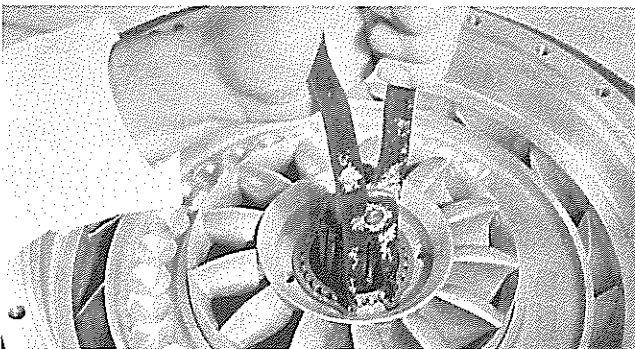


Figure 55

Install reaction member on stator support and secure with retaining ring.

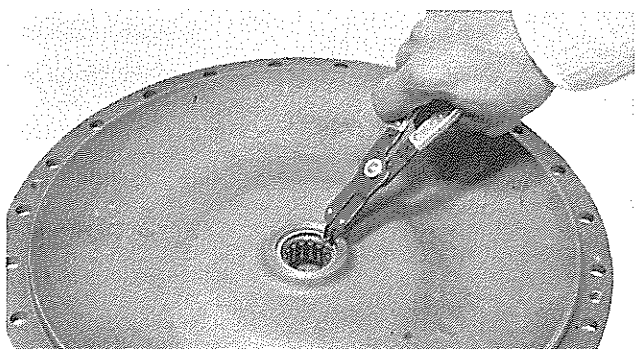


Figure 58

Press pilot bearing in impeller cover and secure with retainer ring.

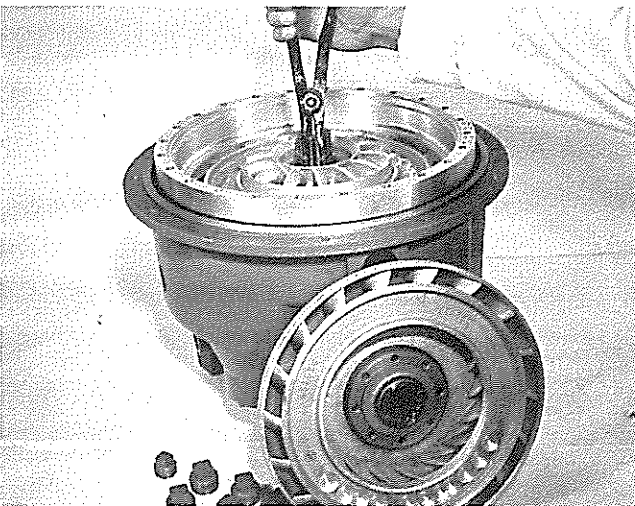


Figure 56

Install inner turbine locating ring on turbine shaft.

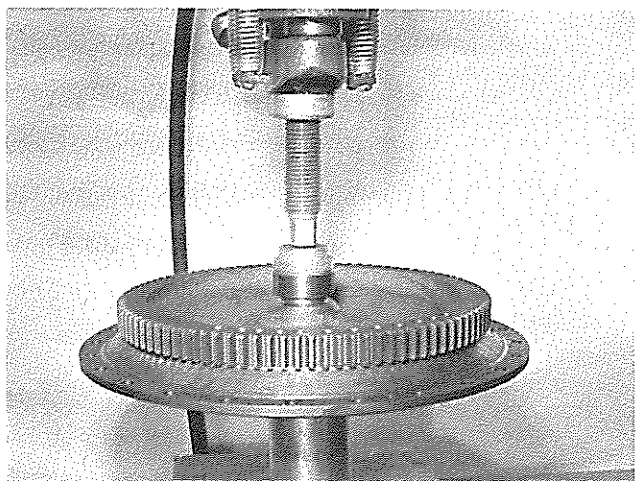


Figure 59

Heat impeller cover sleeve to 200° and press on impeller shaft.

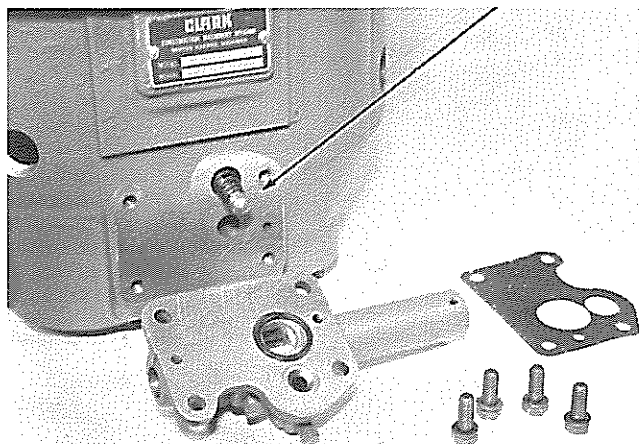


Figure 60

Install spring and plunger in converter housing (See arrow). Install new gasket on valve assembly. Install new "O" ring on valve assembly. Secure valve assembly to converter housing with bolts and lockwashers. Tighten to specified torque.

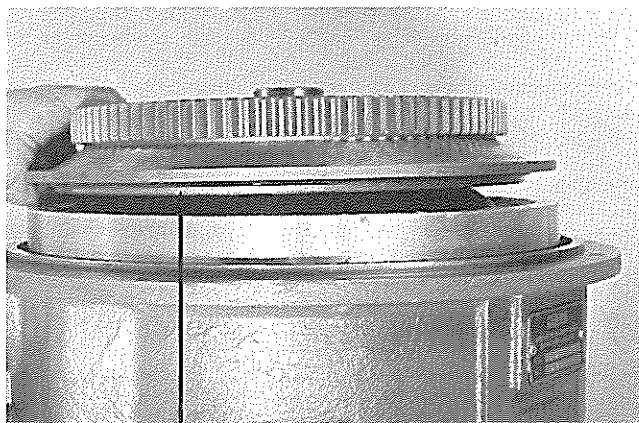


Figure 61

Install new "O" ring (See arrow) on impeller cover. Align holes in impeller cover with holes in impeller.

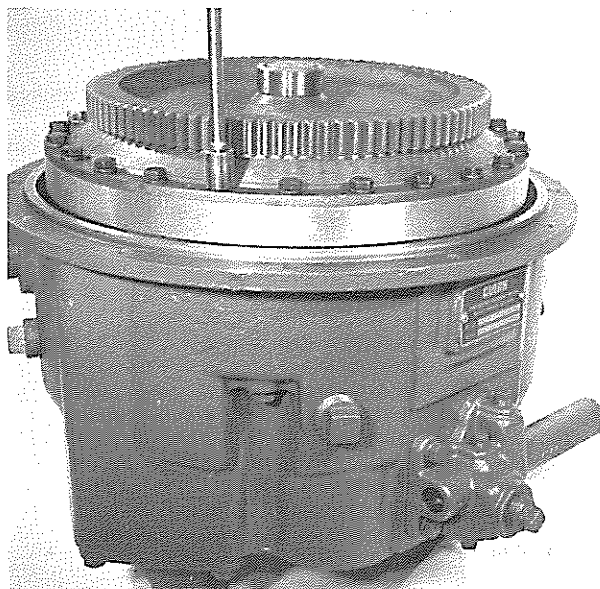
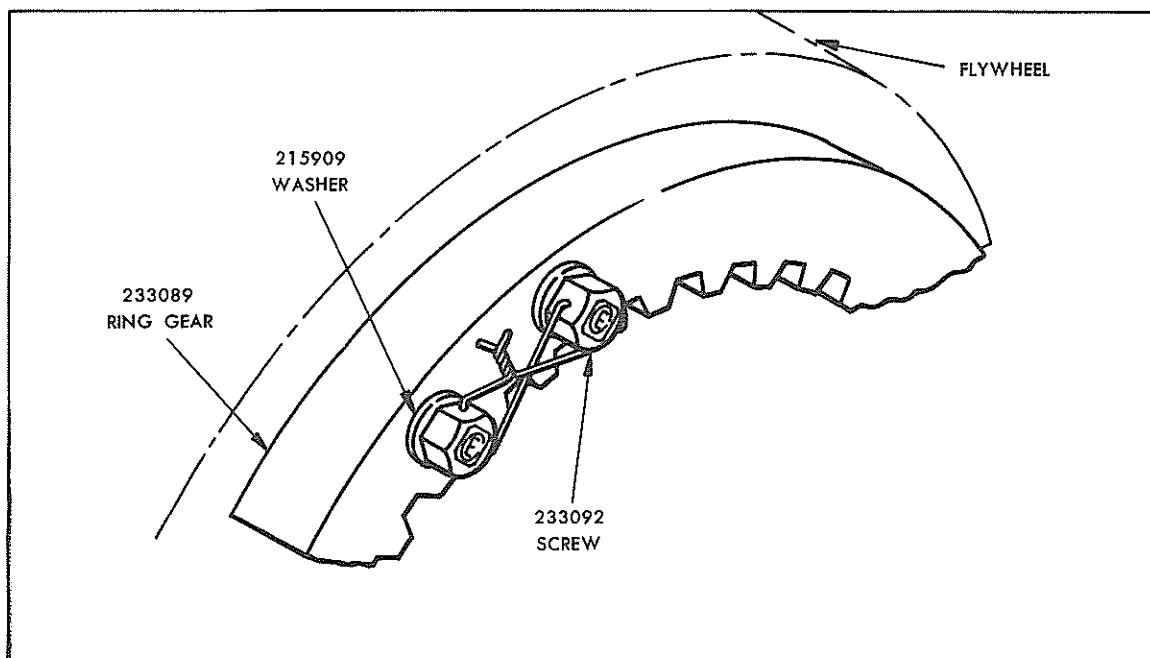


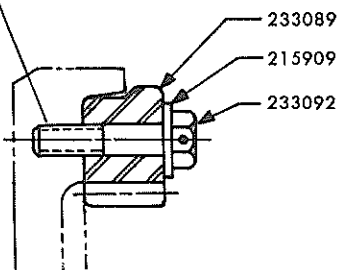
Figure 62

Install impeller cover to impeller bolts and lockwashers, tighten to specified torque.

FLYWHEEL RING GEAR INSTALLATION



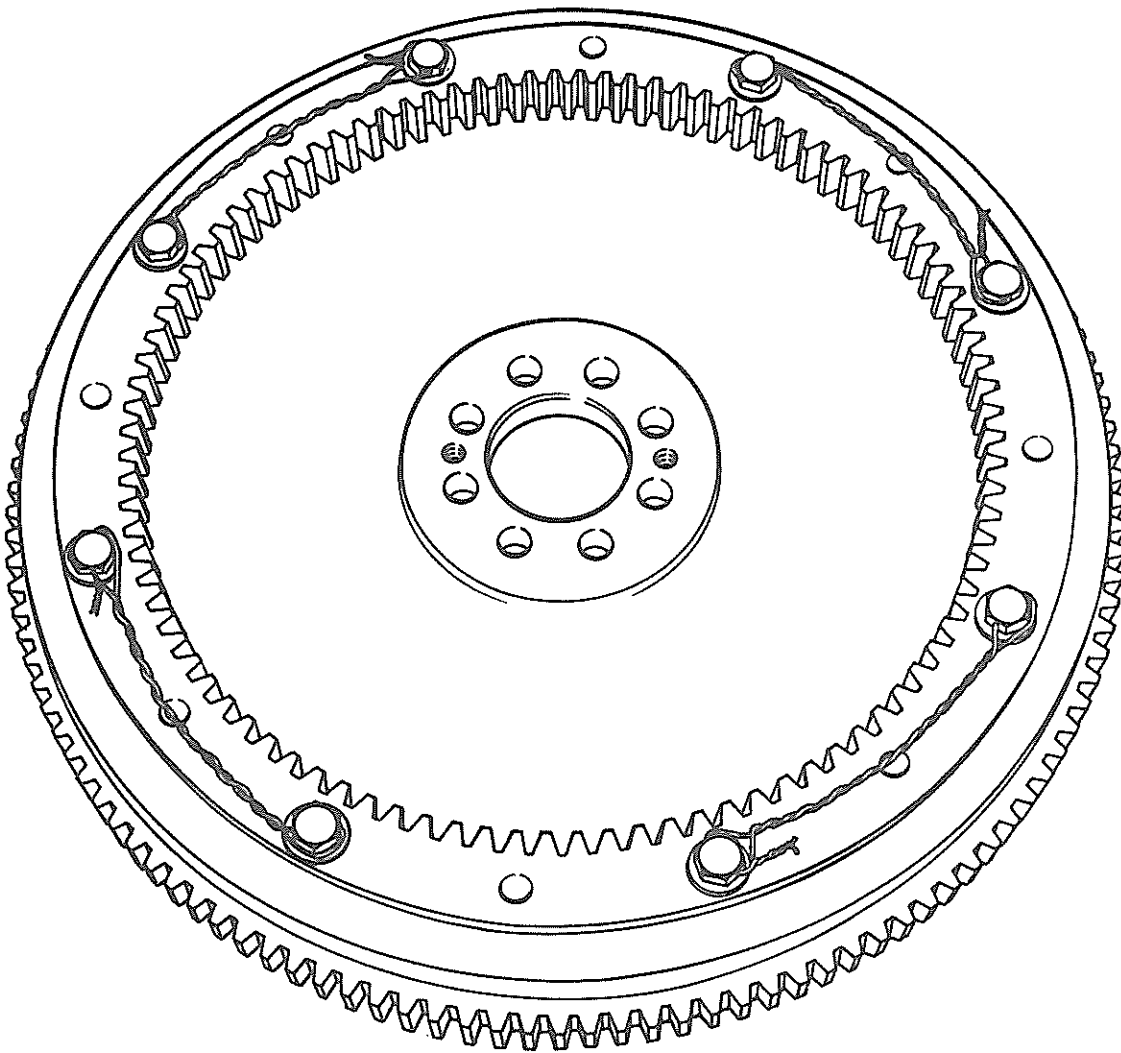
ST'D. S.A.E. $\frac{3}{8}$ -16 UNC-2B THD'S.
687 MIN. FULL THREAD DEPTH 16
HOLES EQUALLY SPACED IN FLYWHEEL



16 HOLE RING GEAR INSTALLATION AND ASSEMBLY PROCEDURE

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. 3 (S.A.E. J927) TOLERANCE SPECIFICATIONS FOR PILOT BORES, ECCENTRICITIES, AND MOUNTING FACE DEVIATIONS.
2. INSTALL RING GEAR No. 233089 AS SHOWN.
3. INSTALL SPECIAL WASHERS No. 215909 AND SPECIAL SCREWS No. 233092. TIGHTEN SCREWS TO 30 TO 33 LBS. [4,2-4,6 m.kg] FT. TORQUE. LOCK WIRE IN PLACE AS SHOWN.

SEE REVERSE SIDE FOR 16 BOLT RING GEAR INSTALLATION
TO AN 8 BOLT HOLE ENGINE FLYWHEEL.

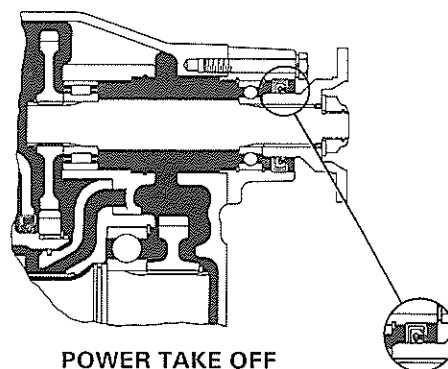


16 HOLE RING GEAR INSTALLATION TO 8 HOLE ENGINE FLYWHEEL

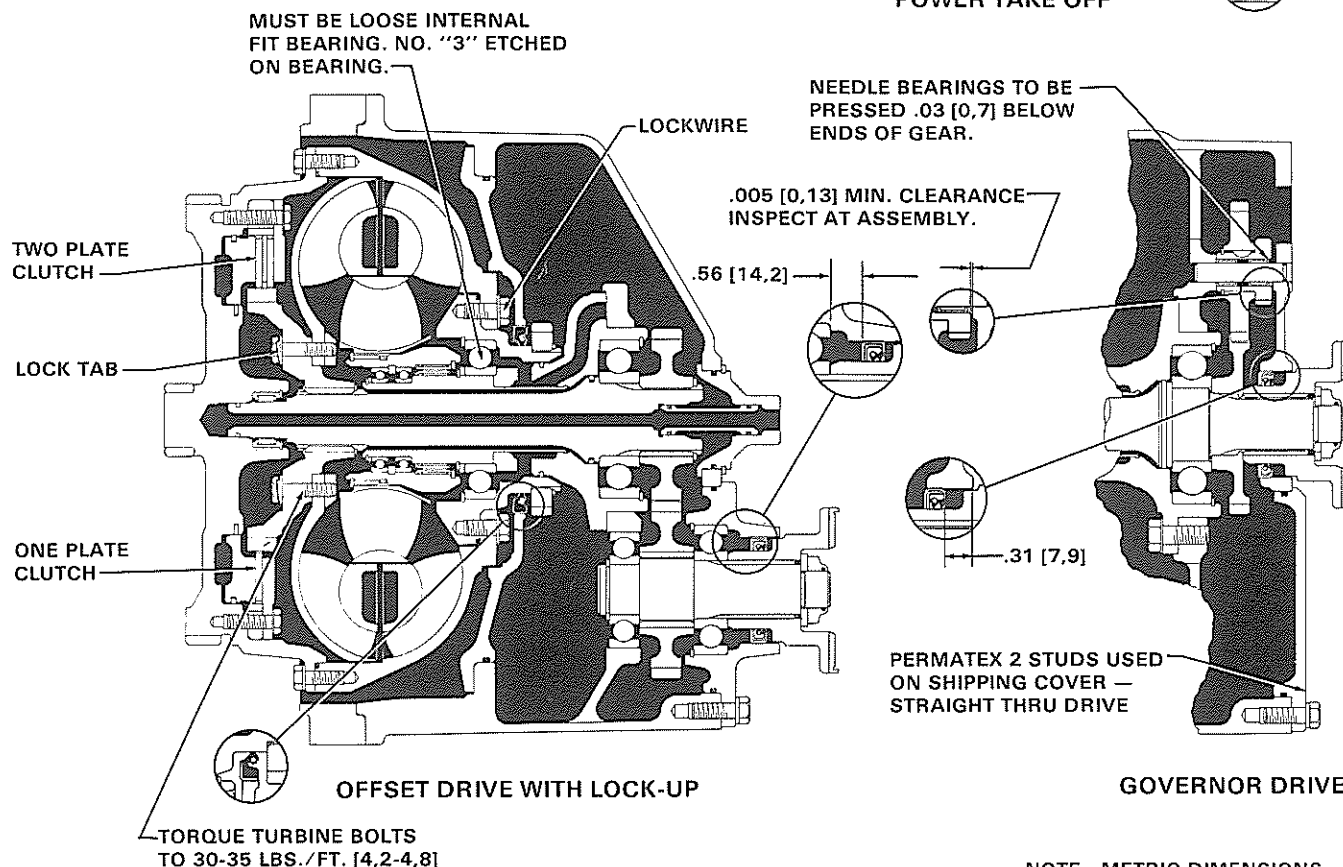
WHEN A 16 HOLE RING GEAR IS USED WITH AN 8 HOLE FLYWHEEL THE FOLLOWING PROCEDURE MUST BE FOLLOWED:

1. ALIGN HOLES IN RING GEAR WITH HOLES IN FLYWHEEL.
2. INSTALL SPECIAL SCREWS AND SPECIAL WASHERS.
3. TORQUE SCREWS IN CROSS SEQUENCE 30 TO 33 FT. LBS. [4,2-4,6 m.kg].
4. LOCK WIRE IN PAIRS AS SHOWN. NOTE: CURVE WIRE AWAY FROM RING GEAR TEETH.

1. TORQUE OUTPUT SHAFT NUT TO 200-250 lb-ft [27.7-34.7 kg-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. [93° C] BEFORE ASSEMBLY OF BUSHING TO COVER.
9. GOVERNOR DRIVE NEEDLE BEARINGS TO BE PRESSED 0.031 [0.79] BELOW ENDS OF GEAR.
10. LUBE HOLES TO BE CHECKED PRIOR TO ASSEMBLY. HOLES MUST BE FREE OF DIRT & BURRS.





POWER TAKE OFF



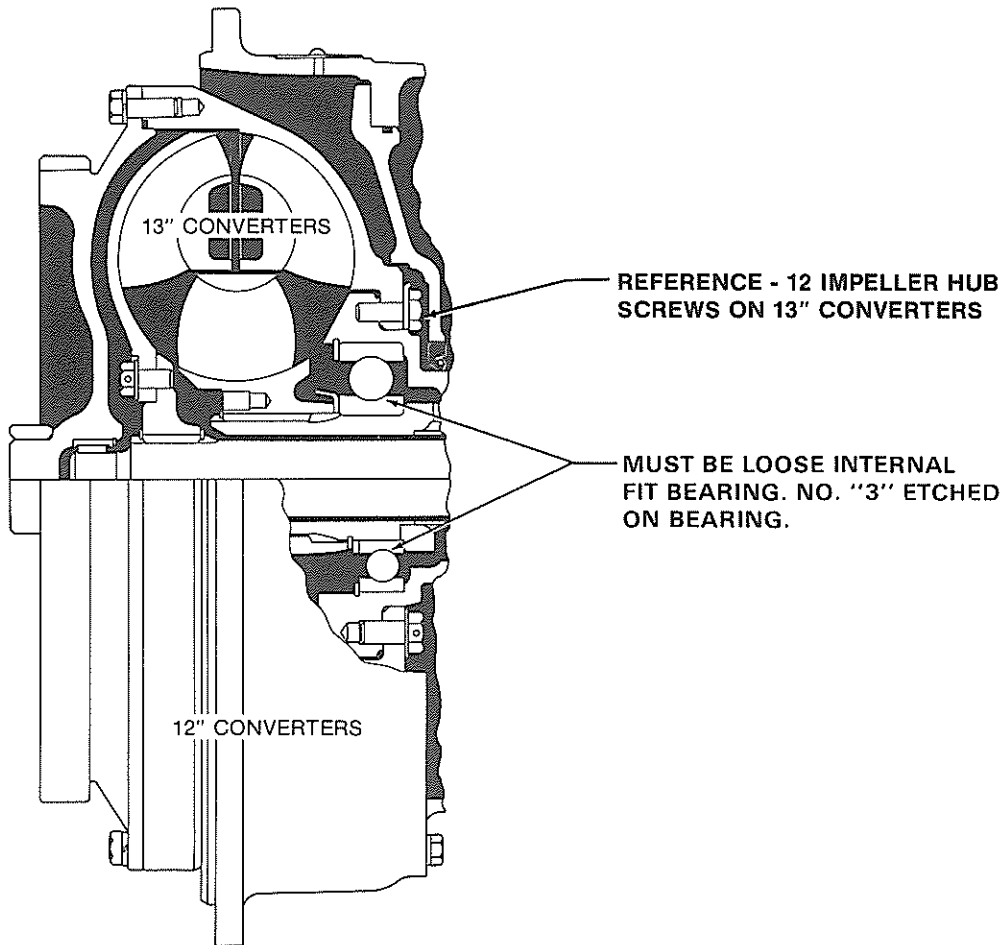
NOTE: METRIC DIMENSIONS
SHOWN IN BRACKETS []

TORQUE SPECIFICATIONS FOR SCREW THREADS

TORQUE lb-ft [kg-m]

NOMINAL SIZE	GRADE 5 		GRADE 8 	
	FINE THREADS	COARSE THREADS	FINE THREADS	COARSE THREADS
1/4 .2500	9-11 [1.3-1.5]	8-10 [1.2-1.3]	11-13 [1.6-1.7]	9-11 [1.3-1.5]
5/16 .3125	16-20 [2.3-2.7]	12-16 [1.7-2.2]	28-32 [3.9-4.4]	26-30 [3.6-4.1]
3/8 .3750	26-29 [3.6-4.0]	23-25 [3.2-3.4]	37-41 [5.2-5.6]	33-36 [4.6-4.9]
7/16 .4375	41-45 [5.7-6.2]	37-41 [5.2-5.6]	58-64 [8.1-8.8]	52-57 [7.2-7.8]
1/2 .5000	64-70 [8.9-9.6]	57-63 [7.9-8.7]	90-99 [12.5-13.6]	80-88 [11.1-12.1]
9/16 .5625	91-100 [12.6-13.8]	82-90 [11.4-12.4]	128-141 [17.7-19.4]	115-127 [15.9-17.5]

ASSEMBLY INSTRUCTIONS FOR C-270 CONVERTER WITH LOCK-UP AND OTHER OPTIONS



13" CONVERTERS WITH 312S L.I.F. BEARING. IMPELLER HUB SCREW ASSEMBLY.

1. CLEAN IMPELLER HUB MOUNTING SURFACE AND TAPPED HOLES WITH SOLVENT. DRY THOROUGHLY BEING CERTAIN TAPPED HOLES ARE DRY AND CLEAN.
2. INSTALL BACKING RING AND TWELVE IMPELLER HUB SPECIAL SCREWS TO APPROXIMATELY .06 INCH [1,5] OF SEATED POSITION. WITH A CALIBRATED TORQUE-WRENCH, TIGHTEN SCREWS TO 35-40 LBS. FT. (4,8-5,4 Kg.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 AN EPOXY 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 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.

**ASSEMBLY INSTRUCTIONS FOR C-270 CONVERTER
WITH SPECIAL APPLICATION IMPELLER HUB BEARING.**



