

Transamerica Delaval

IMO PUMP[®]

INSTRUCTIONS AND PARTS LIST

SERIES 323F

WARNING

READ CA-1 AND THIS INSTRUCTION BOOK BEFORE
INSTALLATION, OPERATION, OR MAINTENANCE

This manual now is
identified as part no.
SRM00015

INSTRUCTIONS 323F-6 (R-3)

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APRIL 1982

FOREWORD

This instruction with the CA-1 manual covers Transamerica Delaval Series 323F IMO pumps. The Series 323F pump has been designed to meet the requirements of fuel and lubricating oil applications. Because of the large number of operating conditions, it is necessary to have a variety of constructions and material combinations to meet job requirements. Before using this instruction manual, check the pump nameplate for the pump type, then refer to Table 1 for applicable pump assembly and mechanical seal Figure Numbers. As you use this manual, refer to the Figures applicable to your pump type. Figure 1 defines model designators.

STRUCTURAL LIMITS

Operating conditions such as speed, fluid viscosity, inlet pressure, discharge pressure, temperature, filtration, duty cycle, mounting, drive type, etc. are interrelated. Due to variable conditions, specific application limitations may vary from structural limitations. *This equipment must not be operated without verification that operating requirements are within published capabilities as shown in the appropriate pump data manuals* (available from local Transamerica Delaval, Inc. offices and representatives listed in manual CA-1).

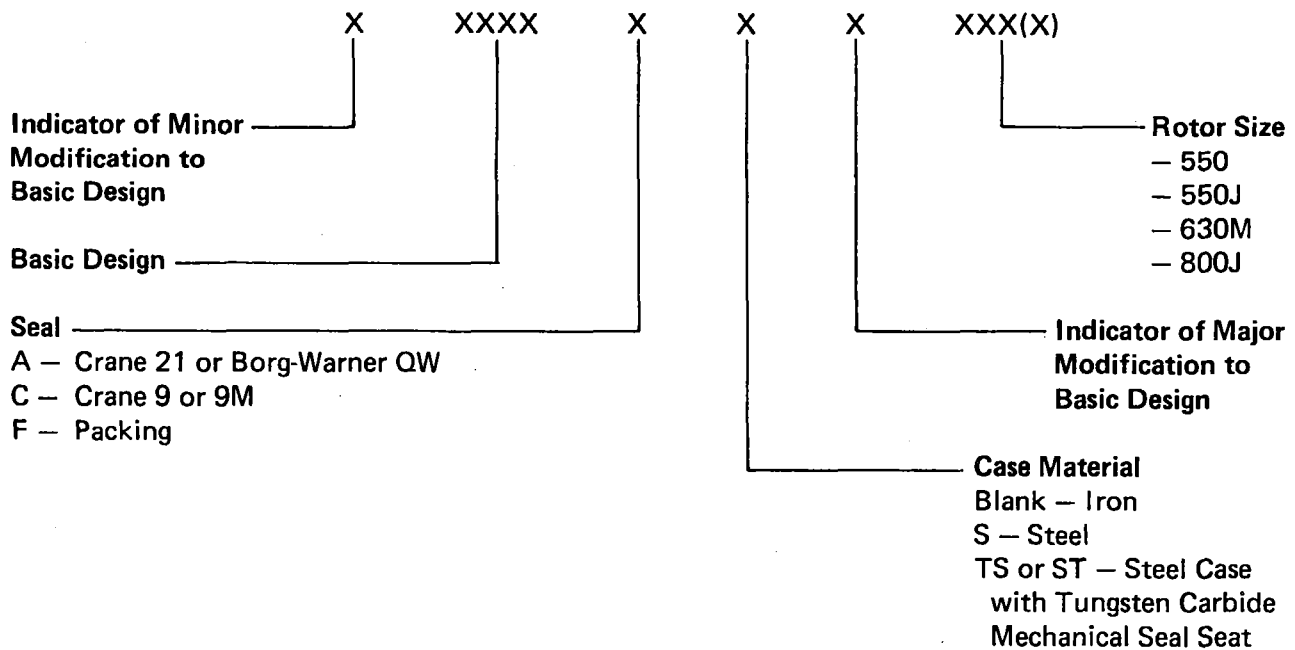


FIGURE 1. Definition of Model Designators

TABLE 1. LIST OF PUMP TYPES

Pump Type	Pump Assy. Drawing No.	Pump Assy. Fig. No.	Mechanical Seal Type	Mechanical Seal Fig. No.
323FAS-550	SD-5396	10	Crane 21	5
323FAS-550J	SD-5395	9	Crane 21	5
323FF-550	SD-5396	10	Std. Packing	
323FF-550J	SD-5396	10	Std. Packing	
323FFS-550	SD-5396	10	Std. Packing	
323FFS-550J	SD-5395	9	Std. Packing	
A323FFSC-550	SD-5396	10	Std. Packing	
323FFSX-550J	SD-5395	9	Hi-Temp Packing	
A323FA-550	SD-5396	10	Borg-Warner QW	7
323FC-550J	SD-5396	10	Crane 9M	6
323FC-550	SD-5396	10	Crane 9M	6
323FCS-550J	SD-5395	9	Crane 9M	6
C323FCS-550	SD-5396	10	Crane 9M	6
C323FCS-550J	SD-5395	9	Crane 9M	6
323FCT-550J	SD-5396	10	Crane 9	6
323FCTS-550J	SD-5395	9	Crane 9	6
323FA-630M	SD-5396	10	Crane 21	5
A323FF-630M	SD-5396	10	Hi-Temp Packing	
L323FFS-630M	SD-5395	9	Std. Packing	
B323FFS-630M	SD-5395	9	Std. Packing	
C323FCS-630M	SD-5395	9	Crane 9M	6
C323FCSX-630M	SD-5395	9	Sealol 676	8
323FFS-800J	SD-5400	11	Std. Packing	
323FCSX-800J	SD-5400	11	Crane 9	6
C323FFS-800J	SD-5400	11	Std. Packing	

ORDERING INSTRUCTIONS

All correspondence pertaining to renewal parts for Series 323F pumps must refer to this instruction book number and should be addressed to the nearest Transamerica Delaval representative listed in Manual CA-1.

The following directions should be followed for renewal part orders:

- (1) Give the number of this instruction book.
- (2) Give the pump type and serial number of the pump for which part(s) is ordered.
- (3) Give the figure number(s) on which pump type and sealing design part(s) are shown.
- (4) Give part(s) name, item number(s) and table number in this manual when identifying part(s) ordered.

DESCRIPTION

The 323F Series pumps are constant-displacement, rotary screw-type pumps. Fluid enters the inlet chamber and is divided equally as it enters the rotor sets. The smooth intermeshing of these rotors traps and propels the fluid axially in a smooth flow, without churning, pocketing or pulsating as it arrives at the central discharge chamber. The two-direction fluid flow keeps the rotors hydraulically balanced. Fluid flowing through the pump provides lubrication to wearing parts.

External tubing is provided to bleed oil from both ends of the pump (high pressure fluid) to the pump suction. Shaft bushings are lubricated by a fluid flow between power rotor and bushing that is released back to the suction through the external tubing. A relief valve is installed in the tubing connected to the packing or mechanical seal end of the pump. The relief valve maintains a minimum positive pressure to packing for lubrication and relieves excessive pressure when a mechanical seal is installed. In all cases, fluid flow through the tubing ensures lubrication and cooling of bushings and packing or mechanical seal.

The normal rotation of the pump rotor is clockwise when the pump is viewed from the shaft end.

NOTE

The term *outboard* describes the closed end of the pump; the term *inboard* describes the exposed shaft end.

MAINTENANCE

Maintenance procedures in this manual are divided into Servicing Mechanical Seal, Servicing Packing and Pump Overhaul. Read and establish a complete understanding of the applicable procedure prior to performing maintenance. Refer to Table 1 to select correct pump assembly Figure number and applicable mechanical seal Figure (if installed) prior to beginning maintenance.

WARNING

Before beginning any maintenance procedure, (1) Remove electrical service fuse and lock deenergized the electrical service panel supply to the driver and (2) Shut, wire or chain shut and lock all pump piping valves.

Depending on type of coupling installed (clearance between pump and driver shaft ends), maintenance to mechanical seal or packing can be performed without removal of pump driver. If complete overhaul of pump is required, removing pump from its mounting and locating pump in a suitable work area are recommended.

SERVICING MECHANICAL SEAL

With pump driver deenergized and all valving locked shut, disconnect coupling. Loosen setscrew (061, Figures 9 through 11) and remove checknut (046). Remove pump coupling hub and key (044). Disconnect and remove tubing (054) from coupling end of pump. Remove bolts (009), seal housing (063) and gasket (005). Loosen mechanical seal (064) setscrews, if installed, and slide seal rotating assembly (3, Figures 5 through 8) off power rotor (034). Slide mechanical seal stationary parts (1 and 2, Figures 5 through 8) from seal housing (063).

Install mechanical seal (064) rotating assembly (3, Figures 5 through 8) on power rotor as follows; (NOTE: Refer to Table 1 for type of mechanical seal installed.)

CRANE TYPE 21. The installed working length of the Crane Type 21 mechanical seal is controlled by position setting of sleeve (067, Figure 2) on power rotor (034, Figures 9 through 11). To install or verify correct setting of sleeve (067, Figure 2), proceed as follows: (Refer to Figure 2 unless otherwise noted.)

Pull power rotor from pump until collar (042, Figures 9 through 11) contacts bushing (045). Install gasket (005) and seal housing (063) on cover (002). Lightly mark power rotor at position "A." Measure distance "B" and remove seal housing (063) and gasket (005) from cover (002). Determine distance "C" by subtracting 17/32-inch from distance "B."

$$C = B (-) 17/32\text{-inch}$$

Starting at position "A," measure distance "C" on power rotor to locate position "D." Sleeve (067) is correctly installed when face of sleeve (067) is at marked position "D" on power rotor. If sleeve (067) is not installed, install sleeve on power rotor (034).

Wipe power rotor with oil, then slide mechanical seal rotating assembly (3, Figure 5) on power rotor. Mechanical seal rotating assembly (3) is correctly installed when spring holder (3C, Figure 5) is next to sleeve (067). Do Not push on washer (3A4, Figure 5) face when installing washer bellows assembly (3A, Figure 5). Do Not allow flexible diaphragm (3A3, Figure 5) to be cut or damaged when sliding rotating assembly on power rotor.

Stationary parts (1 and 2, Figure 5) of mechanical seal are installed during installation of seal housing (063) in later step.

CRANE TYPE 9 and 9M and BORG-WARNER TYPE QW. The rotating assembly of the 9, 9M or QW mechanical seal is installed on the pump power rotor (034), with setscrews, in a non-compressed or free length condition. When the seal housing (063) is installed, with mechanical seal stationary parts, the seal is compressed to its correct working length only if the seal rotating assembly is correctly positioned when it is installed. To determine correct seal rotating assembly installed position, proceed as follows: (Refer to Figure 3 unless otherwise noted.)

Install gasket (005) and seal housing (063) on cover (002). Pull power rotor from pump until collar (042) contacts bushing (045). Lightly scribe the power rotor at position "A." Determine distance "B" and remove seal housing (063) and gasket (005). Determine distance "C" as follows:

Crane 9 and 9M

Rotor Sizes 550, 550J and 630M.

Distance "B" minus 25/32-inch equals "C."

$$C = B (-) 25/32\text{-inch}$$

Rotor size 800J.

Distance "B" minus 1-5/32-inch equals "C."

$$C = B (-) 1-5/32\text{-inch}$$

Borg-Warner QW

Rotor Sizes 550, 550J and 630M.

Distance "B" minus 15/32-inch equals "C."

$$C = B (-) 15/32\text{-inch}$$

Start at position "A" and measure distance "C" to determine position "D." Using a scribe, mark the power rotor at position "D." Mechanical seal (064) rotating assembly (3, Figures 6 or 7) is correctly installed when the rear of retainer (3E, Figure 6) or spring holder (3D, Figure 7) is installed at position "D" of Figure 3.

Wipe power rotor shaft with lubricating oil and slide rotating assembly (3, Figure 6 or 7) on power rotor until the back of retainer (3E, Figure 6) or spring holder (3D, Figure 7) is at position "D" of Figure 3.

NOTE

Retaining clips (4, Figure 6) are normally installed on new Crane Type 9 and 9M mechanical seals. The retaining clips evenly compress springs (3G, Figure 6) to remove compression on chemlon wedge (3C, Figure 6), allowing more freedom of movement when sliding rotating assembly (3, Figure 6). The retaining clips must be removed and discarded prior to final assembly, but only when identified in this procedure. The retaining clips are not to be used as a measuring point when aligning retainer with position "D" of Figure 3.

With rotating assembly (3, Figure 6 or 7) aligned at position "D," remove seal setscrews and apply bluing compound on tip of each setscrew. Install each setscrew and tighten to transfer bluing compound on power rotor. Loosen setscrews and slide rotating assembly off power rotor.

File or grind a small flat surface at each location identified by bluing compound. Remove all metal particles caused by filing or grinding from power rotor (034). Wipe lubricating oil on power rotor exposed surfaces. Wipe lubricating oil on internal surfaces of rotating assembly (3, Figure 6 or 7). Using a lint free cloth, clean face of Crane seal primary ring (3B, Figure 6) or rotating face (3A, Figure 7) of Borg-Warner seal.

Slide rotating assembly (3, Figure 6 or 7) on power rotor, being careful not to cut or damage seal as it slides on power rotor. Position back of retainer (3E, Figure 6) or spring holder (3D, Figure 7) at position D of Figure 3. Do Not push on face of primary ring (3B, Figure 6) or rotating face (3A, Figure 7) when sliding rotating assembly on power rotor.

NOTE

REMOVE and DISCARD retaining clips (4, Figure 6) if installed.

Align rotating assembly setscrews with filed flats on power rotor, then tighten evenly all setscrews.

Stationary parts (1 and 2, Figure 6 or 7) of mechanical seal are installed during installation of seal housing (063) in later step.

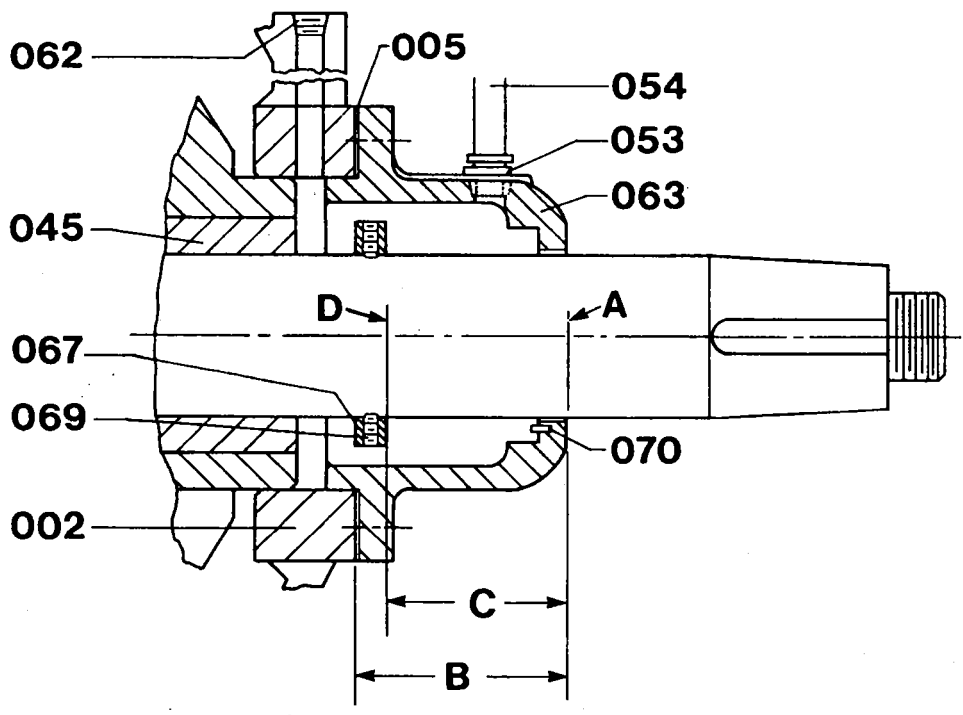


FIGURE 2. Position Setting of Seal Sleeve (Crane 21 Seal)

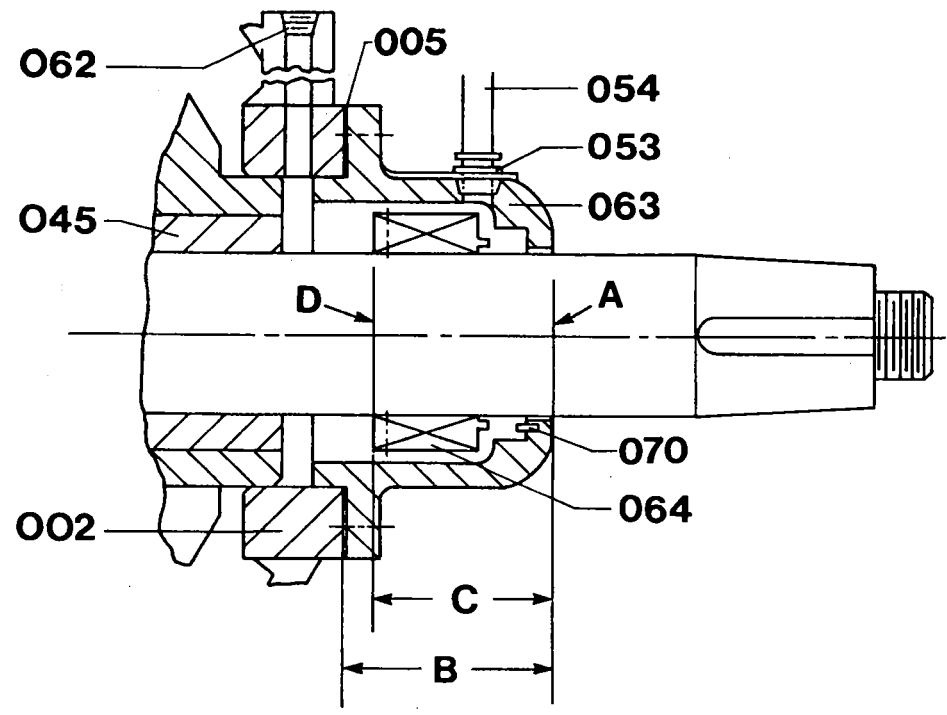


FIGURE 3. Position Setting of Seal Rotating Assembly (Crane 9, 9M and Borg-Warner QW)

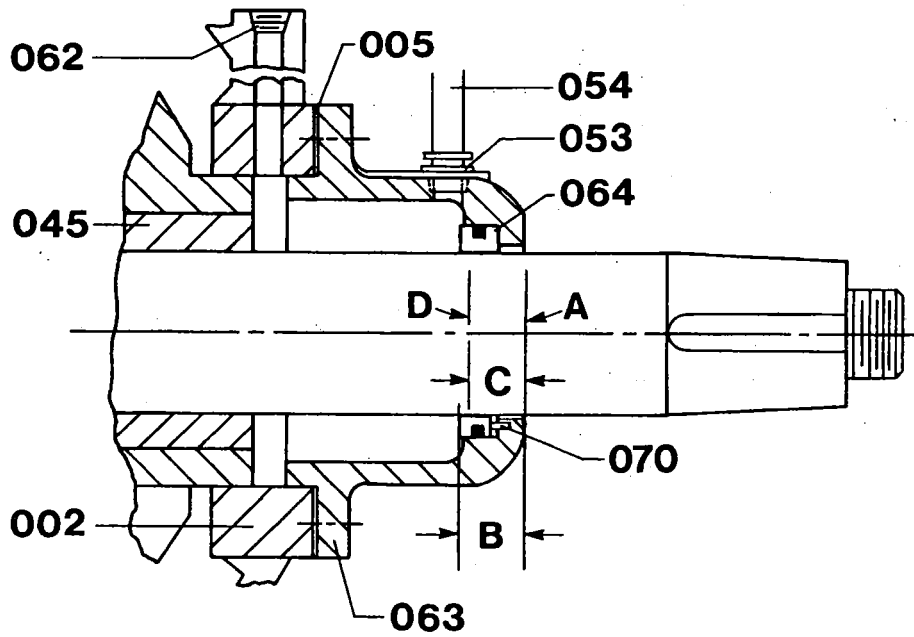


FIGURE 4. Position Setting of Seal Rotating Assembly (Seal 676)

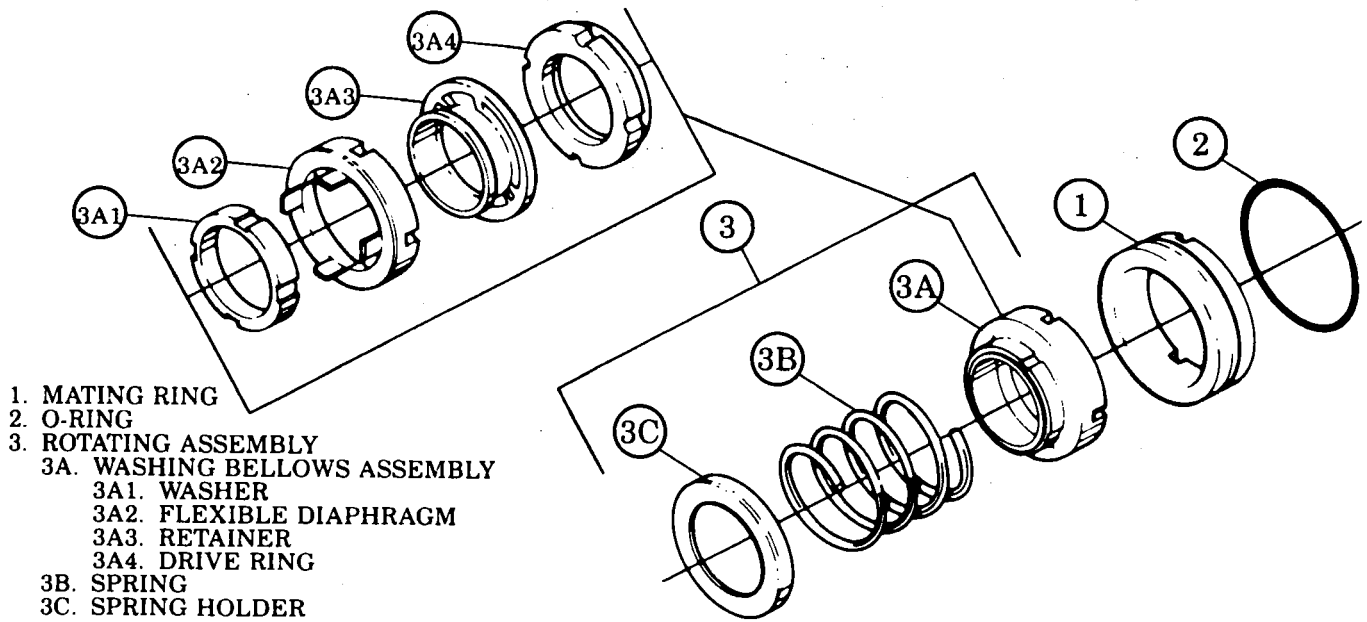


FIGURE 5. Crane 21 Mechanical Seal

- 1. MATING RING
 - 2. O-RING
 - 3. ROTATING ASSEMBLY
 - 3A. SNAP RING
 - 3B. PRIMARY RING
 - 3C. WEDGE
 - *3D. ADAPTER
 - 3E. RETAINER
 - 3F. DISC
 - 3G. SPRING
 - 4. RETAINING CLIPS
- *Normally required on type 9M

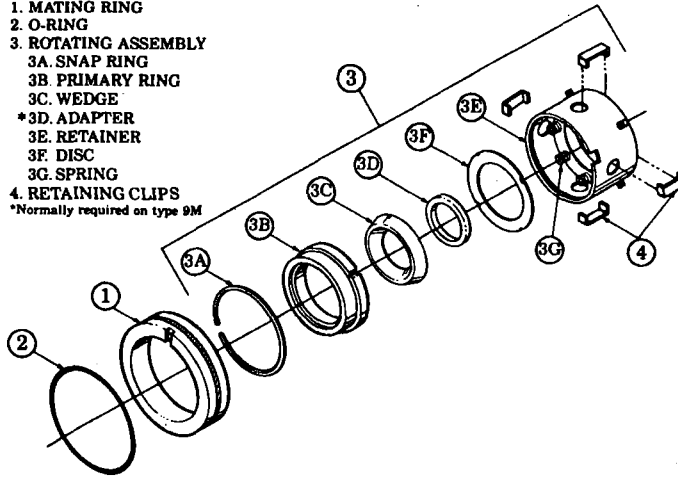
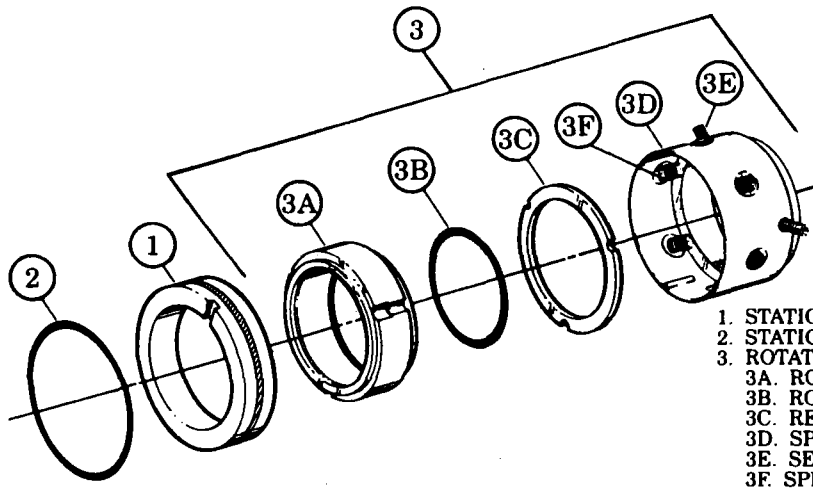
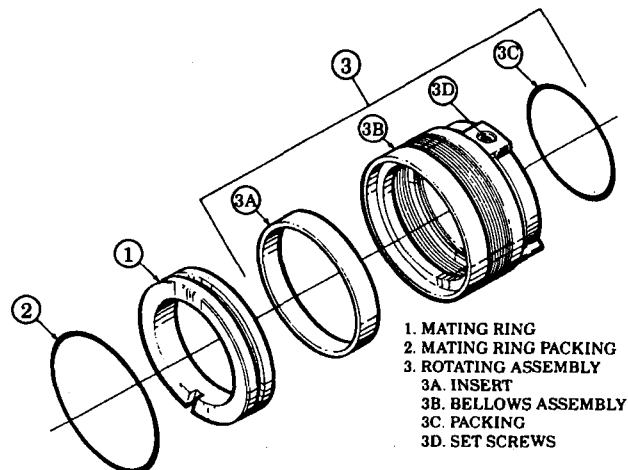


FIGURE 6. Crane 9 and 9M Mechanical Seal



- 1. STATIONARY FACE
- 2. STATIONARY FACE GASKET
- 3. ROTATING ASSEMBLY
- 3A. ROTATING FACE
- 3B. ROTATING FACE GASKET
- 3C. RETAINING RING
- 3D. SPRING HOLDER
- 3E. SETSCREW
- 3F. SPRING

FIGURE 7. Borg-Warner QW Mechanical Seal



- 1. MATING RING
- 2. MATING RING PACKING
- 3. ROTATING ASSEMBLY
- 3A. INSERT
- 3B. BELLOWS ASSEMBLY
- 3C. PACKING
- 3D. SET SCREWS

FIGURE 8. Sealol 676 Mechanical Seal

SEALOL MECHANICAL SEAL. The rotating assembly of the Sealol mechanical seal is installed on the power rotor (034), with setscrews, in a non-compressed or free length condition. When the seal housing (063) is installed, with mechanical seal stationary parts, the seal is compressed to its correct working length only if the seal rotating assembly is correctly positioned when it is installed. To determine correct seal rotating assembly installed position, proceed as follows: (Refer to Figure 4 unless otherwise noted.)

Install gasket (005) and seal housing (063) on cover (002). Pull power rotor from pump until collar (042) contacts bushing (045). Lightly scribe power rotor at position "A" of Figure 4. Remove seal housing (063) and gasket (005) from cover (002). Wipe light lubricating oil in stationary parts bore of seal housing (063) and on stationary mechanical seal parts (1 and 2, Figure 8). Slide mating ring packing (2, Figure 8) in groove of mating ring (1, Figure 8). Align pin slot of mating ring (1, Figure 8) with spring pin (070) and slide assembled mating ring in seal housing (063). Refer to dimension "B," Figure 4, then measure distance "B" on assembled seal housing. Determine distance "C" by subtracting 0.180-inch from distance "B."

$$C = B (-) 0.180\text{-inch}$$

Starting at position "A," measure distance "C" on power rotor to locate position "D." Using a scribe, mark power rotor (034) at position "D." When the face of rotating insert (3A, Figure 8) is located at position "D," the seal rotating assembly (3, Figure 8) is correctly installed.

Wipe the power rotor with lubricating oil. Check to ensure packing (3C, Figure 8) is installed in bellows assembly (3B, Figure 8). Wipe inside of seal rotating assembly with lubricating oil. Check setscrews (3D, Figure 8) to ensure setscrews are not threaded into inside bore of bellows assembly (3B, Figure 8). NOTE: Setscrews (3D, Figure 8) may be removed to ensure they do not rub on power rotor when rotating assembly (3, Figure 8) is installed on power rotor.

Holding the bellows assembly (3B, Figure 8) at the setscrew thread area, slide the rotating assembly (3, Figure 8) on power rotor until insert (3A, Figure 8) outside face is at position "D" identified in Figure 4. Do Not push on insert (3A, Figure 8) or bellows area of bellows assembly (3B, Figure 8) when sliding rotating assembly (3, Figure 8) on power rotor.

Remove setscrews (3D, Figure 8) and apply bluing compound on tip of each setscrew. Install each setscrew and tighten to transfer bluing compound on power rotor. Loosen setscrews and slide rotating assembly off power rotor. Do Not pull on bellows assembly (3B, Figure 8) when removing rotating assembly.

File or grind a small flat surface at each location identified by bluing compound. Remove all metal particles caused by filing or grinding from power rotor. Wipe lubricating oil on power rotor exposed area and inside surfaces of rotating assembly. Using a lint free cloth, clean the rotating face of insert (3A, Figure 8).

Slide the rotating assembly (3, Figure 8) on power rotor until face of insert (3A, Figure 8) is aligned with position "D" scribe mark and setscrews are aligned with flat surfaces on power rotor. Install and tighten setscrews (3D, Figure 8).

Wipe seal housing (063), Figures 2 through 4) bore with lubricating oil. Ensure spring pin (070, Fig-

ures 2 through 4) is installed in seal housing. Wipe either stationary face (1, Figure 7) or mating ring (1, Figure 5, 6 or 8) and stationary face gasket (2, Figure 7) or O-ring (2, Figures 5 or 6) or mating ring packing (2, Figure 8) with lubricating oil. Slide part 2 (Figure 5, 6, 7 or 8) on part 1 (Figure 5, 6, 7 or 8). Slide assembly in seal housing (063), Figure 2, 3 or 4) with part 1 (Figure 5, 6, 7 or 8) aligned with spring pin (070, Figure 2, 3 or 4).

Place gasket (005), Figure 9, 10 or 11) on cover (002) and install assembled seal housing (063) on cover (002). Install bolts (009) and tighten to a torque value of 45 lbs. ft. (\pm 2 lbs. ft.).

Connect tubing (054) on seal housing (063). Install key (044), coupling hub and checknut (046) on power rotor (034). With checknut (046) tight, install setscrew (061) and tighten.

Check pump and driver alignment as described in CA-1 manual. Connect coupling and lubricate coupling as required by coupling manufacturer.

Prime pump to remove all air from case (001). Remove locks from pump valving and open valves. Remove locks from electrical service panel, install fuse and energize the electrical service to start the pump. Verify pump/driver direction of rotation.

SERVICING PACKING

Packing can be replaced without removing pump, coupling or pump driver from their installed positions. Before start of work on pump, deenergize pump driver and lock shut all pump valving and electrical service supply. Refer to either Figure 9, 10 or 11 during this procedure.

Remove nuts (026) and washers (025) from gland bolts (024). Slide gland assembly (022) from pump packing cover box (004) until gland assembly (022) rests next to coupling hub. NOTE: to obtain additional work area when removing packing, gland assembly (022) may be removed from pump by removing capscrews (029).

Swing gland bolts (024) away from power rotor (034). Using a packing puller or sharp pointed brass or copper rod, remove the installed five rings of packing (030). Clean power rotor (034) at packing area, then wipe power rotor with lubricating oil.

A packing set (030) consists of three hard and two soft rings of die-molded packing. To install packing, first slide one ring of hard packing into the packing cover box (004). Slide a ring of soft packing into packing cover box (004) followed by a hard ring, soft ring and ending with a hard ring. Stagger cut ends of packing as each ring is installed to prevent a straight line passage for leakage.

If gland assembly (022) was removed, install gland assembly (022) using capscrews (029). Tighten capscrews (029) to a torque value of 50 lbs. inch (\pm 2 lbs. inch). NOTE: Rotor size 800J capscrews (029) torque to 16 lbs. ft. (\pm 2 lbs. ft.).

Swing gland bolts (024) in aligned position of gland and slide gland assembly (022) and nuts (026) on gland bolts (024) and tighten only enough to position gland assembly next to packing (030) and to ensure that gland assembly enters gland packing box (004) at least 1/8-inch. NOTE: Power rotor shaft (034) and packing (030) are cooled and lubricated by fluid leakage between the power rotor and packing. Excessive tightening of packing can cause shaft to become scored and result in rapid breakdown of the packing. Tightening of packing gland nuts should be made when the pump is running and with final adjustment for a slight leakage of eight drops per minute while pump is running.

When the pump is ready for operation, remove locks from pump valving and open valves. Remove lock from electrical service panel and energize pump driver. Tighten packing nuts (026) to allow approximately eight drops per minute leakage from the gland.

PUMP OVERHAUL

If complete overhaul of pump is required, removal of pump from its mounting and locating the pump in a suitable work area are recommended. It is also recommended that all gaskets and seal or packing be replaced during overhaul regardless of their condition.

Deenergize electrical service; remove fuse and lock deenergized the electrical service supply panel. Close all valving to the pump; chain or wire shut and lock each valve to prevent accidental opening. Disconnect coupling and all connecting piping to the pump. Remove drain plugs and drain all fluid from pump. On packing type pumps, remove drain cup (031) piping.

Disassembly of Pump. With the pump located in a clean suitable work area, disassemble the pump by following the procedures outlined below. Refer to Table 1 to identify correct Figure number for the applicable pump. NOTE: Unless otherwise noted, part numbers are for parts identified on Figures 9, 10 or 11. Refer only to the Figure number applicable to your pump during disassembly.

Remove tubing (054) from inboard and outboard end of pump. Tag each tube to identify its installed location. NOTE: If relief valve (056) is removed, tag valve with a note to reinstall on inboard end of pump only.

Loosen setscrew (061) and remove checknut (046), coupling hub and key (044).

Remove either seal housing (063) or packing cover box (004) as follows:

Mechanical Seal Type Pump. Remove bolts (009), seal housing (063) and gasket (005) from cover (002). Remove mechanical seal (064) stationary parts (1 and 2, Figure 5, 6, 7 or 8) from seal housing (063).

Crane 9 and 9M, Borg-Warner QW or Sealol. Loosen setscrews and slide rotating assembly (3, Figure 6, 7 or 8) from power rotor.

Crane 21. Slide rotating assembly (3, Figure 5) from power rotor (034). Loosen setscrew (069, Figure 2) and slide sleeve (067, Figure 2) off power rotor (034).

Packing Type Pump. Remove gland nuts (026), washers (025) and slide gland assembly (022) off power rotor. Remove bolts (009), packing cover box (004) and gasket (005) from cover (002). Remove packing (030) from packing cover box (004).

Remove two taper pull pins (071) from inboard and outboard covers (002). Remove both covers (002) and gasket (006) by removing the following:

Rotor Size 550 and 550J. Remove nine bolts (059) and seven bolts (007) with nuts (008) from each cover.

Rotor Size 630M. Remove eleven bolts (059) and nine bolts (007) with nuts (008) from each cover.

Rotor Size 800J. Remove sixteen bolts (007) with nuts (008) from each cover.

Remove bolts (009), cover (003) and gasket (005) from outboard cover (002). Remove capscrews (020), internal tooth washers (021) and shims (018) from outboard bracket (012). Remove brackets (012) from housing (011) by removing the following from each end:

Rotor Size 550 and 550J. Remove four bolts (016), four internal tooth washers (015) and four nuts (008).

Rotor Size 630M. Remove four bolts (016), four internal tooth washers (015) and four nuts (068).

Rotor Size 800J. Remove eight bolts (016) with eight internal tooth washers (015).

If bushing (045) requires replacement, remove spring pin (017) to slide bushing (045) from bracket (012).

Grasp each end of inboard and outboard idlers (040 and 041) and rotate each idler to remove all four idlers from housings (011). Slide power rotor (034) from housings (011).

Remove both housings (011) from pump case by removing the following from each end of pump:

Rotor Sizes 550, 550J and 630M. Remove four capscrews (013) and four internal tooth washers (015).

Rotor Size 800J. Remove six capscrews (013) and six internal tooth washers (014).

If collar (042) requires replacement, remove setscrew (043) from collar (042) and remove collar (042).
NOTE: Two setscrews (043) are installed in collar (042) on Rotor size 800J.

Assembly of Pump. Clean and inspect all parts before assembly. Replace all worn or damaged parts. It is recommended that gaskets and mechanical seal or packing be replaced regardless of their condition. Wipe each part with lubricating oil (SAE-30) just before installing. Rotate power rotor (034) frequently during assembly to ensure freedom of rotation. Refer to Table 1 to identify correct pump assembly and mechanical seal Figure numbers.

Install inboard and outboard housings (011) in case (001) using four capscrews (013) and four internal tooth washers (015) in each housing (011). Align housings (011) rotor bores as illustrated in Section A-A of Figure 9, 10 or 11. (Six capscrews (013) and six internal tooth washers (014) are required for each housing (011) on rotor size 800J pumps.) Tighten capscrews (013) to the torque values listed in Table 2.

TABLE 2. Torque Values for Housing Capscrews (013)

Rotor Size	Value (lbs. ft.)	Tolerance (\pm)
550 & 550J	76	5
630M	136	10
800J	136	10

If collar (042) was removed from power rotor (034), install collar (042) and lock in position using setscrew (043). Ensure collar (042) is installed next to step-cut of power rotor (034). Pin setscrew (043), using a center punch, to collar (042) threads to prevent loosening. NOTE: Two setscrews (043) are installed in collar (042) on rotor size 800J.

If bushings (045) require replacement, slide bushing (045) in each bracket (012). Using pin hole in bracket (012) as a jig, drill 3/8-inch hole through bushing (045). Remove all drill burrs and install spring pin (017). Do Not extend spring pin (017) into bushing (045) bore.

Slide power rotor (034) into housing (011) rotor bore. Rotate power rotor while inserting inboard idlers (040) until idler end is centered in housing (011). Idler position may be observed by looking into pump inlet port. Repeat procedure for both outboard idlers (041). NOTE: Each idler (040 and 041) is stamped with a manufacturer's symbol number on one end. When installing each idler, insert the stamped end of each idler first.

Install assembled bracket (012) on each end of housing (011). Before installing bolts (016) in bracket (012), and with each bracket in place, check idlers (040 and 041) to ensure bracket will not bind on ends of idlers. Turning power rotor (034) in its normal direction of rotation will pull idler rotors (040 and 041) toward center of pump. Attach each bracket (012) to housing (011) using bolt, nut and internal tooth washer quantities, per bracket, listed in Table 3. Tighten each bolt to torque value listed in Table 3.

TABLE 3. Bracket Bolt Torque Values

Rotor Size	Bolt		Washer		Nut		Torque (lbs. ft.)	
	Part No.	Quantity	Part No.	Quantity	Part No.	Quantity	Value	Tolerance
550 & 550J	016	4	015	4	008	4	57	± 5
600M	016	4	015	4	068	4	109	± 10
800J	016	6	015	6	Not Required		57	± 5

Install shim (018) and cover (019) on outboard bracket (012) with four capscrews (020) and internal tooth washers (021). Tighten capscrews (020) to a torque value of 52 lbs. inch (± 2 lbs. inch). NOTE: Rotor size 800J requires six capscrews (020) and internal tooth washers (021) tightened to a torque value of 16 lbs. ft. (± 2 lbs. ft.).

Push key groove end of power rotor (034) in pump as far as it will go. Mount a dial indicator on inboard bracket (012) with indicator point resting on key groove end of power rotor. Set indicator pointer to "zero." Pull power rotor (034) out from the pump until collar (042) contacts face of inboard bushing (045). Check dial indicator to determine total end float travel. Correct end float is 0.062-inch (± 0.005-inch). If end float requires shim adjustment, remove cover (019) and shim (018). Remove or add shim laminations to obtain correct end float. Brass shims on rotor sizes 550, 550J and 630M have 0.003-inch laminations. Brass shim on rotor size 800J has 0.005-inch laminations. Steel shims require full surface grinding of metal to reduce shim thickness. Faces of steel shims after grinding are to be smooth and parallel within 0.002-inch full indicator runout (F.I.R.). If shims are removed for adjustment, install shim (018), cover (019), capscrews (020) and internal tooth washers (021). Tighten capscrews (020) to torque values given in the preceding paragraph. Remove dial indicator from bracket (012). Rotate power rotor to check for any binding.

Install gasket (006) and inboard and outboard covers (002) as follows: Place gasket (006) and cover (002) on case (001) and insert taper pull pins (071). Install cover bolting and tighten to torque values

listed in Table 4. Bolting quantities in Table 4 are for one cover.

TABLE 4. Cover Bolt Torque Values

Rotor Size	Bolt		Bolt		Nut		Torque (lbs. ft.)	
	Part No.	Quantity	Part No.	Quantity	Part No.	Quantity	Value	Tolerance
550 & 550J	059	9	007	7	008	7	81	± 5
630M	059	11	007	9	008	9	81	± 5
800J	Not Required		007	16	008	16	193	± 10

Install gasket (006) and outboard cover (003) on outboard cover (002) using bolts (009). Tighten bolts (009) to a torque value of 42 lbs. ft. (± 2 lbs. ft.). NOTE: On rotor size 800J, tighten bolts (009) to a torque value of 16 lbs. ft. (± 2 lbs. ft.).

Mechanical Seal Type Pump. Install gasket (005), seal housing (063) and mechanical seal following instructions outlined in Servicing Mechanical Seal. Refer to Table 1 to identify type of mechanical seal installed.

Packing Type Pump. Install gasket (005), packing cover box (004), gland assembly (022) and packing (030) following instructions outlined in Servicing Packing. NOTE: Do Not tighten packing on power rotor. Final adjustment of packing must be made with pump operating.

Packing Type Pump. If drip cup (031) was removed, install drip cup (031) using bolts (032). Tighten bolts (032) to a torque value of 161 lbs. inch (± 10 lbs. inch).

Install tubing (054) on inboard and outboard end of pump. Relief valve assembly (056) must be located on inboard end tubing. NOTE: Inboard end tubing (054) is connected to cover (002) on packing type pump and to seal housing (063) on mechanical seal type pump.

Install key (044), coupling hub and checknut (046). Lock checknut (046) in position by installing setscrew (061).

Install pump and align pump driver to pump following procedures for alignment in CA-1 manual.

Remove locks and wiring from pump valving. Fill pump with fluid to be pumped, expelling all air. Rotate power rotor to flood chamber area between housing and rotors.

Remove lock from electrical service; install fuse, and with system pipe valving correctly positioned, start pump to test. NOTE: On packing type pump, adjustment must be made to packing on initial start-up. Refer to Servicing Packing section of manual.

TABLE 5. LIST OF MATERIAL

ROTOR SIZES 550, 550J and 630M

Part No.	Description	Part No.	Description
001	Case	033 (2)	Plug
002	Cover (2)	034 (6)	Power Rotor
003	Cover	040 (6)	Inboard Idler (2)
004	Packing Cover Box	041 (6)	Outboard Idler (2)
005 (5)	Gasket (2)	042 (6)	Collar
006 (5)	Gasket (2)	043	Setscrew
007 (1)	Bolt (14)	044	Key
008 (1)	Nut (22)	045 (6)	Bushing (2)
009	Bolt (12)	046	Checknut
010 (2)	Plug (4)	047	Name Plate
011 (6)	Housing (2)	048	Name Plate
012	Bracket (2)	049	Name Plate
013	Capscrew (8)	050	Drive Screw (4)
015	Internal Tooth Washer (16)	051	Tee
016	Bolt (8)	052	Closed Nipple
017	Spring Pin (2)	053	No-Flare Connector (2)
018 (6)	Shim	054	Tubing
019 (6)	Cover	055	No-Flare Connector
020	Capscrew (4)	056	Relief Valve Sub-Assembly
021	Internal Tooth Washer (4)	059 (3)	Bolt (18)
022	Gland Sub-Assembly	060	Plug
023	Gland (Part of 022)	061	Setscrew
024	Gland Bolt (2)	062 (4)	Plug
025	Wide Washer (2)	063	Seal Housing Sub-Assembly
026	Nut (2)	064 (5)	Seal
027	Bolt Pin (2)	066 (7)	Plug (2)
028	Cotter Pin (4)	067 (8)	Sleeve
029	Capscrew (Part of 022) (2)	069 (8)	Setscrew (2)
030 (5)	Packing	070	Spring Pin (Part of 063)
031	Drip Cup	071	Pull Taper Pin (4)
032	Bolt (2)	073	Drive Screw
032	Bolt (2)		

NOTES:

- (1) Quantity 18 on Rotor Size 630M
- (2) Assembly Drawing SD-5395 only (Figure 9)
- (3) Quantity 22 on Rotor Size 630M
- (4) Quantity varies each pump design
- (5) Part of Minor Repair Kit
- (6) Part of Major Repair Kit (includes parts (5) in Minor Repair Kit)
- (7) Assembly Drawing SD-5396 Pumps Only (Figure 10)
- (8) Used only with Crane 21 Mechanical Seal

All quantities are one except as noted in parentheses after part description.

Transamerica Delaval, Inc. recommends that repair parts be ordered by Minor or Major Repair Kit. When ordering kit, identify Minor or Major repair, pump model and serial number.

TABLE 6. LIST OF MATERIAL

ROTOR SIZE 800J

Part No.	Description	Part No.	Description
001	Case	030 (4) (2)	Packing
002	Cover (2)	031 (2)	Drip Cup
003	Cover	032 (2)	Plug
004 (2)	Packing Box Cover	033 (2)	Plug
005 (4)	Gasket (2)	034 (5)	Power Rotor
006 (4)	Gasket (2)	036	Drive Screw (3)
007	Bolt (32)	040 (5)	Inboard Idler (2)
008	Nut (32)	041 (5)	Outboard Idler (2)
009	Bolt (16)	042 (5)	Collar
010	Plug (4)	043	Setscrew (2)
011 (5)	Housing (2)	044	Key
012	Bracket (2)	045 (5)	Bushing (2)
013	Capscrew (12)	046	Checknut
014	Internal Tooth Washer (12)	047	Name Plate
015	Internal Tooth Washer (16)	048	Name Plate
016	Bolt (16)	049	Name Plate
017	Spring Pin (2)	050	Drive Screw (4)
018 (5)	Shim	051	Tee
019 (5)	Cover	052	Closed Nipple
020	Capscrew (6)	053	No-Flare Connector (2)
021	Internal Tooth Washer (6)	054	Tubing
022 (2)	Gland Sub-Assembly	055	No-Flare Connector
023 (2)	Gland (Part of 022)	056	Relief Valve Sub-Assembly
024 (2)	Gland Bolt (2)	062 (1)	Plug
025 (2)	Wide Washer (2)	063 (1)	Seal Housing Sub-Assembly
026 (3)	Nut (6)	064 (4) (1)	Seal
027 (2)	Bolt Pin (2)	070 (1)	Spring Pin (Part of 063)
028 (2)	Cotter Pin (4)	071	Pull Taper Pin (4)
029 (2)	Capscrew (Part of 022) (2)		

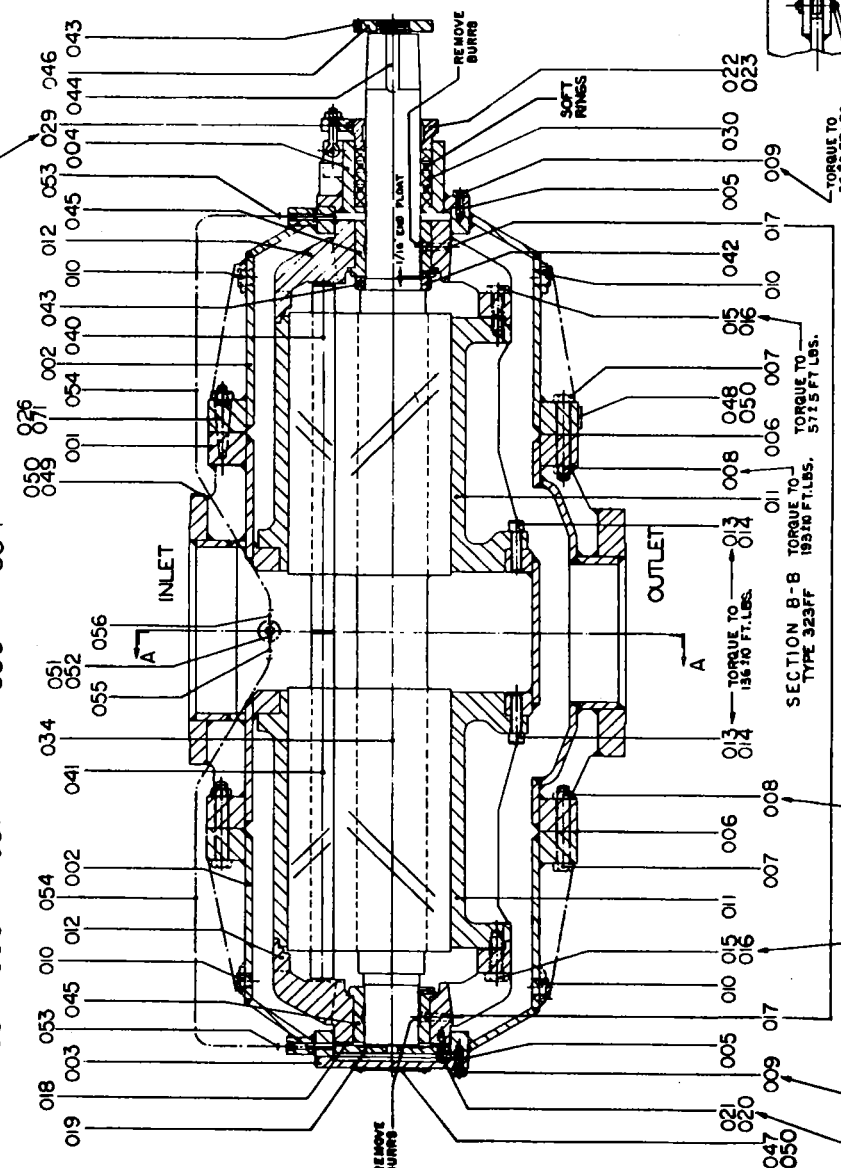
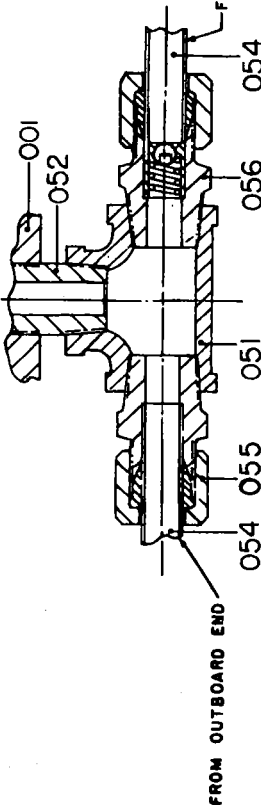
NOTES:

- (1) Mechanical Seal Pumps Only
- (2) Packing Type Pumps Only
- (3) Quantity 4 on Pump Type 323FCSX-800J
- (4) Part of Minor Repair Kit for Packing OR Mechanical Seal Type Pump
- (5) Part of Major Repair Kit for Packing OR Mechanical Seal Type Pump (Includes parts in Minor Repair Kit for Packing or Mechanical Seal Type Pump)

All quantities are one except as noted in parentheses after part description.

Transamerica Delaval, Inc. recommends that repair parts be ordered by Minor or Major Repair Kit. When ordering kit, identify Minor or Major repair, pump model and serial number.

ENLARGED VIEW SHOWING PIPING CONNECTIONS TO CASE



NOTE: WITH POWER ROTOR PC#034 REMOVED, AND USING HOLE IN BRACKET PC#012 AS JIG OR LUGS AND THE BRACKET PC#045, AND USE THE BRACKET PC#045, PIN TO BE FLUSH WITH FLANGE O.D. OF PC#012, AND NOT EXTEND INTO BORE OF PC#045.

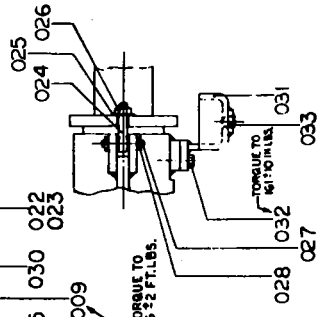
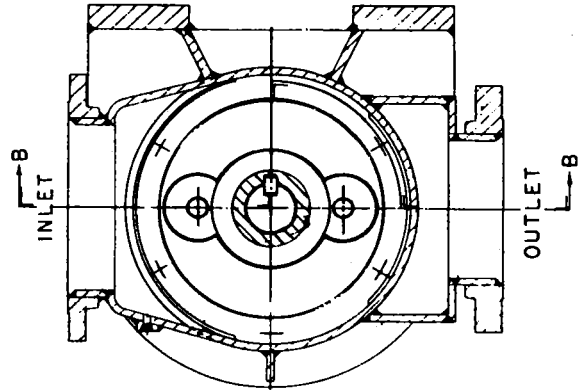
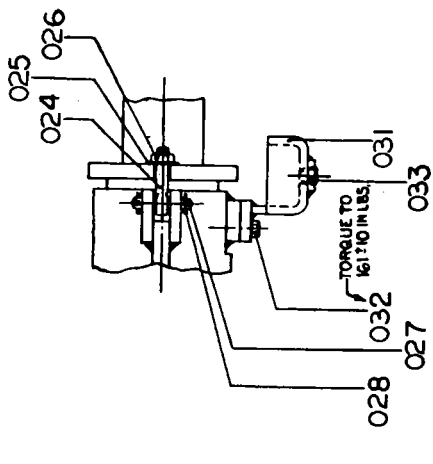


FIGURE 9

ENLARGED VIEW SHOWING
PIPING CONNECTIONS TO CASE

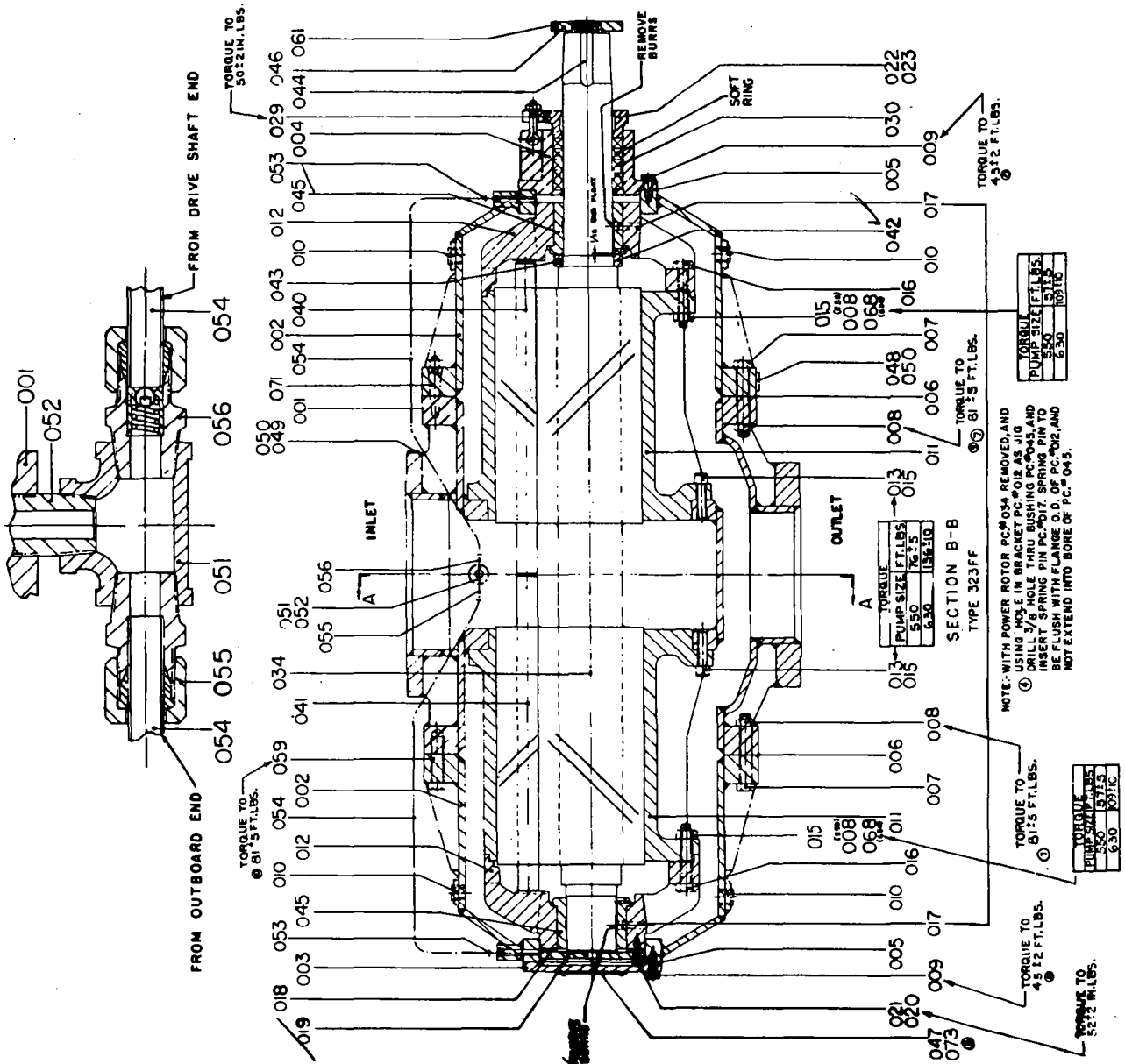
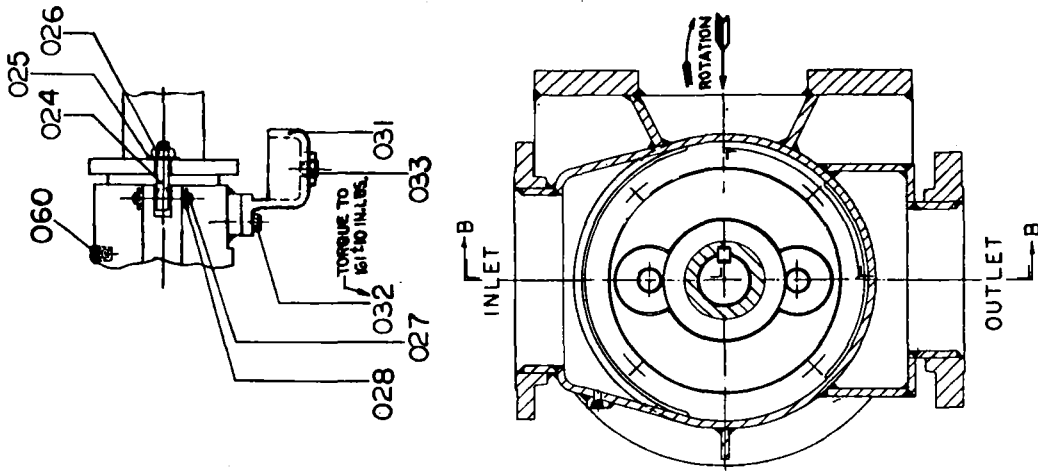


FIGURE 10

