



IMO<sup>®</sup>

## INSTRUCTIONS AND PARTS LIST

### SERIES A12D, B12D AND C12D

**WARNING**

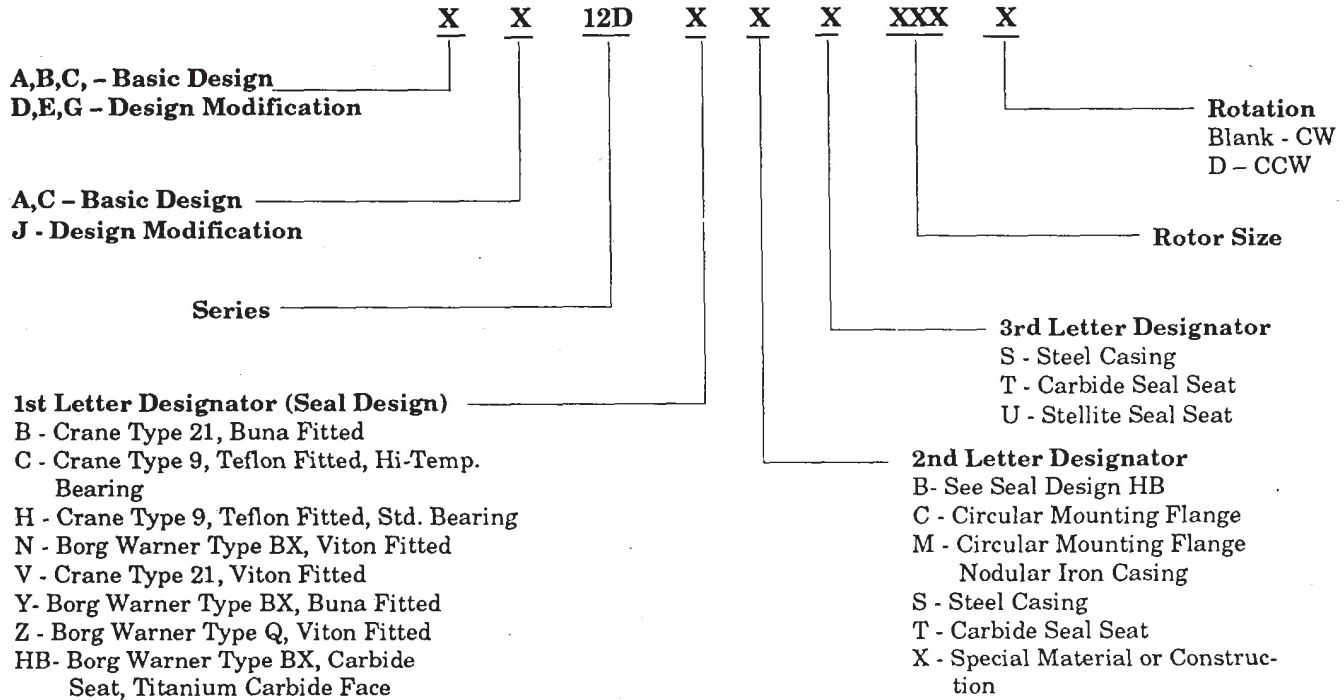
**READ CA-1 AND THIS INSTRUCTION BOOK BEFORE  
INSTALLATION, OPERATION OR MAINTENANCE**

This manual now is  
identified as part no.  
SRM00035

**Instructions A12D (R-5)**

## FOREWORD

This instruction manual covers Series A12D, B12D, and C12D, rotor sizes 106 through 400, Imo Pumps. Because of the large number of operating conditions, it is necessary to have a variety of construction and material combinations to meet job requirements. The model of each pump is identified on the pump nameplate. This manual identifies pump types and sealing designs by Figure numbers only. For maintenance, disassembly and re-assembly procedures, ensure that specific pump type is identified with correct Figure number. Refer to Table 1, Figure 1 and Figures 8 through 15 for proper identification of specific models.



**NOTE:** Letter designators following series designator (12D) identify mechanical seal design, construction and special features. Series designator (12D) is followed by 1, 2, or 3 letter designators. Table 1 applies to all designators. Examples of determining a particular pump type from letter designators are given below.

**Examples:** 12DB (Crane 21 Seal)  
 12DBC (Crane 21 Seal, Circular Mounting Flange)  
 12BCS (Crane 21 Seal, Circular Mounting Flange, Steel Casing)

**FIGURE 1. Definitions of Model Designators**

**TABLE 1**  
**SERIES A12D AND C12D**  
**ROTOR SIZES 106 THRU 400**

Pump Model	Rotor Size	Assembly Fig. No.	Seal Fig. No.	Pump Model	Rotor Size	Assembly Fig. No.	Seal Fig. No.
A12DB	106 thru 137	8	3 or 5	C12DVS	156	10	3 or 5
B12DB	106 thru 118	8A					
A12DB	218 thru 312	11	3 or 5	C12DVS	187	9	3 or 5
A12DB	350, 400	14	3 or 5	C12DBCS	156	9	3 or 5
A12DH	106 thru 137	8	2 or 4	C12DBST	156	9	5
B12DH	106 thru 118	8A					
A12DH	218 thru 312	11	2 or 4	C12DBST	187	9	5
A12DH	350, 400	14	2 or 4	C12DBSU	187	9	5
A12DV	137	8	3 or 5	C12DHST	156	9	4
A12DV	218	11	3 or 5	D12DB	250, 275	13	3 or 5
A12DZ	218 thru 312	11	6	D12DZ	250	13	6
A12DY	312	11	7	D12DZX	250	12	6
A12DBC	118	8	3 or 5	E12DC	350	11	2 or 4
A12DBC	218 thru 312	11	3 or 5	AA12DH	106	8	2 or 4
A12DBM	137	8	3 or 5	AC12DB	187	9	3 or 5
A12DBS	118, 137	8	3 or 5	AJ12DB	106 thru 137	8	3 or 5
G12DBS	118	8A		BJ12DB	106 thru 118	8A	
A12DBS	218	11	3 or 5	AJ12DH	106 thru 137	8	2 or 4
				AJ12DH	106 thru 118	8A	
A12DHB	250	11	7	AJ12DH	250	11	2 or 4
A12DHC	218 thru 312	11	2 or 4	AJ12DBS	137	8	3 or 5
A12DHS	118, 137	8	2 or 4	AJ12DHS	137	8	2 or 4
B12DHS	118	8A					
A12DHS	218	11	2 or 4	AJ12DBST	137	8	5
A12DVS	137	8	3 or 5	AJ12DVST	137	8	5
C12DB	156	9	3 or 5	BS12DV	156	10	3
C12DB	187	9	3 or 5	CJ12DB	156	9	3 or 5
C12DH	156	9	2 or 4	CJ12DB	187	9	3 or 5
C12DH	187	9	2 or 4	CJ12DH	156	9	2 or 4
C12DV	156	10	3 or 5	CJ12DH	187	9	2 or 4
C12DV	187	9	3 or 5	CJ12DBC	187	9	3 or 5
C12DV	218 thru 350	12	3 or 5	CJ12DBS	156	9	3 or 5
C12DBC	156, 187	9	3 or 5	CJ12DHS	156	9	2 or 4
C12DBS	156	9	3 or 5	CJ12DHT	187	9	4
C12DBS	187	9	3 or 5	GA12DB	218 thru 312	11	3 or 5
C12DBT	187	9	5	GA12DH	218 thru 312	11	2 or 4
C12DBX	187	9	3 or 5	GA12DBS	218	11	2 or 4
C12DHS	156	9	2 or 4	GA12DHB	250	11	7
C12DHS	187	9	2 or 4	GC12DNST	187	9	7

**NOTES:**

(1) Pump model precedes rotor size. Example A12DB-106

(2) Crane Types 9 and 21 mechanical seals can be equipped with either clamped seat or O-ring seat as illustrated in Figures 1 through 5.

## STRUCTURAL LIMITS

Operating conditions such as speed, fluid viscosity, inlet 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 IMO Pump Division offices and representatives listed in Manual CA-1).*

Under no circumstances are the following structural limitations to be exceeded.

### MAXIMUM SPEED:

Rotor Size	RPM	
	Distillate Oils & Lube & Seal Oils	Residual & Crude Oil
106 - 187	4400	
218 - 250	3600	1800
275	3000	All Sizes
312 - 350	2500	

DISCHARGE PRESSURE: 1500 PSIG (Distillate, Residual and Crude Oils)  
2200 PSIG (Lube and Seal Oils)

VISCOSITY: 33 SSU Minimum  
3000 SSU Maximum - Types B and V Mechanical Seals  
For viscosities above 3000 SSU, use Type H Mechanical Seal  
Consult factory for allowable operating viscosity for other seal types at specific speeds and pressures. Do not alter design viscosity without prior approval from factory.

TEMPERATURE: Type B: 0- 160°F, Type H: 0 - 250°F  
Consult factory for minimum required inlet pressure

DRIVE: Direct only

FILTRATION: Light fluids - 60 mesh  
Heavy fluids - 1/8 to 3/16-inch

MOUNTING: Foot mounted in any attitude  
Optional flange mount available for vertical mounting only

NOTE: Series A12D pumps, rotor sizes 218 through 400 are equipped with bronze housings. Having a higher coefficient for heat expansion, bronze housings are more susceptible to heat changes than the surrounding iron case or steel alloy rotors. Rapid temperature changes can cause distortion of the bronze housings, resulting in breakdown conditions. Therefore, care must be taken to prevent thermal shock to the pump. Pumps must be heated or cooled slowly as conditions dictate.

## ORDERING INSTRUCTIONS

All correspondence pertaining to renewal parts for Series 12D pumps must refer to this instruction book number and should be addressed to the nearest IMO Pump Division 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 the part number(s) for necessary part(s).

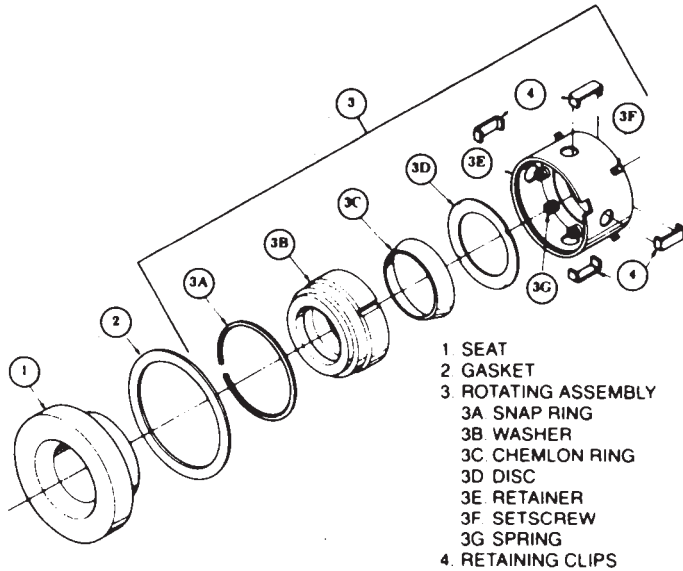
## MECHANICAL SEALS

Mechanical seals installed in Series A12D, B12D, and C12D pumps are Crane Type 9, Figures 2 and 4, Crane Type 21, Figures 3 and 5, Borg Warner Type Q, Figure 6, and Borg Warner Type BX, Figure 7. Disassembly and assembly procedures for mechanical seals are as follows:

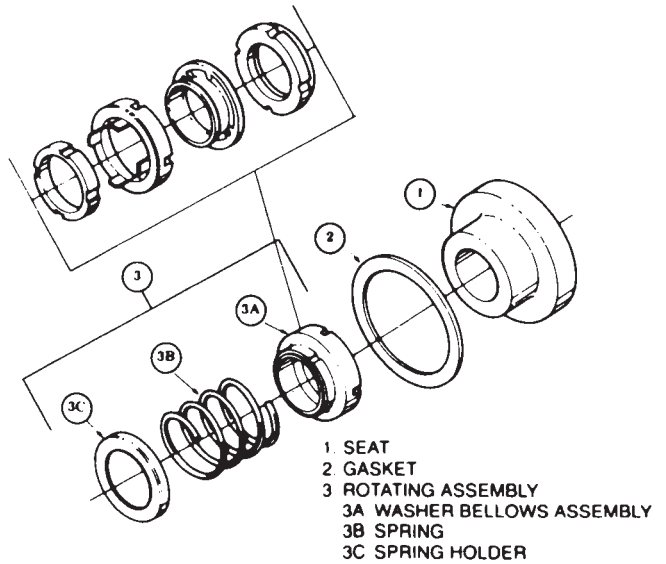
### DISASSEMBLY PROCEDURES

#### Stationary Assembly:

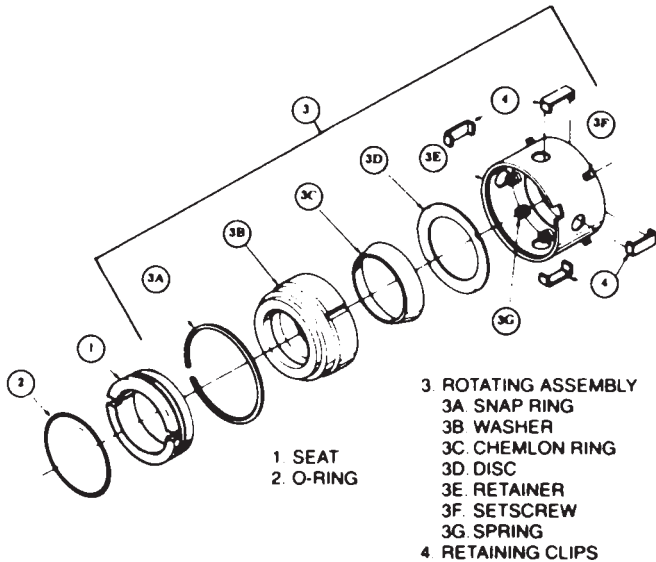
(Figures 2 and 3) Slide stationary assembly, seat (1) and gasket (2) off power rotor shaft.



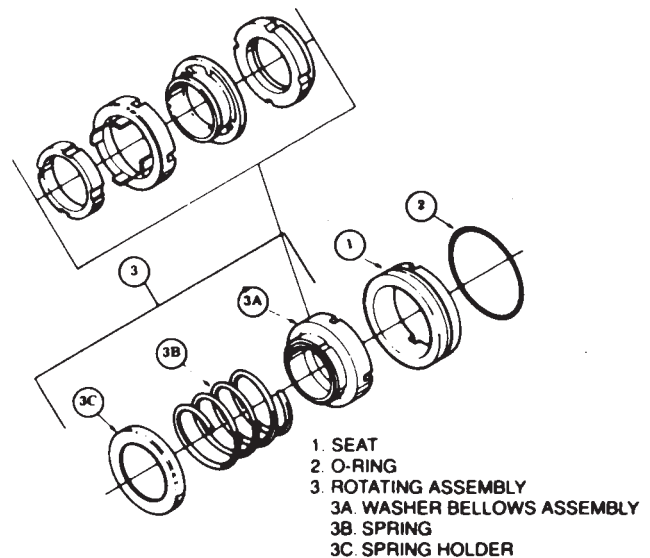
**Figure 2. Crane Type 9 Mechanical Seal - Clamped Seat**



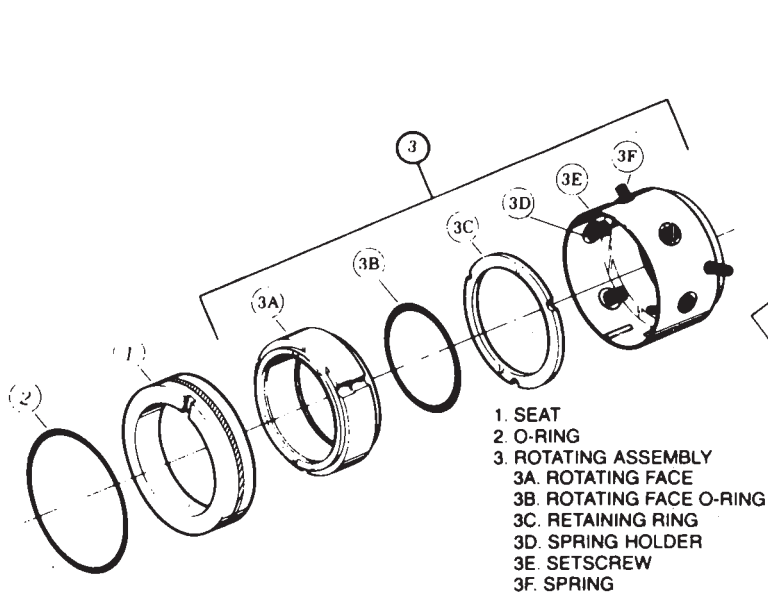
**Figure 3. Crane Type 21 Mechanical Seal - Clamped Seat**



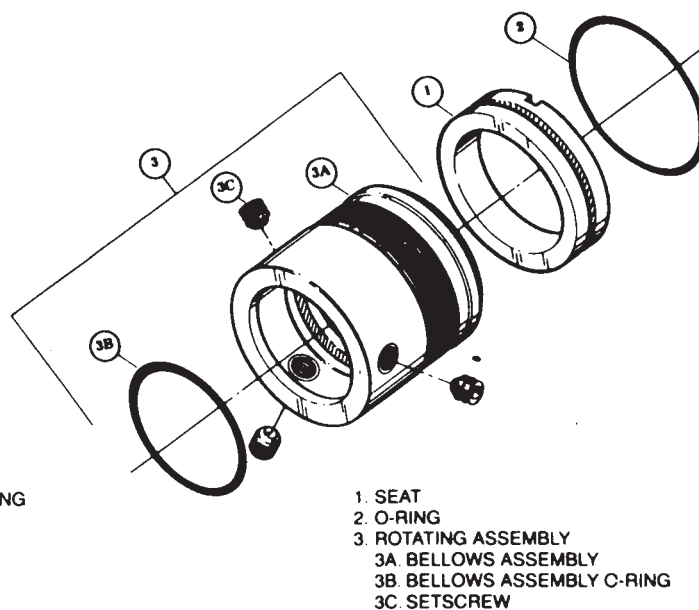
**Figure 4. Crane Type 9 Mechanical Seal - O-ring Seat**



**Figure 5. Crane Type 21 Mechanical Seal - O-ring Seat**



**Figure 6. Borg Warner Type Q Mechanical Seal**



**Figure 7. Borg Warner Type BX Mechanical Seal**

(Figures 4, 5, 6 and 7) Stationary assembly, seat (1) and O-ring (2), is removed with spacer (048, 091 or 092). Remove mechanical seal seat (1) from spacer (048, 091 or 092) and remove O-ring (2) from seat (1).

**Rotating Assembly:**

(Figures 4 and 5) Slide rotating assembly (3) off power rotor shaft.

(Figures 2, 3, 6 and 7) Loosen setscrews and slide rotating assembly (3) off power rotor shaft.

**ASSEMBLY PROCEDURES:**

**Rotating Assembly:** The rotating assembly (3) is normally packaged as an assembly for ease of installation. Coat all parts of the seal with oil prior to assembly on power rotor shaft. Refer to mechanical seal drawings, Figures 2 through 7, and assembly drawings, Figures 8 through 15, for applicable assembly procedures.

**NOTE:** Installed working length of mechanical seals is a physical measurement of the rotating assembly (3), Figures 2 through 7, when the mechanical seal seat is locked in position. The installed mechanical seal working length is normally automatically adjusted when the mechanical seal rotating element is fitted next to the power rotor piston (020), sleeve (038) or retaining ring (075). Installed working length can be verified for mechanical seals positioned next to piston (020), sleeve (038) or retaining ring (075) by determining distance from face of piston (020), sleeve (038) or spacer (075) to face of mechanical seal seat (1) when mechanical seal seat is installed. Refer to Table 2 for proper mechanical seal installed working lengths.

(Figures 3 and 5) Slide rotating assembly (3) on power rotor shaft next to piston (020), sleeve (038) or spacer (075) as indicated on applicable assembly drawing.

(Figures 2 and 4) Slide rotating assembly (3) on power rotor shaft next to piston (020), sleeve (038) or spacer (075) as indicated on applicable assembly drawing. Tighten setscrews. Remove and discard retaining clips.

(Figures 6 & 7) Installation of these seals is the same as that referenced for the Crane 9 in Figure 4. The only exception is the Borg Warner Q seal does not have the retaining clips. Check Table 2 for the proper installed working length for the respective seals.

### Stationary Assembly

(Figures 2 and 3) Slide mechanical seal seat on power rotor next to rotating assembly (3).

(Figures 4, 5, 6 and 7) Install mechanical seal seat (1) and O-ring (2) in spacer (048, 091, or 092), ensuring that spring pin is properly positioned to engage slot in mechanical seal seat (1).

**TABLE 2  
MECHANICAL SEAL INSTALLED LENGTH**

Rotor Size	Seal Type	Installed Length	Rotor Size	Seal Type	Installed Length
106, 118	9	1.0 (±.0625)	275	9	1.375 (±.0625)
	21	1.0 (±.0625)		21	1.5 (±.0625)
137, 156 & 187 218, 250	9	1.0625 (±.0625)		312, 350	Q
	21	1.0625 (±.0625)	9		1.6875 (±.031)
	9	1.375 (±.0625)	21		1.8125 (±.031)
	21	1.375 (±.0625)	Q	1.750 (±.031)	
250	Q	1.6875 (±.031)	312	BX	1.6510 (±.031)
	BX	1.6510 (±.031)			

### DISASSEMBLY AND ASSEMBLY PROCEDURES

#### DISASSEMBLY PROCEDURES (FIGURES 8 THROUGH 15)

NOTE: Disassembly and assembly procedures are given for pump types and sealing arrangements by Figure numbers. Ensure that pump type and sealing arrangement are identified by proper Figure numbers for correct disassembly and assembly procedures. Refer to Table 1 and Figure 1 for proper identification of pump type and applicable Assembly Figure Number and Seal Figure Number. Disassembly procedures for Figures 8 through 15 are identical except when specifically noted.

STEP 1. Close off suction and discharge piping to pump and disconnect piping. Remove seal piping (071). Remove drain plugs and drain unit. Remove pump from driver, coupling and baseplate. Remove coupling hub and key (031). NOTE: (Figure 15) Remove setscrew (060) and checknut (064) prior to removal of coupling hub and key (031) for rotor size 400 only.

STEP 2. Remove capscrews or bolts (004) and, if applicable, washer (090) and inlet head (002).

STEP 3. Remove gasket (009) from case (001) or O-ring (088) from inlet head (002) groove.

STEP 4. Remove retaining ring (008) or spacer (089) from case (001).

STEP 5. (Figure 12 Only) Remove retaining ring (090) and Retainer (089) from case (001).

STEP 6. Remove thrust cage or thrust plate assembly as follows:

- a. (Figures 8 and 9 and 11 thru 15) Remove thrust cage (029). Remove oil balance tube (026) with O-rings (027) from either cage (029) or housing (024, 050 or 073). Remove O-rings (027) from tube (026).
- b. (Figure 10 Only) Remove thrust plate (029) assembly by removing capscrews (098) and (099) with Dyna seal (007). Remove spacers (097) from plate assembly.

STEP 7. Remove idler balance piston housings (023) from idlers (021). Remove idlers (021) by unscrewing them from housing (050, 073 or 095). Remove remaining idlers (035 and/or 087) from housings by rotating power rotor (063) in a counter-clockwise direction. Do Not permit idlers to drop as they emerge from housing. NOTE: Quantity of idlers will vary depending on pump type. Refer to applicable assembly drawing and List of Materials, Table 4.

STEP 8. Remove bolts (047) and, if applicable, washers (091 or 092) and bearing retainer (043) from cover (046) NOTE: (*Figure 14 Only*) Lip seal (086) will be removed with bearing retainer (043). Ensure that lip seal (086) is not permitted to drop as it is removed.

STEP 9. Remove assembled power rotor (063) from pump and disassemble power rotor as follows:

- a. (*Figure 14 Only*) Removing gasket (087) from face of ball bearing (049).
- b. Remove outer truearc ring (042), ball bearing (049) and inner truearc ring (042) from power rotor (063).
- c. (*Figure 14 Only*) Remove gasket (087) from face of spacer (048). Remove spacer (048). NOTE: Removal of spacer (048) will also remove lip seal (085), mechanical seal seat (1) and O-ring (2), Figures 3, 5, 6 or 7, and spring pin (083). Remove lip seal (085) and mechanical seal seat (1) from spacer (048). Remove O-ring (2) from mechanical seal seat (1).
- d. Remove spacer (048, 091 or 092) from power rotor (063).

NOTE: Removal of spacer (048, 091 or 092, *Figures 8, 9 and 11 with O-ring seat*) will also remove mechanical seal seat (1) and O-ring (2), Figures 3, 5, 6 or 7, and spring pin (082, 083, 092 or 093). Remove mechanical seal seat (1, Figures 3, 5, 6 or 7) from spacer (048, 091 or 092) and remove O-ring (2, Figures 3, 5, 6 or 7) from seal seat.

- e. (*Figures 8, 9, 10, 11, 12, 13 and 15*) Remove mechanical seal seat (1, Figures 2 or 4) from power rotor (063).
- f. Remove mechanical seal (025) rotating assembly (3, Figures 2 through 7) from power rotor (063). NOTE: Refer to Mechanical Seals for proper disassembly procedures based on applicable seal arrangement.

NOTE: Piston (020) is provided as part of power rotor (063) and is not serviced separately.

- g. (*Figures 11, 12, 14 and 15*) Remove sleeve (038) from power rotor (063). NOTE: Sleeve (038) not installed in pump type A12DHB-250.

STEP 10. Remove capscrews or bolts (004 or 090) and, if applicable, washers (090 or 092) and inboard cover (046 or 085).

NOTE: (*Figures 8 and 11 - Circular Mounting Flange, 9 and 10*) Removal of inboard cover (046 or 085) will include removal of O-ring (028) and bushing (086), if installed. Remove O-ring (028) from inboard cover (046 or 085). Bushing (086) is loctited to inboard cover during pump assembly and will not be removed unless replacement is necessary.

STEP 11. (*Figure 10 Only*) Remove stop plate (093) from bushing (086) by removing spring pins (094). Remove back-up ring (083) from groove of inboard cover (085).

STEP 12. (*Figures 8, 11, 12, 13, 14 and 15*) Remove gasket (009) from flange of case (001).

STEP 13. Remove gasket from mechanical seal (025) bore of inboard cover (046 or 085).

STEP 14. (*Figures 11, 12, 13 and 14*) Remove retaining ring (008) or retainer (089) from groove of case (001).



STEP 15. (*Figure 8 Only*) Remove spacer (084) from case (001).

STEP 16. (*Figures 8, 11 and 12*) Remove balance piston housing (022 or 078) with O-ring (028) from case (001). Remove O-ring (028) from balance piston housing (022 or 078) groove.

NOTE: Refer to Figure 8A. Balance piston housing (091) for series B12D 106 & 118 rotor sizes, is a sub-assembly and should be removed as one piece. It consists of the housing (091), bushing (098), pin (092) and bolt (093). The "o" ring (028) is the same as other design.

STEP 17. (*Figure 12 Only*) Remove back-up ring (083) from groove of balance piston housing (022). NOTE: Bushing (086) is loctited to balance piston housing (022) at assembly and will not be removed unless replacement is necessary.

STEP 18. (*Figures 13 and 14*) Remove idler stop (080) and balance piston bushing (079) from balance piston housing (078) by removing capscrews (081). Remove pin (073) from idler stop (080).

STEP 19. (*Figures 8, 11 and 12*) Remove oil balance tube (026) from either balance piston housing (022) or housing (024).

STEP 20. Remove stop pin (006) with Dyna seal (007) from case (001).

STEP 21. Remove housings (024, 050, 073 and/or 095) from inlet end of pump case (001). NOTE: Quantity of housings varies with pump type. Refer to applicable assembly drawing and List of Material, Table 4, for proper quantity.

#### CAUTION

Do not permit housings to fall as they are removed from pump.

NOTE: Housings for rotor sizes 218 through 350 are equipped with two tapped bores (3/8"-16 tap) for insertion of eye bolts to assist in removing housings from case.

STEP 23. (*Figures 11, 12 and 15*) Remove oil balance tubes (026) with O-rings (027) from housings as they are removed from pump case (001). Remove O-rings (027) from tubes (026).

STEP 24. (*Figures 13 and 14*) Remove vent pins (077) from housings (024 or 050).

STEP 25. Remove O-rings (028) from housing (024 or 050).

STEP 26. (*Figures 10 and 12*) Remove back-up ring (083) from housing (024).

#### ASSEMBLY PROCEDURES (FIGURES 8 THROUGH 15)

NOTE: Prior to assembly of pump, all parts should be cleaned and inspected for nicks and burrs. Replace all worn or damaged parts. IMO Pump Division recommends automatic replacement of O-rings (027, 028 and 088), gaskets (009 and 087), Dyna seal (007), mechanical seal (025) and ball bearing (049) when these parts are disturbed from their previously installed position. Refer to pump assembly drawings, Figures 8 through 15; mechanical seal drawings, Figures 2 through 7; and List of Material, Table 4, during assembly. Coat all parts with light lubricating oil to assist in assembly. Assembly procedures for Figures 8 through 15 are identical except when specifically noted.

STEP 1. Install O-rings (028) in housing (024) or (050, *Figures 13 and 14*).

STEP 2. (*Figures 10 and 12*) Install back-up ring (083) in groove of housing beside O-ring (028). NOTE: Back-up ring to be positioned in groove toward inlet end of pump.

STEP 3. Install housing (024) or (050, *Figures 13 and 14*), properly aligning housing with bore for stop pin (006) in case (001). Install stop pin (006) with Dyna seal (007).

STEP 4. (*Figures 8 through 12 and 15*) Install O-rings (027) on oil balance tubes (026). Install oil balance tubes (026) in bores of housings (024, 050, 073 and/or 095) and install housings (024, 050, 073 and/or 095) in pump case (001), ensuring that tubes (026) engage bores of adjoining housings. NOTE: Quantity of housings varies with pump type. Refer to applicable assembly drawing, Figures 8 through 15, and List of Materials, Table 4, for proper quantity.

STEP 5. (*Figures 13 and 14*) Install vent pins (077) in housing (024 or 050) and install housing (024 or 050), ensuring that vent pins (077) engage bores of housing (024 or 050) previously installed.

STEP 6. (*Figures 8, 11 and 12*) Install oil balance tube (026) in bore of balance piston housing (022).

STEP 7. (*Figures 13 and 14*) Install bushing (079) and idler stop (080) on balance piston housing (078) by installing capscrews (081). Torque capscrews (081) to proper value listed in Table 3. Install pin (073) on idler stop (080).

STEP 8. (*Figures 12 Only*) Install back-up ring (083) in groove of balance piston housing (022). NOTE: If bushing (086) was removed from balance piston housing (022) during disassembly, install bushing (086) on balance piston housing (022) with Loctite Retaining Compound coated between bushing (086) and balance piston housing (022). Allow one hour for Loctite compound to harden.

STEP 9. (*Figures 8, 11 and 12*) Install O-ring (028) in groove of balance piston housing (022 or 078) and install assembled balance piston housing (022 or 078) in case (001). NOTE: Refer to Figure 8A for B12D balance piston housing design. Install assembled balance piston housing which consists of housing (091), bushing (098), pin (092), and bolt (093) after inserting "o" ring (028) in groove.

STEP 10. (*Figure 8*) Install spacer (084) in case (001).

STEP 11. (*Figure 12 Only*) Install back-up ring (090) in case (001).

STEP 12. (*Figures 11, 12, 13 and 14*) Install retaining ring (008) or retainer (089) in groove of case (001).

STEP 13. (*Figures 8 and 11 - Circular Mounting Flange, 9 and 10*) Install O-ring (028) in groove of inboard cover (046 or 085). NOTE: If bushing (086), where applicable, was removed during disassembly, install bushing (086) to inboard cover (046 or 085) with Loctite Retaining Compound coated between bushing (086) and inboard cover (046 or 085). Allow one hour for Loctite compound to harden.

STEP 14. (*Figure 10 Only*) Install back-up ring (083) in groove of inboard cover (085) next to installed O-ring (028). Install stop plate (093) on bushing (086) using spring pins (094).

STEP 15. (*Figures 8, 11, 12, 13, 14 and 15*) Install gasket (009) on flange of case (001).

STEP 16. Install inboard cover (046 or 085) on case (001) using capscrews or bolts (004 or 090) and, if applicable, washers (090 or 092). Torque capscrews or bolts (004 or 090) to proper value listed in Table 3.

STEP 17. Assemble power rotor (063) as follows:

- a. (*Figures 11, 12, 14 and 15*) Install sleeve (038) on power rotor (063) next to piston (020). NOTE: Sleeve (038) not installed on pump type A12DHB-250.
- b. Install mechanical seal (025) rotating assembly (3, *Figures 2 through 7*) on power rotor (063) next to piston (020), sleeve (038) or spiral ring (075) per applicable pump assembly drawing, *Figures 8 through 15*. Refer to Mechanical Seals for correct assembly procedures for applicable seal design.

NOTE: Piston (020) is provided as part of power rotor (063) and is not serviced separately.

**TABLE 3  
TORQUE VALUES**

Part	Pump Designator	Rotor Size	Torque Value
004 (1)	A12D	106	120 lbs. ft. (± 10 lbs. ft.)
		118	120 lbs. ft. (± 10 lbs. ft.)
		137	120 lbs. ft. (± 10 lbs. ft.)
		156	120 lbs. ft. (± 10 lbs. ft.)
		187	110 lbs. ft. (± 10 lbs. ft.)
004 (2)	C12D	156	120 lbs. ft. (± 10 lbs. ft.)
		187	200 lbs. ft. (± 15 lbs. ft.)
004 (2)	A12D	218	80 lbs. ft. (± 5 lbs. ft.)
		250	110 lbs. ft. (± 5 lbs. ft.)
		275	60 lbs. ft. (± 5 lbs. ft.)
		312	60 lbs. ft. (± 5 lbs. ft.)
		350	90 lbs. ft. (± 5 lbs. ft.)
		400	115 lbs. ft. (± 5 lbs. ft.)
004 (1)	C12D	218	167 lbs. ft. (± 10 lbs. ft.)
		250	245 lbs. ft. (± 10 lbs. ft.)
		275	78 lbs. ft. (± 5 lbs. ft.)
		312	78 lbs. ft. (± 5 lbs. ft.)
		350	78 lbs. ft. (± 5 lbs. ft.)
004 (3)	A12D	218	95 lbs. ft. (± 5 lbs. ft.)
		250	160 lbs. ft. (± 5 lbs. ft.)
		275	65 lbs. ft. (± 5 lbs. ft.)
		312	65 lbs. ft. (± 5 lbs. ft.)
		350	100 lbs. ft. (± 5 lbs. ft.)
		400	145 lbs. ft. (± 5 lbs. ft.)
047	A12D and C12D	106	9 lbs. ft. (± 2 lbs. ft.)
		118	11 lbs. ft. (± 2 lbs. ft.)
		137	11 lbs. ft. (± 2 lbs. ft.)
		156	11 lbs. ft. (± 2 lbs. ft.)
		187	11 lbs. ft. (± 2 lbs. ft.)
		218	15 lbs. ft. (± 2 lbs. ft.)
		250	20 lbs. ft. (± 2 lbs. ft.)
		275	20 lbs. ft. (± 2 lbs. ft.)
		312	30 lbs. ft. (± 2 lbs. ft.)
		350	30 lbs. ft. (± 2 lbs. ft.)
		400	30 lbs. ft. (± 2 lbs. ft.)
081	D12D	250	40 lbs. in. (± 2 lbs. in.)
		275	180 lbs. in. (± 10 lbs. in.)
090	A12D	106	120 lbs. ft. (± 10 lbs. ft.)
		118	120 lbs. ft. (± 10 lbs. ft.)
		137	120 lbs. ft. (± 10 lbs. ft.)
		156	120 lbs. ft. (± 10 lbs. ft.)
		187	110 lbs. ft. (± 10 lbs. ft.)
090	C12D	156	105 lbs. ft. (± 10 lbs. ft.)
		187	200 lbs. ft. (± 15 lbs. ft.)
099	C12D	156	25 lbs. ft. (± 2 lbs. ft.)

- (1) Part (004) installed in Inboard Cover and Inlet Head.  
(2) Part (004) installed in Inboard Cover.  
(3) Part (004) installed in Inlet Head.



- c. *(Figures 8, 9 and 11 - Clamped Seat Seal, 10, 12, 13 and 15)* Install mechanical seal (025) seat (1, Figures 2 or 4) on power rotor (063) as described in assembly procedures of Mechanical Seals for applicable seal design.
- d. *(Figures 8, 9, 11 and 13 - O-ring Seat Seal)* Install O-ring (2, Figures 3, 5, 6 or 7) in groove of mechanical seal seat (1, Figures 3, 5, 6 or 7). Install mechanical seal seat (1) in spacer (048, 091 or 092), ensuring that spring pin (082, 083, 092 or 093) is properly positioned to engage bore of seal seat. Refer to Mechanical Seals for assembly procedures for applicable seal design.
- e. Install spacer (048, 091 or 092) on power rotor (063) shaft.
- f. *(Figure 14 Only)* Press lip seal (085) on power rotor (063), ensuring that lip seal is not damaged as it is installed.
- g. Install inner truarc ring (042) in groove of power rotor (063).
- h. *(Figure 14 Only)* Install gasket (087) on face of spacer (048).
- i. Press ball bearing (049) on power rotor (063), pressing only on inner race of bearing.
- j. Install outer truarc ring (042) in groove of power rotor (063) shaft.

STEP 18. Install assembled power rotor (063) in pump, centering all parts as they enter inboard cover (046 or 085). NOTE: *(Figures 11, 12, 13 and 15)* Bearing spacer (048) to be aligned with slot located over drain.

STEP 19. *(Figure 14 Only)* Install gasket (087) on face of ball bearing (049).

STEP 20. Install bearing retainer (043) on cover (046) using bolts (047). If applicable, install washers (092) with bolts (047). Torque bolts (047) to proper value listed in Table 3.

STEP 21. *(Figure 14 Only)* Press lip seal (086) on power rotor (063) shaft, ensuring that lip seal is not damaged as it is installed.

STEP 22. Install idlers (035 and/or 087) by screwing them into housing idler bores. NOTE: Quantity of idlers (035 and/or 087) will vary depending on pump type. Refer to applicable assembly drawing, Figures 8 through 15, and List of Materials, Table 4.

STEP 23. Install idlers (021) in housing (050, 073 or 095) in idler bores and install idler balance piston housings (023) on idlers (021).

STEP 24. *(Figure 10 Only)* Install spacers (097) and thrust plate (029) using capscrews (098) and (099) with Dyna seal (007). Torque capscrews (098) to proper value listed in Table 3. Install spacer (096).

STEP 25. *(Figures 8, 9, and 11 thru 15)* Install O-rings (027) on oil balance tube (026) and install oil balance tube (026) in housing (024, 050 or 073). Install thrust cage (029), ensuring that bore in thrust cage (029) engages oil balance tube (026).

STEP 26. *(Figure 12 Only)* Install retaining ring (090) in groove of case (001).

STEP 27. Install retaining ring (008) or spacer (089) in case (001).

STEP 28. *(Figures 8, 11, 12, 13, 14 and 15)* Install gasket (009) on case (001).

**STEP 29. (Figures 9, 10 and 11 - Inlet Head with O-ring)** Install O-ring (088) in groove of inlet head (002).

**STEP 30.** Install inlet head (002) using capscrews or bolts (004). If applicable, washers (090 or 092) will be installed with bolts (004). Torque capscrews or bolts (004) to proper value listed in Table 3.

**NOTE:** Inlet head (002) can be rotated and re-positioned in 90° increments to suit suction pipe arrangements. To change the inlet head position, disconnect tubing, remove capscrews or bolts, and rotate inlet head to desired position, ensuring that gasket or O-ring is not damaged. Replace capscrews or bolts and torque capscrews or bolts to proper value listed in Table 3.

**STEP 31.** Install coupling hub and key (031).

**STEP 32. (Figure 15 Only)** Install checknut (064) and setscrew (060). **NOTE:** Checknut (064) and setscrew (060) installed on 400 rotor size only.

**STEP 33.** Install seal piping (071). Install all plugs removed during disassembly.

**STEP 34.** Mount pump on baseplate and align with driver as described in CA-1 manual.

**TABLE 4**  
**LIST OF MATERIAL (FIGURES 8 THROUGH 15)**

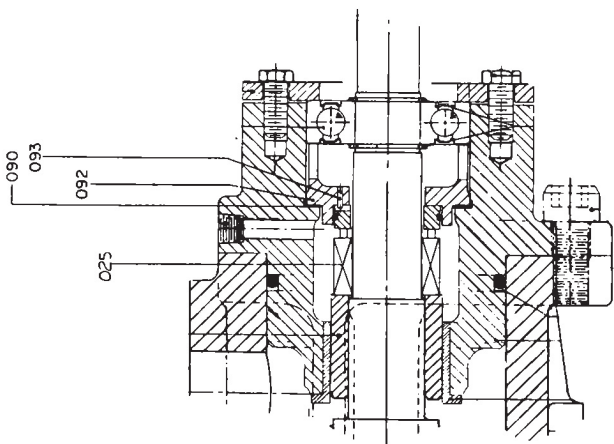
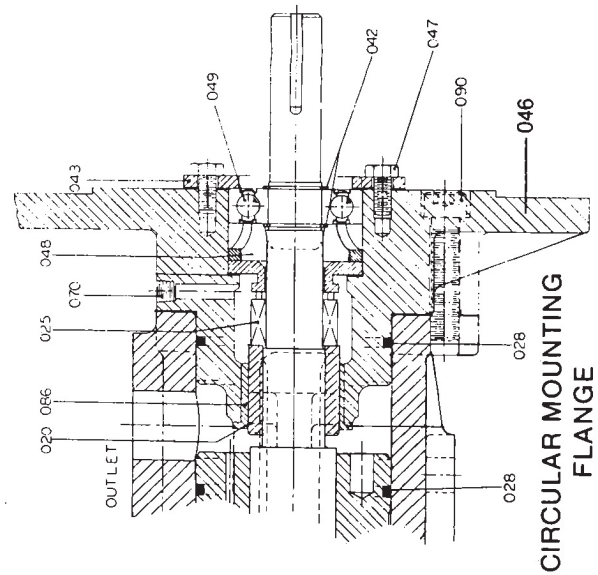
Part	Description	Part	Description	Part	Description
001	Case	034	Drive Screw (3)	078 (2)	Balance Piston Hous-
ing 002	Inlet Head	035 (2) (10)	Idler (6)	079 (2)	Balance Piston Bush-
ing 004 (3)	Bolt or Capscrew	038	Sleeve	080 (2)	Idler Stop
				080 (2)	Retainer
				081	Capscrew (2)
005	Plug (2)	042 (2)	Truarc Ring (2)	081 (2)	Retaining Ring
006 (2)	Stop Pin	043	Retainer	082	Spring Pin
007 (1)	Dyna Seal	046	Inboard Cover	083 (1)	Back-up Ring (2)
008 (4) (2) (13)	Spiral Ring (2)	047	Bolt (4)	084 (18)	Spacer
009 (1) (5)	Gasket (2)	048	Spacer	085 (19)	Inboard Cover
011	Capscrew (2)	049 (1)	Ball Bearing	086 (2)	Bushing
		050 (2) (11)	Housing	087 (2)	Idler (2)
		063 (2)	Power Rotor	088 (1)	O-ring
021 (2)	Idler (2)	067	Plug (2)	089	Spacer
022 (2)	Balance Piston Housing	068	Nipple	090	Capscrew (4)
023 (2)	Idler Balance Piston Housing (2)	069	Elbow	091	Spacer
				091 (014) (2)	Balance Piston
					Housing Assembly
024 (2)	Housing	070	Elbow	092	Spacer
025 (1)	Seal	071	Seal Pipe	093	Stop Plate
026 (6)	Tube (5)	072	Plug (3)	094	Spring Pin (2)
027 (1) (7)	O-ring (8)	073 (2) (12)	Housing	095 (2)	Housing
028 (1) (8)	O-ring (2)	074	Elbow	096	Spacer
029 (2) (9)	Cage	075	Connector	097	Spacer
030	Drive Screw (2)	076	Nipple	098	Capscrew
031	Key	077	Vent Pin (2)	099	Capscrew
033	Name Plate				

Quantities are one (1) except when noted in parentheses after part description or in notes below.

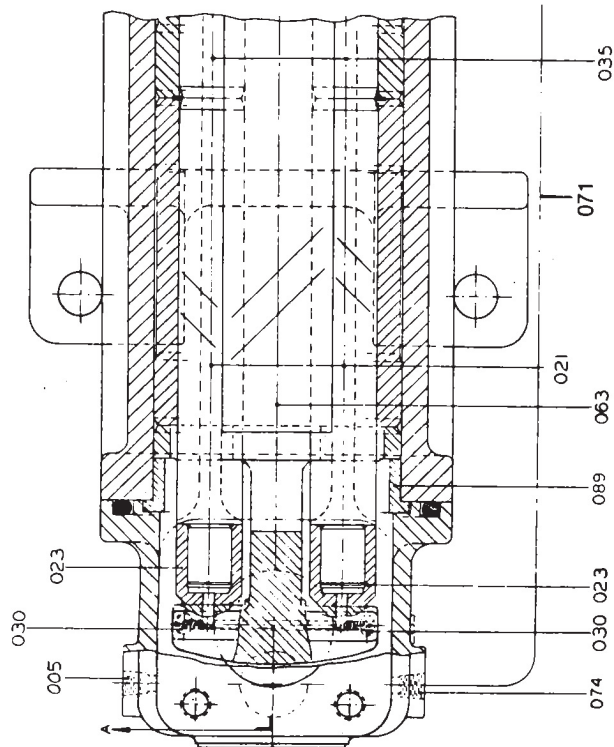
- (1) Minor Repair Kit items.
- (2) Major Repair Kit items. Items marked (1) also included in Major Repair Kit.
- (3) Quantity is four (4) for Figure 8; eight (8) for Figures 9, 10, and sixteen (16) for Figures 11-15.
- (4) Quantity is one for 106-187.
- (5) Not Required for 156 and 187.
- (6) Quantity is four for 156 and 187.
- (7) Quantity is two (2) for Figures 13 and 14.
- (8) Quantity is three (3) for Figure 10.
- (9) Part Description is Plate for Figure 10.
- (10) Quantity is two (2) for Figures 13 and 14, four (4) for Figures 9, 10 and 12.
- (11) Quantity is three (3) for Figures 8, 10 and 15.
- (12) Quantity is (2) for Figures 11 and 12.
- (13) Rotor sizes 218-300 two Retaining Rings (008) have been replaced with a Retainer (080) and Retaining Ring (081) adjacent to Balance Piston Housing (022).
- (14) Can only be purchased as a complete assembly.







MECHANICAL SEAL WITH O-RING SEAT



GASKET FURNISHED WITH SEAL PC. NO. 025

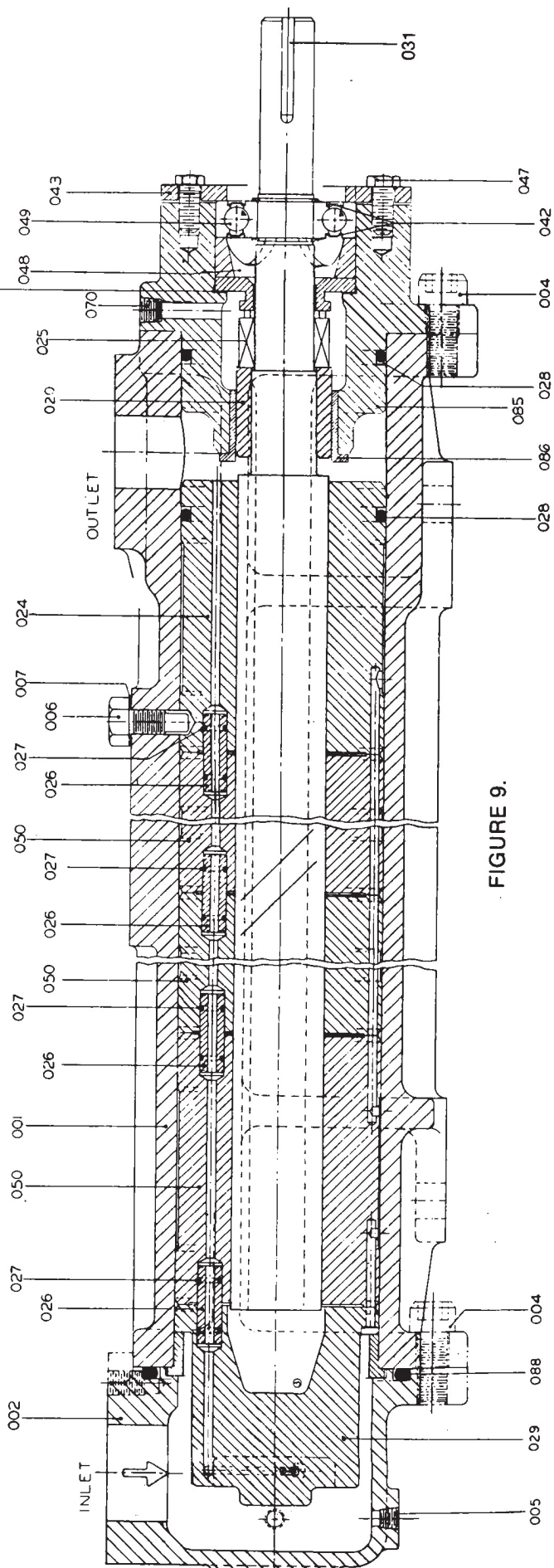


FIGURE 9.

MECHANICAL SEAL WITH CLAMPED SEAT

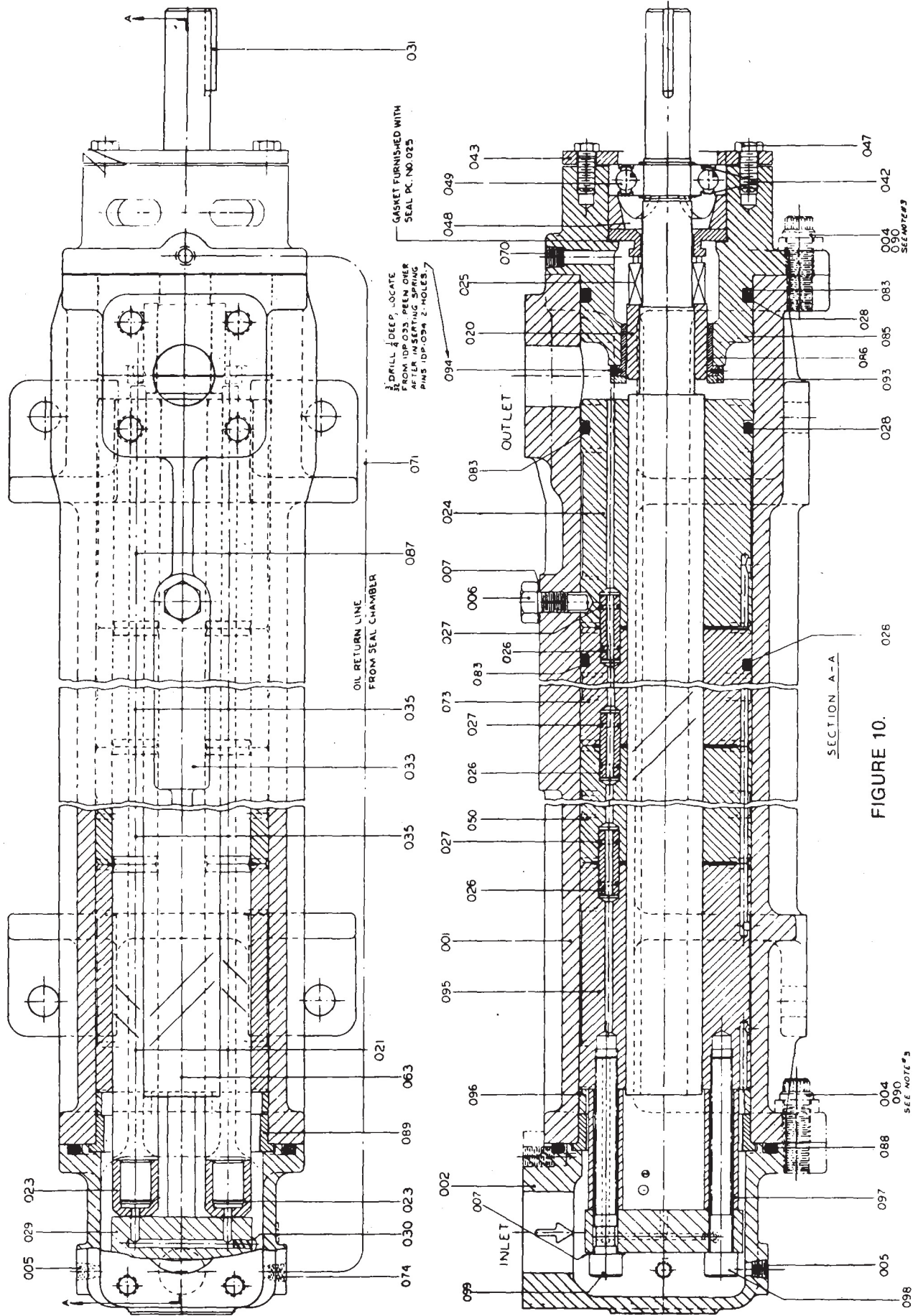
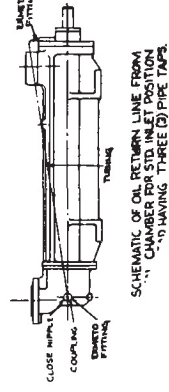
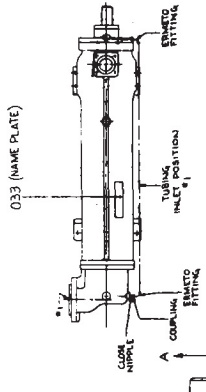
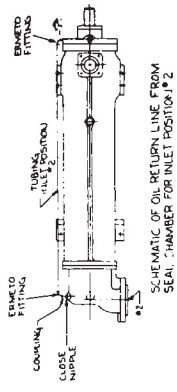


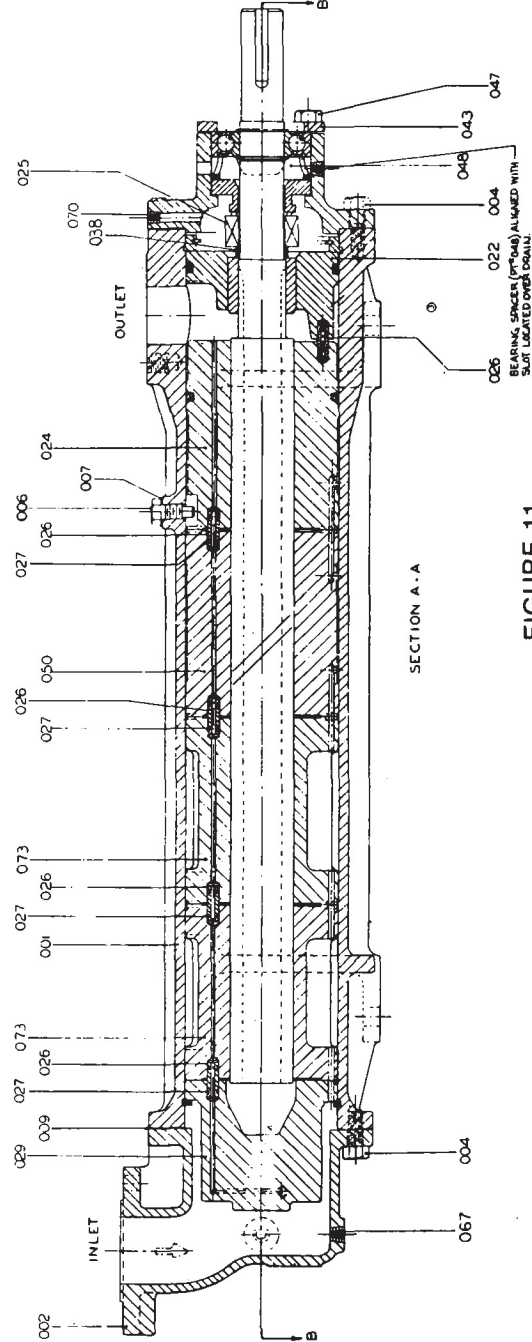
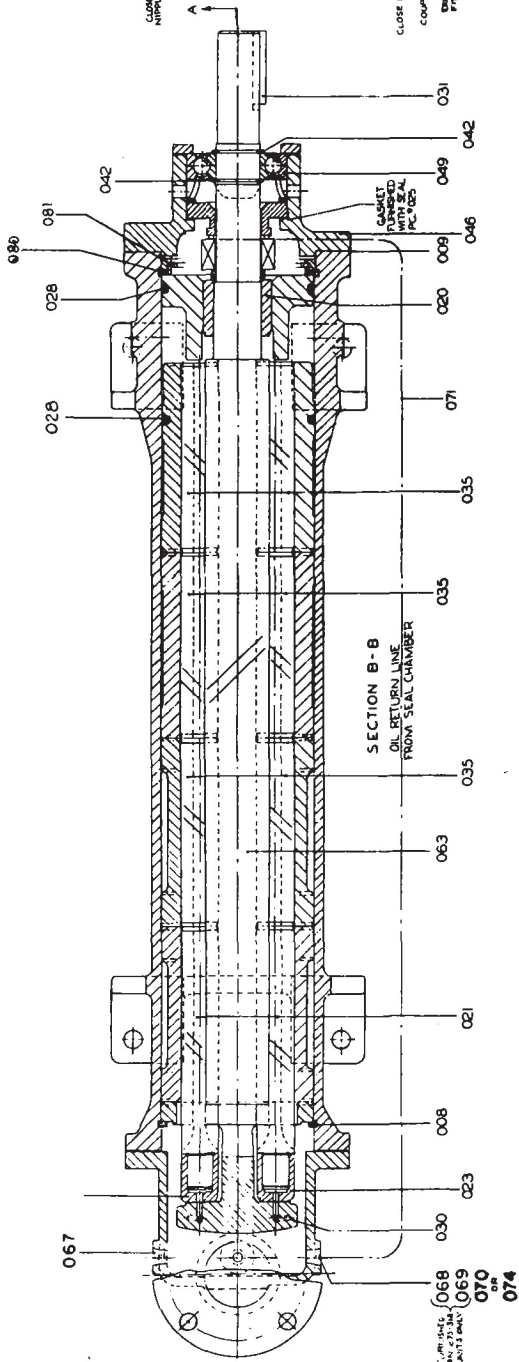
FIGURE 10.

SECTION A-A

SEE NOTE#5



- NOTES:
- 1 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY
  - 2 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY
  - 3 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY
  - 4 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY
  - 5 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY
  - 6 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY
  - 7 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY
  - 8 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY
  - 9 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY
  - 10 BALL BEARING DESIGN OR NO ODS NOT SERVICED SEPARATELY



MECHANICAL SEAL WITH CLAMPED SEAT

FIGURE 11.

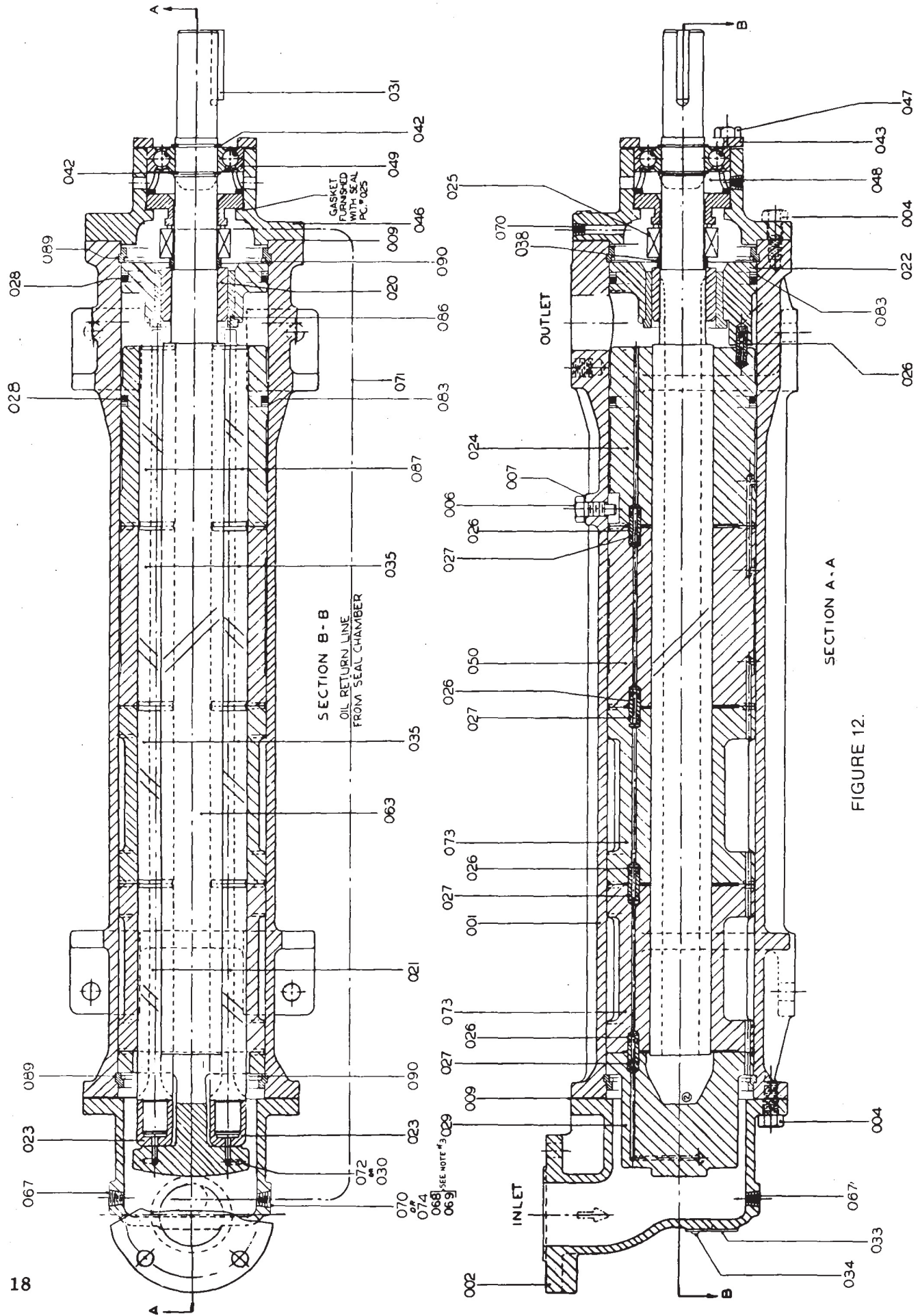


FIGURE 12.

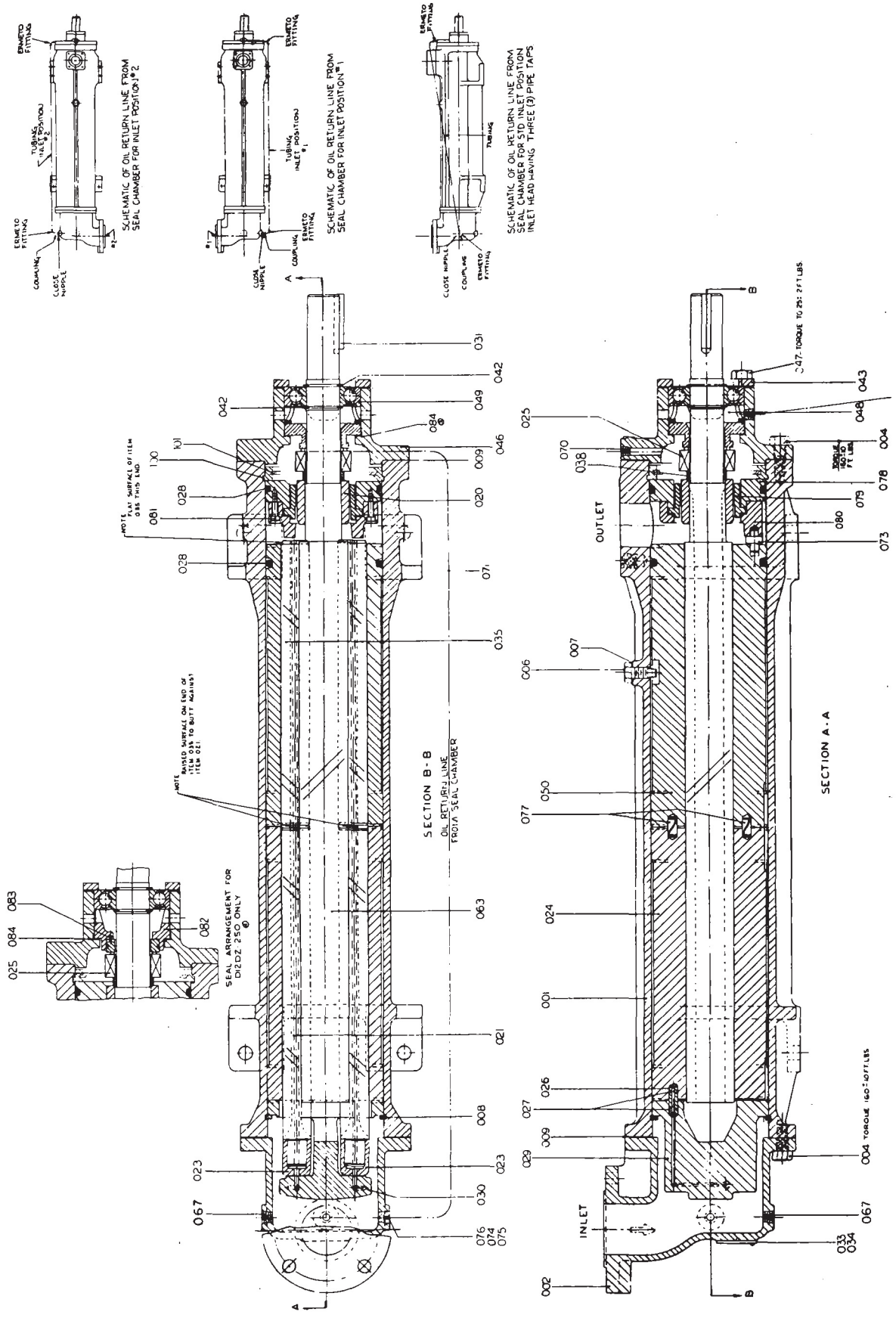


FIGURE 13.

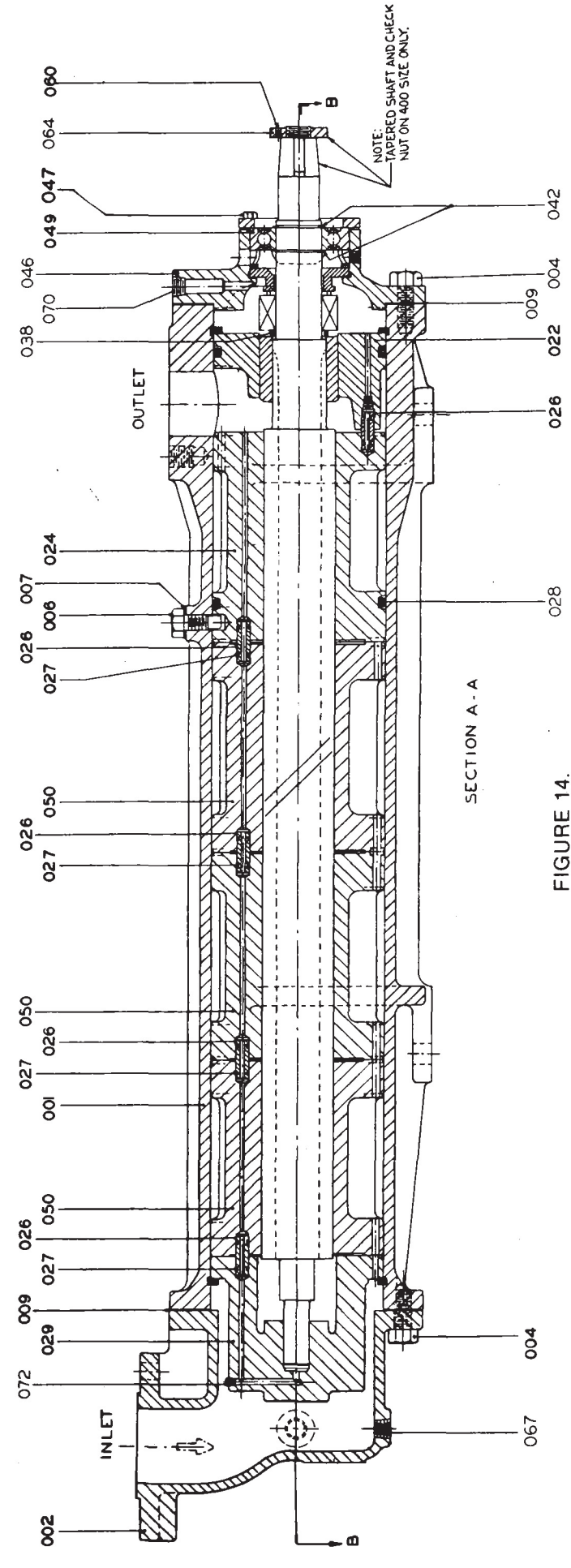
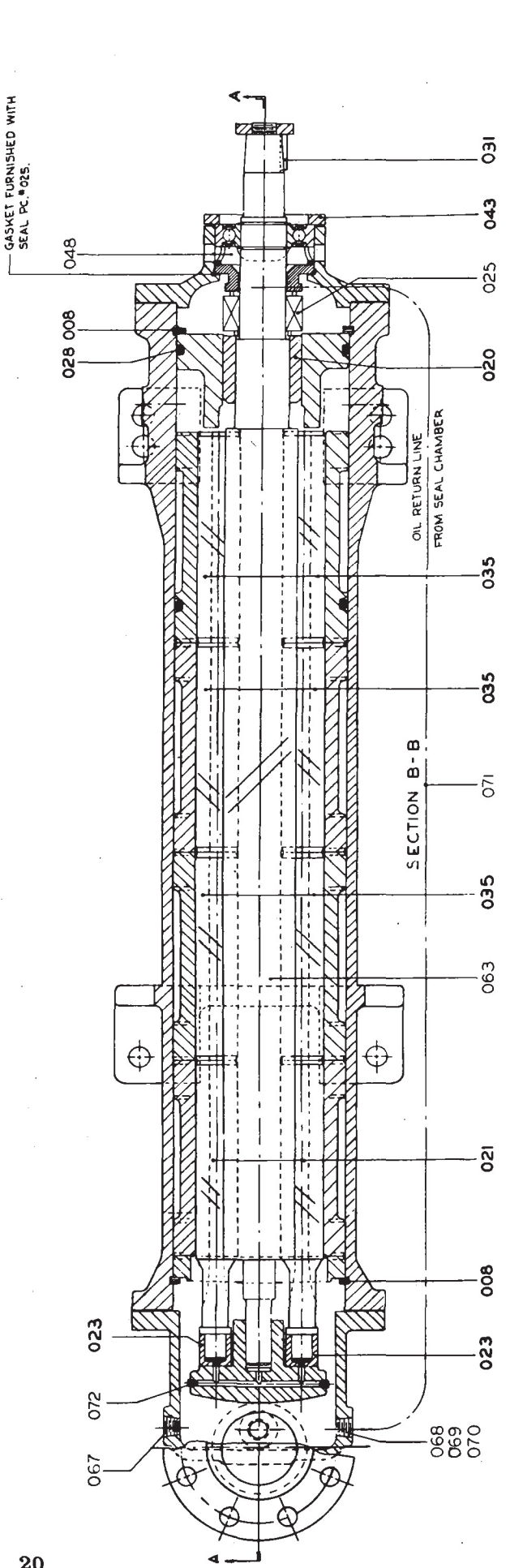
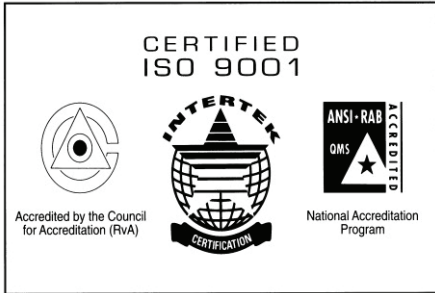


FIGURE 14.

The instructions given herein cover generally the operation and maintenance of subject equipment. Should any questions arise which may not be answered specifically by these instructions, they should be referred to the Imo Pump for further detailed information and technical assistance.

This manual cannot possibly cover every situation connected with the operation, adjustment, inspection, test, overhaul and maintenance of the equipment furnished. Every effort is made to prepare the text of the manual so that engineering and design data is transformed into the most easily understood wording. The Imo Pump, in furnishing this equipment and this manual, must presume that the operating and maintenance personnel assigned thereto have sufficient technical knowledge and experience to apply sound safety and operational practices which may not be otherwise covered herein.

In applications where the Imo Pump furnished equipment is to be integrated with a process or other machinery, these instructions should be thoroughly reviewed to determine the proper integration of the equipment into the overall plant operational procedures.



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