



**INSTRUCTION MANUAL  
AND  
PARTS LIST  
FOR  
3G SERIES PUMPS  
SIZES 187 THROUGH 250  
*(Iron Version Only)***







**WARNING**

This Special Instruction Manual and General Instructions Manual, CA-1, should be read thoroughly prior to pump installation, operation or maintenance.

SRM00074	Rev. 0 (01-0228)	May 02, 2001
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## READ THIS ENTIRE PAGE BEFORE PROCEEDING

FOR THE SAFETY OF PERSONNEL AND TO PREVENT DAMAGE TO THE EQUIPMENT, THE FOLLOWING NOMENCLATURE HAS BEEN USED IN THIS MANUAL:

	<b>DANGER</b>	
Failure to observe the precautions noted in this box can result in severe bodily injury or loss of life.		
	<b>WARNING</b>	
Failure to observe the precautions noted in this box can cause injury to personnel by accidental contact with the equipment or liquids. Protection should be provided by the user to prevent accidental contact.		
<b>CAUTION</b>		<b>ATTENTION</b>
Failure to observe the precautions noted in this box can cause damage or failure of the equipment.		
Non compliance of safety instructions identified by the following symbol could affect safety for persons:  	Safety instructions where electrical safety is involved are identified by:  	Safety instructions which shall be considered for reasons of safe operation of the pump and/or protection of the pump itself are marked by the sign:  <b>ATTENTION</b>

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**ATTENTION**

***If operation of this pump is critical to your business, we strongly recommend you keep a spare pump or major repair kit in stock at all times. As a minimum, a minor repair kit (o-rings, gaskets, shaft seal and bearings) should be kept in stock so pump refurbishment after internal inspection can be accomplished.***

## A. GENERAL INSTRUCTIONS

The instructions found herein cover the disassembly, assembly and parts identification of the 3G-187 through 250 Series, Imo pumps.

**NOTE:** Individual contracts may have specific provision that vary from this manual. Should any questions arise which may not be answered by these instructions, refer to the General Instructions Manual, CA-1, provided with your order. For further detailed information and technical assistance please refer to Imo Pump, Technical Service Department at (704) 289-6511.

This manual cannot possibly cover every situation connected with the installation, operation, inspection and maintenance of the equipment supplied. Every effort was made to prepare the text of the manual so that engineering and design data is transformed into the most easily understood wording. Imo Pump must assume the personnel assigned to operate and maintain the supplied equipment and apply this instruction manual have sufficient technical knowledge and are experienced to apply sound safety and operational practices which may not be otherwise covered by this manual.



### WARNING

If installation, operation and maintenance instructions are not correctly and strictly followed and observed, injury to personnel or serious damage to pump could result. Imo Pump cannot accept responsibility for unsatisfactory performance or damage resulting from failure to comply with instructions.

## B. INTRODUCTION

This instruction manual covers series 3G Imo Pumps. This series of pumps has been designed for general use in lubricating, seal and distillate fuel oil applications. The size and construction of each pump is identified in the model number on the pump nameplate. Definitions of model designators are identified in Figure 1.

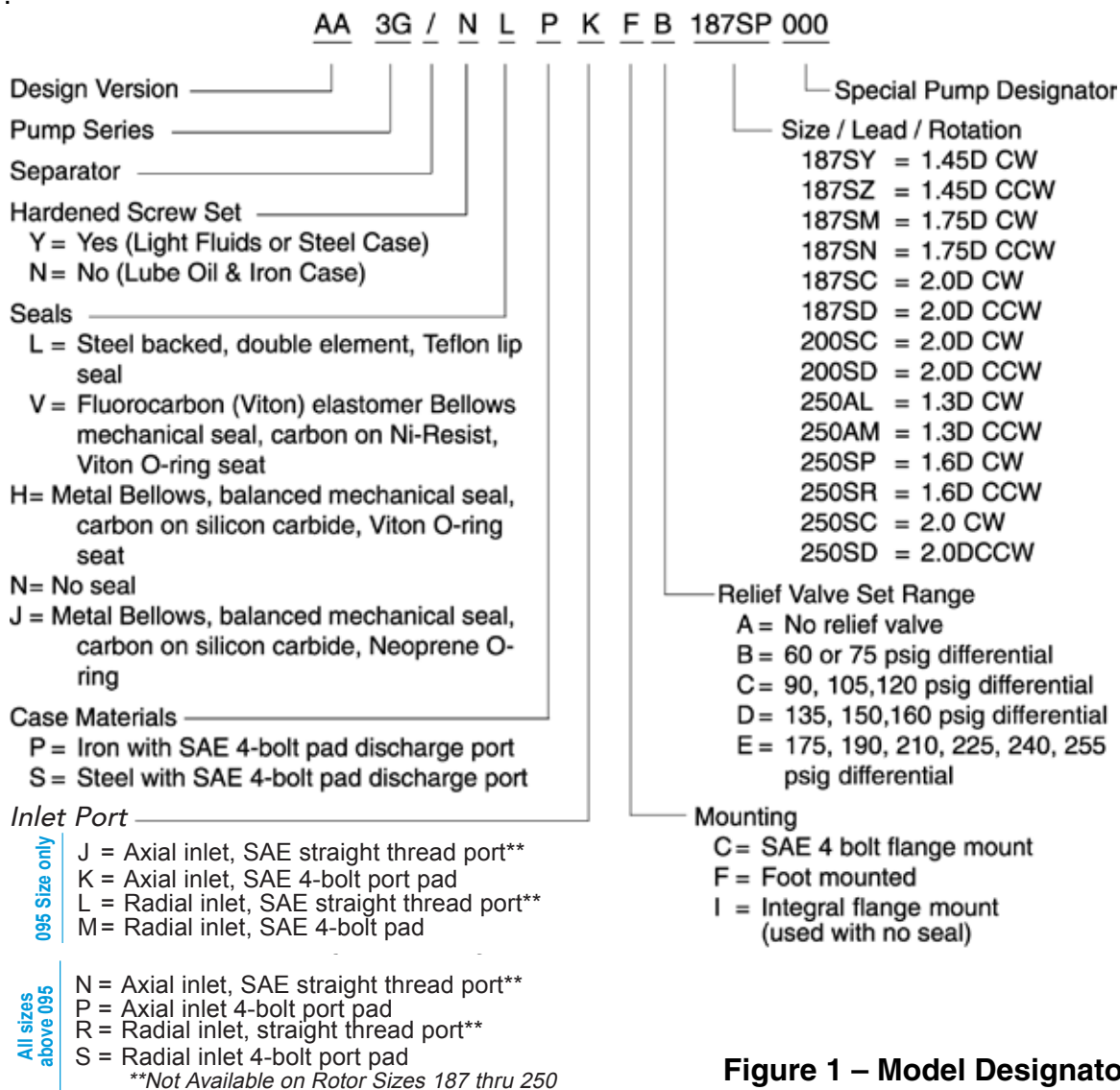



Figure 1 – Model Designator Definitions



## MODELS WITH RELIEF VALVES

<b>CAUTION</b>		<b>ATTENTION</b>
<p>The optional built-in relief valve is intended for momentary protection of the pump against overpressure. It is <u>not</u> intended to be a pressure or flow control device. Continuous bypass of pumped liquid through this valve will cause the liquid to heat up very rapidly. Excessive temperature rise will damage the pump.</p> <p>The optional externally connected relief valve can be used as a pressure or flow control device if its bypass line is piped back to the fluid tank and not the pump inlet. The minimum and maximum relief valve set pressures are 60 psid (4.1 Bar) and 255 psid (17.6 Bar) respectively.</p>		

	<b>DANGER</b>	
<p>Relief valves are pre-set at the factory. <b><u>DO NOT TAMPER WITH RELIEF VALVE.</u></b> Tampering with relief valve will void pump warranty and can cause bodily injury or loss of life. If relief valve must be adjusted, return pump to factory.</p>		

## PARTS LIST TABLE – TABLE 2

IDP	QTY	DESCRIPTION
1	1	Housing
2	1	Inlet Cover
3	8	Bolt
4	1	Inboard Cover
7	1	Shaft
8	2	Idler Rotor
11X	1	Ball Bearing

IDP	QTY	DESCRIPTION
13	1	Key
15 X	1	Retaining Ring
16 X	1	Seal
26 X	1	Inlet Cover O-Ring
31X	1	Inboard Cover O-Ring
47	1	Pipe Plug
95	1	Pin

X = Minor Repair Kit Item

## INSPECTION

The interval for inspection and replacement of worn parts varies with the properties of the pumped liquid and can only be determined by experience. All internal parts of the 3G Series pumps are lubricated by the pumped fluids. Pumping liquid which contains abrasive materials or liquid that is corrosive, will significantly reduce service life and call for shorter service intervals. A worn pump will be noticeable by excessive vibration, noise, reduction in flow output and/or reduction in system pressure.

## PUMP MAINTENANCE



### WARNING

Failure to observe precautions while installing, inspecting, and maintaining the pump can cause injury to personnel from accidental handling, e.g.: Liquids that may harm skin or clothing, fire hazard risks from flammable liquids, or injury from high pressure fluid jets.



### DANGER

**BEFORE** working on equipment, be sure all power to the equipment is disconnected and locked-out.

### GENERAL COMMENTS

Part number identifiers (IDPs) contained in Table 2 and shown within parenthesis such as (8) refer to the circled numbers shown on the assembly drawings.

**NOTE:** If upon disassembly, significant wear on power or idler rotors or rotor housing is found, Imo Pump recommends replacement of the entire pump.

### TOOLS REQUIRED

The procedures described in this manual require common mechanics hand tools, an arbor press, a torque wrench and a suitable lifting device such as a sling for smaller pumps or a strap for larger models.

### PUMP DISASSEMBLY – SEE ASSEMBLY DRAWING, FIGURE 4

#### CAUTION

#### ATTENTION

Fluid leakage from disassembly of pump may make the floor slippery and cause personal injury.

### The following steps are required before starting any maintenance action:

- a) De-energize and lock out power to driver and tag power control box “**WARNING - Out of Service**”.
- b) Close all inlet and outlet valves and tag valves “**WARNING - Out of Service**”.
- c) Vent pressure from pump and drain pumping liquid.
- d) Remove pipe fittings/flanges at pump inlet and outlet openings.
- e) Remove bolts holding pump to its mounting.
- f) Remove coupling hub and key (13) from power rotor (7) shaft and locate pump on a suitable workbench.

**NOTE:** The 3G Series pumps incorporate highly finished precision parts that must be handled carefully to avoid damage to critical machined surfaces. The parts removed should be tagged for identification and their exact positions in the pump carefully noted so that new parts, or the removed parts can be properly replaced.

#### CAUTION

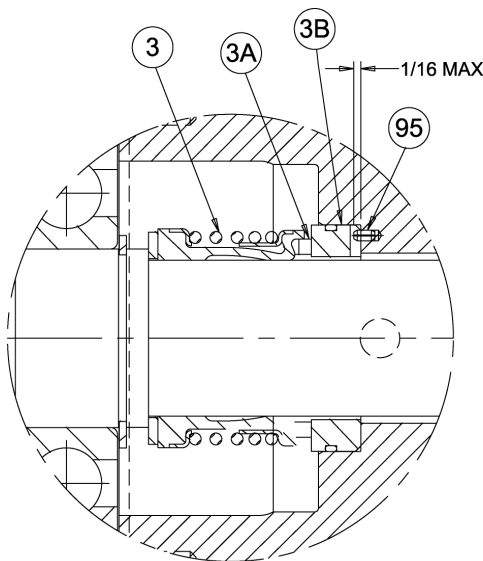
#### ATTENTION

When removing inboard cover (4) from pump in step 1, below, DO NOT pull out the rotors (7 & 8) since they may drop to floor and be damaged. If rotors start to come out, hold them in place.

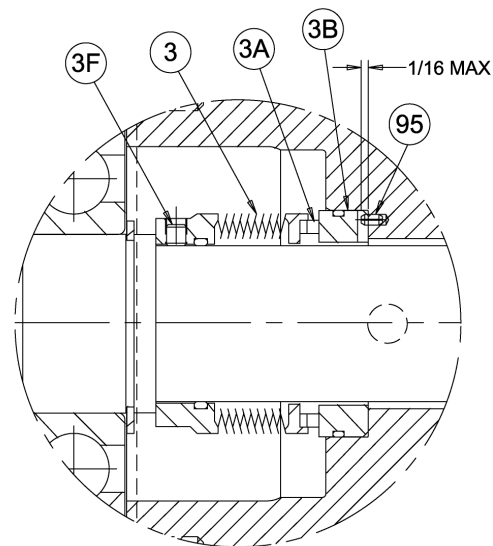
1. Remove bolts (3) from inboard cover (4) and then remove inboard cover (4) from pump housing (1).
2. For lip seal installed pumps, remove lip seal (16) and O-ring (31) from inboard cover (4). For mechanical seal installed pumps, remove stationary seat of seal (16) and O-ring (31) from inboard cover (4).

<b>CAUTION</b>	<b>ATTENTION</b>
<p>In next step, the rotors will be removed from the pump. They will come out as a unit. Use care to support the rotors set as it is withdrawn from the housing so the idlers will not be dropped on the floor.</p>	

3. Remove power rotor (7) and idlers (8) by grasping shaft of power rotor and easing it out of housing (1). Set idlers (8) aside.
4. For mechanical seal pumps, perform the following:
  - a) For Elastomeric Bellows Type Seals (see Figure 2 below) – Slide rotating assembly (3) of mechanical seal (16) off power rotor (7).
  - b) For Metal Bellows Type Seals (see Figure 3 below) – Loosen set screw (3F) and slide rotating assembly (3) from power rotor (7).



**FIGURE 2 – ELASTOMERIC BELLOWS MECHANICAL SEAL WITH SPACER**



**FIGURE 3 – METAL BELLOWS MECHANICAL SEAL**

**NOTE:** IF ONLY REPLACING SEALS, pump disassembly is complete. For lip seal installation, proceed to Pump Reassembly and complete steps 3, 4, 8 through 11 and 13 through 16. For mechanical seal installation, complete steps 3, 5 through 10 and 12 through 16. If remainder of pump needs to be disassembled, proceed below.

5. Remove ball bearing (11) from power rotor (7) by first removing the retaining ring (15) from the groove in the power rotor (7) shaft. The ball bearing (11) can then be removed with a gear puller or arbor press.

<b>CAUTION</b>	<b>ATTENTION</b>
<p>Removal of bearing by force applied to its outer ring could damage bearing.</p>	

**NOTE:** Imo Pump strongly recommends replacement of the ball bearing every time the bearing is pressed off the power rotor.

6. Remove inlet cover (2) by removing four bolts (3).
7. Remove O-ring (26) from inlet head (2).

## PUMP REASSEMBLY – SEE ASSEMBLY DRAWING – FIGURE 4

**NOTE:** Prior to pump assembly, all parts should be cleaned and inspected for nicks, burrs or gouges. When ready for assembly, wipe all parts, including bolts, O-rings and seal faces with clean, lubricating oil or pumped product, if applicable.

### CAUTION

### ATTENTION

Bearing service life could be significantly reduced if the bearing is pushed on by its outer race.

1. Install ball bearing (11) onto shaft (7) using an arbor press and sleeve by pushing on ball bearing (11) inner race only until ball bearing (11) is positioned against shoulder on power rotor (7).
2. Install retaining ring (15) in groove in power rotor (7).
3. Before installing seal (16), insure power rotor (7) shaft is clean and has no burrs or sharp edges.
4. If pump has a lip seal (16), install lip seal into outboard cover (4) and skip to step 7 below.  
Note: Seal Lip is graphite impregnated Teflon and should **not** be lubricated when installed.)
5. If pump has mechanical seal (16), apply clean lubricating oil to rotor shaft at seal diameter.
  - a. **If seal has elastomeric rubber bellows, (see figure 2)**, apply light film of oil to bore of bellows and install rotating assembly (3) on power rotor (7) shaft with a twisting motion by pushing on seal retainer only with fingers. Do not touch carbon face with fingers. Clean carbon face of seal with alcohol and lint free cloth. Apply light film of clean lubricating oil to carbon face.
  - b. **If seal is metal bellows type, (see figure 3)**, apply a light film of oil to rotating seat O-ring of seal and slide rotating assembly (3) on power rotor shaft (7). Tighten setscrew (3F). Do not touch carbon seal face with fingers. Clean carbon face of seal with alcohol and lint free cloth. Apply light film of clean lubricating oil to carbon face.
6. Apply light film of clean lubricating oil on seat and O-ring of stationary seat (3B) of mechanical seal (16). Install stationary seat (3B) into bore in inboard cover (4) with fingers (do not touch seal face with any tools) so slot in face of seal is facing into inboard cover (4). Be sure stationary seat (3B) is all the way to bottom of the bore in inboard cover (4) and slot in seal mates up to pin (95) in inboard cover (4).
7. Clean stationary seat of mechanical seal (16) in inboard cover (4) with alcohol and soft, lint free cloth, and apply light film of clean lubricating oil to carbon face.
8. Mesh the two idler rotors (8) and power rotor (7) together into a rotor assembly making sure idler rotors and balance piston are properly engaged.
9. Install rotors by positioning pump housing in a vertical position and sliding rotor assembly into housing bore (1) until ball bearing (11) bottoms out in housing bore.
10. Install O-ring (31) in groove in inboard cover (4).
11. If pump has lip seal (16), install seal installation tool (see figure 8) on coupling end of power rotor (7). Then, carefully install inboard cover (4) on housing being sure that inboard cover (4) is kept square with power rotor shaft and inner lip seal lip (16) does not roll under as cover (4) is installed

### CAUTION

### ATTENTION

Failure to use seal installation tool (see Figure 8) on lip seal units is likely to result in improper lip seal installation.

12. If pump has mechanical seal, install inboard cover (4) on housing (1) without seal installation tool.

**CAUTION**

**ATTENTION**

**To maximize seal life, seal vent in cover must be oriented at 12:00 o'clock when pump is horizontally mounted in its installed position. Vent orientation is not critical when unit is vertically mounted.**

13. Install the four bolts (3) into inboard cover (4) and thread bolts into housing (1). Torque bolts to values shown on assembly drawing.
14. Install O-ring (31) in groove in inlet head (2).
15. Install inlet head (2) onto housing (1) with cap screws (3).
16. Installing key (13) into power rotor (7) keyway and coupling on shaft (7).
17. On pumps with external relief valves, install relief valve using cap screws (5) and O-ring (10). See figure 8. Relief valve can be installed in original position or facing 180° from original position.

## **INSTALLATION, ALIGNMENT AND TROUBLESHOOTING**

Install coupling to driver shaft and align pump and driver as detailed in the Installation Manual, CA-1.

After pump is connected to piping and inlet and outlet valves are open, be sure to vent air from seal chamber before starting pump by opening pipe plug at inboard end of pump until oil comes out. This will assure that seals are lubricated at startup.

For detailed instructions regarding installation, alignment, operation and trouble shooting, see General Installation, Operation, Maintenance & Troubleshooting Manual, CA-1.

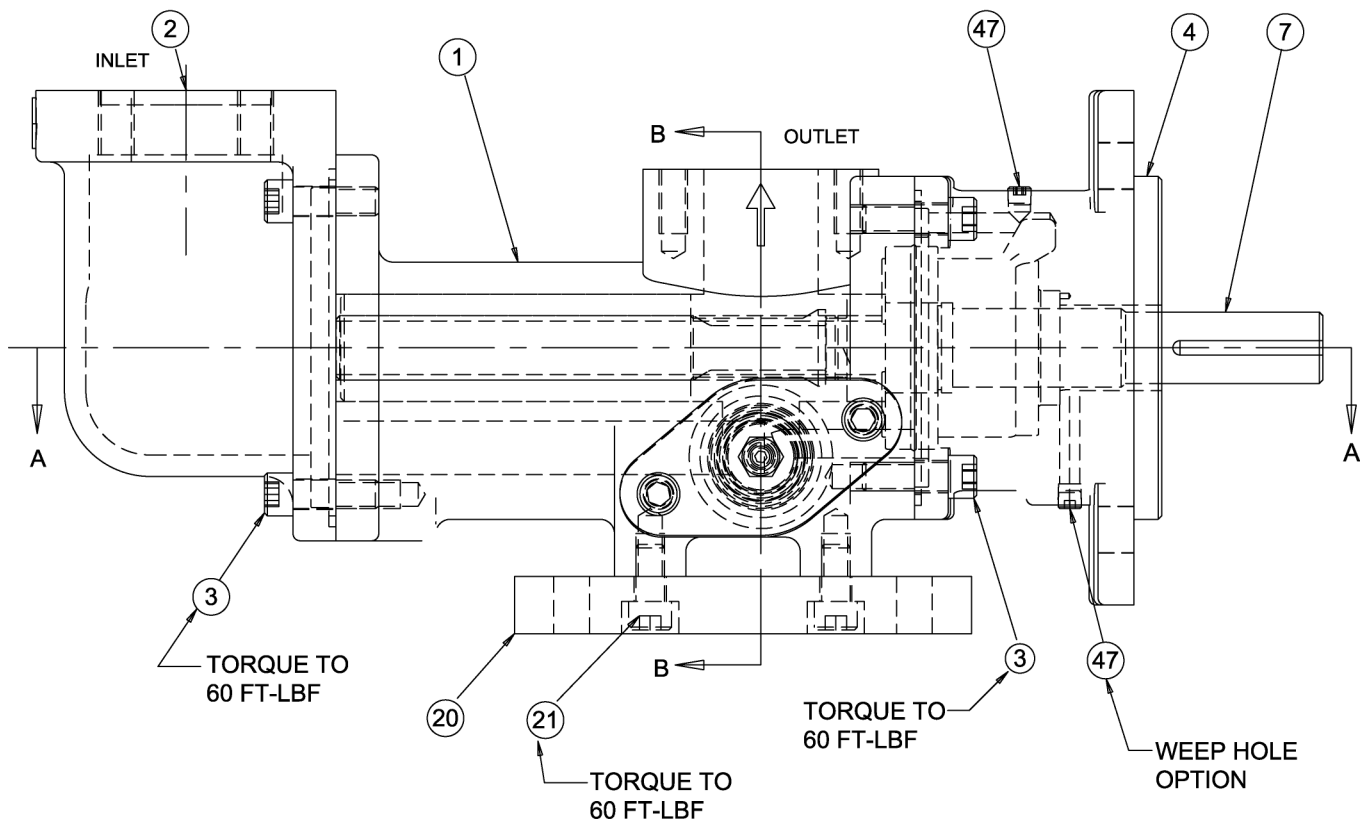
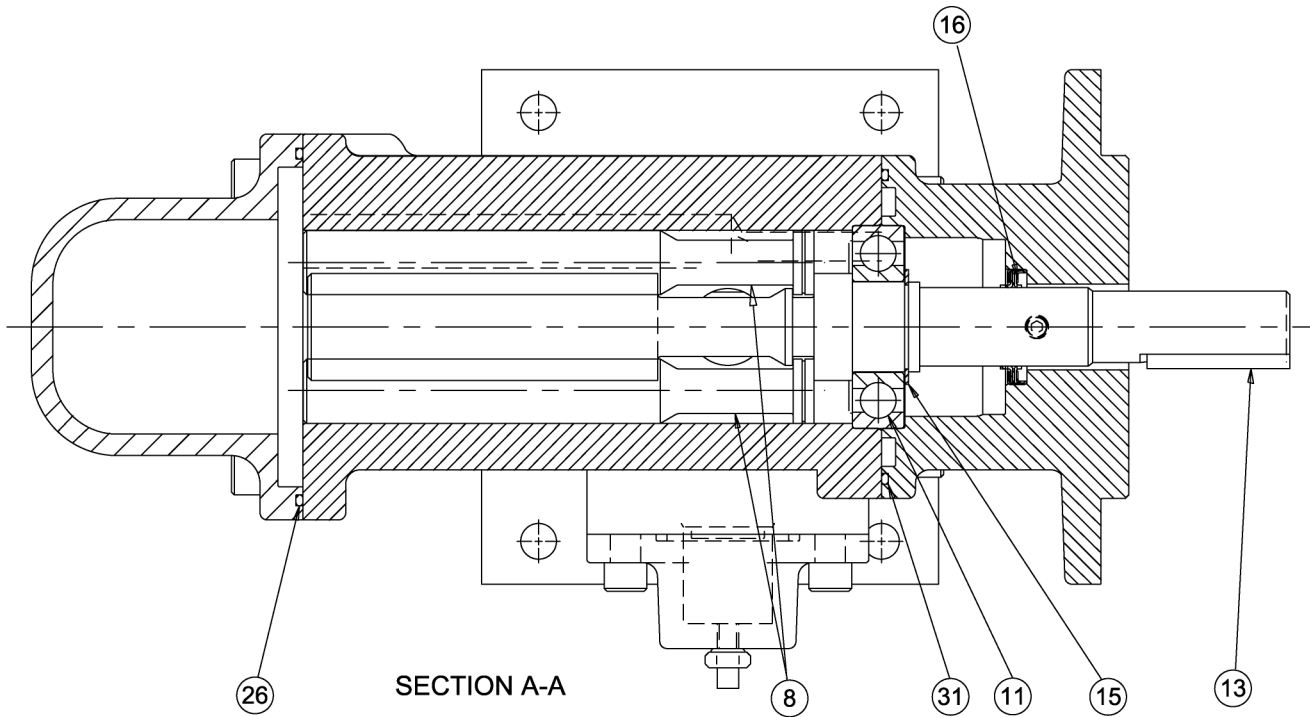
## **FIELD AND FACTORY SERVICE AND PARTS**

Imo Pump maintains a staff of trained service personnel that can provide pump installation, pump start-up, maintenance/overhaul and troubleshooting supervision as well as installation and maintenance training.

Our factories provide maintenance as well as overhaul and test facilities in the event the user prefers to return pumps for inspection or overhaul. Pumps that have been factory-overhauled are normally tested and warranted "as-new" for a period of one year from date of shipment.

For either field service or factory overhaul assistance, contact your local Imo Sales Office or representative at the Technical/Customer Service Department in Monroe, NC, USA.

Most pumps have minor repair kits available. Minor Repair Kits are used to repair leaking seals, bad bearings and/or for re-assembly after pump tear-down. They include (as applicable) pump shaft seals, packing, all gaskets/O-rings and bearings. Since kits have all the necessary parts, it is preferred that they be purchased rather than selecting individual parts. When parts are individually selected from the Parts List, some needed components are often overlooked. In addition, mixing worn or used parts with new parts risks rapid wear and shortened service life from the new parts.



**Figure 4 –Pump Assembly Drawing**





ALLWEILER



HOUTTUIN



IMO PUMP



WARREN



**COLFAX PUMP GROUP**



A MEMBER OF THE  
COLFAX PUMP GROUP

**Imo Pump**

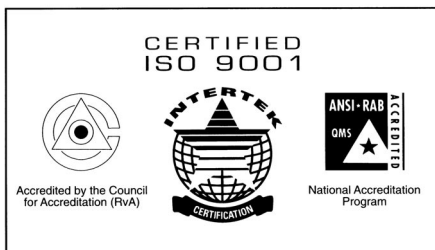
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