



**Product Service Manual for
(A)G6D_(C) (S)-137, 350 and 400
SERIES PUMPS**



WARNING

This Instruction Manual and General Instructions Manual (SRM00046), should be read thoroughly prior to pump installation, operation or maintenance.

SRM00113

Rev. 0

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READ THIS ENTIRE PAGE BEFORE PROCEEDING

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

	DANGER	
Failure to observe precautions noted in this box can result in severe bodily injury or loss of life.		

	WARNING	
Failure to observe precautions noted in this box can cause injury to personnel by accidental contact with equipment or liquids. Protection should be provided by user to prevent accidental contact.		

CAUTION		ATTENTION
Failure to observe precautions noted in this box can cause damage or failure of equipment.		

Non compliance of safety instructions identified by the following symbol could affect safety for persons: <div style="text-align: center;"></div>	Safety instructions where electrical safety is involved are identified by: <div style="text-align: center;"></div>	Safety instructions which shall be considered for reasons of safe operation of pump and/or protection of pump itself are marked by the sign: <div style="text-align: center;">ATTENTION</div>
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ATTENTION	
If operation of 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.	

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A. GENERAL INSTRUCTIONS

The instructions found herein cover the disassembly, assembly and parts identification of (A)G6D_(C)-137, 350 and 400 series pumps

NOTE: Individual contracts may have specific provisions that vary from this manual. Should any questions arise which may not be answered by these instructions, refer to the General Instructions Manual, SRM00046, provided with your order. For further detailed information and technical assistance please refer to Imo Pump, Technical/Customer Service Department, at (704) 289-6511.

This manual cannot possibly cover every situation connected with the installation, operation, inspection, and maintenance of equipment supplied. Every effort was made to prepare text of manual so that engineering and design data is transformed into the most easily understood wording. Imo Pump must assume personnel assigned to operate and maintain 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.

In applications where equipment furnished by Imo Pump is to become part of processing machinery, these instructions should be thoroughly reviewed to ensure proper fit of said equipment into overall plant operational procedures.

	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 (A)G6D_(C)-137, 350 and 400 Imo pumps. This series of pumps has been designed for use in hydraulic, lubricating, seal, distillate, residual, fuel and crude oil applications. The model and design construction of each pump can be identified by the designator code on the pump nameplate. Definitions of model designators are identified in figure 1.

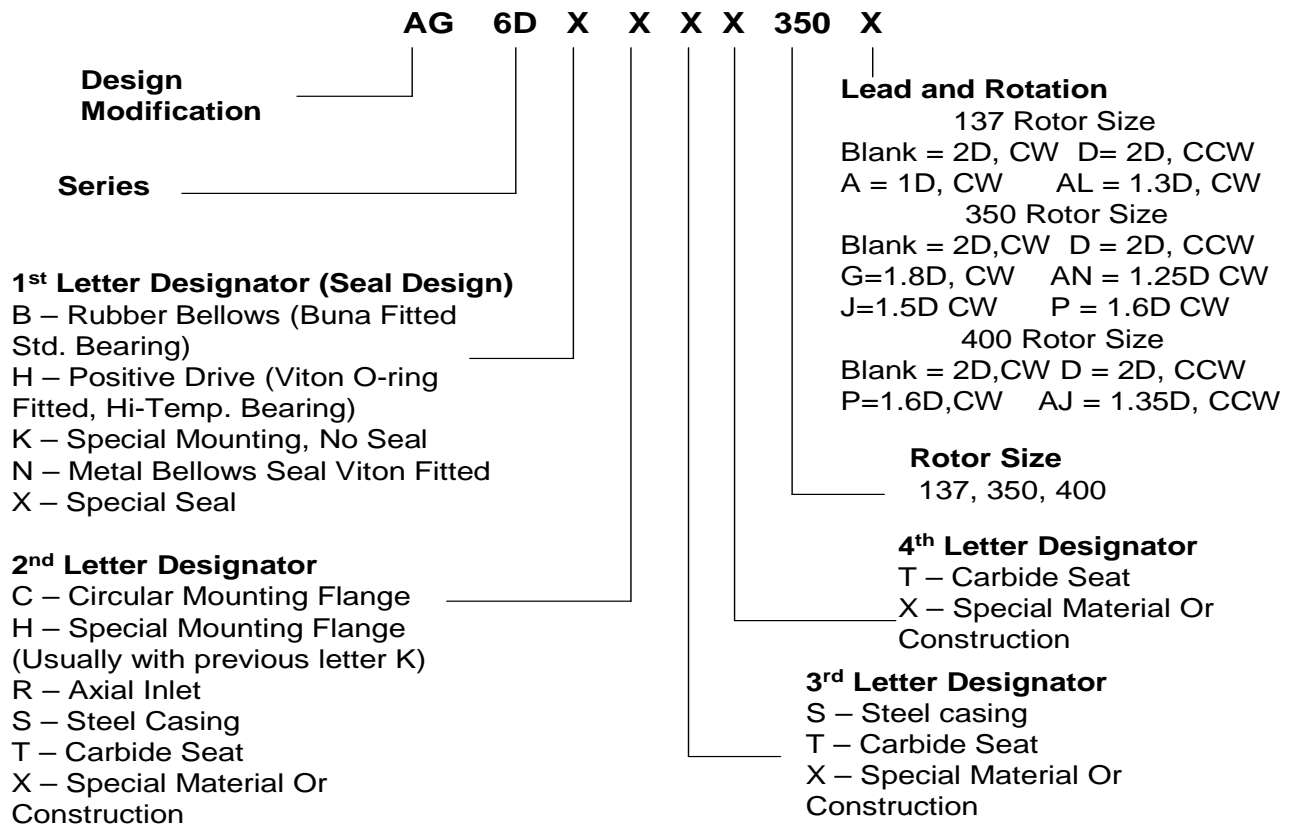
C. DESCRIPTION OF EQUIPMENT

(A)G6D_(C)-137, 350 and 400 series pumps are positive displacement, rotary screw pumps consisting of precision bored housings which enclose a driven screw (power rotor) and intermeshing following screws (idler rotors). These screws when rotating form a succession of closures or cavities. As they rotate, fluid is moved axially from inlet port to outlet port in a continuous, uniform flow with minimum fluid pulsation and pump noise.

D. PUMP MODEL IDENTIFICATION

This instruction manual covers Imo Series (A)G6D_(C)-137, 350 and 400 pumps. The model of each pump is identified on pump nameplate. Refer to figure 1 and table 1 for instructional keys when using this manual.

Figure 1 – Model Designator Definitions



E. ORDERING INSTRUCTIONS

When corresponding with Imo Pump regarding Series **(A)G6D_(C)-137, 350 and 400** series pumps, refer to pump nameplate, this instruction manual, and assembly drawing as instructed below:

1. From pump nameplate, record pump model number, serial number, and manufactured date.
2. Record instruction manual number, revision, and date.
3. From instruction manual, record figure numbers that apply to replacement part(s).
4. From assembly drawing or parts list (see table 2) provide IDP number(s) and names for replacement part(s).
5. Give above information to your Imo service representative.

Imo sales and service representatives are listed herein and in General Instruction Manual, SRM00046.

F. OPERATION

F.1 LIQUID LIMITATIONS

Never operate with thin liquids such as solvents or water. Pump is designed for liquids having general characteristics of oil.

F.2 OPERATING LIMITS

CAUTION	ATTENTION
<p>Operating conditions, such as speed, fluid viscosity, temperature, inlet pressure, discharge pressure, filtration, duty cycle, drive type, mounting, etc., are interrelated. Due to these variable conditions, specific application limits may be different from operational limitations. Equipment must not be operated without verifying system operating requirements are within pump's capabilities.</p>	

Under no circumstances are the following operating limits (specified in table 1) to be exceeded without specific approval from Imo Pump.

Table 1 – Normal Pump Operating and Structural Limits

Condition	Limit
Maximum Speed	2500 rpm for 350 and 400 sizes 4400 rpm for 137 size
Minimum Viscosity	32 SSU
Maximum Viscosity (figure 1)	
1 st Letter Designator B	2500 SSU
1 st Letter Designator H	15000 SSU
Minimum Liquid Temperature	0°F
Maximum Liquid Temperature (figure 1)	
1 st Letter Designator B	180°F
1 st Letter Designator H	220°F
Maximum Inlet Pressure	50 psig for 350 and 400 sizes 75 Psig for 137 size
Maximum Discharge Pressure (Continuous Duty)	1500 psig
Filtration	Refer to General Instruction Manual, SRM00046
Drive	Direct
Mounting	Any attitude


G. PARTS LIST


Table 2 – Pump Parts List

IDP	QTY	DESCRIPTION	KIT	IDP	QTY	DESCRIPTION	KIT
1	1	Case		43	2	Bearing Retainer	
2	1	Inlet Head		46	1	Inboard Cover	XX
4	16	Cap Screws (Qty 8 on size 400 C-face and all size 137)		47	2	Bearing Retainer Hex Bolts	
6	1	Pin Stop		48	1	Seal Seat Adapter	
7	1	Fastener Seal	X	49	1	Ball Bearing	X
8	2	Housing Snap Rings	XX	63	1	Power Rotor	XX
9	2	Cover Gasket or O-rings	X	67	2	Pipe Plug	
21	2	Suction Idlers	XX	68	1	Tube Fitting (Not 137)	
22	1	Balance Piston Housing (Not On C-Face Pumps)	XX	69	1	Pipe Nipple (Not 137)	
23	2	Cups	XX	70	1	Tubing Fitting	
24	1	Discharge Housing	XX	71	1	Seal Pipe	
25	1	Mechanical Seal	X	73	1	Inlet Housing	XX
26	2	Housing Tube		74	1	Pipe Fitting	
27	6	Thrust Tube O-Rings	X	83	1	Seal Gasket	X
28	2	Housing O-Ring	X	86	1	Balance Piston (C-face Pumps Only)	X
29	1	Thrust Plate	XX	95	8	Hex Nuts (400 size C-face only)	
31	1	Key		100	1	Oil Balance Tube	
35	2	Discharge Idlers	XX	101	2	Thrust Plate Spacer	
38	2	Seal Spacer (Not 137 Size)		102	2	Thrust Plate Hex Bolt	
42	2	Bearing Retaining Ring	X				

X = Minor Repair Kit Items.
 XX = Major Repair Kit Items. (Items marked (X) are included in Major Repair Kit.)

H. PUMP MAINTENANCE

	WARNING
<p>Failure to observe precautions while installing, inspecting and maintaining pump can cause injury to personnel from accidental handling of liquids that may harm skin or clothing, or fire hazard risks from flammable liquids, or injury from high pressure fluid jets.</p>	

	DANGER
<p>BEFORE working on equipment, make sure all power to equipment is disconnected and locked-out.</p>	

H.1 GENERAL COMMENTS

NOTE: Part number identifiers (IDP) contained within parenthesis, such as (9), refer to circled numbers shown on assembly drawings (Figures 2 through 7).

De-energize driver before starting with any maintenance action.

H.2 TOOLS REQUIRED

Procedures described in this manual require common mechanics hand tools, a torque wrench, dial indicators for alignment and a suitable lifting device such as slings, straps, etc.

H.3 Pump Disassembly Procedure



CAUTION

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

Note: To service mechanical seal and ball bearing only, perform H.3, steps 1 thru 5 and H.4, Steps 14 through 17.

Determine pump model identification on pump nameplate to select applicable pump assembly shown in Figures 2 thru 7. Refer to appropriate assembly for the following instructions.

1. Close suction and discharge valves. Drain pump by removing drain plugs (67). Remove seal tubing (71). Remove pump from driver, coupling and base plate. Remove coupling hub and key (31).
2. Remove bearing retainer (43) from inboard cover (46) by removing bolts (47).
3. Remove assembled power rotor (63) from inboard cover (46). Removal of power rotor (63) includes removal of snap rings (42), ball bearing (49), seal (25), seal seat adapter (48) and spacer (38).
4. Disassemble power rotor (63) as follows (See Figure 1 for seal drawings):

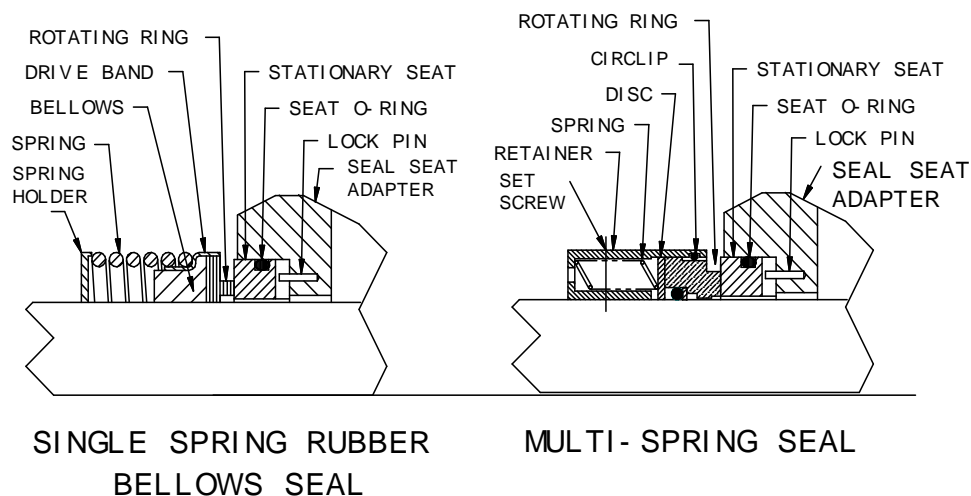


FIGURE 1 - SEAL DRAWINGS

- a. Using a flat nosed tool, such as a screw driver, remove snap rings (42) from groove in power rotor (63).
- b. Sealed ball bearing (49) is assembled to power rotor (63) with light press fit. Ball bearing (49) may be removed by using bearing puller or vertical arbor press. When using press, place two pieces of key stock through openings of mechanical seal seat adapter (48) underneath ball bearing (49) on both sides of power rotor shaft. Key stock should be long enough to support power rotor (63) as it is placed in press. Position press ram against power rotor (63) coupling end face. Gently press power rotor (63) through ball bearing (49)

CAUTION**ATTENTION**

Ensure power rotor (63) does not fall to floor once ball bearing (49) is off of its diameter

- c. Remove seal seat adapter (48) with stationary seal seat. Remove stationary seat with O-ring from seal seat adapter (48). Discard O-ring.
 - d. If seal is multi-spring type, disengage set screw and remove rotating seal seat. If seal is a single spring rubber bellows type, remove it from shaft with a rotating motion.
 - e. Remove spacer (38) from shaft where applicable.
5. Remove gasket (83) from inboard end cover (46).
 6. Remove inboard cover (46) by removing bolts (4) or nuts (93) if pump is 400 size and remove gasket (9) or, if pump is a C-face mount type, O-ring (28).

CAUTION**ATTENTION**

If pump is size 400, C-face model, be sure not to damage studs in case (1) when removing inboard cover (46)

7. Remove inlet head (2) from case (1) by removing bolts (4). Remove and discard gasket (9) from inlet head (2).
8. Remove thrust plate (29) and spacers (101) by removing bolts (102).
9. Remove seal return tube (100) with O-rings (27). Remove and discard O-rings (27).
10. Remove cups (23) from idlers (21) and idlers (21, 35) from housings (73, 24).

CAUTION**ATTENTION**

Do not permit idlers (21, 35) to drop as they emerge from housing (2).

11. Remove snap rings (8) from case (1). Remove pin stop (6) with fastener seal (7) from case (1)
12. If pump is a C-face model skip to step 14, if not proceed to next step.
13. Remove balance piston housing (22) by pushing it out through the discharge end of the case (1) with the housings (73, 24). Remove and discard balance piston housing O-ring (28).
14. Remove housings (73, 24) by pushing them out through discharge end of the case (1). Remove and discard housing O-ring (28). Remove tubes (26) and O-rings (27) from housings (24 or 73).

CAUTION**ATTENTION**

Do not permit housings (73, 24) to drop as they are removed from pump.

H4. Pump Reassembly Procedure:

Note: Prior to reassembly, all parts should be cleaned and inspected for nicks and burrs. Replace all worn and damaged parts. Imo pump recommends replacement of ball bearing (49), mechanical seal (25), gaskets (9, 83) and O-rings (28) when these parts are disturbed from their original installed position. All parts should be coated with light lubricating oil to assist in assembly.

1. Install O-ring (28) in groove in housing (24). Install O-rings (27) in grooves in tube (26) and install tube (26) in housing (24) on opposite side as O-ring (28).
2. Install housing (24), O-ring end first, in pump case (1) from suction end until stop pin (6) slot is properly aligned. Install stop pin (6) with fastener seal (7) in case (1).
3. Install housing (73) in pump case (1) with the end that has the two drilled and tapped holes facing the inlet end of the pump. Be sure that tube (26) in housing (24) mates to hole in housing (73).
4. Install snap rings (8) in case (1).
5. If pump is C-face version (Figure 3), proceed to next step, otherwise skip to step 11.
6. Remove balance piston bushing (86) from inboard cover (46) by heating it to loosen loctite. Be sure to remove all traces of the old loctite before installing new bushing.
7. Clean and dry inboard cover (46) and balance piston bushing (86) mating surfaces with solvent. Wipe Loctite "T747" Primer or equivalent onto the mating surfaces of bushing (86) and inboard cover (46). Allow 1 to 5 minutes until primer is visibly dry. Apply Loctite 609 or equivalent to bushing (86) and inboard cover (46) mating surfaces. Assemble bushing (86) into inboard cover (46). Allow 10 minutes to dry before proceeding with assembly.
8. Install O-ring (28) on inboard cover. Install O-rings (27) on tube (26) and tube (26) in inboard cover (46).
9. Install inboard cover (46) onto studs in discharge port side of case (1) using hex nuts (95). Ensure seal vent (70) is facing up and pin (26) in inboard cover (46) mates with hole in housing (24) Torque bolts (95) to value on appropriate assembly drawing.
10. Skip to step 14
11. Install O-ring (28) on balance piston housing (22). Install O-ring (27) on tube (26) and tube (26) in balance piston housing (22).
12. Install balance piston housing (22) in case (1) lining up tube (26) in balance piston housing (22) with hole in rotor housing (24). Install gasket (9) on inboard cover (46)
13. Install inboard cover (46) into discharge port side of case (1) using bolts (4). Ensure seal vent (70) is facing up. Torque bolts (4) to value on appropriate assembly drawing
14. Assemble power rotor (63) and mechanical seal (25) as follows (See Figure 1 for seal drawings):
 - a. Assemble spacer (38) onto shaft (63) where applicable.

- b. If seal is a single spring rubber bellows type, apply light coat of system fluid to inside diameter of bellows and slide mechanical seal rotating assembly on power rotor (63) until it seats against the shoulder of seal spacer (38). Wipe seal face with isopropyl alcohol and a lint free rag.
 - c. If seal is a multi-spring seal, coat O-ring inside of rotating seat with system fluid and slide mechanical seal rotating assembly on power rotor (63) until it seats against the shoulder of seal spacer (38). Tighten rotating seat set screw. Wipe seal face with isopropyl alcohol and a lint free rag.
 - d. Install O-ring in groove of mechanical seal stationary seat. Install seat including O-ring in seal seat adapter (48) ensuring that groove in back of stationary seat mates to spring pin in seal seat adapter (48). Clean seal face with isopropyl alcohol and a lint free rag. Put small amount of clean system fluid or light oil on seal running face. Install stationary seat running face against rotating seat face.
 - e. Install inner snap ring (42) in groove of power rotor (63).
 - f. Press bearing (49) on power rotor (63), using an installation sleeve by pressing only on inner race until it is located next to inner snap ring (42).
 - g. Install outer snap ring (42) in groove of power rotor (63).
15. Install gasket (83) in seal bore of inboard cover (46).
16. Install assembled power rotor (63) in pump, centering all parts as they enter inboard cover (46). Align one of openings in spacer (48) over drain in inboard cover (46).
17. Install bearing retainer (43) on inboard cover (46) using bolts (47). Torque bolts (47) to value on appropriate assembly drawing.
18. Install idlers (35 and then 21) into housings (24, 73) by meshing threads with power rotor thread
19. Install cups (23) on idlers (21).
20. Install bolts (102) in thrust plate (29) and spacers (101) on bolts (102).
21. Install O-rings (27) on tube (100) and tube (100) into housing (73).
22. Install thrust plate assembly including thrust plate (29), bolts (102) and spacer (101) on housing (73). Be sure seal return hole in thrust plate (29) mates to tube (100) in housing (73) Torque bolts (102) to value on appropriate assembly drawing.
23. Install gasket (9) on inlet head (2), and install inlet head (2) on case (1) using hex bolts (4). Torque bolts (4) to value on appropriate assembly drawing
- NOTE:** Inlet head (2) can be rotated and repositioned in 90 degree increments to suit suction piping. To change inlet position remove bolts (4) and rotate inlet head to desired position. Install bolts (4) and torque to proper values indicated on assembly drawing.
24. Install coupling hub key (16). Install and align pump and driver as specified in General Instruction Manual, SRM00046.

TROUBLESHOOTING

For assistance with troubleshooting see the General Instruction Manual, SRM00046.

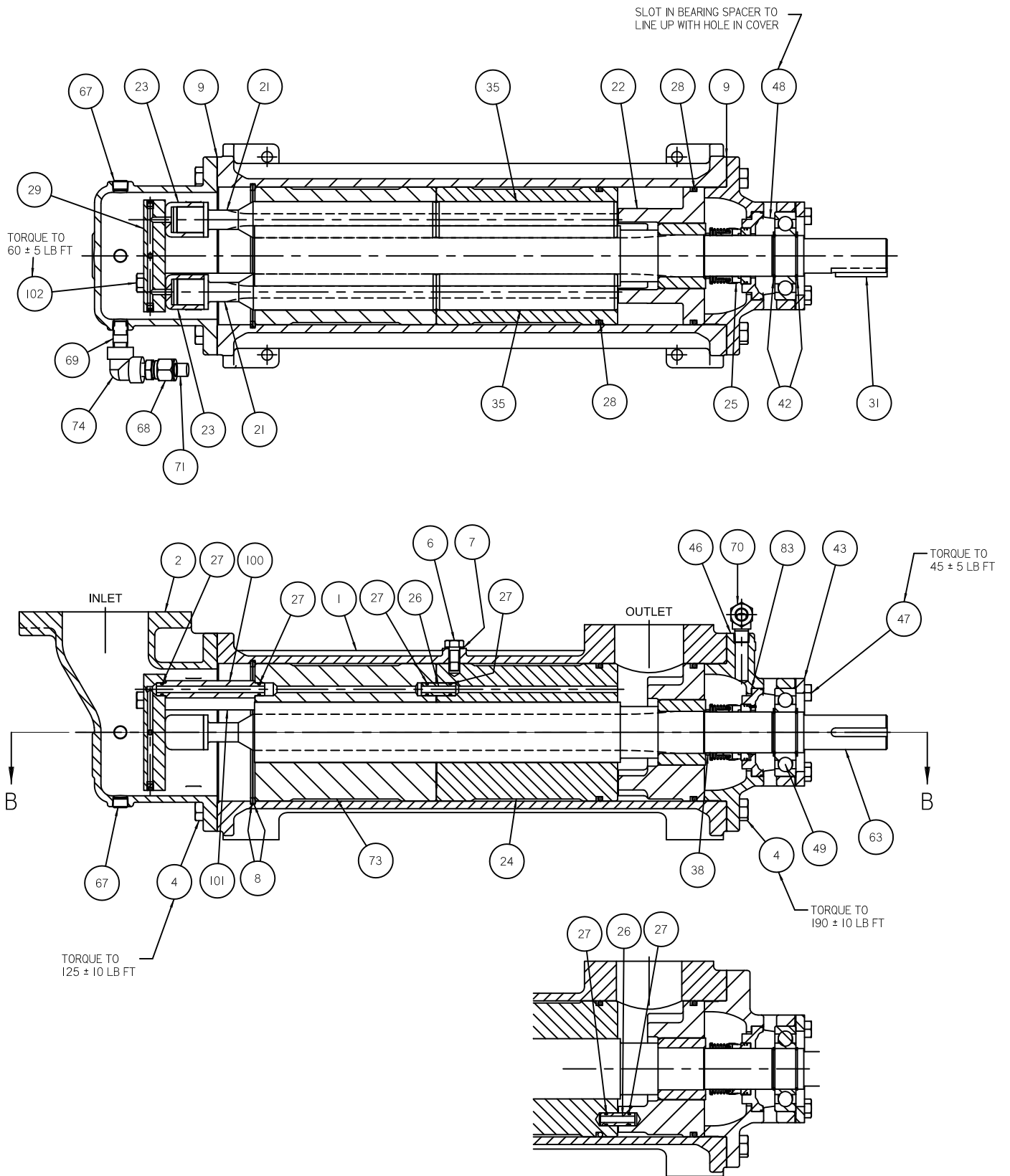
J. FIELD AND FACTORY SERVICE AND PARTS

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 user prefers to return pumps for inspection or overhaul. Factory-overhauled pumps 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 Technical/ Customer Service Department in Monroe, NC, USA.

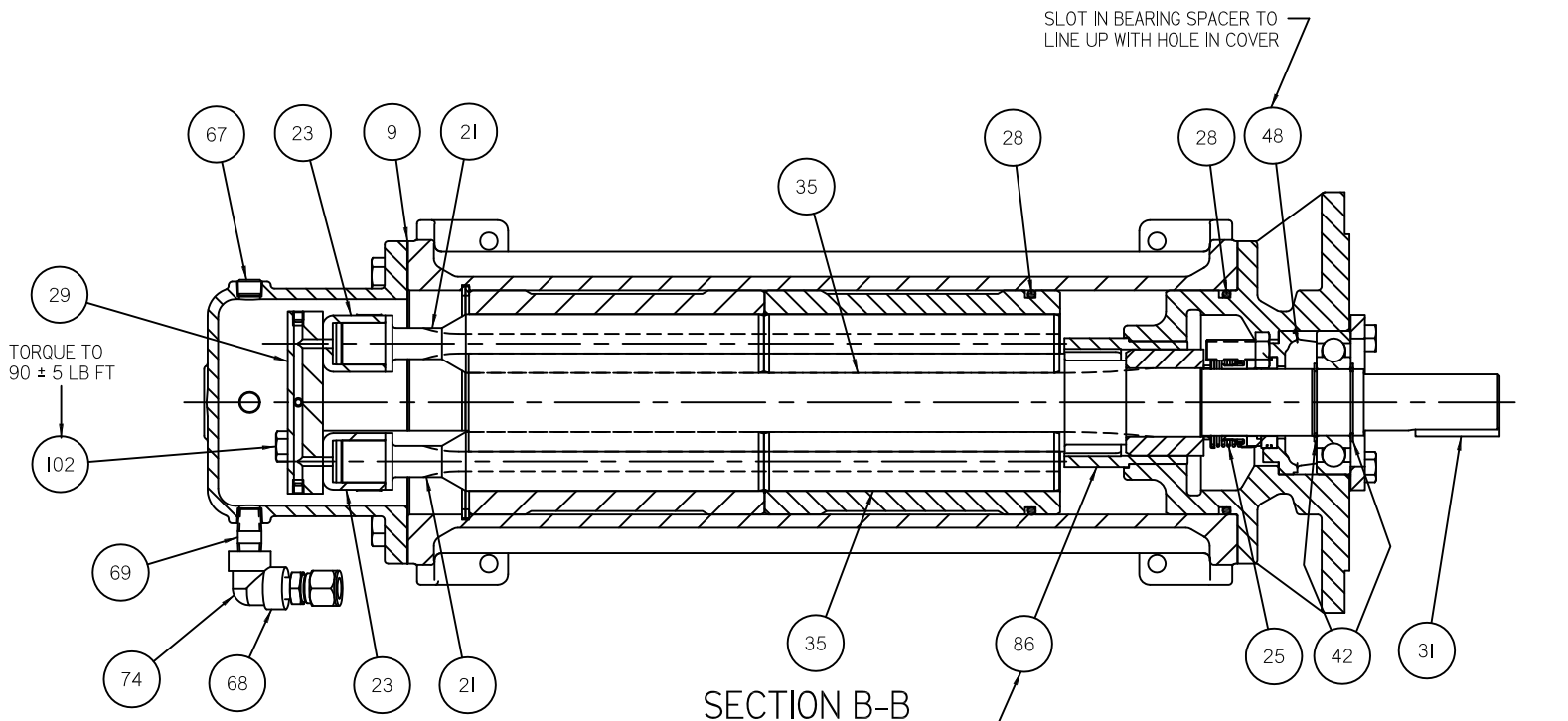
Most pumps have repair kits available. Minor Repair Kits are used to repair leaking seals, bad bearings and/or for re-assembly after pump tear-down. They include pump shaft seals all gaskets/O-rings and bearings. Major Repair Kits are sufficient to rebuild completely worn-out pumps to “as-new” condition. They include all parts found in Minor Repair Kits plus all major internal parts subject to wear. Since kits have all necessary parts, kit purchase is preferred rather than selecting individual parts. When parts are individually selected from 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 new parts.

FIGURE 2

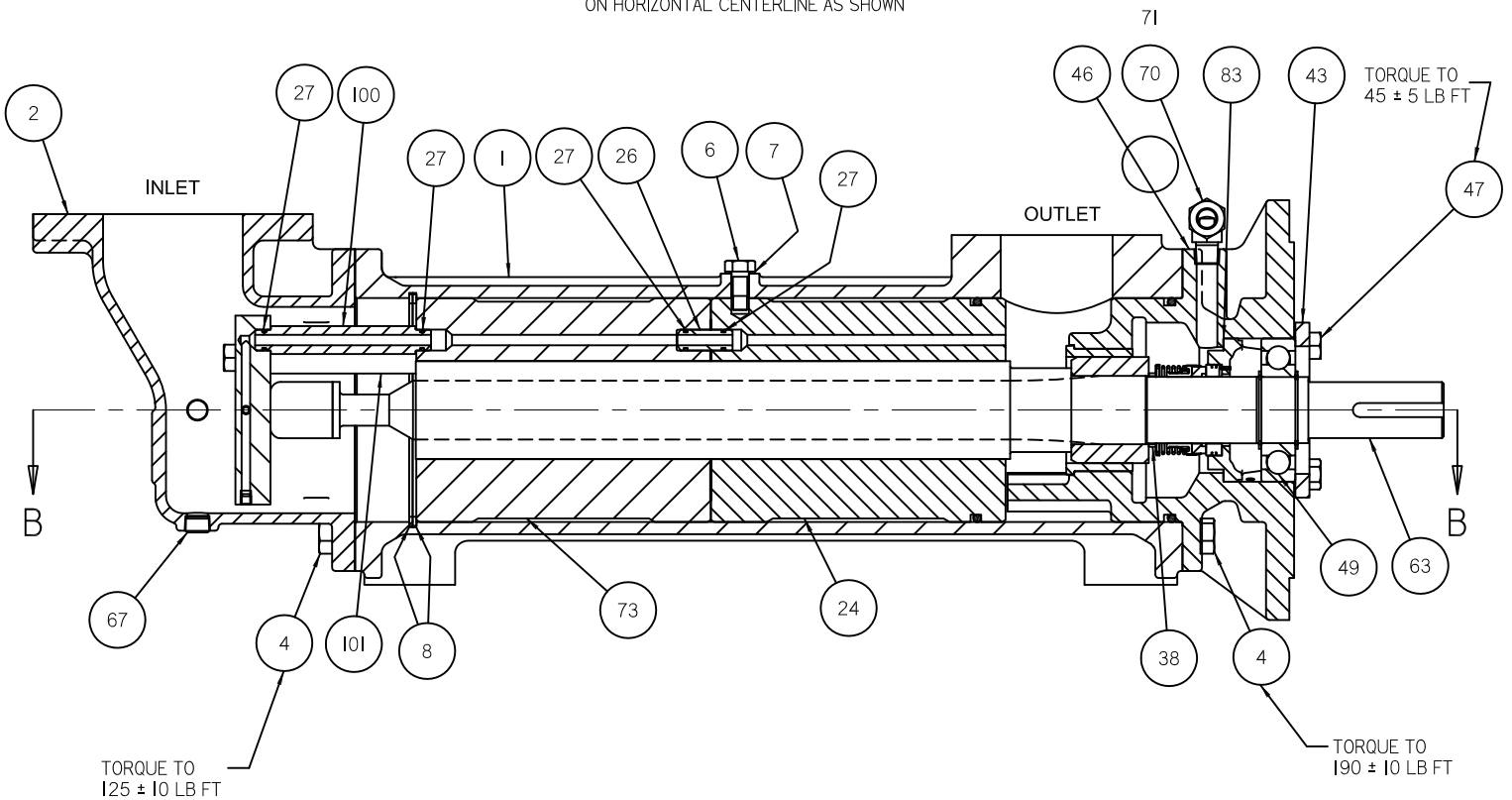


AG6D_-350 ASSEMBLY

FIGURE 3

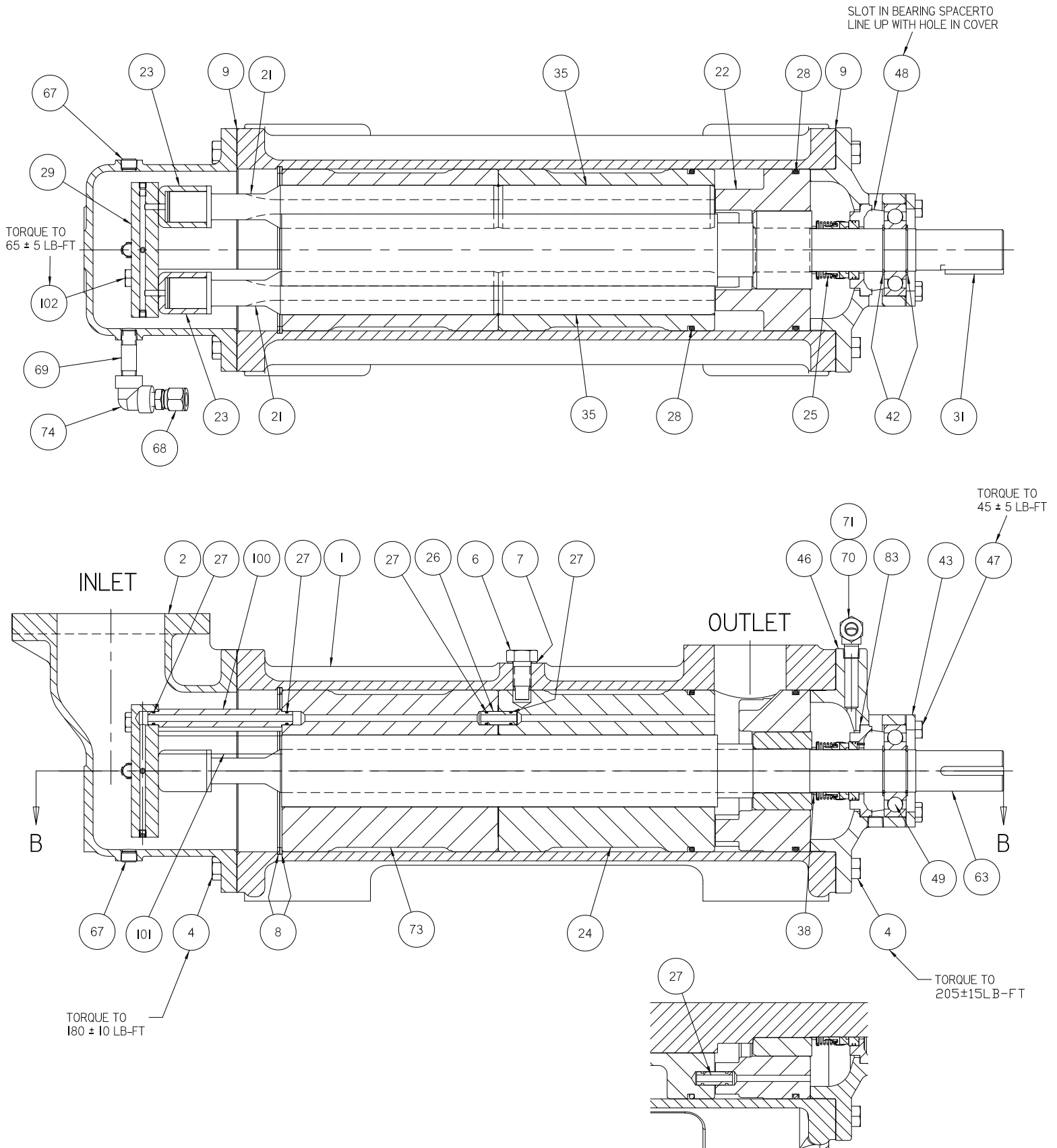


INSTALL BUSHING IDP 86 TO END COVER IDP 46
 USING LOCTITE ES 2.3.3-DI PER ES 3.14.1
 IDLER STOP LUGS TO BE LOCATED
 ON HORIZONTAL CENTERLINE AS SHOWN



G6D_C-350 ASSEMBLY

FIGURE 4

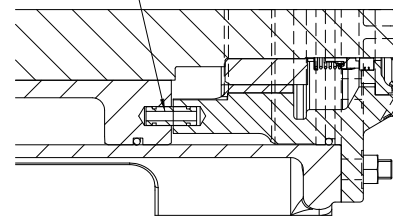
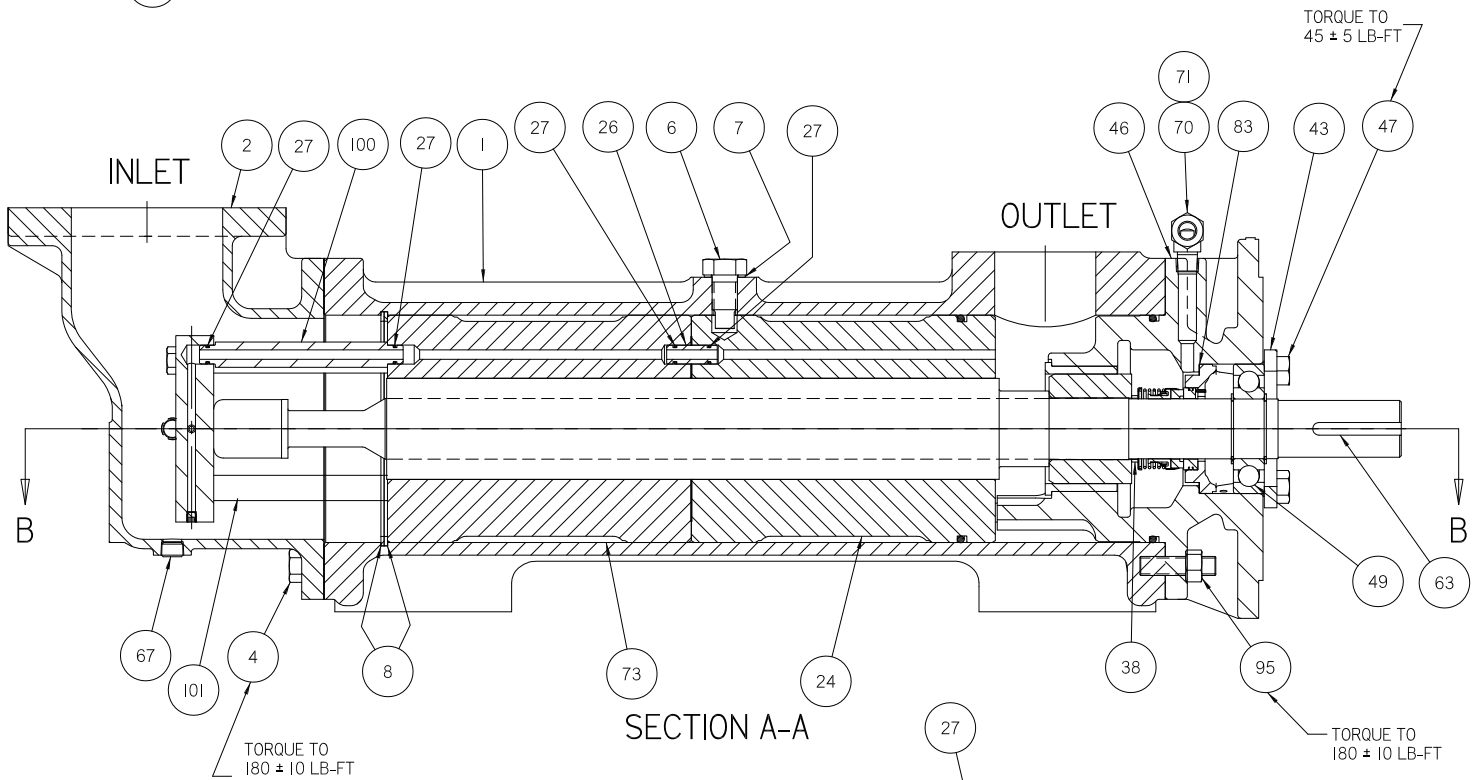
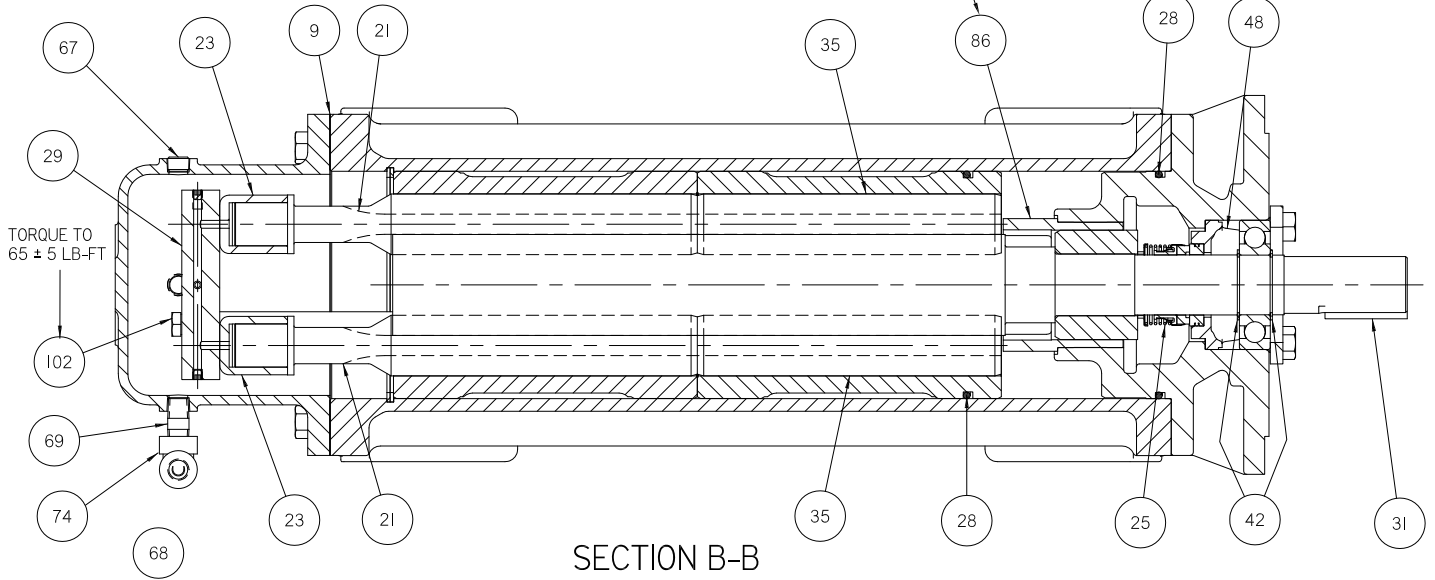


AG6D - 400 ASSEMBLY

FIGURE 5

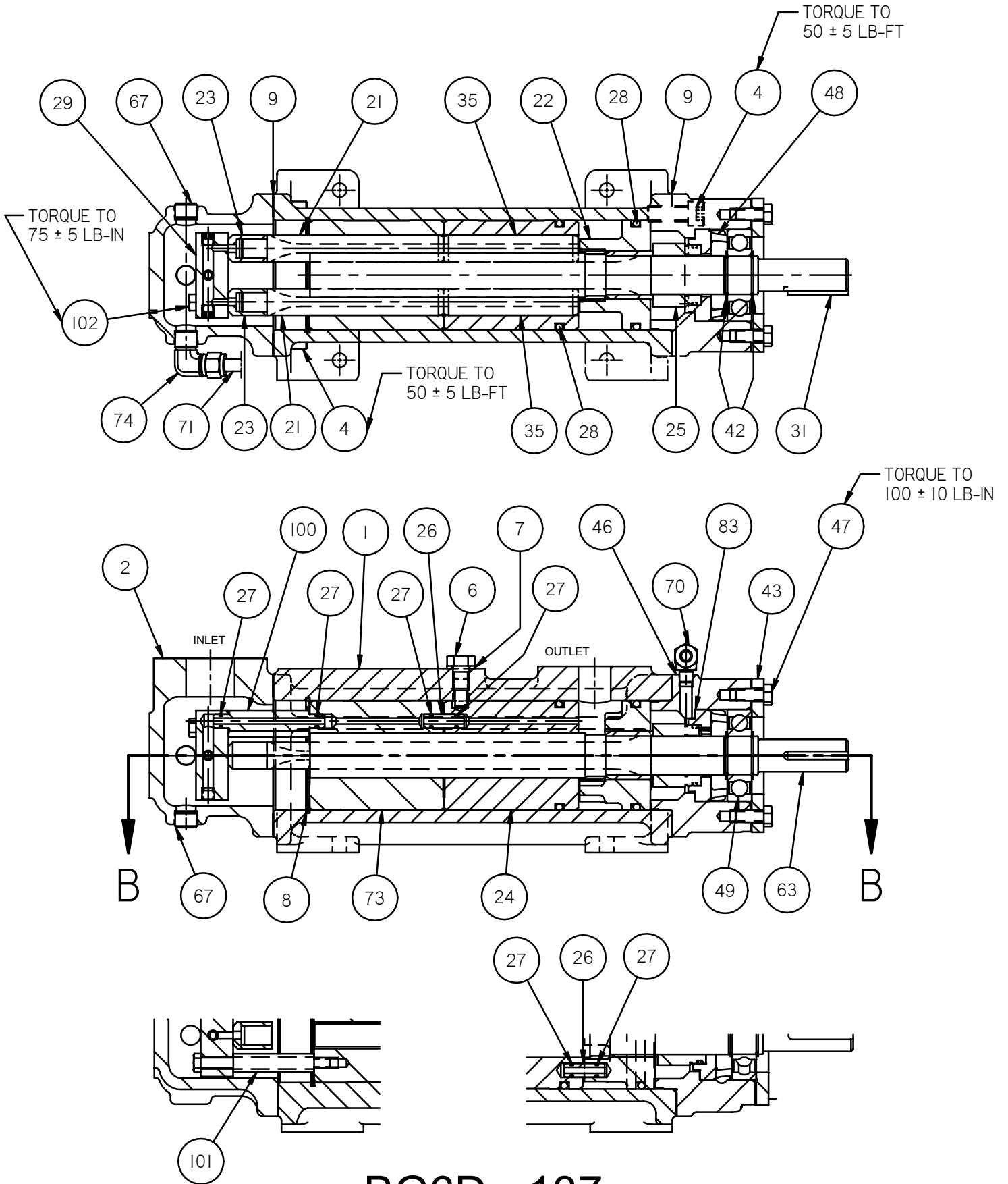
INSTALL BUSHING IDP 86 TO END COVER IDP 46
 USING LOCTITE ES 2.3.3-DI PER ES 3.14.1
 IDLER STOP LUGS TO BE LOCATED
 ON HORIZONTAL CENTERLINE AS SHOWN

SLOT IN BEARING SPACERTO
 LINE UP WITH HOLE IN COVER



G6D_C-400 ASSEMBLY

FIGURE 6



BG6D_-137

FIGURE 7

INSTALL BUSHING IDP 86 TO END COVER IDP 46
 USING LOCTITE ES 2.3.3-DI PER ES 3.14.1
 IDLER STOP LUGS TO BE LOCATED
 ON HORIZONTAL CENTERLINES AS SHOWN

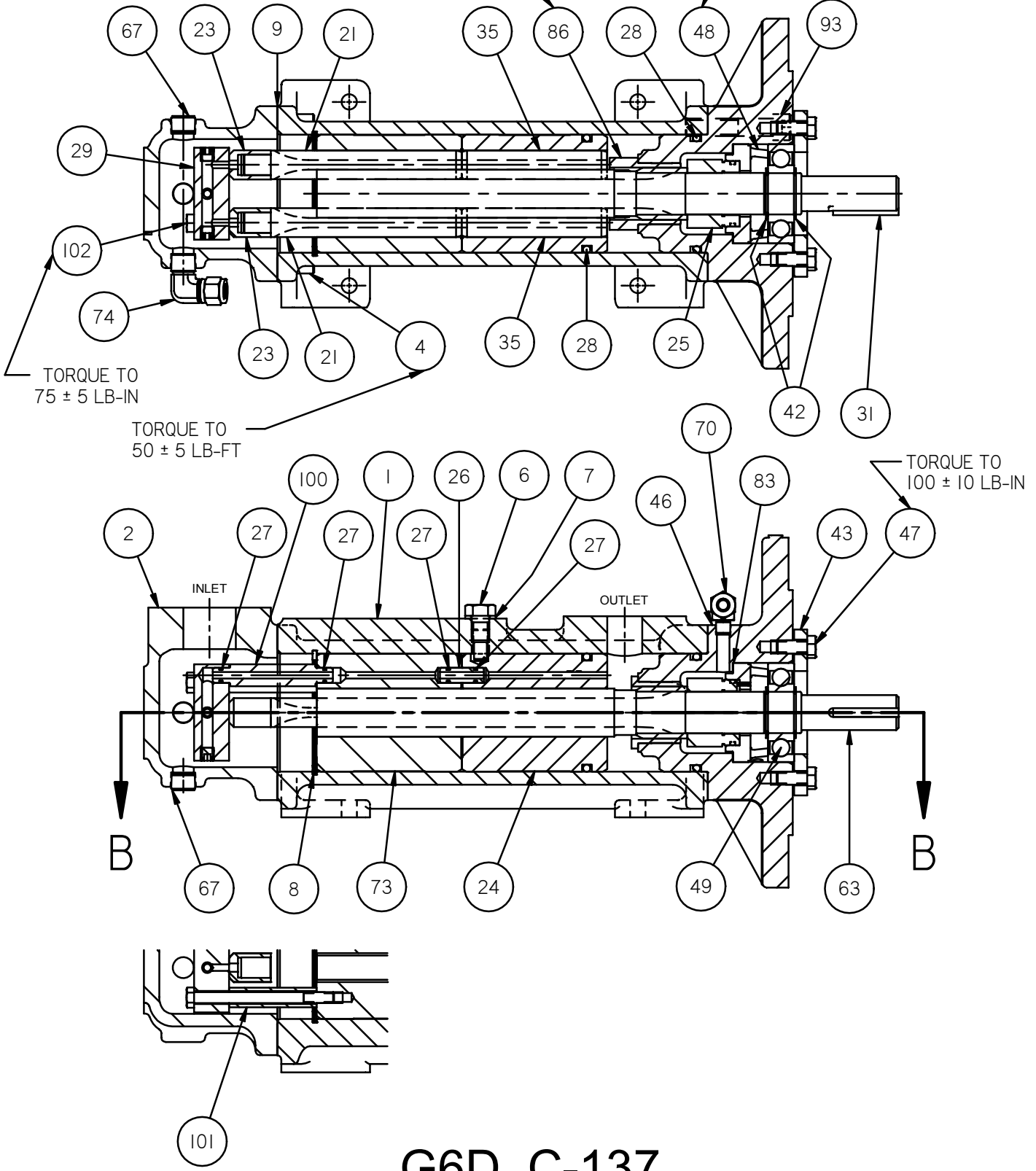
SLOT IN BEARING SPACER TO
 LINE UP WITH HOLE IN COVER

TORQUE TO
 50 ± 5 LB-FT

TORQUE TO
 75 ± 5 LB-IN

TORQUE TO
 50 ± 5 LB-FT

TORQUE TO
 100 ± 10 LB-IN





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