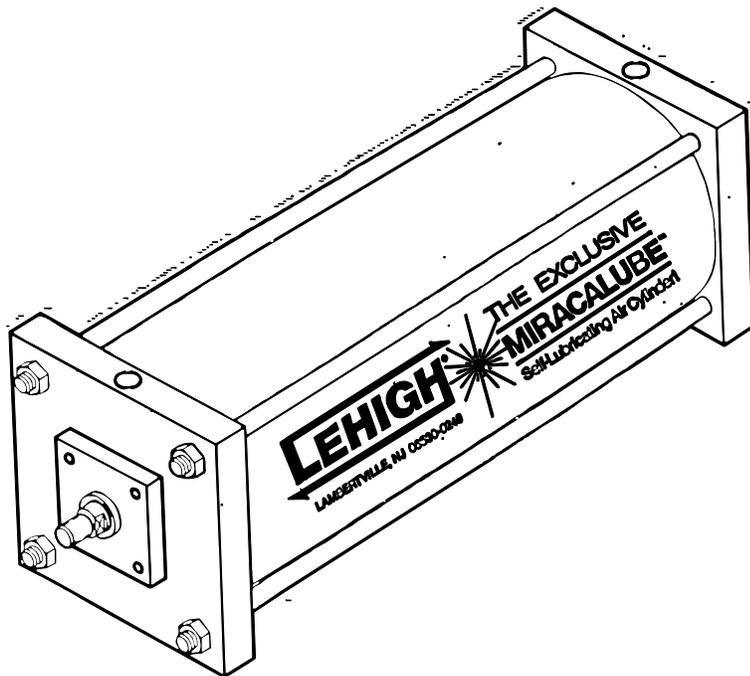




JHD CYLINDERS
INSTALLATION & OPERATING INSTRUCTIONS



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A. INSTALLATION: (Follow All Safety Lockout/Tagout Procedures)

The cylinder is shipped from the factory with the MIRACALUBE self-lubrication system (filled at the factory at the time of assembly). It is not necessary to add grease or other lubrication to the unit prior to installation.

The cylinder is shipped with protective caps in the ports. Do not remove these caps until the piping is ready for installation. If the cylinder has been in storage for an extended time, it is advisable to exercise the cylinder; i.e., flex the internal seals by stroking the piston before installation. Insure the air line used is equipped with suitable filters, pressure control and a water trap.

Alignment of the piston rod with the work is necessary for the cylinder to operate satisfactorily and insure long seal and rod bearing life. Be sure all mounting surfaces are clean, smooth, flat and in alignment. Before finish piping of the cylinder, stroke the cylinder using the air line to check the mounting arrangement for misalignment or binding of attached mechanisms. The piston rod should extend and retract without any unsteady or jerky motion.

If the cylinder is equipped with cushions, adjust the cushion screws to produce the desired effect for the load, speed and air line pressure to which the cylinders will be subjected under normal operating conditions.

B. TROUBLE SHOOTING:

1. JERKY ACTION:

Check for misalignment. Look for a bent or scored piston rod. The rod bushing may be damaged. Check the cylinder tube for dents or bumps. Confirm that the air cylinder supply pressure and volume are adequate to operate the cylinder under normal conditions.

2. AIR LEAKAGE:

a. Loss of Power or No Power:

1. Check the air pressure at the machine. Then check the operating pressure at the control valve for the cylinder and check the line pressure at the cylinder port(s).
2. Apply air pressure to one port of the cylinder and check for escaping air from the opposite port or the exhaust port of the control valve.

Next attach a small hose with adaptors to the open cylinder port. Immerse the end of the hose in water, leak detection fluid or soapy water to simplify this test.

Excessive bubble stream coming from the hose indicates worn or damaged piston seals or damaged cylinder tube. Both should be replaced in order for the cylinder to develop full power.

b. Evident Leak at Rod Seal:

The rod bushing assembly may be replaced without disassembly of the cylinder. Loosen and remove the “ED” (for rod bushing) locking screw if present. Use a close fitting wrench to remove the rod bushing assembly from the cylinder by turning counter-clockwise (Figures 2 and 3).

Check the rod seal condition and replace as required. The rod seal is found at the bottom of the now visible counterbore (Figure 3).

c. Leak between the Cylinder Tube and End Caps (Heads):

Tighten the tie rods to the torque specified in the table on page 6. Be sure the Open and Closed Heads are properly squared to each other. Check for the cylinder tube being seated in the tube groove in the face of each head (Figure 3).

3. LOUD METALLIC IMPACT NOISE—Reference Figure 3:

Check the cushion adjustment. To increase the cushioning effect turn the cushion screw clockwise (facing the screw driver slot in the cushion screw). If adjusting the cushion screw does not correct the problem, replacement of the cushion seal may be required. However, confirm the pressure settings and operation of externally mounted shock absorbers on the equipment prior to the replacement of the cushion seal.

When replacing the cushion seal, check the piston for impact damage. If the piston, piston rod, or rod end shows damage, check the mechanism adjustment instructions in the machine manual before returning the cylinder to operation.

The cushion seals look like rod and piston seals except the outer body of the seal is VERY stiff. The outside edge may appear abraded or “sanded.” This is a sizing process that improves the fit of the seal body in the cavity in the tube groove side of the head (Figure 3).

C. GENERAL REBUILD INSTRUCTIONS:

1. GENERAL GUIDELINES:

Remove the cylinder from the equipment and disassemble on a bench or other clean flat surface.

All necessary parts for the rebuild are contained in the Cylinder Repair Kit for the specific cylinder used in this equipment.

Clean and inspect all metal parts, particularly the piston rod for wear, scratches or pitting. Replace the rod if its condition would damage the rod bushing or seals.

Inspect the piston to piston rod assembly. The piston must be secure on the piston rod, and the piston nut must be tight. If not, or if there is a question of the secureness of the assembly, then proceed to the CAUTION SECTION before continuing with the repair.

2. PISTON & ROD ASSEMBLY w/MIRACALUBE® LUBRICATION SYSTEM—Reference Figure 1:

On 1.00" to 8.00" bores, apply a thin bead of sealant to the bottom tube grooves in the Open and Closed Heads. Use either Permatex Form-a-Gasket® #2 or Loctite® #2 Gasket/Sealant. On 10.00" bore and up, use tube "O" Rings supplied with kit.

Carefully remove the old piston seals so as not to scratch, nick or burr the lip or groove of the piston, and gently stretch the new piston seals into the piston grooves. Be sure that the flat sides of the seals are positioned towards the center of the piston (Figure 1).

Place the piston and rod assembly in a horizontal position. Remove the Wicking (Braided Material) and either remove with a sharp hooked scribe or push all four (4) existing porous plugs into the reservoir. Using the pre-filled syringe provided, attach the fill nozzle to the syringe with a gentle twisting motion. Pump about 1/5 of the syringe full into each hole.

Replace the porous plugs with the new plugs provided (some kits may have one piece of plug material, divide this into four (4) equal lengths). Carefully press these plug sections fully into the holes. Trim flush, if required with the bottom of the wicking groove.

Replace the wicking with the new wicking provided being sure the wicking is stretched tightly. Press the wicking fully into the groove, entirely around the piston. Trim the excess as necessary with a very sharp knife or side cutters to form a flush joint.

Using the remaining lubricant in the syringe, lubricate the seals, wicking and “mouth” of the tube to ease reassembly.

3. FINAL ASSEMBLY:

Place the Closed Head (Cap End or Back Cover) on a flat surface with the tube grooved side up. Position the tube in the tube groove lubricated end up. Carefully, slip the piston and rod assembly into the tube. Be sure that the seal lips enter the tube without wrinkling, tearing or pinching.

Slide the Open Head (Rod End or Front Cover) over the piston rod being sure that the tube grooved side is down. Seat the tube in the tube groove (Figure 3).

Slip the rod seal(s) carefully over the rod threads, down the rod and into the counterbore in the Open Head. Be sure that the seal lips face the head (Figure 2).

Screw the bearing cartridge into the front flange (about 2-1/2 turns). Slide the bearing cartridge/flange assembly down the rod with the integral seal facing upwards (this is the rod scraper). Position the flange on the Open Head such that the “ED” Lock Screw, if present, is properly positioned relative to the port in the Open Head (Figure 3).

Check the position of the port in the Closed Head relative to the port position in the Open Head. Insert the tie rods and just snug the tie rod nuts.

Lay the cylinder down on a smooth flat surface, with the mounting points of the cylinder supported and square the Open Head to the Closed Head. Re-snug the tie rods as necessary.

Turn the bearing cartridge in until just bottoming on the Open Head which pre-loads the bearing cartridge threads and tighten to 1-2 foot pounds of torque.

Alternately (cross-pattern style) tighten the tie rod nuts in even 1/3 steps to the torque listed in the following table. Confirm the head alignment after each torque step set. To prevent tie rod rotation during torquing, hold the tie rods with locking pliers within 1/2 inch of the respective head.

D. “ED” LOCK SCREW – CYLINDER OPTION:

Reference Figure 3

Tighten the “ED” Lock Screw by gently bottoming the lock screw on the bearing cartridge (6-8 inch pounds torque). The amount of backing off required can be confirmed by checking how easily the piston rod assembly moves in and out (after the rod is clear of the internal cushions).

E. CAUTION SECTION:

Reference Figures 1, 2 and 3

If the piston to piston rod connection has been loosened, both the piston and piston rod must be cleaned, degreased, and reassembled prior to using the Repair Kit.

The carefully cleaned piston and piston rod are assembled using LOCTITE LOCQUIC PRIMER N[®] per package directions and LOCTITE REMOVABLE THREAD LOCKER #242[®] (BLUE) per package directions.

Remember to install the Cushion Boss "O" Ring and Cushion Boss, as applicable, and the Piston Rod "O" Ring prior to applying the LOCTITE[®] products. Do not allow the LOCTITE[®] products to come in contact with the "O" Ring(s).

The piston nut is torqued per the following table and the threads staked.

ANY DEVIATION FROM THE LOCTITE[®] PRODUCT INSTRUCTIONS, ASSEMBLY PROCEDURE OR CONTAMINATION MAY CAUSE CATASTROPHIC FAILURE, EQUIPMENT DAMAGE, AND/OR PERSONAL INJURY.

LIST OF TYPICAL REPAIR KIT CONTENTS

Repair kits containing all dynamic and static seals are available for all cylinders.
These kits contain:

- 1 – Piston Rod Bearing Cartridge which includes:
 - Rod Bearing, Threaded housing, Rod Scraper & Miracalube Lubrication System
- 2 – Piston Seals
 - 1 – Piston Rod Seal Set
 - 2 – Piston “O” Ring (use the same as removed “O” Ring)
 - 2 – Wicking Set includes: Porous Plugs, Braided Wicking
 - 1 – Syringe of Miracalube & Insertion Tip (Nozzle)
 - 2 – Cushion Seals (use as required)
 - 2 – Cushion Screw “O” Rings (use as required)
- 1 set – Cushion Boss and Piston “O” Rings (use as required)
 - 2 – Tube “O” Rings (Supplied in Kits 10.00 Bore & Up)

COMPONENT TORQUE CHART

Bore Size	Piston Rod Diameter	Tie Rod Torque	Piston Nut & Piston Torque
1-1/2	5/8 & 1	7 Foot Pounds	30 Foot Pounds
2	5/8 & 1	12 Foot Pounds	30 Foot Pounds
2-1/2	5/8 & 1	12 Foot Pounds	30 Foot Pounds
3-1/4	1 & 1-3/8	28 Foot Pounds	140 Foot Pounds
4	1 & 1-3/8	28 Foot Pounds	140 Foot Pounds
5	1 & 1-3/8	50 Foot Pounds	140 Foot Pounds
6	1-3/8 & 2	50 Foot Pounds	290 Foot Pounds
8	1-3/8 & 2	68 Foot Pounds	290 Foot Pounds
10	1-3/4 & 2	130 Foot Pounds	360 Foot Pounds
12	2 & 2-1/2	130 Foot Pounds	360 Foot Pounds
14	2-1/2 & 3	200 Foot Pounds	420 Foot Pounds

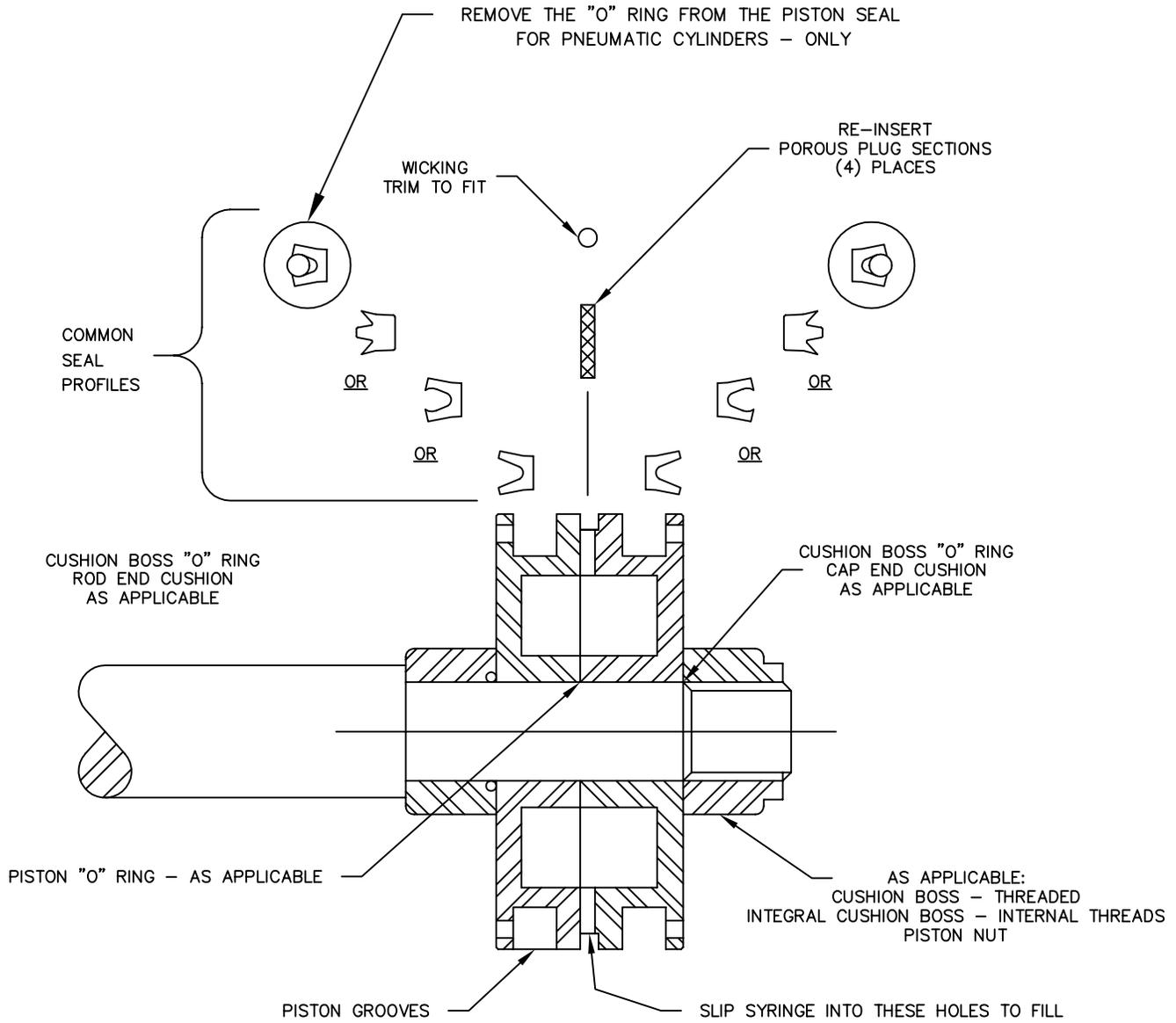


FIGURE NUMBER 1

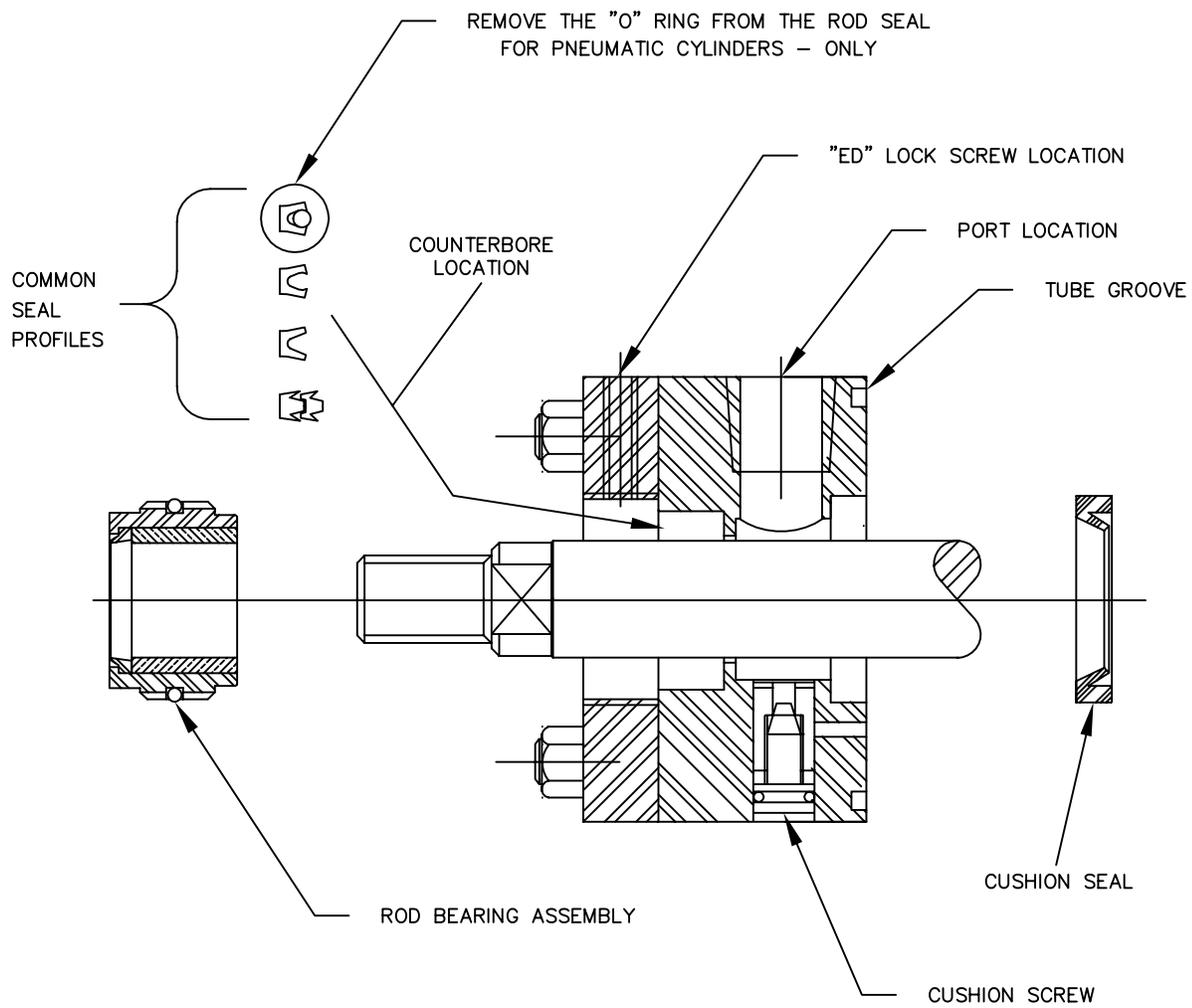


FIGURE NUMBER 2

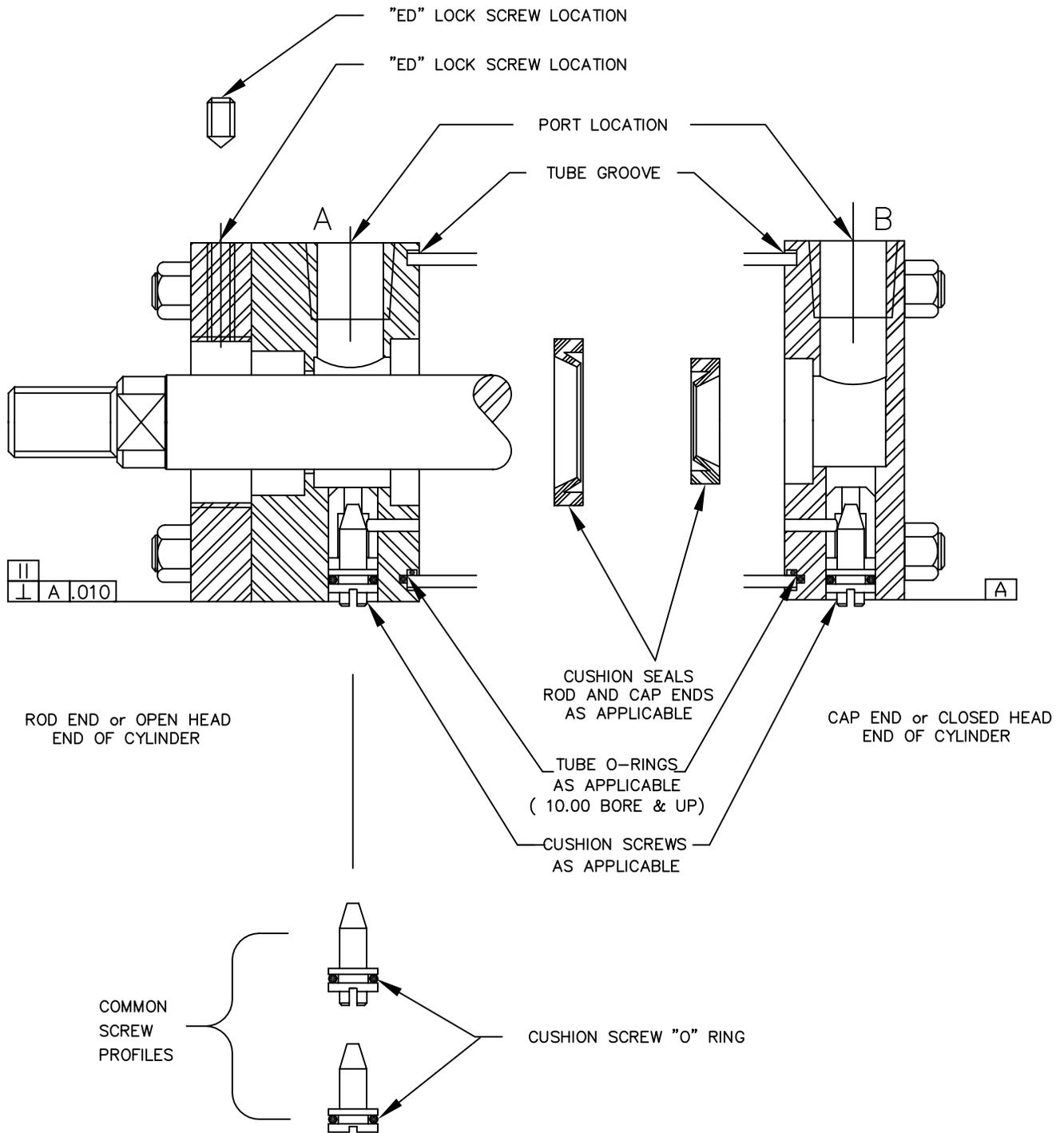


FIGURE NUMBER 3



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