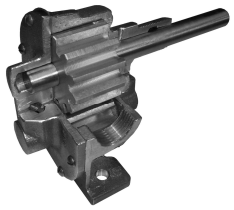


LOBEE GEAR PUMP

OPERATION AND MAINTENANCE INSTRUCTIONS FOR LOBEE GEAR PUMPS

Lubrication- It is of utmost importance that a gear pump never be run dry. This is a major cause of damage to a pump. Pumping non-lubricating liquids is tantamount to running the pump dry. When lifting, install check valve on suction line to keep flooded suction.

Shaft alignment- Also of extreme importance is to be sure the pump is correctly aligned. Misalignment causes extreme wear and damage to pump. Although a mounted unit has been perfectly aligned at the factory before shipping, it is almost certain to need realignment when placed on its foundation. Many units are direct coupled to the motor with Lovejoy™ (jaw type) or similar type coupling. If pump is to be pulley driven, use an outboard bearing and jack shaft, which is designed to prevent torsional strains on pump shaft bearings. DO NOT mount pulley directly on pump shaft.

Bi-rotational- All Lobee gear pumps will operate in either direction, as it has spur (external) gears, except when equipped with a relief valve. Connect motor and start pump to determine pump inlet and outlet, the correct rotation of the electric motor would be established before assembling couplings. If the motor operates in the wrong rotation, interchange any two of the lead wires and the opposite rotation will result.

Relief valve- On pumps with a built-in relief valve, which is a spring operated cone type that simply opens and closes clearance, and when installing a factory built pump the pump rotation must be clockwise (looking at pump from shaft end) for relief valve to work. Should it be necessary to operate the pump in a counter-clockwise direction, the complete rear cover can be rotated 180 deg. Simply remove the cover screws, pull and rotate cover while fitting gear bearing cavities onto gear journals, then re-install screws. The relief valve fitting goes through the pump cover with the adjusting screw on the input side of the pump. Tighten the adjusting screw to increase pressure and back off to decrease pressure. CAUTION-adjusting the relief valve does NOT increase or decrease pump flow. Adjusting the screw 'in' enables the pump to transfer liquid material at a greater distance. The greater the distance, especially vertically, the greater the pressure required. The relief valve will bypass the liquid from the high pressure (delivery) side to the low pressure (suction) side when the adjusted pressure has been exceeded.

Plumbing- For best performance pump should be installed as near the liquid source as possible. Excessive pipe lengths and elbows create fluid losses which detract from the overall efficiency of the pump. Avoid errors in suction piping —such as abrupt changes in pipe size, the use of concentric reducer, etc. Never use pipe of a smaller size than that for which the pump is fitted. Reducing the porting on any given size unit will starve the pump and cause cavitation which will result in a form of internal erosion. Almost invariably it is necessary to use one pipe size larger and sometimes several sizes larger in order to avoid excessive frictional loss with a result in prohibitory high suction lift. If conditions require the use of a foot valve and strainer, the area of the foot valve should be from 1½ to 2 times the area of the suction pipe; and the strainer should have a free open area equal to 3 to 4 times the area of the suction pipe. Otherwise excessive frictional loss will result. The pipe should not be pulled into position by drawing down on the flange bolts or threads. The pipe should meet the pump; pump should not be required to meet the pipe. All piping should be supported independently of the pump. Pumps are not designed for carrying heavy loads imposed by piping and its contents.

Contamination- In making installation guard against the possibility of foreign material such as nails, bolts or pieces of waste in the line likely to lodge in the gears and cause damage. Install a strainer on suction line if there is any possibility of foreign material entering the line.

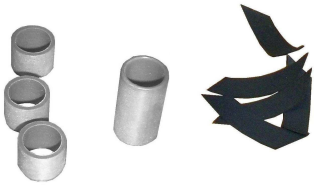
Wear- Pumps should be checked periodically for wear and parts showing signs of wear replaced to maintain top performance. Often times pump life can be lengthened by removing one or two cover gaskets which have the effect of compensating for the wear and will tighten up the pump. When removing gaskets for tightening up the pump, do so one at a time until desired tightness is achieved. If pump is too tight and binding, just add another gasket.

Operating characteristics- Positive displacement gear pumps have excellent suction lift characteristics and are self priming when wetted. For vertical suction lift, should pump run dry between uses, re-'wet' pump or use foot valve. All pumps are broken in at the factory. Pumps assembled with soft gears, i.e. Teflon, Delrin, Pactene, etc. may not turn by hand. Pumps with 2 metal gears will turn over by hand. It is the characteristic of a packed pump to drip at the stuffing box. If amount of drippage is objectionable a lip type seal can be installed in lieu of packing. While this will not completely eliminate drippage, it will effectively reduce it.

Replacing packed seal with buna Lip Seal- For installing a lip seal on the Model LOS Pump remove packing nut from pump. Take packing out of packing nut. Slide lip seal over pump shaft with rubber towards the pump body. Reinstall packing nut, hand tighten and snug. Do not over tighten. For Model LOL pumps, remove packing nut, follower and packing material. Clean drive shaft and remove any burrs that may tear oil seal. Clean body threads where New Style Oil Seal Nut goes. Leave locknut in place, do not remove. Apply Teflon tape over threads, lubricate shaft and oil seal, slide carefully over shaft and tighten to wrench snug fit only. On 2LOL-62(1/2" shaft), nut should thread on ~1/4". On 3LOL-62(5/8" shaft), nut should thread on ~1/2". Tighten locknut against oil seal nut. Do not over tighten. If no drippage can be tolerated you must use a mechanical shaft seal.

Bearing replacement- Depending on pump model, caged or sleeve bearings may be used.

On model LOE/LOX Stainless Steel pumps, the standard journal bearing is a caged Rulon™ 'T' strip. Bearing strips are 'curled' and pushed into the cage which has been press fit into the front and rear pump cover. The strip, which has opposing diagonal cuts, will fit completely inside the cage cavity. Be careful to smooth the Rulon™ T strip into the cavity so that the idler or drive shaft journal fit without catching. Some configurations, such as high pressure models or FDA compliant required materials, will use solid Rulon™ or other material type sleeve. These should not be field replaced, but should be returned to the factory for replacement.



On model LOM bearing sleeves are standard Ertalyte™ material and should be replaced by the factory only. All other model pumps use the cast body material (Federally™ bronze, Iron) as a bearing surface, so there is no need to service a separate journal bearing. Some special bronze, nickel and cast iron models do have sleeve bearings that should also only be replaced at the factory when necessary.

Models MOE/MOX contain a PEEK 1000 or HPV type bearing sleeve as standard and should only be replaced by the factory. Should you wish to replace the bearing sleeves, they can be purchased separately and will come oversized to allow a squeeze fit in the journal cavity. Once pressed into place they must be reamed to a .504-.506 finish diameter.

Stainless Steel Pumps- On stainless steel pumps be sure the rear and front covers are installed correctly. Teflon washer in cover must be used in conjunction with stainless drive gear to prevent a galling situation. Do not install cover upside down with Teflon washer opposite Teflon gear. When replacing parts on stainless steel pumps, install Teflon washers in covers first. To install Teflon washers in the covers, align screw hole in washer with screw hole in cover and tap washer into cover recess. Install washer screw and sand down washer flush with cover. Then install Teflon liner in body. Put back cover, with gaskets (generally 3 gaskets) on pump and hand tighten cover screws. Put drive shaft and idle shaft assemblies in. Gears are a press fit on shafts. Drive gear is pinned on the shaft. To install pin, using 1/8 drill, drill through gear drilling approximately 1/16" deeper than length of pin. Install pin and then prick punch top of hole on gear so pin can't fall out. If difficulty is found in pressing stainless gear on shaft, a little powdered graphite on the shaft and inside the gear will help. If problems arise in installing gears on shaft, we suggest they be ordered preassembled from factory. Teflon idler gear can be tapped on shaft with a soft hammer. Stick flat on drive shaft into a vise and work the body of pump around a few times to free up gears. If still tight, it might be necessary to reverse idler gear and work pump body around a few more times. Then put front cover on, with gaskets (generally 2 gaskets) and tighten cover securely. Put pump back in vise and ascertain that shaft turns and then tighten up rear cover screws securely. If pump is still tight add one more gasket.

Teflon gear characteristics- You should be aware of the possibility of expansion of the lower idler gear which is made of glass filled Teflon. This expansion or swelling of the gear and other Teflon parts is an inherit property of the type of material. This usually occurs when the pump is not used or is stored for a period of time (that is 3 weeks or more). To minimize this problem and to put the pump back into first-class operating condition, do the following: (1) loosen the six screws on the rear cover of the pump to allow the gears to turn but still able to pump without too great a loss of liquid, (2) pump cold water through the pump for 5-10 minutes and, (3) while pump is running, gradually tighten the six rear cover screws until leakage has stopped.

Mechanical shaft seals-

Pump Model LOM – The mechanical shaft seal seats against a washer located next to the drive shaft retaining ring inside the seal housing cavity, so no location measurement is necessary as is the case with the model LOX/LOE Stainless Steel Pumps. Make sure to fill the seal cavity with mineral oil or material being pumped prior to re-installing the seal retainer and retaining ring. See cutaway below.

Pump Model LOX/LOE, MOE/MOX and LOL – These mechanical shaft seals do require a location measurement for proper operation. The 1/8" NPT sight plugs are used to locate and tighten the set collar. If setting measurement is not held the spring will not be activated correctly and seal will leak. Use caution in installing the ceramic face in the seal housing cover/retainer so that alignment is correct as seal ceramic can be easily cracked and cause seal to leak. Do not force coupler on pump shaft and do not pound coupler on. It should slide on and then be secured with set screws. Liquid being pumped will generally seep into seal cavity to provide necessary lubrication and cooling. When a heavy liquid that will not easily seep is being used it is recommended the seal cavity be filled with a compatible liquid. Mechanical seals normally run hot to the touch.

Factory repairs- For the safety of our repair department, when returning a pump for inspection, repairs should be tagged with the identification of material that has been pumped. When chemicals have been used the pump should either be neutralized before being returned, and tagged to this effect, or the neutralizing agent should be noted on tag along with the material pump has been in contact with. Also, all pipe fittings must be removed from pump prior to being returned.

THE MOST COMMON REASONS FOR PUMP FAILURE ARE:
1. Pumping abrasives- clear signs of scoring and definite wear pattern on all internal parts.
2. Pumping non-lubricating liquids — definite wear pattern on all internal parts.
3. Excessive pressure- bearing will be worn egg-shaped. Gear will show definite wear on the teeth and cover.
4. Severe acids- definite etching and eroding of the castings.
5. Excessive belt tension- premature shaft bearing wear and failure.
6. Misalignment- premature shaft bearing wear and failure.

INSTALLATION OF VITON AND TEFLON MECHANICAL SEALS

Model LOX/MOX Stainless Steel Pumps

INSTRUCTIONS FOR INSTALLING TYPE 9 TEFLON SEAL

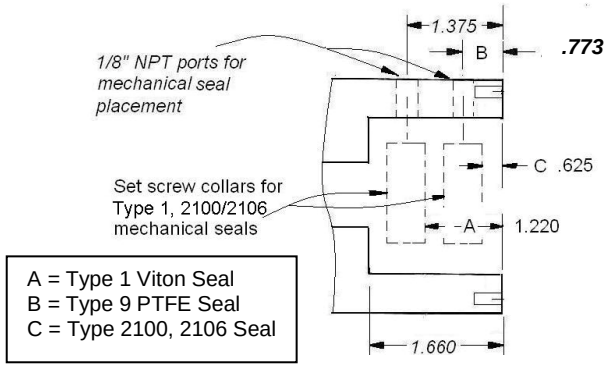
STEP 1. Check to be sure that pump drive shaft is beveled on the end and smooth. Lubricate shaft lightly with oil. Place seal body on shaft with carbon face towards front of shaft. Remove three (3) retaining clips from seal body; this will cause body to clamp onto shaft but will still be movable. Slide seal body into seal housing so that the socket screw in the body is centered to the first housing plug measured from the housing face. See

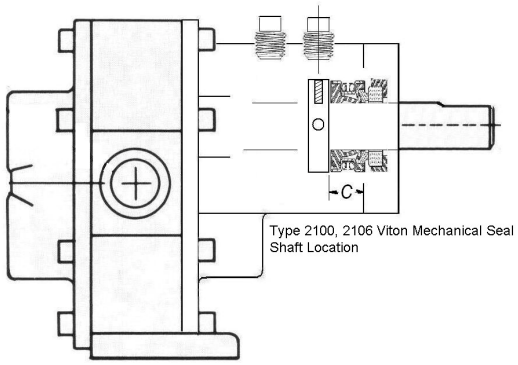
diagram below. Once body is properly positioned, tighten the two set screws.
STEP 2. To install ceramic mating ring in seal housing cover, place it in recess so that the two pre-drilled holes in the ceramic line up with the two pins in the cover. If you are upgrading from a type 1 or 2100 seal and the cover holding the mating ring does not have the drilled holes for pins, this is not a problem so long as the mating ring when installed is firmly in place and cannot move or rotate on its own. For ease in installation lubricate both ceramic and seal cover with mineral oil or any compatible lubricant and gently but firmly press ceramic in cover. Ceramic is fragile and has to be handled with care. Use protective covering on ceramic side when pressing.
STEP 3. Re-install cover to housing with 4 socket head screws and four (4) PTFE gaskets #LSS2-3 (This will allow centering adjustment of the ceramic face seal with the drive shaft). Fill mechanical seal with a lubricant, either material to be pumped or a compatible liquid. Seal will be damaged if not lubricated.

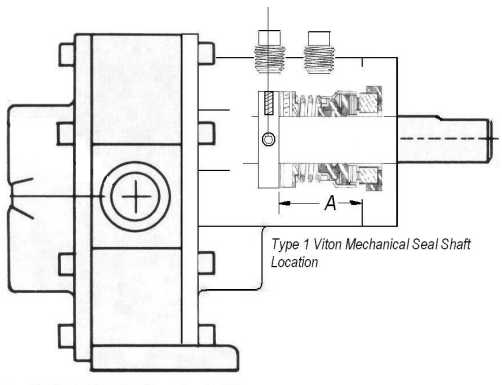
INSTRUCTIONS FOR INSTALLING TYPE 1, 2100 and 2106 VITON SEAL

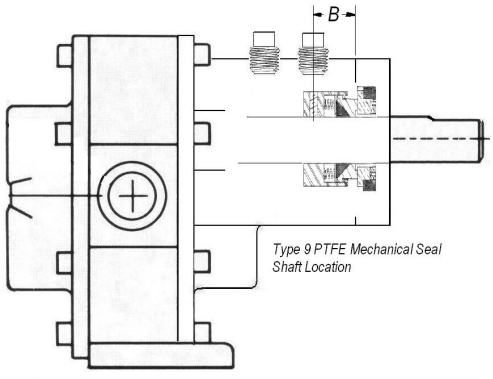
STEP 1. Place set collar on shaft and locate from front face of housing per diagram below. Lock set collar on shaft with set screw (accessible through hole in seal housing). THIS DIMENSION IS CRITICAL AND MUST BE HELD. Check end of drive shaft on pump, be sure it is smooth and beveled. Lubricate shaft freely. Install seal body on shaft (carbon face towards front of shaft). Seal body to be installed firmly against set collar.
STEP 2. To install ceramic in seal body cover place ceramic with the Viton gasket down and press firmly into seal cover BY HAND. Ceramic is fragile and has to be handled with care.
STEP 3. Re-install cover to housing with 4 socket head screws and one (1) PTFE gasket. Fill mechanical seal with a lubricant, either material to be pumped or a compatible liquid. Seal will be damaged if not lubricated.

Seal body position dimensions







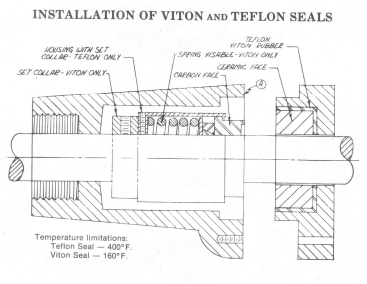


Model LOE Stainless Steel Pumps

INSTRUCTIONS FOR INSTALLING TEFLON SEAL

STEP 1. Check to be sure that pump drive shaft is beveled on the end and smooth. Lubricate shaft liberally with oil. Place seal body on shaft with carbon face to the front of face (A). Slide seal body into seal housing so that the carbon face is lined up flush with seal housing face (A) (THIS IS CRITICAL). Tighten two set screws in seal body that are accessible through hole in seal housing.
STEP 2. To install ceramic in seal housing cover, place ceramic in recess so that the two pre-drilled holes in the ceramic line up with the two pins in the cover. For ease in installation lubricate both ceramic and seal cover with mineral oil or any compatible lubricant and gently but firmly press ceramic in cover. Ceramic is fragile and has to be handled with care. Use protective covering on ceramic side when pressing.

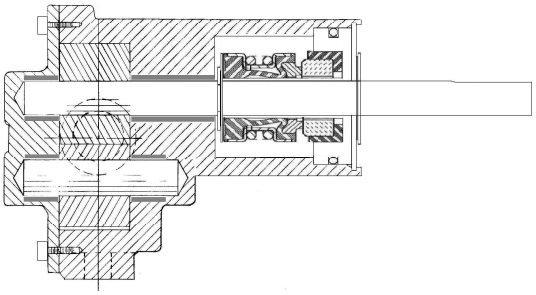
INSTRUCTIONS FOR INSTALLING VITON SEAL



STEP 1. Place set collar on shaft and locate from front face of set collar 1.1250 inch to face (A) of seal housing. Lock set collar on shaft with set screw (accessible through hole in seal housing). (THIS 1.1250 INCH DIMENSION IS CRITICAL AND MUST BE HELD). Check end of drive shaft on pump, be sure it is smooth and beveled. Lubricate shaft freely. Install seal body on shaft (carbon face to the front of face (A)). Seal body to be installed firmly against set collar.
STEP 2. To install ceramic in seal body cover place ceramic with the Viton gasket down and press firmly into seal cover BY HAND. Ceramic is fragile and has to be handled with care.
STEP 3. For Viton and Teflon seals install gasket on cover over shaft and line up bolt holes in seal housing. (It should be spring tension that holds the seal cover away from the housing). Install three bolts and tighten. Fill mechanical seal with a lubricant, either material to be pumped or a compatible liquid. Seal will be damaged if not lubricated.

Model LOM Bronze Pumps

INSTRUCTIONS FOR INSTALLING TYPE 2106 VITON SEAL



STEP 1. Check end of drive shaft on pump, be sure it is smooth and beveled. Lubricate shaft freely. Install seal body on shaft (carbon face towards front of shaft). Seal body to be installed firmly against washer located next to retaining ring on drive shaft.
STEP 2. To install ceramic in seal body cover/retainer place ceramic with the Viton gasket down and press firmly into seal cover BY HAND. Ceramic is fragile and has to be handled with care.
STEP 3.. Fill mechanical seal housing cavity with a lubricant, either material to be pumped or a compatible liquid. Seal will be damaged if not lubricated. Re-install cover/retainer to housing with retaining ring.

Model LOL Bronze Pumps

INSTRUCTIONS FOR INSTALLING TYPE 2106, 2100 and TYPE 1 VITON SEAL

STEP 1. Place set collar on shaft and locate from front face of housing per diagram below. Lock set collar on shaft with set screw (accessible through hole in seal housing). THIS DIMENSION IS CRITICAL AND MUST BE HELD. Check end of drive shaft on pump, be sure it is smooth and beveled. Lubricate shaft freely. Install seal body on shaft (carbon face towards front of shaft). Seal body to be installed firmly against set collar.
STEP 2. To install ceramic in seal body cover place ceramic with the Viton gasket down and press firmly into seal cover BY HAND. Ceramic is fragile and has to be handled with care.
STEP 3. Fill mechanical seal with a lubricant, either material to be pumped or a compatible liquid. Seal will be damaged if not lubricated. Re-install cover to housing with retaining ring.