



TECHNICAL SERVICE MANUAL

VIKING BRACKET MOUNTED LP-GAS PUMPS

SERIES 200-G AND 260-G

SIZES K, KK, L, LQ, LL



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INTRODUCTION

The illustrations used in this manual are for identification purposes only and should **not** be used for ordering parts. Secure a parts list from the factory or a Viking® representative. Always give complete name of part, part number and material with model number and serial number of the pump when ordering repair parts.

The unmounted pump or pump unit model number and serial number can be found on a nameplate attached to the pump or base.

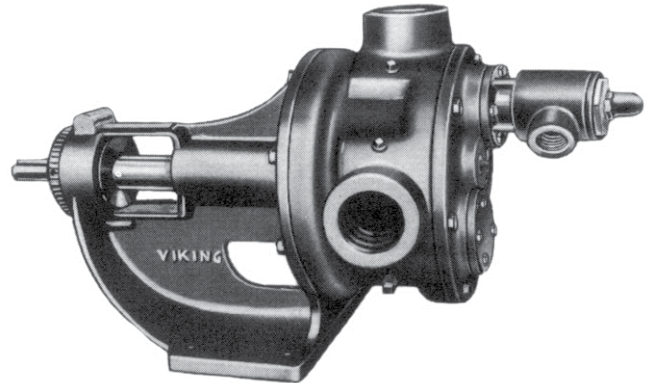


FIGURE 1
200-G, 260-G SERIES
UNMOUNTED PUMP

MODEL NUMBER CHART

UNMOUNTED PUMPS	UNITS
K200-G	Units are designated by the unmounted pump model numbers followed by a letter(s) indicating drive style. V = V-Belt D = Direct Drive R = Viking Speed Reducer P = Commercial Speed Reducer
KK200-G	
KK260-G	
L200-G	
LQ200-G	
LL200-G	

This manual deals exclusively with the 200-G and 260-G series bracket-mounted LP-Gas pumps. Refer to figures 1-13 for general configuration and nomenclature used in this manual.

CAUTION !

THE 200-G AND 260-G SERIES ARE UL LISTED PUMPS. ANY CHANGES OR REPAIRS TO THE PUMP WILL VOID THE UL LISTING. TO MAINTAIN THE UL LISTING, THE PUMP WILL NEED TO BE REPLACED WITH A NEW PUMP OR REPAIRED AND RETESTED AT THE FACTORY.

SPECIAL INFORMATION

DANGER !

Before opening any Viking pump liquid chamber (pumping chamber, reservoir, relief valve adjusting cap fitting etc.) Be sure:

1. That any pressure in the chamber has been completely vented through the suction or discharge lines or other appropriate openings or connections.
2. That the driving means (motor, turbine, engine, etc.) has been "locked out" or made non- operational so that it cannot be started while work is being done on pump.
3. That you know what liquid the pump has been handling and the precautions necessary to safely handle the liquid. Obtain a material safety data sheet (MSDS) for the liquid to be sure these precautions are understood.

Failure to follow above listed precautionary measures may result in serious injury or death.

SAFETY INFORMATION AND INSTRUCTIONS

IMPROPER INSTALLATION, OPERATION OR MAINTENANCE OF PUMP MAY CAUSE SERIOUS INJURY OR DEATH AND/OR RESULT IN DAMAGE TO PUMP AND/OR OTHER EQUIPMENT. VIKING'S WARRANTY DOES NOT COVER FAILURE DUE TO IMPROPER INSTALLATION, OPERATION OR MAINTENANCE.

THIS INFORMATION MUST BE FULLY READ BEFORE BEGINNING INSTALLATION, OPERATION OR MAINTENANCE OF PUMP AND MUST BE KEPT WITH PUMP. PUMP MUST BE INSTALLED, OPERATED AND MAINTAINED ONLY BY SUITABLY TRAINED AND QUALIFIED PERSONS.

THE FOLLOWING SAFETY INSTRUCTIONS MUST BE FOLLOWED AND ADHERED TO AT ALL TIMES.

Symbol Legend :



Danger - Failure to follow the indicated instruction may result in serious injury or death.

WARNING

Warning - In addition to possible serious injury or death, failure to follow the indicated instruction may cause damage to pump and/or other equipment.



BEFORE opening any liquid chamber (pumping chamber, reservoir, relief valve adjusting cap fitting, etc.) be sure that :

- Any pressure in the chamber has been completely vented through the suction or discharge lines or other appropriate openings or connections.
- The pump drive system means (motor, turbine, engine, etc.) has been "locked out" or otherwise been made non-operational so that it cannot be started while work is being done on the pump.
- You know what material the pump has been handling, have obtained a material safety data sheet (MSDS) for the material, and understand and follow all precautions appropriate for the safe handling of the material.

WARNING

INSTALL pressure gauges/sensors next to the pump suction and discharge connections to monitor pressures.



WARNING

USE extreme caution when lifting the pump. Suitable lifting devices should be used when appropriate. Lifting eyes installed on the pump must be used **only** to lift the pump, **not** the pump with drive and/or base plate. If the pump is mounted on a base plate, the base plate must be used for all lifting purposes. If slings are used for lifting, they must be safely and securely attached. For weight of the pump alone (which does not include the drive and/or base plate) refer to the Viking Pump product catalog.



BEFORE operating the pump, be sure all drive guards are in place.



DO NOT attempt to dismantle a pressure relief valve that has not had the spring pressure relieved or is mounted on a pump that is operating.



DO NOT operate pump if the suction or discharge piping is not connected.



AVOID contact with hot areas of the pump and/or drive. Certain operating conditions, temperature control devices (jackets, heat-tracing, etc.), improper installation, improper operation, and improper maintenance can all cause high temperatures on the pump and/or drive.



DO NOT place fingers into the pumping chamber or its connection ports or into any part of the drive train if there is **any possibility** of the pump shafts being rotated.



WARNING

THE PUMP must be provided with pressure protection. This may be provided through a relief valve mounted directly on the pump, an in-line pressure relief valve, a torque limiting device, or a rupture disk. If pump rotation may be reversed during operation, pressure protection must be provided on **both** sides of pump. Relief valve adjusting screw caps must always point towards suction side of the pump. If pump rotation is reversed, position of the relief valve must be changed. Pressure relief valves cannot be used to control pump flow or regulate discharge pressure. For additional information, refer to Viking Pump's Technical Service Manual TSM 000 and Engineering Service Bulletin ESB-31.

WARNING

DO NOT exceed the pump's rated pressure, speed, temperature, or change the system/duty parameters from those the pump was originally supplied, without confirming its suitability for the new service.



WARNING

BEFORE operating the pump, be sure that:

- It is clean and free from debris
- all valves in the suction and discharge pipelines are fully opened.
- All piping connected to the pump is fully supported and correctly aligned with the pump.
- Pump rotation is correct for the desired direction of flow.



WARNING

THE PUMP must be installed in a matter that allows safe access for routine maintenance and for inspection during operation to check for leakage and monitor pump operation.

ROTATION: Viking pumps operate equally well in a clockwise or counterclockwise rotation. When rotation changes, the suction and discharge is reversed.

PRESSURE RELIEF VALVES:

1. Viking pumps are positive placement pumps and must be provided with some sort of pressure protection. Series 200-G and 260-G pumps are only available with a return to tank relief valve.
2. If pump rotation is to be reversed during operation, pressure protection must be provided on both sides of pump.
3. Relief valve adjusting screw cap must always point towards suction side of pump. If pump rotation is reversed, remove pressure relief valve and either turn end for end or change position with the cover plate.
4. Pressure relief valves cannot be used to control pump flow or regulate discharge pressure.

For additional information on pressure relief valves, **Refer to Technical Service Manual TSM000 and Engineering Service Bulletin ESB-31.**

SPECIAL MECHANICAL SEALS:

Extra care should be taken in repair of these pumps. Be sure to read and follow all special instructions supplied with your pump.

MAINTENANCE

1. **LUBRICATION:** Periodic external lubrication should be applied slowly with a handgun at all lubrication fittings provided. A good quality of general-purpose grease is satisfactory in the majority of cases; however, applications involving low temperatures may require other types of lubricants. Suggested frequency of lubrication is once every 500 hours of operation with multi-purpose grease, NLGI # 2. Do not over-grease. Applications involving low temperatures will require other types of lubrication. **Refer to Engineering Service Bulletin ESB-515.** Consult factory with specific lubrication questions.
2. **END CLEARANCE ADJUSTMENT:** After long term operation it is sometimes possible to improve the performance of the pump, without major repair, through adjustment of end clearance of the pump. Refer to instructions under assembly of the pump for information regarding this procedure.

3. **CLEANING THE PUMP:** It is good practice to keep the pump as clean as possible. This will facilitate inspection, adjustment and repair work and help prevent omission of lubrication to fittings covered or hidden with dirt.

STORAGE: If the pump is to be stored or not used for any appreciable length of time it should be drained and a light coat of lubricating and preservative oil should be applied to the internal parts. Lubricate all fittings.

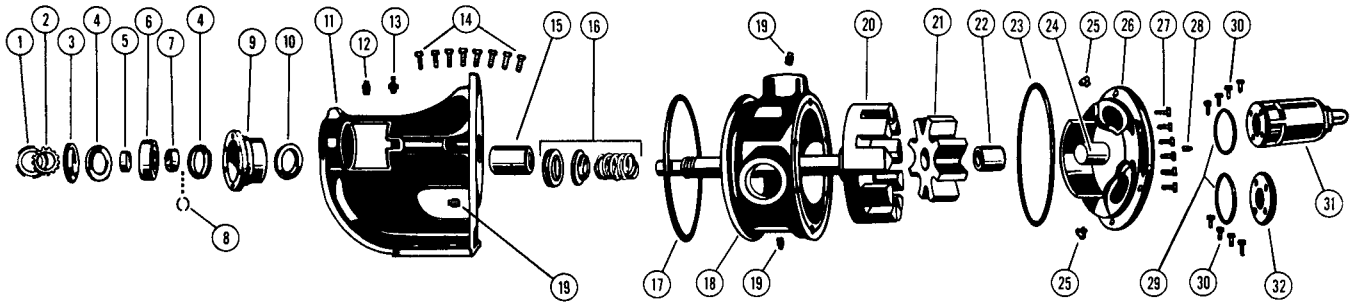
SUGGESTED REPAIR TOOLS: The following tools must be available to properly repair Series 200 and 260 pumps. These tools are in addition to standard mechanics' tools such as open end wrenches, pliers, screwdrivers etc. Most of the items can be obtained from an industrial supply house.

1. Soft Headed Hammer
2. Allen Wrenches
(some mechanical seals and set collars)
3. Mechanical seal installation sleeve
4. Bearing locknut spanner wrench
(Source: Grainger # 1APC4)
5. Spanner wrench, adjustable pin type for use on double end caps (Source: Grainger # 1APC1)
6. Brass Bar
7. Arbor Press

DISASSEMBLY

DANGER !

Before disassembling a pump or removing it from the line, be sure the pump and system are free of LP-Gas. As an extra precaution, protective clothing for face and body should be used when doing this work.



ITEM	NAME OF PART	ITEM	NAME OF PART	ITEM	NAME OF PART
1	Locknut	12	Pressure Relief Plug	23	O-Ring Gasket, Head
2	Lockwasher	13	Grease Fitting	24	Idler Pin
3	End Cap, Bearing Housing	14	Capscrew, Bracket	25	Check Valve
4	Closure Bearing Housing	15	Bracket Bushing (Needle Bearing and Snap Ring on KK-250G Only)	26	Head (Valve Type) and Idler Pin
5	Bearing Spacer Collar	16	Mechanical Seal	27	Capscrew for Head
6	Ball Bearing	17	O-Ring Gasket, Back Flange	28	Pipe Plug
7	Bearing Spacer Collar, Recessed	18	Casing	29	O-Ring Valve Gasket
8	Keeper Ring Halves	19	Pipe Plug	30	Capscrew for Valve and Cover Plate
9	Bearing Housing with Setscrews	20	Rotor and Shaft	31	Return-To-Tank Relief Valve
10	Closure for Seal Chamber	21	Idler	32	Cover Plate
11	Bracket	22	Idler Bushing		

FIGURE 2
Exploded View Series 200G & 260G Pumps

DANGER !

Before opening any Viking pump liquid chamber (pumping chamber, reservoir, relief valve adjusting cap fitting etc.) Be sure:

1. That any pressure in the chamber has been completely vented through the suction or discharge lines or other appropriate openings or connections.
2. That the driving means (motor, turbine, engine, etc.) has been "locked out" or made non-operational so that it cannot be started while work is being done on pump.
3. That you know what liquid the pump has been handling and the precautions necessary to safely handle the liquid. Obtain a material safety data sheet (MSDS) for the liquid to be sure these precautions are understood.

Failure to follow above listed precautionary measures may result in serious injury or death.

1. Remove the head from the pump. Avoid damaging the O-ring head gasket. If the pump has a relief valve on the head, the valve may be removed, but this is not necessary.

CAUTION !

WHEN THE HEAD IS BEING REMOVED FROM THE PUMP THE IDLER USUALLY STAYS ON THE IDLER PIN, BUT WILL FALL OFF IF THE INSIDE OF THE HEAD IS TILTED DOWNWARD.

Always keep your feet in the clear should this part fall. A fall on a hard surface can damage the idler. If the idler should fall, check carefully and file or stone all nicked or rough places before re-assembly.

Using a pencil, inspect the check valves located at the base of the idler pin in the head. (See Figure 3). The ball on the inside of these fittings should be depressed with the point of the pencil to insure that the valve is not stuck. If the spring behind the ball does not hold the ball in a closed position, or if the spring is broken, remove the check valve from the head. If a defective check valve is removed from the discharge side of the head, it need not be replaced and can be discarded.

CAUTION !

IF THE CHECK VALVE IS LEFT OUT OF THE DISCHARGE SIDE OF THE HEAD, THE PUMP MUST NEVER BE RUN IN THE OPPOSITE DIRECTION WITHOUT INSTALLING A NEW CHECK VALVE.

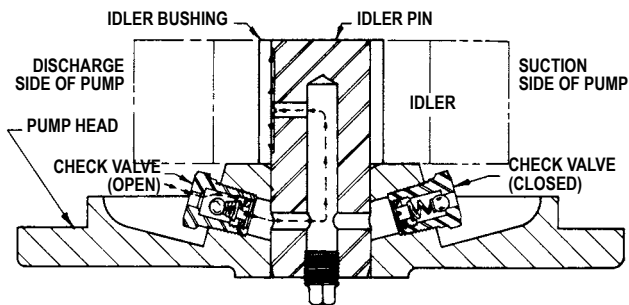


FIGURE 3

However, should a defective check valve be removed from the suction side of the head, it must be replaced with a new check valve

2. Remove the idler and bushing assembly from the idler pin. Replace all excessively worn parts. If it is necessary to install a new carbon graphite bushing, extreme care should be taken to prevent breaking when it is being installed in the idler. If it is cracked in the idler, this bushing will quickly disintegrate. An arbor press should be used to install carbon graphite bushings. Be sure bushing is started straight. **DO NOT STOP** the pressing operation until the bushing is in the proper position. Starting and stopping this operation invariably results in a bushing failure.
3. Bend up tang on lockwasher and, using a spanner wrench, remove the lockwasher and locknut. Hint: A piece of wood or brass inserted between the rotor teeth and into the casing port will prevent the rotor from turning.
4. Drive the shaft forward approximately 0.50 inch and inspect for the presence of a pair of half circle, round, wire keeper rings under the inner bearing spacer collar. If present these rings must be removed before the rotor and shaft can be removed from the pump. Carefully remove the rotor and shaft from the pump.

The spring and rotating member of the mechanical seal will come out with the shaft

CAUTION !

UNLESS THE SEAL IS DEFECTIVE, DO NOT REMOVE THE ROTARY MEMBER FROM THE SHAFT. REMOVAL OF THE SEAL WILL LIKELY CAUSE LEAKAGE WHEN REINSTALLED.

5. Inspect the bracket closure and replace it if not in first class condition. If this closure is replaced, be sure the new closure is installed with the lip facing **IN** toward the mechanical seal. Recent models have double lip closure facing both ways.
6. Loosen the radial socket head set screws in outer ring of bearing housing and remove the bearing housing end cap, closure and bearing spacer collar. Use a spanner wrench to remove the end cap.
7. Remove the double row ball bearing. The bearing should be washed thoroughly and examined. If there is any evidence of wear or damage, a new bearing should be used.

8. Loosen two axial setscrews in bearing housing flange and remove the bearing housing from bracket.
9. Examine the closures in the bearing housing and end cap. These closures are important to this assembly and should be replaced if not in first-class condition.

When installing new closures, be sure they are assembled with the lip facing toward the locknut – **See Figure 11.**

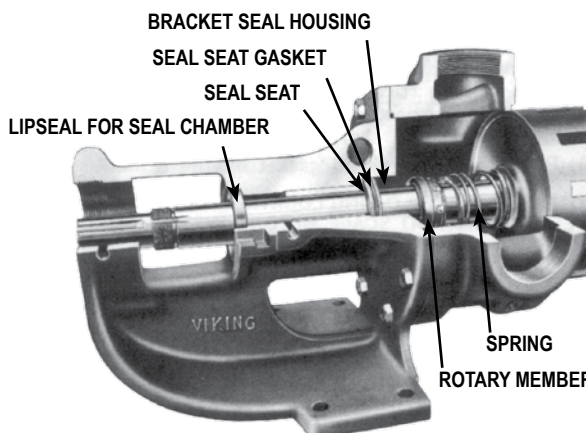
10. The casing should be examined for wear, particularly at the seal (area between port openings). If this surface is in good condition, the casing in all probability may be used
11. If KK-260-G, (**See Figure 5**) remove the needle bearing from the bracket. If 200-G Series **see Step 12.**

Remove the stationary seal seat, being careful not to damage the lapped surface of the seat. **See Figure 7.** Using snap ring pliers, remove the snap ring located at the end of the needle bearing. The bearing is now free to be removed.

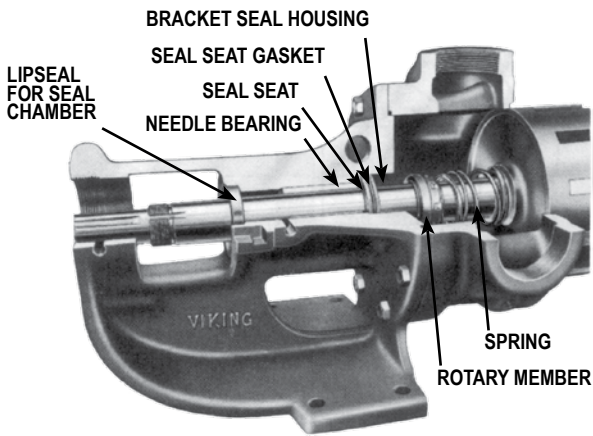
The bearing should be washed thoroughly and examined. If there is any evidence of wear or damage, a new bearing should be used.

Also examine the bearing surface on the shaft. This surface is pitted or worn, it is strongly recommended that a new rotor, shaft and needle bearing be installed

12. If series 200-G, the bracket bushing should be inspected and if it shows signs of wear, should be replaced. This carbon graphite bushing must be removed from the casing end of the pump. If it is necessary to install a new carbon graphite bracket bushing, the same care should be taken as in **Step 2** when replacing the carbon graphite idler bushing
13. **Mechanical Seal:** If the mechanical seal in your pump ever fails, it can be easily replaced with a new seal. There are three basic parts to this seal. They are: the spring, the rotary member and the stationary seal seat. **See Figures 4 or 5.** Remove the spring and rotary member from the shaft and the stationary seal seat from the bracket. The principle of the mechanical seal is the contact between the rotary and stationary members. These parts are lapped to a high finish and their sealing effectiveness depends upon complete contact



**FIGURE 4
CUTAWAY VIEW 200-G SERIES**

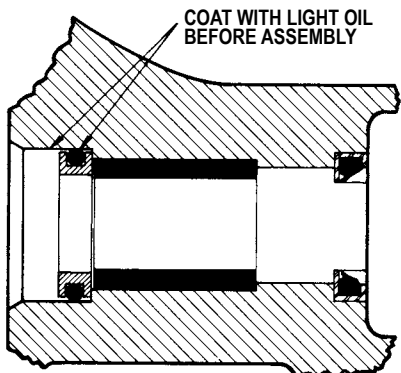


**FIGURE 5
CUTAWAY VIEW 260-G SERIES**

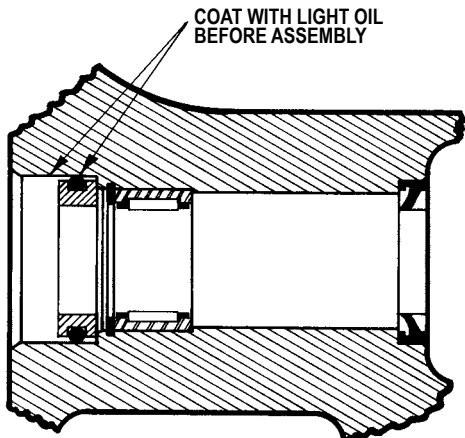
ASSEMBLY

- 1. Installing New Seal:** The seal is simple to install and good performance will result if care is taken in its installation. **NOTE:** Never touch the sealing faces with anything except the fingers or a clean cloth. Clean the rotor hub and bracket seal housing, making sure both are free from dirt and grit.

Coat the outside diameter of the seal seat and the inside diameter of the seal housing bore with light oil. With thumb and forefinger, push the seal seat into place, as shown in **Figures 6 & 7**.



**FIGURE 6
200-G SERIES**



**FIGURE 7
260-G SERIES**

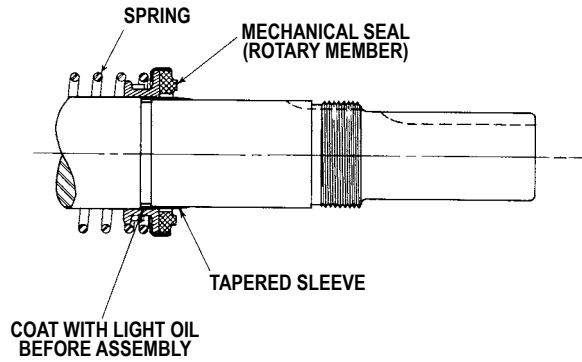


FIGURE 8

Place the tapered sleeve (furnished with replacement seals) on the shaft as in **Figure 8**. Coat the inside of the rotary member and the outside of the tapered sleeve with light oil. Place the spring and rotary member on the shaft, over the sleeve and against the hub of the rotor only enough to hold the spring in position. Do not compress spring at this stage. (**See Figure 9**). Remove the tapered sleeve.

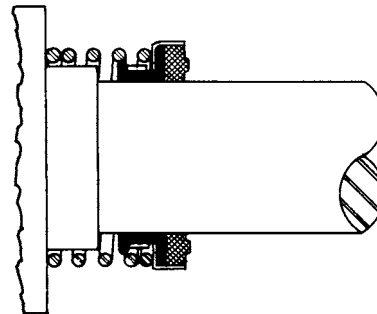


FIGURE 9

Refill the bracket lubrication chamber with multi-purpose grease and place the tapered sleeve in the bracket closure as shown in **Figure 10**. Flush the sealing faces of both the rotary member and stationary member with oil just before installing rotor and shaft.

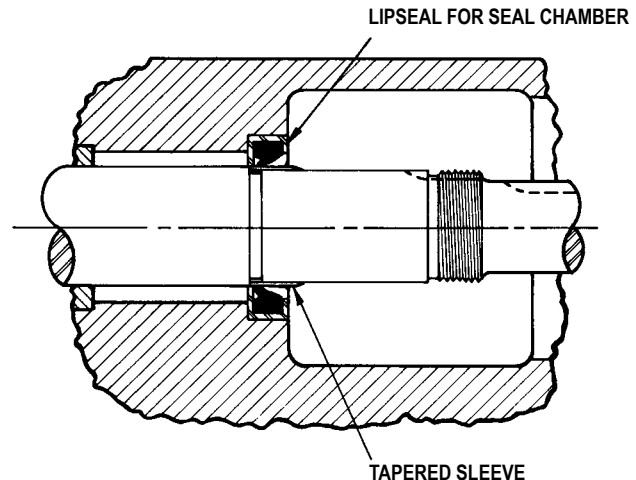


FIGURE 10

2. Install the rotor and shaft. Place the end of the shaft in the bracket bushing or needle bearing. Turn from right to left slowly, pushing it into place, until the end of the rotor teeth are just below the face of the casing. Placing the head and idler on the casing will force the rotor to its proper depth. Be sure the shaft is free from burrs and foreign particles that might damage the bracket bushing or needle bearing. Remove the tapered sleeve from the shaft.
3. Place the O-ring head gasket on the head.

NOTE: BE SURE THE O-RING LOCATION ON THE HEAD IS FREE OF DIRT AND SCALE BEFORE INSTALLING THE O-RING

4. Place the head on the pump. With the idler on the idler pin, put the head on the pump and tighten the capscrews. Tilt the top of the head away from the pump slightly until the crescent enters the inside diameter of the rotor and rotate the idler until its teeth mesh with the rotor teeth. This will help in putting the head on the pump.
5. Place the bearing collar on the shaft as far as it will go. Replace keepers.
6. Install the bearing housing and closure in the bracket.
7. Pack the ball bearing with grease, place on the shaft and push or drive into place in the housing.
8. Turn the bearing end cap (with closure and bearing collar inside) into the bearing housing until tight against the bearing. Lock in place by the setscrews in the outside diameter of the bearing housing.
9. Put lockwasher and locknut on shaft. Insert length of hardwood or brass through port opening between rotor teeth to keep shaft from turning. Tighten locknut to 100-130 ft. – lbs. Torque (K, KK, L, LQ, LL) . If tang does not line up with slot, tighten locknut until it does. Failure to tighten locknut or engage lockwasher tang could result in early bearing failure and cause damage to pump. Remove length of hardwood or brass from port opening.
10. Adjust the pump end clearance.

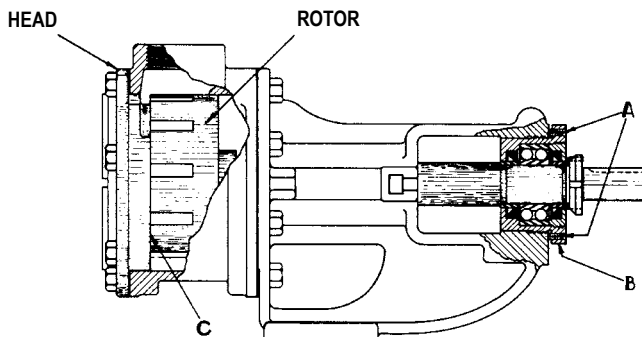


FIGURE 11

THRUST BEARING ADJUSTMENTS

(See Figure 11)

1. Loosen the two set screws "A" in the outer face of the bearing housing "B" and turn this thrust bearing assembly "B" clockwise until it can no longer be turned by hand. Back off counterclockwise only until the rotor shaft can be turned by hand with a slight noticeable drag.
2. For standard end clearance, back off the thrust bearing assembly "B" the required number of notches or an equivalent length measured on the outside of the bearing housing. See the following table.

PUMP SIZE	TURN BRG. HOUSING C.C.W. NO. OF NOTCHES OR LENGTH ON O., INCHES
K, KK, L, LQ & LL	4 1"

3. Tighten the two self-locking type "Allen" set screws "A", in the outboard face of the bearing housing, with equal force against the bracket. Your pump is now set with standard end clearances and locked.

NOTE: Be sure the shaft can rotate freely. If not, back off additional notches and check again

4. For specific recommendations, consult the factory. Each additional notch (or each 0.25") on the outside diameter of the bearing housing is equivalent to an extra end clearance of .0015" on K, KK, L, LQ and LL size pumps.

VALVE INSTRUCTIONS

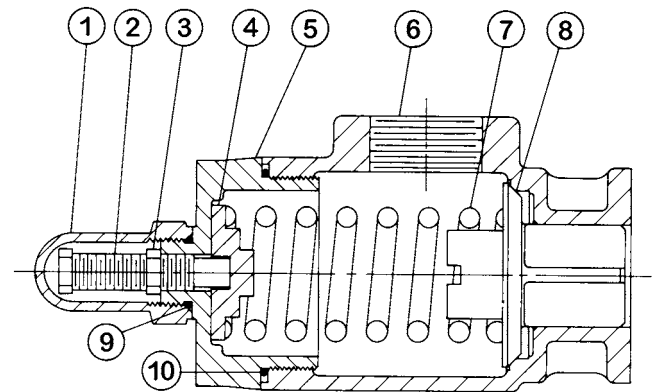


FIGURE 12

VALVE - LIST OF PARTS	
1. Valve Cap	6. Valve Body
2. Adjusting Screw	7. Valve Spring
3. Lock Nut	8. Poppet
4. Spring Guide	9. Cap Gasket
5. Bonnet	10. Bonnet Gasket

VIKING PUMP

TECHNICAL SERVICE MANUAL

VIKING BRACKET MOUNTED LP-GAS PUMPS

SERIES 200-G AND 260-G

SIZES K, KK, L, LQ, LL



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DISASSEMBLY

DANGER !

Before opening any Viking pump liquid chamber (pumping chamber, reservoir, relief valve adjusting cap fitting etc.) Be sure:

1. That any pressure in the chamber has been completely vented through the suction or discharge lines or other appropriate openings or connections.
2. That the driving means (motor, turbine, engine, etc.) has been "locked out" or made non-operational so that it cannot be started while work is being done on pump.
3. That you know what liquid the pump has been handling and the precautions necessary to safely handle the liquid. Obtain a material safety data sheet (MSDS) for the liquid to be sure these precautions are understood.

Failure to follow above listed precautionary measures may result in serious injury or death.

DANGER !

BE SURE VALVE AND SYSTEM ARE FREE OF LP-GAS.

1. Remove the valve cap.
2. Measure and record the length of extension of the adjusting screw.
3. Loosen the locknut and back out the adjusting screw until the spring pressure is released.
4. Remove the bonnet, spring guide, spring(s) and poppet from the valve body. Clean and inspect all parts for wear or damage and replace as necessary.

ASSEMBLY

Follow the procedure outlined under Disassembly.

Remember to replace gaskets, and re-set and lock adjusting screw.

VIKING PUMP

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WARRANTY

Viking warrants all products manufactured by it to be free from defects in workmanship or material for a period of one (1) year from date of startup, provided that in no event shall this warranty extend more than eighteen (18) months from the date of shipment from Viking. The warranty period for Universal Seal series pumps ONLY (Universal Seal models listed below) is three (3) years from date of startup, provided that in no event shall this warranty extend more than forty-two (42) months from the date of shipment from Viking.

UNDER NO CIRCUMSTANCES SHALL VIKING BE LIABLE UNDER THIS WARRANTY OR OTHERWISE FOR SPECIAL, INCIDENTAL, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING, BUT NOT LIMITED TO, LOST OR UNREALIZED SALES, REVENUES, PROFITS, INCOME, COST SAVINGS OR BUSINESS, LOST OR UNREALIZED CONTRACTS, LOSS OF GOODWILL, DAMAGE TO REPUTATION, LOSS OF PROPERTY, LOSS OF INFORMATION OR DATA, LOSS OF PRODUCTION, DOWNTIME, OR INCREASED COSTS, IN CONNECTION WITH ANY PRODUCT, EVEN IF VIKING HAS BEEN ADVISED OR PLACED ON NOTICE OF THE POSSIBILITY OF SUCH DAMAGES AND NOTWITHSTANDING THE FAILURE OF ANY ESSENTIAL PURPOSE OF ANY PRODUCT.

THIS WARRANTY IS AND SHALL BE VIKING'S SOLE AND EXCLUSIVE WARRANTY AND SHALL BE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT ALL OF WHICH OTHER WARRANTIES ARE EXPRESSLY EXCLUDED.

See complete warranty at www.vikingpump.com.

IMPORTANT

In ordering parts for relief valve on head, always be sure to give Model and Serial Number of pump as it appears on nameplate and the name of the part wanted. When ordering springs, be sure to give the pressure setting desired. If valve is removed for repairs, be sure to replace in same position. The return to tank valve should be on the discharge side of the pump.

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