

Viking Heavy Duty High Viscous Pump 1-1/2 hp Model KK4225

Mfg: Viking

Model: KK4224

Stock No. HDPH436.3

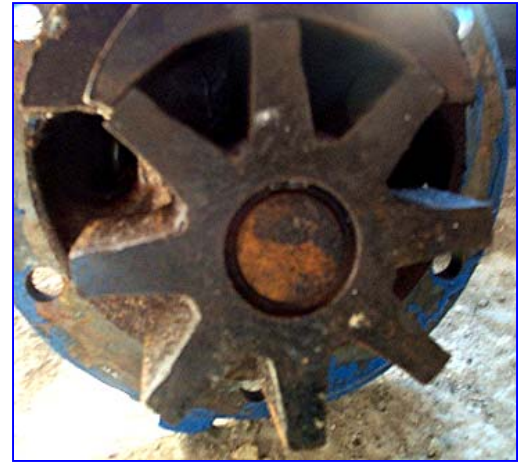
Serial No. 10844149

Viking Heavy Duty High Viscous Pump.

- Model KK4224
- S/N 10844149
- (2) 2 in. Inlet/outlets
- Heavy Duty Cal Res mechanical seal with double silicone carbide face capable of handling temperatures up to 500 °F as well as chemically resistant.
- Handles high viscous products up to 7500 SSU, 13 gpm per 100 rpm, max rpm 780.
- Reliance IEEEE45 SXT Duty Master Electric Motor, 1.5 hp, 1,725 rpm, 230/460 volt, 4.4/2.2 amps, 60 hz.
- Overall dimensions 16 in. W x 36 in. L x 25 in. H.

Heavy-Duty Series Internal Gear Specifications

Cast Iron and Steel Externals Models	Size	Std. Port (in.)	Nominal Capacity at Max. Speed		Max. Speed	Weight	
			M3/hr	GPM	RPM	KG	Lbs.
	KK	2.0	22.7	100	780	50	110



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INTRODUCTION

The illustrations used in this manual are for identification purposes only and cannot be used for ordering parts. Obtain 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 pump when ordering repair parts. The unmounted pump or pump unit model number and serial number are on the nameplate.

In the Viking model number system, basic size letters are combined with series number (125 and 4125) indicating both unmounted or mounted pump unit.

UNMOUNTED PUMP		UNITS
PACKED	MECH. SEAL	
G125	G4125	Units are designed by the unmounted pump model numbers followed by a letter indicating drive style. V=V-belt D=Direct Connected R=Viking Speed Reducer P=Commercial Speed Reducer
H125	H4125	
HL125	HL4125	
AK125	AK4125	
AL125	AL4125	
K125	K4125	
KK125	KK4125	
L125	L4125	
LQ125	LQ4125	
LL125	LL4125	

This manual deals only with Series 125 and 4125 HeavyDuty Bracket Mounted Pumps. Refer to Figures 1 thru 19 for general configuration and nomenclature used in this manual. Pump specifications and recommendations are listed in Catalog Section 141, Series 125 and 4125 HeavyDuty Bracket Mounted Pumps.



FIGURE 1
Sizes G, H and HL



FIGURE 2
Sizes AK and AL



FIGURE 3
Sizes K, KK and LL



FIGURE 4
Sizes LQ and LL

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 CHAMBER HAS BEEN COMPLETELY VENTED THROUGH 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.

ROTATION: Viking pumps operate equally well in a clockwise or counterclockwise rotation. Shaft rotation determines which port is suction and which is discharge. Port in area where pumping elements (gear teeth) come out of mesh is suction port.

PRESSURE RELIEF VALVES:

1. Viking pumps are positive displacement pumps and must be provided with some sort of pressure protection. This may be a relief valve mounted directly on the pump, an inline pressure relief valve, a torque limiting device or a rupture disk.
2. There are relief valve options available on those pump models designed to accept a relief valve. Options may include a return to tank relief valve and a jacketed relief valve. Pumps equipped with a jacketed head plate are generally not available with a relief valve.
3. If pump rotation is reversed during operation, pressure protection must be provided on *both* sides of pump.
4. Relief valve adjusting screw cap must *always* point towards suction side of pump. If pump rotation is reversed, remove pressure relief valve and turn end for end. Refer to Figures 1, 2, 3 and 4.
5. 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 INFORMATION

SPECIAL MECHANICAL SEALS can be installed either next to rotor hub or in an altered stuffing box.

Extra care must be taken in repair of pumps with mechanical seals. Read and follow all special information supplied with pump.

MAINTENANCE

Series 125 and 4125 pumps are designed for long, trouble-free service life under a wide variety of application conditions with a minimum of maintenance. The points listed below will help provide long service life.

LUBRICATION: External lubrication must be applied slowly with a hand gun to all lubrication fittings every 500 hours of operation with multi-purpose grease, NLGI #2. Do not over-grease. Applications involving very high or low temperatures will require other types of lubrication. Refer to Engineering Service Bulletin ESB-515. Consult factory with specific lubrication questions.

PACKING ADJUSTMENT: New packed pumps require initial packing adjustment to control leakage as packing "runs in". Make initial adjustments carefully and do not over-tighten packing gland. After initial adjustment, inspection will reveal need for packing gland adjustment or packing replacement. Refer to instructions under Disassembly, page 4, and Assembly, page 4, regarding repacking pump.

CLEANING PUMP: Keep pump as clean as possible. This will facilitate inspection, adjustment and repair work and help prevent overlooking a dirt covered grease fitting.

STORAGE: If pump is to be stored, or not used for six months or more, pump must be drained and a light coat of non-detergent SAE 30 weight oil must be applied to all internal pump parts. Lubricate fittings and apply grease to pump shaft extension. Viking suggests rotating pump shaft by hand one complete revolution every 30 days to circulate the oil.

SUGGESTED REPAIR TOOLS: The following tools must be available to properly repair Series 125 and 4125 pumps. These tools are in addition to standard mechanics' tools such as open end wrenches, pliers, screw drivers, 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. Packing hooks, flexible (packed pumps)
Small for 0.25 inch and 0.31 inch cross section packing
Large for 0.38 inch and up cross section packing
4. Mechanical seal installation sleeve
Viking Part No. 2-751-001-900 for 0.75 inch seal; G4125
Viking Part No. 2-751-002-900 for 1.12 inch seal;
H & HL4125
Viking Part No. 2-751-003-900 for 1.44 inch seal;
AK - LL4 125
5. Bearing locknut spanner wrench
(Source: #471 J. H. Williams & Co. or equal)
6. Spanner wrench, adjustable pin type for use on double end caps (Source: #482 J. H. Williams & Co. or equal)
7. Brass bar
8. Arbor press

PACKED PUMPS

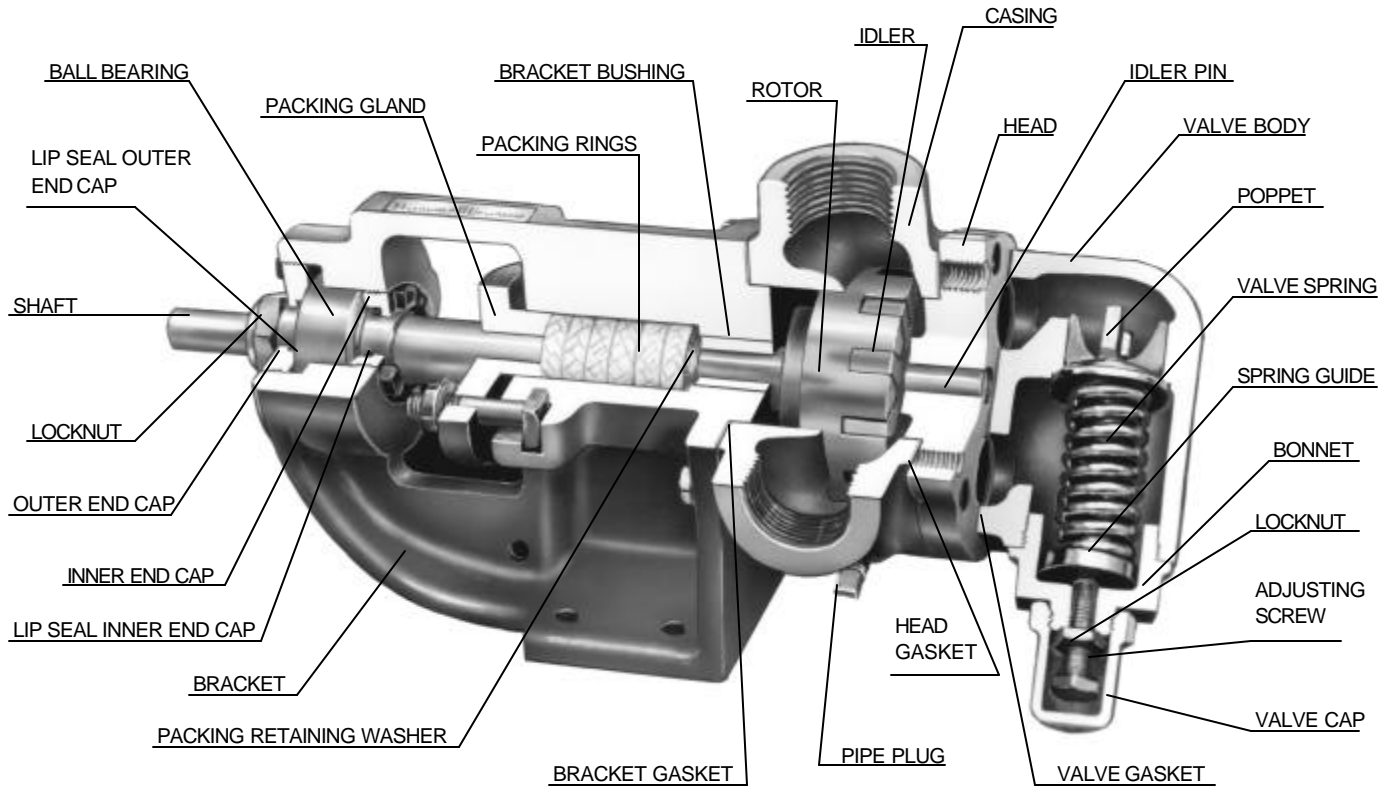
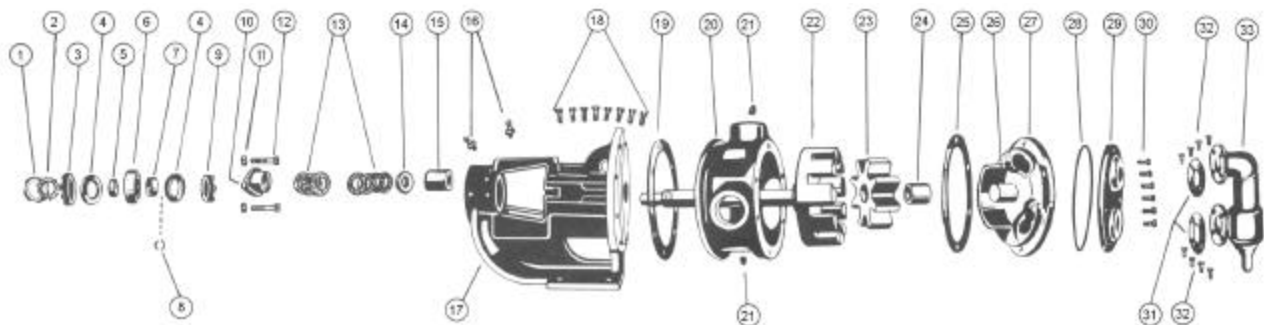


FIGURE 5
Cutaway View of G 125 with Callouts

Exploded View of Models G125, H125, HL125, AK125, AI 125, K125, KK125, L125, LQ125, and LL125 (Model KK125 shown)



ITEM	NAME OF PART	ITEM	NAME OF PART	ITEM	NAME OF PART	ITEM	NAME OF PART
1	Locknut	10	Packing Gland	19	Bracket Gasket	28	Gasket for Jacketed Head Plate
2	Lockwasher (Not G)	11	Packing Gland Nut	20	Casing	29	Jacketed Head Plate
3	End Cap (Outer)	12	Packing Gland Capscrew	21	Pipe Plug	30	Capscrew for Head
4	Lip Seal for End Cap	13	Packing	22	Rotor and Shaft	31	Relief Valve Gasket
5	Bearing Spacer Collar (Outer)	14	Packing Retaining Washer	23	Idler and Bushing	32	Capscrew for Valve
6	Ball Bearing	15	Bracket Bushing	24	Idler Bushing	33	Internal Relief Valve
7	Bearing Spacer Collar (Inner)	16	Grease Fitting	25	Head Gasket		
8	Ring, Half Round (Not G,H,HL)	17	Bracket and Bushing	26	Idler Pin		
9	End Cap (Inner)	18	Capscrew for Bracket	27	Head and Idler Pin		

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 CHAMBER HAS BEEN COMPLETELY VENTED THROUGH 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. Mark head and casing before disassembly to insure proper reassembly. The idler pin, which is offset in pump head, must be positioned toward and equal distance between port connections to allow for proper flow of liquid through pump.

Remove head from pump. *Do not allow idler to fall from idler pin.* Tilt top of head back when removing to prevent this. Avoid damaging head gasket. If pump is furnished with pressure relief valve, it need not be removed from head or disassembled at this point. Refer to Pressure Relief Valve Instructions, page 14.

If pump has jacketed head plate, it will separate from head when it is removed. The gasket between head and jacket head plate must be totally removed. Use new gasket when assembling pump.

2. Remove idler and bushing assembly.
3. Insert length of hardwood or brass through port opening between rotor teeth to keep shaft from turning. Bend up tang of lockwasher and with a spanner wrench remove locknut and lockwasher from shaft. There is no lockwasher on G size pump.
4. Remove packing gland nuts.
5. Tap shaft forward approximately 0.5 inch and remove pair of half round rings under inner bearing spacer collar. There is no pair of half round rings on G, H and HL size pumps.

6. Carefully remove rotor and shaft to avoid damaging bracket bushing.
7. Remove packing gland from side of bracket.

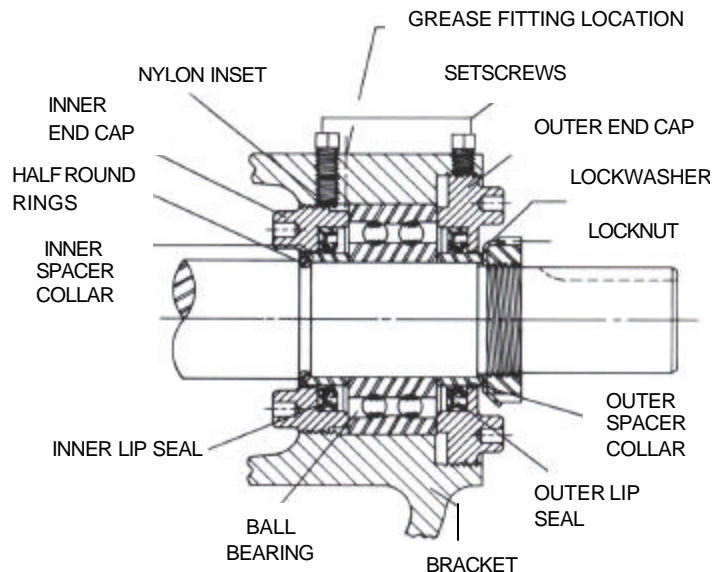


FIGURE 6

8. Loosen setscrews. Two on G, H and HL size pumps, four on all other sizes. With a spanner wrench, remove both end caps with lip seals. Remove ball bearing and spacer collars. Refer to Figure 6.
9. Remove packing and packing retainer washer.
10. Clean all parts thoroughly and examine for wear and damage. Check lip seals, ball bearing, bushings and idler pin and replace if necessary. Check all other parts for nicks, burrs, excessive wear and replace if necessary.
Wash bearings in clean solvent. Blow out bearings with compressed air. Do not allow bearings to spin; turn them slowly by hand. Spinning bearings will damage race and balls. Make sure bearings are clean, then lubricate with non-detergent SAE 30 weight oil and check for roughness. Roughness can be determined by turning outer race by hand.
11. Casing can be checked for wear or damage while mounted on bracket.

ASSEMBLY

1. Install bracket bushing. If bracket bushing has a lubrication groove, install bushing with groove at 6:00 o'clock position in bracket. If carbon graphite, refer to Installation of Carbon Graphite Bushings, page 13.
2. Coat shaft of rotor shaft assembly with non-detergent SAE 30 weight oil. Start end of shaft in bracket bushing turning from right to left, slowly pushing rotor in casing.

3. Place packing retainer washer in bottom of packing chamber and pack pump with new packing. Use packing suitable for liquid being pumped. Install packing, staggering the joints from one side of shaft to other. Lubricate packing rings with oil, grease or graphite to aid assembly. A length of pipe will help to seat each packing ring.
4. Install packing gland, capscrews and nuts. Back rotor and shaft out of casing just far enough to insert packing gland through side opening of bracket over end of shaft. Make sure gland is installed square and nuts are tightened evenly. Tighten nuts wrench tight then back off until gland is slightly loose.
5. Coat idler pin with non-detergent SAE 30 weight oil and place idler and bushing on idler pin in head. If replacing with carbon graphite bushing, refer to Installation of Carbon Graphite Bushings, page 13.
6. Using a .010 to .015 inch head gasket, install head and idler assembly on pump. Pump head and casing were marked before disassembly to insure proper reassembly. If not, be sure idler pin, which is offset in pump head, is positioned toward and equal distance between port connections to allow for proper flow of liquid through pump.

If pump is equipped with jacketed head plate, install at this time along with new gasket.

Tighten head capscrews evenly.
7. Slide inner spacer collar over shaft with recessed end facing rotor. G, H and HL size bearing spacer collars are not recessed.

Place pair of half round rings on shaft and slide inner bearing spacer collar over half round rings to lock them in place. There is no pair of half round rings on G, H and HL size pumps. Refer to Figure 6, page 4.
8. Press lip seal, lip facing end of shaft, in inner end cap and insert end cap through shaft end of bracket. Turn end cap clockwise, looking at shaft end, until it engages threads. End cap spanner wrench holes must be facing rotor. Turn end cap with spanner wrench until it projects slightly from opening on side of bracket. End cap must not be turned so far that lip seal drops off end of spacer collar on shaft or end cap becomes disengaged from threads. Refer to Figure 6, page 4.

If this happens, remove inner spacer collar, half round rings and end cap and start over at Step 7.
9. Pack ball bearing with multi-purpose grease, NLGI #2. Place on shaft and push or gently drive in place in bracket.
10. Press lip seal, lip facing end of shaft, in outer end cap and insert end cap in bracket. Turn end cap in bracket until it is tight against bearing. Refer to Figure 6, page 4.
11. 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 and bend one tang of lockwasher into slot of locknut. There is no lockwasher on G size pumps.

12. Adjust pump end clearance. Refer to Thrust Bearing Adjustment, page 13.
13. Lubricate all grease fittings with multi-purpose grease, NLGI #2.

DANGER

BEFORE STARTING PUMP, BE SURE ALL DRIVE EQUIPMENT GUARDS ARE IN PLACE.

FAILURE TO PROPERLY MOUNT GUARDS MAY RESULT IN SERIOUS INJURY OR DEATH.

MECHANICAL SEAL PUMPS

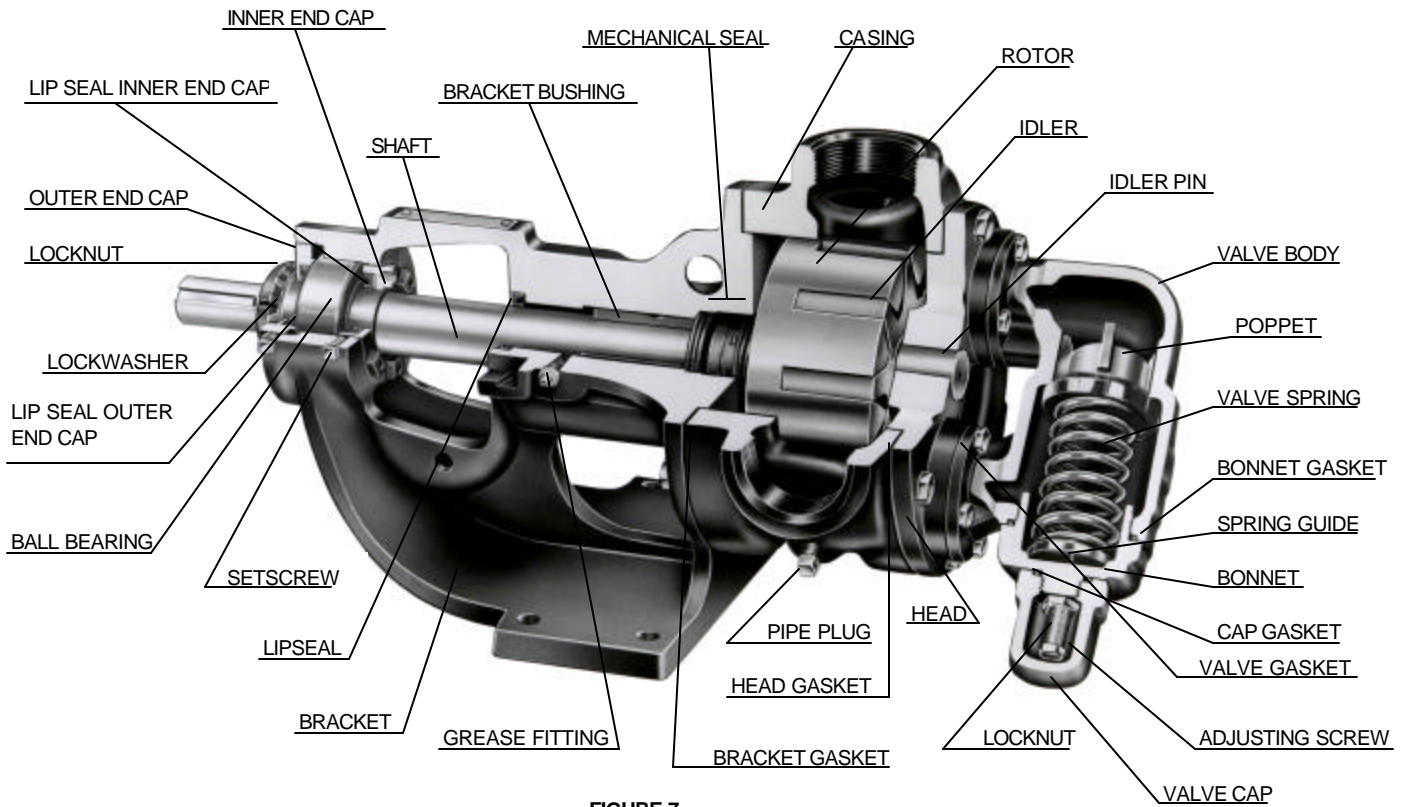
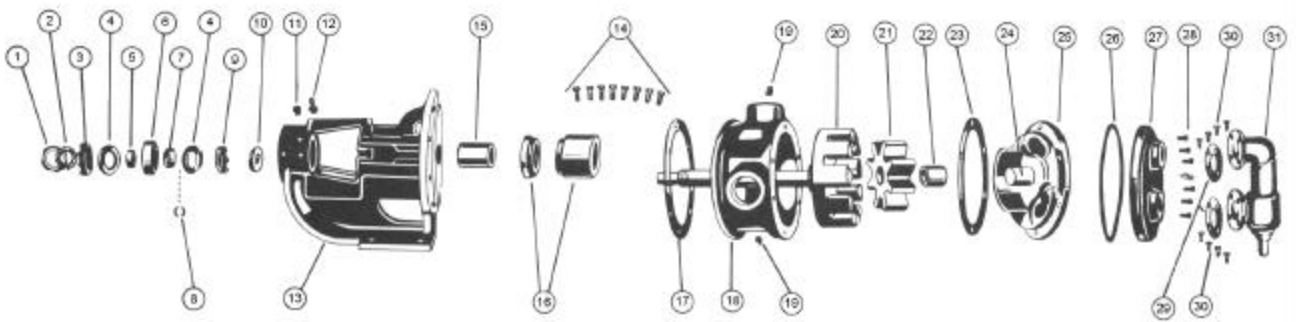


FIGURE 7
Cutaway View of KK 4125 with Callouts

Exploded View for Models G4125, H4125, HL4125, K4125, KK4125, L4125, LQ4125 and LL4125 (Model KK4125 shown)



ITEM	NAME OF PART	ITEM	NAME OF PART	ITEM	NAME OF PART	ITEM	NAME OF PART
1	Locknut	9	End Cap (Inner)	17	Bracket Gasket	25	Head and Idler Pin
2	Lockwasher (Not G)	10	Lip Seal for Seal Chamber	18	Casing	26	Gasket for Jacketed Head Plate
3	End Cap (Outer)	11	Pressure Relief Plug	19	Pipe Plug	27	Jacketed Head Plate
4	Lip Seal for End Cap	12	Grease Fitting	20	Rotor and Shaft	28	Capscrew for Head
5	Bearing Spacer Collar (Outer)	13	Bracket and Bushing	21	Idler and Bushing	29	Relief Valve Gasket
6	Ball Bearing	14	Capscrew for Bracket	22	Idler Bushing	30	Capscrew for Valve
7	Bearing Spacer Collar (Inner)	15	Bracket Bushing	23	Head Gasket	31	Internal Relief Valve
8	Ring, Half Round (Not G,H,HL)	16	Mechanical Seal	24	Idler Pin		

For Disassembly and Assembly of AK 4125 and AL 4125 see page 11.

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 CHAMBER HAS BEEN COMPLETELY VENTED THROUGH 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. Mark head and casing before disassembly to insure proper reassembly. The idler pin, which is offset in pump head, must be positioned toward and equal distance between port connections to allow for proper flow of liquid through pump.

Remove head from pump. *Do not allow idler to fall from idler pin.* Tilt top of head back when removing to prevent this. Avoid damaging head gasket. If pump is furnished with pressure relief valve, it need not be removed from head or disassembled at this point. Refer to Pressure Relief Valve Instructions, page

If pump has jacketed head plate, it will separate from head when it is removed. The gasket between head and jacket head plate must be totally removed. Use new gasket when assembling pump.

2. Remove idler and bushing assembly.
3. Insert length of hardwood or brass through port opening between rotor teeth to keep shaft from turning. Bend up tang of lockwasher and with a spanner wrench remove locknut and lockwasher from shaft. There is no lockwasher on G size pump.
4. Tap shaft forward approximately 0.5 inch and remove pair of half round rings in inner spacer collar. There is no pair of half round rings on G, H and HL size pumps.
5. Carefully remove rotor and shaft to avoid damaging bracket bushing.
6. Remove rotary member of seal from shaft and stationary seal seat from bracket.

7. Loosen setscrews. Two for G, H and HL size pumps, four for all other sizes. With spanner wrench remove both end caps and lip seals. Remove ball bearing and spacer collars. Refer to Figure 6, page 4.

8. Examine seal chamber lip seal and remove if it shows wear or damage. Lip seal must be removed if bracket bushing needs to be replaced.

9. Clean all parts thoroughly and examine for wear or damage. Check lip seals, ball bearing, bushing and idler pin and replace if necessary. Check all other parts for nicks, burrs, excessive wear and replace if necessary.

Wash bearings in clean solvent. Blow out bearings with compressed air. Do not allow bearings to spin; turn them slowly by hand. Spinning bearings will damage race and balls. Make sure bearings are clean, then lubricate with non-detergent SAE 30 weight oil and check for roughness. Roughness can be determined by turning outer race by hand.

Be sure shaft is free from nicks, burrs and foreign particles that might damage bracket bushing. Scratches on shaft in seal area will provide leakage paths under mechanical seal.

10. Casing can be checked for wear or damage while mounted on bracket.

ASSEMBLY

Standard Mechanical Seal (Synthetic Rubber Bellows Type)

The seal used in this pump is simple to install and good performance will result if care is taken during installation.

The principle of the mechanical seal is contact between the rotary and stationary members. These parts are lapped to a high finish and their sealing effectiveness depends on complete contact.

Viking furnishes a number of heavy-duty pumps with special mechanical seals installed in the packing end of the pump. These special seals are not discussed in TSM141.1. Information is available by contacting the factory. When requesting special seal information, be sure to give pump model number and serial number.

1. Install bracket bushing. If bracket bushing has a lubrication groove, install bushing with groove at 6:00 o'clock position in bracket. If carbon graphite, refer to Installation of Carbon Graphite Bushings, page 13.
2. Install lip seal in bracket. Refer to Figure 8.

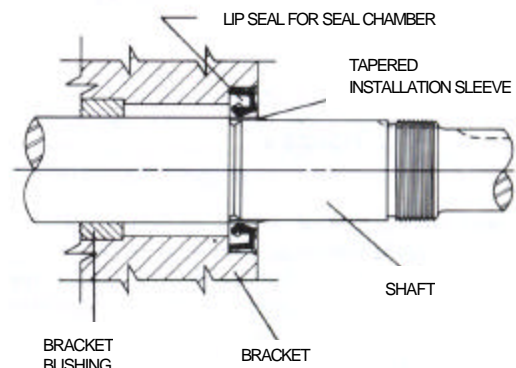


FIGURE 8

Prior to installing rotating portion of mechanical seal, prepare and organize rotor shaft, head and idler assemblies and appropriate gaskets for quick assembly.

Once rotating portion of mechanical seal is installed on rotor shaft, it is necessary to assemble parts as quickly as possible to insure that seal does not stick to shaft in wrong axial position. The seal should be expected to stick to the shaft after several minutes setting time.

Never touch sealing faces with anything except clean hands or clean cloth. Minute particles can scratch the seal faces and cause leakage.

3. Coat idler pin with non-detergent SAE 30 weight oil and place idler and bushing on idler pin in head. If replacing a carbon graphite bushing, refer to Installation of Carbon Graphite Bushings, page 13.
4. Clean rotor hub and bracket seal housing bore. Make sure both are free from dirt and grit. Coat outer diameter of seal seat and inner diameter of seal housing bore with non-detergent SAE 30 weight oil.
5. Start seal seat in seal housing bore, refer to Figure 9. If force is necessary, protect seal face with a clean cardboard disc and gently tap it in place with a piece of wood.

COAT SEAL SEAT AND SEAL HOUSING BORE WITH NON-DETERGENT SAE 30 WEIGHT OIL BEFORE ASSEMBLY.

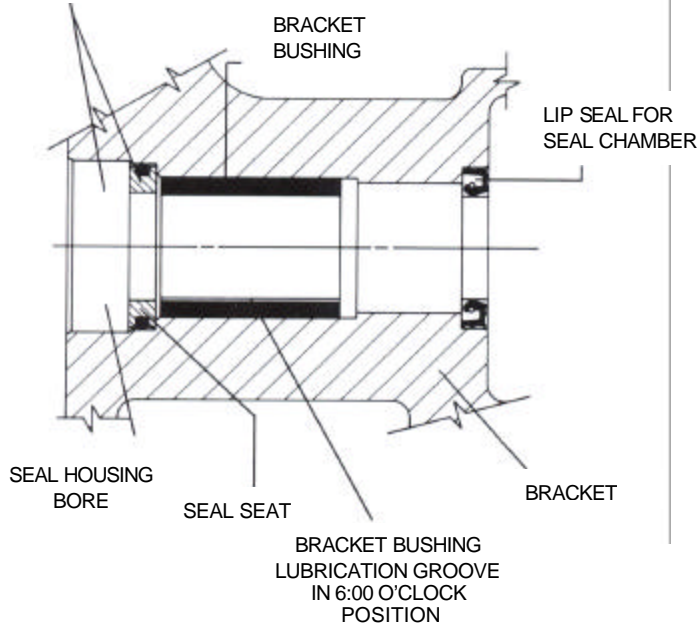


FIGURE 9

6. Place tapered installation sleeve on shaft, refer to Figure 10. Sleeve is furnished with H, HL, K, KK, L, LO and LL size replacement mechanical seals. Coat rotor shaft, tapered installation sleeve and inner diameter of mechanical seal rotary member with a generous amount of non-detergent SAE 30 weight oil. Petrolatum may be used but grease is not recommended.

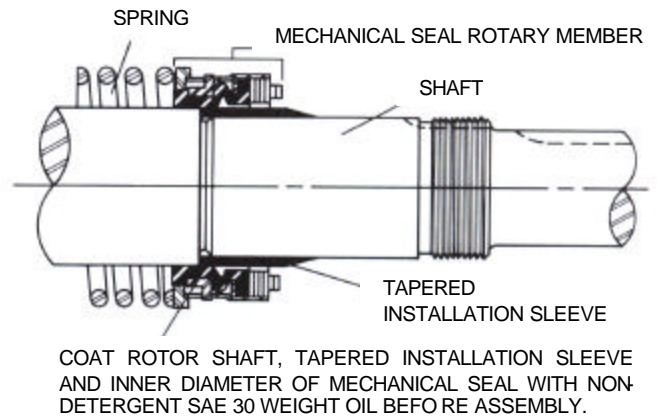


FIGURE 10

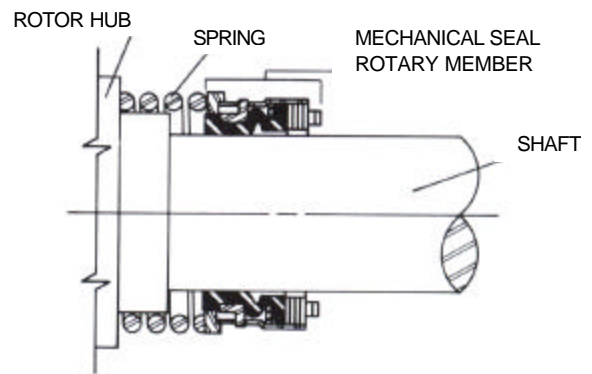


FIGURE 11

7. Place seal spring on shaft against rotor hub. Refer to Figure 11.
8. Slide rotary member, lapped contact surface facing away from spring, over installation sleeve on shaft until it is against spring.
Do not compress spring.
9. Coat rotor shaft with non-detergent SAE 30 weight oil. Start end of shaft in bracket bushing and turn from right to left, slowly pushing until the ends of the rotor teeth are just below the face of the casing.

Leave the rotor in this position. Withdrawal of rotor and shaft may displace the carbon seal rotating face and result in damage to the seal.

10. Using a .010 to .015 inch head gasket, install head and idler assembly on pump. Pump head and casing were marked before disassembly to insure proper reassembly. If not, be sure idler pin, which is offset in pump head, is positioned toward and equal distance between port connections to allow for proper flow of liquid through pump.

If pump is equipped with jacketed head plate, install at this time along with new gasket.

Tighten head capscrews evenly.

Remove tapered installation sleeve from the shaft.

11. Slide inner spacer collar over shaft with recessed end facing rotor. G, H and HL size bearing spacer collars are not recessed.

Place pair of half round rings on shaft and slide inner bearing spacer collar over half round rings to lock them in place. There is no pair of half round rings on G, H and HL size pumps. Refer to Figure 6, page 4.

12. Press lip seal, lip facing end of shaft, in inner end cap and insert end cap through shaft end of bracket. Turn end cap clockwise, looking at shaft end, until it engages threads. End cap spanner wrench holes must be facing rotor. Turn end cap with spanner wrench until it projects slightly from opening on side of bracket. End cap must not be turned so far that lip seal drops off end of spacer collar on shaft or end cap becomes disengaged from threads. Refer to Figure 6, page 4.

If this happens, remove inner spacer collar, half round rings and end cap and start over at Step 11.

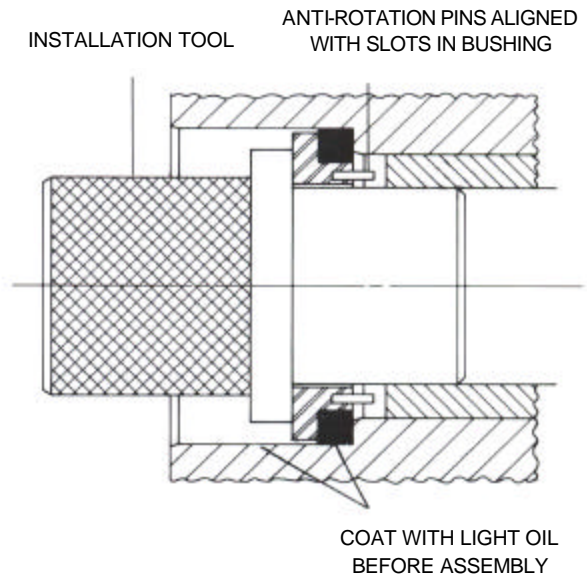
13. Pack ball bearing with multi-purpose grease, NLGI #2. Place on shaft and push or gently drive in place in bracket.
14. Press lip seal, lip facing end of shaft, in outer end cap and insert end cap in bracket. Turn end cap in bracket until it is tight against bearing. Refer to Figure 6, page 4.
15. 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 and bend one tang of lockwasher into slot of locknut. There is no lockwasher on G size pump.
16. Adjust pump end clearance. Refer to Thrust Bearing Adjustment, page 13.
17. Lubricate the grease fitting over the seal chamber with petroleum jelly, petrolatum (Vaseline) or other similar low melting point lubricant. Lubricate all other grease fittings with multi-purpose grease, NLGI #2.

ASSEMBLY

Optional Mechanical Seal (Teflon Fitted Type)

The seal type shown in Figures 12, 13 and 14 can be installed as an alternate to the standard mechanical seal (synthetic rubber bellows type). These seals are setscrew driven and the stationary seats have anti-rotation pins which mate with slots in the end of the bracket bushing.

1. Install bracket bushing. If bracket bushing has a lubrication groove, install bushing with groove at 6:00 o'clock position in bracket. If carbon graphite, refer to Installation of Carbon Graphite Bushings, page 13.
2. Install lip seal in bracket.
3. Clean rotor hub and bracket seal housing bore. Refer to Figure 12. Make sure both are free from dirt and grit. Coat outer diameter of seal seat gasket and inner diameter of seal housing bore with non-detergent SAE 30 weight oil.



BRACKET SEAL HOUSING BORE WITH SEAL SEAT INSTALLED. NOTE SPECIAL INSTALLATION TOOL USED FOR FACTORY ASSEMBLY.

FIGURE 12

4. Start seal seat in seal housing bore. Make sure seat anti-rotation pins are aligned to engage slots in end of bracket bushing. Refer to Figure 12.
5. Using a cardboard disc to protect lapped face of seal seat, press seal seat assembly to bottom of seal housing bore using a piece of wood. An arbor press can also be used to install the seal seat. Seal seat must be started square and carefully pressed to bottom of seal housing bore.

K size pumps require a 0.25 inch spacer between seal and rotor hub to properly position seal on shaft.

DANGER

BEFORE STARTING PUMP, BE SURE ALL DRIVE EQUIPMENT GUARDS ARE IN PLACE.

FAILURE TO PROPERLY MOUNT GUARDS MAY RESULT IN SERIOUS INJURY OR DEATH.

- Place tapered installation sleeve (furnished with H, HL, K, KK, L, LQ and LL size replacement mechanical seals) on shaft. Refer to Figure 13. Coat inner diameter of seal rotary member, tapered installation sleeve and the shaft with a generous quantity of non-detergent SAE 30 weight oil. Place rotary member on shaft over sleeve and against hub of rotor. Refer to Figure 14.

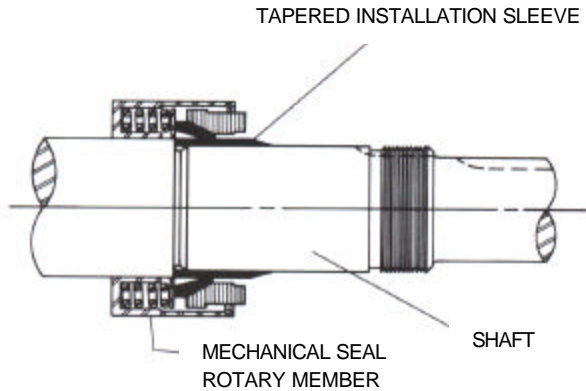


FIGURE 13

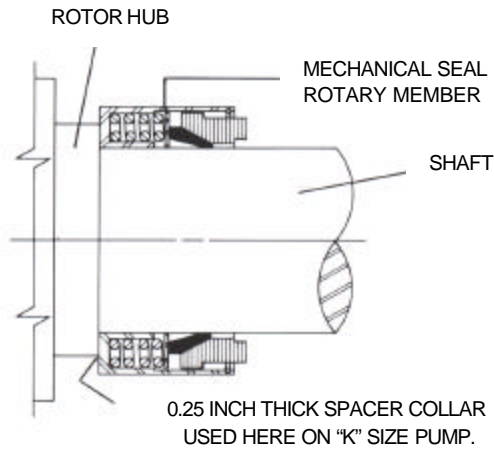
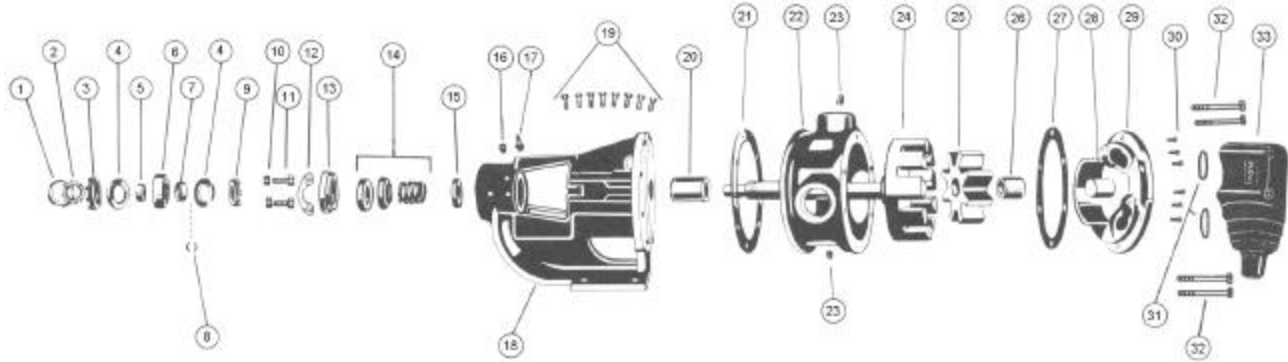


FIGURE 14

Some Teflon seals are equipped with holding clips which compress the seal springs. Remove holding clips to release springs after seal is installed on shaft. Tighten all drive setscrews securely to shaft.

AT THIS POINT, FINISH ASSEMBLY PROCEDURES STARTING AT STEP 9, PAGE 8 (STANDARD MECHANICAL SEAL).

Exploded View for Models AK41 25 and AL41 25 (Model AK41 25 shown)



ITEM	NAME OF PART	ITEM	NAME OF PART	ITEM	NAME OF PART	ITEM	NAME OF PART
1	Locknut	10	Seal Holder Nut	19	Capscrew for Bracket	28	Idler Pin
2	Lockwasher	11	Seal Holder Capscrew	20	Bracket Bushing	29	Head and Idler Pin
3	End Cap (Outer)	12	Seal Plate	21	Bracket Gasket	30	Capscrew for Head
4	Lip Seal for End Cap	13	Seal Holder	22	Casing	31	Relief Valve Gasket
5	Bearing Spacer Collar (Outer)	14	Mechanical Seal	23	Pipe Plug	32	Capscrew for Relief Valve
6	Ball Bearing	15	Set Collar with Setscrews	24	Rotor and Shaft	33	Internal Relief Valve
7	Bearing Spacer Collar (Inner)	16	Pipe Plug	25	Idler and Bushing		
8	Ring, Half Round	17	Grease Fitting	26	Idler Bushing		
9	End Cap (Inner)	18	Bracket and Bushing	27	Head Gasket		

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 CHAMBER HAS BEEN COMPLETELY VENTED THROUGH 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. Mark head and casing before disassembly to insure proper reassembly. The idler pin, which is offset in pump head, must be positioned toward and equal distance between port connections to allow for proper flow of liquid through pump.

Remove head from pump. *Do not allow idler to fall from idler pin.* Tilt top of head back when removing to prevent this. Avoid damaging head gasket. If pump is furnished with pressure relief valve, it need not be removed from head or disassembled at this point. Refer to Pressure Relief Valve Instructions, page 14.

If pump has jacketed head plate, it will separate from head when it is removed. The gasket between head and jacket head plate must be totally removed. Use new gasket when assembling pump.

2. Remove idler and bushing assembly.
3. Insert length of hardwood or brass through port opening between rotor teeth to keep shaft from turning. Bend up tang of lockwasher and with a spanner wrench remove locknut and lockwasher from shaft.
4. Rotate shaft so that the two setscrews for set collar can be seen through the seal access hole on left side of pump (viewed from shaft end). These two setscrews must be loosened before shaft can be removed from pump. Refer to Figure 15.
5. Remove seal holder nuts., seal holder plate and capscrews.
6. Seal holder cannot be removed until shaft is removed.
7. Tap shaft forward approximately 0.5 inch and remove pair of half round rings under inner spacer collar.
8. Carefully remove rotor and shaft to avoid damaging bracket bushing.
9. Remove seal holder, seal seat and rotary member of seal from side opening in bracket.

10. Loosen the four setscrews over outer and inner end caps. With spanner wrench remove both end caps and lip seals. Remove ball bearing and spacer collars. Refer to Figure 6, page 4.
11. Clean all parts thoroughly and examine for wear or damage. Check lip seals, ball bearing, bushings and idler pin and replace if necessary. Check all other parts for nicks, burrs, excessive wear and replace if necessary.

Wash bearings in clean solvent. Blow out bearings with compressed air. Do not allow bearings to spin; turn them slowly by hand. Spinning bearings will damage race and balls. Make sure bearings are clean, then lubricate with non-detergent SAE 30 weight oil and check roughness. Roughness may be determined by turning outer race by hand.

Be sure shaft is free from nicks, burrs and foreign particles that might damage bracket bushing. Scratches on shaft in seal area will provide leakage paths under mechanical seal.

12. Casing can be checked for wear or damage while mounted on bracket.

ASSEMBLY

Standard Mechanical Seal (Synthetic Rubber Bellows Type)

Models AK4125 and AL4125

The seal used in this pump is simple to install and good performance will result if care is taken during installation.

The principle of the mechanical seal is contact between the rotary and stationary members. These parts are lapped to a high finish and their sealing effectiveness depends on complete contact.

1. Install bracket bushing. If bracket bushing has a lubrication groove, install bushing with groove at 6:00 o'clock position in bracket. If carbon graphite, refer to Installation of Carbon Graphite Bushings, page 13.
2. Coat shaft of rotor shaft assembly with non-detergent SAE 30 weight oil. Start end of shaft in bracket bushing turning from right to left, slowly pushing rotor in casing.
3. Coat idler pin with non-detergent SAE 30 weight oil and place idler and bushing on idler pin in head. If replacing carbon graphite bushing, refer to Installation of Carbon Graphite Bushings, page 13.
4. Using a .010 to .015 inch head gasket, install head and idler assembly on pump. Pump head and casing were marked before disassembly to insure proper reassembly. If not, be sure idler pin, which is offset in pump head, is positioned toward and equal distance between port connections to allow for proper flow of liquid through pump.
If pump is equipped with jacketed head plate, install at this time with new gasket.
Tighten head capscrews evenly.
5. Examine set collar to be sure there are no burrs or scratches and that setscrews are withdrawn so shaft will not be scratched when set collar is installed.

6. Place seal set collar on shaft, push into seal chamber so centerline of setscrew coincides with centerline of access hole on left side of bracket (viewed from shaft end.) Refer to Figure 15. Tighten setscrews to secure set collar to shaft.
7. Slide spring over shaft into seal chamber on set collar pilot. Place tapered installation sleeve on shaft. Refer to Figure 10.

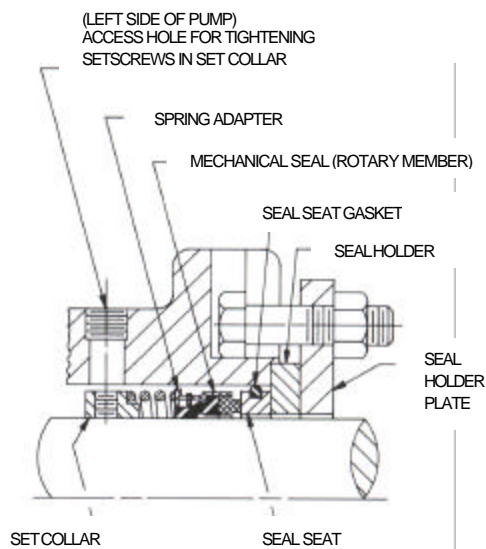


FIGURE 15

8. Apply generous amount of non-detergent SAE 30 weight oil to large diameter of shaft, tapered installation sleeve and inner diameter of mechanical seal rubber parts.
9. Slide rotary member, lapped contact surface facing away from spring, over installation sleeve on shaft until it is against spring.
Do not compress spring.
10. Lubricate outer diameter of mechanical seal O-ring seat gasket and flush lapped seal faces with non-detergent SAE 30 weight oil.
11. Press stationary seal seat in bore until back, unlapped face, is just inside bore. Position stationary seal seat by installing seal holder and secure seal holder to machined face of bracket with seal holder plate.
12. Tighten nuts securing seal holder plate evenly so seal holder will not be distorted.
13. Remove tapered installation sleeve.
14. Slide inner bearing spacer collar over shaft with recessed end facing rotor.
Place pair of half round rings on shaft and slide inner bearing spacer collar over half round rings to lock them in place. Refer to Figure 6, page 4.
15. Press lip seal, lip facing end of shaft, in inner end cap and insert end cap through shaft end of bracket. Turn end cap clockwise, looking at shaft end, until it engages threads. End cap spanner wrench holes must be facing rotor. Turn end cap with spanner wrench until it projects slightly from opening on side of bracket.

End cap must not be turned so far that lip seal drops off end of spacer collar on shaft or end cap becomes disengaged from threads. Refer to Figure 6, page 4.

If this happens, remove inner spacer collar, half round rings and end cap and start over at Step 15.

16. Pack ball bearing with multi-purpose grease, NLGI #2. Place on shaft and push or gently drive in place in bracket.
17. Press lip seal, lip facing end of shaft, in outer end cap and insert end cap in bracket. Turn end cap in bracket until it is tight against bearing. Refer to Figure 6, page 4.
18. Insert length of hardwood or brass through port opening between rotor teeth to keep shaft from turning. Put lockwasher and locknut on shaft, tighten and bend one tang of lockwasher into slot of locknut.
19. Adjust pump end clearance. Refer to Thrust Bearing Adjustment, below.
20. Lubricate all grease fittings with multi-purpose grease, NLGI #2.

DANGER

BEFORE STARTING PUMP, BE SURE ALL DRIVE EQUIPMENT GUARDS ARE IN PLACE.

FAILURE TO PROPERLY MOUNT GUARDS MAY RESULT IN SERIOUS INJURY OR DEATH.

THRUST BEARING ADJUSTMENT

1. Loosen setscrews over outer and inner end caps. Two for G, H and HL size pumps, four for all other sizes.
2. Turn inner end cap clockwise, viewed from shaft end, until it projects slightly from bracket exposing approximately three threads.
3. Turn outer end cap clockwise until rotor is tight against head and rotor shaft cannot be turned.
4. Make a reference mark on bracket end, opposite a notch on outer end cap. There are no notches on G size pump. Back off outer end cap required number of notches. Refer to Figure 16.

Each 0.25 inch travel on circumference of end cap is equivalent to approximately .002 inch end clearance for G size pump and .0015 inch for all other sizes.

5. End clearances set per Step 4 are adequate for viscosities up to 750 SSU (SAE20 lube oil at room temperature). Higher viscosity liquids require additional end clearances.

As a general guideline, for viscosities between 750 and 7500 SSU (heavier lube oils) double the amount of end clearance indicated in Step 4; for viscosities between

7500 and 75,000 SSU (e.g., resins) triple the amount and for viscosities greater than 75,000 SSU (e.g., black strap molasses) use 4 times the amount.

For specific recommendations for end clearances for viscosity or for operating temperatures above 225 °F, check with your Viking representative or consult the factory.

6. Tighten inner end cap with a spanner wrench. Tap spanner wrench lightly but DO NOT OVER TIGHTEN as it will only damage the threads.
7. Tighten all setscrews that hold inner and outer end caps to prevent their turning in bracket.
8. Rotor and shaft should turn smoothly by hand one complete revolution. If rotor and shaft doesn't turn smoothly, go back and repeat Thrust Bearing Adjustment Steps 1 thru 8.

PUMP SIZE	Turn Outer End Cap C.C.W.	
	No. of Notches*	or Length on O.D., Inches
G	-	0.38"
H - HL	3	0.5"
AK - LL	5	0.66"

* Each small notch on outer end cap represents .001 inch end clearance.

FIGURE 16

INSTALLATION OF CARBON GRAPHITE BUSHINGS

When installing carbon graphite bushings, extreme care must be taken to prevent breaking. Carbon graphite is a brittle material and easily cracked. If cracked, the bushing will quickly disintegrate. Using a lubricant and adding a chamfer on the bushing and the mating part will help in installation. The additional precautions listed below must be followed for proper installation:

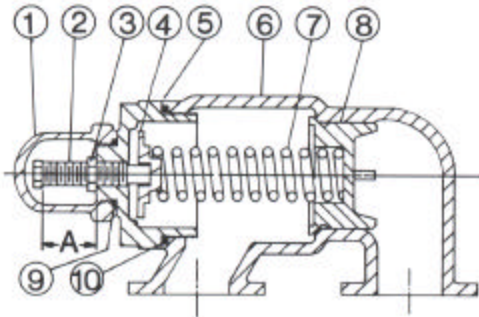
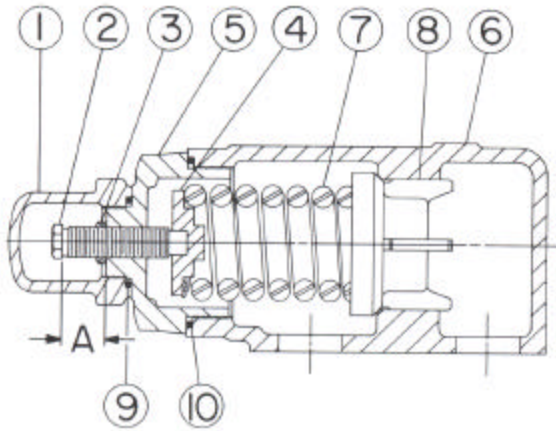
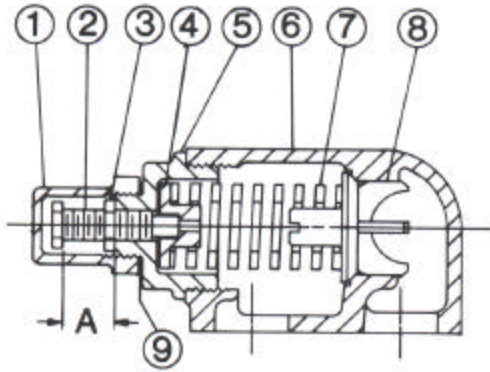
1. A press must be used for installation.
2. Be certain bushing is started straight.
3. Do not stop pressing operation until bushing is in proper position. starting and stopping will result in a cracked bushing.
4. Check bushing for cracks after installation.

Carbon graphite bushings with extra interference fits are frequently furnished for high temperature operation. These bushings must be installed by a shrink fit.

1. Heat bracket or idler to **750 °F**.
2. Install cool bushings with a press.
3. If facilities are not available to reach **750 °F** temperature, it is possible to install with **450 °F** temperature; however, the lower the temperature, the greater the possibility of cracking bushing.

Consult factory with specific questions on high temperature applications. Refer to Engineering Service Bulletin ESB-3.

PRESSURE RELIEF VALVE INSTRUCTIONS



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

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 CHAMBER HAS BEEN COMPLETELY VENTED THROUGH 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.

Mark valve and head before disassembly to insure proper reassembly.

1. Remove valve cap.
2. Measure and record length of extension of adjusting screw. Refer to "A" on Figures 17, 18 and 19.
3. Loosen locknut and back out adjusting screw until spring pressure is released.
4. Remove bonnet, spring guide, spring and poppet from valve body. Clean and inspect all parts for wear or damage and replace as necessary.

ASSEMBLY

Reverse procedures outlined under Disassembly. If valve is removed for repairs, be sure to replace in same position. Relief valve adjusting screw cap must *always* point towards suction side of pump. If pump rotation is reversed, remove relief valve and turn end for end. Refer to Figures 1, 2, 3 and 4, page 1.

DANGER

BEFORE STARTING PUMP, BE SURE ALL DRIVE EQUIPMENT GUARDS ARE IN PLACE.

FAILURE TO PROPERLY MOUNT GUARDS MAY RESULT IN SERIOUS INJURY OR DEATH.



TECHNICAL SERVICE MANUAL

HEAVY-DUTY BRACKET MOUNTED PUMPS
SERIES 125 and 4125
SIZES G-LL

SECTION TSM141.1
PAGE 15
ISSUE C

PRESSURE ADJUSTMENT

If a new spring is installed or if pressure setting of pressure relief valve is to be changed from that which the factory has set, the following instructions must be carefully followed.

1. Carefully remove valve cap which covers adjusting screw.
Loosen locknut which locks adjusting screw so pressure setting will not change during operation of pump.
2. Install a pressure gauge in discharge line for actual adjustment operation.
3. Turn adjusting screw in to increase pressure and out to decrease pressure.
4. With discharge line closed at a point beyond pressure gauge, gauge will show maximum pressure valve will allow while pump is in operation.

IMPORTANT

In ordering parts for pressure relief valve, always give model number and serial number of pump as it appears on nameplate and name of part wanted. When ordering springs, be sure to give pressure setting desired.



WARRANTY

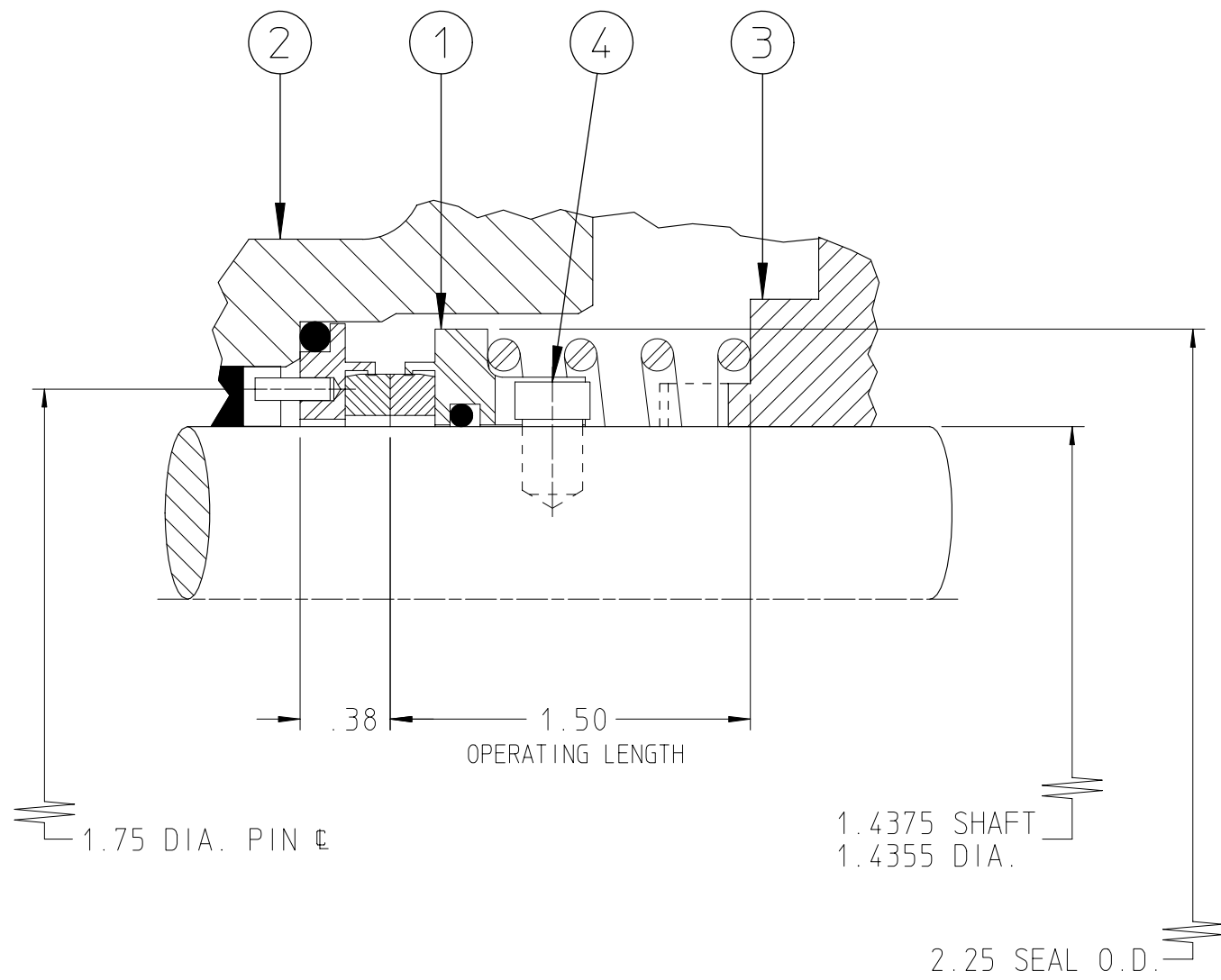
Viking warrants all products manufactured by it to be free from defects in workmanship or material for a period of one (1) year from date of startup, provided that in no event shall this warranty extend more than eighteen (18) months from the date of shipment from Viking. If, during said warranty period, any products sold by Viking prove to be defective in workmanship or material under normal use and service, and if such products are returned to Viking's factory at Cedar Falls, Iowa, transportation charges prepaid, and if the products are found by Viking to be defective in workmanship or material, they will be replaced or repaired free of charge, FOB. Cedar Falls, Iowa.

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PARTS LIST		
ITEM	DESCRIPTION	PART NUMBER
2	BRACKET	STD. FOR SEAL PUMP
3	ROTOR & SHAFT SUBASSEMBLIES	
		C.I. S.M.
K	3-570-361	3-571-367
KK	3-570-562	3-571-556
L,LQ	3-572-160	3-573-173
LL	3-572-359	3-573-353
4	DRIVE PIN	2-537-055-610

SPECIAL INSTRUCTIONS	
ASSEMBLY:	OPERATING:
PER TSM-410.2	

SEAL ①	PUMP MODELS
2-477-297-999	K-LL4125
2-477-298-999	K-LL4123
2-477-322-999	K-LL4225
2-477-387-999	K-LL4223
2-477-471-999	K-LL4625
2-477-505-999	K-KK4124B
2-477-526-999	K-KK4224B
2-477-570-999	
2-477-689-999	

FLUSHLINE PER 0-243-455 OR 0-243-459 OR 0-243-426		
REV.	C.N. NO.	DATE
K		07 JUL 03

USE & RELATED INFORMATION
2-SBD-477-005

GEOMETRIC SYMBOLS		UNLESS OTHERWISE SPECIFIED
RUNOUT	PARALLELISM //	TWO PLACE DECIMALS .XX = + -.02
FLATNESS	PERPENDICULARITY ⊥	THREE PLACE DECIMALS .XXX = + -.005
ROUNDNESS		ANGLES = + -5°
		ALL FINISHED SURFACES
		BREAK EDGES .005 / .015 RADIUS OR CHAMFER

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DRAWN	JAKEL 06 AUG 93
CHECKED	MILLER 13 AUG 93
APPROVED	
SCALE	2=1 INCH DIM.

VIKING PUMP
VIKING PUMP, INC.
A Unit of IDEX Corporation
Cedar Falls, Iowa 50613
U.S.A.

PATTERN NUMBER	DRG. SIZE C
DRAWING NUMBER	2-SID-477-066