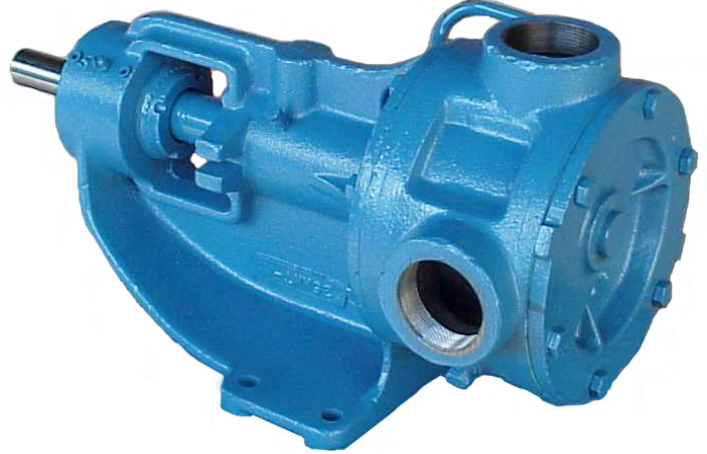


CONTENTS

Special Information	2
Maintenance	2
Pump Breakdown Drawing	3
Pump Disassembly	4
Pump Assembly	4
End Clearance Adjustment	6
Pneumatic Test	6
Pressure Relief Valve Instructions	7
Pressure Adjustment	7
Troubleshooting	8
Pump Inspection	9
Warranty	10



124SD

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 Canada representative. Always give complete name of part, part number and material with model number and serial number of pump when ordering repair parts. The pump model number and serial number are on the nameplate.

In the Viking model number system, basic size letters are combined with series number.

UNMOUNTED PUMP	UNITS
	Units are designated by the unmounted pump model numbers followed by "Arrangement" indicating drive style.
K-124SD	
KK-124SD	
L-124SD	13-Direct Connected
LQ-124SD	53-Belt Driven
LL-124SD	70-Commercial Speed Reducer
	90-Commercial Gear Motor

This manual deals only with the severe duty series bracket mounted pumps. Pump specifications and recommendations are listed in Catalog Section 3, series 124SD Heavy Duty Bracket Mounted 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 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: Rotary gear pumps operate equally well in a clockwise or counterclockwise rotation. The 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 pump models. Options may include a return to tank relief valve
4. Relief valve bonnet (see page 10) must always point towards suction side of pump.
5. Pressure relief valves cannot be used to control pump flow or regulate discharge pressure.

MAINTENANCE

Series SD 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: All pumps are greased at the factory. External lubrication must be applied slowly with a handgun to all lubrication fittings every 500 hours of operation with multi-purpose grease. Do not over-grease. Applications involving very high or low temperatures will require other types of lubrication. Consult factory with specific lubrication questions.

CLEANING PUMP: Keep pump as clean as possible. This will facilitate inspection, adjustment and repair.

STORAGE: If pump is to be stored, or not used for six months or more, pump must be drained and a light coat of lubricant and rust preventative suitable to the application must be applied to all internal pump parts. Lubricate fittings and apply grease to pump shaft extension. Rotating the 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 severe duty 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
5. Bearing lock nut wrench or hammer and punch
6. Spanner wrench, adjustable pin type for use on end caps (Source: #482 J. H. Williams & Co. or equal) or hammer and punch
7. Brass bar
8. Arbor press

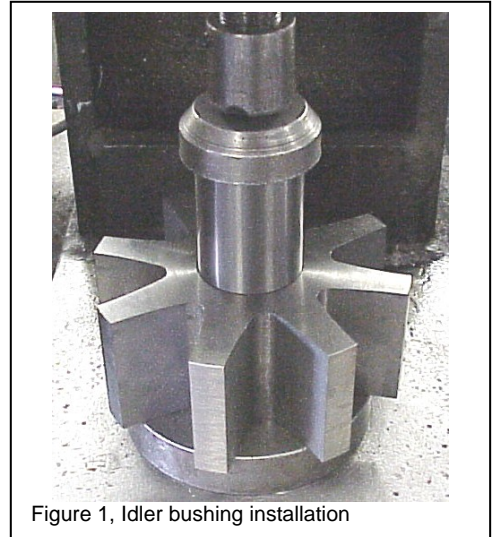


Figure 1, Idler bushing installation

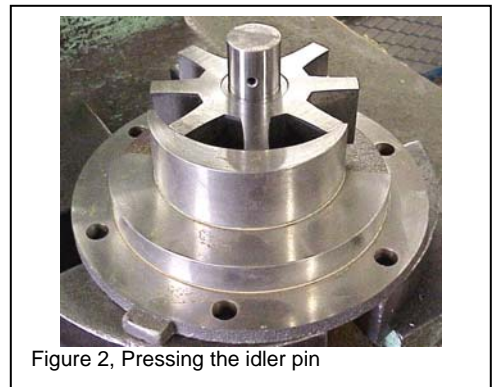
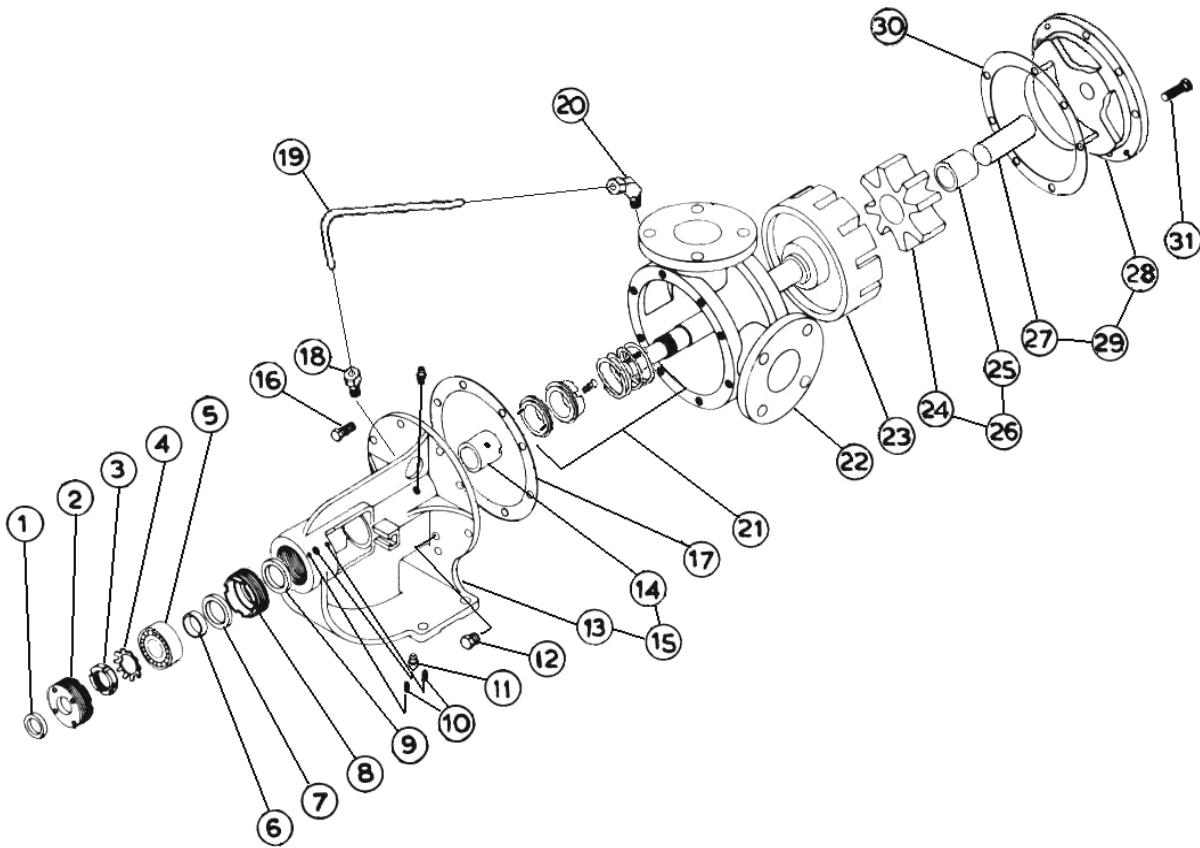
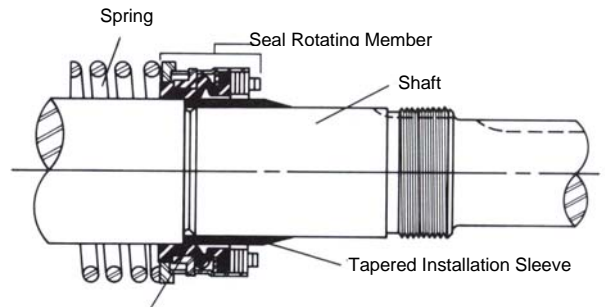
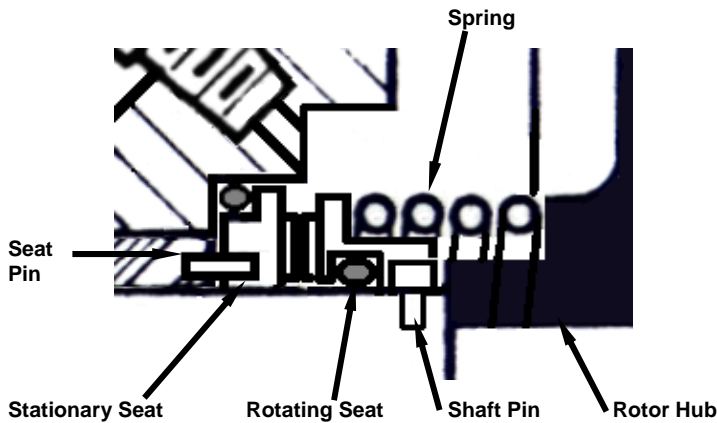


Figure 2, Pressing the idler pin

SEVERE DUTY



Mechanical Seal Cross Section



Coat the shaft, tapered installation sleeve and inner diameter of mechanical seal with lubricant as recommended by your seal supplier.

ITEM	NAME OF PART	ITEM	NAME OF PART	ITEM	NAME OF PART
1	Lip seal (Outer)	11	Grease fitting	21	Mechanical seal ass'y
2	End cap	12	Pipe plug	22	Casing
3	Lock nut	13	Bracket	23	Rotor and shaft ass'y
4	Lock washer	14	Bracket bushing	24	Idler
5	Ball Bearing	15	Bracket & bushing ass'y	25	Idler bushing
6	Bearing Spacer	16	Bracket fasteners	26	Idler & bushing ass'y
7	Lip Seal (Inner)	17	Casing gasket	27	Idler pin
8	End cap	18	Tubing adapter	28	Head
9	Lip Seal (Seal chamber)	19	Tubing	29	Head & Idler ass'y
10	Set screws	20	90° tubing adapter	30	Head gasket
				31	Head fasteners

DISSASSEMBLY

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.
2. Remove head from pump. *Do not allow idler to fall from idler pin.* Tilt top of head back when removing to prevent this. 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 10.
3. Remove idler and bushing assembly from the head and idler pin.
4. Loosen the setscrews on the adjusting nuts and remove the outer adjusting nut only.
5. Insert length of hardwood or brass through port opening between rotor teeth to keep shaft from turning. Bend up tang of the lock-washer and remove the lock nut and lock washer from shaft.
6. Tap the shaft forward and remove the rotor and shaft assembly from the pump carefully. The mechanical seal is mounted behind the rotor on severe duty pump be sure not to damage the seal during disassembly.
7. Remove the rotating seat and drive pin from the rotor and shaft assembly.
8. The seal seat can be removed by gently prying it out with a small flat screwdriver.
9. Remove the inner adjusting nut.
10. 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.
11. 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.
12. Be sure the 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.
13. The casing and bracket bushing can be checked for wear or damage while assembled.

If needed remove the bracket bushing with the casing still mounted, by standing the unit on the casing in a press and proceed to push the bushing out of the bracket.

ASSEMBLY

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 that contact between the rotary and stationary members. These parts are lapped to a high finish and their sealing effectiveness depends on complete contact.

1. Press lip seals into the adjusting nuts with the lip facing away from the threads, Figure 4&5, page 4.
2. Apply non-detergent SAE 30 weight oil to the idler bushing and the bore on the idler gear, then setup the idler and bushing in a press. Press the idler bushing into the gear. Figure 1, page 2.
3. Coat idler pin with non-detergent SAE 30 weight oil and place idler and bushing on the head with the idler pin in placed in the idler bushing and aligned to be pressed into the head
4. Press the idler pin into the head while using the idler and bushing assembly as a guide. Figure 2, page 2.
5. Apply non-detergent SAE 30 weight oil to the bracket bushing and the bore on the bracket, then setup the bracket and bushing in a press. Be sure that the bracket bushing is aligned straight, that the notches are away from the bracket, and the grease holes is aligned with the hole in the bracket before pressing. Press the bushing into the bracket. Figure 3, page 4.
6. Be sure all components are clean prior to any further installation.

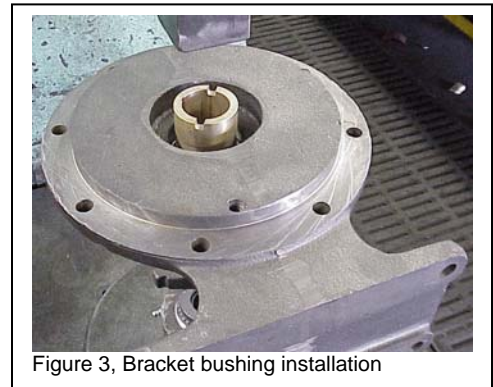


Figure 3, Bracket bushing installation



Figure 4, Outer lip seal orientation

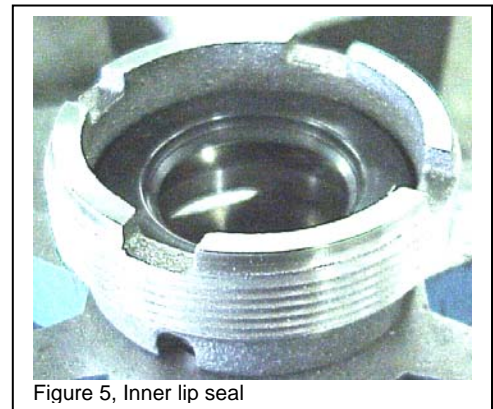


Figure 5, Inner lip seal



Figure 6, Lip seal in seal chamber

7. Press the seal chamber lip seal into the bore with the lip seal pointing toward the bushing. Figure 6, page 4.
8. Install the inner end cap into the bracket.

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

9. Lubricate the seal seat oring and the bore in the bracket around the bushing with a lubricant as recommended by your seal supplier.
10. With the polished faces out, press the stationary seat into the bracket against the bracket bushing and align the pins in the seal seat with the grooves in the bushing. Protect the face as pictured in figure 7, page 5.

Prior to installing rotating portion of mechanical seal, prepare and organize rotor shaft, head and idler assemblies, bearing components and appropriate o-rings for quick assembly.

Once the 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.

11. Install the rotating seal pin in the hole in the shaft located directly behind the rotor hub.
12. Place the seal spring over the shaft and onto the hub of the rotor.
13. Slide the seal installation sleeve onto the shaft. Apply lubricant as recommended by your seal manufacturer to the sleeve, shaft and inside diameter of the rotating seat.
14. The rotating seat has slots in the backside of it, the pins in the shaft is to mate with these slots. Polished face out slide the outer rotating element over the seal installation sleeve and onto the shaft and into the spring. Figure 8, page 5.

15. Start the end of the shaft into the bracket bushing and slowly push the shaft through. Continue until the rotor and shaft assembly is all of the way into the bracket. Figure 9, page 5.

16. Remove the tapered installation sleeve from the shaft.

17. Stand the pump on the rotor.

18. Slide bearing spacer over shaft, passed the threads and against the shoulder on the shaft. Figure 10, page 5.

19. With the ball bearing on the bench, hold the grease gun tip against the bearing and apply grease to the top of the bearing all the way around the diameter. Place the ball bearing on the shaft and push it against the bearing spacer with the greased side down. Figure 11, page 6. Hold the grease gun tip against the bearing and apply grease to the top of the bearing as before.

20. Put the lock washer and lock nut on shaft. Insert piece of hardwood or brass through port opening between rotor teeth to keep shaft from turning. Tighten the lock nut with a lock nut wrench or hammer and punch (If using a hammer and punch: gently tap the lock nut tight). One tang of lock washer will line up with a slot in the lock nut. Bend that tang into the slot. Figure 12, page 6.

21. Put the outer end cap and lip seal assembly on the shaft and turn it into the bracket until it is against the bearing. Figure 13, page 6.

22. Place the pump back on the mounting foot.

23. Place a 1 gasket over the step on the bracket, mount the casing on the bracket, and install the bracket bolts but do not tighten.

24. Then stand the bracket assembly on the casing. Turn the shaft to determine if the rotor is rotating free inside the casing. If not, tap the casing from side to side with a softheaded hammer until the rotor does not touch the casing. Tighten the bracket bolts evenly on the casing. Return the pump to the foot on the bracket.

25. Install the head and idler assembly on pump with 2 gaskets on the head between them. If the pump head and casing were marked before disassembly simply match up the markings. If not, be sure the idler pin, which is offset in pump head, is centered between the ports where the distance between the ports is the shortest. Tighten head the head bolts evenly. Figure 14, page 6.

26. Perform the end clearance adjustment on page 6.

27. If needed reinstall the seal flush tubing. Figures 15, page 7.

28. Pneumatic test your pump for leaks. Page 6.

29. Return the pump to service.



Figure 7. Seal seat installation



Figure 8, Rotating seat installed

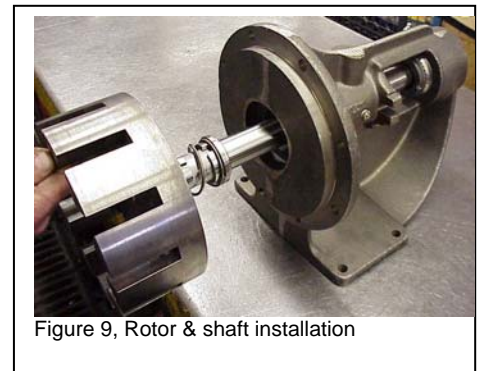


Figure 9, Rotor & shaft installation



Figure 10, Bearing spacer install

END CLEARANCE ADJUSTMENT

1. Loosen setscrews over outer and inner end caps. See bearing cross section, page 6.
2. Turn inner end cap clockwise, viewed from shaft end, about 2 or 3 turns.
3. Turn outer end cap clockwise until the rotor is tight against the head and the shaft cannot be turned.
4. Make a reference mark on bracket end, opposite a notch on outer end cap.
5. Back off the outer end cap required number of notches to obtain the required end clearance. Each notch is 0.0025 inches. Consult the factory for your specific end clearance requirement.
6. Tighten the inner end cap with the spanner wrench to pull the bearing and shaft away from the head and tight against the outer end cap. Do not over tighten the end cap.
7. Tighten down the setscrews on the outer and inner end caps.



Figure 11, Install the ball +bearing

PNEUMATIC TESTING

1. Seal the ports with pipe plugs or plates and gaskets. Be sure to provide a male air line connection to one of the ports.
2. Apply air pressure to the pump.
3. Spray or brush the externals with soapy water and watch for growing air bubbles around the seal, fitting, and gaskets. Figure 16, page 8.
4. Relieve the pressure from the pump.
5. Carefully disconnect the air supply.
6. Remove the plugs or covers from the ports.
7. Return the pump to service.



Figure 12, Lock-nut & lock-washer

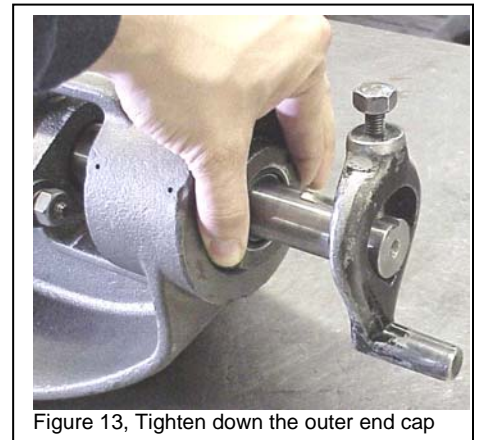
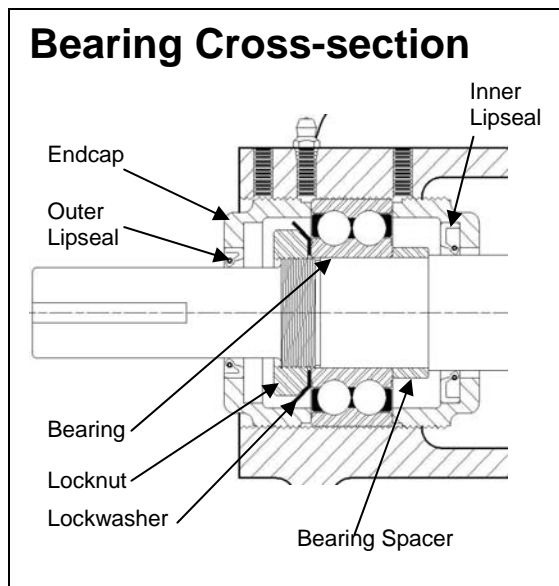


Figure 13, Tighten down the outer end cap

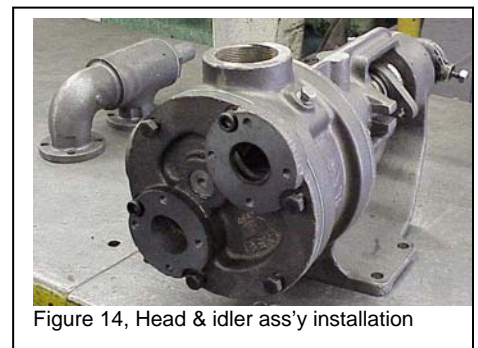
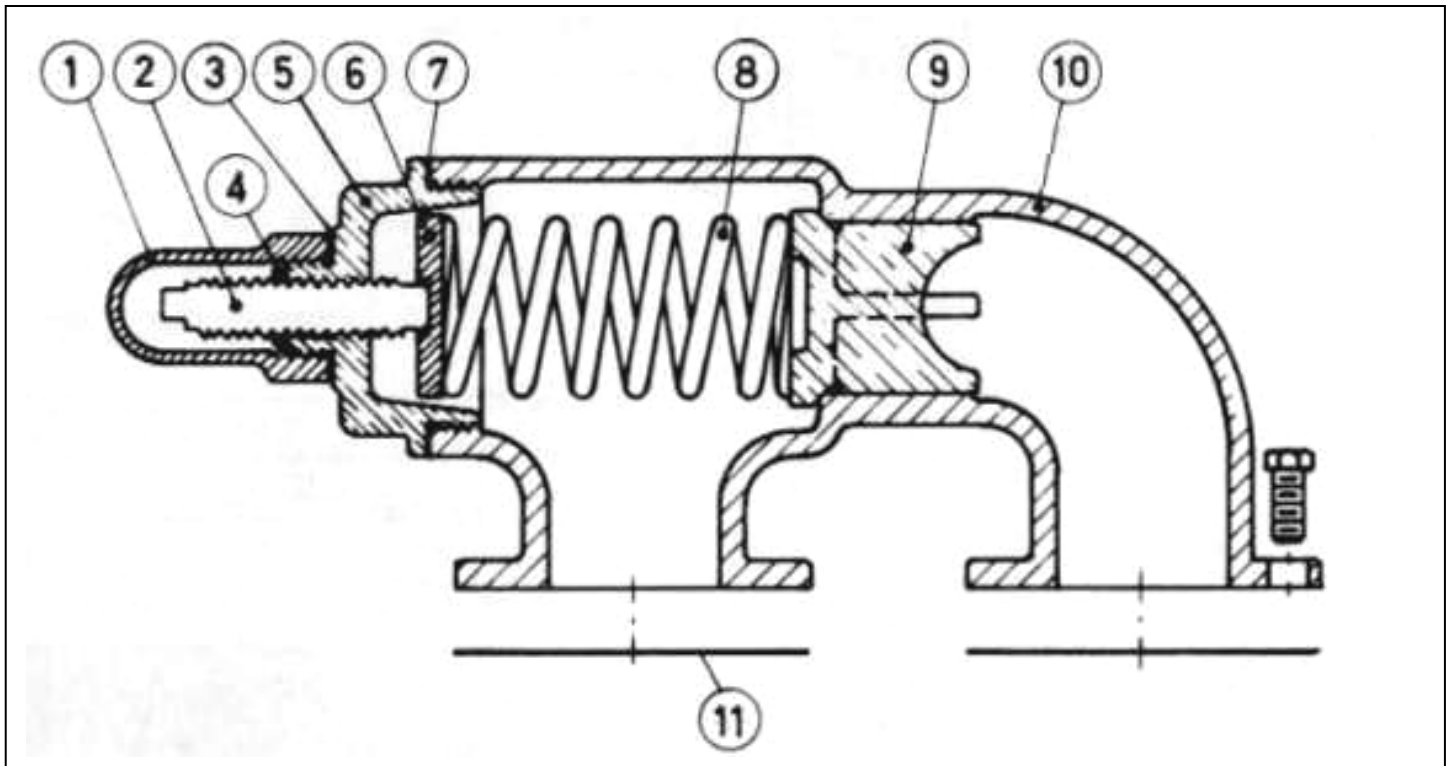


Figure 14, Head & idler ass'y installation

PRESSURE RELIEF VALVE INSTRUCTIONS



ITEM	NAME OF PART	ITEM	NAME OF PART	ITEM	NAME OF PART
1	Bonnet	5	End cap	10	Poppet
2	Adjusting Screw	6	Spring Guide	11	Relief valve port gasket
3	Bonnet o-ring	7	Cap Gasket	12	Blanking plate
4	Lock nut	8	Spring	13	Relief valve fasteners
		9	Casing	14	Spacer Plate

DISASSEMBLY

Mark valve and head before disassembly to insure proper reassembly.

1. Remove the relief valve from the head, making note which port has the blanking plate on it.
2. Remove the bonnet.
3. Measure and record length of adjusting screw protruding out of the end cap.
4. Loosen locknut and back out adjusting screw until spring pressure is released.
5. Remove relief valve cap, spring guide, spring and poppet from valve body.
6. Clean and inspect all parts for wear or damage and replace as necessary.



Figure 15, Seal flush tubing installed

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

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 the bonnet, which covers the adjusting screw.
2. Loosen the locknut, which locks the adjusting screw so that the pressure setting will not change during operation of pump.

3. Install a pressure gauge in discharge line for actual adjustment operation.
4. Turn adjusting screw in to increase pressure and out to decrease pressure.
5. Closing a valve in the piping stopping all flow, the pressure gauge on the discharge port of the pump will show the maximum pressure that the relief valve will allow while pump is in operation.

IMPORTANT

Ammonia pumps should never have integral relief valves. Use only return to tank relief valves of inline relief valves. 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.

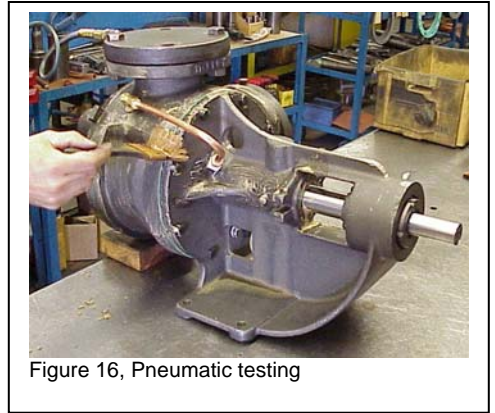


Figure 16, Pneumatic testing

Troubleshooting

No Discharge:	Pump priming may be required
	Suction lift is too great
	Relief valve is stuck open
	Strainer needs cleaning
	Wrong direction of rotation
Insufficient Discharge Volume	Air leaks in suction
	Speed is too slow
	Relief valve is set to low
	Suction lift too high for liquid handled. This is very important on hot or volatile fluids
	Suction line is not submerged
	Suction piping too small in diameter, or foot valve is too small
	Wrong rotation
	Pump internals worn
	Air or gases in suction piping
	Viscosity is higher than expected
Insufficient Pressure	Relief valve set to low
	Air or gases in the fluid
	Pump internals are worn
	Insufficient volume being pumped
	Wrong rotation
	Improper clearances in the internals
Loss of suction after a period Of operation	Suction line is leaking (letting air into the pump)
	Packing is too loose or the mechanical seal is leaking
	Leaking Gaskets
Excessive power requirement	Viscosity too high
	Discharge pressure is too high
	Insufficient lubrication
	Shaft or rotor is bent, misalignment or packing gland is too tight
Noisy operation with good Performance	Misalignment of coupling
	Worn bearings
Noisy operation with poor or No performance	Cavitation – Not enough fluid getting to the pump
	Worn bearings or bushings
Leaking around the shaft	Packing is loose, or needs replacement
	Mechanical seal is damaged or misaligned
	Shaft is scored
	Shaft is bent

PUMP INSPECTION REPORT

DATE: _____

PUMP MODEL: _____ SERIAL NUMBER: _____

CUSTOMER: _____

SALES ORDER NUMBER: _____ REFERENCE: _____

APPLICATION AND/OR PROBLEM: _____

DESCRIPTION	STANDARD DIMENSIONS	EX. CL. (IF ANY)	ACTUAL	WEAR
ROTOR O.D.				
ROTOR I.D.				
ROTOR TOOTH LENGTH				
IDLER O.D.				
IDLER (BUSHING) I.D.				
IDLER TOOTH LENGTH				
IDLER PIN O.D.				
SHAFT O.D.				
SHAFT BUSHING I.D.				
CRESCENT LENGTH				
CASING I.D.				
END CLEARANCE				

COMMENTS & RECOMMENDATIONS: _____



TECHNICAL SERVICE MANUAL

SEVERE-DUTY BRACKET MOUNTED PUMPS

SERIES 124SD

SIZES H, HX4, K, KK, L, LQ AND LL

SECTION 3
BULLETIN TSM SD
ISSUE A



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 Windsor, Ontario, 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. Windsor, Ontario.

Viking assumes no liability for consequential damages of any kind and the purchaser by acceptance of delivery assumes all liability for the consequences of the use or misuse of Viking products by the purchaser, his employees or others. Viking will assume no field expense for service or parts unless authorized by it in advance.

Equipment and accessories purchased by Viking from outside sources which are incorporated into any Viking product are warranted only to the extent of and by the original manufacturer's warranty or guarantee, if any.

THIS IS VIKING'S SOLE WARRANTY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, WHICH ARE HEREBY EXCLUDED, INCLUDING IN PARTICULAR ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. No officer or employee of IDEX Corporation or Viking Pump Canada is authorized to alter this warranty.

