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FIGURE 1
1 Series**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 (540).

This manual deals only with Series 540 Heavy Duty Bracket Mounted Pumps. Pump specifications and recommendations are listed in Catalog Section 5, series 540 Heavy Duty Bracket Mounted Pumps.

FIGURE 2
2 Series

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.

Maintenance

Viking pumps are designed for long, minimum maintenance free service. The points listed below will help provide long service life.

Packing Adjustment: New packed pumps require initial packing adjustment to control leakage as packing. Make initial adjustments during startup, by carefully tightening the packing gland with the pump full of liquid and running. Do not over-tighten packing gland, it will break. When properly adjusted the packing will leak very slowly, approximately 1 to 4 droplets per minute. This leakage is required to lubricate the packing and prevent overheating which will score the shaft.

Lubrication: All Viking pumps are greased prior to shipment. External lubrication must be applied slowly with a hand-operated grease gun to all lubrication fittings every 500 hours of operation with multi-purpose grease. Do not over grease.

Cold Environment: It is recommended that the pump be drained when the possibility of freezing is present.

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

Strainers: Use a strainer on the suction side of the pump to prevent foreign material from entering the pump. This will cause damage to the impeller, casing or possibly lock-up the pump. Keep the strainer on the suction side of the pump clean and free of debris. A blocked strainer will not allow sufficient liquid to reach the pump. The lack of liquid reaching the pump will create cavitation. Cavitation is when the liquid vaporizes on its way to the pump, then returns to a liquid form on the surfaces off the pump. This is very noisy, damaging to a pump, and seriously affects the output.

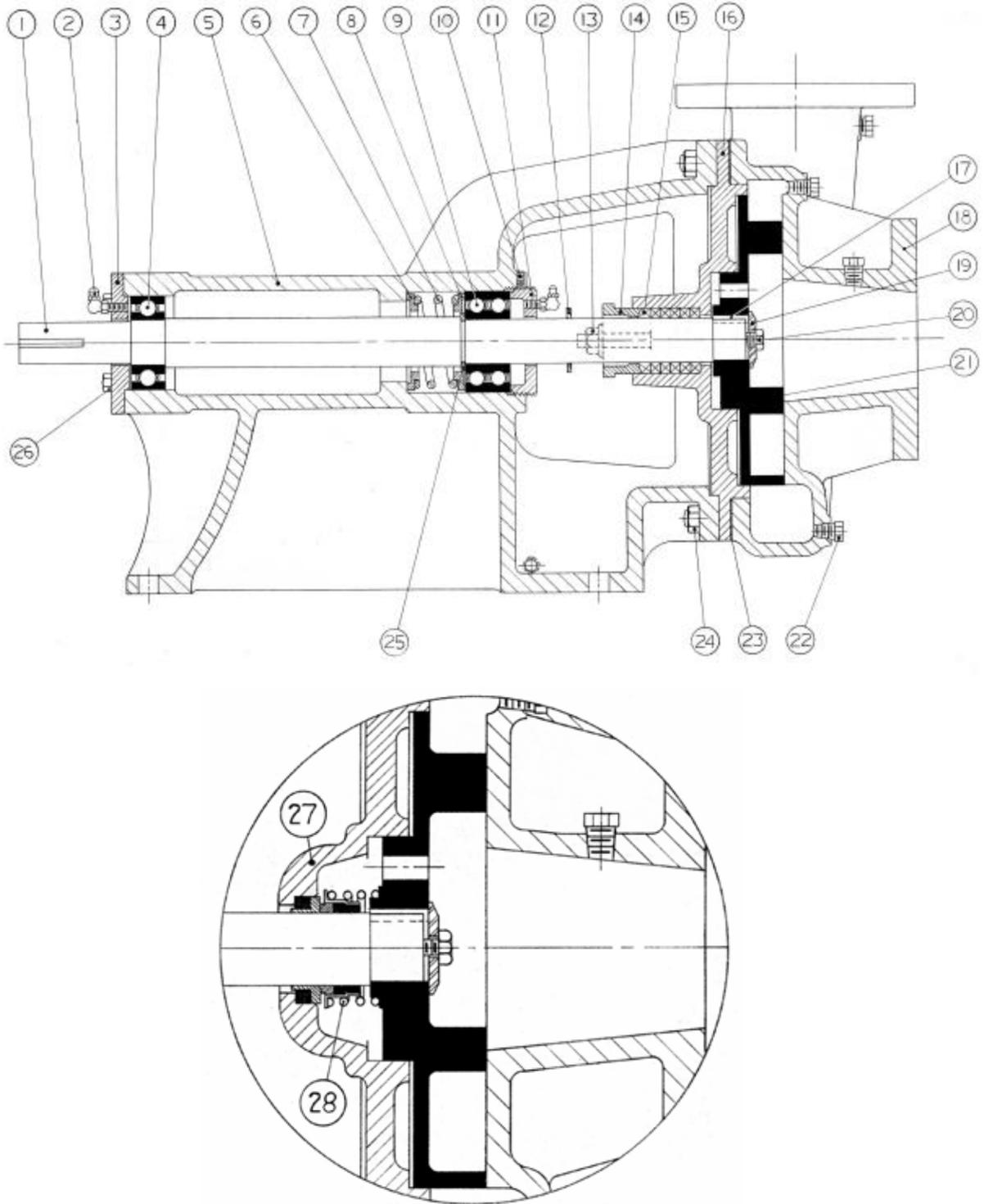


Figure 1: Pressing the bearing onto the Shaft



Figure 2: Installing the shaft assembly

Series 1 and 2 Assembly Drawing



1	Shaft	8	Spring retainer	15	Packing rings	22	Pipe plug
2	Grease fittings	9	Inner ball bearing	16	Back plate	23	Casing gasket
3	End Cap	10	Setscrew	17	Key Stock	24	Casing fasteners
4	Outer ball bearing	11	Adjusting nut	18	Casing	25	Snap ring
5	Bracket	12	Flinger	19	Impeller washer	26	Cap screws
6	Spring retainer	13	Packing gland fasteners	21	Hex head impeller bolt	27	Cap plate - Mechanical seal
7	Spring	14	Packing gland	21	Impeller	28	Mechanical Seal

Series 1 and 2 Disassembly

1. Remove the fasteners on the casing.
2. Remove the casing from the pump, taking note of how many gaskets are between the casing and the back plate.
3. Remove the cap screw and washer from the impeller. Figure 9, page 5. Stop the shaft from turning with a pipe wrench on the drive end of the shaft. Be sure to protect the shaft from damage by the jaws of the wrench.
4. Use a puller to remove the impeller. There are three tapped holes around the diameter for a puller. Be careful not to damage the threads on the shaft. If the pump is a 1 or 2 series and has a mechanical shaft seal, it will now be visible.

Steps 5 thru 7 are for mechanically sealed pumps only.

5. Pull the rotating element of the seal off the shaft carefully, and slowly.
6. Remove the back plate from the bracket.
7. Remove the stationary seal element from the back-plate with the aid of a small flat screwdriver.

Steps 8 and 9 are for packed pumps.

8. Remove the nuts and washers on the packing gland and pull the packing gland loose from the back plate.
9. Pull the back plate and packing gland off of the shaft.
10. Slide the shaft flinger off of the shaft.
11. Loosen the setscrew, which locks the adjusting nut into location.
12. Remove the adjusting nut from the bracket.
13. Pull the shaft with bearings, spring, and spring retainer out of the bracket. If the bearings are stuck in the bracket use a mallet to tap the motor end of the shaft.
14. Use an arbor press to push the ball bearings off of the shaft. After the ball bearings have been pressed off, we recommend replacing them.
15. The spring, spring retainer and retaining ring can be removed from the shaft.
16. The end cap can be removed for cleaning out the bearing chamber.

1 and 2 Series Assembly

Before assembling the pump, be sure that all parts are clean.

1. Place the retaining ring into the groove on the shaft. This ring keeps the bearing from climbing the step. (not shown in the drawing)
2. Using new greased, ball bearings, press the inner ball bearing onto the impeller end of the shaft. APPLY PRESSURE TO THE INNER RACE OF THE BEARING.
3. Put the spring retainer, and spring on the shaft.
4. Press the outer bearing onto the coupling end of the shaft (still applying pressure to the inner race). Figure 1, page 2
5. Attach the outer end cap to the bracket. Put the shaft assembly in the bracket from the impeller end. The outer bearing will slide through the bracket. With the outer bearing in the bracket, slide the spring retainers and spring into the bore. Now push the shaft in until the spring compresses. Then released it, it should return freely. Figure 2, page 2



Figure 3, Alternate packing rings



Figure 4. Packing Installation



Figure 5. Backing gland installed

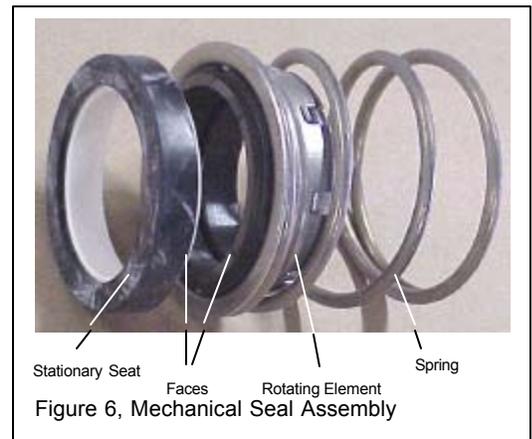


Figure 6, Mechanical Seal Assembly

6. Apply pressure to the end of the shaft, to compress the spring, so that the threads can engage. Turn the adjusting nut in a few turns, and then check the shaft movement. Side to side movement should be near zero.
7. Place the shaft flinger on the shaft in a location where it will not touch anything other than the shaft.
8. For packed pumps, place the back plate on the bench with the protrusion up. Install the new packing rings inside the bore, with the ends alternating from side to side. Figure 3, page 4. Use the packing gland to push the rings into position. Figure 4, page 4.
9. Place the packing gland on the packing and loosely install the fasteners. Figure 5, page 4.
10. Carefully guide the back plate assembly onto the impeller end of the shaft, packing gland first. Do not force it on; slowly turning the shaft may help get the packing past the step on the shaft.
11. If the pump has a mechanical seal, place the back plate on the bench with the protrusion down.
12. Carefully unpackage the new seal. Apply a lubricant to the elastomer and the counter bore on the back plate. Consult the seal supplier for the most appropriate lubricant. Figure 6, page 4.
13. Push the stationary seal element into the counter bore with the polished face up and protected by the paper disc that came in the package with the seal, figure 7.
14. Place the Back plate assembly over the shaft and against the bracket.
15. Apply the lubricant to the shaft and inside of the rotating seal element. With the polished face towards the stationary seal element, carefully push the rotating element and spring onto the shaft, so that it touches the stationary seat, figure 8.
16. Place the key stock into the keyway on the shaft and slide the impeller over the key and shaft. With a mechanical sealed pump, make sure the seal spring sits on the step on the impeller hub.
17. Fasten the impeller down with the bolt, washer and a lock-washer. Figure 9.
18. Place 3 casing gaskets over the studs in the casing, and place the casing on the bracket. Place all nuts on the studs and torque down evenly.
19. Tighten the adjusting nut until the shaft turns freely. Figure 10.
20. Loosen the adjusting nut while turning the shaft until the impeller touches the casing. The clearance of the impeller is now zero.
21. Tighten the adjusting nut approximately a quarter of a turn. The shaft should turn freely with no evidence of scraping inside the pump. If scraping does appear evident then tighten another quarter turn.
22. Tighten the setscrew onto the adjusting nut to lock it into position. Check the shaft rotation again.

The pump is ready to be put back into service.



Figure 7, Installing the stationary seal element in the backplate



Figure 8, Installing the rotating seal



Figure 9, Impeller fastener



Figure 10, Adjusting the impeller

Troubleshooting

No Discharge: Insufficient Discharge Volume	Pump priming may be required
	Suction lift is too great
	Rpm is to slow
	Impeller is clogged
	Wrong direction of rotation
	Air leaks in suction
	Speed is too slow
	Discharge head is higher than estimated
	Suction lift too high for liquid handled. This is very important on hot or volatile fluids
	Impeller partially plugged
	Suction line is not submerged
	Suction piping too small in diameter, or foot valve is to small
	Wrong rotation
	Pump internals worn
	Air or gases in suction piping
Viscosity is higher than expected	
Insufficient Pressure	Speed to low
	Air or gases in the fluid
	Pump internals are worn
	Impeller diameter is too small
	Wrong rotation
	Improper clearance between the impeller and the casing
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	Speed to high
	Head is lower than expected causing higher pump capacity
	Specific gravity or viscosity of the liquid is to high
	Shaft or impeller bend, misalignment or packing gland is to tight
Noisy operation with good Performance	Improper impeller clearance
	Misalignment of coupling
	Worn bearings
Noisy operation with poor or No performance	Cavitation – Not enough fluid getting to the pump
	Worn bearings
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: _____ OTHER REFERENCE: _____

APPLICATION AND/OR PROBLEM: _____

DESCRIPTION	STANDARD DIMENSIONS	EX. CL. (IF ANY)	ACTUAL	WEAR
Impeller Diameter				
Impeller Vane Depth				
Casing Depth				
Shaft Diameter at Seal Area				
End Clearance				

COMMENTS & RECOMMENDATIONS: _____



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.

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