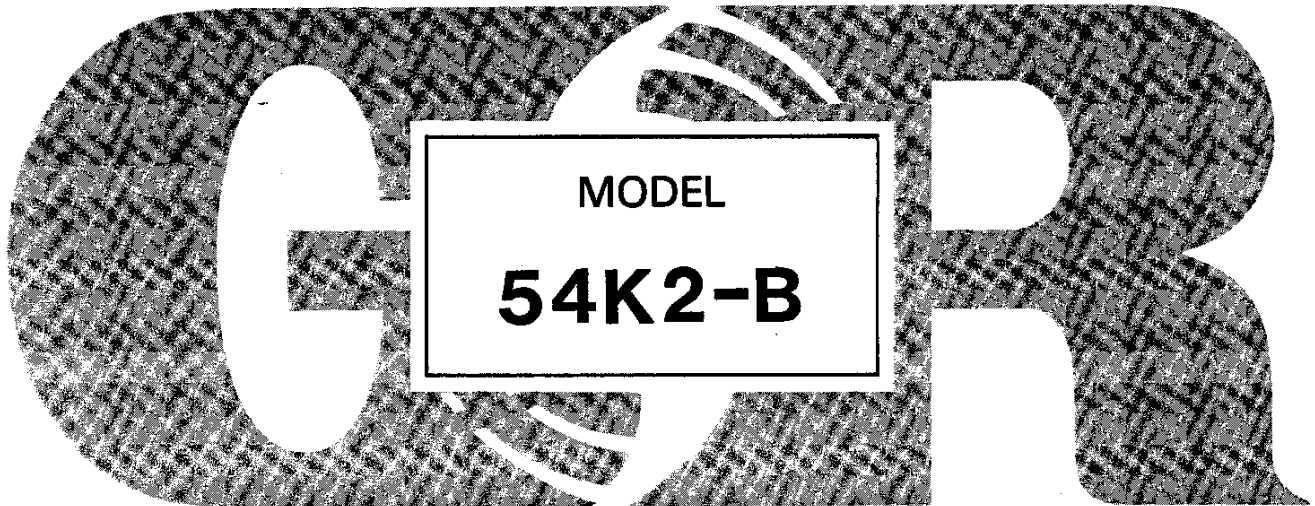


ACE

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Rev. B

# **50**SERIES

## **INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL**



**THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO**  
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA

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## INTRODUCTION

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This Installation, Operation, and Maintenance Manual is designed to help you achieve the best performance and longest life from your Gorman-Rupp pump.

This pump is 50 Series, basic, centrifugal model with an enclosed impeller. This pump is designed for for pumping clean liquids at high discharge heads and pressures. The basic material of construction for wetted parts is gray iron, with brass seal housing, and alloy steel impeller shaft.

If there are any questions regarding the pump or its application which are not covered in this manual or in other literature accompanying this unit, please contact your Gorman-Rupp distributor, or write:

The Gorman-Rupp Company  
P.O. Box 1217  
Mansfield, Ohio 44901-1217

or  
Gorman-Rupp of Canada Limited  
70 Burwell Road  
St. Thomas, Ontario N5P 3R7

For information or technical assistance on the power source, contact the power source manufacturer's local dealer or representative.

The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

### NOTE

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

### CAUTION

Instructions which must be followed to avoid causing damage to the product or other equipment incidental to the installation. These instructions describe the requirements and the possible damage which could result from failure to follow the procedures.

### WARNING

```
////////////////////////////////////  
//  
// These instructions must be followed to avoid causing in-  
// jury or death to personnel, and describe the procedure  
// required and the injury which could result from failure  
// to follow the procedure.  
//  
////////////////////////////////////
```



## WARNINGS

## WARNINGS - SECTION A

THESE WARNINGS APPLY TO 50 SERIES BASIC PUMPS. GORMAN-RUPP HAS NO CONTROL OVER OR PARTICULAR KNOWLEDGE OF THE POWER SOURCE WHICH WILL BE USED. REFER TO THE MANUAL ACCOMPANYING THE POWER SOURCE BEFORE ATTEMPTING TO BEGIN OPERATION.

## WARNING

```
////////////////////////////////////
//
// Before attempting to open or service the pump:
//
// 1. Familiarize yourself with this manual.
// 2. Lock out or disconnect the power source to ensure
//    that the pump will remain inoperative.
// 3. Allow the pump to cool if overheated.
// 4. Vent the pump slowly and cautiously.
// 5. Close the suction and discharge valves.
// 6. Check the temperature before opening any covers,
//    plates, or plugs.
// 7. Drain the pump.
//
////////////////////////////////////
```

## WARNING

```
////////////////////////////////////
//
// This pump is designed to handle clear water. Do not at-
// tempt to pump volatile, corrosive, or flammable liquids
// which may damage the pump or endanger personnel as a re-
// sult of pump failure.
//
////////////////////////////////////
```

## WARNING

```
////////////////////////////////////
//
// After the pump has been installed, make certain that the
// pump and all piping connections are tight, properly sup-
// ported and secure before operation.
//
////////////////////////////////////
```

## WARNING

```
////////////////////////////////////
//
// Do not operate the pump without shields and/or guards in
// place over the drive shafts, belts and/or couplings, or
// other rotating parts. Exposed rotating parts can catch
// clothing, fingers, or tools, causing severe injury to
// personnel.
//
////////////////////////////////////
```

---

---

**WARNINGS**

---

---

**WARNING**

```
//////////////////////////////////////  
//  
// Do not operate the pump against a closed discharge valve //  
// for long periods of time. This could bring the liquid //  
// to a boil, build pressure, and cause the pump to rupture //  
// or explode. //  
//  
//////////////////////////////////////
```

**WARNING**

```
//////////////////////////////////////  
//  
// Overheated pumps can cause severe burns and injury. If //  
// overheating of the pump occurs: //  
//  
// 1. Stop the pump immediately. //  
// 2. Allow the pump to cool. //  
// 3. Refer to instructions in this manual before re- //  
// starting the pump. //  
//  
//////////////////////////////////////
```

**WARNING**

```
//////////////////////////////////////  
//  
// Do not remove plates, covers, gauges, pipe plugs, or //  
// fittings from an overheated pump. Vapor pressure within //  
// the pump can cause parts being disengaged to be ejected //  
// with great force. Allow the pump to cool before servic- //  
// ing. //  
//  
//////////////////////////////////////
```

## INSTALLATION - SECTION B

Since pump installations are seldom identical, this section offers only general recommendations and practices required to inspect, position, and arrange the pump and piping.

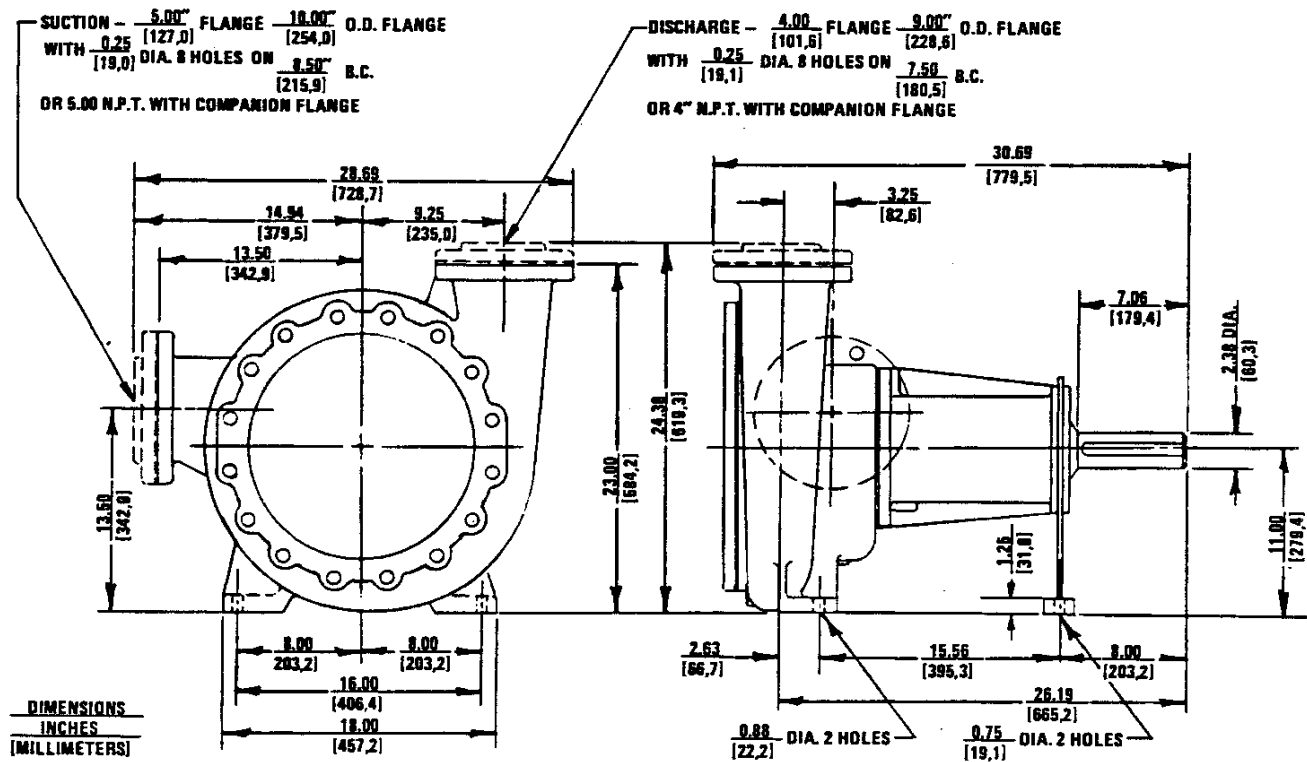
Most of the information pertains to a standard **static lift application** where the pump is positioned above the free level of liquid to be pumped.

If installed in a **flooded suction application** where the liquid is supplied to the pump under pressure, some of the information such as mounting, line configuration, and priming must be tailored to the specific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to 50% of the maximum permissible operating pressure as shown on the pump performance curve. (See Section E, Page 1). If the pump is fitted with a Gorman-Rupp double grease lubricated seal, the maximum incoming pressure must be reduced to 10 p.s.i..

For further assistance, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

### Pump Dimensions

See Figure 1 for the approximate physical dimensions of this pump.



**Figure 1. Pump Model 54K2-B**



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## PREINSTALLATION INSPECTION

The pump assembly was inspected and tested before shipment from the factory. Before installation, inspect the pump for damage which may have occurred during shipment. Check as follows:

- a. Inspect the pump for cracks, dents, damaged threads, and other obvious damage.
- b. Check for and tighten loose attaching hardware. Since gaskets tend to shrink after drying, check for loose hardware at mating surfaces.
- c. Carefully read all tags, decals, and markings on the pump assembly, and perform all duties indicated. Note the direction of rotation indicated on the pump. Check that the pump shaft rotates in the required direction.

### CAUTION

Only operate this pump in the direction indicated by the arrow on the pump body and on the accompanying decal. Otherwise, the impeller could become loosened from the shaft and seriously damage the pump.

- d. Check all lubricant levels and lubricate as necessary. Refer to LUBRICATION in the MAINTENANCE AND REPAIR section of this manual and perform duties as instructed.
- e. If the pump and power source have been stored for more than 12 months, some of the components or lubricants may have exceeded their maximum shelf life. These **must be inspected or replaced** to ensure maximum pump service.

If the maximum shelf life on any item has been exceeded, or if anything appears to be abnormal, contact your Gorman-Rupp distributor or the factory to determine the repair or updating policy. **Do not** put the pump into service until appropriate action has been taken.

## POSITIONING PUMP

### Lifting

Use lifting equipment with a capacity of at least **2,750 pounds**. This pump weighs approximately **550 pounds**, not including the weight of accessories and options. Customer installed equipment such as piping or power source **must** be removed before attempting to lift.

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---

### CAUTION

The pump assembly can be seriously damaged if the cables or chains used to lift and move the unit are improperly wrapped around the pump.

### Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation. The pump may have to be supported or shimmed to provide for level operation or to eliminate vibration.

If the pump has been mounted on a moveable base, make certain the base is stationary by setting the brake and blocking the wheels before attempting to operate the pump.

### SUCTION AND DISCHARGE PIPING

The size of the system piping is **not** always determined by the nominal suction and discharge port diameter. Factors such as suction lift, discharge elevation, and friction losses for the complete system must be considered to be sure your application allows the pump to operate within the safe operating range shown on page E-1. In any case, the suction line should never be smaller than the pump inlet.

### Materials

Either pipe or hose may be used for suction and discharge lines; however, the materials must be compatible with the liquid being pumped. If hose is used in suction lines, it must be the rigid-wall, reinforced type to prevent collapse under suction. Using piping couplings in suction lines is not recommended.

### Line Configuration

Keep suction and discharge lines as straight as possible to minimize friction losses. Make minimum use of elbows and fittings, which substantially increase friction loss. If elbows are necessary, use the long-radius type to minimize friction loss.

---

### Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts and/or couplings.

Lines near the pump must be independently supported to avoid strain on the pump which could cause excessive vibration, decreased bearing life, and increased shaft and seal wear. If hose-type lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

### Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines not less than 18 inches from the suction and discharge ports and install the lines. Installation closer to the pump may result in erratic readings.

### SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created.

### Fittings

Suction lines should be the same size as the pump inlet. If reducers are used in suction lines, they should be the eccentric type, and should be installed with the flat part of the reducers uppermost to avoid creating air pockets. Valves are not normally used in suction lines, but if a valve is used, install it with the stem horizontal to avoid air pockets.

### Strainers

If a strainer is furnished with the pump, be certain to use it; any spherical solids which pass through a strainer furnished with the pump will also pass through the pump itself.

If a strainer is not furnished with the pump, but is installed by the pump user, make certain that the total area of the openings in the strainer is at least three or four times the cross section of the suction line, and that the openings will not permit passage of solids larger than the solids handling capability of the pump.

This pump is designed to handle up to 1-1/4 inch diameter spherical solids.

## INSTALLATION

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### Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. Follow the sealant manufacturer's recommendations when selecting and applying the pipe dope. The pipe dope should be compatible with the liquid being pumped.

### Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to one and one-half times the diameter of the suction line.

If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

If it is necessary to position inflow close to the suction inlet, install a baffle between the inflow and the suction inlet at a distance one and one-half times the diameter of the suction pipe. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance equal to at least three times the diameter of the suction pipe.

### Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure 2 shows recommended minimum submergence vs. velocity.

#### NOTE

The pipe submergence required may be reduced by installing a standard pipe increaser fitting at the end of the suction line. The larger opening size will reduce the inlet velocity. Calculate the required submergence using the following formula based on the increased opening size (area or diameter).

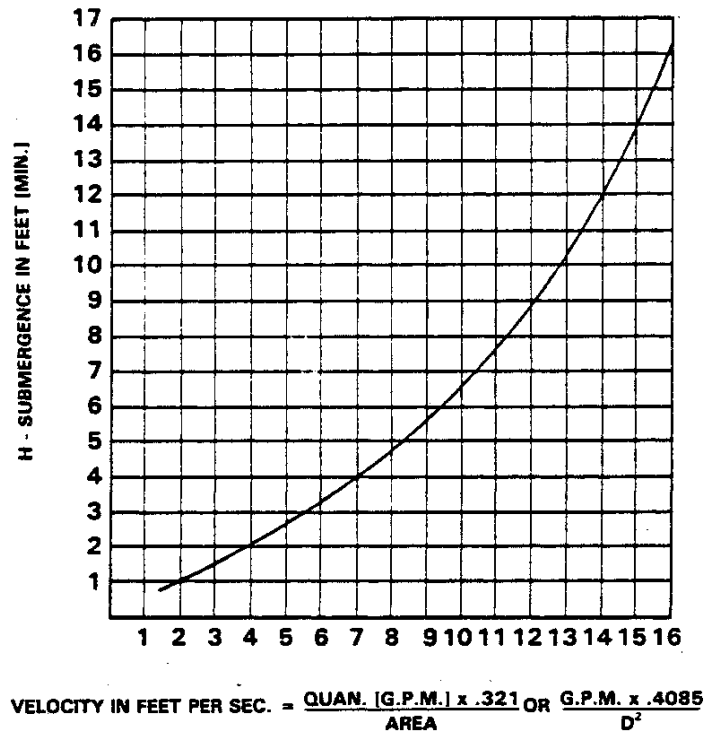


Figure 2. Recommended Minimum Suction Line Submergence Vs. Velocity

## DISCHARGE LINES

### Siphoning

Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action causing damage to the pump could result.

### Valves

A check valve in the discharge line is normally recommended, but it is not necessary in low discharge head applications.

If a throttling valve is desired in the discharge line, use a valve as large as the largest pipe to minimize friction losses. Never install a throttling valve in a suction line.

With high discharge heads, it is recommended that a throttling valve and a system check valve be installed in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.

---

---

## ALIGNMENT

The alignment of the pump and its power source is critical for trouble-free mechanical operation. In either a flexible coupling or V-belt driven system, the driver and pump must be mounted so that their shafts are aligned with and parallel to each other. It is imperative that alignment be checked after the pump and piping are installed, and before operation.

### NOTE

Check **Rotation**, Section C, before final alignment of the pump.

When mounted at the Gorman-Rupp factory, driver and pump are aligned before shipment. Misalignment will occur in transit and handling. Pumps **must** be checked and realigned before operation. Before checking alignment, tighten the foundation bolts. The pump casing feet and/or pedestal feet, and the driver mounting bolts should also be tightly secured.

### WARNING

```
////////////////////////////////////  
//  
// When checking alignment, disconnect the power source to //  
// ensure that the pump will remain inoperative.           //  
//  
////////////////////////////////////
```

### CAUTION

Adjusting the alignment in one direction may alter the alignment in another direction. Check each procedure after altering alignment.

## Coupled Drives

When using couplings, the axis of the power source must be aligned to the axis of the pump shaft in both the horizontal and vertical planes. Most couplings require a specific gap or clearance between the driving and the driven shafts. Refer to the coupling manufacturer's service literature.

Align spider insert type couplings by using calipers to measure the dimensions on the circumference of the outer ends of the coupling hub every 90 degrees. The coupling is in alignment when the hub ends are the same distance apart at all points (see Figure 3A).

Align non-spider type couplings by using a feeler gauge or taper gauge between the coupling halves every 90 degrees. The coupling is in alignment when the hubs are the same distance apart at all points (see Figure 3B).

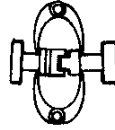


Figure 3A. Aligning Spider-Type Couplings



Figure 3B. Aligning Non-Spider Type Couplings

Check parallel adjustment by laying a straightedge across both coupling rims at the top, bottom, and side. When the straightedge rests evenly on both halves of the coupling, the coupling is in horizontal parallel alignment. If the coupling is misaligned, use a feeler gauge between the coupling and the straightedge to measure the amount of misalignment.

### V-Belt Drives

When using V-belt drives, the power source and the pump must be parallel. Use a straightedge along the sides of the pulleys to ensure that the pulleys are properly aligned (see Figure 3C). In drive systems using two or more belts, make certain that the belts are a matched set; unmatched sets will cause accelerated belt wear.

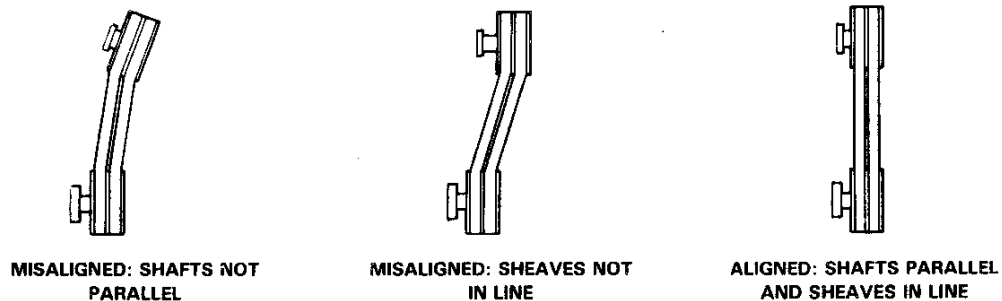


Figure 3C. Alignment of V-Belt Driven Pumps

## INSTALLATION

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Tighten the belts in accordance with the belt manufacturer's instructions. If the belts are too loose, they will slip; if the belts are too tight, there will be excessive power loss and possible bearing failure. Select pulleys that will match the proper speed ratio; overspeeding the pump may damage both pump and power source.

## WARNING

```
////////////////////////////////////  
//  
// Do not operate the pump without shields and/or guards in //  
// place over the drive shafts, belts and/or couplings, or //  
// other rotating parts. Exposed rotating parts can catch //  
// clothing, fingers, or tools, causing severe injury to //  
// personnel. //  
//  
////////////////////////////////////
```





## OPERATION

## OPERATION - SECTION C

## WARNING

```
////////////////////////////////////  
//  
// This pump is designed to handle clear water. Do not at- //  
// tempt to pump volatile, corrosive, or flammable liquids //  
// which may damage the pump or endanger personnel as a re- //  
// sult of pump failure. //  
//  
////////////////////////////////////
```

## PRIMING

Install the pump and piping as described in **INSTALLATION**. Make sure that the piping connections are tight, and that the pump is securely mounted. Check that the pump is properly lubricated (see **LUBRICATION** in **MAINTENANCE AND REPAIR**).

This is not a self-priming pump, so an external priming device must be used if the pump is installed on a suction lift. A foot valve may be installed at the end of the suction pipe to maintain the prime; however, this may adversely affect pump performance due to friction loss.

Many standard centrifugal models are equipped with a hand-operated vacuum pump, exhaust primer, or ejector for this purpose. If a priming device was not furnished with the pump, it may be ordered from the factory as an option.

Before attempting to operate the priming device, close the discharge throttling valve. (Installation of a spring-loaded check valve is also recommended to facilitate priming). Once the pump is fully primed, close the valve between the priming device and pump to preserve the prime. Start the pump and open the discharge valve slowly to fill the discharge line.

When installed in a **flooded suction application**, simply open the system valves and permit the incoming liquid to evacuate the air. After the pump and piping system have completely filled, evacuate any remaining air pockets in the pump or suction line by loosening pipe plugs or opening bleeder valves.

## CAUTION

Never operate this pump unless there is liquid in the casing. The pump will not prime when dry. Extended operation of a dry pump will destroy the seal assembly.

---

---

### Hand-Operated Priming Pump

The hand-operated priming pump (see Figure 1) is designed to draw air out of the suction line and the pump casing.

The hand-operated priming pump can be used while the pump is either stopped or operating.

Close the discharge line throttling valve and spring-loaded check valve (if so equipped) before engaging the priming device.

To prime the pump, open the cock in the bottom of the priming pump. Operate the handle of the pump until all of the air is expelled from the line and a small amount of liquid flows from the drain cock.

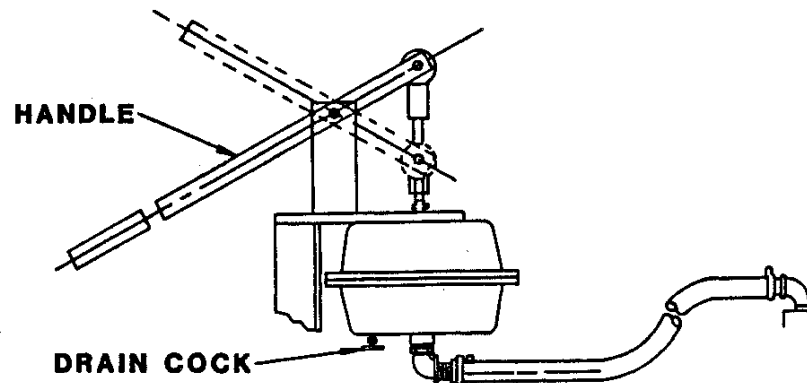


Figure 1. Hand Primer Assembly

Once the pump is fully primed, close the cock, open the discharge line throttling valve and start the pump.

### STARTING

Consult the operations manual furnished with the power source.

### Rotation

The correct direction of pump rotation is indicated by an arrow on the pump body or accompanying decals. If the pump is operated in the wrong direction, the impeller could become loosened from the shaft and seriously damage the pump.

---

---

### CAUTION

The pump must operate in the direction indicated by the arrow on the pump, or accompanying decals. Reverse rotation could loosen the impeller and seriously damage the pump.

Consult the operating manual furnished with the pump power source before attempting to start the power source.

If an electric motor is used to drive the pump, remove V-belts, couplings, or otherwise disconnect the pump from the motor before checking motor rotation. Operate the motor independently while observing the direction of the motor shaft, or cooling fan.

If rotation is incorrect on a three-phase motor, have a qualified electrician interchange any two of the three phase wires to change direction. If rotation is incorrect on a single-phase motor, consult the literature supplied with the motor for specific instructions.

## OPERATION

### Leakage

No leakage should be visible at pump mating surfaces, or at pump connections or fittings. Keep all line connections and fittings tight to maintain maximum pump efficiency.

### NOTE

The seal cavity drain hole in the pedestal allows liquid to escape in the event of seal failure. If leakage occurs, refer to Section E for seal replacement.

### Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 110°F. Do not apply it at a higher operating temperature.

Overheating can occur if operated with the valves in the suction or discharge lines closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the pump casing with cool liquid.

---

---

**WARNING**

```
////////////////////////////////////  
//  
// Do not remove plates, covers, gauges, pipe plugs, or //  
// fittings from an overheated pump. Vapor pressure within //  
// the pump can cause parts being disengaged to be ejected //  
// with great force. Allow the pump to cool before servic- //  
// ing. //  
//  
////////////////////////////////////
```

**Strainer Check**

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop. If a vacuum suction gauge has been installed, monitor and record the readings regularly to detect strainer blockage.

**Never** introduce air or steam pressure into the pump casing or piping to remove a blockage. This could result in personal injury or damage to the equipment. If backflushing is absolutely necessary, **liquid pressure** must be limited to 50% of the maximum permissible operating pressure shown on the pump performance curve. (See Section E, Page 1). If the pump is fitted with a Gorman-Rupp double grease lubricated seal, the maximum incoming pressure must be reduced to 10 p.s.i..

**Pump Vacuum Check**

Since this pump does not have a suction check valve, the discharge line must be fitted with a check valve if a pump vacuum reading is to be taken.

With the pump inoperative, install a vacuum gauge in the system, using pipe dope on the threads. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches or more of mercury. If it does not, check for air leaks in the seal, gasket, or discharge valve.

Open the suction line, and read the vacuum gauge with the pump primed and at operating speed. Shut off the pump. The vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists. Before checking for the source of the leak, check the point of installation of the vacuum gauge.

**STOPPING**

Never halt the flow of liquid suddenly. If the liquid being pumped is stopped abruptly, damaging shock waves can be transmitted to the pump and piping system. Close all connecting valves slowly. On engine driven pumps, reduce the throttle speed slowly and allow the engine to idle briefly before stopping.

---

**OPERATION**

---

**CAUTION**

If application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

After stopping the pump, lock out or disconnect the power source to ensure that the pump will remain inoperative.

**Cold Weather Preservation**

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for approximately one minute; this will remove any remaining liquid that could freeze the pump rotating parts.

If the pump will be idle for more than a few hours, or if it has been pumping liquids containing a large amount of solids, drain the pump, and flush it thoroughly with clean water. To prevent large solids from clogging the drain port and preventing the pump from completely draining, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.

**BEARING TEMPERATURE CHECK**

Bearings normally run at higher than ambient temperatures because of heat generated by friction. Temperatures up to 160°F are considered normal for bearings, and they can operate safely to at least 180°F.

Checking bearing temperatures by hand is inaccurate. Bearing temperatures can be measured accurately by placing a contact-type thermometer against the housing. Record this temperature for future reference.

A sudden increase in bearing temperatures is a warning that the bearings are at the point of failing to operate properly. Make certain that the bearing lubricant is of the proper viscosity and at the correct level (see LUBRICATION in MAINTENANCE AND REPAIR). Bearing overheating can also be caused by shaft misalignment and/or excessive vibration.

When pumps are first started, the bearings may seem to run at temperatures above normal. Continued operation should bring the temperatures down to normal levels.



## PUMP TROUBLESHOOTING - SECTION D

## WARNING

```

////////////////////////////////////
//
// Before attempting to open or service the pump:
//
// 1. Familiarize yourself with this manual.
// 2. Lock out or disconnect the power source to ensure
//    that the pump will remain inoperative.
// 3. Allow the pump to cool if overheated.
// 4. Vent the pump slowly and cautiously.
// 5. Close the suction and discharge valves.
// 6. Check the temperature before opening any covers,
//    plates, or plugs.
// 7. Drain the pump.
//
////////////////////////////////////

```

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Auxiliary priming device faulty or improperly installed.	Repair priming device or check installation.
	Air leak in suction line.	Correct leak.
	Suction check valve or foot valve clogged or binding.	Clean valve.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Suction lift or discharge head too high.	Check piping installation and install bypass line if needed. See INSTALLATION.
	Strainer clogged.	Check strainer and clean if necessary.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Suction check valve or foot valve clogged or binding.	Clean valve.
	Suction intake not submerged at proper level or sump too small.	Check installation and correct submergence as needed.



TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRES-SURE(cont.)	Lining of suction hose collapsed.	Replace suction hose.
	Impeller or other wearing parts worn or damaged.	Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.
	Impeller clogged.	Free impeller of debris.
	Pump speed too slow.	Check driver output; check belts or couplings for slippage.
	Discharge head too high.	Install bypass line.
	Suction lift too high.	Measure lift w/vacuum gauge. Reduce lift and/or friction losses in suction line.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Strainer clogged.	Check strainer and clean if necessary.
PUMP REQUIRES TOO MUCH POWER	Pump speed too high.	Check driver output; check that sheaves or couplings are correctly sized.
	Discharge head too low.	Adjust discharge valve.
	Liquid solution too thick.	Dilute if possible.
PUMP CLOGS FREQUENTLY	Discharge flow too slow.	Open discharge valve fully to increase flow rate, and run power source at maximum governed speed.
EXCESSIVE NOISE	Cavitation in pump.	Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory.
	Pumping entrained air.	Locate and eliminate source of air bubble.
	Pump or drive not securely mounted.	Secure mounting hardware.
	Impeller clogged or damaged.	Clean out debris; replace damaged parts.

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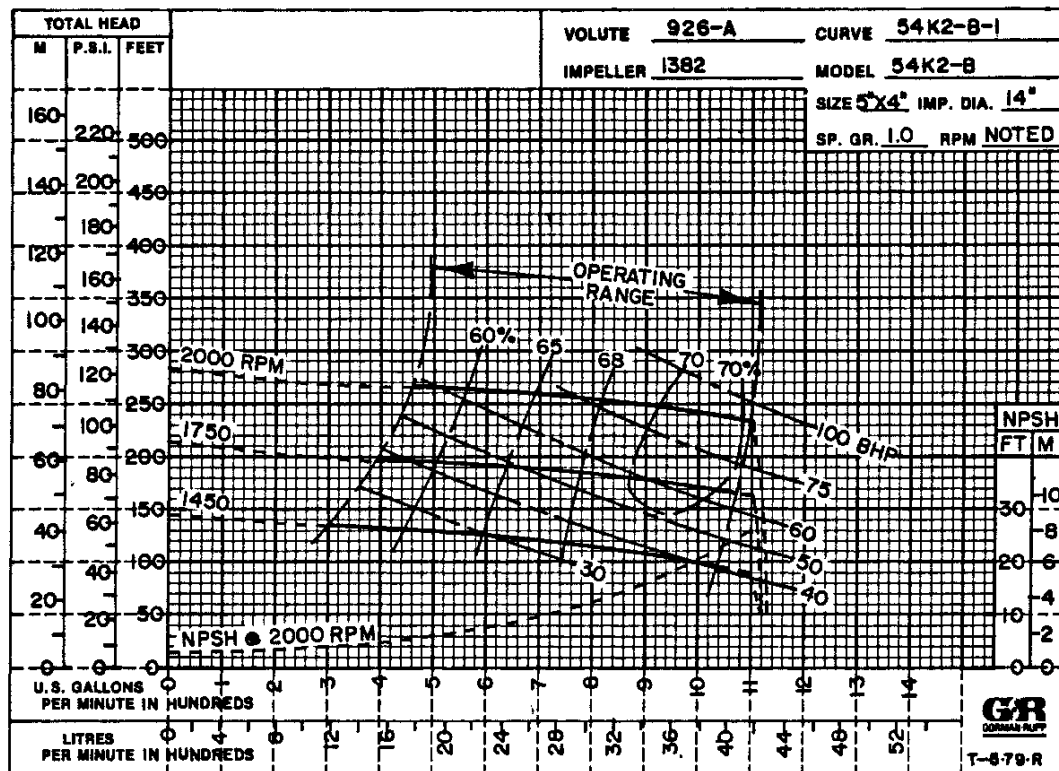
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TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits.	Check bearing temperature regularly to monitor any increase.
	Low or incorrect lubricant.	Check for proper type and level of lubricant.
	Suction and discharge lines not properly supported.	Check piping installation for proper support.
	Drive misaligned.	Align drive properly.



## PUMP MAINTENANCE AND REPAIR - SECTION E

MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.



## \*STANDARD PERFORMANCE FOR PUMP MODEL 54K2-B

\*Based on 70°F clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be different due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify performance or part numbers.

## CAUTION

Pump speed and operating condition points must be within the continuous performance range shown on the curve.

### SECTIONAL DRAWING

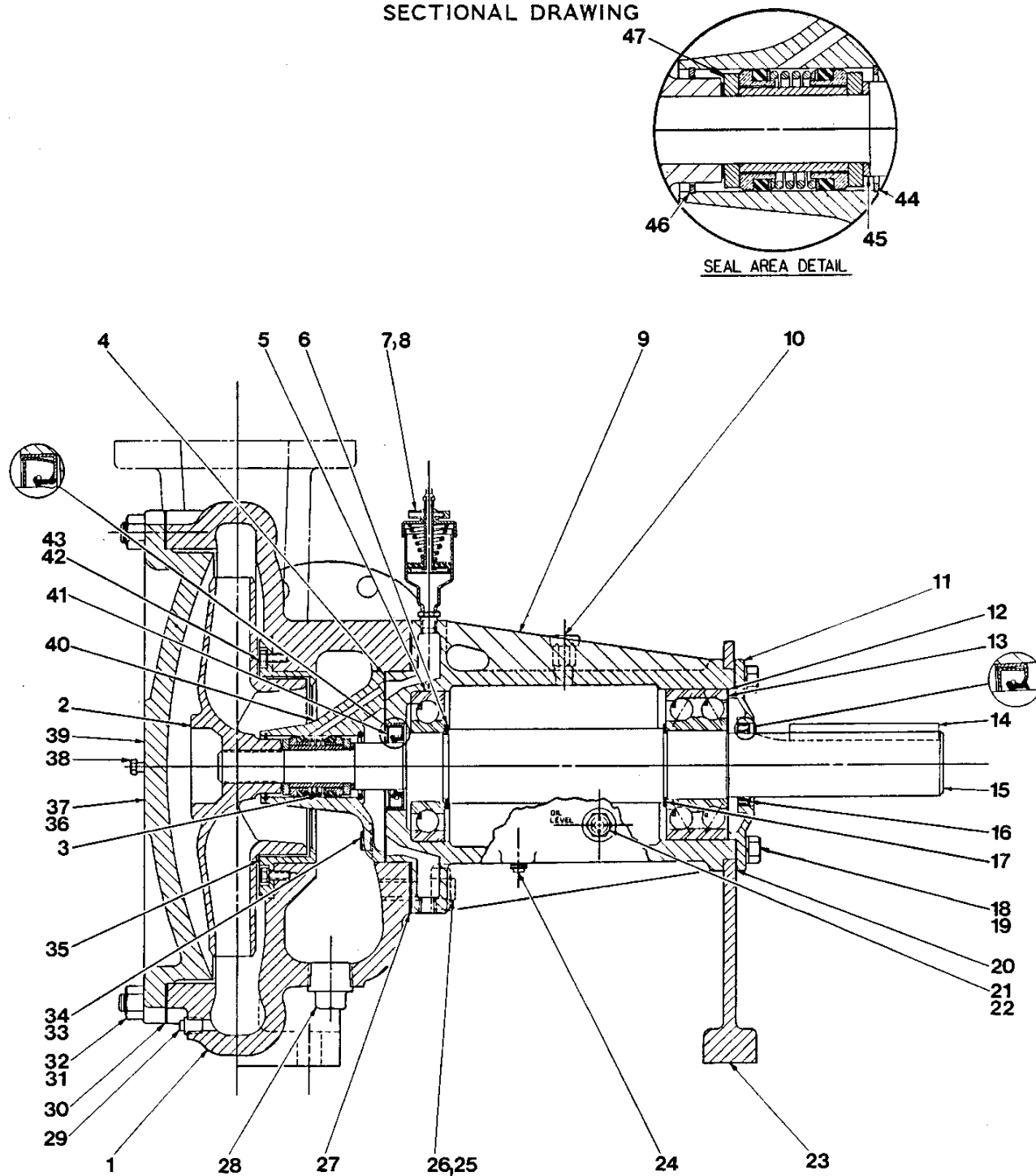


Figure 1. Pump Model 54K2-B

**PARTS LIST**  
**Pump Model 54K2-B**  
 (From S/N 731481 up)

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify part numbers.

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP CASING	926-A	10020	1	34	LOCKWASHER	J06	15991	6
2	*IMPELLER	1382	10010	1	35	*WEAR RING	6597	10010	1
3	*SEAL ASSY	GS1250	-----	1	36	NAME PLATE	2613-C	13990	1
4	*SEAL HOUSING GSKT	2178-G	18000	1	37	DRIVE SCREW	BM#04-03	15991	4
5	*BALL BEARING	S1217	-----	1	38	HEX HD CAPSCREW	B0604	15991	2
6	RETAINING RING	S720	-----	1	39	COVER PLATE	923	10010	1
7	GREASE CUP	S1509	-----	1	40	SEAL HOUSING	6595	14060	1
8	RED PIPE BUSHING	AP0604	15990	1	41	*OIL SEAL	S79	-----	1
9	PEDESTAL BODY	5474-A	10010	1	42	HEX HD CAPSCREW	B0503	15991	4
10	*AIR VENT	S1703	-----	1	43	LOCKWASHER	J05	15991	4
11	BEARING CAP	5475-A	10010	1	44	LOCK SPRING	947-A	16030	1
12	*BALL BEARING	S1038	-----	1	45	WASHER	37-H	15990	1
13	*BRG SHIM SET	8548	15990	1	46	LOCK SPRING	947-A	16030	1
14	*SHAFT KEY	N1022	15990	1	47	*IMP SHIM SET	37-J	17090	REF
15	*IMPELLER SHAFT	6612	17060	1	NOT SHOWN:				
16	*OIL SEAL	25227-763	-----	1		PIPE PLUG	P16	11990	1
17	RETAINING RING	S720	-----	1		ROTATION DECAL	2613-CU	00000	1
18	HEX HD CAPSCREW	B0805	15991	4		STRAINER	S2278	-----	1
19	LOCKWASHER	J08	15991	4		RED PIPE BUSHING	AP9680	11990	1
20	*BEARING CAP GSKT	5475-G	18000	1		SUCTION STICKER	6588-AG	00000	1
21	SIGHT GAUGE	26714-011	-----	1		DISCHARGE STICKER	6588-BJ	00000	1
22	PIPE PLUG	P06	11990	1		LUBE DECAL	38816-079	-----	1
23	PEDESTAL FOOT	6611	24000	1	OPTIONAL:				
24	PEDESTAL DRAIN PLUG	P06	11990	1		SUCTION FLANGE	1757	10010	1
25	STUD	C1210	15991	8		SUCT FLANGE GSKT	1678-G	18000	1
26	HEX NUT	D12	15991	8		DISCH FLANGE	1756	10010	1
27	*CASING GSKT	922-G	18000	1		DISCH FLANGE GSKT	1676-G	18000	1
28	CASING DRAIN PLUG	P20	11990	1		DISCH CHECK VALVE	GRP14-13	-----	1
29	PIPE PLUG	P08	11990	3		PRESSURE GAUGE	S180	-----	1
30	*COVER PLATE GSKT	926-G	18000	1		HAND PRIMER ASSY	GRP43-1B	-----	1
31	STUD	C1210	15991	16					
32	HEX NUT	D12	15991	16					
33	HEX HD CAPSCREW	B0604	14990	6					

\*INDICATES PARTS RECOMMENDED FOR STOCK

Above Serial Numbers Do Not Apply To Pumps Made In Canada.

CANADIAN SERIAL NO ..... AND UP

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## PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

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This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions which are keyed to the sectional view (see Figure 1) and the accompanying parts list.

Most service functions may be performed by draining the pump and removing the cover plate. If major repair is required, the piping and/or power source must be disconnected. The following instructions assume complete pump disassembly is required.

Before attempting to service the pump, disconnect or lock out the power source to ensure that it will remain inoperative, and close all valves in the suction and discharge lines.

For power source disassembly and repair, consult the literature supplied with the power source or contact your local power source representative.

### WARNING

```
//////////////////////////////////////  
// Before attempting to open or service the pump: //  
// 1. Familiarize yourself with this manual. //  
// 2. Lock out or disconnect the power source to ensure //  
// that the pump will remain inoperative. //  
// 3. Allow the pump to cool if overheated. //  
// 4. Vent the pump slowly and cautiously. //  
// 5. Close the suction and discharge valves. //  
// 6. Check the temperature before opening any covers, //  
// plates, or plugs. //  
// 7. Drain the pump. //  
// //////////////////////////////////////
```

### Cover Plate Removal

The impeller, wear ring and seal assembly may be serviced by removing the cover plate (39).

Remove the casing drain plugs (28 and 29) and drain the pump. Clean and reinstall the drain plugs.

Remove the nuts (32) and use the jacking screws (38) to break the cover plate loose from the pump casing. Remove the cover plate and gasket (30).

### Impeller And Wear Ring Removal

Before attempting to remove the impeller, turn the cross-arm on the automatic lubricating grease cup (7) clockwise until it rests against the cover (see Figure 3). This will prevent the grease in the cup from escaping when the impeller is removed.

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The impeller bore is designed to accept a 2 inch square block of wood or steel bar to aid in removal of the impeller. Use an impeller wrench if one is available. Turn the impeller counterclockwise (when facing the impeller) to remove it from the impeller shaft.

Slide the impeller adjusting shims (48) off the shaft. Tie and tag the shims, or measure and record their thickness for ease of reassembly.

Inspect the wear ring (35) for excessive wear or damage. If replacement is required, remove the hardware (42 and 43) and install 5/16 - 13 UNC X 2-1/2 inch long jacking screws in the threaded holes in the wear ring. Tighten the jacking screws evenly (to prevent binding) until the wear ring separates from the pump casing.

### Seal Removal

The seal assembly (3) may be serviced as a bench operation by removing the seal housing (40) and seal assembly as a single unit. To remove the seal housing, disengage the hardware (33 and 34) and install 3/8-16 UNC jacking screws (not supplied) in the threaded holes in the seal housing. Tighten the jacking screws evenly to prevent binding.

When the seal housing separates from the pedestal, slide the seal housing and seal assembly off the shaft as a single.

Lay the seal housing on a flat surface with the impeller side up, and carefully remove the outboard locking spring (47). Use caution when removing the locking spring; tension on the seal spring will be released as the locking spring is removed.

Carefully remove the stationary and rotating seal elements, packing rings, seal spring and the spacer sleeve from the seal housing. It is not necessary to remove the inboard seal locking spring (45) unless replacement is required.

Remove the seal washer (46) and seal housing gasket (4).

If no further disassembly is required, refer to **Seal Installation**.

### Shaft And Bearing Removal And Disassembly

When the pump is properly operated and maintained, the pedestal should not require disassembly. Disassemble the shaft and bearings **only** when there is evidence of wear or damage.

#### CAUTION

Shaft and bearing disassembly in the field is not recommended. These operations should be performed only in a properly-equipped shop by qualified personnel.

Remove the power source and the pedestal mounting hardware.



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Remove the pedestal drain plug (24) and drain the lubricant from the pedestal. Clean and reinstall the drain plug.

Remove the nuts (26) and separate the pedestal (9) from the pump casing. Remove the pump casing gasket (27).

Disengage the hardware (18 and 19) and separate the bearing cap (11), gasket (20), pedestal foot (23) and bearing shim set (13) from the pedestal. Tie and tag the shims, or measure and record their thickness for ease of reassembly.

Press the oil seal (16) from the bearing cap.

Place a block of wood against the impeller end of the shaft (15) and tap the shaft and assembled bearings from the bore of the pedestal. Press the inboard oil seal (41) from the pedestal.

Use a bearing puller to remove the bearings (5 and 12) from the impeller shaft. It is not necessary to remove the retaining rings (6 and 17) unless replacement is required. Use snap ring pliers to remove the rings from the shaft.

#### Shaft and Bearing Reassembly And Installation

Clean the pedestal, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage and replace as necessary.

#### WARNING

```
////////////////////////////////////  
//  
// Most cleaning solvents are toxic and flammable. Use //  
// them only in a well-ventilated area free from excessive //  
// heat, sparks, and flame. Read and follow all prec- //  
// autions printed on solvent containers. //  
//  
////////////////////////////////////
```

Inspect the shaft for distortion, nicks or scratches or thread damage on the impeller end. Dress small nicks and burrs with a fine file or emery cloth. Replace the shaft if defective.

Clean the bearings thoroughly in **fresh** cleaning solvent. Dry the bearings with filtered compressed air and coat with light oil.

Rotate the bearings by hand to check for roughness or binding and inspect the bearing balls. If rotation is rough or the bearing balls are discolored, replace the bearings.

#### CAUTION

Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. DO NOT spin dry bearings. This may scratch the balls or races and cause premature bearing failure.

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The bearing tolerances provide a tight press fit onto the shaft and a snug slip fit into the pedestal. Replace the shaft or pedestal if the proper bearing fit is not achieved.

If removed, install the bearing retaining rings (6 and 17) on the shaft. Use an arbor (or hydraulic) press to install the inboard bearing (5) on the shaft.

#### CAUTION

When installing the bearings onto the shaft, NEVER press or hit against the outer race, balls, or ball cage. Press ONLY on the inner race.

Position the outboard bearing (12) on the shaft with the loading groove facing **toward** the impeller end of the shaft. Press it onto the shaft until it seats squarely against the retaining ring.

Press the oil seal (41) into the pedestal bore with the lip positioned as shown in Figure 1.

Slide the shaft and assembled bearings into the pedestal bore until the inboard bearing seats squarely against the pedestal shoulder. **Be careful** not to damage the oil seal on the shaft threads.

#### CAUTION

When installing the shaft and bearings into the bearing bore, push against the outer race. NEVER hit the balls or ball cage.

Press the oil seal (16) into the bearing cap (11) with the lip positioned as shown in Figure 1.

Install the same thickness of bearing adjusting shims (12) as previously removed, and secure the pedestal foot (23), bearing cap and gasket (20) to the pedestal with the hardware (18 and 19). **Be careful** not to damage the oil seal lip on the shaft keyway.

#### NOTE

Shaft endplay should be between .002 - .010 inch. Add or remove bearing adjusting shims until the correct endplay is obtained.

For ease of reassembly, the seal housing and seal assembly may be installed at this point. Refer to **Seal Installation**, and then proceed as follows.

Replace the casing gasket (27) and secure the pedestal assembly to the pump casing with the nuts (26). Install any leveling shims used under the pedestal foot, and secure the pedestal to the base.

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### NOTE

The seal cavity drain hole is located in the bottom of the pedestal. **Do not** plug this hole. In the event of seal failure, liquid will leak from the hole, preventing contamination of the pedestal.

Lubricate the bearing cavity as indicated in LUBRICATION.

### Seal Installation

(Figures 1 and 2)

Clean the seal cavity and shaft with a cloth soaked in fresh cleaning solvent.

### WARNING

```
////////////////////////////////////  
//  
// Most cleaning solvents are toxic and flammable. Use //  
// them only in a well-ventilated area free from excessive //  
// heat, sparks, and flame. Read and follow all prec- //  
// autions printed on solvent containers.                //  
//                                                        //  
////////////////////////////////////
```

The seal is not normally reused because wear patterns on the finished faces cannot be realigned during reassembly. This could result in premature failure. If necessary to reuse an old seal in an emergency, **carefully** wash all metallic parts in fresh cleaning solvent and allow to dry thoroughly.

Handle the seal parts with extreme care to prevent damage. Be careful not to contaminate precision finished faces; even fingerprints on the faces can shorten seal life. If necessary, clean the faces with a non-oil based solvent and a clean lint free tissue. Wipe **lightly** in a concentric pattern to avoid scratching the faces.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. Clean and polish the seal spacer sleeve, or replace it if there are nicks or cuts on either end. If any components are worn, replace the complete seal; **never mix old and new seal parts**.

If a replacement seal is being used, remove it from the container and inspect the precision finished faces to ensure that they are free of any foreign matter.

To ease installation of the seal, lubricate the packing rings and seal housing with water or a very **small** amount of oil, and apply a drop of light lubricating oil on the finished faces. Assemble the seal as follows, (see Figure 2).

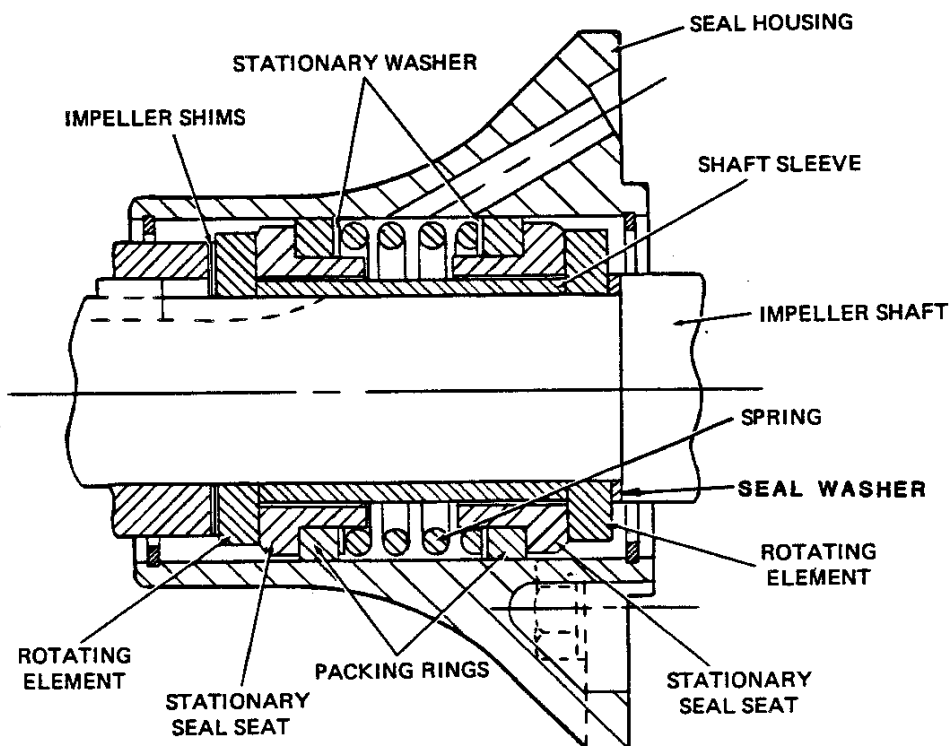


Figure 2. GS1250 Seal Assembly

**CAUTION**

This seal is not designed for operation at temperatures above 110°F. Do not use at higher operating temperatures.

Remove the jacking screws from the seal housing.

If the inboard seal locking spring (45) was removed, install it in the seal housing. Position the seal housing on a flat surface with the impeller side up.

Position the inboard rotating element in the seal housing and center it against the locking spring. Subassemble the inboard stationary element and packing ring, and press this subassembly into the lubricated seal housing until the seal elements contact. A push tube cut from a length of plastic pipe would aid this installation. The O.D. of the pipe should be approximately the same size as the O.D. of the seal spring.

Position the seal sleeve against the inboard rotating element, and install the seal spring. Subassemble the outboard stationary element and packing ring, and press this subassembly into the lubricated seal housing. Install the outboard rotating element.

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Carefully compress the seal spring and secure the seal assembly with the out-board locking spring (47).

Install the seal washer (46) on the impeller shaft.

Position the seal housing gasket (4) on the seal housing, making sure the slotted hole in the gasket aligns with the grease passage in the housing. Slide the assembled seal housing, gasket, and seal onto the shaft. **Be careful** not to damage the rotating elements on the shaft threads.

Align the grease passage in the seal housing and pedestal, and tighten the hardware (33 and 34) evenly (to prevent binding) until the seal housing is fully seated in the in the pump casing.

Lubricate the seal as indicated in **LUBRICATION** after the impeller is installed.

### Impeller And Wear Ring Installation

If the wear ring (35) was removed, press the replacement wear ring into the pump casing until fully seated. Apply 'Never-Seez' or equivalent compound to the capscrews (42) and secure the wear ring to the pump casing with the capscrews and lockwashers (43).

Inspect the impeller and replace it if cracked or badly worn.

Screw the impeller onto the shaft until tight and observe the position of the impeller through the discharge port. For maximum pump efficiency, the vanes of the impeller should be centered within the casing scroll. If the impeller appears centered, rotate the shaft to check for binding. If no binding is felt, proceed with **Cover Plate Installation**. If the impeller binds or does not appear centered, remove the impeller and add enough adjusting shims (48) to prevent binding or center the impeller after reinstallation.

### Cover Plate Installation

Clean any scale or debris that might prevent a good seal from the cover plate shoulder and pump casing.

#### NOTE

To ease future disassembly, apply a film of grease or 'Never-Seez' on the cover plate shoulder, or any surface that contacts the pump casing. This action will reduce rust and scale build-up.

Replace the cover plate gasket (30), and secure the cover plate to the pump casing with the nuts (32). Make sure the jacking screws (38) do not interfere with the cover plate seating.

#### NOTE

Apply 'Loctite Thread Sealant' (G-R part number 18771-050) or equivalent to the studs (31) before securing.

Turn the shaft by hand to make sure that the impeller is not binding or scraping.

#### Final Pump Reassembly

**Be sure** the pump is secure to the base and power source. Install the suction and discharge lines and open all valves in the lines. Make certain that all piping connections are tight, properly supported and secure.

**Be sure** the pump and pedestal have been properly lubricated, see LUBRICATION.

Refer to OPERATION, Section C, and start the pump.

### LUBRICATION

#### Seal Assembly

Fill the grease cup (7) through the grease fitting with No. 2 lithium base grease until grease escapes from the relief hole. Turn the grease cup arm counterclockwise until it is at the top of the stem; this will release the spring to apply grease to the seal (see Figure 3).

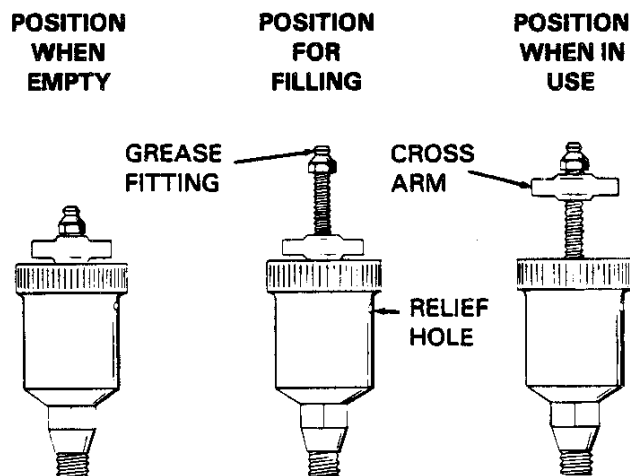


Figure 3. Automatic Lubricating Grease Cup

#### Bearings

The pedestal was fully lubricated when shipped from the factory. Check the oil level regularly through the sight gauge (21) and maintain it at the mid-point of

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the gauge. When lubrication is required, add SAE No. 30 non-detergent oil through the hole for the air vent. **Do not** over lubricate. Over-lubrication can cause the bearings to over-heat, resulting in premature bearing failure.

Under normal conditions, drain the pedestal once each year and refill with approximately 14 ounces of clean oil. Change the oil more frequently if the pump is operated continuously or installed in an environment with rapid temperature change.

#### CAUTION

Monitor the condition of the bearing lubricant regularly for evidence of rust or moisture condensation. This is especially important in areas where variable hot and cold temperatures are common.

For cold weather operation, consult the factory or a lubricant supplier for the recommended grade of oil.

#### Power Source

Consult the literature supplied with the power source, or contact your local power source representative.

**For U.S. and International Warranty Information,  
Please Visit [www.grpumps.com/warranty](http://www.grpumps.com/warranty)  
or call:**

**U.S.: 419-755-1280**

**International: +1-419-755-1352**

**For Canadian Warranty Information,  
Please Visit [www.grcanada.com/warranty](http://www.grcanada.com/warranty)  
or call:**

**519-631-2870**