INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WITH PARTS LIST

50 SERIES PUMP

MODEL

54J2–B
Register your new Gorman-Rupp pump online at www.grpumps.com
Valid serial number and e-mail address required.

RECORD YOUR PUMP MODEL AND SERIAL NUMBER

Please record your pump model and serial number in the spaces provided below. Your Gorman-Rupp distributor needs this information when you require parts or service.

Pump Model: ________________________________
Serial Number: ________________________________
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Thank You for purchasing a Gorman-Rupp pump. Read this manual carefully to learn how to safely install and operate your pump. Failure to do so could result in personal injury or damage to the pump. 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 a 50 Series basic centrifugal model with an enclosed impeller. The pump is designed for handling clean liquids at high heads and high discharge pressures. The basic material of construction is gray iron, with gray iron impeller and wear ring.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for every aspect of each specific application. Therefore, it is the responsibility of the owner/installer of the pump to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor pump integrity are compromised by the installation. Pumps and related equipment must be installed and operated according to all national, local and industry standards.

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:

The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901—1217
Phone: (419) 755—1011
or:
Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7
Phone: (519) 631—2870

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:

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**DANGER!**

Immediate hazards which WILL result in severe personal injury or death. These instructions describe the procedure required and the injury which will result from failure to follow the procedure.

---

**WARNING!**

Hazards or unsafe practices which COULD result in severe personal injury or death. These instructions describe the procedure required and the injury which could result from failure to follow the procedure.

---

**CAUTION**

Hazards or unsafe practices which COULD result in minor personal injury or product or property damage. These instructions describe the requirements and the possible damage which could result from failure to follow the procedure.

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**NOTE**

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.
SAFETY - SECTION A

This information applies 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.

This manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly provide detailed instructions and precautions for each specific application or for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner, installer and/or maintenance personnel to ensure that applications and/or maintenance procedures not addressed in this manual are performed only after establishing that neither personal safety nor pump integrity are compromised by such applications or procedures.

Before attempting to open or service the pump:

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

WARNING!

This pump is designed to handle clear liquids. Do not attempt to pump volatile, corrosive, or flammable materials which may damage the pump or endanger personnel as a result of pump failure.

WARNING!

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment. Suction and discharge hoses and piping must be removed from the pump before lifting.

WARNING!

After the pump has been positioned, make certain that the pump and all piping connections are tight, properly supported and secure before operation.

DANGER!

Do not operate the pump without the guards in place over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

WARNING!

Do not operate the pump against a closed discharge valve for long periods of time. If operated against a closed dis-
charge valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

**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 servicing.

**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 completely cool.
3. Refer to instructions in this manual before restarting the pump.

**CAUTION**

Pumps and related equipment must be installed and operated according to all national, local and industry standards.
INSTALLATION – SECTION B

Review all SAFETY information in Section A.

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. This pump is equipped with a Gorman-Rupp double grease lubricated seal, therefore the maximum incoming pressure must be limited 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.

**OUTLINE DRAWING**

![Diagram of Pump Model 54J2-B](image)

**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.

d. Check levels and lubricate as necessary. Refer to LUBRICATION in the MAINTENANCE AND REPAIR section of this manual and perform duties as instructed.

e. Check to ensure the warning and caution stickers that were shipped loose with pump are included with the pump assembly. (Check Parts List in Section E for the itemized list.)

f. If the pump has 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 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

Pump unit weights will vary depending on the mounting and drive provided. Check the shipping tag on the unit packaging for the actual weight, and use lifting equipment with appropriate capacity. Drain the pump and remove all customer-installed equipment such as suction and discharge hoses or piping before attempting to lift existing, installed units.

Make sure that hoists and other lifting equipment are of sufficient capacity to safely handle the pump assembly. If chains and cables are used, make certain that they are positioned so that they will not damage the pump, and so that the load will be balanced.

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

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. See the performance curve and operating range shown on Page E-1 to be sure your overall application allows the pump to operate within the safe operation range.

Materials

Either pipe or hose maybe 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 (457.2 mm) 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 1/2 inch (12.7 mm) diameter spherical solids.

**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 1 1/2 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 1-1/2 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 3 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.

**CAUTION**

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

**Bypass Lines**

If it is necessary to permit the escape of air to atmosphere during initial priming or in the repriming cycle, install a bypass line (sized so that it will not affect pump discharge capacity) between the pump and the discharge check valve. Since this pump does not use a suction check valve, the discharge end of the bypass line must be submerged in the liquid being pumped in order to maintain suction.
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°. The coupling is in alignment when the hub ends are the same distance apart at all points (see Figure 3).

Figure 3. Aligning Spider-Type Couplings

Align non-spider type couplings by using a feeler gauge or taper gauge between the coupling halves every 90°. The coupling is in alignment when the hubs are the same distance apart at all points (see Figure 4).

Figure 4. 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.

Drive Belts

When using drive belts, 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 5). In drive sys-
tems using two or more belts, make certain that the belts are a matched set; unmatched sets will cause accelerated belt wear.

Under-tensioning will cause belt slippage. Always keep belts free from dirt, grease, oil and other foreign material which may cause slippage.

Tension Measurement

Correct v-belt tension can be achieved using a v-belt tension tester and Table 1 or 2. Use the tables to find the v-belt size (cross-section), the smallest sheave diameter, the belt type for your application. The corresponding deflection force required for new or used belts is shown opposite the RPM range of the pump.

The ratio of deflection to belt span is 1:64 for both ASA and metric units. Therefore, a belt with a span of 64 inches would require a deflection of 1 inch at the force shown on the Tables for your particular application.

For example, if the span as measured in Figure 6 is 32 inches (813 mm), the v-belt cross-section is C, the smallest sheave diameter is 8 inches, the pump speed is 1250 RPM, and the belts are uncogged Yy-T type, then 11.5 lbs. of force on the tensioner should show 1/2-inch (12.7 mm) of deflection.

A tension tester is available as an option from Gorman-Rupp (P/N 29513-001). Other tension testers are available from your local belt/sheave distributor, and work on a similar principal.

To use the Gorman-Rupp tensioner, measure the belt span as shown in Figure 6. Position the bottom of the large O-ring on the span scale of the tensioner at the measured belt span. Set the small O-ring on the deflection force scale to zero.
Place the tension tester squarely on the belt at the center of the belt span. Apply force on the plunger, perpendicular to the belt span, until the bottom of the large O-ring is even with the top of the next belt, or with the bottom of a straight edge laid across the sheaves.

Read the force applied from the bottom of the small O-ring on the deflection force scale. Compare this force with the value shown in Table 1 or 2 and adjust the tension accordingly. Note that the tension for new belts is higher than that for used belts to allow for expected belt stretching. Do not over-tension used belts to the higher deflection forces shown for new belts.
**Table 1. Sheave Diameter (Inches) Deflection Force (Lbs.)**

<table>
<thead>
<tr>
<th>Cross Section</th>
<th>Smallest Sheave Diameter Range</th>
<th>R.P.M. Range</th>
<th>Used Belt</th>
<th>New Belt</th>
<th>Used Belt</th>
<th>New Belt</th>
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**Table 2. Sheave Diameter (Millimeters) Deflection Force (Kg.)**

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<tr>
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<th>Smallest Sheave Diameter Range</th>
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</table>
ELECTRICAL CONNECTIONS

Before connecting a motor to the incoming power, check that the electrical service available matches the pump motor requirements stamped on the motor nameplate.

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.

**WARNING!**

The electrical power used to operate the pump is high enough to cause injury or death. Obtain the services of a qualified electrician to make all electrical connections.

**WARNING!**

Do not install and operate a non-explosion proof motor in an explosive atmosphere. Install, connect, and operate the motor in accordance with The National Electric Code and all local codes. If there is a conflict between the instructions in the manual accompanying the unit and The National Electric Code or the applicable local code, The National or local code shall take precedence.
OPERATION – SECTION C

Review all SAFETY information in Section A.

Follow the instructions on all tags, labels and decals attached to the pump.

WARNING!

This pump is designed to handle clear water. Do not attempt to pump volatile, corrosive, or flammable materials which may damage the pump or endanger personnel as a result 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.

CAUTION

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

STARTING

Consult the operations manual furnished with the power source.

Starting procedures will vary slightly depending on the pump application, type of priming device, and type of drive.

OPERATION

Lines With a Bypass

Either a Gorman-Rupp automatic air release valve or a hand operated shutoff valve may be installed in a bypass line.

Close the discharge throttling valve (if so equipped) so that the pump will not have to prime against the weight of the liquid in the discharge line. Air from the suction line will be discharged through the bypass line back to the wet well during the priming cycle. When the pump is fully primed and liquid is flowing steadily from the bypass line, open the discharge throttling valve. Liquid will then continue to circulate through the bypass line while the pump is in operation.

Lines Without a Bypass

Open all valves in the discharge line and start the engine. Priming is indicated by a positive reading on the discharge pressure gauge or by a quieter operation. The pump may not prime immediately
because the suction line must first fill with liquid. If the pump fails to prime within five minutes, stop it and check the suction line for leaks.

After the pump has been primed, partially close the discharge line throttling valve in order to fill the line slowly and guard against excessive shock pressure which could damage pipe ends, gaskets, sprinkler heads, and any other fixtures connected to the line. When the discharge line is completely filled, adjust the throttling valve to the required flow rate.

WARNING!

Do not operate the pump against a closed discharge throttling valve for long periods of time. If operated against a closed discharge throttling valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.

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.

Liquid Temperature And Overheating

The maximum liquid temperature for this pump is 160°F (71°C). 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!

Allow an over-heated pump to completely cool before servicing. Do not remove plates, covers, gauges, pipe plugs, or fittings from an overheated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump cools, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.

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.

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 (508 mm) 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 operation 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.

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

After stopping the pump, disconnect or lock out 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 (71°C) are considered normal for bearings, and they can operate safely to at least 180°F (82°C).

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 Section E). 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.
TROUBLESHOOTING — SECTION D

Review all SAFETY information in Section A.

![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 completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.
6. Vent the pump slowly and cautiously.
7. Drain the pump.

<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>POSSIBLE CAUSE</th>
<th>PROBABLE REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMP FAILS TO PRIME</td>
<td>Air leak in suction line.</td>
<td>Correct leak.</td>
</tr>
<tr>
<td></td>
<td>Lining of suction hose collapsed.</td>
<td>Replace suction hose.</td>
</tr>
<tr>
<td></td>
<td>Leaking or worn seal or pump gasket.</td>
<td>Check pump vacuum. Replace leaking or worn seal or gasket.</td>
</tr>
<tr>
<td></td>
<td>Suction check valve or foot valve clogged or binding.</td>
<td>Clean valve.</td>
</tr>
<tr>
<td></td>
<td>Suction lift or discharge head too high.</td>
<td>Check piping installation and install bypass line if needed. See INSTALLATION.</td>
</tr>
<tr>
<td></td>
<td>Strainer clogged.</td>
<td>Check strainer and clean if necessary.</td>
</tr>
<tr>
<td>PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE</td>
<td>Air leak in suction line.</td>
<td>Correct leak.</td>
</tr>
<tr>
<td></td>
<td>Lining of suction hose collapsed.</td>
<td>Replace suction hose.</td>
</tr>
<tr>
<td></td>
<td>Suction intake not submerged at proper level or sump too small.</td>
<td>Check installation and correct submergence as needed.</td>
</tr>
<tr>
<td>TROUBLE</td>
<td>POSSIBLE CAUSE</td>
<td>PROBABLE REMEDY</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (cont.)</td>
<td>Impeller or other wearing parts worn or damaged.</td>
<td>Replace worn or damaged parts.</td>
</tr>
<tr>
<td></td>
<td>Strainer clogged.</td>
<td>Check that impeller is properly centered and rotates freely.</td>
</tr>
<tr>
<td></td>
<td>Impeller clogged.</td>
<td>Check strainer and clean if necessary.</td>
</tr>
<tr>
<td></td>
<td>Discharge head too high.</td>
<td>Free impeller of debris.</td>
</tr>
<tr>
<td></td>
<td>Suction lift too high.</td>
<td>Install bypass line.</td>
</tr>
<tr>
<td></td>
<td>Leaking or worn seal or pump gasket.</td>
<td>Measure lift w/vacuum gauge. Reduce lift and/or friction losses in suction line.</td>
</tr>
<tr>
<td></td>
<td>Pump speed too slow.</td>
<td>Check pump vacuum. Replace leaking or worn seal or gasket.</td>
</tr>
<tr>
<td>PUMP REQUIRES TOO MUCH POWER</td>
<td>Pump speed too high.</td>
<td>Check driver output; check that sheaves or couplings are correctly sized.</td>
</tr>
<tr>
<td></td>
<td>Discharge head too low.</td>
<td>Adjust discharge valve.</td>
</tr>
<tr>
<td></td>
<td>Liquid solution too thick.</td>
<td>Dilute if possible.</td>
</tr>
<tr>
<td>PUMP CLOGS FREQUENTLY</td>
<td>Discharge flow too slow.</td>
<td>Open discharge valve fully to increase flow rate, and run engine at maximum governed speed.</td>
</tr>
<tr>
<td></td>
<td>Suction check valve or foot valve clogged or binding.</td>
<td>Clean valve.</td>
</tr>
<tr>
<td>EXCESSIVE NOISE</td>
<td>Cavitation in pump.</td>
<td>Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory.</td>
</tr>
<tr>
<td></td>
<td>Pumping entrained air.</td>
<td>Locate and eliminate source of air bubble.</td>
</tr>
<tr>
<td></td>
<td>Pump or drive not securely mounted.</td>
<td>Secure mounting hardware.</td>
</tr>
<tr>
<td></td>
<td>Impeller clogged or damaged.</td>
<td>Clean out debris; replace damaged parts.</td>
</tr>
<tr>
<td>BEARINGS RUN TOO HOT</td>
<td>Bearing temperature is high, but within limits.</td>
<td>Check bearing temperature regularly to monitor any increase.</td>
</tr>
<tr>
<td></td>
<td>Low or incorrect lubricant.</td>
<td>Check for proper type and level of lubricant.</td>
</tr>
<tr>
<td></td>
<td>Suction and discharge lines not properly supported.</td>
<td>Check piping installation for proper support.</td>
</tr>
<tr>
<td></td>
<td>Drive misaligned.</td>
<td>Align drive properly.</td>
</tr>
</tbody>
</table>
PREVENTIVE MAINTENANCE

Since pump applications are seldom identical, and pump wear is directly affected by such things as the abrasive qualities, pressure and temperature of the liquid being pumped, this section is intended only to provide general recommendations and practices for preventive maintenance. Regardless of the application however, following a routine preventive maintenance schedule will help assure trouble-free performance and long life from your Gorman-Rupp pump. For specific questions concerning your application, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Record keeping is an essential component of a good preventive maintenance program. Changes in suction and discharge gauge readings (if so equipped) between regularly scheduled inspections can indicate problems that can be corrected before system damage or catastrophic failure occurs. The appearance of wearing parts should also be documented at each inspection for comparison as well. Also, if records indicate that a certain part (such as the seal) fails at approximately the same duty cycle, the part can be checked and replaced before failure occurs, reducing unscheduled down time.

For new applications, a first inspection of wearing parts at 250 hours will give insight into the wear rate for your particular application. Subsequent inspections should be performed at the intervals shown on the chart below. Critical applications should be inspected more frequently.

<table>
<thead>
<tr>
<th>Preventive Maintenance Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>General Condition (Temperature, Unusual Noises or Vibrations, Cracks, Leaks, Loose Hardware, Etc.)</td>
</tr>
<tr>
<td>Pump Performance (Gauges, Speed, Flow)</td>
</tr>
<tr>
<td>Bearing Lubrication</td>
</tr>
<tr>
<td>Seal Lubrication (And Packing Adjustment, If So Equipped)</td>
</tr>
<tr>
<td>V-Belts (If So Equipped)</td>
</tr>
<tr>
<td>Air Release Valve Plunger Rod (If So Equipped)</td>
</tr>
<tr>
<td>Front Impeller Clearance (Wear Plate)</td>
</tr>
<tr>
<td>Rear Impeller Clearance (Seal Plate)</td>
</tr>
<tr>
<td>Check Valve</td>
</tr>
<tr>
<td>Pressure Relief Valve (If So Equipped)</td>
</tr>
<tr>
<td>Pump and Driver Alignment</td>
</tr>
<tr>
<td>Shaft Deflection</td>
</tr>
<tr>
<td>Bearings</td>
</tr>
<tr>
<td>Bearing Housing</td>
</tr>
<tr>
<td>Piping</td>
</tr>
<tr>
<td>Driver Lubrication — See Mfr’s Literature</td>
</tr>
</tbody>
</table>

Legend:
I = Inspect, Clean, Adjust, Repair or Replace as Necessary
C = Clean
R = Replace

* Service interval based on an intermittent duty cycle equal to approximately 4000 hours annually. Adjust schedule as required for lower or higher duty cycles or extreme operating conditions.
MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.

* STANDARD PERFORMANCE FOR PUMP MODEL 54J2–B

* Based on 70°F (21°C) 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.

CAUTION

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

Pump Model 54J2—B  
(From S/N 1424552 Up)

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NAME</th>
<th>PART NUMBER</th>
<th>MAT'L CODE</th>
<th>QTY</th>
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<tbody>
<tr>
<td>1</td>
<td>PUMP CASING</td>
<td>926A</td>
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<td>2</td>
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<td>3</td>
<td>SEAL ASSY</td>
<td>GS1250</td>
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<tr>
<td>4</td>
<td>HEX HD CAPSCREW</td>
<td>B0503</td>
<td>14990</td>
<td>4</td>
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<tr>
<td>5</td>
<td>LOCK WASHER</td>
<td>J05</td>
<td>15991</td>
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</tr>
<tr>
<td>6</td>
<td>IMP WEAR RING</td>
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<td>7</td>
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<td>8</td>
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<td>P08</td>
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<td>9</td>
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<td>10</td>
<td>HEX HD CAPSCREW</td>
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<td>12</td>
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<td>13</td>
<td>GREASE CUP</td>
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<td>15</td>
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<td>16</td>
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<td>17</td>
<td>PED AIR VENT</td>
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<td>BALL BEARING</td>
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<td>BRG SHIM SET</td>
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<td>25</td>
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<td>26</td>
<td>IMPELLER SHAFT</td>
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<tr>
<td>27</td>
<td>PEDESTAL FOOT</td>
<td>6611</td>
<td>24000</td>
<td>1</td>
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<tr>
<td>28</td>
<td>OIL SIGHT GAUGE</td>
<td>26714—011</td>
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<tr>
<td>29</td>
<td>PIPE PLUG</td>
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<td>30</td>
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<td>31</td>
<td>STUD</td>
<td>C1210</td>
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<td>32</td>
<td>HEX NUT</td>
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<td>33</td>
<td>RETAINING RING</td>
<td>S720</td>
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<td>34</td>
<td>OIL SEAL</td>
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<td>35</td>
<td>SEAL HOUSING GSKT</td>
<td>2178G</td>
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<tr>
<td>36</td>
<td>CASING DRAIN PLUG</td>
<td>P20</td>
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<td>37</td>
<td>CASING DRAIN PLUG</td>
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<td>COVER PLATE GSKT</td>
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<td>HEX HD CAPSCREW</td>
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<td>43</td>
<td>SNAP RING</td>
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<td>44</td>
<td>IMP ADJ SHIM SET</td>
<td>37J</td>
<td>17000</td>
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<td>45</td>
<td>SEAL WASHER</td>
<td>3349</td>
<td>15990</td>
<td>1</td>
</tr>
</tbody>
</table>

* INDICATES PARTS RECOMMENDED FOR STOCK

**NOT SHOWN:**
- RED PIPE BUSHING: AP9680 11990 1
- PIPE PLUG: P08 10009 1
- STRAINER: 46641—005 24151 1
- NAME PLATE: 2613D 13990 1
- DRIVE SCREW: BM#04—03 17000 4
- ROTATION DECAL: 2613M —— 1
- LUBE DECAL: 38816—079 —— 1
- SUCTION STICKER: 6588AG —— 1
- DISCHARGE STICKER: 6588BJ —— 1

INDICATES PARTS RECOMMENDED FOR STOCK
PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

Review all SAFETY information in Section A.

Follow the instructions on all tags, label and decals attached to the pump.

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.

This manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly anticipate and provide detailed precautions for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner/maintenance personnel to ensure that only safe, established maintenance procedures are used, and that any procedures not addressed in this manual are performed only after establishing that neither personal safety nor pump integrity are compromised by such practices.

Before attempting to service the pump, lock out or disconnect the power source to ensure that it will remain inoperative. 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. Disconnect or lock out the power source to ensure that the pump will remain inoperative.
3. Allow the pump to completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.
6. Vent the pump slowly and cautiously.
7. Drain the pump.

WARNING!

Use lifting and moving equipment in good repair and with adequate capacity to prevent injuries to personnel or damage to equipment.

Cover Plate Removal

The impeller, wear ring and seal assembly can be serviced by removing the cover plate (41).

Remove the casing drain plugs (36 and 37) and drain the pump. Clean and reinstall the drain plugs.

Remove the nuts (40) and use the jacking screws (42) to break the cover plate loose from the pump casing (1). Remove the cover plate and gasket (38).

Impeller And Wear Ring Removal

Before removing the impeller, screw the cross arm on the automatic lubricating grease cup (14) clockwise until it rests against the cover (see Figure 5) to prevent the grease in the cup from escaping. Remove the grease cup from the bearing housing.

If removed, install the shaft key (25). See Figure 2 and install a lathe dog on the drive end of the shaft (26) with the “V” notch positioned over the shaft keyway. Position a piece of heavy bar stock between the arm of the lathe dog and the work surface to block shaft rotation. Use caution not to damage the shaft or keyway.
Work Surface

Lathe Dog Arm

Lathe Dog

Shaft Key

“V” Notch

Shaft

Heavy Bar Stock

Setscrew

Figure 2. Loosening Impeller

The impeller bore is designed to accept a 2 inch (50.8 mm) 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). When the impeller breaks loose, remove it from the impeller shaft. Use caution when removing the impeller; tension on the seal spring will be released as the impeller is removed. Remove the lathe dog and shaft key.

Slide the impeller adjusting shims (44) off the shaft. Tie and tag the shims or measure and record their thickness for ease of reassembly.

With the impeller removed, inspect the wear ring (6) for excessive wear or damage. If replacement is required, remove the hardware (4 and 5) and install 5/16−18 UNC x 2−1/2 inch long jacking screws (not supplied) 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 and Disassembly

(Figures 1 and 4)

The seal housing (7) and seal assembly (3) must be removed as a unit.

To remove the seal housing, disengage the hardware (10 and 11) 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 and separate the seal housing from the pump casing.

Slide the seal housing and seal assembly off the shaft as a single unit. Remove the snap rings (43) from the seal housing. Lay the seal housing on a flat surface with the impeller side up and press the seal components from the seal housing.

Remove the seal housing gasket (35).

If no further disassembly is required, refer to Seal Reassembly.

Shaft and Bearing Removal and Disassembly

When the pump is properly operated and maintained, the shaft and bearings 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.

If not removed, remove the power source and pedestal mounting hardware. Separate the pedestal (16) from the power source and retain the shaft key (25).

Remove the pedestal drain plug (30) and drain the lubricant from the pedestal. Clean and reinstall the drain plug.

Remove the nuts (32) and separate the pedestal from the pump casing (1). Remove the casing gasket (12).

Remove the hardware (22 and 23) securing the bearing cap (21) and remove the cap and gasket (20). Press the oil seal (24) from the bearing cap.

Slide the pedestal foot (27) off the pedestal. Remove the bearing shim set (19). Tie and tag the shims, or measure and record their thickness for ease of reassembly.

Place a block of wood against the impeller end of the shaft and tap the shaft and assembled bear-
ings (15 and 18) from the pedestal bore. Be careful not to damage the shaft threads.

It is recommended that the oil seal (34) be replaced whenever the shaft and bearings are removed. Press the oil seal from the pedestal bore.

After removing the shaft and bearings, clean and inspect the bearings in place as follows.

**CAUTION**

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected in place. It is strongly recommended that the bearings be replaced any time the shaft and bearings are removed.

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 precautions printed on solvent containers.

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

**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.

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.

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

If bearing replacement is required, use a bearing puller or an arbor (or hydraulic) press to remove the bearings from the impeller shaft.

It is not necessary to remove the retaining rings (33) from the shaft unless replacement is required. Use snap ring pliers to remove the snap rings from the shaft.

**Shaft and Bearing Reassembly And Installation**

Clean and inspect the bearings as indicated in Shaft and Bearing Removal and Disassembly.

**CAUTION**

To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected in place. It is strongly recommended that the bearings be replaced any time the shaft and bearings are removed.

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 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 precautions printed on solvent containers.

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

Position the inboard oil seal (34) in the pedestal bore with the lip positioned as shown in Figure 1.
Press the oil seal into the bore until the face is **just flush** with the machined surface on the pedestal.

If removed, install the retaining rings (33) in the grooves in the impeller shaft (26).

The bearings may be heated to ease installation. An induction heater, hot oil bath, electric oven, or hot plate may be used to heat the bearings. Bearings should **never** be heated with a direct flame or directly on a hot plate.

**NOTE**

*If a hot oil bath is used to heat the bearings, both the oil and the container must be absolutely clean. If the oil has been previously used, it must be thoroughly filtered.*

Heat the bearings to a uniform temperature **no higher than** 250°F (120°C), and slide the bearings onto the shaft, one at a time, until they are fully seated. This should be done quickly, in one continuous motion, to prevent the bearings from cooling and sticking on the shaft.

![WARNING!](image)

Use caution when handling hot bearings to prevent burns.

**NOTE**

*Position the outboard bearing (18) on the shaft as indicated by the following illustration.*

---

**Figure 3. Bearing Installation**

After the bearings have been installed and allowed to cool, check to ensure that they have not moved away from the retaining rings in shrinking. If movement has occurred, use a suitably sized sleeve and a press to reposition the bearings against the retaining rings.

If heating the bearings is not practical, use a suitably sized sleeve and an arbor (or hydraulic) press to install the bearings on the shaft.

![CAUTION](image)

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.

---

Slide the shaft and assembled bearings into the pedestal bore until the inboard bearing is fully seated against the pedestal shoulder. Use caution not to roll or damage the lip of the oil seal (34).

![CAUTION](image)

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

Install the same thickness of bearings shims (19) as previously removed.

Replace the bearing cap gasket (20). Install the pedestal foot (27) and secure the bearing cap using the hardware (22 and 23). Check shaft endplay.
NOTE
Impeller shaft endplay should be between .002 and .010 inch (0.05 mm to 0.25 mm). Add or remove bearing shims to establish the correct endplay.

Lubricate the shaft in the area of the oil seal (24) and press the oil seal into the bearing cap with the lip positioned as shown in Figure 1. Use caution not to roll or cut the lip of the oil seal on the shaft keyway.

NOTE
Press the oil seal into the bearing cap far enough to provide clearance between the seal lip and the impeller shaft keyway.

Replace the casing gasket (12) and secure the pedestal to the pump casing using the nuts (32).

Lubricate the bearing cavity as indicated in LUBRICATION at the end of this section.

Seal Reassembly and Installation
(Figures 1 and 4)

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

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 precautions printed on solvent containers.

Inspect the impeller shaft for damage. Small scratches or nicks may be removed with a fine file or emery cloth. If excessive wear exists, the shaft will have to be replaced.

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 spacer sleeve 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 4).
This seal is not designed for operation at temperatures above 160 °F (71 °C). Do not use at higher operating temperatures.

Install the inboard snap ring (43) in the groove in the I.D. of the seal housing (7). Make sure the lubrication channel in the seal housing aligns with the opening in the bearing housing and secure the seal housing to the pedestal with the hardware (10 and 11).

Lubricate the I.D. of the seal housing with light oil. Position the inboard rotating element on the shaft with the chamfer facing the shaft shoulder. Slide the element onto the shaft until fully seated against the shaft shoulder.

Subassemble the inboard stationary seat, packing ring and spring washer, and press the subassembly into the lubricated seal liner. A push tube cut from a length of plastic pipe would aid this installation. The O.D. of the tube should be slightly smaller than the I.D. of the seal liner.

Install the spacer sleeve and spring.

Subassemble the outboard stationary seat, packing ring and spring washer. Press this subassembly into the seal liner.

Install the outboard rotating element with the chamfered side facing the impeller end of the shaft. Install the seal washer (45) with the chamfered side facing the outboard rotating element.

Install the automatic grease cup (14) in the bearing housing. After the impeller is installed, lubricate the seal assembly as indicated in LUBRICATION.

**Impeller And Wear Ring Installation**

If the wear ring (6) was removed for replacement, remove the jacking screws, align the mounting holes, and press the wear ring into the pump casing until fully seated. Apply ‘Never-Seez’ or equivalent compound to the hardware (4 and 5) and secure the wear ring to the pump casing.
The wear ring **must** seat squarely in the casing bore or binding and/or excessive wear will result.

Inspect the impeller, and replace it if cracked or badly worn. Install the seal washer (45). Install the same thickness of impeller shims (43) as previously-removed and screw the impeller onto the shaft until tight.

For maximum pump efficiency, the impeller should be centered within the volute scroll.

To verify the impeller positioning, measure the pump casing and impeller as shown in Figure 5. Use these measurements to calculate the required impeller location (dimension E). Add or remove impeller adjusting shims until dimension E is obtained.

![Step 1](image1)

![Step 2](image2)

![Step 3](image3)

\[
(A + \frac{B}{2}) - (C + \frac{D}{2}) = E
\]

**Figure 5. Centering Impeller Within Volute Scroll**

**NOTE**

*After the impeller has been properly positioned, check for free rotation. Correct any scraping or binding before further reassembly.*

Replace the cover plate gasket (38). Apply ‘Loctite Thread Sealant’ or equivalent compound to the studs (39) and attach the cover plate (41) to the pump casing using the nuts (40). Make sure the jacking screws (42) do not interfere with the cover plate seating.

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

**Final Pump Assembly**

**Be sure** the pump assembly is securely mounted to the power source and base.

Install the suction and discharge lines and open all valves. Make certain that all piping connections are tight, properly supported and secure.

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

Refer to **OPERATION**, Section C, before putting the pump back into service.

**LUBRICATION**

**Bearings**

The bearing housing was fully lubricated when shipped from the factory. Check the oil level regularly through the sight gauge (28) and maintain it at the middle of the gauge. When lubrication is required, add SAE No. 30 non-detergent oil through the hole for the air vent (17). **Do not** over-lubricate. Over-lubrication can cause the bearings to over-heat, resulting in premature bearing failure.
NOTE
The white reflector in the sight gauge must be positioned horizontally to provide proper drainage.

Under normal conditions, drain the pedestal once each year and refill with approximately 14 ounces (414 ml) 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.

Seal Assembly

Fill the grease cup (14) 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 6).

NOTE
Some smoking and leakage may occur after installing a new seal assembly. This should stop after the pump has run a while and the lapped seal faces have seated in.

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 or call:
U.S.: 419−755−1280
International: +1−419−755−1352

For Canadian Warranty Information, Please Visit www.grcanada.com/warranty or call:
519−631−2870