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80 SERIES™

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL

MODEL

82E49-B

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA
Printed in U.S.A.

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INTRODUCTION

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 an 80 Series, semi-open impeller, self-priming centrifugal model with a suction check valve. The pump is handling liquids containing non-abrasive chemicals. This pump is **not** recommended for solutions in concentrations which will **'salt-out'** or form precipitates. The basic material of construction (pump casing, flanges, seal plate and impeller) is fiberglass-reinforced thermosetting polyester. All other wetted parts are Type 316 stainless steel.

This pump will safely handle chemicals and chemical waste solutions of the concentrations and temperatures shown on the chart on Page A-3.

If there are any questions regarding the pump or 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 injury or death to personnel, and describe the procedure required and the injury which could result from failure to follow the procedure.

WARNINGS - SECTION A

THESE WARNINGS APPLY TO 80 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 pump materials which could cause serious illness or injury through direct exposure or emitted fumes. Wear protective clothing, such as rubber gloves, face mask, and rubber apron, as necessary before disassembling the pump or piping.

WARNING

This pump is designed to handle liquids containing non-abrasive chemicals of the type and concentration indicated on the application chart (Page A-3). Do not attempt to pump any solutions which have not been specified, or liquids which may damage the pump or endanger personnel as a result of pump failure.

WARNING

After the pump is installed, check to ensure that the pump and all piping connections are tight, properly supported and secure before operation.

WARNING

Do not operate the pump without shields and/or 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. 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 restarting 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 servicing.

COMPATABILITY APPLICATION RECOMMENDATION CHART

The wetted portions of this pump are constructed of fiberglass-reinforced thermosetting polyester and type 316 stainless steel. It incorporates a mechanical self-lubricating shaft seal with teflon and carbide faces. The pump will safely handle non-abrasive chemicals and solutions, at the recommended concentrations and within a 0° to 160°F temperature range, as specified in the following chart.

The application compatibility shown on the following chart can be further affected by dynamic and static product pressures and by hydrostatic shock pressure loading.

This pump is keyed as **R = RECOMMENDED** and **N S = NOT SUITABLE** for the liquids and concentrations listed. Concentrations are keyed as **< = LESS THAN** and **> = GREATER THAN.**

WARNING

DO NOT apply this pump on liquids which have not been listed as compatible on the Compatibility Application Recommendation Chart, or at temperatures beyond 0° to 160°F, or at other than specified concentrations. Operating this pump in any other manner could damage it, and cause the pump to rupture and release corrosive chemicals and/or fumes.

LIQUID PUMPED AND CONCENTRATION		APPLICATION	LIQUID PUMPED AND CONCENTRATION		APP
Acetic Acid	<50%	R	Amyl Chloride		N S
Acetic Anhydride		N S	Aniline		N S
Acetone		N S	Aniline Sulfate		R
Acetonitrile		R	Aqua Regia		N S
Aluminum Fluoride		N S	Arsenic Acid	80%	R
Aluminum Hydroxide		N S	Arsenious Acid	15%	R
Aluminum Nitrate	10%	R	Barium Acetate		R
Ammonia, Aqueous	<30%	N S	Barium Chloride		R
Ammonium Bensoate		R	Barium Sulfate		R
Ammonium Bicarbonate	10-50%	R	Barium Sulfide		R
Ammonium Carbonate		R	Beer		R
Ammonium Chloride		R	Beet Sugar Liquor		R
Ammonium Citrate		R	Benzaldehyde		N S
Ammonium Fluosilicate		N S	Benzene		N S
Ammonium Hydroxide		N S	Benzene Sulfonic Acid	0-75%	R
Ammonium Nitrate		R	Benzoic Acid		R
Ammonium Persulfate		R	Benzoquinones		R
Ammonium Phosphate		R	Benzyl Alcohol		R
Ammonium Sulfate	>20%	R	Black Liquor		R
Ammonium Thiocyanate	20-50%	R	Blood		R
Amyl Acetate		R	Borax		R
Amyl Alcohol		R	Boric Acid		R

*Requires Special Seal

WARNINGS

LIQUID PUMPED AND CONCENTRATION		APPLICATION	LIQUID PUMPED AND CONCENTRATION		APP
Brine (NaCl & CaCl)		R	Green Liquor		R*
Bromine		N S	Hydrocyanic Acid	10%	R
Butyl Acetate		N S	Hydrofluoric Acid		N S
Butyl Alcohol		R	Hydrogen Peroxide	3-30%	R*
Butyric Acid	50%	R	Hydrogen Sulfide		R
Cadmium Chloride		R	Kerosene		R
Calcium Chlorite		R	Lead Acetate (Sugar of Lead)		R
Calcium Hydroxide		N S	Linseed Oil		R
Calcium Sulfate		R	Magnesium Sulfate		R
Cane Juice, Liquor & Sweetwater		R	Methyl Chloride		R
Caprylic Acid		R	Milk		R
Carbon Dioxide		R	Naphtha		R
Carbon Disulfide		N S	Nickel Chloride		R
Carbon Tetrachloride		R	Nickel Nitrate		R
Caustic Potash		N S	Nickel Sulfate		R
Chloroacetic Acid	100%	N S	Nitric Acid	5%	R
Chlorobenzene		R	Nitric Acid	>10%	N S
Chloroform		N S	Nitrobenzene		N S
Chlorosulfonic Acid		N S	Oleic Acid		R
Chrome Plating Solution	Consult	G-R	Oleum		N S
Chromium Sulfate		R	Perchloric Acid	>25%	N S
Citric Acid		R	Phenol		N S
Coconut Oil		R	Phosphoric Acid	10-85%	R
Copper Chloride		R	Phthalic Anhydride		R
Copper Cyanide		R	Picric Acid (Alc soln.)	10%	R
Copper Nitrate		R	Potassium Bicarbonate	10%	R
Copper Sulfate (Blue Vitriol)		R	Potassium Carbonate		N S
Corn Oil		R	Potassium Chloride		R
Corn Starch Slurry		N S	Potassium Dichromate		R
Cottonseed Oil		R	Potassium Ferrocyanide		R
Cresylic Acid		N S	Potassium Hydroxide		N S
Crude Oil		R	Potassium Nitrate		R
Detergents Sulfonated		R	Potassium Permanganate		R
Dimethyl Phthalate		R	Potassium Persulfate		R
Dimethyl Sulfoxide		R	Potassium Sulfate		R
Dioctyl Phthalate		R	Silver Nitrate		R
Ethyl Acetate		N S	Sodium Acetate		R
Ethyl Alcohol (Ethanol)		R	Sodium Bicarbonate	10%	R
Ethyl Ether		N S	Sodium Bisulfite		R
Ethylene Chloride		N S	Sodium Bromide		R
Ethylene Chloroformate		N S	Sodium Carbonate		N S
Ethylene Dichloride		N S	Sodium Chloride		N S
Ethylene Glycol		R	Sodium Cyanide		N S
Fatty Acids		R	Sodium Ferricyanide		R
Ferric Nitrate		R	Sodium Hydroxide		N S
Ferric Sulfate		R	Sodium Hypochlorite	5%	R*
Ferrous Sulfate		R	Sodium Hypochlorite	>10%	N S
Formaldehyde	10-40%	R	Sodium Nitrate		R*
Formic Acid		N S	Sodium Nitrite		R
Fruit Acid		R	Sodium Sulfate		R
Gasoline		R	Stannous Chloride		R
Gluconic Acid	50%	R	Stearic Acid		R

*Requires Special Seal

WARNINGS

LIQUID PUMPED AND CONCENTRATION		APPLICATION	LIQUID PUMPED AND CONCENTRATION	APP
Sulfur Dioxide		R	Trichloromonofluoromethane	N S
Sulfuric Acid	10%	R	Urea-Ammonia Nitrate Fert.	N S
Sulfuric Acid	>75%	N S	8-8-8 Fertilizer	N S
Tannic Acid		R	Water, potable city	R
Tartaric Acid		R	Water, de-ionized	R
Trichloroacetic Acid	50%	N S	Water, distilled	R
Trichloroethylene		N S	Water, well	R
Tetrachloroethylene		N S	Xylene (Xylol)	N S
Toluene		N S	Zinc Nitrate	R
Trisodium Phosphate		N S	Zinc Sulfate	R

*Requires Special Seal

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.

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

Pump Dimensions

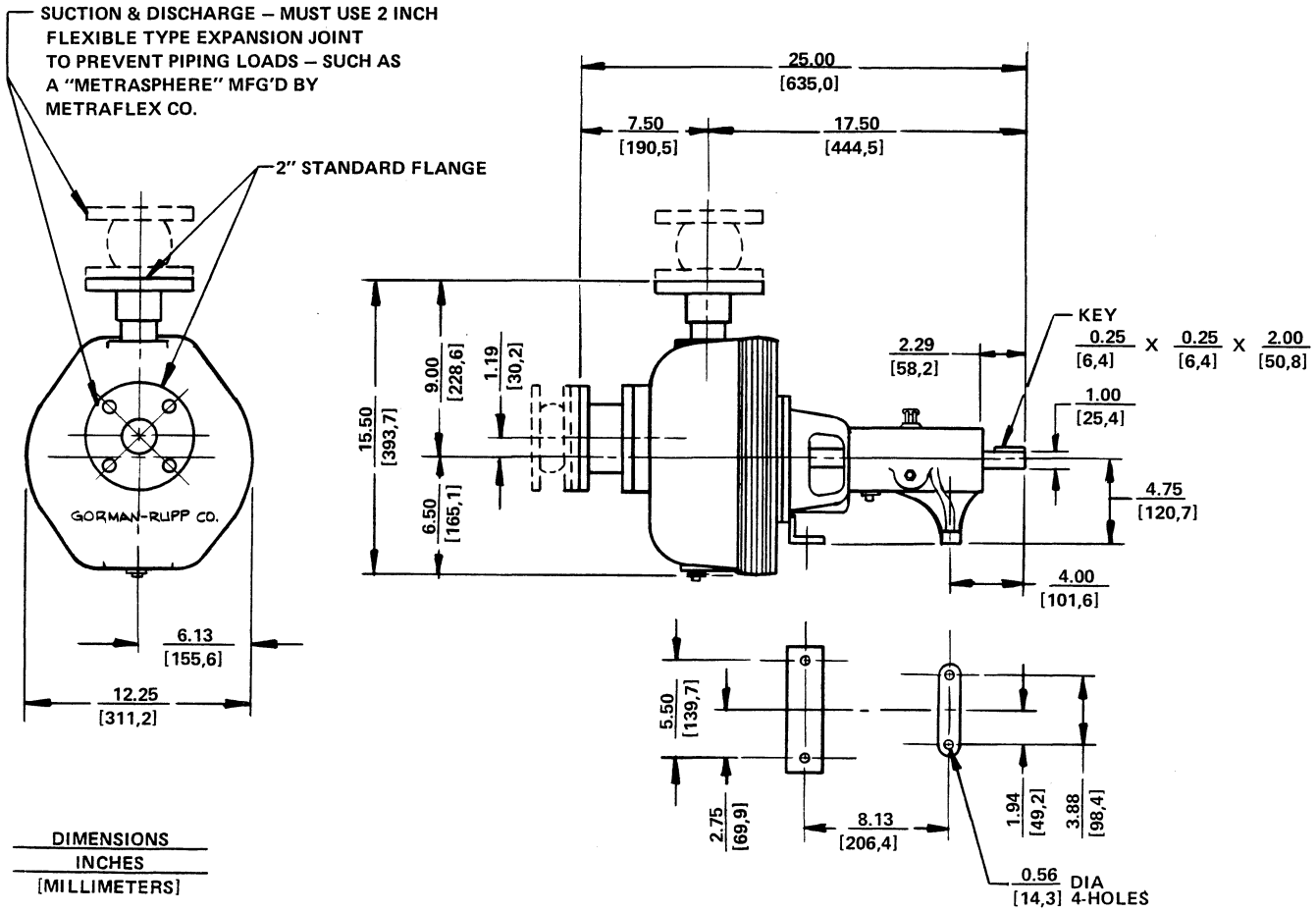


Figure 1. Pump Model 82E49-B

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.

f. Check to ensure the impeller removal tool (P/N 48731-006) has been shipped with the pump assembly.

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

Use lifting equipment with a capacity of at least **300 pounds**. This pump weighs approximately **60 pounds**, not including the weight of accessories and base and power source. Customer installed equipment such as suction and discharge piping **must** be removed before attempting to lift.

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.

CAUTION

The pump casing, flanges, and seal plate are made of glass-reinforced polyester which can crack under impact or shock. Take every precaution against dropping the pump or striking plastic parts.

Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation.

Recommended Pump Installation

Figure 2 shows a typical installation recommended for this pump.

Anchor the pump assembly securely to the base (A), or to the floor, to prevent movement of the pump.

Remove the 1/2-inch NPT drain plug from the bottom of the pump casing, and install a 1/4-inch pipe (minimum) or 3/8-inch I.D. drain line from the pump casing to the sump or drain. Install a manual shutoff valve (B) in the line to drain the pump prior to any maintenance or repair. Support the drain line.

Install a flexible pipe connector (C) at the pump suction flange, and install a full vacuum type line. A flexible connector may also be fabricated from a full vacuum type hose as an alternative. In either case, make certain that the material content of the flexible connector is compatible with the liquid being pumped.

Use pipe hangers (D) to support both suction and discharge piping, and to prevent piping loads from being transferred to the flexible pipe connectors or to the pump casing. The reinforced plastic body of the pump is strong but brittle, and bending loads combined with vibration from normal operation can cause fatigue or cracking of the piping or pump casing.

Install a 4-way piping cross (E) on the pump discharge flange (F) to facilitate priming, and install a blind flange (G) at the top of the cross. Remove this flange to fill the pump casing, and replace it before starting the pump.

WARNING

Replace and secure the blind flange at the top of the piping cross before starting the pump. If the flange is not securely tightened, caustic or hazardous liquid could be forcibly discharged when the pump is operating, and personnel could be injured.

A permanent priming line (H), fitted with a suitable shutoff valve (J) and a wall-mounted priming reservoir (K), is recommended for installations where the pump must be primed with caustic or hazardous liquids.

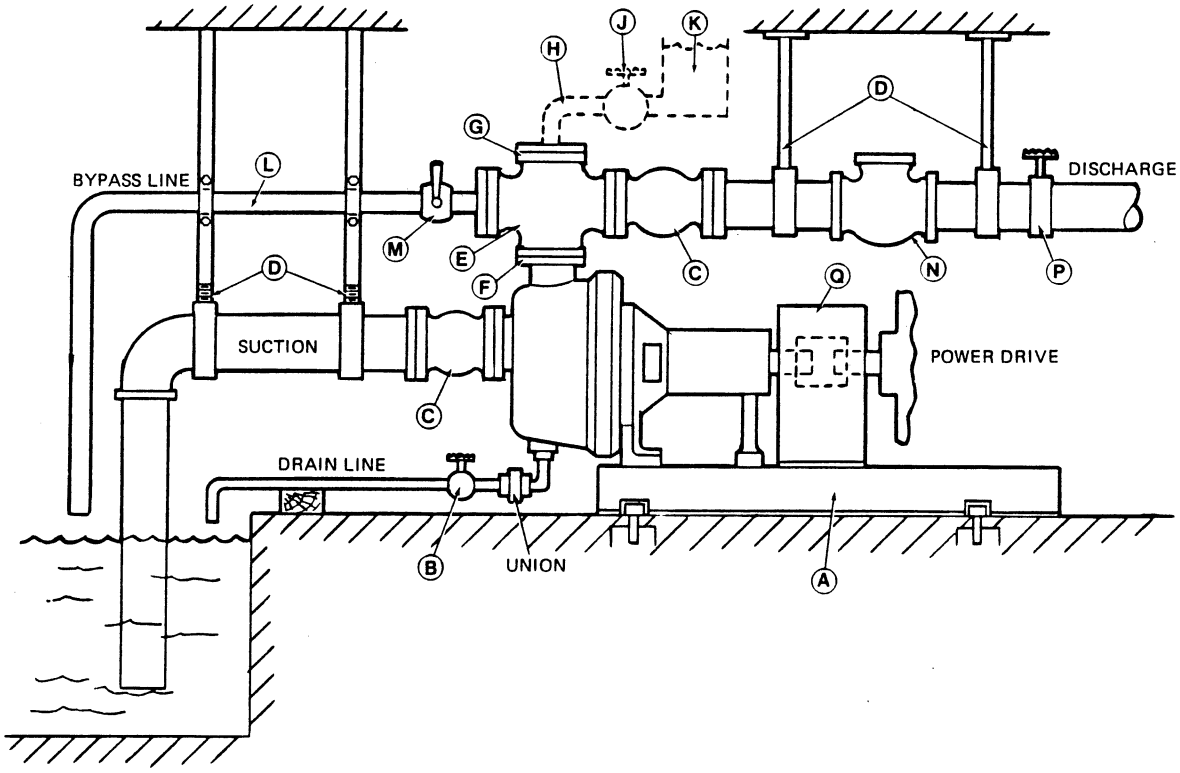


Figure 2. Typical Recommended Installation, Pump 82E49-B

SUCTION AND DISCHARGE PIPING

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.

Flexible connectors are required on suction and discharge connections in order to prevent piping loads.

CAUTION

> In order to prevent piping loads, the suction and discharge line MUST be supported and connected to the pump with flexible connectors. IF FLEXIBLE CONNECTORS ARE NOT USED, THE PUMP WARRANTY WILL BE VOIDED.

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.

This pump is designed to handle up to 3/4 inch diameter spherical solids.

Sealing

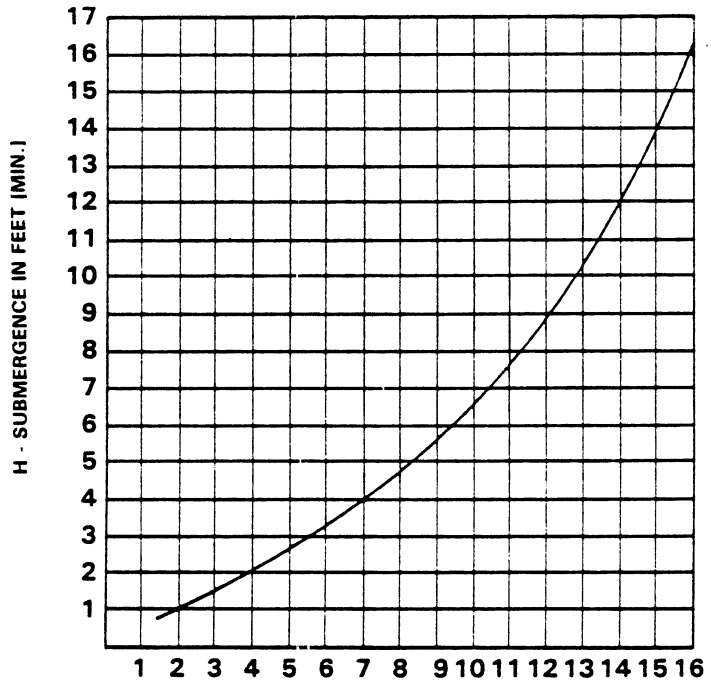
Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. Follow the sealant manufacturer's recommendations when selecting and applying the pipe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

Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure 3 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).



$$\text{VELOCITY IN FEET PER SEC.} = \frac{\text{QUAN. (G.P.M.)} \times .321}{\text{AREA}} \text{ OR } \frac{\text{G.P.M.} \times .4085}{D^2}$$

Figure 3. 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

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.

Bypass Lines

(See Figure 2)

In a system with an existing static discharge head, it is recommended that a bypass line (L) be installed to permit the escape of air to atmosphere during initial priming and in the repriming cycle. This bypass line should be sized at 1/2-inch or 3/4-inch, and fitted with a hand-operated shutoff valve (M).

NOTE

This bypass line may clog frequently, particularly if the shut-off valve remains closed for long periods of time. If this condition occurs, either install a larger bypass line or leave the shutoff valve open slightly during the pumping operation.

Install a flexible pipe connector (C) on the discharge side of the piping cross (E).

The installation of a discharge check valve (N) and a manual shutoff valve (P) in the discharge piping is also recommended in systems with existing static discharge heads. The check valve will close off the static discharge head during priming when the bypass shutoff valve is open, and it will open after priming has been accomplished and the bypass shutoff valve is closed. The manual shutoff valve in the discharge line is intended to be used to close off system pressure when the check valve or pump are being serviced.

CAUTION

Close the manual shut-off valve (P) in the discharge line to completely isolate the system before any maintenance, service, or repair on the pump or discharge check valve.

WARNING

When operating this pump, make certain that the discharge throttling valve is open. If this pump is 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 to rupture.

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 could result, causing damage to the pump.

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 4a).

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 4b).

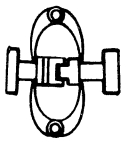


Figure 4a. Aligning Spider-Type Couplings

Figure 4b. 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 4c). In drive systems using two or more belts, make certain that the belts are a matched set; unmatched sets will cause accelerated belt wear.

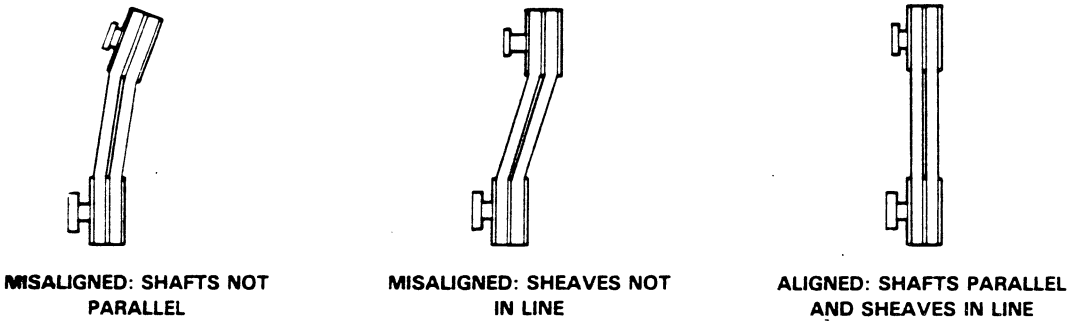


Figure 4c. Alignment of V-Belt Driven Pumps

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 rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

OPERATION - SECTION C

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

DO NOT apply this pump on liquids which have not been listed as compatible on the Compatibility Application Recommendation Chart, or at temperatures beyond 0° to 160°F, or at other than specified concentrations. Operating this pump in any other manner could damage it, and cause the pump to rupture and release corrosive chemicals and/or fumes.

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 pump should never be operated unless there is liquid in the casing.

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.

Add liquid to the pump casing when:

1. The pump is being put into service for the first time.

2. The pump has not been used for a considerable length of time.
3. The liquid in the pump casing has evaporated.

WARNING

After filling the pump casing, reinstall and tighten the fill plug. Do not attempt to operate the pump unless all connecting piping is securely installed. Otherwise, liquid in the pump forced out under pressure could cause injury to personnel.

STARTING

Consult the operations manual furnished with the power source.

Rotation

The correct direction of pump rotation is clockwise when viewed from the drive end. If the pump is operated in the wrong direction, the impeller could become loosened from the shaft and seriously damage the pump.

CAUTION

Be sure the pump is operated in the correct direction. Otherwise, the impeller could become loosened from the shaft and seriously damage the pump.

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

OPERATION

Lines With a Bypass

A hand operated shutoff valve may be installed in a bypass line.

If a hand operated shutoff valve has been installed, close the throttling valve in the discharge line, and open the bypass shutoff valve so that the pump will not have to prime against the weight of the liquid in the discharge line. When the pump has been primed, and liquid is flowing steadily from the bypass line, close the bypass shutoff valve and open the discharge throttling valve.

Lines Without a Bypass

Open all valves in the discharge line and start the power source. 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.

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, or as dictated by the chemical characteristics. 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 servicing.

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

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.

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

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	Air leak in suction line.	Correct leak.
	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 check valve or foot valve clogged or binding.	Clean valve.
	Suction lift or discharge head too high.	Check piping installation and install bypass line if needed. See INSTALLATION.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Suction intake not submerged at proper level or sump too small.	Check installation and correct submergence as needed.
	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.

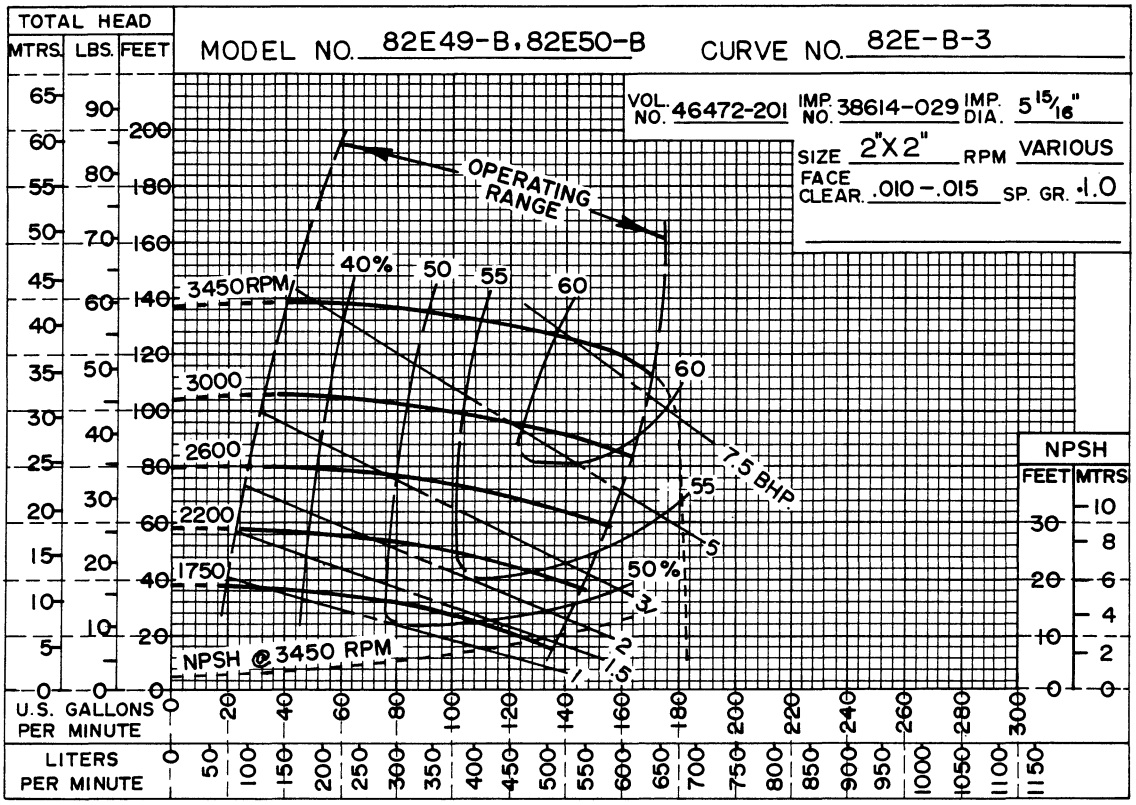
TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE(cont.)	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.
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.
	Suction check valve or foot valve clogged or binding.	Clean valve.
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.

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 82E49-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. &curv.

SECTIONAL DRAWING

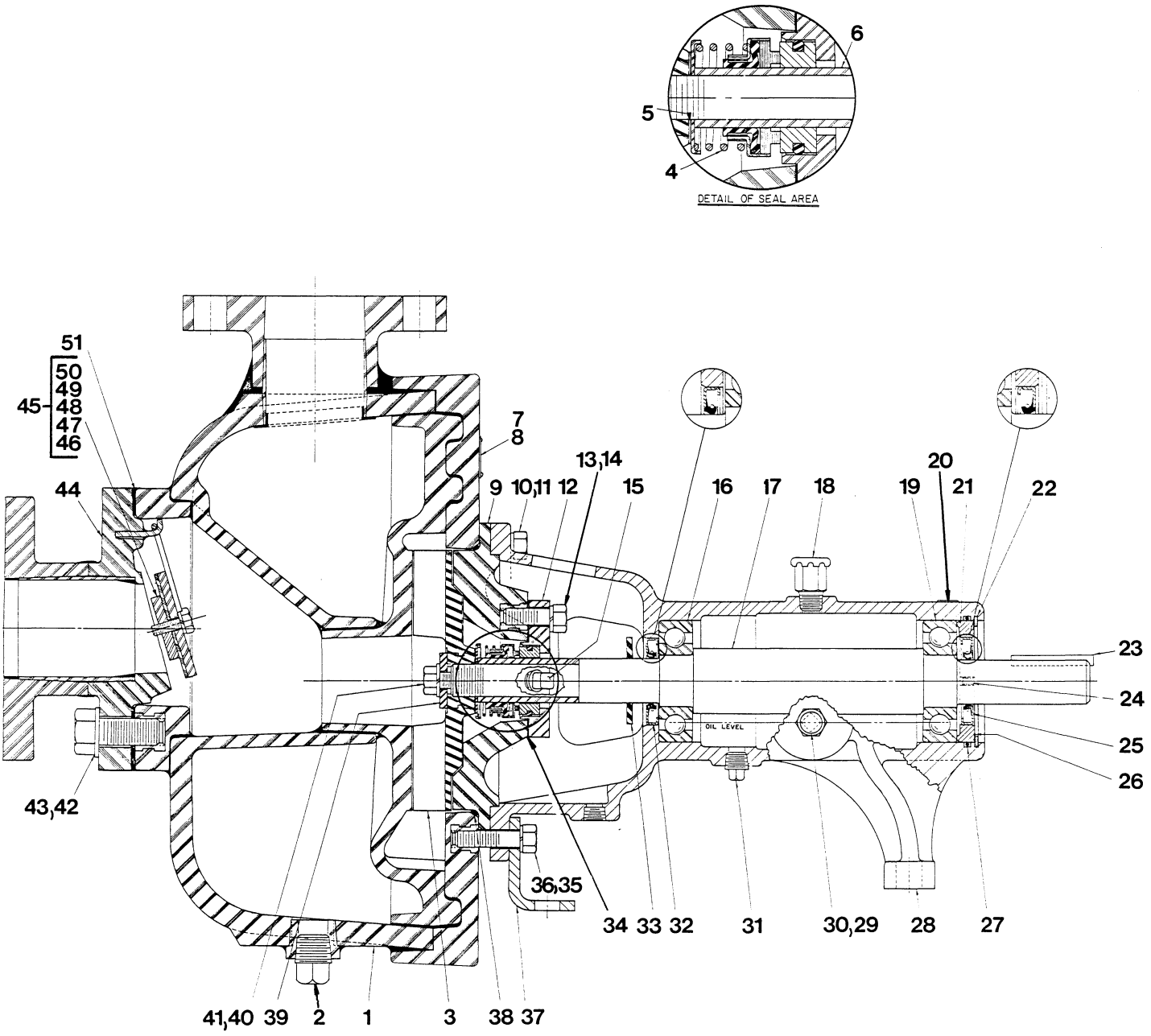


Figure 1. Pump Model Assembly 82E49-B

PARTS LIST
Pump Model 82E49-B
(From S/N 887615 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP CASING ASSY	46472-202	-----	1	28	PEDESTAL	3212-C	10010	1
2	-DRAIN PLUG	P08	17090	1	29	PIPE PLUG	P06	11990	1
3	*IMPELLER	38614-029	23140	1	30	PED SIGHT GAUGE	26714-011	-----	1
4	*SEAL ASSY	25271-867	-----	1	31	PED DRAIN PLUG	P06	11990	1
5	*IMP SHIM SET	2-Y	17090	1	32	*OIL SEAL	25227-216	-----	1
6	*SHAFT SLEEVE	3217	17090	1	33	SLINGER RING	2351	19120	1
7	NAME PLATE	38812-046	13990	1	34	SEAL CLAMP GSKT	38681-209	19210	1
8	DRIVE SCREW	BM#04-03	15990	2	35	HEX HD CAPSCREW	B0606	17090	2
9	SEAL PLATE	38272-227	23140	1	36	LOCKWASHER	J06	17090	2
10	HEX HD CAPSCREW	B0605	17090	4	37	FOOT BRACKET	34265-020	15990	1
11	LOCKWASHER	J06	17090	4	38	*CASING O-RING	25154-163	-----	1
12	SEAL CLAMP	38326-429	17070	1	39	IMP WASHER	3118	17090	1
13	HEX HD CAPSCREW	B0604	17090	2	40	IMP CAPSCREW	B0603	17090	1
14	FLAT WASHER	KB06	17090	2	41	IMP LOCKWASHER	J06	17090	1
15	PIPE PLUG	P02	17090	1	42	HEX HD CAPSCREW	B1006	17090	4
16	*BALL BEARING	S390	-----	1	43	FLAT WASHER	KB10	17090	4
17	*IMPELLER SHAFT	38514-210	17130	1	44	CHECK VALVE FLANGE ASSY	46353-036	24010	1
18	PED AIR VENT	S1703	-----	1					
19	*BALL BEARING	S390	-----	1	45	CHECK VALVE ASSY	46411-065	-----	1
20	ROTATION DECAL	2613-M	00000	1	46	-LG VALVE WEIGHT	44211-002	24170	1
21	BRG RETAINER	38322-517	26000	1	47	-HEX HD CAPSCREW	B0403	17090	1
22	RETANING RING	S219	-----	1	48	-LOCKWASHER	J04	17090	1
23	SHAFT KEY	N0407	15990	1	49	-VALVE WEIGHT	31137-001	17090	1
24	SETSCREW	GA#1001-S	15990	2	50	* -CHK VALVE GSKT	38671-411	19410	1
25	*OIL SEAL	25227-216	-----	1	51	*SUCT FLANGE GSKT	38688-007	19410	1
26	BRG SHIM SET	S464	-----	1	NOT SHOWN:				
27	*BRG RET O-RING	25152-149	-----	1		IMPELLER TOOL	48731-006	-----	1

*INDICATES PARTS RECOMMENDED FOR STOCK

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

CANADIAN SERIAL NO ..... AND UP

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

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(s) (see Figures 1 and 2) and the accompanying parts list(s).

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

For pump disassembly and repair, consult the literature supplied with the pump, or contact your local pump 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. Drain the pump.

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 pump materials which could cause serious illness or injury through direct exposure or emitted fumes. Wear protective clothing, such as rubber gloves, face mask, and rubber apron, as necessary before disassembling the pump or piping.

Suction Check Valve Removal And Disassembly

Before servicing the check valve assembly (45), remove the casing drain plug (2) and drain the pump. Clean and reinstall the drain plug.

Remove the suction piping and hardware (42 and 43) securing the suction flange (44) to the pump casing. Pull the suction flange and check valve assembly from the suction port. Remove the suction flange gasket (51) and clean the mating surfaces.

Lift the check valve assembly from the suction flange. Inspect the check valve parts and if replacement is required, separate the check valve gasket (50) and weights (46 and 49) by removing the hardware (47 and 48).

Pump Disassembly

The pump casing (1) and pedestal (28) must be separated to perform all maintenance and repair. This may be accomplished by removing the suction and discharge piping, or by removing the power source and withdrawing the pedestal. If the piping is to be left in tact, support the pump casing before removing the pedestal. The following instructions are based on removing the power source.

Remove the hardware (10, 11, 35 and 36) securing the seal plate (9) and pedestal to the pump casing. Separate the assemblies, and remove the pump casing O-ring (38).

Inspect the casing assembly (1), particularly where paint has peeled or hairline cracks have developed. Examine stress areas and cemented joints. Replace the casing assembly if cracked or damaged.

WARNING

Do not attempt to repair a cracked pump casing. The casing is designed to handle hazardous liquids at pressures up to 60 psi. The repaired area could rupture, releasing corrosive chemicals and/or toxic fumes.

Inspect the wearing surface of the pump casing assembly. If this surface is scored or badly worn, the casing must be replaced as a complete assembly.

To remove the impeller (3), disconnect the power source and remove the shaft key (23). Install a lathe dog on the drive end of the shaft to prevent shaft rotation. Be sure the "V" notch on the lathe dog is positioned over the keyway to prevent damage to the keyway.

Remove the impeller capscrew, lockwasher and washer (39, 40 and 41). Install the impeller removal tool, and use the end of a 1/2-inch drive ratchet extension (see Figure 2) to unscrew the impeller in a counterclockwise direction (when facing the impeller). Use caution when unscrewing the impeller; tension on the seal spring will be released as the impeller is unscrewed.

CAUTION

Do not try to loosen the impeller by striking the wrench, impeller tool, or impeller; this will crack or chip the impeller. If the impeller will not unscrew readily, hold the impeller stationary and strike the lathe dog sharply (in a counterclockwise direction) with a soft-faced mallet.

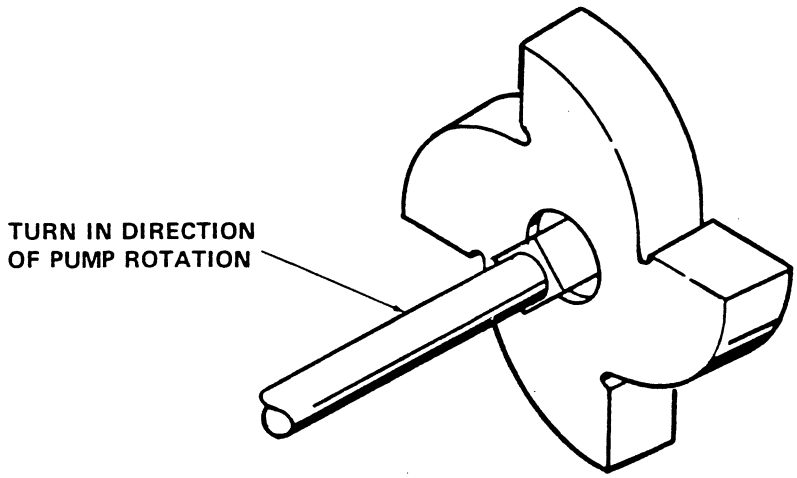


Figure 2. 48731-006 Impeller Tool With Drive Wrench

Inspect the impeller, and replace it if cracked or badly worn. Remove the impeller adjusting shims (5). For ease of reassembly, tag and tie the shims, or measure and record their thickness.

Seal Removal

Remove the spring centering washer and spring. Slide the shaft sleeve (6) and rotating portion of the seal off the shaft as a unit. Apply oil to the sleeve and work it up under the bellows. Slide the rotating portion of the seal off the sleeve.

Separate the seal plate (9), seal clamp (12), and stationary seal seat from the pedestal. To remove the stationary seat, disengage the hardware (13 and 14) and separate the seal clamp, gasket (34), and stationary seat from the seal plate.

Carefully press the stationary seat and O-ring out of the seal clamp from the back side.

If no further disassembly is required, see **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 drain plug (31) and drain the pedestal. Clean and reinstall the plug.

Remove the slinger ring (33) from the shaft. Remove the pedestal mounting hardware from the base. Tie and tag any shims used under the mounting feet for leveling.

Use snap ring pliers to remove the bearing retaining ring (22) from the pedestal bore. Remove the bearing shim set (26); tie and tag the shims, or measure and record their thickness for ease of reassembly.

Remove the setscrews (24) from the bearing retainer (21), and install two machine screws (#10-32 X 1 inch long, not supplied). Pry the retainer from the pedestal bore using a screwdriver against the head of the machine screws. **Do not** use the machine screws to jack against the ball bearing. Remove the machine screws and reinstall the setscrews.

Press the oil seal (25) from the bearing retainer, and remove the O-ring (27) from the pedestal bore.

Place a block of wood against the impeller end of the shaft, and tap the shaft and assembled bearings (16 and 19) out of the pedestal. Use a bearing puller to remove the inboard and outboard bearings from the impeller shaft.

Press the oil seal (32) from the pedestal bore.

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 precautions 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.

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.

Lubricate the shaft with light oil and press the bearings (16 and 19) onto the shaft until seated squarely against the shaft shoulders.

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.

Press the oil seal (32) into the pedestal bore with the lip positioned as shown in Figure 1.

Slide the shaft and assembled bearings into the pedestal until the inboard bearing seats squarely against the pedestal shoulder. Be careful not to damage the lip of the oil seal (32) 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 (25) into the bearing retainer (21) with the lip positioned as shown in Figure 1. Replace the bearing retainer O-ring (27) in the pedestal, and press the bearing retainer into the pedestal until it seats against the bearing. Be careful not to cut the oil seal lip on the shaft keyway. **Be sure** the setscrews in the bearing retainer are positioned horizontally inline.

Install the same thickness of bearing adjusting shims (26) as previously removed, and reinstall the retaining ring (22). Check the shaft endplay.

NOTE

Shaft endplay should be between .002 and .010 inch. Add or remove bearing adjusting shims to obtain this endplay.

Install the slinger ring (33) and shaft key (23). Install any leveling shims used under the pedestal feet, and secure the pedestal to the base. Reconnect the power source, and lubricate the pedestal as indicated in **LUBRICATION** at the end of this section.

Seal Installation

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 precautions 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 shaft 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 O-rings and shaft 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 3).

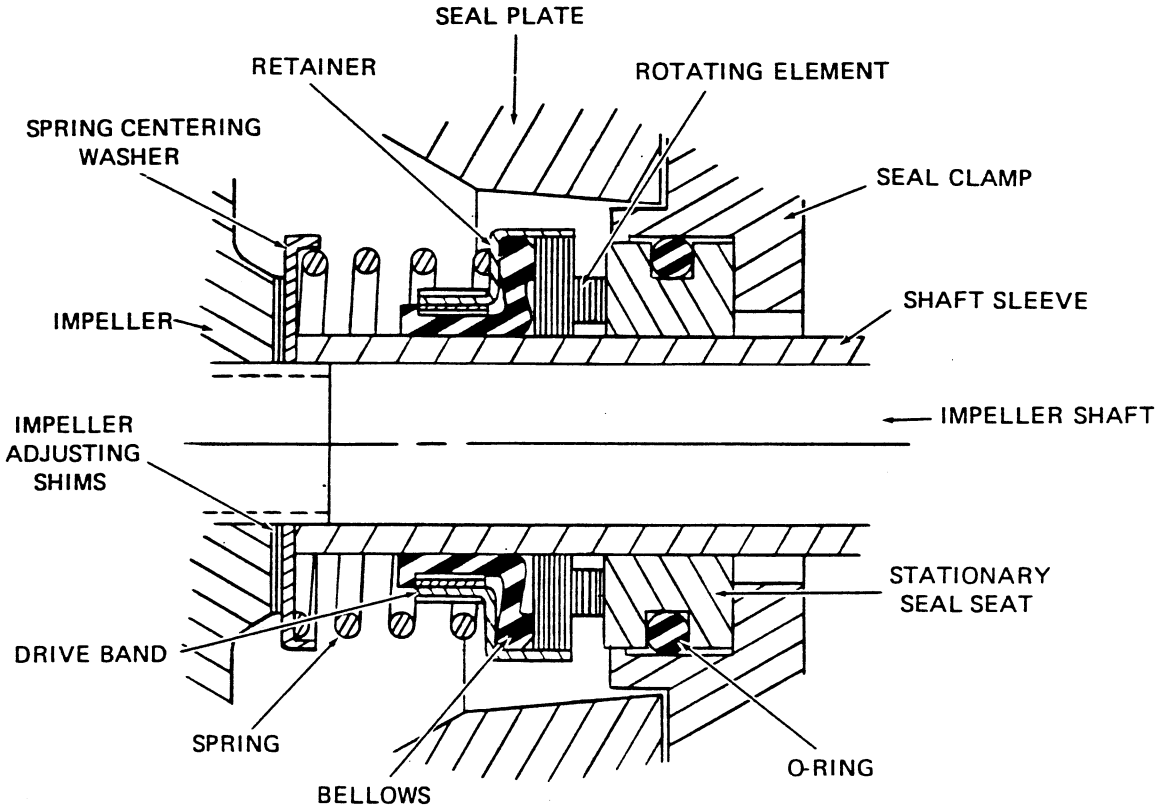


Figure 3. 25271-867 Seal Assembly

CAUTION

> This seal is not designed for operation at temperatures above 160°. Do not use at higher operating temperatures.

Install the stationary seat O-ring in the stationary seat. Using thumb pressure, press this assembly squarely into the seal clamp until fully seated.

Install the seal clamp gasket (34), and secure the seal clamp and stationary seat to the seal plate with the hardware (13 and 14).

CAUTION

Be certain to reinstall the flat washers (14) under the capscrews when reassembling the seal clamp to the seal plate. Since the threaded inserts are imbedded in plastic, and the bolt length is critical, DO NOT over-tighten or change capscrews length, this may crack the plastic.

Carefully slide the assembled seal plate and stationary portion of the seal over the impeller shaft until the seal plate seats in the pedestal. Temporarily secure the seal plate to the pedestal using two capscrews and nuts (7/16-14 UNC x 1 1/2-inch long, not supplied).

Subassemble the rotating element into the retainer and bellows. Be sure the drive lugs in the rotating element seat in the grooves in the retainer. Slide this rotating subassembly onto the shaft sleeve until the face of the rotating element is **just flush** with the chamfered end of the sleeve. Slide the assembled seal and sleeve onto the shaft until the seal faces contact. Continue to push the sleeve through the seal until the chamfered end of the sleeve seats firmly against the shaft shoulder.

Install the spring and spring centering washer.

Pump Reassembly

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

Install the same thickness of impeller adjusting shims as previously removed, and screw the impeller onto the shaft until tight.

A clearance of .008 to .015 inch between the impeller and the wearing surface in the pump casing is necessary for maximum pump efficiency. To achieve this clearance, remove the two capscrews temporarily securing the seal plate. Position the pump casing against the seal plate, making sure that the casing and seal plate are **firmly** seated against the pedestal.

Rotate the impeller shaft by hand. Add or remove impeller shims until the impeller binds slightly against the pump casing when the shaft is turned. When the impeller binds, remove the pump casing and impeller, then remove .010 inch of impeller shims. The clearance between the impeller and the wear plate should now be correct.

Reinstall the impeller, and secure with the impeller washer, capscrew and lockwasher (39, 40 and 41).

When the correct clearance has been achieved, remove the casing and install the casing O-ring (38). Secure the pump casing to the seal plate and pedestal with the hardware (10, 11, 35 and 36).

CAUTION

Be certain to reinstall the lockwashers (11 and 36) under the capscrews (10 and 35) when reassembling the pump. The threaded inserts are imbedded in plastic, and the bolt length is critical. Install the two longer capscrews (35) in the bottom of the pedestal through the pedestal foot (37). Do not overtighten or change capscrew length; this may crack the plastic around the inserts. Tighten the capscrews in an alternating pattern to ensure uniform torque.

Suction Check Valve Installation

Replace any worn or damaged parts, and secure the valve weights (46 and 49) to the check valve (50) with the attaching hardware (47 and 48). Hang the check valve assembly on the bracket on the suction flange with the small weight toward the flange and the large weight toward the pump. Replace the flange gasket (51), and secure the assembled flange (44) and check valve to the pump casing using the attaching hardware (42 and 43).

Check the operation of the check valve to ensure proper seating and free movement.

Final Pump Reassembly

Be sure the pump is secured to the base and power source.

Seal pipe plugs that were removed with a thin coat of Teflon-based sealant or equivalent.

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

Be sure the pump has been lubricated, see **LUBRICATION**.

Prime the pump through the discharge port with liquid compatible with that being pumped.

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

LUBRICATION

Seal Assembly

Under most conditions, the seal is lubricated by the medium being pumped, and no additional lubrication is required. Certain severe applications may require flushing with clean liquid. Consult the factory for specific applications, and make sure the flushing liquid is compatible with the liquid being pumped.

Bearings

The pedestal was fully lubricated when shipped from the factory. Check the oil level regularly through the sight gauge (30) and maintain it at the mid-point of the gauge. When lubrication is required, add SAE No. 30 non-detergent oil through the hole for the air vent (18). **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 5 ounces 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.

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

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