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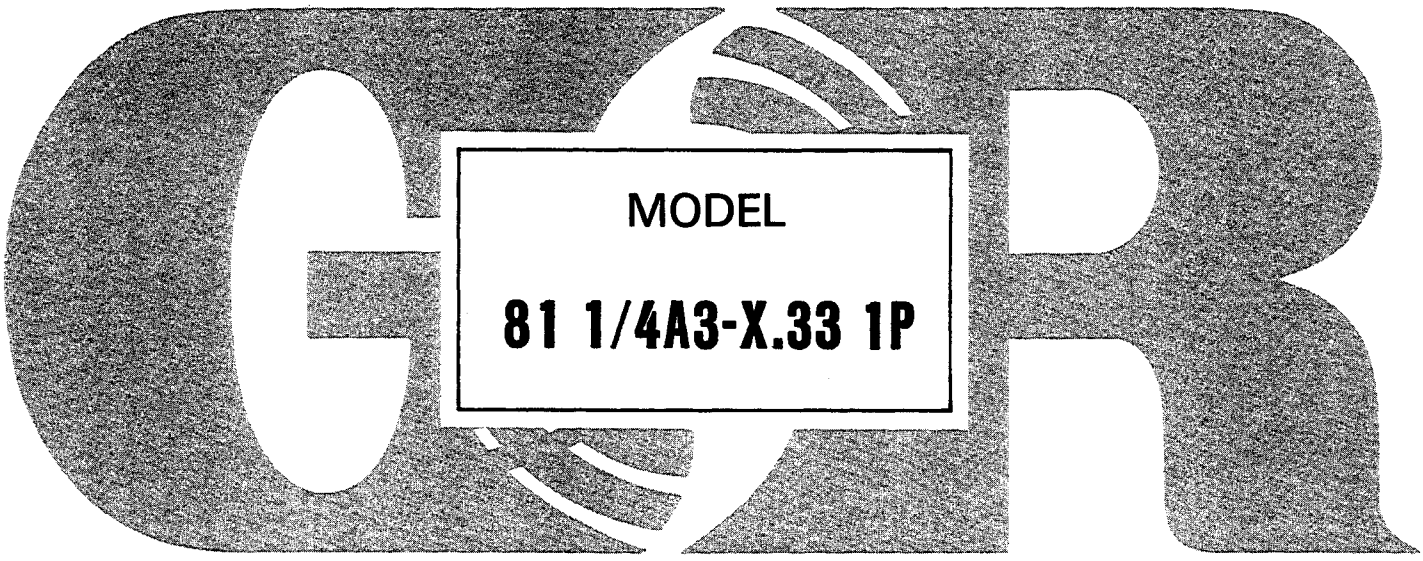
OM-00784-OM02
January 23, 1984

80 SERIES™

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL



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 designed for pumping petroleum products with a maximum specific gravity of 0.8. It is equipped with an integral explosion-proof motor and is approved for use in a hazardous environment. The basic material of construction for wetted parts is gray iron with a bronze impeller and stainless steel motor shaft.

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

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

or

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

For information or technical assistance on the motor, contact the motor 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 MOTOR DRIVEN PUMPS. REFER TO THE MANUAL ACCOMPANYING THE MOTOR BEFORE ATTEMPTING TO BEGIN OPERATION.

WARNING

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect incoming power to the motor and lock it out 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 petroleum products with a maximum specific gravity of 0.8. Do not attempt to pump liquids with a specific gravity greater than 0.8 or corrosive liquids which may damage the pump or endanger personnel as a result of pump failure.

WARNING

After the pump has been installed, make certain that the pump and all piping connects are secure before operation.

WARNING

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

WARNING

Overheated pumps can cause severe burns and injury. If overheating of the pump occurs:

1. Stop the pump immediately.
2. Allow the pump to cool.
3. Refer to instructions in this manual before re-starting the pump.

WARNING

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

WARNING

All electrical connections must be in accordance with N.E.C. Article 250. If there is a conflict between the instructions provided and N.E.C. specifications, N.E.C. specifications shall take precedence. All electrical equipment supplied with this pump was in conformance with N.E.C. requirements in effect on the date of manufacture. Failure to follow applicable specifications, or substitution of electrical parts not supplied or approved by the manufacturer, can result in severe injury or death.

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 pressure developed by the pump.

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

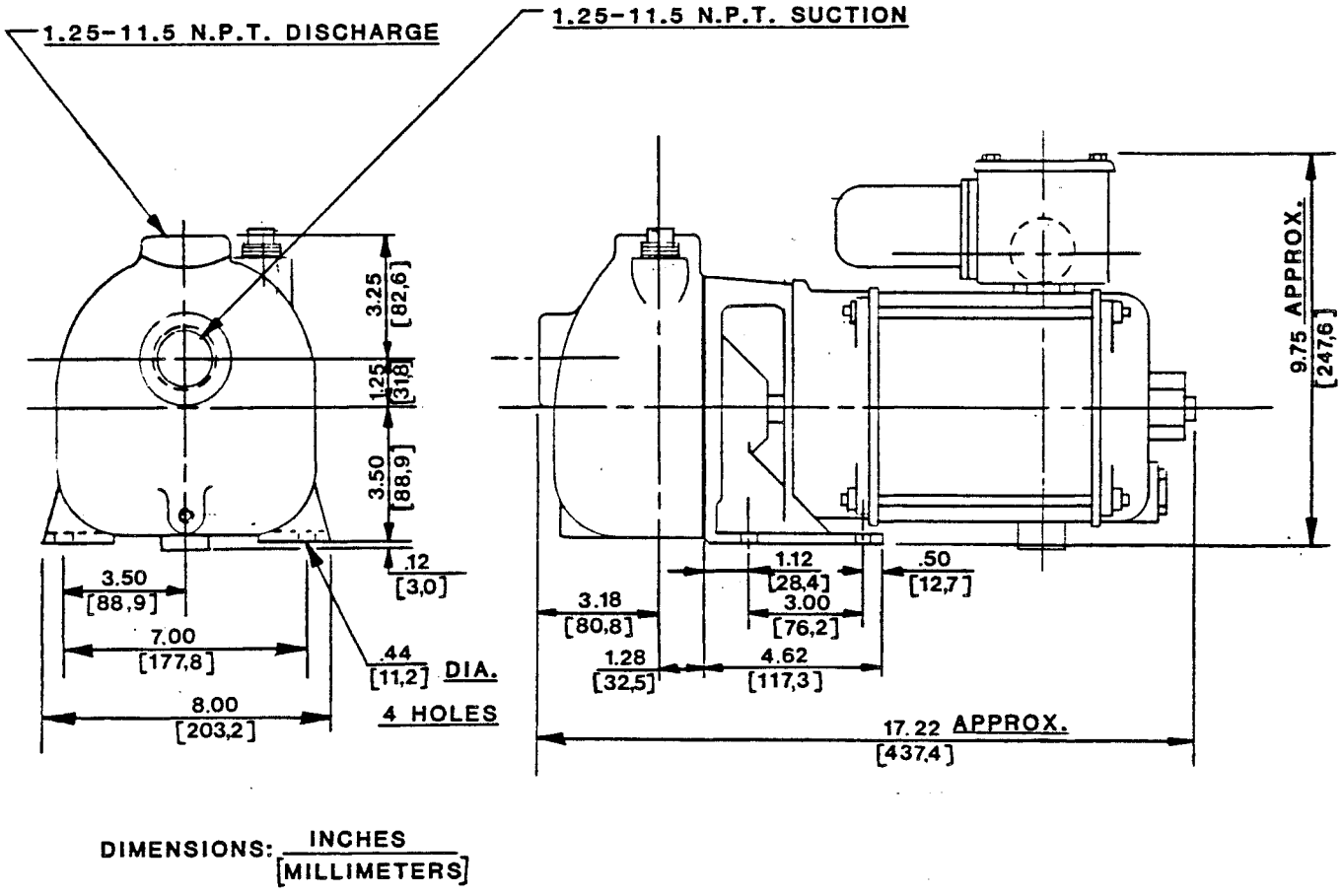


Figure 1. Pump Model 81 1/4A3-X.33 1P

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 bolts, nuts, capscrews, and other attaching hardware. Since gaskets tend to shrink after drying, check for and tighten loose nuts and capscrews securing 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 motor have been stored for more than 12 months, some of the components or lubricants may have exceeded their maximum shelf life. These **must be inspected or replaced** to ensure maximum pump service.

If the maximum shelf life 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 a least **300 pounds**. This pump weighs approximately **55 pounds**, not including the weight of accessories and base.

CAUTION

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

Mounting

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

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.

Connections to Pump

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

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

Gauges

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

SUCTION LINES

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

Fittings

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

Strainers

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

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

This pump is designed to handle up to 1/4 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 Lines In Sumps

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

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

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

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

Suction Line Positioning

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

NOTE

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

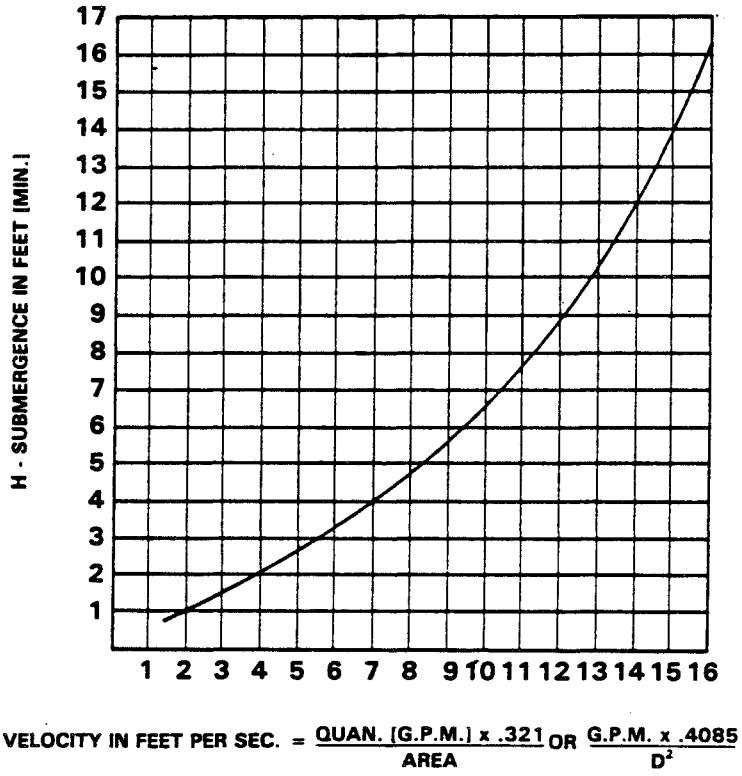


Figure 2. Recommended Minimum Suction Line Submergence Vs. Velocity

DISCHARGE LINES

Siphoning

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

Valves

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

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

With high discharge heads, it is recommended that a throttling valve and a 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

If it is necessary to permit the escape of air to atmosphere during initial priming or in the repriming cycle, install a bypass line between the pump and the discharge check valve. The bypass line should be sized so that it does not affect pump discharge capacity.

Either a Gorman-Rupp automatic air release valve - which will automatically open to allow the pump to prime, and automatically close when priming is accomplished - or a hand-operated shutoff valve should be installed in the bypass line.

NOTE

The bypass line may clog frequently, particularly if the valve remains closed. If this condition occurs, either use a larger bypass line or leave the shutoff valve open during the pumping operation.

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.

OPERATION - SECTION C

WARNING

This pump is designed to pump petroleum products with a maximum specific gravity of 0.8. Do not attempt to pump liquids with a specific gravity greater than 0.8 or corrosive liquids which may damage the pump or endanger personnel as a result of pump failure.

CAUTION

Pump speed and operating condition points must be within the continuous performance range shown on the curve. See Section E, Page 1.

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 is self-priming, but the pump should never be operated unless there is liquid in the casing.

CAUTION

Never operate a self-priming 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.

Once the pump casing has been filled, the pump will prime and reprime as necessary.

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.

To fill the pump, remove the pump casing fill cover or fill plug at the top of the casing and add clean liquid until the pump is filled. Replace the fill cover or fill plug before operating the pump.

STARTING

Consult the operations manual furnished with the motor.

Rotation

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

CAUTION

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

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

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.

If a Gorman-Rupp automatic air release valve has been installed, close the throttling valve in the discharge line. The Gorman-Rupp valve will automat-

ically open to allow the pump to prime, and automatically close when priming has been accomplished. After the pump has been primed, and liquid is flowing steadily from the bypass line, open the discharge throttling valve.

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. Do not apply it at a higher operating temperature.

Overheating can occur if the valves in the suction or discharge lines are 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

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

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

Open the suction line, and read the vacuum gauge with the pump primed and at 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.

After stopping the pump, disconnect the motor to ensure that the pump will remain inoperative.

Cold Weather Preservation

Since the application of this pump is limited to petroleum products, normal freezing conditions will not damage the pump. However, during extremely severe conditions care should be exercised during start-up, especially if the pump has been idle for more than a few hours.

PUMP TROUBLESHOOTING - SECTION D

WARNING

Before attempting to open or service the pump:

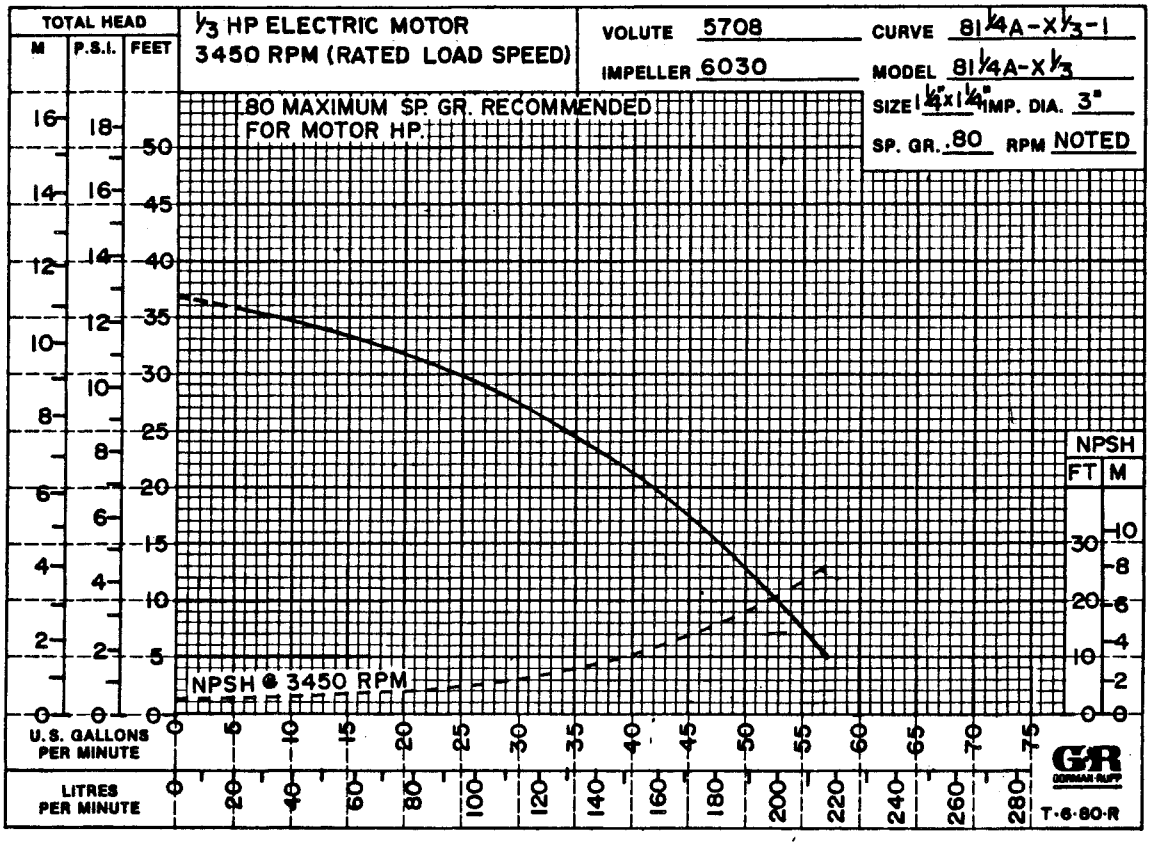
1. Familiarize yourself with this manual.
2. Disconnect incoming power to the motor and lock it out to ensure that the pump will remain inoperative.
3. Allow the pump to cool if overheated.
4. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before 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 lift or discharge head too high.	Check piping installation and install bypass line if needed. See INSTALLATION.
	Strainer clogged.	Check strainer and clean if necessary.
	Suction check valve or foot valve clogged or binding.	Clean valve.
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 as needed.Check submergence chart (Section B).
	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.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE(cont.)	Impeller clogged.	Free impeller of debris.
	Low or incorrect voltage.	Measure control box voltage, both when pump is running and when shut off.
	No voltage at line side of circuit breaker.	Check power source for blown fuse, open breaker, broken lead, or loose connection.
	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	Motor shaft or bearings defective.	Disassemble pump and check motor and bearings.
	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 motor 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.
	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.

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 81 1/4A3-X.33 1P

*Based on 70°F clear water at sea level with minimum suction lift, corrected to 0.80 specific gravity. 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. See Section E, Page 1.

SECTIONAL DRAWING

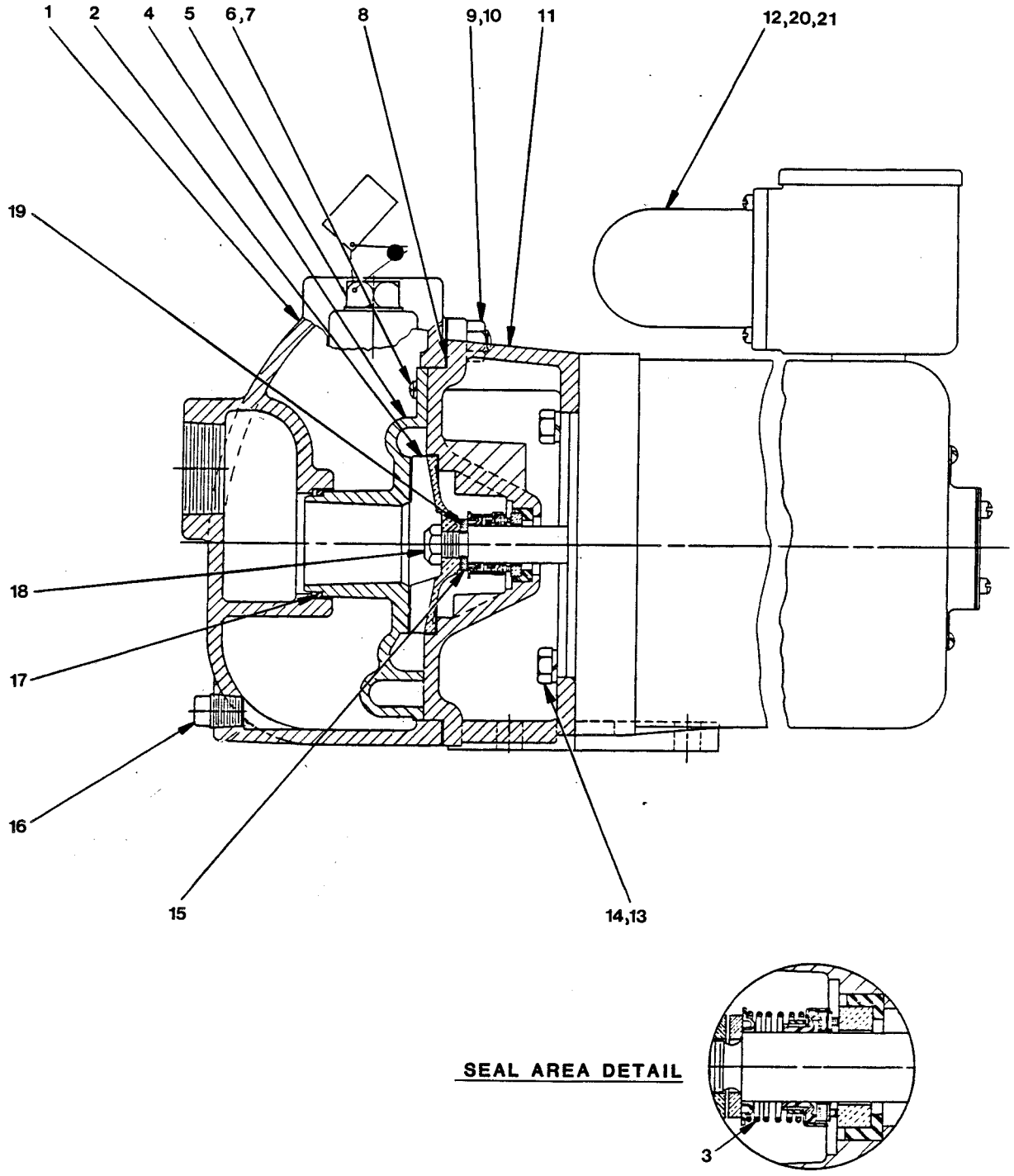


Figure 1. Pump Model 81 1/4A3-X.33 1P

PARTS LIST
Model 81 1/4A3-X.33 1P
(From S/N 794462 up)

ITEM NO.		PART NAME	PART NUMBER	MATL CODE	QTY
1		PUMP CASING	5709	10010	1
2	*	IMPELLER	6030	14010	1
3	*	SEAL ASSY	25271-821	-----	1
4		VANE PLATE	38632-515	10010	1
5		FILL PLUG ASSY	48271-060	-----	1
6		ROUND HD MACHINE SCREW	X#10-02	14990	2
7		LOCKWASHER	J#00010	15991	2
8	*	GASKET	5709-GA	20000	1
9		STUD	C00605	15991	4
10		HEX NUT	D00006	15991	4
11		INTERMEDIATE	5711	10010	1
12		MOTOR 1/3 HP 1P X P	M00002	-----	1
13		HEX HD CAPSCREW	B00604	15991	4
14		LOCKWASHER	J00006	15991	4
15	*	SEAL WASHER	6087	14110	1
16		DRAIN PLUG	P00004	11990	1
17	*	O-RING	S00461	-----	1
18		DEFORM LOCKNUT	DC00007-S	15991	1
19	*	IMPELLER ADJUSTING SHIM SET	5889	17000	1
20		HEAVY PIPE NIPPLE	THA01206	15070	1
21		CONDUIT BOX	27144-103	-----	1
NOT SHOWN:					
		NAME PLATE	2613-A	13990	1
		DIRECTION PLATE	2613-BM	00000	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 views (see Figure 1 and 2) and the accompanying parts list.

WARNING

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect incoming power to the motor and lock it out 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

Before operating or servicing the pump, be certain proper safety practices are followed. Provide adequate ventilation, prohibit smoking, wear static-resistant clothing and shoes. Clean up all fuel spills immediately after occurrence.

Pump Disassembly

(Figure 1)

Terminate the power supply to the motor to ensure that it will remain inoperative while the pump is being serviced. Close all connecting valves. Remove the drain plug (16) to drain the pump. Clean and reinstall the drain plug.

Remove the nuts (10) securing the pump casing (1) to the intermediate (11) and separate the assemblies. Separate the vane plate (4) from the intermediate after removing the machine screws and lockwashers (6 and 7).

To remove the impeller (2), immobilize the motor shaft and remove the locknut (18). Unscrew the impeller in a counterclockwise direction (when facing the impeller). Use caution when unscrewing the impeller; tension on the shaft seal spring will be released when the impeller is removed.

Remove the impeller adjusting shims (19) and seal washer (7). For ease of reassembly, tag and tie the shims, or measure and record their thickness.

Seal Disassembly

(Figure 2)

Carefully remove the spring centering washer, spring, and rotating elements. Remove the stationary element and cup seat using a stiff wire with a hooked end if necessary.

Seal Reassembly

(Figure 2)

Clean the seal cavity with a soft cloth soaked in 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 since any damage to the precision finished faces could result in premature seal failure. If it is necessary to reuse the old seal in an emergency, **carefully** wash all metallic parts in fresh cleaning solvent and allow them to dry thoroughly.

Handle the seal parts with extreme care to prevent damage to the precision finished faces. Even fingerprints can shorten seal life. Cleanliness is essential.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. 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.

Subassemble the stationary element with the cup seat and lubricate the outer surfaces with light oil. Using thumb pressure, seat the stationary assembly squarely in the seal bore.

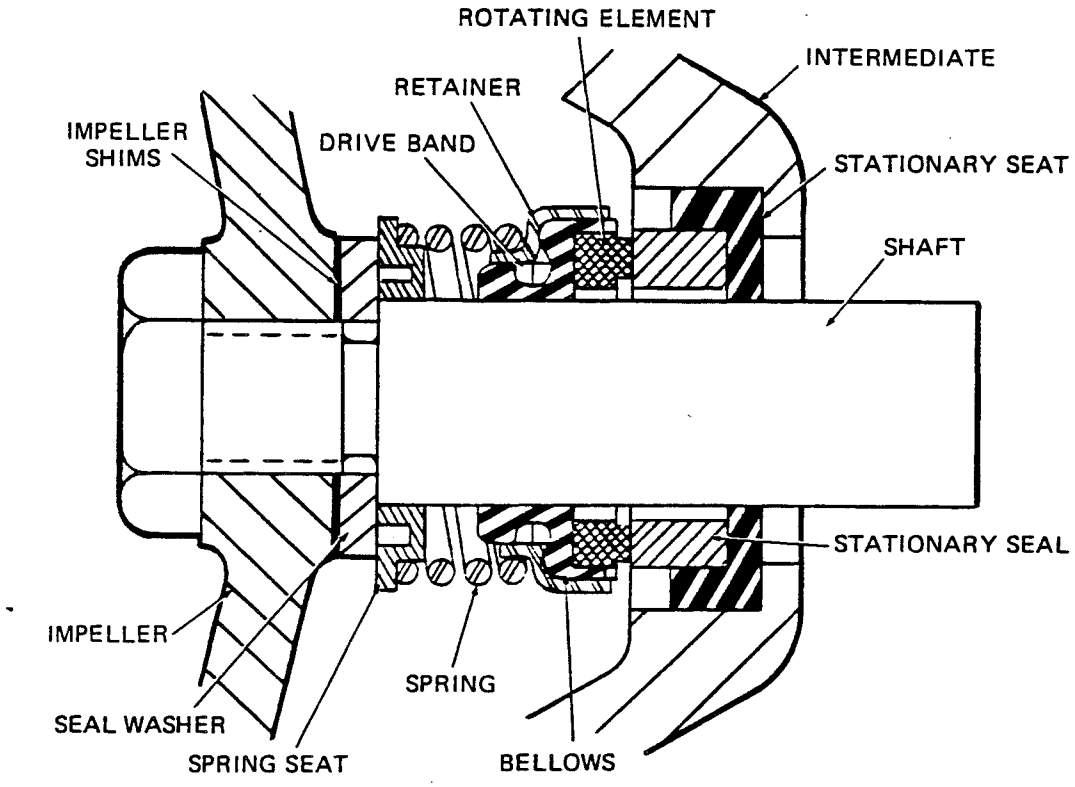


Figure 2. 25271-821 Seal Assembly

Subassemble the rotating element, bellows, retainer and drive band and lubricate the I.D. of the bellows with light oil. Apply a drop of light oil on the precision finished seal faces, **never** use grease. Slide the assembled seal parts completely onto the shaft.

NOTE

It is recommended that a tapered sleeve be installed over the threads of the impeller shaft to ease installation of the rotating seal elements.

Install the spring and spring centering washer.

Pump Reassembly

(Figure 1)

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

Install the same number of impeller adjusting shims (19) as previously removed. Install the seal washer (15) and screw the impeller onto the shaft. Replace the impeller locknut (18).

A clearance of .008 to .015 inch between the impeller and the vane plate is necessary for maximum pump efficiency. To achieve this clearance, secure the vane plate to the intermediate and rotate the impeller shaft by hand. If the impeller binds slightly against the vane plate, remove the impeller, and remove

.010 inch of impeller shims. Reassemble the pump. The clearance between the impeller and the vane plate should now be correct.

If the shaft moves freely when rotated by hand, remove the impeller, and add another impeller shim. Reassemble the pump and rotate the shaft by hand. Repeat this procedure, adding one shim at a time, until the impeller binds slightly against the vane plate. When this occurs, remove .010 inch of shims as indicated above.

After the impeller clearance is set, apply 3M-847 sealant (or equivalent) on the contacting surfaces of the vane plate and secure it to the intermediate.

NOTE

An alternate method of setting this clearance is to install the impeller with no adjusting shims. Use a depth micrometer to measure the height of the impeller vanes from the intermediate, and the depth of the impeller cavity in the vane plate. Subtract one measurement from the other to obtain the distance between the impeller and the vane plate. Subtract approximately .012 inch from this figure to obtain the thickness of adjusting shims required.

Install a new vane plate O-ring (17) and lubricate it with light oil. Replace the pump casing gasket (8) and secure the pump casing to the intermediate.

Fill the pump casing with clean liquid and reinstall the fill plug.

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

LUBRICATION

Seal Assembly

The seal is lubricated by the medium being pumped.

Motor Bearings

The motor bearings are permanently sealed. Periodic lubrication should not be required. Consult the literature provided with the motor.

For U.S. and International Warranty Information,
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