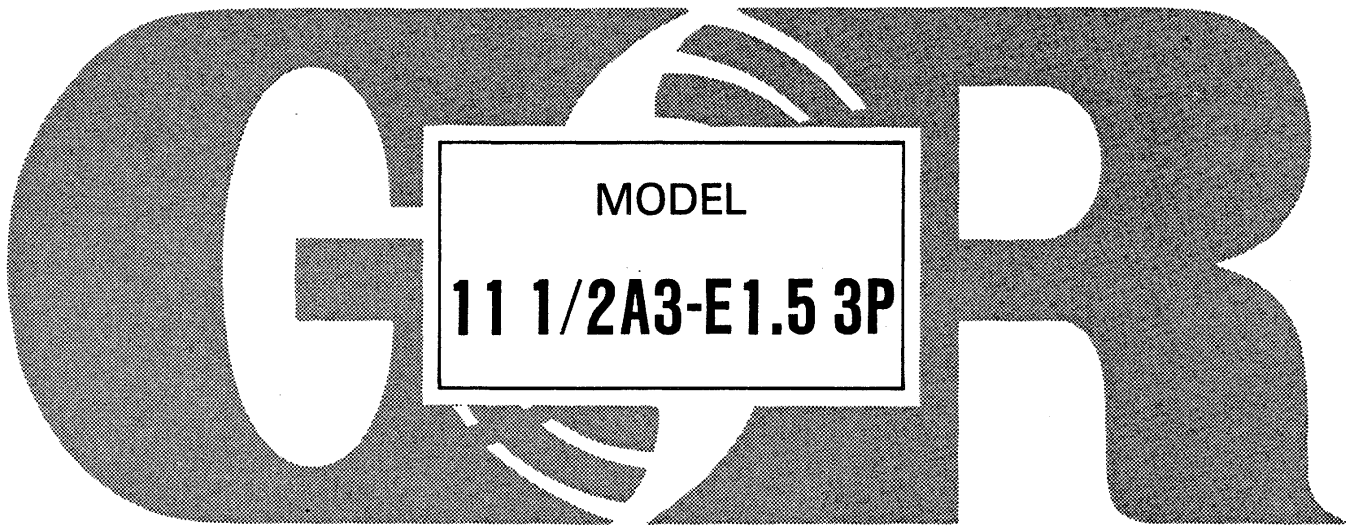


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Rev. A

10 SERIES™

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL



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

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INTRODUCTION

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 10 Series, semi-open impeller, self-priming centrifugal model with a suction check valve. The pump is designed to handle most most non-volatile, non-flammable liquids containing specified entrained solids. The pump is close-coupled to a 1 1/2 HP, three phase, dual voltage, totally enclosed fan-cooled electric motor. The basic material of construction for wetted parts is gray iron, with steel wearing parts and 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 44901-1217

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 in-  //  
// jury or death to personnel, and describe the procedure  //  
// required and the injury which could result from failure  //  
// to follow the procedure.                                   //  
//                                                           //  
////////////////////////////////////
```


WARNINGS

WARNINGS - SECTION A

THESE WARNINGS APPLY TO 10 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 inop- //  
// erative. //  
// 3. Allow the pump to cool if overheated. //  
// 4. Vent the pump slowly and cautiously. //  
// 5. Close the suction and discharge valves. //  
// 6. Check the temperature before opening any covers, //  
// plates, or plugs. //  
// 7. Drain the pump. //  
//  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// This pump is designed to handle most non-volatile, //  
// non-flammable liquids containing specified entrained //  
// solids. Do not attempt to pump volatile, corrosive or //  
// flammable 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 tight, properly sup- //  
// ported, and 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 servic- //  
// ing. //  
// //  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// Do not install and operate a non-explosion proof motor //  
// in an explosive atmosphere. Install, connect, and oper- //  
// ate the motor in accordance with the National Electric //  
// Code and all local codes. If there is a conflict be- //  
// tween 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 pre- //  
// cedence. //  
// //  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// The electrical power used to operate this pump is high //  
// enough to cause injury or death. Obtain the services of //  
// a qualified electrician to troubleshoot, test and/or //  
// service the electrical components of this pump. //  
// //  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// Never run this pump backwards. Be certain that rotation //  
// is correct before fully engaging the pump. //  
// //  
//////////////////////////////////////
```

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

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

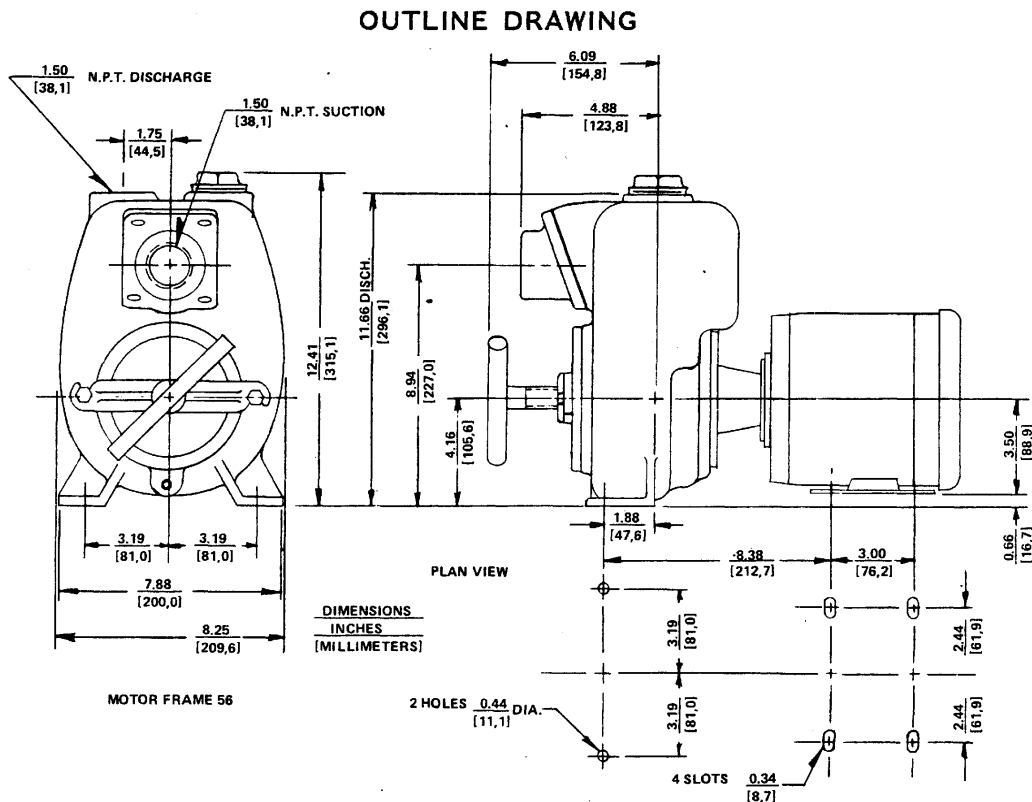


Figure 1. Pump Model 11 1/2A3-E1.5 3P

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 and motor 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

The impeller of the pump is threaded onto the pump shaft. Reverse rotation of the shaft can cause the impeller to unscrew and break the suction head or casing. Disconnect power source before checking for proper direction of rotation.

- 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.

WARNING

```
////////////////////////////////////  
//  
// The electrical power used to operate this pump is high //  
// enough to cause injury or death. Obtain the services of //  
// a qualified electrician to troubleshoot, test and/or //  
// service the electrical components of this pump. //  
//  
////////////////////////////////////
```

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

POSITIONING PUMP

Lifting

Use lifting equipment with a capacity of at least **500 pounds**. This pump weighs approximately **96 pounds**, not including the weight of accessories and base. 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.

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.

Clearance

A minimum clearance of **18 inches** in front of the cover plate is required to permit removal of the cover and easy access to the pump interior.

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

INSTALLATION

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 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).

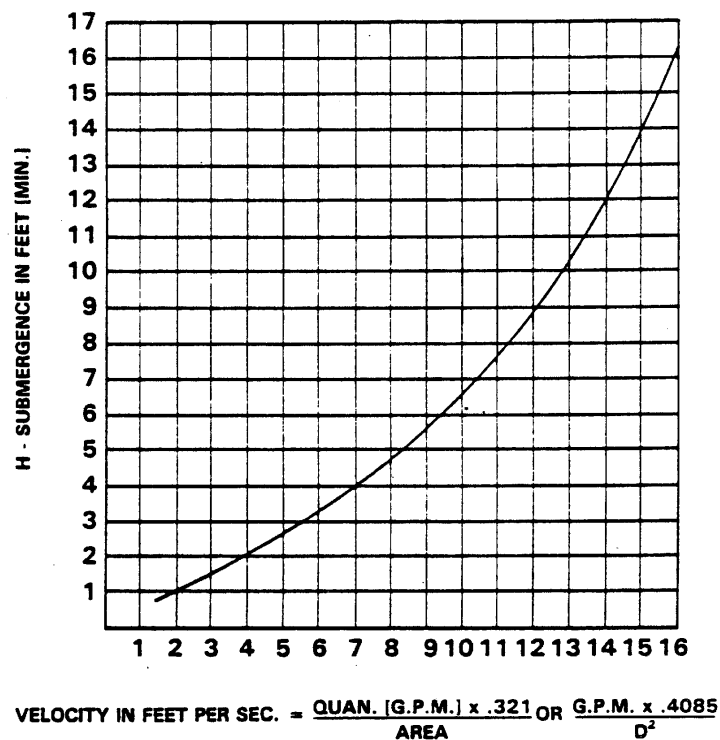


Figure 2. Recommended Minimum Suction Line Submergence Vs. Velocity

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 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

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.

ELECTRICAL CONNECTIONS

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

WARNING

```
//////////////////////////////////////  
//  
// The electrical power used to operate this pump is high //  
// enough to cause injury or death. Obtain the services of //  
// a qualified electrician to make all electrical con- //  
// nections. //  
//  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// Do not install and operate a non-explosion proof motor //  
// in an explosive atmosphere. Install, connect, and oper- //  
// ate the motor in accordance with the National Electric //  
// Code and all local codes. If there is a conflict be- //  
// tween 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 pre- //  
// cedence. //  
//  
//////////////////////////////////////
```

Refer to the following motor data before making electrical connections.

MOTOR DATA

VOLTAGE	PHASE	HP	Hz	RPM	THERMAL OVERLOAD
230/460	3	1.5	60	3450	N/A

OPERATION

OPERATION - SECTION C

WARNING

```
////////////////////////////////////  
//  
// This pump is designed to handle most non-volatile, //  
// non-flammable liquids containing specified entrained //  
// solids. Do not attempt to pump volatile, corrosive or //  
// flammable 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.

OPERATION

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.

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

OPERATION

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 automatically 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 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

```
////////////////////////////////////  
//  
// 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. //  
// //  
////////////////////////////////////
```

Strainer Check

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

Never introduce air or steam pressure into the pump casing or piping to remove a blockage. This could result in personal injury or damage to the equipment. If backflushing is absolutely necessary, **liquid pressure** must be limited to 50% of the maximum permissible operating pressure shown on the pump performance curve.

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.

After stopping the pump, disconnect incoming power to the motor and lock it out to ensure that the pump will remain inoperative.

OPERATION

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.

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 inop-
//    erative.
// 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

```

////////////////////////////////////
//
// The electrical power used to operate this pump is high
// enough to cause injury or death. Obtain the services of
// a qualified electrician to troubleshoot, test and/or
// service the electrical components of this pump.
//
////////////////////////////////////

```

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Not enough liquid in casing.	Add liquid to casing. See PRIMING.
	Suction check valve contaminated or damaged.	Clean or replace check valve.
	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.

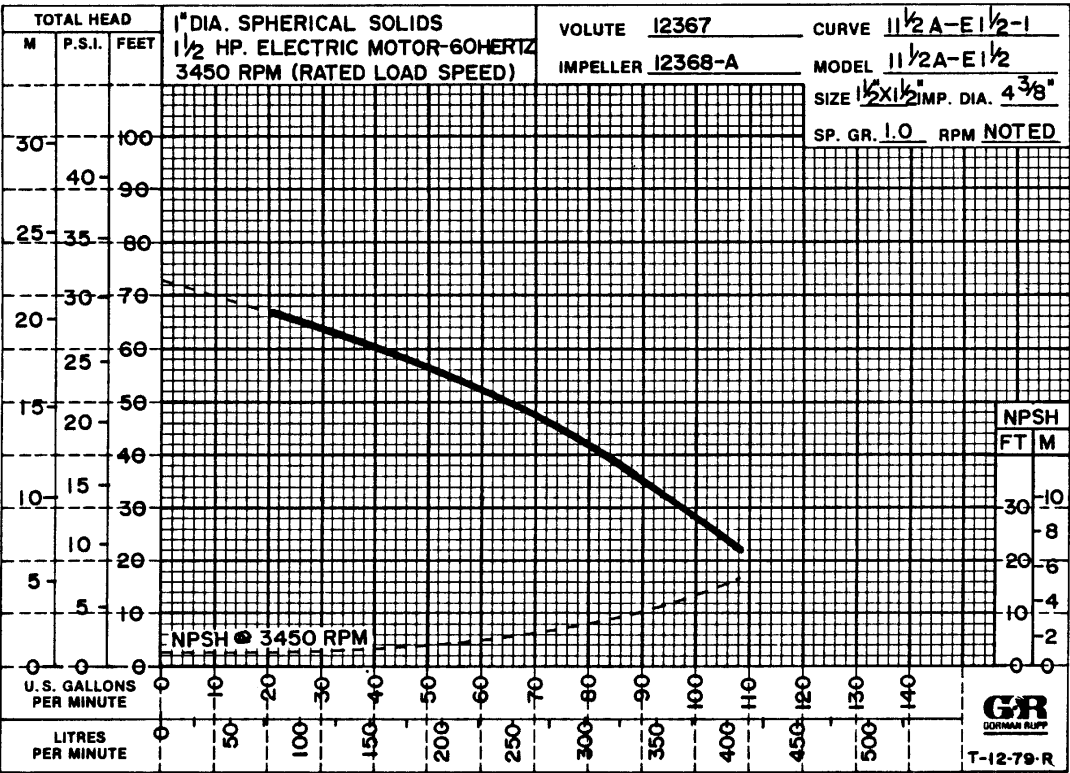
TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRES-SURE	Air leak in suction line. Suction intake not submerged at proper level or sump too small. Lining of suction hose collapsed. Impeller or other wearing parts worn or damaged. Impeller clogged. Low or incorrect voltage. No voltage at line side of circuit breaker or control box. Pump running backwards. Discharge head too high. Suction lift too high. Leaking or worn seal or pump gasket.	Correct leak. Check installation and correct submergence as needed. Replace suction hose. Replace worn or damaged parts. Check that impeller is properly centered and rotates freely. Free impeller of debris. Measure control box voltage, both when pump is running and when shut off. Check power source for blown fuse, open circuit breaker or control box, broken lead, or loose connection. Check direction of rotation and correct by interchanging any two motor leads at control box. (See Pump Rotation, Section C). Install bypass line. Measure lift w/vacuum gauge. Reduce lift and/or friction losses in suction line. Check pump vacuum. Replace leaking or worn seal or gasket.
PUMP REQUIRES TOO MUCH POWER	Motor shaft or bearings defective. Discharge head too low. Liquid solution too thick.	Disassemble pump and check motor and bearings. Adjust discharge valve. Dilute if possible.
PUMP CLOGS FREQUENTLY	Discharge flow too slow. Suction check valve or foot valve clogged or binding.	Open discharge valve fully to increase flow rate, and run motor at maximum governed speed. Clean valve.

TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
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.

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 11 1/2A3-E1.5 3P

*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. (See Section E, Page 1.)

SECTIONAL DRAWING

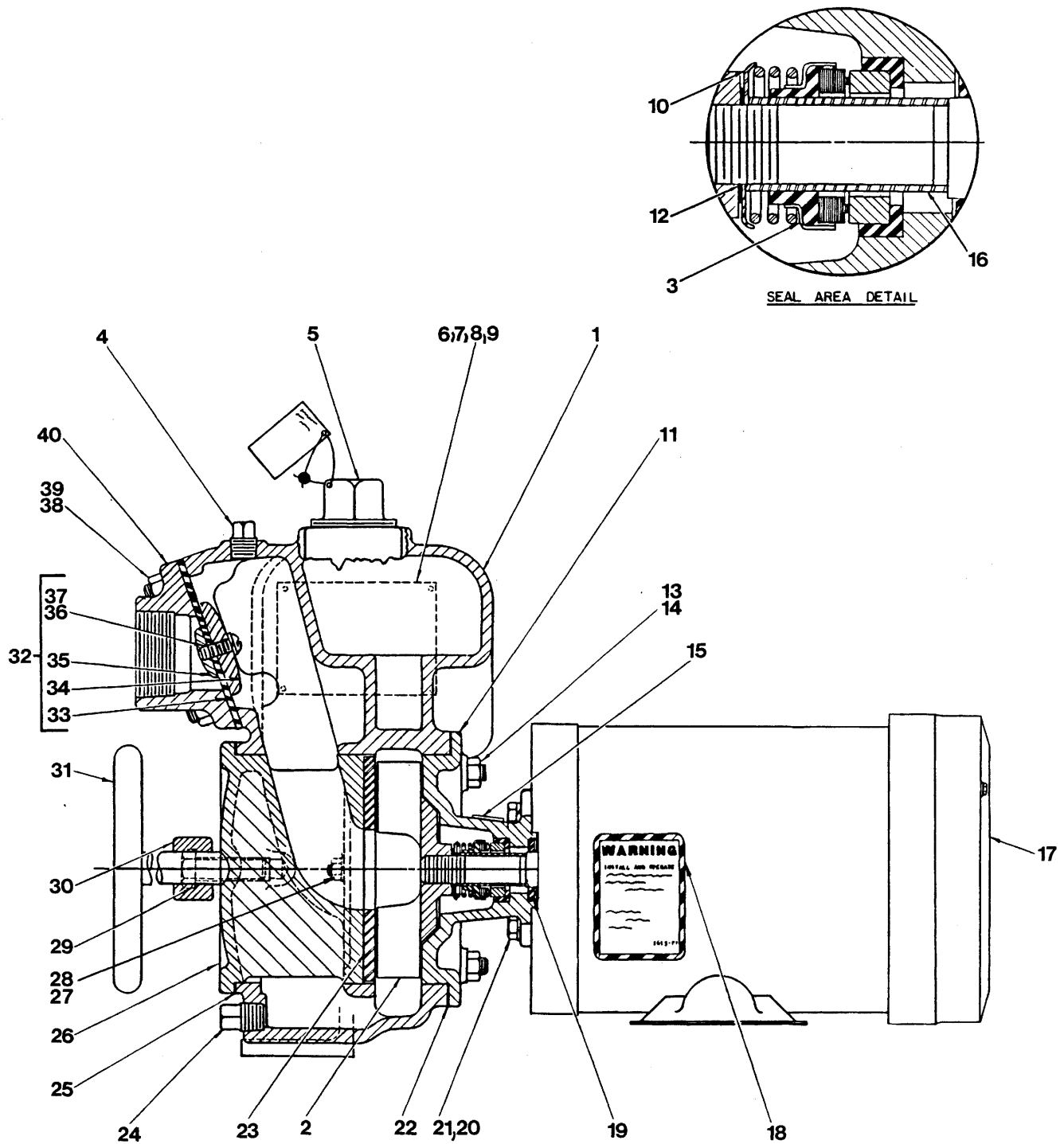


Figure 1. Pump Model 11 1/2A3-E1.5 3P

MAINTENANCE AND REPAIR

PARTS LIST
Model 11 1/2A3-E1.5 3P
 (From S/N 388408 up)

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

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP CASING	12367	10010	1	27	LOCKWASHER	J04	15991	2
2	*IMPELLER	12368-A	10010	1	28	HEX NUT	D04	15991	2
3	*SEAL ASSY	S1575	-----	1	29	HEX HD CAPSCREW	B0808	15991	2
4	ACCESSORY PLUG	P04	11990	1	30	CLAMP BAR	12370	11000	1
5	FILL PLUG ASSY	48271-067	-----	1	31	CLAMP BAR SCREW	8618	24000	1
6	NAME PLATE	38818-021	13990	1	32	CHECK VALVE ASSY	1352	-----	1
7	DRIVE SCREW	BM#04-03	15990	4	33 *	-CHECK VALVE	1352-G	19070	1
8	WARNING PLATE	2613-EV	13990	REF	34	-LRG VLV WEIGHT	1353	10010	1
9	DRIVE SCREW	BM#04-03	15990	REF	35	-SM VALVE WEIGHT	1354	10010	1
10	*SPRING CTR WASHER	12658	17100	1	36	-RD HD MACH SCRW	X0403	17090	1
11	INTERMEDIATE	6732-A	10010	1	37	-LOCKWASHER	J04	17090	1
12	*IMP ADJ SHIM SET	513-A	17090	1	38	STUD	C0606	15991	4
13	STUD	C0605 1/2	15991	4	39	HEX NUT	D06	15991	4
14	HEX NUT	D06	15991	4	40	SUCTION FLANGE	8599	10010	1
15	ROTATION DECAL	2613-M	-----	1					
16	*SHAFT SLEEVE	2353	17020	1	NOT SHOWN:				
17	1.5 HP 3P MOTOR	M41	-----	1		WARNING DECAL	2613-FE	-----	1
18	WARNING DECAL	2613-FF	-----	1		STRAINER	12383	24000	1
19	*SLINGER RING	14049	19140	1		SUCTION STICKER	6588-AG	-----	1
20	HEX HD CAPSCREW	B0503-S	15991	4		DISCHARGE STICKER	6588-BJ	-----	1
21	LOCKWASHER	J05	15991	4	OPTIONAL:				
22	*CASING GSKT SET	504-GA	20000	1		HI TEMP SHUT-DOWN KITS:			
23	*WEAR PLATE ASSY	2643	15990	1		120°F	48313-257	-----	1
24	CASING DRAIN PLUG	P06	11990	1		130°F	48313-256	-----	1
25	*BACK COVER GSKT	12369-G	20000	1		145°F	48313-186	-----	1
26	BACK COVER PLATE	12369	10010	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, disconnect incoming power to the motor and lock it out to ensure that the motor will remain inoperative and close all valves in the suction and discharge lines.

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

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 inop- //  
// erative. //  
// 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. //  
//  
//////////////////////////////////////
```

Suction Check Valve Removal And Disassembly

Before attempting to service the pump, remove the casing drain plug (24) and drain the pump. Clean and reinstall the drain plug.

Remove the nuts (39) and separate the suction flange (40) and check valve assembly (32) from the pump casing (1). Inspect the check valve parts and replace as required. To disassemble the check valve assembly, remove the machine screw and lockwasher (36 and 37), and separate the valve weights (34 and 35) and check valve gasket (33).

Back Cover Removal

The wear plate (23) is easily accessible and may be serviced by removing the back cover (26). Loosen the clamp bar screw (31) and remove the clamp bar (30). Pull the back cover from the casing. Remove the back cover gasket (25) and clean the mating surfaces.

Inspect the wear plate for excessive wear or scoring. If replacement is required, remove the hardware (27 and 28) securing it to the back cover.

Pump Disassembly

Remove the hardware securing the pump casing to the base.

Remove the nuts (14) and slide the casing off the intermediate (11). Remove the gasket set (22) from the casing studs. Tie and tag the gasket set for ease of reassembly.

To remove the impeller (2), immobilize the motor shaft, and tap the vanes with a soft-faced mallet or block of wood in a counterclockwise direction (when facing the impeller). **Be careful** not to damage the impeller vanes. Use caution when unscrewing the impeller from the shaft; tension on the seal spring will be released as the impeller is removed.

Remove the impeller adjusting shims (12). Tie and tag the shims for ease of reassembly.

Seal Removal

(Figures 1 and 2)

Remove the spring centering washer (10) and seal spring. Slide the shaft sleeve (16) and rotating portion of the seal off the shaft as a unit. Apply oil to the sleeve and work it under the bellows. Slide the rotating portion of the seal off the sleeve.

To remove the stationary seat and element, remove the hardware (20 and 21), and slide the stationary portion of the seal and intermediate (11) off the shaft as a unit. Position the intermediate on a flat surface with the impeller side down. Use thumb pressure to press the stationary seat and element from the intermediate.

Remove the slinger ring from the shaft.

If no further disassembly is required, see **Seal Installation**.

Seal Installation

(Figures 1 and 2)

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

WARNING

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

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

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

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. Clean and polish the 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 (16) with water or a very **small** amount of oil, and apply a drop of light lubricating oil on the finished faces. Assemble the seal as follows, (see Figure 2).

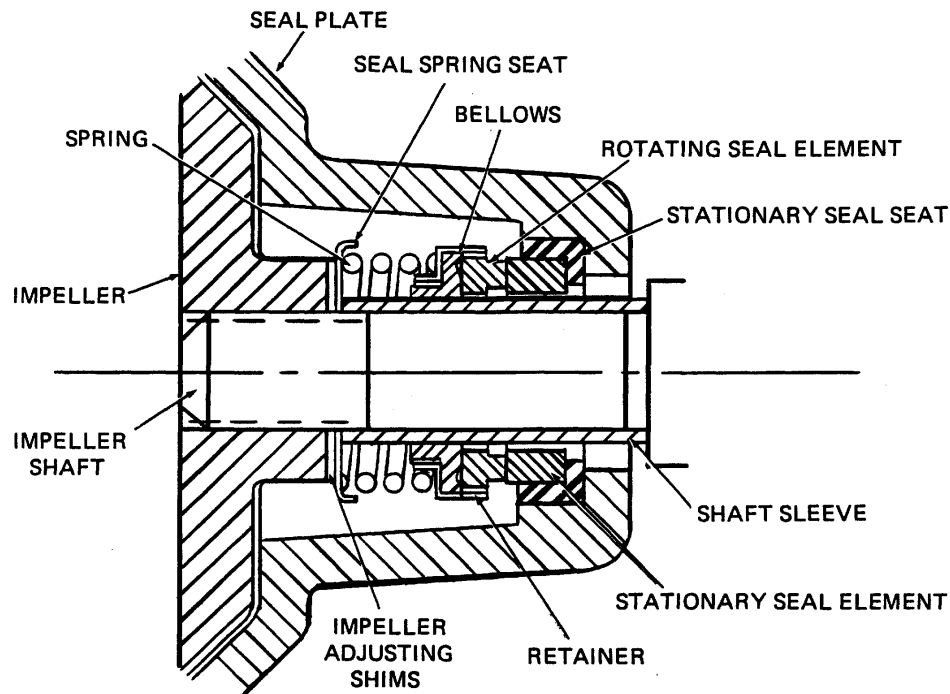


Figure 2. S1575 Seal Assembly

CAUTION

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

Slide the slinger ring (19) onto the shaft. Install the stationary element in the seat and press this stationary subassembly into the intermediate until fully seated. After installation, wipe the sealing face lightly in a concentric pattern with a clean, lint-free tissue.

Position the intermediate and stationary subassembly over the shaft and secure it to the motor with the hardware (20 and 21).

Slide the rotating subassembly (consisting of the rotating element, bellows and retainer) over the lubricated shaft sleeve until the rotating element is **just flush** with the chamfered end of the sleeve. Slide the sleeve over the shaft until the sealing faces contact. Continue to press the shaft sleeve through the seal assembly until it seats squarely against the shaft shoulder.

Install the seal spring and spring centering washer (10).

Pump Reassembly

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

Install the same thickness of impeller adjusting shims (12) as previously removed, and screw the impeller onto the shaft until tight. A clearance of .020 to .040 inch between the impeller and the intermediate is necessary for maximum pump efficiency. Measure this clearance, and add or subtract impeller shims until it is reached.

Install the same thickness of pump casing gaskets (22), as previously removed and secure the pump casing to the intermediate with the nuts (14). **Do not** fully tighten the nuts until the impeller face clearance has been set.

NOTE

If the pump has been completely disassembled, it is recommended that the back cover assembly be reinstalled at this time. The back cover assembly must be in place to adjust the impeller face clearance.

A clearance of .008 to .015 inch between the impeller and the wear plate assembly is also recommended for maximum pump efficiency. This clearance can be obtained by adding or subtracting gaskets in the casing gasket set until the impeller binds against the wear plate when the shaft is turned. After the impeller binds, add approximately .012 inch of gaskets.

Secure the pump casing to the base with the previously removed hardware. Be sure to reinstall any leveling shims used under the casing mounting feet.

Back Cover Installation

If the wear plate was removed for replacement, carefully center it on the back cover and secure it with the hardware (27 and 28). The wear plate must be concentric to prevent binding when the back cover is installed.

Clean any scale or debris from the contacting surfaces in the pump casing that might interfere or prevent a good seal with the back cover.

Replace the back cover gasket (25) and slide the back cover (26) into the pump casing.

NOTE

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

Secure the back cover assembly with the clamp bar (30) and clamp bar screw (31). Be sure the wear plate does not bind against the impeller.

Suction Check Valve Reassembly And Installation

Assemble the valve weights to each side of the check valve gasket (33) and secure the parts with the round head machine screw and lockwasher (36 and 37).

Position the check valve assembly in the suction port with the large weight (34) toward the impeller and the small weight (35) toward the suction flange (40). Install the suction flange, and secure the complete assembly with the nuts (39).

Check the operation of the suction check valve to ensure proper seating and free movement. Reinstall the suction and discharge piping.

Before starting the pump, check that the piping is secure, fill the casing with liquid, and open all valves in the suction and discharge lines.

LUBRICATION

Seal Assembly

The seal assembly is lubricated by the medium being pumped, and no additional lubrication is required.

Motor

Consult the literature supplied with the motor, or contact your local motor 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

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