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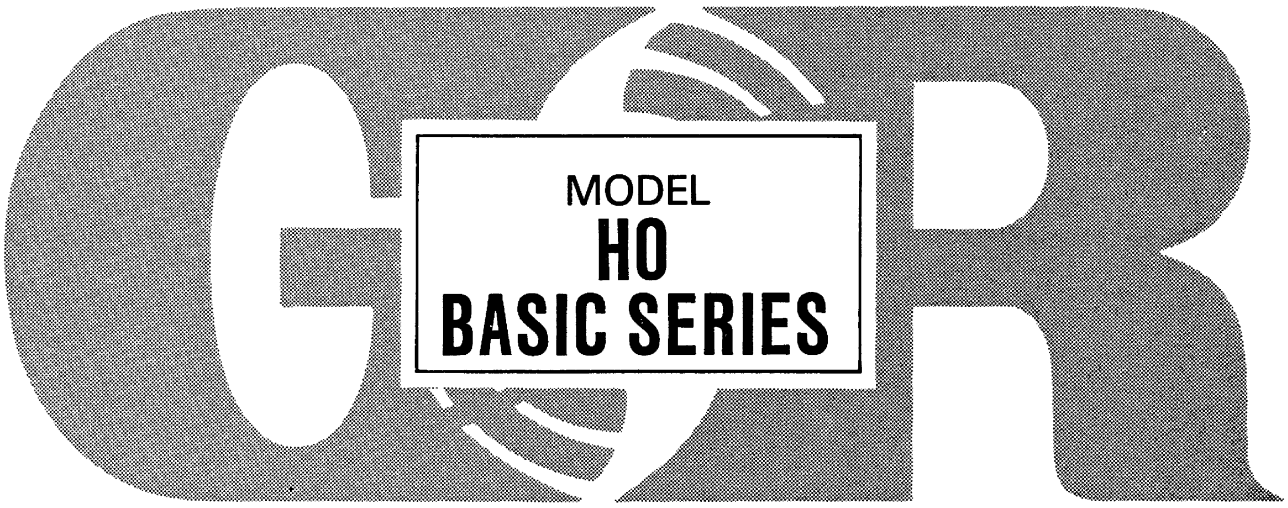
December 28, 1984

HO 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.

Register your new
Gorman-Rupp pump online at
www.gormanrupp.com/register.

Valid serial number and e-mail address required.

RECORD YOUR PUMP MODEL AND SERIAL NUMBER

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

Pump Model: _____

Serial Number: _____

TABLE OF CONTENTS

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 HO Series (Hand-Operated), self-priming positive displacement pump. It provides economical transfer of most petroleum-based liquids, and mildly corrosive industrial products. The pump is easily installed into plant piping systems, drums, or priming applications. For specific information on pump dimensions, materials of construction, capacities or unit weight, see the Specification Data included in Section E.

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

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 THE PUMP ONLY

WARNING

This pump is designed to handle water, gasoline, or other petroleum products. Do not attempt to pump highly corrosive liquids which may damage the pump or endanger personnel as a result of pump failure. Consult the factory for chemical compatibility BEFORE pumping.

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.

WARNING

Overheating may produce dangerous fumes. Use extreme caution when venting the pump, or when removing covers, plates, plugs, or fittings.

WARNING

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

WARNING

Do not attempt to thaw the pump by using a torch or other source of flame. This could damage gaskets or heat the oil within the pump above the critical point and cause the pump to rupture or explode.

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.

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

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 follow the instructions indicated.

PREINSTALLATION CLEANING

The pump was factory-tested using non-detergent oil. If flushing is required, use an approved solvent that is compatible with the product to be pumped. **Be sure** the solvent will not attack the pump or components, particularly seals and gaskets.

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. //
// //
//

Do not flush the pump until just before actual installation. The test oil protects the close tolerances within the pump from corrosion.

POSITIONING THE PUMP

Mounting

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

The pump is equipped with two holes for attaching to a post or bulkhead. See the Specification Data included in Section E for dimensions. Allow sufficient clearance to operate the pump lever through the full range of travel.

SUCTION AND DISCHARGE PIPING

Materials

Either rigid pipe or hose may be used for suction and discharge lines. Piping materials must be compatible with the liquid being pumped. If hose is used in the suction line, it must be the rigid-wall, reinforced type to prevent collapse under suction. Use of pipe couplings in the suction line is not recommended due to the potential for leaks.

Connections to Pump

Before connecting rigid piping to the suction and discharge, align it exactly with the pump port. Never attempt to pull a pipe line into place by tightening.

Lines near the pump must be independently supported to avoid strain on the pump. If hose lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

SUCTION LINES

The suction port is located at the bottom of the pump housing. It is tapped for a standard pipe connection. See the Specification Data included in Section E for dimensions.

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 and priming efficiency will be reduced.

On high static lift applications, install a foot valve on the end of the suction line to retain the prime.

Strainers

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

If a strainer is not furnished, the user should install one to protect the pump from accidental damage. 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.

CAUTION

Damage to the pump resulting from debris in the suction line will not be covered by the pump warranty.

Sealing

Since even a slight leak will affect priming and capacity, especially when applied on 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.

DISCHARGE LINES

The discharge port is located at the top of the pump housing. It is tapped for a standard pipe connection. See the Specification Data included in Section E for dimensions.

OPERATION - SECTION C

THEORY OF OPERATION

The housing cavity is divided into four pumping chambers by the wing and suction and discharge decks. There is a single-acting valve within each chamber. Passage ports have been drilled diagonally through the wing and shaft to connect two of the cavities. Passage port "X" joins cavities "A" and "AA", and port "Y" joins cavities "B" and "BB". See Figure 1.

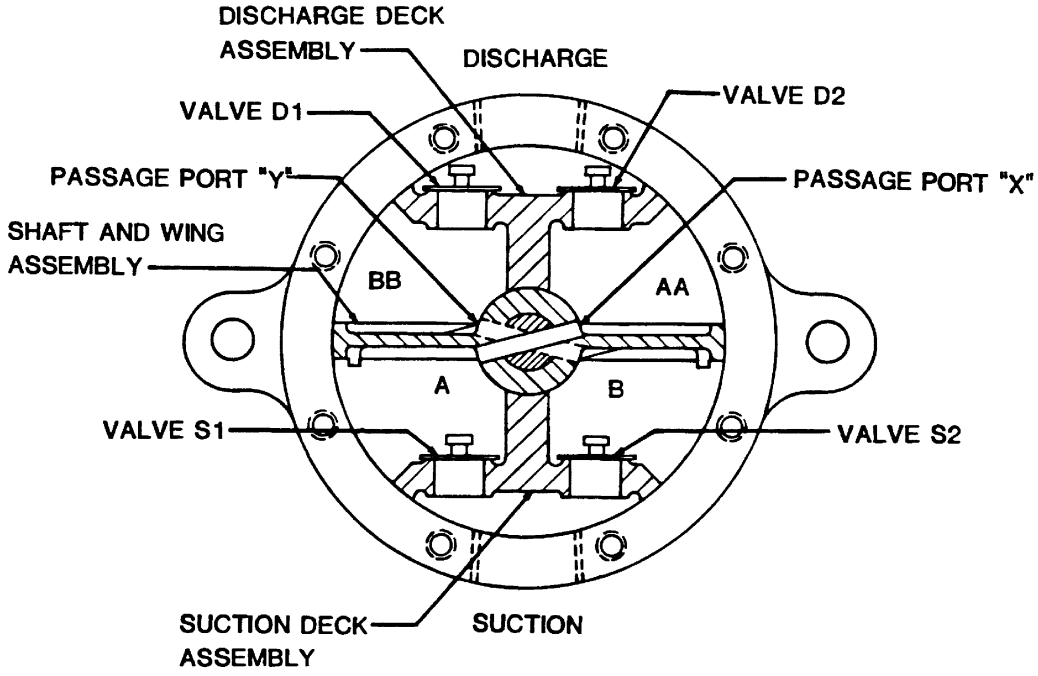


Figure 1. Wing In Center Position

When the wing is moved to the right, a vacuum is created in chambers "A" and "AA" and causes them to be filled with liquid entering through valve "S1" on the suction side. At the same time, liquid in chambers "B" and "BB" is forced through valve "D1" and out through the pump discharge. See Figure 2.

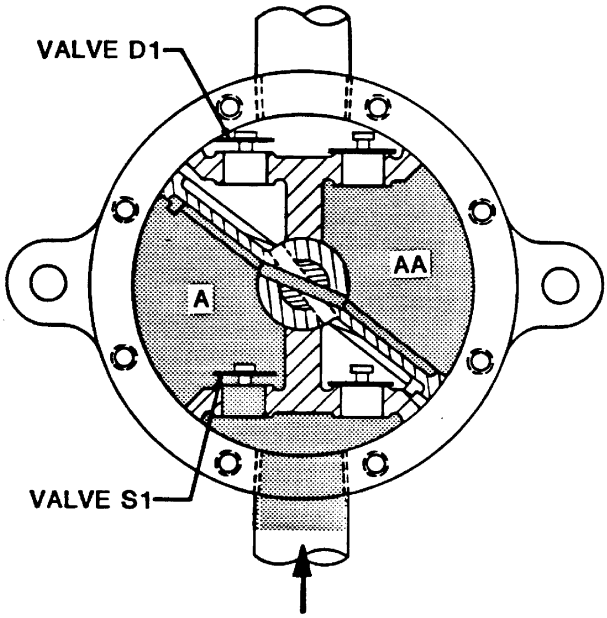


Figure 2. Wing In Right Hand Position

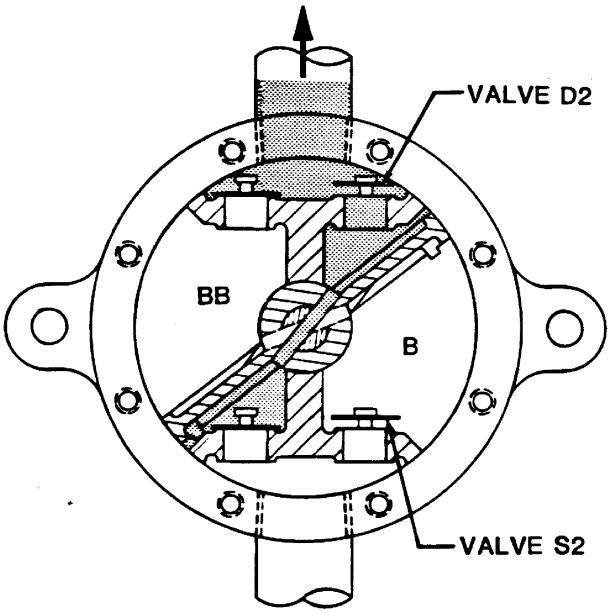


Figure 3. Wing In Left Hand Position

When the wing is moved to the left on the return stroke, chambers "B" and "BB" are filled and chambers "A" and "AA" are emptied. See Figure 3. With one full cycle of the pump, all **four** chambers of the pump have been **filled** and **emptied**. Hence this pump is known as a quadruple-acting pump, and will deliver twice as much liquid as a double-acting pump of the same size.

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.

Although this pump is self-priming, a suction foot valve must be installed and liquid added to the pump housing when applied on high static lifts.

CAUTION

Never operate a self-priming pump unless there is liquid in the housing. The pump will not prime when dry. Extended operation of a dry pump will damage parts.

Add liquid to the housing 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 housing has evaporated.

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

To fill the pump, remove the fill plug and add clean liquid until the pump is filled. Replace the fill plug before operating the pump.

OPERATION

Operate the pump lever through the full range of travel to achieve the desired flow rate. Pump in slow even strokes; **never jerk the lever**, this may damage the pump.

Leakage

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

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.

CLEANING THE PUMP

If the pump is to be out of service for an extended period of time, drain the system and flush the pump and piping with an oil based preservative to protect the the pump. This is **especially** important when handling non-lubricating liquids, such as water or chemicals.

PUMP TROUBLESHOOTING - SECTION D

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Air leak in suction line.	Correct leak.
	Suction lift or discharge head too high.	Check piping installation and install suction foot valve.
	Suction check valve or foot valve clogged or binding.	Clean valve.
	Leaking or worn seal or pump gasket.	Replace worn seal or gasket.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Strainer clogged.	Check strainer and clean if necessary.
	Pump speed too slow.	Increase speed using even strokes.
	Worn pump parts.	Replace worn or damaged parts.
	Discharge line clogged or restricted; hose kinked.	Check discharge lines; straighten hose.

July 18, 1979

WARRANTY

Pumping units manufactured by The Gorman-Rupp Company, Mansfield, Ohio are guaranteed to be free from defects in material and workmanship for one year from date of shipment from factory in Mansfield, Ohio. The obligation under this Warranty, statutory or otherwise, is limited to replacement or repair at Mansfield, Ohio factory or at a point designated by Gorman-Rupp, of such part as shall appear to us, upon inspection at such point, to have been defective in material or workmanship.

This Warranty does not obligate The Gorman-Rupp Company to bear the cost of labor or transportation charges in connection with replacement or repair of defective parts; nor shall it apply to a pump upon which repairs or alterations have been made unless authorized by Gorman-Rupp.

No warranty is made in respect to engines, motors, or trade accessories, such being subject to warranties of their respective manufacturers.

In Submersible Pumps, pump and motor are integral and Submersibles are warranted as a unit. Since motor is subject to an important degree upon quality and performance of electrical controls, unit warranty is valid only when controls have been specified and provided by Gorman-Rupp.

No express implied or statutory warranty, other than herein set forth is made or authorized to be made by Gorman-Rupp.

In no event shall The Gorman-Rupp Company be liable for consequential damages or contingent liabilities arising out of the failure of any Gorman-Rupp pump or parts thereof to operate properly.

THE GORMAN-RUPP COMPANY
Mansfield, Ohio

NOTE: In Canada, all above references to "The Gorman-Rupp Company, Mansfield, Ohio" is understood to mean "Gorman-Rupp of Canada Limited, St. Thomas, Ontario."

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