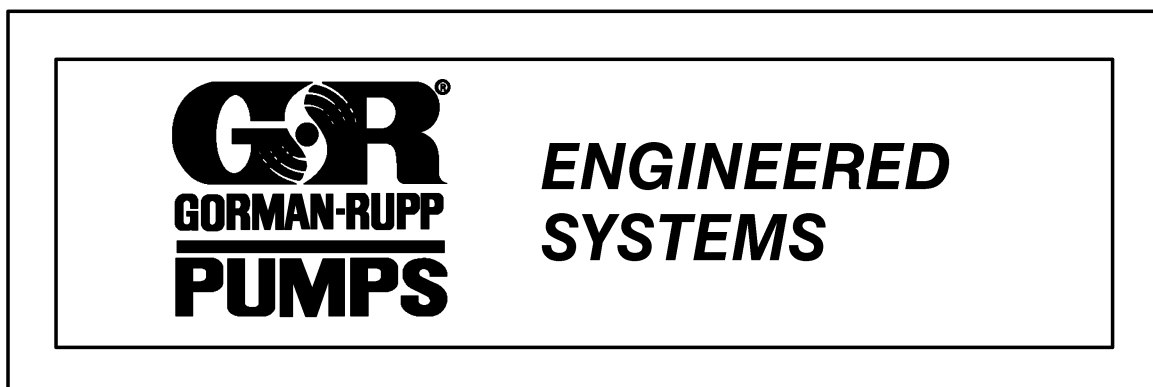


**ABOVE-GROUND
SUBMERSIBLE LIFT STATION
VALVE PACKAGE
INSTALLATION MANUAL**



THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

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

©Copyright by the Gorman-Rupp Company

ABOVE GROUND SUBMERSIBLE LIFT STATION VALVE PACKAGE INSTALLATION INSTRUCTIONS

Introduction

This document provides important information for personnel responsible for the installation of your Gorman-Rupp lift station.

This station has been operated and thoroughly tested at the factory to ensure that it meets your pumping requirements and is ready for installation.

Please read this manual completely before installing the station. If the procedures in this manual are followed carefully, your Gorman-Rupp lift station will provide years of continuous service.

This manual covers the basic lift station. Your station may include equipment not covered in these instructions. All phases of the installation should be

in compliance with applicable codes and performed in a workmanlike manner.

The driver of the truck delivering the station will have an Operation and Maintenance Manual for the specific station. This manual will be helpful in installing the station.

WARRANTY INFORMATION

The warranty provided with your pump station is part of Gorman-Rupp's support program for customers who install, operate and maintain their equipment as described in this and the other accompanying literature. Please note that should the equipment be abused, damaged or modified to change its performance beyond the original factory specifications, the warranty will become void and any claim will be denied.

The following are used to alert personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:



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



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



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

NOTE

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

CONTENTS

SAFETY PAGE 2

SITE PREPARATION PAGE 3

 Electrical PAGE 3

 Wet Well Preparation PAGE 3

 Lifting Equipment PAGE 3

PRE-INSTALLATION INSPECTION PAGE 3

OFF-LOADING PAGE 4

TEMPORARY STORAGE PAGE 5

STATION MOUNTING PAGE 5

PIPING INSTALLATION PAGE 5

 Discharge Piping PAGE 6

 Pump Guide Rails PAGE 6

 Optional Pump Hoist Winch Installation And Operation PAGE 6

 Pump Installation PAGE 7

 Water Hammer Arrestor PAGE 7

 Air Bubbler Liquid Level Control Lines PAGE 8

ELECTRICAL SERVICE CONNECTION PAGE 8

FINAL INSTALLATION INSPECTION PAGE 9

SAFETY

This information applies to the Gorman-Rupp Above-Ground Submersible Valve Package Lift Station covered in this manual.



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



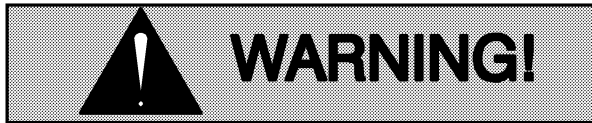
Install and operate this station in accordance with the National Electric Code and all local codes. Ground the unit before applying line potential. Failure to follow the instructions in this warning and manual could result in injury or death to personnel.



The electrical power to operate the equipment in this station is high enough to cause injury or death. Shut down incoming power and tag and lock all controls to prevent accidental startup during maintenance or repair of the equipment. The equipment in this station utilizes more than one source of power and therefore more than one disconnect may be required to completely de-energize all equipment being serviced.

The equipment in this station is designed for automatic control and can start without warning unless all circuits are de-energized. Failure to shut down and lock out power can result in death, serious personal injury or damage to the equipment.

SITE PREPARATION



In the event of conflict between the instructions contained in this section and The National Electric Code or local codes, The National Electric Code or local codes shall take precedence.

Electrical

Notify the local power company in advance to assure that electrical power will be provided to the site before arrival of the lift station. Verify that incoming service is in conformance with design specifications on the electrical wiring diagram, $\pm 10\%$. Where local codes permit, it is strongly recommended that power lines to the station terminate in a service entrance disconnect outside the station.

Wet Well Preparation

It is recommended that construction of the wet well be completed before the station arrives. If this work has not been completed, or if the station will not be installed immediately, it should remain sealed as shipped from the factory.

The wet well for the pump station must be constructed in accordance with design specifications. Consult the engineer's plans for recommendations for securing the pump station base to the wet well.

The mounting surface and surrounding area of the wet well must be free of all foreign material and debris before the station is set in place. Even a small amount of debris on the wet well mounting surface can affect piping installation and station leveling.

To provide a seal when the station base is set in place, completely coat the wet well mounting surface with a roll form of asphalt-based mastic.

Verify that the wet well conforms to design specifications.

Remove all construction debris from the wet well, piping and manholes. If debris is not removed, stoppages will occur and could result in damage to pumps and valves. Lift station collection lines flowing to the wet well should be flushed and debris removed.

Lifting Equipment

Arrange to have proper unloading equipment available upon arrival of the station.

Lifting equipment must include a spreader bar and a four (4) point sling system of sufficient strength. The spreader bar must be a minimum of 8 feet (2,4 m) long, and each sling must be a minimum of 12 feet (3,7 m) long. To avoid damage to the fiberglass, do not allow lifting cables to contact the station (see Figure 1). **The overall weight of the lift station will not exceed 6,000 lbs. (2722 kg.).** Slings and lifting equipment must be rated for at least the load of the station **plus a minimum safety factor of 4 times the weight of the station.**

PREINSTALLATION INSPECTION

The lift station was thoroughly inspected before leaving the factory and was complete and operational when shipped. Loading and tie down were supervised by Gorman-Rupp personnel and the bed of the carrier was padded, if necessary, to protect the station. In spite of all precautions however, damage to the station may have occurred in transit and the station should be inspected before being off-loaded.



Temporary power must be single phase and cannot exceed 115 volts, $\pm 10\%$. Severe damage to the station electrical circuits can result if voltage exceeds design conditions.

Supply **only** 115 volt, single phase A.C. ground fault interrupter-protected power to the temporary power cord supplied with the station.

OFF-LOADING

Make certain that the lifting equipment and sling are of an adequate capacity, plus an appropriate safety factor (a minimum of 4 times the weight of the station), to support the weight of the station.

Do not push or slide the station off the truck bed. Each station contains a control panel with sensitive electrical components. Avoid rough handling, and use caution to prevent undue shock and vibration to the station.

If possible, position the lifting equipment so that the station can be lifted and set on the wet well without moving the lifting equipment. Make certain that the lifting equipment is on a solid surface and stabilizers are in position.

Check that the angle of lift will not de-rate the lifting equipment below the required capacity.



Do not attempt to lift the station with cables making contact with the station. Serious damage to the station could result.



When the pump station is suspended, keep personnel from beneath it at all times.

Make all lifts as smoothly as possible. The station equipment includes control panels with sensitive electrical components, and care should be taken to avoid shocks and rough handling.



The station base is equipped with four (4)

lifting eyes. Use **only** the four (4) lifting eyes to lift the station. Failure to do so may result in serious damage to the station equipment.

Lower the station onto the wet well using a four (4) point sling and spreader bar (see Figure 1).



Do not use blocks or shims between the lift station base and wet well. The station is designed for proper internal drainage only then the station base is level on the wet well.



All regulations established by the Occupational Safety and Health Administration (OSHA) for confined spaces must be followed when working on the wet well and/or piping. Failure to do so could result in serious injury or death to personnel.

When lowering the station onto the wet well, extreme care must be taken not to damage any piping already installed above the level of the well.

NOTE

Layout marks are provided on the underside of the station base for alignment of the station over the wet well.

After the station has been lowered onto the wet well, do not remove the sling until the positions of the piping holes have been checked for alignment; repeat short lifts as often as necessary until these features are aligned.

After the station is properly seated on the wet well, remove the slings, using caution not to damage the fiberglass enclosure.

TEMPORARY STORAGE



If the station is to be stored for an extended period of time before installation, or if it is to be installed without being put into operation for an extended period of time, temporary power must be applied to the control system to prevent damage.

If the station will not be installed on the wet well immediately, place the station on a level surface of smooth, clean planks or similar support. **Do not** place the station on uneven or rocky terrain. Ensure that the site is high enough to keep the station above ground water level. **Make sure** the station is protected against vandalism during storage.



All electrical equipment in the pump station is grounded to the control panel sub-plate. Before applying line potential, connect the main ground lug terminal on the sub-plate in the pump station control panel to a driven earth ground according to the National Electric Code and all local codes. Failure to do so can result in serious personal injury or death.



Temporary power must be 60 Hz. single phase and cannot exceed 115 volts, $\pm 10\%$. Severe damage to the station electrical circuits can result if voltage exceeds design conditions.

Connect 60 Hz., 115-volt, single phase service to the control center in accordance with the schematic circuit diagram provided with the station.

Place the blower and/or heater into operation.

STATION MOUNTING

The weight of the station and the station piping are sufficient to hold the station in place on the wet well. No additional anchoring is required.

PIPING INSTALLATION



All regulations established by the Occupational Safety and Health Administration (OSHA) for confined spaces must be followed when working on the wet well and/or piping. Failure to do so could result in serious injury or death to personnel.



Automatic control features of the system can cause the pumps to start without warning. If line potential has been applied to the pump station, make certain that the main service disconnect is locked in the OFF position before working on the system piping. If no main service entrance disconnect has been installed, make certain that all circuits on the control panel are locked open.

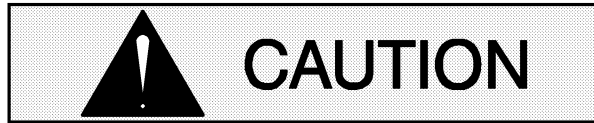
When working with liquids that produce hazardous fumes, make certain that the wet well is adequately ventilated and/or protective breathing apparatus is worn. Protective clothing must always be worn.



Do not allow any unprotected part of the body to come into contact with liquids being pumped; serious injury or disease could result. Clean tools and protective clothing after exposure. Gases present in wet wells may be hazardous; to not work in an unventilated area without protective breathing apparatus.

Clean debris from the wet well before and after piping installation. Debris can cause pump and/or

valve damage. Flush pump station collection lines flowing into the wet well and remove any debris.



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

Carefully check the wet well and piping and remove all debris, including construction debris such as nuts, bolts, wire, weld slag, and other foreign material. Flush pump station collection lines flowing into the wet well before connecting the suction and discharge piping to prevent debris from entering the pump.

Discharge Piping

Lay out the location of the pump anchor bolts in the bottom of the wet well in accordance with the layout drawing provided with the submittal data. Mount the pump base elbows in the bottom of the wet well with the anchor bolts provided with each pump. Bolt the discharge piping to the base elbow flange.

Station discharge lines terminate 6 inches (152 mm) beneath the station base. The Class 53 ductile iron plain end pipe projections on the underside of the station base are for the contractor's connection to the force main and the pump discharge lines. Plain-end couplings (supplied by others) can be used to complete the piping connections. Install the force main in accordance with the engineer's plans and specifications.

To avoid transfer of piping loads to the pump station, discharge lines must be supported in accordance with good commercial practices. Discharge lines should be air-tight to prevent the liquid being pumped from entering the station or leaking into the surrounding ground. If gauges or other instruments are installed in the pump or piping, make certain that all connections are air-tight and sealed using "Loctite Pipe Sealant with Teflon" or equivalent compound.

Pump Guide Rails

Install the stainless steel guide rails in the pump guide plates, cutting the rails as required to suit the

station depth. Secure the rails with intermediate (if required) and upper guide rail brackets supplied with the station.

NOTE

A bead of silicone caulk applied around the inserts of the upper guide brackets will prevent "singing" or chattering of the guide rails during pump operation.



Do not attempt to lift the pump by the power cable. Use the lifting cable supplied with the pump.

Optional Pump Hoist Winch Installation And Operation



The pump hoist winch is of a general purpose design and the load rating is based on an intermittent duty cycle. The maximum capacity of the hoist is 650 lbs. (295 kg). The winch is not designed to be a human hoist and should never be operated when there are persons positioned on or under the load being moved. The brake is actuated by turning the handle. The load-lock brake is designed to hold the load whenever the handle is released.

A socket to receive the hoist is bolted to the valve package base. Open the wet well access doors before installing the hoist. Make sure the inside of the socket and the bottom of the winch support post are clean and rust-free. Apply a coating of grease to the bottom six inches (152 mm) of the post, and position the post in the socket.

NOTE

The lifting arm is adjustable from 32 inches to 47 inches (813 mm to 1194 mm) in length. Adjust the length of the arm so the pulley on the end of the arm will be positioned over the wet well guide rails when the hoist is positioned for lifting.



Never use worn, frayed or kinked cable. Replace damaged cables immediately. Make sure the cable is long enough to keep at least three (3) complete wraps around the drum when under load conditions.

Never attempt to lift a pump by the power cable. Lift a pump only by the stainless steel cable attached to the lifting bail on the pump. Lifting a pump by the power cable can result in damage the pump and/or power cable.

Following the manufacturer's instructions provided with the winch, feed the end of the pump lifting cable over the lifting arm pulley, **under the winch drum**, and out through one of the holes in the drum flange. Extend a minimum of 2 inches (51 mm) of cable through the cable keeper on the side of the drum flange and secure the cable by tightening the keeper hardware (See Figure 1).

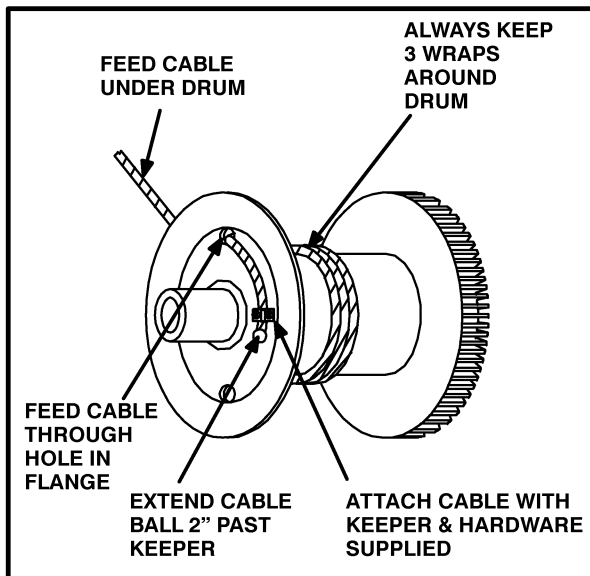


Figure 1. Attaching Cable to Drum

Make sure the cable is securely attached to the pump and winch, and turn the winch handle **clockwise to lift** the pump (see the "Load-Unload" decal on the side of the winch). A "clicking" sound will be heard as the handle is turned clockwise to lift. When the pump is suspended at the required height, rotate the hoist in the socket until the pump

guide shoe aligns with the guide rails in the wet well.

Turn the winch handle **counterclockwise to lower** the pump and engage the guide shoe with the guide rails (see the "Load-Unload" decal on the side of the winch). No "clicking" sound will be heard because the load-lock braking system is now activated.

NOTE

If the load is very light, the load-lock braking system is automatically bypassed by a mechanical drive system. When a heavier load is sensed by the winch, the load-lock system will automatically reset.

Continue to turn the winch handle counterclockwise to lower the pump down the guide rails until the guide shoe engages the discharge elbow at the bottom of the wet well.

When the pump power cables are connected, turn the winch handle counterclockwise until the all of the cable is off the drum. Disengage the keeper hardware and remove the cable from the winch. Secure the lifting cables to the upper guide plate brackets, close the access doors and remove the hoist from the socket.

Pump Installation

Slide the pumps down the guide rails until they seat on the base elbows. Extend the pump lifting cables to the upper guide plate brackets, loop and clamp the cables around the hooks on the brackets.

Pull the power cables up through the transition plate included with the station. **No junction boxes or conduit runs are required.** Pull all of the slack cable up through the transition plate, coiling any extra cable under the control panel in the station. Use the cord grip fittings supplied with the station to seal the cables against the entry of gasses into the station enclosure.

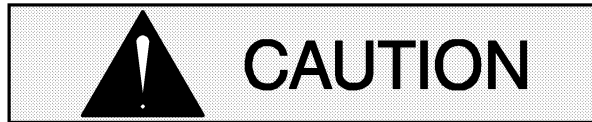
Route the loose ends of the power cables through the bottom of the control panel and secure them with the remaining cord grip fittings. Strip the cable ends and wire the leads to the appropriate terminals in the control panel as shown on the submittal drawings.

Water Hammer Arrestor

In installations where the length, rise or profile of the force main may cause destructive hydraulic

shock, a Water Hammer Arrestor should have been specified. The device will control these concussions and prevent the rupturing of pumps, valves or piping.

If a Water Hammer Arrestor has been specified, make certain that it is installed and functioning properly before the lift station is placed in operation.



Air release lines or valves furnished with the lift station **are not** designed to act as shock arrestors, and are not intended as substitutions for proper control devices.

Air Bubbler Liquid Level Control Lines

If the station is equipped with an air bubbler liquid level control system, the air bubbler pipe should extend into the center of the wet well and terminate with a tee fitting. Where possible, position the tee fitting so that the cleanout extension will be accessible from the underside of the aluminum access doors and cap the pipe tightly.

Connect the bubbler pipe to the tee fitting. Connect the air bell to the bubbler pipe. Refer to the engineer's plans and specifications to determine the proper distance between the air bell and the floor of the wet well.



The air bubbler pipe and cleanout extension must be firmly supported and **absolutely airtight**.

ELECTRICAL SERVICE CONNECTION

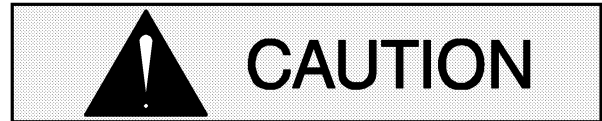


The electrical power applied to this station is high enough to cause injury or death. Ground the station before applying line potential. Failure to do so may

result in injury or death. A grounding electrode system must be available or installed and connected according to the National Electric Code or local codes. Grounding electrodes are not furnished with this lift station.

This equipment contains more than one source of power. More than one disconnect is required to completely de-energize the lift station.

Contact the electrical contractor for service extension to the control panel. Wiring must be made in accordance with the plans and specifications per local and the National Electrical Code. The schematic wiring diagram furnished with the station must be followed in making connections to the control panel.



On installations where a low voltage (115 volts) tap on incoming service is specified for control circuits and auxiliary equipment, care must be taken to ensure that the tap is not made to high voltage lines. If this occurs, **severe damage to control circuits will result**. The upper voltage limit for control power is 126 volts.

All electrical equipment in the lift station is grounded to the control panel sub-plate at the factory. Before applying line potential, however, ground the control panel itself at the main ground lug terminal installed on the control panel sub-plate.

The grounded circuit conductor, or one of the transformer secondary conductors (if supplied), is to be grounded if conditions permit. Follow practices recommended in the National Electric Code or local codes.

Terminal blocks are provided for the power connections to the lift station. Refer to the schematic wiring diagram furnished with the station.

If a remote warning and/or alarm device is to be installed outside the lift station housing, install and connect the device.

FINAL INSTALLATION INSPECTION

Ensure that all valves in the lift station are in the closed position as shipped from the factory.

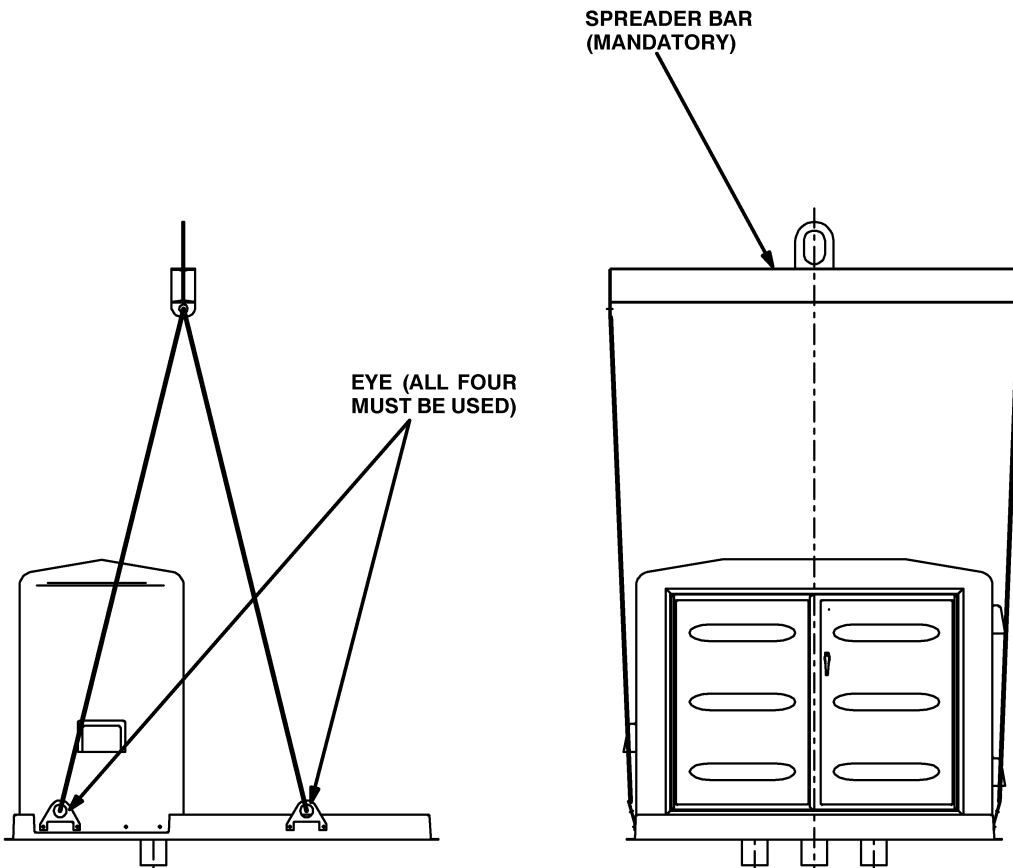
Check that, where specified, a Water Hammer Arrestor has been installed, and that all pipes con-

nected to the station are properly supported. Clean all construction debris from the wet well and pump station site area.

Verify that electrical service is properly connected.



All four eyes must be used. Approximate station weight - 6,000 lbs. (2722 kg.).



NOTE

Avoid sudden starts and stops while moving station.

Figure 2. Lifting Station With Sling and Spreader Bar



THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

www.grpumps.com

GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA

Printed in U.S.A.

©Copyright by the Gorman-Rupp Company