

## Installation Manual

685000C

# Omnivore® Explosion-Proof 2 HP Grinder Pumps

## XLSG and XLSGX-Series

### Models

**XLSG200-Series**

*Single-Stage*

**XLSGX200-Series**

*2-Stage High Head*



Certified to CSA, UL,  
and FM standards



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**Approved for Hazardous Locations**  
*Class I, Division 1, Groups C and D T4*  
*Class I, Zone 1, Groups IIA and IIB T4*

Keep this manual handy for future reference.

For replacement manual, visit [LibertyPumps.com](http://LibertyPumps.com),  
or contact Liberty Pumps at 800-543-2550.

Retain dated sales receipt for warranty.

### NOTICE

Installer: Manual must remain with owner or operator/maintainer.

Prior to installation, record information  
from pump nameplate for future reference:

Model: \_\_\_\_\_

Serial: \_\_\_\_\_

Mfg Date: \_\_\_\_\_

Install Date: \_\_\_\_\_

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## Safety Guidelines

	This safety alert symbol is used in the manual and on the pump to alert of potential risk for serious injury or death.
	This safety alert symbol identifies <b>risk of electric shock</b> . It is accompanied with an instruction intended to minimize potential risk of electric shock.
	This safety alert symbol identifies <b>risk of fire</b> . It is accompanied with an instruction intended to minimize potential risk of fire.
	This safety alert symbol identifies <b>risk of serious injury or death</b> . It is accompanied with an instruction intended to minimize potential risk of injury or death.
<b>⚠ DANGER</b>	Warns of hazards which, if not avoided, <b>will</b> result in serious injury or death.
<b>⚠ WARNING</b>	Warns of hazards which, if not avoided, <b>could</b> result in serious injury or death.
<b>⚠ CAUTION</b>	Warns of hazards which, if not avoided, <b>could</b> result in minor or moderate injury.
<b>NOTICE</b>	Signals an important instruction related to the pump. Failure to follow these instructions could result in pump failure or property damage.

**⚠ WARNING** Read every supplied manual before using pump system. Follow all the safety instructions in manual(s) and on the pump. Failure to do so could result in serious injury or death.

## Safety Precautions

### **⚠ WARNING** **RISK OF ELECTRIC SHOCK**

- Accidental contact with electrically live parts, items, fluid, or water can cause serious injury or death.
- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.
- All installation and maintenance of pumps, controls, protection devices, and general wiring shall be done by qualified personnel.
- All electrical and safety practices shall be in accordance with the National Electrical Code<sup>®</sup>, the Occupational Safety and Health Administration, or applicable local codes and ordinances.
- Do not remove cord and strain relief, and do not connect conduit to pump.
- Pump shall be properly grounded using its supplied grounding conductor. Do not bypass grounding wires or remove ground prong from attachment plugs. Failure to properly ground the pump system can cause all metal portions of the pump and its surroundings to become energized.
- Do not handle or unplug the pump with wet hands, when standing on damp surface, or in water unless wearing Personal Protective Equipment.
- Always wear dielectric rubber boots and other applicable Personal Protective Equipment (PPE) when water is on the floor and an energized pump system must be serviced, as submerged electrical connections can energize the water. Do not enter the water if the water level is higher than the PPE protection or if the PPE is not watertight.
- Do not lift or carry a pump or a float assembly by its power cord. This will damage the power cord, and could expose the electrically live wires inside the power cord.
- The electrical power supply shall be located within the length limitations of the pump power cord, and for below grade installations it shall be at least 4 ft (1.22 m) above floor level.
- Do not use this product in applications where human contact with the pumped fluid is common (such as swimming pools, fountains, marine areas, etc.).
- Protect the power and control cords from the environment. Unprotected power and control (switch) cords can allow water to wick through ends into pump or switch housings, causing surroundings to become energized.
- Single-phase 208/230V pumps shall only be operated without the float switch by using the circuit breaker or panel disconnect.
- Some products may have internal capacitors that could cause shock. Avoid contact with plug ends after removing from energy source.

**⚠️ WARNING****RISK OF FIRE**

- Do not use an extension cord to power the product. Extension cords can overload both the product and extension cord supply wires. Overloaded wires will get very hot and can catch on fire.
- This product requires a separate, properly fused and grounded branch circuit, sized for the voltage and amperage requirements of the pump, as noted on the nameplate. Overloaded branch circuit wires will get very hot and can catch on fire. When used, electrical outlets shall be simplex of the appropriate rating.
- Do not use this product with or near flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. If rotating elements inside pump strike any foreign object, sparks may occur. Sparks could ignite flammable liquids.
- Hazardous locations contain explosive gases that can be detonated by sparking or electric shock.
- All terminations and penetrations of conduit or cable shall be done using approved materials and methods intended for use to mitigate the potential for explosion.
- When working in a hazardous location, all precautions to minimize ignition sources such as spark and flame should be taken to limit the potential for fire or explosion.
- Sewage and effluent systems produce and may contain flammable and explosive gases. Prevent introduction of foreign objects into basin as sparks could ignite these gases. Exercise caution using tools and do not use electronic devices or have live, exposed electrical circuits in or around basins, open covers and vents.
- Use only non-sparking tools and components in and around basins, open covers and vents. Do not use electronic devices that are not rated for use in hazardous locations or have live, exposed electrical circuits in or around basins, open covers and vents. Sewage and effluent systems produce and may contain flammable and explosive gases and sparks could ignite these gases.

**⚠️ WARNING****RISK OF SERIOUS INJURY OR DEATH**

- Energizing the control panel or breaker for the first time is potentially dangerous. Licensed electrical personnel should be present when the panel or breaker is energized for the first time. If faults caused by damage or poor installation practices have not been detected, serious damage, injury or death can result when power is applied.
- All electrical and motor repairs and service must be performed by a repair facility approved by Liberty Pumps and certified to work on explosion-proof motor enclosures.
- Do not remove power supply or control cord. All electrical and motor repairs and service must be performed by the factory or a repair facility approved by Liberty Pumps and certified to work on explosion-proof motor enclosures.
- Refer to Chapter 5 of the National Electric Code® or applicable local codes and ordinances for all electrical and wiring requirements in hazardous locations.
- Float switches must be connected to an intrinsically safe circuit in the control panel as per the requirements of Chapter 5 of the National Electric Code®.

- All personnel shall be trained and qualified for safe work practices and procedures.
- All installations shall be in compliance with all applicable Federal, State, and Local codes and ordinances for hazardous locations.
- All electrical terminations shall be made according to Federal, State, and Local codes for hazardous or classified locations.
- Conduit, junction boxes, and associated components shall be approved for use with hazardous locations and installed according to specifications.
- Do not modify the pump/pump system in any way. Modifications may affect seals, change the electrical loading of the pump, or damage the pump and its components.
- All pump/pump system installations shall be in compliance with all applicable Federal, State, and Local codes and ordinances.
- Do not allow children to play with the pump system.
- Do not allow any person who is unqualified to have contact with this pump system. Any person who is unaware of the dangers of this pump system, or has not read this manual, can easily be injured by the pump system.
- In 208/230V installations, one side of the line going to the pump is always "hot", whether the float switch is on or off. To avoid hazards, install a double pole disconnect near the pump installation.
- Vent basin in accordance with local code. Proper venting of sewer and effluent gases alleviates poisonous gas buildup and reduces the risk of explosion and fire from these flammable gases.
- Wear adequate Personal Protective Equipment when working on pumps or piping that have been exposed to wastewater. Sump and sewage pumps often handle materials that can transmit illness or disease upon contact with skin and other tissues.
- Do not enter a pump basin after it has been used. Sewage and effluent can emit several gases that are poisonous.
- Do not remove any tags or labels from the pump or its cord.
- Keep clear of suction and discharge openings. To prevent injury, never insert fingers into pump while it is connected to a power source.
- This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov).
- A grinder pump contains metal parts that rotate at high speeds. Be careful around pump base while power is connected. Make sure that the pump is either in the tank or clear from people and wires when in operation.

**⚠️ CAUTION**

- ◆ This pump has been evaluated for use with water only.
- ◆ Wear Personal Protective Equipment as exposed bottom has sharp edges.

## NOTICE

- ◆ Check 3-phase pumps for correct rotation prior to installing pump(s) in basin. To change rotation, reverse any two of the three power leads to the pump (not the ground). Code the wires for reconnection after installation.
- ◆ Do not dispose of materials such as paint thinner or other chemicals down drains. Doing so could chemically attack and damage pump system components and cause product malfunction or failure.
- ◆ Do not use pump system with mud, sand, cement, hydrocarbons, grease, or chemicals. Pump and system components can be damaged from these items causing product malfunction or failure. Additionally, flooding can occur if these items jam the impeller or piping.
- ◆ Do not run dry.
- ◆ Do not position the pump float directly under the inlet from drain tile or in the direct path of any incoming water.
- ◆ Do not use pumps with fluid over 104°F (40°C). Operating the pump in fluid above this temperature can overheat the pump, resulting in pump failure.
- ◆ The Uniform Plumbing Code® states that sewage systems shall have an audio and visual alarm that signals a malfunction of the system, to reduce the potential for property damage.
- ◆ Keep pump upright.
- ◆ At no time shall the pump be stored within an incomplete wet pit. The pump shall not be placed into the pit until it can be fully operational.
- ◆ Do not allow the pump to freeze.

## General Information

Before installation, read these instructions carefully. Each pump is individually factory tested to ensure proper performance. Closely following these instructions will eliminate potential operating problems, assuring years of trouble-free service.

The XLSG/XLSGX-Series pumps are to be used for handling septic tank effluent, sewage, and drain (storm) water.

Provide pump serial number in all correspondence.

Pumps are certified by CSA Group to CSA®, UL®, and FM standards for use in hazardous locations with division classification of Class 1, Division 1, Groups C and D; or as zone classified Class 1, Zone 1, and Groups IIA and IIB.

Pumps must be serviced at a qualified hazardous motor enclosure repair facility approved by Liberty Pumps. Any unauthorized field repairs void warranty and hazardous location ratings. Contact Liberty Pumps at 1-800-543-2550 to locate the closest authorized repair facility.

## Operating Constraints

It is extremely important to verify that the pump has been sized correctly for the intended installation. The operating point of the pump must lie within the acceptable range as outlined by the applicable Liberty Pumps performance chart. Operating the pump outside of the recommended range can invalidate the CSA Certification of the pump and can also cause damage and premature failure. Operating outside of the recommended range can cause the pump to exceed its rated nameplate amp draw, which will void the pump certification. It can also cause motor overheating, cavitation, excessive vibration, clogging, and poor energy efficiency.

## Model Specifications

For complete listing of models and their specifications, refer to <http://www.LibertyPumps.com/About/Engineering-Specs>. Pump nameplate provides a record of specific pump information.

## Inspection and Storage

### Initial Inspection

The pump should be immediately inspected for damage that may have occurred in shipment.

1. Visually check the pump and any spare parts for damage.
2. Check for damaged electrical wires, especially where they exit the motor housing.

Contact Liberty Pumps customer service to report any damage or shortage of parts.

### Storage Before Use

#### **WARNING** **RISK OF ELECTRIC SHOCK**

- Protect the power and control cords from the environment. Unprotected power and control (switch) cords can allow water to wick through ends into pump or switch housings, causing surroundings to become energized.

#### **NOTICE**

- ◆ At no time shall the pump be stored within an incomplete wet pit. The pump should not be placed into the pit until it can be fully operational.
- ◆ Do not allow the pump to freeze.

XLSG/XLSGX-Series Omnivore grinder pumps are shipped from the factory ready for installation and use. The pump should be held in storage if the pump station is not complete.

If storage is necessary, the pump should remain in its shipping container. It should be stored in a warehouse or storage shed that has a clean, dry temperature-stable environment where the pump and its container are covered to protect it from water, dirt, vibration, etc. The cord ends must be protected against moisture.

**Uninstalled** pumps that are idle for greater than three months should have impellers and cutters manually rotated once a month to lubricate the seals.

**Installed** pumps that are idle for greater than one month should have impellers and cutters manually operated through the breaker panel once a month to lubricate the seals.

## Pump Design

XLSG/XLSGX-Series grinder pumps are designed for continuous underwater operation. The motor and pump form a close coupled, watertight unit. The induction motor is insulated against heat and moisture in accordance with Class F 311°F (155°C) regulations.

The motor is protected against damage from water entry by two mechanical seals. The lower seal is 2-piece, silicon carbide/silicon carbide and the upper seal is unitized silicon carbide/silicon carbide.

The impeller and volute are designed for efficient flow characteristics and clog-free operation. The hardened cutters grind solids and fibrous matter into small particles that can be safely pumped through small diameter piping.

## Pump System Components

### Control Panel

#### **⚠️ WARNING** **RISK OF SERIOUS INJURY OR DEATH**

- Float switches must be connected to an intrinsically safe circuit in the control panel as per the requirements of Chapter 5 of the National Electric Code®.

XLSG/XLSGX-Series grinder pumps require a separate, approved control panel for automatic operation. Operation will be according to the control selected. Refer to separate manufacturer's instructions supplied with the unit.

The control panel shall be installed outside the hazardous area and appropriately isolated and sealed to prevent any potential ignition or explosion. Only approved controls that have intrinsically safe float switch connections shall be used. Mounting, installation and wiring connections are specific to the control panel used. Refer to the manufacturer's instructions supplied with the unit.

**IMPORTANT:** When connecting an XLSG/XLSGX-Series pump to an existing control panel, verify the panel is correctly sized and equipped for the pump.

The control panel for 3-phase pumps shall have provisions for the thermostats that open the motor contactors in order to maintain the T4 (135°C) temperature class. Do not exceed voltage/current combinations for the thermostat: 16 VDC/20 Amps, 115 VAC/22 Amps, 277 VAC/8 Amps, 600 VAC/4 Amps. All models have a temperature (T) class rating of T4 with thermostats connected. Failure to use the proper circuitry and to connect the thermostat will void the T4 temperature class of the pump and will drop the temperature class to T3 (200°C).

Intrinsically safe control panels designed for use with the XLSG/XLSGX-Series pumps available from Liberty Pumps can be found at [http://www.LibertyPumps.com/Portals/0/Files/panel\\_selection\\_guide.pdf](http://www.LibertyPumps.com/Portals/0/Files/panel_selection_guide.pdf) or contact Liberty Pumps.

1-phase pumps require a panel-mounted start circuit consisting of a start capacitor, run capacitor, and start relay, which are available separately. Refer to Table 1 for these control panel components.

Table 1. Control Panel Components 1-Phase

Required Component and Specification	Liberty Pumps P/N
208 V 1-phase Start Kit (contains 3 items listed separately below)	K001640
Start Capacitor, 270–324 µF 220/250 VAC	
Run Capacitor, 65 µF 370 VAC	
Start Relay	
230 V 1-phase Start Kit (contains 3 items listed separately below)	K001641
Start Capacitor, 270–324 µF 220/250 VAC	
Run Capacitor, 50 µF 370 VAC	
Start Relay	

### Overload Protection

XLSG/XLSGX-Series grinder pumps require overload protection in the control panel. The motor control unit shall be approved and shall be properly sized or adjusted for the full load input power indicated on the pump nameplate. It is important to properly adjust or select the motor control overload protection. The full load amps on the nameplate should be used as a baseline, but it is important to consider that events such as supply voltage variation or large solids passing through the pump can temporarily increase current draw. To avoid possible nuisance tripping, it may be necessary to adjust overloads to a value slightly higher than the full load input power indicated on the pump nameplate.

### Thermostats

XLSG/XLSGX-Series grinder pumps are protected from overheating by means of thermal switches (thermostat) located in the motors. For 1-phase models, a hermetically sealed thermal overload device is mounted on the motor windings and wired directly in series with the motor's winding, interrupting power in a high heat condition. 3-phase models utilize two thermostats mounted in series directly on the motor windings. The thermostat circuit shall be connected to a control panel that will stop power to the pump in a high temperature condition.

Both 1- and 3-phase pumps are constructed with class F materials, with a maximum operation temperature of 155°C. **Failure to use the proper circuitry and connection of the thermostat will drop temperature class from T4 to T3 on 3-phase units.**

Many panels have a manual reset button for the thermostats on 3-phase units. This button must be pressed to reset the system after the pump has cooled. 1-phase units reset automatically after the pump has cooled.

## Seal Failure Probes

XLSG/XLSGX-Series grinder pumps are equipped with two mechanical face seals with an intermediate oil chamber between them. This ensures lubrication for the seals, shaft flame path, and as a barrier to the motor chamber in the event the lower seal is compromised. A seal fail or moisture sensing device is located in the mid oil chamber and continuously monitors for leakage. In the event of a seal failure, moisture mixes with the oil, tripping the seal leak circuit. In a failure condition, a fault light will illuminate on the control panel. The pump will continue to operate, but service should be scheduled as soon as possible.

Intrinsically safe (ISS and ISD) control panels by Liberty Pumps have a seal leak test button that tests the integrity of the seal leak circuit continuity. When pressed, the light should illuminate. The light should go off when the test button is released. If it remains on, the potentiometer is set too high. If light does not illuminate, the light is burned out, the circuitry is open, or the system does not have power. The seal leak relay requires adjustment upon installation. See **Seal leak relay setup** on page 7.

## Power and Control Cords

### **⚠️ WARNING** ⚡ RISK OF ELECTRIC SHOCK

- Do not remove cord and strain relief, and do not connect conduit to pump.

The power and control cords cannot be spliced; a junction box may be used providing it is rated for hazardous locations and has approved cord connectors.

**IMPORTANT:** Each cord has a green lead. This is the ground wire and must be grounded properly per NEC® and/or local codes.

## Wiring Instructions

### **⚠️ WARNING** ⚡ RISK OF ELECTRIC SHOCK

- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.
- All installation and maintenance of pumps, controls, protection devices, and general wiring shall be done by qualified personnel.
- All electrical and safety practices shall be in accordance with the National Electrical Code®, the Occupational Safety and Health Administration, or applicable local codes and ordinances.

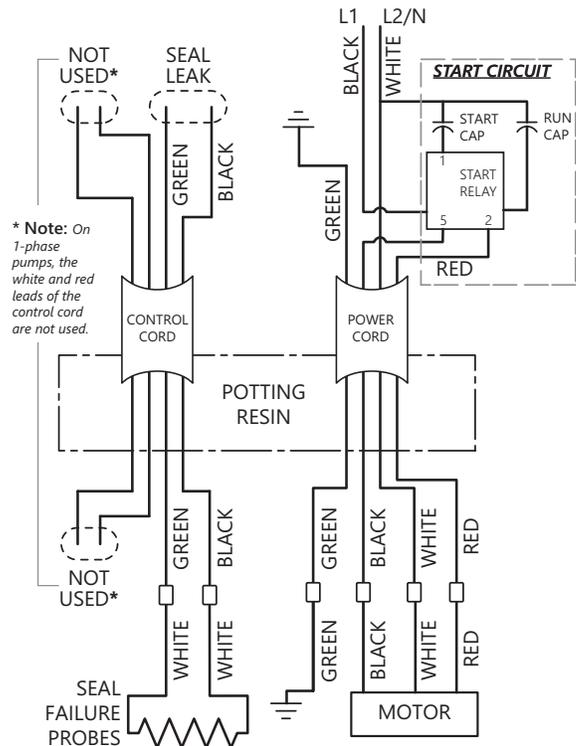


Figure 1. Wiring Diagram 1-Phase

208V/230V 3PH	440-480V 3PH	575V 3PH
L1 → BLK RED	L1 → BLK BRN → RED	L1 → BLK
L2 → PNK WHT	L2 → PNK ORN → WHT	L2 → PNK
L3 → VIO BLU	L3 → VIO YEL → BLU	L3 → VIO

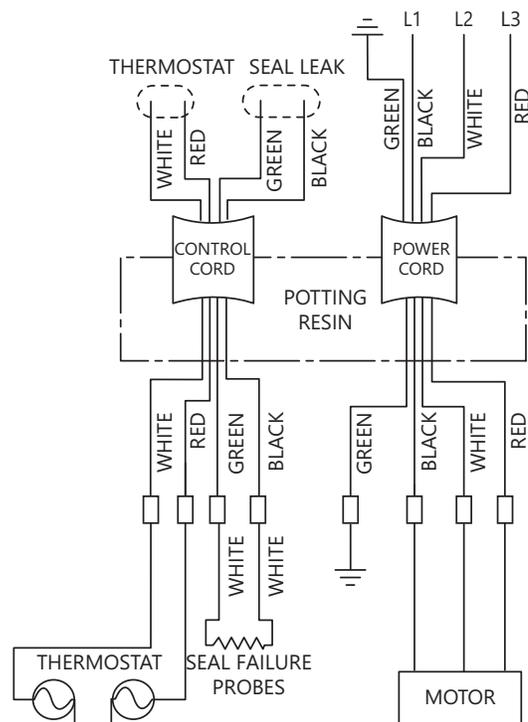


Figure 2. Wiring Diagram 3-Phase

## Preparation

### **⚠️ WARNING** ⚡ RISK OF ELECTRIC SHOCK

- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.

### **Prepare Sump [Basin]**

If replacing a previously installed pump, prepare the basin by removing the old pump and cleaning any debris from the basin. Inspect all remaining equipment in the basin including guide rails, piping, valves, and electrical junction boxes (if present) and repair or replace as appropriate. Ensure that control hardware such as floats or pressure transducers are clean, properly adjusted, and in good working order.

Pump installation should be at a sufficient depth to ensure that all plumbing is below the frost line. If this is not feasible, remove the check valve and size the basin and/or adjust pump differential to accommodate the additional backflow volume. Consult Liberty Pumps for details on how this should be done.

### **Pump Control and Alarm Floats**

The water level in the basin is determined by the placement of the control floats and should be positioned such that the motor housing is completely submerged to properly cool the motor. If full submersion is not possible, the minimum water depth must be no less than 13 inches as measured from the bottom of the pump legs. The upper water level should be positioned to minimize pump starts. The alarm float must be above the turn-on float switch but below any inlets. No control should be set above the inlet to the basin.

Set the second (turn-on) control above the lower turn-off control. The exact distance between the two floats must be a compromise between a frequent pumping cycle (10 starts per hour max) to properly manage sewage level, and a longer pump run duration per start, which maximizes energy efficiency. This distance must be determined by the engineer, depending on the conditions of the application.

### **Cutter and Impeller Free Movement Check**

#### **⚠️ CAUTION**

- Wear Personal Protective Equipment as exposed bottom has sharp edges.

**Do not connect any power to pump until this check is complete.** Manually rotate the cutter to check that it spins freely with very little resistance. The cutter is located on the bottom of the pump. The cutter can be carefully rotated by hand, or rotated by inserting a tool into the cutter bolt. If rotating by hand, wear protective gloves as the cutter and cutter plate have sharp edges. The pump can remain upright or can be laid down on its side for easier access to the cutter. Besides verification that the cutter and impeller are freely spinning, rotating the cutter helps to lubricate the shaft seals if the pump has been non-operational for more than a week. It is recommended to rotate the cutter 5–10 full rotations.

## Installation

### **⚠️ WARNING** ⚡ RISK OF ELECTRIC SHOCK

- All installation and maintenance of pumps, controls, protection devices, and general wiring shall be done by qualified personnel.
- All electrical and safety practices shall be in accordance with the National Electrical Code®, the Occupational Safety and Health Administration, or applicable local codes and ordinances.

### **Electrical Connections**

With main power disconnected, complete pump and control wiring connections per wiring diagrams included with the control panel and Figure 1/Figure 2 as applicable. All wires should be checked for unintentional grounds with an ohmmeter after the connections are made.

### **Thermostat and Seal Failure Connections**

Verify thermostat wires are connected in series with the contactor and that seal fail probes are properly connected and relay sensitivity properly adjusted. Connections are provided on the terminal strip inside the Liberty Pumps control panel.

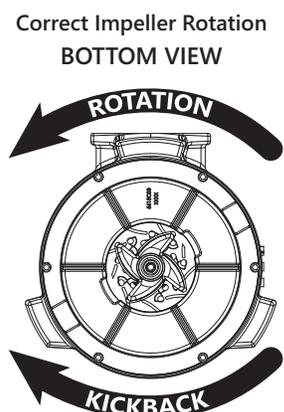
**Seal leak relay setup:** Turn the potentiometer dial clockwise until the red light turns on, then turn the dial counterclockwise until the red light turns off. The tick marks on the seal leak relay are for reference only. The seal leak adjustment dial should be set to around 75 (range is 75 to 125).

### **3-Phase Pump Rotation Verification**

#### **NOTICE**

- Check 3-phase pumps for correct rotation prior to installing pump(s) in basin. To change rotation, reverse any two of the three power leads to the pump (not the ground). Code the wires for reconnection after installation.

3-phase power uses three separate alternating currents that peak at different integrals. With pumps that are powered by three phase electric, the phase sequence of the motor must match the phase sequence of the power source. When the phase sequences match, the pump operates properly. However, when the phases are out of order, the pump runs backward (i.e., the impeller rotates in the wrong direction). This causes an extreme loss of performance and could raise the current draw, which could result in tripping an overload or circuit breaker.



To ensure that the power to the pump is installed correctly, always verify proper rotation **before** lowering it into the basin. If the pump is rotating in the wrong direction, turn off the power and reverse any two power leads. This reverses the phase sequence and corrects the pump rotation. **Rotation must be counterclockwise when looking from the bottom of the pump.**

## Guide Rail System

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### **WARNING** **RISK OF FIRE**

- When working in a hazardous location, all precautions to minimize ignition sources such as spark and flame should be taken to limit the potential for fire or explosion.

If guide rails are used, refer to the separate instructions supplied with the unit for proper installation and operation, making sure all gaskets and components are present. Use of a guide rail system shall be of a non-sparking design. Contact Liberty Pumps for available models, such as GR20NS.

If guide rails are not used, complete all pump-mounted plumbing at this time, being sure all gaskets and components are present.

### **Pump**

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Record information from pump nameplate onto inside cover of these instructions. Complete a visual inspection before lowering into basin.

Place pump in basin being sure the mounting interface (i.e., guide rail, torque stop) is engaged correctly.

### **Discharge**

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Make all discharge connections. A check valve is required to prevent the backflow of liquid after each pumping cycle. A gate valve should follow the check valve to allow periodic cleaning of the check valve or removal of the pump. The remainder of the discharge line should be as short as possible with a minimum number of turns to minimize friction head loss. Do not reduce the discharge to below the pump outlet size. Larger pipe sizes may be required to eliminate friction head loss over long runs. Contact Liberty Pumps or other qualified person if questions arise regarding proper pipe size and flow rates.

### **Vent**

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Vent basin in accordance with applicable plumbing codes.

## Operation

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### **WARNING** **RISK OF SERIOUS INJURY OR DEATH**

- Energizing the control panel or breaker for the first time is potentially dangerous. Licensed electrical personnel should be present when the panel or breaker is energized for the first time. If faults caused by damage or poor installation practices have not been detected, serious damage, injury or death can result when power is applied.

## Starting System

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1. Verify all plumbing components in the basin are installed correctly and functional. Verify all valves are open and ready for pump use.
2. Double check all wire connections. Re-tighten all factory and field connections.
3. Ensure pump has no obstructions.
4. With all electrical and mechanical connections complete and secure, turn on power to control panel and pump.
5. Verify operation of the pump, floats, and alarm circuits.
6. Run several cycles of water through the system to verify correct control operation for the installation.

Be certain to complete adequate testing, especially on systems with multiple pumps or custom control configurations.

## Maintenance and Troubleshooting

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### **WARNING** **RISK OF ELECTRIC SHOCK**

- Accidental contact with electrically live parts, items, fluid, or water can cause serious injury or death.
- Always disconnect pump(s) from power source(s) before handling or making any adjustments to either the pump(s), the pump system, or the control panel.
- All electrical and motor repairs and service must be performed by a repair facility approved by Liberty Pumps and certified to work on explosion-proof motor enclosures.

### **WARNING** **RISK OF FIRE**

- Use only non-sparking tools and components in and around basins, open covers and vents. Do not use electronic devices that are not rated for use in hazardous locations or have live, exposed electrical circuits in or around basins, open covers and vents. Sewage and effluent systems produce and may contain flammable and explosive gases and sparks could ignite these gases.

### **WARNING** **RISK OF SERIOUS INJURY OR DEATH**

- Wear adequate Personal Protective Equipment when working on pumps or piping that have been exposed to wastewater. Sump and sewage pumps often handle materials that can transmit illness or disease upon contact with skin and other tissues.
- Do not enter a pump basin after it has been used. Sewage and effluent can emit several gases that are poisonous.

### **NOTICE**

- ◆ Verify correct 3-phase pump rotation before retuning to service.

## Maintenance

Pump should be checked quarterly for corrosion and wear. As the motor is oil-filled, no lubrication or other maintenance is required. Severe operating environments will require more frequent checks.

### Field Service on Hazardous Location Pumps

The power and control cord are not field replaceable. If either cord is compromised, the entire pump must be brought to an authorized hazardous motor enclosure repair facility approved by Liberty Pumps.

The only allowable repair/replacement without compromising the hazardous location rating of the pump is the lower shaft seal. A certified repair shop should perform this task since they have the capability to clean and flush the mid oil chamber.

Otherwise, the pump must be returned to Liberty Pumps or an authorized hazardous repair facility for electrical and motor service. This will ensure the integrity of the hazardous location rating of the pump and comply with Liberty Pumps warranty requirements.

## Troubleshooting

No repair work shall be carried out during the warranty period without prior factory approval. To do so may void the warranty.

Liberty Pumps, Inc. assumes no responsibility for damage or injury due to disassembly in the field. Disassembly, other than an authorized hazardous motor enclosure repair facility approved by Liberty Pumps or its authorized service centers, automatically voids warranty.

Table 2. Troubleshooting Matrix

Problem	Possible Cause	Corrective Action
Pump does not start.	Damaged power cable.	Return pump to an authorized repair facility.
	Control panel selector switch in Off position.	Set selector switch to Hand or Auto position.
	Blown control circuit transformer fuse.	Replace fuse.
	Tripped circuit breaker, blown fuse, or other interruption of power.	Reset tripped circuit breaker; replace blown fuse with properly sized fuse; investigate power interruption.
	Improper voltage.	Have an electrician check all wiring for proper connections and adequate voltage and capacity.
	Float switch unable to move to the PUMP ON position due to interference in basin or other obstruction.	Position the pump or float switch so that it has adequate clearance for free movement.
	Insufficient liquid level.	Verify the liquid level is allowed to rise enough to activate float switch(es).
	Defective float switch.	Replace float switch.
	Obstructed impeller or volute.	Remove obstruction.
	Loose wiring connections.	Check and tighten all connections.
	Thermal overload tripped.	Wait for pump to cool to operating temperature.
Pump does not start and overload heaters trip.	Unintentional ground.	Turn off power and check motor leads for possible ground.
	3-phase motor winding failure.	Check resistance of motor windings. All three phases should have the same reading.
	Obstructed impeller or volute.	Remove obstruction.
Pump operates with control panel selector switch in Hand position but does not operate in Auto position.	Control circuits malfunctioning.	Check float level control or the alternator relay for issues.
		Check control panel.

Table 2. Troubleshooting Matrix (continued)

Problem	Possible Cause	Corrective Action
Pump runs, but does not turn off.	Pump is airlocked.	Turn pump off and let set for several minutes, then restart.
	Control panel selector switch in Hand position.	Set selector switch to Auto position.
	Float switch unable to move to the PUMP OFF position due to interference with the side of basin or other obstruction.	Position the pump or float switch so that it has adequate clearance for free movement.
	Control panel failure.	Check control panel.
	Defective float switch.	Replace float switch.
Motor stops and then restarts after short period but overload heaters in starter do not trip.	Pump operating on a short cycle due to basin being too small.	A larger basin may be required. Consult Liberty Pumps.
Pump cycles too frequently.	Improper float switch setting.	Adjust float switch setting.
	Check valve not installed, is stuck open, or is leaking.	Install check valve(s); remove check valve and examine for freedom of operation and proper installation.
Pump runs or hums, but does not pump.	Discharge line is blocked or restricted.	Check the discharge line for foreign material, including ice if the discharge line passes through or into cold areas.
	Check valve is stuck closed or installed backward.	Remove check valve(s) and examine for freedom of operation and proper installation.
	Gate or ball valve is closed.	Open gate or ball valve.
	Total head (lift height) is beyond pump's capability.	Route piping to a lower level. If not possible, a larger pump may be required. Consult Liberty Pumps.
	Obstructed impeller or volute.	Remove obstruction.
	Pump is airlocked.	Turn pump off and let set for several minutes, then restart.
		Add baffle to reduce trapped air bubbles.
	Capacitor failure in control panel.	Check capacitors and replace if needed.
	Stuck/defective motor contactor in control panel.	Replace motor contactor.
Pump is not seated correctly in guide rail base.	Lift pump and re-position.	
Pump runs periodically when fixtures are not in use.	Check valve not installed, is stuck open, or is leaking.	Install check valve(s); remove check valve and examine for freedom of operation and proper installation.
	Fixtures are leaking.	Repair fixtures as required to eliminate leakage.

Table 2. Troubleshooting Matrix (continued)

Problem	Possible Cause	Corrective Action
Pump does not deliver proper capacity.	Discharge valve(s) partially closed or clogged.	Check the discharge line for foreign material, including ice if the discharge line passes through or into cold areas.
	Check valve partially clogged.	Raise liquid level up and down to clear; remove check valve to remove obstruction.
	Incorrect motor rotation.	1-Phase: Contact factory. 3-Phase: Correct 3-phase pump rotation direction. Refer to section <b>3-Phase Pump Rotation Verification</b> .
	Total head (lift height) is beyond pump's capability.	Route discharge piping to a lower level. If not possible, a larger pump may be required. Consult Liberty Pumps.
	Low liquid level.	Check liquid level.
	Obstruction in pump or piping.	Remove obstruction.
Pump operates noisily.	Piping attachments to building are too rigid.	Replace a portion of the discharge line with rubber hose or connector.
	Incorrect motor rotation.	1-Phase: Contact factory. 3-Phase: Correct 3-phase pump rotation direction. Refer to section <b>3-Phase Pump Rotation Verification</b> .
	Pump is being run below minimum head requirement causing cavitation.	A different sized pump or impeller may be required. Consult Liberty Pumps.
	Foreign objects in the impeller cavity.	Clean the impeller cavity.
	Broken impeller.	Consult Liberty Pumps for information regarding impeller replacement.
	Worn bearings.	Return pump to an authorized repair facility.
Seal fail light is illuminated.	Lower (outer) seal has been compromised.	Replace lower seal.
	Control panel relay sensitivity is incorrect.	Adjust sensitivity dial.
Repeated tripping.	Circuit protection underrated.	Check rating and replace with proper size.
	Current unbalance.	Check current draw.
	Other appliance on same circuit.	Pump requires separate circuit.
	Pump is connected to an extension cord or wiring is inadequate or compromised.	Have an electrician check for proper wiring.
	Improper voltage.	Have an electrician check all wiring for proper connections and adequate voltage and capacity.
	Obstruction in pump.	Remove obstruction.
	Foreign matter build-up.	Clean motor housing.
	Incorrect motor rotation.	1-Phase: Contact factory. 3-Phase: Correct 3-phase pump rotation direction. Refer to section <b>3-Phase Pump Rotation Verification</b> .

## **Warranty**

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### **Liberty Pumps Wholesale Products Limited Warranty**

Liberty Pumps, Inc. warrants that Liberty Pumps wholesale products are free from all factory defects in material and workmanship for a period of three (3) years from the date of purchase (excluding batteries). The date of purchase shall be determined by a dated sales receipt noting the model and serial number of the pump. The dated sales receipt must accompany the returned pump if the date of return is more than three years from the date of manufacture noted on the pump nameplate.

The manufacturer's sole obligation under this Warranty shall be limited to the repair or replacement of any parts found by the manufacturer to be defective, provided the part or assembly is returned freight prepaid to the manufacturer or its authorized service center, and provided that none of the following warranty-voiding characteristics are evident:

The manufacturer shall not be liable under this Warranty if the product has not been properly installed, operated, or maintained per manufacturer instructions; if it has been disassembled, modified, abused, or tampered with; if the electrical cord has been cut, damaged, or spliced; if the pump discharge has been reduced in size; if the pump has been used in water temperatures above the advertised rating; if the pump has been used in water containing sand, lime, cement, gravel, or other abrasives; if the product has been used to pump chemicals, grease, or hydrocarbons; if a non-submersible motor has been subjected to moisture; or if the label bearing the model and serial number has been removed.

Liberty Pumps, Inc. shall not be liable for any loss, damage, or expenses resulting from installation or use of its products, or for indirect, incidental, and consequential damages, including costs of removal, reinstallation or transportation.

**There is no other express warranty. All implied warranties, including those of merchantability and fitness for a particular purpose, are limited to three years from the date of purchase. This Warranty contains the exclusive remedy of the purchaser, and, where permitted, liability for consequential or incidental damages under any and all warranties are excluded.**



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