

Installation Manual

3473000C

Explosion-Proof Submersible Sewage Pumps

XLE-Series

Models

XLE50-Series

1/2 hp

XLE70-Series

3/4 hp

XLE100-Series

1 hp

XLE150-Series

1-1/2 hp



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,
or contact Liberty Pumps at 1-800-543-2550.

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 risk of electric shock . It is accompanied with an instruction intended to minimize potential risk of electric shock.
	This safety alert symbol identifies risk of fire . It is accompanied with an instruction intended to minimize potential risk of fire.
	This safety alert symbol identifies risk of serious injury or death . It is accompanied with an instruction intended to minimize potential risk of injury or death.
⚠ DANGER	Warns of hazards which if not avoided will result in serious injury or death.
⚠ WARNING	Warns of hazards which if not avoided could result in serious injury or death.
⚠ CAUTION	Warns of hazards which if not avoided could result in minor or moderate injury.
NOTICE	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.
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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[®], 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.

⚠ 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.
- 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.

- 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.
- 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.

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

- 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.
- 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.
- 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.
- 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.
- All pump/pump system installations shall be in compliance with all applicable Federal, State, and Local codes and ordinances.
- 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 remove any tags or labels from the pump or its cord.
- Do not enter a pump basin after it has been used. Sewage and effluent can emit several gases that are poisonous.
- 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.

⚠ CAUTION

- ◆ This pump has been evaluated for use with water only, however use with human waste and toilet paper is permitted.

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 pumps with fluid over 104°F (40°C). Operating the pump in fluid above this temperature can overheat the pump, resulting in pump 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.
- ◆ 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.
- ◆ Do not position the pump float directly under the inlet from drain tile or in the direct path of any incoming water.
- ◆ Do not introduce any consumer item that is not toilet paper into a non-grinder (dewatering/effluent or sewage) pump/pump system. This includes, but is not limited to the following: feminine products, wipes, towels, towelettes, dental floss, swabs, pads, etc. Items such as these put the pump under undo strain and can result in pump/pump system failure. Additionally, it creates conditions for discharge line blockage.
- ◆ Keep pump upright.
- ◆ Do not allow the pump to freeze.
- ◆ At no time shall the pump be stored within an incomplete wet basin. The pump shall not be placed into the basin until it can be fully operational.

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.

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

Provide pump serial number in all correspondence and reports.

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 basin. The pump shall not be placed into the basin until it can be fully operational.
- ◆ Do not allow the pump to freeze.

XLE-Series pumps are shipped from the factory ready for installation and use. Hold the pump 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 manually rotated once a month to lubricate the seals.

Installed pumps that are idle for greater than one month should have impellers manually operated through the breaker panel once a month to lubricate the seals. *Pumps that are idle in a wet basin must be removed.*

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®.

XLE-Series pumps require a separate, approved pump control device or panel for automatic operation. Operation will be according to the control selected. Refer to separate manufacturer's instructions supplied with the unit. Verify the electrical specifications for the control panel properly match those of the pump.

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. 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 XLE-Series pump to an existing control panel, verify the panel is correctly sized and equipped for the pump.

3-phase models require overload elements selected or adjusted in accordance with the control instructions. The control panel shall have provisions for the thermostat that open the motor contactors. Do not exceed voltage/current combinations for the thermostat: 16 Vdc/20 Amps, 115 Vac/22 Amps, 277 Vac/8 Amps, and 600 Vac/4 Amps. All models have a surface temperature (T) class rating of T4; however, if thermostat is not connected on 3-phase models, the T class drops to T3.

Intrinsically safe control panels designed for use with the XLE-Series pumps available from Liberty Pumps can be found at http://www.LibertyPumps.com/Portals/0/Files/panel_selection_guide.pdf or contact Liberty Pumps.

1-phase pumps require a panel-mounted run capacitor. Refer to Table 1.

Table 1. Capacitor Kits

Model	Run Capacitor	Capacitor Kit
XLE51	45 µF 370 VAC	K001514
XLE52	30 µF 370 VAC	K001513
XLE71	45 µF 370 VAC	K001514
XLE72	30 µF 370 VAC	K001513
XLE102	40 µF 370 VAC	K001585
XLE152	40 µF 370 VAC	K001585

Overload Protection

3-phase models require overload protection in accordance with the control panel instructions. 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 select and adjust the motor control overload protection. The full load amperes 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.

Seal Failure Probes

XLE-Series pumps are equipped with two mechanical face seals with an oil chamber between them to provide permanent lubrication to the seals. A seal fail or moisture sensing device is located in the mid oil chamber and continuously monitors for leakage. Should moisture mix with the oil, an indicator light will illuminate on the control panel indicating a shaft seal failure has occurred and the pump is in need of service. The pump will continue to operate as normal but service should be scheduled as soon as possible.

Intrinsically safe (ISS and ISD Series) 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. If it does not, either the light is burned out, the circuitry is open, or the system does not have power.

The seal leak module is located inside the panel and requires adjustment upon installation. See **Seal leak relay setup** on page 7.

Seal fail probes connect to a relay in the control panel, which is included in a Liberty Pumps control panel. For a non-Liberty Pumps control panel or for a replacement relay, refer to Table 2.

Table 2. Seal Fail Replacement Relay

Description	Relay Input Voltage	Liberty Pumps P/N	Macromatic P/N
Simplex, controls 1 pump	120V	K001672	SFP120A250
	240V	K001673	SFP240A250
Duplex, controls 2 pumps	120V	K001675	SFP120C250
	240V	K001676	SFP240C250

Thermostats

XLE-Series pumps are protected from overheating by thermal switches (thermostats) located in the motor. For 1-phase models, a hermetically sealed thermostat 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, thus monitoring the pump's internal temperatures. The thermostat circuit must be connected in such a way as to open the motor contactors in the panel cutting power to the pump in an overheat condition.

Both 1-phase and 3-phase pumps are designed to operate under class B insulation with a maximum temperature of 266°F (130°C) internal temperatures, even though the motors are constructed with class F materials. **Failure to use the proper circuitry and connection of the thermostat will drop T class to T3 on 3-phase models.**

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

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 cable 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.

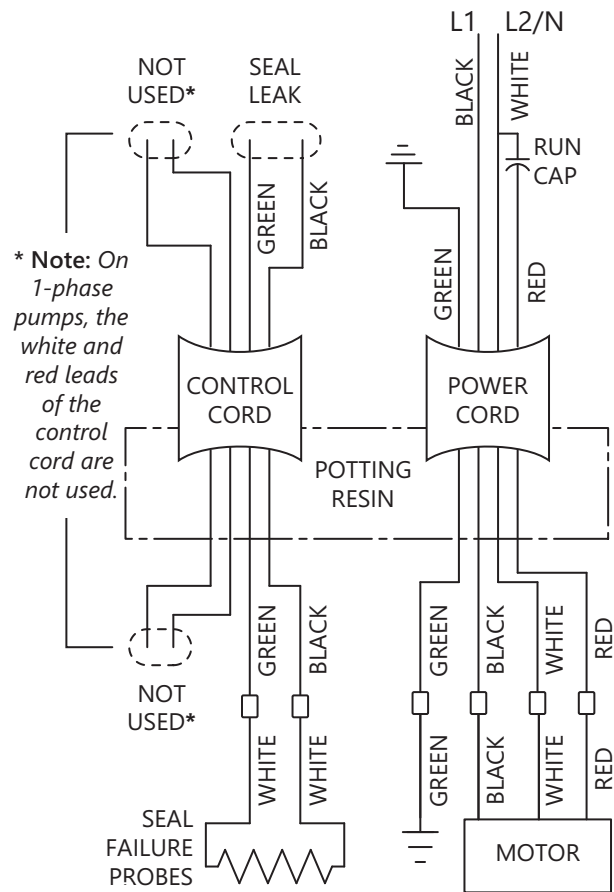


Figure 1. Wiring Diagram 1-Phase

208–230V 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
		BRN ↔ ORN YEL

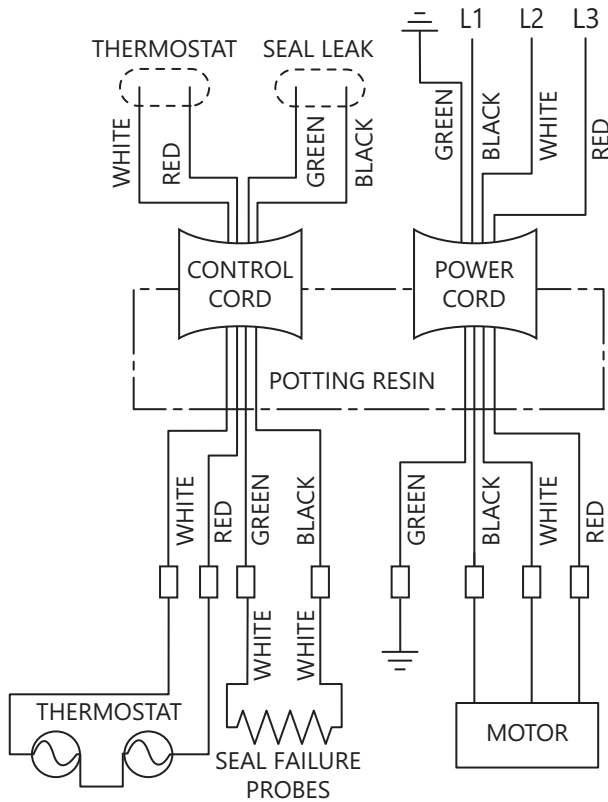


Figure 2. Wiring Diagram 3-Phase

Preparation

⚠️ 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, first 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. Also, ensure that control hardware such as floats or pressure transducers are clean, properly adjusted, and in good working order.

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 pump is completely submerged. The **minimum** water depth to properly cool the motor should be set as follows:

- XLE50 7" from the bottom of the legs
- XLE70 7" from the bottom of the legs
- XLE100 9" from the bottom of the legs
- XLE150 14" from the bottom of the legs

The upper water level should be positioned to minimize pump starts. The alarm float should be above the turn on float switch but below any inlets. No control should be set above the inlet to the basin. Float switches must be unobstructed and maintain free movement in basin.

Impeller Free Movement Check

Do not connect any power to pump until this check is complete. Manually rotate the impeller to check that it spins freely with very little resistance. The impeller can be rotated by reaching into the pump intake. The pump can remain upright or can be laid down on its side for easier access to the intake. Besides verification that the impeller is freely spinning, rotating the impeller helps to lubricate the shaft seals if the pump has been non-operational for more than a week. It is recommended to rotate the impeller 5–10 full rotations.

Installation

⚠️ 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 mains power disconnected, complete pump and control wiring connections per wiring diagrams included with the control panel and Figure 1/Figure 2 as applicable. Check all wires for unintentional grounds 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: The dial should be set to 75. For best results, turn the dial until the light turns on (around 125), then back slowly until the light just goes out (approx. 75).

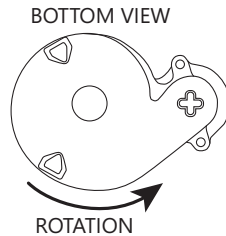
3-Phase Pump Rotation Verification

NOTICE

- Check 3-phase pumps for proper 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 intervals. 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 leads to the pump (not ground). This reverses the phase sequence and corrects the pump rotation. For 3-phase pumps, rotation must be counterclockwise when looking from the bottom of the pump. Label the wires for reconnection after installation.



Guide Rail System

⚠️ 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. Verify 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 GR22NS-LE or GR30NS (XLE100/150 models).

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

Pump

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

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

Discharge

A union should be installed just above the cover to facilitate pump removal if necessary. A check valve is required after the union 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 restrict the discharge to below 2". Larger pipe sizes may be required to eliminate friction head loss over long runs. Contact Liberty Pumps or other qualified person if there are questions regarding proper pipe size and flow rates.

Vent

Vent basin in accordance with applicable plumbing codes.

Operation

⚠️ 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

- Verify all plumbing components in the basin are installed correctly and functional. Verify all valves are open and ready for pump use.
- Double check all wire connections. Re-tighten all factory and field connections.
- Ensure pump has no obstructions.
- With all electrical and mechanical connections complete and secure, turn on power to control panel and pump.
- Verify operation of the pump, floats, and alarm circuits.
- 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

⚠️ 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.

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

- Do not enter a pump basin after it has been used. Sewage and effluent can emit several gases that are poisonous.
- 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.
- 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.
- 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.

NOTICE

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

Maintenance

As the motor is oil-filled, no lubrication or other maintenance is required.

Some pumps come equipped with an air bleed hole to help prevent airlock. A small spray of water from this hole is normal while pump is running.

In the event the pump becomes clogged, the inlet screen can be removed to gain access to the pump impeller. Once the obstruction is removed, the anti-air lock hole should be cleaned.

Severe operating environments will require more frequent checks. For any issues that are not resolvable, contact Liberty Pumps for further assistance.

To keep the pump/pump system operating smoothly, perform the following routine checks:

Monthly

Pumps that are idle for more than a month in a dry basin should have impellers manually operated through the breaker panel monthly to lubricate the seals. *Pumps that are idle in a wet basin must be removed.*

Quarterly

1. Check pump(s) for corrosion and wear.
2. Check for free and unobstructed float switch operation and float switch condition.
3. Inspect for proper check valve operation.
4. For multiple pumps, check for balanced operating times. Uneven times indicate a defective unit, float switch or control.
5. Inspect the control panel for any presence of moisture in enclosure, loose connections, and general component condition.

Annually

1. Basin should be inspected and cleaned. Replace any defective components.

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 replacement. 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 3. Troubleshooting Matrix

Problem	Possible Cause	Corrective Action
Pump does not start.	Damaged power or control cord.	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 switch, level control or alternator relay for issues. Replace as necessary.
		Check control panel.
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 the Auto position.
	Float switch unable to move to the pump OFF position due to interference with the side of basin or other obstacle.	Position the pump or float switch so that switch 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, stuck open, or leaking.	Install check valve(s); remove check valve and examine for freedom of operation and proper installation.

Table 3. 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: Verify capacitor wiring in Figure 1, else consult factory. 3-Phase: Correct 3-phase pump rotation direction. Refer to section 3-Phase Pump Rotation Verification .	
	Total head 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 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 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 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; clogged inlet screen.	Remove obstruction.	
	Pump is airlocked.		Turn pump off and let set for several minutes, then restart.
			Add baffle to reduce trapped air bubbles.
			Clear anti-airlock hole.
	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 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: Verify capacitor wiring in Figure 1, else consult factory. 3-Phase: Correct 3-phase pump rotation direction. Refer to section 3-Phase Pump Rotation Verification .	
	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.	

Table 3. Troubleshooting Matrix (continued)

Problem	Possible Cause	Corrective Action
Pump runs periodically when fixtures are not in use.	Check valve not installed, stuck open, or 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.
Seal fail light is illuminated.	Lower 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.
	Incorrect motor rotation.	1-Phase: Verify capacitor wiring in Figure 1, else consult factory. 3-Phase: Correct 3-phase pump rotation direction. Refer to section 3-Phase Pump Rotation Verification .

Warranty

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 and "Commercial Series" models). 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.

*Liberty Pumps, Inc. warrants StormCell batteries for 1 year from date of purchase, and warrants that pumps of its Commercial Series are free from all factory defects in material and workmanship for a period of 18 months from the date of installation or 24 months from the date of manufacture, whichever occurs first, and provided that such products are used in compliance with their intended applications as set forth in the technical specifications and manuals.