

## Installation Manual

7108000J

# Submersible Sump Pumps

## Models

### **240-Series 1/4 hp Cast Iron**

*240 Switchless (Manual)*

*241 Wide-Angle Float Switch*

*243 Wide-Angle Float Switch with Piggyback Plug*

*247 Vertical Magnetic Float Switch*

### **230-Series 1/3 hp Poly/Aluminum**

*230 Switchless (Manual)*

*231 Wide-Angle Float Switch*

*233 Wide-Angle Float Switch with Piggyback Plug*

*237 Vertical Magnetic Float Switch*

### **450-Series 1/2 hp Poly/Aluminum**

*450 Switchless (Manual)*

*451 Wide-Angle Float Switch*

*453 Wide-Angle Float Switch with Piggyback Plug*





*457 Vertical Magnetic Float Switch*



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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.

<b>▲ WARNING</b>	<b>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.</b>
<b>NOTICE</b>	<b>Installer: manual must remain with owner or system operator/maintainer.</b>
Record information from pump nameplate:	
Keep this manual handy for future reference.	Pump Model #: _____
For replacement manual, visit LibertyPumps.com, or contact Liberty Pumps at 1-800-543-2550.	Pump Serial #: _____
Retain dated sales receipt for warranty.	Manufacture Date: _____
	Install Date: _____

## Safety Precautions

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

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- 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**

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- 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.

- For cord replacement: power cord must be of the same length and type as originally installed on the Liberty Pumps product. Use of incorrect cord may lead to exceeding the electrical rating of the cord and could result in death, serious injury, or other significant failure.
- 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.
- 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.
- These pumps are not to be installed in locations classified as hazardous in accordance with the National Electric Code®, ANSI/NFPA 70.

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

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- 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.
- 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.
- Keep clear of suction and discharge openings. To prevent injury, never insert fingers into pump while it is connected to a power source.
- Do not use this product with flammable, explosive, or corrosive fluids. Do not use in a flammable and/or explosive atmosphere as serious injury or death could result.
- 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).

### **NOTICE**

- ◆ 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 position the pump float directly under the inlet from drain tile or in the direct path of any incoming water.
- ◆ Keep pump upright.

- ◆ Do not use pumps with fluid over 140°F (60°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 introduce any consumer item that is not toilet paper into a non-grinder (dewatering, effluent, 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.
- ◆ Do not run dry.
- ◆ Do not allow pump to freeze.
- ◆ 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.

### General Information

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

These pumps are to be used for drain (storm) water. Pumps are certified to CSA® and UL® standards.

Provide pump serial number in all correspondence.

Pumps must be serviced at a qualified repair facility approved by Liberty Pumps. No repair work should be carried out during the warranty period without prior factory approval. Any unauthorized field repairs void warranty. Contact Liberty Pumps at 1-800-543-2550 to locate the closest authorized service center.

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

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 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. For **automatic models**, turn off the breaker, unplug the piggyback switch, and plug the pump directly into receptacle. Turn the breaker on for 30 seconds, then turn the breaker off. Plug the piggyback switch back in. Refer to Figure 1 on page 6.

## Pump Design

Liberty Pumps provides an integral anti-airlock hole in the volute housing of submersible pumps. Airlock occurs when air gets trapped in the volute/impeller area of the pump and cannot escape due to the water column above the check valve on the discharge line. When the basin fills with water and the pump is called to activate, the impeller spins in this pocket of air and cannot prime. An anti-airlock hole allows this trapped air to escape, allowing the pump to prime and start pumping.

A small spray of water from this hole is normal while pump is running. Bleeding off the air could take from several seconds to more than a minute once the pump starts.

For added protection, consider the addition of a back-up pump, such as Liberty Pumps SJ10 SumpJet as well as alarm ALM-P1 or ALM-2 in applications where loss of pump function could result in property damage. If an alarm is used, it must be connected to a separate electrical circuit.

## Pump System Components

### Float Switches

#### Automatic Models

Models 243, 233, and 453 come with two cords—one to the float switch and the other to the pump motor. The switch cord has a series (piggyback) plug enabling the pump motor cord to be plugged into the back of it. The purpose of this design is to allow temporary manual operation of the pump.

For manual operation, or in the event of switch failure, the pump cord can be separated and plugged into the electrical outlet, directly bypassing the switch. Refer to **Piggyback Switch Operation** on page 6.

#### Switchless (Manual) Models

Manual pumps with no switch may be operated by directly plugging into an approved electrical outlet. To prevent excessive seal wear and overheating, pumps should not be run dry for extended periods of time. A minimum 4-1/2" water level is recommended. If manual models are to be used with an optional control device, follow the instructions provided with the control and make power connections per those instructions. Set the turn OFF level at 4-1/2" or greater.

#### Vertical Magnetic Float Models

Do not remove float rods from VMF models for manual use as switch damage will result.

## Preparation

For ordinary ground water pumping applications, the sump basin diameter should be a *minimum* of 14" (*minimum* of 10" for models 247, 237, and 457). A larger diameter pit is preferred as it allows for longer pump cycling and reduced switch cycling. The depth of the pit should be at least 12" above the surface on which the pump is resting. A sump basin cover is **required** for safety and to prevent foreign objects from entering the basin.

### Prepare Existing Sump [Basin]

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

- 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.

**If replacing a previously installed pump**, prepare the basin by removing the old pump. Separate the discharge pipe at either the check valve or at the union. If neither a check valve nor a union is part of the existing discharge pipe, cut the pipe with a hacksaw and remove the pump. A check valve and optional union will need to be installed at this cut.

Clean any debris from the basin. Inspect all remaining equipment in the basin including piping, valves, and electrical junction boxes (if present) and repair or replace as appropriate.

If the basin is not already enclosed on the bottom, provide a hard level bottom of bricks or concrete. Do not place the pump directly on earth, gravel, or debris since this can cause excessive wear of the impeller and possible jamming. "The Brick" (Liberty Pumps #4445000) is a pre-molded stable platform designed to fit the submersible pump. It raises the pump 2-1/2" off the bottom of the basin, reducing the potential for jamming from rocks and debris. Contact a local distributor to order.

### Prepare New Sump [Basin]

#### Excavation

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

- Locate all overhead and underground utilities before excavating.

Excavate the hole as small as possible, with a minimum recommended 8" diametrical clearance around the tank. Never place the basin directly in contact with rocks or other sharp objects. Place only fine, 1/8" to 3/4" pea gravel or 1/8" to 1/2" washed, crushed stone as bedding between the basin and the hole walls. Do not use sand or native soil as backfill. Properly compact underneath the basin to provide a solid, level base that can support the weight of the filled basin.

#### Inlet Connection & Initial Backfill

Use only fine, 1/8" to 3/4" pea gravel or 1/8" to 1/2" washed, crushed stone around the bottom of the basin to hold it in place. Do not use sand or native soil as backfill.

Make the inlet connection as required per basin.

#### Final Backfill

Keep large rocks, clods, and foreign objects out of the backfill material. Only fine, 1/4" to 3/4" pea gravel, or 1/8" to 1/2" washed, crushed stone is recommended. Do not use sand or native soil as backfill. Mound the backfill slightly and allow for natural settling. Provide access to the basin cover for maintenance and service.

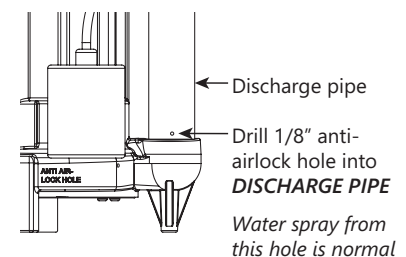
Compaction of backfill materials must be adequate to ensure the support of the tank, and to prevent movement or settlement.

#### **NOTICE**

- Do not exert heavy pressure or run heavy equipment on the backfill material as this could cause the tank to collapse.

### Anti-Airlock

To speed or assist with air bleed in the event of airlock, the addition of a 1/8" hole in the discharge pipe is recommended. This hole should be no more than 1/8" diameter and drilled low on the pipe—just above the threaded connection to the pump discharge. Refer to figure.



## 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.

### **Pump**

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 any mounting interface (i.e., "The Brick" platform, torque stop) is engaged correctly.

Models with wide-angle float switches must have adequate clearance to side wall of basin with free, unobstructed movement throughout its complete travel and must not contact the pump, piping, or other objects.

### **Discharge**

Make all discharge connections. A 1-1/2" NPT threaded discharge is provided for connection of the discharge pipe. **Do not reduce the discharge size to less than 1-1/4"**, as this will affect pump flow and performance. Schedule 40 PVC pressure pipe is recommended; however, flexible discharge hose kits may be used for temporary installations. Connect pipe or discharge hose to the discharge of the pump. Hand-tighten only as over-tightening can damage the pump discharge.

Install a union or other means of separating the discharge pipe just above the floor to facilitate removal of the pump if necessary. **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.

### **Vent**

Vent basin in accordance with applicable plumbing codes.

### **Piggyback Switch Operation**

**IMPORTANT:** Verify breaker is turned off before plugging in the switch.

Plug the piggyback switch into the outlet receptacle. Plug the pump into the piggyback receptacle.

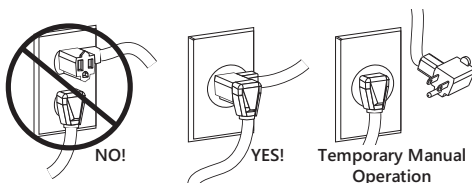


Figure 1. Piggyback Switch Operation

## Operation

### **Starting System**

1. Verify all plumbing components 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 pump.
5. Verify operation of the pump and floats.
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**

#### **⚠️ 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

- 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.

### **Maintenance**

Pump should be checked frequently for debris and/or build up that may interfere with pump or float switch operation. The float must be able to move freely through its complete travel without any restrictions. Pour enough water into the sump to activate the pump periodically (at least every 3 months) when not normally in use to verify proper function. Check periodically to make sure the pit is free from accumulated debris, rocks or other objects that may potentially jam the pump.

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-airlock hole should be cleaned.

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

### **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 repair facility approved by Liberty Pumps or its authorized service centers, automatically voids warranty.

Table 1. Troubleshooting Matrix

Problem	Possible Cause	Corrective Action
Pump does not start.	Tripped circuit breaker, tripped GFCI, blown fuse, or other interruption of power.	Reset tripped circuit breaker, reset GFCI, replace blown fuse with properly sized fuse, check that the unit is securely plugged in, investigate power interruption.
	Improper voltage.	Have an electrician check all wiring for proper connections and adequate voltage and capacity.
	Defective motor.	Consult Liberty Pumps.
	Low line voltage.	Check voltage. If under 108 V, check wiring size.
		Remove extension cord, or use with heavier gauge.
	Float switch unable to move to 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.
	Defective float switch.	Replace float switch.
	Obstructed impeller or volute.	Remove obstruction.
Loose wiring connections.	Check and tighten all connections.	
Pump runs, but does not turn off.	Pump airlocked.	Turn pump off and let set for several minutes, then restart.
	Float switch unable to move to 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.
	Defective float switch.	Replace float switch.
Pump runs or hums, but does not pump.	Discharge line 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 and examine for freedom of operation and proper installation.
	Gate or ball valve closed.	Open gate or ball valve.
	Total head (lift height) 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 airlocked.	Turn pump off and let set for several minutes, then restart.
Clear anti-airlock hole.		
Pump does not deliver proper capacity.	Discharge 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.
	Total head (lift height) 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 periodically when fixtures are not in use.	Check valve not installed, stuck open, or leaking.	Install check valve; remove check valve and examine for freedom of operation and proper installation.
	Fixtures leaking.	Repair fixtures as required to eliminate leakage.

Table 1. Troubleshooting Matrix (continued)

Problem	Possible Cause	Corrective Action
Pump runs or hums, but does not pump.	Discharge line 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 and examine for freedom of operation and proper installation.
	Gate or ball valve closed.	Open gate or ball valve.
	Total head (lift height) 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 airlocked.	
		Clear anti-airlock hole.
Pump cycles too frequently.	Improper float switch setting.	Adjust float switch setting.
	Check valve not installed, stuck open, or leaking.	Install check valve; remove check valve and examine for freedom of operation and proper installation.
Repeated tripping.	Circuit protection underrated.	Check rating and replace with proper size.
	Other appliance on same circuit.	Pump requires separate circuit.
	Pump 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 buildup.	Clean motor housing.
	Defective motor.	Consult Liberty Pumps.

## 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). 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.**