

## Installation Manual

7212000F

# Automatic Drain Pumps

## Models



### 404

#### 1/3 hp Residential 115V

- 404
- 404/A
  - with Alarm
- 404/A-EYE
  - with NightEye® Alarm
- 404CV
  - with Check Valve
- 404CV/A
  - with Check Valve and Alarm
- 404CV/A-EYE
  - with Check Valve and NightEye® Alarm
- 404L
  - with Larger Ports
- 404L/A
  - with Larger Ports and Alarm
- 404L/A-EYE
  - with Larger Ports and NightEye® Alarm



### 405





#### 1/2 hp Commercial High Temp 115V

- 405
- 405HV
  - High Voltage 230V
- 405/A
  - with Alarm
- 405/A-EYE
  - with NightEye® Alarm

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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, could 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 <a href="http://libertypumps.com">libertypumps.com</a> , 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.
- 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.
- This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, be certain that it is connected to a Ground Fault Circuit Interrupter (GFCI) receptacle that meets the latest requirements per UL 943 including Auto-Monitoring or Self-Test Function and Reverse Line-load Miswire Function – Repeated.

### **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.

- Explosion hazard during installation. PVC cleaners, primers, and cements can release explosive vapors. These heavier-than-air vapors can accumulate in the tank. The heat of soldering or sweating copper or other metal pipe can ignite these vapors causing a violent explosion. If the unit is to be connected to copper discharge or vent piping, all solvent-welded PVC joints must be allowed to cure a *minimum* of 24 hours. The access cover must be removed to allow the tank to be thoroughly ventilated prior to sweating copper pipe near the unit.
- 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.
- 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.
- 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**

- ◆ **Model 404:** 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.
- ◆ **Model 405:** Do not use pumps with fluid over 180°F (82°C). Operating the pump in fluid above this temperature can overheat the pump, resulting in pump failure.
- ◆ 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.

## Dimensions

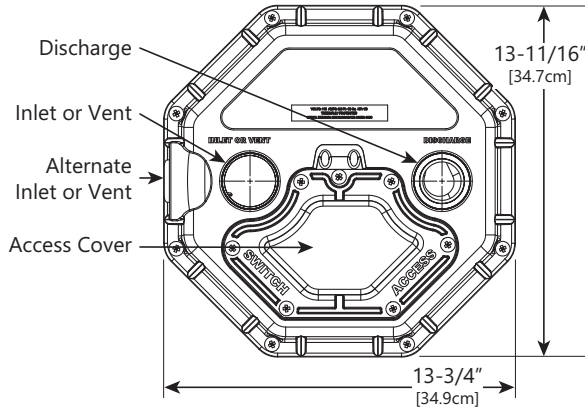


Figure 1. Model 404 and 405 Cover Dimensions

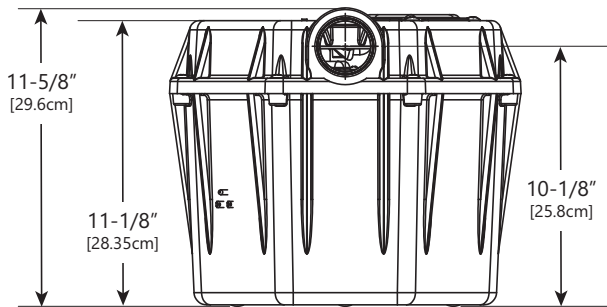


Figure 2. Model 404 Basin Dimensions

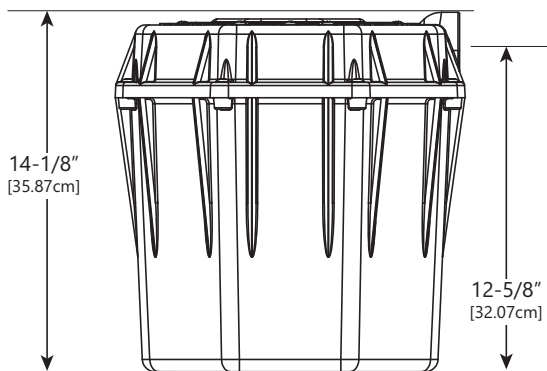


Figure 3. Model 405 Basin Dimensions

## Application

The Model 404 and 405-Series drain pumps are designed for use in gray wastewater applications. They will handle small debris and solids, such as laundry lint (up to 3/8"), associated with normal gray water drainage from a sink. Larger solids should be kept out of the pump system. The 405-Series is designed for commercial applications where higher temperature drain water (up to 180°F) may be used.

## Installation

### Inlet

The drain pump has two available ports: one on the top, the other on the side. Either can be used as a vent or inlet. Using the appropriate piping (1-1/2" on 404 and 404CV models and 2" on 404L and all 405 models), connect the fixture (i.e., laundry tub, basement sink, washing machine) to the pump. Refer to Figure 4 for a typical installation.

#### NOTICE

- ◆ Hand-tighten only
- ◆ Do not cross thread

A trap shall be used between the fixture and pump; a flange type is recommended. Hand-tighten trap to pump.

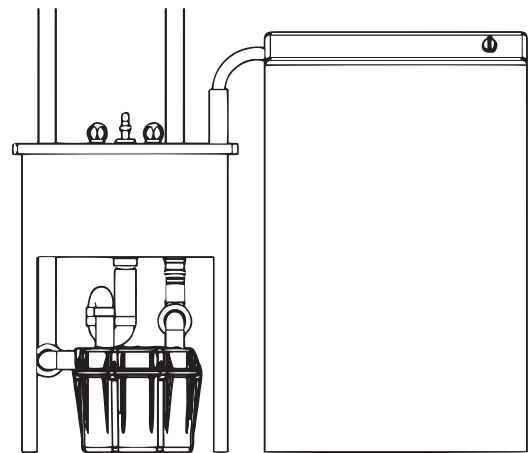


Figure 4. Typical Residential Installation

### Discharge

#### NOTICE

- ◆ Hand-tighten only
- ◆ Use appropriate thread sealing tape
- ◆ Do not cross thread

Install a union just above the pump to facilitate removal, if necessary, for cleaning or service. Install a check valve (**not included** except for CV models listed below) just above the union and as close to the pump as possible to prevent the backflow of water after each pump cycle.

#### Check Valve for CV Models

Models 404/CV, 404CV/A, and 404CV/A-EYE come with a check valve in order to meet ASME A112.3.4/CSA B45.9. This check valve must be threaded into the discharge port of the 404 cover.

## Vent

### NOTICE

- ◆ Hand-tighten only
- ◆ Do not cap-off vent
- ◆ Do not use one-way quick-vents or air admittance valves as they will not guarantee proper fixture performance

Provision is made for a vent stack to allow extra volume for high suds conditions, and to ensure proper drainage of the fixture. The vent pipe should have a union to facilitate removal, if required, and shall be connected directly to a building or house vent.

### Inlet Air Hole (Alarm Units Only)

If the top port (hole) is used for the vent, the potential exists for an air pocket to form that would prevent the alarm float from activating. After the vent pipe has been installed, it is recommended that a 1/8" hole is drilled through both the unit and vent pipe to allow air to escape. Refer to Figure 5.

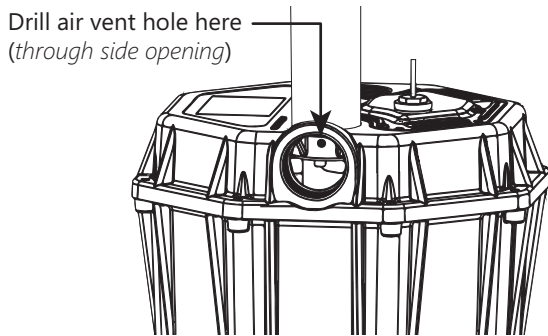


Figure 5. Air Vent Hole Location (Alarm units only)

## Power Cord

### ⚠ WARNING ⚡ RISK OF ELECTRIC SHOCK

- 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.
- 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.
- 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.
- 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.

### ⚠ 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.

The pump power cord is equipped with a grounding-type 3-prong plug. It must be connected to a separately fused, grounded, 3-wire grounding-type receptacle of 15-amp capacity with the proper pump voltage (all models are 115V, except the 405HV which is 230V). Refer to the pump nameplate to verify electrical specifications.

## Alarm

Models 404 and 405 with /A or /A-EYE come with a Liberty Pumps alarm. For instructions on using this alarm, refer to the included alarm manual.

## Operation

The Model 404 and 405-Series pumps come factory-equipped with a float switch mounted in the tank. There are two controlling cords—one to the float switch (float switch shown in Figure 7) and the other to the pump motor. The float switch cord has a series (piggyback) plug enabling the pump motor cord to be plugged into the back of it (see Figure 6). The purpose of this design is to allow temporary manual operation of the pump.

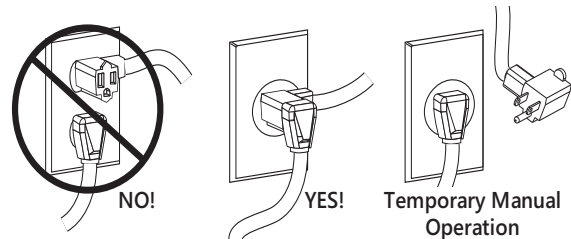


Figure 6. Piggyback Plug Installation

For automatic operation using Liberty Pumps' supplied switch, the two cords must be interconnected and plugged into a separately fused, grounded outlet.

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. **Note:** Model 405HV should only be operated without the float switch by using the circuit breaker or panel disconnect.

## Maintenance and Troubleshooting

### **⚠️ 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.

Each unit is individually factory-tested to ensure proper adjustment and operation. If the unit fails to operate properly, re-read the instructions to verify they have been followed correctly. Replacement parts for this product are available at <http://www.libertypumps.com/Services/Replacement-Parts>.

Routine maintenance is not required on the pump itself, but associated connections may require occasional attention. Lint and foreign objects should be removed from the trap periodically. The check valve on the discharge should also be checked for freedom of operation at the same time.

The pump is automatically turned on and off by use of a float switch mounted within the tank. This switch can be easily removed and checked for operation by removing the access cover located on top of the unit. Once the access cover has been removed, a rubber plug must be lifted to free up the switch cord. The switch is mounted to a rod which can be removed by lifting or pulling upward.

**IMPORTANT:** Do not adjust the tether length (*tether length is the distance of cord measured between the clamp and top of float switch*). If replacing the switch, make sure to maintain the correct tether length for the model. Refer to Figure 7.

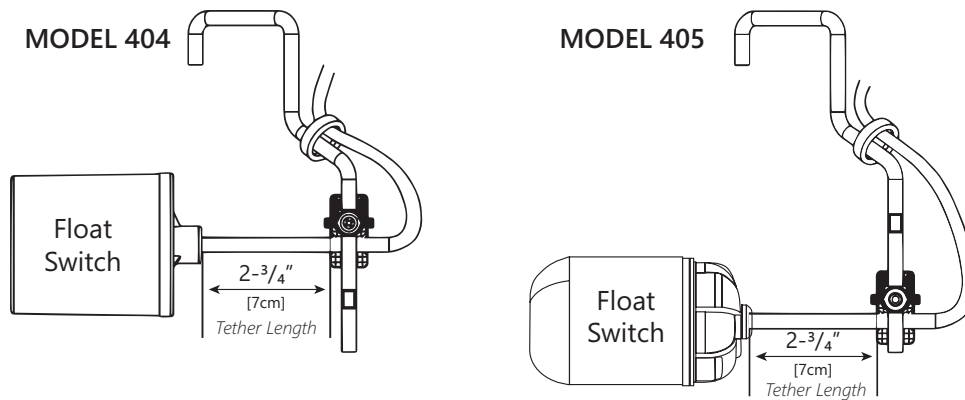


Figure 7. Pump Float Switch and Tether Length

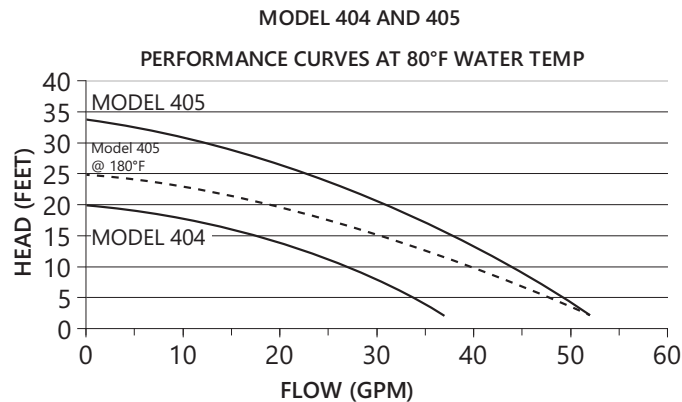


Figure 8. Performance Curves for Models 404 and 405

Table 1. Troubleshooting Matrix

Problem	Possible Cause	Correction
Pump will not turn on or shut off.	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 capacity.
	Plugged vent, or quick-vent in use.	Verify that an unrestricted vent at least 1-1/4" in diameter is in use. <b>Quick-vents shall not be used.</b>
	Defective float switch or build-up on tank wall restricting free movement of float switch.	*Remove access cover and check that float is free to move. If build-up restricts float, clean and reinstall. If defective, replace switch.
Pump runs or hums but does not pump.	Discharge is blocked or restricted.	Check the discharge line for blockage, including ice if the line passes through or into cold areas.
	Check valve is stuck closed or installed wrong.	Remove and examine for freedom of operation and proper installation.
	Total head (lift height) has been reached (refer to Figure 8)	Try routing pipe to a lower level. If not possible, another pumping station may be required at a level of roughly half the total head (lift).
	Pump impeller is jammed.	*Disassemble unit to expose pump impeller. Remove foreign material. Reassemble.
	Trap or inlet piping is clogged.	Check the trap and inlet piping for restrictions.
Pump short-cycles.	Plugged vent, or quick-vent in use.	Verify that an unrestricted vent at least 1-1/4" in diameter is in use. <b>Quick-vents shall not be used.</b>
	Defective float switch.	*Remove access cover and check that float is free to move. If build-up restricts float, clean and reinstall. If defective, replace switch.
	Check valve was not installed, is stuck open, or is leaking.	Remove and examine for freedom of operation and proper installation.
Pump runs periodically when fixtures are not in use.	Check valve was not installed, is stuck open, or is leaking.	Remove and examine for freedom of operation and proper installation.
	Faucets are dripping.	Repair faucets to eliminate dripping.
Water or soap suds come out of vent pipe.	Vent pipe is too short or too small in diameter.	Verify that an unrestricted vent at least 1-1/4" in diameter is in use.
	Defective float switch.	*Remove tank cover and check that float is free to move. If build-up restricts float, clean and reinstall. If defective, replace switch.
	Rate of inflow exceeds pump output.	Use valve on the inlet to reduce rate of inflow.
Pump operates noisily.	Foreign objects in impeller cavity.	*Disassemble unit to expose pump impeller. Remove foreign material. Reassemble.
	Piping to house structure is too rigid.	Replace a portion of the discharge pipe with rubber hose to absorb noise.

\*NOTE: Liberty Pumps, Inc. assumes no responsibility for damage or injury due to disassembly beyond float removal in the field. Disassembly, other than at Liberty Pumps or its authorized service centers, automatically voids warranty.

## **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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