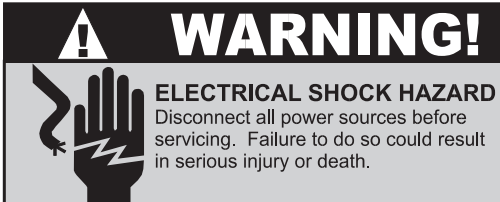


Three Phase Liberty Engineered Products Control Panels

Installation Instructions and Operation/Troubleshooting Manual



Warranty void if panel is modified.

Call factory with servicing questions:

1-800-543-2550

This manual applies to
Control Panels
With and Without
Intrinsically Safe Wiring
for Control Floats

Liberty Pumps[®]

Engineered**Products**

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This control panel must be installed and serviced by a licensed electrician in accordance with the National Electric Code NFPA-70, state and local electrical codes.

IMPORTANT: BEFORE PROCEEDING TO INSTALL AND WIRE THE CONTROL PANEL, READ AND THOROUGHLY UNDERSTAND THESE INSTRUCTIONS.

For Intrinsically Safe Panels: When installed according to these instructions and Article 504 of the National Electrical Code (NFPA 70), this control panel provides intrinsically safe sensing circuits for interface with Class 1, Division 1, Groups C and D hazardous locations. Intrinsically safe wiring must be in accordance with the enclosed control drawing of the specific intrinsically safe relay manufacturer.

NEMA 4X enclosures are for indoor or outdoor use, primarily to provide a degree of protection against corrosion, windblown dust, rain, splashing water and hose-directed water. **Cable connectors must be liquid-tight in NEMA 4X enclosures.**

Installation

Simplex LEP Control Panels are designed to operate as a three float system. They are: stop float - start float - high level alarm float.

Duplex LEP Control Panels are designed to operate as a four float system. They are: stop float - lead start float - lag float - high level alarm float.

NOTE: Simplex or Duplex Panel will affect the number of floats and their functions. Reference the schematic provided with the control panel for proper installation.

Liberty Pumps recommends Commercial Control Switches:

K001722	(1) 50 ft Narrow Angle Float
K001723	(1) 100 ft Narrow Angle Float
KFLT3-50	(3) 50 ft Narrow Angle Float Kit
KFLT3-100	(3) 100 ft Narrow Angle Float Kit
KFLT4-50	(4) 50 ft Narrow Angle Float Kit
KFLT4-100	(4) 100 ft Narrow Angle Float Kit

Float Installation

CAUTION: If control switch cables are not wired and mounted in the correct location, the pump system will not function properly.

1. Use float label kit to identify and label cables on both float and stripped ends for specific operation (stop, lead, lag, alarm, etc.). See schematic for float options.
2. Determine your normal operating range, as illustrated in **Figures 1-2**.
3. Mount float switches at appropriate levels as illustrated in **Figures 1-2**. Be sure that floats have free range of motion without touching each other, or other equipment in the basin.

Non-weighted Floats require tethering (see **Figures 4-5**). For typical installations, either a cable weight or clamp should be used. The tether length should be 3.5" unless otherwise stated by float manufacturer.

Self-Weighted Floats do not require tethering. However they must be properly connected to prevent movement. See **Figure 3** to determine proper cord length.

Installation Instructions

Mounting the control panel

1. The control panel must be situated in a nonhazardous area in an appropriate NEMA rated enclosure, where an explosive atmosphere will not exist at any time. If distance exceeds the length of either the float switch cables or the pump power cables, splicing will be required. For outdoor or wet installation, we recommend the use of a Liberty Pumps liquid-tight junction box with liquid-tight connectors to make required connections.

For Hazardous Locations: intrinsically safe wiring will require a separate junction box, and cables will require a sealing fitting to prevent passage of gases and vapors.

WARNING for Intrinsically Safe Panels: Intrinsically safe wiring must be kept separate from non-intrinsically safe wiring. Intrinsically safe wiring and non-intrinsically safe wiring may occupy the same raceway if they are at least two inches (50 mm) apart and separately tied down. Inside panels, field wiring terminals for intrinsically safe circuits must be separate from non-intrinsically safe wiring. Do not exceed maximum cable length as stated in intrinsically safe relay control drawing.

2. Mount control panel with furnished mounting flanges.
3. Determine conduit entrance locations on control panel.

If Intrinsically Safe: The intrinsically safe wiring entrance location must be within intrinsically safe barrier area. A separate rigid metallic conduit must be used to enclose the conductors of the intrinsically safe control circuit.

NOTE: Be sure that conduit is of adequate size to pull the switch cables through.

4. Determine conduit entrance for "power-in" and pump cables. The entrance location must be outside of the intrinsically safe barrier area.

NOTE: Be sure the power supply voltage, and phase are the same as the pump motor being installed. If in doubt, see the pump identification plate for voltage/phase requirements.

5. Drill proper size hole for "power-in" and pump cable conduit connections.
6. Attach conduit connectors to control panel.

FOR INSTALLATION REQUIRING A SPLICE,

FOLLOW STEPS 7–17 (omit Step 11);

FOR INSTALLATION WITHOUT A SPLICE,

FOLLOW STEPS 11–17.

7. Determine location for mounting junction box according to NEC requirements. Separate junction boxes are required for pump wiring and float wiring. Mount junction boxes to proper supports. **Do not** mount the junction box inside the sump or basin.
8. Run conduit to junction box. Drill proper size holes for the type of conduit used. Attach connectors to junction box.
9. Identify and label each wire before pulling through conduit into control panel and junction box. Make wire splice connections at junction box.
10. Firmly tighten and seal all fittings on junction boxes.
11. If splicing is not required, identify and label pump cable before pulling through conduit into control panel.
12. **If Intrinsically Safe:** Bring intrinsically safe circuits (i.e. float switches) through separate rigid metallic conduit into the control panel area marked for intrinsically safe wiring.

WARNING: All wiring entering a hazardous location must be sealed by an approved seal in accordance with the National Electric Code Article 504.

13. Wire switch cables according to the schematic provided with control panel.
14. Bring pump cables and "power-in" wiring through conduit into the control panel.
15. Wire the pump cables and the "power-in" cables according to the schematic provided with control panel.
16. Connect "power-in" conductors to proper locations: 208/240/480 VAC to three position terminal block. **Install tagged factory wire to appropriate transformer primary voltage tap.**
17. The GROUND LUG (GL) is a redundant system ground terminal and **MUST BE CONNECTED TO THE EARTH GROUND BUSS OF THE CONTROL'S AC SUPPLY LINE FEEDER.** The resistance between the system ground terminals and the earth must be less than 1 ohm. Connect ground wire from conduit system to ground terminal (GL) in the panel.

NOTE: Liberty Pumps recommends the use of separate pump and control/alarm power sources. The control/alarm circuitry pulls from L1 and N; schematic provided with control panel. Rewiring is required.

VERIFY CORRECT OPERATION OF CONTROL

PANEL AFTER INSTALLATION IS COMPLETE.

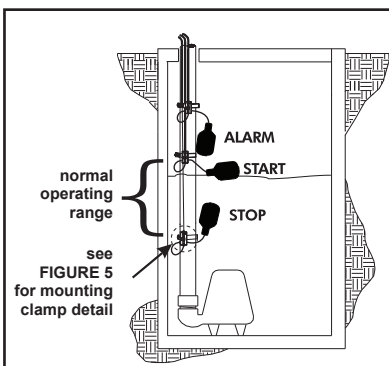


FIGURE 1 - Three float simplex (pump down installation)

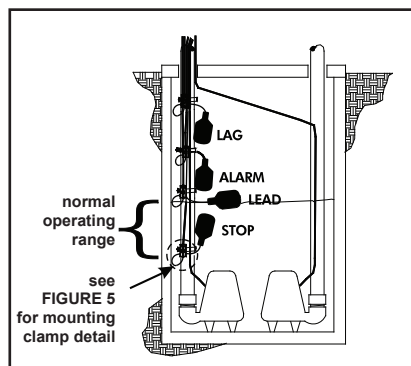


FIGURE 2 - Four float duplex (pump down installation)

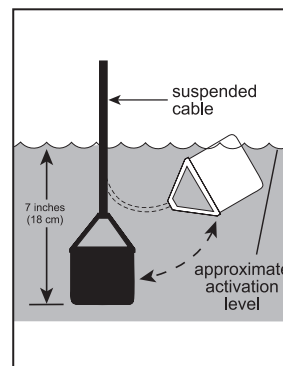
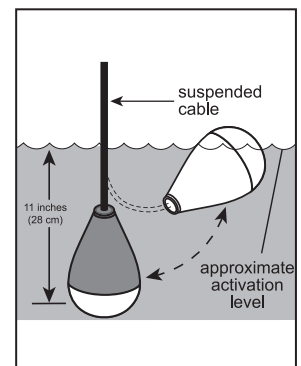


FIGURE 3 - Internally weighted float examples



Installation Instructions

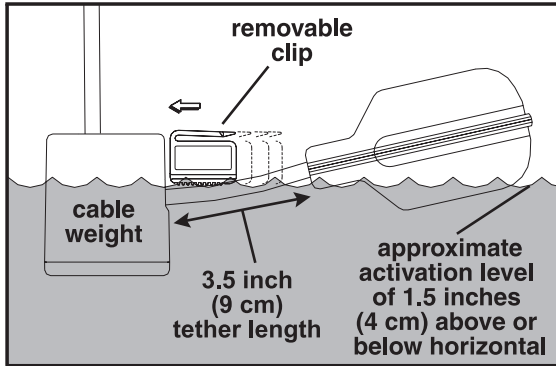


FIGURE 4 - Non-weighted float with cable weight

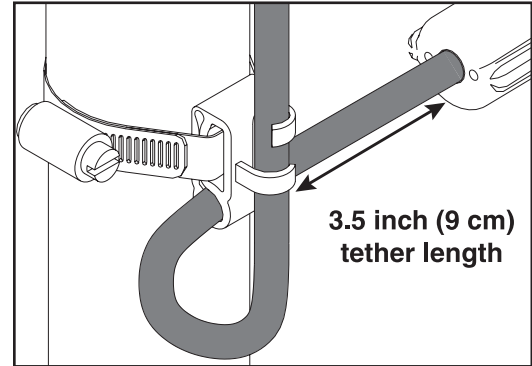


FIGURE 5 - Mounting clamp detail

Operation

Liberty Pumps three phase LEP panels are designed to operate with three floats for simplex pump applications or four floats for duplex pump applications.

Simplex operation: stop - start - high level alarm.

Duplex operation: stop - lead start - lag start - high level alarm.

Float Operation

When all floats are in the open or OFF position, the panel is inactive. As the liquid level changes and closes the stop float, the panel will remain inactive until the start float (lead float on duplex) closes. At this point, a pump will start. On duplex panels, if the liquid level continues changing and closes the lag float, the lag pump will start. Both pumps will run until the liquid level drops down to the stop float. If the liquid level continues changing and closes the alarm float, the audio/visual alarm will activate. On duplex panels, the alternator will switch the lead pump once the stop float opens.

Alarm System (Horn and Indicator - standard)

When an alarm condition occurs, a red light and a horn will be activated. If the test/normal/silence switch is moved to the silence position, the horn will be silenced. When the alarm condition is cleared, the alarm system is reset. The alarm system can be tested by moving the test/normal/silence switch to the test position.

Motor Protective Switch

A motor protective switch is supplied for each pump to provide an adjustable overload, branch circuit protection, and pump disconnect. The overload must be set in the field. To set the overload, dial the amp scale to the pump's full load amps (FLA). If the FLAs are unknown, use a calibrated ammeter to measure the pump amperage draw under loaded conditions. An auxiliary contact is wired in series with the magnetic contactor coil so that on an overload trip, the magnetic contactor will be disabled. In the event of an overload trip, the motor protective switch must be reset by first turning the handle counterclockwise to the OFF position and then turning the handle 90° clockwise to the ON position.

Circuit Breaker

The pump circuit has a thermal-magnetic circuit breaker provided for branch circuit, short circuit protection for the pump. In the OFF position, the circuit breaker will not allow power to the pump.

Pump Run Lights

The run light will be ON in either the hand or the automatic mode when the pump is called to run unless other safety measures are employed.

HOA Switch

A hand-off-automatic switch is provided for each pump. In hand mode, the pump will turn on unless other safety features are employed. In the automatic mode, the pump will turn on and off from commands by the float switches.

Seal Failure Circuit and Indicator Light

Turn the dial completely up, connect the leads from the pump, then push the test button. The light should turn on. While still depressing the button, turn the dial down until the light turns off, then turn the dial up until the light turns back on. For best results, the potentiometer dial should be around 160.

Dry Auxiliary Contacts

Normally open - Contacts are open under normal conditions and closed when alarm condition is present. Contacts automatically reset once alarm condition is cleared.

Thermal Cutout

The thermal cutout is wired in series with the magnetic contactor coil. If the pump's thermal switch opens on high temperature, the contactor will turn off and stop the pump. When the thermal switch cools and closes, the magnetic contactor will turn on if the pump is called to run.

Troubleshooting

Alarm Horn

Moving the test/normal/silence switch to the test position or activating the alarm float should turn on the alarm horn. If the horn does not sound, replace horn with same type.



Alarm Light

Moving the test/normal/silence switch to the test position or activating the alarm float should turn on the alarm light. If the light does not activate, replace with bulb of same type.

Alternating Relay or Device

The alternation can be sequenced by lifting the float switches or making jumper wires to simulate the floats closing. If the alternator fails during testing, replace with same type. Consult Liberty Pumps at 1-800-543-2550 when in doubt about testing procedures or results.

Circuit Breaker

Check each pole of the circuit breaker for proper resistance reading using the following procedure:

Warning: Disconnect all incoming power to control panel. Failure to do so could result in serious or fatal electrical shock.

1. Isolate the circuit breaker by disconnecting either the line side or load side wires.
2. Place the ohmmeter leads across the corresponding line and load terminals of each pole.
3. With the ohmmeter on the R X 1 scale and the breaker in the OFF position, the reading should be infinity (very high resistance). With the breaker in the ON position, the reading should be nearly zero ohms (very low resistance). If the readings are not as stated, replace the circuit breaker with one of the same ratings.

Float Controls

Check the floats through their entire range of operation. Clean, adjust, or replace damaged floats with same type.

Checking the float resistance - The float resistance can be measured to determine if the float is operating correctly or is defective. Use the following procedure to measure the float resistance.

Warning: Disconnect all incoming power to panel. Failure to do so could result in serious or fatal electrical shock.

1. Isolate the float by disconnecting one or both of the float leads from the float terminals.
2. Place one ohmmeter lead on one of the float wires, and the other ohmmeter lead on the other float wire.
3. Place the ohmmeter dial to read ohms and place on the R X 1 scale. With the float in the "off" position, the scale should read infinity (high resistance). Replace the float if you do not get this reading. With the float in the ON position, the scale should read nearly zero (very low resistance). Replace the float if you do not get this reading.

NOTE: Readings may vary depending on the length of wire and accuracy of the measuring device.

Fuses

Check the continuity of the fuse. With power OFF, pull the fuse out of the fuse block. With the ohmmeter on the R X 1 scale, measure resistance. A reading of infinity indicates a blown fuse and must be replaced. Replace fuse with same type, voltage and amp rating.

Indicator Lights

If defective, replace all indicator lights with same type.

Magnetic Contactor

Contacts - Check the contacts for severely burnt or welded contacts. The contactor arm should move freely.

Coil - Measure the coil by disconnecting one of the coil leads. Measure the coil resistance by setting the ohmmeter on the R X 1 scale. A defective coil will read zero or infinity, indicating a short or opened coil respectively. All defective contacts and coils must be replaced with same type.

NOTE: Readings may vary slightly depending on the accuracy of the measuring device.

Motor Protective Switch

Test by inserting a paper clip or other small device into the test hole and push to the left. The relay should trip. If it does not, replace with same type. The relay must be reset once tripped.

Liberty Engineered Products Limited Warranty

Liberty Pumps, Inc. warrants that products of its Engineered Product line 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 Liberty Engineered Products specifications and technical manuals. The date of installation shall be determined by a completed pump start-up report and warranty registration form.

A pump startup report, filled out by a qualified installer, is required for warranty to take effect. The report must be submitted within 30 days from the installation date and submitted through the Liberty Pumps website. During the warranty period, the manufacturer's obligation, and at its discretion, shall be limited to the repair or replacement of any parts found by the manufacturer to be defective, provided the product 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 or maintained in accordance with the printed instructions provided; if it has been disassembled, modified, abused or

tampered with; if the pump discharge has been reduced in size; if the pump has been used in water temperatures above those shown in the specifications; if the thermal overload(s) and seal moisture probe(s) have not been properly connected (where equipped); 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 or hydrocarbons; if the product has been moved from its original installation location, or if the label bearing the serial and code 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 consequential damages, including field labor costs, travel expenses, rental equipment, costs of removal, reinstallation or transportation to and from the factory or an authorized Liberty Pumps repair facility.

There is no other express warranty. All implied warranties, including those of merchantability and fitness for a particular purpose, are limited to 18 months from the date of installation or 24 months from the manufacturing date. 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.

NOTICE!

Products returned must be cleaned, sanitized, or decontaminated as necessary prior to shipment to ensure that employees will not be exposed to health hazards in handling said material. All applicable laws and regulations shall apply.