

Warning! Electrical Shock Hazard – Be sure to disconnect all power sources before installing or servicing any control panel or pump system. Failure to do so could result in severe personal injury or death! This or any other control panel must be installed by a certified electrician and be wired in accordance to all National Electric Code requirements as well as all state or local code requirements.

This control panel is designed and wired to operate on a particular power supply voltage as well as a specific horsepower and current. Do not attempt to operate this or any other control panel with different power supply voltages or current ratings exceeding the specified value on the nameplate or wiring schematic. Failure to do so will void warranty and damage components within the control panel or the pump being used with this control.

When installing any control panel or pump, it is advisable to put them on their own circuit with a properly sized disconnect or circuit breaker. The disconnect should be sized in accordance to local or state codes as well as the National Electric Code. All wiring between the main power source and the control panel should be sufficiently sized to not only handle the operating current of the pump(s) being operated but to prevent any significant voltage drop due to extended distances from the power source. Failure to size wiring properly can prevent the panel and the pump from operating properly and can even result in damage. It is best for the supply voltage to be within 5% of the nominal nameplate voltage rating. Exceeding 5% voltage drop or variance increases the potential for damage to control panel as well as the pump.

This instruction manual should be used in conjunction with the pump instructions and should be kept in a safe and easy to find location, so that it can be referred to often by the installer as well as the person(s) in charge of maintaining the system.

Caution – Do not proceed with the installation of the control panel until this entire instruction manual has been read and is understood. Always take appropriate precautions and be sure that all

power sources have been disconnected before beginning to service or install any control panel or pump.

Locating and Mounting the Control Panel

This control panel is constructed to a NEMA 4x standard and can be installed in either an indoor or outdoor location. However, this control should be mounted in location which will limit the potential for the panel to become submersed in water or other mediums, since this panel is not rated for submersible locations. The panel enclosure is provided with either mounting feet or integral mounting bar. The following items should be considered when determining where to mount this or any control panel:

- 1) The Visibility of the Visual Alarm Light.
- 2) The Distance from the Power Source.
- 3) The Distance from the Collection Tank.
- 4) Accessibility for Maintenance
- 5) Damage Prevention

The panel enclosure should be mounted to a secure and stable base or wall. Also, the enclosure should be mounted in a vertical position and be high enough from the ground to allow for easy access for maintenance personnel. Once the appropriate position is determined, the mounting holes provided in the mounting feet or mounting bar can be used to secure the enclosure to the wall or mounting base.

Important! – The enclosure used with this control panel has locking latches. It is advisable to use a pad lock to prevent any unauthorized access to the inside of the control panel.

Connecting Incoming Power Supply

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All entries created in the control panel must be appropriately sealed per the National Electric Code

(NEC Code NFPA#70), and all fittings, conduit, cord seals, etc. should be the same rating as the control panel (NEMA 4X). Failure to use appropriately rated fittings, conduit, and cord seals will void all warranties as well as result in damage to the components inside the control panel.

Once the appropriate fittings are determined, a hole must be created in the panel enclosure to secure and seal the entry fitting to the control panel. Once this is done the cord from the incoming power source will be feed through this fitting and conduit. After the incoming power cord has been feed into the control panel, it will connect to the terminal block provided in the control panel. If 230v - 1 phase power is being provided the terminal block will be marked as follows: L1, L2, and N. These represent the three legs of the power source. It is good practice to mark the three incoming power leads L1, L2, N. If 115V – 1phase power is being provided the terminal block will be marked L1 & N. The control panel is provided with grounding lugs, which must be properly grounded per NEC code.

Connecting the Pump and Float Cords

Note: if using a single entry and conduit for the incoming power, pump cords, and float cords, be sure the fitting and conduit are large enough to allow for all of these cords.

If using separate entries for all of the pump and float cords, please be sure all fittings and conduit and properly rated per NEC Code. Then a separate hole must be cut into the panel enclosure for each cord entry fitting. Once the appropriate fittings are determined, a hole must be created in the panel enclosure to secure and seal the entry fitting to the control panel. Once this is done the pump power cord will be feed through the appropriate fitting and conduit and into the control panel. The pump power cord will be connected the terminal block provided inside the control panel. If using a 230v – 1 phase pump the terminal block will be marked as follows: T1, T2. It is good practice to label or mark the leads on the pump power cord T1, T2 as well. If using an 115V – 1 phase pump the terminal block will be marked as follows: T1 & N. The control panel is provided with grounding lugs, which must be properly grounded per NEC code

Pump Control Cord Connections

If the pump has a separate control cord provided (i.e. for seal leak sensors or motor heat sensors), the panel will be provided with additional terminal blocks. These terminal blocks will be referred to on the schematic and connection diagram included with the panel. Normally these connections will be marked as follows (refer to schematic):

SL for Seal Leak Connections

H for Motor Heat Sensor Connections

Note: If the panel is provided with motor heat sensor connections and the pump does not have motor heat sensors, a jumper wire will have to be placed between the two terminal block positions provided. If this is not done the control circuit in the control panel will not function properly (see provided schematic).

Float or Level Control Connections

Before connecting any of the float or level controls, it is a good practice to mark the float cords. For example:

“OFF” Float = Label “OFF”

“ON” Float = Label “ON”

Alarm Float = Label “Alarm”

This will help prevent any confusion after feeding these cords thru any conduit entering the control panel. If the floats are not connected in the appropriate sequence the panel will not function properly. A terminal block is provided inside the panel for connecting the appropriate number of floats into the panel. Normally, three floats are required for a simplex, four floats for a duplex. The provided wiring schematic and connection diagrams are located inside the door of the panel enclosure as well as a loose copy inside the control panel. Normally the float terminal blocks are marked as follows:

Simplex Control

1 & 2 = “OFF” Float

3 & 4 = “ON” Float

5 & 6 = “Alarm” Float

Duplex Control

- 1 & 2 = "Off" Float
- 3 & 4 = Lead Pump "ON" Float
- 5 & 6 = Lag Pump "ON" Float
- 7 & 8 = "Alarm" Float

(Always check provided panel schematic)

Important! – Always located the floats or level controls in accordance with the pump manufacturer's recommendation as well as the system requirements. Always check the float or level control before installing. This can be done using an ohm meter. To check the float simply connect one of the meter leads to the black wire on the float and the other to the white lead on the float. When the float is in the "OFF" position, meter should read infinity. When float is in the "ON" position the meter should read zero.

Initial Panel Start Up

Once all of the connections have been made to the control panel, it is time to verify the panel is working properly. Before turning on the main circuit breaker or disconnect, the voltage should be checked on the line side. **Warning!** – Live voltage can kill! Use caution when checking the power supply voltage. This can be done with a volt meter or multi-meter. To check the supply voltage, place one of the meter leads to the first leg of the incoming power and the other to the second leg. Unequal voltage can severely damage the pump and the control panel. After confirming the incoming power supply, verify that the power supply matches the voltage of the control panel and the pump. Before turning on the main circuit breaker or disconnect, be sure all of the circuit breakers in the control panel are in the "OFF" position.

Panel Initialization

First turn on the main circuit breaker or disconnect switch. Once again check the voltage, this time check the voltage at the CBI circuit breaker in the panel. Use the same procedure describes in the previous section. If voltage is still good, then turn "ON" all circuit breakers in the control panel.

The pump should be started to make sure it is working and running operating properly. Note – It is important to check the rotation of the impeller. Consult the instructions provided with the pump to confirm the proper rotation. The control panel is supplied with an HAND-OFF-AUTO switch. The pump can be run manually by pushing the switch into the HAND position. The pump should turn "ON". This should allow the rotation of the impeller to be checked. **Warning!** – Do not place fingers, hands or wear loose clothing that can get caught in the impeller. If the impeller is not rotating the proper direction, consult the pump manufacturer. **Warning!** – Live voltage can kill! Be sure all power sources are disconnected before attempting to disconnect the pump motor leads from the terminal block.

Verifying the Float Switch Connections

To check the float switch connections on a simplex panel, place the H-O-A switch in the Auto position. First, raise the "OFF" float switch, the pump should remain "OFF". Second, raise the "ON" float switch, The pump should turn "ON" and the amber indicating light should also turn "ON". Third, lower the "ON" float switch, the pump should stay "ON". Fourth, lower the "OFF" float switch, the pump and the amber indicating light should both shut "OFF".

To check the float switch connections on a duplex panel, place both of the H-O-A switches in the Auto position. First, raise the "OFF" float switch, neither pump should run. Second, raise the lead pump "ON" float switch, the first pump and the amber indicating light marked "PUMP 1" should turn "ON". Third, raise the lag pump float switch and the amber indicating light marked "PUMP 2" and the second pump should turn "ON". Fourth, lower the lag pump "ON" float switch, both pumps should continue to run. Fifth, lower the lead pump "ON" float, both pumps should continue to run. Sixth, lower the "OFF" float switch, both pumps and amber indicating lights should turn "OFF". On a duplex panel, this procedure will have to be done twice, since the pumps alternate after every cycle. The second time, the second pump should run first.

Confirming Alarm System

To check the alarm system, first located the toggle

switch protruding thru the panel enclosure. To test the system simply push the toggle switch “UP” This will turn “ON” the alarm light and the audible alarm. The alarm light may or may not flash based on the design of the panel. After confirming the test function of the alarm system, release the toggle switch. This should automatically turn OFF” the alarm light and the audible alarm.

To make sure the alarm float switch is hooked up properly, raise the alarm float switch. This should activate the alarm light and the audible alarm. If the panel is built with a silence feature, push the toggle switch located on the outside panel “DOWN”. This should turn “OFF” the audible alarm, while leaving the alarm light “ON”. Finally, lower the alarm float switch, this should turn “OFF” the alarm light. The audible alarm will automatically reset and will turn “ON” when the alarm is triggered again.

Additional (Optional) Features

Seal Leak Detection – This feature will indicate via a red indicating light that water has entered seal chamber. This feature is a warning only and will not shut down the pump or pumps. Note – adjustable sensitivity option for seal leak detection is available.

Motor Heat Sensor Connections – This feature will work in series with the motor contactors. When the sensors inside the pump motor open, the motor contact will open and stop the pump. Unless, requested no alarm will be sounded.

Anti-Condensation Heater and Thermostat – This feature will be used to prevent condensation build up inside the panel enclosure. An adjustable thermostat will allow the temperature to be adjusted.

Elapsed Time Meters (ETM) and Cycle Counters – The ETM will display the number of hours a pump has run. While the cycle counter will display the number of times a pump has been started or run. Both will be non-reset able unless specifically requested.

Convenience Outlet – This feature will be provided upon request and have its own separate circuit breaker and be sized per customer request.

Voltage Monitors – This feature will monitor and protect the pump (s) against phase loss or voltage drop via the motor contactor.

IEC Overload Relays – These feature will provide and an adjustable amp setting for pump overload protection. The relay will have a small dial to allow for adjustment and be sized according to the pump full load amps. This overload relay will be able to be set for manual or automatic reset.

Note – Other options or features are available, please consult factory.

Troubleshooting Panel

Pump Does Not Run

In “Hand” Position

- 1) Check for tripped Circuit Breakers
- 2) Check for blown Fuses
- 3) Check Overload Relay; is it tripped?
- 4) Motor Heat Sensor may be “OPEN”
wait for a few minutes and try again.
- 5) Check the Voltage monitor setting; the range may be set too narrow.
- 6) Verify incoming power voltage is Correct and matches the pump nameplate.
- 7) If the pump requires start components (I.e. start or run capacitors, and start relays), verify they a working properly and size appropriately for the specific pump being used.

In “Auto” Position

- 1) Check Liquid level in basin
- 2) Check Float Switches in Tank
 - a) Float Freely
 - b) Functioning Properly
- 3) Check for tripped Circuit Breakers
- 4) Check for blown Fuses
- 5) Check Overload Relay; is it tripped?
- 6) Motor Heat Sensor may be “OPEN”
Wait for a few minutes and try again.
- 8) Check the Voltage monitor setting; the range may be set too narrow.
- 9) Verify incoming power voltage is correct and matches the pump nameplate.
- 10) If the pump requires start components

(I.e. start or run capacitors, and start relays), verify they are working properly and size appropriately for the specific pump being used.

Pump Does Not Shut-Off

- 1) Make sure H-O-A switch not in the "HAND" position
- 2) Check for Failed Float Switches
- 3) Make sure float switches are able to move freely and not hung up inside the tank.
- 4) Check for Failed Motor Contactor
- 5) Pump may be air locked refer to the instructions included with pump.

Chattering or Buzzing Motor Contactors

- 1) Check float switches – failing float switches can cause contactors to chatter.
- 2) Make sure float switches are located away from any turbulence inside the tank or to close the tank inlet.

Nuisance Tripping of Overload Relay, Circuit Breakers

- 1) Check rotation of the pump
- 2) Check Incoming Power
- 3) Check the Current Draw of the Pump
Pump may be clogged or motor may be failing.
- 4) Check Overload Relay, is it set to the correct amps?

Alarm Does Not Turn-On

- 1) Check Float Switch
- 2) Check "SR" Relay –make sure it is not loose.
- 3) Check Alarm Circuit Fuse
- 4) Check Transformer Fuses
- 5) Use Toggle to test circuit
- 6) Check Alarm Light bulb

Seal Leak Light Does Turn-On

- 1) Check Alarm Circuit Fuse
- 2) Check Transformer Fuses

- 3) Check "R1" Relay – make sure it is not loose.
- 4) Check Pump control cord connections to Panel (see schematic)

For additional troubleshooting help, please consult the factory