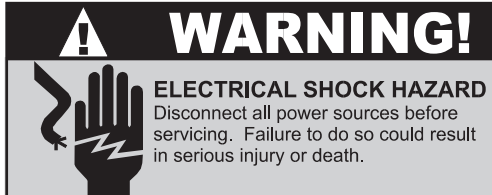


# Three Phase Duplex 331 Lift Station Control Panel

## Installation Instructions and Operation/Troubleshooting Manual



Warranty void if panel is modified.

Call factory with servicing questions:

**1-800-746-6287**

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.

All conduit running from the sump or tank to the control panel must be sealed with conduit sealant to prevent moisture or gases from entering the panel. NEMA 4X enclosures are for indoor or outdoor use, primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water and hose-directed water. **Cable connectors must be liquid-tight in NEMA 4X enclosures.**

Check the incoming power: voltage, amperage, and phase meet to requirements of the pump motor being installed. Always check the pump identification place for electrical requirements.

### Installation

The 331 Lift Station Control Panel is designed to operate via a four float system. The four float system should include floats for: all pumps stop, lead pump start, lag pump start, and high level alarm.

#### CAUTION:

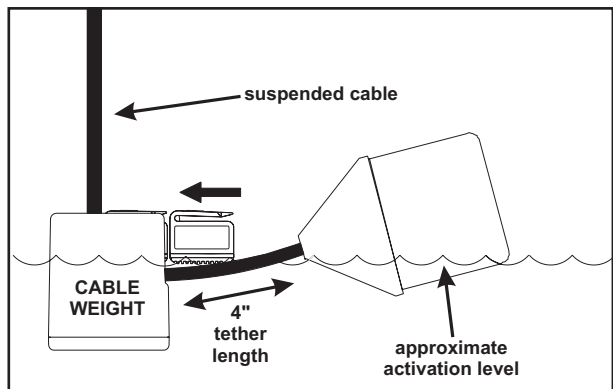
Please reference the schematic provided with the control panel for proper installation.

#### Installation of Floats

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

**WARNING:** Turn off all power before installing floats in pump chamber. Failure to do so could result in serious or fatal electrical shock.

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



**Cable Weight Mounting**

Manufactured by:  
**CSI Controls**

Technical Support: +1-800-746-6287  
techsupport@sjeinc.com  
www.csicontrols.com  
Technical Support Hours: Monday - Friday,  
7 A.M. to 6 P.M. Central Time

# Installation Instructions

## Mounting the Control Panel

1. Determine mounting location for panel. 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 Nema 4X junction box with liquid-tight connectors to make required connections. **You must use conduit sealant to prevent moisture or gases from entering the panel. Do not mount the junction box in the wet well.**
2. Determine conduit entrance locations on control panel.

**NOTE:** Be sure the incoming power, voltage, amperage, and phase meet the requirements of the pump motors being installed. Always check the pump identification plate for electrical requirements.

3. Drill proper size holes for type of connectors being used.

**NOTE:** If using conduit, be sure that it is of adequate size to pull the pump and switch cables through.

4. Attach cable connectors and/or conduit connectors to control panel.

**FOR INSTALLATION WITHOUT A SPLICE,  
GO TO STEP 8; FOR INSTALLATION REQUIRING  
A SPLICE, FOLLOW STEPS 6-7.**

5. Determine location for mounting junction box according to state and local code requirements. Mount the junction box to proper support.
6. Run conduit to control panel or to junction box if required. Drill proper size holes for the type of conduit used. Use one conduit for float switch cables and a separate one for pump cables. Do not run pump and float cables in the same conduits.

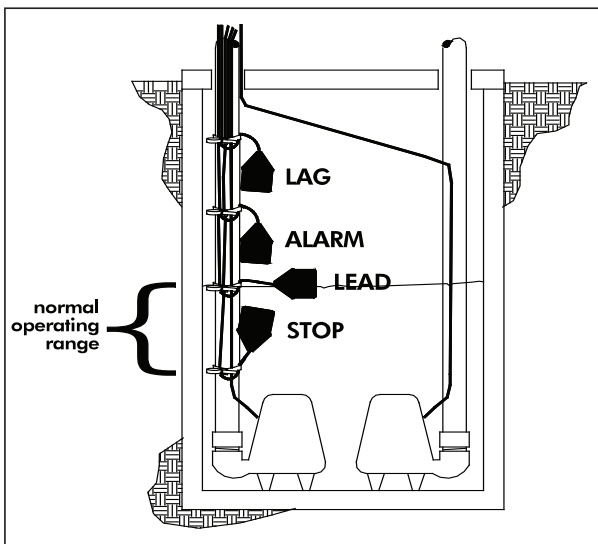


FIGURE 1 - Four float duplex

7. Identify and label each wire before pulling through conduit into control panel and junction box. Make wire splice connections at junction box if necessary.
8. Firmly tighten all fittings on control panel or junction box if required.
9. In the control panel, insert the appropriate overload unit in the motor starter.
  - a) Adjust the dials to match motor full load amps.
  - b) Turn motor starter switch to the ON position.

**CAUTION:** Resetting the motor starter with power applied may cause the pump to run unexpectedly.

10. Connect pump wires directly to the motor starter terminal positions T1, T2, and T3.

**NOTE:** Three-phase motors will run in either direction. Check pump motor before installation for proper rotation. To reverse the rotation, swap pump cable connections on any two terminals T1-T2-T3.

11. Connect "power-in" conductors to proper locations: 208/230/460 VAC on the 3 position terminal block. **Verify that the appropriate voltage tap on the transformer primary matches the incoming voltage.**

**CAUTION:** The transformer is wired from the factory for 460VAC. If incoming power is 230VAC or 208VAC, the wire connections to the transformer must be changed for proper operation. Not doing so could result in damage.

**VERIFY CORRECT OPERATION OF CONTROL PANEL AFTER  
INSTALLATION IS COMPLETE.**

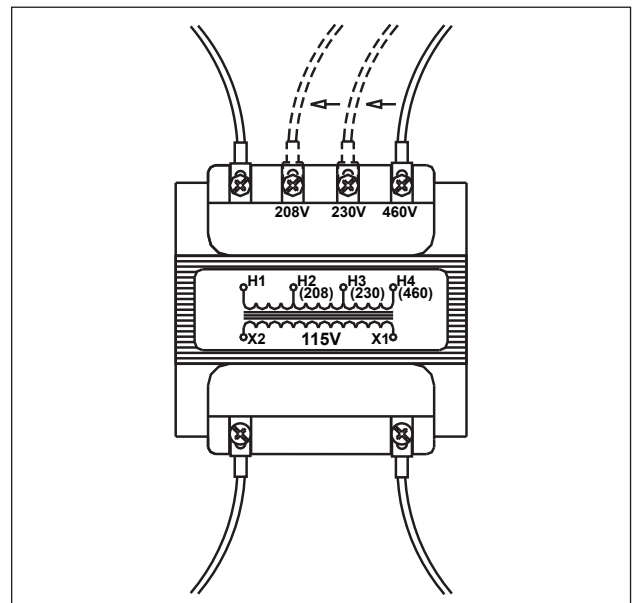
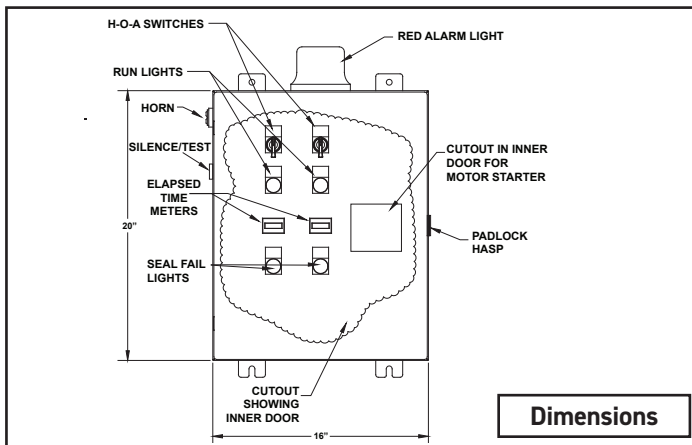


FIGURE 2 - Transformer

# Operations



The 331 panels are designed to operate with four floats for pump sequencing. The standard float functions are common pump stop, lead pump start, lag pump start and alarm float.

## Float Operation (in AUTO mode)

As the liquid level rises above the STOP float the panel will remain inactive. As the level rises above the LEAD start float, the lead pump will start and remain ON until the level drops below the STOP level. If the level continues to rise past the start LEAD float and above the start LAG float, the second pump will start and both pumps will remain ON until the level drops below the STOP float.

## Alarm Operation

The alarm will activate and remain ON only if the alarm float is tipped to the ON (close) position.

## Alarm System (Horn and Beacon)

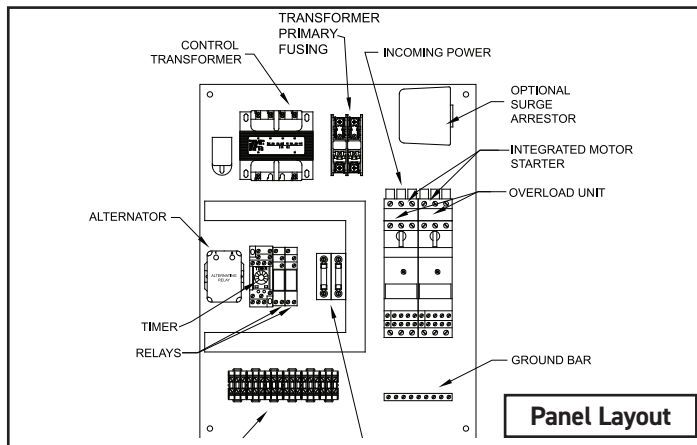
When an alarm condition occurs, a red light and a horn will be activated. If the silence push button is pressed, the horn will be silenced. When the alarm condition is cleared, the alarm system is reset. The alarm system can be tested by pressing the same push button.

## HOA Switch

A HAND/OFF/AUTO switch is provided for each pump. In the HAND mode, the pump will run regardless of the float switch. It will stop only if manually stopped and or an overload trip or motor thermal cutoff condition has occurred. In the OFF position, the pumps will not RUN. In the AUTO position, the pumps will only run if the float switches are activated in the correct sequence.

## Motor Protective Switch (Motor Starter)

A motor protective switch is supplied for each pump to provide motor overload protection, branch circuit protection and a means to disconnect the pump. The overload dial on the starter must be set to match the motor Full Load Amps (FLA). In the event of an overload trip, the motor protective switch must be reset by first turning the selector handle counterclockwise to the OFF position and then turning the handle clockwise to the ON position.



## Pump Run Lights

Each pump has a run light. The run light will be ON in either the hand or the automatic mode when the pump is called to run.

## Dry Auxiliary Contacts

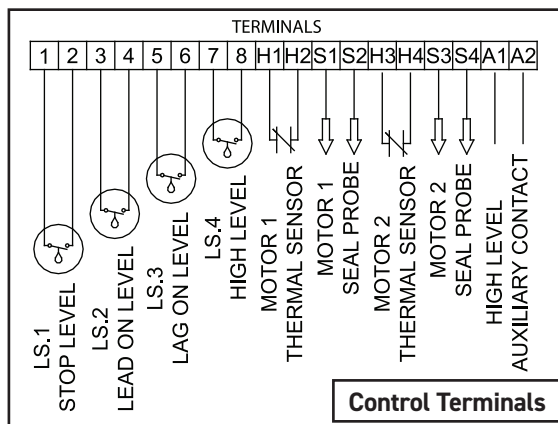
**Normally open** - Contacts are open under normal conditions and closed when alarm condition is present. Automatically reset once alarm condition is cleared.

## Seal Failure Circuit and Indicator Light (optional)

The seal fail circuit is resistance sensitive and will sense the presence of water in the pump seal chamber. When water is sensed, the control circuit will illuminate the appropriate indicator light on the control panel. If a seal fail occurs, turn off the pump and consult the pump manufacture for proper repair or maintenance.

## Thermal Cutoff

The thermal cutoff 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.



If the pumps are not supplied with a thermal sensor, jumper wires must be placed on the terminal block from H1 to H2 and H3 to H4. Not doing so will result in the pumps not operating.

# Troubleshooting



## WARNING!



### ELECTRICAL SHOCK HAZARD

Disconnect all power sources before servicing. Failure to do so could result in serious injury or death.

### Alarm Beacon and Horn

Pressing the alarm silence/test push button or activating the alarm float should flash the alarm beacon and turn on the alarm horn. If the beacon does not flash or the horn does not sound, replace them with the 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. Consult factory when in doubt about testing procedures or results.

### Float Controls

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

**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:

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. 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.

### Transformer

The 331 panel can be configured to operate at 208VAC, 230VAC, or 460VAC. It is factory set for 460VAC operation. Check the available incoming supply voltage to the 331 control panel prior to installation. Verify that the connections on the transformer are correct and will match the available incoming voltage. Measure the voltage between terminals 1 and S2 with a Voltmeter. It must read 115VAC (+/- 15%) for proper operation.



## CSI Controls®

Technical Support: +1-800-746-6287

[techsupport@sjeinc.com](mailto:techsupport@sjeinc.com)

[www.csicontrols.com](http://www.csicontrols.com)

Technical Support Hours: Monday - Friday,  
7 A.M. to 6 P.M. Central Time