

# 331-SV



## User Manual

THREE PHASE DUPLEX  
LIFT STATION CONTROL PANEL  
WITH  
STATIONVIEW CONTROLLER





# WARNING!



## ELECTRICAL SHOCK HAZARD

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

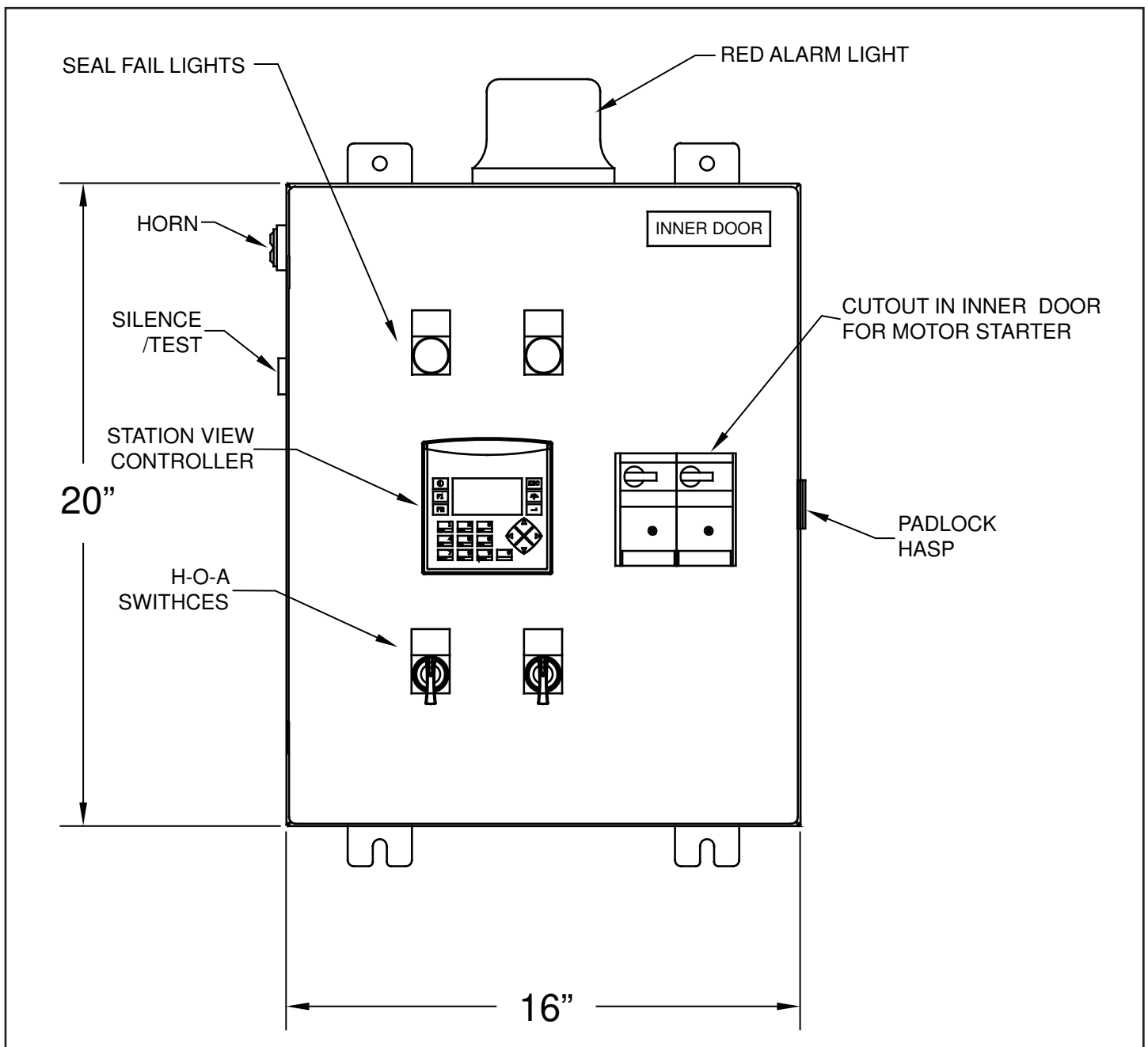
Warranty void  
if panel is modified.

Call factory with  
servicing questions.

**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 to meet requirements of the pump motor being installed. Always check the pump nameplate for electrical requirements.



# INSTALLATION INSTRUCTIONS

## MOUNTING THE CONTROL PANEL

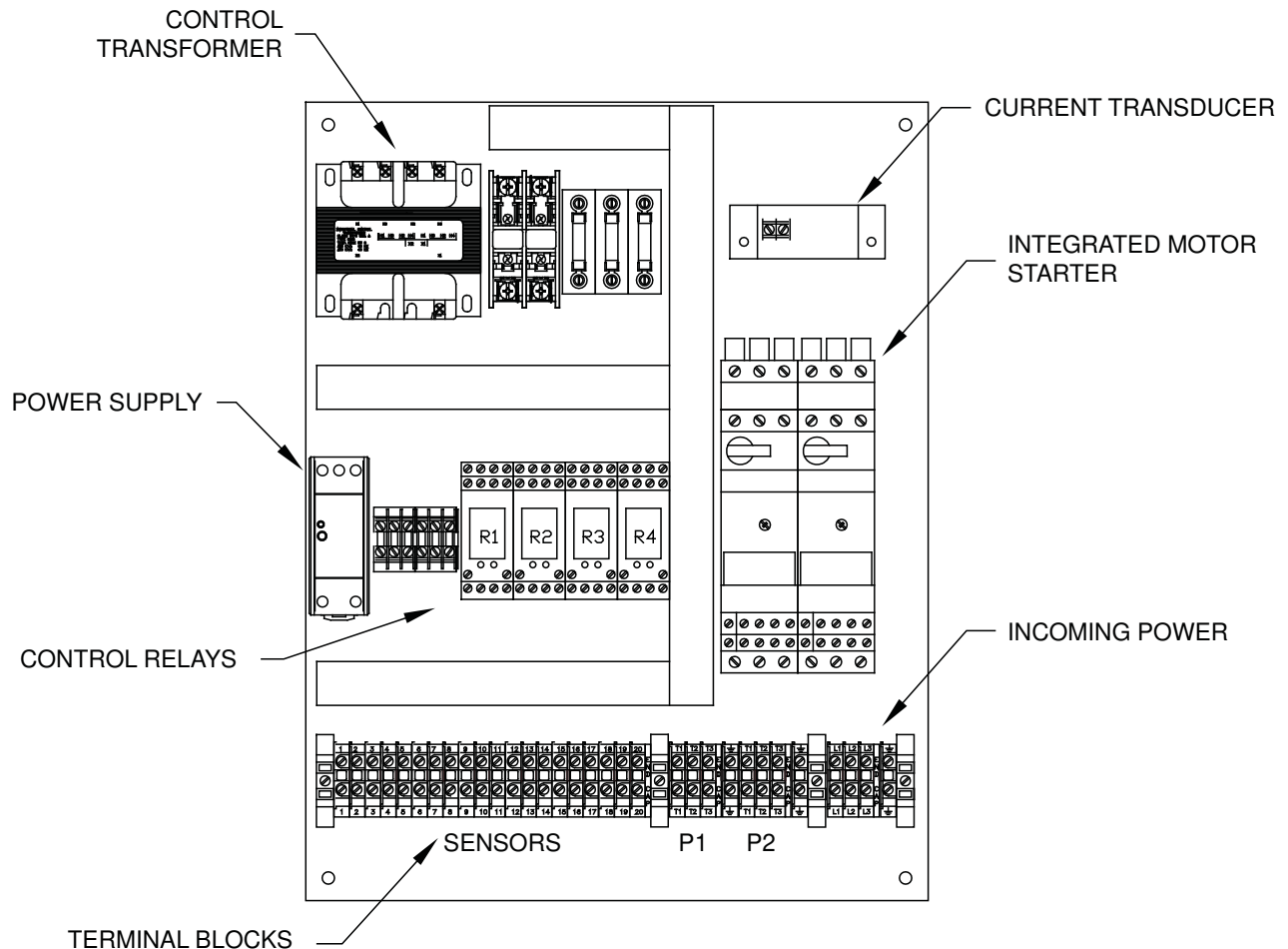
1. Determine mounting location for panel. If distance exceeds the length of either the level sensor cables or the pump power cables, splicing will be required. For outdoor or wet installation, we recommend the use of a Nema 4X junction box with liquid-tight connectors to make required connections. You 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.
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 sensor 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.
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.

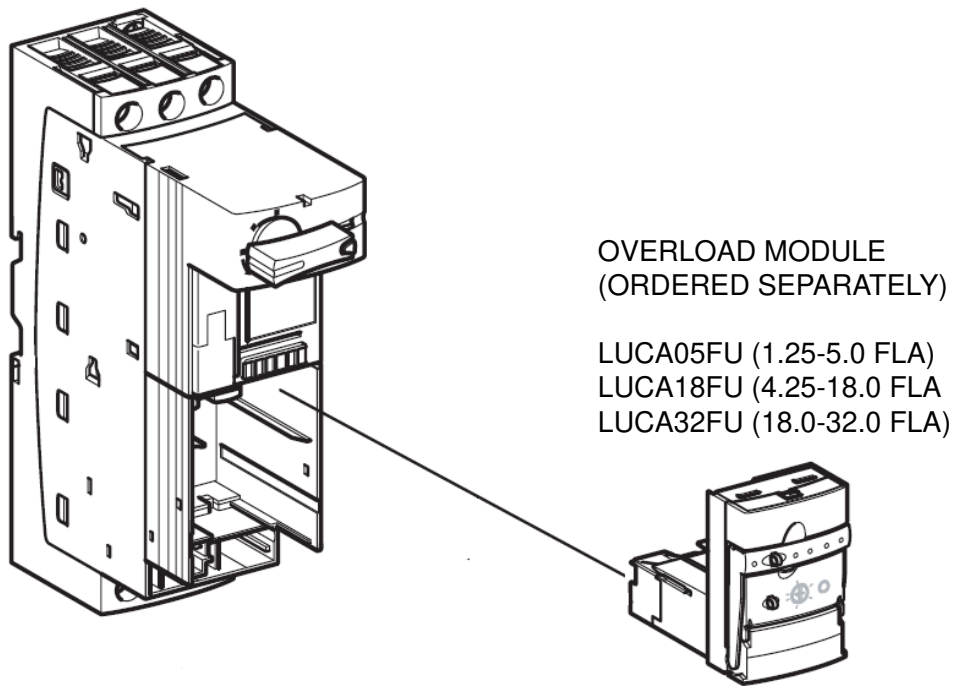


8. Firmly tighten all fittings on control panel or junction box if required.
9. In the control panel, insert the appropriate overload modules in the motor starter.

**These overload modules must be ordered separately. The control panel will not operate without overload modules.**

- 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.



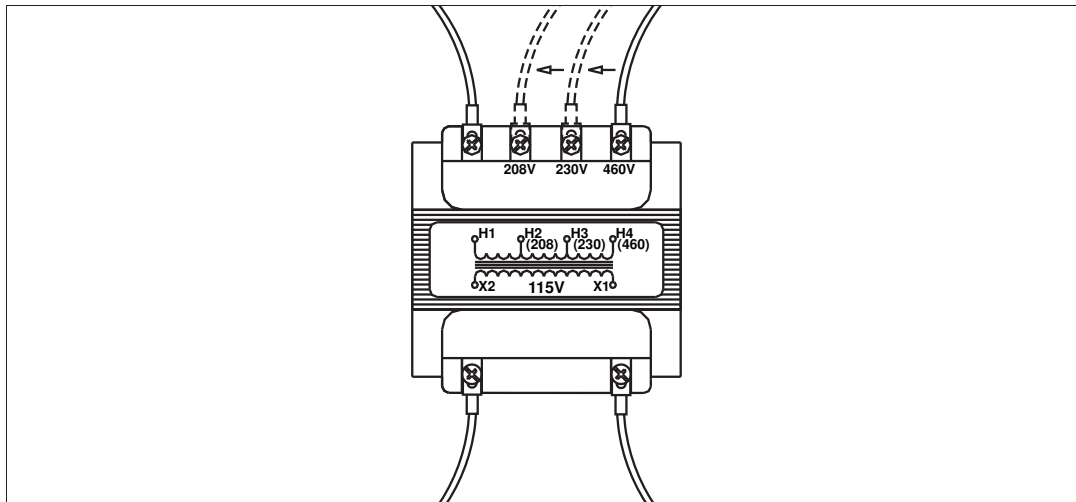
10. Connect pump wires to terminal blocks as indicated on the provided electrical schematics.

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

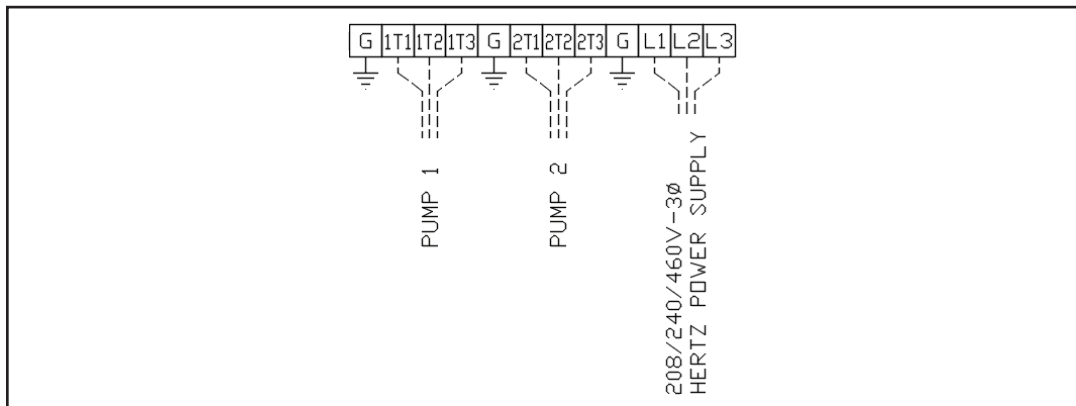
11. Connect incoming power (208/230/460 VAC, 3 phase) to the 3 position terminal block as indicated on the provided electrical schematics. Verify that the appropriate voltage tap on the transformer primary matches the incoming voltage.

**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**

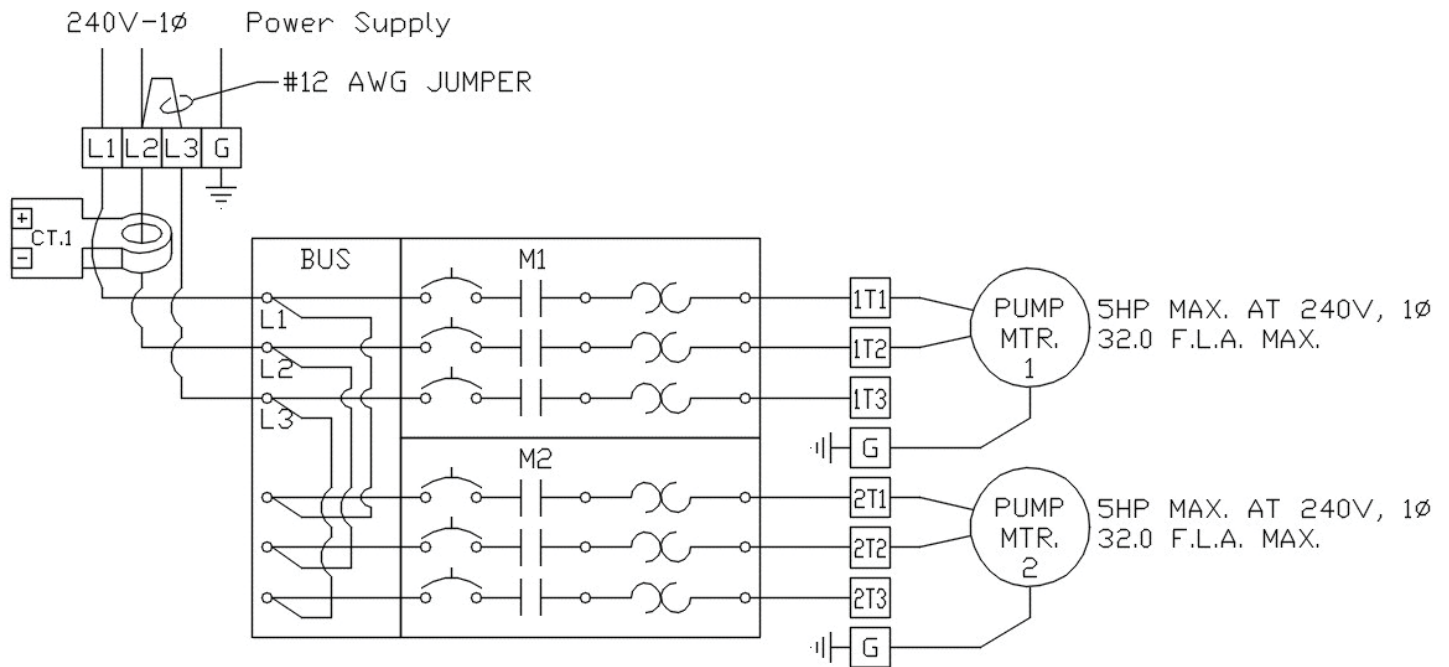


**FIGURE 2A - Power Supply and Pump Wiring Diagram (3 phase)**

**NOTES:**

- 1) Panel ground lugs must be connected to earth ground per NEC and Local Electric Codes.
- 2) Factory wiring is shown as  
Field wiring is shown as:
- 3) Installer must provide either an inverse time main circuit breaker or a main fusible disconnection device with dual element fuses per Table No.1.
- 4) Recommended tightening torques for terminals 208/230/460 volt power: 35 pound inches. 120 volt power, control & low voltage: 18 pound inches.
- 5) Motor thermal heat sensors are not in all motors. If the motor does not have them, a jumper must be placed between the H1-H2 and H3-H4 terminals.
- 6) The transformer is factory set at 460 volts. Configure in field for other line voltages.
- 7) Overloads are factory set to minimum setting. Overload relays to be adjusted per nameplate FLA of the motor.
- 8) Auxiliary high level alarm contact is rated for 3A, 30VDC / 240VAC.
- 9) It is possible to operate the 331-SV panel using 240VAC-1Ø power provided that all the following requirements are followed:
  - The pump is also rated for 240VAC-1Ø.
  - No external capacitor kit is required to operate the pump.
  - A #12 AWG jumper wire must be connected between L1 and L2 (user supplied).
  - Line power should be connected to terminals L1 and L2 Do not connect power to L3.
  - Pumps should be connected to terminals 1T1-1T2 and 2T1-2T2. So not connect pump wires to terminals 1T3 and 2T3.
  - Change the line side of the transformer to the proper voltage tap.

12. Single phase supply power and pump connection. (See note 9 on previous page and wiring diagram below).



**FIGURE 2B- Power Supply and Pump Wiring Diagram (Single phase)**

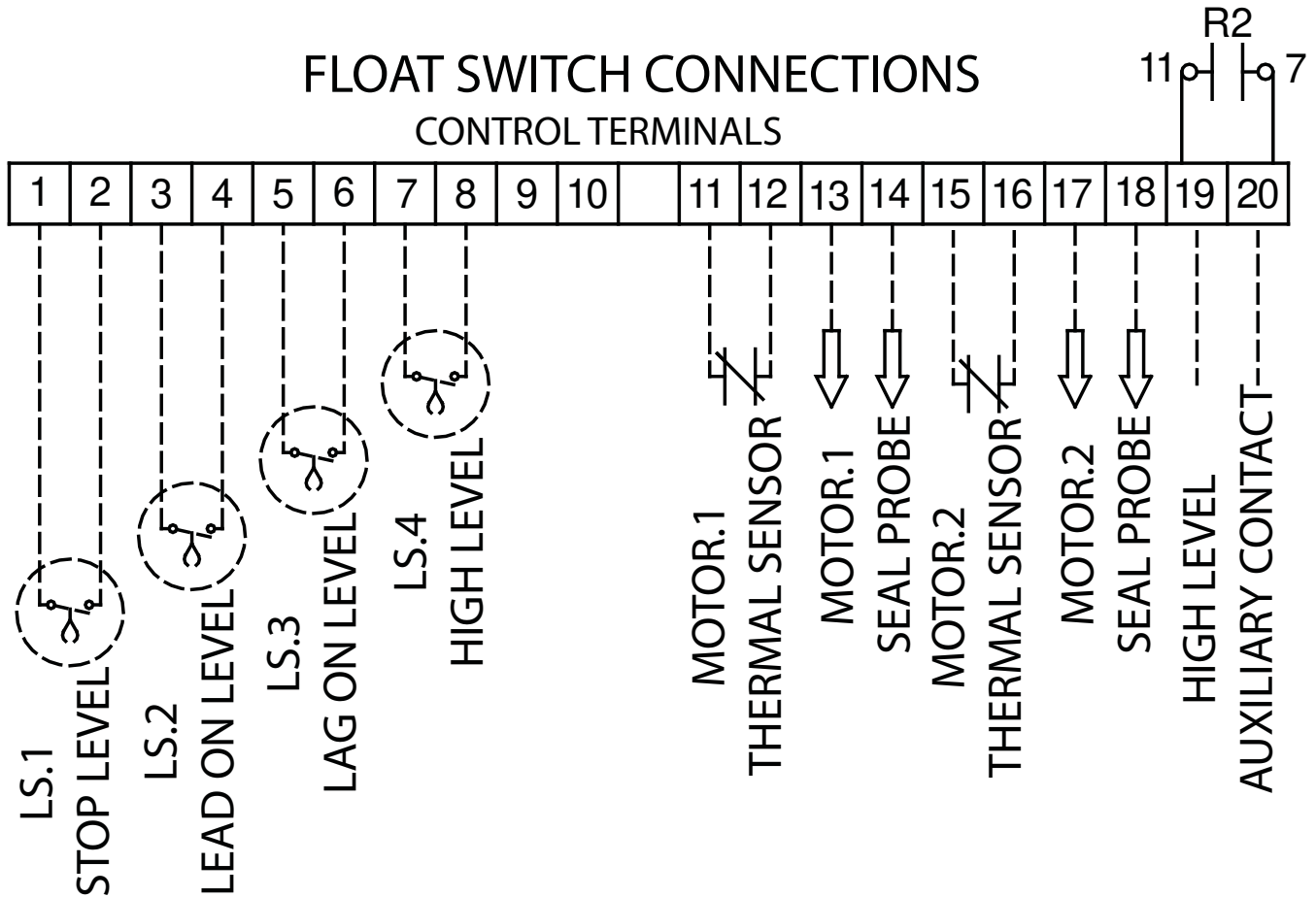
## INSTALLATION OF LEVEL SENSORS

**CAUTION:** If the level sensors are not mounted correctly, the pump system will not function properly.

**WARNING:** Turn off all power before installing level sensors in wet well. Failure to do so could result in serious or fatal electrical shock.

1. Use label kit to identify level sensors cables (stop, lead, lag, alarm, etc.). See control panel schematic for level sensor connections.
2. Determine your normal operating level.
3. Mount level sensors at appropriate levels. Be sure that floats have free range of motion without touching each other or other equipment in the basin.
4. Ensure that the level transducers cannot reach the pump.

# OPERATIONS - FLOAT

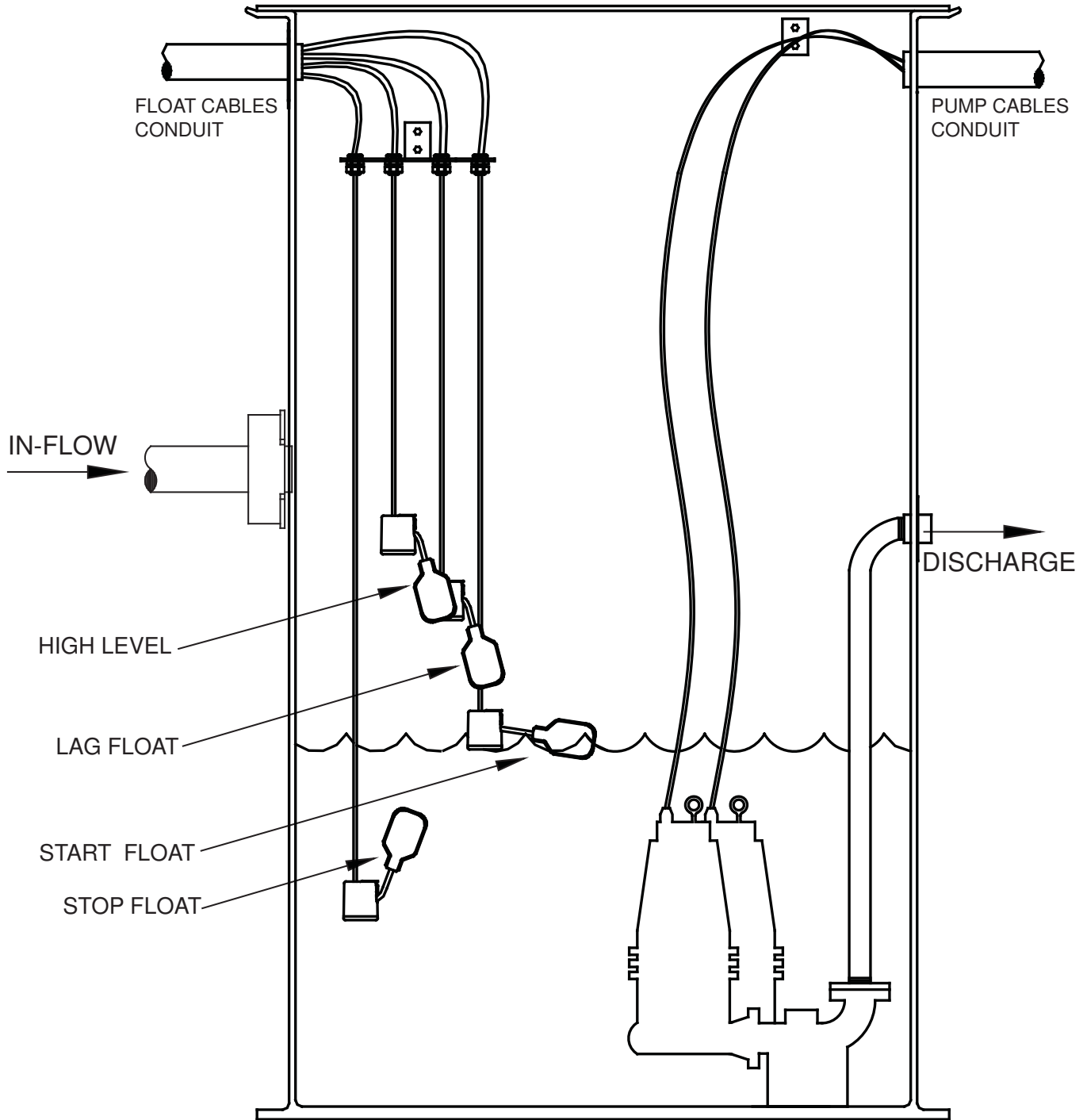


The 331 panels are designed to operate with four floats for pump sequencing. The standard float functions are common pump stop, lead pump start, lag pump start and alarm float.

### FLOAT SWITCH OPERATION (IN AUTO MODE)

As the liquid level rises above the STOP float the pumps 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.

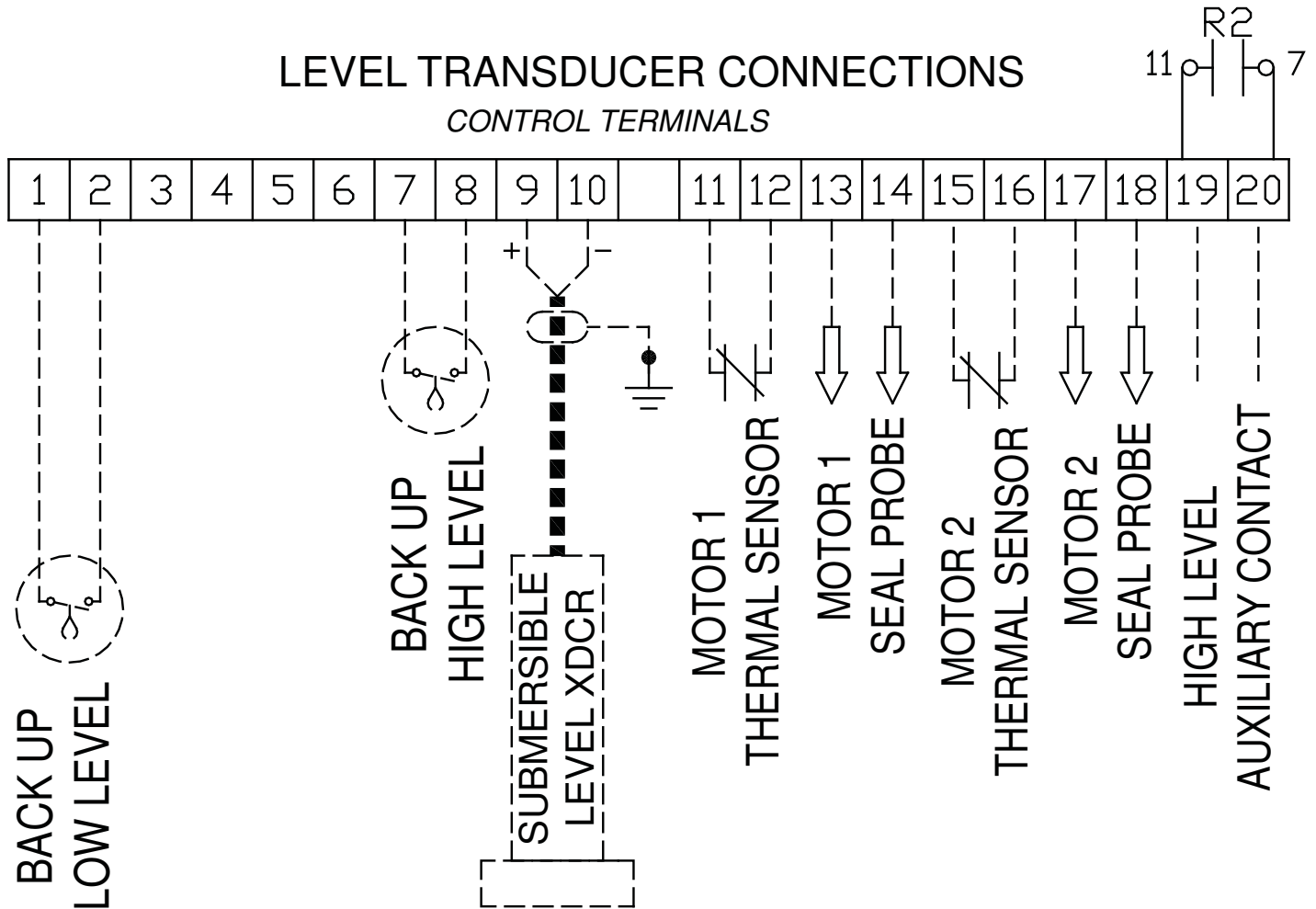
# FLOAT INSTALLATION



Typical float setup for a duplex lift station

**WARNING:**  
Keep floats clear of pumps, pipes, and motor cables.  
Ensure that floats cannot reach pump suction.  
Do not run pump and float cables in the same conduit.

# OPERATIONS - TRANSDUCER



## TRANSDUCER OPERATION (IN AUTO MODE)

As the liquid level rises above the STOP set point the pumps will remain inactive. As the level rises above the LEAD start set point, 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 and above the start LAG start set point, the second pump will start and both pumps will remain ON until the level drops below the STOP set point.

## BACK UP FLOAT (IN AUTO MODE)

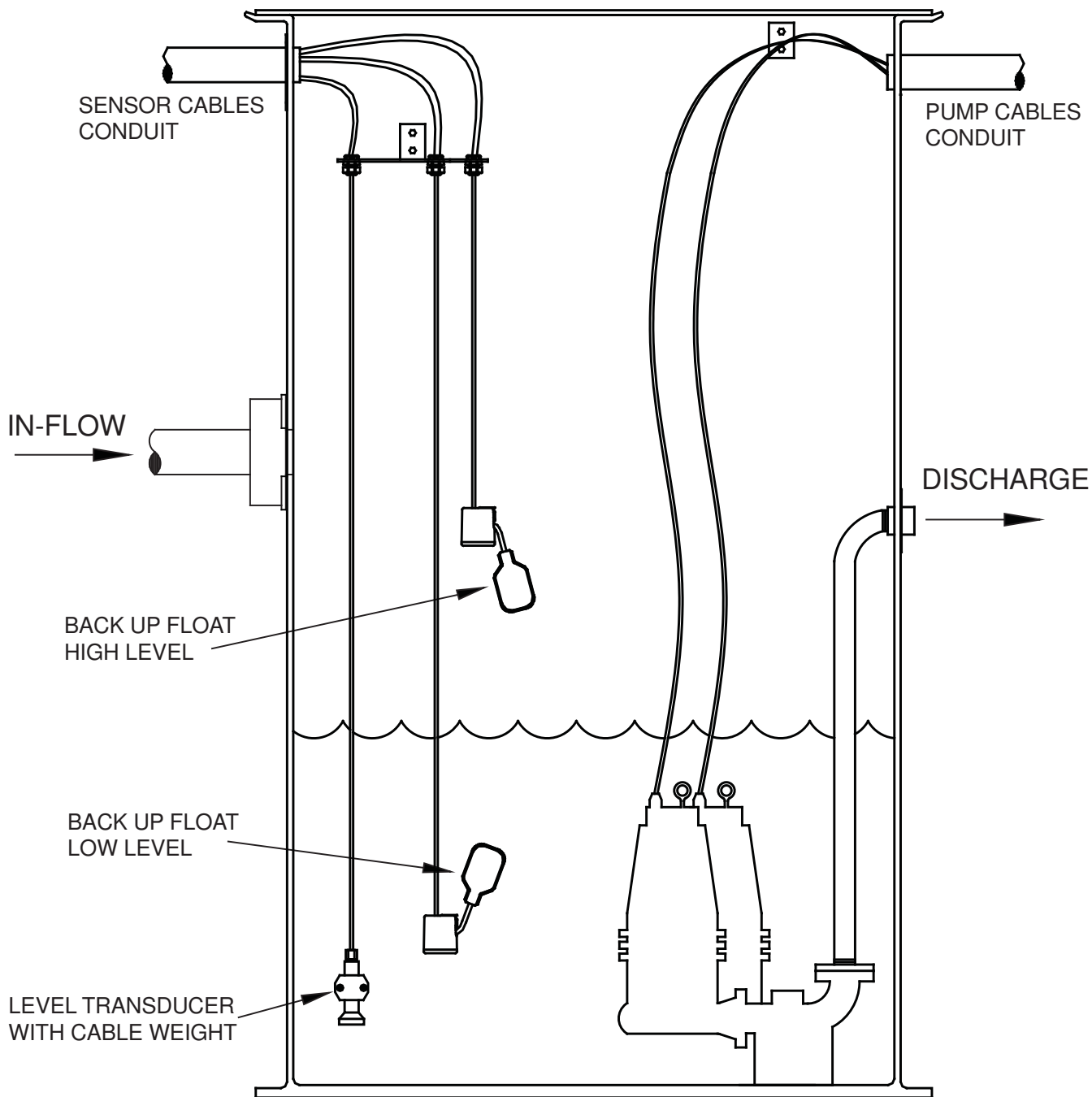
If the level drops below the back up LOW LEVEL float switch, pumps will stop. As the level rises above the LOW LEVEL Float, the pumps will remain inactive until the level rises above the LEAD start set point. If the level rises above the back up HIGH LEVEL float switch, both pumps will start and both pumps will remain ON until the level drops below the back up LOW LEVEL float switch.

## ALARM LEVELS

The alarm beacon and the horn will active on the following level conditions:

- If the level rises above the back up HIGH LEVEL float switch
- If the level rises above the HIGH LEVEL set point (transducer)
- If the level drops below the back up LOW LEVEL float switch

# TRANSDUCER INSTALLATION



Typical transducer (with float back up) setup for a duplex lift station

**WARNING:**  
Keep sensors clear of pumps, pipes, and motor cables.  
Ensure that floats cannot reach pump suction.  
Do not run pump and float cables in the same conduit.

## **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.

## **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**

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 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.

If the pumps are not supplied with a thermal sensor, jumper wires must be placed on the terminal block from I1 to I2 and I5 to I6. Not doing so will result in the pumps not operating.



### 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 27 and 28 with a voltmeter. It must read 115VAC (+/- 15%) for proper operation.

### PUMPS AMPS DISPLAY

If the pump amps do not display correctly check the following:

1. Check that the jumper setting on the current transducer is correct.
2. Current monitoring is enabled in the Station View™ Controller.



Ashland, OH

800-363-5842