

ABH—Advanced Basin Heater Controls

The Marley ABH basin heater package controls the ON and OFF operation of the basin heater device, providing freeze protection in the cold water collection basin of a cooling tower. The stand-alone control package includes a main circuit breaker disconnect that feeds a contactor providing power for the heater element or steam solenoid valve.

WARNING

For safety purposes, see **Figure 1** for high voltage components in the ABH panel. DO NOT interact with the panel live without proper electrical training and personal protective equipment. When checking continuity, ensure panel has no power.

When looking inside the ABH panel, check for any loose wires. Submit an RFQ for technical assistance if any wires inside the panel are not connected. The only exception is loose wires on the terminal block. Those wires can be rewired using the panel diagram and do not need an RFQ submission.

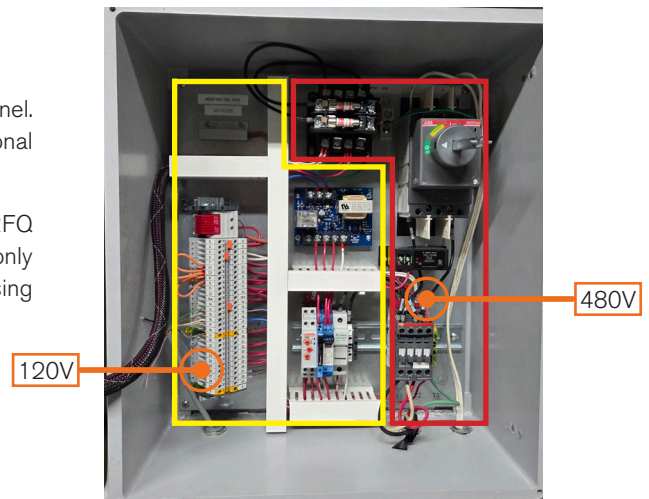
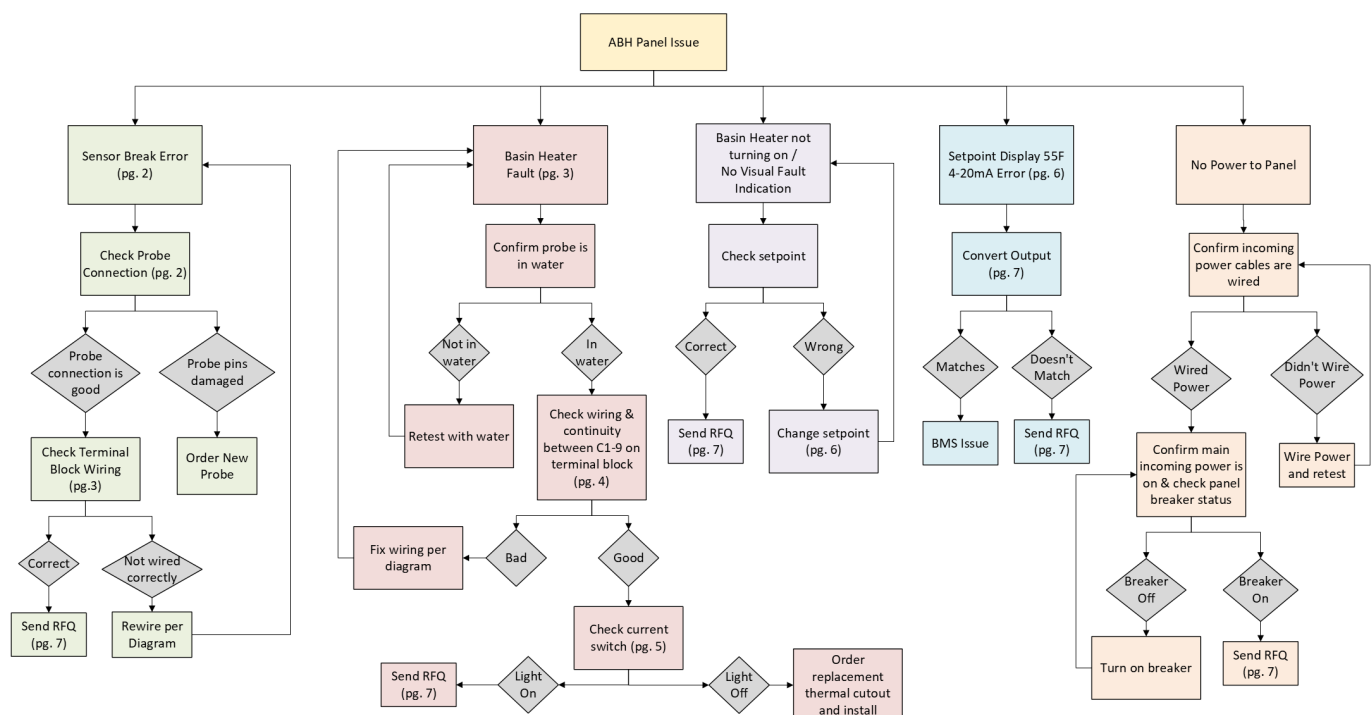


Figure 1: ABH High Voltage Components

The following troubleshooting diagram walks through FAQs – use the diagram to follow the visual indicators from the panel.



Sensor Break Error

See setpoint display for sensor break error, **Figure 2**.



Figure 2: Sensor Break Error

If the 561E error is present, check probe connection to ensure proper installation.

Check Probe Connection

To ensure the probe connection pins are not damaged, when connecting the water temperature Resistance Temperature Detector (RTD) to the sensor cable, it is important to find where the keyed orientation is on the connector, see **Figure 3** for probe and cable.



Figure 3: RTD Probe and Sensor Cable

The keyed orientation can be identified in **Figure 4**.



Figure 4: Probe and Sensor Cable Keyhole

Line up the key (1a) with the key slot (1b), and the other prongs should align with the connector slots. **DO NOT PUSH OR FORCE THE PROBE AND CABLE TOGETHER.** Once probe and sensor cable are connected, they should look like **Figure 5**.

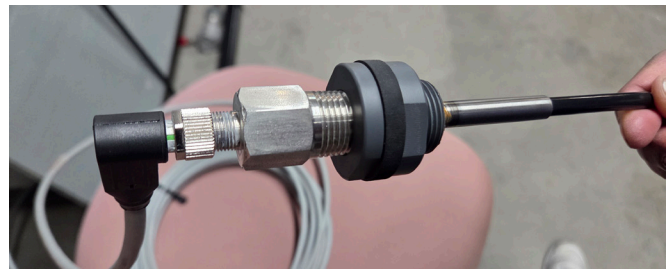


Figure 5: Connected Probe, Loose Thread

With the probe and sensor cable aligned, rotate the threaded collar clockwise to have the probe and sensor cable snugged together tightly. The probe will now be properly connected to the sensor cable and should look like **Figure 6**. Check Terminal Block Wiring:

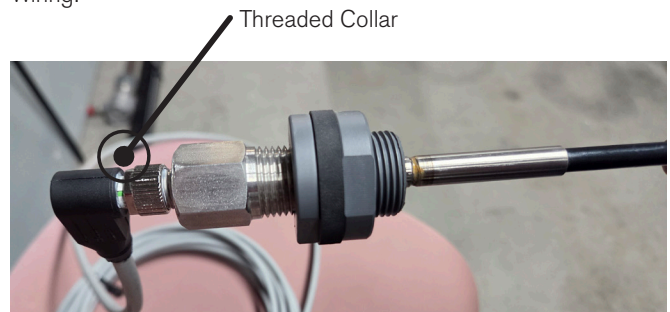


Figure 6: Properly Connected Probe and Sensor Cable

Check Terminal Block Wiring

Ensure that the sensor cable is wired correctly to the terminal block using the correct wire colors. See **Figure 7**.



Figure 7: Sensor Terminal Block Wiring

Past panels may have different water temperature RTD probes. The only difference is the wire colors of the probe. See the table below, **Table 1**. To identify which probe is in your panel, check the available wire colors. An orange wire indicates Set 1 and a green wire indicates Set 2.

Table 1: Probe RTD Wire Colors

Set 1 Colors	Set 2 Colors	Terminal Pin
Orange	Green	14
Red	Brown	15
White	White	16
Blue	Yellow	17
Black	Grey	18

The inside panel door drawing also indicates these color differences. The format is Set 1 (Set 2), see **Figure 8**.

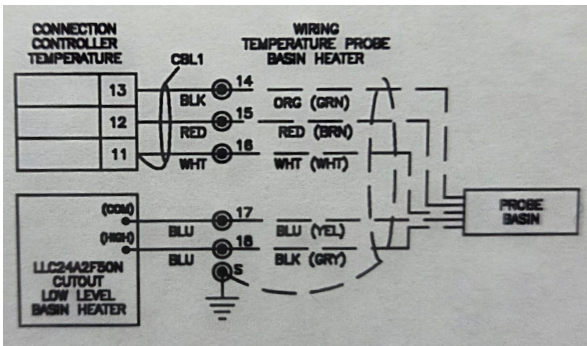


Figure 8: Probe RTD Wire Colors Panel Door Drawing

Basin Heater Fault

To test the basin heater element, ensure that the probe is submerged in water, then press and hold the “test” button for 3 seconds, see **Figure 9**.



Figure 9: Basin Heater Test Button

If necessary, while power is supplied, open the panel to see if the water temperature probe light is on. The water temperature probe should be illuminated when it is submerged. Inside the panel there is a card that has a visual indicator when the probe is contacting water, see **Figure 10**.

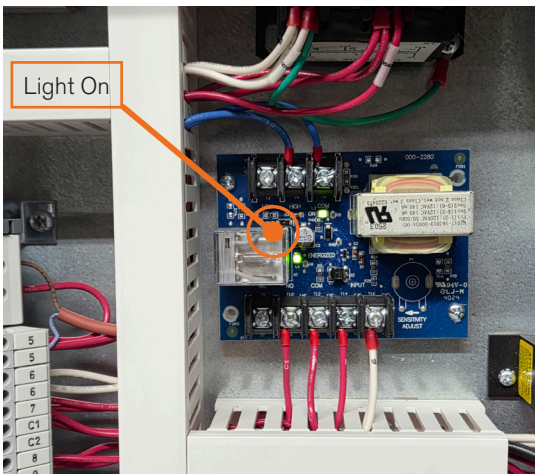


Figure 10: Water Temperature Probe Light On

ABH Troubleshooting

If the light is off, as seen in **Figure 11**, then the probe is not contacting water.

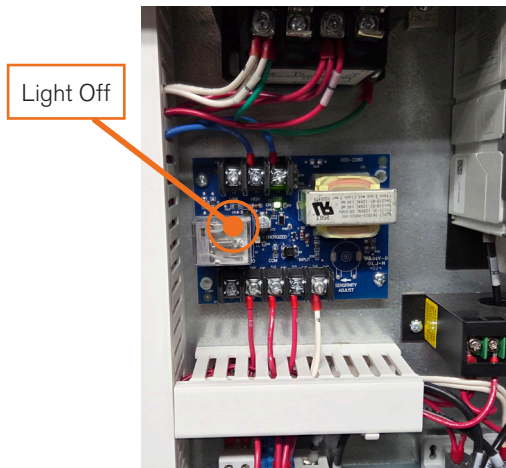


Figure 11: Water Temperature Probe Light Off

Continuity Check

Check if the basin heater thermal cutout has been wired. If not, then wire the thermal cutout. When the basin heater is installed, the thermal cutout needs to be wired to the ABH panel. The thermal cutout can be seen in **Figure 12**.

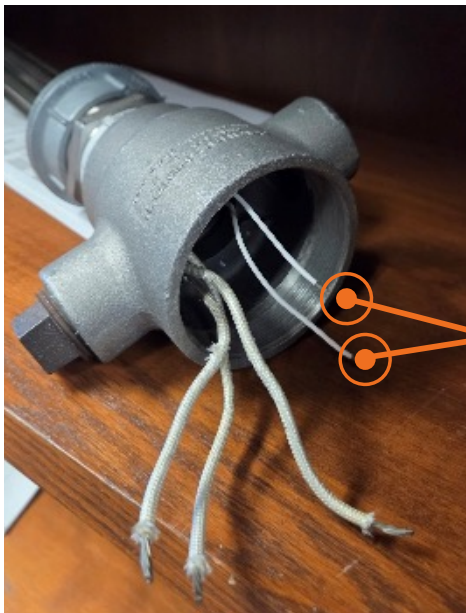


Figure 12: Thermal Cutout in Basin Heater

The two thermal cutout wires should replace the orange jumper cable within the ABH panel where it connects in terminal ports **C1** and **C2**. See **Figure 13** for reference.

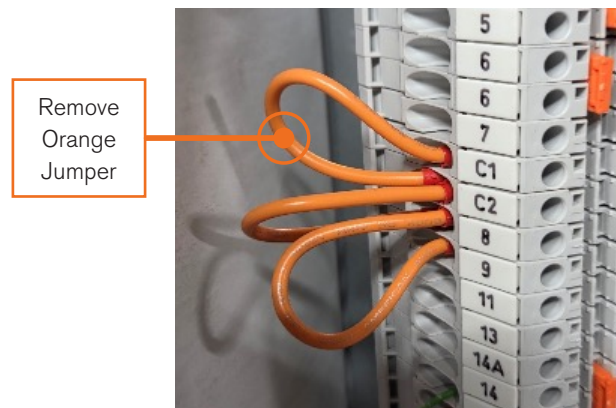


Figure 13: Orange Jumper Cable Replacement

The panel electrical diagram also shows the location for the thermal cutout. See **Figure 14**.

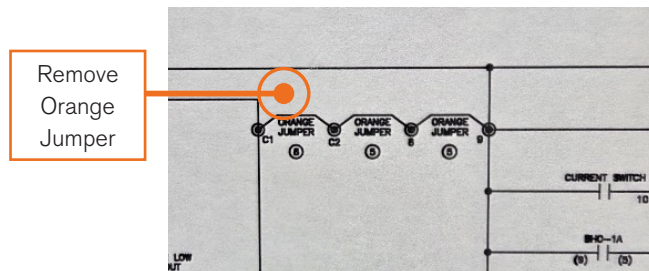


Figure 14: Panel Wiring Diagram Orange Jumper

Figure 15 shows the thermal cutout wired into the ABH panel in place of the orange jumper cables. The jumper cables in terminal ports C2 to 8 and 8 to 9 are for the Building Management System (BMS) and other customer hookup use.

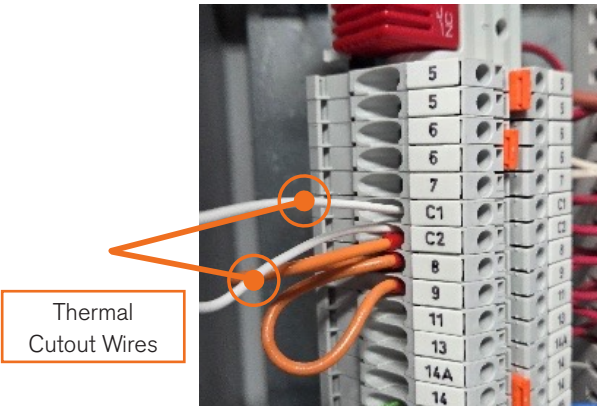


Figure 15: Installed Thermal Cutout

Conductivity can be checked by setting the multimeter to the continuity settings, see **Figure 16**. The multimeter probes will then need to contact the respective terminal ports to indicate that power is flowing across that connection.

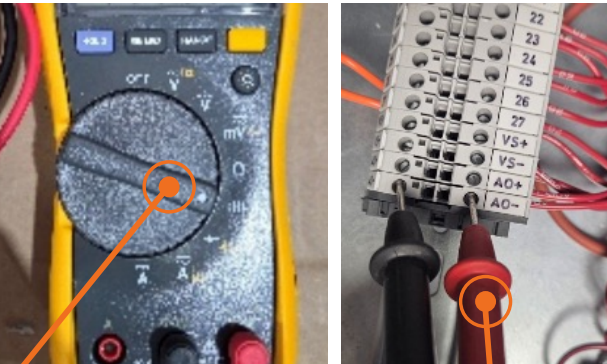


Figure 16: Multimeter Continuity

Turn off power and conduct the continuity test specifically across terminal C1 to 9. **Figure 17** and the respective table outline the required continuity tests.

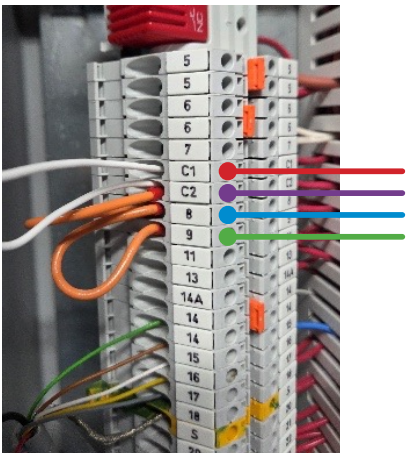


Figure 17: Continuity Tests

Test Connection	Probe Location	Tone
C1 to 9	Red to Green	Yes
C1 to C2	Red to Purple	Yes
C2 to 8	Purple to Blue	Yes
8 to 9	Blue to Green	Yes

If any of the tests do not produce a tone, refer to the panel diagram and rewire accordingly if necessary.

Current Switch

With power supplied, open the panel to look at the current switch. Verify that the current switch indicates current flowing. See **Figure 18** for visual indicator.

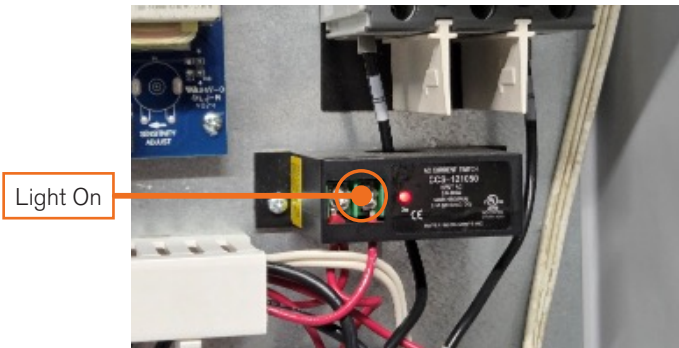


Figure 18: AC Current Switch Light On

ABH Troubleshooting

If the light is off, the basin heater is not drawing current. See **Figure 19** for visual indicator. This indicates the heater element could be faulty.



Figure 19: AC Current Switch Light Off

Change Setpoint

To change the setpoint on the ABH panel's FDC-9300 temperature controller, open up the panel to access the inside portion of the component. See **Figure 20** for reference.

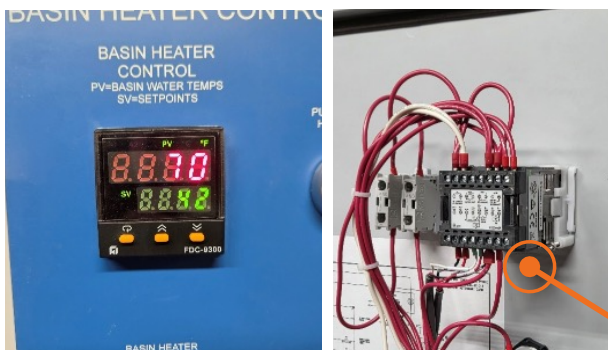


Figure 20: FDC-9300 Temperature Controller

Underneath the temperature controller there is a switch to flip the device into a state where the setpoint can be adjusted. See **Figure 21** for the switch state required to enable the adjustment mode. Switch 3 needs to be switched down to enable adjustments. Switch back when finished.

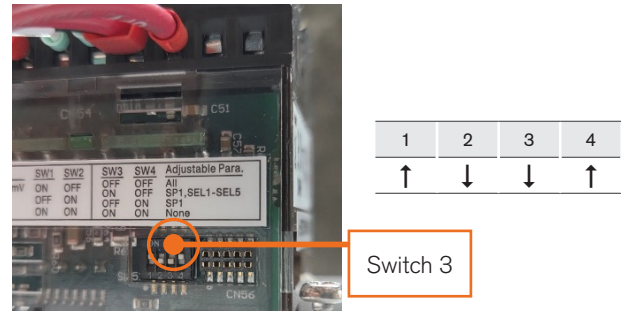


Figure 21: Setpoint Adjustment Enabled

To disable the setpoint adjustment mode, see **Figure 22** switch positions. Switch 3 needs to be switched to up to disable adjustments.

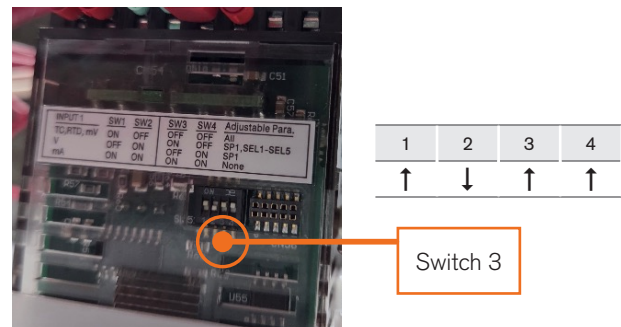


Figure 22: Setpoint Adjustment Disabled

Setpoint Display 55F 4-20mA Error

If the BMS system reads 55F and the ABH panel setpoint display reads 70F, the output conversion equation is needed to determine if there is an issue with the ABH panel or the BMS system.

ABH Troubleshooting

Convert Output

To convert output, use the following equation where x = RTD output.

$$T = 11.25(x-4)+32$$

This will yield a temperature value. Compare this value to the setpoint display value, see **Figure 23**. If they match, the issue is related to the BMS system and not the ABH panel.



Figure 23: Setpoint Display

RFQ Requests

For RFQ requests, please submit with the following photos:

1. Tower Serial Number:



Figure 24: Tower Serial Number

2. Panel Enclosure Photo



Figure 25: Panel Enclosure Photo

3. Temperature Probe Reading:



Figure 26: Setpoint Display

Temperature Reading

4. Temperature Probe light status:

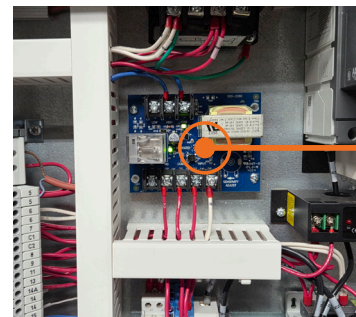


Figure 27: Temperature Probe Light Status

Light Status

5. Terminal Block photo of wiring

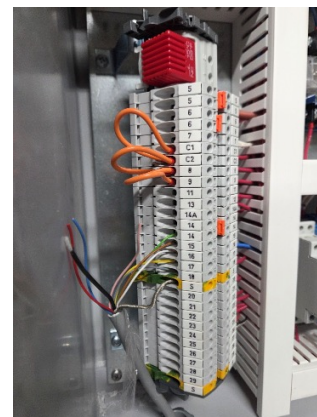


Figure 28: Terminal Block Photo of Wiring

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