

Troubleshooting for Electricians

These instructions are only for qualified electricians.
You will need: Continuity Tester, Voltage Meter, OHMs Meter

Basic Tankless hot water heater operation.

The lights on the sides of the unit represent activation of the contactors. The thermostats activate the contactors. The contactors activate the heating elements. **The thermostats are hooked up in a series.** With normal operation all lights will be on. Lights will go on and off sequentially, depending on the amount and flow rate of the hot water being dispersed. The heater is designed to only use the thermostats and contactors necessary to heat the water needed at any given time.

Fluctuation in temperature can often be remedied by a simple adjustment of the outflow valve on the left side of the heater, or can be a more serious problem. Fluctuation in hot water, lukewarm water, or no hot water at all, are almost always signs that indicate element, contactor or thermostat failure.

NOTE: In cases where water fails to maintain the desired temperature, you may be running the water faster than the heater is capable of heating the water. For instance: If you turn the faucet on the tub all the way on with hot water only, and the water is very hot and then cools, down, the flow is faster than what the heater is rated. You can remedy this by slowing down the faucet. The water will heat back up to the rated temperature.

Use these steps in your diagnosis.

STEP 1: TURN OFF ALL POWER SUPPLY.

TURN OFF MAIN CIRCUIT BREAKER AND SUPPLY VOLTAGE TO THE UNIT.

(CAUTION: FAILURE TO DISCONNECT THE POWER COULD CAUSE SERIOUS INJURY OR DEATH FROM ELECTROCUTION)

STEP 2: Check for any loose connections, properly operating breakers, etc.

STEP 3: Turn off the switch on the heater.

(THIS IS FOR CIRCUIT CONTROL. THERE IS STILL LIVE ELECTRICAL POWER AND DANGER OF ELECTROCUTION. CAUTION: FAILURE TO DISCONNECT THE POWER COULD CAUSE SERIOUS INJURY OR DEATH FROM ELECTROCUTION)

STEP 4. Purge the Heater

Run the hot water through the faucet until the water becomes as cold as the cold water temperature.

STEP 5: Observe the Lights

While the water is still running, turn the main circuit breakers back on, then turn the heater switch back on, and observe which lights are on and which lights are off. *(A working heater will have all of the lights on)* If all lights are operating, most likely the thermostats and contactors are working, proceed to STEP 7. If the lights are not working, proceed to STEP 6 and do the continuity test.



STEP 6: Continuity Check: Testing the Thermostats:

TURN OFF ALL POWER SUPPLY. TURN OFF MAIN CIRCUIT BREAKER AND SUPPLY VOLTAGE TO THE UNIT.

(CAUTION: FAILURE TO DISCONNECT THE POWER COULD CAUSE SERIOUS INJURY OR DEATH FROM ELECTROCUTION)

Because the thermostats are in series, any thermostat that fails will prohibit the other thermostats from engaging. Most likely, the light that is out corresponds to the failing thermostat. (The thermostats following a bad thermostat may be good, but the corresponding lights will still be out because they are in a series)

The condition of the thermostats can be determined by a Continuity Check. CAUTION, to properly check thermostats for continuity, the heater should be turned off at the main power source and water should be run for at least one minute through the heater, thus checking the continuity of the thermostats in a cool state. Continuity is done between the arms on a thermostat.

Occasionally you may get a false reading on a thermostat. It may read good but have a weak connection.

NOTE: Two element heaters have the same basic operation as the four element heaters. (For H-36-6 heaters, one wire on the thermostat must be disconnected to get an accurate continuity reading.)

FOUR ELEMENT HEATERS: (H-16-4, H-18-4, H-24-4 and H-28-4)

Our FOUR element heaters have three lights on each side.

Check to see if the Power On Pilot Lights are on or off. The **Power On Pilot Lights** are the lights on the bottom lights on the right and left side of the heaters.

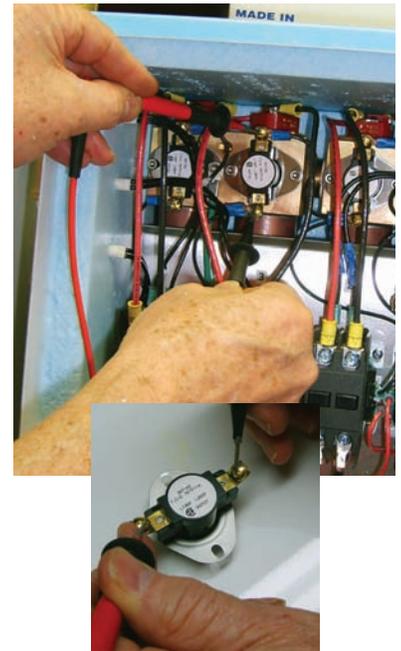
If the Power On Pilot Lights are off, check incoming power at the circuit breakers. If the Pilot On Lights are on, but other lights fail to come on when the water is turned on, it is likely that one of the following thermostats has failed:

a. The light on the right side of the heater at the top is the **Thermostat and Element Indicator Light #2**. If this light is off, Thermostat # 2 (135 degrees) could be failing.

b. The light on the right side of the heater in the middle is the **Thermostat and Element Indicator Light #1**. If this light is off, Thermostat # 1 (110 degrees) could be failing.

d. The light on the left side of the heater at the top is the **Thermostat and Element Indicator Light #4**. If this light is off, Thermostat # 4 (125 degrees) could be failing.

e. The light on the left side of the heater in the middle is the **Thermostat and Element Indicator Light #3**. If this light is off, Thermostat # 3 (125 degrees) could be failing.



STEP 7: Ohms Check: Testing the Elements

If all lights are on and you still have bad performance, (not hot enough, fluctuations, etc) you may have a failing element. Check each element with an OHMS meter for correct readings:

6KW 220 Volts - **10 OHMS**

6KW 208 Volts - **7.2 OHMS**

5.3 KW - **8.2 OHMS**

5KW - **12.2 OHMS**

4.5 KW - **13 OHMS**

4 KW - **15 OHMS**

3 KW - **19.5 OHMS**

STEP 8: Testing the Contactors

The lights will tell you if the contactor is on or off. If the lights are on, your contactors ARE working. If the lights are off, the contactors are not engaging, which can be the result of a failing thermostat or the contactor.

STEP 9: Checking for Leaks

If you have a leak, there are three possible reasons:

The top O-ring on the elements

O-rings on the thermostats

Other which represents a serious problem which requires sending the heater back to the factory for repair.

You can save yourself a lot of expense and time by doing a simple test to determine if an inexpensive O-ring will solve the leak problem.

1. Turn the main power off at the Circuit Breaker.

(CAUTION: FAILURE TO DISCONNECT THE POWER COULD CAUSE SERIOUS INJURY OR DEATH FROM ELECTRICUTION)

2. Take off the cover of the heater.

3. Take a paper towel and dry up all of the water.

4. Take another dry paper towel and gently blot around the element. If there is water on the towel, it is the O-ring on the element.

5. Take another dry paper towel and gently blot around the thermostat. If there is water on the towel, it is the O-ring on the thermostat.

If neither the thermostats or element O-rings are the source of the water, send the heater back.

