

### Subject: Lab Oven Heater Circuit Troubleshooting

- 1) If oven is not heating, first check temperature control heater or out light. Light should be on for the oven to heat up. If light is not on, refer to control manual for further troubleshooting. Below are typical controls that you might have.



- 2) Check high limit safety. High limit light or OP1 light should not be on. If the light is on, reset high limit and test oven again.



- 3) If control and high limit are operating properly, locate the main circuit board in the control compartment.

Most Despatch bench top or laboratory ovens have circuit board that contains most of the oven wiring. There is a 120 volt version and a 240 volt version of the board. There are also several different revisions of each board, but the troubleshooting steps are common to all revisions

**Warning: The following troubleshooting steps must be performed by a qualified electrician or electrical technician that has been trained on electrical safety and personal protection equipment.**

**Warning: Turning the power switch off on the oven DOES NOT de-energize the circuit board. Remove power from oven to de-energize board.**

The first step in troubleshooting is to identify which version (120 volt or 240 volt) of the board you have. The easiest way to tell is to count the fuse holders. The 120 volt version has 2 fuse holders, and the 240 volt version has 4 fuse holders. See figures 1 and 2.

Figure 1: 120 volt board

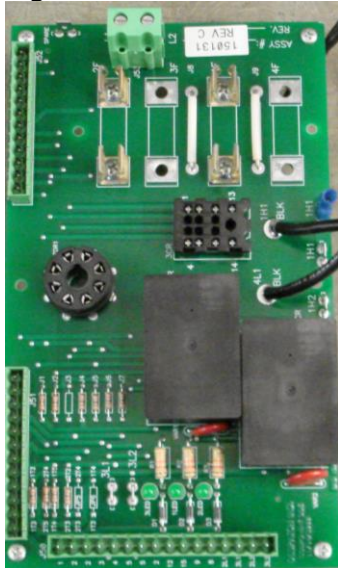
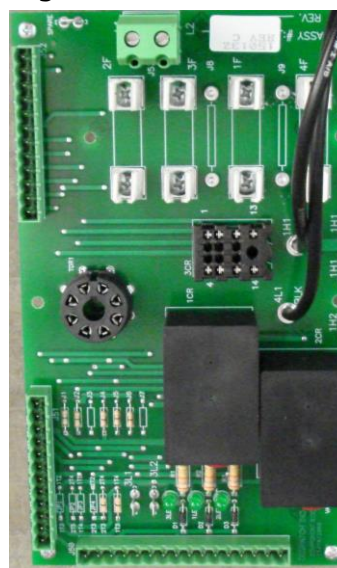
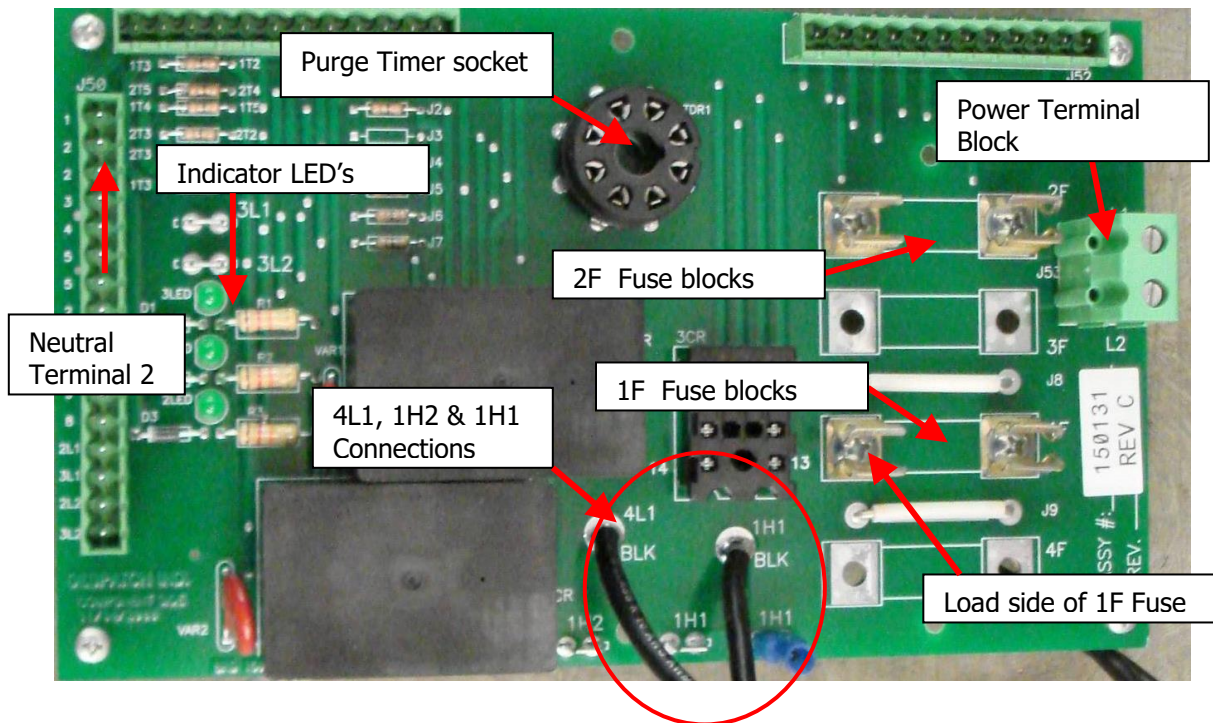


Figure 2: 240 volt board



### 120 volt board troubleshooting

Figure 3: 120 volt board component locations

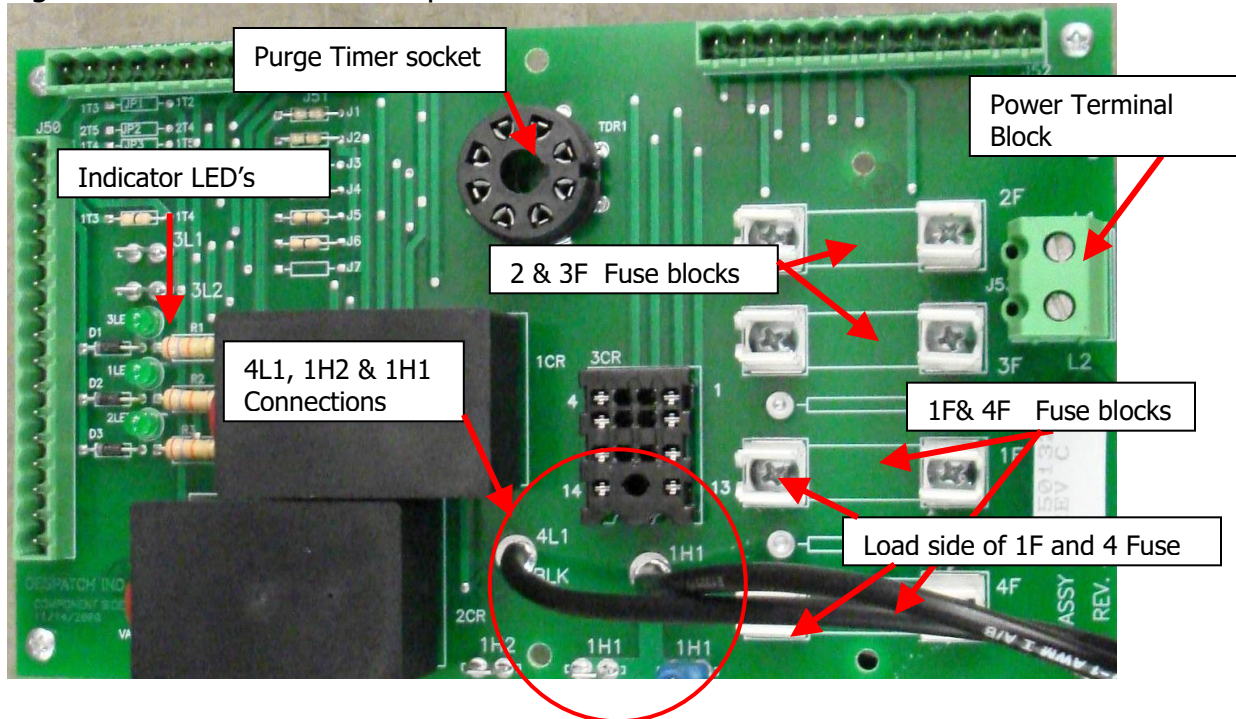


- 4) Check the three indicator LED's. During normal operation, all three indicator lights must be ON.
- 5) If 1LED is not ON, check for 120 VAC on power terminal block terminals L1 and L2. If there is no power, check power cord, and facility power supply.
- 6) If 3LED is not On, check jumper J1 or optional exhaust fan air flow switch if present.
- 7) If 2LED is not ON, Check high limit contact, and optional purge timer circuit and/or door switch if present. Ovens with a Protocol Plus or Protocol3 control will have a jumper between terminals 8 and 9 if they do not have the door switch option.
- 8) If all LED's are ON, check for 120 volt power on the load side of 1F by measuring between the load side of the 1F fuse and neutral terminal 2 (shown by arrows).
- 9) If there is no voltage, remove the power from the oven and pull the 1F fuse and check for continuity. If fuse is blown, check to make sure it is the correct size per the oven wiring schematic. Note: the 1F and 2F fuse do not have the same amperage rating.
- 10) Start the oven again and re-check the voltage between 1F fuse and neutral.
- 11) Check for 120 VAC between terminals 4L1 and 1H2. If there is no power at 4L1 and 1H2 and all the LED's are ON, the circuit board is bad.
- 12) If there is power between 4L1 and 1H2, check for 120 VAC between terminals 1H1 and 1H2. If there is no power, check the SSR. If there is power at 1H1 and 1H2, check the heater.
- 13) Turn the power off to the oven and check the ohmage across terminals 1H1 and 1H2.
- 14) If the ohmage is anything other than zero, the Heater is OK.



## 240 volt board troubleshooting

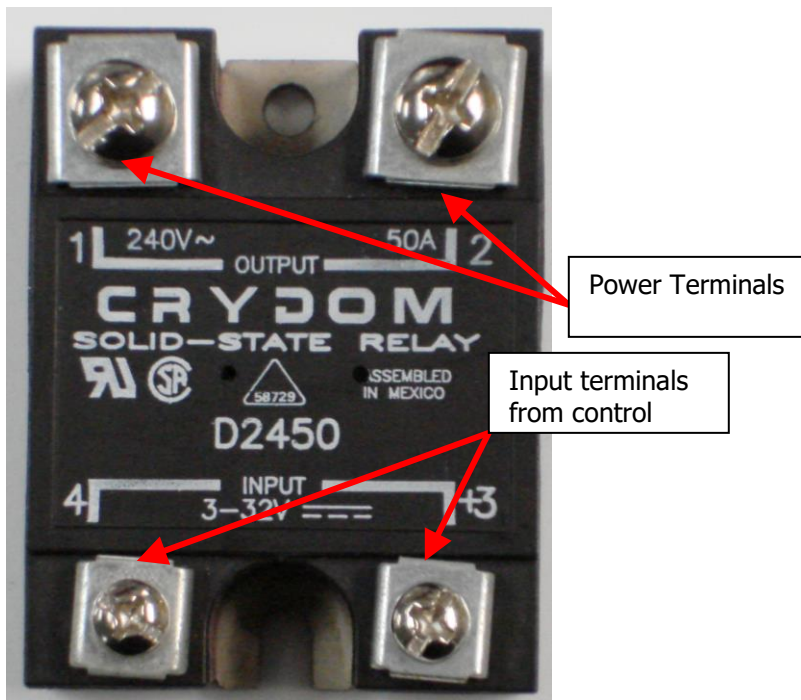
Figure 4: 240 volt board component locations



- 4) Check the three indicator LED's. During normal operation, all three indicator lights should be ON.
- 5) If 1LED is not ON, check for 240 VAC on power terminal block terminals L1 and L2. If there is no power, check power cord, and facility power supply.
- 6) If 3LED is not ON, check jumper J1 or optional exhaust fan air flow switch if present.
- 7) If 2LED is not ON, Check high limit contact, and optional purge timer circuit and/or door switch if present. Ovens with a Protocol Plus or Protocol3 control will have a jumper between terminals 8 and 9 if they do not have the door switch option.
- 8) If all LED's are ON, check for 240 volt power on the load side of 1F & 4F by measuring between the load side of the 1F & 4F fuses (shown by arrows).
- 9) If there is no voltage, remove the power from the oven and pull the 1F and 4F fuses and check for continuity. If a fuse is blown, check to make sure it is the correct size per the oven wiring schematic. Note: the 1F and 4F fuses do not have the same amperage rating as the 2F and 3F fuses.
- 10) Start the oven again and re-check the voltage between 1F fuse and 4F.
- 11) Check for 240 VAC between terminals 4L1 and 1H2. If there is power between 1F and 4F fuses and no power at 4L1 and 1H2 and all the LED's are ON, the circuit board is bad.
- 12) If there is power between 4L1 and 1H2, check for 240 VAC between terminals 1H1 and 1H2. If there is no power, check the SSR. If there is power at 1H1 and 1H2, check the heater.
- 13) Turn the power off to the oven and check the ohmage across terminals 1H1 and 1H2.

14) If the ohmage is anything other than zero, the Heater is OK.

### SSR Troubleshooting



- 1) Check for DC voltage from control on input terminals 3 and 4. Voltage should typically be between 8 and 20 volts DC. Check to make sure the polarity is correct. Positive must be on terminal 3. If there is no DC voltage on terminals 3 and 4 check the temperature controller.

#### 120 volt ovens

- 2) For 120 volt units, check for 120 VAC power between neutral terminal 2 on the circuit board and terminal 1 on the SSR. If there is no power go back to board troubleshooting.
- 3) Check for 120 volt power from terminal 2 on the circuit board and terminal 2 on the SSR. If there is no power on terminal 2 of the SSR, and there is power on terminal 1 of the SSR, and there is correct DC voltage on terminals 3 and 4, then the SSR is bad.

#### 240 volt ovens

- 2) For 240 volt units, check for 240 VAC power between 1H2 on the circuit board and terminal 1 on the SSR. If there is no power go back to board troubleshooting.
- 3) Check for 240 volt power from terminal 1H2 on the circuit board and terminal 2 on the SSR. If there is no power on terminal 2 of the SSR, and there is power on terminal 1 of the SSR, and there is correct DC voltage on terminals 3 and 4, then the SSR is bad.