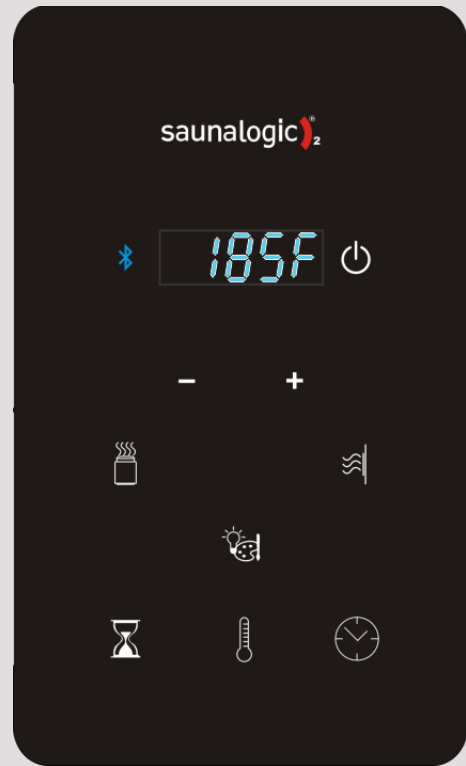
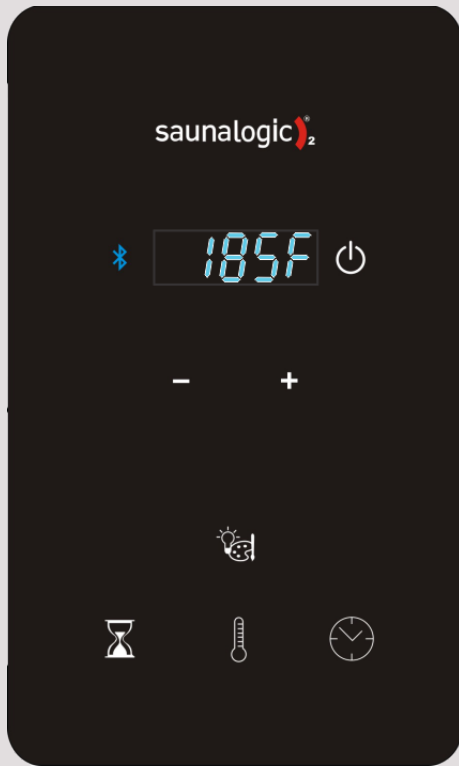




DESIGNER SERIES

Troubleshooting Guide

Designer 1201-14-1, 1201-16-1, 1201-16-3

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Sauna360® Technical Troubleshooting Guide

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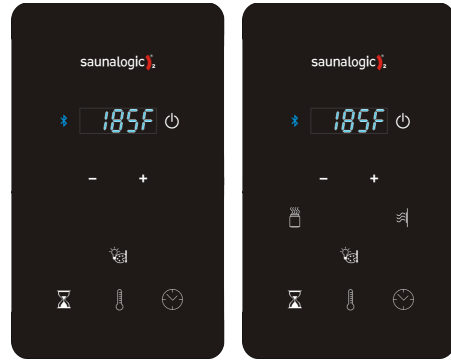
SECTION 1. BEFORE YOU BEGIN

This manual is for troubleshooting the Designer (1712-45-0207, 1712-60-0207, 1712-80-0207) sauna heater mated with an SL2 | SL2 IS (1601-38, 1601-38-1, 1601-43, 1601-43-1, 1601-51, 1601-51-1) control and a (1201-14-1, 1201-16-1, 1201-16-3) contactor (CB) Box.



Designer Heater

(1712-45-0207, 1712-60-0207, 1712-80-0207)



SL2 | SL2 IS Control

(1601-38, 1601-38-1, 1601-43,
1601-43-1, 1601-51, 1601-51-1)



Contactor Box

(1201-14-1, 1201-16-1,
1201-16-3)

Figure 1.

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Diagram 1. 24-0004 Designer IS 240VAC 1 Phase Configuration

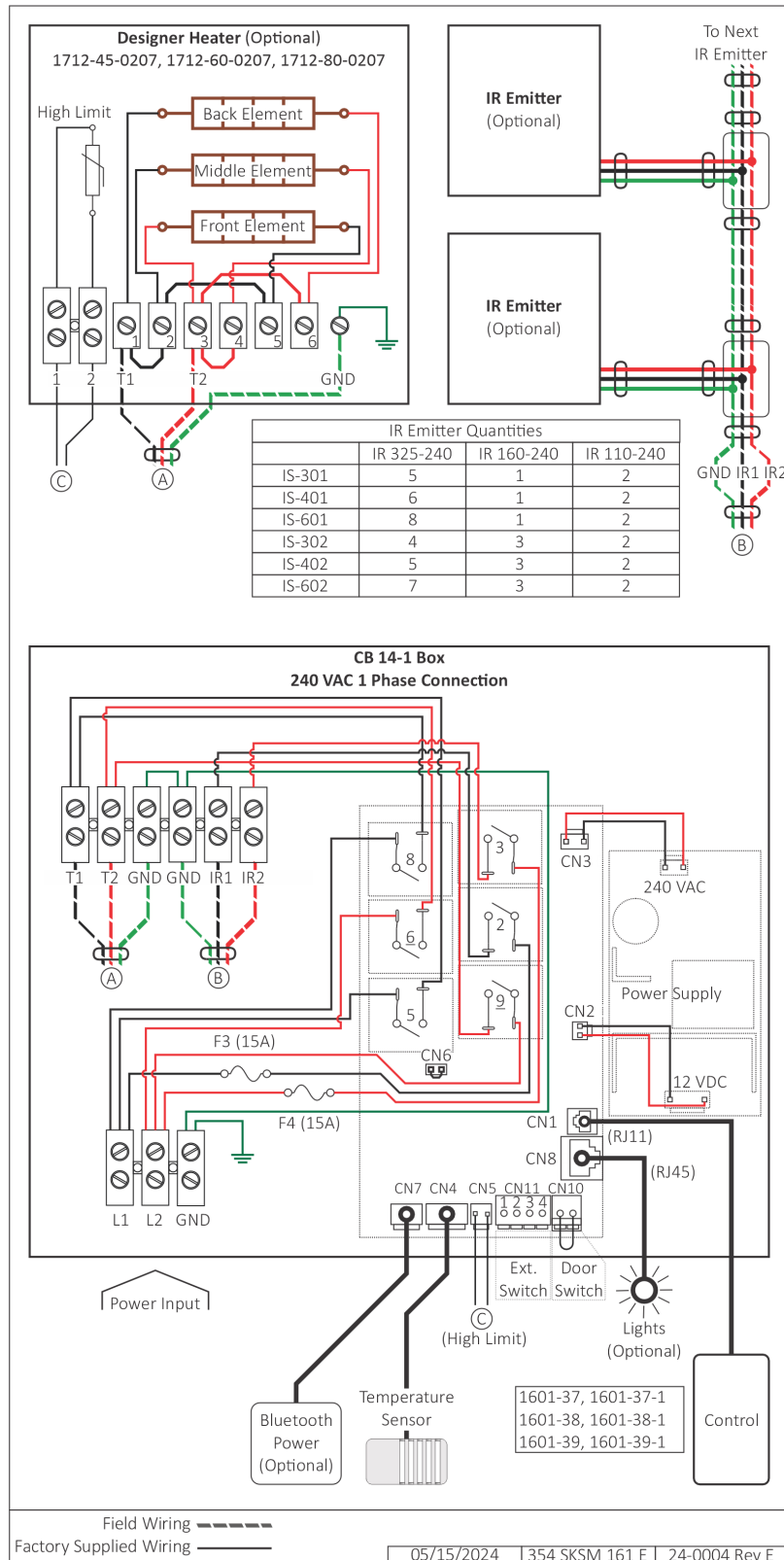


DIAGRAM 2. 24-0005 Designer Traditional 208 | 240 VAC 1 Phase Configuration

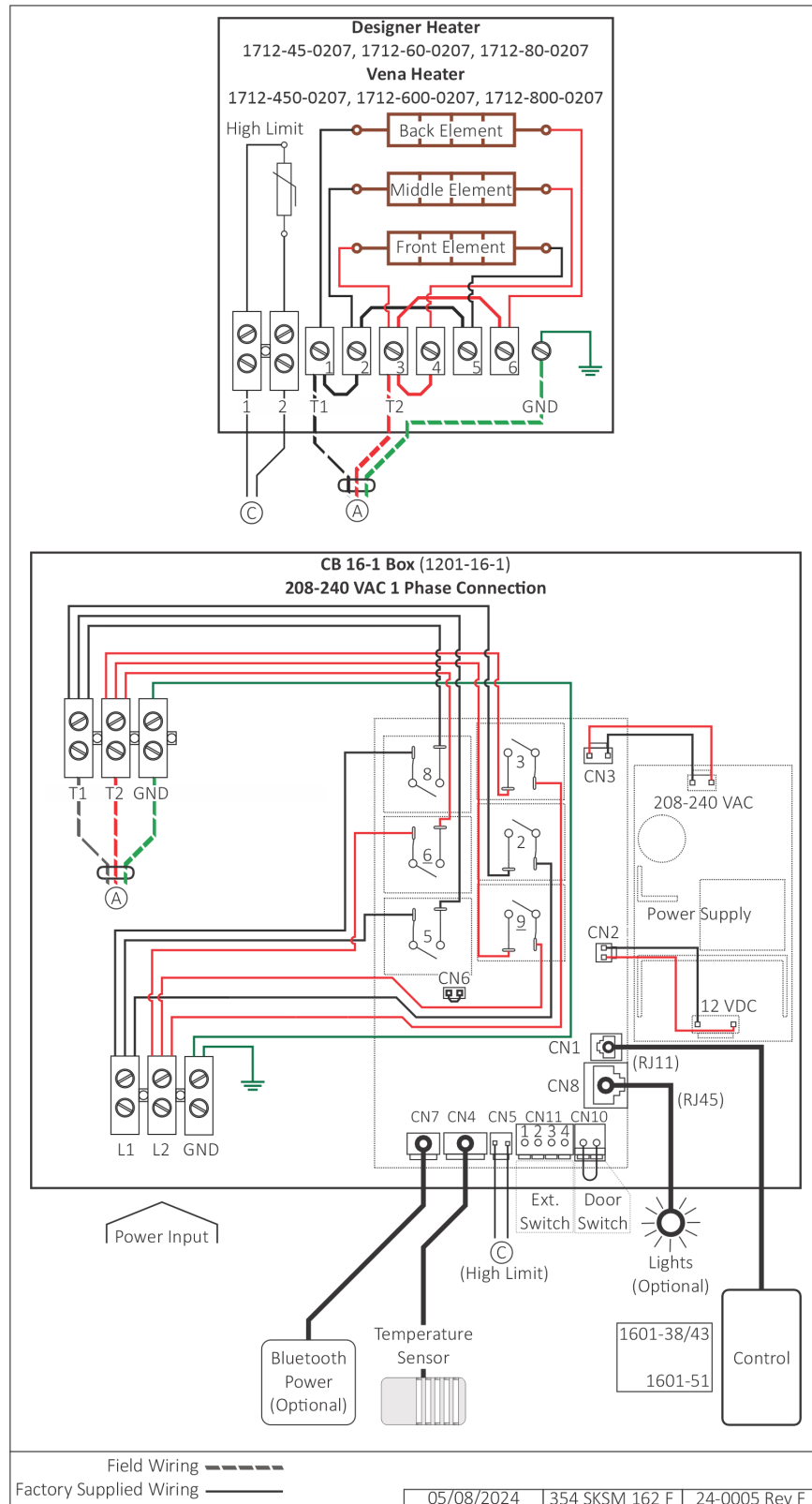


DIAGRAM 3. 24-0006 Designer Traditional 208 VAC 3 Phase Configuration

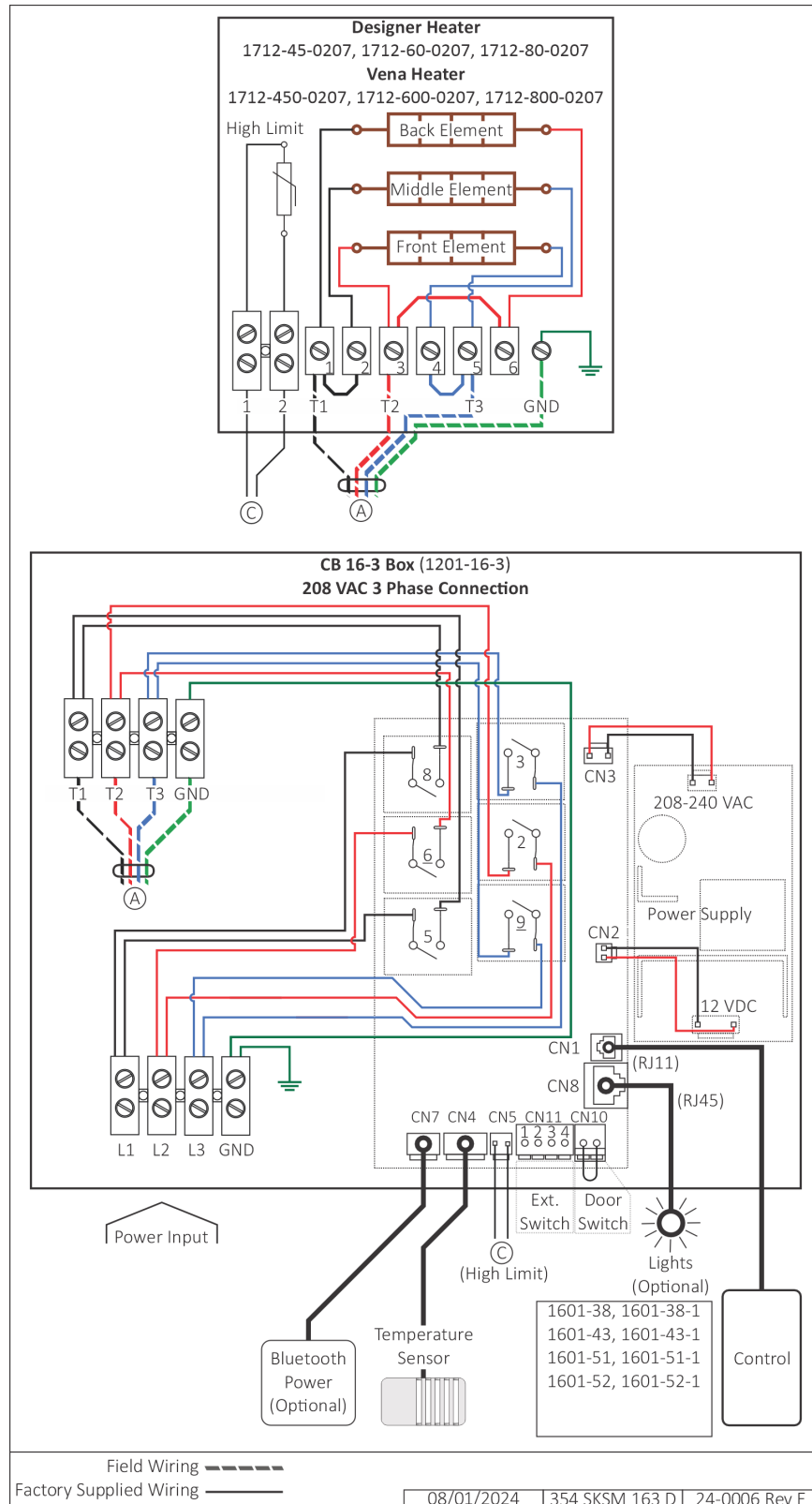


Diagram 4. Temperature Sensor, Part One

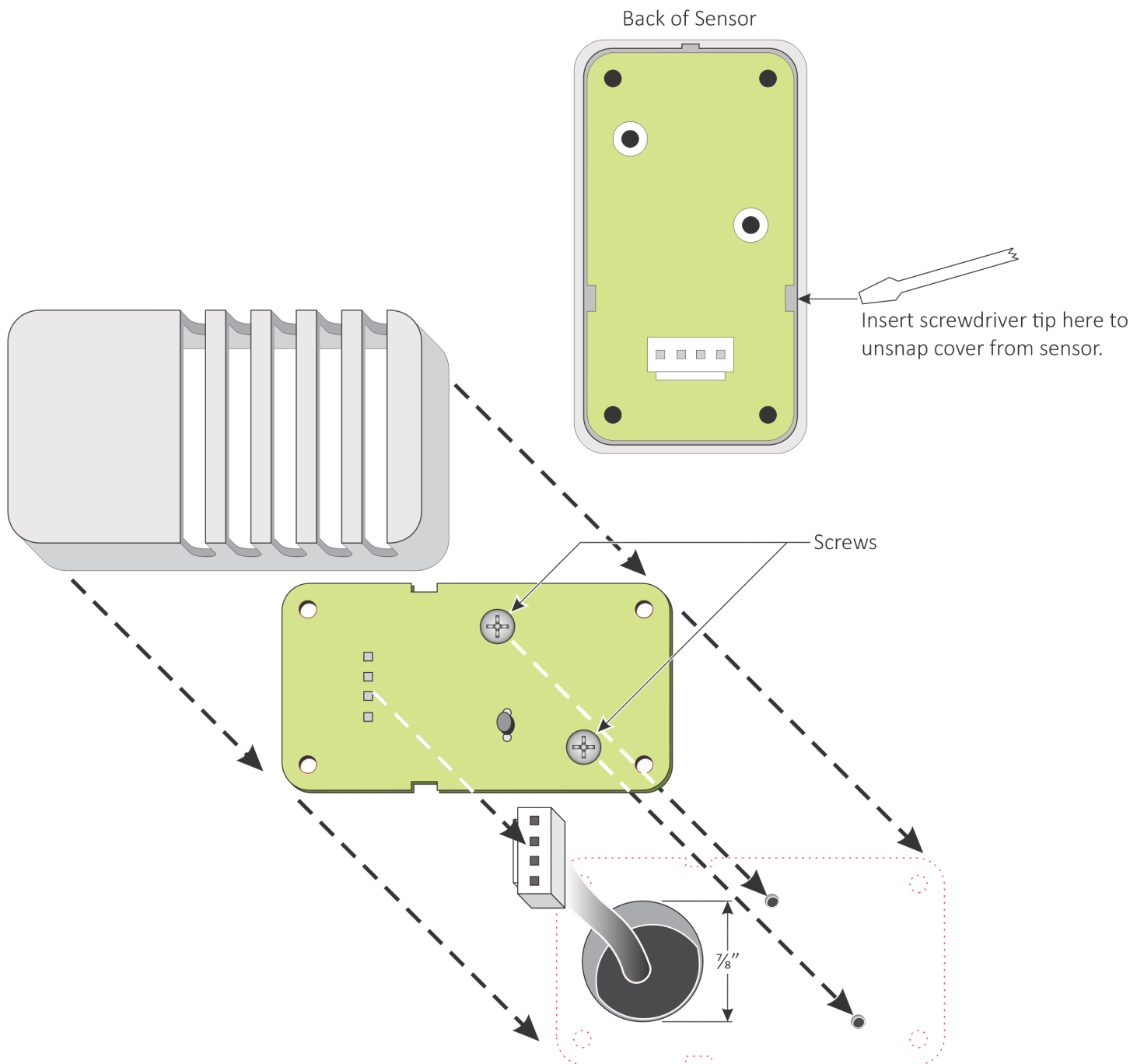
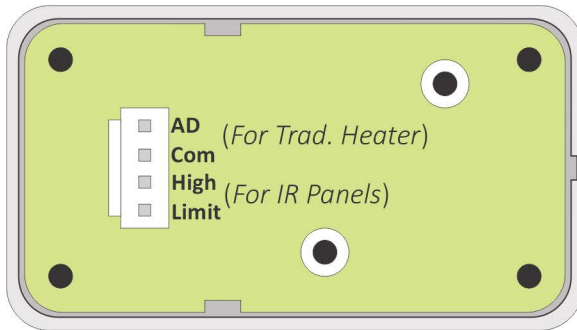
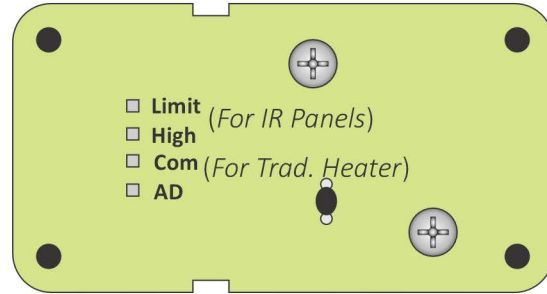


Diagram 5. Temperature Sensor, Part Two



Bottom (exposed) side of Temperature Sensor.



Top (internal) side of Temperature Sensor.



Temperature Sensor Cable

For use with traditional heaters, the **AD** and **Com** terminals connect to the thermistor (temperature sensor). With a multimeter configured to measure resistance, touch the leads across the **AD** and **Com** terminals and take a reading. At 70°F, the resistance should read 56,000 (56K) ohms (+/- 2,000 ohms).

The **High Limit** terminals are for use with Temperature Sensors configured with a high limit sensor for use with infrared panels in either an IR room or IS room. With a multimeter configured to measure resistance, touch the leads across the **High** and **Limit** terminals and take a reading. A functioning high limit sensor will read as a direct short circuit, zero (0) ohms. A tripped high limit sensor will read as an open circuit, infinite (---- M) resistance. The high limit sensor will trip at temperatures in excess of 149°F and automatically reset at temperatures below 129°F.

Diagram 6. SL2 IS Control

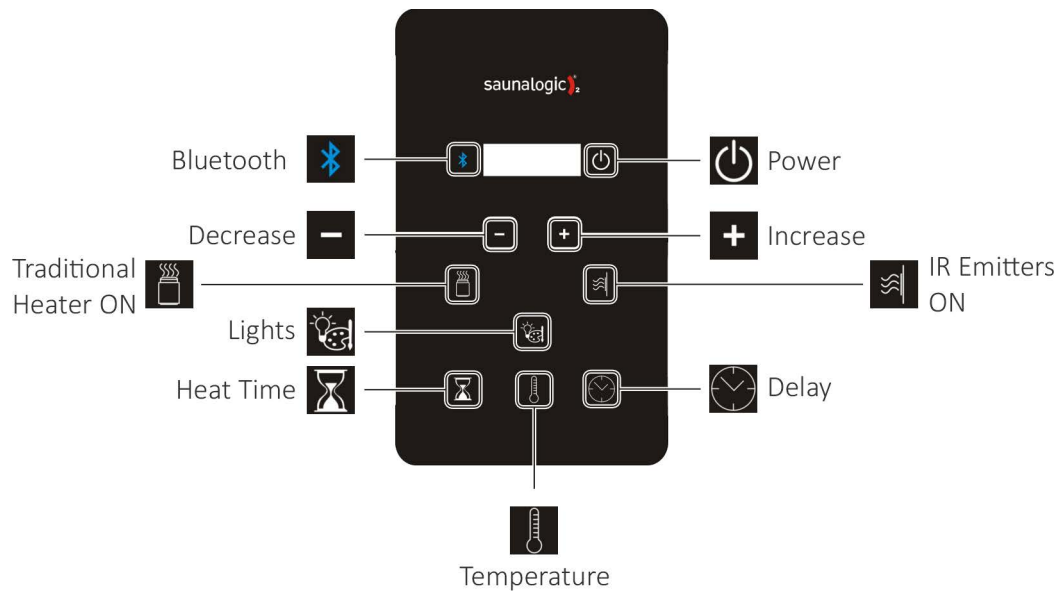


Diagram 7. SL2 Traditional Control

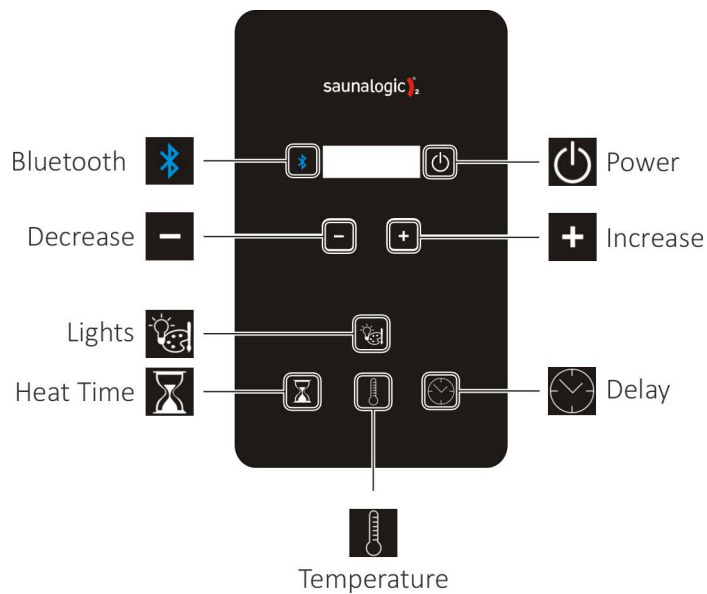
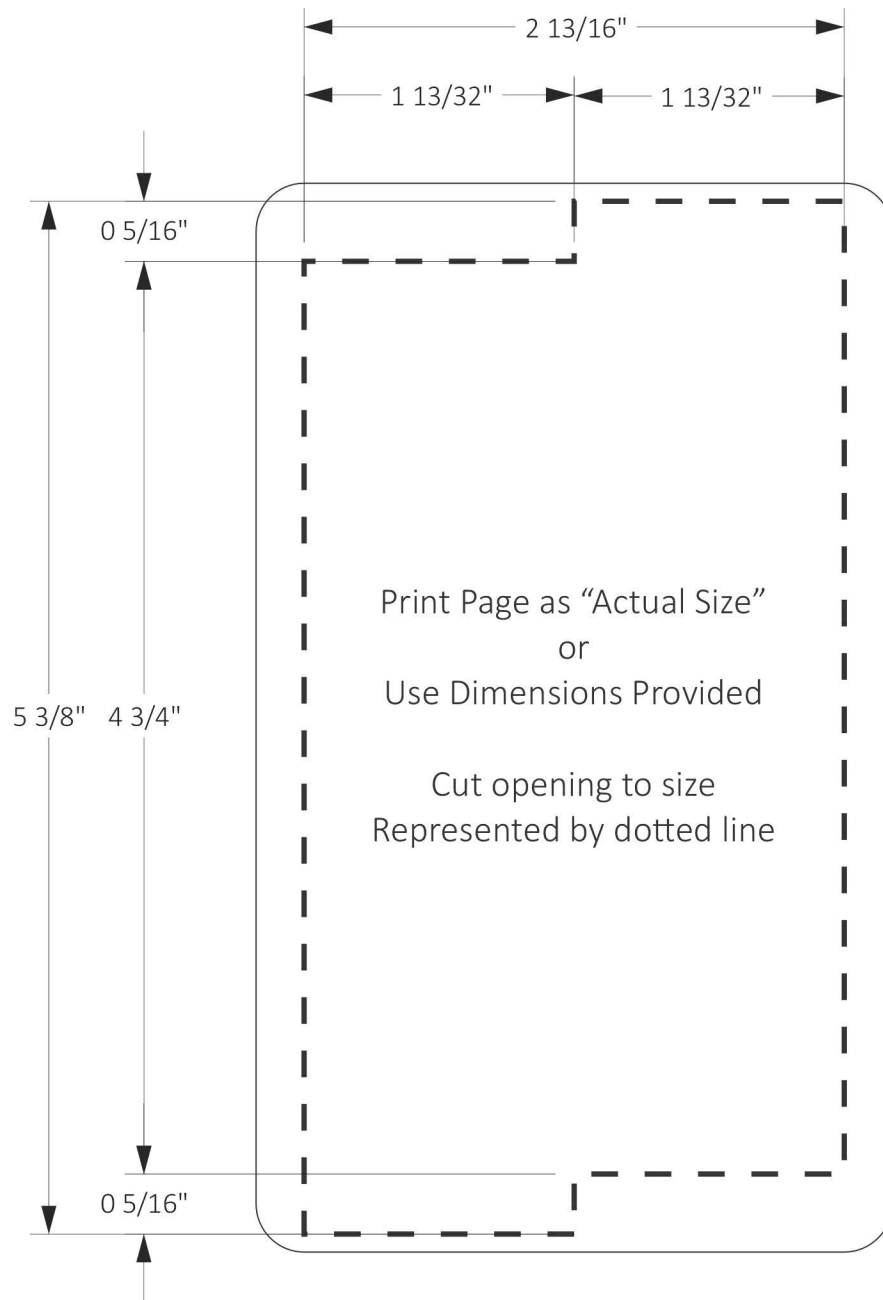


Diagram 8. SL2 Cutout Pattern





WARNING - ELECTRIC SHOCK HAZARD: These instructions are written for authorized service personnel only. There are no user-serviceable parts contained inside the contactor box or heater. Hazardous voltages are present inside the contactor box and heater. Before opening electrical access panels for servicing/replacing components, turn **OFF** electrical power to the sauna from the assigned circuit breaker in the power distribution panel. If required by local/state electrical codes perform standard **LOCK OUT** and **TAG OUT (LOTO)** procedures. Before proceeding, perform an electrical test of the sauna to ensure voltage is safely removed.

SECTION 1. Control Powers On, But No Increased Temperature from Heater

1.1. Existing Installation

- Turn off the sauna from the control.
- Turn on the control and turn on the heater. Make a note of any messages or display changes.
- If there is still no increase in temperature from the heater, then disable electrical power to the sauna from the main circuit breaker. See **WARNING** above.
- Open the access panel to the contactor box and heater terminals.
- Before moving forward with in-depth troubleshooting, make a high-level assessment of the condition of the terminal blocks, circuit board and DC power supply. Smell the contactor box for burnt component odor.
 - If there is discoloration of terminals, make a note to examine these in detail later this procedure.
 - If there is burnt component smell, then a close examination of components on the main circuit board and power supply is called for, as the main circuit board and/or power supply may need replacement.
- Using the Ohm setting/configuration on the digital multimeter, test the continuity across the high limit terminals in the heater and at CN5 in the contactor box.

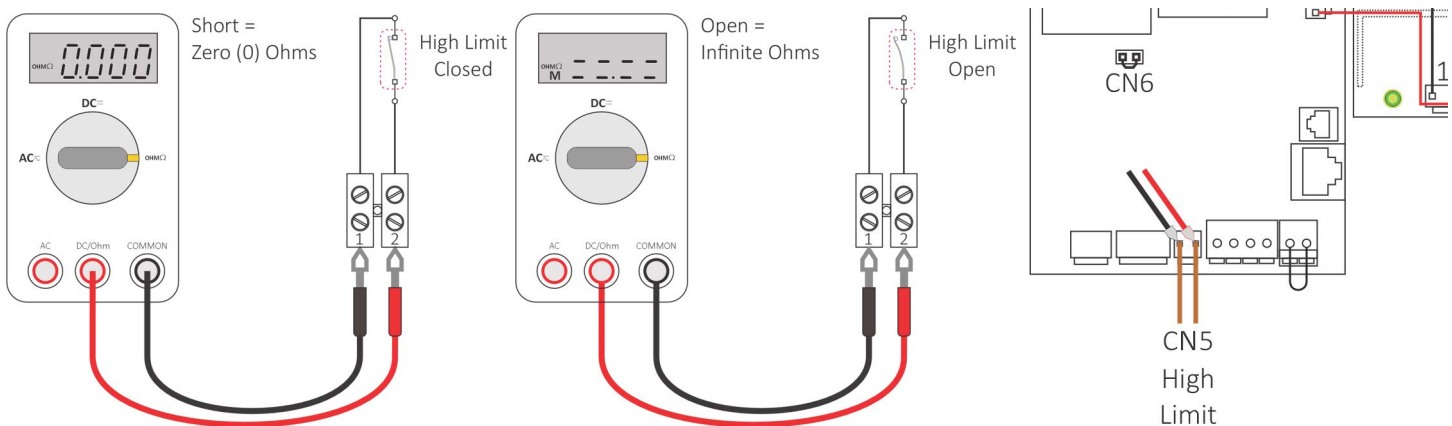


Figure 2. Measuring High Limit Continuity

- If it tests at high/infinite resistance, examine the high limit cables and sensor for damage or broken wires. Replace the high limit sensor/cable(s) if necessary.
- If the high limit sensor tests at low/near zero resistance, proceed to the next troubleshooting step.

- g. Using the Ohm setting/configuration on the digital multimeter, test the resistance reading across the red and yellow wires of the temperature sensor terminals.

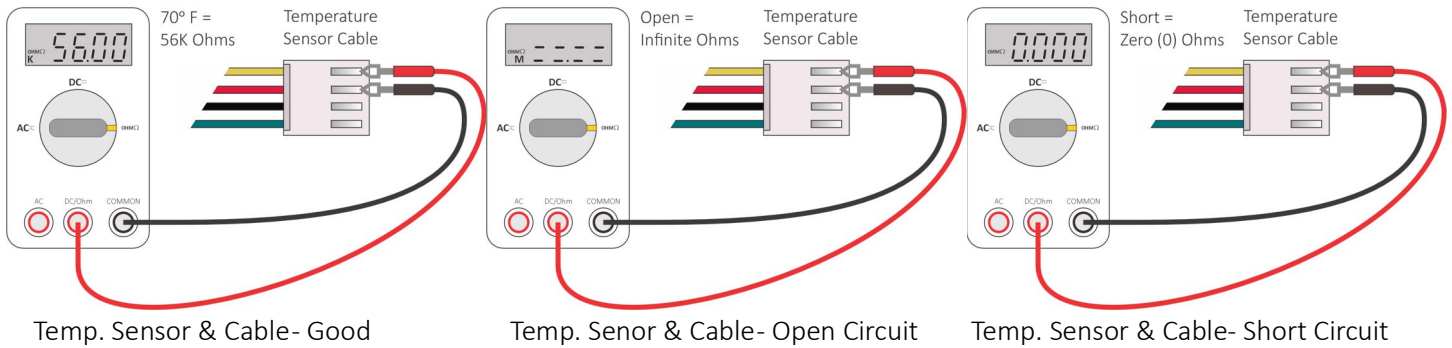


Figure 3. Measuring Temperature Sensor Resistance

- A sauna room at an ambient room temperature of 70 °F should have a resistance reading of 56KΩ (56,000, +/- 2,000) ohms (Ω).
- If the resistance reading is more than +/- 2KΩ out of tolerance (greater than 58,000 Ω or less than 54,000 Ω), or infinite resistance or at zero ohms, then remove the temperature sensor from the wall/ceiling and test resistance of the sensor with a new/known good sensor cable. If the reading is still suspect, replace the temperature sensor. Alternatively, if the reading is good, then replace the sauna room sensor cable.

- h. From the heater and contactor box, examine the high voltage terminals, ensure there is no evidence of discoloration/melting of insulation/plastic caused by excessive heat.
 - If there is discoloration/melting, then make a detailed safety evaluation to determine if cables/terminal blocks require replacement.
 - Permanent damage, such as copper wire melting through the insulation.
 - Charred insulation (burnt, brittle, breaking, cracked, bubbled, mushroomed, deformed).
 - Plastic insulation on the terminal (sagging, dark yellow, amber, black, dimpled, blistered, distorted)
 - Copper wire (darkly discolored, blued, melted, welded, cracked, fatigued, broken)
 - Discoloration/melting is a symptom of excessive heat caused by development of resistance between the wire and a loose terminal screw. Ensure all terminal screws are tight with adequate copper wire held secure.
 - Ensure the wire is the correct gauge to handle the current load (14 AWG <15 amp, 12 AWG <20 amp, 10 AWG < 30 amp)
- i. Examine physical condition of power cables.
 - Evaluate for damage, ensuring each portion of insulated wire is intact.
 - If necessary re-dress terminations/replace suspect cables.
- j. If using braided wire, examine for frayed wire, breaks and fatigue at each terminal.
- k. Using a screw driver, ensure all screw terminals are tight and the wires are held secure.
- l. Examine physical condition of heater elements.
 - Evaluate for damage, ensuring elements are not corroded, bent, cracked, broken, or severely discolored from excessive heat.
 - If needed, review specifications for the model/type/voltage/wattage of the heater installation and replace suspect heater elements.
 - Ensure an adequate amount of the correct sauna rocks are present in the heater element enclosure.
- m. Using the Ohm setting/configuration on a digital multimeter, measure the resistance across each heater element. See "SECTION 3. How to Test an Element" on page 26 for details.
 - Compare the measured resistance values against the following specifications:

Table 1: Designer Element Resistance Values

Wattage	208VAC	240VAC
4.5 Kw	28.8 Ω	38.4 Ω
6.0 Kw	21.6 Ω	28.8 Ω
8.0 Kw	16.2 Ω	21.6 Ω

- Replace heater elements that are +/- 3 ohms out of electrical tolerance.

- n. Using the Ohm setting/configuration on a digital multimeter, measure the resistance across each power input terminal at the heater. Make a note of the values.
 - Measure the resistance across each power output terminal at the contactor box. Make a note of the values.
 - Compare the values measured at the heater and at the contactor box. The values should be close to the same (within +/- 2 ohms).
- o. Re-apply power to the sauna.
- p. Set/configure the digital multimeter to read AC voltage (auto-ranging up to at least 250VAC)
- q. Test the power terminals coming into the contactor box. Verify the correct voltage is supplied to the sauna.
- r. Set the sauna control to heat and check for an increased temperature from the heater.
 - If there is still no increase in temperature, test the power terminals from the contactor box to the heater. Verify voltage is supplied to the heater.
- s. If no voltage is supplied to the heater, set the digital meter to read DC voltage and test for DC voltage across the high limit terminals, a good reading: no voltage is present.
 - A voltage reading across the high limit terminals indicates an open circuit. If an open circuit was not revealed in earlier tests, then an intermittent broken wire or faulty high limit sensor is likely.

1.2. New Installation

- Turn off the sauna from the control.
- Turn on the control and turn on the heater. Make a note of any messages or display changes.
- If there is still no increase in temperature from the heater, then disable electrical power to the sauna from the main circuit breaker. See **WARNING** located on page 9.
- Open the access panel to the contactor box and heater terminals.
- Using the Ohm setting/configuration on the digital multimeter, test the continuity across the high limit terminals in the heater and at CN5 of the contactor box.

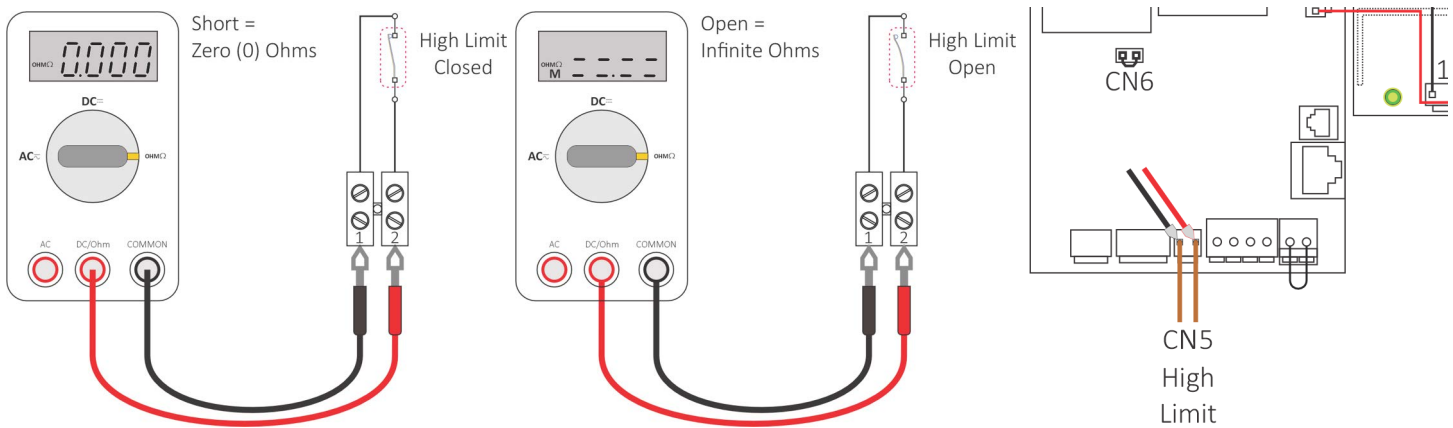


Figure 4. Measuring High Limit Continuity

- If it tests at high/infinite resistance, examine the high limit cables and sensor for damage or broken wires. Replace the high limit sensor/cable(s) if necessary.
 - If the high limit sensor tests at low/near zero resistance, proceed to the next troubleshooting step.
- Using the Ohm setting/configuration on the digital multimeter, test the resistance reading across the red and yellow wires of the temperature sensor terminals.

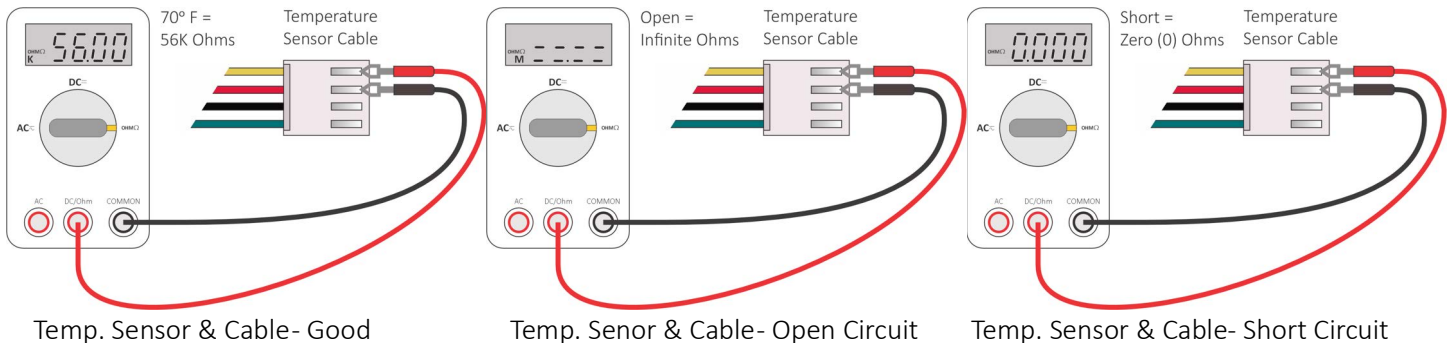


Figure 5. Measuring Temperature Sensor Resistance

- A sauna room at an ambient room temperature of 70 °F should have a resistance reading of 56KΩ (56,000, +/- 2,000) ohms (Ω).
- If the resistance reading is more than +/- 2KΩ out of tolerance (greater than 58,000 Ω or less than 54,000 Ω), or infinite resistance or at zero ohms, then remove the temperature sensor from the wall/ceiling and test resistance of the sensor with a new/known good sensor cable. If the reading is still suspect, replace the temperature sensor. Alternatively, if the reading is good, then replace the sauna room sensor cable.

- g. From the heater and contactor box, examine the high voltage terminals, ensure there is no evidence discoloration/melting of insulation/plastic caused by excessive heat.
 - If there is discoloration/melting, then make a detailed safety evaluation to determine if cables/terminal blocks require replacement.
 - Discoloration/melting is a symptom of excessive heat caused by development of resistance between the wire and a loose terminal screw. Ensure all terminal screws are tight with adequate copper wire held secure.
- h. Examine physical condition of visible power cables for damage. Ensure each portion of wire insulation is intact.
 - If necessary re-dress terminations.
- i. If braided wire is in use, examine for frayed wires and breaks at each terminal.
- j. Using a screw driver, ensure all screw terminals are tight and wires secure. Ensure insulation from wires is **NOT** grabbed by terminals.
- k. Examine the physical condition of the heater elements, ensuring they are not damaged or bent. Also ensure an adequate amount of the correct sauna rocks is provided in the heater element enclosure.
 - If needed, replace suspect heater elements.
- l. Using the Ohm setting/configuration on a digital multimeter, test resistance across each heater element. Verify the readings against the heater element specifications to ensure the elements are within electrical tolerance. See "Table 1: Designer Element Resistance Values" on page 11.
 - Replace heater elements where the resistance measured is +/- 3 ohms out of specification.
- m. Measure the resistance across the power terminals at the heater and at the contactor box. Ensure the readings measured at the heater and at the contactor box are close to the same.
- n. Re-apply power to the sauna.
- o. Set/configure the digital multimeter to read AC voltage (auto-ranging up to at least 250VAC)
- p. Test the power terminals coming into the contactor box. Verify the correct voltage is supplied to the sauna.
- q. Set the sauna control to heat and check for an increased temperature from the heater.
 - If there is still no increase in temperature, test the power terminals from the contactor box to the heater. Verify voltage is supplied to the heater.
- r. If no voltage is supplied to the heater, set the digital meter to read DC voltage and test for DC voltage across the high limit terminals - no voltage should be present.
 - A voltage reading across the high limit terminals indicates an open circuit. If an open circuit was not revealed in the earlier tests, then an intermittent broken wire or faulty high limit sensor is likely.

SECTION 2. Unit Does Not Power Up or Respond

2.1. New Installation



WARNING - ELECTRIC SHOCK HAZARD: The following Instructions require power is applied to the sauna. The contactor box cover is open, exposing the individual to a high-voltage hazard. Take precautions not to touch metal surfaces with hands, fingers, or screw drivers while using a digital meter to test high-voltage terminals.

- Remove the cover from the contactor box.
- Visually examine the main circuit board and power supply, looking for one green and two red illuminated LEDs.

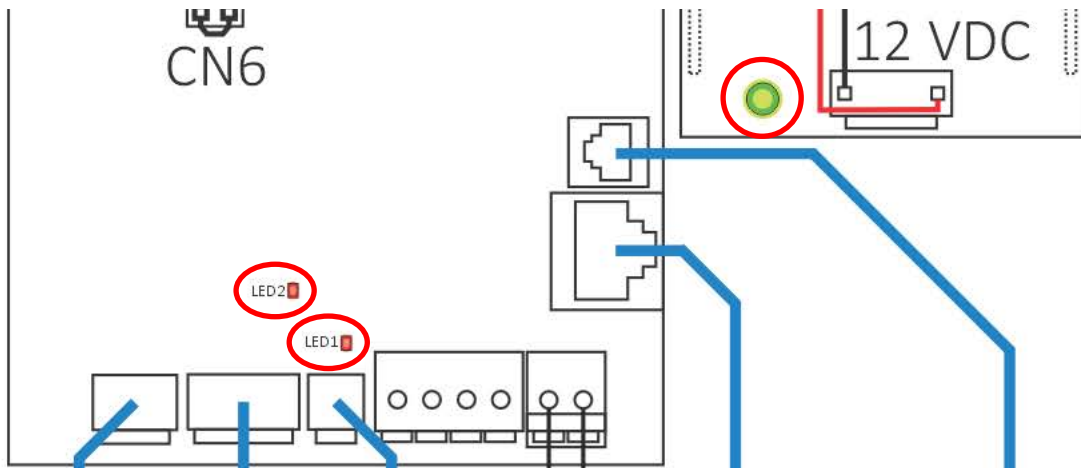


Figure 6. LED Locations

- If no LEDs are illuminated, configure the digital multimeter and test leads for measuring AC voltage.
- Measure for incoming voltage across the L1 and L2 terminals.
- If correct AC voltage is measured at the terminals, then measure voltage at the two glass fuses located on the main circuit board.

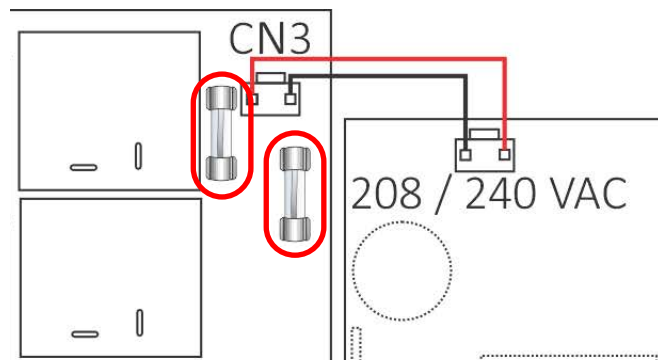


Figure 7. Glass Fuse Locations

- First test for voltage **across** each fuse. No voltage should be present. If random AC voltage is measured across a fuse, then the circuit is OPEN, likely indicating a blown fuse.

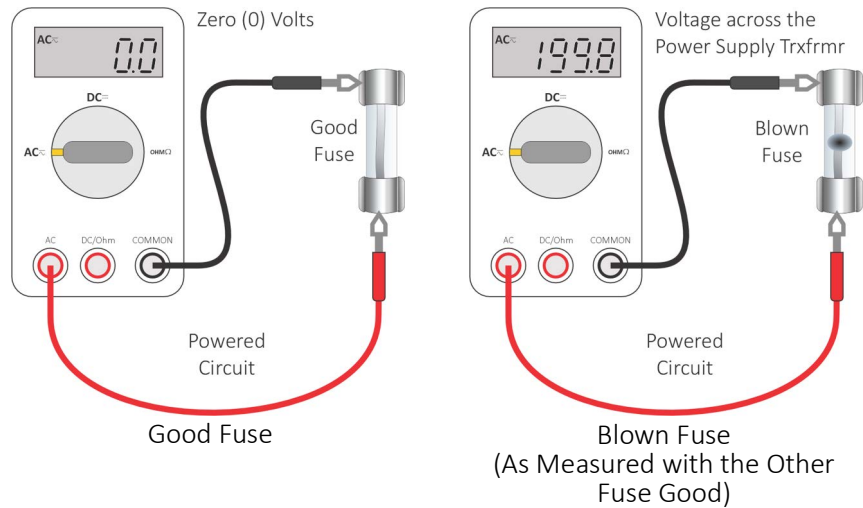


Figure 8. Testing for AC Voltage Across a Fuse

- If a fuse is blown, turn off power to the sauna from the circuit breaker.
- Replace the fuse(s).
- Then re-apply power and repeat the tests above.
- Second, measure voltage from one fuse to the other, on both sides (top and bottom) of each fuse. AC voltage should be present on both sides of each fuse.

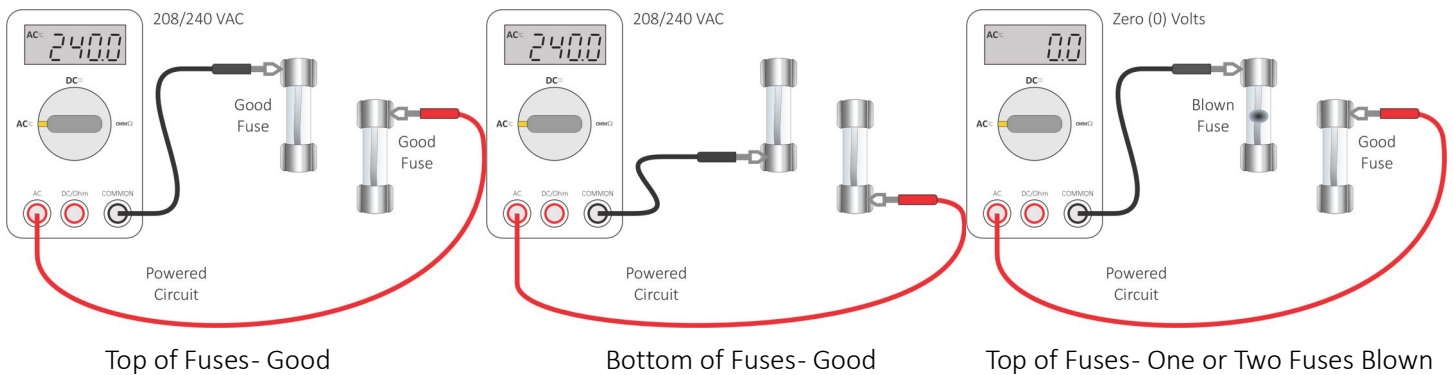


Figure 9. Testing for AC Voltage Top and Bottom of Fuses

- This verifies AC voltage is present and passing through the fuses.

- f. If correct voltage has been measured at each test point thus far, then disconnect the AC input cable from the power supply.

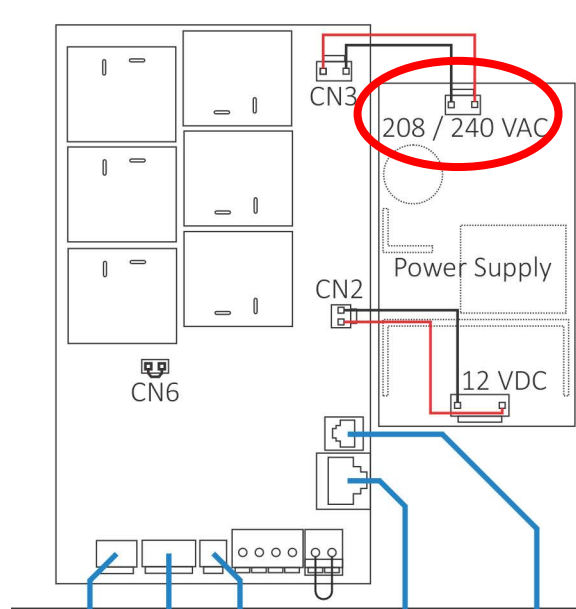


Figure 10. AC Input Cable to DC Power Supply

- g. Carefully connect the test leads of the multimeter to end of the AC input cable and take a reading for AC voltage.

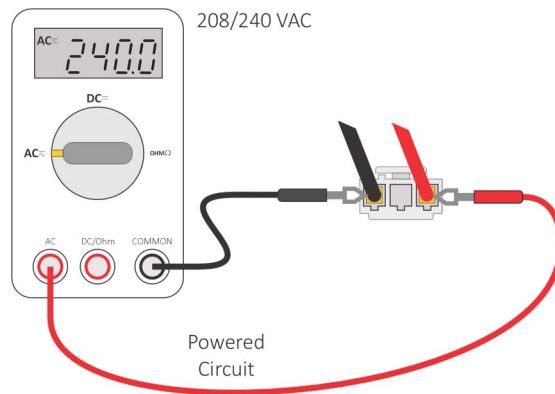


Figure 11. Testing for AC Voltage at DC Power Supply AC Input Cable

- If AC voltage is present, then reconnect the AC input cable to the power supply and skip ahead to Step h.
- If voltage is not present, carefully disconnect the AC input cable from the CN3 connector on the main circuit board.

- Carefully touch the test leads on each pin of CN3 and take a reading for AC voltage.

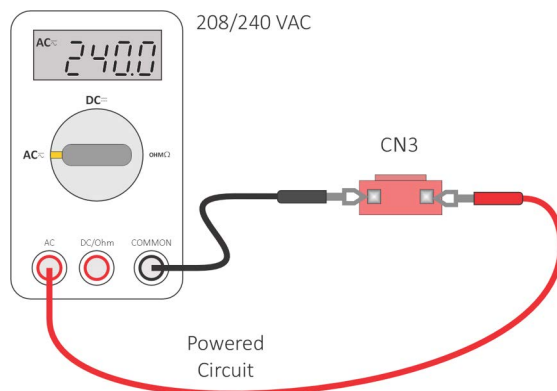


Figure 12. Testing for AC Voltage at CN3 Connector

- If voltage is present, then the AC input cable is faulty. If this occurs, replace the AC input cable.
 - If no voltage is present, touch the test leads to the top of each glass fuse once again.
 - If voltage is present at the top of the fuses but not at CN3, then there is a board failure between the fuses and CN3. If this occurs, replace the main circuit board.
- h. Reconfigure the multimeter (and test leads if necessary) to measure DC voltage.
- i. Disconnect the 12 VDC output cable from the power supply.

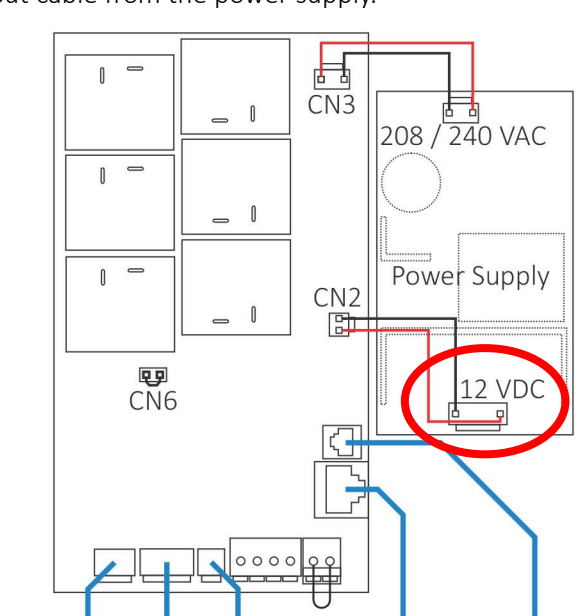


Figure 13. 12 VDC Output Cable

- j. If the green LED on the power supply suddenly illuminates when the cable is disconnected, this indicates a short circuit is present in the low voltage section of the main circuit board. If so, replace the main circuit board.

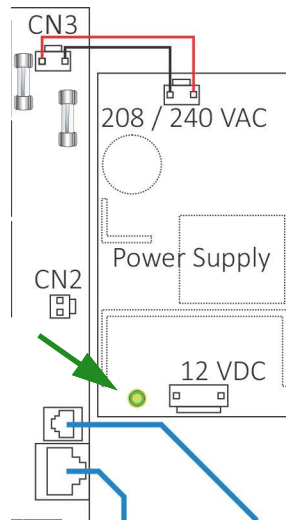


Figure 14. DC Power Supply LED Indicator

- k. Touch the ends of the test leads to the 12 VDC output pins on the power supply and take a voltage reading.

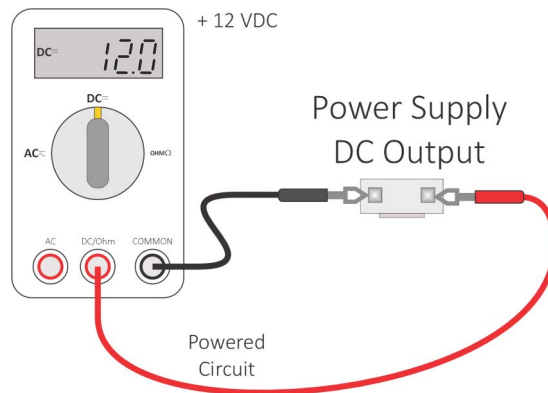


Figure 15. Testing for DC Voltage at Output of Power Supply

- If 12 volts DC is not present, then the power supply has failed. If this occurs, replace the power supply.

2.2. Controller Displays HL



Figure 16.

- a. If the sauna room has been operating for a session and then the controller displays the characters **HL**, this indicates the **High Limit** circuit has tripped.
 - The heater includes a self-resetting high limit switch. Allow the heater time to cool off and reset automatically.
 - If the high limit circuit continues to trip, verify rock placement and location of the high limit sensor.
- b. If this is a new install/startup and the control displays the characters **HL**, verify the high limit cable is connected at the heater and contactor box.
 - If the high limit cable is visually connected at the heater and CN5 at the contactor box, turn off power to the sauna from the circuit breaker.
 - Configure the multimeter (and test leads if necessary) to measure resistance (Ohms).
 - Disconnect the high limit wires from the terminals located at the heater.
- c. Test for continuity across the high limit wires. Verify resistance measured is zero (0) ohms.

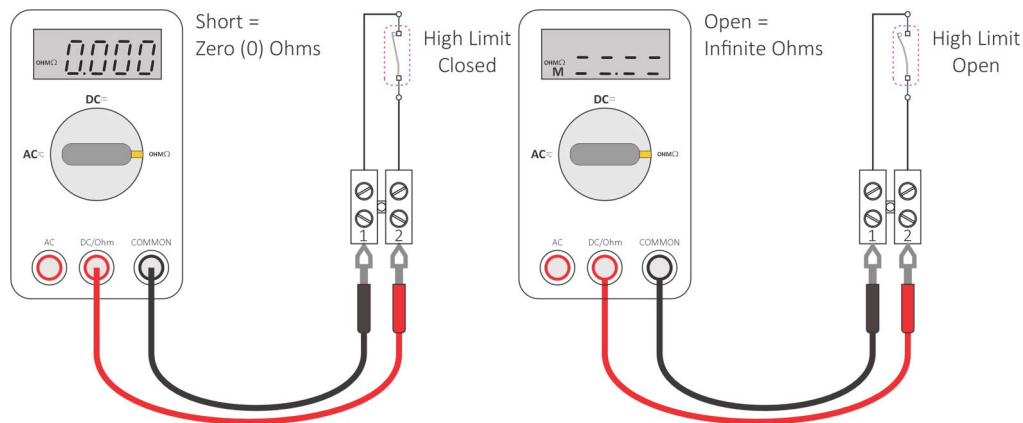


Figure 17. Measuring High Limit Continuity At Heater

- If the resistance measured is infinite (high resistance), then examine the high limit wire for breaks, and also examine the sensor and its leads for damage. Replace the high limit sensor if necessary.
- If the resistance measured is zero (0) ohms, reconnect the wires to the terminals, ensuring the terminals grab the metal wire only, not on the insulation.

- From the contactor box, disconnect the high limit wires from the CN5 connector on the main circuit board.
- Carefully test for continuity across the wires.
 - If the resistance measured is infinite (high resistance), then examine the length of wire to the heater for breaks. Ensure the terminals grab the metal wire only, not on the insulation. Replace the wire if necessary.
- If the resistance measured is zero (0) ohms, reconnect the wires to the terminals, ensuring the terminals grab the metal wire only, not on the insulation.

2.3. Control Displays CON (CON0, CON1, CON2, CON3, CON4)

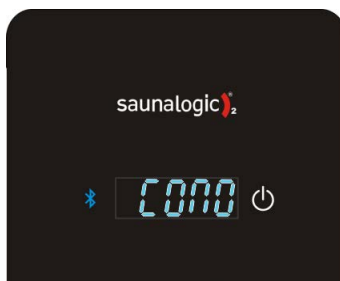


Figure 18.

- When the control displays the characters **CON** followed by a number, this indicates the control is in *Programing Mode*.
- This occurs when the **Power** button is pressed for too long, or when pressing the **Bluetooth** button to put the control into *Pairing Mode*.

2.4. Control Displays SN



Figure 19.

- When the control displays the characters **SN** this indicates a sensor error code.
- This error code appears when the control does not detect the temperature sensor.
- This error code may also occur when the sauna room temperature is less than 32° F.
- If the sauna room temperature is above 32° F, then check the temperature sensor cable connections.
- Configure the multimeter (and test leads if necessary) for measuring resistance (Ohms).
- Disconnect the temperature sensor cable at the contactor box and measure for resistance across the red and yellow wires to verify the sensor has not failed.

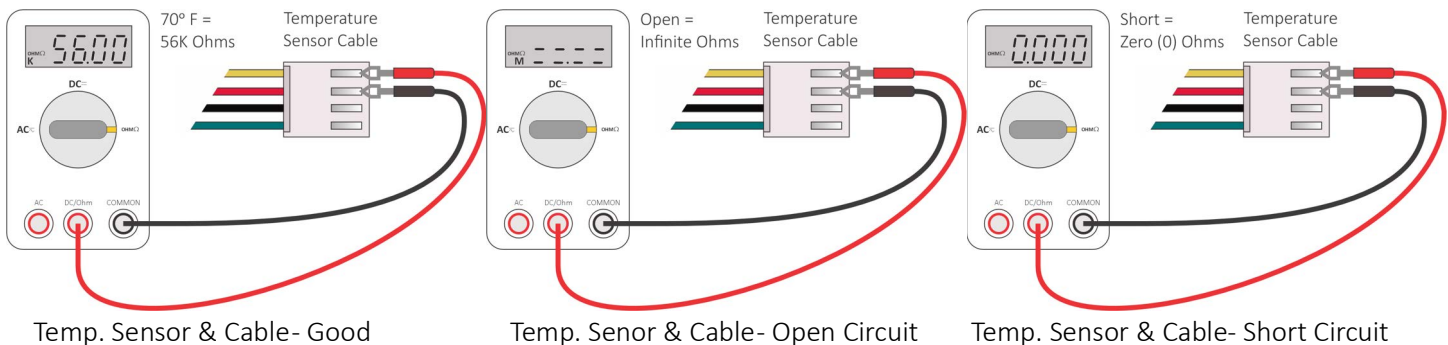


Figure 20. Measuring Temperature Sensor Resistance Through Cable

- If the resistance measured is infinite (high resistance), then open the case of the temperature sensor, disconnect the cable and connect a known good cable and test for resistance again. If the correct resistance is measured, replace the cable.
- If the resistance measured remains high, remove the temperature sensor and test with a known good sensor. If the correct resistance is measured, replace the temperature sensor.

2.5. Control Displays JP



Figure 21.

- When the control displays the characters **JP** this indicates that a configuration jumper in the contactor box it is missing.
- Verify which location/position the jumper should be in on the main circuit board and make the correction accordingly.
- If the jumper is absent from the contactor box, contact the dealer/tech for a new jumper (Part Number 2381-01).

2.6. Control Displays dLay

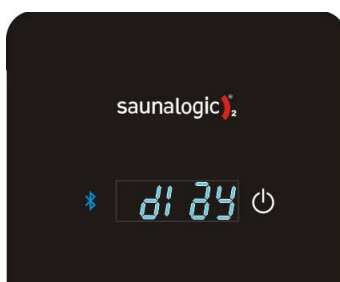


Figure 22.

- When the control displays the characters **dLay**, the delay timer is set.
- To bypass the delay timer, press the **Power** button once to shut if off, then press the **Power** button a second time to turn on the sauna.

2.7. Sauna Lights are Inoperative

Follow these steps when the sauna (either strip or ceiling) lights are inoperative.

For Strip Lighting:

- a. Verify all connectors are seated fully and that the arrows on the color strips are all going in the same direction.
 - If the arrows are not all going in the same direction, the lights will not work.
- b. Try an alternate port on the splitter.
 - If an alternate port does not resolve the issue, then bypass the splitter.
 - With the splitter bypassed and if the lights remain inoperative, then connect directly to the main circuit board in the contactor box for testing.
 - If the lights finally function, then try testing the lights with the splitter in line to the main circuit board. This will aid in determining if the splitter/ports is/are faulty.
 - If the lights function with the splitter in line, then the issue is likely a faulty cable between the contactor box and splitter.
 - If none of these tests are successful, then the issue is with the main circuit board. Replace the main circuit board.

For Puck Lighting:

- a. Verify all the connectors are seated fully.
- b. If all connections are secure, then try an alternate port on the splitter.
 - If an alternate port does not resolve the issue, then bypass the splitter.
 - With the splitter bypassed and if the lights remain inoperative, then connect directly to the main circuit board in the contactor box for testing.
 - If the lights finally function, then try testing the lights with the splitter in line to the main circuit board. This will aid in determining if the splitter/ports is/are faulty.
 - If the lights function with the splitter in line, then the issue is likely a faulty cable between the contactor box and splitter.
 - If none of these tests are successful, then the issue is with the main circuit board. Replace the main circuit board.

2.8. Controller Not Responding to Touch Input

Follow these steps when the control does not illuminate and/or does not respond to touch.

- a. Check all control cable connections, ensuring all connections are secure and seated properly.
- b. Examine the main circuit board in the contactor box, ensuring the two (2) red LEDs are illuminated.

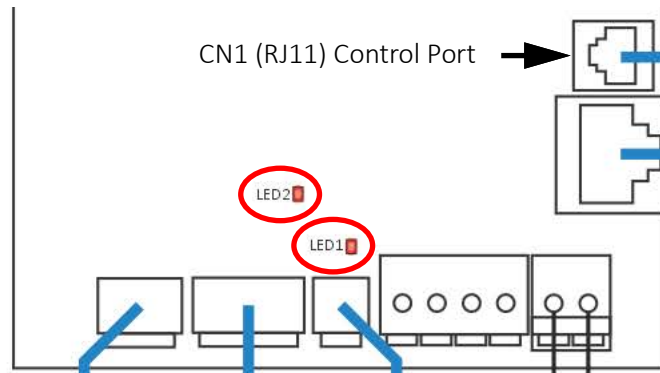


Figure 23.

- c. If only one (1) LED is illuminated, then disconnect the control from its cable and connect the control directly to the CN1 (RJ11) port of the main circuit board.
 - Test the operation of the control. If the control is operating, then the issue is isolated to one of the control cables.
 - If the control remains unresponsive, then the CN1 port on the main circuit board is suspect. Replace the main circuit board.
- d. If the control illuminates, but not responsive to touch, then power off the sauna from the breaker.
 - Clean the glass touch pad.
 - After cleaning, power up the sauna and wait for the control to load.
 - If the control remains unresponsive to touch this will require removing the faceplate for further testing. Contact the dealer for further support.

SECTION 3. How to Test an Element

Follow instructions in this section for testing suspect heater elements. All power must be disabled to the sauna room during these tests. See **WARNING** located on page 9.

- a. Verify heater wattage for the heater elements being tested.
- b. Gain access to the element tips and wires located in the bottom of the heater.
- c. Remove the wires from the suspect heater element tips.
- d. Configure the multimeter (and test leads if necessary) for measuring resistance (Ohms).
- e. Touch the end of the test leads to the metal portion on the tips of the suspect heater element.
- f. Take a reading with the meter and compare the measured value with the specifications below.

Table 2: Designer Element Resistance Values

Wattage	208VAC	240VAC
4.5 Kw	28.8 Ω	38.4 Ω
6.0 Kw	21.6 Ω	28.8 Ω
8.0 Kw	16.2 Ω	21.6 Ω

- g. Replace the suspect heater element if the measured resistance is +/- 3 ohms out of tolerance.

SECTION 4. Bluetooth Audio

Follow instructions provided in this section for troubleshooting sauna's equipped with a bluetooth audio feature.

- a. Begin by cycling power from the sauna room circuit breaker.
 - Following the power cycle, an audible chime should be heard from the sauna speakers.
- b. If the chime is not heard following the power cycle, then verify all electrical connections between the contactor box and the bluetooth module.
- c. If all connections are good, then replace the bluetooth module.