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# S95 & 208 Series Troubleshooting Guide

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## *Warning: Electrical Shock Hazard*

Field service must be performed by qualified personnel. High voltages and currents are present, when troubleshooting this equipment, that can result in serious injury or death. Service personnel must assume this danger exists at all times, even if not specifically mentioned in the troubleshooting guide, and exercise proper caution and safety procedures.

## **Step Control Operation**

Master step controls receive an input signal from a temperature sensing device. This may be a room thermostat, building management system, digital controller, combination sensor and setpoint adjuster or other similar device. Based on this input signal and the step control's selected modes, stages will be added, removed or remain unchanged depending upon the amount of heat required. Slave step controls receive their input signal from the master step control, providing additional stages that operate identical to the master's stages. A slave power controller may be used with a master step control to provide a vernier control scheme. See the individual step control spec sheets for additional information.

## **Troubleshooting Procedure**

- 1) Visually inspect the step control, wiring and loads for signs of discolored or burnt areas. If so, contact the factory for repair or replacement. Verify proper wiring of the high voltage line and low voltage input, including polarity. If available, use the equipment's wiring diagram. If not, use the general wiring diagram for the step control.
- 2) Identify the step control and locate the spec sheet. A product code label should be attached to the unit. Contact the factory for units that cannot be matched with catalog numbers or part numbers in the spec sheets. Spec sheets can be downloaded from the website or faxed from the factory.
- 3) **Note: Power down the step control before changing any dip switches or jumpers.**  
Verify that the input signal matches the step control's selected input. All other input selections should be turned off. Verify that the number of stages selected, matches the number of stages being used. For S95 Series units, verify that the control mode (dead band or proportional) and switching scheme (progressive or linear) match the intended operation of the equipment. Verify that the test jumper is in the Control mode.
- 4) Obtain a multimeter (ohms, VDC and VAC) for troubleshooting the input. VAC readings should not be used to troubleshoot the output, since the step control's snubber circuits can cause false measurements. Observe the contactor operation and measure the load currents with an ammeter.
- 5) Locate the LEDs on the step control. The power LED should light whenever 120 or 240VAC is applied to the S95 Series units and 24VAC is applied to the 208 Series units. The error LED should be off if the dip switches are properly set and the test mode is not selected.
- 7) Choose one of the following symptoms:

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**Note: Power down the step control before changing any dip switches or jumpers.**

### **Symptom # 1 - Error light on.**

- 1) If jumper JP1 (S95 Series) is set to TEST MODE or jumper J1 (208 Series) is set to TEST, the stage LEDs should be cycling on and off. This is normal test mode operation. If the stage LEDs are not cycling, contact the factory for repair or replacement.
- 2) If jumper JP1 (S95 Series) is set to CONTROL MODE or jumper J1 (208 Series) is set to CONTROL, verify that the dipswitch settings for the input type and number of stages are correct. Verify that the input signal is wired to the correct terminals, including proper polarity.
- 3) Contact the factory for repair or replacement.

### **Symptom # 2 - Loads will not turn on.**

- 1) If the stage LEDs are off, locate the jumper mentioned in Symptom # 1 above and move it to the test mode. If the stage LEDs do not cycle, verify that the delay dipswitches are set properly. If so, contact the factory for repair or replacement.
- 2) If the stage LEDs cycle, verify that the contactors are turning on and off. If not, verify that power is applied to the contactors through the M terminal (S95 Series) or the 24VAC terminal (208 Series) and the correct return path. Verify that the contactors, wiring and loads are not damaged.
- 3) If the contactors cycle, return the jumper to the control mode. Verify that the input signal matches the dipswitch setting and is wired to the correct terminals, including polarity. Adjust the input signal to the high end of the range. The green LED (SMI for S95 Series or RUN for 208 Series) should be full on and all of the stages should turn on. If not, contact the factory.
- 4) Adjust the input signal to the low end of the range. The green LED should be full off and all of the stages should turn off. If not, contact the factory.
- 5) Troubleshoot the input device for proper operation and placement.

### **Symptom # 2 - Loads will not turn off.**

- 1) Remove the 2 input wires from the temperature sensing device at the step control's terminal block. The green LED should turn off and all of the stages should turn off. If not, contact the factory.
- 2) Adjust the input signal to the low end of the range. Verify the input signal at the disconnected wires.
- 3) Reconnect the 2 input wires to the correct terminals, including polarity. Verify that the dipswitch settings match the input type and the delay dipswitches are set properly. If the green LED and all of the loads do not remain off, contact the factory.
- 4) Troubleshoot the input device for proper operation and placement.