

WHAT YOU ALWAYS WANTED TO KNOW  
ABOUT THE MODEL 85 TEMPERATURE CONTROL  
BUT DIDN'T KNOW WHO TO ASK

RDW080489

To begin with there are two similiar but different controls. There are those made before 1989 and those made 1989 and after. On back of the control is a serial number. The first two digits designate the year made. The reason for a change was to get the unit UL listed. Changes made were the transformer, the fuse, and arrangement of circuit board traces. Arrangement of circuit board traces has caused concern because it resulted in movement of terminations on the connector on the back. You can't mix new controls with old carriages ( housings) and vice versa. That would result in improper operation of fans and alarms.

If the alarm is on but nothing on the control is lighted check the FUSE. It is located under the top cover in the right rear corner. In pre1989 models it is a 125V 3 amp micro Littelfuse. Just pull it straight up. In models 1989 and after it is a 5x20mm 250V 2 amp (Radio Shack 270-1244). Twist the cap with a screwdriver to remove it.

If the fuse blows as soon as power is supplied check the MOV (voltage surge protector) located beside the fuse. It could have absorbed an overvoltage and now be shorted as has happened when 230 volts has accidentally been supplied to the control. If that's the case remove the bottom cover and look for vaporized circuit board traces, also.

What if the display shows dashes? Sometimes dashes will show when the unit is switched on. Press the READ button and see if they go away. If they remain then read on! Three dashes are supposed to indicate an open thermistor in the coil number that is displayed. It could be the thermistor leads are not properly plugged into the Model 85 or the leads are broken somewhere between the Model 85 and the thermistor or the thermistor is bad. It could be that everything is good but coil temperatures are hovering about 24 or 25 degrees. If the control has two thermistors detecting 25 or more and one detecting below 25, dashes will be displayed for the lower one.

What if the display shows 24 degrees on two or more coils but you know the coils are hotter? 24 is the lowest temperature the control will display. It is the temperature displayed if a thermistor is open, disconnected, misconnected, with broken leads or bad. If all three coils show 24 then it could be that switch 1 is closed instead of open meaning the control is set to be a slave rather than a master. Switch 1 is one of four switches on a small block located under the top cover in the left front corner.

About the display not scanning or staying on, there are four switches on a small block located under the top cover in the left front corner. If switch 2 is open the READ button must be pressed to light the display. If it is closed the display stays lighted (and probably won't last as long). If switch 3 is open only the hottest coil is displayed. If it is closed all three coils are displayed in sequence. What does switch 4 do? It's a spare.

The fan and alarm relays deserve some explanation. The fan and high temperature alarm are switched on and off by double pole double throw relays located under the top cover of the control. Contacts are accessible on back of the control carriage. In normal operation these relays are energized. They deenergize to turn on fans or alarms.

The emergency shutdown is an electronic circuit rather than a set of relay contacts. Two terminals on back of the control carriage are labeled +6V DC and ES RELAY. The +6V terminal constantly furnishes about six volts dc. The ES RELAY terminal goes to ground only when temperatures sensed reach the setpoint where the emergency shutdown should activate. An external relay with a six volt coil would normally be connected to these terminals.

The setpoints are the temperatures at which fans and alarms switch on. They can be set to any temperature a customer needs but only with a special piece of equipment at the transformer plant. Normal settings are for fans to switch on at 110 and off at 100. The high temperature alarm normally switches on at 125 and off at 123. The emergency shutdown normally switches on at 155 and off at 145.

What if the display shows 134? Check capacitor C11 for a broken lead. It is located on the main circuit board on the left edge where in early models it bumped the board mount.

If an external fuse blows whenever the control is inserted into its carriage and powered up check to see that power supply wires are connected to the proper terminals on back of the control carriage.

There are three things to check for intermittent problems. One is terminals on the control circuit boards that missed getting soldered and therefore make intermittent contact. Another is stray strands of wire where connections are made to the back of the control carriage. The other is that the control is not fully inserted and locked into its carriage.

Other things to check within the control are as follows:

- Check for correct setpoints.

- Be sure relays are firmly pushed into sockets.

- Check to see that the CPU board is plugged into the main board properly -- no bent or broken pins.

- Check the large blue capacitor C14 for broken leads.

- Check for componets which didn't get soldered to boards.

- Check bottom of main board for vaporized circuit traces.

Checking thermistors can be done with an ohm meter from inside the Model 85 carriage. Looking into the carriage on the left of the circuit board are three groups of three solder joints. Each thermistor is connected to the outside solder joints of a group. Touching ohmmeter leads there should give more than 100K ohms for 25 degrees C, about 10K for 85 degrees and 4K for 115.

External wire to the back of the carriage is stranded. Stray strands of wire can touch other wires causing apparent improper operation of the control.