



# Wiring Instructions

## ElectraCOOL™ Cold-Plates with the TLK38-S Controller

The [TLK38-S](#) is now the standard temperature controller included with our TCP50 and TCP100 cold-plate sets. It's easy to use and provides accurate control for cooling or warming.

If you've purchased an ElectraCOOL™ Cold-Plate Set, we taken care of setting things up. Simply plug-in and your cold-plate is ready work. The default cold-plate temperature is 4 °C (39 °F) however, set-point modifications are quick and easy with the TLK38-S.

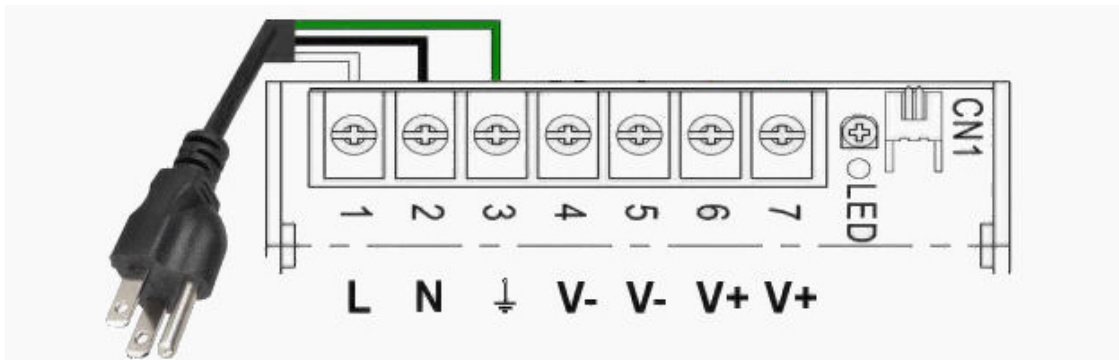
Starting from scratch or want to switch things around? The following step-by-step instructions are all you'll need. To use the TLK38-S for HEATING see the end of these instructions.



**Caution! Risk of electric shock. Your TLK38-S temperature controller and our ElectraCOOL™ Cold-Plate are designed for operation from a 12 or 24 Volt DC power source (such as the AC-to-DC power supply you may have purchased). Do not connect the temperature controller or cold-plate directly to an AC source such as a wall outlet. If your power supply has a manual switch, make sure that the switch is in the correct position. In North America the switch should be set to 110 (or 115), and in Europe 220 (or 230).**

### 1. Connect the Power Cord to the Power Supply

To attach the 3-prong power cord, first locate the three terminal posts for (AC) input on the terminal strip of the power supply. Connect the white wire, from the power cord, to the 1st post marked "L", the black wire to the 2nd post marked "N", and the green wire to the post marked "FG" or with the ground symbol ( $\equiv$ ). You may test the connections by plugging in your supply and observing the led glowing. Unplug the power supply until you have connected the fans.





# Wiring Instructions

## ElectraCOOL™ Cold-Plates with the TLK38-S Controller

There are two pairs of DC Output terminals on the RSP150W power supply. Two adjacent posts are marked “V-” in positions 4 and 5 and those marked “V+” in positions 6 and 7. Use posts numbered 4 and 6 (V- and V+) as a pair and post 5 and 7 as a pair. Unless otherwise instructed, red wires connect to V+ and black wires to V-.

### 2. Connect the Fan/s

The TCP50™ has one fan and the TCP100™ has two. Each fan has a red (+) and black (-) lead. The fan leads can be identified with white shrink wrap and having narrower wire than is used for the TECs (with blue shrink wrapping). *The fans on the TCP100-24V are connected in series with only one set of leads.*

Connect the red fan lead/s directly to a V+ post on the power supply and the black fan lead/s to a V- post. Confirm that you have the fan leads correctly attached by plugging in the power cord and observing the fans spin. If the fans are not spinning, unplug the power cord and check the previous instructions then, if unsuccessful, call or e-mail us.

NOTE: We recommend connecting fans directly to the power supply so that they are supplied a constant nominal voltage. If fans are connected within the loop that's temperature controlled, they may not supply enough airflow to keep the hot-side heat-sink sufficiently cool.

### 3. Connect the TLK38-S Temperature Controller

Be sure that the power supply is not plugged in until the entire controller wiring process has been completed.

See the wiring schematic for cooling below. You will need a small Phillips head screwdriver and three additional pieces of wire. Use 18-gauge wire to make all connections. Find one red and one black wire about two feet long and a three inch long red “jumper” wire.

On the TLK38-S, slots 1 and 2, marked “SUPPLY” are for DC power input from the power supply. Connect one end of a 24” spare piece of 18-gauge red wire to slot 1 in the TLK38-S and the other end to a +V output on the power supply. Next connect a 24” spare piece of 18-gauge black wire to slot 2 on the TLK38-S and the other end to a -V output post of the power supply.

Using a 3” spare piece of (red) wire make a “jumper” from TLK38-S slot 1 (also connected to the power supply) to the TLK38-S terminal slot 3 (“C” or common of the 1st Output).



# Wiring Instructions

## ElectraCOOL™ Cold-Plates with the TLK38-S Controller

From the cold-plate, select the pair of leads for the thermoelectric module/s inside the cold-plate. TE module leads are heavier gauge than those for the fans and exit the cold plate with blue shrink wrap. Connect the red, positive lead/s to TLK38-S slot 5 identified by “NO” (This will create a Normally Open circuit in the 1st Output). Finally, connect the black, negative lead from this pair to –V terminal post on the power supply (not the controller).

Finally, connect the 1.5 meter (59 inch) long NTC sensor, that's included with the TLK38-S. This type of thermistor can be shortened to 1 ft. (38 cm) in length but calibration (see instructions below) is advised.

The two NTC leads go into TLK38-S slots 10 and 12. There is no + or - for the sensor leads so either wire can go in either slot.



Place the actual sensor (on the other end of the wire with a bullet shape) into the hole in the side of the actual cold-plate. This is the side that all lead wires exit the cold-plate. The hole for the sensor probe stops in the center of the cold-plate. Insert the sensor until you meet resistance at about 2 inches (5cm). *We recommend bedding the sensor in a dab of thermal grease to enhance the thermal interface within the cold plate. We also recommend holding the sensor in place with a cotton ball or two inserted after the sensor is in place.*

#### 4.) Power up and Program the TLK38-S

You may now plug in the power cord and if necessary, program the TLK38-S controller for your application.

Since the majority of our ElectraCOOL™ thermoelectric assemblies are used for cooling we have pre-programmed Output 1 of the TLK38-S for cooling with a set-point of +4 °C. (*parameter #21, “Fun1” set to “Cool”*) and (*parameter #6, “SP1” set to “4.0”*)

In order to change the set-point push the “P” button for a moment and SP1 will be displayed. Press the “P” button again and the current set-point value will be displayed. Use the UP or DOWN arrow keys to make a change to the set-point. Leave the controller alone for about 20 seconds and the new value will be programmed.

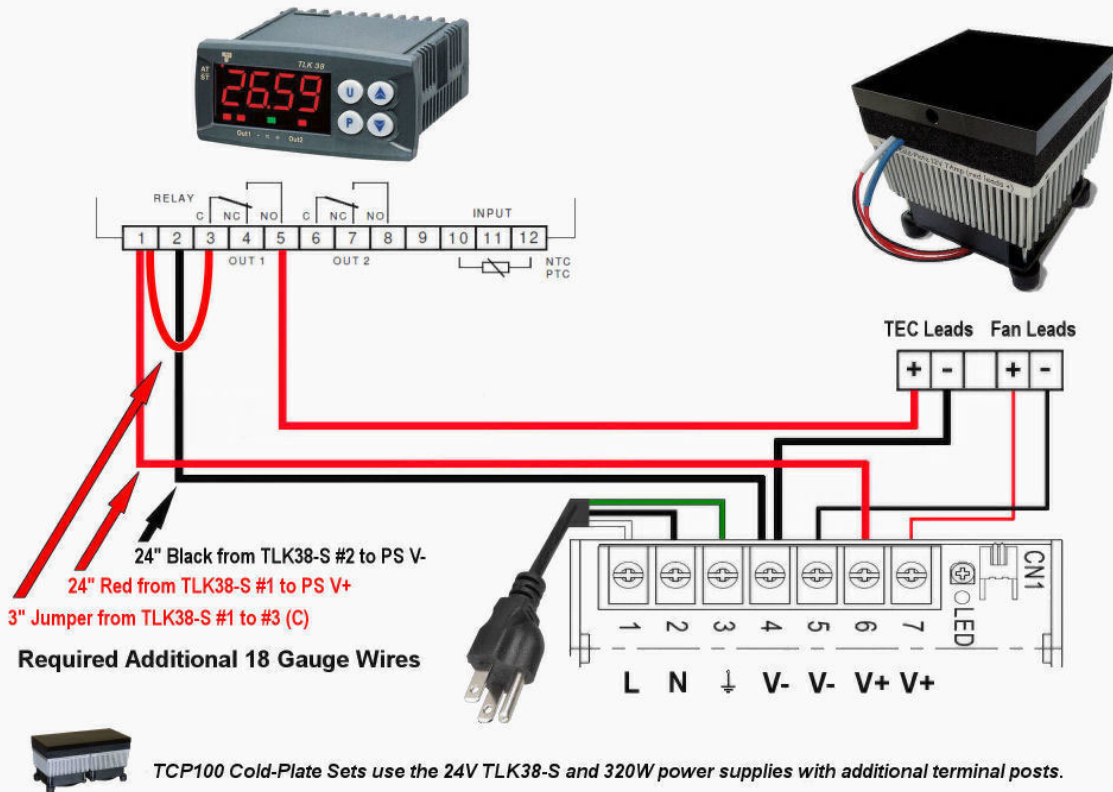


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For the complete list of pre-programmed parameters, see the [TLK38-S User Manual \(.pdf download\)](#). It's relatively easy to make modifications, for example, from °C to °F.

### TLK38-S Temperature Controller to ElectraCOOL™ Cold-Plate Wiring for Cooling



In order to change the set-point push the “P” button for a moment and SP1 will be displayed. Press the “P” button again and the current set-point value will be displayed. Use the UP or DOWN arrow keys to make a change to the set-point. Leave the controller alone for about 20 seconds and the new value will be programmed.

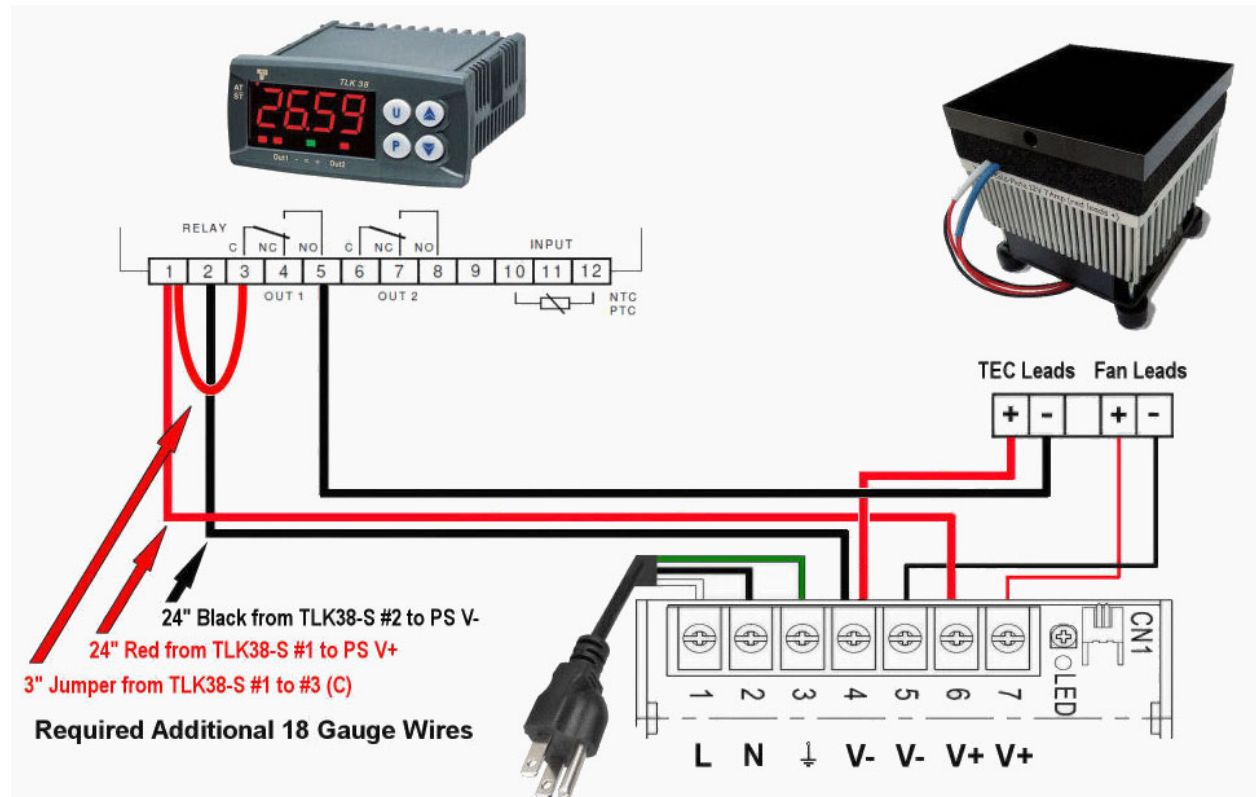


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### WARMING Mode

For warming, first modify the wiring, as illustrated below (to reverse polarity to the TEC/s) then program the controller for heating.



### WIRING:

To use a cold-plate for warming/heating, the polarity of the power to the TECs must be reversed from that of the cooling mode.

Connect the black lead/s from the TE/s (heavier gauge than fan leads) to TLK38-S slot 5, marked "NO" for Normally Open. Then connect the red lead/s (typically connected to a positive V+ terminal post) from the TE/s lead wire to a **NEGATIVE (V-)** post on the power supply (to change the polarity). Make all other connections to the TLK38-S and power supply, as described and illustrated (red to + and black to -).



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### PROGRAMMING:

Push the TLK38-S “P” button for 5 seconds until the LEDs flash. Push the down arrow until the Function mode parameter for output one “Fun1” is displayed. Push the P button and the current status will be displayed. If “Cool” is displayed, push the down arrow and “HEAT” will be displayed. Leave the controller alone for about 20 seconds and the new value will be programmed.

Finally, change the set-point to the desired temperature (above ambient).

In order to change the set-point push the “P” button for a moment and SP1 will be displayed. Press the “P” button again and the current set-point value will be displayed. Use the UP or DOWN arrow keys to make a change to the set-point. Leave the controller alone for about 20 seconds and the new value will be programmed.

### DUAL Set-points

TLK38-S has two outputs available and each may be programmed with different set-points. This allows the user to program two separate temperatures for cooling, warming, or one for each. Output 1 is capable of PID control while Output 2 is exclusively on/off control. With Output 1 using the normally open “NO” circuit (posts 3 and 5) Output 2 should use the normally closed “NC” circuit (posts 6 and 7).

In order to use both TLK38-S outputs with ElectraCOOL™ assemblies, it’s necessary to use a splitter that converts each of the TEC leads into two. This can be accomplished by or using 1-to-2 splitters on each of the TEC leads, or one 2-to-4 splitter for both leads. A variety of mechanical splitters are available from Molex or Amp, but insulated barrel crimps or wire nuts will work.

The illustrations above show how to wire the TLK38-S for cooling or warming on output 1. To use the second output, copy the desired configuration using the normally closed “NC” circuit (posts 6 and 7).

Be sure that the set-point for each output is appropriate for the requested action (Cool vs. Heat).

*For instructions for our alternative cold-plate temperature controller, the Z31-A, see:  
<https://www.electracool.com/TCP50-Z31A-Wired.html>.*