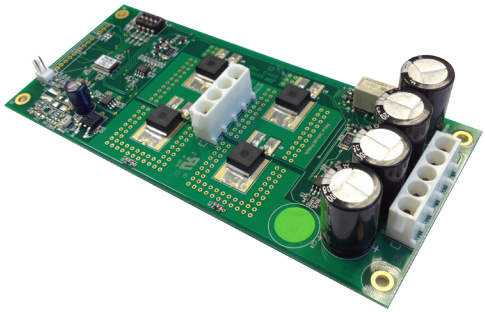

Thermoelectric Temperature Controller

TEC24VCNTLRN, TEC48VCNTLRN Models

INSTRUCTION MANUAL

Rev. D

P/N 89109826

89109826

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INSTALLATION INSTRUCTIONS

The Thermoelectric Temperature Controller is designed to mount directly on all Thermoelectric Cooler (TEC) models, or it can be mounted in any convenient location near the TEC using the included bracket and screws. The location should take into consideration the desired position of the thermistor sensing bead and the 36 in. (915 mm) length of the supplied thermistor harness. It is recommended, but not required, that the thermistor sensing bead be located at the inlet of the inside fan.

First determine the controller mounting location, either directly on the TEC or another suitable location. If mounting on the TEC, use the existing 0.136 in. diameter holes in the heat sink cover. If mounting to something other than the TEC, the bracket can be used as a template for locating the mounting holes. Drill 0.136 in. diameter holes (#29 drill bit) if required, and mount the bracket to the selected location using the supplied (2) #8-18 Type AB tapping screws. Next mount the controller to the bracket using the four supplied #4-40 screws.

POWER SUPPLY

A SELV power source is required.

WIRING

Connect the controller and TEC as shown in the wiring diagrams. Wire harnesses and the fuse are both included with the controller. See Table 1 - Inline Fuse Specification for replacement fuse specifications. Ensure that higher potential input power conductor is connected to the (VIN+) terminal and lower potential is connected to the (VIN–) terminal. Input power conductors shall be no longer than 10 feet. TE module and fan wires between the controller and TEC each shall be twisted pairs, no longer than 3 feet.

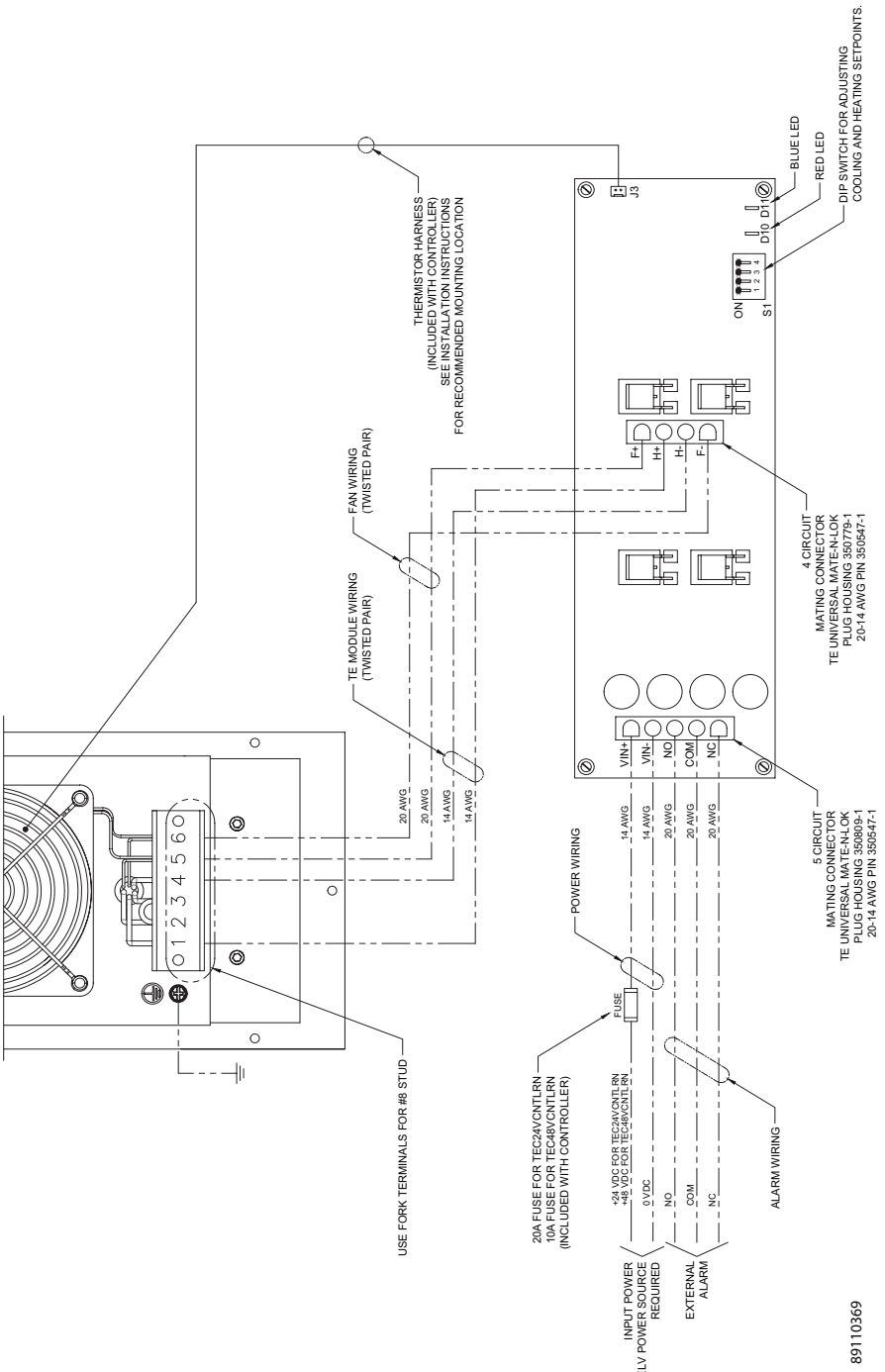
Table 1 - Inline Fuse Specification

Controller Kit Model	Fuse Rating	Fuse Part Number
TEC24VCNTLRN	20 A	Littelfuse 314020P or Cooper Bussman ABC-20-R
TEC48VCNTLRN	10 A	Littelfuse 314010P or Cooper Bussman ABC-10-R

NOTE:

Fuse supplied with the controller must be installed in the inline fuseholder in the power harness.

WIRING DIAGRAM



SETUP

Cooling and heating temperature setpoints are factory set to 95 F/35 C for cooling and 59 F/15 C for heating.

These setpoints can be changed by adjusting the 4-position dip switch on the printed circuit board assembly (S1). See Table 2 - Cooling and Heating Setpoints.

Note: The heating function includes a disabled position.

Table 2 - Cooling and Heating Setpoints

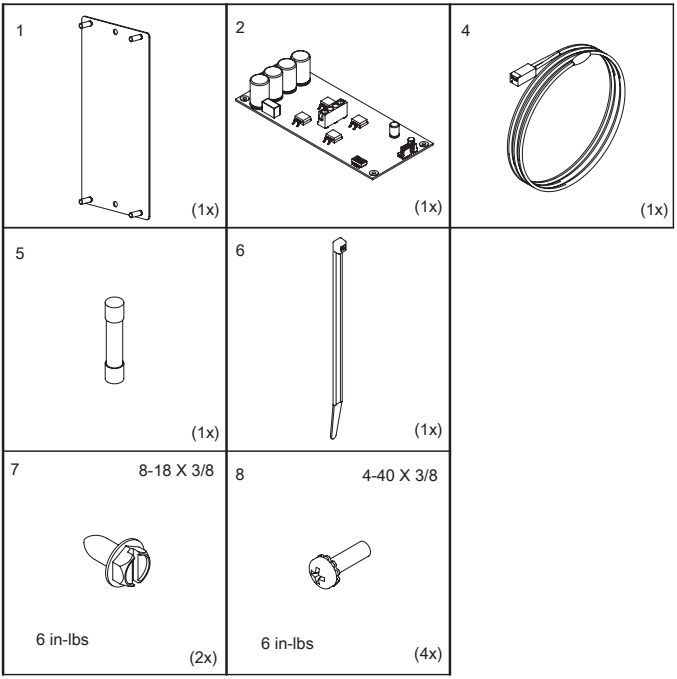
Cooling Setpoint (°C)	S1 Position 1	S1 Position 2	S1 Position 3	S1 Position 4	BLUE LED at Startup
35 Factory Default	**ON**	**ON**	See Heating Setpoint below		**Blinks 1 Time**
30	ON	OFF			Blinks 2 Times
25	OFF	ON			Blinks 3 Times
22.5	OFF	OFF			Blinks 4 Times
Heating Setpoint (°C)	**S1 Position 1**	**S1 Position 2**	**S1 Position 3**	**S1 Position 4**	**RED LED at Startup**
15 Factory Default	See Cooling Setpoint above		**ON**	**ON**	**Blinks 1 Time**
5			ON	OFF	Blinks 2 Times
-5			OFF	ON	Blinks 3 Times
No Heat			OFF	OFF	Blinks 4 Times

Table 3 - Design Data

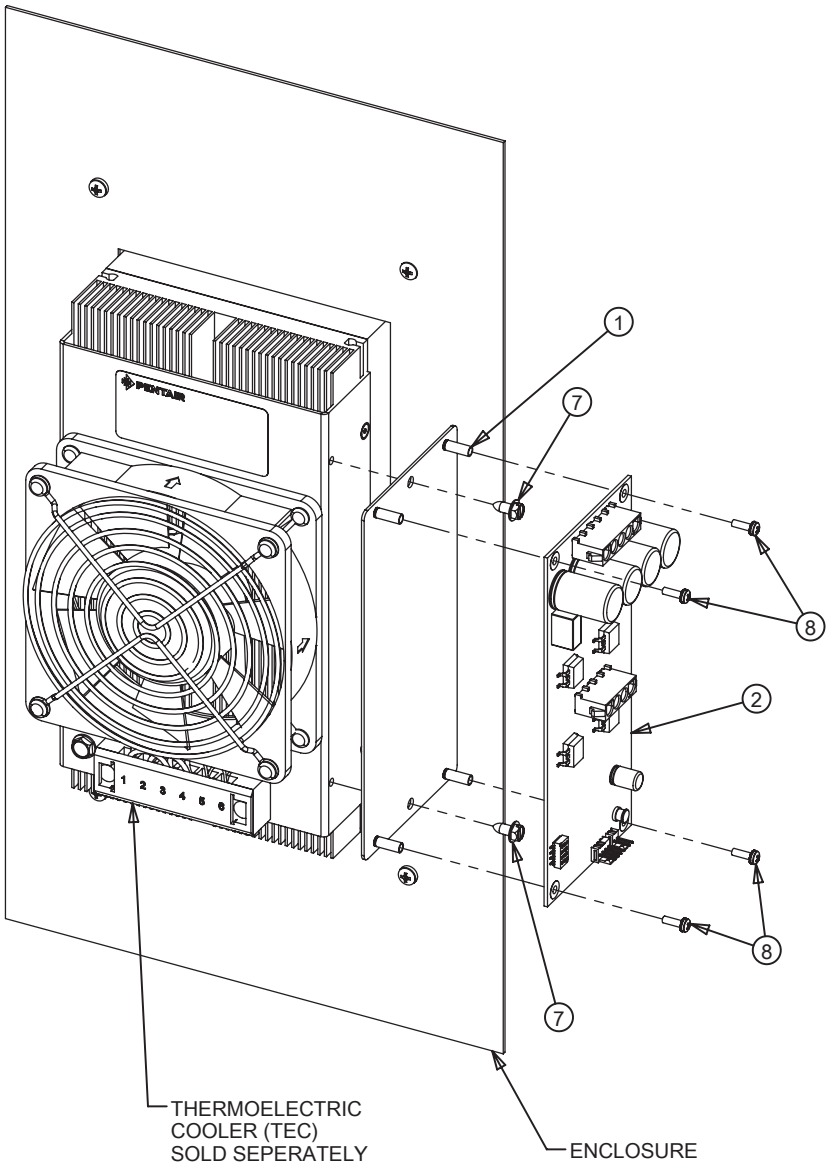
Technical Data	Part Number	
	TEC24CNTLRN	TEC48CNTLRN
Rated Voltage (VDC)	24	48
Operating Range (VDC)	18 to 30	40 to 60
Maximum Current @ Rated Voltage (Amps) **	17.2	8.6
Operating Temperature (°F/°C)	-40 to +149/ -40 to +65	
Alarm Contact Rating	1) 0.5 A max @ 24 VDC - from same source of power as unit, SELV, non-power limited (greater than 15 W); OR 2) 0.5 A max @ 24 VAC - from SELV, Class 2 safety isolating transformer.	1) 0.5 A max @ 48 VDC - from same source of power as unit, SELV, non-power limited (greater than 15 W); OR 2) 0.5 A max @ 24 VAC - from SELV, Class 2 safety isolating transformer.
Temperature Accuracy (°F/°C)	±3.6/2	
High Temperature Alarm (°F/°C)	27/15 above cooling setpoint	
Low Temperature Alarm (°F/°C)	* 18/10 below heating setpoint, N/A if heating is disabled.	

* If heating is disabled, there is no low temp alarm.

** Actual current draw will depend on the TEC model connected.



DETAIL DRAWING



OPERATION

Each time power is applied, the controller will step though a start-up sequence. This consists of indicating the current cooling and heating settings, and turning on the cooling and heating function such that proper operation of the TEC can be verified. The sequence is as follows:

1. The blue cooling LED blinks for a half second ON and half second OFF for the appropriate number of times (see Table 2 - Cooling and Heating Setpoints).
2. The red heating LED blinks for half second ON and half second OFF for the appropriate number of times (see Table 2 - Cooling and Heating Setpoints).
3. The TEC ramps up in cooling mode for 5 seconds. The blue cooling LED flashes rapidly.
4. The TEC ramps up in heating mode for 5 seconds. The red heating LED flashes rapidly.

The controller will command the TEC to cool if the temperature read by the thermistor is above the cooling setpoint, and to heat if the temperature is below the heating setpoint. If heating is called for, the controller will automatically reverse the DC voltage to the TE modules. During cooling, H+ is a higher potential than H-. During heating, H- is a higher potential than H+. The controller logic will slowly ramp power to the peltier chips. If the temperature read by the thermistor is between the cooling and heating setpoints, the controller will be in a standby mode with no power applied to the TEC modules.

The normally open (NO) alarm dry contact will close when an alarm occurs, including loss of power. The normally closed (NC) contact will open when an alarm occurs.

Table 4 - LED and alarm connection status

Status	Red	Blue	Com-NO	Com-NC
OFF	OFF	OFF	Closed	Open
Start up sequence - see Table 2 - Cooling and Heating Setpoints	Flashes	Flashes	Toggles	Toggles
ON – Standby	OFF	OFF	Open	Closed
ON – Cooling	OFF	ON	Open	Closed
ON – Cooling/High Temp Alarm	Flashing	ON	Closed	Open
ON – Heating	ON	OFF	Open	Closed
ON – Heating/Low Temp Alarm	ON	Flashing	Closed	Open
ON – Temp Sensor Failure	Flashing	Flashing	Closed	Open

NOTES

WARRANTY

nVent Equipment Protection warrants that the Goods manufactured by nVent Equipment Protection will be free from defects in material and workmanship for a period of one (1) year from the date of shipment by nVent Equipment Protection, subject to the following conditions and exclusions:

A. Conditions. All Goods must be installed and operated according to the following specifications:
   1. Maximum voltage variation no greater than plus or minus 10% of nameplate nominal rating;
   2. Maximum frequency variation no greater than plus or minus 3 Hz. of nameplate nominal rating;
   3. Must not exceed minimum and maximum stated temperatures on the nameplate;
   4. Must not exceed (BTU/Hr) rating, including any heat sink as indicated on the nameplate;
   5. Refrigerant bearing Goods must not be restarted for a period of one (1) minute after intentional or accidental shut-off;
   6. The filters (if applicable) must be cleaned regularly;
   7. The Goods and any parts thereof must not be modified, unless prior written authorization is received from nVent Equipment Protection; and
   8. All Goods must be installed and grounded in accordance with all relevant electrical and safety codes, as well as the National Electric Code and OSHA rules and regulations.
   9. All Goods must be installed in a stationery application, free of vibration.

   A violation of any one of these conditions shall render the warranty hereunder void and of no effect.

B. Exclusions. This warranty shall be void if product is misapplied in any way or:
   1. Buyer specified product is inappropriate for system or environment in which it is operating.
   2. nVent Equipment Protection product modified in any way without prior written authorization from nVent Equipment Protection.
   3. Removal or modification of nVent Equipment Protection label affixed to product without written nVent Equipment Protection approval.

   nVent Equipment Protection must be notified of a claim in writing not later than fourteen (14) days from the date when Buyer has become aware of such occurrence, or where the defect is such that it may cause damage, immediately, such notice containing a description of how the defect manifests itself. Failure to provide such prompt notice to nVent Equipment Protection shall result in forfeiture of Buyer's rights under this warranty.

   In the event of a warranty claim, Buyer is to return defective goods to nVent Equipment Protection in accordance with nVent Equipment Protection Return Policy. Warranty period for repaired goods remains at 1 year from shipment of original goods. nVent Equipment Protection sole obligation to Buyer under this warranty will be, at nVent Equipment Protection option:

C. Repair or replace nVent Equipment Protection products or parts found to be defective in material or workmanship.

D. Issue credit for the purchase price paid by Buyer relating to such defective Goods or part.

THIS WARRANTY CONSTITUTES THE ENTIRE WARRANTY WITH RESPECT TO THE GOODS AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY AND IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

RETURN AND REPAIR POLICY

nVent Equipment Protection products that: (i) are made to order, (ii) have been modified by Buyer, (ii) have special finishes, or (iv) are determined by nVent Equipment Protection to constitute "custom" products that cannot be returned to stock or resold to other Buyers, will not be accepted for return by nVent Equipment Protection.

All returns require a Return Material Authorization number (RMA #), regardless of reason for return, whether it be for warranty or out of warranty repair. Returns without an RMA # will be refused by our Receiving Department. An RMA # is valid for 60 days.

E. An RMA # will be issued by our Repair Department in Anoka, MN at 866-545-5252. Buyer should have following information available at time of RMA request:
   1. Complete Model Number, Serial Number and description of damaged unit being returned.
   2. Original Buyer Purchase Order number and date product was received by Buyer.
   3. Quantity to be returned and a brief description of failure for each unit, if different.
   4. Contact information of Buyer that must include: name of company, billing and shipping address, phone, number, fax number, freight carrier and the name and phone number of a Buyer contact who can elaborate on the claimed defect in detail.
   5. Buyer must provide a Repair Purchase Order number for both warranty and out of warranty repairs. The PO will not exceed 50% of a new unit. Buyer will be notified of repair charges that exceed approved PO amount.

F. All returns to nVent Equipment Protection must be securely packed, using original cartons if possible. All returns must have the RMA number visible on the outside of the carton. nVent Equipment Protection is not responsible for material damaged in transit. Any refrigerant-bearing Goods must be shipped upright for return.

G. Shipping cost for all non-warranty repairs is the responsibility of the sender and must be shipped prepaid. Shipping costs for all warranty related repairs will be covered by nVent Equipment Protection provided the goods are returned using a nVent Equipment Protection approved carrier. If after diagnoses the product is determined by nVent Equipment Protection not be covered under warranty, Buyer will be responsible for all shipping charges and will be billed accordingly.

H. Non-warranty repairs are subject to a $75 minimum analysis fee. Analysis fee will be waived if Buyer approves repair work. If approval is not received within 30 days, material will be scrapped and all shipping expenses and corresponding analysis fees will be billed to Buyer.

I. At Buyer's request, Failure Analysis can be provided by nVent Equipment Protection for warrantable goods at no charge. Failure analysis for non-warranty repairs are subject to a $100 per hour Engineering charge plus any other incurred testing costs.

J. All returned merchandise must be sent to the following address: nVent Equipment Protection, 2100 Hoffman Way, Anoka, MN 55303-1745.

K. Credit for accepted returns shall be at the original selling price or the current selling price, whichever is lower, less the restocking charge indicated as follows:
   1. Within 60 days of invoice date - 20% of applicable selling price.
   2. Within 61-120 days of invoice date - 30% of applicable selling price.
   3. Within 121-180 days of invoice date - 40% of applicable selling price.
   4. Beyond 180 days - subject to individual review by nVent Equipment Protection.

   If product being returned for credit requires repair or modification, the cost of any labor or material necessary to bring product into saleable condition will be deducted from credit. Buyer may not take credit against returns without prior written nVent Equipment Protection approval.

LIMITATION OF LIABILITY

nVent Equipment Protection WILL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION ANY LOST PROFITS OR LABOR COSTS, ARISING FROM THE SALE, USE OR INSTALLATION OF THE GOODS, FROM THE GOODS BEING INCORPORATED INTO OR BECOMING A COMPONENT OF ANOTHER PRODUCT, FROM ANY BREACH OF THIS AGREEMENT OR FROM ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON WARRANTY (EXPRESSED OR IMPLIED) OR OTHERWISE BASED ON CONTRACT, OR ON TORT OR OTHER THEORY OF LIABILITY, AND REGARDLESS OF ANY ADVICE OR REPRESENTATIONS THAT MAY HAVE BEEN RENDERED BY nVent Equipment Protection CONCERNING THE SALE, USE OR INSTALLATION OF THE GOODS

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