

TC-4300 Temperature Controller

Product Information Packet

The logo for 'teca' is rendered in a light blue, sans-serif font with a thin purple outline. It is positioned in the lower-middle section of the page, superimposed over a background of a blue sky and a snow-capped mountain range. The overall design is clean and professional, with a color palette of blues, purples, and whites, contrasting with the fiery orange and yellow vertical bar on the left side of the page.

Table of Contents

| | | |
|------------|--|-----------|
| 1 | INTRODUCTION | 4 |
| 2 | SPECIFICATIONS | 5 |
| 2.1 | Features | 5 |
| 2.2 | Part Numbers | 6 |
| 3 | DIMENSIONS | 7 |
| 4 | ELECTRICAL INSTALLATION AND SENSORS | 8 |
| 4.1 | Electrical Installation | 8 |
| 4.2 | Terminal Block Layout | 8 |
| 4.3 | Sensors | 10 |
| 5 | EXTERNAL RELAYS (applies only to the models with external relays) | 11 |
| 5.1 | Relay Block Mounting | 12 |
| 5.2 | Relay Block Wiring | 13 |
| 6 | RS-232 COMMUNICATIONS | 14 |
| 6.1 | EasyLog Software | 14 |
| 6.2 | iTools Engineering Studio | 14 |
| 6.3 | MODBUS RTU Protocols | 14 |
| 7 | WARRANTY | 15 |

1 INTRODUCTION

The TC-4300 is the control center for TECA's liquid chiller, cold plate and air conditioner products. This unique controller is a full featured instrument with advanced control capabilities.

Depending on the application, part number and functions available the TC-4300 consists of either two or three interconnected circuit boards.

1. Main circuit board
2. Fan speed board
3. RS-232 communications board

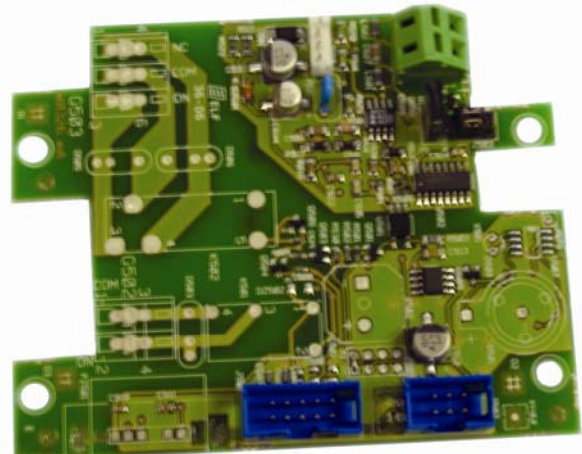
TC-4300 main board



RS-232 communications board



Fan speed board



2 SPECIFICATIONS

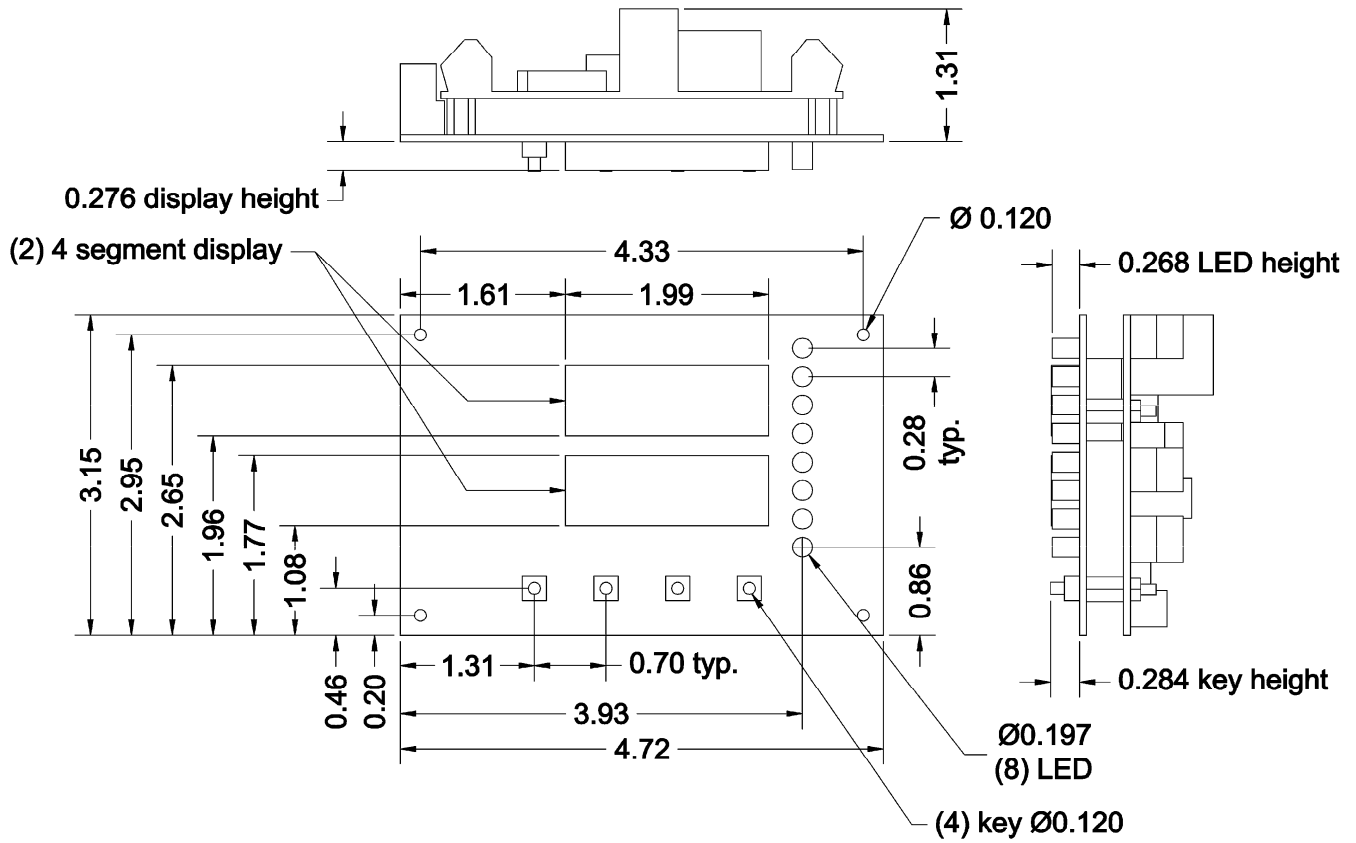
2.1 Features

- Dual-line 4-digit display
- Status lights for low fluid level, low flow condition and over temperature condition
- Highly accurate and highly stable temperature control
- High accuracy RTD input
- Proportional-Integral-Derivative (PID) control
- One shot auto tuning for the automatic selection of PID terms
- Programmer with 4 profiles of 8 segments each
- Full-functioned programmer with automatic program repetition, ramp tracking, guaranteed soak, and PV servo.
- Integrated H-Bridge control circuitry
- Integrated pump reset logic (liquid chillers only) low flow situations
- AutoFan control on selected models
- Optionally available RS232 or communication interface

2.2 Part Numbers

| | 43 | - | X | X | X | - | X | X | - | X | X | X |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Input Voltage | | | | | | | | | | | | |
| 0 | Universal AC - 100 to 240Vac, 50/60 Hz | | | | | | | | | | | |
| 2 | 24 VDC | | | | | | | | | | | |
| Functions | | | | | | | | | | | | |
| 0 | For assembly with TECA unit | | | | | | | | | | | |
| 1 | Cool only - No relay | | | | | | | | | | | |
| 2 | Heat/Cool -No relay | | | | | | | | | | | |
| 3 | Cool only, with relays | | | | | | | | | | | |
| 4 | Heat/Cool, with relays | | | | | | | | | | | |
| Switching Volts & Amps | | | | | | | | | | | | |
| A | None, drive signal only - no relays | | | | | | | | | | | |
| B | Cool only, VAC switching, 120/240Vac, 10 Amps | | | | | | | | | | | |
| C | Cool Only, VDC switching, 0-100 VDC, 12 Amps | | | | | | | | | | | |
| D | Cool Only, VDC switching, 0-100 VDC, 20 Amps | | | | | | | | | | | |
| E | Cool Only, VDC switching, 0-100 VDC, 40 Amps | | | | | | | | | | | |
| F | Heat/Cool, VDC switching, 0-100 VDC, 12 Amps | | | | | | | | | | | |
| G | Heat/Cool, VDC switching, 0-100 VDC, 20 Amps | | | | | | | | | | | |
| H | Heat/Cool, VDC switching, 0-100 VDC, 40 Amps | | | | | | | | | | | |
| I | Heat/Cool, Heat: 120/240 VAC, 10 amps Cool: VDC switching, 0-100 VDC, 12 Amps | | | | | | | | | | | |
| J | Heat/Cool, Heat: 120/240 VAC, 10 amps Cool: VDC switching, 0-100 VDC, 20 Amps | | | | | | | | | | | |
| K | Heat/Cool, Heat: 120/240 VAC, 10 amps Cool: VDC switching, 0-100 VDC, 40 Amps | | | | | | | | | | | |
| L | Heat/Cool, Heat: 0-100 VDC, 12 Amps Cool: VAC switching, 120/240 VAC, 10 amps | | | | | | | | | | | |
| M | Heat/Cool, Heat: 0-100 VDC, 20 Amps Cool: VAC switching, 120/240 VAC, 10 amps | | | | | | | | | | | |
| N | Heat/Cool, Heat: 0-100 VDC, 40 Amps Cool: VAC switching, 120/240 VAC, 10 amps | | | | | | | | | | | |
| O | Heat/Cool, Reverse Polarity, 0-100 VDC, 12 Amps | | | | | | | | | | | |
| P | Heat/Cool, Reverse Polarity, 0-100 VDC, 20 Amps | | | | | | | | | | | |
| Q | Heat/Cool, Reverse Polarity, 0-100 VDC, 40 Amps | | | | | | | | | | | |
| R | Heat/Cool, VAC switching, 120/240 VAC, 10 amps | | | | | | | | | | | |
| Sensor | | | | | | | | | | | | |
| 0 | None | | | | | | | | | | | |
| 1 | 3- Wire RTD - RTD-Probe | | | | | | | | | | | |
| 2 | T type thermocouple (ring mount) - RTD-Ring | | | | | | | | | | | |
| Communications | | | | | | | | | | | | |
| 0 | No communications | | | | | | | | | | | |
| 1 | RS-232 external option | | | | | | | | | | | |
| Fan Speed Control | | | | | | | | | | | | |
| 0 | None | | | | | | | | | | | |
| 1 | Yes | | | | | | | | | | | |
| Overlay | | | | | | | | | | | | |
| 0 | None | | | | | | | | | | | |
| 1 | Liquid chiller | | | | | | | | | | | |
| 2 | Cold plate | | | | | | | | | | | |
| Custom Features | | | | | | | | | | | | |

3 DIMENSIONS



4 ELECTRICAL INSTALLATION AND SENSORS

4.1 Electrical Installation

Please refer to the appropriate wiring diagram included with the product package.

The TC-3300 is designed for use with the following supply voltages:

- 100 to 240 (-15% to +10%) V ac 50/60 Hz (Line and Neutral)
- 24 V (+/- 10%) dc/ac 50/60 Hz

Power consumption: 4W 7VA maximum

Wiring the connectors:

Prepare the cable carefully, remove a maximum of 8mm insulation and ideally tin to avoid bridging. Prevent excessive cable strain. Maximum recommended wire size: 32/0.2mm 1.0mm² (18AWG).

4.2 Terminal Block Layout

Terminal block: spring cage connector type ZFKDS 1,5C-5,0 from Phoenix Contact (order number 1889259) or equivalent
 Conductor section: rigid: max 2,5 mm², flexible: max 1,5 mm²
 Used for: RTD or TC input, outputs, power supply



Terminal block: screw connector type MKDS 3/3 from Phoenix Contact (order number 1711039) or equivalent
 Conductor section: rigid: max 4 mm², flexible: max 2,5 mm²
 Used for: digital inputs



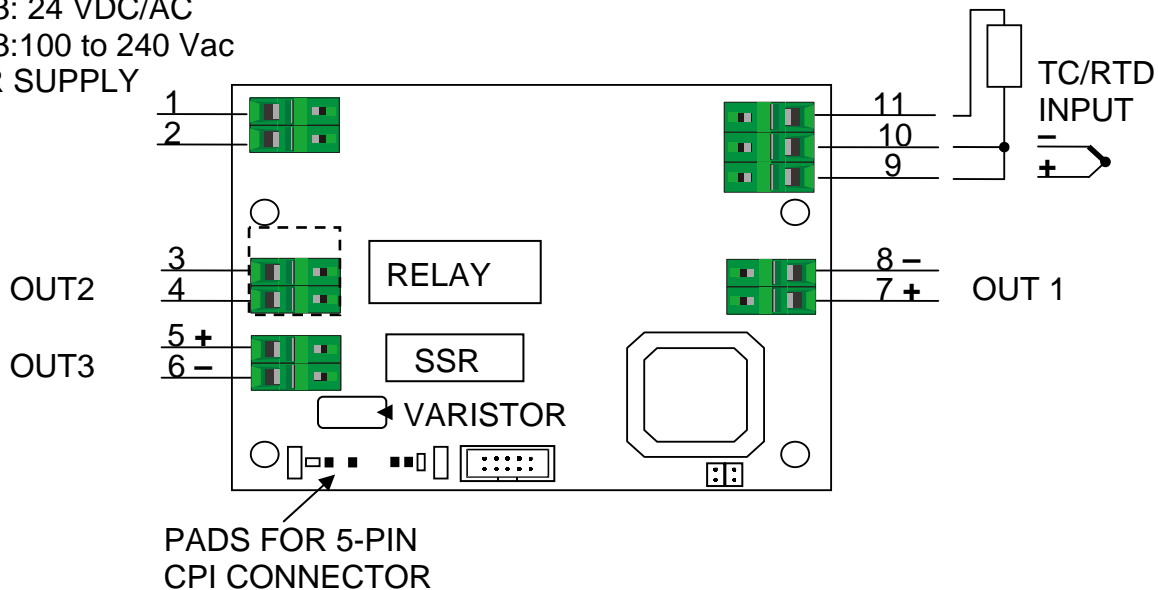
Terminal poles assignment:

- 3 for RTD or TC input
- 2 for OUT1, SSR drive output
- 2 for OUT2, relay output
- 2 for OUT3, SSR drive output
- 2 for OUT4, 0-10 V analog output
- 2 for power supply
- 4 for digital inputs (mounted on display board)

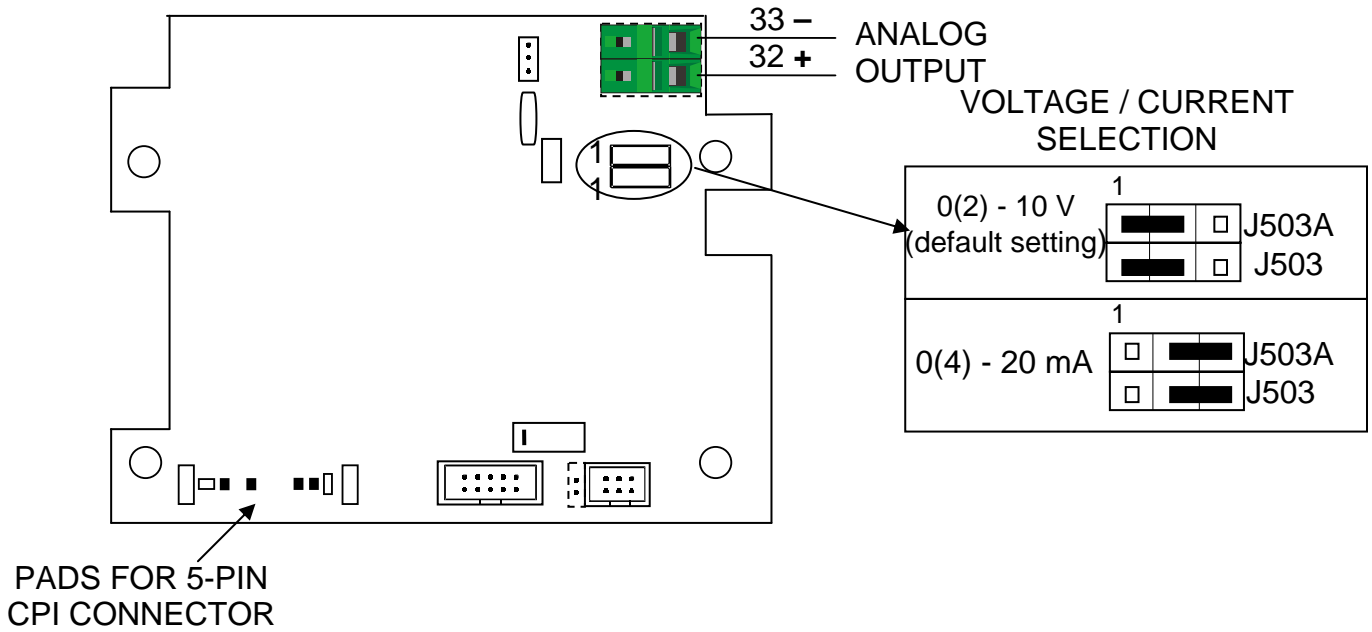
Communication module connector: 6 o 10 pins male connector (optional)

CONTROLLER BOARD

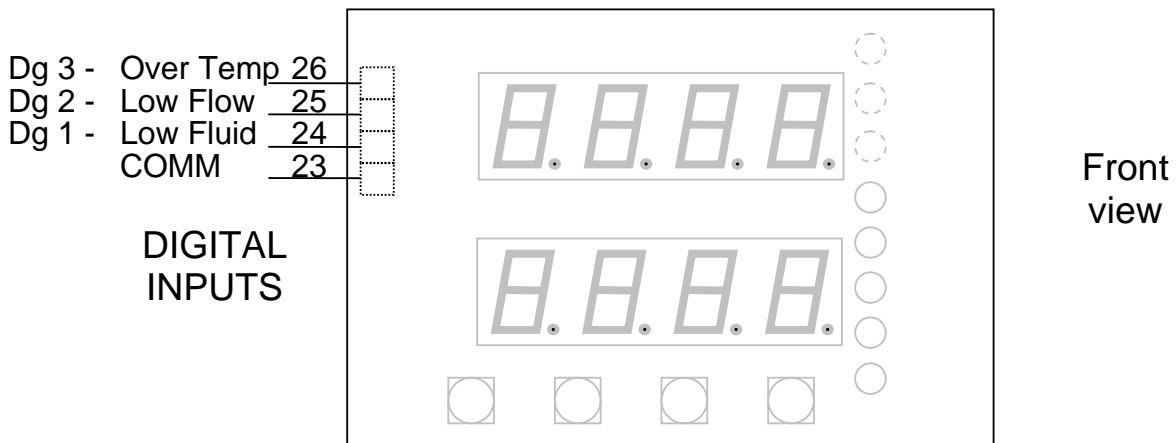
K2P S03: 24 VDC/AC
 K1P S03: 100 to 240 Vac
 POWER SUPPLY



Fan Speed Board (select models only)



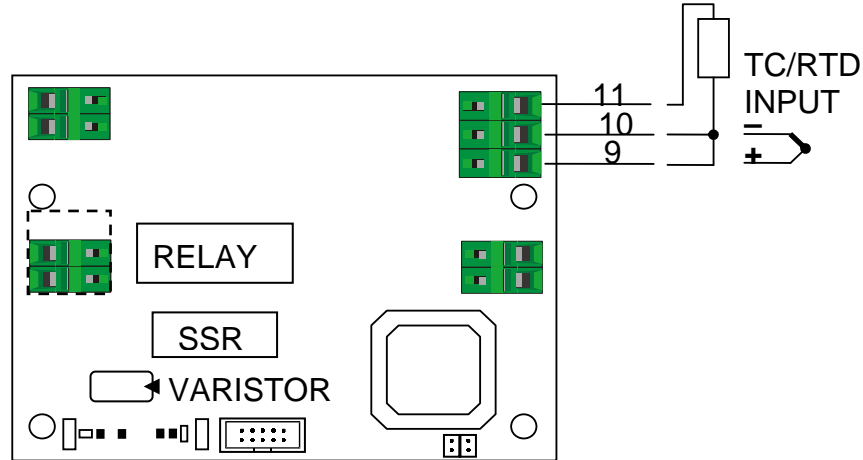
DISPLAY BOARD



4.3 Sensors

There are two types of sensors available for order with TC-4300.

The diagrams below show the sensors to TC-4300, note how the three wire RTD is connected to TC-4300.



Other than the two standard types of sensors, the TC-4300 accepts wide range of thermocouples and other inputs. Please refer to CAL3300.PDF on the included CD for more detail.

PV input: Thermocouple J, L, K, N, T, R, S or Resistance Temperature Detector (RTD) Pt100
 Only the input types required by "How To Order" are calibrated
 The input type is keyboard selectable
 The line must be not longer than 30 meters or leave the building

| Ranges: | TC type L (DIN 43710-1977) | -100 / 900 °C | -148 / 1652 °F |
|---------|----------------------------|----------------|----------------|
| | TC type J (IEC 584-1:1995) | -100 / 1000 °C | -148 / 1832 °F |
| | TC type K (IEC 584-1:1995) | -100 / 1370 °C | -148 / 2498 °F |
| | TC type N (IEC 584-1:1995) | -100 / 1400 °C | -148 / 2552 °F |
| | TC type T (IEC 584-1:1995) | -100 / 400 °C | -148 / 752 °F |
| | TC type R (IEC 584-1:1995) | -20 / 1760 °C | -4 / 3200 °F |
| | TC type S (IEC 584-1:1995) | -20 / 1760 °C | -4 / 3200 °F |
| | RTD type Pt100 (IEC 751) | -200 / 800 °C | -328 / 1472 °F |

Resolution: One decimal figure is available for temperature display and setting from -199.9 to 999.9 °C or °F. This auto-ranging feature can be disabled to remove the presentation of the decimal digit in the whole operating range. (see P11)

TC sensor current: 150 nA for over range indication (default) 75 nA for under range indication

RTD sensor current: 130 uA

Source impedance: 100 ohm max for TC input 20 ohm per wires for RTD input

Reference junction: Automatic compensation 0 / 50 °C

5 EXTERNAL RELAYS (applies only to the models with external relays)

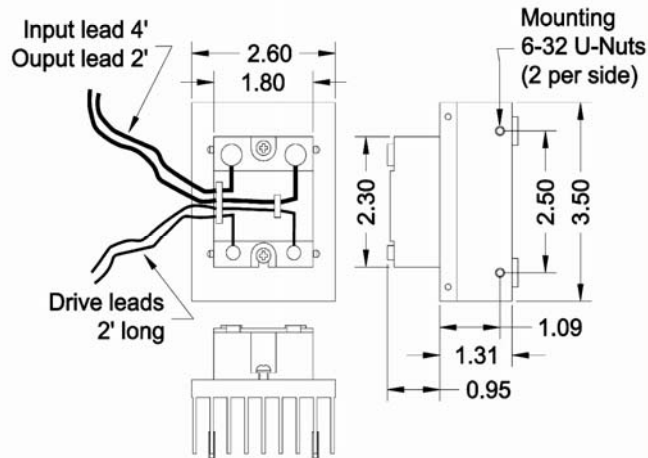
SOLID STATE RELAYS H-BRIDGE

RELAYS

Relays
H-Bridges

SINGLE RELAY

Single Relay

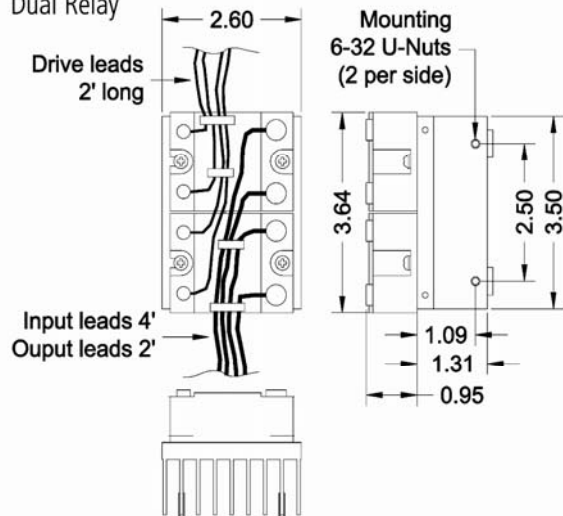


DESCRIPTION

PART

| | |
|--|-----------|
| Cool only, VAC switching, 120/240 VAC, 10 AMPS | RELAY - B |
| Cool only, VDC switching, 0-100 VDC, 12 AMPS | RELAY - C |
| Cool only, VDC switching, 0-100 VDC, 20 AMPS | RELAY - D |
| Cool only, VDC switching, 0-100 VDC, 40 AMPS | RELAY - E |

Dual Relay

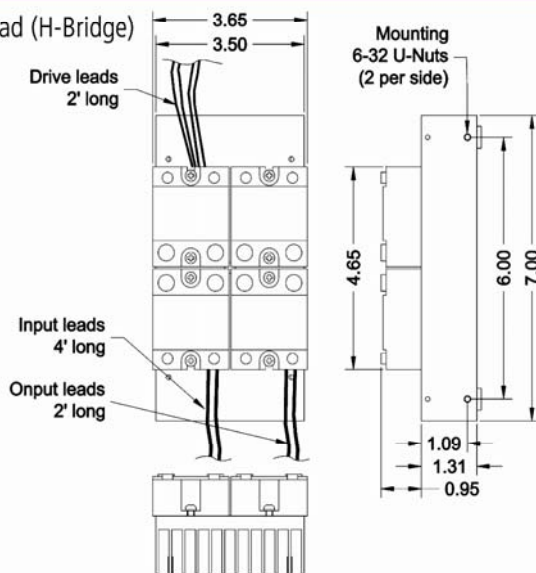


DESCRIPTION

PART

| | |
|---|-----------|
| Heat/Cool, VDC switching, 0-100 VDC, 12 AMPS | RELAY - F |
| Heat/Cool, VDC switching, 0-100 VDC, 20 AMPS | RELAY - G |
| Heat/Cool, VDC switching, 0-100 VDC, 40 AMPS | RELAY - H |
| Heat/Cool, Heat: 120/240 VAC, 10 AMPS Cool: 0-100 VDC, 12 AMPS | RELAY - I |
| Heat/Cool, Heat: 120/240 VAC, 10 AMPS Cool: 0-100 VDC, 20 AMPS | RELAY - J |
| Heat/Cool, Heat: 120/240 VAC, 10 AMPS Cool: 0-100 VDC, 40 AMPS | RELAY - K |
| Heat/Cool, Heat: 0-100 VDC, 12 AMPS Cool: 120/240 VAC, 10 AMPS | RELAY - L |
| Heat/Cool, Heat: 0-100 VDC, 20 AMPS Cool: 120/240 VAC, 10 AMPS | RELAY - M |
| Heat/Cool, Heat: 0-100 VDC, 40 AMPS Cool: 120/240 VAC, 10 AMPS | RELAY - N |
| Heat/Cool, VAC switching, 120/240 VAC, 10 AMPS | RELAY - R |

Quad (H-Bridge)



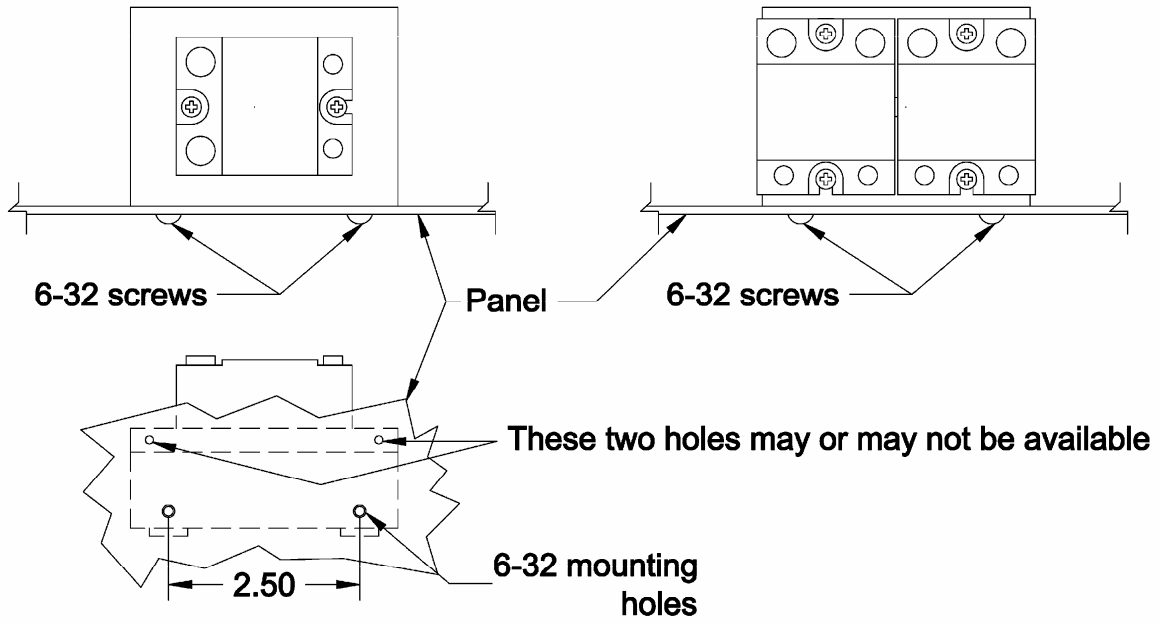
DESCRIPTION

PART

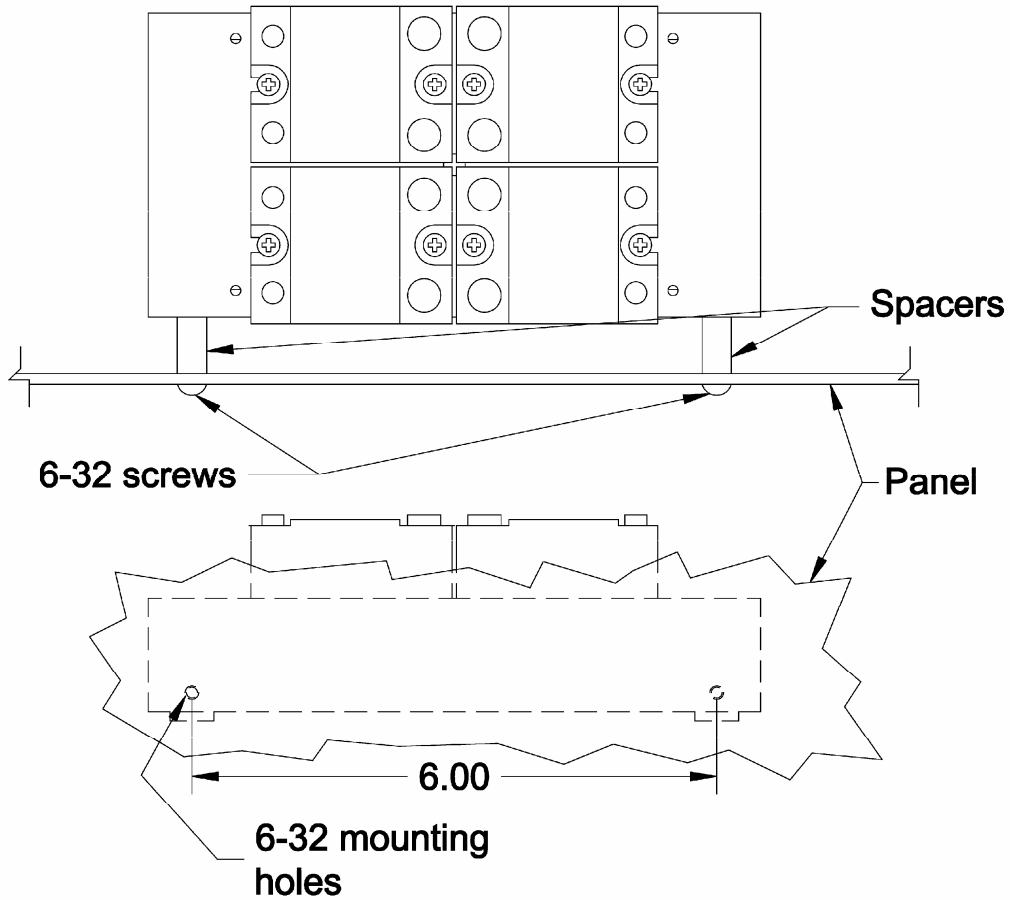
| | |
|---|-----------|
| Heat/Cool, reverse polarity, 0-100 VDC, 12 AMPS | RELAY - O |
| Heat/Cool, reverse polarity, 0-100 VDC, 20 AMPS | RELAY - P |
| Heat/Cool, reverse polarity, 0-100 VDC, 40 AMPS | RELAY - Q |

5.1 Relay Block Mounting

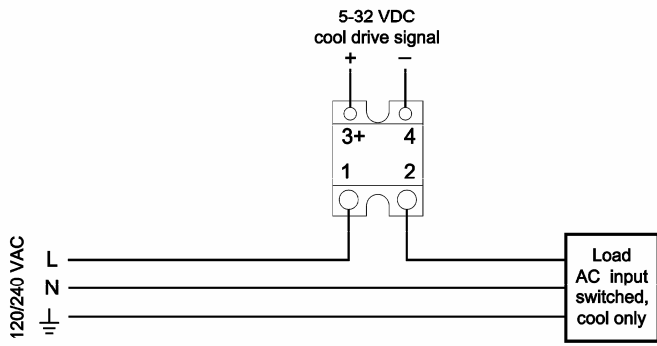
Single and dual relay blocks



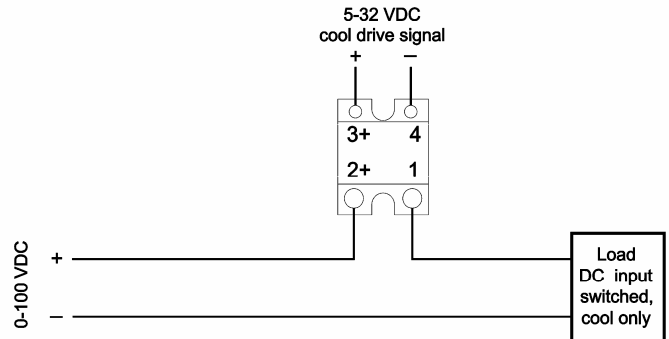
Quad relay block (H-Bridge)



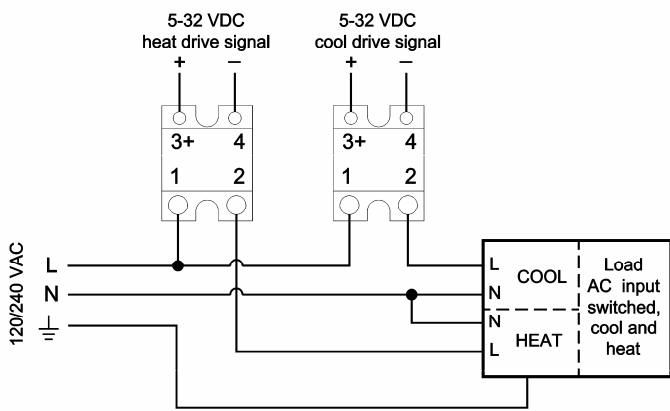
5.2 Relay Block Wiring



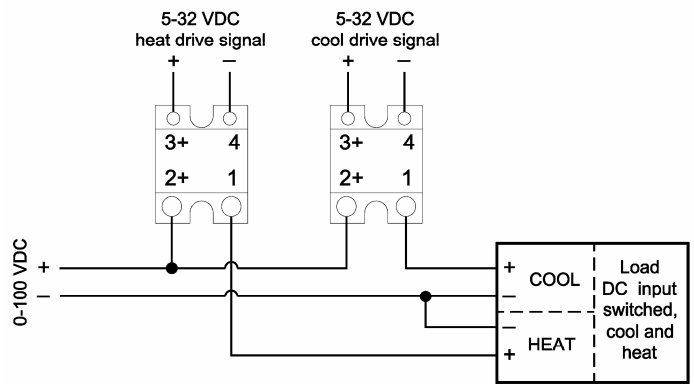
Typical wiring diagram for **RELAY-B**



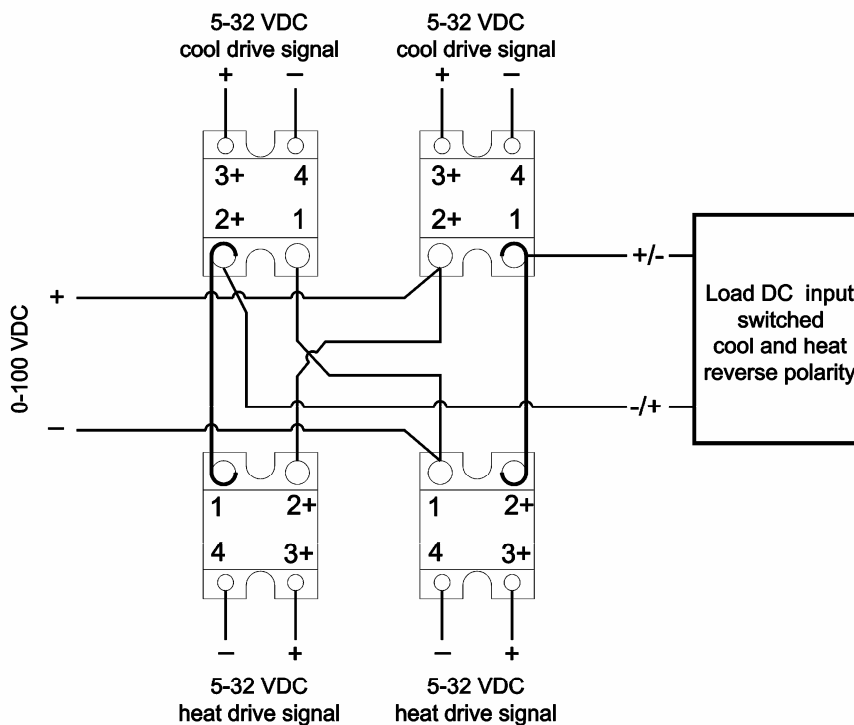
Typical wiring diagram for **RELAY-C, D, E**



Typical wiring diagram for **RELAY-R**



Typical wiring diagram for **RELAY-F, G, H**



Typical wiring diagram for **RELAY-O, P, Q**

6 RS-232 COMMUNICATIONS

This section is applicable only to the models with communications option.

6.1 EasyLog Software

The EasyLog software is included in the CD which is shipped with TC-4300 at no extra charge. It is a windows based GUI program that enables real time communication between a PC and the TC-4300 temperature controller.

For more detail please refer to EasyLog manual included in the CD.

6.2 iTools Engineering Studio

The iTools Engineering Studio is another free program that is included in the CD. The iTools software provides more in depth access to programs and program parameters of TC-4300.

Optional **OPC Server** is available for purchase, for more information please contact TECA Corporation.

6.3 MODBUS RTU Protocols

Reference MODBUS communication document in the CD.

7 WARRANTY

LIMITED WARRANTY

In the event a defect in material or workmanship is discovered in any of TECA's products within one year after the date they are delivered to Buyer, and if: (a) TECA is notified of the defect in writing by certified mail within 14 days of the date of discovery; (b) TECA may then either, at its sole discretion, inspect the product at Buyer's location, or require that the product be made available at Buyer's expense at TECA's premises for TECA's inspection within 14 days of the date of notification; and (c) the products are defective and the defects result from faulty materials and/or workmanship and not in any way from accident, misuse, misapplication, mishandling, modification, or alteration by the Buyer or the shipper, then TECA shall, at its sole option, repair or exchange defective products free of charge to Buyer, or credit to buyer the price of the defective products. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARE EXCLUDED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL TECA BE LIABLE FOR ANY CLAIM BASED UPON BREACH OF EXPRESS OR IMPLIED WARRANTY OR ANY OTHER DAMAGES WHETHER SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, LOST PROFITS, BUSINESS INTERRUPTION, OR LOSS OF BUSINESS OR CUSTOMER RELATIONSHIPS.

RETURNED GOODS, RESTOCKING CHARGES

In order to return merchandise for any reason (repair, replacement, or credit) a return authorization number must be issued by TECA. New merchandise may not be returned for credit beyond 60 days from shipment. Charges for incidental or other damages may also be made. All returned goods must be sent freight prepaid. A restocking charge of 15% will apply. On special equipment and custom modified equipment orders, additional incremental cancellation charges may be made.

