

Temperature Controllers



Model TEC-4400 1/4 DIN

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Design Features

- * 1/4 DIN size – 96 mm × 96 mm
- * Fuzzy modified PID heat and cool control
- * Universal input (TC, PT100, mA, V) with high accuracy 18-bit D-A
- * Countdown display
- * RS - 485 and Analog Retransmission Available
- * Micro USB Programming Port
- * Fast sampling rate (200 msec)
- * Manual control & auto-tune function
- * Wide range of alarm mode selection
- * Lockout protection
- * Bumpless transfer during failure mode
- * Soft-start ramp & dwell timer
- * Bright LCD display stabilized with digital filter
- * High performance with low cost

Agency Approvals:



RoHS, REACH, WEEE

Hardware Code: TEC-4400 - 1 2 3 4 5 6 7 8 9

A Part Number based on the hardware code and any software pre-programming will be issued at time of order.

Standard lead time is stock to 2 weeks.

Power Input BOX 1

- 4 = 90-250 VAC
- 5 = 11-40 VDC / 20-28 VAC

Output 1 BOX 2

- 1 = Relay: 2A / 240 VAC
- 2 = Pulse DC for SSR drive: 5 VDC (30 mA max)
- 3 = Isolated, 4-20 mA (default), 0-20 mA
- 5 = Isolated VDC, 0-10 scalable
- C = Pulse DC for SSR drive: 14 VDC (40 mA max)

Output 2 / Alarm 1 BOX 3

- 0 = None
- 1 = Relay: 2A / 240 VAC
- 2 = Pulse DC for SSR drive: 5 VDC (30 mA max)
- 3 = Isolated, 4-20 mA (default), 0
- 5 = Isolated, VDC, 0-10 scalable
- C = Pulse DC for SSR drive: 14 VDC (40 mA max)

Alarm 2 to 3 BOX 4

- 0 = None
- 1 = Alarm 2: Relay: 2A / 240 VAC
- 2 = Alarm 2 and 3: Relays: 2A / 240 VAC

Event Inputs BOX 5

- 0 = None
- 1 = 6 Event Inputs

Option 1 BOX 6

- 0 = None
- 1 = RS-485 Interface and Remote Setpoint

Option 2 BOX 7

- 0 = None
- 1 = 1 CT Input and Remote Setpoint
- 2 = 2 CT Inputs and Remote Setpoint

Option 3 BOX 8

- 0 = None
- 1 = Retransmit: 4-20 mA / 0-20 mA and Remote Setpoint
- 2 = Retransmit: 0-10 VDC and Remote Setpoint
- 3 = Alarm 4 Relay: 2A / 240 VAC and Remote Setpoint
- 4 = Alarm 4 Relay: 2A / 240 VAC, Retransmit: 4-20 mA / 0-20 mA and Remote Setpoint
- 5 = Alarm 4 Relay: 2A / 240 VAC, Retransmit: 0-10 VDC and Remote Setpoint

Option 4 BOX 9

- 0 = None
- 1 = Terminal Covers
- 2 = Ramp and Soak Firmware
- 3 = Terminal Covers and Ramp and Soak Firmware



Note: Detailed information on features common to digital microprocessor-based TEC temperature controls and the complete Table of Input Range and Accuracy can be found on page 13-46.

**Transformer for
Heater Break Alarm**
(0-50 Amp current)
Part Number: TEC99998
Specifications on page 13-47

Stock and Common Part Numbers

(All Stock Part Numbers Include Terminal Covers)
(Default Type "J" Thermocouple Input)

Part Number	Output 1	Out 2/ Alm 1	Alarm 2 & 3
TEC44001	Relay	None	None
TEC44002	Relay	Relay	None
TEC44003	Relay	Relay	(2) Relays
TEC44004	Pulse DC	None	None
TEC44005	Pulse DC	Relay	None
TEC44006	Pulse DC	Relay	(2) Relays
TEC44007	4-20mA	none	none
TEC44008	4-20mA	Relay	(2) Relays



Power Input

Standard: 90 to 250 VAC, 47-63 Hz, 12VA, 6W maximum
Optional: 11 to 40 VDC / 20 to 28 VAC, 47-63 Hz, 12VA, 6W maximum

Signal Input

Resolution: 18 Bits
Sampling Rate: 5 Times / Second (200msec)
Maximum Rating: -2VDC minimum, 12VDC maximum
Sensor Break Detection: Sensor open for Thermocouple and RTD inputs, sensor short for RTD input, below 1mA for 4-20mA input, below 0.25V for 1 - 5V input, not available for other inputs
Sensor break responding time: Within 4 seconds for Thermocouple and RTD inputs, 0.1 second for 4-20mA and 1 - 5V inputs

Remote Set Point Input

Type: Linear current, Linear voltage
Range: -3-27mA, -1.3-11.5V **Accuracy:** ±0.05 %
Input Impedance: Current: 2.5Ω, Voltage: 1.5MΩ
Resolution: 18 bits **Sampling Rate:** 1.66 times/second
Maximum Rating: 280mA maximum for Current Input, 12VDC maximum for Voltage Input
Sensor Break Detection: Below 1mA for 4-20mA input, below 0.25V for 1 - 5V input, not available for other inputs

Event Input

Number of Event Inputs: 6
Logic Low: -10V minimum, 0.8V maximum
Logic High: 2V minimum, 10V maximum

CT Input

CT type: CT98-1
Accuracy: ±2% of full scale reading, ± 1 digit maximum
Input Impedance: 294Ω
Measurement Range: 0-50A AC
Output of CT: 0-5V DC
CT Mounting: Wall (Screw) mount
Sampling Rate: 1 time/second

Output 1 /Output 2

Type: Relay, pulsed voltage, linear voltage and linear current
Relay Rating: 2A, 240V AC, 200000 life cycles for resistive load
Pulsed Voltage: Source voltage 5V, Current limiting resistance 66Ω
Linear Output Resolution: 15 Bits
Isolation Breakdown Voltage: 1000 V AC
Load Capacity of Linear Output: Linear current: 500Ω maximum, Linear voltage: 10KΩ minimum

Alarm

Relay Type: Form A
Maximum Rating: 2A, 240VAC, 200000 life cycles for resistive load
Alarm Functions: Dwell Timer, Deviation Low, Deviation High, Deviation Band Low, Deviation Band High, Process High, Process Low
Alarm Mode: Latching, Hold, Normal, Latching/Hold
Dwell Timer: 0.1-4553.6 minutes

Data Communications

Interface: RS-485 **Protocol:** Modbus RTU
Address: 1-247 **Baud Rate:** 2.8 - 115.2 Kbits/sec
Parity Bit: None, Even or Odd **Stop Bit:** 1 or 2 Bits
Data Length: 7 or 8 Bits **Communication Buffer:** 160 bytes

Analog Retransmission

Output Signal: 4-20 mA, 0-20 mA, 0-10V
Resolution: 15 Bits **Accuracy:** ±0.05% of span ± 0.0025% / °C
Load Resistance: 0-500Ω for current output, 10KΩ minimum for voltage output
Isolation Breakdown: 1000VAC minimum
Linear Output Ranges: 0-22.2mA (0-20mA / 4-20mA), 0-5.55V (0-5V, 1-5V), 0-11.1V (0-10V)

User Interface

Keypad: 4 Keys **Display Type:** 4 digit LCD display
No. of Display: 3
Upper Display Size: 0.98" (25mm)
Lower Display Size: 0.55" (14mm)

Programming Port

Interface: Micro USB
PC Communication Function: Automatic Setup, Calibration and Firmware Upgrade

Control Mode

Output 1: Reverse (Heating) or Direct (Cooling) Action
Output 2: PID cooling control, Cooling P band 50~300% of PB, Dead band -36.0 ~ 36.0 % of PB
ON-OFF: 0.1-90.0 (°F) hysteresis control (P band = 0)
P or PD: 0-100.0 % offset adjustment
PID: Fuzzy logic modified Proportional band 0.1 ~ 900.0°F, Integral time 0-3600 seconds, Derivative time 0-360.0 seconds
Cycle Time: 0.1-90.0 seconds
Manual Control: Heat (MV1) and Cool (MV2)
Failure Mode: Auto transfer to manual mode while sensor break or A-D Converter damage
Ramping Control: 0 to 900.0°F / Minute or 0 to 900.0°F / Hour Ramp Rate

Environmental and Physical Specifications

Operating Temperature: -10°C to 50°C
Storage Temperature: -40°C to 60°C
Humidity: 0 to 90 % RH (Non-Condensing)
Insulation Resistance: 20MΩ minimum (@500V DC)
Dielectric Strength: 2000V AC, 50/60 Hz for 1 Minute
Vibration Resistance: 10 to 55 Hz, 10m/s² for 2 Hours
Shock Resistance: 200 m / s² (20g)
Moldings: Flame retardant polycarbonate
Mounting: Panel
Dimensions W x H x D: 3-3/4 x 3-3/4 x 2-3/8" (96 x 96 x 59 mm)
Depth Behind Panel: 2" (50 mm)
Cut Out Dimensions: 3-5/8 x 3-5/8" (92 x 92 mm)
Weight: .64 lbs. (290 g)

Rear Terminal Connections

