

# Temperature Controllers

## Model TEC-6400 DIN Rail Mount



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#### Design Features

- \* DIN Rail Mount, 35 mm
- \* Fuzzy Logic PID Autotune heat and cool control
- \* Universal input, field configurable (Type J T/C default, 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 using NFPA/IEC standard colors
- \* High performance with low cost

#### Agency Approvals:



RoHS, REACH, WEEE

**Hardware Code:** TEC-6400 - 1 2 3 4 5

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 (40mA 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), 0-20 mA
- 5** = Isolated, VDC, 0-10 scalable
- C** = Pulse DC for SSR drive: 14 VDC (40mA max)

#### Option 1 BOX 4

- 0** = None
- 1** = RS-485 Interface
- 2** = 1 Event Input EI 1
- 3** = 1 CT Input (CT 1)

#### Option 2 BOX 5

- 0** = None
- 1** = Retransmit: 4-20mA / 0-20mA
- 2** = Retransmit: 0-10 VDC
- 3** = Alarm 2 Relay: 2A / 240 VAC
- 4** = 1 Event Input EI 2
- 5** = 1 CT Input (CT 2)



**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



### Power Input

**Standard:** 90-250 VAC, 47-63 Hz, 8VA, 4W maximum

**Optional:** 11-40 VDC / 20-8 VAC, 47-63 Hz, 8VA, 4W 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

### Event Input

**Number of Event Inputs:** 1

**Logic Low:** -10V minimum, 0.8V maximum

**Logic High:** 2V minimum, 10V maximum

### CT Input

**CT type:** TEC99998

**Accuracy:**  $\pm 2\%$  of full scale reading,  $\pm 1$  digit maximum

**Input Impedance:** 294 $\Omega$

**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 66 $\Omega$

**Linear Output Resolution:** 15 Bits

**Isolation Breakdown Voltage:** 1000 V AC

**Load Capacity of Linear Output:** Linear current: 500 $\Omega$  maximum, Linear voltage: 10K $\Omega$  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

**Address:** 1-247

**Parity Bit:** None, Even or Odd

**Data Length:** 7 or 8 Bits

**Protocol:** Modbus RTU

**Baud Rate:** 2.8 - 115.2 Kbits/sec

**Stop Bit:** 1 or 2 Bits

**Communication Buffer:** 160 bytes

### Analog Retransmission

**Output Signal:** 4-20 mA, 0-20 mA, 0-10V

**Resolution:** 15 Bits **Accuracy:**  $\pm 0.05\%$  of span  $\pm 0.0025\%$  /  $^{\circ}\text{C}$

**Load Resistance:** 0-500 $\Omega$  for current output, 10K $\Omega$  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:** 2

**Upper Display Size:** 0.31" (8mm)

**Lower Display Size:** 0.25" (6.5mm)

### 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 ( $^{\circ}\text{F}$ ) hysteresis control (P band = 0)

**P or PD:** 0-100.0 % offset adjustment

**PID:** Fuzzy logic modified Proportional band 0.1 ~ 900.0 $^{\circ}\text{F}$ , 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 $^{\circ}\text{F}$  / Minute or 0 to 900.0 $^{\circ}\text{F}$  / Hour Ramp Rate

### Environmental and Physical Specifications

**Operating Temperature:** -10 $^{\circ}\text{C}$  to 50 $^{\circ}\text{C}$

**Storage Temperature:** -40 $^{\circ}\text{C}$  to 60 $^{\circ}\text{C}$

**Humidity:** 0 to 90 % RH (Non-Condensing)

**Insulation Resistance:** 20M $\Omega$  minimum (@500V DC)

**Dielectric Strength:** 2000V AC, 50/60 Hz for 1 Minute

**Vibration Resistance:** 10 to 55 Hz, 10m/s<sup>2</sup> for 2 Hours

**Shock Resistance:** 200 m / s<sup>2</sup> (20g)

**Moldings:** Flame retardant polycarbonate

**Mounting:** DIN Rail, 35 mm

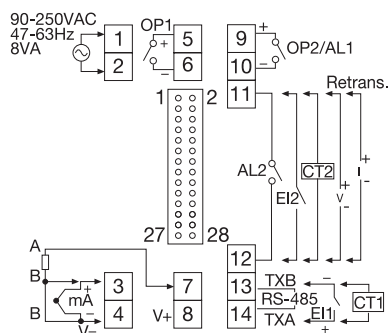
**Dimensions W x H x D:** 3-3/4 x 7/8 x 3-11/16" (96 x 22.5 x 83 mm)

**Depth Behind Panel (mm):** n/a

**Cut Out Dimensions (mm):** n/a

**Weight:** .35 lbs. (160 g)

### Rear Terminal Connections



### Stock and Common Part Numbers

(Default Type "J" Thermocouple Input)

| Part Number | Output 1 | Out 2/ Alm 1 | Option 2 |
|-------------|----------|--------------|----------|
| TEC80001    | Relay    | None         | None     |
| TEC80002    | Relay    | Relay        | None     |
| TEC80003    | Relay    | Relay        | Relay    |
| TEC80004    | Pulse DC | None         | None     |
| TEC80005    | Pulse DC | Relay        | None     |
| TEC80006    | Pulse DC | Relay        | Relay    |
| TEC80007    | 4-20mA   | None         | None     |
| TEC80008    | 4-20mA   | Relay        | Relay    |