Temperature Controllers

Model TEC-4400 1/4 DIN

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Design Features
- 1/4 DIN size – 96 mm × 96 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-4400 -

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)

Alarm 2 and 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)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Output 1</th>
<th>Out 2 / Alm 1</th>
<th>Alarm 2 &amp; 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC44001</td>
<td>Relay</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC44002</td>
<td>Relay</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC44003</td>
<td>Relay</td>
<td>(2) Relays</td>
<td>None</td>
</tr>
<tr>
<td>TEC44004</td>
<td>Pulse DC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC44005</td>
<td>Pulse DC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC44006</td>
<td>Pulse DC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC44007</td>
<td>4-20mA</td>
<td>None</td>
<td>(2) Relays</td>
</tr>
<tr>
<td>TEC44008</td>
<td>4-20mA</td>
<td>None</td>
<td>(2) Relays</td>
</tr>
</tbody>
</table>

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

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

### Remote Set Point Input
- **Type:** Linear current, Linear voltage
- **Range:** -3-27 mA, -1.3-11.5 V
- **Accuracy:** ±0.05 %
- **Input Impedance:** 294 Ω
- **Resolution:** 18 bits
- **Maximum Rating:** 280 mA maximum for Current Input, 12 VDC maximum for Voltage Input
- **Sensor Break Detection:** Below 1 mA for 4-20 mA input, below 0.25 V for 1-5 V input, not available for other inputs

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

### CT Input
- **Type:** TEC99998
- **Accuracy:** ±2 % of full scale reading, ±1 digit maximum
- **Input Impedance:** 294 Ω
- **Measurement Range:** 0-50 A AC
- **Output of CT:** 0-5 V DC
- **CT Mounting:** Wall (Screw) mount

### Output 1 / Output 2
- **Type:** Relay, pulsed voltage, linear voltage and linear current
- **Relay Rating:** 2 A, 240 V AC, 200000 life cycles for resistive load
- **Pulsed Voltage:** Source voltage 5 V, Current limiting resistance 66 Ω
- **Linear Output Resolution:** 15 Bits
- **Isolation Breakdown Voltage:** 1000 V AC
- **Load Capacity of Linear Output:** Linear current: 500 Ω maximum, Linear voltage: 10 kΩ minimum

### Alarm
- **Relay Type:** Form A
- **Maximum Rating:** 2 A, 240 VAC, 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, 0-10 V
- **Resolution:** 15 Bits
- **Accuracy:** ±0.05 % of span ±0.0025 % / °C
- **Load Resistance:** 500 Ω for current output, 10 kΩ minimum for voltage output
- **Isolation Breakdown:** 1000 VAC minimum
- **Linear Output Ranges:** 0-2.22 mA (0-20 mA / 4-20 mA), 0-5.55 V (0-5 V, 1-5 V), 0-11.1 V (0-10 V)

### 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" (14 mm)

### 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 °C ± 36.0 % of PB
- **ON-OFF:** 0.1-90.0 °F (°C) hysteresis control (P band = 0)
- **P or PD:** 0-100.0 % offset adjustment
- **PID:** Fuzzy logic modified Proportional band 0.1 °C ~ 900.0°F, Integral time ~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:** 20 MΩ minimum ( @ 500 V DC)
- **Dielectric Strength:** 2000 V AC, 50/60 Hz for 1 Minute
- **Vibration Resistance:** 10 to 55 Hz, 10 m/s² for 2 Hours
- **Shock Resistance:** 200 m / s² (20 g)
- **Moldings:** Flame retardant polycarbonate
- **Mounting:** Panel
- **Dimensions W × H × D:** 3-3/4 × 3-3/4 × 2-3/8" (96 × 96 × 59 mm)
- **Depth Behind Panel:** 2" (50 mm)
- **Cut Out Dimensions:** 3-5/8 × 3-5/8" (92 × 92 mm)
- **Weight:** 0.64 lbs. (290 g)

### Rear Terminal Connections

![Rear Terminal Connections Diagram](image-url)

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(800) 323-6859 • Email: sales@tempco.com