Model TEC-2400 1/32 DIN Temperature Controller

Design Features
- 1/32 DIN size – 24 mm × 48 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-2400 -

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

<table>
<thead>
<tr>
<th>BOX 1</th>
<th>4</th>
<th>90-250 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>11-40 VDC / 20-28 VAC</td>
<td></td>
</tr>
</tbody>
</table>

Output 1 — BOX 2

<table>
<thead>
<tr>
<th>BOX 2</th>
<th>1</th>
<th>Relay: 2A / 240 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Pulse DC for SSR drive: 5 VDC (30 mA max)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Isolated, 4-20 mA (default), 0-20 mA</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Isolated VDC, 0-10 scalable</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Pulse DC for SSR drive: 14 VDC (40mA max)</td>
<td></td>
</tr>
</tbody>
</table>

Output 2 / Alarm 1 — BOX 3

<table>
<thead>
<tr>
<th>BOX 3</th>
<th>0</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Relay: 2A / 240 VAC</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Pulse DC for SSR drive: 5 VDC (30 mA max)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Isolated, 4-20 mA (default), 0-20 mA</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Isolated VDC, 0-10 scalable</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Pulse DC for SSR drive: 14 VDC (40mA max)</td>
<td></td>
</tr>
</tbody>
</table>

Option 1 — BOX 4

<table>
<thead>
<tr>
<th>BOX 4</th>
<th>0</th>
<th>None</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>RS-485 Interface</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Event Input</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CT Input</td>
<td></td>
</tr>
</tbody>
</table>

Option 2 — BOX 5

<table>
<thead>
<tr>
<th>BOX 5</th>
<th>0</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Retransmit: 4-20mA / 0-20mA</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Retransmit: 0-10VDC</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Alarm 2 Relay: 2A / 240 VAC</td>
<td></td>
</tr>
</tbody>
</table>

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

View Product Inventory @ www.tempco.com
Temperature Controllers

Model TEC-2400 Specifications (1/32 DIN)

Power Input
- Standard: 90-250 VAC, 47-63 Hz, 8VA, 4W maximum
- Optional: 11-40 VDC / 20-28 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: Open sensor 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: ±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, 240VAC, 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
- 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: 0-50Ω for current output, 10KΩ minimum for voltage output
- Isolation Breakdown: 1000VAC minimum
- Integral Linearity Error: ±0.005% of span
- 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: 0.4" (10mm)
- Lower Display Size: 0.19" (4.8mm)

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 (% 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 × H × D: 15/16 × 1-7/8 × 3-13/16 (48 × 24 × 92 mm)
- Depth Behind Panel: 3-15/16" (84 mm)
- Cut Out Dimensions: 7/8 × 1-25/32" (22 × 45 mm)
- Weight: 0.26 lbs (160 g)

Stock and Common Part Numbers
- TEC-2400
- TEC-2401
- TEC-2402
- TEC-2403
- TEC-2404
- TEC-2405
- TEC-2406
- TEC-2407
- TEC-2408

Rear Terminal Connections

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Rev 1 (3-19)