Model TEC-8400 & Model TEC-8450 1/8 DIN Temperature Controllers

Design Features
- 1/8 DIN size – 48 mm × 96 mm, horizontal: 96 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

Hardware Code:

TEC-8400 -

TEC-8450 -

Output 1 BOX 2
- 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 (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), 0-20 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 & 3: Relays: 2A / 240 VAC

Option 1 BOX 6
- 0 = None
- 1 = RS-485 Interface & Remote Setpoint

Option 2 BOX 7
- 0 = None
- 1 = 1 CT Input & Remote Setpoint
- 2 = 2 CT Inputs & Remote Setpoint

Option 3 BOX 8
- 0 = None
- 1 = Retransmit: 4-20 mA / 0-20 mA & Remote Setpoint
- 2 = Retransmit: 0-10 VDC & Remote Setpoint
- 3 = Alarm 4 Relay: 2A / 240 VAC & Remote Setpoint
- 4 = Retransmit: 0-10 VDC & Remote Setpoint

Option 4 BOX 9
- 0 = None
- 1 = Terminal Covers
- 2 = 2 Programs each with 8 Segments of Ramp & Soak
- 3 = Terminal Covers and Ramp & 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.
**Power Input**

- **Standard:** 90-250 VAC, 47-63 Hz, 8VA, 4W maximum
- **Optional:** 11-40 VDC / 20-8 VAC, 47-63 Hz, 10VA, 5W maximum or 12VA, 6W maximum

**Signal Input**

- **Resolution:** 18 Bits
- **Sampling Rate:** 5 Times/Sec. (200msec)
- **Maximum Rating:** -2VDC minimum, 12VDC maximum
- **Normal Mode Rejection Ratio (NMRR):** ±55dB
- **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
- **Temperature Effect:** ±1.5µV / °C for voltage input, ±3.0µV / °C for current input
- **Sensor Break Detection:** Below 1mA for 4-20mA input, below 0.25V for 1-5V input, not available for other inputs

**Event Input**

- **No. of Event Inputs:** 6
- **Logic Low:** -10Vmin., 0.8V max.
- **Logic High:** 2V min., 10V max.

**CT Input**

- **CT Type:** TEC99998
- **Accuracy:** ±2% of full scale reading, ± 1 digit max.
- **Input Impedance:** 294Ω
- **Measurement Range:** 0-50A AC
- **Output of CT:** 0-5V DC
- **CT Mount:** 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 VAC
- **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 low, Process high
- **Alarm Mode:** Latching, Hold, Normal, Latching/Hold
- **Dwell Timer:** 0.1-4553.6 minutes

**Data Communication**

- **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

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**Temperature Controllers**

**Model TEC-8400 & -8450 Specifications**

**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
- **Integral Linearity Error:** ±0.005% of span
- **Linear Output Ranges:** 0-2.2mA (0-20mA/4-20mA), 0-5.55V (0-5V, 1-5V), 0-1.1V (0-10V)

**User Interface**

- **Keypad:** 4 Keys
- **Display Type:** 4 digit LCD display
- **No. of Display:** 3
- **Upper Display Size:** 0.7” (17.7mm)
- **Lower Display Size:** 0.4” (11.2mm)

**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 control cooling, Cooling P band 50~300% of PB, Dead band -360 ~ 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:** 0-900.0°F/Minute or 0-900.0°F/Hour Ramp Rate

**Profiler**

- **Availability:** Option
- **No. of Segments/Program:** 4 / 8 / 16

**Environmental and Physical Specifications**

- **Operating Temp.:** -10°C to 50°C
- **Storage Temp.:** -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:** 10-55 Hz, 10m/s2 for 2 hours
- **Shock Resistance:** 200 m/s2 (20g)
- **Moldings:** Flame retardant polycarbonate
- **Mounting:** Panel

**Dimensions H x W x D:**

<table>
<thead>
<tr>
<th>Model</th>
<th>TEC-8400</th>
<th>TEC-8450</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-3/4 × 1-7/8 × 2-3/8”</td>
<td>1-7/8 × 3-3/4 × 2-3/8”</td>
</tr>
<tr>
<td></td>
<td>(96 × 48 × 59 mm)</td>
<td>(48 × 96 × 59 mm)</td>
</tr>
</tbody>
</table>

**Depth Behind Panel:**

<table>
<thead>
<tr>
<th></th>
<th>2” (50 mm)</th>
<th>2” (50 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-5/8 × 1-25/32”</td>
<td>3-5/8 × 1-25/32”</td>
</tr>
<tr>
<td></td>
<td>(92 × 45 mm)</td>
<td>(92 × 45 mm)</td>
</tr>
</tbody>
</table>

**Weight:**

<table>
<thead>
<tr>
<th></th>
<th>.48 lbs. (220 g)</th>
</tr>
</thead>
</table>

**Stock and Common Part Numbers (8400)**

<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>TEC36001</td>
<td>Relay</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC36002</td>
<td>Relay</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC36003</td>
<td>Relay</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC36004</td>
<td>Pulse DC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC36005</td>
<td>Pulse DC</td>
<td>Relay</td>
<td>(2) Relays</td>
</tr>
<tr>
<td>TEC36006</td>
<td>Pulse DC</td>
<td>Relay</td>
<td>(2) Relays</td>
</tr>
<tr>
<td>TEC36007</td>
<td>4-20mA</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC36008</td>
<td>4-20mA</td>
<td>None</td>
<td>(2) Relays</td>
</tr>
</tbody>
</table>

**Note:** All Stock Part Numbers Include Terminal Covers

**Stock and Common Part Numbers (8450)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Output 1</th>
<th>Out 2/Alm 1</th>
<th>Option 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC37001</td>
<td>Relay</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC37002</td>
<td>Relay</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC37003</td>
<td>Pulse DC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC37004</td>
<td>Pulse DC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC37005</td>
<td>Pulse DC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC37006</td>
<td>Pulse DC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC37007</td>
<td>4-20mA</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>TEC37008</td>
<td>4-20mA</td>
<td>None</td>
<td>(2) Relays</td>
</tr>
</tbody>
</table>

**Terminal Covers**: (Default Type "J" Thermocouple Input)