Model TEC-2500 1/32 DIN Temperature Controller

**Output 1**
- **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
- **4**: Isolated, VDC, 1-5 (default), 0-5, 0-1
- **5**: Isolated, VDC, 0-10
- **6**: Triac-SSR output 1A / 240 VAC
- **C**: Pulse DC for SSR drive: 14 VDC (40 mA max)
- **9**: Other

**Output 2 / Alarm 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
- **4**: Isolated VDC, 1-5 (default), 0-5, 0-1
- **5**: Isolated VDC, 0-10
- **6**: Triac-SSR output 1A / 240 VAC
- **7**: Isolated 20V @ 25 mA DC, Output Power Supply
- **8**: Isolated 12V @ 40 mA DC, Output Power Supply
- **9**: Isolated 5V @ 80 mA DC, Output Power Supply
- **A**: Other

**Communications**
- **0**: None
- **1**: RS-485 Interface
- **2**: RS-232 Interface
- **3**: Retransmission 4-20 mA (default), 0-20 mA
- **4**: Retransmission 1-5 VDC (default), 0-5 VDC
- **5**: Retransmission 0-10 VDC
- **9**: Other

**Units**
- **0**: °F or °C
- **1**: °F on faceplate
- **2**: °C on faceplate
- **3**: None (process units)

**Agency Approvals**: RoHS, UL, CE

Hardware Code: TEC-2500-

1 2 3 4 5 6 7

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.**

**Transformer for Heater Break Alarm**

(0-50 Amp current)

Part Number: TEC99999

Specifications on page 13-47

**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: 90-264 VAC, 47-63 Hz, 15 VA, 7W maximum
Optional: 11-26 VAC / VDC, 15 VA, 7W maximum

Signal Input
Input 1
Resolution: 18 bits  Sampling Rate: 5 samples / second
Accuracy: ±24% of span typical
Maximum Rating: -2 VDC minimum, 12 VDC maximum (1 minute for mA input)
Temperature Effect: ±1.5 µV / °C for all inputs except mA input ±30 µV / °C for mA input
Sensor Lead Resistance Effect: T/C: 0.2µV/ohm
3-wire RTD: 2.6°C/Ohm of resistance difference of two leads
Burn-out Current: 200mA
Common Mode Rejection Ratio (CMRR): 120 dB
Normal Mode Rejection Ratio (NMR): 55 dB
Sensor Break Detection: Sensor open for TC, RTD and mA inputs; sensor short for RTD input; below 1 mA for 4-20 mA input; below 0.25V for 1-5V input; unavailable for other inputs
Sensor Break Response Time: Within 4 seconds for TC, RTD and mA inputs; 0.1 second for 4-20 mA and 1-5 V inputs

Input 2
Resolution: 18 bits
Sampling Rate: 1.66 times per second
Sensor Break Response Time: 0.5 second
Types: Current Transducer: 150 mA -3 to 27 mA V: -1.3 to 11.5 VDC
Event Input Functions: Select 2nd setpoint and/or PID, disable output 1 and/or output 2, remote lockout, reset alarm 1 and/or alarm 2

Output 1 or Output 2 / Alarm 2
Relay Rating: 240 VAC, 2 Amp
Pulsed Voltage: Source voltage 5V, Current limiting resistance 66Ω
Linear Output — Characteristics

<table>
<thead>
<tr>
<th>Type Tolerance</th>
<th>Zero Tolerance</th>
<th>Span Capacity</th>
<th>Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-20 mA</td>
<td>3.6-4.0 mA</td>
<td>20-21 mA</td>
<td>500Ω max</td>
</tr>
<tr>
<td>0-20 mA</td>
<td>0 mA</td>
<td>20-21 mA</td>
<td>500Ω max</td>
</tr>
<tr>
<td>0-5 VDC</td>
<td>0 VDC</td>
<td>5-5.25 VDC</td>
<td>10 KΩ min</td>
</tr>
<tr>
<td>1-5 VDC</td>
<td>0.9-1.0 VDC</td>
<td>5-5.25 VDC</td>
<td>10 KΩ min</td>
</tr>
<tr>
<td>0-10 VDC</td>
<td>0 VDC</td>
<td>10-10.5 VDC</td>
<td>10 KΩ min</td>
</tr>
</tbody>
</table>

Resolution: 15 bit analog to digital converter
Isolation Breakdown Voltage: 1000 VAC
Solid State Relay (Triac) Output
Rating: 1A / 240 VAC  Inrush Current: 20A for 1 cycle
Min. Load Current: 50 mA rms
Max. Off-state Leakage: 3 mA rms
Max. On-state Voltage: 1.5 VAC rms
Insulation Resistance: 1000 Megohms minimum at 500 VDC
Dielectric Strength: 2500 VAC for 1 minute

Alarm 1 / Alarm 2
Alarm 1: 5 VDC logic output
Alarm 2 Relay: Form A, (NO)  Maximum rating: 240 VAC, 2 Amp
Alarm Functions:
Dwell timer  PV1-PV2 High / Low Alarm
Deviation Band High / Low Alarm  Loop Break Alarm
PV2 High / Low Alarm  Sensor Break Alarm
Alarm Mode: Normal, Latching, Hold, Latching / Hold
Dwell Timer: 0 - 6553.5 minutes

Data Communications
Interface: RS-232 (1 unit), RS-485 (up to 247 units)
Protocol: Modbus Protocol – RTU mode

Control Mode
Output 1: Reverse (heating) or direct (cooling) action
Output 2: PID cooling control, cooling P band 1-255% of PB
On-Off: 0.1 - 100.0°F hysteresis control (P band = 0)
P or PD: 0 - 100.0% offset adjustment
PID: Fuzzy logic modified
Proportional band: 0.1 - 900°F (500°C)
Integral: 0 - 1000 seconds  Derivative: 0 - 360 seconds
Cycle Time: 0.1 - 100 seconds
Manual Control: Heat (MV1) and Cool (MV2)
Auto-tuning: Cold start and warm start
Failure Mode: Auto-transfer to manual mode with sensor break or A-D converter damage
Ramping Control: 0 - 900°F/min or 0 - 900°F/hr ramp rate
Power Limit: 0 - 100% for output 1 and output 2
Remote Setpoint: Programmable range for voltage or current input
Digital Filter: Time constant: settable from 0.2 to 60 seconds

Analog Retransmission
Analog Retransmission Functions: PV1, PV2, PV1-PV2, PV2-PV1, setpoint, MV1, MV2, PV-SV deviation value
Output Signal: 4-20 / 0-20 mA, 0-1, 0-5, 1-5, 0-10 VDC
Accuracy: ±0.05 % of span, ±0.0025 %/°C

Environmental and Physical
Operating Temperature: 14 to 122°F (-10 to 50°C)
Storage Temperature: -40 to 140°F (-40 to 50°C)
Humidity: 0 to 90% RH, non-condensing
Dielectric Strength: 2000 VAC, 50/60 Hz for 1 minute
Dimensions: 47.63 x 110.5 x 45 mm (1.88" x 4.35" x 1.75")
Panel Cutout: 3-7/8" (98 mm)
Rear Terminal Connections

Stock and Common Part Numbers
(Power Input: 90-264 VAC, w/ alarm 1, no data com)

Part Number  Signal Input  Out 1  Out 2 / Alarm 2  °F/°C
TEC02001  tc  relay  none  °F
TEC02002  tc  relay  none  °F
TEC02003  tc  4-20 mA  none  °F
TEC02004  tc  4-20 mA  none  °F
TEC02005  tc  DC pulse  none  °C
TEC02006  tc  relay  none  °F
TEC02007  tc  4-20 mA  none  °F
TEC02008  tc  DC pulse  none  °C

Model TEC-2500 Specifications (1/32 DIN)

Protective Class:
Front Panel: NEMA 4X / IP65
Housing and Terminals: IP 20

Part Number  Signal Input  Out 1  Out 2 / Alarm 2  °F/°C
TEC02001  tc  relay  none  °F
TEC02002  tc  relay  none  °F
TEC02003  tc  4-20 mA  none  °F
TEC02004  tc  4-20 mA  none  °F
TEC02005  tc  DC pulse  none  °C
TEC02006  tc  relay  none  °F
TEC02007  tc  4-20 mA  none  °F
TEC02008  tc  DC pulse  none  °C

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