Model TEC-920 1/16 DIN Temperature Controllers

Model TEC-920 1/16 DIN Temperature Controller

Design Features
✶ 1/16 DIN size – 48 mm × 48 mm
✶ Fuzzy Logic PID Autotune heat & cool control
✶ Short panel depth – only 3-3/8” (86 mm) required
✶ Universal input, field configurable (Type J T/C default, PT100, mA, V) with high accuracy 18-bit D-A
✶ Highly versatile – 6 types of inputs available
✶ Output 2 can be programmed as output or alarm
✶ Universal input power – 90-250 VAC or 11-26 VAC/VDC
✶ Highly accurate universal input with 18 bit Analog to digital converter
✶ Bumpless transfer to manual mode during sensor failure
✶ Wide variety of alarm mode selections
✶ Optional RS-485 communications interface
✶ Bright 0.40” (10 mm) LED display
✶ High performance at a very low price

Agency Approvals:

Hardware Code: TEC-920-

Output 2 / Alarm 1

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 = RS-485 Data Interface
8 = Isolated 20V @ 25 mA DC, Output Power Supply
A = Isolated 12V @ 40 mA DC, Output Power Supply
9 = Isolated 5V @ 80 mA DC, Output Power Supply
C = Pulse DC for SSR drive: 14 VDC (40 mA max)
B = Other

Power Input

4 = 90-250 VAC
5 = 11-26 VAC / VDC
9 = Other

Signal Input— Universal, can be programmed in the field for item 5 or 6
5 = Thermocouple: *J, K, T, E, B, R, S, N, L
0-60mV
6 = RTD: *PT100 DIN, PT100 JIS
7 = 0-1 VDC
8 = *0-5, 1-5 VDC
A = 0-10 VDC
B = *4-20, 0-20 mA
9 = Other * indicates default value

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.

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
- Standard: 90-250 VAC, 47-63 Hz, 10 VA, 5W maximum
- Optional: 11-26 VAC / VDC, 10 VA, 5W maximum

Signal Input
- 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 ±3.0 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 (NMRK): 55 dB
- Sensor Break Detection: Sensor open for TC, RTD and mV 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 mV inputs; 0.1 second for 4-20 mA and 1-5 V inputs

Output 1 / Output 2
- Relay Rating: 240 VAC, 2 Amp
- Pulsed Voltage: Source voltage 5V, Current limiting resistance 66Ω

<table>
<thead>
<tr>
<th>Type</th>
<th>Linear Output — Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zero Tolerance</td>
</tr>
<tr>
<td>4-20 mA</td>
<td>3.6-4.0 mA</td>
</tr>
<tr>
<td>0-20 mA</td>
<td>0 mA</td>
</tr>
<tr>
<td>0-5 VDC</td>
<td>0 VDC</td>
</tr>
<tr>
<td>1-5 VDC</td>
<td>0.9-1.0 VDC</td>
</tr>
<tr>
<td>0-10 VDC</td>
<td>0 VDC</td>
</tr>
</tbody>
</table>

- Resolution: 15 bit analog to digital converter
- Output Regulation: 0.02% for full load change
- Output Settling Time: 0.1 sec. (stable to 99.9%)
- Isolation Breakdown Voltage: 1000 VAC
- Temperature Effect: ±0.01% of span /°C

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

Output 2 / Alarm 1 — Programmable
- Alarm 1 Relay: Form A, (NO)
  - Maximum rating: 240 VAC, 2 Amp
- Alarm Functions:
  - Dwell timer
  - Deviation High / Low Alarm
  - Deviation Band High / Low Alarm
  - Process High / Low Alarm
  - Sensor Break Alarm
- Alarm Mode: Normal, Latching, Hold, Latching / Hold
- Dwell Timer: 0 - 4553.6 minutes

Interface: RS-485 (up to 247 units)
- Protocol: Modbus Protocol – RTU mode

Address: 1-247
- Baud Rate: 0.3 - 38.4 Kbits/sec
- Data Bits: 7 or 8 bits
- Parity Bit: None, Even or Odd
- Stop Bit: 1 or 2 bits
- Communication Buffer: 160 bytes

User Interface
- Single 4-digit LED Displays: 0.4" / 10 mm
- Keypad: 4 keys
- Programming Port: For automatic setup, calibration and testing

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 to 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°F
- Integral time: 0 - 1000 seconds
- Derivative time: 0 - 360 seconds
- Cycle Time: 0.1 - 90 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

Environmental and Physical
- Operating Temperature: 14 to 122°F (-10 to 50°C)
- Storage Temperature: -40 to 140°F (-40 to 60°C)
- Humidity: 0 to 90% RH, non-condensing
- Dielectric Strength: 2000 VAC, 50/60 Hz for 1 minute
- Dimensions: 1-7/8 × 45 mm) H × 1-25/32 × 45 mm) W × 3-3/4× (48 × 48 × 94 mm) H × W × D
- Panel Cutout: 1-25/32 × 1-25/32 × 45.45 mm) H × W × D
- Weight: 0.31 lb. (140 grams)

Approval Standards
- Safety: UL61010C-1, CSA C22.2 No. 24-93, EN61010-1 (IEC1010-1)
- EMC: EN61326
- Protective Class: Front Panel: IP30
  - Housing and Terminals: IP 20

Stock and Common Part Numbers
(Power Input: 90-250 VAC)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Signal Input</th>
<th>Out 1</th>
<th>Out 2</th>
<th>Alarm 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC15001</td>
<td>tc</td>
<td>relay</td>
<td>none</td>
<td></td>
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<tr>
<td>TEC15002</td>
<td>tc</td>
<td>relay</td>
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<tr>
<td>TEC15003</td>
<td>4-20 mA</td>
<td>relay</td>
<td>none</td>
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<tr>
<td>TEC15004</td>
<td>tc</td>
<td>DC pulse</td>
<td>none</td>
<td></td>
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<tr>
<td>TEC15005</td>
<td>RTD</td>
<td>relay</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>TEC15006</td>
<td>RTD</td>
<td>DC pulse</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>TEC15007</td>
<td>RTD</td>
<td>DC pulse</td>
<td>relay</td>
<td></td>
</tr>
</tbody>
</table>

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Rear Terminal Connections

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