**Model TEC-7100 3/16 DIN Temperature Controller**

**Design Features**
- **3/16 DIN size** – 72 mm × 72 mm
- **Fuzzy Logic PID heat and cool control**
- **PID Control** – Auto-tuning on cold or warm start
- **Short panel depth** – only 2-9/16” (65 mm) required
- **Universal programmable sensor input**
- **Highly versatile** – 6 types of inputs available
- **Output 2 can be used for cooling function**
- **Universal input power** – 90-250 VAC or 11-26 VAC/VDC
- **Optional NEMA 4X/IP65 front panel**
- **Bumpless transfer to manual mode during sensor failure**
- **Wide variety of alarm mode selections**
- **Optional RS-485 communications interface**
- **Bright 0.40” (10 mm) red LED process display**
- **0.31” (8 mm) green LED setpoint display**
- **High performance at a low price**

**Power Input**

<table>
<thead>
<tr>
<th>Box</th>
<th>Power Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>90-250 VAC</td>
</tr>
<tr>
<td>5</td>
<td>11-26 VAC / VDC</td>
</tr>
<tr>
<td>9</td>
<td>Other</td>
</tr>
</tbody>
</table>

**Hardware Code:** TEC-7100-

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.**

**Alarm**

<table>
<thead>
<tr>
<th>Box</th>
<th>Alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>Relay: 2A / 240 VAC, SPDT</td>
</tr>
<tr>
<td>9</td>
<td>Other</td>
</tr>
</tbody>
</table>

**Communication**

<table>
<thead>
<tr>
<th>Box</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>RS-485 Interface</td>
</tr>
<tr>
<td>3</td>
<td>Retransmission 4-20 mA (default), 0-20 mA</td>
</tr>
<tr>
<td>4</td>
<td>Retransmission 1-5 VDC (default), 0-5 VDC</td>
</tr>
<tr>
<td>5</td>
<td>Retransmission 0-10 VDC</td>
</tr>
<tr>
<td>9</td>
<td>Other</td>
</tr>
</tbody>
</table>

**NEMA 4X / IP65**

<table>
<thead>
<tr>
<th>Box</th>
<th>NEMA 4X / IP65</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>1</td>
<td>Yes</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.

View Product Inventory @ www.tempco.com
### Model TEC-7100 Specifications (3/16 DIN)

#### 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: 3-wire RTD: 2.6°C/ohm
- Sensor Lead Resistance Effect: TC: 0.2µV/ohm
- RTD: 2.6°C/ohm
- Burn-out Current: 3-wire RTD: 2.6°C/ohm
- Sensor Lead Resistance Effect: TC: 0.2µV/ohm
- RTD: 2.6°C/ohm

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

#### Linear Output — Characteristics

<table>
<thead>
<tr>
<th>Type</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
- Output Regulation: 0.02% for full load change
- Output Setting 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

#### Approval Standards
- Safety Standard: UL61010C-1
- CSA C22.2 No. 24-93
- EN61010-1 (IEC61010-1)

#### Protective Class:
- IP65 front panel with additional option
- IP 50 front panel without additional option, all indoor use
- IP 20 housing and terminals with protective cover

#### EMC: EN61326

### Stock and Common Part Numbers

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Signal Input</th>
<th>Out 1</th>
<th>Out 2</th>
<th>Alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC42001</td>
<td>tc relay</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>TEC42002</td>
<td>tc relay</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>TEC42003</td>
<td>tc 4-20 mA</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>TEC42004</td>
<td>tc DC pulse</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>TEC42005</td>
<td>RTD relay</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>TEC42006</td>
<td>RTD DC pulse</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>TEC42007</td>
<td>RTD DC pulse</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>TEC42008</td>
<td>RTD DC pulse</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
</tbody>
</table>

#### Rear Terminal Connections

#### Alarm 1 — Programmable
- Alarm 1 Relay: Form A, (NO)
- Alarm 1 Relay: Form A, (NC), 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

#### Data Communications
- Interface: RS-485 (up to 247 units)
- Protocol: Modbus Protocol – RTU mode
- Address: 1-255
- Baud Rate: 38400, 9600, 115200
- Data Bits: 7 or 8 bits
- Parity Bit: None, Even or Odd
- Stop Bit: 1 or 2 bits
- Sampling Rate: 5 samples / second
- Communication Buffer: 160 bytes

#### User Interface
- Dual 4-digit LED Display: 0.40" (10 mm) Red Process Display
  - 0.31" (8 mm) Green Setpoint Display
- Keypad: 4 keys
- Programmation 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
  - On-Off: 0.1 - 100.0°F hysteresis control (P band = 0)
  - P or PD: 0 - 90.0% 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: -40 to 140°F (-40 to 60°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: 2-27/32 x 2-27/32 x 3" (72 x 72 x 78 mm) H×W×D
- Panel Cutout: 2-11/16 × 2-11/16 (68 × 68 mm) H×W
- Weight: 0.44 lb. (200 grams)
- Model: TEC-7100
- A-D converter damage
- Heat (MV1) and Cool (MV2)
- 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
- Stock and Common Part Numbers

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