Common Design Features
- High Limit Control protects personnel, equipment and materials from over-temperature process conditions
- Universal programmable sensor input
- Versatile – 2 types of outputs available
- Highly accurate universal input with 18 bit analog to digital converter
- FM approved for electric & gas heat systems
- Bright 0.40” (10 mm) red LED process display
- Short panel depth required
- Output 2 can be programmed as output or input

TEC-410 Design Features
- Universal input power – 90-250 VAC or 11-26 VAC/VDC
- Event input for remote reset
- Two programmable outputs
- Optional RS-485 or RS-232 communications interface
- Optional retransmission
- Optional NEMA 4X/IP65 front face

TEC-910 Design Features
- Universal input power – 90-264 VAC or 11-26 VAC/VDC
- Optional event input for remote reset
- Optional RS-485 communications interface
- Output 2 can be programmed as output or input

Output

<table>
<thead>
<tr>
<th>Output 1</th>
<th>BOX 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Relay: 2A / 240 VAC, Form C</td>
</tr>
<tr>
<td>6</td>
<td>Triac-SSR output 1A / 240 VAC</td>
</tr>
<tr>
<td>9</td>
<td>Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output 2</th>
<th>BOX 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Relay: 2A / 240 VAC, Form C</td>
</tr>
<tr>
<td>6</td>
<td>Triac-SSR output 1A / 240 VAC</td>
</tr>
<tr>
<td>7</td>
<td>Isolated 20V @ 25mA DC, Output Power Supply</td>
</tr>
<tr>
<td>8</td>
<td>Isolated 12V @ 40mA DC, Output Power Supply</td>
</tr>
<tr>
<td>9</td>
<td>Isolated 5V @ 80mA DC, Output Power Supply</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communications</th>
<th>BOX 5 (TEC-410 only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>RS-485 Interface</td>
</tr>
<tr>
<td>2</td>
<td>RS-232 Interface</td>
</tr>
<tr>
<td>3</td>
<td>Retransmission 4-20mA, 0-20 mA</td>
</tr>
<tr>
<td>4</td>
<td>Retransmission 1-5 VDC, 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>

<table>
<thead>
<tr>
<th>Mounting Option</th>
<th>BOX 6 (TEC-410 only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Standard Mounting, IP50</td>
</tr>
<tr>
<td>1</td>
<td>NEMA 4X/IP65</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.
Temperature Controllers

Models TEC-410 & TEC-910 Specifications

Power Input
Standard: (TEC-410) 90-250 VAC, 47-63 Hz, 10 VA, 5W maximum (TEC-910) 90-264 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: 0.2 µV/ohm
Burn-out Current: 200nA
Common Mode Rejection Ratio (CMRR): 120 dB
Normal Mode Rejection Ratio (NMRR): 55 dB
Sensor Break Detection: Sensor open for TC and mV inputs; 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 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
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

VDC Voltage Supply (Output 2 only)
20 VDC, ±0.5V, at 25 mA
12 VDC, ±0.3V, at 40 mA
5 VDC, ±0.15V, at 80 mA

Event Input (standard TEC-410, optional TEC-910)
Resolution: 18 bits
Logic Low: -10 VDC minimum, 0.8 VDC maximum
Logic High: 2 VDC minimum, 10 VDC maximum
Functions: Remote reset, remote lockout

Limit Control
Modes available: High Limit, Low Limit and High/Low Limit

Data Communications
Interface: RS-485 (up to 247 units), RS-232, TEC-410 only
Protocol: Modbus Protocol – RTU mode
Address: 1-247  
Baud Rate: 0.3 - 38.4 Kbits/sec  
Data Bits: 8 bits  
Parity Bit: None, Even or Odd  
Stop Bit: 1 or 2 bits  
Communication Buffer: 50 bytes

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

Environmental and Physical
Operating Temperature: 14 to 122°F (-10 to 50°C)
Humidity: 0 to 90% RH, non-condensing
Dielectric Strength: 2000 VAC, 50/60 Hz for 1 minute

Dimensions:
TEC-410: 3-3/4” × 3-3/4” × 2-9/16” (96 × 96 × 65 mm) H × W × D
Depth behind panel: 2” (53 mm)
Panel Cutout: 3-21/32” × 3-21/32” (93 × 93 mm) H × W
Weight: 0.55 lb. (250 grams)

TEC-910: 1-7/8” × 1-7/8” × 3-3/4” (48 × 48 × 94 mm) H × W × D
Depth behind panel: 3-3/8” (86 mm)
Panel Cutout: 1-25/32” × 1-25/32” (45 × 45 mm) H × W
Weight: 0.33 lb. (150 grams)

Approvals Standards
Safety: FM Class 3545 (OCT. 1998)
CSA: C22.2 No. 24-93
EN61010-1 (IEC1010-1)
TEC-410: UL61010C-1  
TEC-910: UL873

Protective Class: IP30 front panel, indoor use, IP20 housing and terminals (with protective cover)

EMC: EN61326

TEC-410 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>
</tr>
</thead>
<tbody>
<tr>
<td>TEC51001</td>
<td>tc</td>
<td>relay</td>
<td>none</td>
</tr>
<tr>
<td>TEC51002</td>
<td>tc</td>
<td>relay</td>
<td>relay</td>
</tr>
<tr>
<td>TEC51005</td>
<td>tc</td>
<td>SSR-1A</td>
<td>none</td>
</tr>
<tr>
<td>TEC51006</td>
<td>tc</td>
<td>SSR-1A</td>
<td>relay</td>
</tr>
</tbody>
</table>

TEC-910 Stock and Common Part Numbers  
(Power Input: 90-264 VAC)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Signal Input</th>
<th>Out 1</th>
<th>Prog. I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC16001</td>
<td>tc</td>
<td>relay</td>
<td>event input</td>
</tr>
<tr>
<td>TEC16003</td>
<td>tc</td>
<td>SSR-1A</td>
<td>event input</td>
</tr>
<tr>
<td>TEC16004</td>
<td>tc</td>
<td>relay</td>
<td>none</td>
</tr>
<tr>
<td>TEC16006</td>
<td>tc</td>
<td>SSR-1A</td>
<td>none</td>
</tr>
</tbody>
</table>

NOTE: See page 13-46 for features common to TEC digital microprocessor-based temperature controls and the complete Table of Input Range and Accuracy.

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