Temperature Controllers

Model **TEC-9400** 1/16 DIN

Model TEC-9400 1/16 DIN Temperature Controller

Design Features

✱ *1/16 DIN size – 48 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*

Agency Approvals:

c **UL** us LISTED **CE**   *RoHS, REACH, WEEE*

File #: E244198

Hardware Code: TEC-9400 - ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

A Part Number based on the hardware code and any software pre-programming will be issued at time of order.

Power Input *BOX 1*

4 = 90-250 VAC
5 = 11-40 VDC / 20-28 VAC

Output 1 *BOX 2*

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 *BOX 4*

0 = None
1 = Relay: 2A / 240 VAC

Option 1 *BOX 5*

0 = None
1 = RS-485 Interface

Option 2 *BOX 6*

0 = None
1 = 2 Event Inputs
2 = 1 Event Input and 1 CT Input
3 = 2 CT Inputs

Option 3 *BOX 7*

0 = None
1 = Retransmit: 4-20 mA / 0-20 mA
2 = Retransmit: 0-10 VDC
3 = Relay: 2A / 240 VAC

Option 4 *BOX 8*

0 = None
1 = Terminal Cover

⚠️ *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.**

Transformer for Heater Break Alarm
(0-50 Amp current)
Part Number: TEC99998
Specifications on page 13-47

View Product Inventory @ www.tempco.com

Power Input
Standard: 90-250 VAC, 47-63 Hz; 10 VA, 5W max.
Optional: 11-40 VDC / 20 to 28 VAC, 47-63 Hz; 10 VA, 5W max.

Signal Input
Resolution: 18 bits
Sampling Rate: 5 Times / Second (200msec)
Maximum Rating: -2VDC minimum, 12VDC maximum
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 Response Time: Within 4 seconds for Thermocouple and RTD inputs, 0.1 second for 4-20mA and 1-5V inputs

Event Input
Number of Event Inputs: 2
Logic Low: -10V minimum, 0.8V maximum
Logic High: 2V minimum, 10V maximum

CT Input
CT Type: TEC99998
Accuracy: ±2% of Full Scale Reading, ± 1 digit maximum
Input Impedance: 294Ω
Measurement Range: 0-50A AC
Output of CT: 0-5V DC
CT Mounting: Wall (Screw) Mount
Sampling Rate: 1 Time/Second

Output 1 / Output 2
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 V AC
Load Capacity of Linear Output: Linear Current: 500Ω maximum, Linear Voltage: 10KΩ minimum

Alarm
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 High, Process Low
Alarm Mode: Latching, Hold, Normal, Latching/Hold
Dwell Timer: 0.1 to 4553.6 Minutes

Data Communications
Interface: RS-485
Address: 1-247
Parity Bit: None, Even or Odd
Data Length: 7 or 8 Bits
Protocol: Modbus RTU
Baud Rate: 2.8 - 115.2 Kbits/sec
Stop Bit: 1 or 2 Bits
Communication Buffer: 160 bytes

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: 0-22.2mA (0-20mA / 4-20mA), 0-5.55V (0-5V, 1-5V), 0-11.1V (0-10V)

User Interface
Keypad: 4 Keys   **Display Type**: 4 digit LCD display
No. of Display: 2
Upper Display Size: 0.58" (15mm)
Lower Display Size: 0.3" (7.8mm)

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 cooling control, Cooling P band 50~300% of PB, Dead band -36.0 ~ 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 to 900.0°F / Minute or 0 to 900.0°F / Hour Ramp Rate

Environmental and Physical Specifications
Operating Temperature: -10°C to 50°C
Storage Temperature: -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 to 55 Hz, 10m/s2 for 2 Hours
Shock Resistance: 200 m / s2 (20g)
Moldings: Flame retardant polycarbonate
Mounting: Panel
Dimensions H×W×D: 1-7/8 × 1-7/8 × 2-3/8" (48 × 48 × 59 mm)
Depth Behind Panel: 2" (50 mm)
Cut Out Dimensions: 1-25/32 × 1-25/32" (45 × 45 mm)
Weight: 6 oz (160 g)
IP50 for the front panel, IP20 for rear terminals and housing.
All indoor use.

Stock and Common Part Numbers
(All Stock Part Numbers Include Terminal Covers)
(Default Type "J" Thermocouple Input)

Part Number	Output 1	Out 2/ Alm 1	Option 1
TEC19001	Relay	None	None
TEC19002	Relay	Relay	None
TEC19003	Relay	Relay	Relay
TEC19004	Pulse DC	None	None
TEC19005	Pulse DC	Relay	None
TEC19006	Pulse DC	Relay	Relay
TEC19007	4-20mA	None	None
TEC19008	4-20mA	Relay	Relay

Rear Terminal Connections