Temperature Controllers

Model TEC-9400 1/16 DIN

www.tempco.com

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

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.
Standard lead time is stock to 2 weeks.

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: .35 lbs. (160 g)

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