

Tempco introduces the all **NEW** Next Generation **TEC** Controllers.

Our new, high-performance controllers are easy-to-use and feature an all new compact design. These Fuzzy Logic plus PID microprocessor-based process controllers incorporate bright, easy to read LCD displays, indicating process value and set point value.

The Fuzzy Logic technology enables a process to reach a predetermined set point in the shortest time, with minimal overshoot during power-up or external load disturbance. Consult Tempco with your Requirements.

1/32 DIN Digital Control



- TEC-2400** (\$117.00)
- * LCD Display
 - * 3 Programmable Outputs
 - * Ramp & Soak
 - * Heater Break Alarm
- See Page 13-3A

1/16 DIN Digital Control



- TEC-9400** (\$122.50)
- * LCD Display
 - * 3 Programmable Outputs
 - * Ramp & Soak
 - * Heater Break Alarm
- See Page 13-3C

1/8 DIN Digital Control



- TEC-8400** (\$146.25)
- * LCD Display
 - * 2 Programmable Outputs
 - * 3 Alarms
 - * Ramp & Soak
 - * Heater Break Alarm
- See Page 13-3E



- TEC-8450** (\$146.25)
- * LCD Display
 - * 2 Programmable Outputs
 - * 3 Alarms
 - * Ramp & Soak
 - * Heater Break Alarm
 - * Horizontal Orientation
- See Page 13-3E

3/16 DIN Digital Control



TEC-7400 (\$157.50)

- * LCD Display
 - * 2 Programmable Outputs
 - * 1 Alarm
 - * Ramp & Soak
 - * Heater Break Alarm
- See Page 13-3G



1/4 DIN Digital Control

TEC-4400 (\$168.00)

- * LCD Display
 - * 2 Programmable Outputs
 - * 3 Alarms
 - * Ramp & Soak
 - * Heater Break Alarm
- See Page 13-3I



DIN Rail Mount Digital Control

TEC-6400 (\$140.00)

- * LCD Display
 - * 3 Programmable Outputs
 - * Ramp & Soak
 - * Heater Break Alarm
- See Page 13-3K

Model TEC-2400 1/32 DIN Temperature Controller



Design Features

- * 1/32 DIN size – 24 mm × 48 mm
- * Fuzzy modified PID heat and cool control
- * Universal input (TC, 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 stabilized with digital filter
- * High performance with low cost

Agency Approvals:



RoHS, REACH, WEEE

Hardware Code: TEC-2400 - 1 2 3 4 5

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 (40mA 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 (40mA max)

Option 1 BOX 4

- 0** = None
- 1** = RS-485 Interface
- 2** = 1 Event Input
- 3** = 1 CT Input

Option 2 BOX 5

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



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



Power Input

Standard: 90-250 VAC, 47-63 Hz, 8VA, 4W maximum
Optional: 11-40 VDC / 20-28 VAC, 47-63 Hz, 8VA, 4W maximum

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 responding 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: 1
Logic Low: -10V minimum, 0.8V maximum
Logic High: 2V minimum, 10V maximum

CT Input

CT type: TEC99998
Accuracy: $\pm 2\%$ of full scale reading, ± 1 digit maximum
Input Impedance: 294 Ω
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

Type: Relay, pulsed voltage, linear voltage and linear current
Relay Rating: 2A, 240V AC, 200000 life cycles for resistive load
Pulsed Voltage: Source voltage 5V, Current limiting resistance 66 Ω
Linear Output Resolution: 15 Bits
Isolation Breakdown Voltage: 1000 V AC
Load Capacity of Linear Output: Linear current: 500 Ω maximum, Linear voltage: 10K Ω minimum

Alarm

Relay Type: Form A
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: 0.1-4553.6 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: $\pm 0.05\%$ of span $\pm 0.0025\%$ / $^{\circ}\text{C}$
Load Resistance: 0-500 Ω for current output, 10K Ω minimum for voltage output
Isolation Breakdown: 1000VAC minimum
Integral Linearity Error: $\pm 0.005\%$ 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: 0.4" (10mm)
Lower Display Size: 0.19" (4.8mm)

Programming Port

Interface: Micro USB
PC Communication Function: Automatic Setup, Calibration and Firmware Upgrade

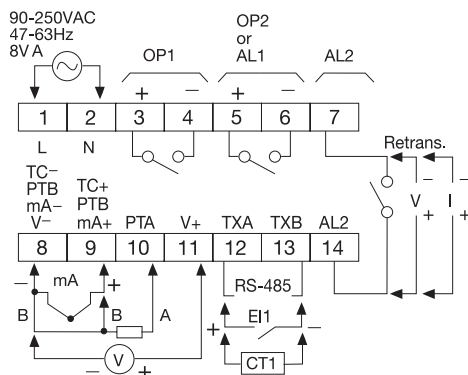
Control Mode

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 ($^{\circ}\text{F}$) hysteresis control (P band = 0)
P or PD: 0-100.0 % offset adjustment
PID: Fuzzy logic modified Proportional band 0.1 ~ 900.0 $^{\circ}\text{F}$, 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 $^{\circ}\text{F}$ / Minute or 0 to 900.0 $^{\circ}\text{F}$ / Hour Ramp Rate

Environmental and Physical Specifications

Operating Temperature: -10 $^{\circ}\text{C}$ to 50 $^{\circ}\text{C}$
Storage Temperature: -40 $^{\circ}\text{C}$ to 60 $^{\circ}\text{C}$
Humidity: 0 to 90 % RH (Non-Condensing)
Insulation Resistance: 20M Ω 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 W x H x D: 15/16 x 1-7/8 x 3-13/16" (48 x 24 x 92 mm)
Depth Behind Panel: 3-15/16" (84 mm)
Cut Out Dimensions: 7/8 x 1-25/32" (22 x 45 mm)
Weight: .26 lbs (160 g)

Rear Terminal Connections



Stock and Common Part Numbers (Default Type "J" Thermocouple Input)

Part Number	Output 1	Out 2/ Alm 1	Option 1
TEC04001	Relay	None	None
TEC04002	Relay	Relay	None
TEC04003	Relay	Relay	Event Input
TEC04004	Pulse DC	None	None
TEC04005	Pulse DC	Relay	None
TEC04006	Pulse DC	Relay	Event Input
TEC04007	4-20mA	None	None
TEC04008	4-20mA	Relay	Event Input



Model TEC-9400 1/16 DIN Temperature Controller



Design Features

- * 1/16 DIN size – 48 mm × 48 mm
- * Fuzzy modified PID heat and cool control
- * Universal input (TC, 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 stabilized with digital filter
- * High performance with low cost

Agency Approvals:



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

- 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



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: $\pm 2\%$ of Full Scale Reading, ± 1 digit maximum
Input Impedance: 294 Ω
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 66 Ω
Linear Output Resolution: 15 Bits
Isolation Breakdown Voltage: 1000 V AC
Load Capacity of Linear Output: Linear Current: 500 Ω maximum, Linear Voltage: 10K Ω 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 **Protocol:** Modbus RTU
Address: 1-247 **Baud Rate:** 2.8 - 115.2 Kbits/sec
Parity Bit: None, Even or Odd **Stop Bit:** 1 or 2 Bits
Data Length: 7 or 8 Bits **Communication Buffer:** 160 bytes

Analog Retransmission

Output Signal: 4-20 mA, 0-20 mA, 0-10V
Resolution: 15 Bits **Accuracy:** $\pm 0.05\%$ of span $\pm 0.0025\%$ / $^{\circ}\text{C}$
Load Resistance: 0-500 Ω for current output, 10K Ω minimum for voltage output
Isolation Breakdown: 1000VAC minimum
Integral Linearity Error: $\pm 0.005\%$ 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 ($^{\circ}\text{F}$) hysteresis control (P band = 0)
P or PD: 0-100.0 % offset adjustment
PID: Fuzzy logic modified Proportional band 0.1 ~ 900.0 $^{\circ}\text{F}$, 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 $^{\circ}\text{F}$ / Minute or 0 to 900.0 $^{\circ}\text{F}$ / Hour Ramp Rate

Environmental and Physical Specifications

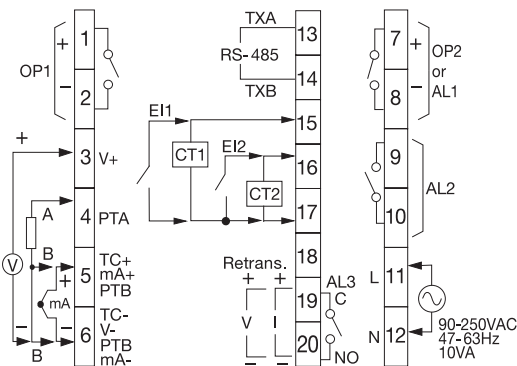
Operating Temperature: -10 $^{\circ}\text{C}$ to 50 $^{\circ}\text{C}$
Storage Temperature: -40 $^{\circ}\text{C}$ to 60 $^{\circ}\text{C}$
Humidity: 0 to 90 % RH (Non-Condensing)
Insulation Resistance: 20M Ω minimum (@500V DC)
Dielectric Strength: 2000V AC, 50/60 Hz for 1 Minute
Vibration Resistance: 10 to 55 Hz, 10m/s² for 2 Hours
Shock Resistance: 200 m / s² (20g)
Moldings: Flame retardant polycarbonate
Mounting: Panel
Dimensions H x W x D: 1-7/8 x 1-7/8 x 2-3/8" (48 x 48 x 59 mm)
Depth Behind Panel: 2" (50 mm)
Cut Out Dimensions: 1-25/32 x 1-25/32" (45 x 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



Temperature Controllers

Model TEC-8400 & TEC-8450 1/8 DIN



Model TEC-8400 & Model TEC-8450 1/8 DIN Temperature Controllers

Agency Approvals:



RoHS, REACH, WEEE



Design Features

- * 1/8 DIN size – 48 mm × 96 mm, horizontal: 96 mm × 48 mm
- * Fuzzy modified PID heat and cool control
- * Universal input (TC, 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 stabilized with digital filter
- * High performance with low cost

Hardware Code:



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 to 3 BOX 4

- 0 = None
- 1 = Alarm 2: Relay: 2A / 240 VAC
- 2 = Alarm 2 & 3: Relays: 2A / 240 VAC

Event Inputs BOX 5

- 0 = None
- 1 = 6 Event Inputs



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.

Option 1 BOX 6

- 0 = None
- 1 = RS-485 Interface & Remote Setpoint

Option 2 BOX 7

- 0 = None
- 1 = 1 CT Input & Remote Setpoint
- 2 = 2 CT Inputs & Remote Setpoint

Option 3 BOX 8

- 0 = None
- 1 = Retransmit: 4-20 mA / 0-20 mA & Remote Setpoint
- 2 = Retransmit: 0-10 VDC & Remote Setpoint
- 3 = Alarm 4 Relay: 2A / 240 VAC & Remote Setpoint
- 4 = Alarm 4 Relay: 2A / 240 VAC, Retransmit: 4-20 mA / 0-20 mA & Remote Setpoint
- 5 = Alarm 4 Relay: 2A / 240 VAC, Retransmit: 0-10 VDC & Remote Setpoint

Option 4 BOX 9

- 0 = None
- 1 = Terminal Covers
- 2 = 2 Programs each with 8 Segments of Ramp & Soak
- 3 = Terminal Covers and Ramp & Soak Firmware

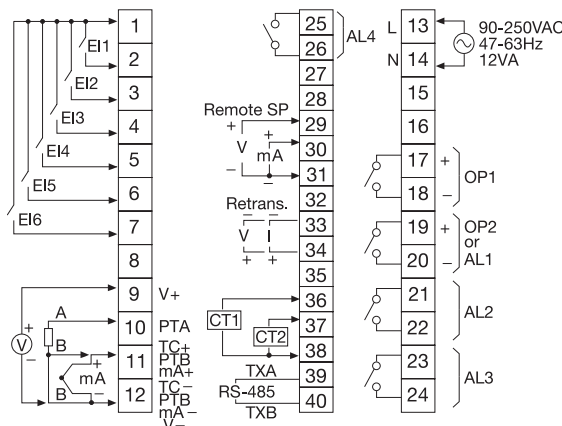
Transformer for Heater Break Alarm

(0-50 Amp current)

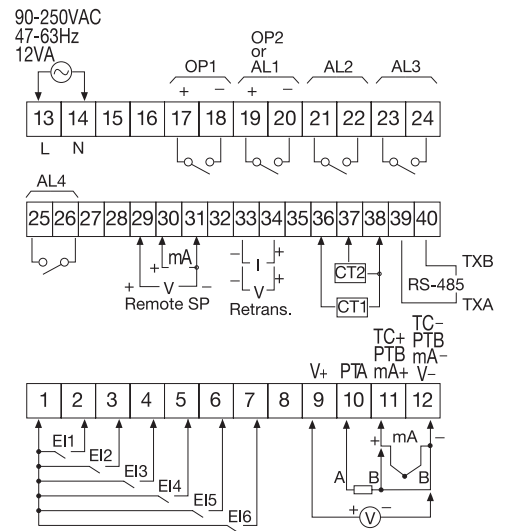
Part Number: TEC99998

Specifications on page 13-47

TEC-8400 Rear Terminal Connections



TEC-8450 Rear Terminal Connections





Power Input

Standard: 90-250 VAC, 47-63 Hz, 8VA, 4W maximum
Optional: 11-40 VDC / 20-8 VAC, 47-63 Hz, 10VA, 5W maximum
 or 12VA, 6W maximum

Signal Input

Resolution: 18 Bits **Sampling Rate:** 5 Times/Sec. (200msec)
Maximum Rating: -2VDC minimum, 12VDC maximum
Normal Mode Rejection Ratio (NMRR): 55dB
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 Responding Time: Within 4 seconds for thermocouple and RTD inputs, 0.1 second for 4-20mA and 1-5V inputs

Remote Set Point Input

Type: Linear current, Linear voltage **Range:** -3-27mA, -1.3-11.5V
Accuracy: ±0.05 % **Input Impedance:** Current: 2.5Ω, Voltage: 1.5MΩ
Resolution: 18 bits **Sampling Rate:** 1.66 times/second
Maximum Rating: 280mA maximum for current input, 12VDC maximum for voltage input
Temperature Effect: ±1.5μV / °C for voltage input, ±3.0μV / °C for current input
Sensor Break Detection: Below 1mA for 4-20mA input, below 0.25V for 1-5V input, not available for other inputs

Event Input

No. of Event Inputs: 6 **Logic Low:** -10Vmin., 0.8V max.
Logic High: 2V min., 10V max.

CT Input

CT Type: TEC99998
Accuracy: ±2% of full scale reading, ± 1 digit max.
Input Impedance: 294Ω **Measurement Range:** 0-50A AC
Output of CT: 0-5V DC **CT Mount:** Wall (Screw) mount
Sampling Rate: 1 time/second

Output 1 /Output 2

Type: Relay, pulsed voltage, linear voltage and linear current
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 VAC
Load Capacity of Linear Output: Linear current: 500Ω maximum, Linear voltage: 10KΩ minimum

Alarm

Relay Type: Form A
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: 0.1-4553.6 minutes

Data Communication

Interface: RS-485 **Protocol:** Modbus RTU
Address: 1-247 **Baudrate:** 2.8-115.2 KBPS
Parity Bit: None, Even or Odd **Stop Bit:** 1 or 2 bits
Data Length: 7 or 8 bits **Communication Buffer:** 160 bytes

Stock and Common Part Numbers (8400)

(Default Type "J" Thermocouple Input)

Part Number	Output 1	Out 2/ Alm 1	Alarm 2 & 3
TEC36001	Relay	None	None
TEC36002	Relay	Relay	None
TEC36003	Relay	Relay	(2) Relays
TEC36004	Pulse DC	None	None
TEC36005	Pulse DC	Relay	None
TEC36006	Pulse DC	Relay	(2) Relays
TEC36007	4-20mA	None	None
TEC36008	4-20mA	Relay	(2) Relays



Note: All Stock Part Numbers Include Terminal Covers

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: 0-2.2mA (0-20mA/4-20mA), 0-5.55V (0-5V, 1-5V), 0-1.1V (0-10V)

User Interface

Keypad: 4 Keys **Display Type:** 4 digit LCD display
No. of Display: 3 **Upper Display Size:** 0.7" (17.7mm)
Lower Display Size: 0.4" (11.2mm)

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: 0-900.0°F/Minute or 0-900.0°F/Hour Ramp Rate

Profiler

Availability: Option **No. of Segments/ Program:** 4 / 8 / 16

Environmental and Physical Specifications

Operating Temp.: -10°C to 50°C **Storage Temp:** -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: 10-55 Hz, 10m/s² for 2 hours
Shock Resistance: 200 m/s² (20g)
Moldings: Flame retardant polycarbonate
Mounting: Panel

	TEC-8400	TEC-8450
Dimensions H x W x D:	3-3/4 x 1-7/8 x 2-3/8" (96 x 48 x 59 mm)	1-7/8 x 3-3/4 x 2-3/8" (48 x 96 x 59 mm)
Depth Behind Panel:	2" (50 mm)	2" (50 mm)
Panel Cutout:	1-25/32 x 3-5/8" (45 x 92 mm)	3-5/8 x 1-25/32" (92 x 45 mm)
Weight:	.48 lbs. (220 g)	.48 lbs. (220 g)

Stock and Common Part Numbers (8450)

(Default Type "J" Thermocouple Input)

Part Number	Output 1	Out 2/ Alm 1	Option 1
TEC37001	Relay	None	None
TEC37002	Relay	Relay	None
TEC37003	Relay	Relay	(2) Relays
TEC37004	Pulse DC	None	None
TEC37005	Pulse DC	Relay	None
TEC37006	Pulse DC	Relay	(2) Relays
TEC37007	4-20mA	None	None
TEC37008	4-20mA	Relay	(2) Relays

Temperature Controllers



Model TEC-7400 3/16 DIN

Model TEC-7400 3/16 DIN Temperature Controller



Design Features

- * 3/16 DIN size – 72 mm × 72 mm
- * Fuzzy modified PID heat and cool control
- * Universal input (TC, 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 stabilized with digital filter
- * High performance with low cost

Agency Approvals:



RoHS, REACH, WEEE

Hardware Code: TEC-7400 - 1 2 3 4 5 6 7 8 9

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 to 3 BOX 4

- 0 = None
- 1 = Alarm 2: Relay: 2A / 240 VAC
- 2 = Alarm 2 and 3: Relays: 2A / 240 VAC

Event Inputs BOX 5

- 0 = None
- 1 = 6 Event Inputs

Option 1 BOX 6

- 0 = None
- 1 = RS-485 Interface & Remote Setpoint

Option 2 BOX 7

- 0 = None
- 1 = 1 CT Input and Remote Setpoint
- 2 = 2 CT Inputs and Remote Setpoint

Option 3 BOX 8

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

Option 4 BOX 9

- 0 = None
- 1 = Terminal Covers
- 2 = Ramp and Soak Firmware
- 3 = Terminal Covers and Ramp and Soak Firmware



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

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
TEC45001	Relay	None	None
TEC45002	Relay	Relay	None
TEC45003	Relay	Relay	(2) Relays
TEC45004	Pulse DC	None	None
TEC45005	Pulse DC	Relay	None
TEC45006	Pulse DC	Relay	(2) Relays
TEC45007	4-20mA	none	none
TEC45008	4-20mA	Relay	(2) Relays



Power Input

Standard: 90-250 VAC, 47-63 Hz, 12VA, 6W maximum
Optional: 11-40 VDC / 20-8 VAC, 47-63 Hz, 12VA, 6W maximum

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 responding time: Within 4 seconds for thermocouple and RTD inputs, 0.1 second for 4-20mA and 1-5V inputs

Remote Set Point Input

Type: Linear current, Linear voltage
Range: -3-27mA, -1.3-11.5V **Accuracy:** ±0.05 %
Input Impedance: Current: 2.5Ω, Voltage: 1.5MΩ
Resolution: 18 bits **Sampling Rate:** 1.66 times/second
Maximum Rating: 280mA maximum for current input, 12VDC maximum for voltage input
Temperature Effect: ±1.5μV / °C for voltage input, ±3.0μV / °C for current input
Sensor Break Detection: Below 1mA for 4-20mA input, below 0.25V for 1-5V input, not available for other 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

Type: Relay, pulsed voltage, linear voltage and linear current
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

Relay Type: Form A
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: 0.1-4553.6 minutes

Data Communications

Interface: RS-485 **Protocol:** Modbus RTU
Address: 1-247 **Baud Rate:** 2.8 - 115.2 Kbits/sec
Parity Bit: None, Even or Odd **Stop Bit:** 1 or 2 Bits
Data Length: 7 or 8 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: 3 **Upper Display Size:** 0.58" (15mm)
Lower Display Size: 0.32" (8.3mm)

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

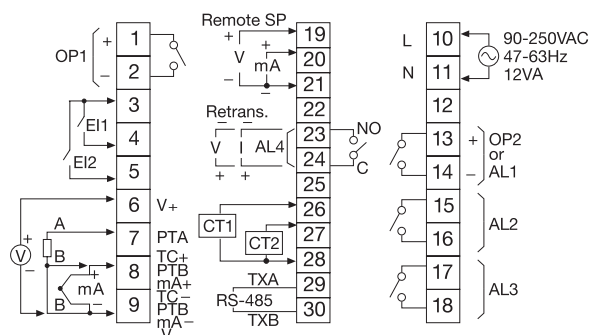
Profiler

Availability: Option **No. of Segments / Program:** 4 / 8 / 16

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 W × H × D: 2-27/32 × 2-27/32 × 2-3/8" (72 × 72 × 59 mm)
Depth Behind Panel: 2" (50 mm)
Cut Out Dimensions: 2-11/16 × 2-11/16" (68 × 68 mm)
Weight: .41 lbs. (190 g)

Rear Terminal Connections



Temperature Controllers



Model ~~TEC-4400~~ 1/4 DIN

Model TEC-4400 1/4 DIN Temperature Controller



Design Features

- * 1/4 DIN size – 96 mm × 96 mm
- * Fuzzy modified PID heat and cool control
- * Universal input (TC, 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 stabilized with digital filter
- * High performance with low cost

Agency Approvals:



RoHS, REACH, WEEE

Hardware Code: TEC-4400 - 1 2 3 4 5 6 7 8 9

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
- 5 = Isolated, VDC, 0-10 scalable
- C = Pulse DC for SSR drive: 14 VDC (40 mA max)

Alarm 2 to 3 BOX 4

- 0 = None
- 1 = Alarm 2: Relay: 2A / 240 VAC
- 2 = Alarm 2 and 3: Relays: 2A / 240 VAC

Event Inputs BOX 5

- 0 = None
- 1 = 6 Event Inputs

Option 1 BOX 6

- 0 = None
- 1 = RS-485 Interface and Remote Setpoint

Option 2 BOX 7

- 0 = None
- 1 = 1 CT Input and Remote Setpoint
- 2 = 2 CT Inputs and Remote Setpoint

Option 3 BOX 8

- 0 = None
- 1 = Retransmit: 4-20 mA / 0-20 mA and Remote Setpoint
- 2 = Retransmit: 0-10 VDC and Remote Setpoint
- 3 = Alarm 4 Relay: 2A / 240 VAC and Remote Setpoint
- 4 = Alarm 4 Relay: 2A / 240 VAC, Retransmit: 4-20 mA / 0-20 mA and Remote Setpoint
- 5 = Alarm 4 Relay: 2A / 240 VAC, Retransmit: 0-10 VDC and Remote Setpoint

Option 4 BOX 9

- 0 = None
- 1 = Terminal Covers
- 2 = Ramp and Soak Firmware
- 3 = Terminal Covers and Ramp and Soak Firmware



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

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	Alarm 2 & 3
TEC44001	Relay	None	None
TEC44002	Relay	Relay	None
TEC44003	Relay	Relay	(2) Relays
TEC44004	Pulse DC	None	None
TEC44005	Pulse DC	Relay	None
TEC44006	Pulse DC	Relay	(2) Relays
TEC44007	4-20mA	none	none
TEC44008	4-20mA	Relay	(2) Relays



Power Input

Standard: 90 to 250 VAC, 47–63 Hz, 12VA, 6W maximum
Optional: 11 to 40 VDC / 20 to 28 VAC, 47–63 Hz, 12VA, 6W maximum

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 responding time: Within 4 seconds for Thermocouple and RTD inputs, 0.1 second for 4-20mA and 1 - 5V inputs

Remote Set Point Input

Type: Linear current, Linear voltage
Range: -3-27mA, -1.3-11.5V **Accuracy:** ±0.05 %
Input Impedance: Current: 2.5Ω, Voltage: 1.5MΩ
Resolution: 18 bits **Sampling Rate:** 1.66 times/second
Maximum Rating: 280mA maximum for Current Input, 12VDC maximum for Voltage Input
Sensor Break Detection: Below 1mA for 4-20mA input, below 0.25V for 1 - 5V input, not available for other inputs

Event Input

Number of Event Inputs: 6
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

Type: Relay, pulsed voltage, linear voltage and linear current
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

Relay Type: Form A
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: 0.1-4553.6 minutes

Data Communications

Interface: RS-485 **Protocol:** Modbus RTU
Address: 1-247 **Baud Rate:** 2.8 - 115.2 Kbits/sec
Parity Bit: None, Even or Odd **Stop Bit:** 1 or 2 Bits
Data Length: 7 or 8 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
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: 3
Upper Display Size: 0.98" (25mm)
Lower Display Size: 0.55" (14mm)

Programming Port

Interface: Micro USB
PC Communication Function: Automatic Setup, Calibration and Firmware Upgrade

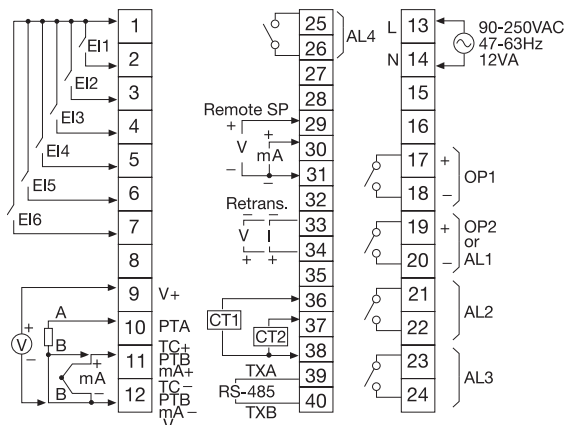
Control Mode

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 W × H × D: 3-3/4 × 3-3/4 × 2-3/8" (96 × 96 × 59 mm)
Depth Behind Panel: 2" (50 mm)
Cut Out Dimensions: 3-5/8 × 3-5/8" (92 × 92 mm)
Weight: .64 lbs. (290 g)

Rear Terminal Connections





Model TEC-6400 DIN Rail Mount Temperature Controller



Design Features

- * DIN Rail Mount, 35 mm
- * Fuzzy modified PID heat and cool control
- * Universal input (TC, 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 stabilized with digital filter
- * High performance with low cost

Agency Approvals:



RoHS, REACH, WEEE

Hardware Code: TEC-6400 -

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 (40mA 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 (40mA max)

Option 1 BOX 4

- 0** = None
- 1** = RS-485 Interface
- 2** = 1 Event Input EI 1
- 3** = 1 CT Input (CT 1)

Option 2 BOX 5

- 0** = None
- 1** = Retransmit: 4-20mA / 0-20mA
- 2** = Retransmit: 0-10 VDC
- 3** = Alarm 2 Relay: 2A / 240 VAC
- 4** = 1 Event Input EI 2
- 5** = 1 CT Input (CT 2)



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



Power Input

Standard: 90-250 VAC, 47-63 Hz, 8VA, 4W maximum
Optional: 11-40 VDC / 20-8 VAC, 47-63 Hz, 8VA, 4W maximum

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 responding 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: 1
Logic Low: -10V minimum, 0.8V maximum
Logic High: 2V minimum, 10V maximum

CT Input

CT type: CT98-1
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

Type: Relay, pulsed voltage, linear voltage and linear current
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

Relay Type: Form A
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: 0.1-4553.6 minutes

Data Communications

Interface: RS-485
Protocol: Modbus RTU
Address: 1-247
Baud Rate: 2.8 - 115.2 Kbits/sec
Parity Bit: None, Even or Odd
Stop Bit: 1 or 2 Bits
Data Length: 7 or 8 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
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: 0.31" (8mm)
Lower Display Size: 0.25" (6.5mm)

Programming Port

Interface: Micro USB
PC Communication Function: Automatic Setup, Calibration and Firmware Upgrade

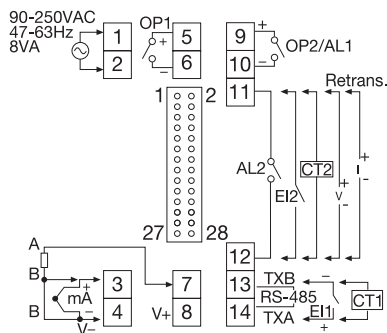
Control Mode

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: DIN Rail, 35 mm
Dimensions W × H × D: 3-3/4 × 7/8 × 3-11/16" (96 × 22.5 × 83 mm)
Depth Behind Panel (mm): n/a
Cut Out Dimensions (mm): n/a
Weight: .35 lbs. (160 g)

Rear Terminal Connections



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 2
TEC80001	Relay	None	None
TEC80002	Relay	Relay	None
TEC80003	Relay	Relay	Relay
TEC80004	Pulse DC	None	None
TEC80005	Pulse DC	Relay	None
TEC80006	Pulse DC	Relay	Relay
TEC80007	4-20mA	none	none
TEC80008	4-20mA	Relay	Relay