

Temperature Controllers



Model TEC-8400 & -8450 1/8 DIN

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

Agency Approvals:



- * RoHS
- * REACH
- * WEEE

File #: E244198



Design Features

- * 1/8 DIN size – 48 mm × 96 mm, horizontal: 96 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

Hardware Code:



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 and 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

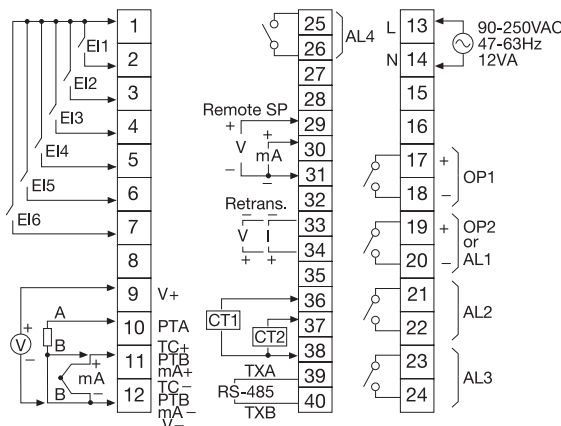
Transformer for Heater Break Alarm

(0-50 Amp current)

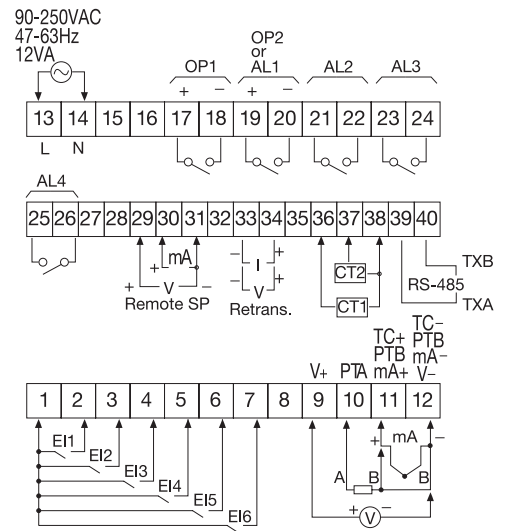
Part Number: TEC99998

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:	8 oz (220 g)	8 oz (220 g)

IP50 for the front panel, IP20 for rear terminals and housing.
All indoor use.

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