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

Agency Approvals:

c UL us LISTED

File #: E244198

CE

- *RoHS*
- *REACH*
- *WEEE*

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:

TEC-8400 -
TEC-8450 -

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.

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

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

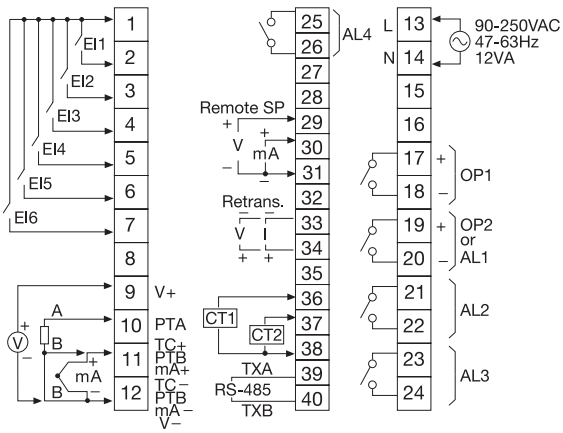
Option 4 *BOX 9*

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

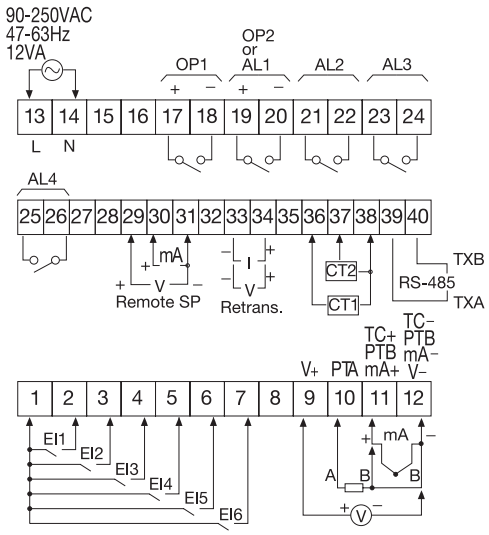
Transformer for Heater Break Alarm
(0-50 Amp current)
Part Number: TEC99998
Specifications on page 13-47

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.**

TEC-8400 Rear Terminal Connections



TEC-8450 Rear Terminal Connections



TEMPCO Since 1972

Model TEC-8400 & -8450 Specifications

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

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×W×D:	3-3/4 × 1-7/8 × 2-3/8" (96 × 48 × 59 mm)	1-7/8 × 3-3/4 × 2-3/8" (48 × 96 × 59 mm)
Depth Behind Panel:	2" (50 mm)	2" (50 mm)
Panel Cutout:	1-25/32 × 3-5/8" (45 × 92 mm)	3-5/8 × 1-25/32" (92 × 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 (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*

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