

Temperature Controllers



Model TEC-4300 1/4 DIN

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Configurable for 5 Programmable Outputs!

Agency Approvals



Design Features

- * 1/4 DIN size – 96 mm × 96 mm
- * Fuzzy Logic PID heat and cool control
- * PID Control – Auto-tuning on cold or warm start
- * Short panel depth – only 2" (53 mm) required
- * Universal programmable sensor input
- * Heater Break Alarm using 0-50 Amp current transformer
- * Output 2 can be programmed as cooling output only
- * 2 optional alarms – programmable NO or NC relay
- * Wide variety of alarm mode selections
- * Bumpless transfer to manual mode during sensor failure
- * Universal input power, 90-264 VAC or 11-26 VAC/VDC

- * Power limiter output
- * RS-485 and RS-232 data communications interface
- * Bright 0.55" (14 mm) red LED process display 0.40" (10 mm) and green LED setpoint display stabilized with a digital filter if required
- * Fast input sample rate (5 samples/second)
- * Differential control
- * "Soft-Start" ramp and dwell timer
- * Analog input for remote setpoint and current transformer
- * Event input for changing functions and setpoint
- * Hardware lockout plus remote lockout protection
- * Loop break alarm
- * Analog retransmission
- * DC power supply outputs
- * Tempco's most highly featured 1/4 DIN control

Hardware Code: TEC-4300-



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 = 90-264 VAC
- 5 = 11-26 VAC / VDC
- 9 = Other

Signal Input – Universal, can be programmed in the field BOX 2

- 1 = Input 1 - Universal input (factory default = tc type J)
Thermocouple: J, K, T, E, B, R, S, N, L
RTD: PT100 DIN, PT100 JIS
Current: 4-20 mA, 0-20 mA
Voltage: VDC, 0-1, 0-5, 1-5, 0-10
- Input 2 - CT: 0 - 50A AC current Transformer (factory default)
Linear Input: 0-1V, 0-5V, 1-5V, 0-10V, 0-20mA, 4-20mA
- Input 3 - Event Input
- 9 = Other

Output 1 BOX 3

- 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
- 4 = Isolated, VDC, 1-5 (default), 0-5, 0-1
- 5 = Isolated, VDC, 0-10
- 6 = Triac-SSR output 1A / 240 VAC
- C = Pulse DC for SSR drive: 14 VDC (40 mA max)
- 9 = Other

Output 2 BOX 4

- 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
- 4 = Isolated VDC, 1-5 (default), 0-5, 0-1
- 5 = Isolated VDC, 0-10
- 6 = Triac-SSR output 1A / 240 VAC
- 7 = Isolated 20V @ 25 mA DC, Output Power Supply
- 8 = Isolated 12V @ 40 mA DC, Output Power Supply
- 9 = Isolated 5V @ 80 mA DC, Output Power Supply
- C = Pulse DC for SSR drive: 14 VDC (40 mA max)
- A = Other

Alarm 1 BOX 5

- 0 = None
- 1 = Relay: 2A/240 VAC, SPDT
- 9 = Other

Alarm 2 BOX 6

- 0 = None
- 1 = Relay: 2A/240 VAC, SPDT
- 9 = Other

Communications BOX 7

- 0 = None
- 1 = RS-485 Interface
- 2 = RS-232 Interface
- 3 = Retransmission 4-20 mA (default), 0-20 mA
- 4 = Retransmission 1-5 VDC (default), 0-5 VDC
- 5 = Retransmission 0-10 VDC
- 9 = Other

Transformer for Heater Break Alarm
(0-50 Amp current)
Part Number: TEC99999
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.



Power Input

Standard: 90 - 264 VAC, 47-63 Hz, 15 VA, 7W maximum
Optional: 11 - 26 VAC / VDC, 15 VA, 7W maximum

Signal Input

Input 1

Resolution: 18 bits **Sampling Rate:** 5 samples / second
Accuracy: $\pm 0.24\%$ of span typical
Maximum Rating: -2 VDC minimum, 12 VDC maximum (1 minute for mA input)
Temperature Effect: $\pm 1.5 \mu\text{V} / ^\circ\text{C}$ for all inputs except mA input $\pm 3.0 \mu\text{V} / ^\circ\text{C}$ for mA input
Sensor Lead Resistance Effect: T/C: $0.2 \mu\text{V}/\text{ohm}$
 3-wire RTD: $2.6^\circ\text{C}/\text{ohm}$ of resistance difference of two leads
Burn-out Current: 200nA
Common Mode Rejection Ratio (CMRR): 120 dB
Normal Mode Rejection Ratio (NMRR): 55 dB
Sensor Break Detection: Sensor open for TC, RTD and mV inputs; sensor short for RTD input; below 1 mA for 4-20 mA input; below 0.25V for 1-5V input; unavailable for other inputs
Sensor Break Response Time: Within 4 seconds for TC, RTD and mV inputs; 0.1 second for 4-20 mA and 1-5 V inputs

Input 2

Resolution: 18 bits **Sampling Rate:** 1.66 times per second
Sensor Break Response Time: 0.5 second
Types: **Current Transducer:** 0 to 50 Amp
 mA: -3 to 27 mA **V:** -1.3 to 11.5 VDC

Input 3

Event Input Functions: Select 2nd setpoint, and/or PID, disable output 1 and/or output 2, remote lockout

Output 1 or Output 2

Relay Rating: 240 VAC, 2 Amp
Pulsed Voltage: Source voltage 5V, Current limiting resistance 66 Ω

Linear Output — Characteristics

Type	Tolerance	Zero Tolerance	Span Capacity	Load
4-20 mA	3.6-4.0 mA	20-21 mA	500 Ω max	
0-20 mA	0 mA	20-21 mA	500 Ω max	
0-5 VDC	0 VDC	5-5.25 VDC	10 K Ω min	
1-5 VDC	0.9-1.0 VDC	5-5.25 VDC	10 K Ω min	
0-10 VDC	0 VDC	10-10.5 VDC	10 K Ω min	

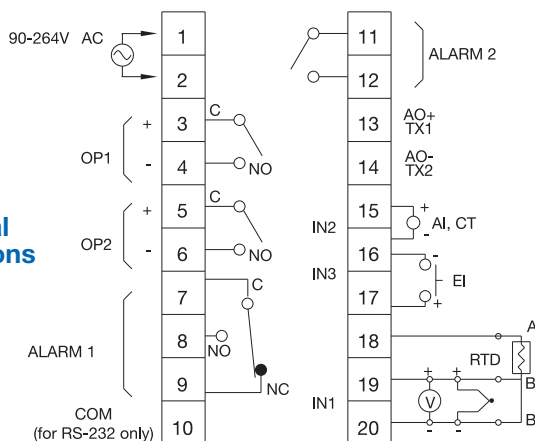
Resolution: 15 bit analog to digital converter

Isolation Breakdown Voltage: 1000 VAC

Solid State Relay (Triac) Output

Rating: 1A / 240 VAC **Inrush Current:** 20A for 1 cycle
Min. Load Current: 50 mA rms
Max. Off-state Leakage: 3 mA rms
Max. On-state Voltage: 1.5 VAC rms
Insulation Resistance: 1000 Megohms minimum at 500 VDC
Dielectric Strength: 2500 VAC for 1 minute

Rear Terminal Connections



Alarm 1 / Alarm 2

Relay: 2 Amp, 240 VAC **Alarm 1:** SPDT **Alarm 2:** SPST (NO)
Alarm Functions:
 Dwell timer PV1-PV2 High / Low Alarm
 Deviation Band High / Low Alarm Loop Break Alarm
 PV2 High / Low Alarm Sensor Break Alarm
Alarm Mode: Normal, Latching, Hold, Latching / Hold
Dwell Timer: 0 - 6553.5 minutes

Data Communications

Interface: RS-232 (1 unit), RS-485 (up to 247 units)

Protocol: Modbus Protocol – RTU mode

User Interface

Dual 4-digit LED Display: 0.55" (14 mm) Red Process Display
Keypad: 3 keys 0.40" (10 mm) Green Setpoint Display
Programming Port: For automatic setup, calibration and testing

Control Mode

Output 1: Reverse (heating) or direct (cooling) action
Output 2: PID cooling control, cooling P band 255% of PB
On-Off: 0.1 - 100.0°F hysteresis control (P band = 0)
P or PD: 0 - 100.0% offset adjustment
PID: Fuzzy logic modified
Proportional band: 0.1 - 932°F (500°C)
Integral: 0 - 1000 seconds **Derivative:** 0 - 360 seconds
Cycle Time: 0.1 - 100 seconds
Manual Control: Heat (MV1) and Cool (MV2)
Auto-tuning: Cold start and warm start
Failure Mode: Auto-transfer to manual mode with sensor break or A-D converter damage
Ramping Control: 0 - 900°F/min or 0 - 900°F/hr ramp rate
Power Limit: 0 - 100% for output 1 and output 2
Remote Setpoint: Programmable range for voltage or current input
Digital Filter: Time constant: settable from 0.2 to 60 seconds

Analog Retransmission

Analog Retransmission Functions: PV1, PV2, PV1-PV2, PV2-PV1, Setpoint, MV1, MV2, PV-SV deviation value
Output Signal: 4-20 / 0-20 mA, 0-1, 0-5, 1-5, 0-10 VDC
Accuracy: $\pm 0.05\%$ of span, $\pm 0.0025\%$ / °C

Environmental and Physical

Operating Temperature: 14 to 122°F (-10 to 50°C)
Humidity: 0 to 90% RH, non-condensing
Dielectric Strength: 2000 VAC, 50/60 Hz for 1 minute
Dimensions: 3-3/4 x 3-3/4 x 2-9/16" (96 x 96 x 65 mm) H x W x D
 Depth behind panel: 2" (53 mm)
Panel Cutout: 3-5/8" x 3-5/8" (92 x 92 mm) H x W
Weight: 0.56 lb. (255 grams)

Approval Standards

Safety: UL873, CSA C22.2 No. 24-93
 EN61010-1 (IEC1010-1)

Protective Class: IP 20 housing & terminals with protective covers
EMC: EN61326

Stock and Common Part Numbers

(Power Input: 90-264 VAC, no alarm 2, no data com)

Part Number	Signal Input	Out 1	Out 2	Alarm 1
TEC55001	tc-J	relay	none	relay
TEC55002	tc-J	relay	relay	none
TEC55003	tc-J	relay	relay	relay
TEC55004	tc-J	4-20 mA	none	none
TEC55005	tc-J	4-20 mA	none	relay
TEC55006	tc-J	DC pulse	none	none
TEC55007	tc-J	DC pulse	none	relay