

CT16A Temperature Controller



CT16A Controller

Overview

This economical controller packs sophisticated PID control into a compact $\frac{1}{16}$ DIN enclosure. A wide range of control modes, sensor input types, and relay or SSR outputs give versatile control of Thermofoil™ heaters and lets you easily connect to other electronics.

- Dual displays continuously show the set point and the actual temperature reading in resolutions of 1°, 0.1°, or engineering units
- Universal Input fits any sensor: Select from 10 thermocouple types, 4 RTD types, voltage, and current signals
- Isolated Outputs for safe, easy wiring
- Loop Break protection handles sensor or heater failure
- Peak / Valley records the maximum and minimum temperatures
- Front panel is waterproof and corrosion-resistant, making it ideal for sanitary applications. Illuminated keypad for easy operation
- Limit the temperatures which the operator can set via four password-protected Security Levels
- Controller can Self-Tune for best PID control
- Control modes: Self-Tune, pre-set or adjustable PID values, simple On/Off control, and open loop
- Fuzzy Logic provides better response time and reduces overshoot in processes with unpredictable inputs
- Alarms at one or two temperatures
- Alarm Relay option is programmable for high, low, absolute, or deviation, can be reset manually or automatically, and controls a single electromechanical relay with voltage-free contacts

- Ramp & Soak option handles complex heating profiles of 16 segments with front-panel activation and a selectable time base (CT16A3)
- Auto / Manual option easily switches to manual control for set up or experiments (CT16A3)
- RS-232 or RS-485 Serial Communications access the temperature readings and all control parameters (optional)
- Retransmit either the sensed temperature or the set point as a voltage or current signal to a computer or recorder (optional)
- 4-Stage Set Point to quickly switch from one temperature to the next (optional)

Specifications

Selectable inputs:

RTD: 2 or 3-wire, Minco types
PD or PE (100 Ω EN60751 platinum),
PA (100 Ω NIST platinum),
PF (1000 Ω EN60751 platinum), or
NA (120 Ω Nickel).

Thermocouple: Type J (factory default), K, T, L, E, R, S, B, C, or N.
DC current: 0-20 mA or 4-20 mA (use with Temptran™ transmitters).
DC voltage: 0-10 or 2-10 VDC, -10 to 10 mVDC, scalable.

Input impedance:

Voltage: 5000 Ω .
Thermocouple: 3 megohms minimum.
Current: 10 Ω .
RTD current: 200 μ A.

Specifications subject to change

Specifications continued

Sensor break or short protection:

Selectable output: disabled, average output before fault, or preprogrammed output.
Adjustable delay: 0.0 to 540.0 minutes.

Loop break protection: Error message is initiated and output is turned off in case of shorted sensor or open heater circuit. Break time adjustable from OFF to 9999 seconds.

Cycle rate: 1 to 80 seconds.

Setpoint range: Selectable from -212 to 2320°C (-350 to 4208°F), input dependent.

Displays: Two, 4 digit, 7 segment, 0.3" high LEDs. Process Value red, Setpoint Value green. °C or °F.

Control action: Reverse (usually heating) or Direct (usually cooling), selectable.

Ramp/soak: (CT16A3 only) 16 separate ramp and soak times are adjustable in minutes or seconds from 0 to 9999. When the program has ended, you may choose to repeat, hold, revert to local setpoint, or turn the outputs off.

Accuracy: ±0.25% of span ±1 count.

Resolution: 1° or 0.1°, selectable.

Line voltage stability: ±0.05% over supply voltage range.

Temperature stability: 4 $\mu\text{V}/^\circ\text{C}$ (2.3 $\mu\text{V}/^\circ\text{F}$) typical, 8 $\mu\text{V}/^\circ\text{C}$ (4.5 $\mu\text{V}/^\circ\text{F}$) max. (100 ppm/°C typical, 200 ppm/°C max.).

Isolation:

Relay and SSR: 1500 VAC to all other inputs and outputs.
SP1 and SP2 current and voltage: 500 VAC to all other inputs and outputs, but not isolated from each other.
Process output (options 934, 936): 500 VAC to all other inputs and outputs.

Supply voltage: 100 to 240 VAC nom., +10/-15%, 50 to 400 Hz, single phase; 132 to 240 VDC, nom., +10/-20%. 5 VA maximum.
Note: Do not confuse controller power with heater power. The controller does not supply power to the heater, but only acts as a switch. For example, the controller could be powered by 115 VAC, but controlling 12 VDC to the heater.

Operating temperature range:

-10 to 55°C (14 to 131°F).

Memory backup: Non-volatile memory (no batteries required).

Control output ratings:

AC SSR (SPST): 2.0 A combined outputs

A & B @ 240 VAC @ 25°C (77°F);
derates to 1.0 A @ 55°C (131°F).

An SSR is recommended for longer life than a mechanical relay.

Mechanical relay, SPST Form A (Normally Open) or Form B (Normally Closed):

3 A resistive, 1.5 A inductive @ 240 VAC;
pilot duty: 240 VA; 2 A @ 120 VAC or 1 A @ 240 VAC.

Switched voltage (isolated): 15 VDC @ 20 mA.

Current (isolated): 0 to 20 mA, 600 Ω max.

DC SSR: 1.75 A @ 32 VDC max.

Alarm relay, SPST Form A (Normally Open):

3 A @ 240 VAC resistive;
1/10 HP @ 120 VAC.

Specifications and order options

CT16A	Model number
2	Feature set: 2 = Standard 3 = Enhanced (ramp & soak, Auto/manual)
1	Alarm relay: 0 = No 1 = Yes
1	Output A: 1 = Built-in AC SSR 2 = Pulsed voltage (15 VDC) for external SSR 3 = Mechanical relay, SPST (normally open) 4 = Mechanical relay, SPST (normally closed) 5 = Current 8 = DC SSR
0	Output B: 0 = None 1 = Built-in AC SSR 2 = Pulsed voltage (15 VDC) for external SSR 3 = Mechanical relay, SPST (normally open) 4 = Mechanical relay, SPST (normally closed) 5 = Current
-948	Options on next page (leave blank for none)
CT16A2110-948 = Sample part number	

Specify and order products at:
www.minco.com/sensors_config

See page 5-36 for Accessories.

Specifications subject to change

