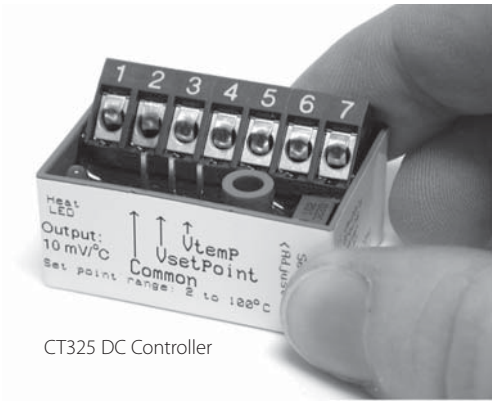
CT325 Miniature DC Temperature Controller



CT325 DC Controller

Overview

The CT325 Miniature DC Temperature Controller is designed for use with Minco Thermofoil™ heaters and RTD or thermistor sensors. It offers inexpensive on/off temperature control of your process or equipment with accuracy many times better than bimetal thermostats. Easily read and adjust the set point temperature using a voltmeter, then monitor the actual signal temperature at the other end. Operating from your 4.75 to 60 volt DC power supply, the controller can switch up to 4 amps power to the heater. A bright LED indicates when power is applied to the heater.

The entire unit is epoxy filled for moisture resistance, with a through-hole for a mounting bolt. A terminal block provides the power input, sensor input and heater output connections.

- Tight control in a small package means that enclosures or panel spaces are not required which allows successful portable device implementation
- Simple control without complicated programming can reduce set-up time
- Three-wire RTD connection cancels lead resistance for highly accurate temperature readings
- Solid state on-off control with adjustable set point improves durability compared to electro-mechanical devices
- Flexible heating control compliments all Minco Thermofoil™ Heaters for convenient off the shelf operation
- Uses standard 100 Ω or 1000 Ω platinum RTD or 50 kΩ thermistor sensor input
- Single DC power source provides power to the controller and heater up to 240 watts

Applications

- IV solutions for medical/surgical applications
- Military batteries
- Enclosures to maintain the temperature of electronics
- Ruggedized laptop LCDs and hardrives

Custom design options

Minco can customize the design of the CT325 for special applications. Specific temperature ranges, other sensor options, and special packaging are possible for volume OEM applications.

Specifications

Input: 100 Ω or 1000 Ω platinum RTD, 0.00385 Ω/Ω/°C, 2 or 3-leads, or 50 k Ω NTC thermistor, 2-lead.

Setpoint range: 2 to 200°C (36 to 392°F) for platinum RTD input. 25 to 75°C (77 to 167°F) for thermistor input. Consult factory for other ranges.

Setpoint stability: ±0.02% of span/°C.

V_{temp} signal: 0.010 V/°C over specified range.

Platinum RTD sensor		Thermistor sensor	
2°C	0.02 V	25°C	0.25 V
50°C	0.50 V	50°C	0.50 V
100°C	1.00 V	75°C	0.75 V
200°C	2.00 V		
Accuracy:	±1% of span	Accuracy:	±2% of span
Linearity:	±0.1% of span	Linearity:	±2% of span

Deadband: ±0.1°C (0.2°F).

Input power: 4.75 to 60 VDC.

Output: Open drain, 4 amps max. DC.

Leadwire compensation: (3-wire RTD) ±0.06°C/ Ω for 100 Ω or 1000 Ω platinum up to 25 Ω per leg.

Fault protection: Heater disabled on RTD short or thermistor open. No heater protection; external fuse is recommended.

Operating ambient temperature range: -40 to 70°C (-40 to 158°F).

Relative humidity: 0 to 95% non-condensing.

Physical: Polycarbonate case, epoxy sealed for moisture resistance.

Weight: 1 oz. (28g).

Connections: Terminal block for wires AWG 22 to AWG 14.

Mounting: Mounting hole for #6 screw through or #8 thread forming screw.

▼= STANDARD OPTIONS

Specifications subject to change

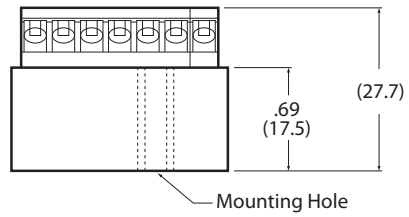
Sensor type	Code
100Ω platinum RTD (0.00385 TCR)	PD
1000Ω platinum RTD (0.00385 TCR)	PF
50 kΩ thermistor R25/R125 = 31.2	TF

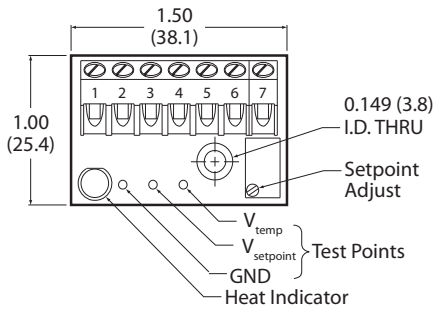
Note: 50kW thermistor sensor TS665TF is available on page 9-6

Specification and order options

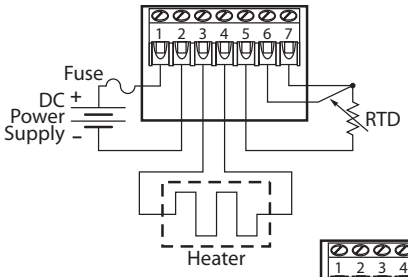
CT325	Model number
PD	Sensor type from table
1	Power supply: 1 = 4.75 to 10 VDC 2 = 7.5 to 60 VDC
C	Temperature range: A = 25 to 75°C (thermistor only) C = 2 to 200°C (RTD only)
1	Dead band: 1 = 0.1°C
CT325PD1C1 = Sample part number	

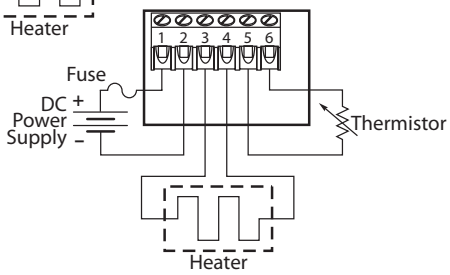
Dimensions in inches (mm)





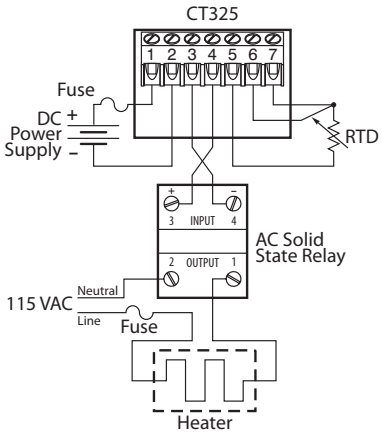
Wiring diagrams





AC powered heaters

The CT325 can provide the control signal to an external solid state relay to switch AC power. Use a DC supply voltage suitable for both the CT325 and SSR.

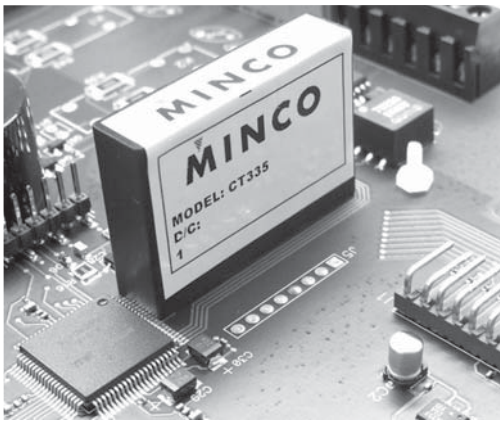


STOCKED PARTS AVAILABLE

▼= *STANDARD OPTIONS*

Specifications subject to change

CT335 PC Board Mount Temperature Controller



Overview

The CT335 is an OEM micro-processor based temperature controller that offers two sensor inputs, and two outputs. This low cost, PCB mount style proportional controller is great for system integration.

The CT335 multiple output options make it more versatile than other temperature controllers. Option 1) one output capable of handling up to 6 Amps. Option 2) Two open drain outputs with 3 Amps each. Option 3) one open drain output that can handle up to 3 Amps and a logic output option to work with an external SSR for higher power.

- Proportional and On/Off control
- Two inputs and two outputs (solid state)
- Small package designed for PCB mounting
- Able to handle up to 6 Amps
- Operates on 7.5-60 volts DC
- Low cost

Specifications

Sensor Inputs:

100Ω at 0ºC Pt RTD, 2-leads (0.00385 TCR)

1000 Ω at 0ºC Pt RTD, 2-leads (0.00385 TCR)

Output Options:
One output of 6A
Two outputs of 3A each
One 3A output and one logic output (0-5V)

Controlling Parameters:
Dead-band for On/Off Control: 0.1 to 10ºC
Proportional band for Proportional Control: 0.1 to 10ºC

Ambient:
Operating temperature: -40 to 70ºC (-40 to 158ºF)
Storage temperature: -55 to 85ºC (-67 to 185ºF)
Relative humidity: 90%, non-condensing

Accuracy: ±1º C
System stability determined by overall system.

Power supply: 7.5 to 60VDC

Physical: ABS case, epoxy potted for moisture resistance

Case Dimensions: 1.49x1.03x0.36"

Mounting: Pins on 0.1" center for mounting on PCB

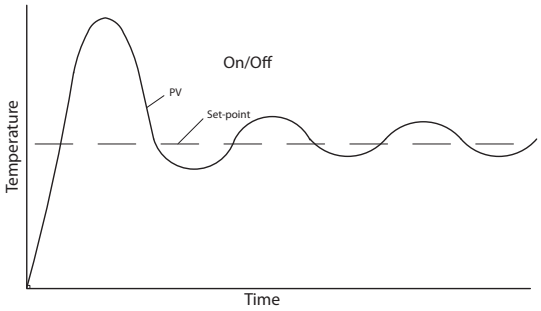
Specifications subject to change

AC207473 USB to SPI Converter Kit:
The AC207473 allows the user to configure the CT335 from a PC. It is ideal for prototyping and early-stage development. It consists of a CT335 USB to SPI converter, power supply, USB cable, and software CD for easy user interface.

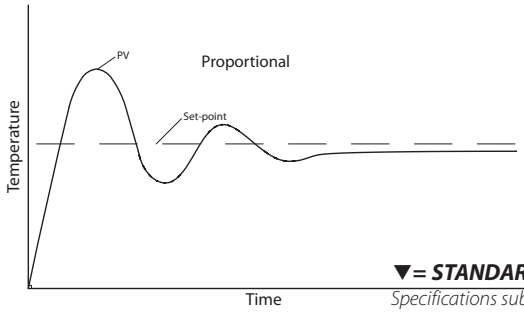
Operation

The CT335 controller can be configured to On/Off or Proportional control. On/Off control offers faster reaction time and better accuracy over thermostats. The CT335 Proportional control minimizes temperature overshoot and gives steadier temperature control by reducing the time the heater/load stays on as the process temperature approaches the set-point. Note that actual outputs depend on the system's configuration and controlling parameters. See below.

On/Off Control



Proportional Control

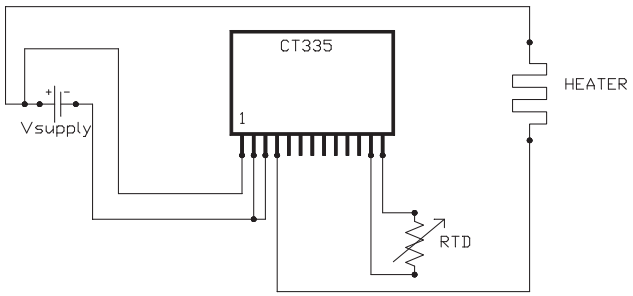


▼= STANDARD OPTIONS

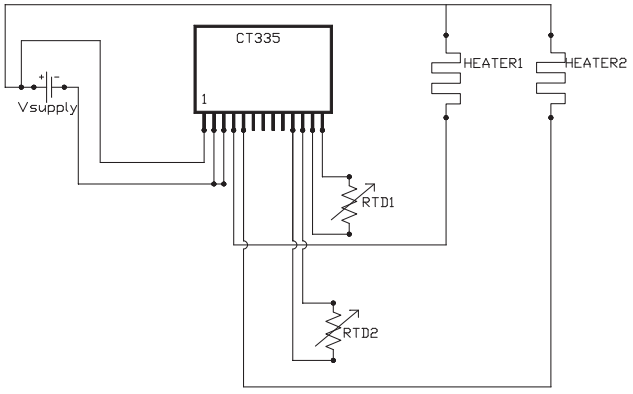
Specifications subject to change

Wiring with Different Output Options:

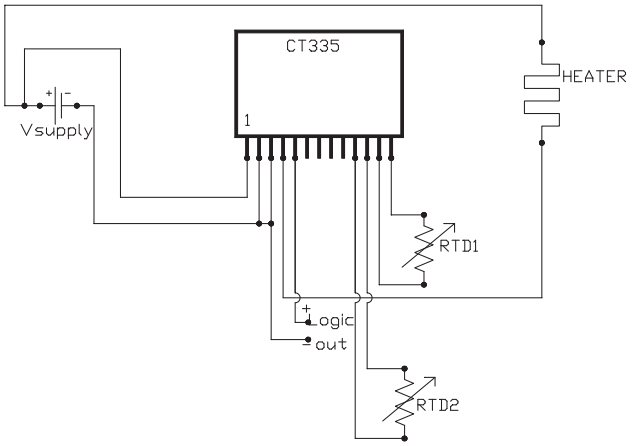
Option 1: One output of 6A



Option 2: Two outputs of 3A each



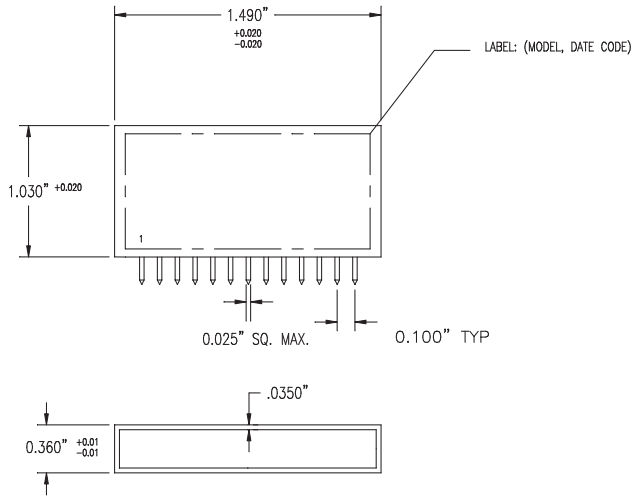
Option 3: One 3A output and one logic output (0-5V)



Specifications and order options

CT335	Model Number: CT335
PD	Sensor Types: PD = 100Ω Platinum RTD (-40 to 200°C) PF = 1000Ω Platinum RTD
1	Output Options: 1. one output of 6A 2. two outputs of 3A 3. one 3A output and 1 logic output
P	Control Method: O = On/Off P = Proportional
10	Dead-band or Proportional Band 1 = 0.1° C 10 = 1.0° C 100 = 10.0° C
T100	Setpoint Temperature (Min = - 40°C, Max = 200°C): XXXX = Setpoint in 0.1°C increments Example: 100 = 10.0°C 103 = 10.3°C -200 = -20.0°C
CT335PD1T100 = Sample part number	

Dimensions

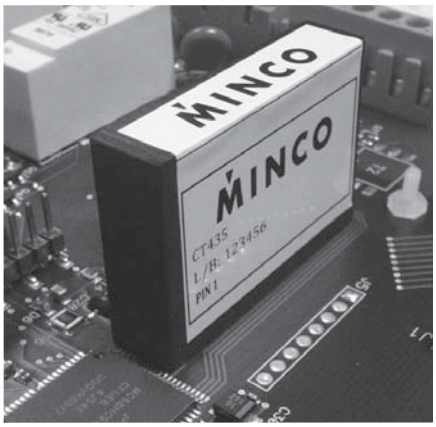


▼= *STANDARD OPTIONS*

Specifications subject to change

CT435 PC Board Mount Temperature Controller

Programmable Multi-input/output Controller



Overview

The CT435 is an OEM micro-processor based PID temperature controller that offers two independent sensor inputs and two outputs. This low cost, PCB mount style PID controller is very flexible through its many configuration options. Using the UART Modbus interface, system parameters, sensor temperatures, and output status may be read and/or written, allowing for complete system integration with existing micro-processors.

- Two RTD temperature sensor inputs – Pt100 or Pt1000
- Wide temperature sensing range
- All controller features are configurable through the UART Modbus interface
- Two independent solid state open drain outputs – 3A each
- Each output individually configurable for any variation of PID, On/Off, or Alarm control
- Auto-tune feature estimates PID coefficients for several control types
- 32-bit microprocessor executes both PID loops simultaneously at individually configurable rates up to 25 times/second
- Addressable Modbus protocol allows for multiple units connected on one set of UART lines
- No additional heat sinking required
- Small package designed for PCB mounting
- Operates from a 5V supply
- Low cost

Specifications

Sensor Inputs:
100 Ω at 0ºC Pt RTD, 2-leads (0.00385 TCR)
1000 Ω at 0ºC Pt RTD, 2-leads (0.00385 TCR)
2-wire connection
Open and shorted sensor detection

Measurement Range:
-70°C to 650°C (-94°C to1202°F), 0.25°C full-range accuracy at 25°C ambient

Accuracy:
25°C ambient: ±0.25º C or ±0.25% of range
Full range ambient: ±1.5º C or ±1% of range
System stability determined by overall system.

Electrical:
Input power: 5 to 24VDC, 20mA typical, 40mA max

Outputs: 2 open drain outputs, 60V max switching voltage

Number of Outputs in Use	Controller Supply Voltage	Ambient Temperature	Current Rating
1 Output	5-12 VDC	25ºC	7 A
		70ºC	4 A
	12-24 VDC	25ºC	6 A
		70ºC	3 A
2 Outputs	5-12 VDC	25ºC	5 A
		70ºC	3 A
	12-24 VDC	25ºC	5 A
		70ºC	2.5 A

Environmental:
Operating temperature: -40 to 70ºC (-40 to 158ºF)
Storage temperature: -55 to 85ºC (-67 to 185ºF)
Relative humidity: 90%, non-condensing

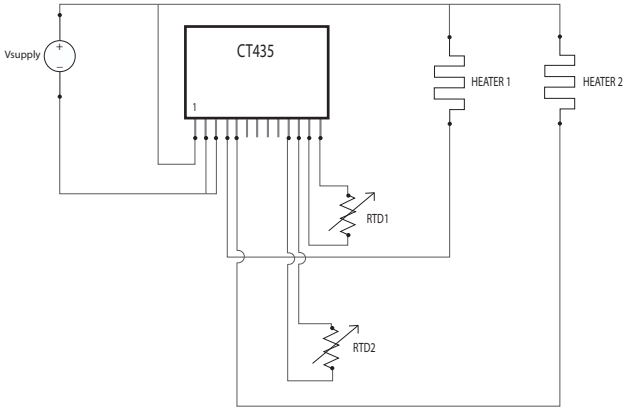
Communication:
Modbus over UART – 19.2kbps, no flow control

Package:
Enclosure: ABS case, epoxy potted
Dimensions: 1.49x1.03x0.36”
Mounting: Pins on 0.1” center for mounting on PCB

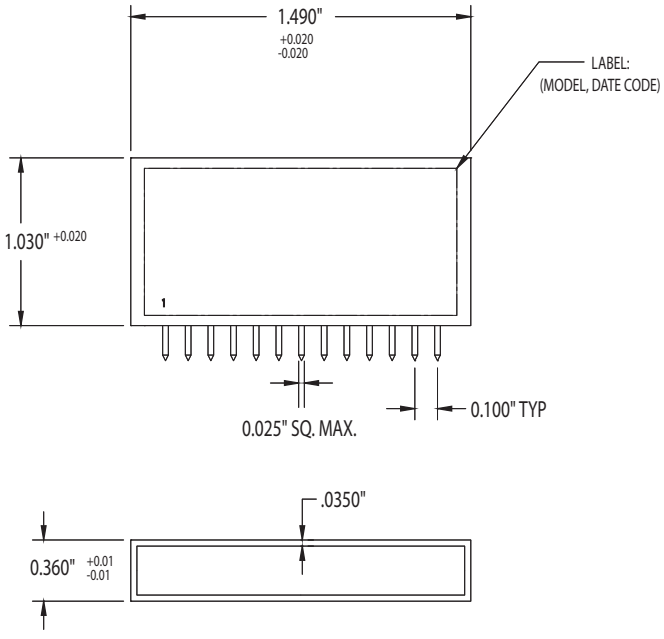
▼= ***STANDARD OPTIONS***
Specifications subject to change

Operation:
The CT435 controller can be configured to PID (and any variation) or On/Off control. On/Off control offers faster reaction time and better accuracy over thermostats. PID control minimizes temperature overshoot and gives steadier temperature control by utilizing proportional, integral, and derivative control factors. The inputs and outputs may be configured in any fashion, and all parameters are read/write through the addressable UART Modbus interface. The controller and heaters may be powered from the same supply or separate supplies, as long as they share a common ground.

Common Wiring Diagram:



Dimensions:



How to Order:

CT435	Model number
PD	Sensor Types: PD = 100 Ω Platinum RTD PF= 1000 Ω Platinum RTD
CT435PD = Sample part number	

▼= STANDARD OPTIONS
Specifications subject to change