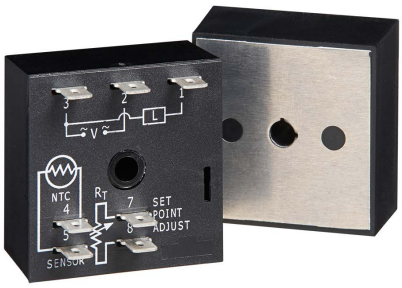
Single Function Relays
TCR9C

Temperature Controller



Description

The solid-state TCR9C series relays are designed for dedicated temperature control of resistive loads. These relays feature a single setpoint controller with high-current, solid-state output. The TCR9C relay is a low-cost, modular approach to accurate temperature control and supports loads up to 20 A. The efficient mounting surface allows for utilization of equipment as the heat sink.

Operation

Setpoint Control: TCR9C is a single setpoint temperature controller. When the thermistor resistance is high (above the setpoint), the solid-state output is ON. When the thermistor resistance decreases (temperature increases) to the setpoint or below, the output turns OFF. It should be noted that temperature differential (under and overshoot) is largely due to the system as a whole. The mass of the system, size of the heaters, and sensor all play an important part. Single setpoint control is best when there is little or no lag time between the heater and sensor, and when the heater is not oversized.

Features & Benefits

FEATURES	BENEFITS
Low-cost setpoint control	NTC thermistor sensing
Control resistive heaters	Solid-state output
Accuracy	External setpoint adjustment
Facilitates heat transfer	Metalized mounting surface
Protects against shock, vibration, and humidity	Encapsulated

Applications

- Temperature control of resistive loads

Revised: 03/07/2023

Specifications

Control

Type	Single setpoint, negative temperature coefficient resistance sensing
Sensor Type	Thermistor, negative temperature coefficient (customer supplied) Electrically insulated for 1500 V RMS min.
Adjustment	Temperature setpoint selected by means of an external resistance
Accuracy	≤ ±5% of the setpoint resistance Add the tolerance of the NTC thermistor and the drift of the adj. pot over temp. range
Setpoint vs. Ambient Temperature and Operating Voltage	±5% of setpoint resistance
Reset Time	≤ 150 ms

Input

Voltage	120–240 V ac
Tolerance	±15%
AC Line Frequency	50/60 Hz

Output

Type	Solid state
Form	Non-isolated, single pole, zero voltage switching
Rating	**Model** **Steady State** **Inrush**** C 20 A 200 A**
Minimum Load Current	100 mA
Voltage Drop	≅ 2 V at rated current
Off State Leakage Current	≅ 5 mA @ 230 V ac

Protection

Dielectric Breakdown	≥2000 volts terminals to mounting surface
Isolation Voltage	≥100mΩ
Circuitry	Encapsulated

Mechanical

Mounting	Surface mount with one #10 (M5 x 0 .8) screw
Dimensions	**H** 50.8 mm (2.0"); **W** 50.8 mm (2.0"); **D** 38.4 mm (1.51")
Termination	0.25 in. (6.35mm) male quick connect terminals

Environmental

Operating/Storage Temperature	-40 °C to 60 °C / -40 °C to 85 °C
Humidity	95% relative, non-condensing
Weight	≅ 2.7 oz (77 g)

** Must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90 °C. Inrush: non-repetitive for 16 ms.

Certification & Compliance

UL Recognized	File E111456 UL873

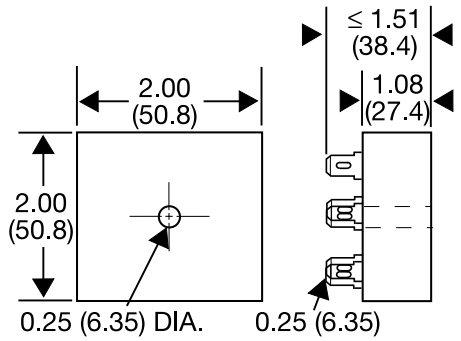
Accessories

P1015-13 (AWG 10/12), **P1015-64** (AWG 14/16), **P1015-14** (AWG 18/22) **Female Quick Connect**
These 0.25 in. (6.35 mm) female terminals are constructed with an insulator barrel to provide strain relief.

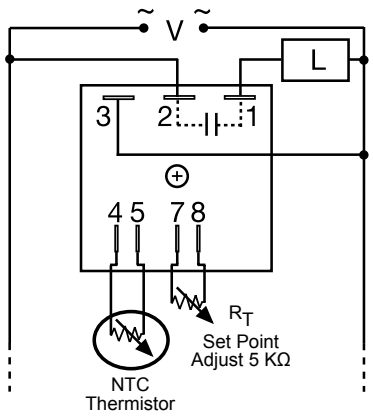
Ordering Information

MODEL	LINE VOLTAGE	OUTPUT AMPERAGE	DESCRIPTION
TCR9C	120 – 240 V ac	20 A	Low cost solid state temperature controller for use with negative coefficient thermistors

Dimensions Inches (mm)



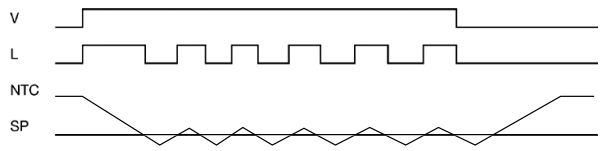
Wiring Diagram



V = Voltage
L = Load

Caution: NTC Thermistor must be electrically insulated, 1500 volts RMS minimum.

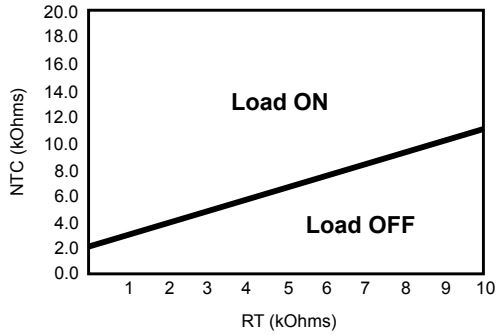
Function Diagram



V = Voltage
L = Load
SP = Setpoint

NTC = Negative Temperature Coeffiecient Thermistor

Adjustment vs. Thermistor Resistance



Note: If R_T value exceeds 13kOhms, the output will not energize.