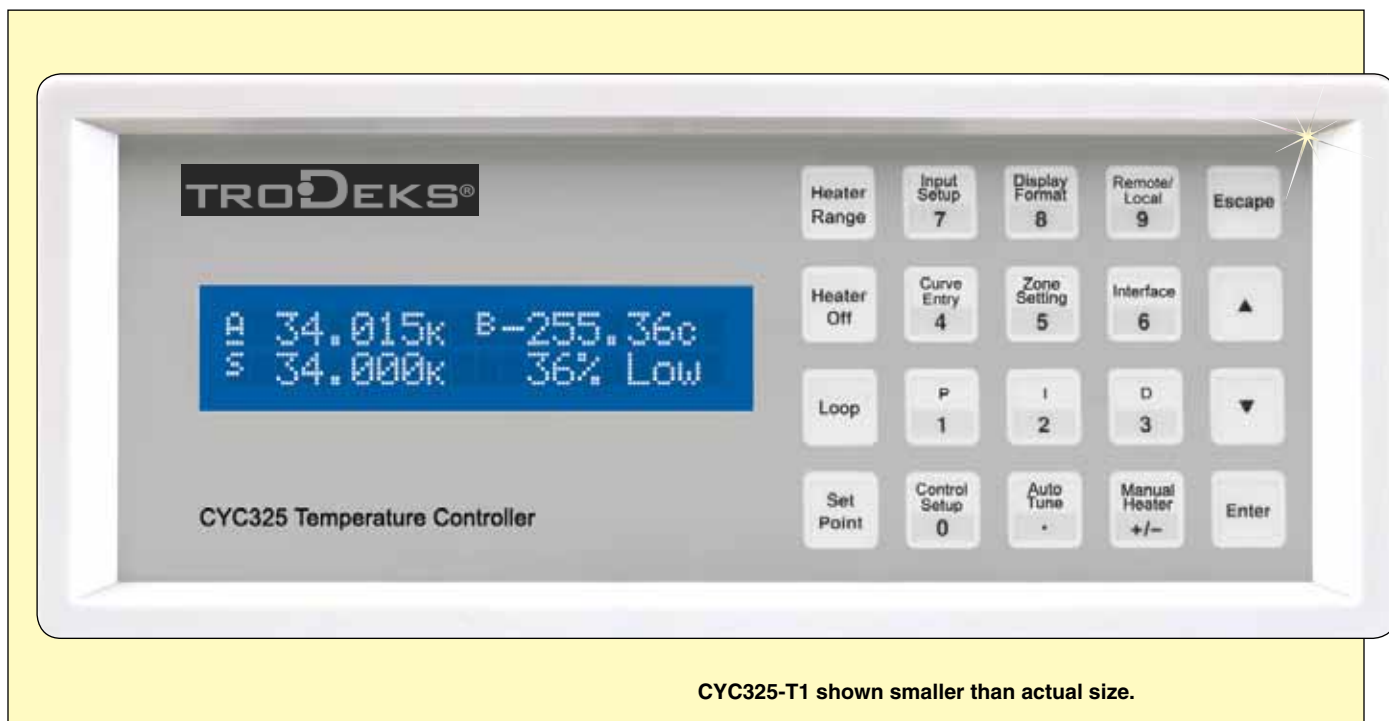




# Dual Channel Autotune Temperature Controllers



CYC325-T1 shown smaller than actual size.

## CYC325 Series



- ✓ Operates Down to 1.2 K with Appropriate Sensors
- ✓ 2 Sensor Inputs
- ✓ Supports Diode, RTD, and Thermocouple Sensors
- ✓ Sensor Excitation (Current Reversal Eliminates Thermal EMF Errors for Resistance Sensors)
- ✓ 2 Autotuning Control Loops: 25 and 2 W Max
- ✓ Control Loop 2: Variable Vdc source from 0 to 10 V Max
- ✓ IEEE-488 and RS232C Interfaces

The CY325 Series dual-channel temperature controller is capable of supporting nearly any diode, RTD, or thermocouple temperature sensor. Two independent PID control loops with heater outputs of 25 and 2 W are configured to drive either a 50 or 25  $\Omega$  load for optimal control flexibility. Designed with ease of use, functionality, and value in mind, the CYC325 Series is ideal for general-purpose laboratory and industrial temperature measurement and control applications.

## Specifications Thermometry

**Number of Inputs:** 2

**Input Configuration:** Each input is factory configured for either diode/RTD or thermocouple

**Isolation:** Sensor inputs optically isolated from other circuits but not each other

**A/D Resolution:** 24-bit

**Input Accuracy:** Sensor dependent, refer to input specifications table

**Measurement Resolution:** Sensor dependent, refer to input specifications table

**Max Update Rate:** 10 rdg/s on each input (except 5 rdg/s on input A when configured as thermocouple)

**Filter:** Averages 2 to 64 input readings

### Sensor Input Configuration Diode/RTD:

**Measurement Type:** 4-lead differential

**Excitation:** Constant current with current reversal for RTDs

**Supported Sensors:** Diodes, silicon, GaAlAs; RTDs, 100  $\Omega$  Platinum, 1000  $\Omega$  Platinum, germanium, carbon-glass, Cernox™, and Rox™

**Standard Curves:** CY7 and CY670, PT-100, PT-1000, RX-102A, RX-202A

**Input Connector:** 6-pin DIN

### Thermocouple:

**Measurement:** 2-lead, room temperature, compensated

**Excitation:** N/A

**Supported Sensors:** Most thermocouple types

**Standard Curves:** Type E, Type K, Type T, AuFe 0.07% vs Cr, AuFe 0.03% vs Cr

**Input Connector:** Ceramic isothermal block



## Control

**Control Loops:** 2

**Control Type:** Closed loop digital PID with manual heater output or open loop

**Tuning:** Autotune (1 loop at a time), PID, PID zones

**Control Stability:** Sensor dependent, see input specification table

### PID Control Settings:

**Proportional (Gain):** 0 to 1000 with 0.1 setting resolution

**Integral (Reset):** 1 to 1000 (1000/s) with 0.1 setting resolution

**Derivative (Rate):** 1 to 200% with 1% resolution

**Manual Output:** 0 to 100% with 0.01% setting resolution

**Zone Control:** 10 temperature zones with P, I, D, manual heater out, and heater range

**Setpoint Ramping:** 0.1 K/min to 100 K/min

**Safety Limits:** Curve temperature, power up heater off, short circuit protection

### Front Panel:

**Display:** 2-line, 20-character, liquid crystal display with 5.5 mm (0.216") character height

**Number of Reading Displays:** 1 to 4

**Display Units:** K, °C, V, mV,

**Reading Source:** Temperature, sensor units

**Display Update Rate:** 2 rdg/s

**Temp Display Resolution:** 0.001° from

0 to 99.999°, 0.01° from 100 to 999.99°, 0.1° above 1000°

**Sensor Units Display Resolution:** Sensor dependent; to 5 digits

**Other Displays:** Setpoint, heater range, and heater output; user selected

**Setpoint Setting Resolution:** Same as display resolution (actual resolution is sensor dependent)

## Heater Output Display:

Numeric display in percent of full scale for power or current

**Heater Output Resolution:** 1%

**Display Annunciators:** Control input, remote, autotune

**Keypad:** 20-key membrane, numeric and specific functions

**Front Panel Features:** Front panel curve entry, keypad lock-out

## Interface

**IEEE-488 Interface Features:** SH1, AH1, T5, L4, SR1, RL1, PP0, DC1, DT0, C0, E1

**Reading Rate:** To 10 rdg/s on each input

**Software Support:** LabVIEW™ driver; consult factory for availability

### Serial Interface:

**Electrical Format:** RS232C

**Baud Rates:** 9600, 19200, 38400, 57600

**Connector:** 9-pin D-style, DTE configuration

**Reading Rate:** To 10 rdg/s, each input

## General

**Ambient Temperature:** 15 to 35°C (59 to 95°F) at rated accuracy, 5 to 40°C (41 to 104°F) at reduced accuracy

**Power Requirement:** Standard 120 Vac, optional 240 Vac, 6%, -10%, 50 or 60 Hz, 85 VA

**Dimensions:** 89 H x 216 W x 368 mm D (3.5 x 8.5 x 14.5"), half rack

**Weight:** 4.00 kg (8.82 lb)

**Approval:** CE mark

## Input Specifications

	Sensor Temp Coefficient	Input Range	Excitation Current	Display Resolution	Measurement Resolution	Electronic Accuracy (at 25°C)	Electronic Control Stability <sup>1</sup>
Diode	Negative	0 to 2.5 V	10 $\mu$ A $\pm 0.05\%^{2,3}$	100 $\mu$ V	0.4 $\mu$ V	$\pm 80 \mu$ V $\pm 0.005\%$ of rdg	$\pm 20 \mu$ V
Diode	Negative	0 to 7.5 V	10 $\mu$ A $\pm 0.05\%^{2,3}$	100 $\mu$ V	10 $\mu$ V	$\pm 80 \mu$ V $\pm 0.001\%$ of rdg	$\pm 40 \mu$ V
PTC RTD	Positive	0 to 500 $\emptyset$	1 mA <sup>4</sup>	10 m $\emptyset$	2 m $\emptyset$	$\pm 0.004\emptyset$ $\pm 0.01\%$ of rdg	$\pm 4 \text{ m}\emptyset$
PTC RTD	Positive	0 to 5000 $\emptyset$	1 mA <sup>4</sup>	100 m $\emptyset$	20 m $\emptyset$	$\pm 0.004\emptyset$ $\pm 0.02\%$ of rdg	$\pm 40 \text{ m}\emptyset$
NTC RTD	Negative	0 to 7500 $\emptyset$	10 $\mu$ A $\pm 0.05\%$	100 m $\emptyset$	40 m $\emptyset$	$\pm 0.1\emptyset$ $\pm 0.04\%$ of rdg	$\pm 80 \text{ m}\emptyset$
Thermocouple	Positive	$\pm 25 \text{ mV}$	N/A	1 $\mu$ V	0.4 $\mu$ V	$\pm 1 \mu$ V $\pm 0.05\%$ of rdg <sup>5</sup>	$\pm 0.8 \mu$ V
Thermocouple	Positive	$\pm 50 \text{ mV}$	NA	1 $\mu$ V	20 $\mu$ V	$\pm 1 \mu$ V $\pm 0.05\%$ of rdg <sup>5</sup>	$\pm 0.8 \mu$ V

<sup>1</sup> Control stability of the electronics only, in ideal thermal system

<sup>2</sup> Current source error has negligible effect on measurement accuracy

<sup>3</sup> Diode input excitation can be set to 1 mA

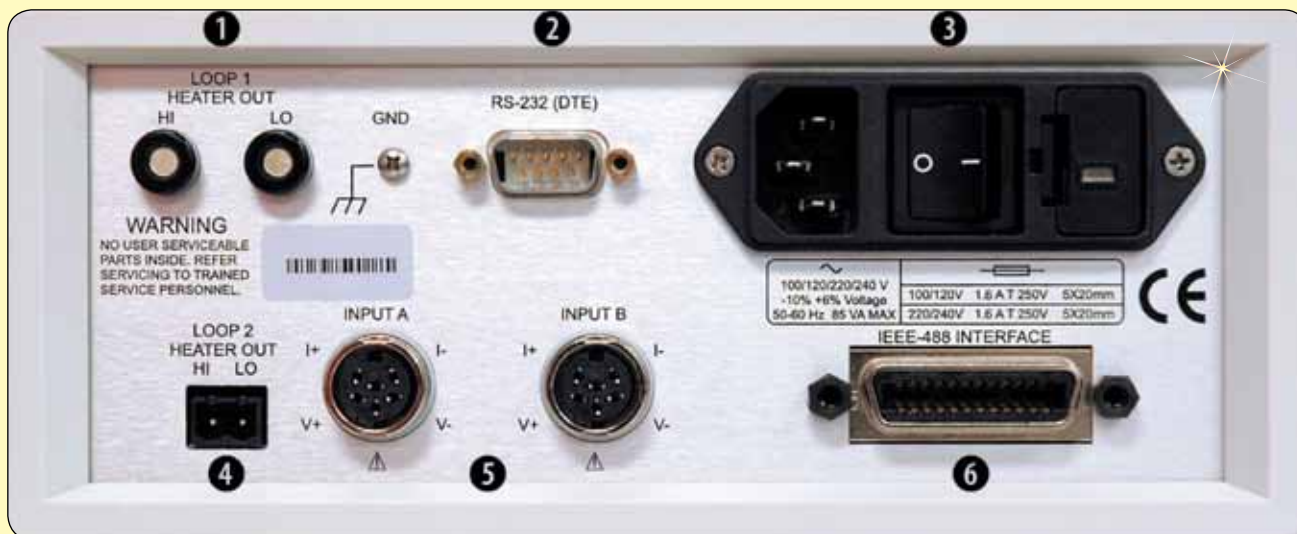
<sup>4</sup> Current source error is removed during calibration

<sup>5</sup> Accuracy specification does not include errors from room temperature compensation

$\emptyset$  = diameter



CYC325-T1 rear view shown smaller than actual size.



- |                             |                           |
|-----------------------------|---------------------------|
| 1 Loop 1 heater output      | 4 Loop 2 heater output    |
| 2 Serial (RS232C) I/O (DTE) | 5 Sensor input connectors |
| 3 Line input assembly       | 6 IEEE-488 interface      |

## To Order

Model No.	Description
CYC325	2 diode/RTD inputs
CYC325-T1	1 diode/RTD, 1 thermocouple input
CYC325-T2	2 thermocouple inputs

## Accessories

Model No.	Description
CYC-6201	1 m (3.3' long) IEEE-488 (GPIB) computer interface cable assembly
CYC-CAL-325-CERT	Instrument recalibration with certificate, no points
CYC-CAL-325-DATA	Instrument recalibration with certificate and data
CYC-RM-1/2	Rack mount kit for mounting one ½ rack temperature controller in 482.60 mm (19") rack, 90 mm (3.5") high
CYC-RM-2	Rack mount kit for mounting two ½ rack temperature controllers in 482.60 mm (19") rack, 135 mm (5.25") high
CYC-106-009	Heater output connector, dual banana jack
CYC-106-233	6-pin male input connector
CYC-106-735	Terminal block, 2-pin
MA-2001	Reference Book: Semiconductor-Laser Physics

Comes complete with heater output connector (dual banana jack), sensor input mating connector (6-pin DIN plugs), terminal block (2-pin), power cord and operator's manual.

Add suffix "-240" for 240 Vac power supply, no additional cost.

**Ordering Example:** CYC325, 2 inputs silicon diode/RTD controller.