

CHAPTERS

Coherent Sources

Incoherent Sources

Quantum Electronics

Drivers/Mounts

Accessories

SECTIONS

Laser Diode Controllers

Temperature/TEC Controllers

LD/TEC Controllers

LD/TEC Platforms

LD Mounts

LED Drivers

LED Mounts

Have you
seen our...Butterfly
MountsSee page
1482Benchtop Temperature Controller, ± 2 A, 12 W (Page 1 of 2)**TED200C**Highly Stable, Low Noise ± 2 A Thermoelectric Temperature ControllerIncludes Power
Cord and Cable for
Connection to
CAB420-15 Mount
(See Page 437)**Introduction**

The TED200C is a Precision Temperature Controller designed to drive thermoelectric cooler (TEC) elements with currents up to ± 2 A. It is equipped with a PID feedback circuit that allows independent setting of the proportional (P) gain, the integral (I) offset control, and the differential (D) rate, thereby allowing the user to adjust the TED200C to obtain the optimal performance for a wide variety of thermal loads.

Temperature Display/Setpoint

The illuminated 5-digit LED display can show the set temperature, the actual temperature, the heating or cooling current, and the current limit for the TE cooler. The temperature is displayed with a resolution of 0.01 °C when used with either an AD590 temperature sensor or a thermistor with a resolution of 1 Ω using the 0 to 20 k Ω range (10 Ω using the 0 to 200 k Ω range).

The temperature setpoint can be designated either by adjusting the front panel control knob or by sending a control signal to the analog input connector at the rear of the unit. This feature is used for adjusting the wavelength of the laser diode via the laser temperature in a control loop.

TEC Protection

The TED200C is designed for maximum protection of the TEC element. An adjustable TEC output current limit can be set anywhere within the controller's range to prevent the controller from overdriving the TEC element.

Adaptability to Different Thermal Loads

The TED200C can easily be adapted to different thermal loads. For example, with optimum PID adjustment, the settling time for a temperature change from 30 °C to 20 °C is less than two seconds for a laser in a butterfly package mounted in our LM14S2 laser diode mount (see page 1482). The PID controls are located on the front panel for easy access when optimizing the response. The proportional gain optimizes the response time of the feedback loop, while the integral gain provides precise zero-offset regulation. The derivative gain optimizes the dynamic response of the feedback loop to account for rapid changes in the thermal load.

Fault Indication

For safe and continuous operation at ambient temperatures up to 40 °C, the TED200C is equipped with a cooling fan and over-temperature protection. The system detects incorrect or missing temperature sensors and connection problems between the sensor and controller. In these cases, the output gets switched off, and an LED fault indicator is lit. All LED faults are accompanied by a short audible warning signal.

Temperature Monitor Output

The TED200C provides an output monitoring voltage signal that is proportional to the actual temperature being measured. The signal is accessed via a BNC connector located on the back panel. This feature allows the long-term recording of the temperature of a device.

Why Temperature Control a Laser Diode?

The characteristics and the efficiency of a laser diode strongly depend on the temperature of the laser chip. For example, in the case of a typical GaAlAs diode, the wavelength increases by about 0.25 nm for every 1 °C increase in temperature. With a single mode laser diode, this change in wavelength can lead to undesirable mode hopping, which results in both frequency and intensity noise. Output power is inversely proportional to laser temperature; therefore, fluctuating temperature can lead to premature failure of the laser if it is running near its maximum power.

Features

- ± 2 A/12 W Low Noise TEC Output
- Temperature Stability <0.002 °C (24 hrs)
- Can be Operated with All Common Sensors (Thermistor, AD590, AD592, LM135/LM335)
- Wide Temperature Range from -45 to 145 °C (AD590/LM135) or 10 Ω to 200 k Ω (Thermistor, 2 Ranges)
- Separate Control of the P, I, and D Gains for Perfect Adaptation to the Thermal Load
- 5-Digit Display with a Resolution of 0.01 °C (IC Sensor) or 1 Ω (Thermistor)
- Analog Control via the TUNE IN Input
- CSA Approved and CE Certified

Applications

- Precise Stabilization of Laser Diodes for Interferometry and Spectroscopy
- Cooling of Detectors for Noise Reduction
- Temperature Stabilization of Nonlinear Crystals and Industrial Systems

Benchtop Temperature Controller, ±2 A, 12 W (Page 2 of 2)

Supported Temperature Sensors

The TED200C temperature controller controls common temperature sensors, thermistors up to 200 kΩ, or temperature-sensing IC sensors such as the following: AD590, AD592, LM135, and LM335. When a thermistor is selected, the temperature is displayed as the resistance value of the thermistor with a control range from 10 Ω to 20 kΩ and 100 Ω to 200 kΩ.

When an AD590, AD592, LM135, or LM335 is selected, the temperature is displayed directly in °C with a resolution of 0.01 °C. The temperature control range of the controller depends on the IC sensor used (see specifications).

Companion Products

The LDC200C family of Laser Diode Controllers are ideal companions for the TED200C temperature controller. When combined with our laser mounts that contain TEC elements, the TED200C is capable of achieving 1 mK stability. This temperature stability, when combined with our low-noise laser diode controllers, provides the precision needed for demanding applications such as diode laser wavelength tuning and atomic absorption cell spectroscopy. See pages 1443 - 1448 for our selection of laser drivers and pages 1483 - 1487 for our selection of TEC laser mounts. Please contact Technical Support or visit our website for more information.

Specifications

TEC Output

- **Control Range of TEC Current:** -2 A to 2 A
- **Compliance Voltage:** >6 V
- **Maximum Output Power:** 12 W
- **Measurement Resolution TEC Current:** 1 mA
- **Measurement Accuracy TEC Current:** ±10 mA
- **Noise and Ripple (Typ.):** <1 mA

Temperature Sensors Thermistor

- **Control Ranges (Switchable):**
10 Ω to 20 kΩ / 100 Ω to 200 kΩ (Two Ranges)
- **Resolution:** 1 Ω / 10 Ω
- **Accuracy:** ±10 Ω / ±100 Ω
- **Stability:** <0.5 Ω / <5 Ω

IC-Sensors (AD590/AD592, LM135/LM335)

- **Control Range:** AD590/LM135: -45 to 145 °C
AD592: -25 to 105 °C
LM335: -40 to 100 °C
- **Resolution:** 0.01 °C
- **Accuracy:** ±0.1 °C (Except LM335)
- **Stability (24 Hours):** <0.002 °C

TEC Current Limit

- **Setting Range:** 0 to >2 A
- **Resolution:** 1 mA
- **Setting Accuracy:** ±20 mA

Temperature Control Input

- **Input Resistance:** 10 kΩ
- **Control Voltage:** -10 to 10 V
- **Transmission Coefficient IC-Sensors:**
20 °C/V ±5%
- **Transmission Coefficient Thermistor (20 kΩ / 200 kΩ Range):** 2 kΩ/V / 20 kΩ/V ±5%

Temperature Control Output

- **Load Resistance:** >10 kΩ
- **Transmission Coefficient IC Sensors:** 50 mV/°C ±5%
- **Transmission Coefficient Thermistor (20 kΩ / 200 kΩ Range):** 500 mV/kΩ and 50 mV/kΩ ±5%

Connectors

- **Sensor, TE Cooler, TEC ON Signal:** 15-pin D-Sub Jack
- **Control Input:** BNC
- **Control Output:** BNC
- **Chassis Ground:** 4 mm Banana Jack

General Data

- **Line Voltage (Switchable):** 110 VAC +15% - 10%, 115 VAC +15%/-10%, 230 VAC +15% - 10 %
- **Line Frequency:** 50 - 60 Hz
- **Maximum Power Consumption:** 60 W
- **Operating Temperature:** 0 to 40 °C
- **Storing Temperature:** -40 to 70 °C
- **Warm-up Time for Rated Accuracy:** 10 minutes
- **Weight:** <3.1 kg
- **Dimensions (W x H x D):**^a 5.75" x 2.60" x 1.42" (146 mm x 66 mm x 290 mm)

^aWithout Operating elements

ITEM #	\$	£	€	RMB	DESCRIPTION
TED200C	\$ 968.00	£ 696.96	€ 842.16	¥ 7,714.96	Benchtop TEC Controller ±2 A, 12 W

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