LDT 5525

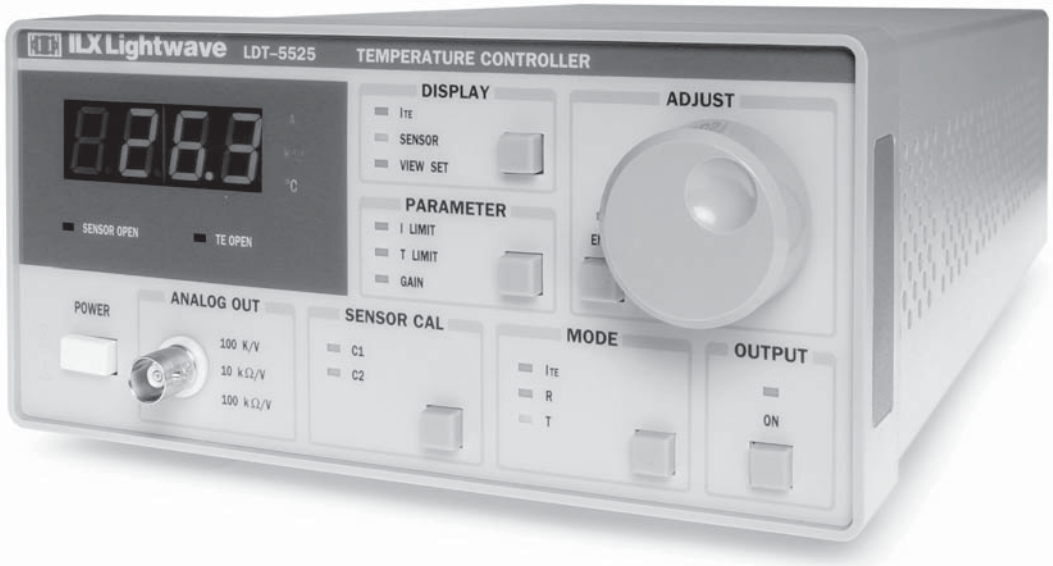
Thermoelectric Temperature Controller

Product Features

- High accuracy, high stability control
- Typical drift less than ±0.004°C
- Wide temperature range; –99°C to 199°C
- Low-noise 24 W bipolar output
- Operational with most thermistors and IC temperature sensors

The LDT-5525 is a precision, low-cost thermoelectric temperature controller optimized for temperature control of laser diodes and IR photodetectors. It provides up to 4 A to a TE module, and features direct temperature readout of thermistors and IC temperature sensors.

The instrument utilizes an advanced hybrid smart-integrator algorithm to ensure fast settling times and maintain high temperature stability, typically within ±0.004°C. The LDT-5525 can be operated in the user's choice of either constant temperature, constant resistance, or constant current modes.



Redefining the Standard in Affordable Temperature Control

ILX Lightwave
Laser Diode Instrumentation & Test Systems

LDT 5525

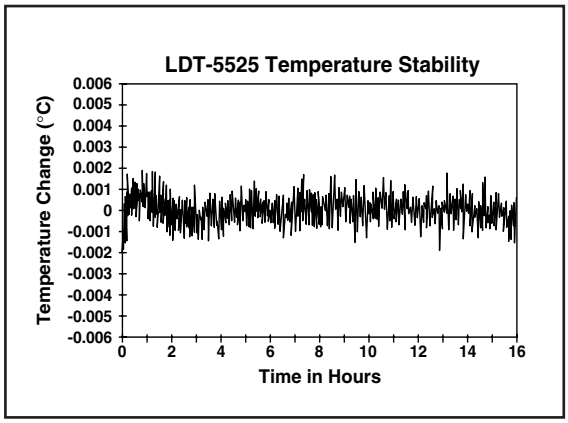
Thermoelectric Temperature Controller

The LDT-5525 Temperature Controller provides the perfect balance of useful features, wide temperature control range, and unbeatable best-in-class stability. It controls and displays temperatures from –99°C to 199°C while delivering a low-noise, bipolar current (up to 4 A) to a thermoelectric module.

Its ultra-stable temperature controller topology paired with a hybrid smart-integrator control loop offers fast settling time with a temperature stability better than 0.004°C — ideal for laser diode applications requiring highly stable wavelength and optical power.

The Precision Temperature Control You've Been Looking For

At the heart of the LDT-5525 is an advanced low-noise bipolar current source operating in your choice of constant temperature mode, constant resistance mode or constant current mode. The proven ILX Lightwave design delivers uncompromising high stability performance, ensuring that your laser output or photodiode response won't drift. Temperature coefficients are also minimized — an important consideration especially if you work in adverse conditions.



The LDT-5525 demonstrates typical temperature stability better than ±0.002°C over 16 hours.

Uncompromising Perfection in Thermal Stability

The LDT-5525 lets you easily control the temperature of your laser diode in one of three modes: (1) constant temperature (2) constant sensor resistance or (3) constant current.

If your application demands uncompromising thermal stability, then constant-sensor-resistance or constant-temperature modes are your answer. These modes utilize a temperature sensor in a feedback control loop to maintain a preset temperature.

In the constant temperature mode, you can drive your TE module to a setpoint temperature anywhere from –99°C to 199°C, depending on the TE module, heatsink load, and the thermistor or IC temperature sensor selected; at stabilities better than 0.004°C.

Best of all, you can display the actual temperature once you've entered the appropriate sensor calibration constants.

A Versatile Temperature Range

The incorporation of user-selectable thermistor source currents of 10 µA and 100 µA ensures versatility over a wide range of temperatures and applications.

This choice of source currents allows the LDT-5525 to operate over a thermistor control range of 25 Ω to 450 kΩ. For a typical 10K thermistor, this corresponds to a temperature range from –25°C to more than 60°C. Other temperature ranges are possible by choosing different thermistors. For more information, refer to ILX Lightwave Application Note #2, "Selecting Thermistors for Temperature Control".

Choice of Sensors

In addition to a broad range of thermistors, the LDT-5525 also accepts IC temperature sensors. Platinum RTD sensors are no problem with the optional sensor converter. ILX Lightwave's exclusive sensor calibration techniques mean accurate temperature readout — even for nonlinear thermistors. For more information, see

LDT 5525

Thermoelectric Temperature Controller

High stability temperature control with the features you need.

ILX Lightwave Application Note #4, “Thermistor Calibration”.

Limits Safeguard Your Devices

In addition to the normal control modes, the output of the LDT-5525 Temperature Controller is bound by fully-independent current limits. The output can also be bound by a temperature limit setting. Adjustment of any of the limit settings is easy and precise even while the output is driving a TE module at a lower current.

Easy to Operate

The intuitive front panel of the LDT-5525 Temperature Controller is designed for quick and easy operation. Parameters are logically grouped together without confusing "multifunction" keys. Precision adjustments are a snap with the digital adjust knob. The bright 4-digit, green LED display is easy to view — even with laser safety goggles.

Optimize Settings for Your Application

The LDT-5525 allows you to optimize slew rate and settling time for the particular thermoelectric module and thermal load you're using. Adjustment is easy with the front-panel GAIN control. For automated testing, or to remotely compute actual temperature, the LDT-5525 also offers an analog voltage output that corresponds to the sensor resistance.

Digital Control Makes Your Work Easier

The LDT-5525 Temperature Controller utilizes microprocessor control, allowing calibration of your thermistor or IC sensor for direct temperature readout. All instrument settings are preserved during shutoff. An adjust knob enable switch lets you "lockout" accidental adjustments. With the digital adjust knob, you'll avoid inaccuracies and repairs that can plague analog adjust methods.

The Best of All Worlds

In keeping with ILX tradition, the LDT-5525 Temperature Controller delivers the right features at the right price, including high stability, low-noise and convenient features, all backed by ILX Lightwave's unmatched service and applications support.

LDT 5525

Thermoelectric Temperature Controller

Specifications

TEMPERATURE CONTROL[1]

Temperature Control Range:[2]	–99.9°C to 199.9°C
Thermistor Setpoint Resolution:	0.1°C
Thermistor Setpoint Accuracy:[3]	±0.2°C
AD590 and LM335 Setpoint Resolution:	0.1°C
AD590 and LM335 Setpoint Accuracy:	±0.2°C
Short-Term Stability (1 hr.):[4]	<±0.004°C
Long-Term Stability (24 hr.):[4]	<±0.01°C

TEC OUTPUT[5]

Output Type:	Bipolar current source
Control Algorithm:	Smart Integrator, Hybrid PI
Compliance Voltage:[6]	6 V (@ 4 A)
Max. Output Current:	4 A
Max. Output Power:[6]	24 W
Ripple/Noise:[7]	<1mA, rms

CURRENT LIMIT

Range:	0–4.0 A
Accuracy:	±50 mA

TEMPERATURE SENSOR

Types	
Thermistor:	NTC (2-wire)
IC Sensors:	AD590/LM335
RTD Sensor:	see note 8
Thermistor Sensing Current:	10/100 µA
IC Sensor Bias:	AD590 = 8V, LM335 = 0.6 mA
Usable Thermistor Range:	25–450,000 Ω, typical
User Calibration:	
IC Sensors:	Two point
Thermistor:	Steinhart-Hart (2 const.)

OUTPUT CONNECTORS

TEC I/O:	15-pin, D-sub
Analog Output:	BNC

TEC MEASUREMENT (DISPLAY)

Display Type:	4-digit green LED
Temperature Range:	–99.9°C to 199.9°C
Temperature Resolution:	0.1°C
Temperature Setpoint Accuracy:[3]	±0.2°C, typical
Therm. Resistance Range	
10 µA Setting:	0.0–450.0 kΩ
100 µA Setting:	0.0–45.00 kΩ
Therm. Resistance Resolution	
10 µA Setting:	0.1 kΩ
100 µA Setting:	0.01 kΩ
Therm. Resistance Accuracy	
10 µA Setting:	±0.05% of FS
100 µA Setting:	±0.05% of FS
TE Current Range:	–4.00 to 4.00 A
TE Current Resolution:	0.01 A
TE Current Accuracy:	±0.03 A

GENERAL

Power, VAC (50–60 Hz):	95–125, 210–250, selectable
Size (HxWxD):	88mm x 185mm x 304mm 3.5" x 7.3" x 12"
Weight:	3.6 kg (8 lbs)
Operating Temperature:	0°C–40°C
Storage Temperature:	–40°C to 70°C
Humidity:	<85% relative, noncondensing

NOTES

1 Output current and power rated into a 1 Ω load.
2 Actual temperature control range depends primarily on the thermal load, sensor and TE module used.
3 Accuracy figures quoted are for a typical 10 kΩ thermistor and 100 µA setting. Accuracy figures are relative to the calibration standard. Both resolution and accuracy are dependent on the user-defined configuration of the instrument.
4 Half–scale output, controlling an LDM-4412 mount @ 25°C, with a 10 kΩ thermistor on 100 µA setting.
5 Into a 1 Ω load.
6 6 V compliance guaranteed. Compliance voltage up to 8 V (32 W) is typical. Higher output powers can also be accommodated with the use of an external booster. Contact ILX Lightwave for further information.
7 Measured at 1 A output over a bandwidth of 10Hz to 10MHz.
8 With use of optional TSC-599 Temperature Sensor Converter.

In keeping with our commitment to continuous improvement, ILX Lightwave reserves the right to change specifications without notice and without liability for such changes.

ORDERING INFORMATION

LDT-5525	Thermoelectric Thermperature Controller (24 W, Includes one TS-510 thermistor)
CC-501S	TE Controller/Unterminated Interconnect Cable
CC-505S	TE Controller/Laser Diode Mount Interconnect Cable
TS-510	10 kΩ Calibrated Thermistor (±0.2°C)
TS-520	10 kΩ Uncalibrated Thermistor (±1.5°C) (–20°C to 50°C)
TS-521	Uncalibrated 5 kΩ Thermistor (±1.5°C) (–45°C to 30°C)
TS-523	Uncalibrated 20 kΩ Thermistor (±1.5°C) (–10°C to 70°C)
TS-525	Uncalibrated 100 kΩ Thermistor (±1.5°C) (10°C–110°C)
TS-530	Uncalibrated AD590LH IC Temperature Sensor
TS-540	Uncalibrated LM335AH IC Temperature Sensor
UCA-350	Unipolar Heater Control Adapter
RM-134	Single Rack Mounting Kit
RM-135	Dual Rack Mounting Kit
TSC-599	RTD Temperature Sensor Converter

ILX Lightwave
Laser Diode Instrumentation & Test Systems
P.O. Box 6310, Bozeman, MT 5977 • FAX: 406-586-9405
www.ilxlightwave.com

For information call
1-800-459-9459
International Inquiries: 406-586-1244
email: sales@ilxlightwave.com

Rev. 10/3/03