LDT 5900 Series

Precision Temperature Controller

Product Features

- High power output up to 120W (LDT-5980)
- Precision setpoint resolution of ±0.001°C with long term temperature stability of 0.005°C
- Fully programmable PID control loop
- Four-wire voltage and sensor measurements
- Auto-tune mode for independent system tuning
- Independent heating and cooling current limits
- GPIB/IEEE488 and RS-232 Interfaces

The LDT-5900 Series Temperature Controllers deliver industry-leading precision, high power temperature control for laser diodes and fiber optic components. These controllers combine a fully adjustable PID control loop with digital PWM output current, ensuring fast, efficient, and precise temperature control from -50°C to +250°C. The LDT-5900 Series supports thermistor, IC and platinum resistive (RTD) sensors, selectable from the front panel or via GPIB interface, giving you maximum flexibility during system design and test. The LDT-5948 Precision Temperature Controller is ideal for internal TE control of laser diodes, with available output power of 60W. The LDT-5980 High Power Temperature Controller delivers 120W of power for external case control in L-I-V test applications and where wide-range test temperatures are required. Additional features like four-wire voltage and sensor measurements and an AC resistance measurement make these instruments perfect for characterizing TE modules during laser module development, testing, or assembly. Input and output triggers, standard GPIB control, and an auto-tune algorithm all work to accelerate and simplify test automation.

Precision high power temperature control for laser diode and component test.

ILX Lightwave
Laser Diode Instrumentation & Test Systems

LDT 5900 Series

Precision Temperature Controller

The LDT-5900 Series Temperature Controllers provide the finest balance of features for today's temperature control needs in laser diode and component testing. In addition to wide temperature control range and uncompromising stability, these instruments combine a fully digital PID feedback loop with a precision 24-bit measurement system for the utmost capability in temperature control and measurement. Control and display temperature from -50°C to 250°C while delivering a low-noise, bipolar current (up to 10A) to the thermo-electric module. This unique temperature control topology offers fast settling time and temperature stability better than 0.005°C - ideal for laser diode applications requiring highly stable wavelength and optical power.

More power for faster temperature settling

The LDT-5980 provides 120W of output power for production applications that require fast temperature swings over a wide temperature range. The LDT-5980, with its high voltage and current output, is designed specifically to drive the TECs used in these applications. Temperature setpoint resolution of 0.001°C gives you the ability to control to the exact temperature your application requires, and the PID control loop minimizes overshoot resulting in faster temperature settling times.

Precision temperature control for today's laser diodes

The LDT-5948 employs 24-bit control technology allowing you to set temperature with 0.001°C resolution with a measurement accuracy of 0.005°C. Precise control reduces temperature effects on wavelength due to changes in physical dimensions of the laser cavity. The LDT-5948 is ideal for temperature controlling DWDM signal source DFB lasers to achieve fine wavelength tuning.

Uncompromising thermal stability

The LDT-5900 Series lets you easily control the temperature of your laser diode in one of four modes: (1) Constant Temperature (2) Constant Sensor (3) Constant Current or (4) Constant Voltage. Temperature stabilities of 0.005°C ensure device

Auto-tune function saves you effort

PID control loops provide unequaled temperature settling and stability performance but can be difficult and time consuming to optimize. Our new auto-tune function saves you effort by automatically determining PID control constants for your particular thermal load. If you change the load, you simply run the auto-tune again and let the LDT-5900 Series do the work of calculating the new control constants.

A choice of sensors for your application

In addition to a broad range of thermistors and RTDs, the LDT-5900 Series can accomodate IC temperature sensors for control feedback. By using the appropriate equation for the selected temperature sensor and the applicable calibration constants, residual errors of less than 0.005°C can be realized over wide temperature ranges. Sensor constants are easily entered via the front panel or GPIB.

Control and measurement for complex testing

In addition to precision temperature control, the LDT-5900 Series provides four-wire voltage and sensor measurement for the most accurate characterization of laser diode module power consumption and reliable measurements. Independent heating and cooling current limits help achieve the fastest settling times, while protecting your device under all instrument modes. If your application requires checking the integrity of the TE device before and after installation into a module or device, there is no need for a separate instrument. The LDT-5900 Series provides an AC resistance measurement mode that outputs a low level AC current to the device under test and calculates its corresponding resistance.

Automated temperature control for functional test systems

These LDT-5900 Series come standard with a high speed GPIB remote interface as well as RS-232 serial communication capability. For quick instrument response without a command program, a TTL trigger-in

LDT 5900 Series

Precision Temperature Controller

Specifications

	LDT-5948	LDT-5980
MEASUREMENT		
Thermistor Resistance		
10µA Setting		
Range:	10kΩ to 600kΩ	10kΩ to 600kΩ
Accuracy:	±0.05% ±5.0Ω	±0.05% ±5.0Ω
Resolution:[9]	0.001kΩ	0.001kΩ
100µA Setting		
Range:	1kΩ to 60kΩ	1kΩ to 60kΩ
Accuracy:	±0.05% ±5.0Ω	±0.05% ±5.0Ω
Resolution:[9]	0.001kΩ	0.001kΩ
1mA Setting		
Range:	10Ω to 6kΩ	10 Ω to 6kΩ
Accuracy:	±0.08% ±0.06Ω	±0.08% ±0.06Ω
Resolution:[9]	0.001kΩ	0.001kΩ
Voltage Measurement		
Range:	-12.000 to 12.000V	-12.000 to 12.000V
Accuracy:	1mV	1mV
Resolution:	±10mV	±10mV
AC Resistance Measurement		
Waveform:	Pseudo AC	Pseudo AC
Amplitude:	±10mA	±10mA
Accuracy:	±1%	±1%
SYNCHRONIZATION		
Trigger In		
Type:	TTL; edge-triggered	TTL; edge-triggered
Trigger Out		
Type:	TTL; level-triggered, active high	TTL; level-triggered, active high
Delay (Programmable):	0 to 60,000ms	0 to 60,000ms
Jitter:	5ns	5ns
Resolution:	0.001s	0.001s
GENERAL		
Output Connectors		
TEC I/O:	Female 25 pin D-sub	Female 25 pin D-sub
GPIB:	IEEE-488	IEEE-488
RS-232:	Female 9 pin D-sub	Female 9 pin D-sub
Trigger-In:	BNC	BNC
Trigger-Out:	BNC	BNC
Power Requirements:	90-260 VAC @ 50-60Hz	90-260 VAC @ 50-60Hz
Size:	3.5"x7.3"x12"	3.5"x7.3"x12"
Weight:	10.0lbs (4.5kg)	10.0lbs (4.5kg)
Ambient Temperature Range		
Operating:	10 to 40°C	10 to 40°C
Storage:	-40 to 70°C	-40 to70°C
Humidity:	85%, relative, non-condensing	85%, relative, non-condensing
Warm-up:	One (1) hour to rated accuracy	One (1) hour to rated accuracy
EMC:	98/336/EEC (CE requirements)	98/336/EEC (CE requirements)
Safety:	EN 60950	EN 60950

NOTES

1 All values relate to a one-hour warm-up period.
2 Software limits of range. Actual range possible depends on the physical load, thermistor type, and TEC module used.
3 Accuracy figures are setpoint referenced and represent the uncertainty that the 5948/5980 adds to the measurement. This figure does not include the sensor uncertainties that can add up to 2°C. Accuracy figures are quoted for a typical 10kΩ thermistor and 100µA current setting for -5°C to 50°C. Both resolution and accuracy are dependent upon the user-defined configuration of the instrument.
4 Into a 0.1 to 2.5Ω load.
5 Temperature stability measurements made at 25°C with a 10kΩ thermistor on the 100µA setting. The number is derived from P-P deviation from the average over the measurement period.
6 Measured over the full DC current range into a 1Ω load.
7 P=Proportional, I=Integral, D=Deriviative. Software programmable terms through the front panel or GPIB.
8 Thermistor sensing current range software selectable through the front panel or GPIB.
9 Higher resolution can be obtained through GPIB; <0.1Ω with 1 µA thermistor current and <0.01Ω with 100 µA thermistor current.

In keeping with our commitment to continuing improvement, ILX Lightwave reserves the right to change specifications without notice or liability for these changes.

ORDERING INFORMATION

LDT-5948	60W Precision Temperature Controller
LDT-5980	120W High Power Temperature Controller
RM-139	Single Rack Mount Kit (5900/3220)
RM-140	Dual Rack Mount Kit (5900/3220)
CC-591H	5900 10A TE Cable, unterminated
CC-595S	5A TE/LDM Cable, terminated
TS-510	Calibrated 10kΩ Thermistor
TS-520	Uncalibrated 10kΩ Thermistor
TS-521	Uncalibrated 5kΩ Thermistor
TS-523	Uncalibrated 20kΩ Thermistor
TS-525	Uncalibrated 100kΩ Thermistor
TS-530	Uncalibrated AD590LH IC Temperature Sensor
TS-540	Uncalibrated LM335AH IC Temperature Sensor

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REV02.032906

Designed for precision temperature control and systems capability.

Put our expertise to work for you

In keeping with ILX tradition, the LDT-5900 Series Temperature Controllers deliver the finest balance of features at the right price, all backed by ILX Lightwave's unmatched service and applications support. ILX Lightwave is a recognized world leader in laser diode instruments and test systems. Our products are renowned for their reliability, quality, value, and strong after-sales support.

LDT 5900 Series

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Specifications

	LDT-5948	LDT-5980
TEMPERATURE CONTROL OUPUT[1]		
Temperature Control Range[2]		
Thermistor Sensor:	-50°C to +250.000°C	-50°C to +250.000°C
IC Sensor:	-50°C to +150.000°C	-50°C to +150.000°C
RTD:	-50°C to +199.999°C	-50°C to +199.999°C
Setpoint Accuracy[3]		
T Mode:	±0.005°C	±0.01°C
I_{TE} Mode:	±0.03A	±0.03A
V_{TE} Mode:[4]	±0.05V (typical)	±0.05V (typical)
Setpoint Resolution		
T Mode:	0.001°C	0.001°C
I_{TE} Mode:	0.001A	0.001A
V_{TE} Mode:	0.001V	0.001V
Temperature Stability (24 hours):[5]	±0.005°C	±0.005°C
Output Type:	Bidirectional current source	Bidirectional current source
Compliance Voltage:	±12V DC	±12V DC
Output Current Range:	-5.000 to 5.000A	-10.000 to 10.000A
Maximum Output Power:	60W	120W
Current Noise and Ripple:[6]	15mA rms (typical)	15mA rms (typical)
Current Limit		
Range:	-5 to 5A	-10 to 10A
Accuracy:	±0.050A	±0.050A
Control Algorithm:[7]	Software PID Loop	Software PID Loop
Proportional Term:	0 to 9999.999	0 to 9999.999
Integral Term:	0 to 999.999	0 to 999.999
Derivative Term:	0 to 999.999	0 to 999.999
TEMPERATURE SENSOR		
Types		
Thermistor:	NTC (2-wire)	NTC (2-wire)
RTD Sensor:	Platinum 100Ω/1000Ω	Platinum 100Ω/1000Ω
IC Sensor		
IC-V (LM-335):	Voltage output, 5mV/°C to 14mV/°C	Voltage output, 5mV/°C to 14mV/°C
IC-I (AD-590):	Current output, 1µA/°K	Current output, 1µA/°K
Thermistor Biasing Current:[8]	10µA/100µA/1mA	10µA/100µA/1mA
Useable Thermistor/RTD Range		
10µA:	10kΩ to 600kΩ	10kΩ to 600kΩ
100µA:	1kΩ to 60kΩ	1kΩ to 60kΩ
1mA:	10Ω to 6kΩ	10Ω to 6kΩ
Sensor Bias:	IC-I=9V, IC-V=1 mA, RTD=1mA	IC-I=9V, IC-V=1mA, RTD=1mA
User Sensor Calibration		
Thermistor:	Steinhart-Hart, 3 constants	Steinhart-Hart, 3 constants
IC Sensors:	Offset/slope	Offset/slope
RTD:	R_0, A, B, C	R_0, A, B, C