

## Product Features

Recirculating chillers with 200W and 375W models

TEC based temperature control from -5°C to 45°C with 0.05°C stability

High power laser diode protection with multiple safety interlocks

Variable speed fan for quiet operation

USB 2.0 computer interface

Removable front panel for remote control

Coolant flow measurement and readout

The LDT-53500 Series of Laser Diode Thermoelectric Chillers are designed specifically for high power laser diode temperature control applications. Four models are available with 200W and 375W cooling capacity and provide high temperature stability for precise high power laser diode temperature control. Heat and cool modes of operation provide temperature control over a range of -5°C to 45°C. Standard features include safety interlocks, a removable front panel for remote control, external temperature sensing, and flow measurement.

The LDT-53500 Series has been optimized for protecting high power laser diodes. Laser diode protection is provided through multiple interlocks which are compatible with ILX high power laser diode drivers. The interlocks will change states in the event of loss of flow, over temperature limit, and if the chiller output is disabled.

For easy integration into automated test applications, the LDT-53500 comes standard with a USB 2.0 computer interface and front panel USB graphical user interface.



Safe, affordable temperature control for  
high power laser diodes

 **ILX Lightwave**  
Laser Diode Instrumentation & Test Systems

# LDT 53500 Series

Laser Diode  
Thermoelectric  
Chiller

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## DESIGNED TO PROTECT HIGH POWER LASER DIODES

The new LDT-53500 Laser Diode Thermoelectric Chiller is specifically designed to provide protection to your high power laser diodes. Protection features include normally open and normally closed interlocks and multiple fault monitoring circuits. When the interlocks are used with ILX Lightwave high power laser diode drivers, the laser is protected if a chiller fault occurs. The interlocks will change states in the event of loss of flow, over temperature limits, and if the chiller output is disabled.

Front panel fault indicators clearly identify low reservoir, over temperature limit, and loss of flow. An audible alarm will notify the user of a low reservoir and over temperature limit. The alarm can be silenced via a front panel mute button.

## PRECISION TEMPERATURE CONTROL

Heat and cool modes of operation provide stable temperature control over a range of  $-5^{\circ}\text{C}$  to  $45^{\circ}\text{C}$ . The heat exchanger design and optimized PID control loop constants provide temperature stability of  $\pm 0.05^{\circ}\text{C}$  at the water outlet.

The chiller can monitor a thermistor or RTD sensor near the laser diode and use that sensor as the feedback control, allowing for more accurate temperature control at the device under test. The user can enter in Steinhart-Hart constants for calibrated thermistors.

## COOLANT FLOW MEASUREMENT

A unique flow sensor developed at ILX monitors for loss of coolant flow and also has the ability to measure flow. This internal flow sensor eliminates the need for external flow sensors that can reduce the overall coolant pressure of the chiller. Measured flow can be displayed on both the front panel and via the USB interface.

## QUICK AND EASY SETUP

The intuitive front panel and use of quick water disconnects enable the user to quickly set up either LDT-53500 model. A bright 7-segment LED display is highly visible from a distance in darkened labs. Connecting the LDT-53500 chiller interlock to a laser diode driver such as the LDX-36000 is accomplished by connecting wires from the 53500 terminal blocks located on the rear of the chiller to the driver's interlock terminal blocks.



LDT-53500 Front Panel Display

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Laser Diode  
Thermoelectric  
Chiller



*LDX-36000 High Power Laser Diode Driver*



To ensure protection of expensive high power laser diodes from chiller faults, the LDT-53500 interlock can be connected to an ILX high power laser diode driver interlock.

## REMOTE CONTROL

The LDT-53500 Laser Diode Thermoelectric Chiller has a unique removable front panel to allow users to place the chiller in a convenient location with the front panel near the application. The front panel communicates to the LDT-53500 chassis via a standard RJ45 connector. In addition to the removable front panel, the LDT-53500 comes standard with a USB interface for remote control from a computer. A GUI interface is included with the LDT-53500 support application CD or can be downloaded from the ILX website.

## SAFE AND RELIABLE OPERATION

The LDT-53500 is designed for long lifetimes by the use of thermoelectric modules. Thermoelectric modules eliminate additional moving parts that can lead to expensive or costly repairs in compressor based chillers. Thermoelectric module lifetimes have exceeded hundreds of thousands of hours. The choice of the only moving parts, the pump and the fan, were carefully selected to provide long lifetime in continuous operation.

## QUIET OPERATION

To reduce noise in the lab, the pump and fans were selected for performance and quiet operation. Also to eliminate excessive noise, the fan speed is automatically adjusted in response to the amount of heat being removed by the chiller. This allows for quieter operation when the chiller is not being operated at the maximum thermal load.

## PUT OUR EXPERTISE TO WORK

ILX Lightwave is a recognized world leader in Laser Diode Instrumentation and Test Systems. Our products are not only renowned for their reliability, quality, and value; they're backed by industry leading after-sales support.

For more information about the LDT-53500 Laser Diode Thermoelectric Chiller, and our complete family of Laser Diode Instrumentation and Test Systems, call us today or visit our website [www.ilxlightwave.com](http://www.ilxlightwave.com).

# LDT 53500 Series

Laser Diode  
Thermoelectric  
Chiller

## Specifications<sup>6</sup>

	LDT-53520	LDT-53540	LDT-53522	LDT-53542
Cooling Capacity: <sup>1</sup>	200W	375W	200W	375W
Power Consumption:	850W	1300W	850W	1300W

### THERMAL PERFORMANCE

Thermal Performance	LDT-53520	LDT-53540	LDT-53522	LDT-53542
Control Temperature Range: <sup>3</sup>	-5°C to 45°C	-5°C to 45°C	-5°C to 45°C	-5°C to 45°C
Temperature Stability: <sup>1,2</sup>	±0.05°C	±0.05°C	±0.05°C	±0.05°C
Temperature Accuracy: <sup>1,5</sup>	±0.2°C	±0.2°C	±0.2°C	±0.2°C

### FLUID / FLOW SPECIFICATIONS

Fluid Type:	Distilled water or distilled water mixed with <30% isopropyl alcohol or propylene glycol
Flow Rate: <sup>4</sup>	2 LPM @ 3m H <sub>2</sub> O
Reservoir Capacity:	300 - 400 ml
Flow Measurement Range:	0.8 - 4.0 LPM
Flow Measurement Accuracy:	±20%
Fluid Interconnects:	Colder Products Quick Disconnect with Check Valve

### EXTERNAL TEMPERATURE SENSORS

External Sensor Selector:	4 Pole Switch
External Sensor Connection:	15 Pin, D-Sub, Female
Thermistor	
Type:	2-Wire NTC
Usable Range:	450Ω - 350 kΩ
Current Source:	10 / 100 μA selectable source
Calibration:	Steinhart-Hart (2 constants)
IC Sensors:	
Type:	AD590 / LM335
Calibration:	2 - Point
Source	
AD590:	8V
LM335	0.6mA

### ERRORS / ALARMS

Error States:	Water Level Low; Flow Stops; Over Temp Set Point; Output Off
Audible Alarm States:	Level Sense Low; Over Temperature Set Point
Mute:	Mute button to disable audible alarm

### INTERLOCKS

Connector:	Terminal Block
Interlock 1:	Normally Open
Interlock 2:	Normally Closed
Interlock States (triggered):	No Flow; Over Temp Set Point; Output Off

### REMOVABLE FRONT PANEL

Size:	2U x 6" wide - rack mountable
Display:	4 digit 7 - segment LED
Remote Connector:	RJ45 - 8 Conductor
Remote Cable:	Ethernet

### SOFTWARE / FIRMWARE / COMMUNICATIONS

External Communication:	USB
Virtual Front Panel:	C# application communicates thru USB

### GENERAL

Size (H x W x D):	15.5" x 11" x 13"
Weight:	47 lbs (LDM-53520; LDT-53522) 57 lbs (LDM-53540; LDT-53542)
Operating Temperature:	23°C ± 5°C
Storage Temperature:	-25°C to + 65°C
Humidity:	<80% RH - non-condensing
Input Power (LDT-53520; LDT-53540):	110V; 60Hz; single phase
Input Power (LDT-53522; LDT-53542):	220V; 50Hz; single phase
Noise:	<66 dBA

### REGULATORY

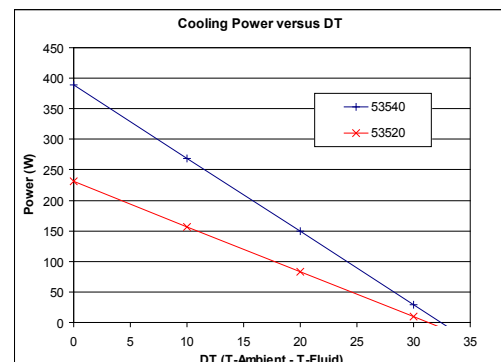
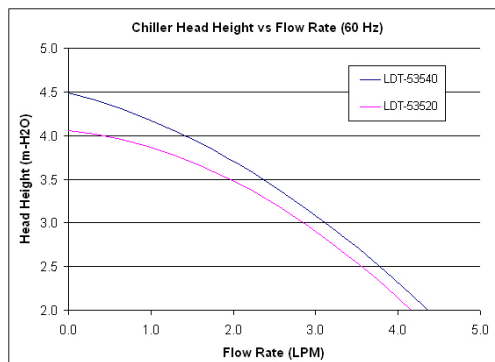
CE:	LDT-53522 and LDT-53542 only
Certifications:	Low Voltage Directive 73/23/EEC; EN61010-1:2001; Electromagnetic Compatibility 89/336/EEC; EN61326-2006

### NOTES

1. Temperature set point (internal) set to ambient and thermal load coupled closely to the inlet and outlet ports.
2. Stability measured with a 200W thermal load (LDT-53540) and a 100W thermal load (LDT-53520) using an internal thermistor.
3. Operation below 5°C requires the addition of isopropyl alcohol (<30%) or propylene glycol (<30%) to prevent freezing. Propylene glycol is effective down to 0°C. To operate below 0°C, isopropyl alcohol must be used.
4. Flow characteristics at 60Hz. Output will be lower at 50Hz.
5. External temperature measurement accuracy for AD590 and LM335 sensors will be ±0.2°C and ±1.0°C respectively.
6. All specifications are after a one hour warm-up / stabilization time.

### ORDERING INFORMATION

LDT-53520	200W Laser Diode Thermoelectric Chiller
LDT-53540	375W Laser Diode Thermoelectric Chiller
LDT-53522	200W 220V Laser Diode Thermoelectric Chiller
LDT-53542	375W 220V Laser Diode Thermoelectric Chiller
LDM-49840	High Power Butterfly Laser Diode Mount
LDM-49840T	High Power Butterfly Laser Diode Mount with Case Temperature Control
LDM-49860	High Power 2-Pin Module Laser Diode Mount
LDM-49860T	High Power 2-Pin Module Laser Diode Mount with Case Temperature Control
LDM-4415	CS Bar Package Mounting Fixture
LDX-36000 Series	High Power Laser Diode Driver
LDX-32420	High Power Precision Current Source



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P.O. Box 6310, Bozeman, MT 59771 • FAX: 406-586-9405

[www.ilxlightwave.com](http://www.ilxlightwave.com)

**光貿易株式会社**  
〒113-0034  
東京都文京区湯島 3-13-8 湯島不二ビル 301号  
TEL: 03-3832-3117 FAX: 03-3832-3118  
e-mail: [contact@hikari-trading.com](mailto:contact@hikari-trading.com)  
<http://www.hikari-trading.com/>



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