



LDC 3900

Modular Laser Diode Controller

Wide Range of Modules

Five current source modules and five combination modules along with two TE controller only modules make the LDC-3900 configurable for many laser diode testing and control applications. Each module is electrically floating or fully isolated from all other modules. This allows you to configure your laser diode test system without the worry of potential laser diode damaging ground loops.

Current Source Modules

The LDC-3900 current source design offers superior laser protection and low noise, high stability performance. These modules also feature a photodiode measurement circuit for devices with backfacet monitor photodiode and analog modulation up to 500kHz for dithering the laser current for wavelength tuning. Five different current source modules up to 8A can be driven in any one of the following modes:

- 1) Constant current, low bandwidth
- 2) Constant current, high bandwidth
- 3) Constant optical power

Highly Stable Temperature Control

The LDC-3900 TEC modules control temperature of your devices with 32W of power. These TEC modules offer maximum flexibility with a choice of operating modes and temperature sensors covering thermistors, IC, and RTDs. A low noise, bipolar output with TE voltage measurement and an ultra-stable topology achieves stabilities better than 0.005°C. A smart integrator control loop, programmable from the front panel or through GPIB, delivers fast settling times.

Controller Modules

Controller modules combine a current source with a temperature controller in one module. Laser current from 200mA to 2A is available with an integrated 12W temperature controller for current

and temperature control of laser diodes. All of the features found in the current only and temperature control modules are incorporated into these flexible modules and include multiple modes of operation, external modulation, a choice of temperature sensors, and all protection features.

Intuitive Front Panel

Divided into two sections, TEC and LASER, the front panel offers quick, easy operation and information display without confusing multi-layer menus. Each channel is directly addressable from the front panel "adjust" section and indicated through discrete LEDs next to the respective display. Laser and TEC parameters and modes are easily selected or adjusted through discrete pushbuttons.

Powerful GPIB Interface

For automated control, the IEEE/GPIB interface allows programming and readout from most computers. All instrument and module functions are accessible through the interface allowing you to simultaneously control multiple laser diodes from the same address. For virtual instrument programming, LabVIEW® drivers are available upon request or through the ILX website.

** Semiconductor lasers are sensitive devices. Always take appropriate antistatic precautions and use extreme care when handling laser diodes. For more information, request ILX Application Note #3, "Protecting Your Laser Diode."*



Up to four modules can be easily adjusted and controlled from the LDC-3900 front panel.

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Modular Laser Diode Controller

Specifications

Current Source Modules¹

Current Source ¹	39020	39050	39100	39400	39800 ¹⁴
DRIVE CURRENT OUTPUT					
Output Current Range:	0–200mA	0–500mA	0–1000mA	0–4000mA	0–8000mA
Setpoint					
Resolution:	10µA	10µA	100µA	100µA	125µA
Accuracy:	±0.1% of FS	±0.1% of FS	±0.1% of FS	±0.1% of FS	±0.1% of FS
Compliance Voltage:	7V	6.5V	6V	5V	5V at connector (4.5V end of cable)
Temperature Coefficient:	<60ppm/°C	<60ppm/°C	<100ppm/°C	<100ppm/°C	<100ppm/°C
Short-Term Stability (one-hour): ²	<20ppm	<20ppm	<20ppm	<20ppm	<20ppm
Long-Term Stability (24 hours): ³	<50ppm	<40ppm	<40ppm	<40ppm	<40ppm
Noise and Ripple (µA rms) ⁴					
High Bandwidth Mode:	<3µA	<5µA	<10µA	<15µA	<120µA
Low Bandwidth Mode:	<2.5µA	<3µA	<5µA	<5µA	<110µA
With LNF-320: ⁵	<1µA	<1.5µA	<2.5µA	<3µA	N/A
Transients:					
Operational: ⁶	<1mA	<1mA	<2mA	<5mA	<8mA
Power-line spike induced: ⁷	<5mA/<8mA	<5mA/<8mA	<5mA/<8mA	<10mA/<20mA	<20mA/<40mA
Isolation:	All modules isolated from other modules and earth ground				
DRIVE CURRENT LIMIT SETTINGS					
Range:	0–200mA	0–500mA	0–1000 mA	0–4000mA	0–8000mA
Resolution:	0.5mA	2mA	4mA	16mA	40mA
Accuracy:	±2mA	±5mA	±10mA	±40mA	±80mA
PHOTODIODE FEEDBACK					
Type:	Transimpedance	Transimpedance	Transimpedance	Transimpedance	Transimpedance
Reverse Bias:	0–5V, adjustable	0–5V, adjustable	0–5V, adjustable	0–5V, adjustable	0–5V, adjustable
Photodiode Current Range:	0–5mA	0–5mA	0–10mA	0–20mA	0–20mA
Output Stability: ⁸	0.02%	0.02%	0.02%	0.02%	0.02%
Setpoint Accuracy:	±0.05% of FS	±0.05% of FS	±0.05% of FS	±0.1% of FS	±0.1% of FS
EXTERNAL ANALOG MODULATION					
Input:	0–10V, 10kΩ	0–10V, 10kΩ	0–10V, 10kΩ	0–10V, 10kΩ	0–10V, 10kΩ
Transfer Function:	20mA/V	50mA/V	100mA/V	400 mA/V	800mA/V
Bandwidth (3dB)					
High Bandwidth: ⁹	DC to 500kHz	DC to 200kHz	DC to 200kHz	DC to 50kHz	DC to 50kHz
Low Bandwidth:	DC to 5kHz	DC to 5kHz	DC to 5kHz	DC to 2kHz	DC to 2kHz
Low Bandwidth CW: ⁵	DC to 30Hz	DC to 30Hz	DC to 30Hz	DC to 30Hz	DC to 30Hz
OUTPUT CONNECTORS					
Current Source Output:	9-pin, D-sub	9-pin, D-sub	9-pin, D-sub	9-pin, D-sub	16-pin, Bulkhead
Photodiode Input:	Coax BNC	Coax BNC	Coax BNC	Coax BNC	Coax BNC
Analog Modulation Input:	Coax BNC	Coax BNC	Coax BNC	Coax BNC	Coax BNC
	inst. amp. input	inst. amp. input	inst. amp. input	inst. amp. input	inst. amp. input
MEASUREMENT (DISPLAY)¹⁰					
Output Current					
Range:	0–200.00mA	0–500.00mA	0–1000.0mA	0–4000.0mA	0–8000.0mA
Resolution:	0.01mA	0.01mA	0.1mA	0.1mA	0.1mA
Accuracy: ¹¹	±0.05% of FS	±0.1% of FS	±0.1% of FS	±0.1% of FS	±0.1% FS
Photodiode Current					
Range:	0–5000µA	0–5000µA	0–10,000µA	0–20,000µA	0–20,000µA
Resolution:	1µA	1µA	1µA	1µA	1µA
Accuracy: ¹¹	±2µA	±2µA	±2µA	±4µA	±4µA
Photodiode Responsivity					
Range: ¹²	0.00–600.00µA/mW	0.00–600.00µA/mW	0.00–600.00µA/mW	0.00–600.00µA/mW	0.00–1000.00µA/mW
Resolution:	0.01µA/mW	0.01µA/mW	0.01µA/mW	0.01µA/mW	0.01µA/mW
Optical Power					
Range:	0.00–200.00mW	0.00–500.00mW	0.00–1000.0mW	0.00–5000.0mW	0.00–8000.0mW
Resolution:	0.01mW	0.1mW	0.1mW	0.1mW	0.1mW
Forward Voltage					
Range:	0.000–7.000V	0.000–7.000V	0.000–7.000V	0.000–5.000V	0.000–5.000V
Resolution:	1mV	1mV	1mV	1 mV	1mV
Accuracy: ¹³	±3mV	±3mV	±3mV	±3mV	±5mV

CURRENT SOURCES NOTES

- All values relate to a one-hour warm-up period.
- Over any one-hour period, half-scale output at 25°C ambient.
- Over any 24-hour period, half-scale output at 25°C ambient.
- Measured optically from resulting intensity fluctuations of a laser diode with a 150kHz bandwidth photodetector. Measurements made with 1MHz detector are typically 10% higher.
- With model LNF-320 low noise CW filter enabled.
- Maximum output current transient resulting from normal operational situations (i.e., power on-off, current on-off), as well as accidental situations (i.e., power line plug removal). For more information, request ILX "Transient Test Standards" #LDC-00196.

- Maximum output current transient resulting from a 1000V power line transient spike. Tested to ILX Lightwave Technical Standard #LDC-00196.
- Maximum monitor photodiode current drift over any 30 minute period. Assumes zero drift in responsivity of photodiode.
- 50% modulation at mid-scale output.
- Displayed on LDC-3900 mainframe front panel "LASER" section.
- Measured at 25°C.
- Responsivity value is user-defined and is used to calculate the optical power.
- Voltage measurement accuracy while driving calibration load. Connected at the rear panel connector. Accuracy may vary depending on load and cable length used.
- Model 39800 8A module uses two rear-panel module bays.

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Isolation:		All modules isolated from other modules and earth ground			
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Type:	Transimpedance	Transimpedance	Transimpedance	Transimpedance	Transimpedance
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Resolution:	0.01µA/mW	0.01µA/mW	0.01µA/mW	0.01µA/mW	0.01µA/mW
Optical Power					
Range:	0.00–200.00mW	0.00–500.00mW	0.00–1000.0mW	0.00–5000.0mW	0.00–8000.0mW
Resolution:	0.01mW	0.1mW	0.1mW	0.1mW	0.1mW
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- 1) Constant current, low bandwidth
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- 3) Constant optical power

Highly Stable Temperature Control

The LDC-3900 TEC modules control temperature of your devices with 32W of power. These TEC modules offer maximum flexibility with a choice of operating modes and temperature sensors covering thermistors, IC, and RTDs. A low noise, bipolar output with TE voltage measurement and an ultra-stable topology achieves stabilities better than 0.005°C. A smart integrator control loop, programmable from the front panel or through GPIB, delivers fast settling times.

Controller Modules

Controller modules combine a current source with a temperature controller in one module. Laser current from 200mA to 2A is available with an integrated 12W temperature controller for current

and temperature control of laser diodes. All of the features found in the current only and temperature control modules are incorporated into these flexible modules and include multiple modes of operation, external modulation, a choice of temperature sensors, and all protection features.

Intuitive Front Panel

Divided into two sections, TEC and LASER, the front panel offers quick, easy operation and information display without confusing multi-layer menus. Each channel is directly addressable from the front panel "adjust" section and indicated through discrete LEDs next to the respective display. Laser and TEC parameters and modes are easily selected or adjusted through discrete pushbuttons.

Powerful GPIB Interface

For automated control, the IEEE/GPIB interface allows programming and readout from most computers. All instrument and module functions are accessible through the interface allowing you to simultaneously control multiple laser diodes from the same address. For virtual instrument programming, LabVIEW® drivers are available upon request or through the ILX website.

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Up to four modules can be easily adjusted and controlled from the LDC-3900 front panel.

Product Features

4 Independent Channels with 8 isolated outputs

Laser current source modules from 200mA to 8A

LD controller modules from 200mA to 2A with integrated 12W TEC

32W TEC only modules with voltage measurement

TEC modules accept thermistor, IC and RTD temperature sensors

Standard GPIB IEEE interface

The LDC-3900 Modular Laser Diode Controller features four channels with eight isolated outputs for controlling multiple laser diodes. Modules include current sources with maximum outputs from 200mA to 8A, TE (thermoelectric) controller modules with up to 32W of power and voltage measurement, and controller modules with laser control from 200mA to 2A and integrated 12W TE control.

An independent power supply powers each channel, providing protection and stability for your laser diode. Every module incorporates low noise, high stability performance, and ILX Lightwave's unmatched laser diode protection topologies including independent current limits and laser diode shorting relays.

Remote communication through an IEEE/GPIB interface simplifies testing and control of multiple devices. LabVIEW® drivers are also available for any combination of mainframe and module.

LDC 3900

Modular Laser Diode Controller



Flexible, Comprehensive Control of Laser Diodes

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

LDC 3900

Modular Laser Diode Controller

Specifications

TEC Modules¹

39032/39034¹⁵

TEMPERATURE CONTROL

Temperature Control Range:² -99.9°C to 199.9°C

Thermistor Setpoint

Resolution and Accuracy:³
-20°C to 20°C
20°C to 50°C

Resolution	Accuracy
0.1°C	±0.2°C
0.2°C	±0.2°C

AD590 and LM335 Setpoint

Resolution and Accuracy:⁴
-20°C to 50°C

Resolution	Accuracy
0.01°C	±0.1°C

Short Term Stability (one-hour):⁵

Long Term Stability (24-hours):⁶

<±0.004°C
<±0.01°C

TEC OUTPUT⁷

Output Type:

Bipolar current source

Isolation:

Isolated from other modules and earth ground

Compliance Voltage:

>8V

Short Circuit Output Current:

4A

Maximum Output Power:

32W

Current Limit

Range: 0-4A

Set Accuracy: ±50mA

Ripple/Noise:⁹

<1mA, rms

Control Algorithm:

Smart Integrator, Hybrid PI

TEMPERATURE SENSOR

Types

Thermistor:

NTC (2-wire)

IC Temperature Sensor:

AD590/ LM335

RTD Sensor:⁹

Pt100/other 100Ω RTD

Thermistor Sensing Current:

10/100μA

Sensor Bias:

AD590 = 8V, LM335 = 1mA,
RTD = 0.8 mA⁹

Usable Thermistor Range:

25-450,000Ω, typical

Typical Thermistor Output¹⁰

AD590 Current Output: I (25°C) = 298.2μA, I_t = 1μA/K

LM335 Voltage Output: V (25°C) = 2.73V, V_t = 10mV/K

RTD (PT100) Resistance: R (25°C) = 109.73Ω

User Calibration:

Thermistor = Steinhart-Hart
IC Sensors, RTD = Two-point

TEC OUTPUT CONNECTORS

Temperature Controller Output: 15-pin, D-sub

TEC MEASUREMENT (DISPLAY)¹¹

Temperature:	Range ¹²	Resolution	Accuracy
10μA Setting: ¹³	-99.99°C to 199.99°C	0.01°C	±0.1°C
100μA Setting: ¹⁴	-99.99°C to 199.99°C	0.01°C	±0.05°C

Thermistor Resistance:

10μA Setting:	0.01kΩ	±0.05%
100μA Setting:	0.001kΩ	±0.05%

TE Current:

-4.000 to 4.000A	0.001A	±0.04A
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TE VOLTAGE¹⁵

Voltage Range:

-9.999 to 9.999V

Voltage Resolution:

1mV

Voltage Accuracy:

±30mV¹⁶

TEC MODULE NOTES:

- All values relate to a one-hour warm-up period.
- Software limits of range. Actual range possible depends on the physical load, thermistor type, and TE module used.
- Accuracy figures are quoted for a typical 10kΩ thermistor and 100μA current setting. Accuracy figures are relative to the calibration standard. Both resolution and accuracy are dependent upon the user-defined configuration of the instrument.
- Accuracy depends upon the the sensor model selected, the calibration standard, and the user-defined configuration of the instrument.
- Over any one-hour period, half-scale output, controlling an LDM-4412 mount at 25°C, with 10kΩ thermistor on 100μA setting.
- Over any 24-hour period, half-scale output, controlling an LDM-4412 mount at 25°C, with 10kΩ thermistor on 100μA setting.
- Into a 1Ω load.
- Measured at 1A output over a bandwidth of 10Hz to 10MHz.
- To use RTD sensor, model 39032 must be ordered with TSC595 Sensor Option. To use RTD sensors with model 39034, order TSC-599 Temperature Sensor Converter accessory.
- Nominal temperature coefficients, I_t and V_t, apply over the rated IC temperature sensor range.
- Displayed on LDC-3900 mainframe front panel "TEC" section.
- Software limits of display range.
- Using a 100kΩ thermistor, controlling an LDM-4412 mount over -30°C to 25°C.
- Using a 10kΩ thermistor, controlling an LDM-4412 mount over 0°C to 90°C.
- Model 39034 has TEC Voltage measurement through GPIB only. Not available on Model 39032.
- Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load used.

MAINFRAME/GENERAL

Chassis Ground: 4mm Banana jack

Power Requirements,

50-60Hz: 100VAC, 120VAC, 220VAC,

(user selectable) 240VAC, (+6%/-10%)

Size (HxWxD): 145mm x 426mm x 346mm

(5 5/8" x 16 3/4" x 13 5/8")

Weight

Mainframe: 12.5kg (27.5lbs)

Module (each, typical): 1.0 kg (2.3lbs)

Operating Temperature:

0°C to 50°C

Storage Temperature:

-40 to 70°C

Humidity:

<90%, noncondensing

Laser Safety Features:

Keypad, Interlock, Output Delay
(Meets CDRH US21 CFR 1040.10)

Laser Display:

5-digit, Green LED

TEC Display:

5-digit, Green LED

ORDERING INFORMATION NOTES

** Includes ILX model LTS-520 calibrated 10kΩ thermistor.

In keeping with our commitment to continuing improvement, ILX Lightwave reserves the right to change specifications at any time without notice and with out liability for such changes.

ORDERING INFORMATION

LDC-3900	Modular Laser Diode Controller Mainframe
CSM-39020	200mA Current Source Module
CSM-39050	500mA Current Source Module
CSM-39100	1A Current Source Module
CSM-39400	4A Current Source Module
CMS-39800	8A Current Source Module (Module take two slots in LDC-3900)
TCM-39032**	32W TEC Module
TCM-39034**	32W TEC Module with Voltage Measurement
LCM-39420	Current/TEC Combination Module (200mA Drive Current/8W TEC)
LCM-39425	Current/TEC Combination Module (500mA Drive Current/12W TEC)
LCM-39427	Current/TEC Combination Module (500mA Drive Current/12W TEC) with Modulation
LCM-39437	Current/TEC Combination Module (1A Drive Current/12 W TEC) with Modulation
LCM-39440	Current/TEC Combination Module (2A Drive Current/8W TEC)
CC-305S	Current Source/Laser Diode Mount Interconnect Cable
CC-306S	Current Source/Unterminated Interconnect Cable
CC-501S	TE Controller/Unterminated Interconnect Cable
CC-505S	TE Controller/Laser Diode Mount Interconnect Cable
TS-510	Calibrated 10kΩ Thermistor
TS-520	Uncalibrated 10kΩ Thermistor
TS-530	Uncalibrated AD590LH IC Temperature Sensor
TS-540	Uncalibrated LM335AH IC Temperature Sensor
TSC-595	RTD Temperature Sensor Control Option (for 39032 Module)
RM-103	Rack Mounting Kit
UCA-350	Unipolar Heater Control Adapter
LNF-320	Low Noise Filter
LabVIEW®	Instrument Driver

 **ILX Lightwave**

Laser Diode Instrumentation & Test Systems

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

www.ilxlightwave.com

For information call
1-800-459-9459

International Inquiries: 406-5856-2481
email: sales@ilxlightwave.com



REV02.092006

Specifications

LDC 3900

Modular Laser Diode Controller

Combination Modules

39420 39425 39427 39437 39440

ISOLATION: Each module is isolated from other modules and earth ground. TEC and current source independently isolated

OUTPUT CONNECTORS

Laser Drive Current I/O: 9-pin, D-sub 9-pin, D-sub 9-pin, D-sub 9-pin, D-sub 9-pin, D-sub
Temperature Controller I/O: 15-pin, D-sub 15-pin, D-sub 15-pin, D-sub 15-pin, D-sub 15-pin, D-sub

DRIVE CURRENT OUTPUT¹

Output Current Range:⁹ 0–200mA 0–500mA 0–500mA 0–1000mA 0–2000mA
Setpoint
Resolution: 10µA 10µA 10µA 100µA 100µA
Accuracy: ±0.05% of FS ±0.05% of FS ±0.05% of FS ±0.05% of FS ±0.05% of FS
Compliance Voltage: 6V 6V 6V 6V 5V
Temperature Coefficient: 100ppm/°C 100ppm/°C 100ppm/°C 100ppm/°C 100ppm/°C
Short-Term Stability (one-hour):² 25ppm 25ppm 25ppm 25ppm 25ppm
Long-Term Stability (24 hours):³ 50ppm 50ppm 50ppm 50ppm 50ppm
Noise and Ripple (µA/rms)⁴
Unfiltered: <2.5µA <4µA <4µA <4µA <10µA
With model 320 Filter:⁵ <1µA <1.5µA <1.5µA <1.5µA <2µA
Transients:
Operational:⁶ <1mA <1mA <1mA <1mA <1mA
1kV EFT: <4mA <4mA <4mA <4mA <10mA
Surge:⁷ <7mA <7mA <7mA <7mA <8mA

DRIVE CURRENT LIMIT SETTINGS

Range: 0–200mA 0–500mA 0–500mA 0–1000mA 0–2000mA
Accuracy: ±2mA ±5mA ±5mA ±10mA ±20mA

PHOTODIODE FEEDBACK

Type: Current input differential, zero bias, all modules
Range: 20–2000µA 20–2000µA 20–4000µA 20–4000µA 20–5000µA
Output Stability:⁸ ±2µA ±2µA N/A N/A ±2µA
Setpoint Accuracy: ±2µA ±2µA N/A N/A ±5µA

EXTERNAL ANALOG MODULATION

Input: N/A N/A 0–10V, 10kΩ 0–10V, 10kΩ N/A
Transfer Function: N/A N/A 50mA/V 100mA/V N/A
Bandwidth (3dB): N/A N/A DC to 250kHz DC to 200kHz N/A

DRIVE CURRENT MEASUREMENT (DISPLAY)

Output Current Range: 0–200.00mA 0–500.00mA 0–500.00mA 0–1000.00mA 0–2000.0mA
Output Current Resolution: 0.01mA 0.01mA 0.01mA 0.01mA 0.1mA
Output Current Accuracy:¹⁰ ±0.1mA ±0.5mA ±0.5mA ±0.5mA ±1mA
Photodiode Current Range: 0–2000µA 0–2000µA 0–4000µA 0–4000µA 0–5000µA
PD Current Resolution: 1µA 1µA 1µA 1µA 1µA
PD Responsivity Range: 0.00–1000.00µA/mW 0.00–1000.00µA/mW 0.00–1000.00µA/mW 0.00–1000.00µA/mW 0.00–1000.00µA/mW
PD Responsivity Resolution: 0.01µA/mW 0.01µA/mW 0.01µA/mW 0.01µA/mW 0.01µA/mW
Optical Power Range: 0.00–200.00mW 0.00–200.00mW 0.00–1000.00mW 0.00–1000.00mW 0.00–2000.0mW
Optical Power Resolution: 10µW 10µW 10µW 10µW 100µW

TEMPERATURE CONTROL OUTPUT⁹

Temperature Control Range:¹¹ –99.9°C to 99.9°C –99.9°C to 99.9°C –99.9°C to 99.9°C –99.9°C to 99.9°C –99.9°C to 99.9°C
Thermistor Setpoint
Resolution and Accuracy¹²
–20°C to +20°C: Res. 0.1°C Acc. ±0.2°C Res. 0.1°C Acc. ±0.2°C Res. 0.1°C Acc. ±0.2°C Res. 0.1°C Acc. ±0.2°C Res. 0.1°C Acc. ±0.2°C
+20°C to +50°C: Res. 0.2°C Acc. ±0.2°C Res. 0.2°C Acc. ±0.2°C Res. 0.2°C Acc. ±0.2°C Res. 0.2°C Acc. ±0.2°C
Short Term Stability (1 hr.):¹³ <±0.05°C <±0.05°C <±0.05°C <±0.05°C <±0.05°C
Long Term Stability (24 hrs.):¹⁴ <±0.1°C <±0.1°C <±0.1°C <±0.1°C <±0.1°C
Output Type: Bipolar, constant current source, all modules
Compliance Voltage: >4V DC >6V DC >6V DC >6V DC >4V DC
Short Circuit Output Current: 2A 2A 2A 2A 2A
Maximum Output Power: 8W 12W 12W 12W 8W
Current Noise and Ripple: <1mA rms <1mA rms <1mA rms <1mA rms <1mA rms
Current Limit Range: 0–2A 0–2A 0–2A 0–2A 0–2A
Current Limit Set Accuracy: 0.05A 0.05A 0.05A 0.05A 0.05A
Control Algorithm: Smart Integrator, Hybrid PI, all modules

LDC 3900

Modular Laser Diode Controller

Specifications

	39420	39425	39427	39437	39440
TEMPERATURE SENSOR					
Types:	Thermistor (2-wire NTC)	Thermistor (2-wire NTC)	Thermistor (2-wire NTC)	Thermistor (2-wire NTC)	Thermistor (2-wire NTC)
Thermistor Sensing Current:	10/100 μ A (user-selectable)	10/100 μ A (user-selectable)	10/100 μ A (user-selectable)	10/100 μ A (user-selectable)	10/100 μ A (user-selectable)
Usable Thermistor Range:	25–450,000 Ω typical	25–450,000 Ω typical	25–450,000 Ω typical	25–450,000 Ω typical	25–450,000 Ω typical
User Calibration:	Steinhart-Hart	Steinhart-Hart	Steinhart-Hart	Steinhart-Hart	Steinhart-Hart
TEC MEASUREMENT (DISPLAY)					
Range					
Temperature:	–99.9°C to 99.9°C	–99.9 °C to 99.9°C	–99.9 °C to 99.9°C	–99.9 °C to 99.9°C	–99.9 °C to 99.9°C
Thermistor Resistance					
10 μ A Setting:	0.00–450.00k Ω	0.00–450.00k Ω	0.00–450.00k Ω	0.00–450.00k Ω	0.00–450.00k Ω
100 μ A Setting:	0.000–45.000k Ω	0.000–45.000k Ω	0.000–45.000k Ω	0.000–45.000k Ω	0.000–45.000k Ω
TE Current:	–2.000 to 2.000A	–2.000 to 2.000A	–2.000 to 2.000A	–2.000 to 2.000A	–2.000 to 2.000A
Accuracy					
Temperature:	\pm 0.5°C	\pm 0.5°C	\pm 0.5°C	\pm 0.5°C	\pm 0.5°C
Thermistor Resistance					
10 μ A Setting:	\pm 0.05k Ω	\pm 0.05k Ω	\pm 0.05k Ω	\pm 0.05k Ω	\pm 0.05k Ω
100 μ A Setting:	\pm 0.005k Ω	\pm 0.005k Ω	\pm 0.005k Ω	\pm 0.005k Ω	\pm 0.005k Ω
TE Current:	\pm 0.01A	\pm 0.01A	\pm 0.01A	\pm 0.01A	\pm 0.01A

COMBINATION MODULES NOTES:

- All values measured after a one-hour warm-up period.
- Over any one-hour period, half-scale output.
- Over any 24-hour period, half-scale output.
- Measured from resulting intensity fluctuations of a laser diode, measured optically with a 150kHz bandwidth photodetector. Measurements made with 1MHz detector are typically 10% higher.
- ILX Lightwave model LNF-320 low-noise filter option may be used if lower noise performance is required.
- Maximum output current transient resulting from normal operational situations (e.g., power on-off), as well as accidental situations (e.g., power line plug removal). For more information request ILX "Transient Test Standards" #LDC-00196.
- Maximum output current transient resulting from a 1000V power line transient spike. Tested to ILX Lightwave Technical Standard #LDC-00196.
- Maximum monitor photodiode current drift over any 30-minute period. Constant-power mode stability specification assumes zero drift in detector responsivity.
- Output current rated into a 1 Ω load.
- Measured at 25°C.
- Software limits of range.
- Accuracy figures quoted for a 10k Ω thermistor. Accuracy figures are relative to calibration standard. Both resolution and accuracy are dependent on the user-defined configuration of the instrument.
- Over any one-hour period at 25°C. Short-term temperature stability is a strong function of the thermal environment of the thermistor and TE module. Room air currents in particular can easily cause fluctuations of 0.1°C in an exposed mounting configuration.
- Over any 24-hour period at 25°C.

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

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

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